

Work progress

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S2E meeting 2013. 05. 14

Plan in last month (2013.04.08)

- 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

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)
 - (10 %)
- To write an internal report for BBA in XFEL
 - (20 %)
- S2E simulation with elegant for XFEL (new lattice)
 - 1 nC, 500 pC cases without wake (100 %)
 - 500 pC case with wake (30 %)

Machine parameters

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

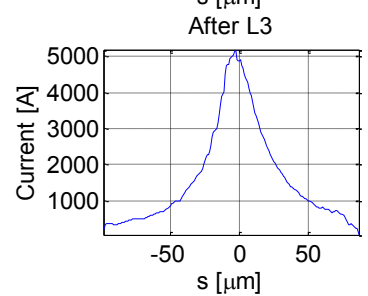
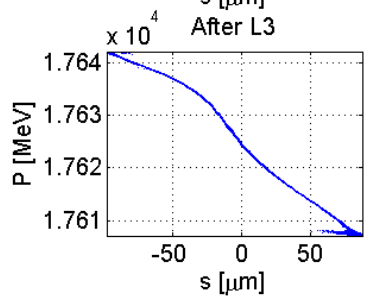
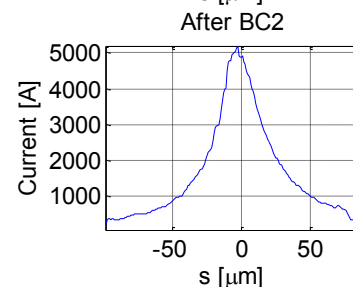
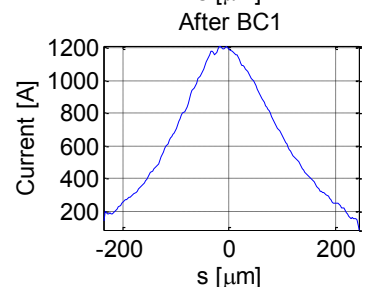
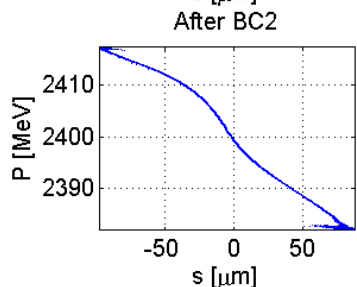
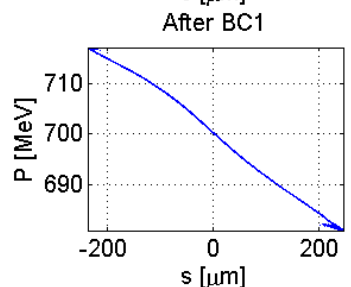
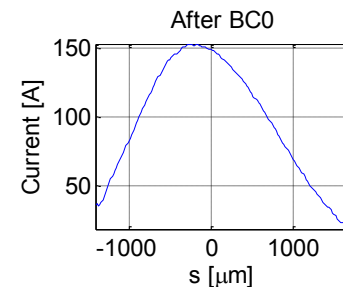
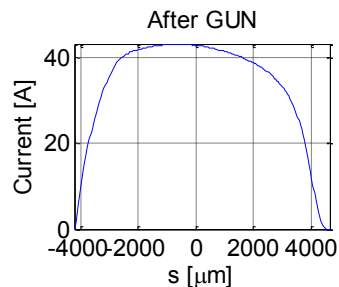
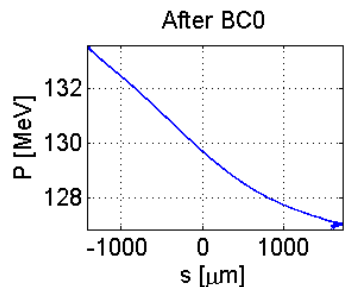
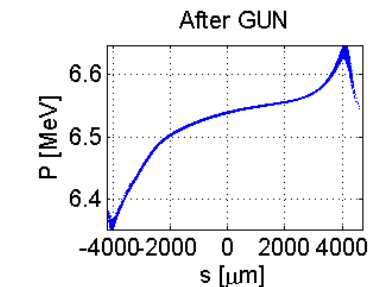
Charge [nC]	R56,1 [mm]	C1	R56,2 [mm]	C2	R56,3 [mm]	C
1.0	-100	3.5	-54	8.0	-20	121
0.5	-89	3.5	-50	8.0	-20	217

