PHYSICS, BS

We have a long history of providing our students with a great educational experience. Our physics department awarded its first PhD in 1899. Since then, our students have earned degrees in virtually every area of physics, and our faculty have played key roles in a myriad of important research efforts.

Physics is the science of the properties of matter, radiation, and energy in all forms. As such, it is the most fundamental of the sciences. It provides the underlying framework for the other physical sciences and engineering and for understanding physical processes in biological and environmental sciences.

CHOOSE TO BE A PHYSICS MAJOR

WHY STUDY PHYSICS?

- Intellectual Satisfaction. First, and foremost, physics satisfies our deep desire to understand how the universe works. Physics is interesting.
- Intellectual Challenge. By striving for fundamental understanding, the physicist accepts the challenge to move past a merely descriptive approach of our world and probes deeply into how and why it works.
- Physics Produces New Technology. Today's esoteric physics research will become tomorrow's technological advances.
- Technical Expertise. Physicists exploit forefront technologies in their pursuits.
- Flexibility. In a fast-paced and changing world, it is much more important to have a broad substantive education than to be trained in a specific skill. We teach people how to think, and how to apply and extend what they know to new types of problems.
- Physics is Analytical and Quantitative. People who can reason analytically and quantitatively are essential for the success of almost any pursuit.

The undergraduate physics program will provide an overall view of both classical and modern physics with the flexibility to continue learning in fields that interest you. It will also help you develop skills in analysis, problem-solving, and quantitative reasoning that will aid you in whatever career you pursue after graduation.

A MAJOR IN PHYSICS CAN...

- Prepare you for employment in industrial or governmental laboratories.
- Prepare you for graduate studies for master's or doctoral degrees in experimental or theoretical physics.
- Provide a broad background for further work in other sciences, such as materials sciences, aerospace, astronomy, computer science, geophysics, meteorology, radiology, medicine, biophysics, engineering, and environmental studies.
- Provide a science-oriented liberal education. This training can be useful in some areas of business administration, law, or other fields where a basic knowledge of science is useful.
- Provide part of the preparation you need to teach physics. To teach physics in high school, you will also take education courses to become certified. You will need a doctoral degree to become a college or university professor.

Interested in the undergraduate physics program? Check out the physics undergraduate page (https://www.physics.wisc.edu/academics/undergrads/) or browse the Undergraduate Physics Majors Handbook (https://www.physics.wisc.edu/undergrads/handbook.pdf).

OTHER PROGRAMS

AMEP

A program in applied mathematics, engineering and physics (AMEP) (http://guide.wisc.edu/undergraduate/letters-science/mathematics/applied-mathematics-engineering-physics-bs-amep/) is described in its own section of the *Guide*.

ASTRONOMY–PHYSICS

Students interested in an Astronomy–Physics major should contact the Astronomy Department (http://guide.wisc.edu/undergraduate/letters-science/astronomy/).

EDUCATION–PHYSICS

A student working toward the Bachelor of Science–Education degree may major or minor in physics. Interested students should contact the School of Education (http://guide.wisc.edu/undergraduate/education/). Upon request, the physics department will assign an advisor.

MEDICAL PHYSICS

A suggested curriculum for students interested in graduate study in medical physics is available on the medical physics webpage (https://www.medphysics.wisc.edu/graduate-program/admissions/#requirements).

HOW TO GET IN

HOW TO GET IN

DECLARING A PHYSICS MAJOR

Students should discuss declaration with one of the undergraduate advisors (http://guide.wisc.edu/undergraduate/letters-science/physics/physics-ba/#advisingandcareerstext) as early as possible and bring a What-If DARS for the Physics major to their meeting.

To be eligible to declare the major, students must have a combined MATH and PHYSICS GPA of at least a 2.500. Eligible students can declare the physics major anytime by meeting with an advisor to complete the department's major declaration form (https://www.physics.wisc.edu/sites/default/files/Physics%20Declaration%20Form.pdf).

There are additional steps to declaring Physics as an Additional Major. Section C of the major declaration form (https://www.physics.wisc.edu/sites/default/files/Physics%20Declaration%20Form.pdf) has important information about this process. Students should consult the Guide page of their home school or college for more information about declaring an Additional Major in L&S.

