Alcap Analyis Code Summary

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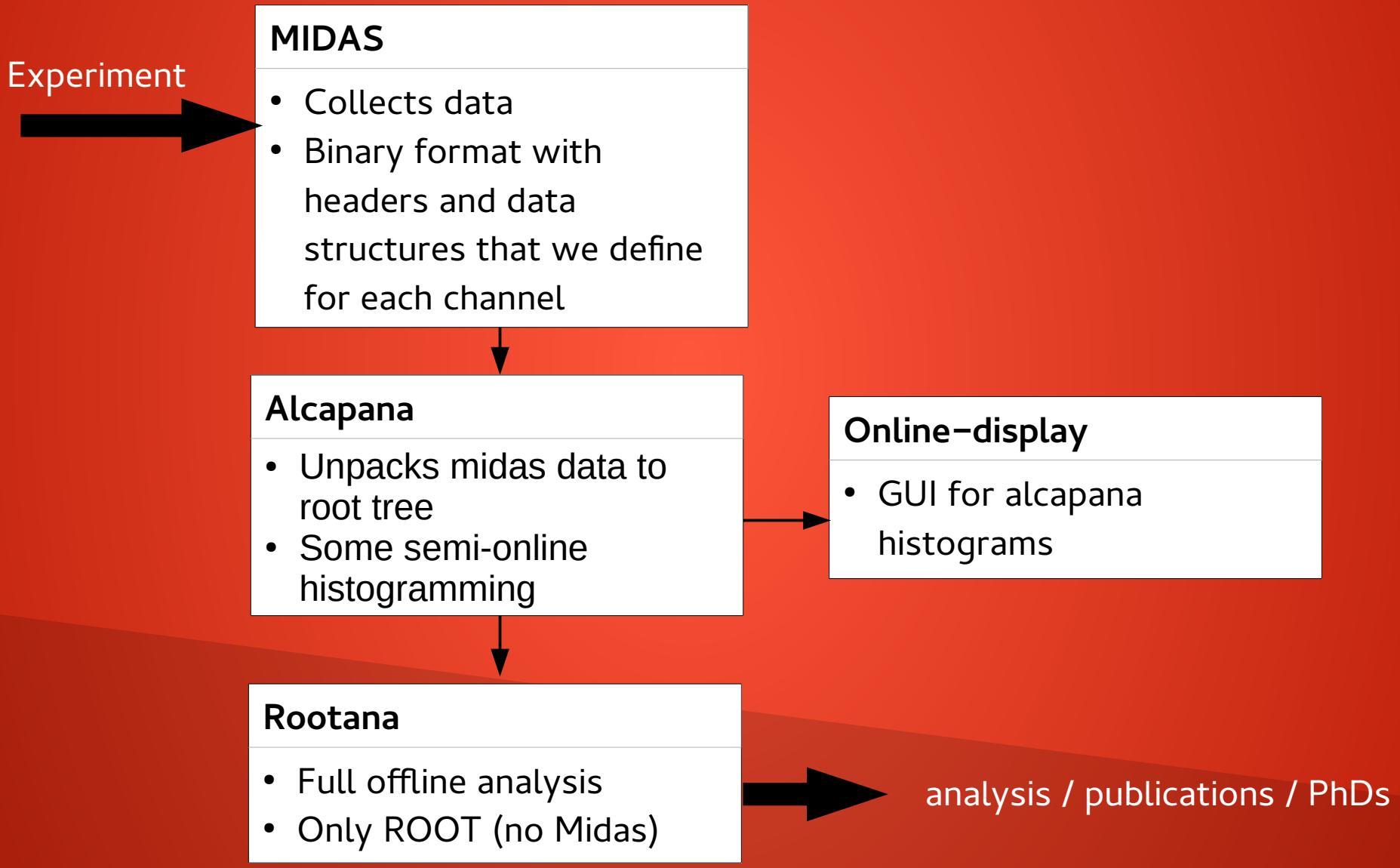
27th February 2014

