Island update
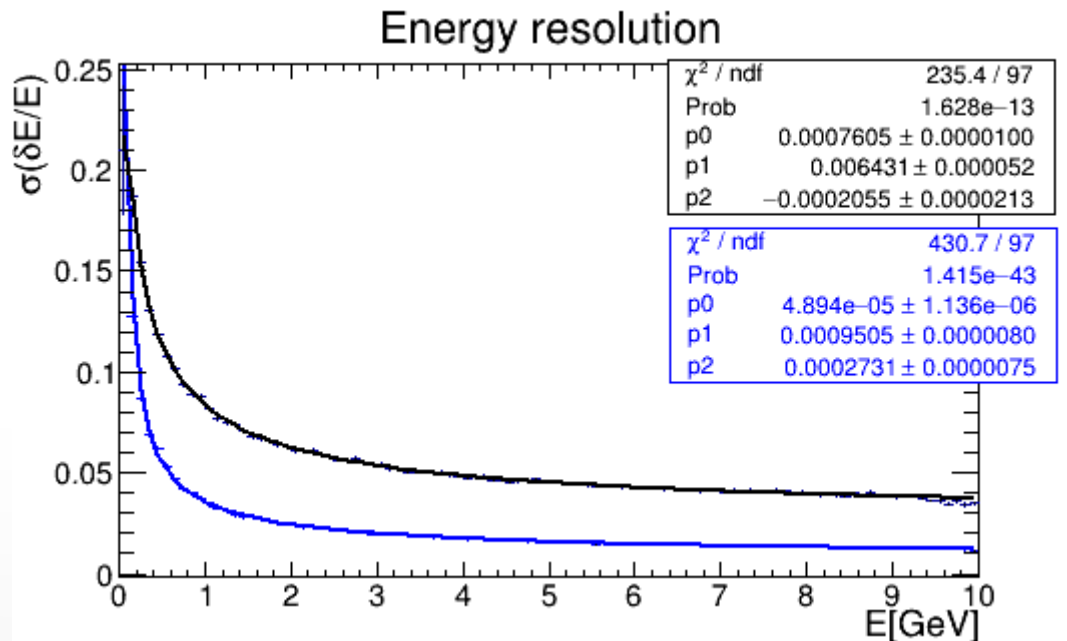## Simon Taylor/JLab
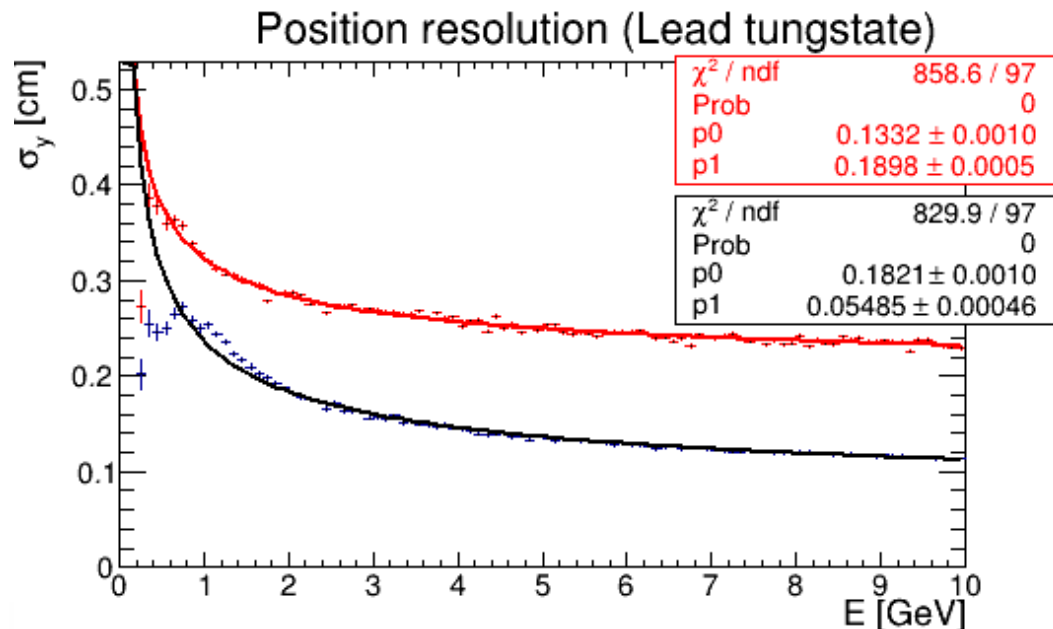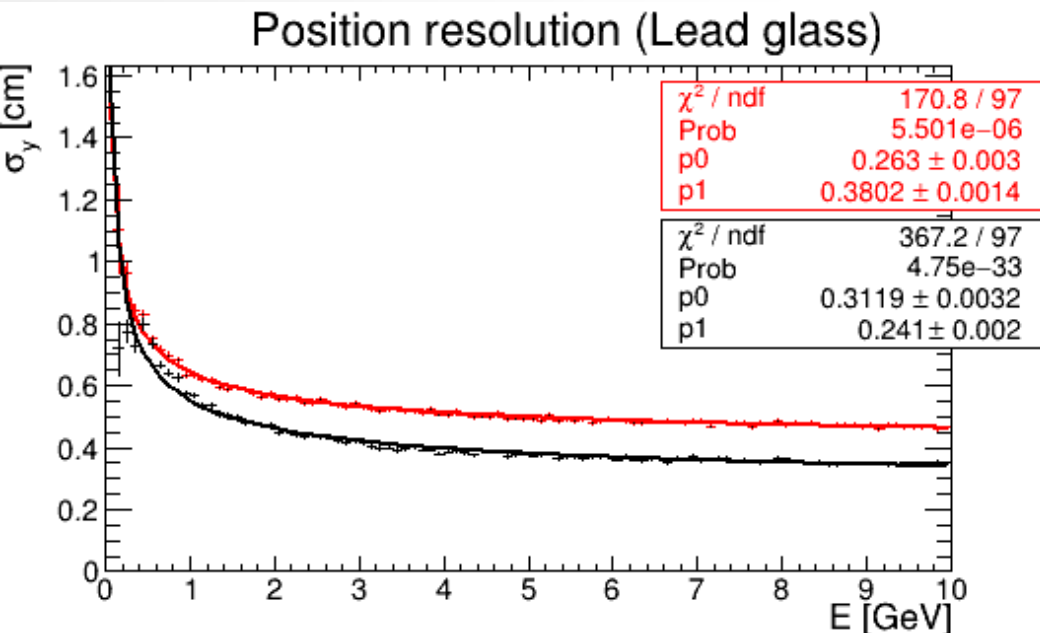
- Photon gun simulations: $E_\gamma=\{0.1,10.1\}$ GeV
  - Insert (Lead tungstate) region: θ =3°
  - Outer (Lead glass) region: θ =6°
- Reconstruction using Island algorithm
  - Shower width parameters:
    - b(Lead tungstate) = 0.315 cm
    - b(Lead glass) = 0.675 cm
- New:
  - Code does not add additional photon candidates if separation with other clusters within a group of adjacent hits is not physical
  - Position-dependent S-curve correction removed
  - Issue at interface between insert and rest of FCAL fixed

