

# Welcome to DESY!

## 10<sup>th</sup> Virtual MicroTCA Workshop for Industry and Research

7 December 2021



**Prof. Dr. Wim Leemans**

Director, Accelerator Division



# A world-leading accelerator lab

## DESY's mission





# At DESY we have a unique combination of analytical tools

Brilliant X-rays, intense electron beams





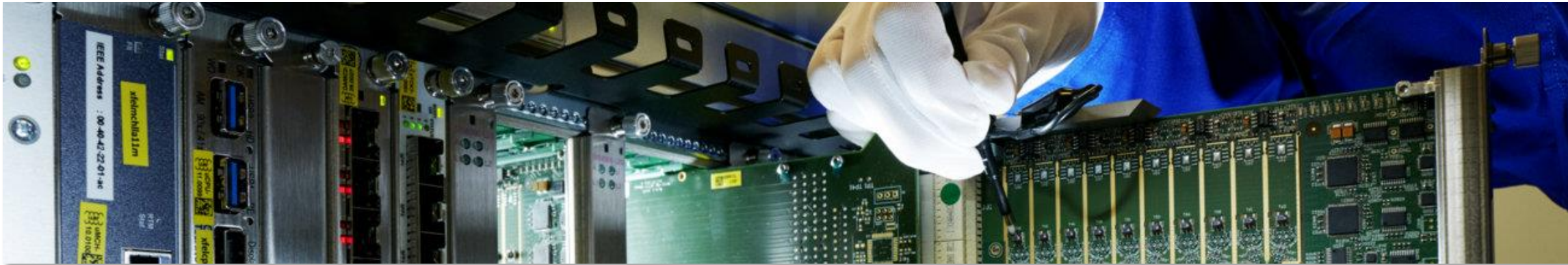
# MicroTCA Technology Lab

[TECHLAB \(desy.de\)](http://TECHLAB.desy.de)



**Core Activities**

- Custom Development MTCA.4 (Hardware, Firmware, Software)
- High-end Test and Measurement
- System Configuration and Integration

