

THE ANALYSIS CENTRE

IN THE HELMHOLTZ ALLIANCE
“PHYSICS AT THE TERASCALE”

Thomas Schörner-Sadenius (DESY)
ATLAS Group Meeting, MPI Munich
17 November 2008

THE HELMHOLTZ ALLIANCE

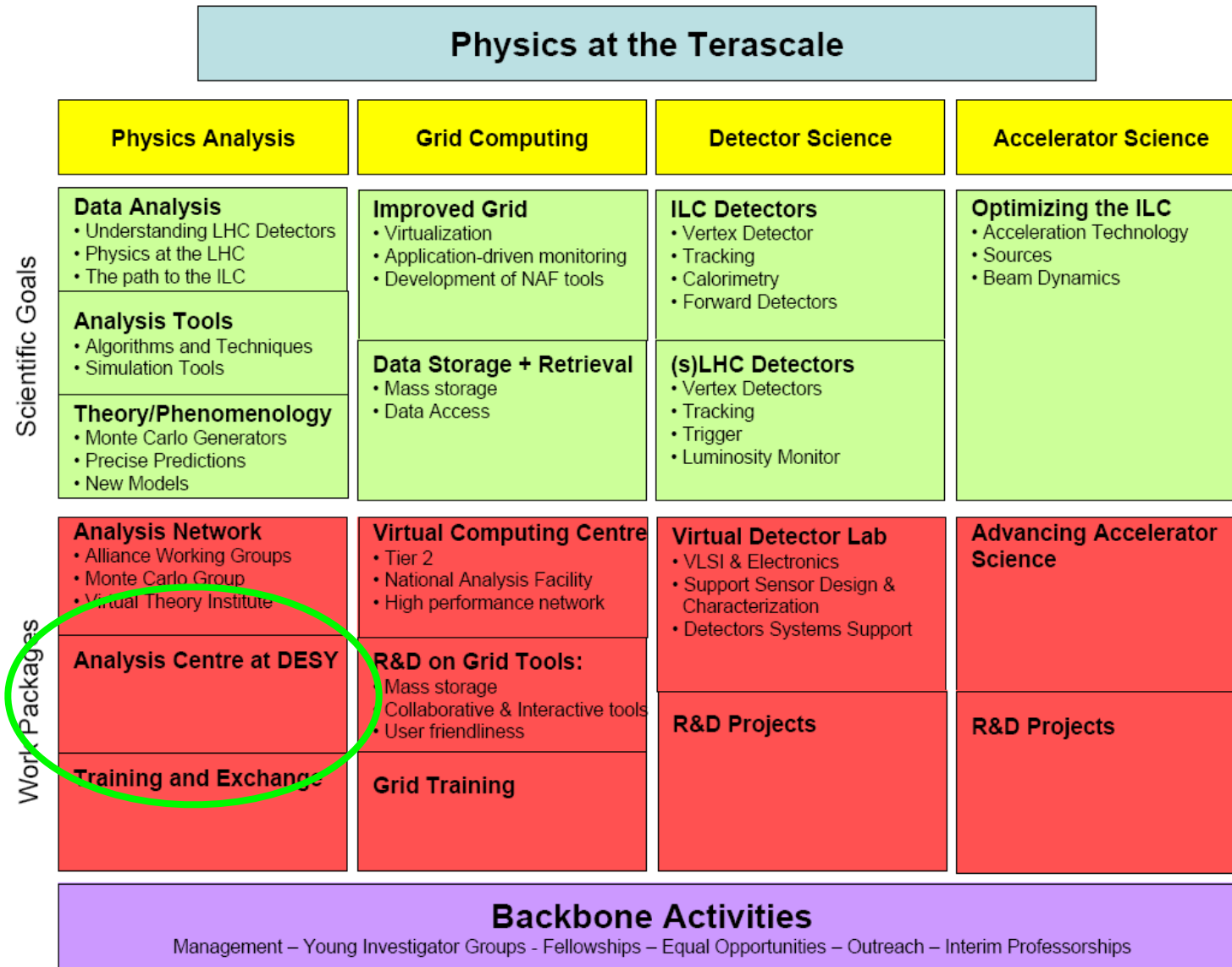
Quotation from the Alliance web page (<http://www.terascale.de>):

