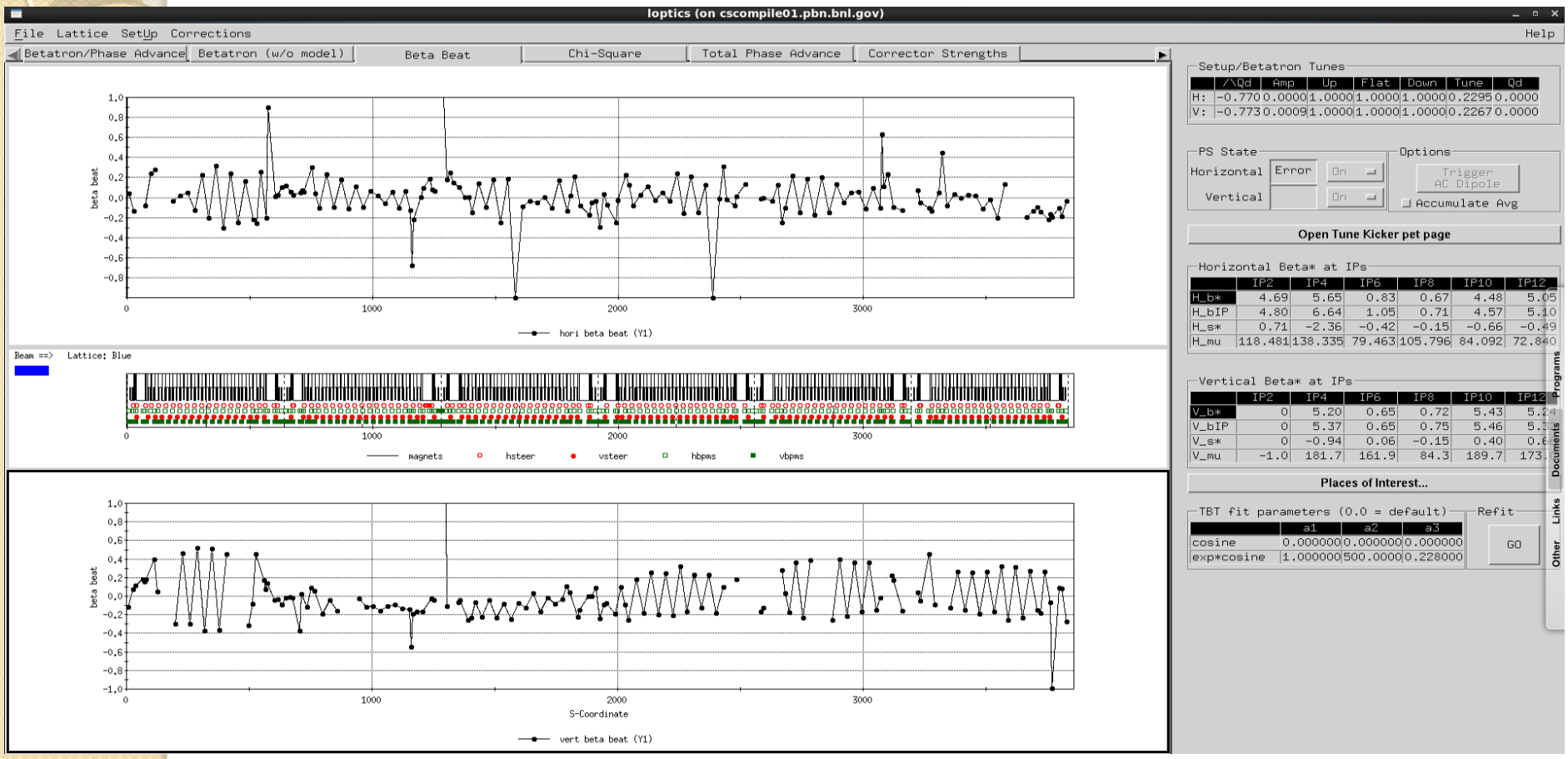
RHIC Run16 Dynamic β* Squeeze proposal

G. Robert-Demolaize (for THOR team)

Plans for Run16

- <u>Machine Development (2/11)</u>: try