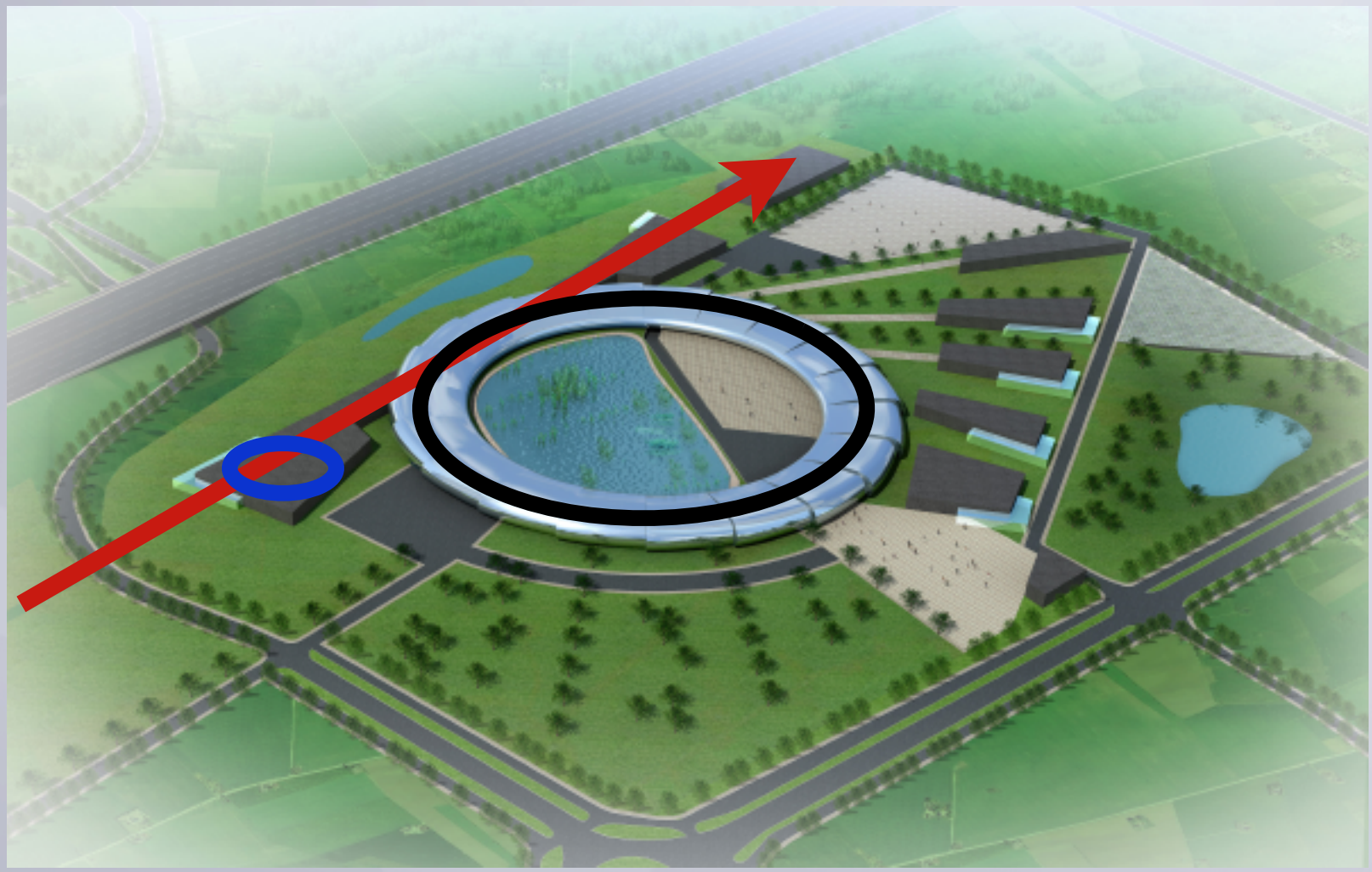
MAX IV Storage Rings

Simon C. Leemann

MAX IV Facility

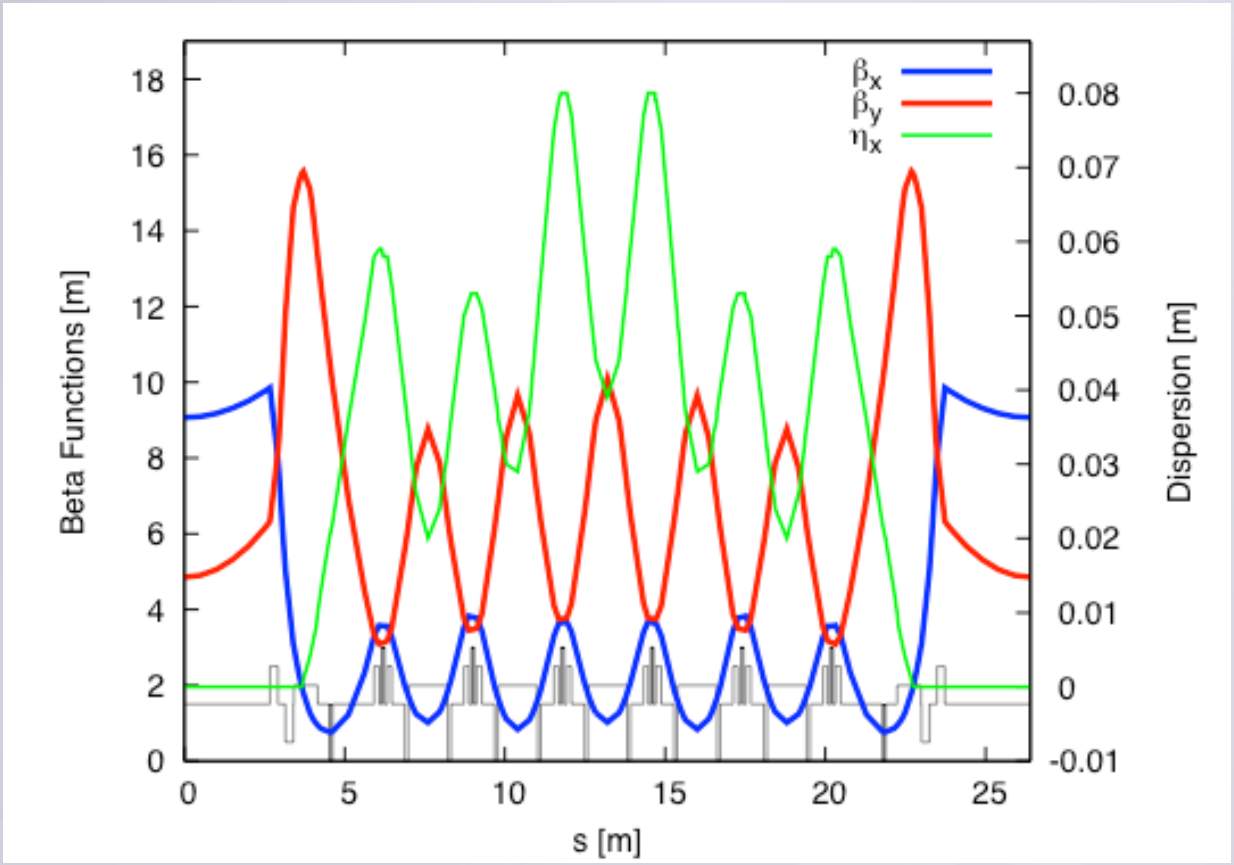
One size DOES NOT fit all!

