

Introduction to Terascale Physics

Welcome and information

Helmholtz Alliance
PHYSICS AT THE TERASCALE

Introduction to Terascale Physics

25 February-1 March 2013
DESY, Hamburg

The "Introduction to Terascale Physics" school aims at providing the essential information and techniques on the subject that bachelor and master students will find very helpful for a productive thesis.

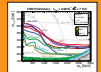

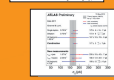


The programme consists of lectures on the following topics:

- Physics at the Terascale
- LHC detectors
- Electroweak physics at the LHC
- QCD at the LHC
- Top quark physics
- Higgs physics
- Searches for new physics

In addition, a tutorial covering four half-days will highlight many of the lecture contents and will provide hands-on experience with typical data analysis problems and techniques.

The deadline for registration is 8 February 2013. The school fee will be 90 Euros. Support for travel and accommodation can be granted on request. For more details and to register see

www.terascale.de/intro2013



Thomas Schörner-Sadenius
DESY-FH



DESY, 25 February 2013

WELCOME ...

- > ... to the fourth “Introduction to Terascale Physics” school.
 - The 2010 – 2012 schools each attracted 40-50 participants. This year
 - Of course we have changed, adapted, improved. But we also repeat a large fraction of last year’s programme.
- > ... to five days of lectures, tutorials, and discussions.
- > ... to DESY – the national HEP laboratory.
 - DESY has to change and is changing – exciting times!
- > ... to Hamburg
 - We have a dense programme, but I hope that you find some time to toddle around and enjoy the city!



DESY - Deutsches Elektronen-Synchrotron

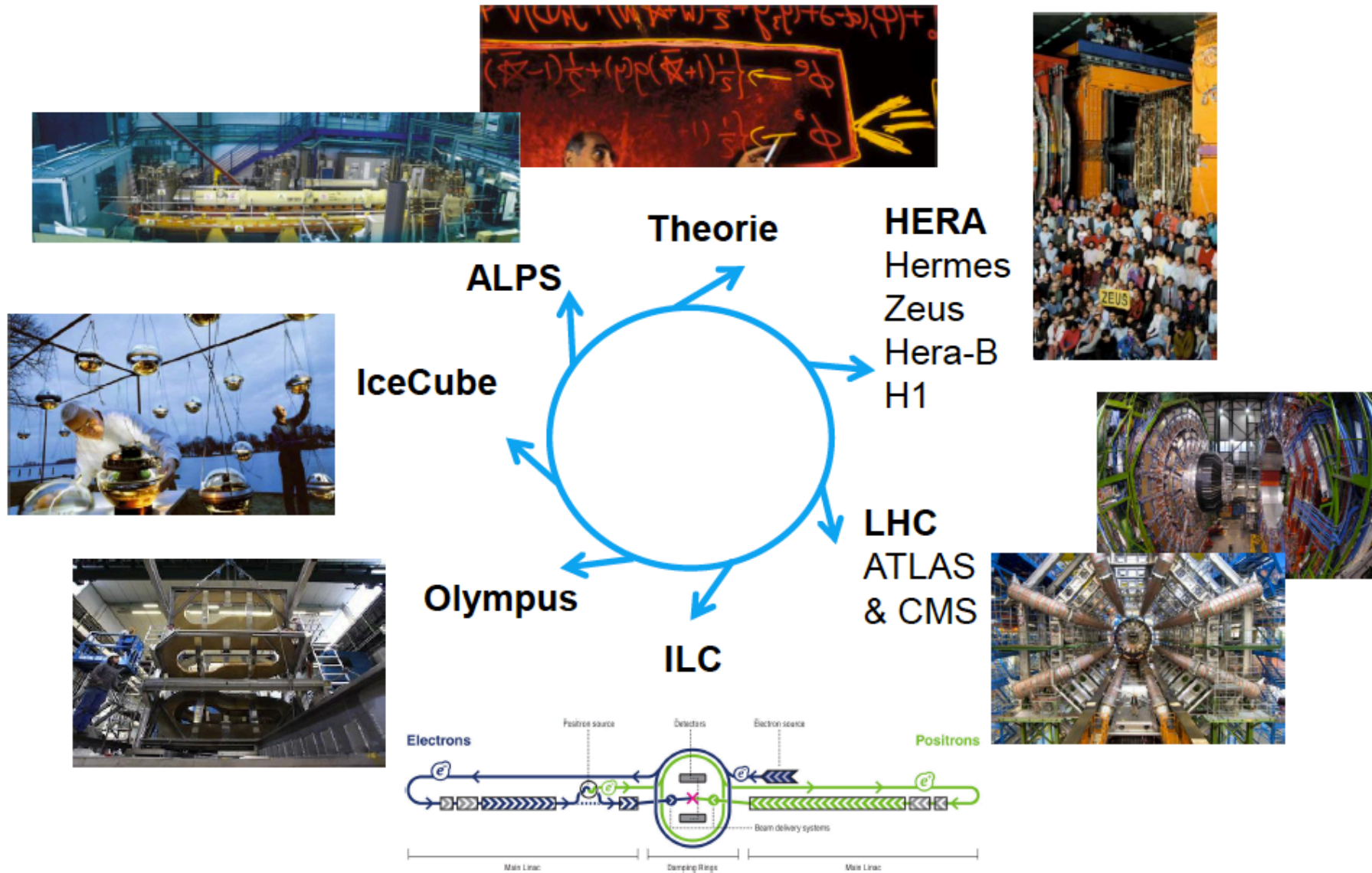
- Founded 18 December 1959
- Research centre of Helmholtz Association, Germany's largest organisation for basic research with large-scale infrastructures.



