Start-to-End Simulations

TTF1, TTF2 and XFEL

- **TTF1**
  - Start-to-End Simulations of SASE FEL at the TESLA Test Facility, Phase 1.
- **TTF2**
  - Optimized version (6.4 nm, 1GeV)
  - Operation wihout 3.9 GHz cavity : Case 0.5 nC, 4 ps sigma, magnetic compression
  - Operation without 3.9 GHz cavity : Case 1.0 nC, 4 ps sigma, velocity bunching
  - Operation without 3.9 GHz cavity : Case 1.0 nC, 20 ps flat top, velocity bunching
- **XFEL**
  - Benchmark S2E workshop, August 2003 (20.5 GeV, 3 chicanes, 12 kA peak)
  - ESFRI XFEL workshop, October 2003 (20.0 GeV, double chicane, 5 kA)

XFEL S2E Files

Case 20 ps laser flat top, with 3.9 GHz cavity, double chicane, 20 GeV

(Y. Kim Optimization)

SCHEMATIC LAYOUT OF THE XFEL (DOUBLE CHICANE, 40 MV/m cathode)

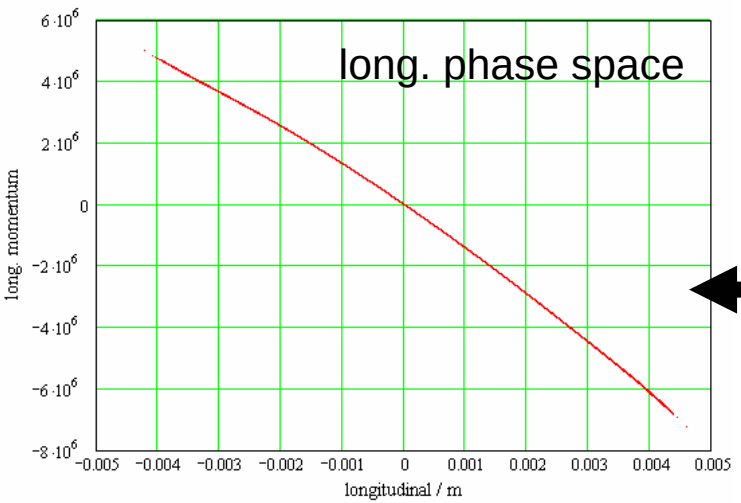
INJECTOR (UP TO Z=12.00 M, between the 7th and 8th cavity inside ACC1)

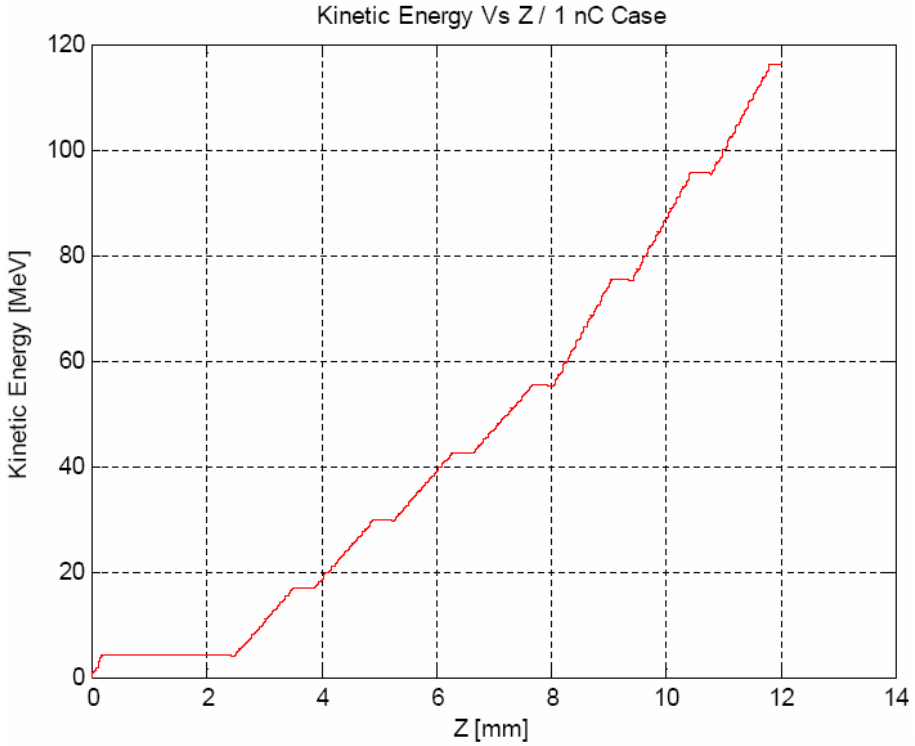
- Input Files for ASTRA: aperture, solenoids, rf gun, 9-cell structure, half-module
- Input Files for Poisson and Superfish : solenoids, rf gun, 9-cell structure

