

# TEMA 5

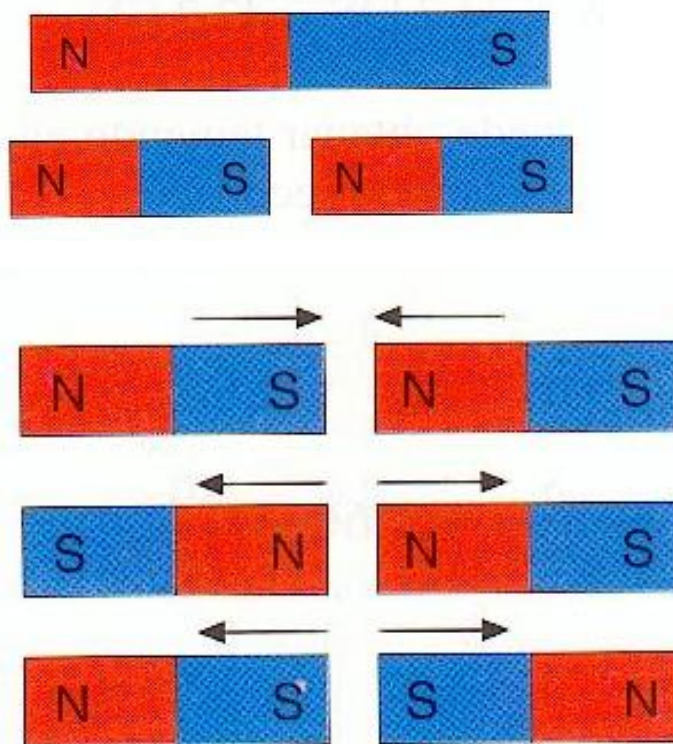
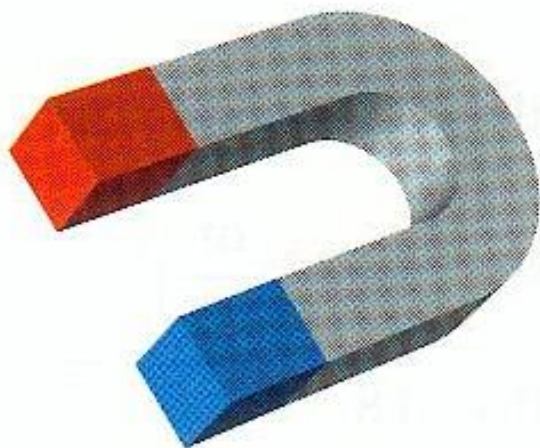
## MAGNETISMO

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# ÍNDICE

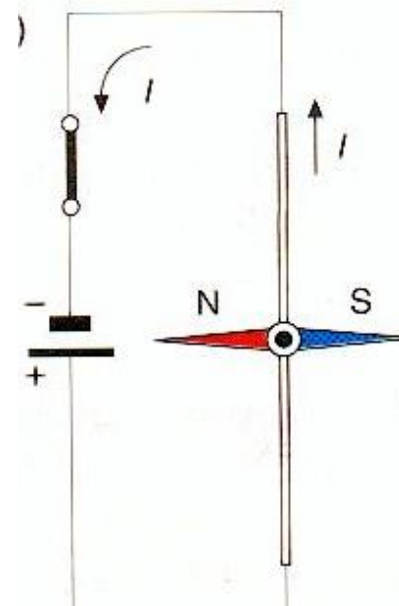
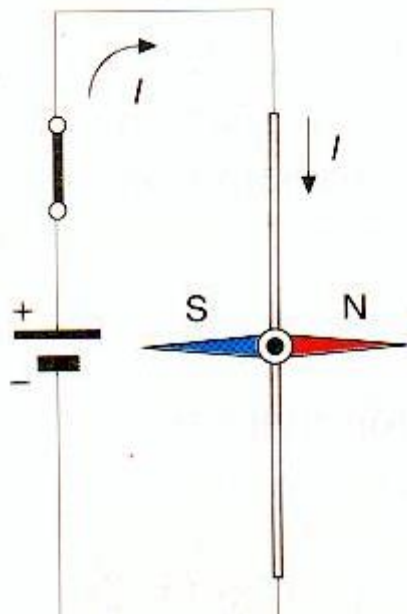
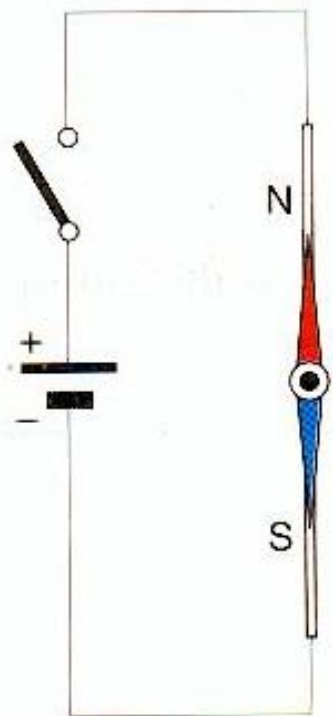
1. Introducción
2. Concepto de campo magnético. Fuerzas sobre cargas en movimiento.
3. Momento sobre unha espira.
4. Forza electromotriz inducida.

