

WEST VIRGINIA UNIVERSITY

DEPARTMENT OF PHYSICS

Morgantown, West Virginia 26506

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

1. General

President: Jim Clements

Provost and V.P. for Academic Affairs & Research:
Jane Martin

Department Chairman: Earl E. Scime

Department Telephone Number: (304) 293-3422

Type of Institution: University

Control: Public

Setting: Small town

Total Faculty: 1,989

Total Graduate Faculty: 1,418

Total Students: 28,840

Total Graduate Students: 6,910

Annual Graduate Tuition:

In-state residents: Full-time—\$5,612

Part-time-\$346/credit

Out-of-state residents: Full-time—\$16,270

Part-time-\$1,004/credit

Tuition rates for: 2008–09

Deferred tuition plan: No

Other Fees: \$0

Term: Semester

2. Number of Faculty in Department

The combined total of full-time faculty in the three professorial ranks is 16. The combined total of full-time, part-time, and other faculty at all ranks is 23.

3. Admission, Financial Aid, and Housing

Address admission inquiries to: Admissions Committee, Dept. of Physics, P.O. Box 6315

Internet Address: <http://www.as.wvu.edu/phys/>

Graduate application fee required: \$50

Admission deadline (Fall admission): 2/15

Admission information: For fall admission, 2008–09, 13 students were accepted from 80 applicants.

Admission requirements: For admission to the graduate programs, a Bachelor's degree in physics is required with no minimum undergraduate GPA specified. The GRE is required. The GRE Advanced is strongly urged. No minimum score is specified. Students from non-English speaking countries are required to demonstrate proficiency in English via the TOEFL exam. Minimum acceptable score for admission is 213.

Undergraduate preparation assumed: Intermediate mechanics, electricity and magnetism, atomic and quantum physics, thermodynamics, and mathematics through partial differential equations. Typical physics texts include Davis (mechanics), Wangness (electricity and magnetism), Saxon (quantum mechanics), and Sears and Salinger (thermodynamics).

Address financial aid inquiries to: Graduate Program Committee, Dept. of Physics

GAPSFAS application required: No

Financial aid deadline: 2/15

Loans available: Yes

Address housing inquiries to: Housing Office, Evansdale Campus

On-campus, single student housing available: Yes

Cost/month: \$526–635 (incl. utils.)

On-campus, married student housing available: Yes

Cost/month: \$526–635 (incl. utils.)

Table A—Faculty, Enrollments, and Degrees Granted

Research Specialty	2008–09 Faculty	Enrollment ¹ Fall 2008		No. of Degrees Granted ² 2008–09 (2004–09)			Median No. of Years for 2008–09 Ph.D.'s
		Mas- ter's	Doc- torate	Mas- ter's	Termi- nal Master's	Doc- torate	
Applied Physics	4	0	0	0(0)	0(0)	0(0)	–
Astrophysics	4	0	8	2(2)	0(0)	0(0)	–
Atmos./Space Phys., Cosmic Rays	4	0	1	0(0)	0(0)	0(0)	–
Biophysics	1	0	0	1(1)	0(0)	0(1)	5
Condensed Matter Physics	9	1	34	6(20)	0(4)	3(22)	6
Fluids & Rheology	2	0	3	1(1)	0(0)	0(0)	–
Materials Sci./ Metallurgy	3	0	0	0(0)	0(0)	0(0)	–
Particles & Fields	1	0	0	0(1)	0(0)	0(0)	–
Physics Education	1	0	0	0(0)	0(0)	0(0)	–
Plasma Physics & Fusion	5	0	14	3(7)	1(1)	5(16)	6
Statistical & Thermal	2	0	2	0(1)	0(0)	0(1)	5
Other Theoretical/ Math.	1	0	0	0(0)	0(3)	0(0)	–
Nonlinear dynamics	0	0	0	0(0)	0(0)	1(1)	5
Total		1	61	13(13)	1(8)	9(41)	
Full-time Grad. Stud.			61				
Part-time Grad. Stud.			1				
First-year Grad. Stud.		0	13				
Median Years in Grad. Study (2008–09 Degrees)				3	2	6	
Undergraduate Degrees, 2008–09 (2004–09):				12(40)			

¹ Students not yet committed to a research specialty are entered under non-specialized.

² Five-year totals in parentheses.

4. Graduate Degree Requirements

Master's: Approved courses with minimum GPA of 3.0; no residence or language requirement. M.S. with thesis: 24 credits. M.S. without thesis: 30 credits.

