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Bubble Chamber : A novel technique for measuring thermonuclear rates at low energies[1] R. TALWAR, Argonne National Laboratory, J. BENESH, Jefferson National Laboratory, B. DIGIOVINE, Argonne National Laboratory, J. GRAMES, Jefferson National Laboratory, R. J. HOLT, Argonne National Laboratory, G. KHARASHVILI, D. MEEKINS, D. MOSER, M. POELKAR, Jefferson National Laboratory, K. E. REHM, Argonne National Laboratory, A. ROBINSON, A. SONNENSCHEIN, Fermi National Laboratory, M. STUTZMAN, R. SULEIMAN, C. TENNANT, Jefferson National Laboratory, C. UGALDE, University of Illinois — Adopting ideas from dark matter search experiments, we have found that a superheated liquid in a bubble detector is sensitive to recoils produced by γ-ray beams impinging on the nuclei in the liquid. Such a target-detector system has a density factor of four orders of magnitude higher than conventional gas targets and is practically insensitive to the γ-ray beam itself. Also, since photodisintegration reactions have approximately two orders of magnitude higher cross-sections than direct particle capture reactions, such a technique can pave the way towards measuring these reactions within the stellar Gamow window. In an effort to study the $^{16}O(\gamma,\alpha)^{12}C$ system using the bubble chamber technique, the first test of the superheated N_2O liquid with a low-energy bremsstrahlung beam at JLab has been completed. This test has been performed to understand the background contributions from ^{17}O and ^{18}O nuclei in N_2O. The experimental technique, results and future plans will be presented.

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