to correct the measured linear optics



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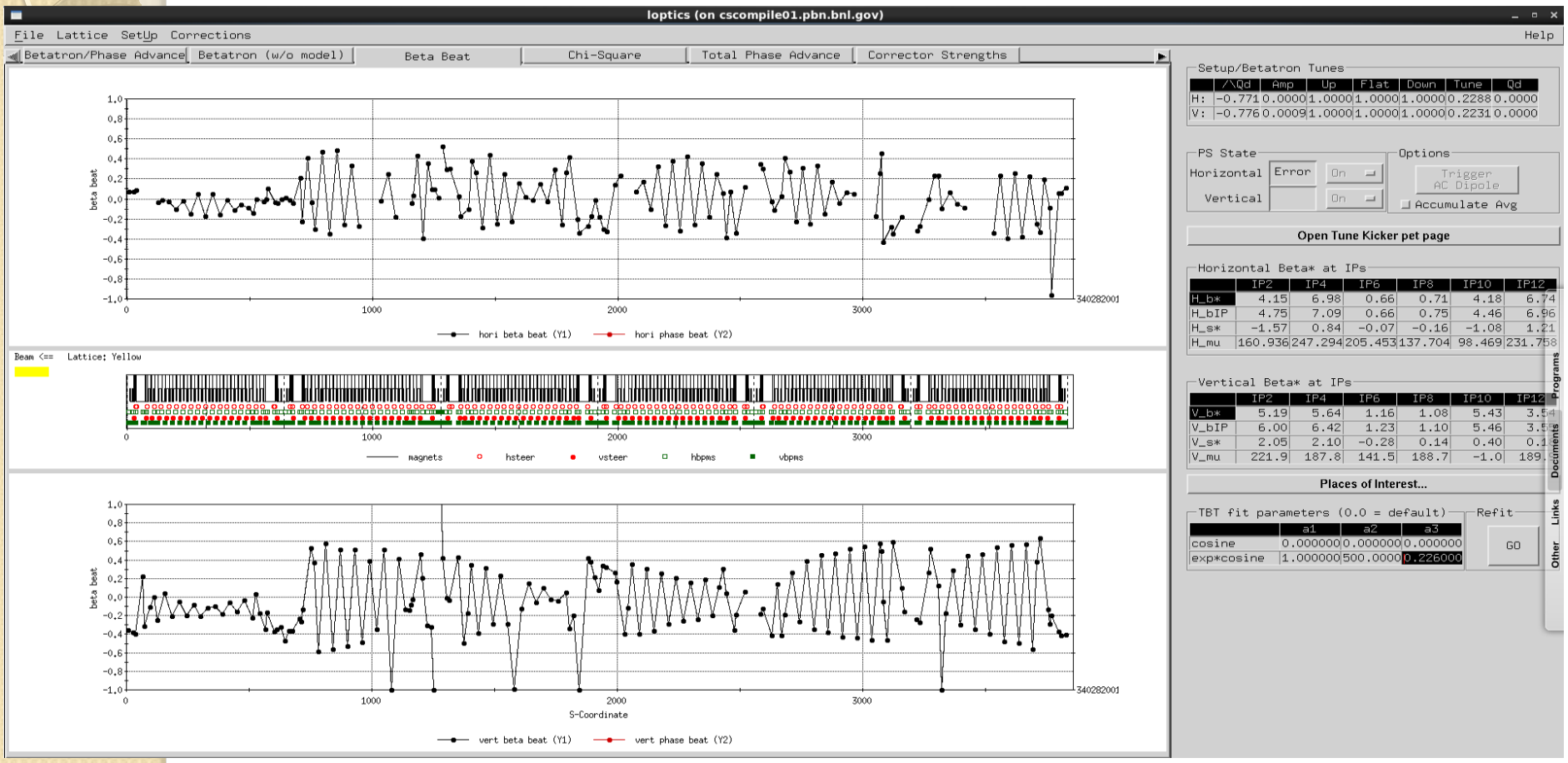
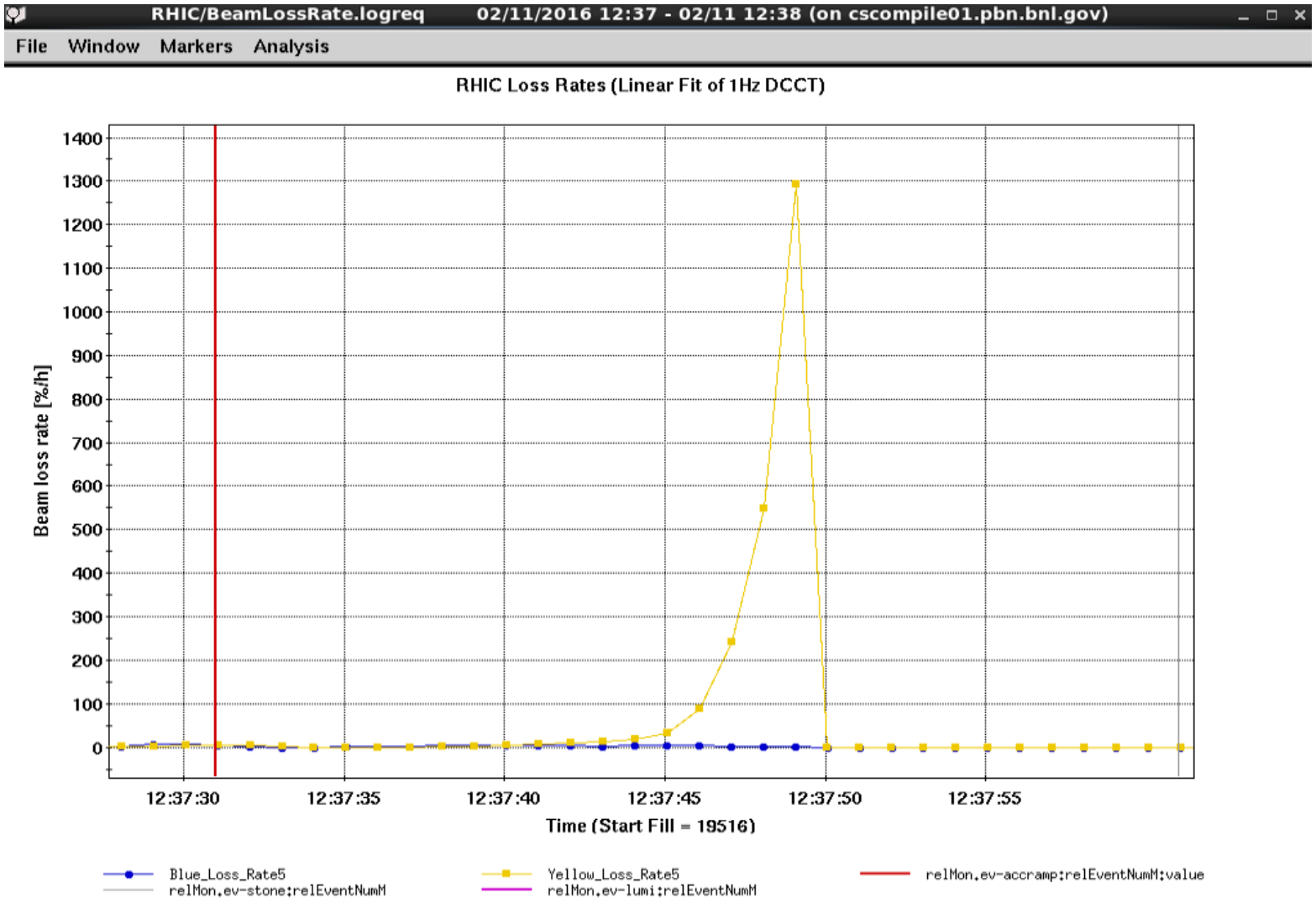


