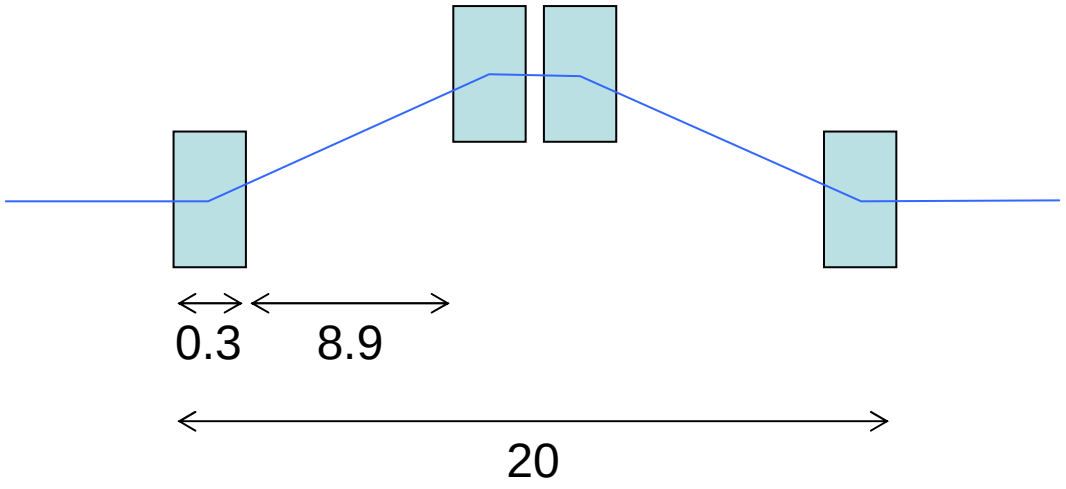
XFEL-BC2 vs energy, absolute chirp = const



chirp = 9.634 MeV/100µm compression = 5

E/MeV =	R56/mm =	R_{bend}/m =
511	–4.24	19.651
1000	–8.30	14.050
1500	–12.46	11.473
2000	–16.60	9.938
2500	–20.76	8.890

initial distribution: ideal gaussian, q = 1nC, σ = 100 µm, dE=5keV@50A

$\varepsilon_{nx} = 10^{-6}$, β_x = 47.5 m, α_x = 2.3

$\sigma_y = 100\ \mu m \cdot (1000/\gamma)^{1/2}$

XFEL-BC2 vs energy, absolute chirp = const

E/MeV =	(slice) emitt. ≈	(proj) emitt. ≈	beta/m ≈
511	1.03/1.01	2.15/1.56	13..17/9.1..9.5
1000	1.01	1.89/1.76	10..10.6/9.1..9.5
1500	1.01	1.92/1.84	9.6..9.8/9.1..9.5
2000	1.01	1.96/1.90	9.1..9.6/9.1..9.5
2500	1.01	2.01/1.95	9.1..9.6/9.1..9.5

