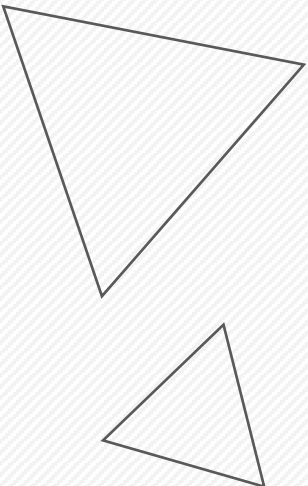# Tuning of HoughTransAlg and KalFitAlg
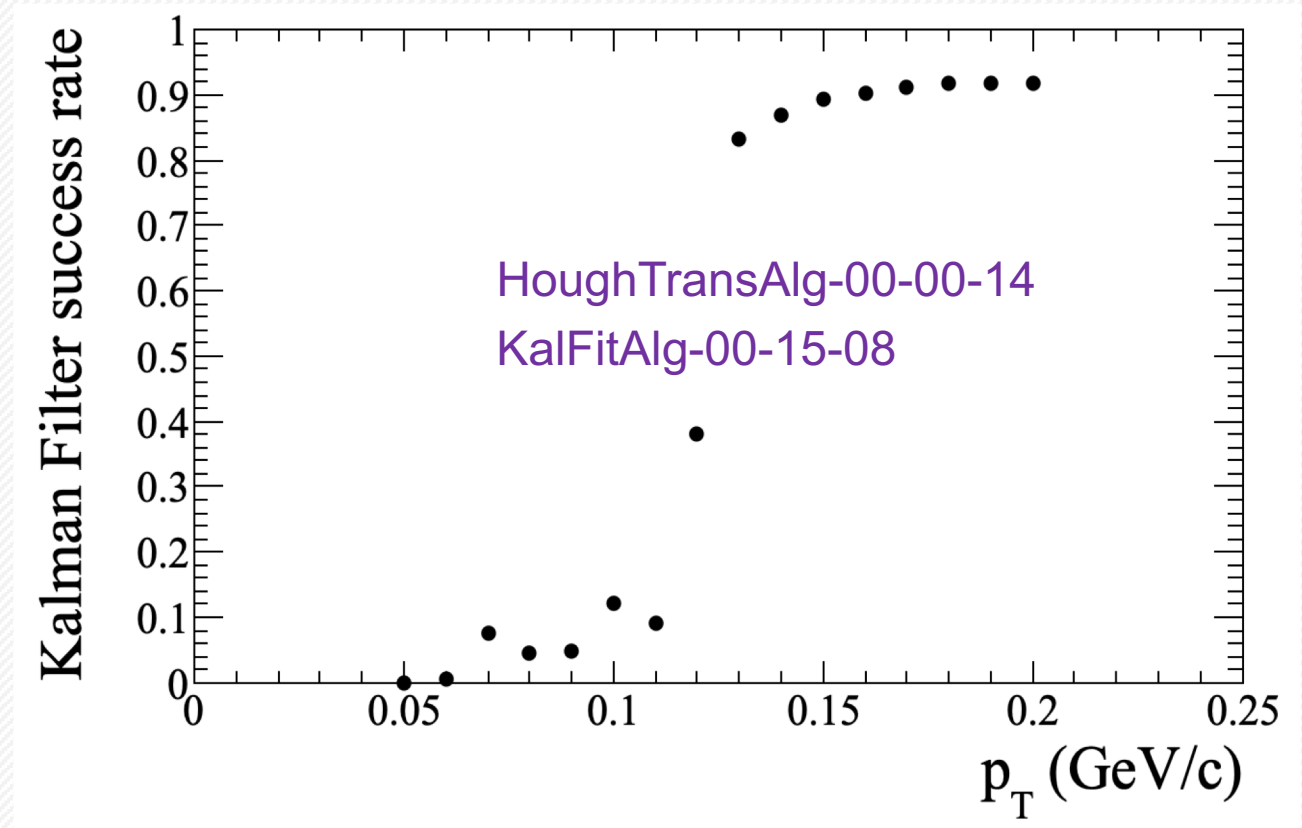