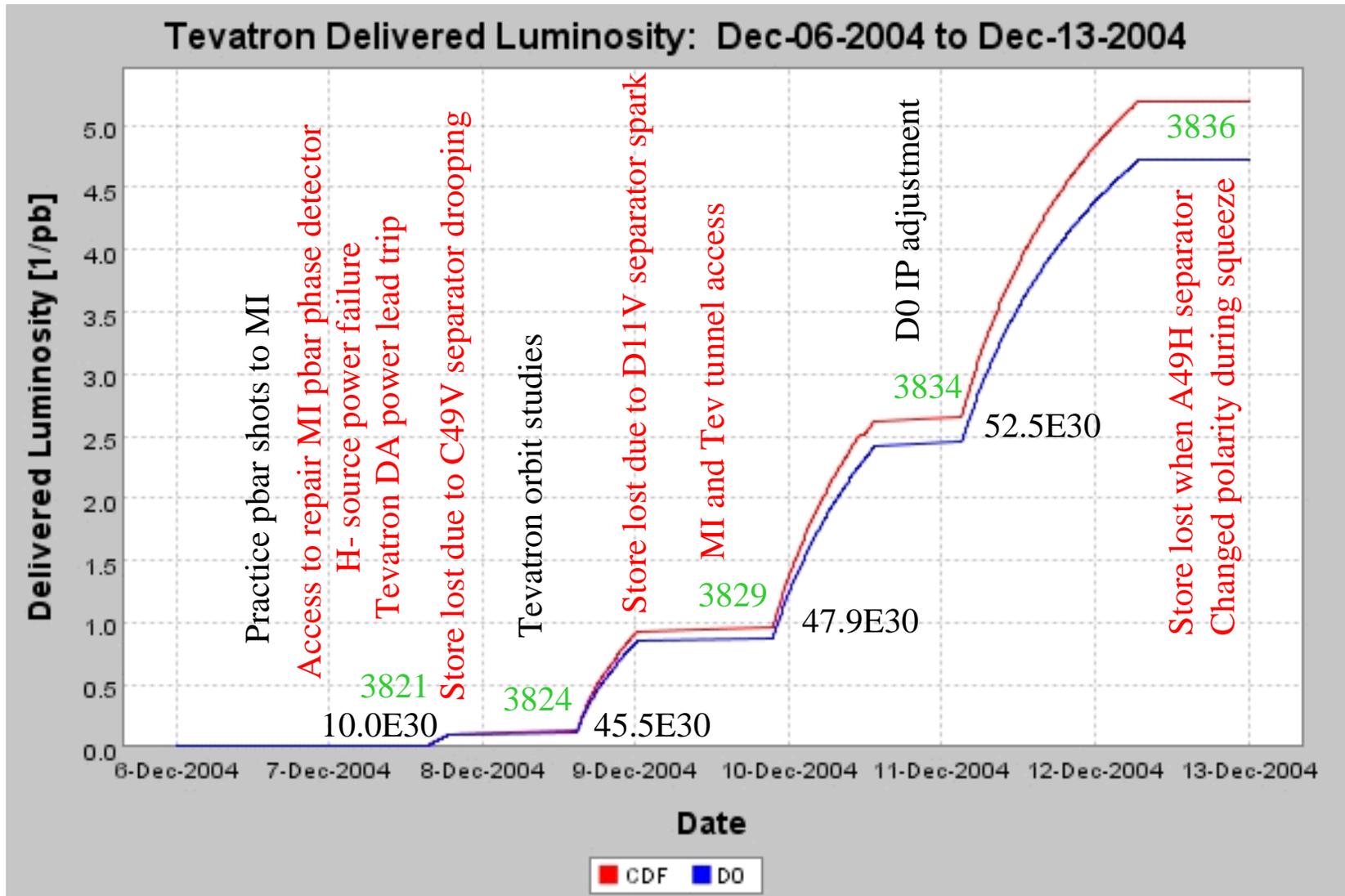

All Experimenter's Meeting

Dave McGinnis
December 13, 2004

Store Summary

Store	Initial Lum. (E30)	Deliv'd Lum. (nb⁻¹)	Termination	Time (hr)	Stack Size (E10)	Comments
3821	10.0	103	Loss of store	3.3	75.9	Separator sparks, quench when C49V separator output sags
3824	45.5	832	Loss of store	9.9	103.4	Separator sparks, quench when D11V separator sparks
3829	47.9	1,702	Planned	16.3	136.8	B17H separator spark during squeeze
3834	52.5	2,576	Planned	28.1	152.6	B17H separator spark during squeeze
3836	0	0	Loss of store	0	172.8	A49H separator changed polarity during squeeze

Store Summary



Recent History of Separator Sparks

Separator	Date	Time (hr)	Occurrence	Result
D11H	12/7	0	Spark during scrape	Emit growth, lum loss
D11H	12/7	1.4	Spark	Emit growth, lum loss
C49V	12/7	3.3	Spark	Quench, store loss
A49V	12/8	1.4	Sag	Emit growth, lum loss
D11H	12/8	2.7	Spark	Emit growth, lum loss
D11V	12/8	9.9	Spark	Quench, store loss
B17H	12/9	0	Spark (squeeze)	Emit growth, lum loss
B17H	12/11	0	Spark (squeeze)	Emit growth, lum loss
A49H	12/12	0	Ran to 0V (Scrape)	Quench, store loss
B11V	12/12	0.3	Spark	Quench, store loss

