

R matrix analysis of low energy data on the resonant $\alpha+^{18}\text{O}$ scattering

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At present the team has finished an analysis of the available information on the resonant $\alpha+^{18}\text{O}$ scattering up to 14 MeV excitation energy in ^{22}Ne . The analysis is important because it provides information on properties ^{22}Ne levels important for astrophysics and for a better understanding of nuclear structure. An essential part of this study is a comparison of the results obtained by the classical approach and by the TTIK approach. New developments are prompting the investigation of higher excitation regions in atomic nuclei and the extensive use of rare beams. This necessitates dealing with more and broader resonances, a higher density of states, and several decay channels, making resonance interference increasingly significant. To meet these new challenges, more detailed experimental data (including data from rare beams) and more precise theoretical predictions (including signs of the wave functions of the states) are required. Consequently, we will gain new and more detailed insights into nuclear structure and the influence of the continuum on this structure.