

Sadeghi, H.; Goodarzi, M.

Three-body calculation of total cross sections of the $pd \rightarrow {}^3He\eta$ reaction from chiral dynamics. (English) [Zbl 1312.81134](#)

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Summary: In this work we have calculated the total cross section of $pd \rightarrow {}^3He\eta$ reaction using recent developments on few body systems involving mesons. We report on an approach to Faddeev equations using chiral dynamics, with the two-body and three-body forces. Within this approach, systems of mesons and baryons are studied. An effective field theory with hadrons and photons is constructed, where the hadronic parameters are determined by fitting available data. The total cross section data for different final momentum q in the center of mass or excess energy is found in agreement with COSY-ANKE and the WASA-at-COSY experiments. at 59.8 MeV access energy the cross section is obtained to be 431 nb in comparison with ANKE experiment $\sigma(59.4 \pm 0.8 \text{ MeV}) = (388.1 \pm 7.1 \pm 58.0)$ nb. To obtain more accurate results, the calculations can be extended to higher order as well.

MSC:

81V35 Nuclear physics

81U35 Inelastic and multichannel quantum scattering

Keywords:

hadron-induced low- and intermediate-energy reactions and scattering; nuclear reactions involving few-nucleon systems; meson production; eta mesons

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