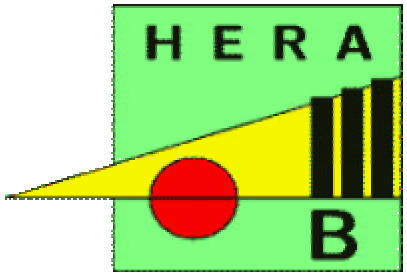


HERA-B

M. Medinnis

HERA Coordination Meeting

26 Sept 2002

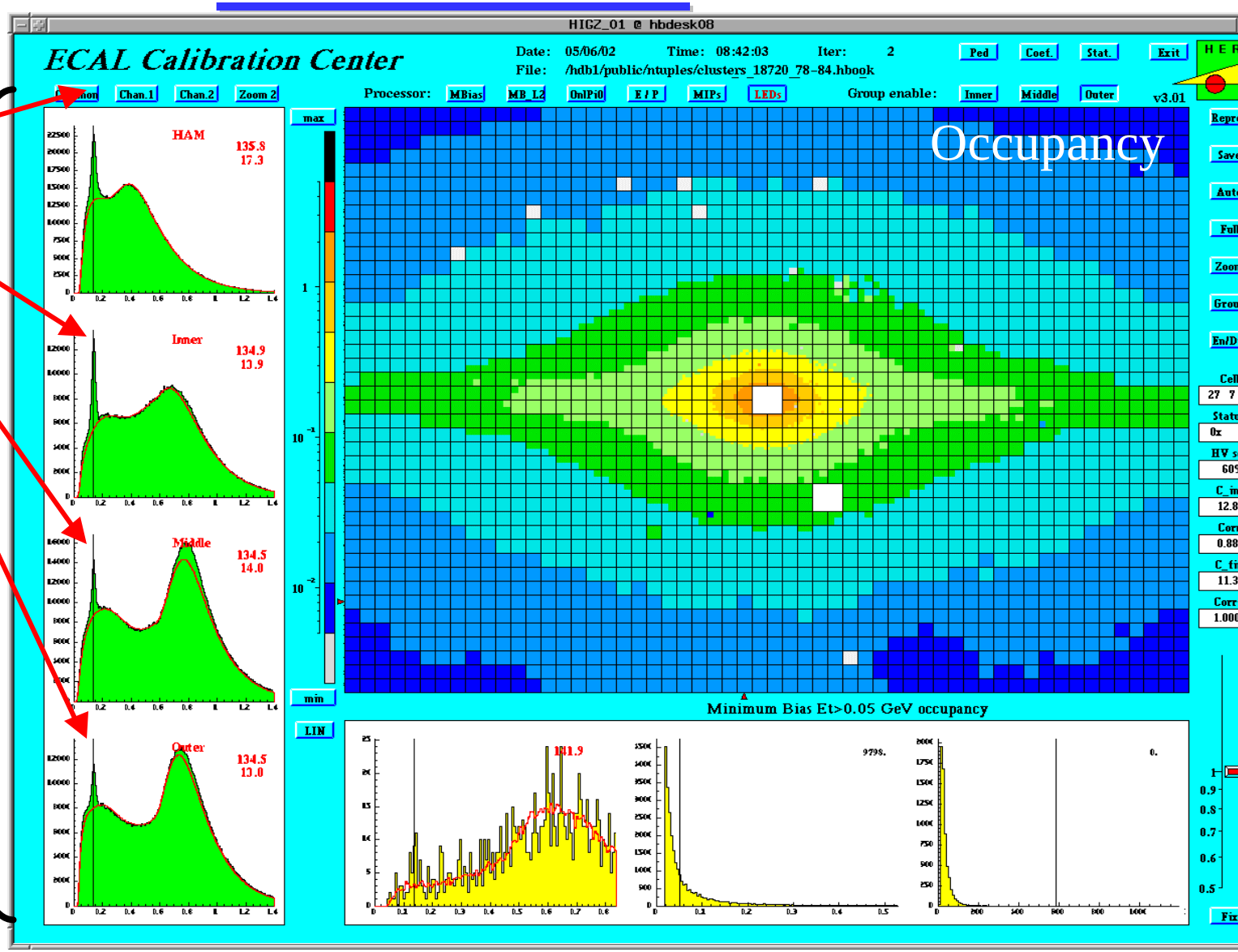
- Detector, trigger status
- Physics plans
- Requests

Calorimeter

p^0

2-cluster mass in 4 Cal. sections

Performance close to design, full coverage.



