



Tevatron Status and Recent Lattice Measurements

A.Valishev for the Tevatron Group

Joint Luminosity Task Force Meeting
12/5/2007



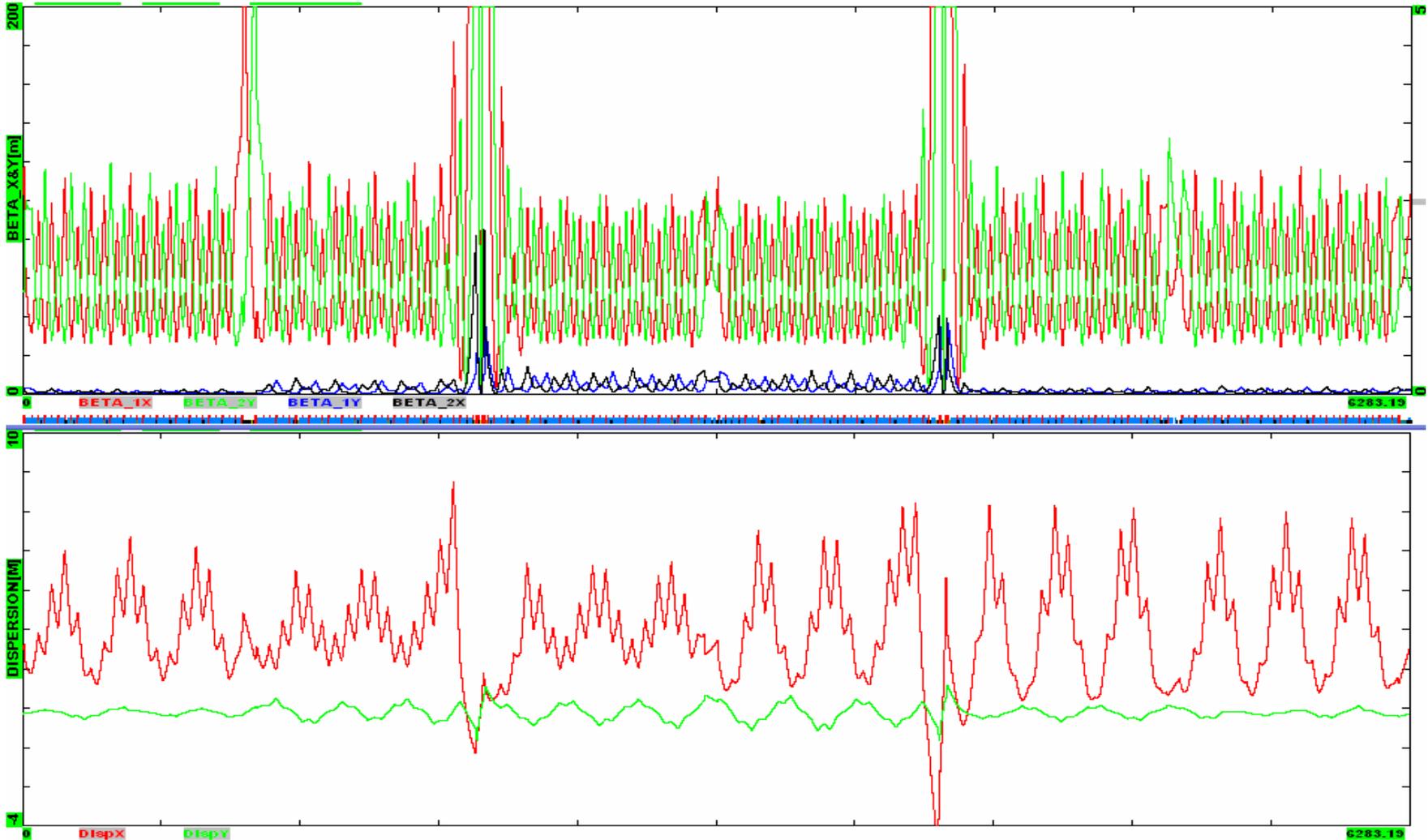
Optics-related Work During Shutdown

- FF quadrupole moves at both experiments in order to minimize corrector strength
- D16 quadrupole unrolled (~ 20 mrad)
- Various minor alignment corrections
- New collision helix



LowBeta Optics as Found (07oct20)

