Status Report on Silicon Tracking

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Outline

- **Cellular Automaton**

  ➢ Adaptation of the cellular automaton algorithm used for the FTD to the barrel Si detectors (VXD + SIT)

- **Mini - Vectors**

  ➢ How can we exploit the mini-vectors

Cellular automaton Vs std Si tracking

- ttbar @ 1 TeV

    - **No background**

- IP tracks (Rvtx < 10mm)

- Si Tracking out of the box

- Vs CA tracking (standalone VXD)

- Found track: ≥ 75% of MC hits are found

- Track selection:

    → Hopfield NN
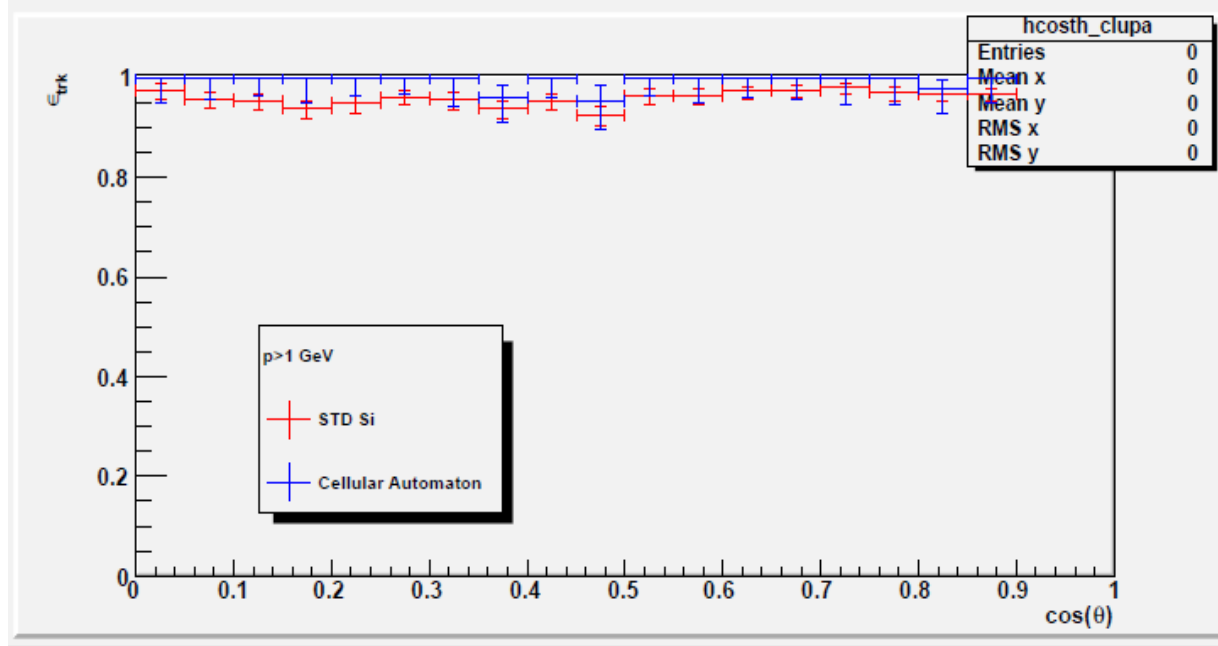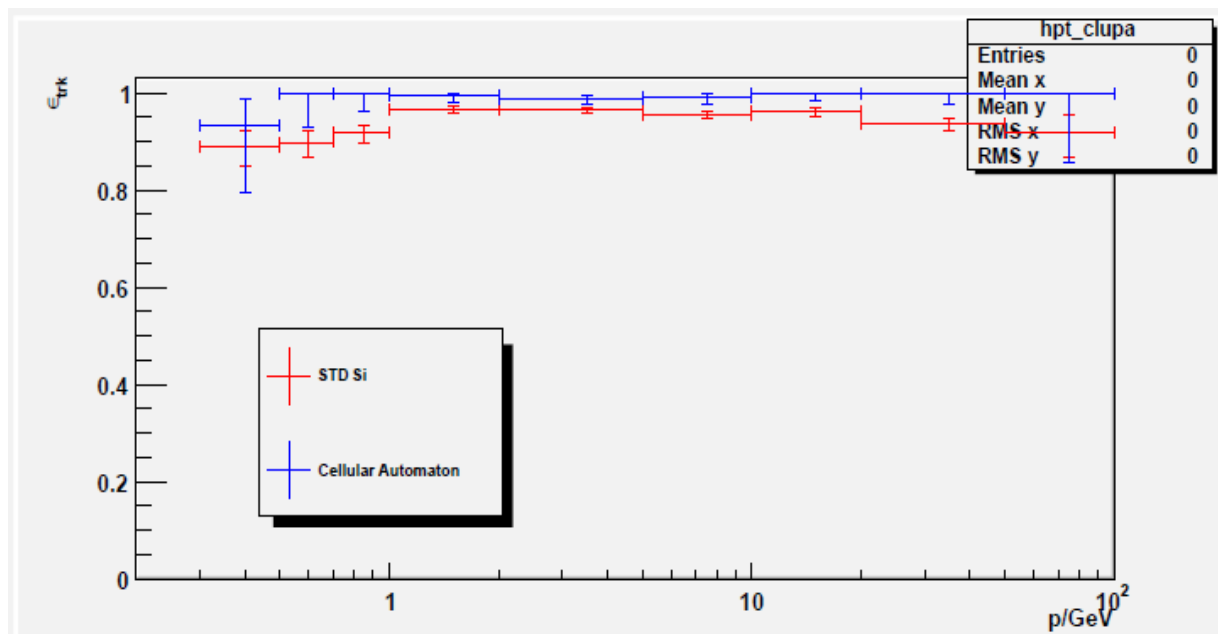
Non-prompt tracks

