DFS in the BDS

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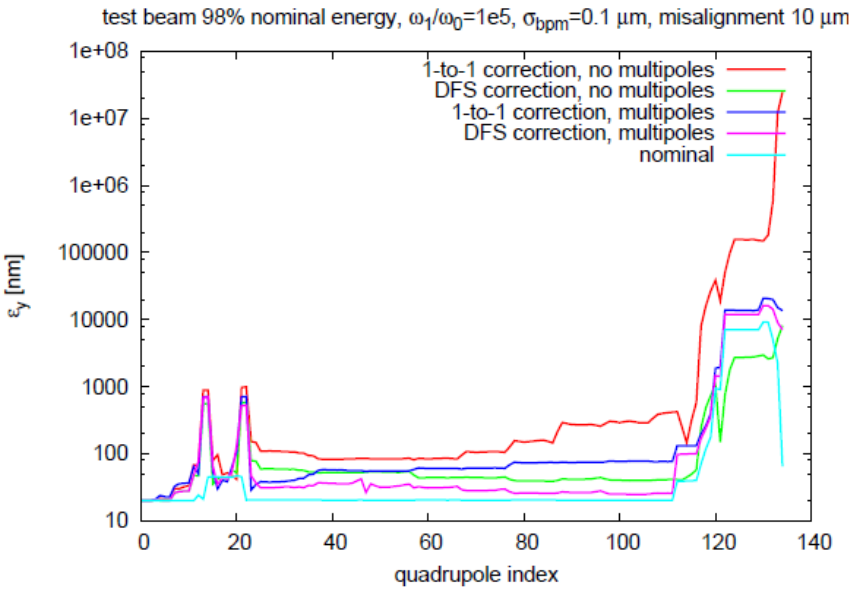
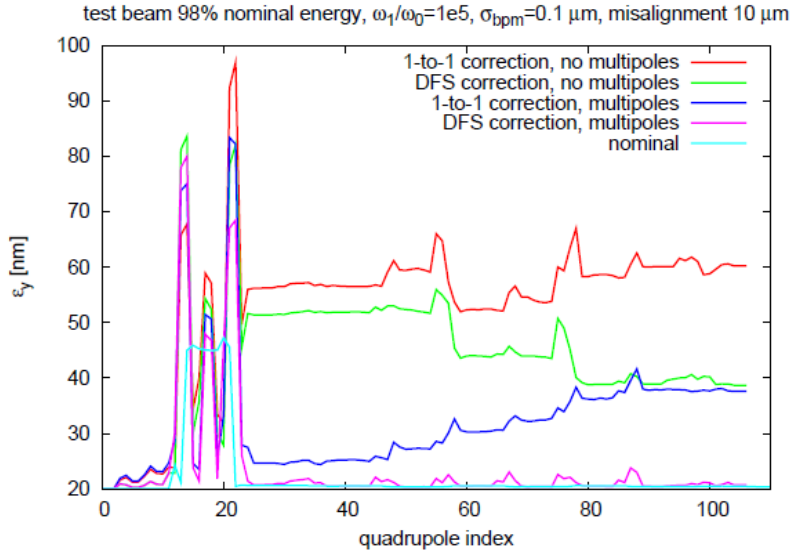
Dispersion-Free-Steering in the BDS



DFS in all the BDS (Collimation + Final Focus section) gives a huge final vertical emittance …



DFS in the Collimation section gives a final vertical emittance $\Delta\varepsilon_y$ = 0.7 nm

