Rich DataQuality

Summary of FEST June '09

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Overview

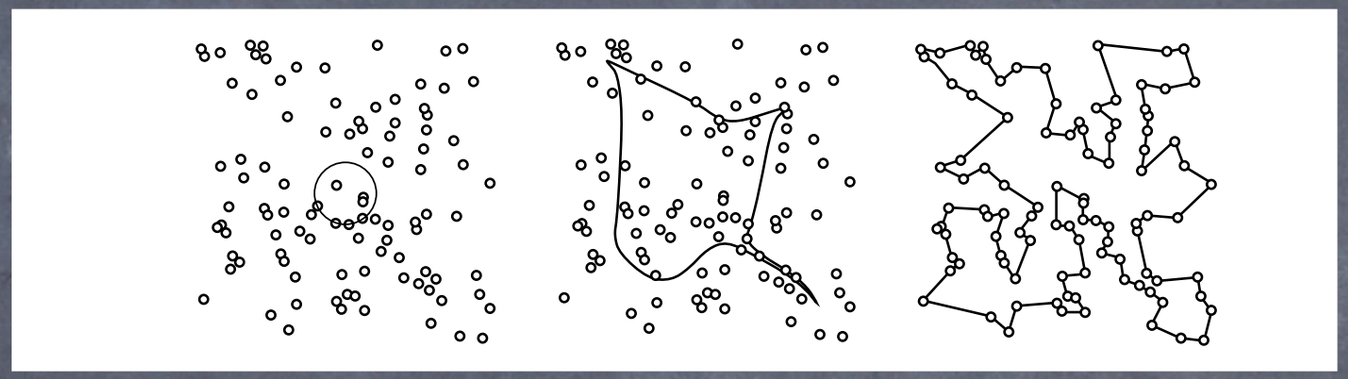
- Test RICH online monitoring and data-quality procedures in FEST setup
  - Readiness for data-taking
  - Speed
  - Running in online environment, ...

Online DQ

- Two separate monitoring tasks for RICH stand-alone
  - Task 1: low- level monitoring
    - Integrity of data banks, hit-maps, #hits, etc
    - After speed optimisation:
      ➥ ~100% of events processed
  - Task 2:
    - Stand-alone (trackless) ring finding
    - Switched from Markov-Chain based approach to Elastic Neural Network

Elastic NN

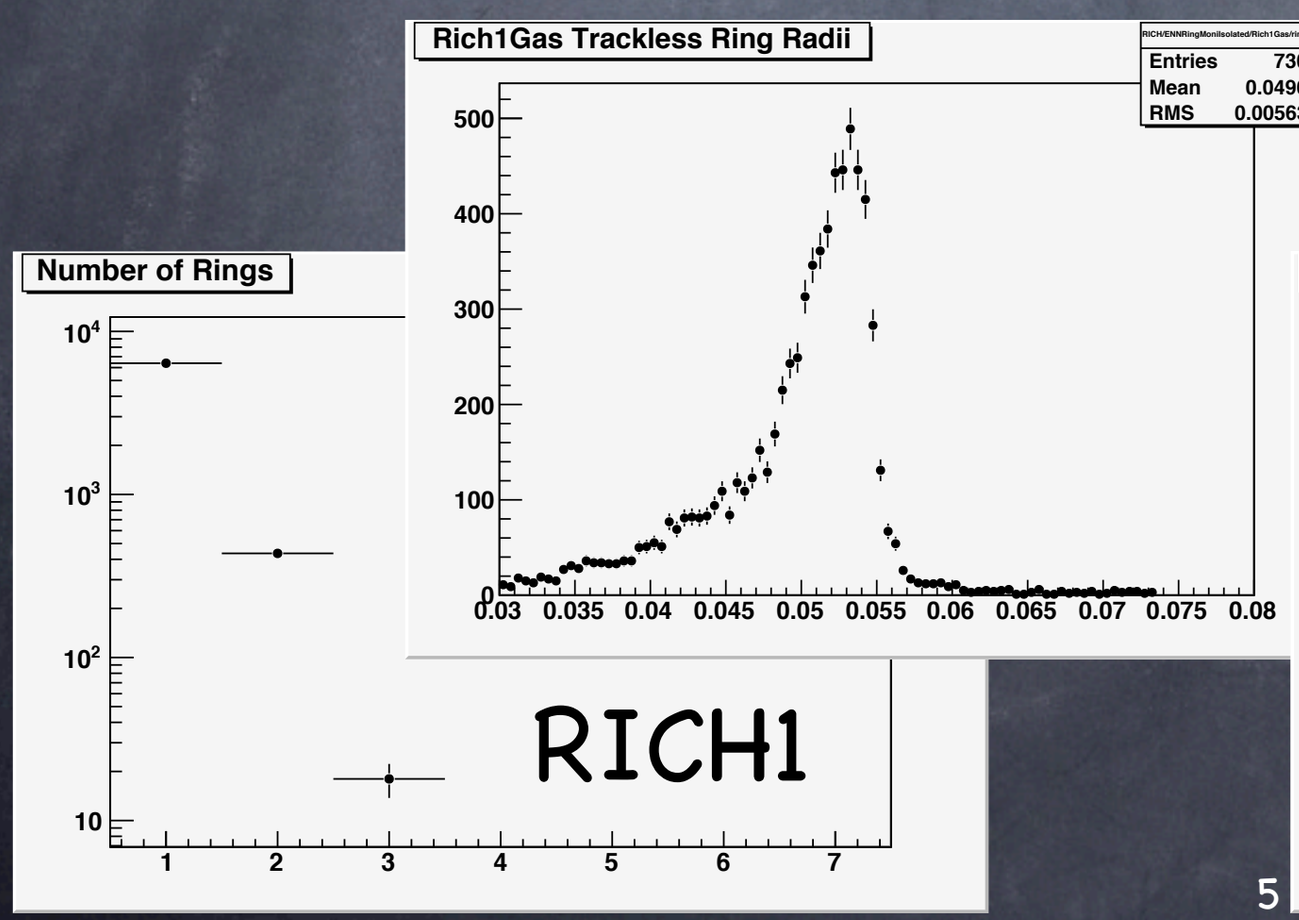
- Solution to Travelling Salesman problem
  - Imagine rubber-band with knots:
    - knots are the cities, the rubber band automatically gives the shortest route.

