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ALICE as an (anti)hypernuclei factory

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Hypernuclei are bound states of nucleons and hyperons. The study of their properties, such as their lifetimes and binding energies, provide information on the hadronic interaction between hyperons and nucleons which are complementary to those obtained from correlation measurements. Precise modeling of this interaction is a fundamental input for the calculation of the equation of state of high-density nuclear matter inside neutron stars. Moreover, measurements of their production rate in different collision systems are important to constrain (hyper)nuclei production models, such as the statistical hadronization model and baryon coalescence.

In this presentation, the first-ever observations of the (anti)hyperhydrogen-4 and (anti)hyperhelium-4 in Pb-Pb collisions at 5.02 TeV will be presented. These measurements pave the way for detailed investigations of the large charge symmetry breaking implied by the Λ binding energy difference in these hypernuclei. Moreover, differential measurements of their productions yields will contribute to a better understanding of their production models. Recent results on the hypertriton production, high-precision measurements of its lifetime and binding energy in Pb-Pb collisions will also be shown and discussed in the context of the state-of-the-art theoretical models.

Category

Experiment

Collaboration (if applicable)

ALICE

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