With the start-up of CERN's Large Hadron Collider (LHC) in 2007 and preparations for the International Linear Collider (ILC) in full swing, we expect revolutionary results explaining the origin of matter, unravelling the nature of dark matter and providing glimpses of extra spatial dimensions or grand unification of forces. Any of these insights would dramatically change our view of the world.

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.

THE HELMHOLTZ ALLIANCE

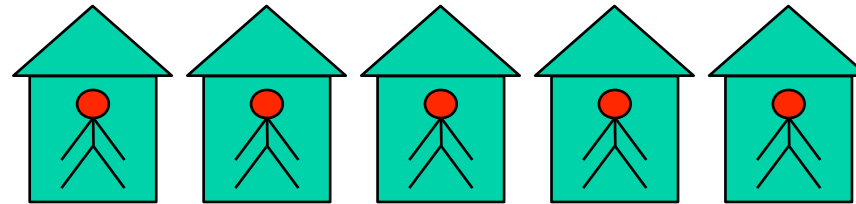


ANALYSIS CENTRE: TASKS

“... optimally place German particle physics
in an increasingly global environment ...”

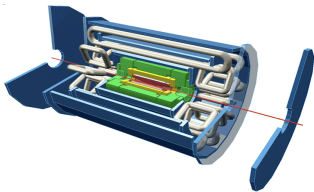
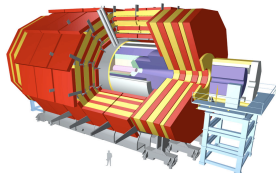
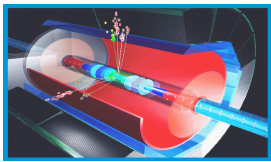
“... a tool for more effective collaboration ...”

ANALYSIS CENTRE: TASKS



Institutes
Fellows
YIGs

Experiments



“... optimally place German particle physics
in an increasingly global environment ...”

“... a tool for more effective collaboration ...”

Virtual
Theory
Institute

National
Analysis
Facility

WG1

WG3

WG2

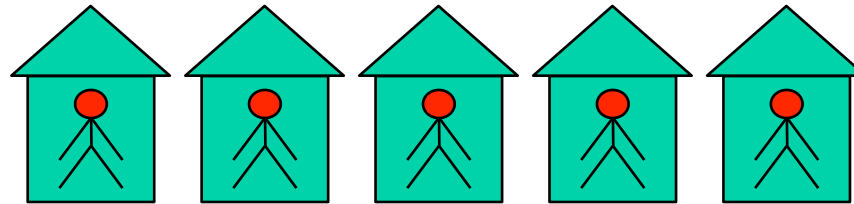


Workshop

Seminar

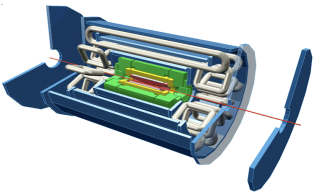
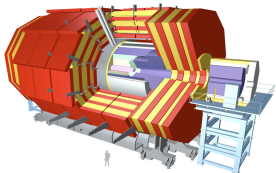
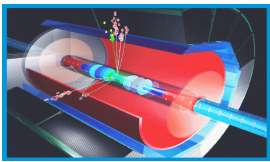
Meeting

