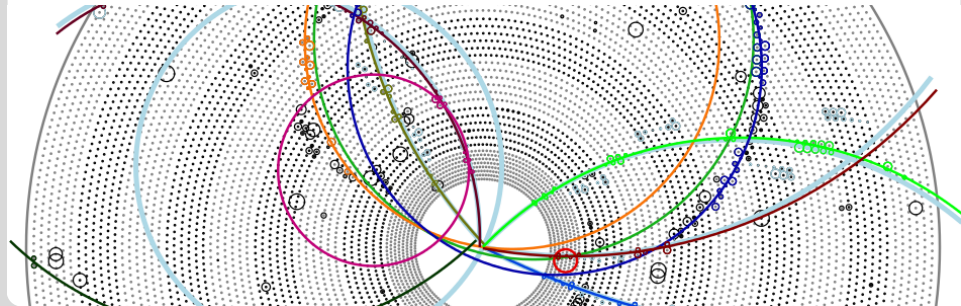


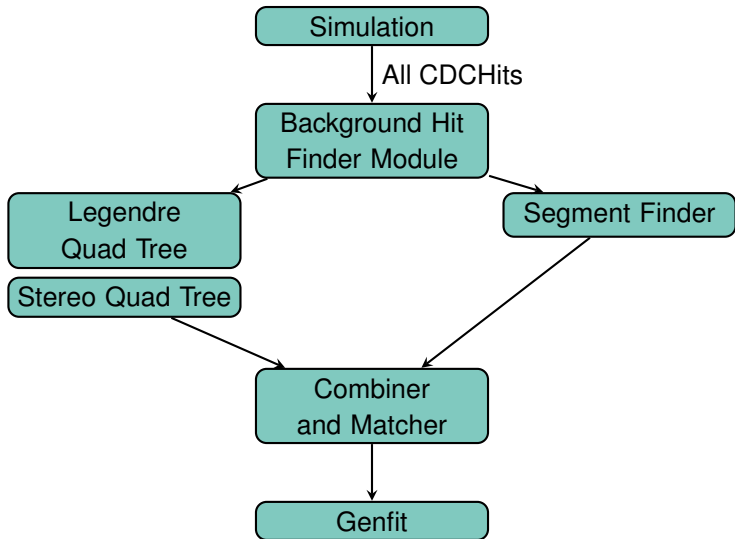
# Improvements on the Stereo Hit Finder

Biweekly tracking meeting.

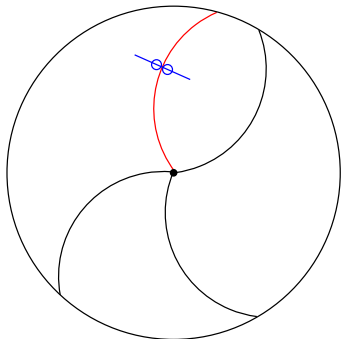
Nils Braun | 12.6.2015

KIT

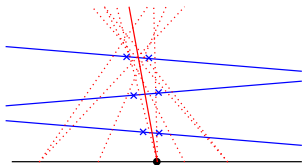




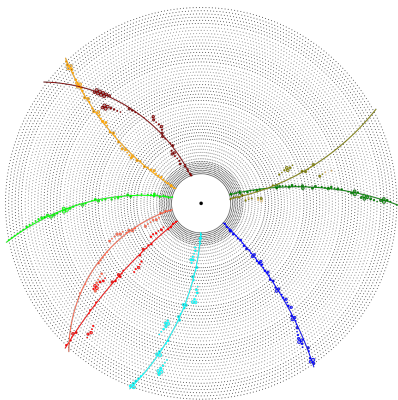
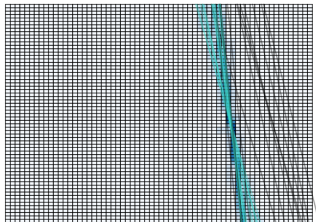
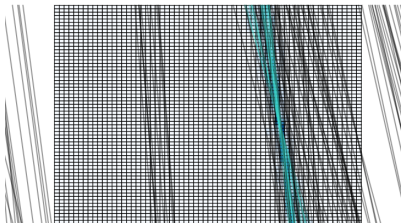
# Principle of the Stereo Hit Assignment



- Each stereo hit corresponds to a line in the  $x$ - $y$ -plane.
- A given trajectory leads to two biunique solutions for the  $xyz$ -position (left and right).
- But: How to decide if the hit belongs to this track?
- Solution: Histogramming approach with  $z_0$  and the  $z$ -slope as the two axis.



