

Welcome to DESY

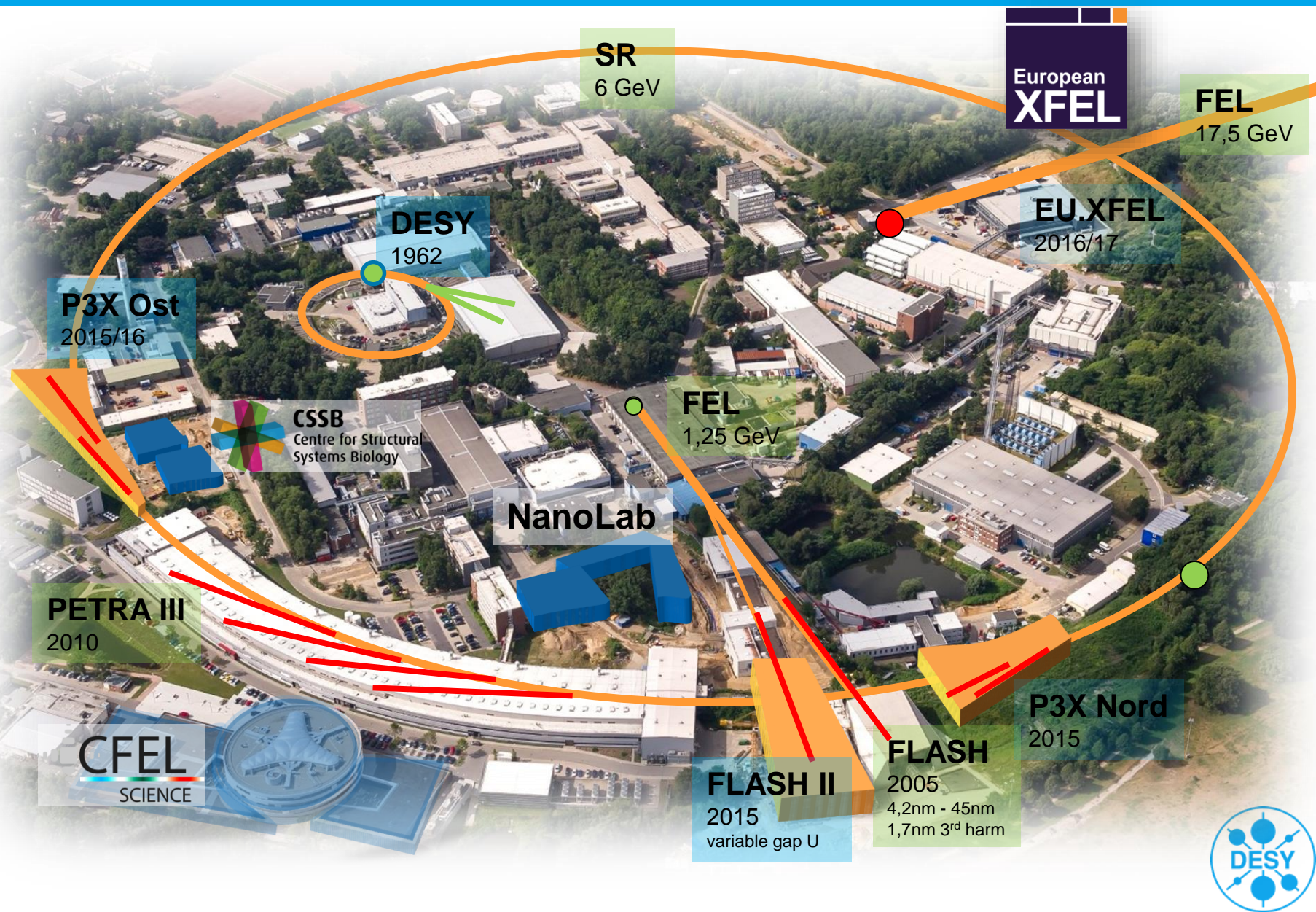
Ralph Assmann, DESY

DESY 50 Years ago...



9284

Today: X-Ray Facilities at DESY. *Masterpieces for photon science*



DESY's Accelerators: Technical Masterpieces.

