Dutch Research School of Theoretical Physics

ANNUAL REPORT 2008

Landelijke Onderzoekschool voor Theoretische Natuurkunde

Dutch Research School of Theoretical Physics (DRSTP)
Landelijke Onderzoekschool voor Theoretische Natuurkunde (LOTN)

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Preface

The Dutch Research School of Theoretical Physics (DRSTP) is a cooperation between the theoretical physics groups of six Dutch universities: University of Amsterdam (UvA), Vrije Universiteit Amsterdam (VUA), University of Groningen (RUG), Leiden University (UL), Radboud University Nijmegen (RU) and Utrecht University (UU, commissioner). In addition, there are several associated groups and individual researchers. Its main objectives are to implement a joint programme of graduate education and to maintain and strengthen research in theoretical physics.

On 31 December 2008, 80 PhD students were affiliated to the DRSTP, as well as 49 tenured and 44 non-tenured staff (postdocs). The research output led to 15 PhD dissertations and 333 academic publications.

This annual report 2008 provides an overview of the educational and research activities during 2008. The report also presents two research highlights written by staff members of the Research School. In addition, it offers information, such as a list of the participating staff, of the PhD students, a comprehensive list of publications, as well as other relevant statistics.

The annual report is not the only information that we make available throughout the year. We also publish a monthly newsletter and a yearly guide of our educational activities. Up-to-date information on the DRSTP is also readily available on internet at: `http://www1.phys.uu.nl/drstp/`.
Finally, we should like to thank all of those who contributed to the Research School during this past year.

prof. dr. B. de Wit
Scientific director

prof. dr. K. Schoutens
Chair governing board

September 2009

Contents

1 The DRSTP in 2008

The Netherlands has a long tradition in theoretical physics which involves research performed at university institutes, industrial laboratories, and government institutions. The strength of this research area is, for a large part, based on the unity of methods employed in a wide range of applications. This manifests itself both in scientific research and in academic education.

To structure and coordinate the graduate education in theoretical physics, the Dutch Research School of Theoretical Physics (DRSTP) was accredited in 1994 by the Royal Netherlands Academy of Arts and Sciences (KNAW) and reaccredited in 1999 and 2004. The school is, at this moment, a cooperation between the theoretical physics groups of six Dutch universities: University of Amsterdam (UvA), Vrije Universiteit Amsterdam (VUA), University of Groningen (RUG), Leiden University (UL), Radboud University Nijmegen (RU) and Utrecht University (UU, commissioner). In addition, there are several associated groups and individual researchers.

The main objectives of the Dutch Research School of Theoretical Physics are to implement a joint programme of graduate education in theoretical physics and to maintain and strengthen research in theoretical physics from a broad unifying perspective that exploits the interrelationships between different fields of theory. The DRSTP is based on the conviction that a joint venture of all the moderately sized local theory groups, each with its own profile, offers added value for the achievement of these objectives. The current version of the mission statement and a short description of the DRSTP organization can be found in appendix A.

The DRSTP graduate programme in 2008
As part of the research training, under supervision of a member-scientist of a participating university, the Research School guarantees a wide range of educational opportunities for its PhD students. These consist of postgraduate schools, advanced courses, seminars and topical courses in the Netherlands, and international experience in the form of workshops, summer schools or extended research visits abroad. As in previous years the educational board published the educational guide with an overview of lecture courses in theoretical physics in the Netherlands. In 2008 fifteen students obtained their PhD. The average time between the start of the research and the date of the PhD exam is 50,0 months. PhD students are admitted on the basis of a so-called "agreement of education and guidance" (plan for training and supervision). The selection and admission procedure is described in appendix B.

The DRSTP research programme
Theoretical physics is based on universal principles. New concepts often have a much wider validity than for the field where they were initially discovered, and methods

of description developed in one field are often fruitful in another. Hence, theoretical physics is characterized by unity in diversity. The research programme of the DRSTP is organized according to two themes:

- Theme 1: Particle physics, cosmology, quantum gravity and string theory.
- Theme 2: Quantum matter, quantum information, soft condensed matter and biophysics.

To give an impression of the variety of research topics, two highlights are presented in chapter 2. The specific content of the research programme depends on the responsible project leaders, on their creativity as well as their success in acquiring research funding from their home university, from the Dutch research councils of NWO, or from international sources such as European Union programmes.
The 2008 research output of DRSTP members presented in this annual report is presented according to the above research themes.

DRSTP PhD Day 2008
On 25 April 2008 the DRSTP student council organized a so-called PhD Day. This day was aimed at exchanging ideas, inviting former PhD students to discuss career options, to present scientific talks and to discuss recent trends in theoretical physics. Also master students and post-docs were invited. More information can be found in appendix D. Based on its success it has been decided that in the future the PhD Day will be an annual event of the DRSTP, which is part of the educational program for the PhD students.

Shell Stipends Theoretical Physics 2008
In 2008 Shell awarded, for the first time, stipends to the best master students in theoretical physics in the Netherlands. With these stipends, Shell intends to draw attention to future career possibilities for graduates in international companies such as Shell. Nine master students in Theoretical Physics were awarded a Shell stipend. In the award ceremony held at Shell Epi Centre Rijswijk on October 16th, dr. Dirk Smit, Shell R&D Manager for Exploration & Novel Technology, handed over the cheques to the students who had obtained their MSc degree at one of the universities involved in the DRSTP. The following students received a stipend:
Ted van der Aalst (UU); Wouter Beugeling (UU); Pawel Caputa (UvA); Kiril Hristov (UU); Martijn Mink (UU); Jorn Mossel (UvA); Louk Rademaker (UL); Siebren Reker (RUG) and Jesper Romers (UvA). More information can be found in appendix F.

Enrico Conti (1974-2009)
Enrico Conti, a PhD student at the VUA with Fred MacKintosh and a DRSTP member since 2004, died suddenly on January 22 (2009).

Enrico was near completion of a thesis on the non-linear elastic properties of stiff polymer networks. He had recently predicted novel "negative normal stresses" in a thermal fiber network [1]. Some of his predictions seem to have been observed subsequently in experiments [2]. Sadly, Enrico did not live to see the fruits of his labor in print.

[1] E. Conti and F.C. MacKintosh, Phys. Rev. Lett. 102 (2009) 088102.
[2] H. Kang, Q. Wen, P.A. Janmey, J.X. Tang, E. Conti, F.C. MacKintosh, J. Phys. Chem. B 113 (2009) 3799.


Enrico Conti - 2009

Staff mutations in 2008
Dr. K. Allaart (VUA) retired per 1 May 2008.
Prof. dr. H. Blöte (UL) retired per 11 April 2008.
Prof. dr. J. Smit (UvA/UU) retired per 1 October 2008.
Prof. dr. H. van Beijeren (UU) retired per 1 December 2008.
Prof. dr. L.J. van den Horn (UvA) retired per 31 December 2008.
Prof. dr. W.A. van Leeuwen (UvA) retired per 12 January 2008.

Prof. dr. P.R. ten Wolde (VUA/AMOLF) was appointed part-time professor at the Vrije Universiteit Amsterdam on 1 August 2008.
The associate membership of prof. dr. ir. H. Dekker (TNO/UvA/TU/e) ended in 2008 because of retirement. Dr. M.V. Mostovoy (RUG) became an associate member in 2008.

Prof. dr. J.E.J.M. van Himbergen, the first scientific director of the DRSTP (1993-1997), resigned from the DRSTP in 2008 because of his full-time activities as Dean of International Affairs of Utrecht University.

Inaugural lecture
Prof. dr. A. Fasolino (RU) delivered her inaugural lecture *Een computer voor jezelf* at Radboud University Nijmegen on 29 October 2008.

Guest chairs
In 2008 staff members and PhD students profited from the presence of world renowned physicists appointed on the guests chairs.
Prof. dr. F.D.M. Haldane (Princeton University) occupied the Lorentz Chair at Leiden University.
Prof. dr. A.H. MacDonald (UT Austin) occupied the Kramers Chair at Utrecht University. More information about their activities can be found in section 3.1.3.

Awards and distinctions
E. Ardonne (UvA) was awarded an Andreas Bonn medal by the "Genootschap ter bevordering van de Natuur-, Genees- en Heelkunde" for the research presented in

his PhD thesis *A conformal field theory description of fractional quantum Hall states* (2002). Ardonne did his PhD work at the Institute for Theoretical Physics (UvA).
G. Stavenga (UU) was awarded the best student award at the Erice International School on Subnuclear Physics, Sicily, Italy, 29 August - 7 September 2008.
M. Taylor (UvA) was awarded the 2008 Minerva Prize from FOM (Foundation for Fundamental Research on Matter) for her work on the fuzzball proposal for black holes. She was also elected to The Young Academy of KNAW (the Royal Netherlands Academy of Arts and Sciences).
H. van Beijeren (UU) was awarded a Humboldt Research Award.
D.J. van der Hoek (RUG) received the Kamerlingh Onnes Prize 2007 on 29 May 2008 for his master thesis. His supervisor is Prof. dr. M. de Roo.
S.J.G. Vandoren (UU) was awarded the Descartes-Huygens prize 2008.
J. Zaanen (UL) was elected Fellow of the American Physical Society.

Visiting scientists (long term)
P. Calabrese (University of Pisa) was a guest at the Institute for Theoretical Physics (UvA) from 16 January - 6 February and from 16 April - 1 June.
E. Grosfeld (Weizmann Institute) was a guest at the Institute for Theoretical Physics (UvA) from 24 March - 27 April.
S. Panda (Harish-Chandra Research Institute, Allahabad, India) was a guest at the Centre for Theoretical Physics (RUG) from 1 September to 1 October.
R. Percacci (SISSA, Trieste) was a guest at the Institute for Theoretical Physics (UU) from 1 April - 1 July.

This annual report is organized as follows. Chapter 2 contains two scientific highlights. Chapter 3 gives a description of the educational programme, short summaries of the PhD theses published in 2008, an overview of the scientific and educational activities of the PhD students affiliated to the DRSTP. An overview of the DRSTP scientific staff and associate members is given in chapter 4. The chapters 5, 6, 7 contain, respectively, the 2008 publications, talks and other presentations and science-related activities (public lectures, professional publications). Data on research funding are listed in chapter 8.

2 | Scientific highlights

This chapter presents two highlights of theoretical research carried out by members of the Research School. One concerns work on top quark physics at the LHC. This work belongs to theme 1 of the school and the contribution has been written by Eric Laenen. A second highlight belongs to theme 2 and deals with ultra-cold atomic gases and new phases in condensed matter systems. This contribution has been written by Cristiane Morais Smith.

Top quarks at the LHC (Eric Laenen, University of Amsterdam/Utrecht University/NIKHEF)

The ephemeral top quark is among the strangest pieces of elementary matter ever made. It is bizarrely heavy, about 20,000 times more massive than its ubiquitous cousin, the up quark which is part of every proton and neutron. The top's heaviness alone has fascinating and potentially far-reaching implications for our understanding of elementary matter and force. Its large mass is thought be a direct consequence of electroweak symmetry breaking, so its behavior must be especially sensitive to this mechanism's details. It might even be its cause, as in some models beyond the Standard Model top quark couplings drive the symmetry breaking when evolving from high to low energies. Moreover, it is possible that thus far unknown symmetries exist with exotic, heavy particles as harbingers. Being about as heavy, the behavior of a top quark in high-energy collisions might well be measurably influenced by such particles, and thereby reveal their existence. The CDF and D0 experiments at Fermilab's Tevatron have discovered the top quark in 1995, have measured mass with great accuracy, as well as some other of its properties. Cern's Large Hadron Collider is a true top quark factory, and will produce millions of top quarks per year starting in 2009. Precise scrutiny of the top quark's interactions is therefore a key component of the research of the LHC experiments. Such an endeavour rests crucially on being able to distinguish the new from the known, which in turn requires the best possible description of the top quarks Standard Model behavior.

A particularly interesting top production mechanism proceeds through the weak interaction and is called single-top production. In the simplest form, in lowest order perturbation theory, the Feynman diagrams in Figure 2.1 describe the process. Although only a lowest order definition, the three channels have sufficiently unique characteristics that this nomenclature is maintained when radiative corrections are included.

For each channel, the rate is proportional to the Cabibbo-Kobayashi-Maskawa element V_{tb}. If only the known three fermion families exist, the latter must be 0.9998. If a heavy fourth family exists, it can be much smaller. A direct measurement of this

parameter, which is in fact only possible in single top production, is therefore very interesting. Moreover, the Standard Model weak interaction produces the top quark in a pure spin-state, and the top decays before mixing the other spin-state occurs. It actually imparts its spin information with 100% efficiency to the angular distribution of the final electron or muons in its decay chain. Many new-physics models produce top in a mixture of spin-states, so that also these angular corrections are an interesting discriminant.

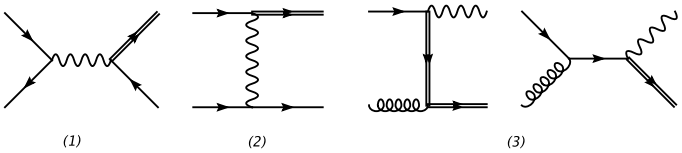

Figure 2.1: Leading order diagrams for single-t production in the (1) s-channel, (2) t-channel and (3) Wt-channel. The t-quark line is doubled.

To describe single top production most accurately, and flexibly, exact higher order radiative corrections must be included, and the result cast in a parton shower Monte Carlo framework. Until a few years ago, these two requirements were never merged in one description. The most severe among the obstacles were the problems of double counting of emissions between the parton shower and the next-to-leading order corrections, and the presence of negative probabilities due to virtual corrections. Such a combined framework was actually developed not long ago [1]. For the case of top quark pair production, Figure 2.2 shows that this approach indeed combines the best of both descriptions.

In references [1] and [2] we included the single-top process in this framework. For the s and t channel production models this involved extending the framework to allow for final state jets. These two channels are relevant for the Fermilab Tevatron. For the Wt channel, important for the LHC, we faced another fundamental obstruction: the quantum interference with the pair production process. Specifically, among the radiative corrections to the Wt channel is the production of a top pair with subsequent decay of the anti-top to a W^- and a b quark. Because the LHC pair production rate is about 20 times larger than the Wt rate, this is a serious problem indeed. In the literature a number of ad-hoc, theoretically idealistic solutions were proposed, but we had to solve this under the stringent requirements of a parton shower event generator. We solved this in two ways, the difference being in fact precisely the interference terms. In the first (diagram removal (DR)), we simply removed the diagrams from the amplitude. This drastic procedure required us to take a very critical look at gauge invariance. In the second (diagram subtraction (DS)) we constructed a counterterm that subtracts the resonant contributions point by point in the multidimensional phase space, and does not upset the delicate balance of cancelling infrared divergences. A very useful additional requirement we imposed to help separate Wt from pair production is to

demand that the *second* most energetic b-quark does not have too high a transverse momentum, since b-quarks from anti-top decay do tend to have such high momentum.

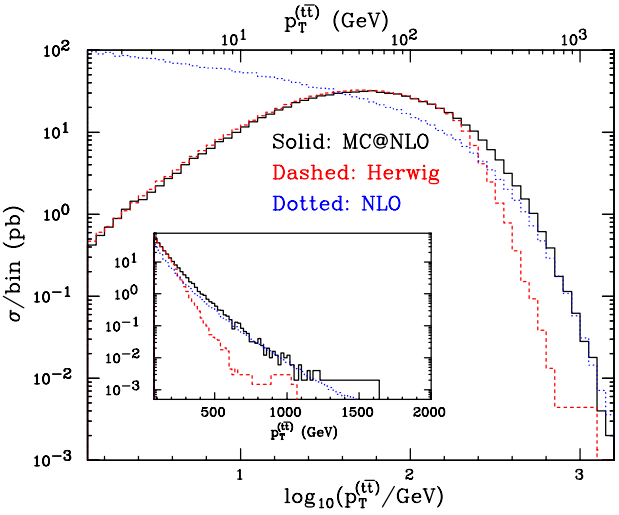

Figure 2.2: Transverse momentum distribution of top quark pair in combined MC@NLO approach, agreeing with parton shower (HERWIG) approach at small, and with fixed order (NLO) at large p_T.

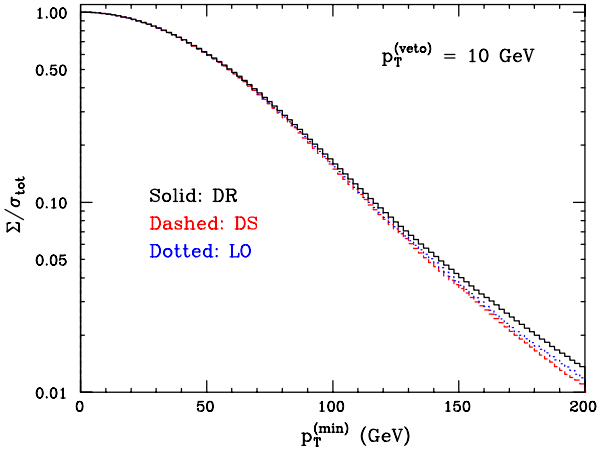

Figure 2.3: Cross section for Wt production, differential in p_T^{ll}.

In Figure 2.3 I show the result for one particular observable: the combined transverse momentum p_T^{ll} of the two leptons that result from top quark decay and W boson decay in Figure 2.3.

Clearly both methods agree quite well, with only a noticeable discrepancy at large p_T^{ll}, implying that we have been successfully able to suppress the dangerously large interference terms.

Even though we have thus demonstrated that, like the s and t single-top production channels, the Wt channel can be consistently described using the best tools for radiative corrections, a selection strategy to separate it from the large background is still required. Having developed such an accurate and flexible description, we are in a prime position to define such a strategy. This is the subject of current, promising research.

[**1**] S. Frixione and B.R. Webber, *Matching NLO QCD computations and parton shower simulations*, JHEP 0206 (2002) 029 [arXiv: hep-ph/0204244].

[**2**] S. Frixione, E. Laenen, P. Motylinski and B.R. Webber, *Single-top production in MC@NLO*, JHEP 0603 (2006) 092 [arXiv: hep-ph/0512250].

[**3**] S. Frixione, E. Laenen, P. Motylinski, B.R. Webber and C.D. White, *Single-top hadroproduction in association with a W boson*, JHEP 0807 (2008) 029 [arXiv: 0805.3067 [hep-ph].

Cold atoms as cond-mat emulators (Cristiane Morais Smith, Institute for Theoretical Physics, Utrecht University)

In the last decade, ultracold atomic gases in optical potentials have emerged as a synthetic laboratory to emulate condensed matter systems. The experimental observation of a cold atom analogue of a superfluid to Mott insulator transition in the Hubbard model, the BEC-BCS-crossover-type physics that would have been impossible to demonstrate in a conventional solid state system, and the Anderson localization phenomenon as triggered by a well-controlled disordered optical potential open up new perspectives into thinking about many-body physics. The high tunability and versatility of the system offers an advantage that is not present in ordinary condensed matter systems. Besides the exciting possibility to realize quantum computation, it is also hoped that the emulation of various lattice models with cold atoms may shed light on the complex behavior of high-T_c cuprate superconductors. Recently, Andreas Hemmerich (Hamburg University) and Cristiane Morais Smith (Utrecht University) proposed a set up to excite a superfluid state which carries the characteristic of a d-density wave [1]. The latter is one of the possible ground states suggested to arise in the pseudo-gap regime of the cuprates. While the experimental observation of the d-density wave phase has been hampered by the effects of disorder, the realization of such a state in a cold atom context offers a new opportunity to probe its properties in a clean environment.

Further studies by Lih-King Lim in the group of Morais Smith, together with Andreas Hemmerich, have shown that in the tight-binding regime, the proposed set-up can in fact be described by a two-dimensional square lattice model in the presence of a "staggered magnetic field" [2]. By applying a uniform rotation to a BEC, the effect of uniform magnetic fields could be simulated, and Abrikosov lattices with up to hundred vortices were observed, thus confirming the superfluid properties of the cold atomic gas. Due to the technical difficulty in engineering magnetic fields alternating on the spatial scale of condensed matter lattices, much less is known about particles moving in a 2D lattice subjected to a staggered magnetic field. By the use of a bichromatic light-shift potential in the ultracold atomic system, the tunneling dynamics with vortical currents alternating across neighbouring plaquettes can be captured quite naturally by a description in terms of an effective staggered magnetic field, as shown in Figure 2.4. Because the interaction strength and the staggered magnetic flux are experimentally tunable parameters, several interesting novel quantum phases may be realized in such a system.

When the lattice is loaded with bosons, a very rich phase diagram emerges in the framework of the generalized Bose-Hubbard model. For strong interactions, the ground state is a Mott insulator. For weak interactions, the bosons condense to form a BEC. Depending on the magnetic flux, different superfluid states are shown to emerge due to the inequivalent minima in the band structure. Besides the usual uniform superfluid for small flux, a staggered-vortex superfluid is stabilized when the externally applied flux is larger than half a magnetic flux quantum ($\phi > \phi_0/2$). The angular phases of the order parameter differ by $\pi/2$ between neighboring lattice points, and there is a quantized flux on each plaquette, with alternating sign for

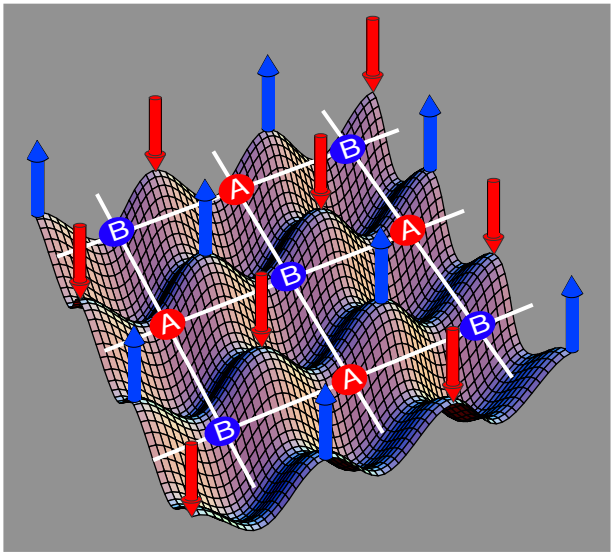

Figure 2.4: Effective staggered gauge field.

adjacent plaquettes. This phase is thus characterized by a vortex-antivortex lattice, commensurate with the optical lattice. By imaging momentum space using standard ballistic expansion techniques, one is able to distinguish the two superfluids, since they display distinct structures of Bragg maxima, directly observable in experiments.

On the other hand, by filling the system with fermionic atoms, different physics emerges due to the Pauli principle. By trapping single component fermions in the optical lattice, an ideal Fermi gas with an energy band structure comprising upper and lower bands touching at two inequivalent conical points is realized (see Figure 2.5). For the density of one particle per site, the lower band is filled and the low-energy description of the system is given by the dynamics around the two conical points. The resulting energy-momentum relation is linear, with the Fermi velocity depending on the direction of propagation. The low-energy quasiparticles are thus nothing but massless Dirac particles in two dimensions, albeit anisotropic ones. While the occurrence of Dirac particles in a condensed matter system is rare, there has been much interest recently when graphene has been fabricated in the laboratory. Due to its hexagonal lattice structure, graphene also carries excitations which are Dirac-like. This feature is responsible for many interesting phenomena, among which are the observation of the anomalous integer Hall effect at room temperature, or the realization of the Klein paradox, to name just a few. In the ultracold system that we consider here in a square optical lattice, the Dirac fermions emerge as a result of time-reversal symmetry breaking. Although the effective description of the two systems is formally the same, the two problems are actually very different in the details. By adding a gauge field to the hexagonal lattice of graphene, the Dirac points approach each other,

but they remain isotropic. In order to generate anisotropic cones, it is necessary to grow a graphene layer on top of a periodically patterned potential. Such a configuration has been recently claimed to be appropriate for developing high performance electronic devices. Here, we obtain the anistropic Dirac cones naturally, and their slope can be directly controled by the anisotropic gauge field.

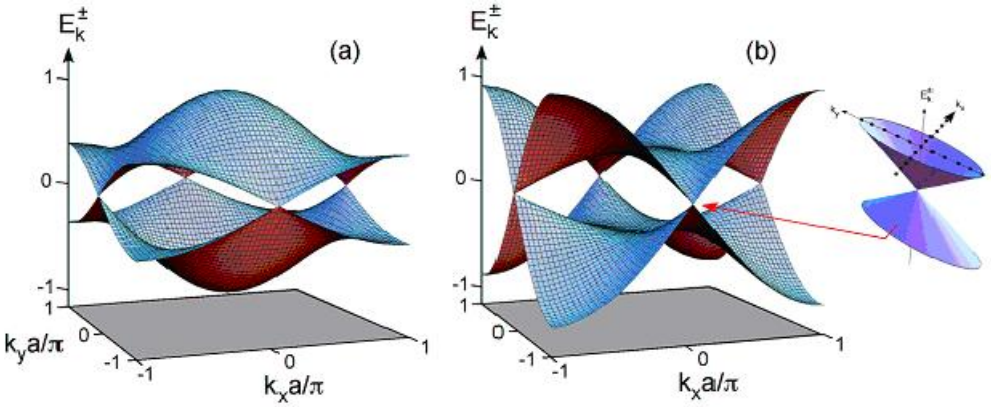

Figure 2.5: Single-particle spectrum. (a) flux per plaquette $\phi < \phi_0/2$; (b) flux per plaquette $\phi > \phi_0/2$.

We thus see that the addition of a staggered magnetic field to a 2D square optical lattice opens up a new avenue to investigate novel quantum phases and emulate different condensed matter systems, such as graphene and high-T_c superconductors. The gauge field transforms the hopping coefficients into complex and anisotropic parameters and brings new features into the well known and largely studied Hubbard model. Future investigations will involve mixtures of bosons and fermions, a case which could allow for the realization of *strongly interacting Dirac fermions* and hence, to promote the first step towards the after-graphene era [3].

[**1**] A. Hemmerich and C. Morais Smith, Phys. Rev. Lett. 99, 113002 (2007).

[**2**] L.-K. Lim, C. Morais Smith, and A. Hemmerich, Phys. Rev. Lett. 100, 130402 (2008).

[**3**] L.-K. Lim, A. Lazarides, A. Hemmerich, and C. Morais Smith, arXiv 0905.1281.

3 PhD programme

This chapter provides an overview of the educational programme and of the PhD degrees granted in 2008. Research projects of current PhD students and data on their scientific and educational activities in 2008 are given.

The DRSTP offers a joint programme of graduate education leading to a PhD. The educational programme is based in part on the regular advanced courses, seminars and topical courses offered at the participating universities. The DRSTP organizes at least two postgraduate schools every year. Furthermore, students can gain international experience by attending (international) workshops or summer schools and, in certain cases, by making extended research visits abroad. The governing board is advised on educational matters by the educational board. Regular advanced courses at the universities are published in a nationwide survey at the beginning of each academic year.

The governing board of the DRSTP decides on admission of individual PhD students and monitors their progress. The affiliation of students is based on the 'agreement of education and guidance' (plan for training and supervision), drawn between each individual student and his/her advisor(s). This document is submitted to the governing board before a decision is taken about the formal affiliation. An extended description of the selection and supervision procedure is presented in appendix B of this annual report.

On 31 December 2008 eighty PhD students were affiliated with the DRSTP. Fifteen PhD students obtained their PhD in 2008.

3.1 Educational programme

3.1.1 DRSTP postgraduate courses (AIO/OIO schools)

The following courses were held in 2008:

Theoretical High Energy Physics (THEP)
The DRSTP Postgraduate Course (AIO/OIO school) Theoretical High Energy Physics was held from 4 to 8 February 2008 in Hotel & Conference Center De Bergse Bossen, Driebergen. The programme was organized by D. Boer (VUA) and R. Loll (UU) and included the following lectures (8 hours each):

R. Harlander (Wuppertal): *Higgs physics at higher orders*
D. Litim (Sussex): *Functional renormalisation group and applications*
M. Taylor (UvA): *Black objects in string theory*

R. Timmermans (RUG): *Precision tests of the standard model*

In addition to these lecture courses, daily discussion/problem sessions were held in the afternoon (8 hours each week).
Evening seminars were given by H. Stoof (UU) entitled: *About ultracold Fermi gases and neutron stars*, and by A. Achúcarro (UL) entitled: *Cosmology with strings attached*. Other evening presentations of 15 minutes each were given by the PhD students.
Twenty-four students participated. Twenty-one of them were from the Netherlands and three from Belgium (KU Leuven). Further information is given in appendix C.

Statistical Physics and Theory of Condensed Matter (SPTCM)
The DRSTP Postgraduate Course (AIO/OIO school) Statistical Physics and Theory of Condensed Matter was held from 7-11 April 2008 in Hotel & Conference Center De Bergse Bossen, Driebergen. The programme was organized by J.-S. Caux (UvA), J. van den Brink (UL) and R. van Roij (UU) and included the following lectures (7 hours each, including the problem sessions):

W. Briels (Twente): *Dynamics in complex fluids*
M. Mostovoy (RUG): *Frustrated magnetism and magneto-electric effects*
B. Mulder (AMOLF): *Classical density functional theory and symmetry breaking transitions*
D. Santiago (UL): *Quantum criticality*

An evening seminar was given by J.P. van der Schaar (UvA) entitled: *Our prepostorous universe: facts and challenges*. Other evening presentations (15 minutes each) were given by the PhD students.
Twenty-two students participated. Twenty-one of them were from the Netherlands and one from Belgium (KU Leuven). Further information is given in appendix C.

3.2 DRSTP PhD Day

On April 25 the first PhD Day was held in Utrecht University, the Netherlands. This day was organized by the members of the PhD students council, aimed at exchanging ideas, inviting former PhD students to discuss career options, presenting scientific talks and discussing recent trends in theoretical physics. Also master students and post-docs were invited.
Fifty-seven people attended of which forty-five were PhD students of the DRSTP, seven were PhD students of other research schools, one was a master student from the Radboud University Nijmegen, three were staff members of the DRSTP and one participant was a former PhD student. The program included the following lectures (35 minutes each):

C. Broedersz (VUA): *Nonlinear squishiness of biological gels with flexible linkers*
L. Hollands (UvA): *Fermions on surfaces*
T. Janssen (UU): *Quantum field theory in the early universe*
Y. Malamos (RU): *OPP method: reduction to scalar integrals*

F. Pijlman (Philips) (ex-VUA): *From Wilson lines to validated consumer insights*
M. van der Vegte (RUG): *Incommensurate order induced by frustration in (spin-)Peierls systems*

Further information is given in appendix D.

3.3 Shell stipends in theoretical physics

In 2008 Shell awarded, for the first time, stipends to the best master students in theoretical physics in the Netherlands. Shell launched this new stipend scheme in close cooperation with the DRSTP to support young talented theoretical physicists in the Netherlands. With these stipends, Shell intends to draw attention to future career possibilities for graduates in international companies such as Shell. Nine master students in Theoretical Physics were awarded a Shell stipend. The following students received a stipend:
Ted van der Aalst (UU); Wouter Beugeling (UU); Pawel Caputa (UvA); Kiril Hristov (UU); Martijn Mink (UU); Jorn Mossel (UvA); Louk Rademaker (UL); Siebren Reker (RUG) and Jesper Romers (UvA). More information about the Shell Stipendia is given in appendix F.

3.3.1 Guest lecturers

Prof. dr. F.D.M. Haldane (Princeton University) occupied the Lorentz Chair at Leiden University from 1 May 2008 to 30 June 2008. He taught a lecture course entitled *Topical properties of quantum states of condensed matter: some recent surprises.*
Prof. dr. A.H. MacDonald (UT Austin) occupied the Kramers Chair at Utrecht University from 1 April 2008 to 1 May 2008. He taught a lecture course entitled *Quantum Hall bilayers and exciton condensation.*

3.4 PhD degrees and subsequent employment

In 2008 fifteen PhD students received their PhD degree. Eight of them accepted postdoctoral positions (in Canada, Italy, South Africa (2), Switzerland, USA (3)), six a position at a commercial company and one a position at a public research institution. More information on career moves of former PhD students during the last six years can be found in appendix G.

3.5 PhD degrees granted in the DRSTP in 2008

In this section a short summary of the PhD theses published in 2008 is given. The summaries are written by the students themselves.

Bardarson, J.H. (UL)
thesis title: *Effects of spin-orbit coupling on quantum transport*
advisor: prof. dr. C.W.J. Beenakker
date: 4 June 2008
present position: postdoctoral fellow, Cornell University, Ithaca, New York, USA

The effect of spin-orbit coupling on various quantum transport phenomena is considered. The main topics discussed are: how spin-orbit coupling can induce shot noise through trajectory splitting, how spin-orbit coupling can degrade electron-hole entanglement (created by a tunnel barrier) by mode mixing, Mesoscopic Spin Hall effect: longitudinal charge current leads to transverse spin currents in a chaotic electron cavity which has universal fluctuations around a zero mean, how smooth disorder increases the conductivity of a graphene sheet. In addition a detailed introduction is given to both the origin of spin-orbit coupling and the consequences of time reversal symmetry in quantum systems.

