Progress of global tracking

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2019/11/11

Reminder of problems of the global tracking

- Test with the pipiJpsi events
- Good track: $|V_{xy}| < 1$cm, $|V_z| < 10$cm, $|\cos\theta| < 0.93$, $Q_{rec} = Q_{truth}$

	Boss665p01 (IDC)	HoughV12 (CGEM-IT)	HoughV13 (CGEM-IT)
4 good tracks events (%)	63.25	60.16	62.68
($\chi^2_{4C} < 200$) events (%)	57.36	51.37	50.14
($\chi^2_{4C} < 60$) events (%)	38.70	30.14	25.36

- Check the Kalman filter results of event tracks in the pipiJpsi events

	Boss665p01 (IDC)	CgemBoss665b (CGEM-IT)	HoughV12 (CGEM-IT)	HoughV13 (CGEM-IT)
Kalmam filter failure rate (%)	1.3	3.0	4.1	15.4

- Kalman filter take initial track parameters of global fitting and hits as input. Failure may cause by:
① Bad initial parameters ? → Check the resolution of global fitting result
② Bad hits ? → Need to find out the common features of bad hits to drop them
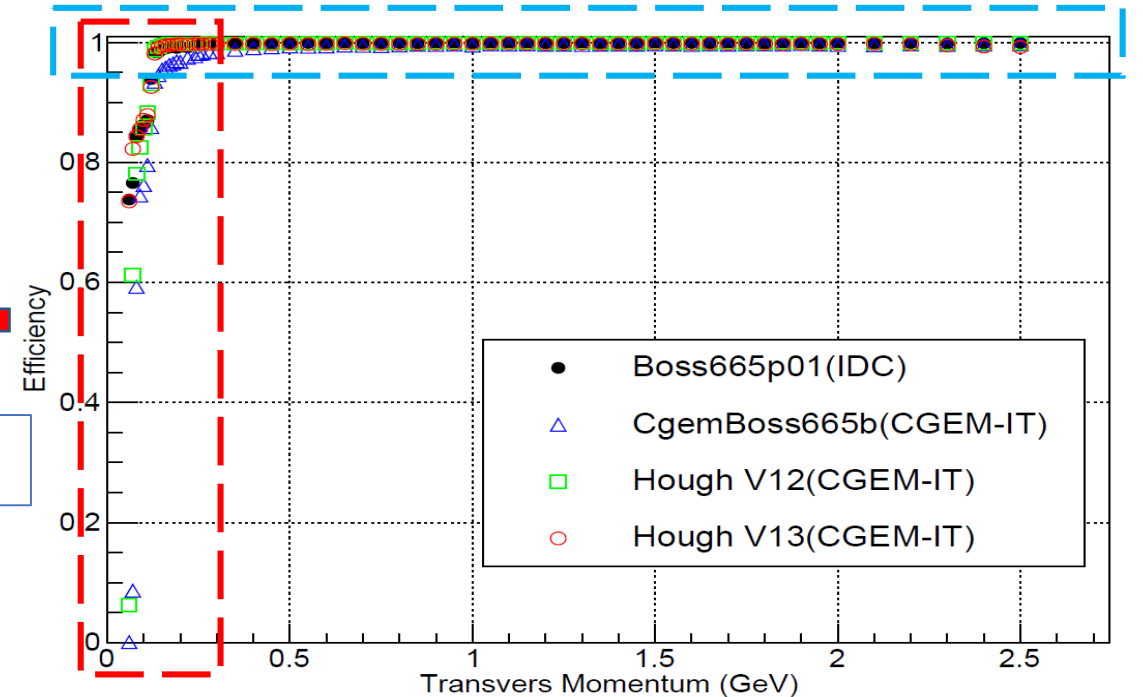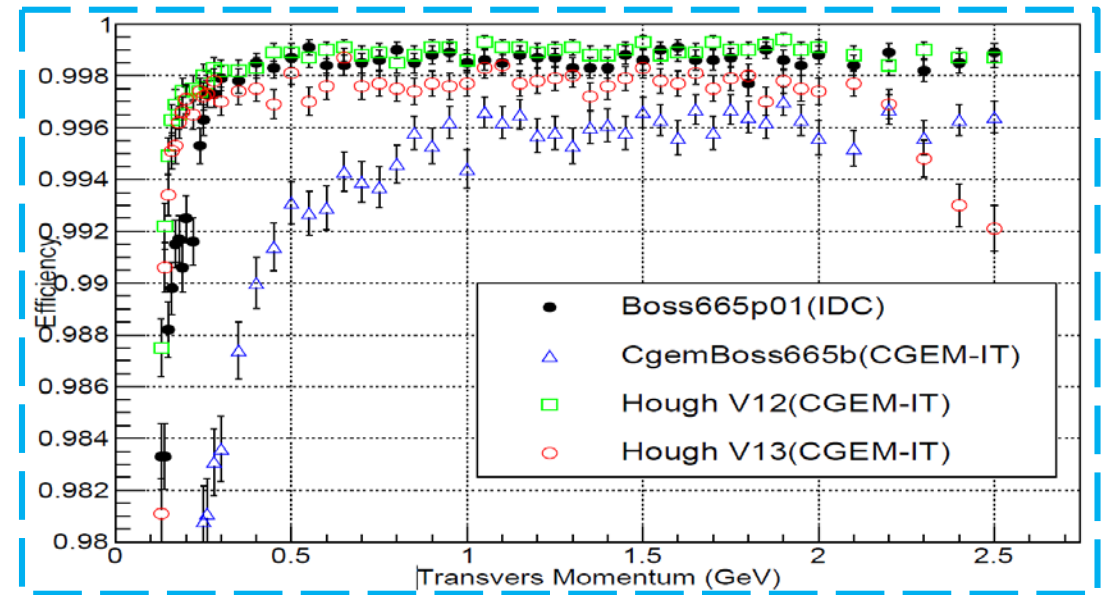
Tracking Efficiency

