Work progress

Hyunchang Jin

S2E meeting 2013. 06. 18

Plan in last month (2013.05.14)

- To make a matlab gui for the BBA experiment at FLASH (experiment will be done in Aug. or Sep. 2013)

- To write an internal report for BBA in XFEL

- S2E simulation with elegant for XFEL, and comparing the results with ASTRA+CSR Track simulations (by G. Feng)

# Achieved works in previous plan

- To make a matlab gui for the BBA experiment at FLASH (experiment will be done in Aug. or Sep. 2013)
  - 20 %

- To write an internal report for BBA in XFEL
  - 30 %

- S2E simulation with elegant for XFEL, and comparing the results with ASTRA+CSR Track simulations (by G. Feng)
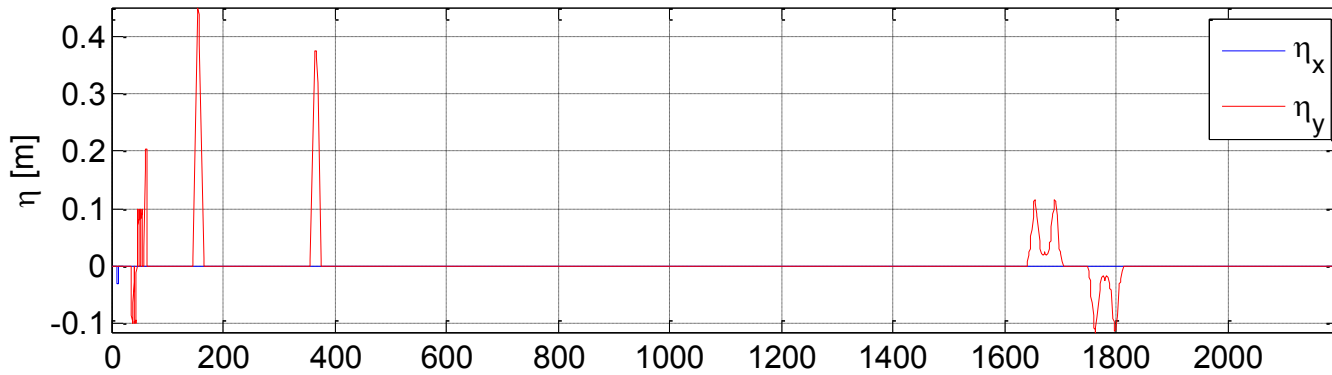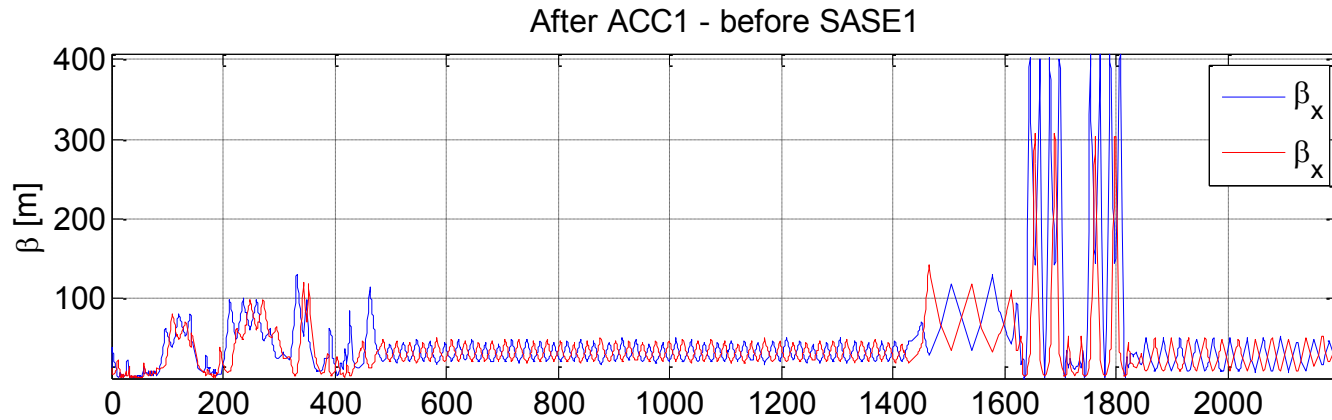 - 0.5 nC (95%)

