

MILO VERMEULEN — 5-12-2019

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# CATCHING PHOTON HITS

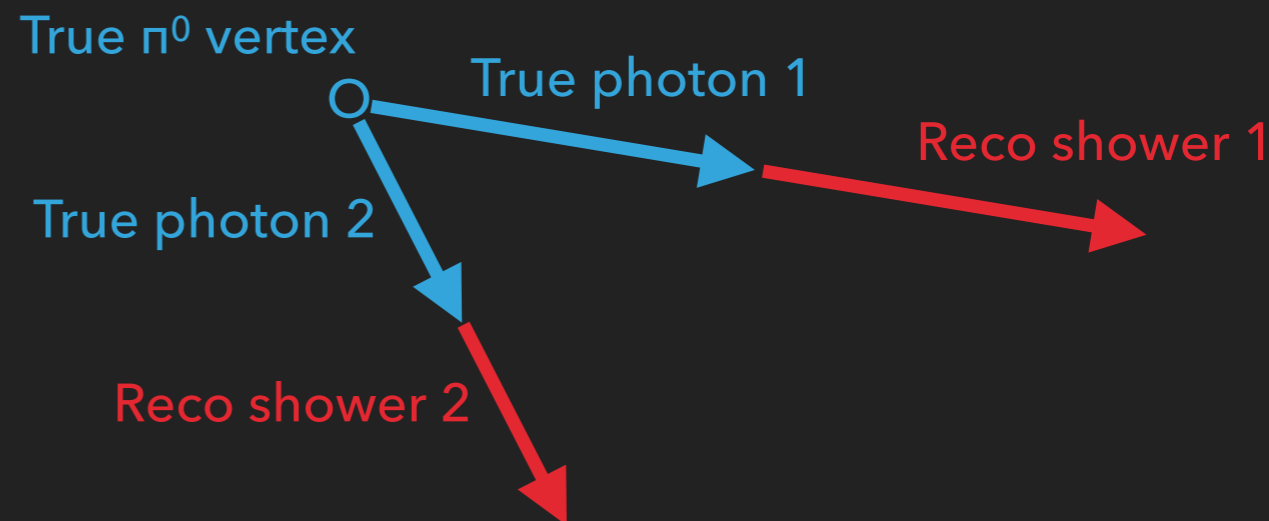
## BACKGROUND

- ▶  $\pi^0$  reconstruction relies on  $\gamma$  reconstruction

- ▶ Invariant mass  $m_{\pi}^2 = 2E_{\gamma 1}E_{\gamma 2} \left( 1 - \cos(\theta_{\gamma 1 \gamma 2}) \right)$

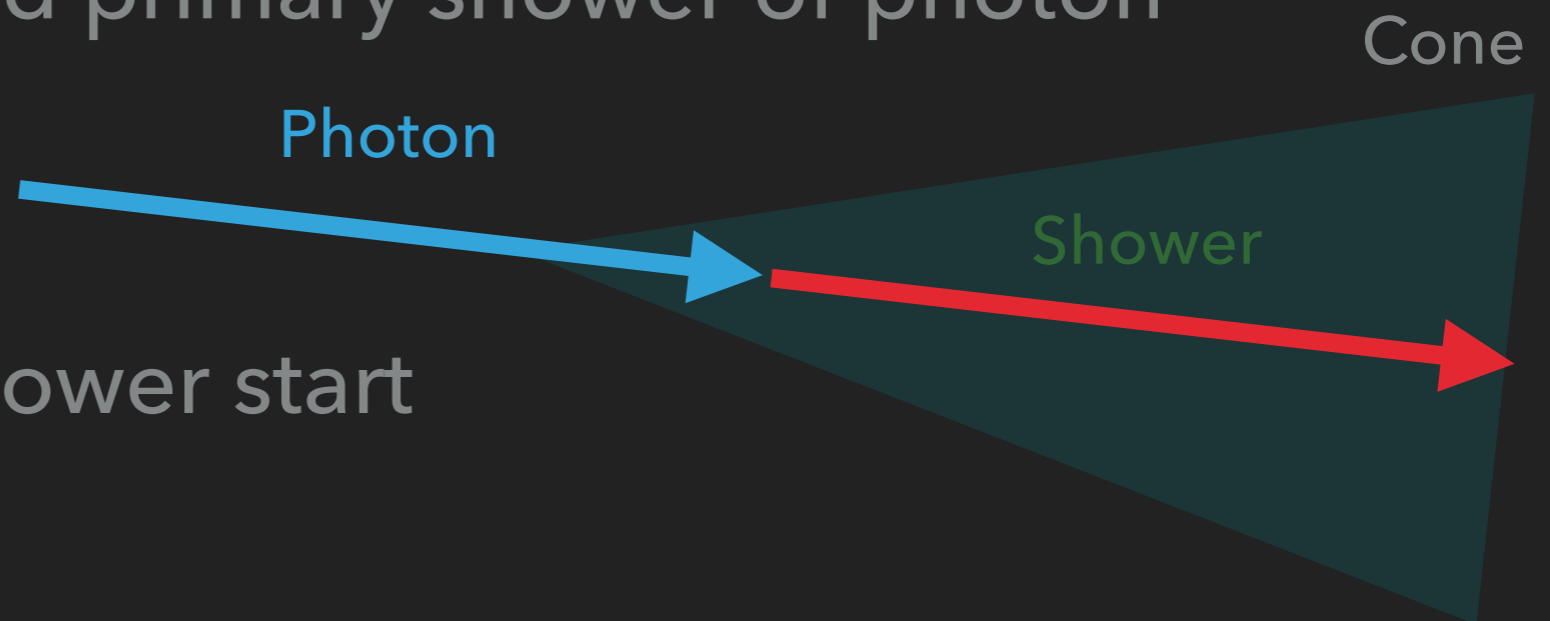
- ▶ Relies on energy and angle reconstruction

