STANFORD UNIVERSITY
DEPARTMENT OF PHYSICS
Stanford, California 94305
http://physics.stanford.edu

General University Information
President: Marc Tessier-Lavigne
Dean of Graduate School: Richard Saller
University website: http://www.stanford.edu
School Type: Private
Setting: Suburban
Total Faculty: 1,651
Total Graduate Faculty: 360
Total number of Students: 17,178
Total number of Graduate Students: 10,116

Department Information
Department Chairman: Prof. Shamit Kachru, Chair
Department Contact: Maria Frank, Student Services Officer
Total full-time faculty: 50
Total number of full-time equivalent positions: 48
Full-Time Graduate Students: 187
Female Full-Time Graduate Students: 32
First-Year Graduate Students: 39
Female First-Year Students: 7
Total Post Doctorates: 60

Department Address
382 Via Pueblo Mall
Stanford, CA 94305
Phone: (650) 723-4344
E-mail: phys-admissions@lists.stanford.edu
Website: http://physics.stanford.edu

ADMISSIONS

Admission Contact Information
Address admission inquiries to: Before calling or emailing Graduate Admissions, please look for answers to your questions on the Applying to Graduate Admissions page http://studentaffairs.stanford.edu/gradadmissions/applying, and the Frequently Asked Questions page https://gradadmissions.stanford.edu/applying/frequently-asked-questions
Phone: (866) 432-7472
E-mail: gradadmissions@stanford.edu
Website: http://gradadmissions.stanford.edu

Application deadlines
Fall admission:
U.S. students: December 18
Int’l. students: December 18

Application fee
U.S. students: $125
Int’l. students: $125
Application Fee Waiver Information: https://graddiversity.stanford.edu/graduate-fee-waiver/graduate-fee-waivers

Admissions information
For Fall of 2018:
Number of applicants: 691
Number admitted: 68
Number enrolled: 33

Admission requirements
Bachelor’s degree requirements: Bachelor’s degree in Physics (or a related field) is required. International academic credential information can be found here: https://gradadmissions.stanford.edu/applying/international-applicants.

GRE requirements
The GRE is required.
No minimum scores specified. We strongly advise you to take the general and physics GRE tests no later than September, so that your scores will be received by the application deadline or shortly thereafter.

Subjective GRE requirements
The Subjective GRE is required.
No minimum scores specified. We strongly advise you to take the general and physics GRE tests no later than September, so that your scores will be received by the application deadline or shortly thereafter.

TOEFL requirements
The TOEFL exam is required for students from non-English-speaking countries.
PBT score: 600
iBT score: 100
Scores must be submitted from a test taken within the last eighteen months. Exemptions are granted to applicants who have earned (or will earn, before enrolling at Stanford) a U.S. bachelor’s, master’s, or doctoral degree from a college or university accredited by a regional accrediting association in the United States, or the international equivalent degree from a university of recognized standing in a country in which all instruction is provided in English. U.S. citizenship does not automatically exempt an applicant from taking the TOEFL if the applicant’s first language is not English. More detailed information regarding the TOEFL can be found here: https://gradadmissions.stanford.edu/applying/starting-your-application/required-exams

Other admissions information
Additional requirements: No minimum scores specified.
The average GRE scores for admitted students to the 2018–19 academic year were: Verbal-164, Quantitative–167; Analytical–4.54; Physics Subject–879.

TUITION

Tuition year 2018–19:
Full-time students: $46,800 annual
Further Info: https://registrar.stanford.edu/students/tuition-and-fees
Credit hours per semester to be considered full-time: 10
Deferred tuition plan: No
Health insurance: Available at the cost of $5,208 per year.
Academic term: Quarter
Number of first-year students who received full tuition waivers: 30

FINANCIAL AID

Loans
Loans are available for U.S. students.
Loans are not available for international students.
GAPSFA application required: No
FAFSA application required: Yes
SPECIAL EQUIPMENT, FACILITIES, OR PROGRAMS

Access to SLAC National Accelerator Laboratory; Teaching Center-Science and Engineering Quad; Hansen Experimental Physics Laboratory; Edward L. Ginzton Laboratory; Kavli Institute for Particle Astrophysics and Cosmology; Center for Space Science and Astrophysics; Laboratory for Advanced Materials.

