



**High
Luminosity
LHC**

**Additional
Q5 in IR6**

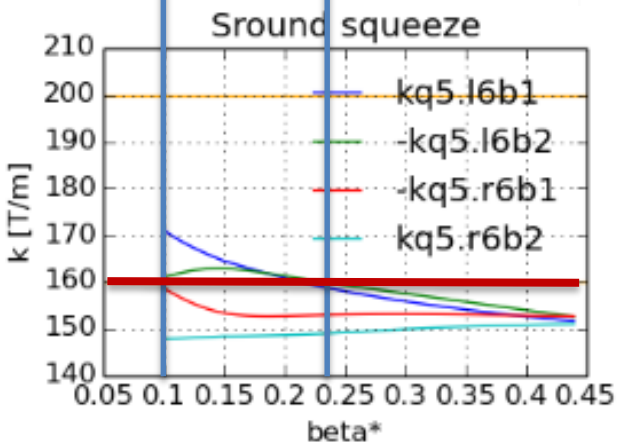
**G. Arduini, R. De Maria, M. Giovannozzi with input from
S. Fartoukh, M. Korostelev, Y. Uythoven.**

Motivation

- HL-LHC needs IR6 optics transitions to reach in IP5 the minimum β^* allowed by the triplet apertures.
- With the ATS scheme and a β^* target of 15/15 cm or 30/7.5 cm, IR6 needs to reduce β^* in Point 5 up to a factor 4x, 4x or 2x, 8x ($\beta^*_{PRE} = 50-60$ cm).
- The present Q5 (MQY 160T/m) in IR6 limits the β^* reduction factor to about 2x and therefore β^* to about 25-30 cm.
- The 12th PLC approved doubling the MQY to meet β^* targets. MQY@1.9K option discarded because more expensive.
- The IR6 optics needs to be fully validated for HL-LHC and LHC in case of a change in LS2.

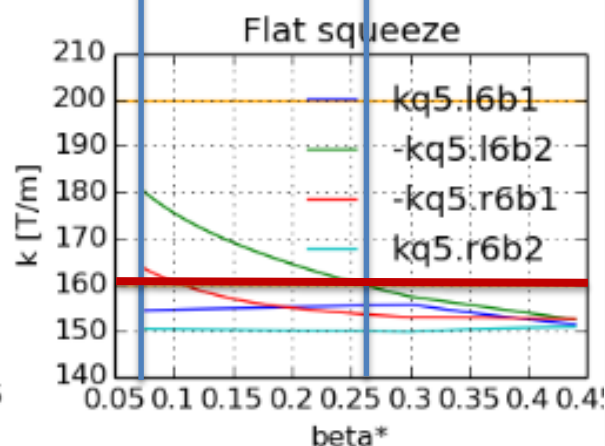
4.4x, 4.4x

1.9x, 1.9x



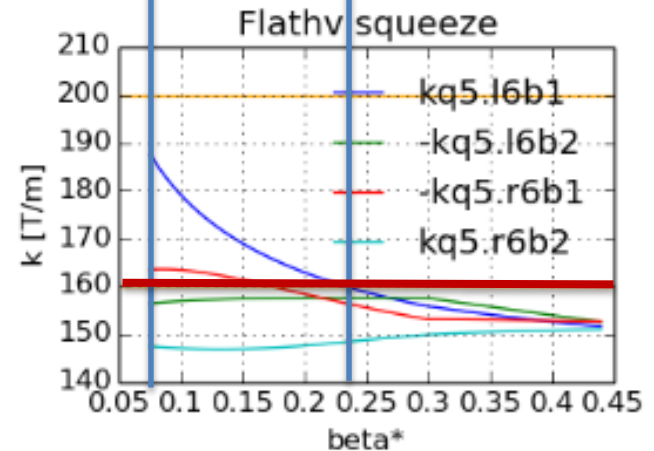
5.9x, 1.5x

1.7x, 1.5x



1.5x, 5.9x

1.5x, 1.9x



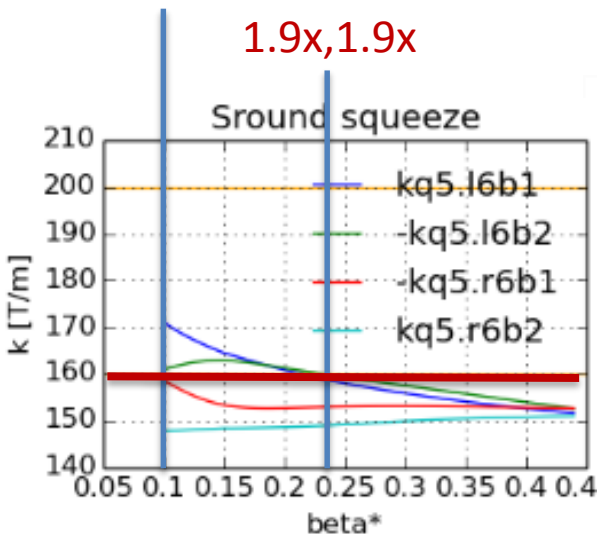
Plots based on HLLHC V1.1 layout and $\beta^*_{PRE} = 44$ cm

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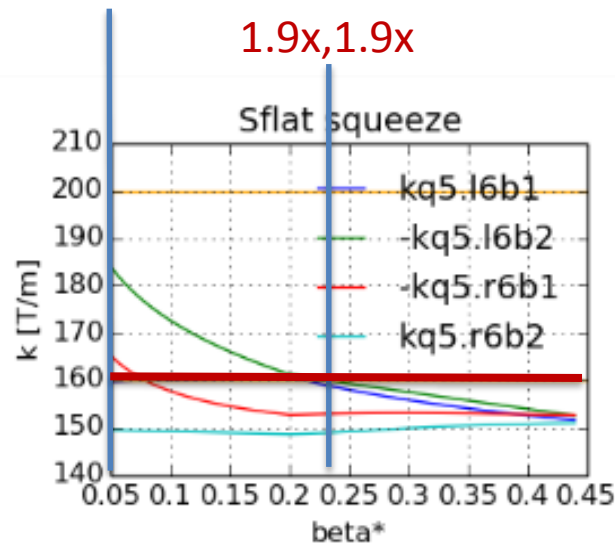
4.4x, 4.4x

1.9x, 1.9x



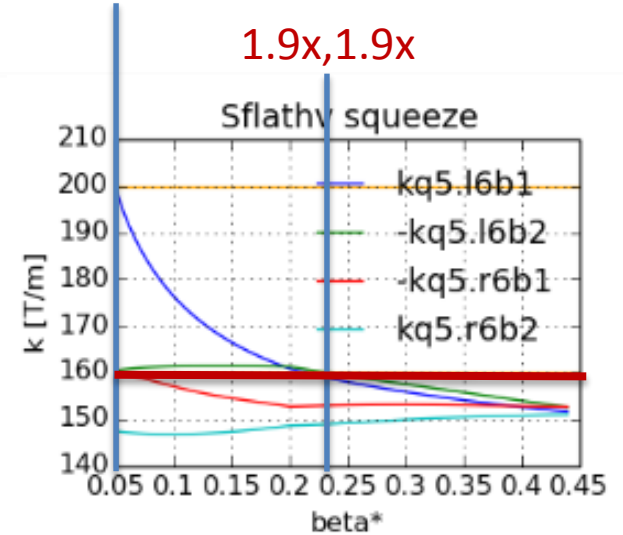
8.8x, 2.2x

1.9x, 1.9x



2.2x, 8.8x

1.9x, 1.9x



Plots based on HLLHCv1.1 layout and $\beta^*_{PRE} = 44$ cm.