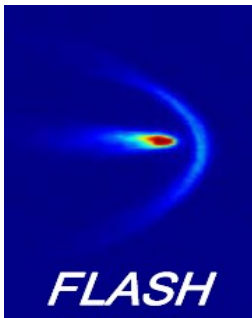


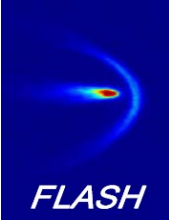


Upgrades of FLASH in 2007

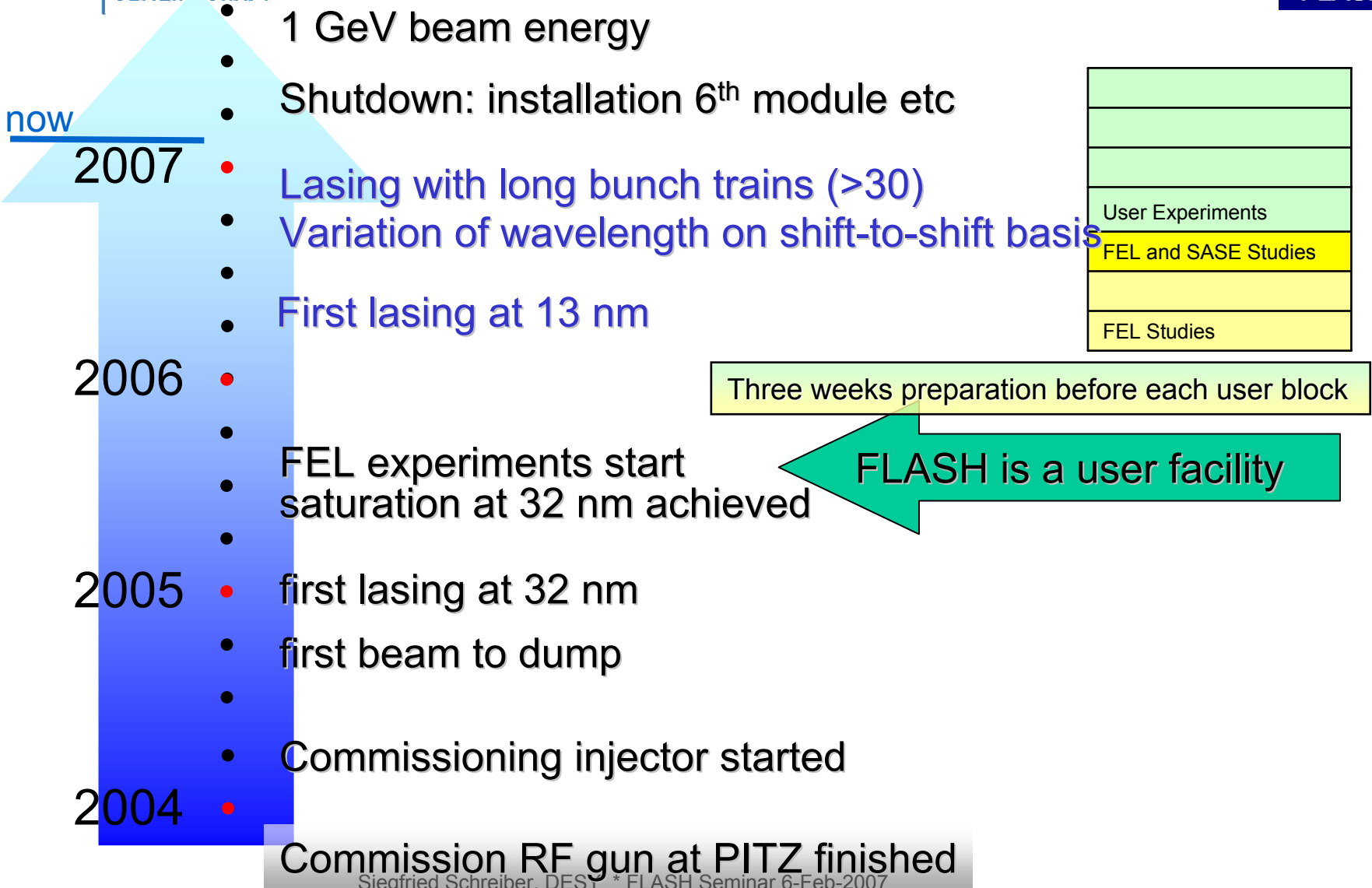
Siegfried Schreiber, DESY



- Shutdown 2007
- further upgrades → Rossbach

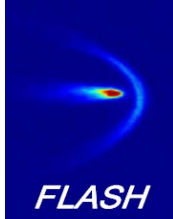


Schedule and Milestones





Schedule 2007



FLASH Schedule 2006/2007

Last modification 21-Nov-2006

| | | | | | |
|-----------------|----|-----------------|-----------------------|----------------------|-------------------------------|
| January 2007 | 1 | 1.Jan - 7.Jan | | Schoolholidays HH/SH | |
| | 2 | 8.Jan - 14.Jan | Accelerator Studies | | |
| | 3 | 15.Jan - 21.Jan | | | with SASE towards end of week |
| | 4 | 22.Jan - 28.Jan | FEL Studies | | 800 pulses, 13.5 nm |
| February | 5 | 29.Jan - 4.Feb | User Run | | |
| | 6 | 5.Feb - 11.Feb | | | |
