

The g-factor of the bound electron: A stringent test of bound-state quantum electrodynamics

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Ultra-precise determinations of the gyromagnetic factor (g-factor) of a bound electron in highly charged medium-heavy ions provide a profound test of quantum electrodynamics in bound systems

(BS-QED) under extreme conditions. In this context the g-factor of hydrogenlike silicon has been measured with a relative uncertainty of 0.5 ppb in a Penning trap, representing the most stringent test of BS-QED in strong fields. The recent determination of the g-factor of lithiumlike silicon allows to probe few electron correlation dynamics.

Moreover, with a novel measurement scheme the uncertainty of the measured frequencies was further decreased by an order of magnitude, paving the way for intriguing measurements as e.g. a determination of the mass of the electron with an accuracy of about 20 ppt, which will improve the current literature value by a factor of 20.

The measurement procedure and results are presented.