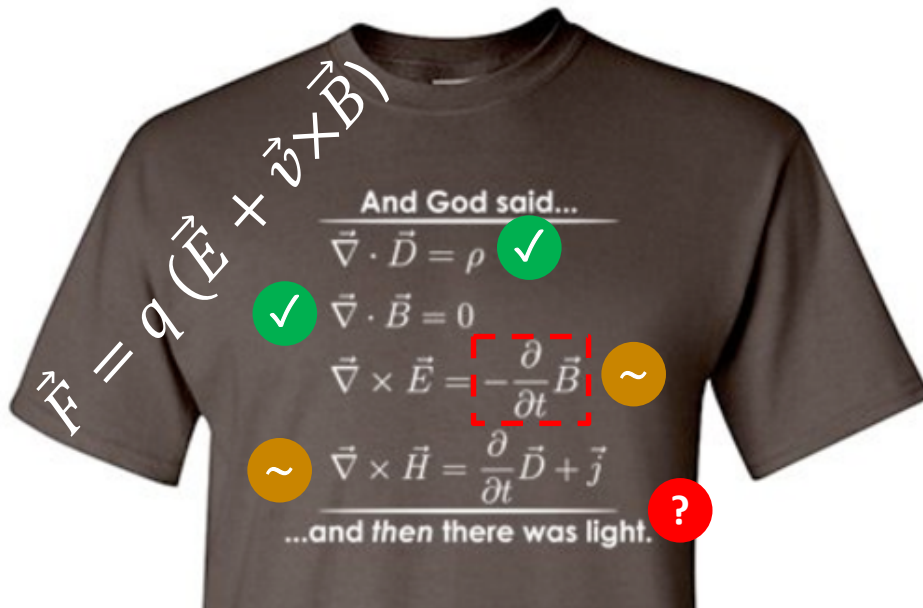


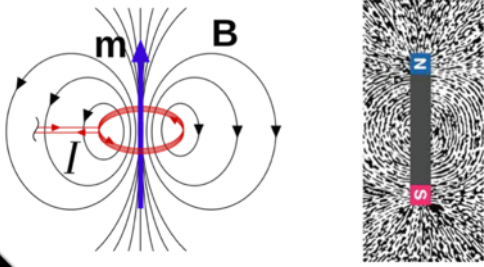


Anteriormente en Física 3 A

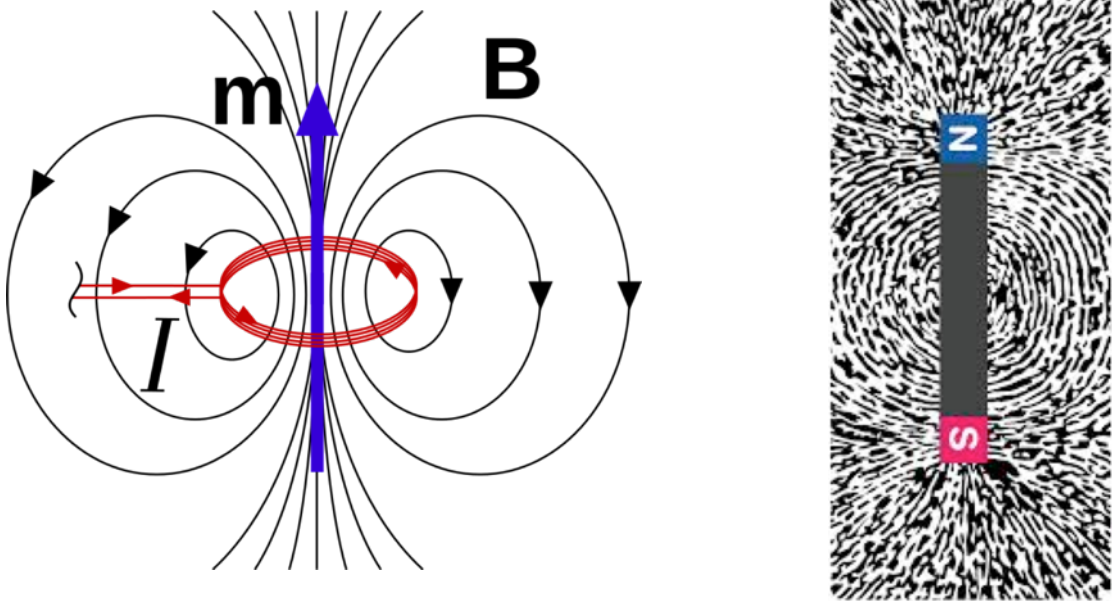


Anteriormente en Física 3 A

La **espira circular** es un dipolo magnético



La **espira circular** es un dipolo magnético



Andre Geim

Nobel 2010



Ig Nobel 2000

Eur. J. Phys. 18 (1997) 307-313. Printed in the UK

PII: S0143-0807(97)84689-2

Of flying frogs and levitrons