| | 7 | 12.Feb - 18.Feb | FEL Studies | | |
| | 8 | 19.Feb - 25.Feb | | | |
| | 9 | 26.Feb - 4.Mar | User Run | | |
| March | 10 | 5.Mar - 11.Mar | | | |
| | 11 | 12.Mar - 18.Mar | | | |
| | 12 | 19.Mar - 25.Mar | | | |
| | 13 | 26.Mar - 1.Apr | Shutdown | | |
| April | 14 | 2.Apr - 8.Apr | Installation of ACC6 | | |
| | 15 | 9.Apr - 15.Apr | Repair ACC5, new ACC3 | | |
| | 16 | 16.Apr - 22.Apr | | | |
| | 17 | 23.Apr - 29.Apr | | | |
| May | 18 | 30.Apr - 6.May | | | |
| | 19 | 7.May - 13.May | | | |
| | 20 | 14.May - 20.May | | | |
| | 21 | 21.May - 27.May | | | |
| June | 22 | 28.May - 3.Jun | | | |
| | 23 | 4.Jun - 10.Jun | | | |
| | 24 | 11.Jun - 17.Jun | | | |
| | 25 | 18.Jun - 24.Jun | | | |
| | 26 | 25.Jun - 1.Jul | | | |
| Sep | | 1.Sep | | | 1 GeV beam energy reached |
| Dec | | 1.Dec | | | lasing at 6.4 nm |

