



LOLA Measurements vs. Beam Dynamics Simulations

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11.04.2011

DESY

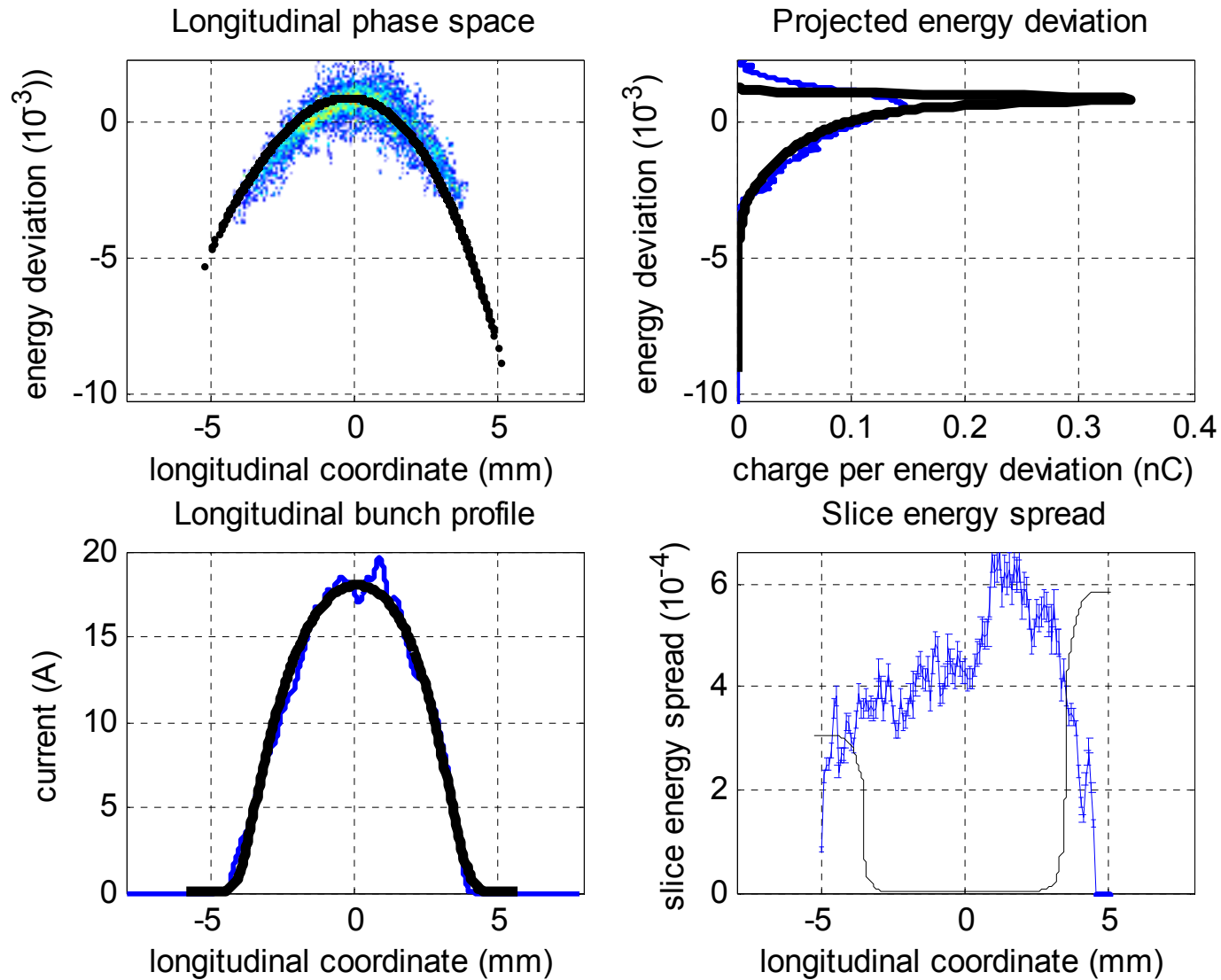
Shift on 23.03.2011 (~3 hours afternoon)

Parameter	
Q	0.35-0.4 nC
E_1	150 MeV
Θ_1	18°
E_2	445 MeV
Θ_2	4.58°
E_3	665 MeV

On-crest phases

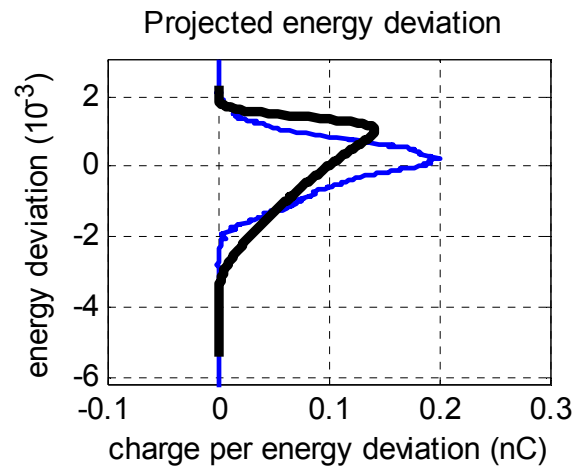
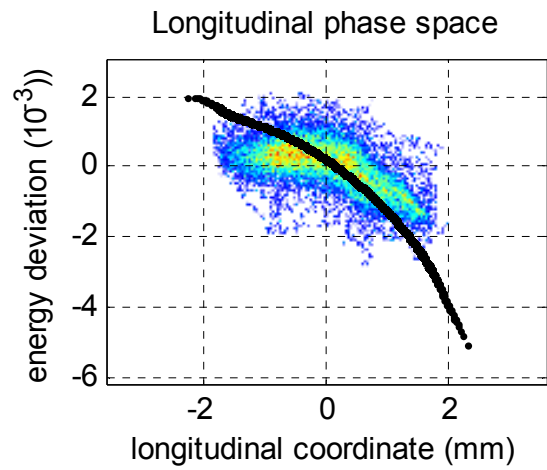
Parameter	
φ_{11}	0°
φ_{13}	1.5°
φ_2	-8°
φ_3	-4.5°

On-crest

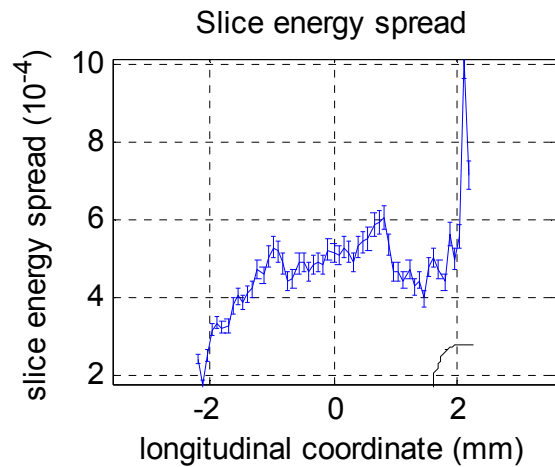
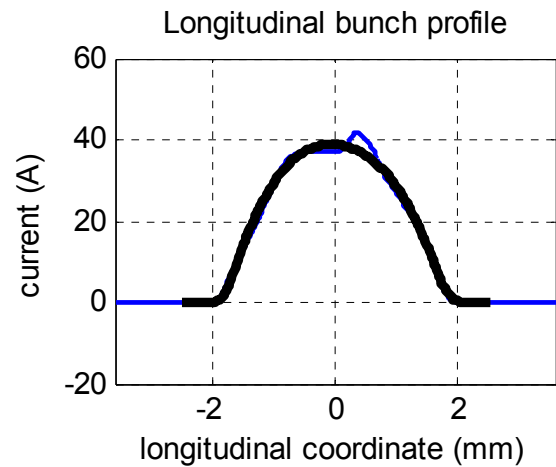


