Update and discussion for run 17 diffractive EM-jet A_N

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Outline

- Some updates since the STAR Collaboration Meeting last week:

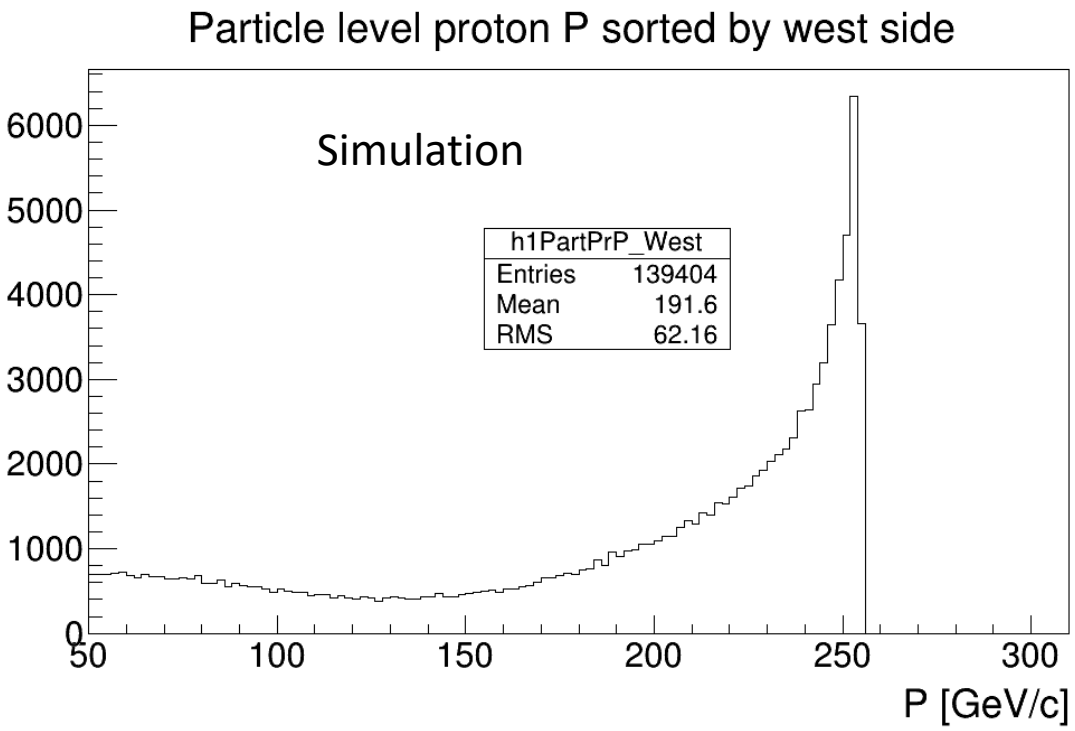
1. Roman Pot track:
   I. Roman Pot track simulation in particle level
   II. Roman Pot track cuts update
2. Small BBC cut study

