RECO Status

ADM - June 14, 2002

Harry Melanson

- P11
  - Status
  - Major new features
  - Snapshots of performance
- P12
  - Schedule
  - Goals
- P13
  - Schedule

P11 status

- Current version: p11.08.00
  - Signed off by all Algo / Object ID groups
  - Being installed on farms
  - Documentation being compiled
- Production Plans
  - Start processing new data
  - Reprocess "special stream" events
  - Reprocess old data (with CFT stereo)

} Dependent on available resources

P11 status

- Schedule
  - p11.07.00 was supposed to go to farms
    - Week of **May 21, 2002**
  - Slipped 3 weeks
    - Major problems *fixed* since then
      - Bug in new calorimeter non-linear corrections
        - » No CAL clusters
      - Compiler bug for Linux RH 7.1 optimized build (I.e. the farms)
        - » No central muons
      - *Many* other problems fixed
  - p11.08.00 - READY
  - Future releases:
    - Bug fixes
    - Attempt to enable calibration db access (SMT, CFT)
    - Possible improved alignment

Also affected p10.15.02 processing (run 153899+), due to farm OS upgrade.

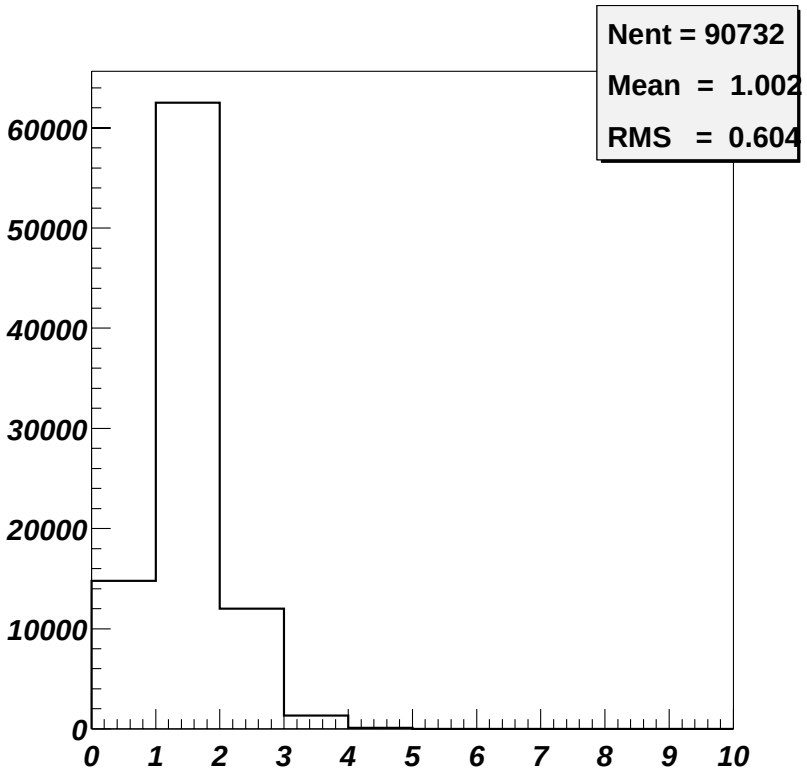
P11 Major New Features

- SMT, CFT, MUO global alignment
- SMT, CFT cluster errors
- CAL non-linearity corrections
- Improved tracking paths (misses, stereo, etc.)
- Correct magnetic field
- Vertexing using global tracks
- Significant muon improvements
  - Allow "scintillater-only" segments
    - fills gaps in the wire chamber coverage
  - Allow BC-only tracks
    - increases coverage by not requiring A layer
  - Use global matching with the full GTrack and Muon::Track error
  - Use calibrated PDT t_0
  - Fix charge (use correct sense of field based on db info)
- Version 1.0 of Thumbnail
- Version 0.1 of DST (current size ~ 365KB, goal: 150KB)
- MANY "minor" features

