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Why dispersion relations help in description of pion-pion amplitudes and lead to precise determination of the f0(600) (sigma) parameters?

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Significant progress in description of pi-pi amplitudes has been
recently made [1,2]. We present amplitudes fitted both to well known and to newest experimental
data. In fits we use additional theoretical constraints from forward dispersion relations, sum rules
and from twice and once subtracted dispersion relations.
The latter two (so called Roy's and GKPY equations) are derived with imposed
crossing symmetry condition for the pi-pi S and P waves and provide strong constraints
for errors of phase shifts and inelasticities below 1 GeV.
In this way very demanding and model independent test for pi-pi amplitudes
fitted to experimental data is constructed and proposed.
We show that constraints from this test imposed on the pi-pi amplitudes lead to very precise
determination of parameters of the f0(600) (sigma) pole and pi-pi threshold parameters in good agreement
with ChPT.
We compare once and twice subtracted dispersion relations and conclude that the former ones provide more
stringent consistency check for parameterizations of the pi-pi amplitudes.
Our analysis is based only on unitarity, analyticity and crossing symmetry.

References:

[1] B. Ananthanarayan et al., Phys. Rept. 353, 207 (2001).
[2] R. Kaminski, J.R. Pelaez and F.J. Yndurain, Phys. Rev. D 77, 054015
(2008).

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