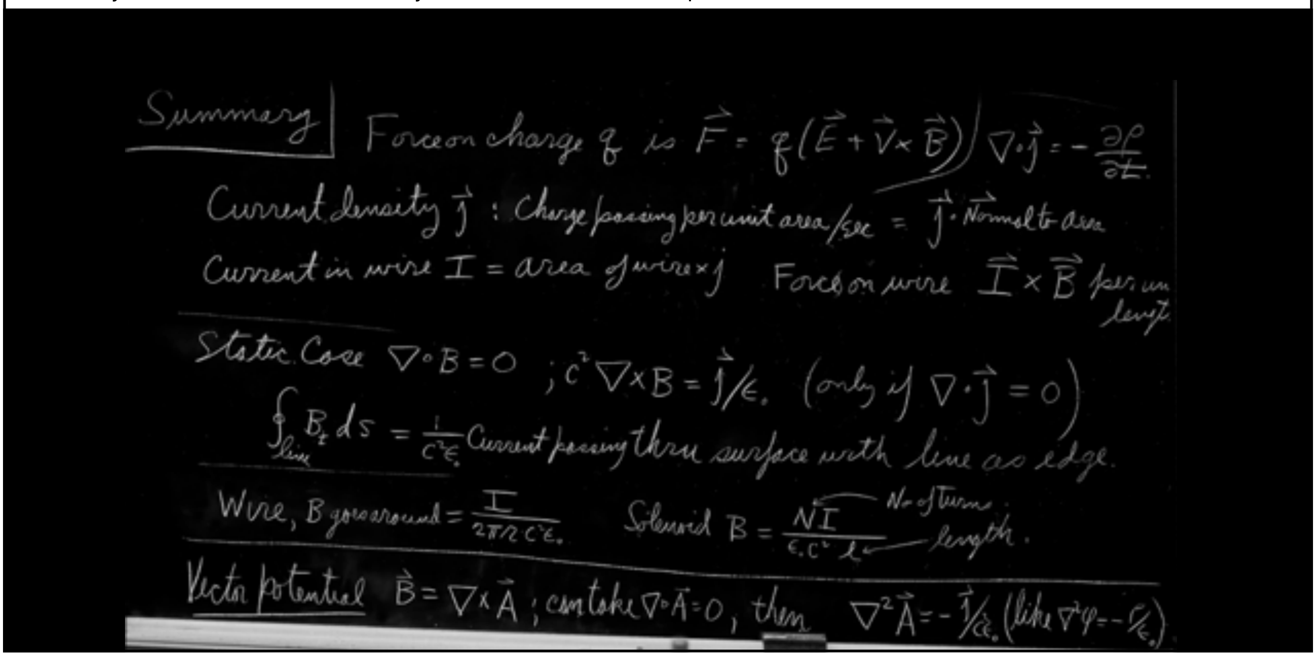
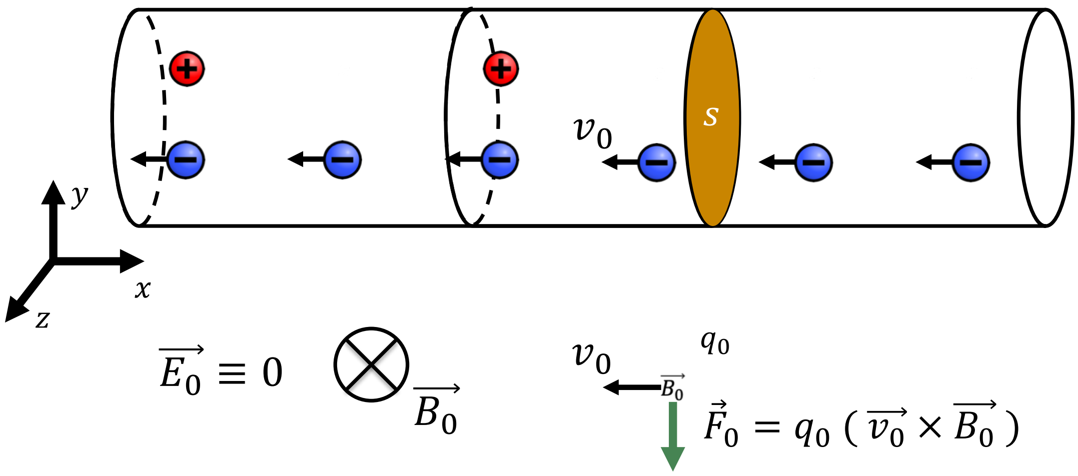