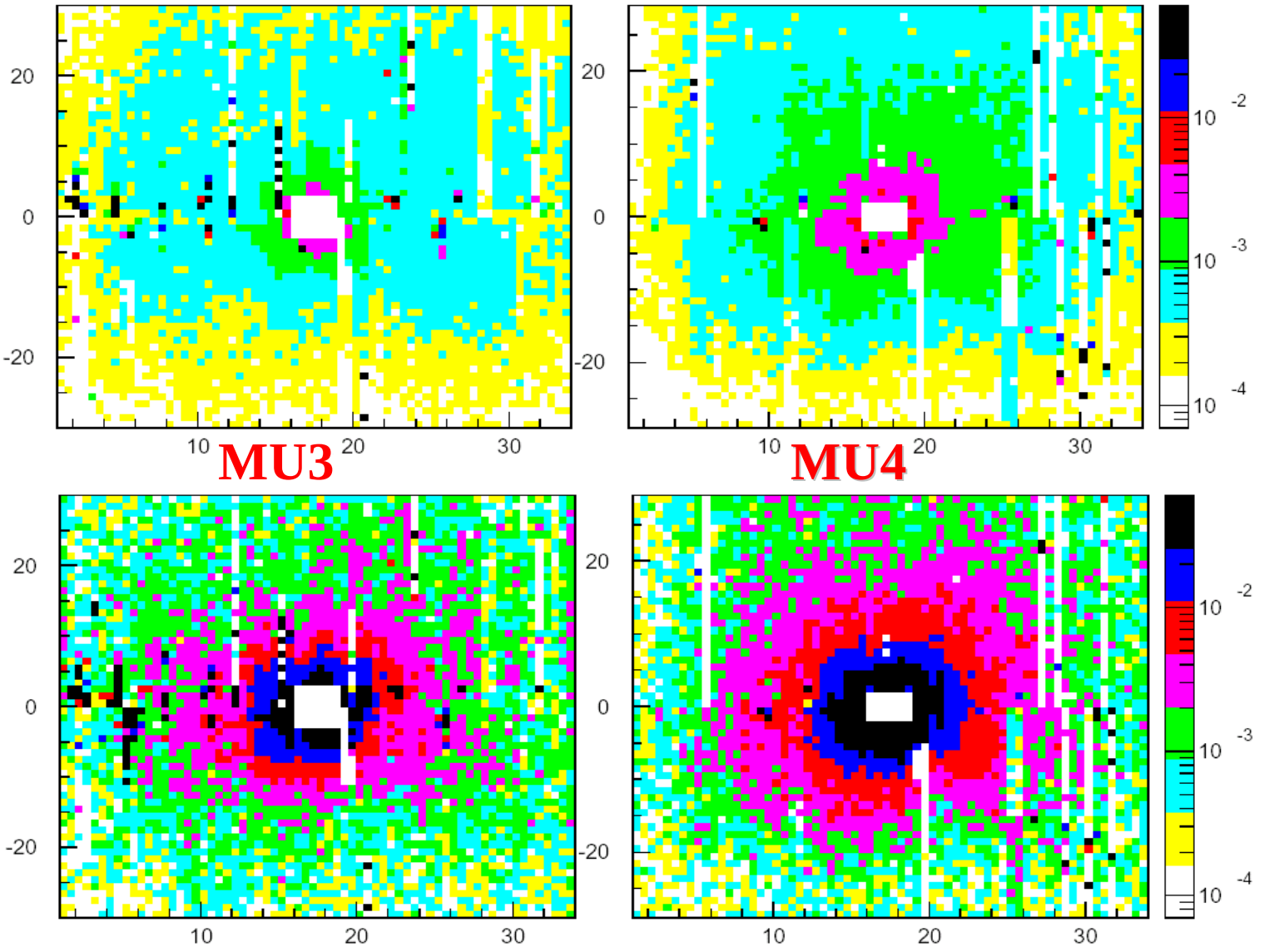
Pad chamber occupancies

- System is stable (no new ‘dead channels’ since January’02)

