FYI: The *real* value of μ_e

- There are relatively simple arguments that predict
  $\mu_e = \mu_B \equiv e\hbar/2m = 9.2740 \times 10^{-24}$ J/T

- In reality, the measured mag. moment of the electron is a bit bigger:
  $\mu_e = -9.2848 \times 10^{-24}$ J/T
- The effect is small:
  $|\mu_e/\mu_B| = 1.00115965218685\ (42)$

[Yes, it has been measured *that* well – in fact, it's one of the most precisely known quantities today.]

- What causes the discrepancy? It comes from the fact that:
  - Magnetic (and electric) effects essentially arise from the exchange of "virtual" photons.
  - Sometimes these can, for a very short time, become an electron-positron pair (which then annihilate each other). There are lots of other exotic processes too.
- When all these are taken into account, our current best theoretical prediction for the value of $|\mu_e/\mu_B| = 1.001159652201\ (27)$
- This is agreement to at least 12 decimal places!!