Charge [nC]	V11 [MV]	ϕ 11 [deg]	V13 [MV]	ϕ 13 [deg]	V2 [MV]	ϕ 2 [deg]	V3 [MV]	ϕ 3 [deg]
1.0	145.0	3.3	24.7	150.22	670	31.6	1701.6	2.05
0.5	145.4	2.05	24.6	153.25	670	31.7	1742.8	12.6

(Without wake)

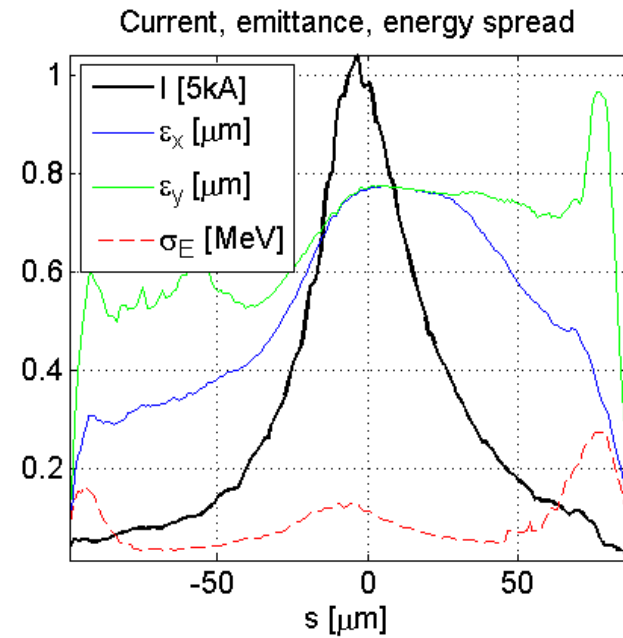
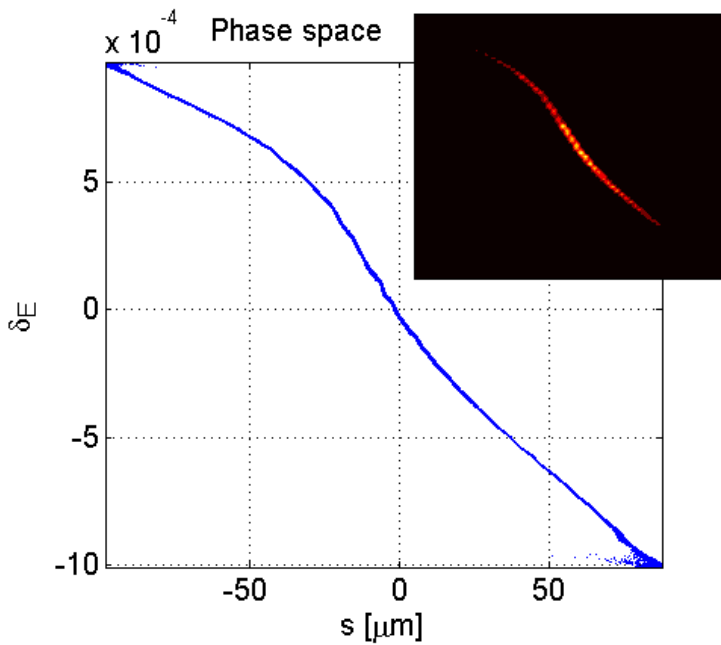
$$Q = 1.0 \text{ nC}$$

Longitudinal phase space & beam current (1.0 nC)



