Vertexing tridents

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SLAC

Inputs

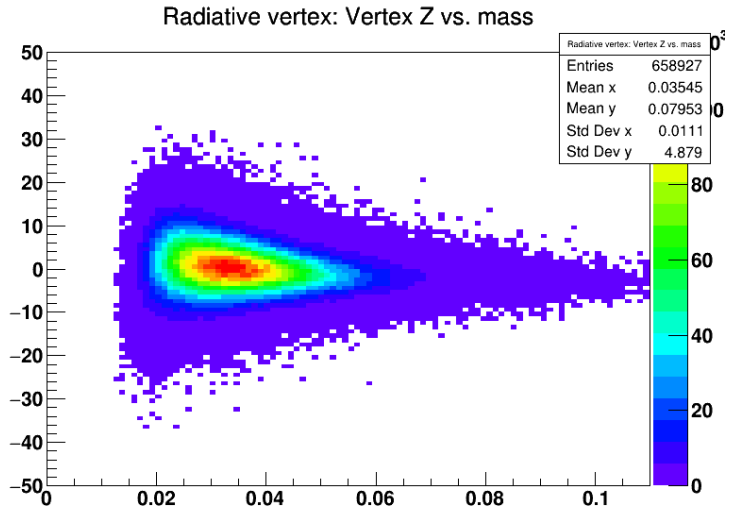
- Data: golden runs, pass3 (484551 nC, 77.51 nb^{-1})
  - pairs1 trigger, filtered on all SVT flags (bias, position, burst-mode noise, header)
- MC: tritrig-beam-tri, pass2, 4962 files (24.73 nb^{-1})
- Normalize to 7 PAC days luminosity (5420 nb^{-1})
- GBL tracks, unconstrained vertex Z
- Data-MC comparisons: black data, red MC

