Overview of lossmaps and BLM thresholds for upcoming B1 proton quench test
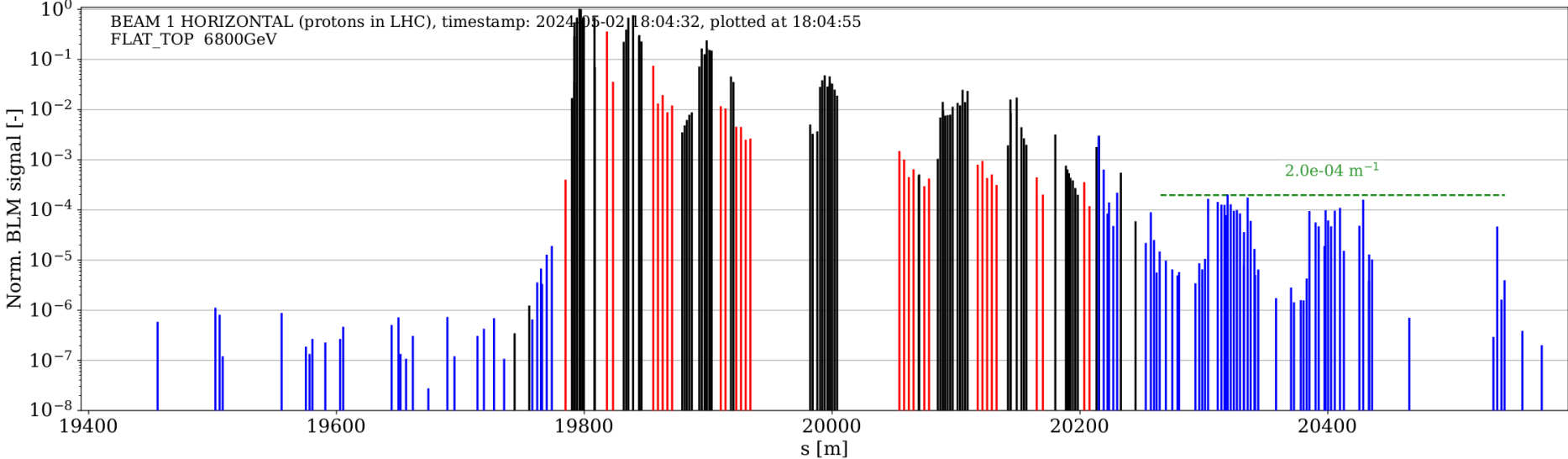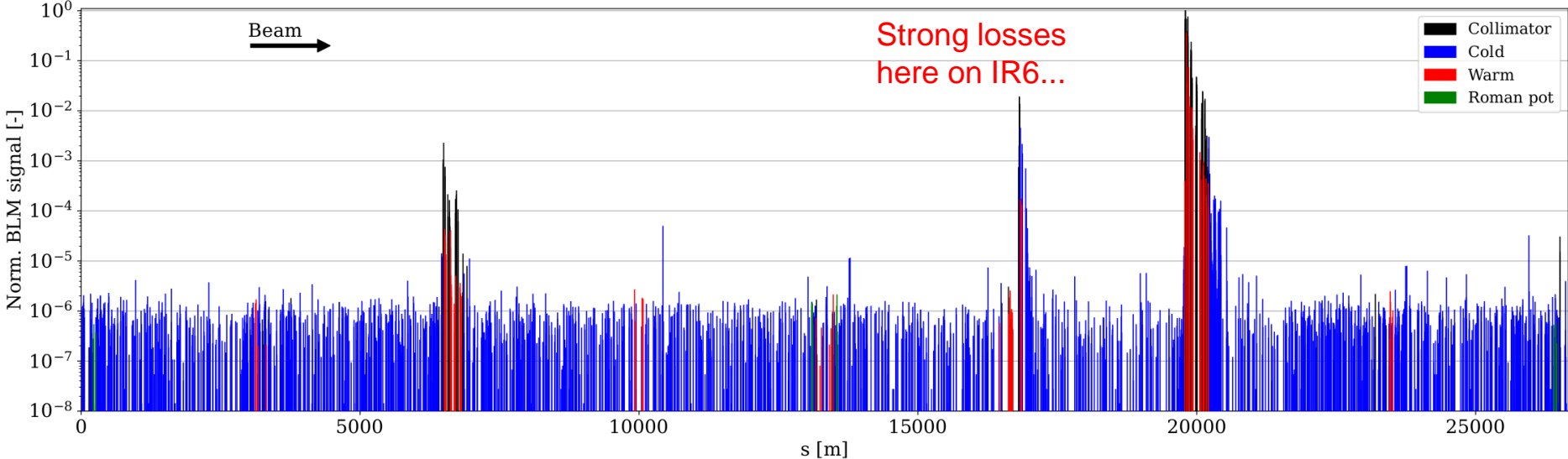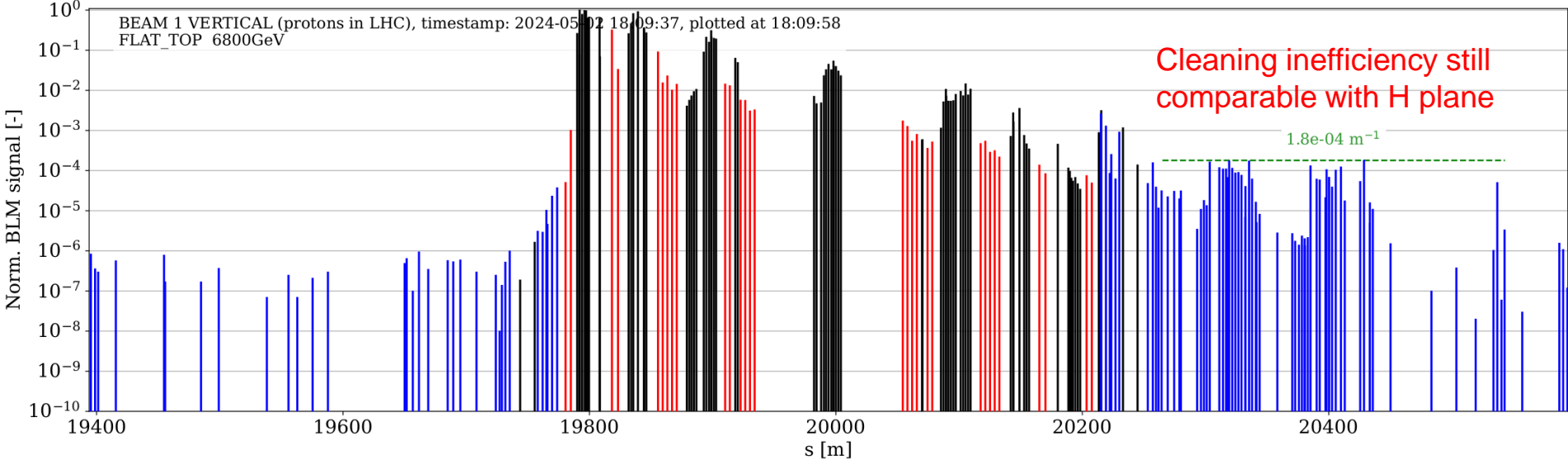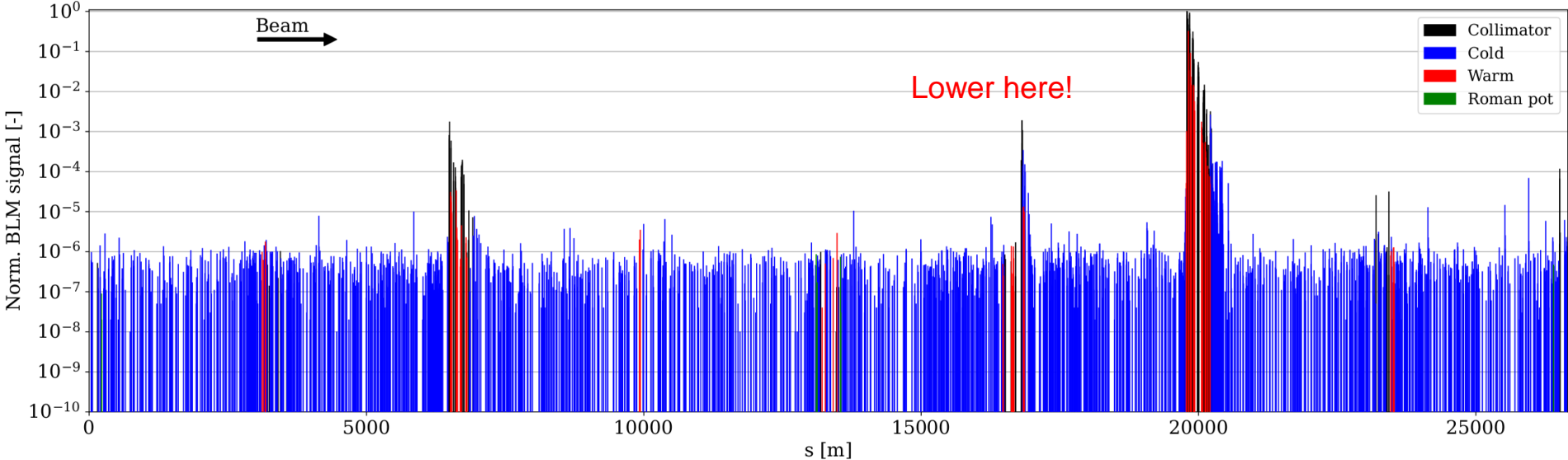
C.E. Montanari, S. Morales Vigo, B.M. Salvachua Ferrando

