

FLASH reference beam optics

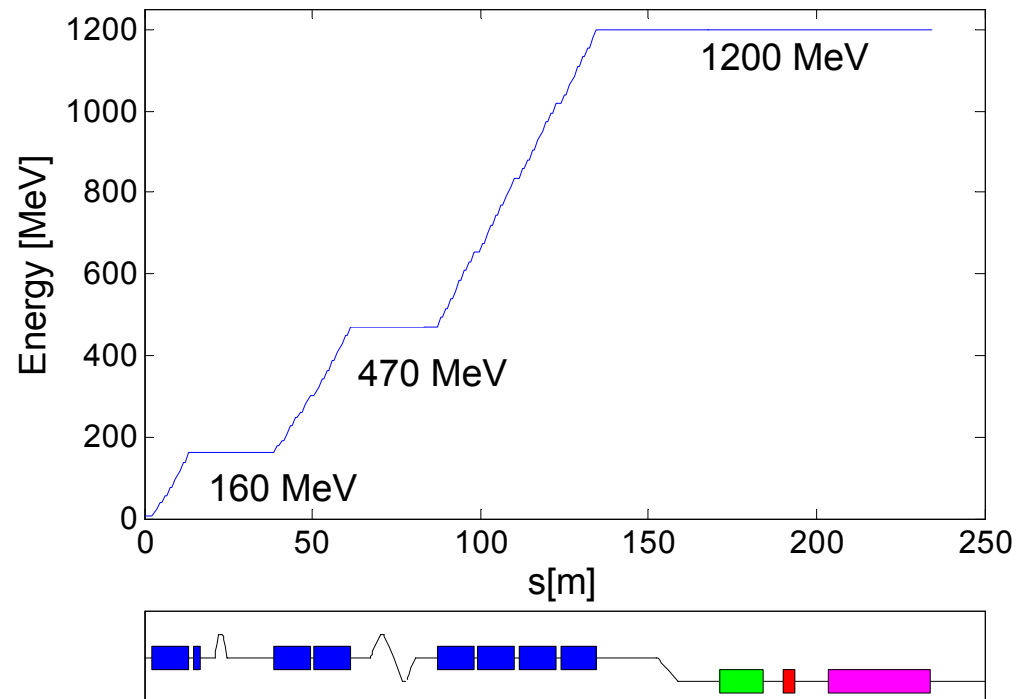


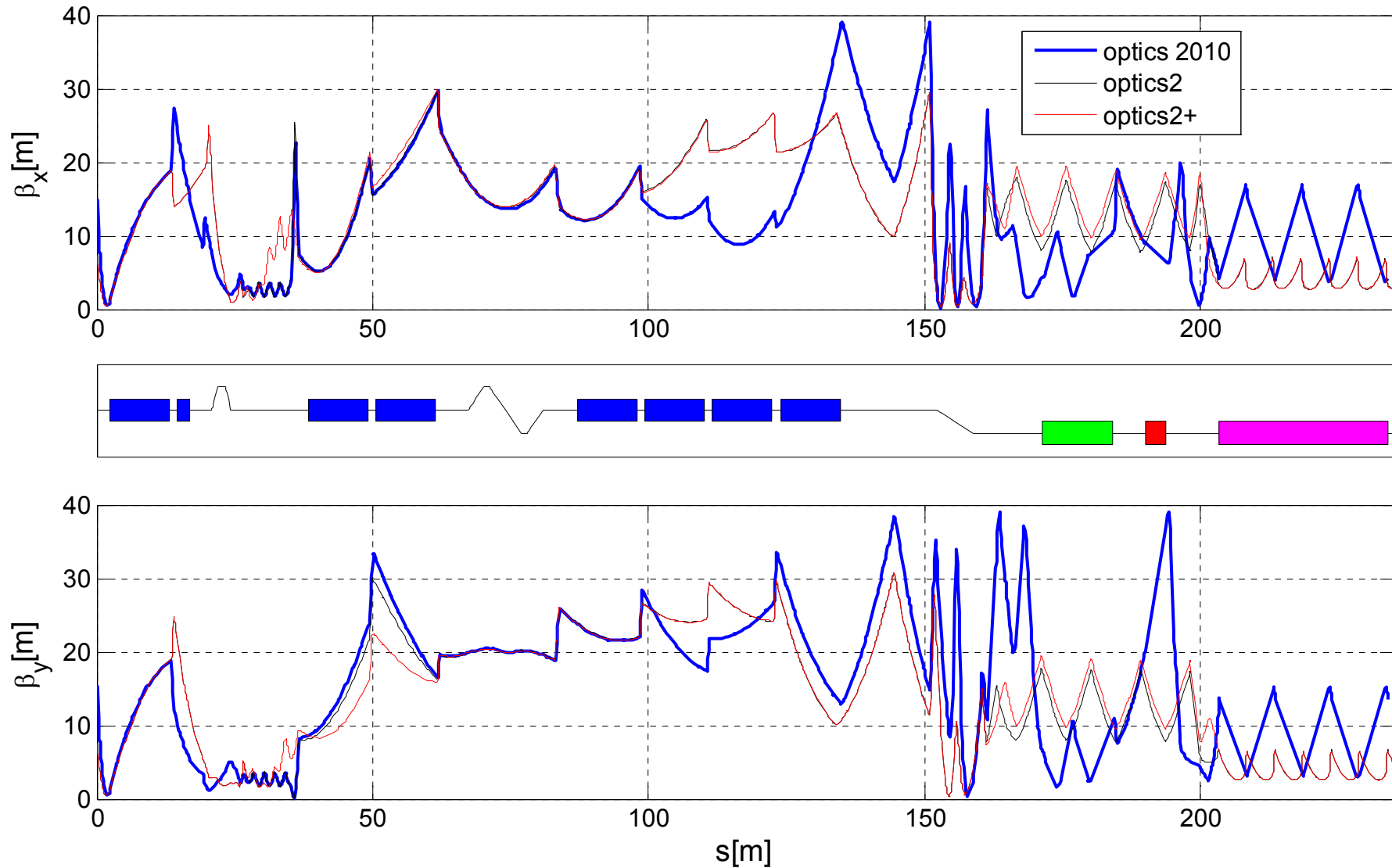
Lattice file based on Master file from Sigg
Main lattice changes: ACC39, ACC7, new section
between dogleg and undulator.