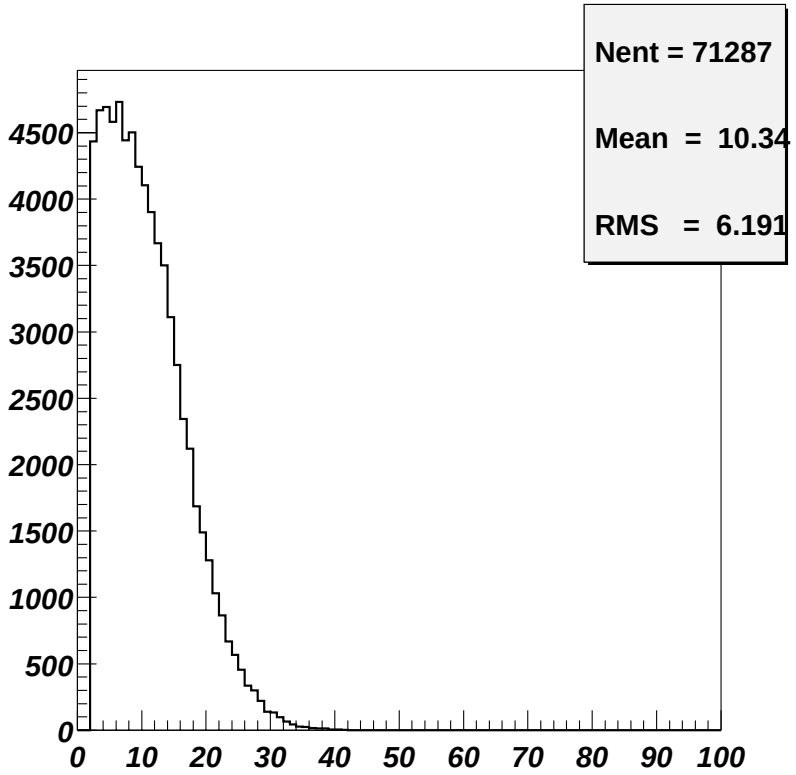
P11 Snapshots of Performance

Using Global tracks (SMT + CFT)

Number of vertices



Number of tracks attached to vertex



85% events with >= 1 vertex (I don't know trigger mix)

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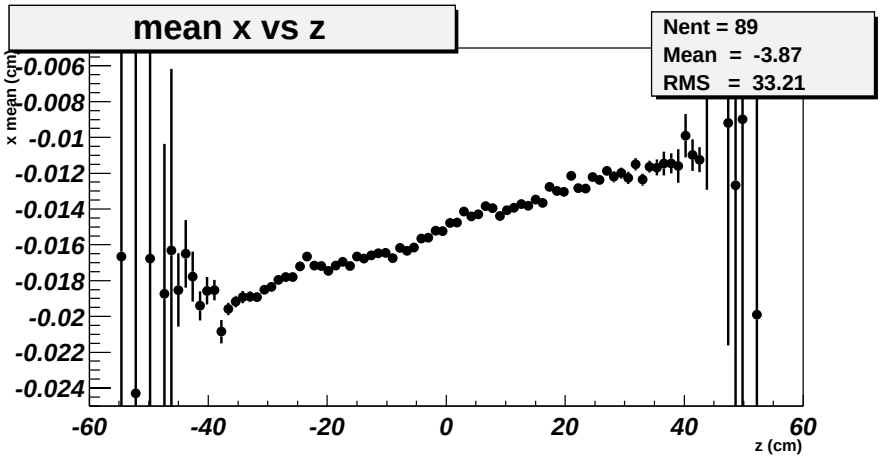
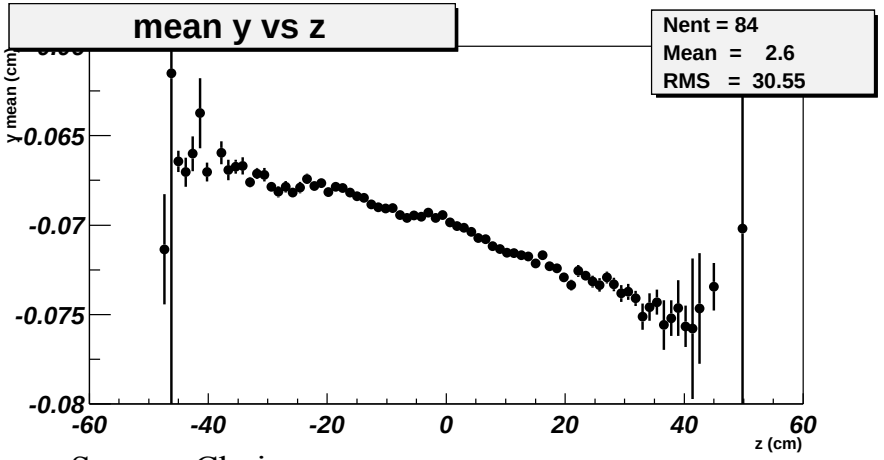
P11 Snapshots of Performance

