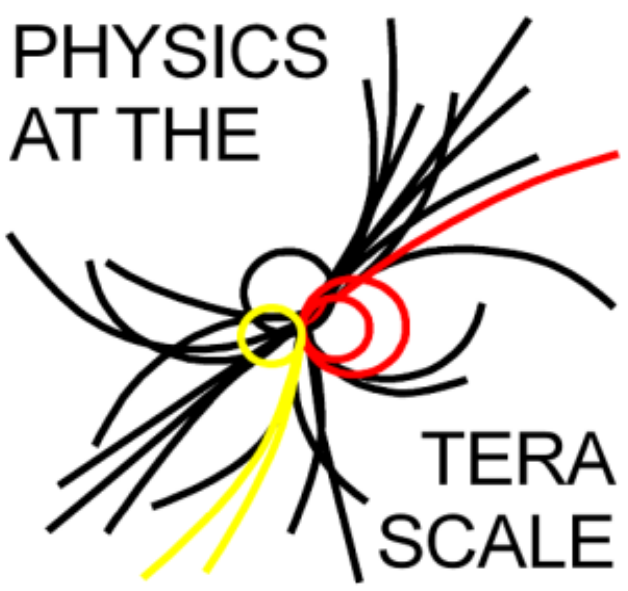
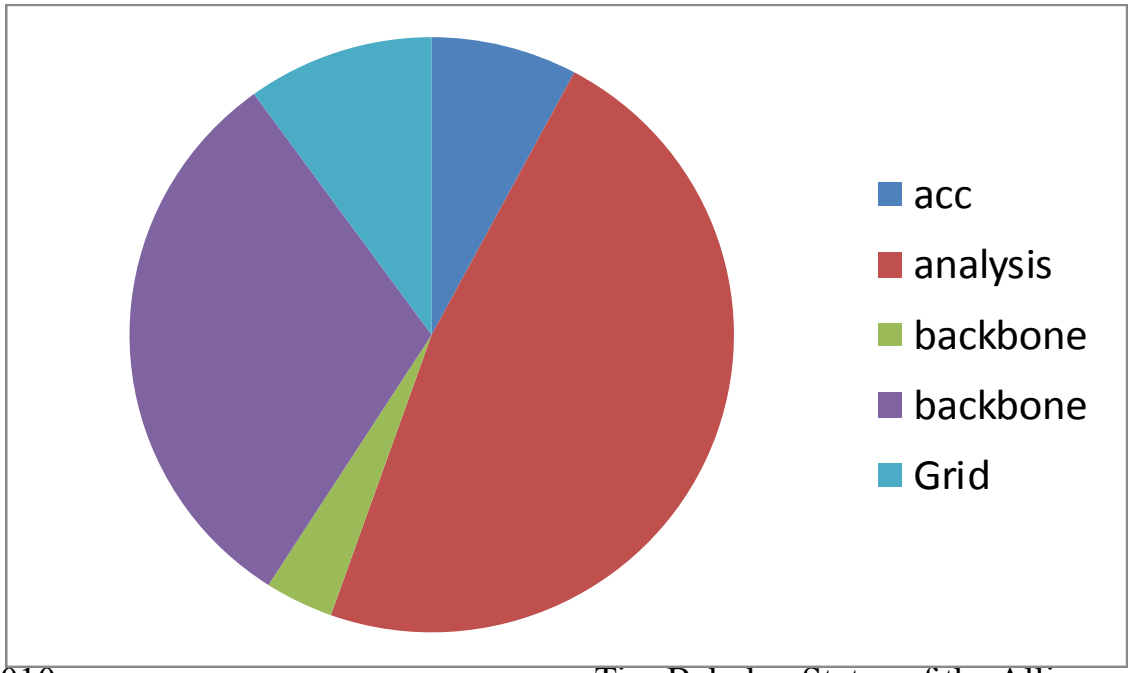
Physics at the Terascale: Status



Ties Behnke, DESY

Facts and Figures

- First Helmholtz Alliance, started 07/2007
- DESY, KIT, 18 Universitäten, MPI für Physik
- Budget: 5 M€ /a from Helmholtz-Gemeinschaft (25 Mio total)
- in 2010: 71 Alliance financed FTE (YIGs, Fellows, Staff, Doktoranden)
  (averaged over all years: 50 FTE/ year)



