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The low-energy role of the $a_0(980)$ and $f_0(980)$ resonances in $\eta \to 3\pi$ decays via the Khuri-Treiman formalism

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Collaboration

Abstract content

$\eta \to 3\pi$ decays are key processes for the determination of the $u - d$ quark mass difference but the chiral expansion of the amplitude converges slowly inside the physical region and fails to reproduce the recent high accuracy measurements of the Dalitz plot parameters. We reconsider the idea of using the chiral expansion in an unphysical region surrounding the Adler zero, where convergence should be much faster, and to predict the amplitude in the physical region using the Khuri-Treiman dispersive formalism. The usual formalism takes into account elastic $\pi - \pi$ rescattering. We present a simple extension to further channels which enable to implement the effects of the $a_0(980)$ and $f_0(980)$ resonances in the dispersive representation. We show that the influence of these resonances at low energy is not negligible, in particular for the $\eta \to 3\pi^0$ decay.

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