- Sample: fix transvers momentum of single-track μ^- (60MeV~2.5GeV)

$$efficiency = \frac{reconstructed\ good\ track\ number}{total\ simulated\ track\ number}$$

- **count only once** for tracks that reconstructed twice of more

- Good tracks:
  - $|V_{xy}| < 1cm,\ |V_z| < 10cm,$
  - $|\cos\theta| < 0.93,\quad Q_{rec} = Q_{truth}$
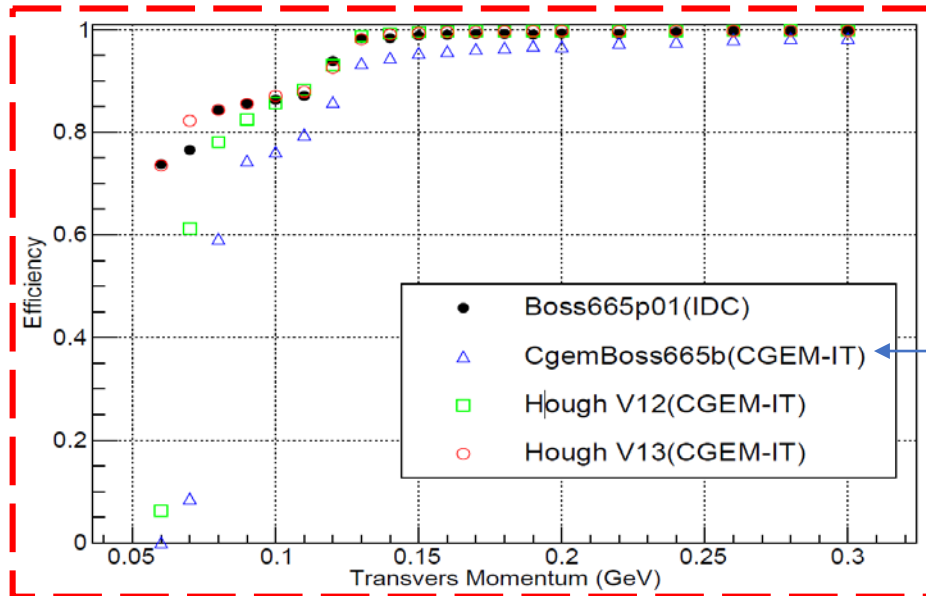
CGEM segment + ODC segment
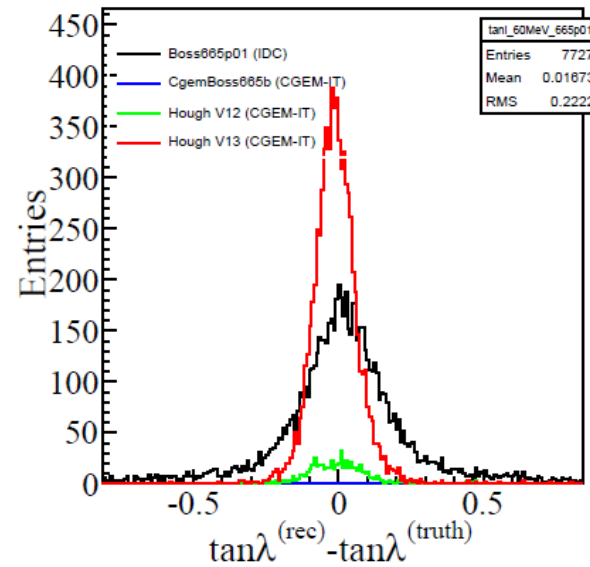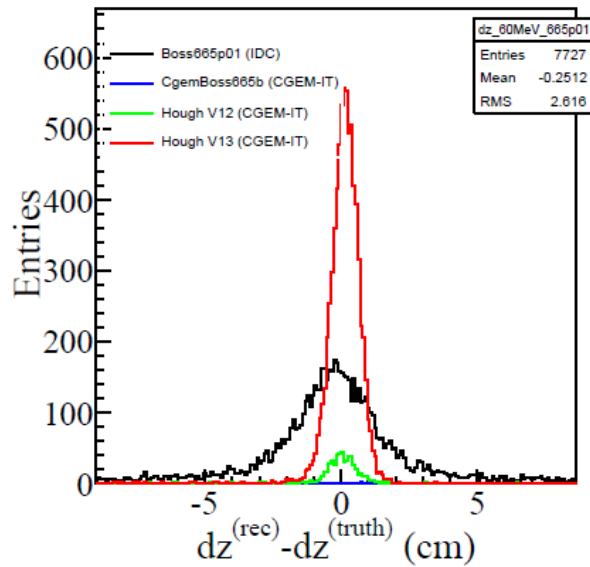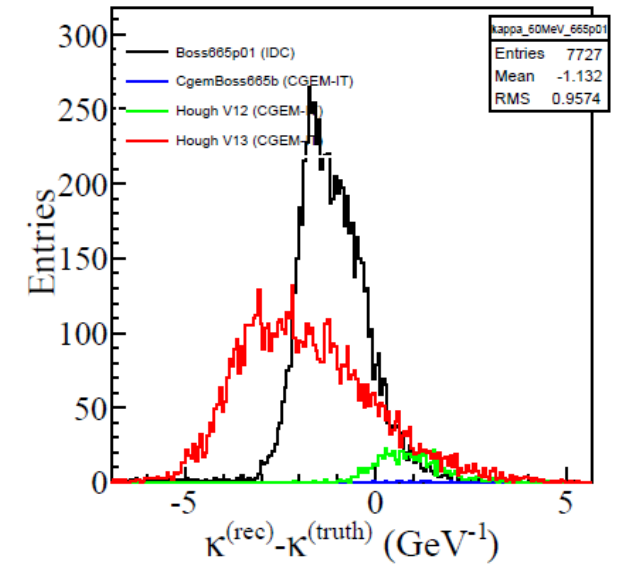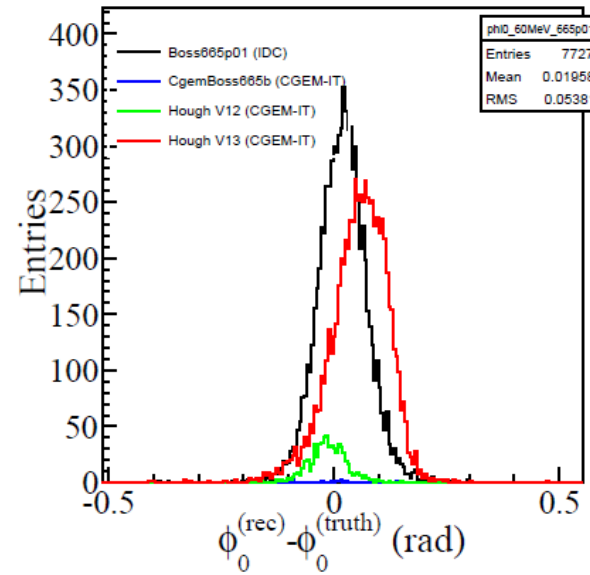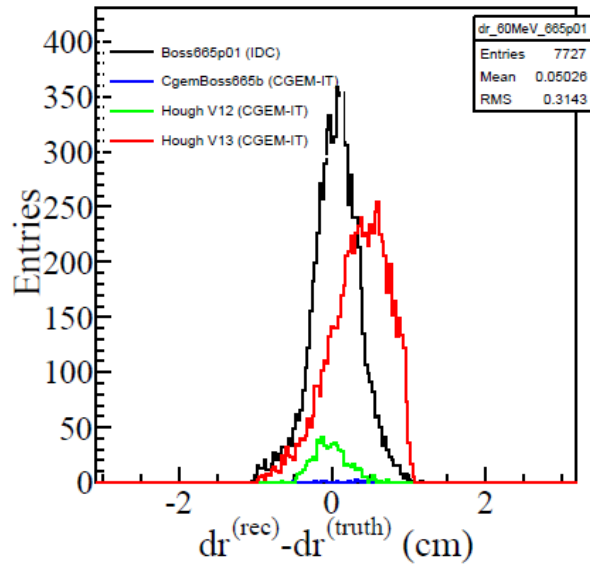
Resolutions of global tracking