- ▶ Needs good completeness and purity of showers



## METHOD

- ▶ Draw 3D cone around primary shower of photon



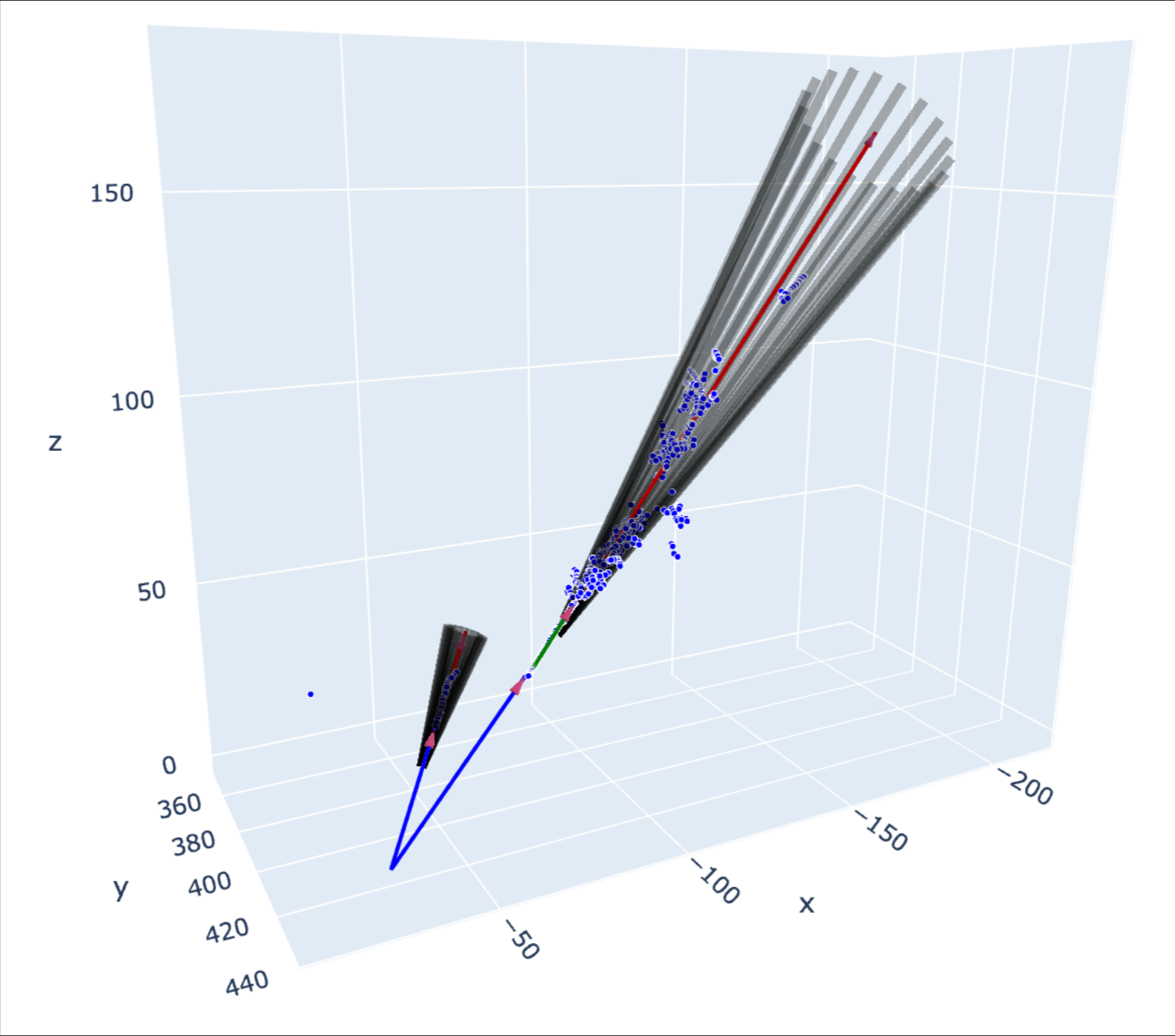
- ▶ Offset cone at the shower start to catch stray hits

