

UNIVERSITY OF TEXAS, DALLAS

PHYSICS DEPARTMENT

Richardson, Texas 75080-3021
<http://www.utdallas.edu/physics/>

General University Information

President: David E. Daniel
Dean of Graduate School: Austin J. Cunningham
University website: <http://www.utdallas.edu/>
Control: Public
Setting: Suburban
Total Faculty: 1,071
Total Graduate Faculty: 582
Total number of Students: 21,193
Total number of Graduate Students: 7,804

Department Information

Department Chairman: Robert Glosser, Head
Department Contact: Barbara Burbey, Graduate Support Assistant; Mail Station PHY 36
Total full-time faculty: 24
Total number of full-time equivalent positions: 24
Full-Time Graduate Students: 54
First-Year Graduate Students: 16
Female First-Year Students: 1
Total Post Doctorates: 6

Department Address

800 West Campbell Road
PHY 36
Richardson, TX 75080-3021
Phone: (972) 883-2835
Fax: (972) 883-2843
E-mail: bburbey@utdallas.edu
Website: <http://www.utdallas.edu/physics/>

ADMISSIONS

Admission Contact Information

Address admission inquiries to: Barbara Burbey, Graduate Support Assistant
Phone: (972) 883-2835
E-mail: bburbey@utdallas.edu
Admissions website: <http://www.utdallas.edu/dept/physics>

Application deadlines

Fall admission:
U.S. students: August 1 *Int'l. students:* May 1
Spring admission:
U.S. students: November 1 *Int'l. students:* September 1

Application fee

U.S. students: \$50 *Int'l. students:* \$100

Admissions information

For Fall of 2014:
Number of applicants: 76
Number admitted: 21
Number enrolled: 11

Admission requirements

Bachelor's degree requirements: Bachelor's degree in physics or a related field is required.
Minimum undergraduate GPA: 3.0

GRE requirements

The GRE is required.
Quantitative score: 155
Verbal score: 153

Mean GRE score range (25th–75th percentile): 310-325

Advanced GRE requirements

The Advanced GRE is required.
Minimum accepted Advanced GRE score: 650
Mean Advanced GRE score range (25th–75th percentile): 690-860

TOEFL requirements

The TOEFL exam is required for students from non-English-speaking countries.
iBT score: 80

Other admissions information

Additional requirements: Students must have a minimum of 155 on the quantitative and 153 on the verbal. Applicants with lower scores will be considered on an individual basis.
Undergraduate preparation assumed: The student applicant should have an undergraduate background that includes the following courses at the level indicated by texts referred to: mechanics at the level of Symon, Mechanics; electromagnetism at the level of Reitz and Milford, Foundations of Electromagnetic Theory; thermodynamics at the level of Kittel, Thermal Physics; quantum mechanics at the level of Griffiths, Introduction to Quantum Mechanics (chapters 1-4), some upper-division course(s) in modern physics, and atomic physics.

TUITION

Tuition year 2014–2015:
Tuition for in-state residents
Full-time students: \$5,970 per semester
Part-time students: \$1,343 per credit
Tuition for out-of-state residents
Full-time students: \$10,803 per semester
Part-time students: \$1,918 per credit
Tuition and fees are waived for Teaching Assistants and Research Assistants. International students pay \$100.00/semester as a fee.
Credit hours per semester to be considered full-time: 9
Deferred tuition plan: Yes
Health insurance: Available at the cost of \$1,859 per year.
Other academic fees: International student orientation fee (one-time assessment)\$50.00
Academic term: Semester
Number of first-year students who received full tuition waivers: 11

Teaching Assistants, Research Assistants, and Fellowships

Number of first-year
Teaching Assistants: 11
Average stipend per academic year
Teaching Assistant: \$21,600
Research Assistant: \$21,600
Fellowship student: \$25,000

FINANCIAL AID

Application deadlines

Fall admission:
U.S. students: March 15

Loans

Loans are available for U.S. students.
 Loans are not available for international students.
GAPSFAS application required: No
FAFSA application required: Yes

For further information

Address financial aid inquiries to: Barbara Burbey, Graduate Secretary, Mail Station PHY 36.
Phone: (972) 883-2835
E-mail: bburbey@utdallas.edu
Financial aid website: <http://www.utdallas.edu/student/finaid/>

HOUSING

Availability of on-campus housing

Single students: Yes
Married students: Yes

For further information

Address housing inquiries to: reslife@utdallas.edu or 972-883-5561.
Phone: (972)-883-5561
E-mail: reslife@utdallas.edu
Housing aid website: <http://www.utdallas.edu/housing/>

