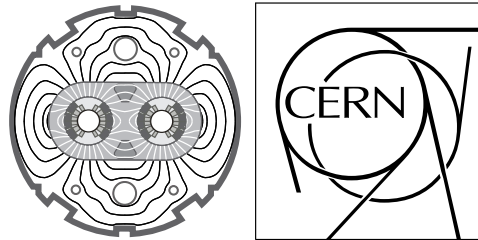


Betatron Cleaning in IR3

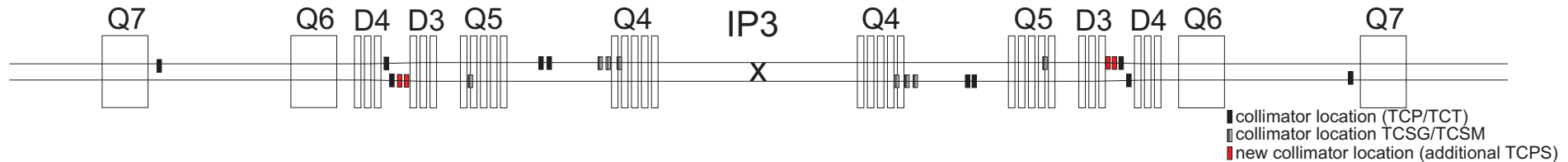
Collimation Working Group Meeting 22.04.2008

R. Assmann, C. Bracco, V. Previtalli, S. Redaelli, Th. Weiler

Accelerator and Beam Department, CERN

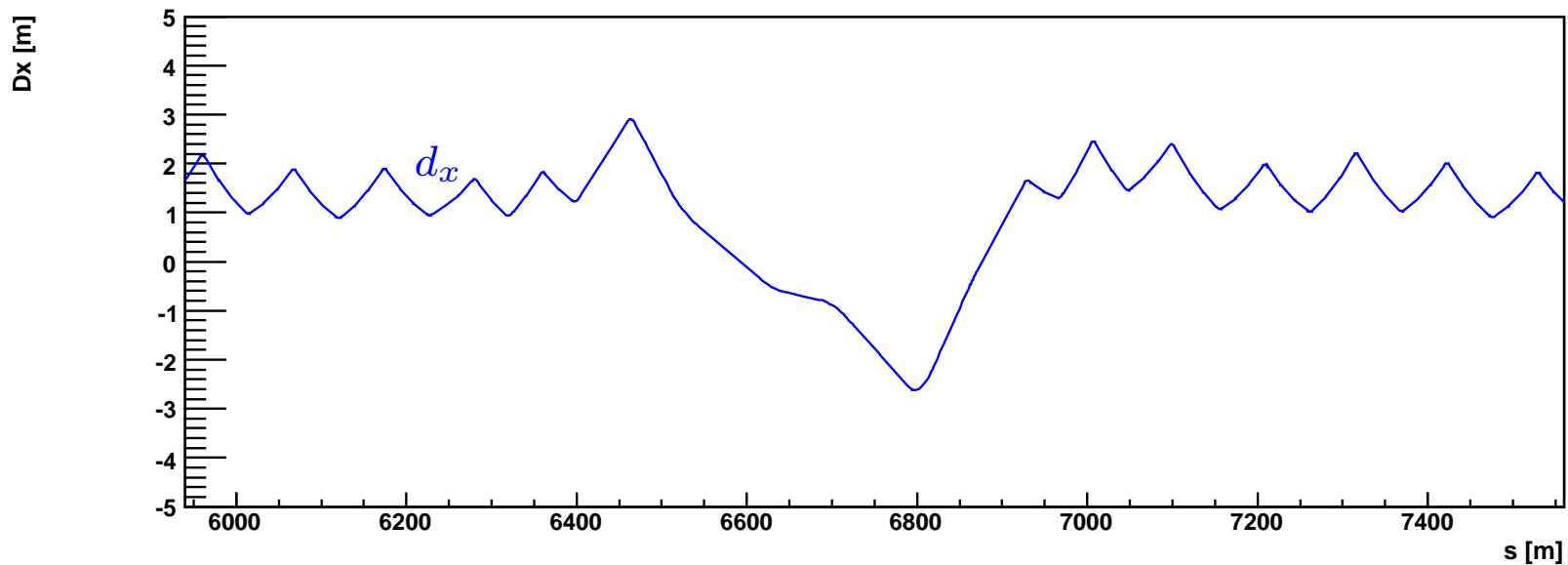
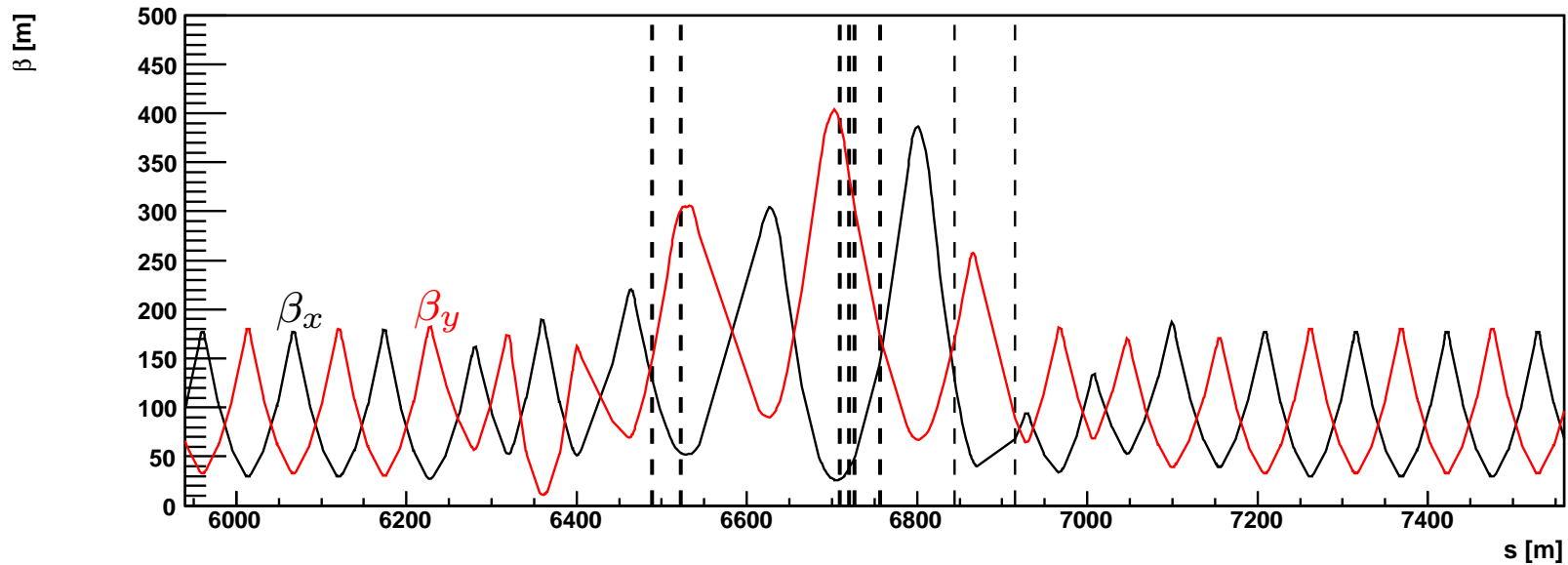


