

NORTHERN ILLINOIS UNIVERSITY

DEPARTMENT OF PHYSICS

DeKalb, Illinois 60115

Students Accepted For Degree	FIELDS		
	Physics	Astronomy	Related Fields
Doctorate	X		
Master's	X		

1. General

President: John G. Peters
Dean of Graduate School: James Erman, Interim
Department Chairman: Suzanne Willis, Interim
Department Telephone Number: (815) 753-1772
Type of Institution: University
Control: Public
Setting: Small town
Total Faculty: 1,279
Total Graduate Faculty: 900 (approx.)
Total Students: 25,000
Total Graduate Students: 6,600
Annual Graduate Tuition:
In-state residents: Full-time—\$2,824/sem.
Out-of-state residents: Full-time—\$4,572/sem.
Tuition rates for: 2008–09
Deferred tuition plan: No
Tuition waived if Research or Teaching Assistant
Annual Other Fees: Full-time—\$1,193.05/sem.
 Graduate assistants—\$1,193.05/sem.
Term: Semester

2. Number of Faculty in Department

The combined total of full-time faculty in the three professorial ranks is 20. The combined total of full-time, part-time, and other faculty at all ranks is 33.

3. Admission, Financial Aid, and Housing

Address admission inquiries to: Graduate School
Graduate application fee required: Yes, \$30.00
Admission deadline (Fall admission): 6/1
Admission information: For fall admission, 2008–09, 32 students were accepted from 49 applicants.
Admission requirements: For admission to the graduate programs, a Bachelor's degree in physics or a related discipline is required with a minimum undergraduate GPA of 2.75. The GRE is required. No minimum score is required. The GRE Physics is not required, but recommended for international students. Students from non-English speaking countries are required to demonstrate proficiency in English via the TOEFL exam. Minimum acceptable score for admission is 80/120.
Undergraduate preparation assumed: Corson and Lorrain, *Electricity and Magnetism*; Fowles, *Mechanics*; Weidener and Sells, *Modern Physics*; Fowles, *Optics*.
Address financial aid inquiries to: Department of Physics
GAPSFAS application required: No
Financial aid deadline: 3/1
Loans available: Yes
Address housing inquiries to: Student Housing Services
On-campus, single student housing available: Yes
On-campus, married student housing available: Yes

On-campus housing

Cost/month 2 bed/1 bath 9 month: \$1,376/month
 12 month: \$1270/month
Cost/month 3 bed/2 bath: 9 month \$2,035/month
 12 month: \$1,876/month

Table A—Faculty, Enrollments, and Degrees Granted

Research Specialty	2008–09 Faculty	Enrollment Fall 2008		No. of Degrees Granted ¹ 2008–09 (2004–09)			Median No. of Years for Ph.D.'s
		Mas-ter's	Doc-torate	Mas-ter's	Terminal Master's	Doc-torate	
Accelerator	3	2	6	0(4)	1(3)	–	–
Applied Physics	0	5	–	–	1(6)	0(2)	–
Astronomy	0	1	1	–	0(2)	–	–
Condensed Matter							
Physics	20	6	12	1(3)	1(5)	2(3)	–
Medical Physics	1	3	–	–	0(1)	–	–
Particles & Fields	7	4	9	0(3)	1(6)	1(5)	–
Physics Education	2	1	–	–	0(4)	–	–
Total	33	2.2	27	0(11)	0(29)	–	–
Full-time Grad. Stud.		15	24	1(10)	4(27)	3(10)	
Part-time Grad. Stud.		7	3				
First-year Grad. Stud.		6	4				
Median Years in Grad. Study		2.5	5.5	–	–	–	
Undergraduate Degrees, 2008–09 (2004–09):							18(46)

¹Five-year totals in parentheses.

4. Graduate Degree Requirements

Master's: 30 hrs. of course work with 24 in physics; thesis required for pure and applied physics specializations.

Doctorate: Students are required to complete 90 semester hours of graduate course work. This includes 15 hours in five out of six core courses covering classical and quantum mechanics, statistical physics, and electromagnetic theory, and twelve hours in two different areas of physics. A minimum of 24 hours dedicated to dissertation research is required. The remaining hours may include additional dissertation work or other graduate course work in physics and related fields. Students entering the program without a master's degree in physics are required to pass a qualifying examination, which is usually taken at the end of the first year. Successful completion of a candidacy examination based on the core courses and other graduate courses is required of all students in the Ph.D. program. Transfer credits for students entering with a master's degree or with graduate coursework from another institution are allowed, pending approval by the Graduate Studies Committee.