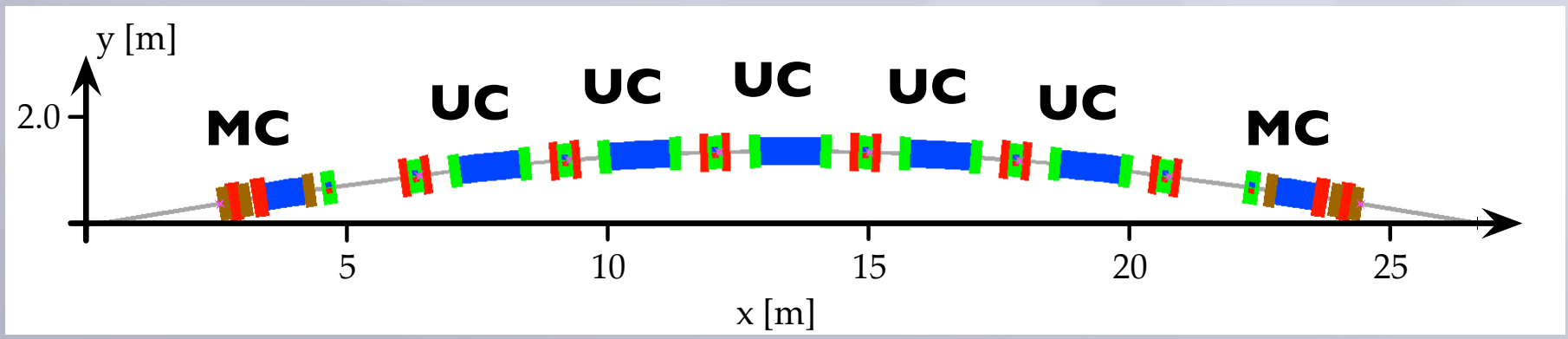
- 3.4 GeV linac (SPF, FEL) ~ 300m
- 1.5 GeV SR (IR/UV) 12 DBAs ε_x = 6 nm rad
- 3 GeV SR (X-ray) 20 MBAs ε_x < 0.3 nm rad



