

UPDATE

Energy Dependence of Underlying Event Observables Measured with ALICE at the LHC

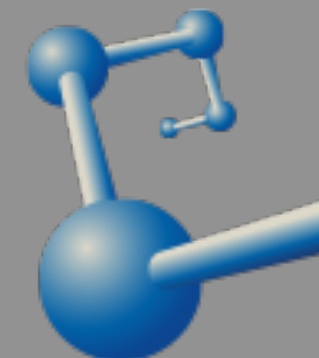
Feng Fan (CCNU)

with Antonio Ortiz Velásquez and Daicui Zhou



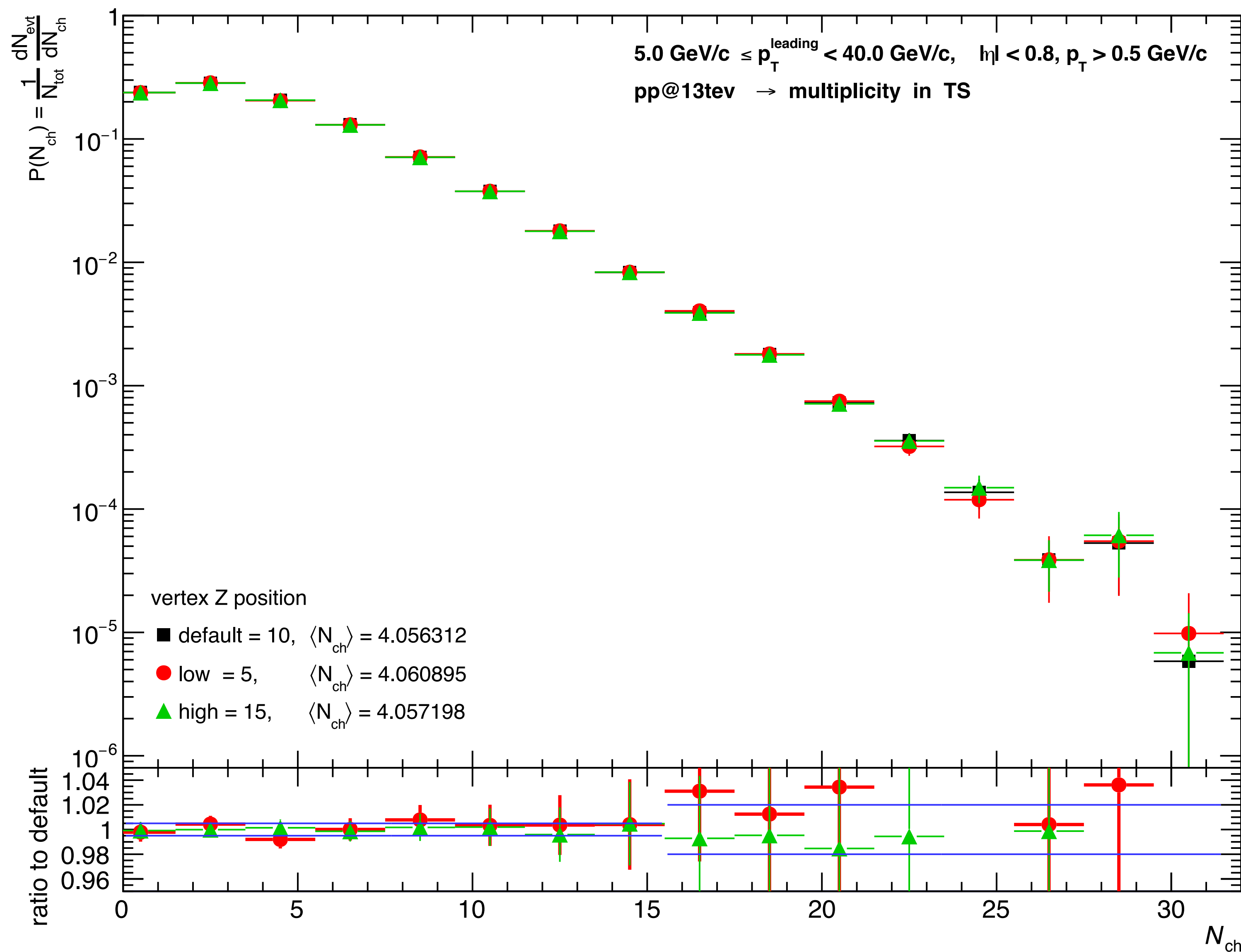
華中師範大學
CENTRAL CHINA NORMAL UNIVERSITY

Instituto de Ciencias Nucleares UNAM

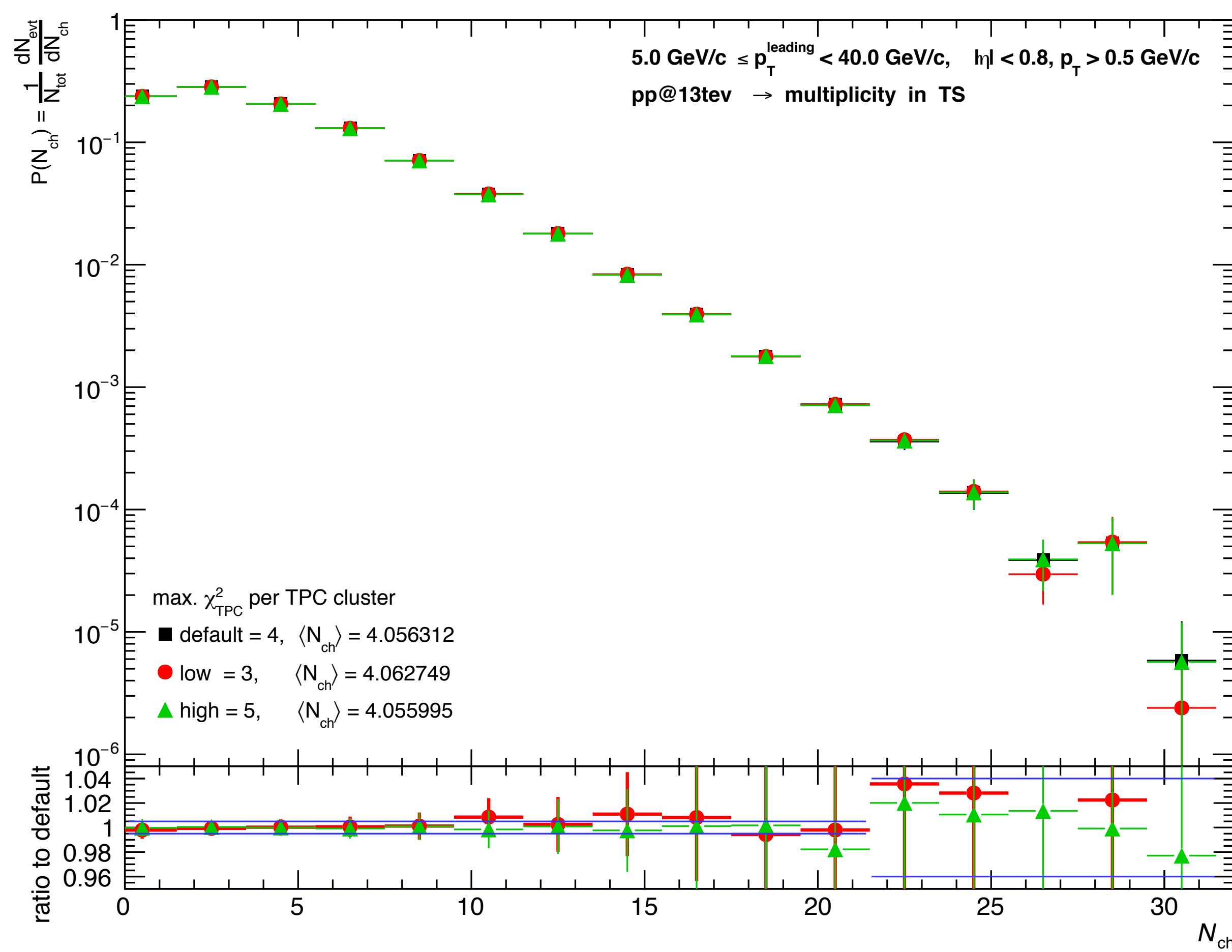
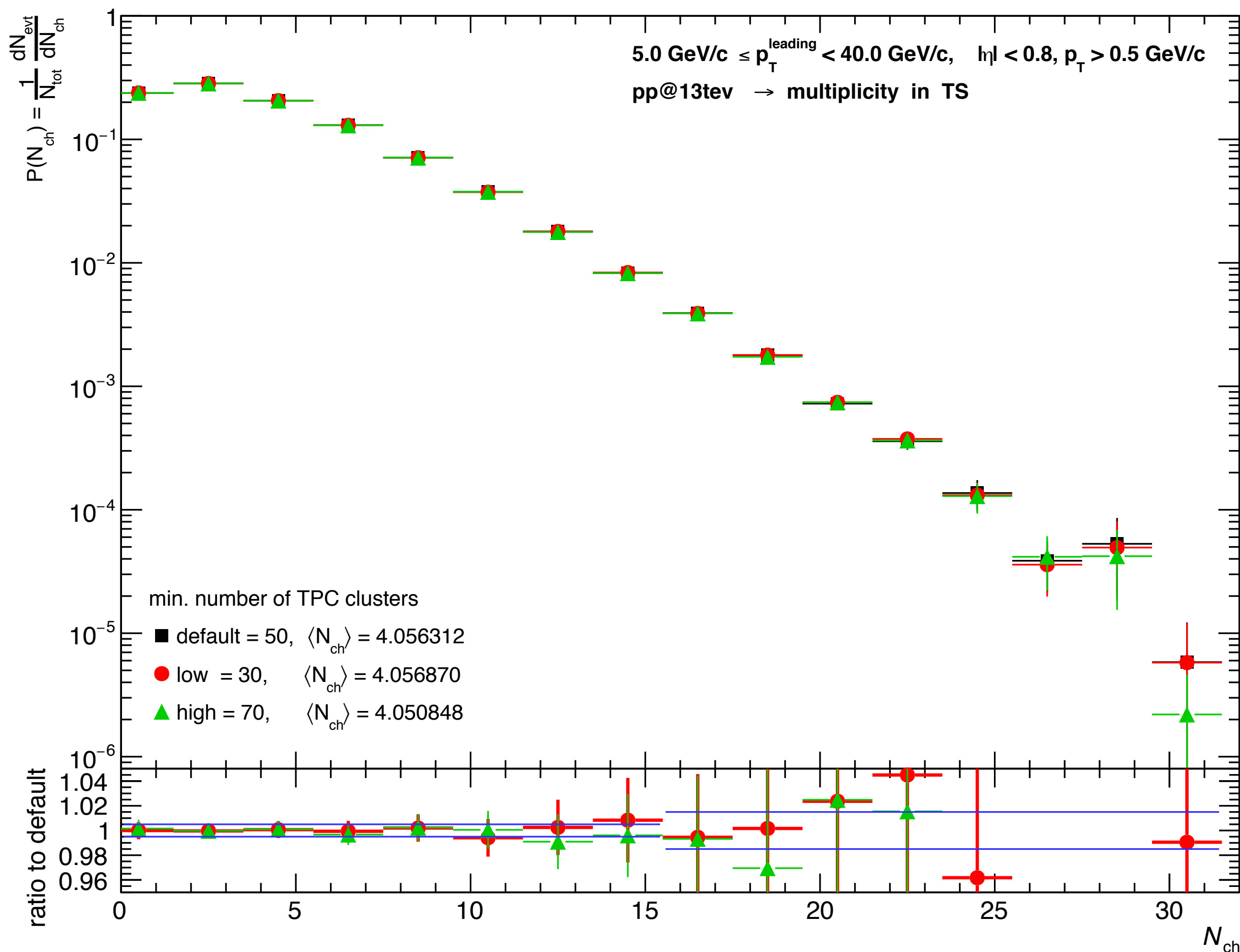


