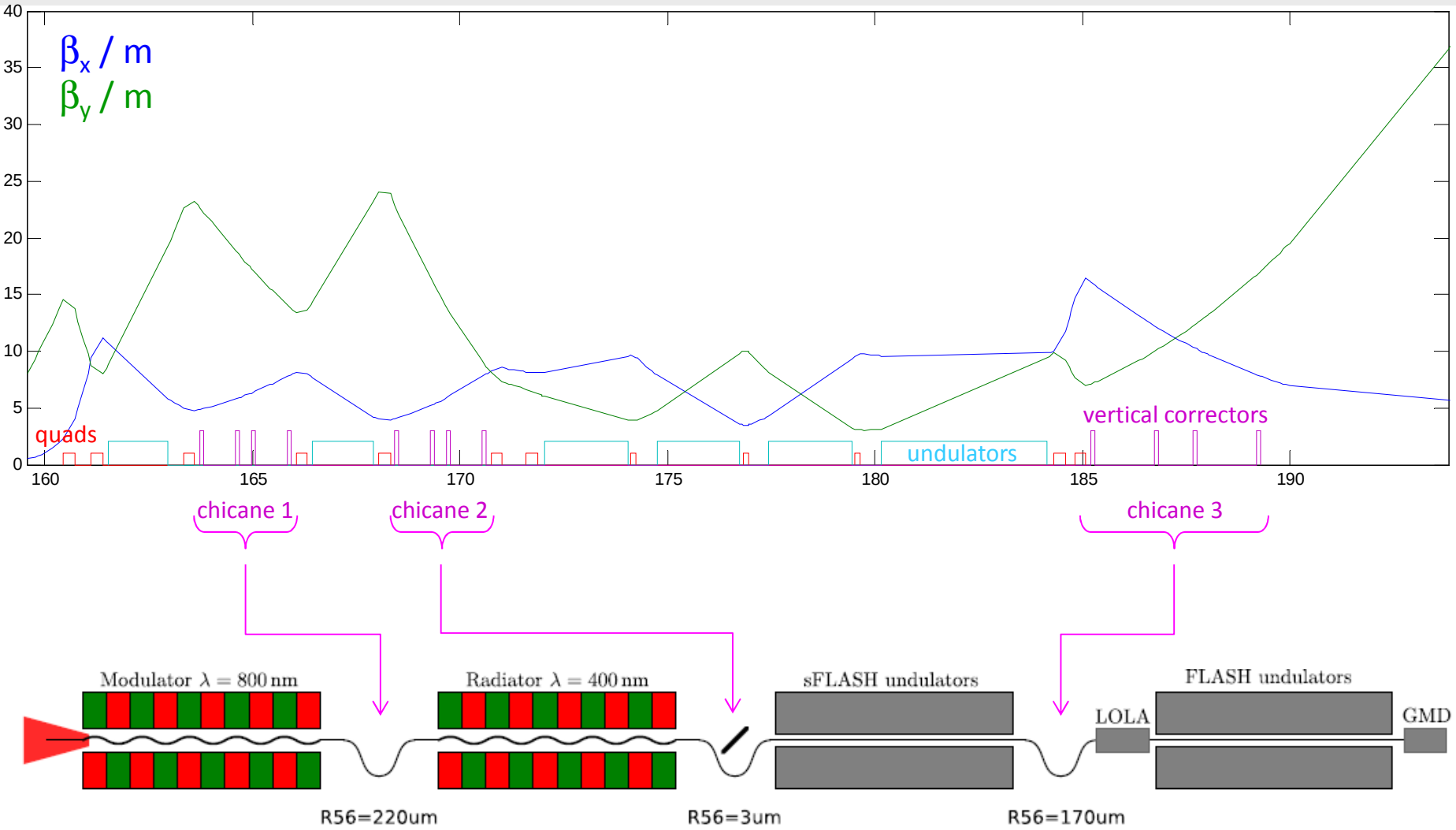
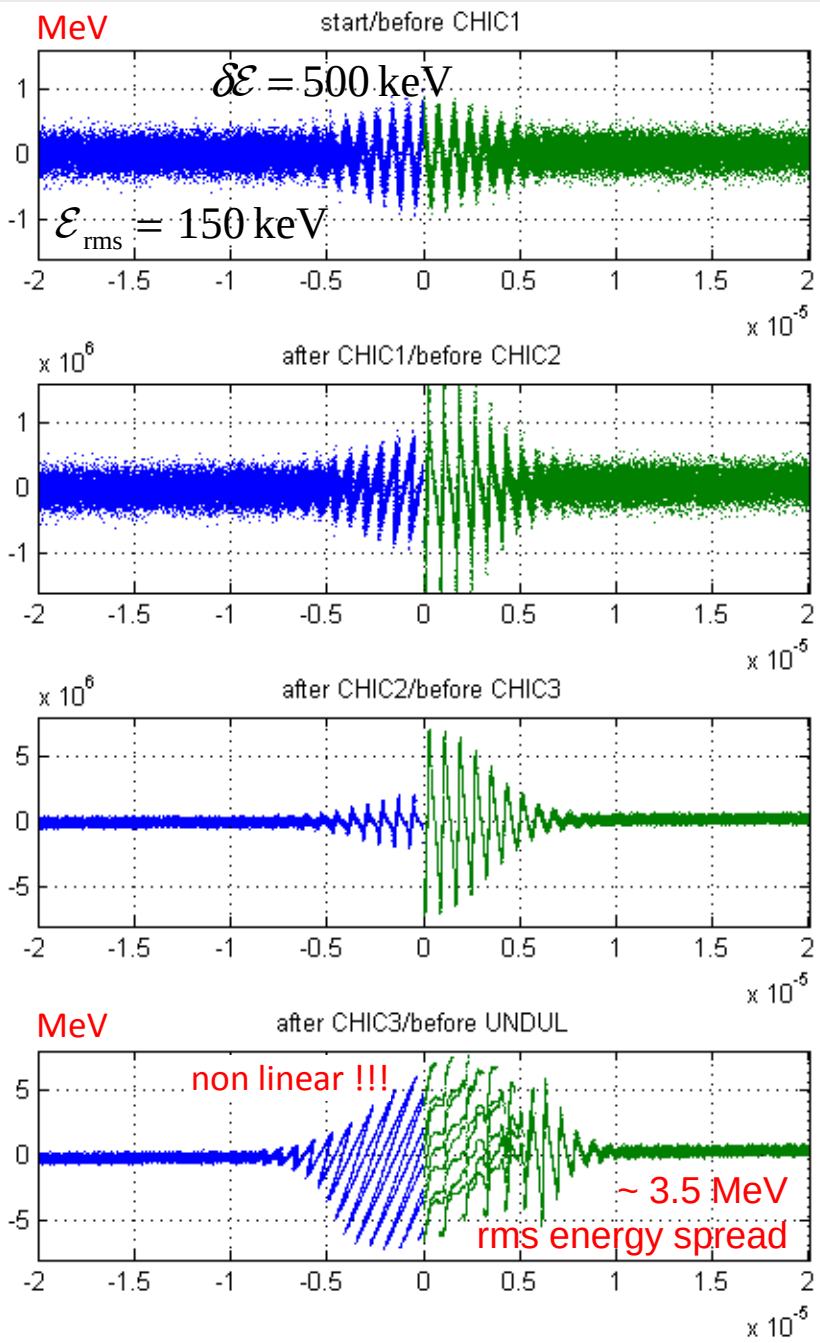
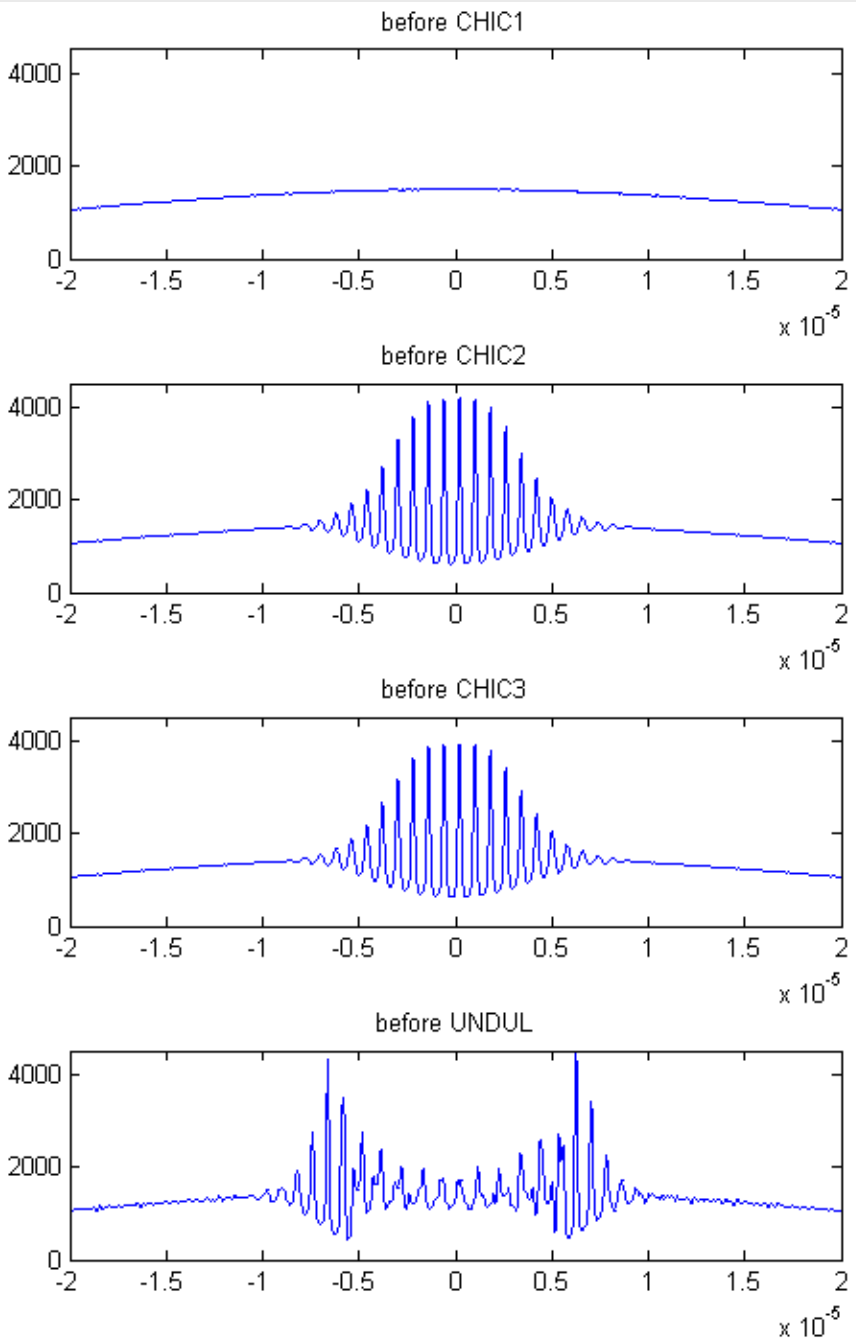
DEC 2013

