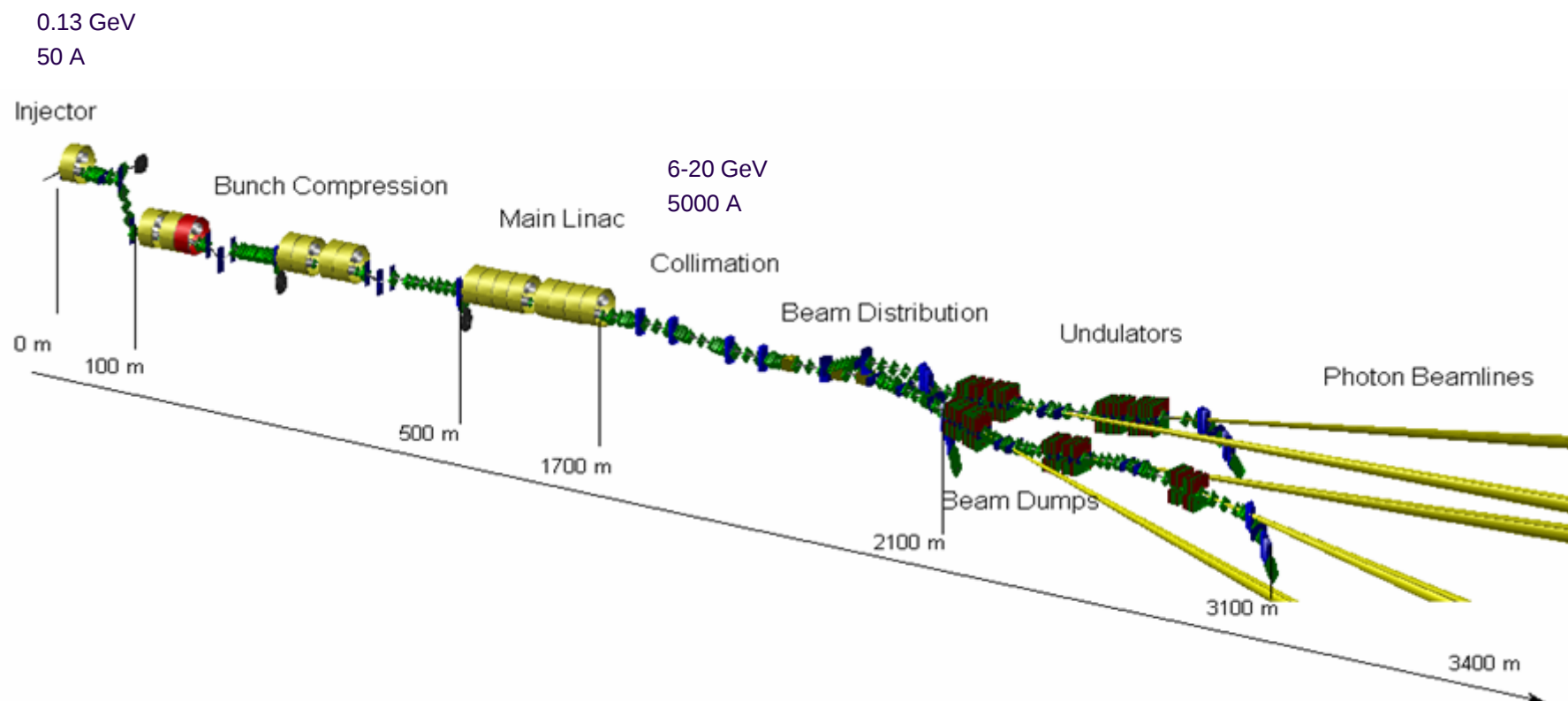
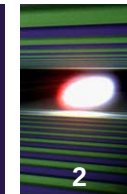


