TOFp / pVPD / TOFr in Run-III

W.J. Llope for the STAR TOF group
STAR Collaboration Meeting, BNL, 2/26/2003

outline:

Run-III (d+Au)
- hardware...
- chronology for days 19 - 55...
- hit patterns
- integrated #'s of events and TOFx hits....
- hit patterns movie...
- preliminary pVPD performance...
  - efficiency & Nhits...
  - preliminary start resolution...
- early results from the stop side

Run-II (Au+Au)
- see talk in spectra PWG tomorrow

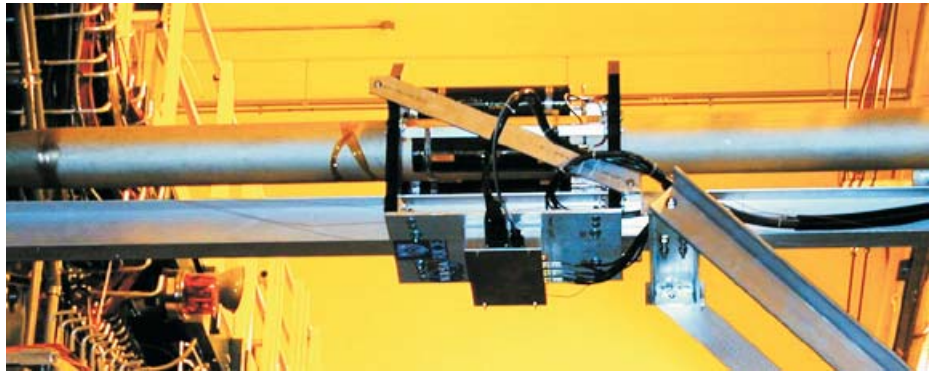
TOFp Detectors for Run III

pVPD and TOFp as in Run-2
first run for MRPC TOFr in STAR

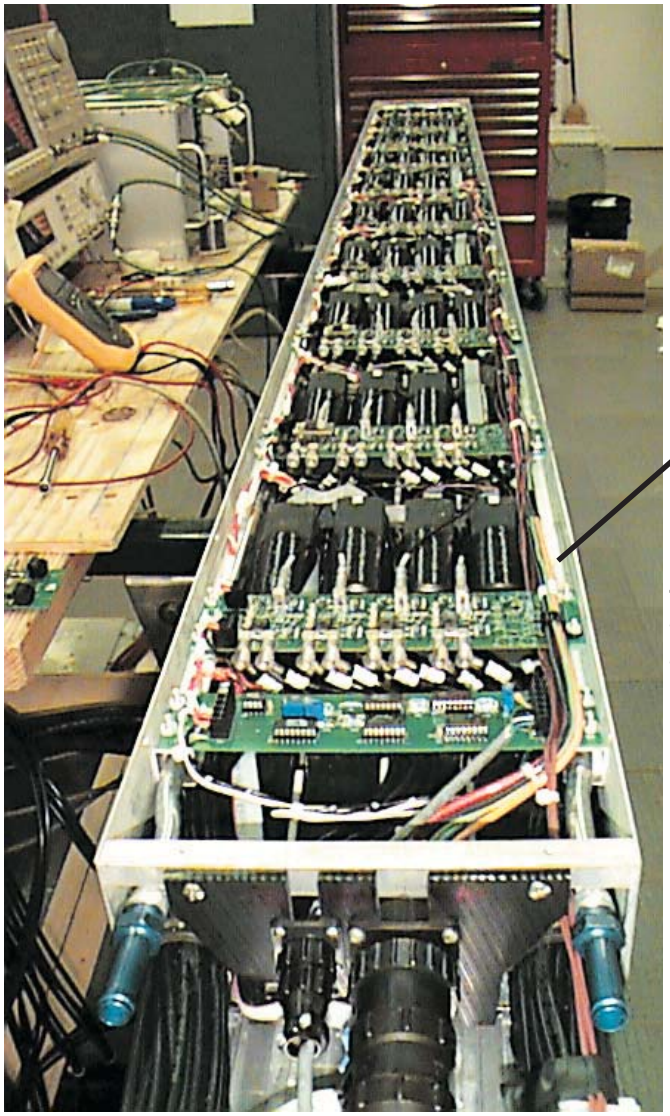
pVPD at run-2 pp gain set
local trigger 1.and.1

