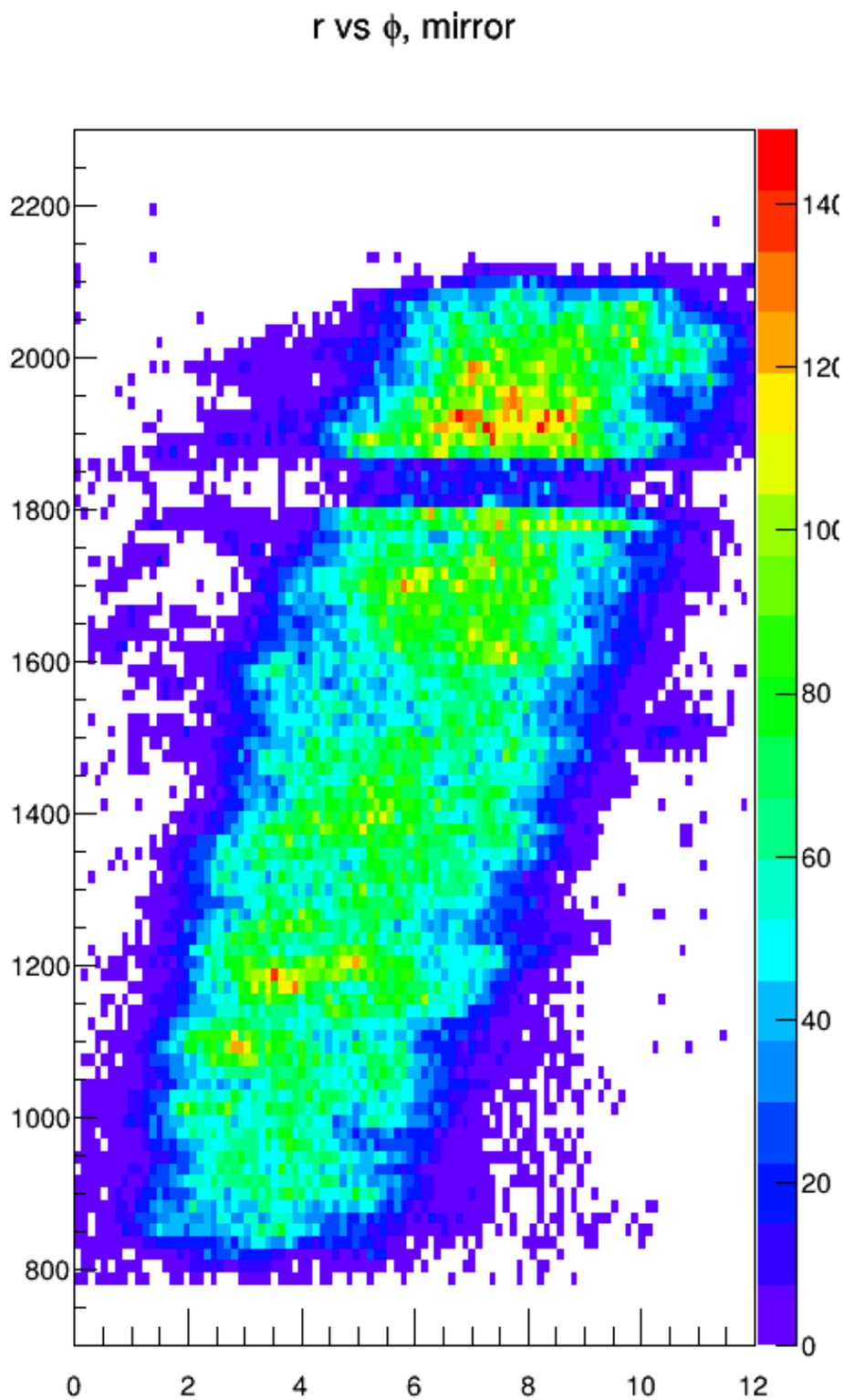
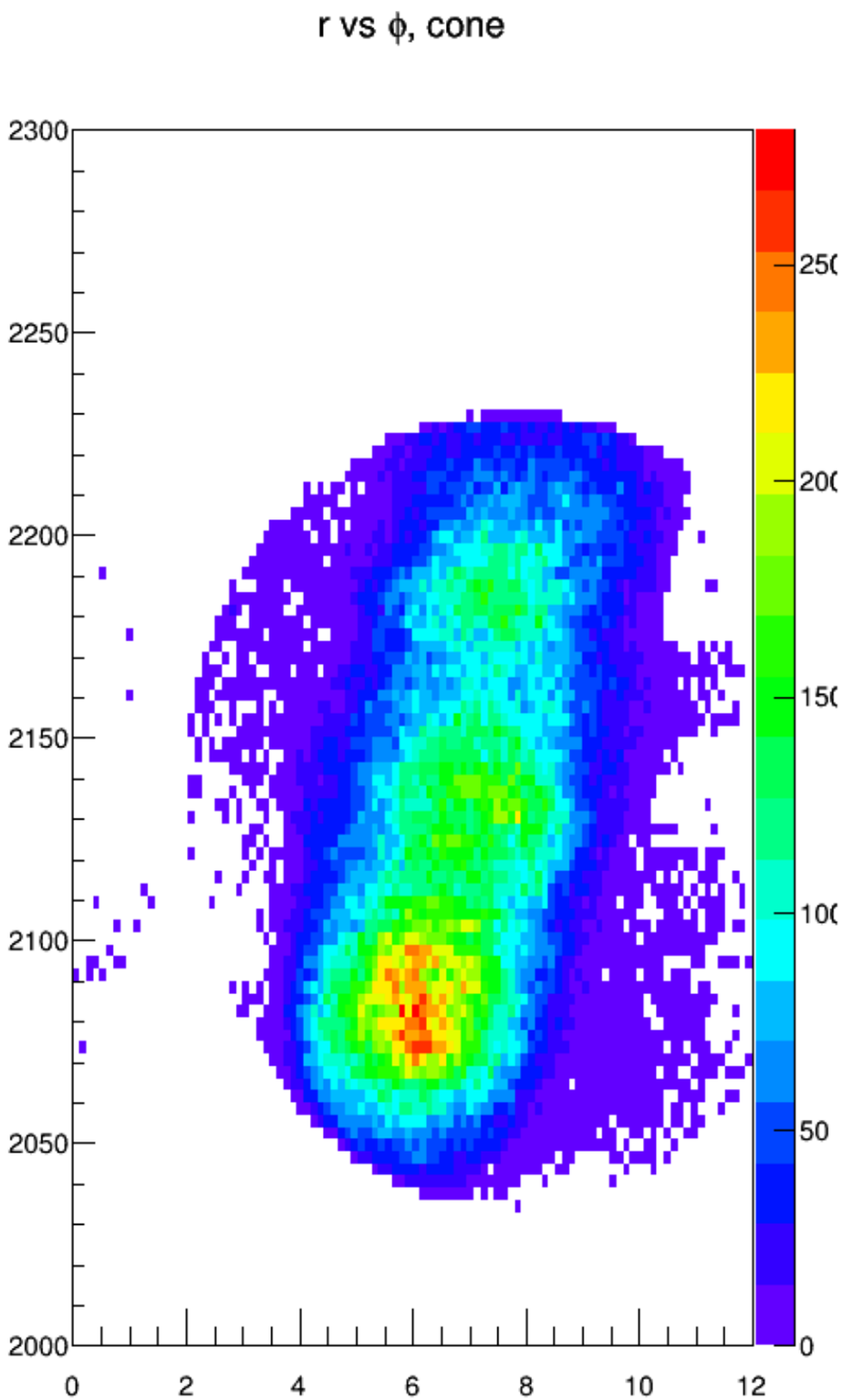
Electron trajectories in LGC