S2E simulations
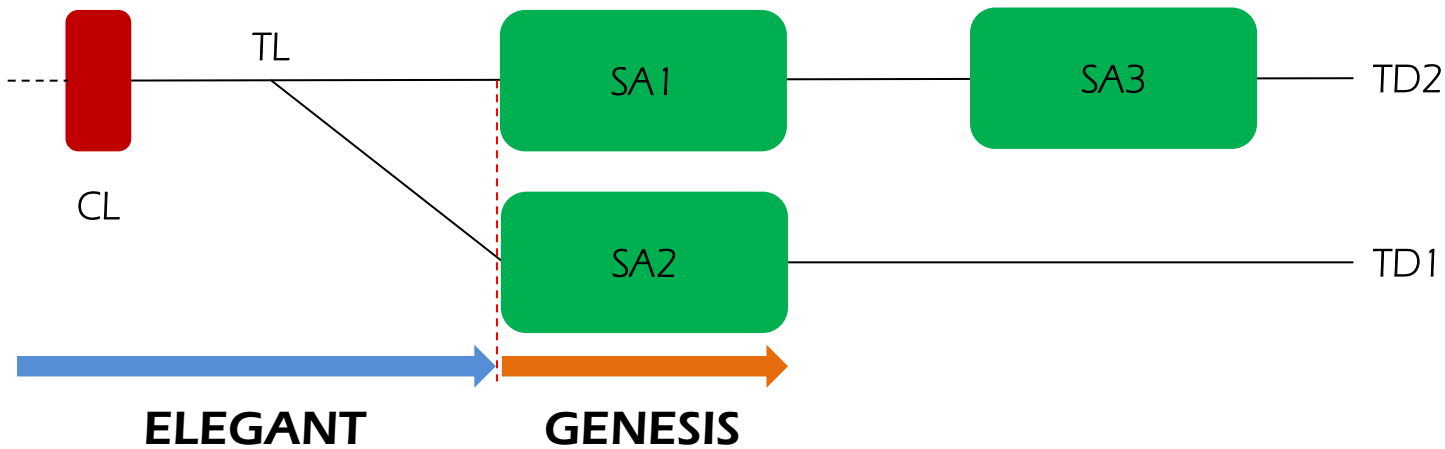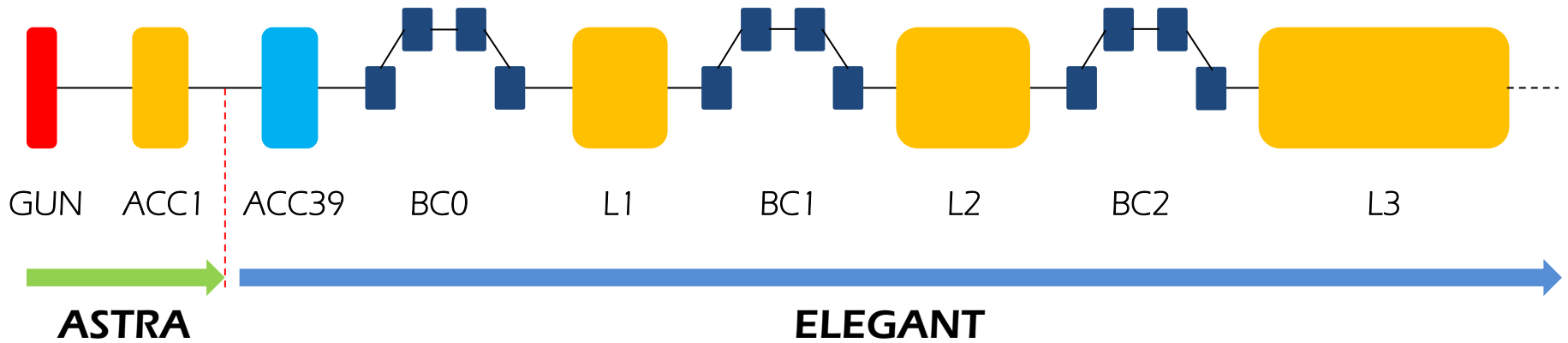
- Particles : 200k // Charge : 0.5 nC
- Collective effects : CSR + LSC + wake

Twiss parameters (TD1)