## La relatividad de campos magnéticos y eléctricos

The Feynman Lectures on Physics. Volumen 2. Capítulo 13.6



## Relatividad de campos eléctricos y magnéticos

$$\vec{F} = q\,(\vec{E} + \vec{v}\times\vec{B})$$

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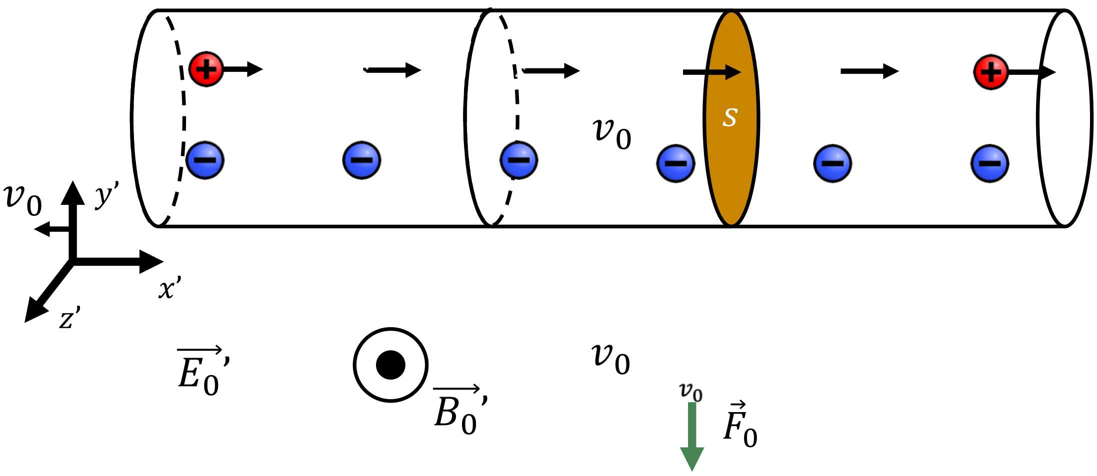

## **Relatividad** de campos eléctricos y magnéticos

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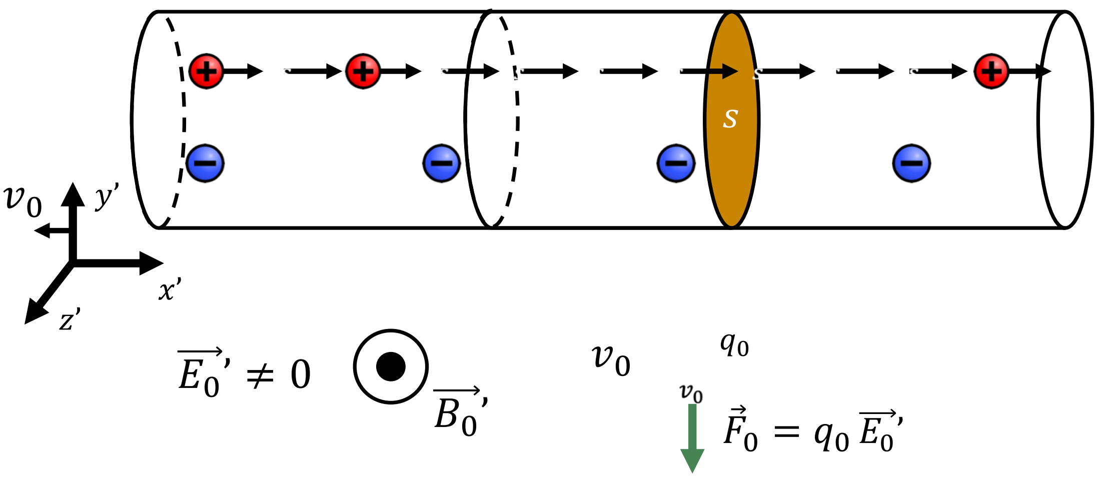


