# Data Quality & Online Reco

Linda R. Coney

UNIVERSITY OF CALIFORNIA UCRIVERSIDE

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# Data Quality

- **Is the data analyze-able?**
  - **Check basic level of data – before reconstruction**
  - **Can we run G4MICE over the data without crashing**

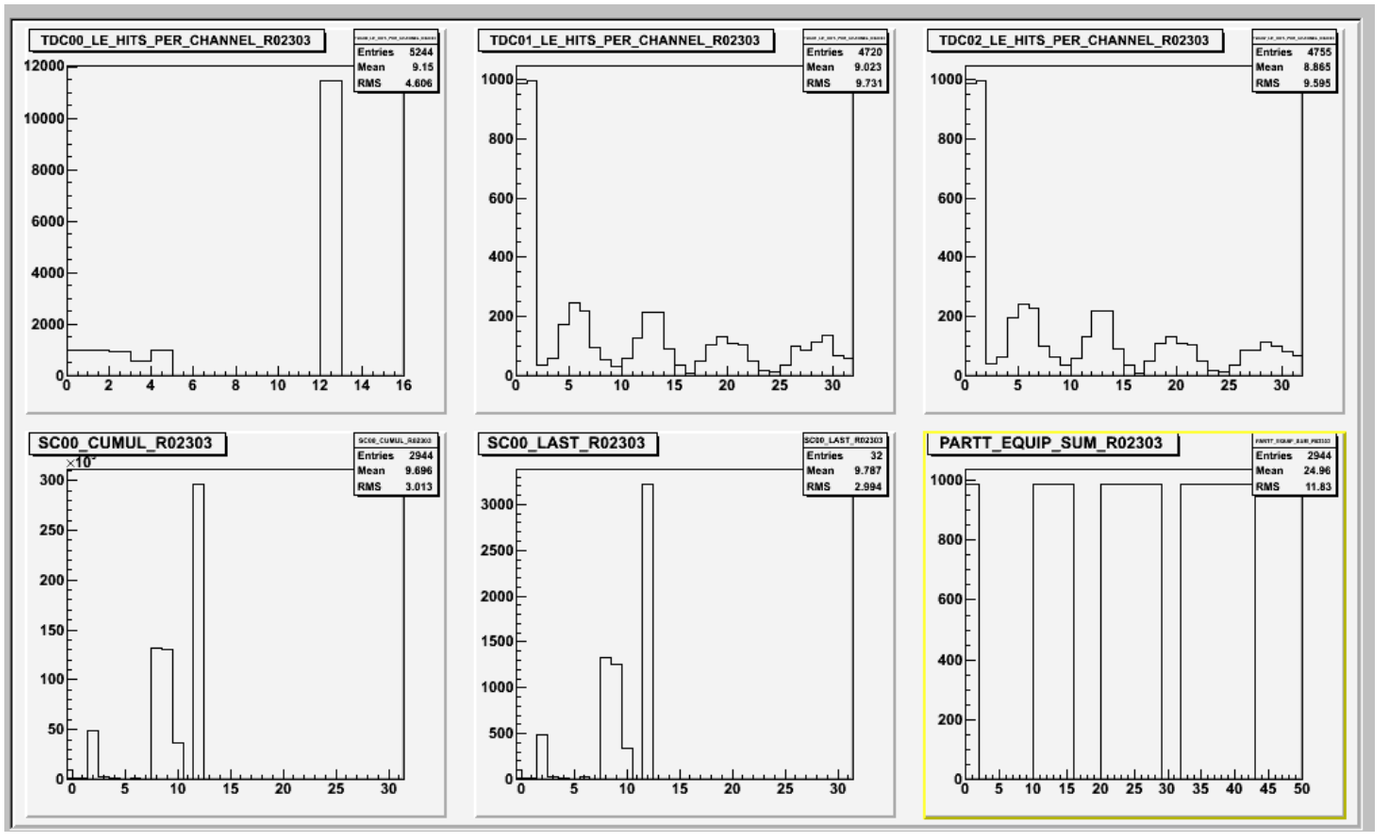
- **Is the data good?**
  - **Check basic quantities – Online Monitoring**
  - **Look for noisy/dead channels**

