UNIVERSITY OF ALASKA FAIRBANKS

DEPARTMENT OF PHYSICS

Fairbanks, Alaska 99775-5920

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

1. General

President: Mark Hamilton
Dean: Joan F. Braddock
Chancellor: Stephen Jones
Department Chairman: John Craven
Department Telephone Number: (907) 474-7339
Type of Institution: University
Control: Public
Setting: City
Total Faculty: 1,074
Total Students: 8,627
Total Graduate Students: 1,027
Annual Graduate Tuition: †
In-state residents: Full-time—$2,911/semester
Part-time—$287/credit*
Out-of-state residents: Full-time—$5,602/semester
Part-time—$586/credit*
Tuition rates for: 2007–08
Deferred tuition plan: Yes
Other Fees: $318/semester
Term: Semester

†All fees subject to change
*9 hr. maximum
Web address: www.uaf.edu/physics/

2. Number of Faculty in Department

The combined total of full-time faculty in the three professorial ranks is 7.25 (FTE). The combined total of full-time, part-time, and other faculty at all ranks is 14.

3. Admission, Financial Aid, and Housing

Address admission inquiries to: Admissions, PO Box 757480, Fairbanks, AK 99775-7480
Graduate application fee required: $50
Admission deadline (Fall admission): 3/1 for international students; 6/1 for U.S. Students.
Admission information: For fall admission, 2007–08, 3 students were accepted.
Admission requirements: For admission to the graduate programs, a Bachelor's degree in physics or related field is required with a minimum undergraduate GPA of 3.0 specified. The GRE is required. Students from non-English speaking countries are required to demonstrate proficiency in English via the TOEFL exam. Minimum acceptable score for admission is 550 for paper exam; 213 for computer exam; 80 for internet-based exam.
Undergraduate preparation assumed: Mechanics: Symon, *Mechanics*; Electricity and Magnetism: Griffith, *Intro to Electrodynamics*; Modern Physics: Iisberg, *Intro to Quantum Mechanics*; Optics: Hecht, *Optics*; Solid State Physics: Turton, *The Physics of Solids*; Statistical Physics: Reif, *Statistical and Thermal Physics*.
GAPSFAS application required: No
Financial aid deadline: 2/15
Loans available: Yes
Address housing inquiries to: Director of Residence Life
On-campus, single student housing available: Yes
Cost/term: $1,720–2,490 (room and board)
Meal plan: $300–1,485
On-campus, married student housing available: Yes
Cost/month: $715 (efficiency); $770 (1 bedroom); $965 (2 bedrooms); $1,100 (3 bedrooms); $1,480 (4 bedrooms)

Table A—Faculty, Enrollments, and Degrees Granted

Research Specialty	2007–08 Faculty	Enrollment[1] Fall 2007–08		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	
Physics/Space Phys.	14	9	14	0(14)	–	3(17)	6
Total		9[3]	15	0(14)	–	1(17)	
Full-time Grad. Stud.		0	0				
Part-time Grad. Stud.		0	0				
First-year Grad. Stud.		3	1				
Median Years in Grad. Study (2007–08 Degrees)				3	–	6	6

[1]Students not yet commited to a research specialty are entered under non-specialized.
[2]Five-year totals in parentheses.
[3]Two on leave of absences.

4. Graduate Degree Requirements

Master's: (a) *Thesis Option*: The minimum number of credits that must be earned is 30 semester hours.
A maximum of 12 credits may be devoted to thesis or to thesis and research. At least 21 credits in any Master's program, including thesis and research, must be at the 600 level.
A maximum of 9 semester hours of credit from another institution may be transferred to UAF and applied toward a Master's degree upon approval of the student's advisory committee and the dean of the college or school in which the student is enrolled.
A thesis is required and an oral defense of the thesis must be taken in conjunction with a comprehensive/final examination. The examining committees shall consist of the candidate's advisory committee.
(b) *Project Option*: A non-thesis Master's degree requires a minimum of 33 credits. Three credits must be devoted to a short research project resulting in a written report. Coursework requirements, totalling a maximum of 30 credits, are the same as those listed for part (a) *Thesis Option*.
A student may apply for admission to candidacy for a specific Master's degree if he/she is in good standing and has satisfied the following requirements: the student must have (1) satisfactorily completed at least 9 credits of graduate study at UAF, (2) received approval for the provisional thesis title if a thesis is required, and (3) received approval of the finalized Graduate Study Plan. All work toward the fulfillment of a Masters' degree must be completed in seven years.
Doctorate: The degree of Doctor of Philosophy is granted for proven ability and scholarly attainment. There are no fixed credit requirements for this degree. However, coursework will be set by individual student's background, coursework

requirements for passing Ph.D. Comprehensive Examination, and research requirements.