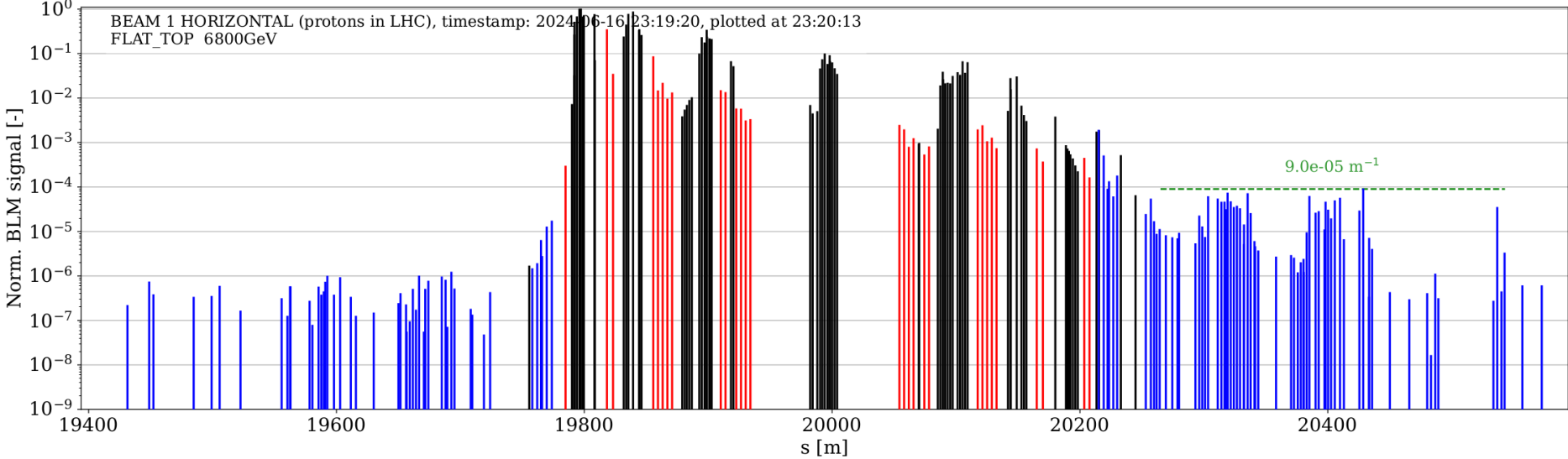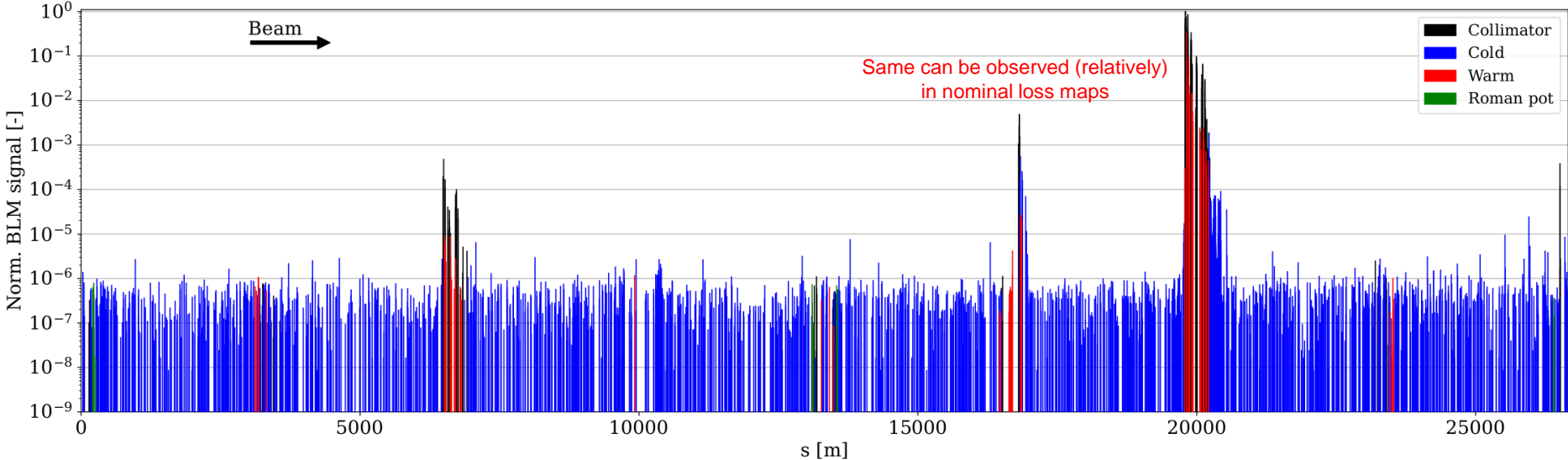BLMTWG - 15 October 2024

