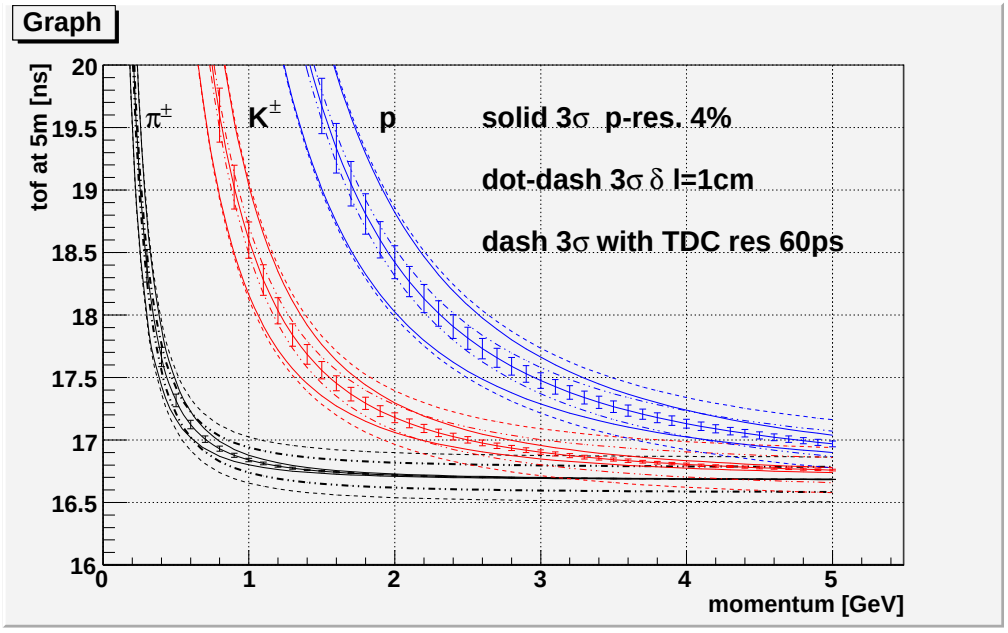
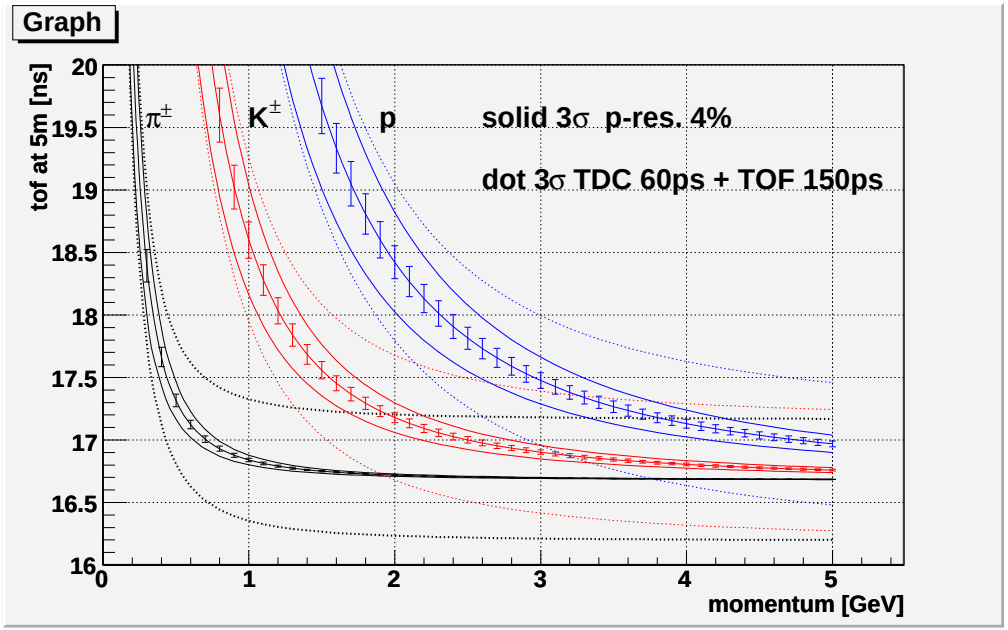
TOF Detector