Students pursuing the Physics major are not eligible to declare the Physics certificate.

REQUIREMENTS

UNIVERSITY GENERAL EDUCATION REQUIREMENTS

All undergraduate students at the University of Wisconsin–Madison are required to fulfill a minimum set of common university general education requirements to ensure that every graduate acquires the essential core of an undergraduate education. This core establishes a foundation for living a productive life, being a citizen of the world, appreciating aesthetic values, and engaging in lifelong learning in a continually changing world. Various schools and colleges will have requirements in addition to the requirements listed below. Consult your advisor for assistance, as needed. For additional information, see the university Undergraduate General Education Requirements (http://guide.wisc.edu/undergraduate/#requirementsforundergraduatestudytext) section of the *Guide*.

General Education	• Breadth–Humanities/Literature/Arts: 6 credits • Breadth–Natural Science: 4 to 6 credits, consisting of one 4- or 5-credit course with a laboratory component; or two courses providing a total of 6 credits • Breadth–Social Studies: 3 credits • Communication Part A & Part B * • Ethnic Studies * • Quantitative Reasoning Part A & Part B *

* The mortarboard symbol appears before the title of any course that fulfills one of the Communication Part A or Part B, Ethnic Studies, or Quantitative Reasoning Part A or Part B requirements.

COLLEGE OF LETTERS & SCIENCE DEGREE REQUIREMENTS: BACHELOR OF SCIENCE (BS)

Students pursuing a Bachelor of Science degree in the College of Letters & Science must complete all of the requirements below. The College of Letters & Science allows this major to be paired with either the Bachelor of Arts or the Bachelor of Science degree requirements.

BACHELOR OF SCIENCE DEGREE REQUIREMENTS

Mathematics	Complete two courses of 3+ credits at the Intermediate or Advanced level in MATH, COMP SCI, or STAT subjects. A maximum of one course in each of COMP SCI and STAT subjects counts toward this requirement.
Language	Complete the third unit of a language other than English.
L&S Breadth	Complete: • 12 credits of Humanities, which must include at least 6 credits of Literature; and • 12 credits of Social Science; and • 12 credits of Natural Science, which must include 6 credits of Biological Science and 6 credits of Physical Science.
Liberal Arts and Science Coursework	Complete at least 108 credits.
Depth of Intermediate/ Advanced Coursework	Complete at least 60 credits at the Intermediate or Advanced level.
Major	Declare and complete at least one major.
Total Credits	Complete at least 120 credits.
UW-Madison Experience	Complete both: • 30 credits in residence, overall, and • 30 credits in residence after the 86th credit.
Quality of Work	• 2.000 in all coursework at UW–Madison • 2.000 in Intermediate/Advanced level coursework at UW–Madison

NON–L&S STUDENTS PURSUING AN L&S MAJOR

Non–L&S students who have permission from their school/college to pursue an additional major within L&S only need to fulfill the major requirements. They do not need to complete the L&S Degree Requirements above.

REQUIREMENTS FOR THE MAJOR

The physics major requires 35 credits from the following:

Code	Title	Credits
Introductory Physics [1]		
First Introductory Course (complete one): [1]		*5*
PHYSICS 247	A Modern Introduction to Physics (recommended)	
PHYSICS 207	General Physics	
PHYSICS 201	General Physics	
E M A 201 & E M A 202	Statics and Dynamics [2]	
E M A 201 & M E 240	Statics and Dynamics [2]	
Second Introductory Course (complete one):		*5*
PHYSICS 248	A Modern Introduction to Physics (recommended)	
PHYSICS 208	General Physics	
PHYSICS 202	General Physics	
Third Introductory Course (complete one):		*3-4*
PHYSICS 249	A Modern Introduction to Physics (recommended)	
PHYSICS 205	Modern Physics for Engineers (See advising and careers for more information.)	
PHYSICS/ E C E 235	Introduction to Solid State Electronics (See advising and careers for more information.)	
PHYSICS 241	Introduction to Modern Physics	
Intermediate Mechanics		
PHYSICS 311	Mechanics	3
Electromagnetism (complete one):		**3**
PHYSICS 322	Electromagnetic Fields	