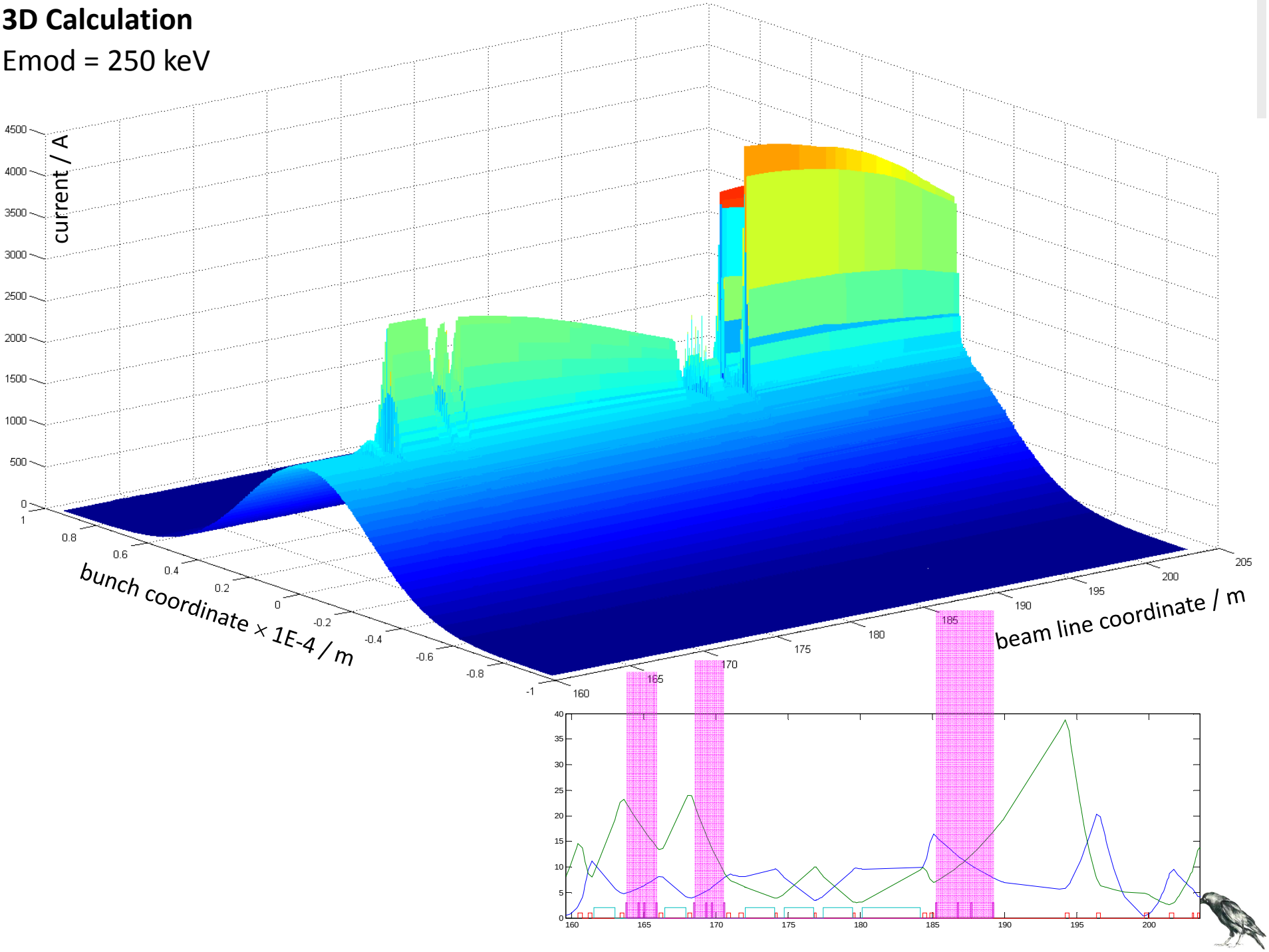

β_x / m
β_y / m
quads
undulators
vertical correctors
chicane 1
chicane 2
chicane 3
Modulator $\lambda = 800\,\mathrm{nm}$
Radiator $\lambda = 400\,\mathrm{nm}$
sFLASH undulators
FLASH undulators
LOLA
GMD
R56=220um
R56=3um
R56=170um


MeV
start/before CHIC1
$\delta\mathcal{E} = 500\,\mathrm{keV}$
$\mathcal{E}_{\mathrm{rms}} = 150\,\mathrm{keV}$
x 10^-5
x 10^6
after CHIC1/before CHIC2
x 10^-5
x 10^6
after CHIC2/before CHIC3
x 10^-5
MeV
after CHIC3/before UNDUL
non linear !!!
~ 3.5 MeV
rms energy spread
x 10^-5


before CHIC1
x 10^-5
before CHIC2
x 10^-5
before CHIC3
x 10^-5
before UNDUL
x 10^-5

3D Calculation

Emod = 250 keV



JAN 2014

periodic SC solver
(in test)

