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MSU to establish training program to address national shortage in accelerator scientists, engineers

Michigan State University is establishing an Accelerator Science and Engineering Traineeship (AS&E) program to address a national shortage in accelerator scientists and engineers.

The AS&E program will bring together MSU's strengths to formulate a graduate student curriculum that will be implemented by faculty in the College of Engineering, Department of Physics and Astronomy in the College of Natural Science, and the Facility for Rare Isotope Beams. The program will address four major areas where there are critical workforce needs:

- physics and engineering of large accelerators,
- superconducting radio frequency accelerator physics and engineering,
- radio frequency power engineering, and
- large-scale cryogenic systems.

The U.S. Department of Energy Office of Science (DOE-SC) Office of High Energy Physics (OHEP) has awarded MSU a $990,000 accelerator science and engineering traineeship grant to develop the program.

"It is a great honor and responsibility to have the DOE Office of Science award the nation’s sole grant in the FY 2017 DOE Traineeship in Accelerator Science & Engineering competition to MSU," said Peter Ostroumov, FRIB Accelerator Physics Department manager, who is also the grant’s principal investigator (PI). “I’m excited to work with my colleagues to establish the new program to educate PhD and master’s students in accelerator science and engineering.”

Students who complete the curriculum will be certified, well trained, and ready for productive AS&E careers in DOE laboratory facilities and industry in discovery science and technology. Fulfilling these needs is critical to maintaining U.S. leadership in accelerator technology and enhancing economic growth.

"Development of this program is an outstanding example of the connection between the world-leading research being done at Michigan State and the education of the young people needed to maintain the scientific and technological
leadership of the United States in areas of critical need," said R. James Kirkpatrick, College of Natural Science dean.

MSU is building FRIB, a new $730 million national user facility supporting the mission of the Office of Nuclear Physics in the DOE-SC, funded by the DOE-SC, MSU, and the state of Michigan. The heart of FRIB is a state-of-the-art 400 kW superconducting linear accelerator. FRIB will provide numerous training opportunities in the four areas experiencing critical workforce needs.

“The collocation of a world-class accelerator and strong academic programs provides particular educational opportunities and value to the nation,” said Thomas Glasmacher, FRIB Laboratory director. “Collaborating with MSU faculty to solve a national issue underscores the uniqueness and significant positive impact of establishing FRIB at MSU for the Office of Nuclear Physics in the U.S. Department of Energy Office of Science.”

Engineering Dean Leo Kempel said the College of Engineering will contribute its growing capabilities in radio frequency, cryogenics, accelerator, and plasma technologies to the project.

"The College of Engineering is proud to be part of this collaboration with the College of Natural Science and the Facility for Rare Isotope Beams in expanding the nation’s talent base in accelerator technologies. Such partnerships are a hallmark of the collaborative spirit at Michigan State University," Kempel added.

The MSU traineeship program will be augmented with two adjunct faculty appointments at other DOE-SC national laboratories, Stanford National Accelerator Laboratory and Argonne National Laboratory. Additionally, a national advisory committee has been established to help guide the program and its outcomes.

Grant Co-PI John Verboncoeur, associate dean for research in the MSU College of Engineering, said the trainee program is a crucial science and technology driver.
"The Department of Energy Accelerator Science and Engineering Traineeship program at MSU is an important component in maintaining the U.S. strength in accelerators, with broad economic and health impact beyond accessing extreme parameter regimes. It will expand our knowledge of the universe, including medical imaging and therapy, materials modification, and isotope creation," added Verboncoeur, who is also a professor of Electrical and Computer Engineering and Computational Mathematics, Science, and Engineering.

In addition to fulfilling a national workforce need, the traineeship program opens doors to exciting careers that students may not even know exist.

"AS&E is a critical area of science and technology that is relatively unfamiliar to both undergraduate and graduate students," said Philip Duxbury, chairperson of the Department of Physics and Astronomy, and grant co-PI. "This DOE training program enables the department to build a highly visible program in this interdisciplinary area; and to develop advertising and recruiting pipelines to ensure a strong pool of qualified graduates. The MSU cohort in AS&E will work in Engineering, FRIB and/or the Physics Department; providing an excellent environment for students interested in all related career paths."

MSU is establishing FRIB as a new scientific user facility for the Office of Nuclear Physics in the U.S. Department of Energy Office of Science. Under construction on campus and operated by MSU, FRIB will enable scientists to make discoveries about the properties of rare isotopes in order to better understand the physics of nuclei, nuclear astrophysics, fundamental interactions, and applications for society, including in medicine, homeland security and industry.

The MSU College of Engineering has eight academic departments serving almost 6,000 undergraduate and 850 graduate students. The college focuses on innovation in automotive, composite materials, energy, health care technologies, infrastructure, and security and has recently added two new academic units -- the Department of Biomedical Engineering and the Department of Computational Mathematics, Science and Engineering. For more, visit: www.egr.msu.edu

The College of Natural Science (NatSci) at Michigan State University is home to 29 departments and programs in the biological, physical and mathematical sciences. With a mission to promote excellence in research, teaching, and public service, NatSci provides world-class educational opportunities to more than 5,400 undergraduate students and 900+ graduate students. Making a difference. It's in our DNA.

MSU's Department of Physics and Astronomy is a highly-ranked department with the number one ranking in nuclear physics. The department offers undergraduate and graduate degrees with specializations in accelerator physics, astrophysics, biophysics, condensed matter physics, elementary particle physics and nuclear physics. Faculty lead two
national facilities at MSU – the Facility for Rare Isotope Beams (FRIB) and the National Superconducting Cyclotron Laboratory (NSCL). There are strong ongoing programs at major international facilities, including CERN in Switzerland; T2K in Japan; and the ICECUBE laboratory at the South Pole. The SOAR telescope is a major facility for astronomical observations and a wide variety of in-house facilities are available for research at MSU.

Related Website: Story courtesy of MSUToday and FRIB. Communications contact: Patricia Mroczek

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