

UNIVERSITY OF TEXAS AT DALLAS

PHYSICS DEPARTMENT

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

General University Information

President: Richard Benson
Dean of Graduate School: Marion Underwood
University website: <http://www.utdallas.edu/>
Control: Public
Setting: Suburban
Total Faculty: 1,150
Total Graduate Faculty: 600
Total number of Students: 24,000
Total number of Graduate Students: 8,000

Department Information

Department Chairman: Prof. Mark Lee, Head
Department Contact: Barbara Burbey, Graduate Support Assistant; PHY 36
Total full-time faculty: 26
Total number of full-time equivalent positions: 26
Full-Time Graduate Students: 60
First-Year Graduate Students: 14
Female First-Year Students: 1
Total Post Doctorates: 12

Department Address

Physics Department PHY36
800 West Campbell Rd.
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: May 1 *Int'l. students:* May 1
Spring admission:
U.S. students: October 1 *Int'l. students:* September 1

Application fee

U.S. students: \$50 *Int'l. students:* \$100
Application fee may be deferred until acceptance and enrollment.

Admissions information

For Fall of 2016:
Number of applicants: 60
Number admitted: 30
Number enrolled: 13

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
Students applying for MS program do not need a GRE Physics score.

TOEFL requirements

The TOEFL exam is required for students from non-English-speaking countries.
iBT score: 80
Minimum iBT score of 80 is a University requirement that cannot be waived by the Physics Department.

Other admissions information

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 2016–17:

Tuition for in-state residents

Full-time students: \$6,209 per semester

Part-time students: \$1,397 per credit

Tuition for out-of-state residents

Full-time students: \$12,075 per semester

Part-time students: \$2,103 per credit

Tuition and fees are paid by the university 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 \$2,181 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: 12

Teaching Assistants, Research Assistants, and Fellowships

Number of first-year

Teaching Assistants: 11

Research Assistants: 1

Fellowship students: 1

Average stipend per academic year

Teaching Assistant: \$22,800

Research Assistant: \$22,800

Fellowship student: \$25,000

University Fellowships are open to US citizens and permanent residents on a competitive basis.

FINANCIAL AID

Application deadlines

Fall admission:
U.S. students: March 31 *Int'l. students:* March 15
 Spring admission:
U.S. students: November 1 *Int'l. students:* September 1

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, The University of Texas at Dallas, Dept. of Physics PHY36, 800 West Campbell Rd., Richardson, TX 75080.
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: University Village, 2800 Water-view Pkwy, Richardson, TX 75080.
Phone: (972)-883-5561
E-mail: reslife@utdallas.edu
Housing aid website: <http://www.utdallas.edu/admissions/graduate/housing-and-location/>

Table A—Faculty, Enrollments, and Degrees Granted

Research Specialty	2015–16 Faculty	Enrollment Fall 2015		Number of Degrees Granted 2015–16 (2011–16)		
		Mas-ter's	Doc-torate	Mas-ter's	Terminal Master's	Doc-torate
ATLAS	2	–	2	1(3)	1(1)	–(3)
Carbon Nanotubes, Nanostructured Superconductors	1	1	4	2(8)	1(1)	1(7)
Device & Materials Physics	1	–	3	2(4)	–	1(2)
DNA electronics; NMR	2	1	6	2(2)	–	1(3)
Early Universe	1	–	1	–(1)	–	–
Earth & Planetary Atmospheric Physics	5	–	6	2(8)	–(1)	1(8)
Experiment: Topological Insulators, 2DEGs	3	–	8	–	–	–
Extragalactic, Black Holes	2	–	5	2(5)	–(1)	–(1)
Fast Laser Spectroscopy	1	–	3	–(4)	–(1)	1(2)
General Relativity	1	–	2	1(4)	–(1)	1(3)
Plasmas for Materials Synthesis	1	–	1	–(2)	–	–(2)
Remote Sensing	1	–	3	1(5)	–(1)	–(2)
Theory	3	–	3	–(3)	–(2)	–(2)
Total	24	2	47	13(49)	2(9)	6(35)
Full-time Grad. Stud.	52	2	60	–	–	–
First-year Grad. Stud.	17	1	13	–	–	–

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.