Modules

Module 6 to be installed

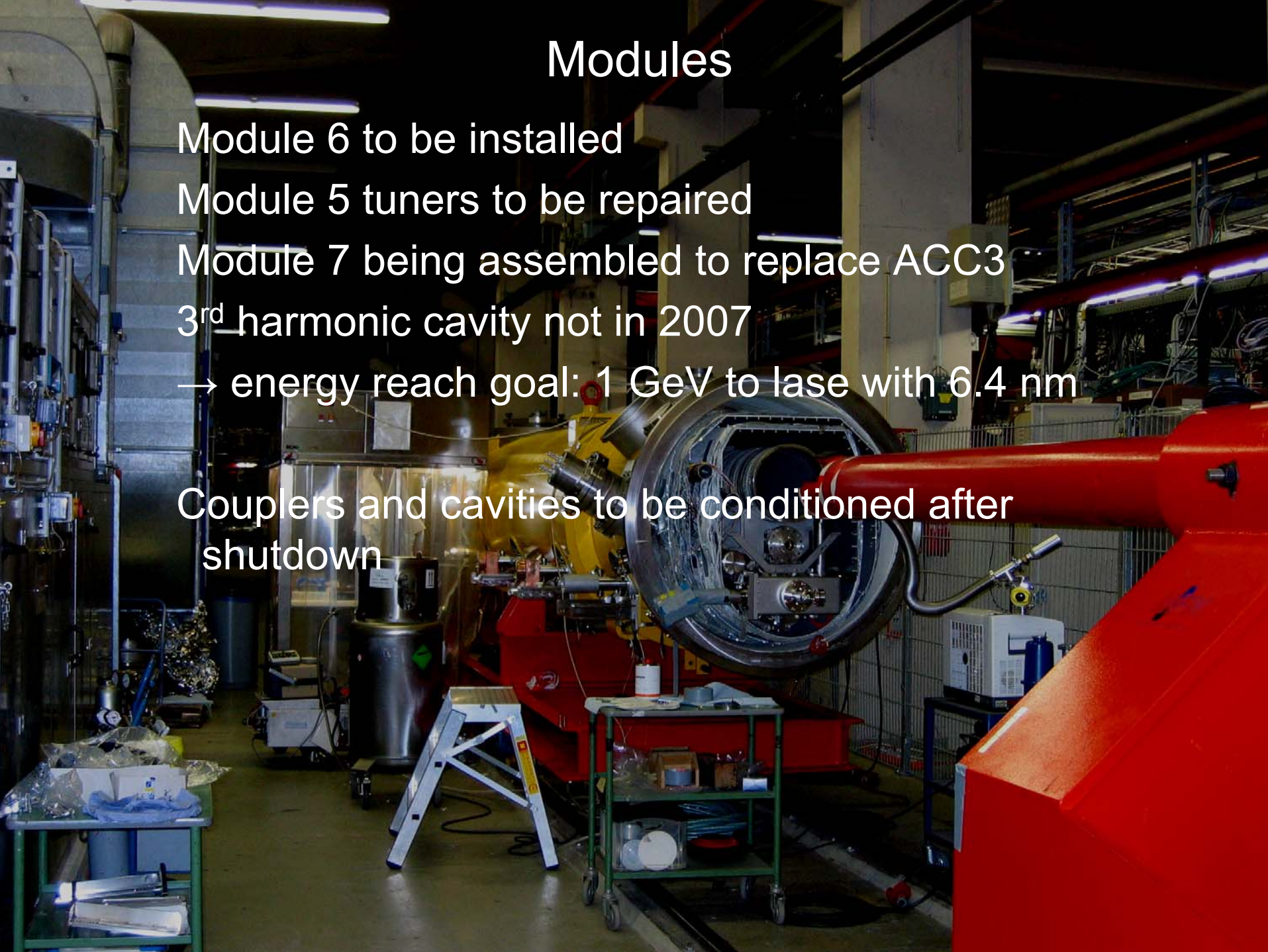
Module 5 tuners to be repaired

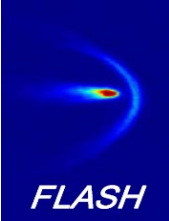
Module 7 being assembled to replace ACC3

3rd harmonic cavity not in 2007

→ energy reach goal: 1 GeV to lase with 6.4 nm

Couplers and cavities to be conditioned after shutdown





- Infrared undulator project

- install undulator in beam line between last undulator module and dump dipole
- Motivation: pump and probe experiments
- FLASH seminar: 13.02.2007 (O. Grimm)