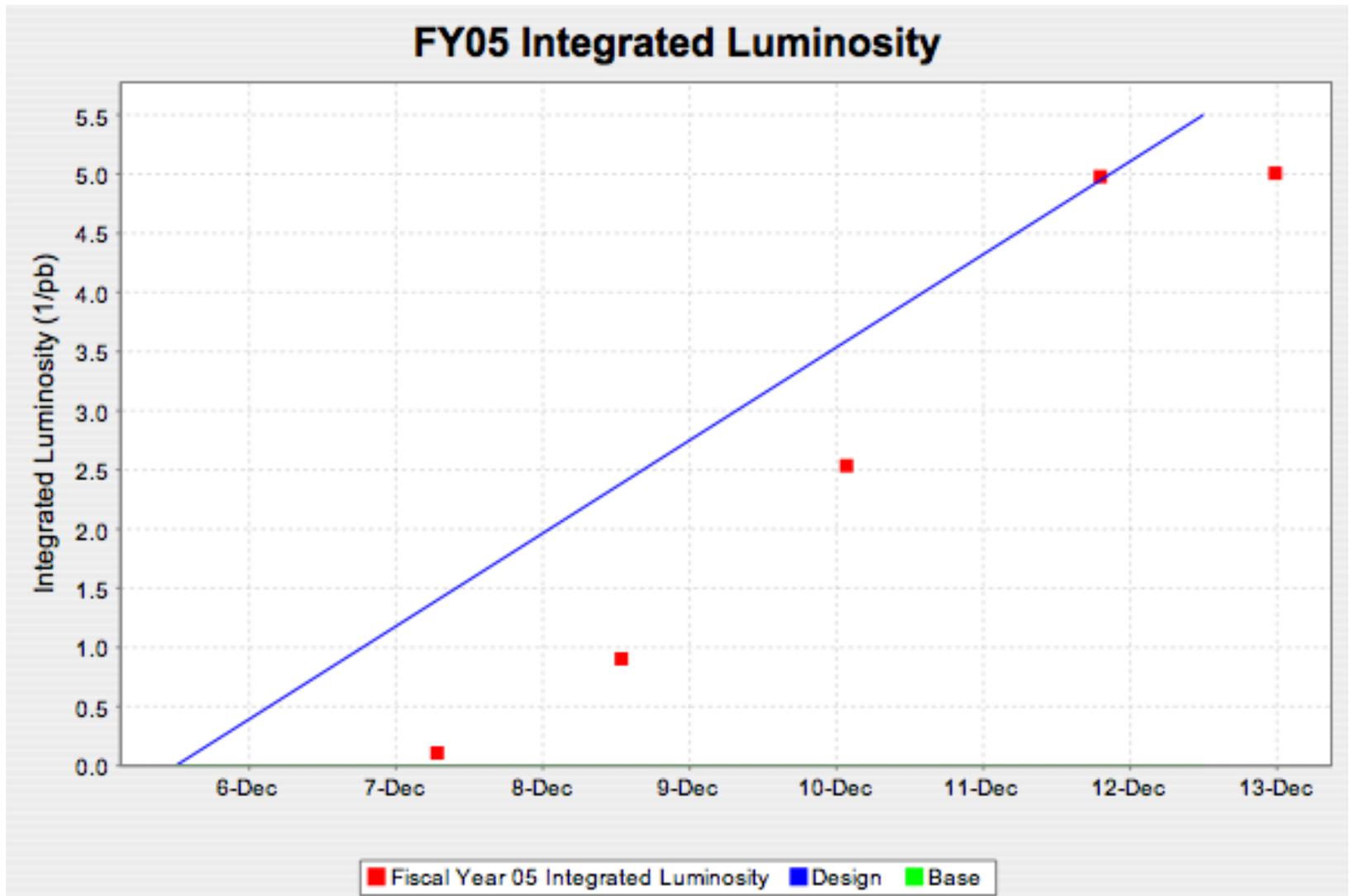
History of Separator Settings

Separator	Power Supply Voltage [kV]			
	Pre 3/1/04	3/2/04 - 8/6/04	8/6/04 - 8/27/04	12/8/04 -
B11H	89.2	105.1	109.2	108.1
B17H	36.0	44.6	46.3	46.4
C49H	93.5	103.0	107.0	110.1
D11H	82.7	96.0	100.0	105.8
D48H	5.3	58.2	58.7	50.2
A49H	90.7	103.0	107.2	110.1
B11V	95.4	110.1	114.6	110.1
C17V	48.4	57.4	59.6	58.2
C49V	90.5	103.2	107.6	103.4
D11V	99.8	115.1	120.0	110.1
D17V	-	-	-	100.8
A17V	5.1	29.6	30.7	67.8
A49V	76.7	86.9	90.7	110.1

