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Analytic Expansions of Two- and Three-Particle Excited-State Energies

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The last years have seen significant developments in methods relating two- and three-particle finite-volume energies to scattering observables. These relations holds for both weakly and strongly interacting systems, and studying their predictions in limiting cases can provide important cross checks as well as giving useful insights to the general formulae. In this talk, I present analytic results for finite-volume excited states, including moving frames, recovered by expanding the general relations in powers of the interaction strength. In particular, I highlight the elegant patterns that are predicted, especially for excited three-particle energies, and discuss various applications of the results.

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