First Attempt – Loss Rates

- Sending 100% of optics corrections, both Blue and Yellow:



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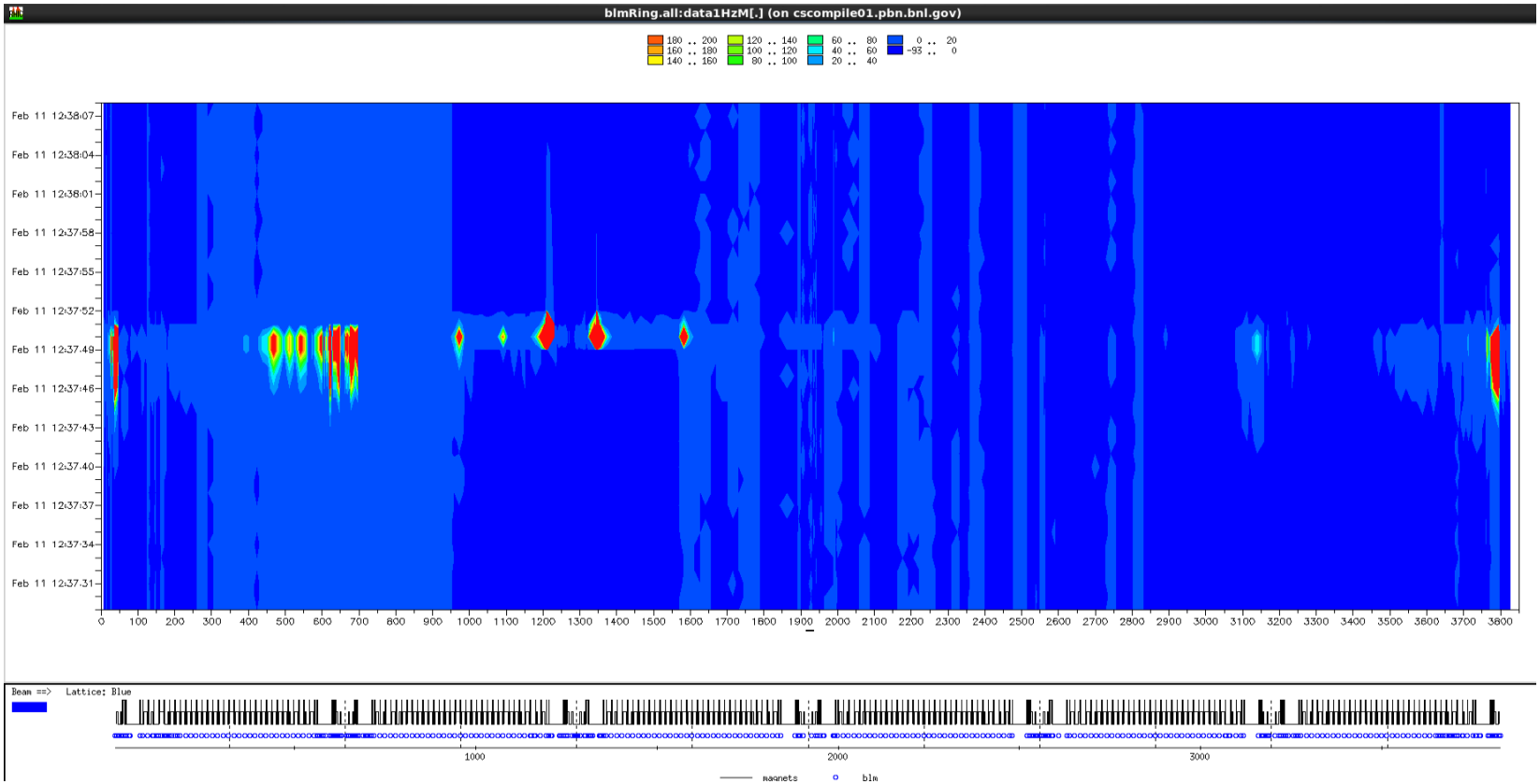
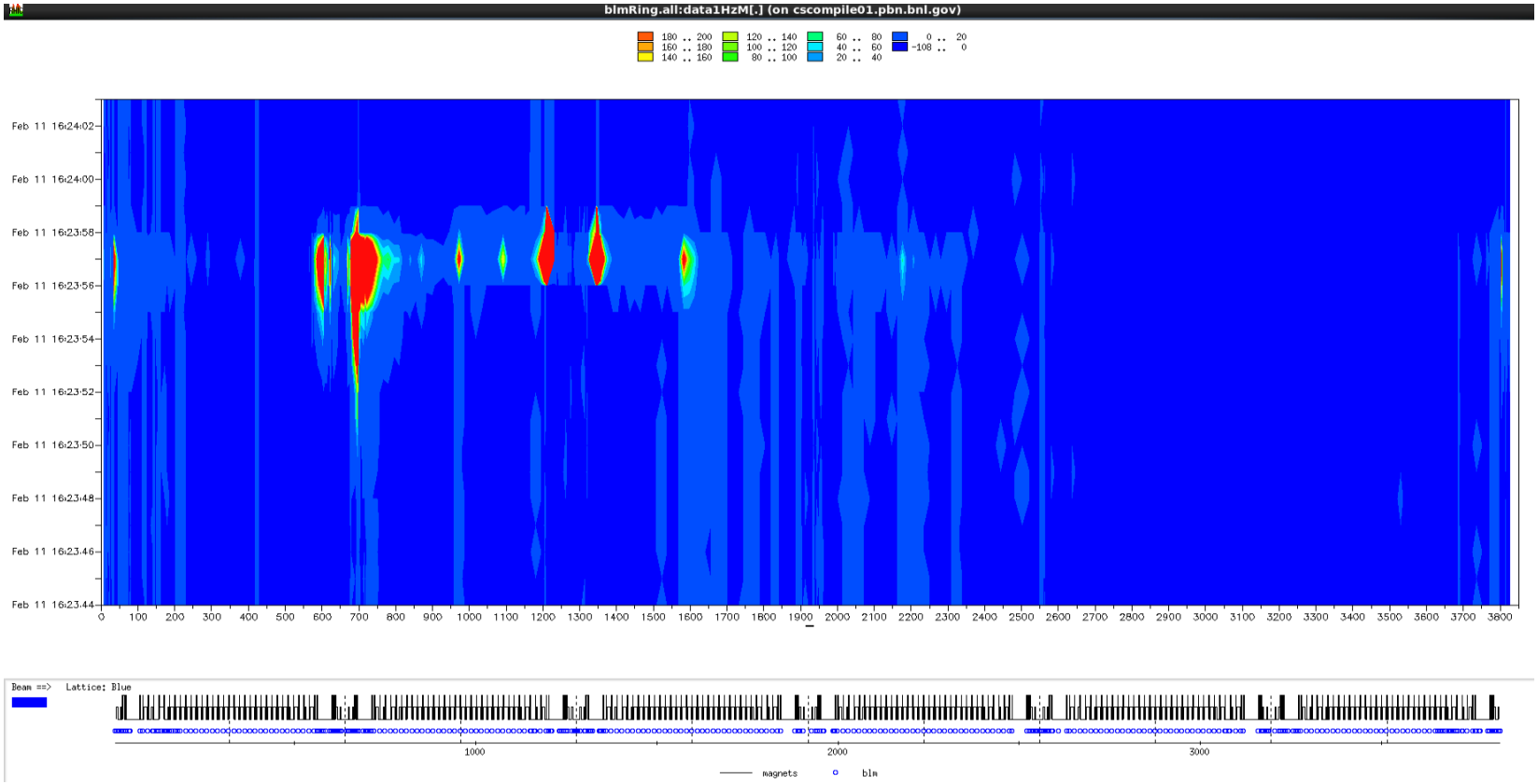


