



BLM response simulations for the HL-LHC triplet

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Outline

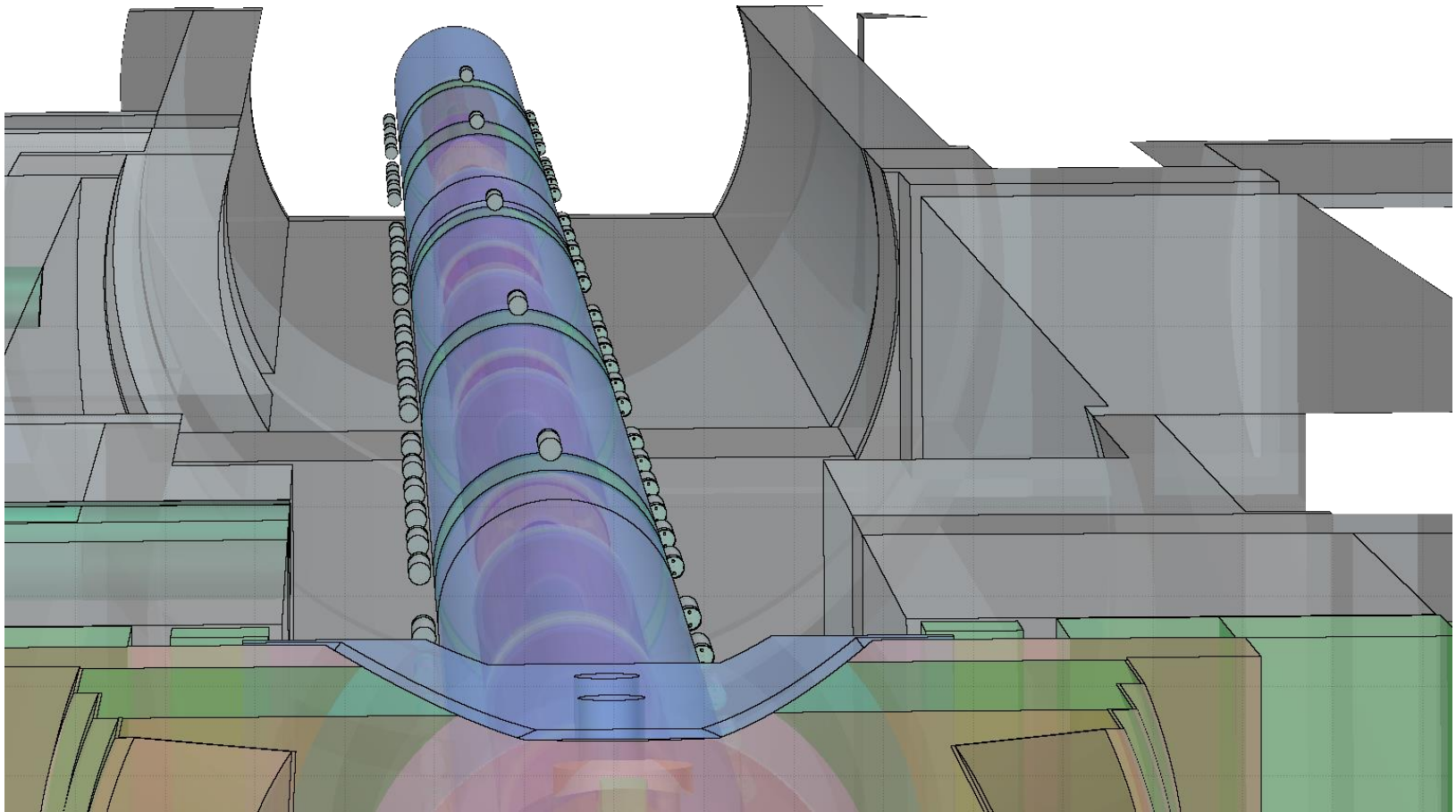
- Layout and optics
- Results (collision debris)
 - Peak power density in coils
 - BLM response
 - “cryoBLM” response
- Results from loss scenario (see previous talk) and comparison