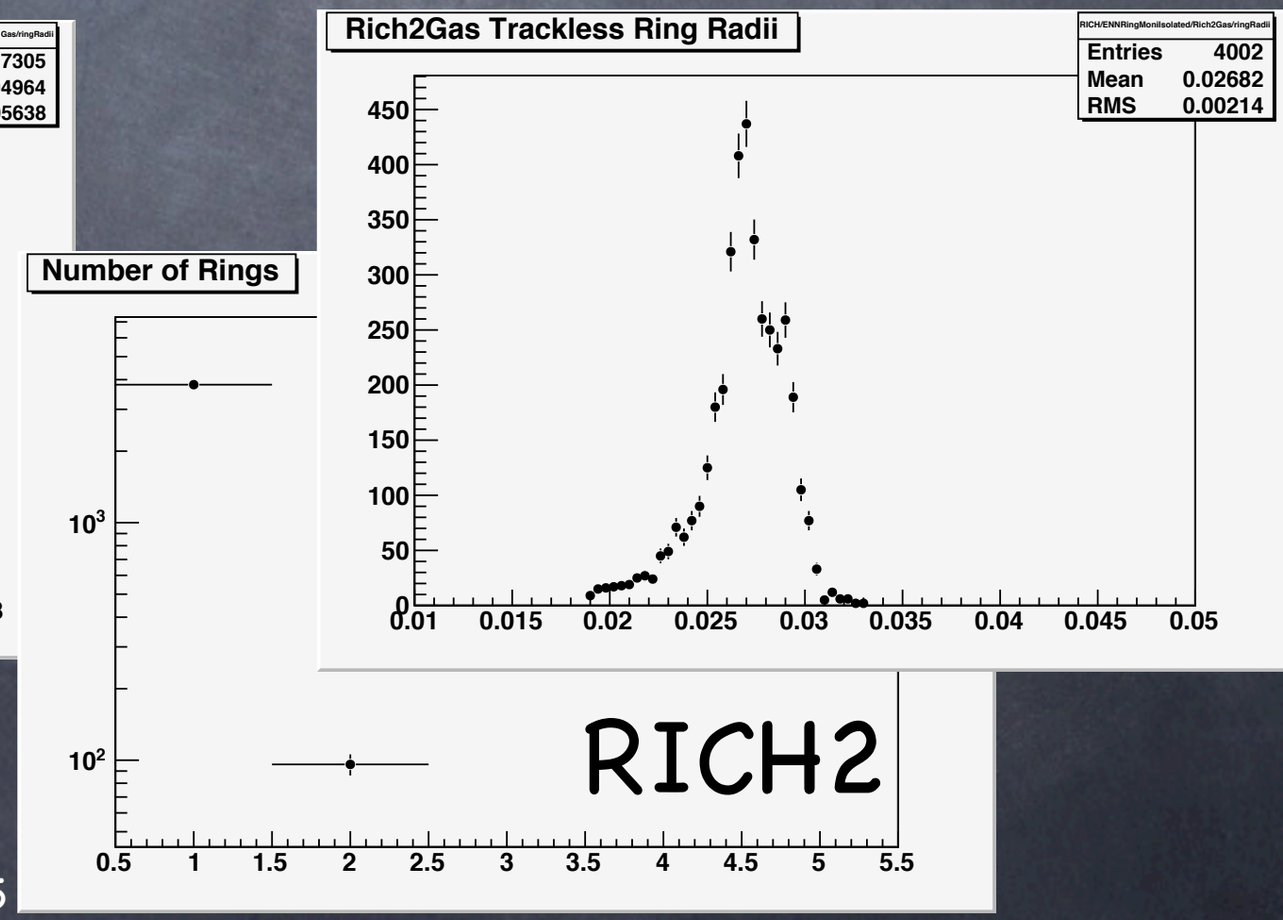


- For ring-finding:
  - Restrict minimised energy function to rings
  - Used successfully at CBM Experiment (GSI, Germany)
  - Take code from technical note
    - CBM-SOFT-note-2005-002
  - More details in future RICH s/w meeting