## La relatividad de campos magnéticos y eléctricos

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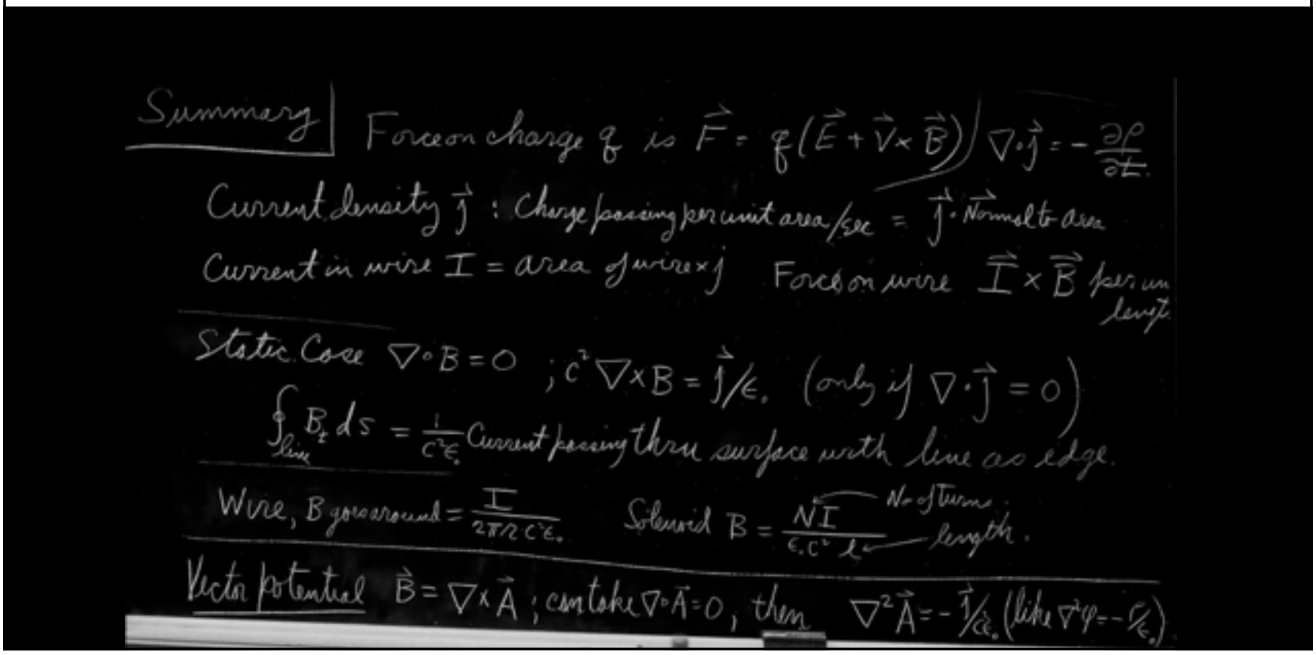
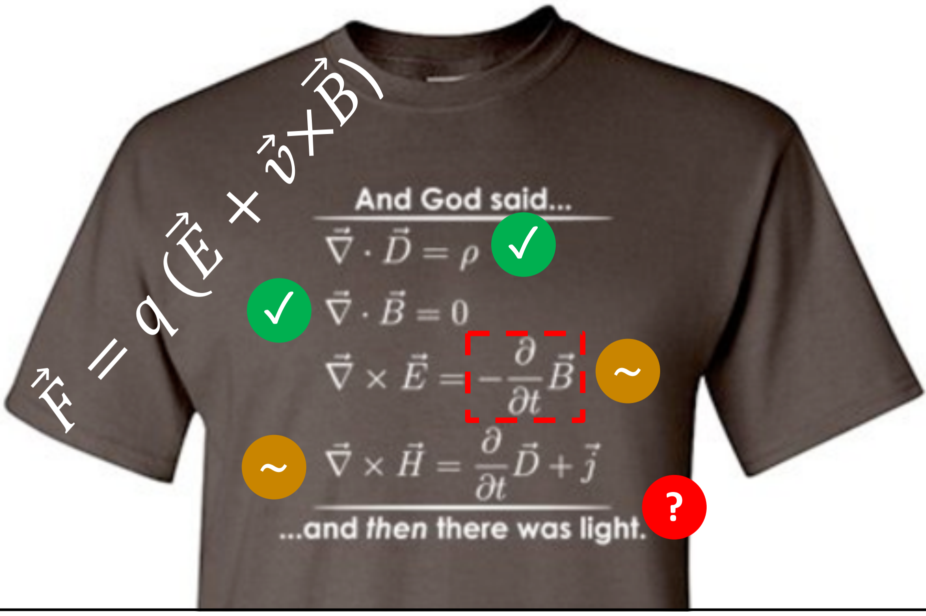


# Anteriormente en Física 3 A

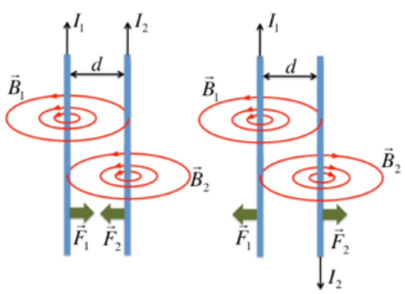



# Anteriormente en Física 3 A

Campo magnético de una carga en movimiento

$$\vec{B}(\vec{r}) = \frac{\mu_0}{4\pi} q_f \left( \vec{v}_f \times \frac{\vec{r} - \vec{r}_f}{\left|\vec{r} - \vec{r}_f\right|^3} \right)$$

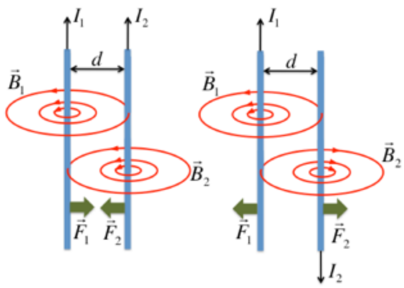
$$\delta\vec{B}(\vec{r}) = \frac{\mu_0}{4\pi} I \left( \delta\vec{\ell} \times \frac{\vec{r} - \vec{r}_f}{\left|\vec{r} - \vec{r}_f\right|^3} \right)$$




$$\left|\delta\vec{F}_{m,2}\right| = |I_2|\left|\delta\vec{\ell}\right| \frac{\mu_0}{2\pi}\frac{|I_1|}{d}$$

