

PHYSICS: RESEARCH, MS

This is a named option within the Physics MS (<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; 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.

ADMISSIONS

ADMISSIONS

The MS named option in Research 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 (<https://guide.wisc.edu/graduate/physics/physics-phd/>). (<https://guide.wisc.edu/graduate/physics/physics-phd/#admissionstext>)

Students may also apply to the MS named option in Quantum Computing. (<https://guide.wisc.edu/graduate/physics/physics-ms/physics-quantum-computing-ms/>)

FUNDING

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 restrictions related to funding.

REQUIREMENTS

MINIMUM GRADUATE SCHOOL REQUIREMENTS

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

NAMED OPTION REQUIREMENTS

MODE OF INSTRUCTION

Face to Face	Evening/ Weekend	Online	Hybrid	Accelerated
Yes	No	No	No	No

Mode of Instruction Definitions

Accelerated: Accelerated programs are offered at a fast pace that condenses the time to completion. Students typically take enough credits aimed at completing the program in a year or two.

Evening/Weekend: Courses meet on the UW-Madison campus only in evenings and/or on weekends to accommodate typical business schedules. Students have the advantages of face-to-face courses with the flexibility to keep work and other life commitments.

Face-to-Face: Courses typically meet during weekdays on the UW-Madison Campus.

Hybrid: These programs combine face-to-face and online learning formats. Contact the program for more specific information.

Online: These programs are offered 100% online. Some programs may require an on-campus orientation or residency experience, but the courses will be facilitated in an online format.

CURRICULAR REQUIREMENTS

Requirement Detail	
Minimum Credit Requirement	30 credits
Minimum Residence Credit Requirement	16 credits
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 All master of science degree candidates must pass the qualifying examination at the master's level.

Master of science degree candidates must write a master's thesis and defend that thesis in a seminar.

Language Requirements Contact the program for information on any language requirements.

REQUIRED COURSES

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

Code	Title	Credits
Required Core		
PHYSICS 711	Theoretical Physics–Dynamics	3
PHYSICS 715	Statistical Mechanics	3
PHYSICS 721	Theoretical Physics–Electrodynamics	3
PHYSICS 731	Quantum Mechanics	3
PHYSICS 732	Quantum Mechanics	3
Additional Coursework		15
The remaining credits may be earned through a combination of research and coursework, to be determined by the advisor in consultation with the student. Courses numbered 300 to 399 cannot fulfill any degree coursework requirements.		
Total Credits		30

POLICIES

GRADUATE SCHOOL POLICIES

The Graduate School's Academic Policies and Procedures (<https://grad.wisc.edu/acadpolicy/>) provide essential information regarding general university policies. Program authority to set degree policies beyond the minimum required by the Graduate School lies with the degree program faculty. Policies set by the academic degree program can be found below.

NAMED OPTION-SPECIFIC POLICIES

PRIOR COURSEWORK

Graduate Credits Earned at Other Institutions

Refer to the Graduate School: Transfer Credits for Prior Coursework (<https://policy.wisc.edu/library/UW-1216/>) policy.

Undergraduate Credits Earned at Other Institutions or UW–Madison

Up to 7 credits in courses numbered 500 or above may be used to satisfy minimum degree requirements.

Credits Earned as a Professional Student at UW–Madison (Law, Medicine, Pharmacy, and Veterinary careers)

Refer to the Graduate School: Transfer Credits for Prior Coursework (<https://policy.wisc.edu/library/UW-1216/>) policy.

Credits Earned as a University Special Student at UW–Madison

With program approval, students are allowed to transfer no more than 15 credits of coursework numbered 500 or above taken as a UW–Madison University Special student. Coursework earned ten or more years prior to admission to a master's degree is not allowed to satisfy requirements.

PROBATION

Grade of B or better in all coursework and a minimum cumulative graduate GPA of 3.0 are required.

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 MS 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 MS candidates are required to write a master's thesis and present their research in a seminar. All master's theses must be approved 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 LIMITS

Refer to the Graduate School: Time Limits (<https://policy.wisc.edu/library/UW-1221/>) policy.

GRIEVANCES AND APPEALS

These resources may be helpful in addressing your concerns:

- Bias or Hate Reporting (<https://doso.students.wisc.edu/bias-or-hate-reporting/>)
- Graduate Assistantship Policies and Procedures (<https://hr.wisc.edu/policies/gapp/#grievance-procedure>)
- Hostile and Intimidating Behavior Policies and Procedures (<https://hr.wisc.edu/hib/>)
 - Office of the Provost for Faculty and Staff Affairs (<https://facstaff.provost.wisc.edu/>)
- Employee Assistance (<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://employeeabilities.wisc.edu/>) (for qualified employees or applicants with disabilities to have equal employment opportunities)
- Graduate School (<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/>) (for class harassment and discrimination, including sexual harassment and sexual violence)
- Office Student Assistance and Support (OSAS) (<https://osas.wisc.edu/>) (for all students to seek grievance assistance and support)
- Office of Student Conduct and Community Standards (<https://conduct.students.wisc.edu/>) (for conflicts involving students)
- Ombuds Office for Faculty and Staff (<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/>) (for concerns about discrimination)

Students should contact the department chair or program director with questions about grievances. They may also contact the L&S Academic Divisional Associate Deans, the L&S Associate Dean for Teaching and Learning Administration, or the L&S Director of Human Resources.

OTHER

n/a

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).

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. Fassnacht 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