Degrees

The department offers two graduate degrees: Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) in Physics.

The M.S. degree requires completion of a minimum of 30 course hours beyond the Bachelor’s degree, and is available with a thesis or a non-thesis option.

The Ph.D. program requires a minimum of 18 course hours beyond the Master’s degree, and completion of the Department qualifying examination at the Ph.D. pass level. The program is designed to prepare the candidate to engage in independent research and creative activity. The final stage of the program requires students to orally defend a dissertation documenting original research performed by the student under the supervision of a faculty member.

Financial Support

Several financial aid packages are available to support students. Incoming students are usually granted a teaching assistantship, but in some cases research assistantships may be given to first-year students. There are also several summer research fellowships. In addition, all regular teaching and research assistants are granted a full tuition waiver and medical insurance by the University.

Research Programs

The experimental and theoretical research programs in the Department of Physics and Astronomy are concentrated in the following emphasis areas:

- Biological Physics
- Condensed Matter Physics
- Theoretical Condensed Matter Physics
- Astrophysics and General Relativity
- Physics Education

Biological Physics

Faculty: Shie-Jie Chen, Gabor Forgacs, Kattesh Katti, Gavin King, Ioan Kosztin, Xiaoqin Zou

The Biological Physics group includes theoretical, experimental and computational investigators. Strong emphasis is placed on translational research – the implementation of laboratory research results in a clinical setting. Major research projects include:

- Nanomedicine
- Cellular biomechanics
- Single molecule studies
- Computational biophysics
- RNA folding and assembly
- Computational drug design

Experimental Condensed Matter & Materials Physics

Faculty: H.R. Chandrasekhar, Meera Chandrasekhar, Suchi Guha, Paul Miceli, Wouter Montfrooij, Peter Pfeifer, Haskell Taub, Owen Vajk, Ping Yu

The Condensed Matter and Materials Physics group studies a wide range of materials, from inorganic/organic semiconductors to magnets and molecular systems. The group is strongly involved in fundamental as well as technological aspects of many materials science problems. Current experimental research projects include:

- Biomedical optical imaging
- Organic displays and photovoltaics
- ZnO-based optoelectronics
- High pressure optical spectroscopy
- Magnetic fractals
- Organic thin films and biomembranes
- Neutron and x-ray scattering
- Alternative fuel research

Condensed Matter Theory

Faculty: Peter Pfeifer, Sashi Satpathy, Carsten Ullrich, Giovanni Vignale, Carlos Wenker

The Condensed Matter Theory group has vigorous research programs in virtually all the areas of this pivotal branch of physics. Programs include:

- Electronic structure of materials
- Magnetic devices and spintronics
- Quantum many-body theory
- Density-functional theory
- Transport and optical excitations in semiconductors
- Quantum and classical statistical mechanics, fractals and phase transitions

Research Programs

- Laser lab
- Organic electronics lab
- Missouri Research Reactor

- From corn to tank: alternative fuel research
- Organ printing — an artist’s conception
- Light-harvesting proteins: a new generation of solar energy nano-devices?
- Racetrack memory: one of many futuristic devices studied by condensed matter theorists of the department
Physics/Science Education
Faculty: Deborah Hanuscin

Physics/Science Education research focuses on effective strategies for college science teaching and teacher education. Current projects include

• Writing-to-learn strategies
• Formative assessment tools
• Inquiry-based teaching methodologies

Leisure
With its many cultural activities, concert series, theaters, restaurants, nightclubs, and natural beauty, Columbia offers great opportunities for fun all the year round.

The activities of the group include a program of both theoretical and observational research focusing on the role played by cosmic dust in the formation and evolution of stars and planets, in the origin of molecules, and in the shaping of galaxies.

Admissions
The Department of Physics and Astronomy encourages applications from students who have successfully completed their undergraduate studies. To submit an application you must complete the following steps:

(1) Apply online to the graduate school at MU
(2) Send the following material directly to the Department of Physics and Astronomy:
   • Application for Graduate Appointment in Physics
   • Three letters of recommendation
   • Statement of Purpose
   • Results of the GRE General and Physics tests
   • Official Transcripts
   • Results of the TOEFL test (only international students)

Inquiries regarding the application process should be directed to Director of Graduate Studies 223 Physics Building University of Missouri, Columbia, MO 65211 Phone: 573-882-2467 Email: ullrichc@missouri.edu

The Department
The Department of Physics and Astronomy, with 30 faculty members, is one of the most vigorously growing departments in MU’s College of Arts and Science. It offers a friendly and intellectually stimulating environment, where students and faculty work together on exciting problems at the cutting edge of science and technology. The three main areas of research are

• Biological Physics
• Condensed Matter Physics
• Astrophysics and General Relativity

All research projects are supported by external grants, and enhanced by outstanding departmental and university facilities. These programs provide great opportunities for graduate students to work with internationally recognized scientists while earning a masters and/or a doctoral degree. Most of our graduates land high-quality jobs and achieve distinction in academia, industry, government and business. The city of Columbia provides excellent living conditions, a stimulating cultural atmosphere, and a vibrant student life.