Abstract Submitted
for the DNP13 Meeting of
The American Physical Society

Measurement of astrophysically important excitation energies of ^{58}Zn with GRETINA CHRISTOPH LANGER, JINA/NSCL, E11024 COLLABORATION — The level structure of proton-rich ^{58}Zn has been measured with the next-generation γ-ray tracking array GRETINA in conjunction with the large-acceptance spectrometer S800 at the National Superconducting Cyclotron Laboratory at MSU. ^{58}Zn is expected to play an important role in the rapid proton capture process (rp process) during Type I X-ray bursts. ^{58}Zn is located in the vicinity of doubly-magic ^{56}Ni, which is a waiting point for further processing in the rp process. The reaction ^{57}Cu(p,γ)^{58}Zn determines the effective lifetime of ^{56}Ni since the electron-capture lifetime of ^{56}Ni is larger than 1000 s and ^{56}Ni is in (p,γ) - (γ,p) equilibrium with ^{57}Cu at typical rp-process temperatures. Proton capture on ^{57}Cu is the only open break-out reaction channel within typical burst timescales. So far, the ^{57}Cu(p,γ) rate has large uncertainties due to the unknown level structure of ^{58}Zn. This presentation will focus on the details of the study and present the extracted level scheme of ^{58}Zn. Moreover, the astrophysical implications will be discussed.

Christoph Langer
JINA/NSCL

Date submitted: 29 Jun 2013 Electronic form version 1.4