FACULTY

Professor


Bucksbaum, Philip, Ph.D., University of California, Berkeley, 1980. Director, Ultrafast Science Center, SLAC National Accelerator Laboratory. Atomic, Molecular, & Optical Physics. Optics; atomic, molecular, and optical physics.


Chu, Steven, Ph.D., University of California, Berkeley, 1976. Professor Physics and Molecular and Cellular Physiology. Atomic, Molecular, and Optical Physics. Atomic, molecular, and optical physics.

Church, Sarah E., Ph.D., University of Cambridge, 1991. Professor by Courtesy, SLAC. Astrophysics. Experimental and observational astrophysics and cosmology.


Kallosh, Renata, Ph.D., Lebedev Physical Institute, Moscow, 1968. Theoretical Physics. Theoretical particle physics.


Michelson, Peter, Ph.D., Stanford University, 1979. Associate Chair, *Astrophysics.* Experimental and observational astrophysics and cosmology.


Wieman, Carl, Ph.D., Stanford University, 1977. Professor, School of Education. *Atomic, Molecular, & Optical Physics, Physics and other Science Education.* Physics education and atomic and molecular physics.


**Associate Professor**


Kuo, Chao-Lin, Ph.D., University of California, Berkeley, 2003. *Astrophysics.* Experimental and observational astrophysics and cosmology.


**Assistant Professor**


**Professor Emeritus**


Sturrock, Peter, Ph.D., University of Cambridge, 1951. Professor (Emeritus) by Courtesy. *Astrophysics, Solar Physics, Theoretical Physics.* Theoretical Astrophysics and Cosmology.


Walecka, John D., Ph.D., Massachusetts Institute of Technology, 1958. *Nuclear Physics, Particles and Fields, Theoretical Physics.* Theoretical Nuclear and Particle Physics.


**Research Professor**

Hollberg, Leo, Ph.D., University of Colorado Boulder, 1984. *Atomic, Molecular, & Optical Physics.* Atomic, Molecular, and Optical Physics.


**Courtesy Professor**


Levin, Craig, Ph.D., Yale University, 1993. Prof. of Radiology and by courtesy, Physics, Electrical Engineering and Biomedical Engineering. *Biophysics.* Molecular Imaging Instrumentation.


Zare, Richard N., Ph.D., Harvard University, 1964. Professor of Chemistry and by courtesy, Physics. Other. Laser Chemistry.

**DEPARTMENTAL RESEARCH SPECIALTIES AND STAFF**

**Theoretical**
Quantum Information, Hayden.
Theoretical Astrophysics and Cosmology. Calculating and modeling the physics of the cosmos. First objects in the universe, relativistic astrophysics, neutron stars, black holes, inflation, cosmic evolution and structure. Current research in theoretical astrophysics and cosmology at Stanford explores a wide range of critical questions. Major topics include numerical simulations of the formation of structure from small scales (first stars) to large scales (dark matter structure), galaxy formation, black holes (evolution, jets, accretion disks and orbiting objects), neutron stars (pulsars, magnetars), particle acceleration (relativistic shocks, origin of cosmic rays), gravitational lensing, and the very early universe (inflation). For more info: https://physics.stanford.edu/research/theoretical-astrophysics-and-cosmology

Theoretical Condensed Matter. Predicting the behavior of material systems based on their structure and composition. Exotic phases of matter, emergent phenomena, origin of physical law, topological phenomena. Theoretical condensed matter physics at Stanford is focused on understanding the macroscopic and collective properties of condensed matter systems. What is the relation between the macroscopic properties and the microscopic physics at the single electron or single molecule scale? In particular what are the consequences of strong correlation effects in electronic materials and devices where the low energy properties are qualitatively different from those of a noninteracting electron gas? How do new phases of matter fit into field theories that describe the collective behavior of electrons in solids and how can these be detected in experiments? Central areas of research include quantum entanglement, the quantum spin Hall effect, topological insulators, quantum spintronics, cuprate and pnictide superconductors, superfluidity, and holographic duality. For more info: https://physics.stanford.edu/research/theoretical-condensed-matter-physics

Theoretical Particle Physics. Understanding the fundamental nature of forces, particles, and space-time geometry. The origin of mass, grand unification of the forces, general relativity, quantum field theory and string theory and their applications, early universe cosmology including inflation and eternal inflation, holography, quantum gravity. Research in the Stanford Institute for Theoretical Physics (SITP) includes a strong focus on fundamental questions about the new physics underlying the Standard Models of particle physics and cosmology, and on the nature and applications of our basic frameworks (quantum field theory and string theory) for attacking these questions. For more info: https://physics.stanford.edu/research/theoretical-particle-physics