# 1 Introducción

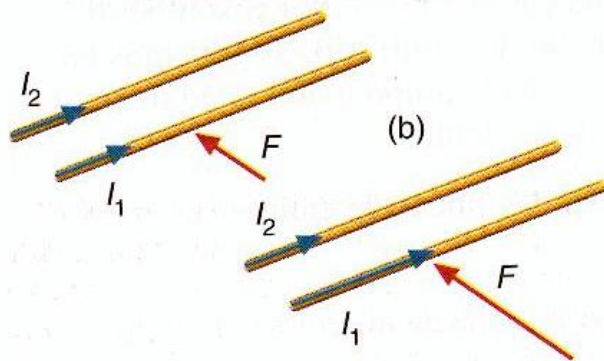
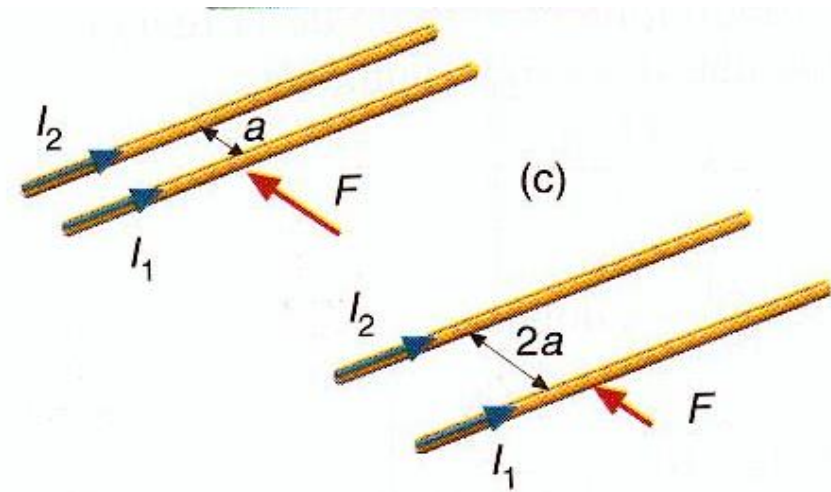
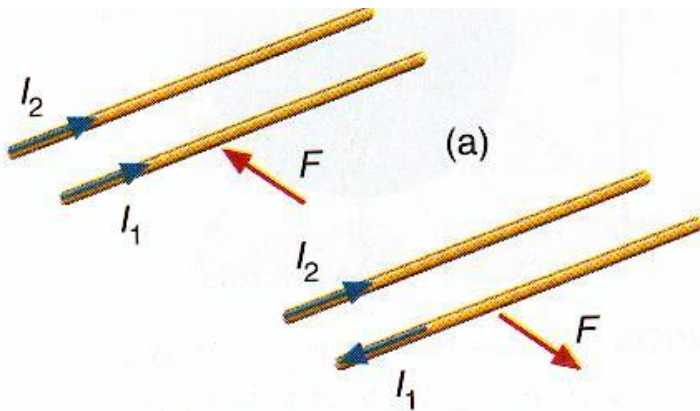


