Recent track fit improvements for Conformal Tracking

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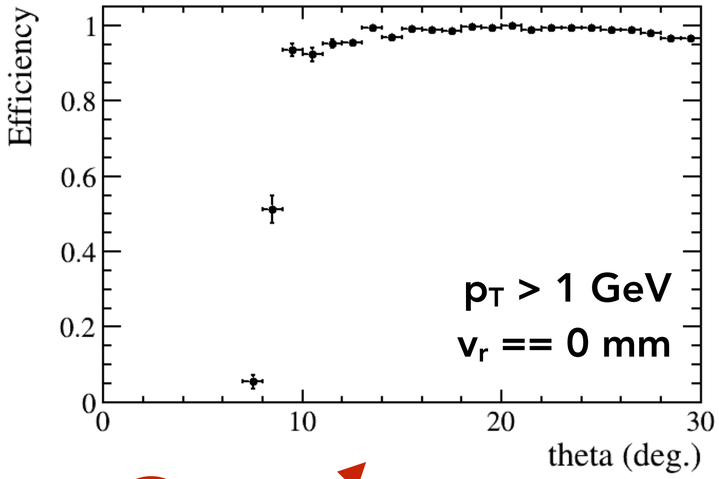
Summary of updates

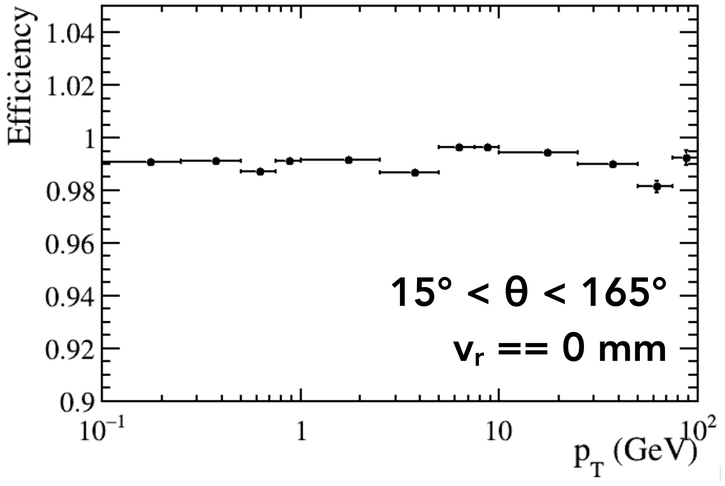
- Track extension now included in conformal tracking - no need to run extrapolator separately
  - Track fit has been updated and is now giving reasonable χ^2 values
  - Tracking strategy now includes extension throughout different subdetectors

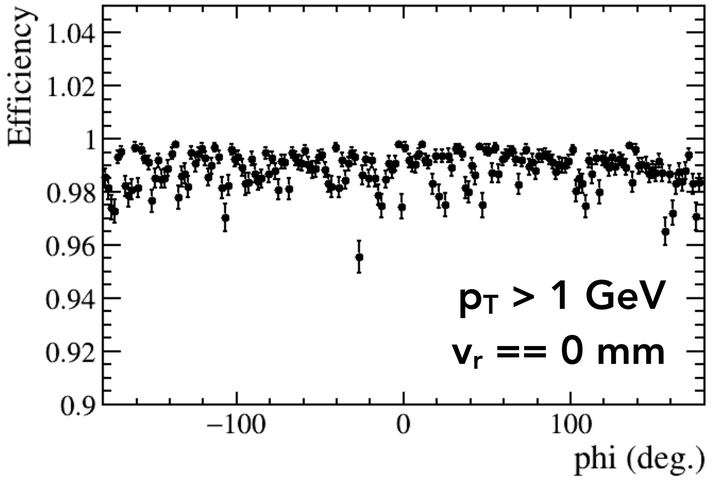
- Initial tests performed on reconstructing displaced tracks - for now just on muons, but encouraging results

