Physics News

MICHIGAN TECH PHYSICS DEPARTMENT NEWSLETTER

Fall 1998 Volume 1, No. 1

A note from the Chair

By Dr. J. Bruce Rafert
Professor and Chair

Faculty, Students, and Alumni:

The past several years have been exceptionally good ones for the Department of Physics at MTU. We've decided to share news and accomplishments of our faculty and students with the entire MTU physics community, as well as those interested in pursuing a degree in Physics at MTU. Not only have we seen a resurgence of our undergraduate physics program in the past three years, with nearly 100% growth, but the Physics department is becoming a leader in research (another increase of 100% during the same interval) and graduate education (see 'Did you know' on the back of *Physics News*). To top things off, we have ten new faculty and professional staff who have joined the department (you will hear from them in subsequent issues).

I hope that each of you will use Physics News as a forum for distributing news of your activities to those interested in pursuing careers in physics, to former classmates, or to the broader MTU community. Plans for future issues, to be published quarterly include an 'Alumni News' section (alumni - let us know what you are doing via email or mail) and speciality articles on research or instructional projects of our faculty and students. I'm looking forward to hearing from you.

-jbrafert@mtu.edu

Current Research: Dr. Ravi Pandey

By Dr. Ravi Pandey
Professor

The primary research interests of my group are in the area of structural and electronic properties of crystals, surfaces and nanoclusters. These include development of theoretical methods and computer programs, as well as analysis of specific materials and defects. We have pursued and partly pioneered the ICECAP methodology for accurate and reliable simulation of electronic properties in ionic and semi-ionic crystals.

Recently, we have begun to study defect properties of ternary II-IV-V_2 semiconductors. Crystals of zinc germanium phosphide and cadmium germanium arsenide are ideal candidate materials for use in high power IR agile lasers. However, defects are known to have a detrimental effect on possible device applications of these materials. Our research work (MRS Bulletin, July 1998) has identified the role of defects in these materials. Accordingly, vacancies are the dominant defects and antisites, contrary to existing opinion, are benign. The suggested process modifications which thermodynamically inhibit vacancy formation, such as control of the partial pressure of zinc and phosphorus are now being implemented during crystal growth of these materials.

Some of the other research projects include study of

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Current Research

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nanoclusters of transition metal oxides (J. Phys. Chem. B102, 1126, 1998) and surfaces of the group III-V semiconductors (Phys. Rev. B55, R16009, 1997; B53, R4209, 1996). In the former project, we have provided the interpretation of the experimental results on clusters of chromium oxide predicting the preference of the oxygen-rich clusters over the metal-rich clusters. For the nonpolar surfaces of nitrides, we have shown that the mechanism of the surface relaxation in GaN is totally different from that in either GaP or GaAs.

We are also pursuing interdisciplinary activities at MTU. With the colleagues in Biology, Chemistry and Computer Science, we have initiated a program on bioinformatics and biomolecular modeling which combines tools of molecular biology with the power of modern computational techniques. It is expected that this proposed program coupled with an established experimental program would launch MTU to the forefront of research in the area of molecular biology by the beginning of the next millennium.

- pandy@mtu.edu

View our Physics Brochure available on-line at http//www.mtu.edu/depts/physics/index.html

Thanks!

We offer our deepest thanks to friends and alumni who have made a recent contribution to the department.

Garry C. Antler
Don J. Gendzwill
Kenneth J. Javor
Kevin C. Nickolaus
Thomas M. Plutchak
Raymond E. Schramm
Gary J. Shiflet
Stephen M. Stewart
Chunguang Zheng
Pamela A. Croy
Ronald S. Hurlbut
Jon H. Macleod
Harold W. Paul
Mary J. Repar
Xiaclin Shi
Richard V. Spigarelli
Michael B. Teneyck

Did we miss your contribution? If so, contact gmgoudge@mtu.edu

Winter Quarter 1998-99 Course Offerings

PH010 Development of Physics skills
PH020 Team Approach Learning Physics
PH181 Introductory Physics Lab 1
PH182 Introductory Physics Lab 2
PH183 Introductory Physics Lab 3
PH201 Elements of Physics I
PH202 Elements of Physics II
PH204 General Physics I
PH205 General Physics II
PH206 General Physics III
PH332 Theoretical Mechanics I
PH337 Electronics for Scientists II
PH412 Senior Laboratory/Project
PH421 Quantum Mechanics II
PH426 Electricity and Magnetism
PH430 Stellar Astrophysics
PH452 Senior Physics Collquium
PH470 Solid-state Physics
PH481 Computers in Physics: Experiment and Analysis
PH490 Special Problems in Physics
PH500 Graduate Research
PH510 Classical Mechanics
PH511 Electrodynamics
PH524 Mathematical Physics II
PH561 Gen. Relativity
PH600 Doctoral Research

Winter arena registration occurs October 19-23, 1998. Instruction begins on November 30, 1998. For more information contact the Physics Department at (906) 487-2086 or checkout the course registration website at http://www.sas.it.mtu.edu/em/coursereg.htm

Department Update

Gina Goudge has joined the Physics Department as the Departmental Coordinator. Gina previously worked at MTU in Extended University Programs as a Staff Assistant.

