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Nuclear Cross Section for Cosmic Rays Experiments

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Apparent discrepancies exist among cosmic-ray (CR) nuclei flux measurements from recent precision experiments such as AMS, CALET, and DAMPE. While it is difficult to determine the origin of these discrepancies, a predominant source of systematic error in these measurements arises from understanding nuclear interactions in detector materials.
Interactions of heavy nuclei with detector materials (such as carbon, aluminum, silicon, etc., or composites such as plastic, BGO, LYSO, etc.) are modeled using a sparse dataset of nucleus-nucleus cross-section measurements and are often extrapolated into regions where no data is available.
In 2024, taking advantage of the high-intensity, high-energy heavy-ion beam available at the CERN Super Proton Synchrotron, a test beam campaign was conducted to study the feasibility of measuring nuclear cross sections with experimental devices originally built for cosmic ray experiments in space. In this work, we report on the experimental setup and the preliminary results obtained, with an outlook on future developments.

Eligibility for ”Best presentation for young researcher” or ”Best poster for young researcher” prize

No

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