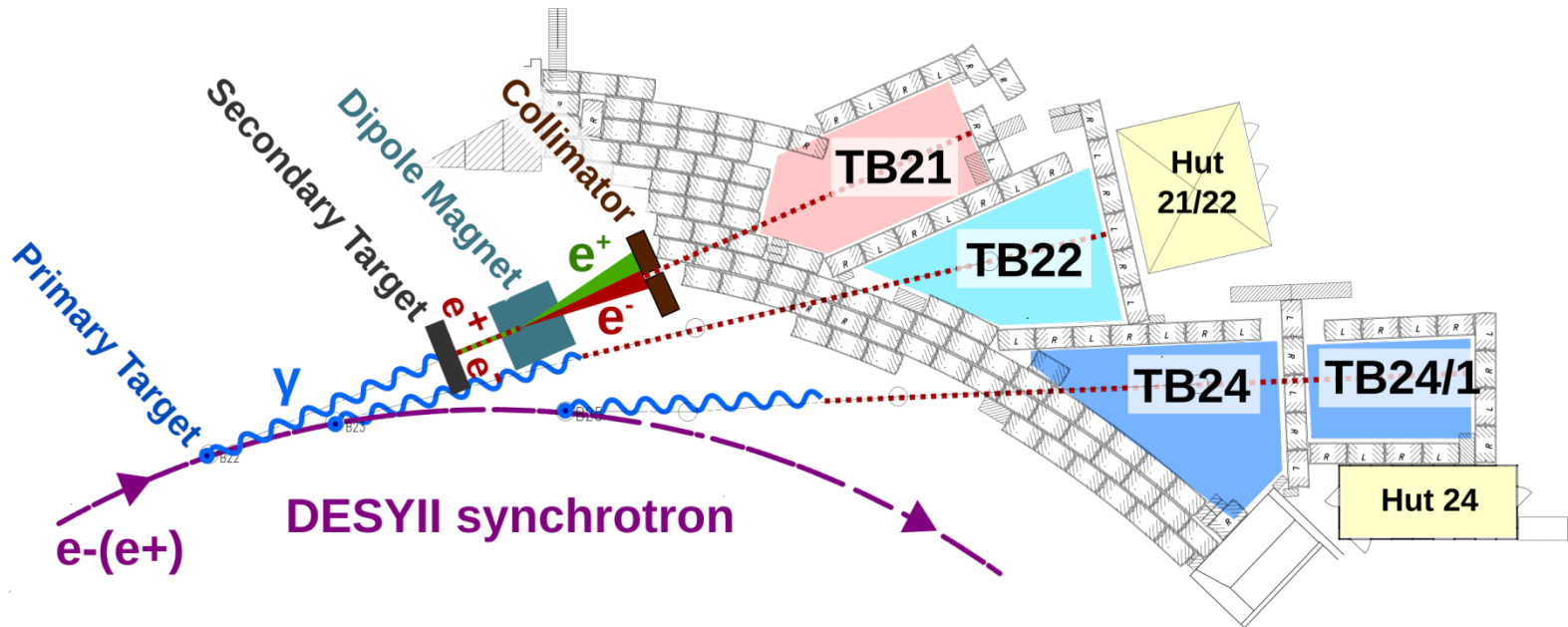


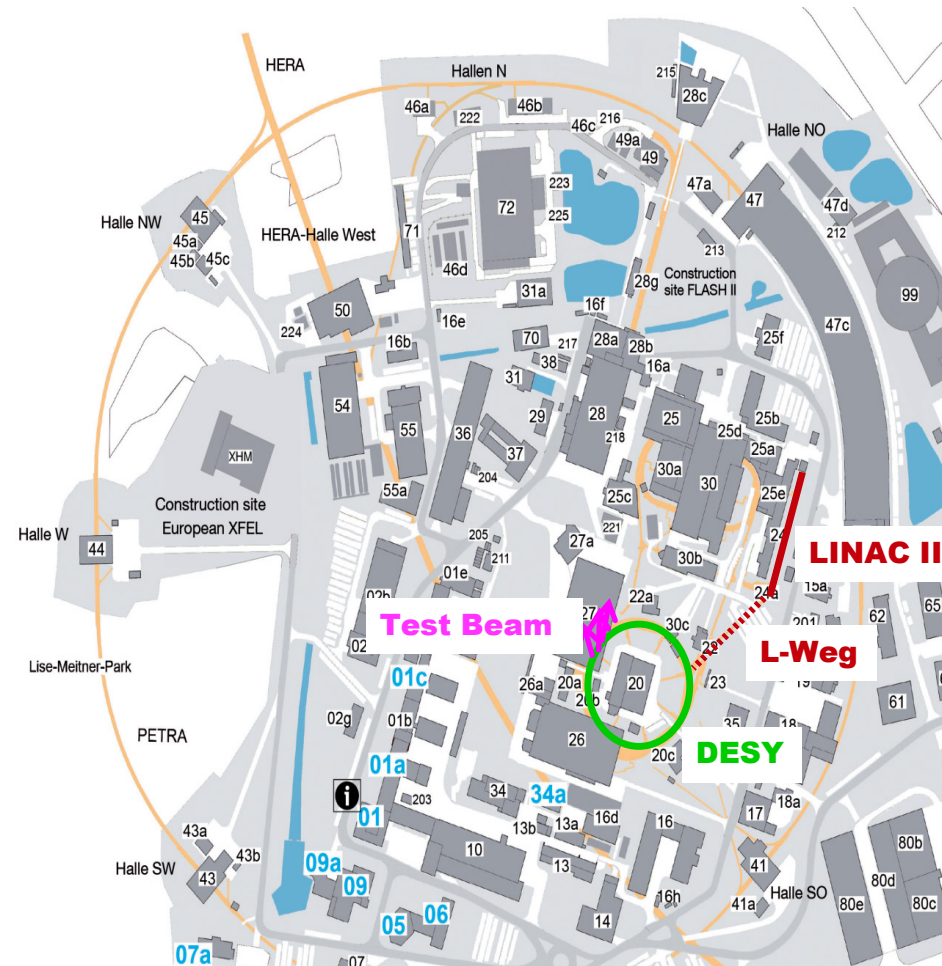
DESY II Test Beam Facility

An Introduction



M. Stanitzki for the DESY Test Beam Team

- Facility parasitic fed by DESY II synchrotron
- Beam Generation & Properties
 - Three carbon fiber targets generate bremsstrahlung photons
 - Conversion at target to e^+/e^- with energies up to 6 GeV