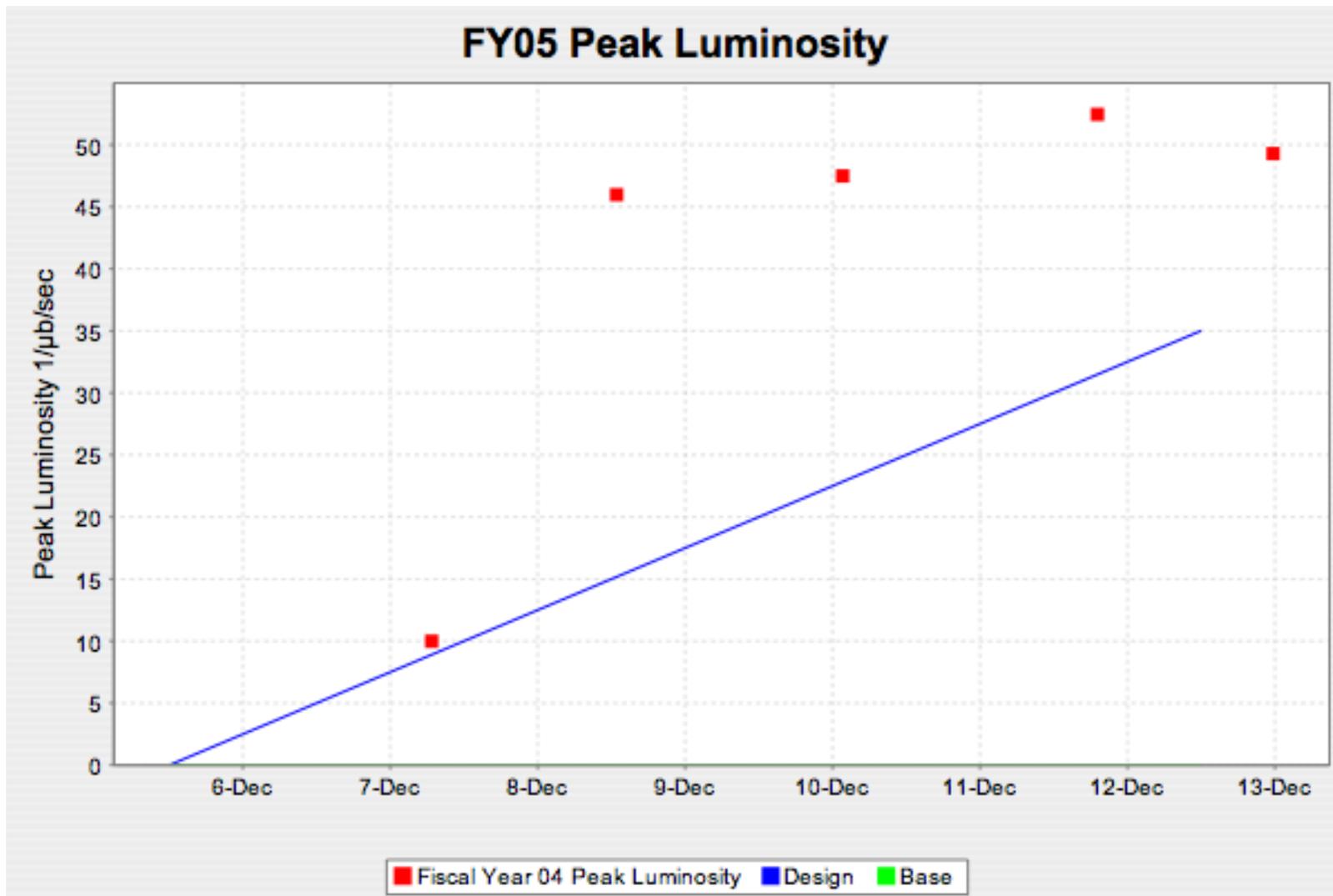
Separator Summary

- Separator Sparks seem to be random
 - Except D11 Separators got vented during the shutdown and were not baked
 - Rash of D11 sparks early on
 - Seems to have been conditioned
 - Some of the quenches dues to these sparks would have been MUCH more serious had it not been for the new over-sampling of the QPM system that was put in by EE support
- Voltage on separators are very close to pre-shutdown values
- The big difference:
 - We put polarity switches on all the separators during the shutdown so that we would be able test the pbar helix with protons.
 - We think that switching the polarity on the separators might cause the separators to be de-conditioned.
 - Used the polarity switches extensively during startup
 - Observed large sparking rates
 - also started up fast so we had little time to condition
 - Ran a bad script this weekend that reversed some of the polarity switches.
 - One of the switches that got reversed caused the store loss today.
- Plan
 - Run alternate periods of conditioning and 14x0 stores for the next 16 hours (or more)
 - Do not flip separator polarity until we understand if this is what is causing the sparks
 - Try to understand if flipping switch causes sparks
 - Test setup?, etc..
 - Back down 10% on helix as a last option

