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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 anti-nuclei 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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