

# APEX Summary 2/23 – Beta\* gymnastics

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## **How the session went:**

- Had 2 hours of beam time, from 12pm to 2pm.
- Worked on a cloned ramp, pp11v7-BSFtest, to avoid any unwanted changes to the operational ramp (pp11v7).
- APEX plan: un-squeeze beta\* by 10% in IR6 for Blue beam only while at store with a 12x12 ramp; this allowed running in parallel with R. Michnoff et al.
- Team: M. Bai for optics measurement, A. Marusic & S. Tepikian for Online Model and wfgMan support.

# Working on a cloned ramp...

- ... it can save a Run!!

RampEditor

Ramp Edit Buffer Optics Stepstone Compare Diagnostics Help

Editing: pp11v7-BSFtest Live Stone: pp11v7-BSFtest::store Ramp State: LastStone Save Activate / Make Live

Optics Table Stepstone Editor Compare/Revert

Blue	Yellow																		
Time	Stepstone	Brho	Gamma	TuneX	TuneY	ChromX	ChromY	Transition	BetaX6	BetaY6	BetaX8	BetaY8	BetaX10	BetaY10	TuneX	TuneY	ChromX	ChromY	
1	0.0	injection	79.367	25.379	28.8703	29.5134	2.6	-0.5	22.195	10.09	5.57	10.20	5.75	10.40	28.7506	29.6300	3.0	1.9	
2	8.0	t8	79.639	25.466	28.8786	29.5147	5.0	0.0	22.339	10.05	5.80	10.22	5.96	10.41	28.7577	29.6296	5.1	2.4	
3	16.0	snapback	81.548	26.075	28.8822	29.5253	3.1	-0.4	22.484	9.92	6.01	10.12	6.14	10.32	28.7630	29.6359	4.2	0.9	
4	31.0	t31	93.435	29.871	28.8565	29.5557	-3.3	6.3	22.733	9.50	6.40	9.71	6.49	9.90	28.7554	29.6468	5.0	1.3	
5	34.0	t34	97.192	31.071	28.8471	29.5626	-5.0	8.2	22.781	9.39	6.48	9.60	6.57	9.77	28.7514	29.6487	5.2	1.5	
6	43.9	gg63	112.897	36.086	28.8215	29.5886	-9.3	15.2	22.875	8.93	6.48	9.12	6.55	9.55	28.7447	29.6577	7.6	2.8	
7	58.0	t58	143.818	45.963	28.7871	29.6184	-17.6	22.0	23.028	7.73	6.14	7.83	6.18	9.24	28.7343	29.6666	6.8	2.7	
8	70.4	gg98	179.412	57.334	28.7644	29.6378	-22.0	25.8	23.184	6.56	5.65	6.57	5.67	8.81	28.7263	29.6736	6.2	2.6	
9	73.8	gg104	190.697	60.939	28.7598	29.6440	-21.6	26.6	23.231	6.25	5.50	6.25	5.52	8.66	28.7247	29.6771	7.2	2.7	
10	90.0	t90	250.736	80.120	28.7454	29.6591	-23.9	29.6	23.324	5.21	4.72	5.15	4.75	8.50	28.7200	29.6833	7.6	2.9	
11	110.9	gg179	331.753	106.005	28.7252	29.6548	-25.2	31.3	23.430	4.31	4.05	4.24	4.09	8.18	28.7065	29.6727	7.9	2.8	
