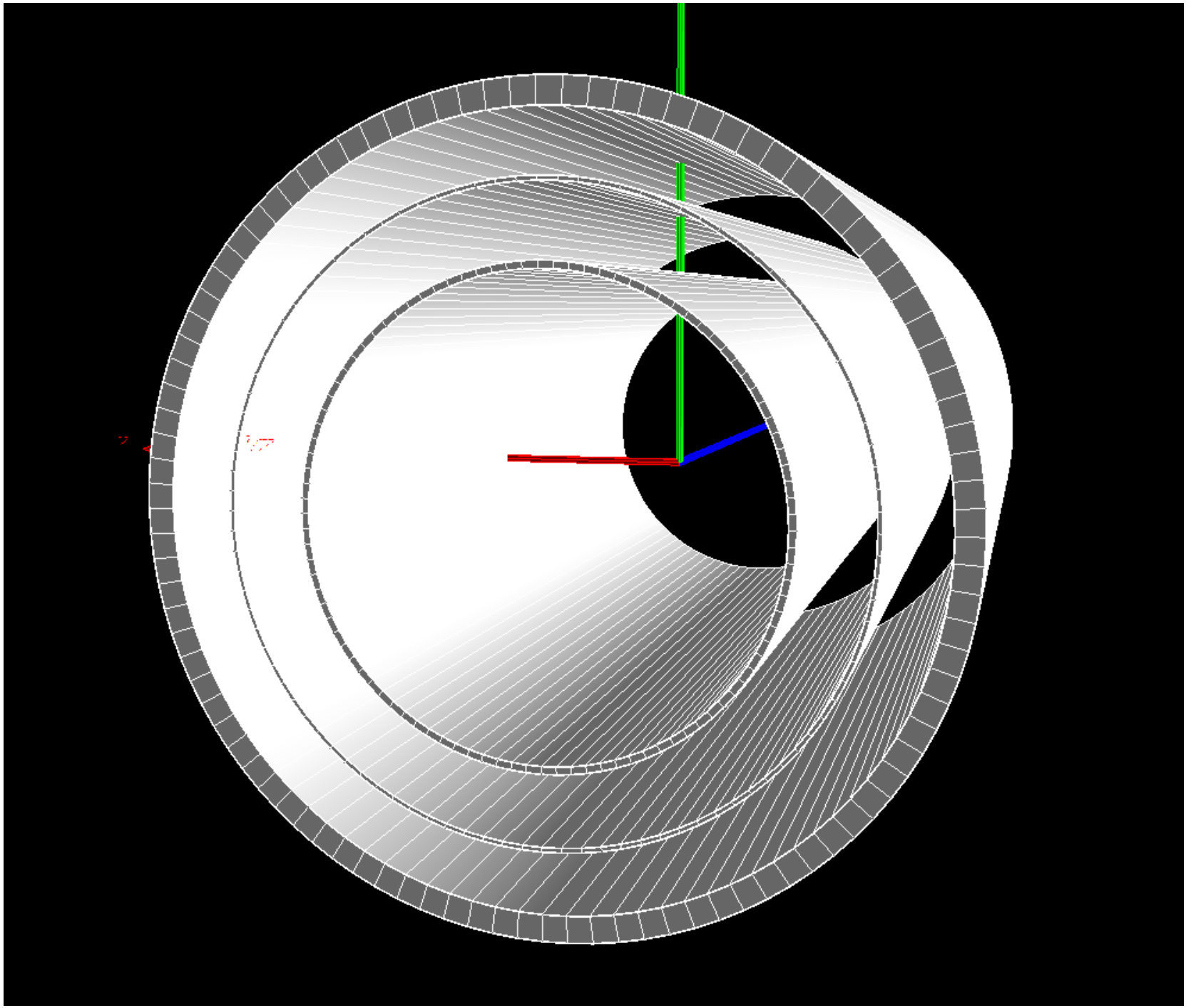
simulation update

- YAG-LaBr-BGO

- Thickness:
  - YAG 10.6 mm
  - LaBr 9.85 mm
  - BGO 33.6 mm

YAG X0 = 35.4mm
LaBr X0 = 19.7mm
BGO X0 = 11.2mm

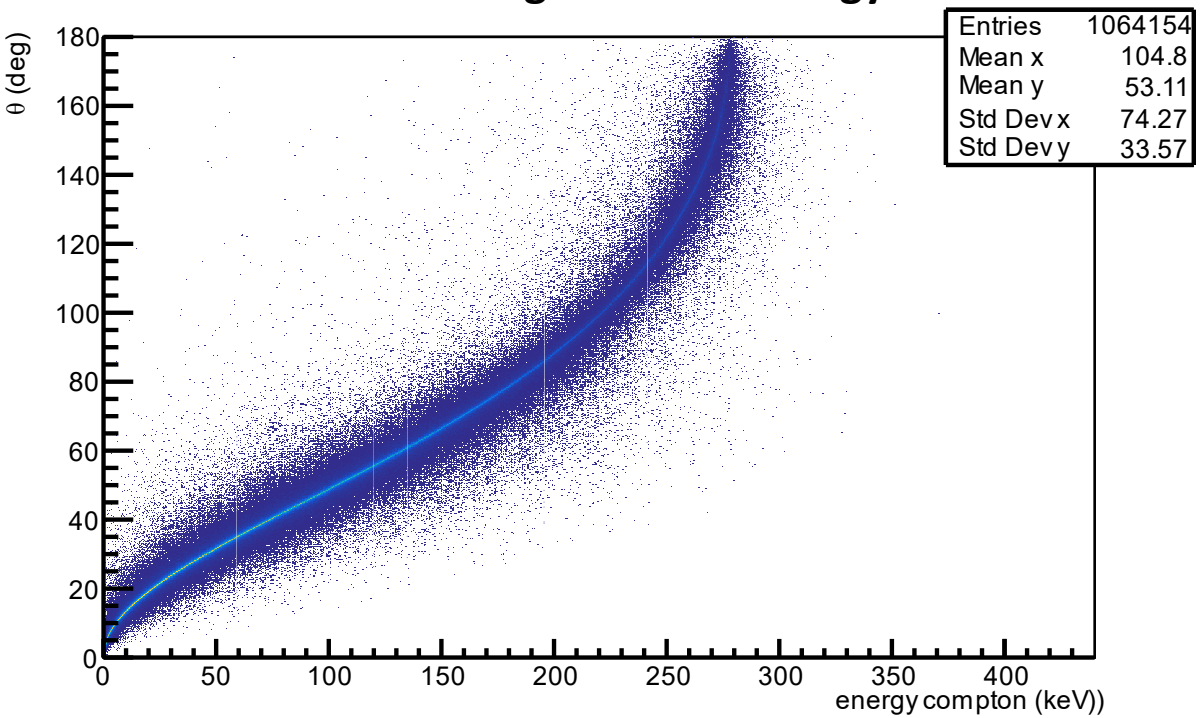


doppler broadening

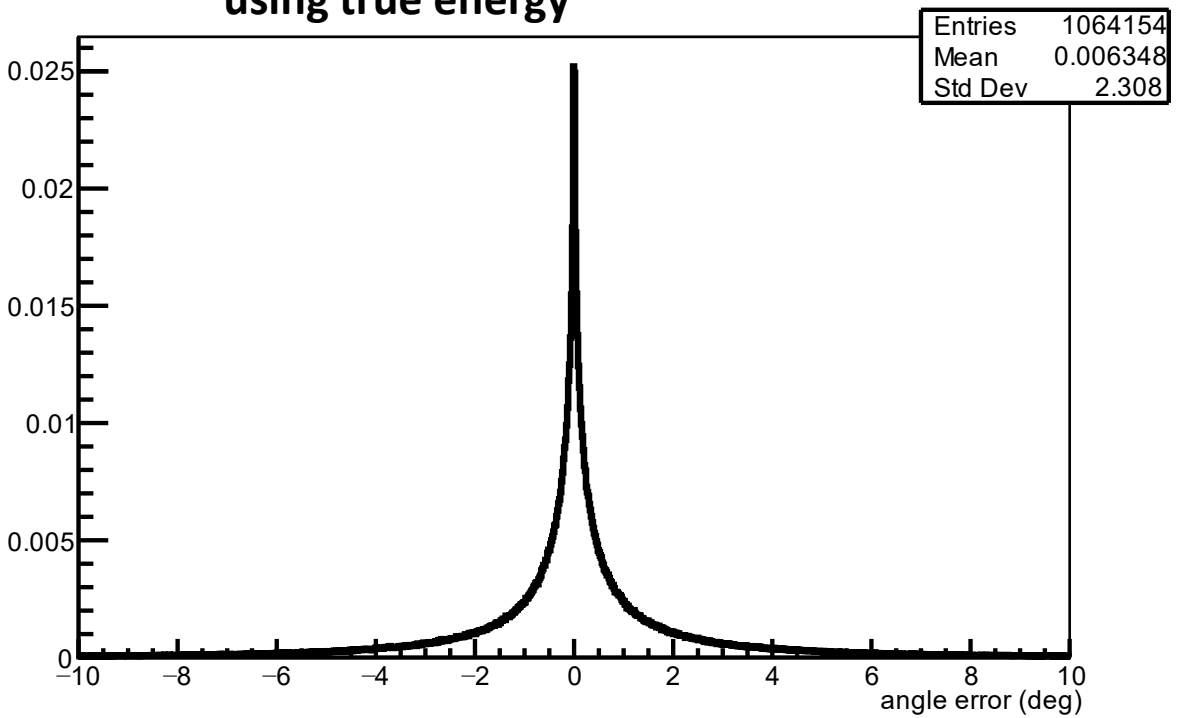
$$\cos\theta = 1 - m_e c^2 \left(\frac{1}{E_f} - \frac{1}{E_i} \right)$$

does not take electron pre-collision momentum into account

