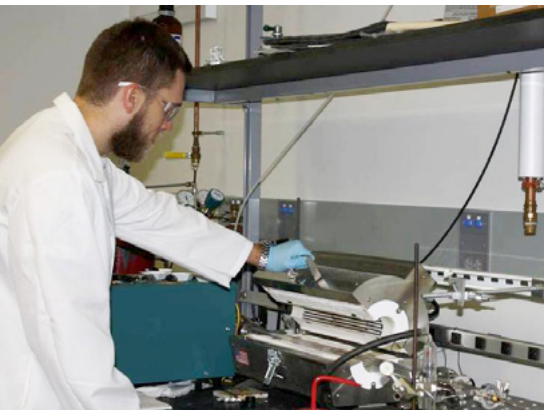
THE UNIVERSITY OF TOLEDO

Ph.D. DEGREE PHYSICS



The doctoral degree in physics prepares students to enter research careers in academic, government and industrial settings. Non-research careers in a variety of areas, including public policy, science communication, intellectual property law and science education, are also possible.

UToledo graduate programs in Physics and Astronomy develop a strong and broad foundation in fundamental physics, while simultaneously teaching the mathematical and problem-solving skills necessary to advance knowledge of our physical world. Coursework is tailored to your specific area of research concentration, with flexibility, so you acquire the skills necessary to complete an innovative, important and original thesis research project.

UToledo boasts nationally and internationally recognized faculty members in physics and astronomy. Students in our Ph.D. physics program can choose concentrations in astrophysics, materials science, medical physics or general physics. Ph.D. students in physics spend most of their time conducting research to complete their thesis. They are expected to publish several papers in peer-reviewed journals and present at conferences.

Physics Ph.D. Degree Highlights:

- **Financial support.** Graduate physics students are supported through teaching and research assistantships. We also offer incentive and stipend enhancements for exceptionally qualified applicants.
- **International reputation in photovoltaics.** Toledo and the State of Ohio have a long history of success in the photovoltaics industry. That history, along with The University of Toledo's expertise in PV science and technology, led to the creation of the Wright Center for Photovoltaics Innovation and Commercialization.
- **High-tech labs and research facilities.** UToledo physics graduate students have access to: state-of-the-art equipment in the Wright Center for Photovoltaics Innovation and Commercialization; on-campus, one-meter reflecting telescope with dedicated spectrographs; full access to the Lowell Discovery Telescope in Arizona through UToledo's partnership with Lowell Observatory; several parallel computing clusters, as well as access to the Ohio Supercomputer Cluster; radiation and diagnostic equipment to perform research in medical physics; and the Toledo Heavy Ion Accelerator (THIA).
- **Research opportunities.** Faculty and students in UToledo's Department of Physics and Astronomy work closely to conduct world-class research. Our primary areas of strength are in: atomic, molecular and optical physics; condensed matter/materials science and photovoltaics; astronomy and astrophysics; biological physics; and medical physics (with strong ties to the UToledo College of Medicine and Life Sciences).

PROGRAM OVERVIEW

Ph.D. Degree in Physics

The doctoral degree in physics is awarded to a student who has demonstrated mastery in the field of physics and a distinct and superior ability to make substantial contributions to the field. The quality of work and the resourcefulness of the student must be such that the faculty can expect a continuing effort toward the advancement of knowledge and significant achievement in research and related activities. Publication of research in peer-reviewed journals is expected.

The degree provides a foundation in either one of the following areas of expertise: astronomy and astrophysics, photovoltaics and condensed-matter physics consisting of theory and experiment, atomic and molecular physics, medical physics, biophysics and photonics. A strong training may be expected in research methodologies and practices, rigorous hypothesis-driven scientific investigation and the dissemination of research results and ideas through scholarly article publication as well as presentation at conferences, other universities and research settings. In general, work for the Ph.D. takes five years of study beyond the bachelor's degree.

A substantial portion of this time is spent in independent research leading to a dissertation. Normally, 90 credit hours of study beyond the bachelor's degree are required for the Ph.D. Students may opt to get a M.S. degree during their Ph.D. program.

We encourage you to contact individual faculty members directly to discuss research interests and opportunities.

Faculty contact information is available at: *utoledo.edu/nsm/physast/research*

Faculty Member	Area(s) of Research
Amar, Jacques	Theoretical condensed matter physics, materials science and surface physics
Anderson-Huang, Lawrence	Astrophysics, theory of stellar atmosphere
Bjorkman, Jon	Astrophysics, theory of stellar winds and disks, radiation transfer and simulations
Bjorkman, Karen	Circumstellar disks, polarimetry and stellar winds
Chandar, Rupali	Stellar populations, star and galaxy formation and evolution
Cheng, Song	Ion-atom and molecule collusions
Collins, Robert	Condensed matter physics, optical properties of solids and thin solid films
Cushing, Michael	Astrophysics, low-mass stars and brown dwarfs
Deng, Xunming	Materials science, thin films and photovoltaics
Ellingson, Randall	Ultrafast laser spectroscopy, photophysics of semiconductor nanocrystals and nanocrystalline films
Federman, Steven	Interstellar matter
Gao, Bo	Light-atom interactions, Bose-Einstein condensation and multibody interactions
Heben, Michael	Nanoscience, materials for energy conversion and storage
Irving, Richard	Atomic physics
Karpov, Victor	Theoretical condensed matter physics and photovoltaics
Khare, Sanjay	Theoretical condensed matter physics and materials science
Lee, Scott	Biophysics and high-pressure physics
Medling, Anne	Black hole growth and feedback
Medling, Scott	X-ray absorption spectroscopy
Megeath, S. Thomas	Plant and star formation
Ray, Aniruddha	Utilizing nanotechnology and optical imaging for biophysical and medical applications
Podraza, Nikolas	Condensed matter and photovoltaics
Smith, J.D.	Infrared and extragalactic astronomy
Visbal, Elijah	Cosmology simulations
Yan,Yanfa	Materials science, condensed matter and photovoltaics

What to expect when you graduate ...

Graduates of UToledo's Ph.D. program in physics typically advance to postdoc programs or take jobs in the industry.

Alumni of UToledo's graduate programs in physics have landed positions at institutions such as: University of Chicago, Baker College, Rensselaer Polytechnic Institute, Ohio State University, Pacific Northwest National Laboratory, NASA, Intel Corporation, Boeing Company and the Raytheon Company.

Admission requirements, guidelines, and application information can be found at: *utoledo.edu/graduate/apply*.
If you have questions about the application process, contact 419.530.4723 or *graduateonlineapplication@utoledo.edu*.

For more information contact:
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nikolas.podraza@utoledo.edu