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Measuring the inelastic cross section of proton and helium-4 in space with DAMPE [10'+5']

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The Dark Matter Particle Explorer (DAMPE) is an ongoing space-borne experiment for the direct detection of cosmic rays (CR). Thanks to its large geometric acceptance and thick calorimeter, DAMPE is able to detect CR ions up to unprecedented energies of hundreds of TeV. Following by now more than 8 years of successful operation, DAMPE has amassed a large dataset of high-energy hadronic interactions in a regime that is often difficult to probe by accelerator experiments. In this contribution, we show how DAMPE data can be used to measure inelastic ion-nucleon cross sections, and present a cross section measurement of both proton and helium-4 on the BGO calorimeter. Our measurements are compared to previous results from accelerator experiments and current cross section models such as EPOS-LHC, QGSJETII-04, and DMPJET3.

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