Global Track Reconstruction

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MICE Collaboration Meeting 45
The Cosener's House, Abingdon

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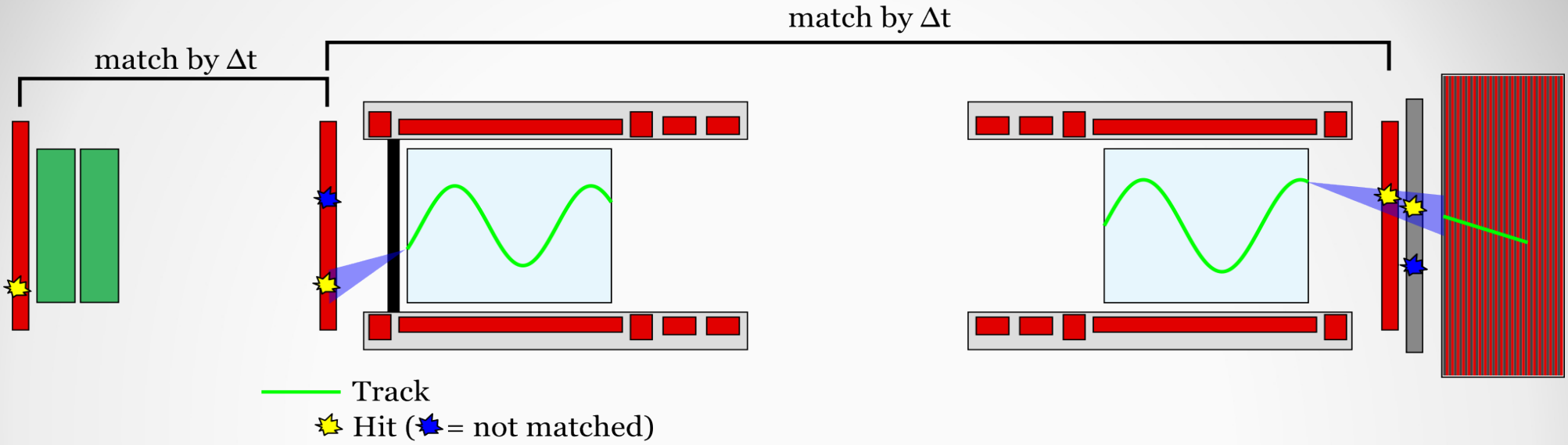
Global Track Reconstruction

- Track Matching – Determine which detector hits belong to the same track and combine them so that PID (and later analysis) can be run on them
- Track Fitting – Improve the matched trackpoints using information from all detectors as well as provide the possibility of inter- and extrapolation to uninstrumented sections of the beamline

Track Matching



- Propagate track point between detectors
- Compare agreement between propagated and measured track point
- ⟶ Accept / Reject
- Different method (Δt based) for TOF0 and US/DS matching

