UNIVERSITY OF CALIFORNIA, SAN DIEGO

DEPARTMENT OF PHYSICS

La Jolla, California 92093-0354
E-mail Address: apply@physics.ucsd.edu

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

1. General

President: Robert C. Dynes
Chancellor: Marye Anne Fox
Dean of Graduate Studies and Research: Kim E. Barrett
Department Chairman: M. Brian Maple
Department Telephone Number: (858) 534-3293 (Grad. Office)
Type of Institution: University
Control: Public
Setting: Suburban
Total Faculty: 2,117
Total Graduate Faculty: 2,117
Total Students: 27,682
Total Graduate Students: 3,952
Annual Graduate Tuition:
In-state residents: Full-time—None
Out-of-state residents: Full-time—$8,147.87/quarter
Tuition rates for: 2008–09
Deferred tuition plan: No
Other Fees: $3,125.35 (includes health insurance)/quarter
Term: Quarter

2. Number of Faculty in Department

The combined total of full-time faculty in the three professorial ranks is 60; 11 Research Professors; and 12 Professor Emeriti. The combined total of full-time, part-time, and other faculty at all ranks is 77.

3. Admission, Financial Aid, and Housing

Address admission inquiries to: Graduate Admissions Office, Department of Physics (0354), 9500 Gilman Dr., La Jolla, CA 92093-0354
Graduate application fee required: $60 (domestic); $80 (international)
Admission deadline (Fall admission): 12/15/08
Admission information: For fall admission, 2007–08, 148 students were accepted from 479 applicants.
Admission requirements: For admission to the graduate programs, a Bachelor's degree in physics is required with a minimum undergraduate GPA of 3.0 specified. The GRE is required, but no minimum scores are specified. The GRE Advanced is required, but no minimum scores are specified. The average GRE scores for admitted students for 2008–09 were verbal–549; quantitative–785; advanced–799. Students from non-English speaking countries are required to demonstrate proficiency in English via the TOEFL exam. Minimum acceptable TOEFL score for admission is 550 paper, 213 computer.
Undergraduate preparation assumed: David J. Griffiths, *Introduction to Electrodynamics, Prentice Hall*, Daniel Dubin, *Numerical and Analytical Methods for Scientists and Engineers, Wiley*, Thornton and Marion, *Classical Dynamics, Thomson/Brooks Cole*, Dennis Barnaal, *Analog Electronics for Scientific Application, Waveland Press,* Paul Horowitz and Winfield Hill, *The Art of Electronics, Cambridge University Press,* David J. Griffiths, *Introduction to Quantum Mechanics, Prentice Hall*, Stephen Gasiorowicz, *Quantum Physics, Wiley*, J. J. J. Sakurai, *Advanced Quantum Mechanics, Addison Wesley*, Ashley Carter, *Classical and Statistical Thermodynamics, Prentice Hall*, Charles Kittel and Alex Zetti, *Introduction to Solid State Physics, Wiley*, Hans Luth and Harald Ibach, *Solid-State Physics: An Introduction to Principles of Materials Sci., Springer Verlag*.
Address financial aid inquiries to: Student Financial Services, 0013 Graduate Division, 9500 Gilman Dr., La Jolla, CA 92093-0013
FAFSA application required: Yes
Financial aid deadline: 3/1
Loans available: Yes
Address housing inquiries to: Housing Service (0907)
On-campus, single student housing available: Yes*
Cost/month: $550–1000
On-campus, married student housing available: Yes*
Cost/month: $725–1300

*waiting list, limited spaces available

4. Graduate Degree Requirements

Master's: B average in 36 units of graduate work, and comprehensive written exam required; thesis not required; no language requirement; three quarters residency required.
Doctorate: B average must be maintained in all course work; comprehensive departmental exam at beginning of second year, completion of five advanced courses, completion of teaching requirement, followed by oral qualifying exam for advancement to candidacy, dissertation, and successful oral defense of dissertation; no language requirement; six quarters residency required.
Other Programs: Ph.D. in Physics (Biophysics) is also available with same requirements as regular Ph.D., except that the departmental exam is taken at beginning of third year and five courses related to the life sciences are required.
Thesis: Thesis may not be written *in absentia*.

