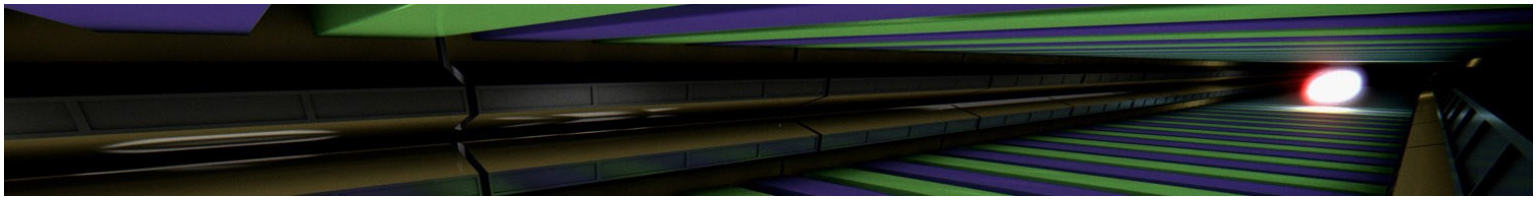


X-ray Beamline Optics and Photon Diagnostics

Harald Sinn

Vacuum Team: Martin Dommach (WP73)

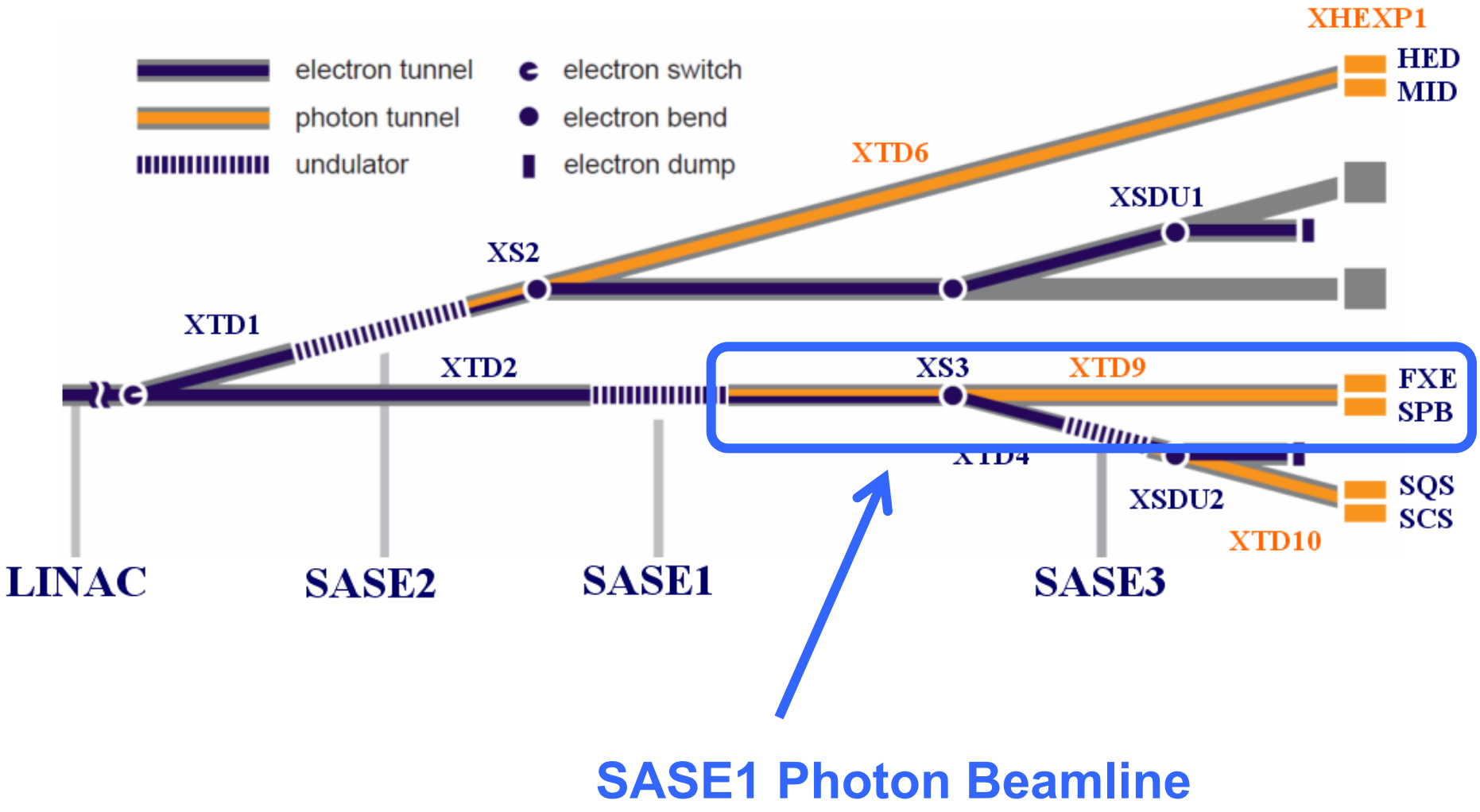
Diagnostics: Jan Grünert (WP74)