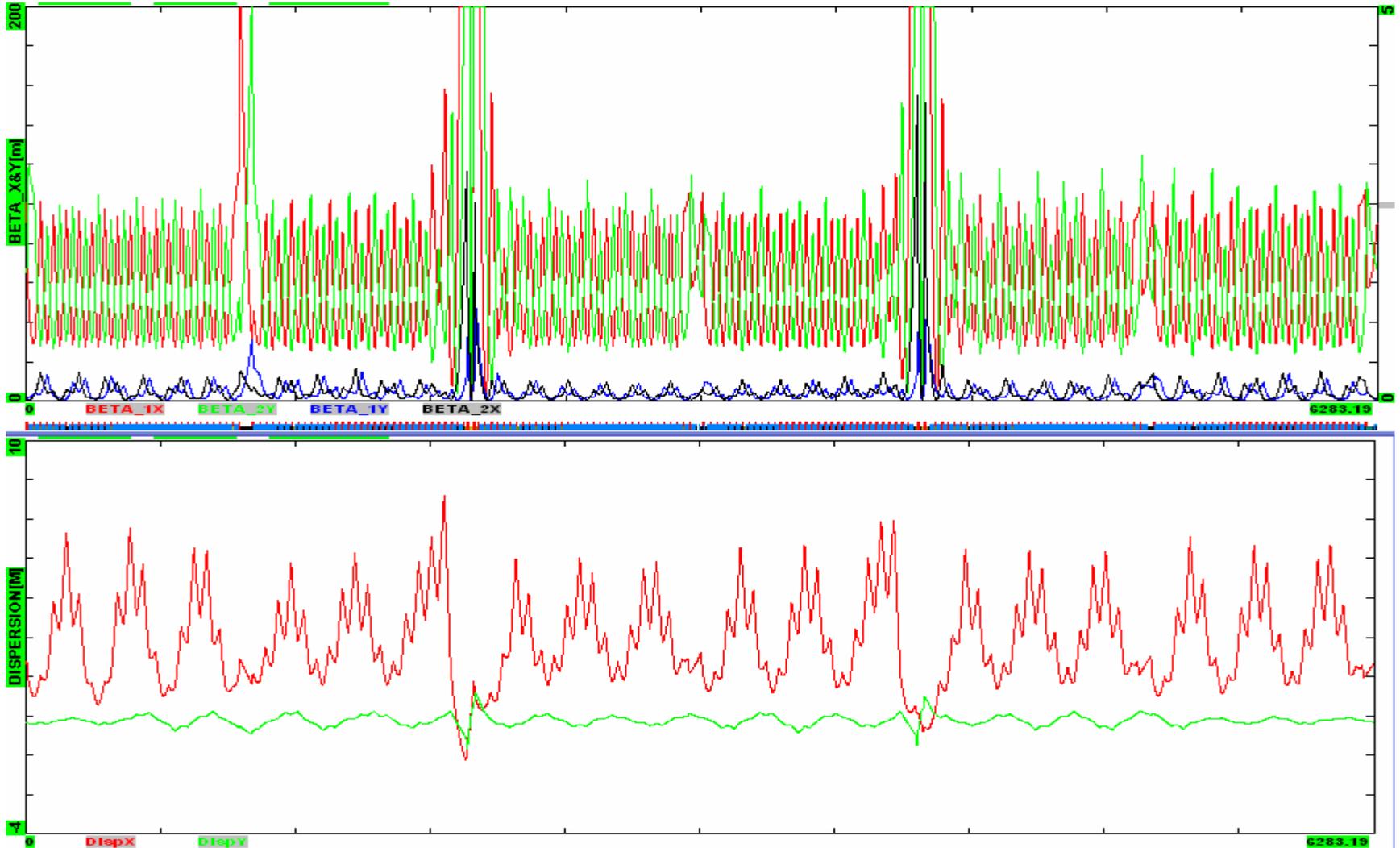
- Beta beating in the arcs
- Coupling needs to be corrected (lower SQA0)
- Dispersion BAD - 10cm at D0 and large angle
- Beta*s are OK at 29cm





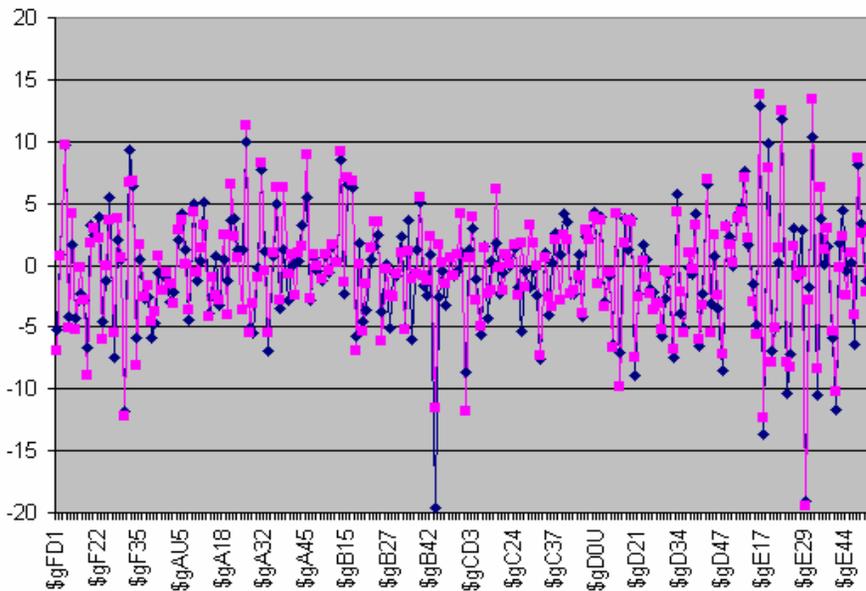
LowBeta Optics Corrected (07oct25)

- Beta beating in the arcs (vertical)
 - Beta*s are OK at 29cm
 - Coupling OK
 - Dispersion OK