Hamburg as a driver of innovative accelerators

RF Accelerators: Synchrotrons & FEL's

Super-Conductivity

Plasma Accelerators



New Future Technology: **Plasma Accelerators**

1000 x higher acceleration fields → Compact accelerators

Helmholtz Application for Strategic Investment „ATHENA“

Research Topics and ARD Projects

Seeding at FLASH2 Project

Goal: FEL light with better controllable properties

Facility: **FLASH2**

Partners: DESY-M + DESY-FS + Uni HH + Uni Dortmund

Photo-Injector R&D Project

Goal: Ultra-bright beams

Facility: **PITZ**

DESY-M

Laser-driven Micro-Accelerators

Goal: Vacuum accelerators with 1 GV/m

Facility: **SINBAD**

Projects: AXSIS, ACHIP

Partners: DESY-M + DESY-FS + Uni HH + Uni Arizona + international collaborators

Plasma Accelerators

Goal: Plasma acc. with 10-100 GV/m

Facilities: **FLASH**, **LUX**, **PITZ**, **REGAE**, (**SINBAD** – only with strategic funding)

Projects: LUX, LAOLA@REGAE, LAOLA@PITZ, FLASHForward, (ATHENA)

Partners: DESY-M + DESY-FH + Uni HH + international collaborators

Atto-Second e- and γ Beams

Goal: Bunch length < 1 atto-second

Facility: **SINBAD**

Projects: ARES, AXSIS, EuCARD3

Partners: DESY-M + DESY-FS + Uni HH + Uni Arizona + international collaborators



Tomorrow: Compact, Novel Accelerators at DESY.



Accelerator Research at DESY



SC Technology
(R&D on CW, cryo module test bench, ongoing)

SC Processes
(large series production & testing of sc cavities and modules, AMTF, ongoing)

Surface Technology
(cavity surfaces, CRISP, ongoing)

FEL Seeding
(sFLASH, FLASH2 seeding, ongoing)

FLASHForward
(beam-driven plasma acceleration, 2016+)

SINBAD (ultra-short bunches, LAOLA, prototype table-top FEL, 2017+)

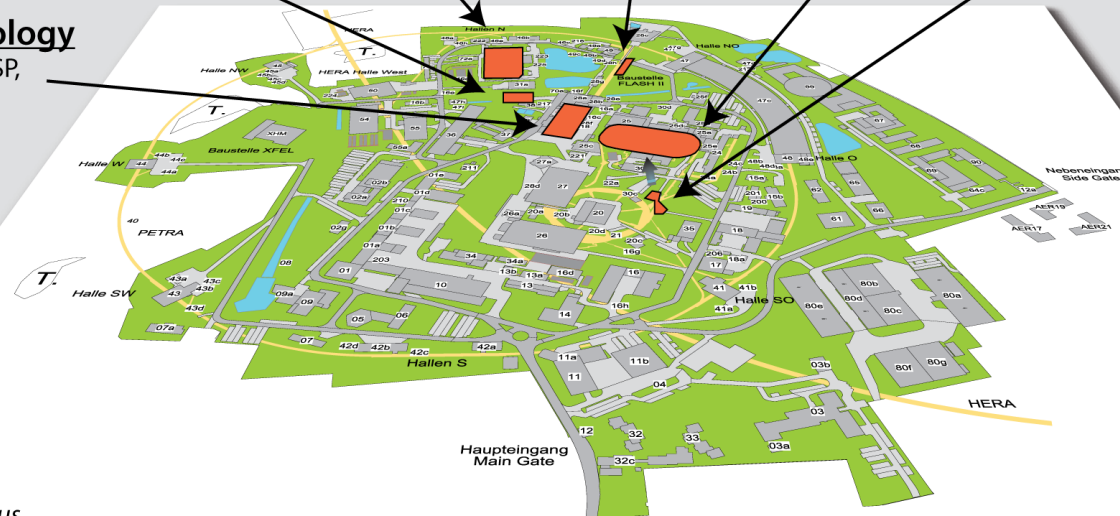
AXSIS (atto-second bunches, ICS, 2014+)

