

Wirecell Updates

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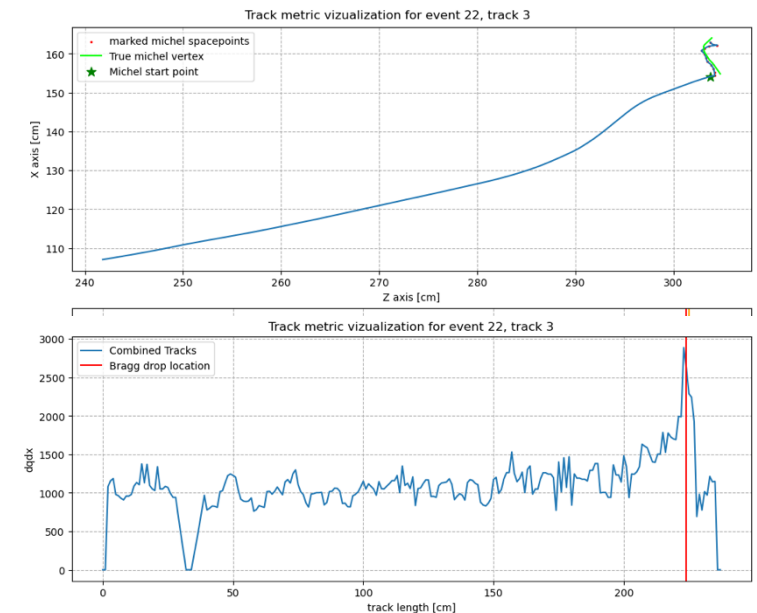
Louisiana State University