Rich Holmes

SoLID simulation meeting 10/10/2017

Optical photon hit positions (r vs ϕ) at mirror and Winston cone
DIS, cuts Q^2>6, W>2, x>0.55





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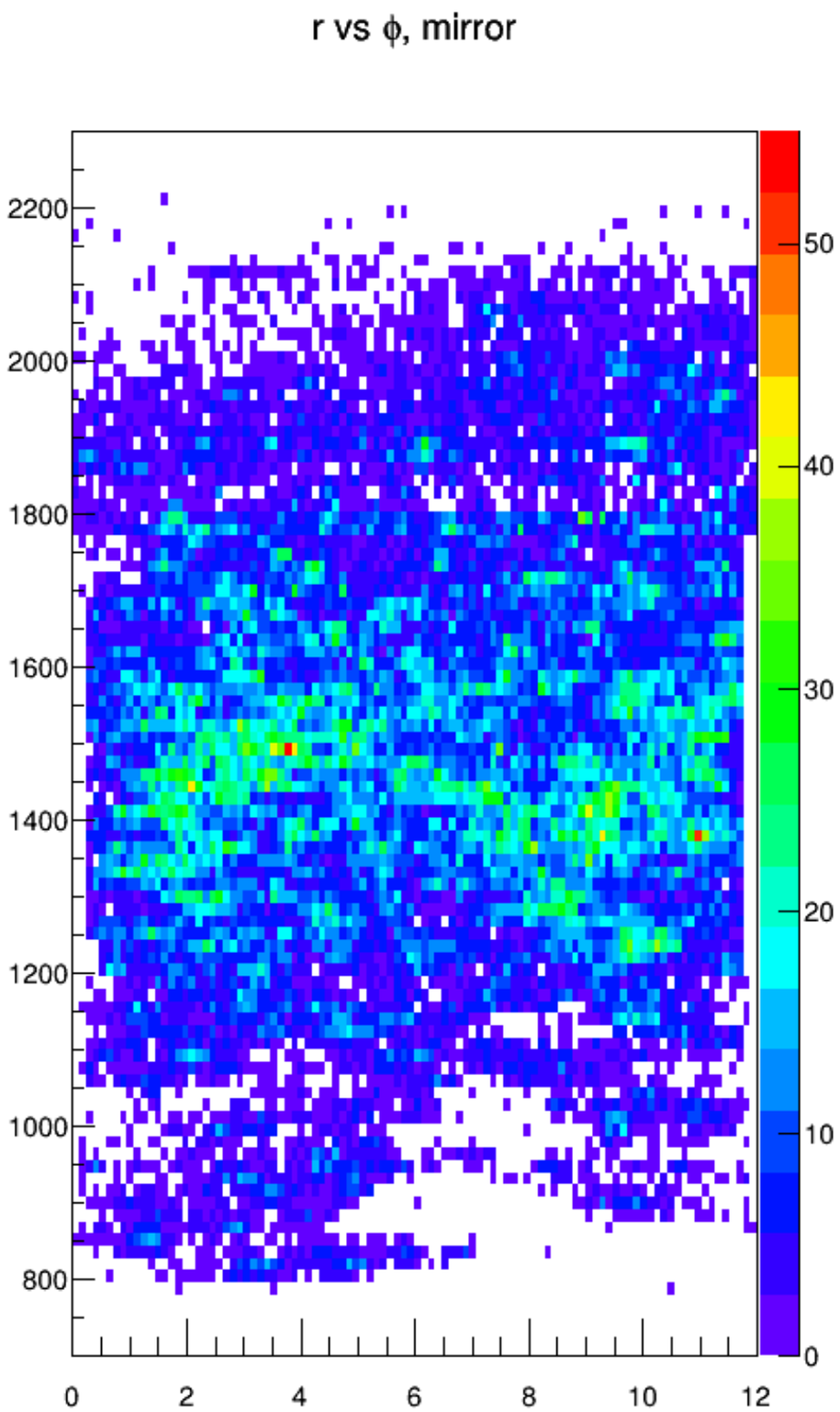
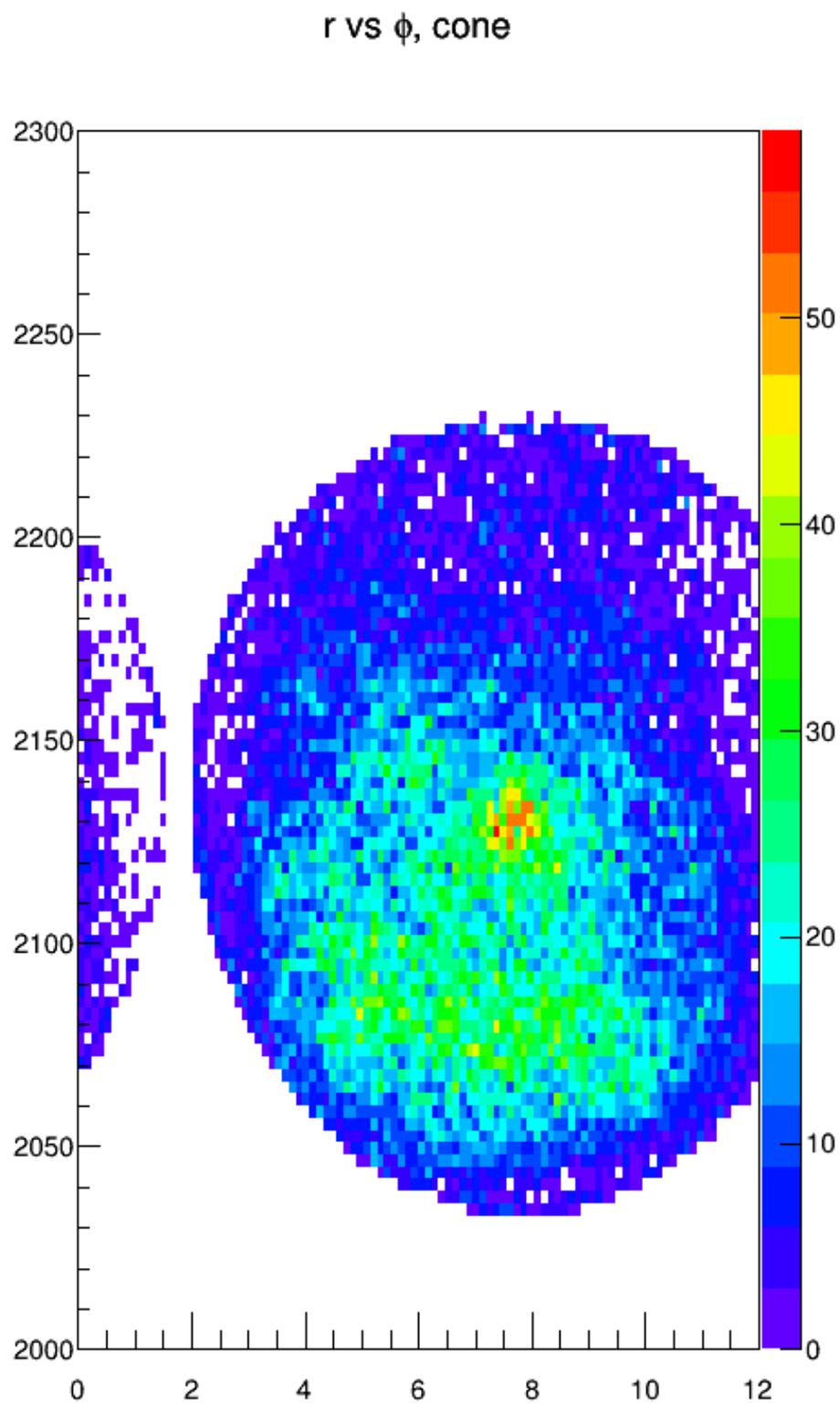
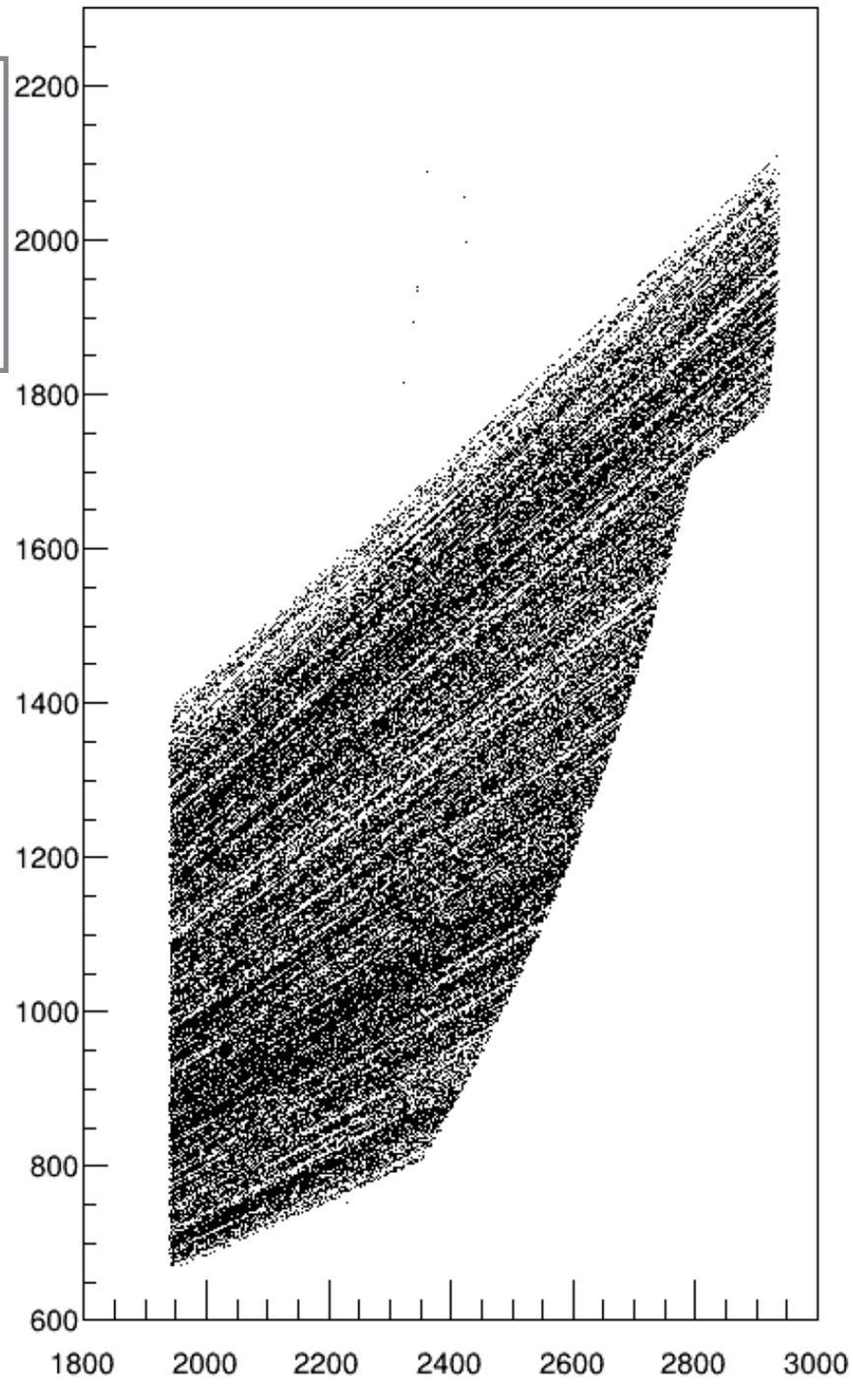
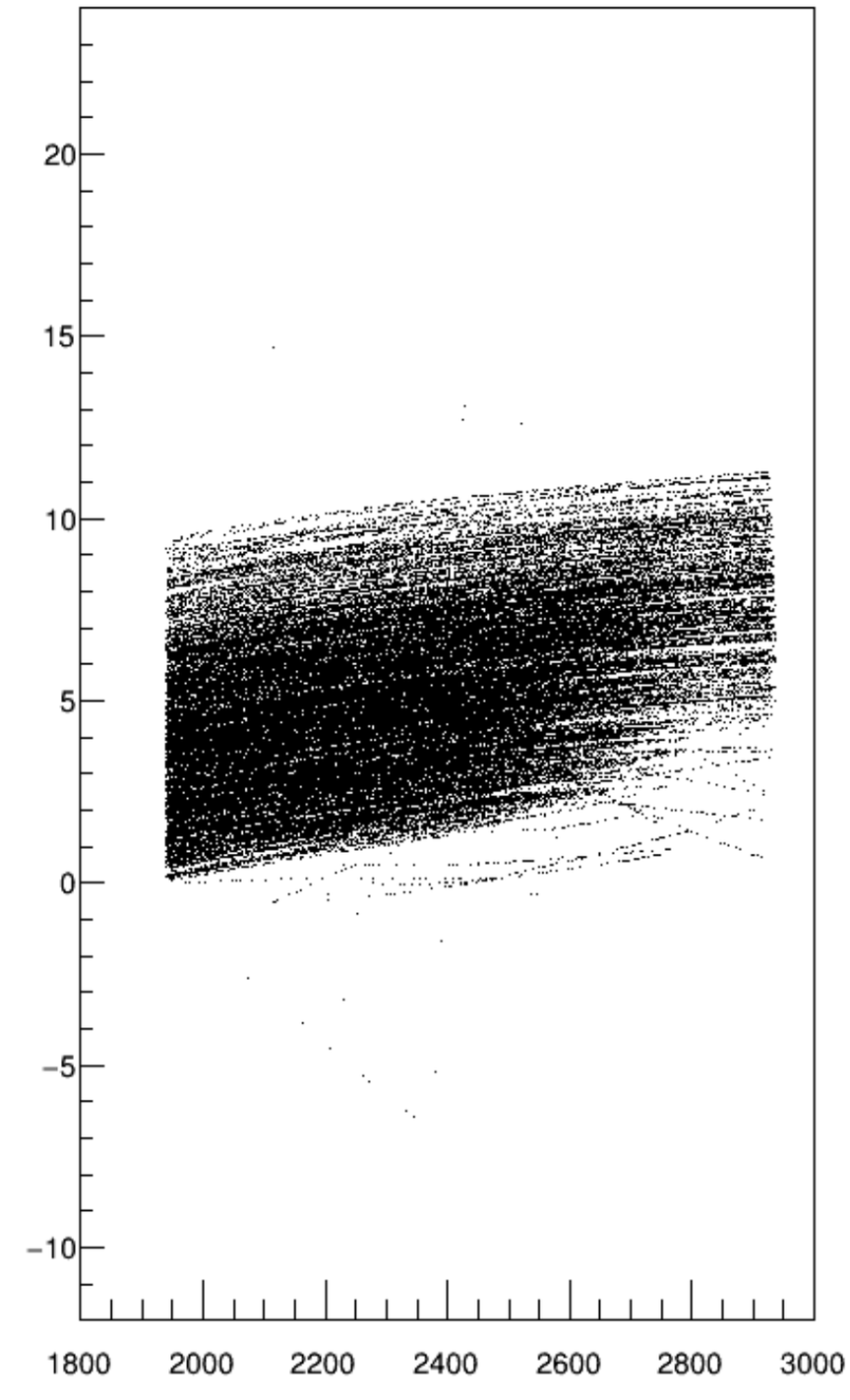