IR3 Layout

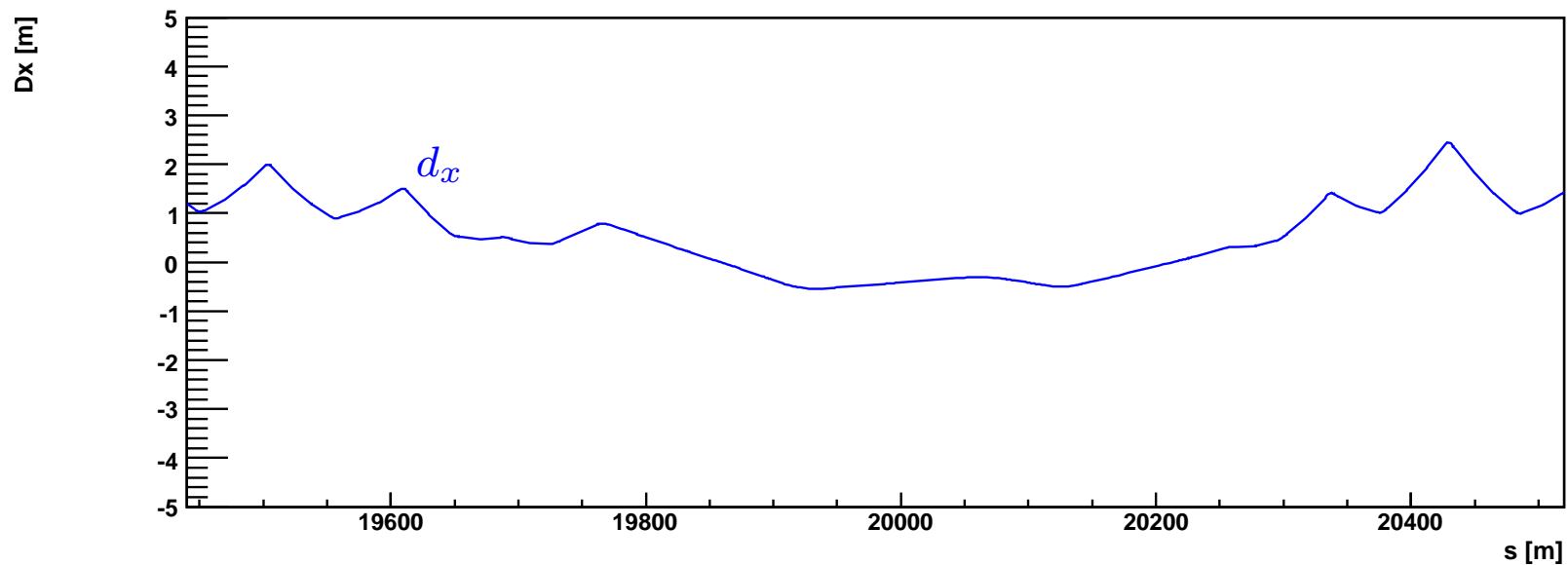
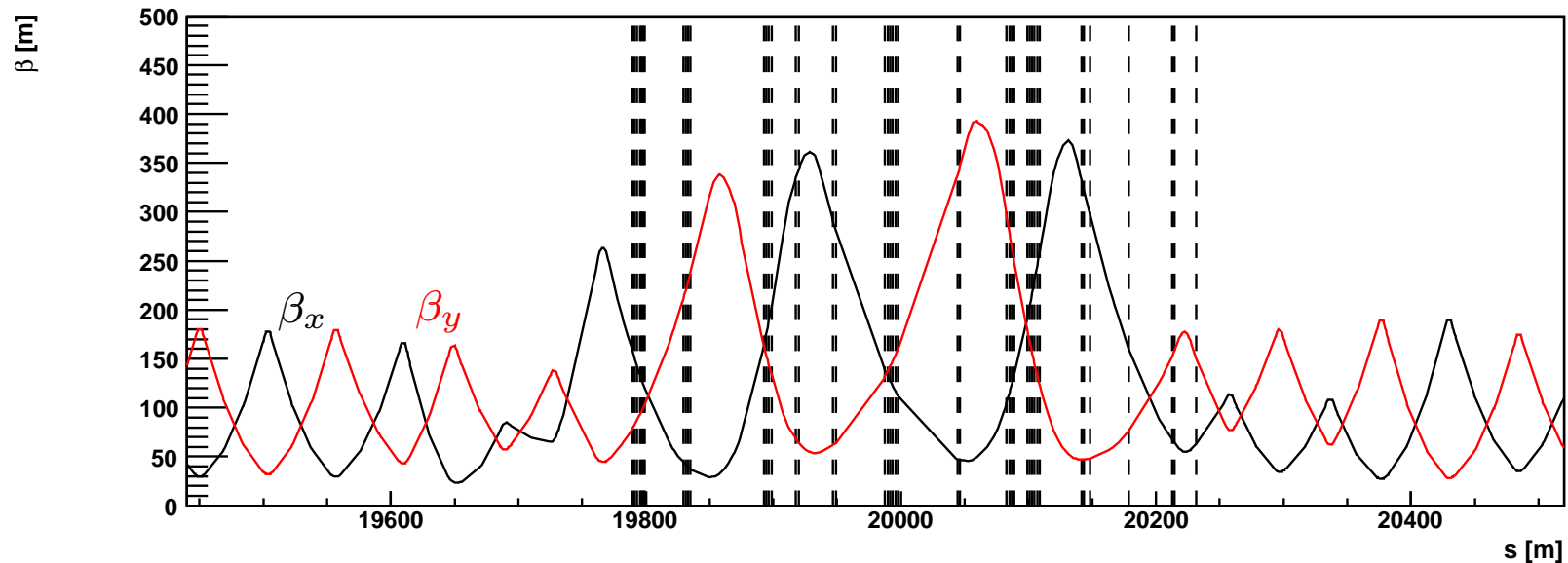


