

Electron magnetic moment

G. Gabrielse

Physics Department, Harvard University, Cambridge, USA

A measurement using a one-electron quantum cyclotron gives the electron magnetic moment in Bohr magnetons, $g/2 = 1.001\,159\,652\,180\,73\,(28)$, with an uncertainty 2.7 and 15 times smaller than for previous measurements in 2006 and 1987, respectively. The electron is used as a magnetometer to allow lineshape statistics to accumulate, and its spontaneous emission rate determines the correction for its interaction with a cylindrical trap cavity. The new measurement and QED theory determine the fine structure constant, with $\alpha^{-1} = 137.035\,999\,084\,(51)$, and an uncertainty 20 times smaller than for any independent determination of α .