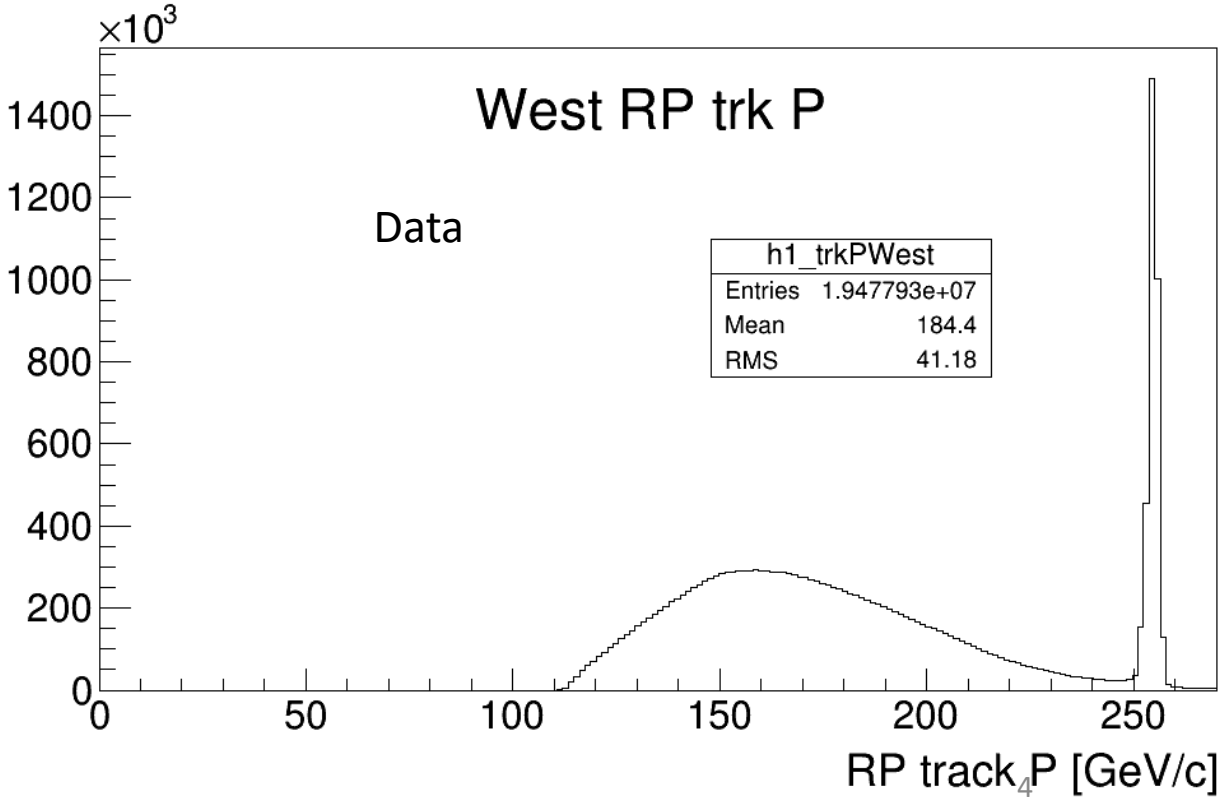
Roman Pot track update

- We discuss with Tomas Truhlar (RP group, LFSUPC PWG), who applies run 17 pp 510 GeV with RP:
  1. It’s better to apply cut on: RP track hits 3 out of 4 planes for each RP package. -> decide to change my RP track cut on hitting at least 7 RP planes.
  2. RP track momentum are still not measuring well.
  3. Detector level simulation for RP for run 17 is still developing. They will apply the simulation to study the detector efficiency.

Simulation for diffractive processes

- Consider <u>hard diffraction</u> in Pythia8 simulation.
  - Only in particle level simulation. The detector level simulation is still developing by Roman Pot group.
- RP track momentum for data look not match well with particle level simulation.