$$k_s = 0.9256$$
$$k_E = 1.1570$$

- an additional calibration of the measurement



$C=2.2$
 $C_1=1.9$
 $C_2=1.1$

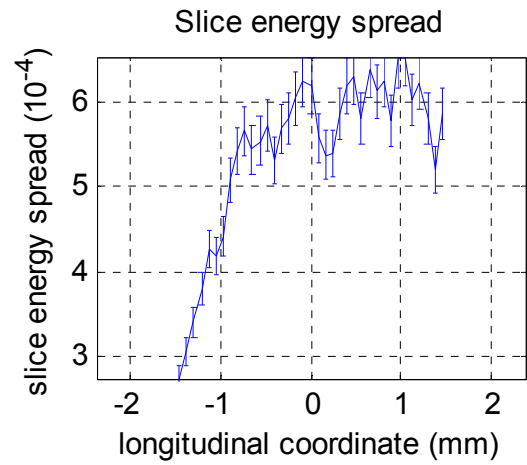
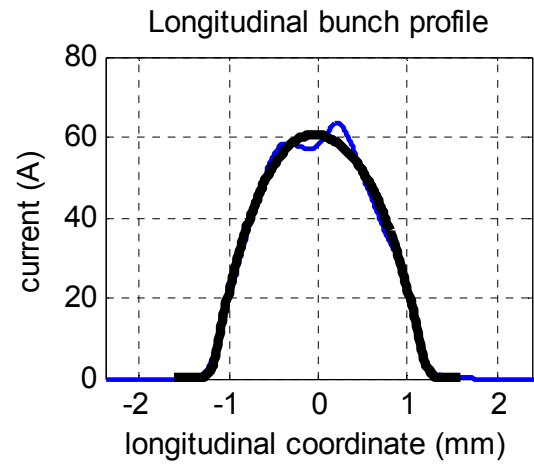
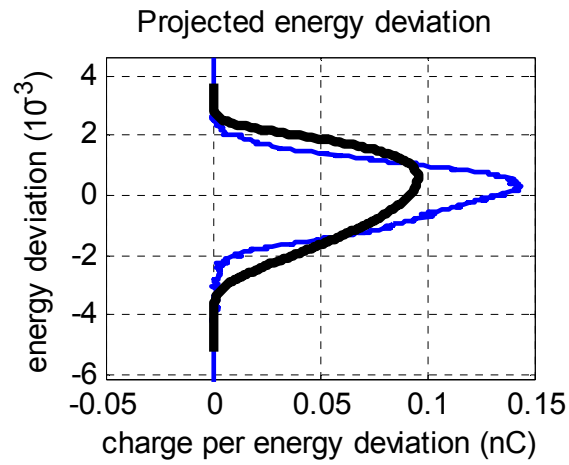
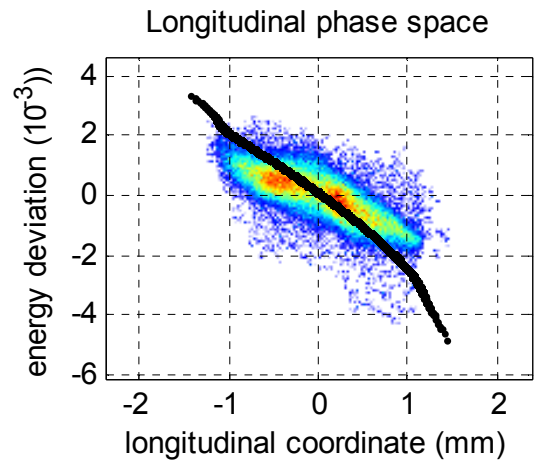


L-Band and 3rd harmonic rf parameters

Amp. L-Band [MV]	164.5677	Offset
Phase L-Band [deg]	5.8865	Read
Amp. 3rd har. [MV]	19.0103	Write
Phase 3rd har. [deg]	-178.1156	

RF sum amplitude and derivatives

V Beam [MV]	144.7	
Chirp [1/m]	-2.8229	Read
V'' [1/m??]	37.3988	Write
V''' [1/m??]	-0.029549	



$C=3.2$
 $C_1=2.6$
 $C_2=1.2$

L-Band and 3rd harmonic rf parameters

Amp. L-Band [MV] 165.0957 Offset

Phase L-Band [deg] 7.4553 Read

Amp. 3rd har. [MV] 19.0166 Write

Phase 3rd har. [deg] -177.6089

RF sum amplitude and derivatives

V Beam [MV] 144.7

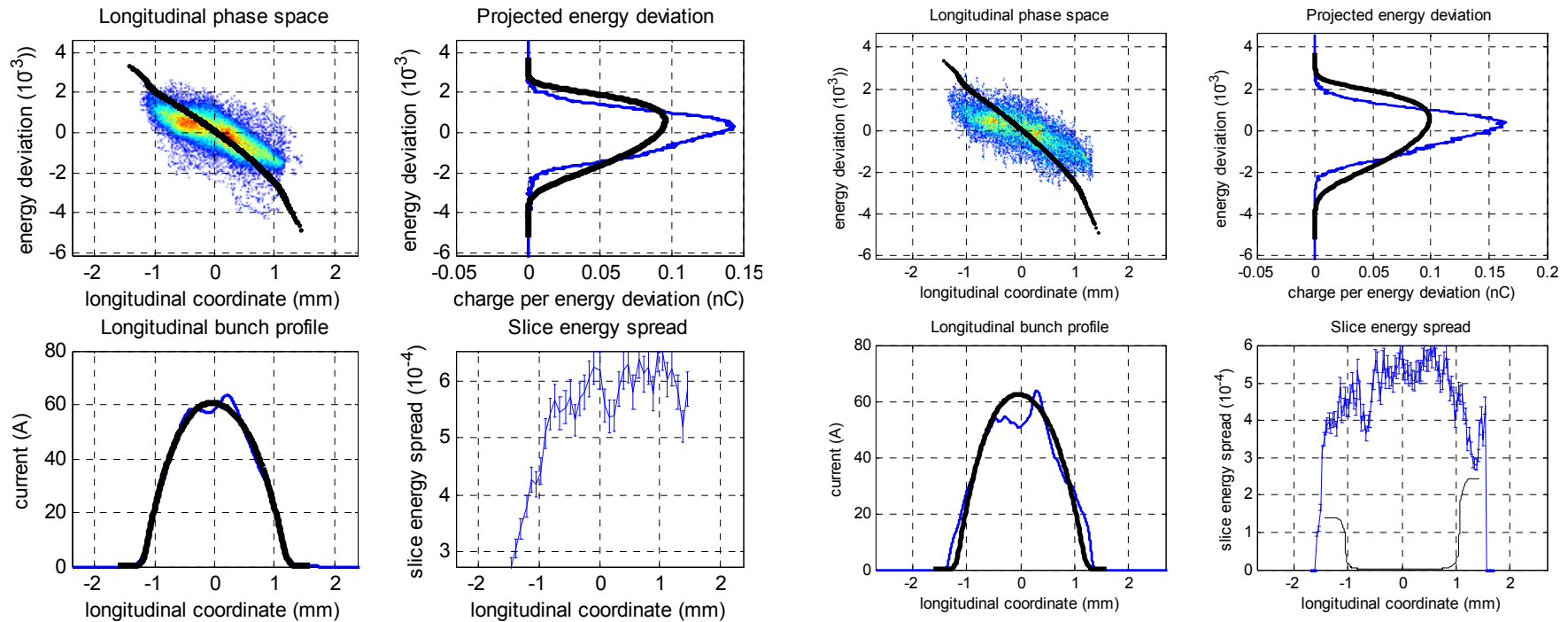
Chirp [1/m] -3.5829 Read

V'' [1/m??] 37.3987 Write

V''' [1/m??] -0.0070079

LOLA resolution increase. New Calibration.

