

Institute for Theoretical Physics
Amsterdam

Annual Report 2007

Faculty of Science
Universiteit van Amsterdam

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1. Scientific Mission

The mission of the Institute of Theoretical Physics of the University of Amsterdam is to strengthen and maintain research and teaching in theoretical physics. It also aims to disseminate knowledge and enthusiasm for physics in society not only to attract students to physics, but also to communicate the importance of physics to the wider society.

While theoretical physics is strongly linked to experimental physics, its status as a separate discipline is well justified. New developments in physics come from new theoretical insights as well as from new experiments. As a result there are cases in which new observations from experiments challenge theoreticians to explain them, but just as likely new phenomena predicted by theory challenge the experimentalists to design the experiments to verify these. We stimulate collaboration with experimental groups to promote this kind of exchanges.

The theoretical description of phenomena from completely different areas in physics often make use of the same techniques. As a result there is intensive cross fertilization between the different branches of theoretical physics. For this reason we maintain the importance of a unified institute of theoretical physics, rather than a thematic division of physics, in which theoreticians are associated with experimental investigations.

As the analytic methods for problem solving in theoretical physics are applicable in many fields besides physics, the graduates of the Institute of Theoretical Physics find very diverse types of employment. We encourage this phenomenon and maintain that this is part of our role in society, besides the education of highly trained researchers for academic and industrial investigations.

Without detracting anything from this role in society, we strongly believe in the importance of fundamental research irrespective of the possibility of applications. The essential technical progress of society requires new insights in the fundamental properties of matter as much as the development of existing theories into new technologies.

2. Annual Survey

In 2007 the Institute for Theoretical Physics (ITFA) welcomed two new permanent staff members. As of May 1, the FOM Springplank fellowship of Jean-Sébastien Caux was transformed into a position as UHD and per September 1, Eric Laenen took up a professorship that is shared between ITFA and Nikhef, strengthening ITFA's effort in particle physics phenomenology. Koenraad Schalm, who was with ITFA on a VIDI fellowship, moved on to a position at Leiden University.

New in the history of the Institute for Theoretical Physics is the Scientific Advisory Board (Wetenschappelijke Advies Raad – WAR), which was created in 2007. We have been extremely pleased that the distinguished professors John Cardy (Oxford University),

Eduardo Fradkin (University of Illinois at Urbana-Champaign) and Stephen Shenker (Stanford University) have agreed to serve on this board.

In July 2007 the *second Amsterdam Summer Workshop on low-D quantum condensed matter* was organized by Caux, Pruisken and Schoutens, with a record high number of some 60 participants. The scientific program consisted of daily morning sessions with one experimental review followed by three or four half-hour theory talks, with the afternoons free for discussion and collaboration. As before, this format was highly appreciated by all participants. The workshop was in part financed by the ESF program INSTANS (*Interdisciplinary statistical and field theory approaches to nanoscopic and low dimensional systems*). In this program, in which some of Europe's leading researchers in the field have joined forces, ITFA is represented by Schoutens (member for the Netherlands in the Steering Committee), Caux and Nienhuis.

In November 2007 the new FOM program *Theoretical particle physics in the era of the LHC*, under the leadership of Laenen, got the green light. It will become operational in the course of 2008. Within the Faculty of Science (FNWI) ITFA participates in the newly defined spearhead (zwaartepunt) *Astroparticle physics*, in a partnership with Nikhef and the Institute Anton Pannekoek.

In addition to achieving a high output in scientific publications, ITFA members (Bais and Dijkgraaf in particular) have in 2007 been prolific in popular publications and outreach activities. After the world-wide success of *The equations* (this year also published in French and Portuguese) Bais followed up with the, already acclaimed, book *De sublieme eenvoud van relativiteit: een visuele inleiding*. Nieuwenhuizen (with L. Leuzzi) published a monograph *Thermodynamics of the glassy state*.

ITFA members have also been very visible in public events. Verlinde took on Lee Smolin in a public debate (with Bais as mediator and with an aftermath in national press) and high-profile public lectures were delivered by Dijkgraaf, Bais, de Boer and van der Schaar (paradisolezing). Members of the institute have been instrumental in the realization of the Volkskrant's Bèta-canon (Dijkgraaf, Bais, Huijse), and they made guest appearances in high school lessons (Bais) and policy meetings (Schoutens).

Attesting to the qualities of ITFA PhD students are the NWO Rubicon award granted to Cheng and the poster prize awarded to van Rees for his poster *Wormholes in 2+1 dimensions* presented at the Symposium 'Trends in Theory 2007' of the Dutch Research School of Theoretical Physics.

In 2007, the teaching of ITFA staff has been mostly in the context of the Bachelor *Natuur- en Sterrenkunde* and the Master program *Theoretical Physics*. In both these programs the influx of students shows an upward trend, which gives confidence that the efforts in outreach and publicity do pay off. Courses aimed at broad audiences of both university students and external participants have been an ongoing success: *Keerpunten in de natuurwetenschappen* (Bais) and *Quantumlessen* (Schoutens and Verlinde).

3. Research

3.1 Programs, themes and 2007 topics

Programs	Themes	2007 Topics
Particle Physics, Cosmology, Quantum Gravity and String Theory	String- and M-theory	Quantum black holes String theory partition functions Super Yang-Mills theory
	Cosmology	Early universe Cold electroweak baryogenesis
	Particle physics	LHC physics
	Quantum fields	Mathematical structures Conformal field theory
	Topological interactions and topological phases	Fractional quantum Hall states Quantum symmetry breaking
	Quantum information	Topological quantum computation Entanglement entropy Quantum measurement
Statistical Physics and Condensed Matter Theory	Quantum matter	1D Bose gas Quantum spin chains Quantum Hall effects Supersymmetric lattice models
	Soft matter and biophysics	Force networks in granular matter
History of Physics		Biography H.A. Lorentz Physics in Amsterdam History of unified field theory

The table gives a bird's eye view of the research programs, themes and topics of the research performed at the Institute for Theoretical Physics in 2007. Following tradition, we make the broad distinction between 'Particle Physics, Cosmology, Quantum Gravity and String Theory' (program 1) on the one hand and 'Statistical Physics and Condensed Matter Theory' (program 2) on the other. However, as the table indicates, this distinction is easily blurred when it comes to the actual handwork of Theoretical Physics, as many of the key concepts and techniques are common to both fields. The methods of quantum field theory in general and conformal and topological field theory in particular are key to many of the research topics studied at the institute. With most of ITFA's members having a broad background in these methods, ITFA is well-positioned for 'thinking outside of

the box' and exploring fruitful cross-connections among various subjects on its research agenda. Some of the highlights of ITFA's 2007 research clearly attest to this idea of unity in diversity.

Some of the recent insights in String Theory and Quantum Gravity point at fruitful analogies with Condensed Matter. The idea of *Gravity and strings as emergent phenomena* was discussed in lectures by Verlinde and de Boer. Similar ideas featured prominently at the Lorentz Centre Workshop *Condensed matter meets gravity* (August 2007), with invited lectures by Schalm, Nieuwenhuizen and Taylor. The AdS/CFT correspondence works as well for 'resolving black holes' (lecture by de Boer at Strings 2007 in Madrid) as for unraveling some of the mysteries of strongly coupled condensed matter systems. Quantum black holes and quantum cosmology, both in string theory and in other frameworks, have been important themes in ITFA's 2007 research [papers and lectures by de Boer, Nieuwenhuizen, van der Schaar, Schalm, Skenderis, Smit, Taylor and Verlinde].

Pruisken's θ -vacuum approach to the quantum Hall problem, as elaborated on in a 2007 Annals of Physics paper with I.S. Burmistrov and in experimental work with colleagues at the van der Waals-Zeeman Institute, is deeply related to the workings of quantum chromodynamics (QCD), which describes the strong interactions in particle physics.

The fascinating idea of *topological quantum computation* (discussed in a paper by Schoutens with E. Ardonne and in lecture series delivered by Bais) combines elements from conformal and topological quantum field theory with quantum information science and advanced theories and experiments on (non-abelian) fractional quantum Hall states.

On the subject of quantum matter, further important topics have been the exploration by exact methods of the *1D Bose gas* (papers by Caux and Calabrese) and of the dynamics of *Heisenberg spin chains* (PhD thesis Hagemans), and the quantification of *entanglement entropy* in fractional quantum Hall systems and quantum magnets (studied in the groups of Schoutens and Nienhuis).

The research program on the History of Physics is fully integrated in the Institute for Theoretical Physics. A highlight has been Kox's seminar *The hidden history of the afsluitdijk: H. A. Lorentz and the enclosure of the Zuiderzee*, delivered in the year which celebrated that it had been 75 years since the Afsluitdijk was completed.

3.2 Publications

Program 1: Particle physics, cosmology, quantum gravity and string theory

PhD-theses

Koers, H.B.J., The astrophysical herald. Neutrinos as probes for particle physics and astronomy, thesis advisor: Prof.dr. K.J.F. Gaemers, Universiteit van Amsterdam, September 12, 2007 (176 pages).

Sulkowski, P., Calabi-Yau crystals in topological string theory, thesis advisors: Prof. dr. R.H. Dijkgraaf (Universiteit van Amsterdam), Dr. J. Pawelczyk (University of Warsaw), June 22, 2007 (200 pages).

Publications in journals, books and conference proceedings

Anastasiou, C., Britto, R.A.P., Feng, B., Kunszt, Z., Mastrolia, P., D-dimensional unitarity cut method, *Physics Letters B*, 645 (2007) 213-216.

