CDF Operations Report

Mary Convery

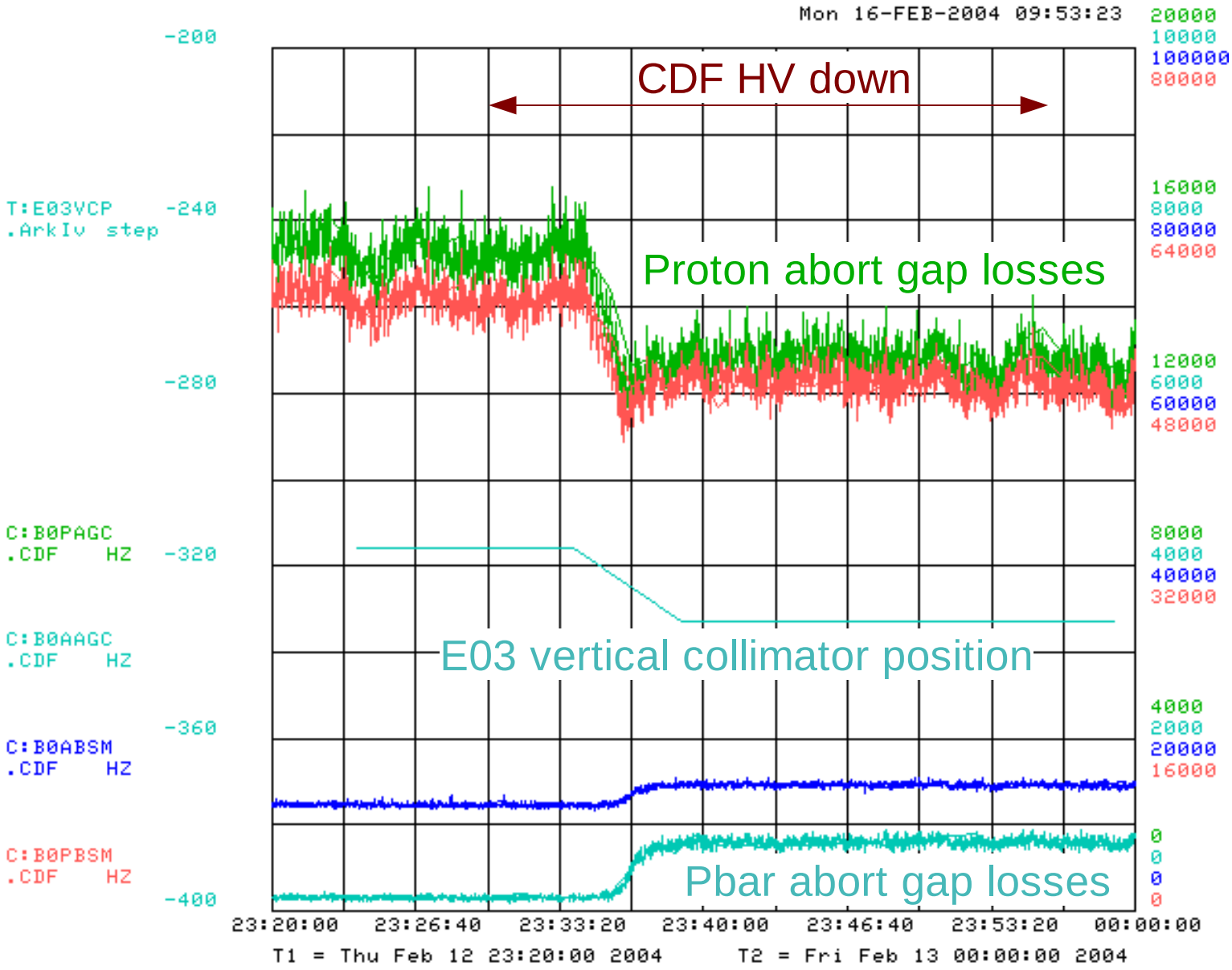
All Experimenters' Meeting

February 16, 2004

Store Summary

Date	Store	Init Inst Lum 10^{30} s^{-1} cm^{-2}	Lum deliver nb^{-1}	Lum to tape nb^{-1} (effic)	Comments
Su 2/28	3224	53.7	2832	1190 (42.0%)	Solenoid down
T 2/10	3226	53.2	2633	2235 (84.9%)	
Th 2/12	3228	47.3	2295	2030 (88.4%)	
F 2/13	3231	50.6	2408	2073 (86.1%)	COT HV / XFT tests
Su 2/15	3237	61.1	In progress		Silicon trip
Total			10168	7528 (74.0%)	