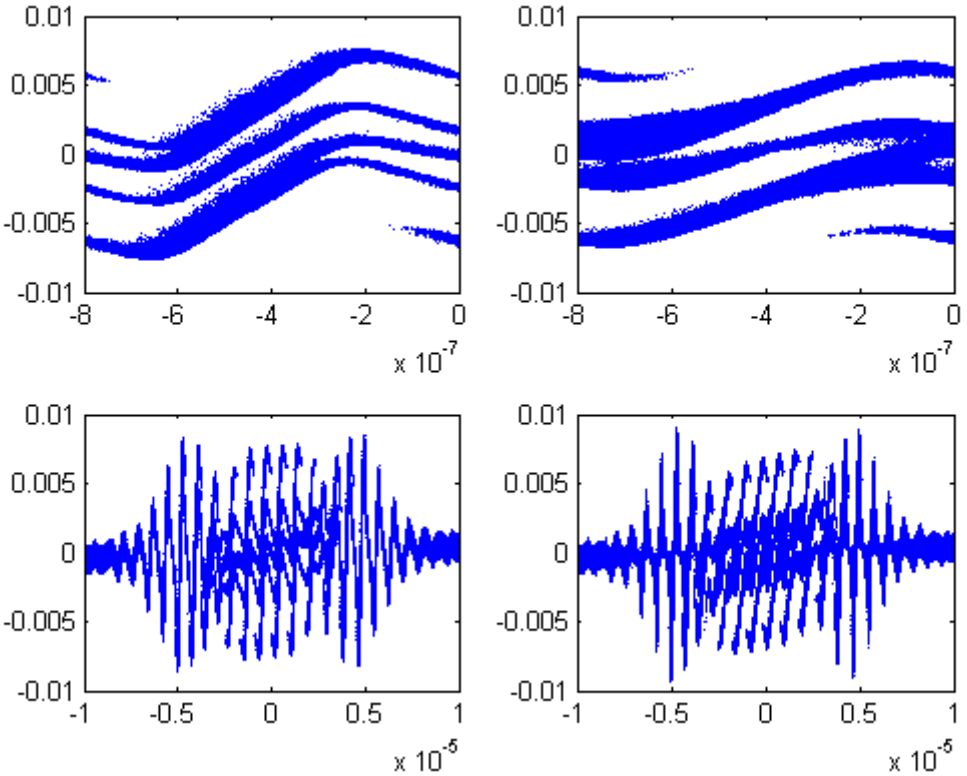
Application: SK problem

250 keV
X_0202p00000

1d 3d

periodic
~ 1E6 particles

non-periodic
20E6 particles



Application: SK problem

250 keV

X_0202p00000

same range, same (plot) density

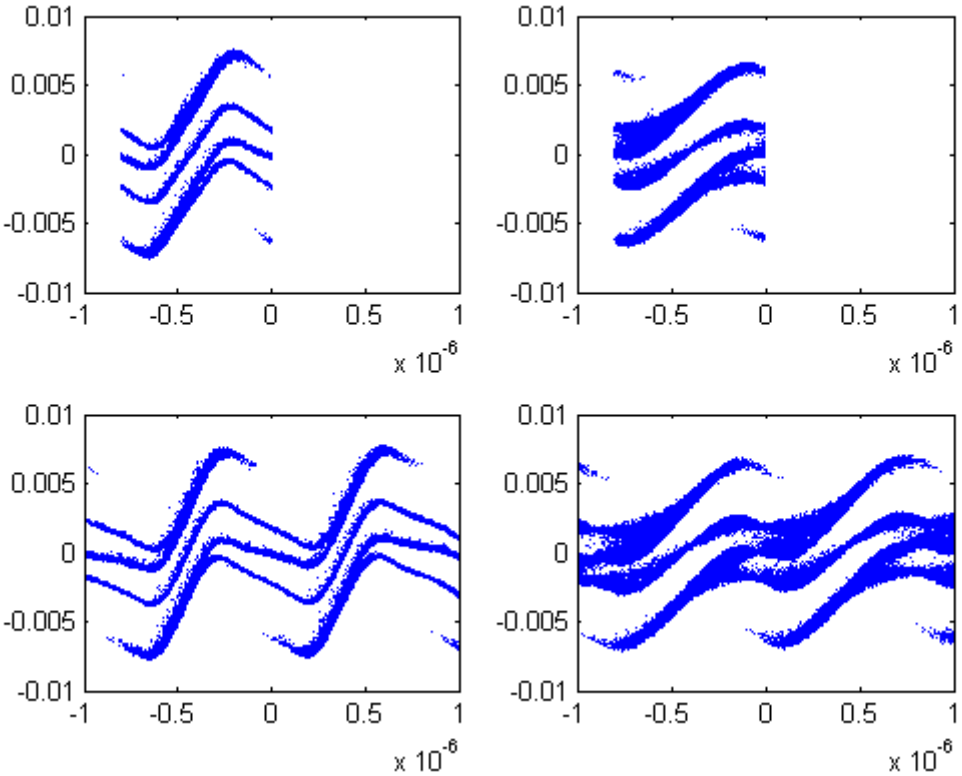
1d 3d

periodic

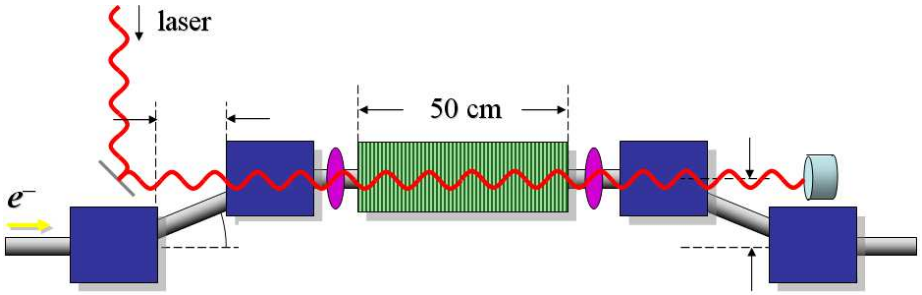
~ 1E6 particles

non-periodic

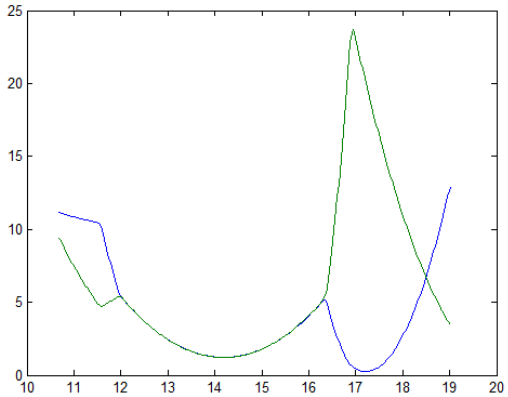
20E6 particles



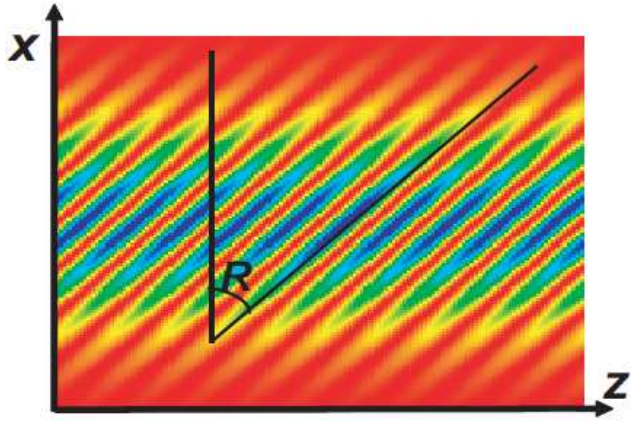
Trickle Heating in LCLS



after LH



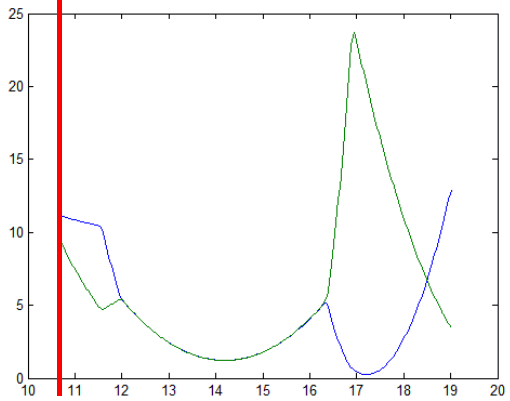
tilted microbunches



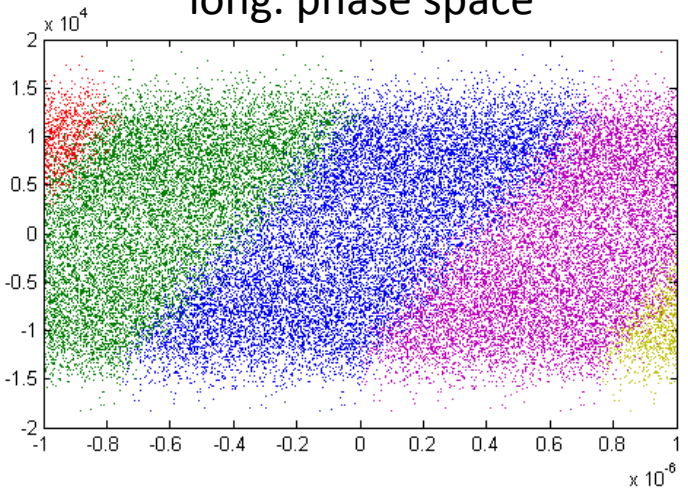
in LCLS

12.2 m

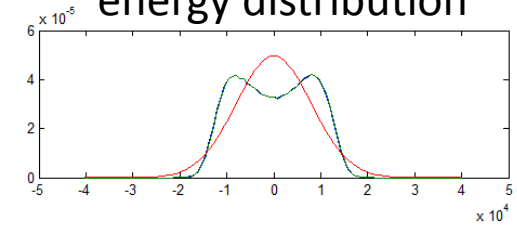
beta functions

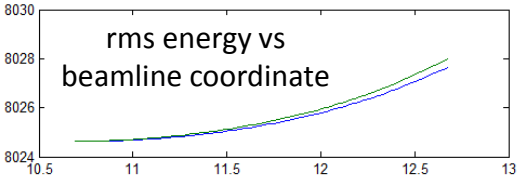


long. phase space

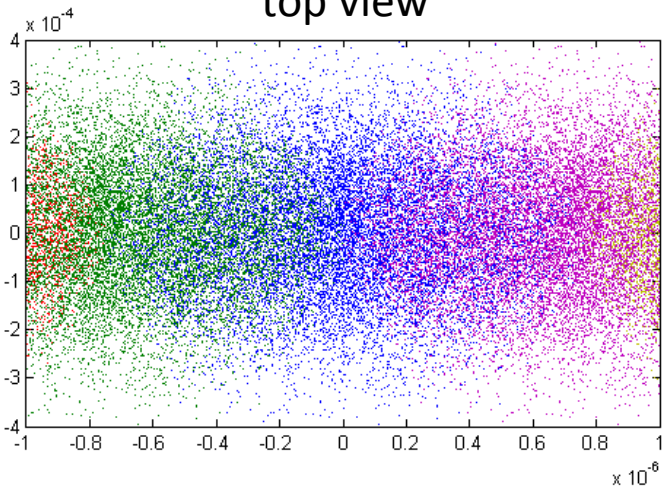


energy distribution





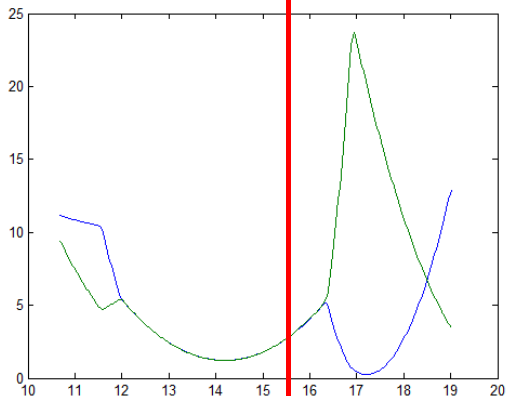
top view



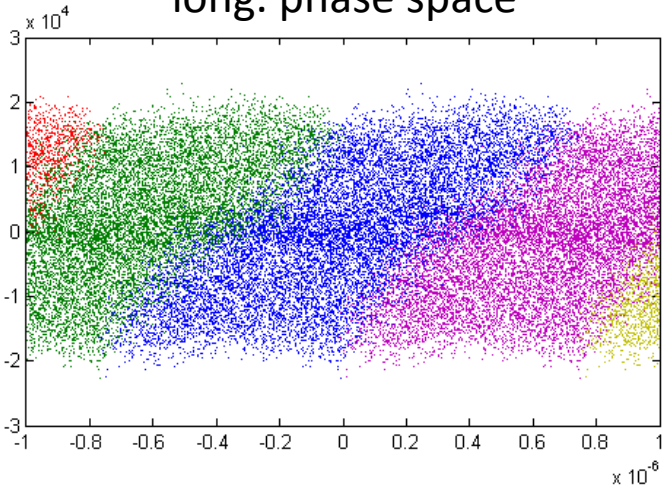
in LCLS

15.7 m

