



Wire compensator in IR1: radiation levels and impact on the machine

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With input from A. Bertarelli and L. Gentini



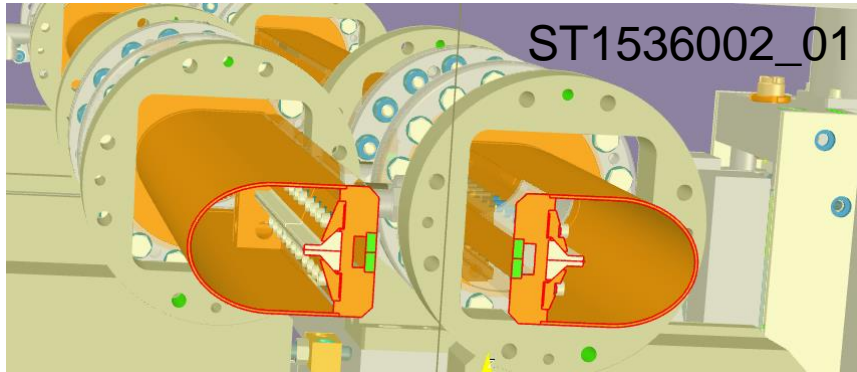
WP10 Energy deposition & R2E

Overview

- HL-LHC: IR1 – right side.
- Optics v1.5 Nov.19.
- Horizontal crossing with a half crossing angle of $250 \mu\text{rad}$ towards the external side of the ring.
- $\beta^* = 15 \text{ cm}$
- Collision at IP1 considering 7 TeV per proton beam.

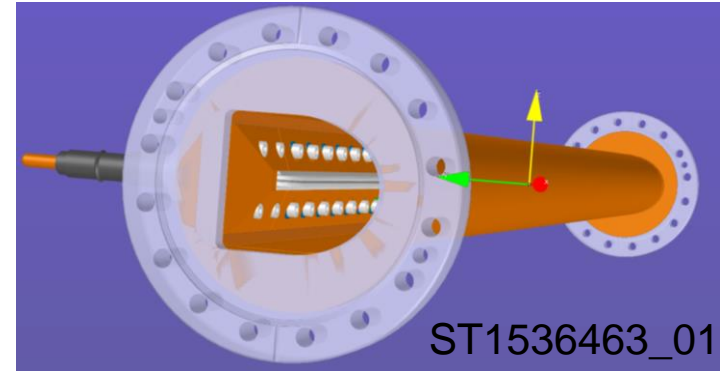
- Inclusion of the wire compensator model in the tunnel file:
 - Dose levels and energy deposition.

