Performance of CDC Standalone Tracking

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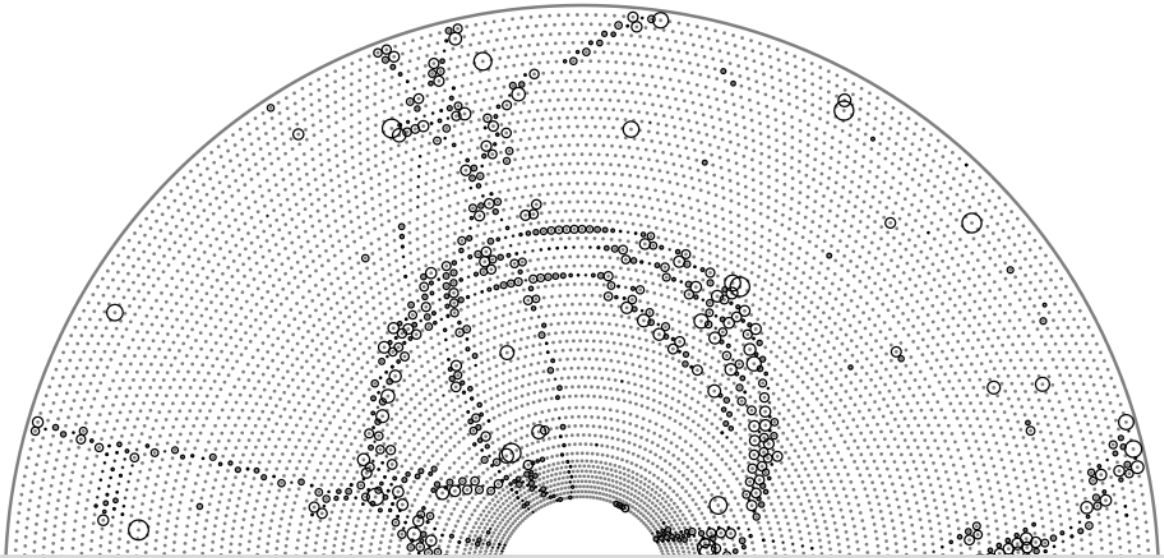
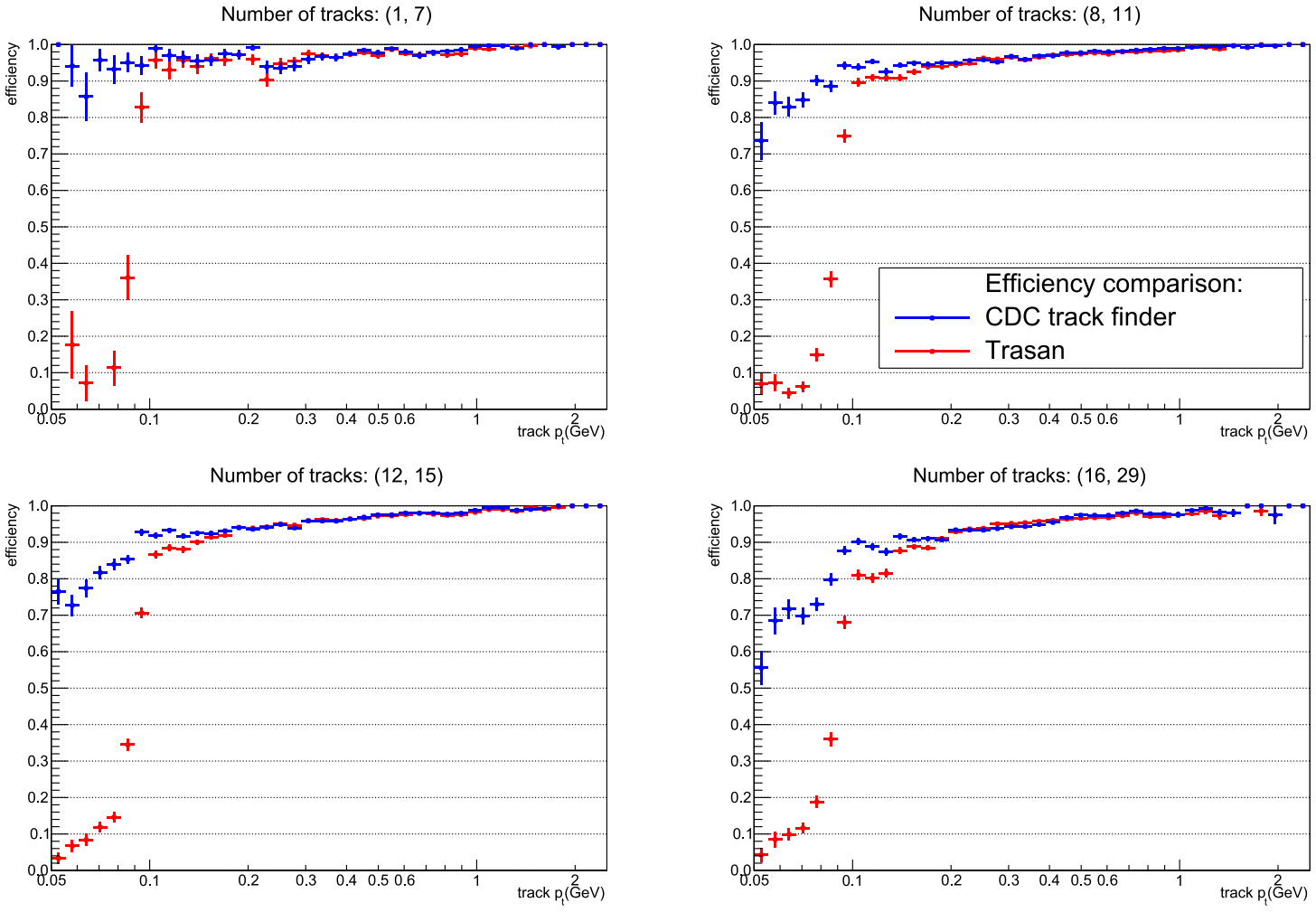


Introduction

- Standard CDC tracking reconstruction is used
- No GenFit -> only track candidates are considered
- Only relations between MCTracks and PRTracks were used, no kinematic matching

