

Follow-up of IP1-IP5 phasing

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LCU section meeting

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Thanks to Massimo, Stephane and Thys

Introduction

- IP1-IP5 phasing discussed in LCU 26/Aug/08

V6.503s1 collision

Beam1										MUX	MUY		
	IR1	IR2	IR3	IR4	IR5	IR6	IR7	IR8	IP1	0.00	0.00		0.75
MUX	2.633	2.986	2.260	2.129	2.633	2.015	2.367	3.183	IP5	32.06	29.75	0.25	
MUY	2.649	2.809	1.990	1.958	2.649	1.780	1.822	2.974	IP1L	64.31	59.32		0.57

Beam2

	IR1	IR2	IR3	IR4	IR5	IR6	IR7	IR8	IP1	0.00	0.00		0.75
MUX	2.633	2.991	2.260	2.124	2.633	2.015	2.491	3.059	IP5	32.06	29.75	0.25	
MUY	2.649	2.844	1.990	1.922	2.649	1.780	2.015	2.782	IP1L	64.31	59.32		0.57

V6.503s2 collision

Beam1										MUX	MUY		
	IR1	IR2	IR3	IR4	IR5	IR6	IR7	IR8	IP1	0.00	0.00		0.75
MUX	2.633	2.986	2.250	2.12940	2.633	2.015	2.49060	3.059	IP5	32.06	29.75	0.25	
MUY	2.649	2.809	1.990	1.95787	2.649	1.780	2.01413	2.782	IP1L	64.31	59.32		0.57

Beam2

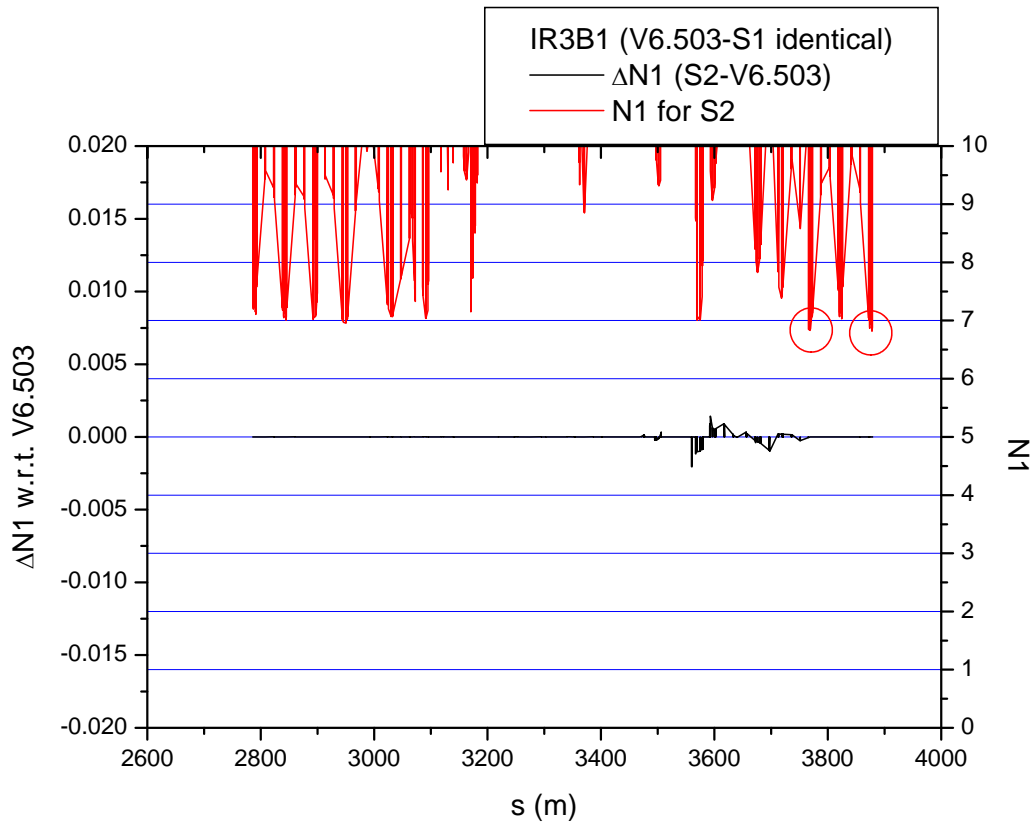
	IR1	IR2	IR3	IR4	IR5	IR6	IR7	IR8	IP1	0.00	0.00		0.75
MUX	2.633	2.986	2.250	2.12860	2.633	2.015	2.49140	3.059	IP5	32.06	29.75	0.25	
MUY	2.649	2.809	1.990	1.95713	2.649	1.780	2.01487	2.782	IP1L	64.31	59.32		0.57

Follow-up: aperture check

- Detailed check
 - using measured profile
 - Most up-to-date one (Massimo)
 - Vacuum markers are ignored, giving very small N1, under check
 - $\Delta N1$ and N1 double plot
 - complementally, check with problematic aperture (plot only for $N1 < 6.8(D)$ and $< 7.1(F)$)

Aperture IR2B1 (S1 identical to V6.503)