Distribution of
FTE between topics

Facts and Figures

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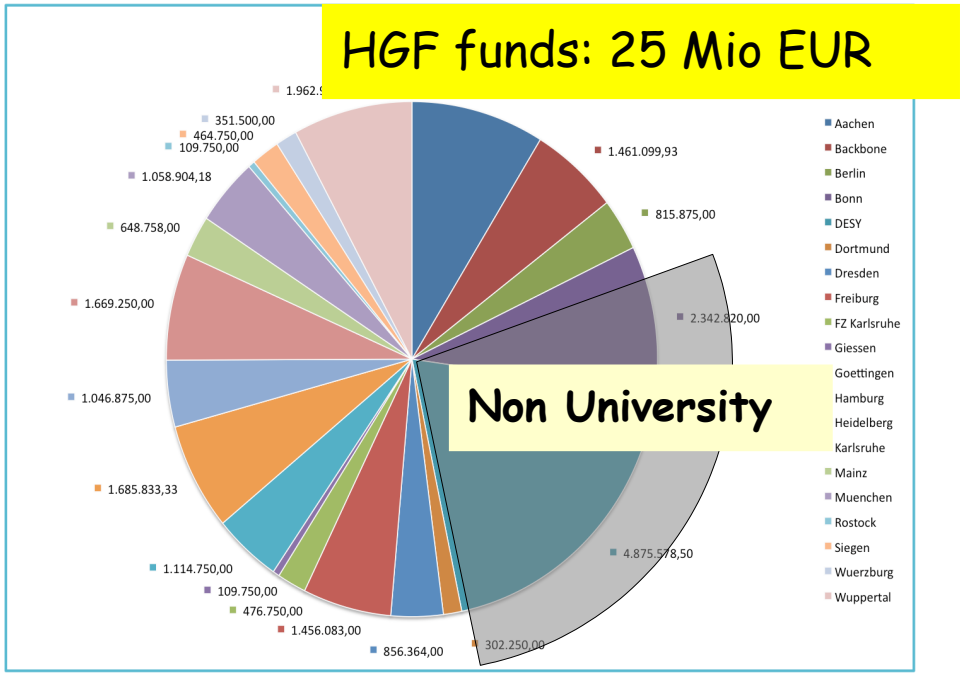
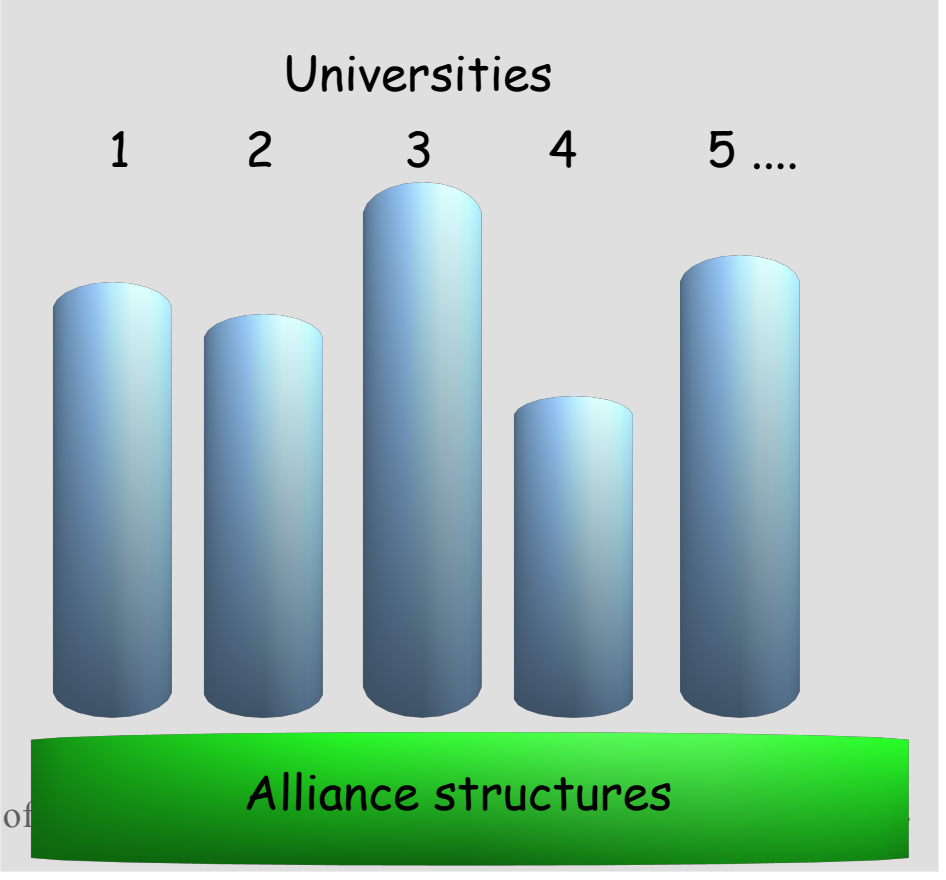


Distribution
of Alliance funds

Structures

German System:

- Strong federal components, “Länder” fund universities
- Central contribution through project oriented funding from the BMBF (Verbundforschung)
- Connections among experiments: Forschungsschwerpunkt (FSP)
- No possibility to fund common and long lasting infrastructures at universities



Alliance:

- Common funding mechanism
- Support infrastructure measures, common nation-wide instruments

Main Goals of the Alliance

Cooperation between

- Theory and Experiment
- Different experiments (LHC experiments, LC projects, others)
- Universities and Research centers

