

News from DESY.

Joachim Mnich

Plenary ECFA
PSI July 2012



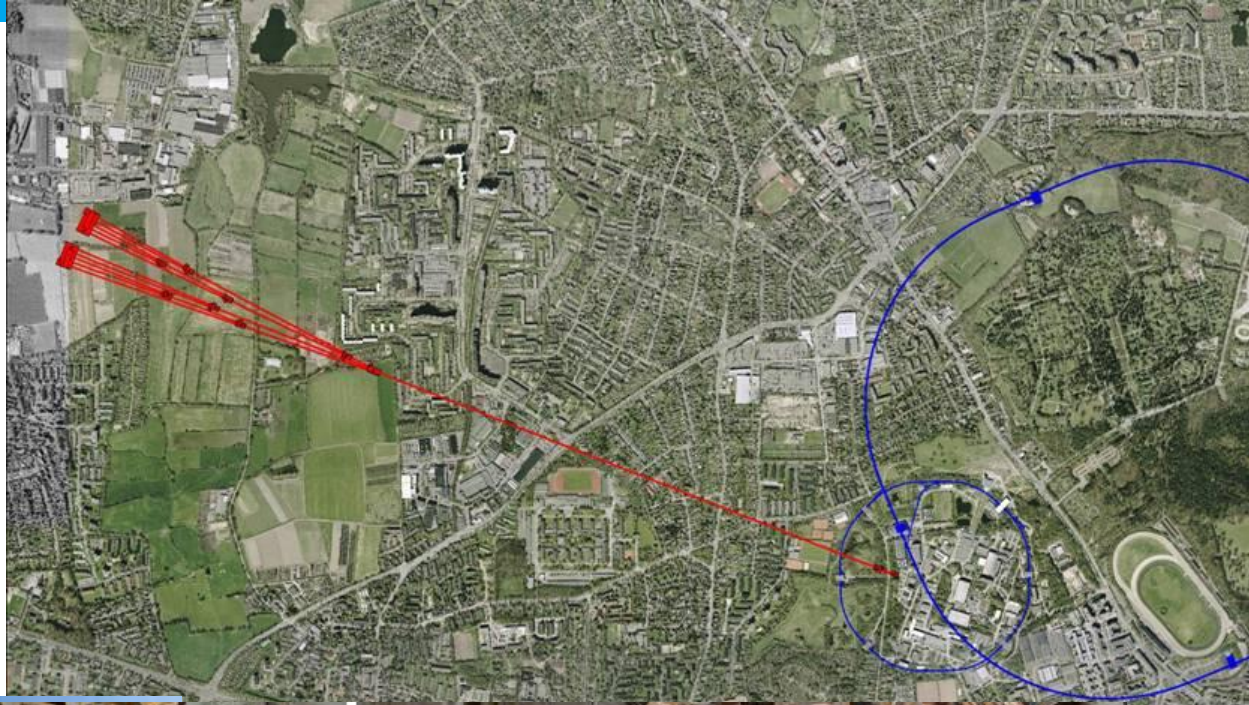
Beschleuniger | Forschung mit Photonen | Teilchenphysik

Deutsches Elektronen-Synchrotron
Ein Forschungszentrum der Helmholtz-Gemeinschaft