Geometry model

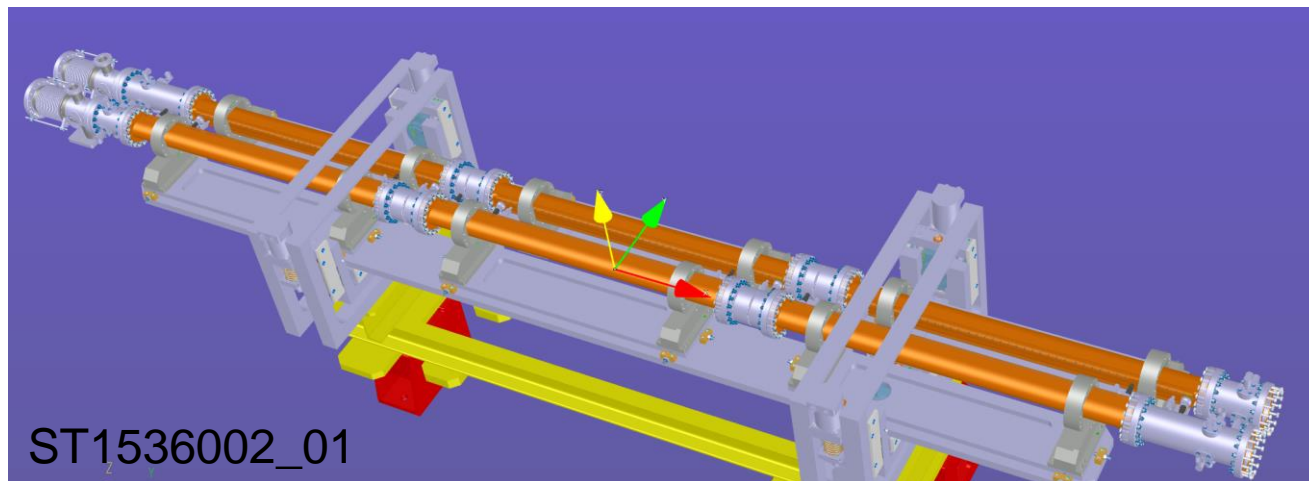


Incoming beam

Outgoing beam



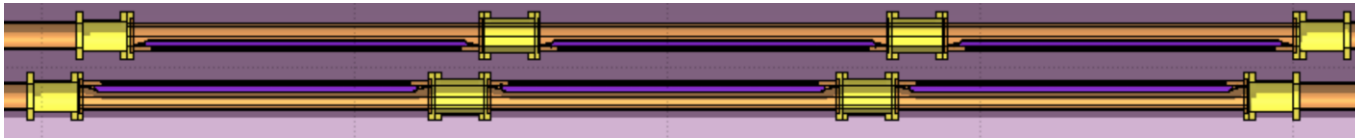
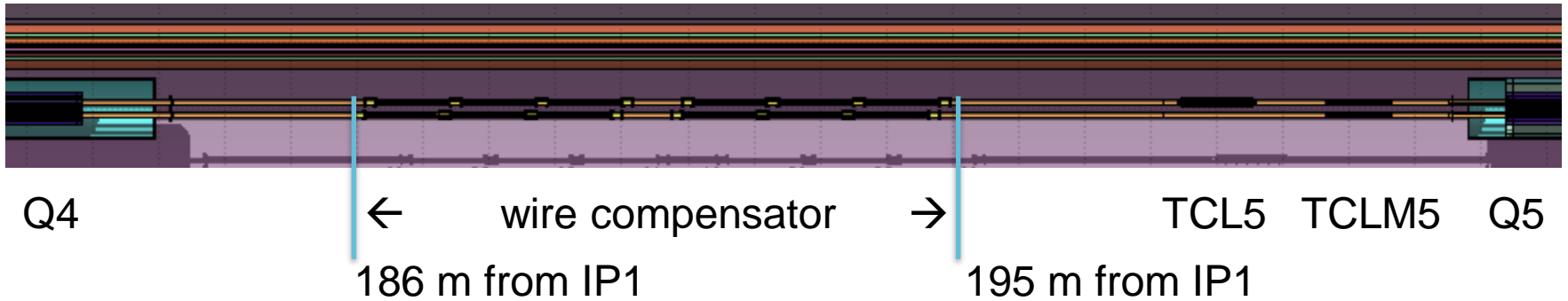
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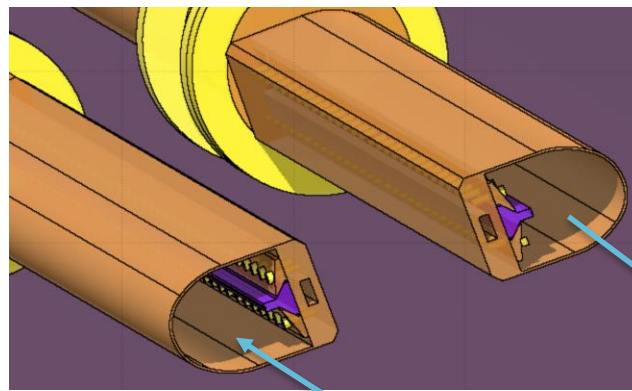
March 2022

Geometry model: implementation in FLUKA



2 modules of 3 compensators in each beam line.