- Most likely cause of losses: collimators were retracted to avoid permit pulls (oh, the irony…)

Second Attempt – Loss Pattern

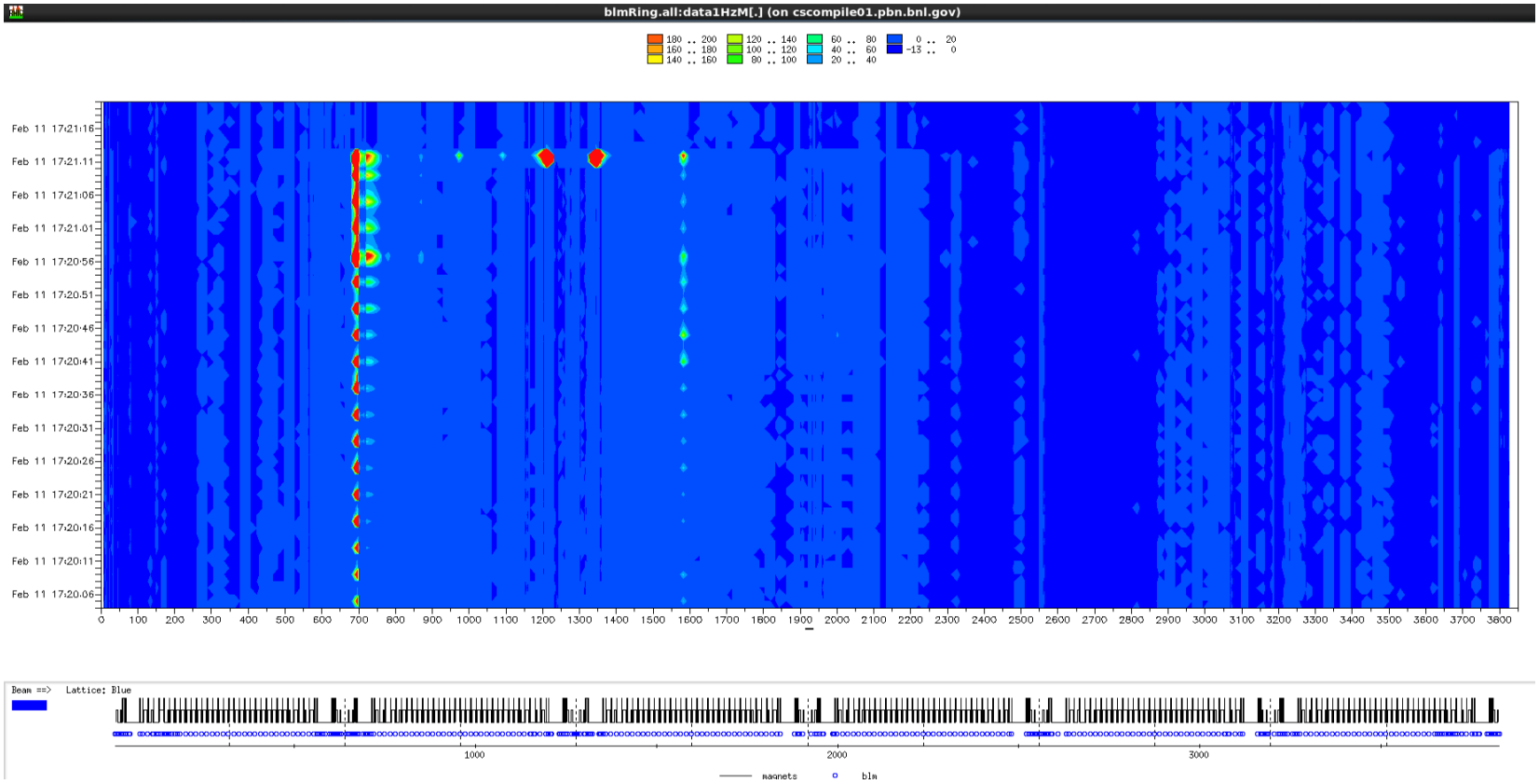
- Sending 100% of optics corrections, Blue only:



- Most likely cause of losses: shape of protection bumps does not match machine optics anymore; can be readily verified during tonight's MD, by taking TBT data for optics measurements once the bumps are removed.