Status European XFEL

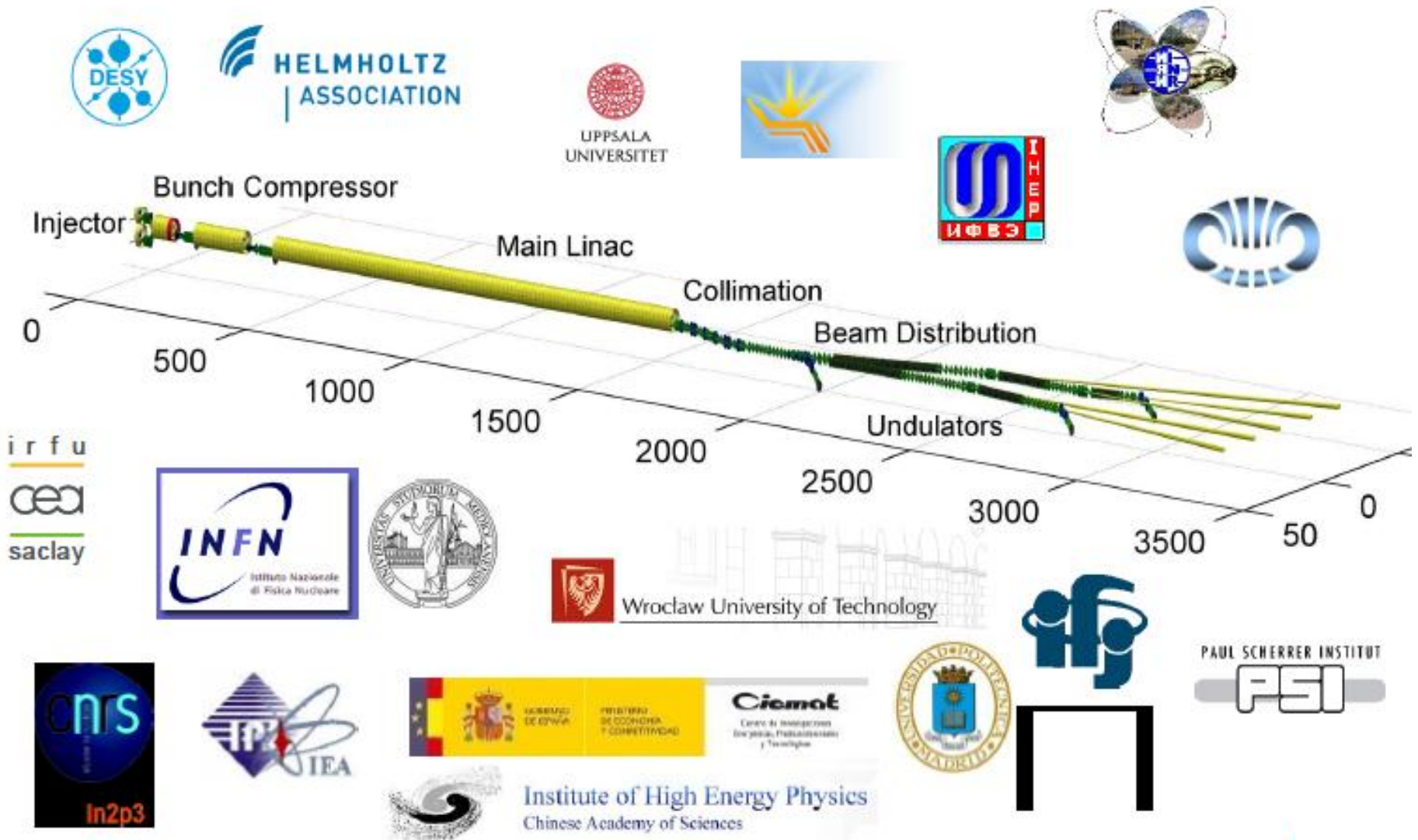
- > Tunneling work completed in June



messung
00



Status European XFEL Accelerator Complex



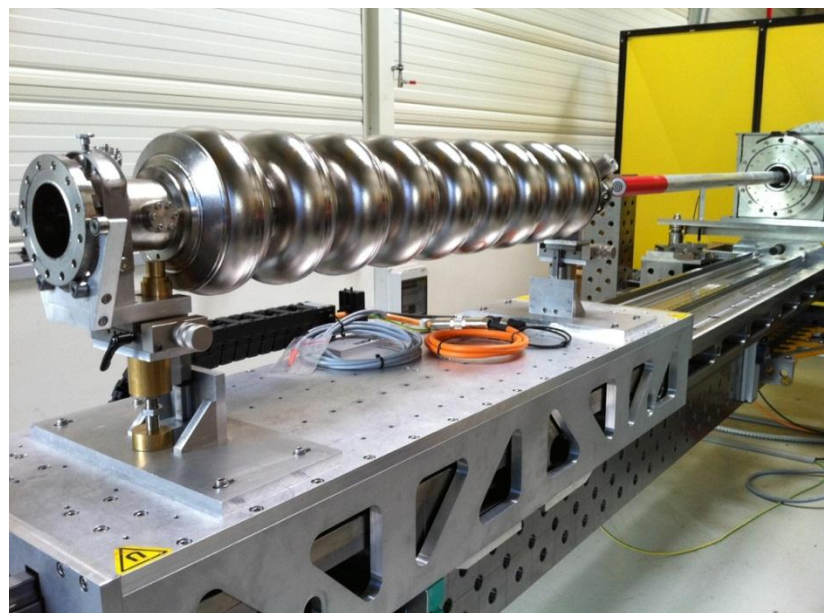
Status European XFEL Accelerator Complex