Vertex distribution





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Vertices with >= 9 tracks

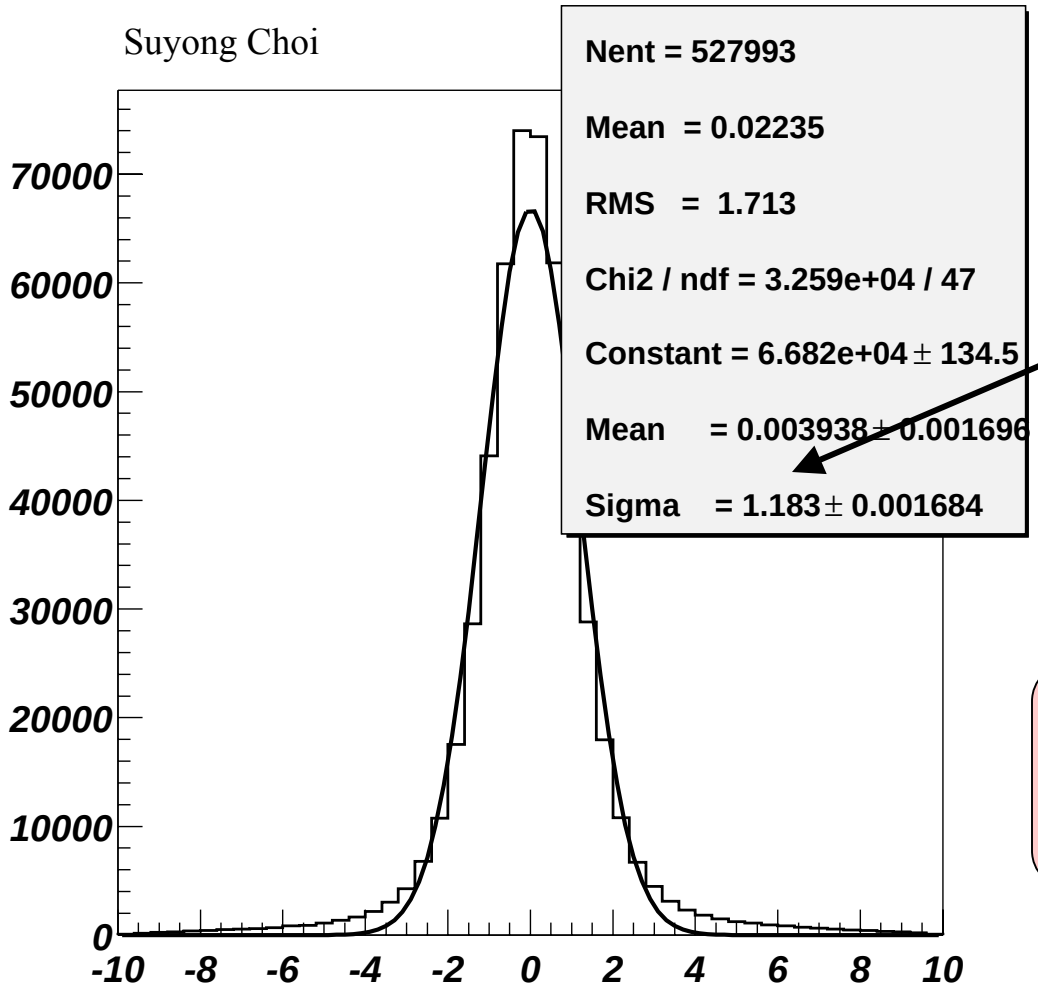
xz slope = 117 μrad

Very linear
Wiggles ~ 10 μm
Sensitive to alignment