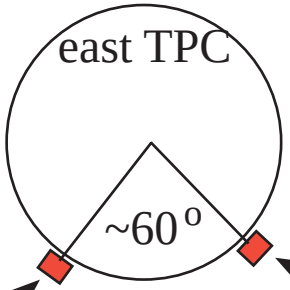
pVPD East

pVPD West



TOFp



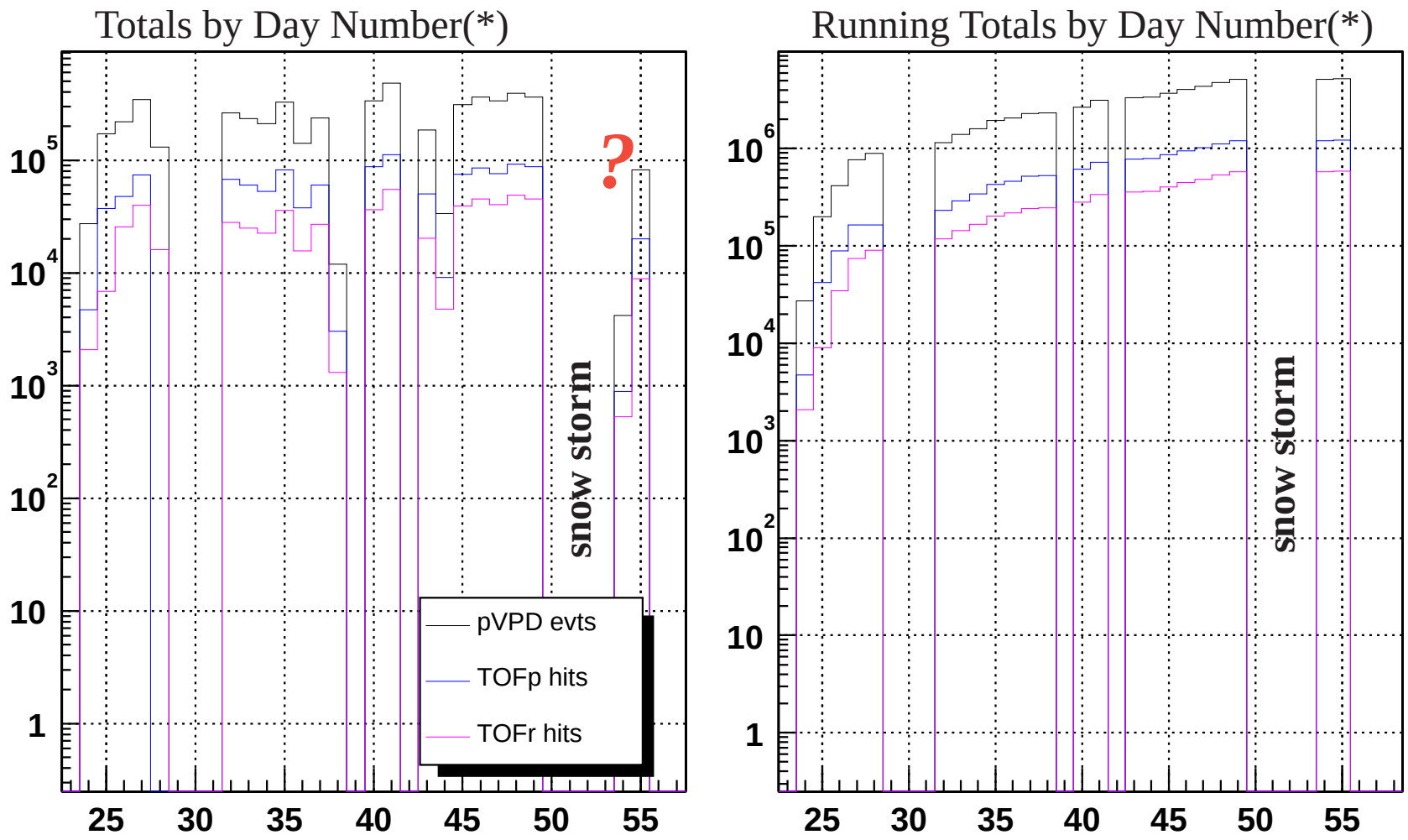


41 slats
~80 cm^2/slat
~3.2k cm^2 total

TOFr

28 modules
168 MRPC chs
72 digitized
~20 cm^2/cell
~1.4k cm^2 total

TOF Systems Event Totals (days 24-55)



(*) day number is that when localmon data are saved to specific file names.
i.e. gaps in the above don't imply tof was down (probably machine was though)...