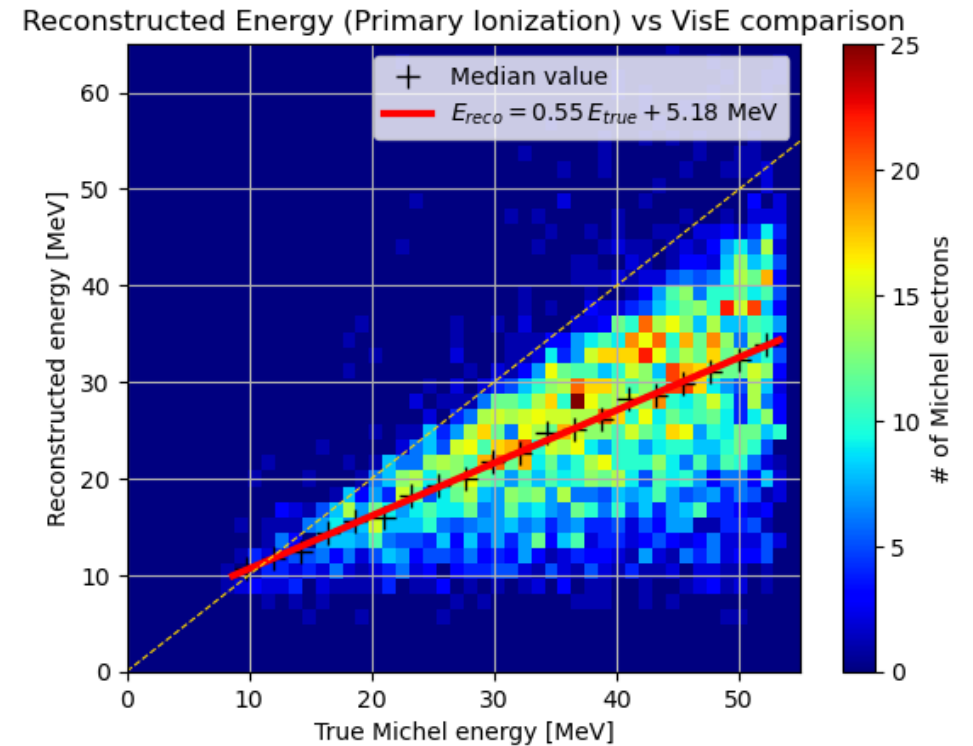
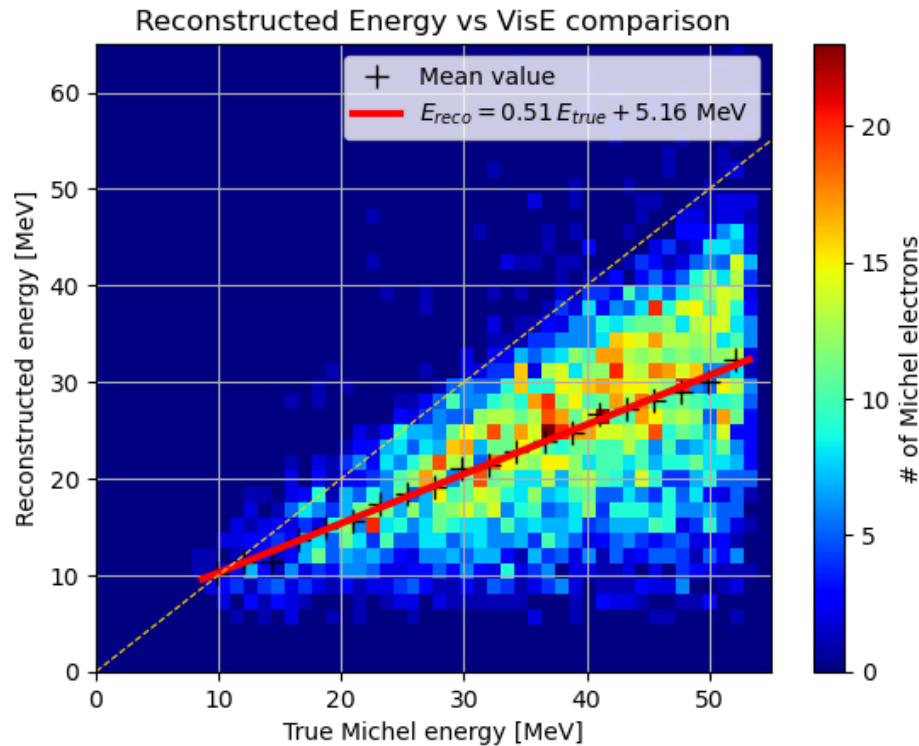
Louisiana State University

Additional correction from Bragg peak

- Typically, the first 1-2 tagged Michel hits still carry leftover charge from the parent muon's Bragg peak
- Can “reject” these charges and “inject” an averaged charge for these hits to improve bias

