

Measurements of resonances and exotic bound states with ALICE at LHC

Tuesday, 18 October 2022 17:30 (30 minutes)

Light-flavor hadrons constitute the bulk of particle production in ultrarelativistic hadron-hadron collisions at the LHC. The study of their production yields, differential in transverse momentum and multiplicity, is fundamental to constrain hadron production models and to investigate the hadronization process. In this context, hadronic resonances are particularly interesting tools since they give also crucial information on the post-hadronization phase. Due to their short lifetimes, most resonances decay shortly after their production, and their decay daughters might scatter off other particles which are produced in the collision. In a high-density particle system, such as that created in heavy-ion collisions, the interaction rate is so large that the interactions among hadrons are expected to contribute to resonance regeneration. Precise modeling of such rescattering and regeneration processes, typically implemented in transport approaches, needs experimental constraints.

The study of the hadronization mechanism can be complemented by investigating the production of exotic bound states. In the case of multi-baryon states with hyperons, the study of their properties gives independent constraints on the hyperon-nucleon and hyperon-hyperon interaction, complementary to scattering experiments and the femtoscopic correlation technique. The study of hadronic interactions involving hyperons is crucial to study the internal structure of neutron stars and constraining their equation of state. Further implications in the field of astrophysics can be obtained with the searches of compact exotic multi-quark states, like the sexaquark, which could be good dark matter candidates.

In this contribution, a review of recent experimental results on both baryonic and mesonic resonances measured by ALICE will be presented. These results are presented in the context of existing hadron production and transport models. Measurements of the hypertriton production and properties as well as searches for exotic bound states are also presented. Prospects for future searches of compact multi-quark states and exotic hadrons are discussed.

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Session Classification: Parallel 2

Track Classification: Baryon resonances in heavy ion collisions and their role in cosmology