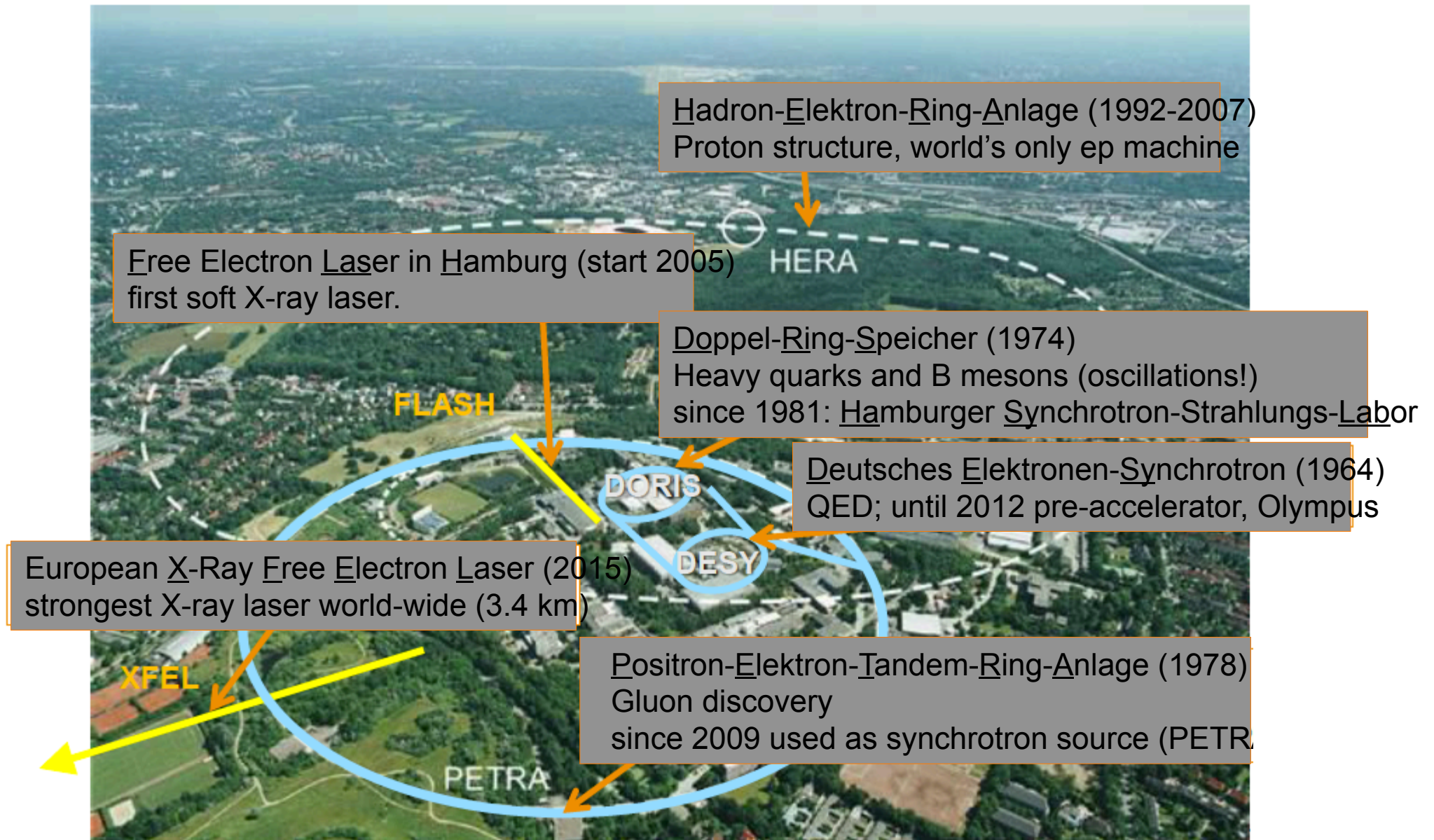
- Located in Hamburg and Zeuthen (Berlin)
- Annual budget: 192 MEUR (90% federal money, 10% state money)
- 2000 staff (650 scientists), 100 apprenticeships, 700 students and young postdocs.
- 3000 guest scientists from 40 countries.
- Particle physics, photon science, accelerator development and operation.



