**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**

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**

<table>
<thead>
<tr>
<th>Requirements Detail</th>
<th>Credit Requirement</th>
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<tbody>
<tr>
<td>Minimum Credit Requirement</td>
<td>30 credits</td>
</tr>
<tr>
<td>Minimum Residence Credit Requirement</td>
<td>See Named Options for policy information.</td>
</tr>
<tr>
<td>Minimum Graduate Coursework Requirement</td>
<td>Half of degree coursework (15 credits out of 30 total credits) must be completed graduate-level coursework; courses with the Graduate Level Coursework attribute are identified and searchable in the university’s Course Guide (<a href="https://registrar.wisc.edu/course-guide/">https://registrar.wisc.edu/course-guide/</a>). No 300-level courses will be counted toward the 30 credit minimum.</td>
</tr>
<tr>
<td>Overall Graduate GPA Requirement</td>
<td>3.00 GPA required.</td>
</tr>
<tr>
<td>Other Grade Requirements</td>
<td>The Graduate School requires an average grade of B or better in all coursework (300 or above, not including research credits) taken as a graduate student unless conditions for probationary status require higher grades. Grades of Incomplete are considered to be unsatisfactory if they are not removed during the next enrolled semester.</td>
</tr>
</tbody>
</table>

**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:

- PHYSICS: QUANTUM COMPUTING, M.S. (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/)

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