Distance from the wire to the center of the vacuum chamber: 15 mm

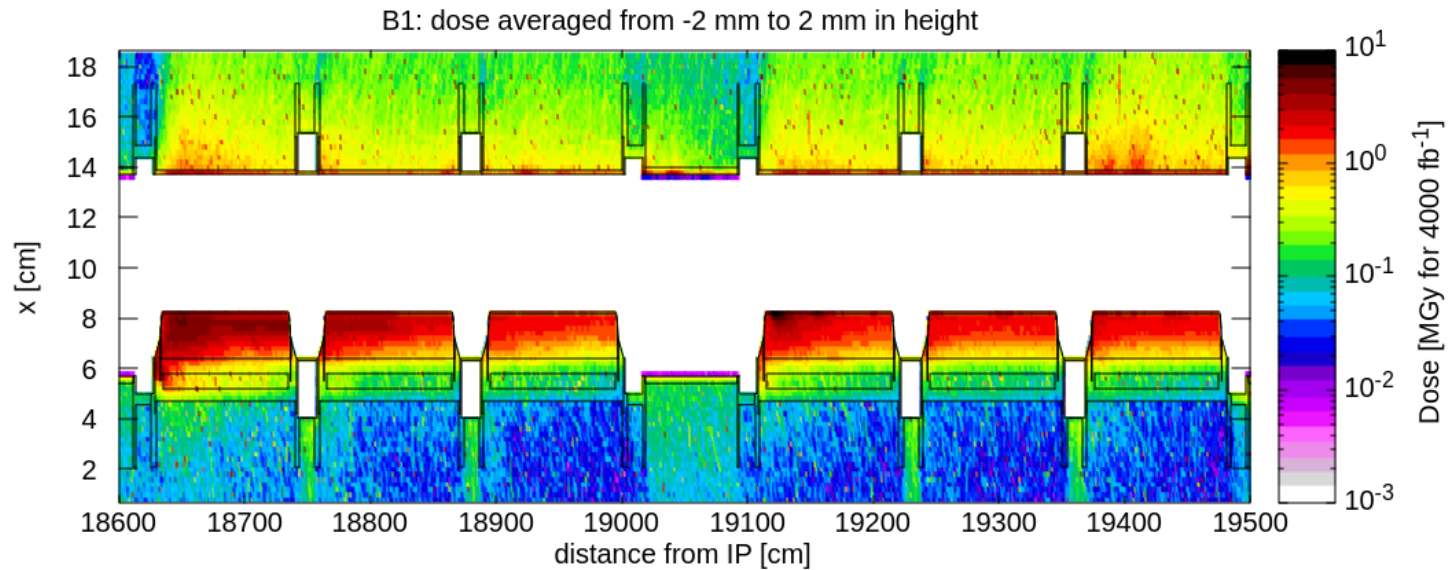


Incoming beam

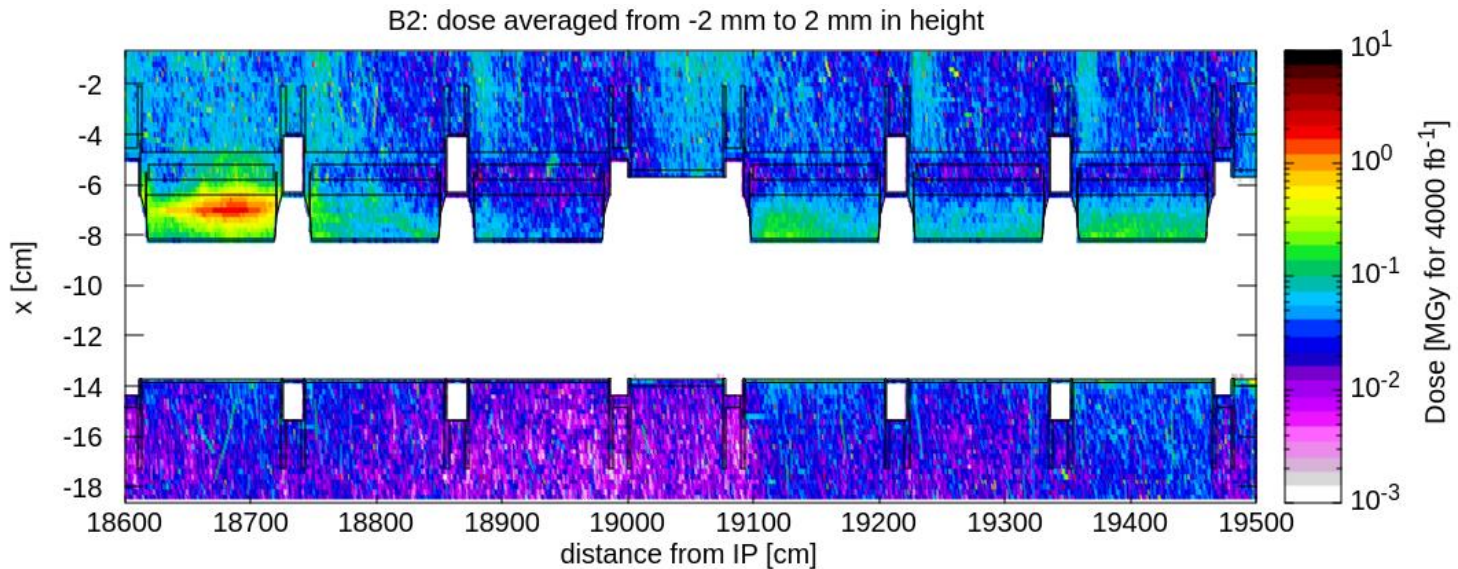
Outgoing beam

Dose levels in the wire compensator

Outgoing
beam



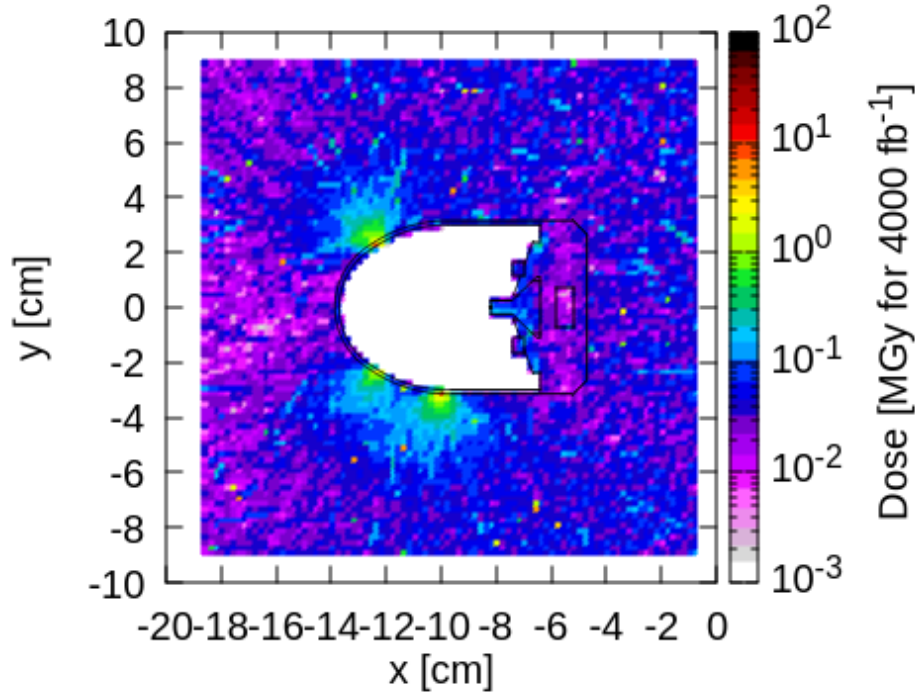
Incoming
beam