European XFEL Status

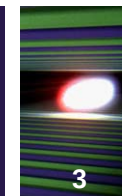
T. Limberg



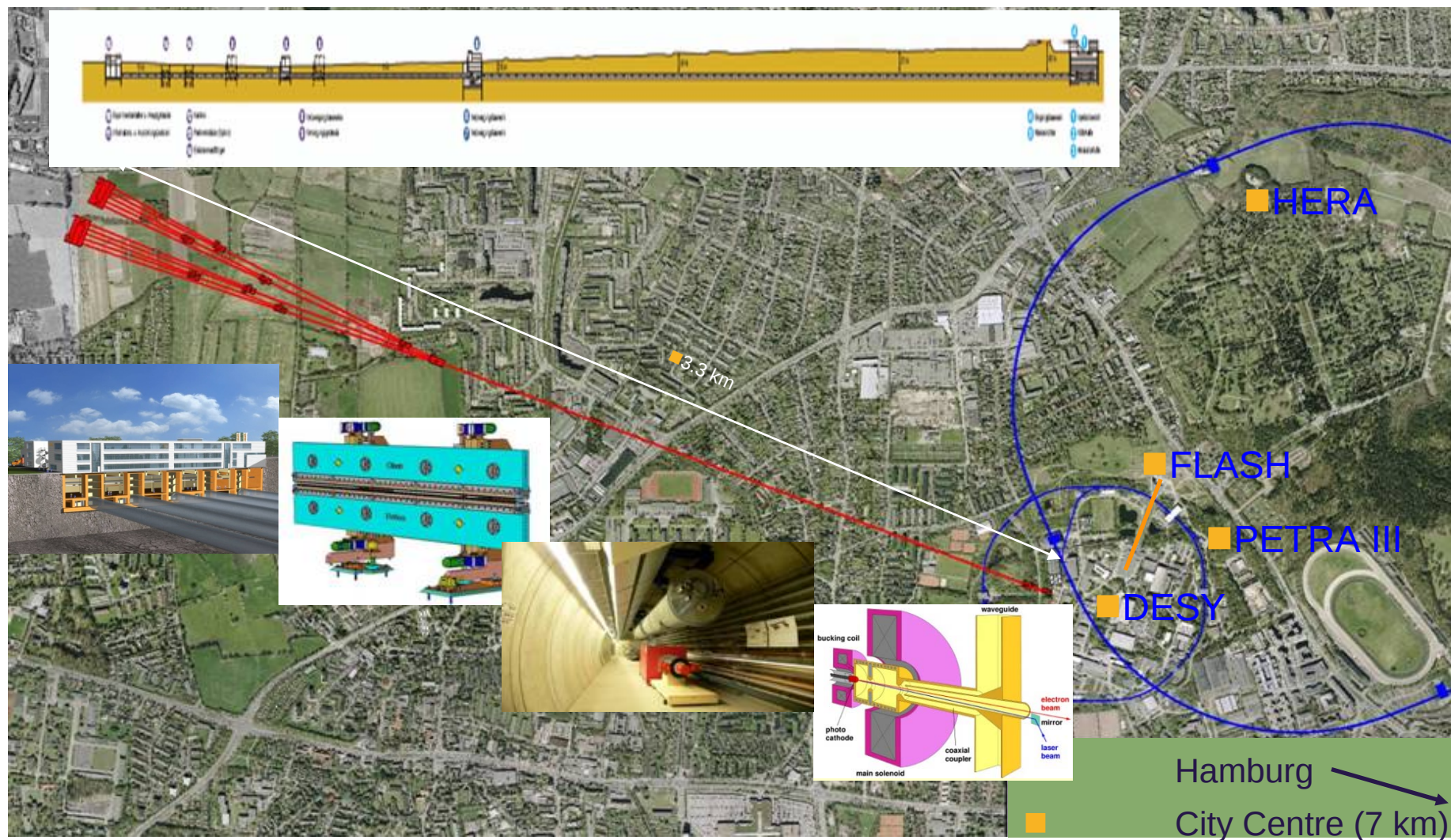
XFEL Schematic Lay-Out



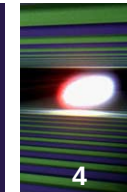
A first look at more realistic models



3



XFEL Main Parameters

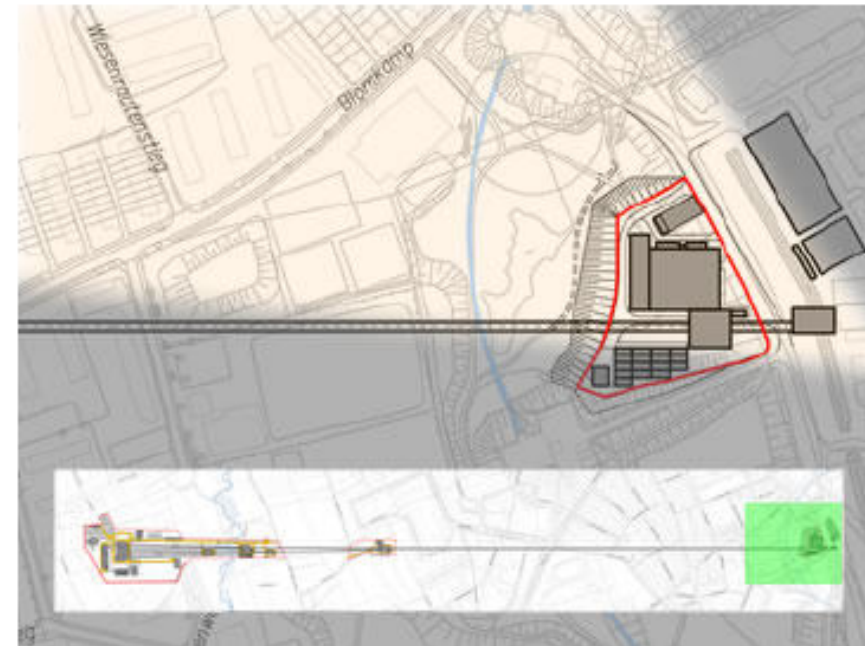
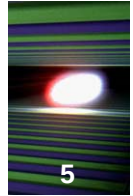


4

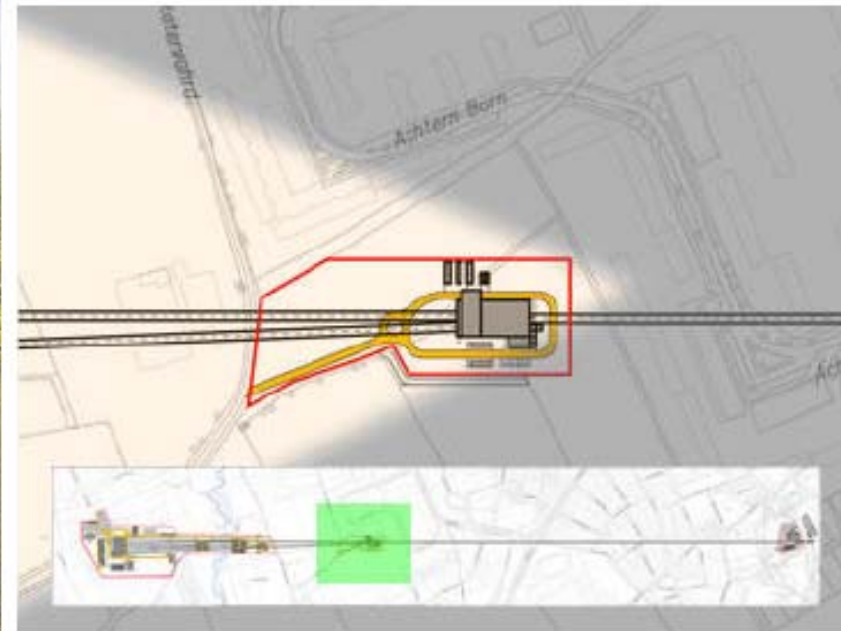
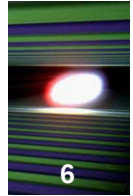
