Abstract Submitted
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A single fluid bubble chamber for measuring radiative capture reactions.[1] D. NETO, University of Illinois at Chicago, M. AVILA, K. BAILEY, Argonne National Laboratory, J.F. BENESCH, B. CADE, Jefferson Lab, B. DIGIOVINE, Argonne National Laboratory, J.M. GRAMES, A. HOFLER, Jefferson Lab, R. HOLT, Caltech, R. KAZIMI, Argonne National Laboratory, D. MEEKINS, M. MCCAUGHAN, D. MOSER, M. POELKER, Jefferson Lab, T. O'CONNOR, K.E. REHM, S.P. RIORDAN, Argonne National Laboratory, R.S. SULEIMAN, Jefferson Lab, R. TALWAR, Argonne National Laboratory, C. UGALDE, University of Illinois at Chicago — Radiative capture reactions play a critical role in nucleosynthesis. Direct studies by detecting the outgoing γ-rays are often performed at facilities deep underground to reduce the cosmic ray background. We have developed a new method to measure the time-inverse photo-dissociation reactions using a single-fluid bubble chamber. The large range of the γ-radiation allows for thicker targets, increasing the luminosity by several orders of magnitude, in addition to a factor of 10-100 gain in luminosity from the reciprocity theorem. We will describe the operational principle of the bubble chamber and discuss first results of test measurements at JLAB where we have measured the cross section of the photodisintegration process $^{19}F(\gamma,\alpha)^{15}N$ by bombarding a superheated fluid of C_3F_8 with Brem γ rays reaching cross sections of the time-reversed $^{15}N(\alpha,\gamma)^{19}F$ reaction of about 80 picobarn. Results of the $^{14}N(\gamma,p)^{13}C$ reaction will also be presented.

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