

Expanding the Horizon of Dutch Theoretical Physics education

It is with great pleasure that we present this annual report of the Dutch Research School of Theoretical Physics (DRSTP) for the year 2024, a period marked by significant activity and the introduction of new initiatives that opened fresh pathways for the future development of the DRSTP. In September 2024, Thomas Grimm (UU) took over as scientific director from Rembert Duine (UU). We would like to thank Rembert again for his efforts for the DRSTP!

In 2024 the DRSTP offered a combined PhD School and Trends in Theory Symposium, held from 13-17 May in Wageningen. The PhD School featured three days of both plenary and parallel lectures, providing a rich educational experience in statistical, condensed matter, and high-energy physics. It was attended by 54 PhD candidates and Masters students, fostering fruitful interactions among participants. Immediately following the school, the event transitioned into a two-day national symposium. This attracted a broad audience, gathering more than 120 researchers at all career stages. Both events highlighted the wide spectrum of topics covered by the DRSTP, sparking lively discussions and the exchange of new ideas.

The PhD Day, held on November 8, served as a dynamic networking event, offering PhD students, and MSc students the opportunity to exchange ideas about their research and explore career opportunities. Invited alumni, as well as active scientists provided valuable insights and advice.

In August 2024, the DRSTP organized the first edition of the DRSTP Summer School for advanced Bachelors students. The program prepared students for the next step into a theoretical physics Masters program with in-depth lectures on various topics. Both the PhD School and the Summer School profited from generous support of the Lorentz Fund.

For 2025, we are well under way with organizing the PhD School, which will take place 12-16 May in Wageningen. This school will continue to serve as an unifying educational event and complement the PhD Day that will take place in November. The next edition of the DRSTP Summer School for advanced Bachelors students will take place in Utrecht, on 18-22 August 2025. These events will again profit from the generous support of the Lorentz Fund. Finally, the DRSTP will invite more Dutch partner universities to join, and open the course in Advanced Theoretical Physics to all Masters students in theoretical physics throughout The Netherlands. With these expanding horizons, the DRSTP aspires to be a home for all Dutch theoretical physics.

Frank Saueressig (RU) | Chair Governing Board
 Jaco ter Hoeve (VU) | Chair PhD Council
 Jasper van Wezel (UvA) | Chair Educational Board
 Thomas Grimm (UU) | Scientific director

13 – 17 May 2024
WICC, Wageningen
Number of participants:
PhD school: 50 PhDs, 4 MScs
Symposium: 126

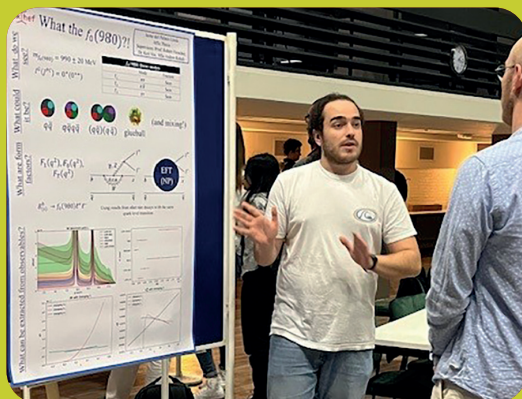
PHD SCHOOL AND SYMPOSIUM TRENDS IN THEORY

From 13 through 17 May, the DRSTP launched the first edition of its PhD school new style. It combined the two traditional PhD schools associated with Theoretical High-Energy Physics (THEP) and Statistical Physics and Theory of Condensed Matter (SPTCM), as well as the national Trends in Theory Symposium, into one single event. The lectures in the first half of the week and the research presentations in the second combined presented a coherent picture covering a broad kaleidoscope of theoretical physics research in The Netherlands.

During the first three days, the event offered high-level PhD education following a format of lectures and interactive tutorials. Generous financial support from the Lorenz Fund allowed lecturers to join from both within the country and beyond its borders. The speaker selection covered a wide range of topics, for a broad audience of students working across all fields of theoretical physics. The range of student interests was also reflected in the theme of the plenary lectures, on Quantum Information. Michael Walter introduced the students to this thriving research area, with applications in modern and ongoing research throughout both high and low energy physics. The parallel sessions were centered around two more specialised themes. For theoretical high-energy physics, the lectures provided introductions to Cosmology by Ivonne Zavala and Effective Field Theory by Anke Biekoetter. The Statistical and Condensed Matter branch offered lectures on Orbitronics by Yuriy Mokrousov and Soft Condensed Matter by Timon Idema. Many students made use of the opportunity to look over the fence and learn something outside of their own research field. To facilitate scientific networking and community building, students had the opportunity to present themselves in mini-pitches at the start of the program, as well as meet up and discuss during the ample free time left in the programme for that purpose.

