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Unitary multi-channel $\pi\pi$ scattering amplitudes of f_2 and ρ_3 mesons

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In a unitary multi-channel approach, precise determination of $\pi\pi$ scattering amplitudes for D and F waves has been presented. These scattering amplitudes are in the $I^G J^{PC} = 0^+ 2^{++}$ sector on the processes of $\pi\pi \rightarrow \pi\pi, 4\pi, K\bar{K}$ and $\eta\eta$, likewise in the $I^G J^{PC} = 1^+ 3^{--}$ sector on the processes of $\pi\pi \rightarrow \pi\pi, 4\pi, \omega\pi$ and $K\bar{K}$ for D and F waves respectively. The amplitudes were refined and re-fitted to the dispersion relations up to $1.1\tilde{\text{GeV}}$, and to the experimental data in the effective two pion mass from the threshold to $2.7\tilde{\text{GeV}}$ and $1.9\tilde{\text{GeV}}$ for D and F waves, respectively. Old parameterizations did not satisfy the crossing symmetry condition and did not describe the $\pi\pi$ threshold region. Moreover, a satisfactory justification regarding the controversies in the states of f_2 and ρ_3 mesons about their masses and number of states that are taken into account has been discussed and finalized.

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