 - Rates dependent on beam line, energy, target, collimation
- Three individual beam lines, controlled by the user
 - Shutter, area interlock, momentum + collimation





DESY II Synchrotron

tesla

QF22

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087-A3

086-A2

085-A1

088-A4

QF22

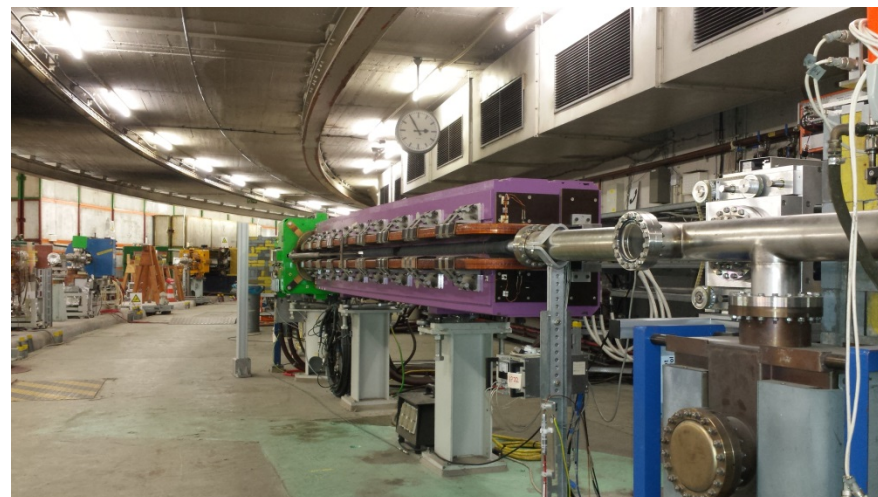
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> DESY II