- **Online Data Quality**
  - **Check other/more advanced quantities**

- **Online Reconstruction**
  - **Physics quantities**
  - **Detector reconstruction**
  - **Beam dynamics**

# Online Now

- **Online Monitoring**
  - **New functionality added by Vassil to give options for which plots to show**
  - **Default still available:**

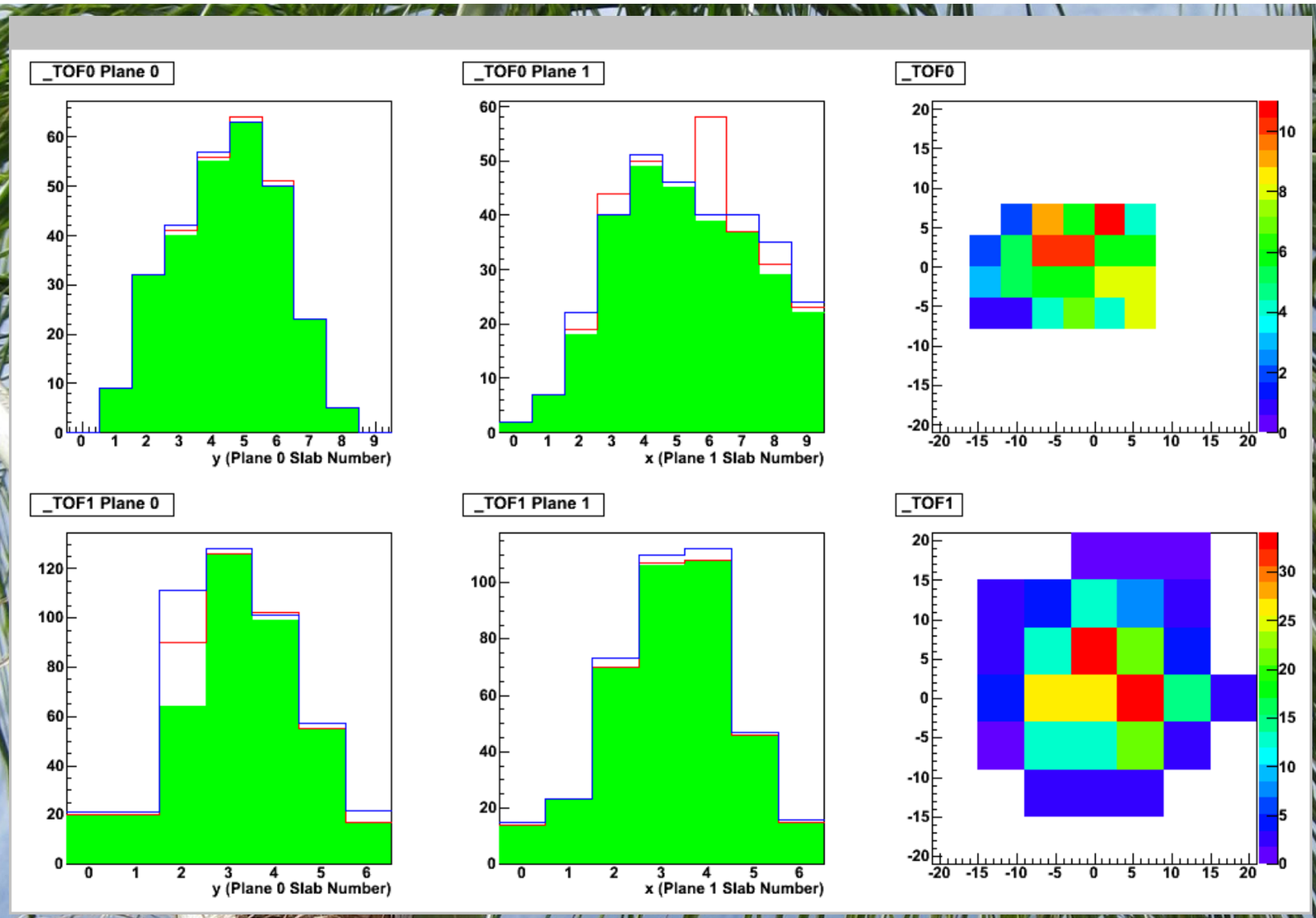



- **Online Data Quality**
  - **Application running**

- **Online Reco**
  - **TofMonitor**
  - **KLMonitor**
  - **Scalar Info**
  - **Beam Optics – phase space reconstruction using TOFs**