Beam profile after L3

$Q = 1.0 \text{ nC}$



Remove about 6% bad particles in the analysis

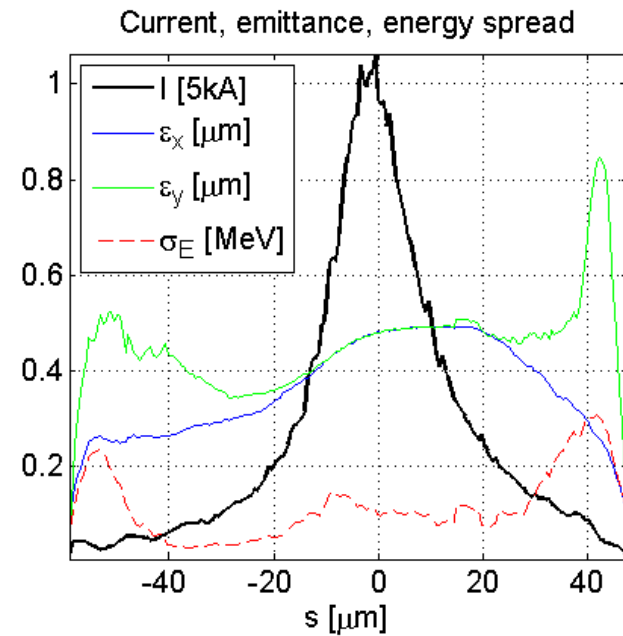
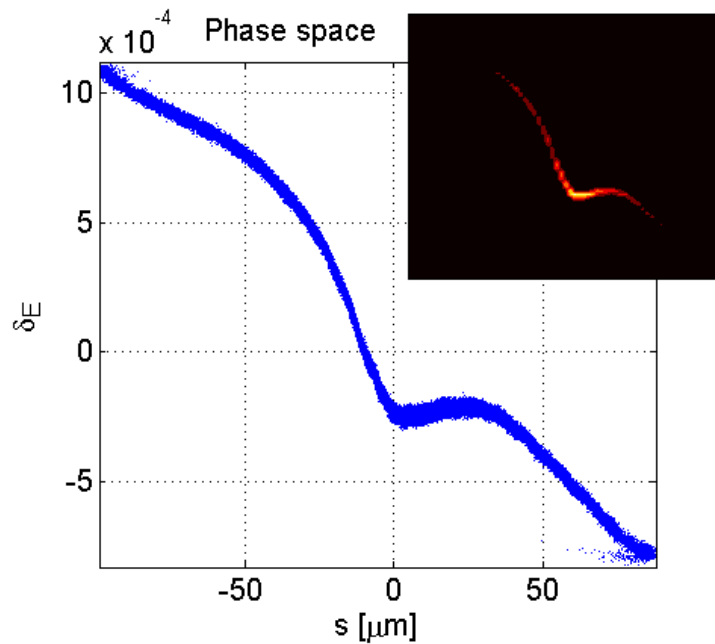
$$\epsilon_{\text{proj},x} = 1.4 \text{ }\mu\text{m}$$

$$\epsilon_{\text{proj},y} = 2.4 \text{ }\mu\text{m}$$

$$\text{FWHM} = 68.26 \text{ fs}$$

Beam profile before SASE2 (TD1)