- Double pulse scheme

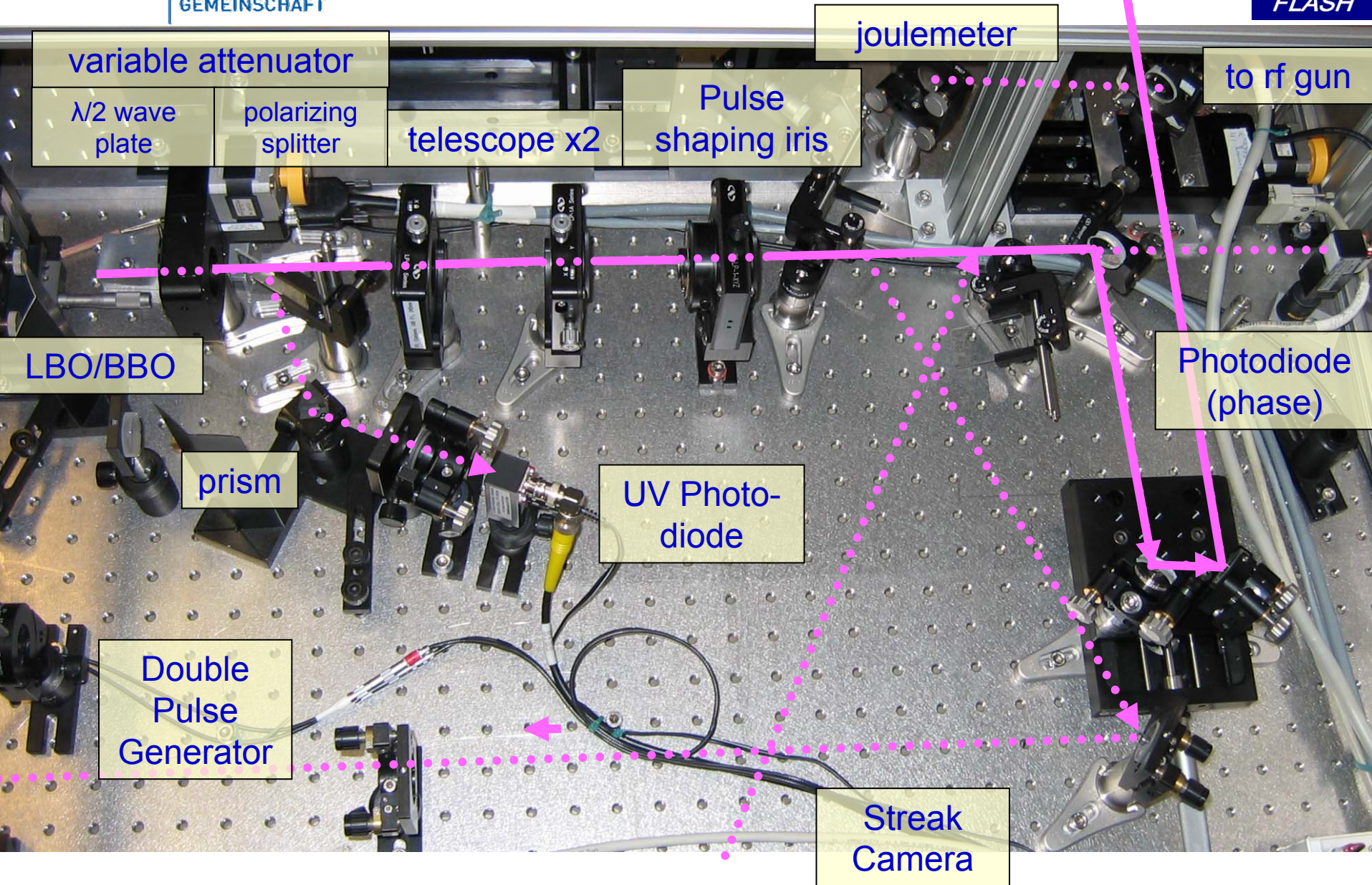
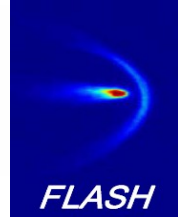
- double pulse generator installed in laser to generate a second pulse for each pulse in the train with a delay of some rf buckets
- Motivation: delay scan of IR vs VUV/EUV radiation is easier if IR arrives first at experiment

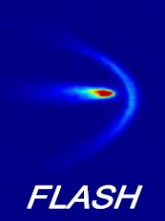
- Infrared beam line

- Motivation: infrared radiation to experimental hall
- FLASH seminar: 20.02.2007 (M. Gensch)



