

Contribution submission to the conference SMuK 2021

Measurement of the antinuclei nuclear inelastic cross sections with ALICE and implications for indirect Dark Matter searches — ●STEPHAN KÖNIGSTORFER for the ALICE-Collaboration — Technische Universität München

Light antinuclei in cosmic rays such as antideuteron or antihelium-3 are considered a unique probe for signals from exotic physics like WIMP Dark Matter annihilations. Indeed, these channels are characterised by a very low astrophysical background, which comes from antinuclei produced by high-energy cosmic ray interactions with ordinary matter.

In order to make quantitative predictions for antinuclei fluxes near earth, both the production and annihilation cross sections of antinuclei need to be accurately known down to low energies. In ultra relativistic pp, p-Pb and Pb-Pb collisions at the CERN LHC, matter and anti-matter are abundantly produced in almost equal amounts, allowing us to study the production of antinuclei and measure their absorption in the detector material. The antinuclei absorption cross section is evaluated on the average ALICE material. Using this result, we can predict the transparency of our galaxy to antihelium-3 nuclei from both dark matter annihilations and high-energy cosmic ray collisions.

In this talk we present the first measurements of the antideuteron and anti-3He absorption cross section with ALICE and we discuss the implications of these results for indirect Dark Matter searches using cosmic antinuclei.

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