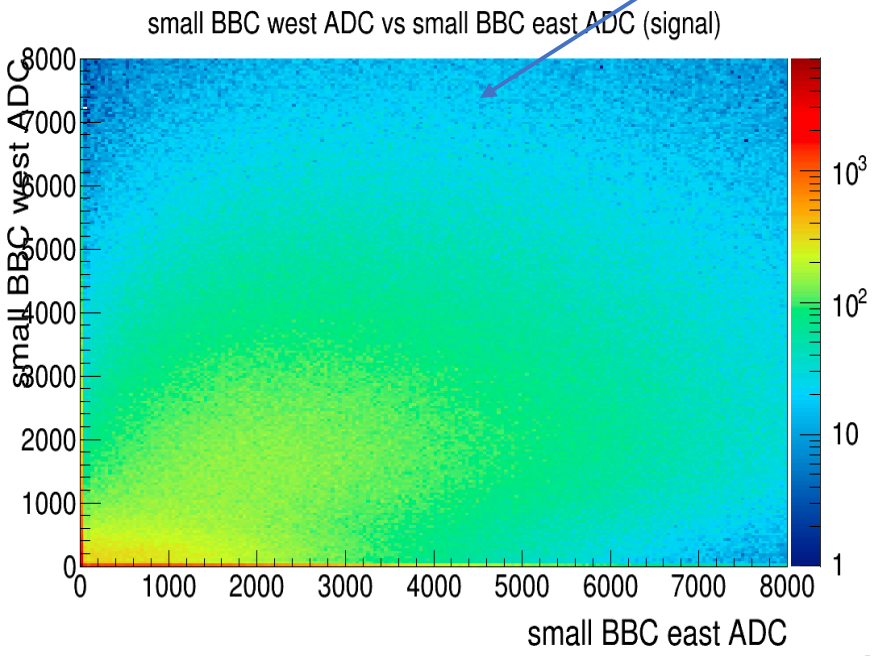


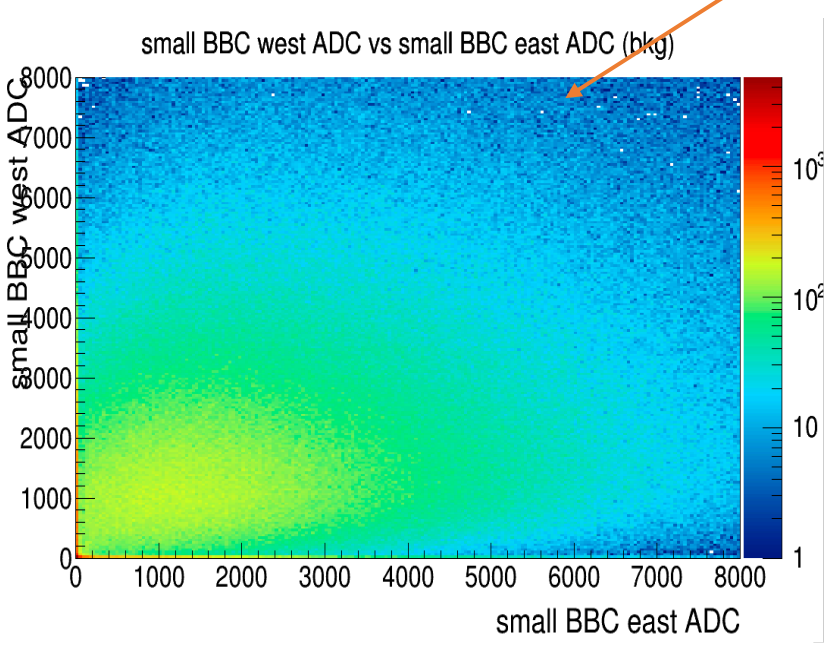
BBC cuts

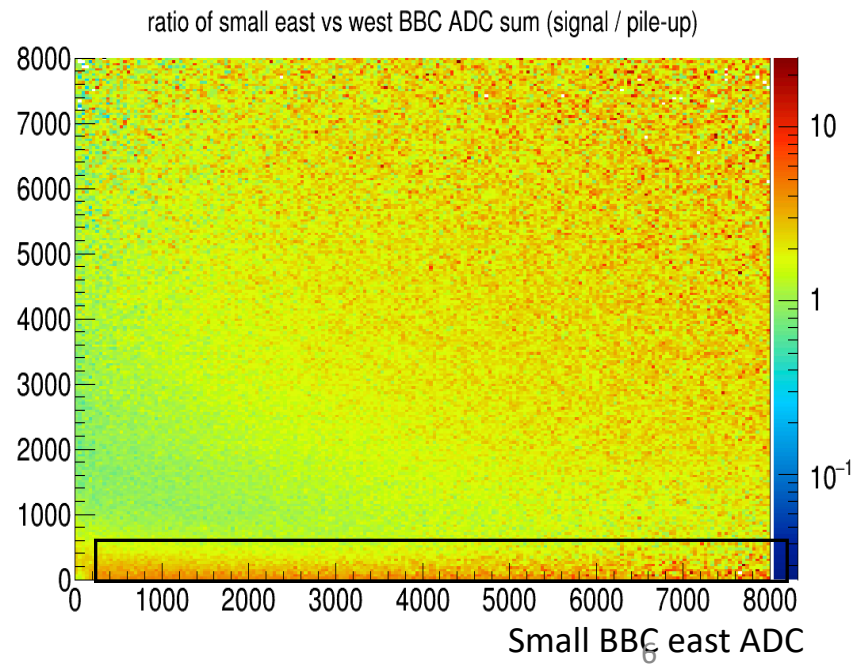
- In the Collaboration meeting last week, the west side BBC cuts are not applied well ---- huge fluctuation for the asymmetry when varying the west BBC cut
- Possible solution:
  - Consider to apply both east BBC and west BBC cuts.
  - Apply a stricter west BBC cut

Check small BBC west ADC vs small BBC east ADC

- Consider $E_{sum} < 260$ GeV as signal and $E_{sum} > 260$ GeV as background
  - E_{sum}: sum of FMS EM-jet energy and west RP track energy
- Plot the signal / background ratio
  - Consider cut on small BBC west ADC < 600 and small BBC east ADC > 220

