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The Level-3 Trigger System at STAR

STAR Collaboration

STAR Level 3 Trigger

- Online event reconstruction at an input rate up to 100 Hz for Au+Au or p+p collisions.

- Trigger for Au+Au or p+p collisions with special topological or physics characteristics.

Trigger Applications:

already applied:

- event vertex in beam direction
  - trigger on events which are centred in the STAR detector.

- ρ^0 produced in peripheral collisions
  - trigger on $\pi^+\pi^-$ candidates from ρ^0.

planned:

- rare particles

$J/\psi \rightarrow e^+e^-$

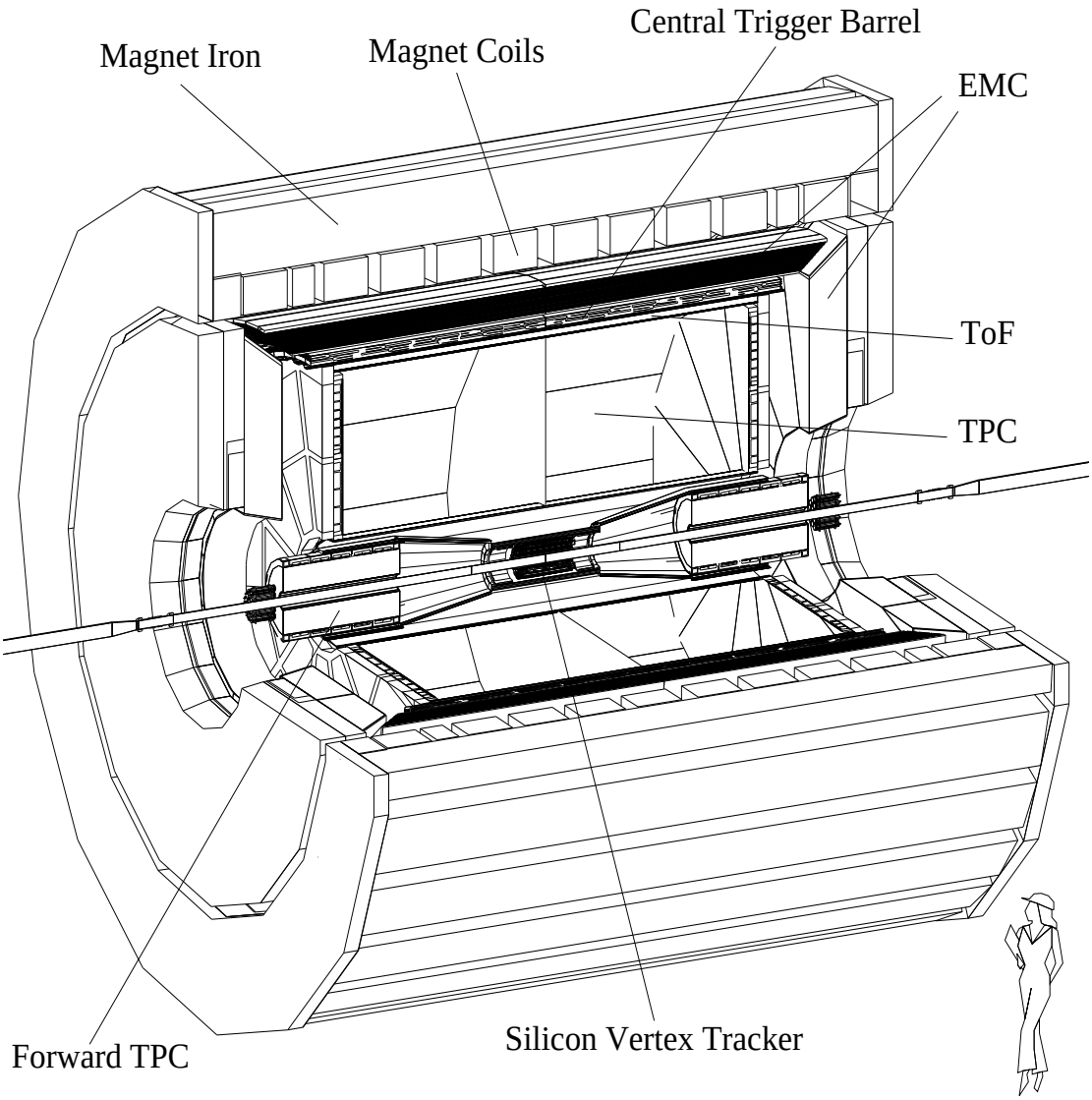
- heavy fragments
  - antideuterons

STAR Experiment

Solenoidal **T**racker **A**t **R**HIC

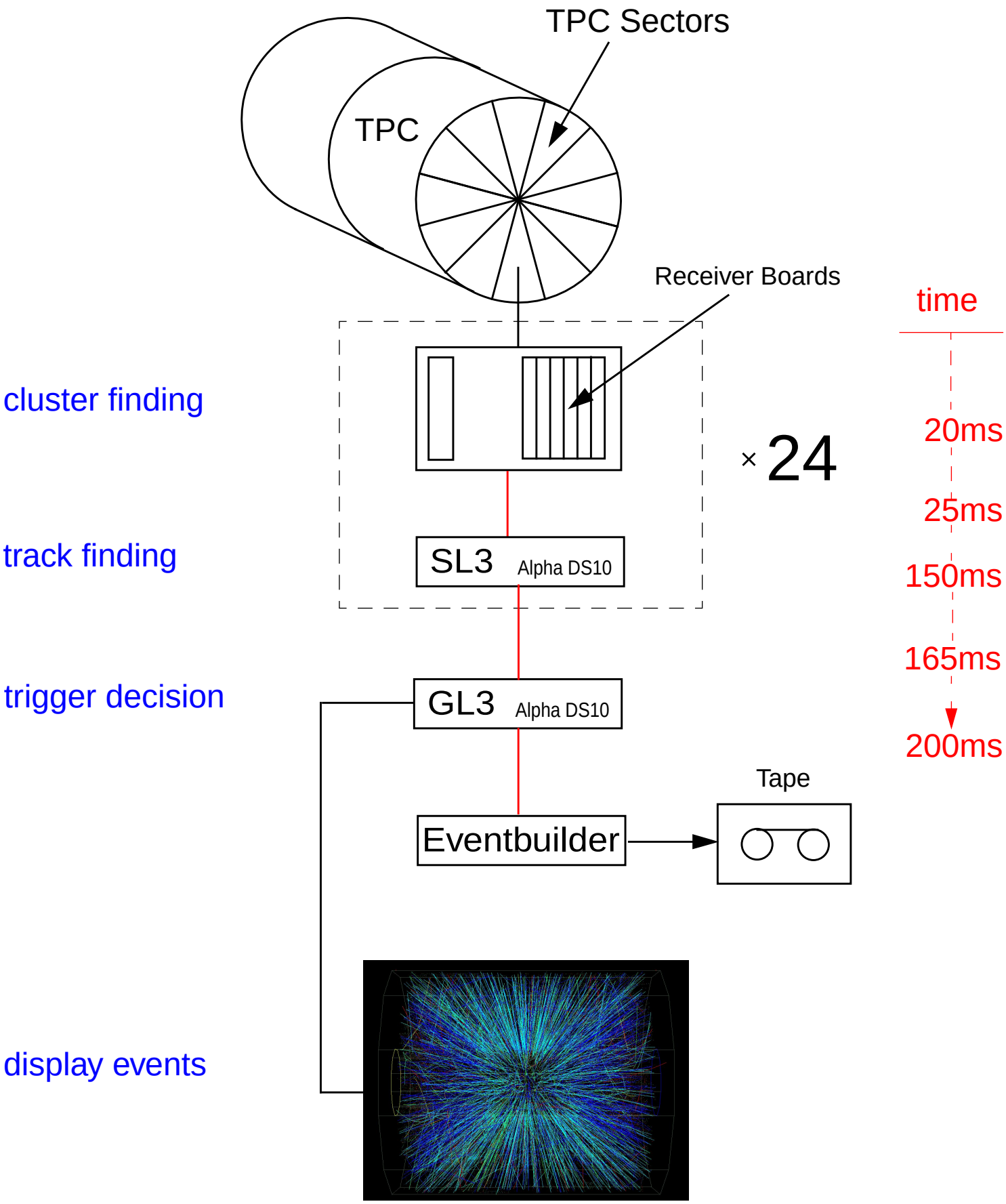
June: Au+Au at $\sqrt{s_{NN}} = 70$ GeV

July - Sept: Au+Au at $\sqrt{s_{NN}} = 130$ GeV