Electron Energy	17.5 GeV
Slice emittance	< 1.4 mm mrad
Bunch charge	1 nC
Peak current	5 kA
Pulse repetition rate	10 Hz
Bunches per pulse	3000
SASE photon wavelength	0.1 – 1.6 nm
SASE Undulators	3 (6)
1.3 GHz RF photo injector	
3 stage bunch compression	
1.3 GHz superconducting linac	
PM, out of vacuum undulators	

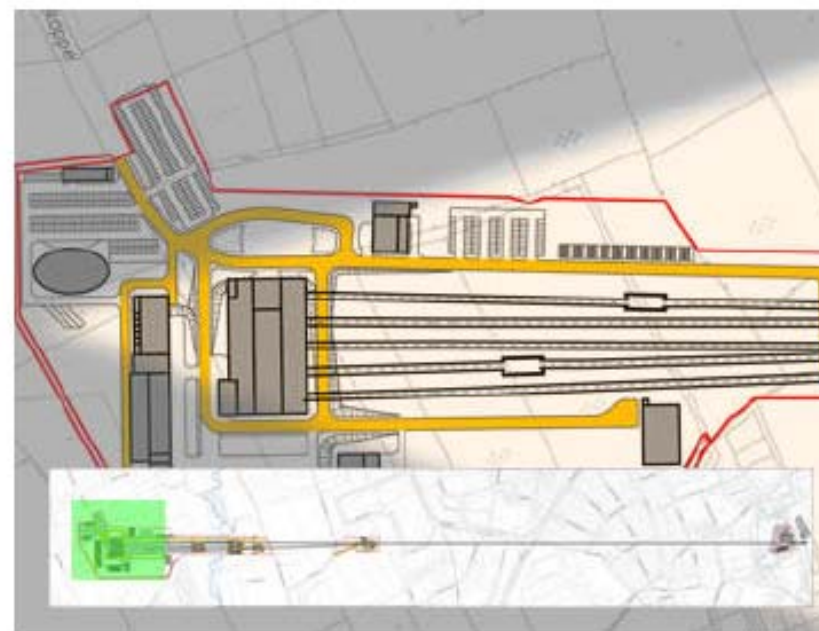
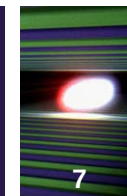