Contents

- Preparation activities in Hera South & tunnel installation progress in 2014
- Mirrors & Metrology in Petra III Lab

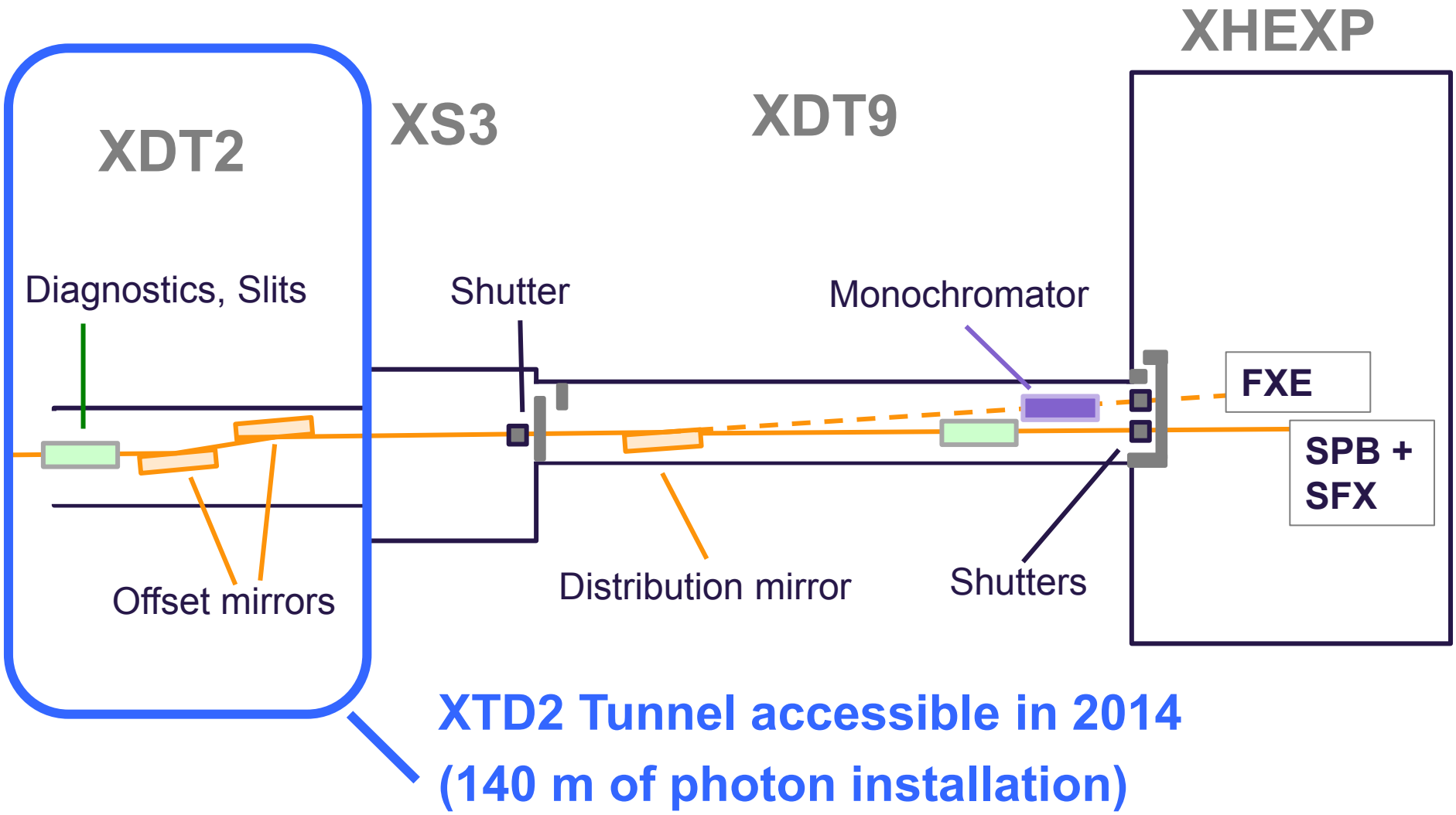
European XFEL

Photon Beamlines



SASE1 Photon Beamline

SASE1 Photon Beamline



XTD2 Tunnel accessible in 2014
(140 m of photon installation)

