Preface

Lara Baudis, Department Head

With its 24 research groups, the Department of Physics at the University of Zurich continues to cover a broad spectrum of modern physics, spanning elementary particle physics, astroparticle physics, condensed matter physics, surface physics, nanoscience, and the physics of biological systems. On the theoretical side, our researchers address questions ranging from quantum chromodynamics and physics beyond the Standard Model to gravitation, astrophysics, and topological phenomena in condensed matter. Together with affiliated groups across the Faculty of Science and beyond, we offer a diverse and stimulating environment for research and teaching. Our department's strength is sustained not only by scientific excellence, but also by outstanding infrastructure, dedicated technical services, and highly professional administrative support.

https://www.physik.uzh.ch/en/research.html

The year 2025 was marked by the International Year of Quantum Science and Technology, which we embraced with great enthusiasm. Our Quantum25 activities, including a symposium, an exhibition, and a themed escape room at the Science Pavilion UZH, were among the highlights of the year and reflected the creativity, commitment, and collaborative spirit of many members of our department. The Science Pavilion has become an important place for exchange between science and society, with exhibitions, public events, and guided tours that brought our research to a wide audience. We were also delighted by the strong public interest in our contributions to the Long Night of Museums, as well as by the continued success of our Open Day for prospective students and the return of many former members for our Alumni Day.

Our research areas continued to develop dynamically. In particle physics, our groups maintained leading roles in international collaborations at CERN and PSI, while in astroparticle physics they contributed prominently to direct dark matter searches, neutrino physics, and multi-messenger astronomy. Condensed matter physics was further strengthened through recent appointments and through a growing strategic collabora-

Quantum Century exhibition in the university library.

tion with PSI, including plans for a joint professorship in muon spin spectroscopy. Across all areas, the high visibility of our department is reflected in competitive third-party funding, major international responsibilities, and the success of our researchers at all career stages.

At the same time, 2025 was also a year of transition. We thanked Thomas Greber, Regina Schmid, and Denise Caneve for their many years of dedicated service to the department and warmly welcomed Annette Jeyakumar and Eva Büchli to our administrative team. We also celebrated the achievements of our students and early-career researchers through prizes for outstanding Master's and PhD theses, as well as poster awards that recognised excellence in science communication. With 195 members from 35 countries, our department remains an international, vibrant, and inspiring place in which curiosity, creativity, and collaboration can thrive.

This annual report offers a glimpse into the breadth of research, teaching, and outreach activities that shaped our department in 2025. I am deeply grateful to all members of the department, researchers, students, technical staff, and administrative colleagues, for their dedication, resilience, and enthusiasm. We also thank the Canton of Zurich, the Swiss National Science Foundation, the European Commission, and many other institutions and partners for their continued support of our work.

Retirement - Andreas Schilling, Emeritus since February 2026

If you ask the department what will be remembered most vividly about Andreas Schilling, three distinct answers emerge. There is the researcher who initiated the study of superconducting single-photon detectors* — a project now spanning solid-state experiments, theory, and astro-particle physics in the hunt for dark matter. There is the teacher who championed the basic experimental lectures, achieving the rare feat of making physics classes a favorite even among biology students. And finally, there is the organizer who ensured the massive 2016 Physics Olympiad ran with clockwork precision.

Andreas's path to these roles began at ETH Zurich, where his thesis work with H.R. Ott still holds the record for the highest superconducting critical temperature at ambient pressure. Following postdoctoral stations at Berkeley and UZH, and a professorship in Karlsruhe, he returned to Zurich in 2003 as the successor to particle physicist Roland Engfer.

Back at UZH, he built a small but remarkably effective materials-science group with a clear signature: turning delicate physical effects into reliable tools. This ranged from the aforementioned detectors to ingenious work on thermal inductivities and resonant thermal circuits, rooted in his deep expertise in calorimetry. Lean in size but strong in impact, the group reflected Andreas's style: precise, hands-on, and allergic to show without substance. It meant fewer distractions, more clarity, and the freedom to pursue questions requiring stubbornness rather than bureaucracy.

Yet, it is perhaps in teaching where his influence is most widely felt. Andreas carried a large share of the basic experimental courses, doing so in a way that made students realize two things simultaneously: physics is demanding, but they can learn to master it. His courses did not train students to reproduce recipes; they taught them how to think — how to question a result, debug their own assumptions, and distinguish a "nice" number from a correct one. While many invoke "critical thinking" as a buzzword, Andreas made it a habit.

There is another side to him that fits surprisingly seamlessly: Andreas has also been a fitness instructor at ASVZ. In his case, this is not a random hobby, but reflects the same appreciation for technique, discipline, and steady progress — simply applied to a different mechanic.

This connection benefited the institute in a tangible way. In 2016, when UZH hosted the International Physics Olympiad (IPhO), bringing roughly 400 students from 84 countries to Zurich, Andreas was responsible for the local organization. His ASVZ connections facilitated the use of the gym halls for the event — a logistical coup that, like good physics, looked effortless only because of the hard work behind it.

In the end, it is this combination we celebrate: the experimentalist with a feel for the smallest signals, the builder of effective research structures, and the teacher who turned "physics is hard" into "physics is enjoyable." He did this not by lowering the bar, but by making the subject clearer, more honest, and undoubtedly worth the effort.

We wish him a retirement as structured and satisfying as his best experiments. Starting, as he has planned, with finally cleaning his balcony.