true angle VS true energy



reconstructed angle - true angle using true energy



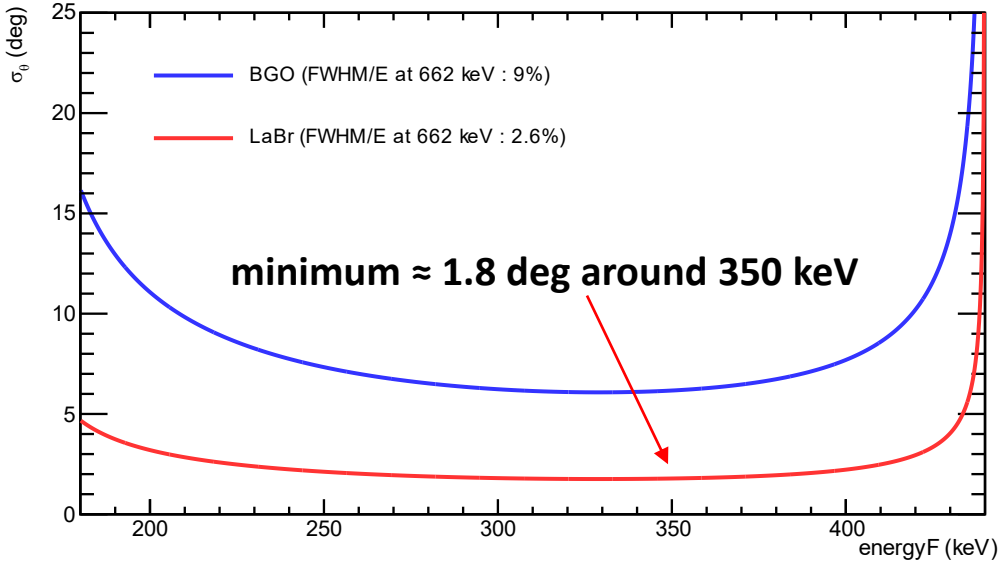
- **energy resolution at 662 keV (FWHM):**
  - **YAG 11%**
  - **LaBr 2.6%**
  - **BGO 9%**

$$\cos\theta = 1 - m_e c^2 \left(\frac{1}{E_f} - \frac{1}{E_i}\right)$$

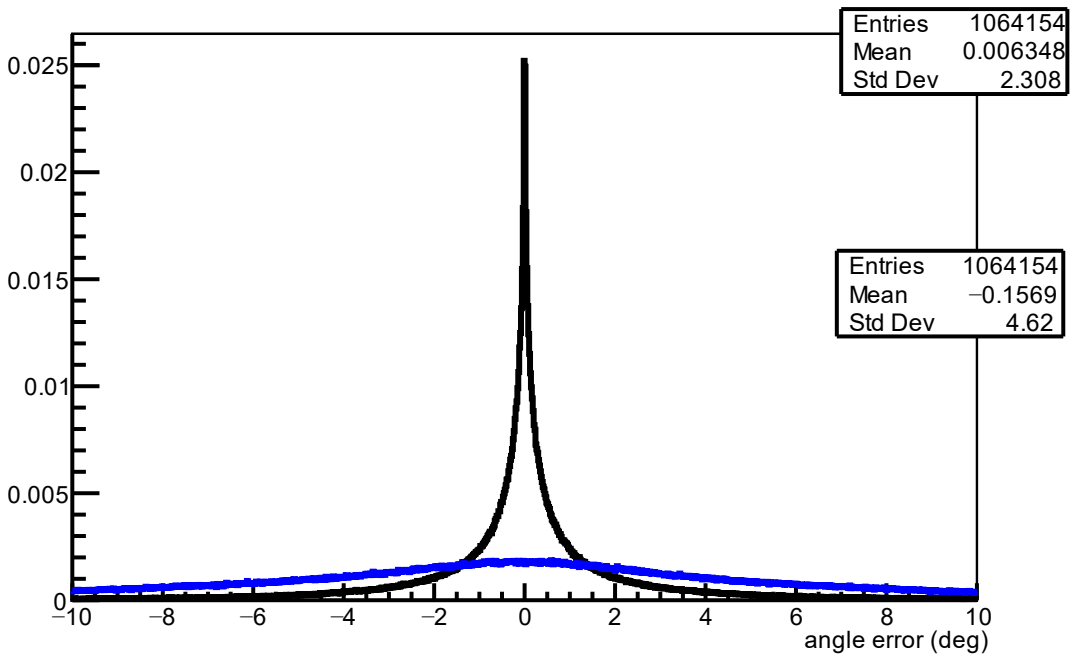
$$\sigma_{E_f} = \frac{x}{2.355} \times \sqrt{662} \times \sqrt{E_f}$$

