

Status of ACTS Deployment at FASER

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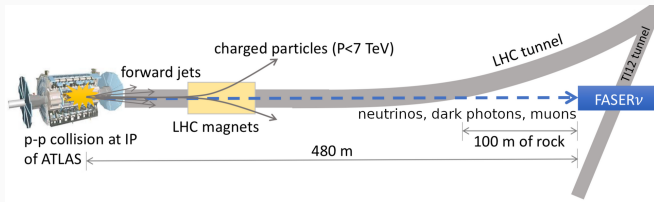
22 September 2020

ErUM Collaboration Meeting

ForwArD Search ExpeRiment (FASER)

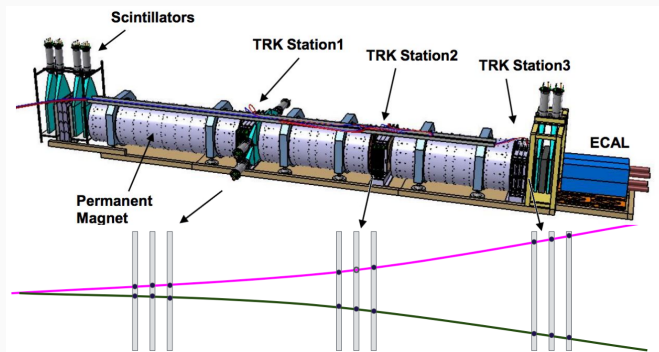
search for long-lived particles:

$pp \rightarrow \text{LLP} + X$, LLP travels 480 m, $\text{LLP} \rightarrow \text{charged tracks} + X$

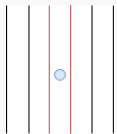
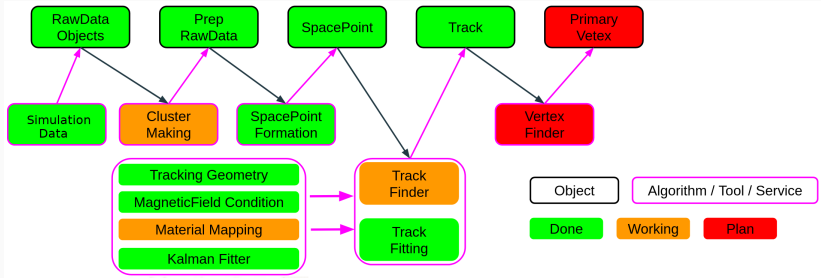


Tracker

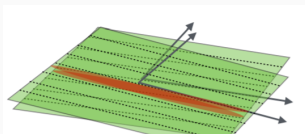
- 3 tracking stations, with 3 planes each
- 3 permanent dipole magnets → separate opp. charged particles



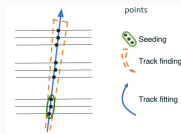
Outline of tracking software



cluster making



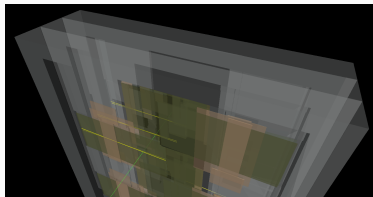
spacepoint formation



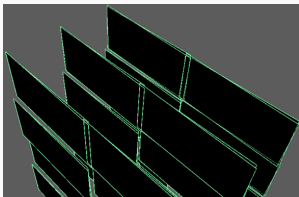
tracking

Tracking geometry

- simplified geometry for tracking
- build ACTS tracking geometry using existing geometry database
- keep two-sided sensors, staggering structure



