

DESY.

Status and Perspectives in Particle Physics



Albrecht Wagner
Chair of the DESY Directorate

DESY is one of the worldwide leading accelerator centres exploring the structure of matter

DESY is Member of the



Mission: Development, construction, operation and scientific exploitation of accelerators

Provide access and services for national and international users

Internationally used, nationally funded Research Institute

Base-Budget: 170 MEuro (2007)

Staff: ~ 1600 FTE in Hamburg and Zeuthen

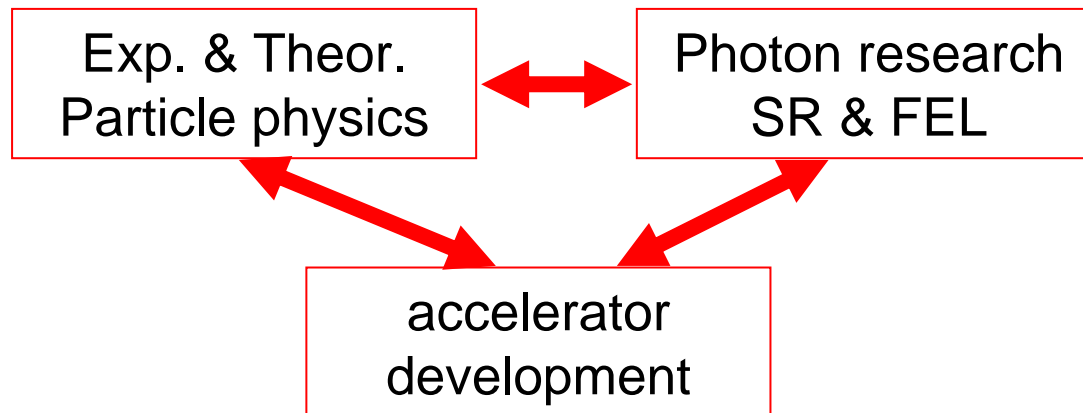
Users: 3000 (1500 from abroad) from 45 nations

920 in particle physics, 2100 in photon science



The three Key Competences of DESY

- > DESY has a long successful history in three areas of basic science and high technology :
 - Particle physics (one of 5 major laboratories world wide),
 - Research with X-rays (synchrotron radiation, FEL) and
 - Accelerator development.
- > These topics stimulate each other and constitute the basis for the future of the laboratory.



Areas of Competence

- Accelerator technology development (SCRF, electron sources, SC magnets)
- Operation of colliders ($e+e^-$, ep)
- Operation of synchrotron light sources
- Development and operation of Linac driven Light sources (FLASH, XFEL)
- International Linear Collider development

Strategy:

- Further strengthening of know-how in accelerators, driven by science needs:

Exploiting the synergy between projects and technologies

Strategy for Research with Photons

Areas of Competence:

> SR sources, FELs, beam lines, instrumentation, photon science

Facilities:

> Synchrotron light sources: DORIS, PETRA III

> Linac driven light sources: VUV-FEL – FLASH,
Participation in European XFEL

Strategy:

> Make leading edge research possible in physics, chemistry, material science, biology etc. through unique light sources:

FLASH, PETRA and the XFEL are or will be unique facilities on a world scale



Areas of Competence:

- 50 years of experience in accelerators, detectors, experimental and theoretical physics, data collection and analysis, computing

Strategy:

- Continue to play a leading roles in particle physics (LHC and ILC science and technology, theory), thus remaining a leading and attractive particle physics lab
- Focus on Physics at the energy frontier (Terascale)

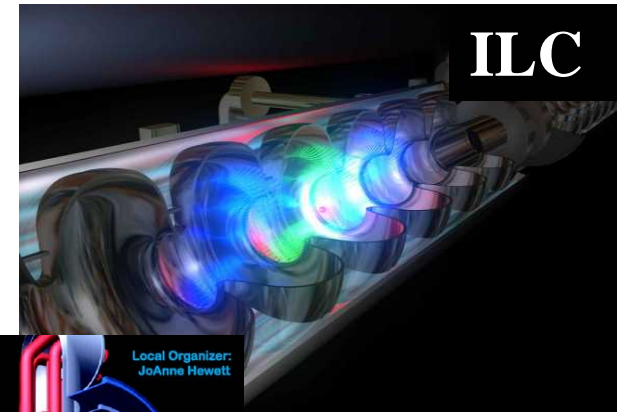


- > Strong participation in two of the **Large Hadron Collider (LHC)** experiments (ATLAS and CMS) and precision **analyses of the HERA** experiments .
- > Further expansion of the **Tier2 centre** (ATLAS, CMS, LHCb) and the **analysis centre** at DESY.
- > **Theoretical studies** in close connection with experimental activity as well as research in areas at the interface of particle and astroparticle physics and in the field of string theory; Lattice Gauge theory
- > Cooperation in further development of **superconducting accelerator technology** for the International Linear Collider (ILC)
- > **Detector development** for a luminosity-upgraded LHC and for precision experiments at the ILC, contributions to development of detectors for the XFEL.
- > Essential: **Helmholtz Alliance** "Physics at the Terascale." (17 German university groups, FZK, and the Max-Planck Institute for Physics)



DESY after HERA – Exploring the Terascale at the LHC

- We expect major scientific breakthroughs
- Strong links to the physics discovered by the HERA Programme
- Preparation for the International Linear Collider



HERA AND THE LHC
A workshop on the implications of HERA for LHC physics

March 2004 - January 2005

Parton density functions
Multijet final states and energy flow
Heavy quarks
Diffraction
Monte Carlo tools

Startup Meeting
March 26-27 2004
Midterm Meeting

Final Meeting
March 21-24
DESY, Hamburg

www.ihep.dur.ac.uk/~herahlc

herahlc.workshop@cern.ch

LHC

Local Organizer:
JoAnne Hewett

SLAC Workshop
23 March 2005

LHC/ILC Synergies

ILC

Organizing Committee:
Georg Weiglein
Howard Haber
John Conway

<http://www.lppp.dur.ac.uk/~georg/lhclc/>



Areas of Competence:

20 years of experience in under water, under ice neutrino detectors, data collection, analysis and science

Strategy:

Experimental Scientific Focus: Origin of high energy cosmic rays, through neutrino messengers

Programme:

- > deployment of Icecube until 2011
- > Combination of neutrino and high energy photon signals (**multi-messenger** principle)

Close collaboration with German universities



Summary

Particle- and
Astropart.-physics

Accelerators
Develop./Operation

Research with
Photons

The scientific focus of the research at DESY is the understanding of the structure of matter at different length and time scales

In its three areas of key competence DESY is a world leading institution

Science driven technology developments have led to a major new research possibilities for photon science and particle physics, such as FLASH, XFEL and ILC