Thesis: Thesis may be written *in absentia*.

Special Equipment, Facilities, or Programs: Students may specialize in four principal areas: condensed matter and materials physics, elementary particles and fields, accelerator physics, and physics education. The department makes special efforts to accommodate the needs of students such as employees of nearby industrial government laboratories and teachers employed in the region who wish to gain advanced degrees in physics on either a part-time or full-time basis. On the departmental faculty are eight condensed matter experimental-

ists and two theoreticians with whom graduate students may work on their thesis research. In addition there are joint and adjunct professors from Argonne National Laboratory, the Advanced Photon Source, and nearby industrial research labs. For solid state experimentation, the department has low- and high-temperature Mössbauer spectrometers; a materials synthesis lab with high-temperature and high-pressure furnaces and thermogravimetric analysis equipment for creating transition element oxides; x-ray diffractometers used for crystal structure determinations; high-vacuum systems for the preparation and study of surfaces; and magnetization, resistivity and magnetoresistive measurements, and two high resolution electron microscopes. The Physics Department has a strong collaborative program with the Advanced Photon Source in x-ray crystallography, inelastic scattering, magnetic x-ray dichroism, high energy x-ray scattering, X-ray and light scattering, surface scattering, and anomalous and resonant scattering spectroscopies. Because of the close departmental ties with the Materials Science Division of the Argonne National Laboratory, both faculty and graduate students make frequent use of research facilities there (1 hour by car). The theorists in this group make use of departmental, university, and Argonne computers.

Among the faculty working on elementary particles and accelerator physics are nine experimentalists and two theoreticians, along with a number of graduate students doing thesis work. At present, the experimentalists participate in the D0 proton-antiproton experiment at the Fermi National Acceleration Laboratory (45 minutes by car) and the ATLAS experiment at CERN. Detector R&D is ongoing with emphasis on use of scintillator detectors at a future linear collider. The theoreticians have joint appointments at Fermilab. Accelerator physics R&D are coordinated through the Northern Illinois Center for Accelerator and Detector Development (NICADD). Current areas include studies of intense electron sources at the Fermilab-NICADD Photoinjector Laboratory and beam diagnostics using resources at NIU, Argonne and Fermilab; Argonne Tandem Linear Accelerator System; muon-based accelerators.

A faculty member works closely with graduate students on methods of physics teaching and serves as a supervisor of their student teaching at selected nearby high schools.

Table B—Appointments to Graduate Students, 2008–09

Title of Appointee	Appointments		Academic Load Allowed in Credit Hours	Hours of Service Per Week	Stipend for Academic Year (\$)
	Total	First year			
	Semester				
Teaching Assistant	23	9	10	20	13,902–14,398
Research Assistant	16	1	10	20	13,902–18,000
Total	39	10			

Table C—Separately Budgeted Research Expenditures

Research Specialty	No. of Grants	Expenditures (\$)
Accelerator Physics	6	904,000
Condensed Matter Physics	19	2,040,000
Particles & Fields	4	907,000
Public Service	1	3,000
Total	30	3,854,000

FACULTY

Professors

- Alp**, Essen, Ph.D., Southern Illinois, 1984. Materials Science.
Bhat, Pushpa, Ph.D., Bangalore, 1982. High-energy experimental physics.
Blazey, Gerald, Ph.D., Minnesota, 1984. High-energy experimental physics.
Crabtree, George W., Ph.D., Illinois, Chicago, 1974. Experimental studies of high- T_c superconductors.
Cummings, MaryAnne, Ph.D., Michigan, 1990. High-energy experimental physics and accelerator physics.
Dabrowski, Bogdan M., Ph.D., Northwestern, 1987. Materials synthesis.
Hedin, David, Ph.D., Wisconsin, 1980. Director of Graduate Studies. High-energy experimental physics.
Martin, Stephen, Ph.D., Univ. of Cal., Santa Barbara, 1988. Elementary particle theory.
Mini, Susan, Ph.D., Southern Illinois, 1991. X-ray scattering. Associate Dean, CLAS.
Thompson, Carol, Ph.D., Houston, 1987. X-ray scattering.
Van Veenendaal, Michel, Ph.D., Laboratory of Solid State Physics, RUG, Netherlands, 1994. Condensed Matter Theory.
Welp, Ulrich, Ph.D., Universität Konstanz, 1988. Materials Science.
Willis, Suzanne, Ph.D., Yale, 1979. High-energy experimental physics. Interim Department Chair.
Xiao, Zhili, Ph.D., University of Konstanz, 1996. Condensed matter experimentalist.