- > 2.1km linac tunnel completed and handed over to DESY for start of infrastructure installation
 - Still ongoing civil construction work in shafts/surface halls complicates the work
- > Installation of pipes & cables in space below floor plates starts in summer

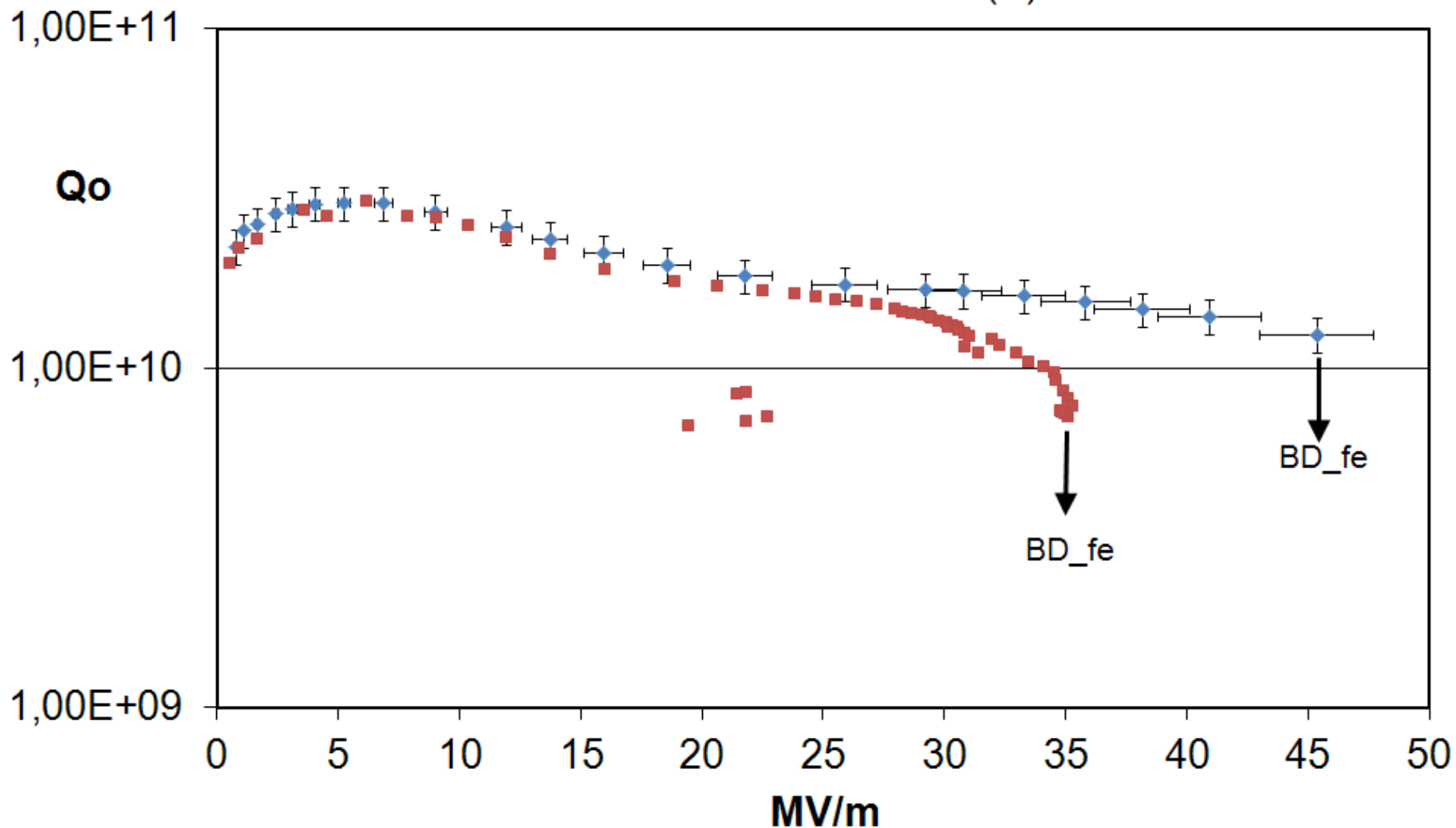
From XFEL to ILC

- > Cavity mass production for XFEL is starting
- > Reference cavities establish production line
 - Industrial production according to specification (fine-grain Nb, single pass electropolishing (EP); first cold tests at DESY)
 - Extensive testing; optical inspection etc. to eliminate initial production flaws
 - Max gradient promising (despite of one-pass EP).
 - 24 ILC-HiGrade (interleaved with production) will allow full qualification
 - Gradient goal of ILC (90% yield for 35 MV/m in vertical test) realistic