- 60MeV
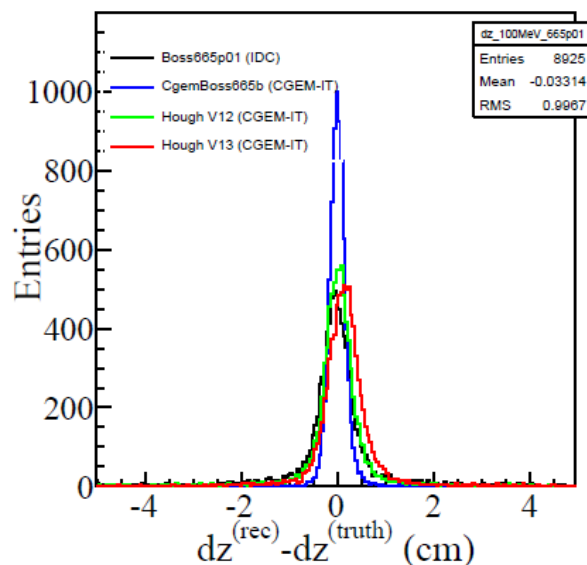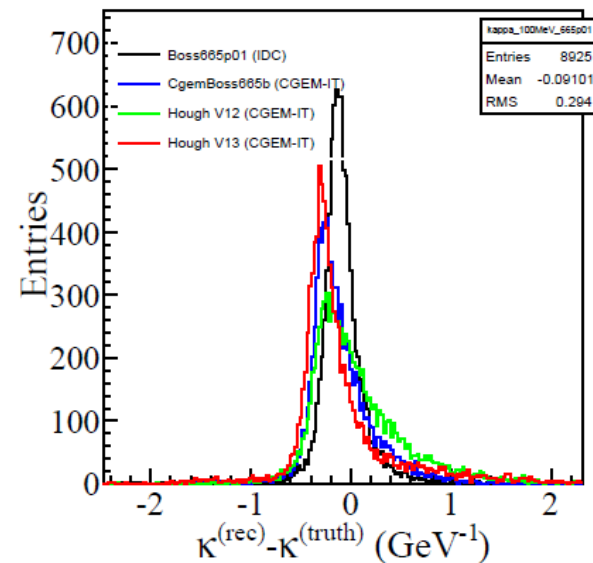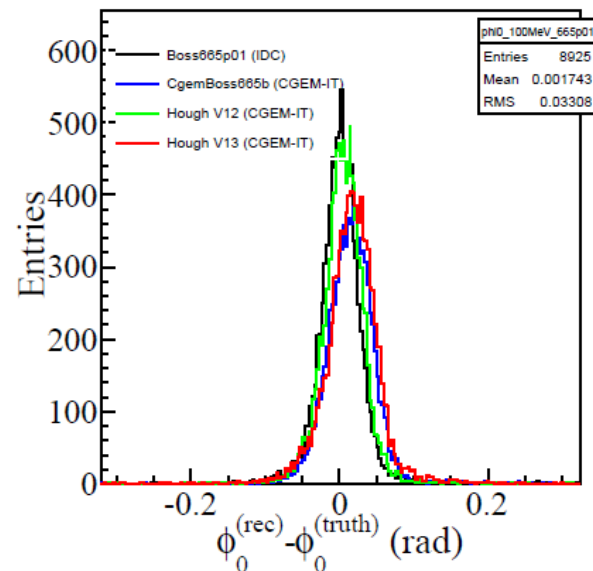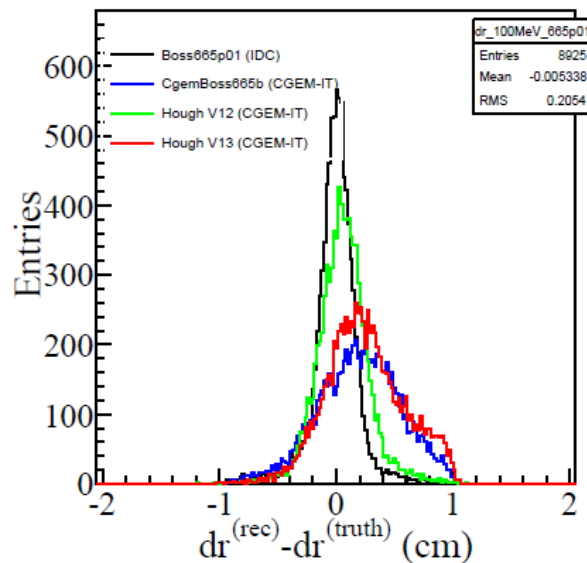
