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Measurement of A>2 (anti)nuclei production in pp at $\sqrt{s}$ = 13.6 TeV by ALICE

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The production of light antinuclei with mass number A>2 in cosmic rays has long been regarded as a promising indirect signature of dark matter annihilation in the Galaxy, owing to the extremely low expected astrophysical background. A precise understanding of these background contributions, arising from interactions of primary cosmic rays with the interstellar medium, is therefore essential. Equally important is a detailed description of the formation mechanisms of these bound states, which govern their production both in dark matter–induced and standard astrophysical processes. Such mechanisms can be experimentally studied in pp collisions at the LHC. In this talk, the ALICE Collaboration presents high-precision measurements of (anti)He3 and (anti)He4 production in pp collisions at 13.6 TeV, based on the large data samples collected during Run 3. The measured integrated yields and transverse momentum spectra are compared with predictions from state-of-the-art coalescence and statistical hadronisation models. These results provide new insights into the mechanisms governing (anti)nuclei production and shed light on the differences observed in the modeling of A=3 and A=4 states across different collision systems.

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