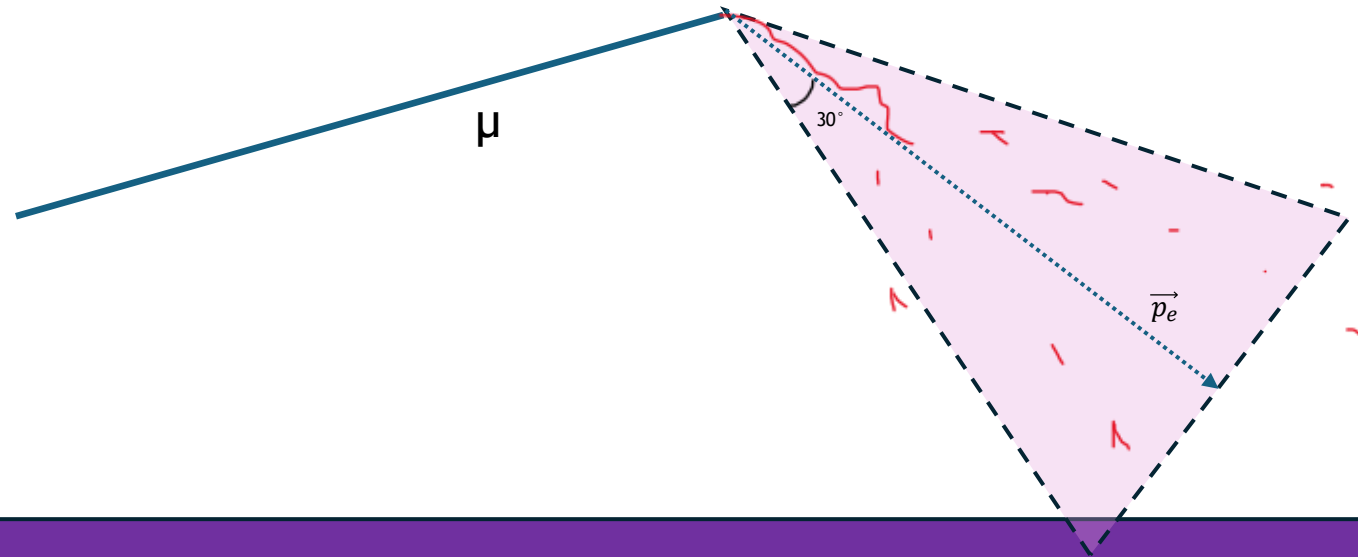


Additional correction from Bragg peak



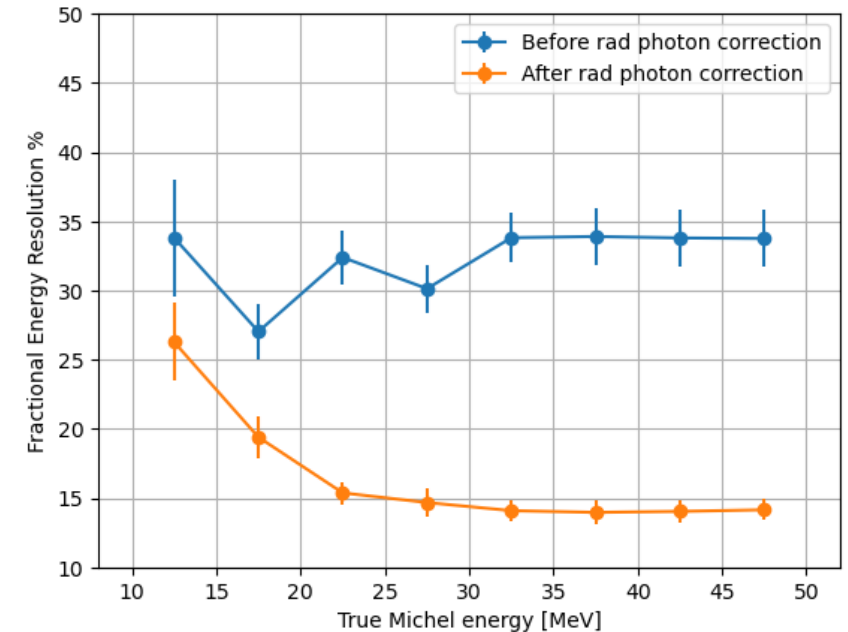
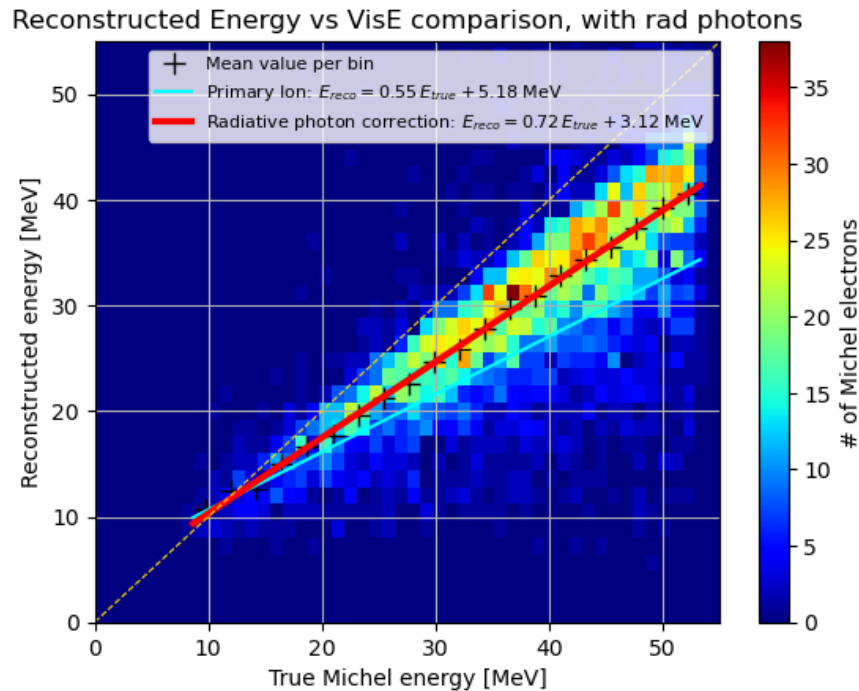
From before

