Title: A single fluid bubble chamber for measuring nuclear reaction rates of astrophysical importance.

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Abstract: Radiative capture reactions, such as (), (p,) and (n,), are of fundamental importance to the study of nucleosynthesis of elements in stellar cores, supernova, etc. In the lab, these reactions are often measured by bombarding gas targets or very thin films with particle beams. With the disadvantages of low density of the target, this increases both the run time for cross section measurements, and the need to reduce background signals from both local and cosmic sources. We show a method to use a single fluid bubble chamber to measure nuclear reaction cross sections. The higher density, compared to gas targets, of the fluid in addition to measuring the time reversal process of the capture reaction reduces the experiment run time. In this study we measured the cross section of the photodisintegration process 19F()15N by bombarding a superheated fluid of C3F8 with Bremsstrahlung  rays produced from the electron injector at Jefferson Laboratory. The bubble chamber experiment produced measurements of the 15N()19F cross section down to around 80 picobarn.