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Constraining production models with light (anti-)nuclei measurements in small systems with ALICE at the LHC

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The large sample of high quality data taken in pp collisions at $\sqrt{s} = 7$ TeV and 13 TeV, together with smaller data sets at 900 GeV and 2.76 TeV, and in p-Pb collisions at $\sqrt{s_{NN}}$ = 5.02 TeV at the LHC with the ALICE detector allows for a systematic study of the light (anti-)nuclei production in these collision systems.

The excellent performance of the Inner Tracking System, the Time Projection Chamber and the Time-Of-Flight detector provide a clear identification and separation of primary produced light (anti-)nuclei from secondaries.

Additionally, the high energy deposit of Z=2 particles in the Transition Radiation Detector has been exploited to collect a hardware-triggered data sample in the high-interaction rate p-Pb collisions at $\sqrt{s_{NN}}$ = 8.16 TeV. First findings from this (anti-)nuclei enriched sample will be shown.

Recent 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. To achieve this, the coalescence parameter B_A is studied as function of transverse momentum in the different systems and as a function of the event multiplicity. In addition to this, prospects for measuring (anti-)deuteron production in jets will be presented.

These investigations have direct connections to cosmological and astrophysical studies, in particular for the search of dark matter candidates where one possible signal is the increased flux of light anti-nuclei which has an interplay with the B_A measurementes shown here.

Content type

Experiment

Collaboration

ALICE

Centralised submission by Collaboration

Presenter name already specified

Author: ALICE COLLABORATION

Presenter: COLOCCI, Manuel (Universita e INFN, Bologna (IT))

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