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Identifying nuclei with time-of-flight at LHCb

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Antimatter in cosmic rays is a powerful probe for Dark Matter indirect detection. To constrain the background from secondary antiparticles, produced during cosmic ray propagation through the interstellar medium, the related cross sections need to be precisely determined at accelerator facilities. In particular, being their secondary production suppressed at low energies with respect to DM signal predictions, light anti-nuclei like anti-deuterium and anti-helium are smoking guns for exotic sources. The LHCb experiment currently offers a unique fixed-target facility exploiting the beam energy provided by LHC and can reproduce cosmic collisions between protons at the TeV scale and gas targets of helium. In this poster, we will present the implementation of a new particle identification technique optimized for heavy particles like light nuclei, based on a time-of-flight measurement in the LHCb Outer Tracker detector, with a focus on the first performance results obtained on data. Applications in future analyses will also be discussed

Category

Experiment

Collaboration (if applicable)

LHCb

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