Progress on Systematic Uncertainty — Variation of Event Selection

- For event cut on vertex position
 - at low $N_{ch} < 15$, the variation is within 0.5%
 - at high $N_{ch} > 15$, the variation is within 2%

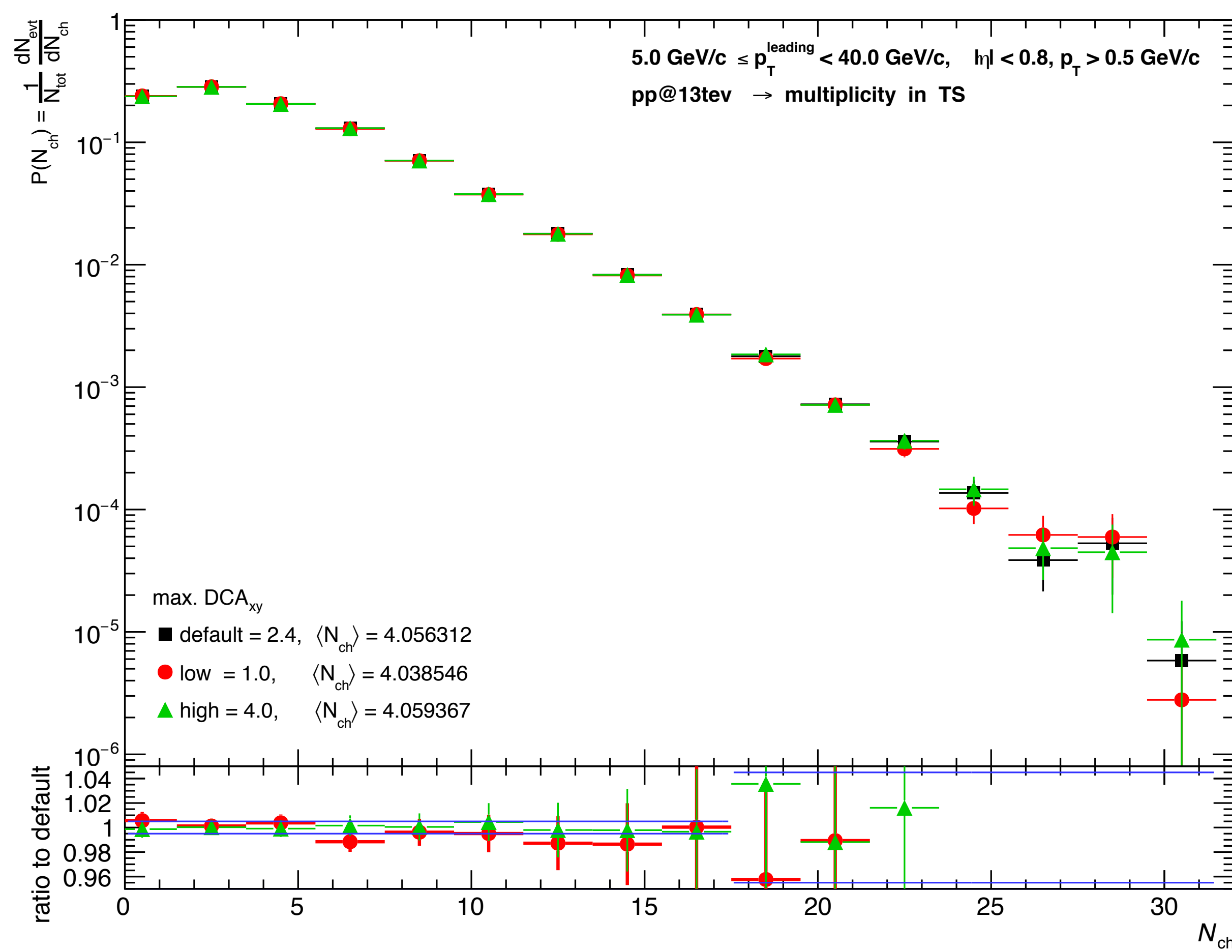
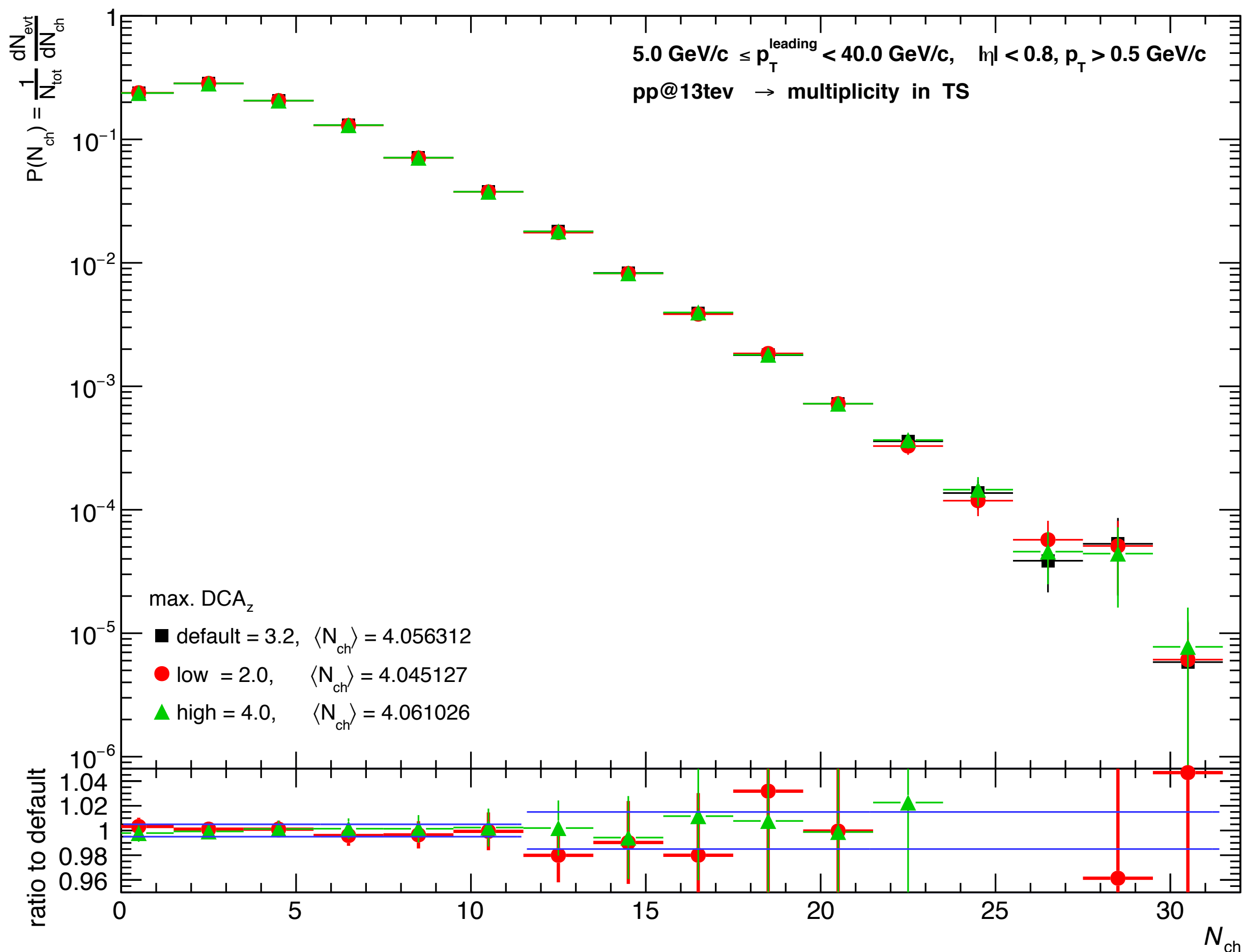


Progress on Systematic Uncertainty — Variation of Track Cut for N_{ch}



- For track cut on minimum number of TPC clusters
 at low $N_{ch} < 15$ the variation is within 0.5%, at high $N_{ch} > 15$ the variation is within 1.5%
- For track cut on maximum χ^2_{TPC} per TPC cluster
 at low $N_{ch} < 21$ the variation is within 0.5%, at high $N_{ch} > 21$ the variation is within 4%