Anastasiou, C., Britto, R.A.P., Feng, B., Kunszt, Z., Mastrolia, P., Unitarity cuts and reduction to master integrals in d dimensions for one-loop amplitudes, *Journal of High Energy Physics*, 0703 (2007) 111 (39 pages).

D'Appollonio, G., Quella, T., The abelian cosets of the Heisenberg group, *Journal of High Energy Physics*, 0711 (2007) 045 (28 pages).

Bais, F.A., Mathy, C.J.M., The breaking of quantum double symmetries by defect condensation, *Annals of Physics*, 322 (2007) 522-598.

Bates, B., Doran, C., Schalm, K.E., Crosscaps in Gepner models and the moduli space of T^2 orientifolds, *Advances in Theoretical and Mathematical Physics*, 11 (2007) 839-912.

Britto, R.A.P., Feng, B., Unitarity cuts with massive propagators and algebraic expressions for coefficients, *Physical Review D*, 75 (2007) 105006 (19 pages).

Cheng, M.C.N., Verlinde, E.P., Dying dyons don't count, *Journal of High Energy Physics*, 0709 (2007)070 (21 pages).

Dijkgraaf, R.H., Mathematical structures, in: *The quantum structure of space and time, Proceedings of the 23rd Solvay conference on physics*, D. Gross, M. Henneaux, A. Sevrin (Eds.), World Scientific Publ. Co., Singapore (2007) 91-162.

Götz, G., Quella, T., Schomerus, V., Representation theory of $sl(2|1)$, *Journal of Algebra*, 312 (2007) 829-848.

Götz, G., Quella, T., Schomerus, V., The WZNW model on PSU (1,1|2), Journal of High Energy Physics, 0703 (2007) 003 (48 pages).

Hollands, L., Topological strings on compact Calabi-Yau's, Nuclear Physics B, Proceedings supplements, 171 (2007) 281-283.

Hoogeveen, J., Skenderis, K., BRST quantization of the pure spinor superstring, Journal of High Energy Physics, 0711 (2007) 081 (24 pages).

Kanitscheider, I.R.G., Skenderis, K., Taylor, M., Fuzzballs with internal excitations, Journal of High Energy Physics, 0706 (2007) 056 (57 pages).

Kanitscheider, I.R.G., Skenderis, K., Taylor, M., Holographic anatomy of fuzzballs, Journal of High Energy Physics, 0704 (2007) 023 (77 pages).

Kashani-Poor, A.K., Nearly Kähler reduction, Journal of High Energy Physics, 0711 (2007) 026 (26 pages).

Kashani-Poor, A.K., The wave function behavior of the open topological string partition function on the conifold, Journal of High Energy Physics, 0704 (2007) 004 (47 pages).

Kashani-Poor, A.K., Minasian, R., Towards reduction of type II theories on SU(3) structure manifolds, Journal of High Energy Physics, 0703 (2007) 109 (20 pages).

Lehners, J.-L., McFadden, P.L., Turok, N., Colliding branes in heterotic M-theory, Physical Review D, 75 (2007) 103510 (13 pages).

Lehners, J.-L., McFadden, P.L., Turok, N., Effective actions for heterotic M-theory, Physical Review D, 76 (2007) 023501 (10 pages).

Lehners, J.-L., McFadden, P.L., Turok, N., Steinhardt, P.J., Generating ekpyrotic curvature perturbations before the big bang, Physical Review D, 76 (2007) 103501 (10 pages).

Lüst, D., Reffert, S., Scheidegger, E., Schulgin, W., Stieberger, S., Moduli stabilization in type IIB orientifolds II, Nucl. Phys. B 766 (2007) 178- 231.

Lüst, D., Reffert, S., Scheidegger, E., Stieberger, S., Resolved Toroidal Orbifolds and their Orientifolds, Adv. Theor. Math. Phys. 12 (2007) 67-183.

Manschot, J., AdS₃ partition functions reconstructed, Journal of High Energy Physics, 0710 (2007) 103 (7 pages).

McFadden, P.L., Turok, N., Steinhardt, P.J., Solution of a braneworld big crunch/big bang cosmology, Physical Review D, 76 (2007) 104038 (27 pages).

Mathy, C.J.M., Bais, F.A., Nematic phases and the breaking of double symmetries, *Annals of Physics*, 322 (2007) 709-735.

Meulen, M.P. van der, Smit, J., Classical approximation to quantum cosmological correlations, *Journal of Cosmology and Astroparticle Physics*, 0711 (2007) 023 (44 pages).

Miller, C.M., Schalm, K.E., Weinberg, E.J., Nonextremal black holes are BPS, *Physical Review D*, 76 (2007) 044001 (9 pages).

Quella, T., Schomerus, V., Free fermion resolution of supergroup WZNW models, *Journal of High Energy Physics*, 0709 (2007) 085 (51 pages).

Quella, T., Runkel, I., Watts, G.M.T., Reflection and transmission for conformal defects, *Journal of High Energy Physics*, 0704 (2007) 095 (45 pages)

Sarangi, S., Schalm, K.E., Shiu, G., Schaar, J.P. van der, The exact spectrum of scalar field perturbations in a radiation deformed closed de Sitter universe, *Journal of Cosmology and Astroparticle Physics*, 0703 (2007) 002 (16 pages).

Skenderis, K., Taylor, M., Anatomy of bubbling solutions, *Journal of High Energy Physics*, 0709 (2007) 019 (60 pages).

Skenderis, K., Taylor, M., Fuzzball solutions and D1-brane-D5-brane microstates, *Physical Review Letters*, 98 (2007) 071601 (4 pages).

Skenderis, K., Townsend, P.K., Pseudo-supersymmetry and the domainwall/cosmology correspondence, *Journal of Physics A - Mathematical and General*, 40 (2007) 6733-6742.

Skenderis, K., Townsend, P.K., van Proeyen, A., Domain-wall/cosmology correspondence in AdS/dS supergravity, *Journal of High Energy Physics*, 0708 (2007) 036 (19 pages).

Tranberg, A., Smit, J., Hindmarsh, M., Simulations of cold electroweak baryogenesis: finite time quenches, *Journal of High Energy Physics*, 0701 (2007) 034 (20 pages).

Tranberg, A., Smit, J., Hindmarsh, M., Simulations of cold electroweak baryogenesis, *Nuclear Physics A* 785 (2007) 102-105.

Program 2: Statistical physics and condensed matter theory**PhD-thesis**

Hagemans, R.L., Dynamics of Heisenberg spin chains, thesis advisor: Prof.dr. K. Schoutens, Universiteit van Amsterdam, April 12, 2007 (149 pages).

Monograph

Leuzzi, L., Nieuwenhuizen, T.M., Thermodynamics of the glassy state, Taylor and Francis, 2007 (364 pages).

Publications in journals, books and conference proceedings

Allahverdyan, A., Nieuwenhuizen, T.M., Minimal-work principle and its limits for classical systems, *Physical Review E*, 75 (2007) 051124 (5 pages).

Allahverdyan, A., Balian, R., Nieuwenhuizen, T.M., The quantum measurement process: lessons from an exactly solvable model, in: *Beyond the Quantum*, Th.M. Nieuwenhuizen, V. Spicka, B. Mehmani, M.J. Aghdami, A.Yu. Khrennikov (Eds.), World Scientific Publ. Co., Singapore (2007) 53-66.

Aquino, G., Mehmani, B., Simultaneous measurements of non-commuting observables, in: *Beyond the Quantum*, Th.M. Nieuwenhuizen, V. Spicka, B. Mehmani, M.J. Aghdami, A.Yu. Khrennikov (Eds.), World Scientific Publ. Co., Singapore (2007) 115-124.

Ardonne, E., Schoutens, K., Wavefunctions for topological quantum registers, *Annals of Physics*, 322 (2007) 201-235.

Calabrese, P., Caux, J.-S., Correlation functions of the one-dimensional attractive Bose gas, *Physical Review Letters*, 98 (2007) 150403 (4 pages).

Calabrese, P., Caux, J.-S., Dynamics of the attractive 1D Bose gas: analytical treatment from integrability, *Journal of Statistical Mechanics, Theory and Experiment*, (2007) P08032 (27 pages).

Capel, H.W., Sahadevan, R., Rajakumar, S., Super integrable four-dimensional autonomous mappings, *Journal of Physics A – Mathematical and General* 40 (2007) 5373-5394.

Caux, J.-S., Calabrese, P., Slavnov, N.A., One-particle dynamical correlations in the one-dimensional Bose gas, *Journal of Statistical Mechanics, Theory and Experiment*, (2007) P01008 (20 pages).

Cetto, A.M., Balian, R., Hooft, G. 't, Khrennikov, A.Yu., Nieuwenhuizen, T.M., Round Table Discussion at the Lorentz Workshop 'Beyond the Quantum', in: Beyond the Quantum, Th.M. Nieuwenhuizen, V. Spicka, B. Mehmani, M.J. Aghdami, A.Yu. Khrennikov (Eds.), World Scientific Publ. Co., Singapore (2007) 377-382.

Dekker, H., Vibrational dynamics of modern lightrail modules, *Archive of Applied Mechanics*, 77 (2007) 849-859.

Fendley, P., Schoutens, K., Cooper pairs and exclusion statistics from coupled free-fermion chains, *Journal of Statistical Mechanics, Theory and Experiment*, (2007) P02017 (18 pages).