green's, projected method
numbers: from plots by eye

511 MeV

slice with I_peak:
Green's projected

emittance(x1) = 1.031×10^{-6}

emittance(x2) = 9.984×10^{-7}

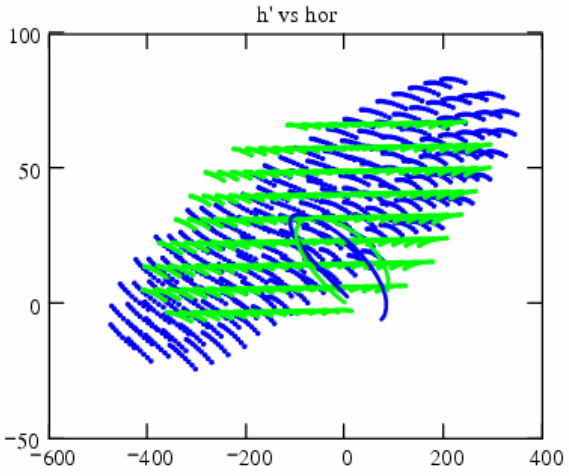
slice

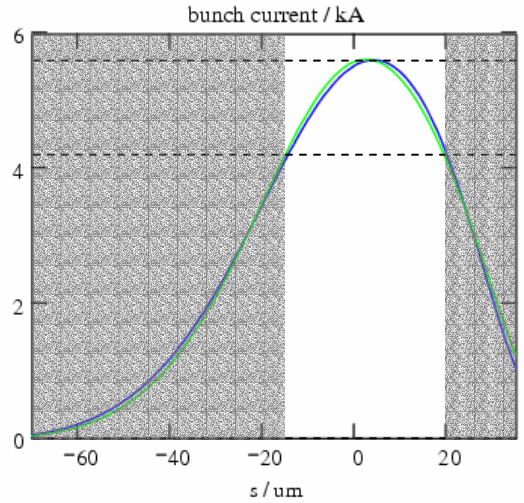
E0 = 5.11×10^{8}

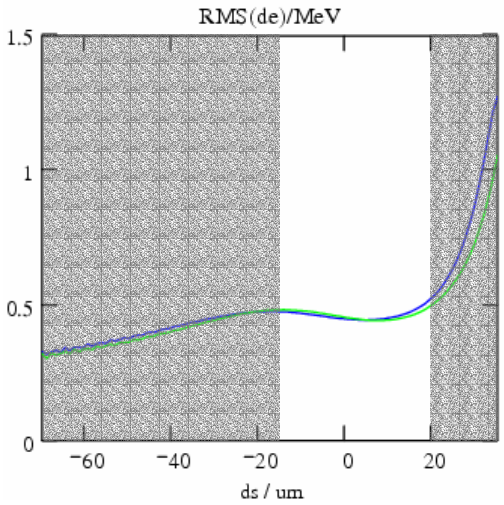
emittance(X1) = 2.147×10^{-6}

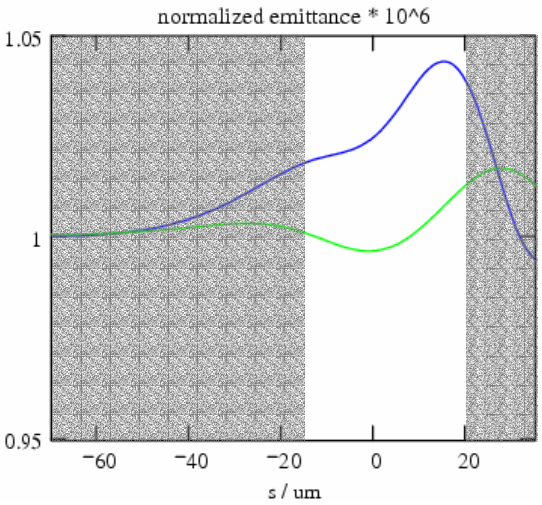
emittance(X2) = 1.555×10^{-6}

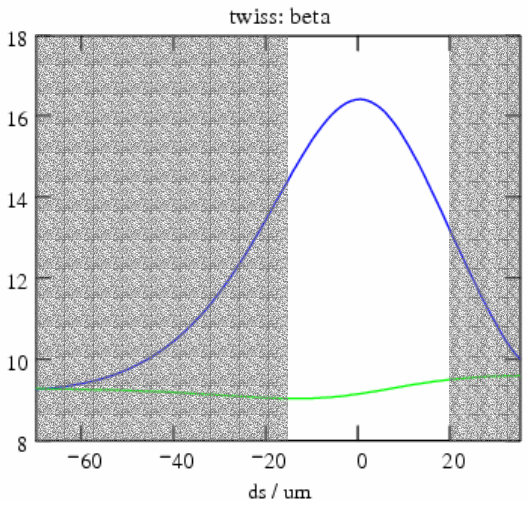
full











1000 MeV

slice with I_peak:
Green's projected