12	130.0	gg219	406.302	129.824	28.7180	29.6546	-24.9	32.0	23.511	4.02	3.86	3.95	3.91	7.75	28.7005	29.6715	8.0	3.4	
13	132.9	gg225	417.586	133.429	28.7175	29.6549	-24.7	32.3	23.522	4.01	3.87	3.94	3.91	7.68	28.6996	29.6721	8.0	3.9	
14	135.8	gg231	428.870	137.034	28.7191	29.6559	-24.5	32.2	23.527	3.99	3.85	3.92	3.89	7.66	28.7008	29.6736	7.9	4.0	
15	150.1	gg260	484.085	154.676	28.7237	29.6577	-23.3	32.2	23.548	3.67	3.55	3.58	3.60	7.64	28.7016	29.6790	7.8	5.2	
16	169.2	gg300	558.633	178.495	28.7328	29.6520	-22.6	31.8	23.585	2.98	2.90	2.88	2.94	7.56	28.7026	29.6811	5.8	7.4	
17	172.1	gg306	569.917	182.100	28.7349	29.6533	-22.2	31.8	23.591	2.88	2.80	2.78	2.84	7.53	28.7035	29.6838	5.8	7.9	
18	189.3	gg341	636.415	203.347	28.7407	29.6553	-19.7	29.8	23.620	2.33	2.28	2.28	2.33	7.35	28.7022	29.6927	5.8	8.3	
19	205.5	gg375	699.679	223.560	28.7325	29.6468	-19.6	29.7	23.626	2.05	2.00	2.02	2.05	7.18	28.6894	29.6887	4.4	9.7	
20	208.4	gg381	710.962	227.166	28.7327	29.6476	-20.4	29.7	23.629	2.03	1.99	2.00	2.03	7.15	28.6891	29.6899	3.4	9.9	
21	211.4	gg387	722.243	230.770	28.7336	29.6490	-20.2	29.7	23.632	2.02	1.98	2.00	2.03	7.11	28.6895	29.6918	3.4	10.1	
22	228.5	gg422	782.243	249.941	28.7381	29.6620	-19.7	28.0	23.640	1.89	1.88	1.89	1.93	6.90	28.6927	29.7061	3.3	8.9	
23	231.4	gg428	790.305	252.517	28.7379	29.6651	-19.5	27.7	23.640	1.85	1.84	1.85	1.89	6.87	28.6924	29.7093	3.4	8.7	
24	248.4	gg462	823.534	263.134	28.7356	29.6755	-18.9	28.0	23.673	1.46	1.50	1.46	1.54	6.74	28.6889	29.7209	3.8	9.3	
25	260.0	t260	832.497	265.997	28.7353	29.6837	-20.0	27.8	23.716	1.18	1.23	1.18	1.27	6.65	28.6880	29.7296	3.0	8.8	
26	270.0	flatlop	833.557	266.336	28.7377	29.6926	-21.5	27.7	23.760	0.97	1.03	0.98	1.07	6.58	28.6903	29.7386	2.1	8.2	
27	280.0	t280	833.557	266.336	28.7404	29.7033	-22.5	27.4	23.794	0.82	0.87	0.82	0.90	6.58	28.6929	29.7494	2.1	7.0	
28	290.0	t290	833.557	266.336	28.7412	29.7079	-23.6	26.5	23.820	0.72	0.75	0.72	0.78	6.60	28.6935	29.7541	2.1	5.1	
29	300.0	t300	833.557	266.336	28.7401	29.7112	-24.0	25.9	23.834	0.65	0.68	0.65	0.70	6.63	28.6924	29.7574	2.6	3.6	
30	310.0	t310	833.557	266.336	28.7406	29.7123	-23.9	25.7	23.840	0.63	0.65	0.63	0.67	6.65	28.6928	29.7585	3.1	3.0	
31	320.0	store	833.557	266.336	28.6908	29.7573	2.0	3.8	23.837	0.63	0.65	0.63	0.67	6.65	28.6908	29.7573	2.0	3.8	