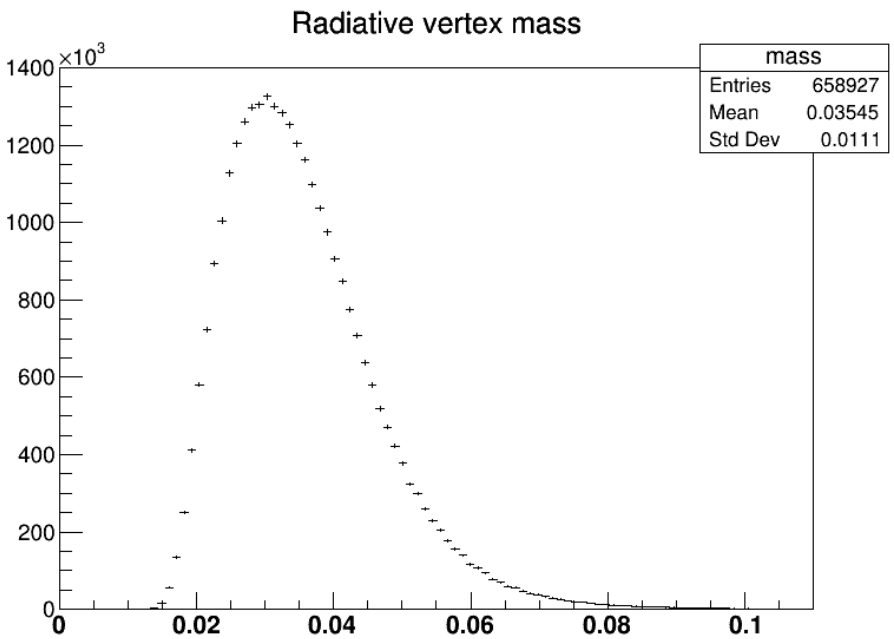
Cuts

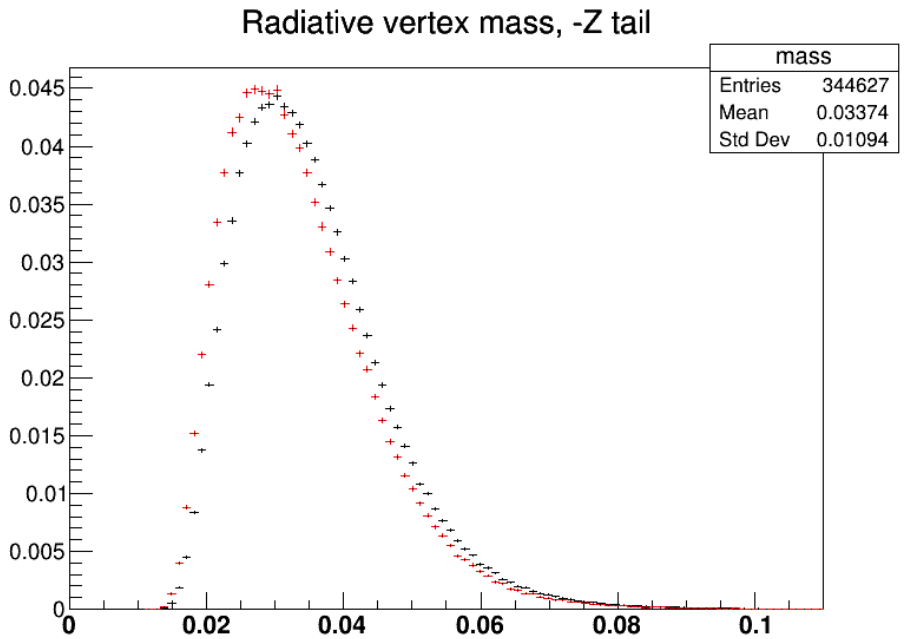
- All cuts applied in org.hps.analysis.dataquality.TridentMonitoring
- Cuts copied from 2014 proposal:
  - Quality: track GBL chi2 < 40, beamspot-constrained vertex chi2 < 5
  - Beamspot-constrained vertex X and Y within 0.4 mm of origin
  - Track cuts: require top-bottom, $p(e^-), p(e^+) < 0.85$ GeV
  - Radiative cut: $p(V0) > 0.8 * E_{beam}$
  - Event cut: $<= 5$ tracks, exactly 1 positron track in event
  - Front layers: require L1 and L2 hits
  - L1 isolation: require > 0.5 mm to nearest strip
- No cluster information used

Vertex distributions

- I see the same data-MC differences Matt does (lower mass peak in MC, more low-energy tridents)