Associate Professors

- Brown**, Dennis, Ph.D., Stanford, 1993. X-ray scattering.
Chakraborty, Dhiman, Ph.D., State University of New York, Stonybrook, 1994. High-energy particle physics.
Chmaissem, Omar W., Ph.D., Grenoble, France, 1992. Materials science and crystallography.
Coutrakon, George, Ph.D., SUNY-Stonybrook, 1983. Medical physics.
Fortner, Michael, Ph.D., Brandeis University, 1989. High-energy experimental physics.
Ito, Yasuo, Ph.D., University of Cambridge, 1996. Electron microscopy.
Lurio, Laurence, Ph.D., Harvard University, 1993. X-ray and light scattering.
Piot, Philippe, Ph.D., University de Grenoble, 1999. Accelerator physics.
Winkler, Roland, Ph.D., University of Regensburg, 1994. Condensed matter theory.
Zaluzec, Nestor, Ph.D., University of Illinois, 1973. Electron microscopy.

Assistant Professors

- Erdelyi**, Bela, Ph.D., Michigan State, 2001. Accelerator physics.
Windelborn, Augden, Ed.D., Northern Illinois Univ. 1988. Science education.

Emeriti

- Albright**, Carl H., Ph.D., Princeton, 1960. Elementary particle theory.

- Benbow**, Ralph, L. Ph.D., Iowa State, 1974. Surface studies using synchrotron radiation.
- Fedro**, Arthur J., Ph.D., Northwestern, 1965. Theory of high- T_c superconductivity.
- Hurych**, Zdenek, Ph.D., Charles University, Prague, 1967. Surface studies using synchrotron radiation.
- Kimball**, Clyde W., Ph.D., St. Louis, 1959. Mössbauer studies of high- T_c superconductors.
- Rossing**, Thomas D., Ph.D., Iowa State, 1954. Musical Acoustics.
- Shaffer**, John C., Ph.D., University of Delaware, 1966. Solid state theory.
- Sill**, Larry R., Ph.D., Iowa State, 1964. Experimental studies of magnetism.

Research Scientists

- Dychkant**, Alexandre, Ph.D., Institute for High Energy Phys., Russia, 1985. HEP.
- Kolesnik**, Stanislaw, Ph.D., Polish Academy of Sciences, 1994. Materials science.
- Lima**, Jose, Ph.D., CBPF-Brazil, 1998. HEP.
- Mihalcea**, Daniel, Ph.D., Kansas State University, 1998. Accelerator physics.
- Terzic**, Balsa, Ph.D., Florida State University, 2002. Beam and Astrophysics.
- Uzunyan**, Sergey, Ph.D., Northern Illinois University, 2006. HEP.
- Vinogradov**, Nikolai, Ph.D., Moscow State Engineering Physical Institute, 2001. Accelerator physics.
- Zutshi**, Vishnu, Ph.D., University of Delhi, 1997. HEP.

RESEARCH SPECIALTIES AND STAFF

Theoretical

- Accelerator and Beam Physics. Erdelyi, Mihalcea.
- Condensed Matter and Materials Physics. Liquid metals; magnetism and cooperative phenomena; many-body theory; optical properties of solids; electronic structure. Mihalcea, Van-Veenendaal, Winkler.
- Elementary Particles. Weak interactions; gauge theory; phenomenology; super-symmetric theories. Albright, Martin.

Experimental

- Accelerator Physics. Simulation and operation of high brightness photoinjectors. Electron beam diagnostics. Muon and heavy nuclei accelerators, Cummings, Lewellen, Piot, Terzic, Vinogradov.
- Condensed Matter and Materials Physics Nanophysics; Mössbauer effect; superconductivity; lattice defects; optical and transport properties of amorphous and crystalline solids; synchrotron radiation; surface physics; magnetic properties of solids; low-temperature physics; x-ray crystallography; materials preparation. Brown, Chmaissem, Crabtree, Dabrowski, Ito, Lurio, Mini, Thompson, Xiao, Zaluzec.
- High-Energy Physics. Collider studies of heavy quark production and decay, jet production and searches for quark compositeness; searches for new massive states; detector development. Bhat, Blazey, Chakraborty, Fortner, Hedin, Zutshi.
- Medical Physics: Development of Proton Tomography. Coutrakon, Erdelyi.
- Physics Education. Willis, Windelborn.