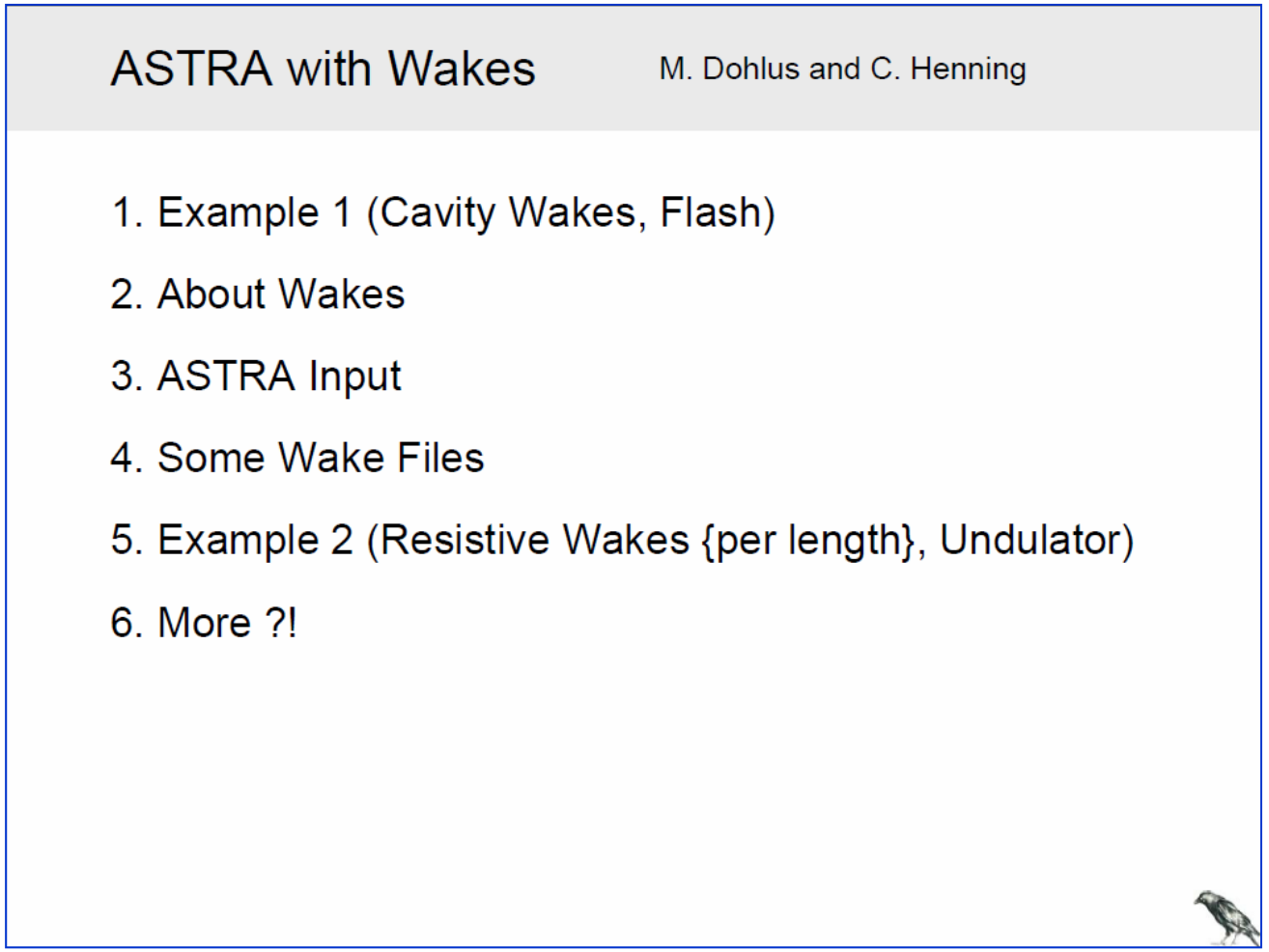
ASTRA with Wakes

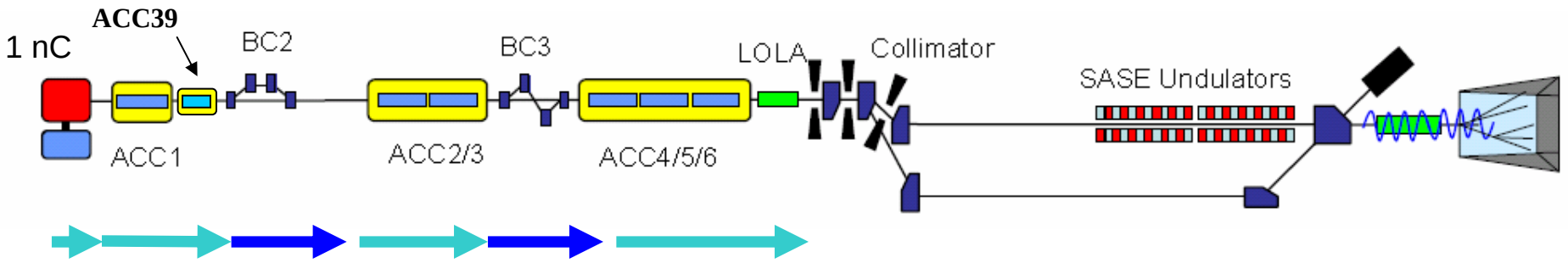
M. Dohlus and C. Henning

Seminar Mo 29th November:



