Token 151 119

$\frac{dN_r}{dt} = \sigma \cdot \frac{dN_p}{dt}$ $n_b \cdot d = \sigma \phi_p N_B$

$p+p \longrightarrow$ $p+p$ σ_1

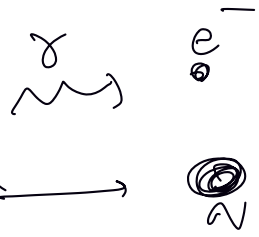
$H+X$ σ_2

$\gamma+V+X$ σ_3

$p+p \longrightarrow$ qualsiasi cosa

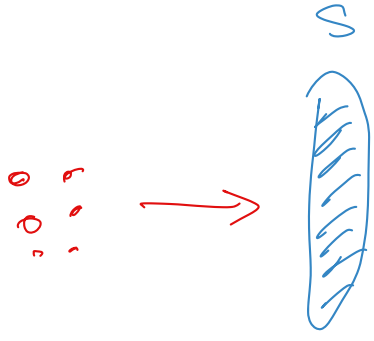
$\sigma(p+p) = \Sigma_i \sigma_i$ ↳ sezione d'urto esclusive singolo processo

inclusiva



$\frac{dN_r}{dt} = \sigma \cdot \underbrace{\frac{dN_p}{dt}\frac{1}{S}}_{\phi_p} N_B$

$\frac{\frac{dN_r}{dt}}{\frac{dN_p}{dt}} \frac{1}{N_B} = \sigma \cdot \frac{1}{S} \cancel{N_B}$



misure in tempo ΔT

$\frac{dN_r}{dt} \Delta T = N_r$

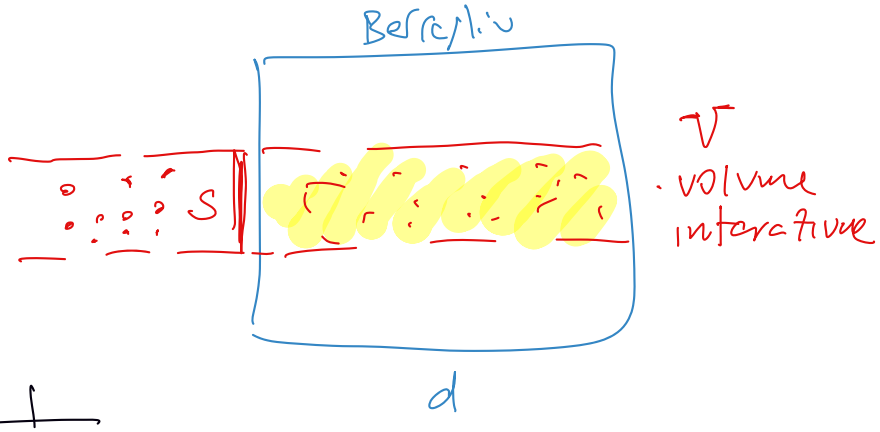
$\frac{dN_p}{dt} \Delta T = N_p$

σ : sez. relativistica

$$\frac{dN_r}{dt} \equiv \sigma \cdot \Phi_p \cdot N_B$$

$$= \sigma \, v_p \cdot n_p \, N_B$$

$$= \sigma \cdot v_p \frac{N_p}{S \cdot d} N_B$$



$$\frac{dN_r}{dt} \frac{1}{N_p} \frac{1}{N_B} = \sigma \cdot v_p \cdot \frac{1}{V_{int}}$$

prob. di interazione per unità di tempo.

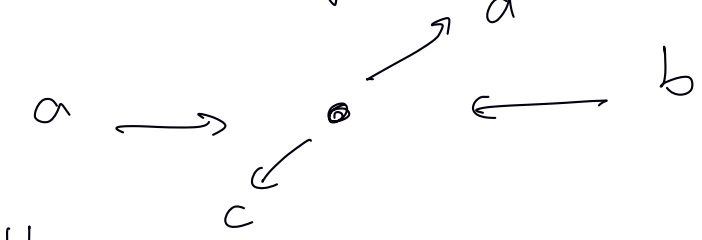
$\gamma + e \longrightarrow \gamma + e$ Compton

