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## Understanding the nature of $f_0(980)$ via $K^+K^-$ correlation and production yield with ALICE

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The  $f_0(980)$  resonance was observed several years ago in  $\pi\pi$  scattering experiments. Despite a long history of experimental and theoretical studies, the nature of this short-lived resonance is far from being understood and there is no agreement about its quark structure. According to different models, it has been associated with a meson, considered as a tetraquark, or as a  $KK$  molecule. In this talk we address two complementary avenues to study the nature of the  $f_0(980)$  resonance.

The first method exploits the excellent tracking and particle identification of the ALICE experiment to measure the differential spectra and integrated yield of the  $f_0(980)$  meson produced in  $pp$  and  $p$ -Pb collisions at an energy of  $\sqrt{s} = 5$  TeV. The results are discussed in the comparison with models and the properties of other hadrons. The nuclear modification factor shows hints of final-state effects in  $p$ -Pb collisions and will be presented and discussed in this perspective. The second method involves femtoscopic correlations of non-identical charged kaons ( $K^+K^-$ ), studied in Pb-Pb collisions at  $\sqrt{s_{NN}} = 2.76$  TeV. For the analysis of the  $K^+K^-$  correlation, a comparison of the measured data to the Lednický-Luboshitz interaction model allows to extract for the first time the  $f_0(980)$  mass and coupling parameters. The measured width and mass of the  $f_0(980)$  resonance are consistent with the existing PDG data.

**Primary author:** CC CHAIRS, ALICE**Presenter:** AGRAWAL, Neelima (Universita e INFN, Bologna (IT))**Session Classification:** Parallel Session T08: Strongly coupled systems**Track Classification:** Strongly coupled systems