Third Attempt – Loss Pattern

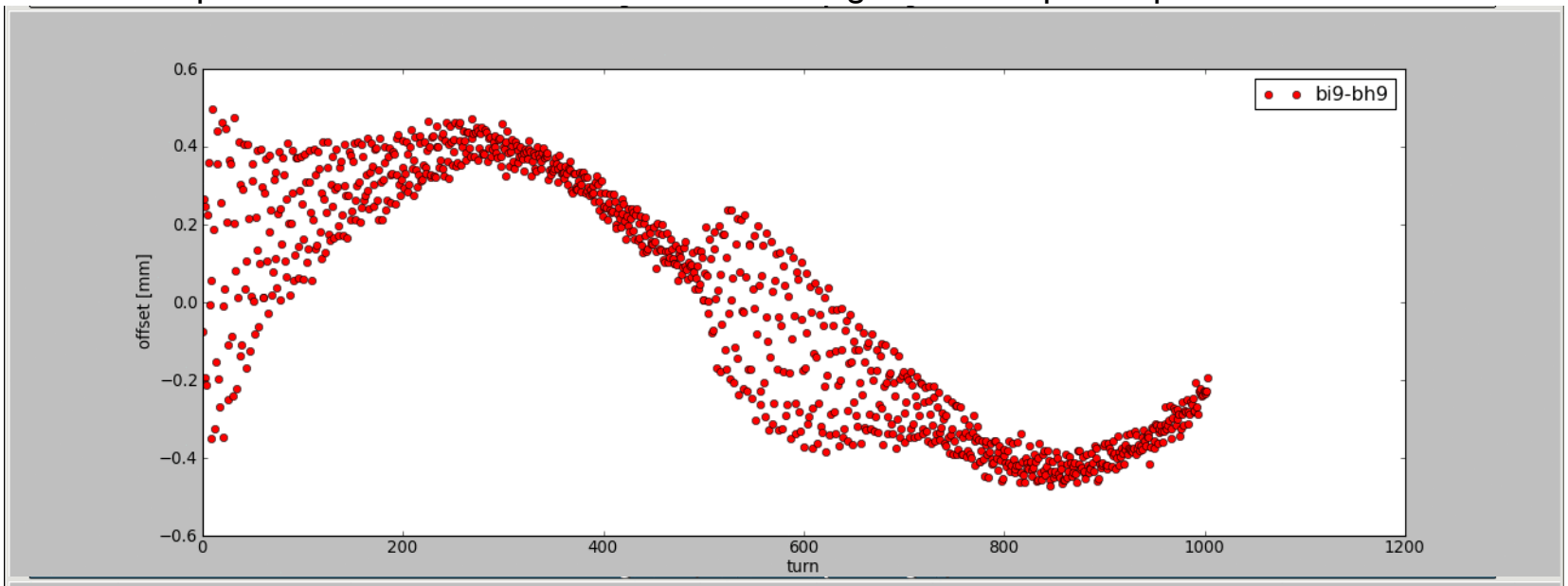
- No optics correction, squeezing Blue only down to 50 cm:

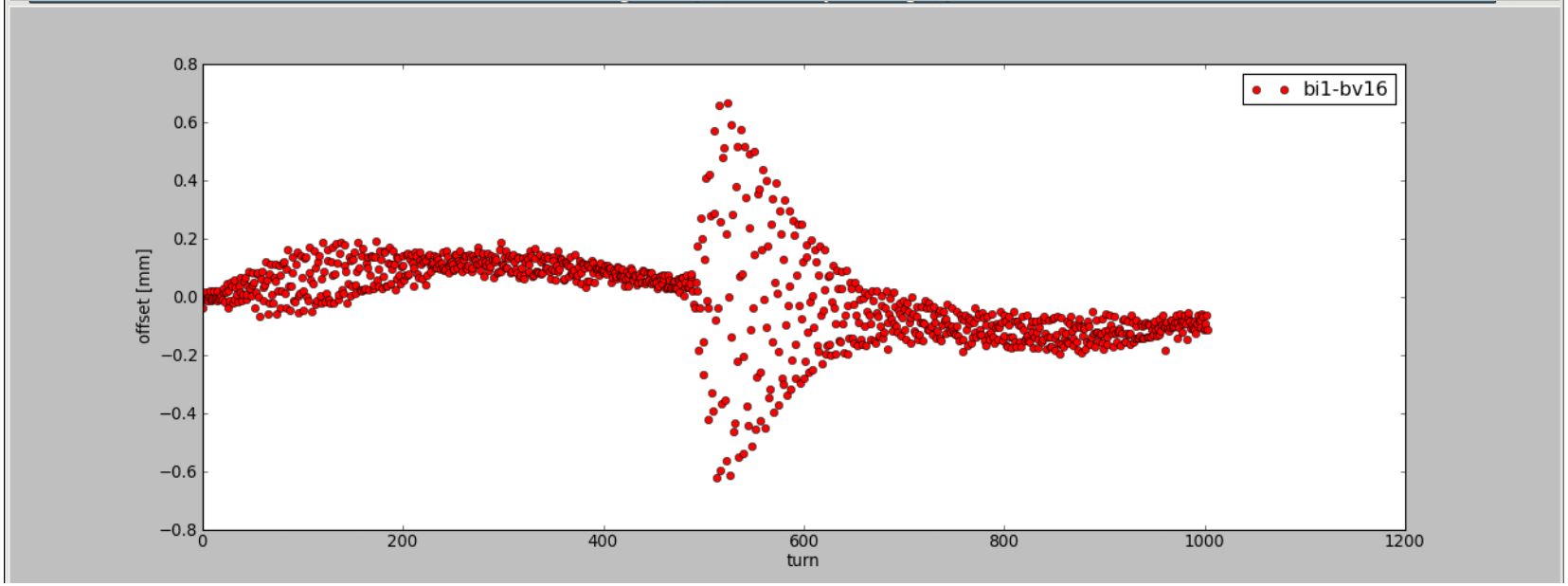


- Managed to acquire TBT data during that ramp, currently being analyzed.
- Source of "pings" on the collimators also being investigated.

Third Attempt – TBT data

- Sample set from Artus TBT data, Blue beam, during the last ramp attempt:





Third Attempt – TBT data

- Optics analysis from Artus TBT data, Blue beam, during the last ramp attempt:

Horizontal Beta* at IPs

	IP2	IP4	IP6	IP8	IP10	IP12
H_b*	4.88	-1.00	0.90	0.58	4.52	5.