yz slope = -117 μrad

P11 Snapshots of Performance

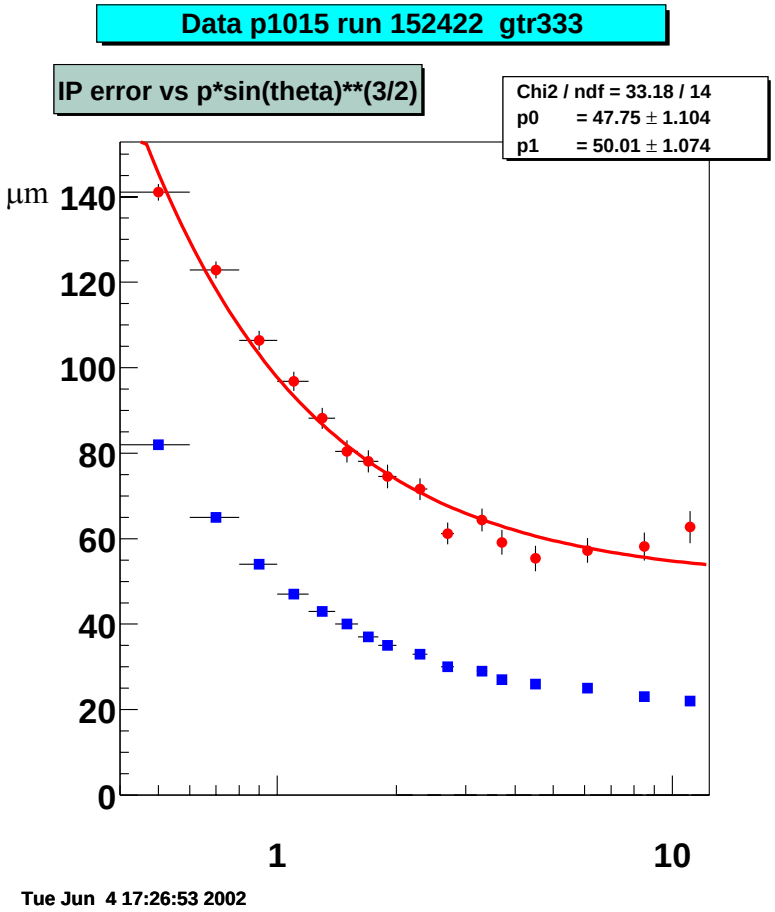
DCA pull to vertex

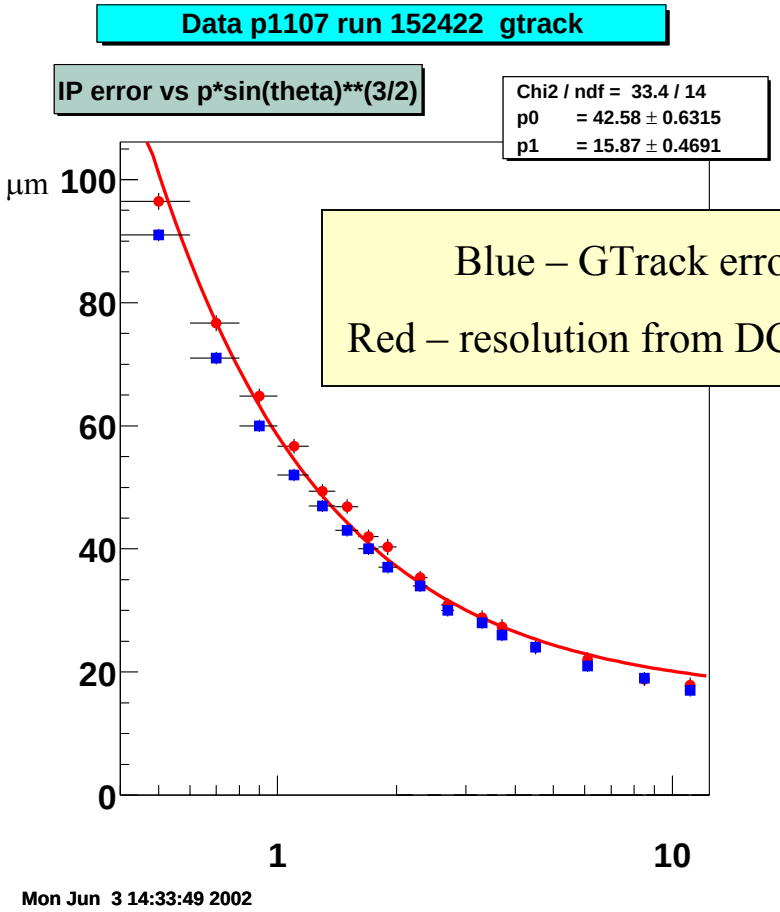


Indicates errors ~ correct
(Track and cluster)