Layout and optics

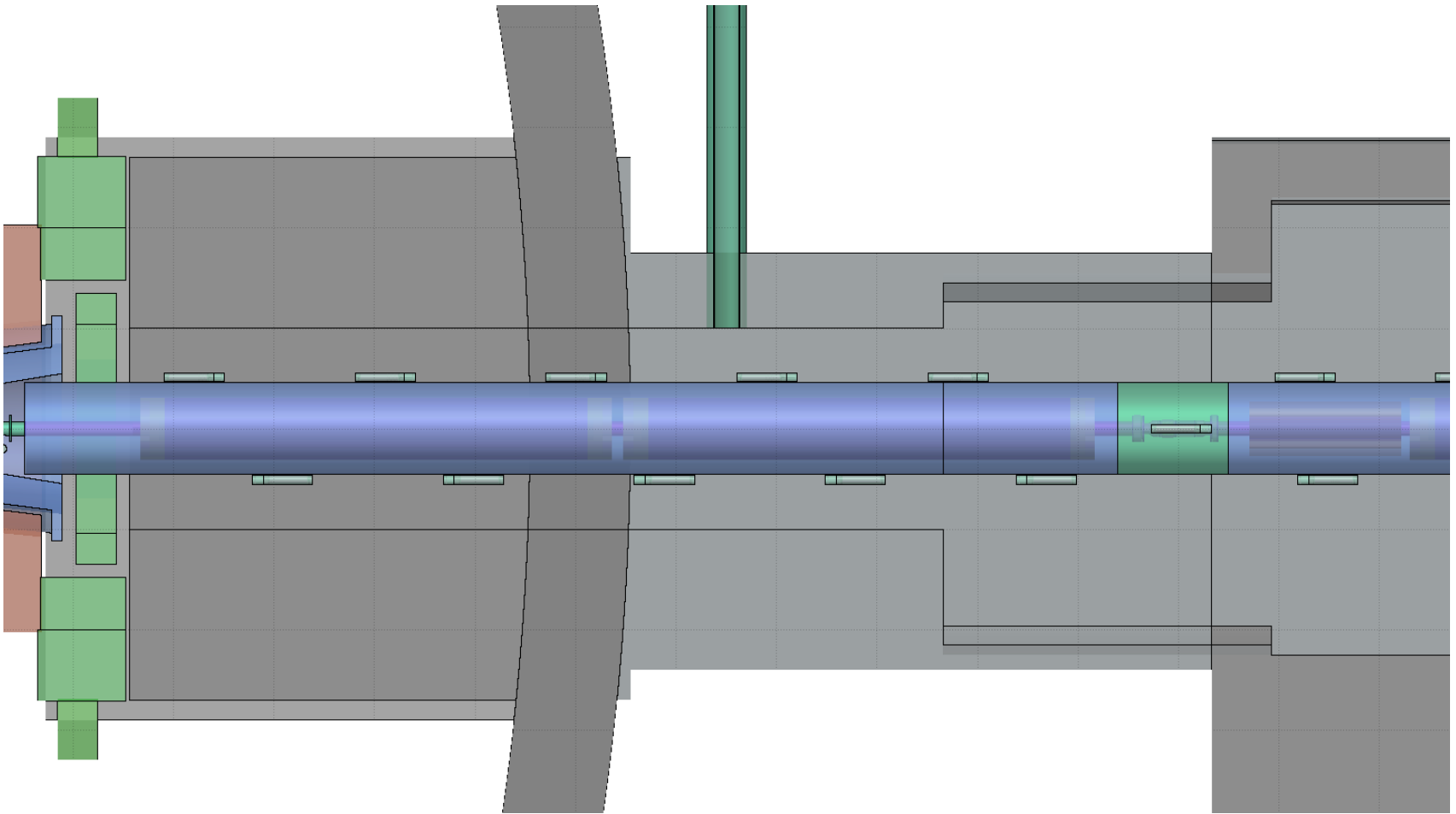
Simulated geometry (triplet-D1)

- HL-LHC V1.3 (255 μ rad half crossing angle, $\beta^*=20$ cm)



