FACTS

2005-2006

DEPARTMENT OF PHYSICS

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Andrew Baden– *Department Chair*
Steven Rolston– *Associate Chair, Facilities and Personnel*
Gregory Sullivan– *Associate Chair, Graduate Education*
Douglas Roberts- *Associate Chair, Undergraduate Education*

DEPARTMENT RANKING

- 1st among public universities on the East Coast;
- 4th among all public universities
- 13th among all physics departments nationally

(2003 U.S. News & World Report)

SIZE: One of the largest physics research programs in the U.S.

GRADUATE EDUCATION & RESEARCH PROGRAMS

Experimental Groups (15):

- Astro-Metrology (AM)
- Atomic Molecular & Optical (AMO)
- Center for Superconductivity Research (CSR)
- Condensed Matter (CME)
- Cosmic Ray Physics (CRP)
- Gravitation Experiment (GRE)
- High Energy Physics with Accelerators (HEP)
- Non Linear Dynamics & Chaos (NLDC)
- Nuclear Physics (NPE)
- Particle Astrophysics (PA)
- Physics Education Research Group (PERG)
- Quantum Electronics: Relativity & Quantum Mechanics (QE)
- Space Physics (SP)
- Spintronics & Spin Quantum Computing (SSQC)
- Superconducting Quantum Computing (SQC)

Theoretical Groups (11):

- Atomic Molecular & Optical (AMO)
- Condensed Matter (CMT)
- Dynamical Systems & Accelerator Theory (DSAT)
- Elementary Particles (EP)
- Gravitation Theory (GT)
- Non Linear Dynamics & Chaos (NLDC)
- Plasma Physics (PPT)
- Theoretical Quarks, Hadrons & Nuclei (TQHN)
- Quantum Coherency & Information (QCI)
- Spintronics & Spin Quantum Computing (SSQC)

Other UM Research Involvements:

- Charged Particle Beam Research (CPB)
- Chemical Physics (CP)
- Institute for Physics Science & Technology (IPST)
- Institute for Research in Electronics & Applied Physics (IREAP)
- Institute for Systems Research (ISR)
- Institute for Advanced Computer Studies (UMAICS)
- Mathematical Physics (MP)

FACULTY

- 84 Tenure-track and tenured faculty
- 60 Full Professors (includes 8 Distinguished Univ. Professors; 2 Distinguished Univ. Fellows; 2 Univ. Sys. Of MD Regents Professors)
- 1 Named Chair: Alford Ward Chair of Semiconductor Physics
- 6 Associate Professors
- 6 Assistant Professors
- 2 Chancellors Emeritus
- 1 President Emeritus (UM)
- 19 Research Scientists
- 62 Research Associates
- 70 Faculty Research Assistants
- 6 Slawsky Tutoring Clinic Staff

FACULTY AWARDS & HONORS

- Boltzmann Medal
- COSPAR Medal
- Buckley Prize-Condensed Matter
- Dirac Medal
- __ Distinguished Scholar-Teachers
- Goeppert-Mayer Award
- Guthrie Medal & Prize (UK)
- Heinemann Prize-Mathematical Physics
- Hirschfelder Prize
- Humboldt Prize
- Irving Langmuir Prize
- Lenin Prize (USSR)
- Maxwell Prize in Plasma Physics
- Meggers Award
- Millikan Medal
- Nobel Prize
- Onsager Prize in Statistical Physics
- Simon Memorial Prize
- Szilard Award
- Tate Medal
- Wetherill Medal
- Wolf Prize
- World Science for Peace Prize
- APS Fellows
- American Academy of Arts & Science Fellows
- American Association for the Advancement of Science Fellows
- A VS Fellows
- AGU Fellows
- Cottrell Scholars Fellowship
- Guggenheim Fellows
- IEEE Fellows
- NY (PIY)'s
- Presidential Early Career Award
- Packard Fellow
- Sloan Fellows
- National Academy of Science Members
- New York Academy of Science Members
- Washington Academy of Science Fellows
- Members of the Royal Society