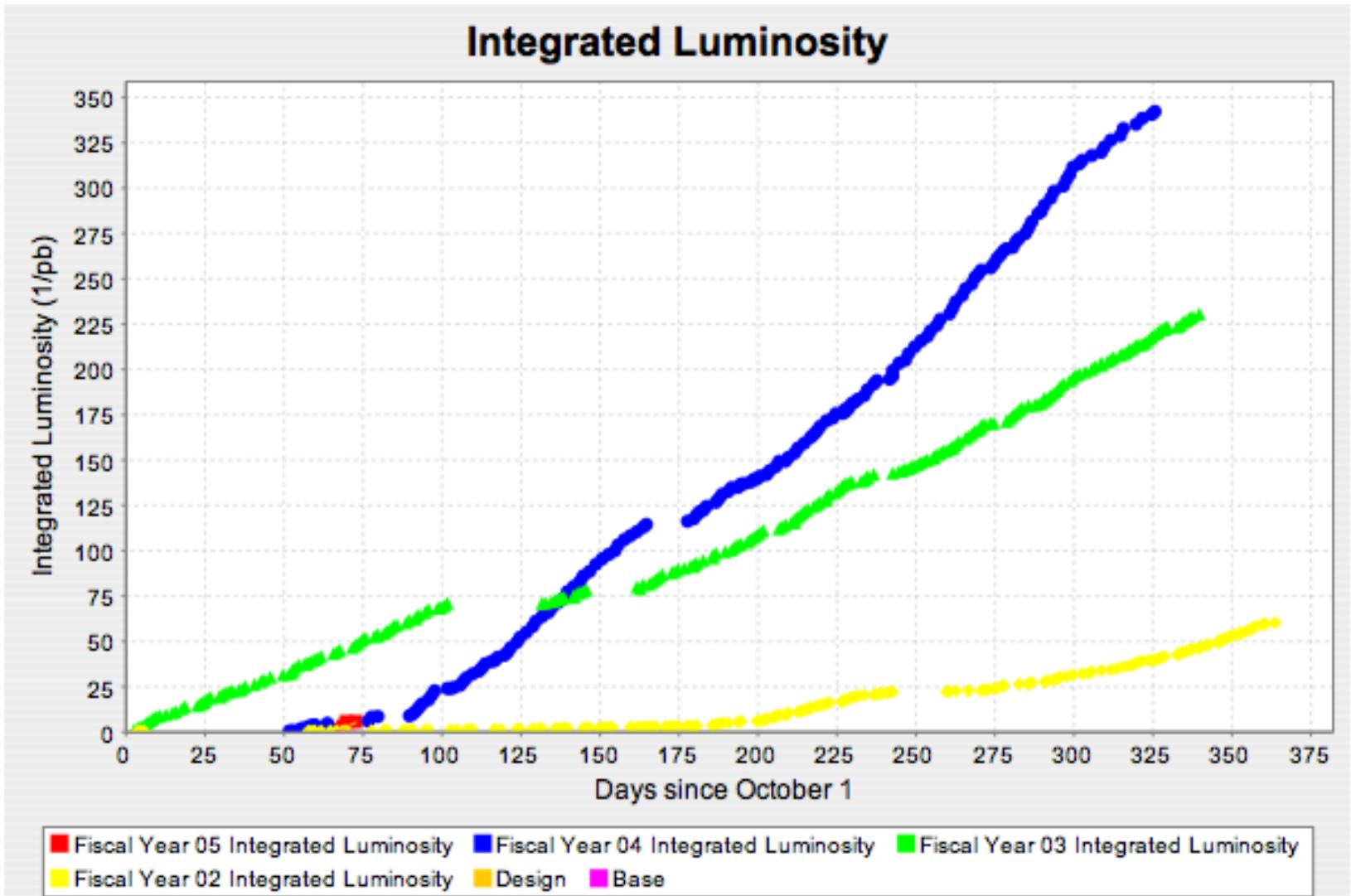
FY05 Integrated Luminosity



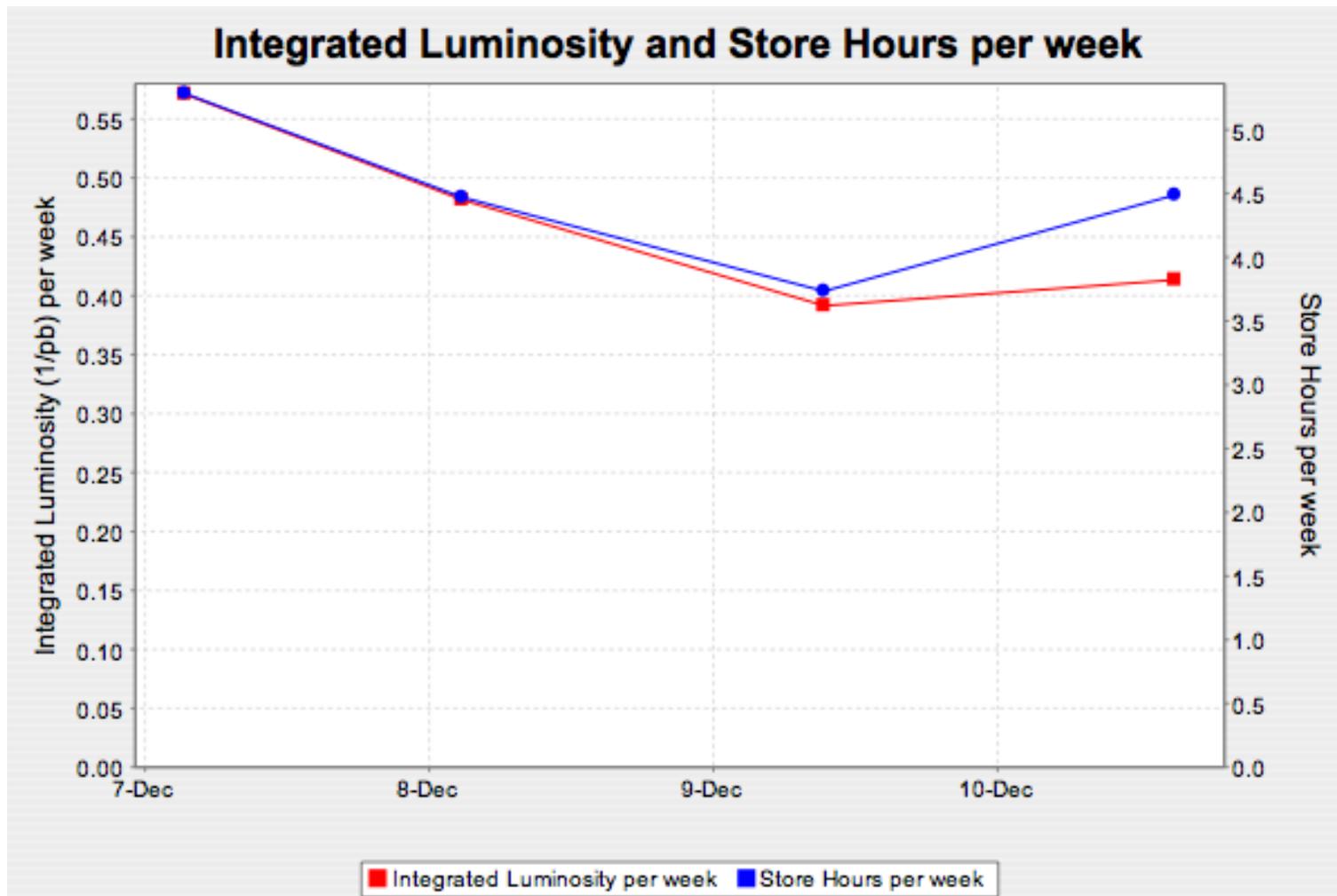
FY05 Peak Luminosity



