Contribution ID: **16** Type: **2.Parallel session talk**

Radiative Capture $d(\alpha,\gamma)^6Li$ Reaction in Cluster Effective Field Theory

In the standard Big Bang Nucleosynthesis (BBN) framework, the primitive ^6Li abundance is mainly determined by two nuclear reactions: the
$d(\alpha,\gamma)^6Li$ reaction, where deuteron reacts with an alpha particle to produce ^6Li. This reaction leads to the formation of ^6Li during the primordial nucleosynthesis process. Conversely, $^6Li(p,\alpha)^3He$, can destroy ^6Li and reduces the abundance of ^6Li in the early universe. In this study, we focused on the radiative capture process of the deuteron on alpha leading to the formation of ^6Li through the cluster Effective Field Theory. The contribution of the Coulomb interaction between particles was taken into account nonpurbatively. In the first step, the asymptotic normalization coefficients (ANCs) of the bound state of ^6Li was calculated based on the elastic scattering process of the alpha-deuteron system. In the following, the calculation of the transition amplitude and astrophysical S-factor were outlined. To evaluate the accuracy of the approach, we compare the astrophysical S-factor of the dominant electromagnetic transitions (E1 and E2) up to next-to-leading order with the experimental data.

Primary authors: NAZARI, Farzaneh (Department of Physics, K. N. Toosi University of Technology, P.O.Box 16315–1618, Tehran, Iran); RADIN, Mahdi (K. N. Toosi University of Technology); Dr MOEINI ARANI, Mahdi (Malek Ashtar University of Technology, Tehran, Iran,)

Presenter: NAZARI, Farzaneh (Department of Physics, K. N. Toosi University of Technology, P.O.Box 16315–1618, Tehran, Iran)

Session Classification: Parallel1：Few-body aspects of atomic and molecular physics

Track Classification: Few-body aspects of atomic and molecular physics