E C E 220 & E C E 320 & E C E 420	Electrodynamics I and Electrodynamics II and Electromagnetic Wave Transmission [3]	
Quantum Mechanics (complete one):		**3**
PHYSICS 448	Atomic and Quantum Physics	
PHYSICS 531	Introduction to Quantum Mechanics	
Laboratory		**4**
Full registered credit per course:		
PHYSICS 307	Intermediate Laboratory-Mechanics and Modern Physics	
PHYSICS 407	Advanced Laboratory	
Two credits apply from each of the following:		
PHYSICS 321	Electric Circuits and Electronics [4]	
PHYSICS 325	Optics [4]	
PHYSICS 623	Electronic Aids to Measurement [4]	
PHYSICS 625	Applied Optics [4]	
N E 427	Nuclear Instrumentation Laboratory [5]	
N E 428	Nuclear Reactor Laboratory [5]	
One credit applies from each of the following:		
E C E 305	Semiconductor Properties Laboratory [5]	
E C E 313	Optoelectronics Lab [5]	
Advanced Physics Electives		**4-9**
Total Credits		**35**

[1] PHYSICS 247/PHYSICS 248/PHYSICS 249 is the introductory course sequence recommended for prospective physics majors, PHYSICS 201/PHYSICS 202/PHYSICS 241 is recommended for engineers, and PHYSICS 207/PHYSICS 208/PHYSICS 241 is intended for life sciences and chemistry majors. Both PHYSICS 201 General Physics/PHYSICS 202 General Physics/PHYSICS 241 Introduction to Modern Physics and PHYSICS 207 General Physics/PHYSICS 208 General Physics/PHYSICS 241 Introduction to Modern Physics are suitable alternatives for physics majors. Although the department recommends following one of these sequences, students are allowed to mix them, with the exception that transfers into the PHYSICS 247/PHYSICS 248/PHYSICS 249 sequence are not permitted.

[2] Both courses must be taken and together count 5 credits toward the 35 required for the major. These credits can be counted toward the 35 required for the major only if these courses are used to satisfy this requirement.

[3] All three of E C E 220 and E C E 320 and E C E 420 must be taken, and together count 3 credits toward the 35 required for the major. These credits can be counted toward the 35 required for the major only if these courses are used to satisfy this requirement.

[4] All four credits for each course count toward 35-credit total.

[5] For non-PHYSICS courses, students will receive only the credit applied as lab toward the 35-credit requirement.

ADVANCED PHYSICS ELECTIVE COURSES

Code	Title	Credits
PHYSICS 301	Physics Today (recommended) [6]	1
PHYSICS 307	Intermediate Laboratory-Mechanics and Modern Physics	2
PHYSICS 311	Mechanics	3
PHYSICS 321	Electric Circuits and Electronics	4
PHYSICS 322	Electromagnetic Fields	3
PHYSICS 323	Electromagnetic Fields	3
PHYSICS 325	Optics	4
PHYSICS 406	Special Topics in Physics	1-4
PHYSICS 407	Advanced Laboratory	2-4
PHYSICS 415	Thermal Physics	3
PHYSICS 448	Atomic and Quantum Physics	3
PHYSICS 449	Atomic and Quantum Physics	3
PHYSICS 472		3
PHYSICS 498	Directed Study	1-3
PHYSICS 499	Directed Study	1-3
PHYSICS/B M E/ H ONCOL/ MED PHYS 501	Radiation Physics and Dosimetry	3
PHYSICS/E C E/ N E 525	Introduction to Plasmas	3
PHYSICS/E C E/ N E 527	Plasma Confinement and Heating	3
PHYSICS 531	Introduction to Quantum Mechanics	3
PHYSICS 535	Introduction to Particle Physics	3
PHYSICS 545	Introduction to Atomic Structure	3
PHYSICS 546		2-3
PHYSICS 551	Solid State Physics	3
PHYSICS/ MED PHYS 588	Radiation Production and Detection	4
PHYSICS 601		2
PHYSICS 603	Workshop in College Physics Teaching	1-2
PHYSICS 623	Electronic Aids to Measurement	4
PHYSICS 625	Applied Optics	4
PHYSICS 681	Senior Honors Thesis	3
PHYSICS 682	Senior Honors Thesis	3
PHYSICS 691	Senior Thesis	2-3
PHYSICS 692	Senior Thesis	2-3

[6] It is recommended that the student's program include the seminar PHYSICS 301 Physics Today.