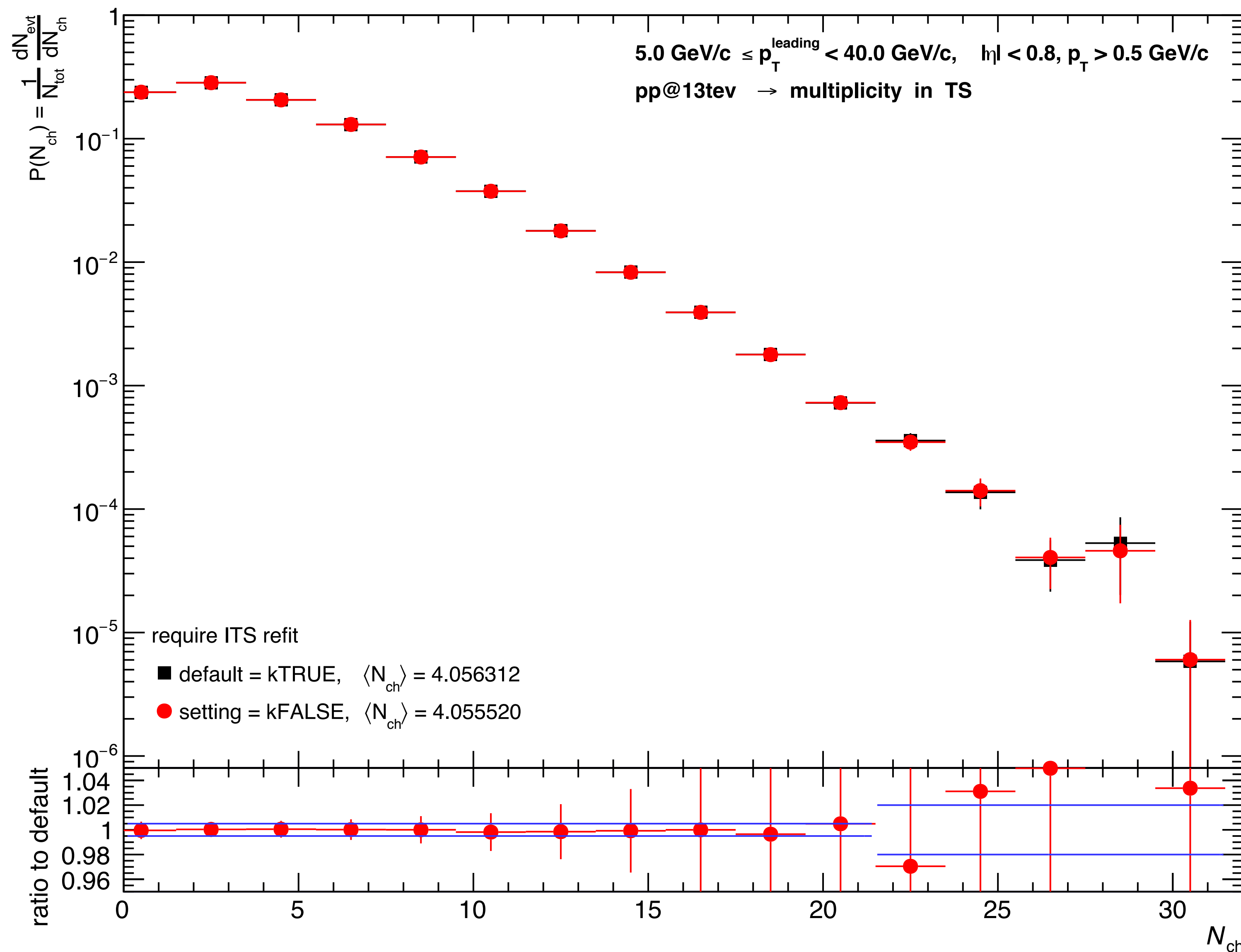
Progress on Systematic Uncertainty — Variation of Track Cut for N_{ch}



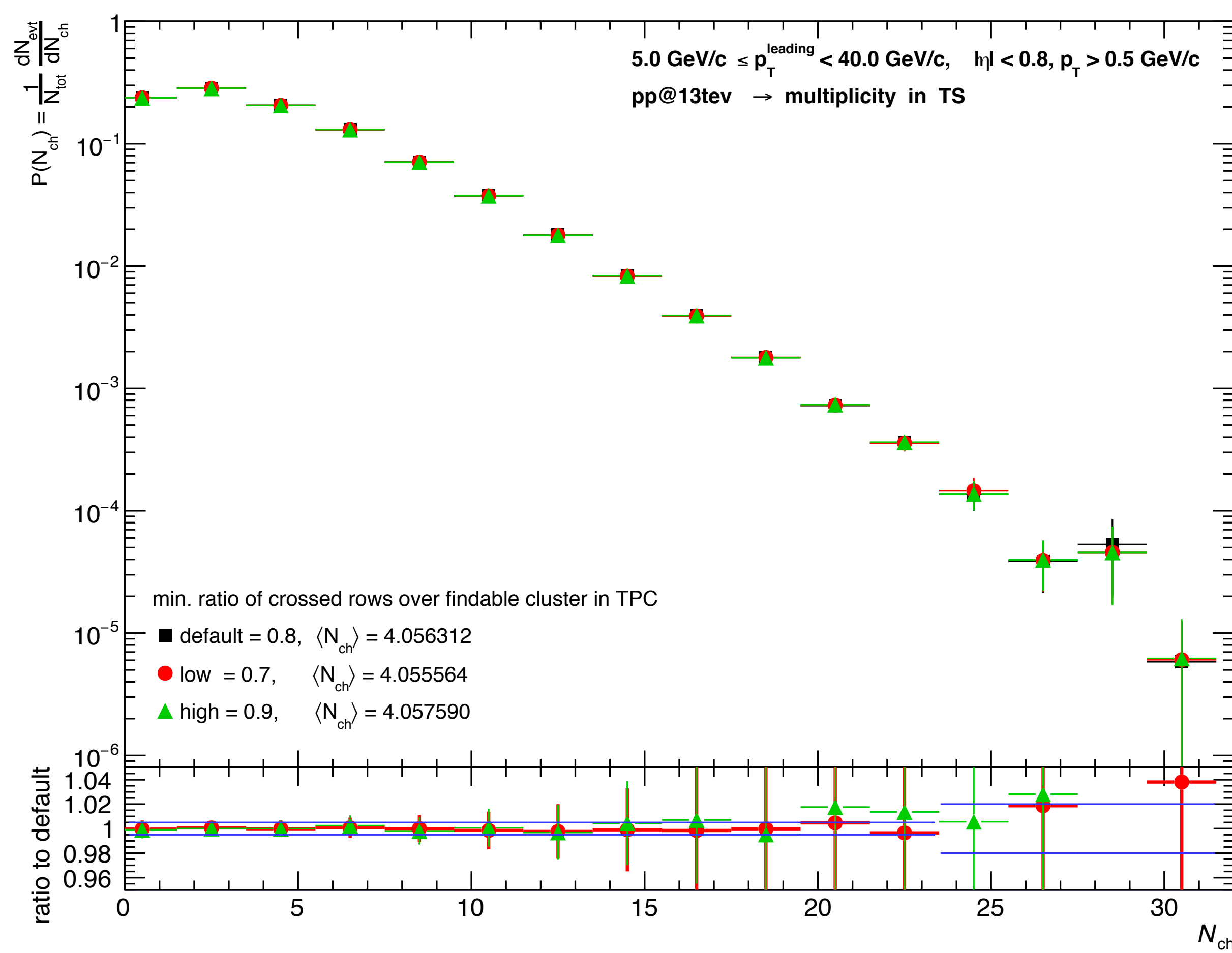
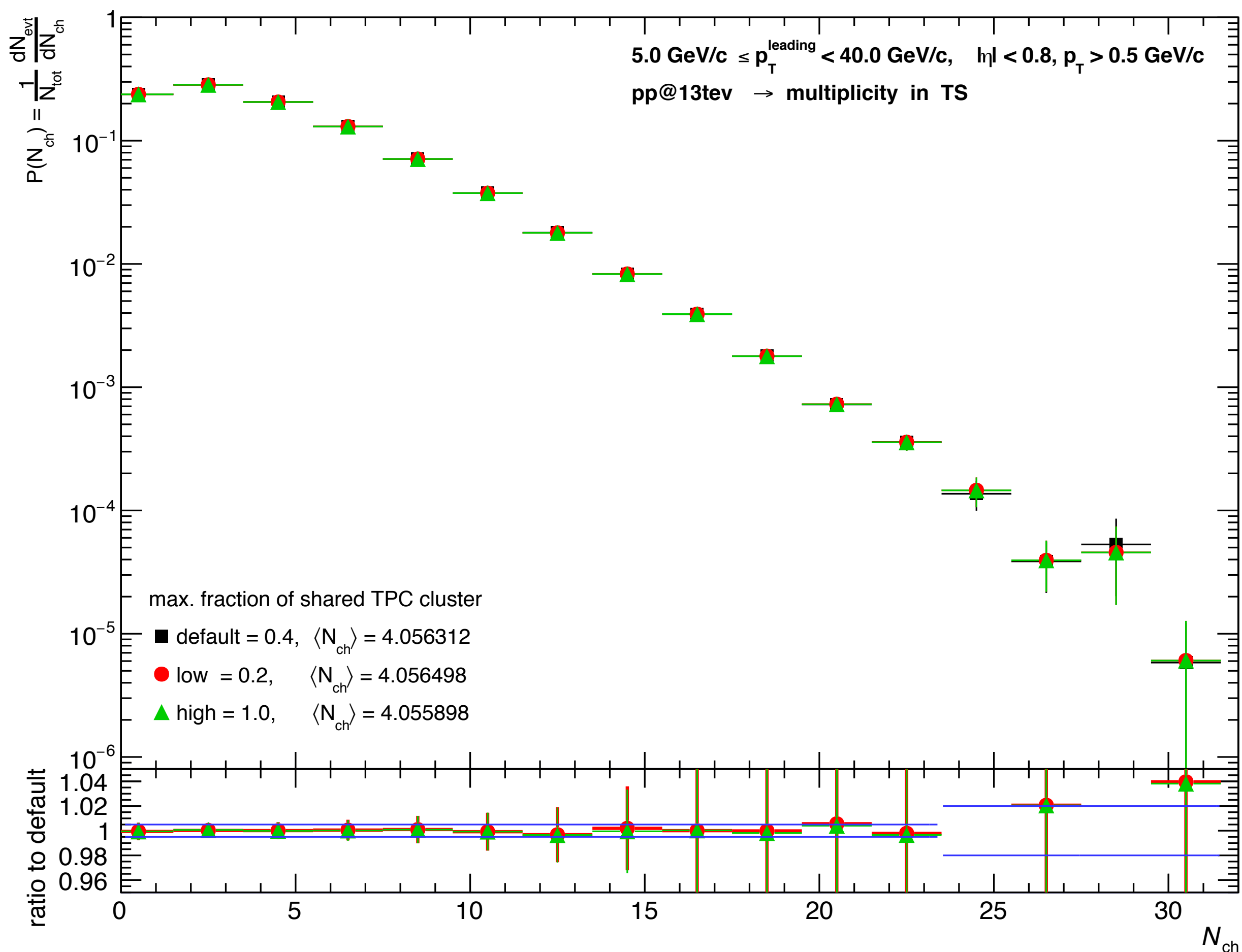
- For track cut on maximum DCA_z
 at low $N_{ch} < 11$ the variation is within 0.5%, at high $N_{ch} > 11$ the variation is within 1.5%
- For track cut on maximum DCA_{xy}
 at low $N_{ch} < 17$ the variation is within 0.5%, at high $N_{ch} > 17$ the variation is within 4.5%