# QuadTree in the Stereo Hit Assigner



## Improvements

- Improved reconstruction algorithm (using the common CDC tracking code basis).
- Improved Quad Tree (using the common QuadTreeTemplate code basis).
- Improved caching and (much) less trigonometrical calculations.

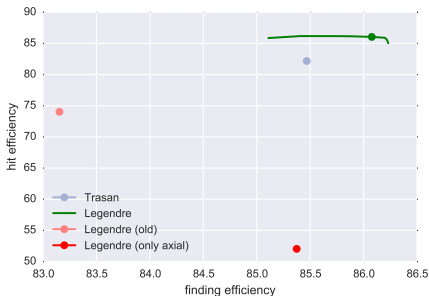
## ■ First Step:

- Add the segments from the Local Track Finder to the tracks if
  - they are not fully found by the Legendre Track Finder,
  - they share more than one hit with a legendre track and
  - the BDT output is above a certain cut value.
- If there is more than one possibility add the segment to the track sharing the most hits.

## ■ Second Step:

- The first step reduces the number of segments from 108/event to 19/event.
- Only about 50 % of these segments are not ghosts or background.
- About 80 % of the remaining segments have a partner in the legendre tracks (but do not share hits in most of the cases).
- These segments should be added to the tracks, the rest of the segments can be used to create new tracks.

# Tracking Performance

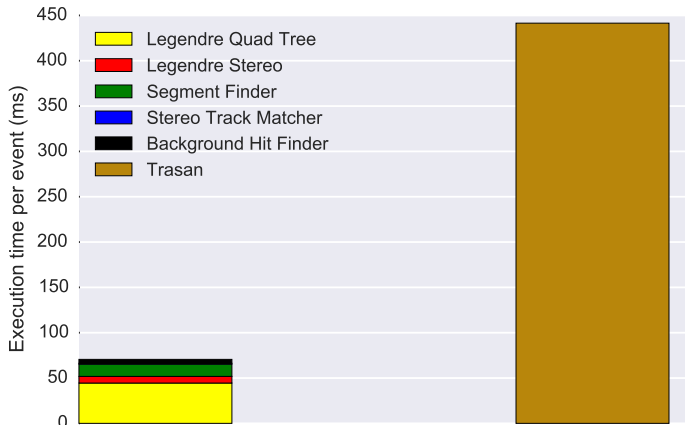


---

	Legendre	Trasan
Finding Efficiency	86.25 %	85.47 %
Hit Efficiency	86.11 %	82.19 %
Fake Rate	14.59 %	15.72 %
Clone Rate	9.71 %	23.40 %

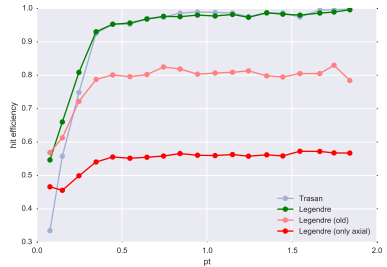
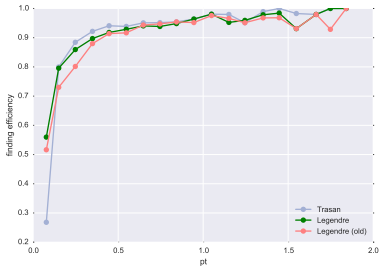
---

# Timing Performance





# Which Tracks are missing?



- Still we have many segments left. Most of them have a legendre partner - but some of them can be used to create new tracks.
- Fitting issue: Genfit is not able to fit the tracks in  $> 50\%$  of the cases.
- Try to use other stereo hit finder procedures.