

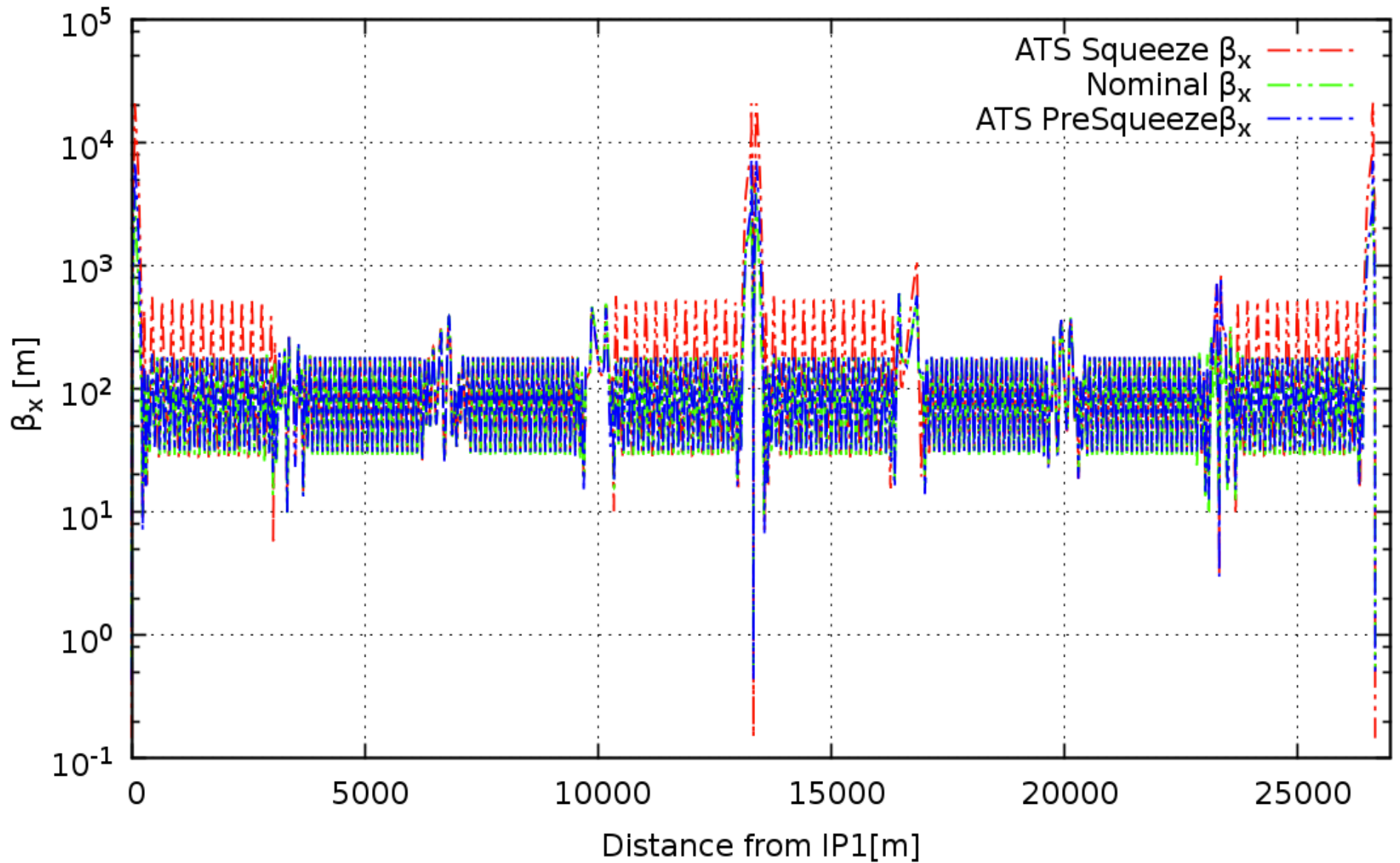
MERLIN: Update on ATS PreSqueeze Loss Map with Sixtrack-like scattering routine

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Summary

- LHC Optics: Nominal, ATS PreSqueeze, ATS
- Collimators setup for ATS PreSqueeze
- Apertures
- Loss Map comparison between ATS PreSqueeze and Nominal case
- Conclusions