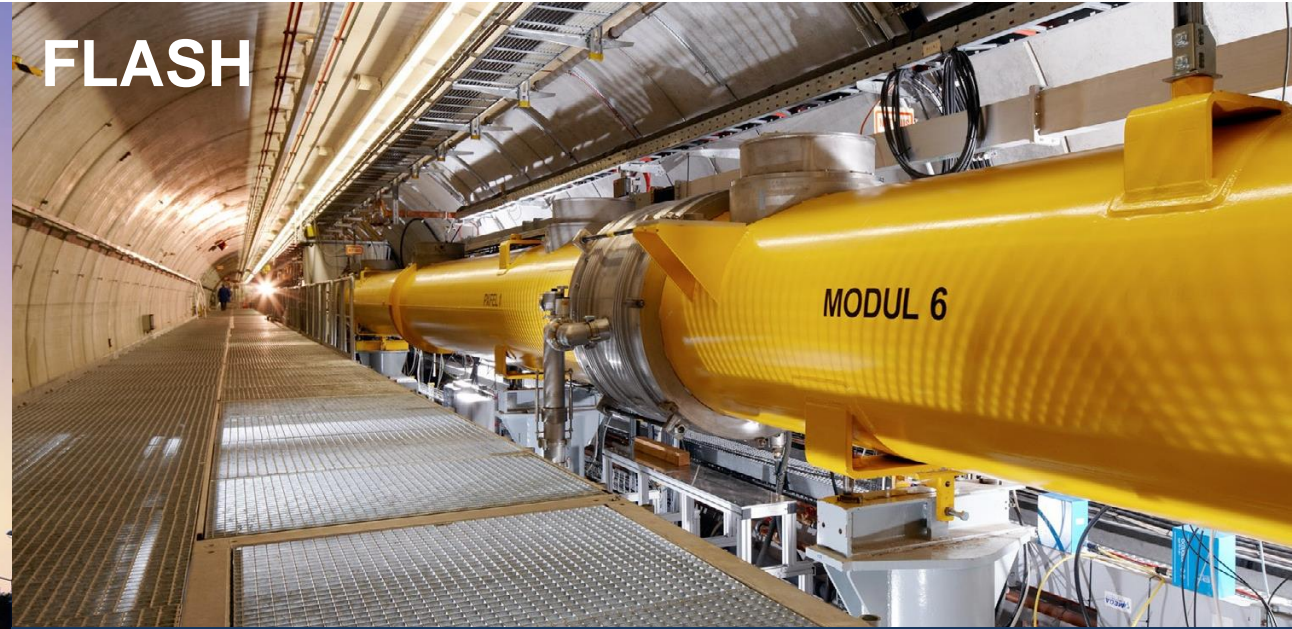




# Our machine operations: PETRA III., DESY II TestBeams, FLASH and EuXFEL



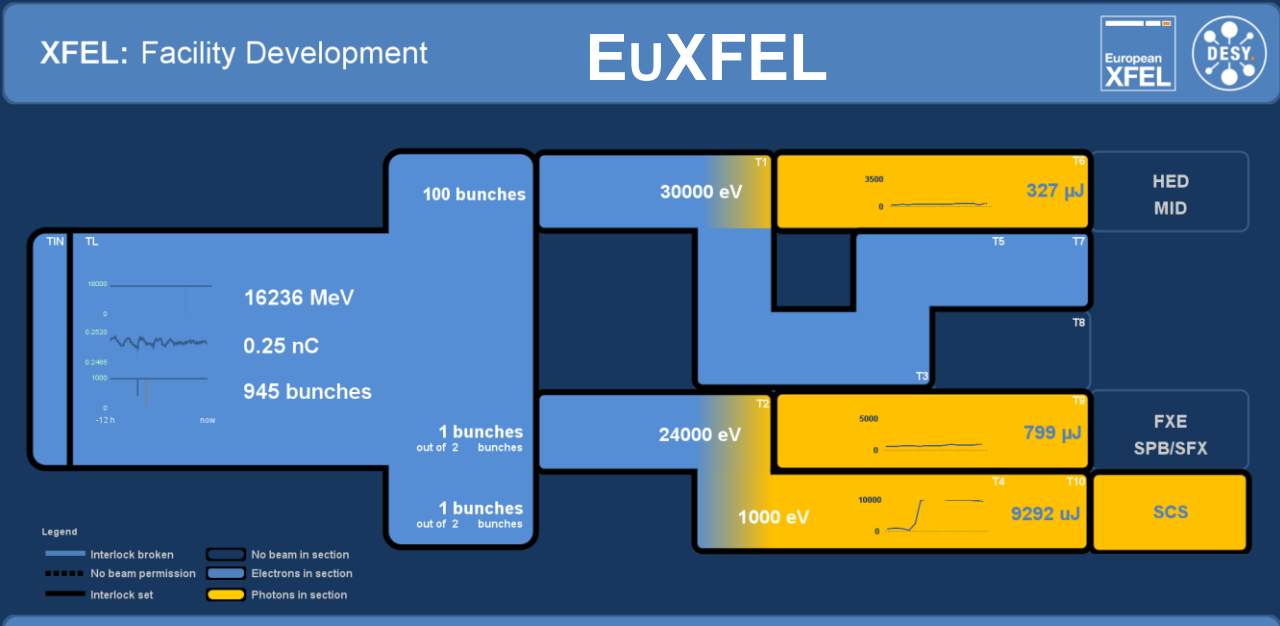
PETRA III



FLASH



DESY II TestBeams





# Our projects: machine upgrades PETRA IV., FLASH2020+, XFEL, KALDERA

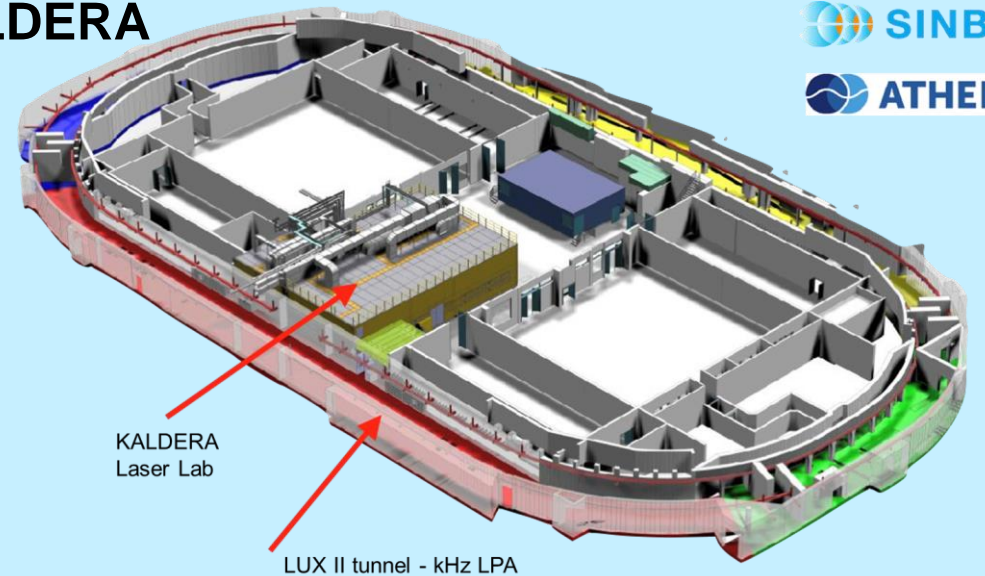
**PETRA IV.**  
NEW DIMENSIONS

**FLASH2020+**

➤ TDRs in progress



**KALDERA**



KALDERA  
Laser Lab

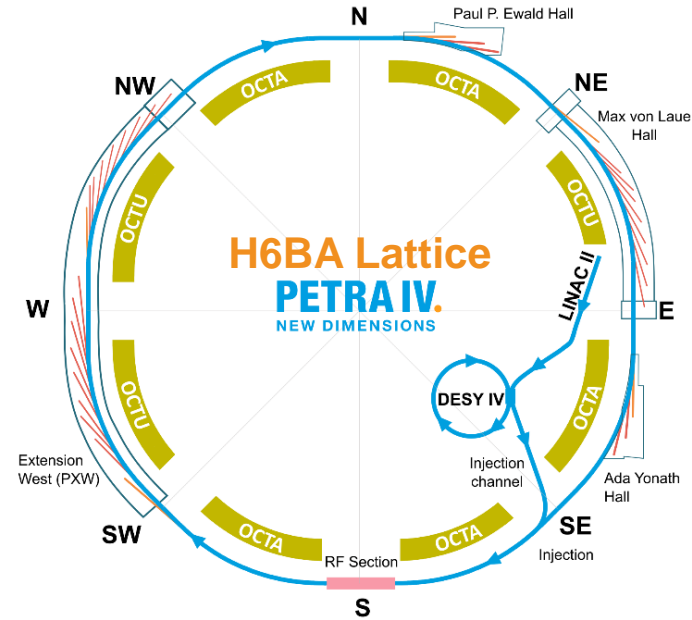
LUX II tunnel - kHz LPA



# Modified PETRA IV. lattice with significant improvement in many aspects

DESY's flagship project for scientific excellence in X-ray Analytics to address global challenges

- > New machine 2.3 km length
- > 100-times higher intensity
- > 100-times faster experiments
- > Experiments *in situ* und *in operando*



- CDR release 11/2019
- TDR 2020-2022
- Construction 2025 – 2027
- **MicroTCA baseline**
- **Enormous data rates**

