Stony Brook Graduate Physics Program

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August 2012

Graduate Program

With 170 graduate students, Stony Brook has one of the largest PhD programs in Physics of the US. Annually about 25 students graduate with a Ph.D. degree. The program is ranked among the top 15 programs in the US according to the National Research Council which is the most prestigeous ranking in the US.

We have the following programs:

- PhD Progam
- Master of Arts Program
- Master of Science Program in Instrumentation
- Master of Teaching

Almost all graduate students are in the PhD program with about 15 students in the Master program.

All information can be found on the webpage of the graduate program
`http://graduate.physics.sunysb.edu`

PhD Program

- Annually we get about 500 applications.
- About 100 students are admitted
- About 30 students accept our offer
- We admit the best students independent of their nationality
- However, some preference is give to experimental students because we have far more applicants interested in theory

Support

- All students in the PhD program are fully supported
- Including the Summer the current stipend is $ 23,000 at this moment and may be increased to $ 26,000 in Fall 2013
- All students in the Ph D program get a full tuition waiver

Application

- All application letters have to be submitted electronically via Applyyourself
- All students whose primary language (or most used language) is not English have to do a Toefl exam. The minimum scrore for admission 90 with at least 19 in the Speaking part.
- Everybody has to do a GRE exam. The results of this exam are not important for admission as long as they are above about 600 (out of 800) for the quantitative part.
- The Physics GRE is recommended but not required. We rarely do not admit someone because of a low score, but it may help you if your physics course load has been light.

Additional Materials

- A personal statement. This should address your motivation to get a PhD degree as well as the weaknesses of your application.
- Three recommendation letters. Note that older professors generally write better letters than friendly young professors. The professors have to upload the letters to Applyyourself.
- All your undergraduate and graduate transcripts. You also need to upload pdf copies electronically.

Tracks in the PhD prgram

In the Physics Graduate Program we have four tracks:

Physics Track
Concentration in Astronomy
Concentration in Physical Biology
Concentration in Chemical Physics

The Physics Track is the default track. If you complete a Ph.D. in on of the other tracks it will appear on your diploma.

Students in the Astronomy track have to take three astronomy courses instead of 2 physics breadth courses.

For Physical Biology the course sequence is quite difference whereas for the Chemical Physics track the course requirements are the same as for Physics.

However, the main difference between the track s is the affiliation of your advisor. For the Astronomy track , he belong to the Astronomy Group. For the Track in Physical Biology, your advisor is affiliated with the Laufer Center, the Department of Physiology and Biophysics or Pharmacological Sciences. For the Chemical physics Track, she has the Department of Chemistry as her main affiliation.

Courses

Core Courses, these are required course unless you have passed the Placement exam in the subject

PHY 501: Classical Mechanics
PHY 505: Electricity and Magnetism
PHY 511/5122: Quantum Mechanics
PHY 504: Statistical Mechanics

Other required courses

Breadth: Two courses in different fields outside your main area of specialization
PHY 515: Graduate Laboratory – should be taken before the end of the second year, taking it in the third or second semester is recommended
Can be substituted by PHY 517 (Astronomy Lab Course)
PHY 598/599: Graduate Seminar
PHY 600: Two semesters of teaching
PHY 521-4: Students in the Astronomy Track should take three of the four Astronomy Courses

Typical Course Plans

Default

First Semester	Second Semester
PHY 501 (Classical Mechanics)	PHY 540 (Statistical Mechanics)
PHY 505 (Classical Electrodynamics)	PHY 515 (Graduate Lab)
PHY 511 (Quantum Mechanics I)	PHY 512 (Quantum Mechanics II)
PHY 598/9 (Graduate Seminar)	PHY 598/9 (Graduate Seminar)
PHY 600 (Teaching)	PHY 600 (Teaching)
PHY 698 (Colloquium)	PHY 698 (Colloquium)

Astronomy Track

First Semester	Second Semester	Third Semester	Fourth Semester
PHY 522 (Interstellar Medium)	PHY 521 (Stars)	PHY 524 (Cosmology)	PHY 523 (Galaxies)
PHY 501 (CM)	PHY 540 (SM)	PHY 511 (QM I)	PHY 512 (QM II)
PHY 505 (EM)	PHY 517 (Lab)	Other Courses	
PHY 598/9 (Seminar)	PHY 598/9 (Seminar)		
PHY 600 (Teaching)	PHY 600 (Teaching)		
PHY 698 (Colloquium)	PHY 698 (Colloquium)	PHY 698 (Colloquium)	PHY 698(Colloquium)