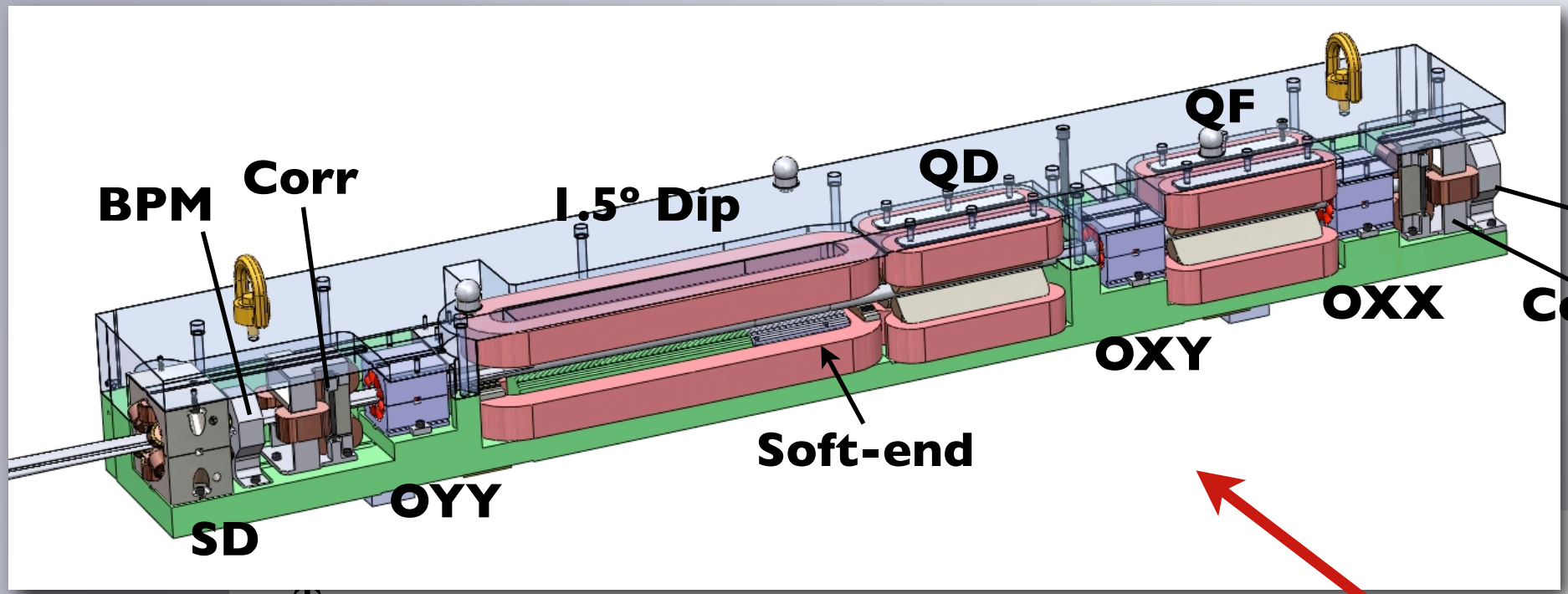
MAX IV 3 GeV Multibend Achromat

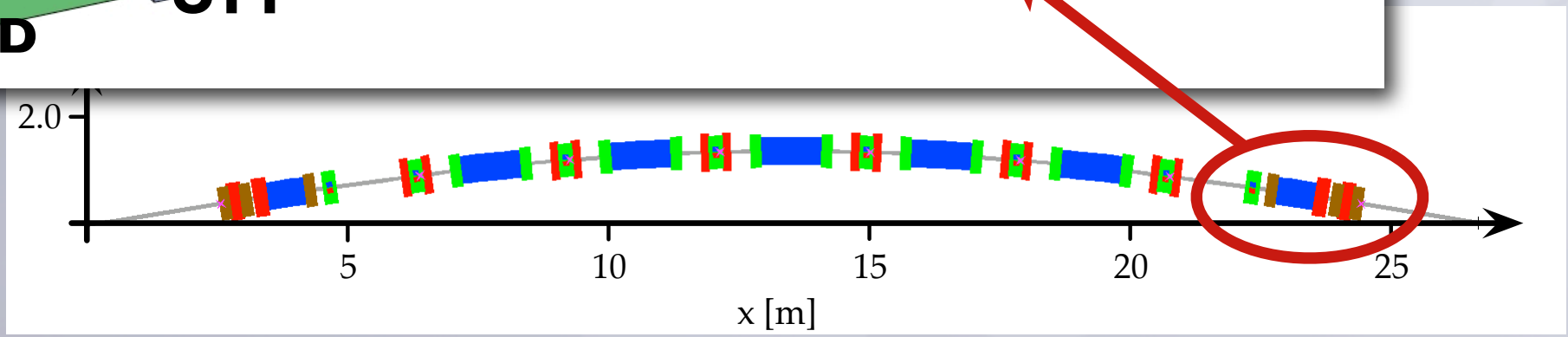
- Many weakly bending cells
  - ➡ low emittance
- Keep compact (cost!)