For the final two days of the event, the student cohort was joined by a large group of more senior researchers for the biennial Trends in Theory Symposium. The programme for this part was comprised of ten scientific presentations, furnishing an exciting kaleidoscope of the forefront of theoretical physics research in The Netherlands. Moreover, the event was used as a platform for informal discussion of plans for the research field at a national level. A particular highlight was the evening panel, discussing the future role of "Artificial Intelligence in science and society". For the first time, with generous support from the Lorenz Fund, the DRSTP was able to award fellowships to five outstanding MSc students, enabling them to participate in the event. These students highly appreciated the opportunity to extend their scientific horizons and make contact with PhD students working on a wide range of research questions.

The event brought together professional researchers, postdocs, and students, and showcased as well as stimulated research excellence throughout all fields of theoretical physics.



Lecturers PhD school

- Michael Walter (Bochum, Germany) | Quantum information
- Ivonne Zavala (Swansea, Wales) | Cosmology
- Anke Biekoetter (Mainz, Germany) | Effective field theory
- Yuriy Mokrousov (Juelich, Germany) | Orbitronics
- Timon Idema, (TU Delft) | Soft condensed matter

Speakers Symposium Trends in Theory

- Anton Akhmerov (TUD) | A roundabout for waves
- Jonas Helsen (CWI) | The quantum PCP conjecture and you
- Timon Idema (TUD) | From balls and springs to colonies and tissues
- Mikhail Katsnelson (RU) | Origin of classicality in quantum spin systems
- Daan Meerburg (RUG) | Machine learning applications in cosmology
- Shuxia Tao (TU/e) | Materials theory of halide perovskites: ion, charge, and spin dynamics
- Jordi Tura Brugués (UL) | Certifying spectral gaps of quantum many-body systems
- Herman Verlinde (Princeton, DRSTP advisory committee) | String theory
- Jordy de Vries (UvA) | Effective field theory and the mysterious hints of a non-unitary quark mixing matrix
- Zeila Zanolli (UU) | Quantum materials by design

Panel round table discussion about AI

- Jean-Sébastien Caux (UvA)
- Allard Mosk (UU)
- Max Welling (UvA)

Organisers

- Irene Aguilera (UvA)
- Juan Diego Arias Espinoza (UvA)
- Andrey Bagrov (RU)
- Wim Beenakker (RU)
- Robin van Bijleveld (NIKHEF)
- Ema Dimastrogiovanni (RUG)
- Wouter Ellenbroek (TUE)
- Frank Saueressig (RU)
- Jagoda Slawinska (RUG)
- Jasper van Wezel (UvA)



Dutch Research School of
Theoretical Physics (DRSTP)
c/o Buys Ballot Building
ITP room 7.13
Princetonplein 5 | 3584 CC Utrecht
+31 (0)30 25 35 928
science.secr.drstp@uu.nl

www.drstp.nl

UPCOMING EVENTS

12 – 16 May 2025, WICC, Wageningen
PhD School 2025

18 – 22 August 2025, Utrecht University, Utrecht
Dutch Summer School of Theoretical Physics

November 2025, Utrecht University, Utrecht
PhD Day

19 – 23 August 2024
Utrecht University, Utrecht
Number of participants: 38

DUTCH SUMMER SCHOOL OF THEORETICAL PHYSICS

This year featured the first edition of the Dutch Summer School of Theoretical Physics. It targets theoretical physics students from all over the world at the advanced bachelor level. During one week of activities, the students were offered an overview of theoretical physics in The Netherlands. There were introductory lectures on path integrals and general relativity and several in-depth lectures and problem classes on quantum and soft matter. There was also a one-day crash course on anti-de Sitter/conformal field theory correspondence (AdS-CFT). Most of the days were closed with a research seminar about recent developments. On the final day, the students listened to Gerard 't Hooft's latest work and were eager to discuss with him. Together with the social activities, the diverse group of students, both from The Netherlands and abroad, had an exciting week of theoretical physics!

Speakers

- Frank Saueressig (RU)
- Rembert Duine (UU)
- Dirk Schuricht (UU)
- Carlo Beenakker (UL)
- René van Roij (UU)
- Marjolein Dijkstra (UU)
- Casey Cartwright (UU)
- Jay Armas (UvA)
- Gerard 't Hooft (UU)

Organisers

- Rembert Duine (UU)
- Umut Gursoy (UU)



8 November 2024
Utrecht University, Utrecht
Number of participants:
25 PhDs, 25 MScs

PhD DAY

On the 8th of November, 25 PhD students and 25 Masters students from across the country gathered in Utrecht for the annual PhD Day. The focus for this day, organised by the PhD Student Council, is not so much the research itself, but rather discussing PhD-life and possible careers. There was a diverse set of speakers, talking about "inertia" in your own life, the "work hard, play hard"-mentality and the advice to just take a step back sometimes. Career-wise we had speakers talking about academia, consultancy (McKinsey) and public service (NWO). As is tradition, we ended with a pub quiz (including making a poem about the DRSTP) and drinks. Hope to see you all again next year!

Speakers

- Alexander Barnaveli (UU)
- Luca Gioni (Leiden University, online)
- Chris de Weert (NWO)
- Rembert Duine (UU)
- Tycho Sikkenk (McKinsey)

Organisers

- PhD Student Council