$\alpha + N \longrightarrow \alpha + N$ Rutherford

$|i\rangle = |a,b\rangle \qquad a + b \longrightarrow c + d \qquad |f\rangle = |c,d\rangle$

$$\Gamma(i \to f) = 2\pi \, |M_{fi}|^2 \, \rho(E)\Big|_{E_f = E_i}$$

$$M_{fi} = -i \int_V d^3r \, \psi_f^* H_I \psi_i$$

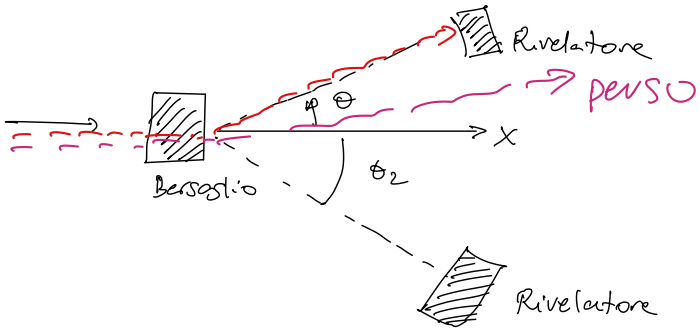


$H = H_0 + H_I$

$$\sigma \propto \underbrace{|M_{fi}|^2}_{\text{informazioni sulle forze di } H_I} \underbrace{\rho(E)}_{\text{cinematica}} \underbrace{\frac{1}{v_p}}_{\text{cinematica bersaglio}}$$

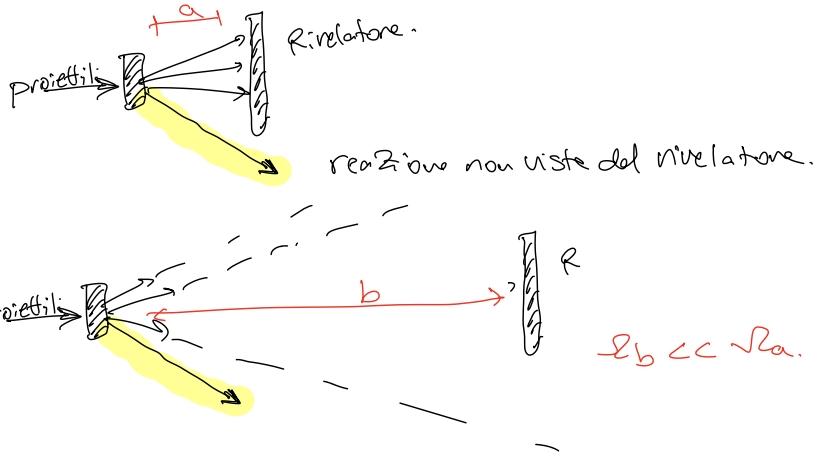
informazioni sulle forze di H_I interazioni fondamentali:

$H_I = H_I(r, \theta, \varphi, \ldots)$

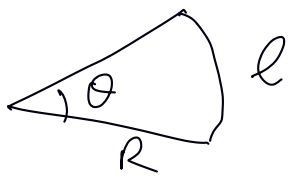


Rivelatori hanno dimensioni finite.

spazi morto.



$$\Omega = \frac{S}{L^2}$$



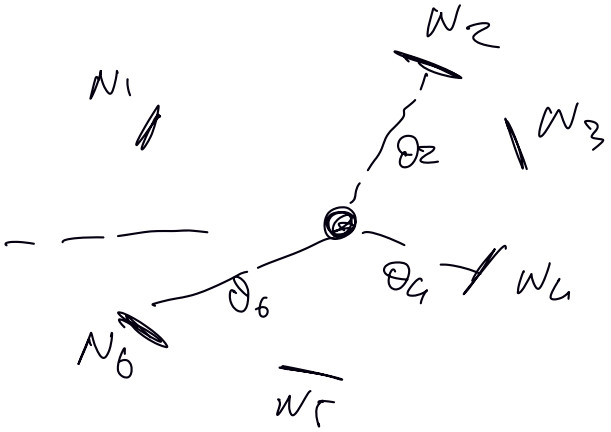
$$l = R \cdot \theta$$

In pratica $\frac{\#N_r}{\Delta T} \frac{1}{\Delta\Omega} = \frac{d\sigma}{d\Omega} \frac{dN_p}{dt} n_B \cdot d$

$\frac{d\sigma}{d\Omega}$

sezione d'urto differenziale.