M V Berry† and A K Geim‡

† H H Wills Physics Laboratory, Tyndall Avenue, Bristol BS8 1TL, UK

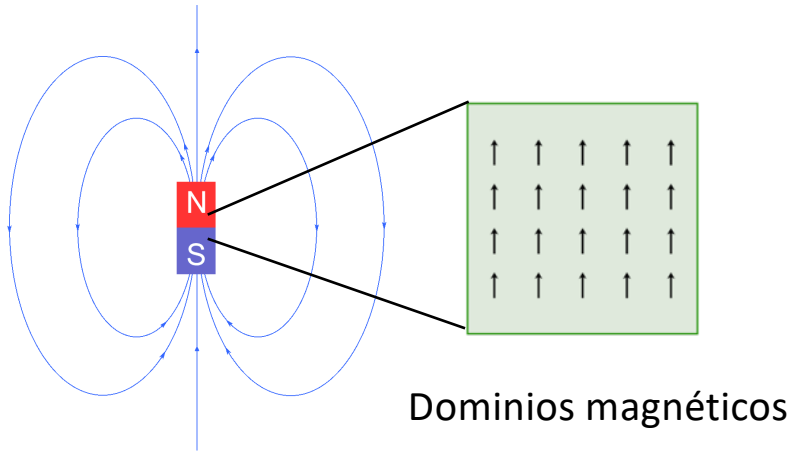
‡ High Field Magnet Laboratory, Department of Physics, University of Nijmegen, Toernooiveld, 6525 ED Nijmegen, The Netherlands

Received 4 June 1997



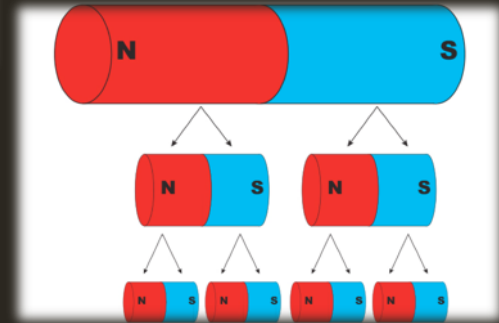
20 T

Origen del magnetismo en la materia



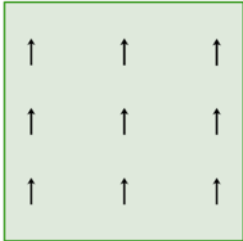
Petrus Peregrinus de Maricourt # Magnetismo