TOF smearing

- TDC resolution (60 ps)
- Momentum resolution ($\sim$4 %)
- path-length resolution (1 cm?)
- 6σ P2P separation

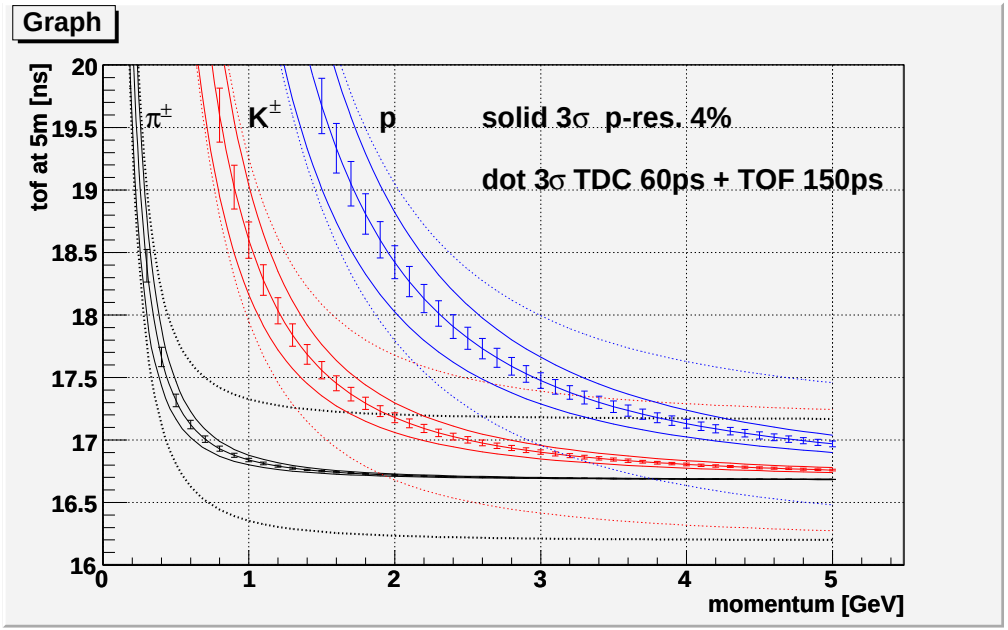
TOF Detector



TOF smearing

- TDC resolution (60 ps)
- Momentum resolution (∼4 %)
- path-length resolution (1 cm?)
- 6σ P2P separation
- TOF-Detector resolution (150 ps/plane)
  scintillation rise-time, decay time
  light dispersion (geometry)
  PMT TTS

TOF Detector



- optimize TOF-Detector resolution
- pion-kaon separation is most important

TOF smearing

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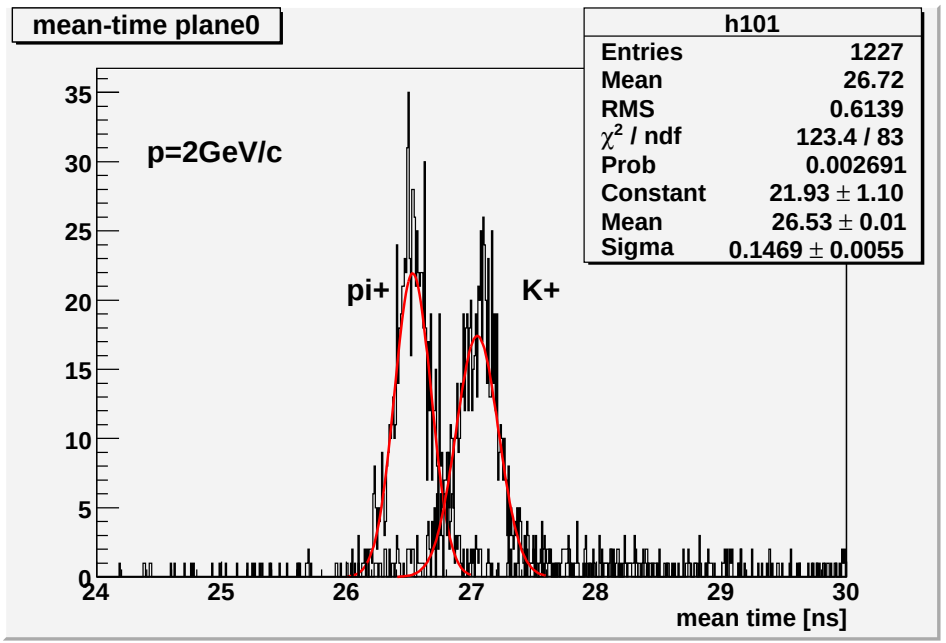
TOF pion-kaon separation