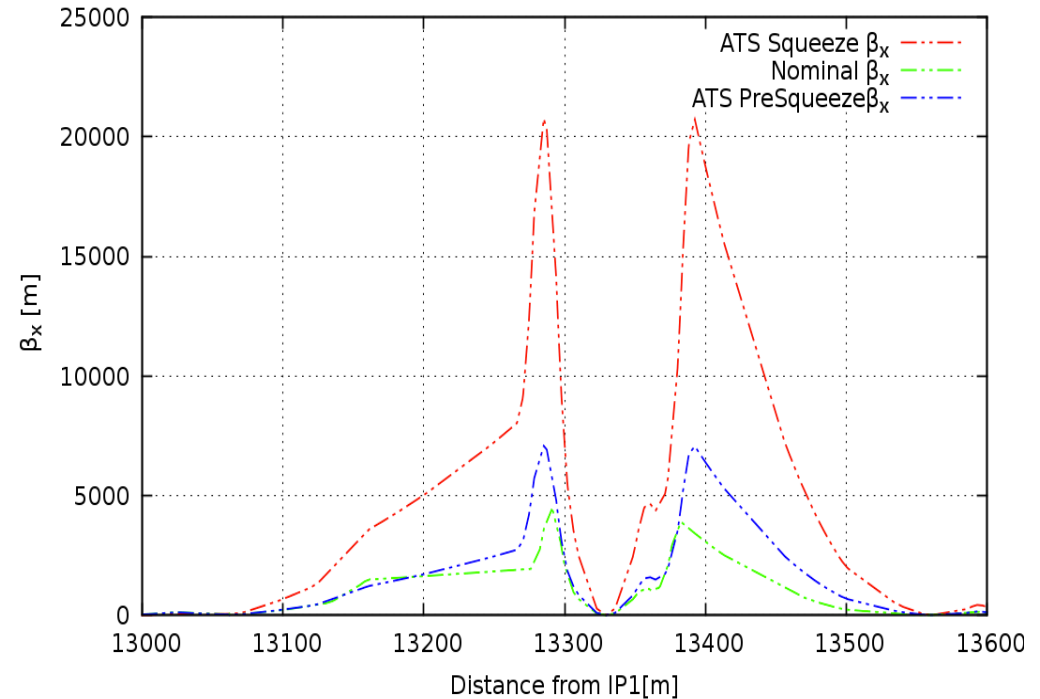
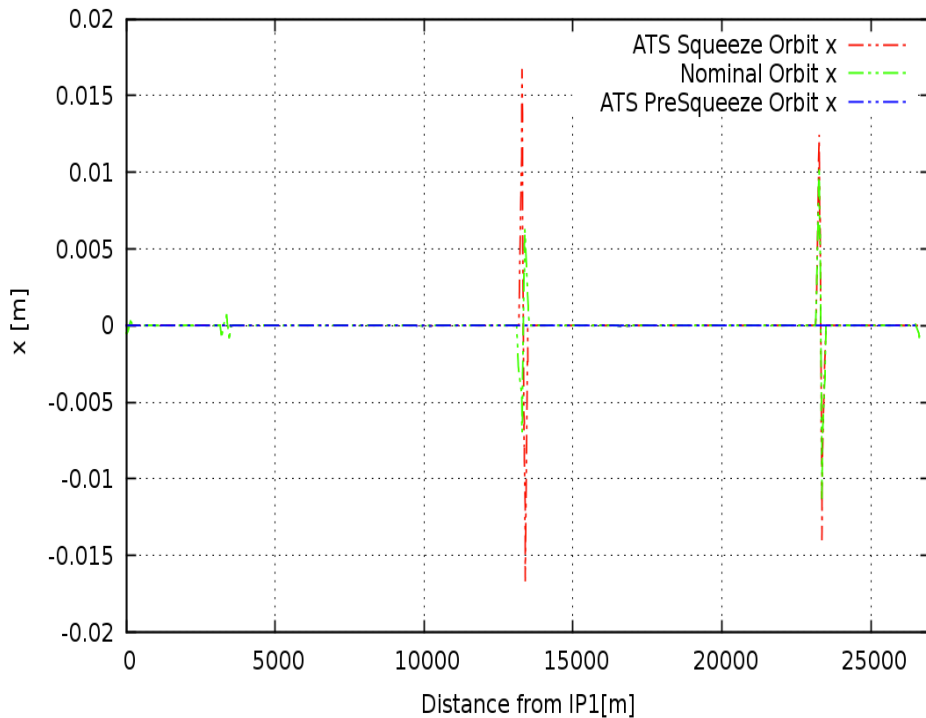
Horizontal beta function



