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Analysis of rescattering effects in 3π final states

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Decays into three particles are often described in terms of two-body resonances and a non-interacting spectator particle. To go beyond this simplest isobar model, crossed-channel rescattering effects need to be accounted for. We quantify the importance of these rescattering effects in three-pion systems for different decay masses and angular-momentum quantum numbers. We provide amplitude decompositions for four decay processes with total $J^{PC} = 0^{--}$, 1^{--}, 1^{-+}, and 2^{++}, all of which decay predominantly as $\rho\pi$ states. Two-pion rescattering is described in terms of an Omnès function, which incorporates the ρ resonance. Inclusion of crossed-channel effects is achieved by solving the Khuri-Treiman integral equations. The unbinned log-likelihood estimator is used to determine the significance of the rescattering effects beyond two-body resonances; we compute the minimum number of events necessary to unambiguously find these in future Dalitz-plot analyses. Kinematic effects that enhance or dilute the rescattering are identified for the selected set of quantum numbers and various masses.

Parallel Session

Hadron Spectroscopy

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