After ACC1 - before SASE2
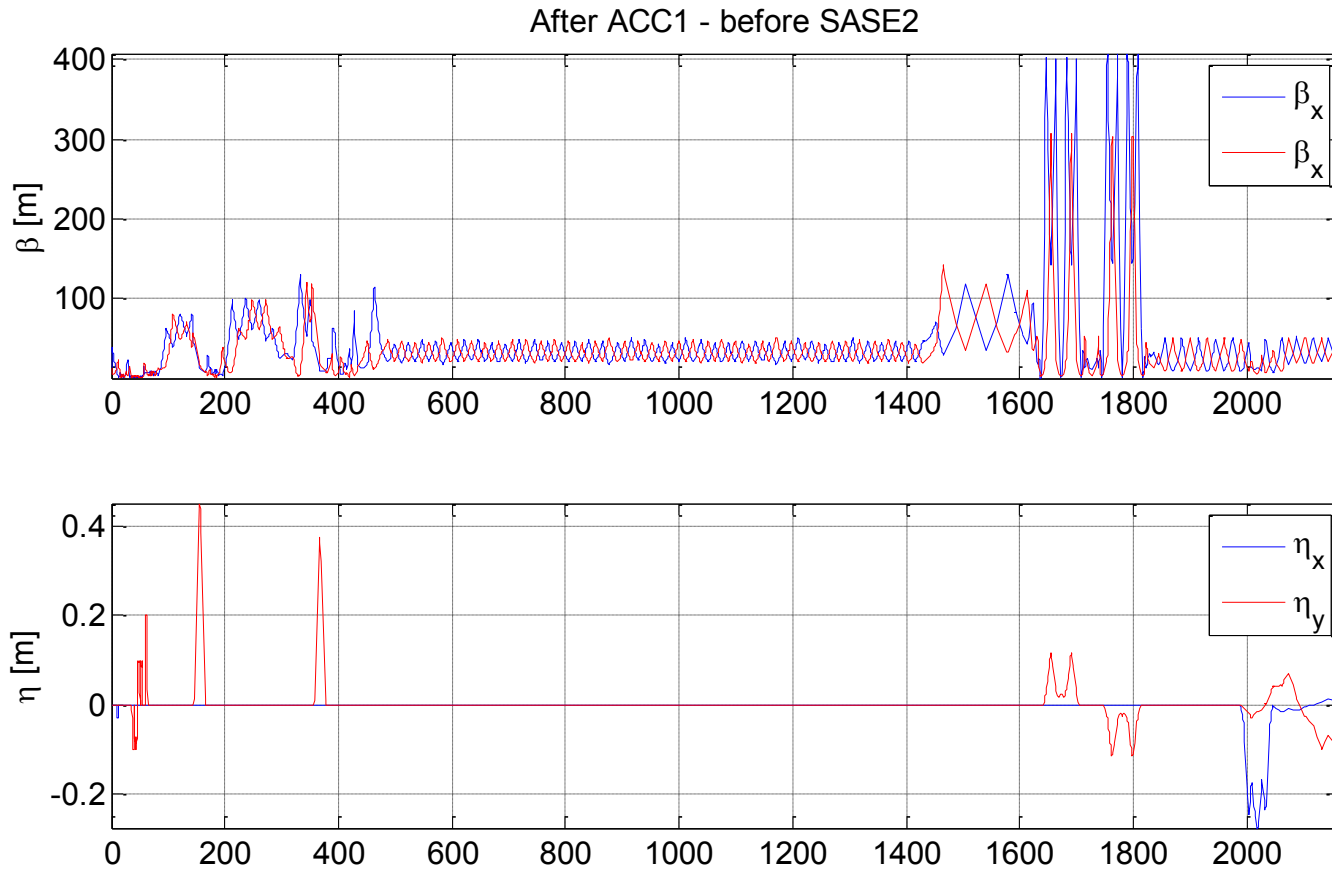