Reproducing Omar's selection

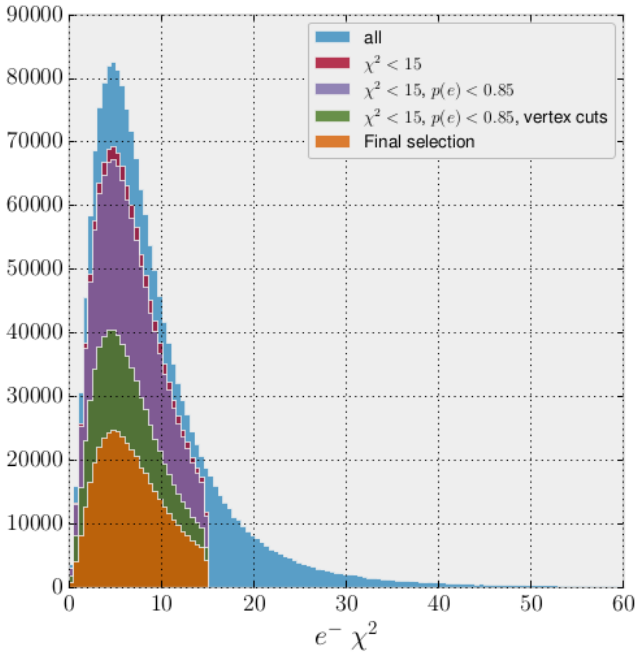
Sho Uemura

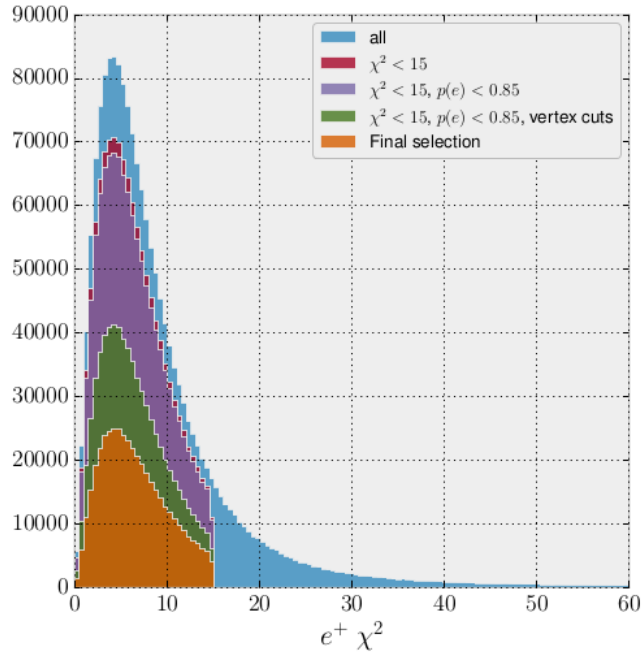
SLAC

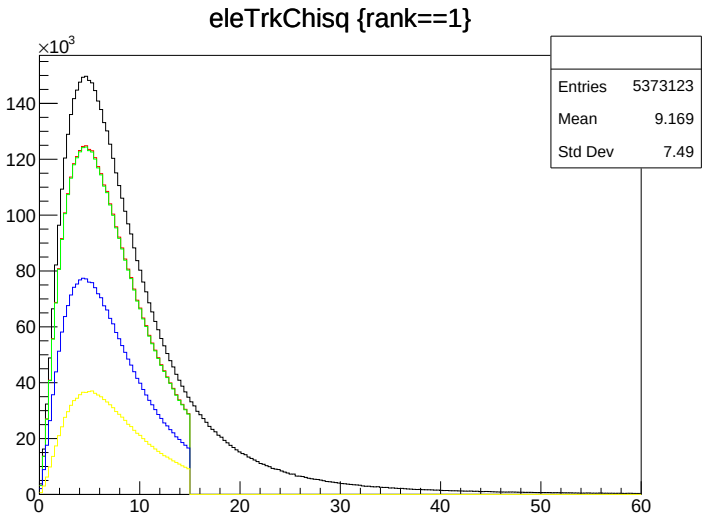
Omar's selection

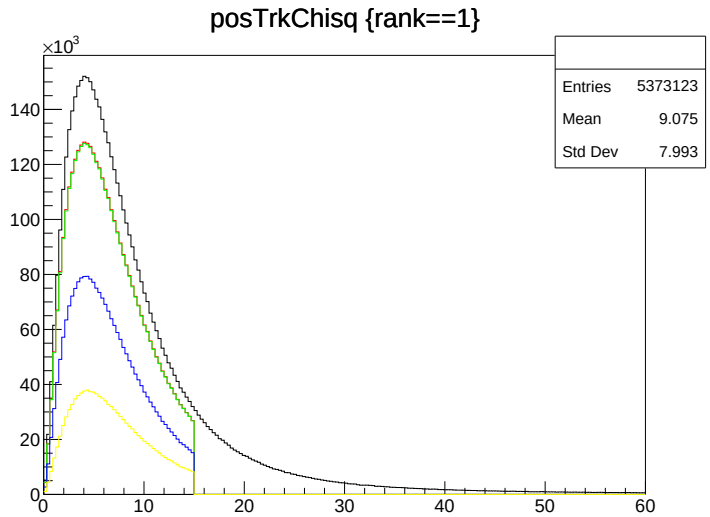
1. Apply initial cuts to e^+e^- pairs (GBL track fit, target-constrained vertex fit):
   - Pair1 trigger
   - Exactly one positron in event
   - Good track-cluster match (3σ cuts in X and Y)
   - Clusters in opposite halves of the ECal
   - Cluster $|\Delta t| < 1.6$ ns
2. Loop through e^+e^- pairs and pick the one with the best target-constrained vertex χ^2
3. Apply additional cuts:
   - Both tracks must have $\chi^2 < 15$
   - $p(e^-), p(e^+) < 0.85$ GeV
   - Elliptical vertex cut: $((v_x - 0.0113)^2/0.04) + ((v_y - 0.003324)^2/0.0025) < 1$
   - Vertex $\chi^2 < 10$
   - $p(V_0) > 0.8$ GeV

