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Overview and new directions about light (anti)nuclei measurements with ALICE

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The production of light (anti)nuclei has been measured over the last decades in many facilities ranging from low collision energies at the AGS and GSI to high energies at RHIC and the LHC. Despite the plethora of experimental results, the production mechanism of light (anti)nuclei is still mysterious and under intense debate in the scientific community. The experimental data are typically described using two different phenomenological models: the statistical hadronization model and baryon coalescence. The measurements of light (anti)nuclei production have also important implications for astrophysics in indirect dark matter searches.

In this talk, a comprehensive overview of recent ALICE results on light (anti)nuclei production measurements will be presented. The global picture emerging from these measurements will be discussed in the context of the available phenomenological models. Recently, ALICE has performed pioneering measurements of the (anti)deuteron coalescence parameter in and out of jets in small collision systems where unexpected and intriguing results were obtained. These will be presented along with perspectives for further developments of this research line in the LHC Run 3.

Primary author: RASÀ, Marika (Istituto Nazionale di Fisica Nucleare)

Presenter: RASÀ, Marika (Istituto Nazionale di Fisica Nucleare)

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