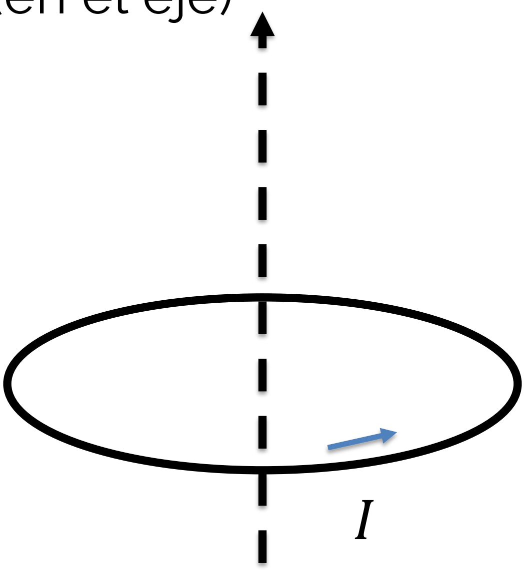
# Anteriormente en Física 3 A


$$\vec{B}(\vec{r}) = \frac{\mu_0}{4\pi} \int_{\mathcal{C}} I \frac{\delta\vec{\ell} \times (\vec{r}-\vec{r}_f)}{\left|\vec{r}-\vec{r}_f\right|^3}$$




$$\left|\delta\vec{F}_{m,2}\right| = |I_2|\left|\delta\vec{\ell}\right| \frac{\mu_0}{2\pi} \frac{|I_1|}{d}$$

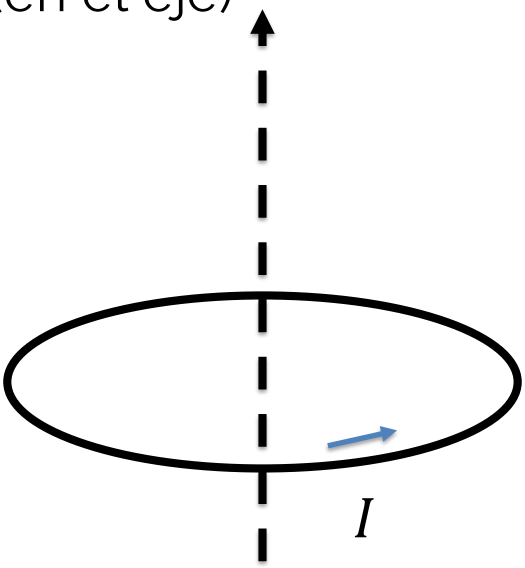
Campo magnético de una **espira circular** (en el eje)




$$\vec{B}(\vec{r}) = \frac{\mu_0}{4\pi} \int_{\mathcal{C}} I \frac{\delta\vec{\ell} \times (\vec{r}-\vec{r}_f)}{\left|\vec{r}-\vec{r}_f\right|^3}$$

$$\vec{B}(z) = \frac{\mu_0}{4} I \frac{a^2}{(a^2+z^2)^{3/2}}$$

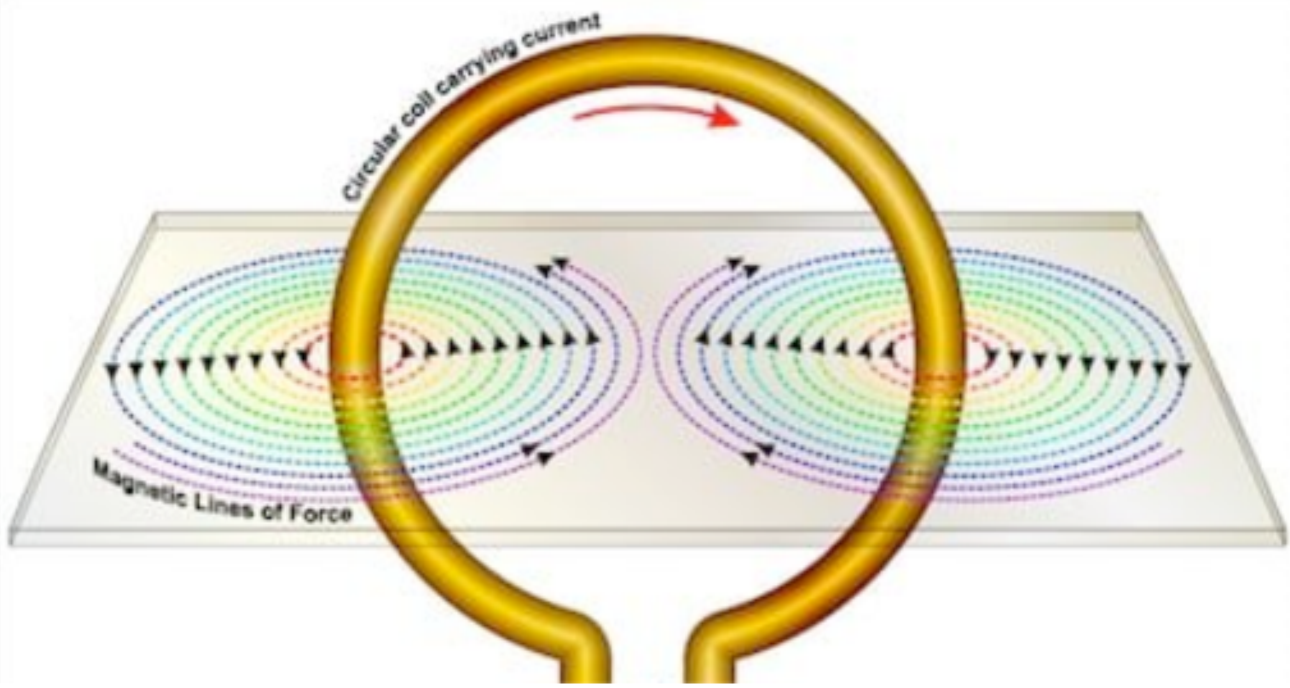
## Campo magnético de una **espira circular** (en el eje)