Omar's selection — track χ^2

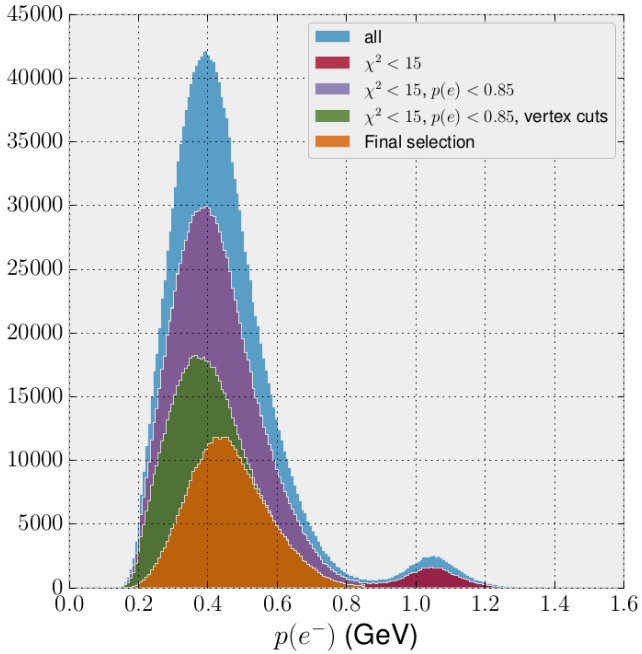


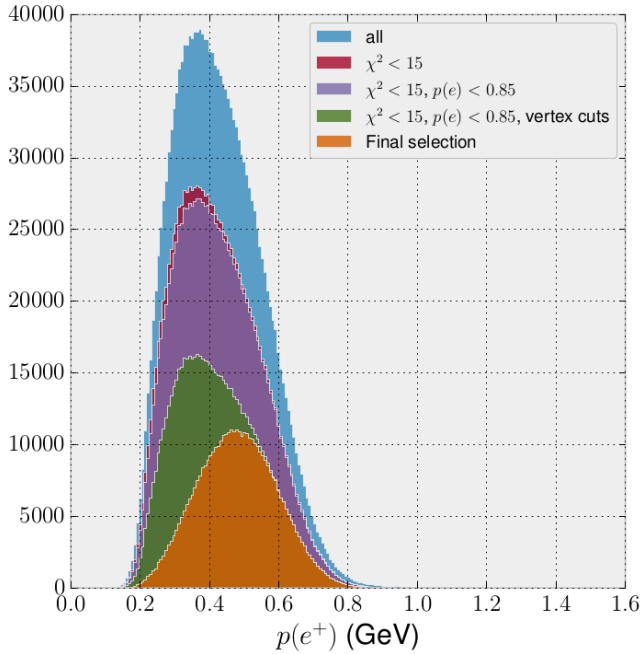


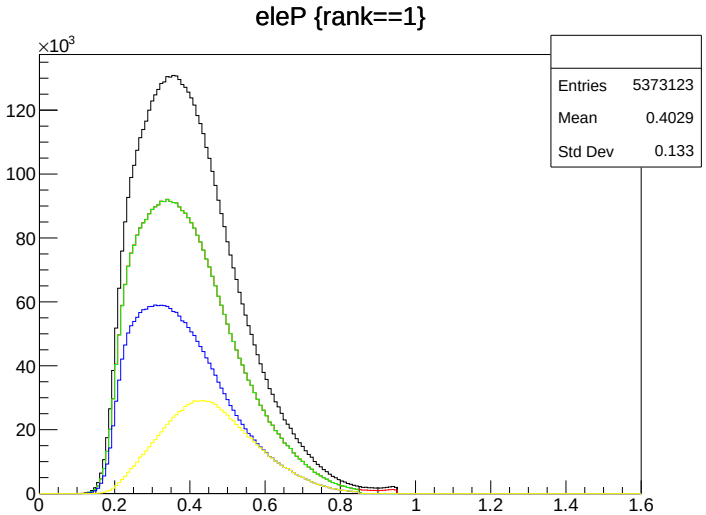


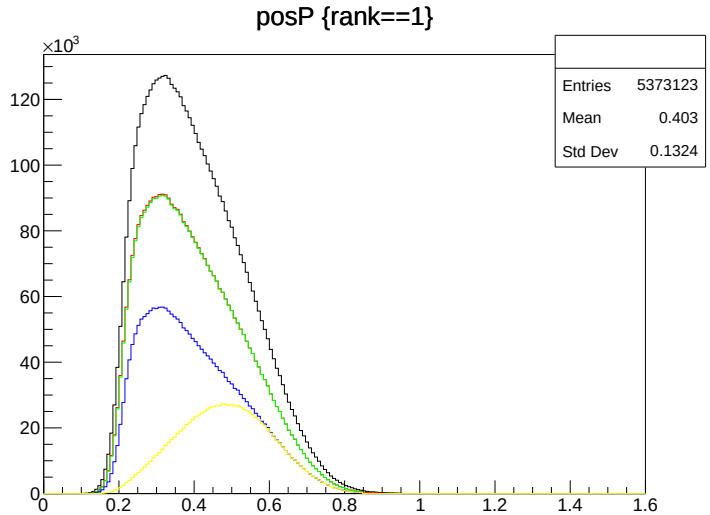


Omar's selection — track p

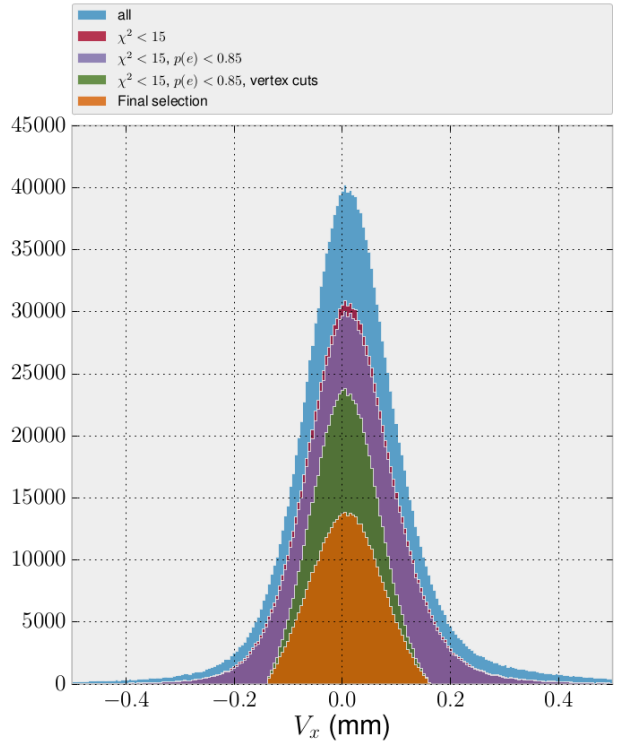