Doctorate: Minimum of 36 hours of course work in approved program with minimum GPA of 3.0; written comprehensive exam, oral research exam, dissertation and oral dissertation defense.

Thesis: Thesis may be written *in absentia*.

Special Equipment, Facilities, or Programs: The department and associated instrument and electronics shops are housed in Hodges Hall, a six-story building located on the downtown campus. The building also houses a planetarium, a roof-top observatory, a small radio telescope, and eleven research laboratories. The facilities include a triple plasma source, a Q-machine for generating space-like plasmas and waves; helicon plasma source, a space simulation chamber; a plasma

processing test facility, four molecular beam epitaxy (MBE) growth facilities; magnetic resonance laboratory (EPR, ENDOR); microimaging MRI; SQUID magnetometer with magneto-resistance probe; rotating anode x-ray source; x-ray diffractometers; e-beam writer, scanning probe microscope, atomic force microscope, Hall effect apparatus; optical spectrophotometer; FTIR spectrophotometer; high-temperature graphite furnace; ultrasonic, thermogravimetry, and differential scanning calorimetry; characterization capabilities for thermoluminescence, optical absorption, photorefectance, photoconductance and photoluminescence of materials; and sputtering system for thin-film deposition. Laser facilities include cw argon ion lasers (4), dye lasers (2), tunable diode lasers (3), cw and Q-switched Nd:YAG lasers (3). Departmental computing facilities include 2 cluster computers. Cooperative research programs with National Energy Technology Laboratory and Pittsburgh Supercomputing Center are possible. Joint facility with Chem. Eng. Dept. for Auger and XPS studies; joint facility with CSEE Dept. for materials and device processing.

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	26	11	12	20	14,500 ^{1,2}
Research Assistant	35	2	12	20	19,000 ¹
Total	61	13			

¹ Tuition waived for academic year and summer.

² Summer assistantships available, \$4,500 more.

5. Personnel Engaged in Separately Budgeted Research, 7/08–6/09

Professorial faculty	22
Postdoctoral appointments	11
Graduate students	53
Undergraduate students	10
Total	96

6. Separately Budgeted Research Expenditures by Source of Support

	Departmental Research	Physics-related Research Outside Department
Federal government	\$2,356,000	\$
Other	100,000	
Total	\$2,456,086	\$

Table C—Separately Budgeted Research Expenditures

Research Specialty	No. of Grants	Expenditures (\$)
Astrophysics	8	453,420
Condensed Matter Physics	31	1,378,321
Plasma Physics & Fusion	8	624,345
Total	47	2,456,086

FACULTY

Distinguished Professors

- Edwards**, Boyd F., Ph.D., Stanford, 1985. Theoretical statistical physics and fluid dynamics.
- Koepke**, Mark E., Ph.D., Maryland, 1984. Experimental plasma physics; nonlinear dynamics.
- Scime**, Earl E., Ph.D., Wisconsin-Madison, 1992. Chair of the Department. Experimental plasma physics.

Professors

- Abdul-Razzaq**, Wathiq, Ph.D., Illinois, Chicago, 1986. Experimental solid state; magnetism of nanoparticles; particulate matter in the environment.
- Cooper**, Bernard R., Ph.D., California, Berkeley, 1961. Professor Emeritus; Condensed matter and materials theory.
- Ferer**, Martin V., Ph.D., Illinois, 1971. Theory; statistical physics; applied physics; critical phenomena.
- Ganguli**, Gurudas, Ph.D., Boston College, 1980. Adjunct Professor. Plasma physics theory.
- Golubovic**, Leonardo, Ph.D., Belgrade, 1987. Condensed matter theory and statistical physics.
- Halliburton**, Larry E., Ph.D., Missouri-Columbia, 1971. Optical and magnetic properties of point defects.
- Lederman**, David, Ph.D., California, Santa Barbara, 1992. Experimental solid state physics; magnetic materials; superconductors.
- Levine**, Arnold D., Ph.D., Columbia, 1957. Professor Emeritus. Classical and quantum field theory; fluid dynamics.
- Littleton**, John E., Ph.D., Rochester, 1972. Professor Emeritus. Theoretical astrophysics; space plasma physics.
- Rotter**, Carl A., Ph.D., Case Western Reserve, 1966. Professor Emeritus; Physics education.
- Smith**, Duane, Ph.D., Univ. of Chicago, 1970. Adjunct Professor. Statistical and applied physics; fluids.
- Pavlovic**, Arthur S., Ph.D., Penn State, 1966. Professor Emeritus. Solid state experiment.
- Treat**, Richard P., Ph.D., California, Riverside, 1967. Professor Emeritus. Quantum field theory.
- Weldon**, H. Arthur, Ph.D., MIT, 1974. Particle theory.