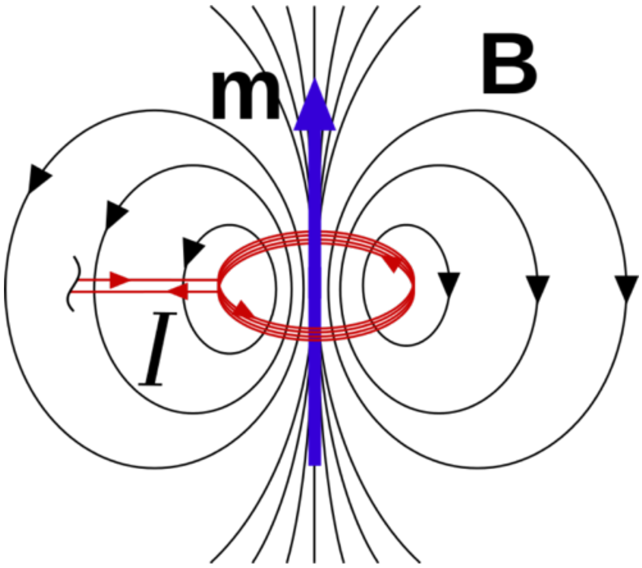

$$\vec{B}(z) = \frac{\mu_0}{4} I \frac{a^2}{(a^2 + z^2)^{3/2}}$$

¿Dónde toma su valor máximo

¿Cuanto vale muy lejos? (m=$\pi a^2 \, I$)

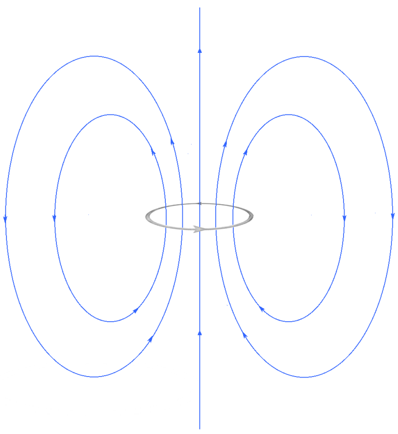


## La **espira circular** es un dipolo magnético

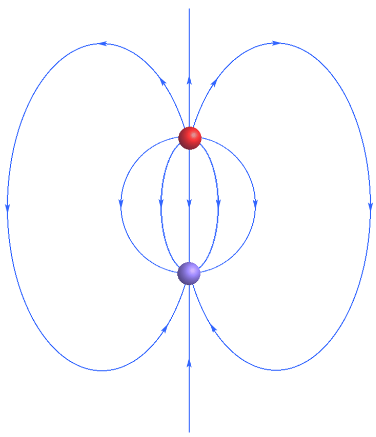




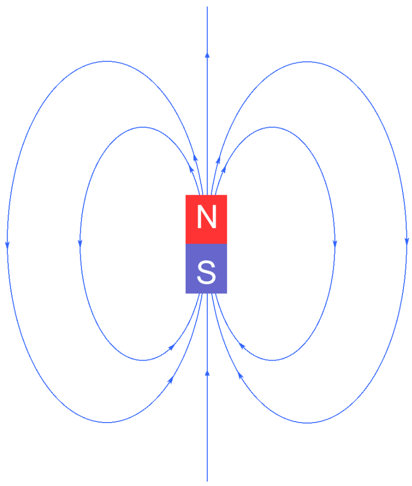
## Dipolo magnético



Una espira



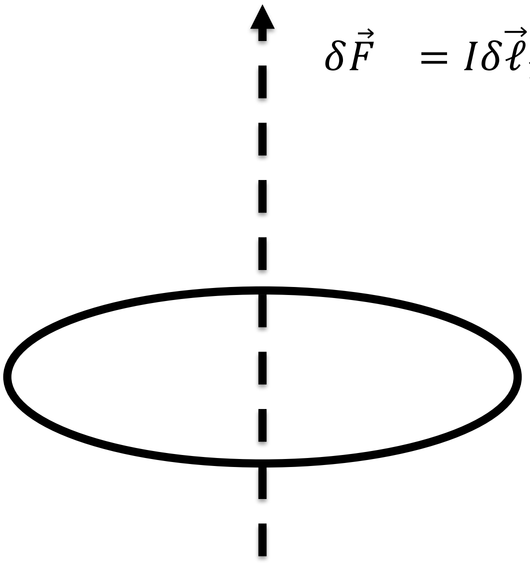
Dos "cargas magnéticas"