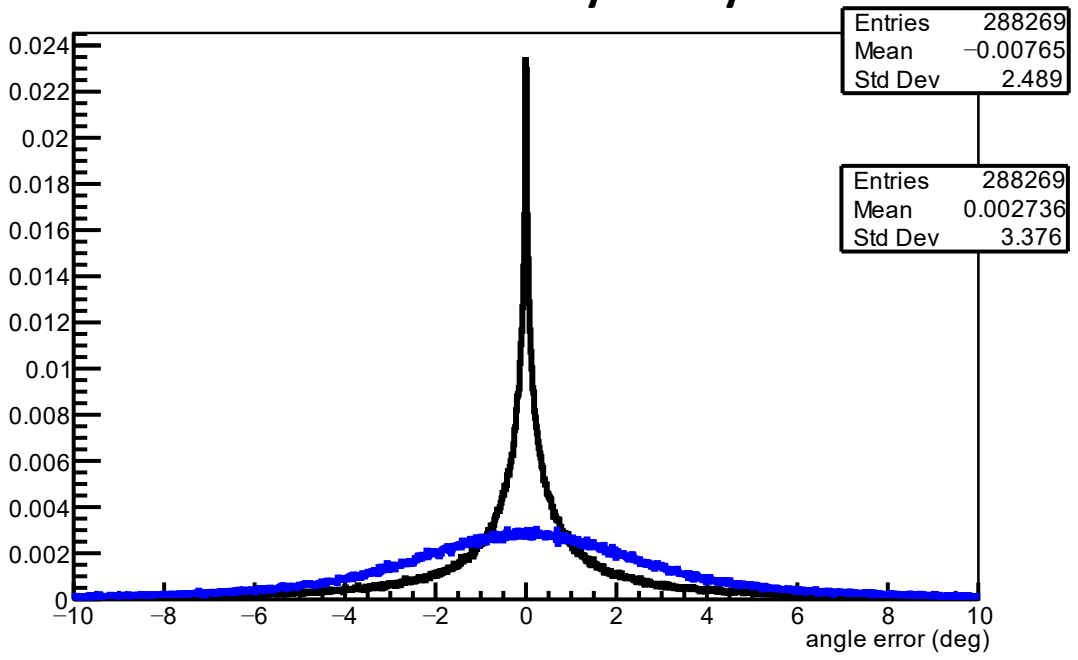
$$\sigma_{\cos\theta} = \frac{m_e c^2}{E_f^2} \sigma_{E_f}$$

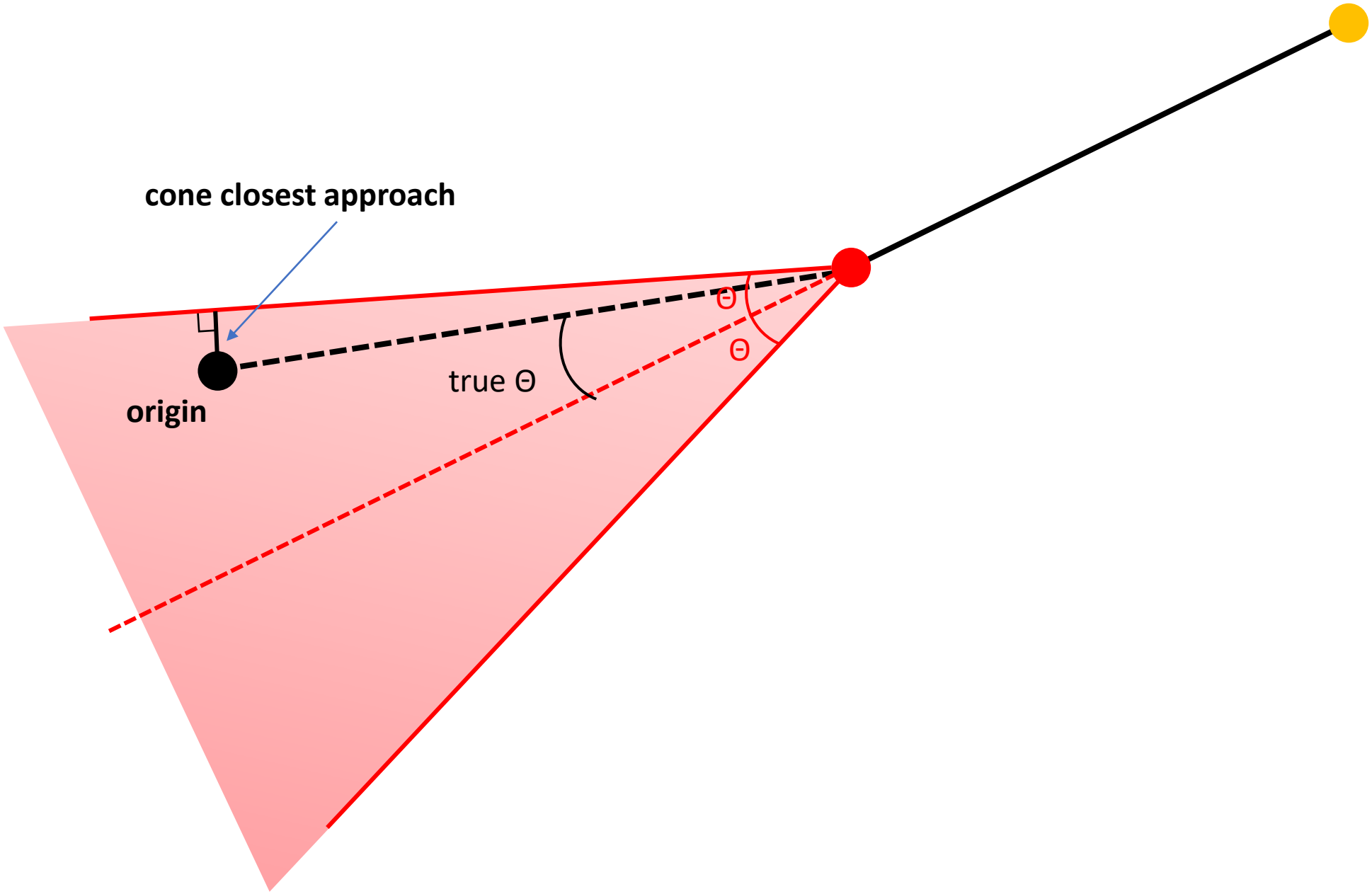
$$\sigma_\theta = \frac{1}{\sin\theta} \sigma_{\cos\theta}$$



