PHYSICS

Discipline Coordinators
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Physics faculty who are members of the doctoral faculty.

Physics is a discipline in the Interdisciplinary Ph.D. (http://catalog.umkc.edu/colleges-schools/graduate-studies/interdisciplinary-phd-program/) Program administered by the School of Graduate Studies.

Note: The discipline-specific requirements listed here are *in addition* to the requirements listed in Interdisciplinary Ph.D. Application Procedure and Minimum Criteria for Admission and Minimum Interdisciplinary Ph.D. Academic Regulations and Degree Requirements.

Discipline-Specific Admission Requirements

For admission to the program, an applicant must meet the requirements of the School of Graduate Studies (https://catalog.umkc.edu/general-graduate-academic-regulations-information/graduate-admission-policies-procedures/), the Interdisciplinary Ph.D. (https://catalog.umkc.edu/colleges-schools/graduate-studies/interdisciplinary-phd-application-procedure-minimum-criteria-for-admission/) program, the International Student Affairs Office (if applicable), and specific Physics and Astronomy admission requirements described below.

The Faculty of Physics and Astronomy does not require general or subject-specific GRE scores as part of the Ph.D. application.

The graduate studies committee of the Faculty of Physics and Astronomy will review applications and make admission recommendations to the School of Graduate Studies. The basic criterion for admission is the likelihood that an applicant will be successful in the Interdisciplinary Ph.D. program, particularly in the research component of the program. All applicants must satisfy the graduate studies committee that they meet this criterion through evidence such as transcripts, letters of recommendation, statements of purpose, performance on a written Ph.D. qualifying examination, etc. Furthermore, a member of the doctoral faculty must be willing to accept the applicant as a research student.

Qualifying Requirements for Full Admission

In addition to the above requirements, applicants must meet the following minimum requirements to be considered for full admission with physics as a discipline. The doctoral studies committee may recommend provisional admission for those applicants who fail to meet these requirements.

Applicants for admission to the Interdisciplinary Ph.D. program electing physics as their primary discipline must have a bachelor's or master's degree in physics or the equivalent. Those applicants holding a bachelor's degree from a discipline other than physics will be expected to provide exceptionally strong evidence of their academic ability and research capability in physics.

Applicants for admission to the Interdisciplinary Ph.D. program electing physics as their co-discipline must hold at least a bachelor's degree in a compatible field.

Ph.D. Program Funding Options

The Ph.D. program is a research-focused degree and so funding for students in the form of a Graduate Research Assistantship is typically driven by the external research grants of faculty members. Because external research funding is a limited resource, admission to the Ph.D. program is highly selective.

Successful applicants to the Ph.D. program will provide evidence of strong research capabilities. A committee of faculty will review the applicant pool and admit students based on the strength of their applications and the degree of fit with the faculty research groups. Selected students may be supported by either a GTA or a GRA position.

Suggested Compatible Co-disciplines

Cell Biology and Biophysics (https://catalog.umkc.edu/colleges-schools/graduate-studies/cell-biology-biophysics/), Chemistry (http://catalog.umkc.edu/colleges-schools/graduate-studies/chemistry/), Computer Networking and Communication Systems (http://catalog.umkc.edu/colleges-schools/graduate-studies/telecommunication-computer-networking/), Computer Science (http://catalog.umkc.edu/colleges-schools/graduate-studies/computer-science/), Curriculum and Instruction (http://catalog.umkc.edu/colleges-schools/graduate-studies/curriculum-instruction/), Electrical and Computer Engineering (http://catalog.umkc.edu/colleges-schools/graduate-studies/electrical-computer-engineering/), Engineering (http://catalog.umkc.edu/colleges-schools/graduate-studies/engineering/), Geosciences (http://catalog.umkc.edu/colleges-schools/graduate-studies/geosciences/), Mathematics (https://catalog.umkc.edu/colleges-schools/graduate-studies/mathematics/), Molecular Biology and Biochemistry (https://catalog.umkc.edu/colleges-schools/graduate-studies/molecular-biology-biochemistry/)

Core Program Requirements

Physics as a Primary Discipline

The credit hour requirement for Ph.D. students with physics as the primary discipline will depend on the student's entering status and individual program. A minimum of thirty (30) credit hours of didactic course work is required. Students with physics as their primary discipline must complete five of the six courses listed in the table below at UMKC or must have already completed equivalent coursework at approved institutions at the time of their admission to the Interdisciplinary Ph.D. program at UMKC.