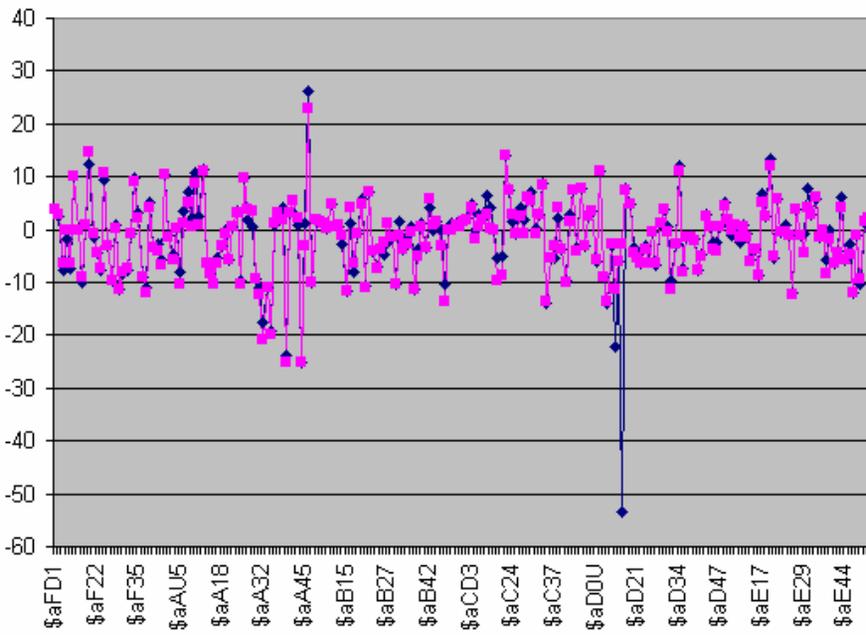




β^* Values and Gradient Errors



	β_x^* (cm)	β_y^* (cm)	
CDF	28.4 (26.7)	29.6 (na)	$\pm 15\%$
D0	28.2 (25.1)	30.8 (na)	$\pm 15\%$



FF Quad Rolls

	Jul06'	Oct07'
B0Q3D	1.8	1.7
B0Q3F	0.9	0.4
D0Q3F	0.9	0.8
D0Q3D	1.1	-1.1



CDF IP Position

- IP position after shutdown was off by 0.6/1.2 mm
- 4 final focus quads at B0 were moved on Nov. 6 and IP position fixed. Corrector strengths are within range.



New Helix Work

- Motivation: avoid horizontal separator polarity switch in the squeeze ($lbseq=17$) to eliminate proton losses.
- Achieved by flipping Collision helix in the short arc
- In the new configuration, transition from Injection to Collision helix at $lbseq=14-15$ caused high pbar losses.
- Satisfactory solution was not found and old helix was returned on Nov. 6

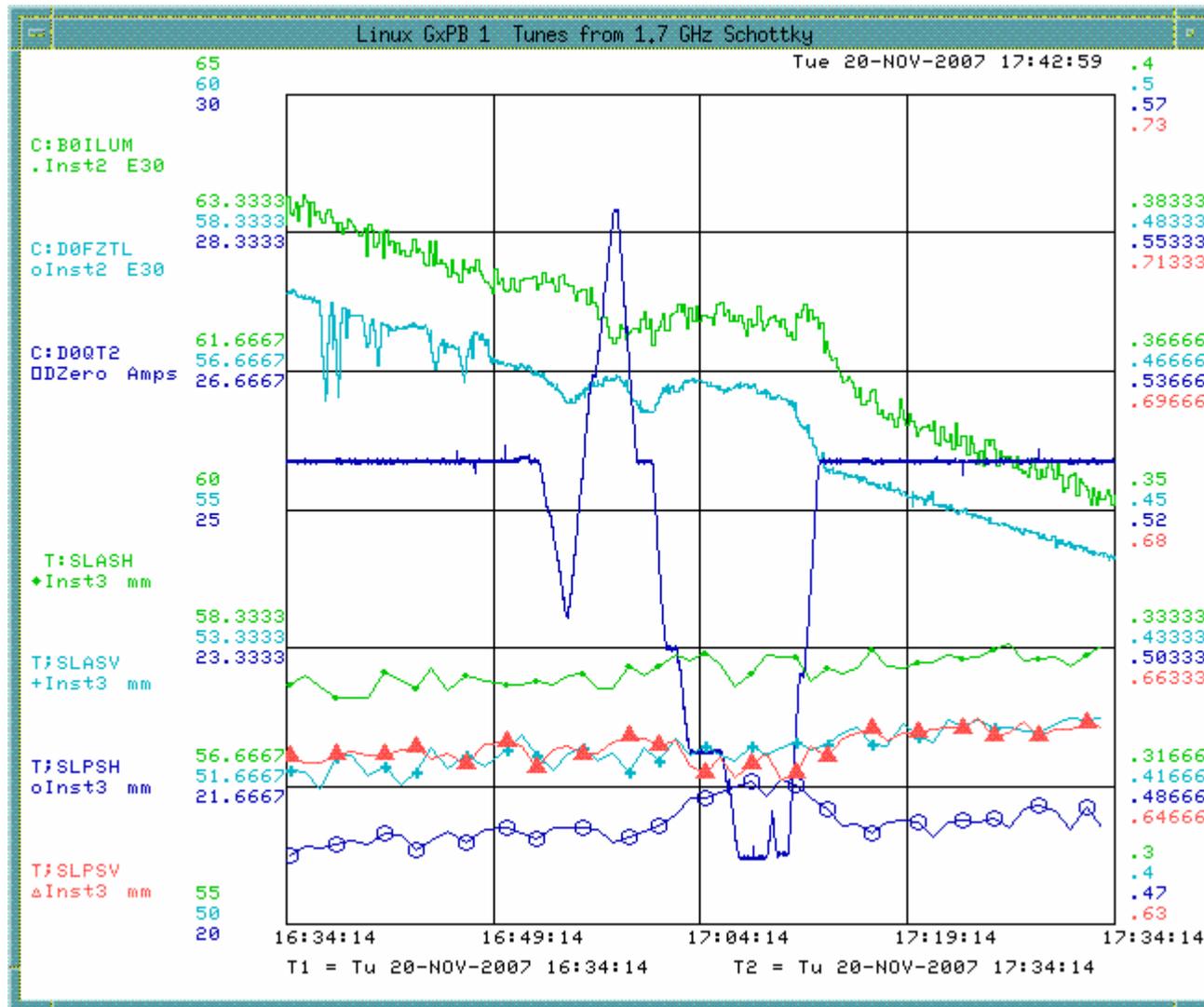


CDF/D0 Luminosity Ratio

- Scans of beam separation at D0 did not reveal alignment errors
- D0 waist position scans
 - Horizontal waist shifted downstream (~5-10cm)
 - Vertical waist shifted upstream by 5cm
 - Two rounds of measurements done, changes implemented on Dec 3.
- CDF luminosity depends on losses?

