Abstract Submitted
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Three bosons in one dimension with short-range interactions NIRAV MEHTA, University of Colorado/JILA, JAMES SHEPARD, University of Colorado — We solve the three-boson problem in one dimension for a variety of interactions. As a benchmark calculation, we follow a procedure outlined by McGuire to find exact results for the particle-dimer scattering phase shifts and three-body binding energies. These results are then compared to adiabatic hyperspherical calculations using the Eigenchannel R-matrix method, and to numerical solutions to the Faddeev equations. Excellent agreement is found between the various calculations. Next, we construct a low-momentum effective two-body interaction which we test in both the two and three-body sector. We show that cutoff-dependence and errors for two- body observables are removed order by order in our effective interaction. With the introduction of a single parameter three-body interaction, three-body observables are predicted to percent-level accuracy.

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