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Cosmic rays, antihelium, and an old navy spotlight

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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 the prediction of the secondary antinuclei flux remains uncertain, as the astrophysical production is dominated by pp collisions, where laboratory cross section data is severely lacking. I will discuss attempts at tackling this problem using a scaling relation between the coalescence yield and the volume of the hadronic emission region; the latter can be probed by Hanbury Brown-Twiss analyses. The scaling relation shows consistency with a multitude of AA and pA collision data. Using the scaling relation, the predicted astrophysical anti-helium flux is orders of magnitude higher than most previous estimates, and could be within reach by AMS-2.

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