Una imán

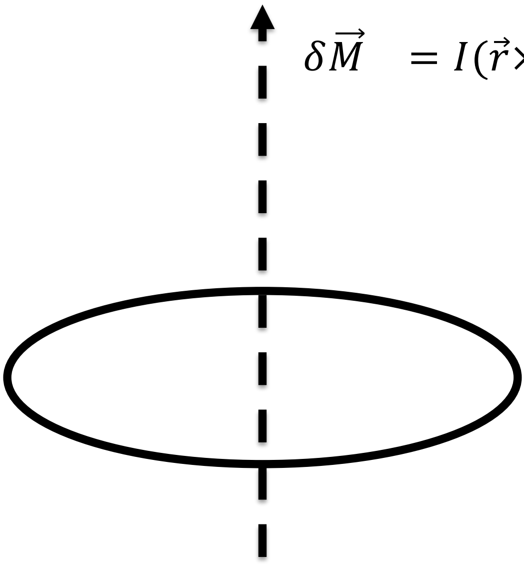
## Fuerza sobre una **espira circular**
(en un campo magnético homogéneo)

$$\delta\vec{F} = I\delta\vec{\ell}_1\times\vec{B}$$

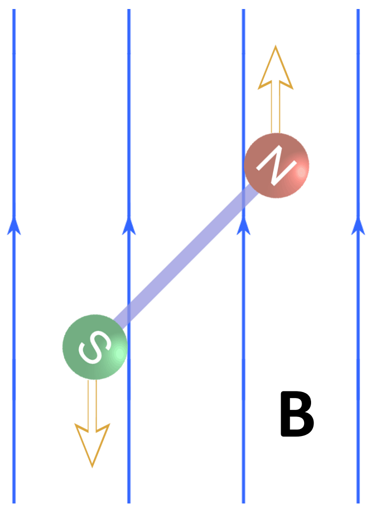


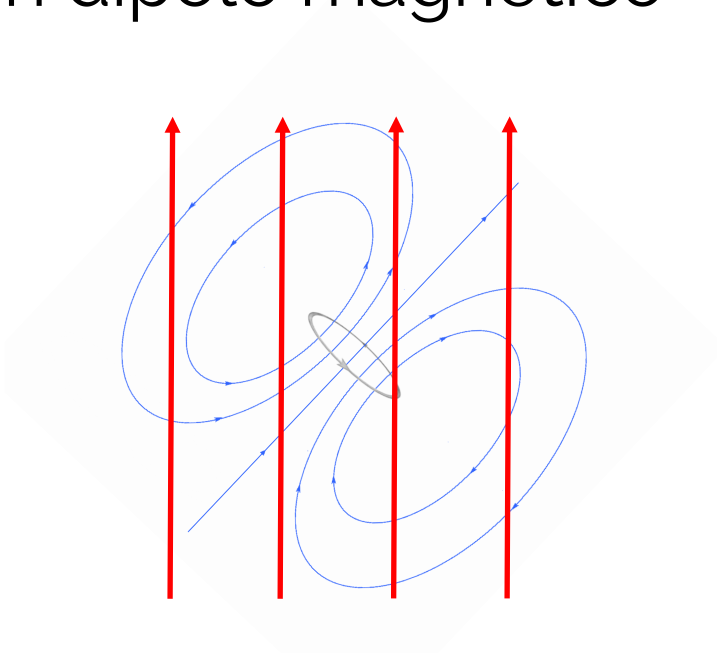
## Momento sobre una **espira circular**
(en un campo magnético homogéneo)