Becherer, P. (UL)
thesis title: *Nonlinear dynamics aspects of subcritical transitions and singular flows in viscoelastic fluids*
advisor: prof. dr. ir. W. van Saarloos
date: 29 October 2008
present position: research scientist, Mesodyn, Leiden, the Netherlands

Recently, there has been a renewed interest in theoretical aspects of flows of viscoelastic fluids (such as dilute polymer solutions). This thesis addresses two distinct issues related to such flows. Motivated by the possible occurrence of subcritical (finite-amplitude) instabilities in parallel flows - instabilities that cannot be captured by the usual linear stability analyses - I present and evaluate a method to describe these subcritical transitions by means of a direct expansion in the amplitude of the linearly least stable mode. A second issue is the behaviour of viscoelastic fluids in steady elongational flow. Here, singular solutions have recently been found for flows involving a stagnation point. These solutions appear to be the mathematical structures underlying the birefringent strands that have been observed experimentally in these flows. In this thesis, explicit approximate solutions are found for idealized extensional flow geometries and simple constitutive equations. Asymptotic results are derived for the width of the strand and other typical parameters. It appears that non-analytical solutions are a general feature of elongational viscoelastic flows, which should also occur for more realistic flows and models.

Chemissany, W. (RUG)
thesis title: *String effective actions, dualities and generating solutions*
advisor: prof. dr. M. de Roo
date: 5 September 2008
present position: postdoctoral fellow, University of Lethbridge, Alberta, Canada

This thesis covers in general two separate topics: the string effective actions and the

geodesic motion of brane solutions. The main theme of the first topic, i.e., the string effective actions, is the construction of the D-brane effective action. For the D-brane effective action, in the abelian case and in the limit of constant field strengths this action has been already known for a long time to all orders in α': it is the Born-Infeld action. In this thesis we propose a new method for constraining the four dimensional D-brane effective action and apply it to the abelian case with derivative corrections. The method is based on the electromagnetic duality invariance. We show that selfduality requirement only constrains the derivative corrections terms to the Born-Infeld theory but not determines them.
The second topic of the thesis is concerned with showing that Dp-branes and Sp-branes can be linked to lower dimensional theories whose solutions are respectively given by instantons or S(-1)-branes if we reduce over the worldvolume of the brane. In the lower dimensional action the gravity part decouples and can be solved independently, while the σ-model sector, obtained after a worldvolume reduction, leads to a geodesic motion. Then we turn to construct the generating solution associated with the geodesic motion traced out by the scalar fields carrying the brane solutions. This applies both to instantons and S(-1)-branes. We introduce the generating geodesic solution as a solution with the minimal number of arbitrary integration constants so that the action of the isometry group G actually generates all other geodesics from the generating one. This way we find the most general fluxless Sp-brane of Einstein gravity with (deformed) worldvolume via the reduction over an Euclidean torus. In case we reduce over a Lorentzian torus, the target space becomes a pseudo-Riemannian G/H* with H* is a non-compact real form of H. Correspondingly, the geodesic solutions on G/H* are labeled by the sign of the affine velocity $||v||2$. We derive the generating solution for cosets GL(r+s)/SO(r,s), and give the Einstein vacuum solutions that can be obtained from uplifting an SL(n, r)/SO(n-1,1) stationary (-1)-brane solution.
The generating solutions that we consider in this thesis are all restricted to theories which are based on symmetric spaces G/H or G/H*, where G is the maximally non-compact real form (split form). The derivation of the generating solution can be extended to Euclidean theories in which G is a non-split isometry group (G is not a maximally non-compact real form), which typically occurs in non-maximally extended supergravities. In this thesis we give the results for the half- and quarter-maximal supergravity theories, e.g., $N = 4$, $D = 3$ symmetric Euclidean models.

Cheng, C.N. (UvA)
thesis title: *The spectra of supersymmetric states in string theory*
advisor: prof. dr. E.P. Verlinde
date: 3 July 2008
present position: postdoctoral fellow, Harvard University, Cambridge, USA

In this thesis we study the spectra of supersymmetric states in string theory compactifications with eight and sixteen supercharges, with special focus placed on the quantum states of black holes and the phenomenon of wall-crossing in these theories. A self-contained introduction to the relevant background material is included.

de Kok, M.O. (UL)
thesis title: *Broken symmetries in field theory*
advisors: prof. dr. P.J. van Baal and prof. dr. J.W. van Holten
date: 26 June 2008
present position: junior associate consultant, McKinsey & Company, Amsterdam, the Netherlands

In this thesis we discuss the role of symmetries in quantum field theory. Quantum field theory is the mathematical framework to describe the physics of elementary particles. A symmetry here means a transformation under which the model at hand is invariant. Three types of symmetry are distinguished: 1. Internal symmetries, 2. Space-time symmetries and 3. Supersymmetries. Supersymmetry is discussed in detail in the first chapter, where emphasis is put on attempts to formulate this symmetrie on a space-time lattice, with the ultimate goal to contribute to the study of computer simulations of this symmetry. Main conclusion here is that two types of mathematical framework to approach this issue are shown to be mathematically inconsistent. The quantum mechanical breaking due regularization and renormalization effects of conformal symmetries (which are a type of space-time symmetries) is discussed in chapters 2 and 3. In chapter 2 in the context of the Non-Linear Schroedinger model, in chapter 3 in the context of the Jackiw-Pi model. Main conclusion here is that the conformal symmetries of both models break quantum mechanically. However, in case of the Jackiw-Pi model these symmetries survive under a special condition which also allows vortex solutions.

Giovanetti, G. (UL)
thesis title: *Electronic structure of various carbon based, correlated and multiferroic materials from ab-initio investigations*
advisor: prof. dr. J. van den Brink and prof. dr. P. Kelly (UT)
date: 27 November 2008
present position: postdoctoral fellow, Università dell' Aquila, Italy

A large part of the thesis is devoted to the study of electronic properties of graphene in contact with two different sets of substrates: an insulating, hexagonal Boron Nitride, and metallic M(111) surfaces of Al, Co, Ni, Cu, Pd, Ag, Pt and Au.
Graphene has a very peculiar band structure: its conduction and valence bands have a single contact point, the canonical point, making graphene a zero band gap semiconductor. However, for graphene to be used in practical application it would be advantageous to induce a finite band gap in its electronic structure. The solution that we consider is to put graphene on a substrate of hexagonal boron nitride. Our density functional show that the two carbon lattices become inequivalent and the breaking of the sublattice symmetry results in the opening of a band gap.
For contacts the interface between metals and graphene is of great importance. Covering a wide range of metals with a systematic study based on first principle calculations we investigated adsorption of graphene on (111) surfaces of Al, Co, Ni, Cu, Pd, Ag, Pt and Au.
Other parts of the thesis are devoted to the study of electronic correlation effects with

the help of ab initio electrotronic structure calculations. The ramifications of elecron-electron interactions are investigated for multiferroic materials, such as $HoMn_2O_5$ and $La_{0.5}Ca_{0.5}MnO_3$, orbital ordered oxides such as $KCrF_3$ and alkali intercalated organic semiconductors such as copper-phthalocynanines (K_2CuPt) and pentacene (K_xPEN).

Hartong, J. (RUG)
thesis title: *Seven-branes and instantons in type IIB supergravity*
advisor: prof. dr. E.A. Bergshoeff
date: 22 September 2008
present position: postdoctoral fellow, University of Bern, Switzerland

F-theory provides a means to study the type IIB string theory in the non-perturbative regime where the complex coupling is of order unity. This should be contrasted with the perturbative regime where the string coupling is small. F-theory will be used in this thesis to argue for the existence of novel types of branes, called Q7-branes. The notion of a Q7-brane leads to the notion of Q-instantons that are related to Q7-branes by electro-magnetic duality. Understanding the world-volume theory of the Q7-branes and the role of the Q-instantons provides a means to study the IIB theory in, so far, poorly investigated corners of its moduli space where the string coupling is of order unity. By moduli space is meant the set of inequivalent values of the complex type IIB coupling constant.
From the set of one-half BPS objects that are present in type IIB supergravity almost all the branes have been given a microscopic interpretation in type IIB string theory. These are the branes that are referred as the (p',q') p-branes with p' and q' relatively prime integers. These are p-dimensional branes on which a (p',q') string is ending. The above-mentioned Q7-branes and Q-instantons are not of this type.
The properties of the Q7-branes such as their gauge group, monodromy and mass have a natural interpretation in terms of coincident F-theory 7-branes, i.e. coinciding (p',q') 7-branes with different values for p' and q'. If the relative positions of the F-theory 7-branes that make up a Q7-brane are kept fixed so that they remain coincident and only the fluctuations associated to the center of mass motion are considered then the Q7-brane behaves effectively as a single brane that couples to an 8-form. By electro-magnetic duality it can be argued that there should exist a Q-instanton, i.e. a Q(-1)-brane that couples magnetically to the same 8-form to which a Q7-brane couples electrically.
The path integral approach to the Q-instantons shows the existence of new vacua and a new superselection parameter. Further, it will be argued that the Q-instantons contribute to the R^4 terms of the string effective action near points in the moduli space where the string coupling is of order unity.

Manschot, J. (UvA)
thesis title: *Partition functions for supersymmetric black holes*
advisor: prof. dr. E.P. Verlinde
date: 18 December 2008
present position: postdoctoral fellow, High Energy Theory Group, Rutgers University, Department of Physics and Astronomy, Piscataway, New Jersey, USA

This thesis presents a number of results on partition functions for four-dimensional supersymmetric black holes. These partition functions are important tools to explain the entropy of black holes from a microscopic point of view. The black holes studied in this thesis are supersymmetric solutions of four-dimensional $N = 2$ supergravity carrying both electric and magnetic charges. If higher derivative contributions are included the entropy receives corrections that suggest that Z_{BH} is well approximated by the square of the topological string partition function $|Z_{top}|^2$. Here the electric charges are in a macrocanonical ensemble and the magnetic charges in a microcanonical ensemble.
Another motivation is the correspondence between a theory including gravity in Anti-de Sitter (AdS) space and a conformal field theory (CFT) on the boundary of the AdS-space. Part of the near-horizon geometry of the black holes in eleven dimensions is AdS_3, whose boundary is a two-dimensional torus. The correspondence suggests that the CFT_2 partition function equals the one of the theory in the bulk of AdS_3, and therefore admits an expansion natural for an AdS_3-(super)gravity partition function. Dijkgraaf *et al.* proposed that an SCFT partition function can be rewritten as a Poincaré series, where each term corresponds to a semi-classical saddle point geometry. Chapter 2 explains these notions rather heuristically.
Chapter 3 explains how the black holes arise as solutions of 11-dimensional M-theory reduced on a six-dimensional Calabi-Yau X times a circle S^1_M. The heavy objects, which source the black holes, are M5-branes. Their low energy degrees of freedom can be reduced to the T^2 formed by S^1_M and the Euclidean time circle S^1_t and combine to an $N = (4, 0)$ superconformal field theory. The relevant partition function for this SCFT transforms covariantly under modular transformations. Hence it is possible to use the Cardy formula, which leads the correct black hole entropy.
An important property of the partition function is the decomposition into theta functions and a vector-valued modular form. Chapter 4 is devoted to an analysis of these forms. The principal part of the Laurent expansion of the vector-valued modular form defines the "polar spectrum" of the SCFT. In terms of these the non-polar degeneracies can be determined with arbitrary accuracy, improving on the leading order estimate by the Cardy formula.
With the results of chapter 4, chapter 5 revisits the motivations of chapter 2. The regularized Poincaré series confirms the AdS_3/CFT_2 correspondence, since it is suggestive of a semi-classical sum over AdS_3-geometries. The Poincaré series heuristically describes a sum over all particle states in the black hole background which themselves do not collapse into a black hole.
This is also how the connection between black holes and topological strings can be understood. The degeneracies of charged BPS-particles (M2-branes) in the near-horizon geometry are enumerated by $|Z_{top}|^2$, which appears for every saddle point geometry in Z_{BH}. This elucidates the conjecture for strong coupling.

Ploegh, A.R. (RUG)
thesis title: *Particle dynamics of branes*
advisor: prof. dr. E.A. Bergshoeff
date: 26 May 2008

position: financial analist, SNS Bank, Utrecht, the Netherlands

The aim of this thesis is to develop a technique with which we can formulate brane solutions easier. Brane solutions play an important role in string theory since they represent the degrees of freedom of the non-perturbative string theory of which little is known.
We choose to let the dynamics of the branes depend on one coordinate r perpendicular to the worldvolume of the brane. As a first step to find brane solutions we reduce over the worldvolume of the brane or over all the directions perpendicular to the worldvolume, with the exception of r.
When we reduce over the worldvolume, the lower-dimensional solutions are S(-1)-branes or instantons. This depends on whether time is part of the worldvolume or is the transversal direction r. As it turns out, both solutions describe geodesic motion on the scalar manifold G/H of the lower-dimensional theory. We present the generating geodesic. With this we mean that if we act with the symmetry group G on this solution, we automatically find the most general solution possible. If we then proceed by undoing the steps of the reduction, we end up with a brane solution with the most general worldvolume.
On the other hand, we can also reduce the brane over the directions perpendicular to the worldvolume. These solutions are domain-walls or cosmologies (again this depends on whether time is part of the worldvolume or is the transversal direction r). We have analyzed under which circumstances both solutions satisfy first order equations. In case the solutions also satisfy scaling behaviour, they turn out to be geodesics on the scalar manifold again. We finish by considering how the domain-wall/cosmology correspondence can sometimes be embedded in a supergravity setting.

Salmi, P.E. (UL)
thesis title: *Oscillons*
advisor: prof. dr. A. Achúcarro
date: 23 September 2008
present position: postdoctoral fellow, Cosmology and Gravity Group, University of Cape Town, South Africa

Solitons are non-dissipative, nontrivial solutions of partial differential equations. In many cases their stability is well understood, e.g. there can be topological reasons that prevent a localised lump of energy to dissolve and become dissipative. However, there are very persistent, soliton-like objects even when there is no obvious conservation law that would guarantee stability and explain longevity. This thesis considers such solutions, called oscillons, that appear in variety of nonlinear scalar theories. In essence, they are persistent oscillations of the field around the (local) minimum of the potential. A numerical study of oscillons in two spatial dimensions is presented. Use of absorbing boundary conditions in the numerical grid enables the study of radiation losses over a long period of time and permits quantitative approach to the lifetime of oscillons. Furthermore, it is shown that oscillons are emitted by collapsing domains, which way they could come into being in nature, e.g. in the conditions met in the very early Universe.

Snyman, I. (UL)
thesis title: *Scattering problems involving electrons, photons, and Dirac fermions*
advisor: prof. dr. C.W.J. Beenakker and prof. dr. Y.V. Nazarov
date: 23 September 2008
present position: postdoctoral fellow, National Institute for Theoretical Physics, Stellenbosch University, Matieland, South Africa

The theoretical foundation for the work reported here is provided by Landauer's scattering theory of electron transport. The three main ingredients of a scattering problem are (1) a set of reservoirs that emit and absorb particles, (2) the particles themselves, that propagate as waves between the reservoirs and (3) a scatterer that obstructs free propagation. In this thesis two classes of problems are considered. The first class results when the physical quantities characterizing the reservoirs or the scatterer are not constant in time. The second class results when wave propagation is described by the Dirac equation rather than the Schroedinger equation, as is the case in a 2D form of carbon, called graphene.

Torres Valderrama, A. (UU)
thesis title: *Statistical thermodynamics of charge-stabilized colloids*
advisor: prof. dr. H. van Beijeren
co-advisor: dr. R.H.H.G. van Roij
date: 9 June 2008
present position: postdoctoral fellow, University Medical Center (UMC), Utrecht, the Netherlands

This thesis is a theoretical study of equilibrium statistical thermodynamic properties of colloidal systems in which electrostatic interactions play a dominant role, namely, charge-stabilized colloidal suspensions. Such systems are fluids consisting of a mixture of a large number of mesoscopic particles and microscopic ions which interact via the Coulomb force, suspended in a molecular fluid. Quantum statistical mechanics is essential to fully understand the properties and stability of such systems. A less fundamental but for many purposes, sufficient description, is provided by classical statistical mechanics. In such approximation the system is considered as composed of a great number of charged classical particles with additional hard-core repulsions. The kinetic energy or momentum integrals become independent Gaussians, and hence their contribution to the free energy can be trivially evaluated. The contribution of the potential energy to the free energy on the other hand, depends upon the configuration of all the particles and becomes highly non-trivial due to the long-range character of the Coulomb force and the extremely different length scales involved in the problem. Using the microscopic model described above, we focus on the calculation of equilibrium thermodynamic properties (response functions), correlations (structure factors), and mechanical properties (forces and stresses), which can be measured in experiments and computed by Monte Carlo simulations. This thesis is divided into three parts. In part I, comprising chapters 2 and 3, we focus on finite-thickness effects in colloidal platelets and rigid planar membranes. In chapter 2 we study electrolyte-

mediated interactions between two of such colloidal objects. Several aspects of these interactions are considered including the nature (attractive or repulsive) of the force between the objects, the osmotic properties for different types of surfaces and image charge effects. In part II, which includes chapters 4 and 5, we consider colloidal mixtures. In chapter 4 we propose a generalization of the cell model which allows the calculation of osmotic properties of polydisperse systems. In chapter 5 we consider volume terms for colloidal mixtures. We calculate explicitly the effective interaction potential for a colloidal mixture that results after tracing out the ionic degrees of freedom. In part III, namely chapters 6 and 7, we study colloidal dispersions in external fields. In chapter 6 we focus on sedimentation of charge-stabilized colloids. We calculate sedimentation profiles by using a one-component model, which effectively treats the degrees of freedom associated with the ions, and compare the results with Monte Carlo simulations of the primitive model, which treats the ions explicitly. In chapter 7 we consider sedimentation of polydisperse systems. In particular we exploit the effective interaction potential calculated in chapter 5 to study the colloidal Brazil nut effect.

van der Meulen, M.P. (UvA)
thesis title: *Cold electroweak baryogenesis and quantum cosmological correlations*
advisor: prof. dr. J. Smit
date: 7 May 2008
present position: senior associate consultant, Bain and Company, Amsterdam, the Netherlands

This thesis describes two subjects from theoretical cosmology. The first concerns the creation of the matter–anti-matter asymmetry, which is generally assumed to be created in the early universe by a process called baryogenesis. The details of this process are yet unknown and there exist many models of baryogenesis in the literature. I study a specific model: "Cold Electroweak Baryogenesis". In particular I study the mechanism of the creation of particles in this model, and I estimate the size of the created asymmetry in this model. The result is that this specific model is unlikely to be able to produce a large enough asymmetry.
The second subject deals with cosmological density fluctuations, which are observed in the Cosmic Microwave Background (CMB) radiation. According to the widely accepted inflationary paradigm, these density fluctuations are caused by quantum fluctuations during an early period in which the universe has expanded in an accelerated way. This period is called inflation and its underlying physics is still largely unclear. There is a plethora of models for inflation that predict characteristics of the fluctuations ("Quantum Cosmological Correlations") that are in agreement with the current observations. However it is possible that more precise future observations will enable us to differentiate between different models of inflation. It is therefore important to calculate the characteristics of the fluctuations to high precision. In general these calculations are very complicated, and one often uses the simplifying assumption that the evolution of the fluctuations in a certain regime can be described by classical physics. In this thesis I check this assumption by applying a classical approximation to the calculation in quantum field theory. The result is that this assumption is valid,

although it is a little bit less good than was expected.

Vocks, H. (UU)
thesis title: *Simulation of polymer translocation*
advisor: prof. dr. G.T. Barkema
date: 9 July 2008
present position: researcher, Shell KSEPL, Rijswijk, the Netherlands

Transport of molecules across membranes is an essential mechanism for life processes. These molecules are often long, and the pores in the membranes are too narrow for the molecules to pass through as a single unit. In such circumstances, the molecules have to squeeze — i.e., translocate — themselves through the pores. DNA, RNA and proteins are such naturally occuring long molecules in a variety of biological processes. Understandably, the process of translocation has been an active topic of current research: not only because it is a cornerstone of many biological processes, but also due to its relevance for practical applications. Translocation is a complicated process in living organisms — the presence of chaperone molecules, pH, chemical potential gradients, and assisting molecular motors strongly influence its dynamics. Consequently, the translocation process has been empirically studied in great variety in biological literature. Study of translocation as a biophysical process is more recent. Herein, the polymer is simplified to a sequentially connected string of N monomers as it passes through a narrow pore on a membrane. The quantities of interest are the typical time scale for the polymer to leave a confining cell (the "escape of a polymer from a vesicle" time scale), and the typical time scale the polymer spends in the pore (the "dwell" time scale) as a function of N and other parameters like membrane thickness, membrane adsorption, electrochemical potential gradient, etc. Our research is focused on computer simulations of translocation. Since our main interest is in the scaling properties, we use a highly simplified description of the translocation process. The polymer is described as a self-avoiding walk on a lattice, and its dynamics consists of single-monomer jumps from one lattice site to another neighboring one. Since we have a very efficient program to simulate such polymer dynamics, which we describe in chapter 2, we can perform long simulations in which long polymers creep through tiny pores. In chapter 3 we study pore blockage times for a translocating polymer of length N, driven by a field E across the pore. In three dimensions we find that the typical time the pore remains blocked during a translocation event scales as $\sim N^{1.37}/E$. We show that the scaling behavior stems from the polymer dynamics at the immediate vicinity of the pore — in particular, the memory effects in the polymer chain tension imbalance across the pore. Chapter 4 studies the unbiased translocation of a polymer with length N, surrounded by equally long polymers, through a narrow pore in a membrane. We show that in dense polymeric systems a relaxation time exists that scales as $N^{2.65}$, much longer than the Rouse time $\sim N^2$. If the polymers are well entangled, we find that the mean dwell times scales as $N^{3.3}$, while for shorter, less entangled polymers, we measure dwell times scaling as $N^{2.7}$. In chapter 5 we study the translocation of an RNA molecule, pulled through a nanopore by an optical tweezer, as a method to determine its secondary structure. The resolution with which the elements of the secondary structure can be determined is limited by ther-

mal fluctuations, ruling out single-nucleotide resolution under normal experimental conditions.

Zaccheddu, M. (UL)
thesis title: *Ab initio study of the optical properties of green fluorescent protein*
advisor: prof. dr. C. Filippi
date: 24 April 2008
present position: research engineer, Computational Tribology, Utrecht, the Netherlands

In the present we focus on the optical properties of the Green Fluorescent Protein (GFP), which are modelled using the state-of-the-art computational tools available up-to-date: the Density Functional Theory (DFT) in the Hybrid QM/MM approach is employed to access the ground state configuration of the chromphore in the protein environment, while Time-Dependent DFT and quantum Monte Carlo (QMC) relate the geometry to the observed absorption spectra.

3.6 Other PhDs advised by DRSTP staff

Hermsen, R. (VUA)
thesis title: *Transcription regulation and genome organization*
advisor: prof. dr. P.R. ten Wolde
date: 28 October 2008
present position: postdoctoral fellow, University of California (UCSD), San Diego, California, USA

Noom, M.C. (VUA)
thesis title: *Mechanisms of DNA organization unraveled with novel single-molecule methods*
advisor: prof. dr. F.C. MacKintosh
date: 16 June 2008
present position: Accenture, Amsterdam, the Netherlands

van Albada, S.B. (VUA)
thesis title: *A Computational study of E. coli chemotaxis*
advisor: prof. dr. P.R. ten Wolde
date: 8 September 2008
present position: Music school, Norway

van Mameren - Schotvanger, J. (VUA)
thesis title: *Integrating single-molecule visualization and DNA micromanipulation*
advisor: prof. dr. F.C. MacKintosh
date: 26 June 2008
present position: application scientist, JPK Instruments AG, Berlin, Germany

3.7 DRSTP PhD students (31-12-2008)

This section gives an overview of the PhD students affiliated to the DRSTP on 31 December 2008. The projects are chronologically ordered according to starting date. The research themes mentioned refer to particle physics, cosmology, quantum gravity and string theory (theme 1) and quantum matter, quantum information, soft condensed matter and biophysics (theme 2).

University of Amsterdam (UvA)

- Kampmeijer, L. as of 1 November 2003 with F.A. Bais.
  project: monopoles with non-Abelian charges, hidden symmetry and confinement (theme 1). PhD exam: 27 February 2009.
- Galistu, G.M. as of 1 December 2003 with A.M.M. Pruisken.
  project: experimental determination of electronic structure of low-dimensional electron systems, with emphasis on quantum critical phenomena of a two-dimensional electron gas in the quantum Hall regime (theme 2).
- Arsiwalla, X.D. as of 1 November 2004 with E.P. Verlinde.
  project: development of non-perturbative methods in string-theory, in particular topological strings and black holes (theme 1).
- Hollands, L. as of 1 November 2004 with R.H. Dijkgraaf.
  project: the study of mathematical aspects of string theory, in particular topological strings (theme 1).
- Messamah, I. as of 6 December 2004 with J. de Boer.
  project: issues in quantum gravity using non-perturbative string theory, in particular the quantum physics of black holes, their formation and Hawking radiation, cosmological models and the nature of quantum space-time geometry (theme 1).
- Hoogeveen, J. as of 1 September 2005 with R.H. Dijkgraaf and K. Skenderis.
  project: string theory, in particular the Berkovits formulation of superstrings (theme 1).
- Kanitscheider, I.R.G. as of 1 September 2005 with J. de Boer and M. Taylor.
  project: quantum gravity, in particular holography (theme 1).
- El-Showk, S.N. as of 10 September 2005 with J. de Boer.
  project: quantum gravity wing perturbative and non-perturbative string theory (theme 1).
- Zozulya, O.S. as of 1 October 2005 with K. Schoutens.
  project: collective behavior vs. entanglement in atomic matter (theme 2).
- Mehmani, B. as of 1 December 2005 with B. Nienhuis and Th.M. Nieuwenhuizen.
  project: fundamental aspects of quantum physics (theme 2).

- Huijse, L. as of 1 June 2006 with K. Schoutens.
  project: study of superssymetric lattice models (theme 2).

- van Rees, B.C. as of 1 September 2006 with K. Skenderis.
  project: understanding black holes and wormholes in 2+1 dimensions as well as global issues in AdS/CFT (theme 1).

- Atmaja, A.N. as of 1 November 2006 with K.E. Schalm (J. de Boer, formal advisor).
  project: studies of string theory/gauge theory duality aiming to make contact with QCD (theme 1).

- Oberreuter, J.M. as of 15 September 2007 with E.P. Verlinde.
  project: cosmological vacua in string theory (theme 1).

- Smolic, J. as of 18 January 2008 with K. Skenderis (E.P. Verlinde, formal advisor).
  project: non-equilibrium dynamics and black hole formation (theme 1).

- Smolic, M. as of 18 January 2008 with M. Taylor (E.P. Verlinde, formal advisor).
  project: the fuzzball proposal for black hole physics (theme 1).

- Mossel, J.J. as of 1 September 2008 with J.-S. Caux (K. Schoutens, formal advisor).
  project: cracking the quantum quench (theme 2).

- Romers, J.C. as of 1 September 2008 with K. Schoutens and F. Bais.
  project: topological quantum registers (theme 2).

Vrije Universiteit Amsterdam (VUA)

- Conti, E. as of 1 October 2004 with F.C. MacKintosh.
  Deceased January 2009.

- Wessels, E. as of 1 December 2004 with P.J.G. Mulders and D. Boer.
  project: investigating observable consequences of the colour glass condensate (theme 1).

- Boomsma, J.K. as of 1 September 2006 with P.J.G. Mulders and D. Boer.
  project: phase transitions in QCD (theme 1).

- van Dijk, T. as of 1 April 2007 with T. Visser.
  project: singular optics and plasmonics (theme 2)

- Broedersz, C.P. as of 1 May 2007 with F.C. MacKintosh.
  project: theoretical development of models for cytoskeletal networks (theme 2).

- Mantz, C.L.M. as of 1 September 2008 with P.J.G. Mulders.
  project: to investigate the ways in which the color flow affects the hard process by using recently developed theoretical tools, applicable in a large variety of scattering processes (theme 1).

- den Dunnen, W. as of 15 December 2008 with D. Boer(P.J.G. Mulders, formal advisor).
  project: CP-violation at LHC from new gauge bosons (theme 1).

University of Groningen (RUG)

- Deuzeman, A. as of 1 January 2006 with E. Pallante (E.A. Bergshoeff, formal advisor).
  project: understanding non-perturbative aspects of strong and weak interactions (theme 1).
- Ruszel, W.M. as of 1 March 2006 with A.C.D. van Enter.
  project: non-Gibbsian aspects in lattice statistical mechanics (theme 2).
- Kadosh, A. as of 1 September 2006 with E. Pallante (M. de Roo, formal advisor).
  project: understanding and constraining extra-dimensional theories (brane worlds) derived as effective low-energy realizations of M-theory (theme 1).
- Nutma, T.A. as of 1 October 2006 with E.A. Bergshoeff.
  project: string theory and quantum gravity, in particular the extended symmetry algebras of supergravity theories and their relation with gauged supergravity will be investigated (theme 1).
- Reker, S.F. as of 1 February 2008 with E. Pallante (E.A. Bergshoeff, formal advisor).
  project: clarify properties of strong and weak interactions of baryonic matter from first principles, through a lattice formulation of the field theory for strong and weak forces (theme 1).
- Andringa, R. as of 1 September 2008 with E.A. Bergshoeff.
  project: properties of gravitational theories in three-dimensional space-time, in particular with regard to contributions of higher order in the curvature, and to black holes (theme 1).
- Dibitetto, G. as of 1 November 2008 with E.A. Bergshoeff.
  project: realistic compactifications of string M-theory that give rise to four-dimensional effective theories with moduli stabilisation (no massless scalar fields) and interesting cosmological aspects (inflation, late-time acceleration) (theme 1).

Leiden University (UL)

- Sousa, K.S. as of 1 September 2004 with A. Achúcarro.
  project: extended objects in cosmological models with supersymmetry (theme 1).
- Idema, T. as of 1 September 2005 with H. Schiessel and C. Storm.
  project: theoretical biophysics of membranes and proteins (theme 2).
- Emanuel, M.O. as of 1 December 2005 with H. Schiessel.
  project: theoretical biophysics of DNA and its complexation with proteins (theme 2).

- Beekman, A.J. as of 1 January 2006 with J. Zaanen.
  project: topological phases in quantum liquid crystals (theme 2).
- Habraken, S.J.M. as of 1 February 2006 with G. Nienhuis.
  project: quantum optics with complex light (theme 2).
- Ament, L.J.P. as of 1 September 2006 with J. van den Brink.
  project: theory of decoherence and defect formation in many-body quantum systems (theme 2).
- Mesaroš, A. as of 1 September 2006 with J. Zaanen.
  project: quantum liquid crystals and emerging Einsteinian gravity (theme 2).
- Sepkhanov, R.A. as of 1 September 2006 with C.W.J. Beenakker.
  project: investigation of transport properties in graphene, with a particular emphasis on the role of superconductivity (theme 2).
- Žeravčić, Z. as of 1 September 2006 with W. van Saarloos.
  project: the behavior of the granular media in the vicinity of the so-called 'jamming point' (theme 2).
- Huisman, E.M. as of 1 April 2007 with G.T. Barkema.
  project: networks of semi-flexible polymers (theme 2).
- She, J.-H. as of 1 May 2007 with J. Zaanen.
  project: fermionic quantum criticality and the constrained path integral (theme 2).
- Akhmerov, A.R. as of 1 July 2007 with C.W.J. Beenakker.
  project: investigation of the potential of spin and valley qubits in graphene for quantum computation (theme 2).
- Hardeman, S.R. as of 1 November 2007 with A. Achúcarro and K.E. Schalm.
  project: observational cosmology from strings, branes and quantum gravity (theme 1).
- Woldhuis, E.L. as of 4 June 2008 with M. van Hecke and W. van Saarloos.
  project: statistical properties and rheology of foams near the jamming point (theme 2).
- Lanzani, G. as of 1 July 2008 with H. Schiessel.
  project: theoretical study of the organization and dynamics of chromatin (theme 2).
- van der Aalst, T.A.F. as of 6 October 2008 with K.E. Schalm (A. Achúcarro, formal advisor).
  project: experimental signatures of string theory in cosmology or collider experiments (theme 1).