Table A—Faculty, Enrollments, and Degrees Granted

Research Specialty	2007–08 Faculty	Enrollment[1] Fall 2007		No. of Degrees Granted[2] 2007–08 (2003–08)			Median No. of Years for 2007–08 Ph.D.'s
		Master's	Doctorate	Master's	Terminal Master's	Doctorate	
Acoustics	1	–	0	0(0)	0(0)	0(1)	
Applied Physics	7	–	0	0(0)	0(0)	0(1)	–
Astronomy/ Astrophyics	21	–	20	0(0)	0(0)	5(13)	6.16
Atomic, Molecular Physics	4	–	2	0(0)	0(0)	0(1)	–
Biophysics	18	–	25	0(0)	0(0)	5(15)	6.16
Condensed Matter Physics	22	–	33	0(0)	0(0)	5(27)	5.41
Energy Sources & Environ.	1	–	0	0(0)	0(0)	0(0)	–
Fluids Dynamics	6	–	0	0(0)	0(0)	0(0)	–
History & Philosphy	1	–	0	0(0)	0(0)	0(0)	–
Low Temperature Physics	3	–	0	0(0)	0(0)	0(0)	–
Materials Sci.	3	1	0	0(0)	3(0)	0(0)	–
Nonlinear Dynamics	6	–	3	0(0)	0(0)	0(4)	–
Nuclear Physics	5	–	0	0(0)	0(0)	0(0)	–
Particles & Fields-Elem.	21	–	11	0(0)	0(0)	3(5)	6.11
Physics Education	1	–	1	0(0)	0(0)	0(0)	–
Physics of Beams	4	–	0	0(0)	0(0)	0(0)	–
Plasma Physics & Fusion	10	–	12	0(0)	0(0)	0(10)	–
Polymer Physics/ Science	1	–	0	0(0)	0(0)	0(0)	–
Public Policy	1	–	0	0(0)	0(0)	0(0)	–
Statistical/Thermal	7	–	0	0(0)	0(0)	0(0)	–
Other Theoretical	3	–	0	0(0)	0(0)	0(0)	–
Non-specialized	1	–	30	0(0)	0(0)	0(0)	–
Total		3	154	12(72)	3(12)	18(77)	
Full-time Grad. Stud.		0	154				
Part-time Grad. Stud.		0	0				
First-year Grad. Stud.		1	39				
Median Years in Grad. Study (2007–08 Degrees)							5.94

Undergraduate Degrees, 2007–08: 52(17)

[1]Students not yet committed to a research specialty are entered under non-specialized.
[2]Five-year totals in parentheses.

Table B—Appointments to Graduate Students, 2007–08

Title of Appointee	Appointments		Academic Load Allowed in Credit Hours	Hours of Service Per Week	Stipend for Academic Year ($)
	Total	First year			
			Quarter		
Teaching Assistant	38	33	12 Units	20 hrs	15,610.50[1,4]
Research Assistant	102	0	12 Units	20 hrs	18,187.50[2,3]
Dept. Education	4	0	12 Units	20 hrs	17,917.00[3]
Cota Robles Fellowship	2	1	12 Units	20 hrs	15,000.00[3]
San Diego Fellowships	3	2	12 Units	20 hrs	12,000.00[3]
NSF Fellowships	3	0	12 Units	20 hrs	22,500.00[3]
Dept. Energy Computational Science Fellowship	0	0	12 Units	20 hrs	$21,000.00[3]
Training Grant Funding	4	0	12 Units	20 hrs	15,579.00[3]
CALIT[2] Fellows	3	0	12 units	20 hrs	15,000.00[5]
General Atomic Research	1	0	12 Units	20 hrs	18,187.50[3]
Total	157	36			

[1]Usually summer employment available.
[2]Tuition and fees usually included, particularly for first-year students. Totals reflect some overlap; some students are Fellows and also hold appointments as Teaching Assistants.
[3]Plus tuition and fees.
[4]Amount is for the nine-month academic year.
[5]Funds allocated from the California Institute for Telecommunications and Information Technology at UCSD.

