26 February, 2025

European XFEL and Ankara University: Capabilities and Opportunities

65th Anniversary of DESY's Foundation: Ankara University-DESY Relations

Serguei Molodtsov
European XFEL, Science Director

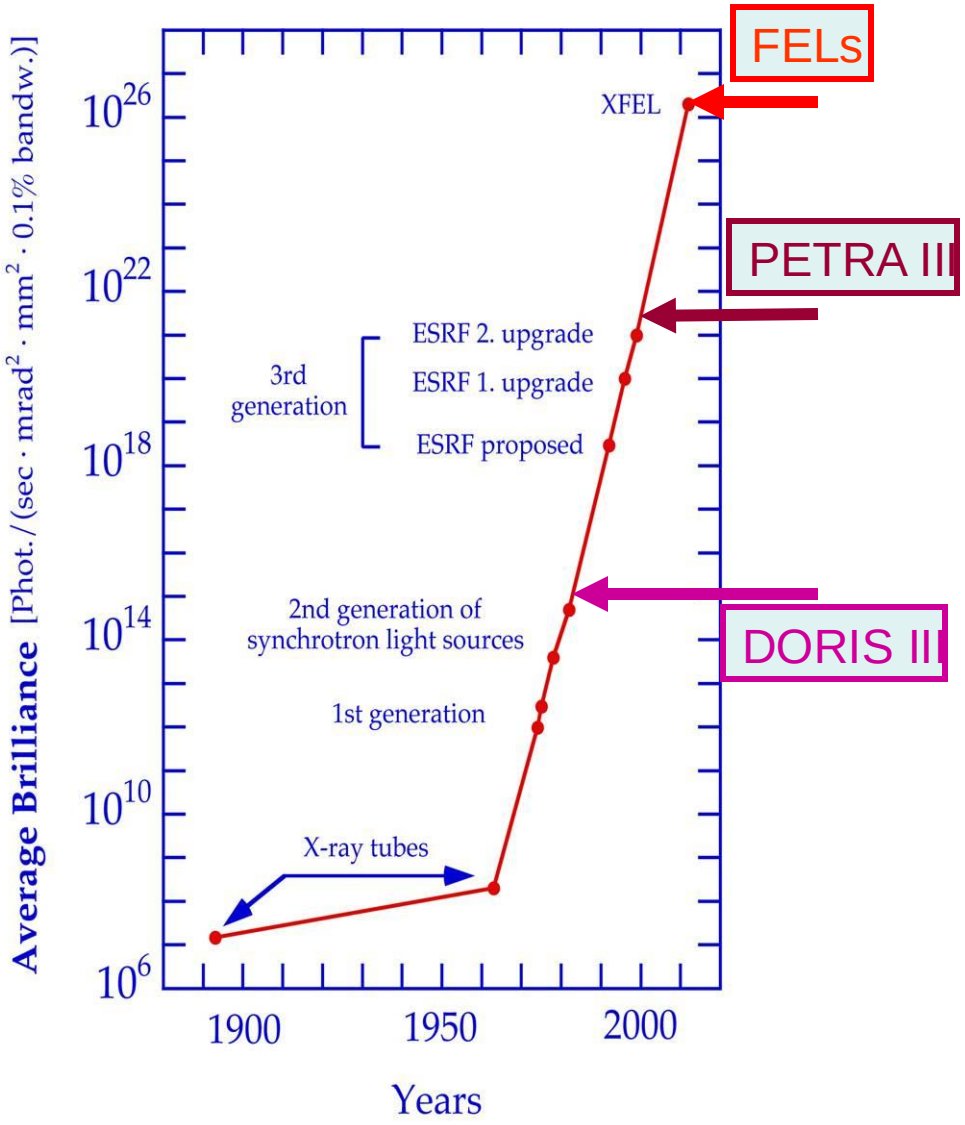
European XFEL inauguration (Sept. 1, 2017)