H_bIP	4.90	0.00	1.21	0.71	4.53	5.
H_s*	0.30	10.00	0.53	0.28	-0.21	-0.
H_mu	109.287	0	259.679	114.035	78.704	80.5

Vertical Beta* at IPs

	IP2	IP4	IP6	IP8	IP10	IP12
V_b*	0	5.47	0.65	0.61	4.79	5.
V_bIP	0	5.69	0.68	0.63	4.81	5.
V_s*	0	-1.09	0.13	-0.11	0.27	0.
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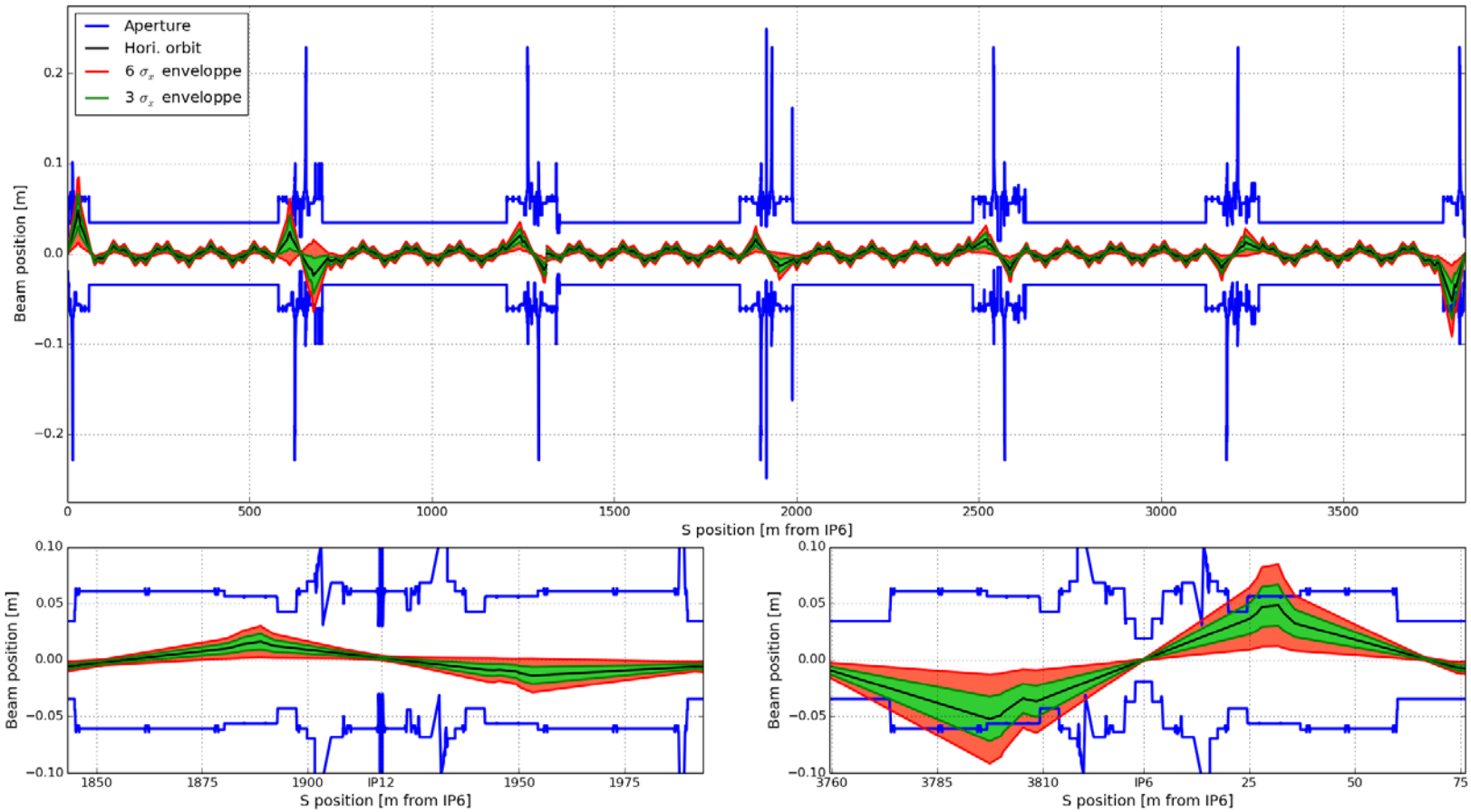
- Data taking during today's test can indicate ***whether*** it is ***absolutely*** necessary to remove the prefire protection bumps.

