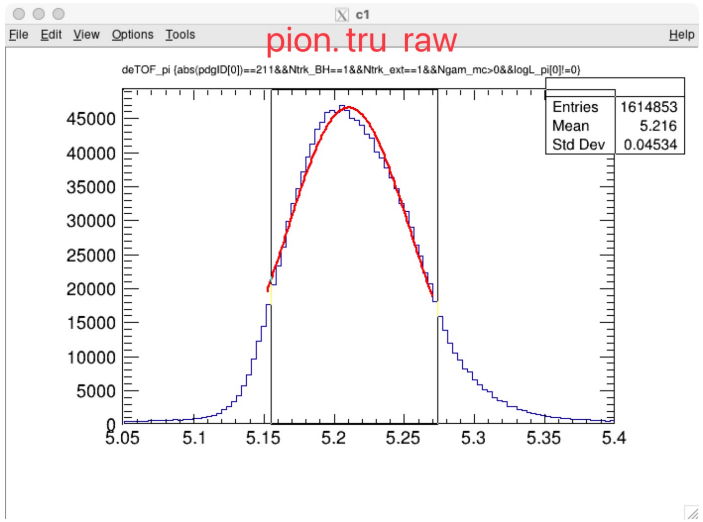
Single-photon Time Uncertainty in DTOF

$$\sigma_t = \sigma_{T_0} \oplus \sigma_{t_{MCS}} \oplus \sigma_{TTS} \oplus \sigma_{t_\lambda} \oplus \sigma_{t_D} \oplus \sigma_{t_{ext(\vec{r},\vec{p})}}$$

Sampled by Gauss

From DTOF

- $\sigma_{t_{ext}} = \sigma_t \ominus \sigma_{t\ (\vec{r},\vec{p})\ by\ tru}$
- $\sigma_{t_{MCS}} = \sigma_t \ominus \sigma_{t_{remove\ Geo\ front\ DTOF}}$



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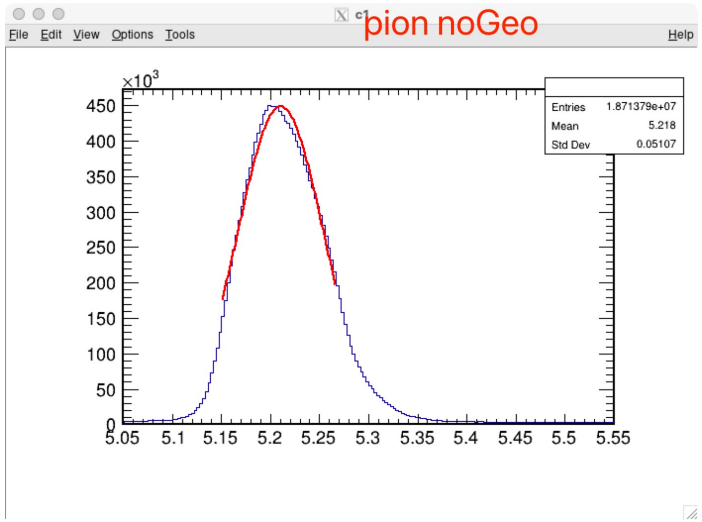
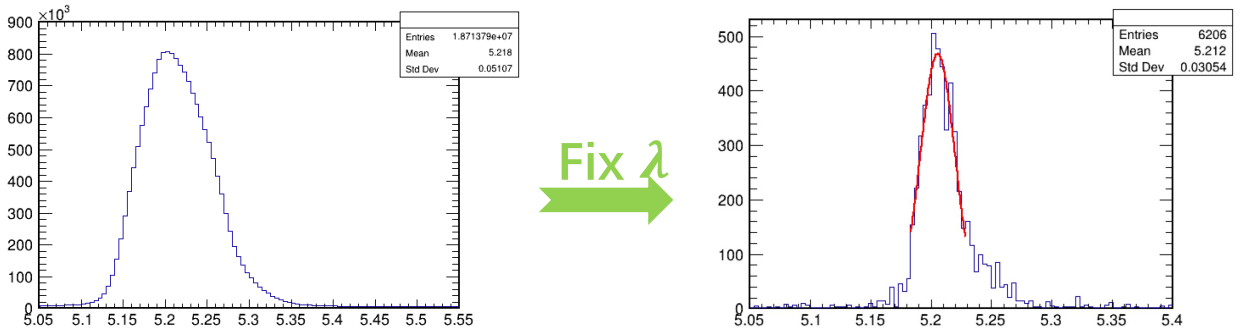


From DTOF

$$\sigma_t = \sigma_{T_0} \oplus \sigma_{t_{MCS}} \oplus \sigma_{TTS} \oplus \sigma_{t_\lambda} \oplus \sigma_{t_D} \oplus \sigma_{t_{ext(\vec{r},\vec{p})}}$$

- $\boldsymbol{\sigma_{t_\lambda}}$ (different n & θ_c) $= \sigma_t \ominus \sigma_{t_{fix\,\lambda}}$