Particle Identification

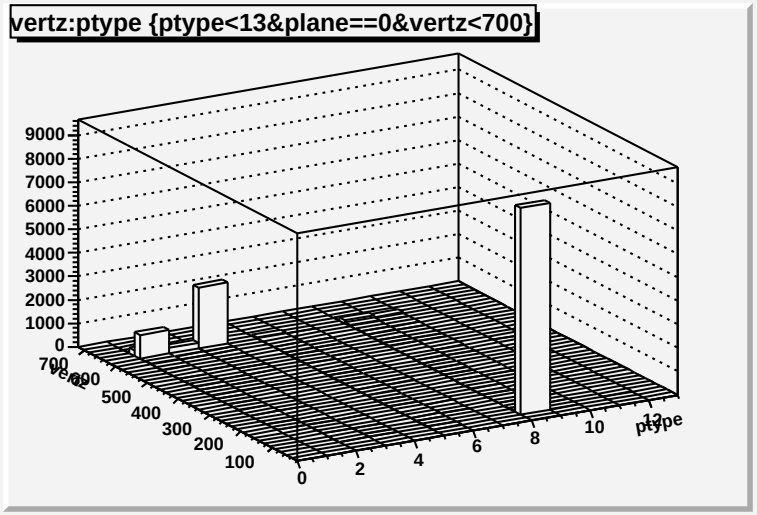
- separate pions from kaons
- 3σ P2P separation not enougth
- relative paricle fluxes important (p-dependent)
- 6σ P2P 1.4 GeV/c ($\pi - K$ separation)