Hagemans, R.L., Caux, J.-S., Deformed strings in the Heisenberg model, *Journal of Physics A - Mathematical and General*, 40 (2007) 14605-14647.

Haque, M., Zozulya, O.S., Schoutens, K., Entanglement entropy in fermionic Laughlin states, *Physical Review Letters*, 98 (2007) 060401 (4 pages).

Kager, W., Reflected Brownian motion in generic triangles and wedges, *Stochastic Processes and their Applications*, 117 (2007) 539-549.

Lang, D.T.N. de, Ponomarenko, L.A., Visser, A. de, Pruisken, A.M.M., Observation of the quantized Hall insulator in the quantum critical regime of the two-dimensional electron gas, *Physical Review B*, 75 (2007) 35313 (7 pages).

Nieuwenhuizen, T.M., Einstein vs. Maxwell: Is gravitation a curvature of space, a field in flat space, or both?, *Europhysics Letters*, 78 (2007) 10010 (5 pages).

Nieuwenhuizen, T.M., Nonequivalence of inertial mass and active gravitational mass, in: *Foundations of probability and physics - 4*, G. Adenier, C.A. Fuchs, A.Yu. Khrennikov (Eds.), AIP Conference Proceedings 889, American Institute of Physics, Melville (2007) 198-207.

Nieuwenhuizen, T.M., The pullback mechanism in stochastic electrodynamics, in: *Quantum Theory: Reconsideration of Foundations - 4*, G. Adenier, A.Yu. Khrennikov, P. Lahti, V.I. Man'ko, Th.M. Nieuwenhuizen (Eds.), AIP Conference Proceedings 962, American Institute of Physics, Melville (2007) 148 (1 page).

Nieuwenhuizen, T.M., The relativistic theory of gravitation and its application to cosmology and macroscopic quantum black holes, in: *Quantum Theory: Reconsideration of Foundations - 4*, G. Adenier, A.Yu. Khrennikov, P. Lahti, V.I. Man'ko, Th.M. Nieuwenhuizen (Eds.), AIP Conference Proceedings 962, American Institute of Physics, Melville (2007) 149-161.

Nieuwenhuizen, T.M., Volovich, I.V., Role of various entropies in the black hole information loss problem, in: *Beyond the Quantum*, Th.M. Nieuwenhuizen, V. Spicka, B. Mehmani, M.J. Aghdami, A.Yu. Khrennikov (Eds.), World Scientific Publ. Co., Singapore (2007) 135-145.

Nieuwenhuizen, T.M., The electron and the neutrino as solitons in classical electromagnetism, in: *Beyond the Quantum*, Th.M. Nieuwenhuizen, V. Spicka, B. Mehmani, M.J. Aghdami, A.Yu. Khrennikov (Eds.), World Scientific Publ. Co., Singapore (2007) 332-342.

Ostojic, S., Vlugt, T.J.H., Nienhuis, B., Universal anisotropy in force networks under shear, *Physical Review E*, 75 (2007) 030301 (4 pages).

Pereira, R.G., Sirker, J., Caux, J.-S., Hagemans, R.L., Maillet, J.M., White, S.R., Affleck, I., Dynamical structure factor at small q for the XXZ spin-1/2 chain, *Journal of Statistical Mechanics, Theory and Experiment*, (2007) P08022 (64 pages).

Pruisken, A.M.M., Burmistrov, I.S., Theta renormalization, electron-electron interactions and super universality in the quantum Hall regime, *Annals of Physics*, 322 (2007) 1265-1334.

Suttorp, L.G., Field quantization in inhomogeneous anisotropic dielectrics with spatio-temporal dispersion, *Journal of Physics A - Mathematical and General*, 40 (2007) 3697-3719.

Zozulya, O.S., Haque, M., Schoutens, K., Rezayi, E.H., Bipartite entanglement entropy in fractional quantum Hall states, *Physical Review B*, 76 (2007) 125310 (11 pages).

Program 3: History of physics

Publications in journals, books and conference proceedings

Huijnen, P., Kox, A.J., Paul Ehrenfest's rough road to Leiden: A physicist's search for a position, 1904–1912, *Physics in Perspective*, 9 (2007) 186-211.

Janssen, M., Kox, A.J., Lorentz, Hendrik Antoon, in: *New Dictionary of Scientific Biography*, Gale Publ. Cy. (2007) 487-500.

Kox, A.J., Casimir, Hendrik Brugt Gerhard, *New Dictionary of Scientific Biography*, Gale Publ. Cy. (2007) 120–122.

Kox, A.J., Uit de hand gelopen onderzoek in opdracht: H.A. Lorentz' werk in de Zuiderzeecommissie, in: L.J. Dorsman & P.J. Knegtman (Eds.), *Onderzoek in opdracht. De publieke functie van het universitaire onderzoek in Nederland sedert 1876*, Verloren Uitg. Mij, Hilversum (2007) 39-52.

3.3 Scientific talks and lectures

Program 1: Particle physics, cosmology, quantum gravity and string theory

Bais, F.A., 2 Lectures on Topological quantum computation, 'El Escorial Summer School on Quantum Computation and Topological Order', El Escorial, Spain, July 16-20, 2007.

Bais, F.A., Topological symmetry breaking, invited lecture, 'International Workshop on Topological Quantum Computing', Trinity College, Dublin, Ireland, September 12, 2007.

Bais, F.A., Topological order and computation, invited colloquium, Perimeter Institute, Waterloo, Ontario, Canada, November 7, 2007.

Bais, F.A., Topological quantum computation, series of 5 invited lectures, 'First Asia-Pacific Summerschool on Mathematical Physics', Australian National University, Canberra, Australia, November 26-30, 2007.

Baptista, J.M.O., Gauge theory and topology, invited lecture, University of Bielefeld, Germany, December 6, 2007.

Boer, J. de, Black holes and modular invariance, invited lecture, Ecole Normale Supérieure, Paris, France, January 11, 2007.

Boer, J. de, Black holes and modular invariance, invited lecture, Durham University, Durham, UK, January 19, 2007.

Boer, J. de, Black holes and modular invariance, invited lecture, 'Swiss Geneziss Meeting', Zürich, Switzerland, February 2, 2007.

Boer, J. de, Black holes and modular invariance, invited lecture, Swansea University, UK, February 23, 2007.

Boer, J. de, Strings, black holes and AdS_3 , invited lecture, 'Conference on String and M theory approaches to particle physics and cosmology', Florence, Italy, March 22, 2007.

Boer, J. de, Black holes in string theory, series of 4 invited lectures, 'Spring School on Superstring Theory and Related Topics', Trieste, Italy, March 27, 2007.

Boer, J. de, Black holes in string theory, series of 3 invited lectures, 'IPM String School and Workshop', Tehran, Iran, April 10-11, 2007.

Boer, J. de, Emergence of spacetime and gravitational entropy II, invited lecture, 'International Sowers Theoretical Physics Workshop What is String Theory?', Virginia Tech, Blacksburg, USA, May 15, 2007.

Boer, J. de, Resolving black holes using AdS/CFT, invited lecture, 'Strings 2007', Madrid, Spain, June 27, 2007.

Boer, J. de, Multi-center AdS black holes, invited lecture, 'International Conference on Symmetries of String Theory', Ascona, Switzerland, August 29, 2007.

J. de Boer, Supergravity, series of lectures, 'Joint Amsterdam-Brussels-Paris PhD school', November 12-30, 2007.

Boer, J. de, Multi-center AdS₃ black holes, invited lecture, 'International Conference on Progress of String Theory and Quantum Field Theory', Osaka, Japan, December 9, 2007.

Boer, J. de, Gravity as an emergent thermodynamic phenomenon, invited lecture, '7a Trobada de Nadal de Física Teòrica a la Universitat de Barcelona', Barcelona, Spain, December 20, 2007.

Britto, R.A.P., Gauge theory scattering amplitudes, invited lecture, 'Paris-Amsterdam Joint Meeting on Holography and Black Holes', Institut Henri Poincaré, Paris, France, March 5, 2007.

Britto, R.A.P., Introduction to on-shell recursions, invited lecture, 'Workshop on Physics at TeV Colliders', Les Houches Centre de Physique, Paris, France, June 26, 2007.

Britto, R.A.P., 4-dimensional and d-dimensional unitarity constructions, invited lecture, 'Workshop on Physics at TeV Colliders', Les Houches Centre de Physique, Paris, France, June 27, 2007.

Britto, R.A.P., Amplitude recursions, invited lecture, 'International Workshop on Advancing Collider Physics', Galileo Galilei Institute for Theoretical Physics, Florence, Italy, September 5, 2007.

Britto, R.A.P., The simplicity of scattering amplitudes, invited lecture, 'National Seminar Theoretical High-Energy Physics', Amsterdam, November 23, 2007.

Cheng, M.C.-N., Dying dyons don't count, lecture, Harvard University, USA, November 30, 2007.

Dijkgraaf, R.H., D-modules and integrable systems, invited lecture, Harvard University, USA, February 7, 2007.

Dijkgraaf, R.H., The unreasonable effectiveness of physics in modern mathematics, The quantum geometry of topological string theory, Quantum field theory, D-modules and integrable systems, series of 3 lectures, 2007 Eisenbud Lecture Series in Mathematics and Physics, Brandeis University, USA, March 26-31, 2007.

Dijkgraaf, R.H., D-branes and D-modules, lecture, Radboud Universiteit Nijmegen, June 1, 2007.