# Effects of the un-squeezing

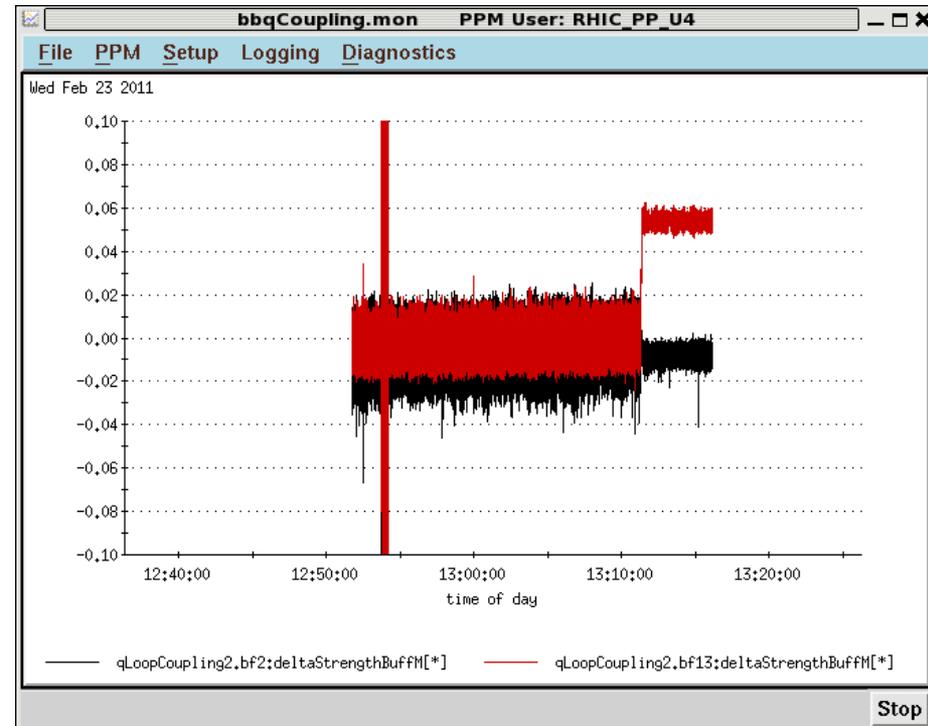
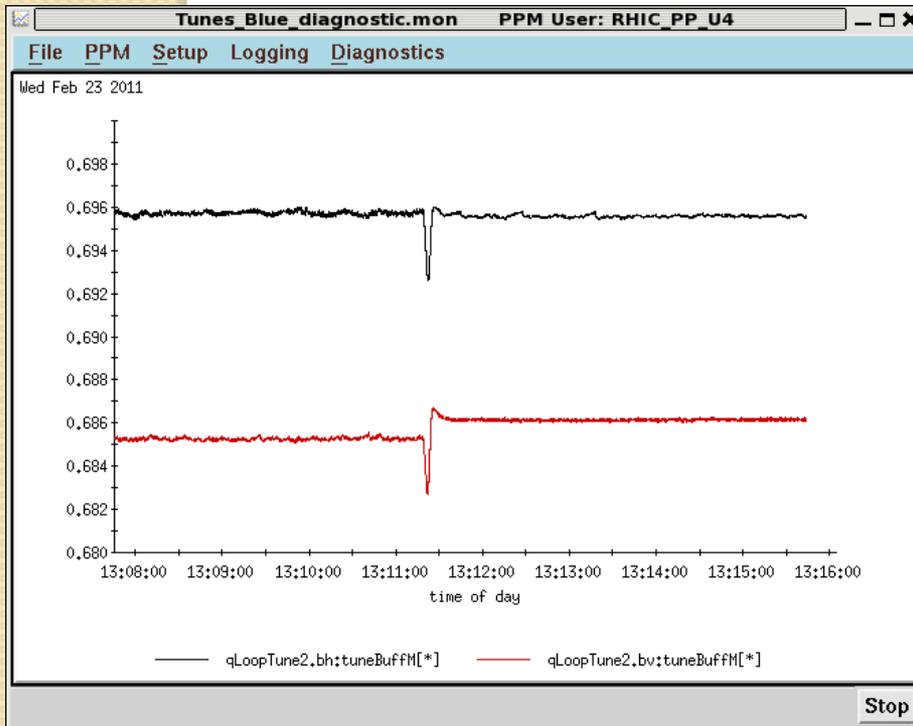
- Asked for a 10% change, from 0.6412 (calculated) to 0.7054.

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# Effects of the un-squeezing

- Asked for a 10% change, from 0.6412 (calculated) to 0.7054.
- Tune & Chromaticity changed after the un-squeezing was completed.
- After activating the changes and taking care of PS limits, we can see changes in the tunes and coupling.



# Optics Measurements

- Un-squeezing is effectively seen by Mei's measurements:

BEFORE

Beta* at IPs						
	IP2	IP4	IP6	IP8	IP10	IP12
H_b*	3.60	5.66	0.79	0.56	8.02	5.37
H_b*sd	0.008	0.007	0.014	0.010	0.008	0.006
H_s*	0.01	1.17	0.69	0.01	1.02	0.08
V_b*	2.99	7.06	0.73	0.74	7.41	6.58
V_b*sd	0.006	0.036	0.000	0.001	0.066	0.059
V_s*	-0.20	-1.24	0.62	-0.01	0.44	-0.37

AFTER

Beta* at IPs						
	IP2	IP4	IP6	IP8	IP10	IP12
H_b*	3.73	5.55	0.87	0.54	8.55	5.24
H_b*sd	0.035	0.050	0.000	0.000	0.182	0.024
H_s*	-0.08	1.35	0.43	-0.07	1.26	0.17
V_b*	2.84	6.47	0.76	0.75	7.44	6.35
V_b*sd	0.011	0.078	0.000	0.001	0.069	0.004
V_s*	-0.27	-0.84	-0.53	-0.03	0.95	-0.04