CITY COLLEGE OF THE CITY UNIVERSITY OF NEW YORK

Department of Physics

Programs of Study

The Department of Physics offers students the opportunity for study and research leading to the degrees of Doctor of Philosophy (Ph.D) and Master of Arts (M.A.).

Students in the Ph.D. program usually take a year of graduate courses before the first qualifying examination, although some advanced students take the examination after half a year of course work or even upon entering the program. The examination tests classical mechanics and electromagnetism, quantum theory, and general undergraduate physics. Students entering the biophysics subspecialty are allowed to substitute a biophysics examination for classical mechanics. Sixty credits of course work are normally required for the Ph.D. degree program; advanced students with an M.A. degree can usually transfer 30 credits of previous graduate work. In addition, arrangements are always made so that advanced students meet course requirements by working at their appropriate level in connection with their anticipated thesis research. After passing the qualifying examination, students choose faculty mentors for their thesis research. When student and mentor feel confident of the area of thesis research, the student takes an oral second examination before an appropriately chosen thesis committee. During this examination, the student describes the proposed research and demonstrates familiarity with the physics in the area of research. When students complete their original research, they defend a written thesis before their thesis committee at a final thesis defense.

Students in the M.A. program normally take the qualifying examination after 1 or 1½ years, when they have completed the necessary course work. Students who pass the qualifying examination are often admitted to the Ph.D. program. Students who do not pass the qualifying examination but show satisfactory performance at the master's level are awarded a master's degree when they have completed 30 credits of course work. The M.A. program normally requires 1½ years to complete.

Research Facilities

The physics department is housed on three floors (about 70,000 square feet) of the thirteen-story Marshak Science Building, which also houses the other CCNY science departments. FT-IR, X-ray diffraction, UV-visible spectrometers, ultrafast laser instrumentation in picosecond and femtosecond regimes, and departmental computers are available to students. In addition, high-resolution FT-NMR spectrometers and mass spectrometers are run by operators for any research group. A wide variety of equipment is used by individual research groups, including lasers of many kinds, molecular beam instrumentation, a microwave spectrometer, computers, ultrahigh-vacuum systems for surface studies, two He3-He4 dilution refrigerators, a SQUID-based magnetometer, e-beam evaporators, crystal growing equipment, Raman spectrometers, ultrafast time-resolving instrumentation, and atomic beam systems. The department has an electronics shop, a machine shop, a student machine shop, and a glassblower available for designing and building equipment. The Institute for Ultrafast Spectroscopy and Lasers has eight laboratories in the Science Building and the Engineering Building. The New York State Center for Advanced Technology in Ultrafast Photonic Materials and Applications focuses on photonics research with commercial applications.

Financial Aid

Students accepted into the Ph.D. program are normally offered financial support by the Department of Physics. The support is in the form of fellowships and/or research assistantships, for a total stipend of $16,000 (taxable) per year, plus tuition. The exact amount depends on the student's progress in the program, tuition costs, and need. Some New York State residents are also eligible for other stipends or awards. More advanced students are generally awarded research assistantships.

Cost of Study

Tuition for fall 2004 was $5700 for an entering student ($2435 for New York residents), $3390 for an intermediate-level student ($1520 for New York residents), and $1210 for an advanced student ($605 for New York residents).

Living and Housing Costs

There is no on-campus housing available at City College. Graduate student housing is available for some students and is run by the City University of New York in midtown Manhattan. Many students live in rooms and apartments throughout New York City, paying $550–$750 per person per month.

Student Group

The total number of graduate students in the physics department is currently about 35. There are about 15 postdoctoral assistants. A wide variety of academic, ethnic, and national backgrounds are represented among these students.

Location

The City College is located in an urban setting in the upper part of Manhattan. The College is part of the City University of New York, which includes eighteen campuses—among them Brooklyn, Hunter, and Queens colleges. Physics research at these other branches of the City University complements that at City College. The College is near many other institutions in the New York metropolitan area, including Columbia University, Rockefeller University, and Polytechnic University of New York, and has cooperative arrangements with Brookhaven National Laboratory on Long Island. A number of world-famous industrial research laboratories are near New York City, including AT&T Bell Laboratories, IBM's Thomas J. Watson Laboratory, RCA's David Sarnoff Laboratory, and the Exxon Research Center.

New York City is a major cultural, artistic, communications, medical, and scientific center with numerous resources and opportunities. The city is also a focus of international travel, and visiting scientists often come to City College as part of their itinerary in the United States.

The College

The City College of the City University of New York is the lineal descendant of the Free Academy of New York City, founded in 1847. City College is the oldest and best-known component of the City University of New York.

Applying

Information and application forms can be obtained from the Department of Physics at the address below. An application fee of $40 must accompany the application, with the exception of international students with financial difficulties, for whom the fee can be deferred until registration.

Correspondence and Information

Chairman
Graduate Admissions Committee
Department of Physics
City College of the City University of New York
New York, New York 10031

Fax: 212-650-6940
E-mail: physdept@sci.ccny.cuny.edu
World Wide Web: http://www.sci.ccny.cuny.edu/physics/