- Can draw a “cone” in an attempt to recover additional ionization from Brem. Photons
 - Most are only available via raw hits from collection plane
 - Lose a degree of freedom (i.e. only a 2d projection of hits), but in principle this shouldn't be an issue



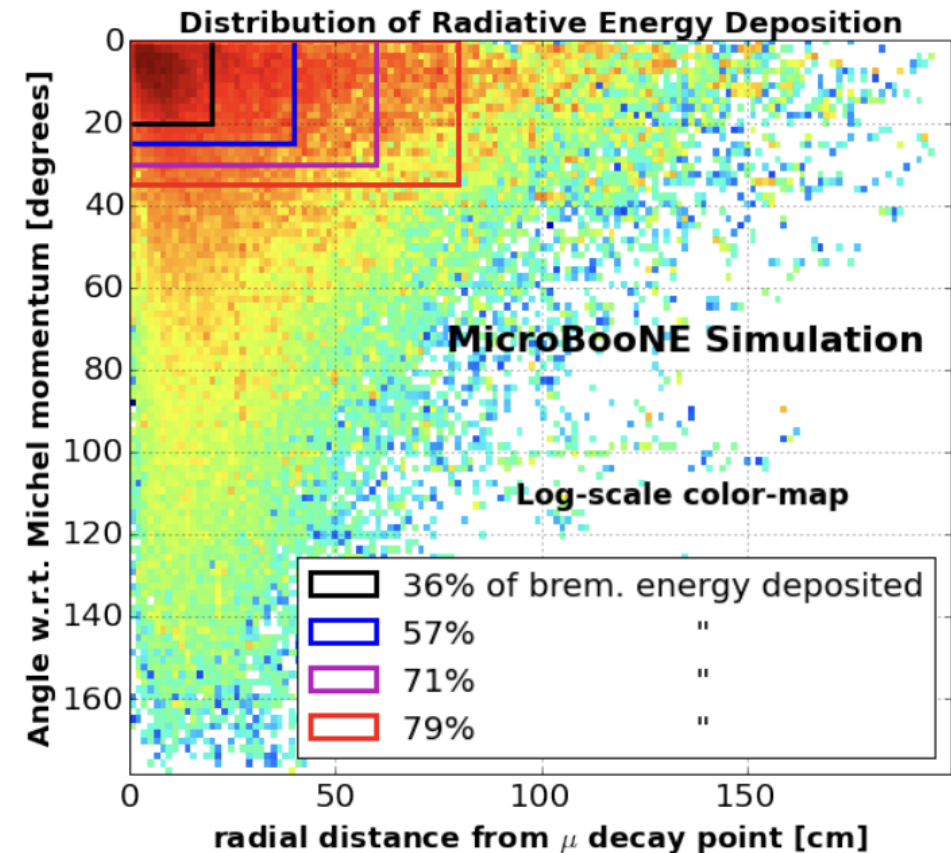
How does this hold?