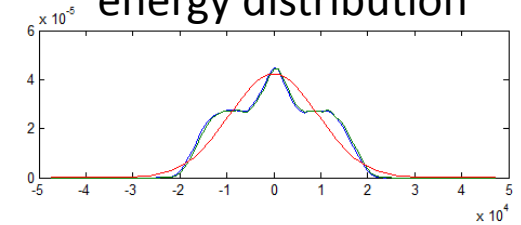
beta functions

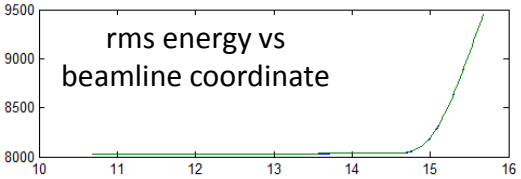


long. phase space

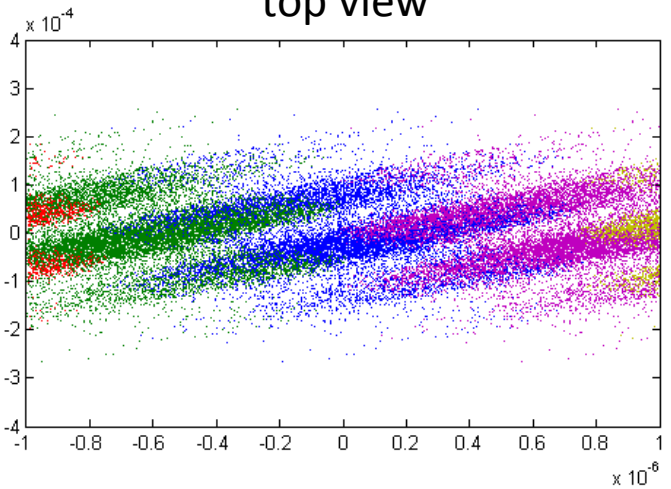


energy distribution





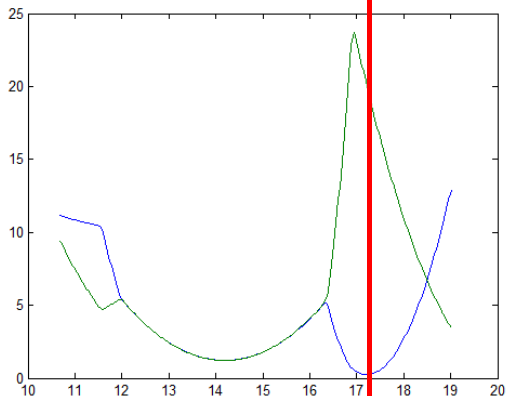
top view



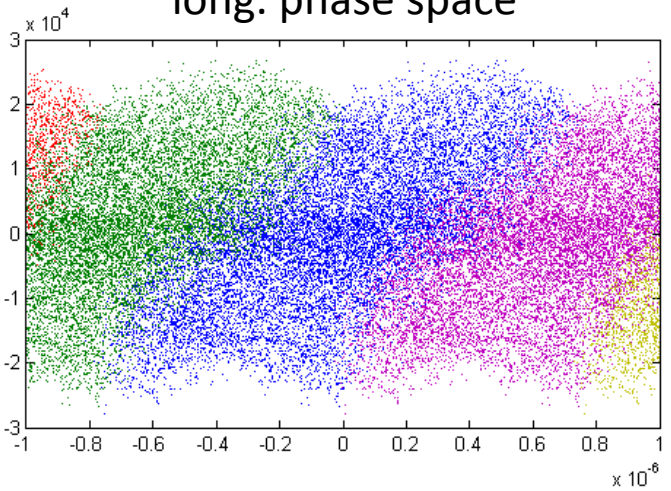
in LCLS

17.2 m

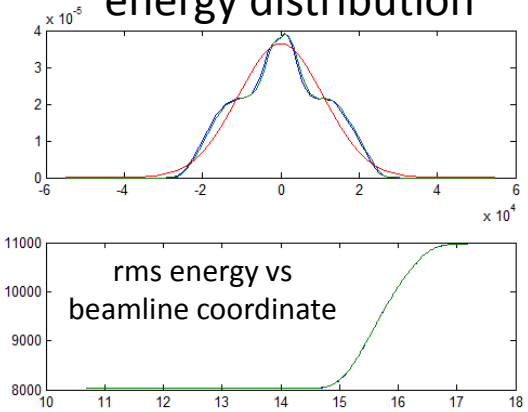
beta functions



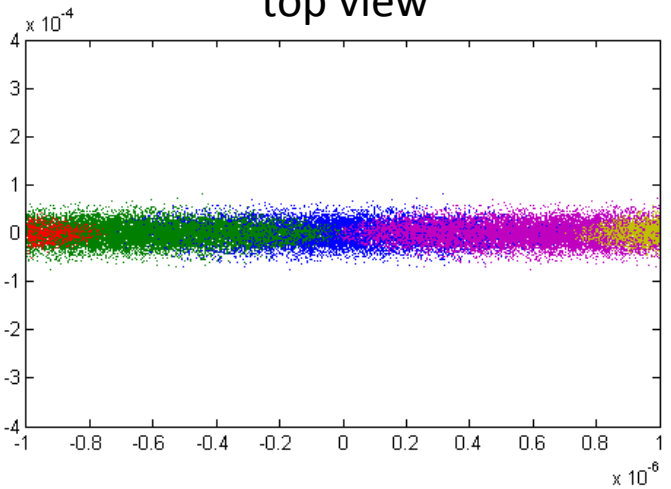
long. phase space



energy distribution

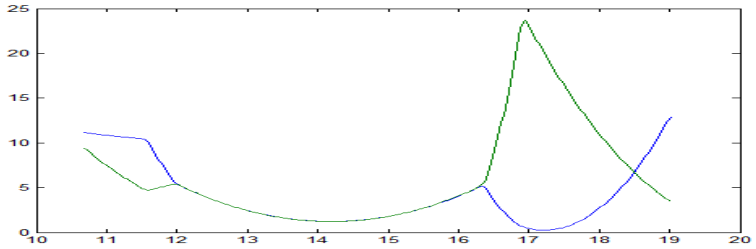


top view

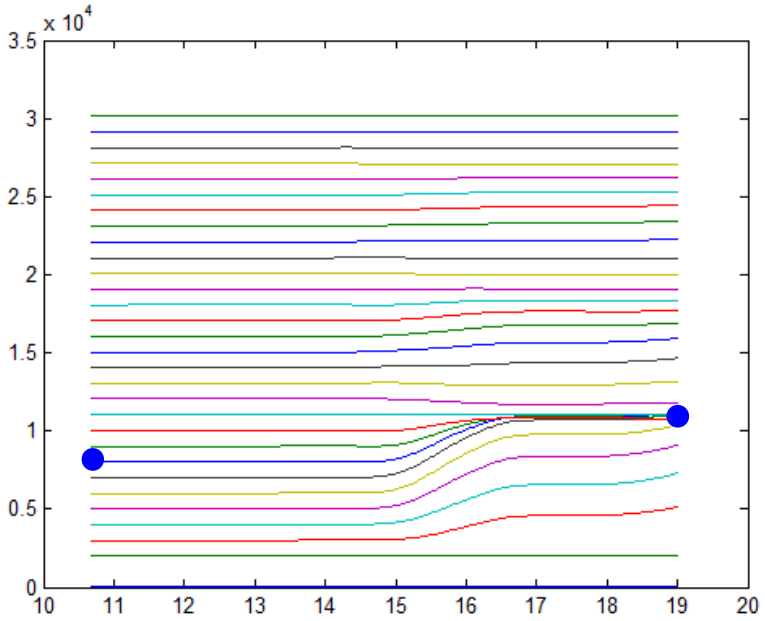


8 keV → 11 keV

Trickle Heating in LCLS

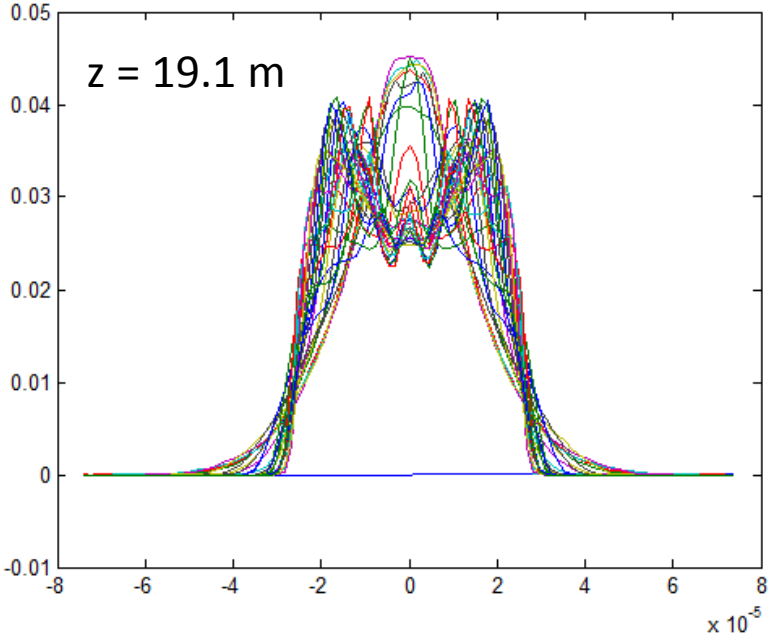


rms energy /eV



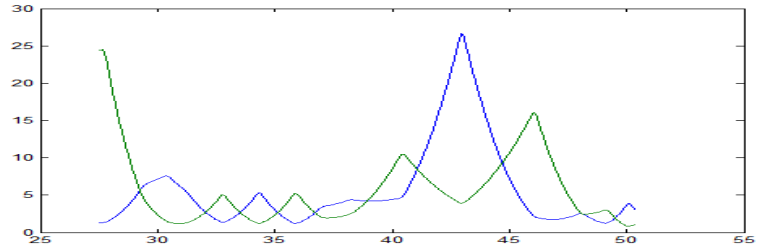
beamline coordinate

normalized energy distribution

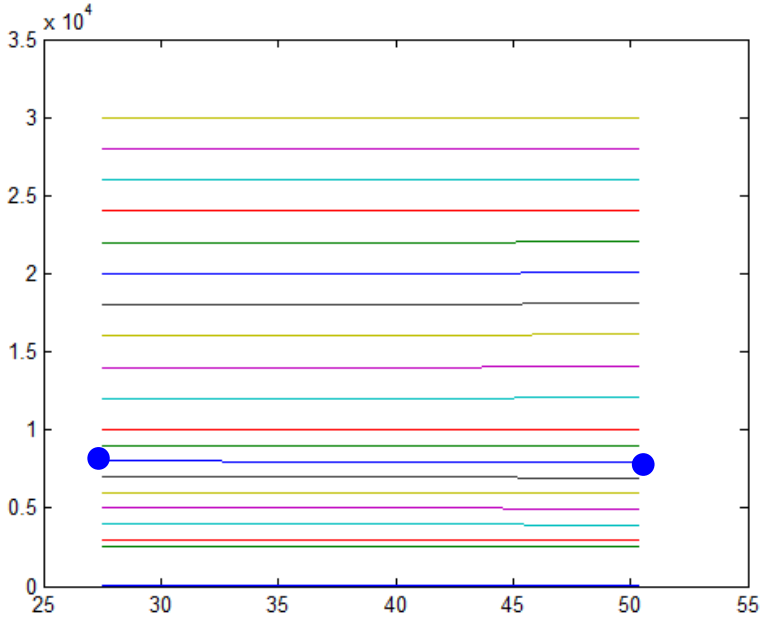


8 keV → 11 keV

Trickle Heating in LCLS

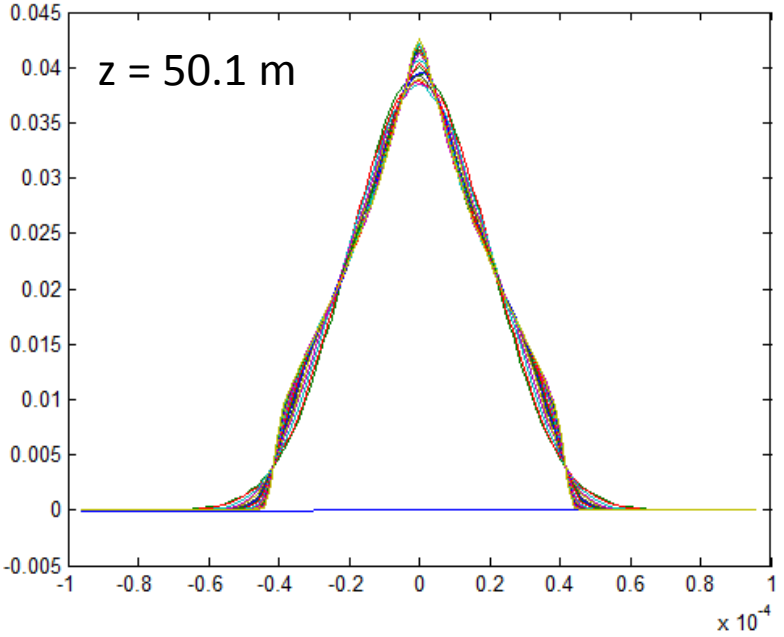


rms energy /eV



beamline coordinate

normalized energy distribution