7. Example 1 (Cavity Wakes, Flash) – 2nd attempt

Flash



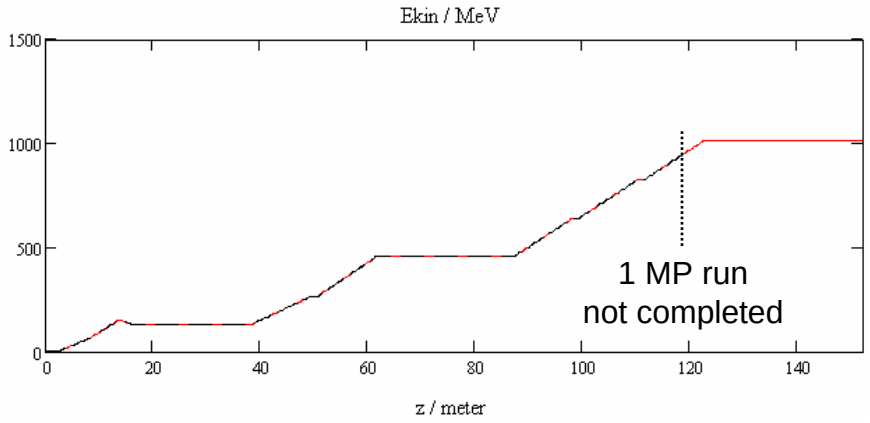
$W_1\, W_3$ $2W_1$ $3W_1$

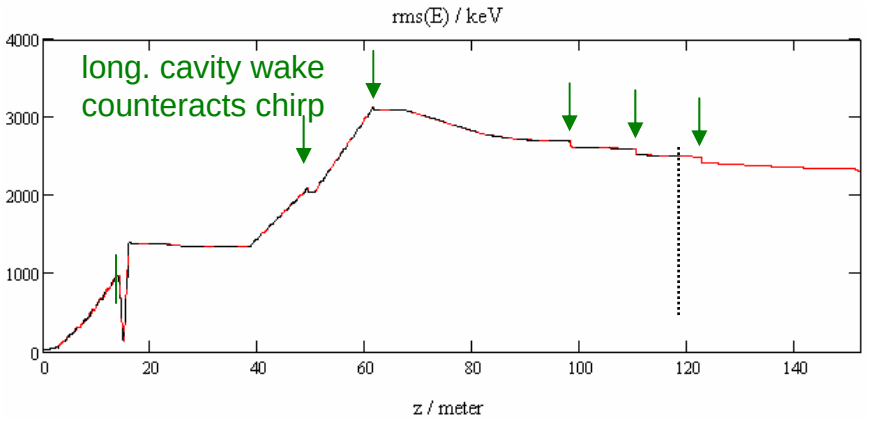
wake-cavity fields: “Taylor” = monopole + dipole

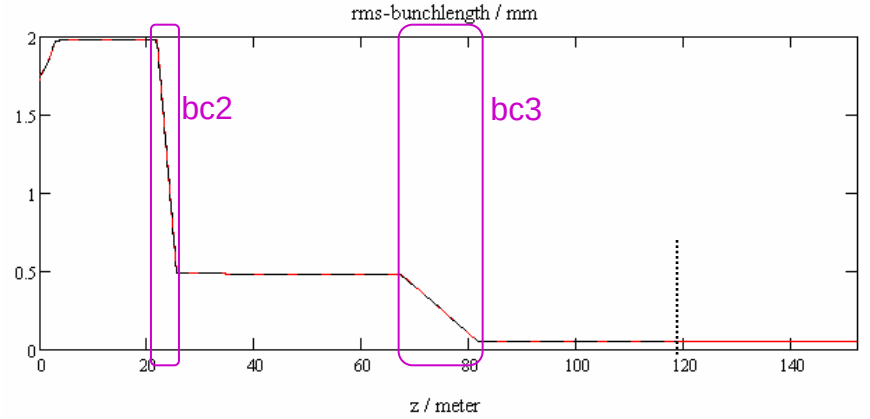
rf-cavity fields: 3d field maps (including coupler kick)