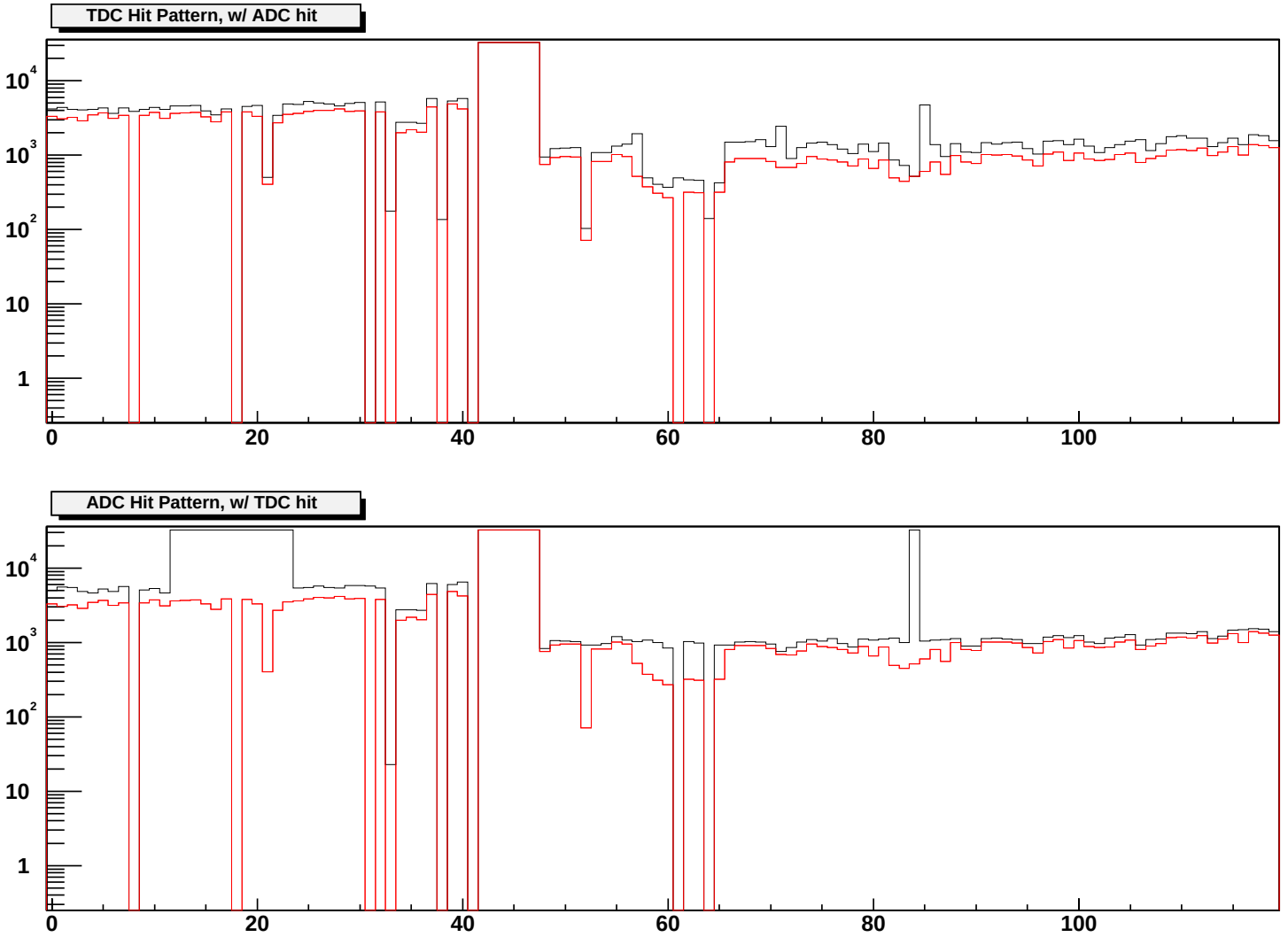
local trigger efficiency ~28% (stable).