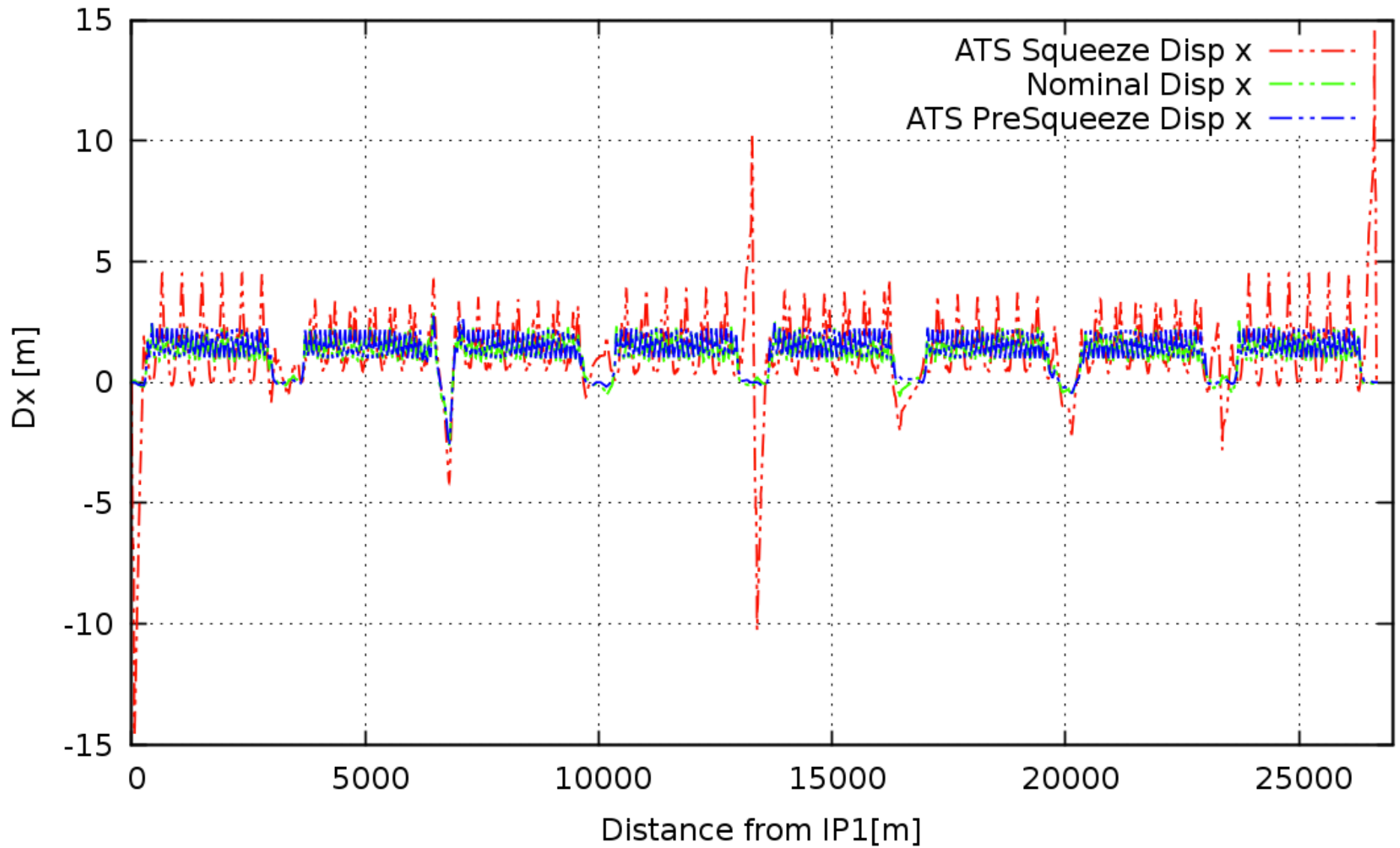
PreSqueeze LHC optics setup

- Thick-lens version – Ideal machine
- afs optics repository: SLHCV3.1b
- Energy = 7TeV, $\varepsilon_n = 3.5$ mm-mrad
- $dp/p = 0$, $\sigma_z = 0$
- Crossing Off
- Separation Off