Particle Physics at DESY



Accelerators at DESY



THE HELMHOLTZ ASSOCIATION



www.helmholtz.de

Used to be:
Providers of large-scale infrastructure

Becoming:
German research networks addressing
future questions of society.

HGF ALLIANCE „PHYSICS AT THE TERASCALE“

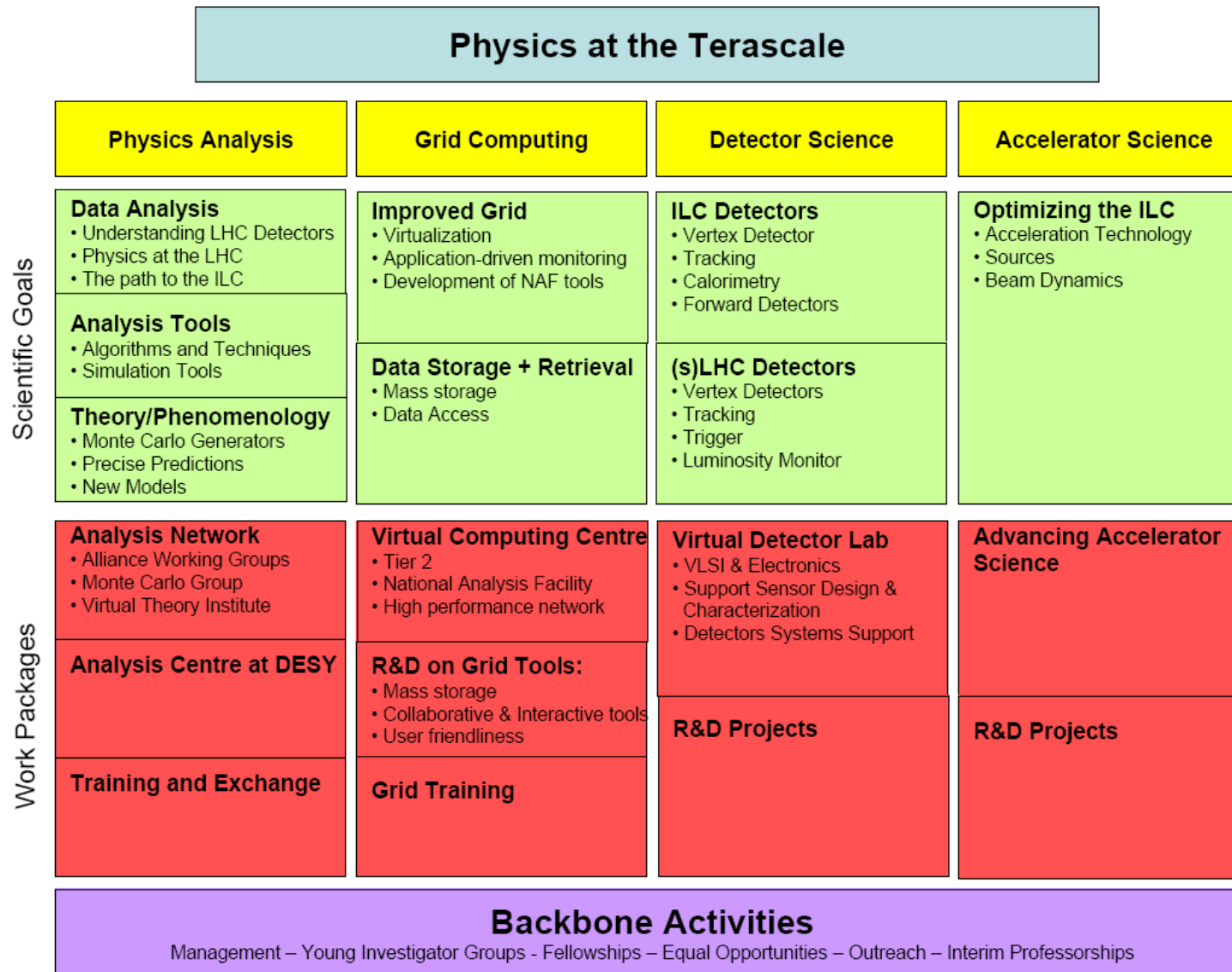
From the Alliance proposal (2007):