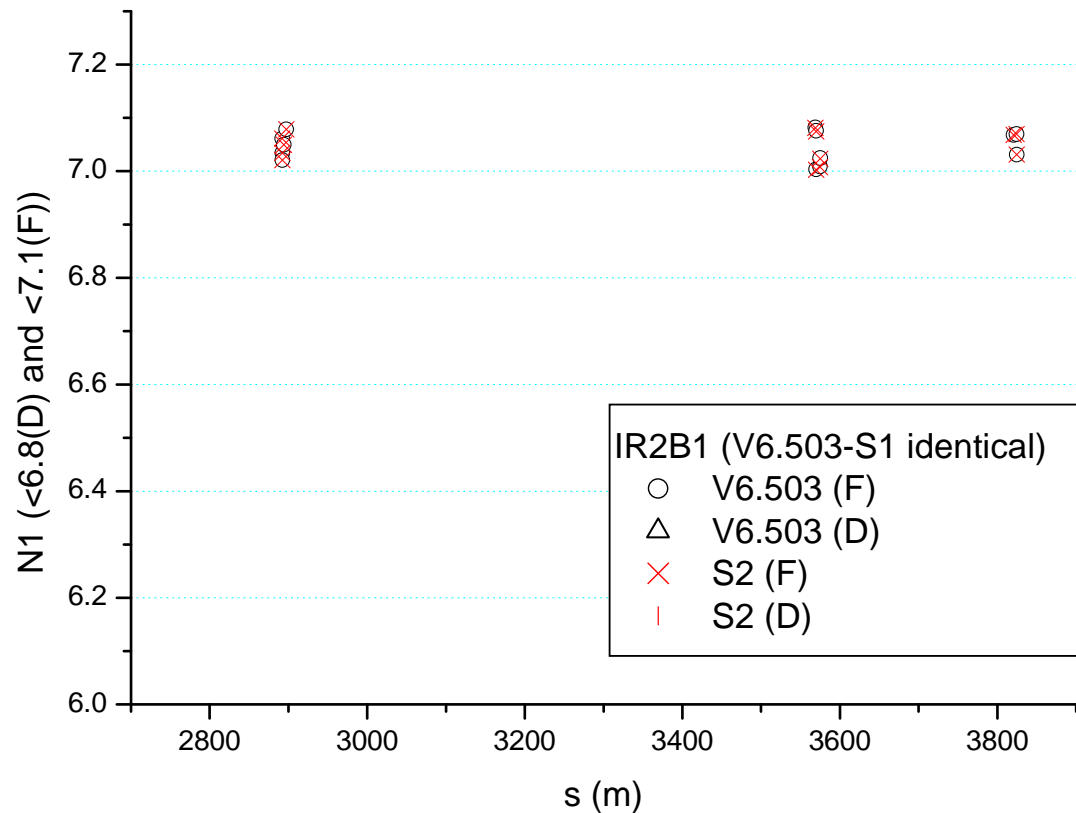
Double plot for S2



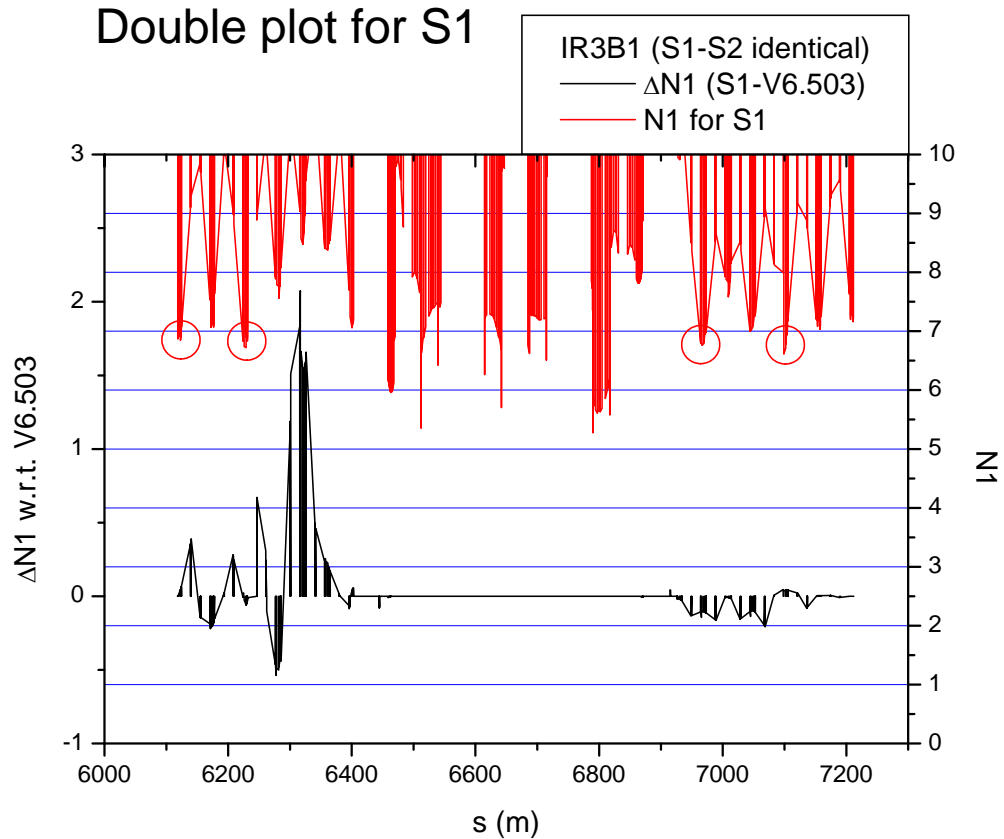
Almost no change in aperture
 $N1 < 7.0$ are in D location and > 6.8

Aperture: IR2B1 (S1 identical to V6.503)

Problematic apertures for S2



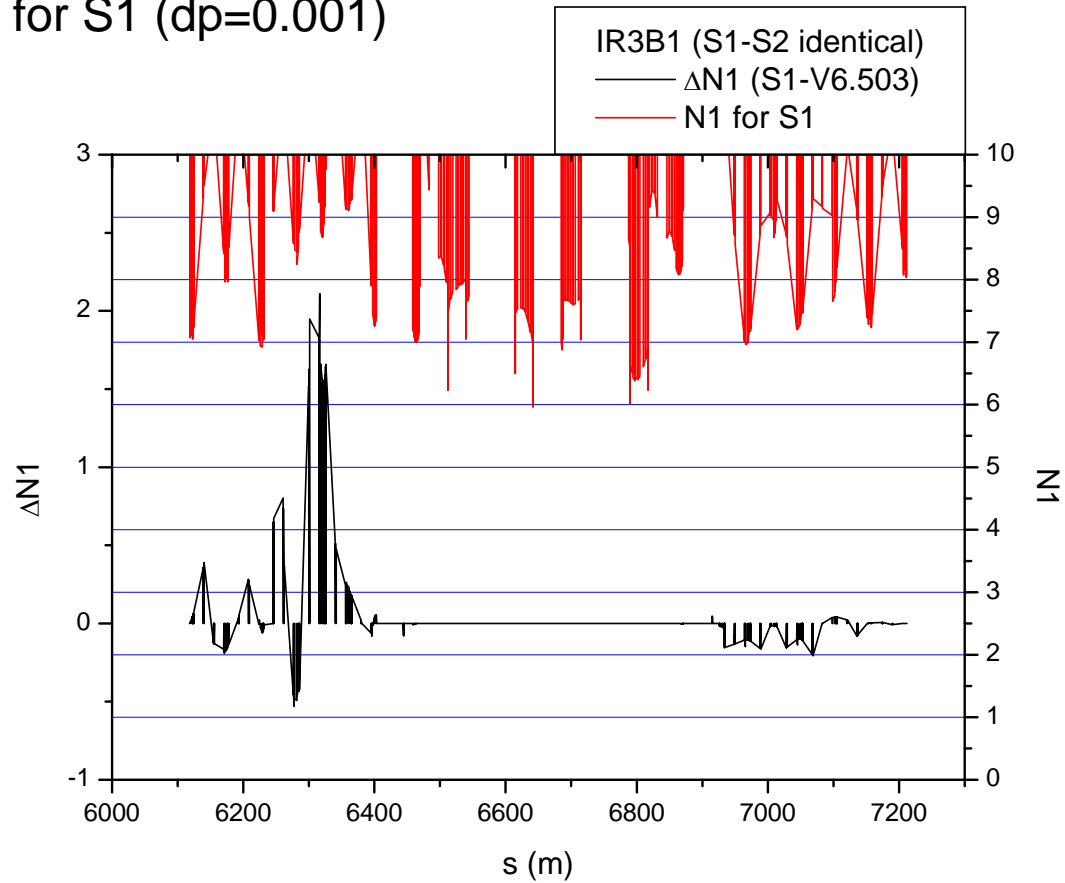
Aperture: IR3B1 (S2 identical to S1)



- s~6120 m, $\Delta N1 > 0.0$, $N1 > 6.8$ (D)
- s~6220 m, $\Delta N1 \sim -0.06$, $N1 > 6.7$ (D)
- LSS has no change (Q6, BPMs, warm)
- s~6970 m, $\Delta N1 \sim -0.1$, $N1 > 6.7$ (D)
- s~7100 m $\Delta N1 \sim +0.04$, $N1 \sim 6.6$ (F,Q11)

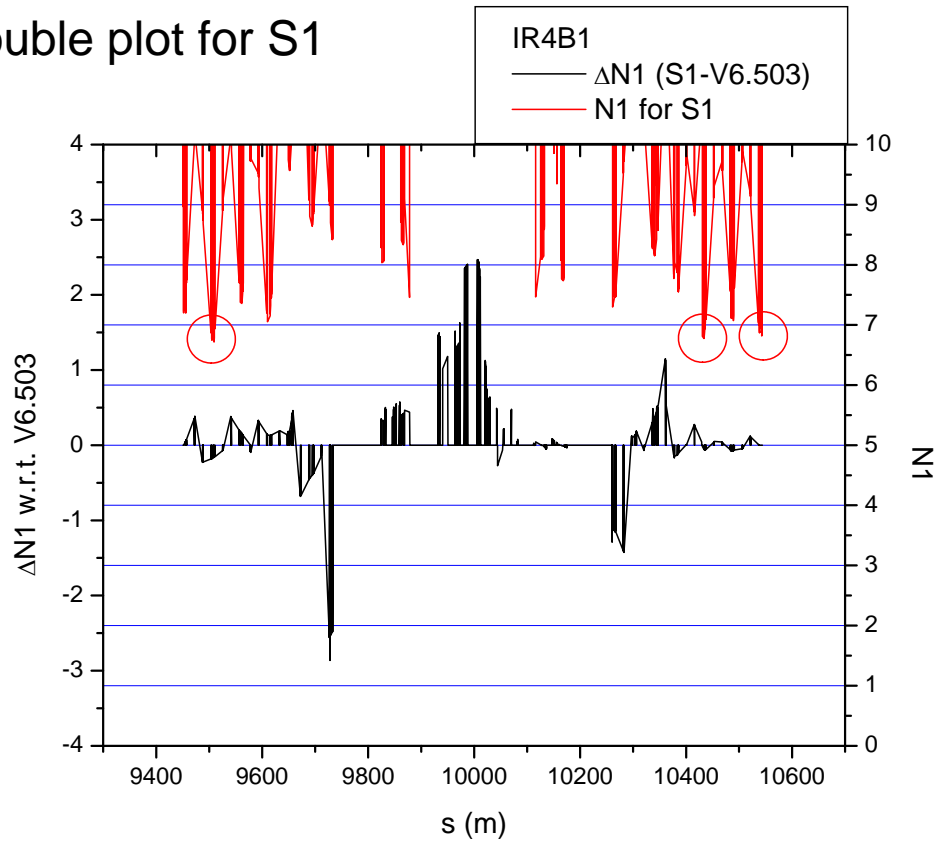
Aperture: IR3B1 (S2 identical to S1)