comparison: rz 200kp <--> rz 1MP

1 MP run not completed

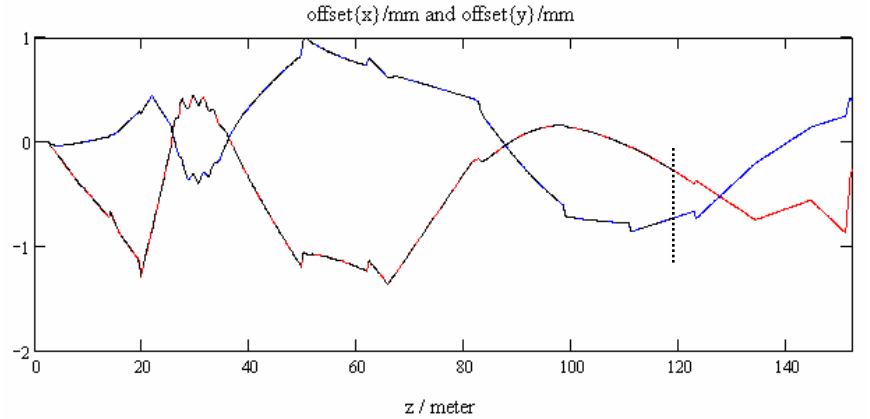






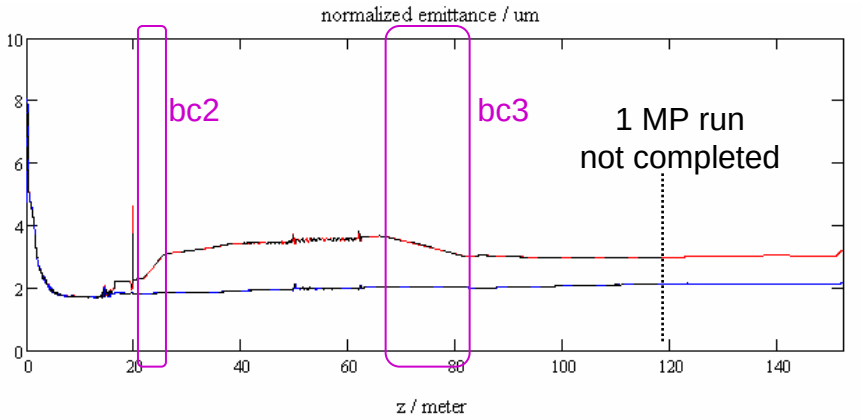
r56/mm= 150.0

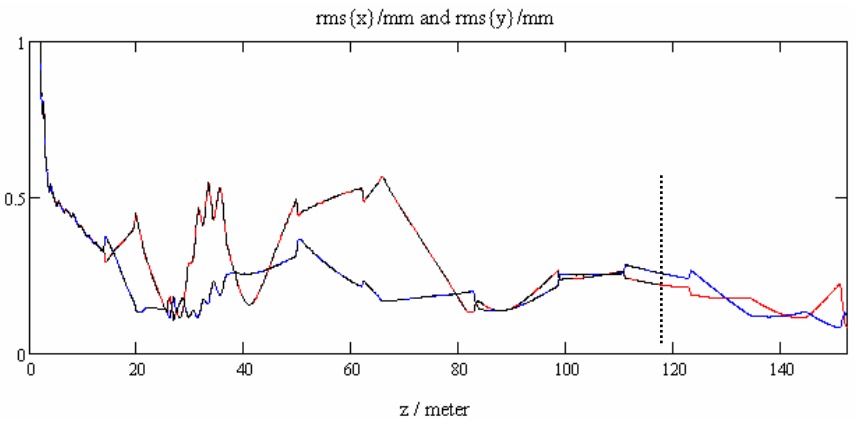
r56/mm= 66.4



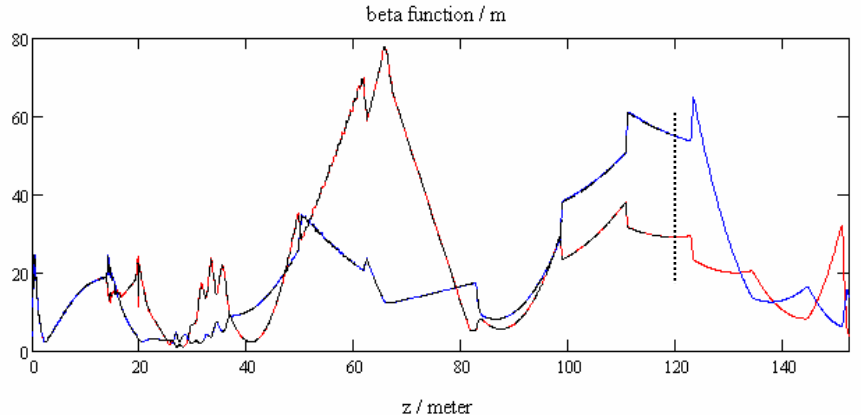
comparison: rz 200kp <--> rz 1MP

1 MP run not completed





good phase advance of optics: compensation of effects



ASTRA: rz space charge model

particle tracking: point particles

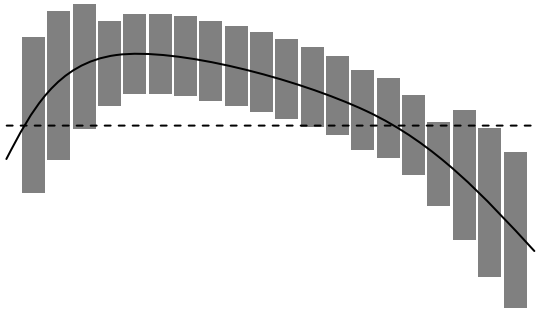
rz space charge solver: ring charges

our usual rz s2e simulations use a centroid extraction method !

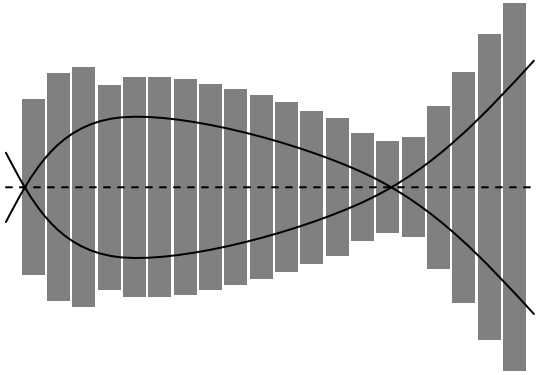
not this comparison !