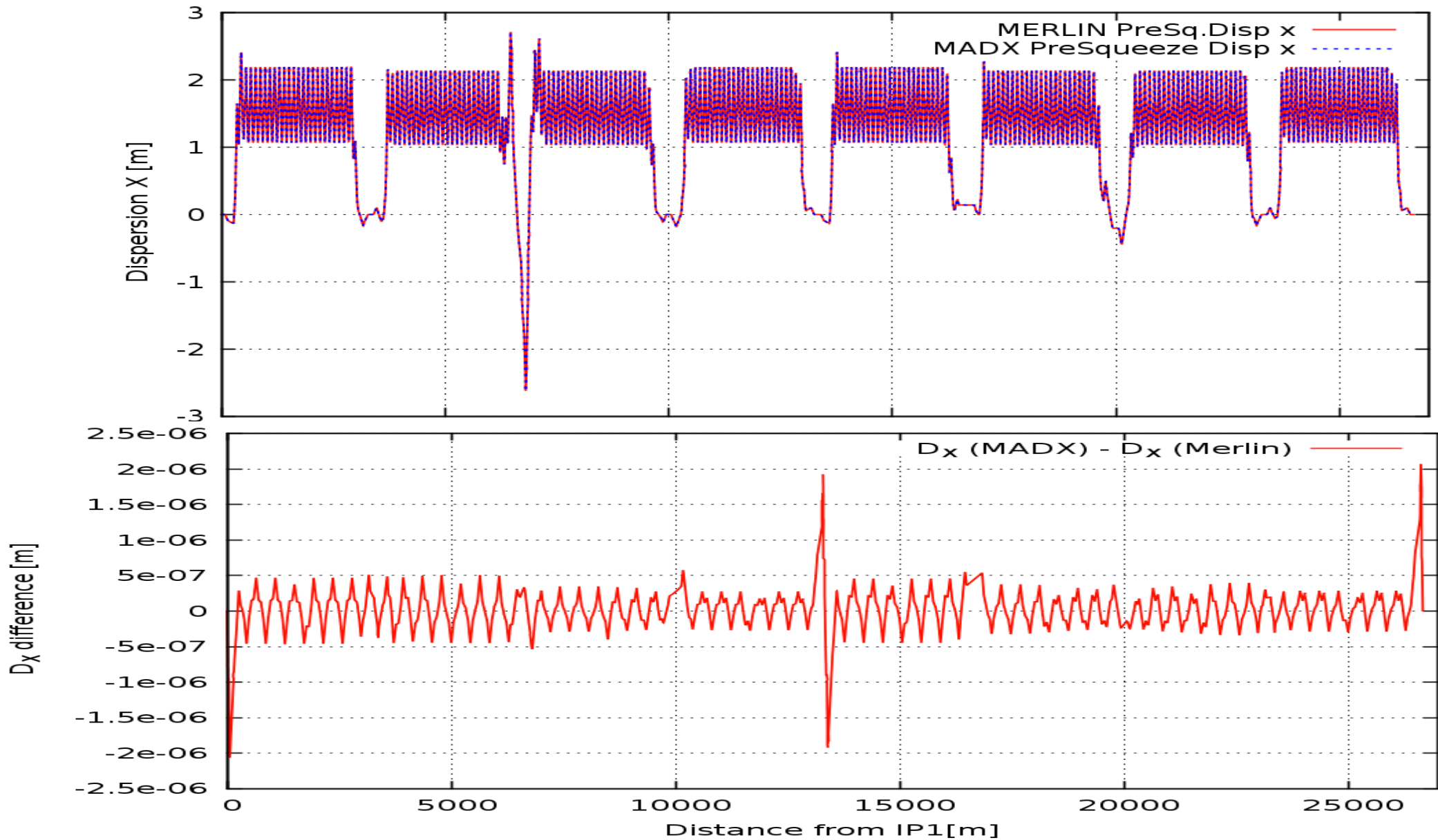
$\beta^*(\text{Nominal}) = 55$ cm
 $\beta^*(\text{ATS PreSq.}) = 44$ cm
 $\beta^*(\text{ATS}) = 15$ cm