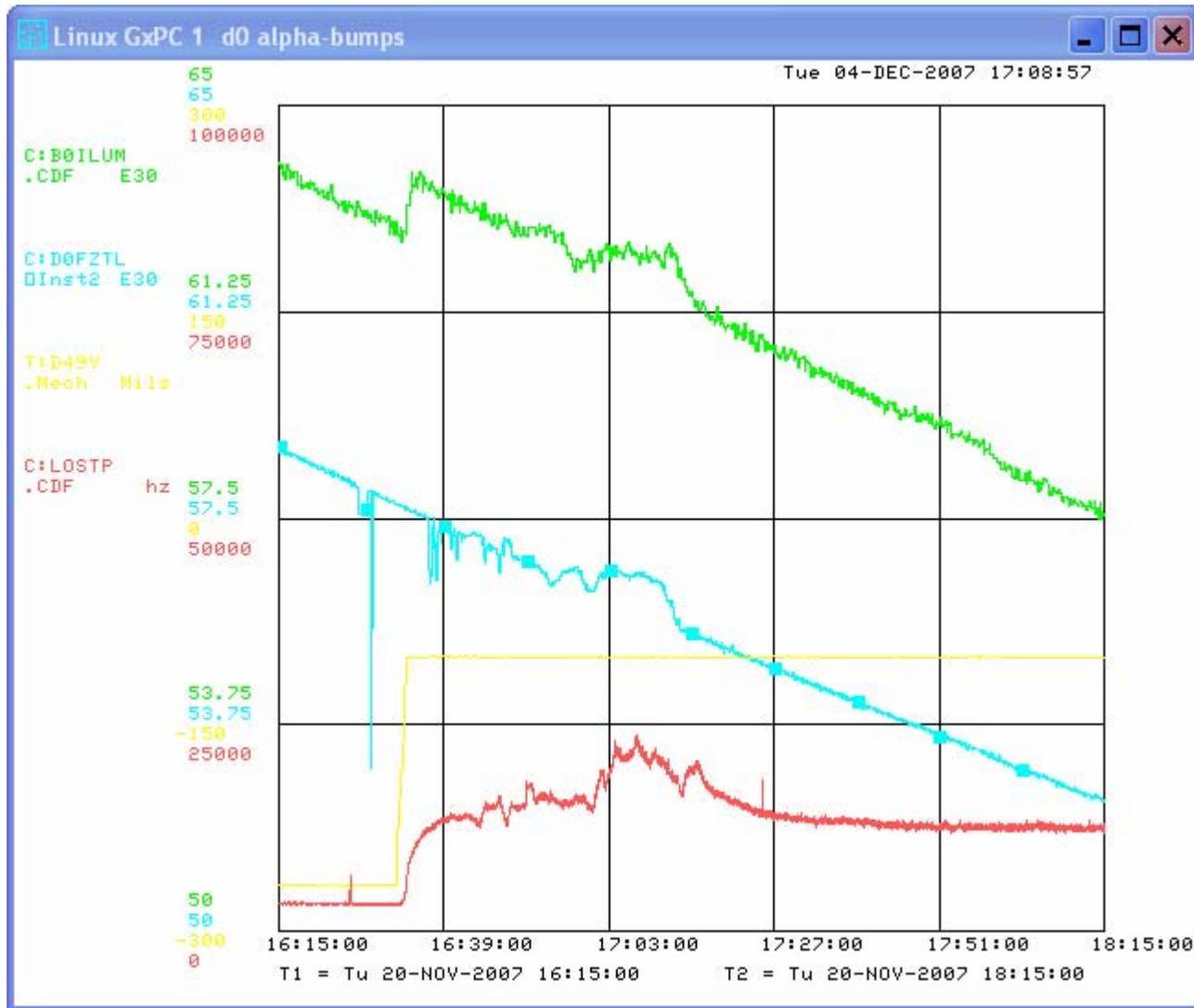


D0 Alpha-bump Scans. 11/20 Store 5737



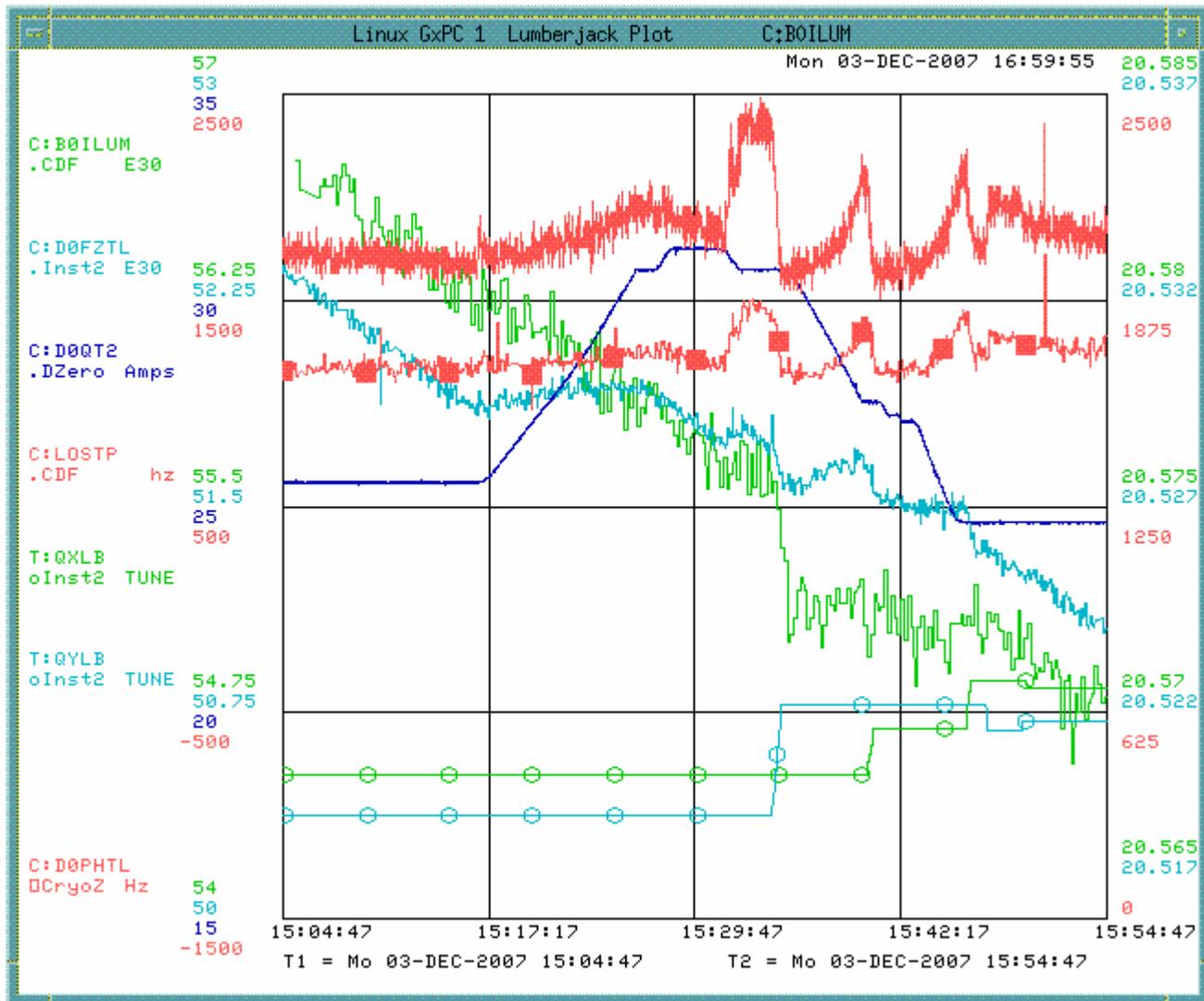