$$C=3.2=2.6*1.2$$

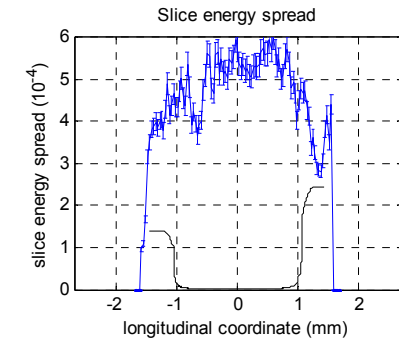
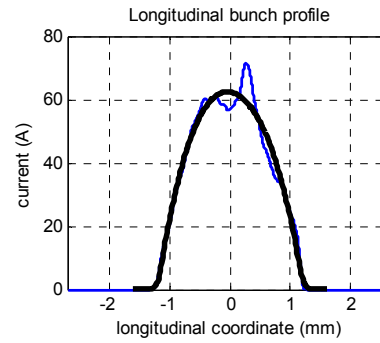
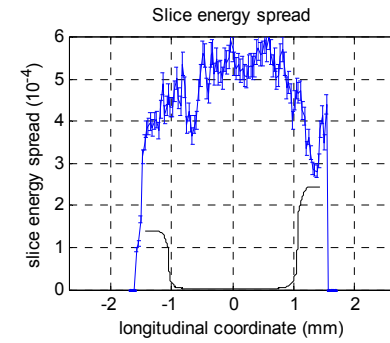
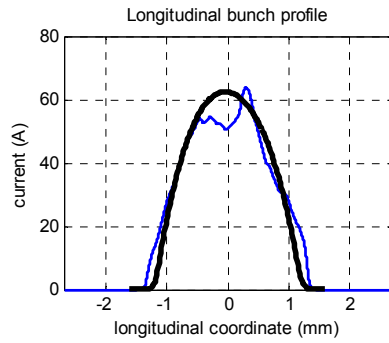
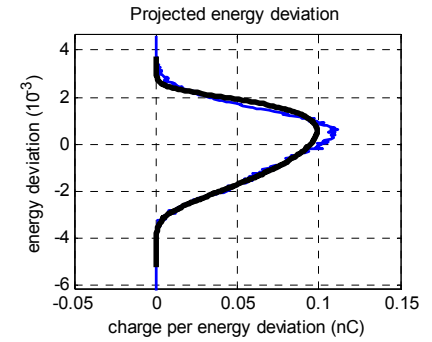
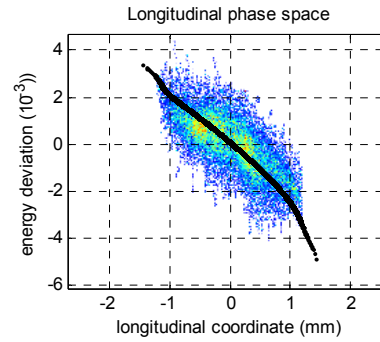
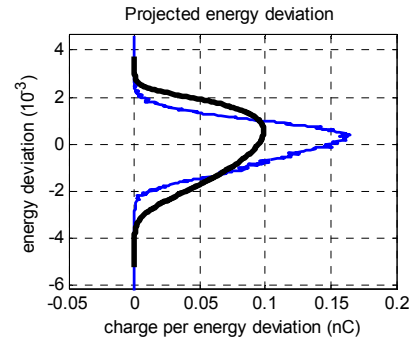
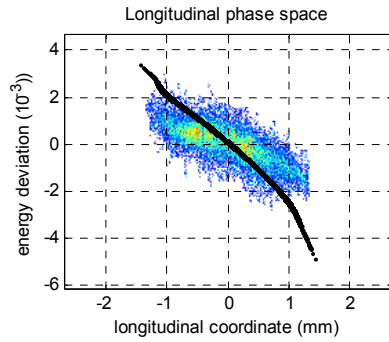


$$k_s=0.9256$$
$$k_E=1.1570$$

- an additional calibration of the measurement

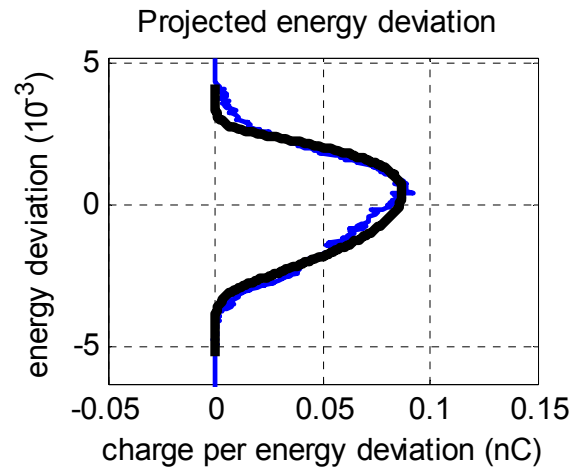
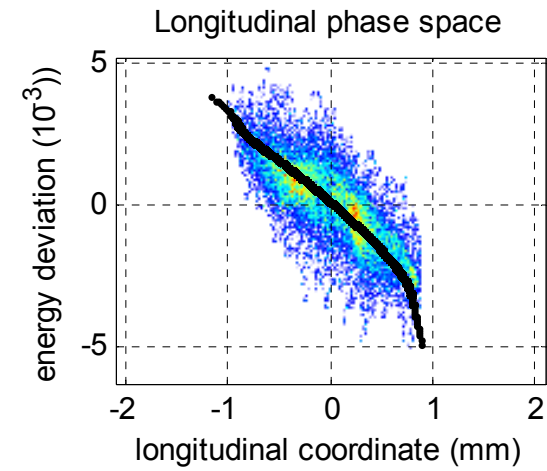
New additional calibration.

$$C=3.2=2.6*1.2$$

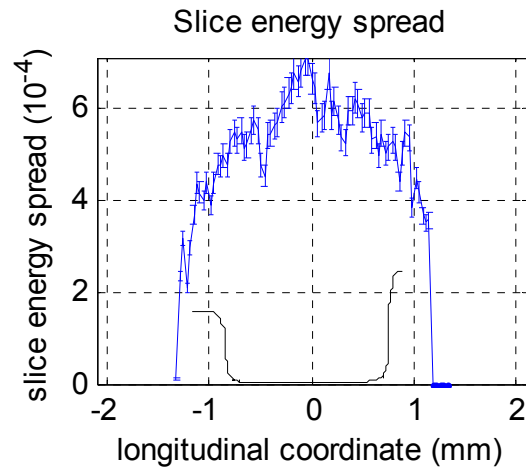
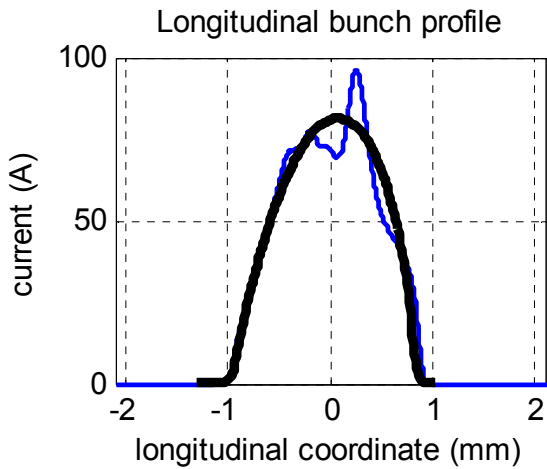


$$k_s=0.9256$$
$$k_E=1.1570$$

$$k_s=0.83$$
$$k_E=1.71$$



$$C=4.5=3.2*1.4$$

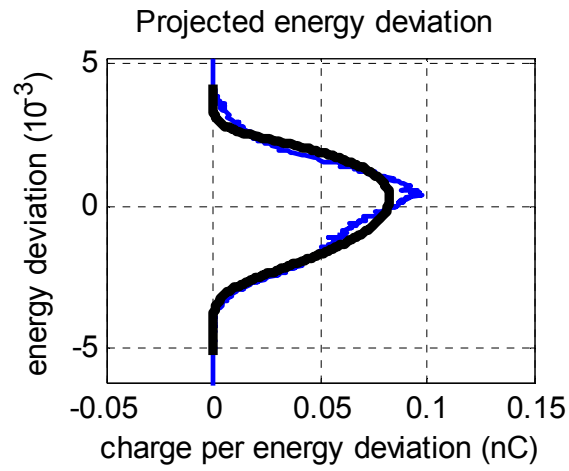
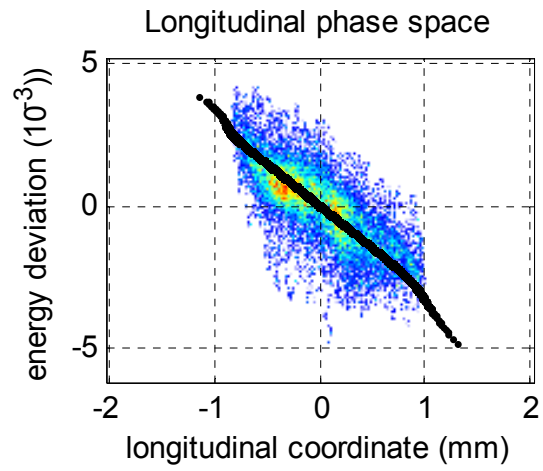


L-Band and 3rd harmonic rf parameters

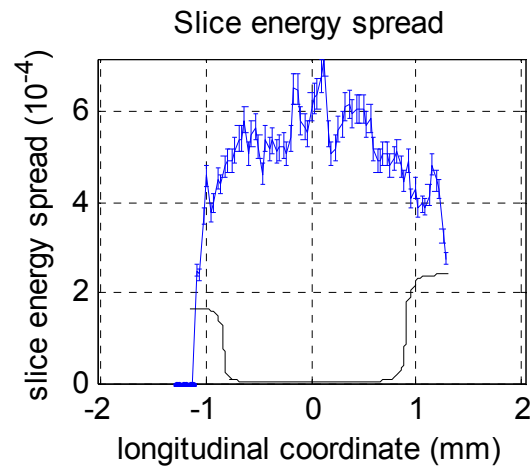
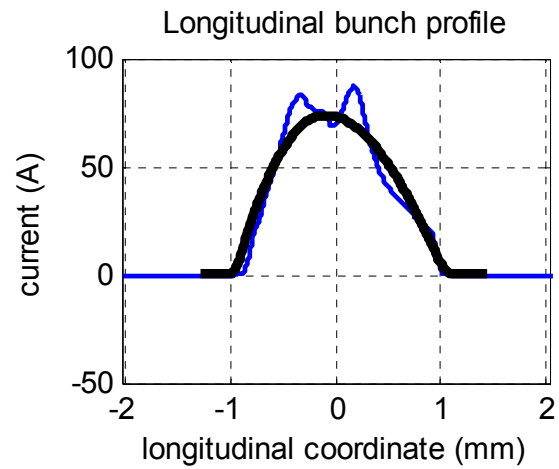
Amp. L-Band [MV]	164.4651	Offset
Phase L-Band [deg]	8.1905	Read
Amp. 3rd har. [MV]	18.1083	Write
Phase 3rd har. [deg]	-177.2532	