European XFEL

Preparation at Hera South Lab

European XFEL

Arrivals at Hera South

3 x Entrance Slits (SRA)

Pop-in Monitors (WP74)

MCP detectors (WP74)

8 Photon Shutters (Frontends)

December 2013: Test Installation

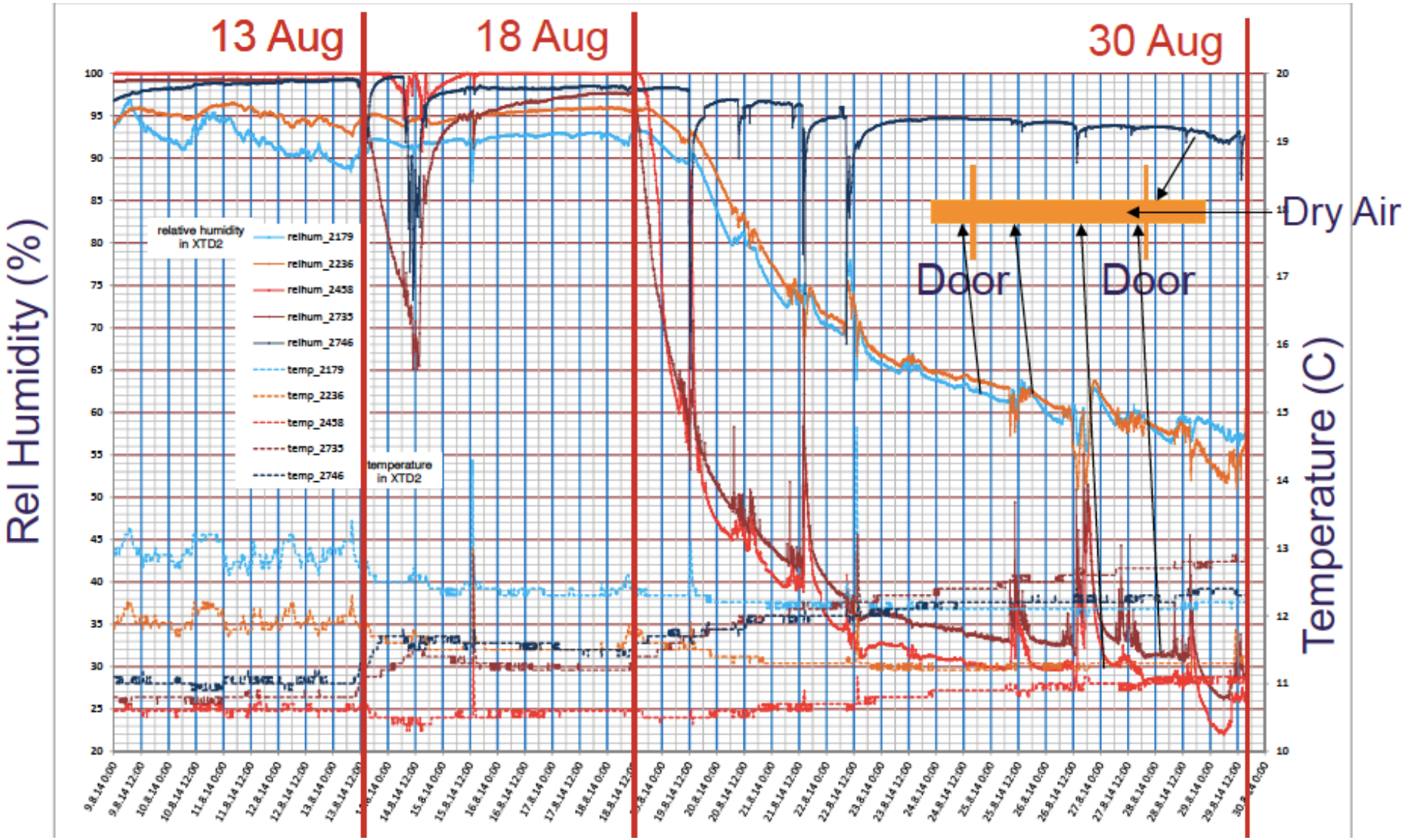
26. May 2014: Tunnel Installation Starts!