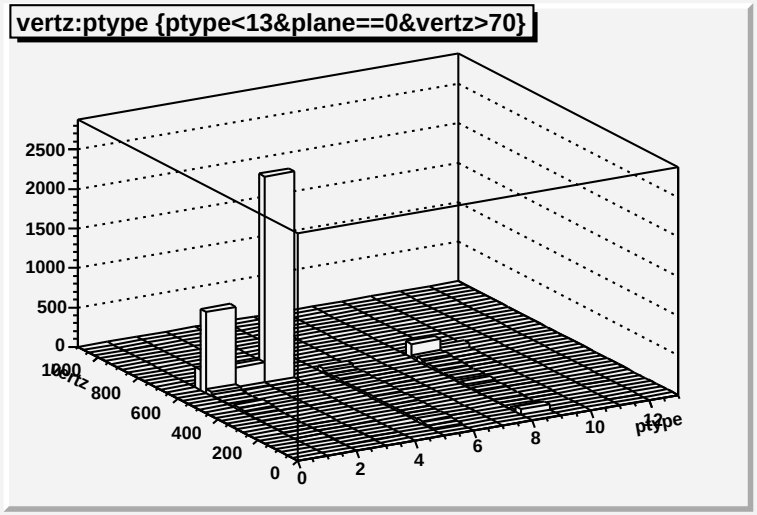
TOF Simulation

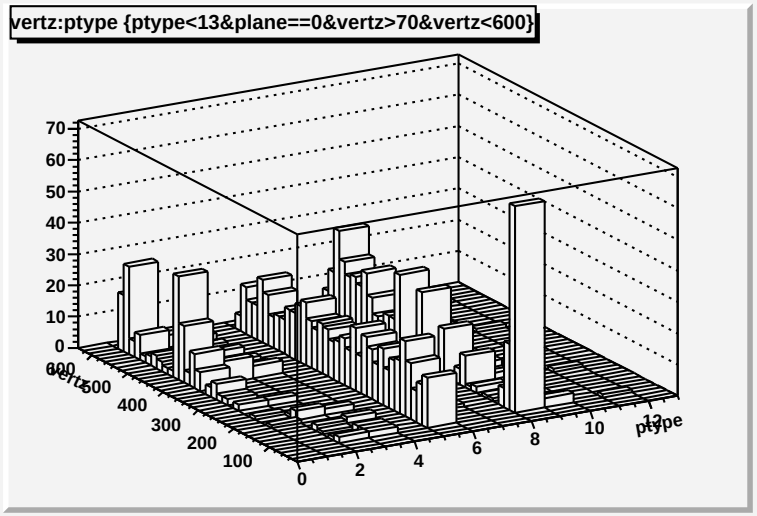
- two planes horizontal/vertical
- each paddle 252 cm x 6.0 cm x 2.54cm
- active material EJ-200 (Bicron 408)
- PMT XP2020
- TOF resolution 150 ps/plane
- digitization in JANA/DANA frame work
- TOF (mean-time), position (time-difference)
- geometrical hit-points
- assign points to tracks
- PID probability on TOF basis