Cavity Research: Large-Grain Cavities

AC155 after EP: first and final Q(E)



A route to higher gradients?



- > **DESY and CERN have launched a study for mass production of cavities and cryomodules**
 - **On the basis of the production of 2x400 cavities for the European XFEL evaluate the potential for mass production of 18000 cavities for the ILC; study 100% and 50% production lot of cavities**
 - **cost benefit arises from better use of machines with less personnel/cavity and optimized layout**
 - **no optimization of actual manufacture (e.g. hydroforming instead welding of cavities, etc.**
 - **Plant layout for cryomodule production**

- > **Results will enter ILC TDR**

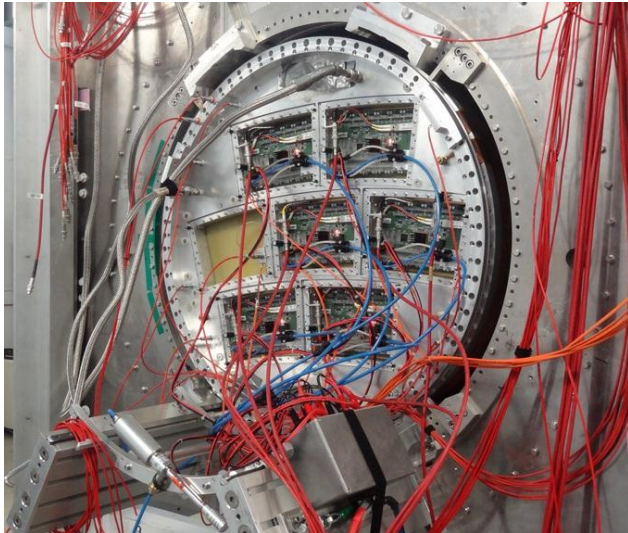


ILC Detector development

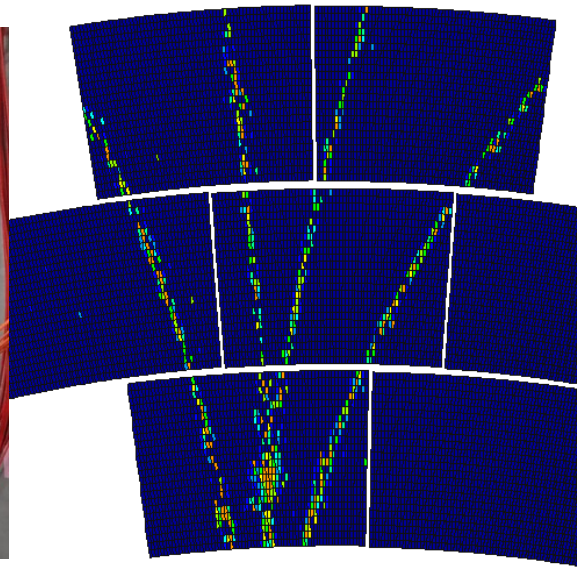
> Example LCTPC collaboration (for ILD)

- 6 modules μ Megas in large TPC (EUDET project) in DESY testbeam
- Led by French groups (Paul Colas et al.)

