

# RECENT IMPROVEMENTS TO THE LATTICES FOR THE MAX IV STORAGE RINGS

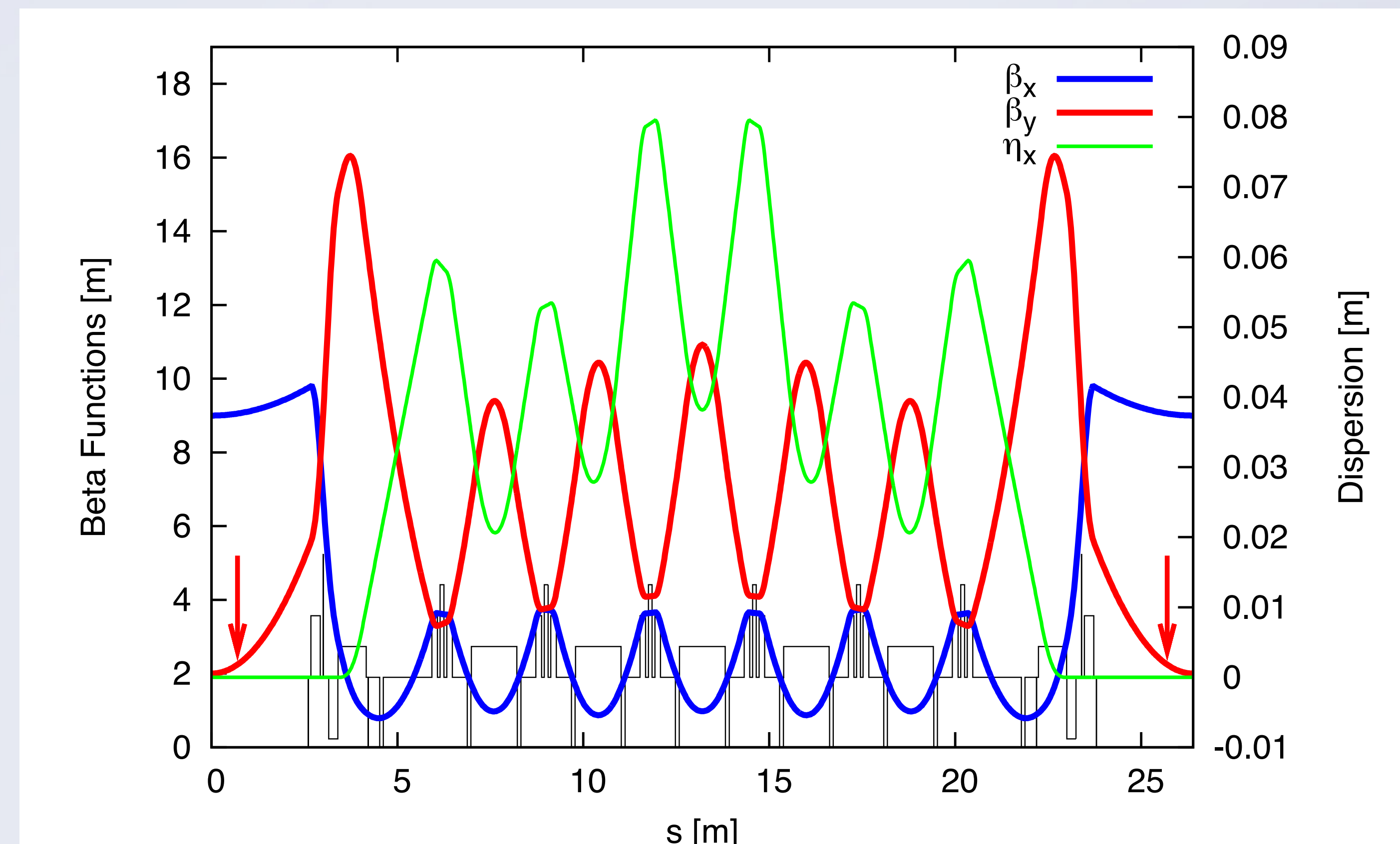
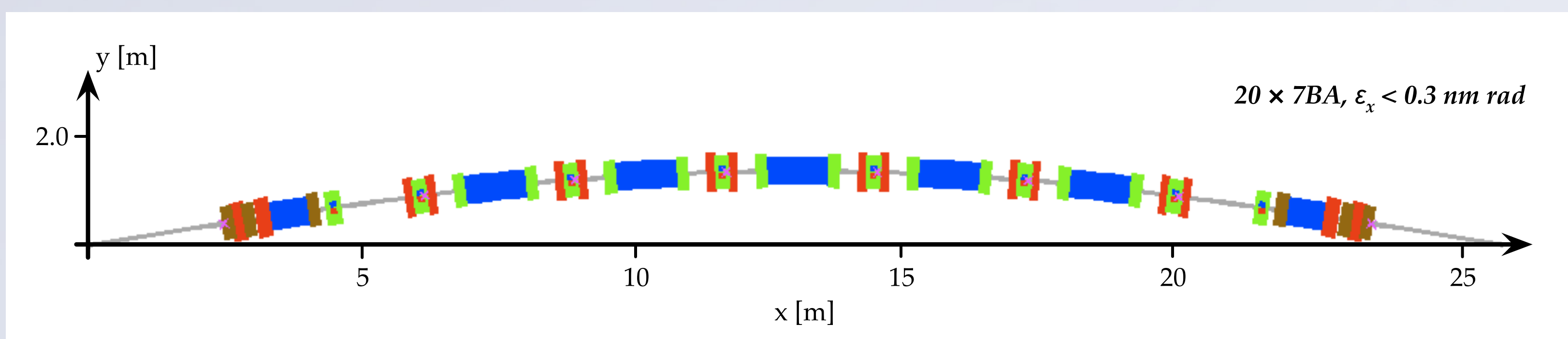
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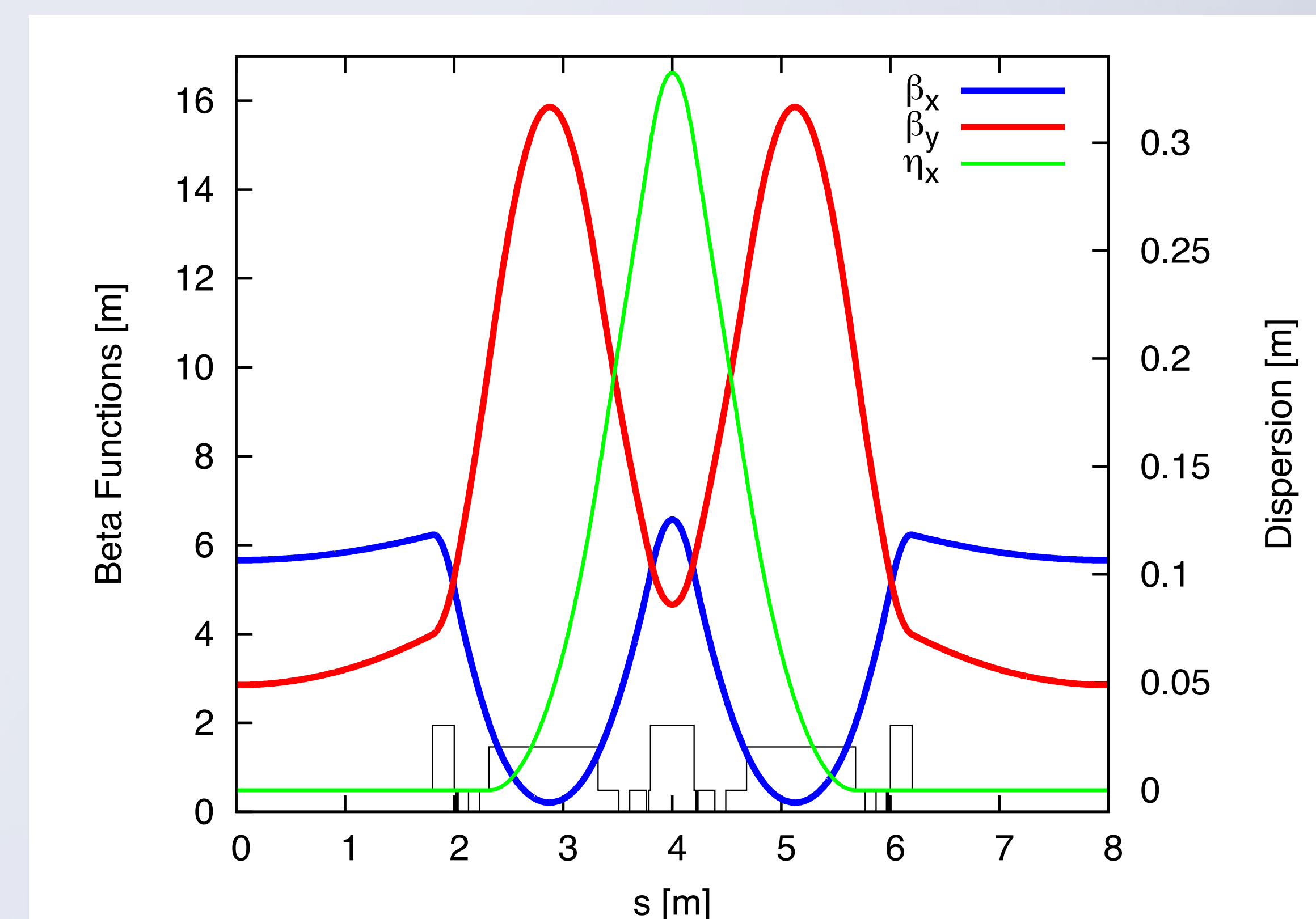
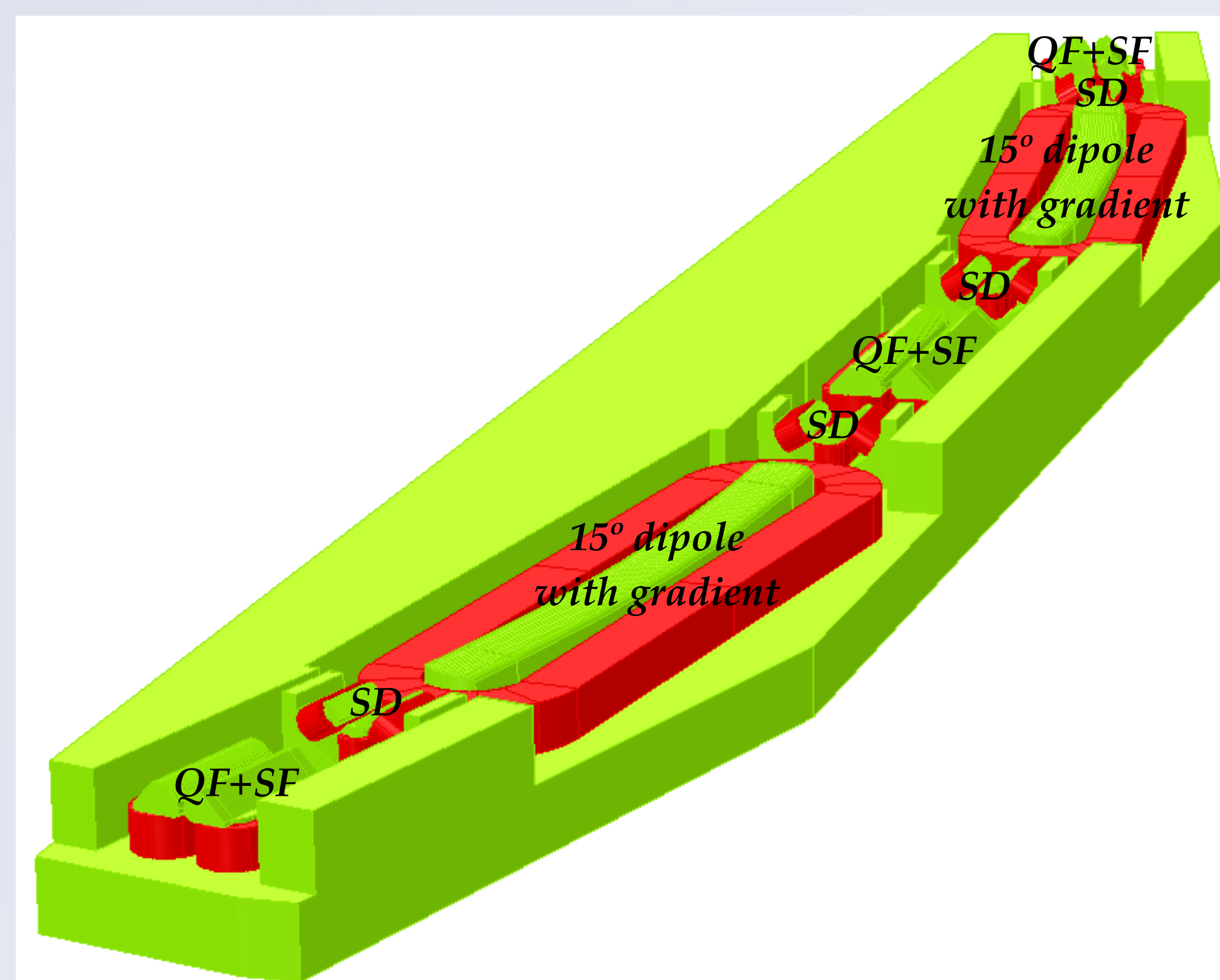
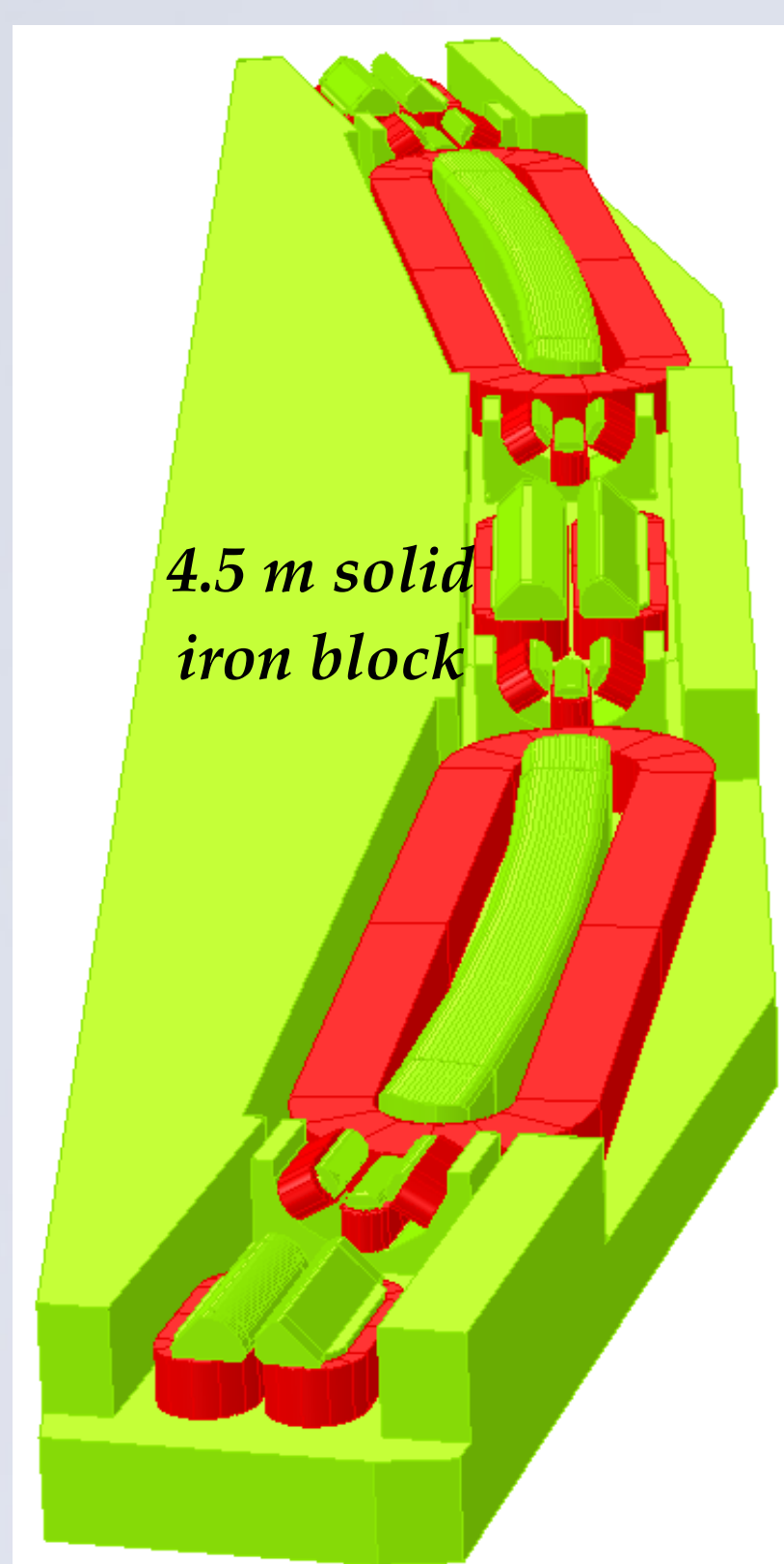