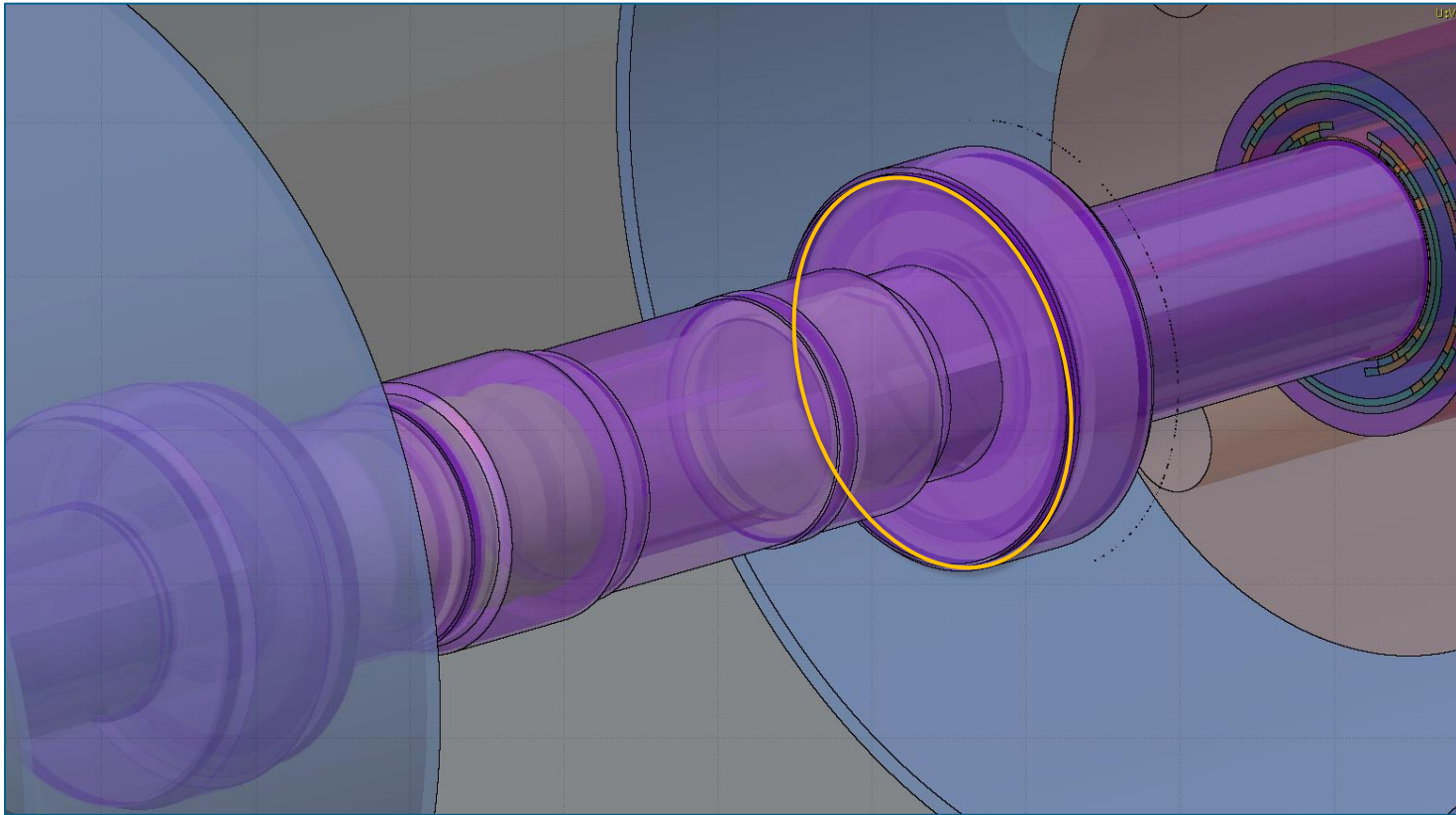
Simulated geometry (triplet-D1)