LAOLA at REGAE
(laser-driven plasma acceleration, 2013-2016)

Zeuthen Campus

Photo-Injector
(ongoing)

LAOLA at PITZ
(bunch modulation in plasma, 2013+)

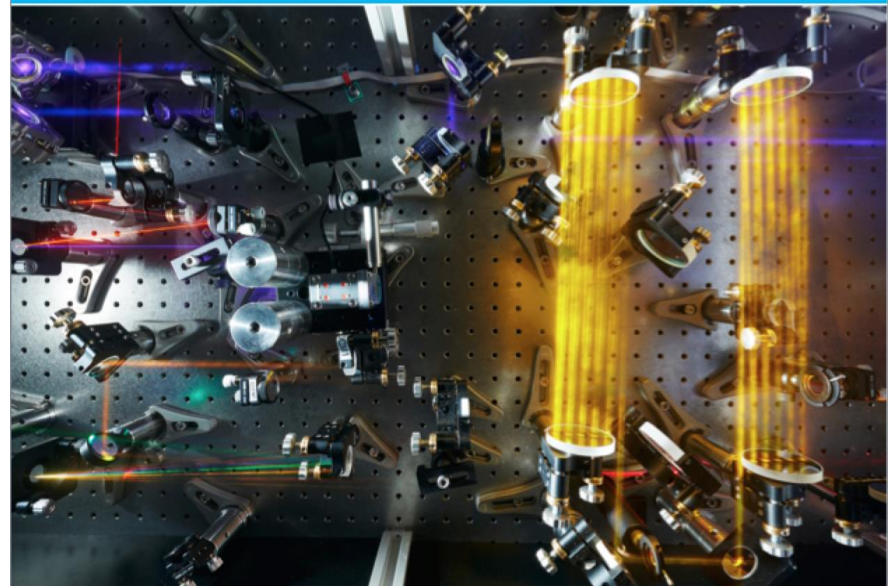


Hamburg Campus

DESY Ultra-Fast Electronics and Synchronization → Holger Schlarb



THz Laser Lab (DESY, CFEL, University Hamburg) → F. Kärtner



ANGUS Laser Lab (200 TW, DESY & University Hamburg) → A. Maier



Plasma Accelerator...



LAOLA Collaboration (Plasma)



Laser: Ti:Sa 200 TW, 25 fs pulse length, 5 Hz repetition rate

- *Initially: Laser-driven wakefields in REGAE. LUX exp. towards FEL*
- *Later: Move to SINBAD facility.*

Beams:

- **REGAE:** 5 MeV, fC, 7 fs bunch length, 50 Hz

- **FLASH:** 1.25 GeV, 20 – 500 pC, 20 - 200 fs bunch length, 10 Hz.
Beam-driven plasma wakefields. Beam-driven plasma wakefields with shaped beams and innovative injection methods. Helmholtz VI with UK collaboration.

FLASHForward ▶▶

- **PITZ:** 25 MeV, 100 pC, 20 ps bunch length, 10 Hz.
Beam modulation experiment in a plasma cell, preparation to CERN experiment AWAKE

- **SINBAD:** dedicated R&D, multi purpose, 150 MeV, 0.01 – 3 pC, down to < 1 fs bunch length, pulse rate 10 – 1000 Hz
→ Home of AXISIS ERC Synergy Grant
→ Home of ATHENA_e