Relaxed B1H

Relaxed B1V

Nominal B1H

Nominal B1V
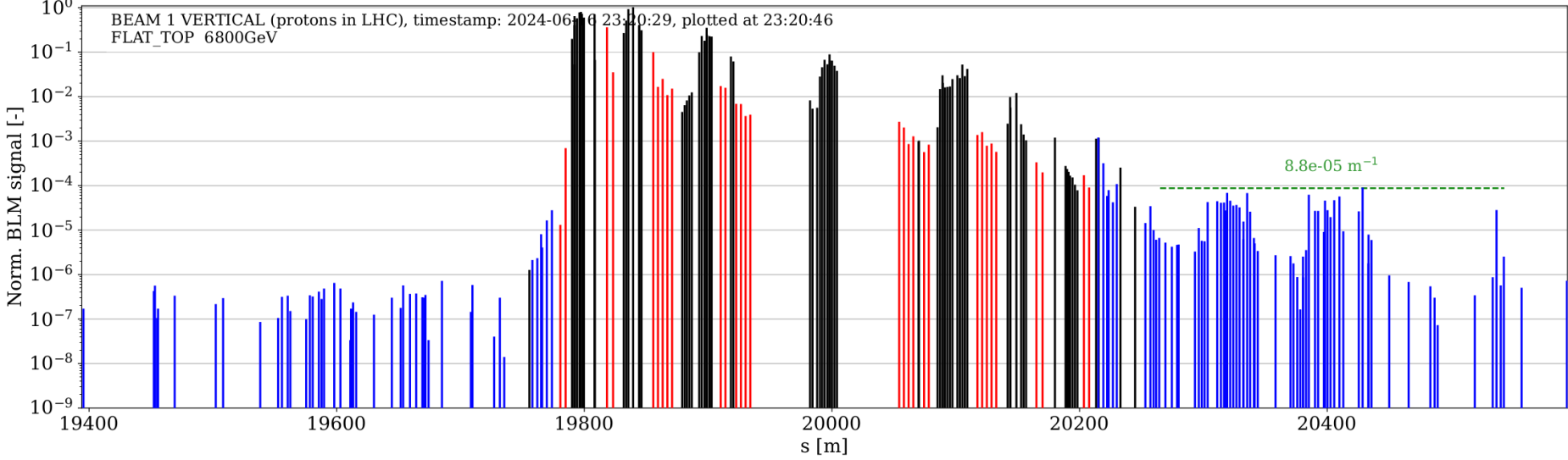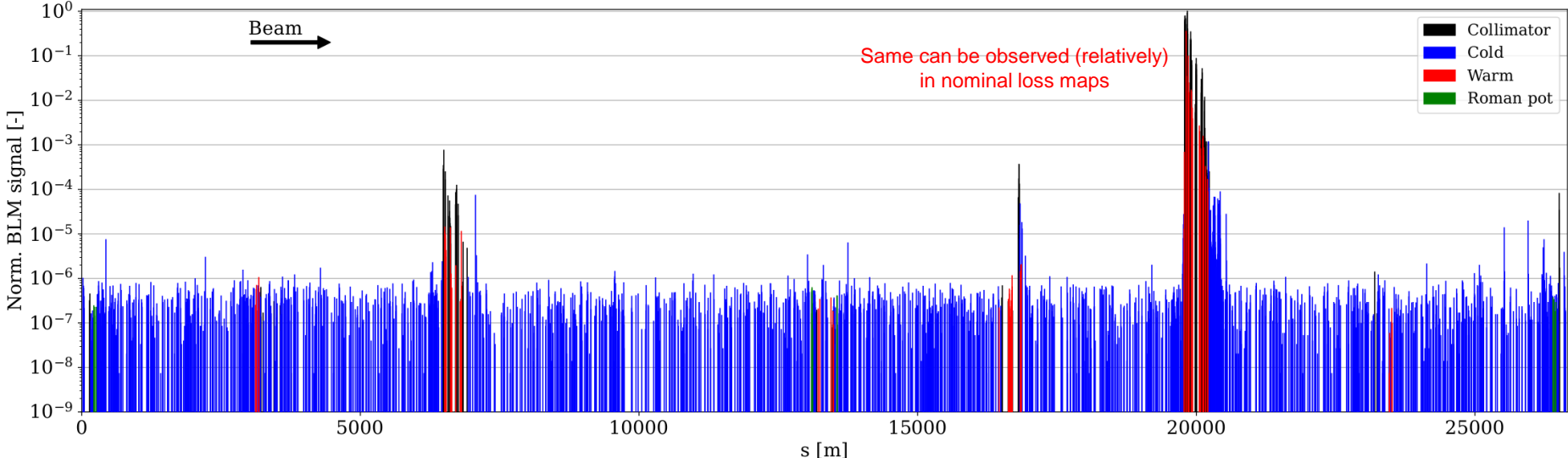
Inspecting BLM threshold with rescaled losses