UV diagnostics/doubler

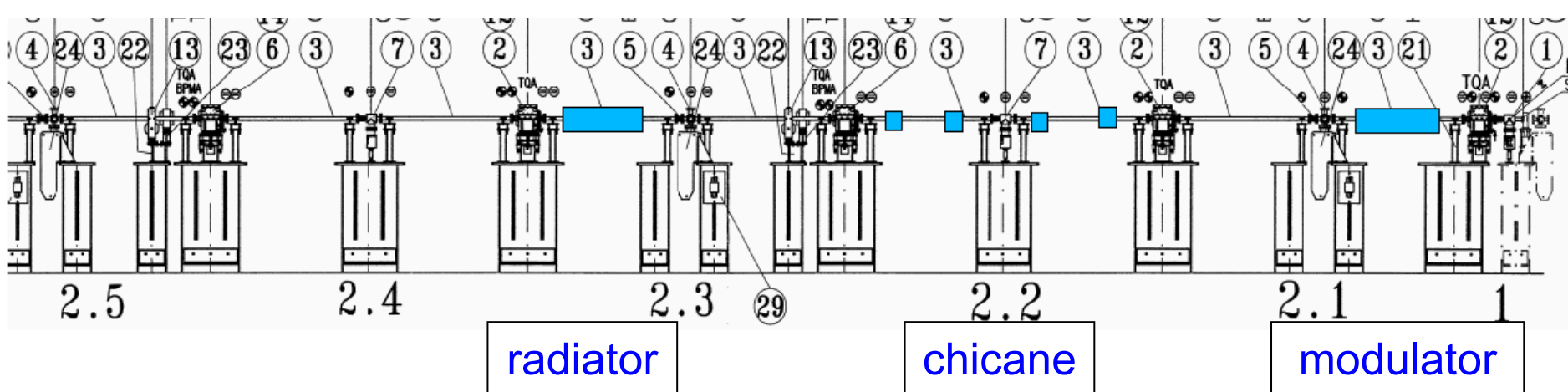
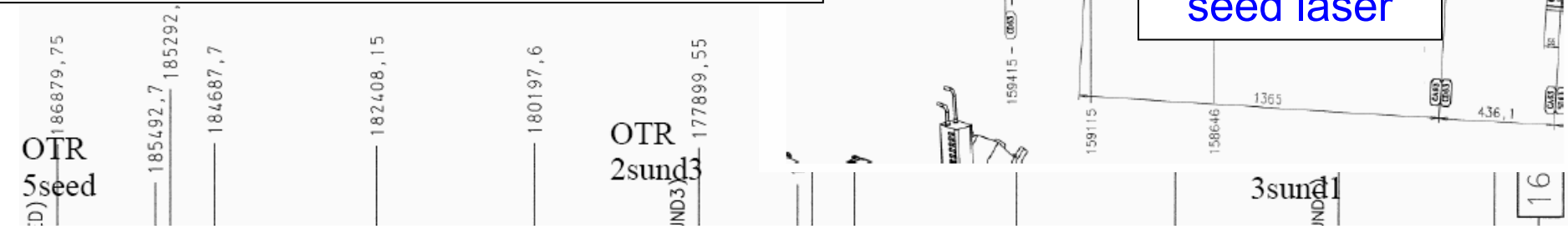
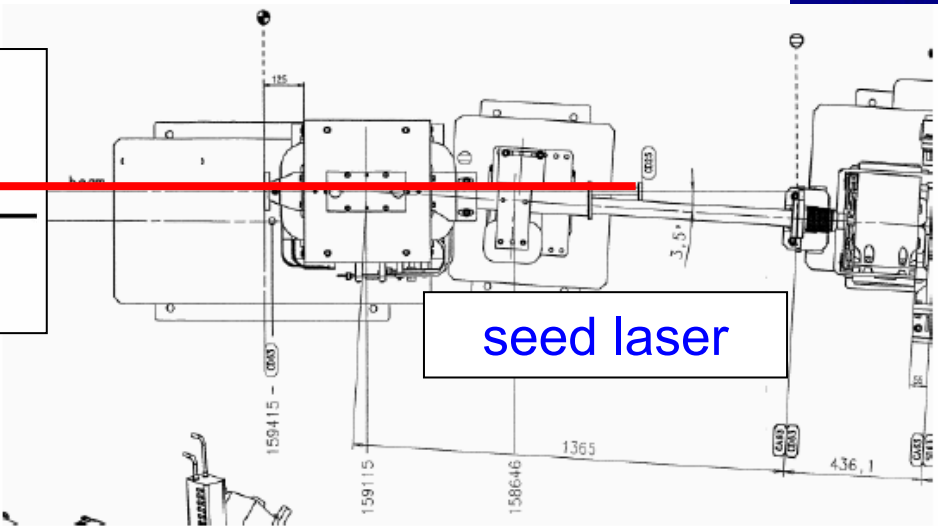
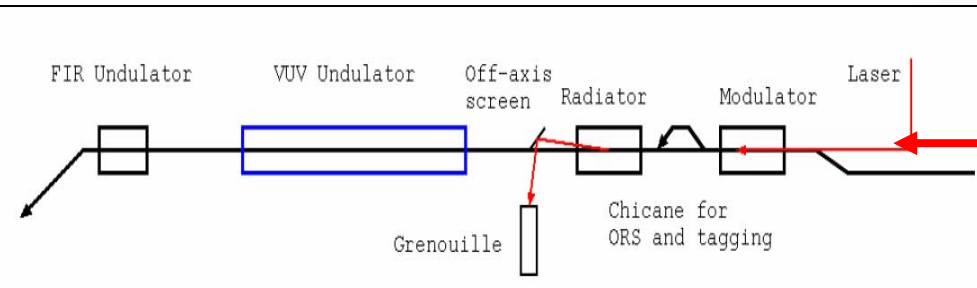