ASTRA: centroid extraction method

3d: slices & centroids

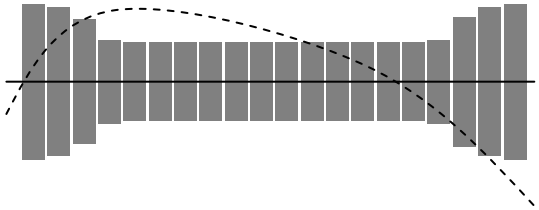


ASTRA rz-model for s.c. calculation



charge density is underestimated

1) extract centroid offsets

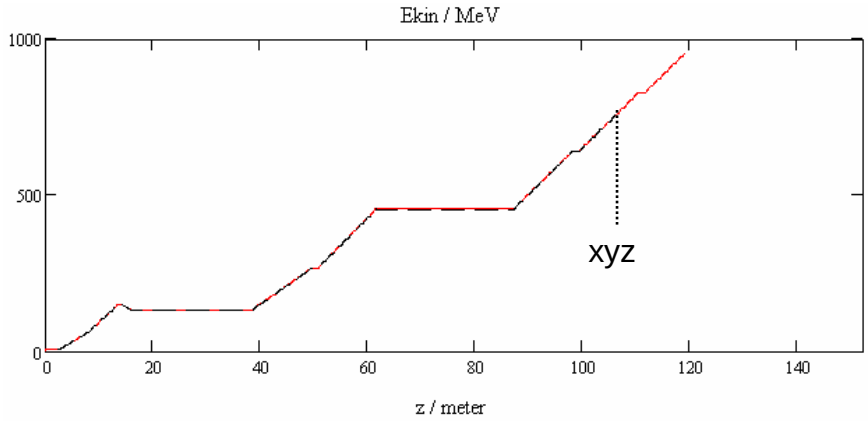


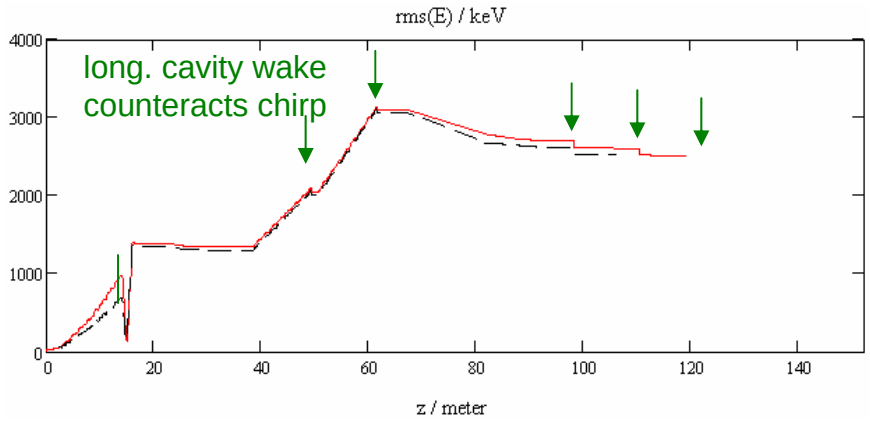
2) ASTRA tracking of particles with extracted centroid offsets
3) transport centroid offsets (matrix)
4) restore new particle coordinates (add centroid offset)

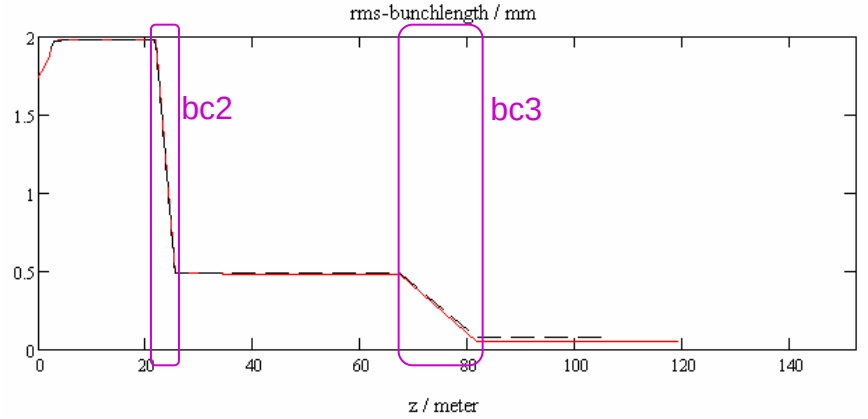
remark: 3d space charge models create more noise (or need more particles)