Optics based on Optics2/2+ from Vladimir and Nina

Elegant and MAD files will be available
BYPASS and DUMP will be included

Energy profile

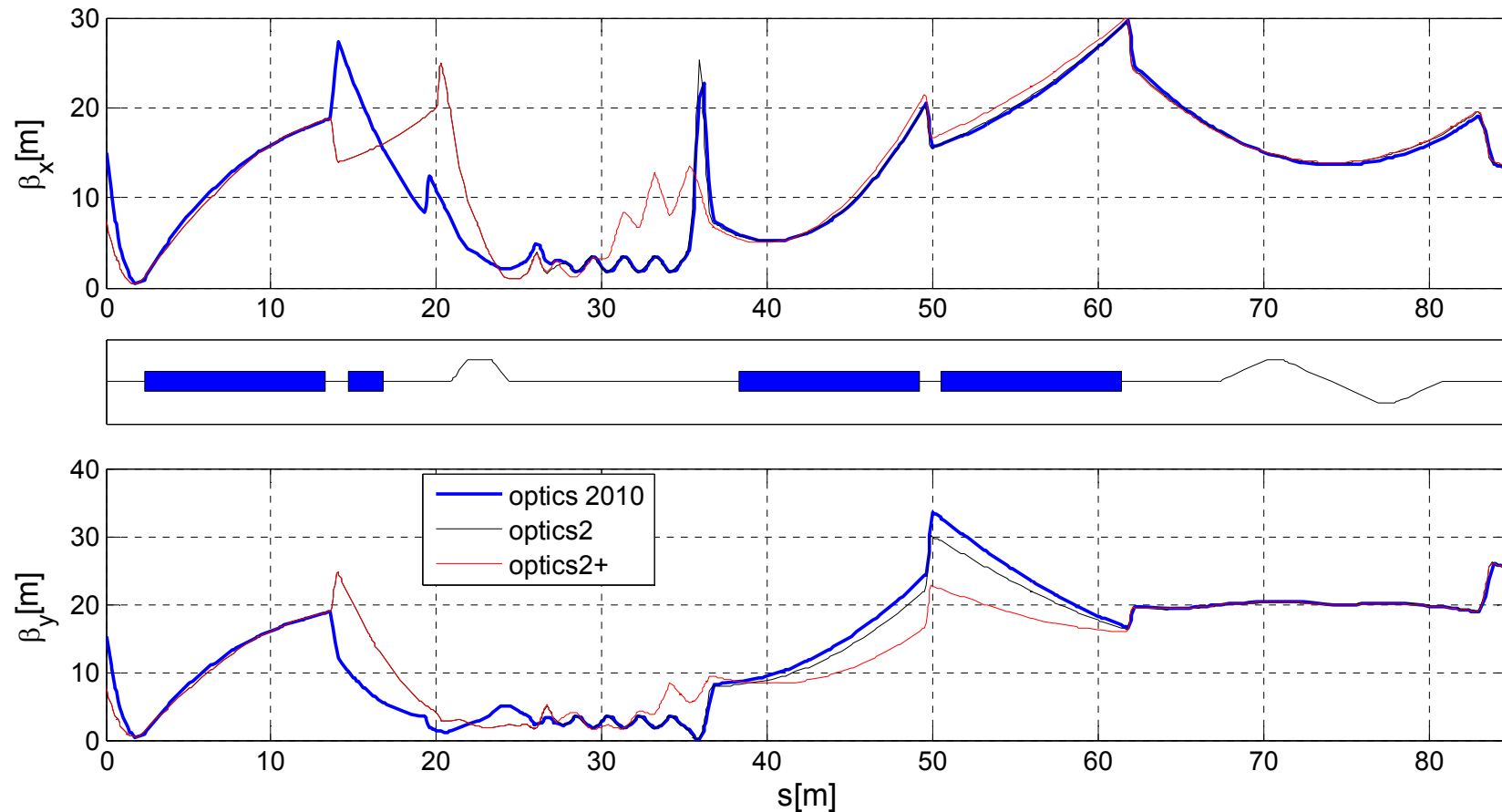




From injector to BC3

Lattice changes: ACC39 , Q9/10ACC1 is now a doublet

Between BCs: $\mu_x = \sim 380$ deg. (like optics2+)
45 deg. in FODO section (like optics2)