Double plot for S1 (dp=0.001)



Aperture: IR4B1 S1

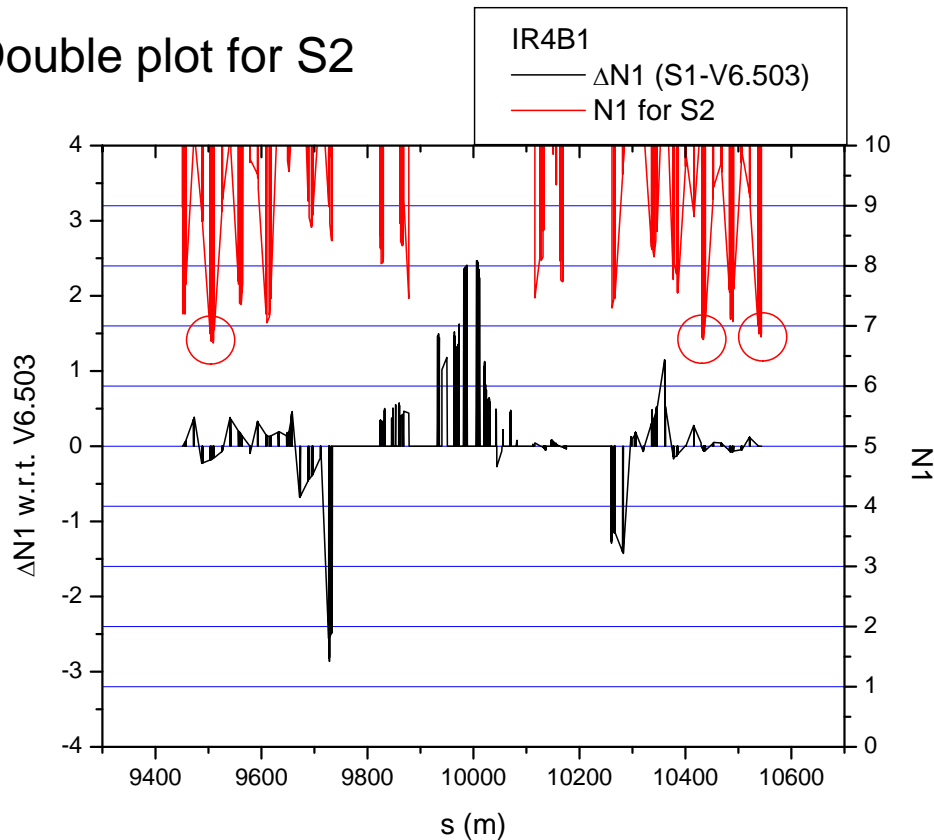
Double plot for S1



$s \sim 9500$ m, $\Delta N1 \sim -0.16$, $N1 > 6.7$ (D)
 $s \sim 10430$ m, $\Delta N1 \sim -0.06$, $N1 > 6.7$ (D)
 $s \sim 10540$ m, $\Delta N1 \sim 0.0$, $N1 > 6.8$ (D)

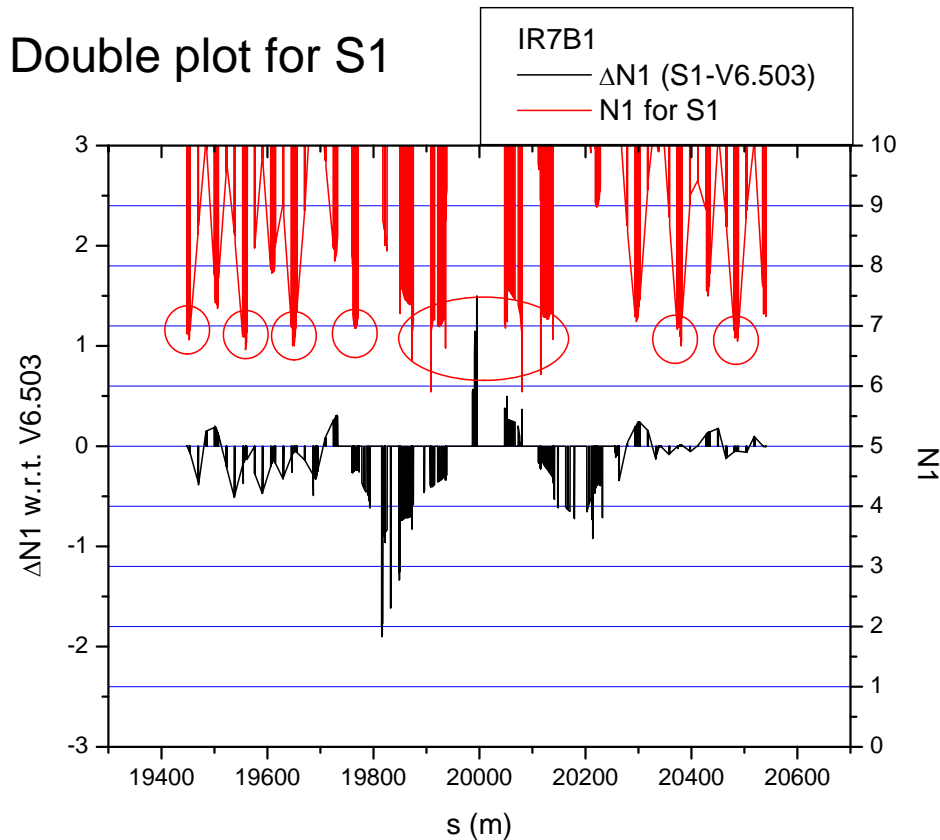
Aperture: IR4B1 S2

Double plot for S2



$s \sim 9500$ m, $\Delta N1 \sim -0.16$, $N1 > 6.7$ (D)
 $s \sim 10430$ m, $\Delta N1 \sim -0.06$, $N1 > 6.7$ (D)
 $s \sim 10540$ m, $\Delta N1 \sim 0.0$, $N1 > 6.8$ (D)

Aperture: IR7B1 S1



s~19450 m, $\Delta N1 \sim -0.05$, $N1 > 6.7$ (D)

s~19560 m, $\Delta N1 \sim -0.12$, $N1 \sim 6.6$ (D)

s~19650 m, $\Delta N1 \sim -0.06$, $N1 > 6.6$ (D)

s~19750 m, $\Delta N1 \sim -0.24$, $N1 > 6.9$ (F)

s~19910 m, $\Delta N1 \sim -0.4$, $N1 \sim 6.9$ (F but 90deg)

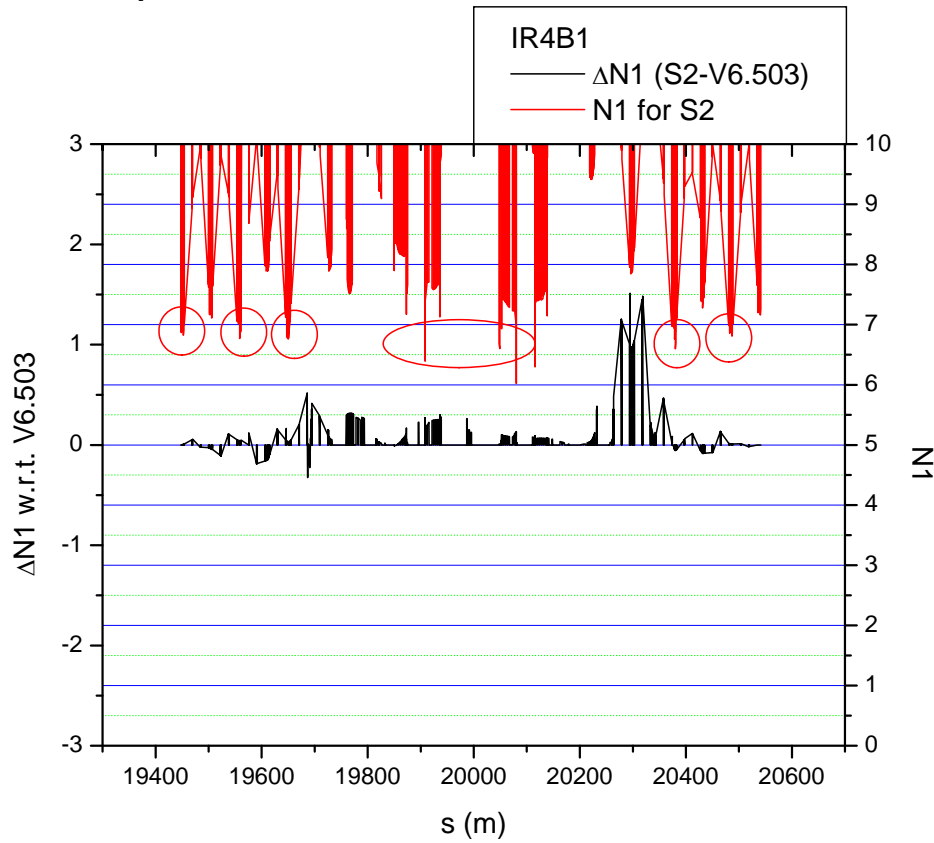
Bad N1s at BPMs in LSS (V6.503 as well)