Integrated Luminosity

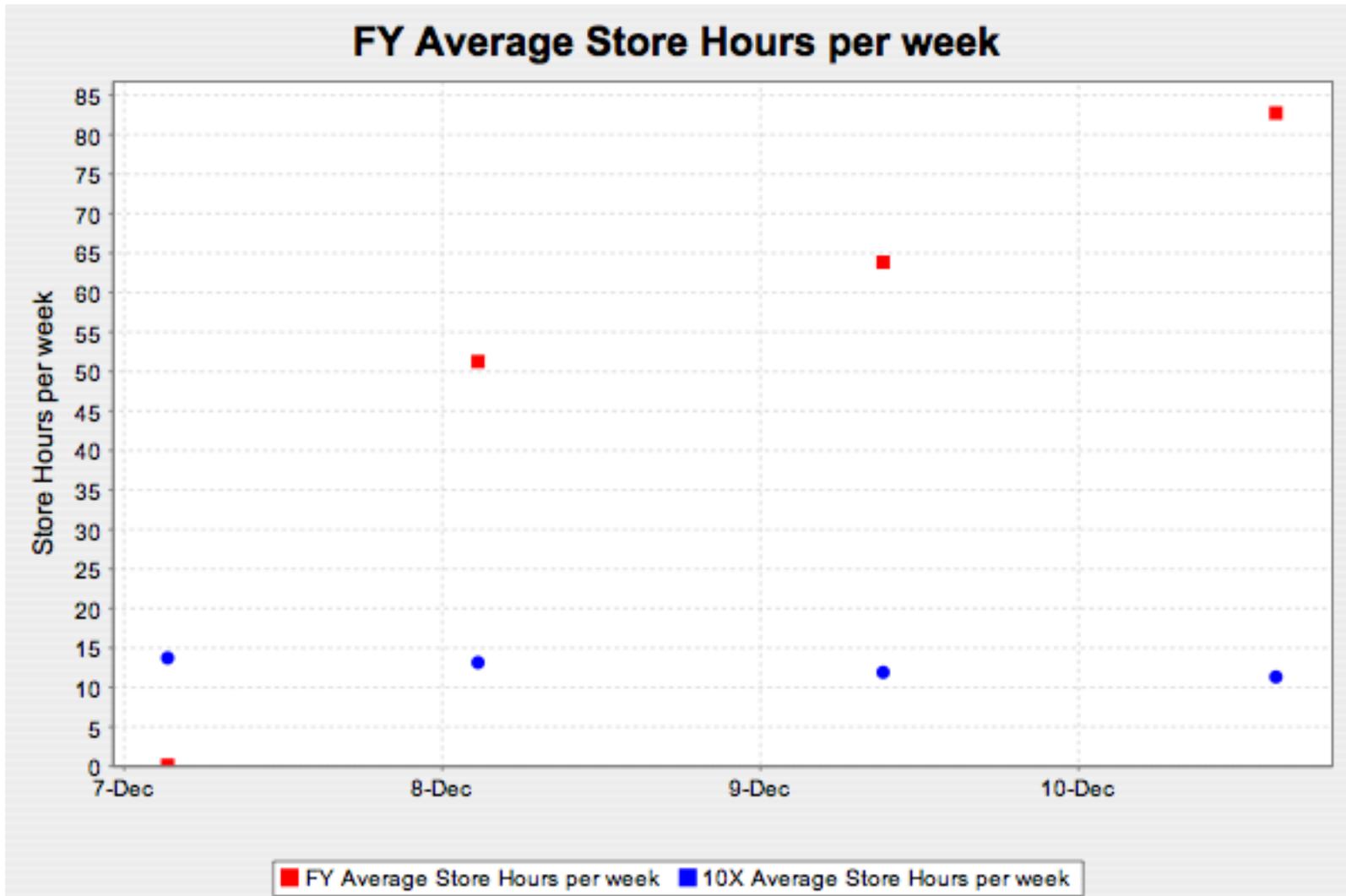


Integrated Luminosity and Store Hours per Week

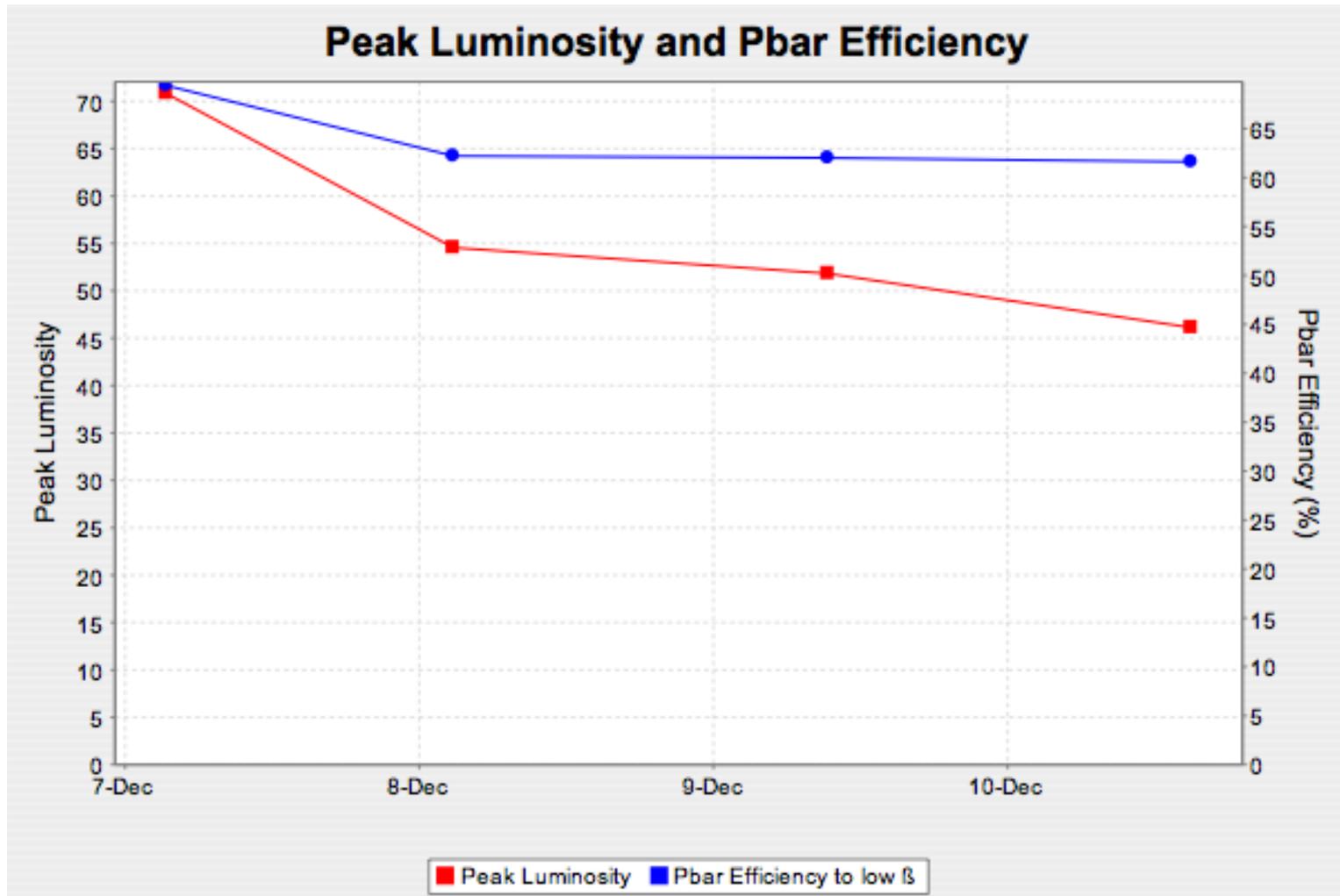