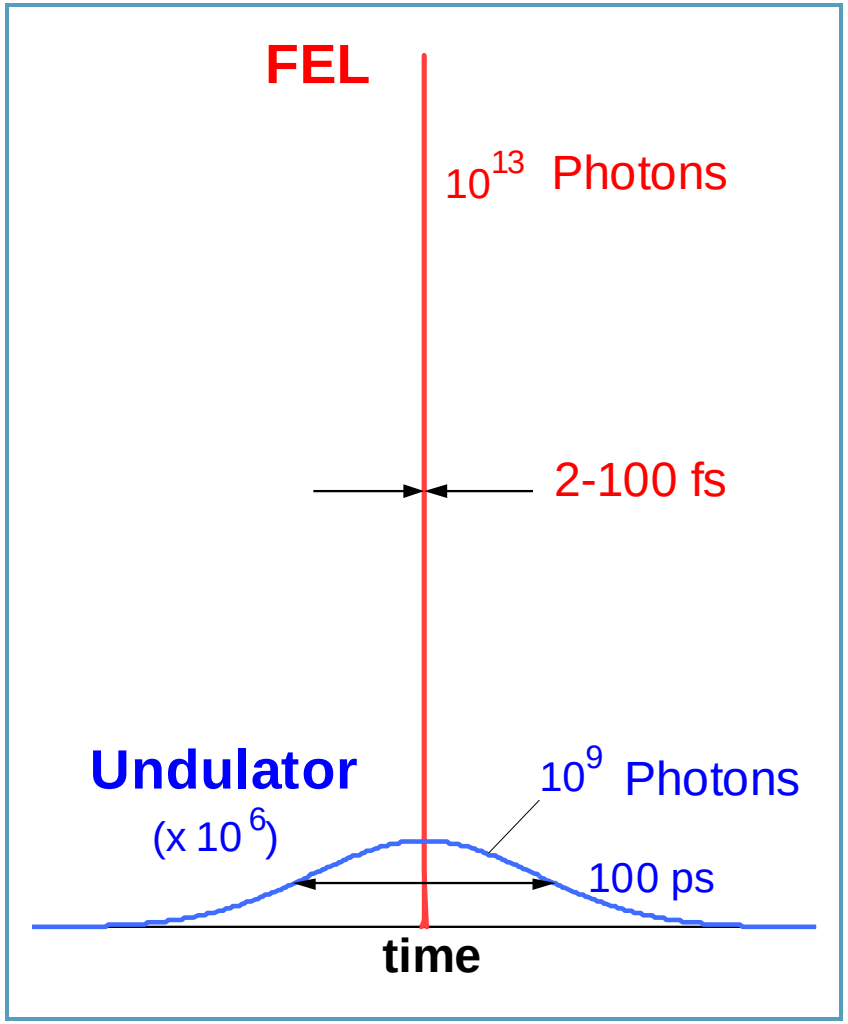
Wissenschaftler Prof. Christian Bressler erklärt Bürgermeister Olaf Scholz, Forschungsministerin Johanna Wanka und der Kieler Wissenschaftsministerin Karin Prien den Aufbau eines Experimentes Roland Magunia