s~20380 m, $\Delta N1 \sim +0.01$, $N1 > 6.6$ (D)

s~20490 m, $\Delta N1 \sim -0.05$, $N1 > 6.7$ (D)

Aperture: IR7B1 S2

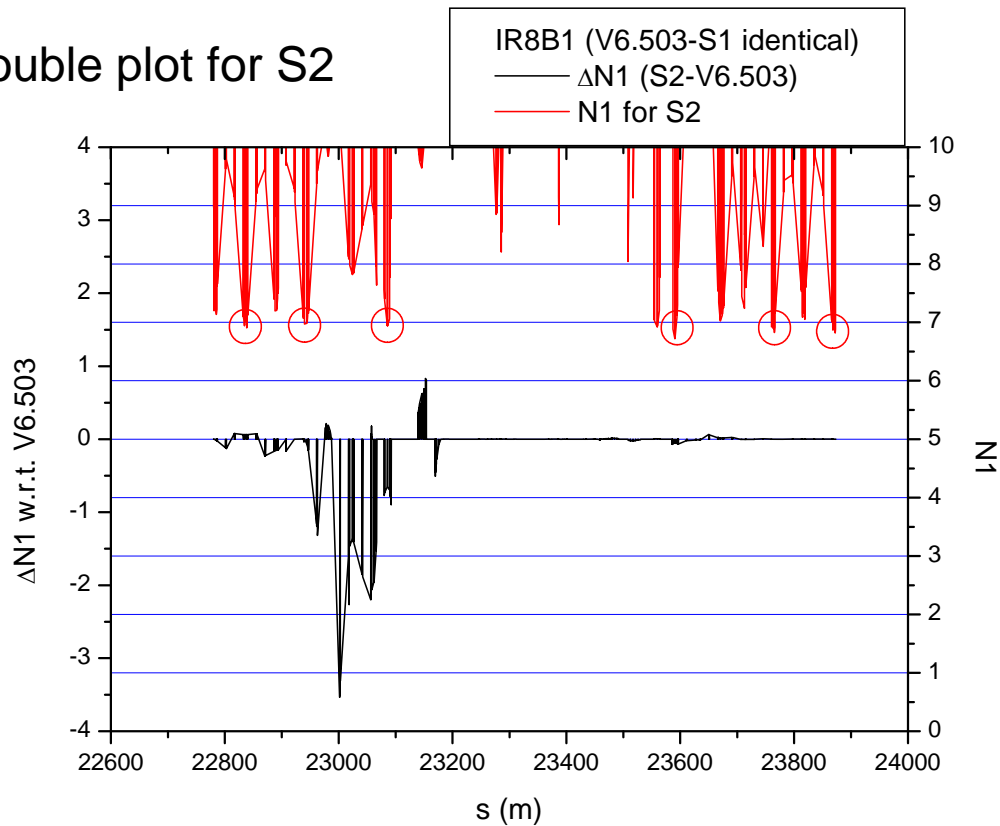
Double plot for S2



- s~19450 m, $\Delta N1 \sim +0.07$, $N1 > 6.8$ (D)
- s~19560 m, $\Delta N1 \sim +0.12$, $N1 \sim 6.7$ (D)
- s~19650 m, $\Delta N1 \sim +0.03$, $N1 > 6.7$ (D)
- Bad N1s at BPMs in LSS (V6.503 as well)**
- s~20050 m, $\Delta N1 \sim +0.01$, $N1 \sim 6.6$ (D)
- s~20380 m, $\Delta N1 \sim -0.05$, $N1 \sim 6.6$ (D)
- s~20490 m, $\Delta N1 \sim +0.01$, $N1 > 6.8$ (D)

Aperture: IR8B1 (S1 identical to V6.503)