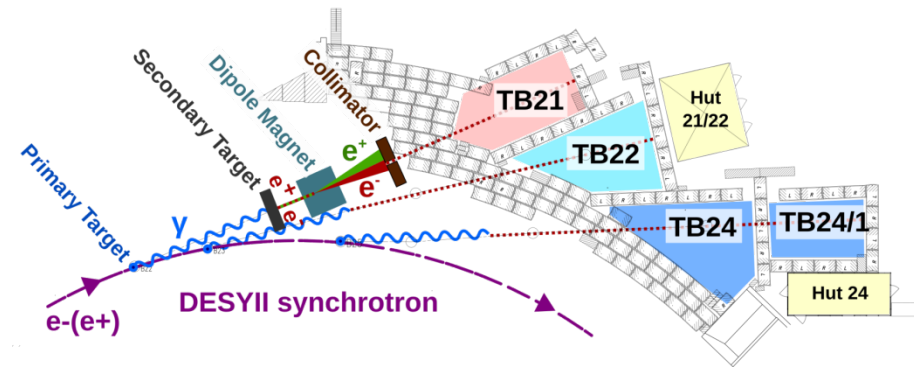
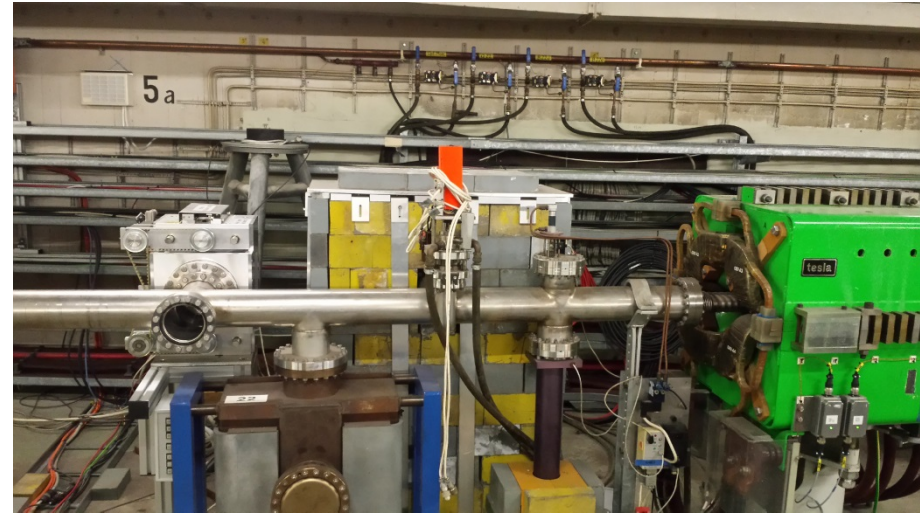
- Workhorse of the DESY accelerator complex
- Feeds beam to PETRA III and the test beam

> Details

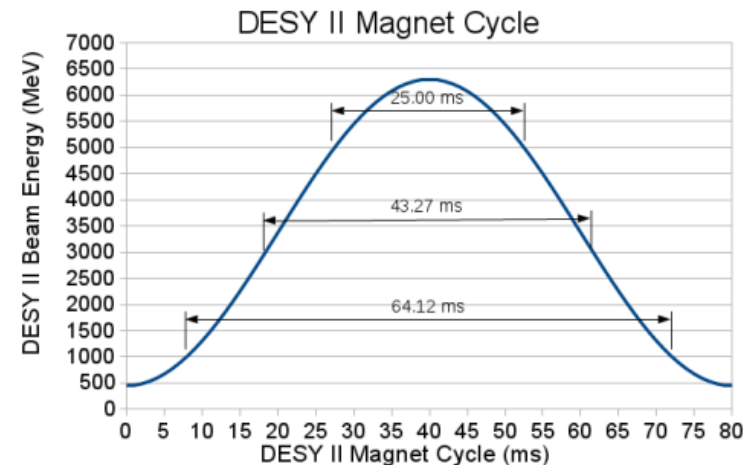
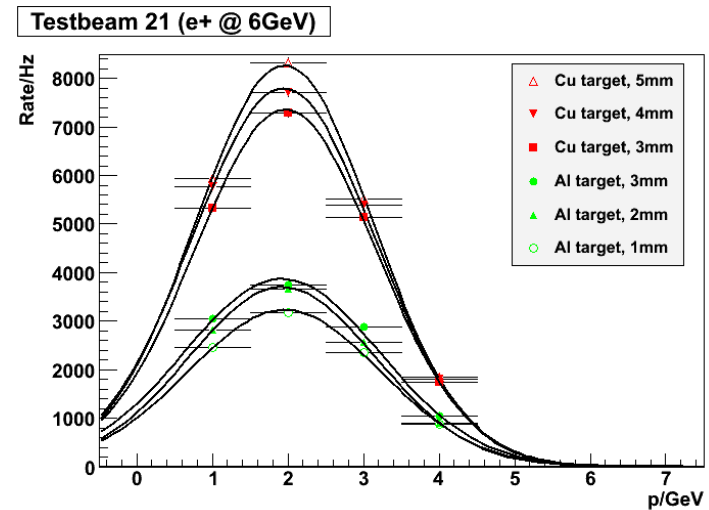
- Electron Synchrotron with 292,8 m circumference
- Injection energy 450 MeV, maximum energy 6.3 GeV
- 500 MHz RF, 1 μ s per turn
- Specialty: Continuously ramping with 12.5 Hz
- Typically with a single bunch with 10-15E9 electrons, 30 ps length