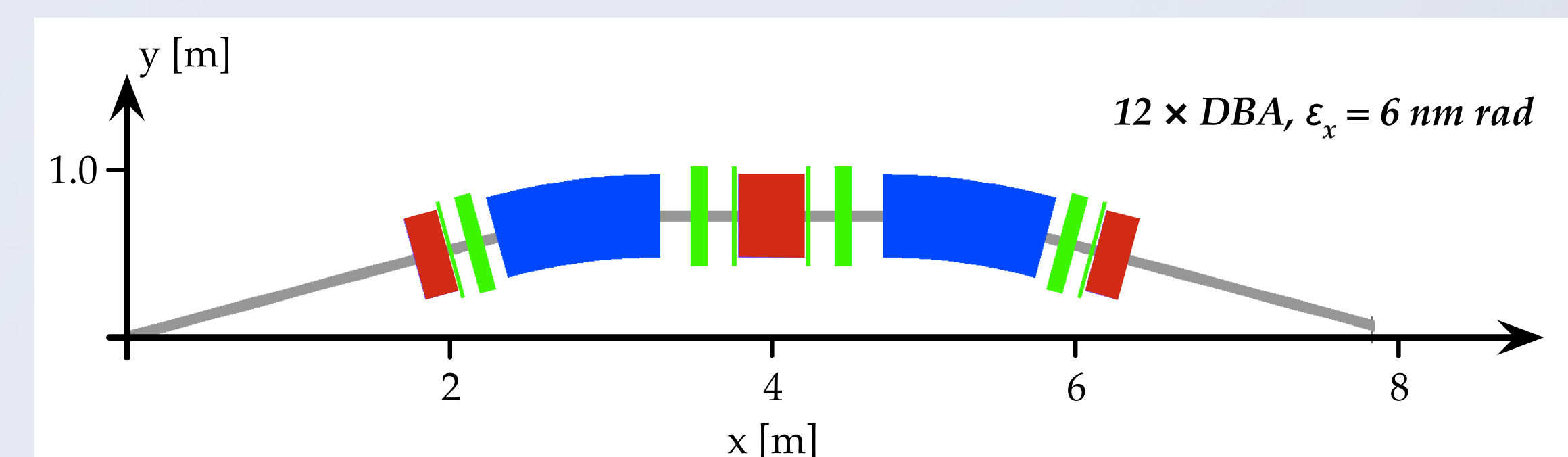
## Optics Improvements MAX IV 3 GeV Storage Ring

- Reduction of vertical beta function in long straights from 4.8 m to 2 m
  - Typical vertical beam size in ID is  $4\mu\text{m}$  ( $1\text{\AA}$  diffraction limit  $\sim 3\%$  coupling)
  - Optics matching for strong IDs no longer involves pole-face strips