- installed collimators per beam: 1 TCP, 4 TCSG and 4 TCT
- reserved locations per beam: 1 scraper and 4 TCSM
- reuse TCSM location for secondary vertical/skew collimators (carbon jaws), place vertical primary at location of scraper and if needed assign new location for skew primary.

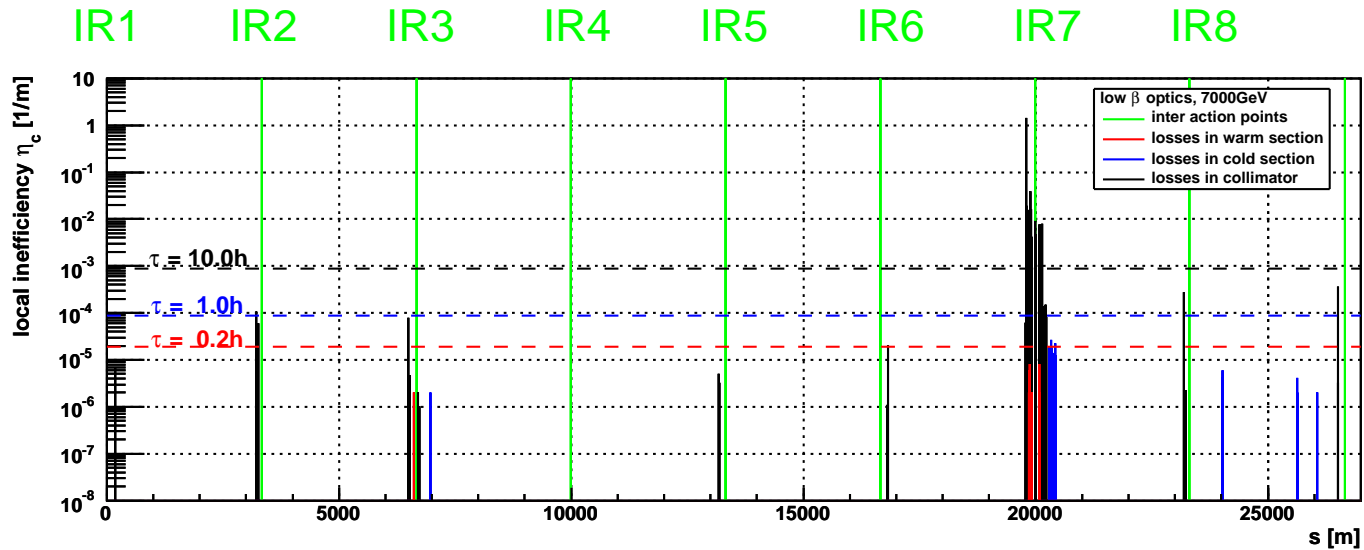
IR3 Optics Layout