Hamburg feiert seinen Superlaser

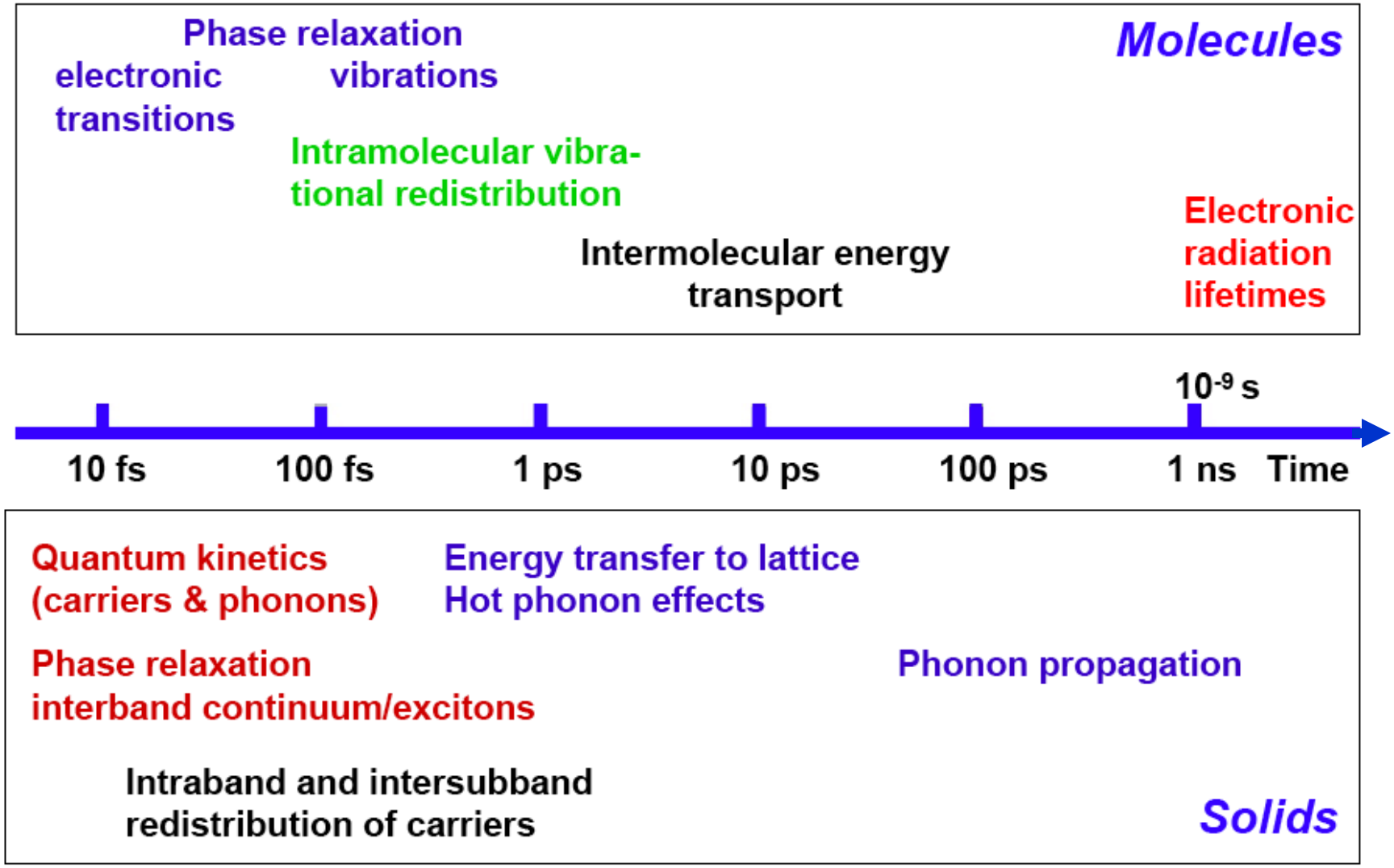
„Basis für die **Innovationen von morgen**“: 800 Gäste nehmen in Schenefeld die 1,5 Milliarden Euro teure Forschungsanlage in Betrieb