S. XIII

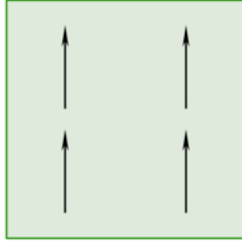


Origen del magnetismo en la materia

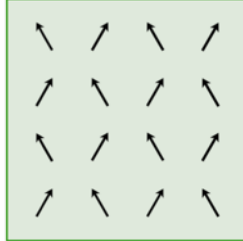
Dominios magnéticos



Densidad

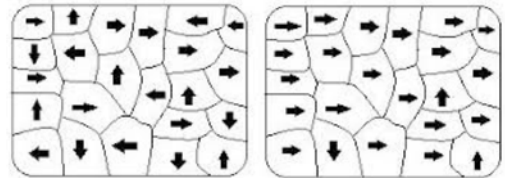


Magnitud

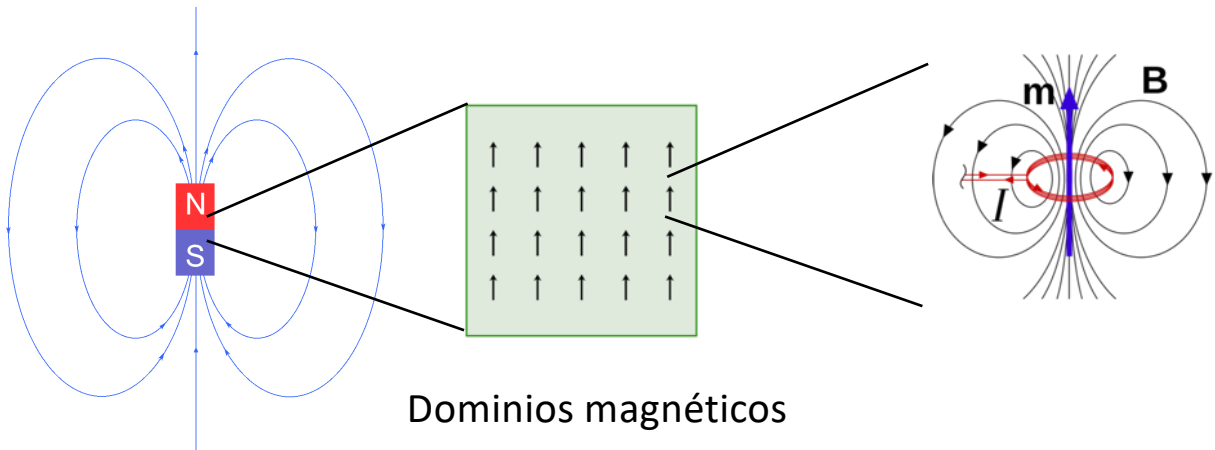


Organización

Organización de los dominios magnéticos

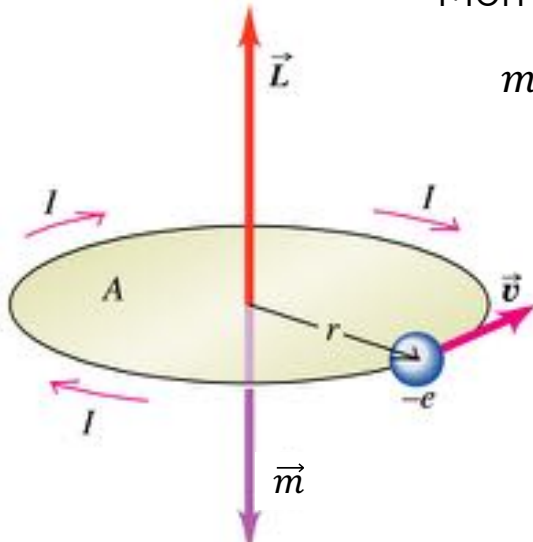


Origen del magnetismo en la materia



Leer acerca del efecto Einstein-de Haas

Origen microscópico del magnetismo



Momento magnético

$$\vec{L} = m \vec{r} \times \vec{v}$$

$$m = I A = -\frac{e}{\tau} \pi r^2$$