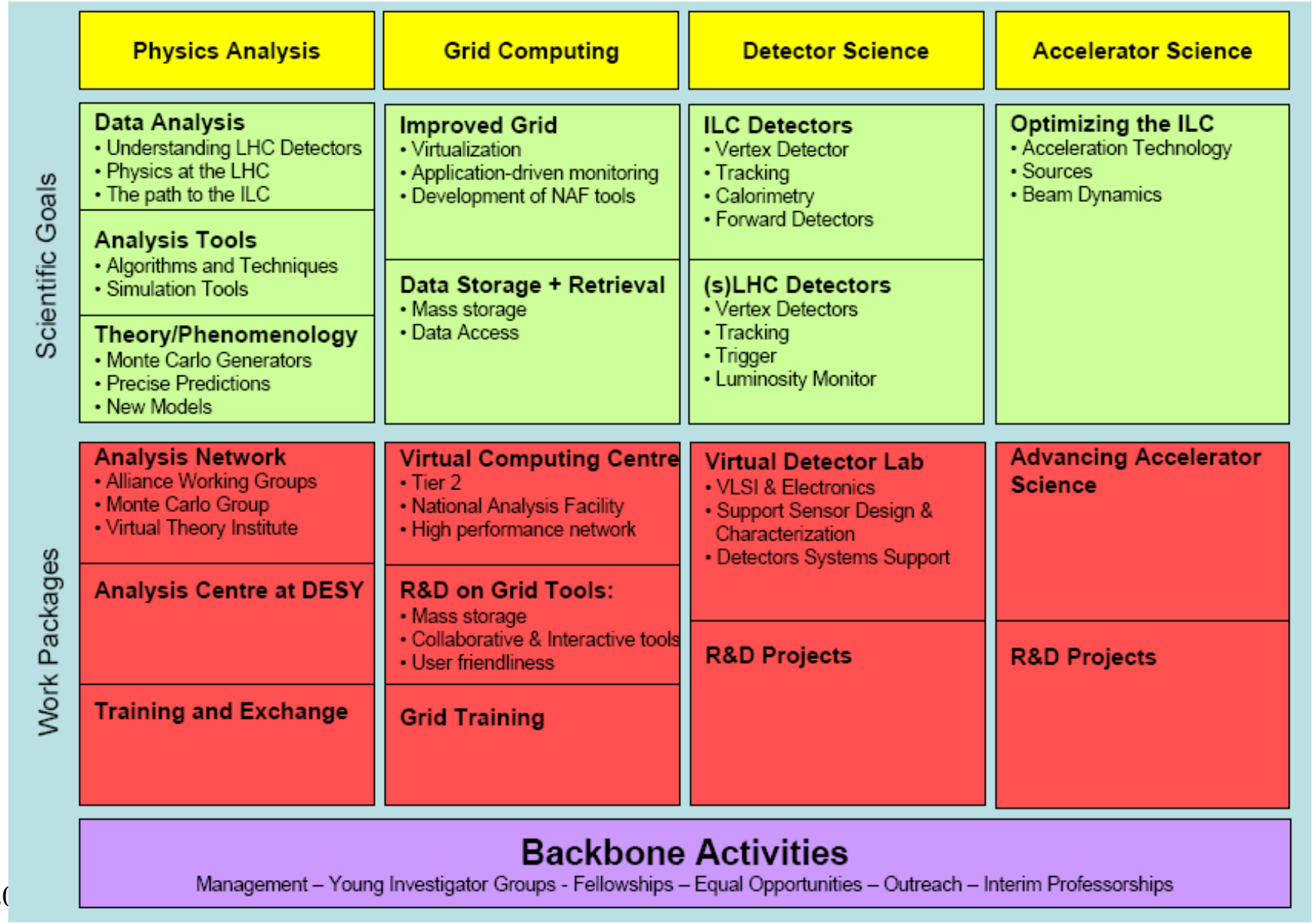
Topic: explore the new physics at the Terascale

position the german groups well in the international context

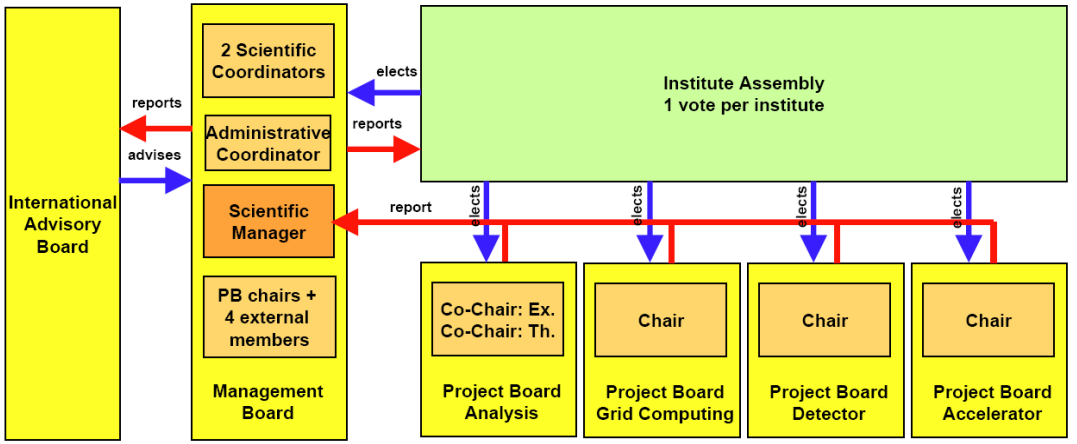
Improve the infrastructure on all levels to make an visible and high impact participation of german groups easier.