- We appreciate efforts to reduce abort gap losses, but...
- Approximately 25% of downtime this week (excluding solenoid) was due to lowering HV for collimator moves
  - Average ~20 minutes down
  - In one case had trouble bringing HV back up


Mon 16-FEB-2004 09:53:23
CDF HV down
Proton abort gap losses
E03 vertical collimator position
Pbar abort gap losses
T:E03VCP
.ArkIv step
C:B0PAGC
.CDF HZ
C:B0AAGC
.CDF HZ
C:B0ABSM
.CDF HZ
C:B0PBSM
.CDF HZ
-200
-240
-280
-320
-360
-400
20000
10000
100000
80000
16000
8000
80000
64000
12000
6000
60000
48000
8000
4000
40000
32000
4000
2000
20000
16000
0
0
0
0
23:20:00
23:26:40
23:33:20
23:40:00
23:46:40
23:53:20
00:00:00
T1 = Thu Feb 12 23:20:00 2004
T2 = Fri Feb 13 00:00:00 2004

Solenoid Downtime

- Lost the wet engine during store 3221 ~2am Sun 2/8
  - DC motor replaced
  - Following that, failure in controller which was fixed
  - Solenoid down until enough liquid He (17 hr total)
  - Silicon alignment run with no magnetic field
  - Used the down time for other tests

- Power glitch caused fast dump of solenoid ~5:30am Sun 2/15
  - Solenoid cold in plenty of time for store 3237

Detector Status

- Power glitch caused loss of HV monitoring for parts of the central and endwall calorimeters
- Other than solenoid problems, no other effects of power glitch observed
- As a response to aging seen in tracking chamber, prior to store 3231 HV was turned off for 2 innermost superlayers and HV lowered for 3 additional superlayers
  - Tracking trigger modified
  - Rob Roser will give details

