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The left-cut for partial waves in terms of physical amplitudes

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Abstract

We derive a novel representation of the partial wave amplitude over the left-hand cut for 2π to 2π scattering. We express the left-hand cut of arbitrary isospin and angular momentum partial waves as an integral of right-hand cut imaginary parts. This formulation provides an explicit, exact extraction of the logarithmic branch cut structures, offering a valuable tool to systematically quantify left-hand cut uncertainties in unitarization methods such as the Inverse Amplitude Method or N/D approaches.