For Comparison IR7

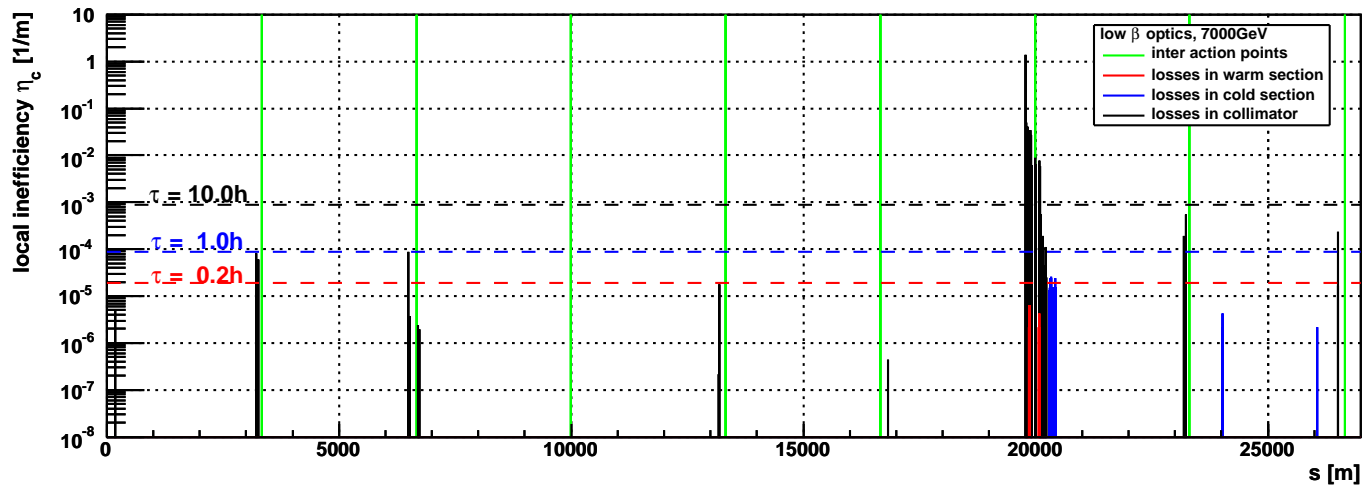


System Performance (Phase1)



beam 1

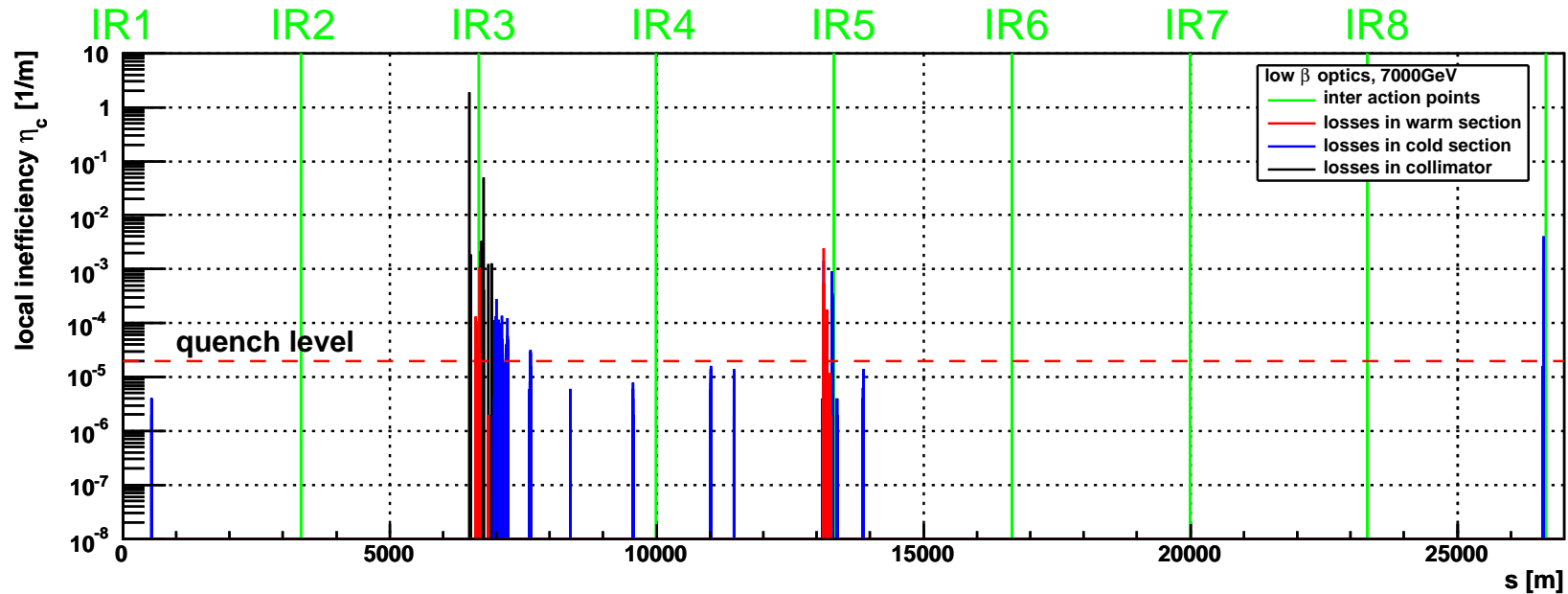
- 7 TeV
- horizontal betatron halo
- standard settings
- ideal machine



beam 1

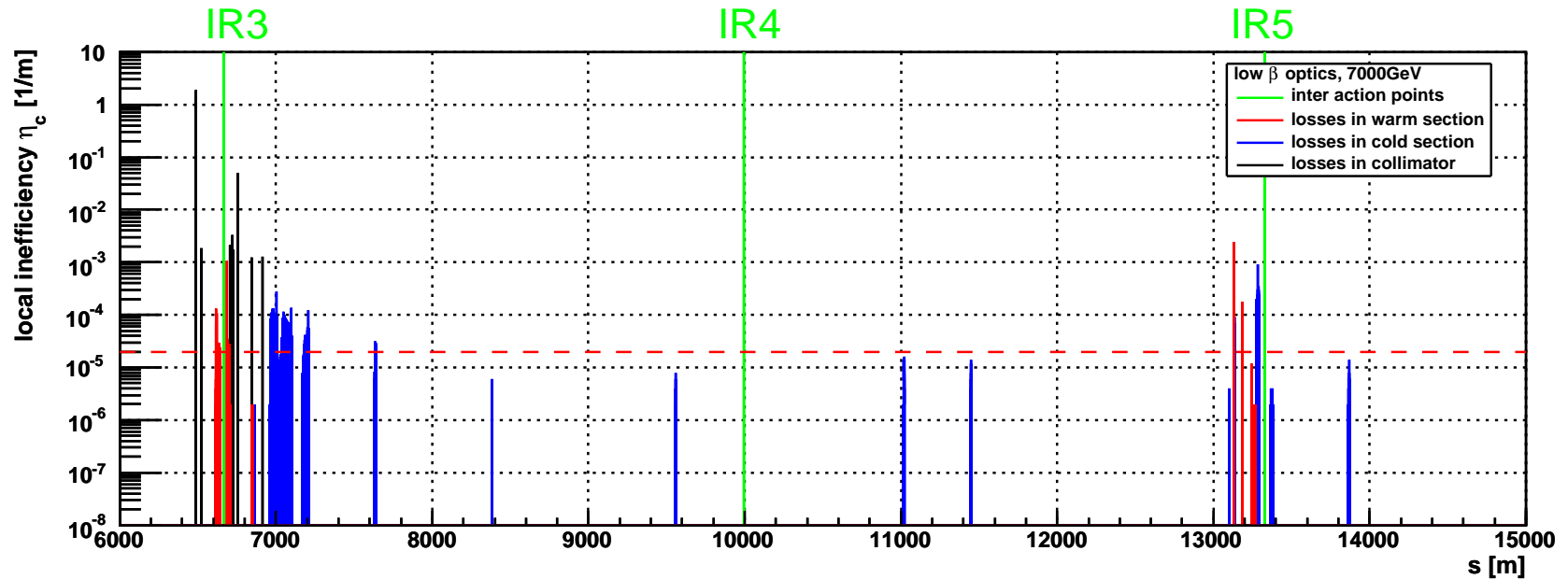
- 7 TeV
- vertical betatron halo
- standard settings
- ideal machine