## Sustainability as focus:

- Hybrid magnets
- Waste heat recuperation
- High efficiency RF systems

Energy

Life and Health

Transportation and Technology

Earth and Environment

Information Technology

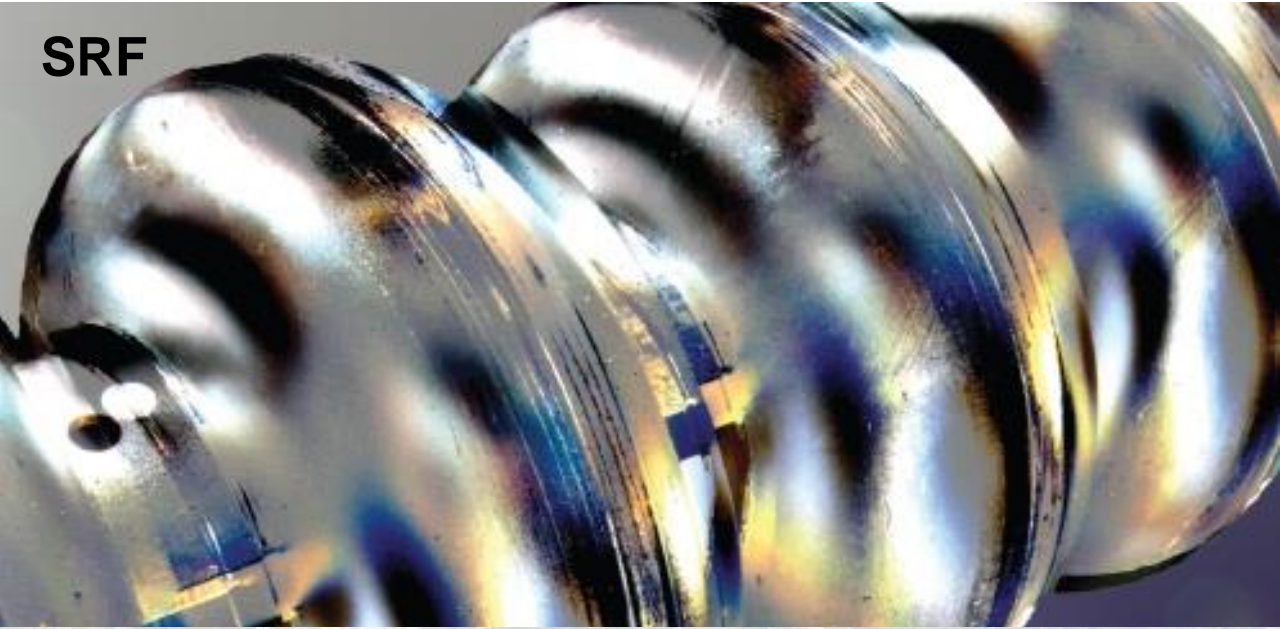
PETRA IV.

