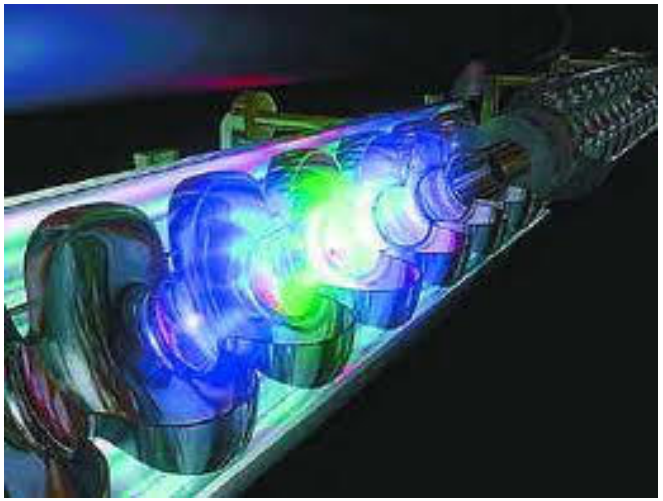
Results and Plans for February 2013

Start-to-End Simulations



Igor Zagorodnov

Deutsches Elektronen Synchrotron,
Hamburg, Germany

S2E Meeting, DESY
30. January 2013

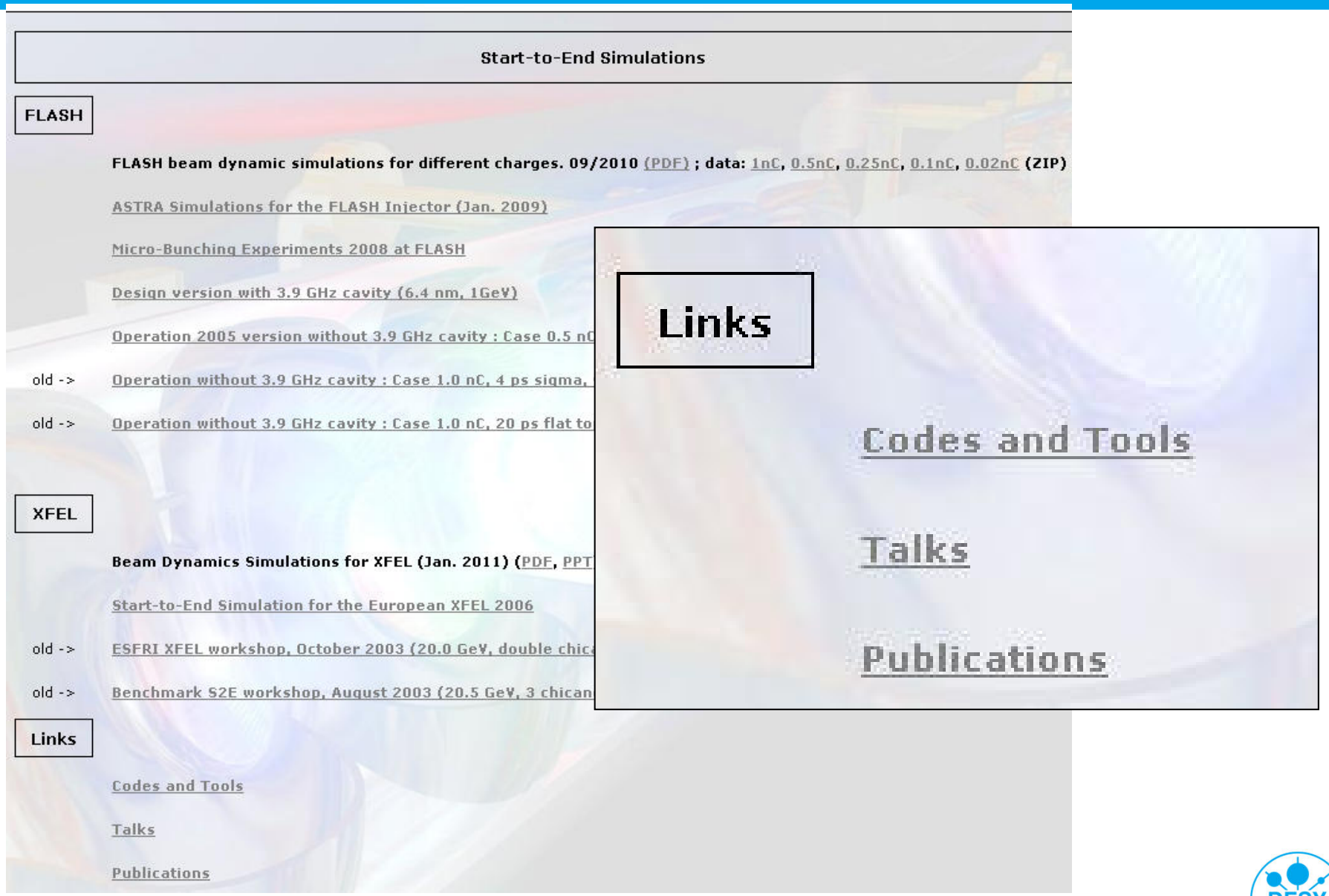
HELMHOLTZ GEMEINSCHAFT

DESY

Content

- Web Presence
- Plans and Results (October 2012- January 2013)
- Plans (February 2013)

Web Presence



Web Presence

Start-to-End Simulations : Codes and Tools

Codes

ALICE (Igor.Zagorodnov@desy.de)

ASTRA (Klaus.Floettmann@desy.de)

CSRtrack (Martin.Dohlus@desy.de)

ECHOz (Igor.Zagorodnov@desy.de)

Elegant (Michael Borland, ANL)

Genesis (Sven Reiche, PSI)

MAD 8

Parallelized Astra (Sascha.Meykopff@desy.de)

Tools

PS Viewer (Torsten.Limberg@desy.de)

Data GUI library for Matlab (Sascha.Meykopff@desy.de)

Impedance Database for XFEL: S:\user\accounts\belok\public\XFEL_MDB\XFEL2010.accdb (Olga.Zagorodnova@desy.de)
Impedance Database for FLASH: S:\user\accounts\belok\public\FLASH_MDB\FLASH.accdb (Olga.Zagorodnova@desy.de)

Web Presence

S2E meeting talks

The S2E meeting will take place monthly, building 30b, room 459

- 2013.02.27
- 2013.01.30
- 2012.12.03
- 2012.09.24

2013.02.27

2013.01.30

- Igor Zagorodnov: Results and Plans for February 2013 (PDF)

2012.12.03

- Feng Guangyao, Limberg Torsten: Study of ACC1 Voltage Amplitude Changing Effects on SASE at FLASH (PDF)

2012.09.24

- Zagorodnov Igor: Numerical Modelling of FLASH and XFEL(PDF)
- Zagorodnov Igor: Plan for October-November 2012 (PDF)