ANALYSIS CENTRE: TASKS



Institutes
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YIGs

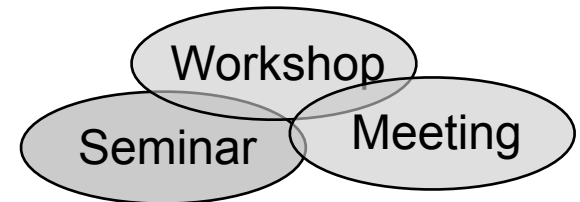
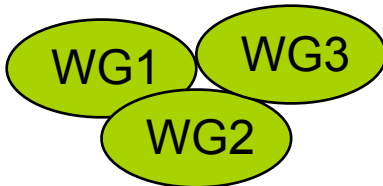
Experiments



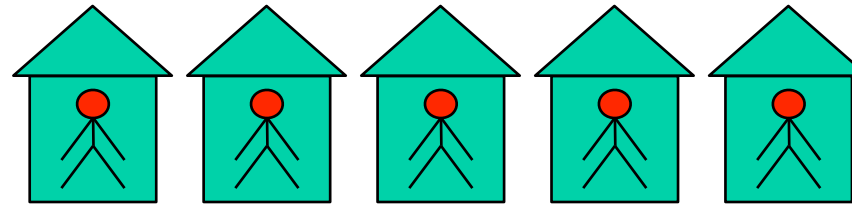
Analysis Centre

Virtual
Theory
Institute

National
Analysis
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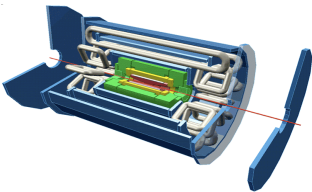
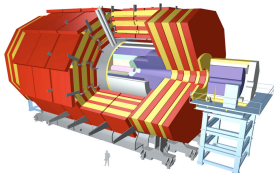
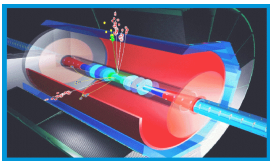


ANALYSIS CENTRE: TASKS



Institutes
Fellows
YIGs

Experiments



1. "Education": Schools, workshops, ...
2. Member support (MC, statistics, PDFs, analysis etc.)
3. Contributions to the LHC programme (research, products, methods, tools)
4. Networking; definition and exploitation of synergies, ...