Elastic NN

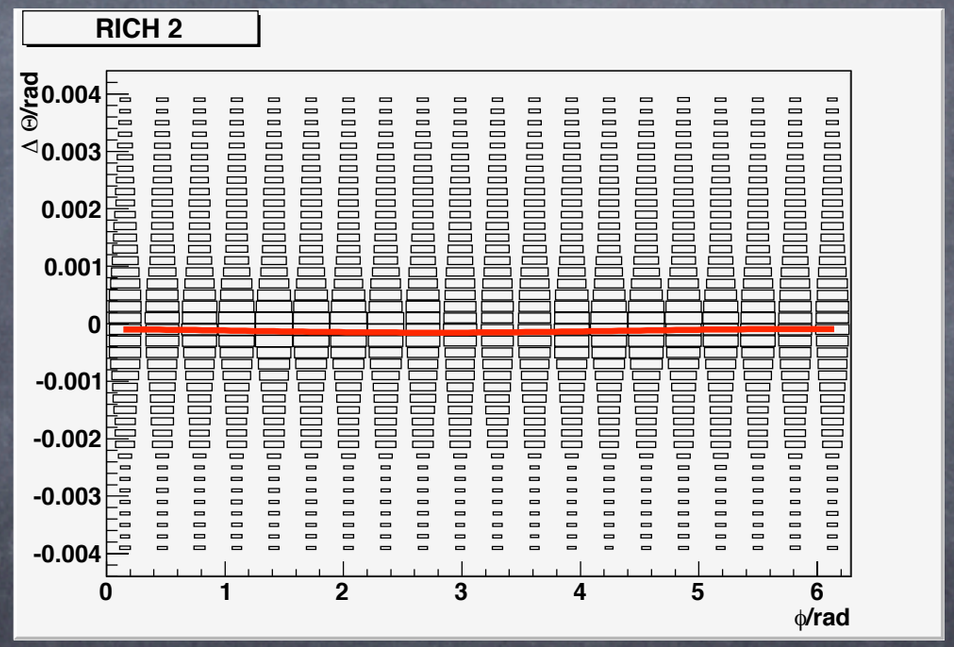
- Implemented in RICH online monitoring
  - Considerably faster than Markov-Chain based approach (~15% of events processed)
  - Both for Rich1 and Rich2
  - Used to find isolated rings
  - Plots taken from one SaveSet