  - ➡ strong and small multi-function magnets → integration
  - ➡ Narrow vacuum chamber
    - ➡ Distributed pumping
    - ➡ NEG-coated chambers
- 100 MHz rf system with 300 MHz harmonic system
  - ➡ stretch bunches
    - ➡ manage instabilities
    - ➡ excellent lifetime





MAX IV Integrated Magnet Design





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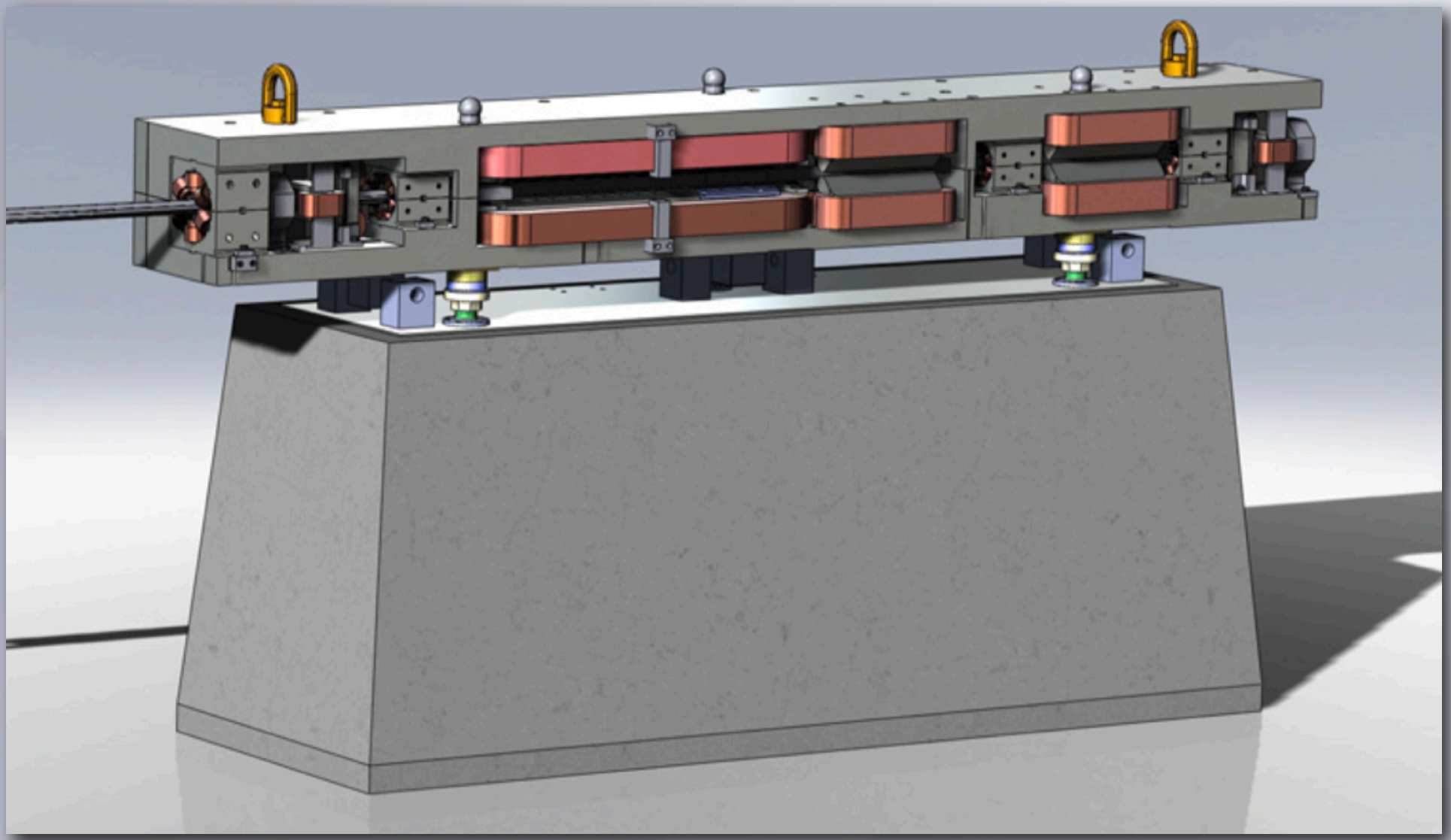