Energy resolution

χ² / ndf		235.4 / 97
Prob		1.628e−13
p0		0.0007605 ± 0.0000100
p1		0.006431 ± 0.000052
p2		−0.0002055 ± 0.0000213

χ² / ndf		430.7 / 97
Prob		1.415e−43
p0		4.894e−05 ± 1.136e−06
p1		0.0009505 ± 0.0000080
p2		0.0002731 ± 0.0000075

Position resolution

- Comparison of default algorithm to island algorithm

$$\sigma_y = p_0/\sqrt{E} + p_1$$

Note: not applying S-curve correction for island peak position result

- Photon gun simulation: $E_\gamma=\{0.1,10.1\}$ GeV, $\theta =0\text{-}11°$

default algorithm
island algorithm

Two photon invariant mass

Shower separation
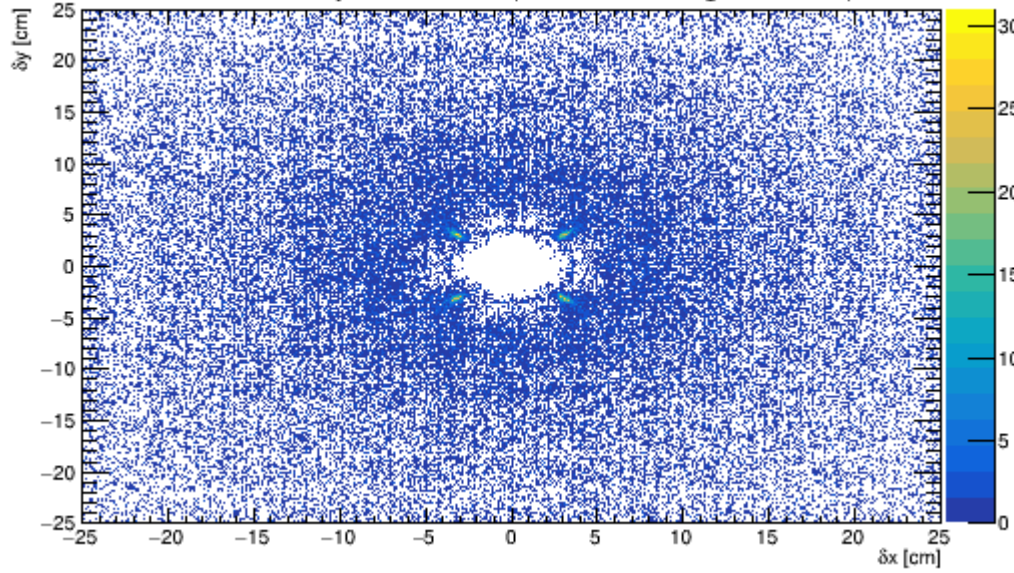

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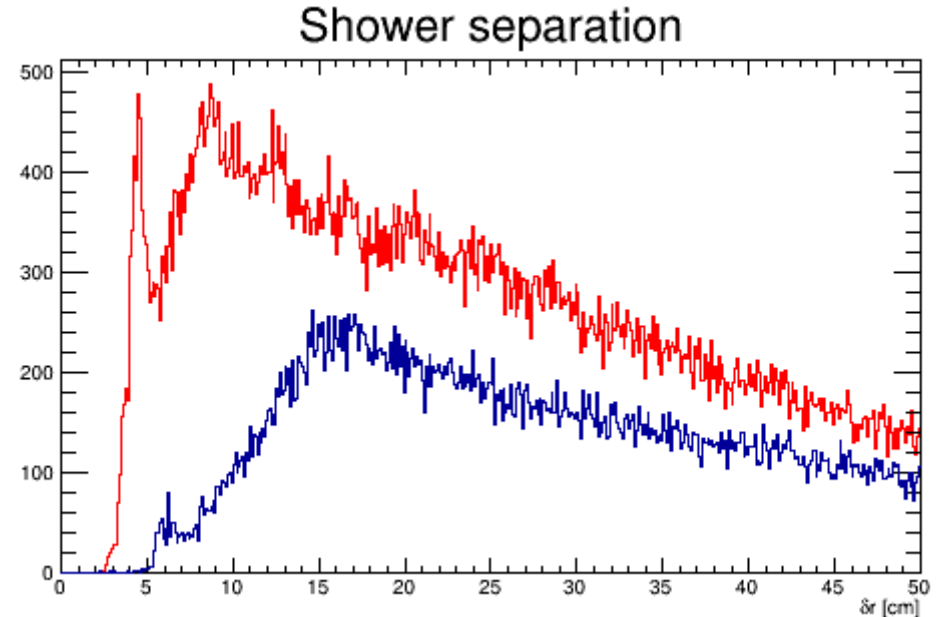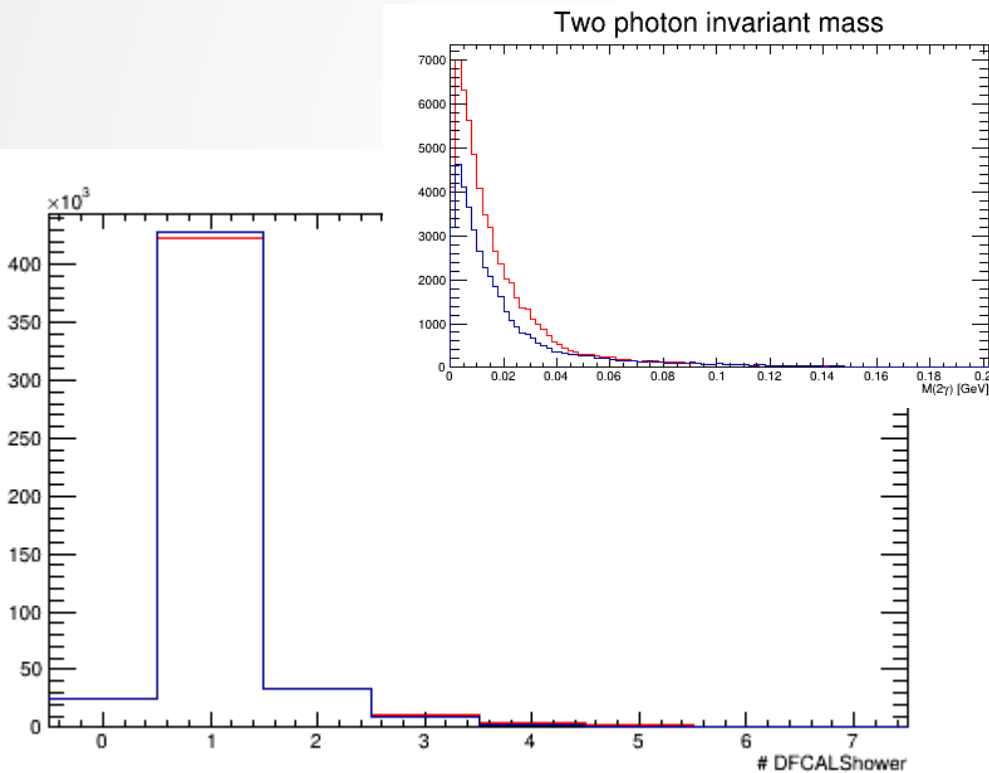
More default/island algorithm comparisons

- Photon gun simulation: $E_\gamma = \{0.1, 10.1\}$ GeV, $\theta = 0\text{-}11°$