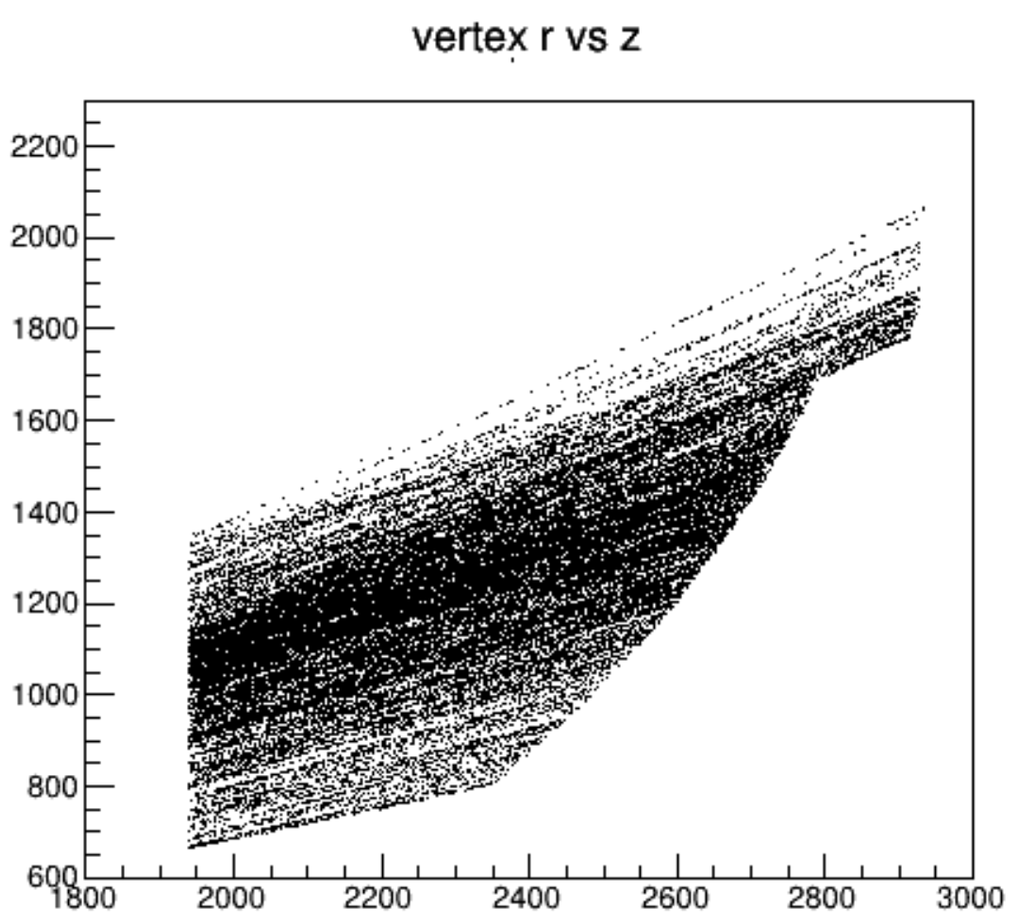
Optical photon vertex positions for Cerenkov photons entering Winston cone
DIS, cuts Q^2>6, W>2, x>0.55

