

## ASACUSA's low energy proton source for matter studies

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Antihydrogen atoms can be formed via three body recombination of antiprotons and positrons. The ASACUSA collaboration will use this technique of forming atoms in order to perform a ppm measurement of the ground-state hyperfine structure of them.

A proton source was developed such that hydrogen can be produced using the same apparatus and techniques which are used in the antimatter experiment.

This device assures that the system can be optimized and tested whenever antiprotons are not available.

The proton source consists of three modules. The first is responsible for electron production, the second for proton formation via electron impact ionization of H<sub>2</sub>-gas and the final one for focusing and steering of the resulting beam.

Molecular hydrogen and other impurities can be removed in the second module by applying a rotating electric field.

Integrated into the ASACUSA experimental setup, the source works as expected, enabling the accumulation of more than a million protons in the mixing trap.

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