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# Towards the Production of a Polarized Antihydrogen Beam

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The ASACUSA CUSP collaboration developed a unique scheme for the precision measurement of the ground state hyperfine splitting of antihydrogen. A polarized antihydrogen beam is produced by using a so-called CUSP magnetic field, which is provided by a superconducting anti-Helmoltz coil assembly. Antihydrogen atoms in high field seeking states which transmit the unique magnetic field configuration are de-focussed, while low field seeking states are focussed. The so produced polarized antihydrogen beam will be used to perform classical Rabi spectroscopy of the ground state hyperfine splitting.
In 2010 we reported on the first production of antihydrogen atoms upstream to the CUSP polarizer [1]. This was achieved by injecting a large number of cryogenic antiprotons, accumulated in the MUSASHI antiproton trap, into a compressed positron plasma stored in a nested Penning trap upstream to the CUSP. Although this was a major step towards our physics goal, experimental cycles were slow, limited by the used positron accumulation scheme. In addition in these experiments the antihydrogen formation rate was rather low. Meanwhile both numbers were significantly increased. A new positron accumulation scheme was developed which enables faster experimental cycles at much higher accumulation rates. By improving the antiproton/positron mixing techniques the antihydrogen formation-rate was increased as well. In the talk an overview on the current setup and status is given, and recent results are presented.

[1] Y. Enomoto et al., Phys. Rev. Lett. 105, 243401 (2010).

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