D0 Alpha-bump Scans. 11/20 Store 5737





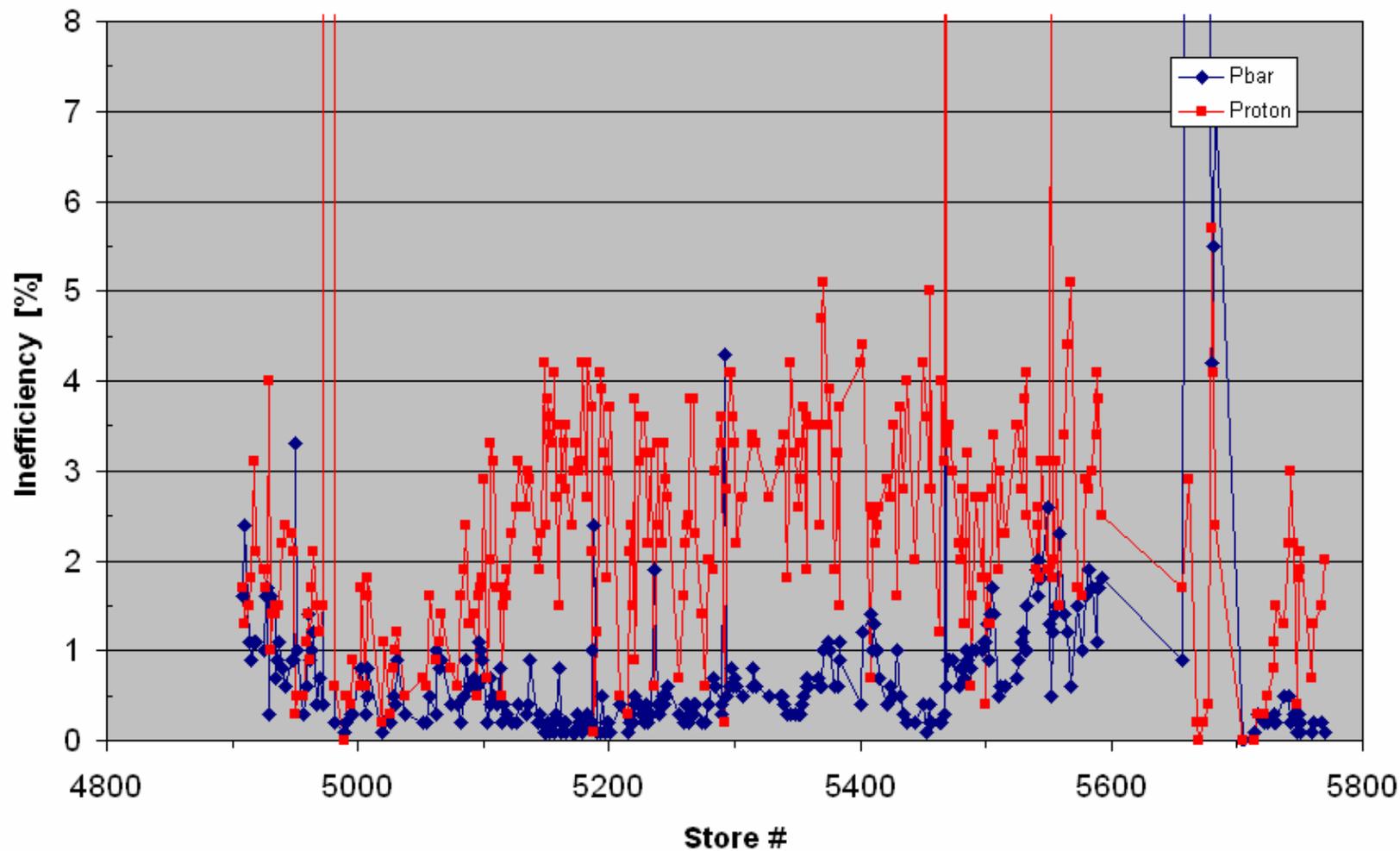
D0 Alpha-bump Scans. 12/3 Store 5770

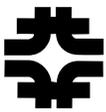




