

Grants Awarded Report

From: 4/1/10 to 4/30/10

Project Title: Nuclear Physics with Radioactive Ion Beams

Activation Amount: \$58,000.00

Agency: U. S. Department of Energy

Personnel:

PI - Raymond Kozub, Physics

Abstract:

The chemical elements, of which all known matter is composed, are produced in the explosions of stars throughout the universe, such as novae and supernovae. These explosions are often so violent that neutrons, protons, or alpha particles can be added or removed from an atomic nucleus, thereby changing its atomic number, and thus its elemental form. (For example, if a carbon nucleus captures a proton, the product is nitrogen.) Many of the collisions within these explosions involve unstable (radioactive) nuclei, since the processes occur so rapidly that the nuclei do not have time to decay to a more stable form between collisions. In order to understand these processes of stellar nucleosynthesis, and thus to account for the observed relative abundance of the various elements and isotopes in the universe, it is necessary to measure the reaction rates for the various types of collisions, including those involving radioactive nuclei. Such measurements are now possible with the radioactive beams available at the Holifield Radioactive Ion Beam Facility at Oak Ridge National Laboratory, and that is one of the main objectives of this research. In addition, experimental information will be gained on the basic structure of atomic nuclei, especially for those exotic isotopes that have unusually large or small neutron-to-proton ratios. This information will help in the development of mathematical models that better describe the properties of exotic nuclei. Such models, in turn, should also provide better input for the calculation of astrophysical reaction rates in cases where experimental data are not available. Finally, the involvement of undergraduate students, which helps to provide the future science and engineering workforce for the nation, is an important component of this research. Through this project, TTU students have opportunities to participate in research activities at a world-class facility while interacting with scientists from all over the world.

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From: 4/1/10 to 4/30/10

Project Title: REU Supplement to RET Project-NSF Award 0908672

Activation Amount: \$10,000.00

Agency: National Science Foundation

Personnel:

PI - Mohamed Abdelrahman, Electrical and Computer Engineering

Abstract:

This supplement is requested for support of two undergraduate students to work collaboratively with teachers and mentors participating in the research experience for teachers in manufacturing for competitiveness in the summer of 2010.

Grants Awarded Report

From: 4/1/10 to 4/30/10

Project Title: Performance Optimization and Extended Speed Control of Multi-Phase Open Winding Induction and Interior Permanent Magnet Machines Actuated with Dual Multi-Phase, Multi-Level Converters

Activation Amount: \$76,322.00

Agency: Office of Naval Research

Personnel:

PI - Joseph Ojo, Electrical and Computer Engineering

Abstract:

Multi-phase electric machines actuated with multi-phase converters hold promise for high power applications in electric ship propulsion, electric and hybrid electric vehicles and high power industrial applications. They provide high reliability and high quality torque production. This project investigates the extended-high speed operation of this converter-machine system using converter reconfigurations and open-ended machine connection. Control of the multi-level converters at the ends of the machine provides the opportunity for system optimization-efficiency improvement, greater converter utilization and power factor correction.

Grants Awarded Report

From: 4/1/10 to 4/30/10

Project Title: EUDL Grant Program

Activation Amount: \$720.00

Agency: Medication Services of Putnam County

Personnel:

PI - Ed Boucher, Student Affairs

Abstract:

This project will assist Medication Services with the implementaion of their EUDL grant.

Grants Awarded Report

From: 4/1/10 to 4/30/10

Project Title: CCLI: Developing a Learner-centered Environment for Algebra-based Physics (LEAP)

Activation Amount: \$49,149.00

Agency: National Science Foundation

Personnel:

Co-PI - Stephen Robinson, Physics

PI - Paula Engelhardt, Physics

Abstract:

The project goal is to develop a coherent, guided-inquiry, algebra-based physics course sequence for medium enrollment, general education settings. This sequence will be especially suitable for low-cost implementation at small regional universities and community colleges, where the audience is often diverse and relatively under-prepared. To address the unique needs of this audience, the proposed curriculum will integrate conceptual and mathematical concepts through the general pedagogical structure of the successful Physics for Elementary Teachers (PET) curriculum, with the goal of helping students develop the critical thinking skills and understanding of science needed to become a part of a scientifically literate citizenry. It will also draw on elements from both Constructing Physics Understanding (CPU) and Visual Quantum Mechanics (VQM). The project has three main objectives: 1) curriculum development-to use the general pedagogical structure of PET as a coherent framework within which the conceptual and mathematical aspects of the algebra-based sequence are integrated; 2) content learning-to enable students to develop a deep understanding of the major conceptual themes of force, motion, and energy as they apply to mechanical, electrical and magnetic contexts, optics and select modern physics topics; and 3) nature of science-to enable students to develop scientific thinking skills such as evidence-based reasoning, utilizing graphs to represent and to show relationships between data, and to develop a deeper understanding of algebraic representations beyond focusing on simple numerical solutions.