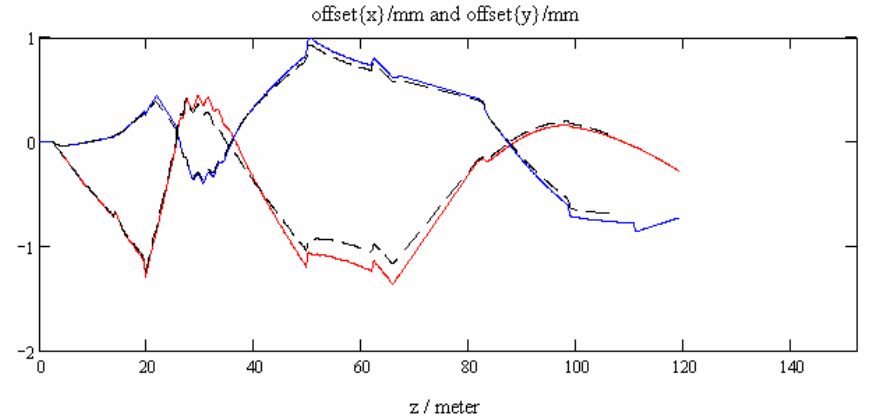
comparison: rz 1Mp <--> xyz 1MP

both runs not completed







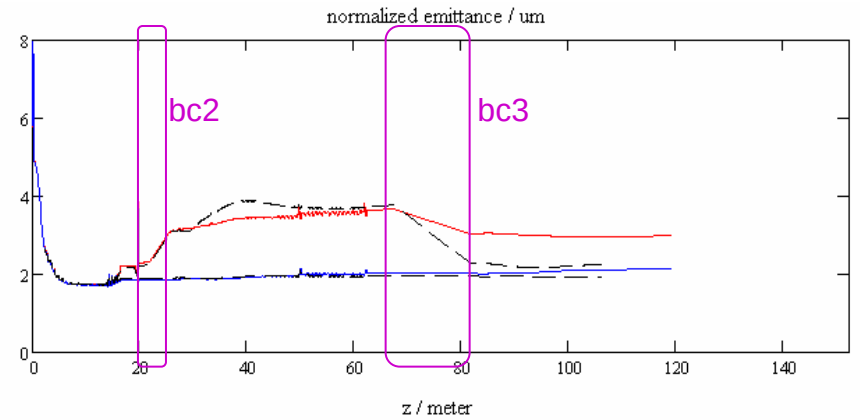


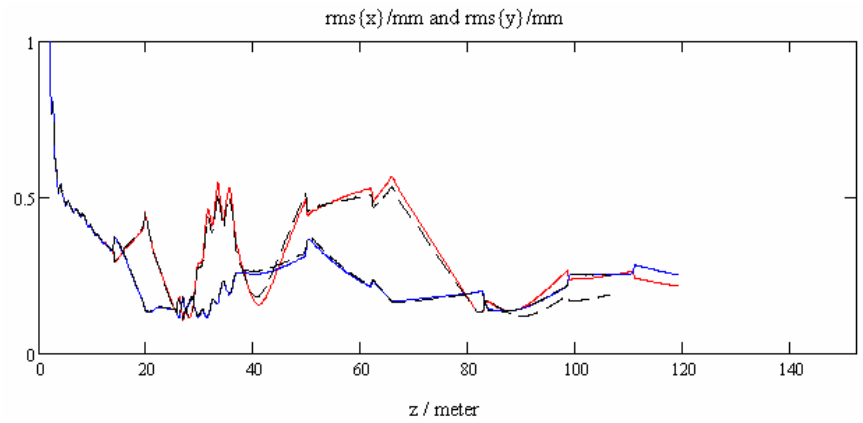
r56/mm=
150.0

r56/mm=
66.4 rz
63.4 xyz

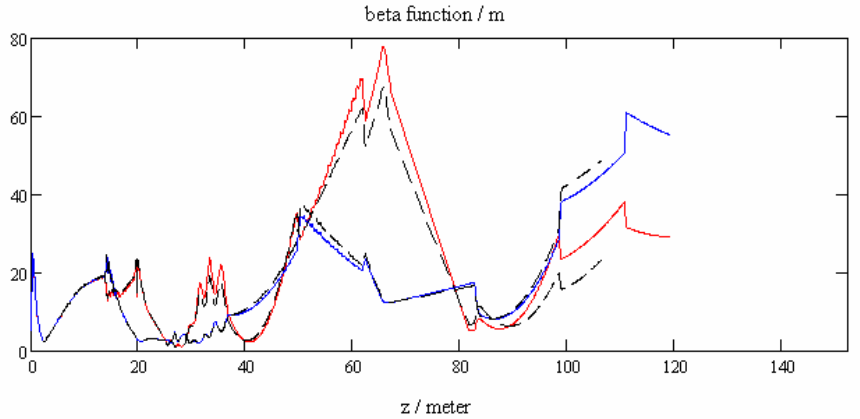
comparison: rz 1Mp <--> xyz 1MP

both runs not completed





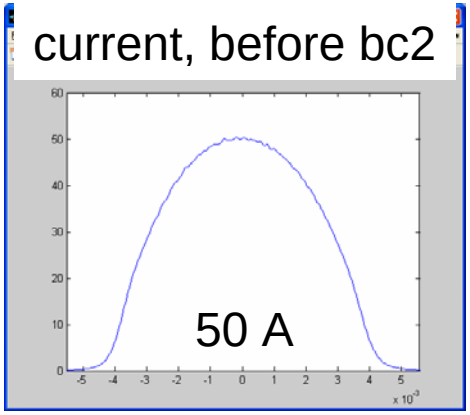
compensation of effects even better !