STUDENTS

- 225 Undergraduate Majors
- 215 Graduate Students
- 20 Graduate Fellows
- 48 Entering Undergraduate Students in 2006
- Average SAT for Fall 2006 incoming freshmen:
  Math - 720
  Verbal - 670
- 138 Graduate Research Assistants
- 43 Teaching Assistants
- 1 : 18 ratio of faculty to undergraduate majors

BUDGET & FUNDING

- *FY '02 State Budget*
  $10.8 M
- *FY '02 Externally Funded Research Expenditures*
  $20 M
- *Total FY '02 Budget*
  $30.8 M

UNDERGRADUATE PROGRAMS

- B.S. degree in traditional physics provides career skills or preparation for graduate study. Interdisciplinary tracks including meteorology and education
- Honors Program in Physics
- Physical Sciences Program
- Undergraduate Research Opportunities Program (UROP) provides hands-on research experience for undergraduates
- Slawsky Tutoring Clinic
- Society of Physics Students-very active chapter of national society

OUTREACH PROGRAMS

- Physics is Phun (since 1982). A public lecture-demonstration series; 4 programs per year, each offered on 3 consecutive days

Total attendance is 5,000 per year

- Traveling Physics is Phun Van presents program to schools & organizations in the region
- Annual Physics Olympics. Competition involves 35-40 teams from high schools in Maryland, Northern Virginia, & Washington, D.C.
- AAPT Physics Olympiad training. UM has served as the training site for 10 years
- Physics Summer Outreach Program for Middle School Girls. A two-week program offered on campus for 14 years.
- MRSEC Out reach: adopted Kettering Middle School; offers Research Experiences for Undergraduates program; industrial outreach; exchange program with Osaka Univ.; Summer Girls Program.

EXTERNAL RELATIONS

United States

- American Center for Physics. Relocated to College Park, adjacent to UM, in November '93. Cooperative activities.
- American Association of Physics Teachers (AAPT)
- American Institute of Physics
- American Physical Society (APS). (UM Physics Professor, Dr. Robert Park, is Executive Director of the APS Office of Public Affairs)
- American Association of Physicists in Medicine (AAPM)
- Thomas Jefferson National Accelerator Facility (formerly CEBAF/SURA). Participant in multi-university experiments
- Fermi National Accelerator Laboratory. Participant in D0 and E665 experiments.
- NASA & UM East-West Space Science Center. Space Station collaboration

NASA Goddard Space Flight Center collaborations:

- Laboratory for Astronomy and Solar Physics
- Laboratory for High Energy Astrophysics
- Naval Research Laboratory (NRL)
- Cooperative Program in Plasma Physics
- National Institute of Standards and Technology (NIST) collaborations
- Physics Laboratory (Electron and Optical Physics Division; Radiometric Physics Division)
- Materials Science and Engineering Laboratory (Reactor Radiation Division)
- National Institutes of Health (NIH). Biophysics of fellowships
- Neocera, Inc.-graduate of UM incubator program-spin-off company of Center for Superconductivity Research; manufactures thin-film hardware and related technologies
- Southeastern Universities Research Association (SURA). SURA Fellowships
- Stanford Linear Accelerator Center (SLAC) Participant in BABAR experiment at the B-Factory

International

- Center for European Nuclear Research (CERN, Geneva). Participate in OPAL and CMS experiments
- National Central University, Taiwan. Collaborative exchange agreement with UM Physics Dept.
- Nuclear Science Center, New Delhi, India. Participate in experiments on ion-beam effects on superconductors. University of Bremen, Germany.

