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ALICE TRD Trigger Performance Study and its Application on the Hypertriton Analysis in p–Pb collisions at the LHC

— •BENJAMIN BRUDNYJ for the ALICE-Collaboration — Institut für Kernphysik, Goethe Universität, Frankfurt am Main

At the Large Hadron Collider (LHC) at CERN significant production rates of light (anti-)(hyper-)nuclei have been measured in heavy-ion collisions. The production of such nuclei has recently become a topic of high interest. One interesting example is the lifetime of the lightest hypernucleus, the hypertriton (a bound state of a proton, a neutron and a Λ hyperon). Several measurements have shown a significant deviation from the theoretical expectation, in particular in heavy-ion collisions. Therefore, it is important to also measure these rare nuclei in p–p and p–Pb collisions.

Due to their short lifetime, only their decay products can be measured, e.g. the charged two body decay channel ${}^3_{\Lambda}\text{H} \rightarrow {}^3\text{He} + \pi^-$. In order to be able to measure these rare (anti-)fragments also in p–p and p–Pb collisions, a trigger on nuclei was implemented on p–Pb collisions at $\sqrt{s_{NN}} = 8.16$ TeV to increase the statistics by using the ability of the ALICE TRD to perform fast trigger decisions.

In this talk the performance of a nuclei trigger in terms of enhancement factors and transverse momentum sensitive efficiencies for the different light nuclei will be shown. In addition, the current status of a hypertriton analysis on p–Pb collisions at $\sqrt{s_{NN}} = 8.16$ TeV will be presented.

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Email: brudnyj@ikf.uni-frankfurt.de