# 1. Introducción

Experiencia de Oersted

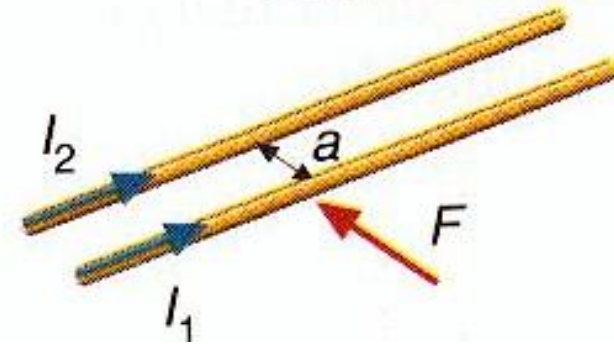


## 2. Concepto de campo magnético. Fuerzas sobre cargas



## 2. Concepto de campo magnético. Forzas sobre cargas

$$\frac{F_1}{L} = K \frac{I_1 I_2}{a}$$

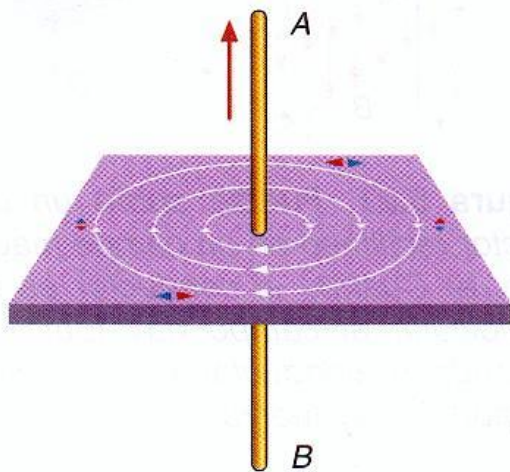


Inducción magnética (Lei de Biot y Savart)

$$B = K \frac{I_2}{a} \quad \text{mídese en T (Tesla)}$$

$$K = \frac{\mu_0}{4\pi} \quad \mu_0 = 4\pi 10^{-7} \quad \text{mídese en T.m/A}$$

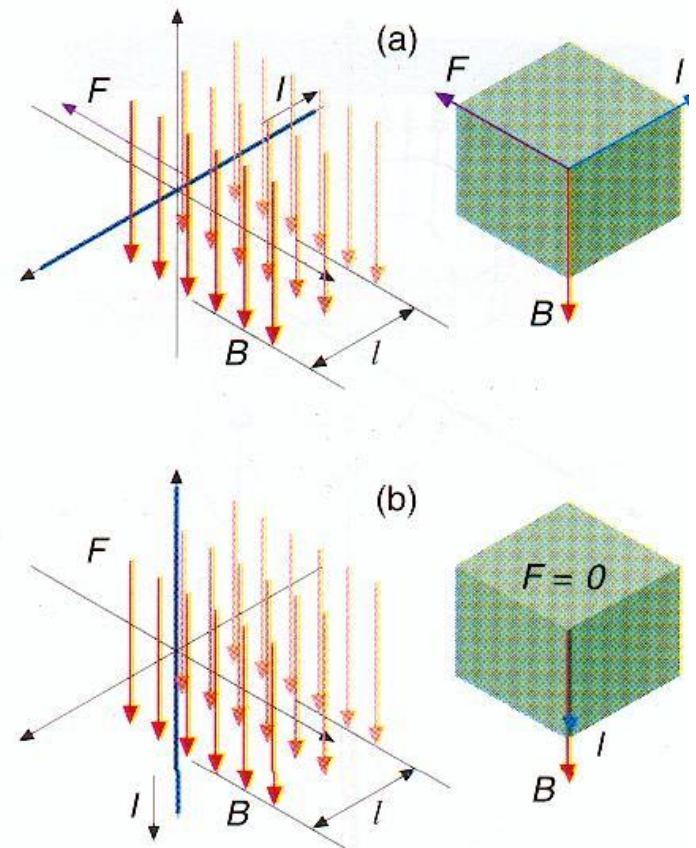
## 2. Concepto de campo magnético. Forzas sobre cargas



