Abstract Submitted
for the DNP15 Meeting of
The American Physical Society

Simulations for a new detector of low-energy beta delayed protons at NSCL MADISON HARRIS, Michigan State University and NSCL, DAVID PEREZ-LOUREIRO, NSCL, CHRISTOPHER WREDE, Michigan State University and NSCL — Our current understanding of astrophysical phenomena such as classical novae is limited by uncertainties in certain key nuclear reaction rates. Of particular interest is the reaction rate of ^{30}P(p,γ)^{31}S, which is a potential nucleosynthesis bottleneck in classical novae. In order to reduce the uncertainty in that and other key reaction rates, a new micro pattern gas amplifier detector will be built at the National Superconducting Cyclotron Laboratory on the campus of Michigan State University. Through the detection of beta delayed proton emission from ^{31}Cl in the new detector, we will be able to measure the proton branching ratios of ^{31}S resonances providing a key component of the ^{30}P(p,γ)^{31}S resonance strengths. To aid in the design of the detector, simulations using the Geant4 Proton Detector simulation have been run to determine the behavior of protons in a variety of gases, under different pressures, and with protons of different energies. More specifically, we have looked at the energy deposition of protons as a function of position in the detector in order examine how various pad geometries will affect efficiency, pad multiplicity, and the beta background.

Madison Harris
Michigan State University and NSCL

Date submitted: 01 Aug 2015 Electronic form version 1.4