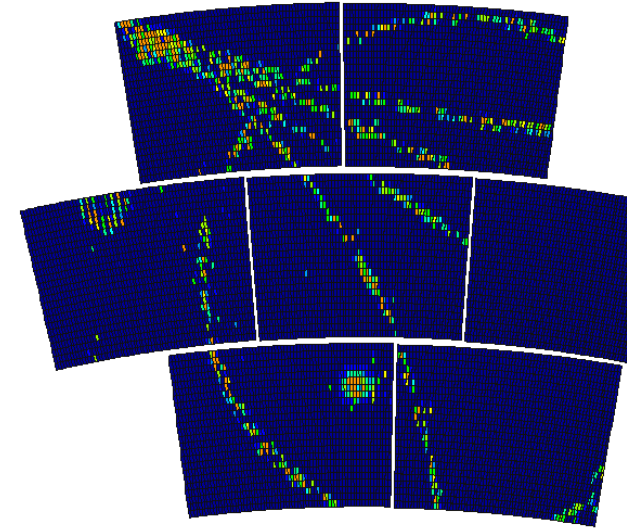
Setup



Beam event



Cosmic



Plasma Wakefield Acceleration

- > **New activity launched at DESY**
 - Humboldt professorship Brian Foster
 - Accelerator R&D programme launched in Helmholtz
 - Make use of FLASH II for future experiments
- > **New: Virtual Institute funded by Helmholtz**

VI Partners & Expertise

- DESY – collaboration of physics and accelerator depts. Accelerator facilities & operation; simulation of plasma processes.
- UniHH – electron PWA experiments; project management.
- MPI Munich & CERN – proton-driven PWA experiments; plasma cell design.
- John Adams Institute – beam dynamics, instrumentation, plasma cell design.
- SLAC – operation of FACET facility, beam-driven PWA experiments.
- Lawrence Berkeley – laser PWA experiments, staging of accelerating cells.



OLYMPUS Experiment at DORIS

> Measurement of elastic cross section ratio e^+p vs e^-p

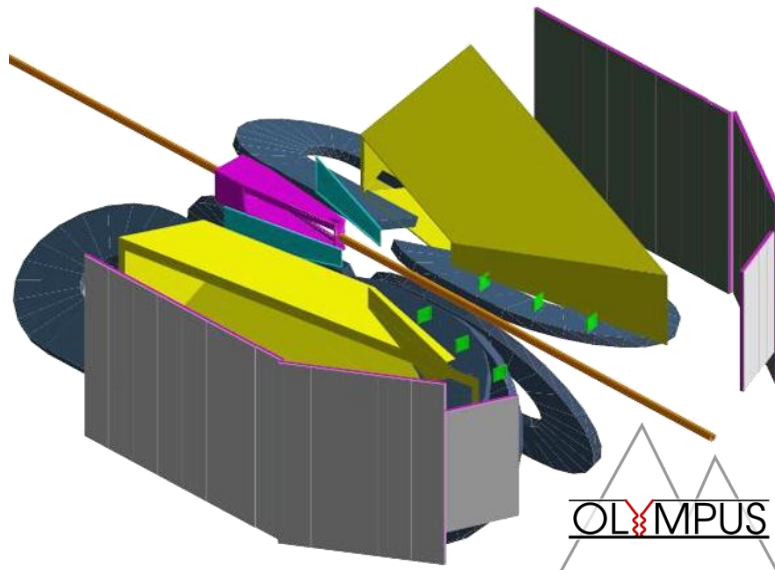
> Use BLAST detector (MIT)

Schedule:

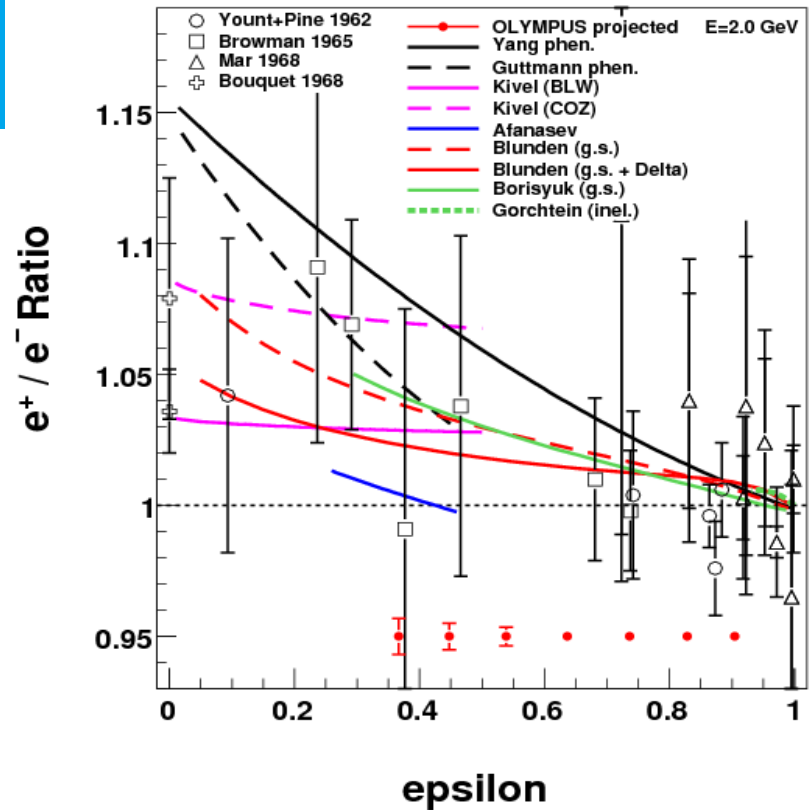
> 2010 set-up experiment at DESY

> 2011 commissioning

> 2012 data taking (3 months)