Scenario 0



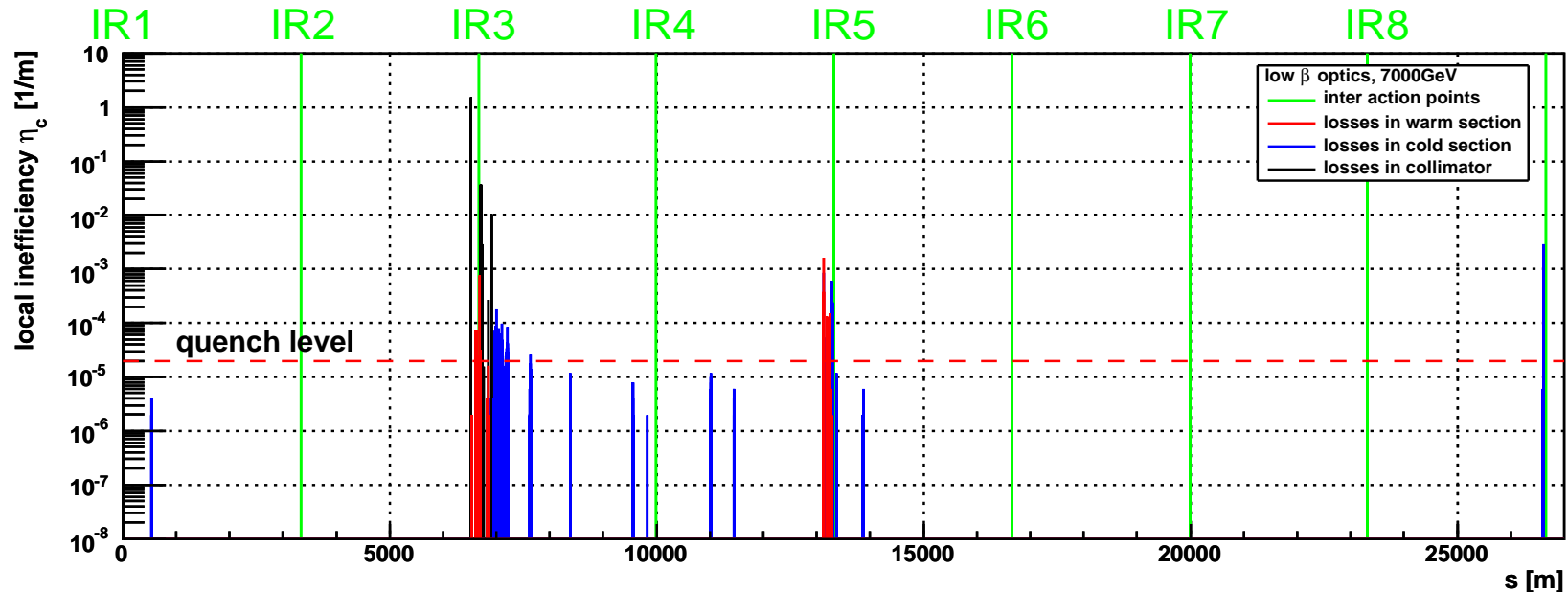
- standard IP3 settings for horizontal collimators, one additional vertical primary at \approx scraper location
- optics: $\beta^* = 0.55$ m in IP1/5 and $\beta^* = 10.0$ m in IP2/8
- $\eta_{local} = 3 \times 10^{-4} \text{ m}^{-1}$ (neglecting peak in experimental insertions \rightarrow TCT not used sofar)