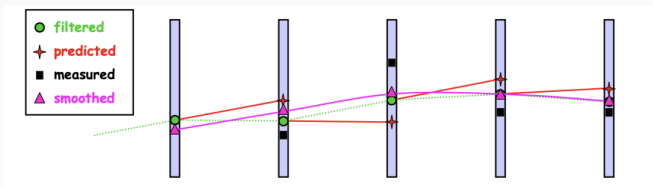
FASER geometry



ACTS geometry

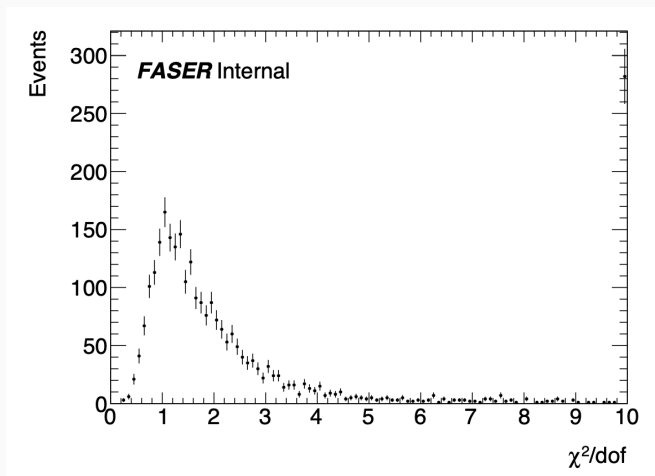
Kalman Fitter

- estimate track parameters: $x, y, \theta, \phi, q/p$
- inputs for Kalman Fitter: source links, initial parameters
- fitted parameters from smoothing / backward filtering



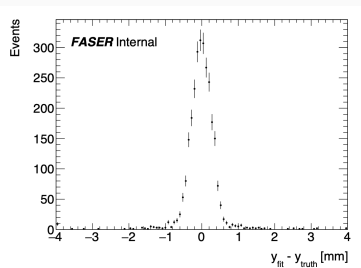
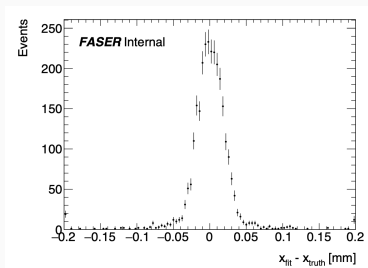
Fitting performance

- simulation of events with single 100 GeV μ^+



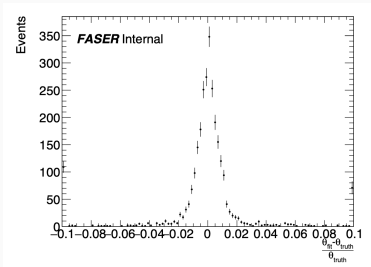
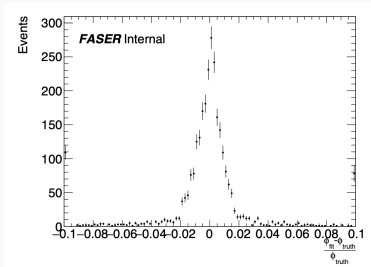
Fitting performance

- expected resolution¹: x: 17 μm , y: 580 μm

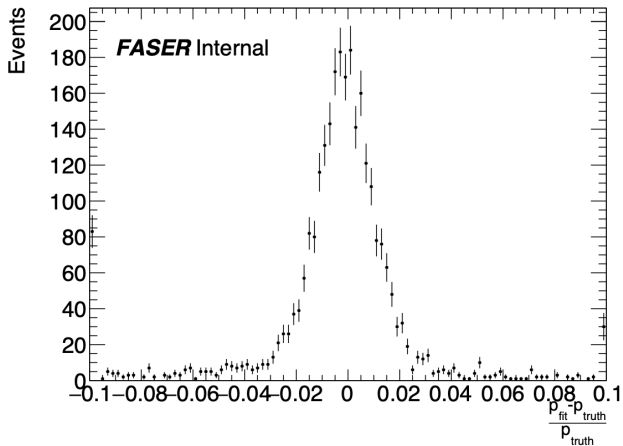


¹2018, Technical Proposal for FASER

Fitting performance



Fitting performance



- finish track finder, material mapping, ...
- analyze first cosmic data (single station)
- alignment, vertex finding, ...