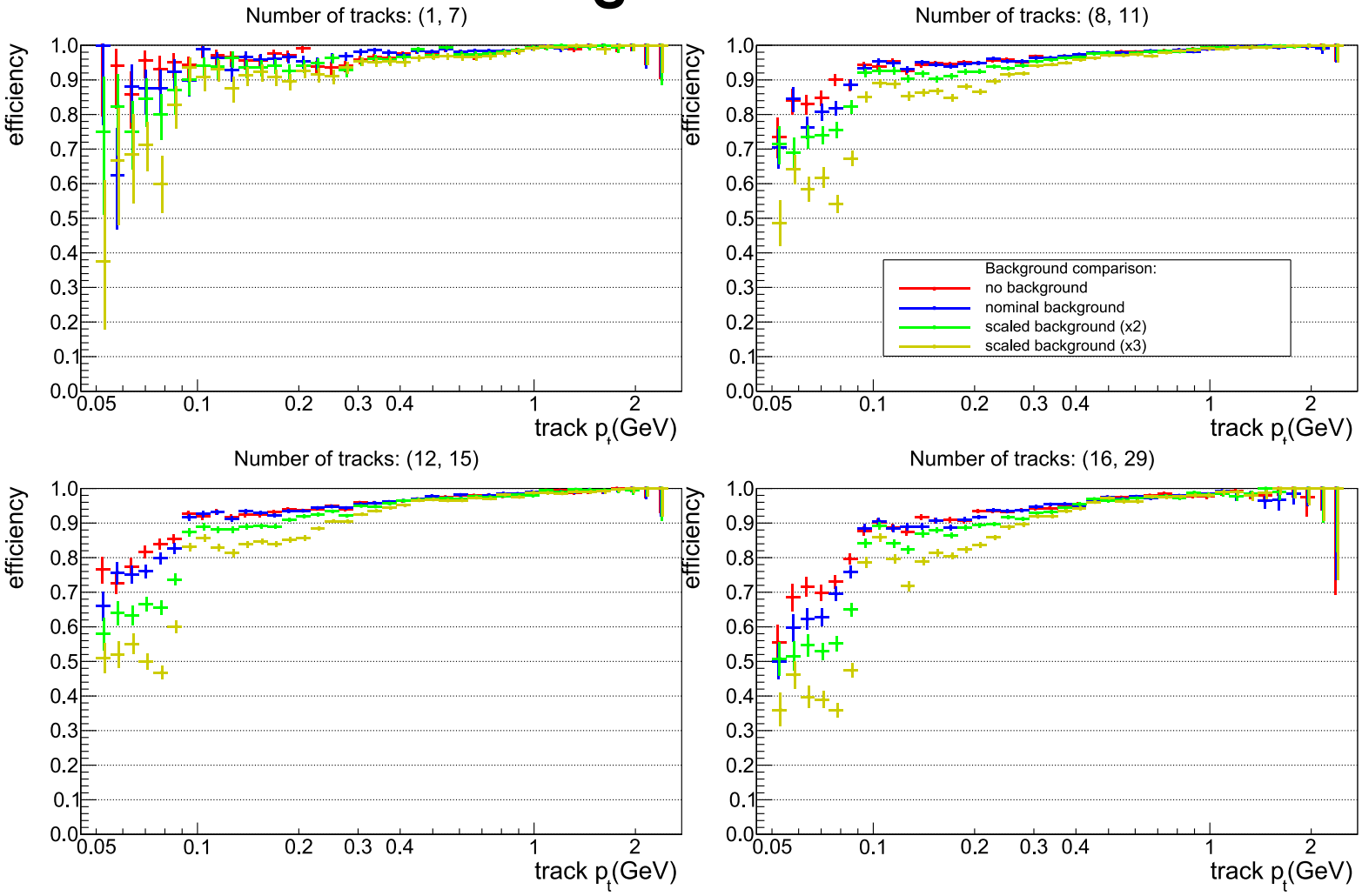
- Framework - ~4 months old, with the updated resolution functions in the Legendre tracking