Progress on Systematic Uncertainty — Variation of Track Cut for N_{ch}

- For track cut on requirement of ITS refit
 - at low $N_{ch} < 21$, the variation is within 0.5%
 - at high $N_{ch} > 21$, the variation is within 2%

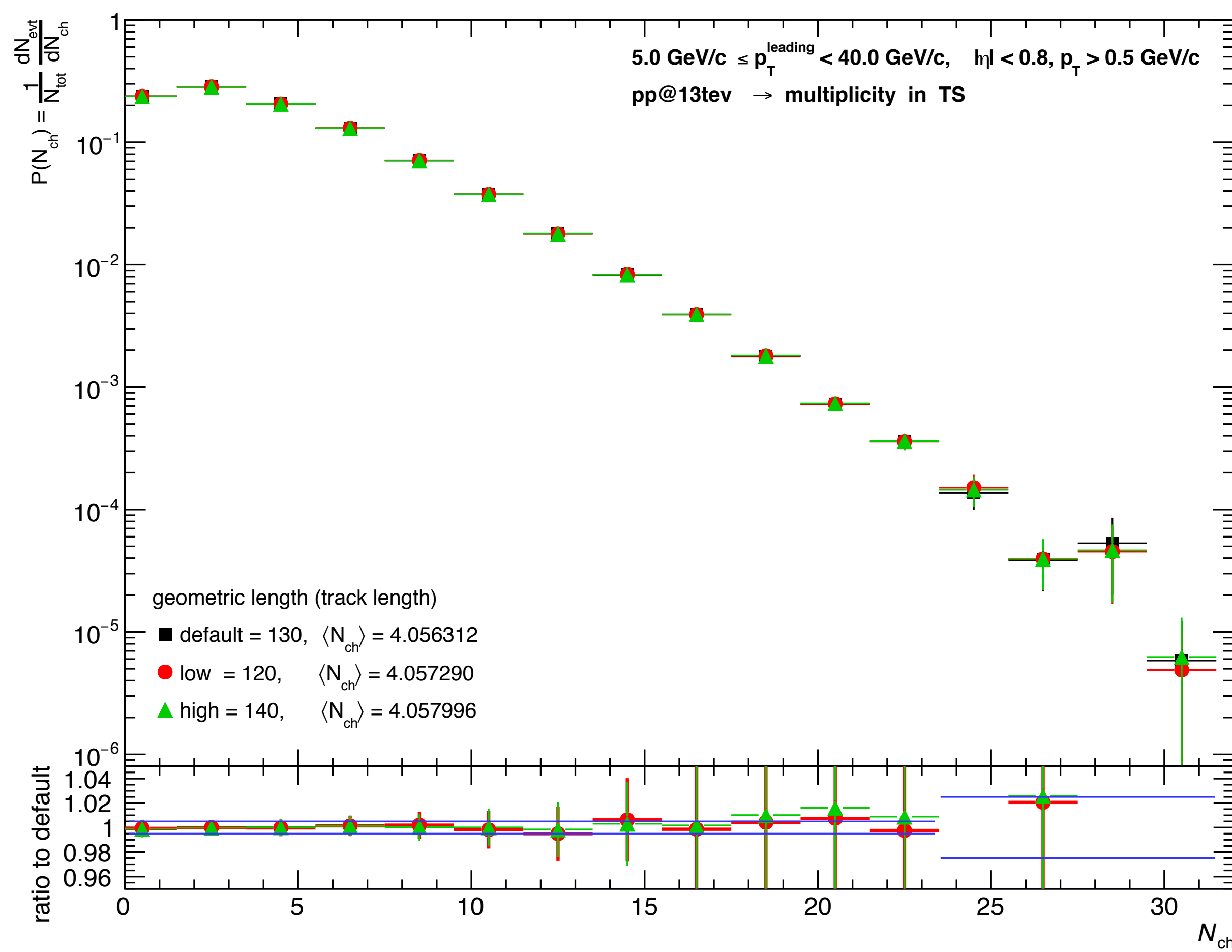
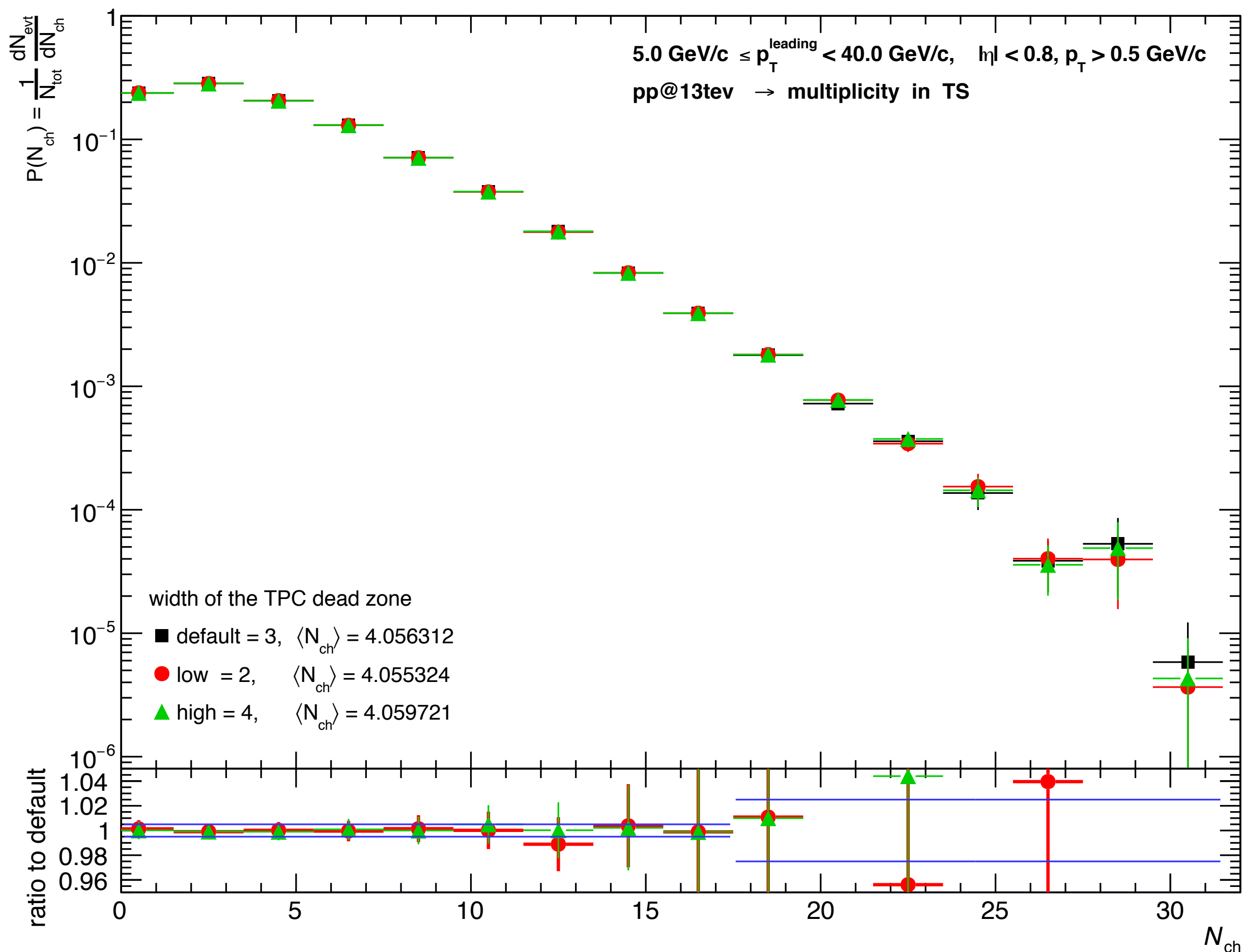


