

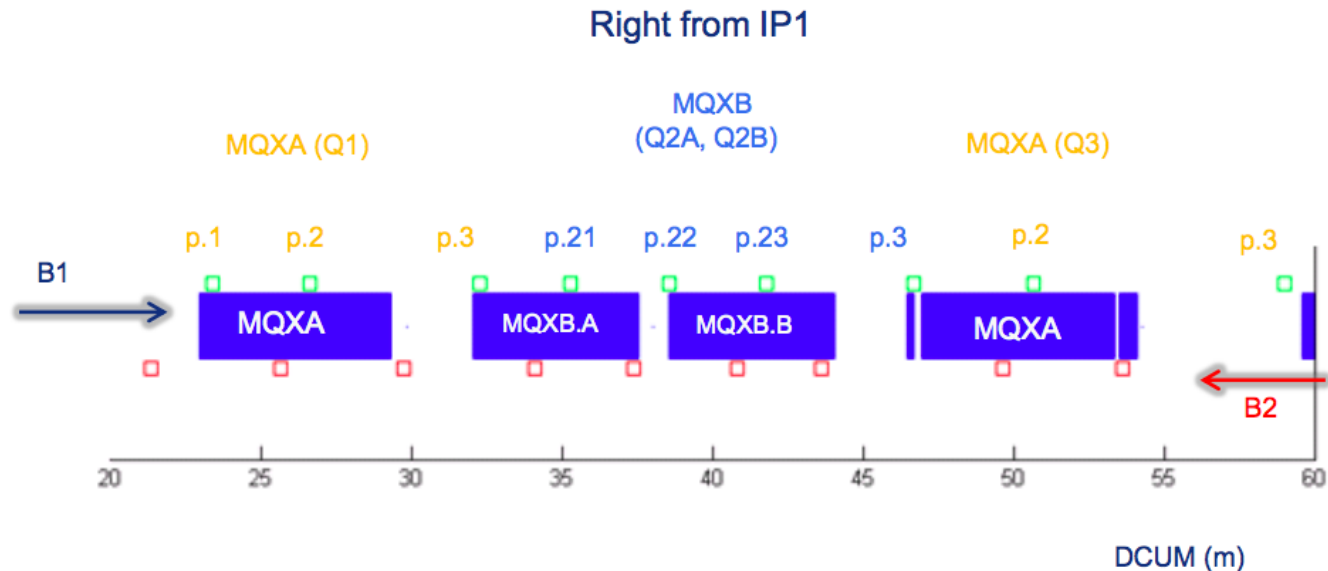
IT protection scenario

Assumption 1: Debris from pp interactions in IP will not (repeatedly) quench triplet magnets.

Assumption 2: The Q2B orbit-bump scenario is selected as a scenario for quench prevention.

In absence of well-studied scenarios s Q1 and Q3 get thresholds of the MQ-dynamic-orbit-bump scenario (with MQXA/B quench levels).

Q1 scenario should be revised for a loss-scenario on TCTs.