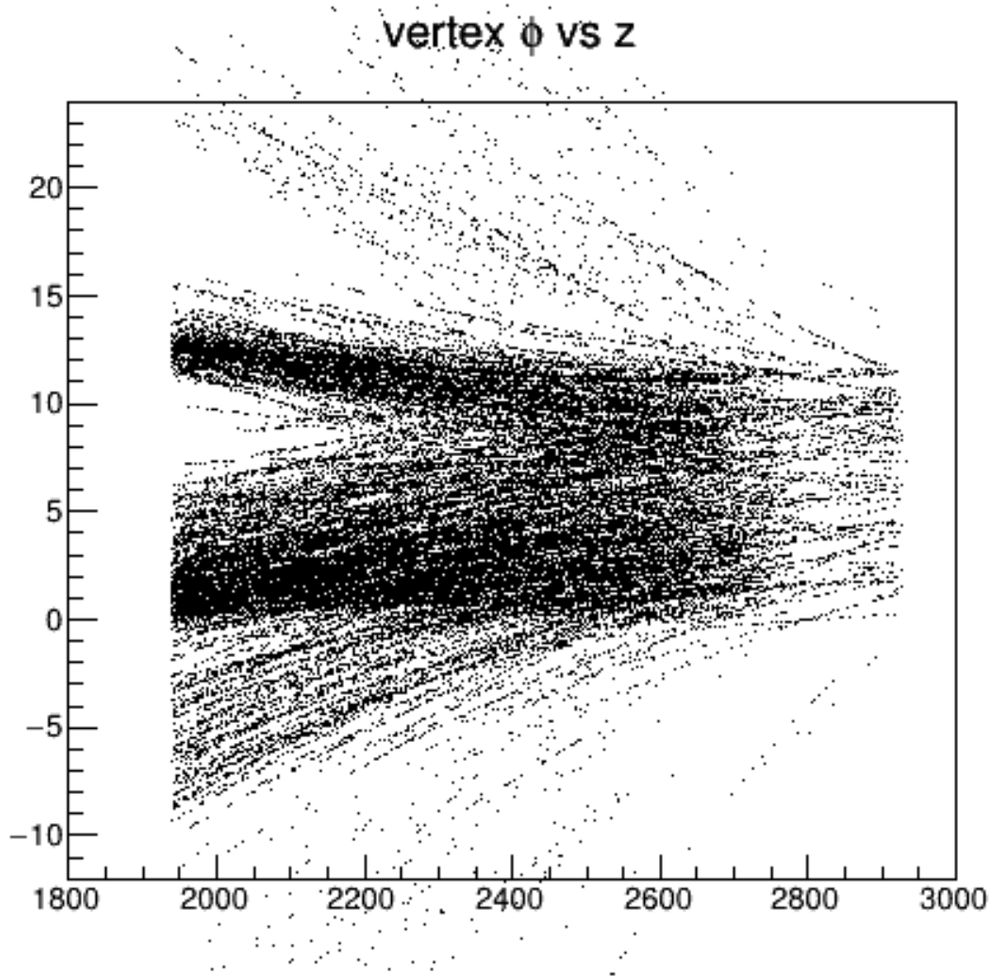
Looking only at sectors where a DIS e- enters and an LGC trigger occurs