RESIDENCE AND QUALITY OF WORK IN THE MAJOR

- 2.000 GPA in all PHYSICS and all major courses
- 2.000 on at least 15 credits in Upper Level work, taken in residence[7]
- 15 credits in PHYSICS, taken on campus

[7] Courses that meet the Core and Laboratory requirements, and Advanced level PHYSICS courses, count as upper-level in the major.

HONORS IN THE MAJOR

Students may declare Honors in the Major in consultation with their major advisor and the Honors Program.

HONORS IN THE MAJOR REQUIREMENTS

To earn Honors in the Major, students must satisfy both the requirements for the major (above) and the following additional requirements:

- Earn a 3.300 University GPA
- Earn a 3.300 GPA in all PHYSICS and all major courses
- 12 credits of Honors PHYSICS courses with grades of B or better, to include:
  - PHYSICS 681 - PHYSICS 682, for a total of 6 credits
  - 3 additional credits of Advanced level PHYSICS for Honors, with a grade of B or better
  - 3 credits at any level in PHYSICS for Honors, with a grade of B or better [8]

[8] Note that enrolling in PHYSICS 247/PHYSICS 248/PHYSICS 249 provides honors credit towards Honors in the Major (not at the Advanced level, however).

UNIVERSITY DEGREE REQUIREMENTS

Total Degree	To receive a bachelor's degree from UW–Madison, students must earn a minimum of 120 degree credits. The requirements for some programs may exceed 120 degree credits. Students should consult with their college or department advisor for information on specific credit requirements.
Residency	Degree candidates are required to earn a minimum of 30 credits in residence at UW–Madison. "In residence" means on the UW–Madison campus with an undergraduate degree classification. "In residence" credit also includes UW–Madison courses offered in distance or online formats and credits earned in UW–Madison Study Abroad/Study Away programs.
Quality of Work	Undergraduate students must maintain the minimum grade point average specified by the school, college, or academic program to remain in good academic standing. Students whose academic performance drops below these minimum thresholds will be placed on academic probation.

LEARNING OUTCOMES

LEARNING OUTCOMES

1. Understand basic physical principles.
2. Solve problems proficiently using both quantitative and qualitative applications of these physical principles.
3. Appreciate the excitement of physics and be acquainted with a wide range of research areas in physics.
4. Know how to perform quantitative measurements of physical phenomena and understand the statistical significance of observations made in the presence of statistical and systematic uncertainties.
5. Be prepared for graduate study and/or careers in STEM fields.
6. Communicate effectively with scientific peers and the public, both orally and in writing.
7. Understand their own learning processes and be able to continue to educate themselves after graduation.

FOUR-YEAR PLAN

FOUR-YEAR PLAN

This Four-Year Plan is only one way a student may complete an L&S degree with this major. Many factors can affect student degree planning, including placement scores, credit for transferred courses, credits earned by examination, and individual scholarly interests. In addition, many students have commitments (e.g., athletics, honors, research, student organizations, study abroad, work and volunteer experiences) that necessitate they adjust their plans accordingly. Informed students engage in their own unique Wisconsin Experience by consulting their academic advisors, Guide, DARS, and Course Search & Enroll for assistance making and adjusting their plan.

Departmental Expectations

Students should arrange a meeting with a departmental advisor as soon as they are even thinking about a physics major. It is important to get major advising as early as possible.

This is one of many paths through the physics major. For other possibilities and details on math preparation and sequence of courses, see the Advising and Careers page (https://guide.wisc.edu/undergraduate/letters-science/physics/physics-bs/#advisingandcareerstext).