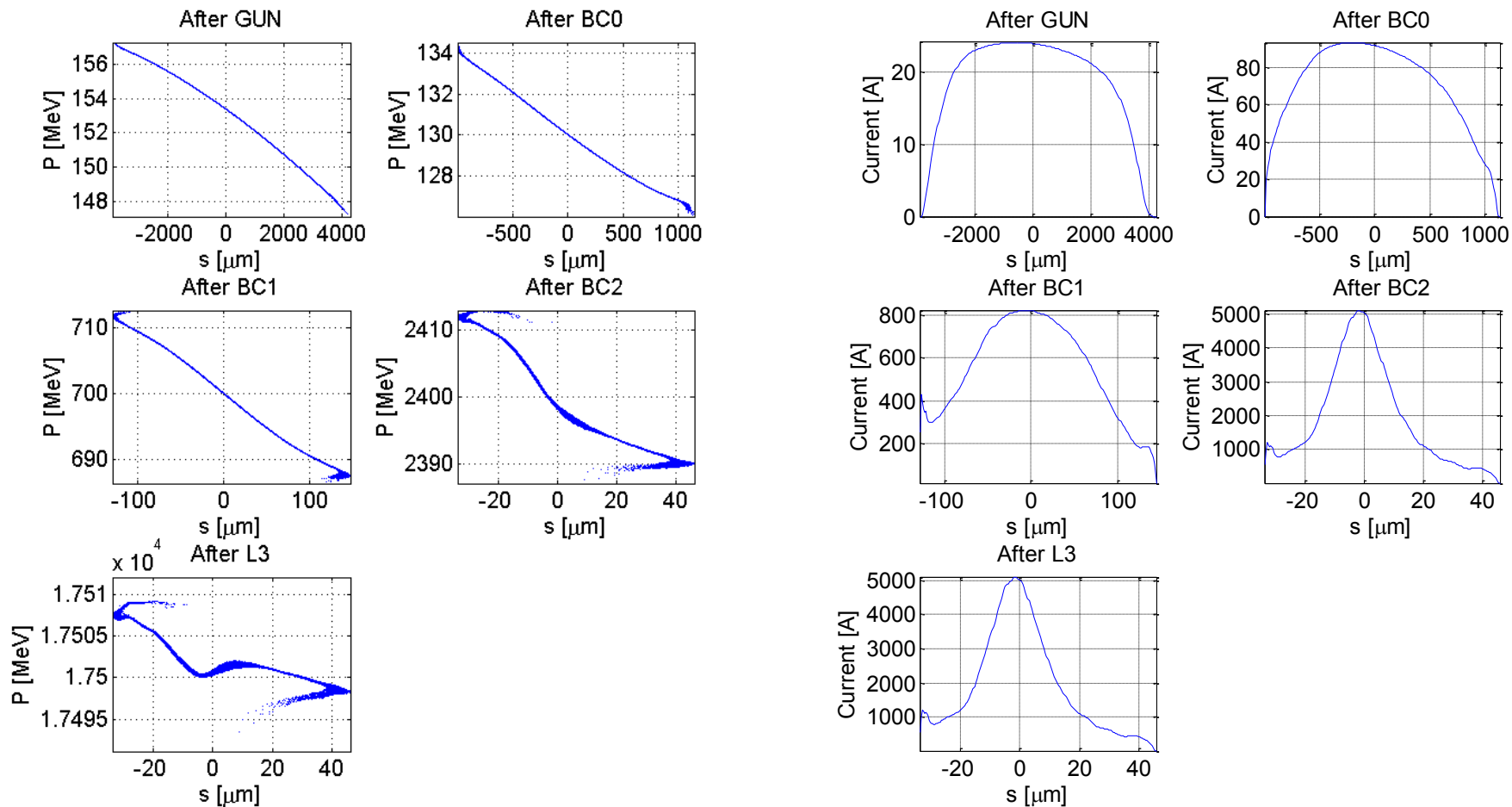
Twiss parameters (TD2)

