This is a named option within the Physics M.S (http://guide.wisc.edu/graduate/physics/physics-ms/). The master of science research degree program in physics requires the completion of a directed master’s project and thesis in the student’s area of interest, 30 credits of graduate work (including the core course requirements), and passage of the qualifying examination at the master’s level. It is designed to strengthen the student’s background and experience in physics, and enhance the opportunities for employment as a physicist or in physics education.

The research program in physics is unusually broad in scope with active experimental and theoretical research programs in astrophysics; atomic, molecular, and optical physics; biophysics; condensed matter physics; elementary particle physics; nuclear physics; particle physics theory; phenomenology; and plasma physics. This broad range of research opportunities makes the department especially attractive to beginning students who have not yet chosen a field of specialization.

Research specialties include:

**THEORETICAL PHYSICS**
Astrophysics; atomic, molecular, and optical physics; biophysics; condensed matter physics; cosmology; elementary particle physics; nuclear physics; particle physics theory; phenomenology; and plasma physics.

**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.

**ADMISSIONS**

Please consult the table below for key information about this degree program’s admissions requirements. The program may have more detailed admissions requirements, which can be found below the table or on the program’s website.

Graduate admissions is a two-step process between academic programs and the Graduate School. Applicants must meet the minimum requirements (https://grad.wisc.edu/apply/requirements/) of the Graduate School as well as the program(s). Once you have researched the graduate program(s) you are interested in, apply online (https://grad.wisc.edu/apply/).

<table>
<thead>
<tr>
<th>Requirements</th>
<th>Detail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall Deadline</td>
<td>December 15</td>
</tr>
<tr>
<td>Spring Deadline</td>
<td>This program does not admit in the spring.</td>
</tr>
<tr>
<td>Summer GRE (Graduate</td>
<td>This program does not admit in the summer.</td>
</tr>
<tr>
<td>Record Examinations)</td>
<td>Required.</td>
</tr>
<tr>
<td>English Proficiency Test</td>
<td>Every applicant whose native language is not English or whose undergraduate instruction was not in English must provide an English proficiency test score and meet the Graduate School minimum requirements (<a href="https://grad.wisc.edu/apply/requirements/#english-proficiency">https://grad.wisc.edu/apply/requirements/#english-proficiency</a>).</td>
</tr>
<tr>
<td>Other Test(s) (e.g.,</td>
<td>n/a</td>
</tr>
<tr>
<td>GMAT, MCAT)</td>
<td></td>
</tr>
<tr>
<td>Letters of Recommendation</td>
<td>3</td>
</tr>
<tr>
<td>Required</td>
<td></td>
</tr>
</tbody>
</table>

Admission is competitive. All applicants are reviewed and evaluated on the basis of previous academic record, three letters of recommendation, statement of purpose for graduate studies, resume, and Graduate Record Exam (GRE) general and subject scores. For applicants whose native language is not English, the department requires a minimum score of 580 (paper-based), 237 (computer-based) or 92 (internet-based) on the Test of English as a Foreign Language (TOEFL) exam, or 7 on the International English Language Testing System (IELTS) exam. To be considered for admission, students must submit all application materials (including test scores) via the Graduate School electronic application site (https://www.gradsch.wisc.edu/eapp/eapp.pl) by December 15.

**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 restrictions related to funding.

**GRADUATE SCHOOL RESOURCES**

**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.

**NAMED OPTION REQUIREMENTS**

**MODE OF INSTRUCTION**

<table>
<thead>
<tr>
<th>Face to Face</th>
<th>Evening/Weekend</th>
<th>Online</th>
<th>Hybrid</th>
<th>Accelerated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

Mode of Instruction Definitions

**Evening/Weekend:** These programs are offered in an evening and/or weekend format to accommodate working schedules. Enjoy the advantages of on-campus courses and personal connections, while keeping your day job. For more information about the meeting schedule of a specific program, contact the program.

**Online:** These programs are offered primarily online. Many available online programs can be completed almost entirely online with all online programs offering at least 50 percent or more of the program work online. Some online programs have an on-campus component that is often designed to accommodate working schedules. Take advantage of the convenience of online learning while participating in a rich,
interactive learning environment. For more information about the online nature of a specific program, contact the program.

Hybrid: These programs have innovative curricula that combine on-campus and online formats. Most hybrid programs are completed on-campus with a partial or completely online semester. For more information about the hybrid schedule of a specific program, contact the program.

Accelerated: These on-campus programs are offered in an accelerated format that allows you to complete your program in a condensed time-frame. Enjoy the advantages of on-campus courses with minimal disruption to your career. For more information about the accelerated nature of a specific program, contact the program.

### CURRICULAR REQUIREMENTS

<table>
<thead>
<tr>
<th>Requirements</th>
<th>Detail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum Credit Requirement</td>
<td>30 credits</td>
</tr>
<tr>
<td>Minimum Residence Credit Requirement</td>
<td>30 credits</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 identifiable 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>
<tr>
<td>Assessments and Examinations</td>
<td>All master of science degree candidates must pass the qualifying examination at the master's level.</td>
</tr>
<tr>
<td>Language Requirements</td>
<td>Contact the program for information on any language requirements.</td>
</tr>
</tbody>
</table>

### REQUIRED COURSES

All graduate degree candidates are required to take five core courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYSICS 711</td>
<td>Theoretical Physics-Dynamics</td>
<td>3</td>
</tr>
<tr>
<td>PHYSICS 715</td>
<td>Statistical Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>PHYSICS 721</td>
<td>Theoretical Physics-</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Electrodynamics</td>
<td></td>
</tr>
<tr>
<td>PHYSICS 731</td>
<td>Quantum Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>PHYSICS 732</td>
<td>Quantum Mechanics</td>
<td>3</td>
</tr>
</tbody>
</table>

The remaining 15 credits may be earned through a combination of research and coursework, to be determined by the advisor in consultation with the student.

