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Crossing symmetry in the pi-pi D- and F-wave scattering amplitudes and new precise results for the S-wave amplitude

Recently presented new-one subtracted dispersion relations with imposed crossing symmetry condition for the pi-pi S - and P -wave scattering amplitudes and the well known Roy's equations with two subtractions have led to a set of many partial wave amplitudes in very wide energy range [1].
They allow for. e.g. a very precise and unambiguous determination of scattering lengths and parameters of the still puzzling f0(600) (often called sigma) and f0(980) resonances in the S wave.
In this talk these parameters will be presented.

Similar - one subtracted dispersion relations for the D and F waves have also been recently derived and presented [2].
Here, general structure of these equations with imposed crossing symmetry condition and results of their first practical application in the testing of the input amplitudes obtained in [1] will be presented.
It will be seen that these equations are very demanding i.e. produce D and F wave output amplitudes with very small errors.
This significantly increases the accuracy of determined amplitudes
and indirectly can further improve the precision of parameters in the other waves, such as S and P.

These new dispersion relations, together with the previous ones for the S and P waves form a complementary set of theoretical constraints that imposed on the experimental amplitude can define them clearly and precisely.
The analysis is based only on unitarity, analyticity and crossing symmetry.

[1] "The pion-pion scattering amplitude. IV: Improved analysis with once subtracted
Roy-like equations in the 450-1100 MeV region",
R. Garcia-Martin, R. Kaminski, J. Ruiz de Elvira, J. Pelaez and F. Yndurain,
Phys. Rev. D 83, 074004 (2011).

[2] "Dispersion relations with crossing symmetry for pi-pi D and F wave amplitudes"},
R. Kaminski, Phys. Rev. D 83, 076008 (2011).

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