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Master: Advanced Quantum Physics • Technische Universität Kaiserslautern • Kaiserslautern ........ 2
# Master's degree

## Master: Advanced Quantum Physics

**Technische Universität Kaiserslautern** • Kaiserslautern

## Overview

<table>
<thead>
<tr>
<th>Degree</th>
<th>Master of Science in Advanced Quantum Physics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teaching language</td>
<td>English</td>
</tr>
<tr>
<td>Languages</td>
<td>Master's thesis might be written in English or German. Language courses are offered by the university.</td>
</tr>
<tr>
<td>Programme duration</td>
<td>4 semesters</td>
</tr>
<tr>
<td>Beginning</td>
<td>Winter and summer semester</td>
</tr>
</tbody>
</table>

### Application deadline

<table>
<thead>
<tr>
<th>Winter semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. If visa required: 30 April</td>
</tr>
<tr>
<td>2. If no visa required: 15 July</td>
</tr>
<tr>
<td>3. Orientation course starts on 1 August.</td>
</tr>
<tr>
<td>4. Lectures start on 1 October.</td>
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<table>
<thead>
<tr>
<th>Summer semester</th>
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</thead>
<tbody>
<tr>
<td>1. If visa required: 31 October</td>
</tr>
<tr>
<td>2. If no visa required: 15 January</td>
</tr>
<tr>
<td>3. Orientation course starts on 1 March.</td>
</tr>
<tr>
<td>4. Lectures start on 1 April.</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Tuition fees per semester in EUR</th>
<th>None</th>
</tr>
</thead>
</table>

| Combined Master's degree / PhD programme | No |

| Joint degree / double degree programme | No |

### Description/content

Discover the modern science of matter and energy on atomic and sub-atomic scales, at one of the leading German research departments. Gain theoretical understanding and experimental expertise in state-of-the-art techniques and technology. Work with leading researchers from all over the world and learn from award-winning teachers. Relax by hiking in the Palatinate forest - or taking day trips to great European cities.

**Knowledge & competences gained:**

- Theoretical foundations & experimental techniques of non-linear & quantum optics
- Physics & experimental tools of ultra-cold quantum gases
Course Details

Six reasons for Advanced Quantum Physics

Qualify for research and development
No matter whether you aim to work in academia, business or industry: our Master’s programme will provide you with everything you need for your career. Our alumni excel in leading positions in fields ranging from optical technologies and semiconductor industry to top-level consulting and finance.

Explore the quantum world
Are you also fascinated with surprising and counter-intuitive phenomena of quantum physics? Our Master’s will let you explore the full width and depth of such quantum effects in theory as well as in our state-of-the-art laboratories.

Learn the science that will drive tomorrow’s technology
Quantum technology is constantly evading technologies in communication, computation, sensing and many others. They emerge from well-known enabling technologies such as micro optics, nano structuring or numerics. Our Master’s will give you a solid background in these technologies and make you fit for your future career.

Bring the quantum theory into the real world
Our Master’s will bring you right into our research groups where you can study, explore and realise your favourite quantum project.

Be part of cutting edge research and technology
Profit from close collaboration between theoretical and experimental research at a top level to see novel prediction come true in our laboratories. Our Master’s will give you access to state-of-the-art equipment in quantum technology and theory to realise your ideas.

Join the world-wide network of quantum researchers
Our research is strongly connected to a large international network. Our Master’s will give you access to these connections and will thus open the scientific world for you.

Course organisation

<table>
<thead>
<tr>
<th>Course organisation</th>
<th>Modules</th>
</tr>
</thead>
<tbody>
<tr>
<td><a href="https://www.physik.uni-kl.de/quantum-master/what-will-you-learn/">https://www.physik.uni-kl.de/quantum-master/what-will-you-learn/</a></td>
<td></td>
</tr>
</tbody>
</table>

Module QT: Quantum Technologies
Quantum physics has already become reality in various technological applications, and other applications will follow. This module will convey the basics of quantum technology, the enabling technologies including, for example, quantum optics and photonics. We are convinced that you learn technologies by applying them. Therefore, this module is closely linked to our advanced laboratory courses.