But still need to get to 1.0
Also, worry about tails.
There's always something else…

P11 Snapshots of Performance





Blue – GTrack error matrix

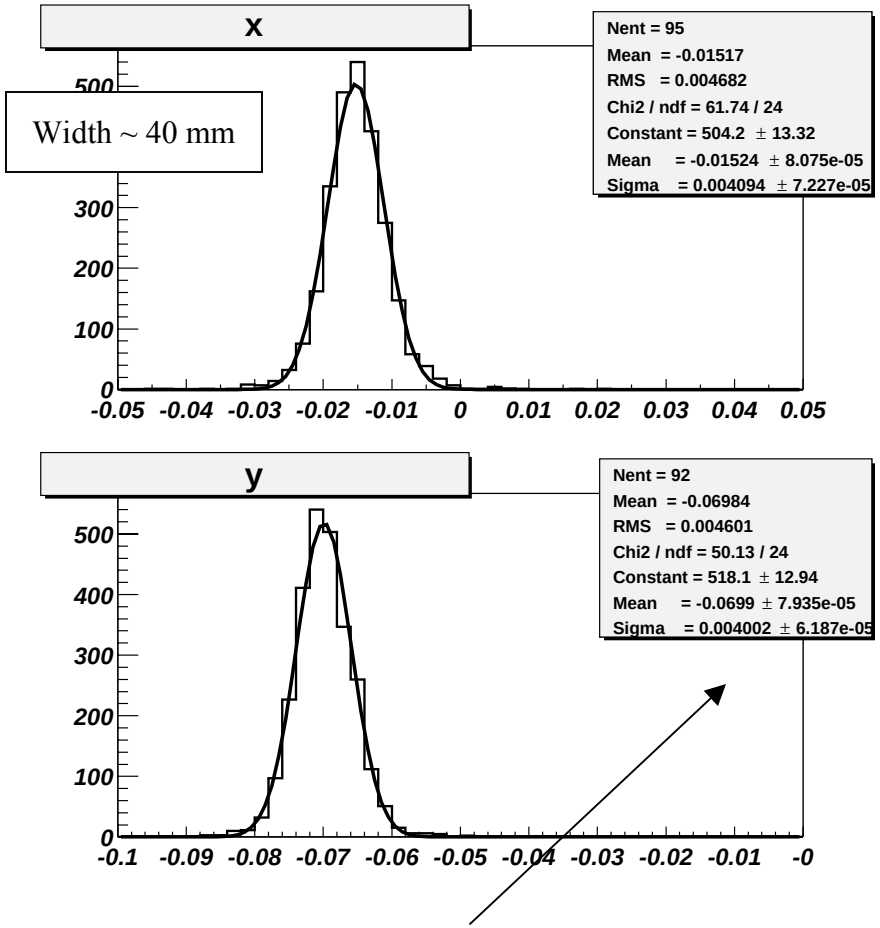
Red – resolution from DCA distribution

B-id (Strasbourg group)

Another indication that errors are getting better…

P11 Snapshots of Performance

Vertex with 4 or more tracks with pt>3 GeV



Approaching intrinsic beam size ~ 30 μm – sensitive to alignment, etc.