- Much better energy resolution using this method
 - Can we do better?

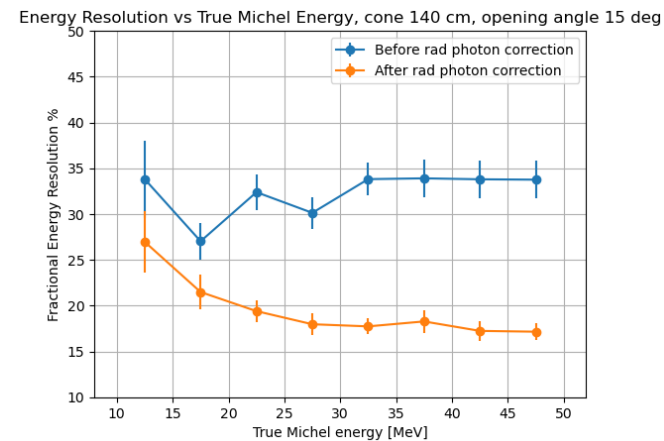
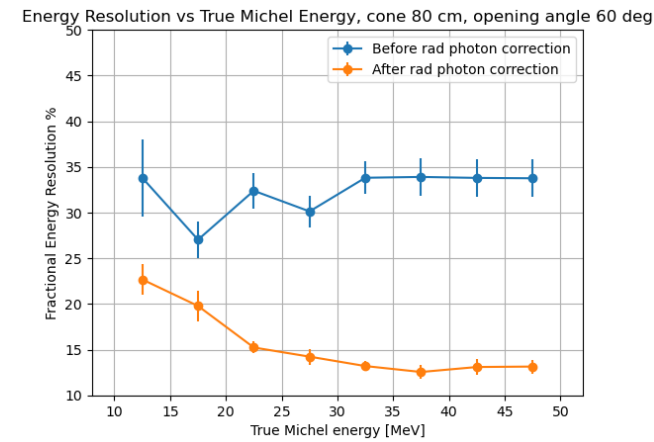
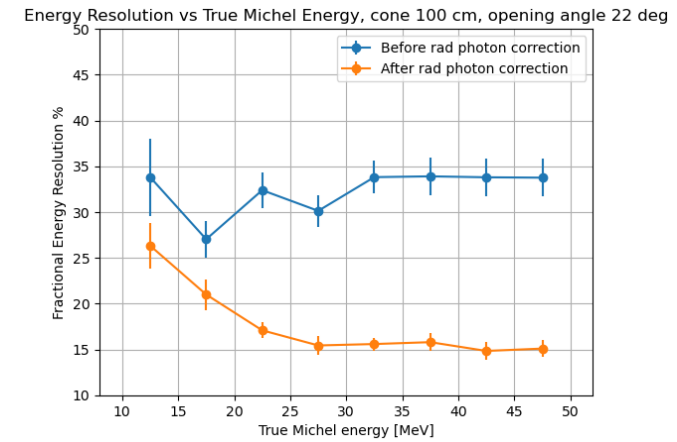
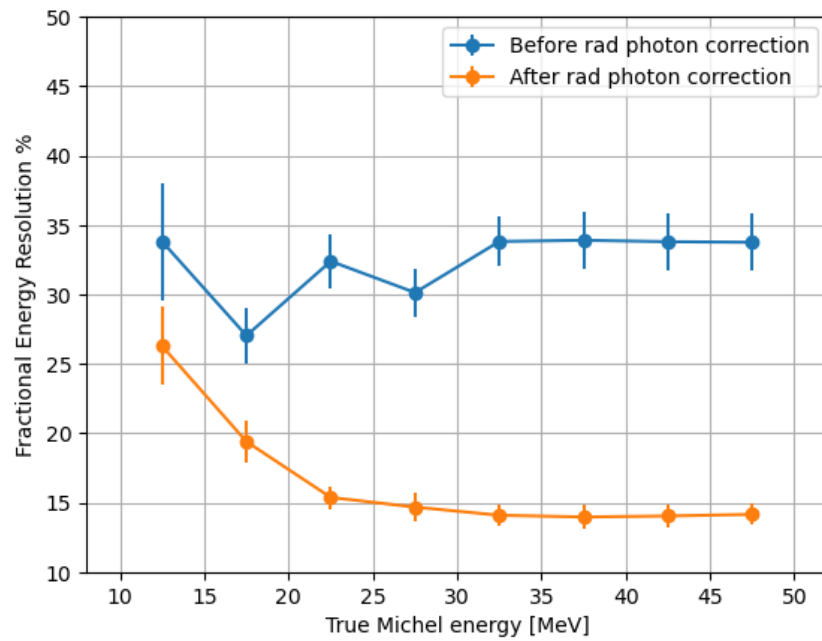