A minimum of twelve (12) credit hours of 5699 Research and Dissertation is required. Any credit hours earned in 5696 Dissertation Research will be counted toward the 12 credit-hour total of 5699 credit hours once the student has successfully presented and defended a Dissertation Research Proposal. Further, if a student in the Physics MS program took 5599 Research and Thesis credit hours but *was not* awarded a degree, then those hours may be converted into 5699 Research and Dissertation credit hours.

Code	Title	Credits
PHYSICS 5510	Theoretical Mechanics I	3
PHYSICS 5520	Electromagnetic Theory And Applications I	3
PHYSICS 5521	Electromagnetic Theory And Applications II	3
PHYSICS 5530	Quantum Mechanics I	3
PHYSICS 5531	Quantum Mechanics II	3
PHYSICS 5540	Statistical Physics I	3

Physics as a Co-discipline

Students are required to complete a minimum of three courses (9 credit hours) at the 300-level or above, from classes offered by the Faculty of Physics and Astronomy. At least three of these credit hours must be at the '5500+ level'. Special topics and research courses do not satisfy any of the above requirements. Students who receive a grade of B- or less in two or more courses used to satisfy these requirements will be disqualified from using Physics as their co-discipline.

Retention in Program

Ph.D. students with Physics as their primary discipline must maintain a 3.25 grade-point average. Students with Physics as a co-discipline must maintain a 3.0 GPA in Physics courses. A student's failure to maintain the minimum GPA will result in a probationary status for the following semester. A failure to remove the GPA deficiency during the probationary semester will then result in the student's dismissal from the Interdisciplinary Ph.D. program.

Appeals

Exceptions to any of the discipline-specific regulations must be approved by the student's supervisory committee and by the physics doctoral studies committee. In the event of disputes or special requests concerning a student's Ph.D. program, written appeals and/or documentation must first be submitted to the student's supervisory committee. If a resolution of the problem cannot be affected at that level, the written appeals process must then progress through the following levels: (1) Doctoral studies committee of the Faculty of Physics and Astronomy; (2) Interdisciplinary Ph.D. Program Director; (3) Dean of the School of Graduate Studies.

Interdisciplinary Ph.D. Examination Guidelines

Physics as Primary Discipline

Written Examination (a.k.a. Ph.D. Qualifying Exam)

During January of each year, the Faculty of Physics and Astronomy will administer a written, Ph.D. Qualifying examination of all Interdisciplinary Ph.D. students with Physics as their primary discipline that have not yet passed the exam. The two-part examination will be given during two sessions (morning and afternoon) of three hours each on the first Saturday after the start of the Spring Semester. Each part of the exam will contain approximately six questions at varying levels of difficulty (advanced undergraduate to introductory graduate). The following subject areas will be addressed in the given order by the two examination sessions:

1. Mechanics and Electromagnetism.
2. Quantum Mechanics and Thermodynamics.

Students must pass the written examination at the Ph.D. Qualifying level before being invited to take the comprehensive examination in fulfillment of the Interdisciplinary Ph.D. program requirements.

Students need only pass the written examination once. However, all graduate students in the Interdisciplinary PhD program or who intend to enroll in the Interdisciplinary PhD program must attempt the exam every year until they pass it. Under a limited set of extenuating circumstances (serious personal or family health issues, visa issues, etc.) a student may be granted an exception to not take the exam in a given year via a petition to the Faculty of Physics and Astronomy.

A maximum of two attempts will be permitted, and any student who does not attempt the exam when required to do so will be deemed to have failed the exam on that attempt, unless they have been given prior permission to delay taking the exam. Students who are required to take this exam are encouraged to consult with the Department of Physics and Astronomy Graduate Advisors (Profs. Paul Rulis (rulisp@umkc.edu; 816-235-1604) and Mark Brodwin (brodwinm@umkc.edu; 816-235-1604)) for detailed information concerning procedures and regulations for the exam.

Ph.D. Comprehensive Exam

Ph.D. seeking students who have passed the Written Exam must pass a Ph.D. Comprehensive Exam to advance to Ph.D. Candidacy. The Ph.D. Comprehensive Exam consists of a proposal of the Ph.D. research topic written in the format of a National Science Foundation proposal narrative with an oral presentation to the student's full Ph.D. committee. This exam must be completed within 12 months of completing the coursework and the qualifying exam degree requirements. The exact timing and topic of this written and oral comprehensive exam will be determined by the student and their supervisory committee.

Defense of Ph.D. Dissertation

The dissertation defense administered by the student's supervisory committee can be taken only after the student has passed their Ph.D. comprehensive exam. The defense may be oral, written, or both and it may include the student's thesis or dissertation proposal and associated background material.

Physics as an Interdisciplinary Ph.D. Co-discipline

There are no formal qualifying or Comprehensive Examination requirements for students whose co-discipline is Physics.