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The GBAR experiment

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The GBAR project (Gravitational Behaviour of Antihydrogen at Rest) at CERN, will measure the free fall acceleration of ultracold neutral antihydrogen atoms in the terrestrial gravitational field. The experiment consists in preparing antihydrogen ions (one antiproton and two positrons) and sympathetically cool them with Be+ ions to a few 10 microK. The ultracold ions will then be photo-ionized just above threshold, and the free-fall time over a known distance measured. I will describe the project, the accuracy that can be reached by standard techniques, and discuss possible improvements using quantum reflection of antihydrogen on surfaces to use quantum methods of measurements.

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