2000: Level-3 Trigger based on TPC data only

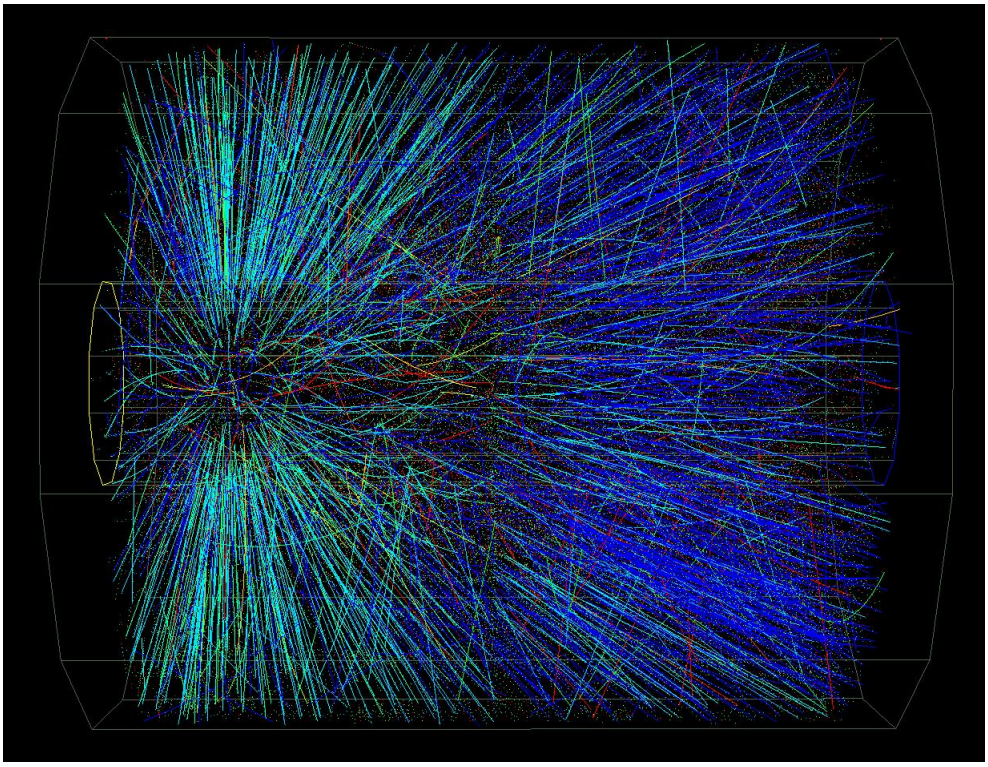
Level 3 Trigger Architecture



Trigger on event vertex

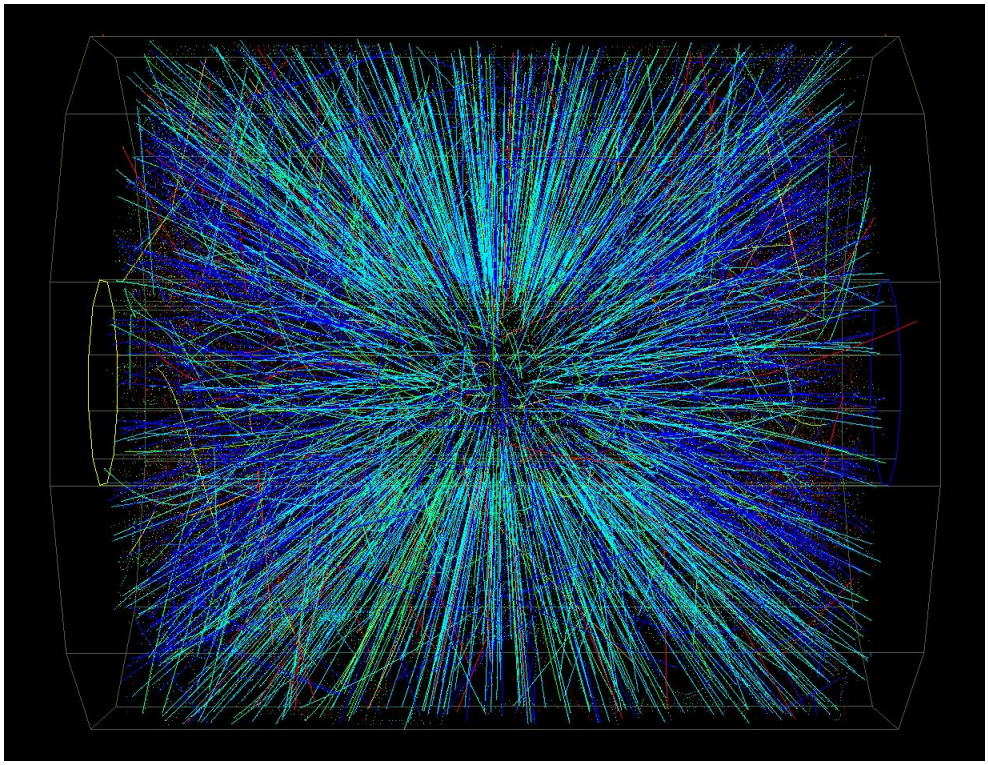
rejected

vertex in beam direction outside 80 cm from center



triggered

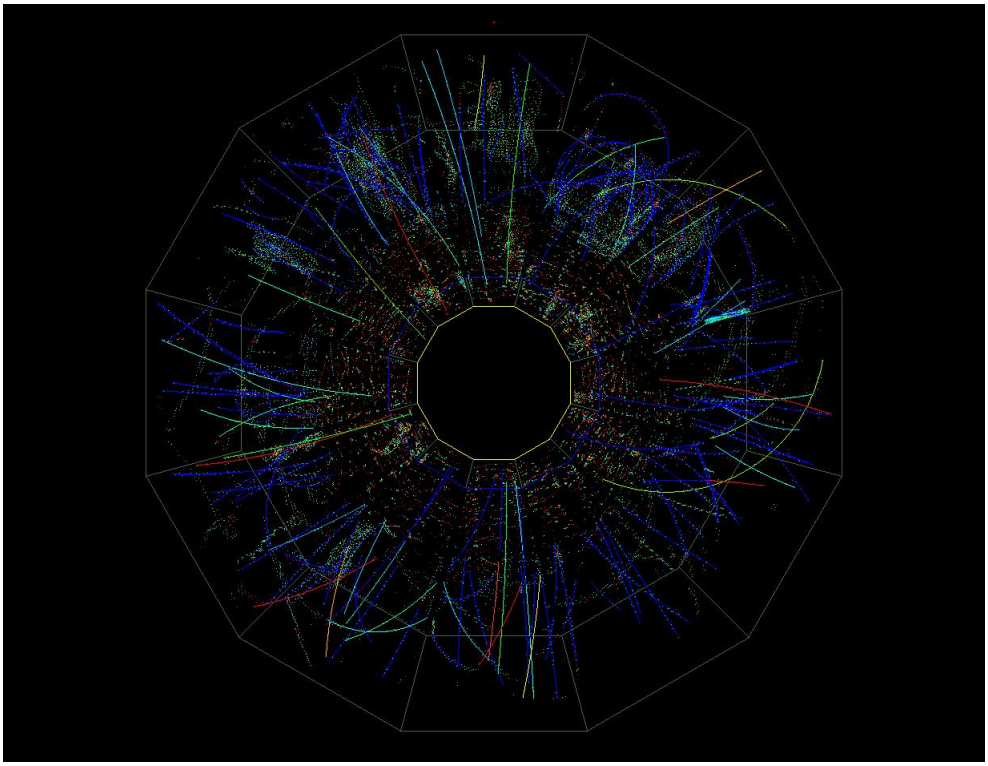
vertex in beam direction within 80 cm from center



Trigger on $\pi^+ \pi^-$ candidates from ρ^0 decays in peri. coll.