First Year

Fall	Credits	Spring	Credits
MATH 222	4	PHYSICS 247	5
COMP SCI 220	4	MATH 234	4
Communication A	3	Ethnic Studies	3
Foreign Language (if needed)	4	Foreign Language (if needed)	4
	15		**16**

Second Year

Fall	Credits	Spring	Credits
PHYSICS 248	5	PHYSICS 249	4
MATH 319	3	PHYSICS 311	3
MATH 340	3	PHYSICS 301	1
INTER-LS 210	1	MATH 321	3
Humanities Breadth	3	Literature Breadth	3
	15		**14**

Third Year

Fall	Credits	Spring	Credits
PHYSICS 307	2	Physics Lab Course	4
PHYSICS 322	3	Physics Elective	3
MATH 322	3	Humanities Breadth	3
Social Science Breadth	3	Social Science Breadth	3
Communication B	3-4	Biological Science Breadth	3
	14		**16**

Fourth Year

Fall	Credits	Spring	Credits
PHYSICS 448	3	PHYSICS 449	3
Physics Elective	3	PHYSICS 415	3
Social Science Breadth	3	Literature Breadth	3
Humanities Breadth	3	Humanities Breadth	3
Biological Science Breadth	3	Social Science Breadth	3
	15		**15**

Total Credits 120

THREE-YEAR PLAN

THREE-YEAR PLAN

This Sample Three-Year Plan is a tool to assist students and their advisor(s). Students should use it –along with their DARS report, the Degree Planner, and Course Search & Enroll tools – to make their own three-year plan based on their placement scores, credit for transferred courses and approved examinations, and individual interests.

Three-year plans may vary considerably from student to student, depending on their individual preparation and circumstances. Students interested in graduating in three years should meet with an advisor as early as possible to discuss feasibility, appropriate course sequencing, post-graduation plans (careers, graduate school, etc.), and opportunities they might forgo in pursuit of a three-year graduation plan.

Departmental Expectations

This three-year degree plan is feasible for students with a minimum of 30 advanced standing credits and who have satisfied the following requirements with course credit or via placement examination:

- MATH 221 Calculus and Analytic Geometry 1
- MATH 222 Calculus and Analytic Geometry 2
- 3-4 units of foreign language

Therefore, this three-year plan can either be for those who completed these requirements in their first year or for students immediately starting with those requirements and who wish to take more advanced electives in their final year.

First Year

Fall	Credits	Spring	Credits
PHYSICS 247	5	PHYSICS 248	5
MATH 234	4	MATH 319	3
Communication A	3	MATH 340	3
Social Science Breadth	4	INTER-LS 210	1
		Humanities Breadth w/ Ethnic Studies	3
	16		**15**

Second Year

Fall	Credits	Spring	Credits
PHYSICS 249	4	PHYSICS 322	3
PHYSICS 311	3	PHYSICS 307	2
MATH 321	3	MATH 322	3
Humanities Breadth	3	PHYSICS 301	1
Literature Breadth	3	Social Science Breadth	4
		Biological Science Breadth	3
	16		**16**

Third Year

Fall	Credits	Spring	Credits
PHYSICS 448	3	PHYSICS 449	3
PHYSICS 415	3	Physics Lab Course	4
Communication B	3-4	Social Science Breadth	4
Literature Breadth	3	Elective	1
Biological Science Breadth	3		
	15		**12**

Total Credits 90

ADVISING AND CAREERS

ADVISING AND CAREERS

PHYSICS UNDERGRADUATE ADVISORS

Evan Heintz

Professor Tulika Bose

Professor Deniz Yavuz

Scheduling an Advising Appointment with a Physics Major Advisor

To meet with a Physics major advisor, you may either schedule a Starfish appointment with Evan Heintz, email physics-advisors@wisc.edu or contact one of them directly.

PHYSICS AMEP ADVISORS

Professor Cary Forest

Professor Robert McDermott

Professor Thad Walker

Professor Deniz Yavuz

Scheduling an Advising Appointment with an AMEP Advisor

Applied Math Engineering Physics (AMEP) students may email AMEP-advisors@wisc.edu. If you already have an assigned AMEP advisor in the physics department, please contact them directly.

ADVISING FOR SOAR STUDENTS

Email eheintz@wisc.edu, physics-advisors@wisc.edu, or AMEP-advisors@wisc.edu, depending on your interests. Include contact information and your availability.