Progress on Systematic Uncertainty — Variation of Track Cut for Leading Track



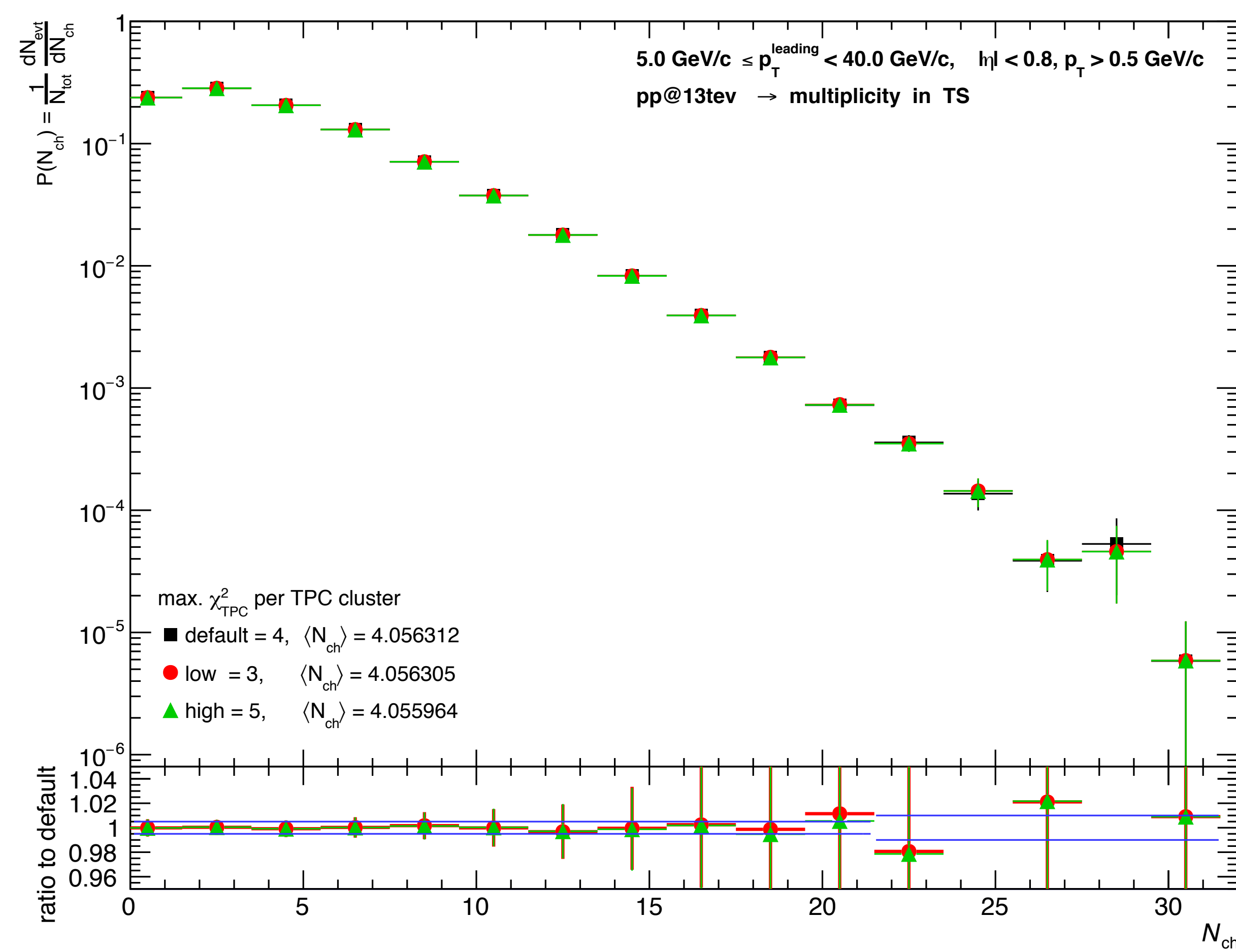
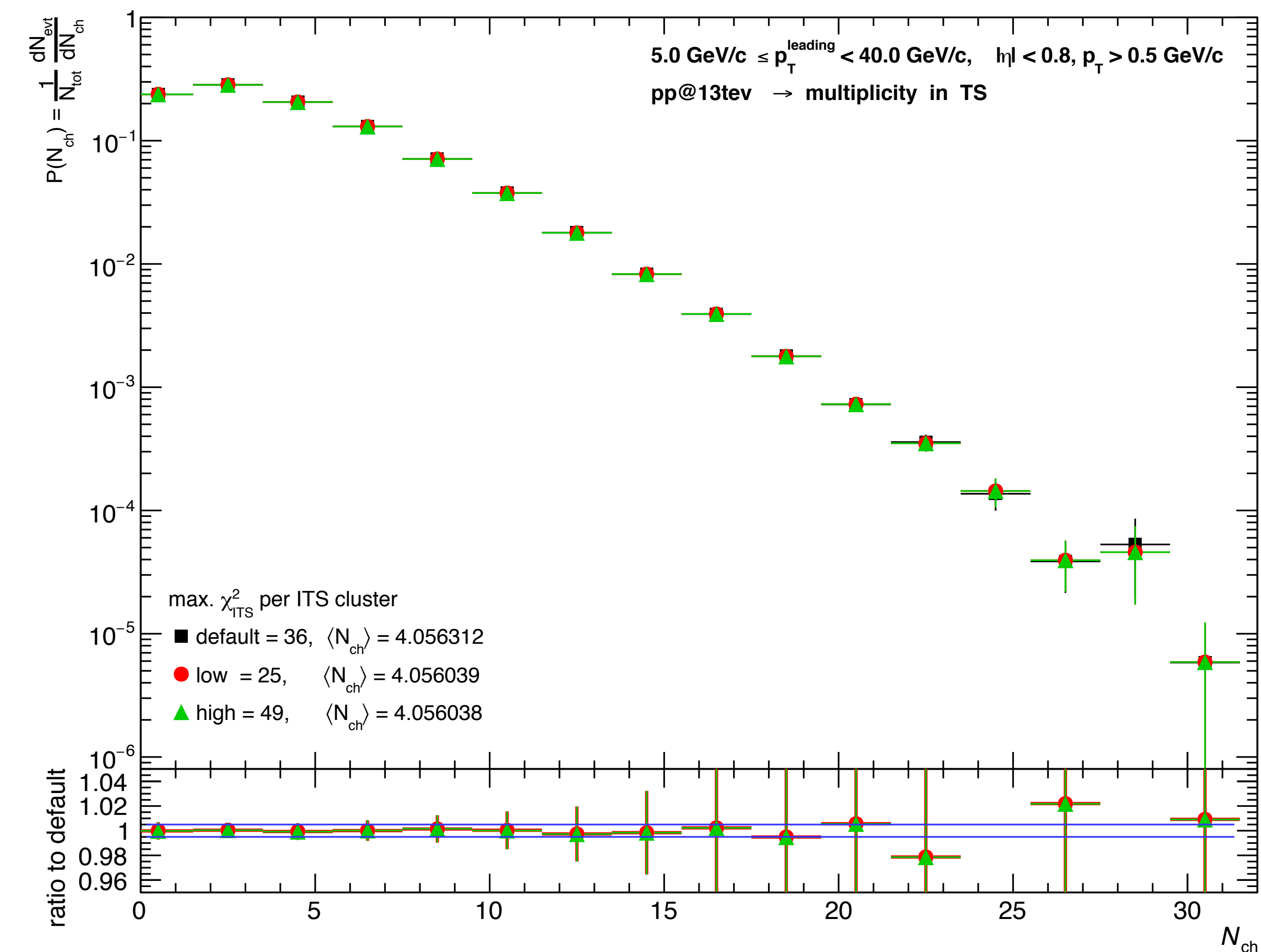
- For track cut on maximum fraction of shared TPC cluster
 at low $N_{ch} < 23$ the variation is within 0.5%, at high $N_{ch} > 23$ the variation is within 2%
- For track cut on minimum ratio of crossed rows over findable cluster in TPC
 at low $N_{ch} < 23$ the variation is within 0.5%, at high $N_{ch} > 23$ the variation is within 2%

Progress on Systematic Uncertainty — Variation of Track Cut for Leading Track



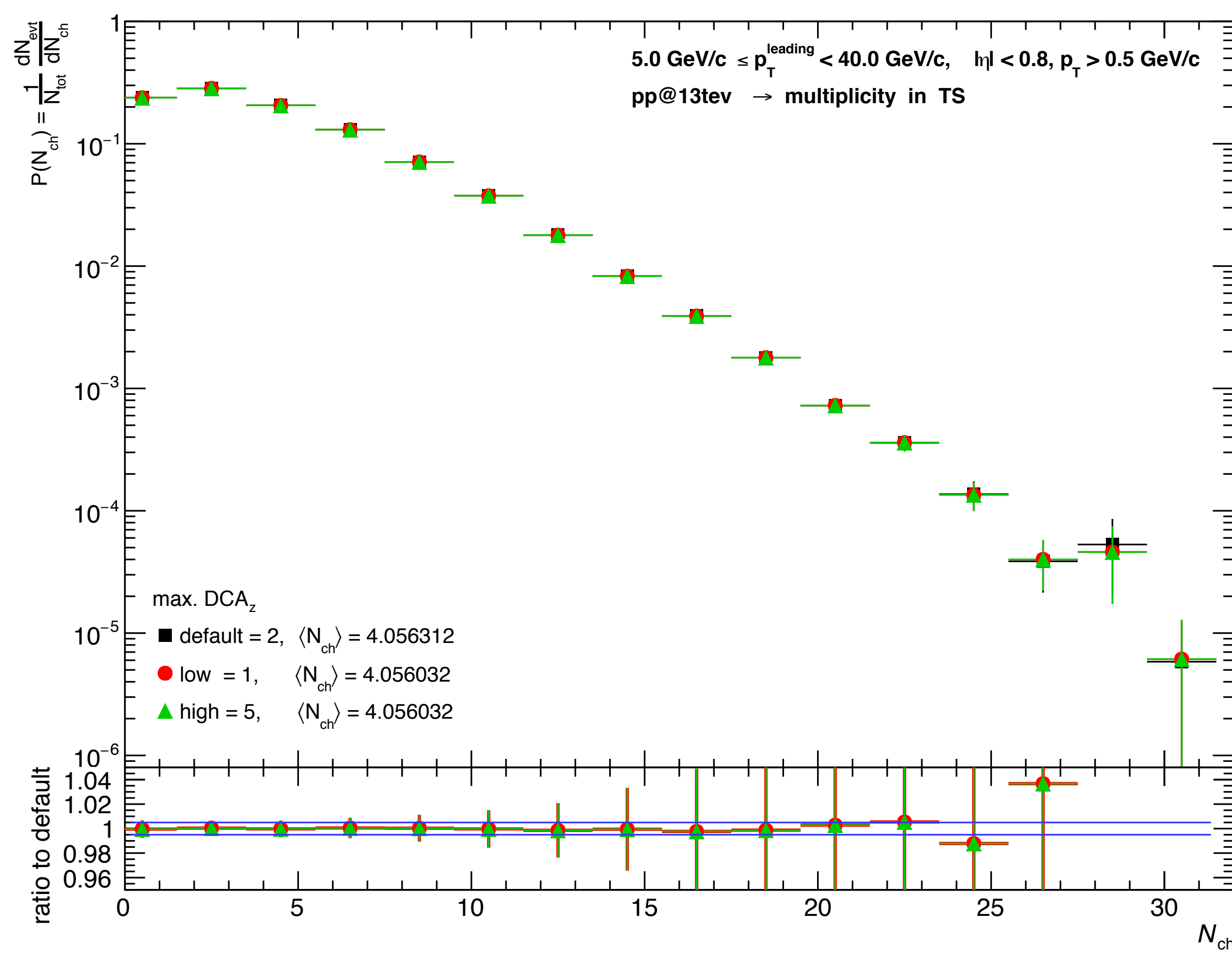
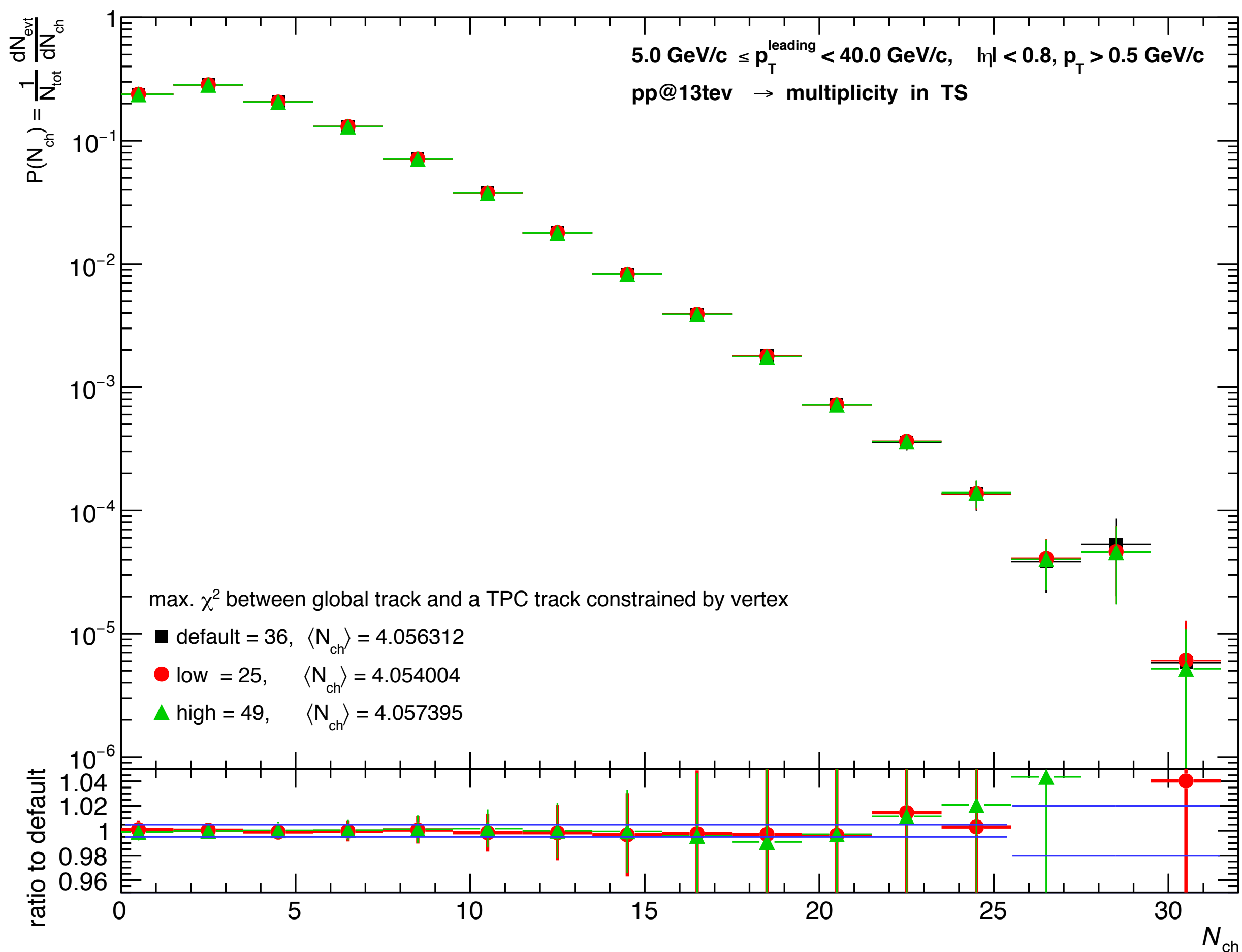
- For track cut on the width of TPC dead zone
at low $N_{ch} < 17$ the variation is within 0.5%, at high $N_{ch} > 17$ the variation is within 2.5%
- For track cut on the geometric length of track
at low $N_{ch} < 23$ the variation is within 0.5%, at high $N_{ch} > 23$ the variation is within 2.5%