$$= -\frac{e v}{2 \pi r} \pi r^2 = -\frac{e}{2 \pi} v r$$

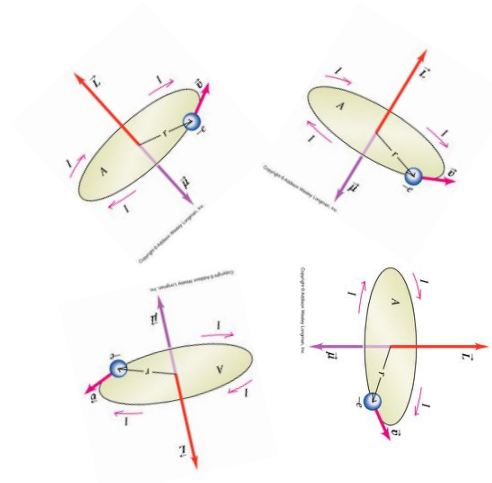
$$= -\mu_b \frac{L}{\hbar}$$

$$\frac{e \hbar}{2 m_e} = 9.274 \cdot 10^{-24} \text{ A m}^2$$

Magnetón de Bohr

* Los núcleos tienen momento magnético pero es 1000 veces menor

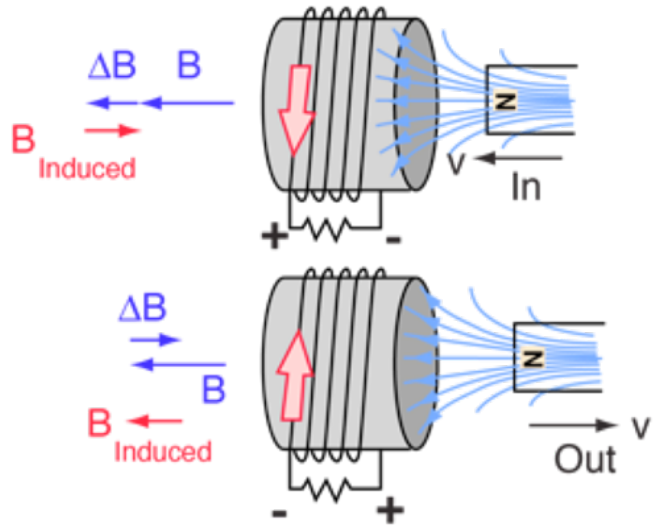
Materiales **Dia**magnéticos



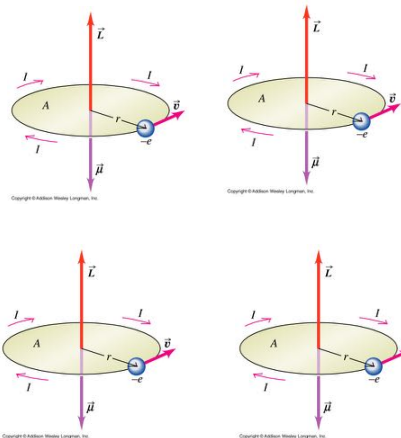
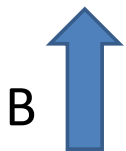
Sin campo magnético aplicado las corrientes circulan en cualquier dirección.

Campo nulo, orientación al azar

La corriente inducida genera un campo magnético que se opone a la variación del flujo