After ACC1 - before SASE1

Machine parameters

E1 [MeV]	E2 [MeV]	E3 [MeV]
130	700	2400

Charge [nC]	BC0 R56,1 [mm]	C1	BC1 R56,2 [mm]	C2	BC2 R56,3 [mm]	C
0.5	-55	3.9	-50	8.9	-20	217

	V11 [MV]	f11 [deg]	V13 [MV]	f13 [deg]	V2 [MV]	f2 [deg]	V3 [MV]	f3 [deg]
Jin (ELEGANT)	153.47	16.71	23.34	184.66	651.8	28.9	1711.06	5.7
Feng (ASTRA+CSR)	153.47	16.71	23.49	184.54	656.4	29.7	1708.99	5.5

Longitudinal phase space & beam current
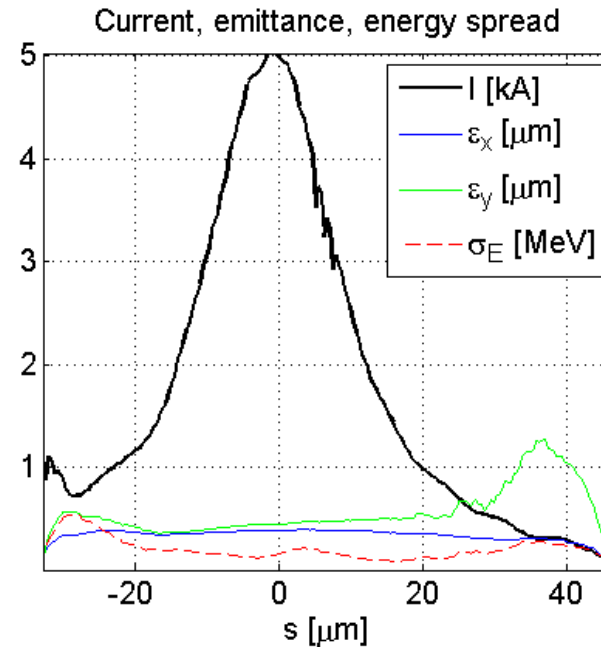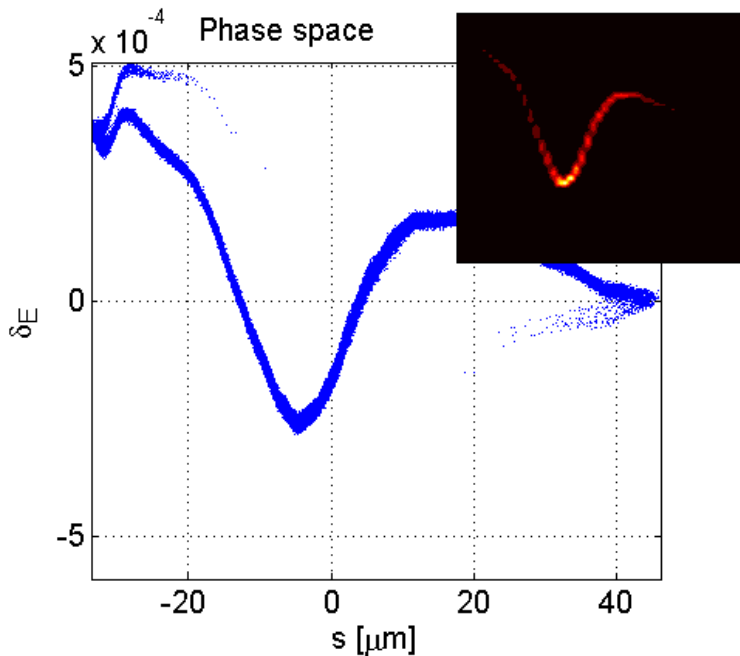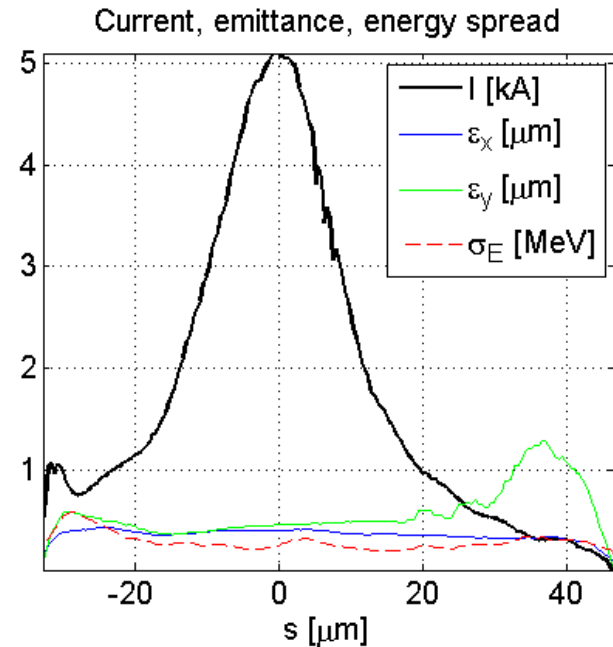
Beam profile after L3
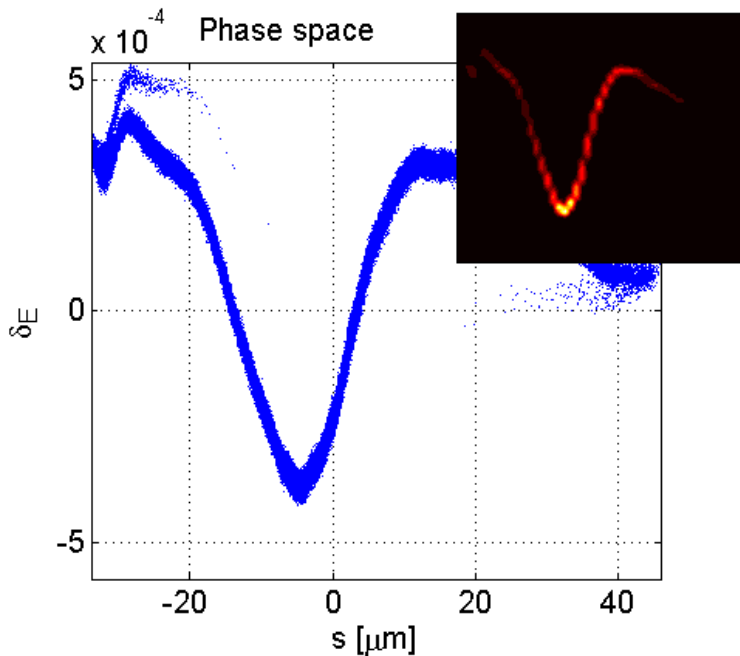

