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Utilising optimised operators and distillation to extract scattering phase shifts

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Distillation is a method of smearing that allows for the efficient computation of correlation functions on the lattice. It vastly reduces the number of operations needed to calculate correlation functions with large bases of operators and all-to-all propagators. In this investigation, we provide a comprehensive comparison of the quality of extracted energy spectra with different amounts of distillation smearing for the isospin-1 $\pi\pi$, ρ like channel. Results are demonstrated in the determination of the mass spectra and also the scattering phase shift and mass and width of the resonant ρ via the Luscher method.

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