- But what's going on if we select non-prompt tracks as well?

  - We miss tracks with a relatively high Impact Parameter

    - When their origin is between the inner and the intermediate VXD layer

  - Possible solution

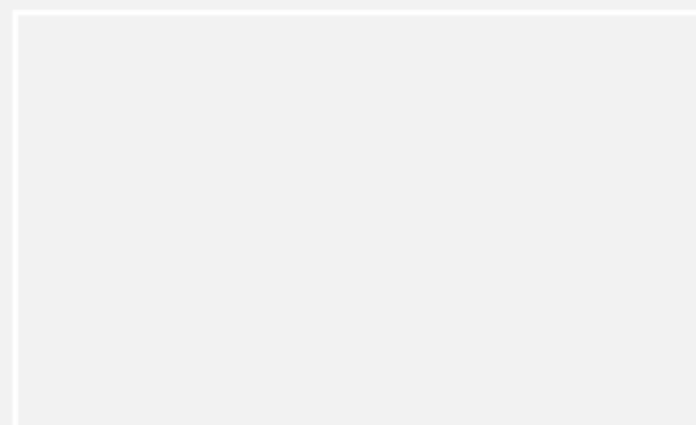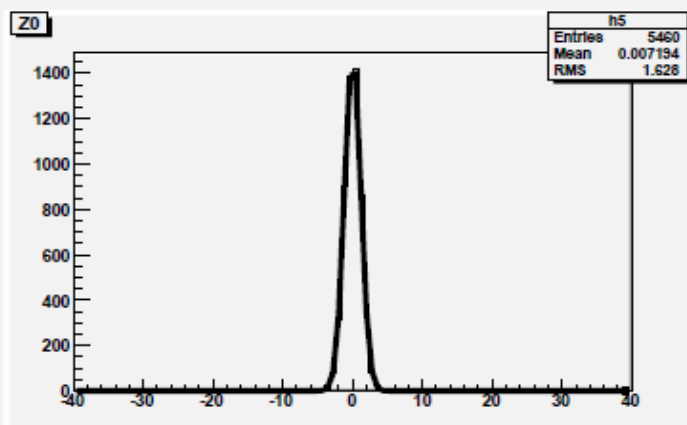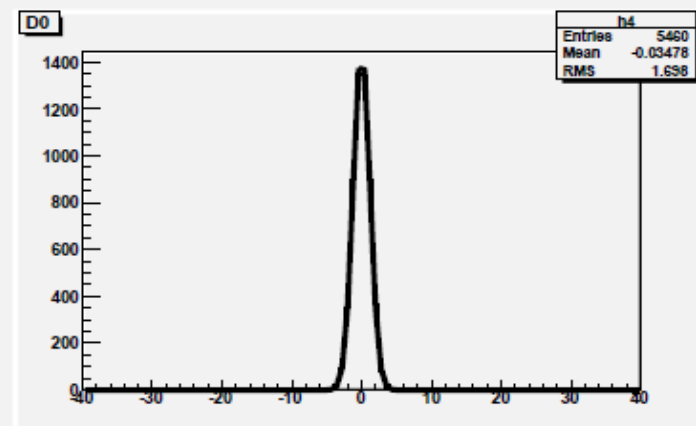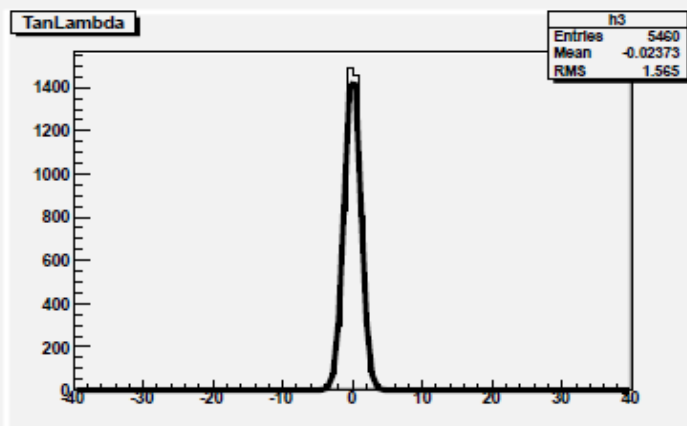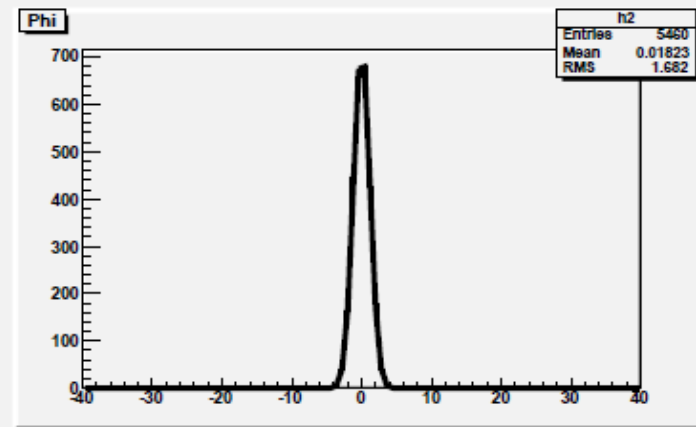