Complementary to other funding sources (BMBF Verbundforschung, Laender, base-funding of laboratories..)

Topics


Physics Analysis
Grid Computing
Detector Science
Accelerator Science
Scientific Goals
Data Analysis
• Understanding LHC Detectors
• Physics at the LHC
• The path to the ILC
Analysis Tools
• Algorithms and Techniques
• Simulation Tools
Theory/Phenomenology
• Monte Carlo Generators
• Precise Predictions
• New Models
Improved Grid
• Virtualization
• Application-driven monitoring
• Development of NAF tools
Data Storage + Retrieval
• Mass storage
• Data Access
ILC Detectors
• Vertex Detector
• Tracking
• Calorimetry
• Forward Detectors
(s)LHC Detectors
• Vertex Detectors
• Tracking
• Trigger
• Luminosity Monitor
Optimizing the ILC
• Acceleration Technology
• Sources
• Beam Dynamics
Work Packages
Analysis Network
• Alliance Working Groups
• Monte Carlo Group
• Virtual Theory Institute
Analysis Centre at DESY
Training and Exchange
Virtual Computing Centre
• Tier 2
• National Analysis Facility
• High performance network
R&D on Grid Tools:
• Mass storage
• Collaborative & Interactive tools
• User friendliness
Grid Training
Virtual Detector Lab
• VLSI & Electronics
• Support Sensor Design & Characterization
• Detectors Systems Support
R&D Projects
Advancing Accelerator Science
R&D Projects
Backbone Activities
Management – Young Investigator Groups - Fellowships – Equal Opportunities – Outreach – Interim Professorships

Organisation



New Management:

Approx. 50% new members

Scientific Coordinators		**Scientific Manager**	
Ties Behnke	DESY ties.behnke@desy.de	Christian Zeitnitz	Wuppertal zeitnitz@uni-wuppertal.de
Klaus Desch	Bonn desch@physik.uni-bonn.de		

Administrative Coordinator		**Secretary**	
Karsten Büßer	DESY karsten.buesser@desy.de	Michaela Grimm	DESY a.grimm@desy.de
		Katja Stemmler (as of 13.12.2010)	

Management Board	*hgfa-mb@desy.de*	
Thomas Hebbeker	Aachen Thomas.Hebbeker@physik.rwth-aachen.de	Scientific Coordinators Scientific Manager
Joachim Mnich	DESY joachim.mnich@desy.de	Administrative Coordinator Project Board Chairs
Markus Schumacher	Freiburg markus.schumacher@physik.uni-freiburg.de	
Dieter Zeppenfeld	KIT – Uni dieter@particle.uni-karlsruhe.de	

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Ulrich Uwer (Experiment Chair)	Heidelberg uwer@physi.uni-heidelberg.de
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Arnulf Quadt	Göttingen aquadt@uni-goettingen.de
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Wolfgang Hillert	Bonn hillert@physik.uni-bonn.de
Shaukat Khan	Hamburg shaukat.khan@desy.de
Günter Müller	Wuppertal gmueller@uni-wuppertal.de
Alan Caldwell	MPI München caldwell@mppmu.mpg.de

Many thanks to the outgoing members!

Analysis

Working groups:

Ulrich Uwer, Herbi Dreiner, chairs

Have reviewed activities of working groups

- Central jet veto: needs reinforcement
  new conveners: Ulla Blumenschein und Babara Jaeger
- Higgs production in association with heavy quarks: active
- BSM parameter determination: very active
- m(tau tau) very active
- Neutrino masses and lepton flavour violation: very active
- New group: linear collider forum

Regular “virtual” seminars:

Works quite well, nearly all Alliance nodes participate, high quality speakers
Concept is working well, makes top-people accessible to a broader audience

Analysis Center: Schools 2010

Thomas Schoerner Sadenius

- Jan/Mar “MC-Pad Workshop”: Geant / Root (financed by MC-Pad)
  - 51 registered / ~40 participants / ~25 non-DESY (March)
- March: “Introductory School to Terascale Physics”
  - 50 participants / 46 non-DESY
- March: “Statistics Tools 2010”
  - 63 registered / 59 participants / 38 non-DESY
- July: “CTEQ / MCNet School” in Black Forrest
  - Contribution of 5000 Euro (no dedicated MC school this year).
- September: “German LHC Physics School”
  - 67 registered / ~50 participants / 25 non-DESY
- September: “MC Days” for Würzburg “Graduiertenkolleg”
- September: “Advanced software design” (Dresden): 25 participants
- October: “Advanced Topics in Statistics”: 40 participants

Analysis Center: workshops 2010

- May: “Unfolding” with about 30 people
  - Proceedings, now working on unfolding framework
- July and November: “SUSY / BSM Fitting”
- September: “Multi-parton interactions” with about 30 people
- October: Discussion session: The LHC ridge
  - About 20 EVO parties connected
- November: “SM Benchmark Processes” at FNAL
  - (150 registered, Analysis Centre as co-organiser)
  - Continuation of series: June 2011, Zeuthen