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WG1

WG3

WG2

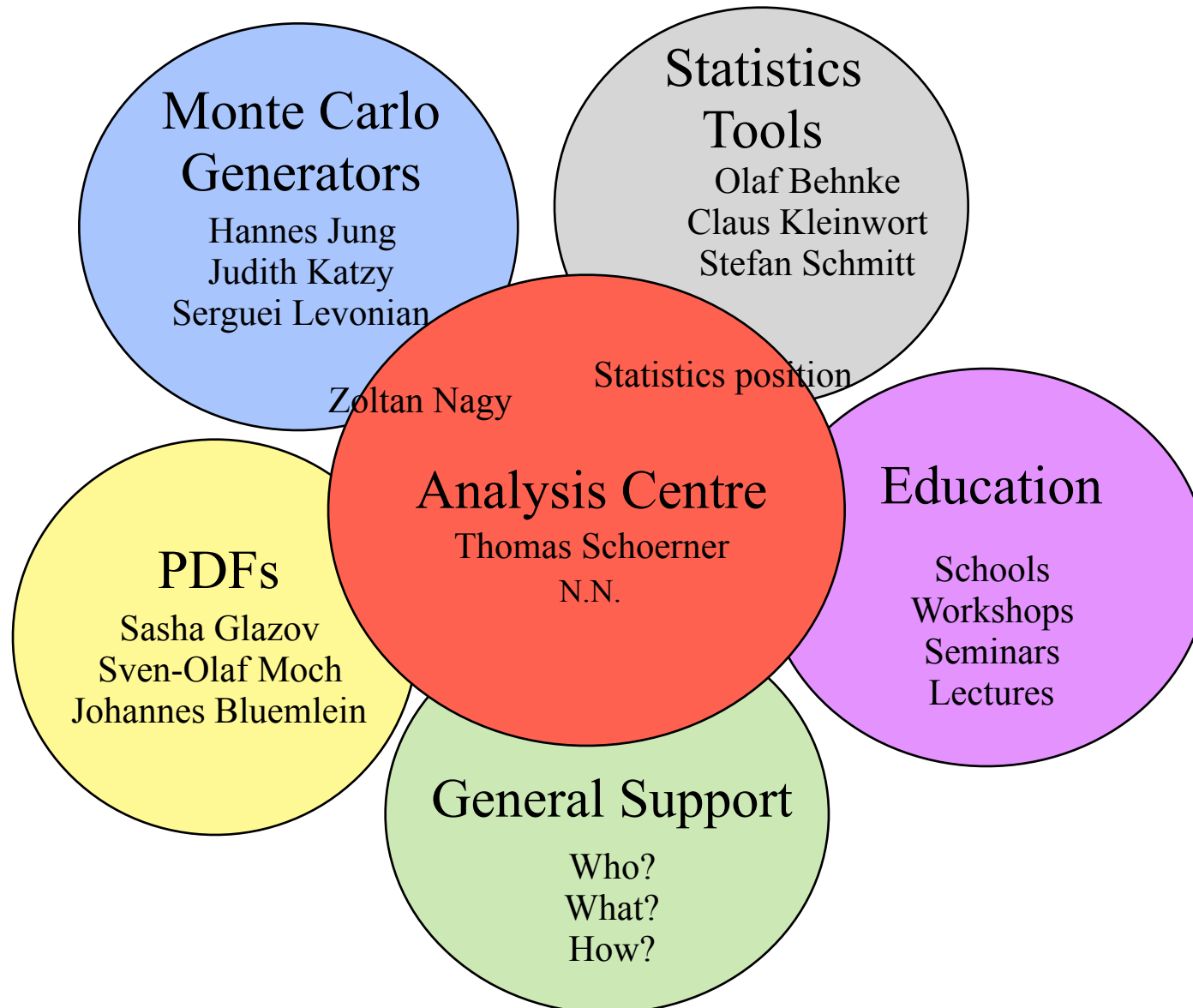


Workshop

Seminar

Meeting

ANALYSIS CENTRE SO FAR



SO FAR: THREE GROUPS

Monte Carlo generators:

- Maintenance and support, validation and tuning, new developments in kT factorisation, for LO+NLO parton showers, for the CASCADE generator, GENSER mirror, ...
- active group with regular meetings.

Statistics tools:

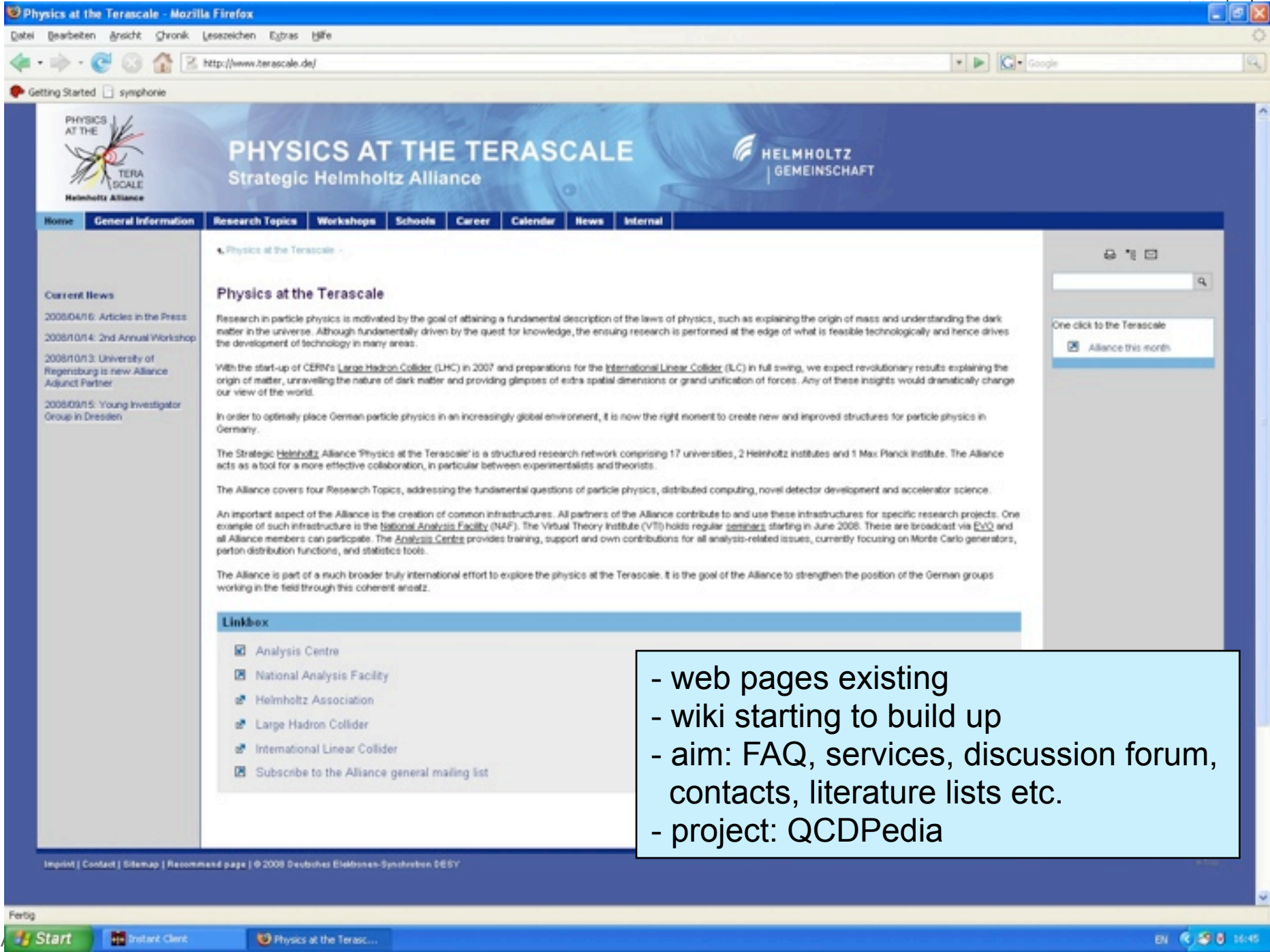
- Signal/background separation (TMVA etc.), significance determination, limits, data corrections, systematic uncertainties, ...
- Development of tools, close contact to CERN statistics committee etc.
- Open analysis centre position to be announced soon.

PDFs:

- general support for PDF issues; theoretical contributions (higher orders for hard scattering processes, PDF theory,)
- My personal dream: global PDF fitting activity with strong contributions from analysis centre.

Group life so far:

- organisation of introductory schools with very high interest from institutes.
- rich group life discussing work progress (especially MC group)
- efforts to attract more contributions from the institutes ==> network.
- efforts to establish service function of groups / analysis centre.
- “Discussion” week program has started (later).



PHYSICS AT THE TERASCALE

Strategic Helmholtz Alliance



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- Schools
- Career
- Calendar
- News
- Internal

Current News

- 2008/04/16: Articles in the Press
- 2008/10/14: 2nd Annual Workshop
- 2008/10/13: University of Regensburg is new Alliance Adjunct Partner
- 2008/09/15: Young Investigator Group in Dresden

Physics at the Terascale

Research in particle physics is motivated by the goal of attaining a fundamental description of the laws of physics, such as explaining the origin of mass and understanding the dark matter in the universe. Although fundamentally driven by the quest for knowledge, the ensuing research is performed at the edge of what is feasible technologically and hence drives the development of technology in many areas.

