Contribution ID: **93** Type: **Poster**

The ASACUSA hydrogen hyperfine structure measurement

Tuesday, 22 October 2019 17:28 (1 minute)

The ASACUSA (Atomic Spectroscopy And Collisions Using Slow Antiprotons) Collaboration of the AD-facility at CERN aims to measure the ground-state hyperfine structure of antihydrogen to test the CPT-Theorem [1]. For this purpose, a spectroscopy apparatus has been built and tested with hydrogen [2]. An upgrade of the interaction region enabled to induce two transitions between the hyperfine transition sublevels by using the same experimental setup. It was shown, that the apparatus works as expected with a relative precision of ppb [3]. Further, analysis of data acquired at lower magnetic fields (˜46 mG to ˜0.231 G), i.e. small Zeeman splitting of the energy levels, shows a systematic shift due to interactions between the sublevels [4].
The poster will show the hydrogen beam experimental setup, the investigation of the systematic shift, the correction of the results and conclusions for the antihydrogen experiment.

References:

[1] Widmann, E., Diermaier, M., Juhász, B. et al. Hyperfine Interact 215: 1-8
(2013).
[2] M. Diermeier et al. In-beam measurement of the hydrogen hyperne splitting and prospects for antihydrogen spectroscopy. Nature Communications, 8, 2017.
[3] S. Argueda Cuendis. Measuring the hydrogen ground state hyperfine splitting through the π_1 and σ_1 transitions. Master's thesis, University of Vienna, 2017.
[4] A. Lanz. Hydrogen Hyperfine Structure Measurements using the σ_1- and π_1-Transitions: Evaluation & Correction. Master's thesis, University of Vienna, 2019.

Primary author: Mr LANZ, Andreas (Stefan Meyer Institute)

Presenter: Mr LANZ, Andreas (Stefan Meyer Institute)

Session Classification: BBQ - Drinks & Posters