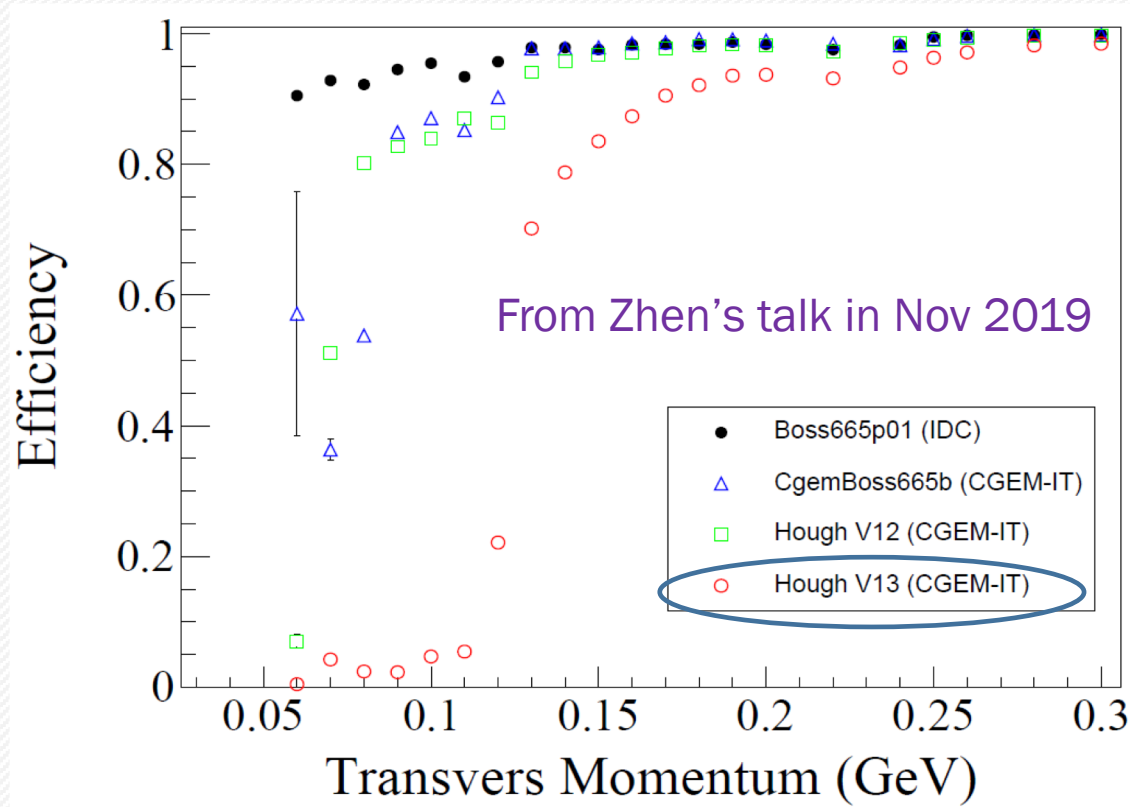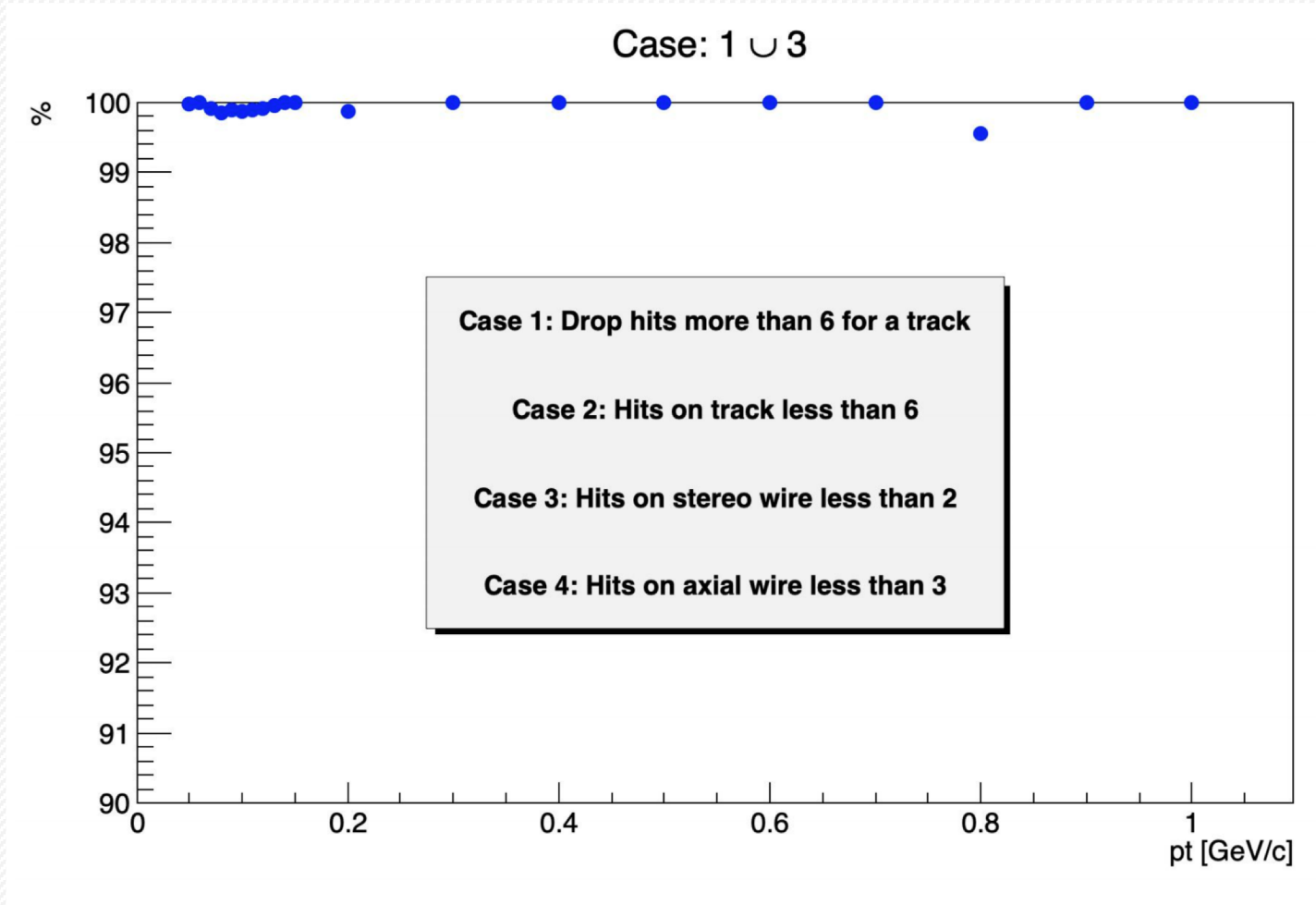
Long Li (Shangdong University), Liangliang Wang (IHEP)