Scenario 0



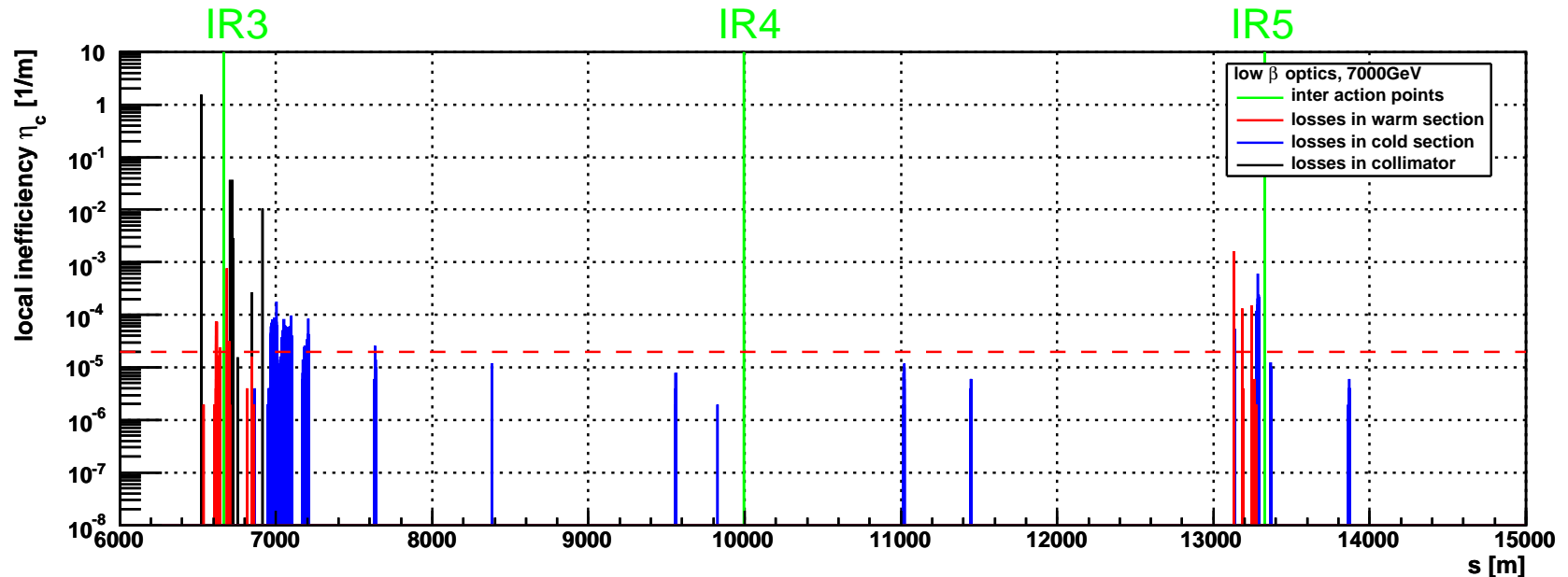
- standard IP3 settings for horizontal collimators, one additional vertical primary at \approx scraper location
- optics: $\beta^* = 0.55$ m in IP1/5 and $\beta^* = 10.0$ m in IP2/8
- $\eta_{local} = 3 \times 10^{-4} \text{ m}^{-1}$ (neglecting peak in experimental insertions \rightarrow TCT not used sofar)

Scenario 1



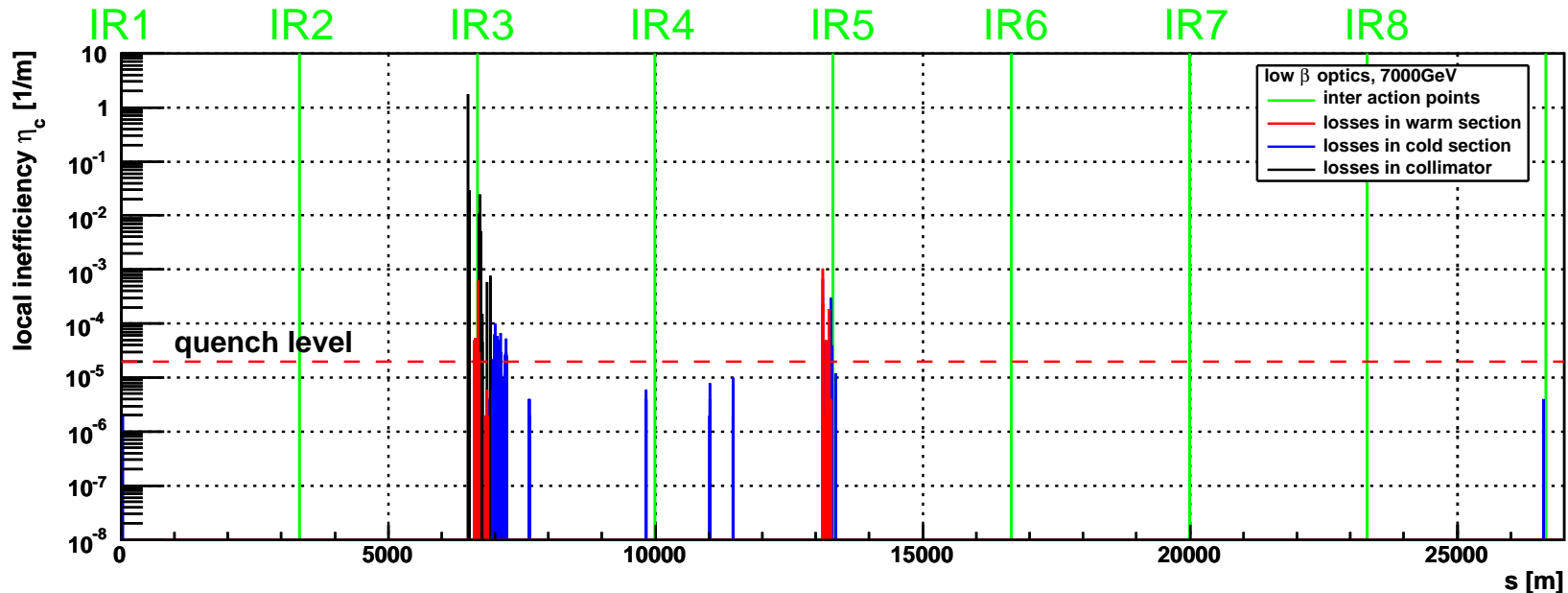
- standard IP3 settings for horizontal collimators, one additional vertical primary (6σ) at \approx scraper location and vertical secondaries (7σ) at phase 2 locations
- optics: $\beta_{*} = 0.55$ m in IP1/5 and $\beta_{*} = 10.0$ m in IP2/8
- $\eta_{local} = 2 \times 10^{-4} \text{ m}^{-1}$ (neglecting peak in experimental insertions \Rightarrow TCT not used so far)