emittance(x1) = 1.003×10^{-6}

emittance(x2) = 9.98×10^{-7}

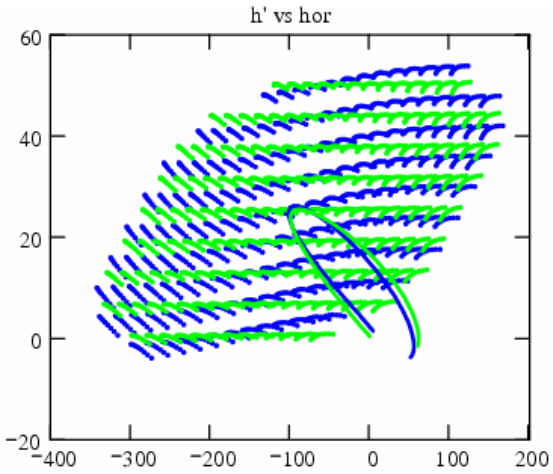
slice

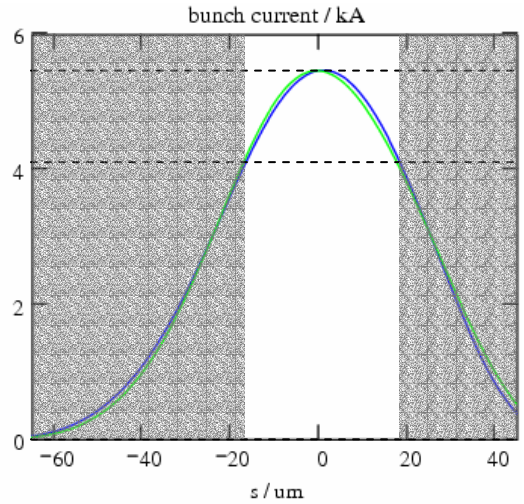
E0 = 1×10^{9}

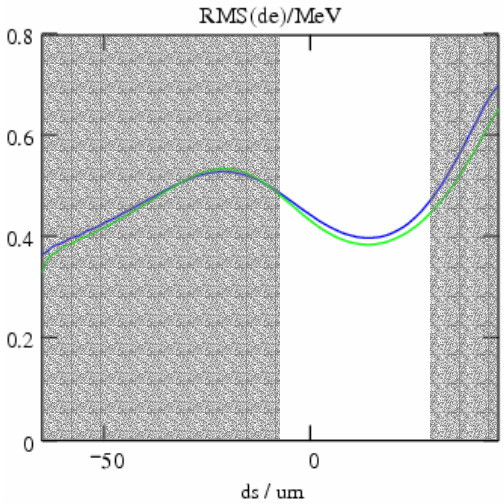
emittance(X1) = 1.887×10^{-6}

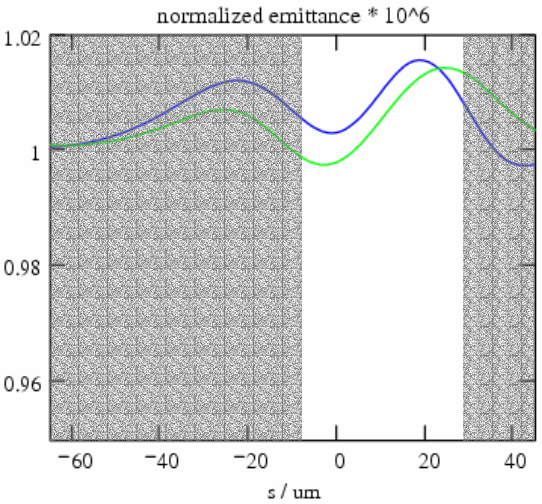
emittance(X2) = 1.755×10^{-6}

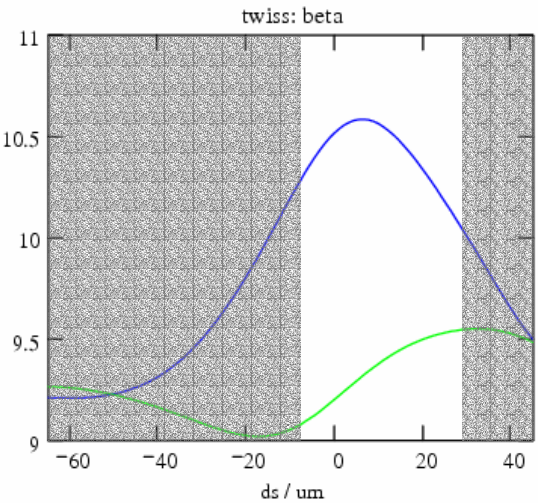
full











1500 MeV

slice with I_peak:
Green's projected

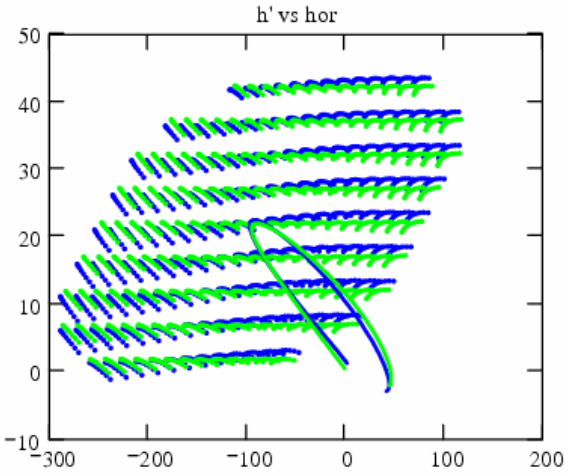
emittance(x1) = 1.002×10^{-6}
emittance(x2) = 9.988×10^{-7}