Radboud University Nijmegen (RU)

- van Kessel, M.T.M. as of 1 April 2004 with R.H.P. Kleiss.
  project: path integral aspects of spontaneous symmetry breaking (theme 1).
  PhD exam: 3 February 2009.

- Wagenaar, J.W. as of 1 December 2004 with R.H.P. Kleiss.
  project: Kaon-nucleon interactions (theme 1).

- van den Oord, G.J.W.M. as of 1 February 2007 with R.H.P. Kleiss and S.C.M. Bentvelsen.
  project: to probe the nature of the Higgs sector, comparing observed data with model-independent, Monte Carlo generated events (theme 1).

- Malamos, I.E. as of 1 January 2008 with R.H.P. Kleiss.
  project: tools and precision calculations for physics discoveries at colliders (theme 1).

- Niessen, A.I.M. as of 1 September 2008 with R.H.P. Kleiss.
  project: precise Higgs and supersymmetry predictions for the LHC (theme 1).

Utrecht University (UU)

- Stavenga, G.C. as of 1 May 2005 with E.L.M.P. Laenen and B. de Wit.
  project: perturbative and non-perturbative QCD in high-energy scattering (theme 1).

- Koetsier, A.O. as of 1 August 2005 with H.T.C. Stoof.
  project: thermodynamical and dynamical properties of degenerate gases (theme 2).

- Janssen, T.M. as of 1 September 2005 with T. Prokopec (G. 't Hooft, formal advisor).
  project: novel observational consequences from cosmic inflation and observational consequences of interacting quantum fields during inflation (theme 1).

- Kuipers, J. as of 1 September 2005 with H. van Beijeren and G.T. Barkema.
  project: comparison between classical nucleation theory (CNT) and computer simulation results of nucleation in lattice gases (theme 2).

- Zwanikken, J.W. as of 1 September 2005 with R.H.H.G. van Roij (H. van Beijeren, formal advisor).
  project: theoretical study of suspensions of colloidal molecules, such as dumbbells and (semi-) flexible chains, both in bulk and in external fields (electric, shear, gravity) (theme 2).

- Lim, L.-K. as of 15 January 2006 with C. Morais Smith.
  project: the application of theoretical methods to describe rotating Bose-Einstein Condensates in the quantum Hall limit (theme 2).

- Gubbels, K.B. as of 1 February 2006 with H.T.C. Stoof.
  project: ultra cold atomic gases (theme 2).

- Eggen, E.J. as of 1 March 2006 with R.H.H.G. van Roij (H. van Beijeren, formal advisor).
  project: theoretical study of suspensions of colloidal molecules such as dumbbells and (semi-) flexible chains, both in bulk and in external fields (electric, shear, substrates) (theme 2).

- Reska, P.M. as of 1 Augustus 2006 with R. Loll.
  project: the focus is on various aspects of non-perturbative quantum gravity and quantum cosmology, and in particular the question of the role of the conformal factor and big-bang scenarios (theme 1).

- Makogon, D. as of 15 August 2006 with C. Morais Smith.
  project: transport properties in one dimensional systems (theme 2).

- de Leeuw, M. as of 1 October 2006 with G. Arutyunov (B. de Wit, formal advisor).
  project: the development and application of new methods aimed to further understand the relationship between gauge and string theories (the AdS/CFT correspondence) (theme 1).

- Looyestijn, H.T. as of 1 October 2006 with S. Vandoren (B. de Wit, formal advisor).
  project: to study the perturbative and non-perturbative structure of type II superstrings compactified to four space-time dimensions, and its relation to heerotic string theory (theme 1).

- Machado, P.F. as of 1 July 2007 with R. Loll.
  project: various aspects of non-perturbative quantum gravity and quantum cosmology (theme 1).

- Katmadas, S. as of 1 September 2007 with B. de Wit.
  project: study of black holes in the context of string theory (theme 1).

- Koksma, J.F. as of 15 September 2007 with T. Prokopec (G. 't Hooft, formal advisor).
  project: study the nature of dark energy (theme 1).

- Diederix, J.M. as of 1 October 2007 with H.T.C. Stoof.
  project: research in the field of ultracold atomic gasses (theme 2).

- van Zalk, M. as of 1 October 2007 with B. de Wit.
  project: study of N=2 and 4 supergravities and their consequences for fluxcompactifications and black holes (theme 1).

- van de Meent, M. as of 1 November 2007 with G. 't Hooft.
  project: algebraical description of quantum effects of the Schwarzschild horizon and related aspects of quantum gravity (theme 1).

- Boon, N.J.H. as of 1 February 2008 with R.H.H.G. van Roij (H. van Beijeren, formal advisor).
  project: theoretically predicting and/or explaining properties of soft matter systems in bulk and in external fields (theme 2).

- Swaving, A.C. as of 1 February 2008 with R.A. Duine (H.T.C. Stoof, formal advisor).
  project: understanding of the interplay between ferro and antiferromagnetism, and electric current (theme 2).

- Budd, T.G. as of 1 March 2008 with R. Loll.
  project: the development and application of new methods aimed to further understand the relationship between gauge and string theories (the AdS/CFT correspondence) (theme 1).

- Höhn, P.A. as of 1 May 2008 with R. Loll.
  project: quantum gravity and quantum cosmology, and their nonperturbative aspects (theme 1).

- Lucassen, M.E. as of 1 June 2008 with R.A. Duine (H.T.C. Stoof, formal advisor).
  project: current-driven magnetization dynamics in ferro and antiferromagnets (theme 2).

- Beugeling, W. as of 1 September 2008 with C. Morais Smith.
  project: the study of multi-layer quantum Hall systems (theme 2).

- Hristov, K.P. as of 1 September 2008 with S. Vandoren (B. de Wit, formal advisor).
  project: string theory compactifications and implications for cosmology (theme 1).

- Mink, M.P. as of 1 September 2008 with R.A. Duine (H.T.C. Stoof, formal advisor).
  project: cold atoms, especially on the boundary between cold atoms and (un)conventional condensed-matter systems (theme 2).

- van Driel, H.J. as of 1 December 2008 with R.A. Duine (H.T.C. Stoof, formal advisor).
  project: theoretical investigation of pseudospin transport in electron-hole and graphene bilayers (theme 2).

3.8 Scientific and educational activities of PhD students (theme 1)

Andringa, R. (RUG)
– Solvay AIO School Brussel-Parijs-Amsterdam, September-December 2008 (attended).

Arsiwalla, X.D. (UvA)
- *Spectral flow invariance of 5D entropy functions*, Seminar University of Amsterdam, the Netherlands, 21 February 2008 (talk).
- Eurostrings 2008, Amsterdam, the Netherlands, 30 June-4 July 2008 (attended).
- Amsterdam Summer Workshop on String Theory, Amsterdam, the Netherlands, 7-11 July 2008 (attended).

Atmaja, A.N. (UvA)
- *Photon production in AdS/QCD*, DRSTP Postgraduate Course Theoretical High Energy Physics, Driebergen, the Netherlands, 28 January-8 February 2008 (talk).
- DRSTP PhD-Day, Utrecht University, the Netherlands, 25 April 2008 (attended).

Boomsma, J.K. (VUA)
- *Spontaneous CP-violation in the strong interaction at* $\theta = \pi$, DRSTP Postgraduate Course Theoretical High Energy Physics, Driebergen, the Netherlands, 28 January-8 February 2008 (talk).
- The 10th Astroparticle Physics Symposium, NIKHEF, Amsterdam, the Netherlands, 5 March 2008 (attended).
- National Seminar Theoretical High-Energy Physics, the Netherlands, 11 April 2008 (attended).
- DRSTP PhD-Day, Utrecht, the Netherlands, 25 April 2008 (attended).
- FOM Course The Art of Presenting Science, NIKHEF, Amsterdam, the Netherlands, 21 May-25 June 2008 (attended).
- *CP violation in the strong interaction at* $\theta = \pi$, Strong and ElectroWeak Matter, Amsterdam, the Netherlands, 26-29 August 2008 (poster).
- *CP violation in the strong interaction at* $\theta = \pi$, Confinement 2008, Mainz, Germany, 1-8 September 2008 (talk).

Budd, T.G. (UU)
- DRSTP PhD-Day, Utrecht University, the Netherlands, 25 April 2008 (attended).
- International School of Subnuclear Physics 2008, Erice, Italy, 29 August-7 September 2008 (attended).
- Workshop Microscopic Models of Quantum Spacetime, Utrecht, the Netherlands, 15-19 November 2008 (attended).

Chemissany, W. (RUG)
- RTN Winter School on Strings, Supergravity and Gauge Theories, CERN, Geneva, Switzerland, 21-25 January 2008 (attended).
- Politecnico di Torino, Italy, 31 March-3 April 2008 (work visit).
- Strings 2008 CERN, Geneva, Switzerland, 18-23 August 2008 (attended).
- ICTP Trieste, Italy, 12-29 September 2008 (work visit).
- *Generating brane solutions via sigma-models*, ICTP Trieste, Italy, September 2008 (talk).
- *Generating brane solutions via sigma-models*, Center for Advanced Mathematical Sciences (CAMS), AUB Beirut, Lebanon, September 2008 (talk).

de Kok, M.O. (UL)
- *Regularization and renormalization in non-relativistic field theories*, NIKHEF Theory Meeting, Amsterdam, the Netherlands, 23 May 2008 (talk).

de Leeuw, M. (UU)
- RTN Winter School 08, CERN, Switserland, 21-25 January 2008 (attended).

- *The Bethe Ansatz in AdS/CFT*, DRSTP Postgraduate Course Theoretical High Energy Physics, Driebergen, the Netherlands, 28 January-8 February 2008 (talk).
- DRSTP PhD-Day, Utrecht University, the Netherlands, 25 April 2008 (attended).
- Eurostrings 08, Amsterdam, the Netherlands, 30 June-4 July 2008 (attended).
- IGST 08, Utrecht, the Netherlands, 11-15 August 2008 (attended).
- *Bound state S-matrices, Yangian symmetry and the Bethe Ansatz*, 4th EU RTN Workshop, Varna, Bulgaria, 13 September 2008 (talk).

Deuzeman, A. (RUG)

- DRSTP Postgraduate Course Theoretical High Energy Physics, Driebergen, the Netherlands, 28 January-8 February 2008 (attended).
- *The physics of eight flavours*, 26th International Symposium on Lattice Field Theory (Lattice 2008), Williamsburg, Virginia, USA, 14-20 July 2008 (talk).

El-Showk, S.N. (UvA)

- Cargese Summer School: Theory and Particle Physics, Cargese, Corsica, France, June 2008 (attended).
- Eurostrings 2008, Amsterdam, the Netherlands, 30 June-4 July 2008 (attended).
- Amsterdam Summer Workshop on String Theory, Amsterdam, the Netherlands, 7-11 July 2008 (attended).
- CEA-Saclay Paris, France, October 2008 (work visit).
- *Quantizing N=2 multicenter solutions*, Seminar CEA-Saclay Paris, France, October 2008 (talk).
- Rutgers, State University of New Jersey, USA, November 2008 (work visit).
- University of Pennsylvania, USA, November 2008 (work visit).
- *Quantizing N=2 multicenter solutions*, Seminar Pennsylvania, USA, November 2008 (talk).
- *Quantizing N=2 multicenter solutions*, Seminar Stony Brook, New York, USA, November 2008 (talk).
- *Quantizing N=2 multicenter solutions*, Seminar Caltech, USA, November 2008 (talk).
- *Quantizing N=2 multicenter solutions*, Seminar University of Southern California, USA, November 2008 (talk).
- University of Southern California, USA, November 2008 (work visit).

Hardeman, S.R. (UL)

- *Stability of uplifted supergravity potentials*, DRSTP Postgraduate Course Theoretical High Energy Physics, Driebergen, the Netherlands, 28 January-8 February 2008 (talk).
- DRSTP PhD-Day, Utrecht University, the Netherlands, 25 April 2008 (attended).

Höhn, P.A. (UU)

- ENRAGE Spring School on Monte Carlo Simulations of Disordered Systems, Leipzig, Germany, 30 March-4 April 2008 (attended).
- DRSTP PhD-Day, Utrecht University, the Netherlands, 25 April 2008 (attended).
- ENRAGE Topical School on Growth and Shapes, Paris, France, 2-6 June 2008 (attended).
- International School of Subnuclear Physics, Erice, Italy, 29 August-7 September 2008 (attended).

Hollands, L. (UvA)
- CERN, Switzerland, 10-13 February 2008 (work visit).
- *Supersymmetric gauge theories, intersecting branes and free fermions*, TH String Theory Seminar, Cern, Switzerland, 12 February 2008 (talk).
- *Fermions on surfaces*, DRSTP PhD-Day, Utrecht University, the Netherlands, 25 April 2008 (talk).
- Eurostrings 2008, Amsterdam, the Netherlands, 30 June-4 July 2008 (attended).
- Amsterdam Summer Workshop on String Theory, Amsterdam, the Netherlands, 7-11 July 2008 (attended).
- Workshop Gauge Theory and Langlands Duality, Santa Barbara, USA, 21 July-8 August 2008 (attended).
- *Free fermions on a quantum curve*, DAMTP string theory seminar Cambridge University, UK, 27 November 2008 (talk).
- Cambridge and Oxford, UK, 26 November-2 December 2008 (work visit).
- *Free fermions on a quantum curve*, String Theory Seminar, Oxford, UK, 1 December 2008 (talk).

Hoogeveen, J. (UvA)
- RTN Winter School CERN, Geneva, Switzerland, 20-26 January 2008 (talk).
- *BRST quantization of pure spinor superstring*, Hamburg, Germany, 25 March 2008 (talk).
- DRSTP PhD-Day, Utrecht University, the Netherlands, 25 April 2008 (attended).
- Eurostrings 2008, Amsterdam, the Netherlands, 30 June-4 July 2008 (attended).
- Amsterdam Summer Workshop on String Theory, Amsterdam, the Netherlands, 7-11 July 2008 (attended).

Janssen, T.M. (UU)
- *Quantum field theory in the early universe*, DRSTP PhD-Day, Utrecht University, the Netherlands, 25 April 2008 (talk).

Kadosh, A. (RUG)
- *The quest for "Thick" FRW branes, a step towards a dynamical model of our universe*, DRSTP Postgraduate Course Theoretical High Energy Physics, Driebergen, the Netherlands, 28 January-8 February 2008 (talk).
- DRSTP PhD-Day, Utrecht University, the Netherlands, 25 April 2008 (attended).
- Parma School for Theoretical Physics, September 2008 (attended).
- 26th Winter School for Theoretical Physics: Particle Physics at the Age of LHC, Jerusalem, Israel, 29 December 2008-8 January 2009 (attended).

Kanitscheider, I.R.G. (UvA)
- School and Workshop String Theory and Experiment, Weizmann Institute and Institute for Advanced Studies, Rehovot and Jerusalem, Israel, 1-12 April 2008 (attended).
- Eurostrings 2008, Amsterdam, the Netherlands, 30 June-4 July 2008 (attended).
- Amsterdam Summer Workshop on String Theory, Amsterdam, the Netherlands, 7-11 July 2008 (attended).
- PhD School IAS PITP School in Princeton, New York, USA, 14-25 July 2008 (attended).

Katmadas, S. (UU)
- RTN Winter School on Strings, Supergravity and Gauge Theories, CERN, Geneva,

Switserland, 21-25 January 2008 (attended).
- DRSTP Postgraduate Course Theoretical High Energy Physics, Driebergen, the Netherlands, 28 January-8 February 2008 (attended).
- Workshop Gravitational Thermodynamics and the Quantum Nature of Space Time, Edinburgh, UK, 16 June-20 June 2008 (attended).
- Eurostrings, Amsterdam, the Netherlands, 30 June-4 July 2008 (attended).
- Integrability in Gauge and String Theory, Utrecht, the Netherlands, 11-15 August (attended).
- 4th EU RTN Workshop, Varna, Bulgaria, 11-17 September 2008 (attended).

Koksma, J.F. (UU)
- *The scalar field kernel in cosmological spaces*, DRSTP Postgraduate Course Theoretical High Energy Physics, Driebergen, the Netherlands, 28 January-8 February 2008 (talk).
- NWO Talentendag, Utrecht, the Netherlands, 18 March 2008 (attended).
- FOM Trainingsdag, Promotie in Eigen Regie, Utrecht, the Netherlands, 3-24 April 2008 (attended).
- DRSTP PhD-Day, Utrecht University, the Netherlands, 25 April 2008 (attended).
- Summer School in Cosmology, Triëste, Italy, 21 July-1 August 2008 (attended).
- Strong and ElectroWeak Matter, Amsterdam, the Netherlands, 26-29 August 2008 (attended).

Looyestijn, H.T. (UU)
- *On volume stabilization with NS5-branes*, DRSTP Postgraduate Course Theoretical High Energy Physics, Driebergen, the Netherlands, 28 January-8 February 2008 (talk).
- DRSTP PhD-Day, Utrecht University, the Netherlands, 25 April 2008 (attended).
- Integrability in Gauge and String Theory, Utrecht, the Netherlands, 11-15 August (attended).

Machado, P. (UU)
- *Functional RG equations and f(R) gravity*, DRSTP Postgraduate Course Theoretical High Energy Physics, Driebergen, the Netherlands, 28 January-8 February 2008 (talk).
- DRSTP PhD-Day, Utrecht University, the Netherlands, 25 April 2008 (attended).
- *Functional renormalization group equations and f(R) gravity*, Perimeter Institute for Theoretical Physics, Waterloo, Canada, 22 May 2008 (talk).
- Continuum and Lattice Approaches to Quantum Gravity, Workshop, University of Sussex, Brighton, UK, 17-19 September 2008 (attended).
- Perimeter Institute for Theoretical Physics, Waterloo, Canada, 30 October-7 November 2008 (work visit).

Malamos, I.E. (RU)
- *The O.P.P. method*, THEP Colloquium, Radboud University Nijmegen, the Netherlands, 24 January 2008 (talk).
- *OPP method: reduction to scalar integrals*, DRSTP PhD-Day, Utrecht University, the Netherlands, 25 April 2008 (talk).

Manschot, J. (UvA)
- Workshop on 3d Gravity, Montreal, Canada, 15-17 February 2008 (attended).
- *A modern farey tail*, Montreal, Canada, 16 February 2008 (talk).

– *Construction of partition functions for AdS3/CFT2*, Zurich, Switzerland, 9 April 2008 (talk).
– Eurostrings 2008, Amsterdam, the Netherlands, 30 June-4 July 2008 (attended).
– Gauge Theory and Langlands Duality KITP, Santa Barbara, USA, 21 July-8 August 2008 (attended).

Messamah, I. (UvA)
– *Black hole bound states and AdS spaces*, Utrecht, the Netherlands, 29 February 2008 (talk).
– Spring School on Superstring Theory and Related Topics, Trieste, Italy, 27 March-4 April 2008 (attended).
– Eurostrings 2008, Amsterdam, the Netherlands, 30 June-4 July 2008 (attended).
– Amsterdam Summer Workshop on String Theory, Amsterdam, the Netherlands, 7-11 July 2008 (attended).
– LPT-ENS, Ecole Normale Superieure, Paris, France, 21 November-24 December 2008 (work visit).

Nutma, T.A. (RUG)
– *Kac-Moody algebras & gauged supergravities*, DRSTP Postgraduate Course Theoretical High Energy Physics, Driebergen, the Netherlands, 28 January-8 February 2008 (talk).
– DRSTP PhD-Day, Utrecht University, the Netherlands, 25 April 2008 (attended).
– *Kac-Moody algebras & gauged supergravities*, Selected Problems of Modern Theoretical Physics, Bogoliubov Laboratory of Theoretical Physics, Dubna, Russia, 23-27 June 2008 (talk).
– *Matching E10 and gauged supergravity*, The 22nd Nordic Network Meeting on Strings, Fields and Branes, The AlbaNova University Center, Stockholm, Sweden, 27-29 November 2008 (talk).

Oberreuter, J.M. (UvA)
– *Entropy function for rotating black holes*, DRSTP Postgraduate Course Theoretical High Energy Physics, Driebergen, the Netherlands, 28 January-8 February 2008 (talk).
– DRSTP PhD-Day, Utrecht University, the Netherlands, 25 April 2008 (attended).
– Eurostrings 2008, Amsterdam, the Netherlands, 30 June-4 July 2008 (attended).
– Amsterdam Summer Workshop on String Theory, Amsterdam, the Netherlands, 7-11 July 2008 (attended).
– Integrability in Gauge and String Theory 2008, Utrecht, the Netherlands, 11-15 August 2008 (attended).

Ploegh, A.R. (RUG)
– Turin Polytechnic, April 2008 (work visit).

Reker, S.F. (RUG)
– Trento, Italy, 8-11 May 2008 (work visit).
– Berlin, Germany, 25-28 May 2008 (work visit).
– *Status of ETMC simulations with $N_f = 2 + 1 + 1$ twisted mass fermions*, Lattice 2008, Williamsburg, USA, 19-25 July 2008 (talk).
– PRACE Petascale Summer School, Stockholm, Sweden, 25-30 August 2008 (attended).
– III Parma International School of Theoretical Physics, Parma, Italy, 7-13 Septem-

ber 2008 (attended).
- Glasgow, UK, 28-30 September 2008 (work visit).
- De Sitter Lecture Series on Theoretical Physics, Groningen, the Netherlands, 2-8 October 2008 (attended).

Reska, P. (UU)
- *Embedding a Schwarzschild mass into cosmology*, DRSTP Postgraduate Course Theoretical High Energy Physics, Driebergen, the Netherlands, 28 January-8 February 2008 (talk).
- Enrage School "Monte Carlo Simulations", Leipzig, Germany, 31 March-4 April 2008 (attended).
- DRSTP PhD-Day, Utrecht University, the Netherlands, 25 April 2008 (attended).
- Enrage School "Random Geometry + Random Matrices", Oxford, UK, 15-19 September 2008 (attended).

Smolic, J. (UvA)
- Eurostrings 2008, Amsterdam, the Netherlands, 30 June-4 July 2008 (attended).
- Amsterdam Summer Workshop on String Theory, Amsterdam, the Netherlands, 7-11 July 2008 (attended).
- Amsterdam-Brussels-Paris Doctoral School on Quantum Field Theory, Strings and Gravity, Fall 2008 (attended).

Smolic, M. (UvA)
- Eurostrings 2008, Amsterdam, the Netherlands, 30 June-4 July 2008 (attended).
- Amsterdam Summer Workshop on String Theory, Amsterdam, the Netherlands, 7-11 July 2008 (attended).
- Amsterdam-Brussels-Paris Doctoral School on Quantum Field Theory, Strings and Gravity, Fall 2008 (attended).

Sousa, K.S. (UL)
- DRSTP PhD-Day, Utrecht University, the Netherlands, 25 April 2008 (attended).

Stavenga, G.C. (UU)
- DRSTP PhD-Day, Utrecht University, the Netherlands, 25 April 2008 (attended).
- Integrability in Gauge and String Theory, Utrecht, the Netherlands, 11-15 August (attended).
- Erice International School on Subnuclear Physics, Sicily, Italy, 29 August-7 September 2008 (attended and best student award).
- *Exponential scattering amplitudes*, NIKHEF Jamboree, Amsterdam, the Netherlands 15 December 2008 (talk).

van de Meent, M. (UU)
- *The S-matrix ansatz for black hole evolution*, DRSTP Postgraduate Course Theoretical High Energy Physics, Driebergen, the Netherlands, 28 January-8 February 2008 (talk).
- DRSTP PhD-Day, Utrecht University, the Netherlands, 25 April 2008 (attended).
- Gravitational Scattering, Black Holes and the Information Paradox, Workshop, Paris, France, 26-28 May 2008 (attended).
- Eurostrings 2008, Amsterdam, the Netherlands, 30 June-4 July 2008 (attended).

van der Meulen, M.P. (UvA)
- *Classical approximation to quantum cosmological correlations*, String Theory Group, Bielefeld, Germany, 15 April 2008 (talk).

van den Oord, G.J.W.M. (RU)
- *Vector bosons at the LHC*, DRSTP Postgraduate Course Theoretical High Energy Physics, Driebergen, the Netherlands, 28 January-8 February 2008 (talk).
- DRSTP PhD-Day, Utrecht University, the Netherlands, 25 April 2008 (attended).
- *Camorra: the CAravaglios-MORetti recursive algorithm tool*, THEP Colloquium, Radboud University Nijmegen, the Netherlands, 3 November 2008 (talk).

van Kessel, M.T.M. (RU)
- DRSTP PhD-Day, Utrecht University, the Netherlands, 25 April 2008 (attended).
- *The path integral approach to spontaneous symmetry breaking*, THEP Colloquium, Radboud University Nijmegen, the Netherlands, 12 June 2008 (talk).
- *The path integral approach to spontaneous symmetry breaking*, THEP Colloquium, Radboud University Nijmegen, the Netherlands, 18 September 2008 (talk).

van Rees, B.C. (UvA)
- *Real-time AdS/CFT*, DRSTP Postgraduate Course Theoretical High Energy Physics, Driebergen, the Netherlands, 28 January-8 February 2008 (talk).
- DRSTP PhD-Day, Utrecht University, the Netherlands, 25 April 2008 (attended).
- Summer School Institut d'Etudes Scientifiques de Cargese, Cargese, France, 16-28 June 2008 (attended).
- Eurostrings 2008, Amsterdam, the Netherlands, 30 June-4 July 2008 (attended).
- Amsterdam Summer Workshop on String Theory, Amsterdam, the Netherlands, 7-11 July 2008 (attended).

van Zalk, M. (UU)
- RTN Winter School on Strings, Supergravity and Gauge Theories, Cern, Switserland, 21-25 January 2008 (attended).
- *Lagrangians with electric and magnetic charges*, DRSTP Postgraduate Course Theoretical High Energy Physics, Driebergen, the Netherlands, 28 January-8 February 2008 (talk).
- DRSTP PhD-Day, Utrecht University, the Netherlands, 25 April 2008 (attended).
- Eurostrings 2008, Amsterdam, the Netherlands, 30 June-4 July 2008 (attended).
- Integrability in Gauge en String Theory, Utrecht, the Netherlands, 11-15 August 2008 (attended).
- EU RTN Workshop Constituents, Fundamental Forces and Symmetries of the Universe, FU-4, Varna, Bulgaria, 11-17 September 2008 (attended).

Wagenaar, J.W. (RU)
- *Dirac's constraint analysis and quantization procedure*, THEP Colloquium, Radboud University Nijmegen, the Netherlands, 19 March 2008 (talk).
- *Pion-nucleon scattering in Kadyshevsky formalism*, THEP Colloquium, Radboud University Nijmegen, 4 September 2008 (talk).
- *Pion-nucleon scattering in Kadyshevsky Formalism*, FGIP Program, Tokyo Institute of Technology, Japan, 9 November 2008 (talk).

Wessels, E. (VUA)
- DRSTP PhD-Day, Utrecht University, the Netherlands, 25 April 2008 (attended).
- *Geometric scaling at RHIC and LHC*, Conference QCD08, Montpellier, France, 7-12 July 2008 (talk).
- *Geometric scaling at RHIC and LHC*, NNV Fall Meeting, Lunteren, the Netherlands, 7 November 2008 (talk).

– *Geometric scaling at RHIC and LHC*, Amsterdam, the Netherlands, NIKHEF Theory Meeting, 14 November 2008 (talk).

3.9 Scientific and educational activities of PhD students (theme 2)

Akhmerov, A.R. (UL)
– *Theory of the valley-valve effect in graphene*, European Network Meeting on Fundamentals of Nanoelectronics, Bremen, Germany, 7-11 April 2008 (talk).
– *Theory of the valley-valve effect in graphene nanoribbons*, ICTP Graphene Week 2008, Trieste, Italy, 25-29 August 2008 (talk).

Ament, L.J.P. (UL)
– *Observing two-magnon dispersion in La2CuO4 by resonant inelastic light scattering*, Veldhoven, Physics@FOM, 21-23 January 2008 (poster).
– *L-edge magnetic RIXS on LCO*, DRSTP Postgraduate Course Statistical Physics and Theory of Condensed Matter, Driebergen, the Netherlands, 7-11 April 2008 (talk).
– DRSTP PhD-Day, Utrecht University, the Netherlands, 25 April 2008 (attended).
– *Observing two-magnon dispersion in La2CuO4 by resonant inelastic light scattering*, Casimir Spring School, Heeg, 19-21 May 2008 (poster).
– *Observing two-magnon dispersion in La2CuO4 by resonant inelastic light scattering*, Entanglement in Spin & Orbital Light Scattering, Krakau, Poland, 18-22 June 2008 (poster).
– *Creating and verifying a quantum superposition in a micro-op-to-mechanical system*, Frontiers of Quantum and Mesoscopic Thermodynamics, Prague, Czech, 28 July-2 August 2008 (poster).

Bardarson, J. (UL)
– *Smooth disorder and graphene*, DRSTP Postgraduate Course Statistical Physics and Theory of Condensed Matter, Driebergen, the Netherlands, 7-11 April 2008 (talk).

Becherer, P. (UL)
– *Singularities in visco-elastic flows*, Analysis Seminar, Leiden, the Netherlands, 6 October 2008 (talk).

Beekman, A.J. (UL)
– *Topological order and defect condensation*, Physics@FOM, Veldhoven, the Netherlands, 21-23 January 2008 (poster).
– DRSTP PhD-Day, Utrecht University, the Netherlands, 25 April 2008 (attended).

Beugeling, W. (UU)
– National Seminar Condensed Matter, Enschede, the Netherlands, 14 November 2008 (attended).

Boon, N.J.H. (UU)
– 19th Han-Sur-Lesse Winterschool, Han-Sur-Lesse, Belgium, 28 January-1 February 2008 (attended).
– *Spherical colloids, on the charge due to porosity*, DRSTP Postgraduate Course Statistical Physics and Theory of Condensed Matter, Driebergen, the Netherlands,

7-11 April 2008 (talk).
- DRSTP PhD-Day, Utrecht University, the Netherlands, 25 April 2008 (attended).
- *Charge reversal of silica colloids*, 7th Liquid Matter Conference, Lund, Sweden, 27 June-1 July 2008, (poster with, P. van Oostrum, A. van Blaaderen and R. van Roij).
- *Charge reversal of silica colloids*, Jülich Soft Matter Days 2008, Bonn, Germany, 11-14 November 2008 (poster with P. van Oostrum, A. van Blaaderen and R. van Roij).

Broedersz, C.P. (VUA)
- *Mechanics of cytoskeletal networks with highly flexible cross-linkers*, Frontiers in Microrheology, UCLA, Los Angeles, California, USA, February 2008 (poster).
- *Mechanics of cytoskeletal networks with highly flexible cross-linkers*, Annual Meeting of the Biophysical Society, Long Beach, California, USA, February 2008 (poster).
- Harvard University, Cambridge, Massachusetts, USA (4 months) 2008 (work visit).
- Harvard University, Cambridge, Massachusetts, USA (1 week) 2008 (work visit).
- *Mechanics of cytoskeletal networks with highly flexible cross-linkers*, 4th Dutch Soft Matter Meeting, Amsterdam, the Netherlands, April 2008 (talk).
- *Mechanics of cytoskeletal networks with highly flexible cross-linkers*, KNAW (Royal Dutch Academy of Science) Biophysics Meeting, Amsterdam, the Netherlands, April 2008 (talk).
- DRSTP PhD-Day, *Nonlinear squishiness of biological gels with flexible linkers*, Utrecht, the Netherlands, 25 April 2008 (talk).
- *Mechanics of cytoskeletal networks with highly flexible cross-linkers*, Workshop Models of Structural Biological Networks, From Discrete to Continuous, Coventry, UK, 15 May 2008 (talk).
- *Nonlinear elasticity of biopolymer networks with highly flexible cross-links*, Squishy Physics Seminar, Harvard University, Cambridge, Massachusetts, USA, 18 June 2008 (talk).
- *Nonlinear elasticity of composite networks of stiff biopolymers with flexible linkers*, The XVth International Congress on Rheology, Monterey, California, USA, August 2008 (talk).

Diederix, J.M. (UU)
- *Superconductivity inside neutron stars*, DRSTP Postgraduate Course Statistical Physics and Theory of Condensed Matter, Driebergen, the Netherlands, 7-11 April 2008 (talk).
- DRSTP PhD-Day, Utrecht University, the Netherlands, 25 April 2008 (attended).

Eggen, E.J. (UU)
- DRSTP PhD-Day, Utrecht University, the Netherlands, 25 April 2008 (attended).

Emanuel, M.O. (UL)
- DRSTP PhD-Day, Utrecht University, the Netherlands, 25 April 2008 (attended).