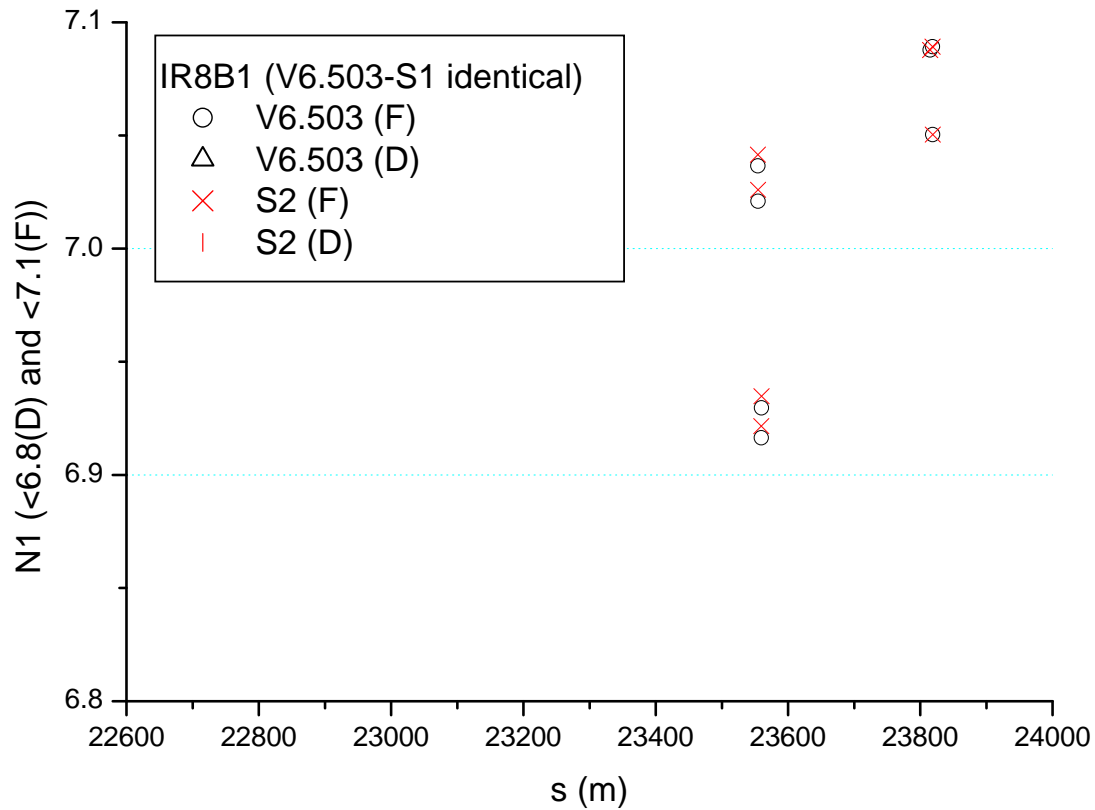
Double plot for S2



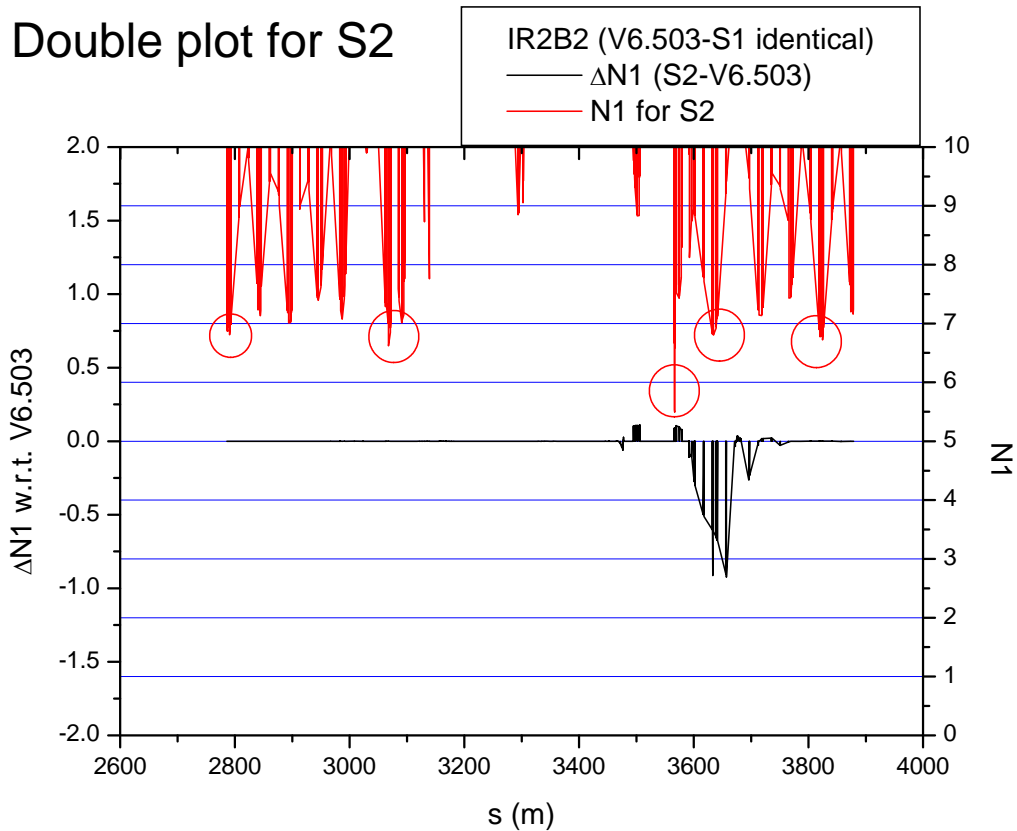
- $s \sim 22830$ m, $\Delta N1 \sim +0.06$, $N1 > 6.9$ (F)
- $s \sim 22940$ m, $\Delta N1 \sim 0.0$, $N1 > 6.9$ (D)
- $s \sim 23090$ m, $\Delta N1 \sim -0.7$, $N1 > 6.9$ (D)
- $s \sim 23560$ m, $\Delta N1 \sim +0.006$, $N1 > 6.9$ (F)
- $s \sim 23590$ m, $\Delta N1 \sim -0.06$, $N1 > 6.7$ (D)
- $s \sim 23760$ m, $\Delta N1 \sim 0.0$, $N1 > 6.8$ (D)
- $s \sim 23870$ m, $\Delta N1 \sim 0.0$, $N1 > 6.8$ (D)

Aperture: IR8B1 (S1 identical to V6.503)

Problematic apertures for S2



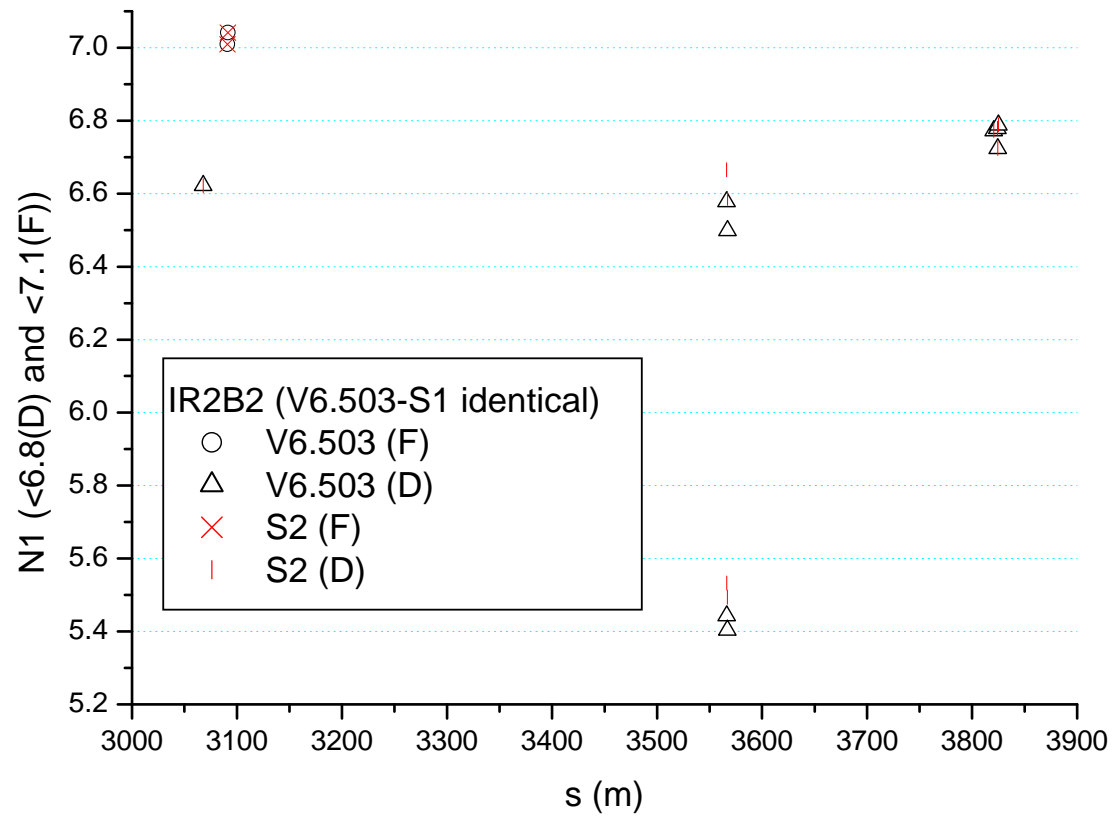
Aperture: IR2B2 (S1 identical to V6.503)



- s~2790 m, $\Delta N1=0.0$, $N1>6.8$ (D)
- s~3070 m, $\Delta N1=0.0$, $N1\sim 6.6$ (D)
- s~3570 m, $\Delta N1\sim +0.1$, $N1\sim 5.5$ (D, TCLIM)
- s~3630 m, $\Delta N1\sim -0.6$, $N1>6.8$ (D)
- s~3820 m, $\Delta N1\sim 0.0$, $N1>6.7$ (D)

