# Deuteron and Antideuteron Production Simulation in Cosmic-ray Interactions

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**Abstract**

The study of the cosmic-ray deuteron and antideuteron flux receives an increasing interest in current astrophysics investigations. For both cases an important contribution is expected from the nuclear interactions of primary cosmic rays with intergalactic matter. In this work, deuteron and antideuteron production from $\sqrt{s}$ = 6 GeV to 7TeVin p+p and p+A collisions were simulated using EPOS-LHC and Geant4's FTFP-BERT Monte Carlo models by adding an event-by-event coalescence model afterburner. These estimates depend on a single parameter (p0) obtained from a fit to the data. The p0 for deuterons in this wide energy range was evaluated for the first time. It was found that for antideuterons p0 is not a constant at all energies, as previous works suggested. As a consequence, the antideuteron production cross section drops a factor of 20 between $\sqrt{s}$ = 6 and 10 GeV than earlier estimations. The expected secondary flux of deuterons and antideuterons is calculated with GALPROP, considering the new p0 parametrization.

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