FACILITIES

8 Shop Facilities

- Mechanical Development
- Electronic Development
- Engineering and Design
- Technical Illustration
- Print Shop
- Student Shop
- Raw Materials Stores
- Physical Stores
- Largest Lecture-Demo Facility in the United States — over 1,500 demonstrations, (seats 500). With World Wide Web access:

http://www.physics.umd.edu/deptinfo/facilities/lecdem

AFFILIATED CENTERS

- Center for Superconductivity Research
- East-West Space Science Center
- NSF Materials Research Science & Engineering Center
- Condensed Matter Theory Center
- Center for Particle & String Theory
- Center for Scientific Computation & Mathematical Modeling
- Institute for Physical Science & Technology
- Institute for Research in Electronics & Applied Physics (IREAP)
- Institute for Systems Research
- Institute for Advanced Computer Studies
- Maryland Center for Integrated Nano Science & Engineering
- Materials Research Science & Engineering Center

FACULTY
2005–2006

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Research Groups– Abbreviation Key

AM– Astro Meteorology
AMO– Atomic Molecular & Optical Physics
CSR– Center for Superconductivity Research
CPB– Charged Particle Beam Research
CP– Chemical Physics
CME– Condensed Matter– Experimental
CMT– condensed Matter– Theoretical
DSAT– Dynamical Systems & Accelerators Theory
EWC– East-West Space Science Center
EP– Elementary Particles
GRE– General Relativity– Experimental
GRT– General Relativity– Theoretical
HEP– High Energy Physics with Accelerators
IPST– Institute for Research in Electronics & Applied Physics
IREAP- Institute for Systems Research
MP– Mathematical Physics
MRSEC– Materials Research Science & Engineering Center (NSF)
NLDC– Non Linear Dynamics & Chaos
NPE– Nuclear Physics
PA– Particle Astrophysics
PPE– Plasma Physics– Experimental
PPT– Plasma Physics– Theoretical
QE– Quantum Electricity: Relativity & Quantum Mechanics
TQHN– Theoretical Quarks, Hadron & Nuclei
PERG– Physics Education Research Group
SP– Space Physics

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Ph.D., Princeton University., 1962
Atomic physics; quantum electronics– precision time keeping, laser range measurement; relativistic gravity. (QE)
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diluted magnetic semiconductors; electronic structures and Fermi surfaces of metals and semi-metals (CME)
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Anlage, Steven, Professor affiliated with Center for Superconductivity Research, Ph.D., Cal Tech., 1988.
Superconductivity-electromagnetic properties, proximity effect; near-field microwave microscopy; experimental chaos. (CSR, MRSEC)
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Antonsen, Thomas M., Professor, joint with EE Dept.; Affiliate Prof, Inst. Research in Elec & Applied Physics. Ph.D., Cornell Univ., 1977. Fellow– APS .
Plasma Physics; coherent sources of radiation. (PPT, CPB, NLDC, IREAP)
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Becker, Melanie, Assistant Professor. Ph.D. Rheinische Friedrich-Wilhelms-Universitaet Bonn, Germany, 1994. Elementary particle theory: string and M-Theory; black hole physics; mirror symmetry. D-branes. (EP)
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Bhagat, Satindar M., Professor Ph.D., MIT, 1988; Experimental nuclear physics-intermediate energy, electron scattering, polarization, few-nucleon & subnucleon systems. (NPE)
301.405.6109

Boyd, Derek A., Professor, Affiliate Professor, Inst for Res in Electronics & Applied Physics; Ph.D., Stevens Inst of Tech, 1973; Fellow-APS; Plasma physics; plasma diagnostics; far infrared spectroscopy; microwave optics;
(PPE, IREAP)
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Brill, Dieter R., Professor Ph.D., Princeton Univ., 1959; Fellow-APS; General Relativity & Gravitation; Black Holes; Cosmology; (GRT)
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Chant, Nicholas S., Professor, Assoc. Chair for Graduate Education., Physics Dept. D. Phil., Lincoln College, Oxford, 1966. Experimental nuclear physics-pion reactions with polarized beams; electron beam experiment at Thomas Jefferson Nat'l Accelerator Facility. (NPE)
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Chen, Hsing-Hen., Professor, Ph.D., Columbia Univ., 1973, Astrophysics; Plasma Physics; non-linear dynamical systems (PPT, MP)
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Chubukov, Andrey V., Professor, Ph.D., Moscow State Univ. P.L. Kapitza Institute for Physical Problems;

