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Hadron Cross Sections and Uncertainties in Cosmic Antiproton Production & Beyond

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Collider-based QCD calculations shed light on cosmic ray antiproton anomalies with novel cross-disciplinary results. Current astrophysical observations require a precise calculation of cross sections for direct proton-proton to antiproton production vs. indirect production (in which an antineutron is produced first and decays to an antiproton with branching ratio 1). The results of cross section and uncertainty calculations using two sets of fragmentation functions for 17.2 GeV and multiple TeV-scale center-of-mass energies include finding a discrepancy between the claimed ~30% difference in direct and indirect antiproton productions. Implications of this work on baryon/antibaryon yield puzzles will be discussed.

Author: RITTENHOUSE WEST, Jennifer (INFN Turin and University of Turin)

Presenter: RITTENHOUSE WEST, Jennifer (INFN Turin and University of Turin)

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