θ resolution and HyCal reconstruction

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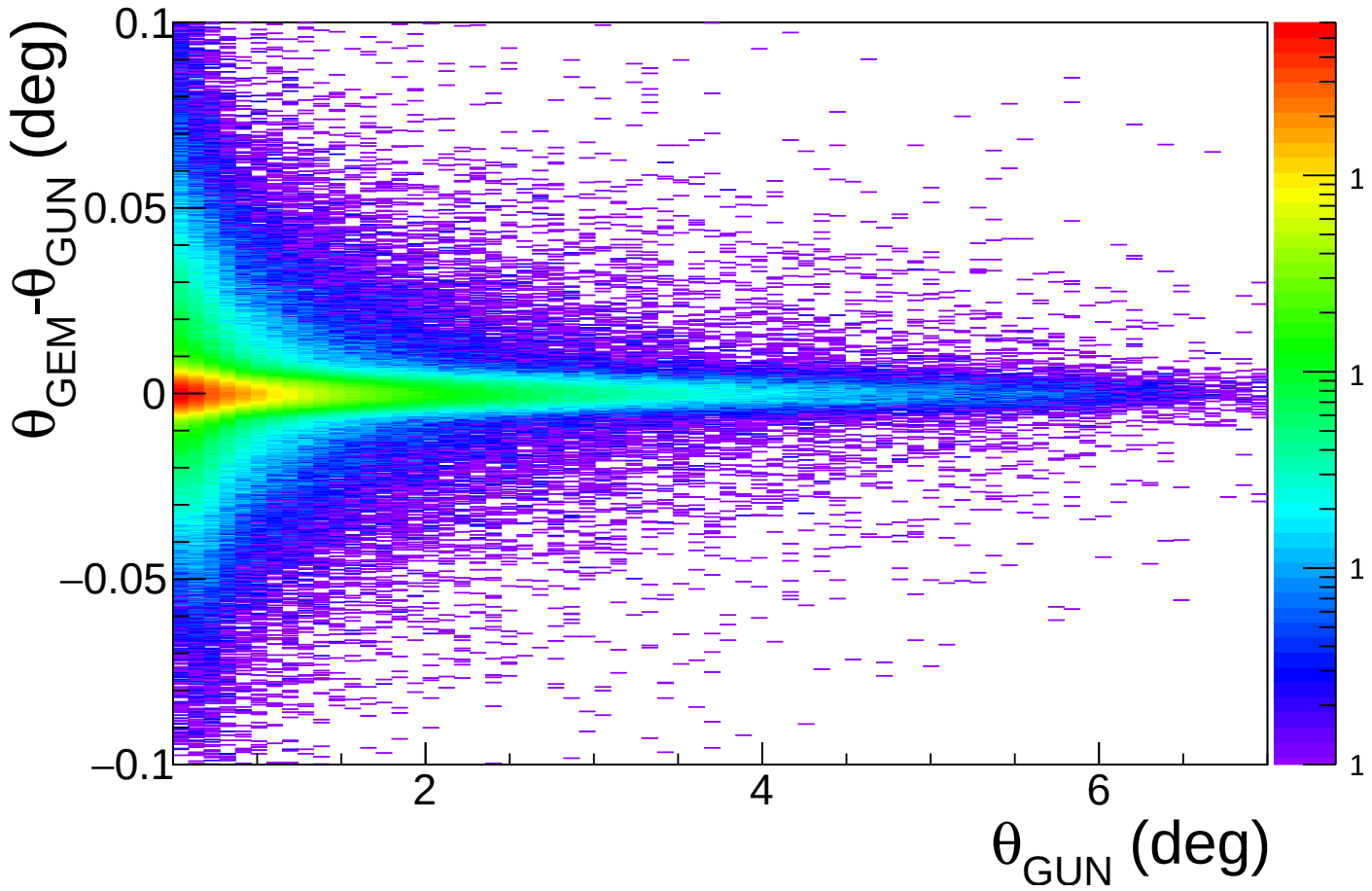
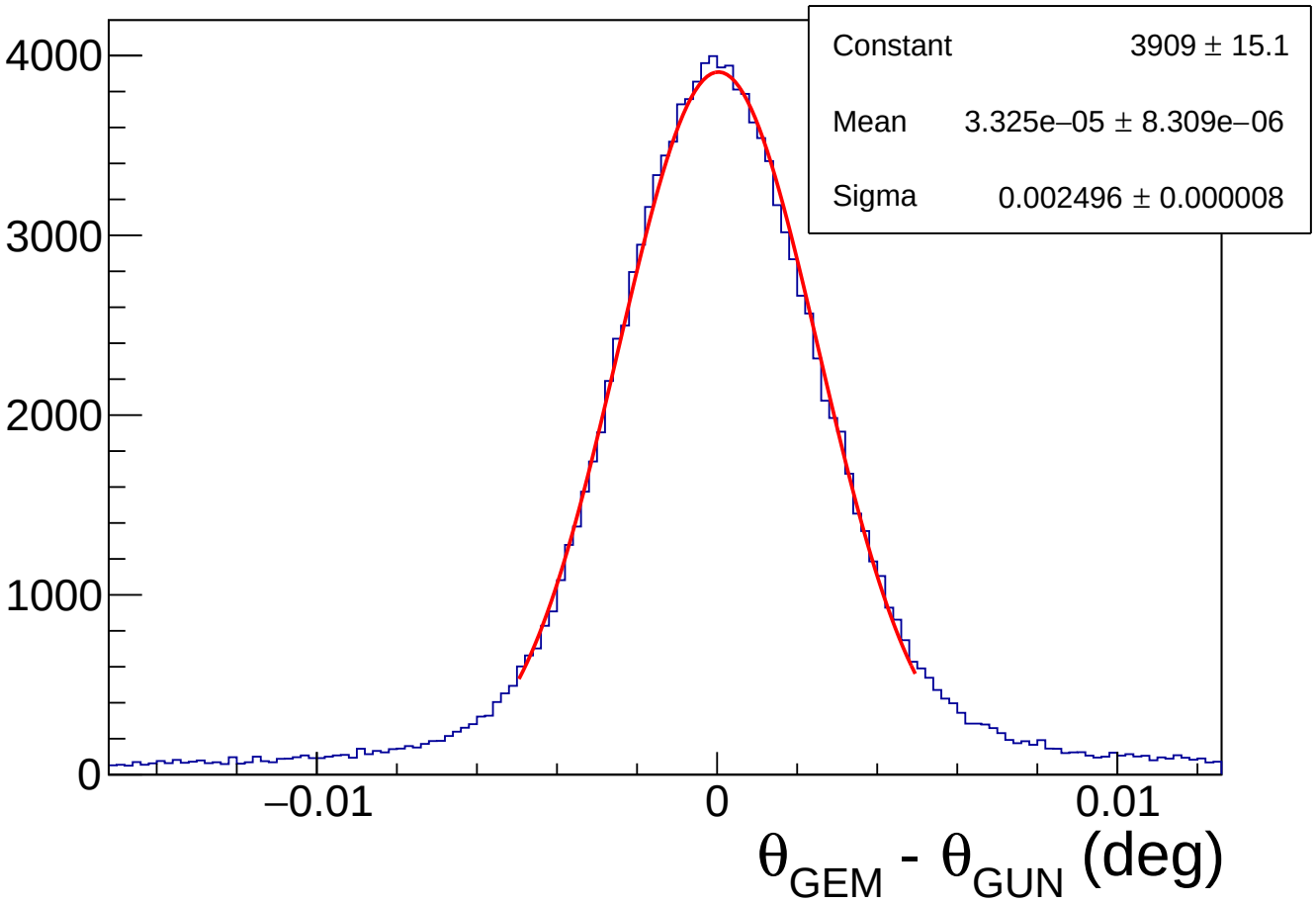
θ resolution vs. θ in simulation