5 Store Running Average

FY05 Average Store Hours per Week

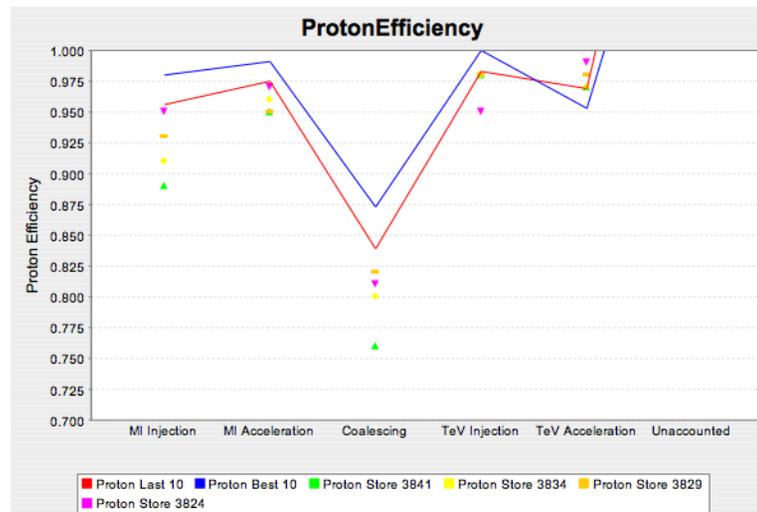
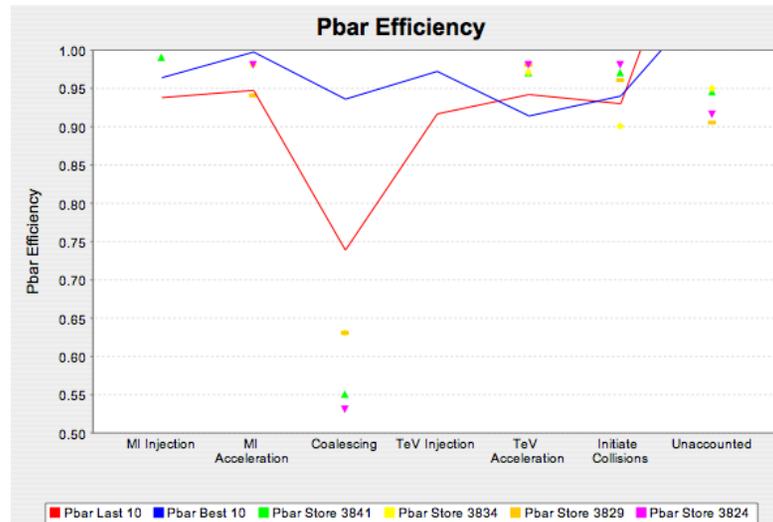


