

Antihydrogen gravitational mass via precision studies of antihydrogen gravitational quantum states.

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We propose a method of study of quantum states of antihydrogen atom in the Earth gravitational field near material surface which benefits from spectroscopy and interferometry of such states. We study the main false effects and show that the estimated accuracy of gravitational to inertial mass ratio for antihydrogen in the developed approach could be better than 0.0001 for 1000 antiatoms used. An essential increase in the precision of gravitational mass measurement is due to more than one order of magnitude increase in the lifetime of antihydrogen gravitational states above surfaces covered with liquid He film.

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