inner – middle layer only

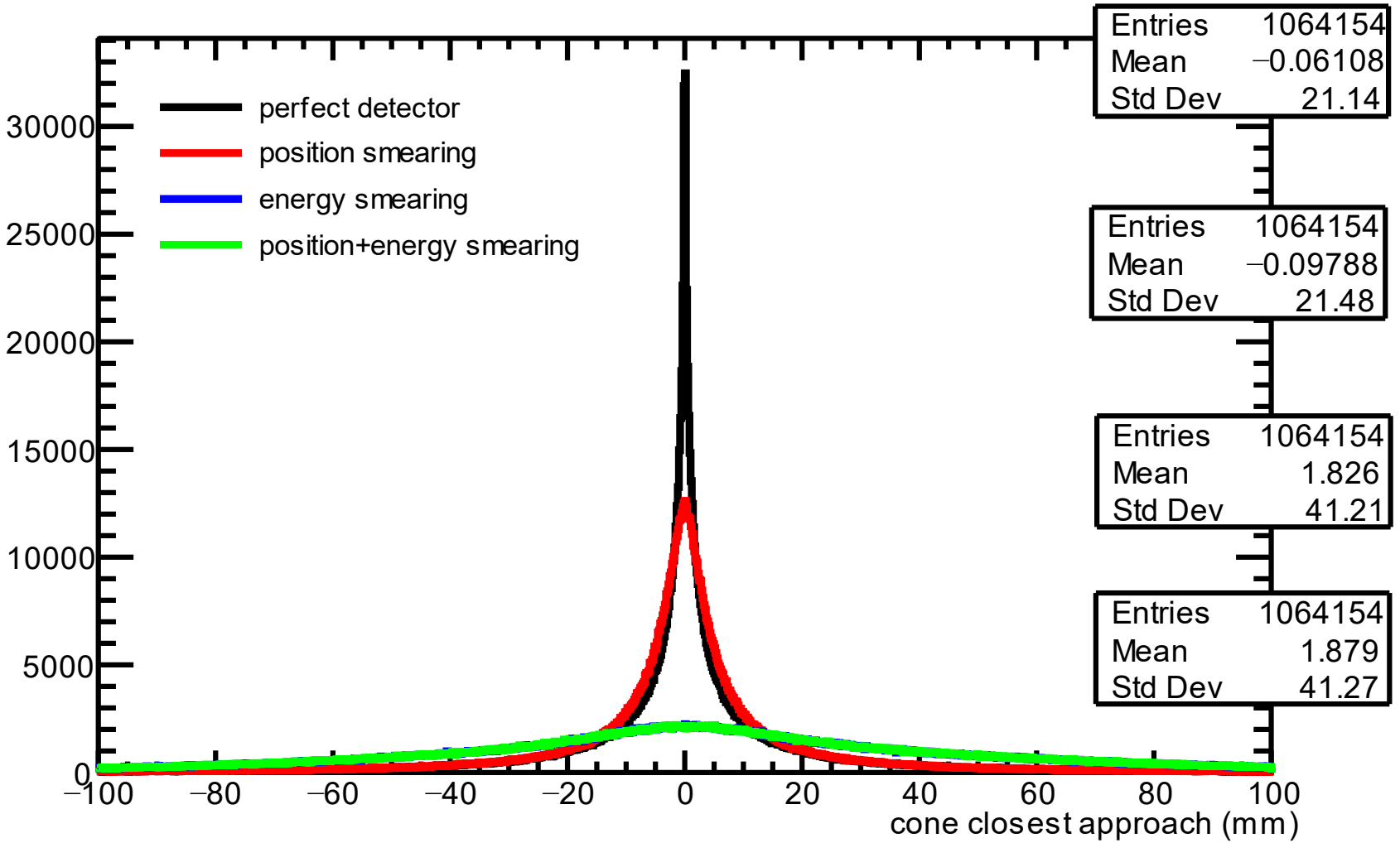





cone closest approach
origin
true Θ
Θ
Θ

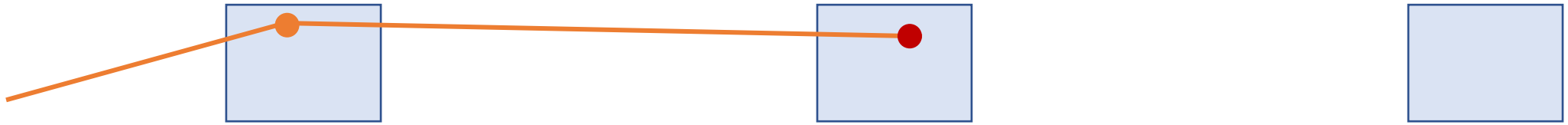
cone closest approach

- **detector resolution :**
  - **5 mm / sqrt(12)**