- Several BLMs placed to obtain a finer-grained information



Scoring for cryoBLMs

- Additional scoring added on the interconnect flanges

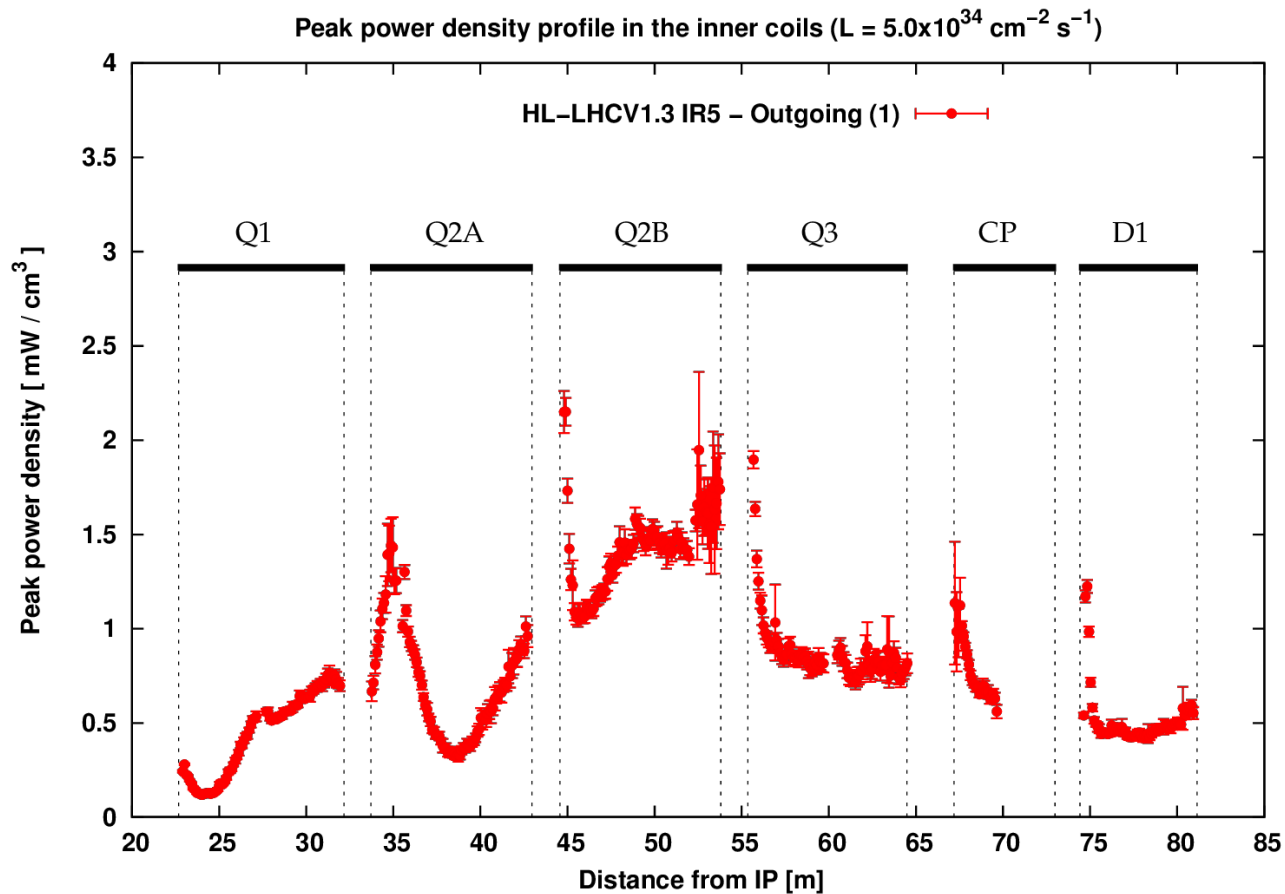




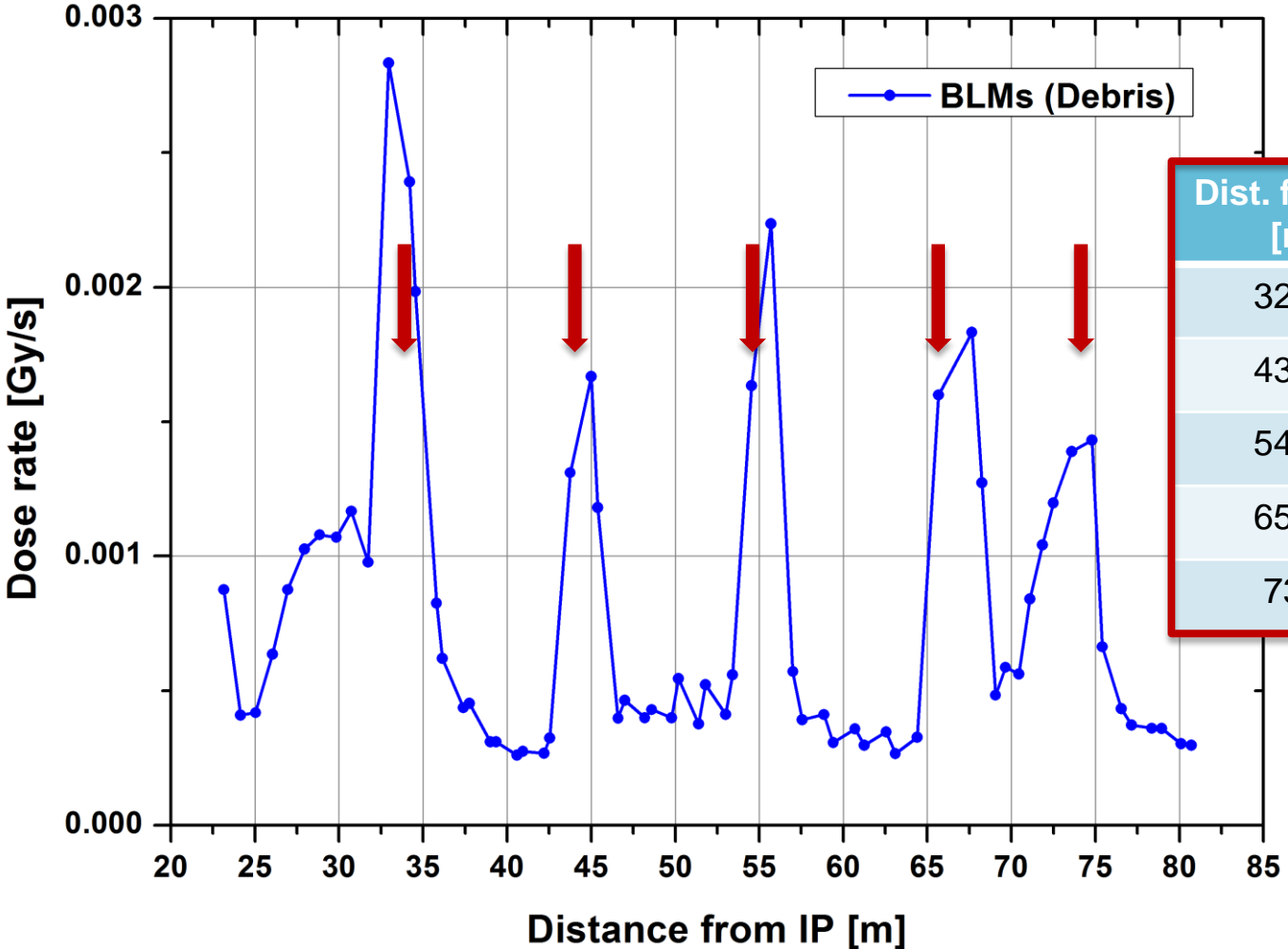
Results

Collision debris

Triplet-D1: Peak power density profile (Debris, $L=5.0 \times 10^{34} \text{ cm}^{-2} \text{ s}^{-1}$)



BLM response to collision debris



Dist. from IP [m]	Min. [Gy/s]	Max. [Gy/s]
32.97	0.018	0.028
43.75	0.021	0.064
54.55	0.026	0.065
65.67	0.019	0.039
73.6	0.019	0.032