IT families

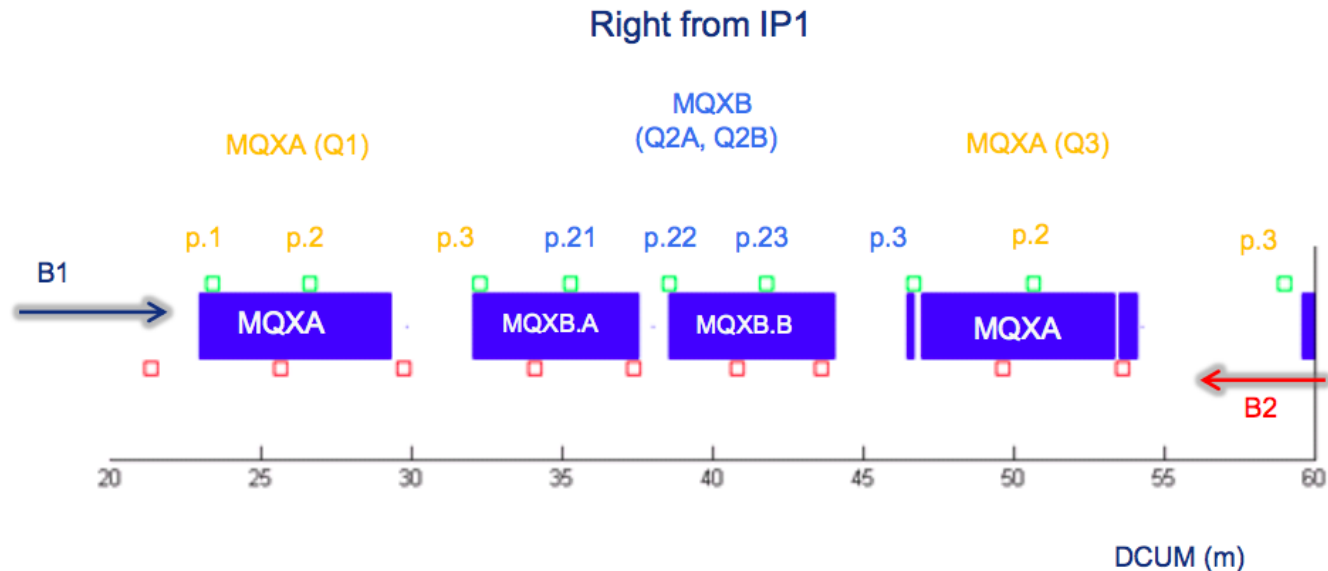
Families are split according to 9 positions.

B1 and B2 monitors are in the same family.

IPs 1 and 5 are in the same family.

IPs 2 and 8 are in the same family.

→ $2 \times 9 = 18$ families.



IT physics debris

For long RSs and at 6.5 TeV we must ensure that

1. the thresholds thus obtained do not trip on debris from nominal luminosity.
2. we do not operate permanently with monitors in warning level due to luminosity debris.

Compute PrelimAppliedThreshold and compute in every RS t of the 6.5 TeV line in the threshold table

For $t=2$ s12

 If(PhysDebris(t) > WarningLevel * PrelimAppliedThreshold(t))

 AppliedThreshold(t) = PrelimAppliedThreshold($t-1$)

 Else

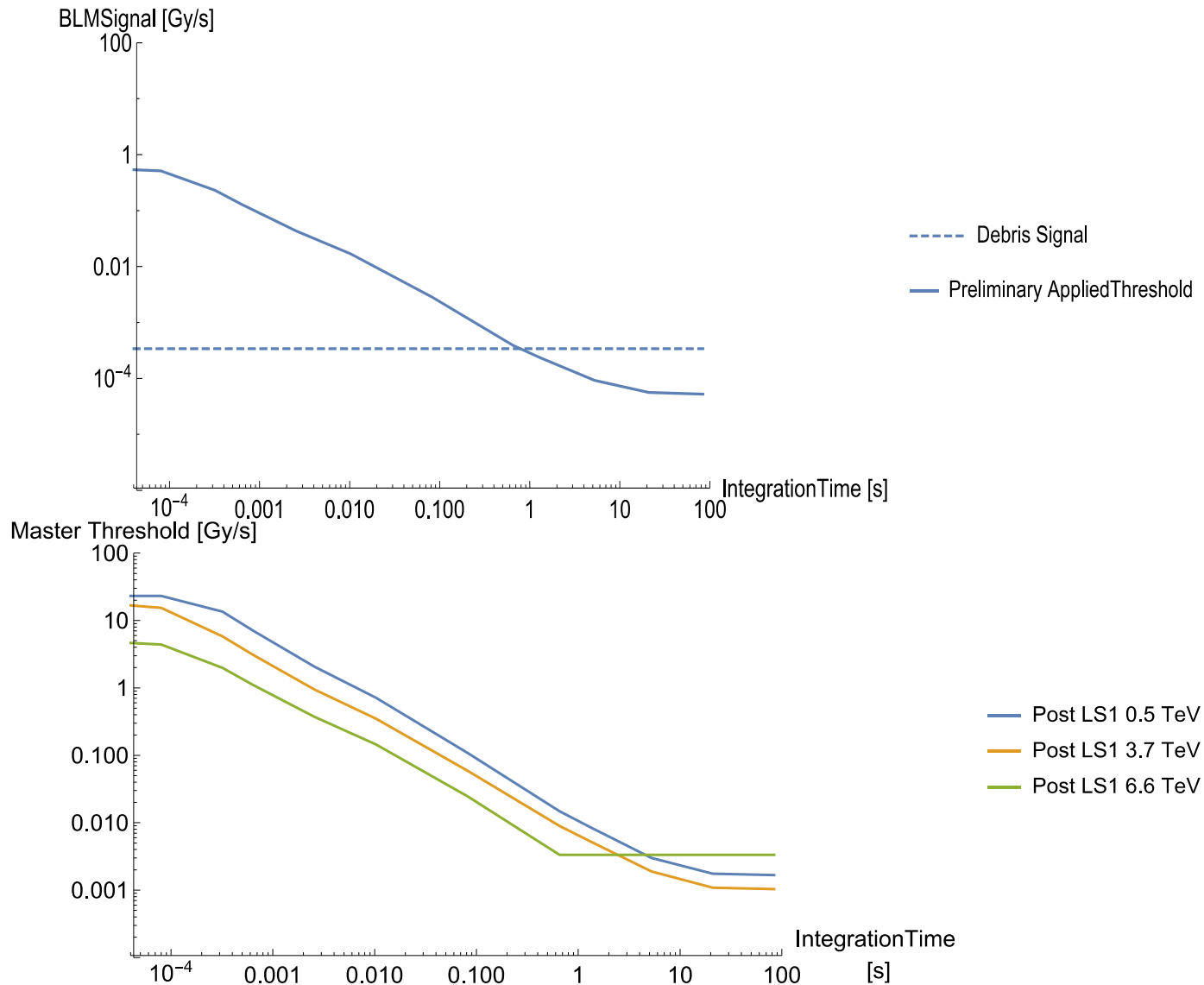
 AppliedThreshold(t) = PrelimAppliedThreshold(t)