so far: → ~5.5M pVPD "physics" events
→ ~1M total TOFp hits
→ ~0.5M total TOFr hits → (all freon-only)

individual ADC and TDC distributions are generally fine - some scattered bad chs

Hit Patterns to date

days 25-55
localmon sampling rate = 10%



so far ~40k hits per TOFp slat
~10k hits per TOFr cell

the usual handful of sick TOFp chs
3-4 TOFr chs w/ problems
(not all necessarily detector problems)

brief chronology of TOF Systems in Run 3 (days 19-55)

Date:	Day:	
Jan 19	19	Run 4018026, first test of TOF-DAQ communication in a test run TOF systems now under Shift Control and involved in running Trouble w/ TOFr HV tripping at beginnings of fills, lost TOFr for some spills...
Jan 20	20	TOFr "Mapping Problem" seen, (re)maps defined to fix problem in software
Jan 23	23	pVPD now at correct gain set and controllable from SC GUIs (Dennis Reichold et al.)
Jan 27	27	TOFr "Re-Ramp" functionality implemented. TOFr never misses spills now...
Jan 28	28	TOFp chokes - FEE failure...
Jan 30	30	Scheduled Access w/ East Pole-Tip off. TOFp fixed. all signal paths strobed... (mapping problem) detailed study of all TOFr cabling - no problems seen!
Feb 6	37	TOFp ADC #2 dies, replaced w/ one w/out preset pedestals...
Feb 12	43	First integration of TOFp HV, TOFr HV, and TOFr Gas Monitor in STAR SC GUIs...
Feb 13	44	TOFp "current limit problem" appears - fixed same day in surprise access... TOFr Mapping problem traced to two bad TDCs - replaced. Mapping problem gone.
Snow		
Feb 21	52	Starting to implement local logic for pVPD- and TOFr-based triggers... timing tests...
Feb 23	54	Data looks wierd (hear lots going on re: L2 and DAQ...)
Feb 24	55	Data looks better (no local changes), but now seeing more L2 timeouts than expected... increased local L2 time-out delay from 0.1s to 0.5s - huge improvement. TOFr TDC #7 dies..
Feb 26	57	Scheduled access.... (replaced 1 TOFr plat disc, 1 TOFp ADC, 1 TOFr TDC, tests)