FEB 2014

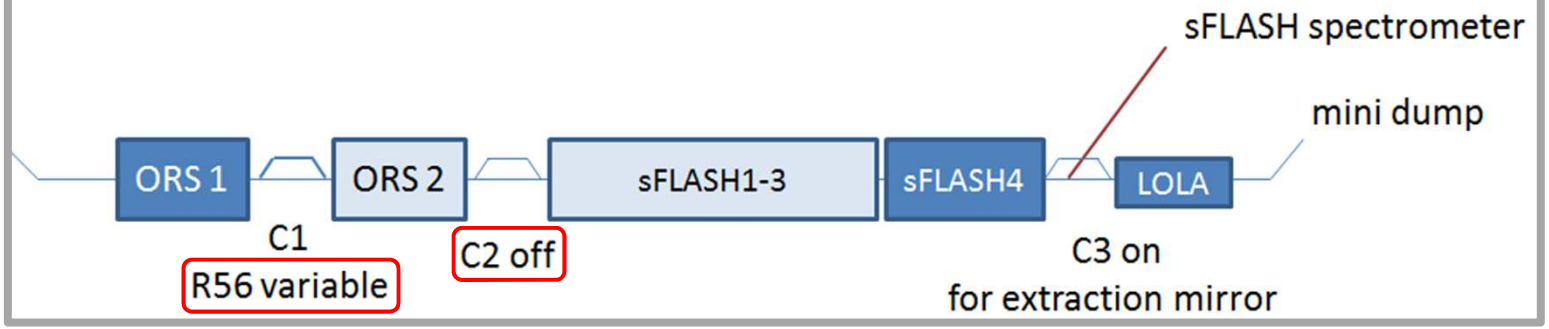
again: SK setup
but

Study period KW12-KW15

FLASH1 study case 1 (CHG)

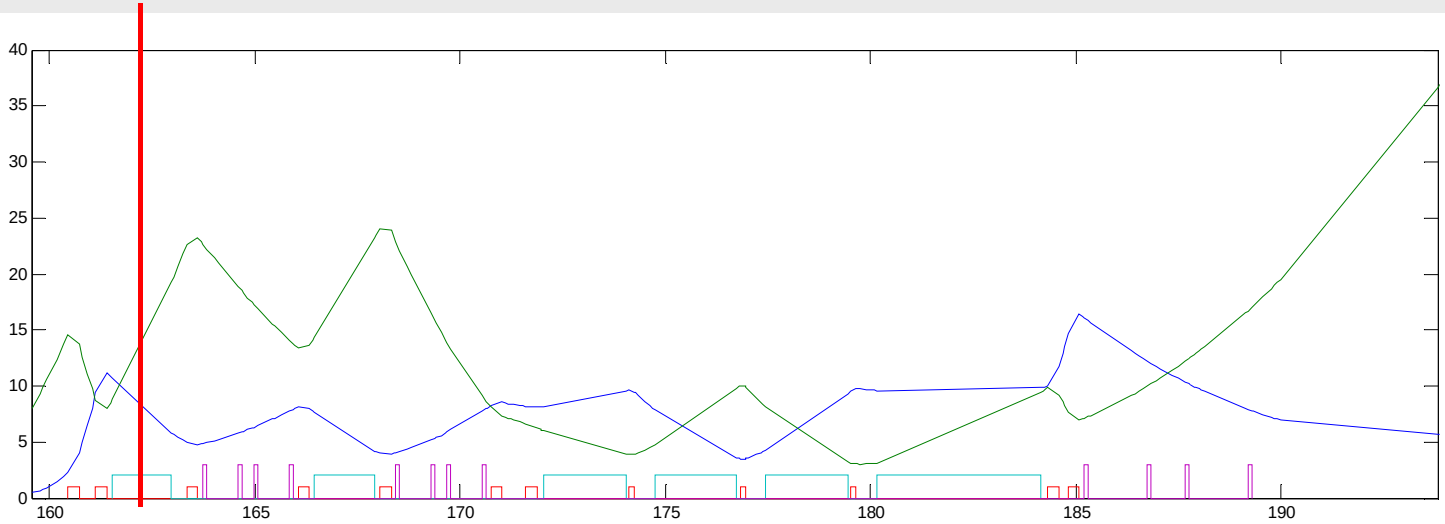
- Electron beam:
  - Beam energy: 700 MeV
  - Charge: 0.5 nC
  - Compression: none
  - Long. phase space distribution: linear, no chirp
  - Minimum uncorrelated energy spread
- Laser beam:
  - Wavelength: 267 nm
  - Pulse duration: 40 fs (FWHM)
  - Pulse energy: up to 200 µJ
  - Beam size at modulator: 1 mm (FWHM)

- Use ORS1 as modulator (tuned to 270nm)
- Use C1 as bunching chicane R56 variable from 0 to 200 µm
- ORS2 and sFLASH1-3 off
- Use sFLASH4 as radiator
- Extract radiation at C3 into spectrometer
- E-beam into mini dump (LOLA on)

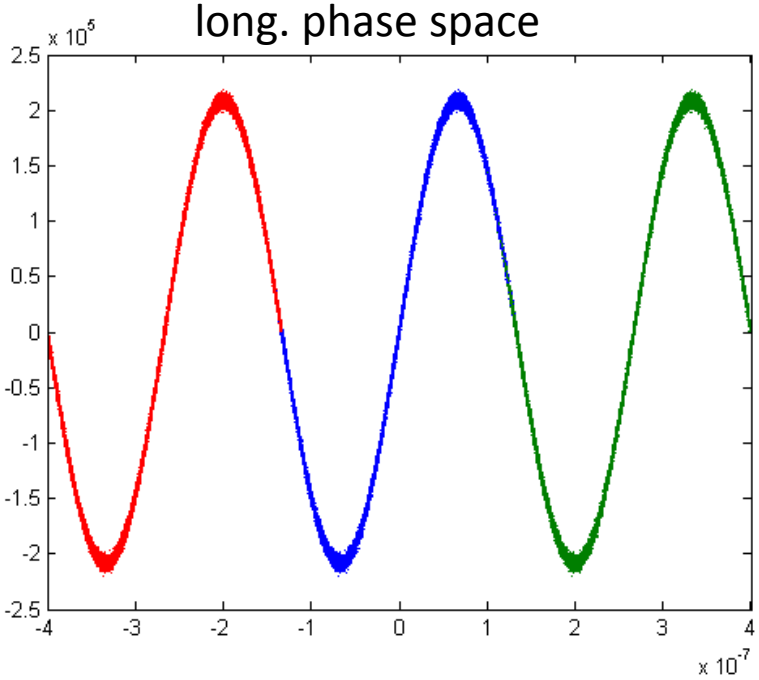


R56 = 100 µm

162.3 m

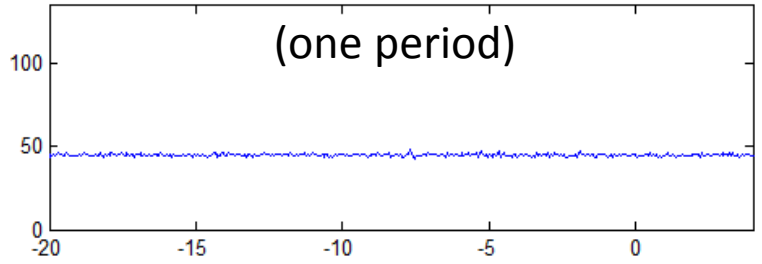


long. phase space

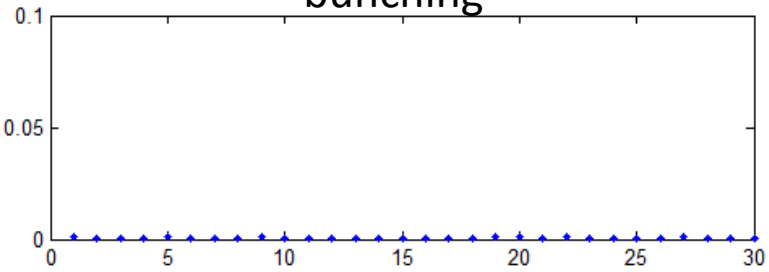


current / A

(one period)

