



MAUS

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MICE CM38

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Overview

- Deliverables
- Status
 - What's available, what's missing
 - Detectors, MC, Batch, CDB, API, Online
- CM38 report summaries
- Work plan
- Risks & Priorities



Deliverables

- Global Reconstruction
 - Tracks
 - PID
- Simulation
 - Beam + Geometry description + Fields + Detectors
- Online
 - Detector-level monitoring
- Data validation & quality checks
- Analysis tools
- Single-event display



Status

- What can you do with MAUS right now?
 - I am listing only functionality that is “in production” *i.e.* what you can expect from running MAUS today
- Available now:
 - Reconstruction: TOF, Tracker, KL, Ckov, EMR-hits
 - Simulation and digitization: TOF, Tracker
 - Idealized beam, legacy geometry
- What’s missing?
 - Official Step X geometry
 - Beam input
 - Digitizers for Ckov, KL, EMR
 - Global reconstruction
 - Some of these are in active development, some are stuck, will go over these in the work plan



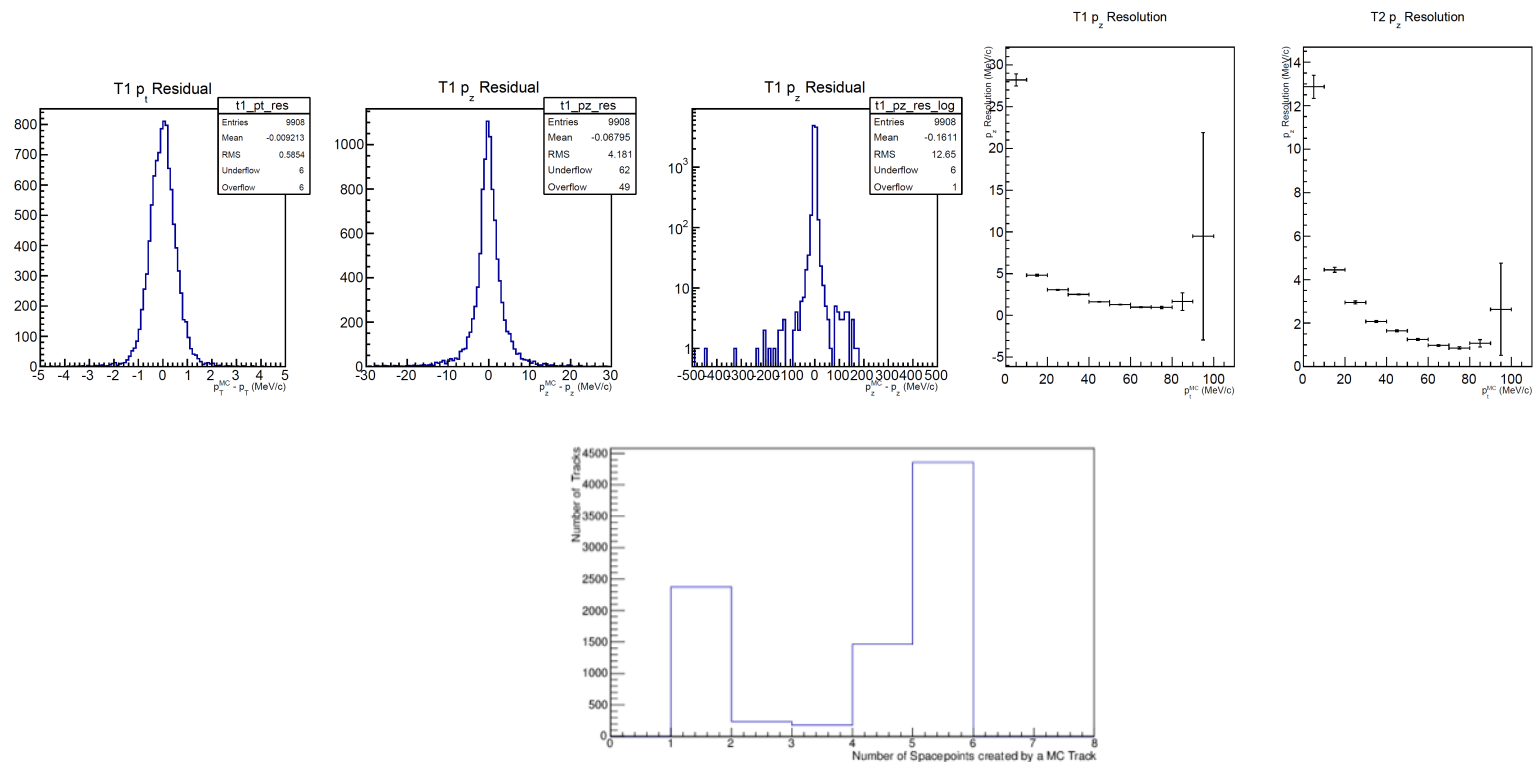
Work in progress (wrap-up)