In order to optimally place German particle physics in an increasingly global environment, it is now the right moment to create new and improved structures for particle physics in Germany.

The Strategic Helmholtz Alliance 'Physics at the Terascale' is a structured research network comprising 17 universities, 2 Helmholtz institutes and 1 Max Planck Institute. The Alliance acts as a tool for a more effective collaboration, in particular between experimentalists and theorists.



HGF ALLIANCE „PHYSICS AT THE TERASCALE“



ANALYSIS CENTRE TASKS

1. “Education”:
Schools, workshops, training events, seminars, ...
2. Significant contributions to the LHC programme:
Various working groups, people in the AC
3. Member support (MC, statistics, PDFs, etc.)
via working groups
4. Networking; definition and exploitation of synergies
5. Other stuff



EDUCATION AND WORKSHOPS

Helmholtz Alliance
PHYSICS AT THE TERASCALE

Deutsches Elektronen-Synchrotron DESY · · · · · Karlsruher Institut für Technologie – Großforschungsbereich · · · · · Max-Planck-Institut für Physik · · · · · Österreich-Österreichische Technische Hochschule Austria · · · · · Universität Bonn · · · · · Rheinisch-Westfälische Technische Universität Aachen · · · · · Technische Universität Chemnitz · · · · · Albert-Ludwigs-Universität Freiburg · · · · · Johannes Gutenberg-Universität Mainz · · · · · Georg-August-Universität Göttingen · · · · · Universität Hamburg · · · · · Ruprecht-Karls-Universität Heidelberg · · · · · Karlsruher Institut für Technologie – Universität Wuppertal · · · · · Johannes Gutenberg-Universität Mainz · · · · · Ludwig-Maximilians-Universität München · · · · · Universität Regensburg · · · · · Universität Tübingen · · · · · Universität Wien · · · · · Julius-Maximilians-Universität Würzburg · · · · · Georg-August-Universität Göttingen · · · · ·

Analysis Centre Schools and Workshops 2011

Introductory School to the Terascale
21-25 February 2011
DESY, Hamburg
terascale.de/intro2011

Monte Carlo School 2011
14-17 March 2011
DESY, Hamburg
terascale.de/mc2011

Computer Algebra & Particle Physics 2011
20-25 March 2011
DESY, Zeuthen
terascale.de/capp2011

School on Statistics 2011
4-7 April 2011
Johannes Gutenberg-Universität, Mainz
terascale.de/statistics2011

Geant4 Training
10-13 May 2011
DESY, Zeuthen
terascale.de/geant2011

Standard Model Benchmark Processes at the LHC
15-17 June 2011, DESY, Zeuthen
terascale.de/smcandles2011