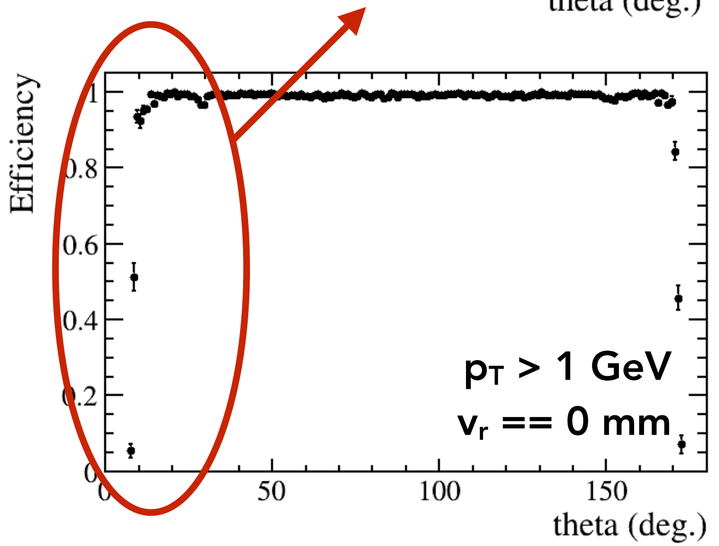
Global performance Z=>u,d,s

- General performance seems to be good
  - High efficiency, drop off occurs below 100 MeV/c
- Dip in efficiency at low theta could probably be recovered with further tweaks to track fit (see next slide)