5. Personnel Engaged in Separately Budgeted Research, Fiscal 2007–08

Professorial faculty	50
Other faculty	5
Postdoctoral appointments	44
Graduate students	85
Undergraduate students	8
Nonteaching research personnel	10
Total	202

6. Separately Budgeted Research Expenditures by Source of Support

	Departmental Research
Federal government	$11,087,392
State and local government	1,081,899
Private, nonprofit organizations	509,009
Total	$12,678,300

7. Separately Funded and Managed Laboratories

Approximately $4.2 million per year of Physics-related research is funded in other research units as:

Center for Astrophysics and Space Sciences
Center for Magnetic Recording Research
Center for Theoretical Biological Physics
Institute of Nonlinear Science
Institute for Pure and Applied Physical Sciences

Table C—Separately Budgeted Research Expenditures

Research Specialty	No. of Grants	Expenditures ($)
Astrophysics/Atmos./Space Phys., Cosmic Rays	7	1,066,764
Atomic, Molecular, & Optical Physics	1	424,607
Biophysics	23	5,479,123
Condensed Matter Physics	18	3,330,782
High Energy	4	1,740,178
Plasma Physics & Fusion	2	636,846
Total	55	12,678,300

Table D—Physics-related Research Outside Department

Field and Unit Outside Department	No. of Grants	Expenditures ($)
Institute for Neural Computational Science	32	2,823,233
Total	32	2,823,233

FACULTY

Professors

Abarbanel, Henry D. I., Ph.D., Princeton, 1966. Nonlinear dynamics of fluids; optical systems and neural assemblies; geophysical fluid dynamics, biophysics, and physical oceanography.

Arovas, Daniel P., Ph.D., California, Santa Barbara, 1986. Condensed matter theory; statistical mechanics.

Basov, Dmitri N., Ph.D., Lebedev Institute, USSR, 1991. Experimental condensed matter.

Berkowitz, Ami E., Ph.D., Pennsylvania, 1953 (Research Professor). Magnetic materials investigations; correlation of microstructures with magnetic behavior; surface effects; relaxation phenomena.

Branson, James G., Ph.D., Princeton, 1977. Experimental elementary particle physics.

Burbidge, E. Margaret, Ph.D., London Observ., 1943 (Univ. Professor Emeritus). Extragalactic studies, spectrophotometric and imaging; observational work on normal galaxies; galaxies with active nuclei, especially radio galaxies; quasars using Lick Observatory 3-M telescope and Keck Observatory 10-M telescope.

Burbidge, Geoffrey R., Ph.D., London, 1951 (Research Professor). Theoretical astrophysics; extragalactic astronomy; nuclear astrophysics; observational cosmology.

Butov, Leonid V., Ph.D., 1991. Experimental condensed matter physics; semiconductor nanostructures; optics; transport.

Diamond, Patrick H., Ph.D., MIT, 1979. Theoretical plasma physics and astrophysics; nonlinear dynamics.

Di Ventra, Massimiliano, Ph.D., EPFL, 1997. Theoretical condensed matter.

Driscoll, C. Fred, Ph.D., California, 1976. Experimental plasma physics; waves and transport in pure electron and pure ion plasmas; 2D fluid dynamics and turbulence.

Dubin, Daniel H. E., Ph.D., Princeton, 1984. Theoretical plasma physics; computational; statistical mechanics fluid dynamics.

Feher, George, Ph.D., California, Berkeley, 1954 (Research Professor). Biophysics; photosynthesis; magnetic resonance; mechanisms of crystallization of macromolecules.

Fuller, George M., Ph.D., Caltech., 1981. Theoretical astrophysics; nuclear and elementary particle physics.

Goodkind, John M., Ph.D., Duke, 1960. Low-temperature experimental research; 2D electrons; solid He; geophysical and fundamental gravity; quantum computing.

Gould, Robert J., Ph.D., Cornell, 1963 (Research Professor). Theoretical physics; statistical mechanics, atomic and electromagnetic processes, with applications in astrophysics.