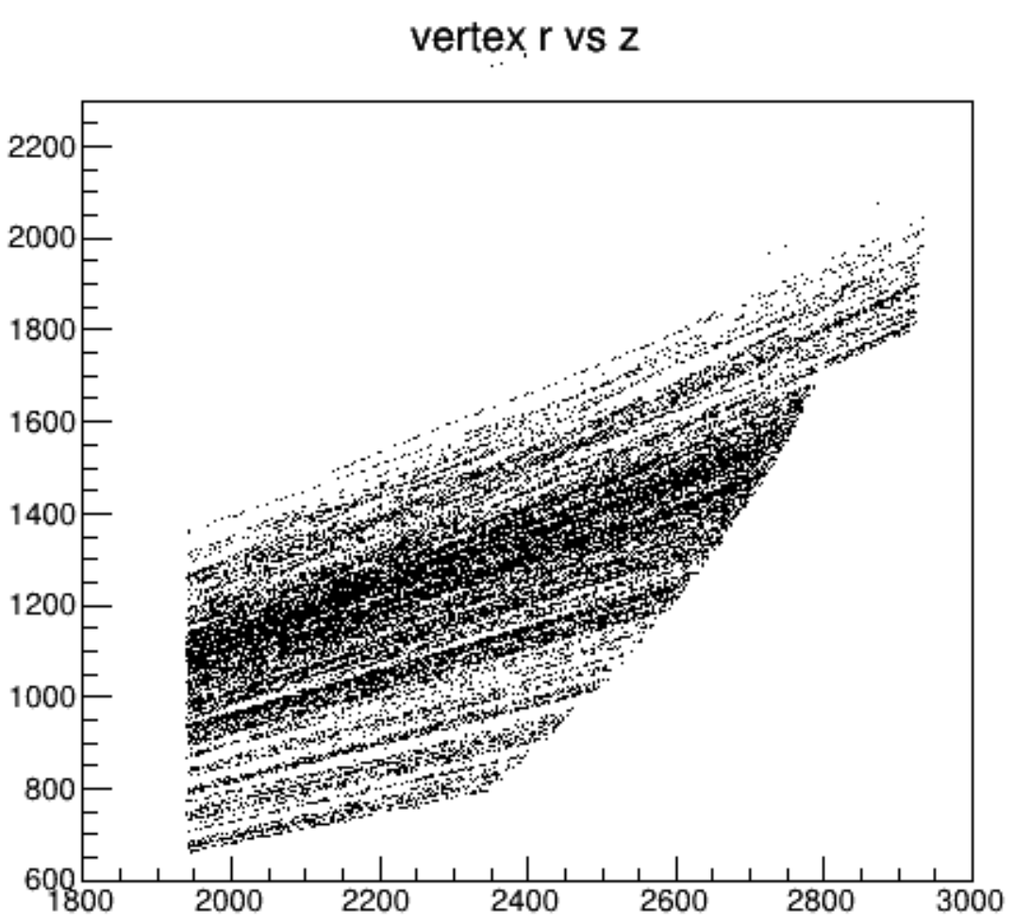
Optical photon vertex positions for Cerenkov photons entering Winston cone
Hall D π0

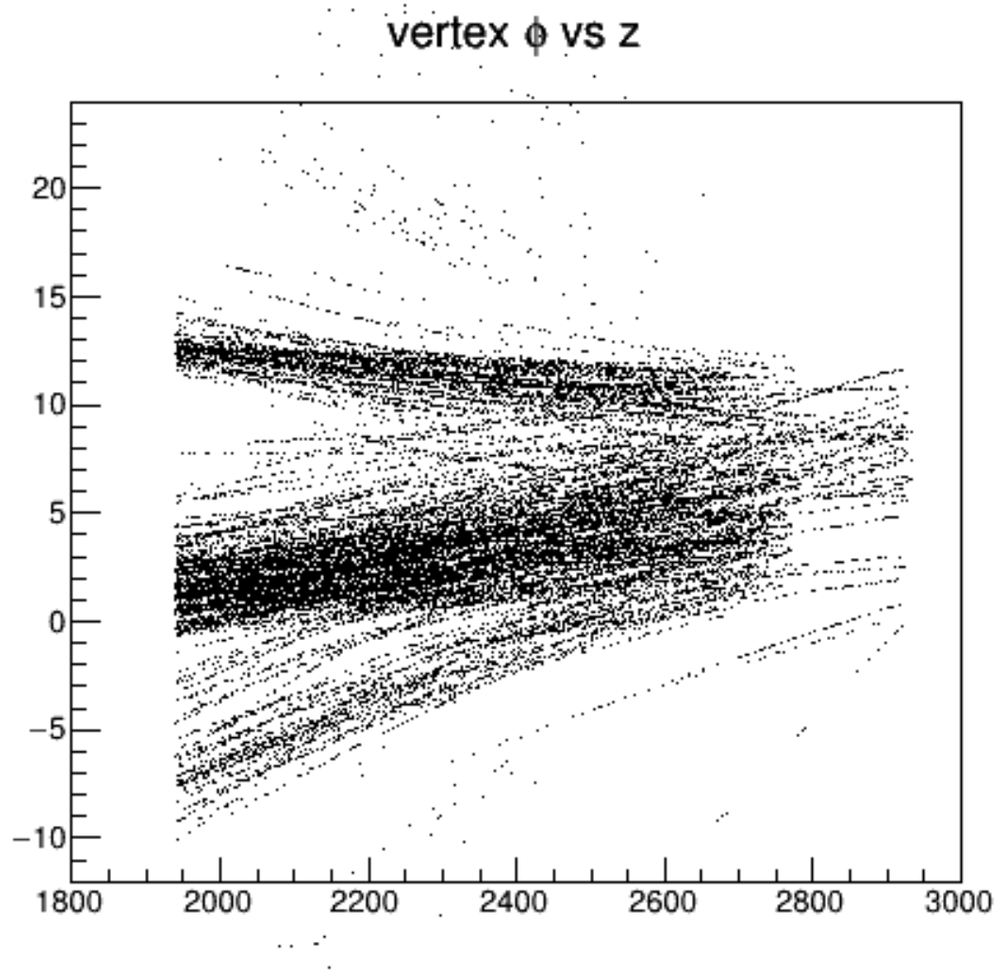




Looking only at sectors where an LGC trigger occurs

Optical photon vertex positions for Cerenkov photons entering Winston cone aperture, but with cone removed
Hall D π0