The student chooses a major line of study and, with the advice of his/her advisory committee, such lines of study in related fields as are necessary for achievement of a thorough and scholarly knowledge of his/her subject. The committee and the student will prepare the student's graduate study plan for the degree which, including applicable and acceptable work transferred from other institutions, shall represent approximately three full years of study beyond the Bachelor's degree.

Admission to graduate study does not imply admission to candidacy for a degree. The student should seek admission to candidacy approximately one year before completing the requirements for the doctorate. A student may be accepted as a candidate by his/her advisory committee after (1) completing the full-time equivalent of two academic years of graduate study, (2) completing at least one semester in residence at UAF, (3) finalizing the graduate study plan, (4) obtaining approval by the advisory committee of the title and synopsis of the dissertation, and (5) passing a written comprehensive examination administered by the Department.

The dissertation, which is expected to represent the equivalent of at least one full academic year's work at the University of Alaska Fairbanks, must be a substantial contribution to knowledge.

After submitting the dissertation, the candidate must pass an oral examination supporting the disseration. The examining committee will consist of the student's advisory committee supplemented by additional examiners, including one from outside the candidate's college or school representing the Office of the Graduate School.

All work toward the fulfillment of a Doctor's degree must be completed within ten years.

Thesis: Dissertation may be written *in absentia*.

Special Equipment, Facilities, or Programs: The University houses a number of research centers and institutes that provide support facilities and services for graduate student research. A majority of department faculty hold joint appointments with the Geophysical Institute. Many are also affiliated with the International Arctic Research Center and/or the Arctic Region Supercomputing Center. Examples of facilities are: Cray X1 and Cray XD1 and two IBM high-performance computers; the Poker Flat Research Range; research and a major state-of-the-art satellite remote-sensing facility to receive, process, and analyze synthetic aperture radar (SAR) data from European Space Agency, Japanese, Canadian, and U.S. spacecraft, machine, and electronic shops; a network of field sites including stations in Antarctica, Spitzbergen, and sites throughout Alaska; specialized optical and radiation instrumentation.

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			
			Semester		
Teaching Assistant	6	2	9	20	13,710–15,884[1]
Research Assistant	12	0	9	20	13,710–15,884[1]
Total	18	2			

[1]Graduate students are normally employed full-time during the summer. The total annual stipend ranges from $21,648–$25,080.

5. Personnel Engaged in Separately Budgeted Research, 9/1/07–6/1/08

Professorial faculty	11
Graduate students	12
Total	23

6. Separately Funded and Managed Laboratories

Geophysical Institute, International Arctic Research Center, Arctic Region Supercomputing Center.

7. Extension Centers and Summer Programs

Summer programs are available but limited in science and mathematics.

FACULTY

Professors

Craven, John D., Ph.D., U. of Iowa, 1969. Chairman of Department. Thermospheric composition, magnetospheric and auroral physics, instrumentation.

Morack, John L., Ph.D., Oregon State U., 1968. Emeritus. Subsea permafrost, ice physics, distance delivery of courses.

Newman, David E., Ph.D., U. of Wisconsin, 1993. Complex systems, turbulence, nonlinear dynamics, fusion plasma physics.

Olson, John, Ph.D., UCLA, 1970. Plasma wave propagation, atmospheric infrasound, digital signal processing, magnetospheric physics.

Otto, Antonius, Ph.D., Ruhr-Universität Bochum, 1987. Space plasma theory and simulation.

Sentman, Davis D., Ph.D., U. of Iowa, 1976. Space plasma physics, artificial heating of the ionosphere, atmospheric electricity.

Stenbaek-Nielsen, Hans C., M.S., Royal Tech. Univ., Denmark, 1965. Rocket investigation, high speed imaging of the aurora.

Watkins, Brenton J., Ph.D., U. of Alaska Fairbanks, 1976. Radar studies of the atmosphere and ionosphere.