- At this CM we heard from
 - SciFi: Reconstruction, MC, studies
 - EMR: reconstruction, MC
 - Globals
 - Geometry
 - G4BL-MAUS
 - Batch & CDB



Tracker (Dobbs/Heidt/Hunt)

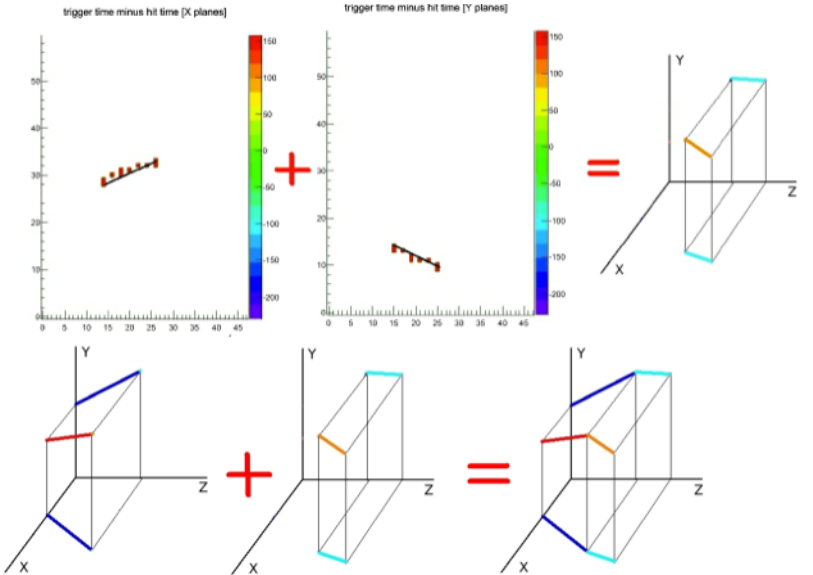
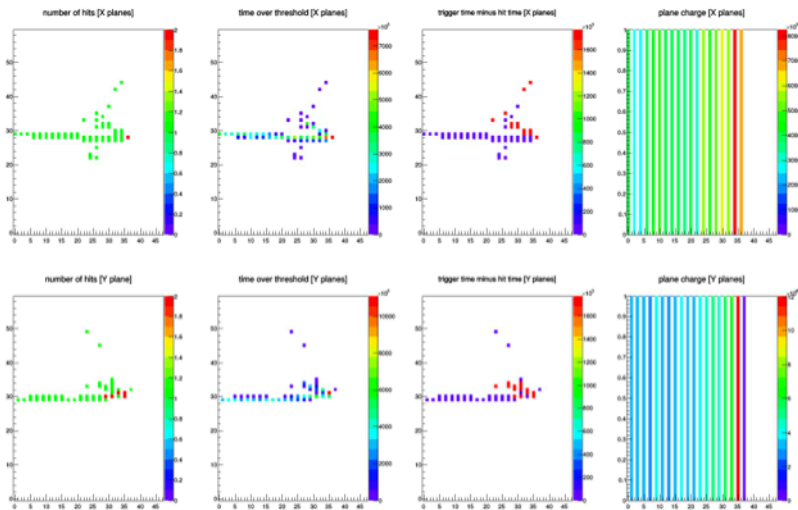
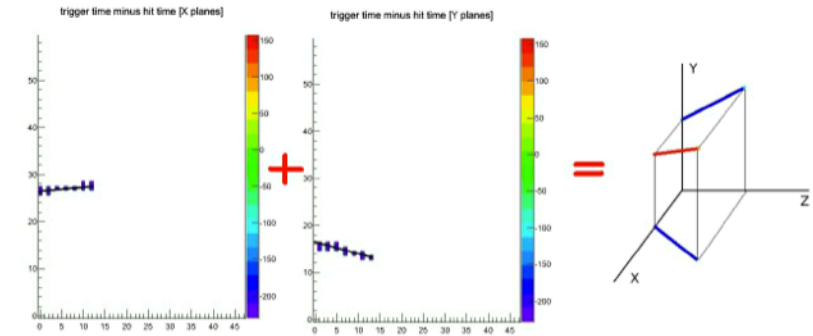
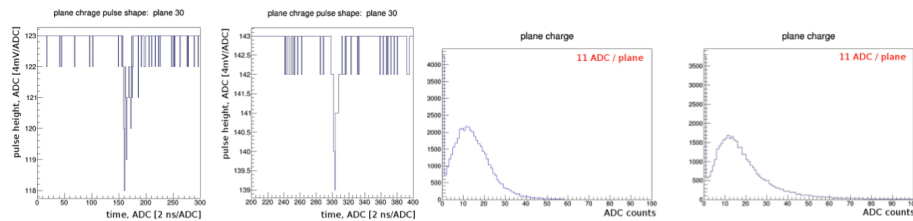
- SciFi tracking is reasonably complete
- Added noise to simulation
- Geometry-CDB interface in place
- Detailed studies have started – truth-matching, momentum residuals, space-point efficiencies
- Much improved documentation





