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Construction of the pion scalar form factor from few poles and zero

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Collaboration

Abstract content

Very simple and self-sufficient method of construction and definitive-full analysis of the pion scalar-isoscalar form factor in the elastic region is presented. It is based on precise S-wave $\pi\pi$ scattering phase shifts generated by dispersive analysis of experimental data with imposed crossing symmetry condition. Final result for values of the $f_0(500)$ meson mass and width, $m_\sigma = (459 \pm 22)$ MeV; $\Gamma_\sigma = (521 \pm 60)$ MeV is compatible with the results from dispersive analyses of the BERN and MADRID groups to be considered now as the most reliable values of the $f_0(500)$ scalar meson parameters, though in presented analysis another, unusual way has been applied. Self-sufficiency of the proposed derivation of the constructed form factor and its predictions near the $K\bar{K}$ threshold have been examined.

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