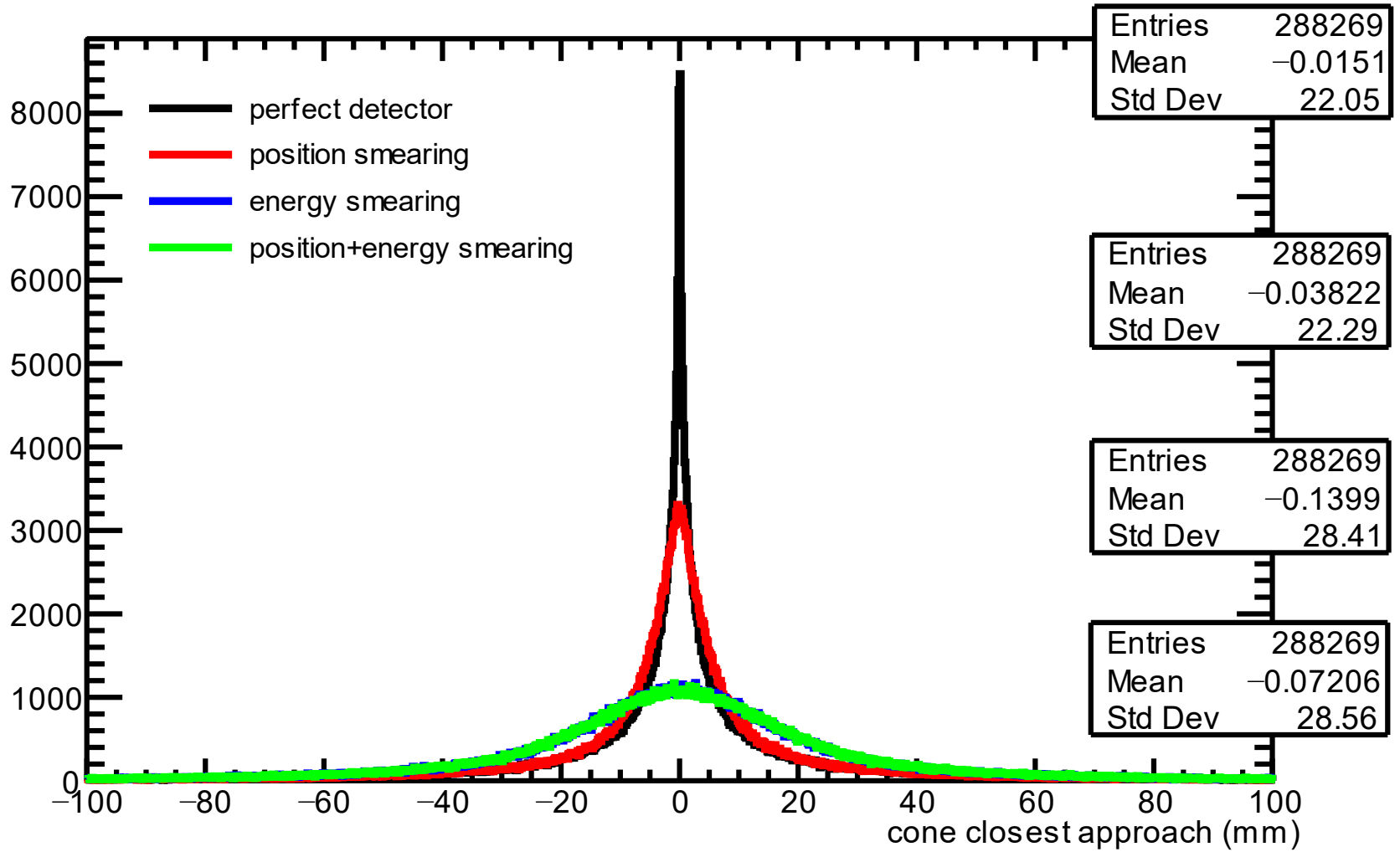


cone closest approach

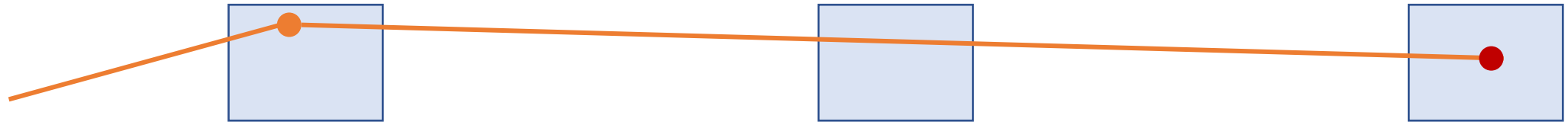
2.9%



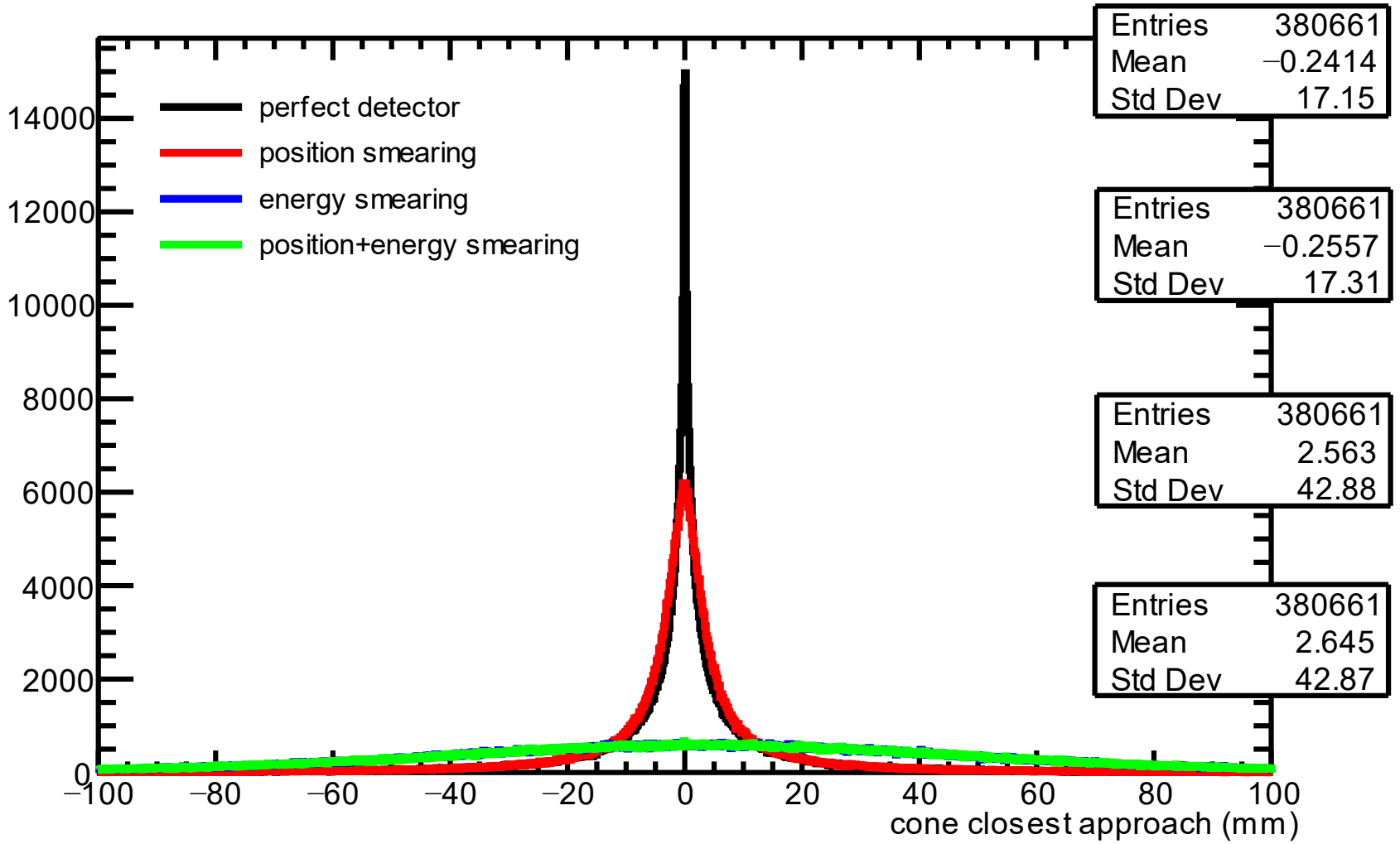
- **detector resolution :**
  - **5 mm / sqrt(12)**