Griest, Kim, Ph.D., California, Santa Cruz, 1987. Theoretical and observational astrophysics, theoretical elementary particle physics; dark matter.

Grinstein, Benjamin, Ph.D., Harvard, 1984. Elementary particle theory; quantum field theory; cosmology.

Hirsch, Jorge E., Ph.D., Chicago, 1980. Condensed matter theory.

Hwa, Terence T.-L., Ph.D., MIT, 1990. Statistical mechanics; biological physics; systems biology; molecular evolution; genomics; condensed matter physics; and dynamics of complex systems.

Intriligator, Kenneth A., Ph.D., Harvard, 1992. Theoretical high-energy physics.

Jenkins, Elizabeth, Ph.D., Harvard, 1989. Thermal particle physics, particle astrophysics, nuclear physics.

Kleinfeld, David, Ph.D., California, San Diego, 1984. Computational neuroscience, sensormeter control, optimal imaging, ultra fast optics.

Kuti, Julius, Ph.D., Hungary, 1967. Elementary particles and fields.

Levine, Herbert, Ph.D., Princeton, 1979. Theoretical nonlinear dynamics; biophysics; bioinformatics, condensed matter physics.

Manohar, Aneesh V., Ph.D., Harvard, 1983. Elementary particle physics.

Maple, M. Brian, Ph.D., California, San Diego, 1969. Superconductivity; magnetism, strongly correlated electron phenomena; high-pressure physics; surface science.

McIlwain, Carl E., Ph.D., Iowa, 1960 (Research Professor). Space physics; experimental and theoretical studies of planetary magnetospheres; observational and instrumental astrophysics.

Nguyen-Huu, Xuong, Ph.D., California, Berkeley, 1962 (Professor Emeritus). Biophysics; protein crystallography; and electron microscopy, detectors for x-rays and electrons.

Norman, Michael L. Ph.D., California, Davis, 1980. Computational astrophysics and cosmology.

Okamura, Melvin Y., Ph.D., Northwestern, 1970. Biophysical (optical and magnetic resonance) studies of photosynthetic reaction centers.

O'Neil, Thomas M., Ph.D., California, San Diego, 1965. Theoretical plasma physics.

Onuchic, José, Ph.D., Caltech., 1987. Theoretical biophysics and chemical physics; theoretical studies in electron transfer reactions in chemical and biological systems and in the protein folding problem, bioinformatics.

Paar, Hans P., Ph.D., Columbia, 1974. Experimental high-energy physics.

Peterson, Laurence E., Ph.D., Minnesota, 1960 (Research Professor). X- and gamma-ray astronomy; cosmic rays; space physics; balloon and satellite instrumentation.

Schuller, Ivan K., Ph.D., Northwestern, 1976. Experimental condensed matter physics and materials science (thin films, heterostructures, magnetism, nanostructures, superconductivity).

Schultz, Sheldon, Ph.D., Columbia, 1960 (Research Professor). Negative index of refraction, meta-materials, photonic band gap structures; plasmon resonant particles; advanced instrumentation in biotechnology.

Sham, Lu Jeu, Ph.D., Cambridge, 1963. Condensed matter theory.

Sharma, Vivek A., Ph.D., Syracuse, 1990. Experimental particle physics.

Shu, Frank H., Ph.D., Harvard, 1968. (University Prof.) Theoretical astrophysics, star and planet formation, magnetohydrodynamics, interstellar medium, stellar dynamics, interacting binaries, planetary rings.

Sinha, Sunil K., Ph.D., Cambridge, 1964. Neutron and X-ray scattering studies of condensed matter.

Suhl, Harry, Ph.D., Oxford, 1948 (Research Professor). Theoretical solid state physics, particularly superconductivity, magnetism, surface kinetics; nonlinear dynamics.

Surko, Clifford M., Ph.D., California, Berkeley, 1968. Experimental studies using positrons and positron-matter interactions, and study of plasma physics using positron.

Tytler, David, Ph.D., London, 1982. Observational cosmology; quasars; ultraviolet and optical observations; statistics, telescopes and astronomical instrumentation.