RF sum amplitude and derivatives

V Beam [MV]	144.7	
Chirp [1/m]	-3.9189	Read
V'' [1/m??]	-6.8571e-01	Write
V''' [1/m??]	-0.018477	



$$C=4.5=3.2*1.4$$



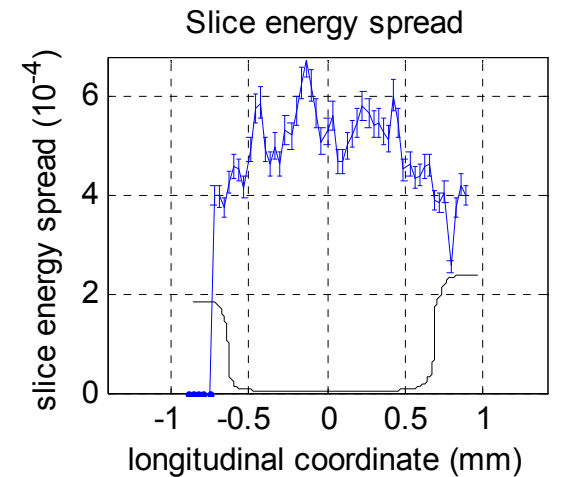
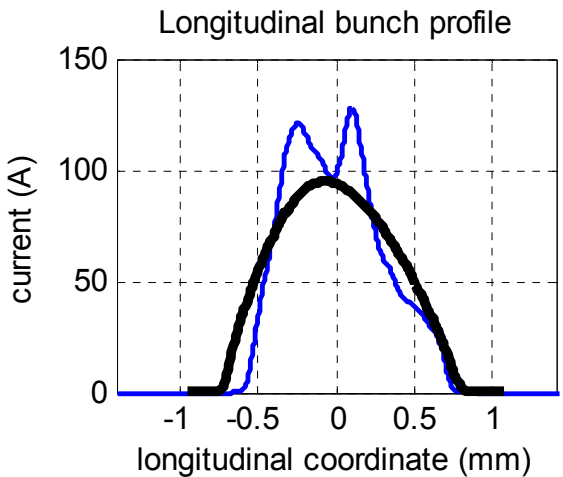
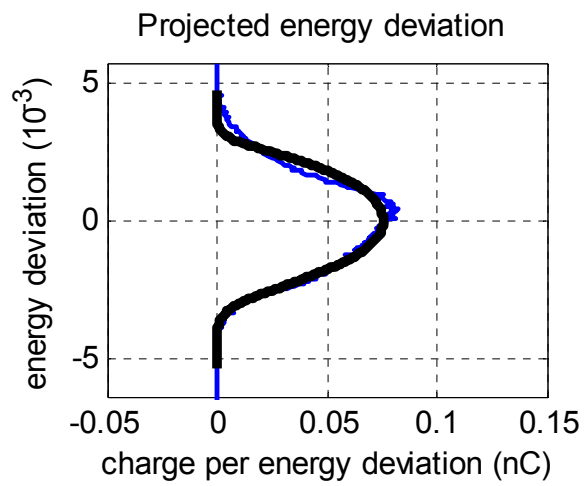
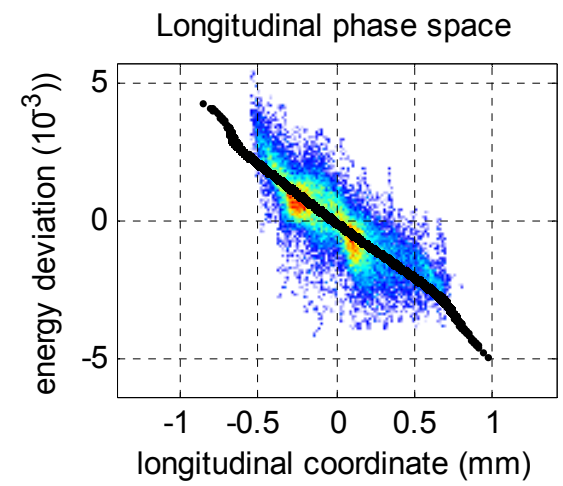
L-Band and 3rd harmonic rf parameters

phase [deg]

amp. L-Band [MV]	164.4273	Offset
Phase L-Band [deg]	0.9129	Read
amp. 3rd har. [MV]	20.6198	Write
Phase 3rd har. [deg]	162.8824	

RF sum amplitude and derivatives

V Beam [MV]	144.7	
Chirp [1/m]	-3.9189	Read
f' [1/m??]	66.352	Write
f'' [1/m??]	23222.797	



$$C=5.4=3.7*1.5$$

L-Band and 3rd harmonic rf parameters

Amp. L-Band [MV]	164.4631	Offset
Phase L-Band [deg]	1.5038	Read
Amp. 3rd har. [MV]	20.6018	Write
Phase 3rd har. [deg]	163.0464	

RF sum amplitude and derivatives

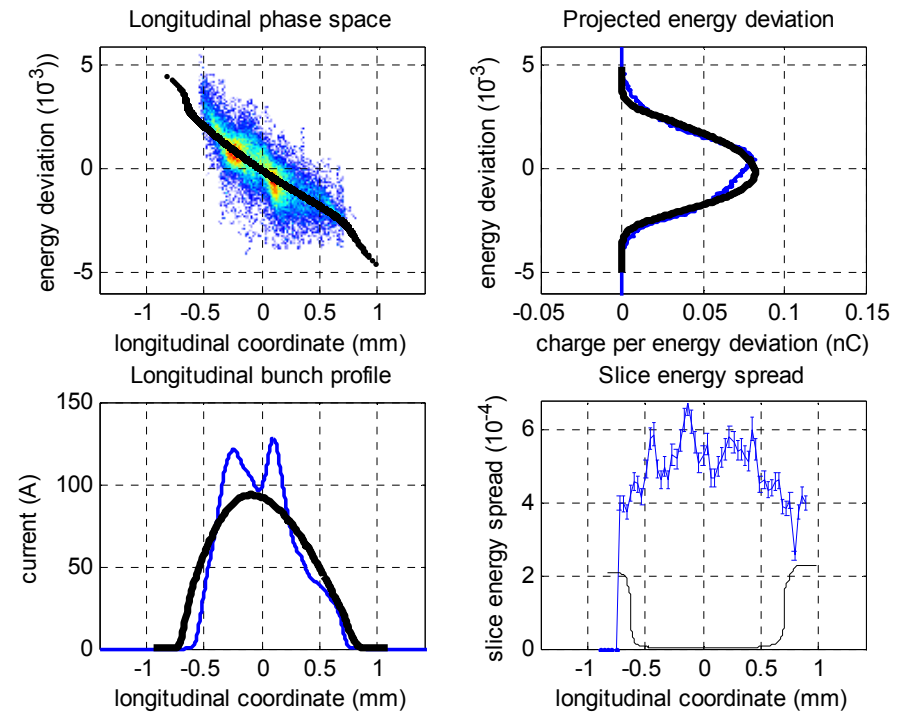
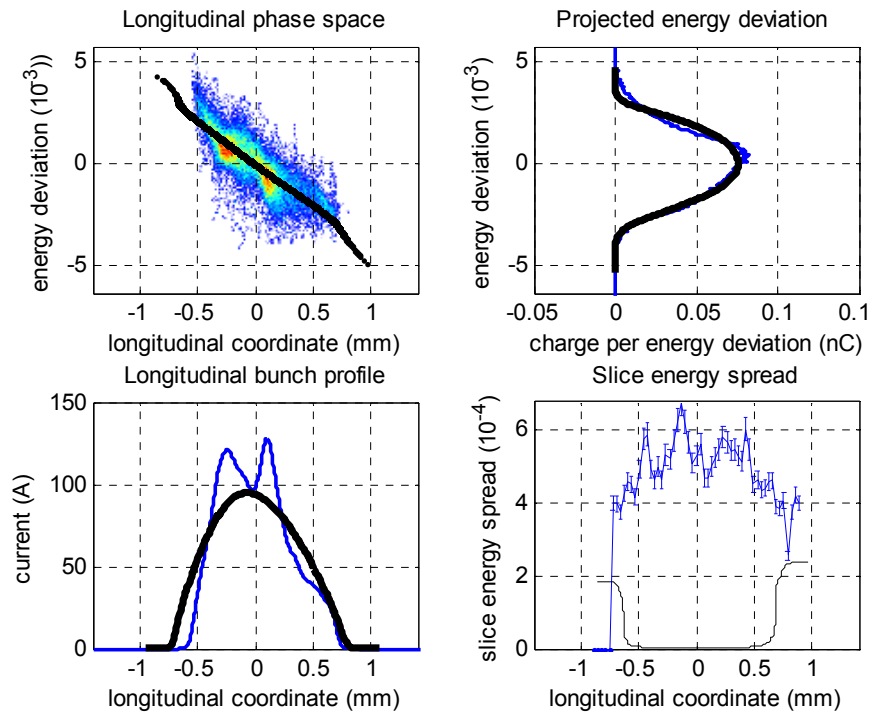
V Beam [MV]	144.7	
Chirp [1/m]	-4.2032	Read
V'' [1/m??]	66.3518	Write
V''' [1/m??]	23227.001	

