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Correlation function and the inverse problem in the two-body interactions

In our work, we dynamically generate the bound states with the coupled channel approach and evaluate the correlation functions for each channel. Then we address the inverse problem starting from these correlation functions to determine the scattering observables related to the system, including the existence of the bound state and its molecular nature. Assuming the correlation functions obtained from our theoretical results to correspond to real measurements, we make a fit to the data within a general framework to extract the information contained in these correlation functions. The bootstrap method is used to determine the uncertainties of the different observables, and we find that, assuming errors of the same order than in present measurements of correlation functions, one can determine the scattering length and effective range of all channels with a very good accuracy.

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