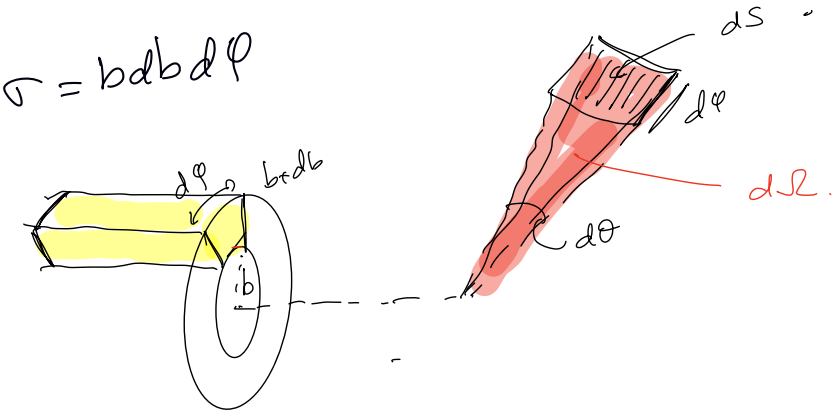
$\frac{d\sigma(\theta,\varphi)}{d\Omega}$.

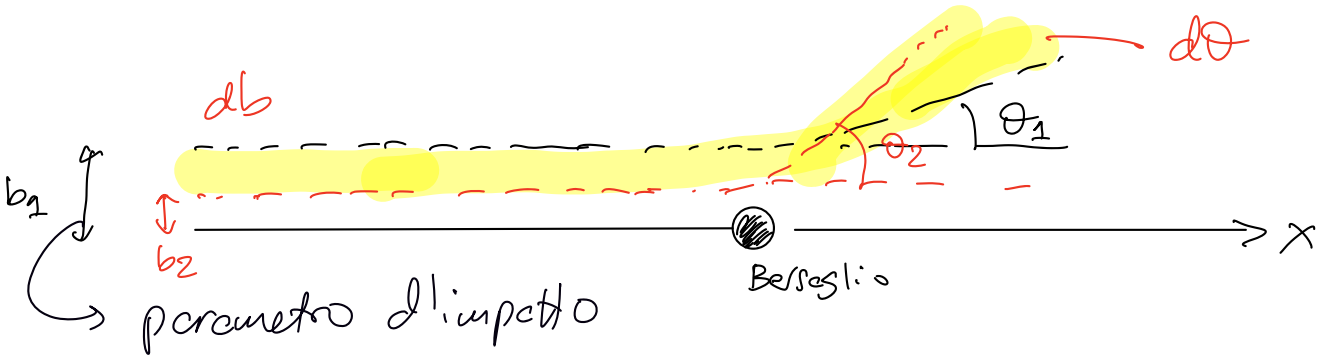


$$d\Omega = \sin\theta\, d\theta\, d\varphi$$

$$\frac{dN_r}{dt} = \sigma \cdot \Phi_p \, N_B$$

$$d\sigma = b\, db\, d\varphi$$





parametro d'impatto

$$b \longleftrightarrow \vartheta$$

parametro d'impatto

↳ angolo di deviazione del proiettile

$$\theta = \theta(b)$$

$$b = b(\theta)$$

$$d\sigma = b\, db\, d\varphi = b \frac{db}{d\theta} d\theta\, d\varphi = b \frac{db}{d\theta} \frac{1}{\sin\theta} d\Omega$$

$$\sin\theta\, d\theta\, d\varphi$$

$$d\sigma = b \left|\frac{db}{d\theta}\right| \frac{1}{\sin\theta} d\Omega$$

$$\frac{d\sigma}{d\Omega} = b \left|\frac{db}{d\theta}\right| \frac{1}{\sin\theta}$$