The Department of Physics encourages our majors to begin working on their career exploration and preparation soon after arriving on campus. We partner with SuccessWorks at the College of Letters & Science. L&S graduates are in high demand by employers and graduate programs.

It is important to us that our students are career ready at the time of graduation, and we are committed to your success.

A good starting point to begin exploring possible careers is to enroll in PHYSICS 301 Physics Today. This course, offered in the spring semester, includes a weekly talk where a topic of local research is discussed by one of the physics faculty, astronomy faculty, or SuccessWorks.

Additional Resources:

- Link to physics department student jobs and research opportunities (https://www.physics.wisc.edu/academics/undergrads/news/)

ADVISORY INFORMATION

Mathematics

There are specific math courses listed as prerequisites for our Physics courses. Depending on your interest in math (some Physics majors also major in Math as well), the courses you select may be different. A typical math sequence is: MATH 221, MATH 222, MATH 234, MATH 319, MATH 340, MATH 321, MATH 322. MATH 320 is an alternative course majors may pursue instead of taking both MATH 319 and MATH 340. Please consult with an advisor when choosing your Mathematics courses, particularly before deciding on one of the honors sequences in Math. We do not recommend the honors sequences for physics majors unless you are considering a second major in Math.

MATH 221 Calculus and Analytic Geometry 1: A prerequisite for PHYSICS 247, PHYSICS 207, and PHYSICS 201.

MATH 222 Calculus and Analytic Geometry 2: A prerequisite for PHYSICS 247 but can be taken concurrently.

MATH 234 Calculus--Functions of Several Variables: MATH 234 is a prerequisite for PHYSICS 248 but can be taken concurrently. If you are not taking the PHYSICS 247/PHYSICS 248/PHYSICS 249 intro sequence, you will still need this course for PHYSICS 311 and PHYSICS 322.

MATH 319 Techniques in Ordinary Differential Equations: Techniques for solving and approximating solutions to ordinary differential equations.

MATH 340 Elementary Matrix and Linear Algebra: An introduction to linear algebra. This course is a bridge between concrete and abstract math. You are strongly advised to take MATH 319 and MATH 340, or MATH 320 before PHYSICS 311 and PHYSICS 322.

MATH 320 Linear Algebra and Differential Equations: This course combines topics from MATH 319 and MATH 340. It is adequate for the rest of our undergraduate physics curriculum but is not recommended for those planning on continuing to graduate school. There is an accelerated honors section that thoroughly covers all of the material in MATH 319 and MATH 340. It is more challenging but is a good way to fit in both topics if you are unable to take MATH 319/MATH 340 before you take PHYSICS 311 or PHYSICS 322.

MATH 321 Applied Mathematical Analysis: Techniques for solving problems in the physical sciences, engineering, and applied mathematics, using advanced calculus and analytic function theory. For students interested in more abstract math, taking MATH 521 would be equivalent. It is recommended that MATH 321 be taken before PHYSICS 322 but especially before you take either PHYSICS 448 /PHYSICS 531. Note that this course is a significant time commitment.

MATH 322 Applied Mathematical Analysis: Techniques for solving partial differential equations, with an emphasis on practical problems in the physical sciences. Also covers special functions, Fourier Transformations, etc. MATH 321 and MATH 322 are recommended for those planning to continue on to graduate school in Physics.

Computer Science & Data Science

Students should become familiar with scientific programming. The most useful languages are Python followed by C or C++. The computer sciences department offers introductory courses. The Division of Information Technology (DoIT) also offers short courses to introduce programming.

COMP SCI 220 Data Science Programming I is generally the best introductory computing course for physics majors interested in doing research due to its focus on Python.

Students interested in data science and machine learning are also recommended to take PHYSICS 361 Machine Learning in Physics.

Chemistry

A college course in chemistry is useful for all physics students, but not required.

L&S CAREER RESOURCES

Every L&S major opens a world of possibilities. SuccessWorks (https://successworks.wisc.edu/) at the College of Letters & Science helps students turn the academic skills learned in their major, certificates, and other coursework into fulfilling lives after graduation, whether that means jobs, public service, graduate school or other career pursuits.

