

- Master of Science in Physics
- 2 years, full-time, 120 ECTS credits
- Faculty of Science
- Lund Campus
- Application deadline: January 2024
- Programme start: August 2024

PROGRAMME OVERVIEW

Quantum theory is as successful as it is radical. Only in recent decades have we begun to understand what it means for quantum theory to go beyond the limitations of classical physics. Genuinely, quantum phenomena provide an avenue both to study fundamental physics and to develop paradigm-shifting technologies that are based on manipulating individual quantum systems. The current era, in which such technologies are beginning to emerge, has been called 'the second quantum revolution', and this master's program provides an education in this field.

In this program, you will study quantum theory from both a conceptual and applied point of view. You will have the opportunity to study quantum mechanics, the role of physics in information and its connections to major quantum technologies such as quantum computers, quantum communication, and quantum simulation. Beyond quantum mechanics itself, the courses cover e.g. the quantum theory of light, the theoretical aspects information carried by quantum systems, lasers and the physics of several important areas for quantum technology, such as superconductors, nanostructures, and atoms. The program has strong links to research in the many groups at LU working on quantum science and technology, ranging from the foundations of quantum theory to Lund Laser-Lab and Lund Nano-Lab.

PROGRAMME MODULES/COURSES

General mandatory courses (15 credits):

- FYSN21 Quantum Physics in Research and Society, 7,5 hp
- FYSN27 Quantum Mechanics, 7,5 hp

Elective courses specific for the program, corresponding to at least 22.5 credits:

- FYST85 Quantum Computation, 7,5 hp
- FYST83 Quantum Optics, 7,5 hp
- FYST82 Quantum Information Theory, 7,5 hp
- FYST84 Superconductivity, 7,5 hp
- FYST21 Light-Matter Interaction, 7,5 hp
- FYSN14 Lasers, 7,5 hp
- FYST79 The Physics of Low-dimensional Structures and Quantum, 7,5 hp.

Thesis project: either 30 or 60 credits, in the second year.

CAREER PROSPECTS

The Master's program provides a good basis for research studies in both theoretical and experimental aspects of quantum information science and/or quantum technology. The program also prepares you for career paths outside of academia. Quantum technology is an industry on the rise, both in Sweden, Europe and around the world, with increasingly many companies, both recent and long-established, aiming to develop its applications in computing, information security, simulation, sensing etc. Graduates are also equipped for jobs in the non-quantum industry, for instance in programming, modeling, and data processing.

ENTRY REQUIREMENTS AND HOW TO APPLY

Entry requirements

Bachelor's degree of at least 180 credits in physics or the equivalent. The degree must include at least 90 credits in physics. Proficiency in English equivalent to English 6/B from Swedish upper-secondary school.

How to apply

- 1. Apply online:** Go to www.lunduniversity.lu.se/quantum-science (the page will be available in October 2024). Click on "Apply" and follow the instructions for the online application at www.universityadmissions.se, the Swedish national application website. Rank the chosen programmes in order of preference.
- 2. Submit your supporting documents:** Check what documents you need to submit (i.e. official transcripts, degree diploma/proof of expected graduation, translations, proof of English, passport) and how you need to submit them at www.universityadmissions.se.
- **Programme-specific supporting documents:** When applying for this programme, you must also submit a 'Summary Sheet' with your application. See the programme webpage for details.
- 3. Pay the application fee (when applicable).**

Selection criteria/additional info

The selection will be based on grades awarded for previous academic courses, particularly qualifying courses, and the statement of purpose (from the applicant's 'Summary Sheet').

Tuition fees

Tuition fee SEK 170 000 per year for non-EU/EEA citizens. No fee for EU/EEA citizens. See www.lunduniversity.lu.se for details on tuition fees

ABOUT THE FACULTY OF SCIENCE

At Lund University's Faculty of Science, we study and describe the physical world. We seek to understand everything from the smallest components of nature and molecular processes in the



human body to the sensitivity of climate systems and the capacity of exoplanets to support life. Research in science enables the development of new drugs, new building materials and models that predict climate change, and offers us the giddy realisation that we may not be alone in the Universe.

ABOUT LUND UNIVERSITY

Lund University was founded in 1666 and is repeatedly ranked among the world's top universities. The University has around 47 000 students and 8 800 staff based in Lund, Helsingborg and Malmö. We are united in our efforts to understand, explain and improve our world and the human condition.

Lund is considered one of the most popular study locations in Sweden. The University offers one of the broadest ranges of programmes and courses in Scandinavia, based on cross-disciplinary and cutting-edge research. The unique disciplinary range encourages boundary-crossing collaborations both within academia and with wider society, creating great conditions for scientific breakthroughs and innovations. The University has a distinct international profile, with partner universities in about 70 countries.

Lund University has an annual turnover of EUR 938 million, of which two-thirds go to research in our nine faculties, enabling us to offer one of the strongest and broadest ranges of research in Scandinavia.

CONTACT

Programme webpage:

www.lunduniversity.lu.se/quantum-science

(The page will be available in October 2024)

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Learn more at www.lunduniversity.lu.se



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