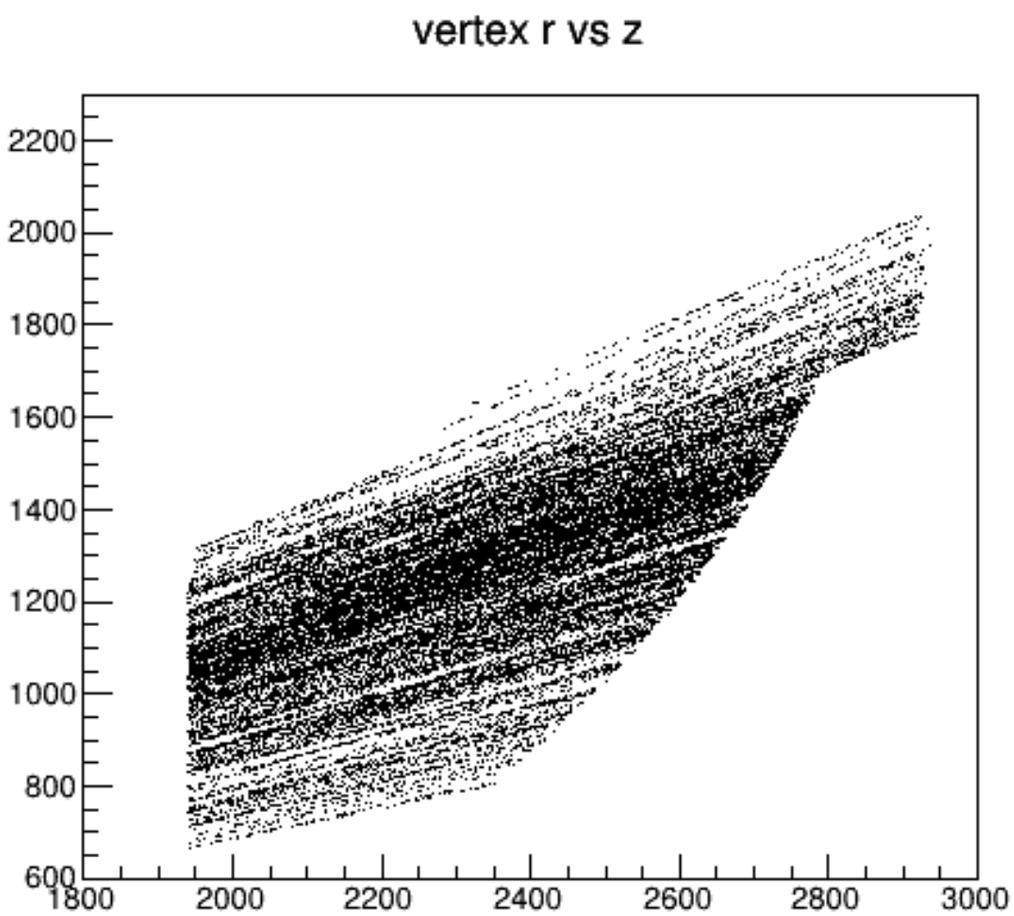


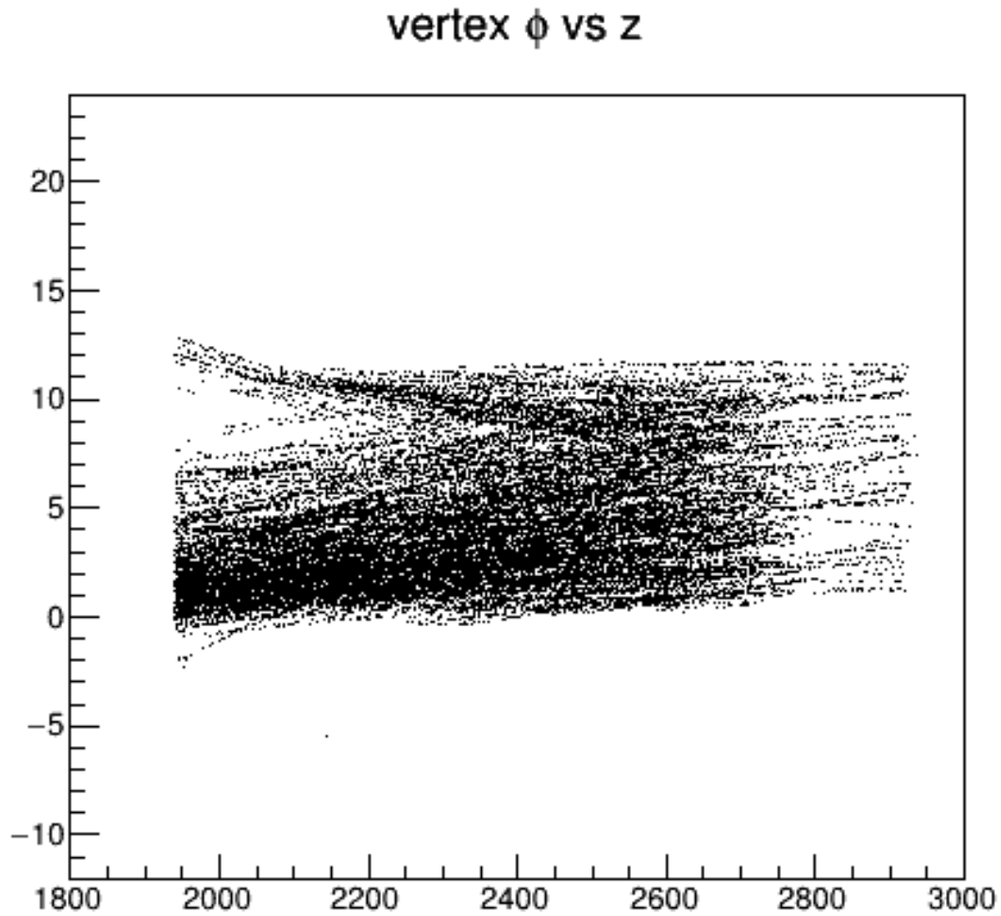


Looking only at sectors where an LGC trigger occurs

π0 LGC trigger rate down ~45%
DIS LGC trigger rate down ~10%

Optical photon vertex positions for Cerenkov photons entering Winston cone, with blinders
Hall D π0