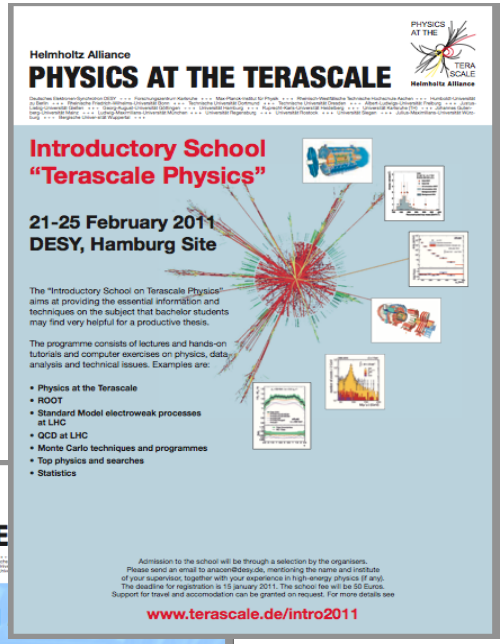
Analysis center: Seminars 2010

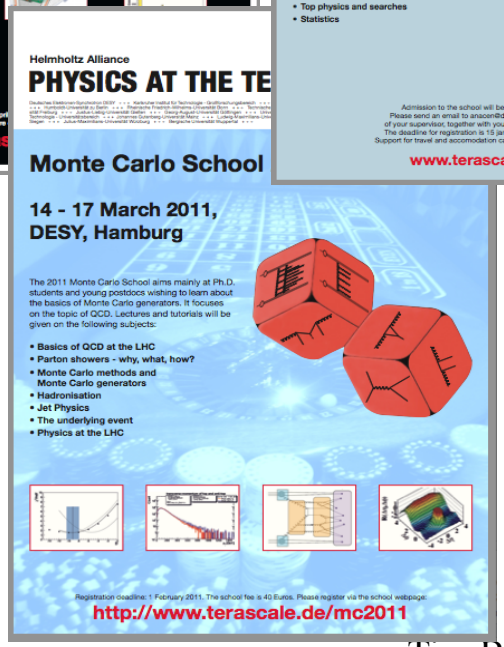
- Gregory Schott (Karlsruhe): RooStats:
- Sergey Alekhin (DESY): The VFN and FFN schemes in the analysis of the heavy-quark electronproduction data
- Fabio Maltoni (Louvain): MadGraph
- Markus Diehl (DESY): Multi-parton interactions in QCD
- Fred Olness (SMU, CTEQ): Benchmark processes at the LHC
- Roger Barlow (Manchester): Making discoveries at the LHC
- Alberto Guffanti (Freiburg): NNPDF parton determinations
- Henrik Nilsen (Freiburg): Dzero Analysis Walkthroughs
- Jamal Jalilian-Marian: The Ridge at the LHC seen through the Colour Glass
- Davison Soper: QCD and jets
- Nikolai Gagunashvili: Machine learning approach and unfolding procedure