Dose levels in wire compensator at peak

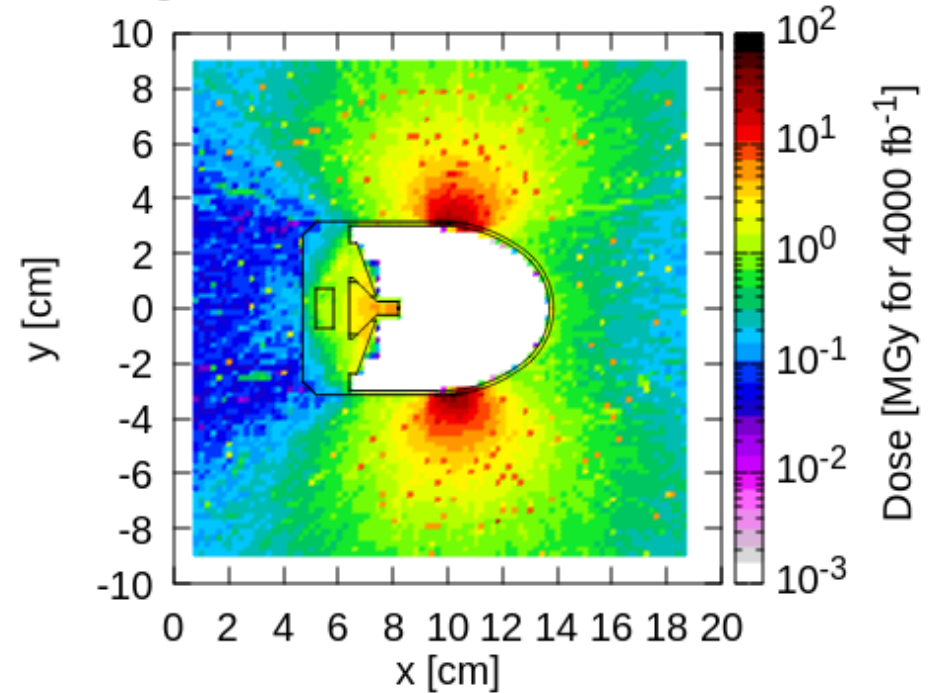
B2: dose at maximum

averaged from 191.05 m to 191.06 m from IP



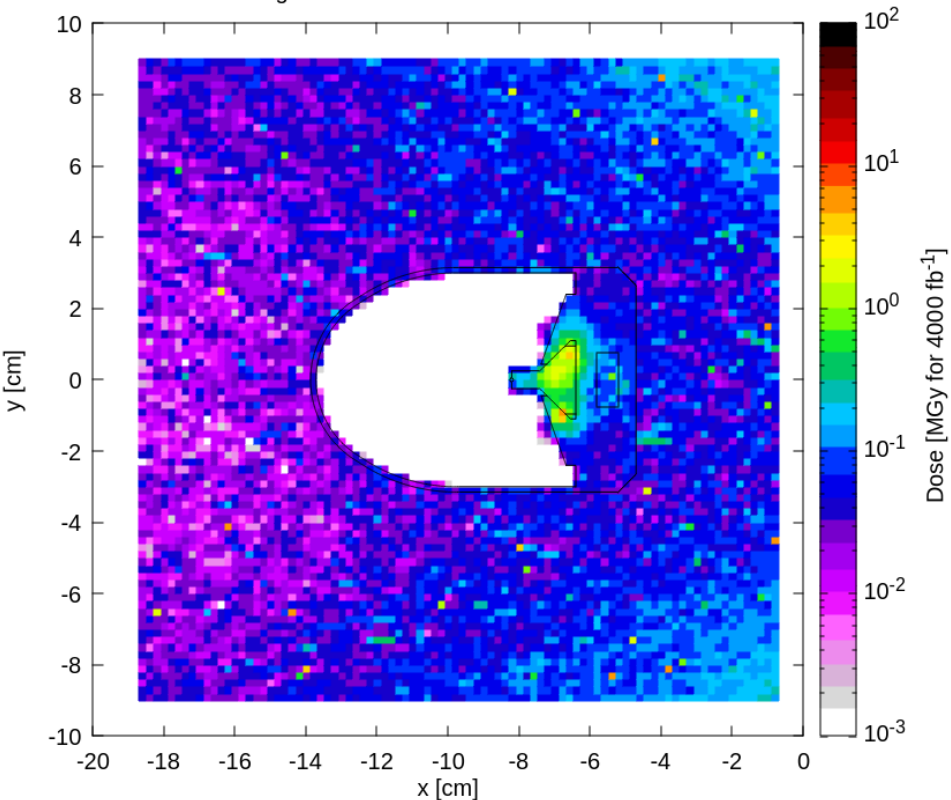
B1: dose at maximum

averaged from 186.43 m to 186.44 m from IP

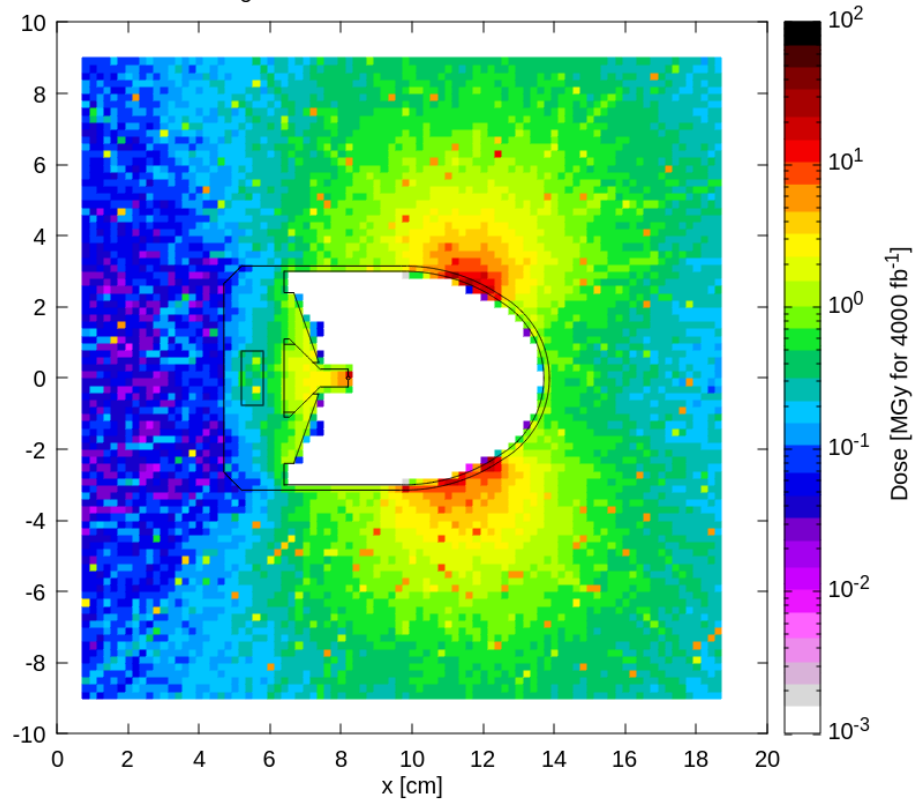


Dose levels in wire compensator at peak in the wire