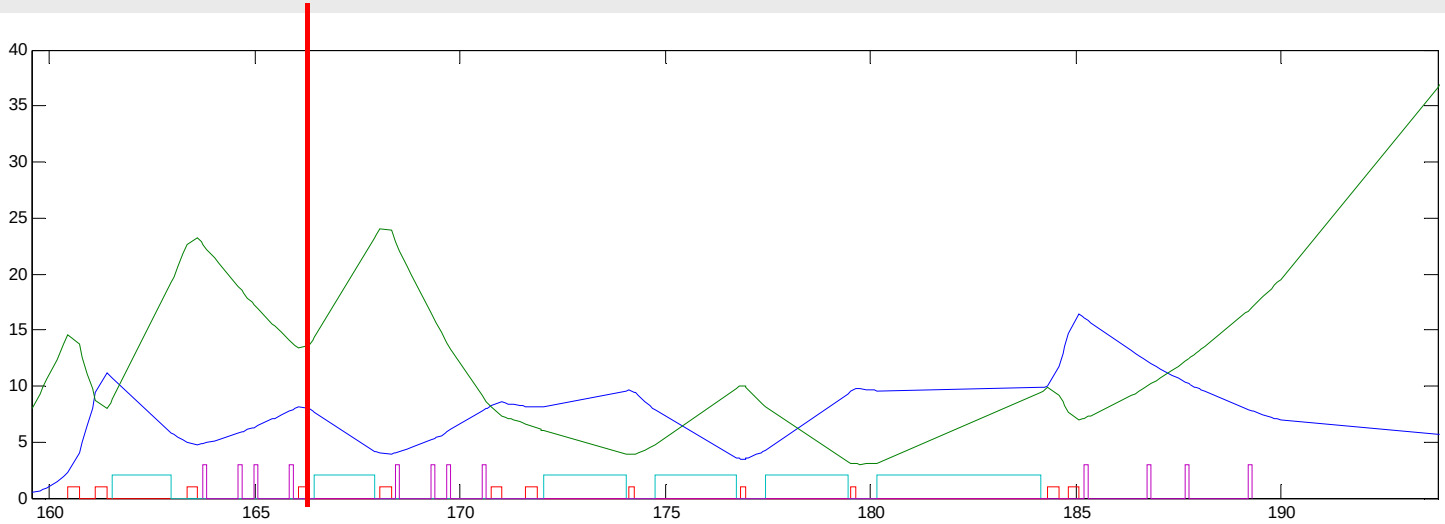


bunching

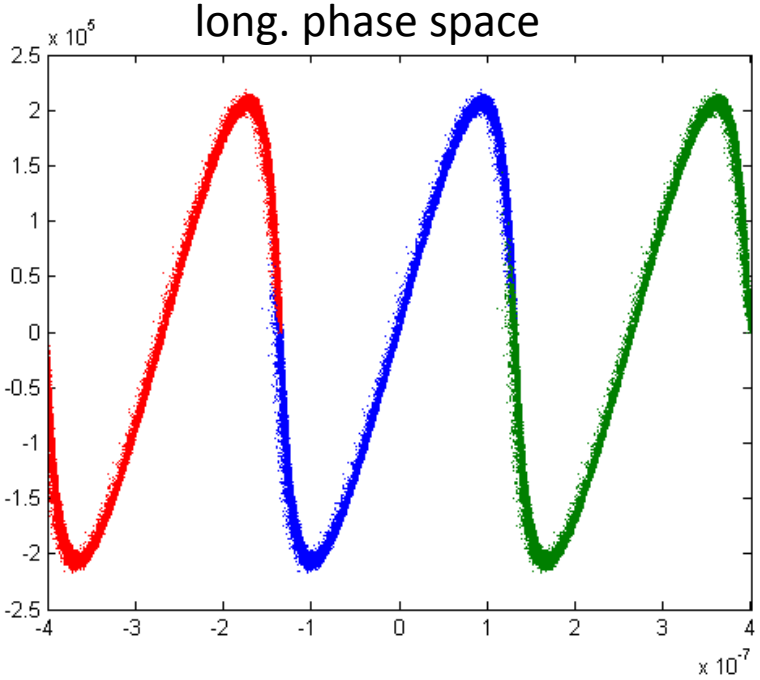


R56 = 100 µm

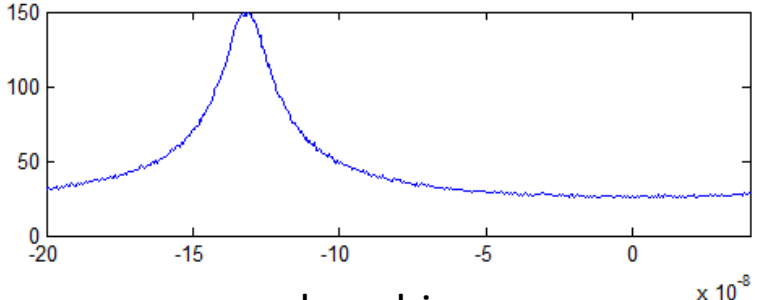
166.5 m



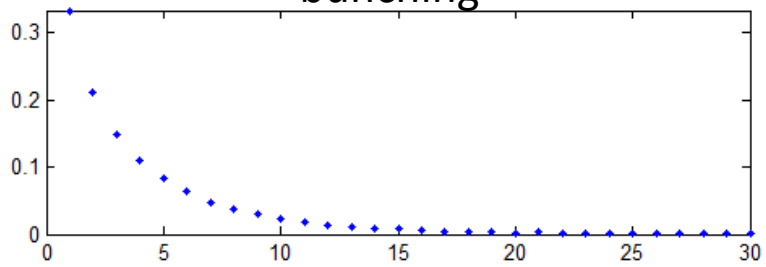
long. phase space



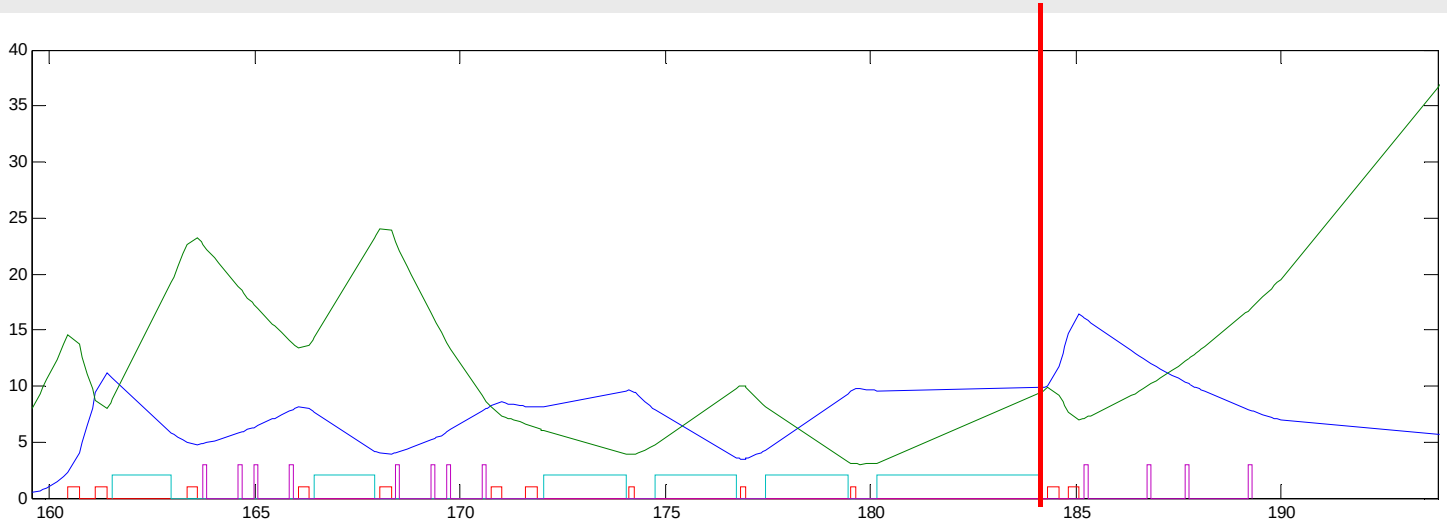
current / A (one period)