Main advantages of XFELs

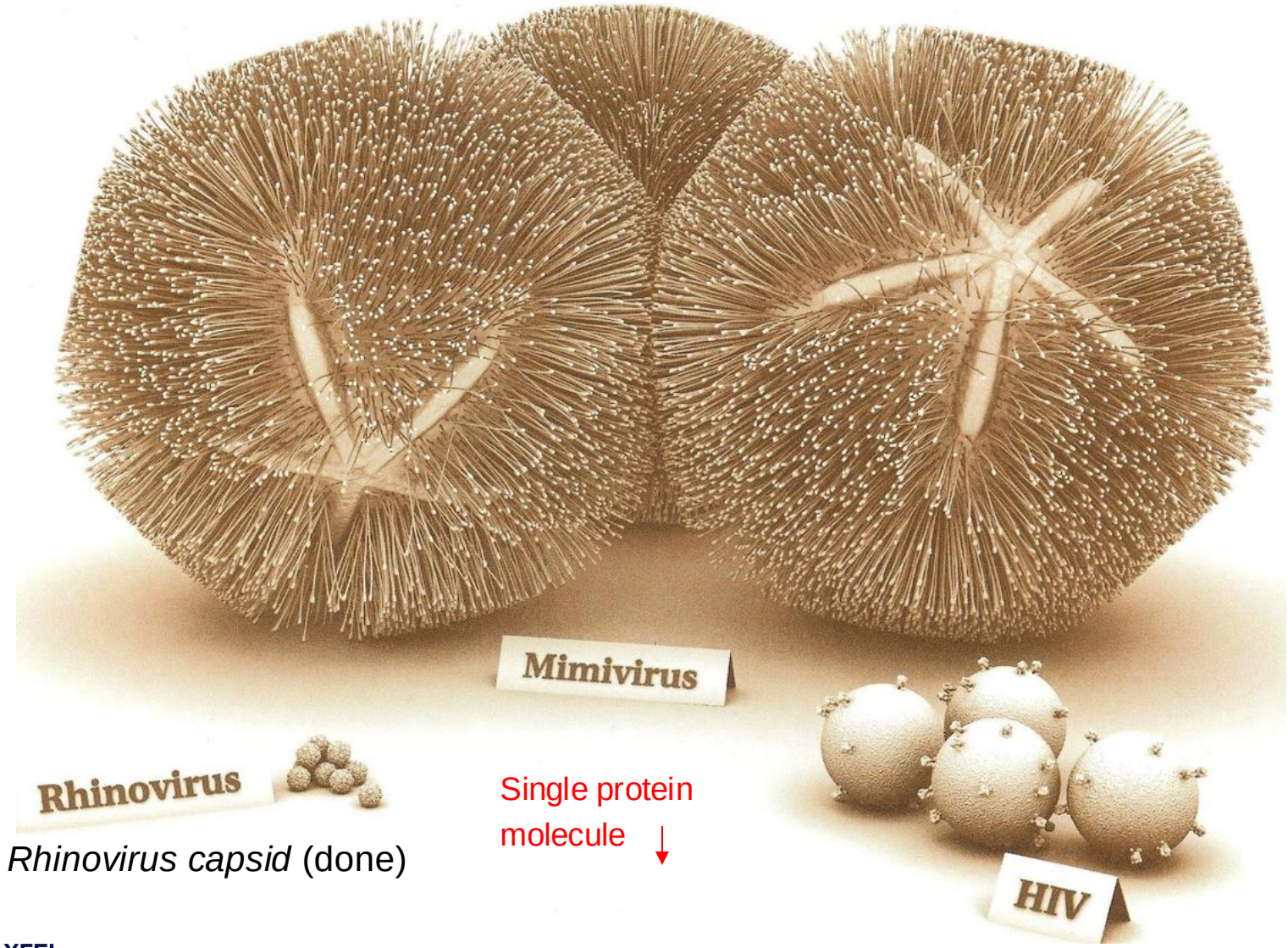




Time scales for dynamics



Tremendous variety of bio-objects to be studied



Rhinovirus capsid (done)

