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Suppression of Λ(1520) resonance production in central Pb—Pb collisions at the LHC

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Hadronic resonances with lifetimes of a few fm/c, shorter than or comparable to the timescale of the fireball evolution are sensitive probes of the dynamics and properties of the medium formed after the hadronisation of the QGP. Because of their short lifetimes, they can decay within the hadronic medium, which can alter or destroy the correlation among the decay daughters via interactions (re-scattering) with the surrounding hadrons, hence reducing the observed yields.

In this poster, we present the published results on the observation of the suppression of the Λ(1520) baryonic resonance in central Pb—Pb collisions at the LHC. The yield of the Λ(1520) is measured at mid-rapidity in Pb—Pb collisions at $\sqrt{s_{\rm NN}}$ = 2.76 TeV with the ALICE detector in the Λ(1520) → pK$^-$ (and charge conjugate) hadronic decay channel as a function of the transverse momentum ($p_{\rm T}$) and collision centrality. The ratio of the $p_{\rm T}$-integrated resonance production relative to its longer-lived counterpart, Λ, is suppressed by about a factor of 2 in central collisions with respect to peripheral collisions and it is smaller than the value predicted by statistical hadronisation model calculations. The shape of the measured $p_{\rm T}$ distributions and the centrality dependence of the suppression are reproduced by the EPOS3 Monte Carlo event generator, which incorporates UrQMD to describe the interactions among particles in the hadronic phase in a microscopic approach. The results highlight the relevance of the hadronic phase in the study of heavy-ion collisions and the importance of a microscopic description of the late hadronic interactions.

Finally, we present the perspectives for the analysis of Λ(1520) production with the full ALICE data sample collected with Pb—Pb collisions at $\sqrt{s_{\rm NN}}$ = 5.02 TeV in LHC Run2, which would allow one to improve the statistical significance with respect to the present measurement and perform the study more differentially and in narrower centrality classes.

Collaboration name

ALICE, CERN

Track

Hadron Resonances

Primary author: AGRAWAL, Neelima (Museo Storico della Fisica e Centro Studi e Ricerche Enrico Fer)

Presenter: AGRAWAL, Neelima (Museo Storico della Fisica e Centro Studi e Ricerche Enrico Fer)

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