cone closest approach

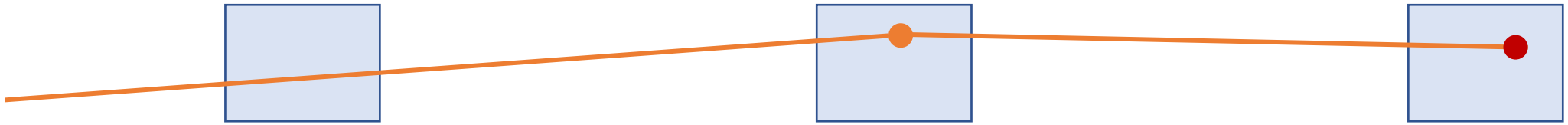


- **detector resolution :**
  - **5 mm / sqrt(12)**

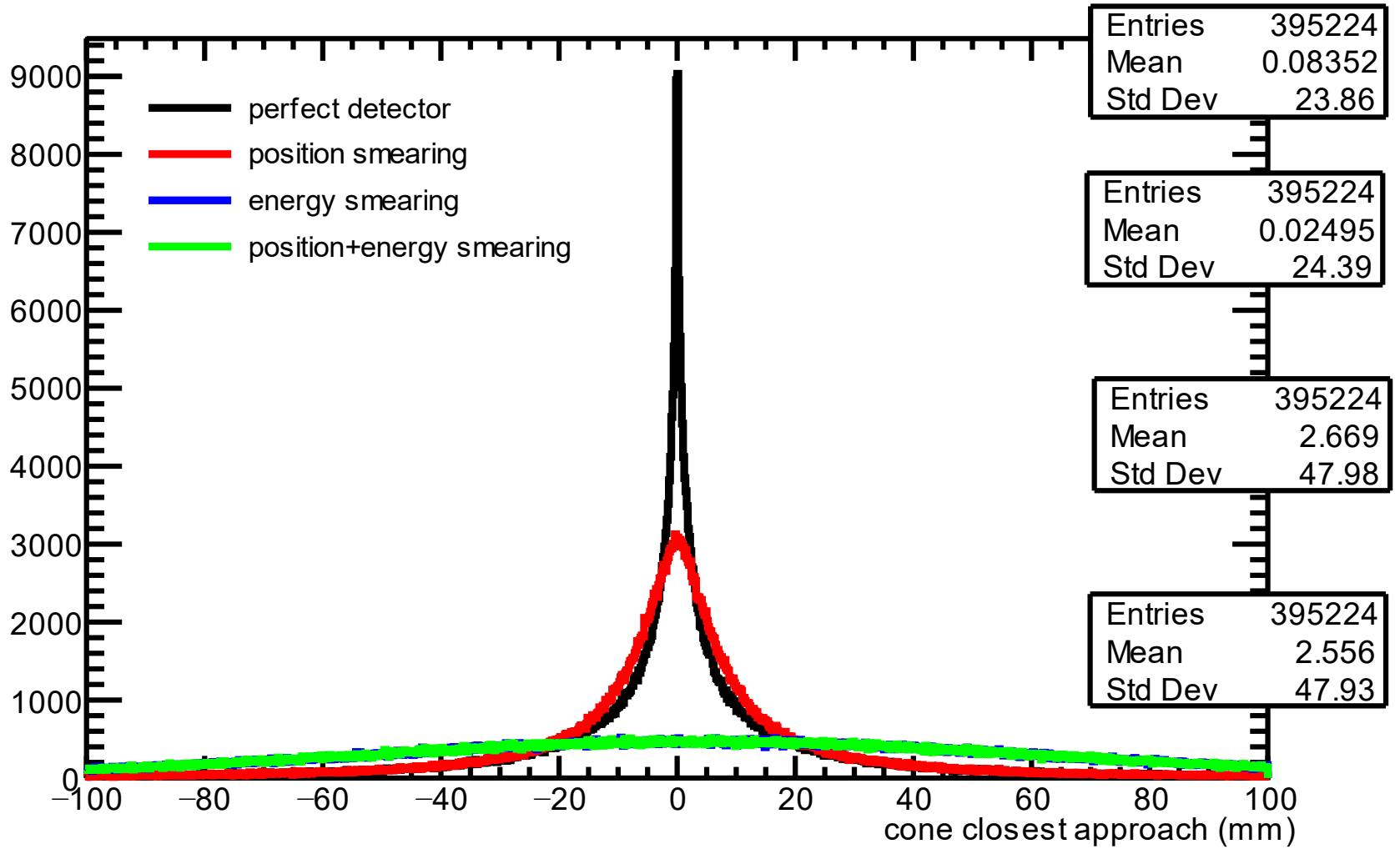


cone closest approach

3.9%



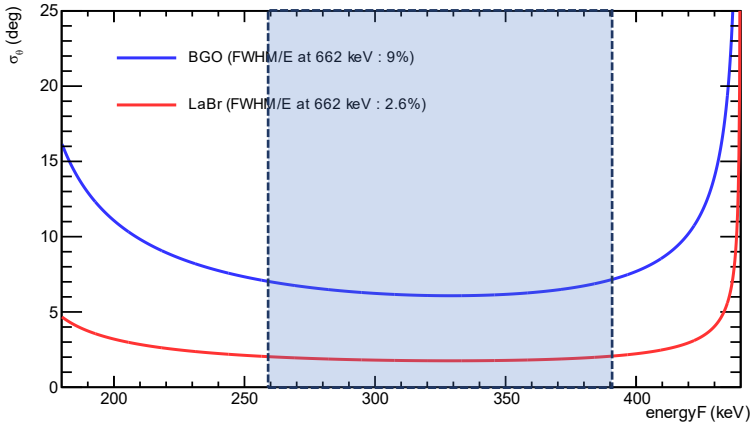
- **detector resolution :**
  - **5 mm / sqrt(12)**