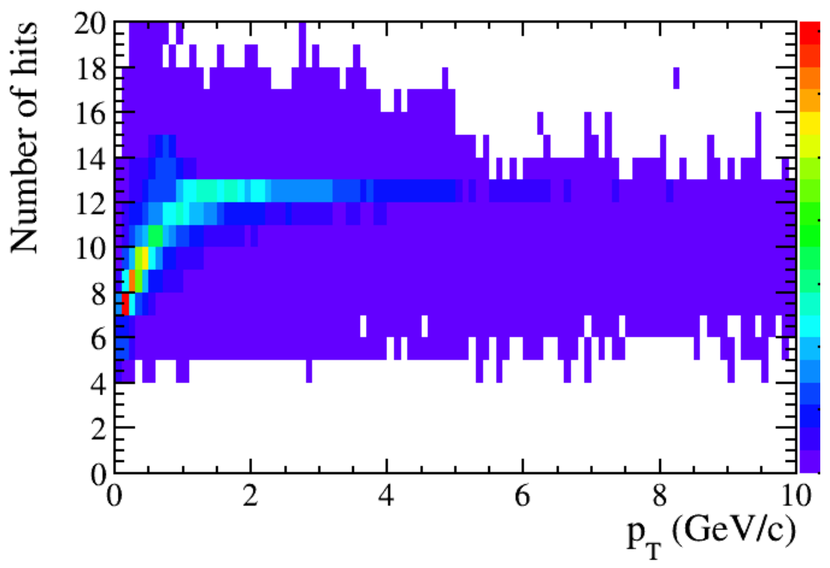


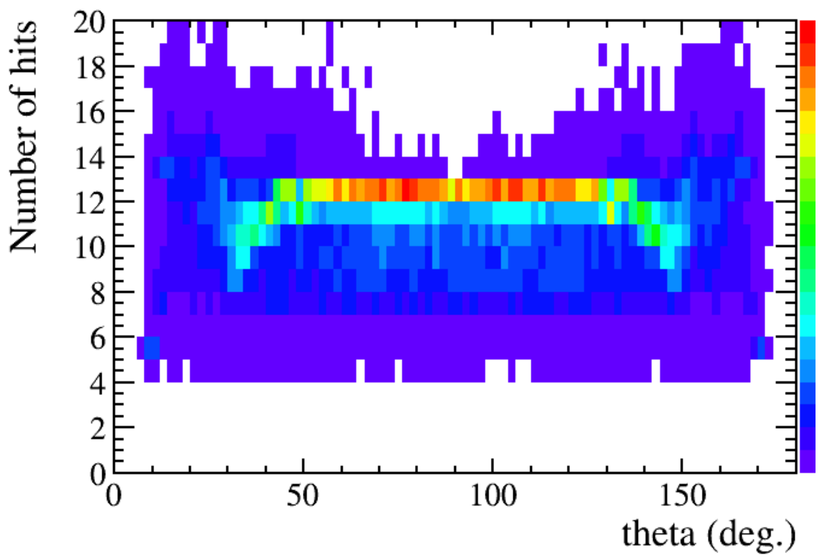


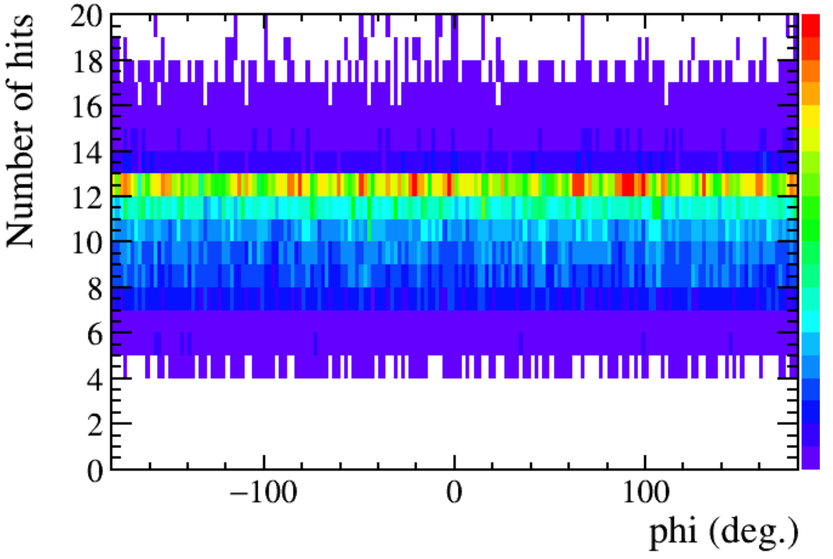


Track extension

- Number of hits on the track quickly rises with p_T
  - Still a dip in the forward region - possible tweaks to the track fit necessary (anomaly since z resolution "perfect") - currently dummy value of 0.01 mm used in χ^2 calculation
  - No phi dependency observed
  - No tuning of χ^2 cut



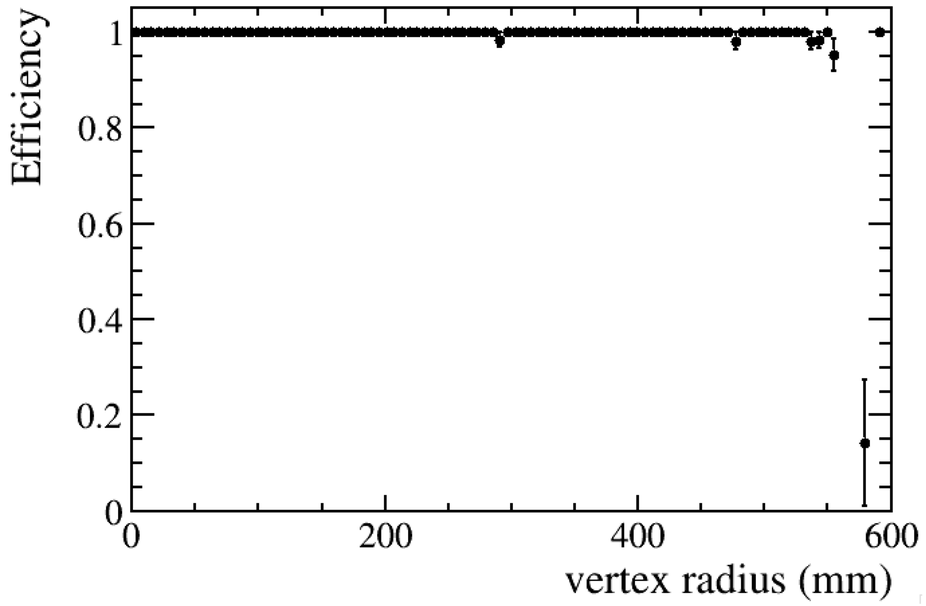


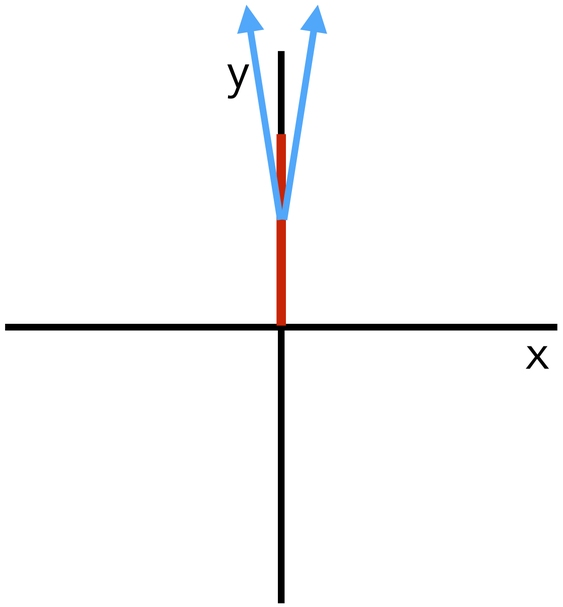


Displaced muons - 100 GeV/c

- Displace muons generated along the y-axis, with random displacement between 0 and 1 m
  - In order to point away from the IP, theta and phi limited to (90 +/- 10)°