Remove about 6% bad particles in the analysis

$\varepsilon_{\text{proj},x}$ = 0.5 μm

$\varepsilon_{\text{proj},y}$ = 1.4 μm

FWHM = 70.4 fs

Beam profile before SASE1
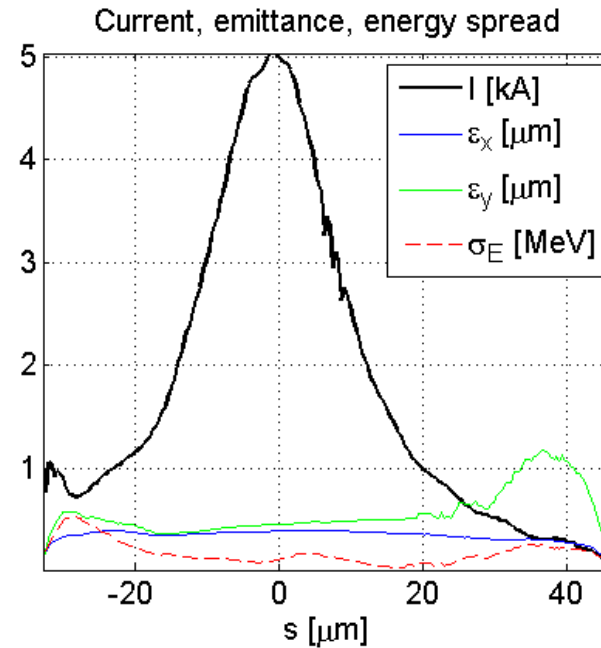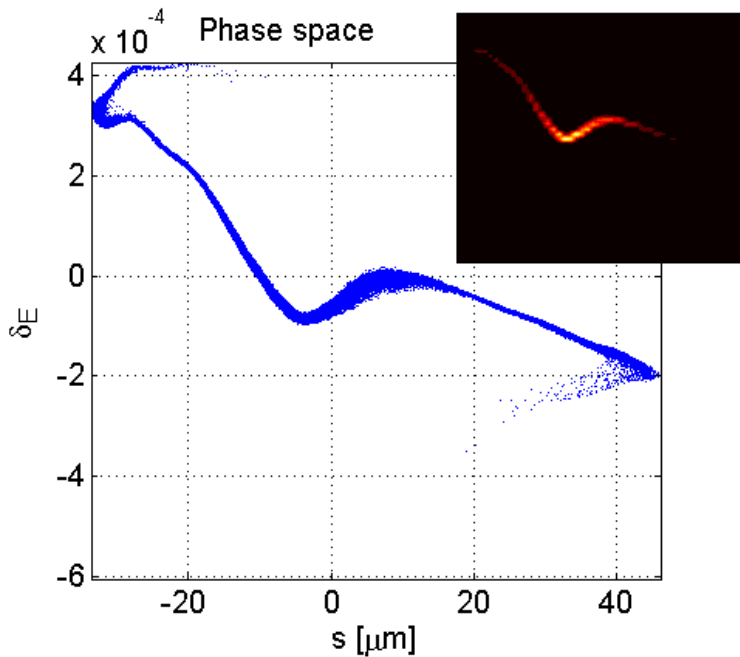
Remove about 6% bad particles in the analysis

