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Pion-pion scattering and the timelike pion form factor from Lattice QCD

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The calculation of infinite-volume hadron-hadron scattering amplitudes from Lattice QCD simulations requires precisely determined finite-volume energy spectra. This required level of precision is achieved using an efficient algorithm to treat the physically important low-lying modes of quark propagation. We show results for elastic pion-pion scattering amplitudes from simulations with heavier-than-physical pion masses $m_\pi = 240$ and 280 MeV in the total isospin $I = 1$ and $I = 2$ channels. We additionally determine a simple resonance photoproduction amplitude, the isovector timelike pion form factor, which is an important low-energy contribution to the hadronic vacuum polarization.

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