 Endif

Endfor

In the first case s we effectively loose quench-prevention capabilities in longer RSs during squeeze and stable beams.

Example IP15 MQXB P23

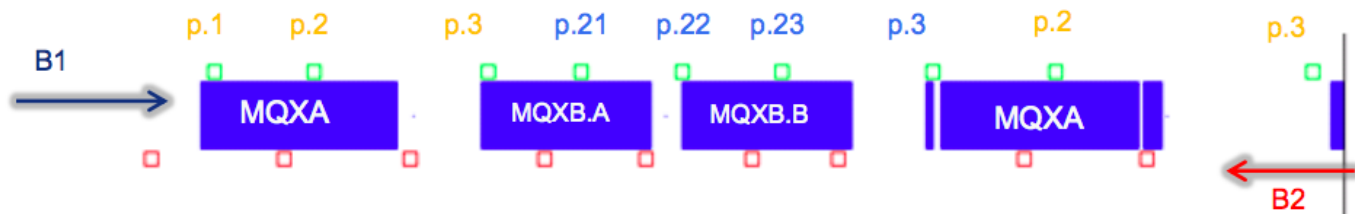


WarningLevel 30 vs 70%

To limit the impact of the warning-level on the corrections s we had proposed to increase it for IT monitors from 30 to 70%.

Family	70%	30%	Family	70%	30%
IP15 MQXA P1	11*	9	IP15 MQXB P21	10	9
IP15 MQXA P2	12	10	IP15 MQXB P22	10	9
IP15 MQXA P3	7	7	IP15 MQXB P23	8	7
IP28 MQXA P1	10	9	IP15 MQXB P3	7	7
IP28 MQXA P2	12	12	IP28 MQXB P21	12	12
IP28 MQXA P3	8	7	IP28 MQXB P22	12	12
			IP28 MQXB P23	12	12
			IP28 MQXB P3	12	12

* ... at limit to 10.



Integration times

RS1 0.00004 s
RS2 0.00008 s
RS3 0.00032 s
RS4 0.00064 s
RS5 0.00256 s
RS6 0.01024 s
RS7 0.08192 s
RS8 0.65536 s
RS9 1.31072 s
RS10 5.24288 s
RS11 20.9715 s
RS12 83.8861 s