With the start-up of CERN's [Large Hadron Collider \(LHC\)](#) in 2007 and preparations for the [International Linear Collider \(ILC\)](#) in full swing, we expect revolutionary results explaining the origin of matter, unravelling the nature of dark matter and providing glimpses of extra spatial dimensions or grand unification of forces. Any of these insights would dramatically change our view of the world.

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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.

The Alliance covers four Research Topics, addressing the fundamental questions of particle physics, distributed computing, novel detector development and accelerator science.

An important aspect of the Alliance is the creation of common infrastructures. All partners of the Alliance contribute to and use these infrastructures for specific research projects. One example of such infrastructure is the [National Analysis Facility \(NAF\)](#). The Virtual Theory Institute (VTI) holds regular [seminars](#) starting in June 2008. These are broadcast via [EvoQ](#) and all Alliance members can participate. The [Analysis Centre](#) provides training, support and own contributions for all analysis-related issues, currently focusing on Monte Carlo generators, parton distribution functions, and statistics tools.

The Alliance is part of a much broader truly international effort to explore the physics at the Terascale. It is the goal of the Alliance to strengthen the position of the German groups working in the field through this coherent ansatz.

Linkbox

- [Analysis Centre](#)
- [National Analysis Facility](#)
- [Helmholtz Association](#)
- [Large Hadron Collider](#)
- [International Linear Collider](#)
- [Subscribe to the Alliance general mailing list](#)

Search bar with magnifying glass icon

One click to the Terascale

Alliance this month

- web pages existing
- wiki starting to build up
- aim: FAQ, services, discussion forum, contacts, literature lists etc.
- project: QCDPedia



PHYSICS AT THE TERASCALE

Strategic Helmholtz Alliance



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Analysis Centre

Analysis Centre

- » Monte Carlo Group
- » Statistics Tools Group
- » PDF Group
- » Making use of the centre
- » People in the centre
- » Old news

News

October 10, 2008: The [Analysis Centre web pages](#) are starting to build up!

October 9, 2008: All talks (and exercises with solutions) of the [statistics school](#) available via [index!](#)

Forthcoming events

November 12-14, 2008: [PDF school](#) at DESY/Zeuthen!

Mission of the Analysis Centre

The Analysis Centre of the Helmholtz Alliance supports physicists from German groups on general data analysis issues. This is done by

- providing training and education on analysis-related topics through schools, workshops and seminars;
- providing support and assistance for individual user problems;
- strengthening the collaboration between different institutes and experiments and between experiment and theory;
- carrying out own research and creating significant contributions to the data analysis project.

The Analysis Centre currently comprises three main activities, namely Monte Carlo generators, parton distribution functions, and statistics tools.

The [Monte Carlo Generator group](#) works towards providing training, support and own contributions in the field of Monte Carlo generators. For this purpose, it is building on the experience already present at DESY and is forming a network of Monte Carlo-related activities in German and other institutes. Besides organising schools and workshops and being a place for discussion, the group is working on the tuning and validation of MC models with the first LHC data, on the development of [HTool](#) and [Rivet](#), and on the (further) development of parton showers models and certain MC generators (CASCADE).

The activities of the [Statistics Tools group](#) comprise the development of statistics tools necessary for data analysis, the implementation of tools into software frameworks like ROOT, and the support of the community in statistics-related questions. The group is organising a series of workshops around the issues of limit determination, fitting, signal-background separation, and data correction.

The [PDF group](#) activities build on in-house expertise in the analysis of DIS structure function data from HERA, and on precise theoretical predictions for hard scattering processes. It will assist in precision determinations of the parton luminosity at the LHC.

What can it do for you?