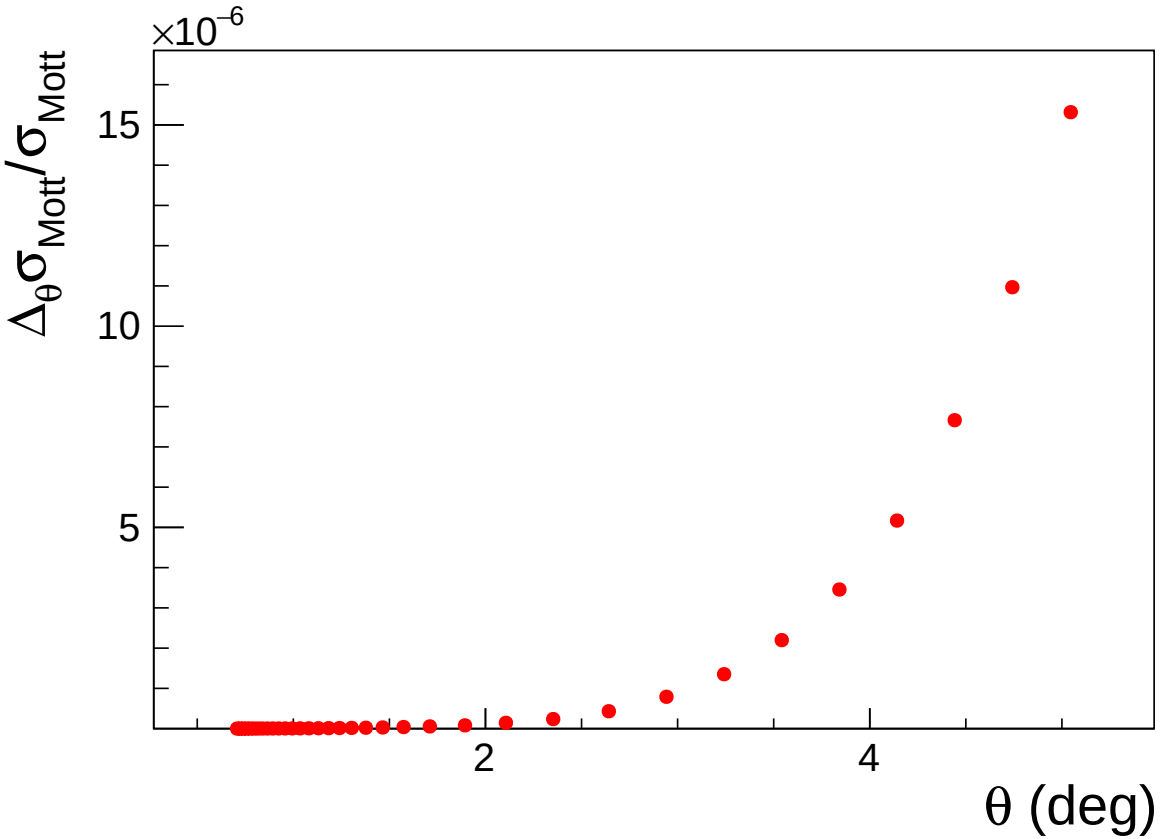
- Uniform *theta* resolution

θ resolution



Effect on Mott Normalization

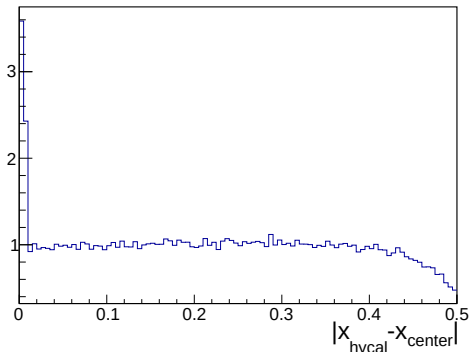
- width of $\Delta\theta$ distribution from simulation
- statistics from data



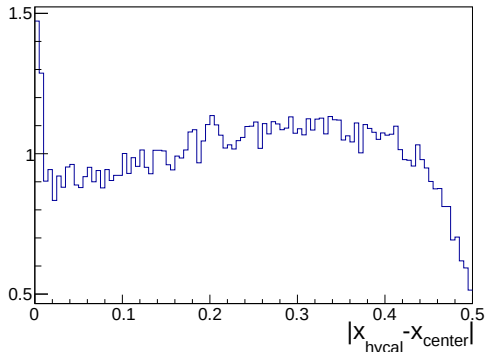
x density in HyCal reconstruction

- Quantity plotted: $|x_{hycal} - x_{module\ center}|$/cell size
- Cuts: $E > 1$ GeV ($E_{beam} = 2.142$ GeV), $n_{modules} > 4$
- depends on logarithm weight parameter α

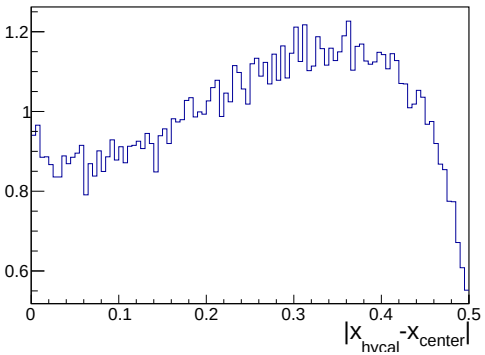
$\alpha = 3.6$



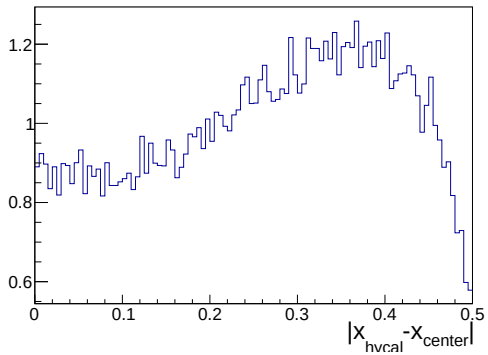
$\alpha = 3.8$



$\alpha = 4.0$



$\alpha = 4.2$



Correction function

- corrected variable $x = x_0 + c(x_0)$
- density function $w(x)$
- fit: $\frac{dw}{dx_0} = P(x_0)$
- corrected density: $\frac{dw}{dx} = 1$

$\rightarrow$ $c'(x_0) = \frac{1}{P(x_0)-1}$

- Plan to do it separately for 1GeV/2GeV, data/simulation
- Might be energy dependent
- Implement it in PRadAnalyzer