Quick recall of the steps used to perform this analysis:

- From a lossmap, gather the peak loss in W from FastBCT signal

- Evaluate BLM Gy rescaling factor from observed peak power loss (1200kW / observed loss)

- Apply rescaling factor to BLM signal observed @ peak loss time - bkg signal

- Compare rescaled BLM signals and RS with:

  - Original thresholds applied

  - Original thresholds with Monitor Factor considered (i.e. threshold / monitor_factor)

- Plots shown are currently considering RS from 4 and above (but data for lower RS is available as well!)
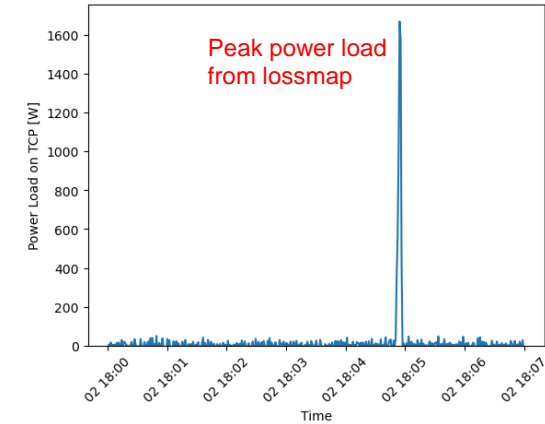
Ratios for relaxed settings, monitor factor removed

Rescaled Ratios @1200kW for BLMs in B1H Relaxed, Monitor Factor Removed, RS from 4 and above
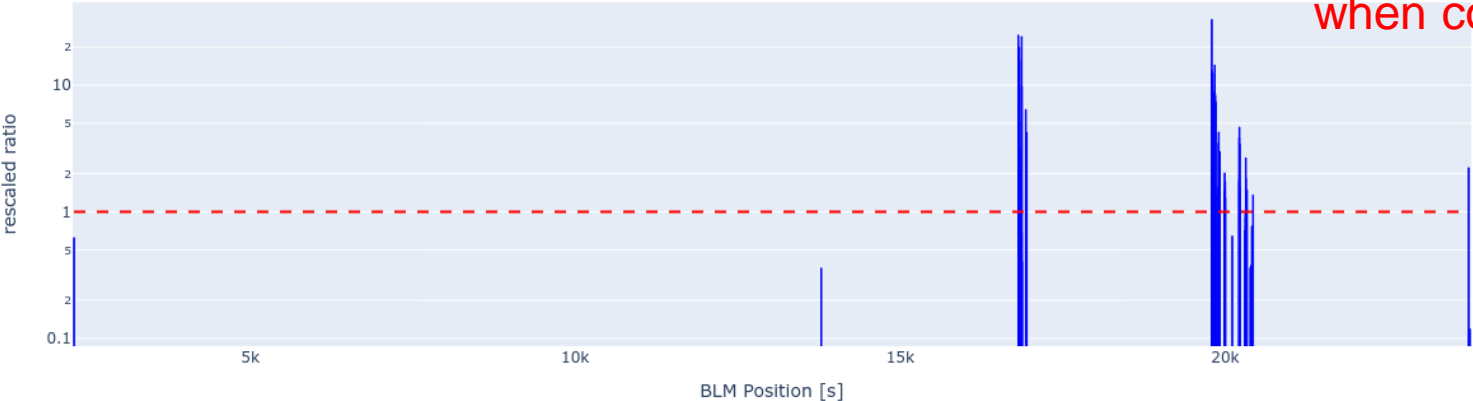
Clear strong leakage in IR6 when considering H plane