Progress on Systematic Uncertainty — Variation of Track Cut for Leading Track



- For track cut on maximum χ^2_{ITS} per ITS clusters, the variation is within 0.5%
- For track cut on maximum χ^2_{TPC} per TPC clusters
 at low $N_{\text{ch}} < 21$ the variation is within 0.5%, at high $N_{\text{ch}} > 21$ the variation is within 1%

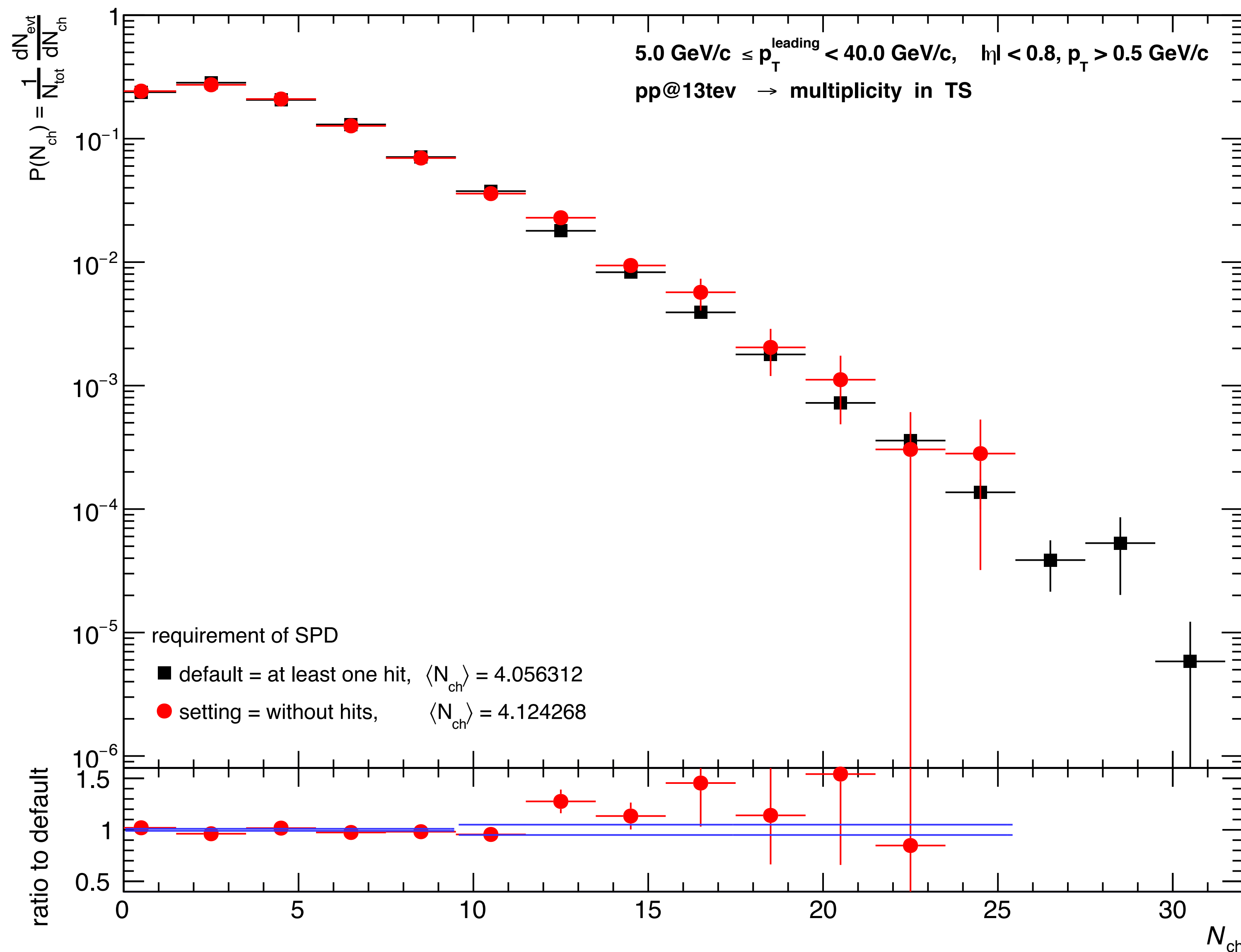
Progress on Systematic Uncertainty — Variation of Track Cut for Leading Track



- For track cut on maximum χ^2 between global track and a TPC track constrained by vertex at low $N_{ch} < 25$ the variation is within 0.5%, at high $N_{ch} > 25$ the variation is within 2%
- For track cut on maximum DCA_z , the variation is within 0.5%

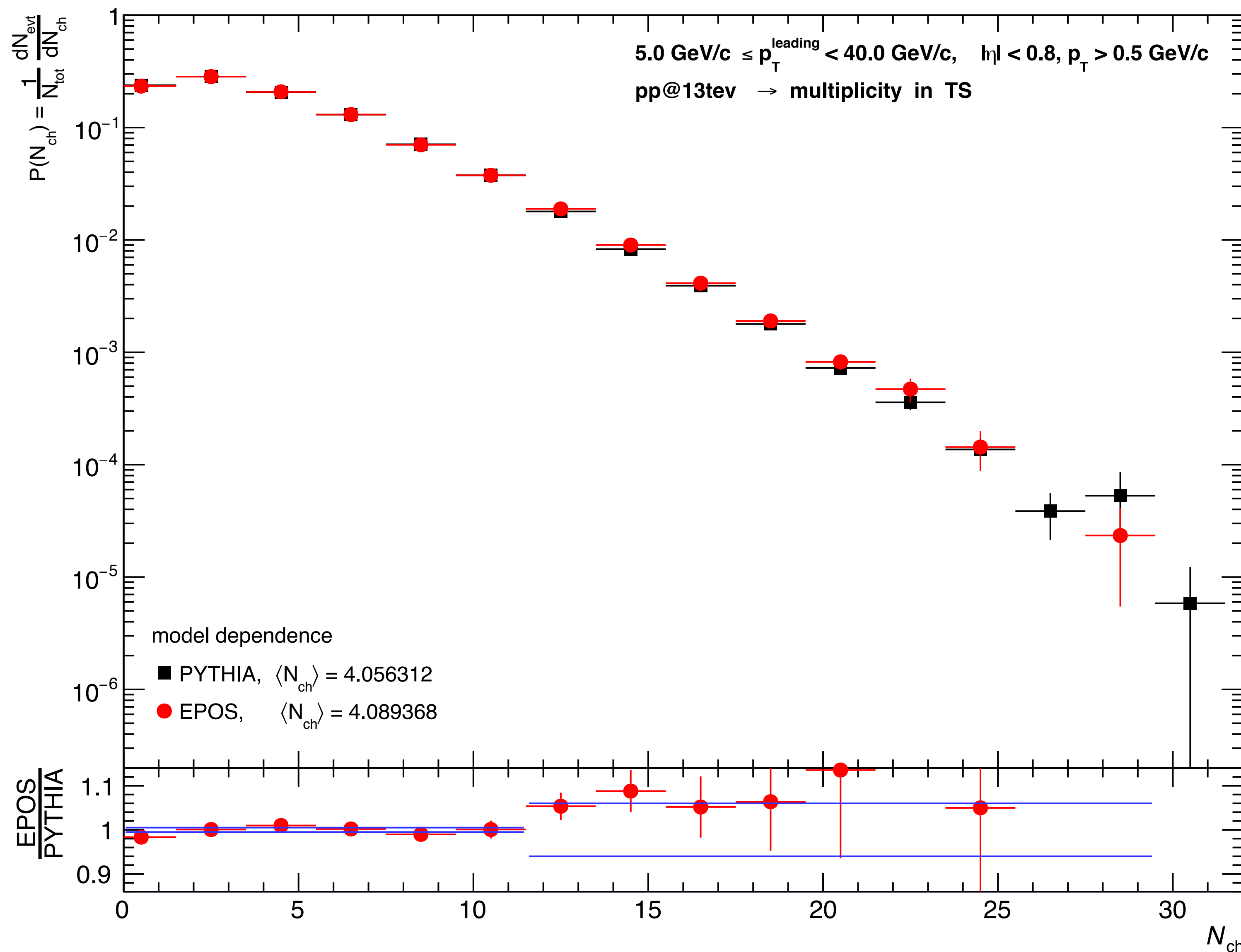
Progress on Systematic Uncertainty — Variation of Track Cut for Leading Track