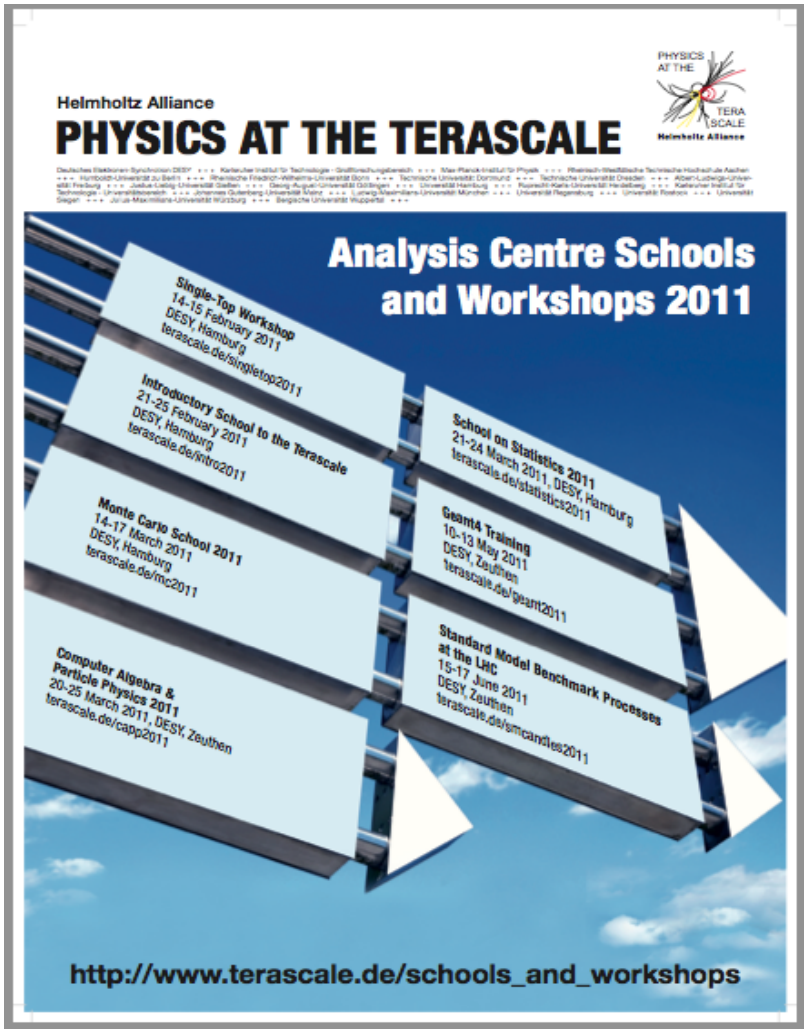
Plans for 2011

- February 21-25: Introduction to Terascale Physics (bachelor students)
- March 14-17: MC School (mainly QCD)
- March 20-25: Computer Algebra and Particle Physics
- April 4-7: Statistics School
- April: Workshop on Fixed-Order Calculations and Matching?
- May 10-13: Geant4 Workshop
- June 15-17: SM Candles Workshop (with CERN, FNAL, …)
- September 5/6: Single-top Workshop
- September: Resummation Workshop
- October 10-14: LHC Precision Predictions for Pedestrians
- October / November: LHC Physics Workshop

Plans for 2011





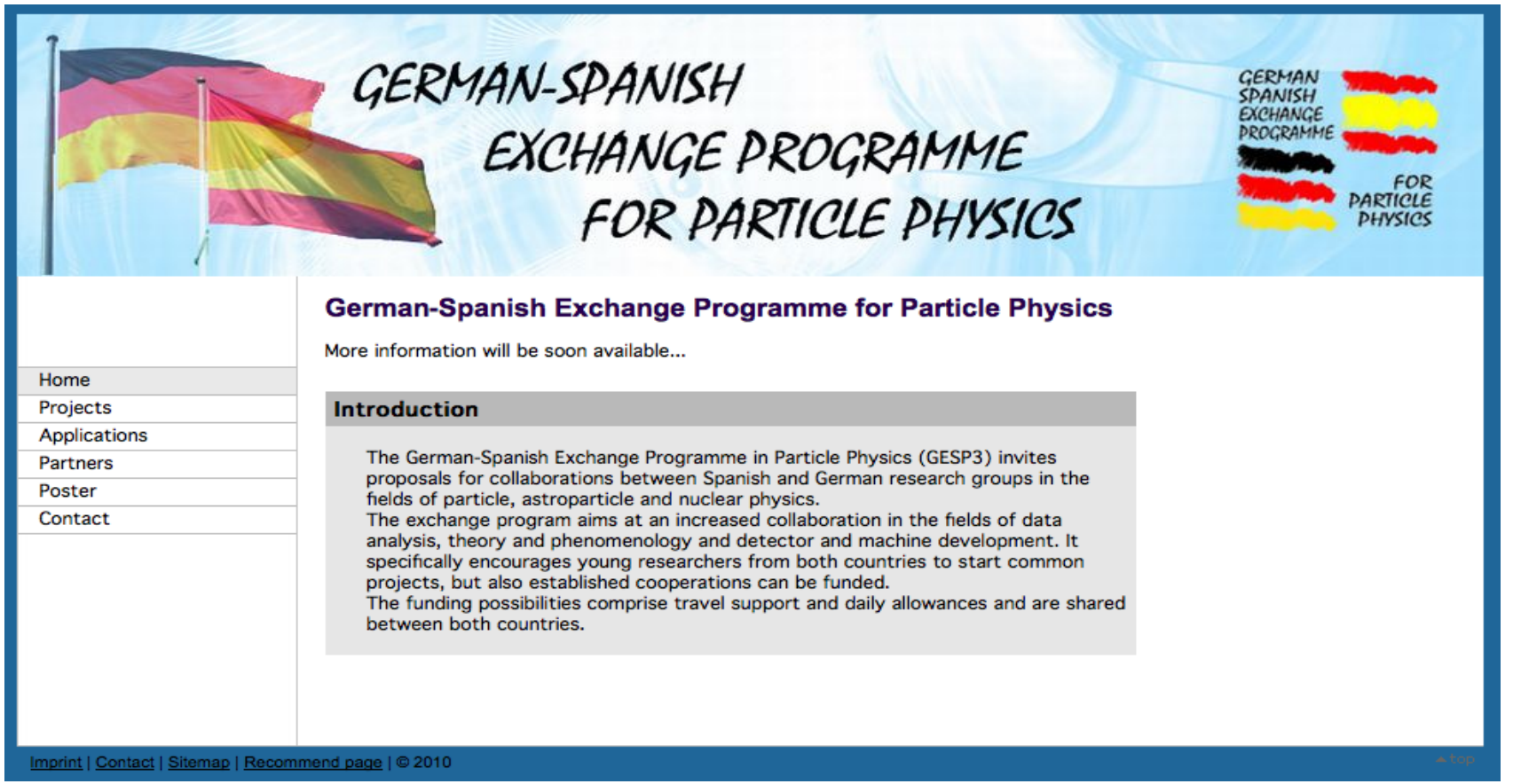


NEWS AND REPORTS

- Newsletter: 6/7 in 2010
  - Regular information about dates, events, important developments in the Analysis Centre / the Alliance.
- Studentships: raise short-term manpower for dedicated AC tasks.
  - 2 in 2010 (one statistics / ROOSTATS @ CERN, one uPDFs @ DESY).
  - More candidates for 1-3 month funding welcome!
- Attracting fellows @ DESY:
  - Limited success – 3-4 fellows working to small percentage of time.
- Improving connections to other LHC centres (CERN, FNAL, Argonne)
- 2 “Theorists of the week”: Fred Olness, Davison Soper
  - Planning more for next year, also “Experimentalist of the week”?
- PDF, MC, SUSY/BSM, Statistics Tools working groups
    - Various projects