- $|V_{xy}| < 1$cm,
- $|V_z| < 10$cm,
- $|\cos\theta| < 0.93$,
- $Q_{rec} = Q_{truth}$
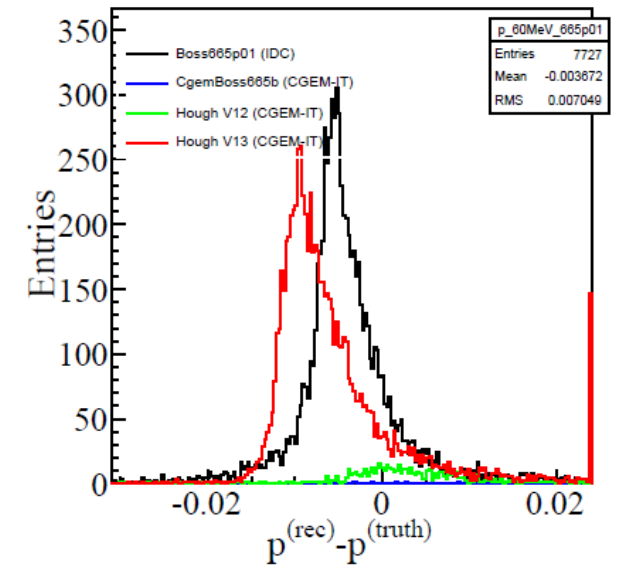
Resolutions of global tracking

