

Measurement of $^{16}\text{O}(\gamma,\alpha)^{12}\text{C}$ with bubble chamber and bremsstrahlung beam at Jefferson Lab Injector

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The carbon-helium fusion reaction is considered to be the key reaction in the helium burning of stars because it determines not only the carbon and oxygen abundances in stars and, ultimately, in the universe, but also the nucleosynthesis of all heavier elements.

At Jefferson Lab, we plan to obtain the rate for this reaction by measuring the inverse process, i.e., the photo-disintegration of oxygen into helium and carbon. This measurement would be based on a novel bubble-chamber technique, which makes use of the fact that a super-heated liquid (Nitrous Oxide) is sensitive to recoiling helium and carbon nuclei produced by photo-disintegration of the oxygen nuclei in the liquid.

In this talk, I will present a description of the Bubble Chamber and the experimental setup at Jefferson Lab Injector, and show how we can use a Bremsstrahlung beam to measure photo-nuclear cross sections.