Single protein molecule ↓

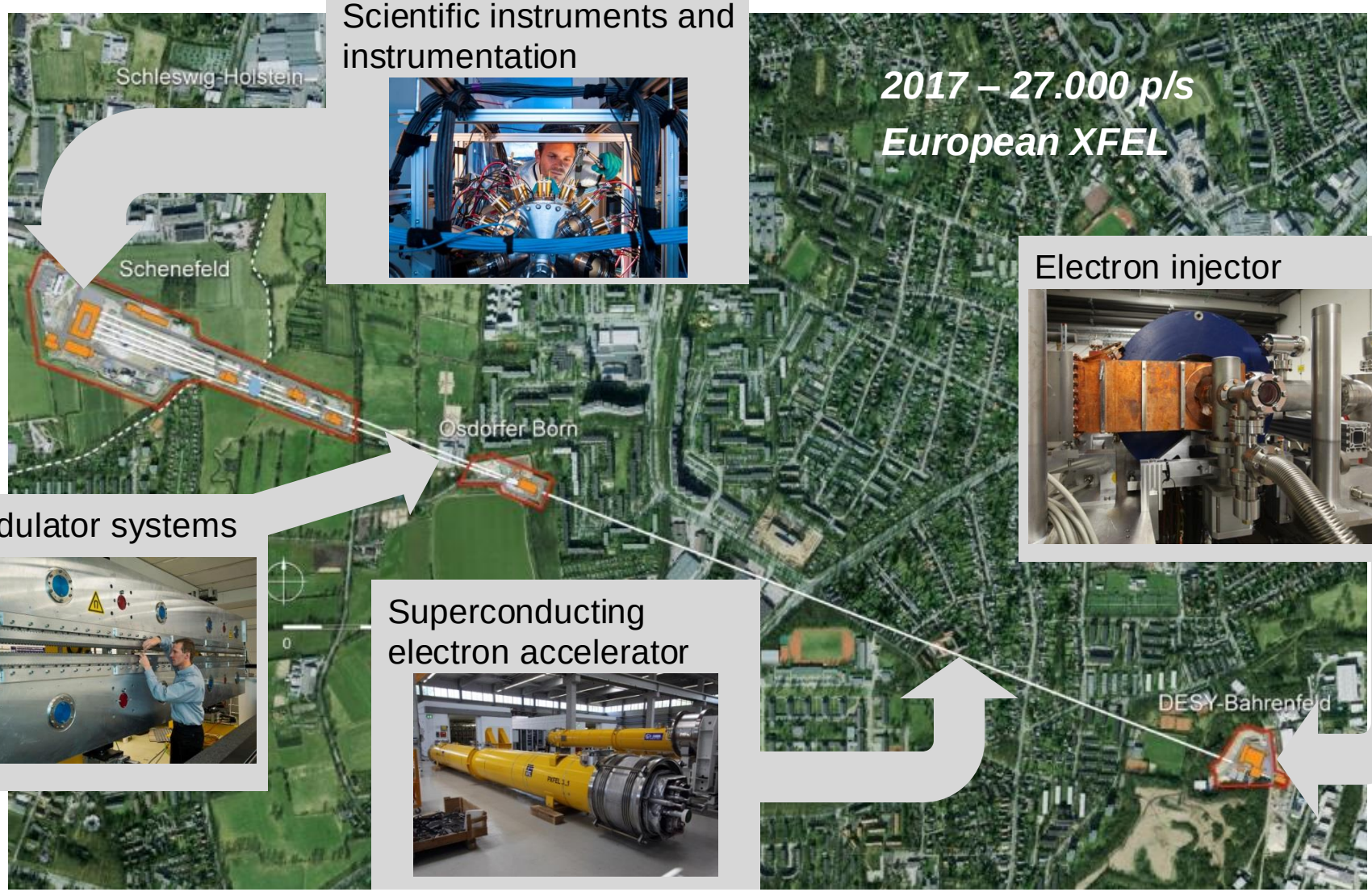
http://www.americanscientist.org/issues/feature/2011/4/giant-viruses

About the European XFEL

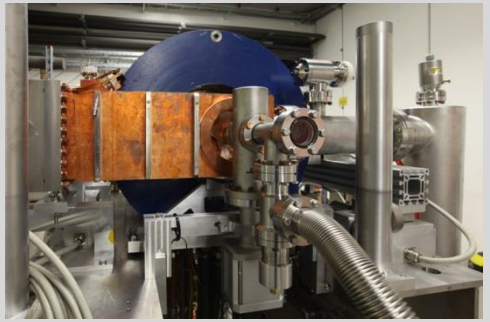
- Start 2009
- Task : Construction and running of the X-ray Laser Facility
- Germany (Bund, Hamburg (65 M€) und Schleswig-Holstein (25M€)) 58%, Russia 27 %, Italy 3%, others 1–3%
- DESY operates the accelerator
- Staff XFEL about 350, Staff @ DESY about 250
- Start of operation 1. July 2017
  - 1,22 Mrd. € (2005 prices)
  - 600 Mio € in cash, 600 Mio € in-kind
  - Yearly running costs 145 Mio € (2024)

