SÉMINAIRE DE PHYSIQUE CORPUSCULAIRE

SUJET: Cosmic rays, anti-helium, and an old navy spotlight

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RÉSUMÉ:

Cosmic-ray anti-deuterium and anti-helium have long been suggested as probes of dark matter, as their secondary astrophysical production was thought extremely scarce. But how does one actually predict the secondary flux? Anti-nuclei are dominantly produced in pp collisions, where laboratory cross section data is lacking. We make a new attempt at tackling this problem by appealing to a scaling law of nuclear coalescence with the physical volume of the hadronic emission region. The same volume is probed by Hanbury Brown-Twiss (HBT) two-particle correlations. We demonstrate the consistency of the scaling law with systems ranging from central and off-axis AA collisions to pA collisions, spanning 3 orders of magnitude in coalescence yield. Extending the volume scaling to the pp system, HBT data allows us to make a new estimate of coalescence, that we test against preliminary ALICE pp data. For anti-helium the resulting cross section is 1-2 orders of magnitude higher than earlier estimates. The astrophysical secondary flux of anti-helium could be within reach of a five-year exposure of AMS02.

INFORMATION : http://dpnc.unige.ch/seminaire/annonce.html
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