Horizontal Dispersion



PreSqueeze X Dispersion: MERLIN-MADX comparison



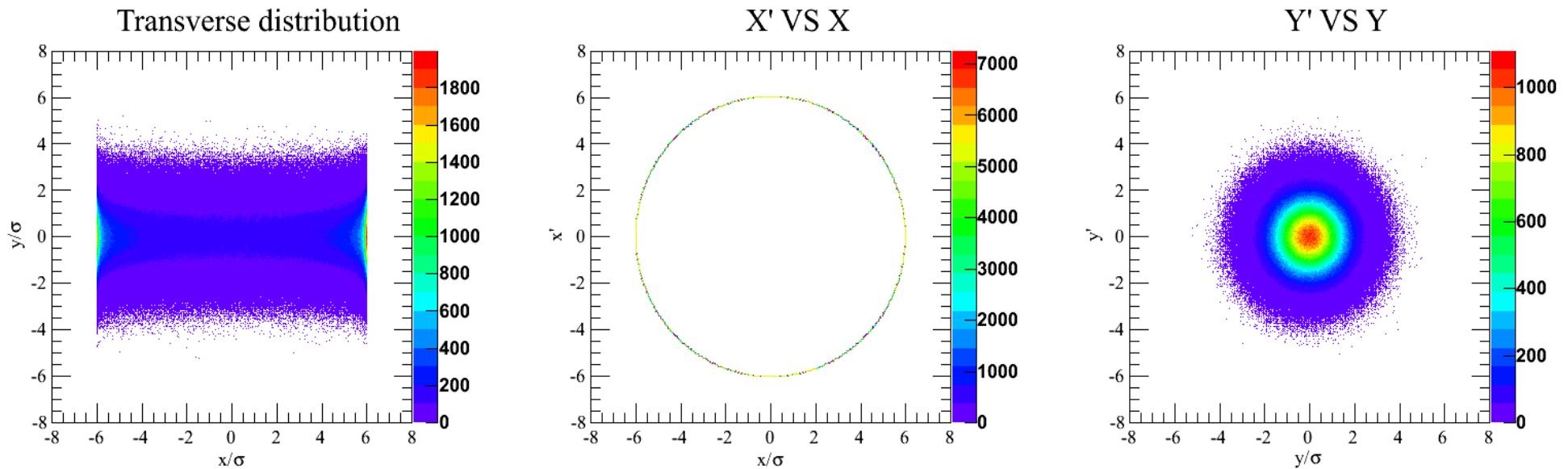
ATS PreSqueeze Collimation Setup

IR1 - IR5	PreSq.[σ]	Nominal[σ]	IR6	PreSq.[σ]	Nominal[σ]
TCTH	8.3	8.3	TCDQA	8	8
TCTVA	8.3	8.3	TCSG	7.5	7.5
IR2			IR8		
TCT	12	25	TCT	8.3	25
TCTVB	12	25	TCTVB	8.3	25
IR3			IR7		
TCP	12	15	TCP	6	6
TCSG	15.6	18	TCSG	7	7
TCLA	17.6	20	TCLA	10	10