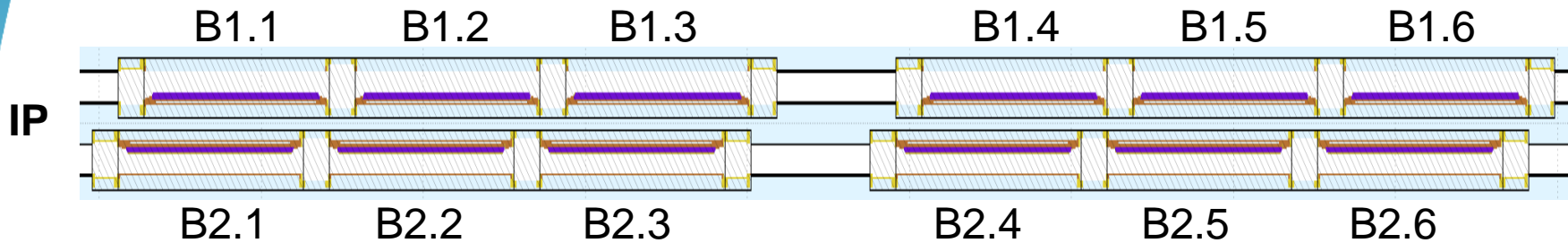
B2: dose at maximum
averaged from 186.74 m to 186.75 m from IP



B1: dose at maximum
averaged from 191.22 m to 191.23 m from IP



Energy deposition in the wire compensator



Total power in the Mo wire (W) for 7.5 Lo						
	.1	.2	.3	.4	.5	.6
B1	0.6×10^{-3}	0.4×10^{-3}	0.3×10^{-3}	1.2×10^{-3}	0.4×10^{-3}	0.4×10^{-3}
B2	24×10^{-4}	14×10^{-6}	6×10^{-6}	23×10^{-6}	15×10^{-6}	24×10^{-6}

Total power in the full compensator (W) for 7.5 Lo						
	.1	.2	.3	.4	.5	.6
B1	0.4	0.2	0.2	0.3	0.2	0.3
B2	0.04	0.02	0.01	0.02	0.02	0.02

Thank you for your attention