- Initial squeeze attempt was performed with bumps kept in their current shape, but the implementation clearly showed losses at the location of the peaks of the bumps => need to have another go with recalculated bumps!

Reminder – Why we need the bumps

- Beam trajectory without bumps during a prefire: sample case, 50% kick from Module 3



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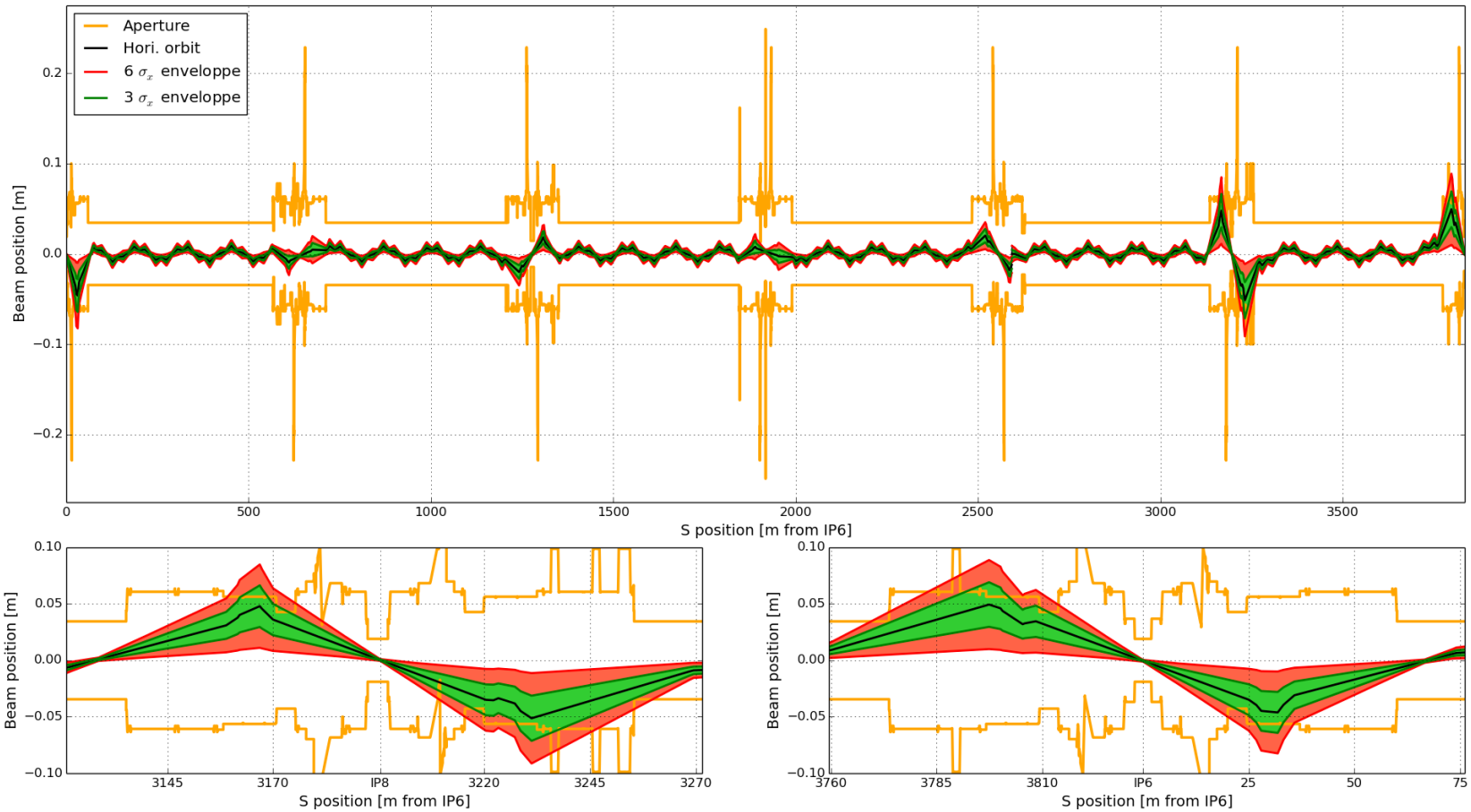
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