Belle II CDC TF vs Trasan



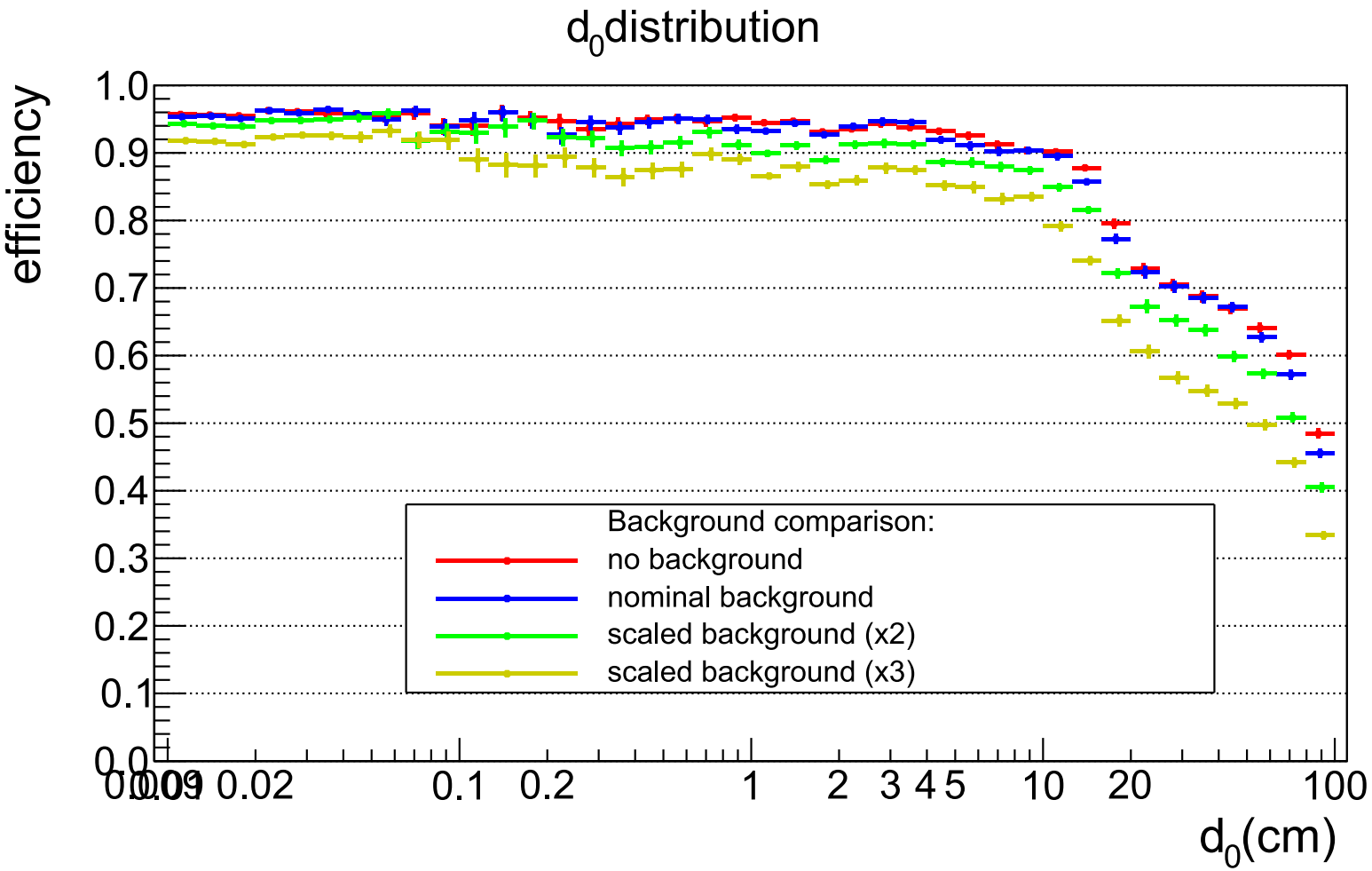
- Only prompt tracks are considered

Influence of beam background



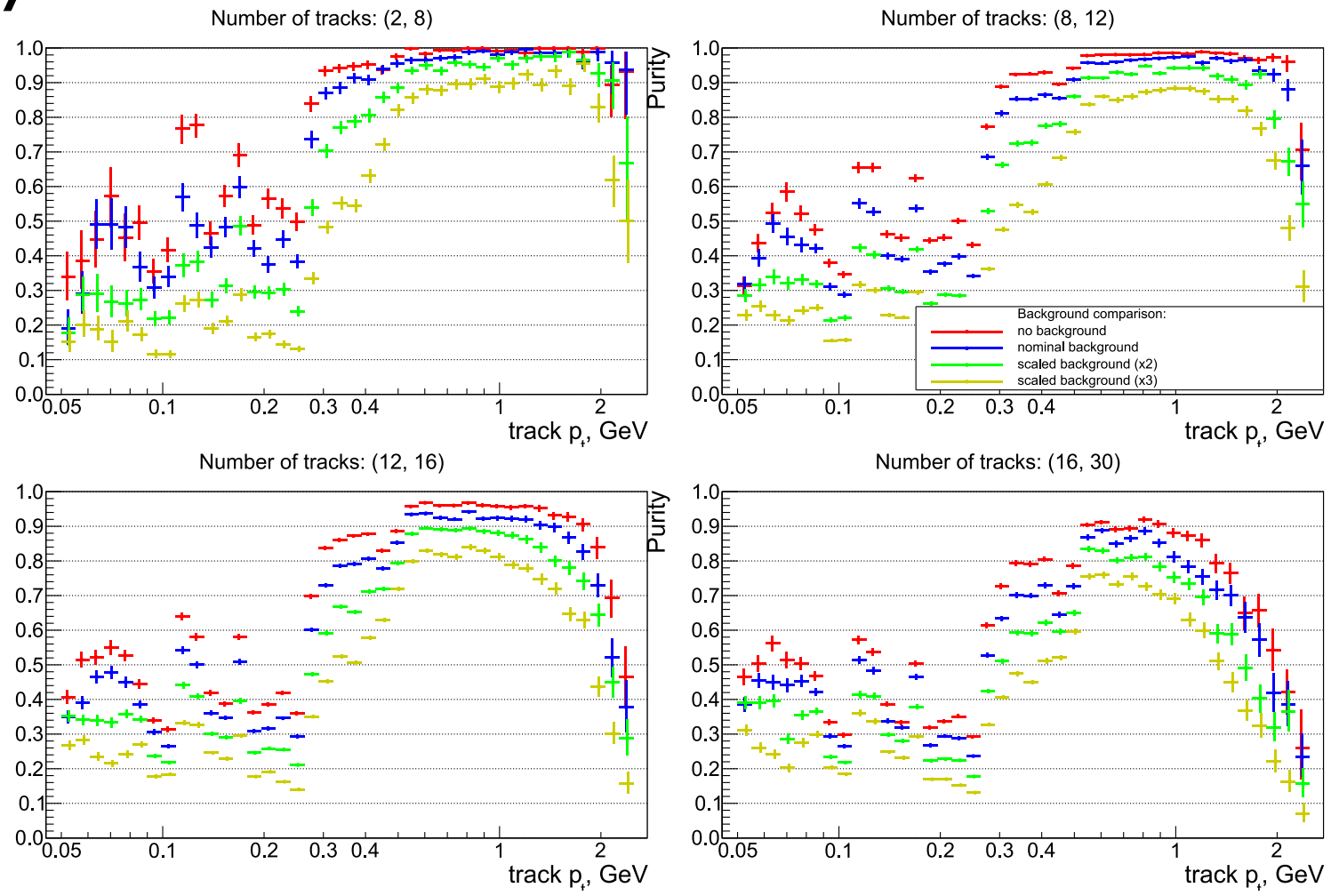
- 12th champaign, no QED background

Efficiency along d_0



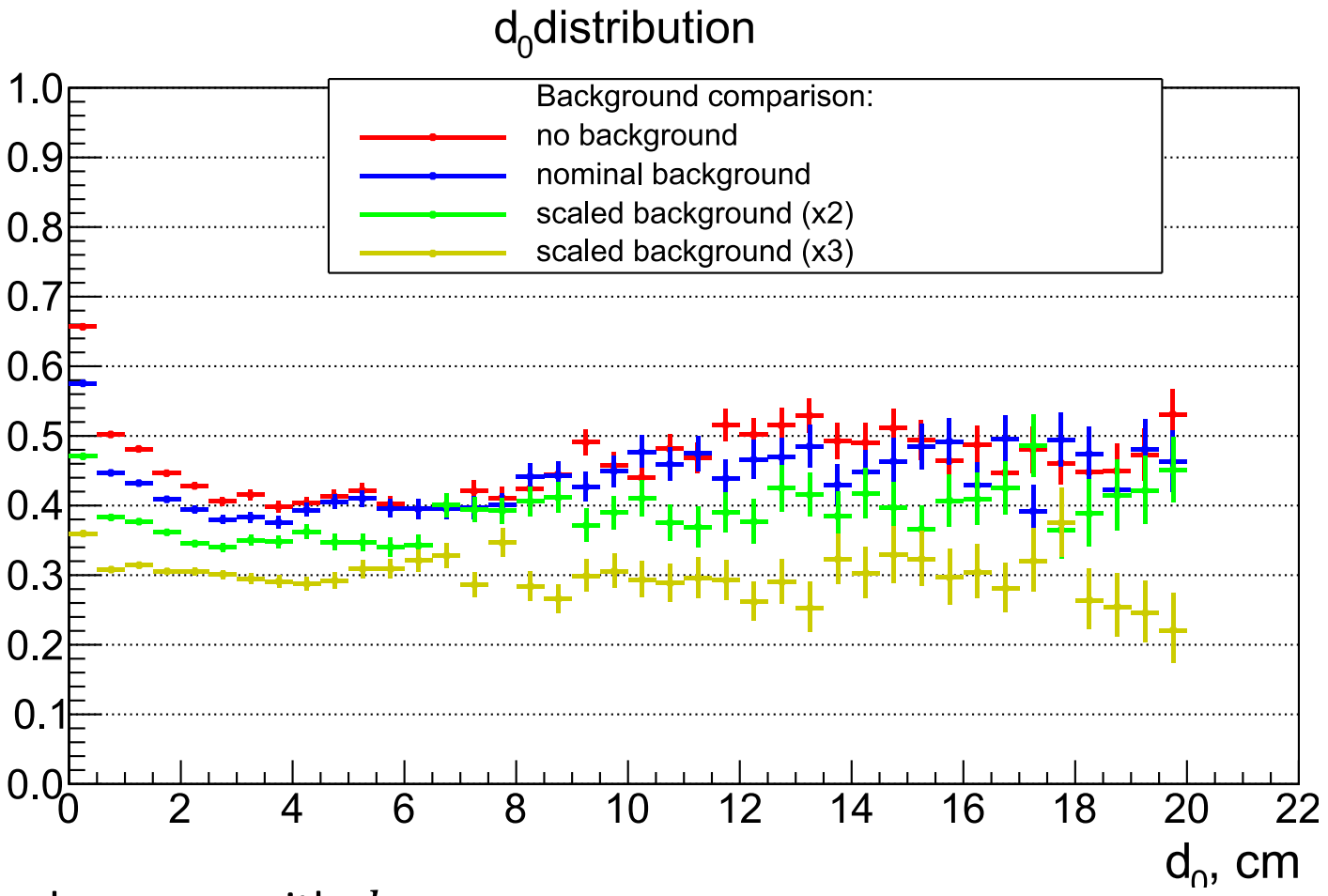
- Nominal background is well supressed
- High probability to find tracks with the large impact parameter