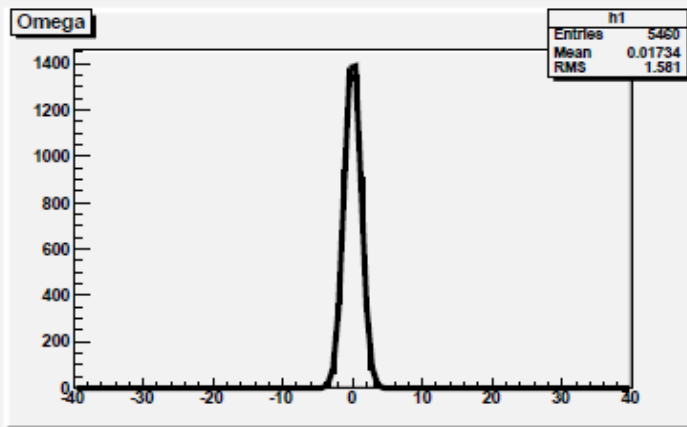   - Add a virtual hit at the interaction point (0,0,0) for all tracks
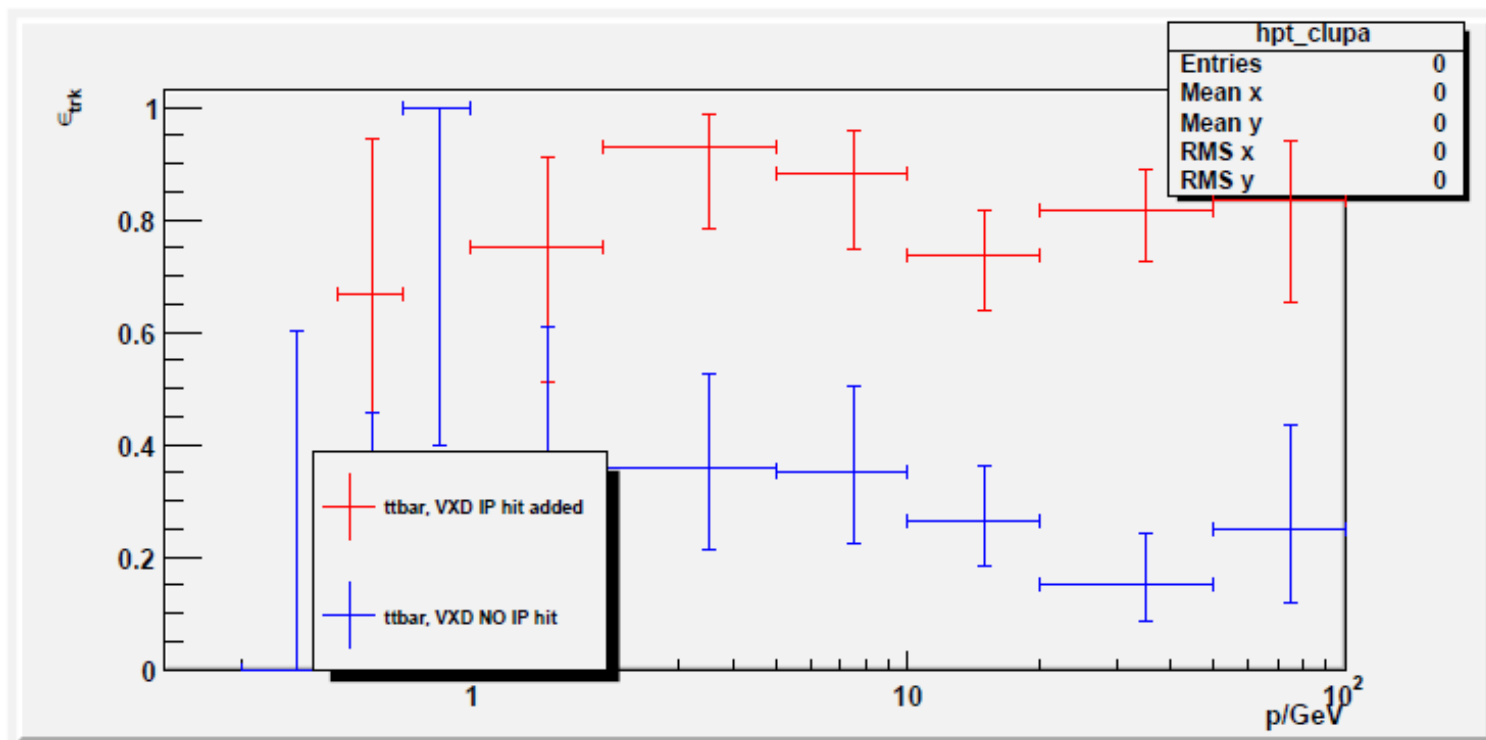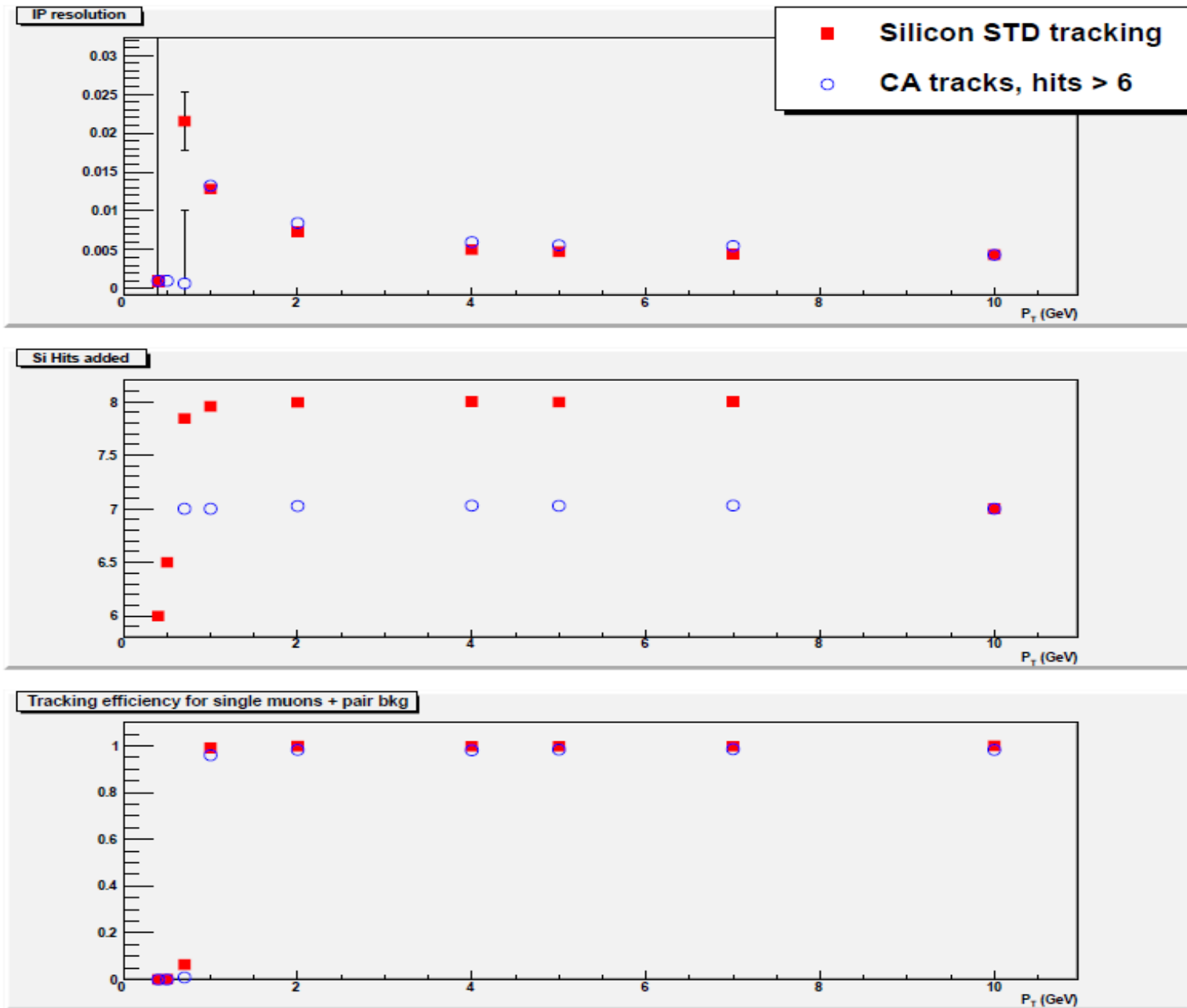
Non-prompt tracks (VXD)