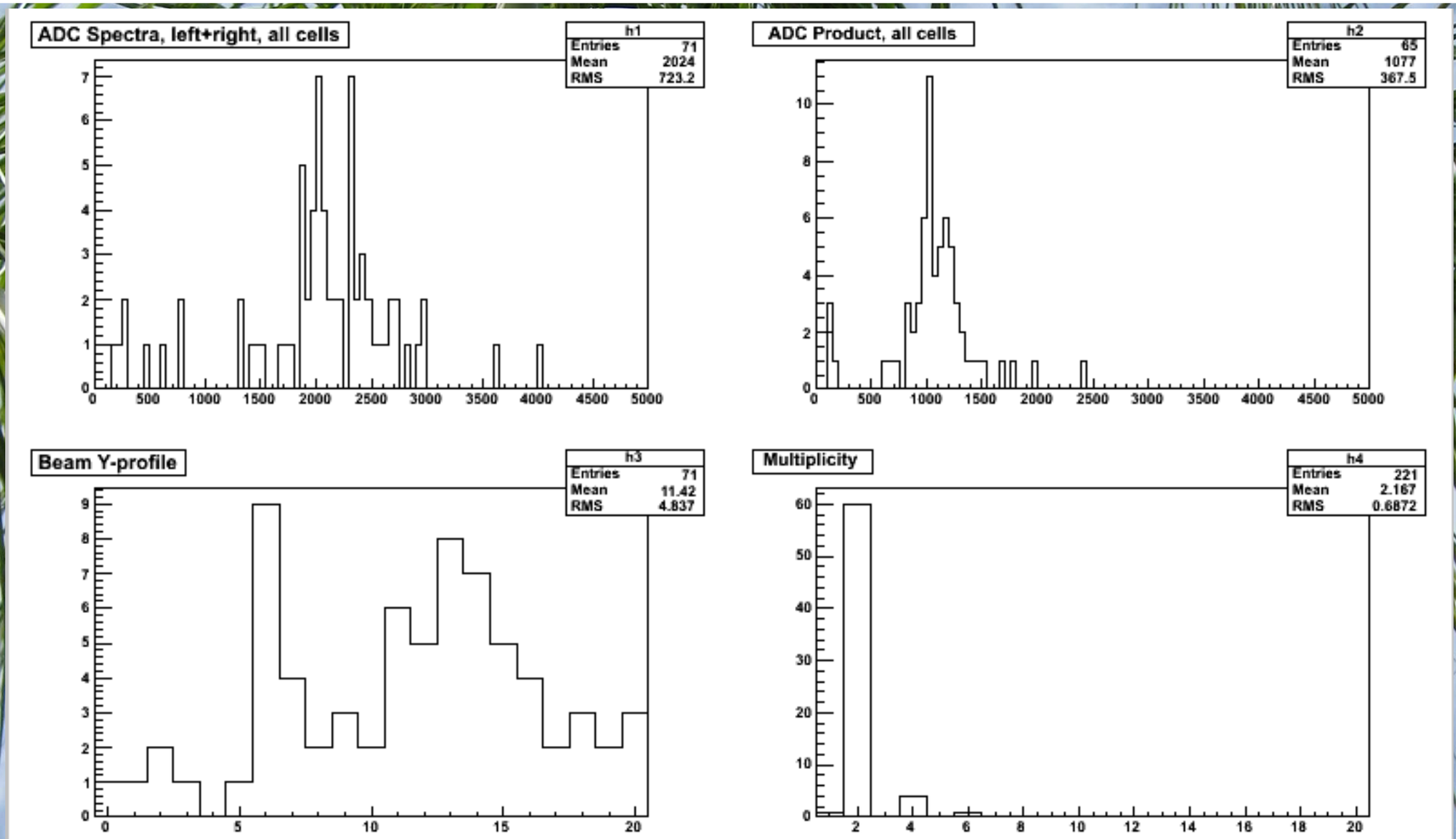
# Online Reconstruction Now

- **Online Reconstruction**