Course Requirements for Physical Biology

Physics Track	Physical Biology
PHY 505 (Electrodynamics) PHY 511 (Quantum Mechanics) PHY 540 (Statistical Mechanics) PHY 600 (Teaching Practicum), two semesters	PHY 505 PHY 511 PHY 540 PHY 600, two semesters
PHY 501 (Classical Mechanics) PHY 512 (Quantum Mechanics)	PHY 501 or PHY 512
PHY 515 (Methods of Experimental Physics) PHY 598/599 (Graduate Seminar) Two advanced courses	Two semesters of PHY 584 (Lab Rotations) PHY 665 (Journal Club), 2 semesters Two life science courses from an approved list
	PHY 558 (Physical Biology) PHY 559 / AMS 534 (Biological Dynamics and Ne PHY 561 (Biology for Physical Scientists)

Course Plan for Advanced Students

F1	S1	F2	S2
501 (CM)	611 (QFT2)		
541 (Adv SM)	620 (Gen Rel)		
610 (QFT1)	612 (Particle Physics)		
557 (EP)	599 (Graduate Seminar)		
598 (Graduate Seminar	Colloquium		
600 (TA)	600 (TA)		

Doing the required courses as soon as possible

F1	S1	F2	S2
541 (Adv SM)	540 (SM)		
515 (Graduate Lab)	620 (Gen Rel)		
610 (QFT1)	611 (QFT2)		
555 (Solid State)	506 (EM2)		
598 (Graduate Seminar)	599 (Graduate Seminar)		
600 (TA)	600 (TA)		

Master Program

- Master of Science Program in Instrumentation: Please contact Prof. Metcalf
- Master of Arts Program
  - ★ No Thesis Option: 598 and 599 (Graduate Seminar)
    Passing 28 credits of graduate courses
    Passing the Comprehensive Exam at the Master level
  - ★ Thesis option: 598 and 599 (Graduate Seminar)
    Another graduate course approved by the GPD
    A Master Thesis (with 25 research credits (590))

PhD program, here or elsewhere, you have to do well in the courses and/or research.

Exams

Placement Exam: This exam covers the core course. If you pass it you don't have to take the core courses. Take it this week (this exam is only offered once a year). It has four parts corresponding to our four core courses and the problems are comparable to final exam problems in these courses.

Comprehensive Exam: This exam is offered twice a year. Most students take it in their second or third semester, but you can also take it next week. It covers "Breadth" and "Experiment" in atomic/molecular/optical physics, condensed matter physics, nuclear physics, particle physics and astronomy.

Oral Exam: The oral exam consists of a presentation of some approved and interesting topic in physics or astronomy to a committee of three faculty members and should be prepared with the guidance of one of them. Usually that person is going to be your advisor.

Research

Experimental/Observational

- Astronomy (Exoplanets, Neutron Stars)
- Atomic, molecular and optical physics (Cold Atoms, Ultrafact Lasers)
- Condensed matter experiment (Graphene, Electromagnetic Materials, Powders)
- High energy experiment (CERN-Atlas, Fermilab, Neutrino)
- Relativistic Heavy Ion Physics (RHIC)

Theoretical

- Astrophysics (computational, neutron stars)
- Atomic physics (Bose Einstein Condensation)
- Condensed matter (computational, strongly correlated electrons)
- Nuclear theory (QCD, Quark Gluon Plasma, Random Matrix Theory)
- YITP (particle theory, statistical mechanics, string theory)
- Simons Institute (mathematical physics, string theory)
- Laufer Center (physical biology, protein structure)

Research Outside the Department

Research at Brookhaven National Laboratory

- Accelerator and beam physics
- NSLS-II – may work before you finish
- Lattice QCD / nuclear theory
- Condensed matter theory

Marine Sciences

- Climate Studies
- Atmospheric Physics

Typical Course of PhD Degree

Year 1	Take courses and TA.
Year 2	Start Research, Take courses in your specialty and TA.
	At the end of the second year all students should have an advisor.
Year 3	Spend all your time on research.
Year 4	Spend all your time on research. Most students author their first paper during this year
Year 5	Start thinking about your dissertation. Many theory students get their PhD degree at th
Year 6	Most experimental students get their PhD degree during this year.

Living on Long Island

Team up with other students to get off-campus housing

Get a bicycle

Get a car (or a friend with a car). Working at BNL is not possible without a car.

Use opportunities on campus:

- Staller Center (concerts, movies, recitals)
- Gym, squash, racket ball, swimming, running, tennis
- Soccer
- Summer Keg
- Starbucks
- University Cafe

West Meadow Beach

NY City

What Does it Take to Become a First Class Physicist or Astronomer?

- Think independently
- Step back to analyze the big picture
- Don’t accept any ’truth’ from any authority unless you have verified it yourself
- Question everything
- Work on hard problems