TCMT Reconstruction Software Status

G. Lima, V. Zutshi

NORTHERN ILLINOIS
UNIVERSITY

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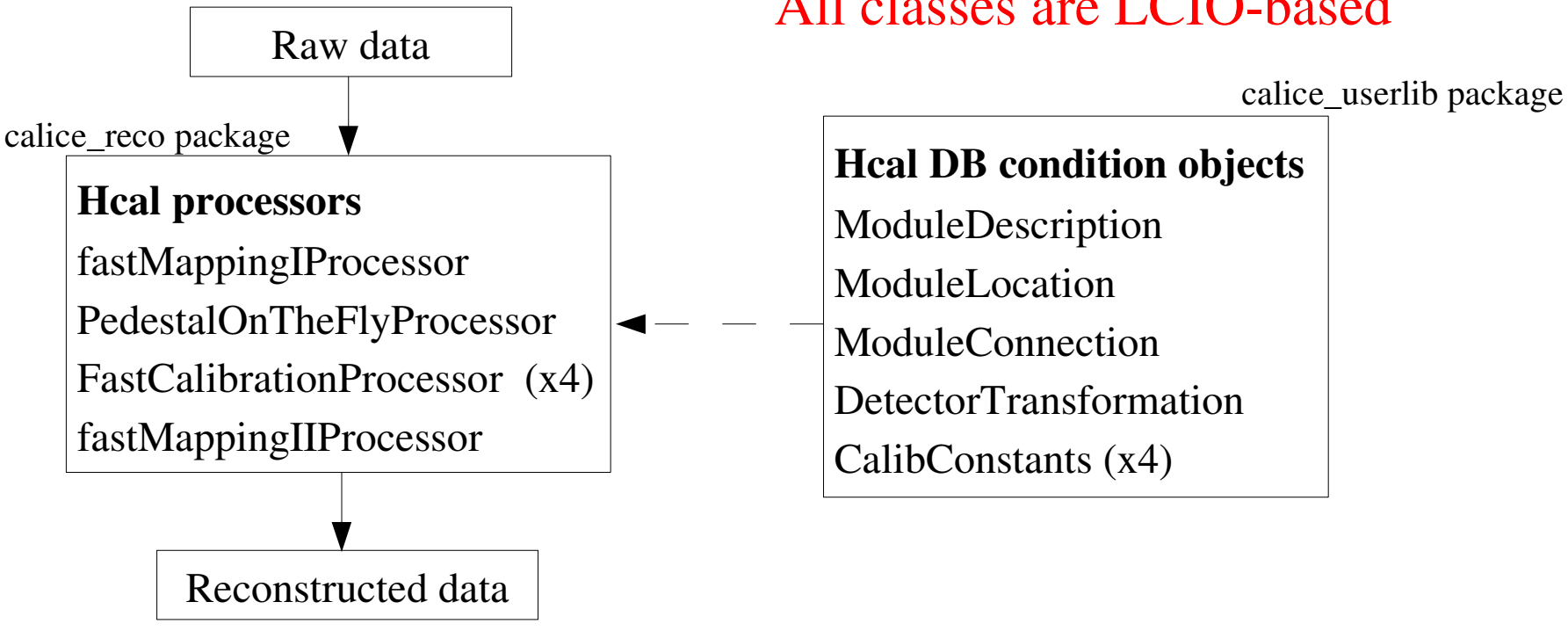
TCMT software and the conditions data

- Run conditions data:
  - Trigger definitions and other DAQ configurations
  - Temperatures, voltages (use based on timestamps)
  - Detector descriptions, connections, local and global positioning (TCMT)
  - Calibration constants
- Calice implementation: CondDBMySQL + LCCD
  - Ecal, Hcal software uses a conditions DB extensively
  - TCMT software should use it too (currently flat files only, prone to error)