Hamburg
City Centre (7 km)



<http://www.xfel.eu/en/construction-webcams/>

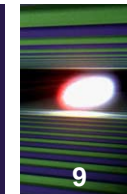




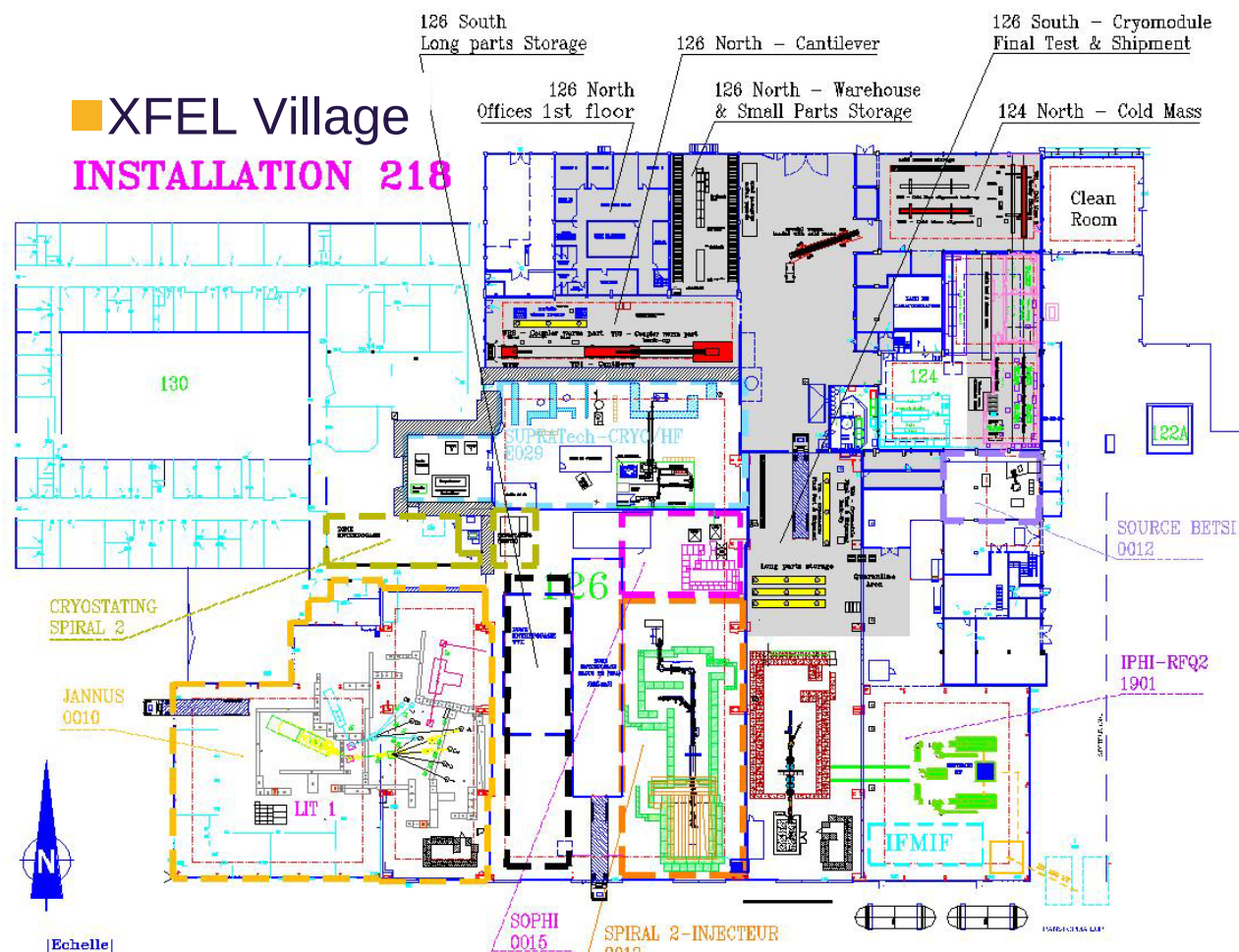
Experimental Area (Campus)