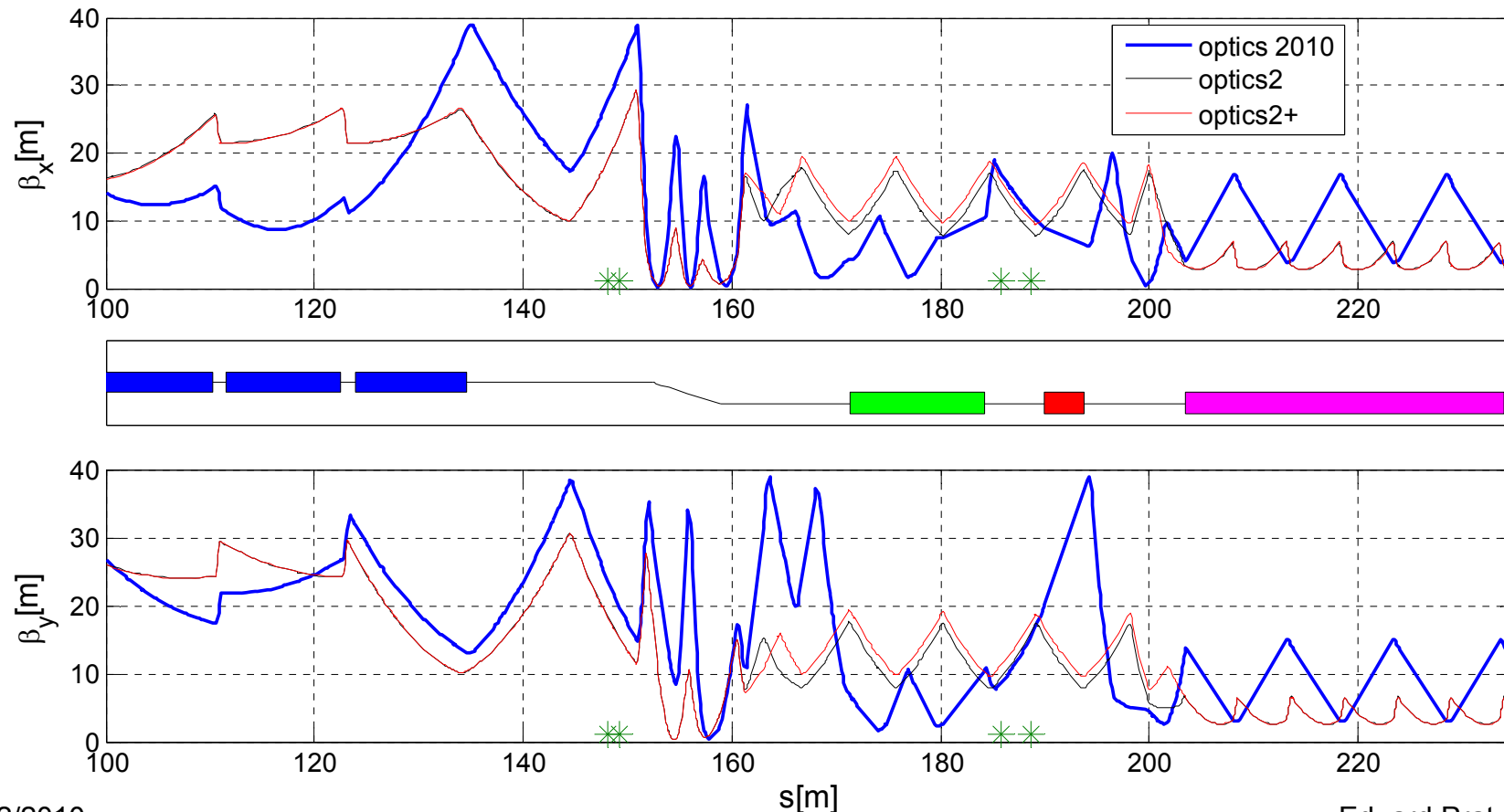


From ACC4567 to UND

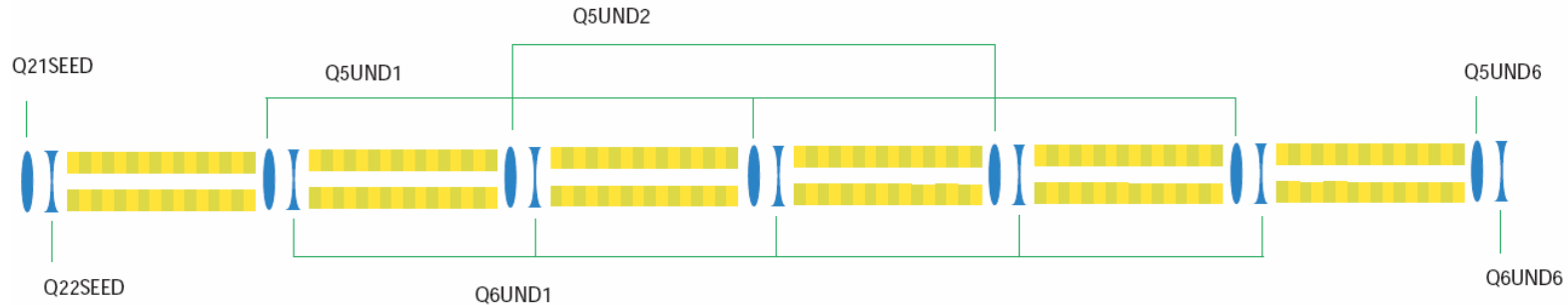
Lattice changes: ACC7, ORS, SFUND, LOLA moved to SMATCH

Optics restrictions:

