

## STUDY PROGRAM

| Basics in Mathematical Physics (1 <sup>st</sup> and 2 <sup>nd</sup> Semester) |          |
|---|----------|
| Geometry in Physics   | 9 CP     |
| Mathematical Quantum Theory*  | 9 CP     |
| Mathematical Relativity*  | 9 CP     |
| Mathematical Statistical Physics*   | 9 CP     |
| Advanced Topics (1 <sup>st</sup> - 3 <sup>rd</sup> Semester)                  |          |
| Advanced Topics in Mathematics  | 9 CP     |
| Advanced Topics in Theoretical Physics  | 9 CP     |
| Seminar   | 3 CP     |
| Optional Modules (2 <sup>nd</sup> and 3 <sup>rd</sup> Semester)**             |          |
| Advanced Topics in Mathematical Quantum Theory                                | 6 - 9 CP |
| Advanced Topics in Mathematical Relativity                                    | 6 - 9 CP |
| Advanced Topics in Mathematical Statistical Physics                           | 6 - 9 CP |
| Scientific Research (3 <sup>rd</sup> and 4 <sup>th</sup> Semester)            |          |
| Scientific Project  | 9 CP     |
| Mathematical Physics Colloquium   | 3 CP     |
| Master Thesis   | 30 CP    |

CP: Credit Points

- \* Two out of the three basic modules Mathematical Quantum Theory, Mathematical Relativity, and Mathematical Statistical Physics are mandatory. The third one is optional. All other courses can be chosen according to personal preferences with one limitation: every student has to pick at least one course from Mathematics (i. e. the module Advanced Topics in Mathematics) and one course from Physics (i. e. the module Advanced Topics in Physics).
- \*\* Within the area „Optional Modules“, the three listed modules from the Mathematical Physics program can be chosen as well as a large number of advanced modules of the master degree programs Mathematics, Physics, or Astro and Particle Physics.

The Mathematical Physics Colloquium is a weekly colloquium where specialists lecture about recent developments in Mathematical Physics. This provides students with the opportunity to meet and discuss with international guest scientists and local professors about current topics.

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**Photo credits:** University of Tuebingen

## MATHEMATICAL PHYSICS @ TÜBINGEN

The master program in Mathematical Physics is jointly organized by the departments of Mathematics and Physics in Tübingen. Both departments are internationally renowned and host several leading groups in Mathematical and Theoretical Physics, with a specific focus on Relativity and Quantum Theory.

### The University of Tübingen

Innovative. Interdisciplinary. International. Since 1477. These have been the University of Tübingen's guiding principles in research and teaching ever since it was founded. With this long tradition, the University of Tübingen is one of the most respected universities in Germany. Recently, its institutional strategy was successfully selected for funding in the Excellence Initiative sponsored by the German federal and state governments, making Tübingen one of Germany's eleven universities distinguished with that title of excellence. Tübingen has also proven its status as a leading research university in many national and international competitions – in key rankings Tübingen is listed among the best universities for the Humanities and Social Sciences as well as for Science and Medicine.

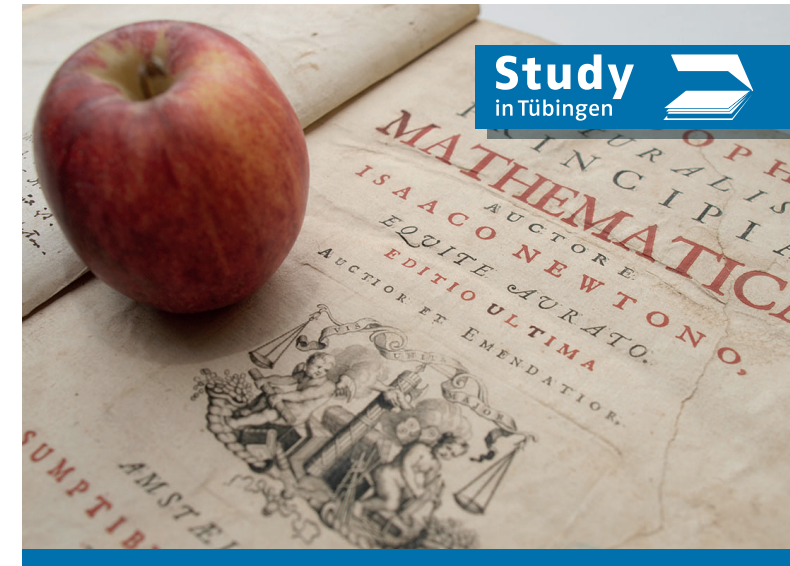
### The City of Tübingen

Tübingen doesn't have a university, Tübingen *is* a university: young, international, creative, open, innovative. With a total population of about 87.000 people and about 28.000 enrolled students, Tübingen offers a distinguished and traditional academic flair paired with the amenities of the youngest average population among all German cities. The beautiful, historic old town and its picturesque location on the Neckar River offer a high quality of life whether you are studying, working, or taking a break.