Peak Luminosity and Pbar Efficiency



5 Store Running Average

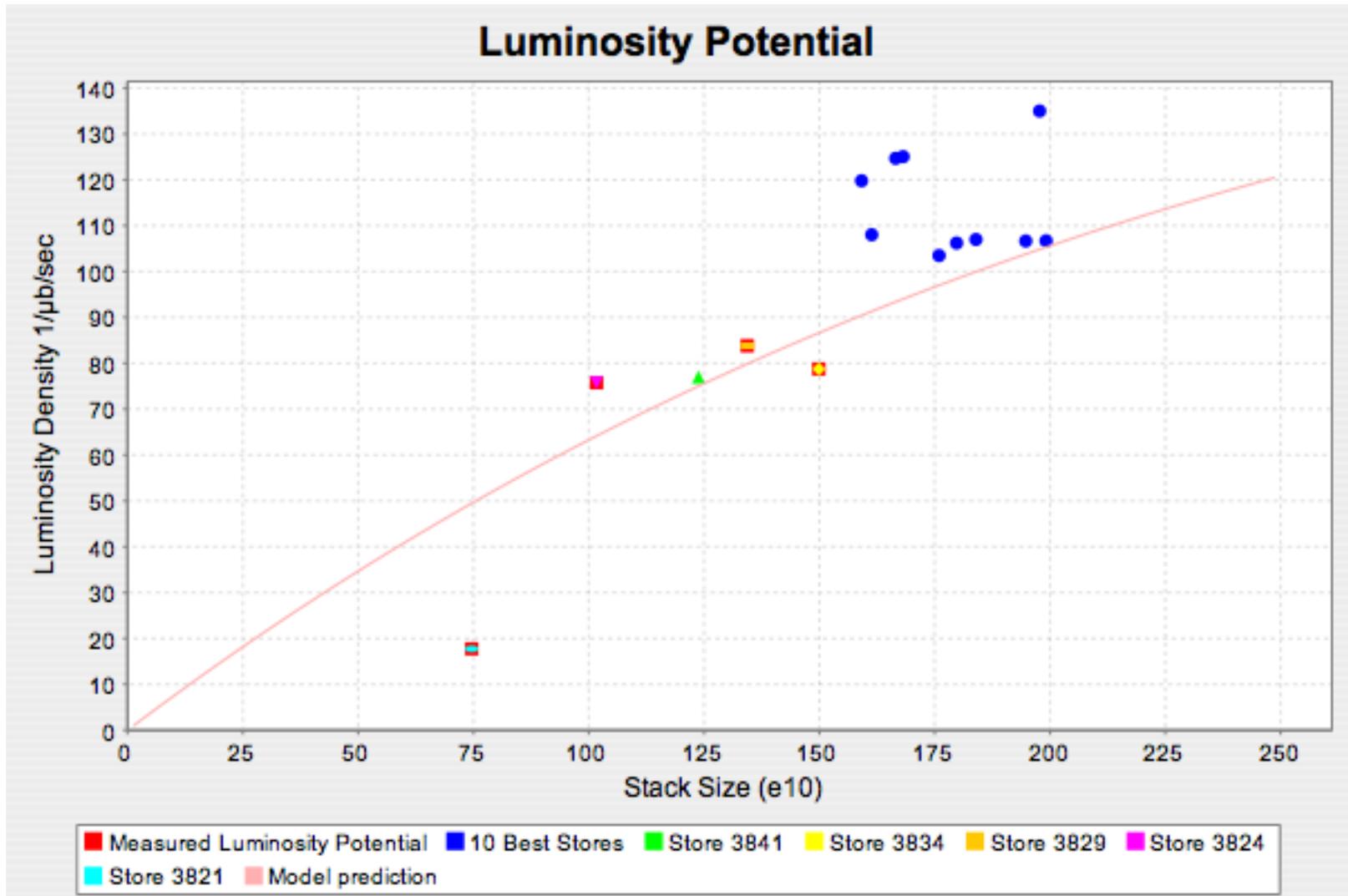
Collider Transmission Efficiency*



Data Summary Table

Luminosity Parameters									
Parameter	Last Store	Best Store	Last 10 Stores (Ave)	Best 10 Stores (Ave)	FY Average	Previous FY	FY End Goal (Design)	FY End Goal (Base)	
Initial Luminosity (Average)	49.2	102.8	59.5	87.6	34.4	71.1	96.1	80.7	$\times 10^{30} \text{cm}^{-2} \text{sec}^{-1}$
Integrated Luminosity per Store (Average)	29.2	4240.9	2025.4	3296.4	1623.2	2660	3369	3190	nb^{-1}
Luminosity per week (Averaged)	-	-	1.2	-	9.2	11.8	16.8	12.7	pb^{-1}
Store Length	1	32.4	19.7	27	18.3	25.1	20	25	Hours
Store Hours per week	-	-	11.2	-	104.4	111	100	100	Hours
Shot Setup Time	2.2	2.4	3.1	2.6	3.4	2.6	2.6	2.6	Hours
TEVATRON Parameters									
Parameter	Last Store	Best Store	Last 10 Stores (Ave)	Best 10 Stores (Ave)	FY Average	Previous FY	FY End Goal (Design)	FY End Goal (Base)	
Protons per bunch	204.5	245.8	228.8	249.1	179.9	247.4	260	260	$\times 10^9$
Antiprotons per bunch	22.4	43.2	23.8	35.9	16.9	30.1	42	34	$\times 10^9$
Proton Efficiency to Low Beta	52	85	71.4	77	56.3	77.4	-	-	%
Pbar Transfer efficiency to Low Beta	70	86	67.3	80.9	59.7	73.7	76	74	%
HourGlass Factor	0.7	0.7	0.7	0.7	0.7	0.7	0.6	0.6	
Initial Luminosity Lifetime	0	0	0	0	0	0	0	0	hours
Asymptotic Luminosity Lifetime	0	0	0	0	0	0	0	0	hours
Effective Emittance	15.3	16.9	15.6	17	14.4	17.9	18.5	17	$\pi\text{-mm-mrad}$
Antiproton Parameters									
Parameter	Last Store	Best Store	Last 10 Stores (Ave)	Best 10 Stores (Ave)	FY Average	Previous FY	FY End Goal (Design)	FY End Goal (Base)	
Zero Stack Stack Rate	11.1	13	9.7	12.5	7.7	12.5	24.5	14	$\times 10^{10}/\text{hour}$
Normalized Zero Stack Stack Rate	2.4	2.4	2	2.4	1.7	2.3	3.1	2.3	$\times 10^{-2}/\text{hour}$