Performance After Shutdown

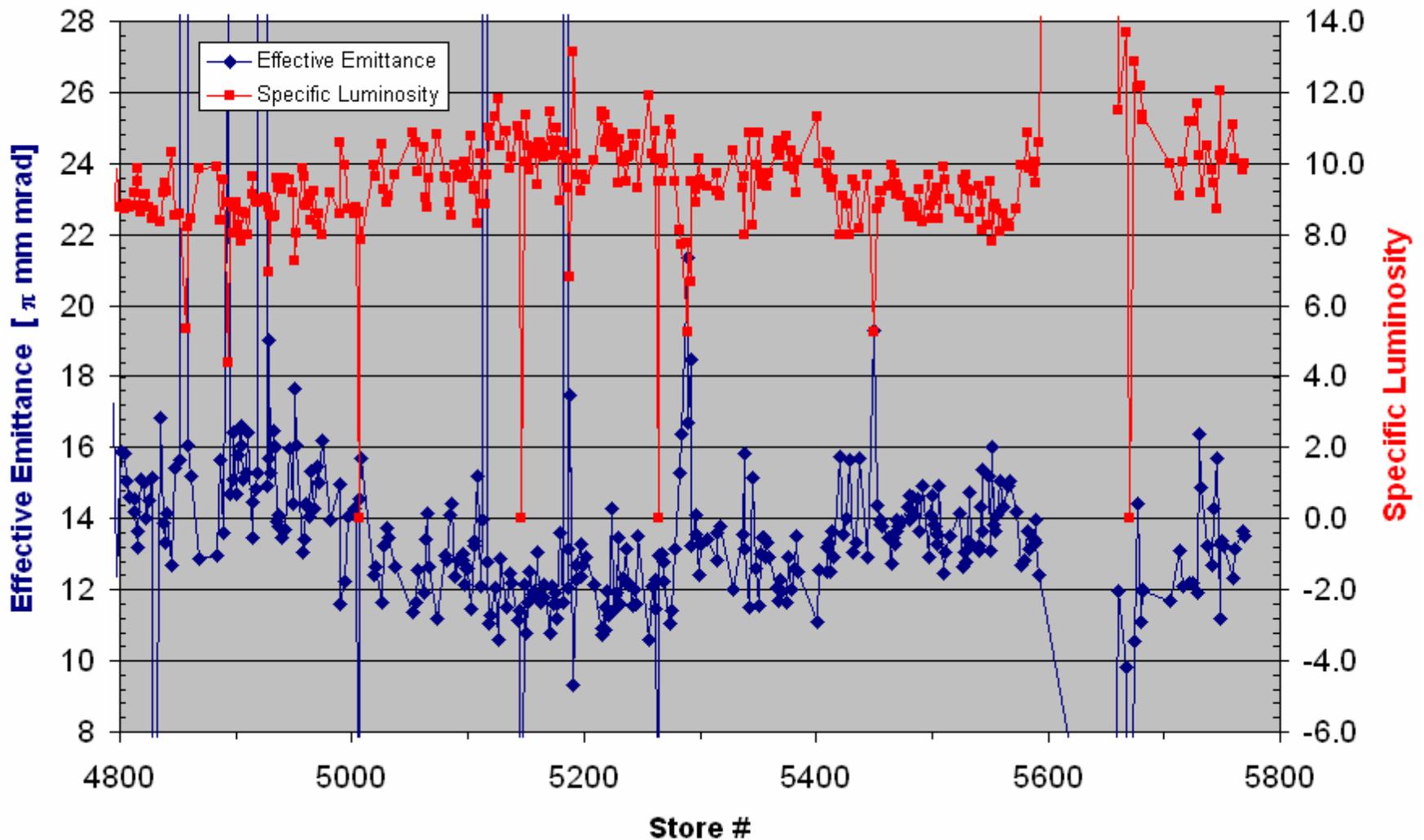
Bunched Beam Inefficiency in Squeeze
Last 300 Stores





