

Abstract Submitted
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Measuring Neutron-Proton Radiative Capture Cross-section at Low Energy TO CHIN YU, Massachusetts Institute of Technology, MICHAEL KOVASH, University of Kentucky, JUNE MATTHEWS, Massachusetts Institute of Technology, HONGWEI YANG, University of Kentucky, YUNJIE YANG, Massachusetts Institute of Technology — The experiment aims to fill in a gap in our data for the cross-section of neutron-proton radiative capture ($p(n,d\gamma)$) at energies below 500 keV. Current measurements in this energy range are scarce and inconsistent with theoretical predictions and with each other. A well-determined cross-section of the capture reaction in the low energy range is useful in nuclear physics due to its fundamental nature. The measurement is also of interest in cosmology. Big Bang Nucleosynthesis (BBN), the process by which light elements are formed in early universe, is very sensitive to the $p(n,d\gamma)$ cross-section in the low energy range. The measurement enables us to put tighter constraints on the theoretical predictions of BBN. We have conducted preliminary measurements in the van de Graaff accelerator facility at the University of Kentucky. Our array of detectors consists of three plastic scintillators to serve as proton targets and deuteron detectors, and five BGO scintillators to detect γ -rays. The combination results in an over-determination of reaction kinematics that discriminates against scattering processes and other backgrounds. We have obtained some early results which show promise for the precise measurement of the $p(n,d\gamma)$ cross-section.

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