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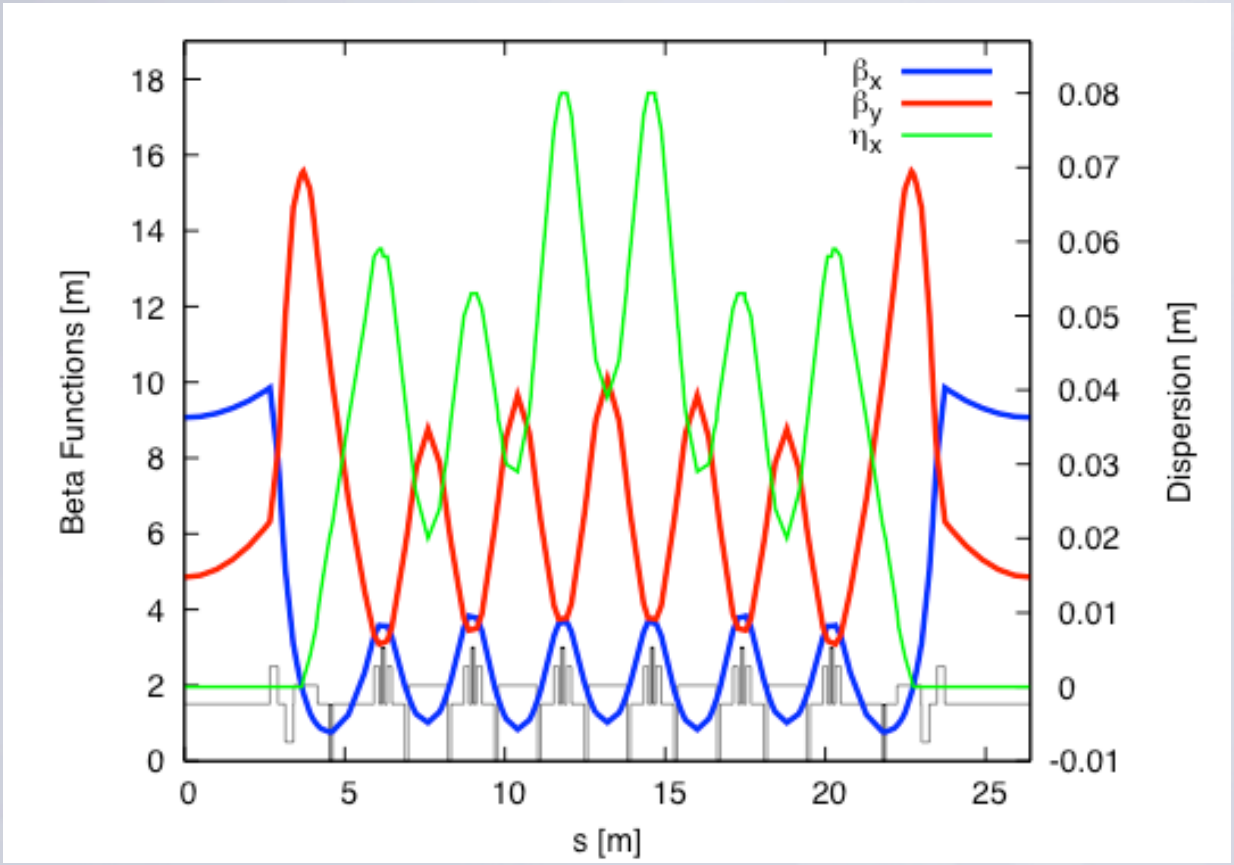
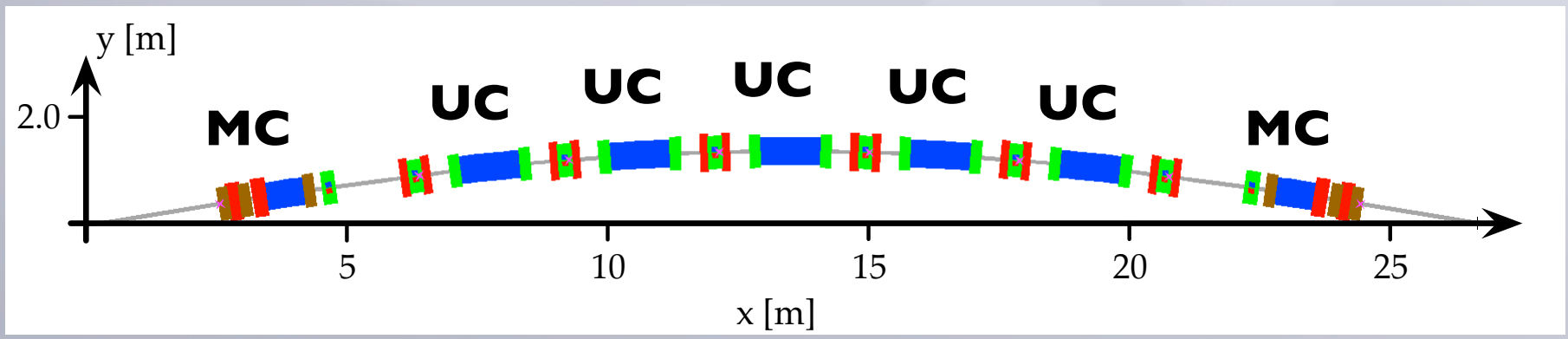
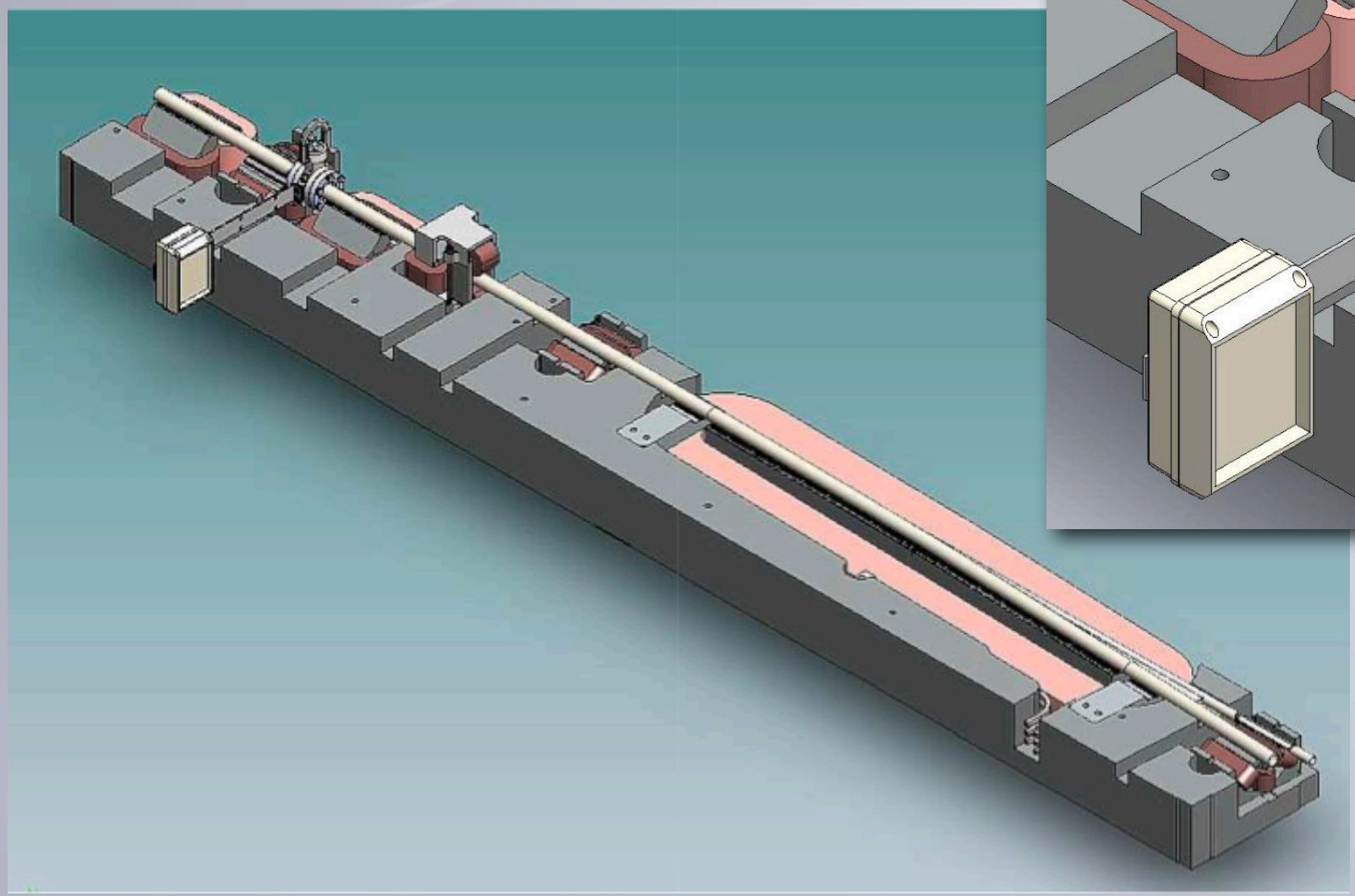
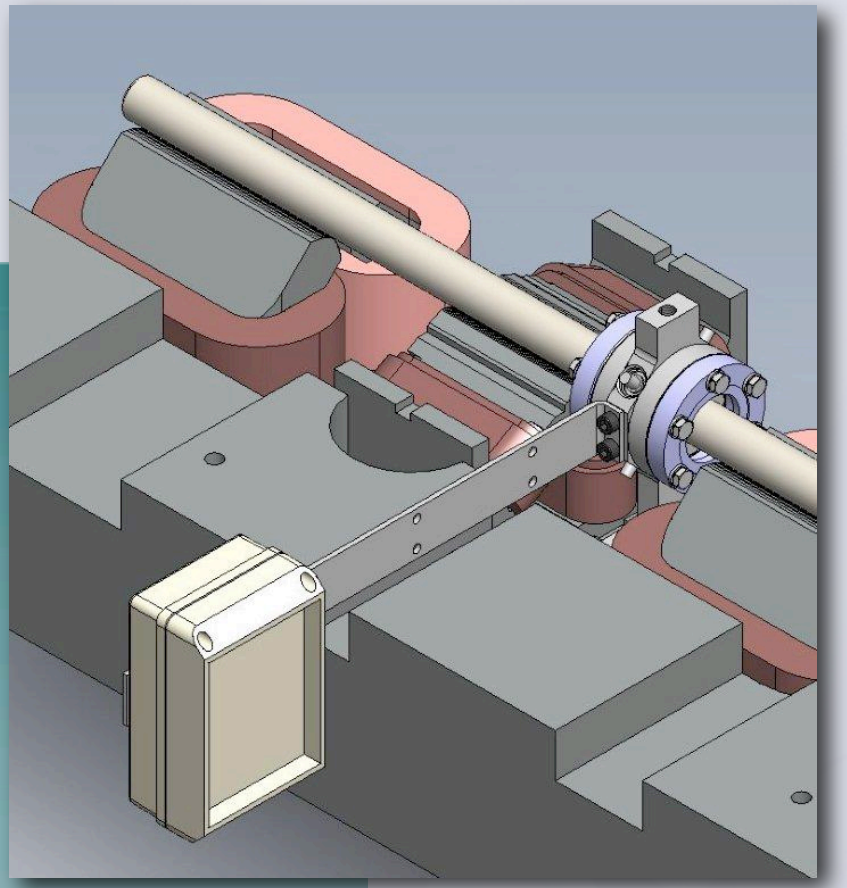




