

A new path toward gravity experiments with anti-hydrogen

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Abstract:

We propose to use a 13 KeV antiproton beam passing through a dense cloud of positronium (Ps) atoms to produce an Hbar^+ "beam". These ions can be slowed down and captured by a trap. The process involves two reactions with large cross sections under the same experimental conditions. These reactions are the interaction of antiprotons with positronium to produce the anti-hydrogen atom and the positron capture by this atom reacting on positronium to produce Hbar^+ . Once decelerated with an electrostatic field and captured in a trap the Hbar^+ ions could be cooled and the e^+ removed with a laser to perform a measurement of the gravitational acceleration of neutral antimatter in the gravity field of the Earth.