Improving energy estimation

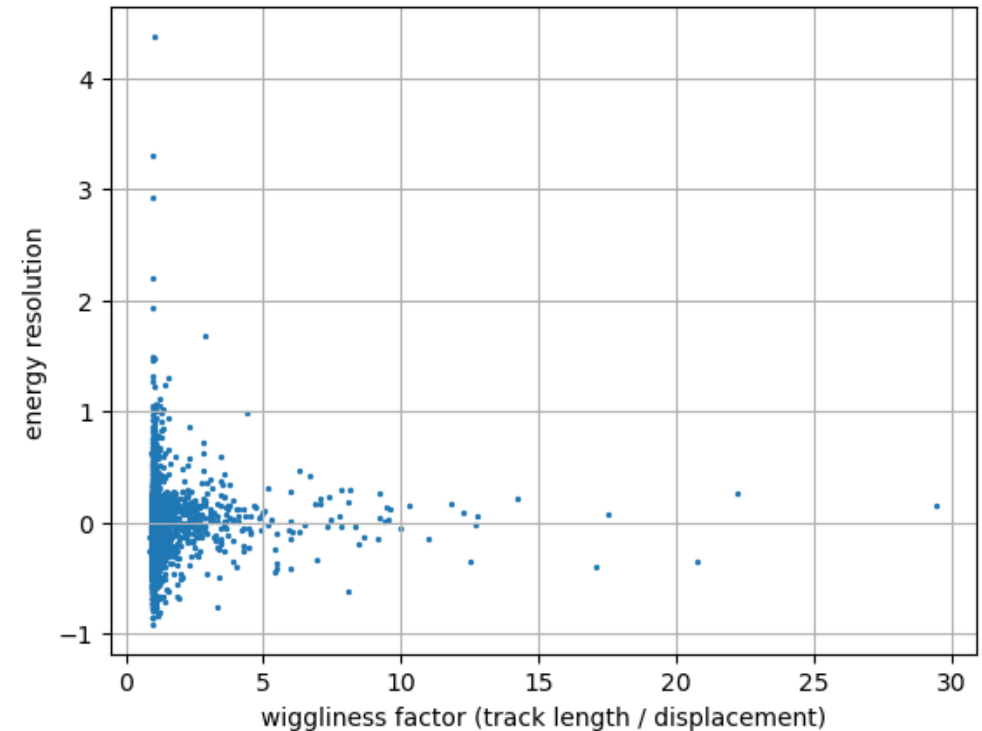
- There is still a significant tail, which indicates this method still underestimates energies
 - Additionally, there is still an offset in the fit
- Can we optimize the search cone for different energy bands?
 - Higher energies → “long” cone, small opening angle
 - Lower energies → “short” cone, large opening angle
- Vary the search cone area, compare results at different energies to see if there’s improvement or not