$Q = 1.0 \text{ nC}$



Remove about 6% bad particles in the analysis

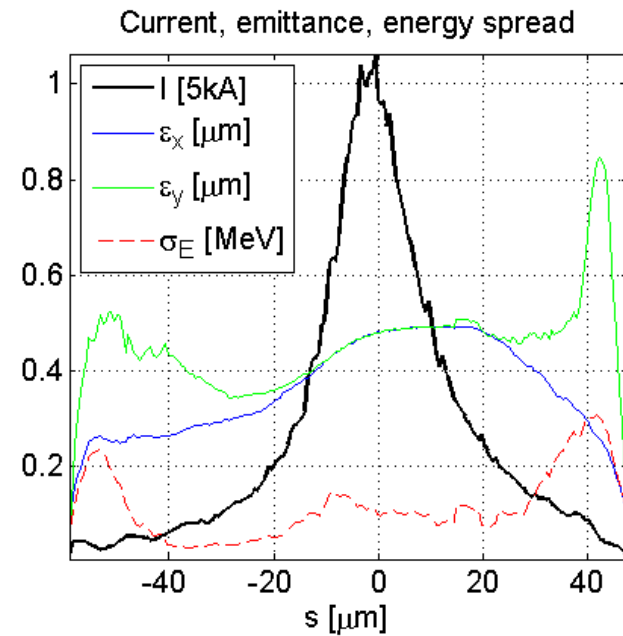
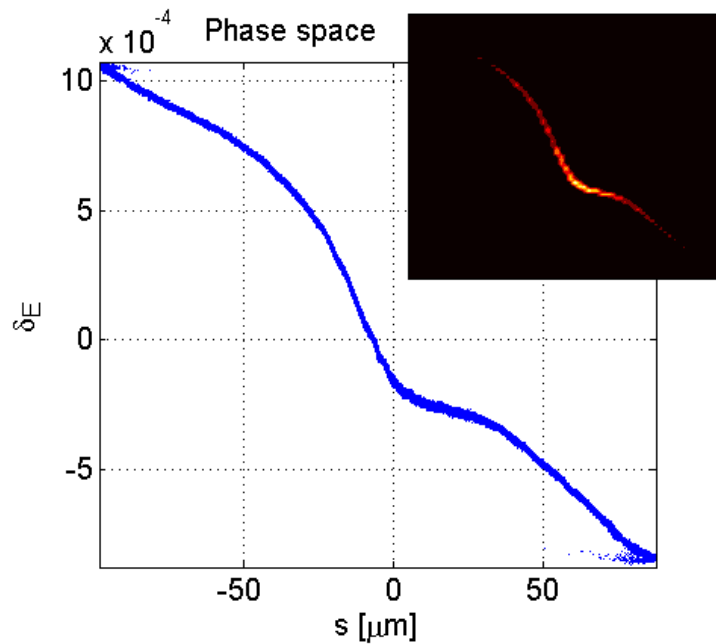
$$\epsilon_{\text{proj},x} = 1.9 \mu\text{m}$$

$$\epsilon_{\text{proj},y} = 3.8 \mu\text{m}$$

$$\text{FWHM} = 67.97 \text{ fs}$$

Beam profile before SASE1 (TD2)