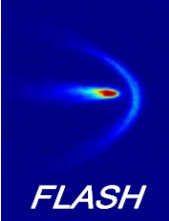


- **Optical replica**

- MATCH/SUND section (after collimator)
- Motivation: measurement of longitudinal bunch profile with fs resolution
- Consists of seed laser (outside tunnel), laser beam line, two undulators (+PS), chicane (+PS), Grenouille/FROG, diagnostics
- Dogleg vacuum chamber modification to insert seed laser
- seed laser in new laser hut being constructed west of tunnel
- undulators and chicane to be installed on optical tables in seeding section
- e-bunch shape translated into optical pulse to be analyzed in a classical FROG set-up (optical gating)
- FLASH seminar: 27.02.2007 (H. Schlarb)

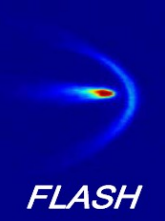
Optical Replica





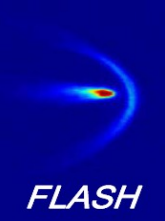
- New design of the Gun section

- GUN section between rf gun and ACC1 overcrowded and difficult to align
 - new diagnostic cross design with reduced wakefield
 - easier alignment of elements in the section
 - rf gun – similar to cathode system – on rails
 - rf gun to be moved upstream by 30 cm to increase efficiency of darkcurrent collimator (→ Han)
 - use the additional place for a darkcurrent kicker
 - rework laser beamline
 - commission required: solenoid alignment, new optimization (small emittance)
- FLASH seminar 06.03.2007 (K.Floettmann)