strategy: reuse when possible, otherwise adapt from Hcal software

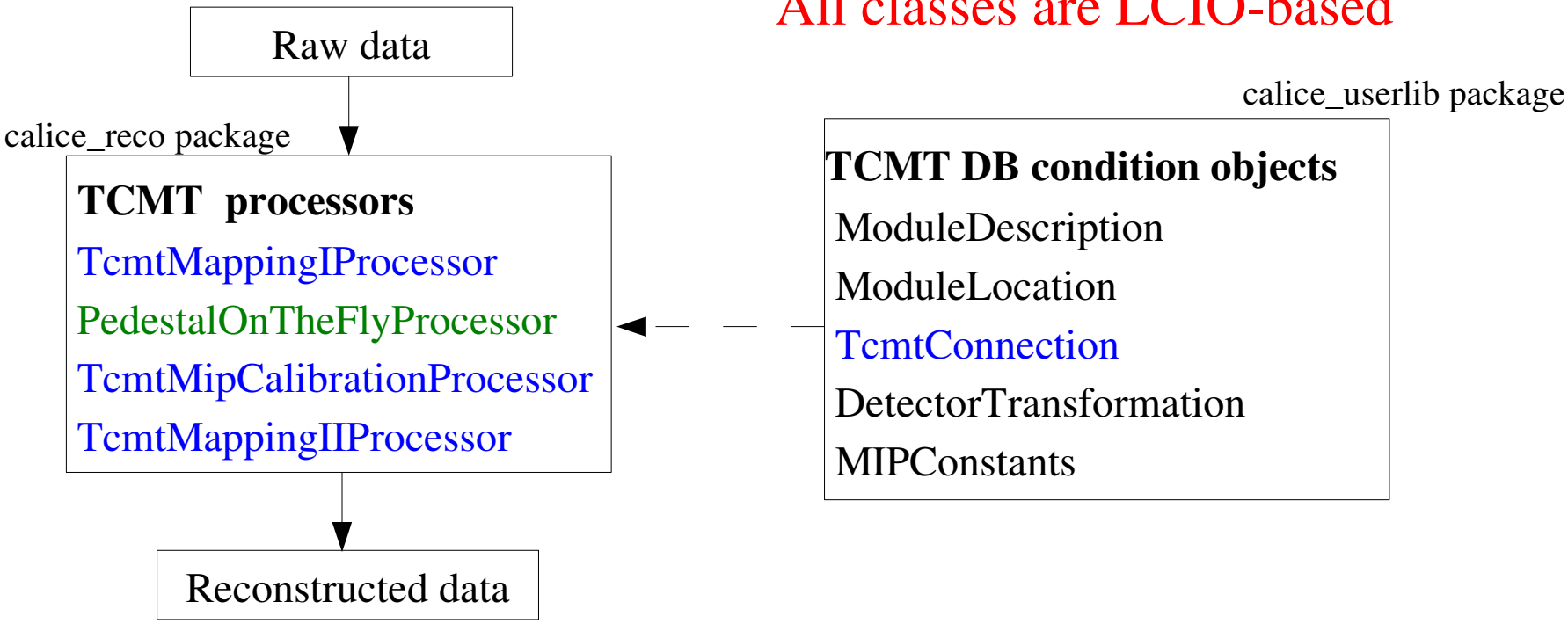
Hcal software structure

All classes are LCIO-based



TCMT implementation

All classes are LCIO-based



Black: reused from Hcal without changes

Green: reused from Hcal with minimal changes

Blue: new code for TCMT

TCMT implementation

- New condDB folders:
  - /cd_calice_cernbeam/Tcmt/TcmtDescription (class ModuleDescription)
  - /cd_calice_cernbeam/Tcmt/TcmtLocation (class ModuleLocation)
  - /cd_calice_cernbeam/Tcmt/TcmtConnection (class TcmtConnection)
  - /cd_calice_cernbeam/Tcmt/TcmtDetectorPosition (class DetectorTransformation)
  - /cd_calice_cernbeam/Tcmt/Mip00 (class MIPConstants)
- Binaries to create these DB folders are released into the cddata package:
  - createTcmtDescription.cc, createTcmtLocation.cc, createTcmtConnection.cc, createDetectorTransformationSimple.cc, createTcmtMIPCalibration.cc

TCMT-relevant additions and changes

- Package calice_userlib:
  - TcmtConnection
    (NEW) slot/fe/chip/channel <---> module/strip relationships
  - Alignment
    maximum of 23 module types allowed (suggested by Sebastian: tcmt types 21,22)
  - CalibrationWriter
    write Tcmt MIP calibration DB folder (use moduleID=0 for all Tcmt modules!)
  - FastCaliceHit::print()
    Tcmt module/strip are stored as chip/channel (used as keys for calib constants)
  - MappingAndAlignment
    _moduleConnectionList (a vector) + _tcmtConnectionList (a map)