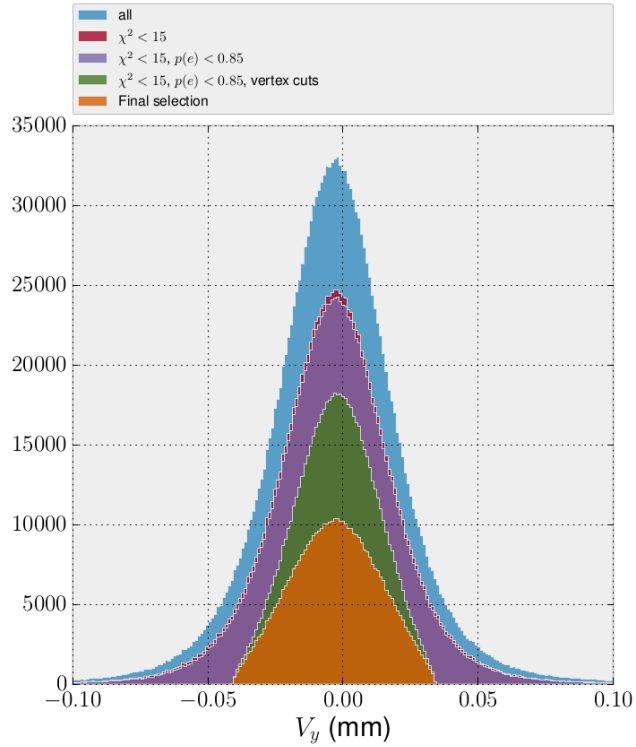


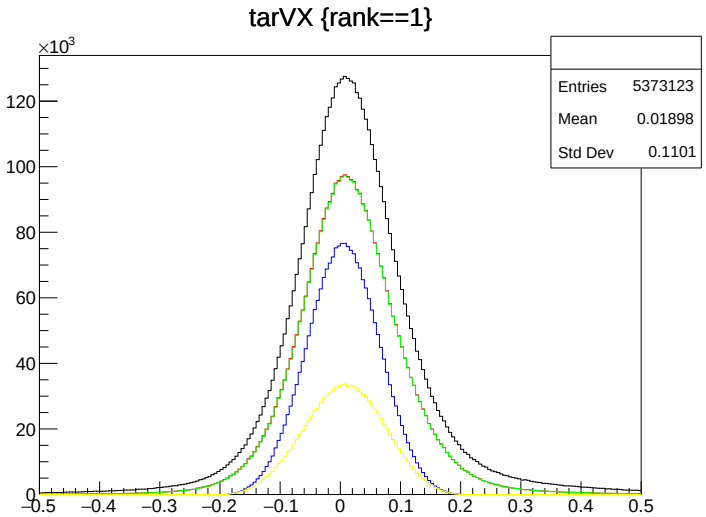


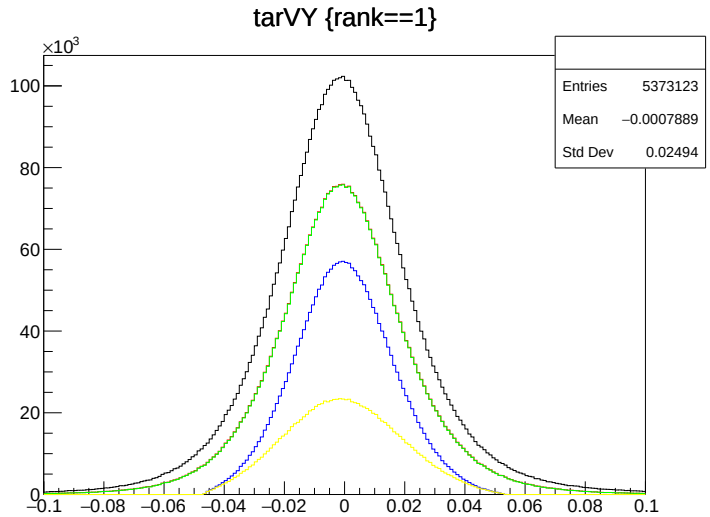


Omar's selection — vertex position

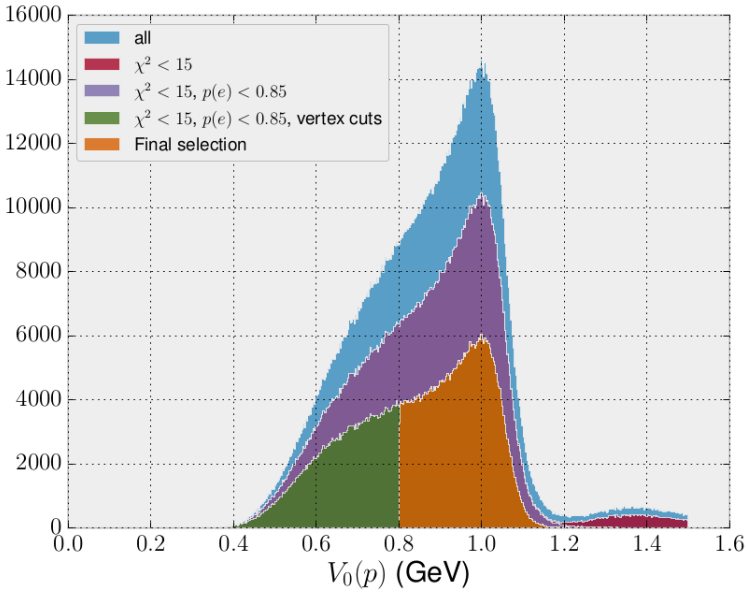


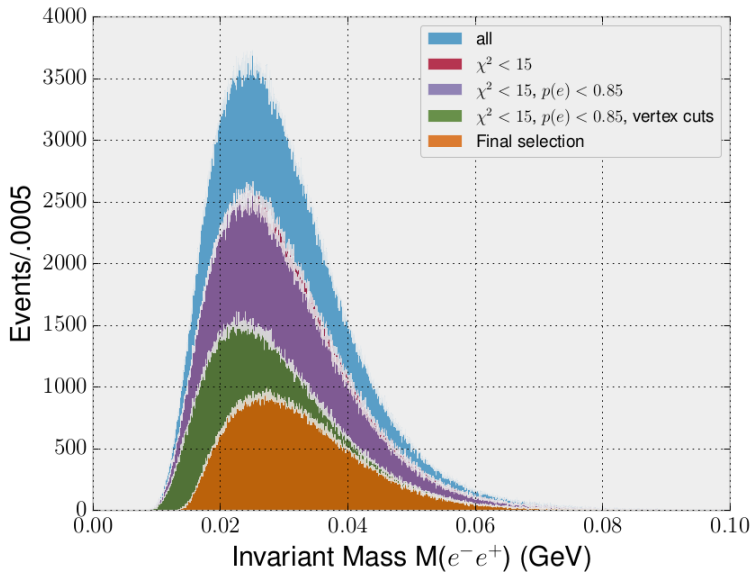