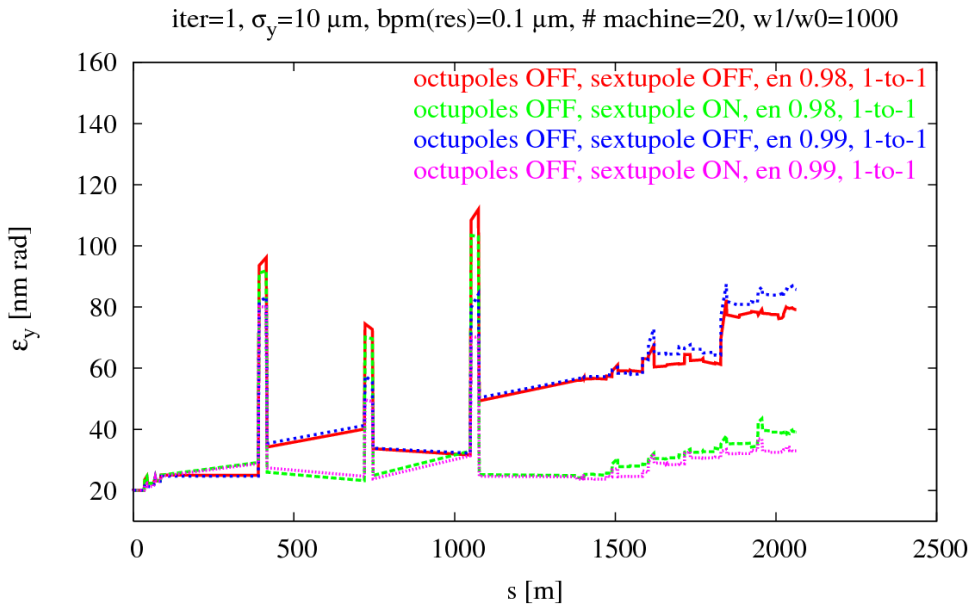
A. Latina et al. CLIC-Note-753

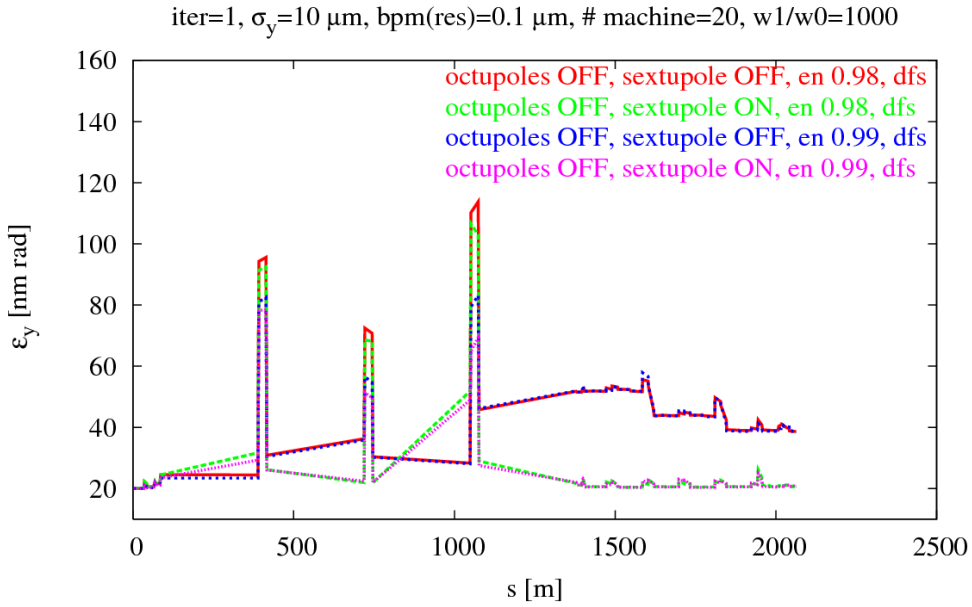
Alignment strategy

- Compute the linear response matrix R (multipoles off, no SR) for the nominal beam and a test beam R1 with E = 98% E_0
- Machine misalignment 10 μm, applied to quadrupoles and bpms (except the last one)
- Dipole correctors (+ bpms) added to the lattice (one every quadrupole)
- Turn off the sextupoles
  - 1-to-1 correction (see paragraph 5.5.3 E. Adli PhD thesis)
  - dispersion free steering (see paragraph 5.5.4 E. Adli PhD thesis)
- Turn on the sextupoles
  - 1-to-1 correction
  - dispersion free steering

$\Rightarrow$ repeat the 4 steps with octupoles on or off

Results with placet-00-95-04 (1/2)