Gubbels, K.B. (UU)
- *P-wave Feshbach molecules*, Fritz Haber Institute, Berlin, Germany, 11 January 2008 (talk).
- *Theory for p-wave Feshbach molecules*, Physics at Veldhoven, Veldhoven, the Netherlands, 22-23 January 2008 (poster).

– *Renormalization group theory for the imbalanced Fermi gas*, Institute for Theoretical Physics, Leuven, Belgium, 30 January 2008 (talk).
– *Theory for p-wave Feshbach molecules*, Department Day, Utrecht, the Netherlands, 12 June 2008 (poster).
– Workshop Theory of Quantum Gases and Quantum Coherence, Grenoble, France, 3-6 June 2008 (attended).
– *Theory for p-wave Feshbach molecules*, Department Day, Utrecht, the Netherlands, 12 June 2008 (poster).
– *Ultracold quantum gases*, Institute for Theoretical Physics, Utrecht, the Netherlands, 12 December 2008 (talk).
– *Strongly-interacting Fermi mixtures with a population imbalance*, Institute for Theoretical Physics, Heidelberg, Germany, 16 December 2008 (talk).

Habraken, S.J.M. (UL)
– DRSTP PhD-Day, Utrecht University, the Netherlands, 25 April 2008 (attended).

Huijse, L. (UvA)
– Masterclass C. Marcus at Physics@FOM, Veldhoven, the Netherlands, 21 January 2008 (attended).
– *Superfrustration, tilings and quantum criticality*, Physics@FOM, Veldhoven, the Netherlands, 22-23 January 2008 (poster).
– Cursus Teaching and Learning in Higher Education, Amsterdam, the Netherlands, January and February 2008 (attended).
– Mini-Course J. Moore/D. Haldane, Leiden, the Netherlands, May and June 2008 (attended).
– *Supersymmetric lattice models*, Summerschool Les Houches, France, July 2008 (talk).
– Exact Results in Low-Dimensional Quantum System: 2nd INSTANS Summer Conference, The Galileo Galilei Institute for Theoretical Physics, Florence, Italy, 8-12 September 2008 (attended).
– 24th Solvay Conference on Physics - Quantum Theory of Condensed Matter, Solvay Insitute, Brussels, Belgium, 11-13 October 2008 (attended).
– *What can cohomology tell us about a many-particle quantum system?*, DIAMANT Meets GQT Workshop, Leiden, the Netherlands, 27-31 October 2008 (talk).

Huisman, E.M. (UL)
– *Modeling three-dimensional networks of semi-flexible polymers*, DRSTP Postgraduate Course Statistical Physics and Theory of Condensed Matter, Driebergen, the Netherlands, 7-11 April 2008 (talk).

Kuipers, J. (UU)
– DRSTP PhD-Day, Utrecht University, the Netherlands, 25 April 2008 (attended).

Lim, L.K. (UU)
– *Staggered-vortex superfluid of ultracold bosons in an optical lattice*, Physics at Veldhoven, Veldhoven, the Netherlands, 22-23 January 2008 (poster).
– *Staggered-vortex superfluid of ultracold bosons in an optical lattice*, BEC Meeting, Utrecht University, the Netherlands, January 2008 (talk).
– DRSTP PhD-Day, Utrecht University, the Netherlands, 25 April 2008 (attended).
– *Staggered-vortex superfluid of ultracold bosons in an optical lattice*, Workshop The-

ory of Quantum Gases and Quantum Coherence, Grenoble, France, 3-7 June 2008 (poster).
- *Cold atoms in 2D optical lattices under staggered rotation*, Workshop on Critical Fluctuations in Spin and Charge Systems, Cambridge, UK, 13 November 2008 (talk).
- National Condensed Matter Seminar, Enschede, the Netherlands, 14 November 2008 (attended).

Makogon, D. (UU)
- *Coupled quantum wires*, Physics at Veldhoven, Veldhoven, the Netherlands, 22-23 January 2008 (poster).
- *Coupled quantum wires*, DRSTP Postgraduate Course Statistical Physics and Theory of Condensed Matter, Driebergen, the Netherlands, 7-11 April 2008 (talk).
- DRSTP PhD-Day, Utrecht University, the Netherlands, 25 April 2008 (attended).
- Summerschool Les Houches Ecole de Physique, Les Houches, France, July 2008 (attended).
- National Condensed Matter Seminar, Enschede, the Netherlands, 14 November 2008 (attended).

Mehmani, B. (UvA)
- DRSTP PhD-Day, Utrecht University, the Netherlands, 25 April 2008 (attended).
- *Systems under the influence of a varying environment*, Open Quantum Systems Workshop, Nancy, France, 9-11 July 2008 (talk).
- *Work as tracer of the force that generates the geometric phase*, Prague, Czech, 28 July-2 August 2008 (talk).
- *Non-Adiabatic cyclic evolution of a quantum system*, Leeds, UK, 12 November 2008 (talk).
- Quantum Information Group, University of Leeds, UK, November 2008 (work visit).

Mesaroš, A. (UL)
- *Dislocations in graphene*, Veldhoven, Physics@FOM, 21-23 January 2008 (poster).
- DRSTP Postgraduate Course Statistical Physics and Theory of Condensed Matter, Driebergen, the Netherlands, 7-11 April 2008 (attended).

Mink, M.P. (UU)
- *Vortex-lattice pinning in single- and two-component BECs*, 2008 INFM School on Physics in Low Dimensions, October 11-18 2008, Lucca, Italy (poster).

Mossel, J.J. (UvA)
- *Representation theory and statistical mechanics*, Summer School for PhD and Postdocs, Wuppertal, Germany, 15-19 September 2008 (attended).

Ruszel, W.M. (RUG)
- Metastability Workshop, Eurandom, Eindhoven, the Netherlands, 9-11 January 2008 (attended).
- FOM/f Symposium and FOM Meeting, Veldhoven, the Netherlands, 21-23 January 2008 (attended).
- *What it takes to be Gibbsian for planar rotors*, Dynamical Systems Seminar, University of Groningen, the Netherlands, 28 January 2008 (talk).
- Equilibrium Statistical Mechanics, Marseille, France, 25-29 February 2008 (attended).

– YEP - Statistical Mechanics on Random Structures, Eurandom, Eindhoven, the Netherlands, 10-14 March 2008 (attended).
– *What it takes to be Gibbsian for planar rotors*, Kansrekening en Statistiek Seminar, TU Delft, the Netherlands, 28 May 2008 (talk).
– *Loss of temperature for XY models*, Forschungsseminar, Universität Potsdam, Germany, 4 July 2008 (talk).
– Random Media, Phase Transition and Information Theory, Fall School IHP Paris, France, 8-20 September 2008 (attended).
– Statistical Mechanics, IHP Paris, France, 8-10 December 2008 (attended).

Sepkhanov, R.A. (UL)
– DRSTP Postgraduate Course Statistical Physics and Theory of Condensed Matter, Driebergen, the Netherlands, 7-11 April 2008 (attended).
– *Extremal transmission at the Dirac point of a photonic band structure*, Graphene Week 2008, Trieste, Italy, 25-29 August 2008 (poster).

She, J.-H. (UL)
– *Higgs effect in the worldline formalism*, DRSTP Postgraduate Course Statistical Physics and Theory of Condensed Matter, Driebergen, the Netherlands, 7-11 April 2008 (talk).
– DRSTP PhD-Day, Utrecht University, the Netherlands, 25 April 2008 (attended).
– *Fermionic quantum criticality*, Critical Fluctuations in Spin and Charge Systems, Cambridge, UK, November 2008 (talk).

Swaving, A.C. (UU)
– DRSTP Postgraduate Course Statistical Physics and Theory of Condensed Matter, Driebergen, the Netherlands, 7-11 April 2008 (attended).
– DRSTP PhD-Day, Utrecht University, the Netherlands, 25 April 2008 (attended).

Torres Valderrama, A. (UU)
– DRSTP Postgraduate Course Statistical Physics and Theory of Condensed Matter, Driebergen, the Netherlands, 7-11 April 2008 (attended).

van Dijk, T. (VUA)
– DRSTP PhD-Day, Utrecht University, the Netherlands, 25 April 2008 (attended).

Woldhuis, E.L. (UL)
– *Investigating the viability of the spot model*, Complex Fluids and Biophysics Seminar, Leiden, the Netherlands, 7 April 2008 (talk).

Žeravčić, Z. (UL)
– *Granular matter*, JMBC Physics Course, Twente/Enschede, the Netherlands, 4-7 February 2008 (talk).
– *Crystalization and jamming in soft matter under driving*, Lorentz Center Workshop, Leiden, the Netherlands, 11-22 February 2008 (talk).
– *Localization behavior of vibrational nodes in granular packings*, DRSTP Postgraduate Course Statistical Physics and Theory of Condensed Matter, Driebergen, the Netherlands, 7-11 April 2008 (talk).
– *Granular and granular-fluid flow*, Gordon Research Center Conference, Colby College, Waterville, Maine, USA, 22-27 June 2008 (talk).
– *Dynamical heterogeneities in glasses, colloids and granular media*, Lorentz Center Workshop, Leiden, the Netherlands 25 August-5 September 2008 (talk).

Zozulya, O.S. (UvA)
- *Entanglement entropy in quantum Hall states*, Physics@FOM, Veldhoven, the Netherlands, 22-23 January 2008 (poster).
- DRSTP PhD-Day, Utrecht University, the Netherlands, 25 April 2008 (attended).
- *Entanglement entropy in quantum Hall states*, Workshop Quantum Phases and Excitations in Quantum Hall Systems, Dresden, Germany, 16-20 June 2008 (poster).
- Dresden, Germany, 27 July-6 August 2008 (work visit).
- Workshop Exact Results in Low-Dimensional Quantum Systems, Florence, Italy, 8-12 September 2008 (attended).
- Solvay Conference Quantum Theory of Condensed Matter, Brussels, Belgium, 11-13 October 2008 (attended).

Zwannikken, J.W. (UU)
- DRSTP PhD-Day, Utrecht University, the Netherlands, 25 April 2008 (attended).

4 Scientific staff (31-12-2008)

Below an overview is given of the permanent and temporary staff of the DRSTP on 31 December 2008. Also the associate groups and members are listed. PhD students are given in chapter 3 (sect. 5).
Theme 1 refers to particle physics, cosmology, quantum gravity and string theory and theme 2 to quantum matter, quantum information, soft condensed matter and biophysics. The fte commitment of the permanent staff is given in the last column.

4.1 Permanent staff

University of Amsterdam (UvA)	**theme**	**fte**
prof. dr. ir. F.A. Bais	1	0.50
dr. J.-S. Caux	2	0.50
prof. dr. J. de Boer	1	0.50
prof. dr. R.H. Dijkgraaf	1	0.50
prof. dr. J.H. Koch	1	0.10
prof. dr. E.L.M.P. Laenen	1	0.20
prof. dr. B. Nienhuis	2	0.50
dr. Th.M. Nieuwenhuizen	2	0.50
prof. dr. A.M.M. Pruisken	2	0.50
prof. dr. K. Schoutens	2	0.50
dr. K. Skenderis	1	0.50
prof. dr. E.P. Verlinde	1	0.50

Vrije Universiteit Amsterdam (VUA)	**theme**	**fte**
dr. B.L.G. Bakker	1	0.20
dr. D. Boer	1	0.25
prof. dr. B. Krauskopf	2	0.00
prof. dr. F.C. Mackintosh	2	0.50
prof. dr. P.J.G. Mulders	1	0.25
prof. dr. J.W. van Holten	1	0.00
prof. dr. T.D. Visser	2	0.20
prof. dr. P.R. ten Wolde	1	0.00

University of Groningen (RUG)	**theme**	**fte**
prof. dr. E.A. Bergshoeff	1	0.50
prof. dr. M. de Roo	1	0.50
prof. dr. E. Pallante	1	0.50
prof. dr. A.C.D. van Enter	2	0.50

Leiden University (UL)	**theme**	**fte**
prof. dr. A. Achúcarro	1	0.80
prof. dr. G.T. Barkema	2	0.00
prof. dr. C.W.J. Beenakker	2	0.40
dr. P.J.H. Denteneer	2	0.80
prof. dr. Y. Levin	1	0.20
prof. dr. G. Nienhuis	2	0.40
dr. K.E. Schalm	1	0.80
prof. dr. H. Schiessel	2	0.40
prof. dr. P.J. van Baal	1	0.20
prof. dr. J. van den Brink	2	0.40
prof. dr. ir. W. van Saarloos	2	0.40
prof. dr. J. Zaanen	2	0.80

Radboud University Nijmegen (RU)	**theme**	**fte**
dr. W.J.P. Beenakker	1	0.30
prof. dr. A. Fasolino	2	0.20
prof. dr. M.I. Katsnelson	2	0.40
prof. dr. R.H.P. Kleiss	1	0.30
prof. dr. A.N.J.J. Schellekens	1	0.10
prof. dr. J. van den Brink	2	0.00

Utrecht University (UU)	**theme**	**fte**
prof. dr. J. Ambjørn	1	0.18
dr. G. Arutyunov	1	0.60
prof. dr. G.T. Barkema	2	0.60
prof. dr. B. de Wit	1	0.60
dr. R.A. Duine	2	0.60
prof. dr. E.L.M.P. Laenen	1	0.10
prof. dr. R. Loll	1	0.60
prof. dr. C. Morais Smith	2	0.60
dr. T. Prokopec	1	0.60
prof. dr. ir. H.T.C. Stoof	2	0.60
prof. dr. G. 't Hooft	1	0.60
dr. R.H.H.G. van Roij	2	0.60
dr. S. Vandoren	1	0.60

4.2 Temporary staff

University of Amsterdam (UvA)	**theme**
dr. J.M.O. Baptista	1
dr. F.A.H. Dolan	1
dr. M. Kulaxizi	1
dr. P.L. McFadden	1
dr. K. Papadodimas	1
dr. T. Quella	1
dr. M. Shigemori	1
dr. M. Taylor	1
dr. J.P. van der Schaar	1

Vrije Universiteit Amsterdam (VUA)	**theme**
dr. F. Bazzocchi	1
dr. M. Das	2
dr. M. Depken	2
dr. C. Pisano	1
dr. T.C. Rogers	1

University of Groningen (RUG)	**theme**
dr. O. Hohm	1
dr. D. Roest	1

Leiden University (UL)	**theme**
prof. dr. C. Filippi	2
dr. S.E. Henkes	2
dr. M. Jackson	1
dr. J.-O. Gong	1
dr. S. Kumar	2
dr. J. Nilsson	2
dr. B.J. Overbosch	2
dr. G. Palma	1
dr. V.G. Rousseau	2
dr. D. Sadri	2
dr. D.I. Santiago	2
dr. B.P. Tighe	2

Radboud University Nijmegen (RU)	**theme**
dr. A.S. de Wijn	2

Utrecht University (UU)	**theme**
dr. M. Bier	2
dr. M. Cirafici	1
dr. S. de Haro	1

dr. B. Dittrich	1
dr. B.Z. Foster	1
dr. K. Goldstein	1
dr. U. Gursoy	1
dr. T.J. Konopka	1
dr. A. Lazarides	2
dr. R.L. Maitra	1
dr. S.P. Miao	1
dr. A. Paredes Galan	1
dr. K. Peeters	1
dr. I. Pushkina	1
dr. A. Torrielli	1

4.3 Associate members

	theme
prof. dr. H.A. de Raedt (RUG)	2
prof. dr. L.-F. Feiner (Philips)	2
dr. B.J. Hoenders (RUG)	2
dr. ir. L.P.J. Kamp (TU/e)	2
prof. dr. J. Knoester (RUG)	2
prof. dr. D. Lohse (UT)	2
dr. M.V. Mostovoy (RUG)	2
NIKHEF Theory Group (Amsterdam)	1
Theoretical and Polymer Physics Group (TU/e)	2
prof. dr. R.G.E. Timmermans (KVI)	1

4.4 Emeriti

	theme
dr. K. Allaart (VUA)	2
prof. dr. H.W.J. Blöte (UL)	2
prof. dr. H.W. Capel (UvA)	2
prof. dr. ir. H. Dekker (UvA)	2
prof. dr. M.H. Ernst (UU)	2
dr. T.A. Rijken (RU)	1
prof. dr. Th.W. Ruijgrok (UU)	1,2
prof. dr. J. Smit (UvA/UU)	1
dr. L.G. Suttorp (UvA)	2
prof. dr. H. van Beijeren (UU)	2
dr. L.J. van den Horn (UvA)	1
prof. dr. N.G. van Kampen (UU)	2
dr. W.A. van Leeuwen (UvA)	2

5 | Academic publications

This chapter presents an overview of publications in refereed journals published in 2008. The publications belonging to theme 1 and theme 2 are given separately. Within each theme the publications are ordered according to university. Occasionally publications may be listed twice, when several universities are involved. Publications by associate members are not included. Professional publications are listed in chapter 7.

5.1 Theme 1: Particle physics, cosmology, quantum gravity and string theory

University of Amsterdam

- Appollonio, G.D. and Quella, T., *The diagonal cosets of the Heisenberg group*, JHEP 05 (2008) 60.
- Arsiwalla, X.D., *More rings to rule them all: fragmentation, 4D/5D and split-spectral flows*, JHEP 02 (2008) 066.
- Balasubramanian, V., de Boer, J., El-Showk, S. and Messamah, I., *Black holes as effective geometries*, Class. Quant. Grav. 25 (2008).
- Balasubramanian, V., de Boer, J., Jejjala, V. and Simon, J., *Entropy of near-extremal black holes in AdS_5*, JHEP 05 (2008) 67.
- Balasubramanian, V., de Boer, J., El-Showk, S. and Messamah, I., *Resolving black hole microstates*, in Sharpe, E. and Greenspoon, A (Eds.), Advances in String Theory: The First Sowers Workshop in Theoretical Physics (2008).
- Britto, R.A.P., *Unitarity cuts for one-loop amplitudes*, Nucl. Phys. B - Proc. Suppl. 183 (2008).
- Britto, R.A.P., Feng, B. and Mastrolia, P., *Closed-form decomposition of one-loop massive amplitudes*, Phys. Rev. D 78 (2008) 025031.
- Britto, R.A.P. and Feng, B., *Integral coefficients for one-loop amplitudes*, JHEP 02 (2008) 095.
- Britto, R.A.P., Feng, B. and Yang, G., *Polynomial structures in one-loop amplitudes*, JHEP 09 (2008) 089.
- Cheng, C.N. and Verlinde, E.P., *Wall crossing, discrete attractor flow, and Borcherds algebra*, Symmetry, Integrability and Geometry: Methods and Applications (SIGMA) 4 (2008) 068.
- Creutzig, T., Quella, T. and Schomerus, V., *Branes in the $GL(1|1)$ WZNW-model*, Nucl. Phys. B 792 (2008).
- Creutzig, T., Quella, T. and Schomerus, V., *New boundary conditions for the c=-2 ghost system*, Phys. Rev. D 77 (2008) 2.

- de Boer, J., *Black hole bound states and their quantization*, Int. J. Mod. Phys. A 23 (2008) 2211-2219.
- de Boer, J., Denef, J.F., El-Showk, S., Messamah, I. and van den Bleeken, D., *Black hole bound states in $AdS_3 \times S^2$*, JHEP 11 (2008) 50.
- de Boer, J., de Medeiros, P., El-Showk, S. and Sinkovics, A., *G(2) Hitchin functionals at one loop*, Class. Quant. Grav. 25 (2008) 075006.
- de Boer, J., Medeiros, P. de, El-Showk, S. and Sinkovics, A., *Open G(2) strings*, JHEP 02 (2008) 12.
- de Boer, J., Naqvi, A.A. and Shomer, A., *The topological G(2) string*, Adv. Theor. and Math. Phys. 12 (2008) 243-318.
- Dijkgraaf, R.H. and Sulkowski, P., *Instantons on ALE spaces and orbifold partitions*, JHEP 03 (2008) 013.
- Dijkgraaf, R.H., Hollands, L., Sulkowski, P. and Vafa, C., *Supersymmetric gauge theories, intersecting branes and free fermions*, JHEP 02 (2008) 106.
- Dijkgraaf, R.H. and Sulkowski P., *Instantons on ALE spaces and orbifold partitions*, JHEP 03 (2008) 013.
- Frixione (et al.), S., Laenen, E.L.M.P., Motylinski, P., Webber, B.R. and White, C., *Single-top hadroproduction in association with a W boson*, JHEP 07 (2008) 029.
- Hollands, L., Marsano, J., Papadodimas, K. and Shigemori, M., *Nonsupersymmetric flux vacua and perturbed N=2 systems*, JHEP 10 (2008) 102.
- Kanitscheider, I.R.G., Skenderis, K. and Taylor, M., *Precision holography for non-conformal branes*, JHEP 09 (2008) 094.
- Kashani-Poor, A.K., *Phase space polarization and the topological string: a case study*, Phys. Lett. A 23 (2008) 3199-3214.
- Kulaxizi, M. and Parnachev, A., *Comments on fermi liquid from holography*, Phys. Rev. D 78 (2008) 086004.
- Laenen, E.L.M.P., Magnea, L. and Stavenga, G., *On next-to-eikonal corrections to threshold resummation for the Drell-Yan and DIS cross sections*, Phys. Lett. B 669 (2008) 173-179.
- Manschot, J., *On the space of elliptic genera*, JHEP 4 (2008) 1-31.
- Marsano, J., Papadodimas, K. and Shigemori, M., *Off-shell M5 brane, perturbed Seiberg-Witten theory, and metastable vacua*, Nucl. Phys. B 804 (2008) 19-69.
- Mitev, V., Quella, T. and Schomerus, V., *Principal chiral model on superspheres*, JHEP 11(2008) 86.
- Parikh, M.K. and van der Schaar, J.P., *Not one bit of de Sitter information*, JHEP 09 (2008) 041.
- Queiroz Faria de Oliveira Baptista, J.M., *Twisting gauged non-linear sigma-models*, JHEP 02 (2008) 96.
- Quella, T., Schomerus, V. and Creutzig, T., *Boundary spectra in superspace sigma-models*, JHEP 10 (2008) 24.
- Skenderis, K. and van Rees, B.C., *Real-time gauge/gravity duality*, Phys. Rev. Lett. 101 (2008) 081601.
- Skenderis, K. and Taylor, M., *The fuzzball proposal for black holes*, Phys. Rep. 467 (2008) 117.
- Taylor, M., *Matching of extremal correlators in AdS_3/CFT_2*, JHEP 06 (2008) 10.

Vrije Universiteit Amsterdam

- Armesto, N., (ed.) et al., *Heavy ion collisions at the LHC - last call for predictions*, J. Phys. G. 35 (2008) 054001 (hep-ph/0711.0974).
- Bacchetta, A., Boer, D., Diehl, M. and Mulders, P.J., *Matches and mismatches in the descriptions of semi-inclusive processes at low and high transverse momentum*, JHEP 08 (2008) 023 (hep-ph/0803.0227).
- Badalian, A.M. and Bakker, B.L.G., *Running mass m(s) at low scale from the heavy-light meson decay constants*, JETP Lett. 86 (2008) 634-636.
- Bakker, B.L.G., *Spectrum and decay constants of heavy-light mesons*, Few-Body Systems 44 (1-4)(2008) 91-93.
- Boer, D. and Boomsma, J.K., *Spontaneous CP-violation in the strong interaction at $\theta = \pi$*, Phys. Rev. D 78 (2008) 054027 (hep-ph/0806.1669).
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5.2 Theme 2: Quantum matter, quantum information, soft condensed matter and biophysics

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6 Scientific activities

This chapter contains an overview of conference talks, seminars, lecture courses and poster presentations of staff members and postdoctoral fellows. An overview of the presentations of PhD students is given in chapter 3 (sects. 6 and 7). A list of public lectures can be found in chapter 7 (sect. 3)

6.1 Theme 1: Particle physics, cosmology, quantum gravity and string theory

University of Amsterdam

- Bais, F.A., *Topological quantum computing*, Amsterdam, the Netherlands, 23 May 2008.
- Bais, F.A., *Topological order*, Santa FE, USA, 23 August 2008.
- Bais, F.A., *Topological quantum computation, a status report*, Gordon Conference on Quantum Information and Processing, Montana, USA, 2 September 2008.
- Britto, R.A.P., *Unitarity cuts for one-loop amplitudes*, Loops and Legs in Quantum Field Theory, Sondershausen, Germany, 21 April 2008.
- Britto, R.A.P., *Integral coefficients for one-loop amplitudes*, Loopfest VII, Buffalo, USA, 16 May 2008.
- Britto, R.A.P., *Spinor integration for one-loop amplitudes*, Wonders of Gauge Theory and Supergravity, Paris, France, 26 June 2008.
- Britto, R.A.P., *Analytic expressions for one-loop amplitudes*, Workshop on Gauge Theory and String Theory, Zurich, Switzerland, 2 July 2008.
- Britto, R.A.P., *The simplicity of scattering amplitudes*, 34th International Conference on High Energy Physics, Philadelphia, USA, 30 July 2008.
- de Boer, J., *Black hole microstates*, RTN Winter School on Strings, Supergravity and Gauge Theories Search, Geneva, Switzerland, 21-25 January 2008.
- de Boer, J., *Introduction to the AdS/CFT correspondence*, Workshop Integrability in the AdS/CFT Correspondence, Utrecht, the Netherlands, 29-31 January 2008.
- de Boer, J., *Black hole microstates*, Spring School on Superstring Theory and Related Topics, Trieste, Italy, 27 March 2008.
- de Boer, J., *Black hole boundstates in AdS3*, Conference: String Theory, From Theory to Experiment, Jerusalem, Israel, 6-11 April 2008.
- de Boer, J., *Black hole boundstates in AdS3*, Seminar DAMTP, Cambridge, UK, 23 April 2008.
- de Boer, J., *Quantization of gravitational solutions*, Conference Gravitational Ther-

modynamics and the Quantum Nature of Space Time, Edinburgh, UK, 16-20 June 2008.
- de Boer, J., *Black hole microstates*, Cargese Summer School Theory and Particle Physics: the LHC Perspective and Beyond, Cargese, France, 16-28 June 2008.
- de Boer, J., *Black hole quantization*, Workshop Emerging Directions in String Theory, Banff, Canada, 23-27 June 2008.
- de Boer, J., *Macroscopic quantum effects in supersymmetric black holes*, Black Holes: A Landscape of Theoretical Physics Problems, Geneva, Switzerland, 25 August-5 October 2008.
- de Boer, J., *Black hole Berry phase*, Black Holes: A Landscape of Theoretical Physics, Geneva, Switzerland, 1 October 2008.
- de Boer, J., *Black holes as effective geometries*, The 22nd Nordic Network Meeting on Strings, Fields and Branes, Stockholm, Sweden, 27-29 November 2008.
- de Boer, J., *Brownian motion in AdS/CFT*, London Triangle Seminar on String Theory, London, UK, 10 December 2008.
- Dijkgraaf, R.H., *D-modules and D-branes*, Colloquium Math Department, Utrecht, the Netherlands, 17 January 2008.
- Dijkgraaf, R.H., *D-branes and D-modules*, Harvard University, USA, 11 February 2008.
- Dijkgraaf, R.H., *Conformal field theory on quantum spectral curves*, Yukawa Institute, Kyoto, Japan, 19 March 2008.
- Dijkgraaf, R.H., *Quantum curves and random matrices*, Conference in honor of Yang & Simons, Stony Brook University, New York, USA, 28 March 2008.
- Dijkgraaf, R.H., *Quantum curves and random matrices*, UCSB Distinguished Lectures in the Mathematical Sciences University of California, Santa Barbara, USA, 31 March-4 April 2008.
- Dijkgraaf, R.H., *Gauge theory and quantum curves*, Crawford Symposium, Stockholm, Sweden, 24 April 2008.
- Dijkgraaf, R.H., *String theory*, Colloquium, Delft, the Netherlands, 29 April 2008.
- Dijkgraaf, R.H., *D-branes and integrable systems*, IHES 50th Anniversary Conference, Paris, France, 19 June 2008.
- Dijkgraaf, R.H., *D-modules and D-branes*, Geometric Langlands Workshop, KITP, Santa Barbara, USA, 6 August 2008.
- Dijkgraaf, R.H., *The unreasonable effectiveness of quantum physics in modern mathematics*, UCL, Leuven, Belgium, 28 October 2008.
- Dijkgraaf, R.H., *Particles, strings, branes*, UCL, Leuven, Belgium, 6 November 2008.
- Dijkgraaf, R.H., *Random matrices and quantum curves*, UCL, Leuven, Belgium, 18 November 2008.
- Dijkgraaf, R.H., *D-branes and D-modules*, UCL, Leuven, Belgium, UCL, 25 November 2008.
- Laenen, E.L.M.P., *Developments in QCD and generators*, DIS2008 Conference UCL, London, UK, 9 April 2008.
- Laenen, E.L.M.P., *Top quark in theory*, Hadron Collider Physics Conference, Galena, USA, 27 May 2008.
- Laenen, E.L.M.P., *Resummation*, Seminar, State University of New York, USA, 6

August 2008.
- Laenen, E.L.M.P., *Broken symmetries*, Nobel Prize Natuurkunde Colloquium, Utrecht, the Netherlands, 12 December 2008.
- Laenen, E.L.M.P., *Top quark physics at the LHC*, RWTH Aachen Graduiertenkolleg, Aachen, Germany, 16 December 2008.
- McFadden, P.L., *Wald entropy and the Einstein equation of state*, Perimeter Institute for Theoretical Physics, Waterloo, Canada, 7 March 2008.
- Papadodimas, K., *Supersymmetry breaking in perturbed Seiberg-Witten theory and string theory*, Seminar, Utrecht, the Netherlands, February 2008.
- Papadodimas, K., *Metastable supersymmetry breaking in N=2 gauge theories and string theory*, Seminar, Bonn, Germany, May 2008.
- Papadodimas, K., *The chiral ring of AdS3/CFT2 and the attractor mechanism*, Monsoon Workshop on String Theory, Mumbai, India, July 2008.
- Papadodimas, K., *The chiral ring of AdS3/CFT2 and the attractor mechanism*, Seminar Durham University, USA, October 2008.
- Papadodimas, K., *The chiral ring of AdS3/CFT2 and the attractor mechanism*, DAMTP seminar, Cambridge, UK, November 2008.
- Papadodimas, K., *The chiral ring of AdS3/CFT2 and the attractor mechanism*, Seminar Theory Group, Cern, Switzerland, November 2008.
- Papadodimas, K., *The chiral ring of AdS3/CFT2 and the attractor mechanism*, Seminar, Paris, France, November 2008.
- Papadodimas, K., *The chiral ring of AdS3/CFT2 and the attractor mechanism*, Seminar ETH, Zurich, Switzerland, December 2008.
- Queiroz Faria de Oliveira Baptista, J.M., *The quantum equivariant cohomology of toric manifolds*, Aarhus Universitet, Denmark, 20 May 2008.
- Queiroz Faria de Oliveira Baptista, J.M., *The quantum equivariant cohomology of toric manifolds*, Lisbon, Portugal, 22 July 2008.
- Quella, T., *Low-dimensional quantum field theories and applications*, Galileo Galilei Institute Workshop, Florence, Italy, October 2008.
- Quella, T., *World-sheet duality for supersphere sigma-models*, Galileo Galilei Institute Workshop, Florence, Italy, October 2008.
- Quella, T., *Sigma-models on supergroups*, Workshop on Applied 2d Sigma-Models, Hamburg, Germany, November 2008.
- Reffert, S., *Quantum crystal and topological strings*, Ecole Normale Superieure Paris, France, January 2008.
- Schalm, K.E., *Effective actions for gravity*, Seminar, Utrecht, the Netherlands, April 2008.
- Shigemori, M., *Small black rings*, Black Holes: A Landscape of Theoretical Physics Problems, Cern, Switzerland, August 2008.
- Shigemori, M., *Brownian motion in AdS/CFT*, Seminar, Utrecht, the Netherlands, 14 November 2008.
- Shigemori, M., *Supersymmetric gauge theories*, Amsterdam-Brussels-Paris Doctoral School on Quantum Field Theory, Strings and Gravity, Amsterdam, the Netherlands, November 2008.
- Skenderis, K., *Holography and fuzzball proposal*, Rome, Italy, 1 February 2008.
- Skenderis, K., *The fuzzball proposal for black holes*, San Diego, USA, 4 March 2008.

