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Studies of Medium and Heavy mass cosmic ray nuclei with the DAMPE space mission

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The Dark Matter Particle Explorer (DAMPE), is a space–borne detector designed for precise galactic Cosmic Ray (CR) studies in a wide energy range (up to hundreds of TeV), along with detailed measurements of high–energy gamma–rays and indirect searches of Dark Matter (DM) annihilation/decay to detectable particles. The satellite was successfully launched into a sun–synchronous orbit at 500 km, on December 17th 2015 and has been successfully acquiring data ever since. The instrument consists of four sub-detectors, namely: a Plastic Scintillator Detector (PSD), a Silicon TracKer-converter (STK), a deep BGO calorimeter (~32 X_0, ~1.6 λ_I) and a Neutron Detector (NUD).

DAMPE provided valuable insight on the spectra of cosmic-ray electrons+positrons, protons, along with recent measurements of helium, leading to impressive findings that necessitate a careful reconsideration of prevailing CR models. In this work, ongoing advancements regarding the analyses of medium (ranging from lithium up to oxygen) and heavier (iron group) mass nuclei will be illustrated. Additionally, preliminary results on secondary-over-primary ratios (i.e., B/C) crucial in deciphering the nature of CR propagation in the Galaxy, will be discussed.

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Cosmic rays

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