Contribution ID: **3** Type: **Talk**

Constraints on the ωπ form factor from analyticity and unitarity

Monday, 29 June 2015 17:00 (20 minutes)

Motivated by the discrepancies noted recently between the theoretical calculations of the electromagnetic ωπ form factor and certain experimental data, we investigate this form factor using analyticity and unitarity in a framework known as the method of unitarity bounds. We use a QCD correlator computed on the spacelike axis by operator product expansion and perturbative QCD as input, and exploit unitarity and the positivity of its spectral function, including the two-pion contribution that can be reliably calculated using high-precision data on the pion form factor. From this information, we derive upper and lower bounds on the modulus of the ωπ form factor in the elastic region. The results provide a significant check on those obtained with standard dispersion relations, confirming the existence of a disagreement with experimental data in the region around 0.6GeV .

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Session Classification: Parallel Session 2 - Goldstone Boson WG

Track Classification: Goldstone Boson Working Group