Scenario 1



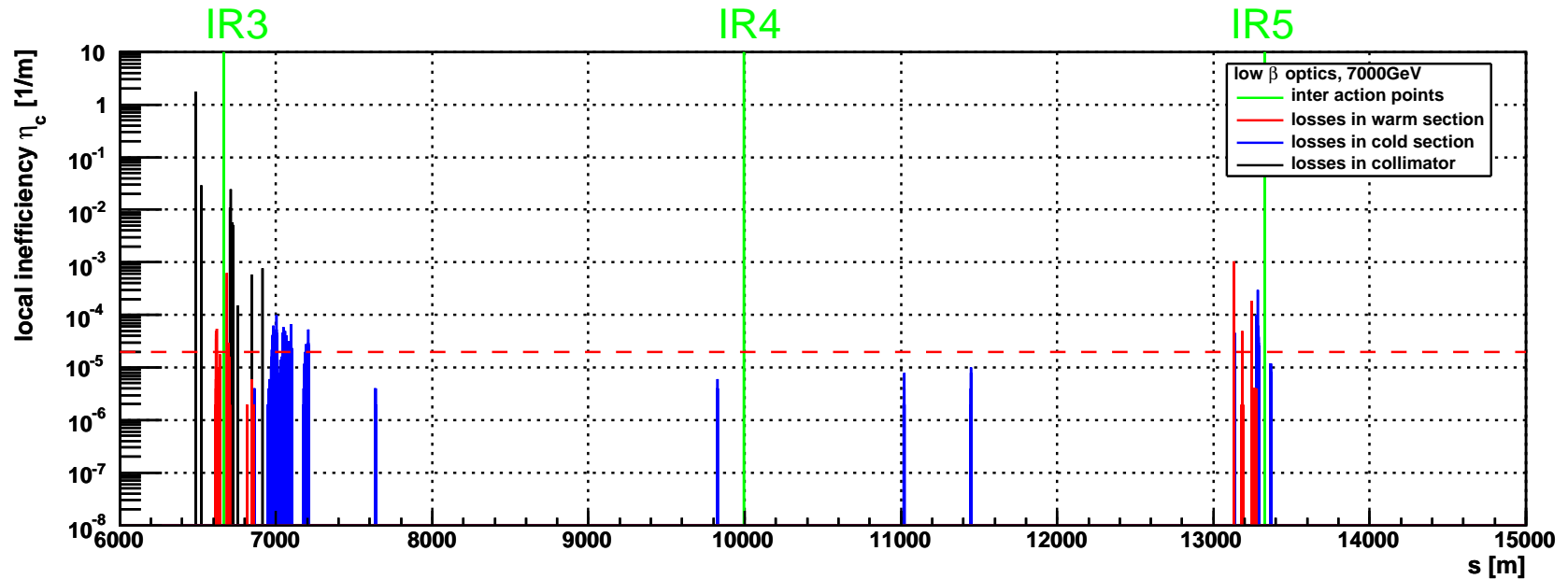
- standard IP3 settings for horizontal collimators, one additional vertical primary (6σ) at \approx scraper location and vertical secondaries (7σ) at phase 2 locations
- optics: $\beta_{*} = 0.55$ m in IP1/5 and $\beta_{*} = 10.0$ m in IP2/8
- $\eta_{local} = 2 \times 10^{-4} \text{ m}^{-1}$ (neglecting peak in experimental insertions \Rightarrow TCT not used so far)

Scenario 2



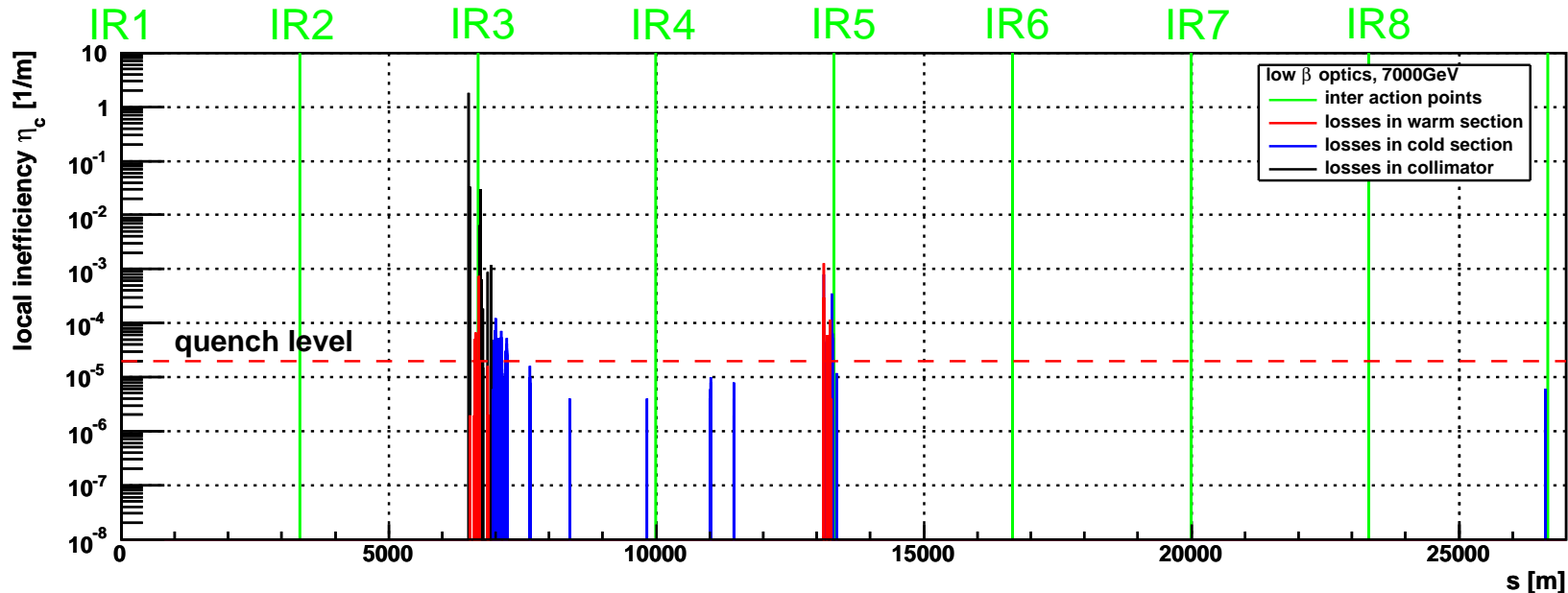
- as Scenario1 standard betatron cleaning settings, primaries at 6σ , secondaries at 7σ and tertiaries at 10σ
- optics: $\beta_{*} = 0.55$ m in IP1/5 and $\beta_{*} = 10.0$ m in IP2/8
- $\eta_{local} = 1 \times 10^{-4} \text{ m}^{-1}$ (neglecting peak in experimental insertions → TCT not used sofar)

