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Three-particle scattering in the (1+1)-dimensional $O(3)$ non-linear sigma model

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We present results on three-particle scattering in the (1+1)-dimensional $O(3)$ non-linear sigma model using lattice-determined finite-volume energies and the relativistic-field-theory (RFT) finite-volume formalism. We focus on the isospin-3 and isospin-2 three-particle channels, and perform lattice computations for four different volumes with three values of the lattice spacing each. The continuum-extrapolated finite-volume energies are compared to the RFT formalism predictions assuming a zero three-particle divergence-free K -matrix, $K_{df,3} = 0$. We study the effect of changing the cutoff function appearing in the quantization condition. Finally, the numerical results are used to constrain the value of $K_{df,3}$. The eventual aim is to match the results for $K_{df,3}$ to the analytically known three-to-three S -matrix, to build experience and confidence in the formalism, as it is also applied to three-hadron QCD calculations.

Topical area

Hadronic and Nuclear Spectrum and Interactions

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