U. Dorda



B. Marchetti



F. Stephan



F. Grüner

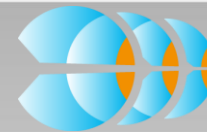
A. Maier



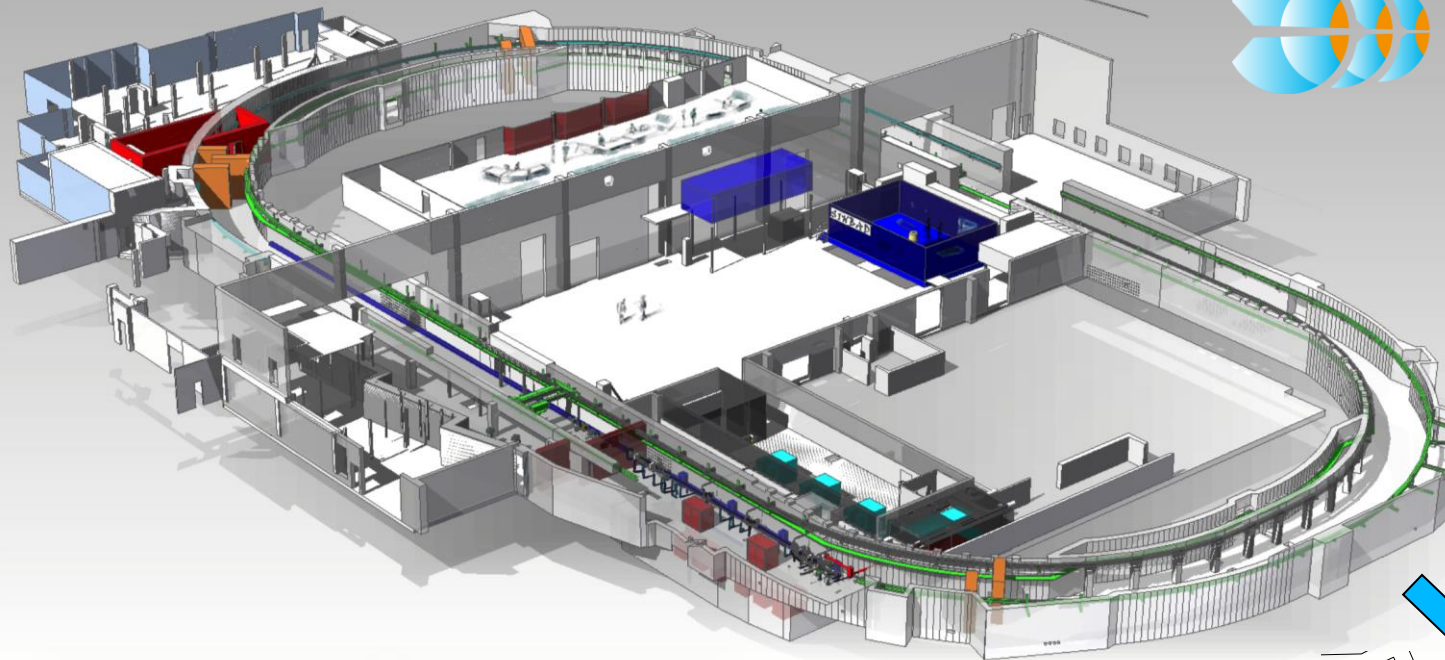
J. Osterhoff



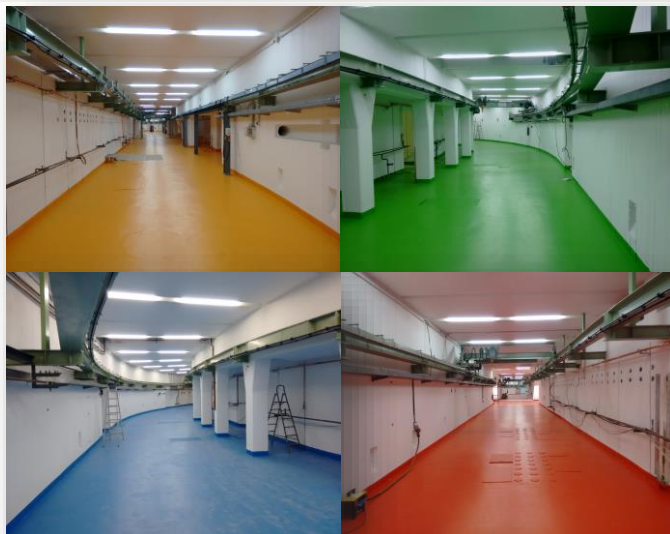
SINBAD at DESY: Dedicated Facility for Accelerator R&D



SINBAD



Ex-DORIS



Project leader:
U. Dorda