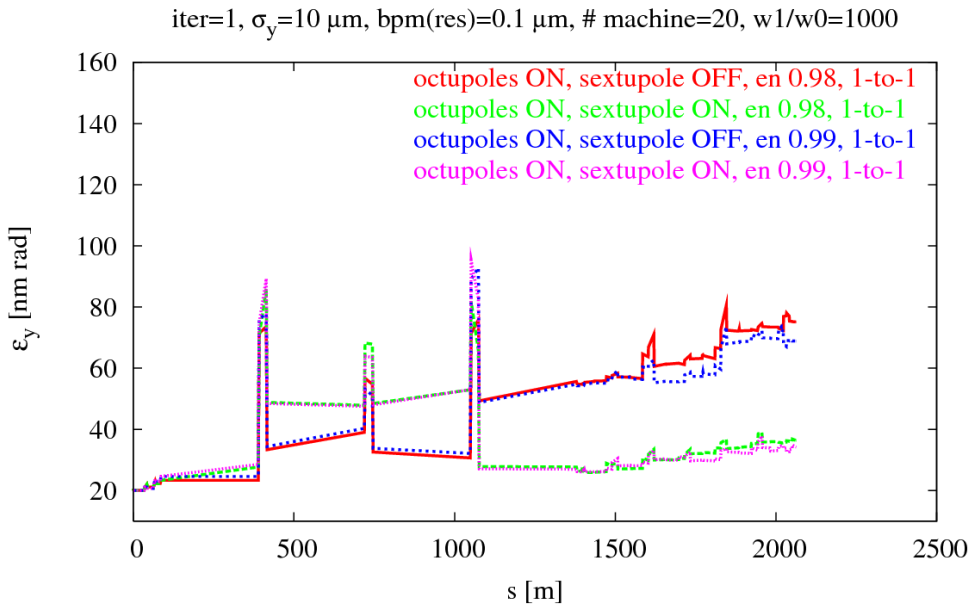


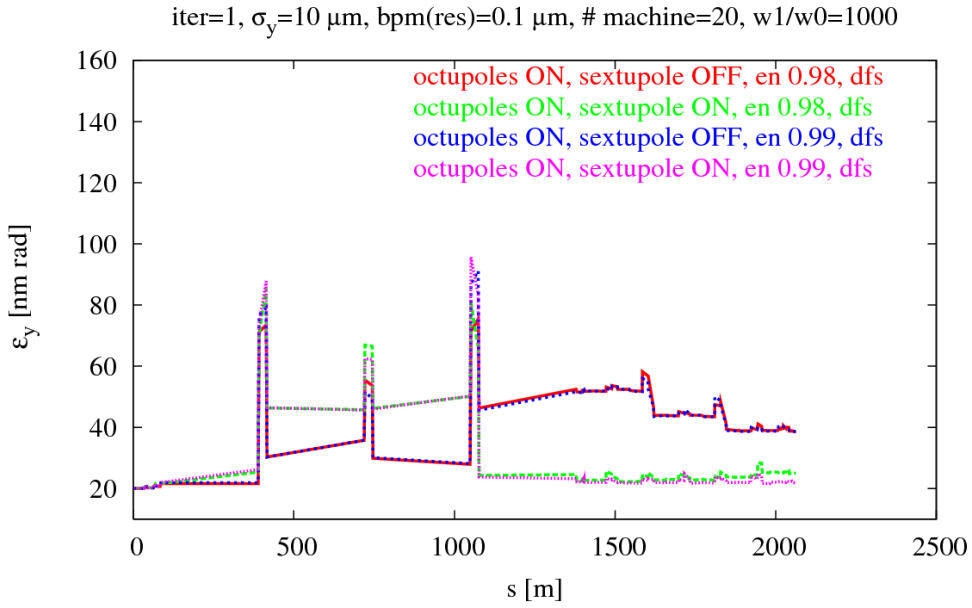
- iter : number of time DFS is applied
- # machine : number of machines simulated (results are the average)
- w1/w0=1000 : w1=1000 and w0=1
- en 0.98 : test beam with 98% of nominal beam energy
- en 0.99 : test beam with 99% of nominal beam energy (collimation section accepts beam energy errors < 1.3%)

Final emittance (sextupoles ON):

	en 0.98 $\Delta\varepsilon_y$ [nm rad]	en 0.99 $\Delta\varepsilon_y$ [nm rad]
1-to-1	19.1	13.0
Dfs	0.6	0.6

Results with placet-00-95-04 (2/2)





- octupoles ON

	en 0.98 $\Delta\varepsilon_y$ [nm rad]	en 0.99 $\Delta\varepsilon_y$ [nm rad]
1-to-1	16.4	14.2
dfs	5.0	1.7

Next step

- Apply DFS in the last collimation section lattice
  - w or w/o spoilers ?
  - w apertures
  - ?

- Request (for integrated studies): can we fix the matching section between LINAC and BDS (main linac lattice4a or lattice4b?) and use the same lattices in all simulations

=> easier to compare results