$Q = 1.0 \text{ nC}$



Remove about 6% bad particles in the analysis

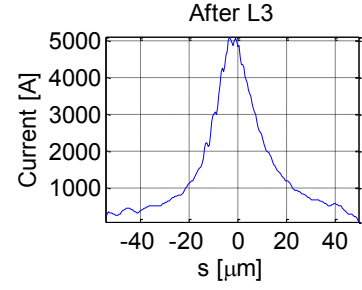
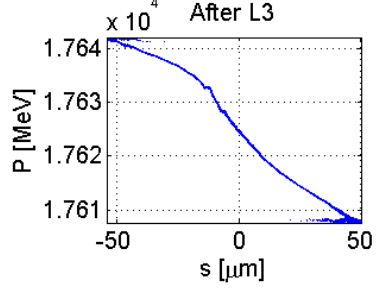
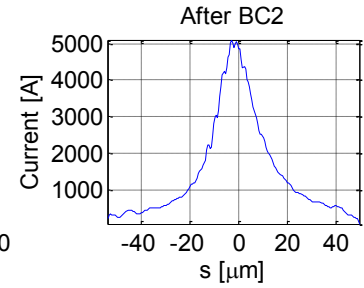
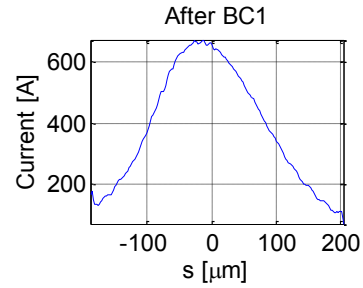
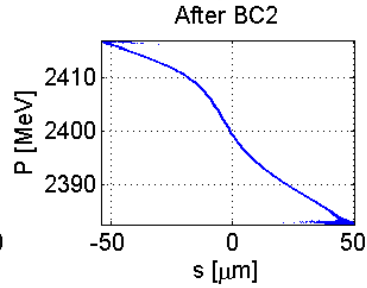
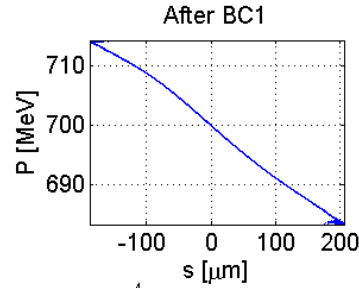
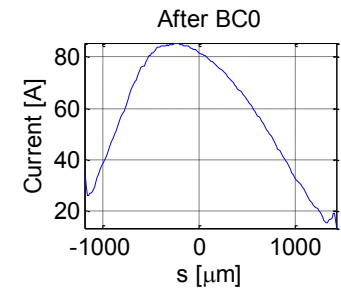
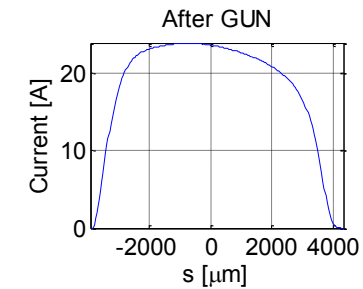
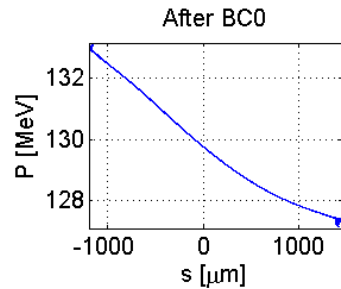
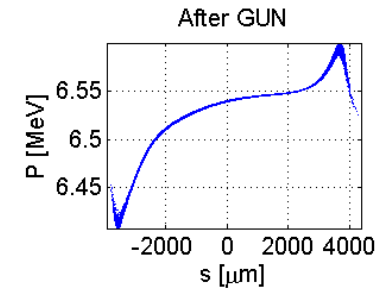
$$\varepsilon_{\text{proj},x} = 1.4 \mu\text{m}$$

$$\varepsilon_{\text{proj},y} = 2.5 \mu\text{m}$$

$$\text{FWHM} = 67.97 \text{ fs}$$

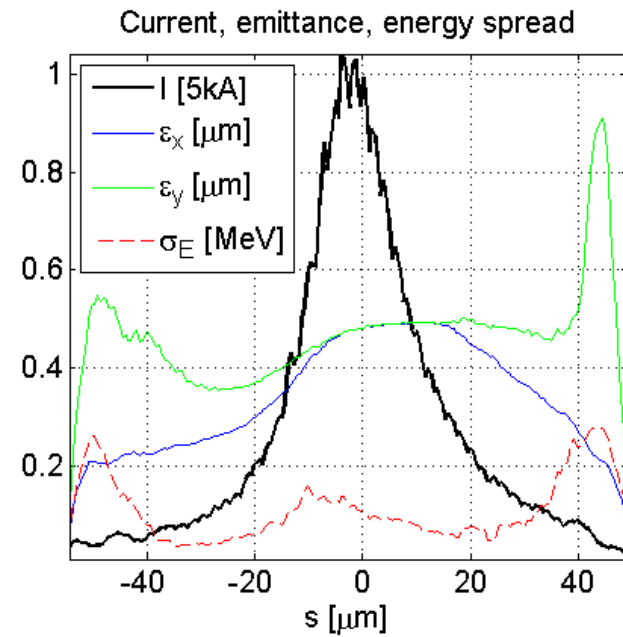
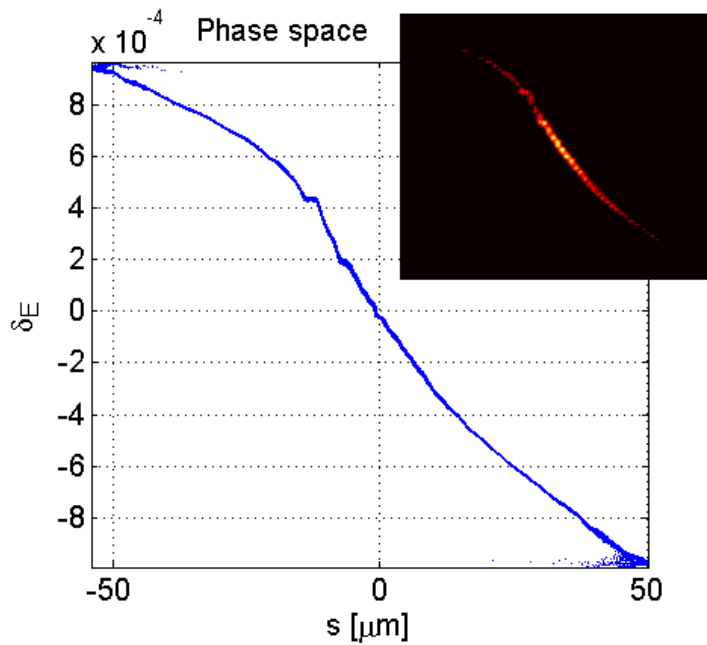
$$Q = 0.5 \text{ nC}$$