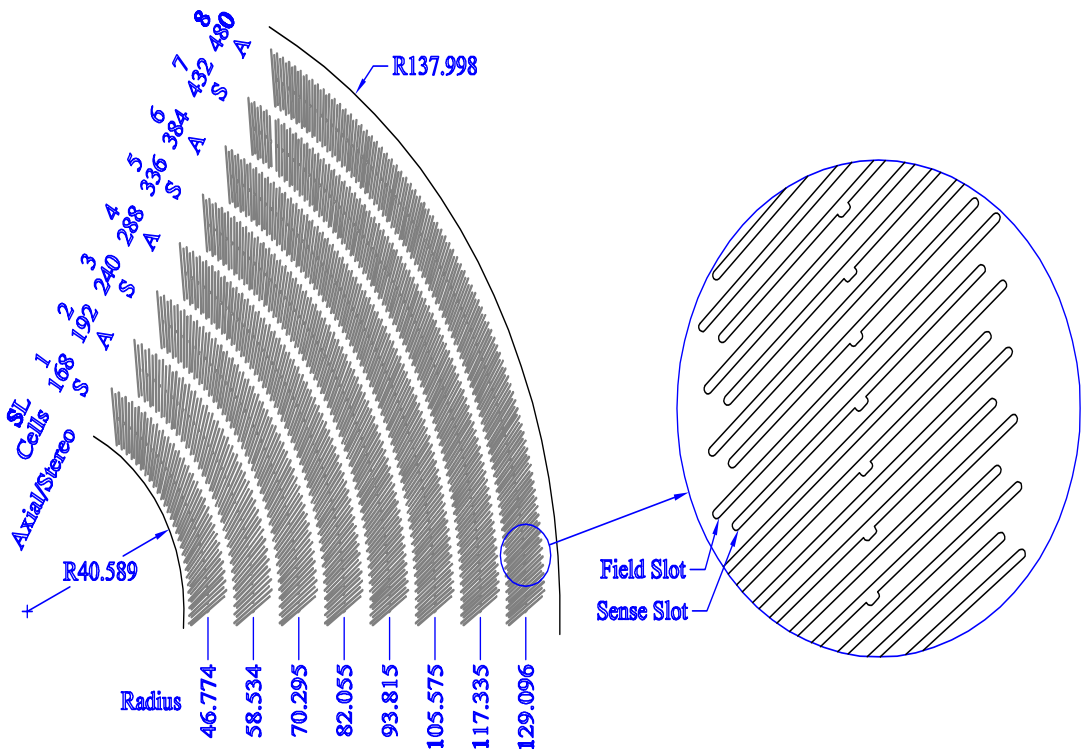
COT Aging Status

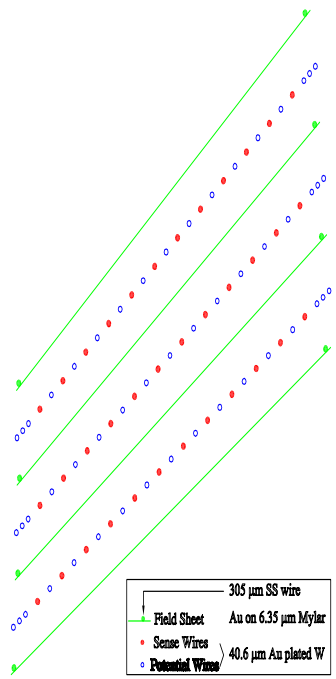
Rob Roser

February 16, 2004

Reminder of basic design and geometry

- 1/6 Section of COT End Plate (Super Layer / Super Cell Design)