- SFUND: minimize beta function $\rightarrow \beta < 10.5 \text{ m}$
- IBFB: maximize R_{12}/R_{34} between kickers $\rightarrow R_{12} = 20.9 \text{ m}, R_{34} = 16.2 \text{ m}$
- LOLA: minimize resolution $\propto \beta(s_0)^{-1/2} \sin(\Delta\mu)^{-1} \rightarrow \beta = 27.7 \text{ m}, \Delta\mu = 89 \text{ deg.}$

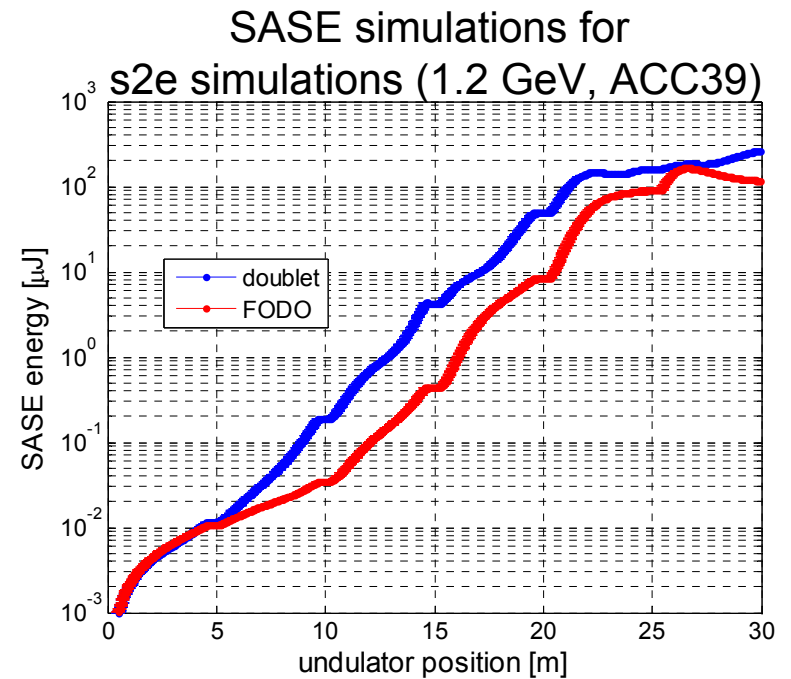
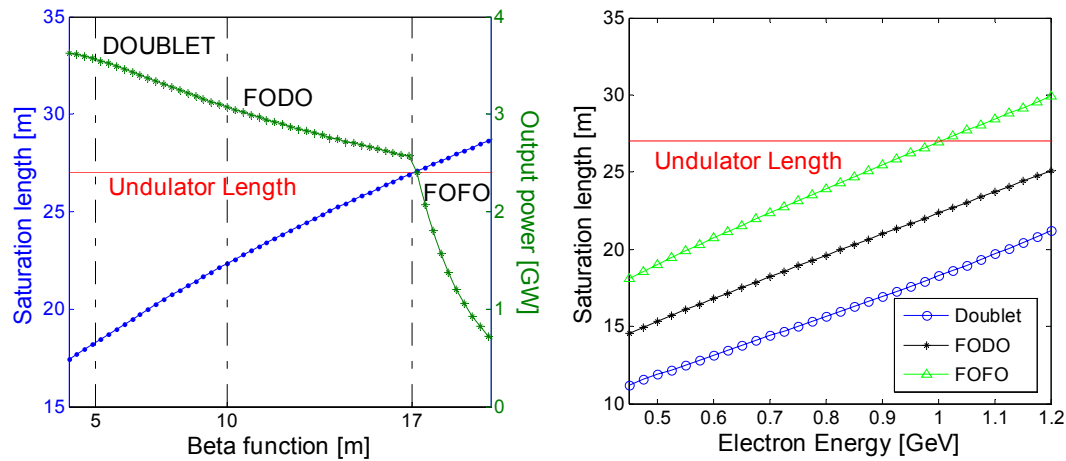


