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Including higher energy data in the R-matrix extrapolation of ^{12}C$(\alpha,\gamma)^{16}$O[1] R.J. DEBOER, JINA and UND, E. UBERSEDER, TAMU, R.E. AZUMA, JINA and UND, A. BEST, INFN, C. BRUNE, OU, J. GOERRES, JINA and UND, D. SAYRE, LLNL, K. SMITH, UTK, MICHAEL WIESCHER, JINA and UND — The phenomenological R-matrix technique has proved to be very successful in describing the cross sections of interest to nuclear astrophysics. One of the key reactions is $^{12}\mathrm{C}(\alpha,\gamma)^{16}\mathrm{O}$, which has frequently been analyzed using R-matrix but usually over a limited energy range. This talk will present an analysis that, for the first time, extends above the proton and α_1 separation energies taking advantage of a large amount of additional data. The analysis uses the new publicly released JINA R-matrix code AZURE2. The traditional reaction channels of $^{12}\mathrm{C}(\alpha,\gamma)^{16}\mathrm{O}$, $^{12}\mathrm{C}(\alpha,\alpha_0)^{12}$, and $^{16}\mathrm{N}(\beta\alpha)^{12}\mathrm{C}$ are included but are now accompanied by the higher energy reactions. By explicitly including higher energy levels, the uncertainty in the extrapolation of the cross section is significantly reduced. This is accomplished by more stringent constraints on interference combination and background poles by the additional higher energy data and by considering new information about subthresold states from transfer reactions. The result is the most comprehensive R-matrix analysis of the $^{12}\mathrm{C}(\alpha,\gamma)^{16}\mathrm{O}$ reaction to date.

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