Most pictures by Nicole Kohlstrunk

The early phase: May – August 2014

Problem: Humidity

Dehumidifier installed by MKK in August



from Sabine Cunis

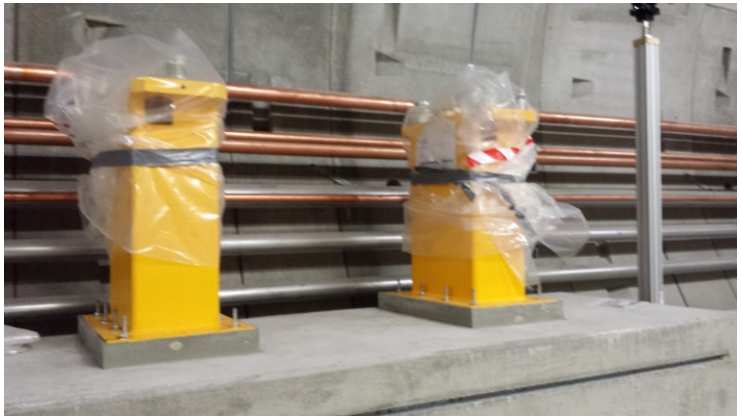
European XFEL

Grouting base plate of mirrors with epoxy

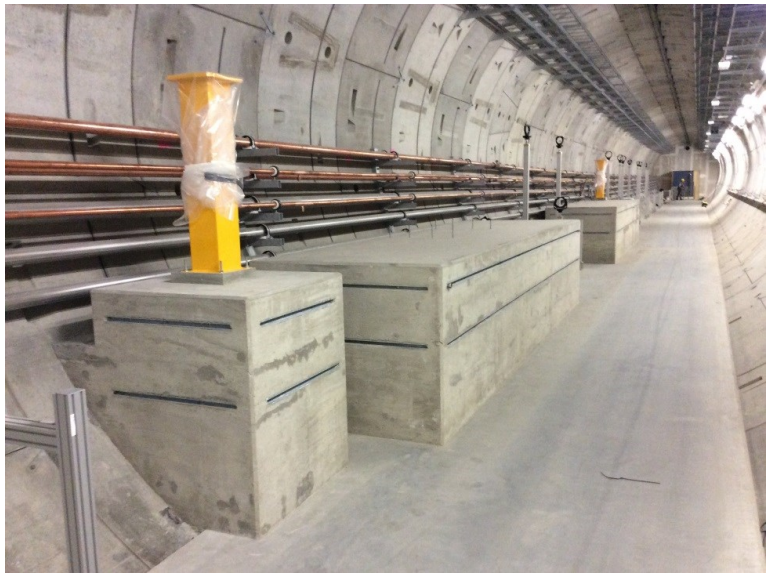
European XFEL

Grouting of diagnostic supports in XTD2

Steel support pillars for 2D-Imager-SR



Support for XGM



2D-Imager-FEL and Pop-In-Type II-45

Slide from Jan Grünert

November: Tunnel cleaning in XTD2 to prepare for vacuum installation

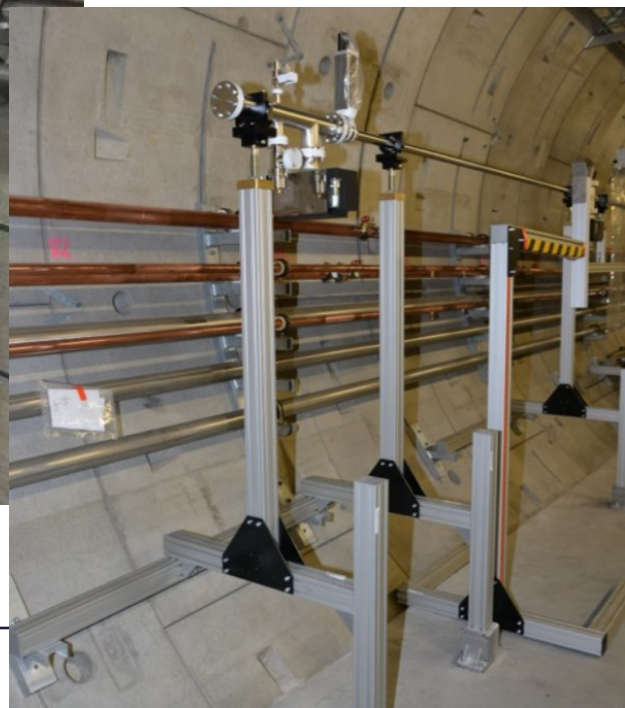
Condition after cleaning

European XFEL

First component installed on Nov 28

Dec 2014:

Start UHV beam transport installation

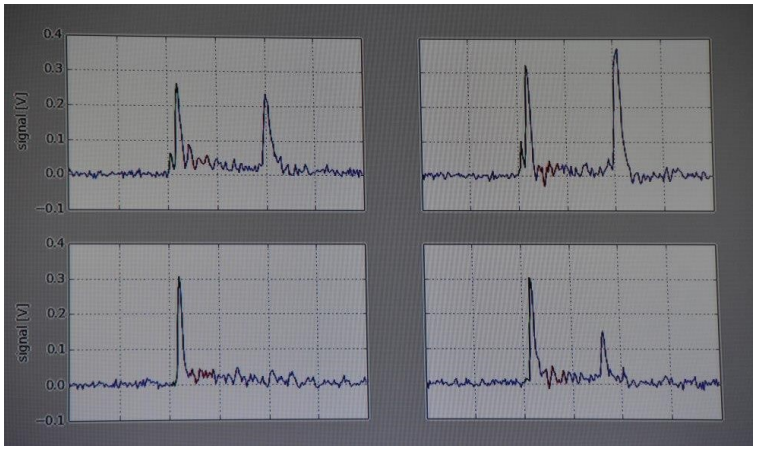


Next items to be installed

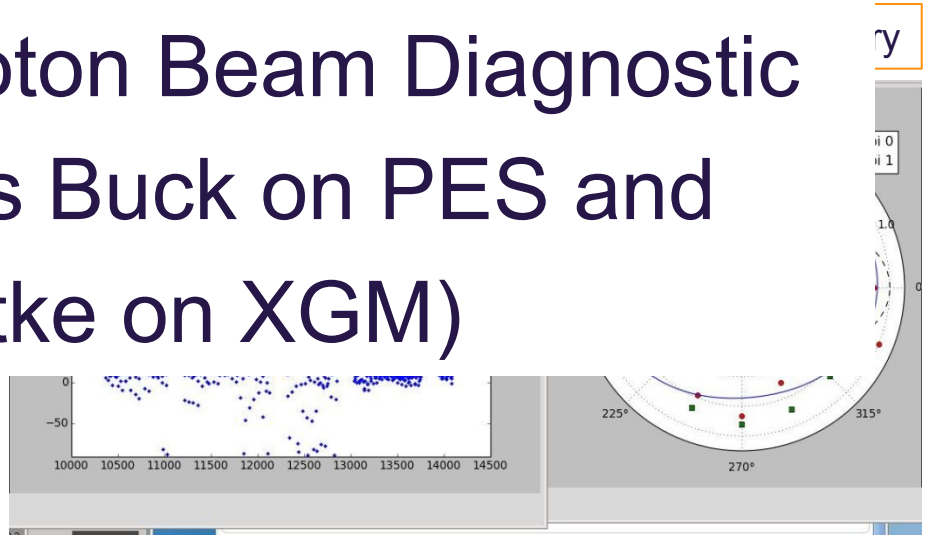
European XFEL

Test of Petra III P04-PES at LCLS

P04-PES in AMO hutch



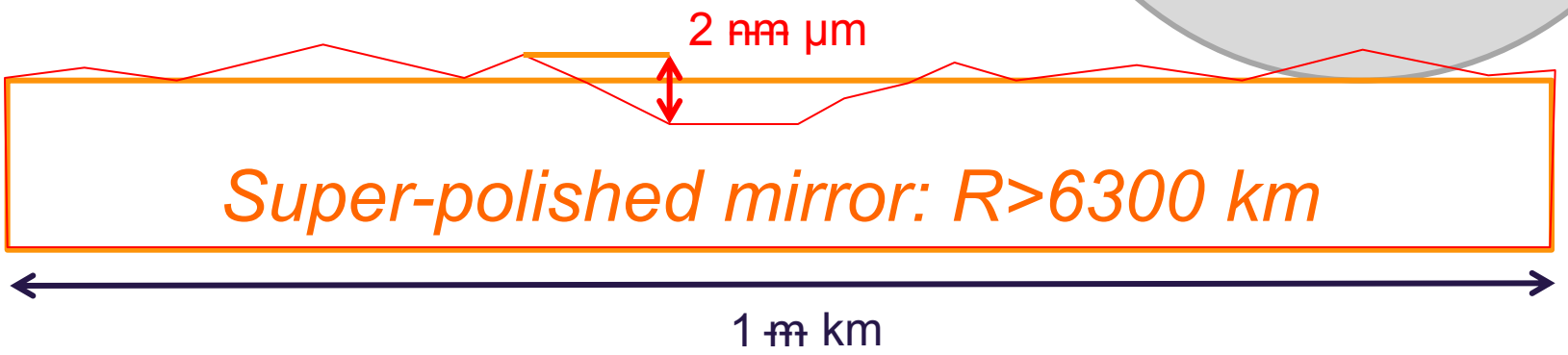
Tomorrow 14:00-18:30, building 61
Workshop on Photon Beam Diagnostic
(talks from Jens Buck on PES and
Kai Tiedtke on XGM)