$$\delta\vec{M} = I(\vec{r}\times\delta\vec{\ell}_1)\times\vec{B}$$

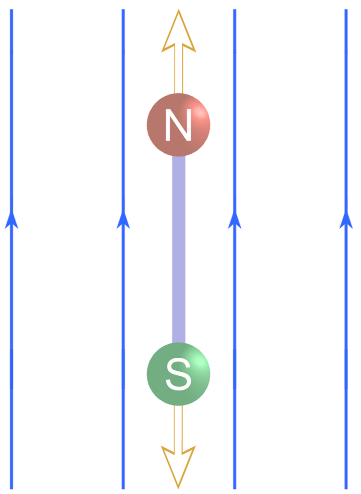


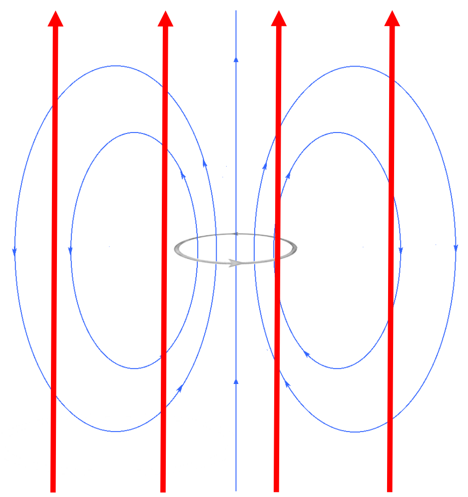
# Torque sobre un dipolo magnético

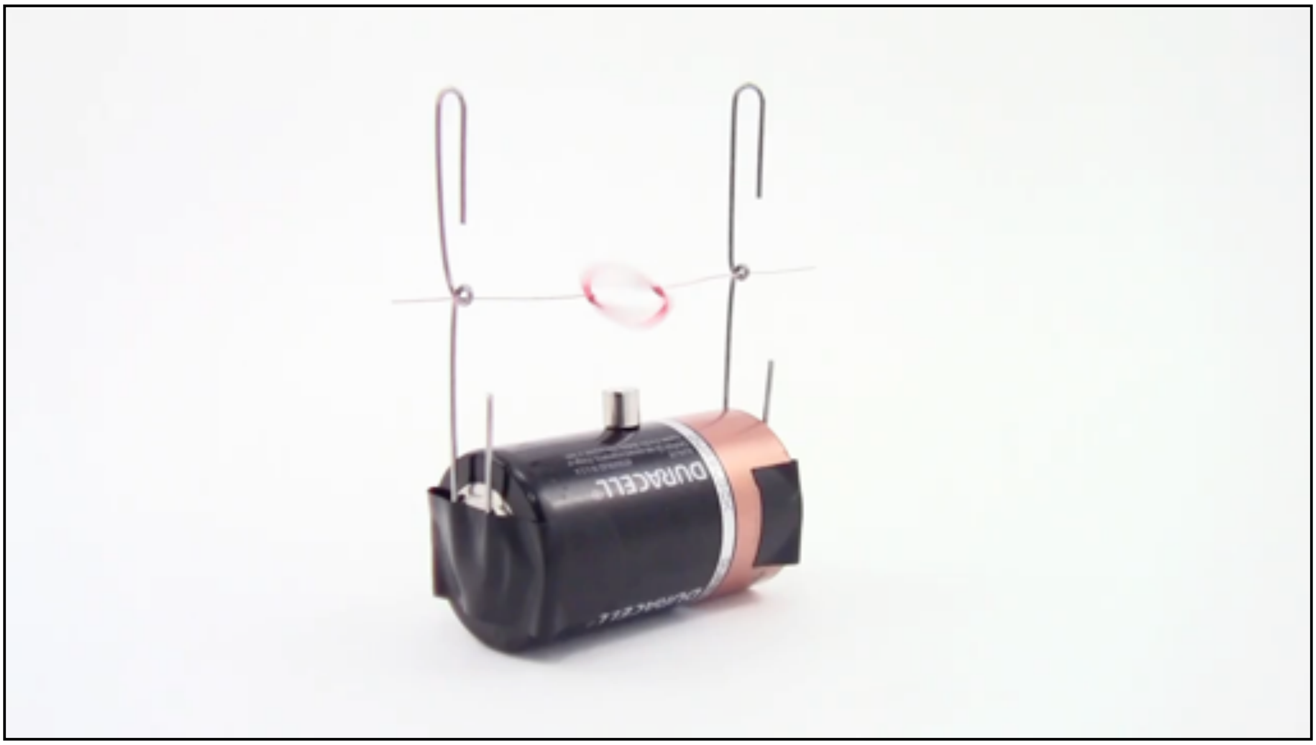


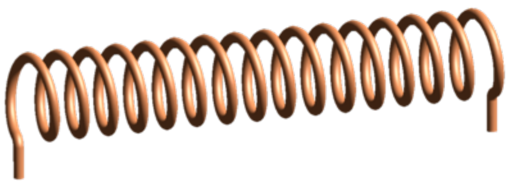
# Torque sobre un dipolo magnético



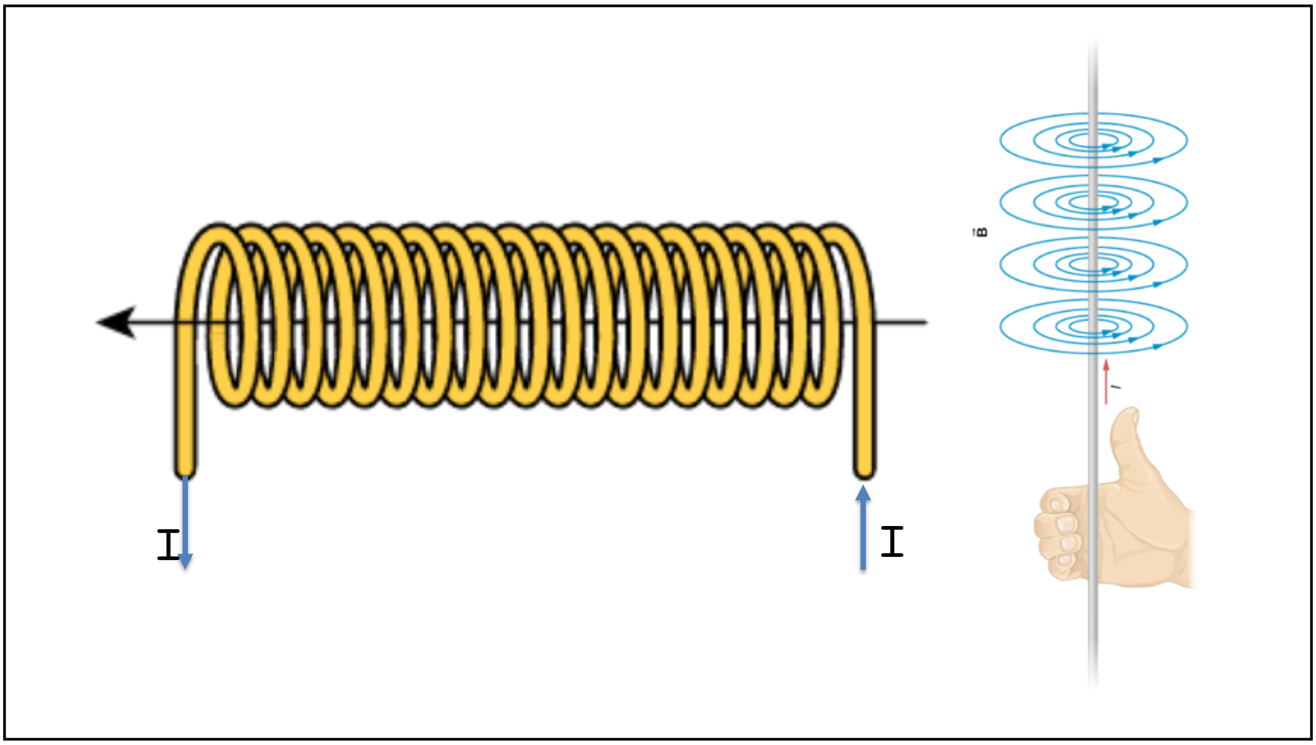