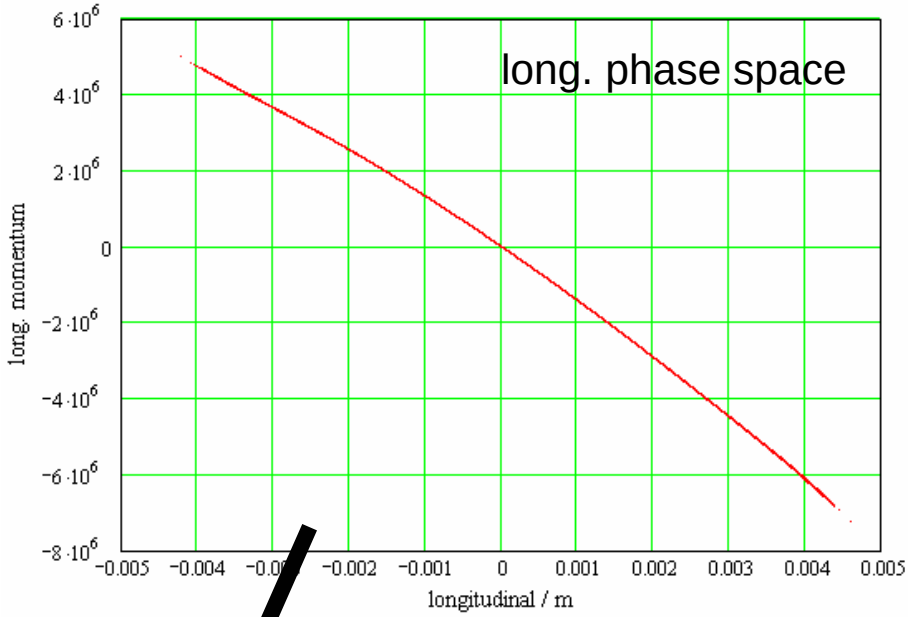
	ASTRA Input files
Input File (For ASTRA)	xfel.in
Input File (For Generator)	laser-200k-1nc.in
Input Laser Distribution	laser-200k-1nc.ini laser-200k-1nc.pdf