Purity



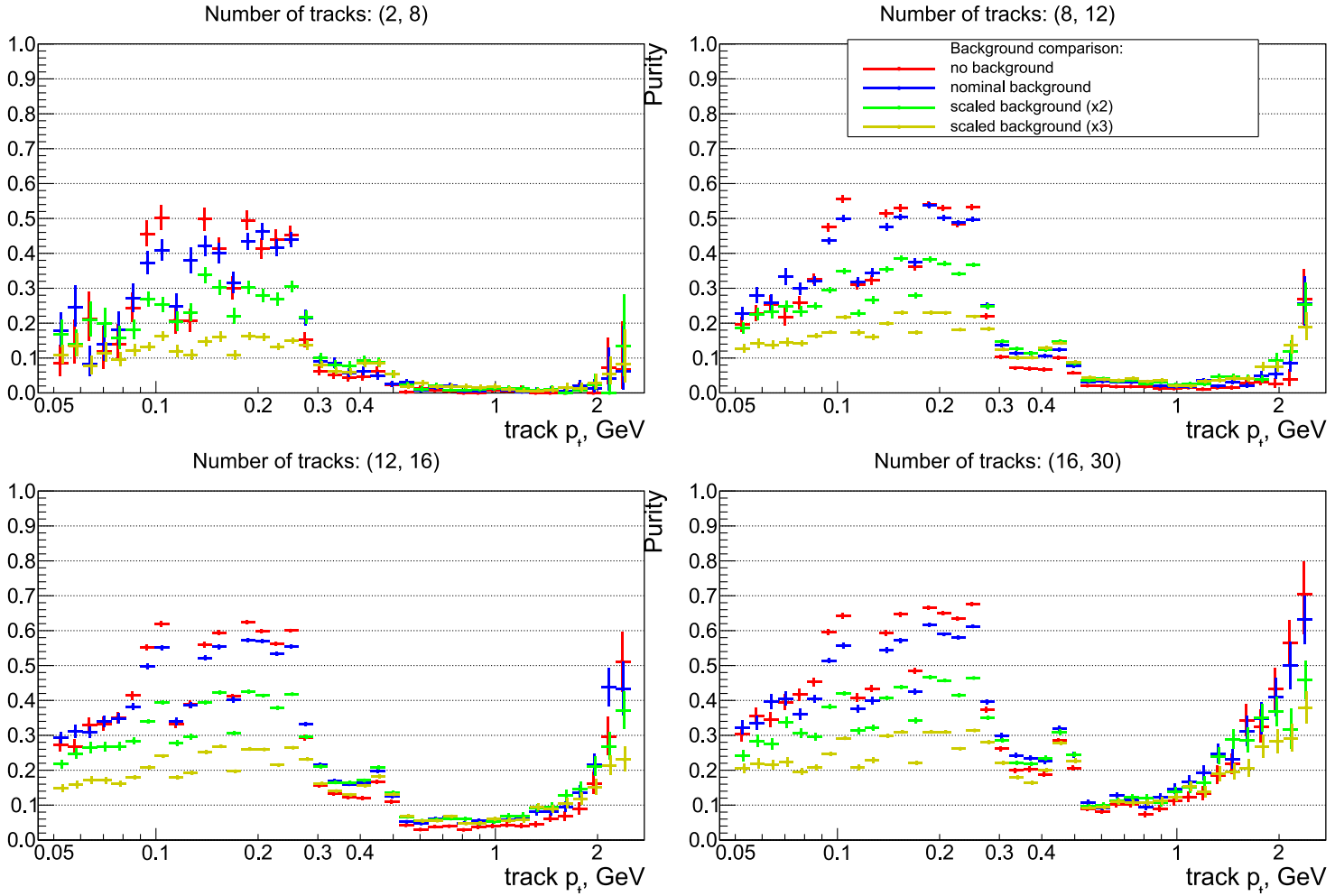
- Histograms are binned by the number of **MCTracks**
- Only prompt tracks are considered

Purity



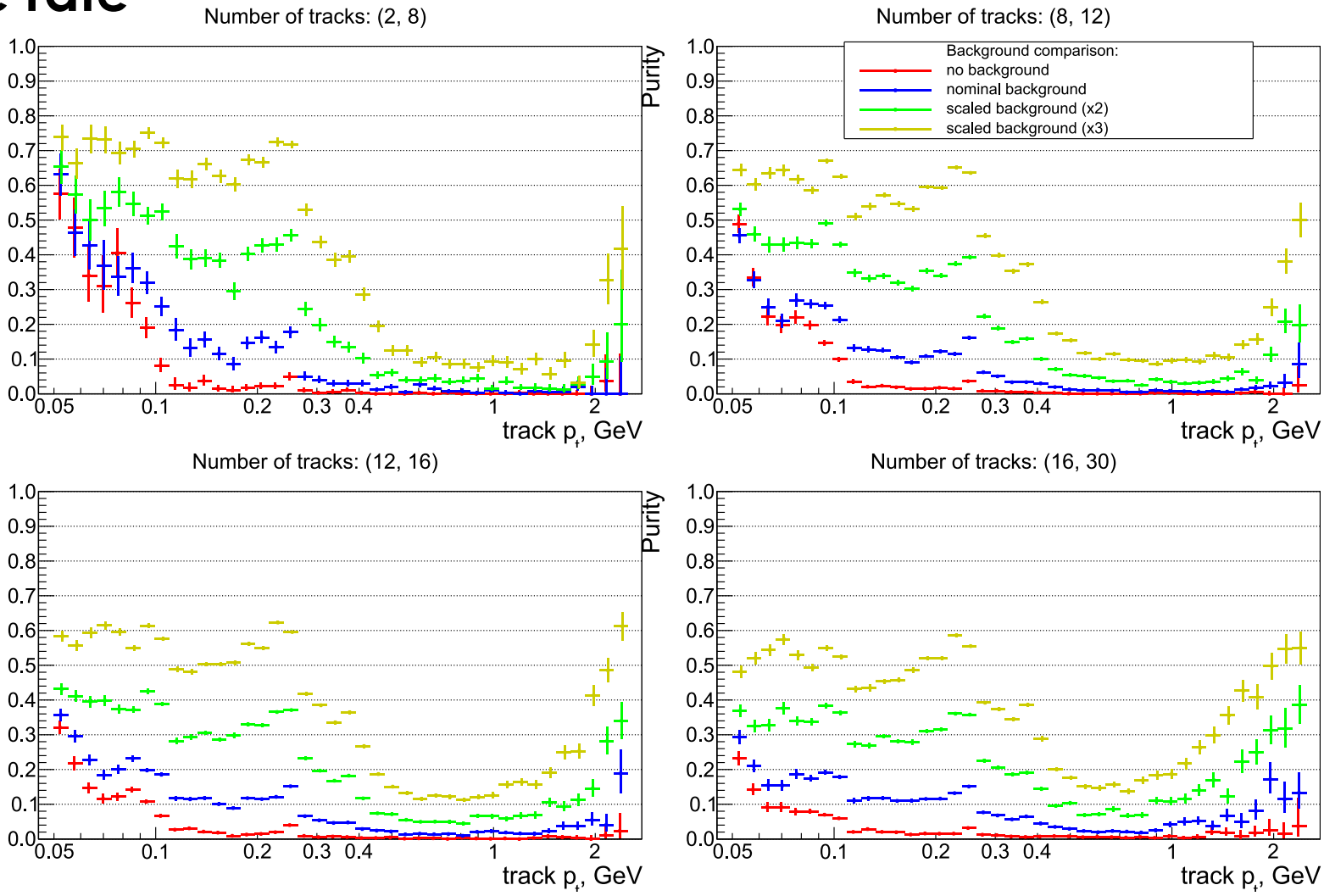
- Purity decreases with d_0

Clone rate



- Fraction of clones decreases with increased background ->
  - Possible clones gain more BG hits and go into “fakes” category