phase [deg]

$$C=5.4=3.7*1.5$$

Without CSRtrack

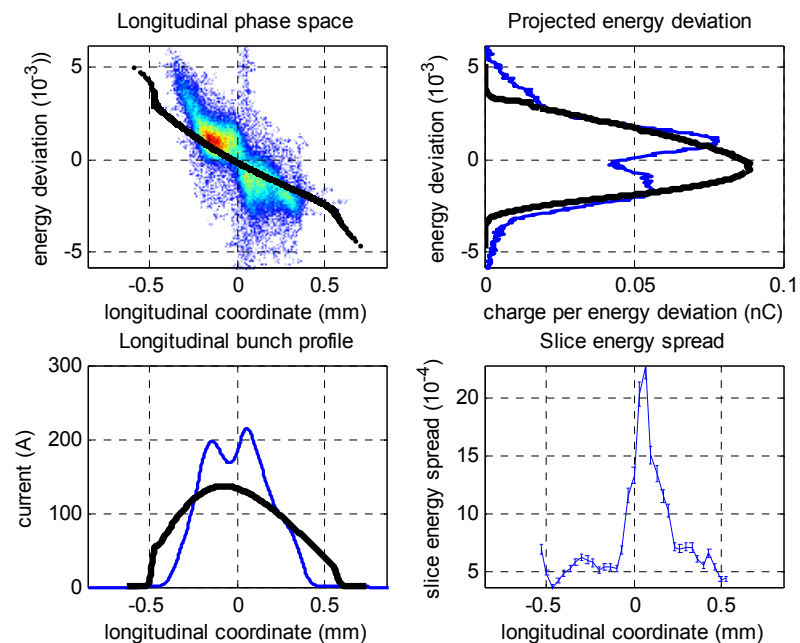
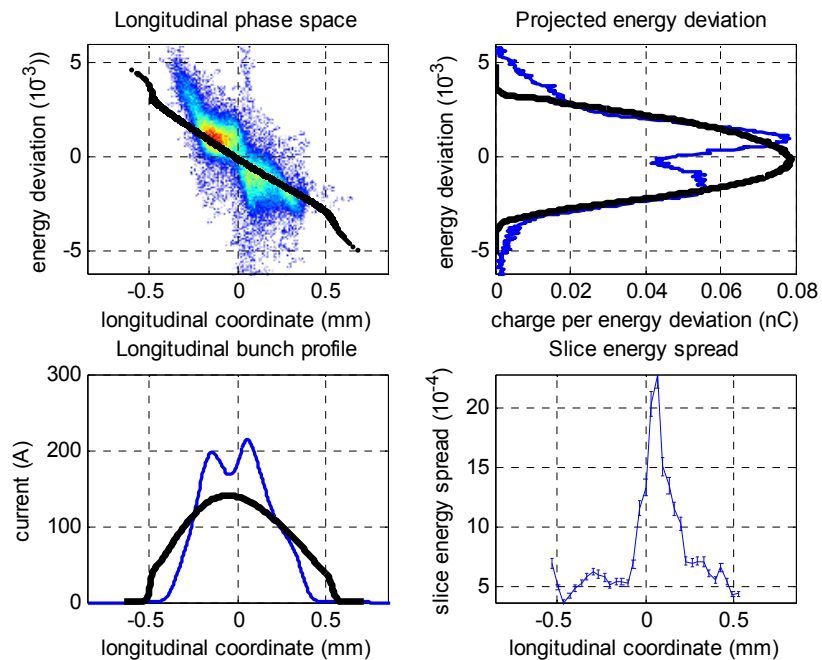
With CSRtrack



$$C=7.6=4.44*1.71$$

Without CSRtrack

With CSRtrack



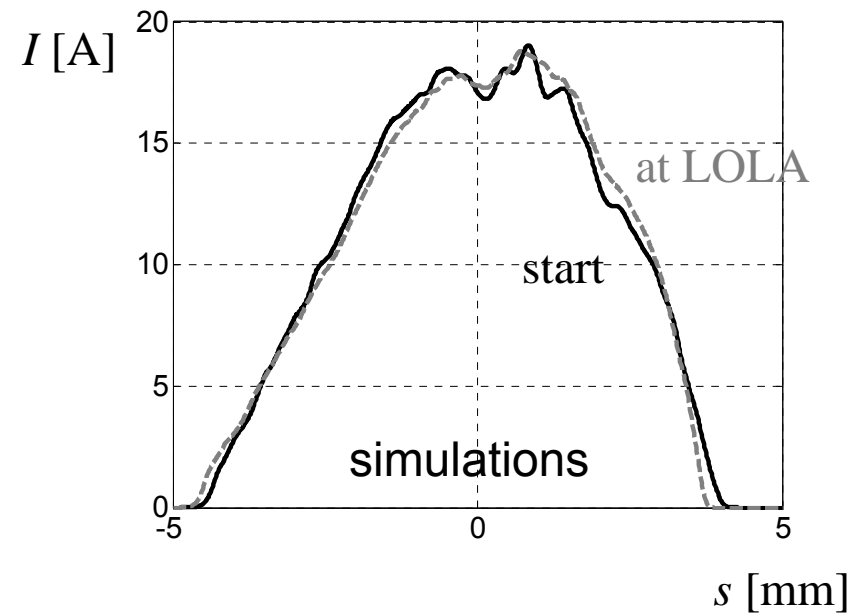
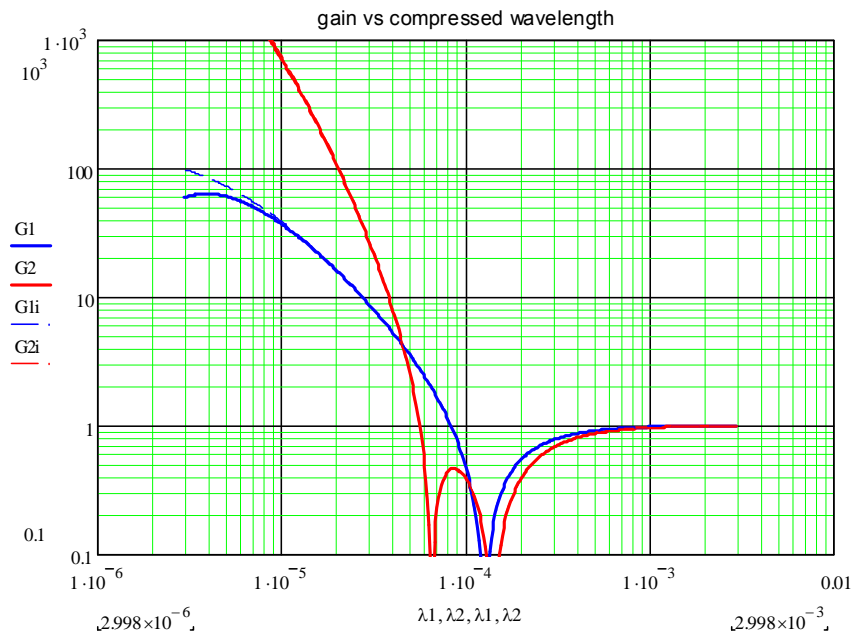
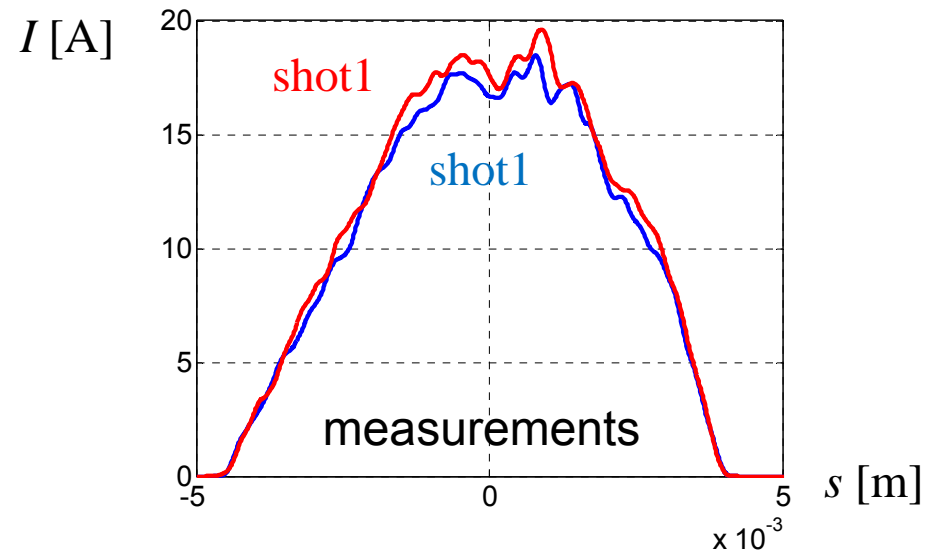
L-Band and 3rd harmonic rf parameters