Performance After Shutdown

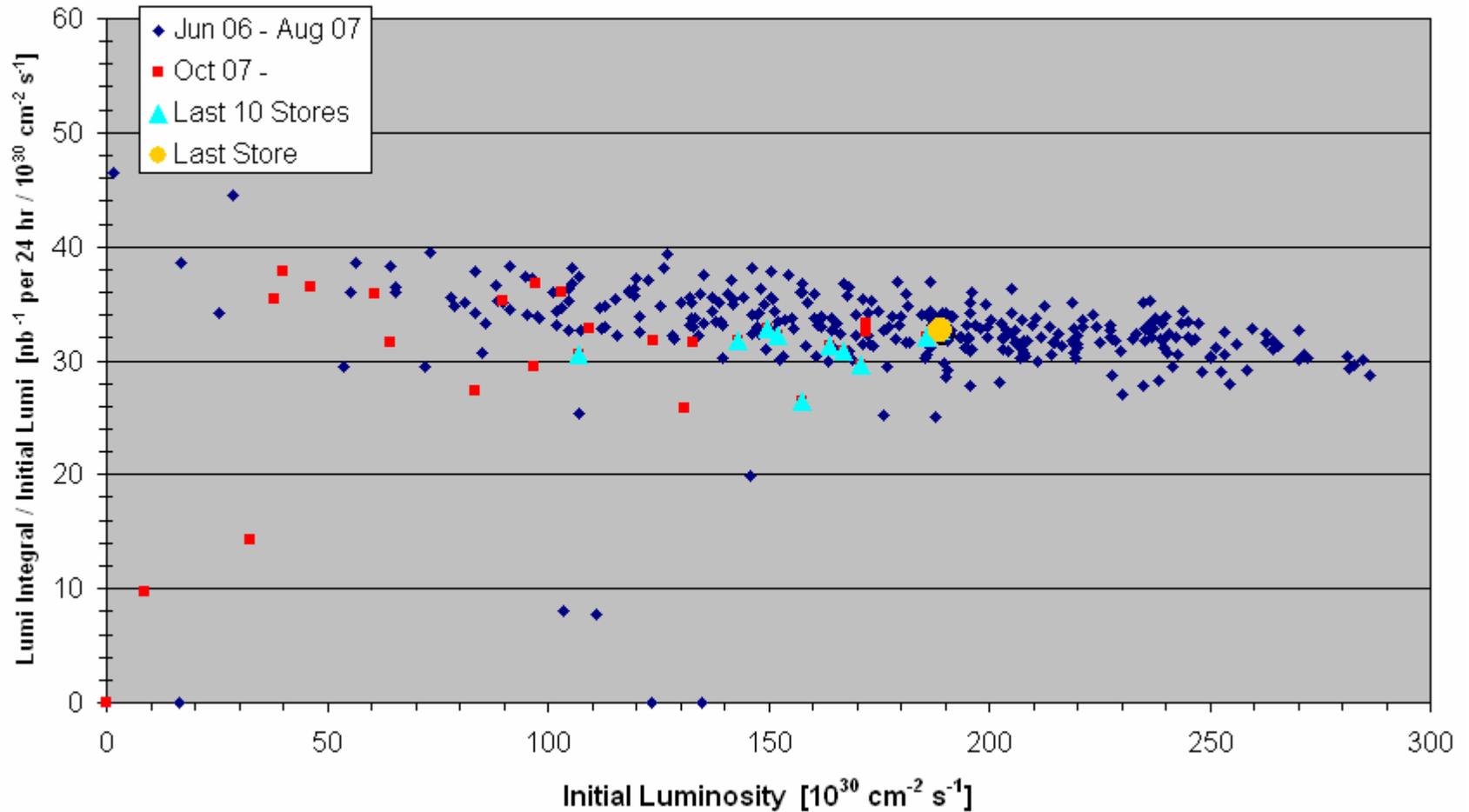
Effective Emittance and Specific Luminosity