Run 19504: Minbias

Vthr = 0.9 V
Vpream = 5.0 V

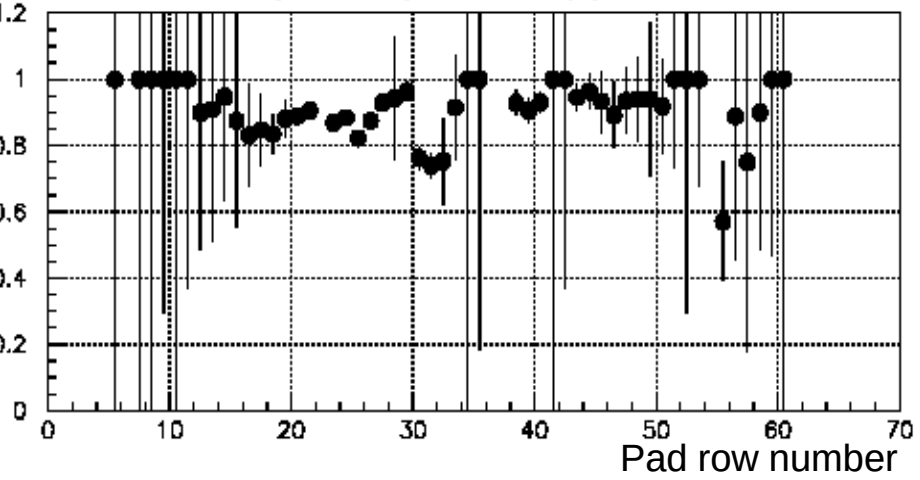
Run 19467: Muon pretr + SLT



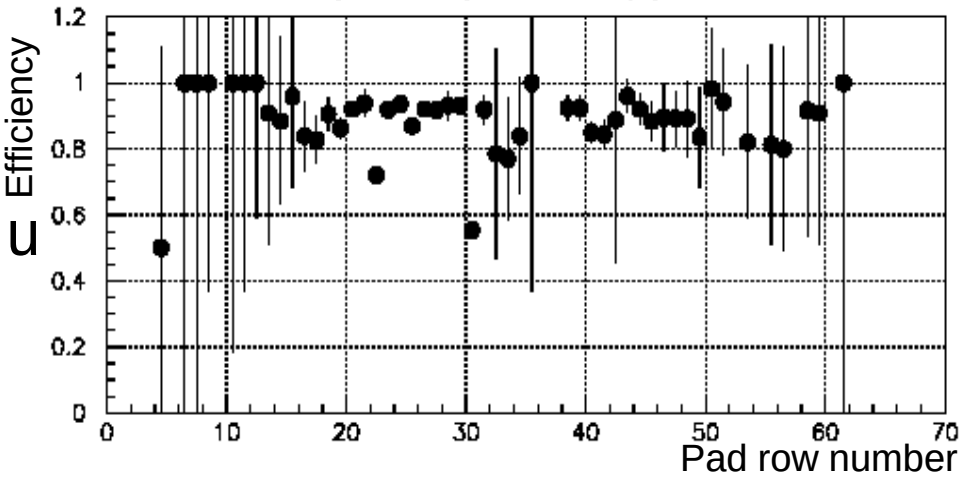
Muon Pad Efficiency

Average efficiency ~ 90% or 85% incl dead channels = goal

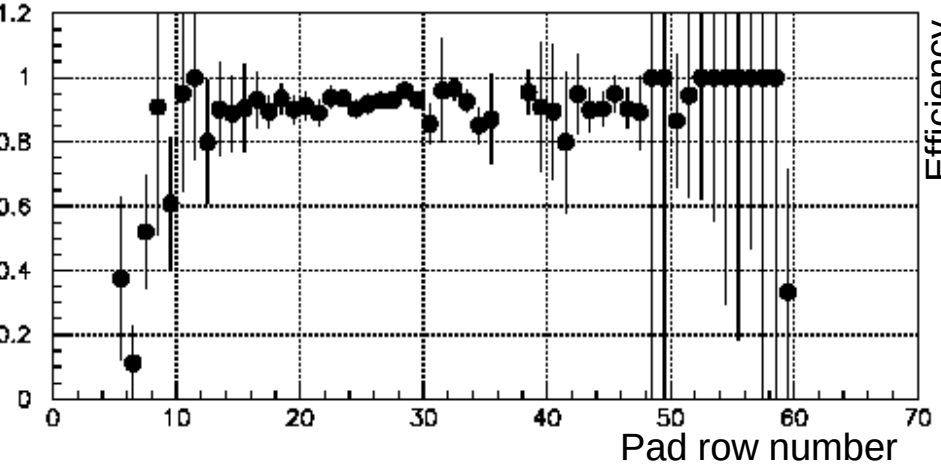
Mp3.1 (all x, +y)