slide from Jan Grünert

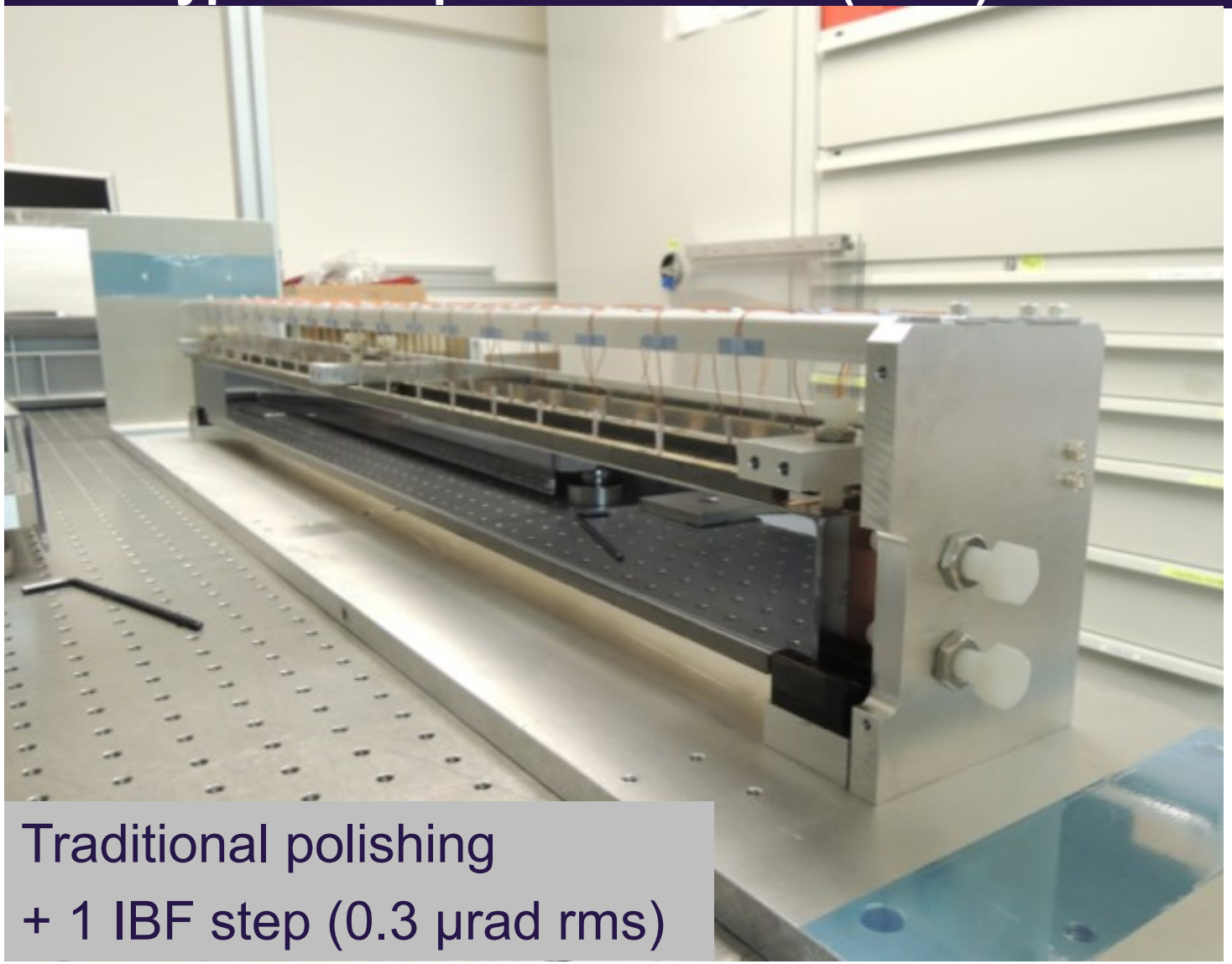
X-ray mirrors: Profile error specification

Human Hair > 20 µm



European XFEL