TCMT-relevant additions and changes

- Package calice_reco:
  - TcmtMappingIProcessor
    (NEW) inherits from VRawADCValueProcessor
  - TcmtMIPCalibrationProcessor
    (NEW) inherits from FastCalibrationProcessor
  - TcmtMappingIIProcessor
    (NEW) define output cellIDs (same convention as Mokka for output cellID bits)
  - PedestalOnTheFlyProcessor
    works just fine for Tcmt as for Hcal if module/strip used for cellKey

Basic checks: run 300620 – October 2006

```
---  LCIOCollectionHistogramer Report :
          TcmtHitsLevel1DB:      9500:      320 <       320+-         0 <       320
        TcmtHitsLevel1noDB:      9500:      320 <       320+-         0 <       320
          TcmtHitsLevel2DB:      9480:        2 <   23.1237+-   17.3087 <       112
        TcmtHitsLevel2noDB:      9480:        2 <   23.1237+-   17.3087 <       112
          TcmtHitsLevel3DB:      9480:        0 <   14.7073+-   15.3211 <        91
        TcmtHitsLevel3noDB:      9480:        0 <   14.7073+-   15.3211 <        91
       TcmCalorimeterHits:      9452:        1 <   14.7508+-   15.3228 <        91
     TcmCalorimeterHitsNoDB:      9452:        1 <   14.7508+-   15.3228 <        91
```

Mapping I

Peds subtraction

MIP calibration

Mapping II

Basic checks: run 330142, July 2007

```
---  LCIOCollectionHistogramer Report :

        TcmtHitsLevel1DB:     9500:      320 <        320+-         0 <       320
      TcmtHitsLevel1noDB:     9500:      320 <        320+-         0 <       320

        TcmtHitsLevel2DB:     9480:        2 <    27.3768+-   6.71089 <        79
      TcmtHitsLevel2noDB:     9480:        2 <    27.3768+-   6.71089 <        79

        TcmtHitsLevel3DB:     9480:        0 <    21.5662+-   5.97083 <        70
      TcmtHitsLevel3noDB:     9480:        0 <    21.5662+-   5.97083 <        70

     TcmCalorimeterHits:     9479:        1 <    21.5685+-   5.96704 <        70
   TcmCalorimeterHitsNoDB:     9479:        1 <    21.5685+-   5.96704 <        70
```