Vernon, Wayne, Ph.D., Princeton, 1965 (Research Professor). Properties of elementary particles and their interactions; neutrino physics and astrophysics; particle detectors and accel-

eration techniques; free-electron lasers; Compton backscattered x-ray production.

Wolfe, Arthur M., Ph.D., Texas, 1967. Observational cosmology; galaxy formation; star formation.

Wolynes, Peter G., Ph.D., Harvard, 1976. Theoretical condensed matter, biological and chemical physics.

Yagil, Avraham, Ph.D., Weizmann Inst., 1988. Experimental elementary particle physics.

Associate Professors

Fogler, Michael M., Ph.D., U. Minnesota, 1997. Theoretical condensed matter.

Padoan, Paolo, Ph.D., Univ. Copenhagen, 1997. Computational physics and astrophysics.

Smith, Douglas E., Ph.D., Stanford, 1999. Single molecule biophysics, polymer physics, optical tweezers, and fluorescence microscopy.

Wuerthwein, Frank, Ph.D., Cornell, 1995. Experimental elementary particle physics.

Assistant Professors

Coil, Alison, Ph.D., California, Berkeley, 2004. Observational Astrophysicist.

Dudko, Olga K., Ph.D., Ukraine, 2001. Biophysics.

Groisman, Alexander, Ph.D., Weizmann Inst., 2001. Fluid Dynamics, microfluidics, polymer liquids, biophysics.

Keating, Brian, Ph.D., Brown Univ., 2000. Observational cosmology; cosmic microwave background-experimental observational; cosmic infrared background; centimeter, millimeter, sub-millimeter, and infrared low noise, low temperature instrumentation, detectors and optics.

Murphy, Thomas M., Jr., Ph.D., Caltech, 2000. Experimental astrophysics.

Shpyrko, Oleg, Ph.D., Harvard U., 2004. Experimental condensed matter.

Wu, Congjun, Ph.D., Stanford University, 2005. Theoretical condensed matter.

Lecturer (PSOE)

Anderson, Michael G., Ph.D., California, Davis, 2006. Physics education.

Faculty Emeriti

Brueckner, Keith A., Ph.D., California, Berkeley, 1950 (Professor Emeritus). Theoretical nuclear physics; statistical mechanics; plasma physics; interaction of lasers with matter; magnetohydrodynamics; theory of metals.

Chen, Joseph C.Y., Ph.D., Notre Dame, 1961 (Professor Emeritus). Theory of atomic and molecular structure and processes; history and philosophy of science.

Fisk, Zachary, Ph.D., California, San Diego, 1969 (Professor Emeritus). Experimental condensed matter physics.

Fredkin, Donald R., Ph.D., Princeton, 1961. Solid state theory; applied magnetics; biophysics.

Goldberger, Marvin L., Ph.D., Chicago, 1948 (Professor Emeritus). Elementary particle physics; quantum field theory; collision theory.

Jones, Barbara, Ph.D., London, 1976 (Professor Emeritus). Infrared astrophysics; galactic and extragalactic astronomy; astronomical instrumentation; and research in physics education.

Liebermann, Leonard N., Ph.D., Chicago, 1940 (Professor Emeritus). Magnetism; propagation of underwater sound; molecular and chemical physics; extremely low-frequency electromagnetic waves.

Lovberg, Ralph H., Ph.D., Minnesota, 1955 (Professor Emeritus). Experimental plasma physics; geophysics.

Ride, Sally K., Ph.D., Stanford, 1978. Beam wave interactions; free-electron lasers; space plasma physics.

Shapiro, Vitali, Dr., Sc., Novosibirsk, 1967. Space plasma physics: nonlinear plasma theory, fluid turbulence.

Swanson, Robert A., Ph.D., Chicago, 1958 (Professor Emeritus). Experiments involving properties and interactions of elementary particles; interference and decay of neutral K-mesons; deep inelastic muon scattering; nucleon structure and fragmentation; rare kaon decays and CP violation.

Ticho, Harold, Ph.D., Chicago, 1949 (Professor Emeritus). Experimental elementary particle physics.