Cohen, Thomas D., Professor, Ph.D., University of Pennsylvania, 1985. Nuclear theoretical physics; solution models of baryons; chiral symmetry; effective low energy models for QCD. (TQHN)
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Das Sarma, Sankar, Distinguished University Professor. Director of Condensed Matter Theory Center; Ph.D., Brown

1979. Fellow– APS. Theoretical condensed matter, many body theory; Semiconductor nanostructures; nonequilibrium statistical mechanics.
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Dorfman, Robert J., Professor, joint with Inst. Of Physical Science. & Tech. Ph.D., The John Hopkins Univ., 1961. Fellows-APS. Statistical and thermal physics; dynamical systems theory. (IPST, CP)
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Dorland, William, Associate Professor joint with Ctr. For Scientific Comp, & Math. Modelin; Ph.D., Princeton Univ., 1993. Turbulence in magnetized plasma; computational physics. (CSCAMM)
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Dragt, Alex J., Professor Ph.D., Univ. of California, Berkeley, 1963. Fellow-APS. Elementary particles and field theory; mechanics; dynamical systems and accelerator theory; charged particle and light optics. (DSAT, NLDC)
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Drake, James F., Professor, joint with Inst. of Physical Science & Technology, affiliated with Inst. For Res. in Electronics & Applied Phys., Ph.D., Univ. of California, Los Angeles, 1975. Fellow-APS. Plasma physics; magnetic reconnection; Tokamak transport. (PPT, IREAP)
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Drew, H. Dennis, Professor, Ph.D., Cornell Univ., 1968. Fellow-APS. Experimental condensed matter physics; statistical and thermal physics; semiconductor heterostructures; infrared properties of superconductors; near-field optical scanning microscopy. (CME, CSR, MRSEC)
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Einstein, Theodore L., Professor, Director, Physical Sciences Program. Ph.D., Univ. of Pennsylvania, 1973. Fellow-APS, American Vacuum Society. Theoretical condensed matter physics; surface physics; statistical and thermal physics. (CMT, CP, MRSEC)
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Ellis, Richard F., Associate Professor; Affiliate Associate Professor, Institute for Research in Electronics & Applied Physics; Ph.D., Princeton Univ., 1970. Experimental plasma physics; plasma waves and instabilities; microwave and far infrared diagnostics for fusion plasmas; plasma probes and analyzers. (PPE, IREAP)
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Eno, Sarah C., Associate Professor. Ph.D., University of Rochester, 1990. Experimental high energy physics with accelerators. (HEP)
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Fisher, Michael E., Distinguished University Professor, Univ. System of Maryland Regents Professor, joint with Institute. Of Physical Science. & Tech. Ph.D., Univ. of London King's College, 1957. Fellow-APS, AAAS, Royal Society of Edinburgh, Foreign Associate-National Academy of Sciences, Foreign Member, Academy of Science., Brazil, Member-Amer. Philosophical Soc. Statistical physics; condensed matter theory; theoretical chemistry; phase transitions and critical phenomena; associated mathematics.
(IPST, CP)
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Gloeckler, George, Distinguished University Professor, Research Professor, joint with Inst. for physical Science. & Tech. Ph.D., Univ. of Chicago, 1965. Member–NAS, Fellow-APS, AGU. Space physics, heliospheric physics. (SP, IPST)
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Goldenbaum, George C., Professor; Affiliate Professor, Inst. for Res. In Electronics & Applied Physics. Ph.D., Univ. of Maryland, 1966. Fellow-APS. Plasma physics; Fluid Dynamics; physics of lightning; environmental science. (PPE, IREAP)
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Goodman, Jordan A., Professor. Chair, Department of Physics. Ph.D., Univ. of Maryland, 1978. Fellow-APS. Univ. System of Maryland Regents Professor; UM Distinguished Scholar-Teacher; Particle Astrophysics (PA, PERG)
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Greenberg, O.W., Professor. Ph.D., Princeton Univ., 1957. Fellow– APS. Elementary Particles and quantum field theory. (EP)
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Hadley, Nicholas J., Professor. Ph.D., Univ. of California, Berkeley, 1983. Fellow-APS. High-energy physics. (HEP)
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Hammer, David, Associate Professor joint with Dept. of Curriculum and Instruction, Science Teaching Center. Ph.D., Univ. of Calif., Berkeley, 1991. Physics education—learning and teaching at high school and college levels. (PERG)
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Jacobson, Theodore A., Professor, Ph.D., Univ. of Texas, Austin, 1983. Gravitation theory, quantum gravity, black hole thermodynamics. (GRT)
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Lathrop, Daniel P., Associate Professor, Affiliate Associate Professor, Inst. of Physicsal Science. & Tech. Ph.D., Univ. of Texas, Austin, 1991. Nonlinear dynamics and chaos; turbulence; fluid dynamics. (NLOC)
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Lobb, Christopher J., Professor, Associate Director, Center for Superconductivity Research. Ph.D., Harvard Univ., 1980. Fellow-APS. UM Distinguished Scholar-Teacher; Experimental superconductivity; superconducting devices; physics and applications of mesoscopic systems; condensed matter physics. (CSR)
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Losert, Wolfgang, Assistant Professor, joint w/ the Institute. for Physical Science & Tech; Ph.D., City College of the Univ. of New York, 1998. Res. Corp. Res. Innovation Award; Biophysics & soft matter, nonlinear dynamics, materials research, granular flows; (NLDC, IPST)
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Ott, Edward, Distinguished University Professor, joint with EE Dept., joint with Inst for Systems Res., Affiliate Prof., Inst. For Res. In Electricity & Applied Physics; Ph.D., Poly. Tech. Univ., Brooklyn, 1967. Fellow-APS, IEEE. Chaotic dynamics, plasmas. (PPT, NLDC,CP)
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Paik, Ho Jung, Professor. Ph.D., Stanford Univ., 1974. Experimental general relativity; gravitational waves; precision tests of laws of gravity.
(GRE)
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Rolston, Steven L., Professor, Ph.D., SUNY Stony Brook, 1986; Fellow-APS; laser cooling of neutral atoms; ultracold collisions; ultracold plasmas; Bose-Einstein condensation; Quantum info; (AMO)