Rescaled Ratios @1200kW for BLMs in B1V Relaxed, Monitor Factor Removed, RS from 4 and above
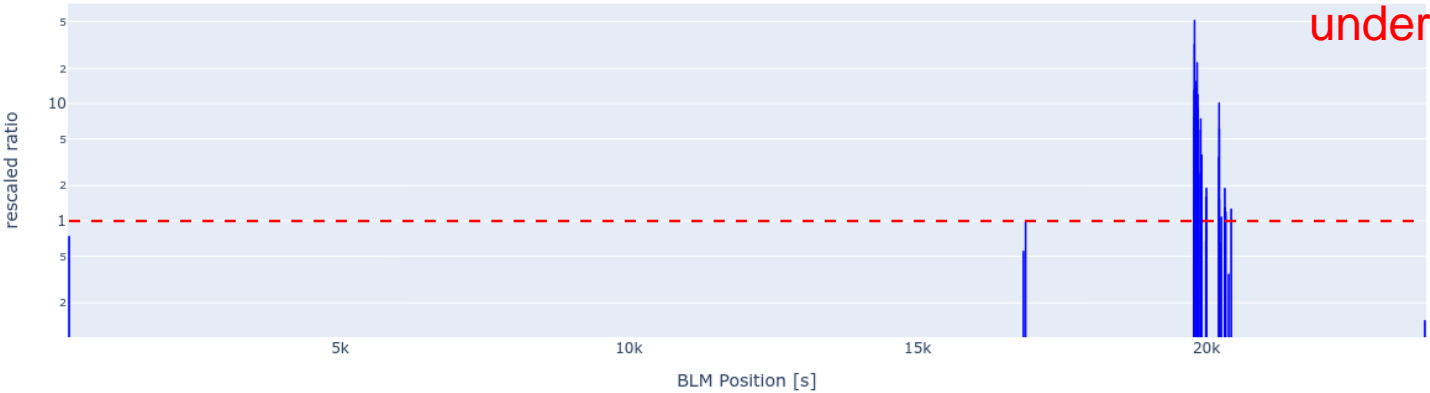
In V plane, situation looks more under control...

Ratios for Nominal settings, monitor factor removed

Rescaled Ratios @1200kW for BLMs in B1H Nominal, Monitor Factor Removed, RS from 4 and above
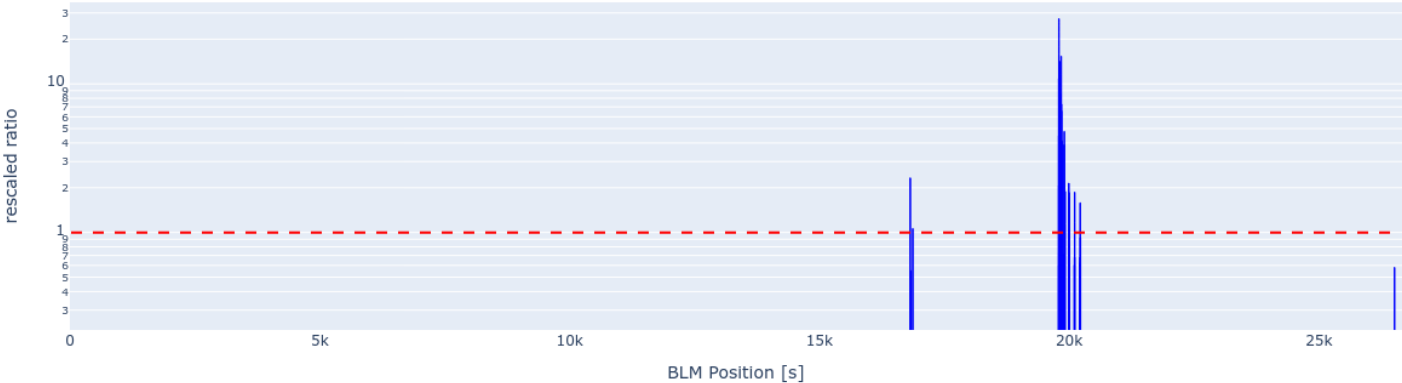
IR6 losses still present in H plane

Rescaled Ratios @1200kW for BLMs in B1V Nominal, Monitor Factor Removed, RS from 4 and above

Ratios for relaxed settings, monitor factor kept

Rescaled Ratios @1200kW for BLMs in B1H Relaxed, Monitor Factor Kept, RS from 4 and above

For completeness, thresholds with original monitor factors can be considered

Rescaled Ratios @1200kW for BLMs in B1V Relaxed, Monitor Factor Kept, RS from 4 and above

In this case, individual BLMs above threhsold appear around the machine...

