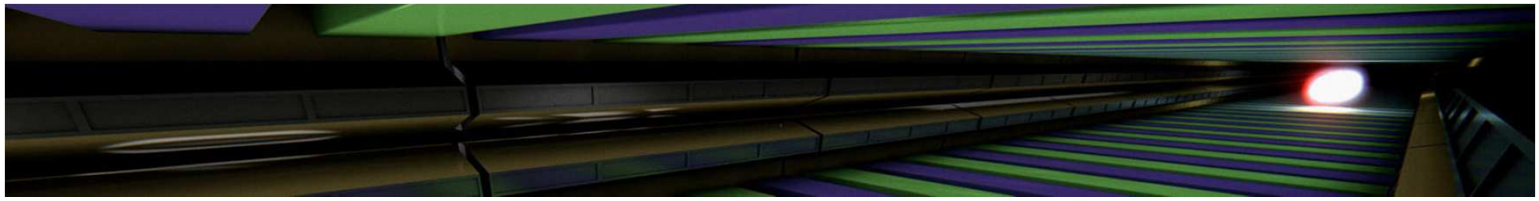


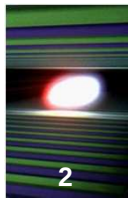
WP-78

XFEL Project Progress Report (1-2012)

presented by

Max Lederer

Comparison of forecast and achieved progress: Jan. 12 -> Mar. 12

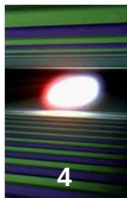


- **Main WP-78 activities scheduled for reporting period:**
  - **Pump-Probe laser R&D project**: High rep-rate burst-mode pump-probe laser for XFEL.
    - ➔ *Fibre Front-End*:
      - Milestone 1 of delivery-plan reached.
      - Delivery delayed by 3 months.
    - ➔ *20kW burst-mode booster amplifier:*
      - OEM-type contract started: „20kW, 10Hz burst-mode InnoSlab Yb:YAG booster amplifier“.
    - ➔ *NOPA:*
      - Change of plan: no experiments with Front-End ⇨ start with AMPHOS400.
      - Conceptual design of 4-stage NOPA operating at 4.5MHz, 1MHz and 200kHz.
      - Determined scheme for dispersion management.
      - Stage 1 and 2 of NOPA designed and layouted.
    - ➔ *System layout of R&D laser:*
      - First iteration
    - ➔ *Special and/or Single-Source Components:*
      - CFBGs, CVBG, MLDGs, low jitter seeder, various optics ⇨ now received.
      - Pulse-on-demand ⇨ pre-projects finalised, negotiation phase.
      - Pointing stabilisation ⇨ progress, but still pre-project.
      - Drift stabilisation ⇨ no further progress.

Comparison of forecast and achieved progress: Jan. 12 -> Mar. 12 (contd.)

- **R&D-lab in 49d (shared with Kärtner/CFEL-group)**:
  - ➔ *Lab accession*:
    - Delayed by another 3 months.
    - Procurement finished.
- **General**:
  - ➔ *Laser group:*
    - 5 members.
    - Hired in March: 1 Sci/Eng and 1 Eng.
  - ➔ *Laser Advisory Committee (LAC):*
    - Reported to LAC in March.
    - Verdict: LAC is very impressed with world class laser R&D-program.

Reasons for schedule deviations
Jan. 12 -> Mar. 12



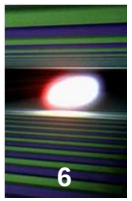
- Delivery of Fibre Front-End is 3 months late.
  - Redesing required due to change of CFBG supplier.
  - Rescheduled due to lack of lab 49d.

- Laser-lab 49d is 6 months late.
  - Construction delays.

Activities and milestones scheduled for the next half year

- Equip and access lab 49d in June 2012.
- Take delivery of all-fibre front-end amplifier in June 2012.
  - Verify and review performance.
  - Characterise supercontinuum from various crystals.
- Take delivery of AMPHOS400 booster amplifier in June / July.
  - Verify and review performance.
- NOPA with AMPHOS400.
  - Start building 2-stage NOPA.
- Start sub-projects on the following topics.
  - Pulse-on-Demand
  - beam pointing stabilisation
  - timing drift stabilisation
- Interaction with Instrument Scientists and Control.
  - Start defining requirements and work on solutions for instrument laser areas.
- TW-laser scouting.
  - Installation of 200TW system at CLPU.

WP-78 schedule, critical milestones



Year	2011				2012				2013				2014				2015				2016			
Quarter	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Tasks																								
(10) PP-Laser R&D						♦			♦	♦				♦	♦									
Front-end						del																		
Burst-mode power booster 20kW						400W				20kW														
NOPA with front-end / Amphos 400									fin															
NOPA with power booster														fin										
Pulse-on-Demand										fin														
Timing, sync, pointing, beam delivery								concept							fin									
(11) Facility		♦				♦				♦		♦			♦	♦				♦				
RnD labs		PETRA-3				49d														XFEL				
Layout XHEXP1 (laser relevant)						layout																		
Hutches planning and realization										TGAs tender				XHEXP1 access									
PP hutch 1, SASE 1												order				install								
TW hutch, SASE 2														order				install						
PP hutch 2, SASE 2																order				install				
PP hutch 3, SASE 3																order				install				
Laser tables														order 1		order TW		order 2/3						
Laser safety concept and realisation, interlocks, shutters									concept															
(20) PP-Laser Production:												♦	♦		♦		♦			♦	♦			♦
Detailed laser system layout and design												prelim			detailed									
Procurement of PP 1 (SASE 1) plus some parts of all systems													order				PP 1							
Build-up of PP 1 (SASE 1) incl. local sync hutch. Test and char.																				beam SASE 1				
Procurement of PP 2/3 (SASE 2/3)																	order				PP 2/3			
Build-up of PP 2/3 (SASE 2/3). Test and characterisation.																								beam SASE 2/3
(30) TW-Laser for HED:						♦							♦					♦		♦				
TW-laser planning						CLPU							tender					laser		beam				

- **Progress-critical for next 6 months:**
  - Accession of Lab 49d in June 2012.
  - Delivery of Fibre-Front-End in June 2012.
  - Delivery 1st stage booster amplifier in June 2012.
  - Speedy start of first NOPA experiments.

Open Issues

- Mainly due to delay with R&D-lab, activities till end of 2012 had to be compressed to make up for lost time.
  - There is no room for contingencies.
- Active project controlling at XFEL GmbH is still somewhat lacking.
  - No project controller / manager to drive the project and interact regularly and often with all WPLs across WPG-3:
    - ➔ Collect info regarding interfaces, important milestones, problems requiring WP-external action, etc.
    - ➔ Consolidate important info from WP-plans in master-plan.
    - ➔ Ascertain concerted action on issues concerning different WPs.
    - ➔ Uncover and deal with problems due to complexity.