Infrastructure for Module Assembly

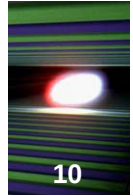


9



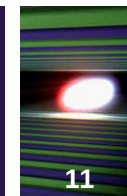
irfu
cea
saclay

- Major part of the civil engineering and general equipments was done; construction has started, big assembly tools ordered and to be delivered.

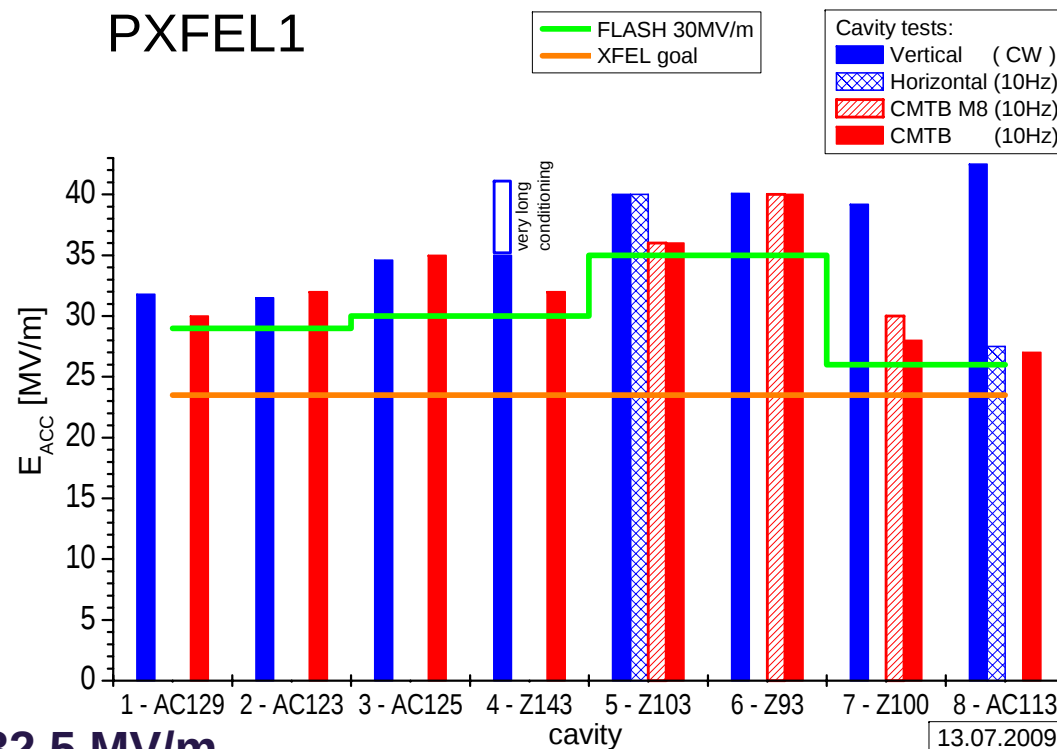


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PXFEL1 - The *Chinese* Module at CMTB



PXFEL1



■ The accelerator module PXFEL1 was conditioned and tested at the Cryo-Module Test Bench (CMTB).

■ The average maximum gradient is **32.5 MV/m**.

■ After string and module installation we have seen a **gradient reduction of only 5%**.

■ PXFEL1 will be installed at FLASH and **can be operated** there with an average gradient of **30 MV/m**.