$\varepsilon_{proj,x} = 0.5 \; \mu m$

$\varepsilon_{proj,y} = 1.5 \; \mu m$

FWHM = 74.4 fs

Beam profile before SASE2

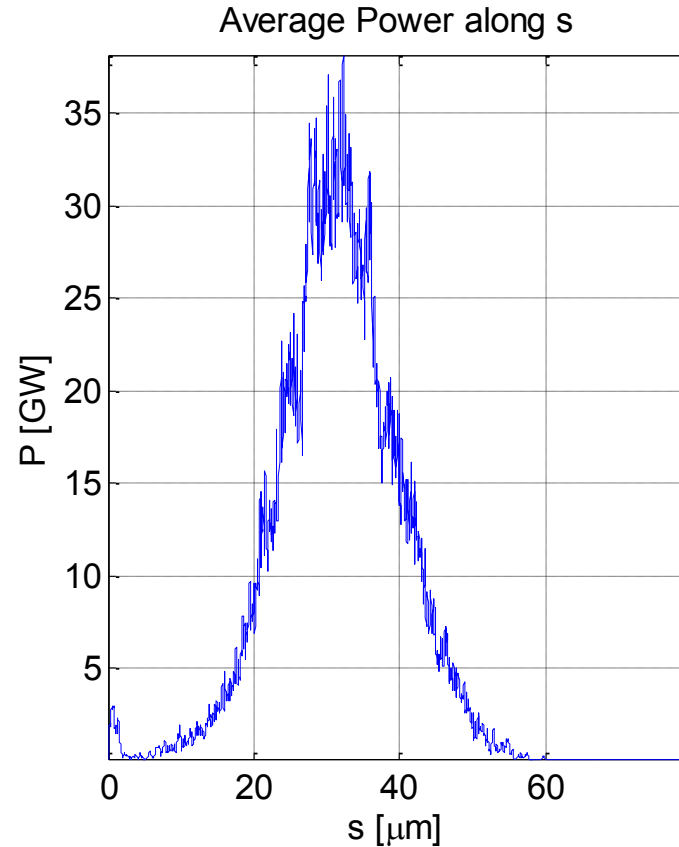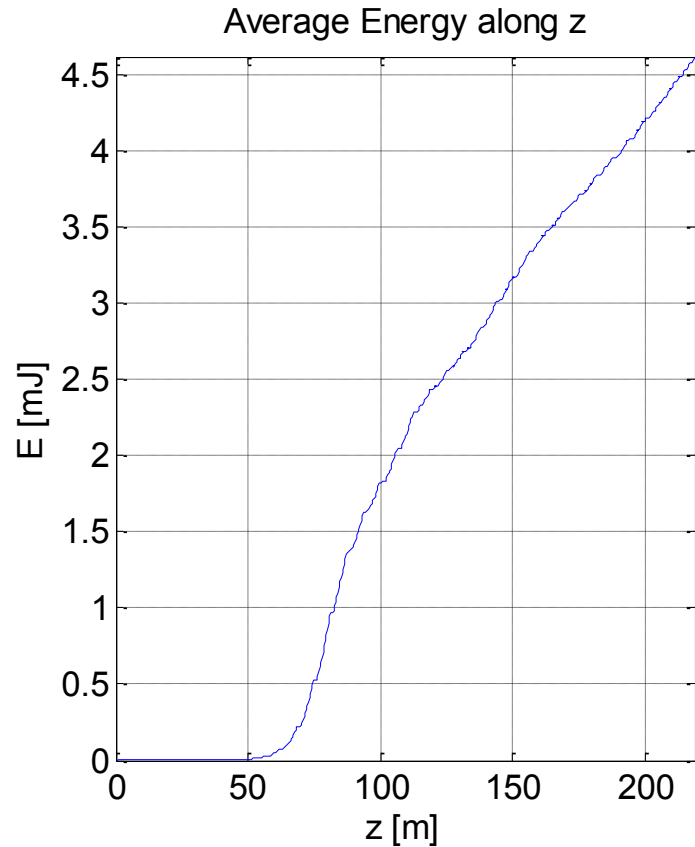

Remove about 6% bad particles in the analysis

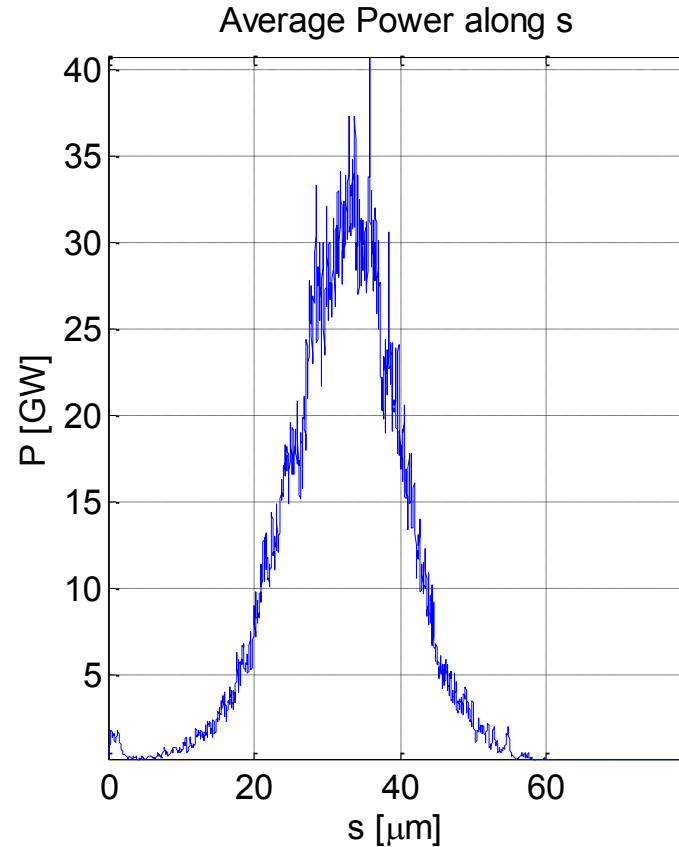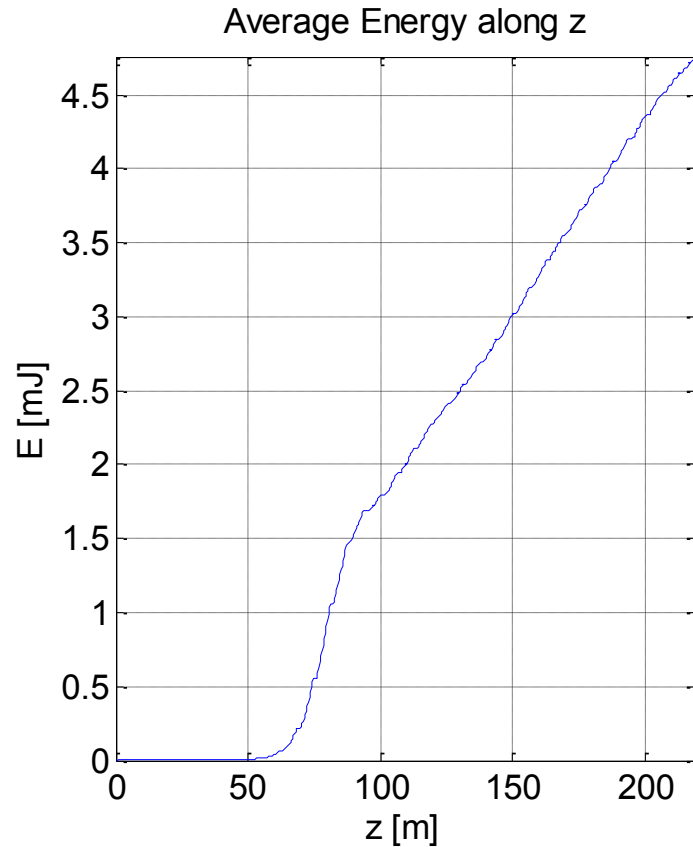$\varepsilon_{proj,x} = 0.7\ \mu m$

$\varepsilon_{proj,y} = 1.6\ \mu m$

FWHM = 70.4 fs

Average radiation energy & power at SASE1

10 random seeds

Average radiation energy & power at SASE2

Average Energy along z

Average Power along s

10 random seeds

Plan in next month

- To make a matlab gui for the BBA experiment at FLASH (experiment will be done in Aug. or Sep. 2013)

- To write an internal report for BBA in XFEL

- S2E simulation with elegant for XFEL, and comparing the results with ASTRA+CSR Track simulations (by G. Feng)
  - Other charges : 1 nC, 0.25 nC (?)