EMR (Asfandiyarov/Drielsma)

- Simulation well advanced – PMT response, digitization. show good agreement w/ data
- Progress with track reconstruction & timing analysis





Beam (Nugent)

- G4BL beam being validated against Step I data
 - Better agreement with data
- Framework developed for integration with MAUS
 - Need to think about speed, pre-generation, usability

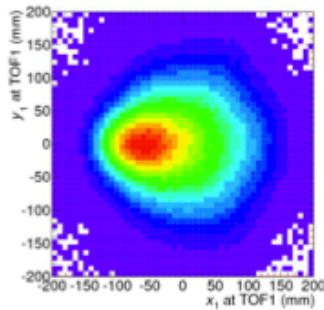


Figure: G4BL xy-distribution TOF1 (6, 200) μ^+ beam, (proj.)

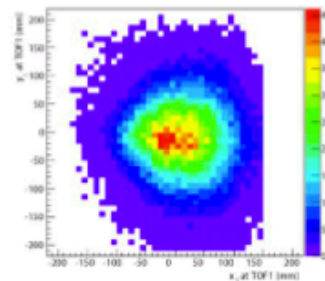
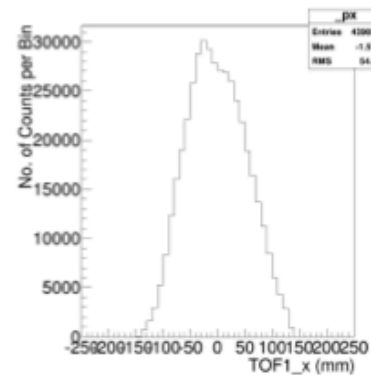
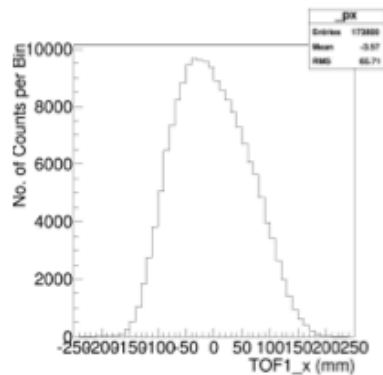