  - **TofMonitor: M. Rayner/V. Verguilov**



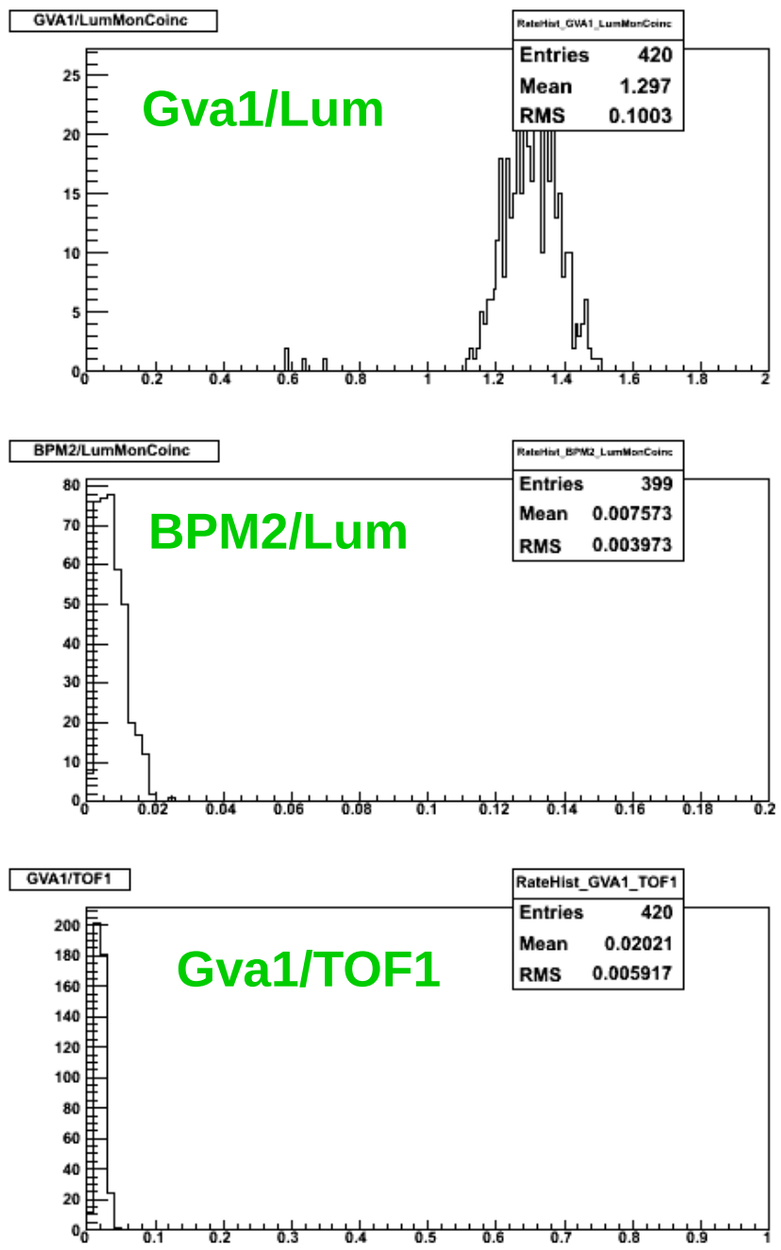
# Online Reconstruction Now