Dijkgraaf, R.H., Supersymmetric gauge theories, intersecting branes and free fermions, invited lecture, 'Conference on Supersymmetric Gauge Theories', Aspen Center for Physics, Aspen, USA, July 2, 2007.

Dijkgraaf, R.H., String theory and quantum Hall effect, invited lecture, Aspen Center for Physics, Aspen, USA, July 3, 2007.

Dijkgraaf, R.H., D-branes and D-modules, invited lecture, 'Conference on Random and Integrable Models in Mathematics and Physics', Brussels, September 12, 2007.

Dijkgraaf, R.H., Conformal field theory on quantum Riemann surfaces, invited lecture, 'Fields, Lattices and Condensed Matter: a symposium in honour of John Cardy', Oxford, UK, December 15, 2007.

Hollands, L., Topological strings as D-modules, lecture, PhysMath seminar, Utrecht, December 7, 2007.

Kanitscheider, I., Fuzzballs with internal excitations, lecture, International Young Researchers Workshop of the Superstring network, Eötvös University, Budapest, Hungary, September 6, 2007.

Kashani-Poor, A.K., The wave function behavior of the open topological string partition function on the conifold, invited lecture, Harvard University, USA, February 2, 2007.

Kashani-Poor, A.K., The wave function behavior of the open topological string partition function on the conifold, invited lecture, Rutgers University, New Jersey, USA, February 6, 2007.

Kashani-Poor, A.K., The wave function behavior of the open topological string partition function on the conifold, invited lecture, University of Chicago, USA, February 7, 2007.

Kashani-Poor, A.K., The wave function behavior of the open topological string partition function on the conifold, invited lecture, University of Pennsylvania, USA, February 12, 2007.

Kashani-Poor, A.K., Beyond Calabi-Yau reductions, invited lecture, 'Flux workshop', DESY, Hamburg, Germany, February 19, 2007.

Kashani-Poor, A.K., A stringy test of flux-induced isometry gauging, invited lecture, 'Flux workshop', DESY, Hamburg, Germany, February 26, 2007.

Kashani-Poor, A.K., The wave function behavior of the open topological string partition function on the conifold, invited lecture, Imperial College, London, UK, March 9, 2007.

Kashani-Poor, A.K., Beyond Calabi-Yau reductions, invited lecture, Liverpool University, UK, March 27, 2007.

Kashani-Poor, A.K., Beyond Calabi-Yau reductions, invited lecture, Swansea University, UK, April 27, 2007.

Kashani-Poor, A.K., Beyond Calabi-Yau reductions, invited lecture, Oxford University, UK, May 7, 2007.

Kashani-Poor, A.K., Beyond Calabi-Yau reductions, invited lecture, 'Simons Workshop', Stony Brook, USA, August 7, 2007.

Kashani-Poor, A.K., Beyond Calabi-Yau reductions, invited lecture, University of Roma Tor Vergata, October 26, 2007.

Kashani-Poor, A.K., Nearly Kähler reduction, invited lecture, University of Utrecht, November 2, 2007.

Kashani-Poor, A.K., Nearly Kähler reduction, invited lecture, 'Workshop Max-Planck-Institut', München, Germany, November 16, 2007.

Laenen, E.L.M.P, QCD at colliders, series of 10 lectures, 'India School at Harish-Chandra Institute', Allahabad, India, November 26-30, 2007.

Laenen, E.L.M.P, Top quark physics, plenary talk, 'Inaugural Meeting of German Physics at the Terascale network', DESY, Hamburg, Germany, December 5, 2007.

McFadden, P.L., Colliding branes in heterotic M-theory, invited lecture, 'International Conference Eurostrings 2007', Crete, Greece, July 5, 2007.

Meulen, M.P. van der, Classical approximation to quantum cosmological correlations, invited lecture, 'Dutch Theoretical Cosmology Seminar', Amsterdam, April 20, 2007.

Meulen, M.P. van der, Classical approximation to quantum cosmological correlations, invited lecture, 'International COSMO 07 Conference', Brighton, UK, August 21, 2007.

Meulen, M.P. van der, Classical approximation to quantum cosmological correlations, invited lecture, 'Theory seminar at the Laboratoire Astroparticule et Cosmologie (APC)', Université Paris 7, France, October 16, 2007.

Meulen, M.P. van der, Classical approximation to quantum cosmological correlations, invited lecture, Nikhef Theory Meeting, Nikhef, Amsterdam, October 19, 2007.

Quella, T., Supersymmetry, supergeometry and physics, lecture, KdV Institute, Amsterdam, March 14, 2007.

Quella, T., Supergroup WZNW models and logarithmic CFT, invited lecture, Arbeitsgemeinschaft Algebraic Structures in Conformal Field Theories, Mathematisches Forschungsinstitut Oberwolfach, Germany, April 2, 2007.

Quella, T., Conformal field theories with supergroup symmetry, invited lecture, Nineteenth Meeting of the North British Mathematical Physics Seminar, Durham, UK, November 7, 2007.

Quella, T., Conformal field theories with supergroup symmetry , invited lecture, Oxford Mathematical Institute, Oxford, UK, November 20, 2007.

Quella, T., Conformal field theories with supergroup symmetry, invited lecture, Isaac Newton Institute Program on Strong Fields, Integrability and Strings, Cambridge, UK, November 21, 2007.

Reffert, S., Geometrical aspects of moduli stabilization, invited lecture, High Energy Seminar, SISSA Trieste, Italy, January 7, 2007.

Reffert, S., Strange connections: the dimer model and the rest of the world, invited lecture, Theoretical Physics Seminar, University of Liverpool, UK, February 7, 2007.

Reffert, S., Strange connections: the dimer model and the rest of the world, invited lecture, Theory Seminar, Università del Piemonte Orientale, Alessandria, Italy, April 7, 2007.

Reffert, S., The geometer's toolkit to string compactifications, invited lecture, Workshop on String and M theory approaches to particle physics and cosmology, GGI, Firenze, Italy, May 7, 2007.

Reffert, S., Categorifying the dimer model: from free fermions to super quantum mechanics, invited lecture, International Conference on Symmetries in String Theory, Ascona, Italy, August 7, 2007.

Reffert, S., Quantum crystal and topological strings, invited lecture, String Theory Seminar, CERN, Geneva, Switzerland, November 7, 2007.

Reffert, S., Quantum crystal and topological Strings, invited lecture, String Theory Seminar, Ludwig Maximilian University, München, Germany, December 7, 2007.

Schaar, J.P. van der, Backreaction corrections in inflation, invited lecture, Physics department Swansea University, Swansea, UK, June 1, 2007.

Schaar, J.P. van der, On backreaction effects in de Sitter space, invited lecture, 'Workshop on Initial Conditions in Cosmology', Würzburg, Germany, September 7, 2007.

Schalm, K.E., Searching for signatures of strings, invited lecture, Lorentz Institute, Leiden, April 12, 2007.

Schalm, K.E., Searching for signatures of strings, invited lecture, Institute for Theoretical Physics, Utrecht, April 19, 2007.

Schalm, K.E., Searching for signatures of strings, invited lecture, 7th biennial DRSTP Symposium 'Trends in Theory', Dalfsen, May 31, 2007.

Schalm, K.E., Effective actions for gravity, invited lecture, 'Workshop on String Phenomenology', Galilei Galileo Institute, Firenze, Italy, June 8, 2007.

Schalm, K.E., Universality in AdS/CFT, invited lecture, 'Workshop Condensed Matter meets Gravity', Lorentz Center, Leiden, August 3, 2007.

Shigemori, M., Metastable vacua in gauge theory and M-theory - Dijkgraaf-Vara meets Seiberg-Witten in M, invited lecture, Ludwig Maximilian University, München, Germany, November 8, 2007.

Shigemori, M., Metastable vacua in gauge theory and M-theory - Dijkgraaf-Vara meets Seiberg-Witten in M, invited lecture, Niels Bohr Institute, University of Copenhagen, Denmark, December 13, 2007.

Shigemori, M., Metastable vacua in gauge theory and M-theory - Dijkgraaf-Vara meets Seiberg-Witten in M, invited lecture, Paris, France, December 20, 2007.

Shigemori, M., Are there four-dimensional small black rings?, invited lecture, Service de Physique Theorique, CEA Saclay, France, December 21, 2007.

Skenderis, K., Introduction to AdS-CFT, series of lectures, Andre Swieca Summer School, Sao Paulo, Brazil, January 29 – February 2, 2007.

Skenderis, K., String theory and holographic dualities, lecture, DAMTP, Cambridge, UK, February 20, 2007.

Skenderis, K., Holographic anatomy, lecture, CPT, Durham, UK, February 27, 2007.

K. Skenderis, Holographic methods and applications to black holes, lecture, Ecole Polytechnique, Paris, France, April 5, 2007.

K. Skenderis, Holographic methods and applications to black holes, lecture, SPhT, Saclay, Paris, France, April 6, 2007.

Skenderis, K., Holography and black holes, invited lecture, YITP Anniversary Symposium, SUNY at Stony Brook, USA, May 5, 2007.

Skenderis, K., Holographic methods and applications to black holes, lecture, Imperial College, London, UK, May 24, 2007.

Skenderis, K., Holographic methods and applications to black holes, invited lecture, Fourth regional meeting in String Theory, Patras, Greece, June 12, 2007.

Skenderis, K., The domain-wall/cosmology correspondence, invited lecture, Eurostrings 2007, Crete, Greece, July 3, 2007.