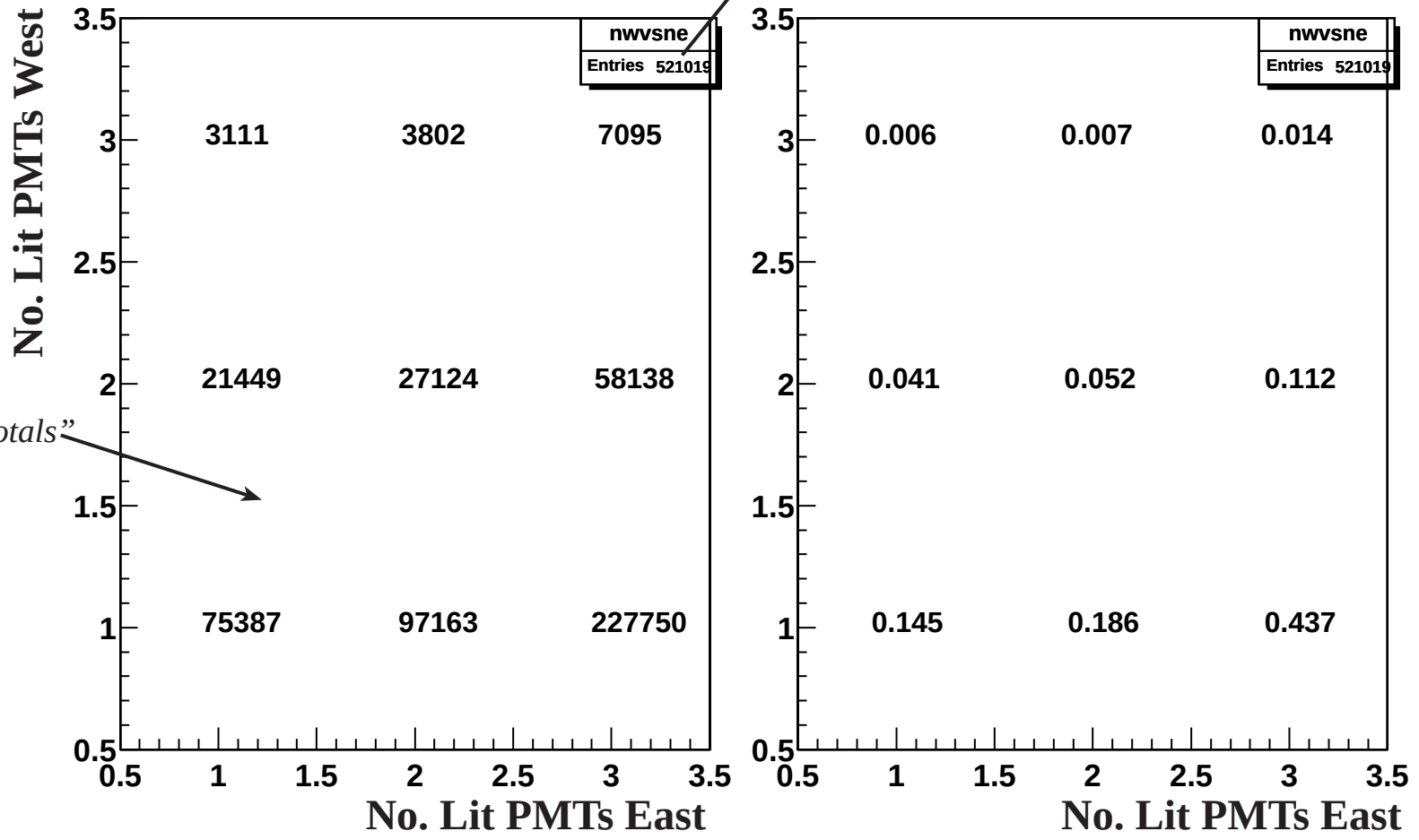
Hit Pattern Movie

pVPD in d+Au

pVPD **East** sees Gold ring → **sees Au** fragmentation
pVPD **West** sees Blue ring → **sees d** fragmentation
local trigger condition is “1.and.1”....

East != West

~5.2M pVPD-triggered events
(days 24-55)



these are “localmon totals”
multiply by ten to
get actual evt totals
so far (days 24-55)...

on average

1.3 hits West hits per event → primarily single-particle timing... (ouch)
2.4 hits East hits per event → multi-particle timing...

East chs should outperform West chs

(vastly different environment on the start side as compared to Run 2’s symmetric beams!)