Z of Selected Primary Vertex

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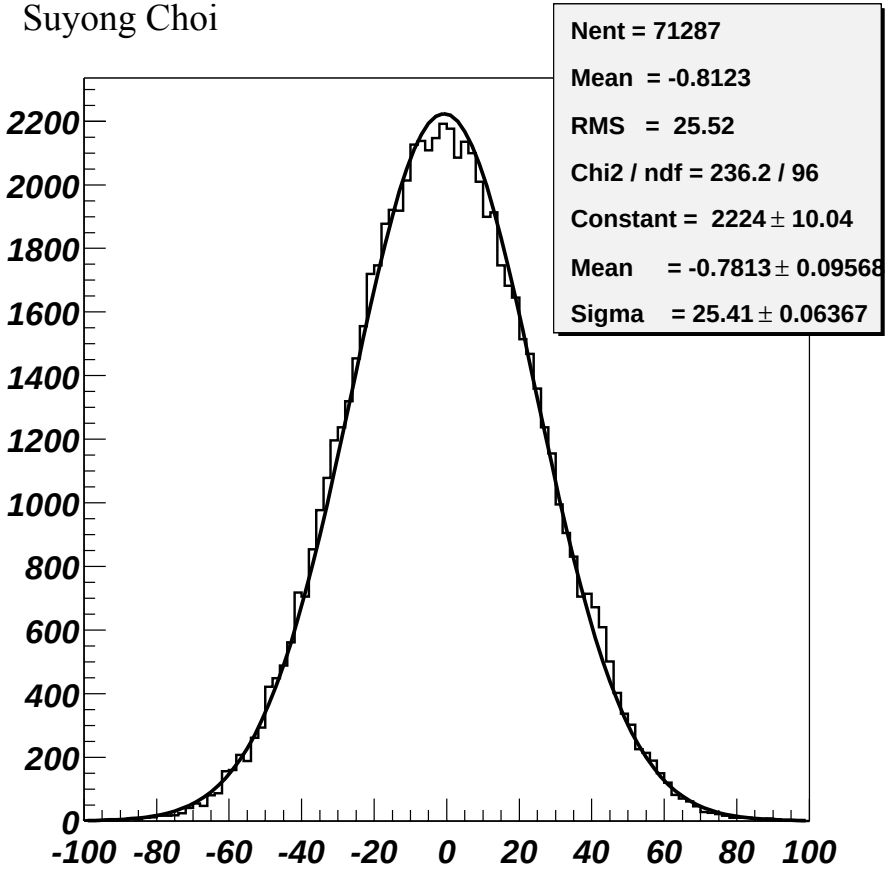
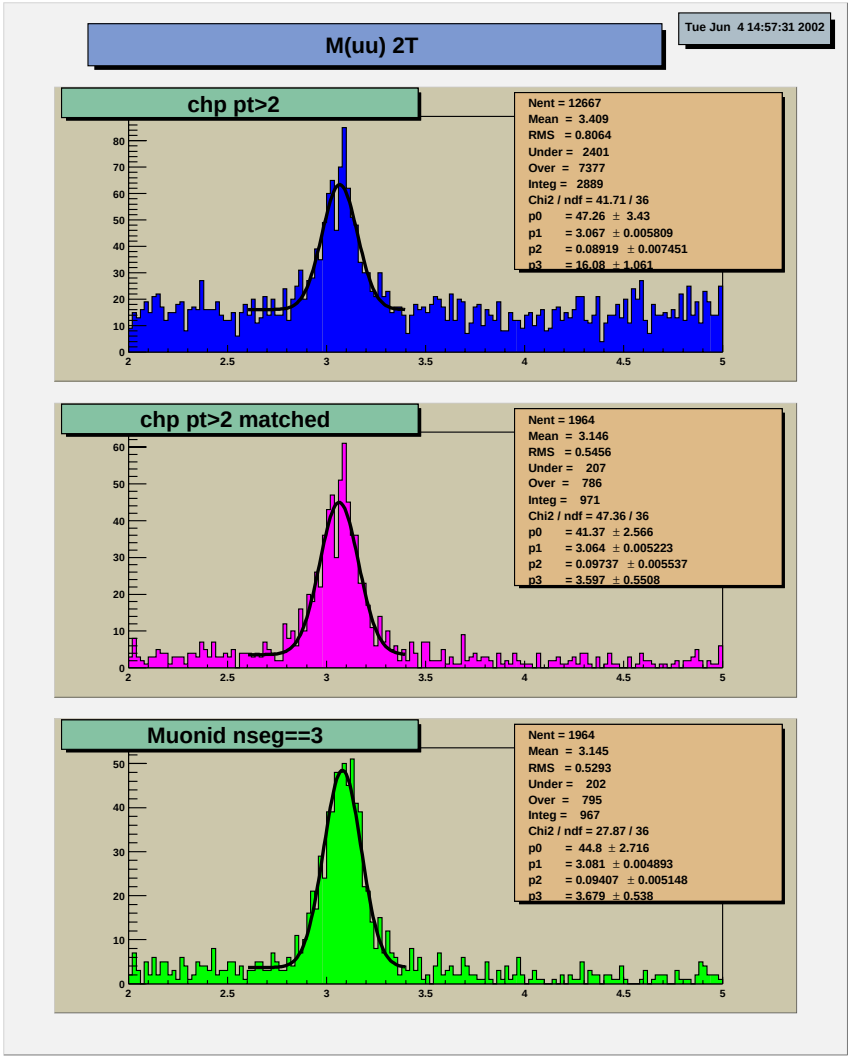


