



Contribution ID: 114

Type: **not specified**

Measurement of anti- ^3He nuclei absorption in matter and impact on their propagation in the Galaxy

Some dark matter candidates, such as the Weakly Interacting Massive Particles (WIMPs), are expected to annihilate in our galaxy and produce, among other particles, light antinuclei, which can be observed as cosmic rays. However, the same antinuclei can also be produced in ordinary cosmic ray collisions with the interstellar gas. Thus, precise modelling of signal and background cosmic ray fluxes, including the inelastic losses in the interstellar medium, is required to draw conclusions from future measurements expected by the AMS and GAPS experiments.

Recently, measurements of the momentum-dependent inelastic cross sections of antideuteron and antihelium-3 nuclei were carried out employing the ALICE detector material as a target. The antihelium-3 inelastic cross sections have been obtained by applying the antimatter to-matter ratio and TOF-to-TPC matching methods in pp and Pb-Pb collisions, respectively. These, for the first time, measured inelastic cross sections have been implemented in the GALPROP propagation model to estimate the losses in the antihelium-3 cosmic ray fluxes due to inelastic interactions with the interstellar medium.

The results of this interdisciplinary study by ALICE allowed the determination of the transparency of our galaxy to the propagation of the antihelium-3 from dark matter annihilation and ordinary cosmic ray collisions, and to demonstrate that antihelium-3 nuclei are a promising probe for indirect dark matter searches.

Author: ŠERKŠNYTĖ, Laura (Technische Universitaet Muenchen (DE))

Presenter: ŠERKŠNYTĖ, Laura (Technische Universitaet Muenchen (DE))