THE FACULTY AND THEIR RESEARCH

Adolf A. Abrahamson, Professor; Ph.D., NYU. Atomic and nuclear structure, properties of superheavy elements.
Robert R. Alfano, Distinguished Professor; Ph.D., NYU. Ultrafast picosecond and femtosecond laser spectroscopy applied to physical and biological systems: nonlinear optics, optical imaging, medical applications of photonics, laser development.
Joseph L. Birman, Distinguished Professor; Ph.D., Columbia. Theoretical physics: condensed-matter theory; symmetry and symmetry breaking and restoration; optical response of matter, including nonlinear response and response of strongly correlated electronic systems (quantum Hall systems); microscopic theory of high-Tc superconductors; many-body theory, including use of quantum deformed algebras.
Timothy Boyer, Professor; Ph.D., Harvard. Connections between classical and quantum theories: zero-point radiation, stochastic electrodynamics, van der Waals forces, classical electromagnetism.
Ngee-Pong Chang, Professor; Ph.D., Columbia. Unification and dynamical symmetry breaking: origin of mass and chirality, quark-gluon plasma and handedness of the early universe, neutrino mass oscillations.
Victor Chung, Professor; Ph.D., Berkeley. Administration, physics instruction.
Harold Falk, Professor; Ph.D., Washington (Seattle). Statistical mechanics, especially exact results for spin-systems: discrete-time, nonlinear, and stochastic models.
Swapan K. Gayen, Associate Professor; Ph.D., Connecticut. Optical biomedical imaging, tunable solid-state lasers, spectroscopy of impurity ions in solids, ultrafast laser spectroscopy, near-field scanning optical spectroscopy.
Joel Gersten, Professor and Acting Dean; Ph.D., Columbia. Solid-state theory: interactions involving small solid-state particles or solid-state surfaces, sonoluminescence.
Daniel M. Greenberger, Professor; Ph.D., Illinois. Fundamental problems in quantum mechanics: the neutron interferometer, coherence in and interpretation of quantum theory, relativistic considerations.
Marilyn Gunner, Associate Professor; Ph.D., Pennsylvania. Experimental and theoretical biophysics: proteins in electron and proton transfer reactions, time-resolved spectroscopic measurements in photosynthesis.
Michio Kaku, Professor; Ph.D., Berkeley. Superstring theory, supersymmetry, supergravity, string field theory, quantum gravity, quantum chromodynamics.
Joel Koplik, Professor; Ph.D., Berkeley. Molecular dynamics of microscopic fluid flow: transport in disordered systems, superfluid vortex dynamics, pattern selection in nonequilibrium growth processes.
Matthias Lenzner, Associate Professor; Ph.D., Schiller (Germany). Application of ultrafast lasers in biomedical optics, machining, and imaging; femtosecond UV solid-state lasers; quantum cryptography.
Michael S. Lubell, Professor and Chair; Ph.D., Yale. Photon-atom interactions, synchrotron radiation studies, polarized electron physics, two-electron systems, science and technology policy.
Herman Makse, Assistant Professor; Ph.D., Boston University. Condensed-matter physics, granular materials, nonlinear elasticity, Edwards thermodynamics and jamming, discrete element modeling, interface roughening, porous media, dynamics of urban populations.
Carlos A. Meriles, Assistant Professor; Ph.D., Córdoba (Argentina). Nobel magnetic resonance methods and instruments, hyperpolarization and ultrasensitive detection, optical NMR, low/zero field spectroscopy and imaging, applications to semiconductors and spintronics.
Vangal N. Muthukumar, Associate Professor; Ph.D., Indian Institute of Mathematical Sciences, Madras. Theoretical condensed matter, superconductivity, magnetism, transport phenomena, oxides and the physics of strong correlation.
V. Parameswaran Nair, Professor; Ph.D., Syracuse. Mathematical and topological aspects of quantum field theory: skyrmions, quantum breaking of classical symmetries, conformal field theory, black holes, quantum chromodynamics, interaction of anyons.
Vladimir Petricevic, Associate Professor; Ph.D., CUNY. Growth of solid-state laser materials, laser development, photonics, spectroscopy of ions in solids, ultrafast phenomena.
Alexios Polchronakos, Professor; Ph.D., Caltech. Quantum field theory, mathematical physics.
Myriam P. Sarachik, Distinguished Professor; Ph.D., Columbia. Low-temperature studies of metal-insulator transitions, Anderson localization, disordered systems, strongly correlated systems; mesoscopic tunneling of magnetization, molecular magnets.
David Schmeltzer, Associate Professor; D.Sc., Technion (Israel). Many-body physics of strongly correlated fermions: Fermi and non-Fermi liquids, Luttinger liquids, fractional quantum Hall effect, renormalization group, bosonization; metal-insulator transition, persistent currents; high-Tc superconductivity.
Mark Shattuck, Assistant Professor; Ph.D., Duke. Soft condensed matter, granular media, pattern formation, nonlinear dynamics.
David I. Shelupsky, Associate Professor; Ph.D., Princeton. General relativity and quantum gravity, abstract harmonic analysis.
Frederick W. Smith, Professor; Ph.D., Brown. Deposition and characterization of semiconducting and dielectric thin films; modeling of local atomic bonding in amorphous films; chemical vapor deposition of diamond.
Richard N. Steinberg, Associate Professor; Ph.D., Yale. Physics education research.
Jiufeng, J. Tu, Assistant Professor; Ph.D., Cornell. Optical studies of correlated systems and nanosystems, infrared and Raman studies of superconductors and nanosystems.
Sergey A. Vitkalov, Assistant Professor; Ph.D., Russian Academy of Sciences. Experimental condensed-matter physics, dynamical properties of low-dimensional quantum systems.

Professors Emeriti

Michael E. Arons, Joseph Aschner, Alvin Bachman, Arthur Bierman, Robert Callender, Herman Z. Cummins, Erich Erlbach, Paul Harris, Hiram Hart, Martin Kramer, Robert M. Lea, S. J. Lindenbaum, Harry Lustig, William Miller, Marvin Mittleman, Leonard Roellig, Harry Soodak, Harold L. Stolov, Peter Tea, Martin Tiersten, Chi Yuan.