MAX IV Vacuum System





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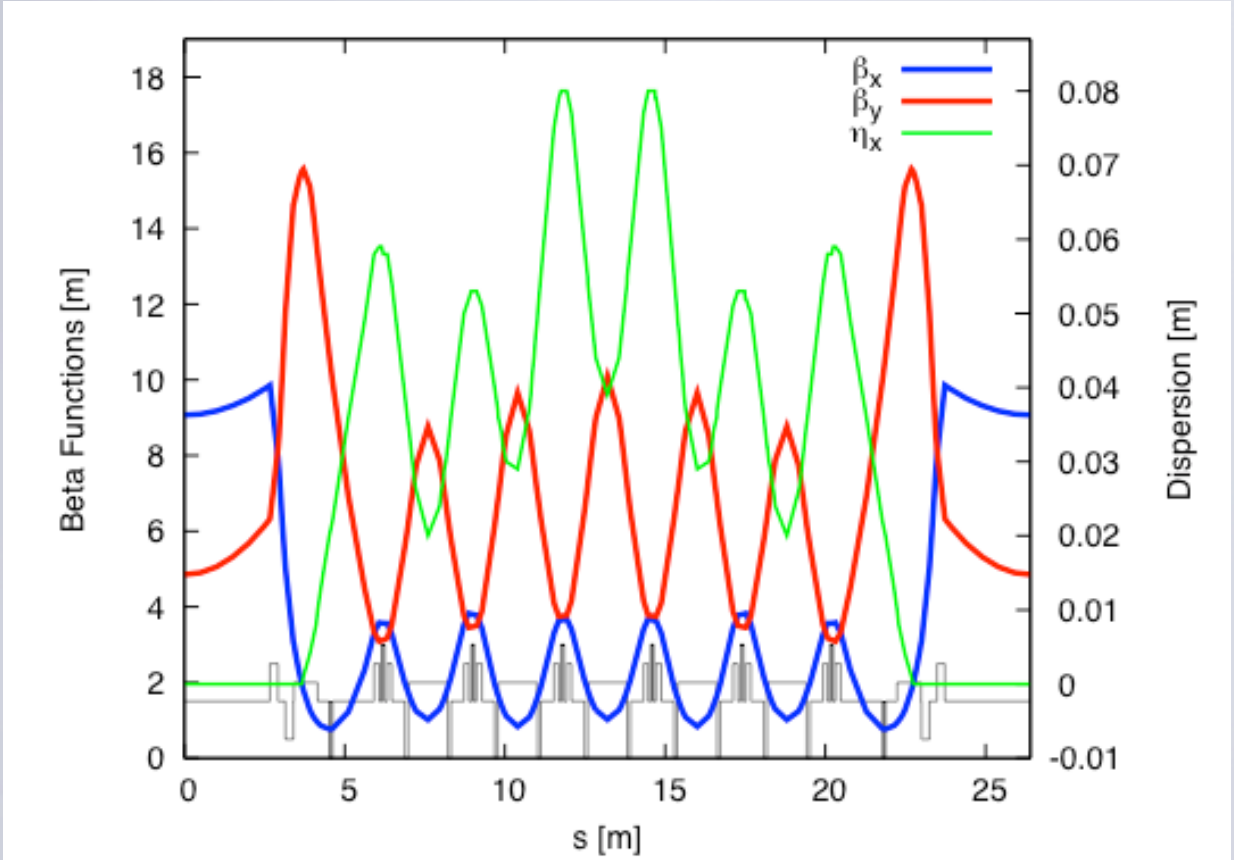

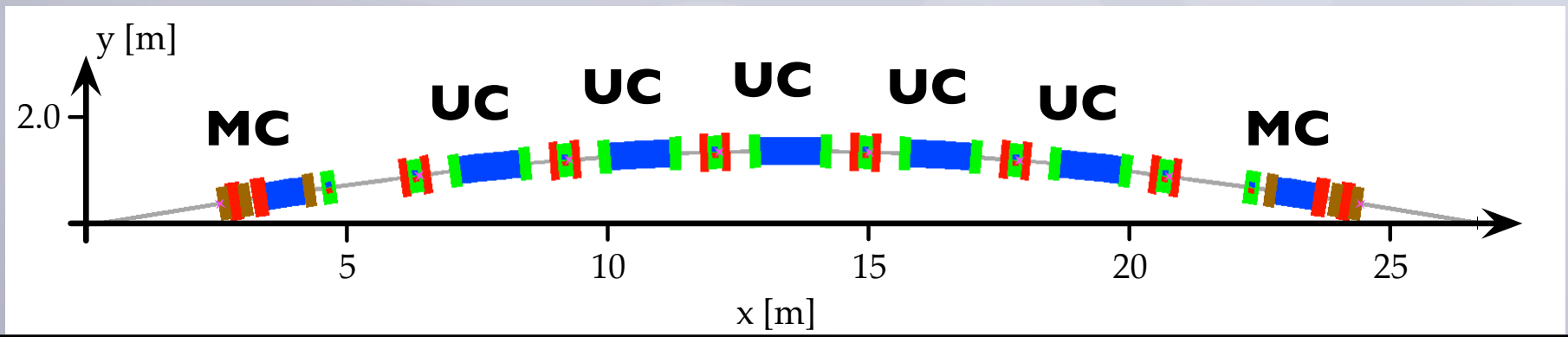

Emittance determined by IBS and IDs

- Unique feature: lower emittance → better lifetime
- MAX IV 3 GeV SR is IBS-limited! (LCs and IDs can mitigate)
- Since lattice equilibrium emittance is so low, IDs determine emittance