

Kinematic Fit

6 kinematic Constraints

13 variables

	π^+	γ_1	γ_2	γ_3
momentum	P_π	P_{γ_1}	P_{γ_2}	P_{γ_3}
azimuthal angle	ϕ_π	ϕ_{γ_1}	ϕ_{γ_2}	ϕ_{γ_3}
dip angle	θ_π	θ_{γ_1}	θ_{γ_2}	θ_{γ_3}
kinematic energy	T_π	-	-	-

π^0 mass

$$m_{\pi^0} = \sqrt{2E_{\gamma_1}E_{\gamma_2}(1 - \cos\theta)}$$

Momentum Conservation

$$P_\pi \cos(\phi_\pi) \cos(\theta_\pi) + P_{\gamma_1} \cos(\phi_{\gamma_1}) \cos(\theta_{\gamma_1}) + P_{\gamma_2} \cos(\phi_{\gamma_2}) \cos(\theta_{\gamma_2}) + P_{\gamma_3} \cos(\phi_{\gamma_3}) \cos(\theta_{\gamma_3}) = 0$$

$$P_\pi \sin(\phi_\pi) \cos(\theta_\pi) + P_{\gamma_1} \sin(\phi_{\gamma_1}) \cos(\theta_{\gamma_1}) + P_{\gamma_2} \sin(\phi_{\gamma_2}) \cos(\theta_{\gamma_2}) + P_{\gamma_3} \sin(\phi_{\gamma_3}) \cos(\theta_{\gamma_3}) = 0$$

$$P_\pi \sin(\theta_\pi) + P_{\gamma_1} \sin(\theta_{\gamma_1}) + P_{\gamma_2} \sin(\theta_{\gamma_2}) + P_{\gamma_3} \sin(\theta_{\gamma_3}) = 0$$

Energy Conservation

$$T_\pi + m_\pi + P_{\gamma_1} + P_{\gamma_2} + P_{\gamma_3} = m_k$$

π^+ mass

$$\sqrt{P_\pi^2 + m_\pi^2} = T_\pi + m_\pi$$

chisquare

$$\chi^2 = \sum_{i=1}^{13} \left(\frac{X_{meas}^i - X_{fit}^i}{\sigma_{meas}^i} \right)^2$$