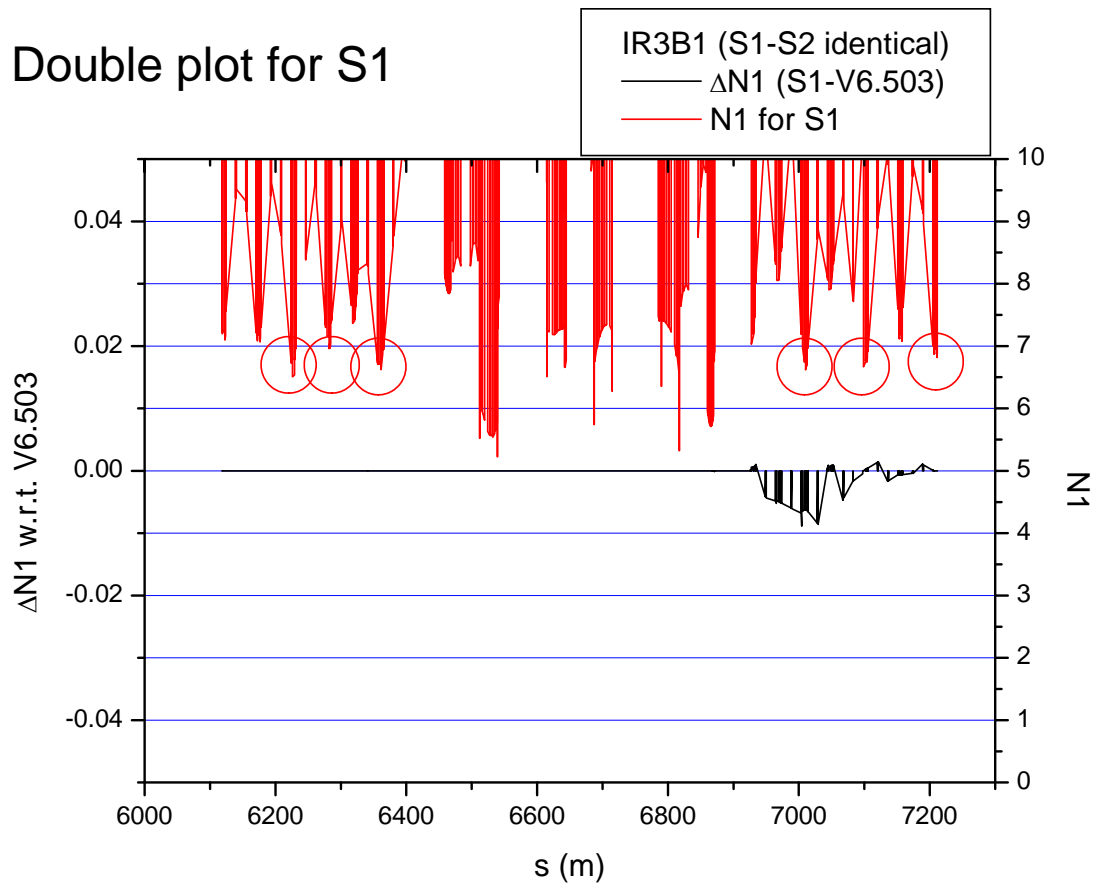
Aperture: IR2B2 (S1 identical to V6.503)

Problematic aperture plot for S2



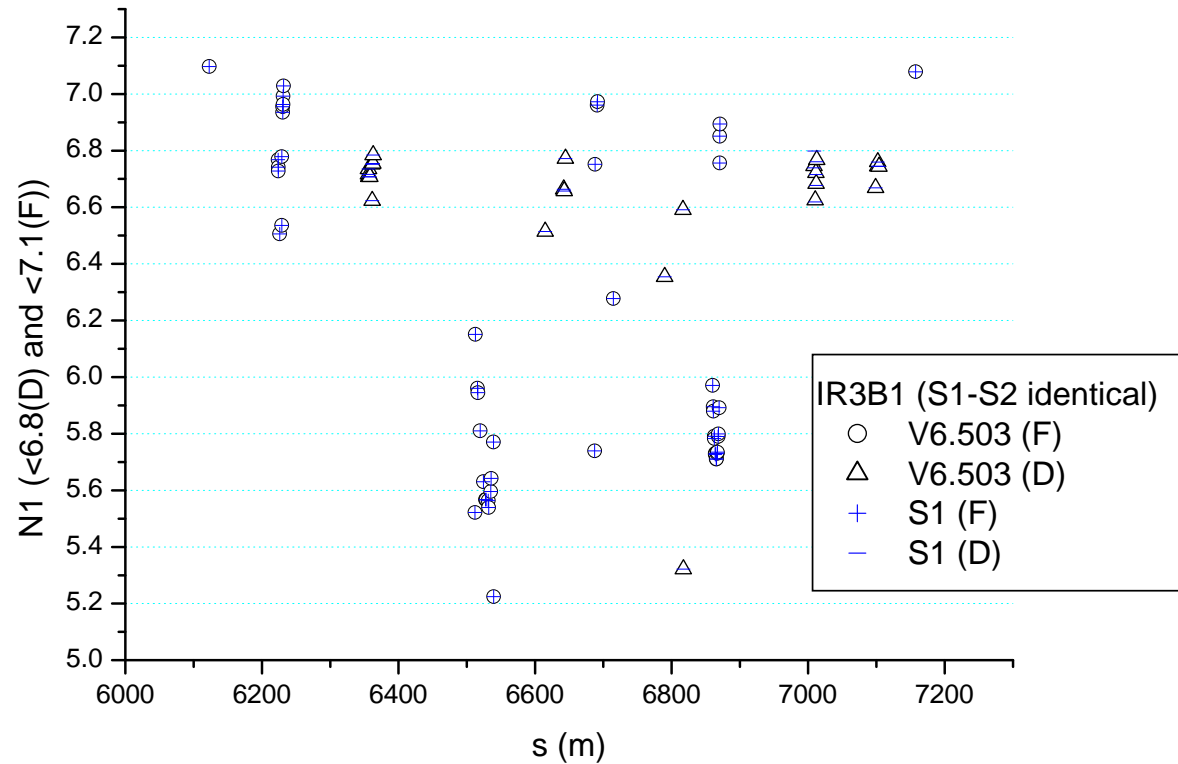
Aperture: IR3B2 (S2 identical to S1)

Double plot for S1



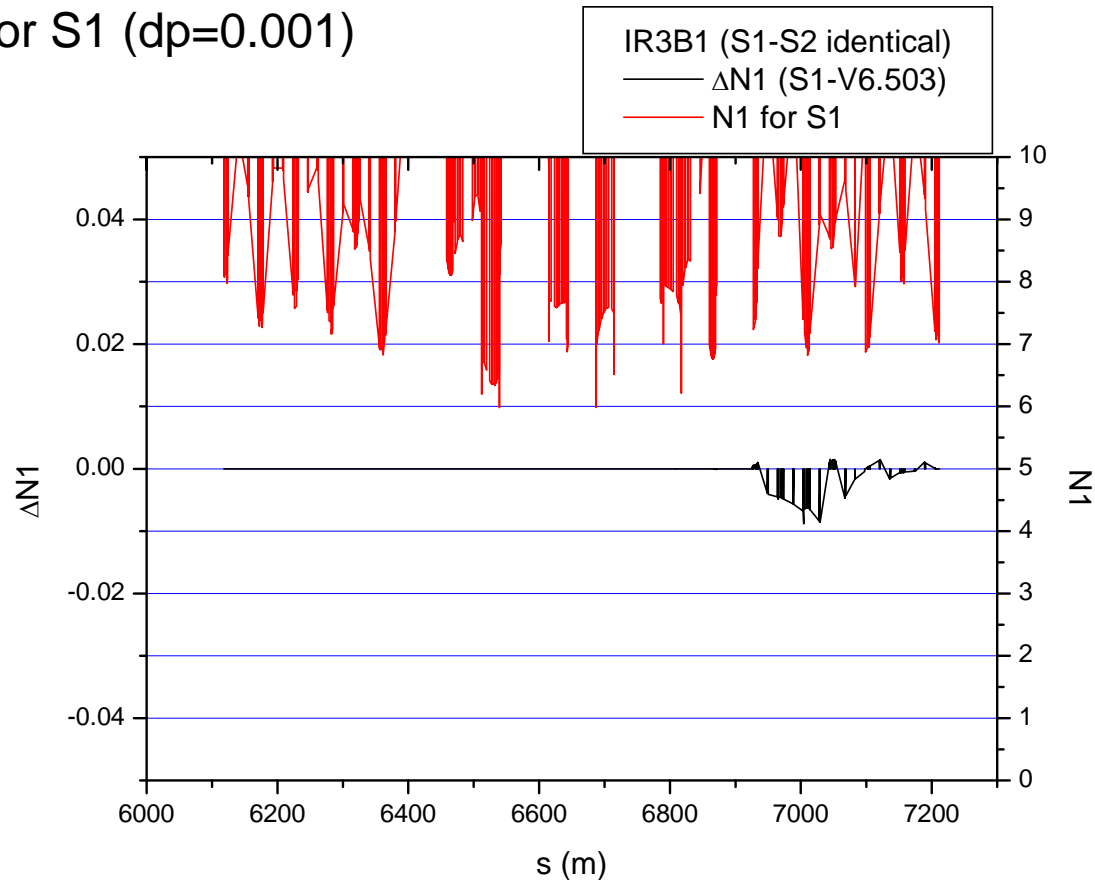
- s~6230 m, $\Delta N1=0.0$, $N1\sim 6.5$ (F,Q11)
- s~6280 m, $\Delta N1=0.0$, $N1>6.8$ (D)
- s~6360 m, $\Delta N1=0.0$, $N1\sim 6.6$ (D)
- No change in LSS
- s~7010 m, $\Delta N1\sim -0.006$, $N1\sim 6.6$ (D)
- s~7100 m $\Delta N1\sim 0.0$, $N1>6.6$ (D)