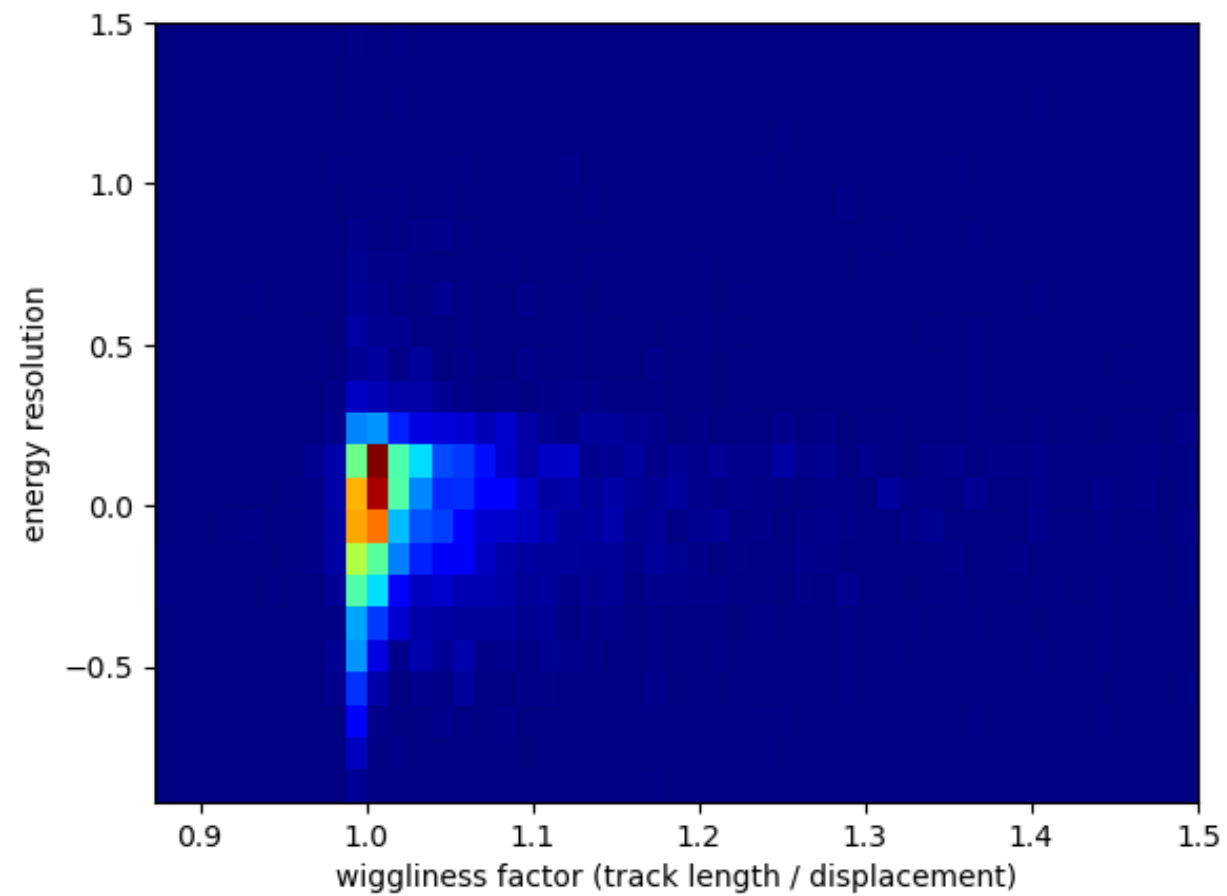


- Default: 80 cm, 30 degree opening angle



- Can define a “wobble factor”: $\frac{length}{|start-end|}$
- Could give insight into if there is a dependence on track length and reconstructed energy
 - If there's a lot of scattering/wiggleness, the energy reconstruction should reflect if this behavior influences the amount of energy we recover from radiative photons





Energy resolution

- Per-bin Gaussian fit, mean tells us the bias and standard deviation gives the energy “resolution”

