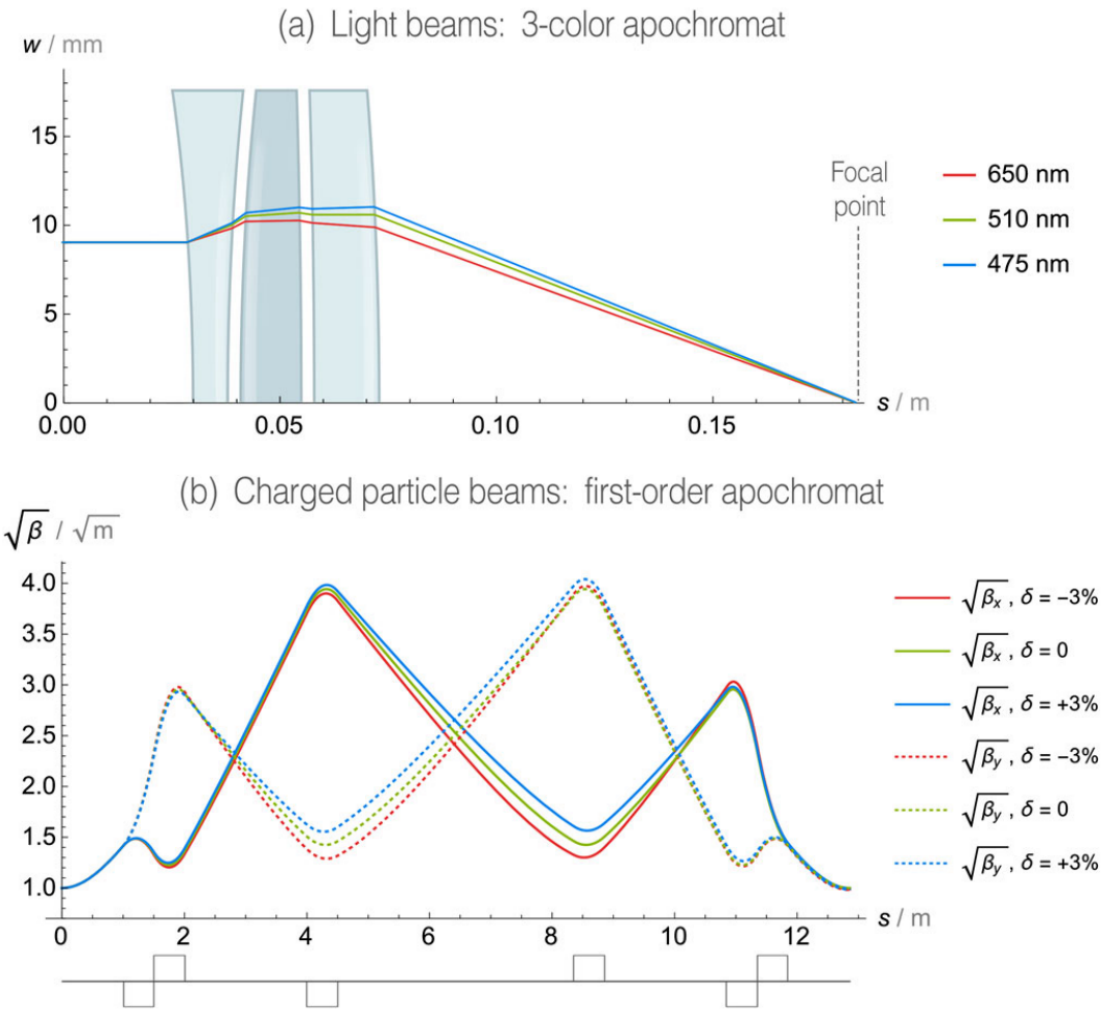
An apochromat lattice among targets



Chromaticity correction w/o sextupoles+dipoles

C. A. Lindstrom and E. Adli. Design of general apochromatic drift-quadrupole-drift beam lines. PRAB 19, 071002 (2016)

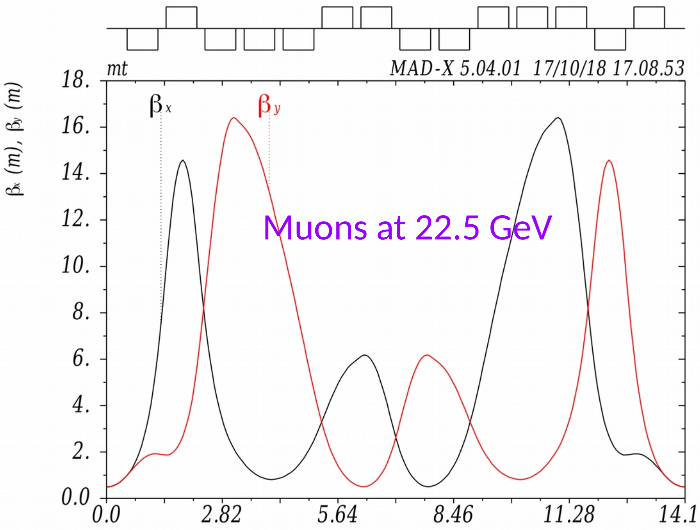
https://journals.aps.org/prab/pdf/10.1103/PhysRevAccelBeams.19.071002

