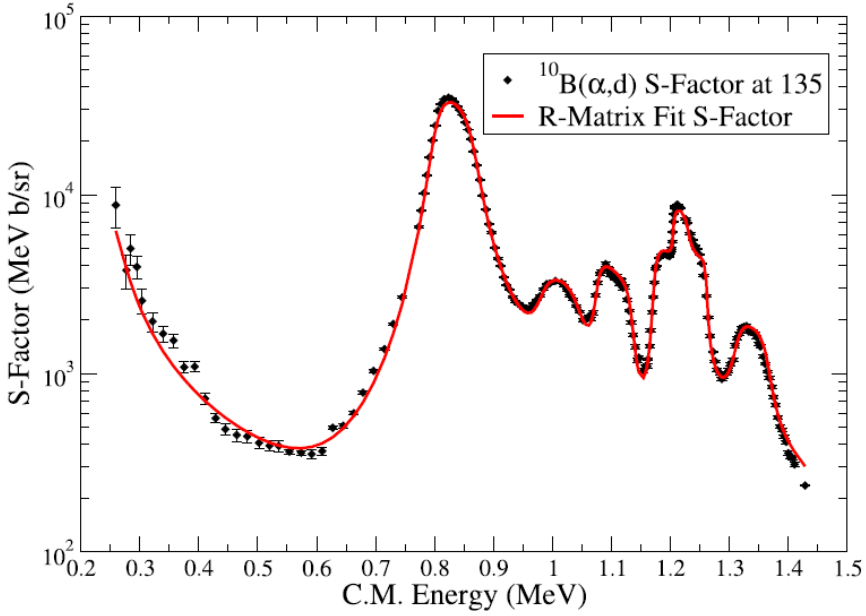
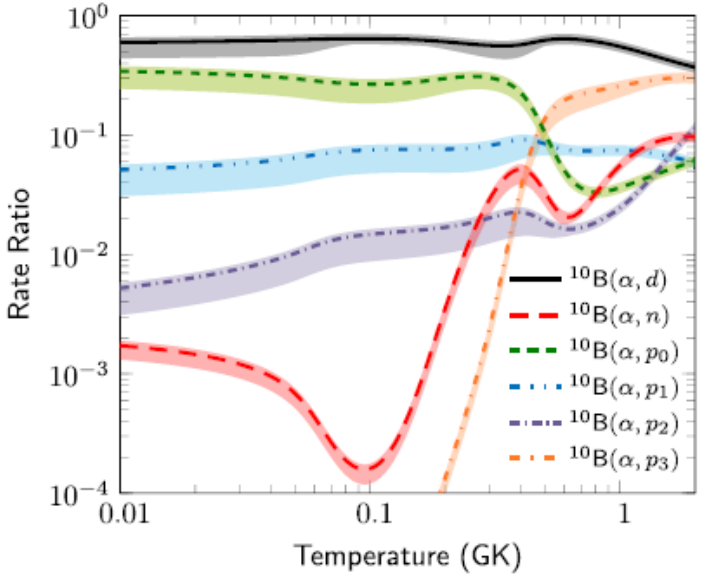
^{10}B + α reactions at low energies

Nucleosynthesis in primordial stellar environments may lead to a substantial production of ^{10}B isotopes, which either are converted by the ^{10}B(p, α)^{7}Be reaction to ^{7}Be or processed further by ^{10}B+α reactions towards the carbon, nitrogen, and oxygen range. This paper focuses on low energy studies of the ^{10}B(α, p)^{13}C and ^{10}B(α, d) ^{12}C reactions to determine the low energy cross section and the reaction rates in stellar environments





using *R*-matrix analysis techniques. The experimental results cover a broad energy range, from 0.21 MeV up to 1.4 MeV in the center of mass frame, extending down to the Gamow energy range. A substantial increase in the reaction rate compared to previous predictions is found, due to the identification of near threshold α-cluster resonance structures.

Gula *et al.* PRC **107**, 025805 (2023)
NSF Grant No. PHY-2011890 and PHY-1430152 (JINA-CEE)