### GRADE OF INCOMPLETE

A grade of Incomplete is considered to be unsatisfactory for the following reasons:

- The candidate is not satisfied with the grade due to lack of progress.
- The candidate is not satisfied with the grade due to lack of effort.
- The candidate is not satisfied with the grade due to lack of resources.
- The candidate is not satisfied with the grade due to lack of time.

These reasons must be documented in writing by the instructor and must be approved by the advisor. The candidate must then complete the work to receive a satisfactory grade within the specified time frame.

### PROBATION

Graduate students who do not meet the requirements for good standing may be placed on probation. The probationary status may be removed if the student meets the requirements for good standing within the specified time frame. If the student does not meet the requirements for good standing within the specified time frame, the student may be dismissed from the program.

### ADVISOR / COMMITTEE

All students are assigned a temporary advisor upon matriculation. The responsibility to acquire (choose and be accepted by) a major professor (permanent advisor) is entirely with the student. Acceptance for M.S. research by a professor depends on the professor's appraisal of the student's potential for research and on the ability of the professor to accept a student at that time. Usually the major professor will be able to offer support in the form of a research assistantship, but this is not always the case, and occasionally a student may need to work as a teaching assistant while performing thesis research.

Graduate students should begin research work as early as possible. Students are encouraged to acquire a major professor (advisor) and begin research by the end of the second semester. Students who do not acquire a research advisor and begin research by the end of their third semester may be dropped from the program.

All M.S. candidates are required to write a master's thesis and present their research in a seminar. All master's theses must be approved by a committee comprised of the student's advisor and two other members, at least one additional faculty member.

### CREDITS PER TERM ALLOWED

15 credits
**TIME CONSTRAINTS**

n/a

**GRIEVANCES AND APPEALS**

These resources may be helpful in addressing your concerns:

- Bias or Hate Reporting ([https://dosostudents.wisc.edu/bias-or-hate-reporting/](https://dosostudents.wisc.edu/bias-or-hate-reporting/))
- Graduate Assistantship Policies and Procedures ([https://hr.wisc.edu/policies/gapp/#grievance-procedure](https://hr.wisc.edu/policies/gapp/#grievance-procedure))
- Hostile and Intimidating Behavior Policies and Procedures ([https://hr.wisc.edu/hib/](https://hr.wisc.edu/hib/))
  - Office of the Provost for Faculty and Staff Affairs ([https://facstaff.provost.wisc.edu/](https://facstaff.provost.wisc.edu/))
- Dean of Students Office ([https://dosostudents.wisc.edu/](https://dosostudents.wisc.edu/)) (for all students to seek grievance assistance and support)
- Employee Assistance ([http://www.eao.wisc.edu/](http://www.eao.wisc.edu/)) (for personal counseling and workplace consultation around communication and conflict involving graduate assistants and other employees, post-doctoral students, faculty and staff)
- Employee Disability Resource Office ([https://employeedisabilities.wisc.edu/](https://employeedisabilities.wisc.edu/)) (for qualified employees or applicants with disabilities to have equal employment opportunities)
- Graduate School ([https://grad.wisc.edu/](https://grad.wisc.edu/)) (for informal advice at any level of review and for official appeals of program/departmental or school/college grievance decisions)
- Office of Compliance ([https://compliance.wisc.edu/](https://compliance.wisc.edu/)) (for class harassment and discrimination, including sexual harassment and sexual violence)
- Office of Student Conduct and Community Standards ([https://conduct.students.wisc.edu/](https://conduct.students.wisc.edu/)) (for conflicts involving students)
- Ombuds Office for Faculty and Staff ([http://www.ombuds.wisc.edu/](http://www.ombuds.wisc.edu/)) (for employed graduate students and post-docs, as well as faculty and staff)
  - Title IX ([https://compliance.wisc.edu/titleix/](https://compliance.wisc.edu/titleix/)) (for concerns about discrimination)

Students should contact the department chair or program director with questions about grievances.

**OTHER**

n/a

**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/](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).

**FACULTY**

More detail about each faculty member ([https://www.physics.wisc.edu/people/faculty/](https://www.physics.wisc.edu/people/faculty/)) and the research areas ([https://www.physics.wisc.edu/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 Bargh, Vilas Professor and Van Vleck Professor
- Keith Bechtol, Assistant Professor
- Kevin Black, Professor
- Stanislav Boldyrev, Professor
- Tulika Bose, Professor
- Victor Brar, Assistant Professor
- Duncan Carlsmit, Professor
- Daniel Chung, Professor
- Susan Coppersmith, Robert E. Fassnacht Professor and Vilas Professor
- Sridhara Dasu, Department Chair & Professor
- Jan Egedal, Professor
- Mark Eriksson, Vilas Distinguished Achievement Professor
- Lisa Everett, 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, Professor
- Robert Joynt, Professor
- Albrecht Karle, Professor, IceCube Associate Director, Science & Instrumentation
- Shimon Kolkowitz, Assistant Professor
- James Lawler, Arthur and Aurelia Schawlow Professor
- Alex Levchenko, Associate Professor
- Dan McCammon, Professor
- Robert McDermott, Professor
- Marshall Onellion, Professor
- Kimberly Palladino, Assistant Professor
- Yibin Pan, Associate 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