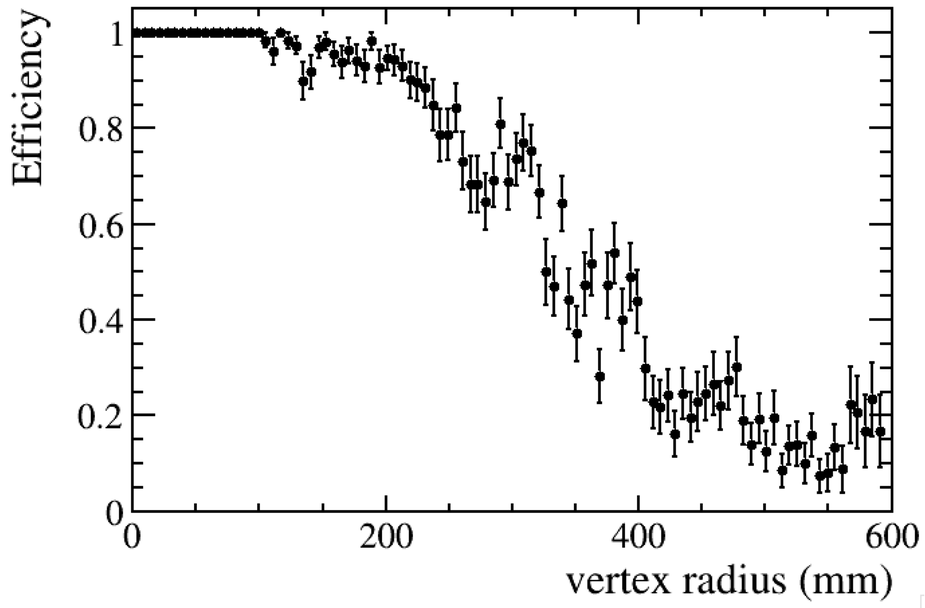
- Tracking efficiency very promising as a function of production radius

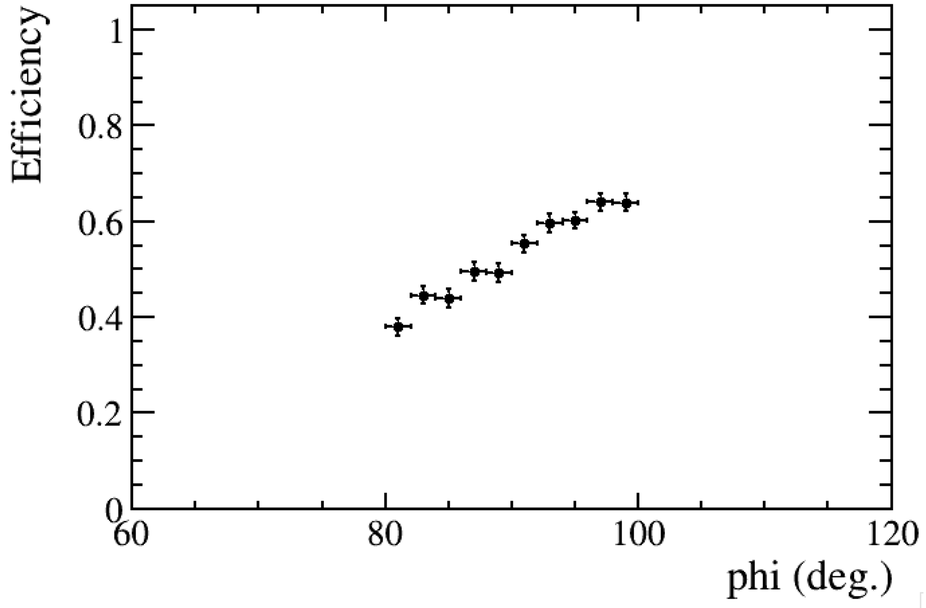




Displaced muons - 1 GeV/c

- More of an issue for lower momentum tracks
  - χ^2 large for a lot of these displaced tracks => to be seen whether this is intrinsic or an issue that can be fixed
  - Asymmetry in phi suggests it could be bug-related?





Summary II

- Things are moving forwards
  - Emilia will start looking into the hits still not picked up during extension of tracks through the other subdetectors
  - First tests of displaced track reconstruction with real events (Z=>u,d,s) showed some events taking a long time, likely some sensible cuts needed to reduce combinatorics during cellular automaton