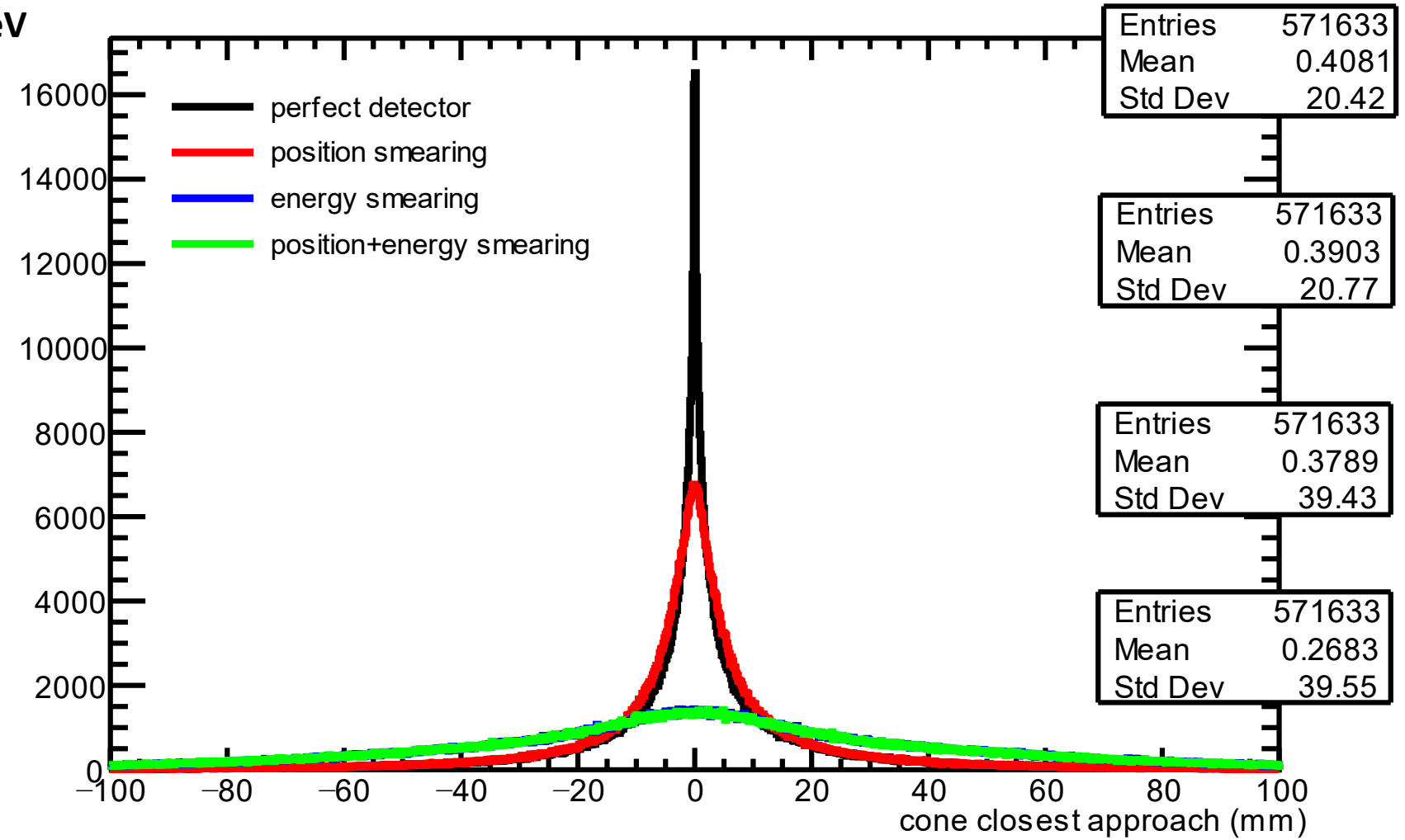
cone closest approach

all events 5.7%

- restrict
  - 260 keV < ePhoto < 390 keV

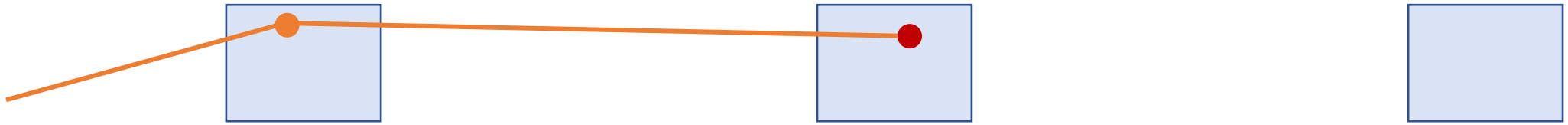


- detector resolution :
  - 5 mm / sqrt(12)

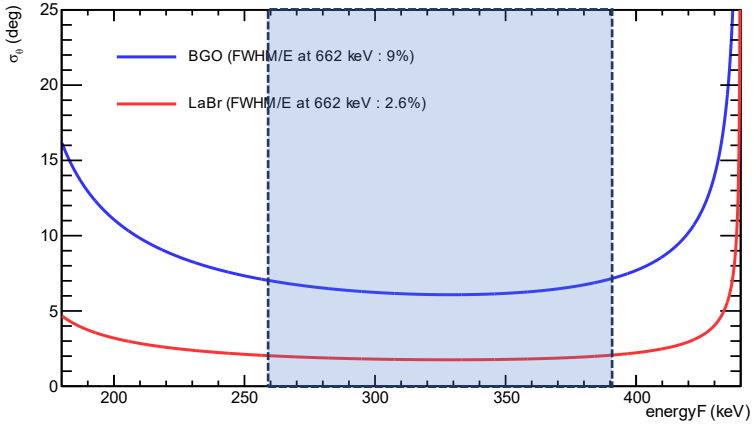


cone closest approach

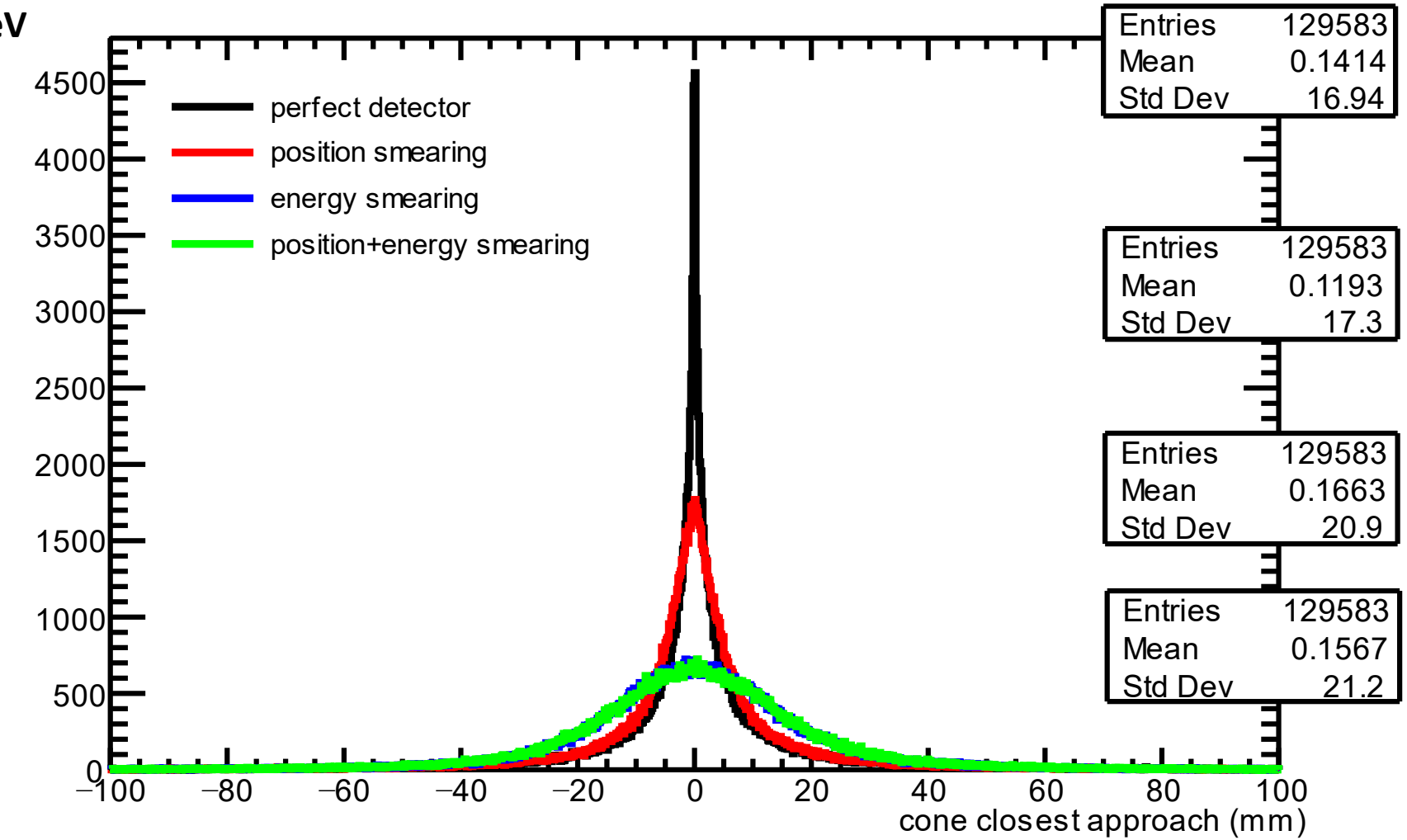
1.3%



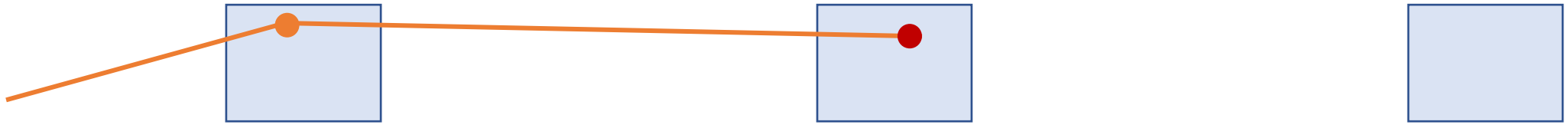
- **restrict**
  - **260 keV < ePhoto < 390 keV**