Fake rate



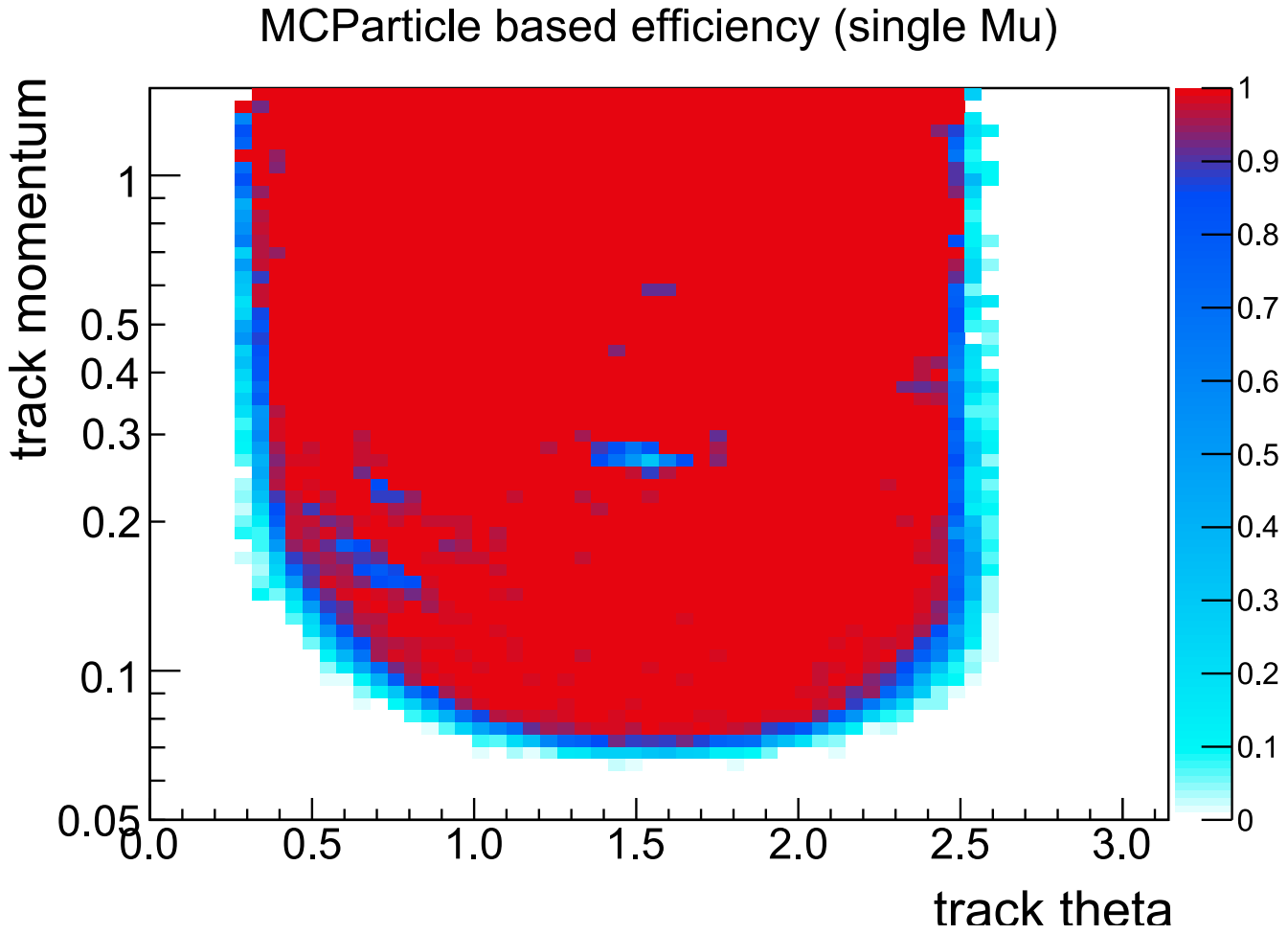
- Fraction of fakes increases significantly

Study of theta-p efficiency (2D heatmap)

- One particle per event was generated
  - μ, π
- No background
- Single MCParticle per event is required
  - Events with secondaries are discarded
- Pattern recognition only -> no GenFit fitting
- Efficiency is based on relations between MCParticles and RecoTracks

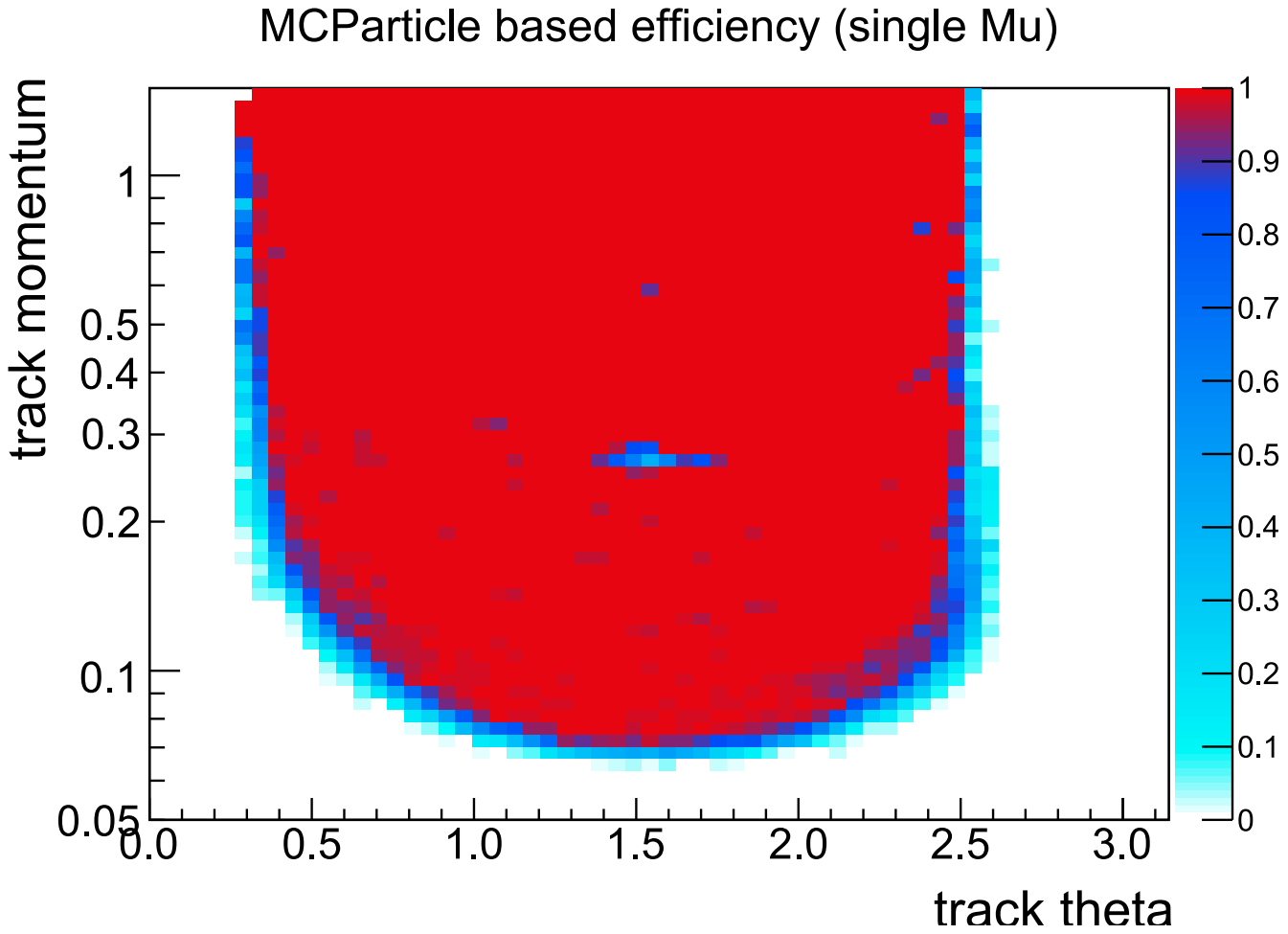
- Compared my old basf2 environment (~4-5 month old) with the HEAD version