- 100MeV

- $|V_{xy}| < 1cm,$
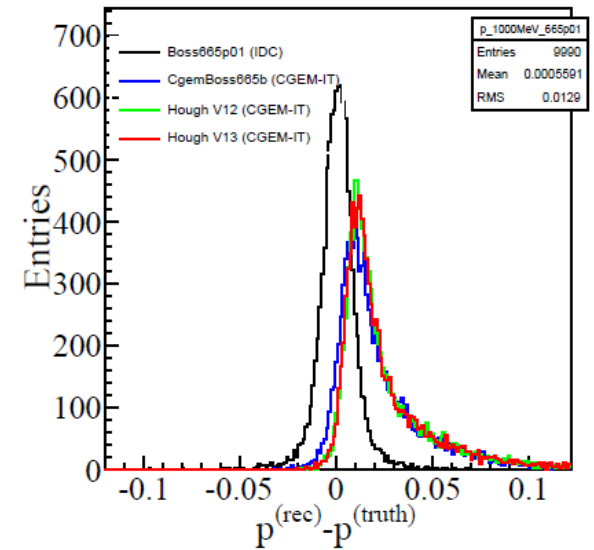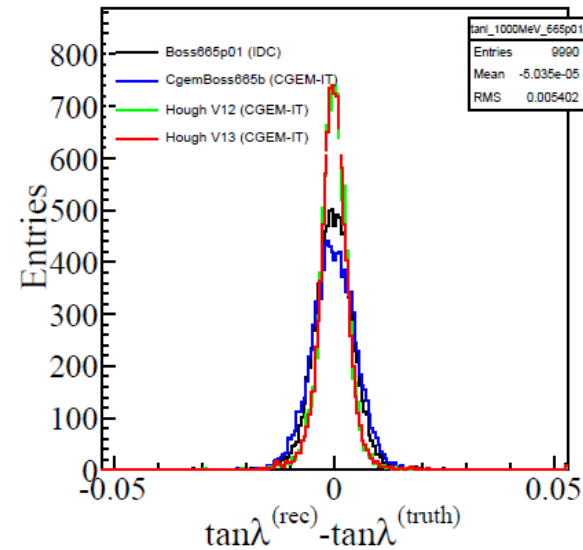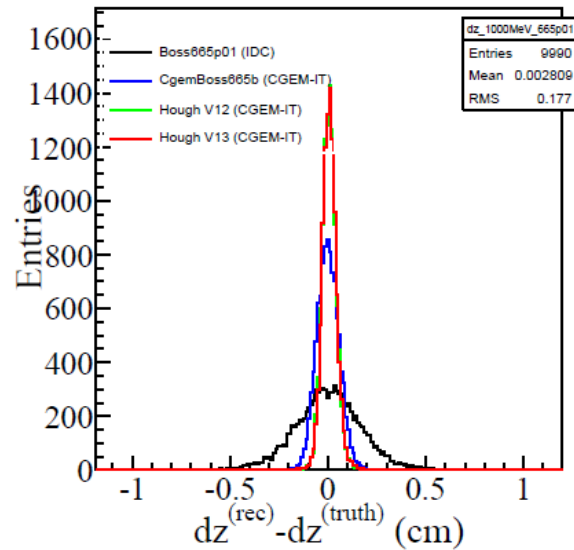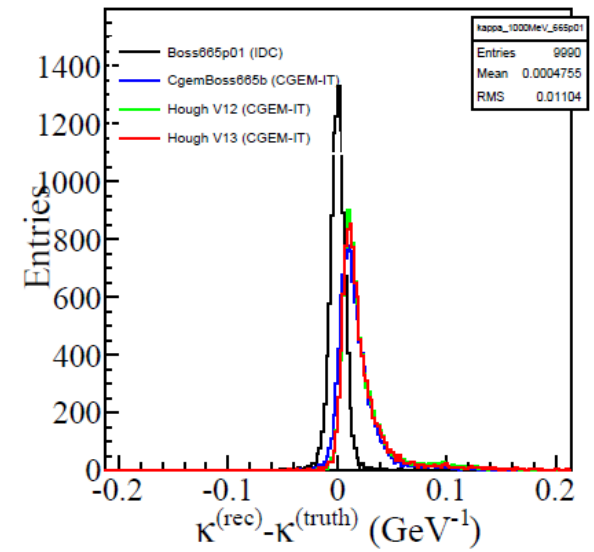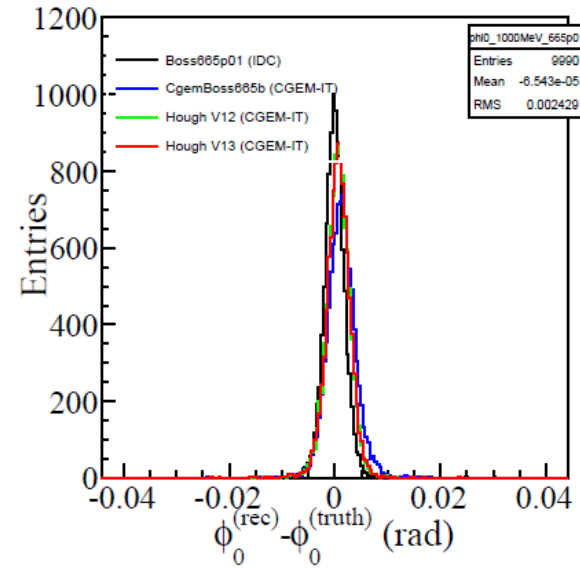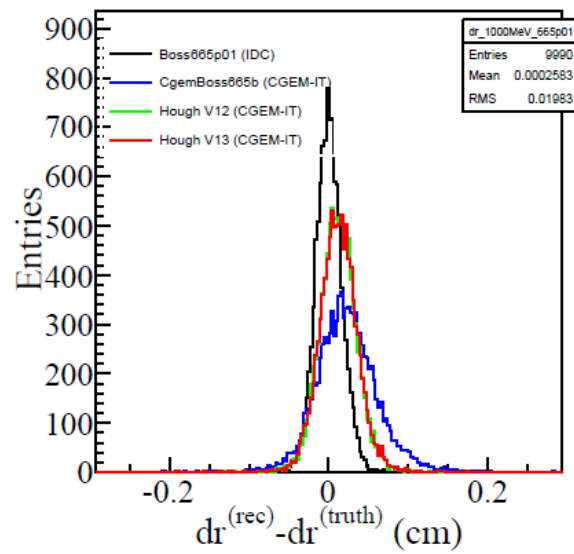- $|V_z| < 10cm,$
- $|\cos\theta| < 0.93,$
- $Q_{rec} = Q_{truth}$
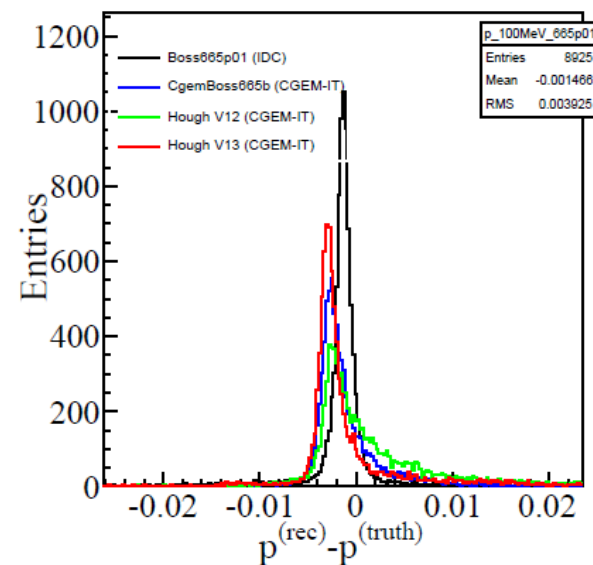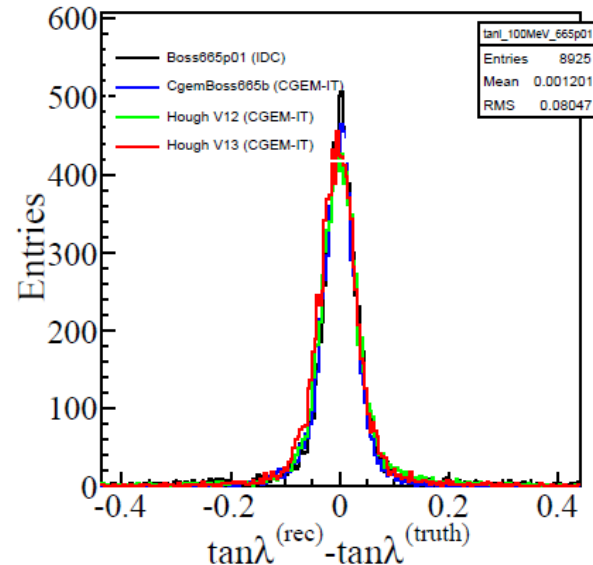
Resolutions of global tracking

- 1000 MeV

> $|V_{xy}| < 1$cm,
> $|V_z| < 10$cm,
> $|\cos\theta| < 0.93$,
> $Q_{rec} = Q_{truth}$

Further study plan

- Resolution may not be the reason of Kalman filter failure. But need further test

    → plan to replace the initial parameters with the truth value to test.

- Maybe need to find out the common features of bad hits of the track

    → find out the bad hits of the track

    → analyze their features (flight length, fake cluster, drift distance …)

    → find out the common features