In addition to providing basic support like resume reviews and interview practice, SuccessWorks offers ways to explore interests and build career skills from their very first semester/term at UW all the way through graduation and beyond.

Students can explore careers in one-on-one advising, try out different career paths, complete internships, prepare for the job search and/or graduate school applications, and connect with supportive alumni and even employers in the fields that inspire them.

- SuccessWorks (https://careers.ls.wisc.edu/)
- Set up a career advising appointment (https://successworks.wisc.edu/make-an-appointment/)
- Enroll in a Career Course (https://successworks.wisc.edu/career-courses/) - a great idea for first- and second-year students:
  - INTER-LS 210 L&S Career Development: Taking Initiative (1 credit)
  - INTER-LS 215 Communicating About Careers (3 credits, fulfills Comm B General Education Requirement)
- Learn about internships and internship funding (https://successworks.wisc.edu/finding-a-job-or-internship/)
  - INTER-LS 260 Internship in the Liberal Arts and Sciences
- Activate your Handshake account (https://successworks.wisc.edu/handshake/) to apply for jobs and internships from 200,000+ employers recruiting UW-Madison students
- Learn about the impact SuccessWorks has on students' lives (https://successworks.wisc.edu/about/mission/)

PEOPLE

PEOPLE

FACULTY

More details about each faculty member (https://www.physics.wisc.edu/people/faculty/) and the 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
Rogerio Manuel Jorge, Assistant 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
Matthew Otten, Assistant Professor
Yibin Pan, Associate Professor
Brian Rebel, Professor
Mark Rzchowski, Associate Chair and Professor
Mark Saffman, Professor
John Sarff, Professor
Tiancheng Song, Assistant 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
Vladimir Zhdankin, Assistant 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

WISCONSIN EXPERIENCE

WISCONSIN EXPERIENCE

PHYSICS CLUB

The Society of Physics Students (SPS) – also known as the Physics Club – is a student organization for people interested in physics and related fields.

What does the Physics Club do?

The Physics Club organizes events such as seminars, tours, trips, and socials for its members. Physics Club volunteers also offer free drop-in tutoring to students in introductory physics and astronomy classes. In addition, we maintain subscriptions to science-related magazines such as *Scientific American*, *Astronomy*, and *Physics Today*, which are kept in the club's room located at 2328 Chamberlin Hall. In addition, UPS sponsors a variety of other events. For example, in the past, we have taken a field trip to Fermilab, sponsored a racquetball tournament, and have frequently gathered for social events such as ice skating, movie night, and bowling.

Why should you join the Physics Club?

By joining the Physics Club you'll be meeting many physics majors, who are, in general, really cool people to hang out with. If you are thinking about declaring a physics major, this is the place to come for helpful advice about taking classes and finding an undergraduate job in the physics department. If you join, you can get access to the Physics Club room, 2328 Chamberlin Hall. Joining also adds you to the club email list, so you can be notified about club-sponsored events.

To Join

Either email physics.society.wisc@gmail.com (physics.society.wisc.@gmail.com) or drop by Room 2328 Chamberlin Hall and pick up a membership form. Turn in a completed form with your annual dues to an SPS club officer.

GENDER MINORITIES AND WOMEN IN PHYSICS

Gender Minorities and Women in Physics (GMaWiP) is a student organization open to undergraduates for the support and promotion of gender minorities and women in physics at UW–Madison. GMaWiP works to provide both professional development and support for women and gender minorities in physics at every step in their careers by taking concrete actions through the following methods:

1. Career Development
2. Mentorship
3. Fellowship
4. Outreach

In addition, they provide advocacy for other minorities in physics, including, but not limited to students of color, students with disability status, low-income students, and LGBT+ students. The group also hosts social events throughout the year aimed at building a sense of community among the members.

GREAT IDEAS

GMaWiP also hosts a bi-weekly GREAT IDEAS (Group for Reading, Educating, And Talking about Inclusion, Diversity, Equity, & Advocacy in Science) seminar. GREAT IDEAS is a multimedia reading group dedicated to amplifying the experiences of underrepresented groups in science and academia in order to become better advocates for our peers. GREAT IDEAS is open to everyone, and all are welcome and encouraged to engage with the material and contribute to the discussions.

