# PLCs in Laser Systems at DESY

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## **Free-Electron Lasers at DESY**

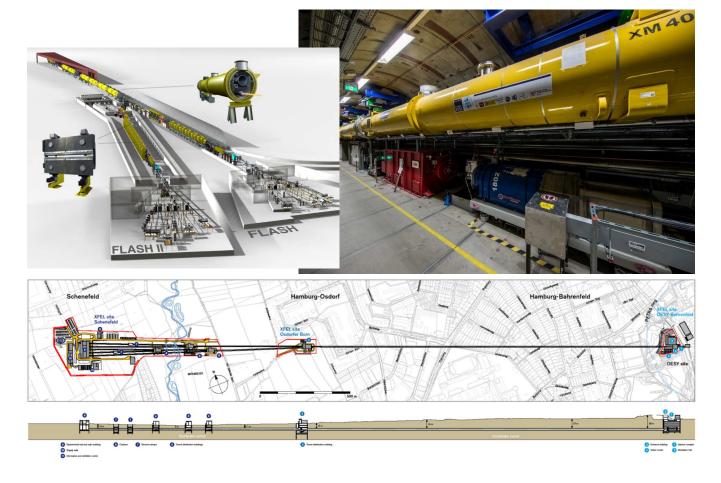
## FLASH and European XFEL

#### Large Free-electron laser facilities

- FLASH: 300m
- European XFEL: 3.4km
- (PETRA Synchrotron)

## **Optical Lasers:**

- Photocathode lasers
- Electron Beam "tuning"
  - Heater
  - Seeding
- Pump-probe lasers
- Laser group develops/operates
  these systems



# **PLCs in DESY FEL Facilities**

#### Machine protection system

- Protect the machine from itself
- European XFEL electron beam: 500kW avg. power
- Vaccuum valves
- Screens

#### **Personnel Interlock**

- Radiation safety
- Laser safety
- Siemens PLCs

## **Motor Controllers**

- Stepper Motors
- Beckhoff PLCs

# **PLCs in DESY Laser Systems**

### Our control system is NOT based on PLCs

- · Goal is to integrate devices into control system
- DOOCS
- PLCs are good to integrate a lot of "small stuff"
- PLCs speak OPC UA
- OPC UA / DOOCS integration is a solved problem
  - Visit my talk/poster on tuesday!

# **PLCs in DESY Laser Systems**

#### Integration of commercial devices

- Laser amplifier
- "plug-and-play"

### Laser protection system

- Protect the laser from itself
- Very short pulses -> very high peak power
  - fs -> GW
- E.g. switch off pump diodes when seed is off

## Integration of sensors/actuators into control system

- E.g. Temperatures
- Cooling water flow
- Motorized mirrors

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