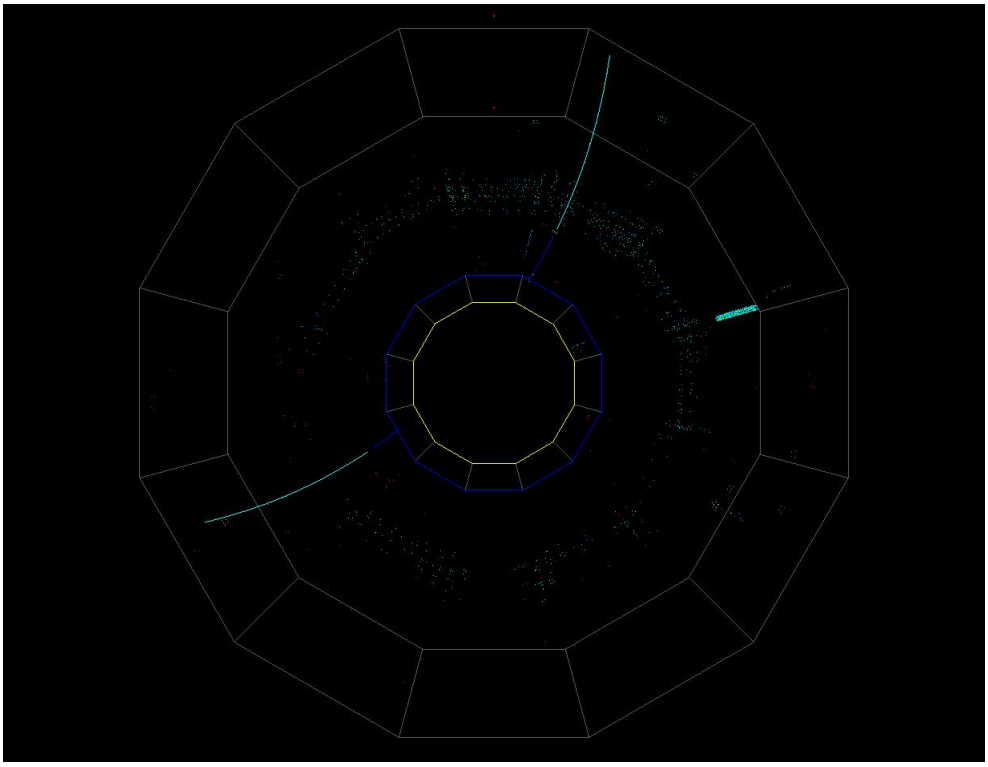
rejected

beam gas event



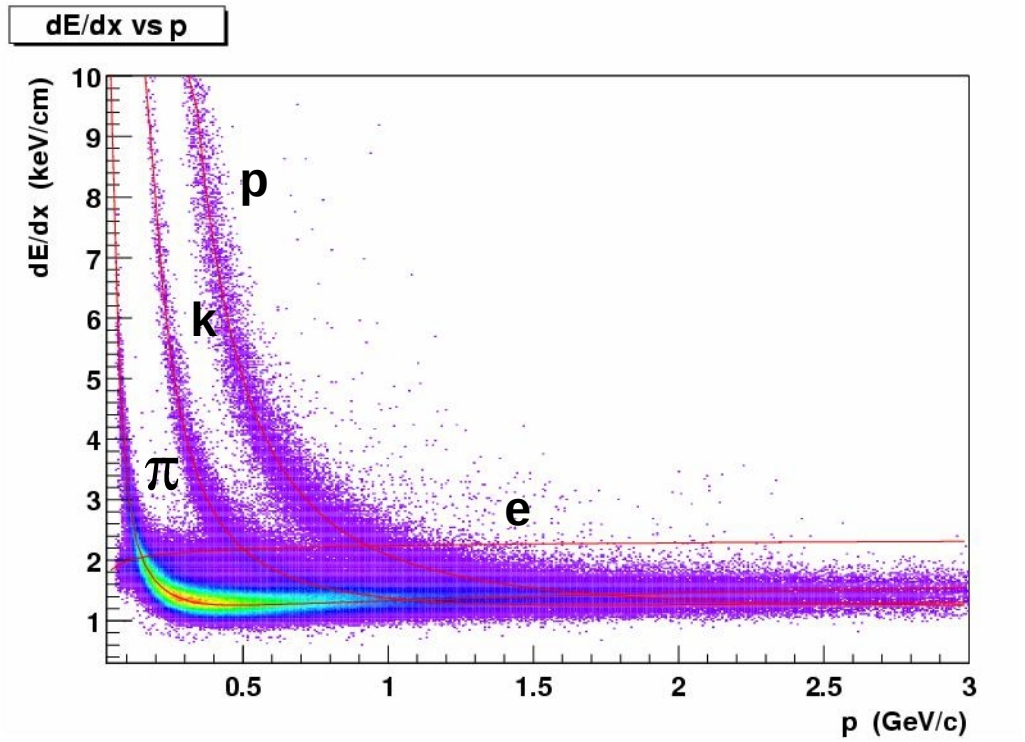
triggered

pair points to the center ot the beam

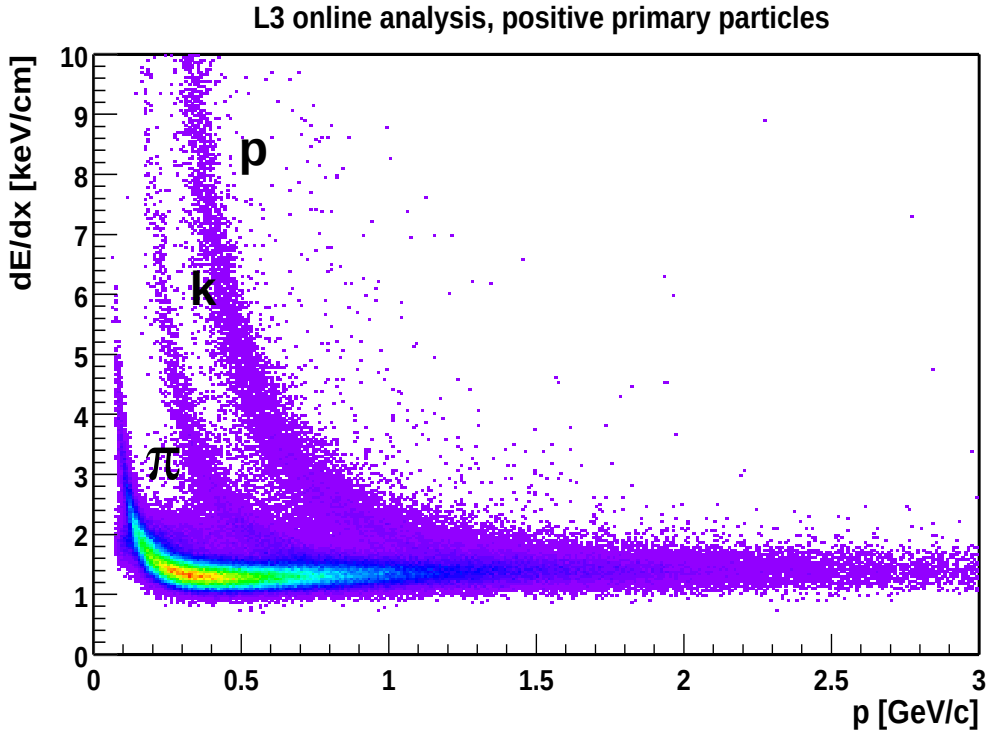