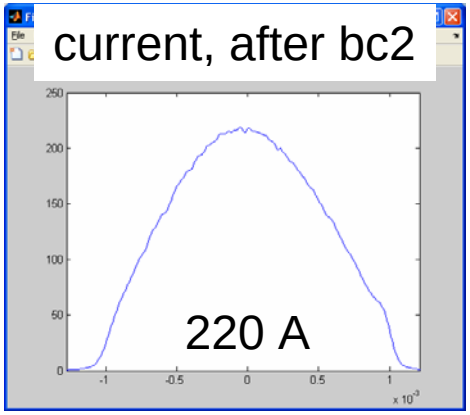
current and longitudinal phase space: rz 1MP

1 nC

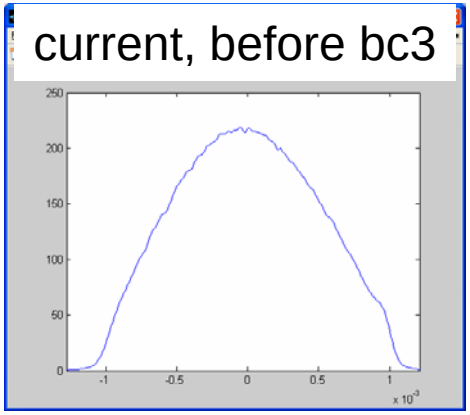
current, before bc2



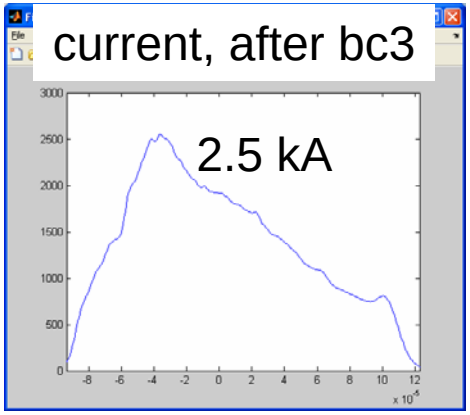
current, after bc2



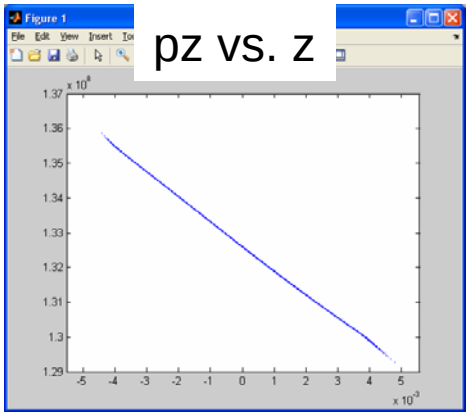
current, before bc3

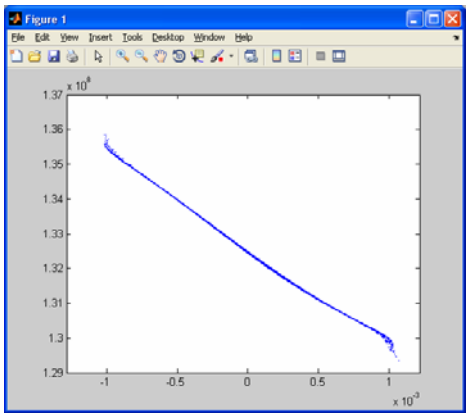


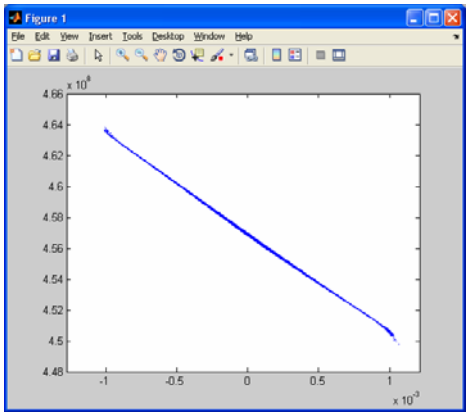
current, after bc3

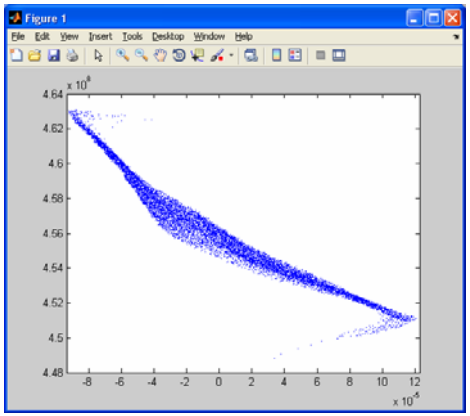


pz vs. z





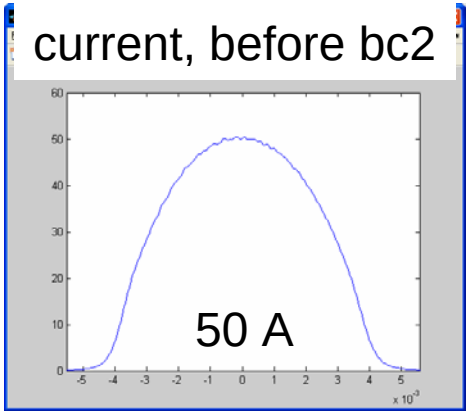




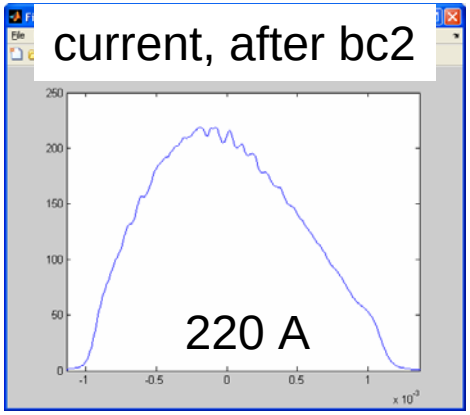
current and longitudinal phase space: xyz 1MP