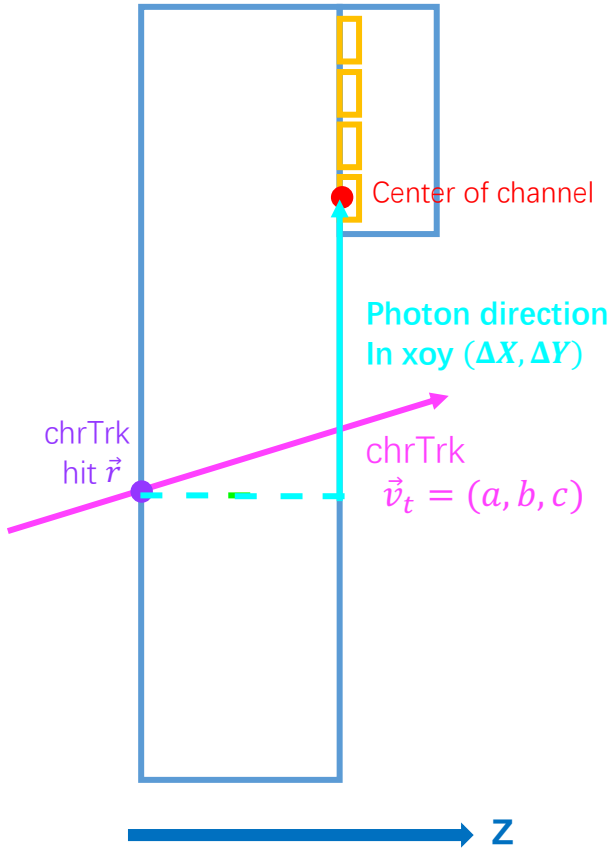
- $\boldsymbol{\sigma_{t_D}}$ (from PD pixel & radiator width)

  remove T_0, TTS, and Geo & fix λ_γ

$$cos\theta_c = \frac{1}{n\beta} = \frac{\vec{v}_t \cdot \vec{v}_p}{|\vec{v}_t| \cdot |\vec{v}_p|}$$

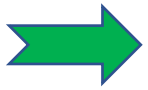
$$\vec{v}_t = (a, b, c)$$
$$\vec{v}_p = (\Delta X, \Delta Y, \Delta Z)$$

To reconstruct ΔZ



$$\sigma_t = \sigma_{T_0} \oplus \sigma_{t_{MCS}} \oplus \sigma_{TTS} \oplus \sigma_{t_\lambda} \oplus \sigma_{t_D} \oplus \sigma_{t_{ext(\vec{r},\vec{p})}}$$

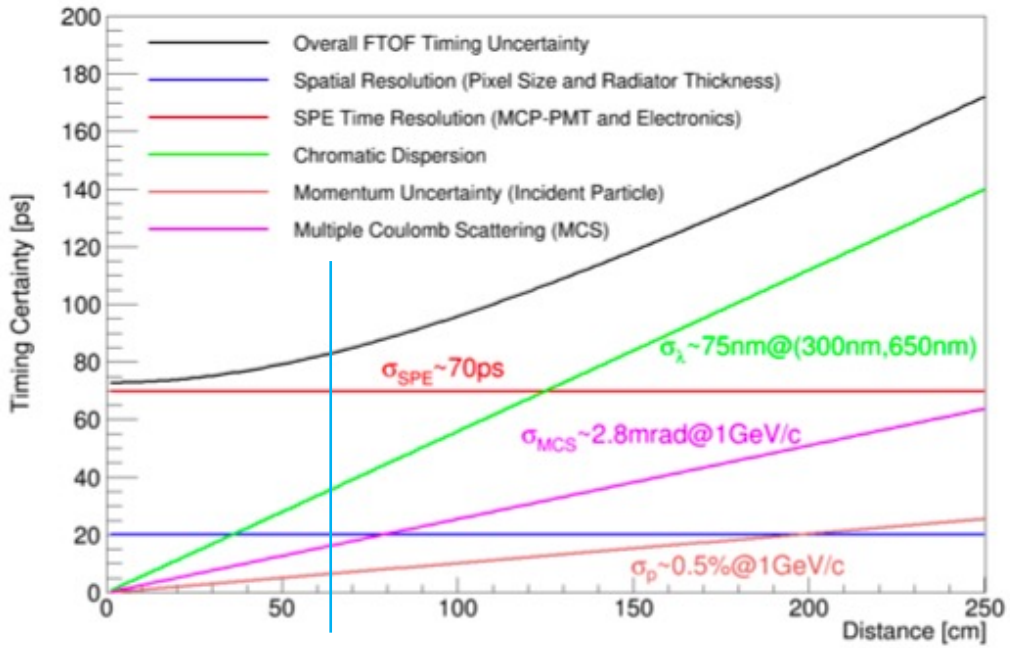
/ps	π
$\sigma_{t_{MCS}}$	9.8
σ_{t_λ}	40.7
σ_{t_D}	14.36
$\sigma_{t_{ext}}$	16.5
σ_{T_0}	40
σ_{TTS}	70



93.44 ps

σ_t/ps	π
Ext	95.7

Kaon p = 1GeV/c by BInbin



$D = \sqrt{\Delta X^2 + \Delta Y^2} = 634.9$ cm