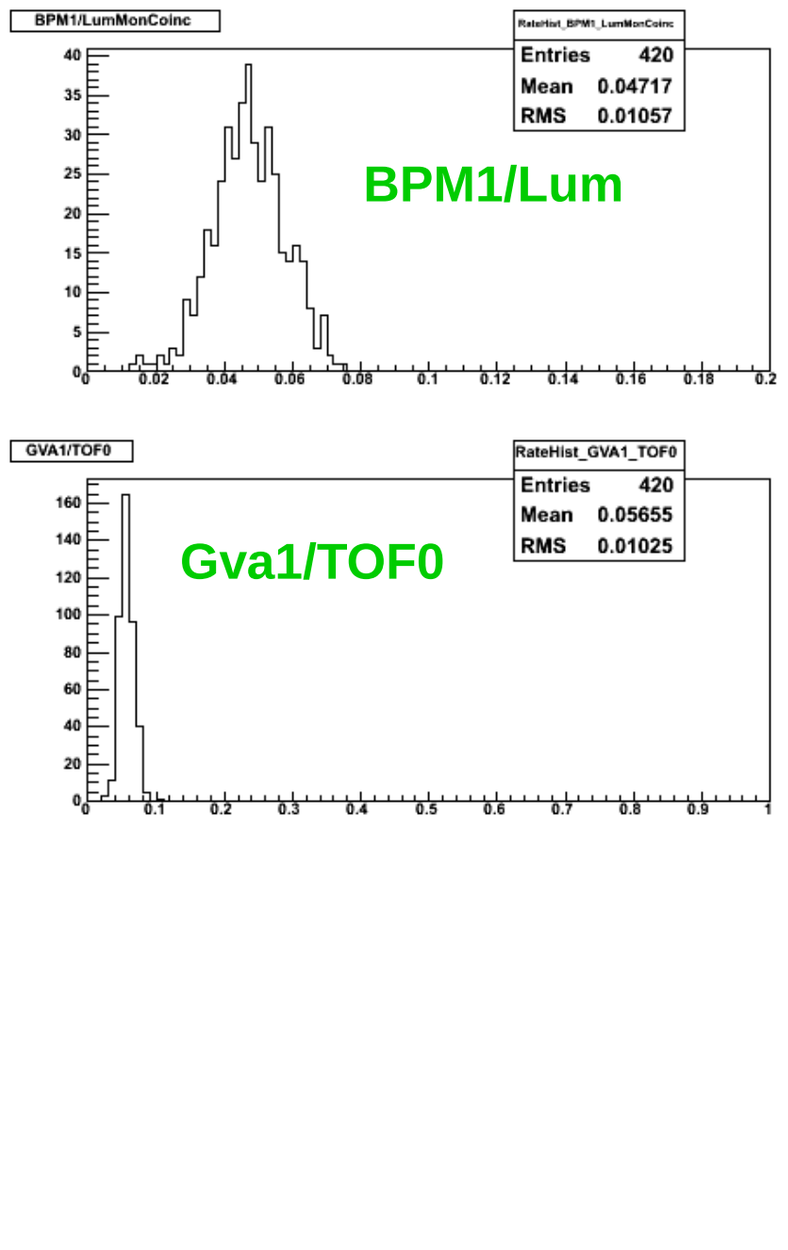
- **Online Reconstruction**
  - **KLMonitor: M. Bogomilov/V. Verguilov**