- Skenderis, K., *The fuzzball proposal for black holes*, UCLA, USA, 10 March 2008.
- Skenderis, K., *The fuzzball proposal for black holes*, Santa Barbara, USA, 13 March 2008.
- Skenderis, K., *Precision holography and applications*, IPM String School and Workshop, Isfahan, Iran, 9-17 April 2008.
- Skenderis, K., *Real-time gauge/gravity duality*, Swansea, UK, 16 May 2008.
- Skenderis, K., *Issues in gauge/gravity duality*, 32nd John Hopkins Workshop Perspectives in String Theory, Seoul, Korea, 28-31 May 2008.
- Skenderis, K., *Real-time gauge/gravity duality*, Workshop Gravitational Thermodynamics and the Quantum Nature of Space Time, Edinburgh, UK, 20 June 2008.
- Skenderis, K., *The fuzzball proposal for black holes*, CERN Black Hole Institute, Cern, Switzerland, 25 August 2008.
- Skenderis, K., *The fuzzball proposal for black holes*, Paris Summer Workshop at Ecole Normale Superieure, Paris, France, 28 August 2008.
- Skenderis, K., *Non-conformal holography*, Perimeter, Canada, 18 November 2008.
- Skenderis, K., *Geometric flows and holography*, Workshop on Field Theory and Geometric Flows, Munich, Germany, 24 November 2008.
- Smit, J., *Lattice simulations of non-equilibrium dynamics*, International Conference on Non-equilibrium Dynamics in Particle Physics and Cosmology, Santa Barbara, USA, 28 February 2008.
- Smit, J., *Classical approximation to quantum cosmological correlations*, KIPT Program: Non-equilibrium Dynamics in Particle Physics and Cosmology, Santa Barbara, USA, 3 March 2008.
- Taylor, M., *Black objects in string theory*, DRSTP Postgraduate Course Theoretical High Energy Physics, Driebergen, the Netherlands, 28 January-8 February 2008.
- Taylor, M., *Non-conformal holography*, Workshop: String Theory - from Theory to Experiment, Jerusalem, Israel, 6-11 April 2008.
- Taylor, M., *Are black holes really fuzzballs?*, Fysica 2008 Conference, Nijmegen, the Netherlands, 18 April 2008.
- Taylor, M., *Precision holography for non-conformal branes*, Workshop Gravitational Thermodynamics and the Quantum Nature of Space Time, Edinburgh, UK, 16-20 June 2008.
- Taylor, M., *Precision holography for non-conformal branes*, Summer Workshop at Ecole Normale Superieure, Paris, France, 25-29 August 2008.
- Taylor, M., *Are black holes really fuzzballs?*, Colloquium at Astronomy Institute Anton Pannenkoek, Amsterdam, the Netherlands, 21 November 2008.
- van der Schaar, J.P., *Our prepostorous universe: facts and challenges*, DRSTP Postgraduate Course Statistical Physics and Theory of Condensed Matter, Driebergen, the Netherlands, 7-11 April 2008.
- Verlinde, E.P., *Hydrodynamics at the horizon*, MIT seminar, Boston, USA, 8 April 2008.
- Verlinde, E.P., *Discussion on black holes*, Seminar, Cern, Switzerland, 18 April 2008.
- Verlinde, E.P., *Wall crossing and counting of BPS dyons*, Seminar Harvard University, Cambridge, UK, 25 March 2008.
- Verlinde, E.P., *Counting black hole dyons*, Seminar, Cern, Switzerland, 11 Septem-

ber 2008.
- Verlinde, E.P., *Black holes, holography and emergent gravity*, Ehrenfest Colloquium, Leiden, the Netherlands, 22 November 2008.
- Verlinde, E.P., *Wall crossing and counting of BPS dyons*, MIT Seminar, Boston, USA, 2008.
- Verlinde, E.P., *Wall crossing and counting of BPS dyons*, Ihes Seminar, France, 2008.

Vrije Universiteit Amsterdam
- Bazzocchi, F., *A bottom-up approach: from A4 neutrino models to SO(10) X SU(3)*, Colloquium, Vrije Universiteit Amsterdam, the Netherlands, 17 January 2008.
- Boer, D., *Azimuthal single spin asymmetries - a theoretical overview*, International Workshop on Hadron Structure and Spectroscopy '08, Torino, Italy, 31 March-2 April 2008.
- Boer, D., *Opening remarks on transversity asymmetries*, Second International Workshop on Transverse Polarisation Phenomena in Hard Processes, Transversity 2008, Ferrara, Italy, 28-31 May 2008.
- Boer, D., *The vacuum as a superconductor - The Nobel Prize in Physics 2008*, Colloquium, Vrije Universiteit Amsterdam, the Netherlands, 10 December 2008.
- Mulders, P.J., *Non-collinearity in high energy processes*, Xth Workshop on High Energy Physics Phenomenology (WHEPPX), Chennai, India, 5 January 2008.
- Mulders, P.J., *Single spin asymmetries and gluonic pole matrix elements*, DIS2008, London, UK, 7-11 April 2008.
- Mulders, P.J., *T-odd phenomena in QCD*, National Seminar Theoretical High Energy Physics, NIKHEF Amsterdam, the Netherlands, 11 April 2008.
- Mulders, P.J., *Nonuniversality of transverse momentum dependent parton distribution functions*, Workshop on GPD's and Transversity, Trento, Italy, 9-13 June 2008.
- Mulders, P.J., *Universality of T-odd phenomena*, Transversity Workshop, Beijing, China, 30 June-4 July 2008.
- Mulders, P.J., *T-odd phenomena in QCD*, LC2008, Mulhouse, France, 7-11 July 2008.
- Mulders, P.J., *Link dependence in TMD distribution and fragmentation functions*, Workshop on Strangeness Polarization in Semi-Inclusive and Exclusive Lambda Production, Trento, Italy, 27-31 October 2008.
- Pisano, C., *Dynamical parton distribution functions*, Ringberg Workshop: New Trends in HERA Physics 2008, Ringberg Castle, Tegernsee, Germany, 5-10 October 2008.
- Pisano, C., *Dynamical next-to-next-to-leading order parton distributions and the perturbative stability of* $F_L(x, Q^2)$, 14th International QCD Conference (QCD08), Montpellier, France, 7-12 July 2008.
- Pisano, C., *Dynamical parton distribution functions*, Ringberg Workshop: New Trends in HERA Physics 2008, Ringberg Castle, Tegernsee, Germany, 5-10 October 2008.
- Rogers, T.C., *Fully unintegrated parton correlation functions and factorization in lowest order hard scattering*, Cracow Epiphany Conference on LHC physics, Cra-

cow, Poland, 4 January 2008.
- Rogers, T.C., *Elastic scattering and unitarity constraints on semi-hard jet production*, Forward Physics at LHC with Totem, Penn State University, Pennsylvania, USA, 30 April 2008.
- Rogers, T.C., *Unitarity and the perturbative QCD dipole picture*, 4th Electron Ion Collider Workshop, Hampton University, USA, 22 May 2008.
- Rogers, T.C., *Multijet production and S-channel unitarity*, 1st International Workshop on Multiple Partonic Interactions at the LHC, Perugia, Italy, 27 October 2008.

University of Groningen
- Bergshoeff, E.A., *The Kac-Moody approach to supergravity*, KU Leuven, Belgium, February 2008.
- Bergshoeff, E.A., *The Kac-Moody approach to supergravity*, Turin, Italy, April 2008.
- Bergshoeff, E.A., *A Qworld of branes*, University Barcelona, Barcelona, Spain, April 2008.
- Bergshoeff, E.A., *Multiple M2-branes and the embedding tensor*, conference, Kellyfest Gravity, Supersymmetry and Branes, London, UK, April 2008.
- Bergshoeff, E.A., *The Kac-Moody approach to supergravity*, Utrecht University, Utrecht, the Netherlands, June 2008.
- Bergshoeff, E.A., *The Kac-Moody approach to supergravity*, Universität Potsdam, Germany, June 2008.
- Bergshoeff, E.A., *Issues in multiple M2-branes, University of Barcelona*, Barcelona, Spain, July 2008.
- Bergshoeff, E.A., *The superconformal gaugings in three dimensions*, 4-th EU RTN Workshop Constituents, Fundamental Forces and Symmetries of the Universe, Varna, Bulgaria, September 2008.
- Bergshoeff, E.A., *Supersymmetry in three dimensions*, University of Copenhagen, Copenhagen, Denmark, October 2008.
- Bergshoeff, E.A., *Supersymmetry in three dimensions*, College Station, Texas, USA, October 2008.
- Bergshoeff, E.A. *New results on multiple M2-branes*, 22nd Nordic Network Meeting, Strings, Fields and Branes, The AlbaNova University Center, Stockholm, Sweden, 27-29 November 2008.
- Bergshoeff, E.A., *Supersymmetry in three dimensions*, Topical Conference on Elementary Particles, Astrophysics, and Cosmology, Miami 2008, Miami, Florida, USA, December 2008.
- Hohm, O., *Gauged supergravity and Kac-Moody algebras*, Laboratoire de Physique de l'Ecole normale suprieure de Lyon, Lyon, France, 3 April 2008.
- Hohm, O., *Gauged supergravity and hidden symmetries*, Quarks 15th International Seminar on High Energy Physics, Sergiev Posad, Russia, 23-29 May 2008.
- Hohm, O., *Multiple M2 branes: lessons from gauged supergravity*, Theoretical Seminar, University of Bonn, Bonn, Germany, 30 June 2008.
- Hohm, O., *Global limits of gauged supergravity*, 4-th EU RTN Workshop, Varna, Bulgaria, September 2008.
- Hohm, O., *The dual graviton and E11*, Theoretical Particle Physics Seminar, KU

Leuven, Belgium, October 2008.
- Pallante, E., 26th International Symposium on Lattice Field Theory (Lattice 2008), Williamsburg, Virginia, USA, 14-20 July 2008.
- Pallante, E., Extreme QCD 2008, The Sixth Workshop on QCD in Extreme Conditions, 21-23 July 2008.
- Pallante, E., Workshop on Dynamical Electroweak Symmetry Breaking, Odense, Denmark, 9-13 September 2008.
- Pallante, E., Brookhaven Forum 2008, Terra Incognita: From LHC to Cosmology, Brookhaven, New York, USA, November 2008.
- Pallante, E., Lattice Practices 2008, Course on Effective Field Theories, DESY Zeuthen, Germany, 8-10 October 2008.

Leiden University
- Achúcarro, A., *Cosmology with strings attached*, DRSTP Postgraduate Course Theoretical High Energy Physics, Driebergen, the Netherlands, 28 January-8 February 2008.
- Schalm, K.E., *Searching for signatures of strings*, Colloquium, Leiden University, the Netherlands, February 2008.
- Schalm, K.E., *Effective actions for gravity*, Seminar, Utrecht University, the Netherlands, April 2008.
- van Baal, P., *Instanton quarks and confinement*, INT program From Strings to Things: String Theory Methods in QCD and Hadrom Physics, University of Washington, Seattle, USA, 8 May 2008.
- van Baal, P., *Calorons and non-trivial holonomy - an overview*, Galileo Galilei Institute for Theoretical Physics on Non-Perturbative Methods in Strongly Coupled Gauge Theories, Florence, Italy, 28 May 2008.
- van Baal, P., *The Witten index revisited*, LC2008, Mulhouse, France, 7 July 2008.
- van Baal, P., *Calorons with non-trivial holonomy*, Workshop T(R)OPICAL QCD, Port Douglas, Australia, 29 July 2008.
- van Baal, P., *Progress on calorons*, Confinement8, Mainz, Germany, 6 September 2008.

Radboud University Nijmegen
- Schellekens, A.N.J.J., *Free fermion orientifolds*, Workshop String Phenomenology and Vacuum Selection, Liverpool, UK, 28 March 2008.
- Schellekens, A.N.J.J., *Non-supersymmetric Gepner orientifolds*, String Phenomenology 2008, Philadelphia, USA, 29 May 2008.
- Schellekens, A.N.J.J., *RCFT orientifolds*, Institut d'ete, Ecole Normale Superieure, Paris, France, 3 September 2008.
- Schellekens, A.N.J.J., *The RCFT orientifold "Landschap"*, Universitate Tor Vergata, Rome, Italy, 22 February 2008.
- Schellekens, A.N.J.J., *Topics in RCFT orientifolds*, CERN Phenomenology Workshop, Geneva, Switzerland, 12 August 2008.

Utrecht University

- Alday, F., *Scattering amplitudes and AdS/CFT*, University of Amsterdam, the Netherlands, 5 February 2008.
- Alday, F., *Scattering amplitudes and AdS/CFT*, Trinity College, Dublin, Ireland, February 2008.
- Alday, F., *Scattering amplitudes and AdS/CFT*, IHP Seminars, Paris, France, February 2008.
- Alday, F., *Scattering amplitudes and AdS/CFT*, Santiago de Compostela University, Spain, February 2008.
- Alday, F., *Gluon amplitudes in N=4 SYM/AdS5 and Wilson loops*, Pre Workshop School String Theory: from Theory to Experiment, Weizmann Institute, Jerusalem, Israel, 1-4 April 2008.
- Alday, F., *Scattering amplitudes via AdS/CFT*, Workshop String Theory: from Theory to Experiment, Jerusalem, Israel, 7 April 2008.
- Alday, F., *Scattering amplitudes and strings on AdS*, Humboldt University, Berlin, Germany, April 2008.
- Alday, F., *Scattering amplitudes and strings on AdS*, Cracow School of Theoretical Physics, Scattering Amplitudes and Strings on AdS, Zakopane, Poland, June 2008.
- Alday, F., *Scattering amplitudes from strings on AdS*, Workshop Wonders of Gauge Theory and Super-Gravity, Paris, France, June 2008.
- Alday, F., *Scattering amplitudes via AdS/CFT*, Strings 2008 Conference, CERN, Geneva, Switserland, August 2008.
- Ambjørn, J., *Quantum gravity as a sum over histories*, New Paths towards Quantum Gravity, Roskilde University, Denmark, 12-16 May 2008.
- Ambjørn, J., *The quantum universe*, Cracow School of Theoretical Physics: Aspects of Duality, Zakopane, Poland, 13-22 June 2008.
- Ambjørn, J., *Quantum gravity on a lattice*, Workshop Continuum and Lattice Approaches to Quantum Gravity, University of Sussex, UK, 17 September 2008.
- Ambjørn, J., *Non-perturbative quantum gravity*, National Theoretical High Energy Physics Seminar, NIKHEF, Amsterdam, the Netherlands, 21 November 2008.
- Arutyunov, G., *On String S-matrix and TBA*, Cern, Geneva, Switserland, 24 January 2008.
- Arutyunov, G., *On string S-matrix*, University of Bologna, Italy, 5 February 2008.
- Arutyunov, G., *Superstring on $AdS_4 \times CP^3$ as the coset sigma model*, Zürich, Switserland, 2 July 2008.
- Arutyunov, G., *Superstring on $AdS_4 \times CP^3$ as the coset sigma model*, Institute for Theoretical Physics, University Utrecht, the Netherlands, 17 October 2008.
- Arutyunov, G., *Superstring on $AdS_4 \times CP^3$ as the coset sigma model*, Hamburg, Germany, 10 November 2008.
- Arutyunov, G., *Towards the solution of the AdS/CFT spectral problem*, Center for Mathematical Sciences, University of Cambridge, UK, 3 December 2008.
- Arutyunov, G., *Towards the solution of the AdS/CFT spectral problem*, Lorentz Center, Leiden, the Netherlands, 9 December 2008.
- Cirafici, M., *Cohomological gauge theory, quiver matrix models and Donaldson-Thomas theory*, University of Amsterdam, the Netherlands, 8 April 2008.
- Cirafici, M., *Cohomological gauge theory and enumerative geometry*, University of

Genova, Italy, 3 June 2008.
- Cirafici, M., *On instantons and Donaldson Thomas invariants*, Convegno di Fisica Teorica, Sestri Levante, Italy, 4-6 June 2008.
- Cirafici, M., *Equivariant cohomology, localization and gauge theory*, 2008 Modave Summer School on Mathematical Physics, Modave, Belgium, 1-5 September 2008.
- Cirafici, M., *Instantons and hypermultiplet moduli spaces*, Université Libre de Bruxelles, Belgium, 6 November 2008.
- de Haro, S., *Dual gravitons in AdS4/CFT3 and the holographic Cotton tensor*, École Normale Supérieure, Paris, 9 October 2008.
- de Haro, S., *Dual gravitons in AdS4/CFT3 and the holographic Cotton tensor*, Utrecht University, the Netherlands, 3 November 2008.
- de Haro, S., *Dual gravitons in AdS4/CFT3 and the holographic Cotton tensor*, University of Groningen, the Netherlands, 13 November 2008.
- de Wit, B., *Embedding gauge theories, or, could Einstein have known about string theory?*, Theoretical Physics Colloquium, Institute for Theoretical Physics, Utrecht University, the Netherlands, 27 February 2008.
- de Wit, B., *Gauge group embeddings, supergravity deformations and M-theory*, Institut de Physique Théorique, CEA Saclay, France, 7 April 2008.
- de Wit, B., *What is the OSV conjecture*, Centre for Theoretical Physics, University of Groningen, the Netherlands, 3 September 2008.
- de Wit, B., *Black hole counting; a critical view*, Cern Theory Black Hole Institute, Switserland, 19 September 2008.
- de Wit, B., *Why* $Z_{\rm BH} \neq |Z_{\rm top}|^2$, Geometrical Aspects of String Theory, Stockholm, Sweden, 20-24 October 2008.
- de Wit, B., *BPS black holes, effective actions and the topological string*, Physikalisches Institut, Bonn, Germany, 3 November 2008.
- de Wit, B., *Supersymmetric black holes, the topological string, and all that*, National Seminar High-Energy Physics, NIKHEF, Amsterdam, the Netherlands, 21 November 2008.
- de Wit, B., *BPS black holes, effective actions and the topological string*, ISM08 Indian Strings Meeting, Pondicherry, India, 6-13 December 2008.
- de Wit, B., *Supersymmetric black holes, the topological string, and all that*, Humboldt Universität zu Berlin, Germany, 16 December 2008.
- Dittrich, B., *Diffeomorphism symmetry in quantum gravity models*, Grafiti, Utrecht University, the Netherlands, 27 October 2008.
- Dittrich, B., *Dealing with discrete features of quantum gravity models*, University of Nottingham, Seminar Quantum Gravity Group, UK, 12 November 2008.
- Dittrich, B., *Diffeomorphism symmetry in quantum gravity models*, Seminar Discrete Gravity Group, University of Cambridge, UK, 14 November 2008.
- Foster, B., *Quantum weirdness In semiclassical gravity*, Institute for Theoretical Physics, Utrecht University, the Netherlands, 3 April 2008.
- Foster, B, *Aether or: Lorentz violation and the second law*, Imperial College, London, UK, 8 May 2008.
- Foster, B., *Dirac's penumbra*, Perimeter Institute, Waterloo, Canada, 7 October 2008.
- Foster, B., *Dirac's penumbra*, Institute for Theoretical Physics, Utrecht University,

the Netherlands, 13 November 2008.
- Foster, B., *Observables are not perennials*, Cologne, University of Cologne, Germany, 24 November 2008.
- Konopka, T., *Particles in a flexible box*, Utrecht University, Utrecht, the Netherlands, 20 March 2008.
- Konopka, T., *Numerical studies of graphity models*, Perimeter Institute, Waterloo, Canada, 12 June 2008.
- Konopka, T., *Matter in toy geometries*, DICE 2008, Castiglioncello, Italy, 25 September 2008.
- Konopka, T., *Statistical mechanics, graphs, and the emergence of space*, Université Libre, Brussels, Belgium, 17 December 2008.
- Laenen, E., *Developments in QCD and generators*, DIS2008 Conference UCL, London, UK, 9 April 2008.
- Laenen, E., *Top quark in theory*, Hadron Collider Physics Conference, Galena, Illinois, USA, 27 May 2008.
- Laenen, E., *Resummation*, State University of New York, Buffalo, USA, 6 August 2008.
- Laenen, E., *QCD at colliders*, BND School, Texel, the Netherlands, 22 September 2008.
- Laenen, E., *Broken symmetries*, Nobel prize Physics Colloquium, Utrecht, the Netherlands, 12 December 2008.
- Laenen, E., *Top quark physics at the LHC*, Graduiertenkolleg RWTH, Aachen, Germany, 16 December 2008.
- Loll, R., *Emergence of symmetry from Planck scale physics*, Workshop Symmetry as a Modern Scientific Concept, Lorentz Center, Leiden, the Netherlands, 12 March 2008.
- Loll, R., *The self-organizing de Sitter universe*, 13th Conference Recent Developments in Gravity, Thessaloniki, Greece, 6 June 2008.
- Loll, R., *De Sitter universe from quantum bits*, Quantum Geometry and Quantum Gravity Conference, Nottingham, UK, 30 June 2008.
- Loll, R., *Quantum gravity from causal dynamical triangulations*, XVII Oporto Meeting on Geometry, Topology and Physics, Oporto, Portugal, 10-13 July 2008.
- Loll, R., *Quantum gravity from dynamical triangulations*, International School of Subnuclear Physics, Erice, Italy, 29 August-7 September 2008.
- Loll, R., *The quantum origin of spacetime*, Space and Time 100 Years after Minkowski, Bad Honnef, Germany, 8 September 2008.
- Loll, R., *Causal dynamical triangulations*, ENRAGE Meeting on Random Geometry and Random Matrices, Oxford, UK, 15 September 2008.
- Loll, R., *Basics of causal dynamical triangulations*, School on Non-Perturbative Methods in Quantum Field Theory, Sussex, UK, 15-16 September 2008.
- Loll, R., *The self-organizing quantum universe*, Autumn Meeting Nuclear and High Energy Physics of the NNV, Lunteren, the Netherlands, 7 November 2008.
- Loll, R., *The self-organizing quantum de Sitter universe*, Zürich Theoretical Physics Seminar, Zürich, Switzerland, 24 November 2008.
- Maitra, R., *Nonlinear normal ordering, ground states, and cosmological models*, QUIST Colloquium, Institute for Theoretical Physics, Utrecht University, January

2008.
- Maitra, R., *Amplitude-real-phase exact solutions for quantum mixmaster universes*, QUIST Colloquium, Institute for Theoretical Physics, Utrecht University, the Netherlands, September 2008.
- Paredes, A., *On a string dual to N=1 SYM with fundamentals*, Institut Henri Poincare, Paris, France, 7 February 2008.
- Paredes, A., *Mesons versus quasinormal modes: undercooling and overheating*, University of Santiago de Compostela, Spain, 29 April 2008.
- Paredes, A., *On unquenched holographic duals with massive flavors*, 38th Institut d'été, Ecole Normale Supérieur, Paris, France, 29 August 2008.
- Paredes, A., *The Unruh effect and the AdS/CFT correspondence*, Utrecht University, the Netherlands, 23 October 2008.
- Paredes, A., *Comments on N=1 holographic duals with dynamical massive quarks*, SISSA, Trieste, Italy, 19 November 2008.
- Peeters, K., *Phase transitions and solitons in holographic QCD*, University of Kent, UK, 11 February 2008.
- Peeters, K., *Group theory and virus capsid dynamics*, British Mathematical Colloquium, 26 March 2008.
- Peeters, K., *Isospin chemical potential in holographic QCD*, University of Southampton, UK, 23 May 2008.
- Peeters, K., *Intriguing patterns in virus capsid vibrations*, Workshop on Applications of Group Theory in Mathematical Biology, University of Durham, UK, 5 December 2008.
- Prokopec, T., *Stochastic inflation and gravitational backreaction*, McGill University, Montreal, Quebec, Canada, 10 January 2008.
- Prokopec, T., *The physics of the antisymmetric tensor field*, Perimeter Institute, Waterloo, Ontario, Canada, 15 January 2008.
- Prokopec, T., *Stochastic inflation and gravitational backreaction*, University of Texas, Austin, USA, 17 January 2008.
- Prokopec, T., *Stochastic inflation and gravitational backreaction*, University of Florida, Gainesville, USA, 23 January 2008.
- Prokopec, T., *Stochastic inflation and gravitational backreaction*, California Institute of Technology (CalTech), USA, 28 January 2008.
- Prokopec, T., *Stochastic inflation and quantum backreaction*, Kavli Institute for Theoretical Physics (KITP), University of California, Santa Barbara, USA, 29 January 2008.
- Prokopec, T., *Quantum dynamics in FLRW spacetimes*, NIKHEF, the Netherlands, 22 February 2008.
- Prokopec, T., *Vacuum and geometry in cosmology*, Utrecht University College, the Netherlands, 26 April 2008.
- Prokopec, T., *Hermitian gravity and cosmology*, Quist, Utrecht University, the Netherlands, 15 May 2008.
- Prokopec, T., *Gravitational backreaction and cosmological constant*, University of Zagreb, Croatia, 9 July 2008.
- Prokopec, T., *How dark is dark energy*, Utrecht University, the Netherlands, 1 October 2008.

- Prokopec, T., *Gravitational backreaction and cosmological constant*, 3rd Biennial Leopoldina Conference on Dark Energy, Ludwig-Maximilians-University Munich, Germany, 7-11 October 2008.
- Prokopec, T., *Cosmological constant and quantum backreaction*, University of Helsinki, Finland, 28 October 2008.
- Pushkina, I., *Quantum systems of gravity and matter in the framework of causal dynamical triangulations*, Wuppertal University, Germany, 1 February 2008.
- Pushkina, I., *Quantum systems of gravity and matter in the framework of causal dynamical triangulations*, Raman Research Institute, Bangalore, India, 10 March 2008.
- Torrielli, A., *Hopf algebra of the 'Anti de Sitter - Conformal Field Theory' conjecture*, MIT Department of Mathematics, Cambridge, MA, USA, 9 May 2008.
- Torrielli, A., *AdS/CFT, Integrability and Yangians*, Grafiti Seminar, Utrecht University, the Netherlands, 7 October 2008.
- Torrielli, A., *Yangians III: the AdS/CFT story*, String Seminar, Utrecht University, the Netherlands, 31 October 2008.
- Torrielli, A., *AdS/CFT, Integrability and Yangians*, Humboldt University of Berlin, Berlin, Germany, 12 November 2008.
- 't Hooft, G., *The deterministic quantum*, Workshop on Reduction, Emergence and Physics, Tilburg University, the Netherlands, 9 April 2008.
- 't Hooft, G., *The holographic mapping of the Standard Model onto the horizon of a black hole*, Workshop on Gravitational Scattering and Information Loss in Black Holes, Institut Henri Poincaré, Paris, France, 28 April 2008.
- 't Hooft, G., *Crystalline gravity*, Smitfest: Passion for Fields and Lattices, University of Amsterdam, the Netherlands, 25 August 2008.
- 't Hooft, G., *Instantons in QCD*, International School of Subnuclear Physics, 46th Course Hommage to S. Coleman, Predicted and Totally Unexpected in the Energy Frontier Opened by LHC, Erice, Italy, 5 September 2008.
- 't Hooft, G., *Crystalline gravity*, International School of Subnuclear Physics, 46th Course Hommage to S. Coleman, predicted and totally unexpected in the energy frontier opened by LHC, Erice, Italy, 6 September 2008.
- 't Hooft, G., *Crystalline gravity*, Parisi 60, Meeting Wandering with Curiosity in a Complex Landscape, Rome, Italy, 9 September 2008.
- 't Hooft, G., *Hilbert space in deterministic theories*, DPG Physics School 2008 on Foundations of Quantum Physics, Bad Honnef, Germany, 25 September 2008.
- 't Hooft, G., *What is an elementary particle?*, A Scientific Day in Memory of Philippe Meyer (1925-2007), Ecole Normale Superieure, Paris, France, 4 October 2008.
- 't Hooft, G., *Crystalline gravity*, Workshop Particle Physics, Astrophysics and QFT: 75 Years since Solvay, Singapore, 28 November 2008.
- Vandoren, S., *On volume stabilization and NS5-brane instantons*, Research Seminar, Niels Bohr Institute, Copenhagen, Denmark, 6 February 2008.
- Vandoren, S., *On NS5-brane instantons and volume stabilization*, Research Seminar, String Theory in Greater Paris, France, 3 April 2008.
- Vandoren, S., *String theory: perturbative and nonperturbative aspects*, National Seminar NIKHEF, Amsterdam, the Netherlands, 11 April 2008.

– Vandoren, S., *Instanton corrections to hypermultiplet moduli spaces*, Research Seminar, Bonn University, Bonn, Germany, 22 April 2008.
– Vandoren, S., *Linear deformations of quaternion-Kähler manifolds*, International Conference on Holonomy Groups and Applications in String Theory, Hamburg University, Germany, 11-14 July 2008.
– Vandoren, S., *Deformations of hyperkähler and quaternion-Kähler metrics*, Mini-Course, Hangzhou, China, 20-24 September 2008.
– Vandoren, S., *Instanton corrections to hypermultiplet moduli spaces*, Research Seminar, Geometrical Aspects of String Theory, Stockholm, Sweden, 22 October 2008.
– Vandoren, S., *D-instantons and twistors*, Research Seminar, Trinity College, Dublin, Ireland, 17 November 2008.

6.2 Theme 2: Quantum matter, quantum information, soft condensed matter and biophysics

University of Amsterdam

– Caux, J.S., *Correlation dynamics, noise and quenches in integrable systems*, Workshop on Quantum Noise in Strongly Correlated Systems, Rehovot, Israel, 11 January 2008.
– Caux, J.S., *Integrability and the Bethe Ansatz: the challenge of correlation functions*, Workshop on Integrability in AdS/CFT, Utrecht, the Netherlands, 30 January 2008.
– Caux, J.S., *1 + 1 is geen 2 en andere verrassingen in gecondenseerde materie*, UvA Viva Fysica, Amsterdam, the Netherlands, 1 February 2008.
– Caux, J.S., *Correlation dynamics in quantum spin chains and 1D Bose gases: from theory to experiment*, Wuppertal, Germany, 7 February 2008.
– Caux, J.S., *Dynamics of Heisenberg spin chains: from the Bethe Ansatz to inelastic neutron scattering*, Workshop on Integrable Quantum Systems, Montreal, Canada, 30 June 2008.
– Caux, J.S., *Correlation dynamics and quantum quenches in integrable systems*, Conference on Strong Fluctuations in Low Dimensional Systems, Montauk, USA, 3 September 2008.
– Caux, J.S., *Correlations and quenches in integrable systems*, INSTANS Workshop on Correlations and Coherence in Quantum Matter, Evora, Portugal, 13 November 2008.
– Faribault, D.P.A., *Algebraic Bethe Ansatz and the Richardson model*, Seminar, Strongly Correlated Quantum Materials Group, Palaiseau, France, 18 January 2008.
– Faribault, D.P.A., *Correlation functions in superconducting metallic nanograins*, Physics@FOM, Veldhoven, the Netherlands, 22 January 2008.
– Faribault, D.P.A., *Interaction quenches in the Richardson model: a Bethe Ansatz approach*, Solid State Theory Seminar, München, Germany, 17 March 2008.
– Faribault, D.P.A., *Bethe Ansatz approach to quench dynamics in the Richardson model*, Workshop on integrable Quantum Systems and Solvable Statistical Mechan-

ical Models, Montreal, Canada, 3 July 2008.
- Nienhuis, B., *Life in transitions*, Symposium in Honor of Henk Blöte, Leiden, the Netherlands, 11 April 2008.
- Nienhuis, B., *Entanglement in the XXZ chain*, Statistical-Mechanics and Quantum-Field-Theory Methods in Combinatoric Enumeration, Cambridge, UK, 23 April 2008.
- Nienhuis, B., *Scaling, universality and integrability in force distributions in granular solids*, Colloquium, Groningen, the Netherlands, 16 June 2008.
- Nienhuis, B., *Correlations in percolation models on arbitrary rhombus tilings*, Recent Progress in Two-Dimensional Statistical Mechanics, Banff International Research Station, Banff, Canada, 30 June 2008.
- Nienhuis, B., *Correlations in percolation models on arbitrary rhombus tilings Kac*, Seminar, Utrecht, the Netherlands, 3 October 2008.
- Nienhuis, B., *qKZ equations and critical percolation*, Low-Dimensional Quantum Field Theory and Applications, Firenze, Italy, 27 October 2008.
- Nieuwenhuizen, T.M., *Physical model for simultaneous measuring of non-commuting variables*, Young Academy, Berlin, Germany, 29 April 2008.
- Nieuwenhuizen, T.M., *Supermassive black holes as giant Bose Einstein condensates*, Como, Italy, 4 June 2008.
- Nieuwenhuizen, T.M., *Supermassive black holes as giant Bose Einstein condensates*, Conference Problems of Practical Cosmology, St. Petersburg, Russia, 24 June 2008.
- Nieuwenhuizen, T.M., *Quantum thermodynamics*, Doctoral College University of Nancy, France, 9-11 July 2008.
- Nieuwenhuizen, T.M., *Supermassive black holes as giant Bose Einstein condensates*, Dresden, Germany, 25 July 2008.
- Nieuwenhuizen, T.M., *Supermassive black holes as giant Bose Einstein condensates*, Conference FQMT08, Prague, Czech, 2 August 2008.
- Nieuwenhuizen, T.M., *Supermassive black holes as giant Bose Einstein condensates*, Conference Foundations of Vxj, Vxj, Sweden, 24 August 2008.
- Nieuwenhuizen, T.M., *Exactly solvable model for the dynamics of a quantum measurement*, Workshop Dynamics and Manipulation of Quantum Systems, Tokyo, Japan, 21 October 2008.
- Nieuwenhuizen, T.M., *Bright light on dark matters*, Condensed Matter Group, Amsterdam, the Netherlands, 12 November 2008.
- Nieuwenhuizen, T.M., *Do non-relativistic neutrinos constitute the dark matter?*, Saclay, France, 18 December 2008.
- Pruisken, A.M.M., *Multi fractality and electron-electron interactions in the quantum Hall regime*, Seminar, Paris, France, 31 January 2008.
- Pruisken, A.M.M., *Multi fractality and electron-electron interactions in the quantum Hall regime*, Condensed Matter Colloquium, Rehovot, Israel, 14 February 2008.
- Pruisken, A.M.M., *Multi fractality and electron-electron interactions in the quantum Hall regime*, Condensed Matter Seminar, Princeton, USA, 29 May 2008.
- Pruisken, A.M.M., *Coulomb blockade and super universality of the ϑ angle*, Condensed Matter Seminar, Providence, USA, 23 October 2008.

