

Abstract Submitted  
for the DNP10 Meeting of  
The American Physical Society

**Nuclear Reaction Calculations relevant for p-process nucleosynthesis** BENJAMIN STEFANEK, ARTEMIS SPYROU, National Superconducting Cyclotron Lab (NSCL), Michigan State University — The p-process is an important nucleosynthesis process and essential in the creation of heavy, proton-rich atomic nuclei. The environment where we are investigating the p-process is in core-collapse supernovae. Under such conditions the flux of energetic photons is high, and the p-process can occur through photo-induced reactions on pre-existing s-nuclei. Because of the difficulty of reproducing gamma-alpha and gamma-proton reactions in the lab, we analyze the reactions in reverse. Astrophysical calculations on the abundance of p-nuclei use nuclear input from the Hauser-Feshbach model, which depends on several nuclear parameters. The alpha particle optical model potential and a parameter describing nuclear level densities above the region of discrete levels are two such parameters. In light of these facts, we calculate production cross sections for P-nuclei under various existing parameterizations using the nuclear reaction code Empire. By doing this we hope to understand how production cross sections vary as isotopes further away from stability are considered. The overall goal is to compare the differing predictions to data that will be gathered from future experiments at the NSCL.

Benjamin Stefanek  
National Superconducting Cyclotron Lab (NSCL), Michigan State University

Date submitted: 10 Aug 2010

Electronic form version 1.4