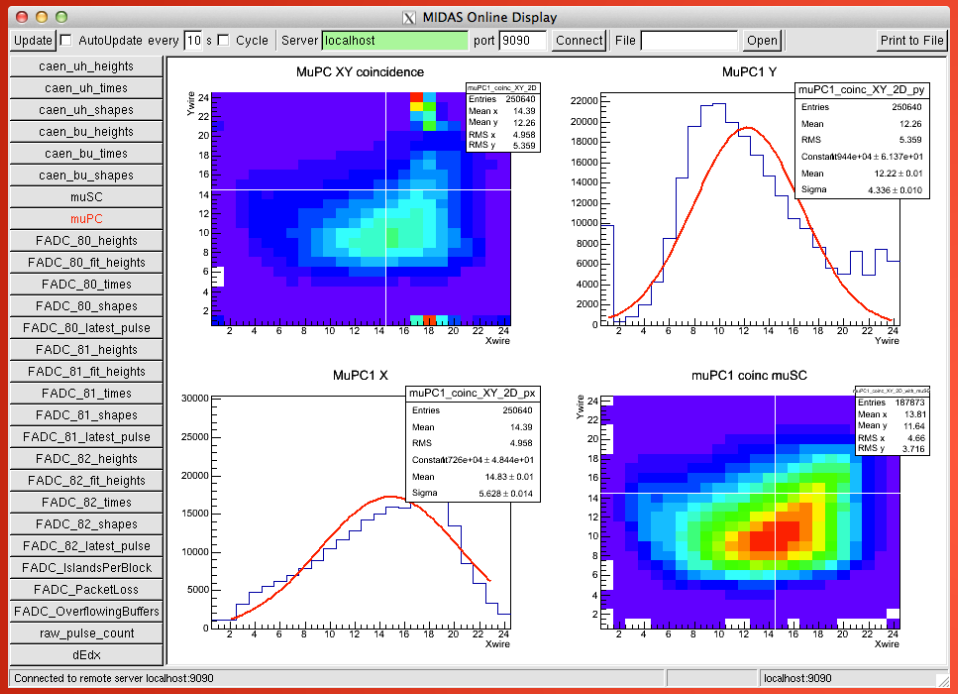
Overview

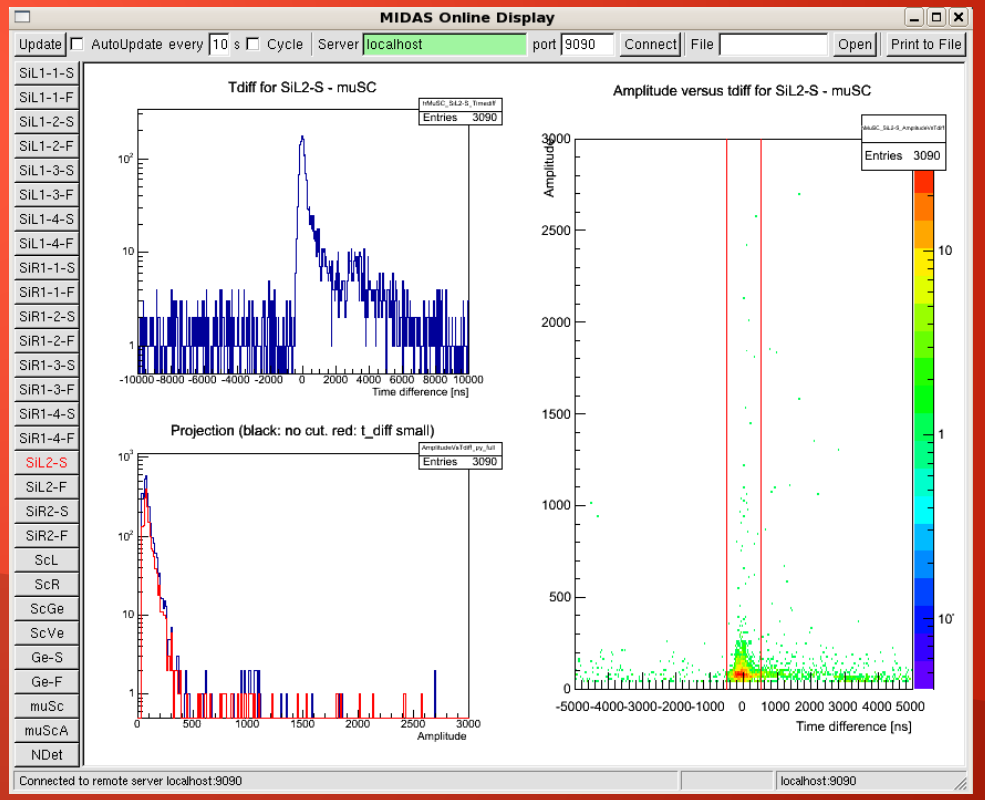
- General approach
- Analysis so far
- What we need / want
- Offline Analysis (Rootana)
  - Where we're at
  - What needs doing

