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R-matrix analysis of 16O reactions[1] RICHARD DEBOER, JOACHIM GOERRES, PAUL LEBLANC, ETHAN UBERSEDER, MICHAEL WIESCHER, University of Notre Dame, GIANLUCA IMBRIANI, INFN — Over the last 60 years, a large amount of experimental nuclear data has been obtained for reactions which probe the ^{16}O compound nucleus near the alpha and proton separation energies, the energy regimes most important for nuclear astrophysics. Difficulties and inconsistencies in past analysis of the individual reaction data prompt a more complete global analysis with the first aim of determining the level of consistency between the wide variety of experimental data. The global analysis has been performed using a multiple entrance/exit channel R-matrix framework. Over the wide range of experimental data considered, a high level of consistency is found between the many different data sets, resulting in a single consistent R-matrix fit which describes the broad level structure of ^{16}O below $E_x = 13.5$ MeV. The resulting fit is used to reinvestigate our current understanding of the reaction components which contribute to the low energy cross sections of ^{15}N + p and ^{12}C + α reactions. Work has begun on establishing a better estimate of the reaction rate uncertainties by performing a Monte Carlo analysis on the many data sets considered.

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