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Measurement of the Lamb Shift of Antihydrogen

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Antihydrogen studies aim to shed light on the observed baryon/antibaryon asymmetry in the Universe by comparing the properties of matter and antimatter with very high precision. In the context of the GBAR experiment [1] located at CERN, our aim is to perform a measurement of the antihydrogen Lamb shift with an uncertainty of 100 ppm, which allows extracting the antiproton charge radius at a level of 10% [2]. Due to the two years shutdown of the accelerator complex at CERN, no experiments with antihydrogen can be performed until 2021. In the meantime, the setup is being tested and optimized by using the same detection method with a hydrogen beam at ETH Zurich. The experimental setup and the current status will be presented.

[1] P. Pérez et al., “The GBAR antimatter gravity experiment,” *Hyperfine Interactions* 233, 21–27 (2015)

[2] P. Crivelli et al., “Antiproton charge radius”, *Phys.Rev. D*94 (2016) no.5, 052008 (2016)

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