Table A—Faculty, Enrollments, and Degrees Granted

Research Specialty	2013–14 Faculty	Enrollment Fall 2013		Number of Degrees Granted 2013–2014 (2009–14)		
		Mas-ter's	Doc-torate	Mas-ter's	Terminal Master's	Doc-torate
Astrophysics	2	–	4	–(3)	–(1)	1(3)
Atmosphere, Space Physics, Cosmic Rays	4	1	3	3(7)	–(1)	–(6)
Condensed Matter Physics	7	5	10	–(3)	–(2)	2(10)
Cosmology & String Theory	2	–	4	–(1)	–	–(1)
DNA; Imaging Fast Laser Spectroscopy	2	–	7	2(2)	–	1(1)
High Energy Physics	1	–	4	–(4)	–	1(1)
Low Temperature Physics	2	–	2	–(1)	–	–(3)
Nano Science and Technology	2	–	2	–(2)	–	–
Relativity & Gravitation	1	–	4	–(5)	2(11)	–
Remote Sensing	1	–	–	–	–(8)	–
Total	1	1	3	4(5)	–	1(1)
Total	25	7	43	9(33)	2(23)	6(26)
Full-time Grad. Stud.	52	2	56	–	–	–
First-year Grad. Stud.	17	1	16	–	–	–

GRADUATE DEGREE REQUIREMENTS

Master's: For the M.S., all students must complete at least 30 hours of graduate physics courses, including a 12-hour "core." The degree is completed either by six hours of research, including a thesis, or by six hours of additional graduate courses.

Doctorate: The Ph.D. students must complete the 24-hour core, a minimum of 3 elective courses, 1 from within his/her area of specialization and 2 selected from different areas within the department plus whatever his/her committee requires. A Ph.D. candidate must pass, in the first year, a written qualifying exam that is presented twice each academic year. Once a dissertation topic has been selected and a faculty committee

formed, the student presents a dissertation proposal to his/her committee for approval, presents a seminar, and is given an oral examination on the dissertation topic and related subjects. The student must then complete an acceptable dissertation and present a seminar. A successful defense of the dissertation concludes the requirements for the Ph.D. degree.

Thesis: Thesis may be written in absentia.

Table B—Separately Budgeted Research Expenditures by Source of Support

Source of Support	Departmental Research	Physics-related Research Outside Department
Federal government	\$4,326,278	
State/local government	\$50,000	
Non-profit organizations	\$104,318	
Business and industry	\$29,167	
Other	\$22,283	
Total	\$4,532,046	

Table C—Separately Budgeted Research Expenditures by Research Specialty

Research Specialty	No. of Grants	Expenditures (\$)
Atmosphere, Space Physics, Cosmic Rays	17	\$2,378,000
Condensed Matter Physics	21	\$1,644,333
Particles and Fields	5	\$330,660
Relativity & Gravitation	5	\$179,052
Total	48	\$4,532,045

FACULTY

Professor

- Anderson, Phillip C., Ph.D.,** University of Texas, Dallas, 1990. Graduate Advisor. *Atmosphere, Space Physics, Cosmic Rays.* Ionospheric and magnetospheric electrodynamics; space weather; space environment effects on human systems, properties of materials.
- Cunningham, Augustine J., Ph.D.,** Queen's Belfast University, 1969. Graduate Dean. *Atomic, Molecular, & Optical Physics, Condensed Matter Physics, Solid State Physics.* Ion–electron recombination processes; ion–molecule reactions; high-temperature and pressure gas kinetics; ultraviolet spectroscopy; plasma etching; e-beam lithography.
- Glosser, Robert, Ph.D.,** University of Chicago, 1967. Head, Department of Physics. *Condensed Matter Physics, Medical, Health Physics, Solid State Physics.* Optical properties of solids and biological materials; Raman, modulation, and fluorescence spectroscopies.
- Heelis, Roderick A., Ph.D.,** University of Sheffield, 1973. Director of the William B. Hanson Center for Space Sciences. Endowed chair. *Atmosphere, Space Physics, Cosmic Rays.* Plasma processes and electrodynamics in planetary atmospheres and ionospheres; space flight instrumentation.
- Hoffman, John H., Ph.D.,** University of Minnesota, 1958. *Atmosphere, Space Physics, Cosmic Rays, Planetary Science.* Ionospheric composition; planetary atmospheres; mass spectroscopy; stratospheric cluster ion composition.
- Izen, Joseph M., Ph.D.,** Harvard University, 1982. *High Energy Physics, Particles and Fields.* Elementary particles, charm, bottom, and τ decay, $e+e-$; collider experiments, high-energy physics computing.
- Lee, Mark, Ph.D.,** Stanford University, 1991. *Applied Physics, Condensed Matter Physics, Electromagnetism, Engineering Physics/Science, Low Temperature Physics, Nano Science*

and Technology, Solid State Physics. Pure and applied condensed matter physics; science and engineering of novel electronic and optical materials; electronic and photonic device engineering.

