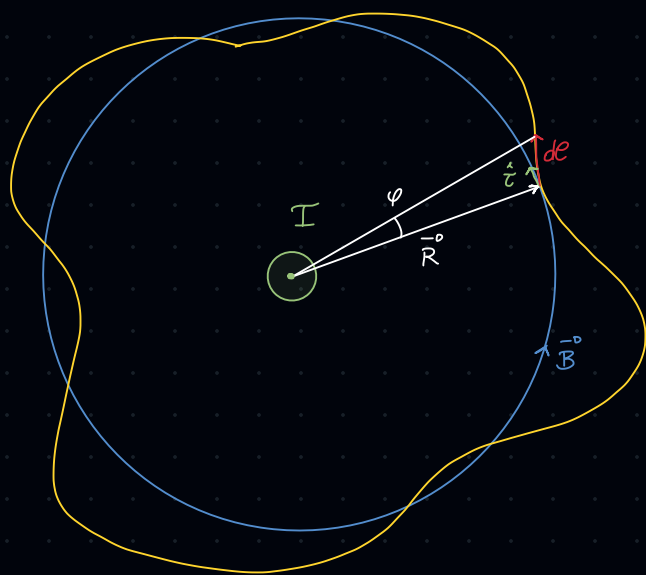


# Legge di Ampère

La spira circonda il filo



Da Biot-Savart:  $\vec{B} = \kappa \cdot \frac{I}{R} \hat{\tau} = \frac{\mu_0}{2\pi} \frac{I}{R} \hat{\tau}$   
 ↑  
 campo di un filo

→ circuitazione  $C = \oint \vec{B} \cdot d\vec{\ell} = \kappa \oint B \cdot \hat{\tau} d\ell$

$\hat{\tau} d\vec{\ell} =$  Arco di circonferenza

$L \circ 1 \text{ Rad} = \frac{\ell}{R} \Rightarrow \ell = \text{Rad} \cdot R$

$\Rightarrow \ell = R \cdot \varphi \Rightarrow \hat{\tau} d\vec{\ell} = R \cdot d\varphi$

→  $C = \frac{\mu_0}{2\pi} \oint \frac{I}{R} \cdot R \cdot d\varphi = \frac{\mu_0 I}{2\pi} \oint d\varphi \xrightarrow{360^\circ = 2\pi \text{ Rad}} \rightarrow C = \frac{\mu_0 I}{2\pi} \cdot 2\pi = \mu_0 I$

Teorema di Ampere

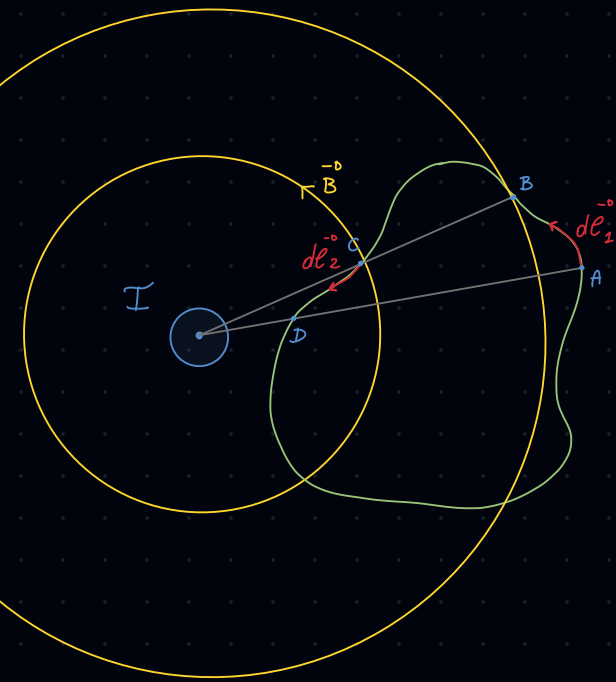
Morale →  $\oint \vec{B} \cdot d\vec{\ell} = \mu_0 I$  Seconda legge di Maxwell campo Magnetico  
 INTEGRALE

$\oint_{\vec{\ell}} \vec{A} \cdot d\vec{\ell} = \int_S (\vec{\nabla} \wedge \vec{A}) \cdot \hat{n} ds \Rightarrow \oint \vec{B} \cdot d\vec{\ell} = \mu_0 I \Rightarrow \int_S (\vec{\nabla} \wedge \vec{B}) \cdot \hat{n} ds = \mu_0 I$

$I = \vec{J} \cdot S = \int_S \vec{J} \cdot \hat{n} ds \Rightarrow \cancel{\int_S (\vec{\nabla} \wedge \vec{B}) \cdot \hat{n} ds} = \mu_0 \cancel{\int_S \vec{J} \cdot \hat{n} ds} \Rightarrow \boxed{\vec{\nabla} \wedge \vec{B} = \mu_0 \vec{J}}$  Maxwell

Seconda legge di Maxwell campo Magnetico  
 DIFFERENZIALE

Il filo circonda la Spira



$$C = \oint \vec{B} \cdot d\vec{e} = \int_B^A \vec{B} \cdot d\vec{e}_1 + \int_C^D \vec{B} \cdot d\vec{e}_2$$

$$= \frac{\mu_0 I}{2\pi} \left[ \int_A^B d\varphi - \int_C^D d\varphi \right] = 0$$