- ▶ Opening angle tunable, but set to  $30^\circ$  here

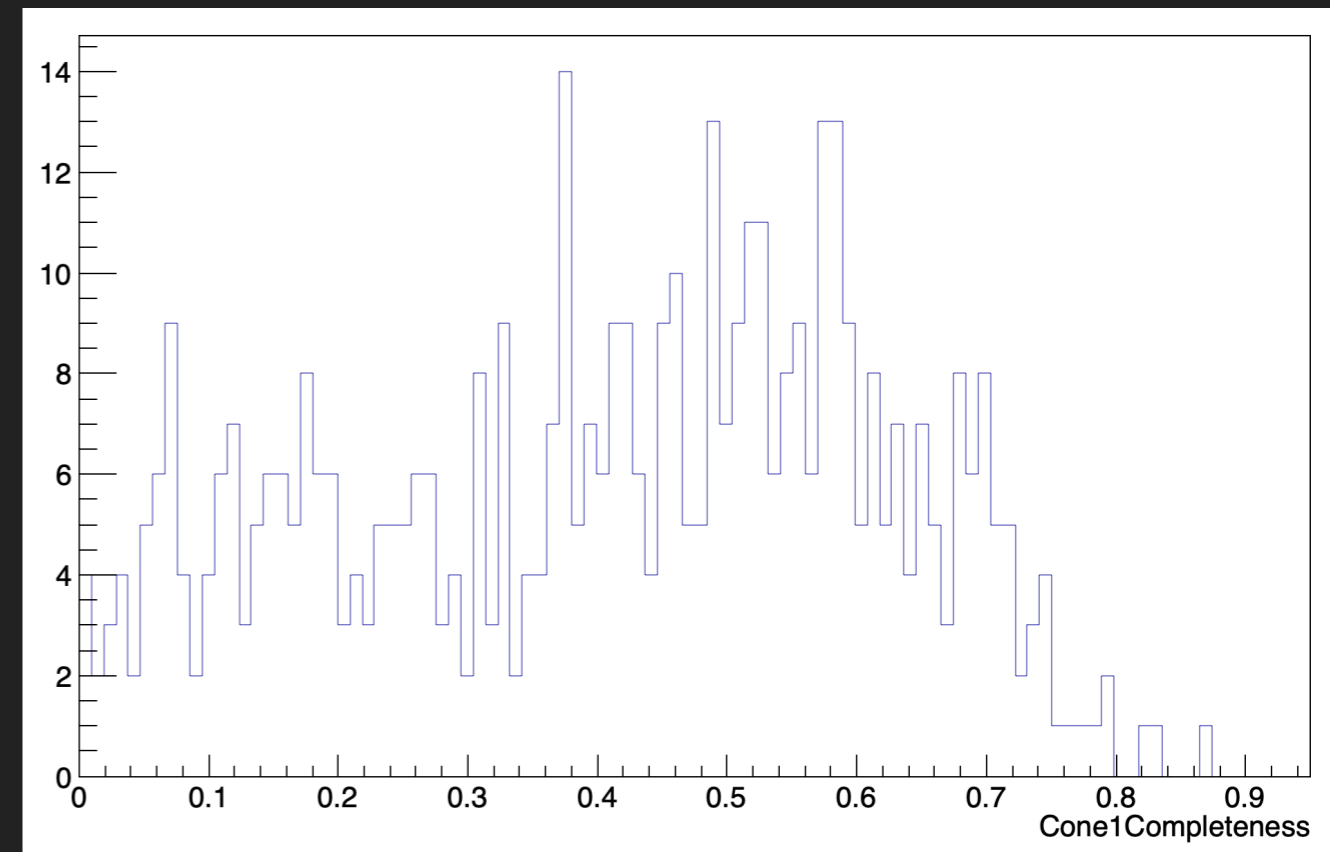
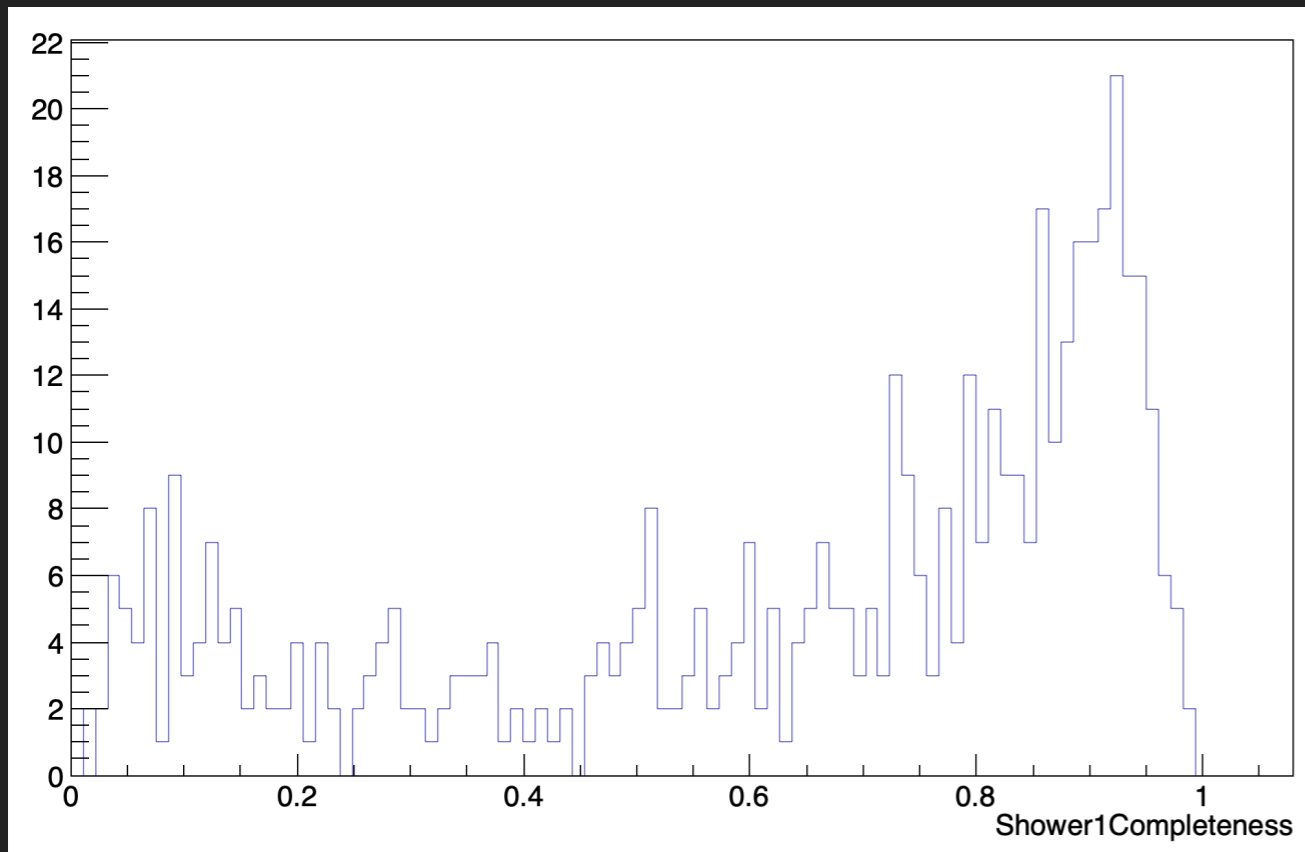
## SAMPLE

- ▶ For now: single 2 GeV  $\pi^+$  events
  - ▶ 1000 events to serve as example
- ▶ Official production runs coming!

# SHOWER AND CONE COMPLETENESS



# PRELIMINARY RESULTS



## IMPROVEMENTS

- ▶ Different container objects possible
  - ▶ Cone? Cylinder? Cone without point?
- ▶ Still based on shower object
  - ▶ Direction and length might be off
  - ▶ Combine with parent track
- ▶ Need to investigate spacepoint solver
  - ▶ Other candidates for 3D hit information?