NOTE: no TCLs installed

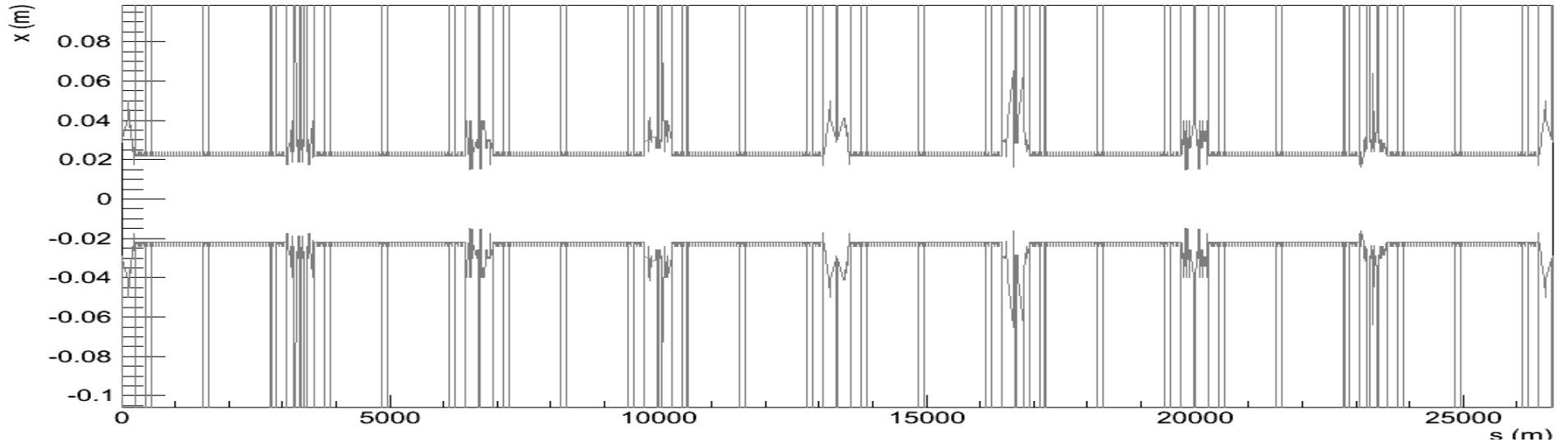
Beam halo

- Beam1 horizontal halo: a ring in $x-x'$ in the normalized space, a Gaussian distribution for the vertical coordinates
- 6.4M particles simulated, beam halo injected at first horizontal primary collimator in IR7 (TCP.C6L7) and tracked for 200 turns
- Impact parameter = 1 μm and 10 cm longitudinal loss resolution