Aperture: IR3B2 (S2 identical to S1)



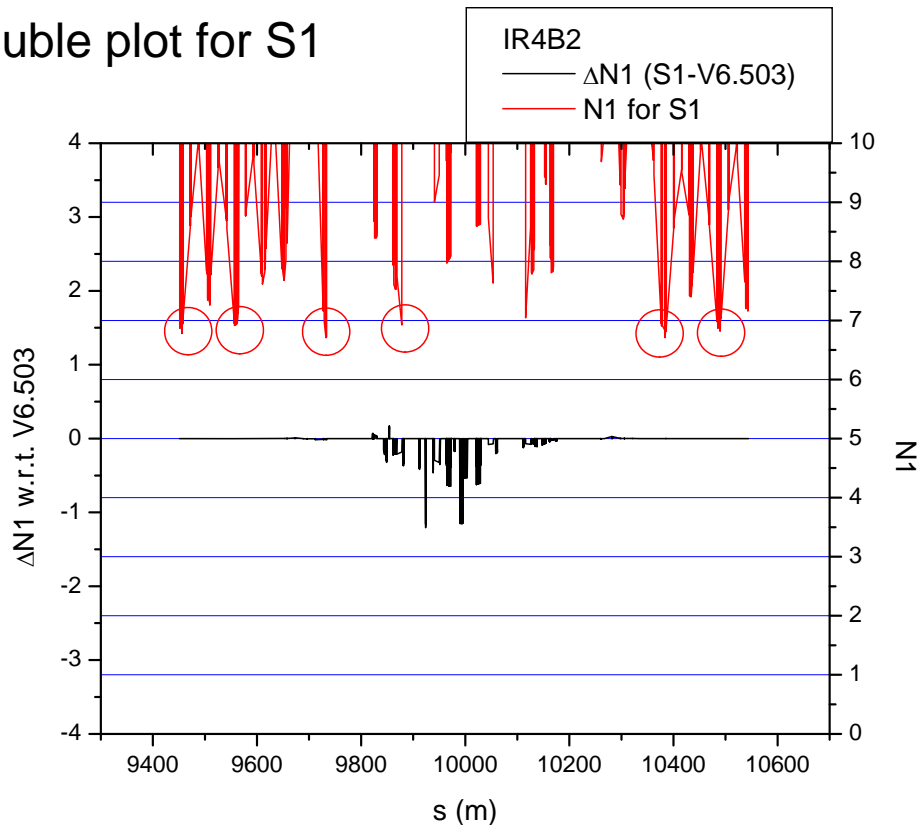
Aperture: IR3B2 (S2 identical to S1)

Double plot for S1 (dp=0.001)



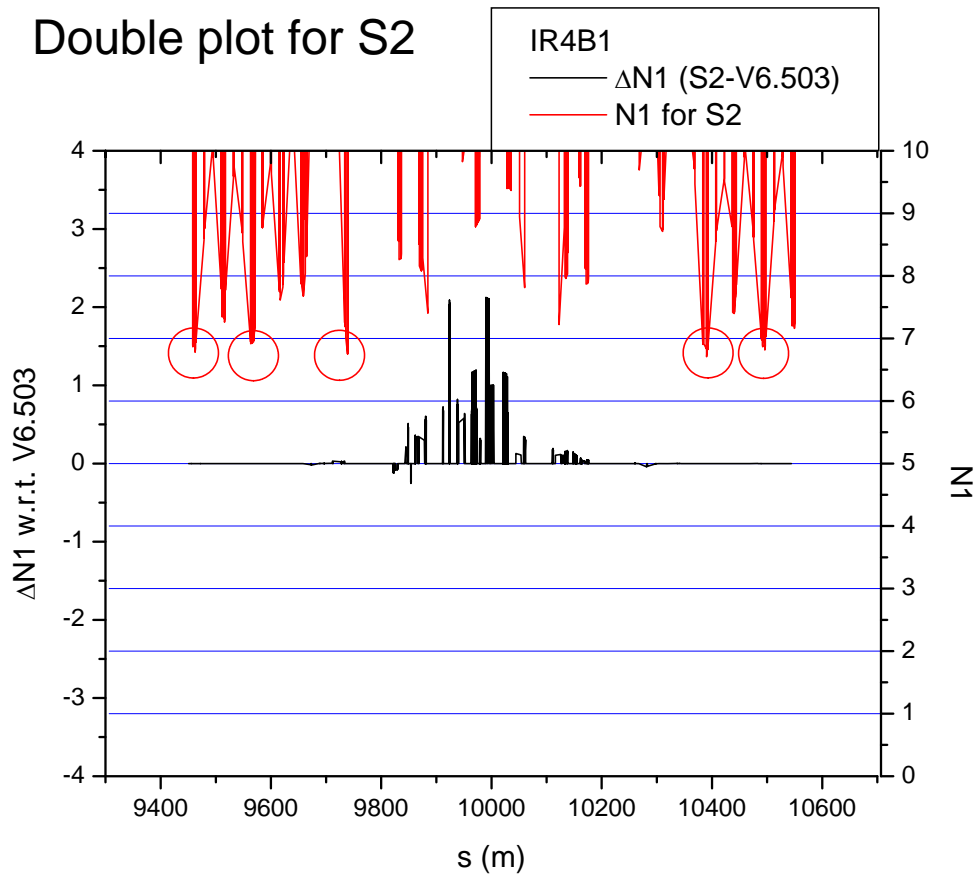
Aperture: IR4B1 S1

Double plot for S1



- $s \sim 9460$ m, $\Delta N1 = 0.0$, $N1 > 6.7$ (D)
- $s \sim 9560$ m, $\Delta N1 = 0.0$, $N1 > 6.9$ (D)
- $s \sim 9730$ m, $\Delta N1 \sim -0.01$, $N1 > 6.7$ (D)
- $s \sim 9880$ m, $\Delta N1 \sim -0.2$, $N1 > 6.9$ (D)
- $s \sim 10380$ m, $\Delta N1 = 0.0$, $N1 > 6.7$ (D)
- $s \sim 10490$ m, $\Delta N1 = 0.0$, $N1 > 6.8$ (D)

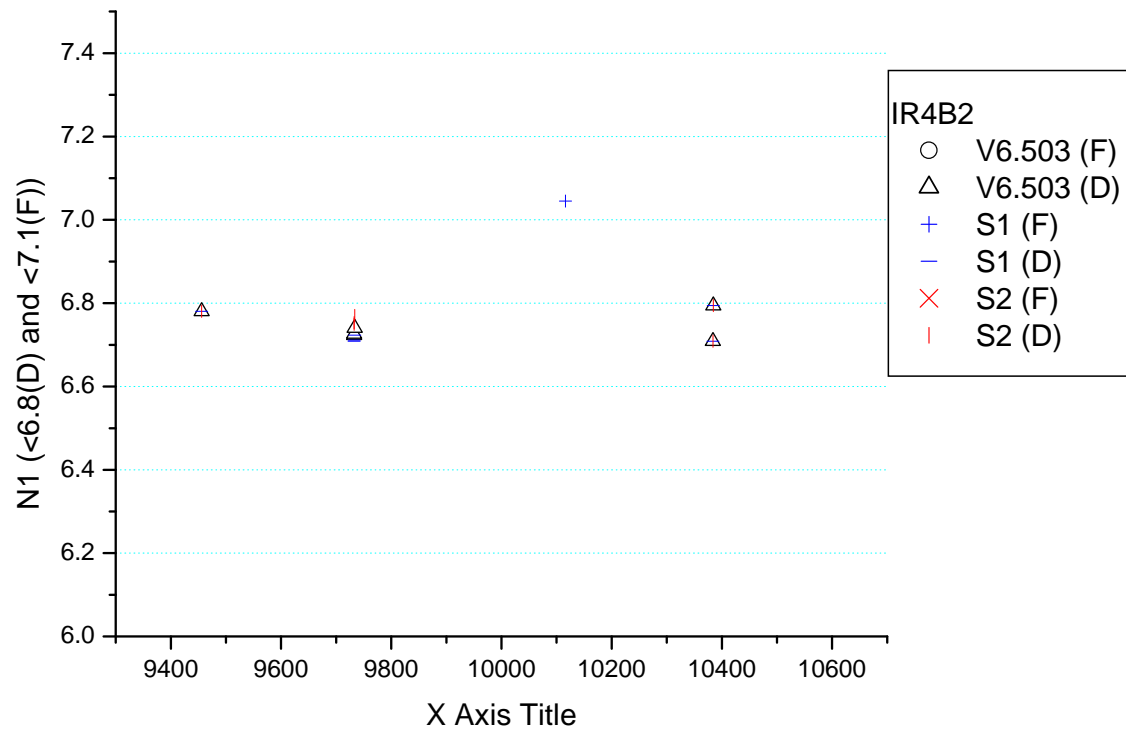
Aperture: IR4B1 S2



- s~9460 m, $\Delta N1=0.0$, $N1>6.7$ (D)
- s~9560 m, $\Delta N1=0.0$, $N1>6.9$ (D)
- s~9730 m, $\Delta N1\sim+0.03$, $N1>6.7$ (D)
- s~10380 m, $\Delta N1=0.0$, $N1>6.7$ (D)
- s~10490 m, $\Delta N1=0.0$, $N1>6.8$ (D)

