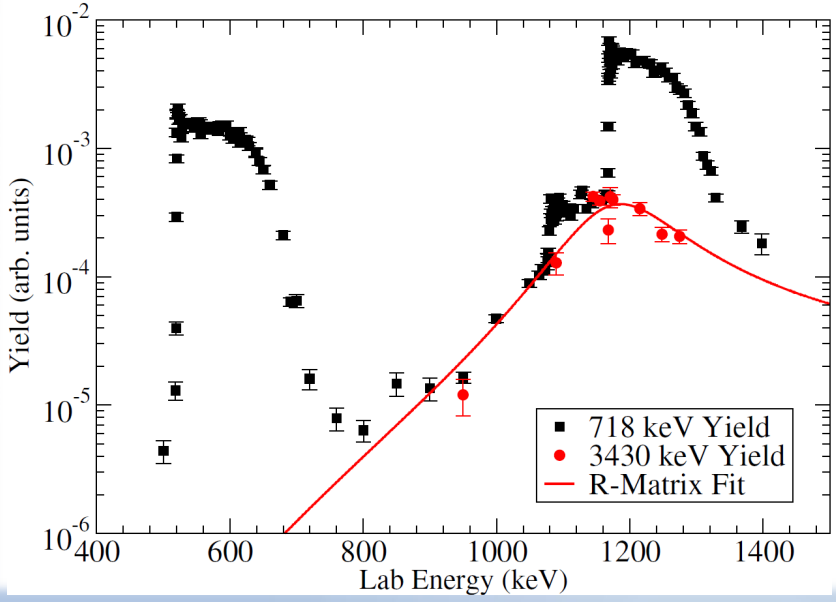
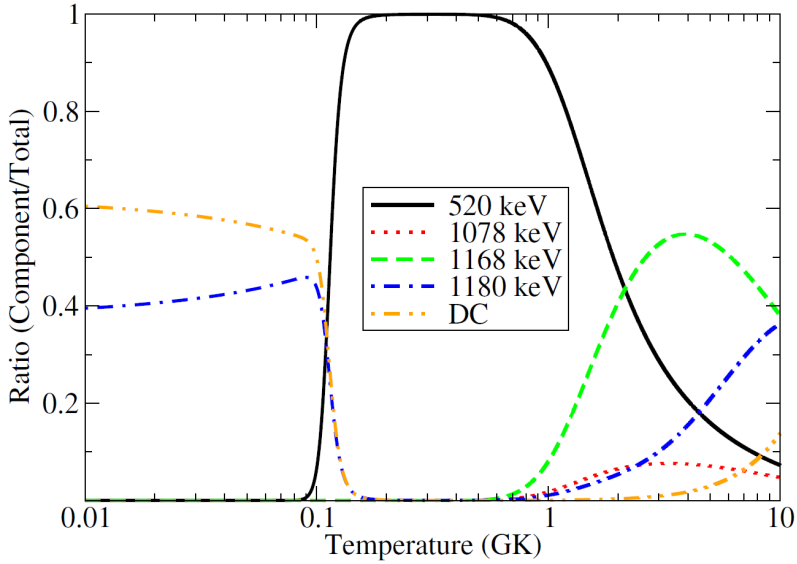
Excitation Function for ^{6}Li+α Reactions Between 0.5 and 1.4 MeV

The recent discovery of Carbon Enhanced Metal Poor (CEMP) stars leaves open questions as to how carbon, nitrogen, and oxygen (CNO) elements were enriched through the nucleosynthesis of primordial elements in the first stars. It has been proposed that the reaction sequence ^{6}Li(α,γ)^{10}B(α,d)^{12}C may offer an alternative path to the traditional triple-α process, taking advantage of α-cluster configurations in the ^{10}B and ^{14}N systems. In the present study, an investigation of the low-energy ^{6}Li(α,γ)^{10}B cross section is performed using





a combination of different γ-ray detectors. The discrepancies in the literature of the width of the broad resonance $E_{c.m.}$=1200 keV, 1_3^+ are resolved. A consistent and much more precise width, Γ_α=125(8) keV, is obtained via a simultaneous *R*-matrix analysis of the present and previously reported literature data. The uncertainty in the tail contribution of the broad resonance indicates that a substantial increase in the low temperature reaction rate is possible compared to that adopted by the REACLIB compilation.

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