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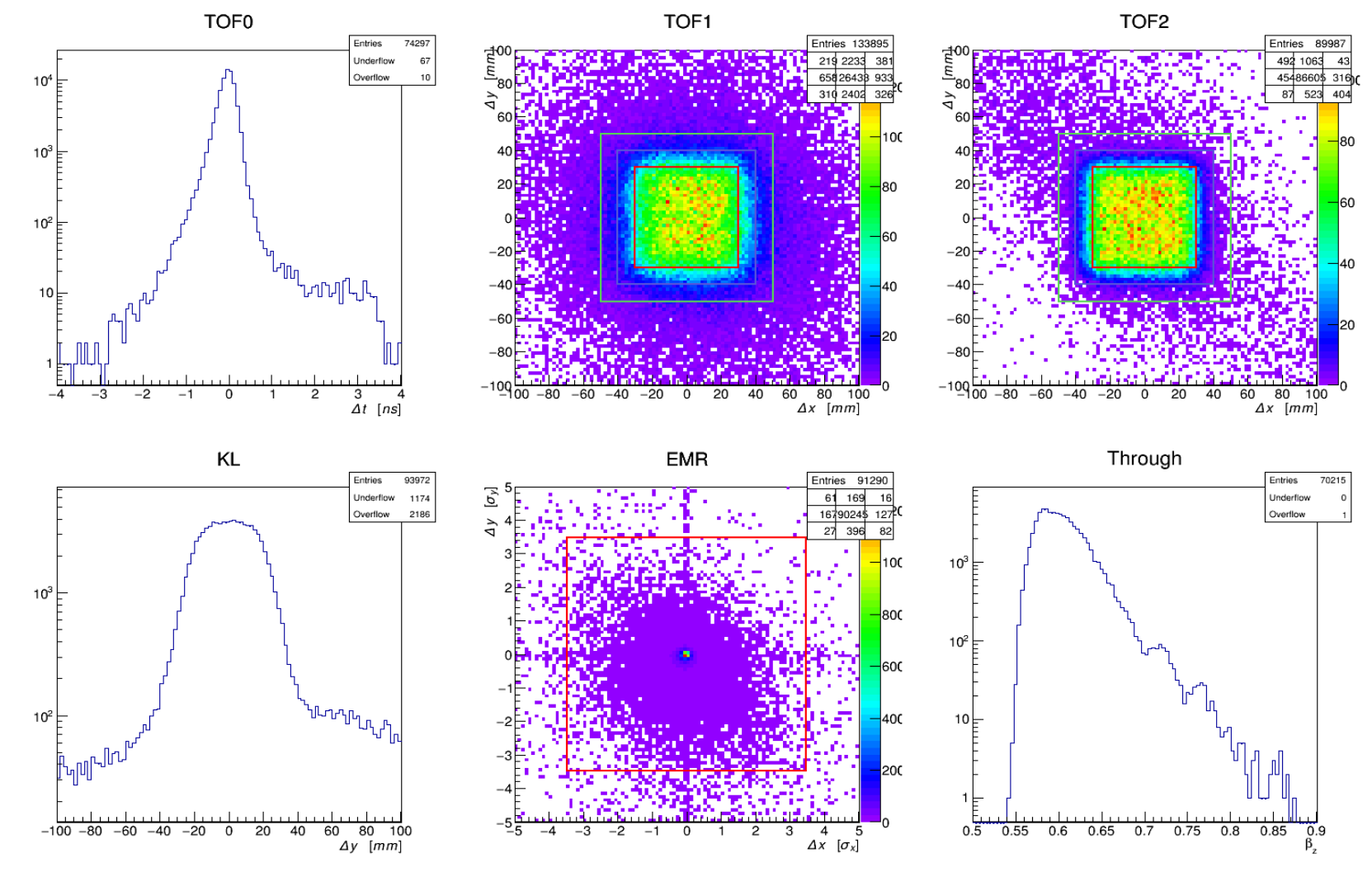
Track Matching

- Propagation requires mass and charge to be known, so track matching creates 3 or 6 tracks for each particle tagged with a PID hypothesis. Celeste's PID code then picks out the correct one

MC Residuals (Geometry 115)