Forza sobre o conductor:

$$\vec{F} = L \cdot \vec{I} \times \vec{B}$$

$$F = L \cdot I \cdot B \cdot \text{sen}(\theta)$$



## 2. Concepto de campo magnético. Forzas sobre cargas

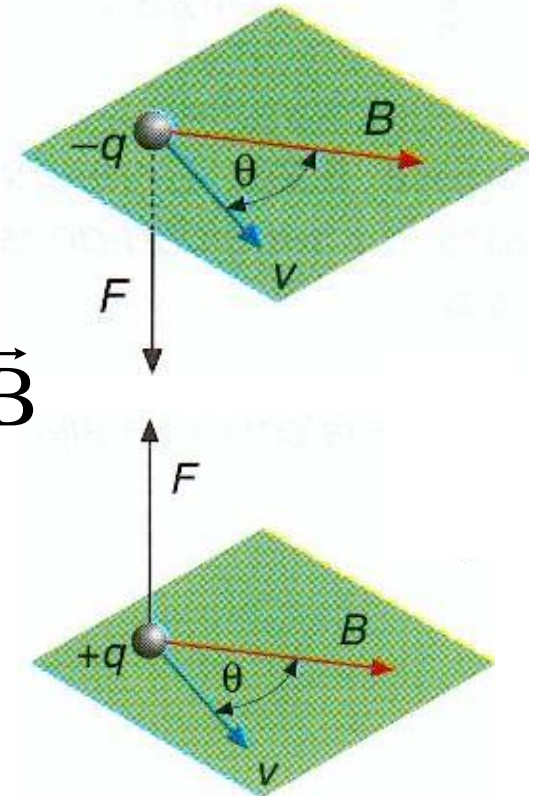
Como  $I = \frac{q}{t}$

**Lei de Lorentz:**

$$\vec{F} = \frac{q}{t} \cdot L \times \vec{B} = q \cdot \frac{L}{t} \times \vec{B} = q \cdot \vec{v} \times \vec{B}$$

De modo que:

$$B = \frac{F}{q \cdot v} \Rightarrow 1[\text{T}] = \frac{1[\text{N}]}{1[\text{C}] \cdot 1\left[\frac{\text{m}}{\text{s}}\right]} = \frac{1[\text{N}]}{1[\text{A}] \cdot 1[\text{m}]}$$