Longitudinal phase space & beam current (0.5 nC)



Beam profile after L3

$Q = 0.5 \text{ nC}$



Remove about 6% bad particles in the analysis

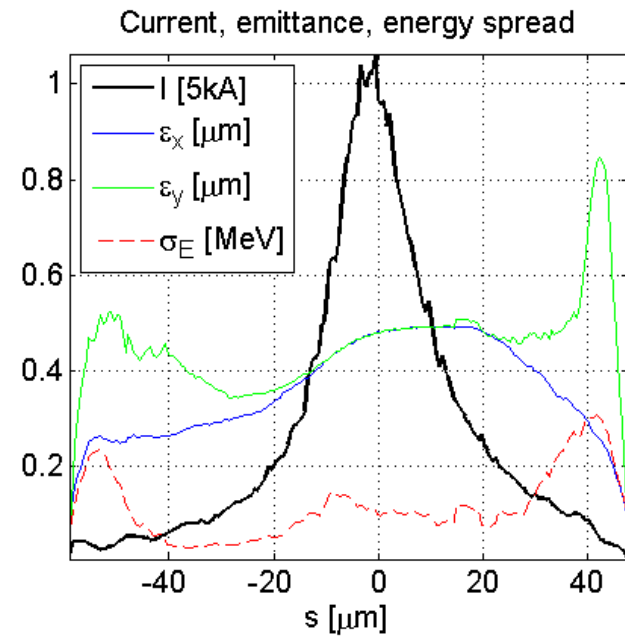
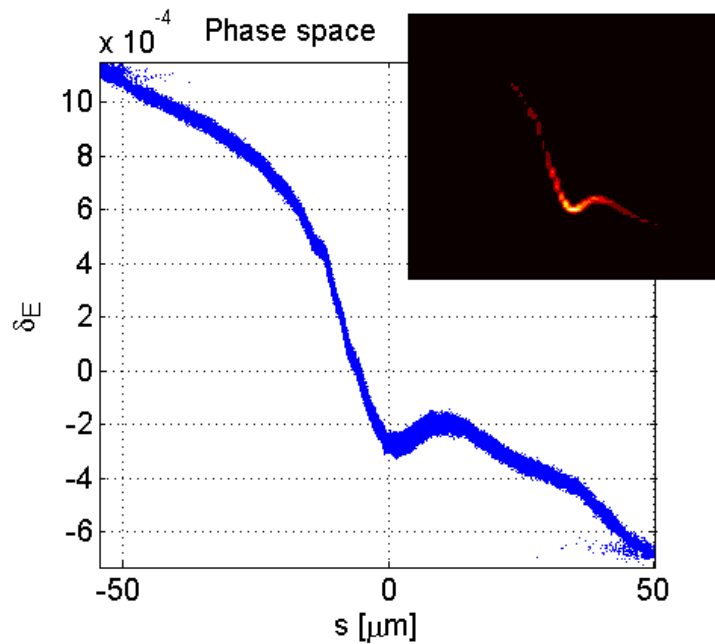
$$\varepsilon_{\text{proj},x} = 0.8 \mu\text{m}$$