Main Page - Wofwiki - Physics at the Terascale

http://www.wiki.terascale.de/index.php/Main_Page

PHYSICS AT THE TERA SCALE Helmholtz Alliance

HELMHOLTZ GEMEINSCHAFT

Wiki Home | Research Topics | Calendar | Workshops | Toolbox | Personal tools | Help

Page | Discussion | View source | History | Upload file | Permanent link

From Wofwiki

Main Page

site notice:

Welcome to the Terascale Alliance Wiki

This wiki is meant to collect and contain information pertaining to the activities and topics covered by the Terascale Alliance, and to enable the community to communicate and create the content collaboratively.

Getting Started

Until further notice, everyone can participate after [creating an account](#).

To practice editing use the [Sandbox](#).

For questions, use the mailing list wiki-users@desy.de.

The Analysis Centre at DESY

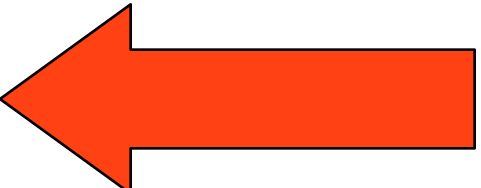
[General information](#) on the Analysis Centre can be found on the [Terascale web pages](#). The Analysis Centre is currently structured into three groups:

- [Monte Carlo Generators](#)
- [Statistical Tools](#)
- [Parton Distribution Functions](#)
- [Collaborative Tools](#)

Please refer to the WIKI pages of these groups for relevant information.

Imported Content LHC-D Workshop

- [LHC-D Workshop](#)
- [ILC](#)



WIKI for discussions / documentation of MC / PDF / Statistics / general issues.

CONTACTS AND SUPPORT

Analysis Centre:

- anacentre@desy.de: general address for distributing information
- anacentre-manage@desy.de: individual questions, information, concern, ...

MC:

- hannes.jung@desy.de, judith.katzy@desy.de, serguei.levonian@desy.de,
zoltan.nagy@desy.de
- anacentre-mc@desy.de

Statistics Tools:

- olaf.behnke@desy.de, stefan.schmitt@desy.de, claus.kleinwort@desy.de
- anacentre-statistics@desy.de

PDF:

- sven-olaf.moch@desy.de, alexandre.glazov@desy.de,
johannes.bluemlein@desy.de
- anacentre-pdf@desy.de

... and all of the persons above directly, of course ...

Which is the best way to organise support?
(mailing list, WIKI, FAQ, hypernews, ...)

Need to try it out !

ANALYSIS CENTRE: EVENTS

Past:

- MC School, 100 participants
- Statistics Tools School, 120 participants
- PDF School, 40 participants.

In preparation:

- Fitting Workshop, March 30 - April 1.
- MC School 2009, April 20-24.
- Computer Algebra School, March 29 - April 3.

Wishes?

- CTEQ+MCNET+Alliance School 2010???)
- Introduction to HEP statistics)
- Limits+Combination Workshop)
- Yearly introductory course to beginners)
- Scientific computing? ROOT?
- Grid tools workshop.

School on **Parton Distribution Functions**

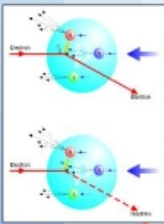
PHYSICS AT THE
TERA
SCALE
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PHYSICS AT THE TERASCALE

Strategic Helmholtz Alliance

Deutsches Elektronen-Synchrotron DESY ··· Forschungszentrum Karlsruhe GmbH ··· Max-Planck-Institut für Physik & München ··· Physikalisches Institut Technische Universität Aachen
··· Universität Bonn ··· Universität Bonn ··· Universität Bonn ··· Universität Bonn ··· Universität Bonn ··· Universität Bonn ··· Universität Bonn ··· Universität Bonn ··· Universität Bonn ···
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**12-14 November 2008,
DESY, Zeuthen**



Speakers:

- Sergey Alekhin (IHEP Protvino)
- Johannes Blümlein (DESY)
- Alexandre Glazov (DESY)
- Joey Huston (Michigan State Univ.)
- Sven-Olaf Moch (DESY)
- Pavel Nadolsky (Michigan State Univ.)
- Eram Rizvi (Queen Mary, U. London)
- James Stirling (Cambridge Univ.)
- Andreas Vogt (Liverpool Univ.)
- Markus Wobisch (Louisiana Tech.)