Lou, Xinchou, Ph.D., State University of New York at Albany, 1989. *High Energy Physics, Particles and Fields*. Elementary particles physics; bottom and charm physics, e^+e^- colliders; offline software and distributed computing.

Salamon, Myron B., Ph.D., University of California, Berkeley, 1966. *Condensed Matter Physics, Low Temperature Physics, Nano Science and Technology, Solid State Physics, Statistical & Thermal Physics*. Experimental studies of unconventional superconductors; manganites and layered magnetic materials; low-temperature physics; neutron and X-ray scattering.

Zakhidov, Anvar, Ph.D., Institute of Spectroscopy, U.S.S.R. Academy of Sciences, 1981. Deputy Director of the Nano-Tech Institute. *Applied Physics, Condensed Matter Physics, Low Temperature Physics, Nano Science and Technology, Solid State Physics*. Nanotechnology; photonic crystals; carbon nanotubes; organic molecular crystals.

Associate Professor

Gartstein, Yuri, Ph.D., Institute for Spectroscopy, USSR Academy of Sciences, 1988. *Condensed Matter Physics, Nano Science and Technology, Solid State Physics, Theoretical Physics*. Condensed matter physics with emphasis on nanoscience; electronic, optical, and transport properties of organic materials.

Ishak-Boushaki, Mustapha, Ph.D., Queen's University, 2002. *Astrophysics, Computational Physics, Cosmology & String Theory, Relativity & Gravitation*. Classical and modern cosmology; relativity; gravitational lensing (cosmic shear); cosmological models; computer algebra systems applied to relativity.

King, Lindsay J., Ph.D., University of Manchester, 1995. *Astronomy, Astrophysics, Computational Physics, Cosmology & String Theory, Relativity & Gravitation*. Physical cosmology using tools such as gravitational lensing to understand dark matter and dark energy. Computational and theoretical work as well as observations with large telescopes.

Lary, David J., Ph.D., University of Cambridge, 1991. *Applied Physics, Atmosphere, Space Physics, Cosmic Rays, Computational Physics*. Computational and information systems to facilitate discovery and decision support in earth system science.

Malko, Anton V., Ph.D., New Mexico State/Los Alamos National Labs, 2002. *Applied Physics, Atomic, Molecular, & Optical Physics, Condensed Matter Physics, Nano Science and Technology, Optics*. Femtosecond laser spectroscopy of Nanomaterials such as semiconductor quantum dots, wires, and wells; photoluminescence spectroscopy and microscopy; quantum optics; photoluminescence spectroscopy of single nanoparticles; solid-state physics; laser physics.

Zhang, Chuanwei, Ph.D., The University of Texas, Austin, 2005. *Atomic, Molecular, & Optical Physics, Computational Physics, Condensed Matter Physics, Low Temperature Physics, Materials Science, Metallurgy, Nano Science and Technology, Nonlinear Dynamics and Complex Systems, Solid State Physics, Theoretical Physics*. Topological superfluids, superconductors and insulators; ultra-cold atomic gases; quantum computation; graphene.

Assistant Professor

Chen, Lunjin, Ph.D., University of California, Los Angeles, 2011. *Atmosphere, Space Physics, Cosmic Rays, Plasma and Fusion*. Magnetospheric physics, Interaction of electromagnetic waves and energetic charge particles in geospace

plasma. Modeling of radiation belt dynamics Instability and propagation of plasma waves Applications of plasma waves.

Chen, Xingang, Ph.D., Columbia University, 2003. *Astrophysics, Cosmology & String Theory, Relativity & Gravitation*. Early universe models; primordial density perturbations; cosmic microwave background and other large-scale structures; dark matter; and string cosmology.

Kesden, Michael H., Ph.D., California Institute of Technology, 2005. *Astrophysics, Cosmology & String Theory, Relativity & Gravitation*. Theoretical astrophysics and relativity; binary black hole formation, evolution, and merger; gravitational wave emission and detection; stellar tidal disruption by supermassive black holes; astrophysical probes of dark-matter dynamics; gravitational lensing of the cosmic microwave background.

Lumata, Lloyd L., Ph.D., Florida State University, 2008. *Biophysics, Medical, Health Physics*. Biomedical physics; biophysics; magnetic Resonance; nuclear magnetic resonance (NMR); electron paramagnetic resonance (EPR); magnetic resonance imaging (MRI); biomedical applications of dynamic nuclear polarization.

Rodrigues, Fabiano, Ph.D., Cornell University, 2008. *Atmosphere, Space Physics, Cosmic Rays, Solar Physics*. Atmosphere, Space Physics; cosmic rays, radio remote sensing of the upper atmosphere/ionosphere, ionospheric electrodynamics and irregularities; space weather.