Wong, David Y., Ph.D., Maryland, 1958. (Professor Emeritus). Theoretical high-energy physics.

York, Herbert F., Ph.D., California, Berkeley, 1949 (Professor Emeritus). Science and public policy.

Adjunct Professors

Kobrak, Hans, Ph.D., Chicago, 1961 (Professor Emeritus). Experimental high-energy physics.

Mezei, Ferenc, D. Sc., Hungarian Academy of Science, 1982. Neutron scattering: advanced instrumentation and studies of dynamic phenomena in condensed matter.

Ohkawa, Tihiro, Ph.D., Tokyo, 1955. Experimental plasma physics and controlled fusion.

Pathria, Raj K., Ph.D., Univ. Delhi, 1957. Statistical physics, quantum fluids, and low-temperature physics.

Waltz, Ronald, Ph.D., Chicago, 1970. Theoretical plasma physics; numerical simulation of turbulence in plasma.

RESEARCH SPECIALTIES AND STAFF

Theoretical

Acoustics. Abarbanel

Astrophysics. G. Burbidge, Diamond, Fuller, Gould, Griest, Norman, Podoan, Shapiro, Shu, Wolfe. 3 postdoctoral fellows.

Atomic Scattering and Structure. Brueckner, Chen, Gould.

Biophysics. Abarbanel, Dudko, Fredkin, Hwa, Levine, Onuchic. 8 postdoctoral fellows.

Bioinformatics. Hwa, Levine, Onuchic.

Condensed Matter/Solid State Physics. Arovas, DiVentra, Fogler, Fredkin, Hirsch, Hwa, Levine, Sham, Suhl. 3 postdoctoral fellows.

Elementary Particles and Quantum Field Theory. Fuller, Goldberger, Griest, Grinstein, Intriligator, Jenkins, Kuti, Manohar, Wong. 4 postdoctoral fellows.

Fluid Dynamics. Abarbanel, Diamond, Dubin, Hwa, Levine, Shapiro.

History and Philosophy. Chen.

Mathematical Physics. Diamond, Manohar, Suhl.

Nonlinear Dynamics. Abarbanel, Diamond, Hwa, Levine, Suhl. 1 postdoctoral fellow.

Nuclear Physics and the Quantum Mechanical Many-Body Systems. Brueckner, Fuller, Jenkins, Manohar.

Particle Beams. Ride.

Plasma Physics. Brueckner, Diamond, Dubin, O'Neil, Shapiro, Waltz. 2 postdoctoral fellows.

Statistical and Thermal Physics. Arovas, Brueckner, Diamond, Dubin, Gould, Hwa, Suhl.

Experimental

Astronomy. M. Burbidge, Griest, Jones, Keating, Masek, McIlwain, Murphy, Peterson, Tytler, Vernon, Wolfe. 8 post-doctoral fellows.
Atomic and Molecular Physics. Surko. 1 postdoctoral fellow.
Biophysics. Feher, Groisman, Kleinfeld, Nguyen-Huu, Okamura, Smith, Wolynes. 1 postdoctoral fellow.
Condensed Matter/Materials Science/Solid State Physics. Basov, Berkowitz, Butov, Fisk, Goodkind, Liebermann, Maple, Mezei, Schuller, Schultz, Sinha, D.R. Smith. 9 postdoctoral fellows.
Electron Microscopy. Nguyen-Huu.
Fluid Dynamics. Driscoll, Surko.
High-Energy Physics. Branson. Kobrak, Liebermann, Masek, Paar, Sharma, Swanson, Ticho, Vernon, Wuerthwein. 5 postdoctoral fellows.
Low-Temperature Physics/Magnetism/Superconductivity. Goodkind, Maple, Schuller. 1 postdoctoral fellow.
Nonlinear Dynamics. Driscoll, Maple, Surko. 1 postdoctoral fellow.
Nuclear Physics. Vernon.
Particle Beams. Schultz, Vernon, Ticho.
Physics Education. Anderson.
Plasma Physics. Driscoll, Lovberg, Ohkawa, Surko. 3 postdoctoral fellows.
Polymer Physics. Hwa.
Space Plasma Physics. McIlwain.