- Pruisken, A.M.M., *Coulomb blockade and super universality of the ϑ angle*, Condensed Matter Seminar, Amsterdam, the Netherlands, 3 December 2008.
- Schoutens, K., *Paired and clustered quantum Hall states*, Seminar, Weizmann Institute, Rehovot, Israel, 31 January 2008.
- Schoutens, K., *Superfrustration of lattice fermions*, Seminar, Firenze, Italy, 4 May 2008.
- Schoutens, K., *Superfrustration of lattice fermions*, Seminar, SISSA, Trieste, Italy, 7 May 2008.
- Schoutens, K., *Supersymmetry in fermionic lattice models*, Seminar, Albert-Einstein-Institut, Potsdam, Germany, 22 May 2008.
- Schoutens, K., *Hard squares, supersymmetry and combinatorics*, Mathematics Colloquium, KdV Institute of the University of Amsterdam, the Netherlands, 28 May 2008.
- Schoutens, K., *Paired quantum Hall states at the edge*, International Workshop Quantum Phases and Excitations in Quantum Hall Systems, Max Planck Institut, Dresden, Germany, 16 June 2008.
- Schoutens, K., *Supersymmetry in fermionic lattice models*, International Workshop on Integrability in Gauge and String Theory, Utrecht, the Netherlands, 11 August 2008.
- Schoutens, K., *Topological quantum registers*, Workshop on Low-dimensional Quantum Field Theories and Applications, Galileo Galilei Institute, Florence, Italy, 5 September 2008.
- Schoutens, K., *Non-Abelian anyons - when Ising meets Fibonacci*, The Sixth Symposium on Topological Quantum Computation, Dublin Institute for Advanced Studies, Dublin, Ireland, 17 September 2008.
- Schoutens, K., *Cosomology of the independence complex on 2-dimensional grids*, Presentation of Challenge and Results, Lorentz Center Workshop DIAMANT meets GQT, Leiden, the Netherlands, 27 October 2008.

Vrije Universiteit Amsterdam

- Das, M., *Microtubules & microtubule-associated proteins*, 52nd Biophysical Society Meeting & 16th IUPAB Biophysics Congress, Long Beach, California, USA, 5 February 2008, (Co Chair).
- MacKintosh, F.C., Lecture Series on Soft Condensed Matter and Physics of Biological Systems, 19th Christ Engelbrecht Summer School in Theoretical Physics, Stellenbosch, South Africa, January 2008.
- MacKintosh, F.C., *Non-equilibrium mechanics and dynamics of active gels and living cells*, Biophysical Society Meeting, Los Angeles, USA, 4 February 2008.
- MacKintosh, F.C., *Non-equilibrium mechanics and dynamics of active gels and living cells*, Frontiers in Microrheology Workshop, UCLA, USA, 8 February 2008.
- MacKintosh, F.C., *Non-equilibrium mechanics and dynamics of active gels and living cells*, American Physical Society Meeting, New Orleans, USA, 11 March 2008.
- MacKintosh, F.C., *Non-equilibrium mechanics and dynamics of active gels and living cells*, Collective effects in Cell Biophysics, Les Houches, France, 11 April 2008.

- MacKintosh, F.C., *Non-equilibrium mechanics of active gels and living cells*, Colloquium, Massachusetts Institute of Technology (MIT), Cambridge, USA, 30 April 2008.
- MacKintosh, F.C., *Non-equilibrium mechanics and fluctuations in active gels and living cells*, Non-equilibrium Soft Matter Meeting, Kyoto, Japan, June 2008.
- MacKintosh, F.C., *Non-equilibrium Mechanics and Dynamics of Cytoskeletal Networks*, IUTAM Symposium on Cellular, Molecular and Tissue Mechanics, Cape Cod, USA, 20 June 2008.
- MacKintosh, F.C., *Non-equilibrium mechanics of motor-activated gels and living cells*, IACM-ECCOMAS 2008 Congress, Venice, Italy, 3 July 2008.
- MacKintosh, F.C. *Non-equilibrium mechanics of active gels and living cells*, XVth International Congress on Rheology, Monterey, USA, 8 August 2008.
- MacKintosh, F.C., *Non-equilibrium mechanics and fluctuations in the Cytoskeleton*, Workshop - Blebs and Cell Cortex Mechanics in Cell Movement, Max Planck Institute for Complex Systems, Dresden, Germany, 6 October 2008.
- Visser, T.D., *Coherence properties of unpolarized beams*, Annual Meeting of the Optical Society of America, Rochester, New York, USA, 23 October 2008.

University of Groningen
- van Enter, A.C.D., *Gradient models and elasticity*, Warwick University, UK, 2008.
- van Enter, A.C.D., XII Brazilian School of Probability, Ouro Preto, Brazil, 2008.
- van Enter, A.C.D., Institut Henri Poincaré, Mini-Course, Paris, France, 2008.
- van Enter, A.C.D., Mathematics Department of the University of Bielefeld (Germany) and the Industrial Engineering Department of the Technion Haifa (Israel), Seminars, 2008.

Leiden University
- Beenakker, C.W.J., *Three powder tours in graphene*, Aspen Center Conference on New Horizons in Condensed Matter Physics, Aspen, USA, 4-10 February 2008.
- Beenakker, C.W.J., *Mesoscopic physics of graphene*, series of five lectures, 4th Capri Spring School on Transport in Nanostructures, Anacapri, Italy, 31 March-4 April 2008.
- Beenakker, C.W.J., *Berry phase and Dirac point in a photonic crystal*, European Network Meeting on Fundamentals of Nanoelectronics, Bremen, Germany, 7-11 April 2008.
- Beenakker, C.W.J., *Shot noise in graphene*, Workshop on Quantum Coherence and Controllability at the Mesoscale, San Sebastián, Spain, 12-16 May 2008.
- Beenakker, C.W.J., *Shot noise in graphene*, Graphene Week 2008, Trieste, Italy, 25-29 August 2008.
- Beenakker, C.W.J., *Anderson localization in graphene*, 24th Solvay Conference in Physics on Quantum Theory of Condensed Matter, Brussels, Belgium, 10-13 October 2008.
- Beenakker, C.W.J., *Science en fiction van quantumcomputers*, Dag van de Onderzoeker, 80th anniversary of the Flanders Research Foundation FWO, Brussels, Belgium, 23 October 2008.
- Beenakker, C.W.J., *Splitting of a Cooper pair by a pair of Majorana fermions*,

Workshop on Quantum Spin Hall Effect and Topological Insulators, Kavli Institute of Theoretical Physics, Santa Barbara, USA, 8-19 December 2008.
- Filippi, C., *Autofluorescent proteins: do first-principle calculations have predictive power?*, Paul Scherrer Institute, Zürich, Switzerland, 4 March 2008.
- Filippi, C., *Excitations in (bio)molecules from quantum Monte Carlo*, Competence Center for Computational Chemistry, Zürich, Switzerland, 27 March 2008.
- Filippi, C., *Quantum Monte Carlo methods in electronic structure theory*, Multi-Scale Computational Chemistry, Spring Meeting of the Swiss Association of Computational Chemistry, University of Fribourg, Switzerland, 28 March 2008.
- Filippi, C., *Autofluorescent proteins: do first-principle calculations have predictive power?*, Amsterdam Center for Multiscale Modelling, the Netherlands, 26 June 2008.
- Filippi, C., *Excitation energies of biomolecules with quantum Monte Carlo*, Workshop on Time-Dependent Density-Functional Theory: Prospects and Applications, Benasque, Spain, 10-15 September 2008.
- Filippi, C., *Quantum Monte Carlo methods for many-body systems*, 11th Asian Workshop on First-Principles Electronic Structure Calculations, National Sun Yat-sen University, Taiwan, 3-5 November 2008.
- Filippi, C., *Autofluorescent proteins: are first-principle calculations predictive?*, Ab initio Modelling in Applied Bio-Sciences: Structure, Dynamics, and Functions, Uppsala University, Sweden, 11-12 December 2008.
- Krüger, F., *Fermionic quantum criticality and the fractal nodal surface*, Physics@FOM, Focus Session on Quantum Criticality, Veldhoven, the Netherlands, 22-23 January 2008.
- Krüger, F., *Fermionic quantum criticality and the fractal nodal surface*, Winter Conference New Horizons in Condensed Matter Physics, Aspen, USA, 4-10 February 2008.
- Krüger, F., *Pacifying the Fermi-liquid: battling the devious fermion signs*, Stripes2008, Erice, Italy, 26 July-1 August 2008.
- Krüger, F., *Fermionic quantum criticality and the fractal nodal surface*, 25th International Conference on Low Temperature Physics, Amsterdam, the Netherlands, 6-13 August 2008.
- Krüger, F., *Fermionic quantum criticality and the fractal nodal surface*, APS March Meeting, New Orleans, USA, 10-14 March 2008.
- Kumar, S., *Inversion symmetry breaking in half-doped manganite*, Summer School on Multiferroics, UCSB, Santa Barbara, California, USA, 20 July-2 August 2008.
- Kumar, S., *Ferroelectricity in half-doped manganites*, NanoNed NEM Meeting, High Tech Campus Eindhoven, the Netherlands, 19 September 2008.
- Kumar, S., *Ferroelectricity in half-doped manganites*, Critical Fluctuations in Spin and Charge Systems, Cambridge University, UK, 13 November 2008.
- Ludwig, T., *Conductivity of a disordered fermion-gaugefield system*, Physics@FOM, Veldhoven, the Netherlands, 22-23 January 2008.
- Nilsson, J., *How to detect the pseudospin-1/2 Berry phase in a photonic crystal with a Dirac spectrum*, Graphene Week 2008, Trieste, Italy, 25-29 August 2008.
- Nilsson, J., *Mesoscopic valley-Hall effect in graphene*, APS March Meeting, New Orleans, USA, 10-14 March 2008.

- Recher, P., *Aharonov-Bohm effect and broken valley degeneracy in a graphene ring*, Physics@FOM, Veldhoven, the Netherlands, 22-23 January 2008.
- Recher, P., *Aharonov-Bohm effect and broken valley-degeneracy in graphene rings*, DPG-Tagung, Berlin, Germany, 25-29 February 2008.
- Recher, P., *Aharonov-Bohm effect and broken valley-degeneracy in graphene rings*, APS March Meeting, New Orleans, USA, 10-14 March 2008.
- Recher, P., *Correspondence between Andreev reflection and Klein tunneling in bipolar graphene*, Graphene Week 2008, Trieste, Italy, 25-29 August 2008.
- Rousseau, V.G., *Quantum phases of atoms and molecules on optical lattices*, APS March Meeting 2008, New Orleans, USA, 14 March 2008.
- Rousseau, V.G., *The stochastic green function algorithm*, University of California, Davis, USA, 20 March 2008.
- Rousseau, V.G., *Feshbach-Einstein condensates*, Instituut-Lorentz, Leiden University, the Netherlands, 25 November 2008.
- Tighe, B.P., *Fluctuations due to distant flow in granular media*, Crystallization and Jamming in Soft Matter under Driving Workshop, Leiden, the Netherlands, 21 February 2008.
- Tighe, B.P., *Stress statistics in jammed matter*, NC State Soft Matter Seminar, Raleigh, North Carolina, USA, 4 June 2008.
- Tighe, B.P., *Force network statistics*, Gordon Conference on Granular and Granular-Fluid Flow, Waterville, Maine, USA, 27 June 2008.
- Tighe, B.P., *Granular statistical mechanics and the force network ensemble*, University of Göttingen Statistical Mechanics of Complex Systems Seminar, Göttingen, Germany, 16 September 2008.
- Tighe, B.P., *Force balance and local stress statistics*, APS March Meeting 2008, New Orleans, Louisiana, USA, 13 March 2008.
- Tighe, B.P., *Force balance and local stress statistics*, Physics@FOM 2008, Veldhoven, the Netherlands, 23 January 2008.
- van den Brink, J., *Novel routes to multiferroics in manganites*, Physics Colloquium, University of Augsburg, Germany, January 2008.
- van den Brink, J., *Theory of magnetic RIXS*, Workshop on X-ray Spectroscopies: Theory and Experiment, Lausanne, Switzerland, February 2008.
- van den Brink, J., *Ultrashort lifetime approach of RIXS*, ICS Colloquium, Politechnico di Milano, Milan, Italy, March 2008.
- van den Brink, J., *Novel routes to multiferroics*, Institute Colloquium, Max Planck Institute Complex Systems, Dresden, Germany, April 2008.
- van den Brink, J., *Novel routes to multiferroics*, Physics Colloquium, University of L'Aquila, Italy, May 2008.
- van den Brink, J., *Multiferroicity due to entangled spin, charge and orbital order*, ESF Workshop on Highly Frustrated Magnetism, Cracow, Poland, June 2008.
- van den Brink, J., *Novel routes to multiferroics*, Physics Colloquium, Forschungszentrum Karlsruhe, Germany, June 2008.
- van den Brink, J., *Multiferroicity in manganites*, Physics Colloquium, University of Groningen, the Netherlands, June 2008.
- van den Brink, J., *Multiferroicity in charge and orbital ordered materials*, Workshop Frontiers in Complex Oxides, Santa Barbara, USA, July 2008.

- van den Brink, J., *Multiferroicity in charge and orbital ordered manganites*, International Conference on Low-Energy Electrodynamics, Vancouver, Canada, July 2008.
- van den Brink, J., *Charge and orbital order in multiferroic manganites*, International Workshop on Electronic Crystals, Cargese, France, August 2008.
- van den Brink, J., *Penrosian collapse and decoherence*, Workshop on Quantum Decoherence, Leiden, the Netherlands, August 2008.
- van den Brink, J., *Mott physics and screening of polarity fluctutations in Fe-As superconductors*, Physics Colloquium, Tsing Hua University, Hsinchu, Taiwan, September 2008.
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- van Saarloos, W., *What can jamming ideas teach us about glassy systems?* FOM Veldhoven Meeting, the Netherlands, 22 January 2008.
- van Saarloos, W., *Is a supercooled glassforming liquid as boring as you think it is?*, International Conference on New Horizons in Condensed Matter Physics, Aspen, Colorado, USA, 3-9 February 2008.
- van Saarloos, W., *A general approach to front propagation into unstable states*, Colloquium, University of Chicago, Illinois, USA, 17 March 2008.
- van Saarloos, W., *Jamming is coming of age*, Physica Lecture, NNV Annual Meeting Fysica 2008, Nijmegen, the Netherlands, 18 April 2008.
- van Saarloos, W., *A general approach to front propagation into unstable states*, Applied Dynamics Seminar, University of Maryland, USA, 6 November 2008.
- van Saarloos, W., *Response and flow of frictional particles near jamming: grains and bubbles*, Seminar, University of Pennsylvania, USA, 7 November 2008.
- van Saarloos, W., *When soft matter gets hard: response of granular media near the jamming transition*, Seminar, Institute for Physical Science and Technology, University of Maryland, USA, 11 November 2008.
- van Saarloos, W., *Low instabilities and turbulence of visco-elastic fluids*, Burgers Lecture, University of Maryland, USA, 14 November 2008.

- van Saarloos, W., *From hard grains to soft bubbles - response and flow of materials near the jamming point*, Colloquium Technical University Eindhoven, the Netherlands, 20 November 2008.
- van Saarloos, W., *Foam rheology and critical scaling in the bubble model*, Farewell Symposium in honor of Prof. H. van Beijeren, Utrecht University, the Netherlands, 27 November 2008.
- Zaanen, J., *Overview of graphene physics*, Gordon Conference Correlated Electrons, Biddeford, Maine, USA, 8-14 June 2008.
- Zaanen, J., *Bosonizing the Fermi-liquid*, International Workshop CMT32, Loughborough, UK, 13-14 July 2008.
- Zaanen, J., *The black hole of high Tc superconductivity*, International Conference LEIT2008, Royal Hollaway, UK, 15-17 July 2008.
- Zaanen, J., *Fermionic quantum criticality. Stripes2008*, Erice, Italy, 26 July-1 August 2008.
- Zaanen, J., *Fermionic quantum criticality*, Correlated Electron Summer Program, Aspen Center for Physics, Aspen, USA, 28 August-6 September 2008.
- Zaanen, J., *Polarity fluctuations and pnictide superconductivity*, Correlated Electron Summer Program, Aspen Center for Physics, Aspen, USA, 28 August-6 September 2008.
- Zaanen, J., *Emergent gravity and quantum liquid crystals*, International Workshop Condensed Matter Meets Gravity, MIT, Boston, USA, 26-29 August 2008.
- Zaanen, J., *Fermionic quantum criticality*, International Conference Correlated Electron Systems in High Magnetic Fields, Dresden, Germany, 12-17 October 2008.
- Zaanen, J., *Quantum criticality and high Tc superconductivity*, Workshop Critical Fluctuations in Spin and Charge Systems, Cambridge, UK, 12-14 November 2008.
- Zaanen, J., *The black hole of high Tc superconductivity*, Seminar, Stanford University, California, USA, March 2008.
- Zaanen, J., *Fermionic quantum criticality*, Colloquium, University of Augsburg, Germany, June 2008.
- Zaanen, J., *Bosonizing the Fermi-liquid*, Seminar, Tsinghua University, Beijing, China, July 2008.
- Zaanen, J., *Polarity fluctuations and Pnictide superconductivity*, Seminar, Tsinghua University, Beiijng, China, July 2008.
- Zaanen, J., *Fermionic quantum criticality*, Colloquium, Chinese Academy of Science, Beijing, China, July 2008.
- Zaanen, J., *Planckian dissipation*, Colloquium University of California, Berkeley, USA, December 2008.
- Zaanen, J., *Fermionic quantum criticality*, Seminar, University of California, San Diego, La Jolla, USA, December 2008.

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- Boukhvalov, D.W., Katsnelson, M.I. and Lichtenstein, A.I., *Chemical functionalization of graphene*, Physics@FOM 2008, Veldhoven, the Netherlands, 2008 (poster).
- de Wijn, A.S., Riesco, N., Vesovic, V., Jackson, G. and Trusler, J.P.M., *Prediction of the viscosity of dense fluid mixtures*, 18th European Conference on Thermophysical Properties (ECTP 2008), Pau, France, 4 September 2008 (poster).

- de Wijn, A.S., *Viscosities of dense mixtures of hydrocarbons*, Dutch Soft Matter Meeting, Eindhoven University of Technology, the Netherlands, 10 April 2008.
- Di Marco, I., Grechnev, A., Katsnelson, M.I., Lichtenstein, A.I., Wills, J. and Eriksson, O., *Theory of quasiparticle spectra for FE, Co, and Ni: bulk and surface*, Veldhoven, the Netherlands, Physics@FOM 2008, 22-23 January 2008 (poster).
- Di Marco, I., *Full potential linear muffin-tin orbital method*, International Workshop on Full Potential Linear Muffin-Tin Orbital Method, Albuquerque, New Mexico, USA, 25-29 August 2008.
- Di Marco, I., *Correlation effects in the electronic structure of Fe Monolayer on W(001) surface*, sIMMposium 2008, Radboud University Nijmegen, the Netherlands, 2008.
- Fasolino, A., FOM Rijnhuizen, Colloquium, Nieuwegein, the Netherlands, 2008.
- Katsnelson, M.I., *Gauge fields in corrugated graphene*, Workshop Relativistic Dynamics of Graphene, Institute for Nuclear Theory, University of Washington, Seattle, USA, 7-12 January 2008.
- Katsnelson, M.I., *Gauge fields in corrugated graphene*, Condensed Matter and Materials Physics Meeting (CMMP), Institute of Physics, London, UK, 26-28 March 2008.
- Katsnelson, M.I., *Graphene: new bridge between condensed matter physics and QED*, L.D. Landau Memorial Conference Advances in Theoretical Physics, Chernogolovka, Russia, 20 June-2 July 2008.
- Katsnelson, M.I., *Graphene: new bridge between condensed matter physics and QED*, Physics Colloquium, University of Minnesota, USA, 27 September-8 October 2008.
- Katsnelson, M.I., *Graphene: electronic structure, chemistry and magnetism*, Workshop Computational Magnetism and Spintronics, Dresden, Germany, 3-7 November 2008.
- Katsnelson, M.I., *Graphene: electronic structure, chemistry and magnetism*, DOE/ BES Computational Materials Science Network Meeting (CMSN), Oak Ridge, Tennessee, USA, 14-19 November 2008.
- Katsnelson, M.I., *Quantum coherense and controllability at the mesoscale*, Conference, San Sebastian, Spain, 2008.
- Katsnelson, M.I., *Scattering mechanisms and charge carrier transport in graphene*, Seminar, University of Regensburg, Germany, 2008.
- Katsnelson, M.I., *Scattering mechanisms and charge carrier transport in graphene*, Seminars, Technical University of Graz and University of Vienna, Austria, 2008.
- Katsnelson, M.I., *Scattering mechanisms and charge carrier transport in graphene*, Conference Quantum Coherence and Controllability at the Mesoscale, San Sebastian, Spain, 2008.
- Katsnelson, M.I., *Scattering mechanisms and charge carrier transport in graphene*, Seminar and Discussions of Joint Research Work, Uppsala University, Sweden, 2008.
- Katsnelson, M.I., *Defects in graphene: electronic structure, magnetism, scattering mechanisms*, 35th International Conference on Metallurgical Coatings and Thin Films 2008 (ICMCTF), San Diego, USA, 2008.
- Katsnelson, M.I., *Graphene: new bridge between condensed matter physics and*

QED, International Conference on Strongly Coupled Coulomb Systems, SCCS Accomodation Camerino, Italy, 2008.
- Katsnelson, M.I., *Graphene: new bridge between condensed matter physics and QED*, Seminar, Institute of Materials Science, Madrid, Spain, 2008.
- Katsnelson, M.I., *Seminar and Discussions of joint research,* Seminar and Discussions of joint research. (Editor)(Editors), vol., Rutgers University Piscataway New Jersey (USA), 2008.
- Katsnelson, M.I., *Computational magnetism and spintronics*, Conference, Dresden, Germany, 2008.
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- Katsnelson, M.I., *Gauge fields in corrugated graphene*, Condensed Matter Seminar, University of Minnesota, USA, 2008.
- van den Brink, J., *Novel routes to multiferroics in manganites*, Physics Colloquium, University of Augsburg, Germany, January 2008.
- van den Brink, J., *Theory of magnetic RIXS*, Workshop on X-Ray Spectroscopies: Theory and Experiment, Lausanne, Switzerland, February 2008.
- van den Brink, J., *Ultrashort lifetime approach of RIXS*, Physics Colloquium Politechnico di Milano, Milan, Italy, March 2008.
- van den Brink, J., *Multiferroicity in manganites*, Physics Colloquium, University of Groningen, the Netherlands, April 2008.
- van den Brink, J., *Novel routes to multiferroics*, Institute Colloquium, Max Planck Institute Complex Systems, Dresden, Germany, April 2008.
- van den Brink, J., *Novel routes to multiferroics*, Physics Colloquium, University of L'Aquila, Italy, May 2008.
- van den Brink, J., *Multiferroicity due to entangled spin, charge and orbital order*, ESF Workshop on Highly Frustrated Magnetism, Cracow, Poland, June 2008.
- van den Brink, J., *Novel routes to multiferroics*, Physics Colloquium, Forschungszentrum Karlsruhe, Karlsruhe, Germany, June 2008.
- van den Brink, J., *Multiferroicity in charge and orbital ordered materials*, Workshop Frontiers in Compex Oxides, Santa Barbara, USA, July 2008.
- van den Brink, J., *Multiferroicity in charge and orbital ordered manganites*, International Conference on Low-Energy Electrodynamics, Vancouver, Canada, July 2008.
- van den Brink, J., *Charge and orbital order in multiferroic manganites*, International Workshop on Electronic Crystals, Cargese, France, Augustus 2008.
- van den Brink, J., *Penrosian collapse and decoherence*, Workshop on Quantum Decoherence, Leiden, the Netherlands, Augustus 2008.
- van den Brink, J., *Measuring magnons and orbitons in resonant inelastic X-ray scattering*, Physics Seminar, National Synchrotron Radiation Research Center, Taiwan, China, September 2008.
- van den Brink, J., *Ultrashort lifetime expansion for indirect resonant inelastic X-ray scattering*, Physics Seminar, National Synchrotron Radiation Research Center,

Taiwan, China, September 2008.
- van den Brink, J., *Mott physics and screening of polarity fluctuations in Fe-As superconductors*, Physics Colloquium, Tsing Hua University Hsinchu, Taiwan, China, September 2008.
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- van den Brink, J., *Features of RIXS*, UPBL7 Meeting ESRF, Grenoble, France, October 2008.
- van den Brink, J., *Heavy anion solvation of polarity fluctuations in Fe-As pnictides*, International Workshop Physics and Chemistry of FeAs-Based Superconductors, Dresden, Germany, October 2008.
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- van den Brink, J., *Heavy anion solvation of polarity fluctuations in Fe-As pnictides*, International Conference on FeAsHigh Tc Superconducting Multilayers and Related Phenomena, Rome, Italy, December 2008.
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Utrecht University
- Barkema, G., *Statistical physics of polymer translocation*, EU-Random Workshop Metastability, Eindhoven, the Netherlands, 11 January 2008.
- Barkema, G., *Simulation of polymer translocation*, Physics Colloquium, Oldenburg, the Netherlands, 8 May 2008.
- Barkema, G., *Simulation of polymer translocation*, ACS Spring Meeting, Philadelphia, USA, 18 August 2008.
- Barkema, G., *Theory and simulation of polymer translocation*, Physics Colloquium, Leuven, Belgium, 29 September 2008.
- Barkema, G., *Theory and simulation of polymer translocation*, Theoretical Physics Colloquium, Utrecht, the Netherlands, 15 October 2008.
- Bier, M. and R. van Roij, *Dynamic density functional theory of colloidal platelets*, FOM@Veldhoven 2008, the Netherlands, 22-23 January 2008 (poster).
- Bier, M. and van Roij, R., *Dynamic density functional theory of fluids of platelike colloidal particles*, 72. DPG-Fruehjahrstagung (CPP-Symposium 'Driven Soft Matter: Non-Equilibrium Phenomena in External Fields'), Berlin, Germany, 25-29 February 2008.
- Bier, M. and R. van Roij, *Colloidal plate dispersions out of equilibrium*, CODEF II, Bonn, Germany, 31 March-2 April 2008 (poster).
- Bier, M., *Van Hove correlation functions of fluids of rodlike particles*, Dutch Soft Matter Meeting, Eindhoven, the Netherlands, 10 April 2008.
- Bier, M. and R. van Roij, *Colloidal platelet fluids in nonequilibrium steady states*, 7th Liquid Matter Conference, Lund, Sweden, 27 June-1 July 2008 (poster).

- Bier, M., *Suspensions of anisotropic colloids within dynamic density functional theory*, SFB Young Researcher Meeting, Schloss Waldthausen, Mainz, Germany, 18-19 September 2008.
- Duine, R., *Generation of Electric Current by a Moving Domain Wall*, STCM Workshop, Kyoto, Japan, 4 November 2008.
- Duine, R., *Berry's phase, motive forces, and domain walls*, Ehrenfest Colloquium, Leiden, the Netherlands, 15 October 2008.
- Duine, R., *Spintronics*, General Physics Colloquium about ERC starting grant together with Andre Mischke, Utrecht, the Netherlands, 3 October 2008.
- Duine, R., *Generation of electric current by a moving domain wall*, Konstanz, Germany, 18 July 2008.
- Duine, R., *Generation of electric current by a moving domain wall*, SFB 668 Seminar, Hamburg, Germany, 4 July 2008.
- Duine, R., *Magnetism and quantum phase transitions in cold-atom systems*, CIFAR Quantum Materials Program Meeting, Toronto, Canada, 8 May 2008.
- Duine, R., *Current-induced torques in magnetic textures and in antiferromagnets*, APS March Meeting, New Orleans, Los Angeles, USA, 10 March 2008.
- Duine, R., *Spin transfer and spin pumping*, Munich Physics Colloquium, Munich, Germany, 14 January 2008.
- Massignan, P., *Twin peaks in ultracold Fermi gases*, Physics@FOM, Veldhoven, the Netherlands, January 2008.
- Massignan, P., *Molecular and atomic signatures in RF spectra of imbalanced Fermi gases*, Research and Development Center on Bose-Einstein Condensation@Trento, Italy, April 2008.
- Massignan, P., *Strong interactions and pairing in Fermi gases: many-body calculations and RF spectroscopy*, Institut de Fsica d'Altes Energies, Universitat Autnoma de Barcelona, Spain, 15 May 2008.
- Massignan, P., *Spin polarons and molecules in strongly-interacting atomic Fermi gases*, WZI Amsterdam, the Netherlands, June 2008.
- Massignan, P., *Spin polarons and molecules in strongly-interacting atomic Fermi gases*, NBIA Copenhagen, Denmark, June 2008.
- Morais Smith, C., *Novel quantum phases in low-dimensional systems*, Theory Seminar, University of Antwerp, Belgium, 6 February 2008.
- Morais Smith, C., *Novel quantum phases in low-dimensional systems*, Theory Seminar, ENS Paris, France, 19 February 2008.
- Morais Smith, C., *Novel quantum phases in low-dimensional systems*, Theory Seminar, Orsay, Paris, France, 21 February 2008.
- Morais Smith, C., *Novel quantum phases in low-dimensional systems*, Theory Seminar, Université Paul Sabatier, Toulouse, France, 26 February 2008.
- Morais Smith, C., *Zooming in on the quantum Hall effect*, Capri Spring School on Transport in Nanostructures 2008, Capri, Italy, 3 April 2008.
- Morais Smith, C., *Bilayer quantum Hall systems*, Capri Spring School on Transport in Nanostructures 2008, Capri, Italy, 3 April 2008.
- Morais Smith, C., *Novel quantum phases in low-dimensional systems*, Quantum Phases and Excitations in Quantum Hall Systems, Dresden, Germany, 16-21 June 2008.

