

Fit of the $a_1(1420)$ as a Triangle Singularity

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Recently, many new hadronic states were found that do not fit into the simple constituent-quark model for mesons and baryons. One prominent example is the $a_1(1420)$ signal that was observed by the COMPASS experiment in the $f_0(980)\pi$ P -wave with $J^{PC} = 1^{++}$ quantum numbers.

Different mechanisms were suggested to explain these signals, one of which is rescattering of final-state particles. The Triangle Singularity (TS) is a prominent rescattering mechanism that is able to produce signals that fully mimic the behavior of a resonance, i.e. a peak in the intensity accompanied by a phase motion of the amplitude.

We present our analysis of the $f_0(980)\pi$ amplitude using a TS model that incorporates spin effects via a dispersion technique. We will show that the $a_1(1420)$ signal is explained by a TS that appears in the decay of the ground-state axial-vector meson $a_1(1260)$ to the $K\bar{K}\pi$ final state, which couples to the observed $f_0(980)\pi$ system in the 3π final state via rescattering.

Category

talk

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