- Test beam at DESY
 - No extraction of primary beam!
 - Fully parasitic
- Secondary beam
 - 3 Carbon-fibre targets inserted into the DESY II primary beam
 - Bremsstrahlung photons hits secondary target (copper or aluminum)
 - Magnet selects the desired momentum and electrons/positrons
 - Primary Collimator to shape the beam
 - If shutter is open, beam enters the respective area



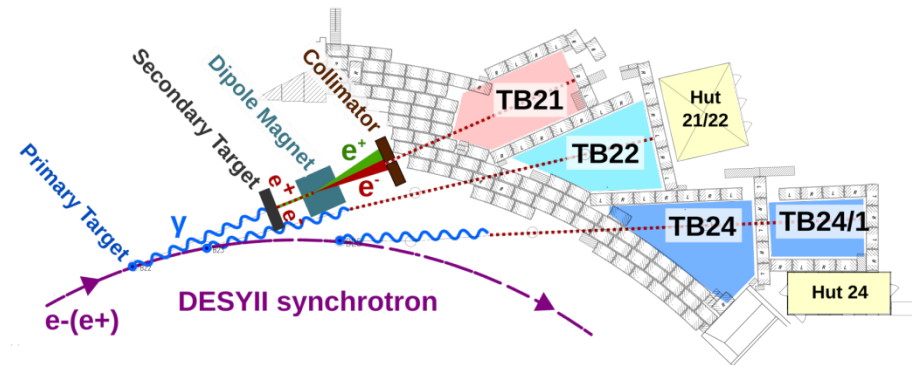
- Beam rates for users
 - Momentum-dependent
- Pulse duration
 - Selected energy only available if $E_{\text{DESY II}} > p_{\text{selected}}$
 - Due to DESY II Magnet cycle
- Available rate depends also on
 - DESY II current
 - Collimator settings
 - Selected target
 - Machine orbit
 - Target states
 - Only partially under our control





DESY II Test Beam Facility

- Three beam lines available at DESY
 - Operate independent of each other
 - Fully controllable by the users
 - One of these lines will be dedicated to BL4S
- Each beam line has its own hut
 - Desks, PC's, Controls
- Operations & Safety
 - Mandatory Safety class
 - Access to the hall and the areas using a DESY access card
 - Dosimetry is not required
 - Interlock can be set by the users (usually a subset)



> Services

- Gas & Gas Alarm System
- Cooling Water, pressurized Air, Nitrogen

> Ethernet

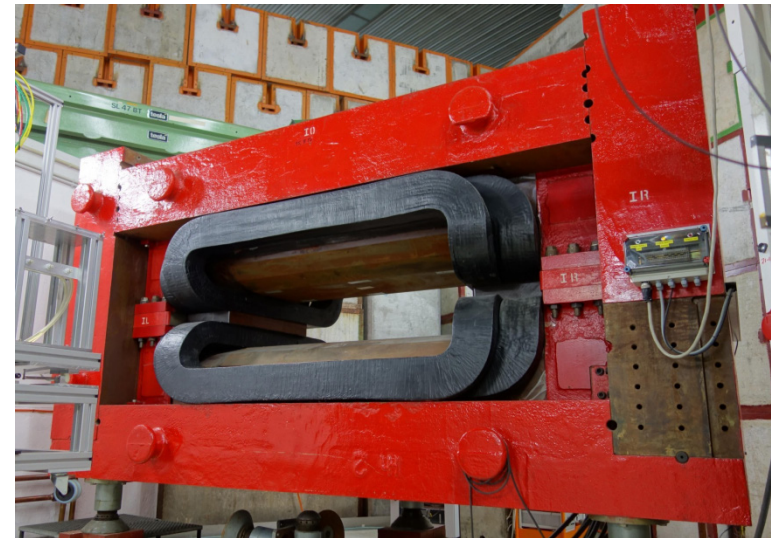
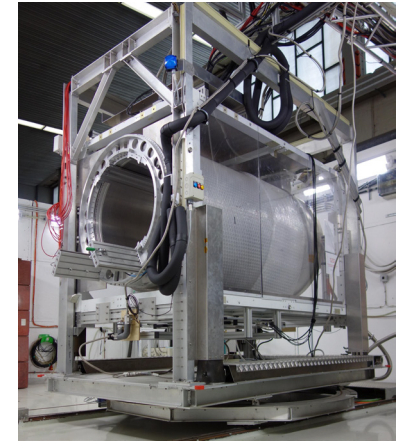
- Gigabit Ethernet everywhere
- SM/MM fibers