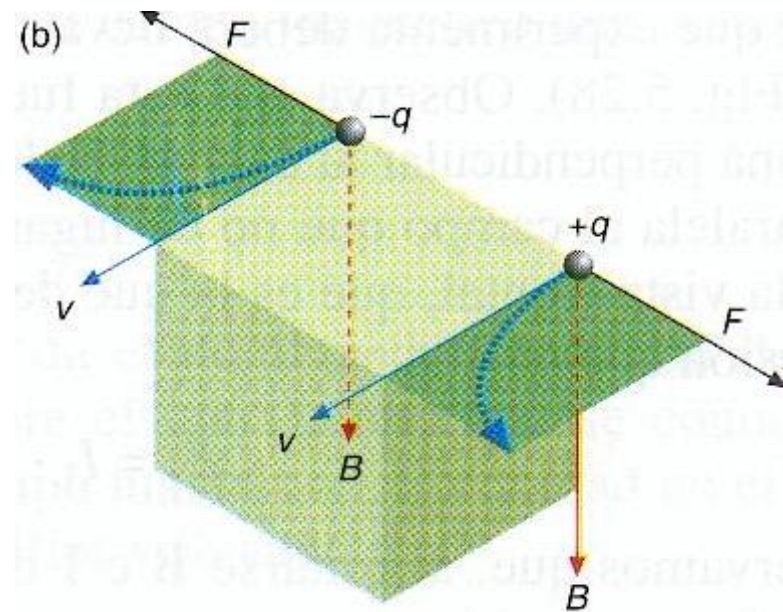
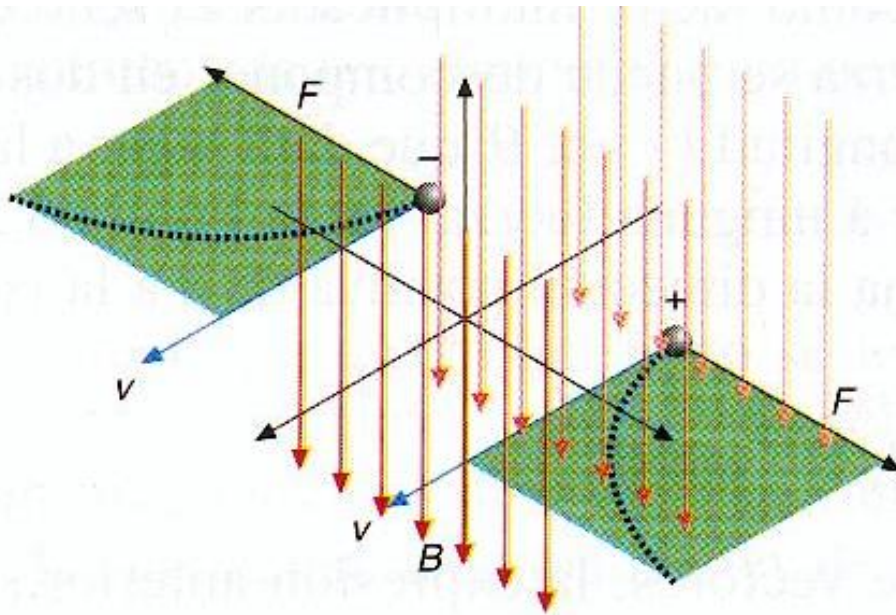




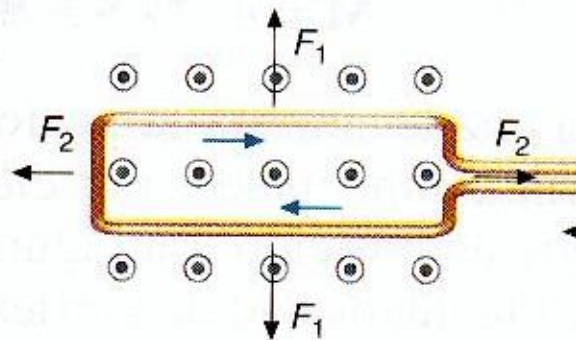
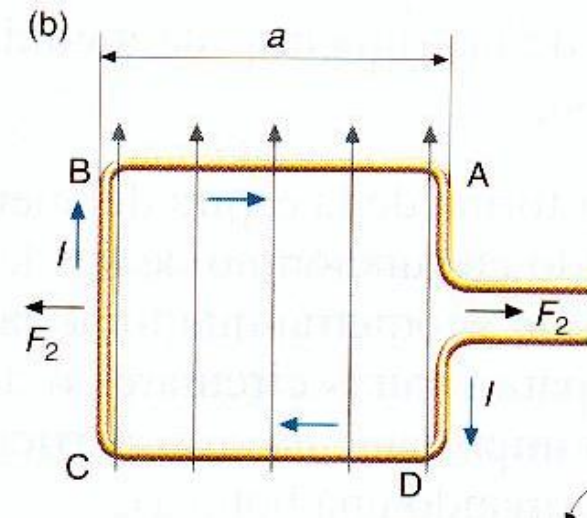
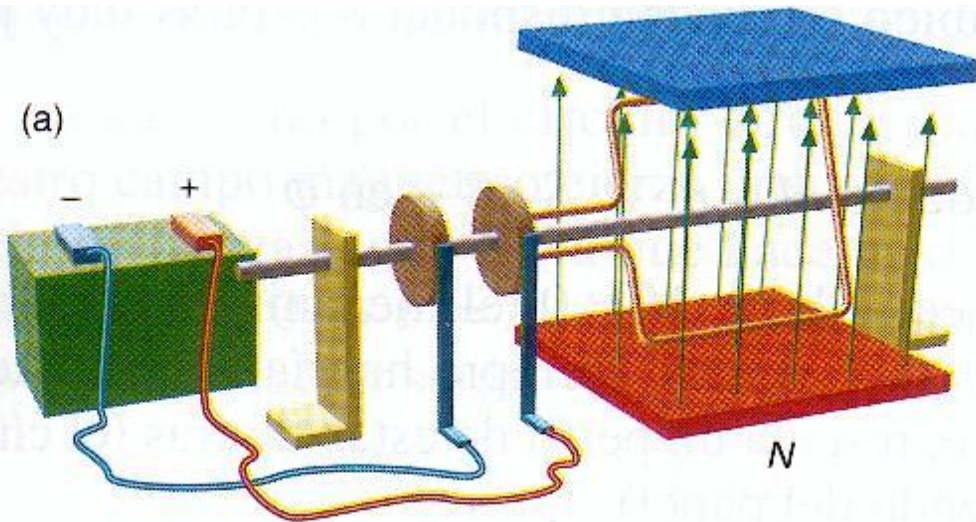
## 2. Concepto de campo magnético. Forzas sobre cargas