**PETRA IV.**  
NEW DIMENSIONS

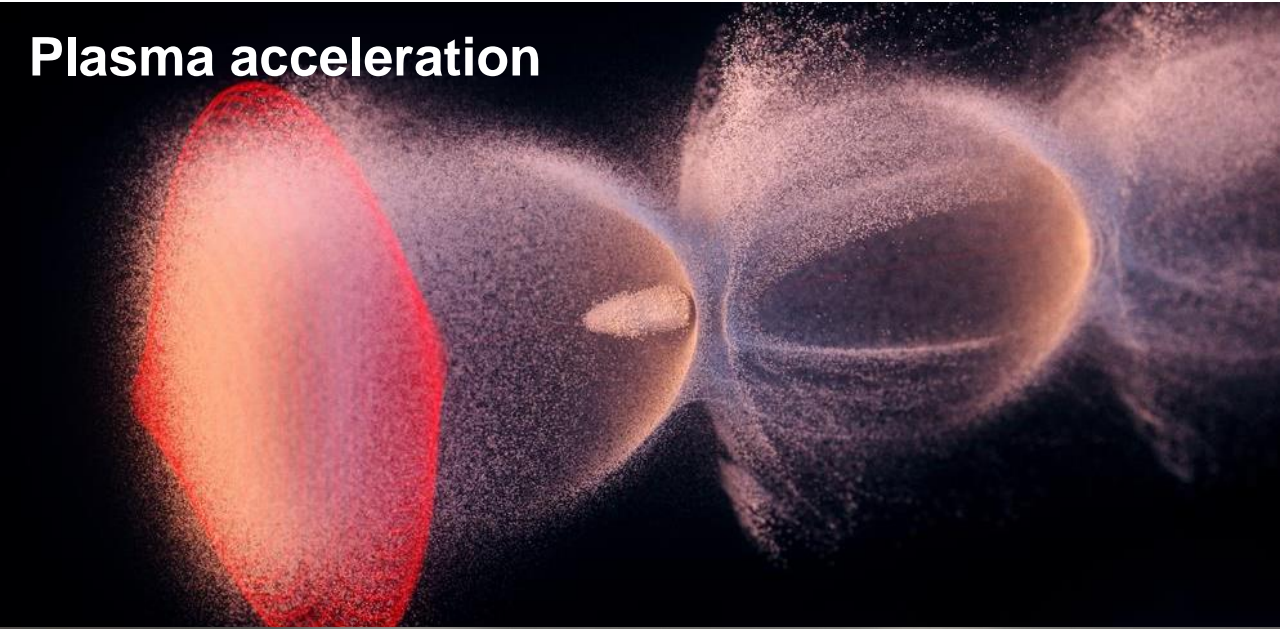


# Our R&D projects: SRF, plasma, small-scale facilities, control systems / IPC...

SRF



Plasma acceleration



## Small-scale accelerator facilities

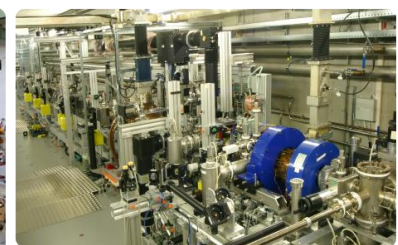
- ARES
- PITZ
- REGAE



ARES



PITZ @DESY Zeuthen



REGAE



## Intelligent process control Machine learning





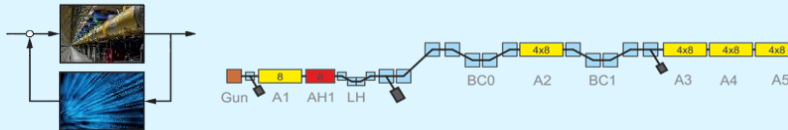
# digitalDESY. projects: HOT topics!



“Umbrella” initiative that spans all of DESY



## Machine learning IPC, Robotics



Special requirements accelerator facilities    Teleoperation/ avatar    VR Holo-Lense    Autonomous robots    Mobile manipulation    Dexterous manipulation

# 1<sup>st</sup> AIRA WORKSHOP

Artificial Intelligence and Robotics for Accelerators

5-8 JULY 2021





# DESY. TechTransfer: Foster start-ups, spin-offs & hightech companies

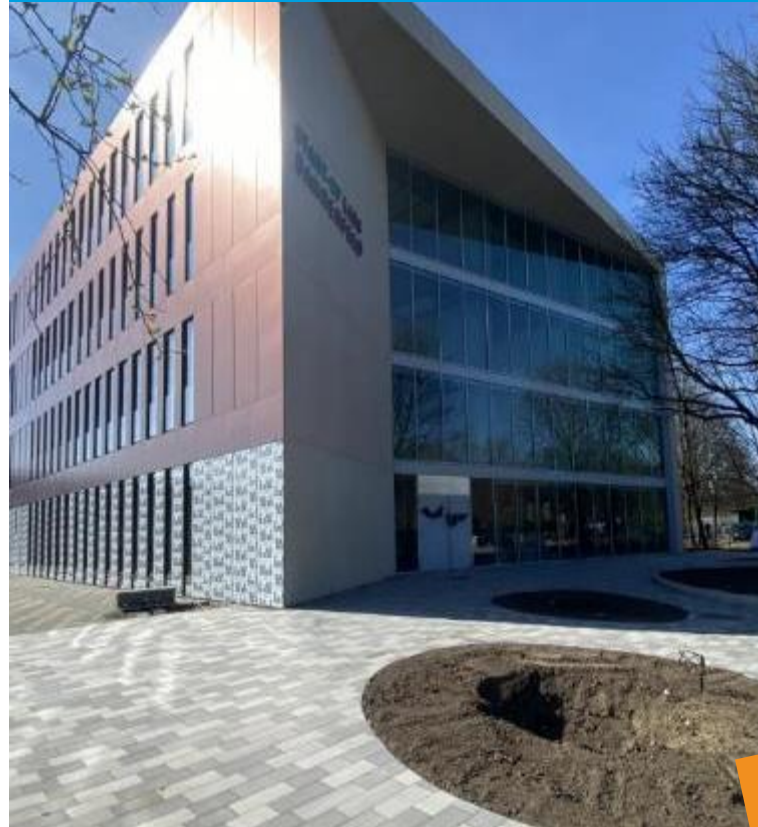
Tailormade infrastructure for successful transfer



DESY Innovation Village  
Since 02/2019



Start-up Labs Bahrenfeld  
Since 07/2021



DESY Innovation Factory  
From 2025



From early stage research to successful commercialisation



# Innovation Ecosystem @Science City Hamburg Bahrenfeld

Build strong bridges of excellent science, academia and companies



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# Thank you



## Contact

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