> Two Big Magnets

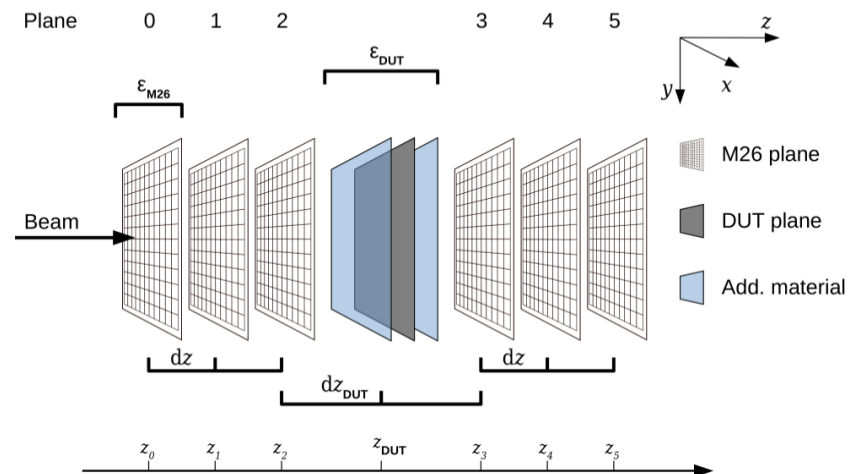
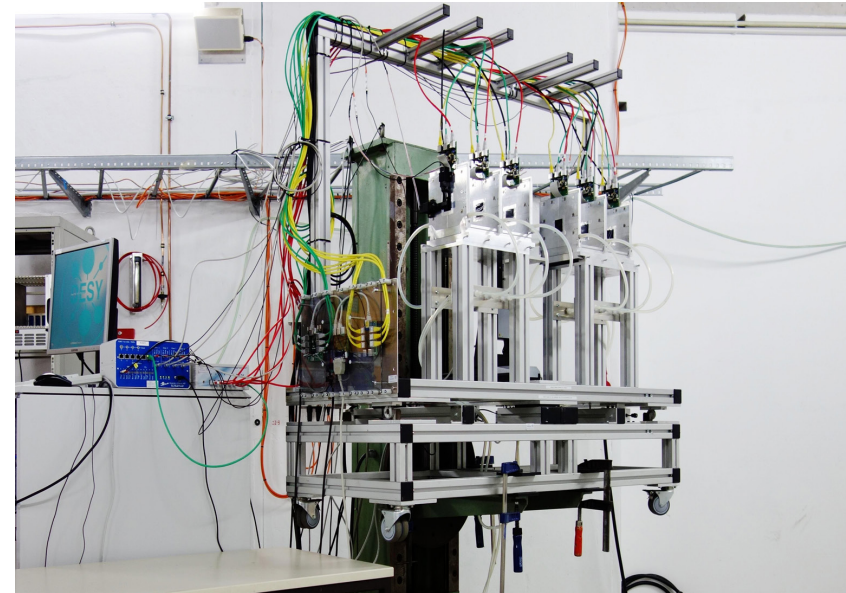
- 1.4 T Dipole (BRM)
- 1 T Solenoid (PCMAG)

> Patch Panels(BNC+SHV)