How it works – a closer look at the facility

Scientific instruments and instrumentation



Electron injector



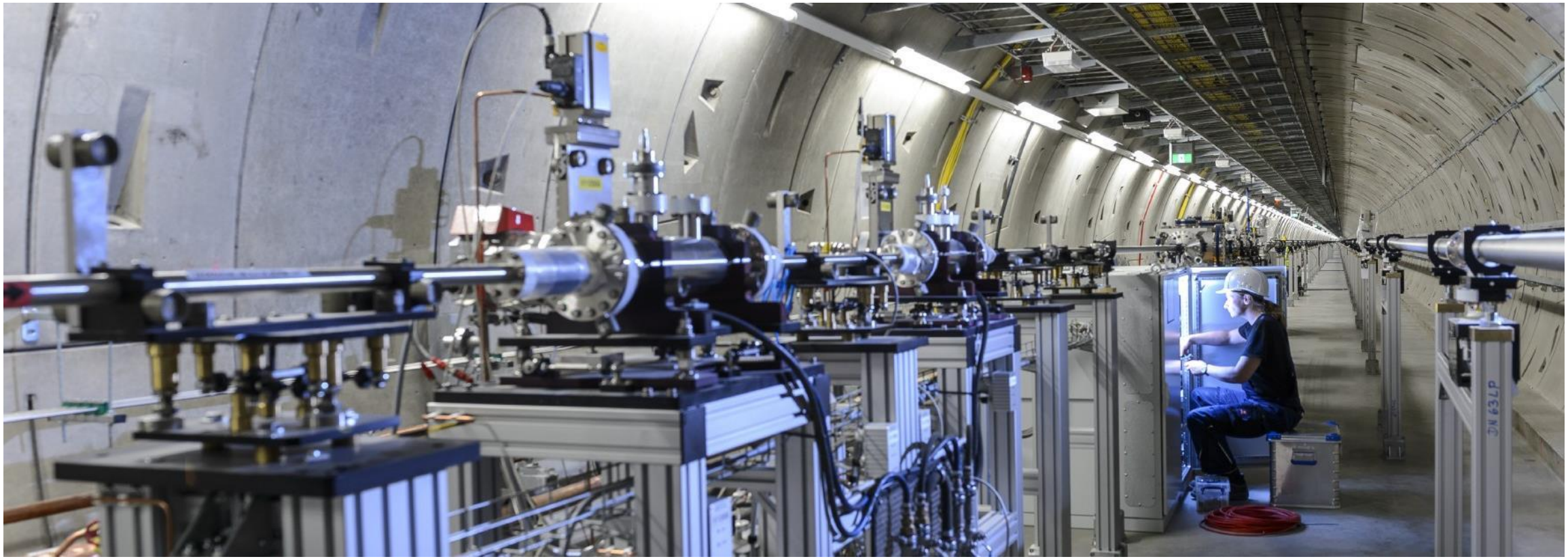
Undulator systems

Superconducting electron accelerator

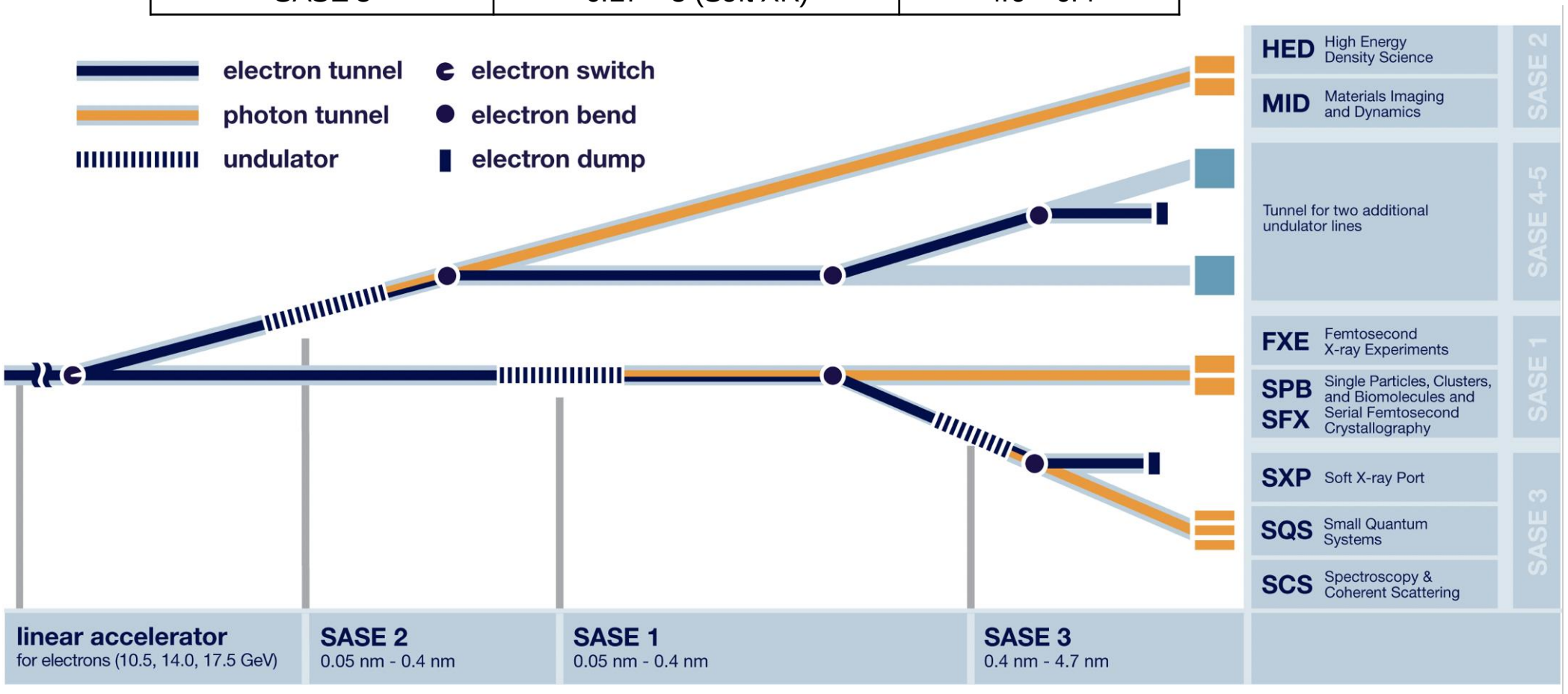
Power RF – installation check

Undulators in tunnel

Photon beamlines



Undulator Segment	FEL radiation energy [keV]	Wavelength [nm]
SASE 1	3 - over 24 (Hard XR)	0.4 - 0.05
SASE 2	3 - over 24	0.4 - 0.05
SASE 3	0.27 – 3 (Soft XR)	4.6 – 0.4