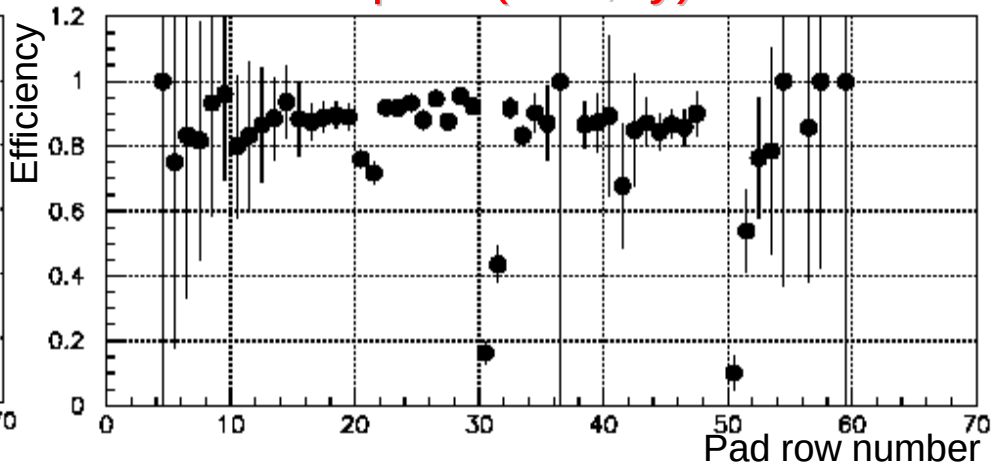
Mp4.1 (all x, +y)



Mp3.2 (all x, -y)



Mp4.2 (all x, -y)