Heat map (μ) -- old



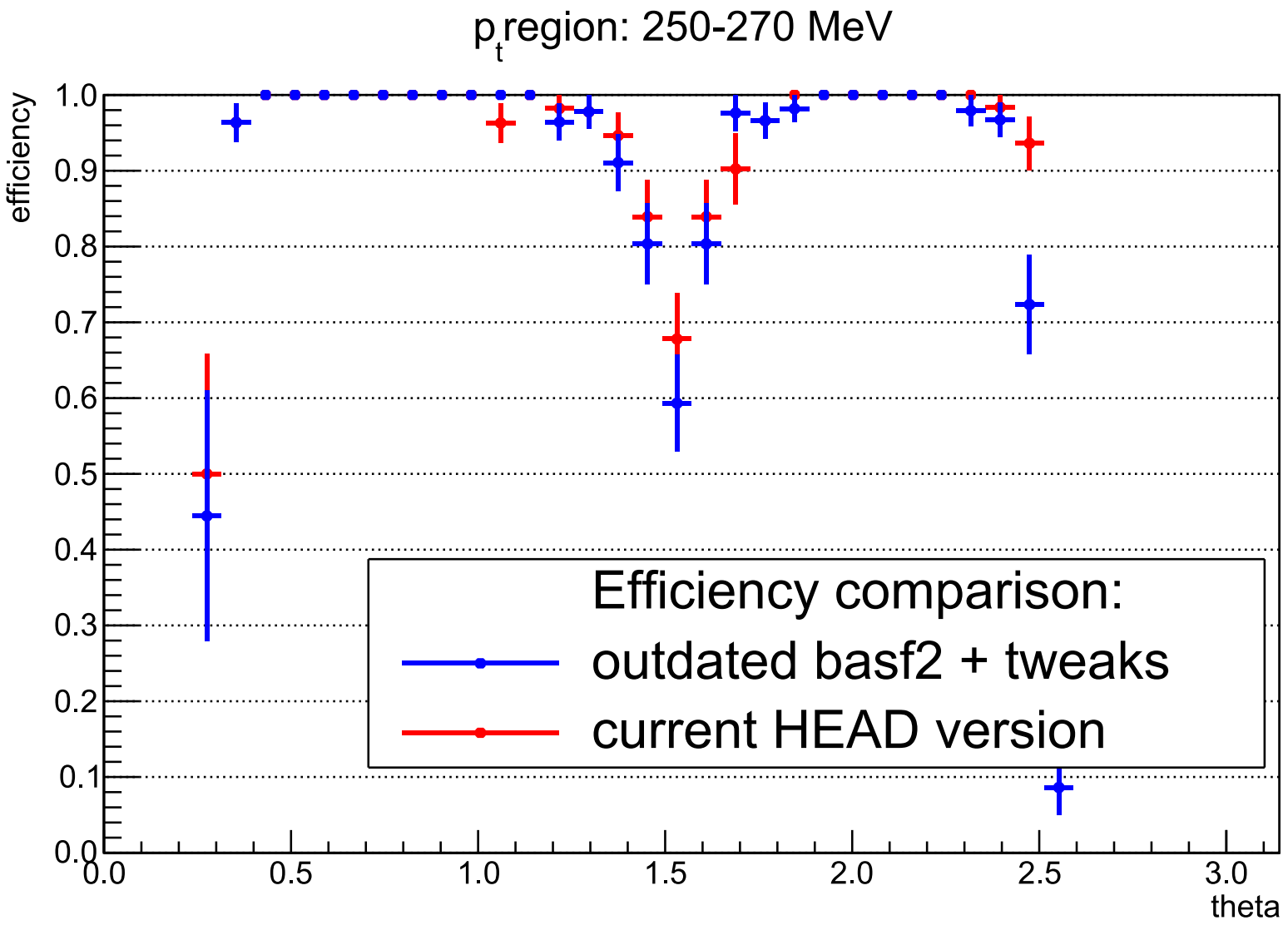
- We got a drop in the efficiency at ~260 MeV
  - Old setup