Skenderis, K., The fuzzball proposal for black holes, invited lecture, 5th Simons Workshop in Mathematics and Physics, Stony Brook, USA, August 3, 2007.

Skenderis, K., Holography and the fuzzball proposal for black holes, series of lectures, Eötvös Superstring Workshop 2007, Budapest, Hungary, September 3-7, 2007.

Skenderis, K., BRST quantization of the pure spinor superstring, invited lecture, Programme on 'Strong Fields, Integrability and Strings', Isaac Newton Institute for Mathematical Sciences, Cambridge, UK, November 8, 2007.

K. Skenderis, Introduction to AdS-CFT correspondence, series of lectures, 'Joint Amsterdam-Brussels-Paris PhD school', November 12-30, 2007.

Skenderis, K., KK holography and applications, lecture, ICTP, Trieste, Italy, December 4, 2007.

Smit, J. Finite-temperature field theory, series of lectures, 'DRSTP PhD Winter School, Instituto de fisica teorica', Universidade Estadual Paulista, Sao Paulo, Brazil, February 5 - 9, 2007.

Smit, J., The anomaly and the lattice, invited lecture, 'Symposium Celebrating R.J. Finkelstein's 90 Birthday', UCLA, Los Angeles, USA, May 2, 2007.

Taylor, M., Holography in string theory, invited lecture, Lorentz Institute, Leiden, April 19, 2007.

Taylor, M., Holographic anatomy of fuzzballs, invited lecture, 'Swiss Regional Meeting', Neuchatel, Switzerland, April 27, 2007.

Taylor, M., Holographic anatomy and its applications, invited lecture, 'Prestrings Conference', Granada, Spain, June 20, 2007.

Taylor, M., Holographic anatomy and the fuzzball proposal, invited lecture, 'Eurostrings conference 2007', Crete, Greece, July 2, 2007.

Taylor, M., Holographic anatomy of fuzzballs, invited lecture, 'Paris Summer Workshop on Black Hole Physics', Paris, France, August 21, 2007.

Taylor, M., The fuzzball proposal for black holes, invited lecture, 'Workshop Gravity meets condensed matter', Lorentz Center, Leiden, August 31, 2007.

Taylor, M., Black hole deconstruction, invited lecture, part of the program 'Strong fields, Integrability and Strings' at the Isaac Newton Institute, Cambridge, UK, November 9, 2007.

Taylor, M., Black holes in string theory, series of lectures, 'Joint Amsterdam-Brussels-Paris PhD school', November 12-30, 2007.

Verlinde, E.P., The matrix big bang and emergent space time, invited lecture, 'Workshop on Space-Time Singularities', ICTP, Santa Barbara, USA, January 15, 2007.

Verlinde, E.P., String theory: what has been achieved!, talk at evening discussion with Lee Smolin, 7th biennial DRSTP Symposium 'Trends in Theory', Dalfsen, May 31, 2007.

Verlinde, E.P., Counting $N=4$ dyons and marginal stability, invited lecture, 'Meeting on Black Holes and Modular Forms', Ecole Normale Supérieure, Paris, France, August 16, 2007.

Verlinde, E.P., Gravity and strings as emergent phenomena, invited lecture, 'Meeting on Enraging Ideas in Physics', University of Utrecht, September 7, 2007.

Verlinde, E.P., Transport coefficients and holographic renormalization, invited lecture, 'Miami 2007, Meeting on String Theory and AdS/CFT', Fort Lauderdale, USA, December 17, 2007.

Program 2: Statistical physics and condensed matter theory

Caux, J.-S., The dynamics of Heisenberg spin chains and 1-d Bose gases, invited lecture, Brookhaven National Laboratory, USA, February 28, 2007.

Caux, J.-S., The dynamics of Heisenberg spin chains, invited lecture, 'March Meeting American Physical Society', Denver, USA, March 8, 2007.

Caux, J.-S., Dynamical correlation functions of the 1-d Bose gas (Lieb-Liniger model), invited lecture, 'March Meeting American Physical Society', Denver, USA, March 9, 2007.

Caux, J.-S., The dynamics of quantum spin chains and 1-d Bose gas, invited lecture, University of Glasgow, Glasgow, UK, April 16, 2007.

Caux, J.-S., The dynamics of quantum spin chains and 1-d Bose gases, invited lecture, Herriott-Watt University, Edinburgh, UK, April 18, 2007.

Caux, J.-S., The dynamics of quantum spin chains and 1-d Bose gases, series of lectures, DRSTP School, Driebergen, April 2007.

Caux, J.-S., The 1D Bose gas: new results from integrability, invited lecture, 'Workshop on Quantum Gases', Institut Henri Poincaré, Paris, France, May 3, 2007.

Caux, J.-S., The dynamics of quantum spin chains and 1-d Bose gases, invited lecture, Orsay, Paris, France, May 3, 2007.

Caux, J.-S., The dynamics of Heisenberg spin chains (and of the 1-d Bose gas), invited lecture, 'Workshop on Highly Frustrated Magnets', ICTP Trieste, August 8, 2007.

Caux, J.-S., The dynamics of Heisenberg spin chains and 1-d Bose gases, invited lecture, 'Workshop on Strong Correlations in Low Dimensional Transport and Dynamics', Montauk, USA, September 5, 2007.

Caux, J.-S., The dynamics of Heisenberg spin chains and 1-d Bose gases, invited lecture, 'Conference on Recent Advances in Quantum Integrable Systems', University of Annecy, France, September 11, 2007.

Caux, J.-S., The 1D Bose gas: new results from integrability, invited lecture, 'Workshop on Disorder in Condensed Matter and Cold Atoms', Lorentz Institute, Leiden, September 28, 2007.

Galistu, G.M., Visser, A. de, Pruisken, A.M.M., Corrections to scaling of the plateau-insulator transition in the quantum Hall regime, poster, 'FOM Meeting Physics', Veldhoven, January 23-24, 2007.

Hagemans, R.L., Dynamics of quantum spin chains, lecture, 'FOM-meeting Physics', Veldhoven, January 23, 2007.

Hagemans, R.L., Dynamics of Heisenberg spin chains, lecture, 'Meeting Condensed Matter Theory', Utrecht, March 15, 2007.

Leeuwen, W.A. van, The Boltzmann equation in general relativity, invited lecture, 'Conference Journées Physique Statistique et Géométrie', Nice, France, January 15, 2007.

Mehmani, B., Simultaneous measurement of non-commuting observables within the Jaynes-Cummings model, invited lecture, QTRF4 - Quantum Theory: Reconsiderations and Foundations 4, Sweden, June 11, 2007.

Nienhuis, B., Universal aspects of forces in static sand piles, invited lecture, AMOLF, Amsterdam, January 19, 2007.

Nienhuis, B., Statistical lattice models on a cylinder: an exercise in experimental mathematics, invited lecture, 'Seminar Geometry and Quantum Theory', Amsterdam, March 23, 2007.

Nienhuis, B., Scale invariance in static granular matter, invited lecture, Technical University Eindhoven, March 26, 2007.

Nienhuis, B., Universality and scaling in static granular matter, invited lecture, 'Conference on Random Shapes, Representation Theory, and Conformal Field Theory', University of California Los Angeles, March 28, 2007.

Nienhuis, B., Forces in sand piles: universality and scaling, invited lecture, Université Henri Poincaré, Nancy, France, September 6, 2007.

Nienhuis, B., Entanglement in a spin chain, invited lecture, 'Landelijk Seminarium Gecondenseerde Materie', Utrecht, December 7, 2007.

Nienhuis, B., Correlations in percolation models on arbitrary rhombus tilings, invited lecture, 'Fields, Lattices and Condensed Matter: a symposium in honour of John Cardy', Oxford, UK, December 14, 2007.

Nieuwenhuizen, T.M., Einstein versus Maxwell: is gravitation a curvature of space, or a field in flat space, or both?, invited lecture, 'Physics of Quantum Electronics 37', Snowbird, Utah, USA, January 6, 2007.

Nieuwenhuizen, T.M., Einstein versus Maxwell: is gravitation a curvature of space a field in flat space, or both?, invited lecture, 'Dynamics and Thermodynamics of Black Holes and Naked Singularities II', Politecnico, Milano, Italy, May 11, 2007.

Nieuwenhuizen, T.M., Einstein versus Maxwell: is gravitation a curvature of space a field in flat space, or both?, invited lecture, 'Physical Interpretations of Relativity Theory', Bauman University, Moscow, Russia, July 3, 2007.

Nieuwenhuizen, T.M., Bose-Einstein condensation, macroscopic quantum black holes and all that, lecture, Institute for Theoretical Physics, Amsterdam, November 23, 2007.

Pruisken, A.M.M., Coulomb blockade and super universality of the theta-angle, invited lecture, Weizmann Institute, Rehovot, Israel, June 4, 2007.

Pruisken, A.M.M., Quantum Hall physics and superuniversality of the theta-angle, invited lecture, Brown University, Providence, USA, October 11, 2007.

Pruisken, A.M.M., The effects of the Coulomb interaction on multi-fractality, invited lecture, 'International Conference on Frontiers in Quantum Science, Novel Phenomena in Graphene', Chennai, India, December 11-12, 2007.

Schoutens, K., Rotating bosons - from spin textures to quantum Hall states, invited lecture, University of Naples, Italy, February 15, 2007.

Schoutens, K., Entanglement entropy in quantum Hall states, invited lecture, 'International conference on Topological Quantum Computing', IPAM, UCLA, Los Angeles, USA, February 28, 2007.