Mapping I

Peds subtraction

MIP calibration

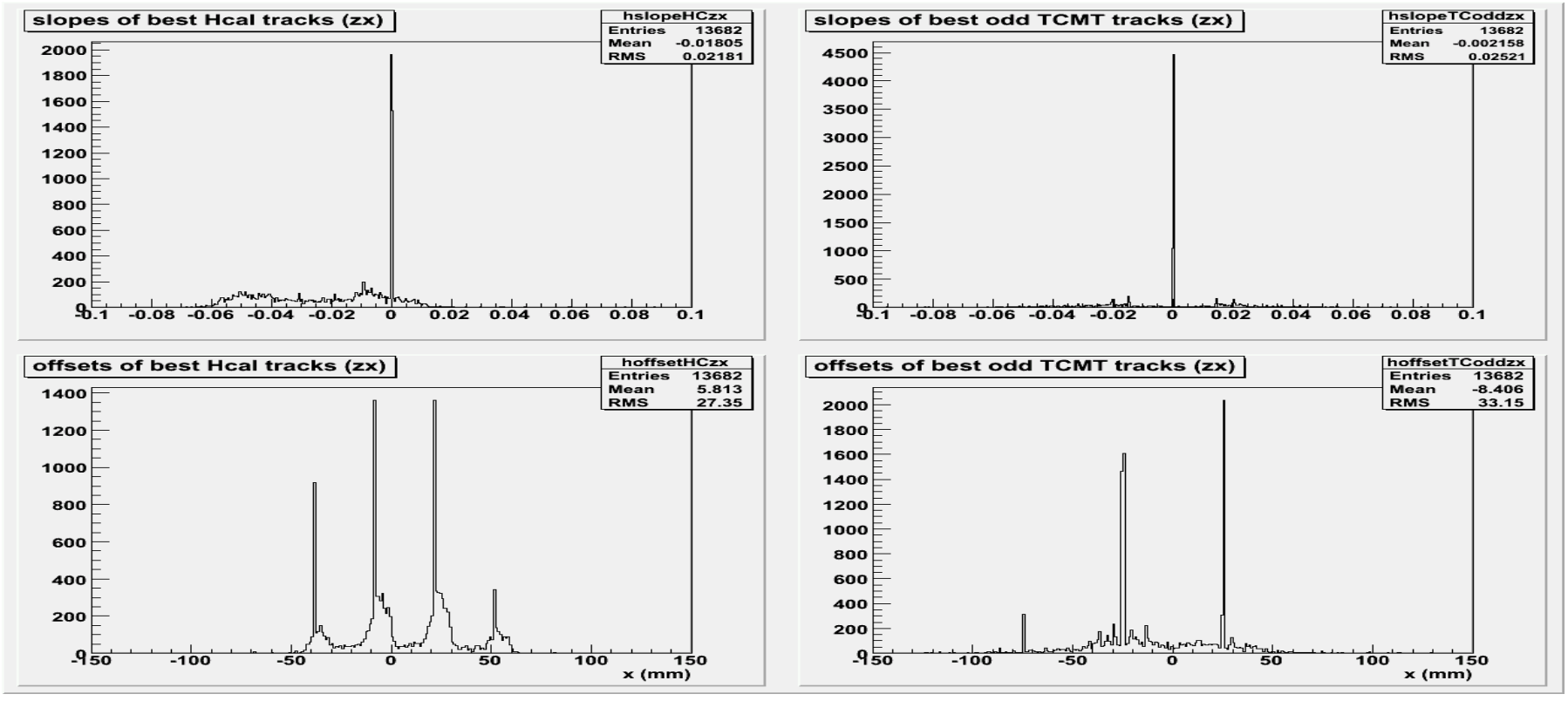
Mapping II

Summary

- Integration of TCMT in the database framework well underway
- All TCMT code has been released into official CVS repository
- Simulation of detector effects in MC needs attention
- Documentation under preparation

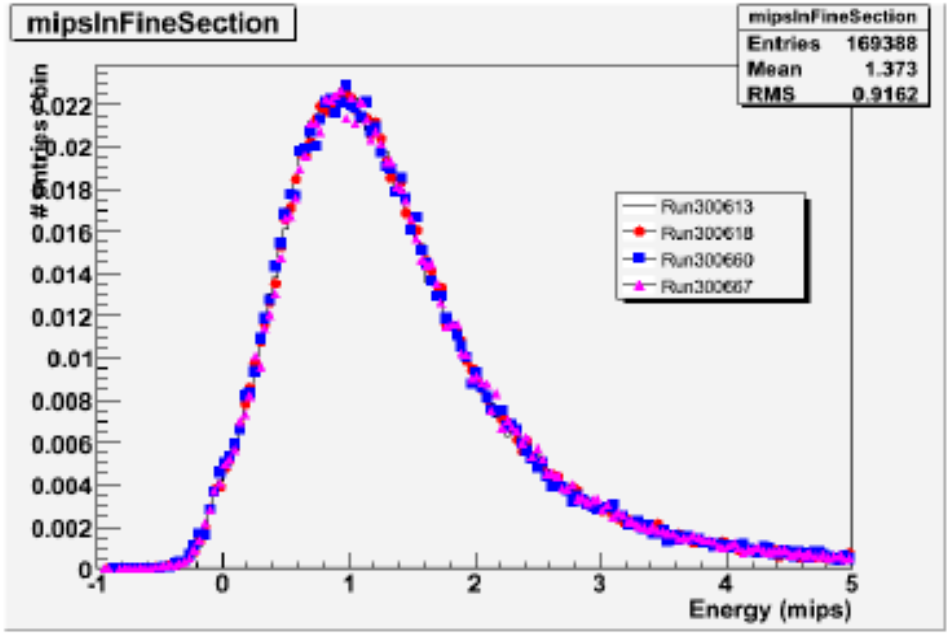
Addendum (Paul's List)

- Can the reconstruction be realistically done with one iteration or is more than one usually needed?



Addendum (Paul's List)

- How much variation is there in calibration (or whatever) constants within a run, or run-to-run?



Addendum (Paul's List)

- How much variation is then needed in MC events? How realistic is the MC digitisation?.....

Mokka output is 5cm x 5cm virtual cells

DigiSim gangs these into real size strips

Input: SimCalHits

Output:CalorimeterHits

Currently no noise, x-talk etc.