SPECIAL EQUIPMENT, FACILITIES, OR PROGRAMS

UT Dallas Alan MacDiarmid NanoTech Institute
 William B. Hanson Center for Space Sciences
 Texas Analog Center of Excellence
 Low-Temperature Center (Helium-4 and Dilution Refrigerator, High-field magnets, Physical Property Measurement System)

Table B—Separately Budgeted Research Expenditures by Source of Support

Source of Support	Departmental Research	Physics-related Research Outside Department
Federal government	\$5,212,912	
State/local government		
Non-profit organizations	\$107,685	
Business and industry	\$68,956	
Other		
Total	\$5,389,553	

Table C—Separately Budgeted Research Expenditures by Research Specialty

Research Specialty	No. of Grants	Expenditures (\$)
Remote Sensing	2	\$68,489
Gravitation, Cosmology, & Astrophysics	5	\$71,464
Atmosphere, Space Physics, Cosmic Rays	15	\$3,938,452
Biophysics	2	\$18,487
Experiment and Theory	12	\$969,461
High Energy Physics	2	\$323,200
Total	38	\$5,389,553

FACULTY

Chair Professor

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.
Malina, Roger, Ph.D., UC Berkeley, 1979. *Applied Physics, Astronomy, Computational Physics, Optics, Other.* Instrumenta-

tion for astronomy and space physics; intersection of science and art.

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.
- Glosser**, Robert, Ph.D., University of Chicago, 1967. *Condensed Matter Physics, Medical, Health Physics, Solid State Physics*. Optical properties of solids and biological materials; Raman, modulation, and fluorescence spectroscopies.
- Hoffman**, John H., Ph.D., University of Minnesota, 1958. Undergraduate Program Head. *Atmosphere, Space Physics, Cosmic Rays, Planetary Science*. Ionospheric composition; planetary atmospheres; mass spectroscopy; stratospheric cluster ion composition.
- 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.
- 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. Department Head. *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.
- 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.
- Zhang**, Chuanwei, Ph.D., The University of Texas, Austin, 2005. Associate Department Head ; Graduate Program Head. *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.

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.
- 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. Graduate Admissions Chair. *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.

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.

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.
- 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.
- Lv**, Bing, Ph.D., University of Houston, 2008. *Condensed Matter Physics, Low Temperature Physics, Materials Science, Metallurgy, Solid State Physics*. Experimental condensed matter physics; new materials; synthesis of solid state crystals; topological insulators and superconductors; novel thermoelectric materials.
- 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.
- Shi**, Xiaoyan, Ph.D., Florida State University, 2011. *Condensed Matter Physics, Low Temperature Physics, Solid State Physics*. Experimental low temperature physics, 2D electron gases, quantum transport, spin Hall effect.
- Stoneback**, Russell, Ph.D., University of Texas at Dallas, 2008. *Atmosphere, Space Physics, Cosmic Rays, Climate/Atmospheric Science, Computational Physics*. Global and non-local forces that drive ionospheric and magnetospheric weather; Cube satellites; Computational analysis of large but sparse data sets.
- Zhang**, Fan, Ph.D., The University of Texas, Austin, 2011. *Condensed Matter Physics, Solid State Physics, Theoretical Physics*. Topological insulators and superconductors.

Professor Emeritus

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.

Salamon, Myron, Ph.D., UC Berkeley, 1966. *Condensed Matter Physics, Low Temperature Physics, Optics, Solid State Physics*. Optical properties of highly correlated condensed matter systems.

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

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

Sun, Kuei, Ph.D., University of Illinois Urbana Champaign, 2012. *Condensed Matter Physics, Solid State Physics, Statistical & Thermal Physics, Theoretical Physics*. Theoretical condensed matter physics.

DEPARTMENTAL RESEARCH SPECIALTIES AND STAFF**Theoretical**

Astrophysics. Extragalactic, Black Holes, Early Universe. Ishak-Boushaki, Kesden, King, Rindler.

Nano Science and Technology. Topological insulators and superconductors, Properties of organic materials, electronic structure by LCAO, highly correlated systems. Gartstein, Sun, 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. Ishak-Boushaki, Kesden, MacAlevy, Rindler.

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

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, Chen, Heelis, Heikkila, Hoffman, Lary, Rodrigues, Stoneback, Tinsley.

Atomic, Molecular, & Optical Physics. Optical properties of solids, fast spectroscopies, Raman spectroscopy. Glosser, Malko. Biophysics. DNA electronics and electronic properties; advanced methods of NMR. Lumata, Slinker.

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. Topological insulators and superconductors. Quantum transport. Low-dimensional systems. Glosser, Lee, Lv, Malko, Shi, Slinker, Zakhidov.

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

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

Nano Science and Technology. Quantum semiconductor nanostructure, optical properties. Glosser, Lee, Malko, Shi, Slinker, Zakhidov.

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

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