~ Gaussian – sensitive to "live" detector

P11 Snapshots of Performance

And then there are muons…

Report coming from the muon group next week…



Charged particles

Matched to muons

Tight muons

But we need a lot more J/ψ events…
We can never get enough.

P11 Snapshots of Performance

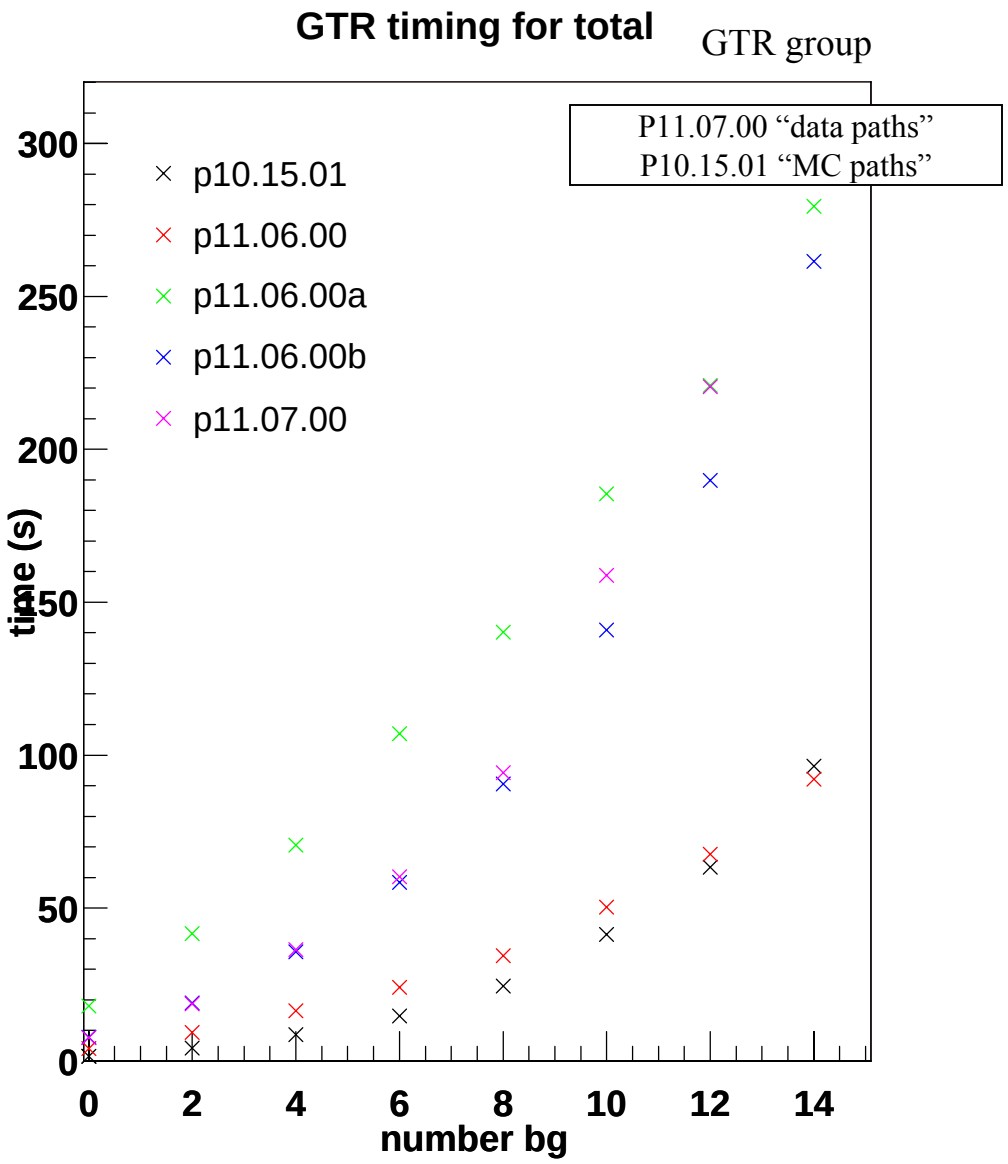
Nothing is free in life…

Measured with **MC**, Z(μμ) + N mb

Preliminary
RECO Farm timing (1 GHz):
p10.15.02 – 10 sec/evt
p11.07.00 – 15 sec/evt

And it gets longer for runs when the detector is "fully working"

This is a "big deal"…



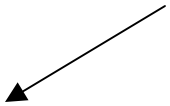
P12 Schedule

- July 1, 2002
  - Make p12.00.00
    - No more **DEVELOPMENT** for p12 after this date
    - If something is not ready, *delay* until p13
    - Puts a lot of pressure on developers
    - Requires groups to postpone "lower-priority" enhancements
    - Tries to get us back on track w.r.t. *believable* schedules
    - Higher priority is being assigned to p13
- July 29, 2002
  - Available for farms production during this week
  - Implies ~ three additional p12 builds to converge
  - P12 will probably not have many "major" improvements
  - Hopefully a few "important" ones.

P12 Goals

- Detectors
  - SMT
    - Refined alignment
    - DST support
  - CFT
    - Apply gains and pedestals/thresholds
    - Refined alignment
    - Support CTT as needed
  - Muon
    - Improve local tracking (reduce fakes)
  - Others
    - Not yet reporting in…
  - All need to respond to "low level" developments

I've said this *at least* 20 times



OUR experiment *relies* on this level of software. We don't have enough people working in these groups. And there are a huge number of "details" that have not been addressed.

P12 Goals

- Tracking
