

# INTT-Calo Tracking Taskforce

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# Motivation of this taskforce

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- The TPC was not operational in the early period of pp collisions.
- Silicon tracks alone provide  $\sim 10\%$  momentum resolution.
- Statistics is eight times larger than runs after TPC included.
  - Calorimeter+Silicon:  $107 \text{ pb}^{-1}$  (0mrad+1.5mrad)
  - All detector:  $13 \text{ pb}^{-1}$  (triggered, 1.5mrad)
  - Streaming:  $3 \text{ pb}^{-1}$
- By connecting the outer EMCAL with silicon tracks, a few percent momentum resolution can be achieved.
  - Invariant mass spectrum of  $J/\psi$  and  $Y$
  - Direct photon
  - Asymmetry in particle production
  - $p_T$  differential flow

# Takuya's study

- Takuya made a framework and estimated that pt resolution can be a few percent using Monte Carlo simulations as expected.

~4 % pT by Calo+Silicon

## INTT + EMcal Hit Matching Algorithm

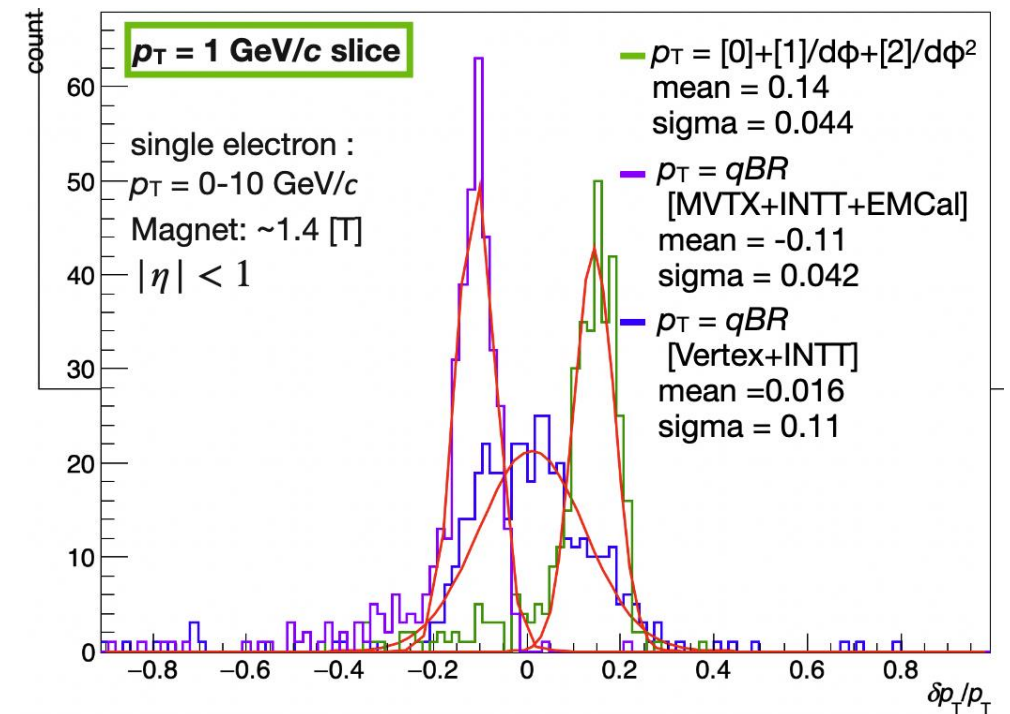
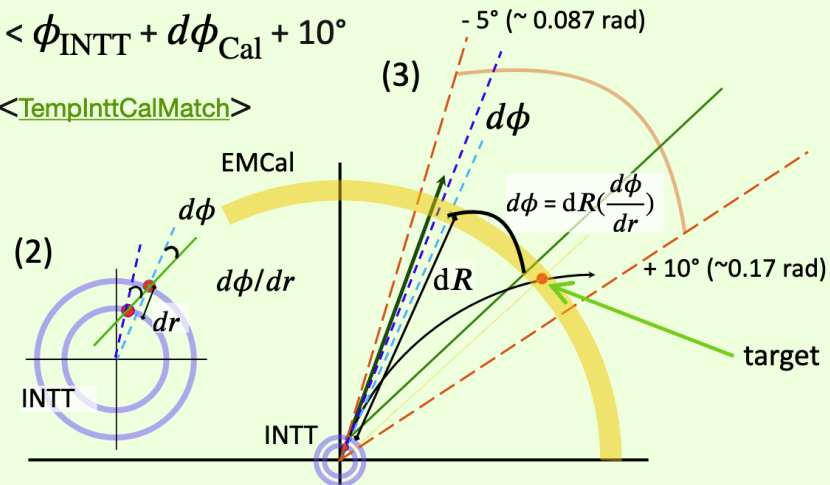
(1) Find a inner INTT cluster having the closest  $\phi_{\text{outer INTT}}$  <TempINTTIOMatching>

(2) Calculate  $d\phi/dr$  (outer INTT - inner INTT) <TempCalcdPhidR>

(3) Searching for an EMCal cluster (> 0.1 MeV) having the highest energy

in the  $\phi_{\text{Cal}}$  range  $\phi_{\text{INTT}} - 5^\circ < \phi_{\text{Cal}} < \phi_{\text{INTT}} + d\phi_{\text{Cal}} + 10^\circ$

$d\phi_{\text{Cal}} = d\phi/dr * (R_{\text{EMCal}} - R_{\text{INTT}})$  <TempInttCalMatch>



# Outlook

The goal for this taskforce is to get this framework recognized as one of sPHENIX's official tracking algorithms.

- Calorimeter Clustering (Jingyu)
- Charged hadrons and muons (Jaein)
- Silicon tracking (Yuko)
- Vertex Finder (Genki?)
- Optimize silicon-Calo matching
- PYTHIA simulation