**Experimental**
Atomic, Molecular, & Optical Physics. Examining and manipulating matter at the scale of the atom and molecule. Attosecond to femtosecond processes, quantum properties of atoms and photons, testing fundamental physics. Research in atomic, molecular, laser and X-ray physics at Stanford takes place in the Physics and Applied Physics Departments and in the Photon Science Department at SLAC National Accelerator Laboratory. A rich set of topics are explored in the Varian Physics Laboratory, the Ginzton Lab and through the PULSE Institute for Ultrafast Energy Science. SLAC houses both the Stanford Synchrotron Radiation Lightsource and the Linac Coherent Light Source. For further info: https://physics.stanford.edu/research/atomic-molecular-and-optical-physics

**Experimental and Observational Astrophysics and Cosmology**
Bucksbaum, Chu, Hogan, Hollberg, Kasevich, Lev, Schleier-Smith.
Experimental and Observational Astrophysics and Cosmology. Viewing the formation and evolution of stars, galaxies, and the cosmos. Galaxy clusters, cosmic microwave background radiation, ultra high-energy sources, large scale structure in the universe and cosmic evolution. Current research in observational astrophysics and cosmology at Stanford covers a wide range of approaches to tackling the most important frontiers. Major topics include direct detection of dark matter, probes of dark energy (via gravitational lensing, surveys of galaxy clusters and supernovae), sources of gamma rays (pulsars, blazars, supernova remnants, dark matter annihilation or decay), the structure of clusters of galaxies and their use as probes of cosmology, the development of next generation detectors of photons (radio through gamma-ray), the origins of solar variability on a wide range of time scales, and experiments in gravitation (detection of gravitational waves, probes of gravity at short distance scales). For further info: https://physics.stanford.edu/research/experimental-observational-astrophysics-and-cosmology

**High Energy Physics**
Allen, Burchat, Cabrera, Church, Drell, Irwin, Kahn, Kuo, Macintosh, Michelson, Scherrer.

**Experimental Condensed Matter Physics**
Experimental Condensed Matter Physics. Measuring the behavior of electrons in material systems. Semiconductor nanostructures, superconductivity and low-temperature physics, atomic and molecular measurement and control, novel quantum materials. News: Stanford researchers create exotic electrons that may lead to new materials, devices Research in experimental condensed matter physics at Stanford takes place in the Physics and Applied Physics Departments and has strong connections with the Photon Science Department at the SLAC National Accelerator Laboratory. A broad set of topics are explored in the Varian Physics Laboratory, Geballe Laboratory for Advanced Materials and through the Stanford Institute for Materials and Energy Science. For more info: https://physics.stanford.edu/research/experimental-condensed-matter-physics

**Experimental Particle Physics**
Experimental Particle Physics. Understanding the fundamental forces and particles of the universe. Electroweak symmetry breaking, heavy flavor physics, searches for physics beyond the Standard Model, matter/antimatter asymmetry, dark matter, single-photon detection, neutrino properties, dark energy, instrumentation and detector development. At Stanford, studies of the fundamental interactions and the elementary particles are enhanced by close collaboration between the Physics Department and the SLAC National Accelerator Center. The Cryogenic Dark Matter Search (CDMS) and the LUX-ZEPLIN Experiment (LZ) focus on the development and operation of new detector technologies to increase the sensitivity of searches for weakly interacting massive particles. The goal
of the Enriched Xenon Experiment (EXO) is to detect "neutrinoless double-beta decay" using large amounts of xenon enriched in the isotope 136. The MINOS Experiment is a long-baseline neutrino experiment designed to observe the phenomenon of neutrino oscillations, an effect that is related to neutrino mass. The BABAR data set provides opportunities for studying matter/antimatter asymmetries (CP violation) and heavy flavor physics. SLAC plays a major role on the ATLAS experiment at the Large Hadron Collider, focusing on the pixel detector, the high-level trigger system, detector simulations and the exploration of TeV-scale physics. For more info: https://physics.stanford.edu/research/experimental-particle-physics Gratta, Hogan, Tompkins, Physics and Science Education Research. Wieman.