- For track cut on requirement of SPD
 - at low $N_{ch} < 9$, the variation is within 1%
 - at high $N_{ch} > 9$, the variation is within 5%



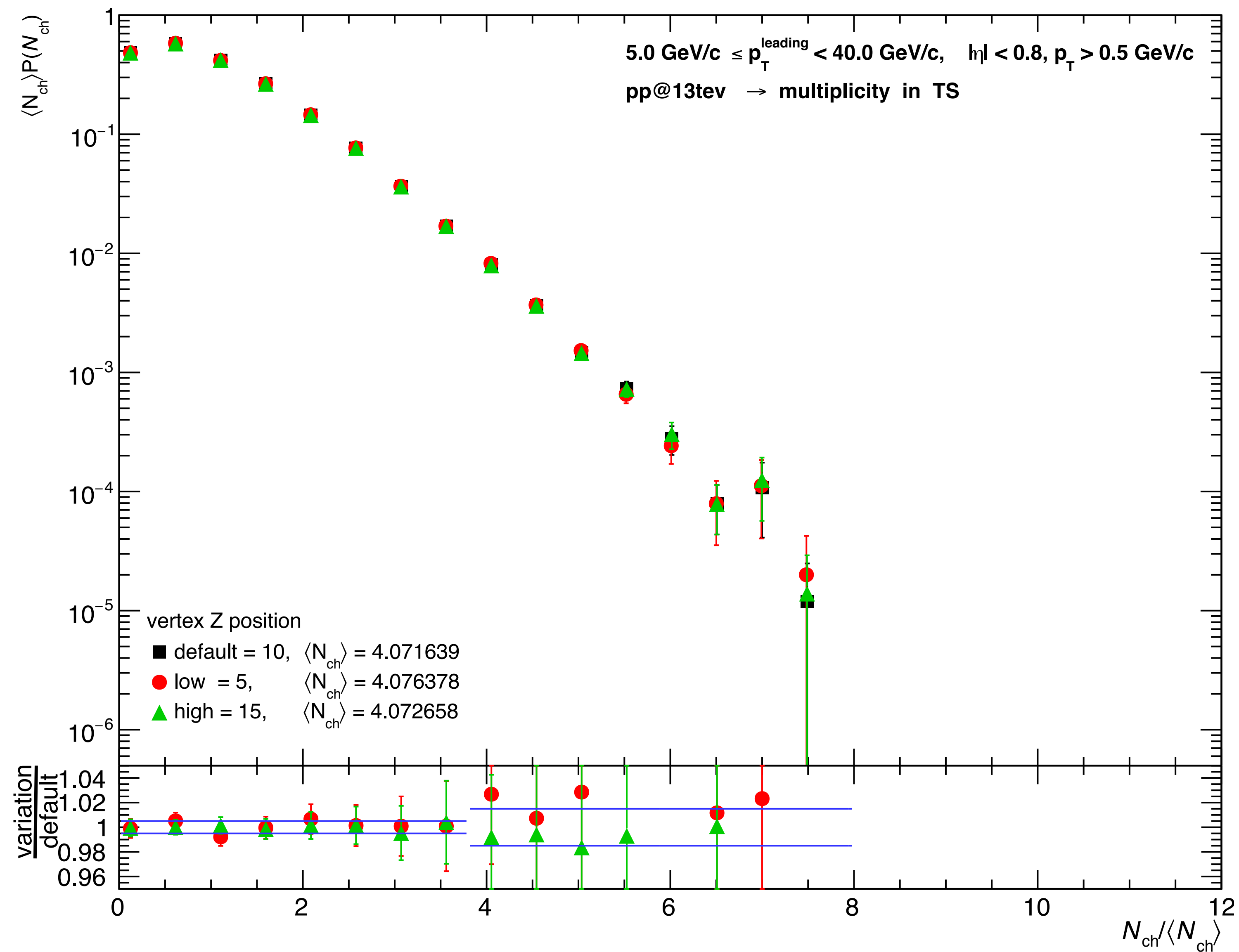
Progress on Systematic Uncertainty — Model Dependence

- For model dependence
 - at low $N_{ch} < 11$, the variation is within 0.5%
 - at high $N_{ch} > 11$, the variation is within 6%

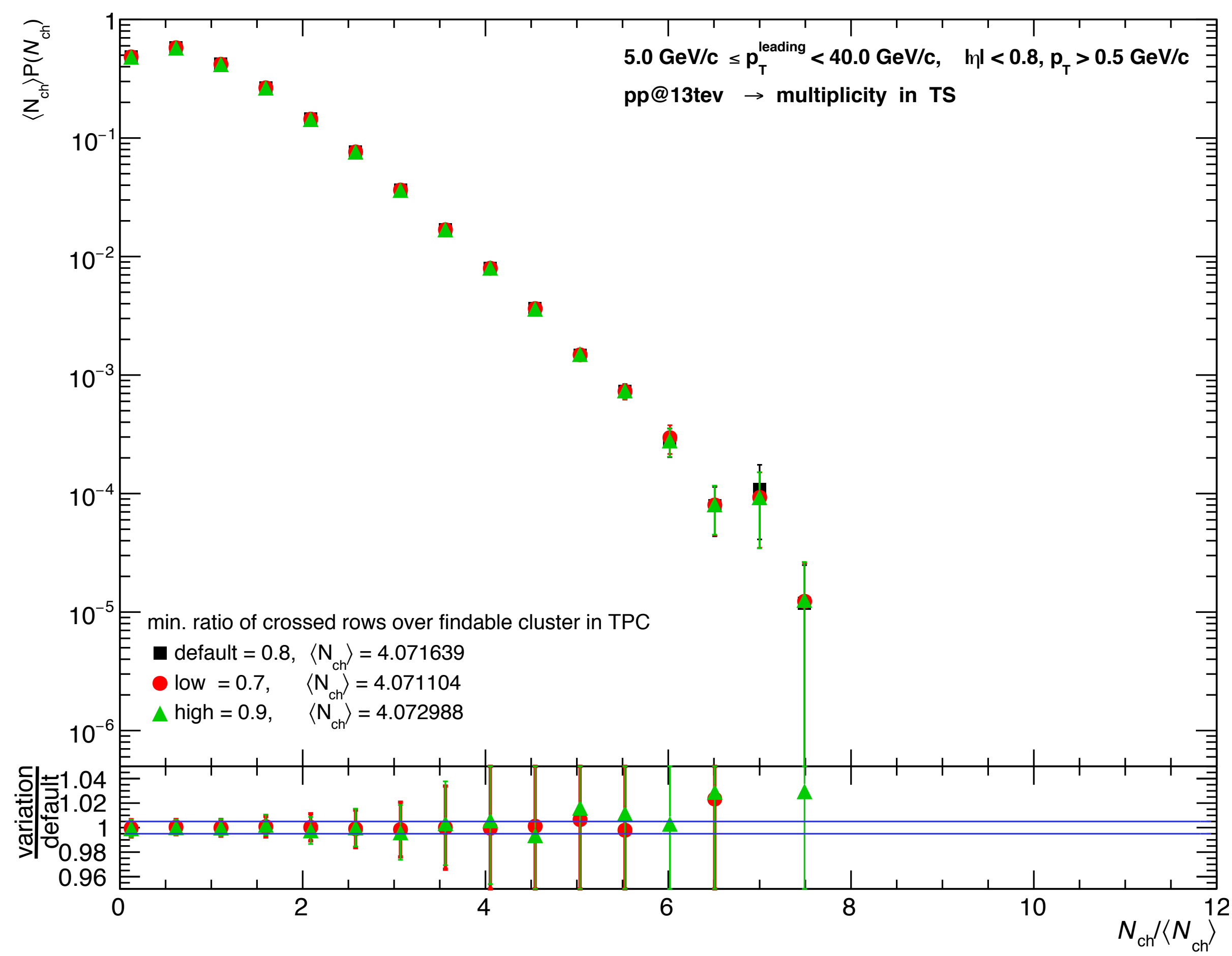
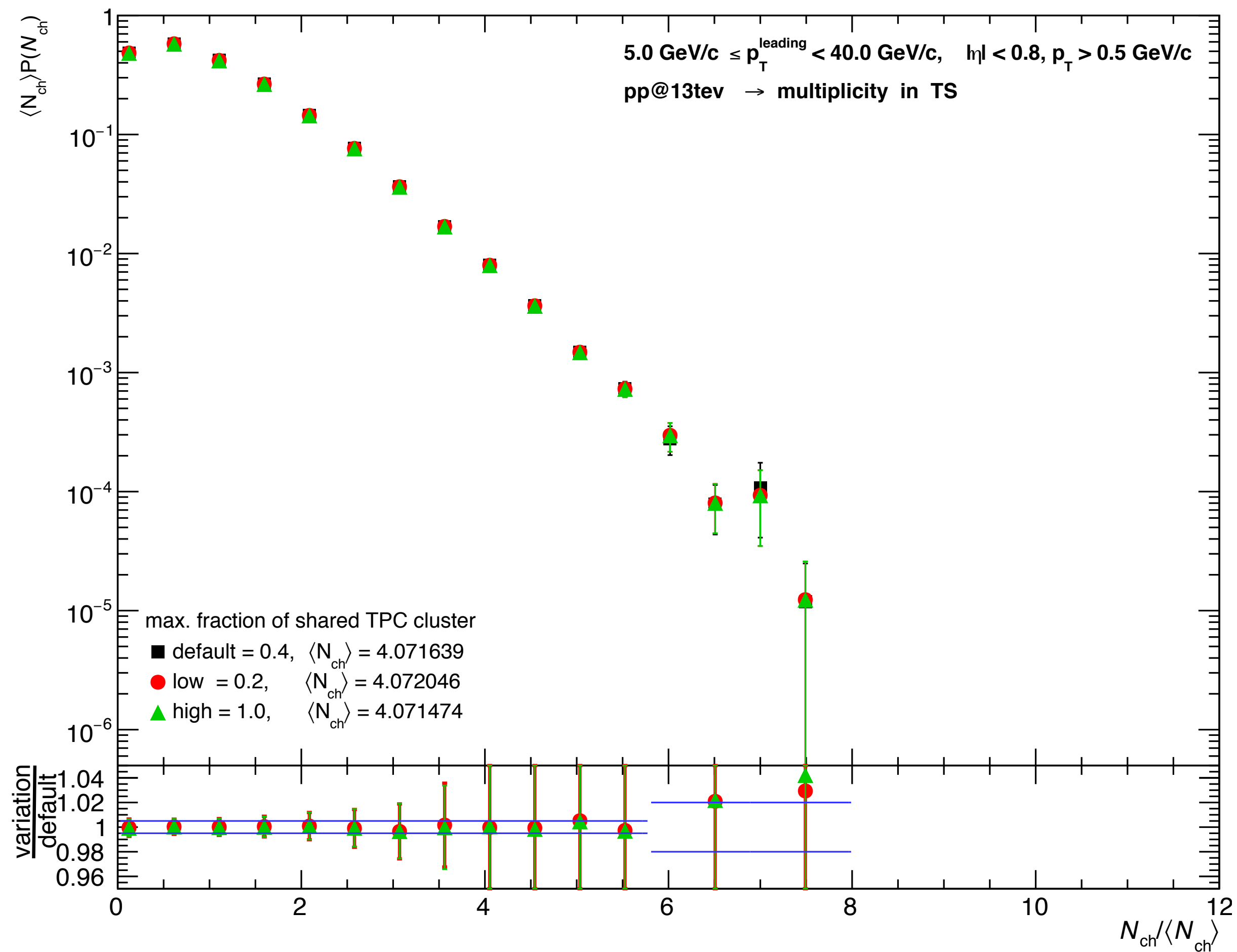