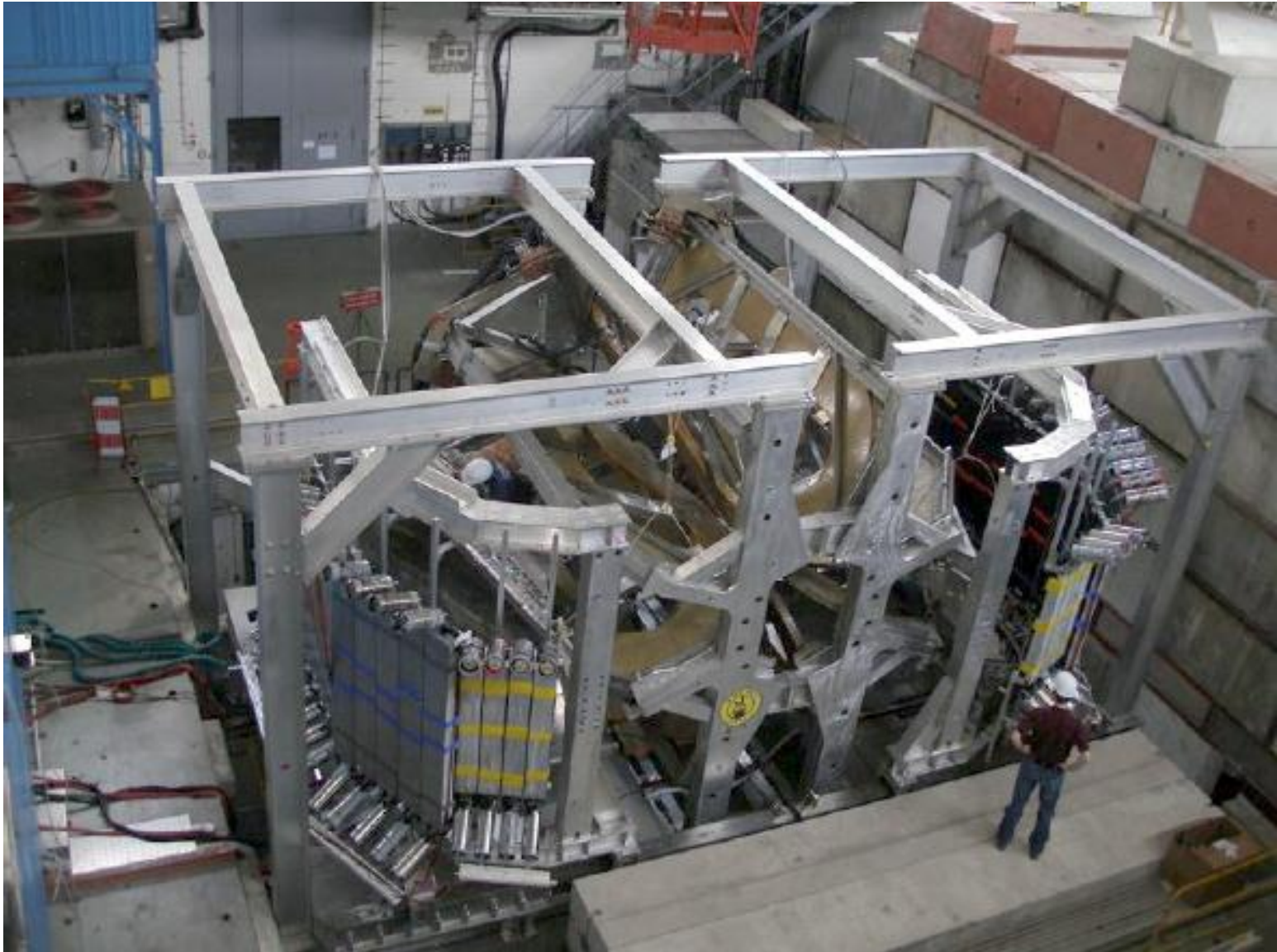
OLYMPUS



- Arizona State University, USA
- DESY, Hamburg, Germany
- Hampton University, USA
- INFN, Bari, Italy
- INFN, Ferrara, Italy
- INFN, Rome, Italy
- Massachusetts Institute of Technology, USA
- St. Petersburg Nuclear Physics Institute, Russia
- Universität Bonn, Germany
- University of Colorado, USA
- Universität Erlangen-Nürnberg, Germany
- University of Glasgow, United Kingdom
- University of Kentucky, USA
- Universität Mainz, Germany
- University of New Hampshire, USA
- Yerevan Physics Institute, Armenia



Detector Overview



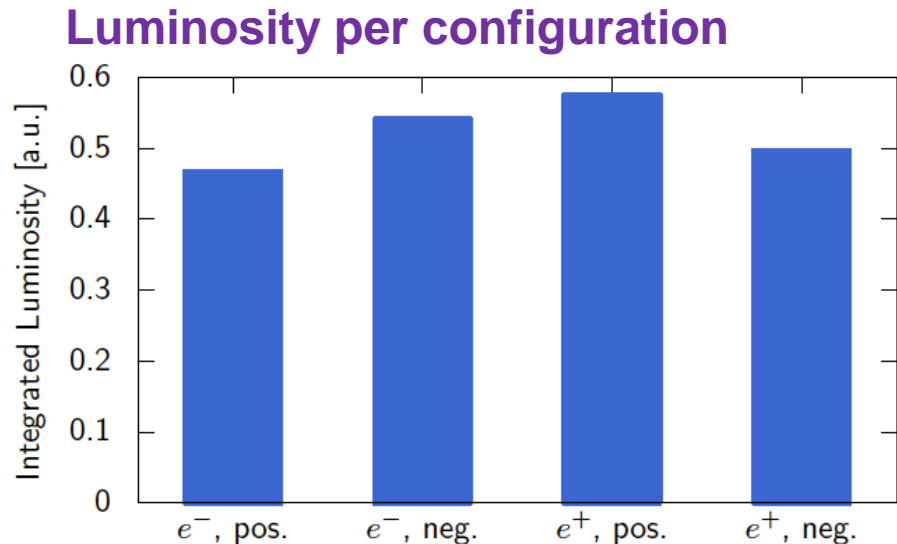
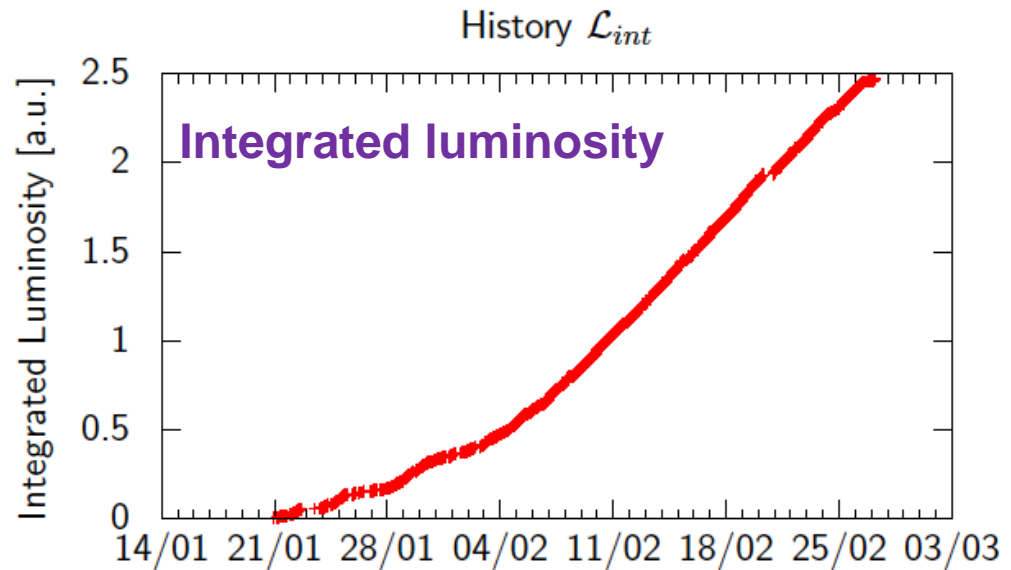
First OLYMPUS Run February 2012