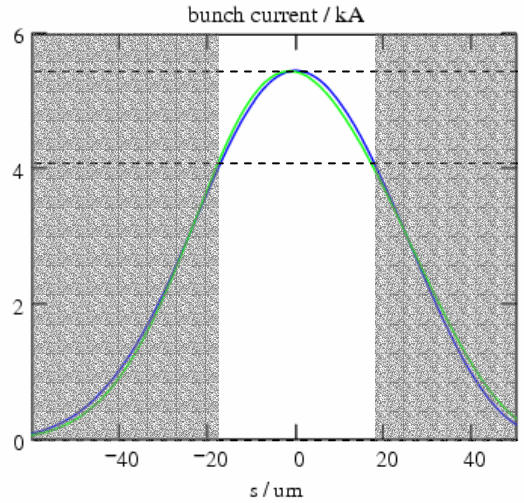
slice

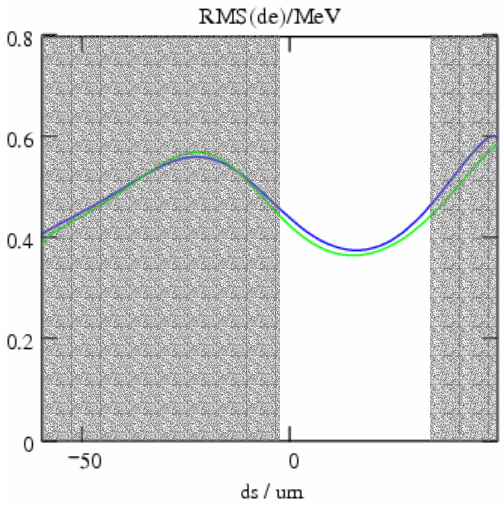
E0 = 1.5×10^{9}

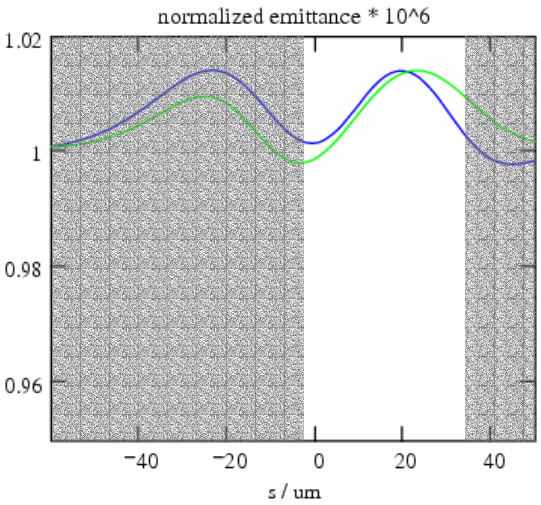
emittance(X1) = 1.917×10^{-6}
emittance(X2) = 1.844×10^{-6}