Particle Identification

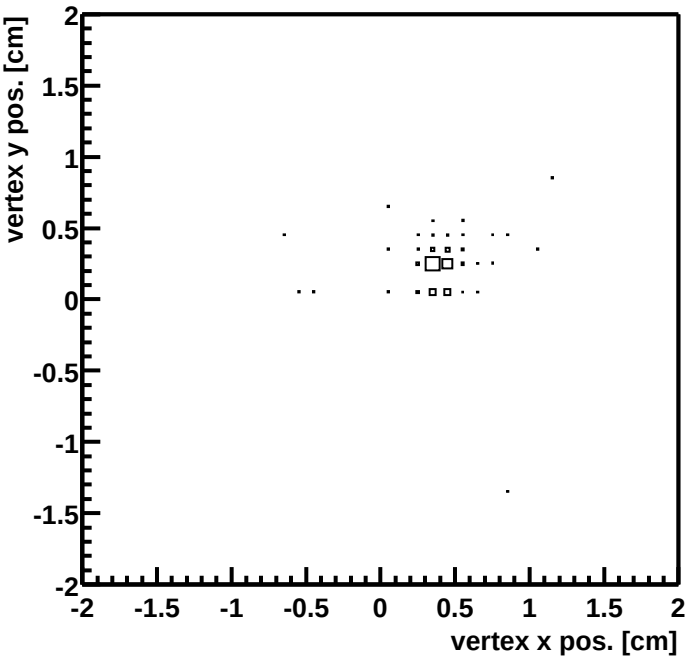
dE/dx offline analysis

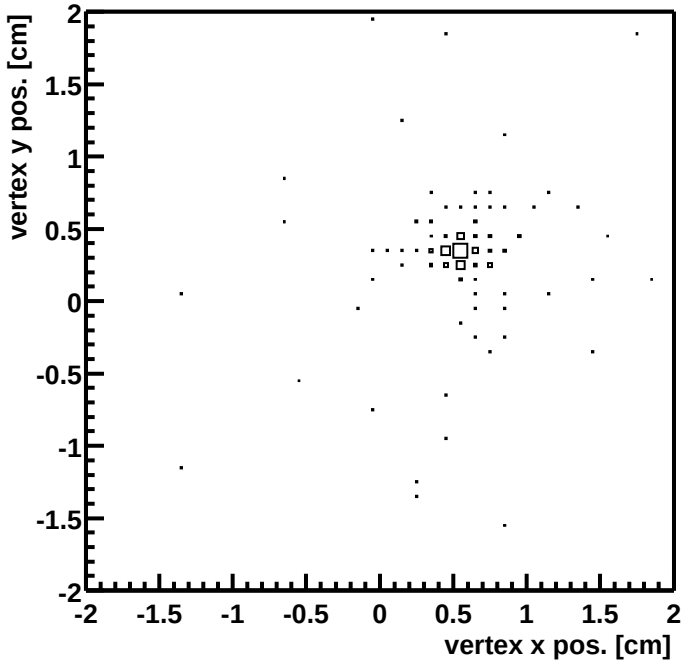


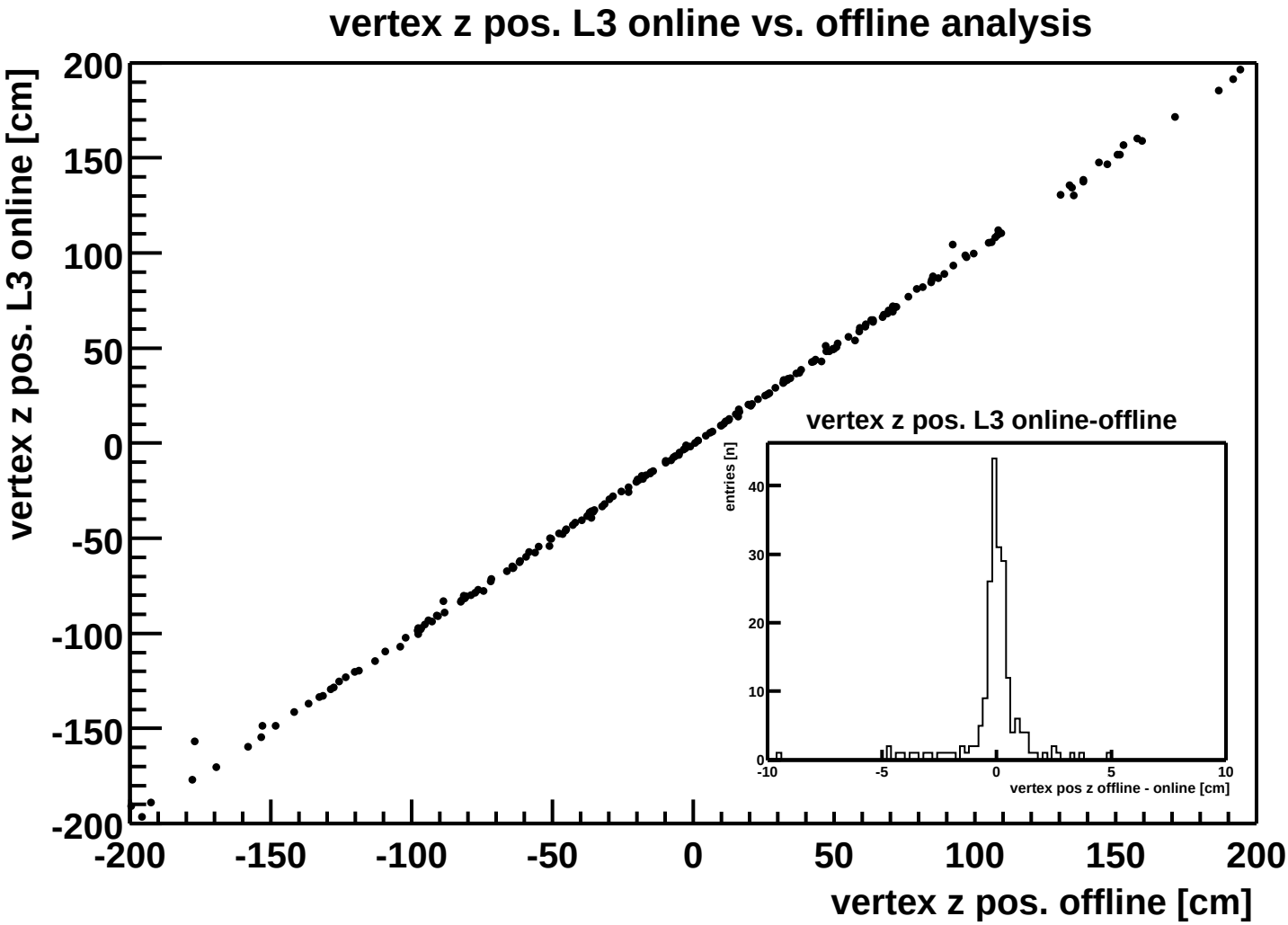
