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The dark side of ALICE: from antinuclei interactions to dark matter searches in space

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Space: the final frontier for antinuclei physics. There, antinucleosynthesis models already tested on the bench of hadronic colliders and particle physics experiments are put at work to crack one of the biggest problems of modern physics: the existence and nature of dark matter.

In fact, the observation of an antinucleus in cosmic rays would most probably mean a breakthrough in searches for Dark Matter. However, to correctly interpret future results, precise knowledge of both the antinuclei production mechanism and their nuclear inelastic cross sections is needed.

The ALICE collaboration already investigated in detail the anti nucleosynthesis models in small and large collision systems at the LHC and has recently performed several measurements of antideuteron, $^3\bar{\text{H}}$ and $^3\bar{\text{He}}$ inelastic cross sections, providing the first experimental information of this kind.

In this talk, the final results on antideuteron and $^3\bar{\text{He}}$ inelastic cross-sections and the new results on $^3\bar{\text{H}}$ inelastic cross-sections are discussed as well how, thanks to them, it is possible to determine for the first time the transparency of the Galaxy to antinuclei stemming from dark matter and Standard Model collisions.

In-person participation

Yes

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