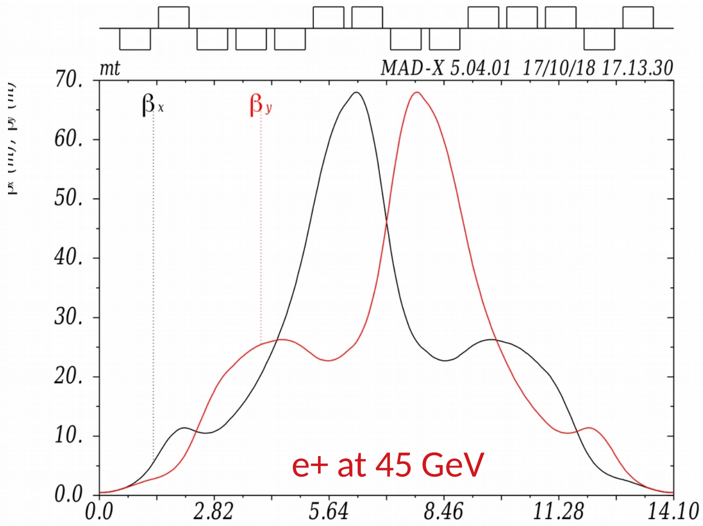
The emittance growth wrt the chromatic function W is

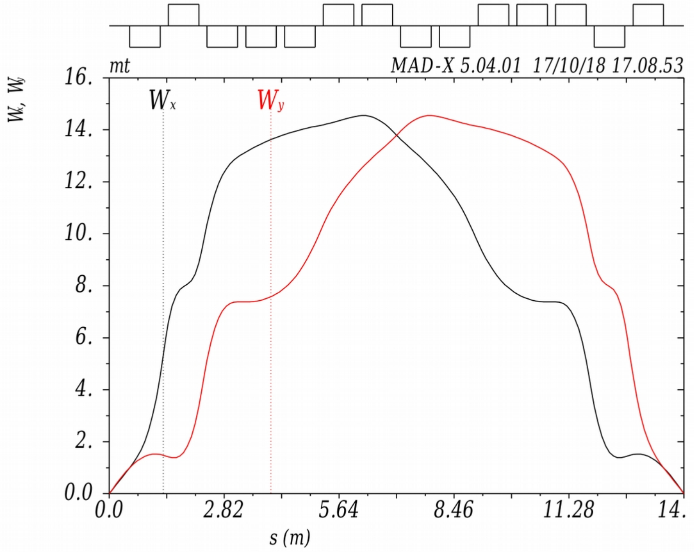
$$\frac{\Delta \epsilon}{\epsilon} = \frac{1}{2} W^2 \sigma_E^2 + 0(\sigma_E^4)$$

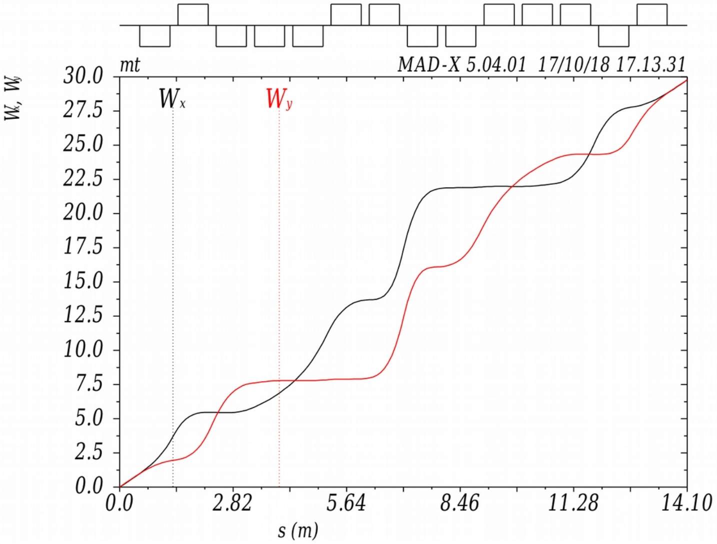
Our case must be apochromatic at two different energies : e+ at 45 GeV, and μ+/μ- at 22.5 GeV

Lattice L=14.1m, β*=0.5m, L*=0.5m, muon apochrom, pos chrom W=30









Lattice length = 14.1m
μ and e+ beams are focused
(β*=0.5m, L* = 0.5m)

μ chromaticity is corrected
e+ chromaticity is not corrected

$$\frac{\Delta\epsilon}{\epsilon} = \frac{1}{2} W^2 \sigma_E^2 + 0(\sigma_E^4)$$

$$\frac{\Delta\epsilon}{\epsilon} = \frac{1}{2} 30^2 (1\%)^2 = 4.5\%$$

Space among magnets is 0.2m
Gradients should be OK :

$$\frac{\partial B_y}{\partial x} = \frac{(K1L)}{L} B\rho$$

NAME	s[m]	L[m]	Grad [T/m]
"QA1"	1.25	0.75	-59.9
"QA7"	2.2	0.75	83.4
"QA2"	3.15	0.75	-43.3
"QA3"	4.1	0.75	-11.5
"QA6"	5.05	0.75	-14.3
"QA4"	6	0.75	23.7
"QA5"	6.95	0.75	50.1