Progress on Systematic Uncertainty — Variation of Event Selection

- For event cut on vertex position
 - at low $z < 3.8$, the variation is within 0.5%
 - at high $z > 3.8$, the variation is within 1.5%

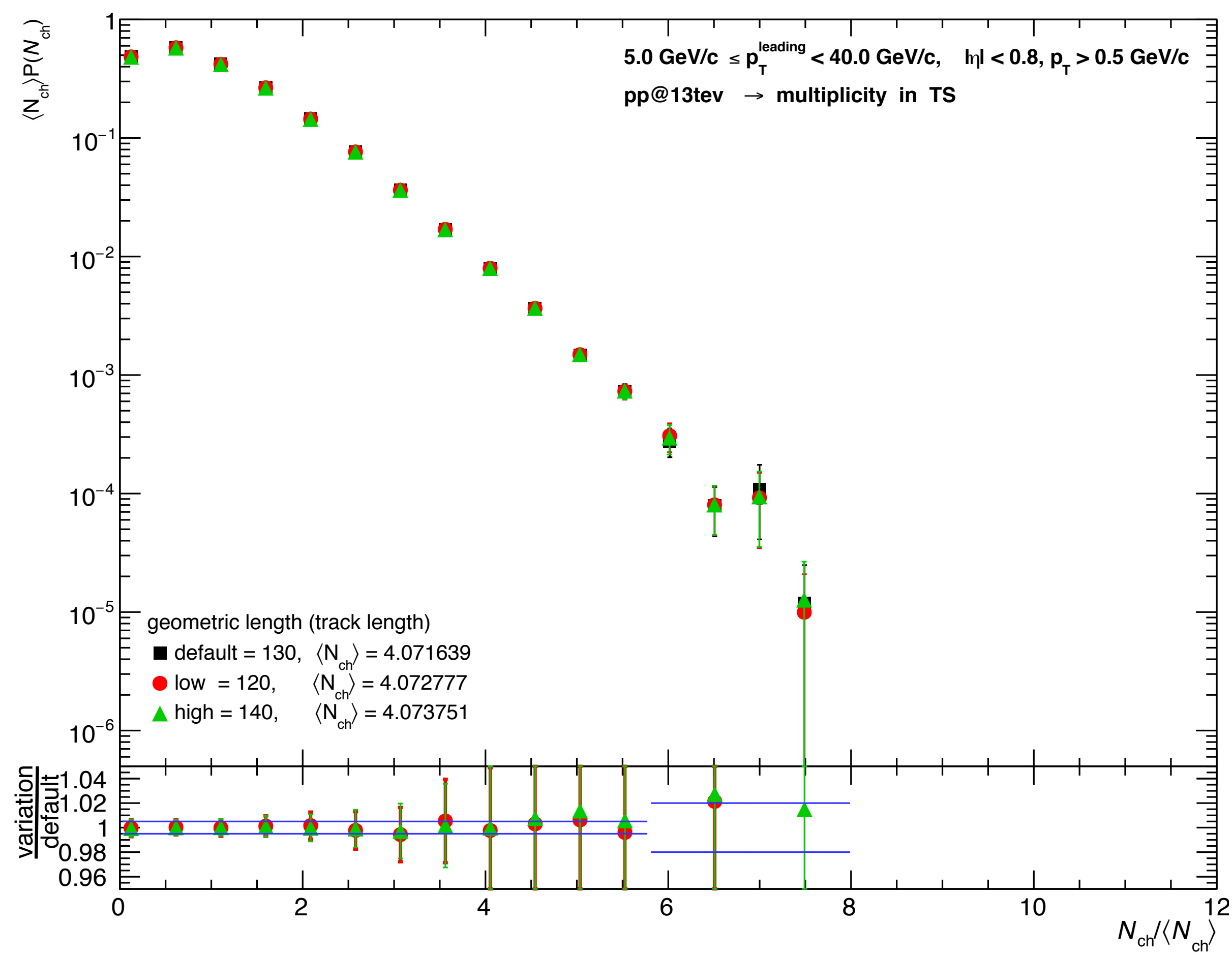
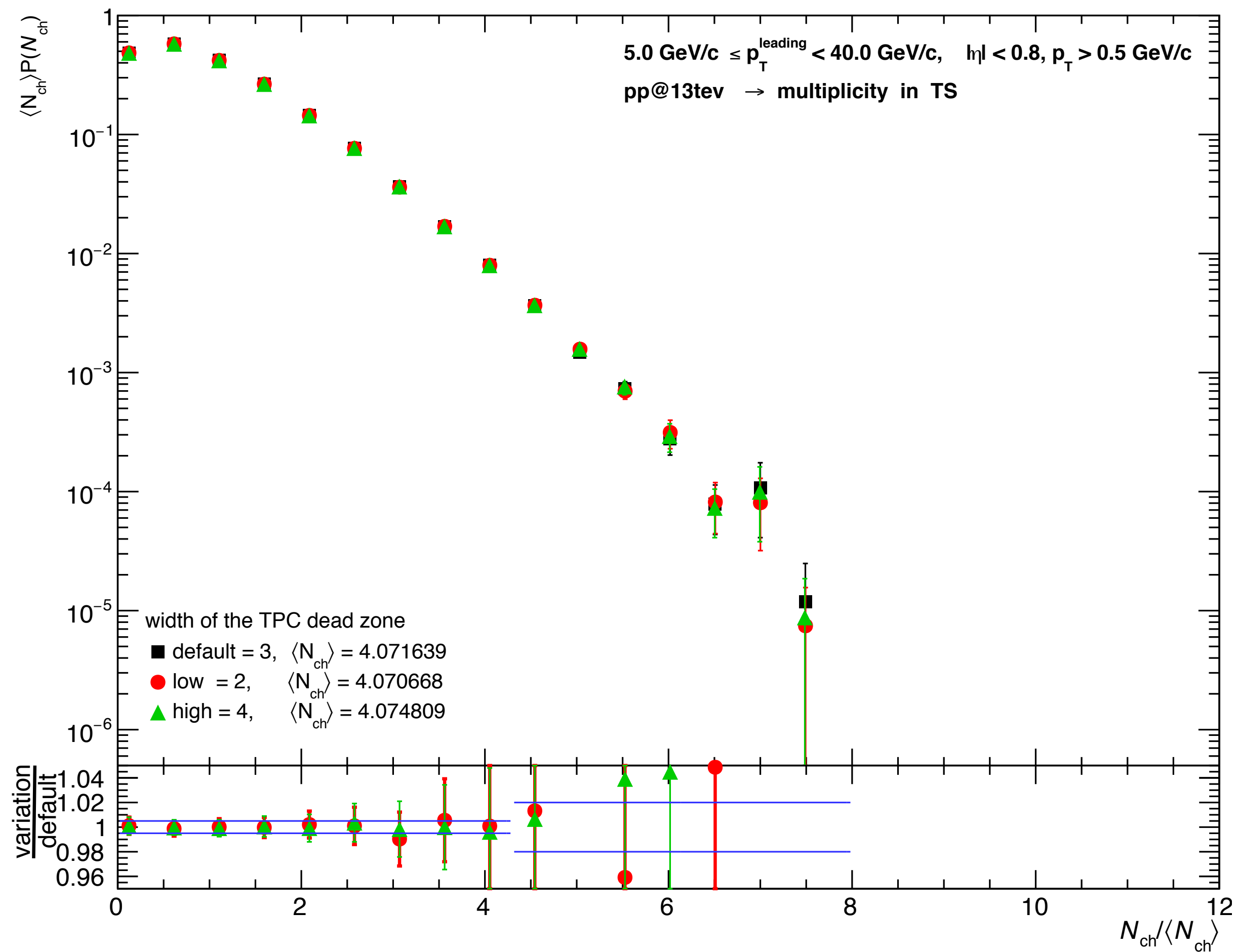


Progress on Systematic Uncertainty — Variation of Track Cut for Leading Track



- For track cut on maximum fraction of shared TPC cluster
at low $z < 5.8$ the variation is within 0.5%, at high $z > 5.8$ the variation is within 2%
- For track cut on minimum ratio of crossed rows over findable cluster in TPC, the variation is within 0.5%

Progress on Systematic Uncertainty — Variation of Track Cut for Leading Track



- For track cut on the width of TPC dead zone
at low $z < 4.3$ the variation is within 0.5%, at high $z > 4.3$ the variation is within 2%
- For track cut on the geometric length of track
at low $z < 5.8$ the variation is within 0.5%, at high $z > 5.8$ the variation is within 2%

Conclusions and Outlook

◉ Did (pp@13 TeV)

- Variation as a function of N_{ch} looks better after rebinning.
- For variation as a function of KNO, only a few variations of some cuts have been checked, more results would be complemented
- MC closure test with rebinning would be complemented.

◉ Conclude each contributions of systematic uncertainties (pp@13, 7, 5.02 and 2.76 TeV)

- Variation as a function of N_{ch}
- Variation as a function of KNO variable
- Contributions: model dependence, MC closure test, event cut on vertex position, track cuts on N_{ch} and tracks cuts on leading particle