Linghui Wu (IHEP)   and   Yao Zhang (IHEP)

Kalman Filter success rate

Sample: single μ^-

From Zhen's talk in Nov 2019

Legend:
- ● Boss665p01 (IDC)
- △ CgemBoss665b (CGEM-IT)
- ☐ Hough V12 (CGEM-IT)
- ○ Hough V13 (CGEM-IT)

HoughTransAlg-00-00-14
KalFitAlg-00-15-08

A reminder of the status two weeks ago

Case: 1 ∪ 3

Case 1: Drop hits more than 6 for a track

Case 2: Hits on track less than 6

Case 3: Hits on stereo wire less than 2

Case 4: Hits on axial wire less than 3

Sample: single μ^-

HoughTransAlg-00-00-14
KalFitAlg-00-15-08

The dominant reason is:
too many hits rejected by Kalman Filter!

Sample: single μ^-

Modifications in HoughTransAlg:
- **active hits only**
  keep only the hits accepted by the global Helix fit
- **DT<400ns**
  keep only the hits with drift time < 400 ns
  (controlled by an option)
- Tag: HoughTransAlg-00-00-15

Modifications in KalFltAlg:
- **Keep multi-hits on one layer**
  Keep the case of more than 3 hits on the same
  layer for p_T<120 MeV/c
- **Loose χ^2 cut**
  Looser χ^2 cut used in Kalman Filter
  (need validation of resolution)

○ Hough v14 & Kal v15-8
□ keep multi-hits on one layer
● + active hits only
▼ + DT<400
▲ + loose χ^2 cut

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