Overall approach

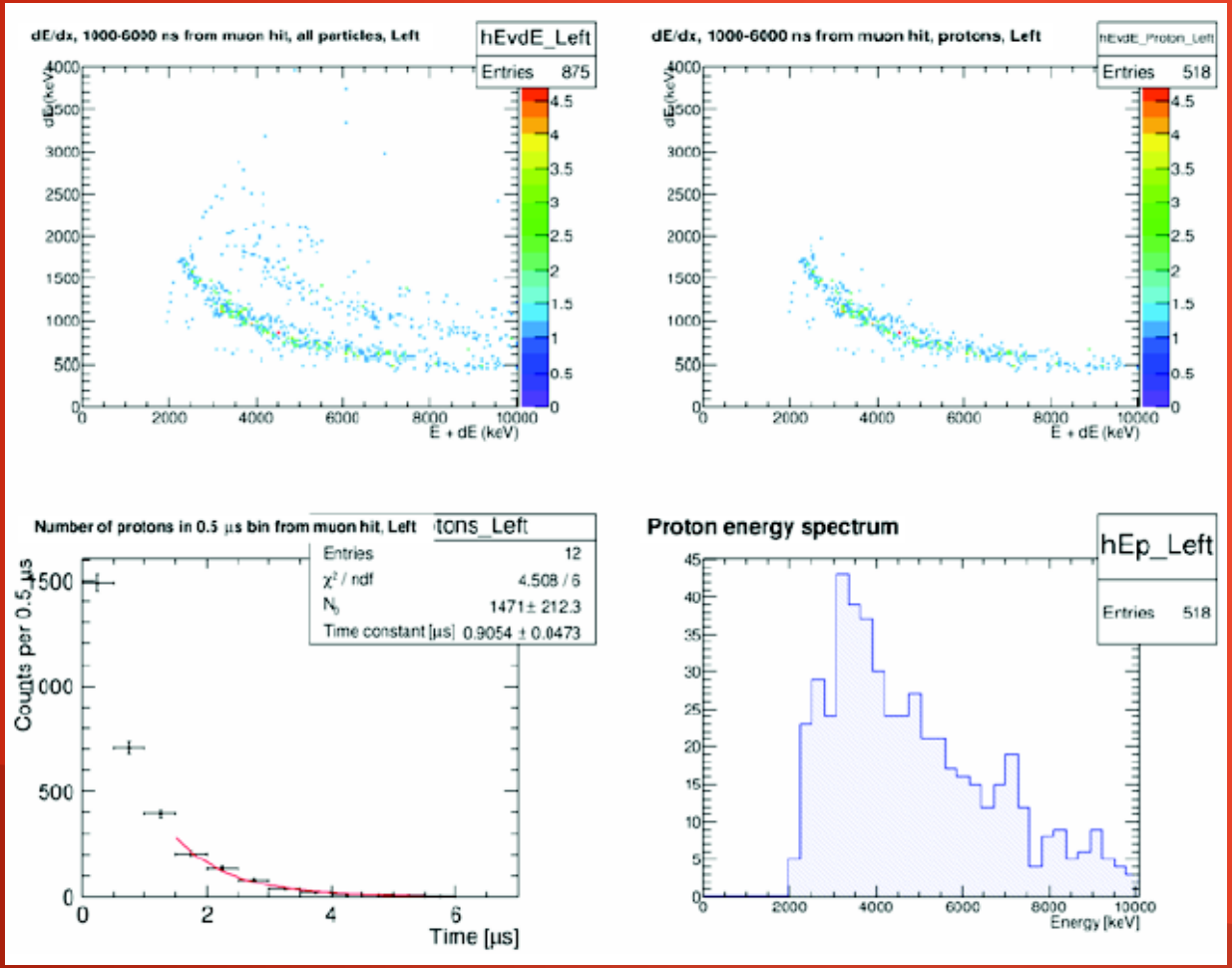


Analysis so far: Online





Analysis so far: Nam



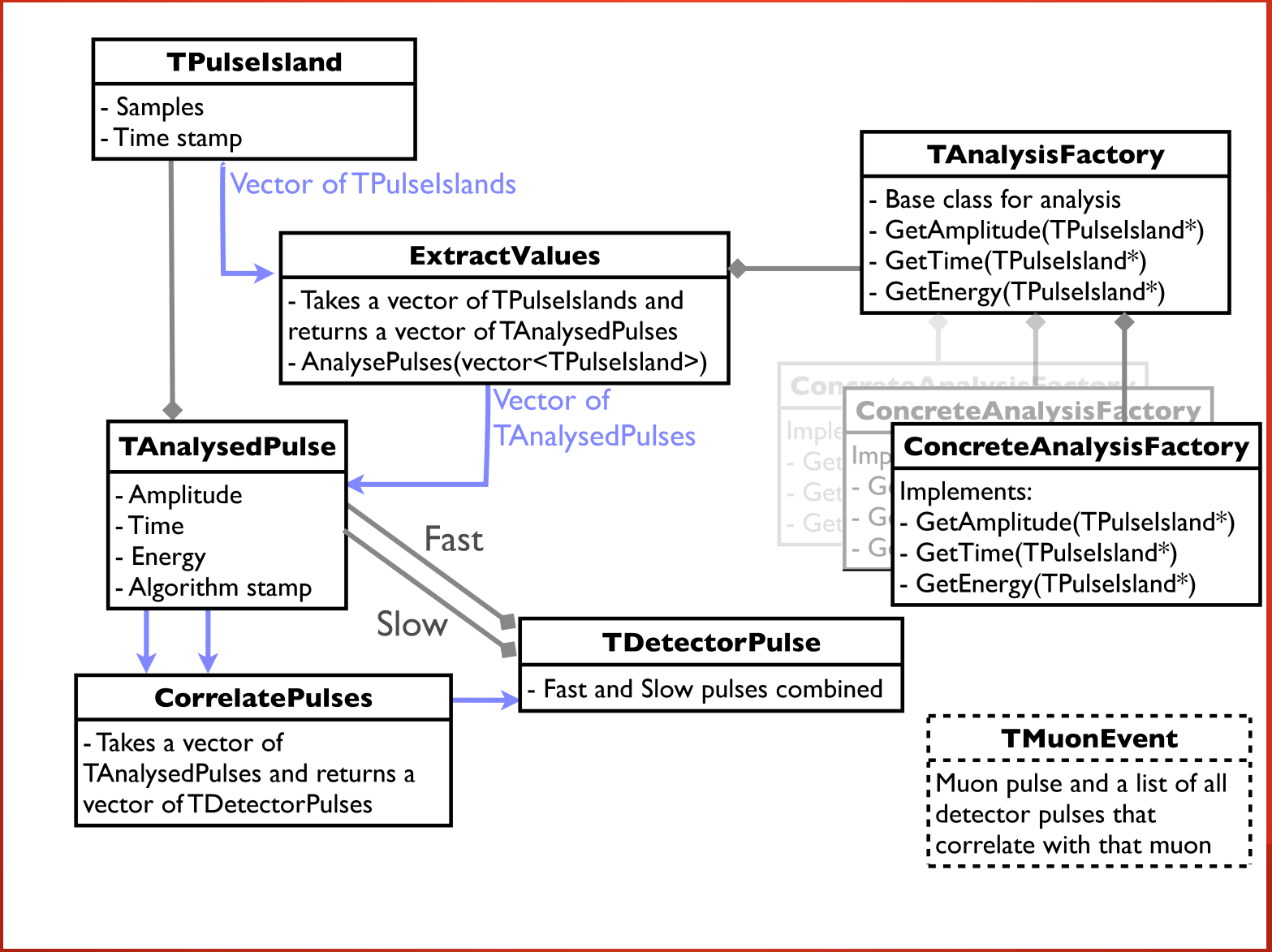
From Nam's talk on Tuesday

- Max-bin methods for pulse amplitude (in rootana)
- EvdE module
- Simple Ttree::Draw + cuts