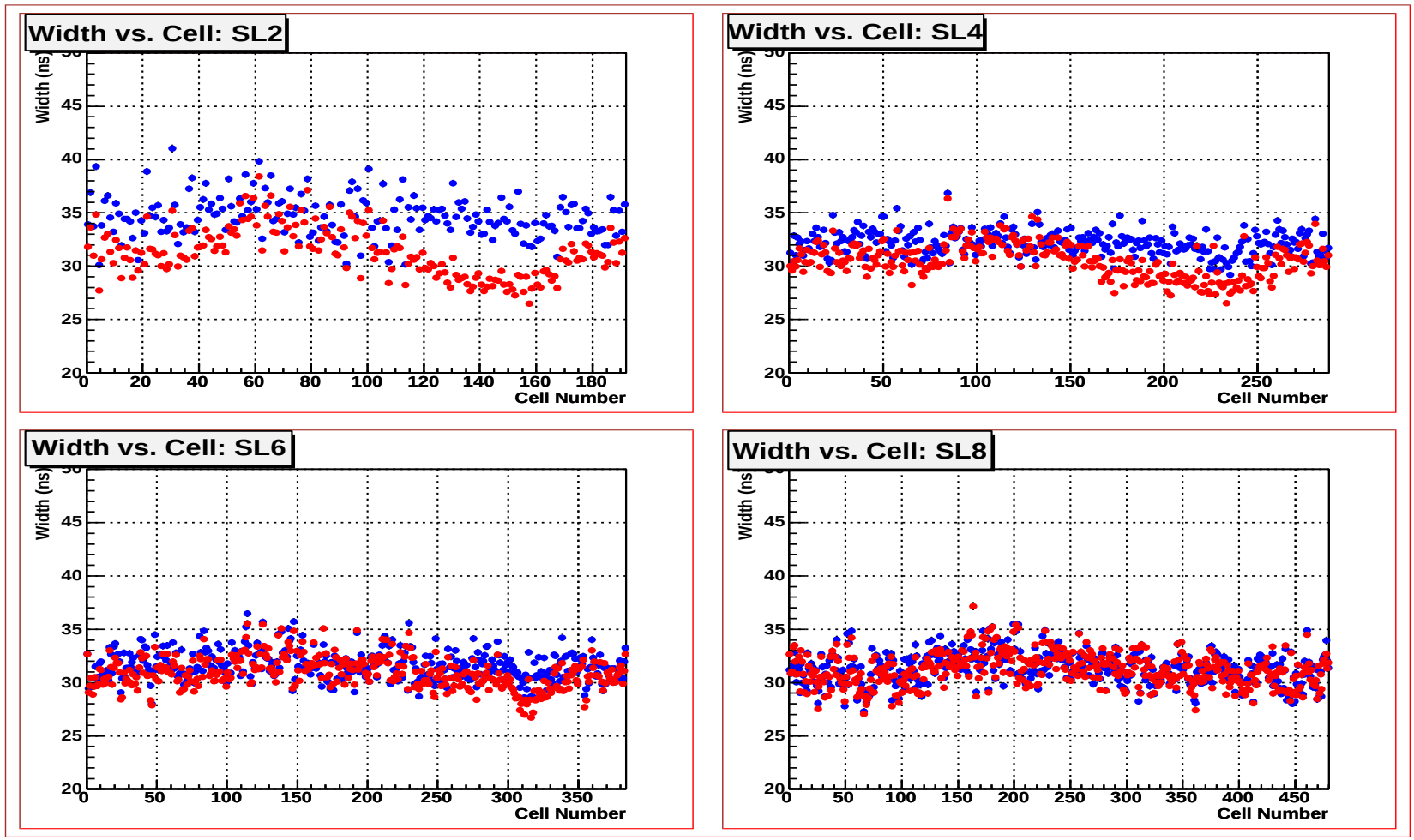


COT Aging Background

- We have been aware of Aging in the Central Outer tracker for some time.
  - Observed average gain is decreasing with time
  - Biggest gain drop closest to the beam with almost no change in the outermost layer
  - Observed change in gain vs Phi – largest on the bottom
  - Observed change in gain vs Z (along the beam)
- We do not observe these effects on the bench
  - Two gas monitoring chambers have been monitoring the input gas and have not observed any symptoms of aging
  - The one monitoring chamber on the exhaust manifold shows some aging, but at a much lower level than observed in the chamber