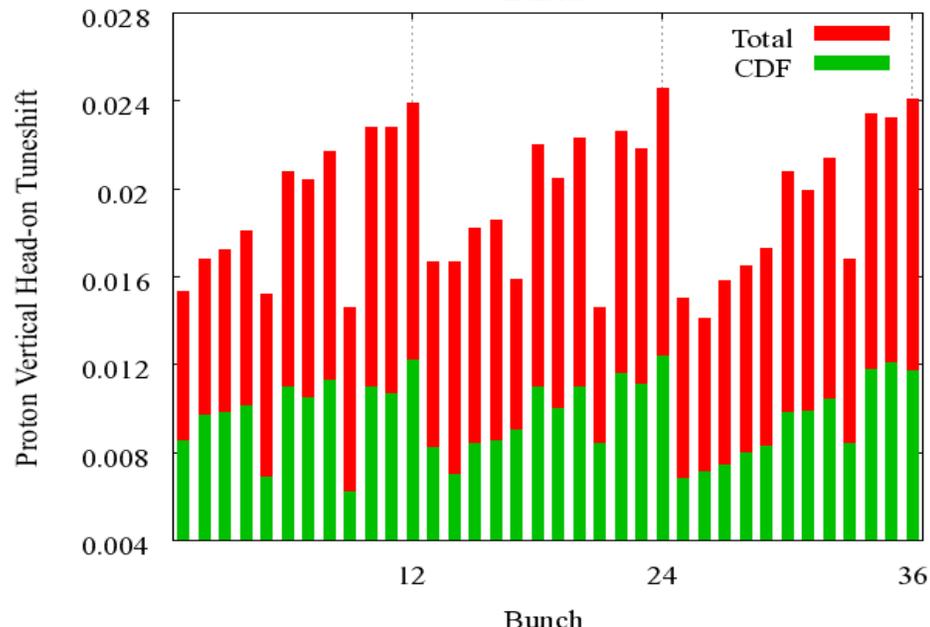
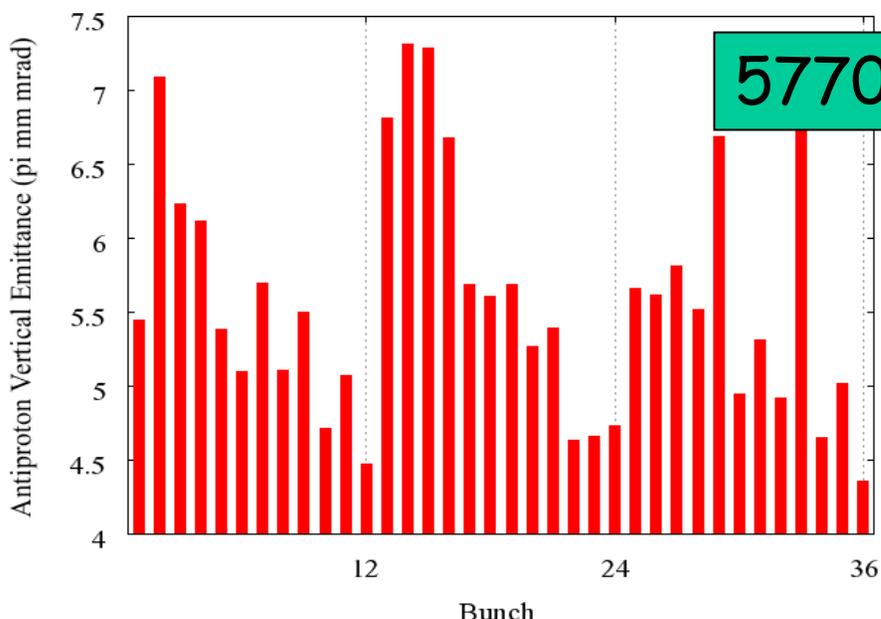
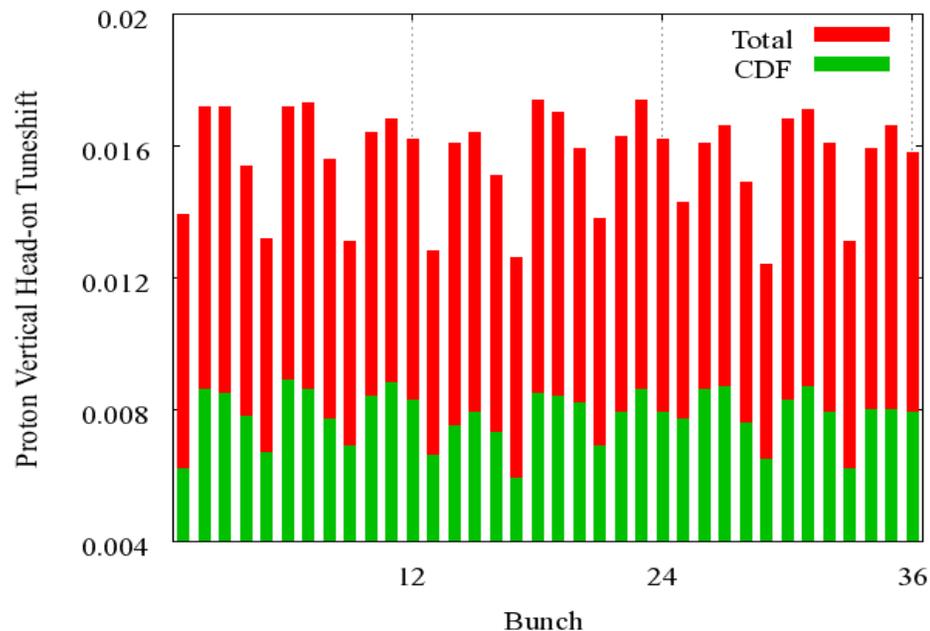
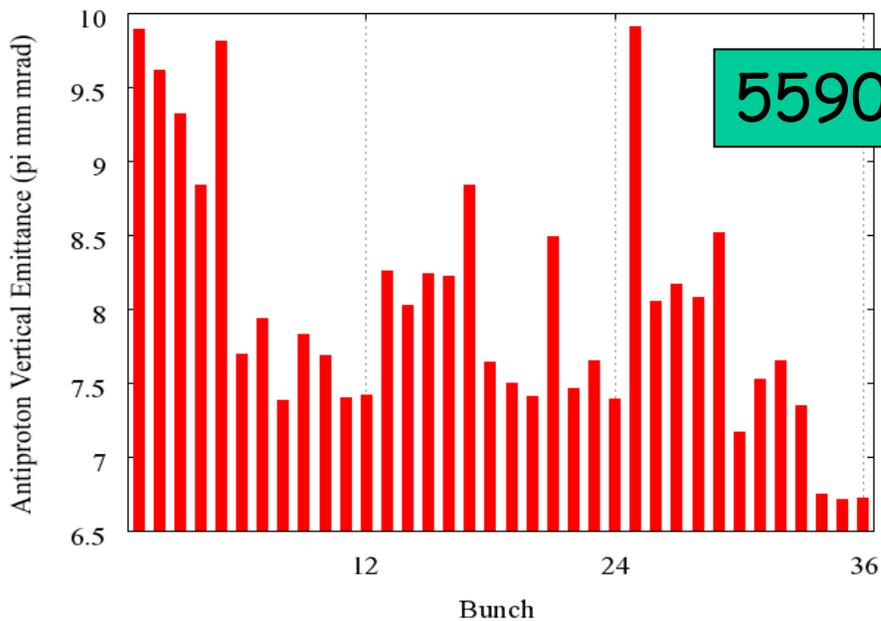
Performance After Shutdown

Normalized Lumi Integral / 24 hr vs Initial Luminosity





Antiproton Emittance and Beam-Beam Tuneshift





What's Next

- Integrate luminosity
- Improve proton life time
 - Blow up antiprotons before collisions?