Ratios for nominal settings, monitor factor kept

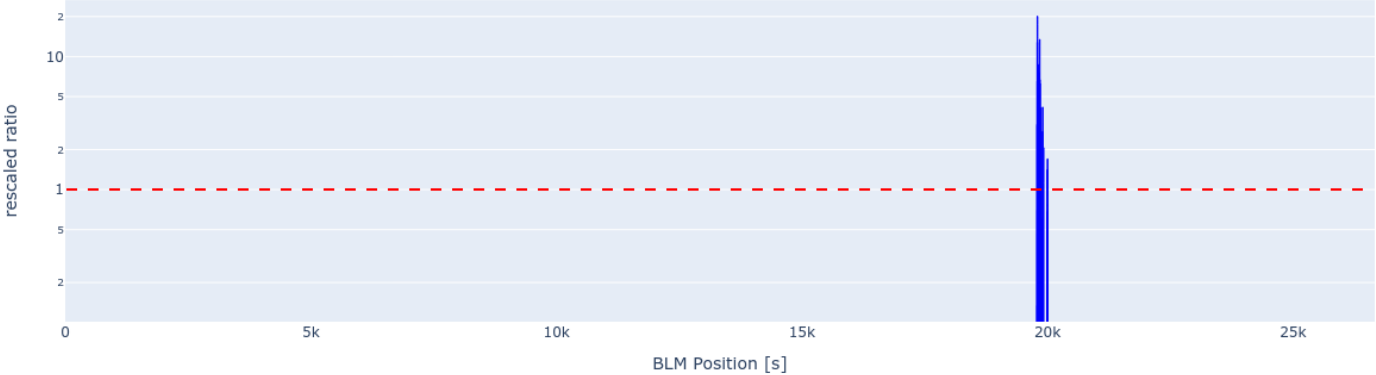Rescaled Ratios @1200kW for BLMs in B1H Nominal, Monitor Factor Kept, RS from 4 and above

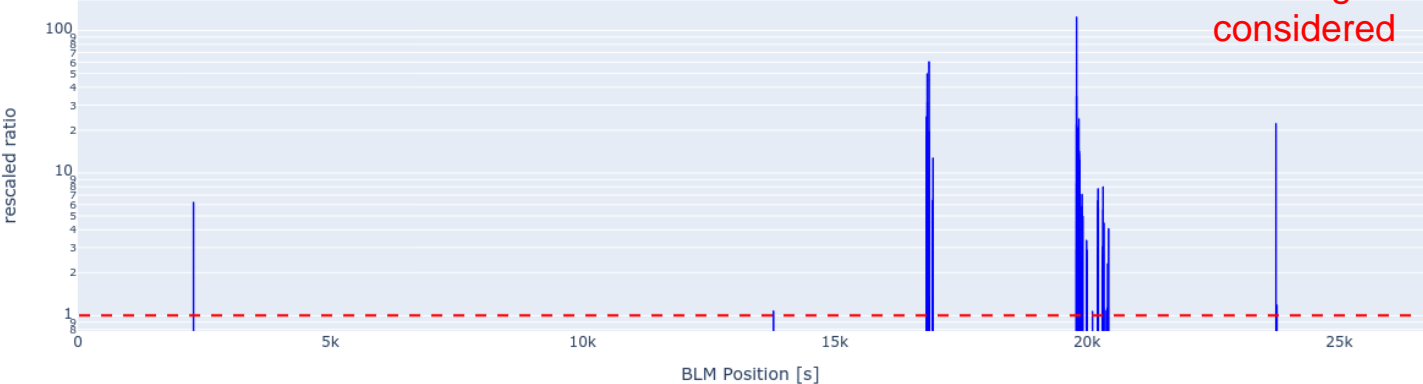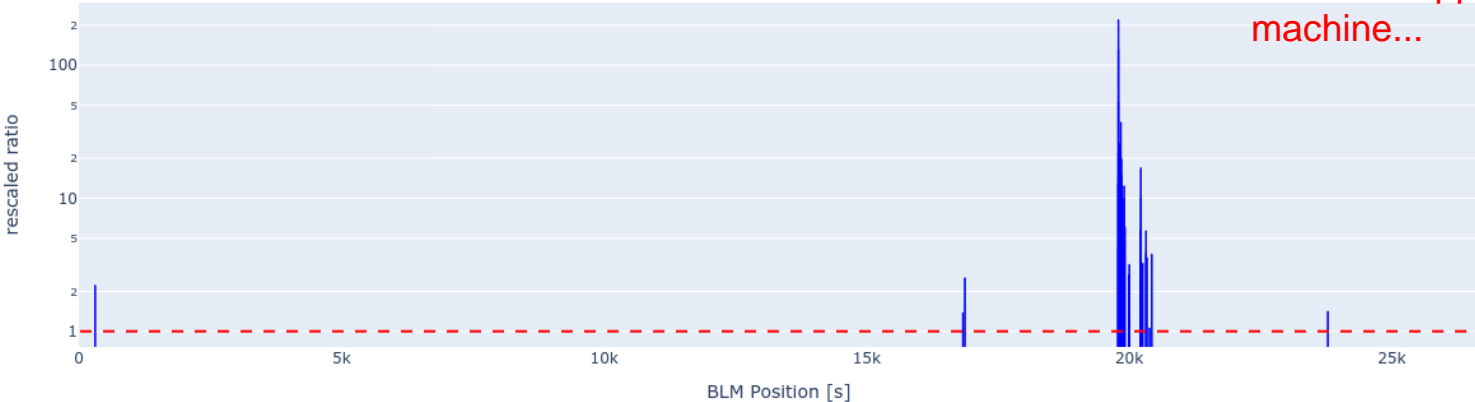Similar results in nominal settings...
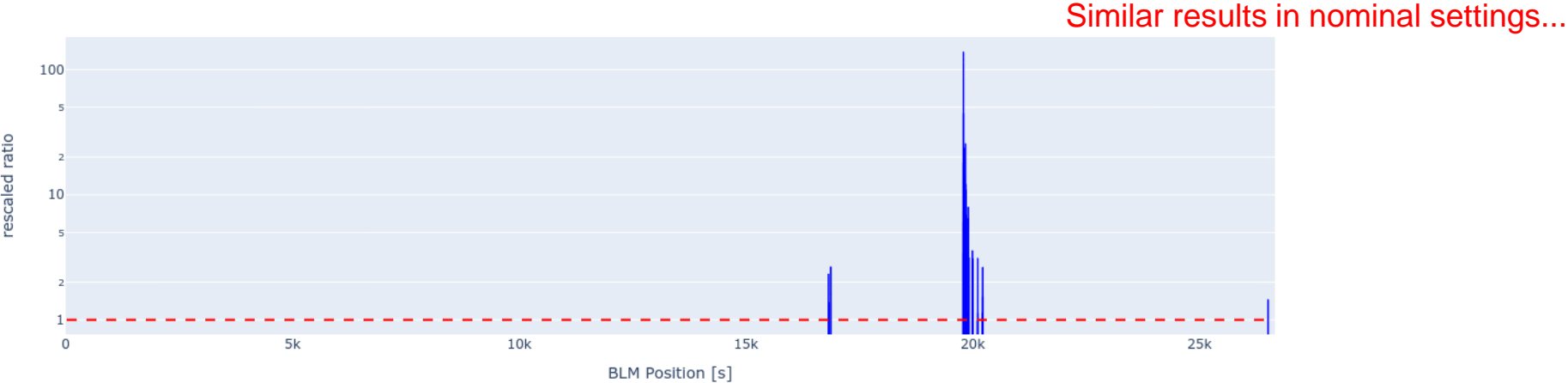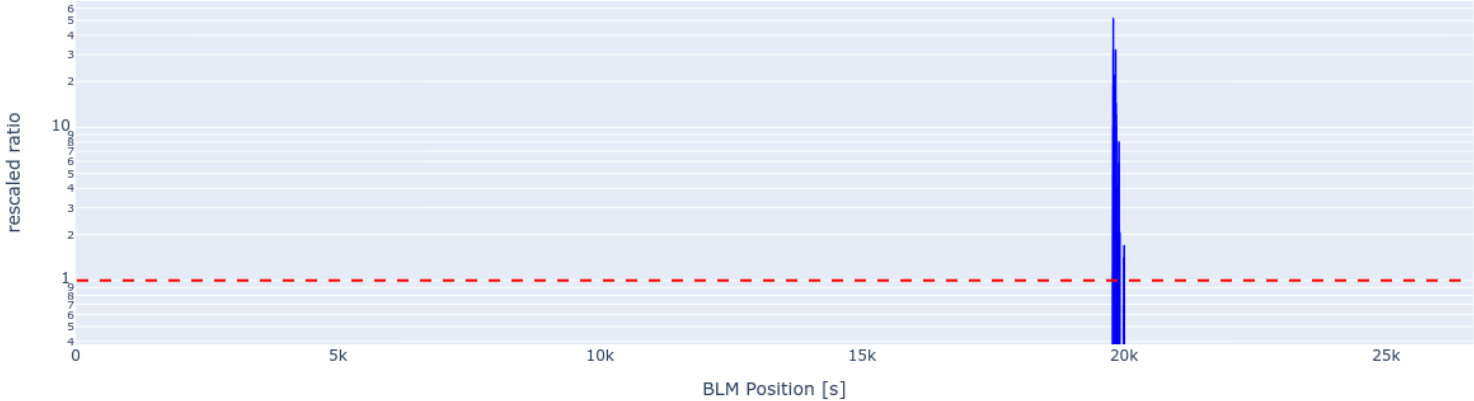