Scenario 2



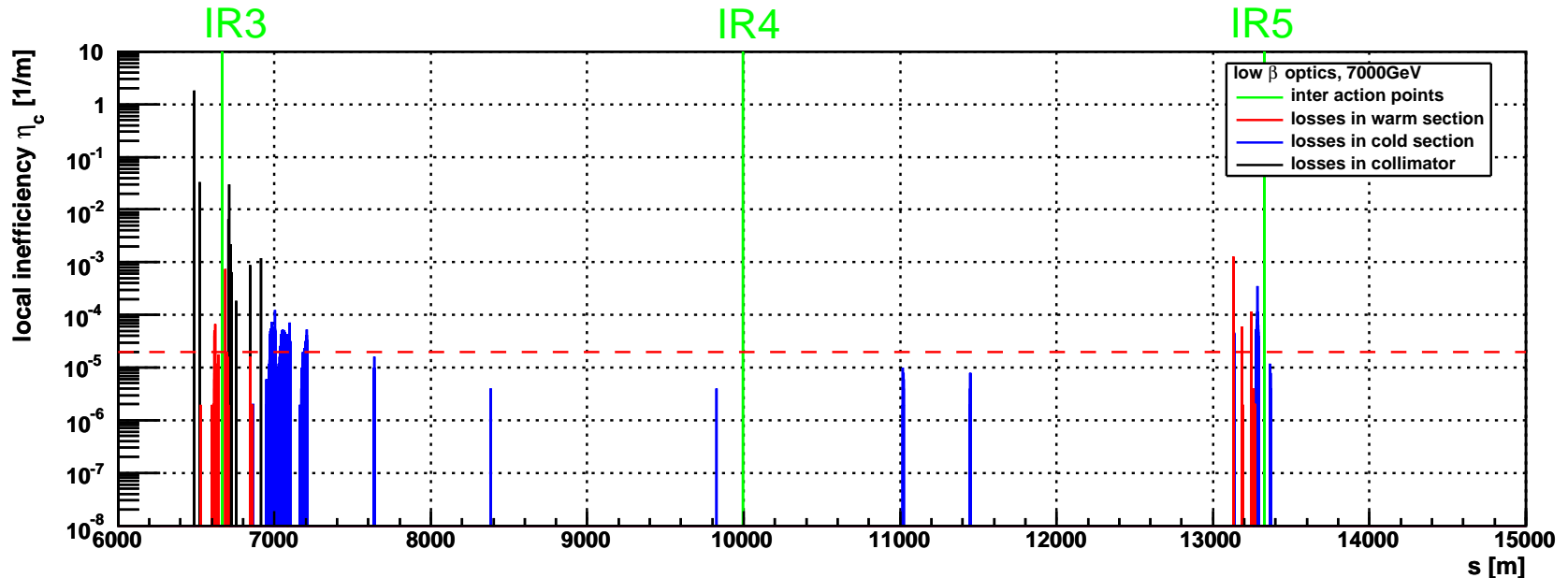
- as Scenario1 standard betatron cleaning settings, primaries at 6σ , secondaries at 7σ and tertiaries at 10σ
- optics: $\beta_{*} = 0.55$ m in IP1/5 and $\beta_{*} = 10.0$ m in IP2/8
- $\eta_{local} = 1 \times 10^{-4} \text{ m}^{-1}$ (neglecting peak in experimental insertions → TCT not used sofar)

Scenario 3



- horizontal collimators at 8σ , 10σ and 13σ , vertical collimators at 6σ , 7σ and 10σ (TCP, TCS, TCLA)
- optics: $\beta^* = 0.55$ m in IP1/5 and $\beta^* = 10.0$ m in IP2/8
- $\eta_{local} \approx 1.3 \times 10^{-4} \text{ m}^{-1}$ (neglecting peak in experimental insertions → TCT not used sofar)

Scenario 3



- horizontal collimators at 8σ , 10σ and 13σ , vertical collimators at 6σ , 7σ and 10σ (TCP, TCS, TCLA)
- optics: $\beta^* = 0.55$ m in IP1/5 and $\beta^* = 10.0$ m in IP2/8
- $\eta_{local} \approx 1.3 \times 10^{-4} \text{ m}^{-1}$ (neglecting peak in experimental insertions
→ TCT not used sofar)