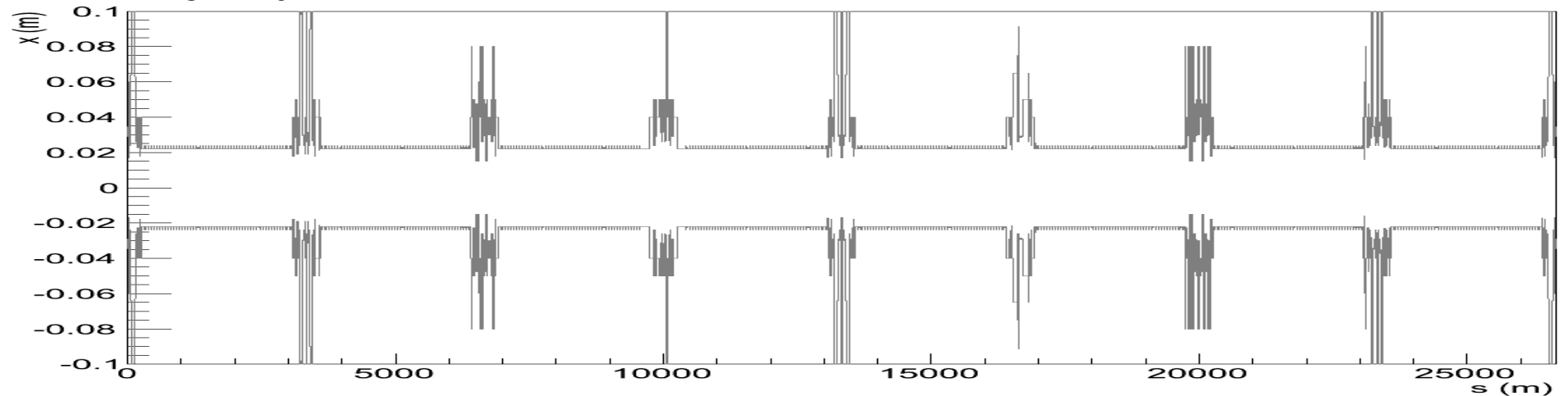


Horizontal Machine Apertures

PreSqueeze

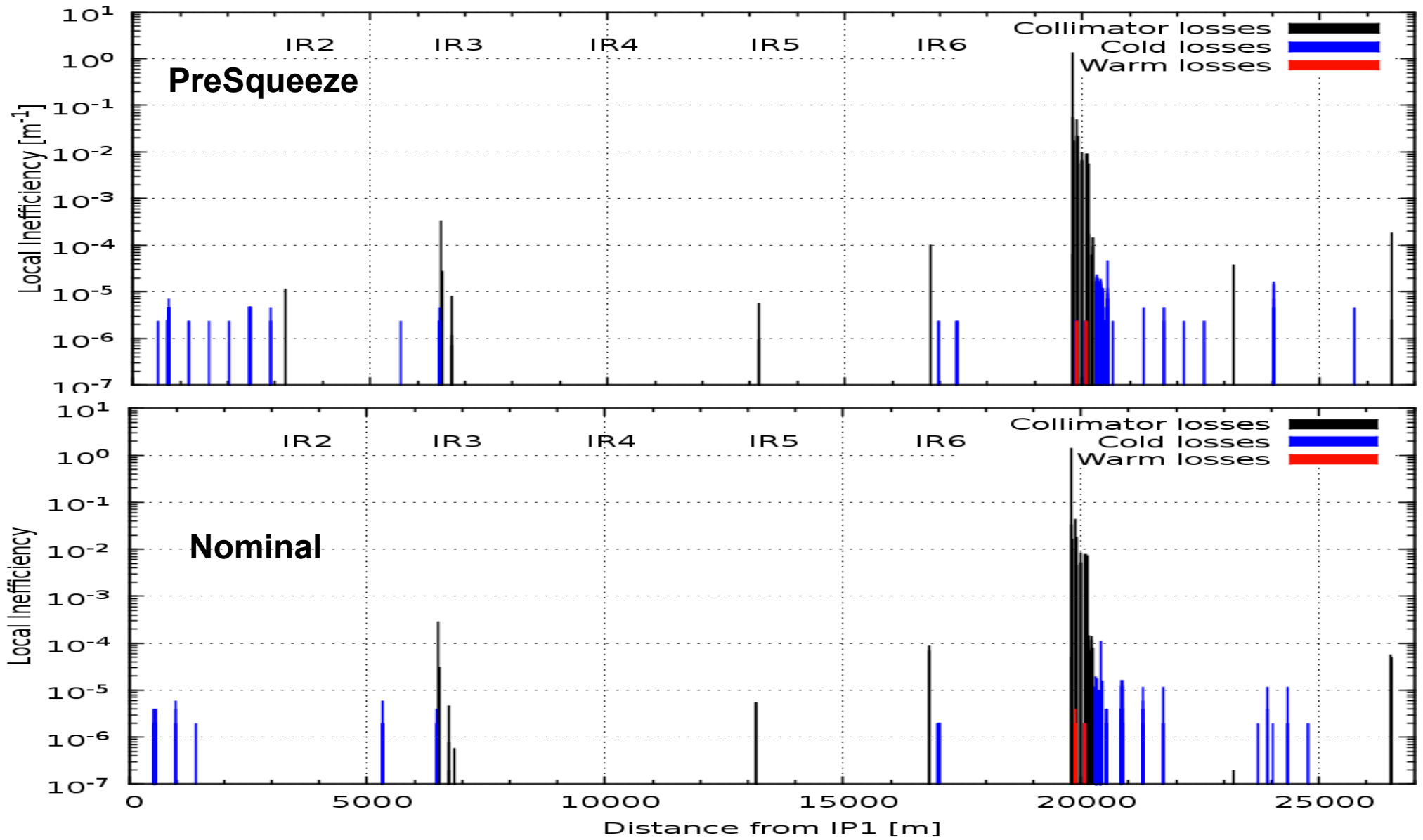


Nominal

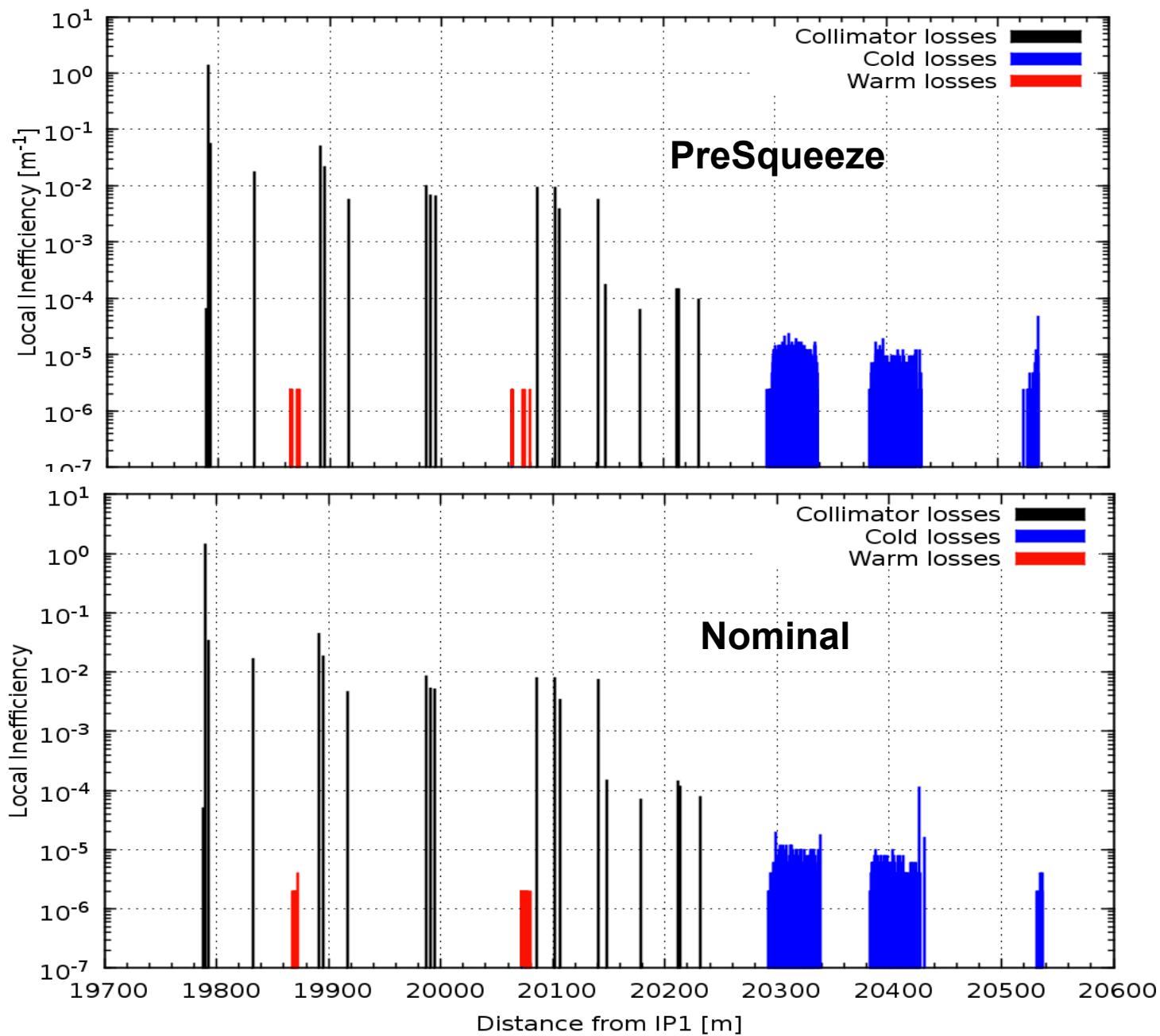


The vertical lines in the PreSqueeze apertures among the IRs are holes (about 1m) due to the 10m aperture of the s.cell in the middle of two drift sections: Needs to be fixed

Horizontal loss map: BEAM 1



PreSqueeze ATS horizontal loss map: BEAM 1 (IR7)



Conclusions

- ◆ We have produced for the first time loss map for the ATS PreSqueeze
- ◆ The results seems reasonable but further investigations (after fixing the aperture table) need to be done
- ◆ Next step is to produce high statistic loss map for the PreSqueeze optics and compare it with the new Single Diffractive routine in MERLIN

Working on:

- ◆ Fix the apertures (fast)
- ◆ Recalculate the optics with the latest PreSqueeze optics in afs
- ◆ IPAC14 paper on HiLumi loss map studies with MERLIN