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**An effective field theory approach to two particles in a spherical box**[1] FENG WU, Univ of Arizona, UBIRAJARA VAN KOLCK, Univ of Arizona and CNRS — We develop an effective field theory approach for two particles interacting via short-range interactions confined to a spherical box. We use the three-dimensional delta potential and its derivatives to simulate the short-range interactions and solve the problem in a truncated model space restricted by an ultraviolet regulator. Renormalization methods are used to remove regulator dependence and obtain meaningful predictions. The leading-order (LO) interaction is solved for exactly while higher-order contributions are treated in perturbation theory. It is shown explicitly that going to next-to-LO systematically improves convergence as the model space increases. In the large-box limit, we recover the known result that the potential produces level shifts proportional to the scattering phase shift at the unperturbed energy. Our approach provides a basis for further study of many-body systems in restricted model spaces that do not break spherical symmetry.

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