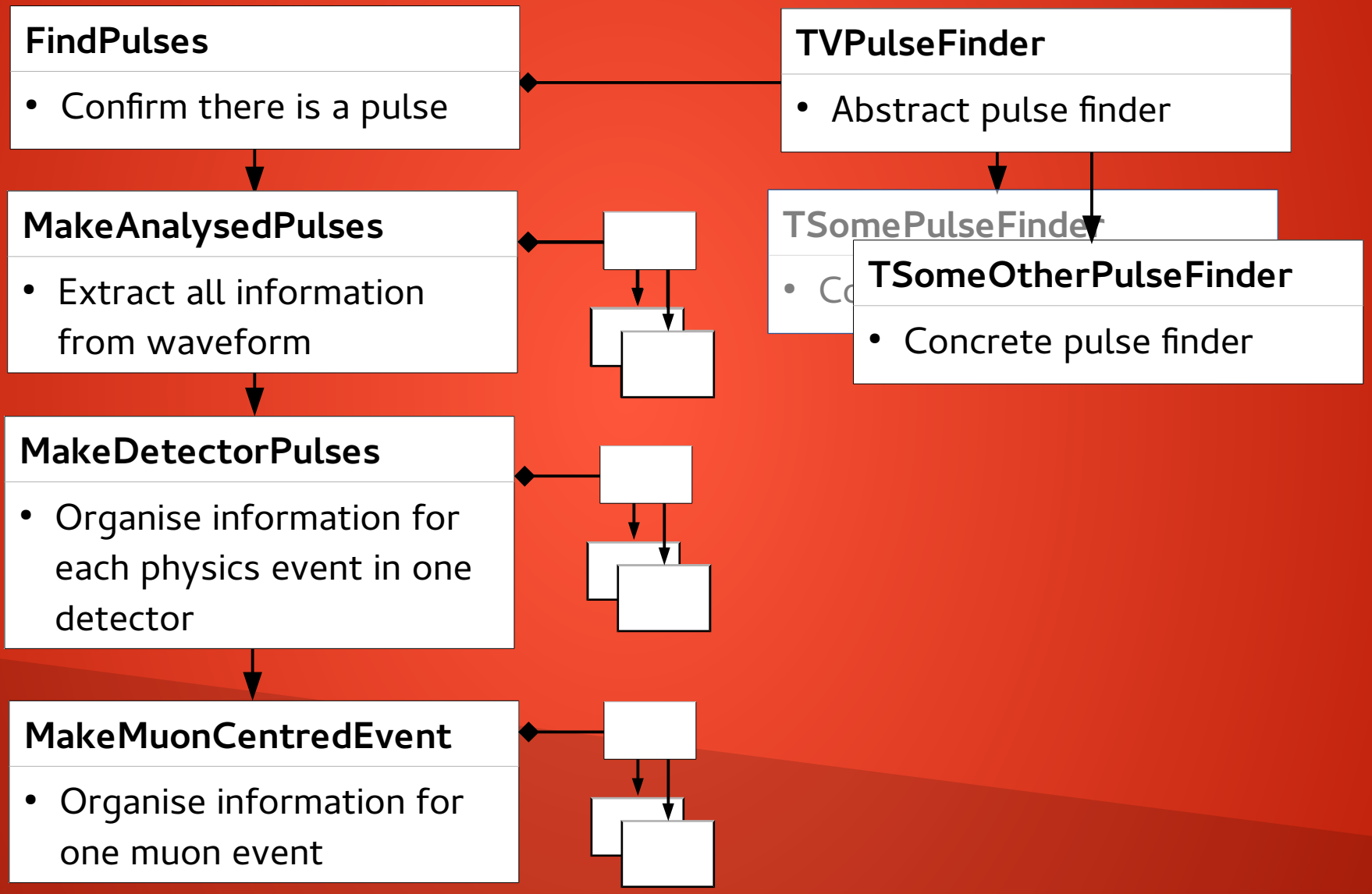
Aims

- Need some real checks for data quality
- Want to see the proton distribution + rate
- Want to know rates for all particles (PID, dEvsE)
- Need x-ray spectrum and integration of peak for normalisation
- Lifetimes of these processes as cross-check that we understand their source
- Neutron spectrum (?)

Planned Rootana structure



(Planned) Rootana structure