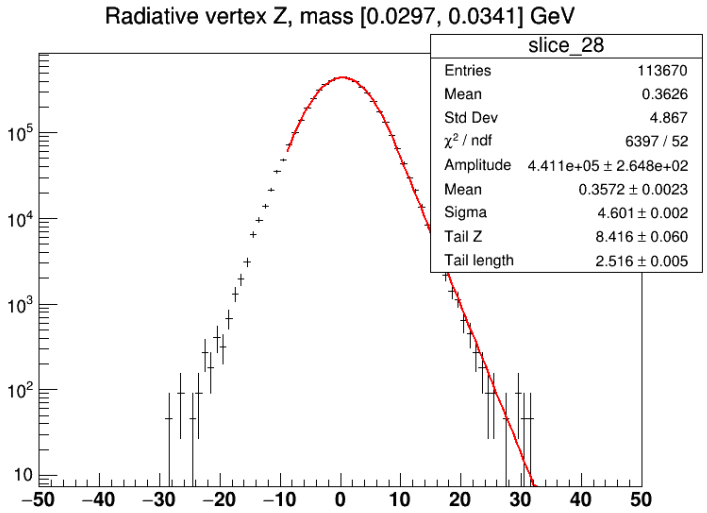


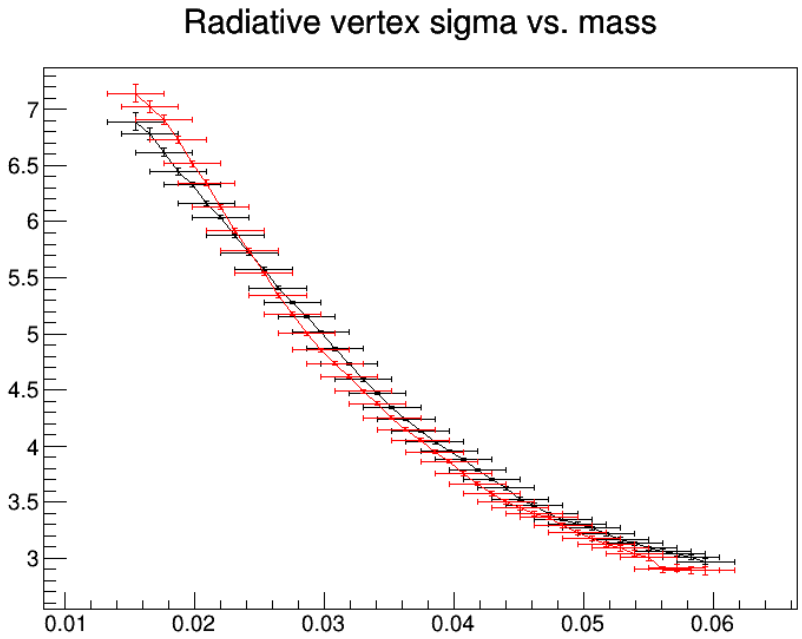


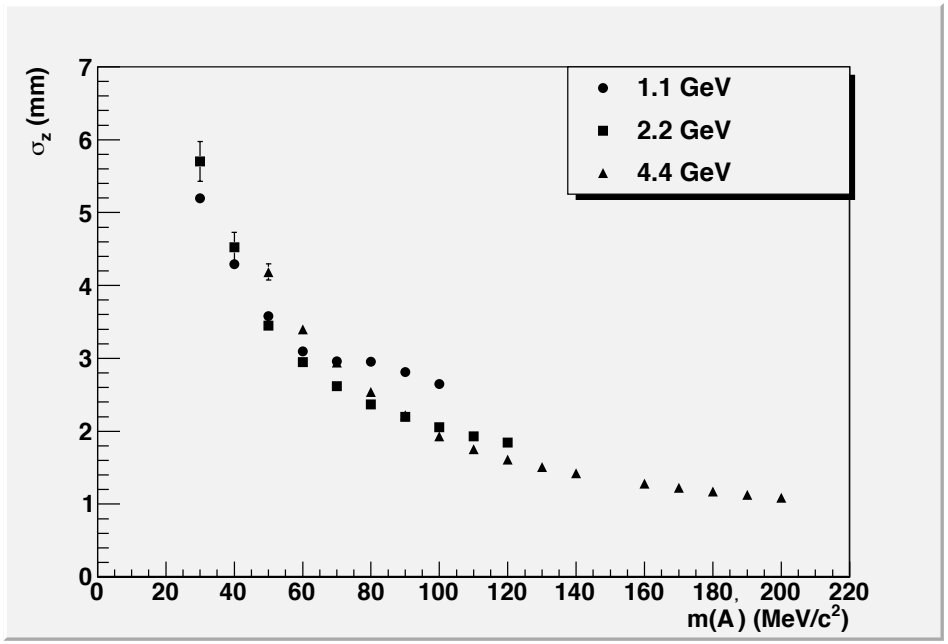


Vertex resolution

- Fit the Gaussian core of the vertex distribution, and exponential tail
- Good data-MC agreement