## Campo magnético de un solenoide (en el eje)



$$\vec{B}(\vec{r}) = \frac{\mu_0}{4\pi}\int_{\mathcal{C}} I\,\frac{\delta\vec{\ell}\times(\vec{r}-\vec{r}_f)}{|\vec{r}-\vec{r}_f|^3}$$

Guia 4. Ejercicio 9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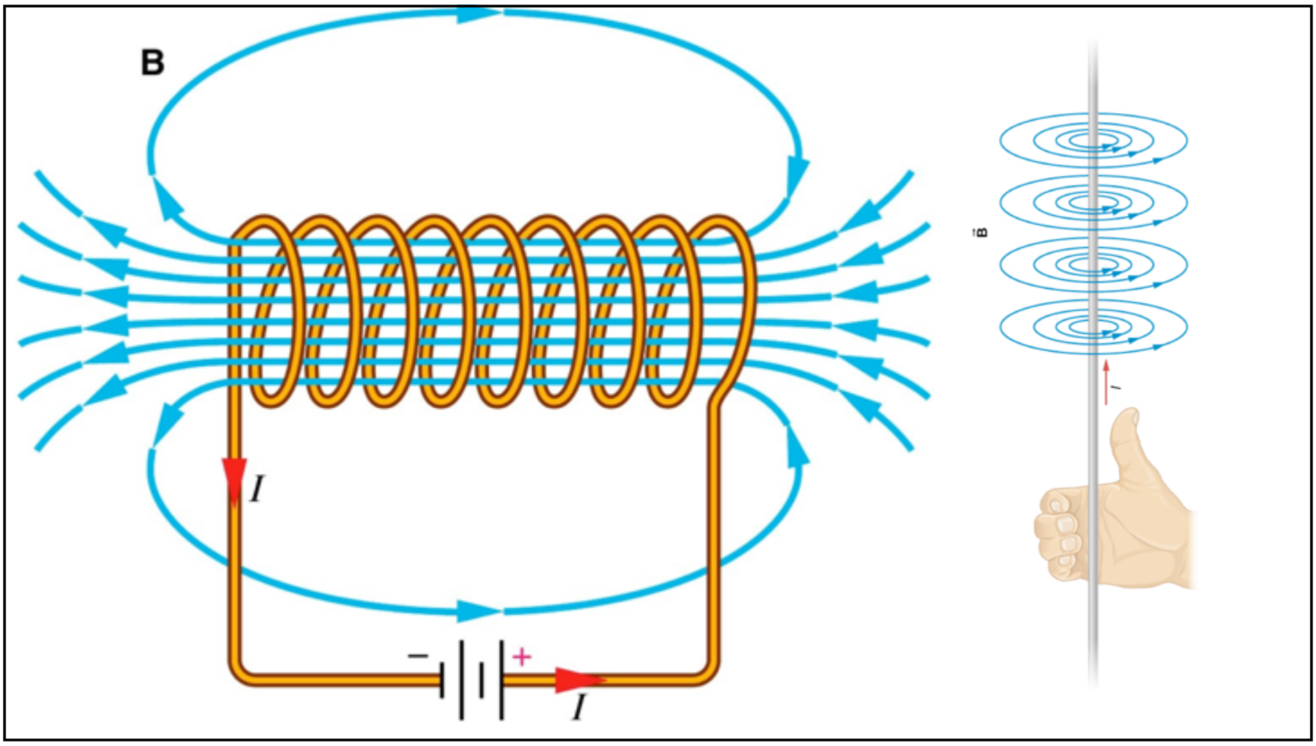
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