(Planned) Rootana structure

TAnalysedPulse

- Amplitude, time, energy, pedestal
- Book-keeping: generator, TPI (pointer, ID ...)

➔All waveform analysis finished (in principle)

TDetectorPulse

- Fast TAP (may be NULL)
- Slow TAP (may be NULL)
- Get time, amplitude etc from one of the TAPs

➔One event in a detector

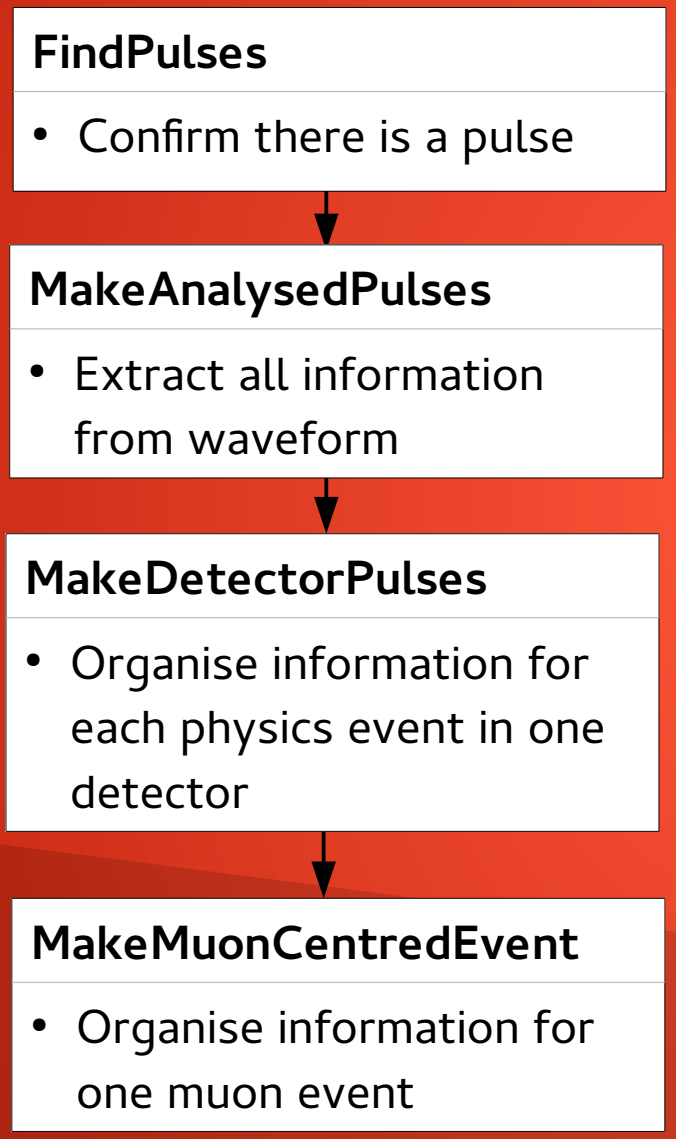
- Is this ok?
- What have I missed?