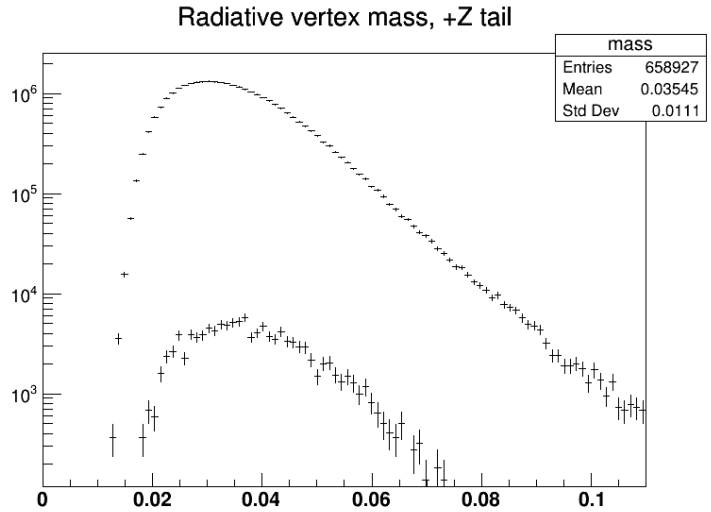


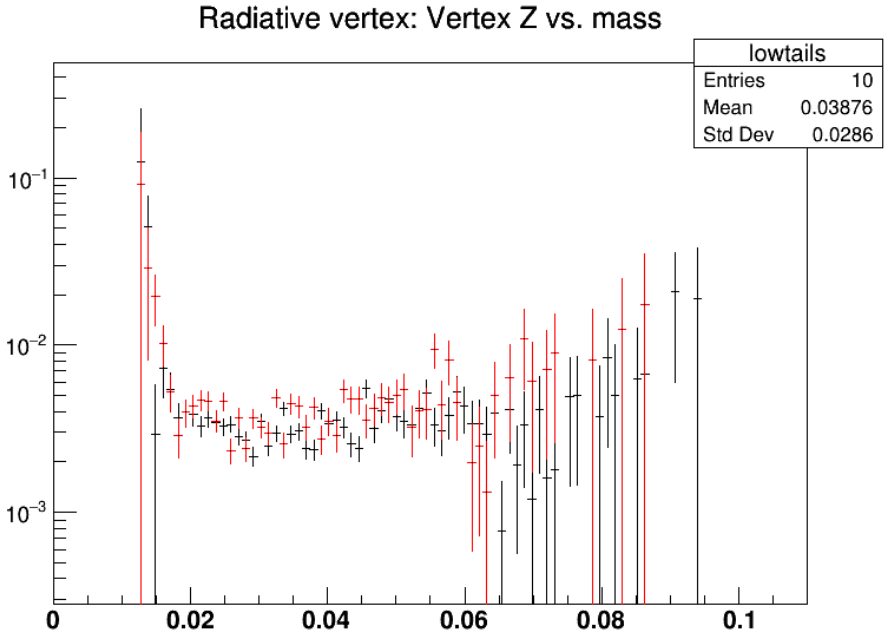


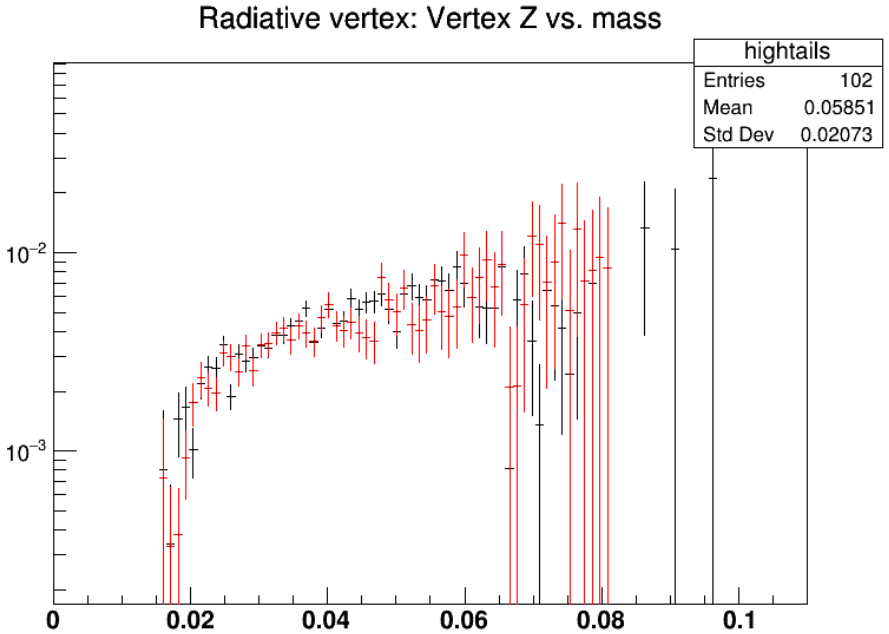


Vertex tails

- Count vertices outside of 3σ: tails are roughly 10^{-2} of total
- Tails asymmetric as expected
- Good data-MC agreement







Vertex Z-cut

- Z cut: E(events with z>zcut)=0.5
  - Blue curve on right is from proposal
- Fit vertex tail to exponential
- Normalize to 7 PAC days