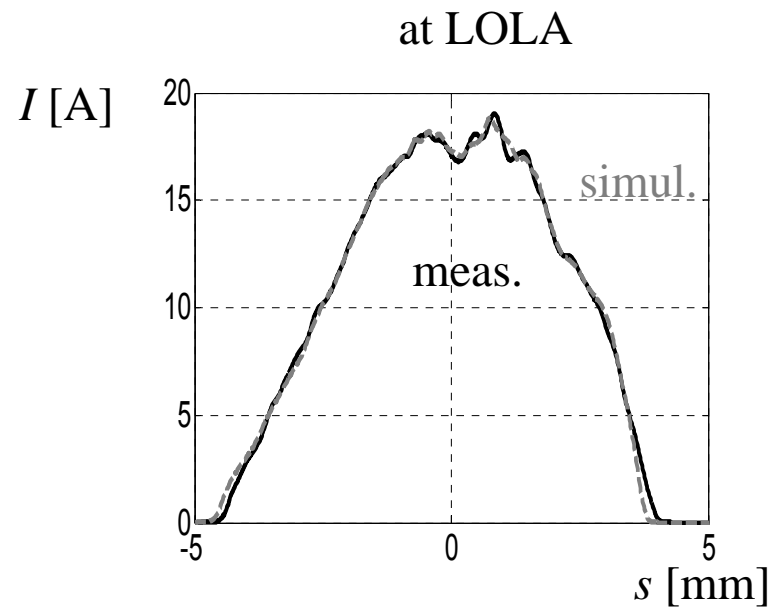
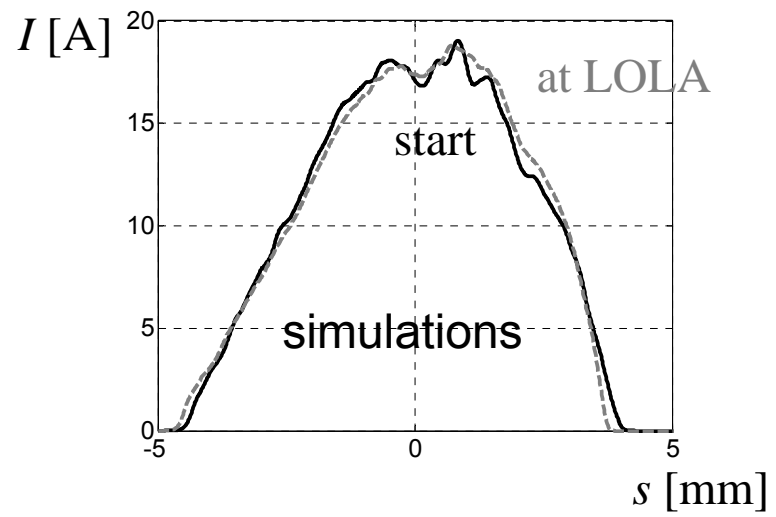
Amp. L-Band [MV]	164.5087	Offset
Phase L-Band [deg]	2.0201	Read
Amp. 3rd har. [MV]	20.5858	Write
Phase 3rd har. [deg]	163.1926	

RF sum amplitude and derivatives

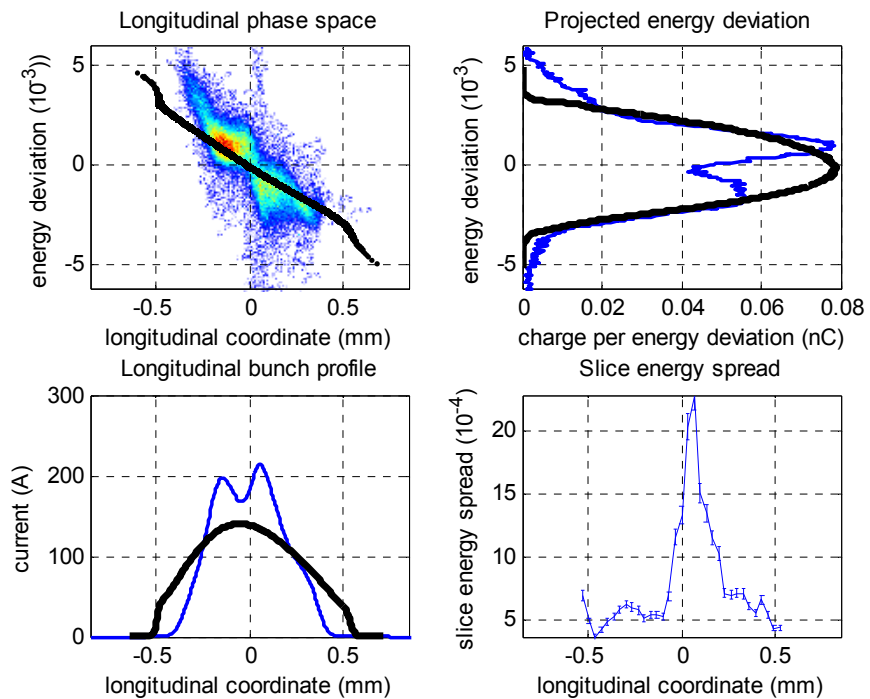
V Beam [MV]	144.7	
Chirp [1/m]	-4.4512	Read
V' [1/m??]	66.3518	Write
V'' [1/m??]	23227.000	

Current profile?