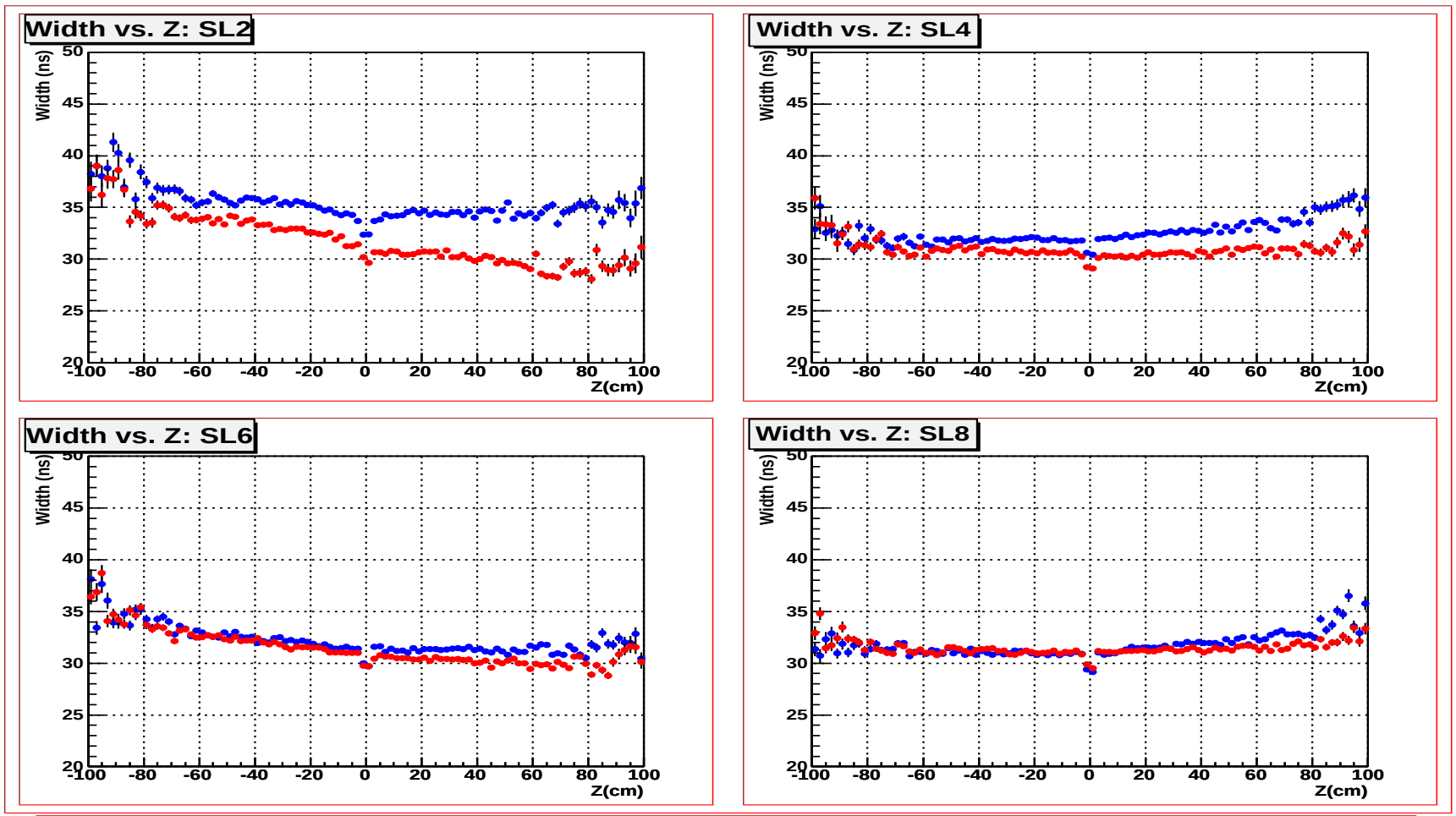
Width versus cell (ϕ) (Axial Layers)

- Run 149663 (very early run)
- Run 168820 (just before Fall '03 shutdown)



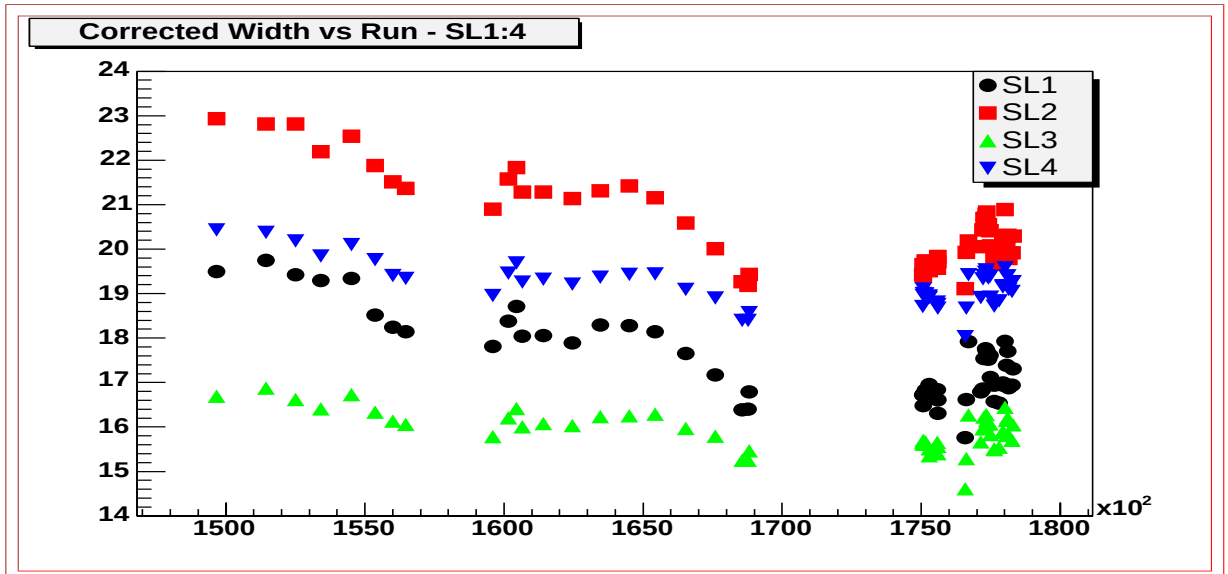
Width versus z (Axial Layers)

