

Global Track Reconstruction

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MICE Collaboration Meeting 39
St. Catherine's College Oxford

Personnel Changes

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PREVIOUSLY

Globals Manager

Ian Taylor

Particle ID

Celeste Pidcott

Global Track Reconstruction

Peter Lane

Chris Rogers

Chris Rogers

NOW

Globals Manager

Adam Dobbs

Particle ID

Celeste Pidcott

Global Track Reconstruction

Jan Greis

Chris Rogers

Chris Rogers

Current Status

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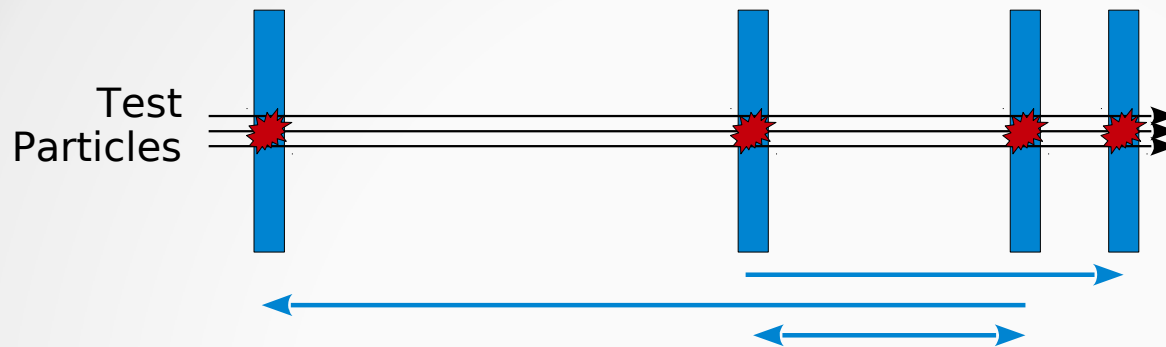
- Parts of the required code exist thanks to Peter's work
- A number of implementation issues exist requiring changes to the transfer map data structure as well as a complete rewrite of track importing and the mappers responsible for track matching and reconstruction
- Only recently started taking over from Peter, so no results yet

Generating Transfer Maps

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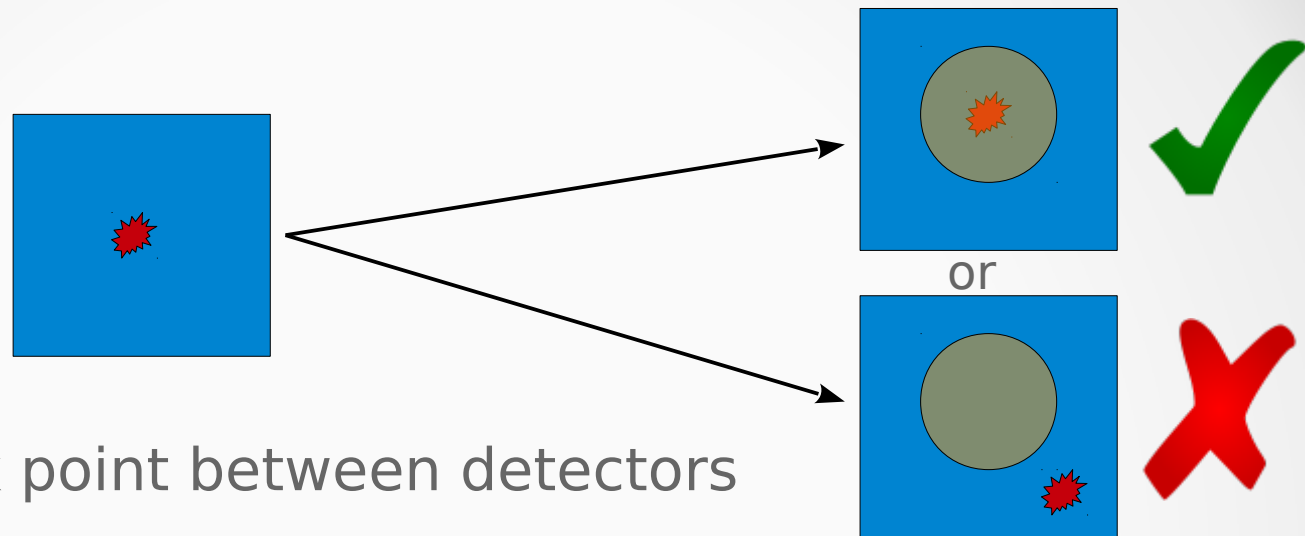
- Send a group of particles through the beamline clustered together in phase-space
- Collect hits in virtual planes
- Create transfer maps between virtual planes as needed
 - $C^T = (A^T W A)^{-1} A^T W B$ where A is formed from polynomial expansion of PS vectors at start plane, B from PS vectors at end plane, and W is a weighting based on detector accuracy

Track Matching

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- Propagate track point between detectors
- Compare agreement between propagated and measured track point
- → Accept / Reject

Track Fitting

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- Direction depends on parameter, e.g. for TOF & Tracker:
 - TOF has poor position resolution, so propagate position backwards from Tracker
 - Tracker has bad or 0 time information, so propagate time forwards from TOF
- χ^2 minimization between propagated and measured track points, later Kalman filter
- Also have track propagation to uninstrumented beamline sections, e.g. just before entering the cooling channel

Next Steps

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For CM40

- Code refactoring & changes to data structure
- Transfer map based track matching

Later

- Minimization track fitting
- Kalman fitting

The End