

Measuring the antimatter fall - The AEgIS experiment

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The study of the (a)symmetry between matter and antimatter is of great interest in modern physics. Recently the antihydrogen 1S-2S levels energy difference has been measured for the first time and compared to that of the hydrogen to test the CPT theorem. Another important aspect about the relation between matter and antimatter is gravity. Even if the general belief is that the Weak Equivalence Principle, also known as the universality of free fall, will stand also for antimatter, no definite tests have been yet performed.

The AEgIS experiment aims to measure the effects of the Earth gravitational field on a beam of antihydrogen. The experiment is taking place at the Antiproton Decelerator (AD) at the CERN European Laboratory. The antihydrogen would be produced by the combination of antiprotons, delivered by the AD, and positronium, generated by positrons implantation on a silica target. The measurement strategy is based on the acceleration of the antihydrogen atoms via an electric field gradient and the measurement of the “free fall” by the detection of the annihilations at the end of the flight path.

The experimental apparatus, the methods for the production of antihydrogen, for the generation of the beam and for the detection of the annihilations, will be presented along with some preliminary results.

Summary

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