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The commissioning of a summing NaI(Tl) (SuN) gamma detector
ANNA SIMON, NSCL/MSU, THE SUN COLLABORATION — Proton rich nuclei more massive than iron cannot be produced by s- or r-processes, as the β-decay of neutron rich seed nuclei stops at the valley of stability. The most favorable scenario for the creation of these nuclei is a chain of photodisintegration reactions, namely (γ,p), (γ,α) and (γ,n), the so called p-process. The p-process can be studied via the reverse reactions, radiative capture. To develop a more lucid picture of the p-process through this capture process at energies relevant to astrophysical environments a summing NaI(Tl) (SuN) gamma detector has been commissioned and developed at the NSCL. SuN is a 16x16 in. cylindrical barrel divided into eight optically separated segments, each of which contains three photomultipliers. The segmentation of the crystal as well as a high summing efficiency (about 70% for 60-Co) make the detector a perfect tool for investigation of (p,γ) and (α,γ) reactions during inverse kinematics experiments. Utilizing radioactive beams from the ReA3 facility, SuN will provide a great opportunity for precise measurement of p-process relevant reactions cross sections for proton rich nuclei. Results of the first measurements utilizing the SuN detector and various beams from a Van de Graaff accelerator at the University of Notre Dame will be presented.

Anna Simon
NSCL/MSU

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