Schoutens, K., Topological quantum computation, invited lecture, Groningen University, March 19, 2007.

Schoutens, K., Supersymmetric lattice models - exact results for lattice fermions in dimension $D > 1$, invited lecture, DAMTP, Cambridge, UK, May 2, 2007.

Schoutens, K., Superfrustration of charge degrees of freedom, invited lecture, 'XXIII IUPAP International Conference on Statistical Physics (Statphys23)', Genova, Italy, July 10, 2007.

Schoutens, K., Phases of rotating bosons, series of 4 invited lectures, 'INSTANS Summer School', Oxford, UK, August 26 - September 2, 2007.

Schoutens, K., Bipartite entanglement entropy in quantum Hall states, invited lecture, 'International Workshop on Topological Quantum Computing', Hamilton Mathematics Institute TCD, Dublin, Ireland, September 11, 2007.

Schoutens, K., Topological quantum computation, invited lecture, 'Nano-Science Seminar', Delft University, November 14, 2007.

Program 3: History of physics

Kox, A.J., The hidden history of the afsluitdijk: H.A. Lorentz and the enclosure of the Zuiderzee, lecture, Universiteit van Amsterdam, June 28, 2007.

Kox, A.J., The editor as relativist: Editing Lorentz and Einstein in different contexts, invited lecture, International Workshop Editing Centenary Scientific Manuscripts, Université Nancy, France, September 25, 2007.

3.4 Conference posters

Program 1: Particle physics, cosmology, quantum gravity and string theory

Arsiwalla, X.D., Aspects of black rings in string theory, 7th biennial DRSTP Symposium 'Trends in Theory', Dalfsen, May 31 and June 1, 2007.

Atmaja, A.N., Photon production in AdS/QCD, 7th biennial DRSTP Symposium 'Trends in Theory', Dalfsen, May 31 and June 1, 2007.

El-Showk, S., Exploring black hole microstates, 7th biennial DRSTP Symposium 'Trends in Theory', Dalfsen, May 31 and June 1, 2007.

Hollands, L., What is this geometric Langlands stuff anyway?, 7th biennial DRSTP Symposium 'Trends in Theory', Dalfsen, May 31 and June 1, 2007.

Hoogeveen, J., Amplitude prescriptions in string theory, 7th biennial DRSTP Symposium 'Trends in Theory', Dalfsen, May 31 and June 1, 2007.

Kampmeijer, L., Fundamental monopoles, dyons and fusion rules, 7th biennial DRSTP Symposium 'Trends in Theory', Dalfsen, May 31 and June 1, 2007.

Kanitscheider, I., The fuzzball proposal for black holes and AdS/CFT, 7th biennial DRSTP Symposium 'Trends in Theory', Dalfsen, May 31 and June 1, 2007.

Manschot, J., Black holes, circles and tori, 7th biennial DRSTP Symposium 'Trends in Theory', Dalfsen, May 31 and June 1, 2007.

Messamah, I., Another face of black holes, 7th biennial DRSTP Symposium 'Trends in Theory', Dalfsen, May 31 and June 1, 2007.

Meulen, M. van der, Classical approximation to quantum cosmological correlations, 7th biennial DRSTP Symposium 'Trends in Theory', Dalfsen, May 31 and June 1, 2007.

Rees, B.C. van, Wormholes in 2+1 dimensions, 7th biennial DRSTP Symposium 'Trends in Theory', Dalfsen, May 31 and June 1, 2007.

Program 2: Statistical physics and condensed matter theory

Huijse, L., Supersymmetric lattice models, 7th biennial DRSTP Symposium 'Trends in Theory', Dalfsen, May 31 and June 1, 2007.

Mehmani, B., Simultaneous measurement of non-commuting observables, FOM-meeting Physics, Veldhoven, January 23-24, 2007.

Mehmani, B., Quantum state tomography with a single apparatus, 7th biennial DRSTP Symposium 'Trends in Theory', Dalfsen, May 31 and June 1, 2007.

Zozulya, S., Entanglement entropy in fractional quantum Hall states, FOM-meeting Physics, Veldhoven, January 23-24, 2007.

Zozulya, S., Entanglement entropy in fermionic Laughlin states, 7th biennial DRSTP Symposium 'Trends in Theory', Dalfsen, May 31 and June 1, 2007.

4. Education and society

4.1 Education

Master theses

W. Hammerstein, Clifford's geometric algebra, April 2007.
Supervisors: J. de Boer, H. Pijls (KdVI)

I.J. Heemskerk, Black hole decay, June 2007.
Supervisor: E.P. Verlinde

P. Katsaroumpas, Recursion Relations for Scattering Amplitudes in Yang-Mills Theory, August 2007.
Supervisor: K. Skenderis

M.H. Lagrillièrè, Distribution of synaptic weights in a biologically inspired neural network, August 2007.
Supervisor: W.A. van Leeuwen

A. Lyons, Supersymmetric realisations of the C-theorem, VU, August 2007.
Supervisor: M. Taylor

M. Maio, Entropy and attractors in supersymmetric black holes, August 2007.
Supervisor: E.P. Verlinde

D. Meerburg, Non-Gaussian seeds of inflation, August 2007.
Supervisors: J.P. van der Schaar, R.A.M.J. Wijers (API)

L. van der Noort, Supersymmetric lattice models and quantum criticality, September 2007.
Supervisor: K. Schoutens

A. Stergiou, New ways of supersymmetry breaking, July 2007.
Supervisor: J. de Boer

Bachelor theses

B. Andela, August 2007.
Supervisor: E.P. Verlinde

M. van Dijk, October 2007.
Supervisor: J. de Boer

Y. Doeleman, August 2007.
Supervisor: J.P. van der Schaar

J. van Driel , August 2007.
Supervisor: J.P. van der Schaar

J. Freire Sanchez, October 2007.
Supervisor: W.A. van Leeuwen

S. Haaker, October 2007.
Supervisor: J. de Boer

P. van Ham, October 2007.
Supervisor: L.J. van den Horn

H. Hoendervanger, November 2007.
Supervisor: J.-S. Caux

P.J. Hofman, October 2007.
Supervisor: Th.M. Nieuwenhuizen

J. Kaas, October 2007.
Supervisor: J. Smit

A. Peterson, August 2007.
Supervisor: E.P. Verlinde

L. Spitz, October 2007.
Supervisor: E.P. Verlinde

W. Weymiens, August 2007.
Supervisor: E.P. Verlinde

Regular courses, supervision and coordination

F.A. Bais, Keerpunten in de natuurwetenschappen, Beta-Gamma Bachelor

F.A. Bais, Keerpunten in de natuurwetenschappen, Open UvA lecture series

J. de Boer, String theory, with A. Kashani-Poor

J. de Boer, coordinator of Master Program in Theoretical Physics

J. de Boer, member of the Educational Committee of the DRSTP

J. de Boer, member of the BKO-committee ("Basis Kompetenties Onderwijs") in early 2007

J.-S. Caux, Statistical physics and condensed matter 1

L.J. van den Horn, Electrodynamica en relativiteitstheorie 1

L.J. van den Horn, Electrodynamica en relativiteitstheorie 2

L.J. van den Horn, Hydrodynamics of fluids and plasmas

L.J. van den Horn, High-energy astrophysics, with M.B.M. van der Klis (API)

L.J. van den Horn, coordinator of Education at Institute for Theoretical Physics

L.J. van den Horn, member of DB Examination board (Examencommissie Natuur- & Sterrenkunde)

L.J. van den Horn, coordinator of Undergraduate research projects (2nd and 3rd year students)

J.H. Koch, Deeltjesfysica 2, with S. Bentvelsen (NIKHEF)

A.J. Kox, Einstein, with J. van Dongen (UU)

A.J. Kox, De wetenschappelijke revolutie van de 17e eeuw in historische context

A.J. Kox, Wetenschap, technologie, cultuur en maatschappij, with G. Alberts, and J. Braeckman (Faculteit der Geesteswetenschappen)

W.A. van Leeuwen, Mathematical methods

W.A. van Leeuwen, Quantumfysica 2

W.A. van Leeuwen, General relativity

Th.M. Nieuwenhuizen, Statistische mechanica

A.M.M. Pruisken, Statistical physics and condensed matter 2

J.P. van der Schaar, Student seminar on Modern cosmology, with K. Schalm

J.P. van der Schaar, Bachelor honours course on Principles and methods in theoretical physics

J.P. van der Schaar, Wiskunde N3

J.P. van der Schaar, Strings and cosmology

K. Schoutens, Quantumfysica 3

K. Schoutens, Quantumlessen UvA, with E.P. Verlinde

K. Schoutens, coordinator of Major Natuur- en Sterrenkunde, Beta-Gamma Bachelor

J. Smit, Particles and fields

J. Smit, Quantum field theory

E.P. Verlinde, Quantumfysica 1

E.P. Verlinde, Klassieke mechanica

E.P. Verlinde, Workshop for third year students, with J.P. van der Schaar

E.P. Verlinde, member of the Opleidingscommissie Natuur- & Sterrenkunde

Tutoring and problem sessions

X.D. Arsiwalla

Elektrodynamica 1 (van den Horn)

Klassieke mechanica (Verlinde)

A.N. Atmaja

Quantumfysica 2 (van Leeuwen)

S. El-Showk

Quantumfysica 1 (Verlinde)

Klassieke mechanica (Verlinde)

L. Hollands

Symmetrie en patroonvorming in natuurwetenschappen

J. Hoogeveen

Electrodynamica 1 (van den Horn)

L. Huijse

Electrodynamica 2 (van den Horn)

L. Kampmeijer

Quantumfysica 2 (van Leeuwen)

I. Kanitscheider
Statistische mechanica (Nieuwenhuizen)
Klassieke mechanica (Verlinde)

J. Manschot
Quantumfysica 1 (Verlinde)

B. Mehmani
Statistische mechanica (Nieuwenhuizen)

M. van der Meulen
Electrodynamica 2 (van den Horn)

B. Mooij
Quantumfysica 1 (Verlinde)

B. van Rees
Quantumfysica 1 (Verlinde)

O.S. Zozulya
Quantumfysica 3 (Schoutens)

4.2 Outreach

Here we summarize a wide variety of science related activities which show our commitment to the important task of bringing science to a wider audience, often through activities in the public media.