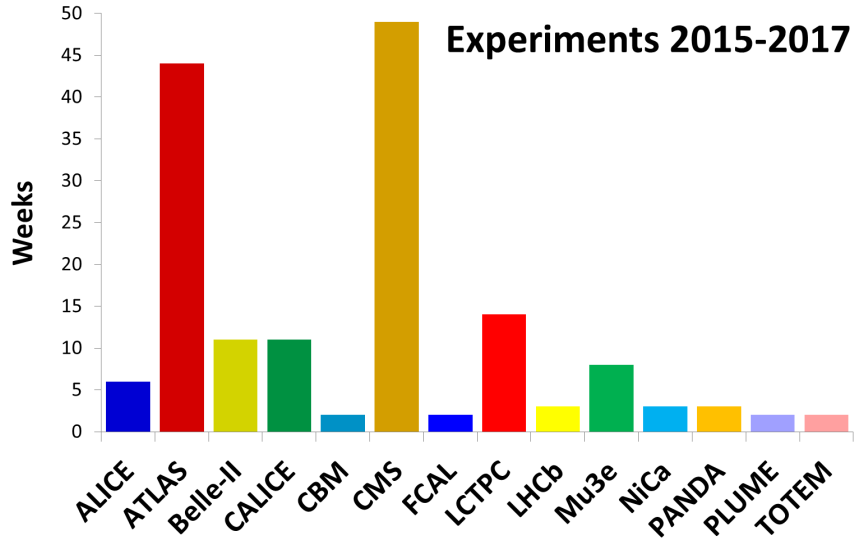
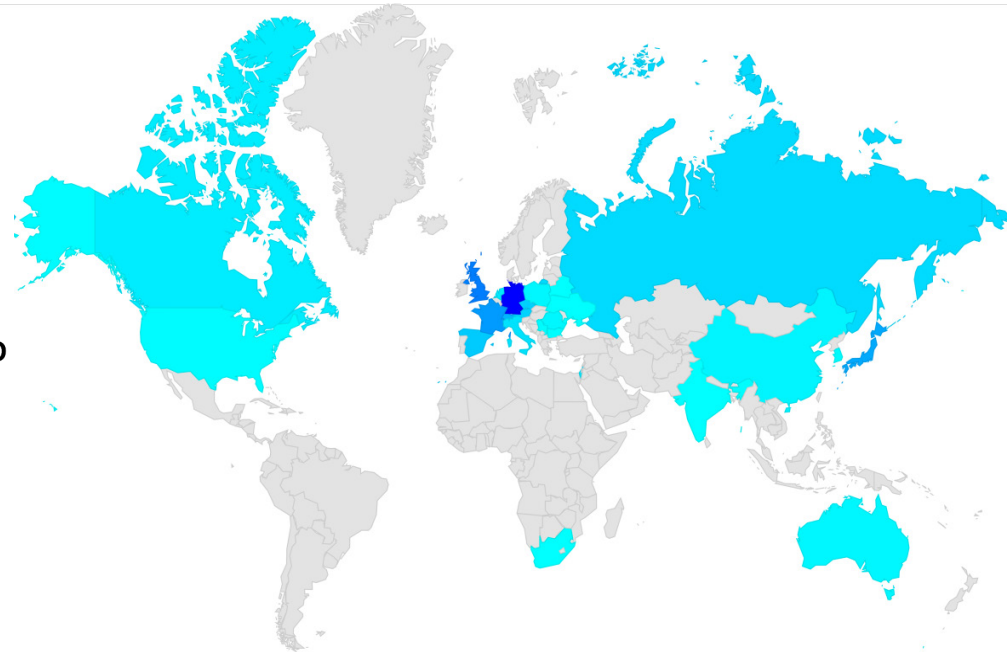
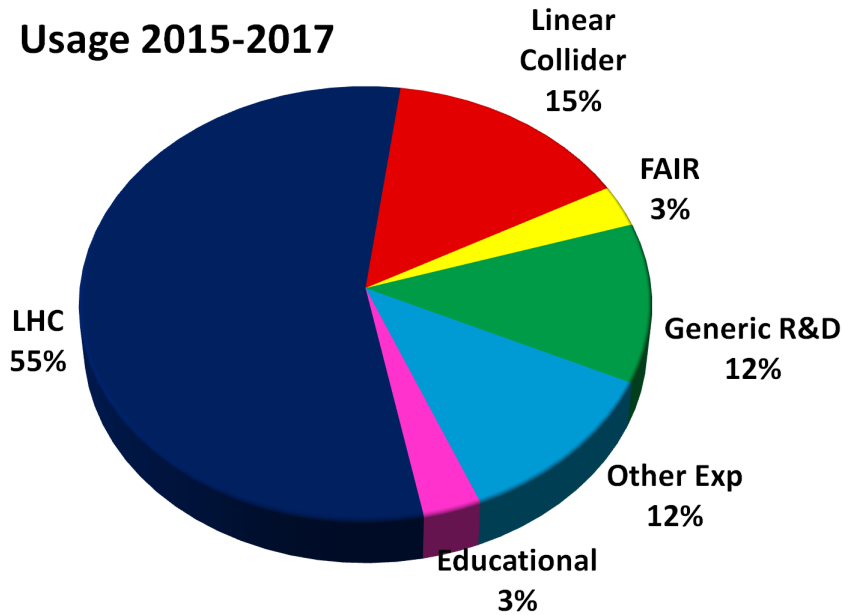
> Laser Alignment System