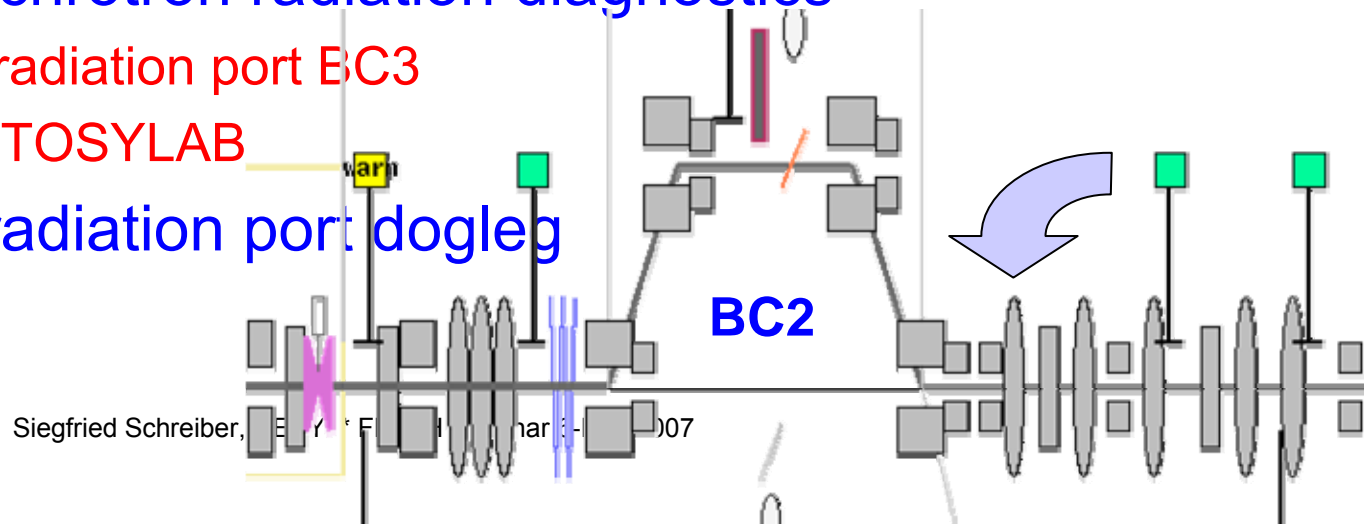


Orbit feedback



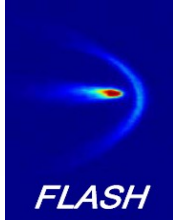
- Orbit feedback test set-up for XFEL
 - with PSI
 - special BPMs from PSI

- New BPM in BC3 dispersive section (similar to new BC2 BPM)
- Rearrange BPMs in BC2 section to measure orbit in a well defined manner
 - swap quadrupole ds BC2 (move BPM to upstream quad)
 - dark current kicker to be removed to make place for the BPM
 - three BPMs in a drift section
- Coherent synchrotron radiation diagnostics
 - Synchrotron radiation port BC3
 - Beam line to TOSYLAB
- Synchrotron radiation port dogleg





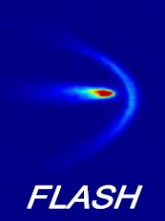
Synchronization



- synchronization in fs scale
 - set-up with stable fiber laser
 - distribution of laser pulses with optical fibers along the machine
 - test for XFEL but also useful for FLASH, especially pump probe experiments
- New phase monitors (BC2, BC3, collimator, ACC7 section)



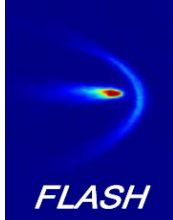
Backup Laser



- second photoinjector laser system is being installed now
 - the upgrade has been tested at PITZ
 - pumped fully with laser diodes
 - improve overall stability
- we intend to use the new laser as a working horse
 - present laser as backup



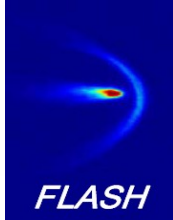
Miscellaneous Work



- New MCP detectors
- New magnet power supplies: choppers to be replaced by Heidbrooks (noise reduction)
- Change of EO crystal
- Possible: change of screen in ODR set-up (by-pass)
- New laser building (28 g, close to FLASH tunnel) in construction
 - Coherent radiation diagnostics, Electro-optical measurements, Optical replica, Optical clocks and synchronization, ...
 - FLASH seminar: 31.10.2006 (S. Khan)



2008 ?



- Installation of 3rd harmonic cavity
- → Rossbach