- Feng Guangyao: Study of ACC1 Voltage Amplitude Changing Effects on SASE at FLASH (PDF)
- Jin Hyunchang: Progress of Research (PDF)

Last update: Tue Jan 29 2013 by zagorodnov

Web Presence

In refereed journals

Zagorodnov I., Dohlus M.,A Semi-Analytical Modelling of Multistage Bunch Compression with Collective Effects,Physical Review ST Accel. Beams, vol. 14, No. 1, 014403, 2011.

In conference proceedings

I. Zagorodnov, Numerical Modeling of Collective Effects in Free Electron Laser 11th International Computational Accelerator Physics Conference (ICAP 2012), Warnemende, Germany (08/19/2012-08/24/2012) JaCOW, CERN, 2012, 81-85

Internal reports

M. Dohlus, K. Floettmann, C. Henning, Fast Particle Tracking With Wake Fields Red Report (2012) DESY-12-012

External talks

Feng Guangyao, Limberg Torsten: Study of ACC1 Voltage Amplitude Changing Effects on SASE at FLASH, Beam Dynamics Group Meeting on 03.12.2012, DESY

Plans (October 2012- January 2013)

- Two different charges in the same train of XFEL (Evgeny Kot)
- BBA in undulator section of XFEL (Hyunchang Jin)
- Impact of ACC1 gradient on SASE in FLASH (Guangyao Feng)
- S2E procedure and webpage (Igor Zagorodnov)

Igor Zagorodnov

October 2012-January 2013

- FLASH simulations with Elegant and comparison with previous results (**70%** done)
- XFEL simulations with Elegant and for the whole machine (**0%** done)
- New webpage design (**50%** done)
- New tools on the web: convertors (MAD<->Elegant, Elegant<->ASTRA, Elegant <->CSRtrack) (**50%** done)
- ALICE 1.0 release on the web (**100 %** done)