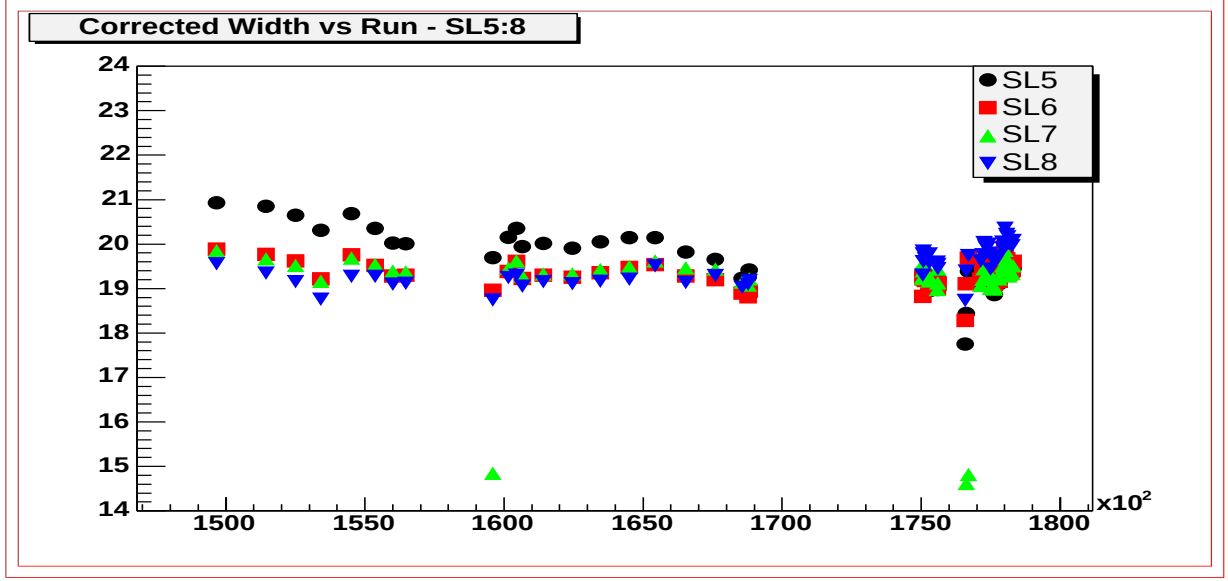
- Run 149663 (very early run)
- Run 168820 (just before Fall '03 shutdown)