- The telescope in numbers
 - Six Pixel planes: $2 \times 1\text{cm}^2$, $18.4 \mu\text{m}$ pitch
 - Trigger rates up to 3 kHz
 - Few micron tracking resolution
- Seven copies around the world
 - AIDA, ACONITE and AZALEA at CERN
 - DATURA and DURANTA at DESY
 - ANEMONE in Bonn
 - CALADIUM at SLAC
- Common DAQ Package EUDAQ/EUDAQ2
 - Allows for easy integration with User DAQ



Usage 2015-2017

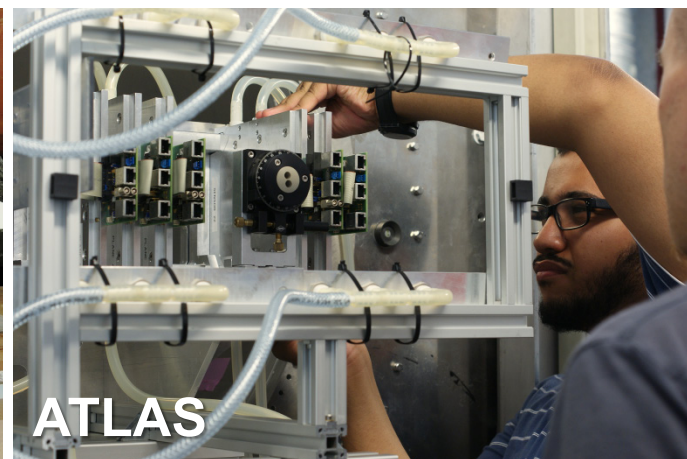
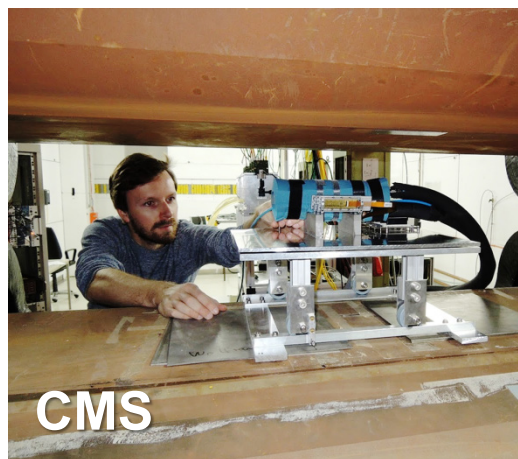
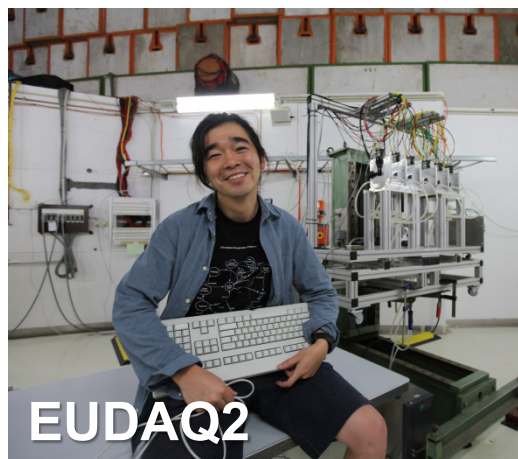
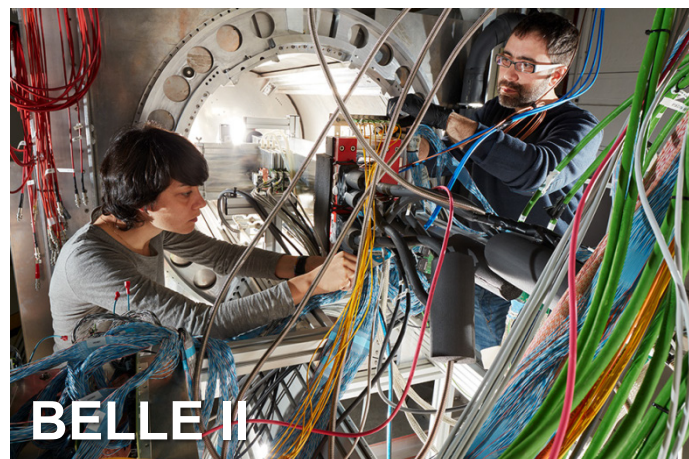