Undulator optics

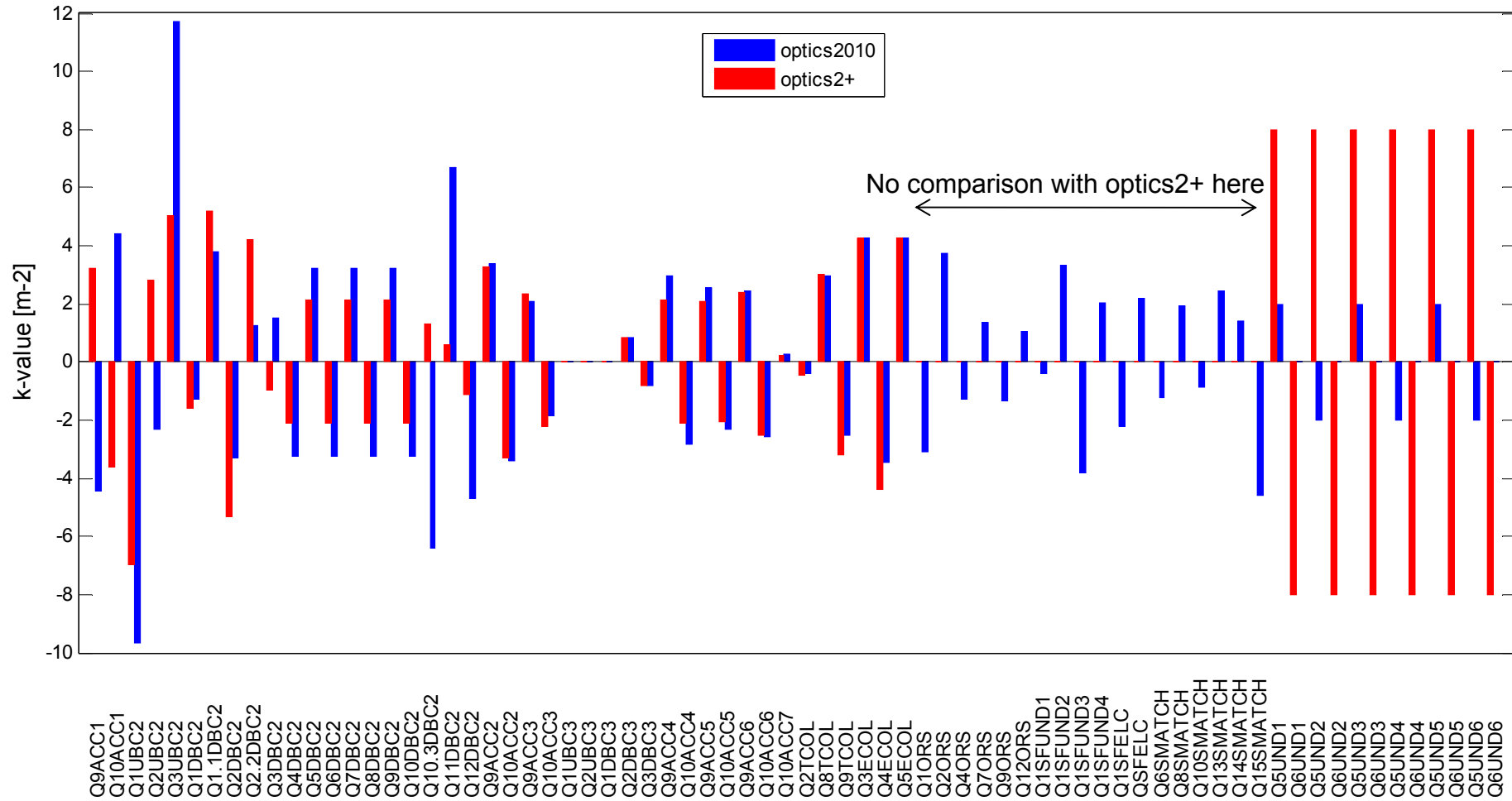


Q5UND* and Q6UND* have now different power supplies. Both FODO (k=2) and doublet (k=8) configurations are possible.
FODO is better for alignment, worsening of FEL performance is acceptable.

Numerical Estimations (M. Xie)
E=1GeV, I=2KA, $\epsilon=1.5 \mu\text{m}$, $\Delta E=0.2 \text{ MeV}$



Quadrupole strengths



Error sensitivities

Mismatch error for 1% individual quad field error