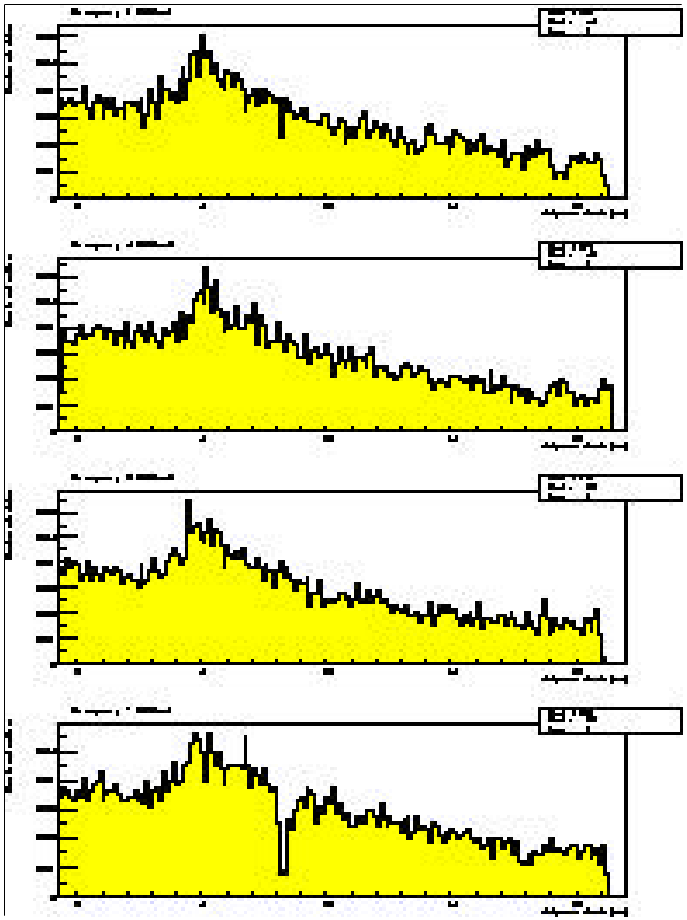


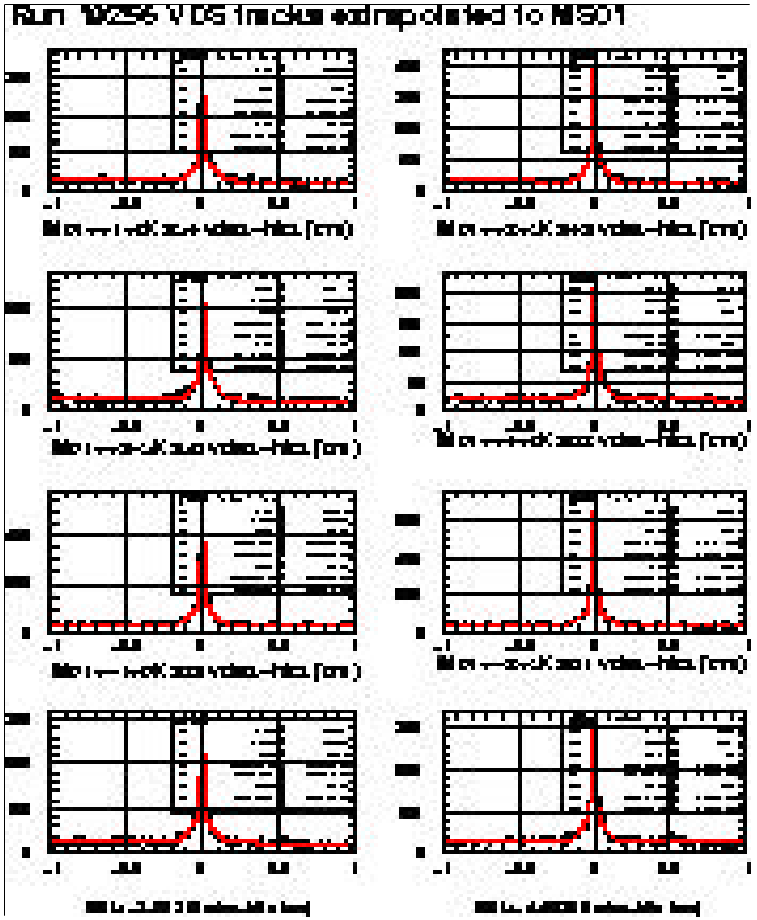
Inner Tracker

Occupancies

MS01

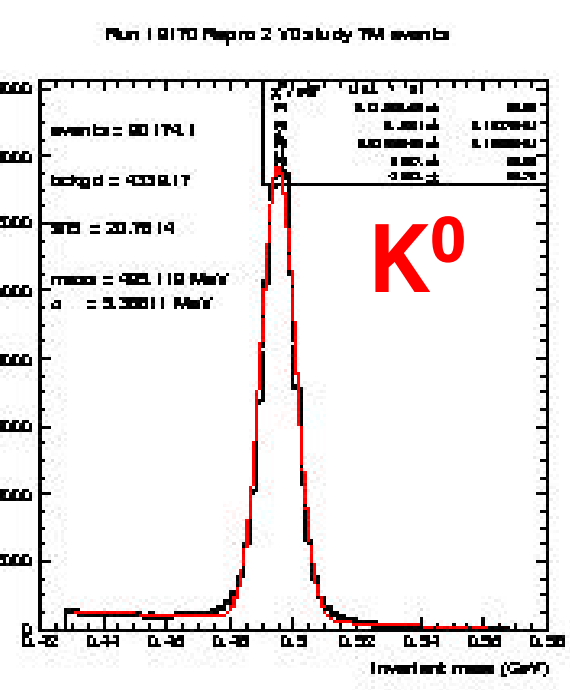
Residuals



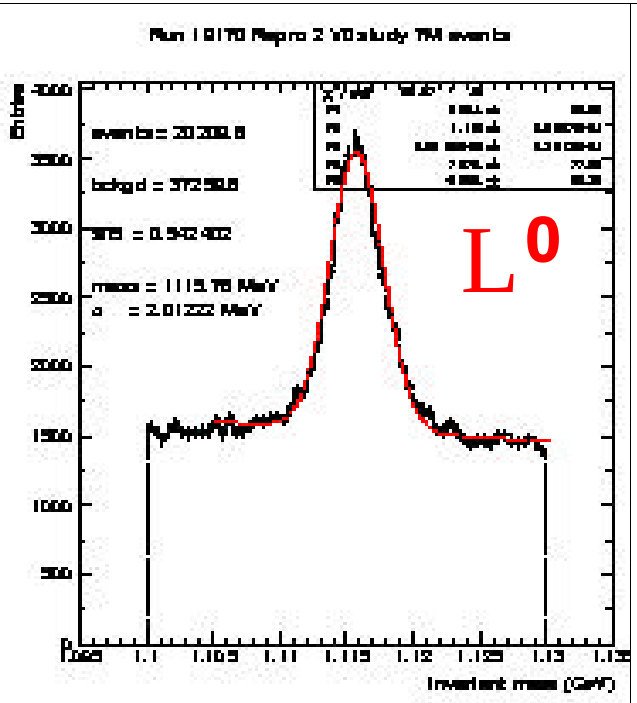


