

# PRISMA+ Colloquium

Jan. 25, 2023 at 1 p.m.  
Lorentz-Raum, 05-127, Staudingerweg 7

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## **Search for anti-matter in the universe**

The tentative detection of a few anti-Helium nuclei [1] is presently revitalising the discussion on the existence of baryonic antimatter in the Universe. As "the discovery of a single anti-helium nucleus in the cosmic ray flux would definitely point toward the existence of stars and even of entire galaxies made of anti-matter" [2] it has been proposed that the anti-Helium nuclei could originate from anti-clouds or anti-stars in the solar vicinity [3]. We discuss possible entities of antimatter in the Universe that would be probed through ordinary matter, with annihilation-radiation providing indirect evidence for their presence [4]. The observations of high energy ( $\sim 100$  MeV) gamma-rays sets limits on the fraction of nuclear antimatter contained in our local and Galactic neighbourhood. We review recent gamma-ray [5] observations that set upper limits on such emissions.

- [1] S. Ting, <https://indico.cern.ch/event/729900>, (2018)
- [2] P. Salati, et al., Nuclear Physics B, 70, 1-3, 492, (1999)
- [3] V. Poulin, et al., Phs. Rev. D 99, 023016, (2019)
- [4] P. von Ballmoos, Hyperfine Interact. 228, 91,, (2014)
- [5] S. Dupourque, et al., Phs. Rev. D 103, 083016, (2021)