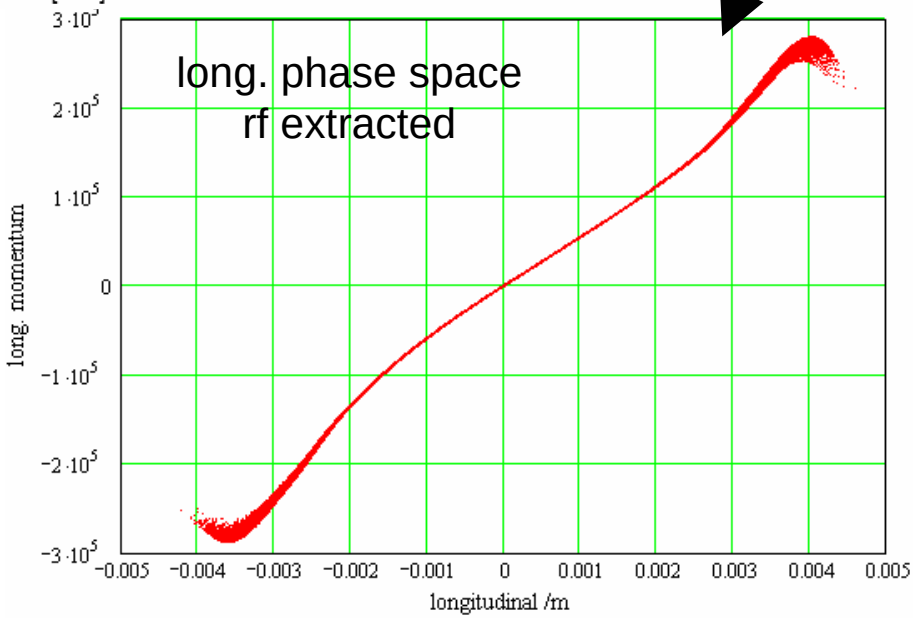
ASTRA INJECTOR SIMULATIONS OUTPUT FILES

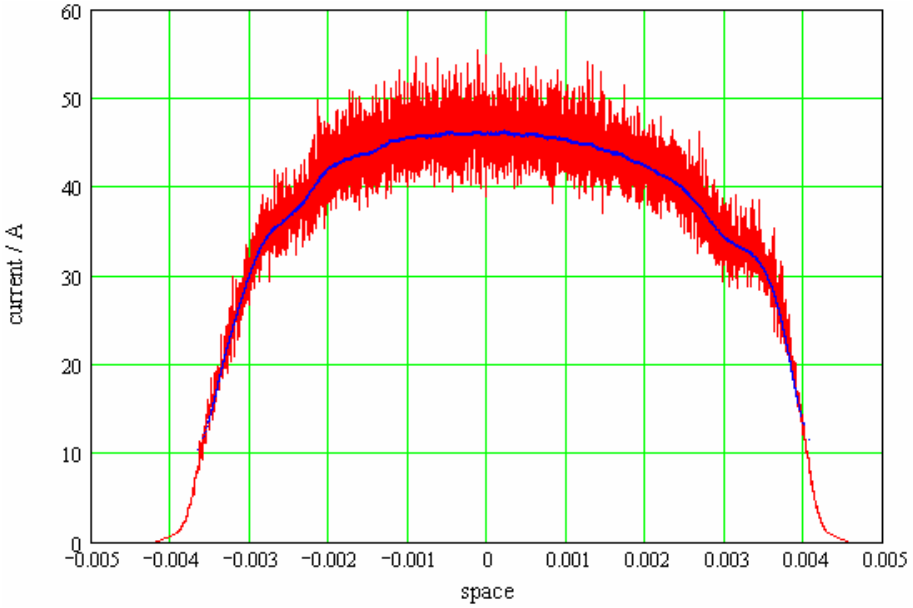
	Output files
Dump (at z=12.00m)	ASTRA File
100 Slices (at z=12.00m)	
Beam Parameters (at z=12.00m)	astra-1nc.pdf



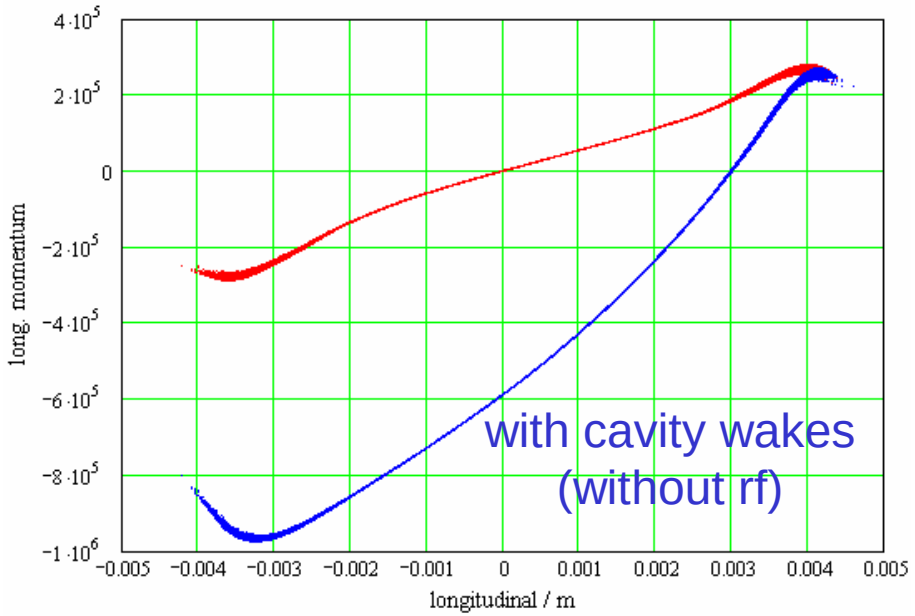

Kinetic Energy Vs Z / 1 nC Case
Kinetic Energy [MeV]
Z [mm]
0
20
40
60
80
100
120
0
2
4
6
8
10
12
14


long. phase space
long. momentum
longitudinal / m
$6 \cdot 10^6$
$4 \cdot 10^6$
$2 \cdot 10^6$
0
$-2 \cdot 10^6$
$-4 \cdot 10^6$
$-6 \cdot 10^6$
$-8 \cdot 10^6$
-0.005
-0.004
-0.002
-0.001
0
0.001
0.002
0.003
0.004
0.005