Alignment Monitoring

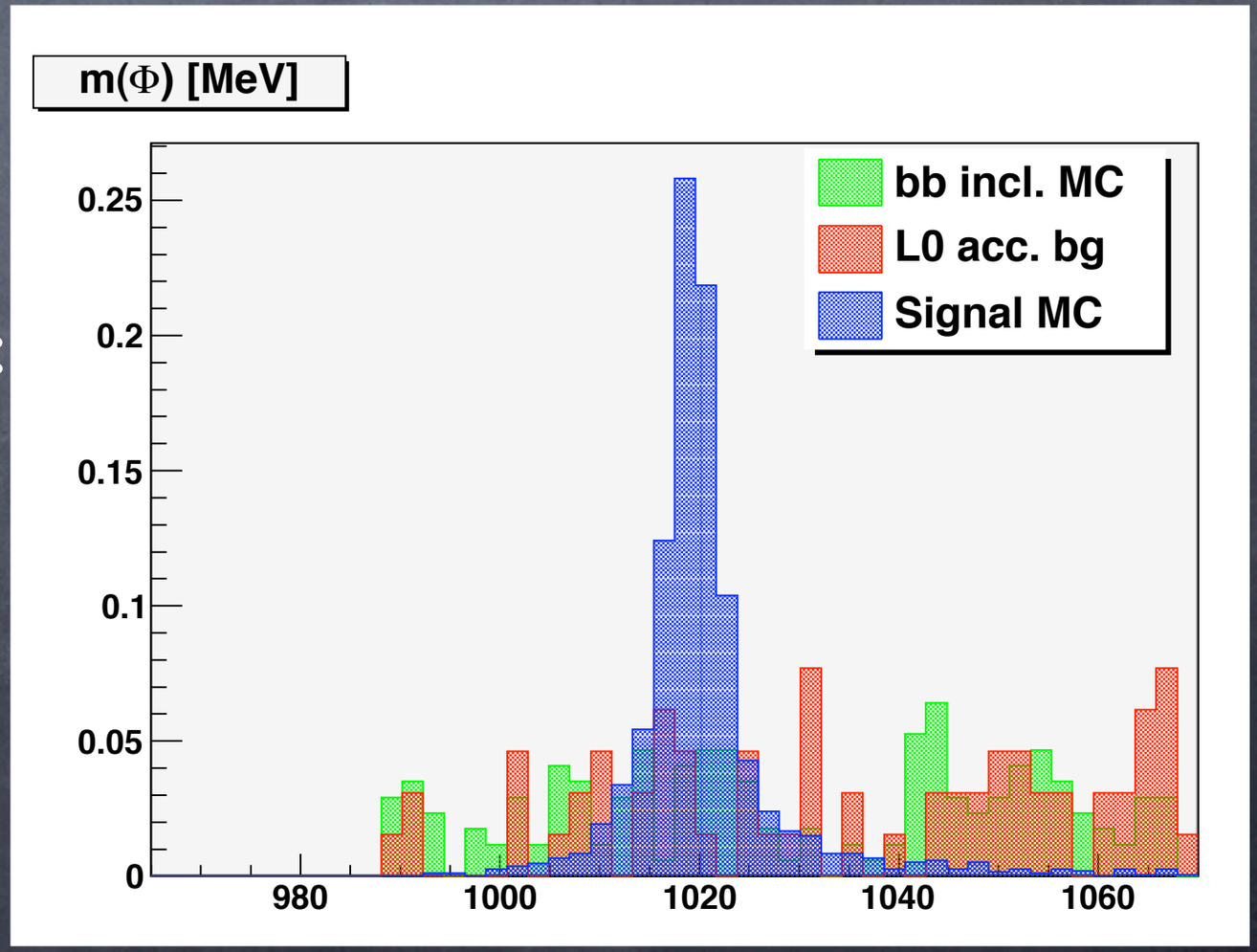
- Monitoring histograms integrated in Brunel
  ➥ both online and offline
- Fit used in online monitoring implemented in OMALib
  - Any deviation from straight line indicates mis-alignment



- Histograms seen online using onlineBrunel in IP8
  ➥ need top-level adder to trigger OMALib analysis and alerts

PID Monitoring

- Use dedicated exclusive decays to monitor PID performance
  - ➥ Particle type can be inferred from kinematics
  - $J/\psi \to \mu\mu$
  - $\Lambda \to p\pi$
  - $D^* \to D\pi$
  - $\phi \to KK$ (ϕ from D_s)
  - $K_s \to \pi\pi$
- E.g. ϕ mass peak after cuts:



PID Monitoring

- Selections integrated into monitoring code
  - for Online: Need something like "onlineDavinci" or onlineBrunel + PHYS
  - for Offline: Should be part of current DQ monitoring using Express Stream / Grid reconstruction, etc.

- Automated alerts being investigated
  - Fit PID performance vs $p_{(t)}$

Summary

- FEST weeks very successful and useful to develop and tune monitoring
- Most RICH online monitoring / data-quality code ready for first beam.
- Some missing bits in the infrastructure
  - Adders / Savers to trigger OMALib analysis
  - Online version of DaVinci for PID monitoring
  - Some fine-tuning needed to get jobs on Calibration farm running