1 nC

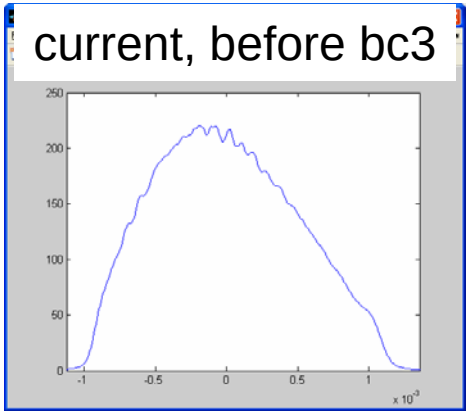
current, before bc2



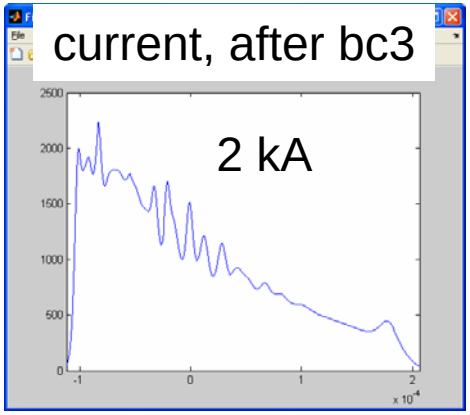
current, after bc2

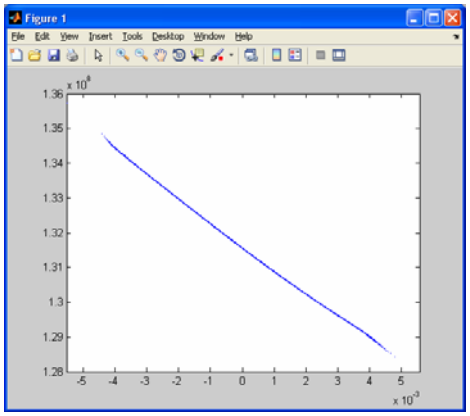


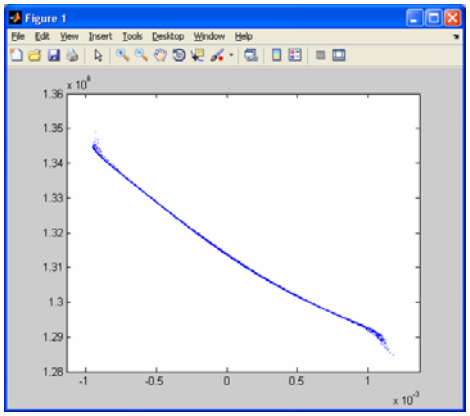
current, before bc3

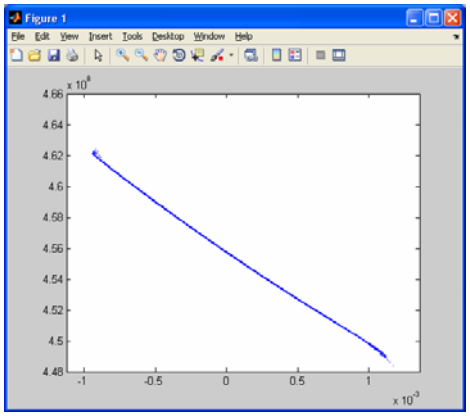