Average Stacking Rate	6.9	6.8	5	6.3	5.4	6.2	10.1	6.6	$\times 10^{10}/\text{hour}$
Stacking Time Line Factor	98.9	92.6	65.8	80.3	76.1	77.9	75	75	%
Stack Size at Zero Stack Rate	279.4	284.4	728.9	299.8	654.6	325.8	300	300	$\times 10^{10}$
Protons on Target	4.6	5.4	5	5.2	4.5	5.3	8	6.2	$\times 10^{12}$
Start Stack	124	198	133.5	178.9	128.9	161.4	216	181	$\times 10^{10}$
End Stack	8.2	17	8.1	18	6.5	13.8	15	15	$\times 10^{10}$
Unstacked Pbars	115.8	181	125.4	160.9	122.4	147.6	201	166	$\times 10^{10}$

Stack Size Potential



Studies

Pbar Studies

12/8/2004	1.0	D/A adjustments during shot setup
12/8/2004	0.8	Flying wires
	1.8	Sum for week
	1.8	Sum for year
	1.8	Average per week

TEV Studies

12/8/2004	7.0	D0 aperture and orbit adjustments
12/8/2004	3.0	Vertical damper check-out
12/8/2004	1.2	Bumper magnet check-out
12/10/2004	1.0	End of store, D0 IP orbit adjustment, phase 1
12/10/2004	0.5	End of store, Flying wires (thick vs. thin)
12/10/2004	0.8	A48 collimator position check
12/10/2004	7.5	D0 IP adjustment, phase 2 (implementation, transition through squeeze)
	21.0	Sum for Week
	21.0	Sum for Year
	21.0	Average per week

Recycler Pbar Tax for the Week = 5%

Plan for the Week

- Proton Source
 - Continue to turn up batch intensity for stacking
 - Tune for better efficiency for Mini-Boone
 - Support Slip-Stacking commissioning with cogging studies
- Main Injector
 - Commission slip-stacking on stacking cycles
 - Increase intensity and efficiency on coalescing
- Pbar Source
 - Increase stacking rate
 - Increase Debuncher aperture
 - Optimize Debuncher cooling
- Recycler
 - Prepare for Mixed Pbar Source shots for next week
- Tevatron
 - Get a hold of the separator spark problem
 - Optimize collision points (alpha bumps, separator scans, etc..)
 - Determine the plan for centering orbit through both detectors
 - Correctors
 - Low Beta quad moves