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Addressing the hyper-triton lifetime puzzle with ALICE at the LHC

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We present a measurement of the hyper-triton lifetime with the ALICE detector at the LHC, aiming at shedding light on the hyper-triton lifetime puzzle. During the LHC Run 2, the ALICE experiment recorded Pb-Pb collisions at $\sqrt{s_{NN}} = 5.02$ TeV that complement the Pb-Pb datasets acquired at $\sqrt{s_{NN}} = 2.76$ TeV from Run 1. These datasets allow for a systematic study of light (anti-)hypernuclei production in Pb-Pb collisions, in particular, for the hyper-triton lifetime determination.

The identification of the hyper-triton is based on the excellent performance in terms of energy loss measurement in the Time Projection Chamber. In addition, the Inner Tracking System is used to discriminate secondary vertices, originating from weak decays, from the primary vertex. This is of particular importance for the measurement of (anti-)(hyper-)triton that decays weakly with a decay length of several centimetres.

The study of (anti-)(hyper-)nuclei production at both energies will be discussed and compared to model predictions. Special emphasis will be put on new results of the hyper-triton lifetime determination in its 2- and 3-body decay modes. Indeed most calculations on the lifetime of hyper-triton give similar lifetimes, which are close to the lifetime of free Λ decays. On the experimental side, all results in Au+Au collision at RHIC and in Li+C collisions at GSI show a significantly shorter lifetime in comparison with that of the free Λ decay.

A detailed discussion of the experimental results and the effort needed on both the experimental and the theoretical side in this sector will be presented.

Content type

Experiment

Collaboration

ALICE

Centralised submission by Collaboration

Presenter name already specified

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