Spanish- German Cooperation

German-Spanish Exchange Programme for Particle Physics – GSEP3
(and for astroparticle and nuclear physics)



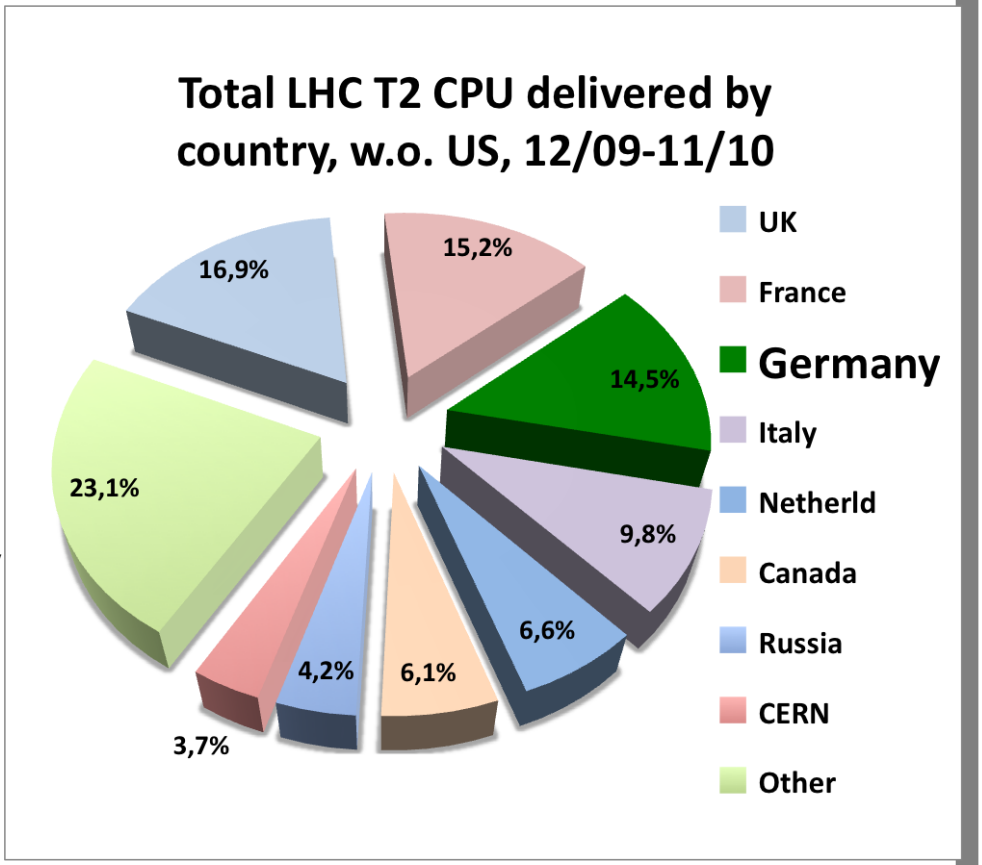
- URL: http://gsep3.desy.de
- Contact: thomas.schoerner@desy.de

LHC Grid computing in Germany

M. Kasemann, Chair

•LHC Grid computing is a major success for LHC data analysis.

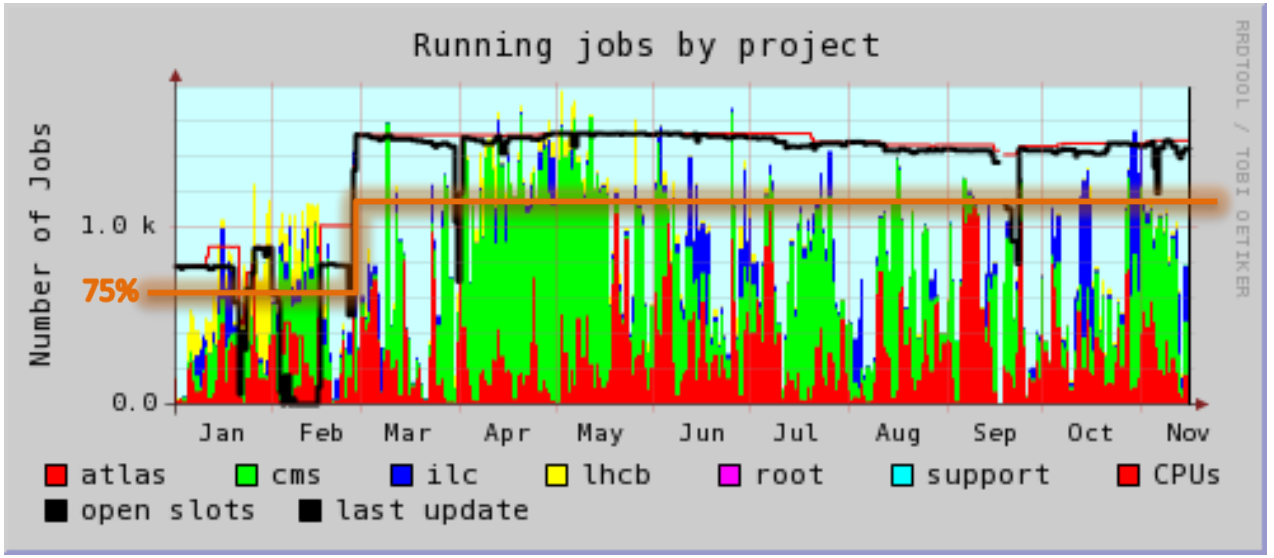
•Germany T2 Centers deliver
~ 15% of all T2 CPU for Analysis
(well above the DE-share)