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EBERHARD KARLS  
UNIVERSITÄT  
TÜBINGEN



# MATHEMATICAL PHYSICS

Master of Science

FACULTY OF SCIENCE  
Department of Mathematics



## PROFILE

The Master's program Mathematical Physics is a research oriented interdisciplinary program geared towards basic research at the interface of Mathematics and Physics.

The development of modern Mathematics and of modern Physics is strongly interwoven. On the one hand, our modern picture of the physical world is formulated in terms of advanced mathematical theories and models. On the other hand, many developments in modern Mathematics were motivated from, even anticipated within, Physics.

## LEARNING OUTCOMES

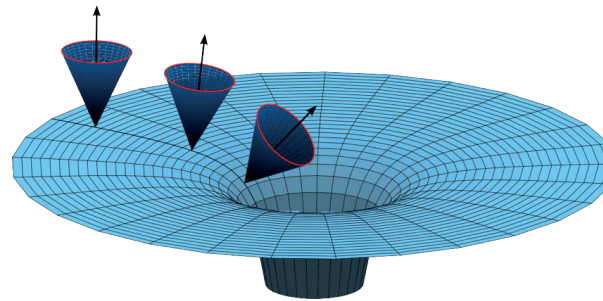
In the Tübingen Master's program in Mathematical Physics, students will learn advanced mathematical concepts and fundamental physical theories in a specific interdisciplinary study program.

- Graduates acquire familiarity with the fundamental concepts of modern Theoretical Physics as well as proficiency in Pure Mathematics.
- The program provides students with insight into the laws of nature along with the skills to model, analyze, and solve complex problems – skills that are highly valued in academia as well as in industry.
- Students develop an attitude of mind conducive to critical questioning and creative thinking and the capacity to formulate ideas mathematically.

## MENTORING

Every student will be assigned to a mentor from the group of professors involved in the master program. The mentor provides help and guidance with course selection and other academic questions.

## CAREER OPTIONS



This Master's program is designed to prepare students for a research career in academia or industry by introducing advanced ideas and techniques in the area of mathematical modeling and analysis that are applicable not only within physics but to a wide range of research areas and sectors in academia, industry, education, and finance.

### a) Professional Qualifications

Mathematical physicists with a graduate degree have a strong reputation for general versatility and problem-solving skills that make them highly sought after for high-level positions even in fields such as finance, software, and management consulting. In industry, graduates in Mathematical Physics are sought after in all technology driven fields where professionals with advanced skills in mathematical modeling are a scarce resource.

### b) Academic Qualifications

Depending on the course selection, the master program qualifies for doctoral studies in Mathematics and/or Physics. In particular, for some graduates there will be the possibility to undertake doctoral research in one of the two contributing departments of Mathematics and Physics with various forms of financial support. For example, a Research Training Group on Spectral Theory and Dynamics of Quantum Systems that provides several PhD positions is at the moment funded by the German Science Foundation.

## REQUIREMENTS

The study program requires enthusiasm, curiosity, and a solid background in Mathematics and/or Physics and acquaintance with the other field. We expect broad interest in Mathematical Physics as well as the willingness to familiarize and work with complex scientific details, and to be able to scientifically communicate in English in written and oral form. Courses are taught in English.

Applicants must have completed a Bachelor of Science degree in Mathematics or Physics (or a comparable undergraduate degree) with a German grade of 2.5 or better (or international equivalent). An adequate knowledge of English is required (level B2 of the Common European Framework of Reference for Languages).

## APPLICATION PROCEDURE

The M. Sc. Mathematical Physics program starts each year in October (winter semester). The closing date for applications is 15 June.

Information on admission to studies (requirements, restrictions, necessary documents, application deadlines, etc.) is available via the Student Administration ([zsb@uni-tuebingen.de](mailto:zsb@uni-tuebingen.de)) or the study coordinator of Mathematical Physics.

The application is to be submitted online only via <https://movein-uni-tuebingen.moveonnet.eu/movein/portal/studyportal.php>

Each application must include the completed application form, copies of your degree certificate, transcript of records/diploma supplement and language certificate, as well as a resume and a letter in English saying why you want to study with us. Reports by your employers or university teachers, recommendations and documentation of prizes/scholarships, or special non-academic activities are welcome.

## FURTHER INFORMATION

[www.math.uni-tuebingen.de/arbeitsbereiche/m-sc-mathematical-physics](http://www.math.uni-tuebingen.de/arbeitsbereiche/m-sc-mathematical-physics)