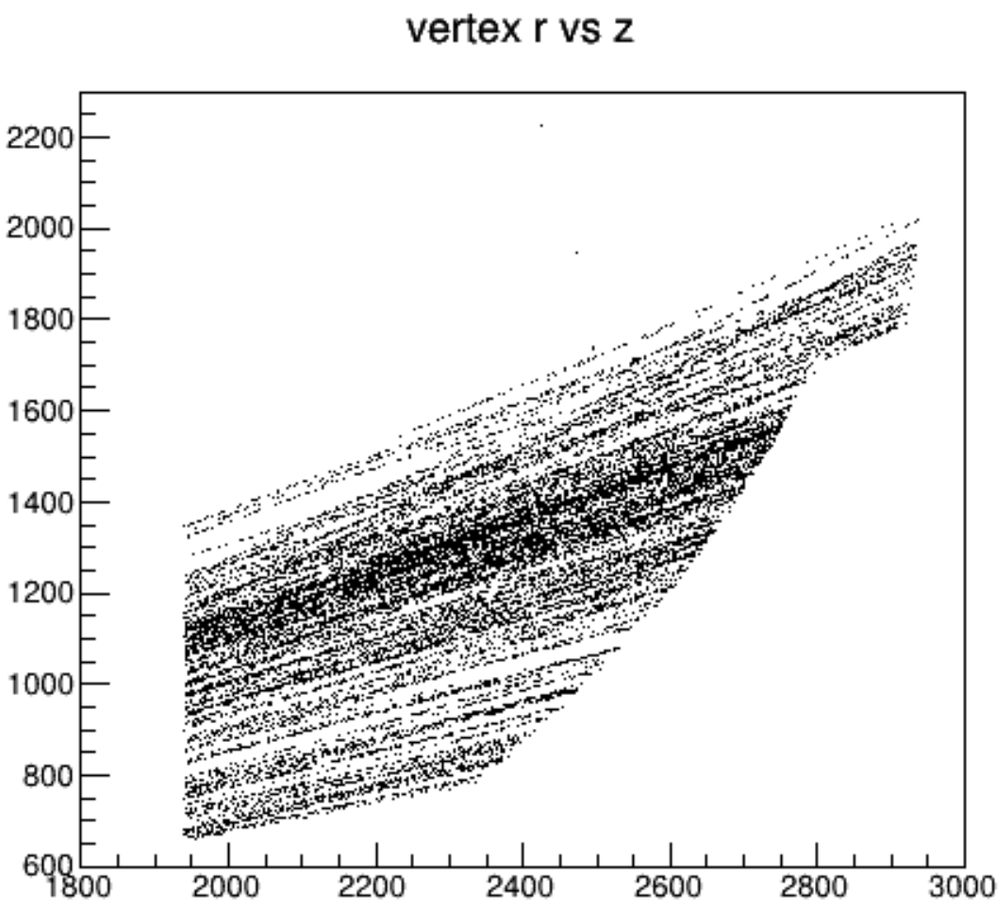


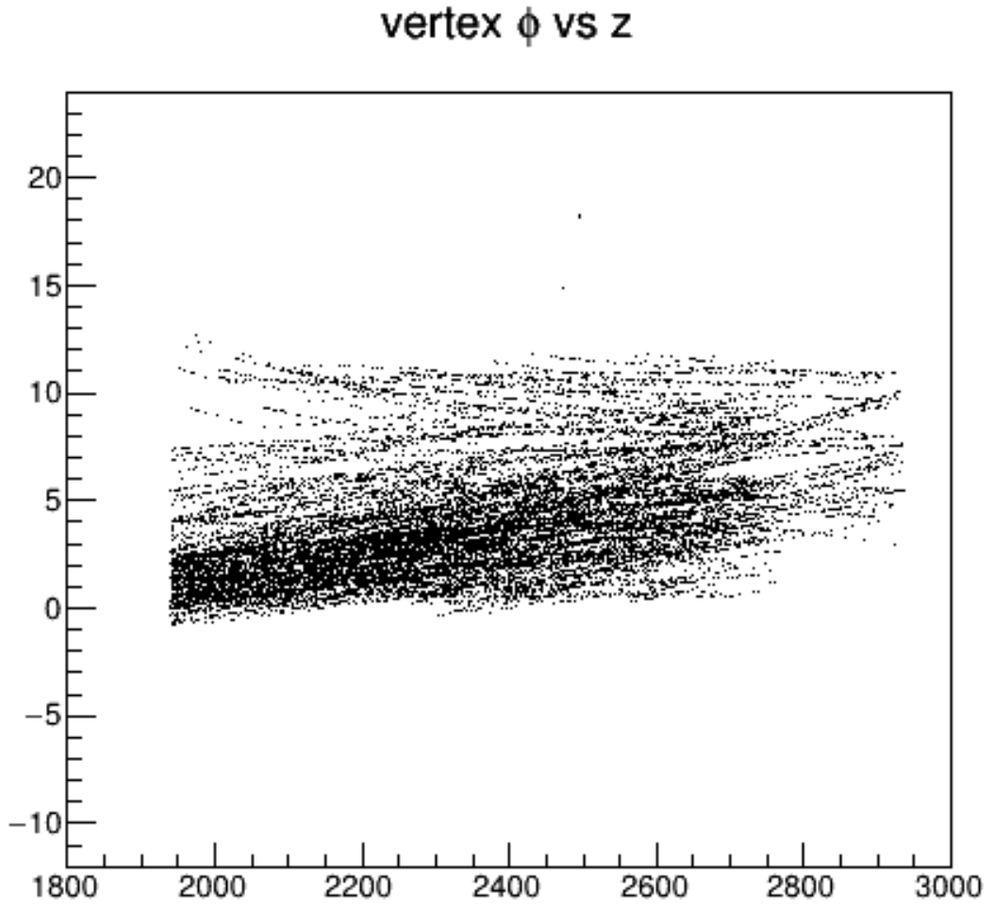


Looking only at sectors where an LGC trigger occurs

π0 LGC trigger rate down ~45%
CAVEAT: Michael reported optical photon rate INCREASED with (thick carbon) blinders — need to reconcile.

Optical photon vertex positions for Cerenkov photons entering Winston cone aperture, but with cone removed, with blinders
Hall D π0





Looking only at sectors where an LGC trigger occurs

π0 LGC trigger rate down ~70% (Again, need to reconcile rate discrepancies — take with grain of salt.)

- LGC mirrors can be masked to reduce background rate
- Mirrors focus light from all directions in ϕ — do not need that behavior for PVDIS
- Winston cone removal reduces background at small cost of signal
- Blinders reduce background at no cost of signal, orthogonal to Winston cone
- But discrepancies with Michael's results need to be resolved
- Is mirror masking orthogonal to cone removal and blinders?