pVPD resolution in minbias d+Au

"1-‹2›" vs ADC

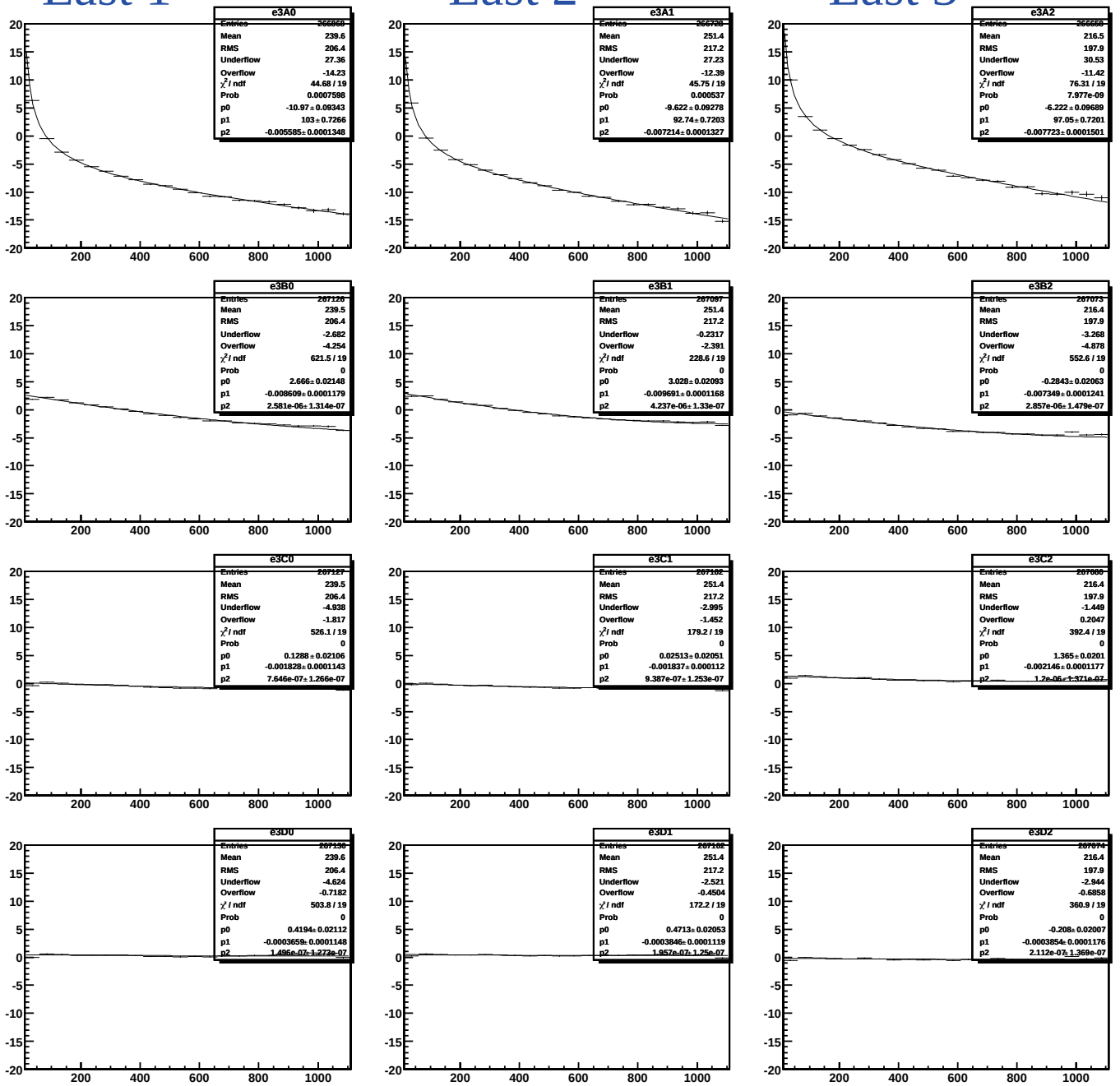
East 1 East 2 East 3

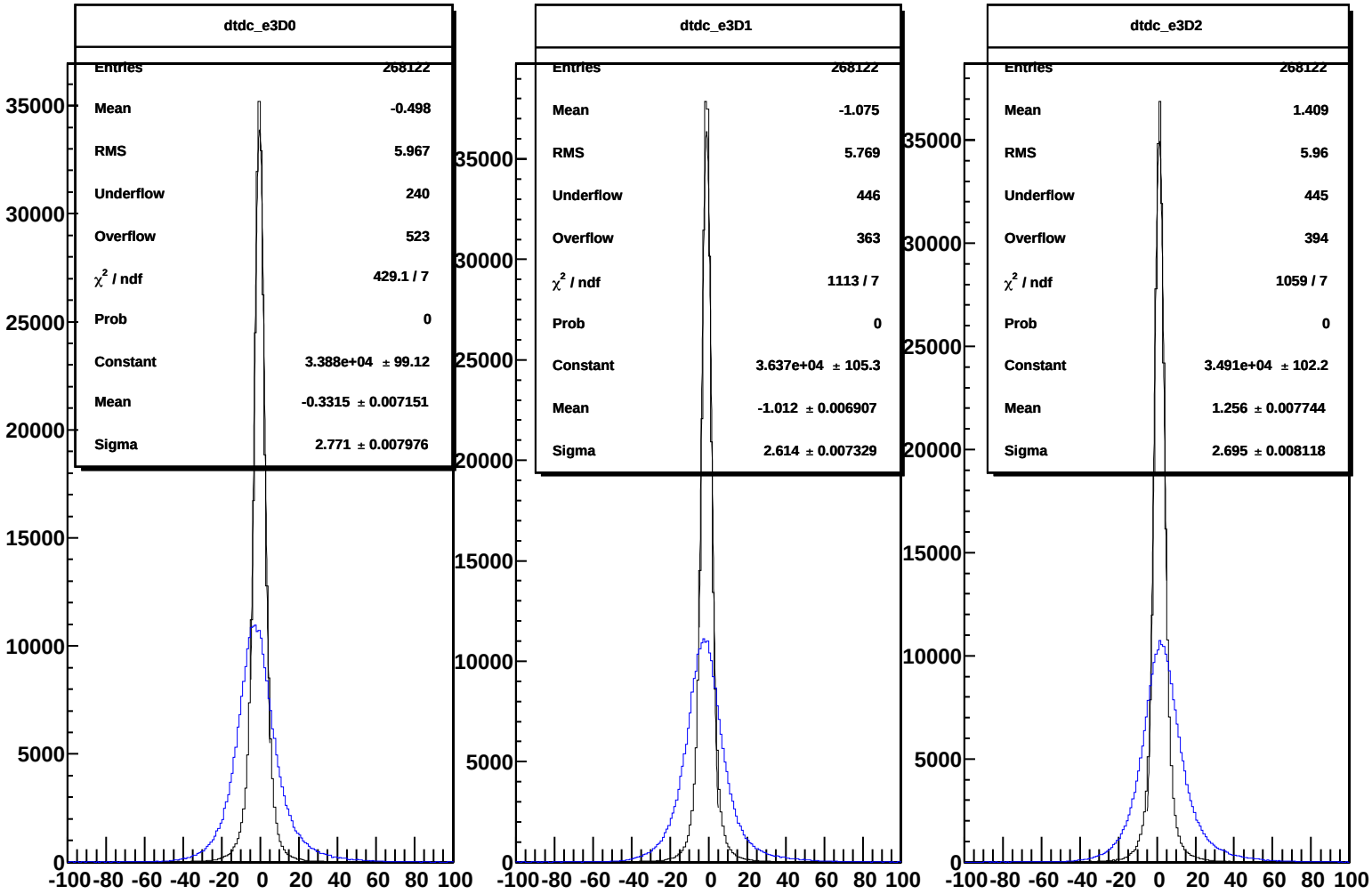
pass 1

pass 2

pass 3

pass 4





σ(1-‹2›) is ~2.7 TDC chs, or ~135ps

→ single detector resn on the East is ~104-110 ps

→ $\sigma_{\langle 2 \rangle}$ ~ 74ps
→ $\sigma_{\langle 3 \rangle}$ ~ 65ps
→ $\sigma_{\langle 4 \rangle}$ ~ 58ps

pVPD start resolution is better than expected
i.e. more forward hits than expected

may be harder to get the West calibrated to this level...