Recent Degree Recipients

1998 (to date)
Graduate
Yi Fu, PhD
Christopher Hart, MS
William Seng, PhD
Srirama V Swaminathan, PhD

1997
Graduate
Bhabana Pati, PhD
Chunguang Zheng, PhD
Donald Woodraska, PhD
Archana Pawse, PhD
Marcin Bruszkaa, PhD
Palash Apte, PhD
Robert, Cunningham, MS
Yongtae Park, MS
Peter Zapol, PhD

Society of Physics Students - MTU Chapter

The Society of Physics Students, open to any person interested in physics, promotes the professional development of students and the professional contributions that students make to the professional community and to society.

The SPS fulfills this mission through seven roles it has within the physics community.

There are nearly 6,000 SPS members in the United States, in nearly 700 chapters in colleges and universities. Membership dues are $15 per year.

The SPS also houses the physics honor society, Sigma Pi Sigma, which has some 75,000 historical members.

The Society sponsors several publications and programs that are of service to our members, and helps our members and chapters be of service to physics and society.

The Society of Physics Students (SPS) is part of the American Institute of Physics (AIP). SPS chapters are formed at many colleges and universities to provide a forum for undergraduate students with an interest in Physics to pursue topics and projects outside their normal coursework.

Membership to the Michigan Technological University SPS Chapter offers many benefits including access to an SPS study lounge in Fisher Hall. The local chapter helps bring in outside speakers and organizes social events. Regular meetings will be held for those with an interest in physics.

The MTU SPS Chapter co-advisors are Dr. Mike Renn and Dr. Bob Nemiroff. - *mrenn@mtu.edu*
- *nemiroff@mtu.edu*

The Physics Learning Center

G019 Fisher Hall, Phone 487-2173

The Physics Learning Center offers a variety of services to students seeking extra help or instruction in the general physics courses. The center is staffed by successful student coaches who receive continual training for professional development.

Physics coaching is available for the following courses: PH201, PH202, PH203, PH204, PH205, PH206, PH310.

Coaching is available during posted “walk-in” hours in the Learning Center, Room G019. One-on-one appointments and team learning options are also available for a limited number of PH204 and PH205 students each quarter. For more information stop by the Physics Learning Center or visit our web site at www.phy.mtu.edu/phylcenter/phylcenter.html.

- *jaszczak@mtu.edu*

Facilities

Both undergraduate and graduate students gain valuable experience through research projects under faculty guidance. The state-of-the-art facilities in the MTU Physics Department are a trememdous benefit to our research and educational efforts. Research projects are often performed in (but not limited to) the following departmental facilities:

NMR Laboratory
Atomic and Molecular Spectroscopy Laboratory
Dislocation Physics Laboratory
Hyperspectral Imaging Lab
Observatory
Computational Facilities
Shop Facilities
Laser Guidance Laboratory

Aside from the observatory, these facilities are all located in Fisher Hall.

-*www.phy.mtu.edu*

Physics News
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Houghton, Michigan 49931-1295

CHANGE SERVICE REQUESTED

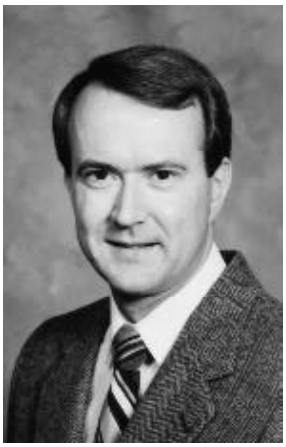
Did you know...

that nearly one out of every nine Ph.D. degrees awarded at MTU have been earned by students in the Physics Department?

that alumni of the Department of Physics at MTU have supplied the highest per capita support for the Tech Fund in 1997-98 within the College of Sciences and Arts?

Faculty Spotlight

Robert S. Weidman
Associate Professor, PhD, University of Illinois, 1980
Physics Education



"The physics and applied physics undergraduate degree programs traditionally attract the best and brightest students at Michigan Tech. It's always a pleasure for me to teach and advise those students who accept the challege of an intellectually stimulating and rigorous program of study."

-weidman@mtu.edu

Distinguished Teacher Award, 1987

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