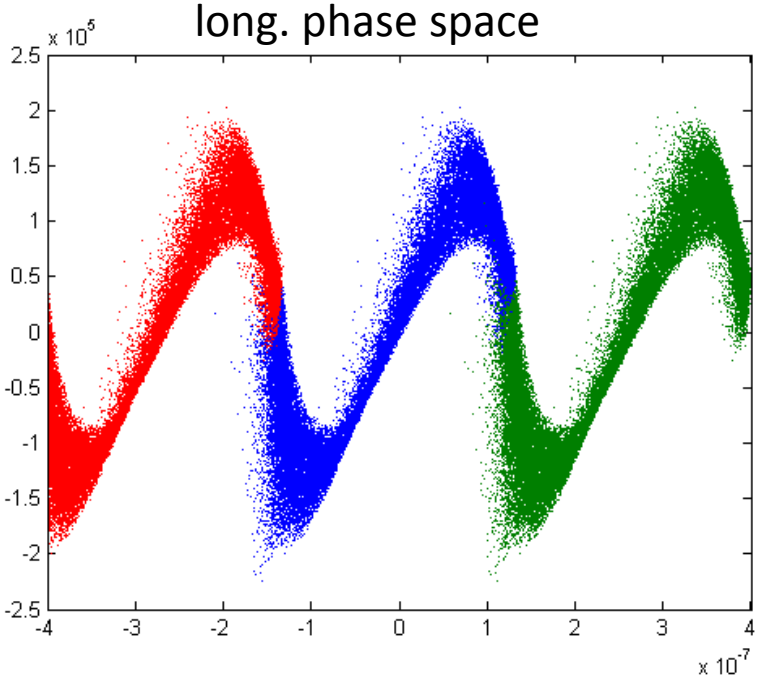
bunching



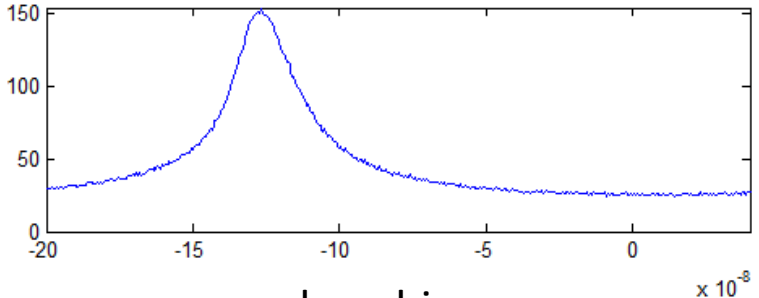
R56 = 100 µm



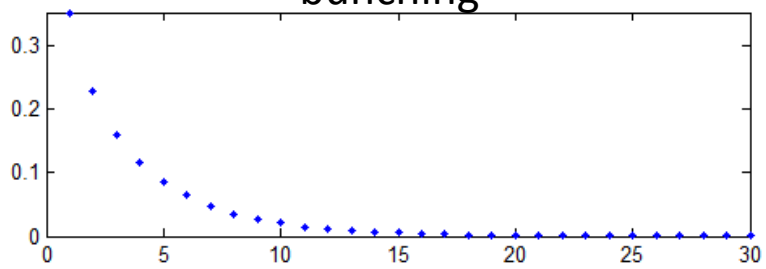
long. phase space



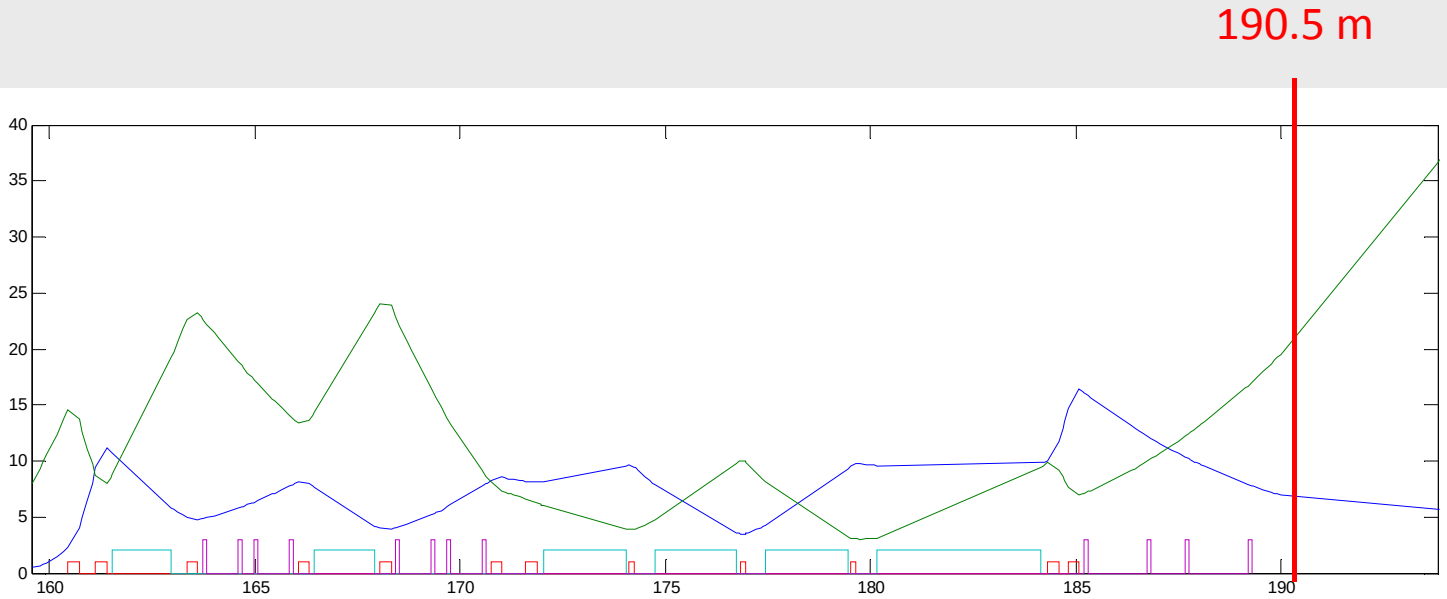
current / A (one period)



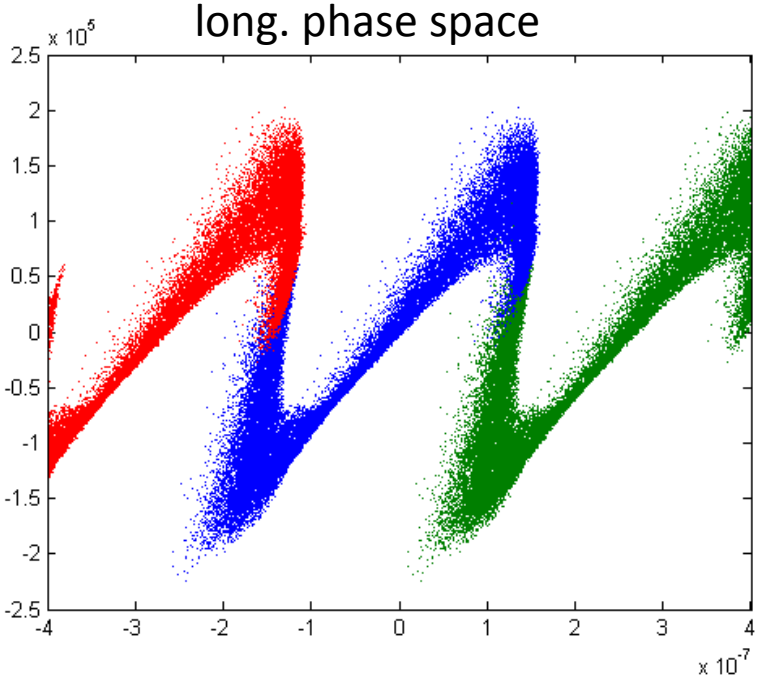
bunching



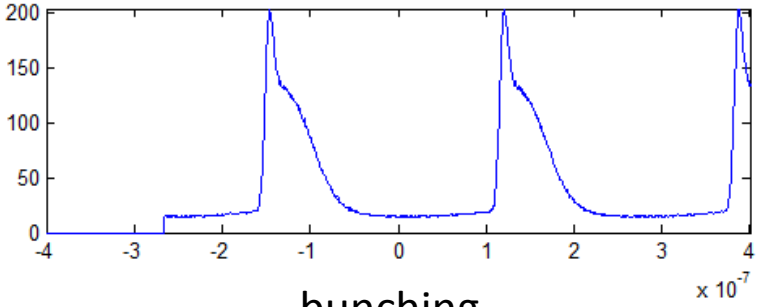
R56 = 100 µm



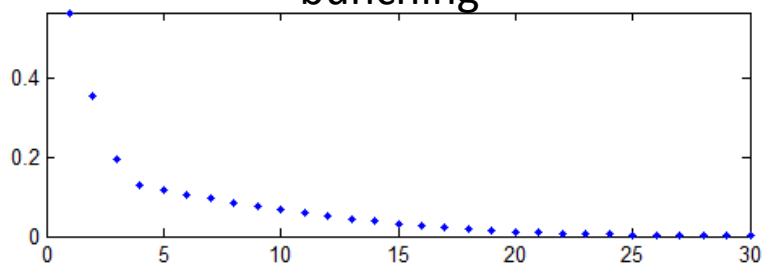
long. phase space



current / A (one period)