Single-Top Workshop
5-6 September 2011
DESY, Hamburg
terascale.de/singletop2011

http://www.terascale.de/schools_and_workshops

www.terascale.de/schools_and_workshops



TIMETABLE

| | Monday 25 February 2013 | | Tuesday 26 February 2013 | | Wednesday 27 February 2013 | | Thursday 28 February 2013 | | Friday 01 March 2013 | |
|----|-------------------------|--|--------------------------|---|----------------------------|--|---------------------------|--|----------------------|--|
| AM | 10:00 | Registration- Susanne Mauff (DESY) (until 14:00) ▾ | 08:00 | Lectures- Thomas Schoerner- Sadenius (DESY) (until 12:30) ▾ | 09:00 | Lectures- Thomas Schoerner- Sadenius (DESY) (until 12:30) ▾ | 09:00 | Lectures- Thomas Schoerner- Sadenius (DESY) (until 12:30) ▾ | 09:00 | Tutorial: finalisation, preparation and presentation of student reports- Thomas Schoerner- Sadenius (DESY) (until 11:30) ▾ |
| | | | 09:00 | EW and QCD physics at LHC 1 - Arno Straessner (IKTP, TU Dresden) ▾ | 09:00 | EW and QCD physics 3 - Arno Straessner (IKTP, TU Dresden) ▾ | 09:00 | Higgs, BSM and statistics - Jana Schaarschmidt (LAL Orsay) ▾ | | |
| | | | 10:00 | --- Coffee break --- | 10:00 | --- Coffee break --- | 12:30 | --- Lunch break --- | | |
| | | | 10:30 | EW and QCD physics 2 - Arno Straessner (IKTP, TU Dresden) ▾ | 10:30 | Top-Quark physics - Georg Steinbrueck (Hamburg University) ▾ | | | 11:30 | Discussion, feedback and farewell- Thomas Schoerner- Sadenius (DESY) (until 12:30) ▾ |
| | | | 11:30 | Particle physics beyond the LHC - Carsten Niebuhr (DESY) ▾ | 11:30 | How to measure a cross section? - Andreas Meyer (DESY) ▾ | | | | |
| | | | 12:30 | --- Lunch break --- | 12:30 | --- Lunch break --- | | | | |
| PM | 14:00 | Introductory lectures and setup- Thomas Schoerner- Sadenius (DESY) (until 18:00) ▾ | 14:00 | Tutorial session- Thomas Schoerner- Sadenius (DESY) (until 18:00) ▾ | 14:00 | Tutorial session (until 18:00) ▾ | 14:00 | Tutorial session- Christian Sander (University of Hamburg) Alexander Schmidt (Universität Hamburg) (until 18:00) ▾ | | |
| | 14:00 | Introduction to the Terascale - Peter Schleper (Hamburg University) ▾ | | | | | | | | |
| | 15:00 | --- Coffee break --- | | | | | 19:00 | School dinner(Canteen appendix / Bistro) ▾ | | |
| | 15:30 | LHC detectors - present and future - Ingrid-Maria Gregor (DESY) ▾ | | | | | | | | |
| | 16:30 | Computer setup - getting things going, ROOT basics - Roman Kogler (University of Hamburg) Alexander Schmidt (Universität Hamburg) Christian Sander (University of Hamburg) Thomas Schoerner- Sadenius (DESY) ▾ | | | | | | | | |

ORGANISATIONAL ISSUES

- > Late registration: every day 13-14 hrs in CMS office B1b/O2-202.
- > Tutorials:
 - Made using your laptops or the provided DELL desktops with the concept of a virtual machine inside VirtualBox – which you hopefully all have tested.
 - We invite you to work in pairs –increases benefit and facilitates discussions.
- > DESY hostel – bills:
 - All Wuppertal, Mainz and Goettingen students should NOT pay their bills in the hostel – the bills should be forward to me. If by accident you nevertheless receive a bill or a gentle payment reminder, please also forward to me.
- > Social events:
 - Workshop dinner on Thursday in the canteen appendix – please attend ;-)
- > Requests from the organisers
 - No laptop work etc. during lectures
 - Questions immediately – and feedback is very welcome (Friday discussion session)
- > WLAN – information has been handed out.



STUDENT PRESENTATIONS

- > Each tutorial step shall be especially observed, documented and reported on (in the Friday morning session) by a team of two to three students.
 - Several benefits: these persons will pay special attention, repetition of material for all colleagues, improving your presentation and documentation skills, etc.
 - We ask for volunteers, otherwise we will volunteer teams.
 - You can use any technology you like that you find installed somewhere: Linux, Windows, Apple, ... Tex, Powerpoint, Keynote, ... hand-written slides ...
 - Idea: Summarise task, results, main messages for colleagues.
 - You can also bring in your feedback here if you want to!