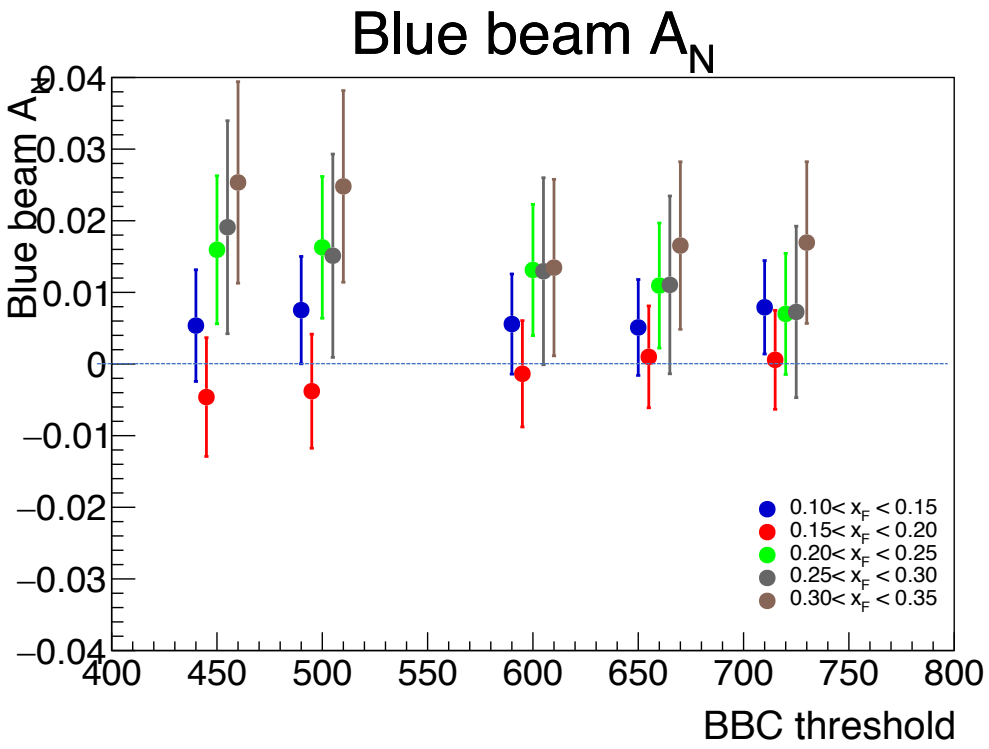


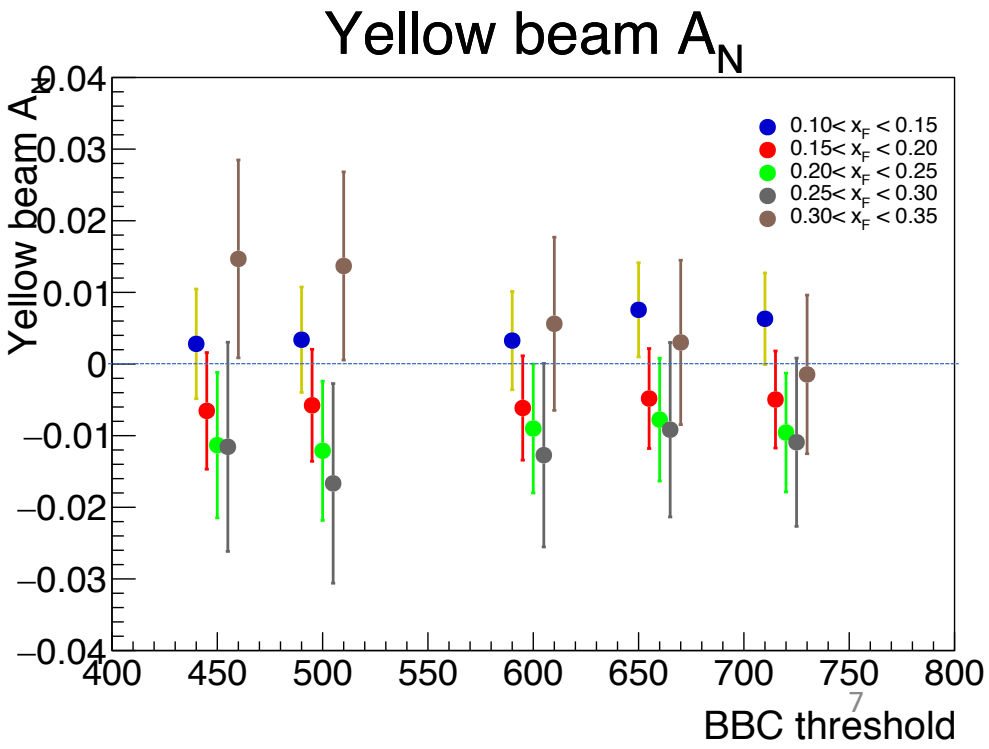




Investigate the A_N for different west BBC cut

- We try on different west BBC cut to see if the results are so converged.
  - List of west BBC max threshold: 450, 500, 600, 660, 720
  - Fix east BBC cut: East small BBC sum < 220
- Use all photon multiplicity A_N as example.
  - Only A_N central value and statistical uncertainty shown in the plots.





Discussion and outlook

- For the BBC cuts, we can try to consider a stricter west BBC ADC threshold, but the statistical uncertainty seems to be large.
- The sign difference compared with run 15 results are still investigating and needed to understand.
- Continue to apply reasonable BBC cuts (or other cuts), and finish for preliminary, if possible.