Abstract Submitted
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Determining the low-energy parameters for ^{4}He(^{3}He,^{3}He)^{4}He scattering using Bayesian methods[1] MAHESHWOR POUDEL, DANIEL PHILLIPS, Ohio Univ — Measuring the cross-section for elastic scattering ^{4}He(^{3}He,^{3}He)^{4}He at solar energies; roughly between 20 to few hundred keV's has not been possible yet because the reaction is exponentially suppressed at this range. So, the solar model is shaped by extrapolating the results of data available at higher energies to solar energies. We employ Effective Field Theory(EFT) up to next-to-leading order(NLO) to model s- and p-waves. We employ Bayesian methods to extract the EFT parameters for these partial waves from the data published in Ref. [1] and from unpublished data recently taken using SONIK at TRIUMF [2]. We analyze the data up to a lab energy of 4.0 MeV after imposing a prior on the p-wave ANCs derived from data on the capture reaction ^{3}He$(\alpha,\gamma)^7$Be. I will discuss our results for effective-range-theory parameters and compare them to a recent R-matrix analysis of the same data set [2]. I will also discuss methods to include EFT uncertainties in the Bayesian inference. [1] A. C. L. Barnard, C. M. Jones, and G. C. Phillips, The scattering of ^{3}He by ^{4}He,Nuclear Physics, vol. 50, pp. 629640. [2] Somnath Paneru's talk, APS Meeting of Divison of Nuclear Physics, Fall 2020.

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