Roos, Phillip G., Professor. Ph.D., MIT, 1964. Fellow-APS. Experimental nuclear physics-electro-weak interactions; Hadron-induced reactions. (NPE)
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Roy, Rajarshi, Professor. Ph.D., Univ. of Rochester, 1981. Fellow, Optical Society of America. Nonlinear dynamics in optical systems; laser physics; wave propagation in optical fibers; coherence and stochastic process. (NLDC)
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Sagdeev, Roald Z., Distinguished University Professor, Director of East-West Space Science Center, joint with Inst. For Physical Science. & Tech., affiliated with Inst. For Plasma Res. DS, Siberian Branch, USSR Acad. Of Sciences, 1962, Ph.D., Inst. Of Physics Problems, Moscow, 1960. Foreign Member– Nat. Academy of Science. Plasma Physics, controlled fusion, space physics planetary research and astrophysics, arms control, science policy, global Security and environment.
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Toll, John S., Professor, part-time; Chancellor Emeritus. President, Washington College. Ph.D., Princeton Univ., 1952. Fellow-APS, Washington Acad. Of Sciences Elementary Particle field theory; science education. (EP)
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(CSR, MRSEC)
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Williams, Ellen D., Distinguished Univ. Professor, Distinguished Univ. fellow, joint with Inst. For Physical Science. & Tech., Dir, MRSEC. Ph.D. California Inst. Of Tech, 1982. Fellow-APS, American Yacuum Society. Condensed matter physics; surface science; scanning tunneling microscopy; statistical mechanics of surfaces. (CME, CP, MRSEC)
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Yakovenko, Victor M., Associate Professor. Ph.D., Landau Inst. For Theoretical Physics, Moscow, 1987. Associated Member– Landu Institute. Condensed matter theory; organic and high-Tc superconductors; the quantum Hall effect; effects of high magnetic fields. (CMT, CSR)
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