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Recent results on (anti-)(hyper-)nuclei production in pp, p-Pb and Pb-Pb collisions with ALICE

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At the end of 2015 the ALICE experiment at the LHC has recorded Pb-Pb collisions at $\sqrt{s_{\mathrm{NN}}}$ = 5.02 TeV, that complement the dataset from Run 1. Both datasets contain a variety of (anti-)(hyper-)nuclei produced in the collisions, namely (anti-)deuteron, (anti-)triton, (anti-)helium-3, (anti-)alpha and (anti-)hypertriton. Furthermore, the large high quality data sample of pp collisions at $\sqrt{s} = 7$ TeV and 13 TeV and in p-Pb collisions at $\sqrt{s_{\mathrm{NN}}}$ = 5 TeV at the LHC with the ALICE detector allows for a systematic study of the light (anti-)nuclei production in these collision systems.
The identification of these (anti-)(hyper-)nuclei is based on the energy loss in the Time Projection Chamber and the velocity from the Time-Of-Flight detector. In addition, the Inner Tracking System is used to distinguish secondary vertices originating from weak decays. This is of particular importance for the measurement of (anti-)(hyper-)triton which decays weakly and has a decay length of several centimeters. The decay mode into a (anti-)helium-3 and a oppositely charged pion is the one with the largest reconstruction efficiency, but the largest branching ratio is given by the 3-body decay mode into a deuteron, a proton and a charged pion. The study of (anti-)(hyper-)nuclei production at both energies will be discussed and findings will be compared to model predictions. Emphasis will be put on new results of the hypertriton in its 2- and 3-body decay modes. New results on deuteron production as a function of multiplicity in pp and p-Pb collisions will be presented, as well as the measurement of helium-3 in p-Pb collisions. The goal is to study production mechanisms such as coalescence in small systems, and to compare them to those in heavy-ion collisions.
Finally, the status of the ongoing searches for hypothetical strange pentaquarks and dibaryons will be discussed, together with perspectives for studies with the increased statistics from the LHC Run II.

Experimental Collaboration

ALICE

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