Imperial College
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MICE Tracker Software Overview

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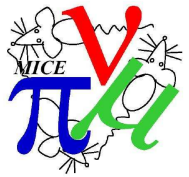
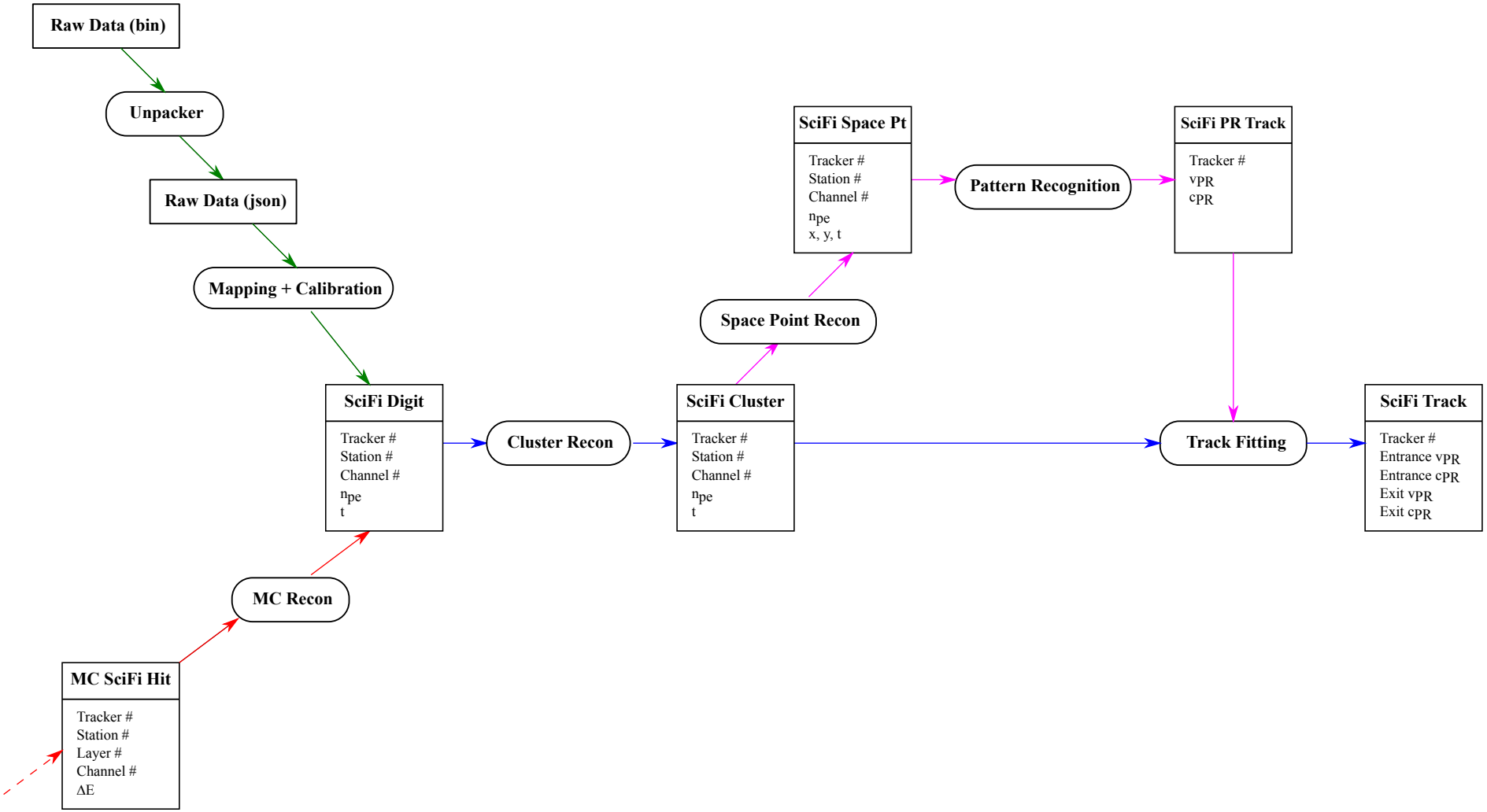
Data Structure: JSON and Classes



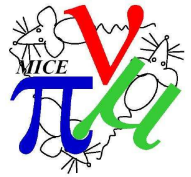
- Currently use JSON for data persistency in MAUS
- Consists of repeating layers of Python dictionaries and lists
- Tracker reconstruction software so far has operated *directly* on the JSON structure
- This is undesirable as:
  - Any future move from JSON will trigger a major code re-write
  - Concerns for JSON speed vs. a binary format
  - Code readability

$\rightarrow$ Define Class-based data structure, using JSON only for persistency

Reconstruction Data Flow



Class Descriptions I



SciFiHit

Methods
birth()
death()
Getters()
Setters()
Members
Int Tracker #
Int Station #
Int Channel #
Double delta_E

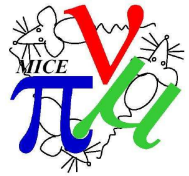
SciFiDigit

Methods
birth()
death()
Getters()
Setters()
Members
Int Tracker #
Int Station #
Int Channel #
Int npe #
Long t

SciFiCluster

Methods
birth()
death()
GetDigits()
SetDigits()
Getters()
Setters()
Members
SFDigits Digits[]
Int Tracker #
Int Station #
Int Channel #
Int npe #
Long t

Class Descriptions II



SciFiSpacePoint

Methods
birth()
death()
GetClusters()
SetClusters()
Members
SFCluster cls[]
Int Tracker #
Int Station #
Int npe #
Long t
Long x
Long y

SciFiPRTrack

Methods
birth()
death()
GetSpacePoints()
SetSpacePoints()
Getters()
Setters()
Members
SFSpacePoints sp[]
Double vPR[]
Double cPR[]

SciFiTrack

Methods
birth()
death()
GetClusters()
SetClusters()
Getters()
Setters()
Members
SFClusters cls[]
Double Ent_vPR[]
Double Exit_vPR[]
Double Ent_cPR[]
Double Exit_cPR[]

Progress

- Unpacker working and in trunk (Y. Karadzhov and E. Santos)
- Geometry schema defined (O.Lysenko, K. Long, M. Littlefield)
- Interface between CDB and MiceModules working (M. Littlefield)
- Mapping and Calibration going well and working for cosmics (E. Santos)
- Space point reconstruction going well and working for cosmics (E. Santos)
- Pattern Recognition progressing (S. Blot)
- Digitisation and Space Point reconstruction being re-written for class system (E. Santos)
- Class structure and data flow progressing (A. Dobbs, K. Long)
- Streamers written for converting JSON to Classes to ROOT (A. Richards)
- First iteration of SciFiDigit class written and compiling in MAUS (A. Dobbs)

To Do

- Geometry data continues to be verified (O. Lysenko)
- Most code still built around JSON, trasfer just begining (e.g Pattern recognition)
- JSON streamers need to work for just Class conversion (A. Richards)
- Most classes still to be written (A. Dobbs)
- Full track reconstruction still needs to be written (A. Dobbs)
- Monte Carlo needs proper implementation (A. Dobbs, E. Santos)
- Almost no code in the MAUS trunk
- No unit tests or documentation