Training program (all stations) to be completed in October

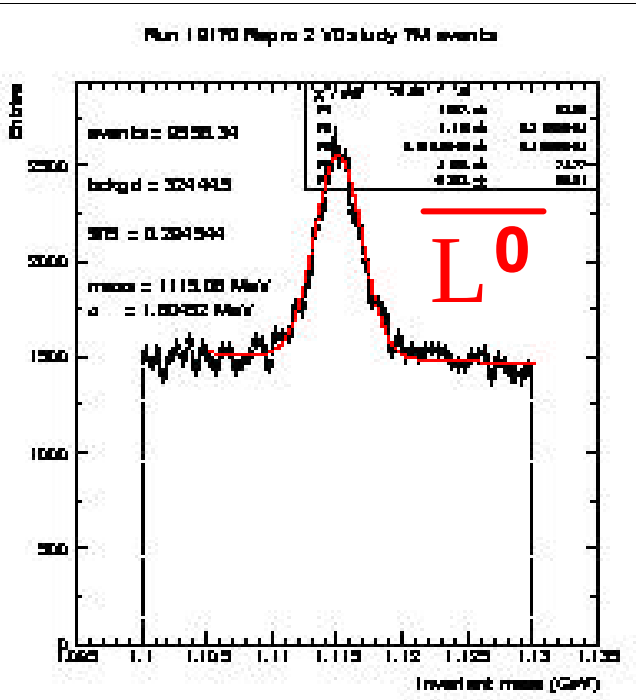
Tracking, Resolution, Alignment



s = 5.4 MeV



s = 2.0 MeV



s = 1.8 MeV

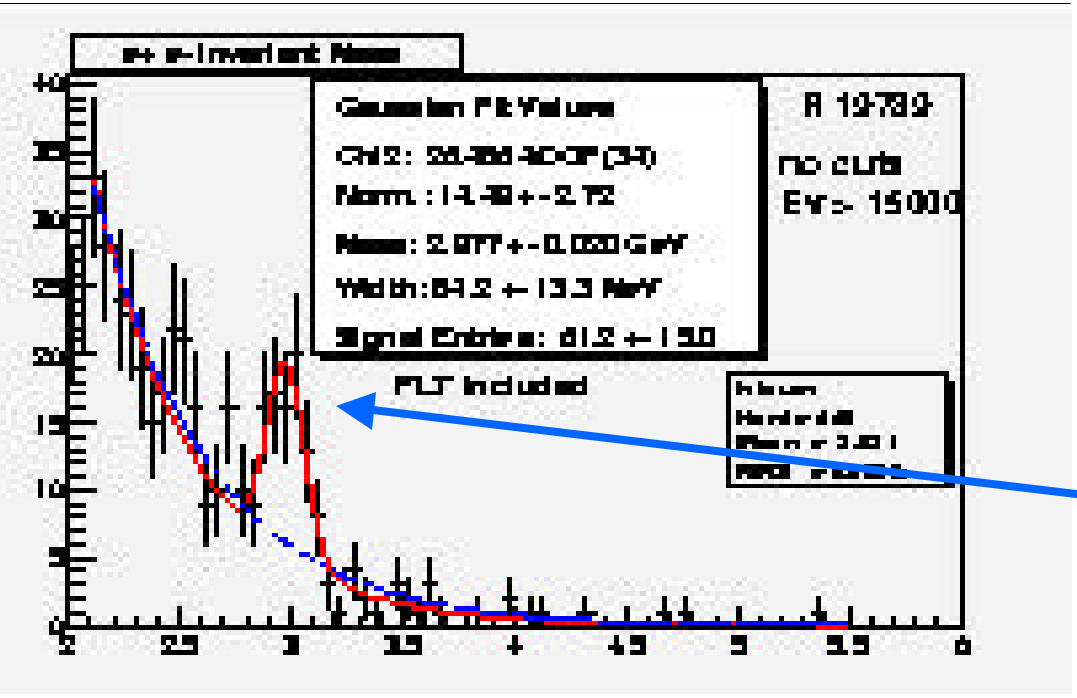
Resolution ≈ 5% better than best of Y2k run.