Heat map (μ) -- new

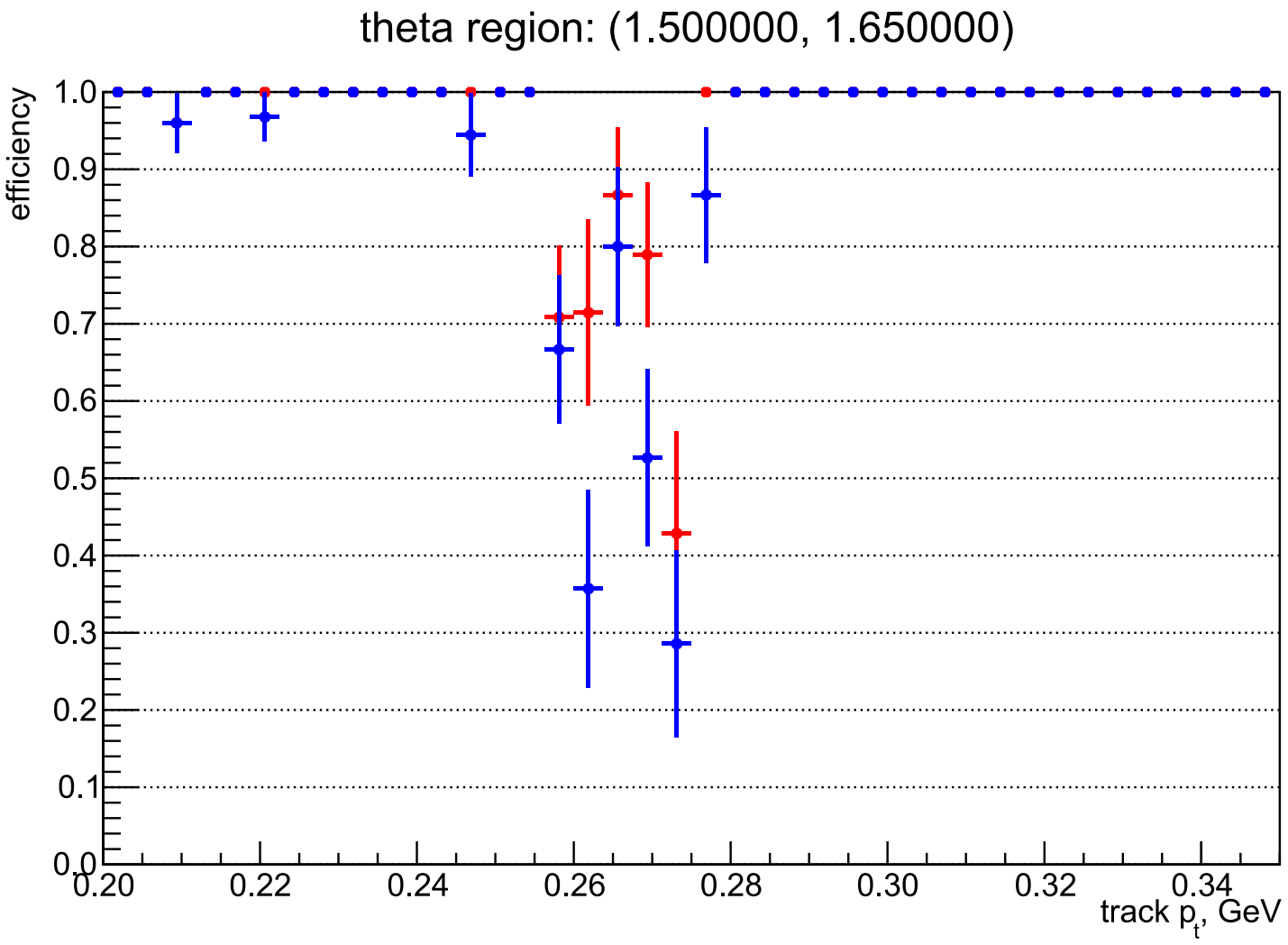


- The drop is still there
  - Fresh setup

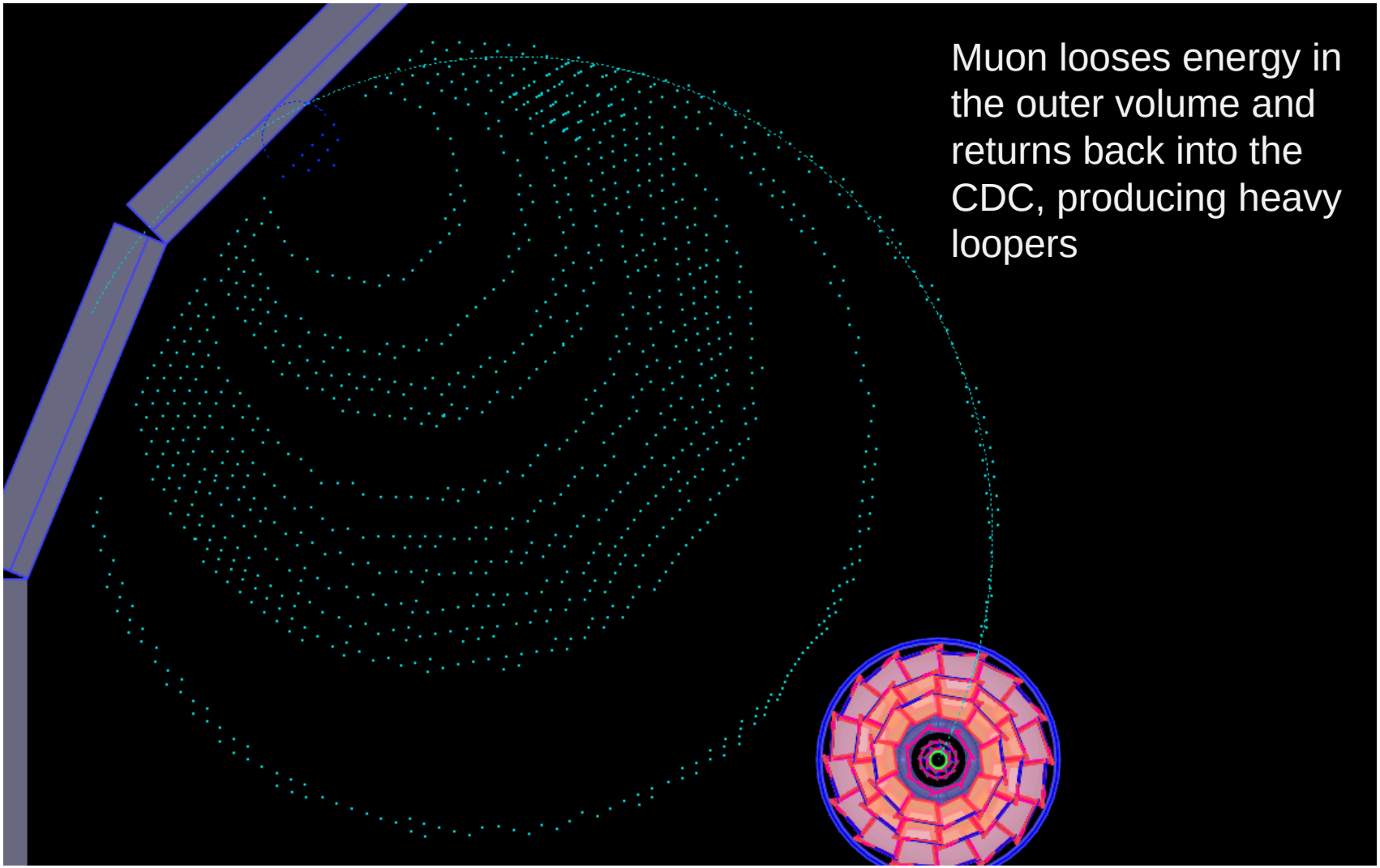
Theta efficiency in the narrow p_t slice