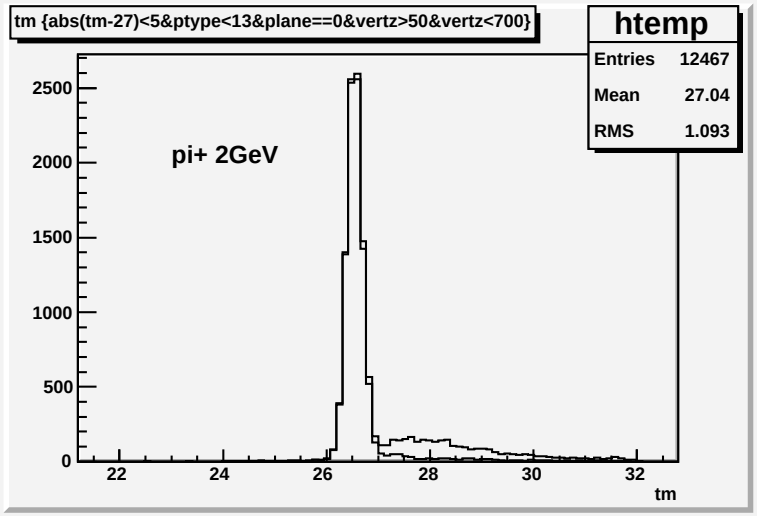
MC checks

Examples of using the MC simulation: 2 GeV π^+ at $\Theta = 5^\circ$









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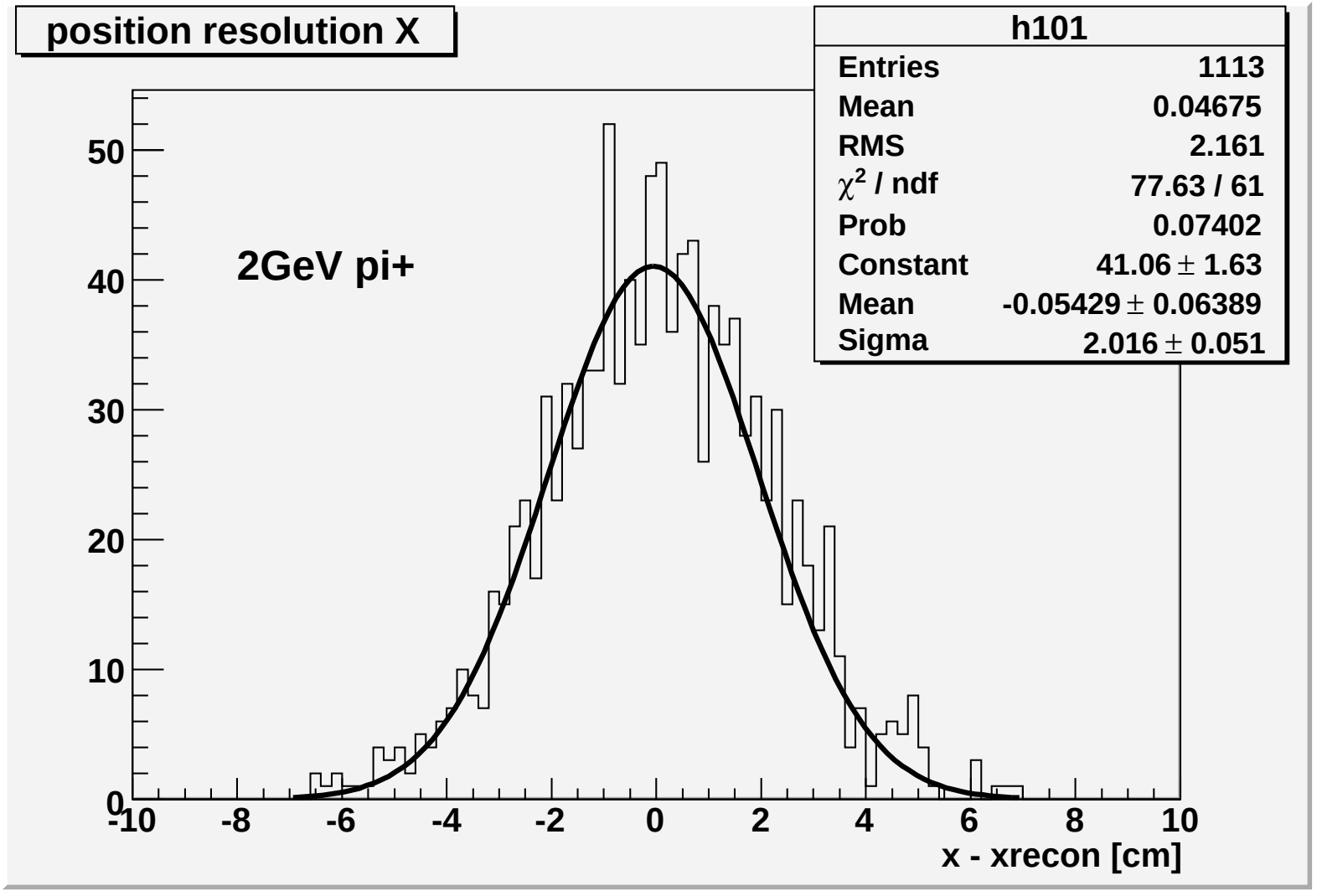

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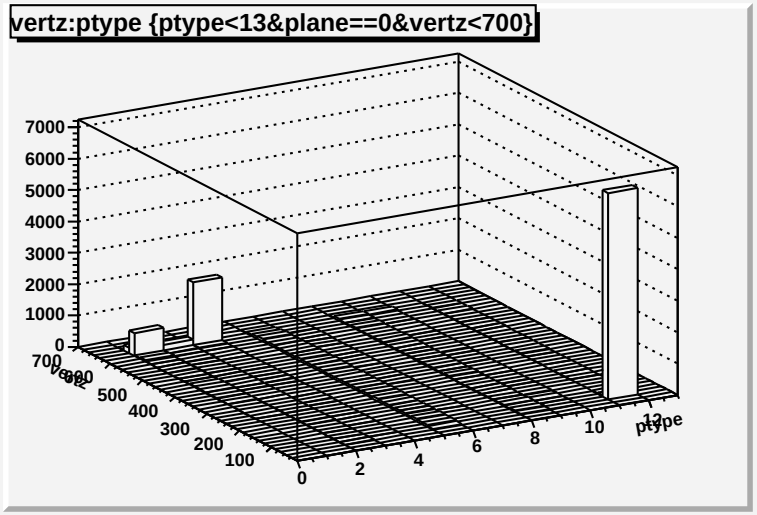