# Online Reconstruction Now

- **Online Reco**
  - **Scalars:**
  - **V. Verguilov**



# Online Reconstruction Now

- **Online Reco**
  - **Scalars**
  - **V. Verguilov**

File Edit View Terminal Tabs Help

mice@miceonrec02a:~/mice/MICE/Applications/... × | root@miceonrec02a:/etc × | root@miceonrec02a:~ ×

```
Tof0/Bpm1       1.4091  1.5603          1.6795          0


Run Number: 2303        Spill Number: 258
Scaler Name     Value   Avg. 10 sp      Avg. 20 sp      Avg. 60 sp
Trig. Req.      9       10.9            11.3            0

Triggers        9       11              11.45           0

Gva1            487     525.5           532.3           0

BPM1            13      18.8            18.35           0

BPM2            1       2.2             3.75            0

Tof0            25      28.9            29.65           0

Tof1            9       11.1            11.5            0

LM 12           1320    1433.1          1444.6          0

LM 34           1269    1402.9          1422.4          0

LM 1234         393     406.8           412.35          0

Trig/Trig.Req.  1       0.99            0.98833         0

Gva1/LM1234     1.2392  1.2909          1.2927          0

Bpm1/LM1234     0.033079        0.046198                0.044591                0

Bpm2/LM1234     0.0025445       0.0053265               0.0090873               0

Tof0/LM1234     0.063613        0.071047                0.072323                0

Tof1/LM1234     0.022901        0.027203                0.027775                0

Bpm1/Gva1       0.026694        0.035812                0.034486                0

Tof0/Gva1       0.051335        0.055092                0.055958                0

Tof1/Gva1       0.01848 0.021085                0.021417                0

Tof1/Tof0       0.36    0.38367         0.39299         0

Tof0/Bpm1       1.9231  1.5597          1.6856          0
```

# Online Reconstruction Now

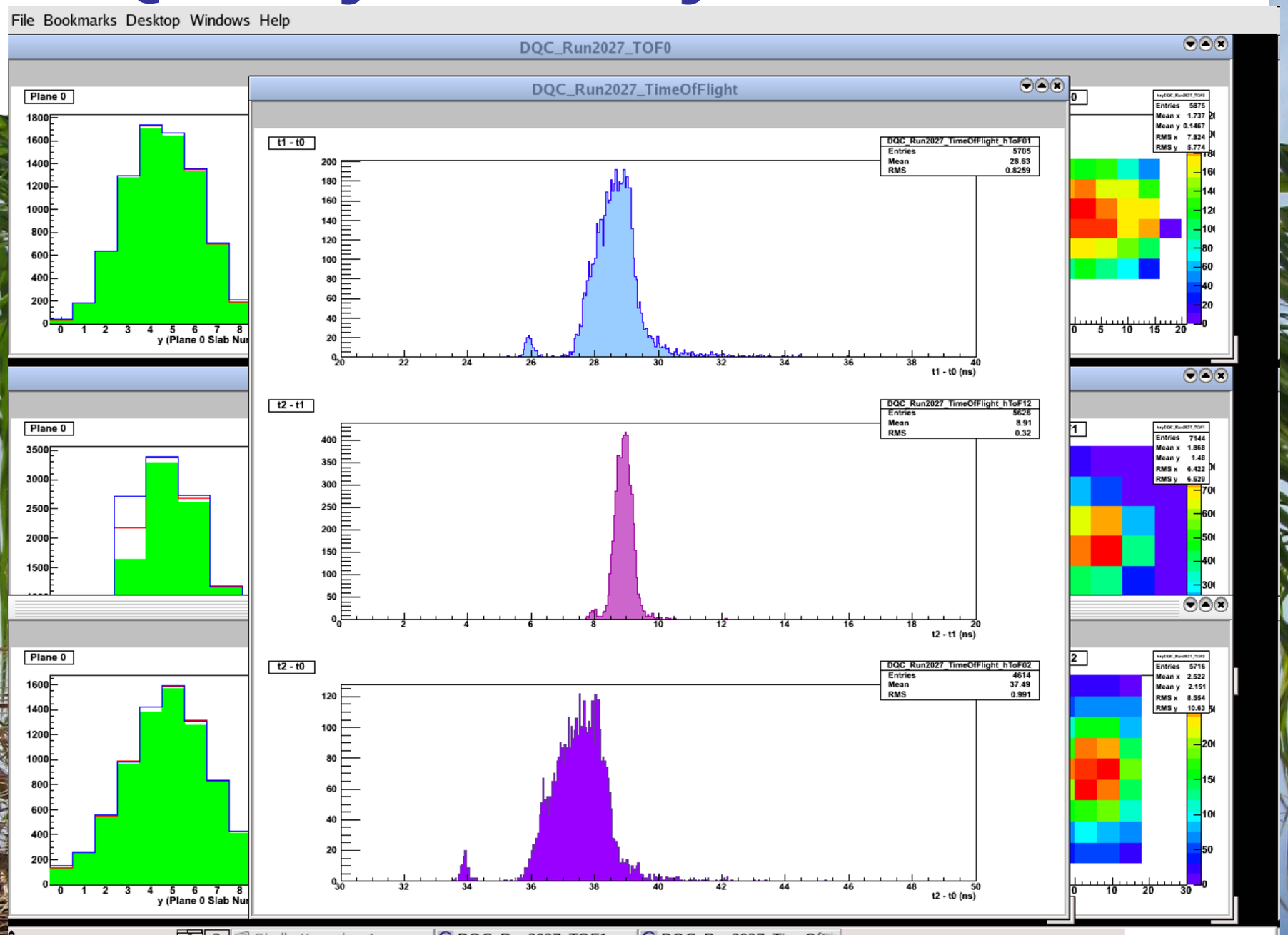
- **Online Reconstruction**
  - **Beam Phase Space: M. Rayner**
  - **Very recent development**
  - **Not yet fully implemented in control room**
  - **Runs over already existing data file**
  - **Vassil is working to get it running Online**