Associate Professors

Chowdhury, Ataur, Ph.D., Clark, 1985. Condensed matter physics.

Price, Channon P., Ph.D., U. of California, Santa Barbara, 1981. Astrophysics, space plasma physics, nonlinear dynamics.

Wiechen, Heinz, Ph.D., Ruhr-Universität Bochum, 1989. Space plasma theory and simulation, dusty plasmas, astrophysics.

Assistant Professors

Conde, Mark, Ph.D., U. of Adelaide, 1991. Auroral processes and space weather.

Szuberla, Curt, Ph.D., U. of Alaska Fairbanks, 1997. Infrasound, digital signal processing.

Truffer, Martin, Ph.D., U. of Alaska Fairbanks, 1999. Glacier dynamics, application of geophysical and borehole techniques to glaciology, numerical modeling of ice flow.

Wackerbauer, Renate A., Ph.D., Max-Planck-Institute for Extraterrestrial Physics, 1995. Complex systems, nonlinear dynamics and chaos, modeling of biological systems.

Affiliate Professor

Bailey, Scott M., Ph.D. U. Colorado, 1995. Assistant Prof., Virginia Polytechnic Institute and State University, Blacksburg, Virginia. Aeronomy, solar terrestrial physics.

Bristow, William, Univ. of Alaska Fairbanks, 1992. Assoc. Prof., Electrical and Computer Engineering, Univ. of Alaska Fairbanks. Space physics and upper atmospheric physics.

Carreras, Benjamin A., Ph.D., Valencia University, Spain, 1968. Senior corporate fellow, Oak Ridge National Laboratory, Fusion Energy Division, Oak Ridge, Tennessee. Fusion plasma physics, complex systems, turbulence and transport.

Collins, Richard, Univ. of Illinois, 1994. Assoc. Prof., Atmospheric Science, Univ. of Alaska Fairbanks. Laser studies of the atmospheres.

Heavner, Matthew, Ph.D., U. of Alaska Fairbanks, 2000. Assistant Prof. of Physics, Dept. of Natural Science, Univ. of Alaska Southeast. Sensor network applications for geophysics, bioacoustics, and research experience for undergraduates.

Lummerzheim, Dirk, Univ. of Alaska Fairbanks, 1987. Research Prof., Geophysical Institute, Univ. of Alaska Fairbanks. Penetration of auroral electrons and protons into the atmosphere and the subsequent optical emissions.

Sanchez, Raul, Ph.D., Universidad Complutense de Madrid (Spain), 1997. Associate Prof., Universidad Carlos III de Madrid (Spain), Scientific staff member, Oak Ridge National Laboratory, Fusion Energy Division, Oak Ridge, Tennessee. Computational physics, complex systems, turbulent transport, fusion plasma physics.

RESEARCH SPECIALTIES AND STAFF

Theoretical

Atmospheric Dynamics. Gravity waves; turbulence and numerical simulation. Watkins.

Computational Physics. Newman, Olson, Otto, Price, Wackerbauer, Watkins, and Wiechen.

Ionospheric Physics. Radio propagation; plasma transport. Watkins.

Non-Linear dynamics. Carreras, Newman, Price, Sanche, Wackbauer.

Numerical Simulation of Space Plasmas. Otto, Wiechen.

Space Plasma Physics. Waves; instabilities; shocks; particle acceleration. Otto, Wiechen.

Experimental

Acoustics. Infrasound, low frequency atmospheric wave propagation. Olson, Szuberla.

Auroral, Ionospheric, and Magnetospheric Physics Through Use of Ground- and Spacecraft-based Observations. Plasmas, energetic particles, images. Conde, Craven, Stenbaek-Nielsen.

Geomagnetic Pulsations and VLF Observations. Olson.

Lidar and Radar Observations of the Lower and Middle Atmosphere and Ionosphere. Watkins.

Phase Transition of Multilayers. Point defects in solids; doped semiconductors. Chowdhury.

Rocket-borne Active Plasma Experiments in the Ionosphere. Stenbaek-Nielsen.

Rocket-borne Thermospheric Winds. Craven, Stenbaek-Nielsen.

Upper Atmospheric and Thermospheric Physics Through Visible and UV Optical Observation. Bailey, Craven.