  - Vertical tune increased by 2 integers  $\rightarrow$  nat. chromaticity shifted from  $-44$  to  $-50$
  - Nonlinear optics updated accordingly
- $\rightarrow$  Retain excellent dynamic aperture and momentum acceptance



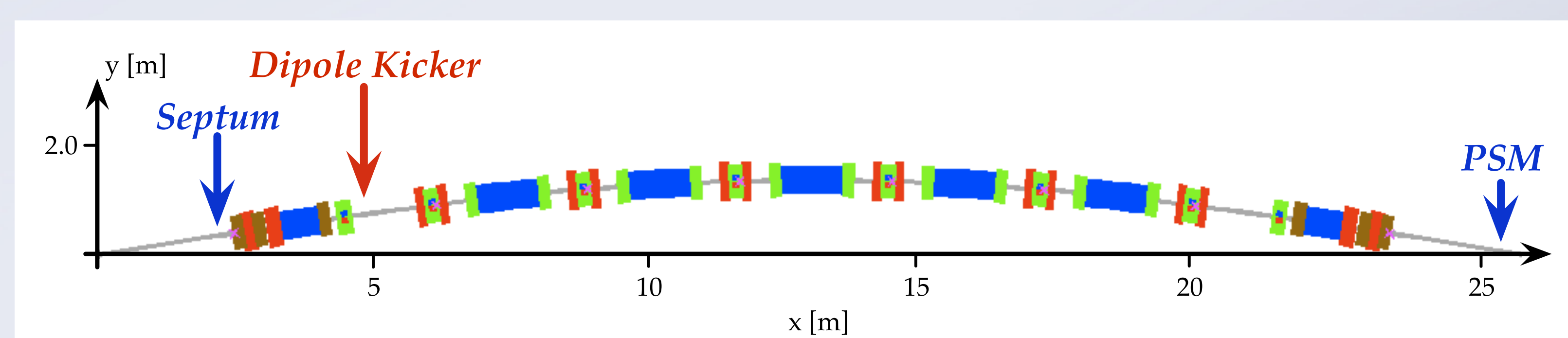
## Progress on MAX IV / Solaris 1.5 GeV Storage Ring

- Detailed magnet and vacuum design have just begun
  - Entire DBA cell machined from two 4.5 m long solid iron blocks
  - Some sextupoles need to be moved by a few mm  $\rightarrow$  no substantial performance change expected
  - Increase hor. aperture at center of DBA  $\rightarrow$  4% momentum acceptance (matches RF acceptance)
- $\rightarrow$  9 hours Touschek lifetime (at 500 mA stored current); increase with Landau cavity to  $\sim 40 \text{ h}$



## Dipole Injection Kicker for Commissioning

- Pulsed sextupole magnet (PSM) injection for both rings  $\rightarrow$  expect great performance, but commissioning non-trivial
  - Install additional dipole kicker close to septum  $\rightarrow$  facilitates initial injection & allows some accumulation
- $\rightarrow$  Correct optics and beam position before commissioning PSM injection



MAX IV Project  $\rightarrow$  <http://www.maxlab.lu.se/maxlab/max4>

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