Module MB: Many-Body Quantum Systems
In the quantum world, a many-body system is much more than just the sum of its constituent parts. This is a consequence of quantum correlations rendering quantum systems so special. This module will provide the necessary theoretical background as well as experimental examples to describe and understand the fascinating properties of quantum many-body systems.

Module LC: Laboratory Courses
The step from theoretical understanding to realisation of quantum phenomena in cutting edge research is a big step. Our advanced laboratory course will give you the chance to get used to state-of-the-art equipment and techniques in, e.g., quantum optics and photonics. In one- or two-week
projects the fundamental methods and techniques of data acquisition, analysis and interpretation are practised so that you can later excel in your own research project.

**Modules RM and MT: Research and Master’s Thesis**

You want to solve your own quantum problem, see quantum phenomena emerge that nobody has seen before? The research module and Master’s thesis will let you join one of our leading theoretical and experimental groups and pursue your research topic under close supervision and in the worldwide network of quantum researchers.

<table>
<thead>
<tr>
<th>Types of assessment</th>
<th>There will be oral exams for the course programme.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Diploma supplement will be issued</td>
<td>Yes</td>
</tr>
<tr>
<td>Integrated internships</td>
<td>Lab course (LC) module: Experiments in university’s research labs</td>
</tr>
<tr>
<td>Course-specific, integrated German language courses</td>
<td>Yes</td>
</tr>
<tr>
<td>Course-specific, integrated English language courses</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**Costs / Funding**

<table>
<thead>
<tr>
<th>Tuition fees per semester in EUR</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td>Semester contribution</td>
<td>Enrolment fee: approx. 240 EUR per semester, includes e.g. free transport in the area around Kaiserslautern (up to 100 km), more than 50 free university sports courses, and more.</td>
</tr>
<tr>
<td></td>
<td>Assessment fee: 50 EUR single payment for verification of foreign certificates (you will get an invoice after submitting your application).</td>
</tr>
<tr>
<td></td>
<td>Recommended: German Language &amp; Orientation Course for international Master’s students: 750 EUR single payment</td>
</tr>
<tr>
<td>Costs of living</td>
<td>High standard of living at low cost:</td>
</tr>
<tr>
<td></td>
<td>Monthly costs: in total approx. 750 EUR to cover all personal expenses, e.g. accommodation: approx. 250-350 EUR; health insurance: approx. 105 EUR; food: approx. 200 EUR</td>
</tr>
<tr>
<td></td>
<td>Cost of living - a snapshot of regional prices:</td>
</tr>
<tr>
<td></td>
<td>- Meal in refectory: 2.40 EUR</td>
</tr>
<tr>
<td></td>
<td>- Loaf of bread: 1.50 EUR</td>
</tr>
<tr>
<td></td>
<td>- Orange juice (1 litre): 1 EUR</td>
</tr>
<tr>
<td></td>
<td>- Rice (1kg): 0.90 EUR</td>
</tr>
<tr>
<td>Funding opportunities within the university</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Description of the above-mentioned funding opportunities within the university: Merit-based scholarships for excellent students are available and can be applied for upon application.
## Requirements / Registration

### Academic admission requirements

What are the admission requirements?

1. **Dedication**, curiosity, and a fascination with quantum phenomena!
2. **Bachelor's degree in Physics** with solid background in basic quantum mechanics (equivalent to the local Bachelor's programme) ([check FAQ](#))
3. **English language proficiency** ([check FAQ](#))

https://www.physik.uni-kl.de/quantum-master/application/

### Language requirements

- Proof of English language proficiency (TOEFL 213 computer-based, 80 Internet-based; IELTS 6.0 or equivalent)

### Application deadline

- **Application deadlines for AQP** (dates are valid for every year)

  1. **Winter semester**
     1. If visa required: **30 April**
     2. If no visa required: **15 July**
     3. Orientation course starts on **1 August**.
     4. Lectures start on **1 October**.
  2. **Summer semester**
     1. If visa required: **31 October**
     2. If no visa required: **15 January**
     3. Orientation course starts on **1 March**.
     4. Lectures start on **1 April**.