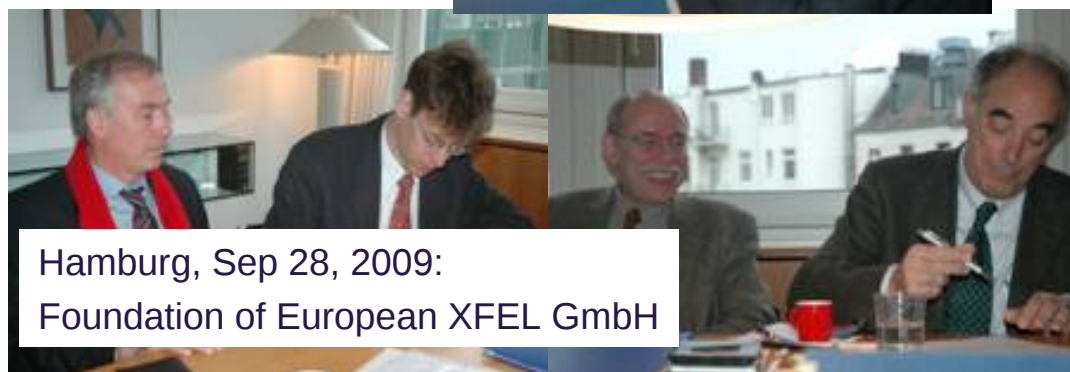
■ The **XFEL waveguide distribution** will be used.

Berlin, Sep 23, 2009:
Initialling of founding documents



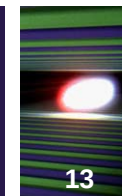
For short intermediate phase,
DESY is the only shareholder

H. Dosch appointed as Council
chair on Oct 19



Hamburg, Sep 28, 2009:
Foundation of European XFEL GmbH

Organizational Progress cont.



Monday, 30 November 2009
2:30 p.m.
DESY, building 26 (hall I)

Montag, 30. November 2009
14:30 Uhr
DESY, Gebäude 26 (Halle I)

Dear colleagues,
dear friends of the European XFEL,

On invitation of German Federal Research Minister Dr. Annette Schavan, representatives of the international partners will sign the Convention on the construction and operation of the European XFEL facility on 30 November 2009. The ceremony will take place in the morning at the Hamburg town hall.

In the afternoon, we would like to celebrate this event in a convivial get-together, to which we cordially invite you.

Massimo Altarelli
(European XFEL GmbH, Managing Director)

Helmut Dosch
(Chairman of the DESY Board of Directors
and of the European XFEL Council)

Liebe Kolleginnen und Kollegen,
liebe Freunde des European XFEL,

auf Einladung der Bundesforschungsministerin Dr. Annette Schavan werden am 30. November 2009 Vertreter der internationalen Partner das staatliche Abkommen für den Bau und Betrieb der European-XFEL-Anlage unterzeichnen. Diese Veranstaltung findet am Vormittag im Hamburger Rathaus statt.

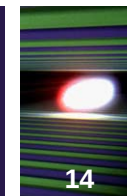
Am Nachmittag möchten wir das Ereignis mit Ihnen bei einem geselligen Beisammensein feiern, zu dem wir Sie herzlich einladen.

Massimo Altarelli
(Geschäftsführer der European XFEL GmbH)

Helmut Dosch
(Vorsitzender des DESY-Direktoriums
und des European-XFEL-Rats)



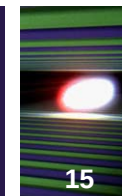
Consideration of Operation Parameter Options



14

- Most remarkably fast & successful start-up of LCLS has triggered some discussions regarding European XFEL
 - Perhaps too conservative assumptions on beam quality/safety margins
 - Very low charge/short bunch options
 - Higher duty cycle (up to CW?)
- Flexibility has been built into XFEL design and options within certain range have been considered in the past – still valuable (& necessary) to re-visit
- Lower emittance makes shorter wavelength immediately accessible ***without any changes*** to the machine (simply open SASE1 undulator gap)
 - Necessary to take higher photon energy into account for photon beam line design!

Example Parameters with Lower Slice Emittance



	Parameter set	E/GeV	λ_u /mm	K _{rms}	λ_r /nm	$\epsilon_n/1e-6$	L _{sat} /m	B _{pk} /1e33	coh/%
1	Baseline TDR	17.5	35.6	2.37	0.10	1.4	136	2.7	65
2	Baseline, low- ϵ	17.5	35.6	2.37	0.10	0.8	85	3.1	91
3	Baseline, low- ϵ	17.5	35.6	1.52	0.05	0.8	156	5.4	54

- Lower emittance & gain lengths very beneficial for several XFEL options discussed over the past years:
 - After burner/frequency doubler with two-color mode option
 - Helical undulator/afterburner for SASE3 (soft X-ray)
 - Sub-fs pulses
 - Additional undulator beam lines (buildings & infrastructure has reserve space)
 - ...

Present Accelerator Schedule (very coarse!)