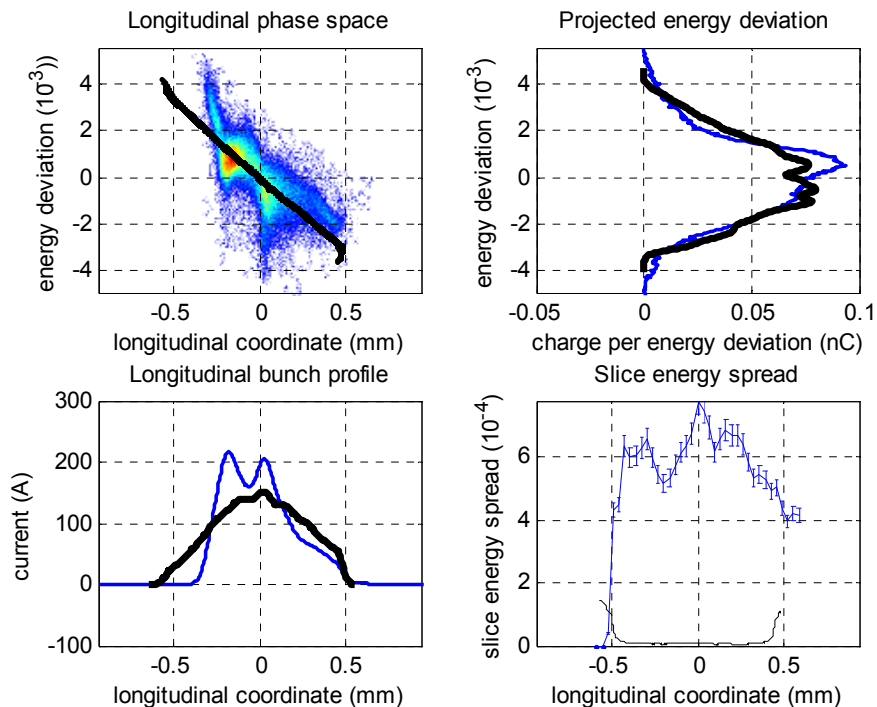




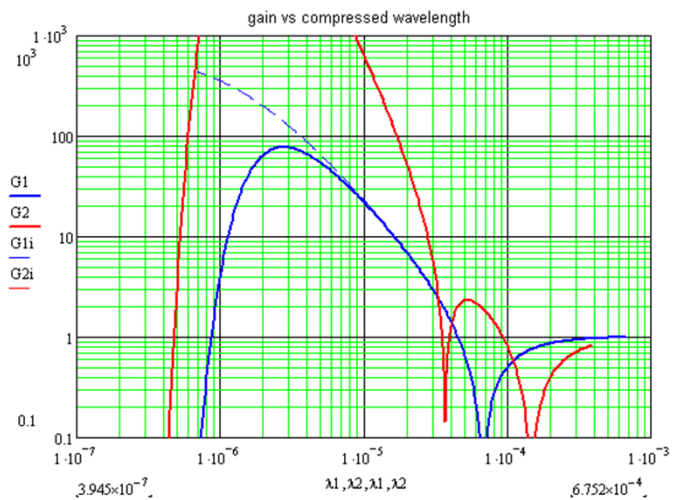
$$C=7.6=4.44*1.71$$



smooth current



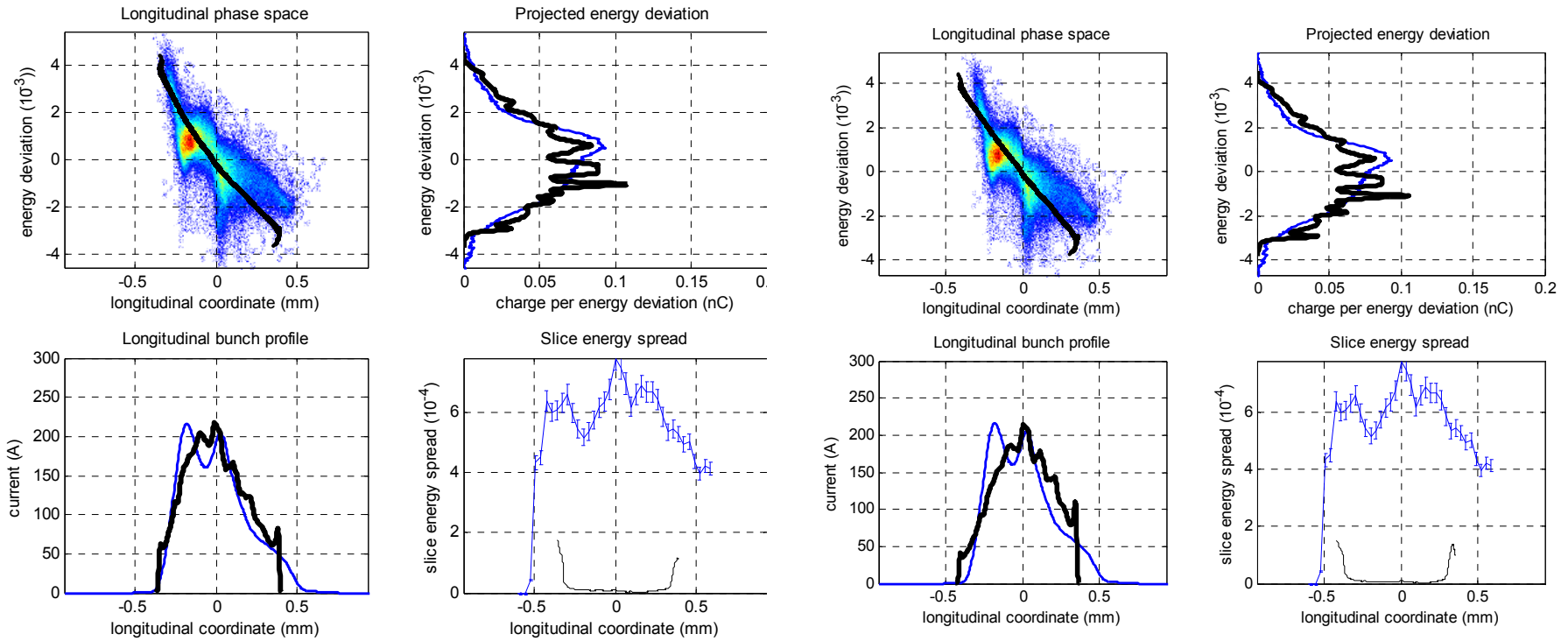
new current



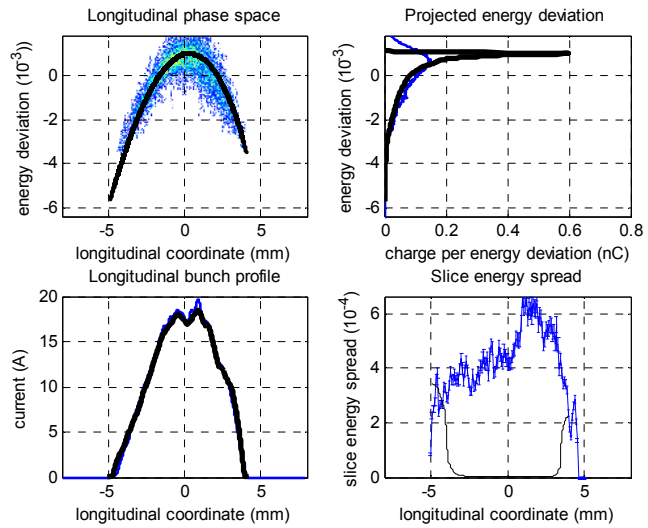
RF parameters?