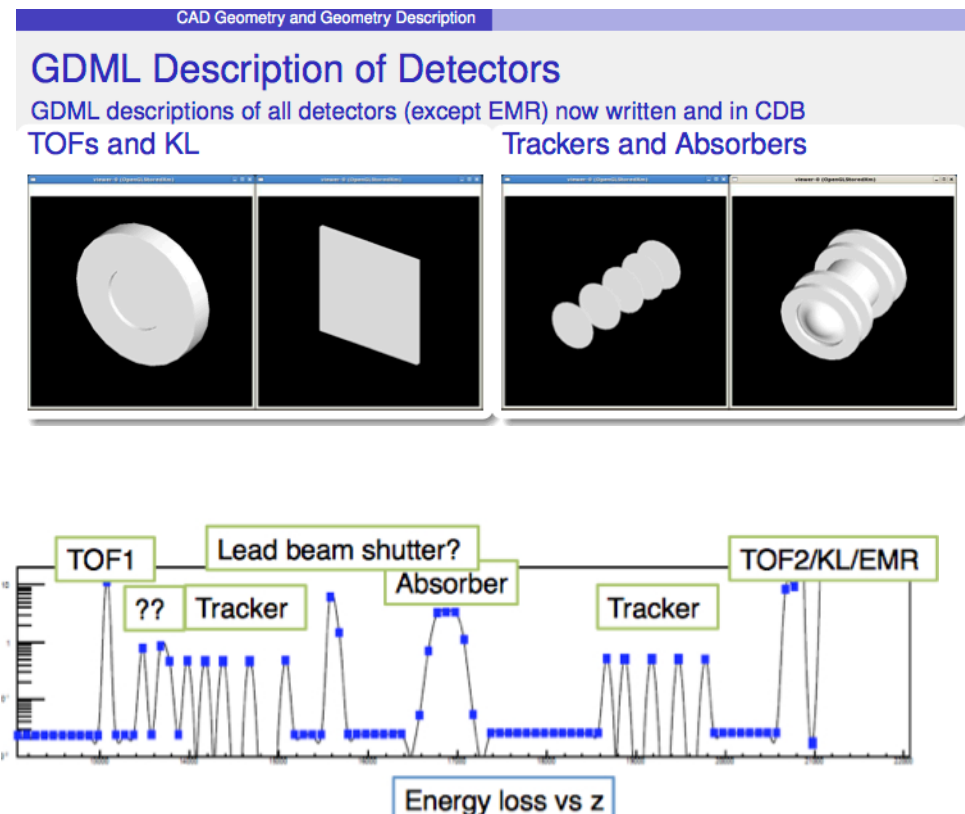
Figure: Data xy-distribution TOF1 (6, 200) μ^- beam, (proj.)





Geometry (Bayes/Ricciardi)

- Step I & Step IV geometries are in CDB
 - No EMR yet
- Algorithm developed for fitting to surveys
 - Some issues with Ckov
- Needs validation
 - Detector groups need to validate detector geom
 - Beamline group validates beamline
- Testing, optimization
- Need to start thinking about user-side issues

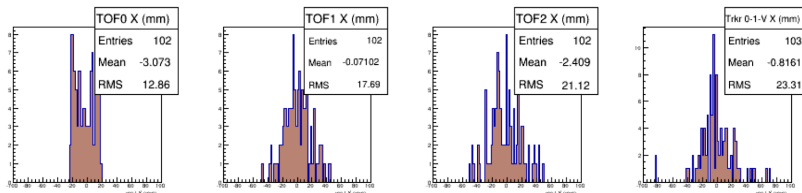
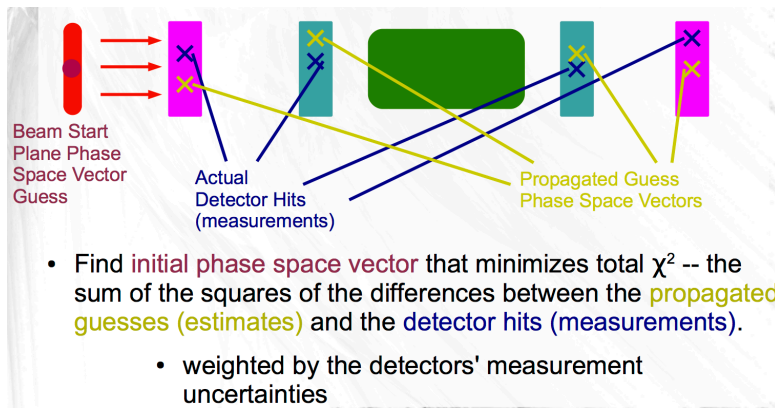




Global (Lane/Pidcott)

