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Universal properties of infrared oscillator basis extrapolations¹ SUSHANT MORE, The Ohio State University — It has been shown recently that a finite harmonic oscillator basis in nuclear many-body calculations effectively imposes a hard-wall boundary condition in coordinate space, motivating infrared extrapolation formulas for the energy and other observables. We present further refinement of these formulas by studying two-body models and the deuteron (More et al., arXiv:1302.3815). We accurately determine the box size as a function of the model space parameters, and compute scattering phase shifts in the harmonic oscillator basis. We show that the energy shift can be well approximated in terms of the asymptotic normalization coefficient and the bound-state momentum, discuss higher-order corrections for weakly bound systems, and illustrate this universal property using unitarily equivalent calculations of the deuteron.

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