V13=+0.9 MV

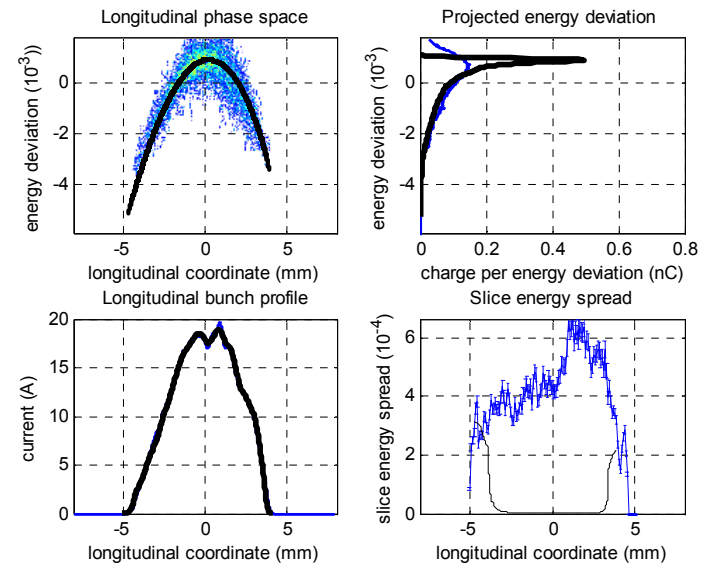
fi11=+0.3 deg



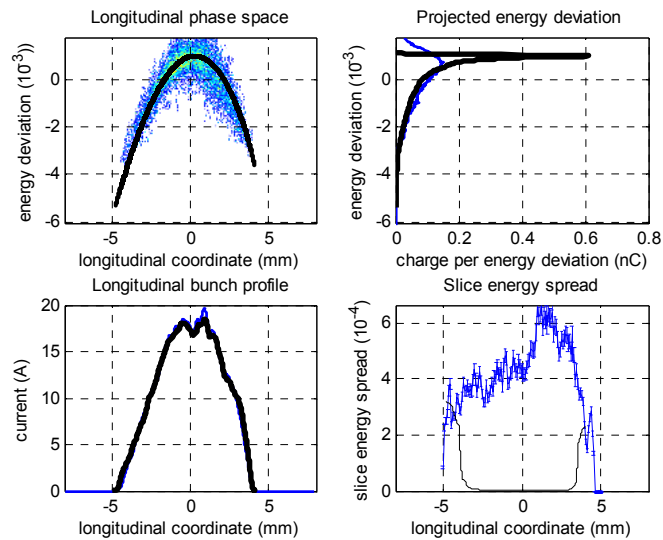
fi11=0 deg



fi11=+0.3 deg



V13=+0.9MV

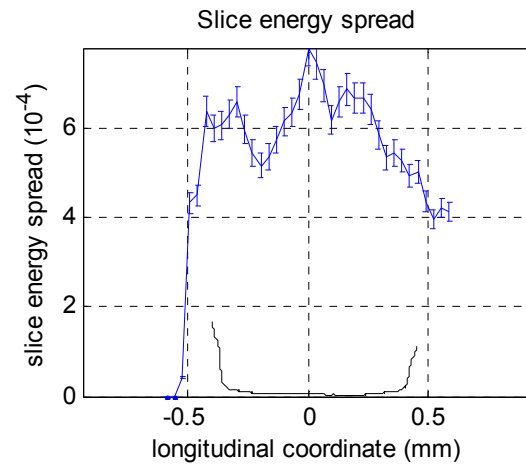
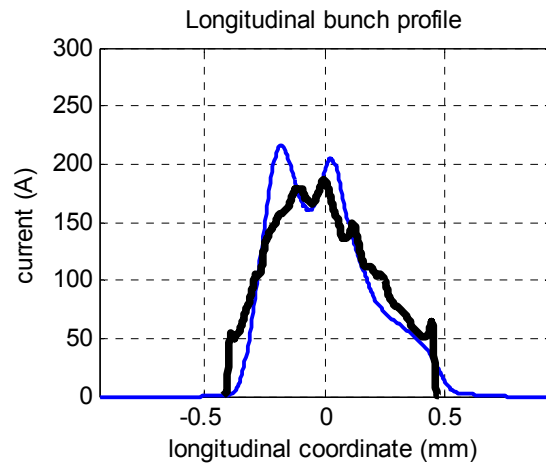
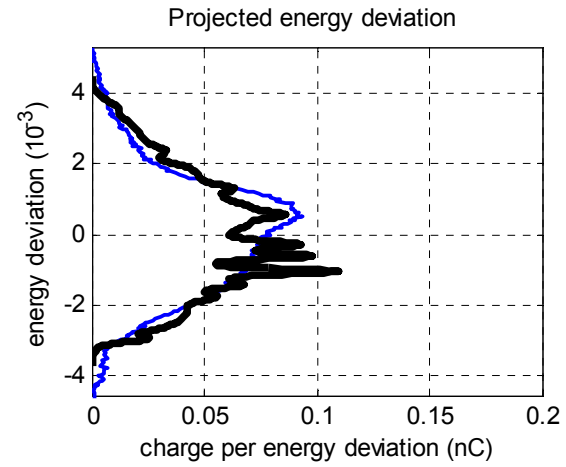
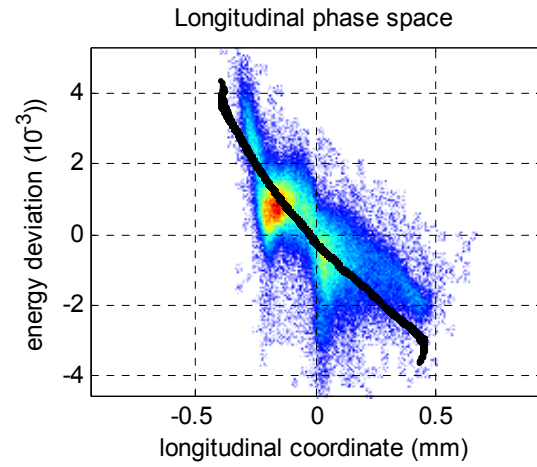


RF parameters?
On-crest simulations
vs the measurement.

$C=9.4=4.9*1.9$

$V13=+1.1$ MV

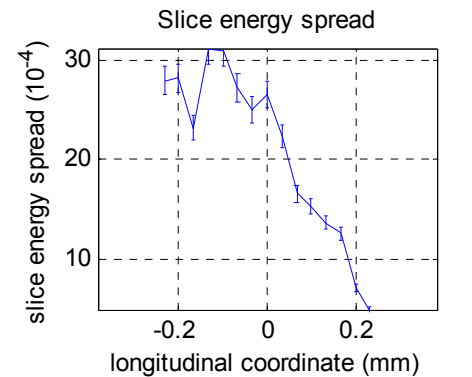
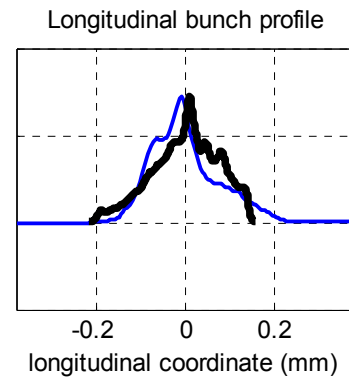
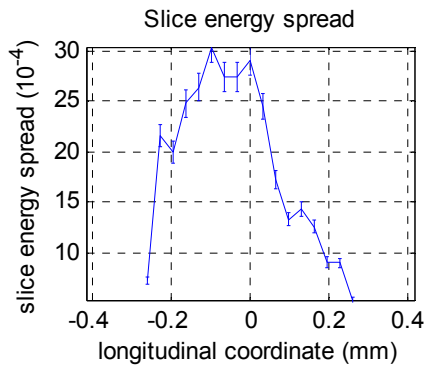
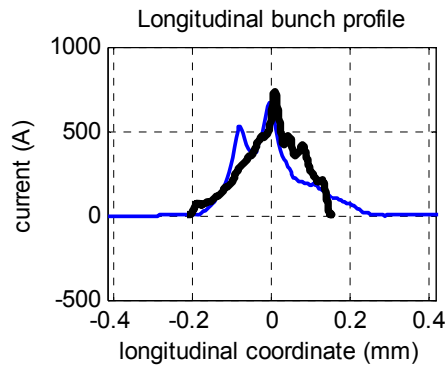
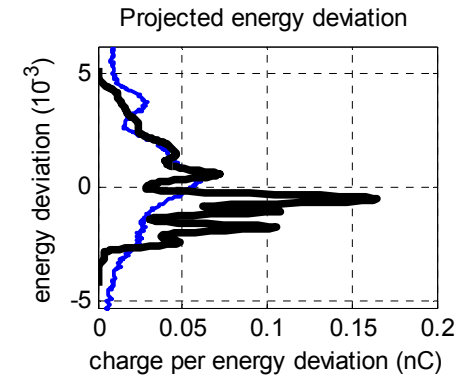
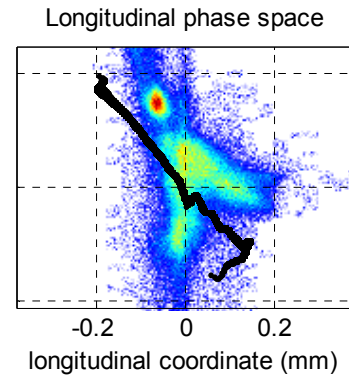
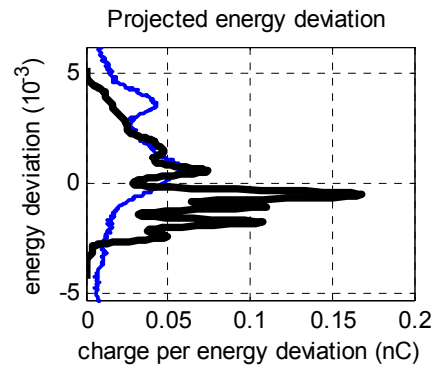
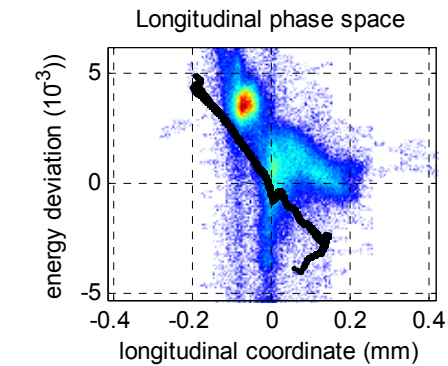
$\phi_{11}=-0.2$ deg



C=32=7.5*4.3

V13=+1.5 MV

fi11=-0.2 deg



L-Band and 3rd harmonic rf parameters

Amp. L-Band [MV]	162.8344	Offset
Phase L-Band [deg]	-1.3751	Read
Amp. 3rd har. [MV]	20.411	Write
Phase 3rd har. [deg]	152.3951	

RF sum amplitude and derivatives

V Beam [MV]	144.7	
Chirp [1/m]	-4.6036	Read
V'' [1/m??]	1.3741e-08	Write
V''' [1/m??]	35075.000	