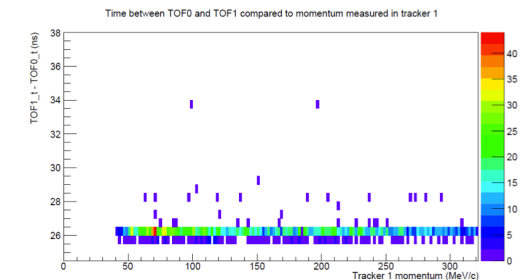
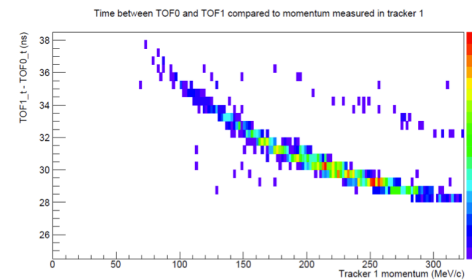
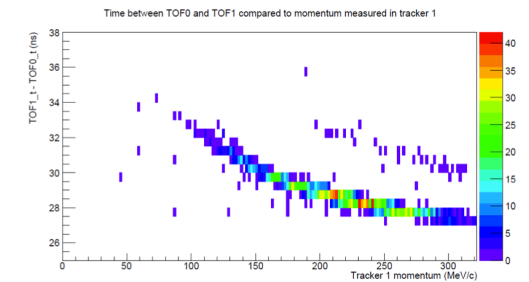
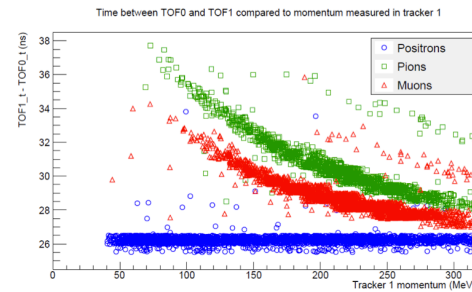
Tracking (PL)

- Infrastructure for global raw tracks, transfer maps, fit (PL)
 - But there are issues with single-track fits of TOF + Tracker



Particle Identification

- PID framework being developed & tested for TOF + Tracker (CP)
 - Integration within global tracking and reconstruction needs further thought & work





Work Plan

- TOF
 - Calibration improvements, online calibration with MAUS
 - MC tuning, MC-trigger-optimization
 - ~3 months @ 0.5 FTE
- Tracker
 - Calibration-CDB
 - Online plots
 - Integration tests, efficiency studies, tuning, optimization
 - ~ 3 months (difficult to estimate some of these e.g. efficiency/noise studies) @ 1 FTE
- KL
 - MC: detector response (hits), digitizer, validation
 - Calibration-CDB
 - Geometry validation
 - ~ 5 months @ 0.25 FTE (MB)
- Ckov
 - Resolve geometry
 - MC: resolve hits, digitizer, validation
 - Reconstruction tuning/cleanup
 - Calibration-CDB
 - ~ 5 months @ 0.5 FTE
- EMR
 - MC: finalize & merge
 - Reco: merge track reconstruction
 - Geometry description
 - Calibrations-CDB
 - “within a month” (Ruslan)
- Global
 - Track propagation & fits
 - PID
 - Need detailed plan (WS)
 - ~ 9 months is my estimate for getting global objects in MAUS
- Geometry
 - Detector-survey fits in MAUS (WS)
 - Validation from detector & beamline groups
 - Simulation tests
 - Documentation
 - ~2 months @ 0.5 FTE
- + Datastructure/API changes (speed improvements)
+ Online API changes (speed, usability) +
Documentation + Testing improvements



Risks & Priorities

- The big gap is global tracking
 - Peter Lane is moving on. New hands on deck
 - Specification exists
 - Need detailed plan (SWS task), guidance, feedback, review. Need to monitor closely and it may be we'll need to (re)allocate resources.
- Need one Official StepX Geometry that everyone uses
 - Geometry needs validation (from beamline & detector groups)
 - Testing and certification (geometry group) documentation
 - Usability and optimization
- Priority is to make sure we have working simulation and reconstruction (beam + geometry + detectors + global) ready for Step IV
- Software workshop this week – Thurs & Fri @ LBNL
 - If you'd like to show up/help/learn/use there's still time