Program 1: Particle physics, cosmology, quantum gravity and string theory

Bais, F.A., *As Equações*, Portuguese edition, published by Gradiva, Lisbon, Portugal, 2007, book.

Bais, F.A., *Les Equations*, French edition, published by DG-Livres, Paris, France, 2007, book.

Bais, F.A., *De sublieme eenvoud van relativiteit: een visuele inleiding*, published by Amsterdam University Press, 2007, book.

Bais, F.A. *Very special relativity: an illustrated guide*, published by Harvard University Press, Cambridge, MA, USA, 2007, book.

Bais, F.A., Dijkgraaf, R.H., Fresco, L., Haring, B., Kroonenberg, S., Lintsen, H., van Lunteren, F., R. Plasterk, R., *Vensters op de stille kracht*, *Bètacanon*, in: *De Volkskrant*, rubriek *Kennis*, January 5, 2007, article.

Bais, F.A., *Zijn zonder zintuigen*, about Werner Herzog's *Land des Schweigens und der Dunkelheit*, *Serie Film en Wetenschap*, Universiteit van Amsterdam, March 12, 2007, talk.

Bais, F.A., *Physicae synopsis*, *Nationale Comenius leergang*, Kasteel Warnsborn, Arnhem, March 16, 2007, talk.

Bais, F.A., *Waarom de bètacanon*, FNWI dies viering, Tropenmuseum, Amsterdam, March 29, 2007, talk.

Bais, F.A., *Turningpoints in science*, *European Comenius Course*, St. John's College, Cambridge, UK, April 18 and 20, 2007, invited lectures.

Bais, F.A., *Nieuwe natuurkunde zal gedijen met gedreven docenten*, *afscheidssymposium Prof. Ch.G. van Weert*, UvA, 25 April 2007, talk.

Bais, F.A., *Bèta in de bieb*, *Nederlandse vereniging van openbare bibliotheken*, Teylers Museum, Haarlem, May 24, 2007, talk.

Bais, F.A., The quest for quantum gravity, debate with Lee Smolin and Eric Verlinde, 7th biennial DRSTP Symposium 'Trends in Theory', May 31 and June 1, Dalfsen, May 31, 2007, debate.

Bais, F.A., Verticaal blijven denken, interviewer Martijn van Calmthout, in: De Volkskrant, June 23, 2007, interview.

Bais, F.A., De sublieme eenvoud, programme Noorderlicht, radio 4, June 25, 2007, radio interview.

Bais, F.A., Meinstein, boekpresentatie 'Sublieme eenvoud...', Universiteit van Amsterdam, June 27, 2007, talk.

Bais, F.A., Sublieme eenvoud, in radio programme 'Hoe? Zo!', Nos/Teleac, July 6, 2007, radio interview.

Bais, F.A., De sublieme eenvoud van relativiteit, Atheneum Boekhandel, Haarlem, August 25, 2007, talk.

Bais, F.A., Keerpunten, Eerste les 'Natuur, Leven en Technologie', Damstede college, Amsterdam, September 25, 2007, lecture.

Bais, F.A., Physicae synopsis, Comenius leergang, Amersfoort, September 27, 2007, lecture.

Bais, F.A., Turningpoints in science, European Comenius Course, St. John's College, Cambridge, UK, September 29-31, 2007, invited lectures.

Bais, F.A., De hoogleraar als bestuurder, rectoraatsoverdracht Universiteit van Amsterdam, October 1, 2007, talk.

Bais, F.A., De sublieme eenvoud..., Nederlandse Defensie Akademie, Den Helder, November 14, 2007, talk.

Bais, F.A., De bètacanon, winterlezing Zaandams Lyceum, Zaandam, December 10, 2007, talk.

Bais, F.A., De sublieme eenvoud, Woudschoten conferentie van het NVON, Noordwijkerhout, December 15, 2007, talk.

Boer, J. de, Snaartheorie, Wolters-Noordhoff sciencedag, Ede, March 14, 2007, talk.

Boer, J. de, Snaartheorie, 'Highlights' voor eerstejaars studenten, Amsterdam, April 20, 2007, talk.

Boer, J. de, Olympiades, SLO forum, Enschede, May 24, 2007, talk.

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Dijkgraaf, R.H., Lezing bij boekpresentatie Lachen om niets van Coen Simon, Utrecht, March 14, 2007, talk.

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Dijkgraaf, R.H., Radio 1 journaal, interview over wiskundefilm Platform Bètatechniek, September 21, 2007, radio interview.

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Dijkgraaf, R.H., Opening Spui 25, September 24, 2007, talk.

Dijkgraaf, R.H., Microtalk, Discovery 07, September 28, 2007, talk.

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Dijkgraaf, R.H., Einsteins droom, NWG, Assen, October 9, 2007, talk.

Dijkgraaf, R.H., Forumdebat, Internationale conferentie over kunstonderwijs, Felix Meritis, October 10, 2007, talk.

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Dijkgraaf, R.H., Wat ons bindt, tafelgast, dialoogavond, Rode Hoed, Amsterdam, October 22, 2007, debate.

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Dijkgraaf, R.H., Pauw en Witteman, VARA televisie, tafelgast, November 1, 2007, debate.

Dijkgraaf, R.H., The quantum universe, Rijksakademie, November 2, 2007, talk.

Dijkgraaf, R.H., Wonderboy in de wetenschap, in: Trouw, November 9, 2007, interview.

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Verlinde, E.P., Donkere materie, Rotary Amsterdam West, Groote Industriële Club, Amsterdam, February 13, 2007, talk.

Verlinde, E.P., Newton's Strand, Interview in NRC Zomerbijlage, NRC Handelsblad, June 21, 2007, interview.

Program 2: Statistical physics and condensed matter theory

Huijse, L., Het standaardmodel, in de serie 'De Bètacanon', De Volkskrant, May 14, 2007, article.

Schoutens, K., De vreemdheid van quantummaterie en de Fibonacci quantumcomputer, 'Viva Fysica', Universiteit van Amsterdam, January 26, 2007, talk.

Schoutens, K., with Verlinde, E.P., Quantumlessen, presentatie college Quantumlessen, Universiteit van Amsterdam 'Nacht van de Wetenschap', Amsterdam, June 16, 2007, talk.

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Program 3: History of physics

Kox, A.J., Prometheus of Icarus, in: De Academische Boekengids no. 60 (2007) 9-10, book review.

Kox, A.J., De verborgen geschiedenis van de Afsluitdijk: H.A. Lorentz' werk in de Zuiderzeecommissie, Harlingen, May 23, 2007, talk.

5. Management, Facts & Figures

5.1 Finances

Finances 2007 (in kEuro)		
Income		
UvA/FNWI lump sum* and other UvA income		2453
NWO and EU		659
FOM		965
Total income		4077
Expenses		
Personnel costs		
UvA*		1793
NWO and EU*		807
FOM		868
UvA matching projects		362
UvA matching NWO and EU projects for total costs		-362
Other expenses		
UvA		165
NWO and EU		215
FOM		97
Total expenses		3945
Net result		132

5.2 Funding

<i>The table shows the University and other funding over the period 2005 - 2007</i>			
(in kEuro)			
	2005	2006	2007
Running budget UvA*	1098	1881	1969
External budgets (NWO, FOM, EU)	1801	1394	1624
Other UvA income	341	351	484
*from 2006 UvA lump sum includes total costs			

5.3. Scientific input (fte)

In the table below we have given the full time equivalent of research carried out at the institute in 2007. The research input is related to the human resource input in the following way: regular staff spend 50%, postdocs/fellows 100%, and PhD students 80% of their time on research. The research input is in accordance with the agreements with the Dutch Research School of Theoretical Physics.

Personnel <i>category</i>	program 1		program 2		program 3		total		
	<i>FNWI</i>	<i>other</i>	<i>FNWI</i>	<i>other</i>	<i>FNWI</i>	<i>other</i>	<i>FNWI</i>	<i>other</i>	<i>all</i>
full professor	1,72	0,50	1,30	0,00		0,10	3,02	0,60	3,62
associate professor	0,25	0,33	1,00	0,30		0,20 0,00	1,45	0,63	2,08
assistant professor				0,20				0,20	0,20
postdoc fellows		8,72		1,10				9,82	9,82
Ph.D students		9,38	1,00	1,96			1,00	11,34	12,34
Total	1,97	18,93	3,30	3,56		0,20 0,10	5,47	22,59	28,06

5.4. Scientific output

In the overview of publications only the articles which were actually published in 2007 are taken into account. Series of two or more lectures (including outreach) on a single subject have been counted as a single item.