- Unidades de medida de **B** (inducción magnética):
    - SI: T (Tesla)
    - Otro: G (Gauss)     $1 \text{ G} = 10^{-4} \text{ T}$
- A Tesla é unha unidade moi grande, de modo que se use con frecuencia o Gauss.

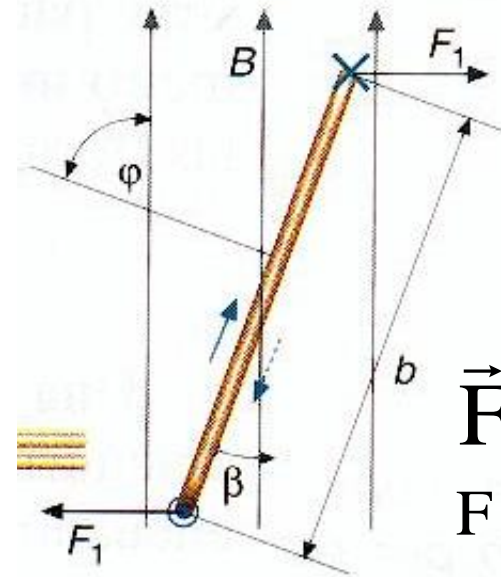
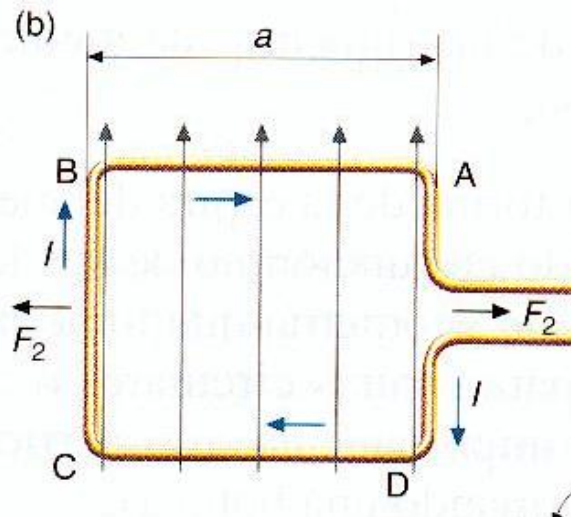
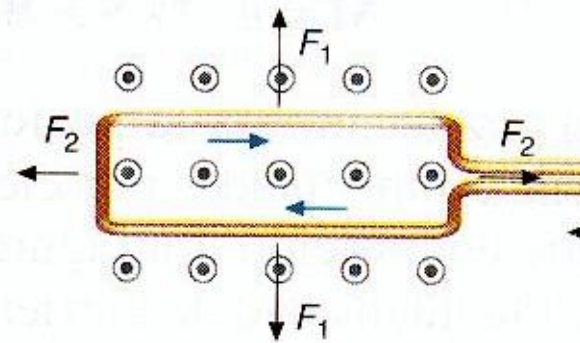
## 2. Concepto de campo magnético. Forzas sobre cargas



