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Collisions and Transport in Antihydrogen Physics

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It has been possible for more than a decade to form antihydrogen atoms by the controlled mixing of antiprotons and positrons held in arrangements of charged particle traps [1]. More recently, magnetic minimum neutral atom traps have been superimposed upon the anti-atom production region, promoting the trapping of a small quantity of the antihydrogen yield [2-4] and first facilitating experiments [5]. We will describe some of the collision and plasma/transport physics that underpin these achievements, including a discussion of topical issues.

- [1] see e.g., M.H. Holzschneider, M. Charlton and M.M. Nieto, *Phys. Rep.* **401** (2004) 1 for a review
- [2] G.B. Andresen *et al.* (ALPHA Collaboration), *Nature* **468** (2010) 673
- [3] G.B. Andresen *et al.* (ALPHA Collaboration), *Nature Phys.* **7** (2011) 558
- [4] G. Gabrielse *et al.* (ATRAP Collaboration), *Phys. Rev. Lett.* **108** (2012) 113002
- [5] C. Amole *et al.* (ALPHA Collaboration) *Nature* **483** (2012) 439