dE/dx online analysis



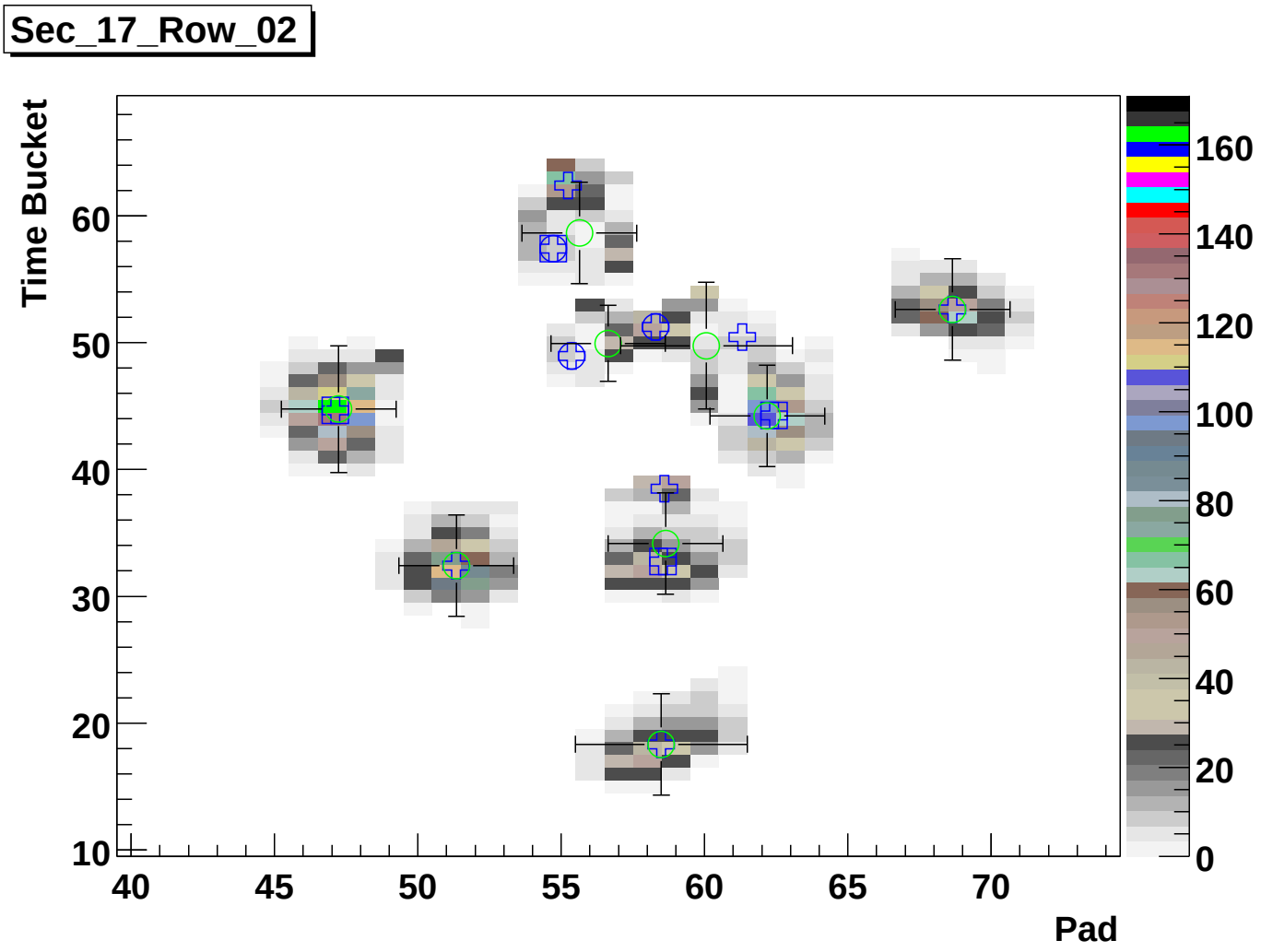
Event Vertex







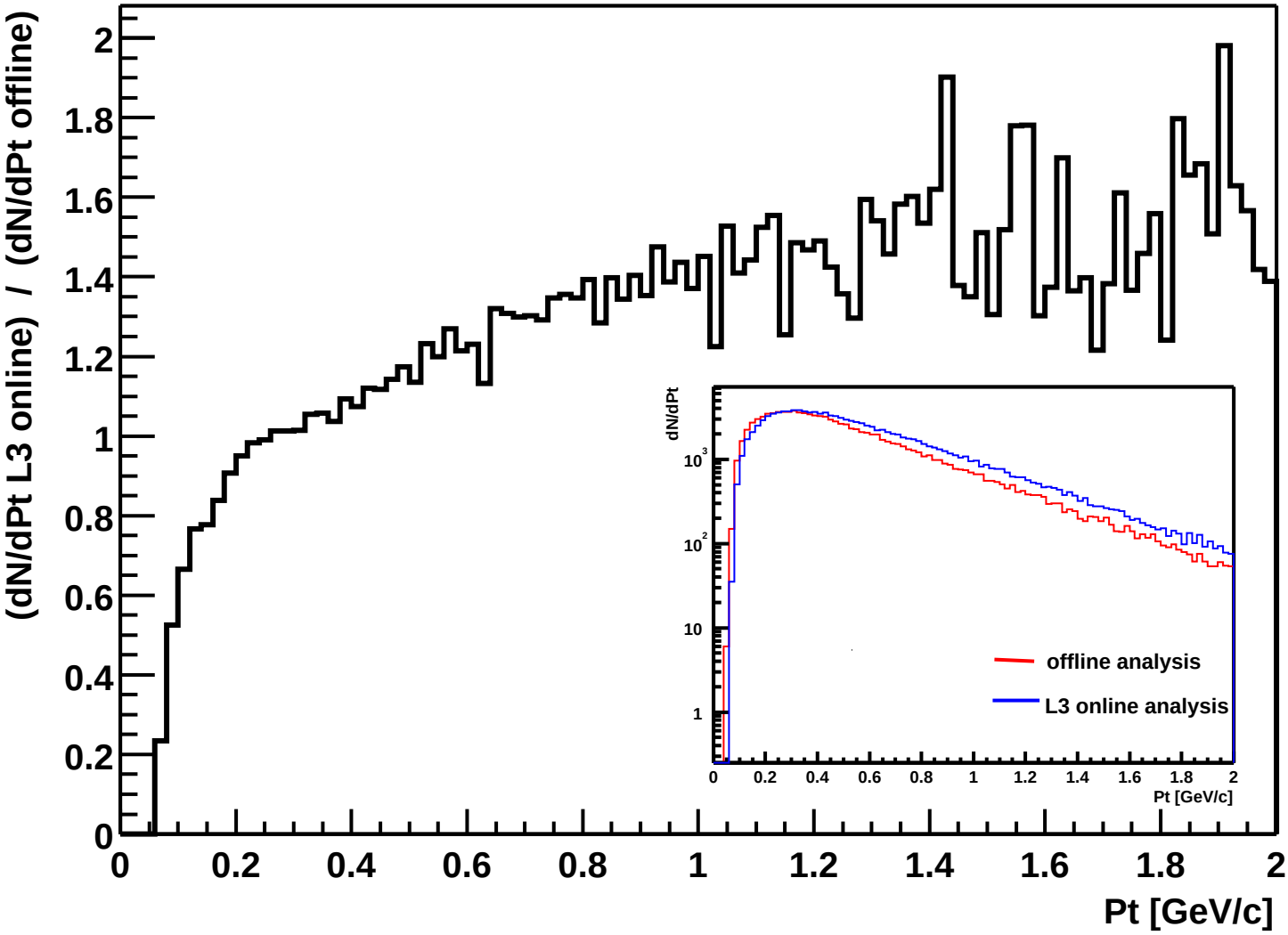
Clusterfinding



spots : RawData
crosses : cluster found offline
error bars: cluster width offline
crosses : cluster found by L3 online

Clusterfinding online is comparable with offline analysis.

Offline / Online Analysis



Summary

- STAR L3 Trigger analyses cental Au+Au events in < 200 ms, offline analysis takes 8 min.
- L3 was used in STAR during Summer 2000 to trigger on
- Tracking quality has to be improved.

j/si