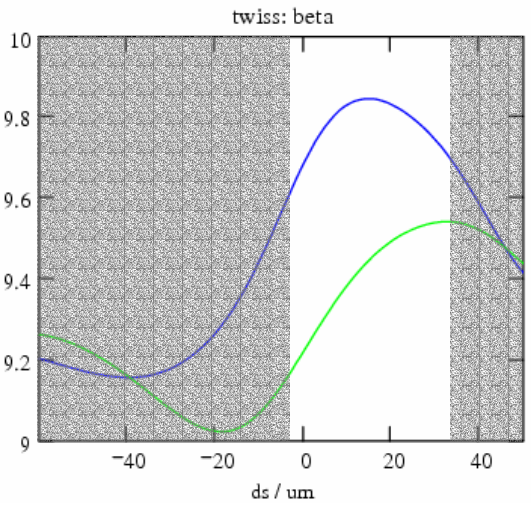
full











2000 MeV

slice with I_peak:
Green's projected

emittance(x1) = 1.001×10^{-6}

emittance(x2) = 9.994×10^{-7}

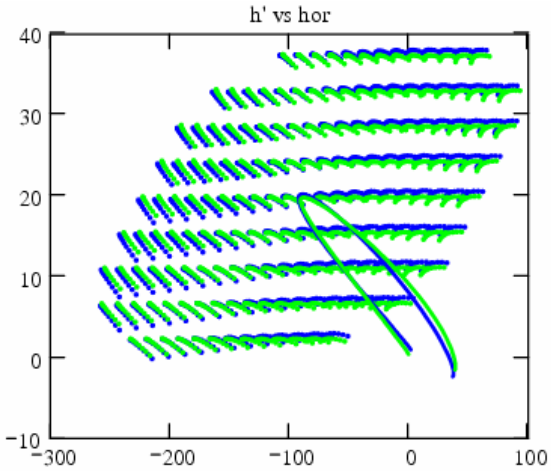
slice

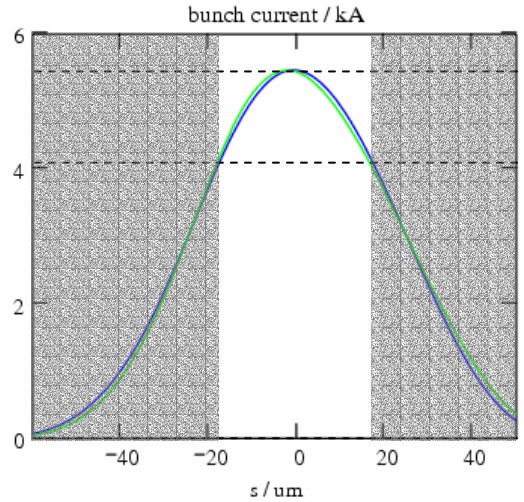
$E0 = 2 \times 10^{9}$

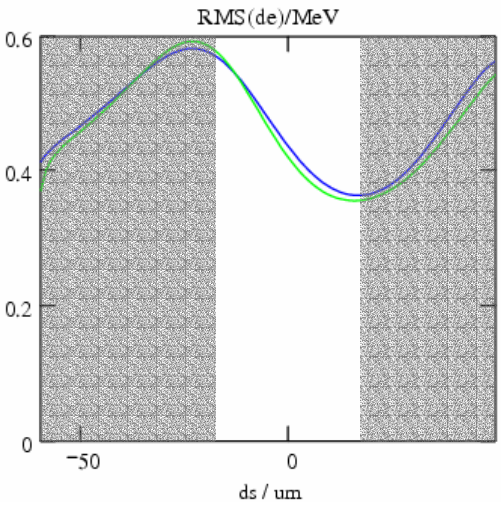
emittance(X1) = 1.963×10^{-6}

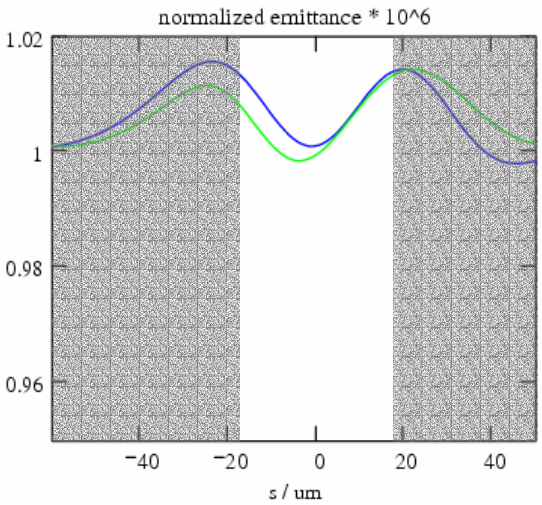
emittance(X2) = 1.903×10^{-6}

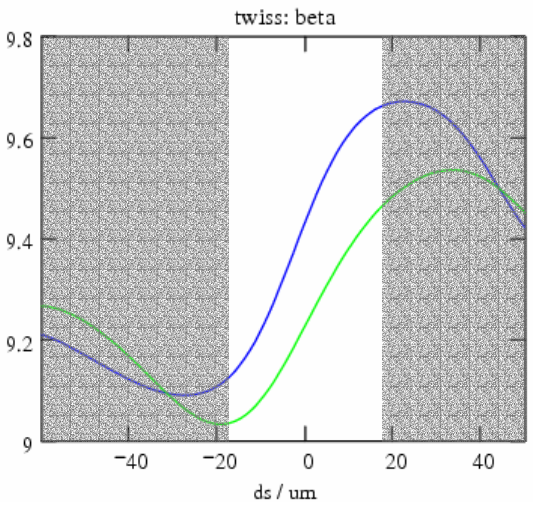
full











2500 MeV

slice with I_peak:
Green's projected

emittance(x1) = 1.001×10^{-6}

emittance(x2) = 10×10^{-7}

slice

$E0 = 2.5 \times 10^{9}$

emittance(X1) = 2.01×10^{-6}

emittance(X2) = 1.951×10^{-6}

full