Orange color: X-ray optics & Beam Transport

User Meeting in Ankara, 2012

FELs OF EUROPE

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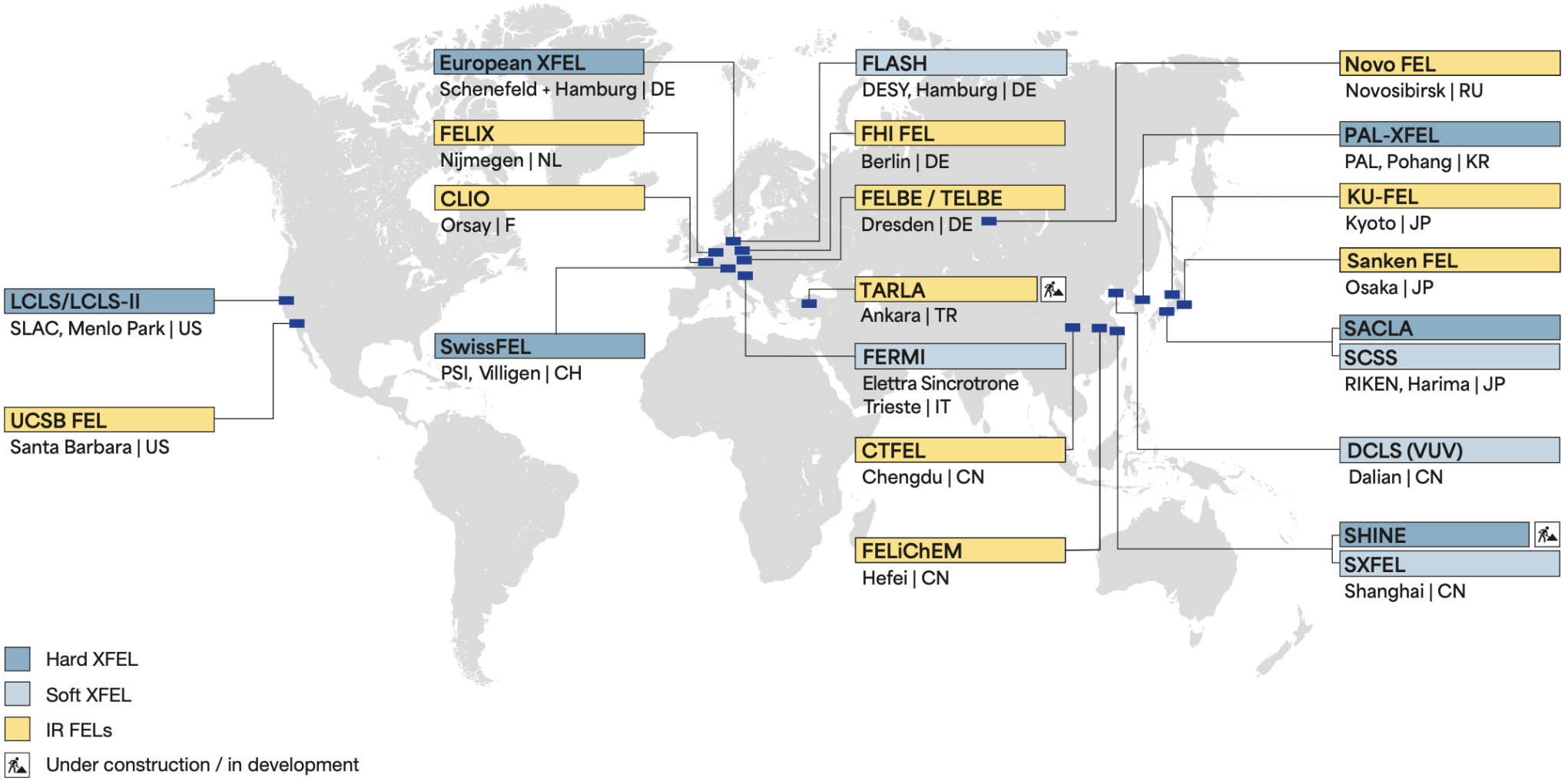
TARLA

The Turkish Accelerator and Radiation Laboratory (TARLA), which is the first accelerator based IR-FEL facility under construction in the Turkish Republic, has been started as a project under the direction of Ankara University. It has been recognized as a National Research Center end of 2020 and is now independent from Ankara University. In order to continue the scientific cooperation with Ankara University, a MoU has been signed between Ankara University and TARLA. At the first stage of operation, Gamma (Bremsstrahlung) radiation and Free Electron Laser (FEL) in the infrared (IR) region will be produced by an up to 40 Million Electron Volts (MeV) accelerated electron beam. The FEL will be generated with resonant wavelengths of 5-350 μm at a repetition rate of 13 MHz and duration of 1-10ps. This type of beam covers the spectral range from mid- to far-infrared and is expected to have an average power of 0.1-100 W range

More information

FEL sources of Europe / Worldwide




We are looking forward to continuing our cooperation!