> Key facts

- 200 weeks delivered
- Availability of DESY II > 99 %

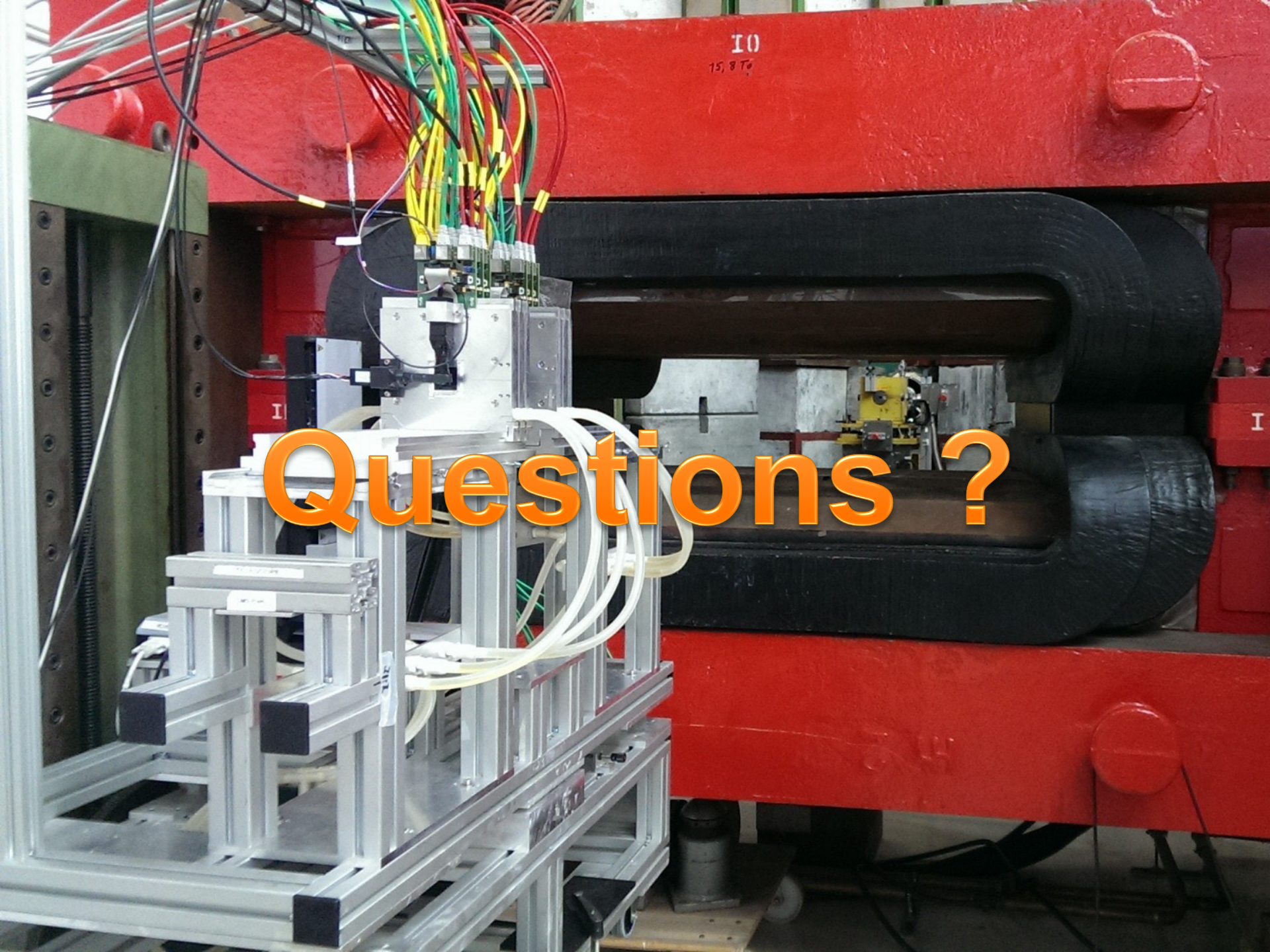
> Users

- 800 users from 26 countries
- About 50% are students



- > Particle ID
 - We can't do Protons, Muons, Pions
 - Beam is a very pure electron beam, so finding contamination from e.g. muons is hard
- > Setups involving hadronic interactions
 - We can't do Protons, Muons, Pions (see above)
- > Setups requiring a very high beam energy
 - Can only do up to 6 GeV electrons/positrons
- > Everything else will work
 - Or at least should ...

- > The DESY II Test Beam Facility looks back on almost three decades of operation
- > DESY II Test Beam Facility
 - Provides electrons and positrons up to 6 GeV to the Users
 - All the usual infrastructures
 - Telescopes as a new possibility for BL4S
- > Looking forward to many interesting proposals



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Questions?