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Measurement of Deuteron over Proton flux ratio among CR with the AMS-02 experiment

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Deuterons are the most abundant secondary light isotopes among cosmic rays (CR) and thus are an extremely sensitive tool to test and constrain cosmic ray propagation models.
Another important feature of the deuteron component of CR is the particularly low threshold of the proton-proton fusion reaction, one of the most important contributors of the sub-GeV deuteron abundance, an energy range accessible by the AMS-02 thanks to its Time of flight detector.
For these reasons, tools like the d/p flux ratio are extremely important for the comprehension of the propagation of CR, integrating the informations coming from measurements such as 3He/4He and B/C and testing the universality of propagation models.
Due to its importance, the deuteron component of CR has been measured by multiple experiments to the time being, but with typically large errors and inconsistency with each other. In this picture, the measurement of AMS02 is a game-changer, being able to access with higher precision to a wider energy range with respect to all the predecessors, going from 0.3 to 9 GeV/n, combining the isotopic separation power of its ToF and RICH sub-detectors.
We will present a preliminary measurement of d/p fluxes ratio coming from the detection of 15 million deuterons over a 6 yrs of continuous data-taking.

Summary

Cosmic Deuteron abundance measurement are very important for the knowledge of cosmic ray propagation, and AMS-02 can measure it with unprecedented precision in a wide energy range

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