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Dispersive analysis of the $\gamma\gamma^* \to \pi\pi, \pi\eta$ processes

24th May 2019

2:15 pm

Minkowski room (Physics building, 05-119)

Abstract

We present a theoretical analysis of $\gamma\gamma^* \to \pi\pi, \pi\eta$ processes within the energy range from threshold to 1.4 GeV and the low spacelike virtualities of photons. The Omn`es representation is adopted in order to account for rescattering effects in both s- and d-partial waves, except for $a_2(1320)$, which is approximated as a Breit-Wigner resonance. For the description of the $a_0(980)$ and $f_0(980$) resonances, we implement a coupled-channel unitarity. The constructed amplitudes serve as an essential framework to interpret the current experimental two-photon fusion program at BESIII. As a natural continuation of our work we also provide a discussion on the double-virtual processes, since they serve as an important input for the dispersive analyses of the hadronic light-by-light scattering contribution to the muon's anomalous magnetic moment.