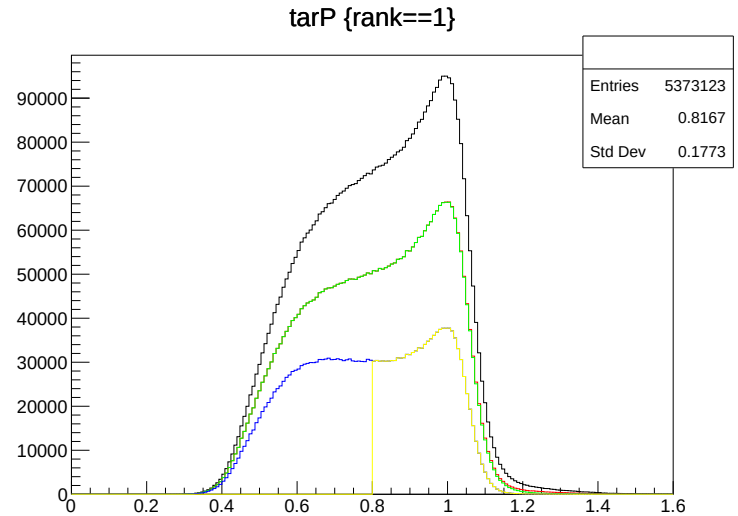


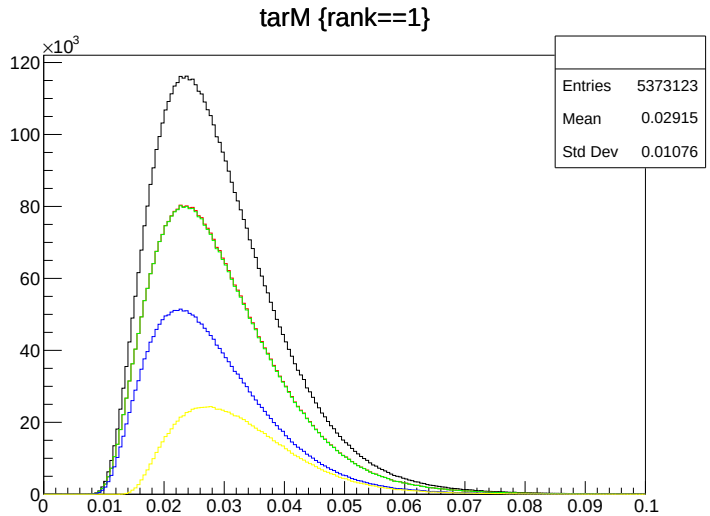


Omar's selection — vertex p, m









New selection

- Cuts should (without killing signal statistics):
  - Get rid of accidentals
  - Improve mass resolution
  - Get rid of mass tails
- $|\Delta t|$ distributions tell us about accidentals
- Mollers guide us on mass resolution (can isolate resolutions for momentum, L1 hit separation, vertex Z)
- MC tells us about everything else
- Working with a loose selection