

PHYSICS, M.S.

DEPARTMENT OVERVIEW

The Department of Physics has a strong tradition of graduate study and research in astrophysics; atomic, molecular, and optical physics; condensed matter physics; high energy and particle physics; plasma physics; quantum computing; and string theory. There are many facilities for carrying out world-class research (<https://www.physics.wisc.edu/research/areas/>). We have a large professional staff: 45 full-time faculty (<https://www.physics.wisc.edu/people/staff/>) members, affiliated faculty members holding joint appointments with other departments, scientists, senior scientists, and postdocs. There are over 175 graduate students in the department who come from many countries around the world. More complete information on the graduate program, the faculty, and research groups is available at the department website (<http://www.physics.wisc.edu>).

Research specialties include:

THEORETICAL PHYSICS

Astrophysics; atomic, molecular, and optical physics; condensed matter physics; cosmology; elementary particle physics; nuclear physics; phenomenology; plasmas and fusion; quantum computing; statistical and thermal physics; string theory.

EXPERIMENTAL PHYSICS

Astrophysics; atomic, molecular, and optical physics; biophysics; condensed matter physics; cosmology; elementary particle physics; neutrino physics; experimental studies of superconductors; medical physics; nuclear physics; plasma physics; quantum computing; spectroscopy.

M.S. DEGREES

The department offers the master science degree in physics, with two named options: Research and Quantum Computing. The M.S. Physics-Research option (<http://guide.wisc.edu/graduate/physics/physics-ms/physics-research-ms/>) is non-admitting, meaning it is only available to students pursuing their Ph.D. The M.S. Physics-Quantum Computing option (<http://guide.wisc.edu/graduate/physics/physics-ms/physics-quantum-computing-ms/>) (MSPQC Program) is a professional master's program in an accelerated format designed to be completed in one calendar year.

ADMISSIONS

Students apply to the Master of Science in Physics through the named option or the Ph.D.:

- Quantum Computing (<https://guide.wisc.edu/graduate/physics/physics-ms/physics-quantum-computing-ms/>)
- The Research (<http://guide.wisc.edu/graduate/physics/physics-ms/physics-research-ms/>) named option is offered for work leading to the Ph.D. Students may not apply directly for the master's, and should instead see the admissions information for the Ph.D. (<http://guide.wisc.edu/graduate/physics/physics-phd/#admissionstext>)

FUNDING

GRADUATE SCHOOL RESOURCES

Resources to help you afford graduate study might include assistantships, fellowships, traineeships, and financial aid. Further funding information (<https://grad.wisc.edu/funding/>) is available from the Graduate School. Be sure to check with your program for individual policies and processes related to funding.

REQUIREMENTS

MINIMUM GRADUATE SCHOOL REQUIREMENTS

Review the Graduate School minimum academic progress and degree requirements (<http://guide.wisc.edu/graduate/#policiesandrequirementstext>), in addition to the program requirements listed below.

MAJOR REQUIREMENTS CURRICULAR REQUIREMENTS

Requirements Detail

Minimum 30 credits

Credit

Requirement

Minimum See Named Options for policy information.

Residence

Credit

Requirement

Minimum 15 credits must be graduate-level coursework. Details Graduate can be found in the Graduate School's Minimum Graduate Coursework (50%) policy (<https://policy.wisc.edu/library/UW-1244>) (<https://policy.wisc.edu/library/UW-1244/>).

Overall 3.00 GPA required.

Graduate GPA This program follows the Graduate School's GPA Requirement policy (<https://policy.wisc.edu/library/UW-1203>) (<https://policy.wisc.edu/library/UW-1203/>).

Other Grade n/a

Requirements

Assessments See Named Options for policy information. and Examinations

Language n/a

Requirements

REQUIRED COURSES

Select a Named Option (<https://guide.wisc.edu/graduate/physics/physics-ms/#NamedOptions>) for courses required.

NAMED OPTIONS

A named option is a formally documented sub-major within an academic major program. Named options appear on the transcript with degree conferral. Students pursuing the Master of Science in Physics must select one of the following named options:

View as list View as grid

- **PHYSICS: QUANTUM COMPUTING, M.S.** ([HTTP://GUIDE.WISC.EDU/GRADUATE/PHYSICS/PHYSICS-MS/PHYSICS-QUANTUM-COMPUTING-MS/](http://guide.wisc.edu/graduate/physics/physics-ms/physics-quantum-computing-ms/))
- **PHYSICS: RESEARCH, M.S.** ([HTTP://GUIDE.WISC.EDU/GRADUATE/PHYSICS/PHYSICS-MS/PHYSICS-RESEARCH-MS/](http://guide.wisc.edu/graduate/physics/physics-ms/physics-research-ms/))