Associate Professors

- Lewis**, James, Ph.D., Arizona State Univ., 1996. Computational physics.
- Raylman**, Raymond R., Ph.D., Univ. Michigan, 1991. Adjunct. Medical physics, radiology, imaging.

Assistant Professors

- Cassak**, Paul, Ph.D., Univ. of Maryland, 2006. Theoretical plasma physics.
- Ganikhanov**, Feruz, Ph.D., Moscow State Univ., USSR, 1993. Nonlinear optics.
- Lorimer**, Duncan R., Ph.D., Univ. Manchester, UK, 1994. Radio astronomy; astrophysics.
- McLaughlin**, Maura A., Ph.D., Cornell University, 2001. Radio astronomy; astrophysics.
- Pisano**, Daniel J., Ph.D., Univ. of Wisconsin - Madison, 2001. Radio astronomy, astrophysics.
- Urzdzhin**, Sergei, Ph.D., Michigan State University, 2002. Experimental condensed matter physics; magnetic materials, spintronics.

Research Professors

Demidov, Vladimir, Ph.D., St. Petersburg State University, USSR, 1981. Experimental plasma physics.

Seehra, Mohindar S., Ph.D., Rochester, 1969. Solid state experiment; x-ray scattering; applied physics; magnetism.

Research Associate Professor

Vasiliadis, Dimitris, Ph.D., Univ. of Maryland, 1992. Space plasma physics.

RESEARCH SPECIALTIES AND STAFF**Theoretical**

Applied Physics. Aquifer remediation, fragmentation and coagulation kinetics, aerosol physics. Edwards, Ferer, Smith.

Astrophysics. Interstellar medium; galactic structure; stellar evolution; compact objects; general relativity. Littleton, Lorimer, McLaughlin, Pisano. 3 postdoctoral fellows.

Condensed Matter and Materials. Surface and interface phenomena; lattice stability and relaxation; molecular dynamics; properties of disordered materials; biomaterials; complex fluids and membranes; fracture; transport in random media; thin film growth. Ferer, Golubovic, Lewis. 5 postdoctoral fellow.

Elementary Particles and Fields. High-temperature quantum field theory; quark-gluon plasma; relativistic heavy-ion collisions. Weldon.

Fluids. Convective instabilities and nonlinear dynamics. Edwards, Smith.

Plasma. Plasma instabilities; simulations applicable to space and laboratory plasmas. Cassak, Ganguli, Vasiliadis.

Statistical Physics. Fractals; percolation theory; chaos; phase transitions and critical phenomena; nonequilibrium growth and pattern formation. Edwards, Ferer, Golubovic, Smith.

Experimental

Applied Physics. Preparation and characterization of nanoparticles; iron-based catalysts; properties of air-borne particulate matter; coal-based high purity carbons and carbon fibers; electrochemical detection of Hg and other trace metals using boron-doped diamond films; visible and UV light emitters and sensors; nonlinear optical and photorefractive materials. Abdul-Razzaq, Ganikhanov, Halliburton, Seehra. 1 postdoctoral fellow.

Astrophysics. Radio Astronomy; X-ray astronomy; pulsars; tests of strong-field gravity; digital signal processing; computational astrophysics. Littleton, Lorimer, McLaughlin, Pisano. 2 postdoctoral fellows.

Condensed Matter and Materials. Electronic structure and magnetic properties of artificially grown surfaces and superlattices and nanoscale particles; spin transport; properties of magnetic ions and clusters; elementary excitations in antiferromagnets; magnetic susceptibility; magnetostriction; electrical, structural, and electro-optic properties of semiconductors; optical and magnetic resonance characterization of point defects. Ganikhanov, Halliburton, Lederman, Seehra, Urazhdin. 5 postdoctoral fellows.

Plasma. Plasma waves and instabilities; nonlinear interactions; turbulence and chaos; space plasma instrument design; space plasma data analysis and instrument (sensor) development; magnetic reconnection; plasma processing. Demidov, Koepke, Scime, Vasiliadis. 3 postdoctoral fellows.

Surface and Interface Physics. X-ray scattering from disordered systems; Auger and X-ray photoelectron spectroscopy deposition physics; molecular beam epitaxy; properties of monolayer and multilayer thin films; optical properties of quantum confined systems and semiconductors. Lederman, Seehra. 2 postdoctoral fellows.