Rescaled Ratios @1200kW for BLMs in B1V Nominal, Monitor Factor Kept, RS from 4 and above

BLMs with highest signals - Relaxed settings - RS08

Horizontal Plane

	MonitorName	blm_pos	RS	MonitorFactor	OriginalTrheshold_Gys	RescaledThreshold_Gys	Signal_1200kW_Gys	NeededFactorRawThresh	NeededFactorMonitorConsidered
165	BLMTI.06L7.B2I10_TCLA.A6L7.B2	19839.37	TH_08	0.6	3.097401	5.162335	13.010981	4.200612	2.520367
162	BLMTI.06L7.B2I10_TCLA.B6L7.B2	19808.23	TH_08	0.6	3.097401	5.162335	11.734239	3.788414	2.273049
159	BLMTI.06L7.B1I10_TCP.B6L7.B1	19794.05	TH_08	0.1	2.316800	23.168000	11.713336	5.055825	0.505583
161	BLMTI.06L7.B1E10_TCP.B6L7.B1	19794.05	TH_08	0.6	1.875172	3.125286	11.281715	6.016364	3.609818
158	BLMTI.06L7.B1E10_TCP.C6L7.B1	19792.05	TH_08	0.6	1.850407	3.084012	9.360330	5.058524	3.035114
164	BLMTI.06L7.B1E10_TCSG.A6L7.B1	19833.81	TH_08	0.6	1.809823	3.016372	6.701390	3.702787	2.221672
166	BLMTI.06L7.B2I10_TCSPM.6L7.B2	19844.43	TH_08	0.6	1.389923	2.316538	5.210365	3.748672	2.249203
157	BLMTI.06L7.B1I10_TCP.C6L7.B1	19791.99	TH_08	0.1	2.316800	23.168000	4.905835	2.117505	0.211750
167	BLMTI.06L7.B2I10_TCSG.6L7.B2	19846.17	TH_08	0.6	0.881237	1.468728	3.890860	4.415228	2.649137
172	BLMTI.05L7.B2I10_TCSG.B5L7.B2	19901.04	TH_08	0.6	0.881237	1.468728	2.606150	2.957379	1.774427

