Grants Awarded Report
From:  5/1/15 to 5/31/15

Project Title:  Nuclear Physics with Radioactive Ion Beams
Agency:  U. S. Department of Energy
Activation Amount:  $66,000.00
Personnel:
    PI - Raymond Kozub, Physics

Abstract:
These projects will involve continuation of investigations of the structure of nuclei that are unstable to radioactive decay. Radioactive ion beams accelerated at the ATLAS Facility at Argonne National Laboratory and at the ReA3 facility at the National Superconducting Cyclotron Laboratory at Michigan State University will be utilized to induce various reactions in reversed kinematics mode, in which a heavy projectile collides with a light target nucleus. Such information will be needed in order to understand the evolution of nuclear properties as one migrates from familiar stable nuclei to the more exotic structures that are expected near the nucleon drip lines, where neutrons or protons may be emitted spontaneously. Some of the proposed experiments target specific astrophysical problems and will provide data that are crucial to determining the paths of nucleosynthesis, the formation of chemical elements, that are followed in various types of stellar explosions. More generally, the results will help in the development of structure models that better describe the properties of exotic nuclei. Such models should also provide better input for the calculation of astrophysical reaction rates in cases where experimental data are not available. Further, the experience gained in making the proposed measurements will no doubt prove invaluable for the design of future experiments to be performed at new radioactive beam facilities such as the Facility for Rare Isotope Beams currently under construction. Finally, the involvement and training of undergraduate students, which helps to provide the future workforce for nuclear science, is an important component of this research.