- Morais Smith, C., *Novel quantum phases in low-dimensional systems*, DESY, Hamburg, Germany, 1 July 2008.
- Morais Smith, C., *Cold atoms as cond-mat simulators*, Stripes 2008, Erice, Italy, 27 July-1 August 2008.
- Morais Smith, C., *Exciting a d-density wave in an optical lattice*, SCES 08 - Strongly correlated electron systems 2008 Conference, Buzios, Brazil, 18-22 August 2008.
- Morais Smith, C., *The quantum Hall effect: a magic world of electrons in two dimensions, novel quantum phases in low-dimensional systems*, UFRJ, Rio de Janeiro, Brazil, 25 August 2008.
- Morais Smith, C., *The quantum Hall effect: a magic world of electrons in two dimensions*, Summer School Lecture, Julius Institute, University of Utrecht, the Netherlands, 28 August 2008.
- Morais Smith, C., *Effect of a staggered magnetic field in 2D quantum systems*, Exact Results in Low-D Quantum Systems: 2nd INSTANS Summer Conference, Florence, Italy, 8-12 September 2008.
- Morais Smith, C., *Staggered-vortex superfluid of ultracold bosons in an optical lattice*, Correlated Electron Systems in High Magnetic Fields, Dresden, Germany, 13-17 October 2008.
- Morais Smith, C., *Quantum criticality in heavy fermions, cuprates, and ferroelectric systems*, Workshop on Critical Fluctuations in Spin and Charge Systems, Cambridge, UK, 13-14 November 2008.
- Morais Smith, C., *Sociology of electrons in low-dimensional systems*, AMOLF Colloquium, Amsterdam, the Netherlands, 1 December 2008.
- Morais Smith, C., *Sociology of electrons in low-dimensional systems*, Grafiti Seminar, Utrecht University, the Netherlands, 8 December 2008.
- Stoof, H.T.C., *About ultracold Fermi gases and neutron stars*, DRSTP Postgraduate Course Theoretical High Energy Physics, Driebergen, the Netherlands, 28 January-8 February 2008.
- Stoof, H., *Imbalanced Fermi gases*, CIFAR Workshop, Banff, Canada, 19 April 2008.
- Stoof, H., *Imbalanced Fermi gases*, Rice University, Houston, Texas, USA, 22 April 2008.
- Stoof, H., *Imbalanced Fermi gases*, Ornstein Colloquium, Utrecht, the Netherlands, 22 May 2008.
- Stoof, H., *Antiferromagnetisme in optical lattices*, Department Day, Utrecht, the Netherlands, 12 May 2008.
- Stoof, H., *Is there a quantum phase transition in trapped polarized Fermi gases?*, LT-25, Amsterdam, the Netherlands, 11 August 2008.
- Stoof, H., *Pairing in ultracold atomic clouds and neutron stars*, Quark Gluon Plasma Workshop, GSI Darmstad, Germany, 27 September 2008.
- Stoof, H., *Aspects of imbalanced Fermi gases*, Frontiers of Degenerate Quantum Gases, CASTU, China, 21 October 2008.
- Stoof, H., *BEC-BCS crossover in an atomic Bose gas*, Quo vadis BEC?, Bad Honnef, Germany, 31 October 2008.
- van Beijeren, H., *Dynamics of solids and the Green-Kubo formalism*, Symposium

Surface Science 2008, St. Christoph, Austria, 5 March 2008.
- van Beijeren, H., *Green-Kubo formalism for solids*, Catholic University of Leuven, Belgium, 16 April 2008.
- van Beijeren, H., *Green-Kubo formalism for solids*, TIENCS 2008, National University of Singapore, China, 6 June 2008.
- van Beijeren, H., *Green-Kubo formalism for solids*, Université Paris-Sud, Orsay, France, 16 June 2008.
- van Beijeren, H., *Green-Kubo formalism for solids*, Hyperbolic Dynamical Systems, Erwin Schrödinger Institute, Vienna, Austria, 26 June 2008.
- van Beijeren, H., *Green-Kubo formalism for solids*, ISTCP-VI, University of British Columbia, Vancouver, Canada, 20 July 2008.
- van Beijeren, H., *The baby and the bath water. On the art of doing statistical physics*, Institute for Theoretical Physics, Utrecht, the Netherlands, 28 November 2008.
- van Roij, R., *Ions and colloids near an oil-water interface: can oil and water mix?*, Annual Meeting Section Liquids and Interfaces of NWO-Chemical Sciences, Lunteren, the Netherlands, 12 February 2008.
- van Roij, R., *Electrostatics near the oil-water interface: can oil and water mix?*, European Liquid Matter Conference, Lund, Sweden, 27 June 2008.
- van Roij, R., *Charge separation near the oil-water interface: Can oil and water mix?*, Seminar Complex Fluids Group, Enschede, the Netherlands, 11 September 2008.
- van Roij, R., *Self diffusion of particles in complex fluids: temporary cages and permanent barriers*, Debye Lunch Seminar, Utrecht, the Netherlands, 5 November 2008.
- van Roij, R., *Nano-deeltjes en micro-druppels: fysica en chemie tussen knikker en atoom*, Open-Day Lecture for Prospective Students, Utrecht, the Netherlands, 29 November 2008.

7 | Science-related activities

This chapter presents an overview of the science-related activities of DRSTP staff members and postdoctoral fellows. Besides publications in professional journals (sect. 7.1) and publications about or related to physics in daily newspapers (sect. 7.2) also public lectures (sect. 7.3) are given. All other outreach activities like forum discussions, television interviews, personal columns in newspapers etc. are listed in the paragraph 'other contributions' (sect. 7.4). Science-related activities of PhD students can be found in chapter 3 (sects. 3.6 and 3.7).

7.1 Professional publications

- Ambjørn, J., J. Jurkiewicz and R. Loll, *The self-organizing quantum universe*, Sci. Am. 299N1 (2008) 42-49.
- Boer, D. and Mulders, P.J., *Het vacuum als supergeleider*, NTvN 74, December 2008.
- Duine, R.A., *Spinning fermions*, Physics 1, 27 (2008).
- Laenen, E.L.M.P., *Theoretische deeltjesfysica in het tijdperk van de LHC*, NTvN 74, August 2008.
- 't Hooft, G. *Playing with planets*, World Scientific, Singapore, London and Hackensack, NJ, (2008) ISBN 978-981-279-307-2 (alk. paper) – ISBN 978-981-279-020-0 (alk. paper; pbk)
- 't Hooft, G., *Naar een herstel van het deterministische wereldbeeld*, Alg. Ned. Tijdsch. voor Wijsbegeerte 100 (2008) 4, 313-319.
- Zwanikken, J., M.E. Leunissen, A. van Blaaderen en R. van Roij, *Olie-watermengsels ontrafeld*, NTvN 74 (2008) 260.

7.2 Other publications

- Bais, F.A., *Het krijtje*, NRC, 16 February 2008, article.
- Bais, F.A., *Relativita; Guida illustrata molto speciale*, Editiono Dedalo, Rome, Italy, 2008, book.
- Bais, F.A. and Farmer, J.D., *The physics of information*, The Philosophy of Information, in Adriaans, P. and van Benthem, J. (Eds.), Amsterdam: North Holland, 2008, book chapter.
- Bais, F.A., *Very special relativity*, Seoul, South Korea: Eco-Livres, 2008, book.
- de Haro Ollé, S., *Is de LHC weggegooid geld?*, Eos, November 2008.
- de Haro Ollé, S., *Stephen Hawking*, Kritisch Denkerslexicon, 41e aanvulling, November 2008.

- Huijse, L., *Standaardmodel - De samenhang der krachten*, In De Bètacanon. J.M. Meulenhoff, 2008, book chapter.
- Loll, R., *De schoonheid, kracht en charme van de letter F*, FOM Expres, July 2008, p.2.

7.3 Public lectures

- Bais, F.A., *De Natuurwetten*, Lustrum Seminarium Serie of the Leidsche Flesch, Leiden, the Netherlands, 21 April 2008.
- Bais, F.A., *Noodzakelijke vaagheden*, Symposium over Cognitie, Wetenschap en Kunst, Groningen, the Netherlands, 28 November 2008.
- Beenakker, C.W.J., *Magie van wetenschap*, Tweede Eeuwfeest van de Koninklijke Nederlandse Akademie van Wetenschappen, Amsterdam, the Netherlands, 8 May 2008.
- Beenakker, C.W.J., *Nanokippengaas*, Radboud University Nijmegen, the Netherlands, 11 June 2008.
- Beenakker, C.W.J., *Nanokippengaas*, Cleveringa Lecture, Rome, Italy, 26 November 2008.
- Beenakker, C.W.J., *Nanokippengaas*, Christmas Lecture, Leids Universitair Medisch Centrum, Leiden, the Netherlands, 18 December 2008.
- Bergshoeff, E.A., *De stille kracht van aandacht*, Be Valuation 2008 Meeting, March 2008.
- Bergshoeff, E.A. *Klein, kleiner, grootste*, three lectures, Technasium, Groningen, the Netherlands, November, December 2008.
- Dijkgraaf, R.H., *Fundamental research, creativity and innovation*, Maastricht University, the Netherlands, 14 May 2008.
- Dijkgraaf, R.H., *Wetenschap en verbeelding*, Nederlands Gesprekscentrum, Leusden, the Netherlands, 5 June 2008.
- Dijkgraaf, R.H., *Pieken in de delta*, Beurs van Berlage, Amsterdam, the Netherlands, 18 September 2008.
- Dijkgraaf, R.H., *De bétacanon*, Discovery 08, Amsterdam, the Netherlands, 26 September 2008.
- Dijkgraaf, R.H., *Wiskundige thrillers*, Studium Generale, Utrecht, the Netherlands, 12 November 2008.
- Dijkgraaf, R.H., *Kosmologie*, Teylers Museum, Haarlem, the Netherlands, 14 November 2008.
- Dijkgraaf, R.H., *Parallelle werelden*, NWO Exacte Wetenschappen, Amsterdam, the Netherlands, 8 December 2008.
- Duine, R., *Spintronica: van lading naar spin*, Natuurkundig Gezelschap, Utrecht, the Netherlands, 7 October 2008.
- Fasolino, A., *Een computer voor jezelf*, Inaugural lecture, Radboud University Nijmegen, the Netherlands, 29 October 2008
- Laenen, E., *Elementaire deeltjes, symmetrie en quantumvelden*, 6 VWO High School Class Lecture, NIKHEF, the Netherlands, 26 September 2008.
- Laenen, E., *Elementaire deeltjes, symmetrie en quantumvelden*, 6 VWO High

School Class Lecture, NIKHEF, the Netherlands, 27 November 2008.
- Laenen, E., *Het standaard model*, Lunchlezing, De Leidsche Flesch Studentenvereniging, Leiden, the Netherlands, 26 November 2008.
- Laenen, E., *Wat gaan we zien met de LHC?*, Natuurkundig Gezelschap, Utrecht, the Netherlands, 9 December 2008.
- Loll, R., *Taking a closer look at (quantum) spacetime*, Colloquium, Marie Curie Studievereniging, Nijmegen, the Netherlands, 4 March 2008.
- Loll, R., TV Interview with journalist Pantelis Savvidis for the Greek TV program Anixneusis (Explorations) on ERT3, 5 June 2008.
- Loll, R., *Die Wahrheit(?) ueber Wurmlöcher*, Popular lecture as part of training program Physik des Zufalls und der Quanten for high school teachers, Bad Honnef, Germany, 26 October 2008.
- Loll, R., *Das selbstorganisierte Quantenuniversum*, 12. Deutsche Physikerinnentagung, Münster, Germany, 8 November 2008.
- Manyuhina, O.V., *Minimal surfaces in soft matter: statistical physics meets differential geometry*, Radboud University Nijmegen, the Netherlands, sIMMposium 2008, 19-20 May 2008.
- Prokopec, T., *Vacuum and geometry in cosmology*, Utrecht University College, the Netherlands, 26 April 2008.
- 't Hooft, G., Optreden in Theater Gasthuis/Frascati, met Ruben Maes, e.a., thema: Uit het Raam Staren, discussie over snarentheorie, Amsterdam, the Netherlands, 11 February 2008.
- 't Hooft, G., 35 jaar, Jubileumlezing Groot en Klein, Hasselt University, Diepenbeek, Belgium, 13 February 2008.
- 't Hooft, G., *Natuurkunde in Utrecht*, lezing, Culturele Zondag, Studium Generale, n.a.v. De Kleine Parade (Een historische verhandeling over Utrecht), Utrecht, the Netherlands, 23 March 2008.
- 't Hooft, G., *Science fiction and reality*, Public talk, (also on TV station Ottawa and a local TV station, as well as on Internet), Perimeter Institute, Canada, 7 May 2008.
- 't Hooft, G., *Humanity in the cosmos*, 58th Meeting of Nobel Laureates in Lindau, Germany, 3 July 2008, followed by press conference and discussions with students.
- 't Hooft, G., *Global competition for global talents*, panel discussion, Alpbacher Technologiegespraeche, Joachim Treusch (Ch), Alpbach, Austria, 22 August 2008.
- 't Hooft, G., *Elementaire deeltjes en de large hadron collider*, Studium Generale, TU/e, Eindhoven, the Netherlands, 5 November 2008.
- 't Hooft, G., *Education and collaboration in fundamental science as bridges between nations*, presentation on behalf of the 2nd ASEAN event series Bridges - Dialogues Towards a Culture of Peace, International Peace Foundation, Open University Malaysia (OUM), followed by Dialogue on *Strategies to strengthen science education and innovation*, hosted by Academy of Sciences Malaysia (ASM), 17 November 2008.
- 't Hooft, G., *Education and collaboration in fundamental science as bridges between nations*, University Malaysia, Sarawak (Unimas Kuching, Sarawak), 18 November 2008.
- 't Hooft, G., *Playing with planets*, book presentation World Scientific, Singapore,

26 November 2008.
- 't Hooft, G., *The future of science*, Universidade de Santiago de Compostela, Spain, 16 December 2008.
- 't Hooft, G., *Determinisme in de fysica*, with Klaas Landsman and Hans Maassen, Science Cafe about *Toeval*, Ierse Pub The Shamrock, Nijmegen, the Netherlands, followed by discussion with public, 2008.
- van Baal, P., *Speciale relativiteitstheorie*, Gastles, Stedelijk Gymnasium Den Bosch, 's Hertogenbosch, the Netherlands, 28 February 2008.
- van der Schaar, J.P., *Alles uit niets*, Studium Generale, Maastricht University, the Netherlands, 17 January 2008.
- Vandoren, S., *Op zoek naar de oerknal*, voorlichtingsdagen Bachelor opleiding Natuur en Sterrenkunde, Utrecht, the Netherlands, 28 November 2008.
- Visser, T.D., *Over tovenaars, tatoeages en tornado's*, Oratie in Delft, the Netherlands, 19 November 2008.
- Zaanen, J., *Het universum in een korreltje roest*, Lezing Studium Generale, Maastricht University, the Netherlands, January 2008.
- Zaanen, J., *Het universum in een korreltje roest*, Publieks avondlezing Physica 2008, Nijmegen, the Netherlands, April 2008.
- Zaanen, J., *Het universum in een korreltje roest*, Lezing Chemische Binding, Groningen, the Netherlands, February 2008.
- Zaanen, J., *Het zwarte gat van hoge Tc supergeleiding*, Lezing Natuurkundig Genootschap Utrecht, the Netherlands, April 2008.
- Zaanen, J., *Het universum in een korreltje roest*, Lezing Studium Generale, Leiden University, the Netherlands, October 2008.

7.4 Other contributions

- Bais, F.A., *The natural sciences in Amsterdam*, Comenius Leergang Amsterdam, the Netherlands, 31 January 2008, talk.
- Bais, F.A., *Highlights lecture*, Amsterdam, the Netherlands, 8 February 2008, talk.
- Bais, F.A., *Speciale relativiteit*, UvA Betamaand, Amsterdam, the Netherlands, 17 February 2008, talk.
- Bais, F.A., *Intro beta gamma*, Open Dag UvA, Amsterdam, the Netherlands, 7 March 2008, talk.
- Bais, F.A., *Windowdressing*, LRPLN, March 2008, column.
- Bais, F.A., *Introductie natuurwetenschappen*, Beta Gamma Bachelor voorlichting, Amsterdam, the Netherlands, 8 March 2008, talk.
- Bais, F.A., *Keerpunten*, Comenius Leergang, Arnhem, the Netherlands, 20 March 2008, 2 lectures.
- Bais, F.A., *Unity in diversity*, TNO-management course, Arnhem, the Netherlands, 9 May 2008.
- Bais, F.A., *Turning points*, European Comenius Course, Cambridge, UK, 27-29 August 2008.
- Bais, F.A., *Van Kepler top supersnaren*, VESTA, Zaandam, the Netherlands, 25 September 2008, talk.

- Bais, F.A., *Einstein in de klas*, KNAW Onderwijs, Symposium, Amsterdam, the Netherlands, 12 November 2008, talk.
- Bais, F.A., *Natuurwetten*, Comenius Leergang, Arnhem, the Netherlands, 13 November 2008, lecture.
- Bais, F.A., *Keerpunten in de natuurwetenschappen*, Diligentia Jongerenlezing, Den Haag, the Netherlands, 17 November 2008, lecture.
- Bais, F.A., *Sublieme eenvoud*, Bonaventura College, Leiden, the Netherlands, 4 December 2008, lecture.
- Dijkgraaf, R.H., *De ochtend*, Radio Noord Holland, the Netherlands, 17 January 2008, interview.
- Dijkgraaf, R.H., *Tot hoever kun je tellen?*, Nemo, Amsterdam, the Netherlands, 20 January 2008, kinderlezing.
- Dijkgraaf, R.H., *Tekort aan technisch talent*, Radio 1, the Netherlands, 26 February 2008, interview.
- Dijkgraaf, R.H., *De onredelijke effectiviteit van de fysica in de moderne wiskunde*, Leidsche Flesch, Leiden, the Netherlands, 9 April 2008, lezing.
- Dijkgraaf, R.H., *Leve de Wiskunde: Flatland II: de vierde dimensie*, UvA, Amsterdam, the Netherlands, 25 April 2008, lezing.
- Dijkgraaf, R.H., *De wereld draait door*, Nederland 3, the Netherlands, 28 April 2008, interview.
- Dijkgraaf, R.H., *Wetenschap, technogie en ruimtelijke ordening*, Forum Stedelijke Vernieuwing, Amsterdam, the Netherlands, 20 May 2008, talk.
- Dijkgraaf, R.H., *Leermeesters*, Noorderlicht Radio, the Netherlands, 23 June 2008, interview.
- Dijkgraaf, R.H., *Het gesprek*, Televisie, the Netherlands, 3 July 2008, interview.
- Dijkgraaf, R.H., *De zwoele stad*, AT5 Televisie, the Netherlands, 15 July 2008, interview.
- Dijkgraaf, R.H., *Kennis en innovatie*, Saint Paul de Vence, France, 25 August 2008, talk.
- Dijkgraaf, R.H., *Energie*, Future Planet Studies, Amsterdam, the Netherlands, 2 September 2008, lezing.
- Dijkgraaf, R.H., *Nova*, Televisie, the Netherlands, 10 September 2008, interview.
- Dijkgraaf, R.H., *De wereld draait door*, Televisie, the Netherlands, 12 September 2008, interview.
- Dijkgraaf, R.H., *De kennisbegroting*, NWO, Den Haag, the Netherlands, 17 September 2008, lezing.
- Dijkgraaf, R.H., *Tot hoever kun je tellen?*, Naturalis, Leiden, the Netherlands, 26 October 2008, kinderlezing.
- Dijkgraaf, R.H., *Canondebat*, Paleis voor Schone Kunsten, Brussel, Belgium, 17 November 2008, talk.
- Dijkgraaf, R.H., *Faust*, Wintertuin Festival, Nijmegen, the Netherlands, 21 November 2008, tweegesprek met Harry Mulisch.
- Dijkgraaf, R.H., *Spinozadebat*, Teleac Televisie, the Netherlands, 26 November 2008, interview.
- Dijkgraaf, R.H., *De bovenkamer*, Teleac Televisie, the Netherlands, 28 November 2008, interview.

- Dijkgraaf, R.H., *Blikwisselingen*, Amsterdam: Bert Bakker, 2008, book.
- Kleiss, R., *Relativiteitstheorie*, Canisiuscollege, Nijmegen, the Netherlands, 11 January 2008.
- Kleiss, R., *Tijd en ruimte van elementaire deeltjes*, Studium Generale University of Twente, the Netherlands, 12 February 2008.
- Kleiss, R., *Antimaterie*, Vereniging Vesta, Oostzaan, the Netherlands, 21 February 2008.
- Kleiss, R., *Tijd en ruimte*, Montessori College, Nijmegen, the Netherlands, 7 March 2008.
- Kleiss, R., *Tijd en ruimte*, Dendron College Horst, the Netherlands, 9 April 2008.
- Kleiss, R., *Relativiteitstheorie*, Overbetuwe College, Nijmegen, the Netherlands, 17 April 2008.
- Kleiss, R., *Het geheim van de topdocent*, Marieke Haakes interview met Wim Beenakker De Gelderlander, the Netherlands, 20 May 2008.
- Kleiss, R., *Relativiteitstheorie*, Marie Curie, Nijmegen, the Netherlands, 24 May 2008.
- Kleiss, R., *Het Higgs boson*, Science Café, Enschede, the Netherlands, 10 December 2008.
- Morais Smith, C., *Me and you, choreographies, games and exercises*, talk about diagrams in physics, participation on part of the Art Event, by Ricardo Basbaum "Re-projecting Utrecht", 20 April 2008.
- Morais Smith, C., *Sociology of electrons*, College van Bestuur of the Utrecht University, the Netherlands, 20 April 2008, talk.
- Nienhuis, B., *Entanglement in a spin chain*, De Theorie Club, Leiden, the Netherlands, 7 March 2008, talk.
- Nieuwenhuizen, T.M., *De grootste zwarte gaten*, Viva Fysica, Amsterdam, the Netherlands, 1 February 2008, talk.
- Pallante, E., Interview for an article on LHC Physics for the Groningen University Journal UK, 2008.
- 't Hooft, G., Interview Robert Dijkgraaf and Gerard 't Hooft, being the Master and the Student, by Peter van der Wielen (VPRO Noorderlicht), Studio Desmet, Amsterdam, the Netherlands, 23 June 2008.
- 't Hooft, G., *Succeed in science*, 100th Annual of the Swiss Physical Society, Bern, performance with Heinrich Rohrer (fysica 1986) answering questions of scholars, Bern, Switserland, 27 June 2008.
- 't Hooft, G., 58th Meeting of Nobel Laureates in Lindau: press conference and several interviews with journalists, 29 June-4 July 2008.
- 't Hooft, G., Press meeting in Lindau on LHC met J. Engelen, L. Evans, M. Veltman, D. Gross, C. Rubbia, G. Smoot, Lindau, Austria, 1 July 2008.
- 't Hooft, G., Interview with Pescara local paper Il Centro, *La citta premia il terzo Nobel*, 9 July 2008.
- 't Hooft, G., *Brains@Work Academy*, talk for scholars, Oktober kennismaand, *Elementaire deeltjes en de large hadron collider*, Hogeschool van Rotterdam, the Netherlands, 1 October 2008.
- 't Hooft, G., *Elementaire deeltjes en de large hadron collider*, openings talk Kennis op Zondag, Nemo, Amsterdam, organized by KNAW, NWO and the Volkskrant,

the Netherlands, 12 October 2008.
– 't Hooft, G., Answering questions of scholars (age 7-13), Klokhuis Vragendagen, Nemo, Amsterdam, the Netherlands, 9 November 2008.
– 't Hooft, G., Visit to the Dutch School in Singapore, presentation and answering questions about elementary particles and planets from scholars, 26 November 2008.
– 't Hooft, G., Interviews with selected journalists and signature in the "Golden Book of the City", Santago de Compostella, Spain, 15 and 16 December 2008.
– van der Schaar, J.P., *Iets uit niets*, Lezing Sterrenwacht Oostzaan, Oostzaan, the Netherlands, 18 October 2008, talk.
– van der Schaar, J.P., *Donkere energie*, NSA Energie Symposium, Amsterdam, the Netherlands, 5 November 2008, talk.

8 Research funding

Below an overview is presented of funding organizations that financially supported the research of the DRSTP in 2007. Regular university funding is not listed.

8.1 Personal grants

University grants

- High Potentials grant UU, R. van Roij (UU) (2005-2010)

KNAW

- Academy professorship, G. 't Hooft (UU) (2005-2010)

NWO

- Spinoza grant (1999), C.W.J. Beenakker (UL) (2000-2009)
- Spinoza grant (2003), R.H. Dijkgraaf (UvA)(2004-2008)
- Spinoza grant (2006), J. Zaanen (UL) (2006-2011)
- VICI grant (2002), H.T.C. Stoof (UU) (2003-2008)
- VICI grant (2003), A. Achúcarro (UL) (2004-2009)
- VICI grant (2004), R. Loll (UU) (2005-2010)
- VICI grant (2007), C. Morais Smith (UU) (2008-2013)
- VICI grant (2008), K. Skenderis (UvA) (2009-2013)
- VIDI grant (2004), K.E. Schalm (UvA/UL) (2005-2009)
- VIDI grant (2004), M.M. Taylor (UvA) (2005-2009)
- VIDI grant (2005), K. Peeters (UU) (2006-2011)
- VIDI grant (2007), R.A. Duine (UU) (2008-2013)
- VIDI grant (2008), D. Roest (RUG) (2008-2013)
- VENI grant (2006), L.F. Alday (UU) (2006-2008)
- VENI grant (2006), J. Baptista (UvA) (2006-2010)
- VENI grant (2007), M. Das (VUA) (2007-2011)
- VENI grant (2007), A.S. de Wijn (RU) (2008-2011)
- VENI grant (2008), P.L. McFadden (UvA) (2008-2010)
- VENI grant (2008), M. Snoek (UvA) (2009-2011)

ERC Starting grant

- R. Duine (UU), *New frontiers in spintronics*, (2008-2013)

EU Marie Curie fellowships

- B. Dittrich (UU), *Observables in quantum gravity*, (1 September 2008 - 1 April 2009)

- H. Sahlmann (UU), *Non-perturbative path integrals for quantum gravity*, (18 October 2006 - 18 October 2008)
- T. Quella (UvA), *Conformal field theories with Lie superalgebra symmetry and string backgrounds with fluxes*, (1 September 2007 - 1 September 2009)

Other fellowships
- P. Höhn (UU), recipient of a German DAAD Doktorandenstipendium 2008.
- K. Hristov (UU), KNAW Huygens Scholarship, (1 September 2008 - 1 September 2010)

8.2 FOM funding

- **FOM-A-01** (group leader F.A. Bais)
Fundamental interactions (FOM programme 31)
02FI10: Non-abelian electric-magnetic symmetry (F.A. Bais)
02FI11: Fundamental interactions (J. Smit)

- **FOM-A-05** (group leader B. Nienhuis)
Collective and cooperative statistical physical phenomena (FOM programme 46)
04CCSPP26: Correlations in groundstates without finite size corrections (B. Nienhuis)

- **FOM-A-13** (group leader A.M.M. Pruisken)
Strongly interacting condensed matter (FOM programme 34)
02SIC15: Studying duality and topological excitations in disordered materials (A.M.M. Pruisken)

- **FOM-A-15** (group leader Th.M. Nieuwenhuizen)
Strongly interacting condensed matter (FOM programme 34)
02SIC16: Thermodynamics and measurement in the quantum world: challenging the validity of standard knowledge (Th.M. Nieuwenhuizen)

- **FOM-A-20** (group leader E.P. Verlinde)
String theory and quantum gravity (FOM programme 57)
01STQG01: Thermodynamics of strings, fluxes and branes (R.H. Dijkgraaf and J. de Boer)
02STQG08: String theory beyond supergravity (J. de Boer)
Projectruimte
02PR2149: String theory and cosmology (J. de Boer)
03PR2266: Supersymmetric gauge theories and matrix models (R.H. Dijkgraaf and J. de Boer)
04PR2387: Connecting gauge interactions with gravity through string theory (R.H. Dijkgraaf and E.P. Verlinde)
06PR2510: Cosmological vacua in string theory (R.H. Dijkgraaf and E.P. Verlinde)
08PR2647: Topological computations for supersymmetric theories (J. de Boer)

- **FOM-A-25** (group leader K. Schoutens)
Collective and cooperative statistical physical phenomena (FOM programme 46)
04CCSPP23: The challenges of the chiral metal (J.-S. Caux)
04CCSPP24: Collective behavior vs entanglement in atomic matter (K. Schoutens)
Solid state quantum information processing (FOM programme 73)
08QIP07: Topological quantum computation in fractional quantum Hall effect devices (K. Schoutens)
Projectruimte
08PR2566: Cracking the quantum quench (J.-S. Caux)
08PR2585: Topological quantum registers (K. Schoutens)
08PR2627: A new launch pad for renormalization (J.S. Caux)
FOM-Springplankplaatsen
02SP002: Dynamica van sterkgecorreleerde systemen in de gecondenseerde materie (J.-S. Caux)

- **FOM-G-01** (group leader E.A. Bergshoeff)
Fundamental interactions (FOM programme 31)
02FI12: Braneworlds (E.A. Bergshoeff/M. de Roo)
String theory and quantum gravity (FOM programme 57)
01STQG03: String theory and quantum gravity (E.A. Bergshoeff/M. de Roo)
02STQG06: Towards a formulation of coinciding M5-branes (E.A. Bergshoeff/ M. de Roo)

- **FOM-G-18** (group leader A.C.D. van Enter)
Mathematical physics (FOM/GBE programme 11)
99MF02: States and metastates in disordered lattice systems (M. Winnink/ A.C.D. van Enter)

- **FOM-L-05** (group leader C.W.J. Beenakker)
Photons in complex media (FOM Programme 45-2)
07WCM09: Photons in complex media: theory (C.W.J. Beenakker)
Graphene-based electronics (FOM Programme 101)
07GE02: Quantum transport in graphene (C.W.J. Beenakker)
Solid state quantum information processing (FOM Focusgroep)
08SSQIP: Nonlocally encoded qubits in topological insulators and graphene (C.W.J. Beenakker)
Projectruimte
04PR2285: Controlled quantum entanglement in the Fermi sea (C.W.J. Beenakker)
05PR2407: Antibunched and entangled microwaves in nanostructures (C.W.J. Beenakker)
06PR2504: Mesoscopic physics in graphene (C.W.J. Beenakker)
08PR2601: Electronic shot noise in fractal conductors' (C.W.J. Beenakker)

- **FOM-L-07** (group leader W. van Saarloos)
Collective and cooperative statistical physical phenomena (FOM programme 46)

04CCSPP15: Efficient statistical physical models for simulating macroscopic viscoelastic flow instabilities and turbulence (W. van Saarloos)
04CCSPP18: Quantum phases of ultracold strongly interacting atoms (P.J.H. Denteneer)
Physics of granular matter (FOM Programme 63)
07PGM17: Response and scaling behavior of dense granular media near the jamming transition (W. van Saarloos)
Rheophysics: connecting jamming and rheology (FOM programme 102)
07CJR07: Competition of jamming and shear banding (W. van Saarloos)
Innovative physics for oil and gas (FOM/SHELL programme 116)
08iPOG02: Nonlinear waves and quasi-localized resonances in disordered granular media (W. van Saarloos & M. van Hecke)
Projectruimte
05PR2438: When soft condensed matter gets hard: the "jamming transition" in granular media (W. van Saarloos)

- **FOM-L-15** (group leader J. Zaanen)
Collective and cooperative statistical physical phenomena (FOM programme 46)
04CCSPP13: Quantum phase transitions and fermion signs (J. Zaanen)
Projectruimte
04PR2295: Stripe fractionalization: the quest for emergent gauge principle (J. Zaanen)

- **FOM-L-26** (group leader H. Schiessel)
Material properties of biological assemblies (FOM programme 90)
05MPBA09: Theory of the role and behavior of membranes in composite systems (H. Schiessel)
06PR2465: Statistical mechanics of semiflexible biopolymers under tension and compression (H. Schiessel)

- **FOM-L-30** (group leader J. van den Brink)
Collective and cooperative statistical physical phenomena (FOM programme 46)
04CSSPP31: Orbital physics in oxides: novel types of quantum order (J. van den Brink)
Projectruimte
04PR2358: Does spontaneous symmetry breaking limit quantum coherence? (J. van den Brink)
FOM-Springplankplaatsen
02SP001: FOM-Springplankplaats (J. van den Brink)

- **FOM-N-01** (group leader R.H.P. Kleiss)
Fundamental interactions (FOM programme 31)
02FI15: Fundamental interactions (R. Kleiss)
Theoretical particle physics in the era of the LHC (FOM programme 104)
07TPP02: Higgs+SuSy (R. Kleiss)

- **FOM-N-09** (group leader M.I. Katsnelson)
Graphene-based electronics (FOM Programme 101)
07GE03: Graphene - based electronics (M.I. Katsnelson)
Projectruimte
05PR2427: Magnetic adatom clusters on metal surfaces as tunable many-body systems (M.I. Katsnelson)
06PR2481: Graphene: the two dimensional crystal that should not exist (A. Fasolino)

- **FOM-U-01** (group leader G. 't Hooft)
Fundamental interactions (FOM programme 31)
02FI17: Fundamental interactions (G. 't Hooft)
Theoretical particle physics in the era of the LHC (FOM programme 104)
07TPP03: Naturalness and fundamental vs composite scalars (G. 't Hooft)

- **FOM-U-05** (group leader H.T.C. Stoof)
Projectruimte
08PR2587: Ultracold Fermi gases and neutron stars (H.T.C. Stoof)

- **FOM-U-07** (group leader H. van Beijeren)
Collective and cooperative statistical physical phenomena (FOM programme 46)
00CCSPP09: Nonequilibrium systems and SRB measures (H. van Beijeren)