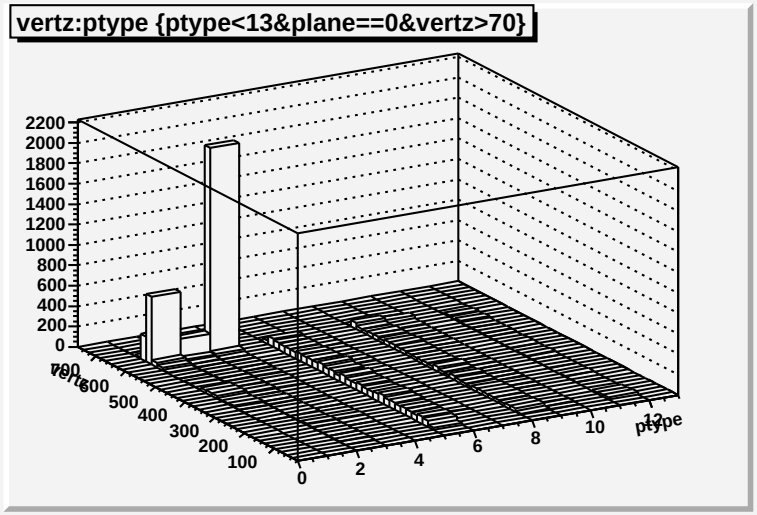

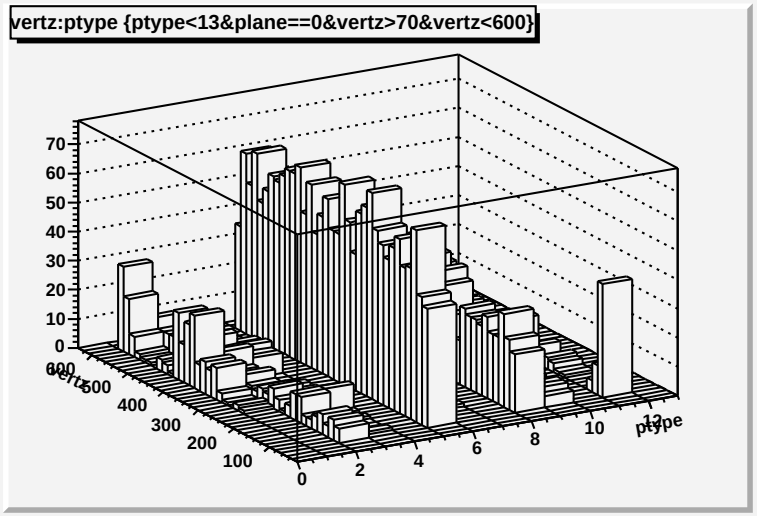

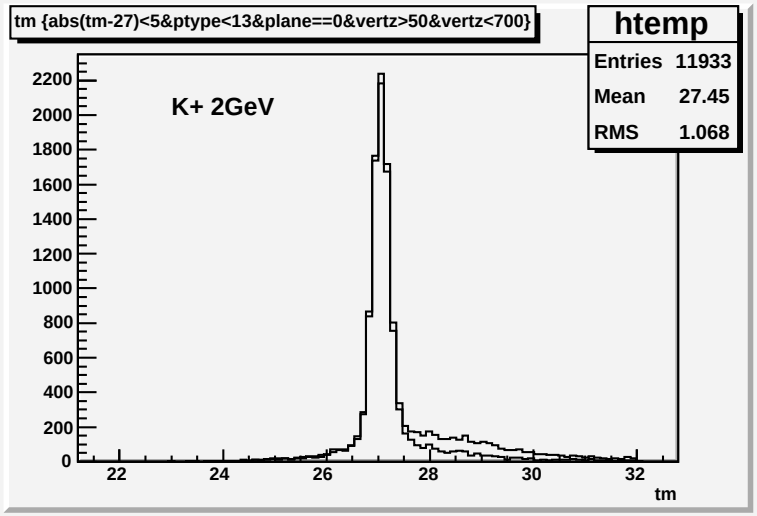

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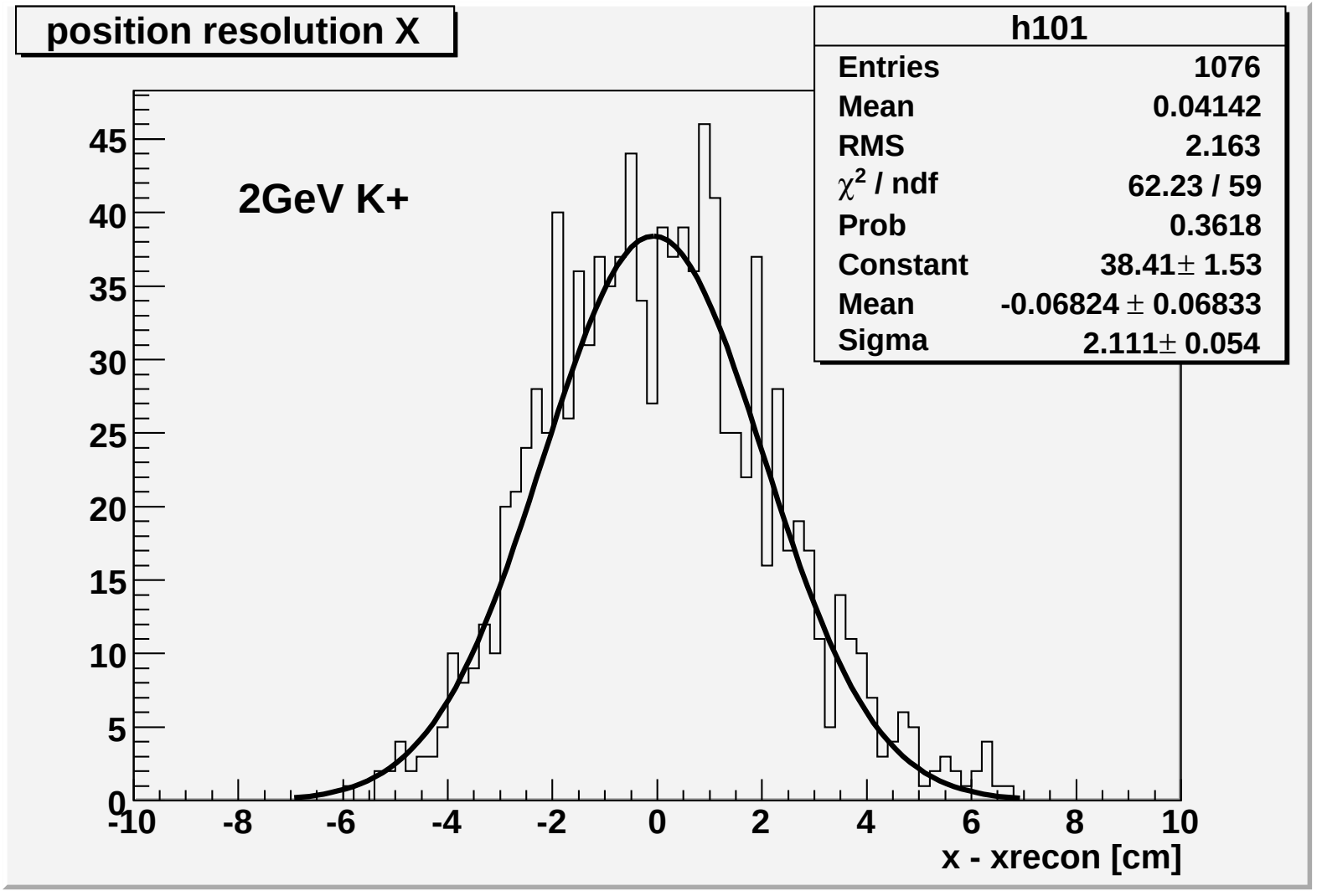

TOF Resolution

optimize TOF detector

- scintillator material (*rise time, decay time*)

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1 paddel cross section 3.0 cm x 2.54 cm: cost!

2 faster PMT? micro-channel-plates?: cost!,rate!