The PDF school covers hard scattering reactions at colliders, both from the theoretical and the experimental side. Emphasis is put on the current information on parton distributions (PDFs) and their impact on predictions and measurement of cross sections at the terascale. The lectures are targeted at PhD students and young post-docs.

The school fee of Euro 25 has to be paid cash at the registration desk during the school.
Registration deadline: 15.10.2008 Please register via the school webpage.
Organising Committee: J. Blümlein, A. Glazov, S.-O. Moch

<http://www.terascale.de/pdf2008>

ANALYSIS CENTRE: WHAT ELSE?

Seminars and presentations:

- Currently trying to set up **statistics seminar series**.
- (Weekly) **lecture series on basic HEP issues**.
- Contributions e.g. to **H1+ZEUS combined PDF fitting** group (future?).
- Open for **your wishes and suggestions!**

Opportunity to work on interesting projects / present your work

- The groups offer the possibility to work (for a fraction of your time) on topics related to the main activities of the groups, thus broadening your horizon and increasing the coherence of the field.
- Contact the groups or me if you are interested or have something to show.

Further (larger) activities

- Currently discussing taking up **software activities**.
 - Possible topics: Frameworks. Virtualisation of data analysis. Graphical/ interactive user analysis. Unification of data formats. ...
 - Requires input from computing / software gurus in the experiments
- => **brainstorming meeting in Aachen (annual alliance meeting) on November 28.**

DISCUSSION WEEKS/DAYS

Analysis Centre Discussion Weeks

- Bring together small number of experts to work on well-defined problem for limited period of time, ~1 week.
- Provide creative atmosphere, a bunch of experts, work space, opportunity for discussion and exchange ...
- mid/long-term effect: Accumulation of experience and knowledge in the centre.

First two discussion days took place in October and yesterday:

P. Marchesini: Criticism of the dipole approach.

~20 people attending directly / via EVO. Very productive discussion.

J. Huston: PDF4MC

Planned discussion weeks:

- MC group: - Minimum bias, underlying event and MPI (Gieseke, Lund)
- PDF group: - PDFs and luminosity determination (Thorne, Nadolsky)
 - Heavy flavour in PDF fits (Vogt, Alekhin)
 - role of strangeness in PDFs (Thorne, N.N. from HERMES)

Open for your suggestions and wishes!

THE ANALYSIS CENTRE

... is the centre of the whole Alliance (at DESY).

- It is the centre of all participating institutes and exists for their support ...
- but it depends on the input + feedback from the people working in the institutes - it depends on you!

Make use of the Analysis Centre by letting us know what you want, need, require, would like to hear, ...

- Which education and training?
- Which seminars, topics, speakers?
- Which tools and services?
- Which kind of user support?



Don't (only) ask what your Alliance ...

- Where do you have specific expertise?
- Where could you help the community by sharing, maybe within the groups?
- What can others learn from you?

Vision: Analysis Centre - the place to go! The centre ...

- ... offers help and support for beginners and advanced physicists.
- ... supports physicists finalising their analysis.
- ... acts as meeting point for people working on a common subject..

QUESTIONS

- Which services? Which form of user support? (mailing lists, hypernews, FAQ, link lists, “helpdesk” for MC/PDF/statistics, ...)
- beginners.help@desy.de?
- Which training? School? Workshop? Speaker? Topic?
- Which (additional) working groups?
- Your connection to and experience with the centre?
 - Overlap activities with the centre?
 - With other groups?
 - Your specific expertise? Sharing?
 - Participation in past analysis centre events? Feedback?

Thank you for your attention and contributions!