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Extracting the scattering parameters from ^{3}He-^{4}He elastic scattering using Effective Field Theory MAHESHWOR POUDEL, DANIEL PHILLIPS, Ohio University — The $^3He(\alpha,\gamma)^7Be$ reaction is one of the prime reaction in Big Bang nucleosynthesis as well as in solar-fusion pp chain. Accurate input for solar-fusion models requires extrapolation of experimental data on this reaction to energies; roughly between 20 to few hundred keV's. Also, the scattering parameters for this reaction affect the shape of extrapolant S(E)[1]. We study the elastic scattering of ^3He by ^4He in the lab energy range 1.0-5.7 MeV to constrain these parameters. We take ^7Be as cluster of ^3He and ^4He as degrees of freedom. We employ Effective Field Theory(EFT) upto next-to-leading order(NLO) to study s- and p-waves with strong interaction included. The relevant scattering amplitudes are the same as those of the modified effective range expansion upto $O(k^2)(O(k^4))$ in the s(p)-waves. We generate s- and p-wave phase shifts and also fit the cross section to study the impacts of imposing constrains available from ^{7}Be bound states and extract s(p) wave effective scattering length(volume) and effective range. [1]Zhang et. al, S-factor and Scattering parameters from $^3He +^4 He \rightarrow^7 Be + \gamma$ data. arXiV:1811.07611v1 [nucl-th] [2]Mohr et.al, Phys. Rev. C **48** 3 (1993) [3]Barnard et.al, Nucl. Phys. **50** (1984) 640

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