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(Anti)nuclei production mechanisms and latest constraints from ALICE at the LHC

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The formation mechanism of light (anti)nuclei in high-energy hadronic collisions remains an open question that is being actively investigated both from theoretical and experimental perspectives. In particular, the (anti)nuclei production at particle accelerator provides a fundamental input to constrain the flux of antinuclei produced from cosmic ray interactions with the interstellar matter, which constitute the background in indirect dark matter searches.

Thanks to its excellent tracking and particle identification capabilities, since the beginning of its operation, the ALICE experiment at the LHC has carried out a wide range of precise measurements of light (anti)nuclei produced in different collision systems. This presentation will highlight the latest results on the production of light (anti)nuclei at the LHC, including measurements based on the most recent LHC Run 3 data and studies on the formation probability of bound states as a function of final-state charged-particle multiplicity. Results will be discussed in comparison with predictions from state-of-the-art theoretical models.

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