Abstract Submitted
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A Bayesian R-matrix analysis of low-energy dt fusion[1] DANIEL PHILLIPS, DANIEL ODELL, CARL BRUNE, Ohio University — The dt fusion reaction ^{2}H + ^{3}H $\rightarrow$ ^{4}He + n is important for nuclear fusion applications. It is also part of the BBN chain. There are several precise measurements of this cross section in the energy range 5-250 keV. These data sets are, however, not consistent with one another. We report on the use of Bayesian methods to analyze this data set, in the spirit of Ref. [1] . Employing the quoted point-to-point and common-mode errors from the original publications and a single-level R-matrix parameterization we find $S(40\text{ keV}) = 26.57 \pm 0.06\text{ MeV} \cdot \text{b}$, but with a poor χ^2 per degree of freedom. We find that the point-to-point errors on some data sets must be inflated to obtain a statistically consistent data base. Different possibilities for the inflation yield consistent results for $S(40\text{ keV})$, as does a three-level R-matrix parameterization. Our preliminary result is $S(40\text{ keV}) = 25.48 \pm 0.17\text{ MeV} \cdot \text{b}$, which is a lower central value and bigger error bar than Ref. [1]. The use of parallel tempering, and the elimination of redundant variables in the R-matrix parameterization allowed us to fully sample the posterior parameter probability density.
[1] R. S. de Souza *et al.*, Phys. Rev. C **99**, 014619 (2019)

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