

# Gravity tests with antimatter: the AEgIS experiment

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The Weak Equivalence Principle (WEP) has been experimentally tested to high precision with differential gravity measurements using probes made of various “ordinary” matter. While in the WEP framework, antimatter should fall in the same way as matter, there is no direct evidence of this fact.

A.E.g.I.S (Antimatter Experiment: Gravity, Interferometry, Spectroscopy), aims to test the WEP on antimatter. The experiment, which is located at the CERN Antiproton Decelerator, consists of a positron accumulator, an antiproton trap and a Stark accelerator in a solenoidal magnetic field to form and accelerate a pulsed beam of antihydrogen atoms towards a free-fall detector. The method for efficient production of antihydrogen atoms at low-temperatures, as necessary for precision gravity measurements, is based on a charge exchange reaction between excited (Rydberg) positronium and cold trapped antiprotons. The antihydrogen beam passes through a moiré deflectometer to measure the vertical displacement due to the gravitational force. A position and time sensitive hybrid detector registers the annihilation points of the antihydrogen atoms and their time-of-flight. A.E.g.I.S may provide additional scientific outcomes including accurate CPT tests with high-resolution spectroscopy on antihydrogen, and study of positronium physics.

I will describe the experimental scheme and present the status of the experiment, including the most recent results on the way to the production of cold antihydrogen.

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**Classifica Sessioni:** Talks on specific topics