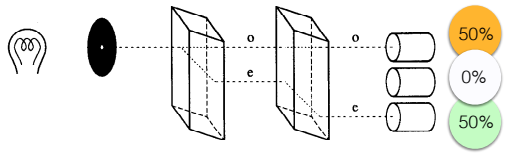
preparação de estado de polarização: adquirindo informação

repetição do teste reproduz o mesmo resultado



saltando do sec. XVIII (Arago, Fresnel) para o sec. XX....

elétron: SPIN 1/2

Experimento Stern+Gerlach 1922
feixe de átomos de Ag

Otto Stern (1888 –1969)
Nobel 1943, assistente de M Born

fóton: spin 1, mas massa de repouso zero

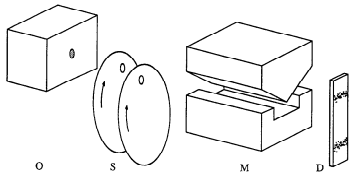
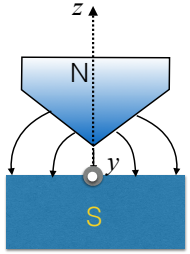


Fig. 1.5. Idealized Stern-Gerlach experiment: silver atoms evaporate in an oven O, pass through a velocity selector S, an inhomogeneous magnet M, and strike a detector D. All the impacts are found in two narrow strips.



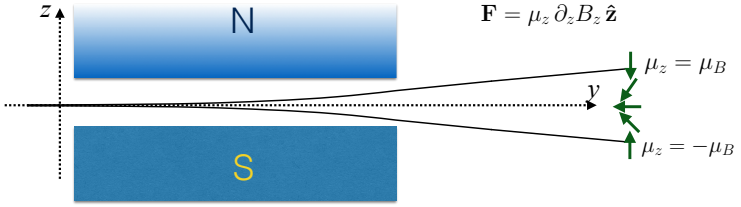
precessão de Larmor

$$U = -\mu \cdot \mathbf{B} \rightarrow \mathbf{F} = \nabla(\mu \cdot \mathbf{B}) \approx \mu_z \, \partial_z B_z \, \hat{\mathbf{z}}$$

< 0

SPIN 1/2

Experimento Stern+Gerlach 1922
feixe de átomos de Ag



$$\mathbf{F} = \mu_z \, \partial_z B_z \, \hat{\mathbf{z}}$$

$\mu_z = \mu_B$

$\mu_z = -\mu_B$

Magneton de Bohr $\mu_B = \dfrac{q\hbar}{2m} = -9.3 \times 10^{-24}\,\mathrm{J/Tesla}$

$$\mu_z = \mu_B \, \sigma_z, \quad \sigma_z = \pm 1$$

Resultado para átomos individuais: **probabilístico**

SPIN 1/2

Experimento Stern+Gerlach 1922
feixe de átomos de Ag