- **detector resolution :**
  - **5 mm / sqrt(12)**



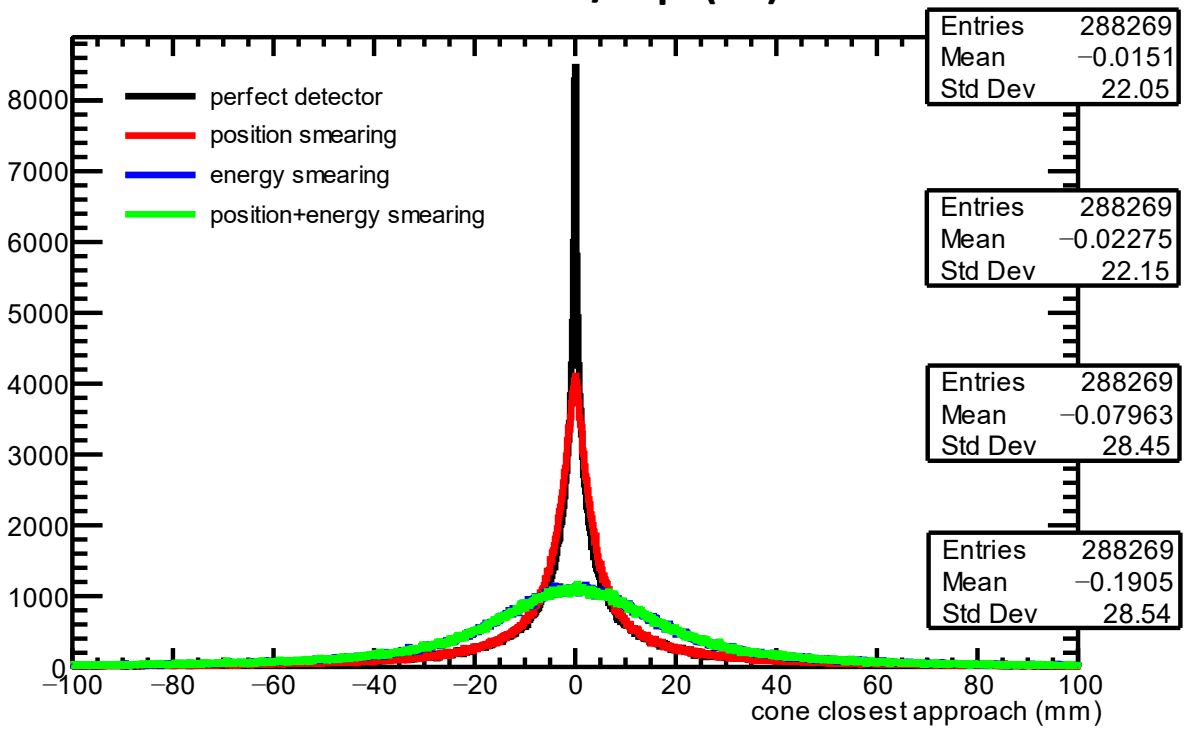
1.3%



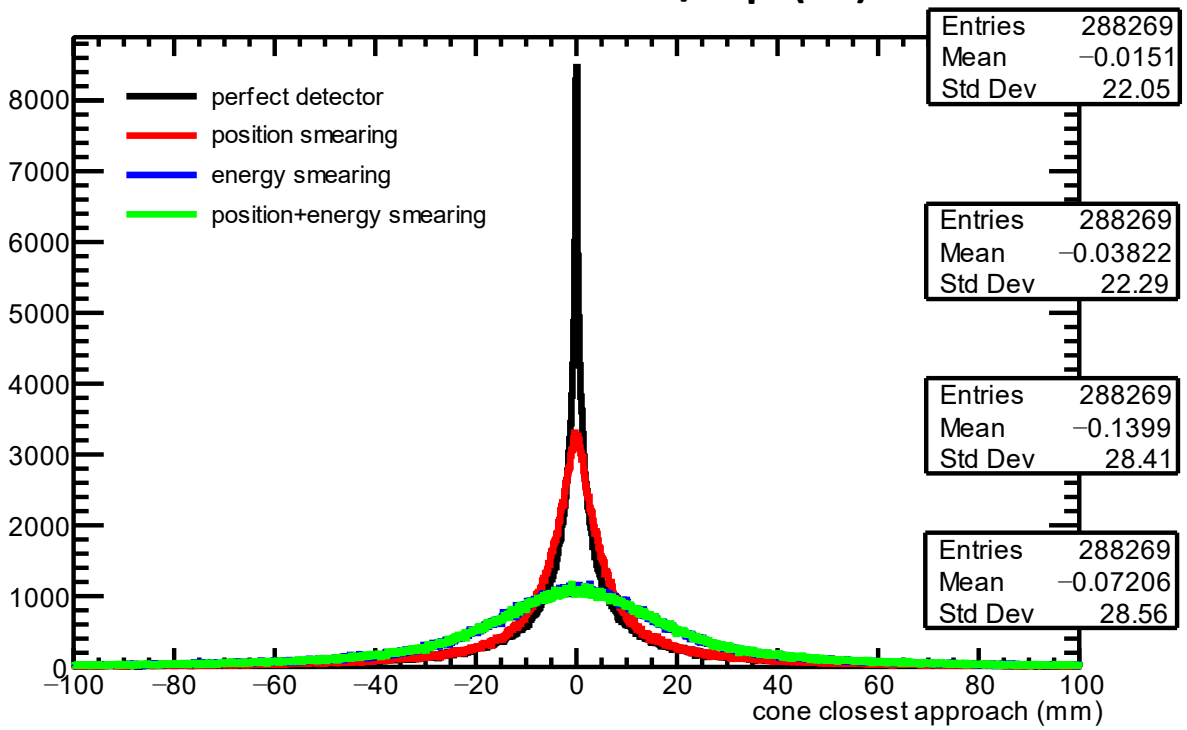
restrict

- 260 keV < ePhoto < 390 keV

detector resolution : 3 mm / sqrt(12)



detector resolution : 5 mm / sqrt(12)



- position resolution negligible compared to energy resolution