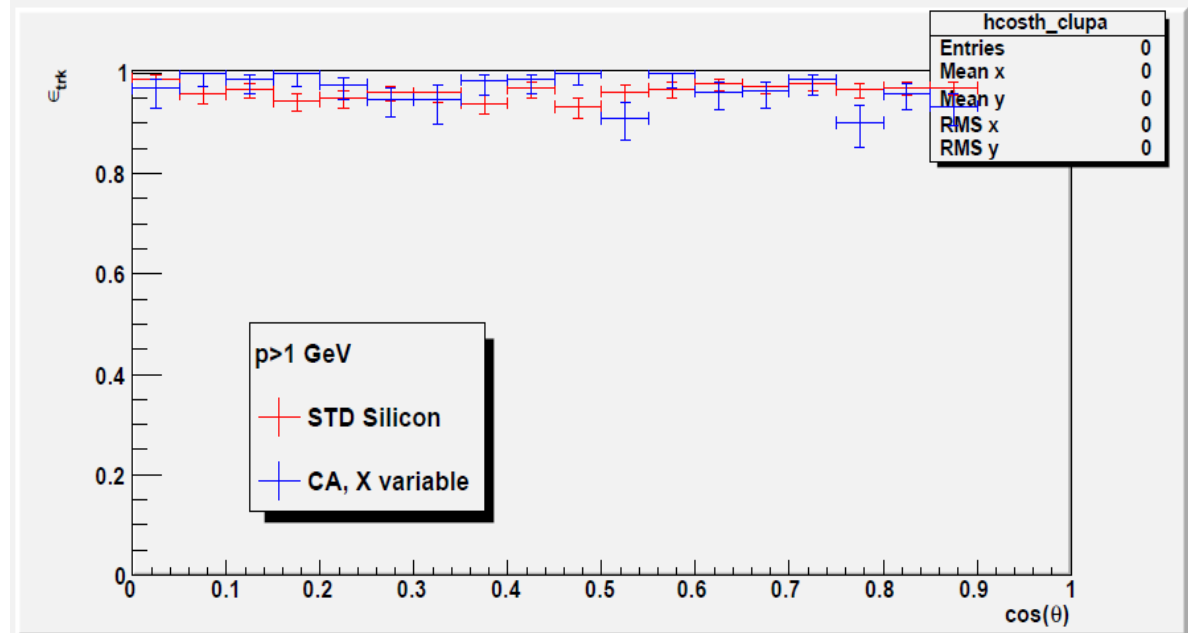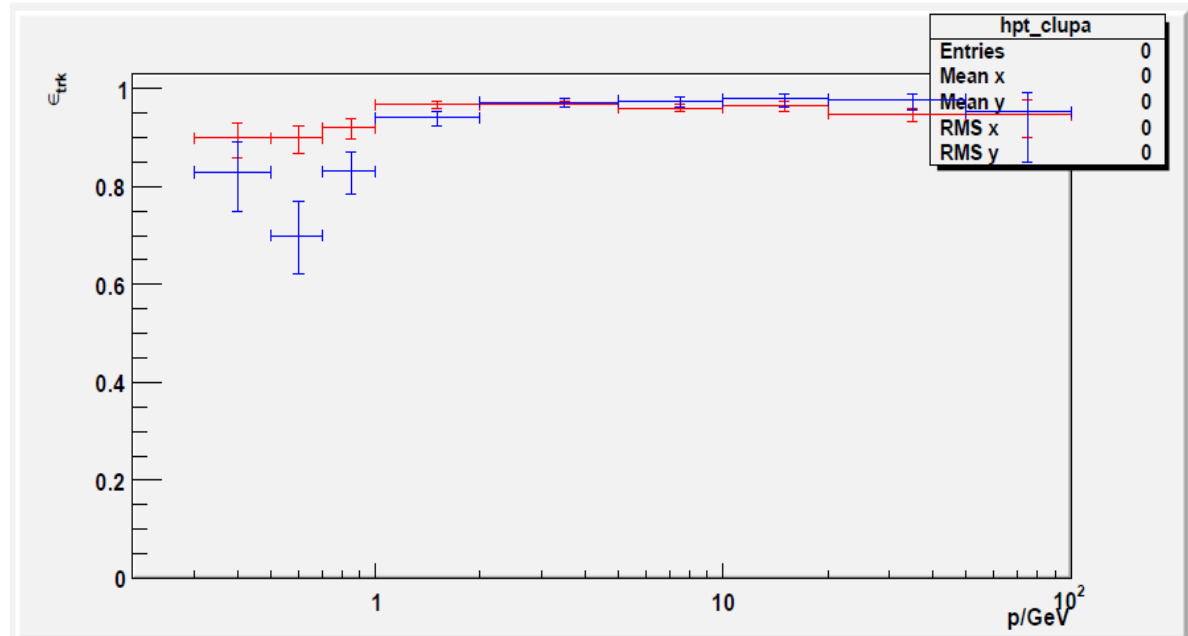- IP < 36 mm (radius of the intermediate VXD superlayer)
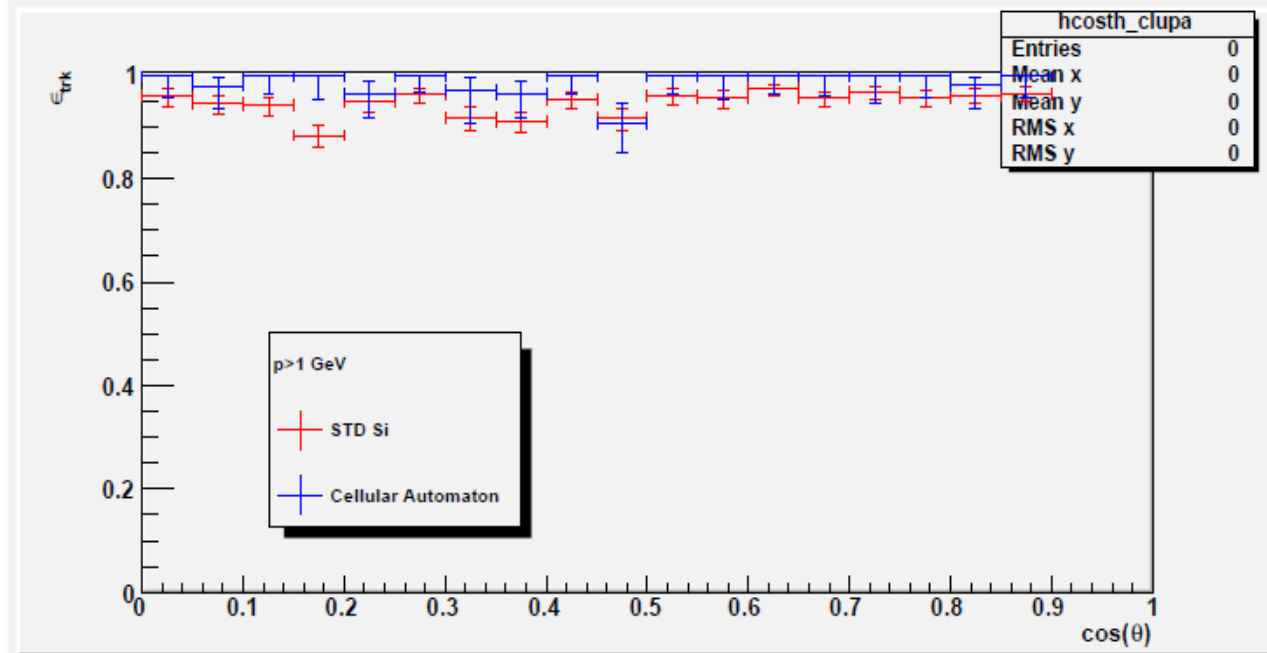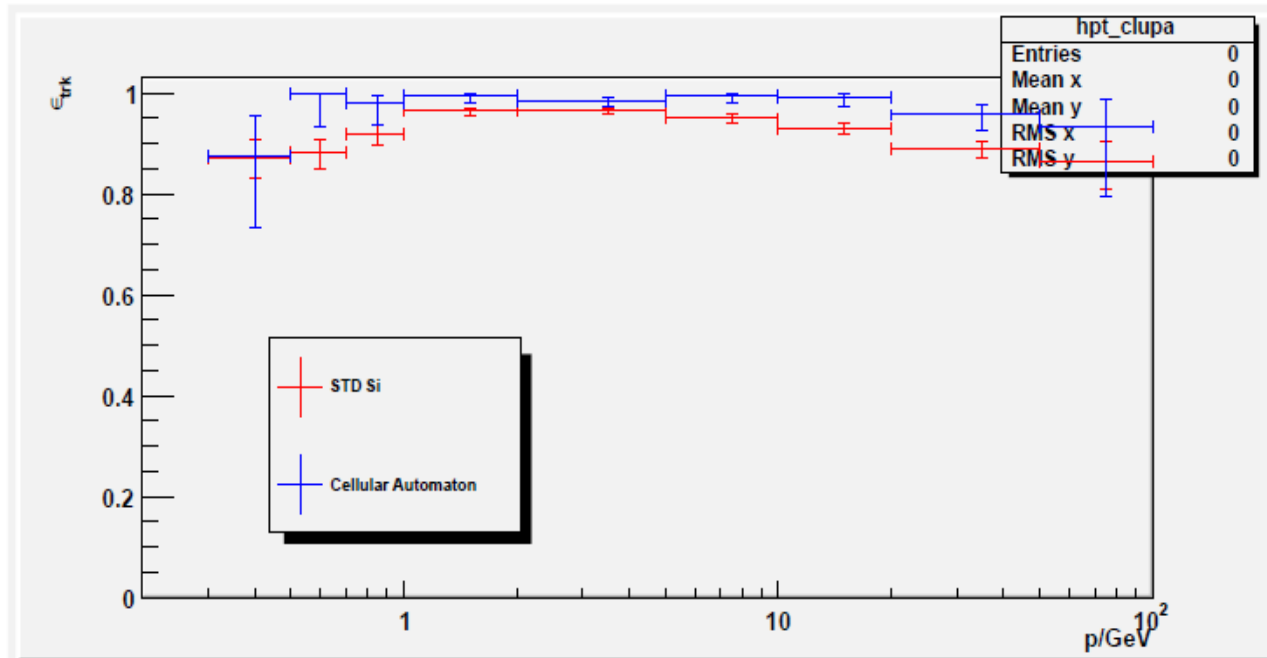
Pulls