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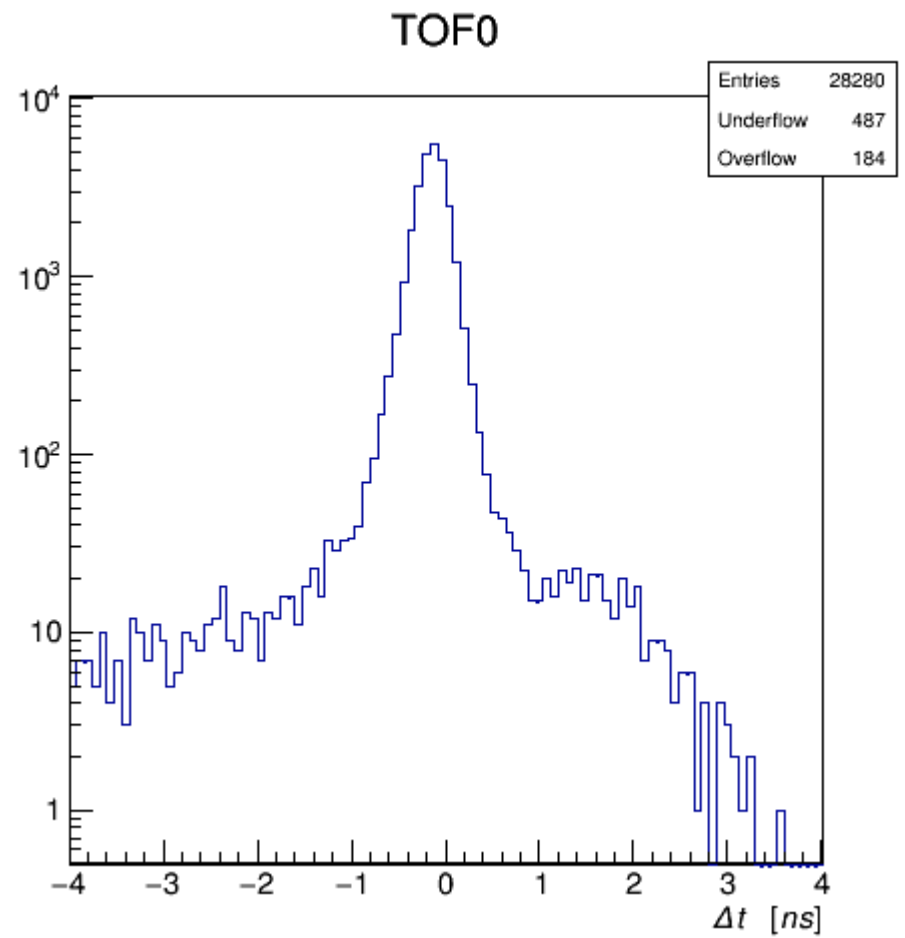
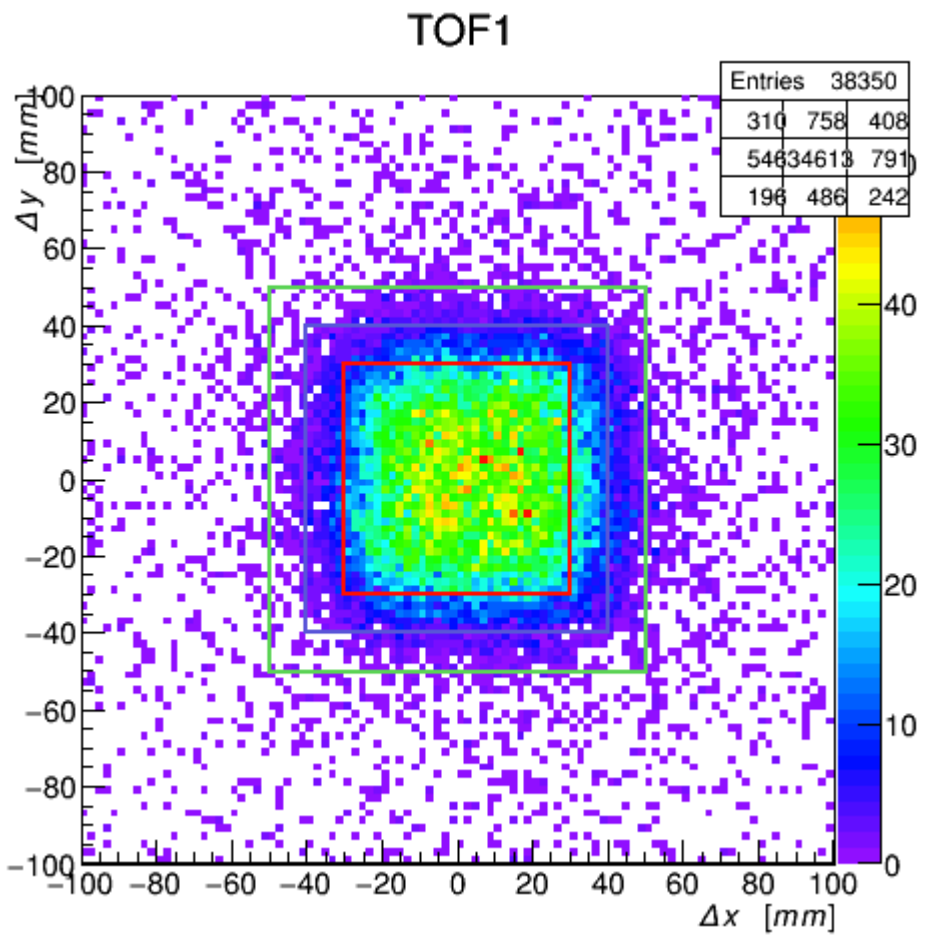
Data Residuals (Run 7469)





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Performance Improvements

- No repeated propagation to different detectors on same side of cooling channel
- Only use propagation if any detector in the section (US or DS) has more than one space point, otherwise assume match
- Together, roughly an order of magnitude performance increase, as well as increase in efficiency

TrefArray Issues

- Discovered an issue with the ROOT data importer and/or the global data structure which results in a failure to import global tracks with trackpoints into MAUS. Work in progress, for the time being workaround on MICEmine.

Future Work

- Once TrefArray issue is fixed, include track matching and PID in standard unpacking script
- Track Fitting: Chris Rogers has been doing some work on this in the meantime, fit this into the current data flow and work from there.