# 3 Momento sobre unha espira



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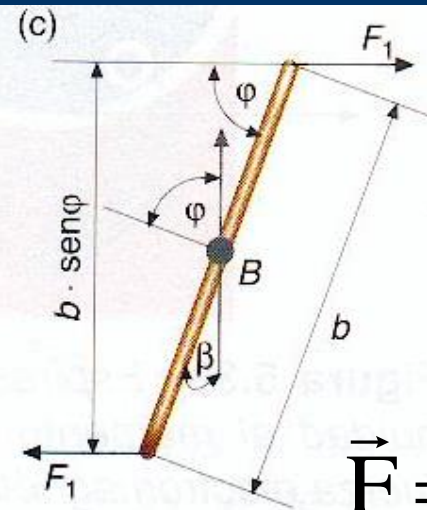
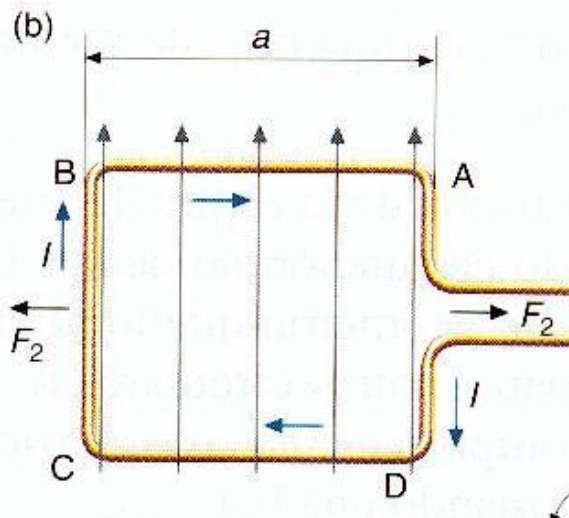
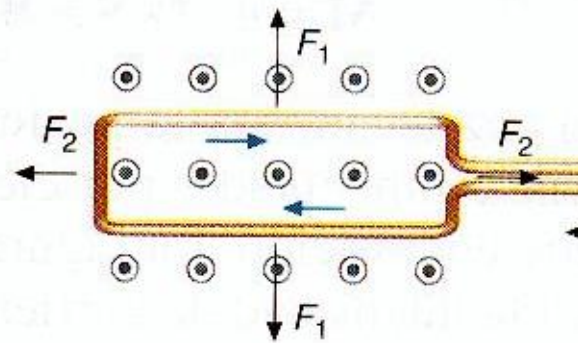


$$\vec{F} = L \cdot \vec{I} \times \vec{B}$$

$$F = L \cdot I \cdot B \cdot \text{sen}(\theta)$$

$$F_2 = b \cdot I \cdot B \cdot \text{sen}(\beta)$$

# 3 Momento sobre unha espira



$$\vec{F} = L \cdot \vec{I} \times \vec{B}$$

$$F = L \cdot I \cdot B \cdot \sin(\theta)$$

$$F_1 = a \cdot I \cdot B$$

# 3 Momento sobre unha espira

- A forza  $F_1$  crea un momento sobre a espira

$$M = I \cdot a \cdot b \cdot B \cdot \text{sen}(\varphi) = I \cdot S \cdot B \cdot \text{sen}(\varphi)$$

$$\vec{M} = I \cdot \vec{S} \times \vec{B}$$