Slinker, Jason D., Ph.D., Cornell University, 2007. Society of Physics Students Advisor. *Applied Physics, Biophysics, Condensed Matter Physics, Nano Science and Technology*. Organic optoelectronic devices and laboratory assays. Devices include light emitting electrochemical cells and electrochemical biosensors with DNA-modified electrodes.

Zhang, Fan, Ph.D., The University of Texas, Austin, 2011. *Condensed Matter Physics, Solid State Physics, Theoretical Physics*. Topological insulators and superconductors.

Professor Emeritus

Fenyves, Ervin J., Ph.D., University of Budapest, 1950. *Nuclear Physics, Particles and Fields*. Elementary particles; cosmic rays; gamma-ray astrophysics; gamma-ray and neutrino detectors.

Heikkila, Walter J., Ph.D., University of Toronto, 1954. *Atmosphere, Space Physics, Cosmic Rays, Plasma and Fusion, Solar Physics*. Magnetospheric physics; solar wind; auroral substorms.

Rindler, Wolfgang, Ph.D., University of London, 1956. *Astrophysics, Cosmology & String Theory, Relativity & Gravitation*. Special and general relativity; cosmology; spinors.

Tinsley, Brian, Ph.D., University of Canterbury, 1963. *Atmosphere, Space Physics, Cosmic Rays*. Airglow; aurora; theoretical research in aeronomy; instrumentation for atmospheric spectroscopy.

Senior Lecturer

MacAlevey, Paul J., Ph.D., University of Texas, Dallas, 1996. *Physics and other Science Education, Relativity & Gravitation*.

Rasmussen, Beatrice, M.S., University of Texas, Dallas, 1996. *Atmosphere, Space Physics, Cosmic Rays, Biophysics, Computational Physics, Physics and other Science Education*. A study on equatorial spread F in the Earth's ionosphere.

DEPARTMENTAL RESEARCH SPECIALTIES AND STAFF

Theoretical

Astrophysics. Xingang Chen, Ishak-Boushaki, Kesden, King, Rindler.

Atmosphere, Space Physics, Cosmic Rays. Anderson, Lunjin Chen, Heelis, Heikkila, Rodrigues, Tinsley.

Nano Science and Technology. Nanoscience, electronic, optical, and transport properties of organic materials. Calculation of electronic structure by LCAO. Gartstein, Lee, Salamon, Zakhidov, Chuanwei Zhang, Fan Zhang.

Relativity & Gravitation. Gravitational radiation; exact solutions of Einstein's field equations. Classical and modern cosmology; gravitational lensing (cosmic shear); cosmological models; computer algebra systems applied to relativity. Xingang Chen, Ishak-Boushaki, Kesden, King, MacAlevey, Rindler.

Remote Sensing for Atmospheric Physics. Computational and information systems to facilitate discovery and decision support in earth system science. Lary.

Experimental

Atmosphere, Space Physics, Cosmic Rays. Aeronomy; thermospheric, ionospheric and magnetospheric physics; planetary atmospheres. Instrumentation and data analysis for various satellites and deep space probes; microphysics of clouds, climate. Atmospheric electricity. Thermal properties of airless planetary regoliths, distribution of volatiles in the Martian crust, misconceptions in physics and astronomy education, space science and physics educational outreach programs. Anderson, Lunjin Chen, Heelis, Heikkila, Hoffman, Lary, Rodrigues, Tinsley.

Atomic, Molecular, & Optical Physics. Malko.

Condensed Matter Physics. Raman, photoluminescence, and modulation spectroscopy of solids. Unconventional superconductivity. Magnetism; disordered and nanoscale magnets. Femtosecond laser spectroscopy of materials, photoluminescence, absorption spectroscopy. Novel electronic and optical materials and electronic and photonic device engineering. Organic optoelectronic devices and laboratory assays. Light emitting electrochemical cells and electrochemical biosensors with DNA-modified electrodes. Cunningham, Glosser, Lee, Lumata, Malko, Salamon, Slinker, Zakhidov, Chuanwei Zhang, Fan Zhang.

Low Temperature Physics. Experimental studies of unconventional superconductors, manganites, and layered magnetic materials. Low-temperature physics, neutron and X-ray scattering. Salamon, Zakhidov.

Nano Science and Technology. Quantum semiconductor nanostructure, optical properties. Gartstein, Glosser, Lee, Malko, Salamon, Slinker, Zakhidov, Chuanwei Zhang, Fan Zhang.

Optics. Quantum and nonlinear optics; single and multiphoton emission processes; ultrafast laser spectroscopy. Glosser, Malko.

Particles and Fields. Charm, bottom, and τ decays at e^+e^- colliders; simulation of fixed target detectors for b physics. Fenyves, Izen, Lou.

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