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

$$\text{FWHM} = 41.73 \text{ fs}$$

Beam profile before SASE2 (TD1)

$Q = 0.5 \text{ nC}$



Remove about 6% bad particles in the analysis

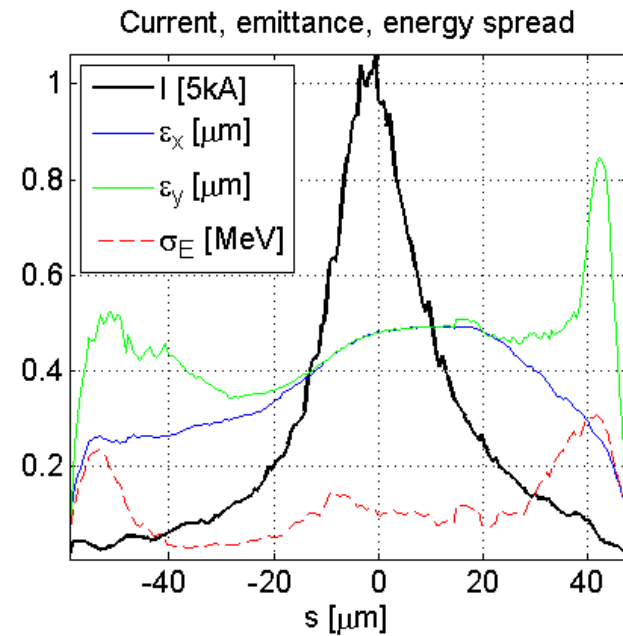
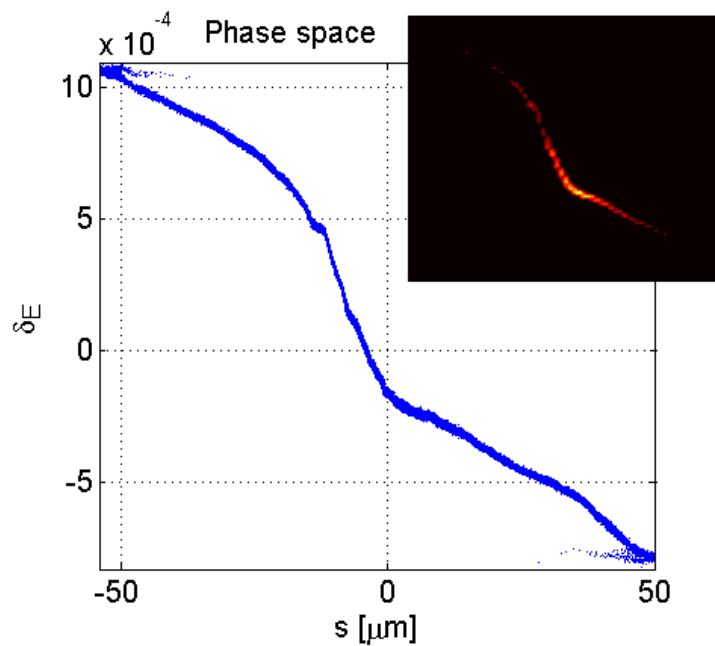
$$\epsilon_{\text{proj},x} = 1.4 \text{ }\mu\text{m}$$

$$\epsilon_{\text{proj},y} = 2.7 \text{ }\mu\text{m}$$

$$\text{FWHM} = 67.97 \text{ fs}$$

Beam profile before SASE1 (TD2)

$Q = 0.5 \text{ nC}$



Remove about 6% bad particles in the analysis

$$\epsilon_{\text{proj},x} = 0.8 \mu\text{m}$$

$$\epsilon_{\text{proj},y} = 1.5 \mu\text{m}$$

$$\text{FWHM} = 67.97 \text{ fs}$$

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)