  - First pass optimization of choice of new algorithm(s)
    - gtr, htf, elastic_reco
    - Optimization choices w.r.t CPU time, efficiency, fake rates
  - Continued optimization of individual algorithms
    - Remove / optimize ones deployed to deal with incomplete electronics
    - Deploy new ideas
  - Support tilted beam axis
  - Improve detector "clustering" algorithms
  - Improve simulation (inefficiencies, etc.)
  - Deal with tracking "in roads" (i.e. lepton finding)
  - Developing monitoring tools
  - Respond to CPU time constraints [added by HLM]
- Vertexing
  - Use same cuts for data and Monte Carlo

Probably too much for p12

Biggest tracking problem: optimize efficiency / fake rates and satisfy CPU time requirements. Currently "a problem". Expect will be "*the* problem".

P12 Goals

- EM
  - Thumbnail testing
  - Algorithm tuning
  - Develop photon H-matrix
  - First pass using CPS?
  - CAL alignment
  - Migrate EM scale into RECO
- MU
  - Study central track matching using improved local tracks
  - Study charged particle efficiency using new tracking algorithms (e.g. HTF)
- TAU
  - Thumbnail
  - NN framework
  - Study data

P12 Goals

- B-ID
  - Thumbnail
  - Improve impact parameter tag
  - Study all tags with data
- Thumbnail
  - Version 2
  - TMB Tree
- DST
  - Version 1
- My primary goals:
  - Be ON-TIME
  - Make p13 viable

Conclusions

- **P11** – very late, but coming now.
  - Many enhancements (tracking, muon, etc.)
- **P12** – Development frozen July 1, 2002
  - Available for the farms week of July 29, 2002
- **P13** schedule
  - Available for farms week of October 28, 2002
  - **Physics Ready**.
  - Very Challenging
    - Get everything ready
    - Running fast enough to keep up

We do NOT have enough people working now to guarantee this goal.