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Two-body scattering on the lattice in the presence of a long-range force

In my talk, I will review the application of the effective field theory methods for the analysis of lattice QCD data in the two- and three-particle sectors. These methods are strikingly similar to the ones used to solve the few-body problems in QCD. The deep reason for this similarity is that the short-range physics in both cases is described by the same effective Lagrangian that allows to unambiguously relate the continuum physics in the two- and three-body scattering sectors to the finite energy levels that are measured on the lattice.

In particular, I will consider in detail the two-body scattering in the presence of a long-range force, for which the effective-range expansion is known to have a very small radius of convergence, owing to the closeness of the left-hand cut to the physical region. Furthermore, I shall utilize the well-known modified effective range expansion that allows to substantially increase the convergence, treating the long-range part of the potential separately. Formulating this approach in a finite volume, a convenient formalism for the extraction of the two-body scattering amplitude from lattice data is derived.

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