Prototype bimorph XFEL mirror (2013)



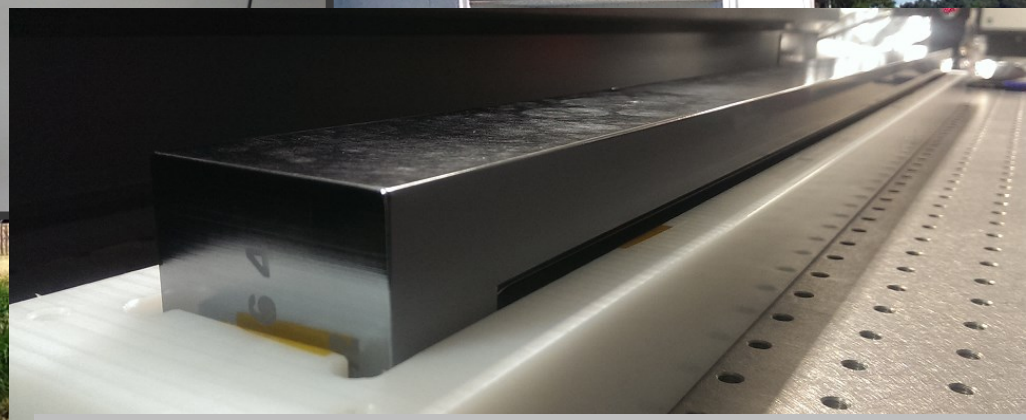
Traditional polishing

+ 1 IBF step (0.3 µrad rms)