### Submit application to

- **Department of International Affairs: ISGS**
  Gottlieb-Daimler-Str. 47
  67663 Kaiserslautern

  [https://www.physik.uni-kl.de/quantum-master/application/](https://www.physik.uni-kl.de/quantum-master/application/)

## Services

### Possibility of finding part-time employment

Student assistant jobs are available on a competitive basis at the university, the partner Institutes of the Science & Innovation Alliance Kaiserslautern (including DFKI, Max Planck, Fraunhofer etc) or at nearby industry companies (John Deere, Daimler, BASF etc.) Excellent students have good chances of finding jobs in research projects, but these are not usually granted in advance. Support in finding a job as a student assistant is available through the Department of International Affairs: ISGS.

### Accommodation

The majority of our students live in residence halls located on or close to campus. Unlike in other countries, German dormitories are not owned or operated by the university but by external institutions. The "Studierendenwerk" operates several large halls of residence in Kaiserslautern. Students submit housing applications directly to the Studierendenwerk; typically there is a waiting period for rooms. For international Master's or PhD students, the Department of International Affairs: ISGS at TU Kaiserslautern aims at arranging accommodation in these residence halls or in private accommodation within its pre-arrival service. The halls of residence have modern single,
double or shared apartments with kitchenette, bathroom/WC, and modern facilities as well as internet access.

- Fully-furnished:
  - Kitchenette (no plates & pots, etc.)
  - Bed & mattress (no blankets & pillows)
  - Wardrobe
  - Shelf, table, chair (no computer)
- Rent: 250-350 EUR

Since accommodation is not automatically guaranteed with admission, a request for accommodation to ISGS is advisable.

www.uni-kl.de/international/master/prospective-students/travel-accommodation/accommodation/

### Career advisory service

Offered by the Faculty of Physics: [https://www.physik.uni-kl.de/quantum-master/aqp-master-program/contact-us/](https://www.physik.uni-kl.de/quantum-master/aqp-master-program/contact-us/)

### Specific specialist or non-specialist support for international students and doctoral candidates

- Welcome event
- Accompanying programme
- Specialist counselling
- Cultural and linguistic preparation

### Supervisor-student ratio

Approx. 1:5

# Contact

**Technische Universität Kaiserslautern**  
Department of International Affairs: ISGS

Dr Parya Memar

PO box: 3049  
Gottlieb-Daimler-Str. 47  
67663 Kaiserslautern

Tel. +49 6312054002  
memar@isgs.uni-kl.de

Course website: [https://www.physik.uni-kl.de/quantum-master](https://www.physik.uni-kl.de/quantum-master)

[https://www.facebook.com/TUKaiserslautern](https://www.facebook.com/TUKaiserslautern)  
[https://twitter.com/uni_kl](https://twitter.com/uni_kl)  
[https://www.linkedin.com/school/technische-universitat-kaiserslautern](https://www.linkedin.com/school/technische-universitat-kaiserslautern)  
[https://www.instagram.com/tukaiserslautern/](https://www.instagram.com/tukaiserslautern/)

Last update 20.09.2020 15:37:10
International Programmes in Germany - Database

www.daad.de/international-programmes
www.daad.de/sommerkurse

Editor
DAAD - Deutscher Akademischer Austauschdienst e.V.
German Academic Exchange Service
Section K23 – Information on Studying in Germany
(responsible: Judith Lesch)
Kennedyallee 50
D-53175 Bonn
www.daad.de

GATE-Germany
Consortium for International Higher Education Marketing
www.gate-germany.de

Disclaimer
The data used for this database was collected and analysed in good faith and with due diligence. The DAAD and the Content5 AG accept no liability for the correctness of the data contained in the "International Programmes in Germany" and "Language and Short Courses in Germany".

The publication is funded by the German Federal Ministry of Education and Research and by contributions of the participating German institutions of higher education.