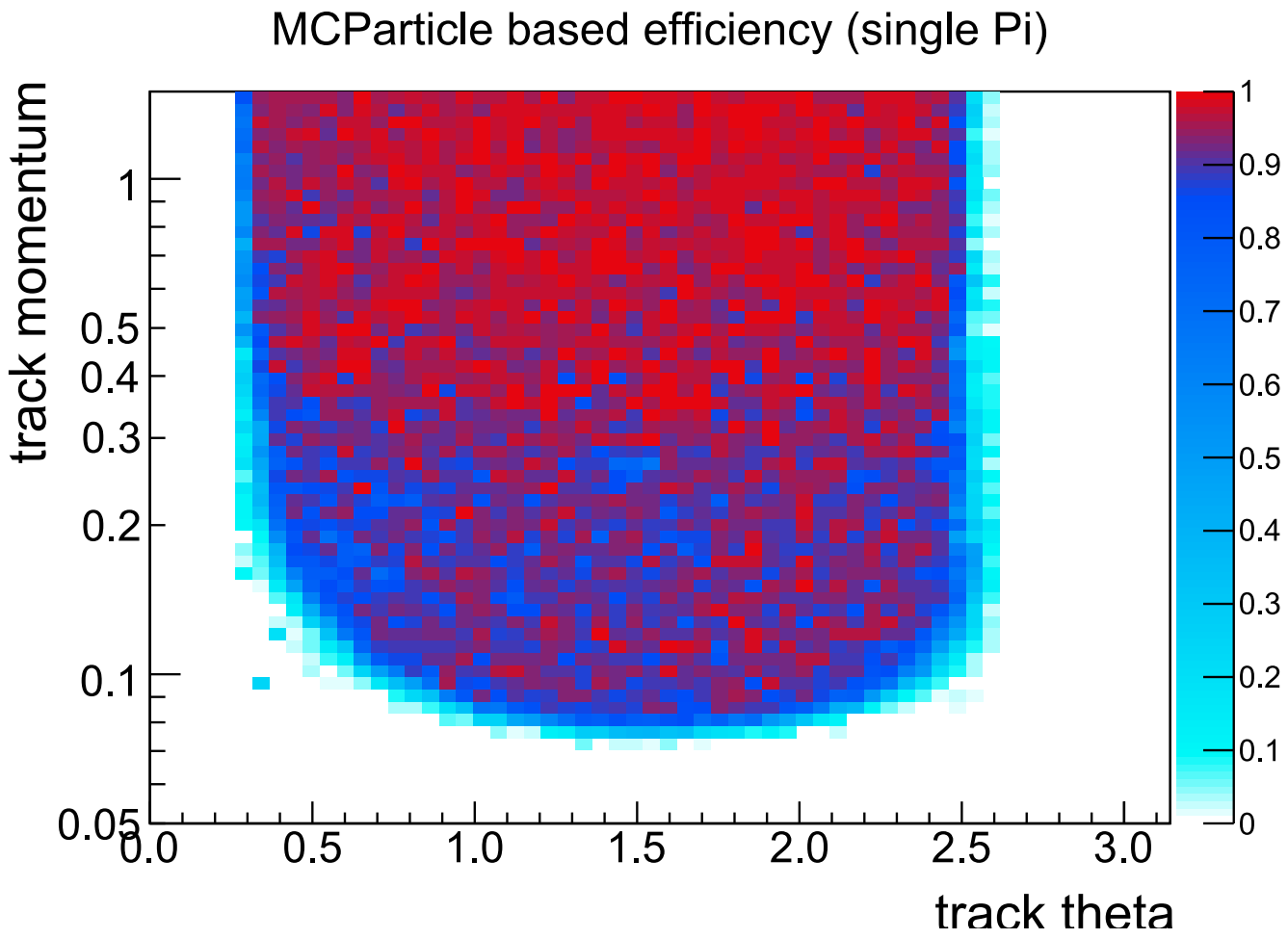
p_t efficiency in the narrow theta slice



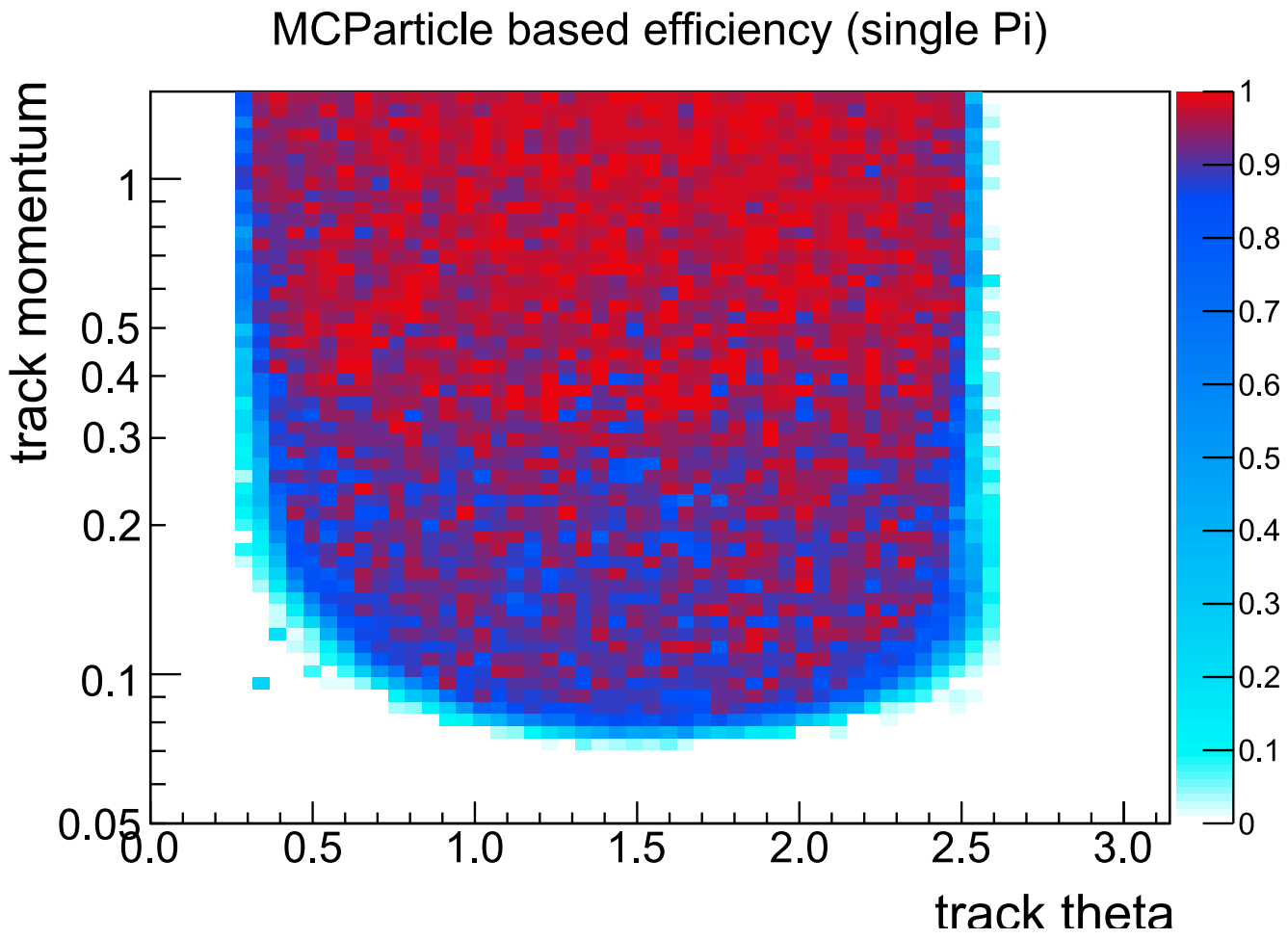
Event Display



Heat map (π) -- old



Heat map (π) -- new



Conclusion and outlook

- CDC standalone TF can provide reasonable amount of information.
  - High reconstruction efficiency.
- Beam induced (nominal) background is successfully suppressed, and reconstruction stays on the same level.
- CDC track finder loses efficiency in case of heavy loopers.
- Need to check performance with involved GenFit.

Thank you for the attention!