Vertical Plane

	MonitorName	blm_pos	RS	MonitorFactor	OriginalTrheshold_Gys	RescaledThreshold_Gys	Signal_1200kW_Gys	NeededFactorRawThresh	NeededFactorMonitorConsidered
172	BLMTI.06L7.B1E10_TCP.C6L7.B1	19792.05	TH_08	0.6	1.850407	3.084012	18.256320	9.866109	5.919665
179	BLMTI.06L7.B2I10_TCLA.A6L7.B2	19839.37	TH_08	0.6	3.097401	5.162335	16.476604	5.319493	3.191696
173	BLMTI.06L7.B1I10_TCP.B6L7.B1	19794.05	TH_08	0.1	2.316800	23.168000	14.087533	6.080600	0.608060
175	BLMTI.06L7.B1E10_TCP.B6L7.B1	19794.05	TH_08	0.6	1.875172	3.125286	12.631246	6.736047	4.041628
176	BLMTI.06L7.B2I10_TCLA.B6L7.B2	19808.23	TH_08	0.6	3.097401	5.162335	11.492434	3.710347	2.226208
171	BLMTI.06L7.B1I10_TCP.C6L7.B1	19791.99	TH_08	0.1	2.316800	23.168000	11.012664	4.753394	0.475339
178	BLMTI.06L7.B1E10_TCSG.A6L7.B1	19833.81	TH_08	0.6	1.809823	3.016372	8.308319	4.590680	2.754408
180	BLMTI.06L7.B2I10_TCSPM.6L7.B2	19844.43	TH_08	0.6	1.389923	2.316538	6.541307	4.706237	2.823742
181	BLMTI.06L7.B2I10_TCSG.6L7.B2	19846.17	TH_08	0.6	0.881237	1.468728	4.902895	5.563654	3.338192
169	BLMTI.06L7.B1E10_TCP.D6L7.B1	19790.05	TH_08	0.6	1.850407	3.084012	4.771762	2.578763	1.547258

BLMs with highest signals - Nominal Settings - RS08

Horizontal Plane

	MonitorName	blm_pos	RS	MonitorFactor	OriginalTrheshold_Gys	RescaledThreshold_Gys	Signal_1200kW_Gys	NeededFactorRawThresh	NeededFactorMonitorConsidered
140	BLMTI.06L7.B2I10_TCLA.A6L7.B2	19839.37	TH_08	0.6	3.097401	5.162335	9.717015	3.137151	1.882291
137	BLMTI.06L7.B2I10_TCLA.B6L7.B2	19808.23	TH_08	0.6	3.097401	5.162335	8.618529	2.782503	1.669502
134	BLMTI.06L7.B1I10_TCP.B6L7.B1	19794.05	TH_08	0.1	2.316800	23.168000	7.500816	3.237576	0.323758
136	BLMTI.06L7.B1E10_TCP.B6L7.B1	19794.05	TH_08	0.6	1.875172	3.125286	7.144257	3.809921	2.285953
133	BLMTI.06L7.B1E10_TCP.C6L7.B1	19792.05	TH_08	0.6	1.850407	3.084012	5.811821	3.140833	1.884500
139	BLMTI.06L7.B1E10_TCSG.A6L7.B1	19833.81	TH_08	0.6	1.809823	3.016372	4.928150	2.723001	1.633801
141	BLMTI.06L7.B2I10_TCSPM.6L7.B2	19844.43	TH_08	0.6	1.389923	2.316538	3.870641	2.784788	1.670873
132	BLMTI.06L7.B1I10_TCP.C6L7.B1	19791.99	TH_08	0.1	2.316800	23.168000	2.988734	1.290027	0.129003
142	BLMTI.06L7.B2I10_TCSG.6L7.B2	19846.17	TH_08	0.6	0.881237	1.468728	2.874208	3.261563	1.956938
146	BLMTI.05L7.B2I10_TCSG.B5L7.B2	19901.04	TH_08	0.6	0.881237	1.468728	2.283565	2.591319	1.554791

Vertical Plane

	MonitorName	blm_pos	RS	MonitorFactor	OriginalTrheshold_Gys	RescaledThreshold_Gys	Signal_1200kW_Gys	NeededFactorRawThresh	NeededFactorMonitorConsidered
122	BLMTI.06L7.B2I10_TCLA.A6L7.B2	19839.37	TH_08	0.6	3.097401	5.162335	8.842013	2.854655	1.712793
119	BLMTI.06L7.B2I10_TCLA.B6L7.B2	19808.23	TH_08	0.6	3.097401	5.162335	6.008010	1.939694	1.163816
115	BLMTI.06L7.B1E10_TCP.C6L7.B1	19792.05	TH_08	0.6	1.850407	3.084012	5.723450	3.093076	1.855845
116	BLMTI.06L7.B1I10_TCP.B6L7.B1	19794.05	TH_08	0.1	2.316800	23.168000	4.984340	2.151390	0.215139
118	BLMTI.06L7.B1E10_TCP.B6L7.B1	19794.05	TH_08	0.6	1.875172	3.125286	4.590634	2.448114	1.468868
121	BLMTI.06L7.B1E10_TCSG.A6L7.B1	19833.81	TH_08	0.6	1.809823	3.016372	4.421445	2.443026	1.465815
123	BLMTI.06L7.B2I10_TCSPM.6L7.B2	19844.43	TH_08	0.6	1.389923	2.316538	3.554728	2.557500	1.534500
114	BLMTI.06L7.B1I10_TCP.C6L7.B1	19791.99	TH_08	0.1	2.316800	23.168000	3.504710	1.512738	0.151274
124	BLMTI.06L7.B2I10_TCSG.6L7.B2	19846.17	TH_08	0.6	0.881237	1.468728	2.676065	3.036716	1.822030
128	BLMTI.05L7.B2I10_TCSG.B5L7.B2	19901.04	TH_08	0.6	0.881237	1.468728	2.038674	2.313424	1.388054

Datasets/Notebooks/Interactive plots available @
https://cernbox.cern.ch/s/vvfD7xnjcj80BIf

(relies on Lossmaps library)