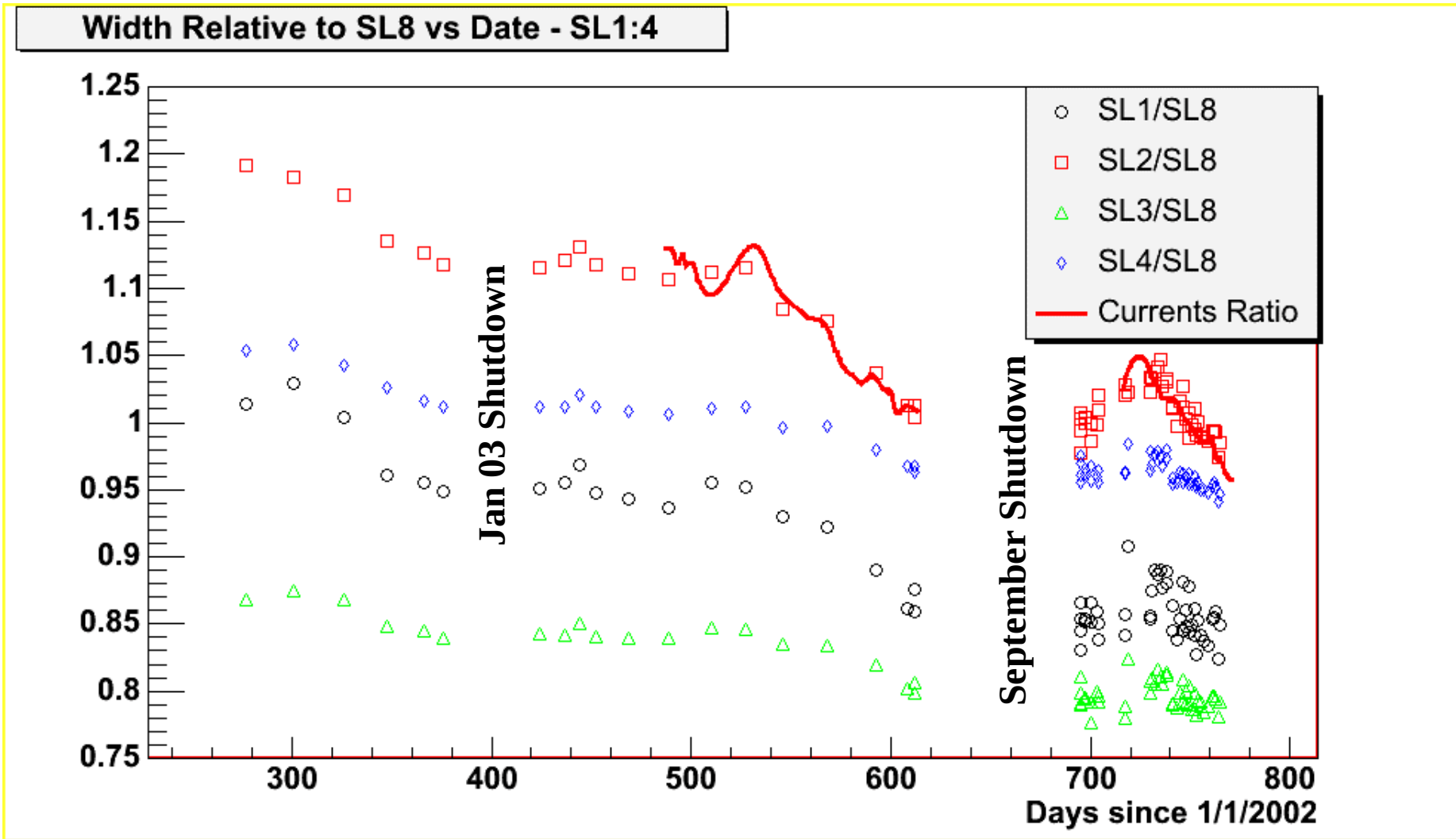
Width .vs. Run Number (time)

- Note that there is little change immediately before and after the Fall '03 shutdown.





Chamber Current .vs. time



Strategy

- Minimize Further Aging until a solution is found
  - Turned HV off to SL1 and SL2
  - Turned Gain down on SL 3,4,5
- Focusing on Gas
  - Increased flow by 2x already
  - Coming up with a plan to re-circulate gas 20-50x initial flow.
  - Re-analyzing gasses to look for anything unusual
  - Investigating options like CF4
- Will Request time to pull an inner wireplane and have it analyzed

Setting up an External Review Committee

- Seeking advice from other experts in the field
  - Bob Kephart has agreed to chair this
  - Outside experts include
    - Fabio Sauil
    - Jerry Va'vra
    - Carsten Niebuhr
    - Marcus Hohlmann
  - First meeting this week

- Bringing in a plasma chemist who specializes in these effects

Short term impact to our physics program

- SL2(off) and SL4(reduced gain) are key components of our on-line tracking trigger
- Masked SL2 wires to be all on and modified our cuts to lessen the gain/efficiency change on SL4
- Compared efficiencies of stores just prior to and just after we have made COT modifications
  - $W \rightarrow \mu\nu$ now at 60% of before
  - $W \rightarrow e\nu$ now at 60% of before
  - J/psi now at 40% of before