Undergraduate Mentorship Program

GMaWiP also provides a mentorship program for undergraduate students. This program connects the undergraduate with a graduate student who will advise and mentor the undergraduate as they work to obtain their degree. If you are interested in this mentorship program or are interested in getting involved with GMaWiP, please contact the undergraduate advisor.

PHYSICS LEARNING CENTER

The Physics Learning Center: Striving to help all students succeed in Physics.
• Do you enjoy Physics?
• Are you patient?
• Do you like to teach?
• Would you like to help other undergraduate students?

The Physics Learning Center (PLC) has job opportunities for physics undergraduates as Peer Mentor Tutors (PMT). The PLC is looking for PMTs who have a desire to help others learn physics and have an enthusiasm for learning new ways to solve physics problems.

The PLC provides supplemental instruction and a supportive learning environment to students in large challenging introductory physics courses. They include algebra-based PHYSICS 103- PHYSICS 104 and calculus-based PHYSICS 207-PHYSICS 208, which are requisites for many STEM majors and pre-health professional pathways. The majority of students in these classes are not physics majors.

PMTs lead a learning team twice a week helping students build a conceptual framework to solve a variety of physics problems. The PLC strives to create a supportive learning environment to help students gain skills, increase confidence, and meet potential study partners.

Peer Mentor Tutors receive extensive training in teaching Physics and in general pedagogy. Tutors meet with a PLC staff member each week to discuss strategies for teaching course content, including how to use teaching materials that stress conceptual understanding. In addition, PMTs from all courses meet as a group for a weekly teaching seminar to discuss issues such as group dynamics, techniques for actively involving students in learning, helping students to prepare for exams, raising awareness of diversity in student experiences, resources on campus, etc.

Our Peer Mentor Tutors report that they greatly enjoy working with their students. In the process, they strengthen their own foundation in Physics and presentation skills. They also tell us that teaching Physics helps to review for the Graduate Record Exam and to prepare for post-graduate teaching in middle/high school or as a university teaching assistant.

PMTs are a mix of students majoring in physics, astrophysics, secondary science education, and engineering, as well as from other majors. This is a paid position taking about eight hours per week that includes learning team time, content and pedagogy meetings, reviews before exams, and time to prepare for teaching.

To find out more about the PLC Peer Mentor Tutor Program, please contact us. The PLC is located in Chamberlin 2337/2338.

Physics Learning Center

2337/2338 Chamberlin Hall
Contact: Susan Nossal
nossal@physics.wisc.edu
608-262-9107

RESOURCES AND SCHOLARSHIPS

RESOURCES AND SCHOLARSHIPS

The Physics Department is very happy to offer a number of awards for undergraduate students in physics each year. Many of these awards have been made possible through very generous donations by alumni and friends of the Department.

A list of all the undergraduate awards can be found on the physics website (https://www.physics.wisc.edu/department/awards/apply/).

APPLICATION PROCESS

Eligibility

- Must be enrolled as a full-time student at UW–Madison in both semesters of the Academic Year
- Must be a Physics (or Astronomy-Physics) major.

Applicants will be judged by the Student Awards Committee. You may apply for a specific award below; however, the Committee will consider all eligible applications for relevant awards. The Committee will review your transcript.

The call for applications is often sent out near the end of the fall semester with the deadline for applications often falling slightly after the beginning of the spring semester. The awards decisions will be made by the Awards Committee soon thereafter. Awardees will be notified and asked to attend the Physics Awards Banquet to be held at the end of the spring semester.

To Apply

Once the call for applications has been sent out, each applicant is to submit the following (in PDF) by the deadline via WiSH (https://wisc.academicworks.com/):

- Resume/CV
- Statement of current research/teaching activity and future plans as a physics major (one page)
- Letter of recommendation from a faculty or staff member (one page)
- Online application system will automatically prompt the letter writer to submit a letter
- If indicated below, a statement of need (one page)

For More information

Please visit the Department of Physics Awards webpage (https://www.physics.wisc.edu/awards/) or contact the Department of Physics at info@physics.wisc.edu.