TMuonEvent

- One MuSc pulse
- A list of TDetectorPulses for each detector that occurred in this MuSc window
- Other information for cuts (time until next muon event etc)

➔One event in the chamber

(Planned) Rootana structure



- In: TPulseIslands
- Out: TPulseIslands

- In: TPulseIslands
- Out: TAnalysedPulses

- In: TAnalysedPulses
- Out: TDetectorPulses

- In: TDetectorPulses
- Out: TMuonEvents

Rootana manager

Accessing analysis objects:

- Singleton manager available from anywhere (replaces global pointers)
- Keep a list of TAnalysedPulses
  - One vector per midas event per channel
- Keep a list of TDetectorPulses
  - One vector per midas event per detector
- Keep a vector of TMuonEvents
  - One vector per midas event per chamber
- Controls writing objects to file

Book-keeping

- Do we use the same 'manager' ?
- TSetupData would be merged into this?
- Analysis options, types of generator etc

Current Rootana Modules

Name	Purpose	Status
AnalysePulseIsland	Get pulse height + timing	Remove
CheckCoincidence	Histograms (code all commented out)	Remove ?
CoincidenceCut	Pair up pulses from two channels	Make into TDP generator
CreateDetectorPulses	Old version of MakeDetectorPulses	Remove
DeadTimeGe	Histogram difference in time of each germanium pulse	Upgrade
EvdE	Make E vs dE plot, uses TAPs	Upgrade, use TMuonEvents
Lifetime	Histogram, lifetime of particles with certain energy	Upgrade, use TMuonEvents

Current Rootana Modules

Name	Purpose	Status
MakeAnalysedPulses	Run TVAnalysedPulseGenerator	New, tested
MakeDetectorPulses	Run TVDetectorPulseGenerator	New, not tested
MakeMuonEvents	Run TVMuonEventGenerator	Old, needs rewriting
MyModule	Example module	Remove ?
Normalization	Count MuSc hits above a threshold	Upgrade
PlotAmplitude	Histrogram pulse amplitudes	Optimise
PlotAmpVsTDiff	Time shift histogram	Optimise
PlotTime	Histogram pulse times	Optimise
SimpleHistograms	Histogram number of pulses and number of coincidence events	Optimise
SiR2Target	Histogram energy deposit in silicon detectors	Check, optimise

Summary

- Intended structure:
  - Analyse the waveforms
  - Correlate pulses within a detector
  - Correlate events to each muon
- To do:
  - Data Manager - need to implement, remove global pointers, ability to store data in root file
  - Make sure our book-keeping is set-up: All inputs and options should be recorded (along-side data, file-hashes, filenaming conventions etc?)
  - Finish basic generators and structure

Run settings

- Problem:
  - Wrong values for certain wiremap fields
  - Some fields missing
- ODB contains:
  - Fixed online configurations (used by DAQ)
  - Offline values (not used by DAQ), that could be wrong online (=> changed offline)
    - Detector names, trigger polarities, time shifts
- Need to know exactly where this information comes from to trust analysis