First Level Trigger

FLT status:
- Regular parasitic running
- Track efficiency: 30 – 70% (average 50%)
  improving: checking alignment, optical links

⇒≥ 75% efficiency for J/ψ in planned 1-track trigger mode

- 1-track mode commissioning starts this week.



HERA-B Design Trigger:

≥2 ECAL clusters, Et>1 GeV

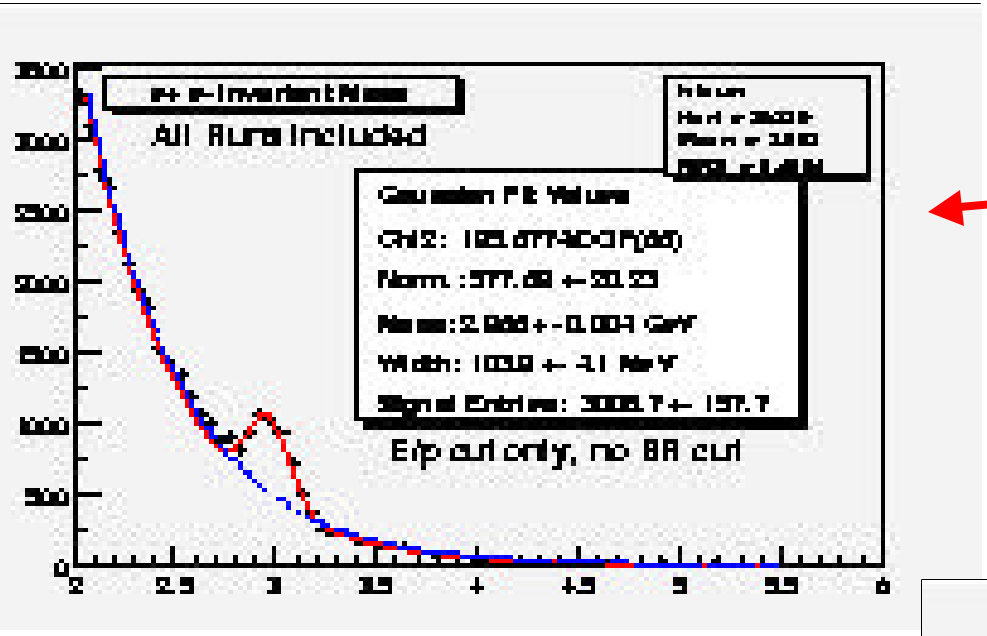
≥ 2 FLT tracks (OTR)

≥ 2 SLT tracks (OTR,VDS)

demonstrated

(i.e. eff as expected)

J/ψ's, so far



Trigger:

≥2 ECAL pretrigs, Et>1 GeV

≥ 2 SLT tracks (OTR,VDS)

Rate: 110 J/ψ /hour

(predicted: 140)

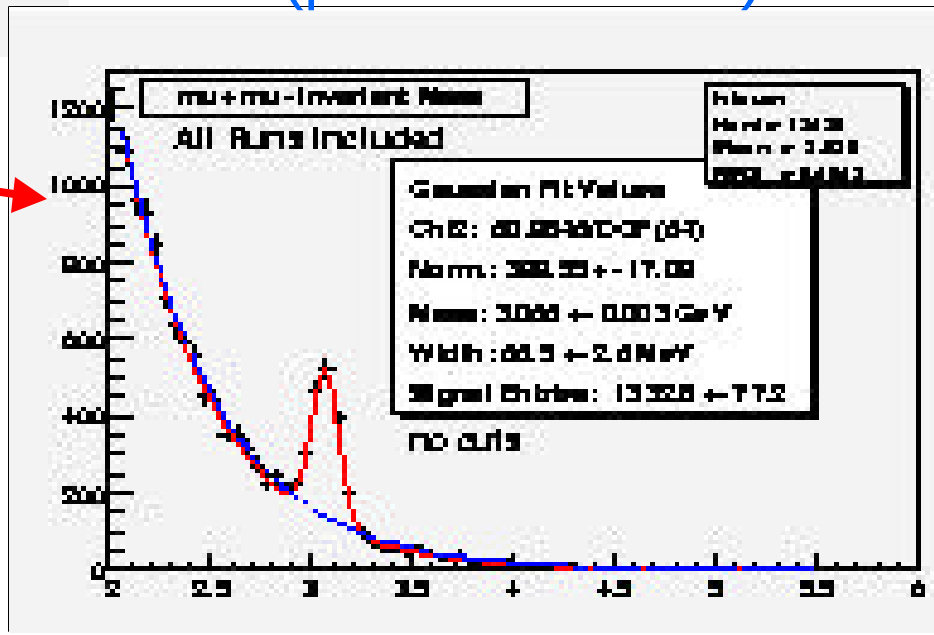
Trigger:

