

Constraints on exotic spin-dependent interactions between matter and antimatter from antiprotonic helium spectroscopy

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Spin-dependent interactions [1, 2] appear in theories including “new”, i.e., so far undiscovered bosons. We have investigated the influence of these hypothetical potentials on the hyperfine structure in antiprotonic helium [3]. By comparing QED-based theoretical calculations [4] and precise spectroscopic measurements [5] we have found constraints on exotic spin- and velocity-dependent interactions between electrons and antiprotons. As a result, for the first time, semileptonic spin-dependent interactions between matter and antimatter have been constrained.

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