- **FOM-U-29** (group leader B. de Wit)
String theory and quantum gravity (FOM programme 57)
01STQG02: New approaches to hypermultiplets/local field theory couplings of BPS states (B. de Wit)
02STQG09: Non-perturbative quantum black holes (R. Loll)
02STQG10: Instantons in string theory (S. Vandoren/G. 't Hooft)
Projectruimte
07PR2522: What curves the space-time at large scales? The quest for the origin of dark energy of the universe (T. Prokopec)
08PR2578: A reality check for quantum cosmology (R. Loll)

- **FOM-U-31** (group leader R. van Roij)
Structure, function and flow of soft materials (FOM programme 27)
01SFFSM30: Phase behaviour, structure and dynamics of colloidal suspensions (R. van Roij)
Innovative physics for oil and gas (FOM/SHELL programme 116)
08iPOG08: Electrokinetics and electroacoustics near oil-water interfaces in porous media (R. van Roij)
Projectruimte
03PR2241: Inhomogenous suspensions of charged colloids: voids, sedimentation, wetting and nucleation (R. van Roij)
FOM/DFG Physics of colloidal dispersions in external fields (FOM programme 61)
in collaboration with DFG (transregio SFB 6018)
Duration: 2002-2008

Scientist in charge: A. van Blaaderen (UU)
Coordinator DFG: H. Löwen (Düsseldorf, Germany)
Participating theorist: R. van Roij (UU)

- **FOM-V-01** (group leader P.J. Mulders)
Fundamental interactions (FOM programme 31)
02FI18: Fundamental interactions (P.J. Mulders)
Theoretical particle physics in the era of the LHC (FOM programme 104)
07TPP04: Theoretical particle physics in the era of the LHC (D. Boer and P.J. Mulders)
Projectruimte
04PR2302: Exposing the color glass condensate (D. Boer)
05PR2422: Time reversal odd phenomena in quantum chromodynamics (P.J. Mulders)
07PR2547: Color flow in hard hadronic scattering processes (P.J. Mulders)

- **FOM-V-13** (group leader F.C. MacKintosh)
Biomolecular physics (FOM programme 60)
03BMP23: Micromechanics and active response of biopolymer networks (F.C. MacKintosh)
Material properties of biological assemblies (FOM programme 90)
05MPBA04: Cytoskeletal/filamentous protein networks and assemblies (F.C. MacKintosh)
05MPBA06: Microrheology and non-equilibrium fluctuations of active cytoskeletal networks (F.C. MacKintosh/G. Koenderink)
05MPBA10: Guest budget (F.C. MacKintosh)
05MPBA11: Personal budget, program leader (F.C. MacKintosh)
Rheophysics: connecting jamming and rheology (FOM programme 102)
07CJR03: Modelling of non-affine deformations and flow (F.C. MacKintosh)

8.3 EU-networks

- Fundamentals of nanoelectronics (MRTN-CT-2003-504574)
Duration: 2004-2008
Network coordinator: University of Lancaster, UK
Scientist in charge for UL: C.W.J. Beenakker

- Soft matter composites-an approach to nanoscale functional materials (6th framework programme, network of excellence 502235-2)
Duration: from 01-06-2004 until 01-06-2009
Network coordinator: D. Richter (Jülich, Germany)
Scientists in charge: A. van Blaaderen/H. Lekkerkerker
Participating theorist: R. van Roij (UU)

- Constituents, fundamental forces and symmetries of the universe (MRTN-CT-2004-005104)
  Duration: from 01-11-2004 until 31-10-2008
  Network coordinator: D. Lüst (Munich, Germany)
  Scientist in charge for RUG: E.A. Bergshoeff
  Scientist in charge for UU: B. de Wit

- Superstring theory (MRTN-CT-2004-512194)
  Duration: from 01-01-2005 until 31-12-2009
  Network coordinator: L. Brink (Göteborg, Sweden)
  Scientist in charge for UvA: R.H. Dijkgraaf
  Scientist in charge for UU (associated with UvA): G. 't Hooft

- European network on random geometry (MRTN-CT-2004-005616)
  Duration: from 01-09-2005 until 31-08-2009
  Network coordinator: R. Loll (UU)

- HEPTOOLS (MRTN-CT-2006-035505)
  Duration: from 01-12-2006 until 30-11-2010
  Network coordinator: Dr. C.G. Papadopoulos (NRCS Dimokritos, Greece)
  Scientist in charge for RU: R.H.P. Kleiss

- Flavour Physics Training network FLAVIAnet
  Duration: 2006 -
  Network coordinator: A. Pich (Valencia U., Spain)
  Scientist in charge for RUG (associated with Valencia): E. Pallante

8.4 ESF

- Programme towards atomistic materials design (Psi-k) (ESF)
  Duration: 2003-2008
  Network coordinator: V. Heine (Cambridge)
  Scientist in charge for UL: C. Filippi

- Interdisciplinary statistical and field theory approaches to nanophysics and low dimensional systems (INSTANS)
  Duration: 2005-2010
  Network coordinator: G. Mussardo (SISSA, Trieste).
  Scientist in charge for UvA: K. Schoutens

8.5 Other

NWO

- Mathematical Physics project (D. Lenstra, B. Krauskopf) (VUA)

- Dynamics of patterns: delay dynamics of laser patterns (K. Green)

- Top-talent: (T. van Dijk)(VUA)

- Geometric aspects of quantum theory and integrable systems
  (NWO-047017015)
  Duration: from 30-10-2005 until 30-10-2008
  Network coordinator: G. Helminck (University of Twente)
  Scientist in charge: G. Arutyunov (UU)

- NWO ECHO grant: Charged colloidal rods in suspension: screening, twisting, demixing, and ordering, R. van Roij (UU) (2008-2012)

- NWO Mozaikbeurs C. Wever

- NWO visitor grant: Hidden symmetries and their relation to black hole entropy (B63-252)
  K. Maharana (Utkal University, Bhubaneswar, India)
  1 May 2007 - 1 July 2007
  host: G. 't Hooft

- NWO visitor grant: Extremal black holes and entropy in string theory (B66-148)
  S. Mahapatra (Utkal University, Bhubaneswar, India)
  1 May 2007 - 1 July 2007
  host: B. de Wit

STW

- VTF 7803 (T. Visser) (VUA): Using light better (T. Stegeman and S. Raghunathan)
- ETC 5963 (D. Lenstra) (VUA): Towards ultrafast communication (Freeband Communication Programme) (W. Wang)

INTAS

- Strings, branes and higher-spin gauge fields (INTAS-03-51-6346)
  Duration: from 01-11-2004 until 31-10-2007
  Network coordinator: A. Sagnotti (Rome)
  Scientist in charge: B. de Wit (UU)

- Extended supersymmetry, strings and non-commutativity in field theory (INTAS-05-1000008-7928)
  Duration: 2006-2008
  Scientist in charge: E. Bergshoeff (RUG)

UU grant

- Prestige masters grant (UU) (2004-2008)

9 | Organisation DRSTP 2008

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Bureau:

W.L. Verweij	030-2535916	w.l.verweij@uu.nl

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prof. dr. D. Nelson, Harvard University, Cambridge, USA
prof. dr. S. Sachdev, Harvard University, Cambridge, USA
prof. dr. G. Sawatzky, University of British Columbia, Vancouver, Canada *until December '08)*
prof. dr. G. 't Hooft, Utrecht University, Utrecht, the Netherlands
prof. dr. F. Wilczek, Massachusetts Institute of Technology, Cambridge, USA *until December '08)*

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representative PhD students council		

PhD student council:

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10 | Addresses

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Appendix A
Mission statement

Objectives

The Dutch Research School of Theoretical Physics (DRSTP) is a cooperation between the theoretical physics groups of six Dutch universities with the following purpose:

- to implement a joint programme of graduate education in theoretical physics that draws upon a dynamic research environment;
- to maintain and strengthen research in theoretical physics from a broad unifying perspective that exploits the interrelationships between different fields of theory;
- to strengthen, both in research and graduate education, connections with experimental physics, and other disciplines such as mathematics, computational science, astrophysics, earth science, physical chemistry and the life sciences.

The DRSTP is based on the conviction that a joint venture of all the moderately sized local theory groups, each with its own profile, offers added value for the achievement of these objectives. The DRSTP represents a sizable part of the national activity in theoretical physics, a field that has a strong tradition in the Netherlands. At present there exists no other organization that represents this field of research at the national level. The DRSTP welcomes further growth, for instance, by cooperation with institutions in neighbouring countries that share these goals. Often its educational activities already attract students from neighbouring countries and occasionally some of these activities are based on a close collaboration with partners abroad.

Mandate

The governing board of the DRSTP, which consists of representatives of the partners, is responsible for undertaking any suitable initiative to further its goals. The scientific director of the DRSTP is responsible for implementing the overall policy on behalf of the board and for coordinating the DRSTP activities. The mandate to carry out these tasks is based on an official agreement between the boards of the participating universities, as a result of which the DRSTP has been accredited by the Royal Netherlands Academy of Arts and Sciences (KNAW) in June of 1994 and re-accredited in 1999 and 2004. The agreement guarantees means for a six year period in terms of explicit staff commitments as well as graduate student positions. The DRSTP is assisted in its endeavor by an international advisory committee of distinguished scientists.

Research

Theoretical physics is based on universal principles. New concepts often have a much wider validity than in the field in which they are discovered, and methods developed in one field are sometimes very useful in another. Hence theoretical physics is characterized by unity in diversity.
The research fields of the DRSTP are highly diverse, ranging from the physics at the very smallest length scales to the large scale structure of space and time, and from the study of building blocks of matter to the intricacies of the many-body physics of condensed matter, be it quantum matter, soft matter or bio-matter.
The methods employed in these various fields make up the universal language of theoretical physics: formalisms such as the renormalization group and quantum field theory, and various concepts of statistical, computational and mathematical physics are universally applied and establish cross-talk among the research fields.
The research areas covered by the DRSTP can be grouped into the following broad and overlapping themes:

- Theme 1: Particle physics, cosmology, quantum gravity and string theory.
- Theme 2: Quantum matter, quantum information, soft condensed matter and biophysics.

The specific content of the research programme depends on the responsible project leaders, on their creativity as well as their initiative to obtain research funding from their home universities, the Dutch research councils of NWO, or from international sources such as European Union programmes.
The research programme is carried out under the responsibility of the governing board and the scientific director in accordance with the agreement. The governing board of the DRSTP safeguards the objectives of the research school. It monitors the overall coherence and quality of the research programme. The board discusses periodically whether the programme remains on the forefront of international developments. The scientific advisory committee plays an essential part in these matters.
The DRSTP is also accountable to the faculties of the participating universities. Therefore it reports regularly on past and planned activities, both in research and graduate education, on the basis of information presented in its yearly reports.

Graduate programme

The six universities in the DRSTP offer a joint programme of graduate education leading to a PhD. As part of the research training, under the supervision of a member scientist in a participating university, the Research School guarantees a wide range of educational opportunities for its PhD students. They consist of advanced courses, seminars and topical courses in the Netherlands, and international experience in the form of workshops, summer schools or extended research visits abroad.
The governing board of the DRSTP decides on admission and monitors the evaluation of progress with a prognosis of ultimate success after the first year. This takes place on the basis of an "agreement of education and guidance" between each individual PhD student and its supervisor(s), to be submitted to and approved by the board upon admittance.
A board of education advises the governing board. It also assembles the content of the yearly programme of regular activities. Standard advanced courses are published in

a nationwide survey. Special PhD courses are offered within the DRSTP, in quantum field theory, statistical physics and in theoretical condensed matter physics, or result from joint efforts with other research schools.
The input of graduate students in the school takes place in the form of a graduate student council that meets regularly with the director and the chairman of the governing board and board of education (which also has one student member).
Individual members of the DRSTP play a pivotal role in helping to organize many summer schools and workshops, in the Netherlands as well as abroad, and in serving as teachers in all the activities that the DRSTP undertakes by itself or in cooperation with others.

Other responsibilities

The responsibilities of the DRSTP includes:

- the promotion of a stimulating research environment in theoretical physics
- setting uniform standards of quality
- making educational supplements available tailored to individual research needs.

The board also develops a wide range of activities in order to support an exciting research climate from fund-raising, e.g. for postdoctoral fellows, guest teachers or international mobility of DRSTP students, to the selection of visiting professors, for example on the Kramers (UU), Lorentz (UL) or Van der Waals (UvA) Chairs.

Appendix B
Selection and supervision procedure of PhD students

Selection and supervision of PhD students
When a PhD research position opens up at one of the participating universities, there is usually an open round of applications. Important criteria in the selection procedure are the potential of the student for doing independent scientific research and the level and skills demonstrated in the master programme.
Admission to the DRSTP requires to submit a 'plan for training and supervision' [opleidings- en begeleidingsplan], containing a global description of educational activities with details provided for the first year. The plan also specifies how individual guidance will be provided under responsibility of the thesis advisor. The Research School safeguards a consistent implementation of the agreement, with uniform standards. The plan has to be submitted to the DRSTP bureau. Formal admission is subject to approval by the governing board.
After one year the progress is evaluated, based on an interview with the thesis advisor and an independent second referee. The school safeguards this procedure without interfering with the responsibilities of the employer. Participation in the educational programme is an explicit element of the evaluation: students are expected to attend at least two DRSTP postgraduate schools and the DRSTP symposium *Trends in Theory*. The outcome of the evaluation will reflect on whether the student will be able to complete the research programme within the amount of time allotted. If the prognosis is negative, the student will be asked to leave the DRSTP. Such outcomes should be, and are, extremely rare provided proper care is given to the initial selection.
A student can appeal a negative evaluation with the governing board of the school; a decision will be reached within one month. If the student does leave the school before completing the PhD, a diploma, specifying the student's accomplishments in the educational programme, will be provided.
After the first year, throughout the duration of the PhD project, the progress will be closely monitored, for example by additional yearly evaluation interviews.

Appendix C
Postgraduate AIO/OIO schools

Theoretical High Energy Physics

Date:
28 January - 8 February 2008

Location:
Hotel & conference center De Bergse Bossen, Driebergen, the Netherlands

Scientific organisers:
D. Boer (VUA); R. Loll (UU)

Lecturers:
R. Harlander (Wuppertal): *Higgs physics at higher orders*
D. Litim (Sussex): *Functional renormalisation group and applications*
M. Taylor (UvA): *Black objects in string theory*
R. Timmermans (RUG): *Precision tests of the standard model*

Guest lecturers:
H. Stoof (UU): *About ultracold Fermi gases and neutron stars*
A. Achúcarro (UL): *Cosmology with strings attached*

Participants (24):
Atmaja, Ardian Nata (UL)
Boomsma, Jorn (VUA)
de Adelhart Toorop, Reinier (NIKHEF)
de Leeuw, Marius (UU)
Deuzeman, Albert (RUG)
Gaasbeek, Bram (KU Leuven)
Hardeman, Sjoerd (UL)
Kadosh, Avihay (RUG)
Katmadas, Stefanos (UU)
Koksma, Jurjen (UU)
Looyestijn, Hugo (UU)
Machado, Pedro (UU)
Maio, Michele (NIKHEF)
Nutma, Teake (RUG)
Oberreuter, Johannes (UvA)
Reska, Paul (UU)
Stoica, Simona (KVI)
van de Meent, Maarten (UU)
van den Oord, Gijs (NIKHEF/RU)
van Herck, Walter (KU Leuven)
van Rees, Balt (UvA)
van Zalk, Maaike (UU)
Vercnocke, Bert (KU Leuven)
Wansbeek, Lotje (KVI)

Student presentations:
Ardian Nata Atmaja (UL): *Photon production in AdS/QCD*
Jorn Boomsma (VUA): *Spontaneous CP-violation in the strong interaction at $R = Y$*
Reinier de Adelhart Toorop (NIKHEF): *The sigmamodel on $SU(8)/(SU(5) \times SU(3) \times U(1))$*
Marius de Leeuw (UU): *The Bethe Ansatz in AdS/CFT*
Bram Gaasbeek (KU Leuven): *Scaling solutions for multi center black holes*
Sjoerd Hardeman (UL): *Stability of uplifted supergravity potentials*
Avihay Kadosh (RUG): *The quest for "Thick" FRW branes, a step towards a dynamical model of our universe*
Jurjen Koksma (UU): *The scalar field kernel in cosmological spaces*
Hugo Looyestijn (UU): *On volume stabilization with NSS-branes*
Pedro Machado (UU): *Functional RG equations and f(R) gravity*
Teake Nutma (RUG): *Kac-Moody algebras & gauged supergravities*
Johannes Oberreuter (UvA): *Entropy function for rotating black holes*
Paul Reska (UU): *Embedding a Schwarzschild mass into cosmology*
Maarten van de Meent (UU): *The S-matrix ansatz for black evolution*
Gijs van den Oord (NIKHEF/RU): *Vector bosons at the LHC*
Balt van Rees (UvA): *Real-time AdS/CFT*
Maaike van Zalk (UU): *Lagrangians with electric and magnetic charges*
Bert Vercnocke (KU Leuven): *First order formalism for branelike supergravity solutions*
Lotje Wansbeek (KVI): *Atomic parity violations*

Statistical Physics and Theory of Condensed Matter

Date:
7 - 11 April 2008

Location:
Hotel & Conference Center De Bergse Bossen, Driebergen, the Netherlands

Scientific organisers:
J.S. Caux (UvA); J. van den Brink (UL); R. van Roij (UU)

Lecturers:
W. Briels (Twente): *Dynamics in complex fluids*
M. Mostovoy (RUG): *Frustrated magnetism and magnetoelectric effects*
B. Mulder (AMOLF): *Classical density functional theory and symmetry breaking transitions*
D. Santiago (UL): *Quantum criticality*

Guest lecturer:
J.P. van der Schaar (UvA): *Our prepostorous universe: facts and challenges*

Participants (22):
Ament, Luuk (UL)
Amuasi, Henry (TU/e)
Artyukhin, Sergey (RUG)
Bardarson, Jens (UL)
Boon, Niels (UU)
Diederix, Jeroen (UU)
Ferrantini, Allessandro (KU Leuven)
Henriksson, Andreas (UL)
Hriscu, Alina (RUG)
Huisman, Liesbeth (UL)
Klauser, Antoine (UL)
Makogon, Dmytro (UU)
Mesaroš, Andrej (UL)
Sepkhanov, Ruslan (UL)
Sharma, Abhinav (TU/e)
She, Jian-Huang (UL)
Swaving, Aaron (UU)
Torres Valderrama, Aldemar (UU)
van der Holst, Jeroen (TU/e)
van der Vegte, Michiel (RUG)
Xiao, Jiang (TU Delft)
Žeravčić, Zorana (UL)

Student presentations:
Luuk Ament (UL): *L-edge magnetic RIXS on LCO*
Sergey Artyukhin (RUG): *Transition from exciton to magneto-exciton in copper oxide*
Jens Bardarson (UL): *Smooth disorder and graphene*
Niels Boon (UU): *Spherical colloids, on the charge due to porosity*
Jeroen Diederix (UU): *Superconductivity inside neutron stars*
Allessandro Ferrantini (KU Leuven): *The physics of DNA-microarrays*
Liesbeth Huisman (UL): *Modeling three-dimensional networks of semiflexible polymers*
Dmytro Makogon (UU): *Coupled quantum wires*
Abhinav Sharma (TU/e): *Temporal instability in organic thin-film transistors*
Jian-Huang She (UL): *Higgs effect in the worldline formalism*

Michiel van der Vegte (RUG): *Coexistence of two types of charge-density-waves in $VO2$*
Jiang Xiao (TU Delft): *Spin pumping and spin-transfer torque in magnetic tunneling junctions*
Zorana Žeravčić (UL): *Localization behavior of vibrational nodes in granular packings*

Appendix D
DRSTP PhD Day 2008

Date:
25 April 2008

Location:
Blauwe Zaal, Marinus Ruppert Building, Utrecht University, the Netherlands

Organisers:
PhD student council

Lecturers:
C. Broedersz (VUA): *Nonlinear squishiness of biological gels with flexible linkers*
L. Hollands (UvA): *Fermions on surfaces*
T. Janssen (UU): *Quantum field theory in the early universe*
Y. Malamos (RU): *OPP method: reduction to scalar integrals*
F. Pijlman (Philips) (ex-VUA): *From Wilson lines to validated consumer insights*
M. van der Vegte (RUG): *Incommensurate order induced by frustration in (spin-)Peierls systems*

A contest was held entitled: *Win a Ferrari-contest.*

Participants (57):
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Atmaja, Ardian (UL)
Beekman, Aron (UL)
Boomsma, Jorn (VUA)
Boon, Niels (UU)
Broedersz, Chase (VUA)
Budd, Timothy (UU)
de Leeuw, Marius (UU)
Diederix, Jeroen (UU)
Dijkstra, Arend (RUG)
Eggen, Eelco (UU)
Emanuel, Marc (UL)
Maio, Michele (NIKHEF)
Makogon, Dmytro (UU)
Malamos, Yiannis (RU)
Mehmani, Bahar (UvA)
Mulders, Piet (VUA)
Netjes, Mark (RU)
Nutma, Teake (RUG)
Oberreuter, J.M. (UvA)
Pijlman, Fetze (Philips)
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Schoutens, Kareljan (UvA)
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Stavenga, Gerben (UU)

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Hardeman, Sjoerd (UL)
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Hoogeveen, Joost (UvA)
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Janssen, Tomas (UU)
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Klauser, Antoine (UL)
Koksma, Jurjen (UU)
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Laenen, Eric (NIKHEF, UvA, UU)
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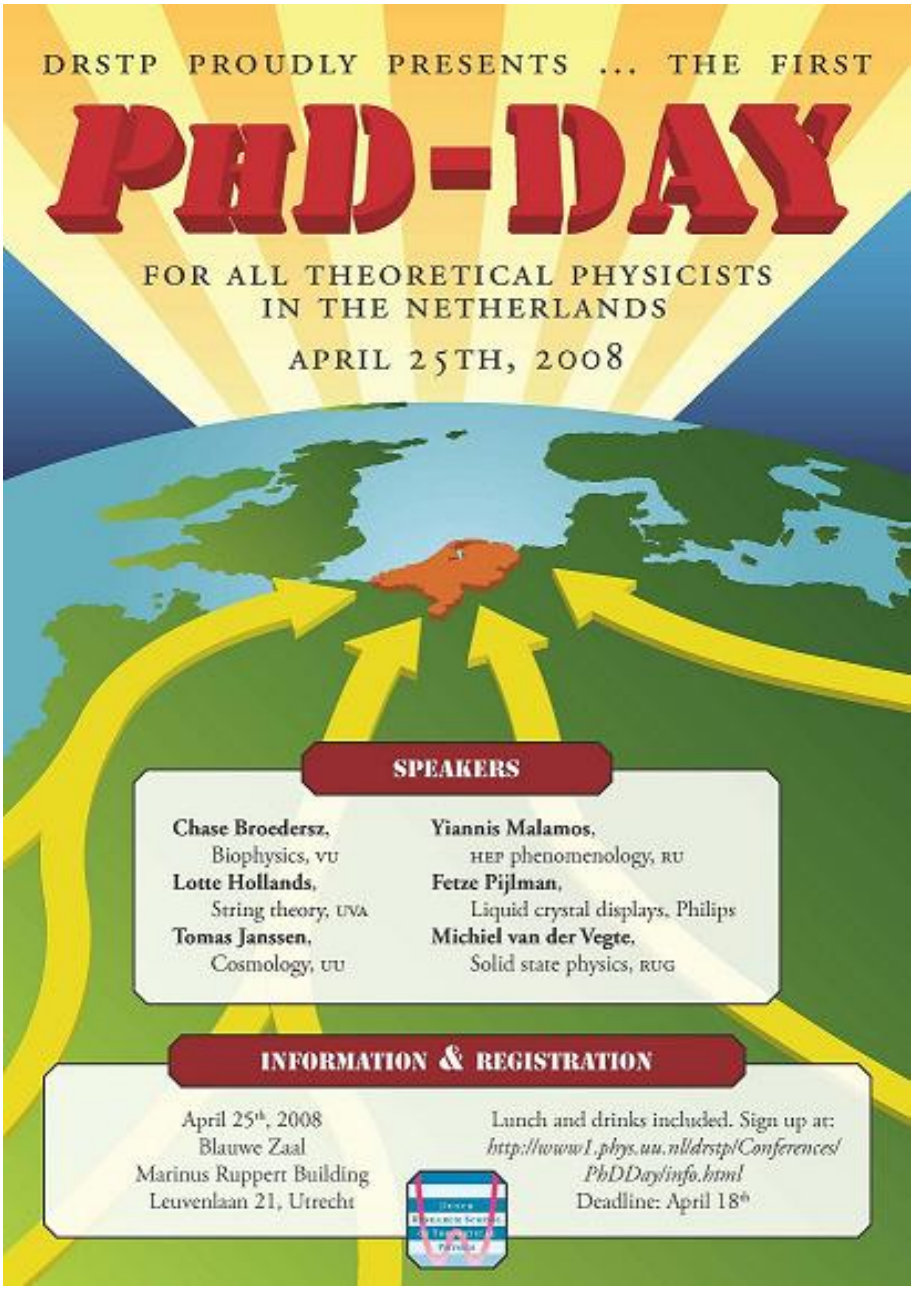
Looyestijn, Hugo (UU)
Machado, Pedro (UU)
Stegeman, Thijs (VUA)
Swaving, Aaron (UU)
van de Meent, Maarten (UU)
van den Oord, Gijs (RU/NIKHEF)
van der Vegte, Michiel (RUG)
van Dijk, Thomas (VUA)
van Kessel, Marcel (RU)
van Rees, Balt (UvA)
van Zalk, Maaike (UU)
Vlaming, Bas (RUG)
Wagenaar, Jan Willem (RU)
Wessels, Erik (VUA)
Zozulya, Oleksandr (UvA)
Zwanniken, Jos (UU)


DRSTP PROUDLY PRESENTS ... THE FIRST
PHD-DAY
FOR ALL THEORETICAL PHYSICISTS
IN THE NETHERLANDS
APRIL 25TH, 2008
SPEAKERS
Chase Broedersz,
Biophysics, VU
Lotte Hollands,
String theory, UVA
Tomas Janssen,
Cosmology, UU
Yiannis Malamos,
HEP phenomenology, RU
Fetze Pijlman,
Liquid crystal displays, Philips
Michiel van der Vegte,
Solid state physics, RUG
INFORMATION & REGISTRATION
April 25th, 2008
Blauwe Zaal
Marinus Ruppert Building
Leuvenlaan 21, Utrecht
Lunch and drinks included. Sign up at:
http://www1.phys.uu.nl/drstp/Conferences/PhDDay/info.html
Deadline: April 18th

Appendix E
National seminars

Condensed Matter Physics

- **Date:**
  10 October 2008

  Location:
  Campushotel Drienerburght, University of Twente, Enschede, the Netherlands

  Scientific organisers:
  H. Hilgenkamp (UT)

  Program:
  B. Rosenow (Harvard University and MPI Stuttgart): *Interactions and disorder in quantum Hall interferometers*
  A. Mosk (Twente): *Universal optimal transmission of light through disordered materials*
  K. Eikema (VUA): *Fundamental studies with femtosecond lasers*
  C. Mudry (PSI Villigen): *Electron fractionalization in two-dimensional graphene-like structures*

Theoretical High Energy Physics

- **Date:**
  11 April 2008

  Location:
  Amsterdam, NIKHEF-WCW, Turingzaal

  Scientific organiser:
  J. Smit (UvA)

  Program:
  S. Vandoren (UU): *String theory: perturbative and non-perturbative aspects*
  F. Aharonian (Dublin): *High-energy neutrinos*
  P. Mulders (VUA): *Time reversal odd phenomena in QCD*
  C. Bachas (Paris): *Spectrum-generating symmetries of string theory*

- **Date:**
  21 November 2008

  Location:
  Amsterdam, NIKHEF-WCW, Turingzaal

  Scientific organisers:
  A. Achúcarro (UL); D. Boer (VUA); J. de Boer (UvA)

  Program:
  B. de Wit (UU): *Supersymmetric black holes, the topological string, and all that*
  C. Quigg (Fermilab): *Worlds without Higgs*
  S. King (Southampton): *Exceptional supersymmetric standard models and non-abelian discrete family symmetry*
  J. Ambjørn (Niels Bohr Institute/Utrecht): *The self-organized quantum universe*

Appendix F
Shell Stipends

Shell Stipends Theoretical Physics 2008

Date:
16 October 2008

On Thursday, 16 October 2008 nine master students in Theoretical Physics were awarded a stipend from Shell.
Shell, together with the Dutch Research School of Theoretical Physics (DRSTP), recently launched a new stipend scheme to support young talented theoretical physicists in the Netherlands. The scheme has been laid out for a period of 3 years and incorporates about 10 stipends per year which will be granted to the best master students

in theoretical physics in the Netherlands.
Shell used to hire in the range of 5 to 10 physicists in the Netherlands per year and is concerned about the decline in number of students in basic and applied science in the Netherlands and Europe over the last few years. With these stipends Shell wishes to emphasize the importance of science education in the Netherlands and in particular the role played by the Dutch Research School of Theoretical Physics.
In the award ceremony held at Shell Epi Centre Rijswijk on October 16th dr. Dirk Smit, Shell R&D Manager for Exploration & Novel Technology, handed over cheques of Euro 2,000 to 9 master students who recently obtained their degree in the Netherlands.
Dr. Dirk Smit, the originator of the initiative, said: "Dutch Universities are well known to provide excellent education in physics. Especially theoretical physics has a long and successful history in The Netherlands and a number of groundbreaking scientific work has actually been done by Dutch physicists, including a number of Nobel laureates. The stipends are a contribution to help continue that tradition and encourage pupils to study physics."

The following students received a stipend:

Ted van der Aalst (UU)
Wouter Beugeling (UU)
Pawel Caputa (UvA)
Kiril Hristov (UU)
Martijn Mink (UU)
Jorn Mossel (UvA)
Louk Rademaker (UL)
Siebren Reker (RUG)
Jesper Romers (UvA)

Appendix G
Statistics

Statistics 2008

On 31 December 2008 eighty (80) PhD students were affiliated to the DRSTP. In 2008 twenty-three (23) PhD students joined the DRSTP.

Fifteen (15) PhD degrees were granted in 2008. The average duration of their PhD research (from start of contract to PhD exam date) was 50,0 months (49,5 in 2007).

Statistics 2003-2008

PhDs (AIO/OIO) granted
1 January 2003 - 31 December 2008

	2003	2004	2005	2006	2007	2008	Total AIO + OIO
Theme 1	6	7	9	7	7	8	44
Theme 2	7	6	10	12	5	7	47
Total	13	13	19	19	12	15	91

PhD efficiency

In the period 1 January 2003 - 31 December 2008, 91 PhD degrees were granted. Of these students 76% finished their PhD research within four years and six months. The full distribution is as follows:

within 4 years:	25	(27%)
within 4 years and 6 months:	44	(48%)
within 5 years:	14	(15%)
more than 5 years:	8	(9%)

The fraction of PhD degrees granted to women in the period 1 January 2003 - 31 December 2008 is 7%.

To monitor the PhD efficiency at a slightly longer time scale, we also present some data for the period 1 January 2001 - 31 December 2008. In this period 142 PhD students have started their research work. At the end of this period (31 December 2008) 61 of them have graduated and 1 of them has prematurely discontinued his contract. Of the remaining 80, 70 have started their PhD research after 1 January 2005.

Employment following the PhD **2003-2008**		
	number	%
Postdoctoral positions in theoretical physics:		
the Netherlands	5	
EU	31	
USA	9	
Abroad elsewhere	7	
subtotal	52	57%
Positions in academia and in public (research) institutions not related to theoretical physics:		
Research scientist education foundation abroad	1	
PhD position mathematics (abroad)	1	
EURANDOM, Eindhoven	1	
Dutch Cancer Inst.	1	
Leiden Univ. Medical Center	1	
Utrecht Univ. Medical Center	2	
subtotal	7	8%
Positions in the government and in government related organizations:		
Ministry of Justice	1	
subtotal	1	1%
Positions in commercial companies:		
Philips research	3	
Shell	1	
NXP semiconductors	1	
ASML	1	
Utility company	1	
Mesodyn	1	
Computational Tribology	1	
Banking	4	
Actuary assistant	1	
(Pension) insurance	2	
Various software companies	6	
Consultancy (Ernst&Young/McKinsey etc.)	5	
subtotal	27	30%
Teaching positions:		
High school teacher	3	
subtotal	3	3%
Other:		
Unknown	1	
subtotal	1	1%
Total	**91**	