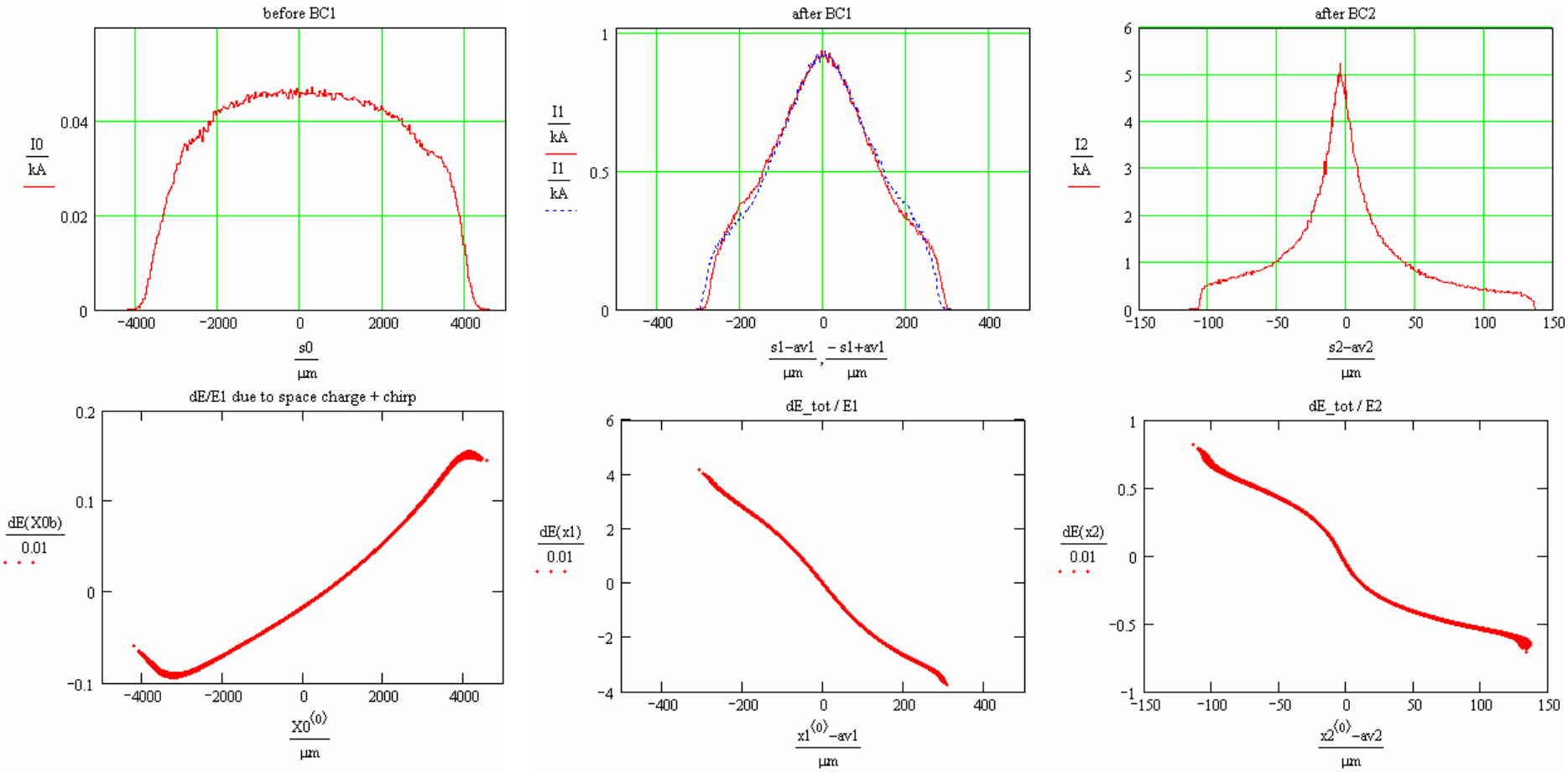

long. phase space
rf extracted
long. momentum
longitudinal /m
$3 \cdot 10^5$
$2 \cdot 10^5$
$1 \cdot 10^5$
0
$-1 \cdot 10^5$
$-2 \cdot 10^5$
$-3 \cdot 10^5$
-0.005
-0.004
-0.003
-0.002
-0.001
0
0.001
0.002
0.003
0.004
0.005



long. Density + wake fields:
4 TESLA modules
3rd harmonic cavities: 8m
active length



working point with V(3rd) = 100 MV



working point with e'''=0