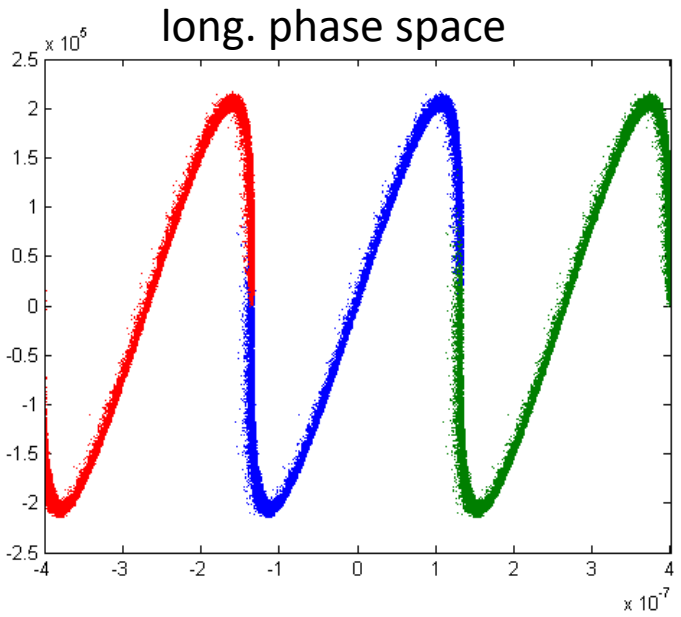


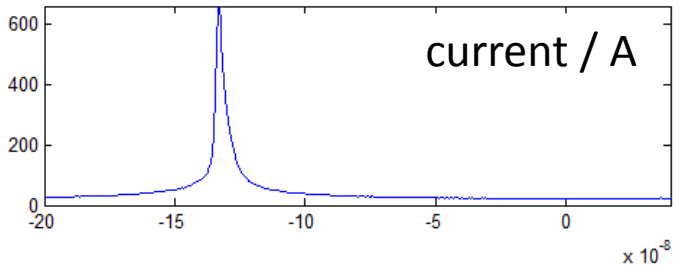
bunching

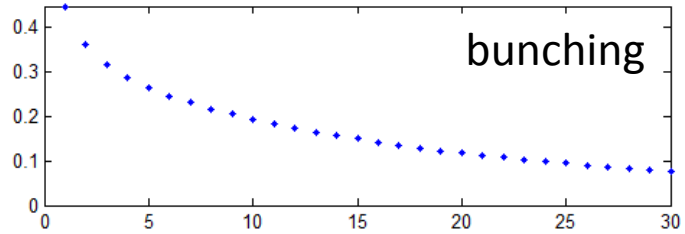


R56 = 141 µm

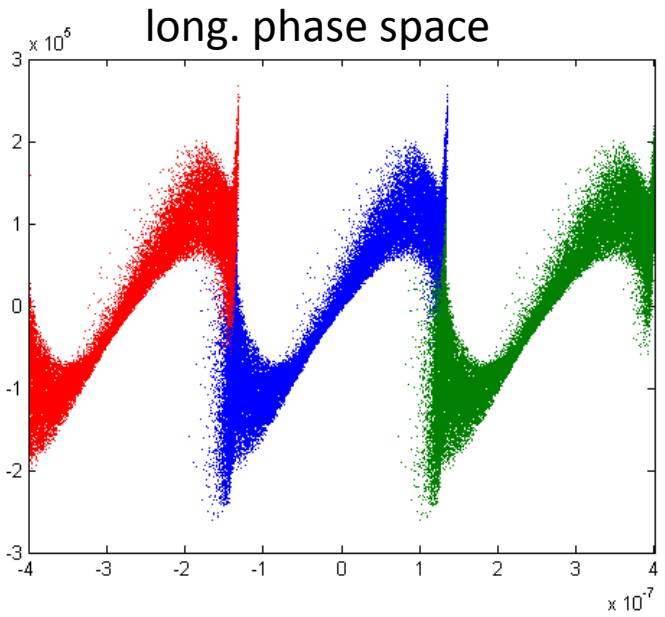
166.5 m

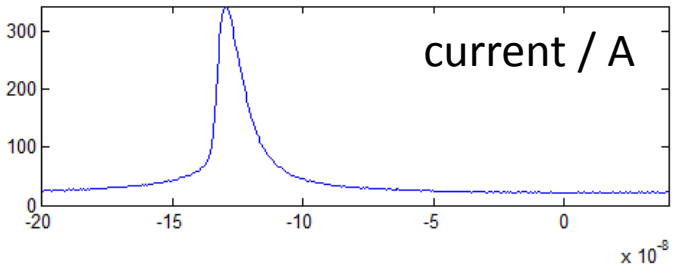


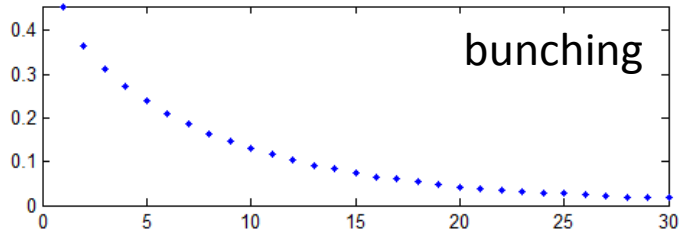




184.5 m

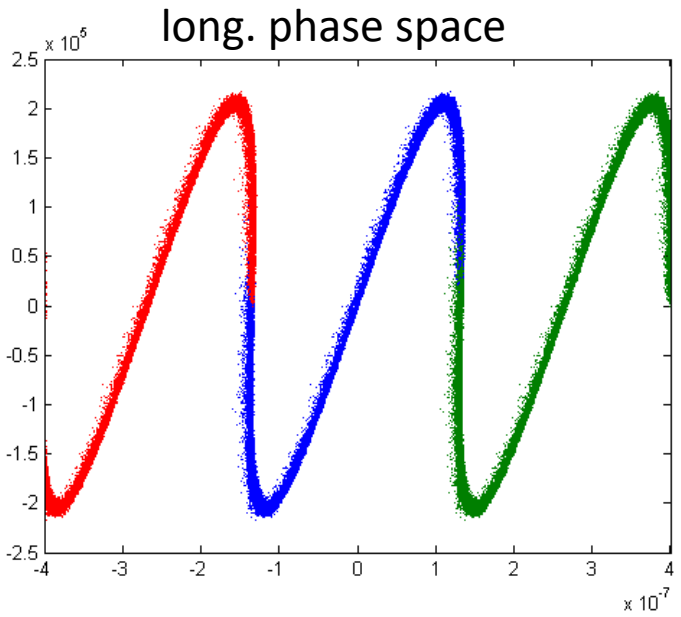


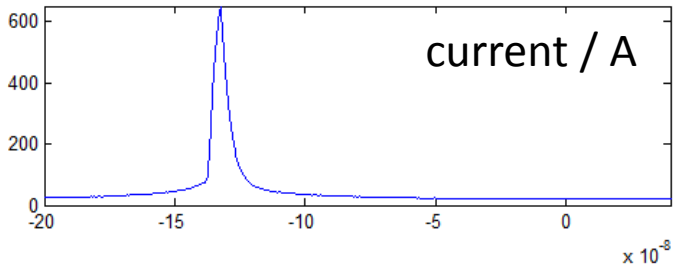


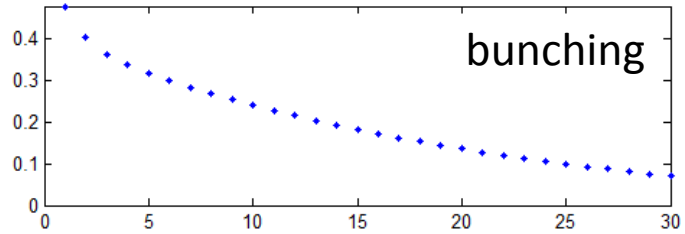


R56 = 160 µm

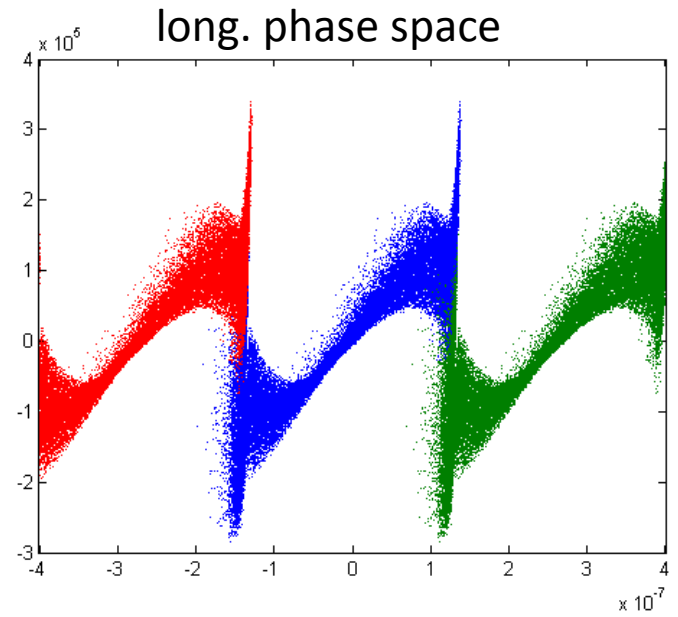
166.5 m

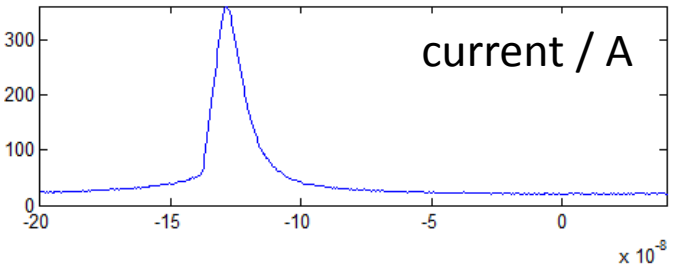


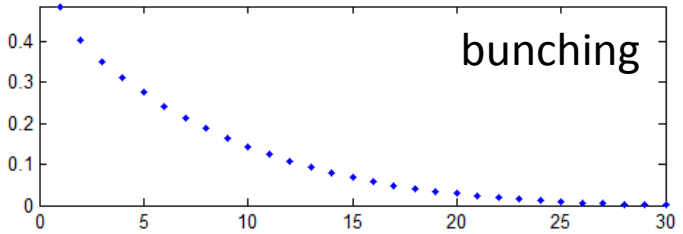




184.5 m

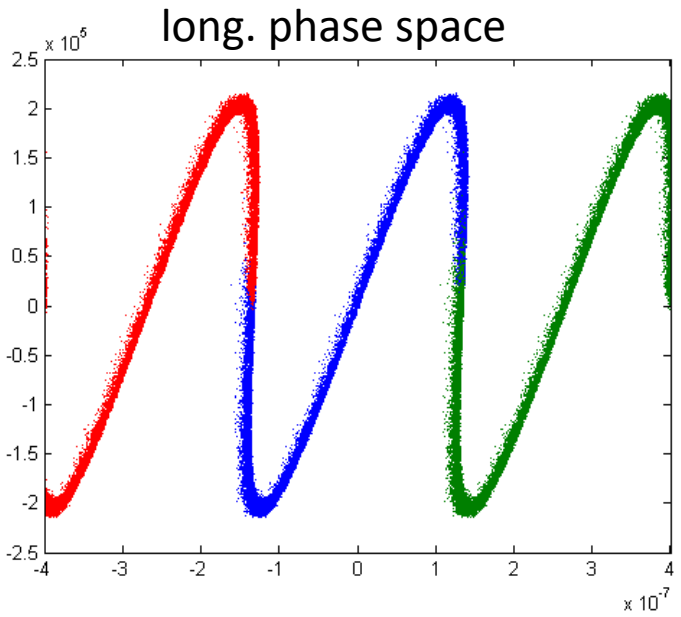


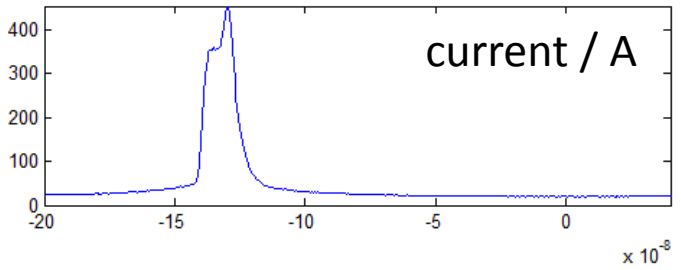


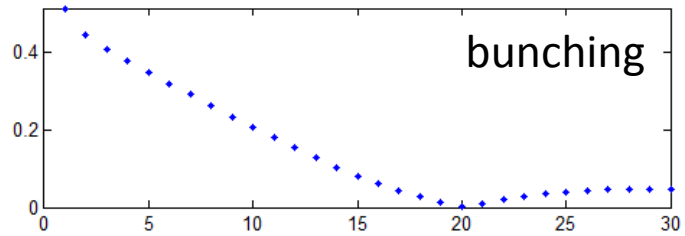


R56 = 180 µm

166.5 m







184.5 m