≥2 Muon pretriggers

≥ 2 SLT tracks (OTR,VDS)

Rate: 110 J/ψ /hour

(predicted: 150)



5x higher rate than in y2k run, each channel.

A big thanks to HERA for having provided the needed running time with conditions ranging from usable to excellent.

Projected Rates

	e^+e^-		$\mu^+\mu^-$	
Observed rate J/ψ / hour		110		110
target rate (mainly 60 → 180 bx)	×5	550	×5	550
FLT eff (1 track)	×.75	412	×.65	360
Other improvements	×1.2	500	×1.3	460
Add ITR	×1.5	750	×1.4	640
Total rate	1400 J/ψ / hour			

To Do

- Nothing: VDS, OTR, RICH, ECAL
- ITR: finish training (mid-Oct, depending on beam)
- Muon: repair work: 2 x 16 hours access
- FLT links: repair failed links: 2 x 16 hrs access
- Integrate & optimize trigger: 1 FLT track + 2 SLT tracks, both pre-triggers.

do while(not optimized) {setup, take data, study;}

Best: setup time: several hours, data: 4-8 hours, study: a few days. Several iteration cycles.

2002 Physics program

- $\sigma(b\bar{b})$ to better than 15% (the systematics limit.)
- J/ψ, ψ' suppression vs. x_F -- new: measure in backward hemisphere. Expected statistics comparable to best Fermilab experiment (E866)
- First measurement of χ_c suppression, also vs. x_F.

Draft plan: implications

- 7 weeks for e/p running – 2days/wk = 5 weeks. ($\varepsilon_{HERA} \approx .5$)
- 3.5 (+1?) week – 2 day/wk dedicated HERA-B running. ($\varepsilon_{HERA} \approx .75$?)
- Equivalent to 5 + 2.5 x 1.5 = 8.75 weeks of "normal" operation.
- = 27% of promised run time.

If HERA does deliver this and if we achieve 1400 J/ψ hour and if running efficiency does not suffer from the highly compressed run time we can do the planned measurements with 2x larger errors – still meaningful, except that the ψ' measurement becomes marginal.

Taking data now is urgent:

- HERA-B was approved for an 8 month production run, planned to start on May 1, 2002, i.e. to stop by ≈ end 2002.
- Meanwhile, four key groups announced that they will be unable to maintain their systems after the shutdown.
- Loss of post-doc manpower & know-how is inevitable.
- We will be unable to run after the shutdown unless we attract new groups to operate ≥ 3 important systems.
- Not easy! Without meaningful physics data before the shutdown, impossible.
- Nonetheless, there is still keen interest from several institutes to continue: we will try.
- (Analysis assured: 19 students and several post-docs need data for theses, CVs.)

Requests

- Setup:
  - ≥ few shifts per week for ≥ 5 weeks, some with 180 bunches
  - 2 x 16 hour access days in October before production run.
  - One fill with magnet off in late October (ITR alignment).
- Production:
  - As much target time before the shutdown as possible.
  - 180 bunches.
  - Stable, continuous running: no breaks, frozen & conservative machine parameters. Minimal interruptions for machine studies.
  - HERA-B priority during production run:
    i.e. HERA-B = coordinating exp.

Conclusion

HERA-B needs data now.

- Last chance for excellent physics from 10 years of effort.
- A prerequisite for any program after the shutdown.