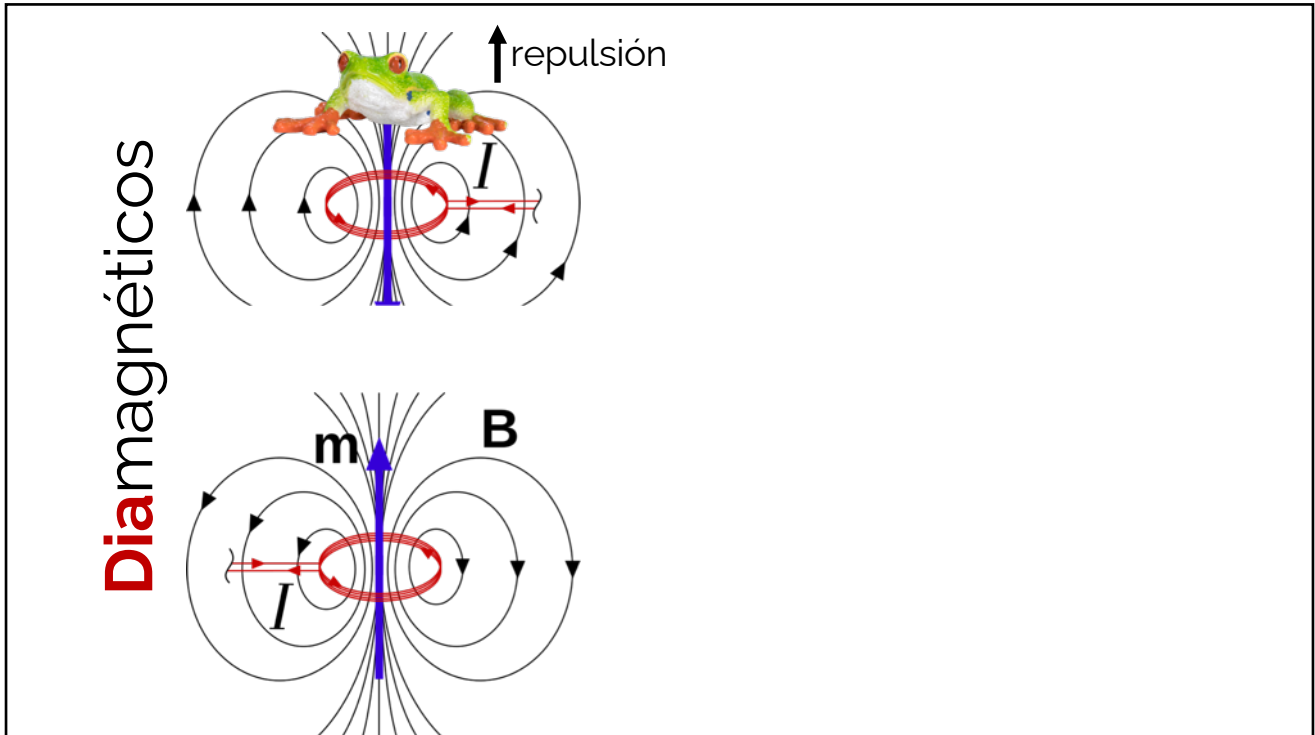


Materiales **Dia**magnéticos

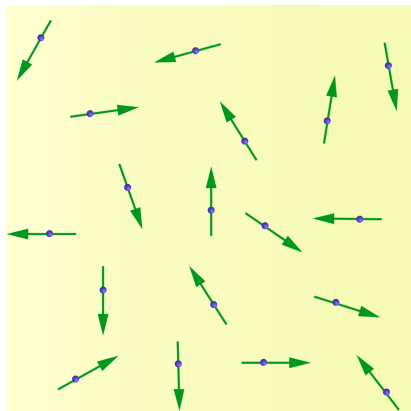


Faraday: oposición al cambio de flujo magnético

Campo no nulo, orientación antiparalela.



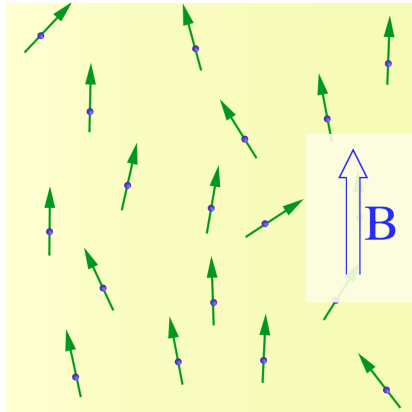
Materiales **Para**magnéticos



Gas clásico de moléculas,
cada una con un momento
dipolar magnético.

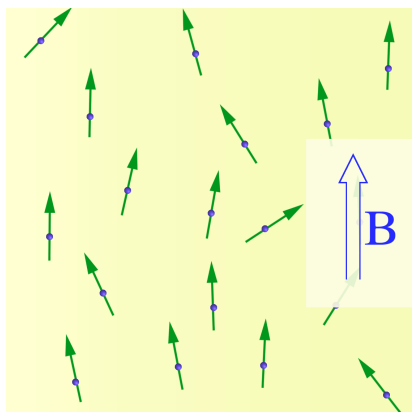
Campo nulo,
orientación al azar

Materiales **Para**magnéticos



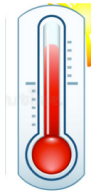
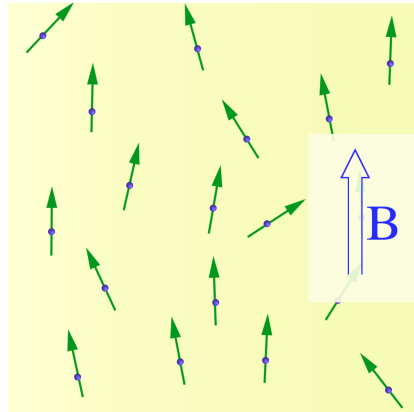
Campo no nulo pequeño,
orientación ordenada.

Materiales **Para**magnéticos



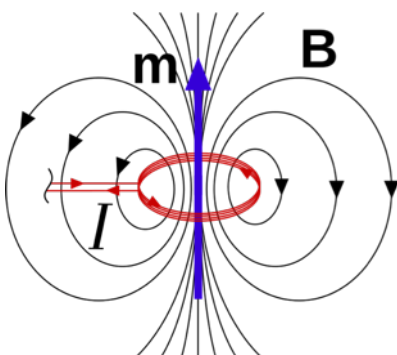
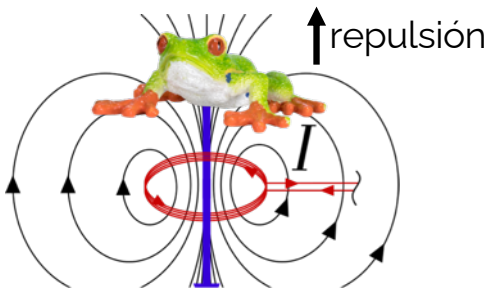
Campo no nulo grande,
saturación.

Materiales **Paramagnéticos**



Campo no nulo grande,
mayor temperatura,
no saturación.

Diamagnéticos



Paramagnéticos