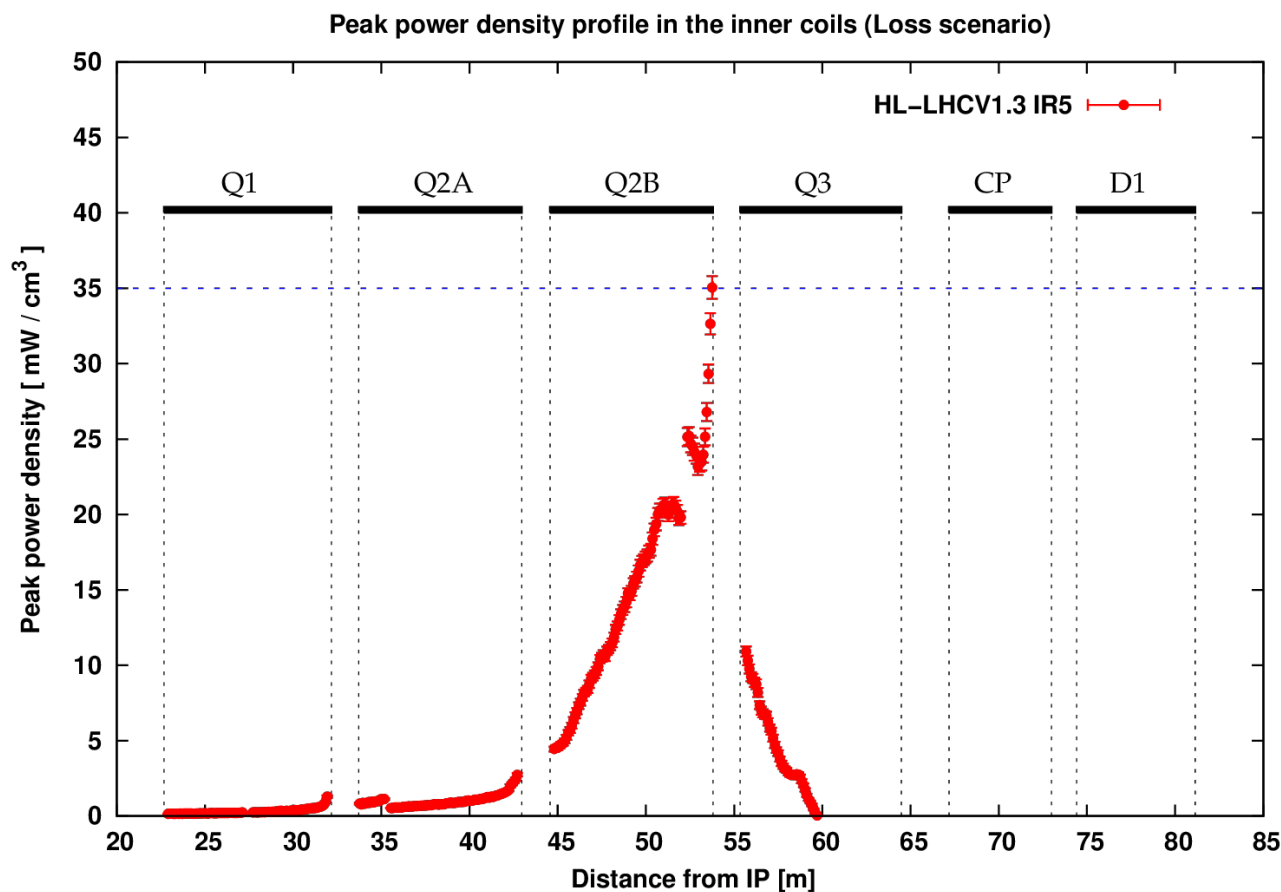


Results

Accidental triplet losses

See previous talk by BE/ABP

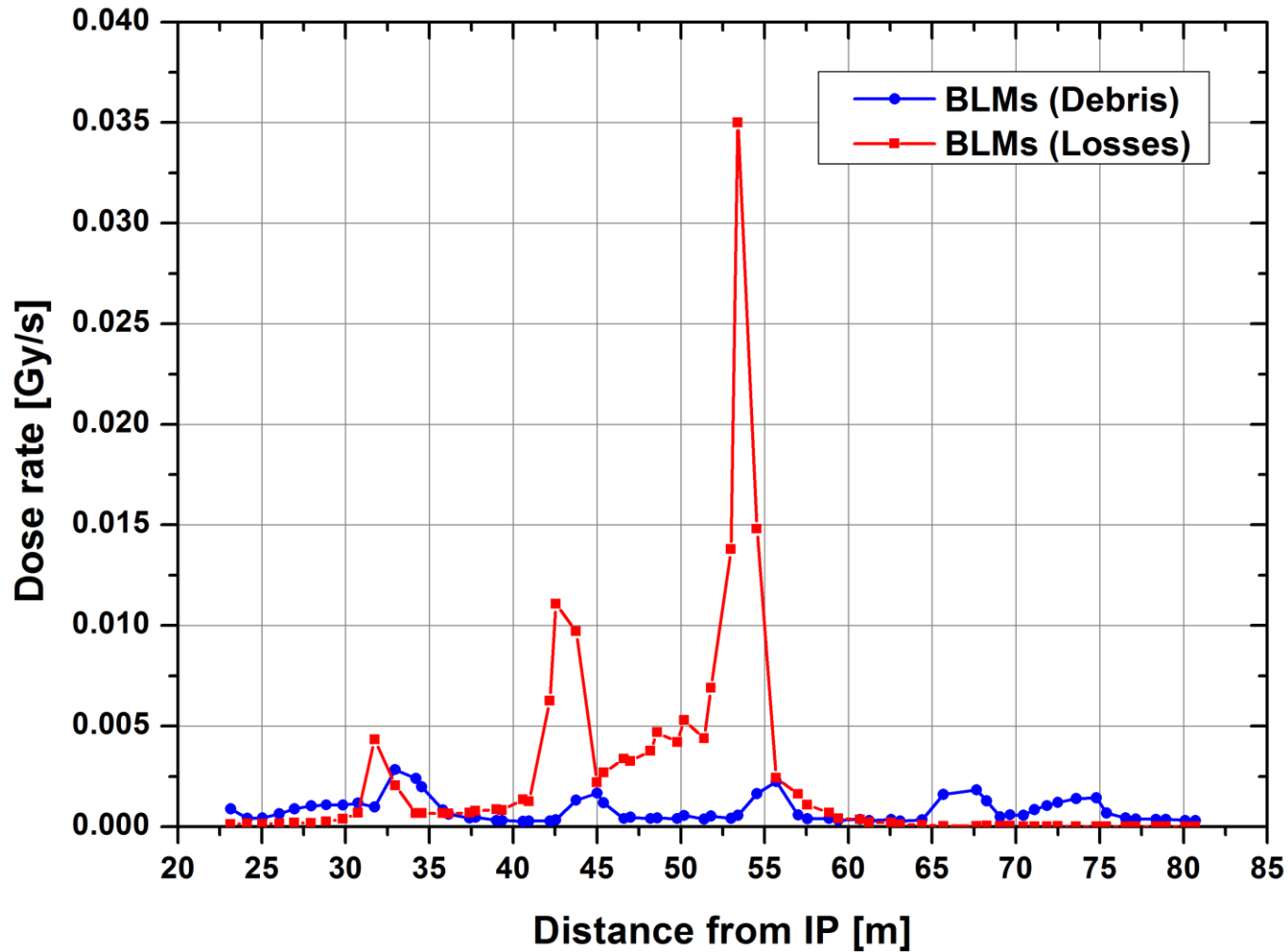
Triplet-D1: Peak power density profile (Losses, normalised to 35mW/cm³ quench limit)



*
*To be checked for
the MCBX corrector!*

- Corresponds to 4.1×10^9 p/s lost locally \rightarrow 7.36×10^{13} p/s global loss rate
- A few seconds of beam life-time
- ~80 MW of power lost

BLM response: debris vs. losses comparison



"cryoBLM" response: debris vs. losses comparison