- > 1 billion triggers collected
- > 4 million elastic events
- > DAQ active 74% (mainly DORIS refill)
- > Fill/run 12 min injection 2-3 min
- > DAQ dead time 25%
- > Very stable operation

OLYMPUS data taking runs

- > Jan. – Feb. 2012 1st run
- > Oct. – Dec. 2012 2nd run

DORIS will be shut down end of 2012



> Restructuring of research area for next funding period (2015 ff)

Structure of Matter

4 programmes:

- Particle Physics
- Astroparticle Physics
- Hadron and Nuclei
- Photon, Nuclei, Ions

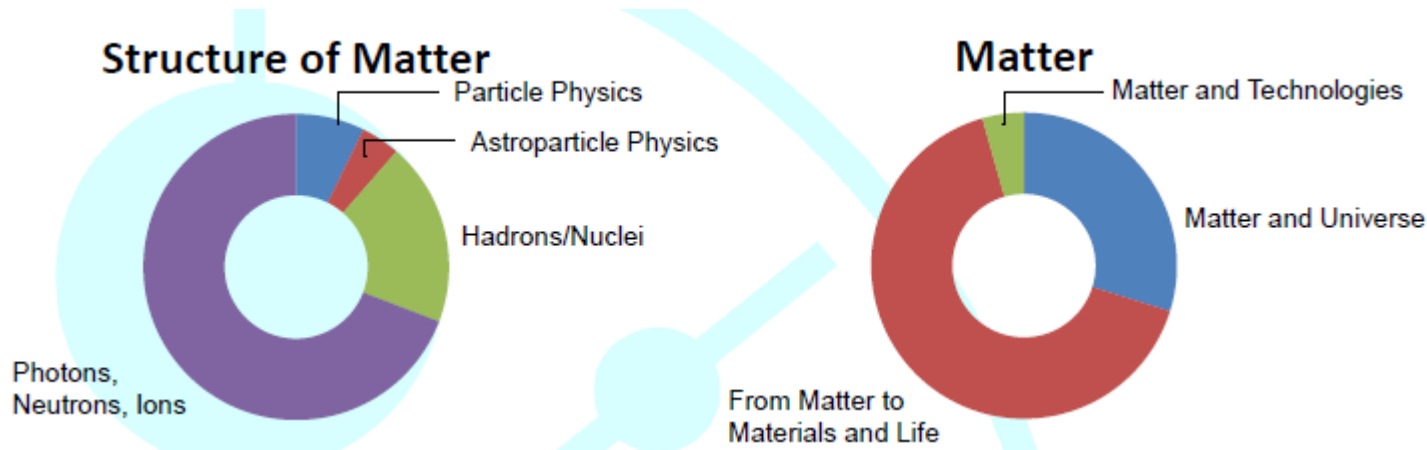


Matter

3 programmes:

- Matter and Universe
- From Matter to Materials and Life
- new** ▪ Matter and Technology
(Accelerator, Detector, Computing)

Portfolio topics accelerator, detector and computing approved



Helmholtz Alliance „Physics at the Terascale“



- > **Network of complementary excellence between**
 - 2 Helmholtz centres
 - 18 German universities and
 - 1 Max Planck-Institute
- > **Project duration: 2007 – 2012**
 - Funding approx. 5 M€/year
- > **Reduced funding 0.5 M€/year for 2013 & 2014**
- > **Future funding of the project still uncertain**

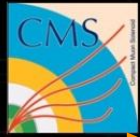
DESY Long-term Strategy in Particle Physics



- > **Accelerators** + support through strong theory group
- > **Detectors** + computing infrastructure
- > **Physics** + testbeam & other infrastructures

> **In addition: Explore potential use of DESY infrastructure for particle physics**

- **ALPS & OLYMPUS are recent examples**
- **High intensity electron beams (FLASH, XFEL)**
- **Use of HERA tunnel?**



- > DESY congratulates CERN to the discovery of a new particle which might turn out to be a Higgs boson
- > A centennial discovery in physics!