

PHYSICS, MS

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.

MS DEGREES

The department offers the master science degree in physics, with two named options: Research and Quantum Computing. The MS 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 PhD. The MS 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

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Students apply to the Master of Science in Physics through the named option or the PhD:

- 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 PhD. Students may not apply directly for the master's, and should instead see the admissions information for the PhD. (<http://guide.wisc.edu/graduate/physics/physics-phd/#admissionstext>)

FUNDING

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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

Requirement Detail	
Minimum Credit Requirement	30 credits
Minimum Residence Credit Requirement	See Named Options for policy information.
Minimum Graduate Coursework Requirement	15 credits must be graduate-level coursework. Refer to the Graduate School: Minimum Graduate Coursework (50%) Requirement policy: https://policy.wisc.edu/library/UW-1244 (https://policy.wisc.edu/library/UW-1244/).
Overall Graduate GPA Requirement	3.00 GPA required. Refer to the Graduate School: Grade Point Average (GPA) Requirement policy: https://policy.wisc.edu/library/UW-1203 (https://policy.wisc.edu/library/UW-1203/).
Other Grade Requirements	n/a
Assessments and Examinations	See Named Options for policy information.
Language Requirements	n/a

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 listView as grid

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

POLICIES

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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

PROFESSIONAL DEVELOPMENT GRADUATE SCHOOL RESOURCES

Take advantage of the Graduate School's professional development resources (<https://grad.wisc.edu/pd/>) to build skills, thrive academically, and launch your career.

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

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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

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, Professor
 Baha Balantekin, Eugene P. Wigner Professor
 Vernon Barger, Van Vleck Professor and Vilas Research Professor
 Keith Bechtol, Associate 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 Associate Professor
 Duncan Carlsmith, Professor
 Daniel Chung, Professor
 Susan Coppersmith, Emeritus Robert E. Fasnacht Professor and Vilas Research Professor
 Kyle Cranmer, Professor & Data Science Institute Director
 Sridhara Dasu, Professor
 Jan Egedal, Professor
 Mark Eriksson, John Bardeen Professor and Department Chair
 Ilya Esterlis, Assistant 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, Hilldale Professor, & Vilas Research Professor
 Kael Hanson, Professor
 Aki Hashimoto, Professor
 Matthew Herndon, Professor
 Robert Joynt, Emeritus Professor
 Albrecht Karle, Professor
 Roman Kuzmin, Dunson Cheng Assistant Professor
 Alex Levchenko, Professor
 Lu Lyu (aka Lu Lu), Assistant Professor
 Dan McCammon, Professor
 Robert McDermott, Professor
 Moritz Muenchmeyer, Assistant Professor
 Yibin Pan, Associate Professor
 Brian Rebel, 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, Vilas Distinguished Achievement Professor
 Sau Lan Wu, Enrico Fermi Professor, Hilldale Professor, and Vilas Research 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, 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, Associate Professor, Materials Science & Engineering
Irena Knezevic, Professor, Electrical & Computer Engineering
Alexandre Lazarian, Professor, Astronomy
Daniel Rhodes, Assistant Professor, Materials Science & Engineering
Oliver Schmitz, Professor, Engineering Physics
Micheline Soley, Assistant Professor, Chemistry
Carl Sovinec, Professor, Engineering Physics
Richard Townsend, Professor, Astronomy
Ying Wang, Assistant Professor, Materials Science & Engineering
Jun Xiao, Assistant Professor, Materials Science & Engineering