IP resolution – single muons

VXD + SIT

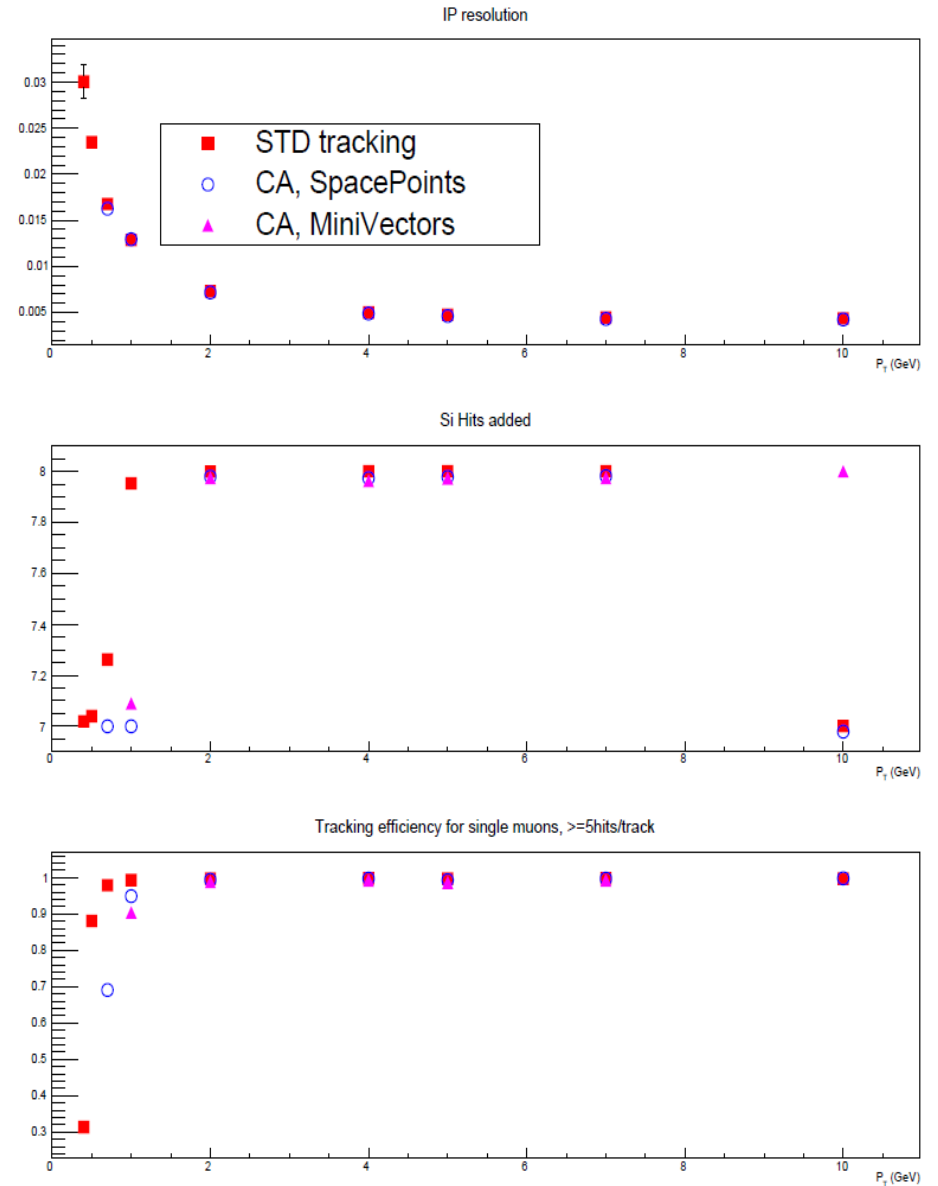- CA, VXD + SIT vs Std algo

- Std algorithm faster

- Many parameters to play with

  - Division in angular sectors

  - Sector combinations

    - Max. layer step and jump to the IP

  - Min. hits / track

  - Maximum allowed connections

  - Connections criteria

  - etc...

Mini - Vectors

- Try to use track segments instead of spacepoints in the cellular automaton

- Big improvement in speed

Conclusions

- **Cellular automaton with spacepoints**

  - Still didn't find a way to provide high efficiency in low mom + time performance

- **Mini – Vectors**

  - Promising concept, reduces significantly the combinatorics

  - Inside the framework of a Cell. Automaton algo

    - Didn't provide satisfactory performance in the presence of beam bkg

  - Should be tested in the framework of a track following algo

- **Need to develop a Silicon tracking based on tracks seed from the TPC as a backup**