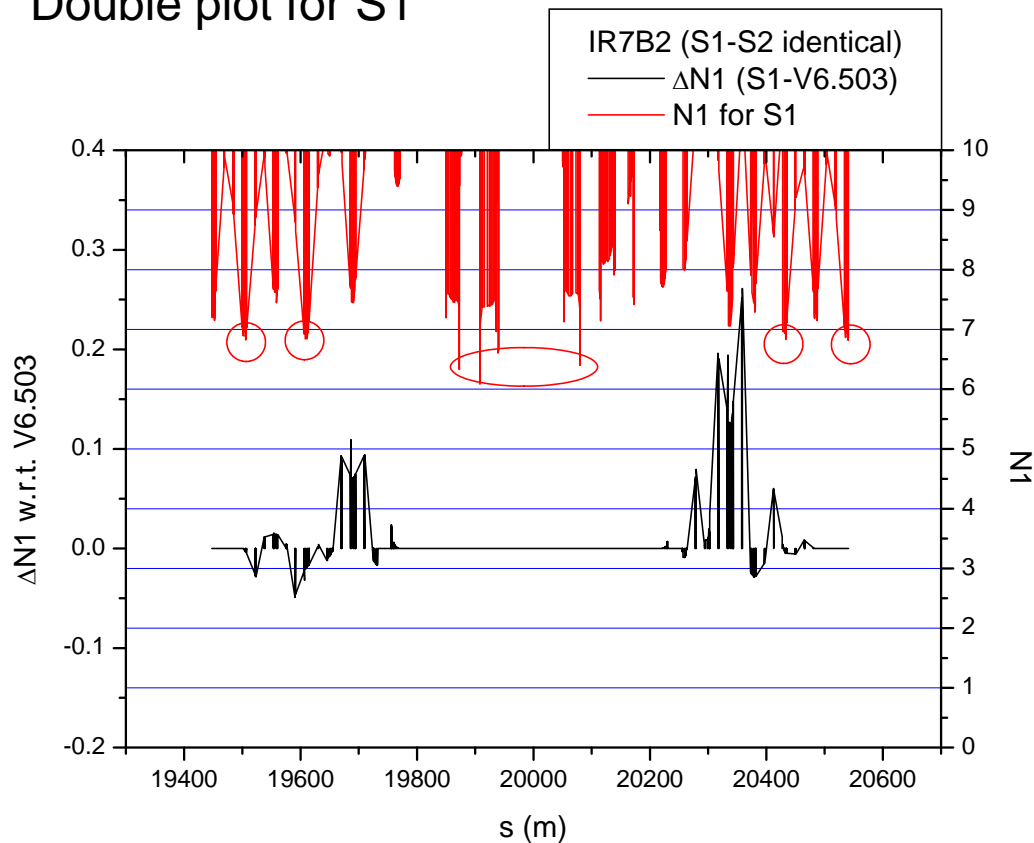
Aperture: IR4B1

Problematic aperture plot for S1 and S2



Aperture: IR7B2 (S2 identical to S1)

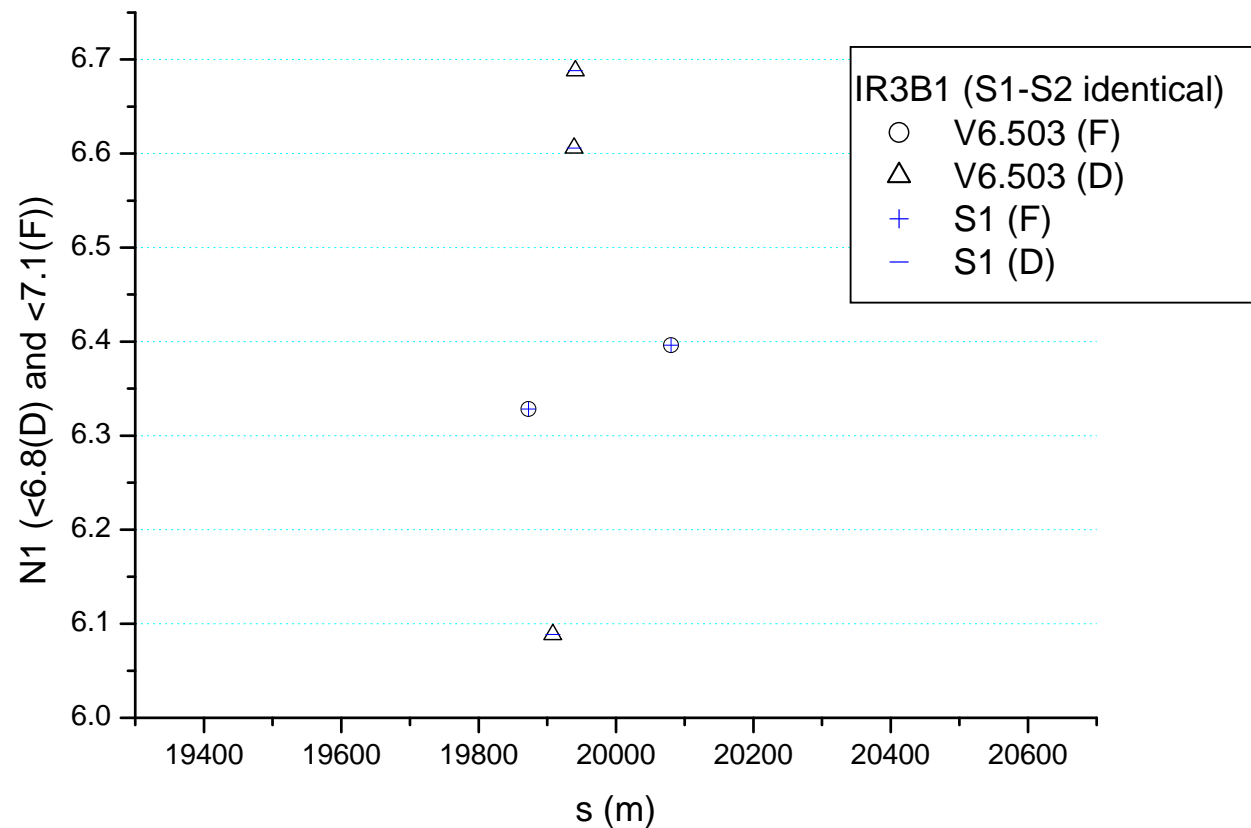
Double plot for S1



- $s \sim 19500$ m, $\Delta N1 \sim -0.03$, $N1 > 6.8$ (D)
- $s \sim 19610$ m, $\Delta N1 \sim -0.02$, $N1 > 6.8$ (D)
- No change in LSS, Bad N1s at BPMs**
- $s \sim 20430$ m, $\Delta N1 \sim -0.005$, $N1 > 6.8$ (D)
- $s \sim 20540$ m, $\Delta N1 = 0.0$, $N1 > 6.8$ (D)

Aperture: IR7B2 (S2 identical to S1)

Problematic aperture plot for S1



Summary

- Aperture of IP1-IP5 phasing optics is checked
 - No critical deterioration in aperture due to phasing with respect to V6.503
- Q strengths are also checked, OK
 - B1-B2 constraint
 - 3% constraint
 - except for $KQ8.L2.B1=0.00381$ (~2.8%)