# Data Quality: G4MICE Application

- Initial version of application created by Mark Rayner
  - Generic code which can be used by each person who wants to add a feature to the DataQualityCheck Application
- Convention for writing code (for use by experts) established
  - Modular
  - Control of overall DataQualityCheck Application by single person
  - Detector Experts write code to create plots for their own detector
  - Request addition to overall
  - Single canvas/detector or theme
- Documentation begun
  - What it does
  - Histograms produced
  - Cuts made on data
- Website
  - http://www.physics.ox.ac.uk/users/raynerm/OnOfflineApps.html

# Data Quality Now

- **Online Data Quality - M. Rayner/V. Verguilov**



# Data Quality

- **Good progress made**
  - **More detector information**

- **Bug/memory leak fixed in all Online applications (Vassil)**
  - **Related to running over the socket**
  - **Was causing everything running online to crash**

- **Bug fixed that crashed Online Monitoring/Online Reco**
  - **Mentioned by JS – extra event header in one portion of the data**
  - **Probably what caused all analysis problems for Chris' Proton Absorber study data**

- **Data Quality**
  - **First Application written and running during data-taking (M. Rayner)**

# Conclusions

- **Good progress made**
  - **Need *more* detector information**
  - **Add CKOV, TOF specific info – ex. Some of what Yordan mentioned in his talk yesterday on the TOFs**
  - **Need expert input**

- **Code needs organizing**
  - **Uploaded into CVS**
  - **Need to be running specific release on OnRec machines**
  - **So far running in ‘get it working’ mode**