DESY – OVERVIEW



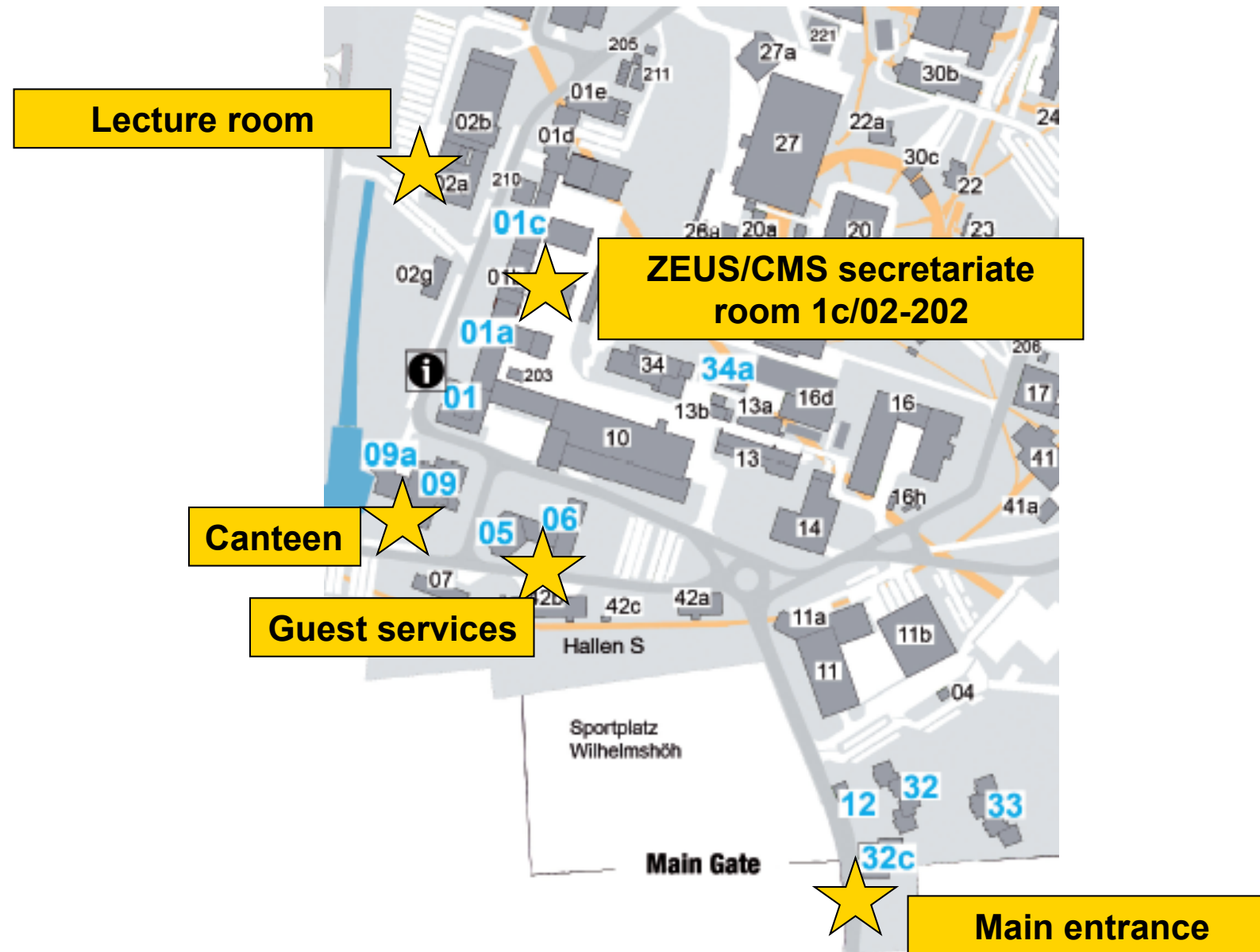
DESY – OVERVIEW



DESY – OVERVIEW



DESY – OVERVIEW



WHERE TO GO?

- > Sternschanze S-Bahn (local train) station and surroundings
 - > St. Georg (north of main station)
 - > Altona - Ottensen (west of the Altona station)
 - > Portuguese quarter (Landungsbrücken)
 - > University quarter (Dammtor, Grindel, ...)
 - > Eimsbüttel
 - > ...
- ➔ ask your local colleagues!



THANKS TO ...

- > ... to your home institutes
 - ... for contributing to the budget and sending you here!
- > ... to DESY
 - ... for hosting us!
- > ... to the Helmholtz Alliance
 - ... for the money and the framework!
- > ... to all lecturers and tutors
 - ... for their immense work!
- > ... and finally to all people behind the scenery which are necessary to put things in place:
 - Secretaries, technicians, DESY IT, ...

