

## Direct measurement of the $^{12}\text{C}(^{12}\text{C},\alpha_0)^{20}\text{Ne}$ cross section at stellar energies

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The direct measurement of the carbon-carbon fusion reaction cross-section has been conducted at LEAF facility at IMP. In the field of nuclear astrophysics, the carbon-carbon fusion reaction plays a crucial role in the evolution of massive stars and impacts the ignition conditions of Type Ia supernova explosions and superbursts. After decades of research, there remains considerable uncertainty in the reaction cross-section within the stellar energy range. Direct measurement experiments are limited by extremely low reaction cross-sections and background noise. Therefore, new techniques need to be advanced.

LEAF accelerator can provide the highest carbon beam intensity achieved for the known carbon-carbon fusion reaction. For background suppression, we have developed the detection system and high-purity carbon targets, reducing impurity background and improving statistics.

The thick-target yield data for the alpha0 reaction channel has been obtained. Several resonances within this energy range were observed. We calculated the angular distribution using Legendre polynomial coefficients provided by Becker and found good agreement with our fit above 3.2MeV. In the fit of the angular distribution below 3.2MeV, a 4+ component was deemed.

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