Scientific Output 2007				
Scientific Output	program 1	program 2	program 3	total
PhD theses	2	1		3
Monographs		1		1
Publications	36	26	4	66
Scientific talks and lectures	106	39	2	147
Conference posters	11	5		16
Outreach	110	5	2	117

5.5 Externally funded projects

Program 1: Particle physics, cosmology, quantum gravity and string theory

- Supersymmetric gauge theories and matrix models
Researcher: X.D. Arsiwalla, PhD-student
FOM-A-20 (R.H. Dijkgraaf and J. de Boer)
- Searching for signatures of strings
Researcher: A.N. Atmaja, PhD-student
NWO Vidi-programma (K.E. Schalm)
- Gauged sigma-models and equivariant mirror symmetry
Researcher: J.M. Baptista, postdoctoral fellow
NWO Veni-programma (F.A. Bais)
- Superstring Theory
Researcher: G.G.E. Bossard, PhD-student
EU Marie Curie Research Training Network ‘Superstring theory’
- Connecting gauge interactions with gravity through string theory
Researcher: R.A.P. Britto, postdoctoral fellow
FOM-A-20 (E.P. Verlinde)
- String theory and cosmology
Researcher: M.C.-N. Cheng, PhD-student
FOM-A-20 (J. de Boer)
- Thermodynamics of strings, fluxes and branes
Researcher: S. El Showk, PhD-student
FOM-A-20 (R.H. Dijkgraaf and J. de Boer)
- Mathematical aspects of string theory
Researcher: L. Hollands, PhD-student
NWO-Spinozapremie (R.H. Dijkgraaf)
- Mathematical aspects of string theory
Researcher: J. Hoogeveen, PhD-student
NWO-Spinozapremie (R.H. Dijkgraaf)
- Fundamental interactions
Researcher: L. Kampmeijer, PhD-student
FOM-A-01 (F.A. Bais)

- Holography, duality and time dependence in string theory
Researcher: I.R.G. Kanitscheider, PhD-student
NWO Vidi-programma (M. Taylor)
- Thermodynamics of strings, fluxes and branes
Researcher: A.K. Kashani-Poor, postdoctoral fellow
FOM-A-20 (R.H. Dijkgraaf and J. de Boer)
- Wilson lines, long strings and AdS/CFT
Researcher: M. Kulaxizi, postdoctoral fellow
NWO-Spinozapremie (R.H. Dijkgraaf)
- Supersymmetric gauge theories and matrix models
Researcher: J. Manschot, PhD-student
FOM-A-20 (R.H. Dijkgraaf and E.P. Verlinde)
- Mathematical aspects of string theory
Researcher: P.L. McFadden, postdoctoral fellow
EU Marie Curie Research Training Network 'Superstring theory' and
NWO-Spinozapremie (R.H. Dijkgraaf)
- Searching for cosmic microwave background signatures of new physics
Researcher: P.D. Meerburg, PhD-student
NWO-toptalentprogramma (R.A.M.J. Wijers and J.P. van der Schaar)
- Connecting gauge interactions with gravity through string theory
Researcher: I. Messamah, PhD-student
FOM-A-20 (R.H. Dijkgraaf and E.P. Verlinde)
- Fundamental interactions
Researcher: M.P. van der Meulen, PhD-student
FOM-A-01 (J. Smit)
- Cosmological vacua in string theory
Researcher: J.M. Oberreuter, PhD-student
FOM-A-20 (R.H. Dijkgraaf and E.P. Verlinde)
- Matrix models and supersymmetric gauge theory
Researcher: K. Papadodimas, postdoctoral fellow
FOM-A-20 (R.H. Dijkgraaf)
- Conformal field theories with Lie superalgebra symmetry and string backgrounds with fluxes
Researcher: T. Quella, postdoctoral fellow
EU Marie Curie fellowship

- Quantum gravity and particle physics
Researcher: B.C. van Rees, PhD-student
NWO-Vernieuwingsimpuls (K. Skenderis)
- Mathematical aspects of string theory
Researcher: S. Reffert, postdoctoral fellow
EU Marie Curie Research Training Network ‘Superstring theory’
- Searching for signatures of strings
Researcher: K.E. Schalm
NWO Vidi-programma
- Nonsupersymmetric flux vacua and perturbed N=2 systems
Researcher: M. Shigemori, postdoctoral fellow
NWO-Spinozapremie (R.H. Dijkgraaf)
- Quantum gravity and particle physics
Researcher: K. Skenderis
NWO-Vernieuwingsimpuls
- Holography, duality and time dependence in string theory
Researcher: M. Taylor
NWO Vidi-programma
- Holography, duality and time dependence in string theory
Researcher: M. Taylor
NWO Van Gogh Travel grant – cooperative grant with Ecole Normale
Supérieure, Paris, France

Program 2: Statistical physics and condensed matter theory

- The dynamics of strongly correlated systems in condensed matter
Researcher: J.-S. Caux
FOM Springplankplaats (until May 1, 2007)
FOM-A-25 (K. Schoutens)
- The challenges of the chiral metal
Researcher: D.P.A. Faribault, postdoctoral fellow
FOM-A-25 (K. Schoutens)

- Studying duality and topological excitations in disordered materials
Researcher: G.M. Galistu, PhD-student
FOM-A-13 (A.M.M. Pruisken)
- Supersymmetric lattice models
Researcher: L. Huijse, PhD-student
NWO-Pionier project (K. Schoutens)
- Universal scaling functions
Researcher: S. Mitra, PhD-student
FOM-A-05 (B. Nienhuis)
- Electron tunneling and shot noise in the quantum Hall effect
Researcher: M. Voropaev, PhD-student
FOM-A-13 (A.M.M. Pruisken)
- Collective behavior vs. entanglement in atomic matter
Researcher: O.S. Zozulya, PhD-student
FOM-A-25 (K. Schoutens)

Program 3: History of physics

- Biografie van H.A. Lorentz
Researcher: A.J. Kox
Prins Bernhard Cultuurfonds
- Universiteit en bedrijfsleven, 1877-1940
Researcher: P. Huijnen
Stichting Pieter Zeemanfonds en
Commissie Universitaire Geschiedschrijving Universiteit van Amsterdam

5.6 Scientific Staff

Program 1: Particle physics, cosmology, quantum gravity and string theory

Program leaders: prof.dr.ir. F.A. Bais
prof.dr. E.P. Verlinde

Permanent staff: prof.dr. J. de Boer
prof.dr. R.H. Dijkgraaf (KdV Instituut)
dr. L.J. van den Horn
prof.dr. J.H. Koch (NIKHEF)
prof.dr. E.L.M.P. Laenen (NIKHEF)
dr. K. Skenderis (NWO laureaat)
prof.dr. J. Smit (FOM/UU)

Temporary staff: dr. J.M. Baptista (NWO – Veni laureaat)
dr. R.A.P. Britto (FOM)
dr. A.K. Kashani-Poor (FOM)
dr. M. Kulaxizi (NWO)
dr. P.L. McFadden (EU Marie Curie Research Training Network/NWO-Spinozapremie (R.H. Dijkgraaf))
dr. K. Papadodimas (FOM)
dr. T. Quella (EU Marie Curie fellowship)
dr. S. Reffert (EU Marie Curie Research Training Network)
dr. J.-P. van der Schaar (KdV Instituut)
dr. K.E. Schalm (NWO - Vidi laureaat)
dr. M. Shigemori (NWO)
dr. M. Taylor (NWO - Vidi laureaat)

PhD-students: drs. X.D. Arsiwalla (FOM)
drs. A.N. Atmaja (NWO)
drs G.G.E. Bossard ((EU Marie Curie Research Training Network)
drs. M.C.-N. Cheng (FOM)
drs. S. El-Showk (FOM)
drs. L. Hollands (NWO)
drs. J. Hoogeveen (NWO)
drs. L. Kampmeijer (FOM)
drs. I.R.G. Kanitscheider (NWO)
drs. H.J. Koers (NIKHEF)
ir. J. Manschot (FOM)
drs. P.D. Meerburg (NWO)
drs. I. Messamah (FOM)
ir. M.P. van der Meulen (FOM)
drs. J.M. Oberreuter (FOM)
drs. B.C. van Rees (NWO)

Program 2: Statistical physics and condensed matter theory

Program leaders: prof.dr. B. Nienhuis
 prof.dr. K. Schoutens

Permanent staff: dr. J.-S. Caux (FOM until May 1, 2007)
 dr. W.A. van Leeuwen
 dr. Th.M. Nieuwenhuizen
 prof.dr. A.M.M. Pruisken

Temporary staff: dr. D.P.A. Faribault (FOM)

PhD students: drs. G.M. Galistu (FOM/WZI)
 drs. R. Hagemans
 drs. L. Huijse (NWO)
 drs. B. Mehmani
 drs. O.S. Zozulya (FOM)

Associates: prof.dr. H.W. Capel
 prof.dr.ir. H. Dekker
 dr. L.G. Suttorp

Guest Scientists: dr. P. Calabrese
 dr. M. Haque

Program 3: History of physics

Program leader: prof.dr. A.J. Kox

PhD student: drs. P. Huijnen (Faculteit der Geesteswetenschappen)

5.7 Administrative staff

ms.drs Y. Chong, manager (bedrijfsvoerder)
 ms. P.S. Uijthoven-Tol
 ms. L.H. Gillieron

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Rudolf Peierls Centre for Theoretical Physics
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5.9 Board and SAC of the Dutch Research School of Theoretical Physics

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