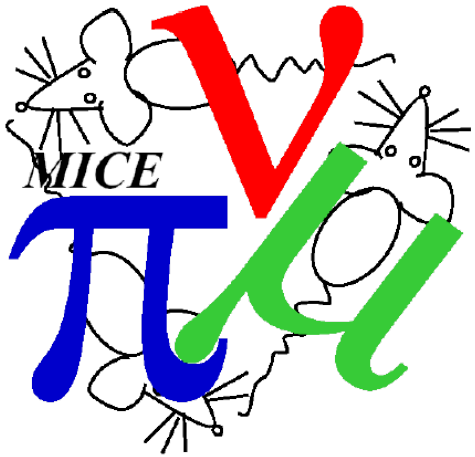
TOF Reconstruction & Calibration



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TOF Software

- Code review
- Calibration
- MC
- Reconstruction
- *Geometry*

TOF Code Review

- Very useful review of the TOF code last Thursday
  - Thanks to Chris Rogers & Ian Taylor
- Covered calibration, MC, reconstruction
  - Code structure, integrity, bugs, missing features, improvements
- Relevant actions from the review on the following pages

TOF Calibration - software

- Currently code is stand-alone, not integrated with MAUS
- The procedure is documented (MICE-NOTE-251), but the way to run the calibration code is not..so, only "experts" can run it...after they remember how to
- Lots of hooks and hard-coded constants
- Dependent on location of the TOFs
  - needs to match with survey & there should be a way to tell which survey/data the calibrations correspond to
- Actions from code review
  - ... should record version of the code that was used & any inputs
  - ... should be a documented procedure for what data to take
  - ... should be runnable by non-expert
  - ... use the correct TDC conversion (see Reconstruction)

TOF Calibration - data

- Two sets of calibrations available in the CDB
  - Step I data, December 2011 data
  - not clear which runs, survey were used for the Step I calibration
- The slabs/pixels on the periphery have poor statistics and hence several of them are uncalibrated
  - 7/20 TOF0 slabs have at least one missing calibration
  - 2 TOF1 (trigger station) slabs – at the top and bottom – have a missing calibration
  - 5/20 TOF2 have at least one missing calibration
  - a pixel with missing calibration means space point reconstruction will fail for hits in that pixel & reduces analyzable data
- Plan to increase coverage & statistics the next time we take calibration data

TOF MC

- Code stable
- Actions from review:
  - Better trigger formation
  - Add trigger window
  - Simulate pulse, ADC model
  - Add noise
  - bug fixes, documentation..

TOF Reconstruction

- Reconstruction code stable, but there are a couple of issues:
- If > 1 hit in a PMT, *only* the earliest is used in forming slab hits
  - Since the output already has this requirement, it makes it impossible to find out what we threw out
  - Modify so that *all* PMT digits are used in slab hit reconstruction
- Reconstruction uses the "wrong" TDC$\rightarrow$time conversion
  - can't be changed without re-running the calibration with the correct conversion
- Online reconstruction has been working with guide for shifters
  - speed improvements

To do

- Code documentation now exists but needs to be expanded
- Improvements in simulation of trigger, pulse
- Noise studies & adding noise to MC
- Calibration to be documented, automated, easy to run, recoverable
- Re-run with the correct TDC conversion and geometry
  - Goal is to have a documented, automated way to run the calibration for July