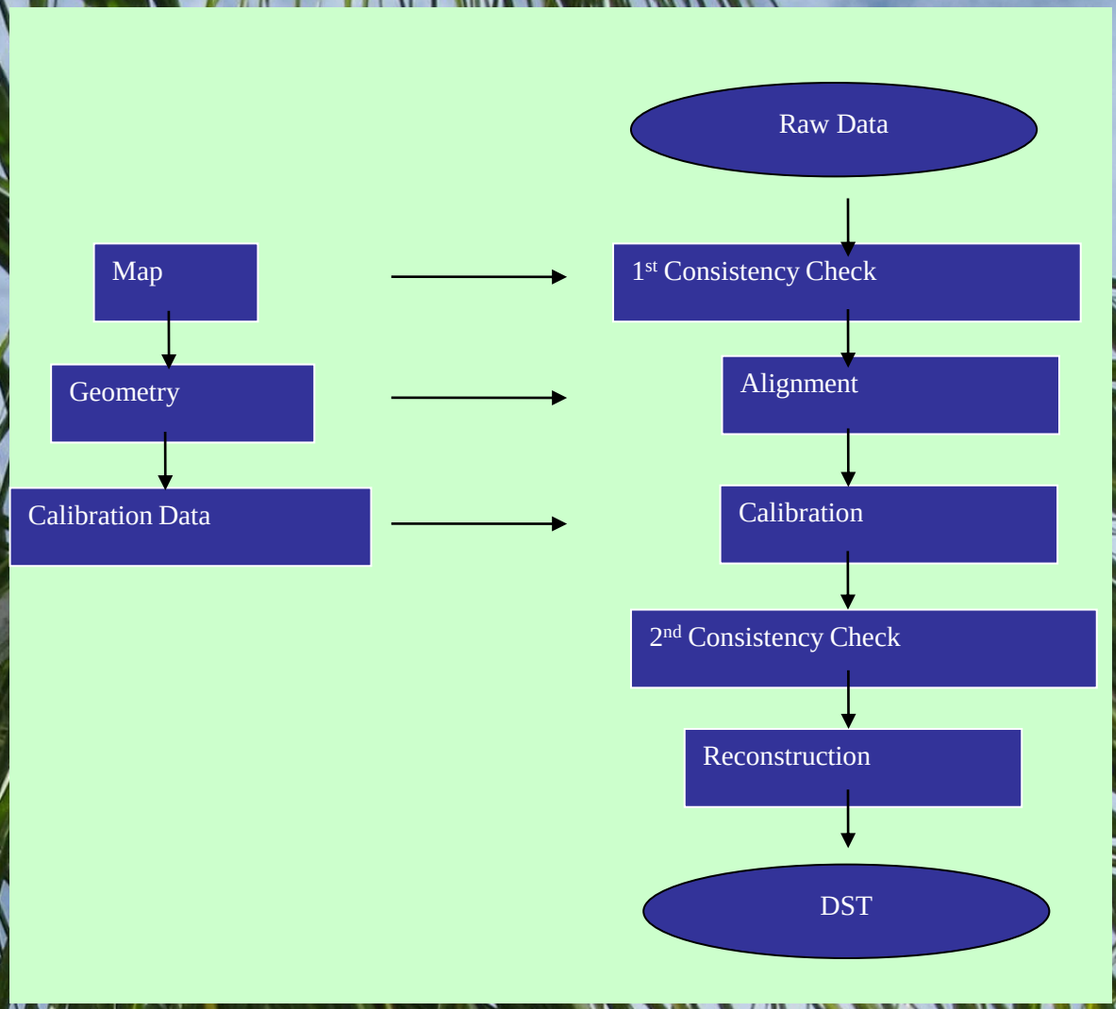
- **Add to Data Quality - much more needed**
  - **Website exists – will make public soon**

# Data Quality Philosophy

- **Need data quality checks offline (and online?) to officially pass the data as good**
  - **Check basic level of data**
  - ***before* reconstruction *and* at each stage**
- **How automated should it be?**
  - **Can we do this in stages?**

- **Do we tag Runs or Event-by-Event?**

- **Need method to process data to produce DST (or MiceEvent list or Root file or what?) that is the Official, Approved, Good data set for analysis**
- **Data Production - iterative**
  - **Software version**
  - **Cabling configuration**
  - **Geometry**
  - **Beamline settings/Hardware status**

# Philosophy Continued

- **Multi-staged data quality determination**
- **Do RAW data consistency check at the beginning**
- **Get Mapping → then consistency check**
- **Geometry → check alignment**
- **Calibration → check again**
- **Finally - reconstruction & create final product**