Developed by Riccardo Signorato

Frank Siewert
HZB

Contract on super-polishing of 10 mirrors (1 m long) with JTEC



2 pre-polished mirrors shipped in Nov 2014

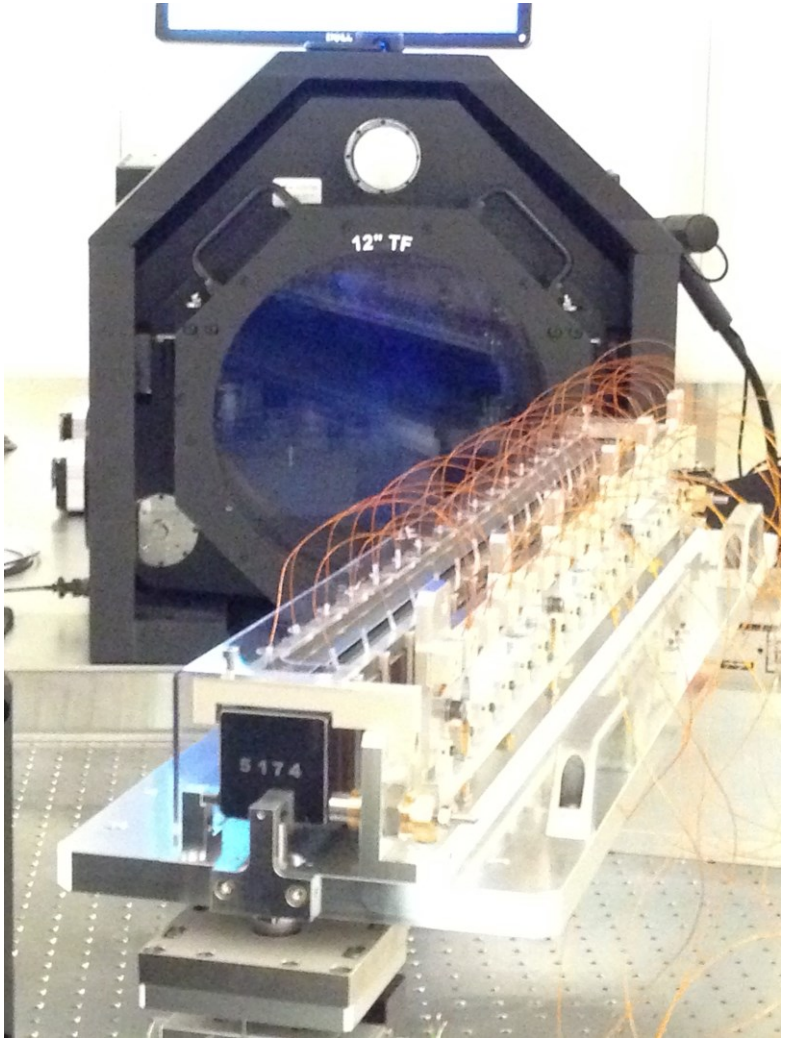
Metrology Lab in Petra III:
30 cm diameter Fizeau Interferometer delivered in November 2014

+ Idoia Freijo

Metrology at European XFEL

Current work at Metrology Lab:

- Commissioning and reference measurements
- Test of bimorph technology & mechanical bender
- Influence of mounting



Outlook

2015:

- XTD2: Finish vacuum installation install E-racks
- XTD9: Drill holes, orbital welding, installation
- XTD10: Start of installation
- Receive first super polished mirrors

2016

- Installation SASE2 (XTD1 & XTD6)
- Close tunnels

Thank you for your attention!

Diagnostics (WP74)

Optics + Beam Transport (WP73)

Diagnostics (DESY)