POLICIES

Students should refer to one of the named options for policy information:

- Quantum Computing (<https://guide.wisc.edu/graduate/physics/physics-ms/physics-quantum-computing-ms/>)
- Research (<http://guide.wisc.edu/graduate/physics/physics-ms/physics-research-ms/>)

PROFESSIONAL DEVELOPMENT

GRADUATE SCHOOL RESOURCES

Resources to help you afford graduate study might include assistantships, fellowships, traineeships, and financial aid. Further funding information (<https://grad.wisc.edu/funding/>) is available from the Graduate School. Be sure to check with your program for individual policies and restrictions related to funding.

PROGRAM RESOURCES

Students are encouraged to attend Graduate School sponsored Professional Development events and participate in Graduate School Professional Development resources, such as the Individual Development Plan (IDP).

LEARNING OUTCOMES

1. Mastery of the core physical concepts (classical mechanics, electricity and magnetism, quantum mechanics, and statistical mechanics).
2. Articulates, critiques, or elaborates the theories, research methods, and approaches to inquiry or schools of practice in physics.
3. Evaluates or synthesizes information pertaining to questions or challenges in physics.
4. Gains rudimentary awareness of physics research execution.
5. Communicates clearly in ways appropriate to the field of physics.

PEOPLE

FACULTY

More detail about each faculty member (<https://www.physics.wisc.edu/people/faculty/>) and the research areas (<https://www.physics.wisc.edu/research/areas/>) can be found on the Physics website.

Yang Bai, Associate Professor
 Baha Balantekin, Eugene P. Wigner Professor
 Vernon Barger, Vilas Professor and Van Vleck Professor

Keith Bechtol, Assistant Professor
 Kevin Black, Professor
 Stanislav Boldyrev, Professor
 Uwe Bergmann, Martin L. Pearl Professor in Ultrafast X-Ray Science
 Tulika Bose, Professor
 Victor Brar, Van Vleck Assistant Professor
 Duncan Carlsmith, Professor
 Daniel Chung, Professor
 Susan Coppersmith, Robert E. Fassnacht Professor and Vilas Professor
 Sridhara Dasu, Department Chair & Professor
 Jan Egedal, Professor
 Mark Eriksson, John Bardeen Professor
 Lisa Everett, Professor
 Ke Fang, Assistant Professor
 Cary Forest, Prager Professor of Experimental Physics
 Pupa Gilbert, Vilas Distinguished Achievement Professor
 Francis Halzen, Gregory Breit Professor and Hilldale Professor
 Kael Hanson, Professor, WIPAC Director
 Aki Hashimoto, Professor
 Matthew Herndon, Professor
 Lev Ioffe, Honorary Associate
 Robert Joynt, Professor
 Albrecht Karle, Professor
 Shimon Kolkowitz, Assistant Professor
 James Lawler, Arthur and Aurelia Schawlow Professor
 Alex Levchenko, Professor
 Lu Lu, Assistant Professor
 Dan McCammon, Professor
 Robert McDermott, Professor
 Moritz Muenchmeyer, Assistant Professor
 Marshall Onellion, Professor
 Kimberly Palladino, Assistant Professor
 Yibin Pan, Associate Professor
 Jeff Parker, Assistant Professor
 Brian Rebel, Associate Professor
 Mark Rzchowski, Associate Chair and Professor
 Mark Saffman, Professor
 John Sarff, Professor
 Gary Shiu, Professor
 Paul Terry, Professor
 Peter Timbie, Professor
 Justin Vandenbroucke, Associate Professor
 Maxim Vavilov, Professor
 Thad Walker, Professor
 Sau Lan Wu, Enrico Fermi Professor and Vilas Professor
 Deniz Yavuz, Professor
 Ellen Zweibel, William L Kraushaar Professor of Astronomy & Physics

AFFILIATED FACULTY

David Anderson, Professor, Electrical & Computer Engineering
 Paul Campagnola, Professor, Biomedical Engineering
 Jennifer Choy, Assistant Professor, Engineering Physics
 Elena D'Onghia, Associate Professor, Astronomy
 Chang-Beom Eom, Professor, Materials Science & Engineering
 Chris Hegna, Professor, Engineering Physics
 Sebastian Heinz, Professor, Astronomy
 Mikhail Kats, Associate Professor, Electrical & Computer Engineering
 Jason Kawasaki, Assistant Professor, Materials Science & Engineering
 Alexandre Lazarian, Professor, Astronomy
 Oliver Schmitz, Professor, Engineering Physics
 Carl Sovinec, Professor, Engineering Physics