Christof Aegerter

Statistical Data

199 personnel

- professors: 25
- affiliated professors: 10
- senior researchers: 23
- postdoctoral researchers: 42
- PhD students: 66
- engineers and technicians: 24
- administration: 6
- + research assistants

403 students

~90

195 bachelor	22 BSc degrees
96 master	22 MSc degrees
112 PhD	18 PhD degrees

7 SNF prof. or ERC grants

- 40 SNF or EU research grants
- 9 fellowships
- 43 UZH and other grants

346 publications

- 315 peer reviewed papers
- 35 conference proceedings
- 1 books & others

429 conference and workshop contributions

- 180 talks at conferences
- 132 seminar and other talks
- 58 posters
- 59 outreach

Outreach

Awards

- Julia Küspert: Zurich Instruments prize (PhD, exp.)
- Andrej Maraffio: Dectris prize (Master, exp.)
- Haojie Geng: Soluyanov prize (Master, theo.)
- Chiara Savoini: CHIPP PhD prize

Events

- 4nd Women in Physics Career Event
- Open Day of the Institute
- Quantum Century: Symposium & Exhibition

Workshops & Visits

- Guided tours through the Science Pavilion UZH
- More than 30 Workshops in the Science Lab UZH

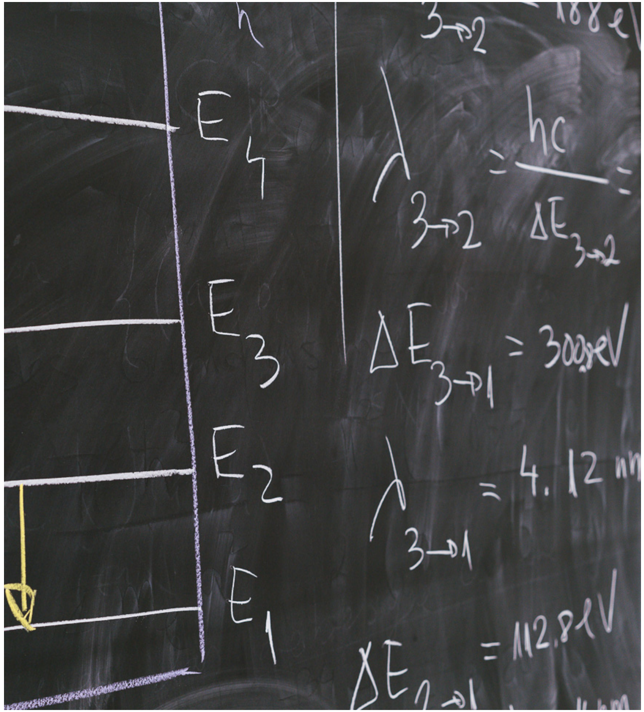
Visiting Artist

- Gina Gibson

Quantum Century @ UZH:
Symposium, exhibition and an escape room to celebrate 100 years of quantum mechanics and the pivotal contributions made in 1920s Zurich.

Teaching

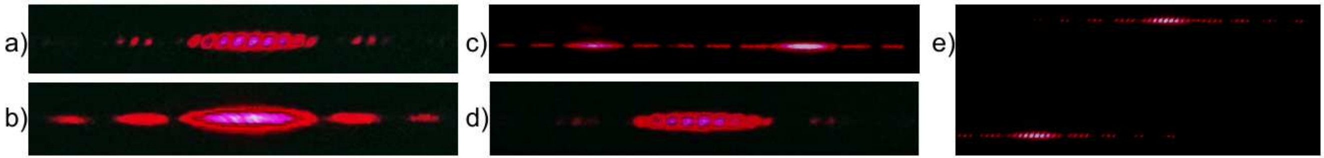
bachelor 3 major options	180 ECTS physics 150 ECTS physics/30 ECTS minor 120 ECTS physics/60 ECTS minor
1 master program	specialized lectures in particle physics condensed matter astro(particle) & cosmology bio- & medical physics
service lectures 1580 students	550 medicine 700 biology & biomedicine 180 chemistry 70 teacher 80 minors



A double slit experiment with controllable which way information

The double slit is one of the hallmark experiment of optics and quantum physics. By placing horizontal and vertical polarizers just before each slit, we have built an experiment that shows what happens to interference patterns in the presence of which way information. As the slit separation is quite large compared to the slit width, the interference pattern (Fig. a), consists of a clearly visible single slit envelope including side bands, where there is a fast modulation of this envelope originating from the double slit. Adding the polarizers (Fig. b) gives a which way information in principle, or destroys the polarization coherence of the two slits, thus making the double slit interference pattern disappear.

Adding a birefringent crystal, refracting the two polarizations differently, the two single-slit diffraction patterns can also be spatially separated (Fig. c.). However, if we destroy the which way information by adding a polarizer at 45° behind the double slit, the interference pattern is restored (Fig. d). With such a polarizer, the polarization coherence is restored and the two paths can interfere again. Similarly, if the birefringent crystal is rotated, such that its optical axis is at 45° to the slits, the interference pattern is also restored in the spatially separated patterns (Fig. e).



Diffraction patterns a) with double slit; b) crossed polarizers before the respective slits; c) slits separated using birefringent crystal with optical axis along the slit; d) with birefringent crystal at 45° to the slit; e) with polarizer at 45° behind the double slit with crossed polarizers before the respective slits.