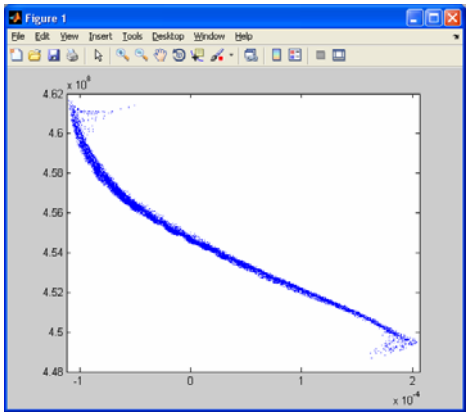
current, after bc3



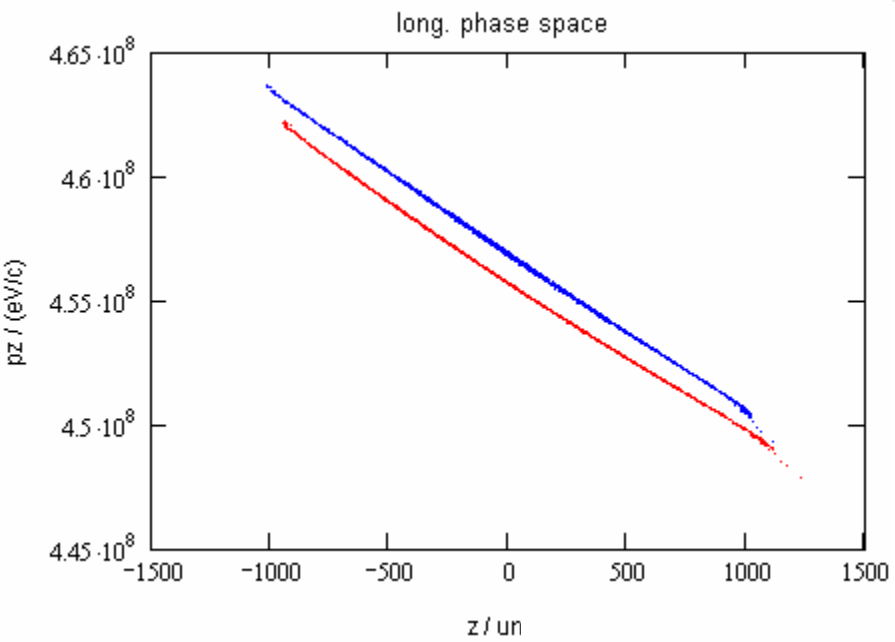


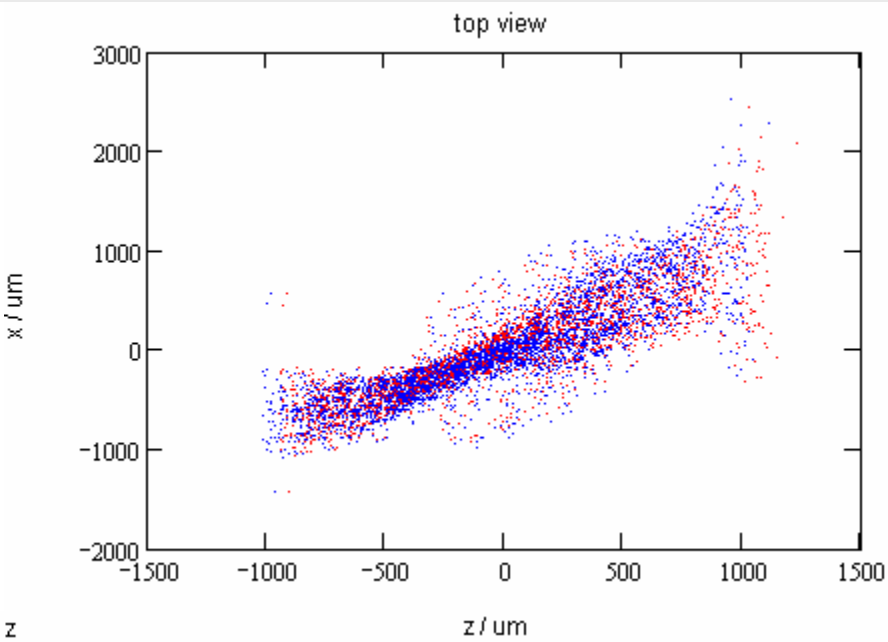


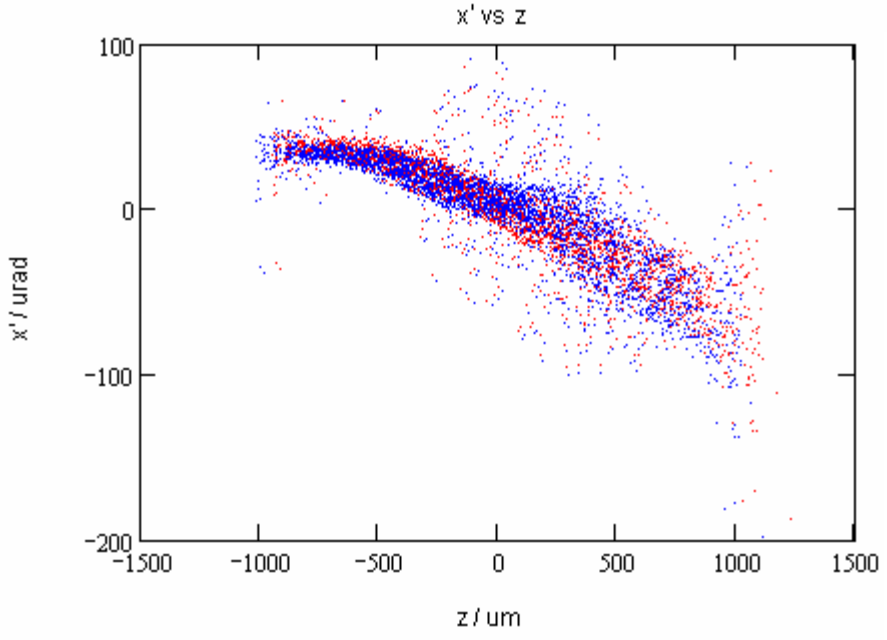




comparison xyz, rz before bc3







comparison xyz, rz after bc3