Plan February 2013

- FLASH simulations with Elegant and comparison with previous results (**100%**)
- XFEL siulations with Elegant and for the whole machine (**10%**)
- New webpage design (**90%**)
- New tools on the web: convertors (MAD<->Elegant, Elegant<->ASTRA, Elegant <->CSRtrack) (**100%**)
- ALICE 1.1 with intersections (**100%**)
- Make a talk at BD group meeting (**100%**)

Guangyao Feng

October 2012-January 2013

Match the beam to the design lattice after ACC1.
Get complete optics agreement between MAD version and the S2E procedure for the basic case (161 MeV in ACC1) without self-fields. Beam energy at BC2 is 150 MeV.
Analyse optics mismatch for the case with self-fields and correct the qudrupole strength if required.
Find RF parameters of ACC1 and ACC39 for increased gradient of ACC1 (165 MeV in ACC1) . Beam energy at BC2 is again 150 MeV. Exactly the same optics as before.
Analyse optics mismatch to design optics and to the nominal case.
Analyse SASE for these two cases and suggest an experiment at FLASH.
Make a talk at BD group meeting in November.
(**100%** done)

Guangyao Feng

Plan February 2013

- the start to end simulation of SASEII (**25%**)
- writing an elegant lattice file based on the Mad8 files (**100%**)
- simulation of FLASHII (**25%**)
- Internal report about ACC1 gradient studies (**50%**)

Evgeny Kot

October 2012-January 2013

- Get complete optics agreement between MAD version and the S2E procedure for the basic case, i.e. without any self fields (**100%** done).
- Track 250pC and 500pC within the same optics and RF - parameters.Check lasing of these bunches with Genesis (**25%** done).
- Establish routine procedure implementing 2d injector scan --> S2E->Genesis and find the working point (**75%** done).
- Internal report about S2E simulations for XFEL (with I. Zagorodnov, M.Dohlus and T. Limberg) (**0%** done).

Evgeny Kot

Plan February 2013

- Track 250pC and 500pC within the same optics and RF - parameters.Check lasing of these bunches with Genesis (**100%**)
- Establish routine procedure implementing 2d injector scan --> S2E->Genesis and find the working point (**100%**)
- Internal report about S2E simulations for XFEL (with I. Zagorodnov, M.Dohlus and T. Limberg) (**50%**)
- Make a talk at BD group meeting (**100%**)

Hyunchang Jin

October 2012-January 2013

- Genesis simulations without and with aligned quadrupoles (**100%** done)
- Genesis simulations for orbit correction with quadrupole and BPM errors (**50%** done)
- To write MAD<->Elegant convertor for FLASH and XFEL optics (in Matlab) (**0%** done)
- Make a talk at BD group meeting (**0%** done)

Hyunchang Jin

Plan February 2013

- Genesis simulations for orbit correction with quadrupole and BPM errors (**100%**)
- To write MAD<->Elegant convertor for FLASH and XFEL optics (in Matlab) (**100%**).
- Make a talk at BD group meeting (**100%**)
- Internal report (**50%**)

Plans (February 2013)

- Two different charges in the same train of XFEL (Evgeny Kot)
- BBA in undulator section of XFEL (Hyunchang Jin)
- XFEL SASE II and FLASH II (Guangyao Feng)
- S2E procedure and webpage (Igor Zagorodnov)

FLASH Simulations

Has to be done (short term)

- more accurate simulations without suspicious steps (matching, shifting of slice centers etc.)
- to reproduce the LOLA measurements at FLASH for average and strong compression
- to include the transverse wakes
- FLASH II

XFEL Simulations

Has to be done (short term)

- simulations of the whole facility
- more accurate simulations without suspicious steps (matching, shifting of slice centers etc.)
- simulations of non-standart scenarious (different charges in the train etc.)
- tollerance studies

Tools, Internet Presence and Publications

Tools

- convertors on the web
- space charge in pipe
- intersections in FEL code

Internet Presence

- web page design
- results documented

Publications

- external talks (1)
- internal reports (1)
- conference proceedings (1)
- in referred journals (1)

Challenges

- we have to be able to reproduce the measurements
- we have to be able to predict the measurements

The next meeting on 27th February 2013