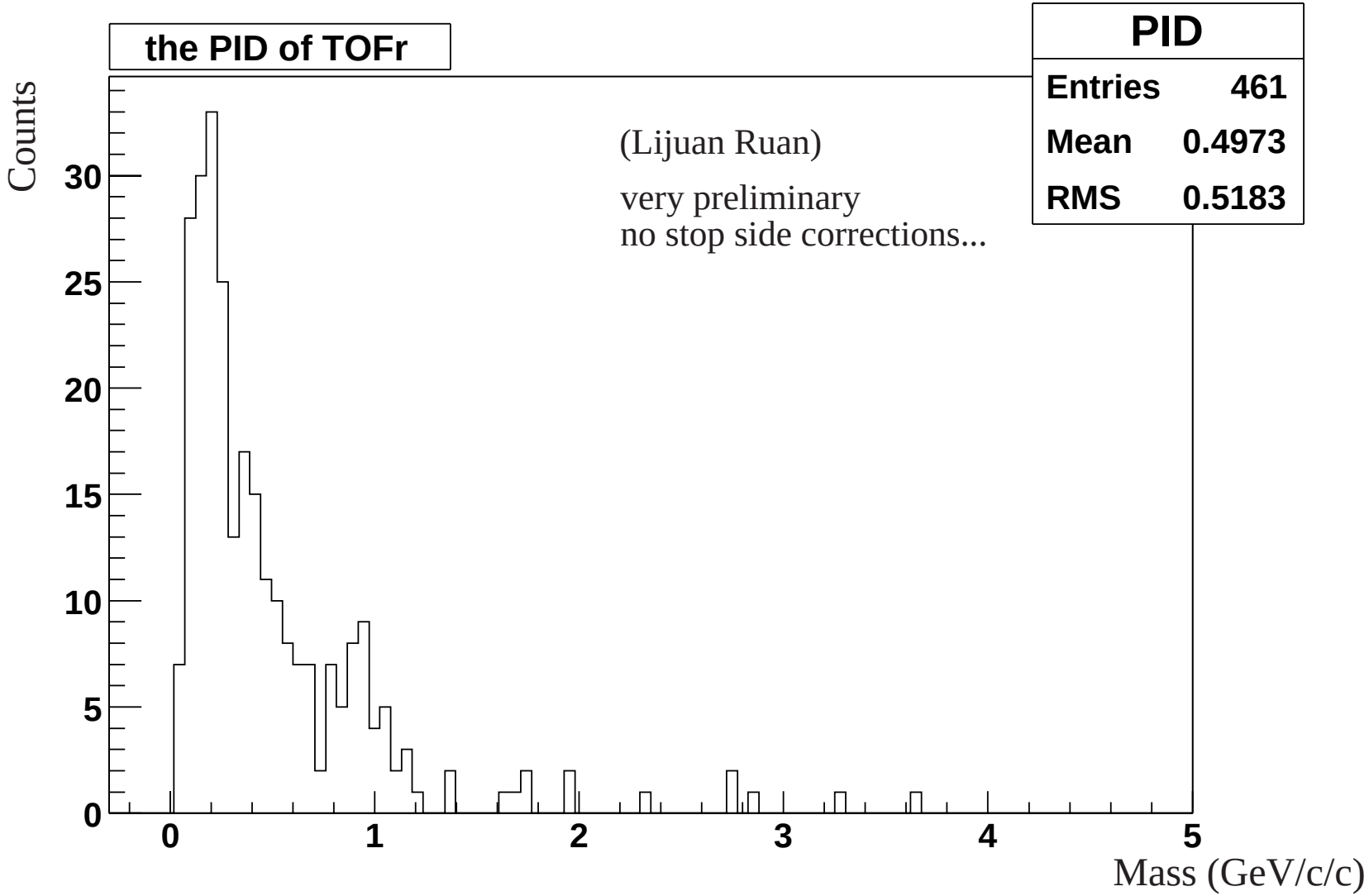
d+Au Production underway (hurray!)

production of TOF miniDST underway (FG),

so-called Match Ntuple for TOFp few days later

full calibration of pVPD and TOFp then starts (few days)

work also started on similar software for TOFr:



first fully calibrated d+Au results from TOFp+pVPD in ~1 week...

Summary

pVPD, TOFp, TOFr up and running well since Day ~24...

no trips or other “emergencies” for the shift crew to deal with...

various intermittant detector/electronics problems throughout but overall

~5.5 M pVPD physics triggers (corresponds to 22M STAR events)

~1M total TOFp Hits

~0.5M total TOFr Hits (all freon-only)

~40k hits/slat in TOFp

~10k hits/cell in TOFr (add’l penalties: ~0.7 good starts * ~0.3 primaries * Zvtx cut)

a pVPD+TOFr trigger would be immense boost to TOFr data set (see following talk)

pVPD timing resolution in d+Au is better than expected.... in range from 50-80ps minbias...

~1.3 hits/event on West

~2.4 hits/event on East

East will outperform West...

Production data becoming available

expect fully calibrated **1/β vs p** spectra from pVPD+TOFp in ~1-2 weeks...

pVPD+TOFr spectra soon thereafter...

Plans for rest of run.

TOFp and pVPD	no changes - just take data...
TOFr	Want to switch to Freon + ~5% isobutane in less than ~1 week...
	Want pvpd+tofr triggered data runs for both gas mixtures...