German T1 and T2 resources are running reliably and are heavily used for analysis.

- German T2 resources co-funded by Terascale Allianz

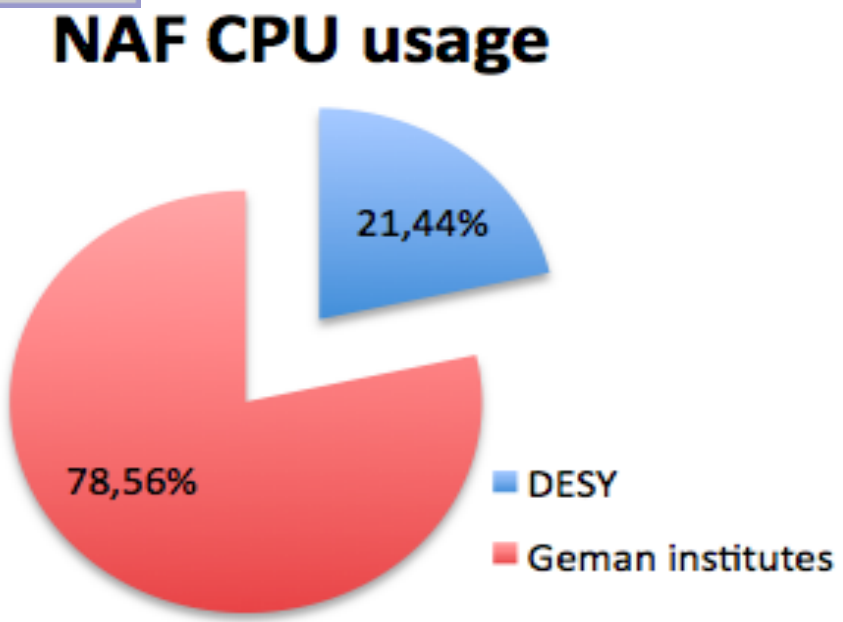
NAF Resources well used



Need to upgrade for next year!

Recommended limit: < 75%, peaks up to 90%

- NAF well used by German institutes
  - 80% used by Universities
  - 20% used by DESY scientists



Grid Project information: Networking

Good access to data is essential for data analysis!

Int'l ATLAS+CMS reviewed network needs, reported to the T1-OPN networking group in September.

In D we need good national and international networks to access data from T1's and T2's.

We plan a Networking workshop to review needs and possible solutions in January in Göttingen.

Grid Project: Computing Workshop

We are planning a computing workshop in spring.
Primary Scope: LHC data analysis

Topics to be discussed:
- Evolution of computing resource needs
- Evolution of technical data analysis tools
- Networking situation and needs
- How can HEP data analysis benefit from / contribute to emerging computing technologies
- …. open for further suggestions

Organization:
- Time: 1-2 days workshop in March ’11
- Place: … looking for volunteers
- Organized by Terascale Grid Project

Detector Project

Lutz Feld, chair

Detector workshop in Heidelberg in October 2010

- Review of detector R&D in D for Particle Physics
- Topical discussion: Silicon detector systems, Trigger upgrades for LHC Silicon Photo Multipliers
- About 70 participants from all of Germany
- Next workshop:

  March 2011in DESY

Detector Project: Infrastructure

Virtual Laboratory for Detector Technology:

DESY: general infrastructure

applied for LC projects
increasing involvement in LHC upgrade projects

Bonn/ Heidelberg:

Chip design and development infrastructure
Facilities are all in place, usage is ramping up
Planned: online tutorial for ASIC design using HD facilities

Karlsruhe:

Irradiation facility heavily used

new: Mannheim:

Flip-chip bonder (low volume)

Detector: Projects

Initial Alliance proposal:

5 projects were funded as startup projects,
have now been moved to BMBF funding for continuation

September 2009:

6 new projects have been selected for funding
All have started, good progress is reported

Project funding: a flexible tool to start new projects

Possiblity to fund cross – experiment projects

Possibility to fund virtual cooperation between alliance partners

But: funds are limited, not clear if there will be another round of proposals

Accelerator

Eckhard Elsen, chair

News: Young investigator group at Hamburg has started (Jens Osterhoff)

focus on novel acceleration techniques, in particular plasma acceleration

CERN and MPI are now also formally involved in the accelerator project board

Accelerator school:

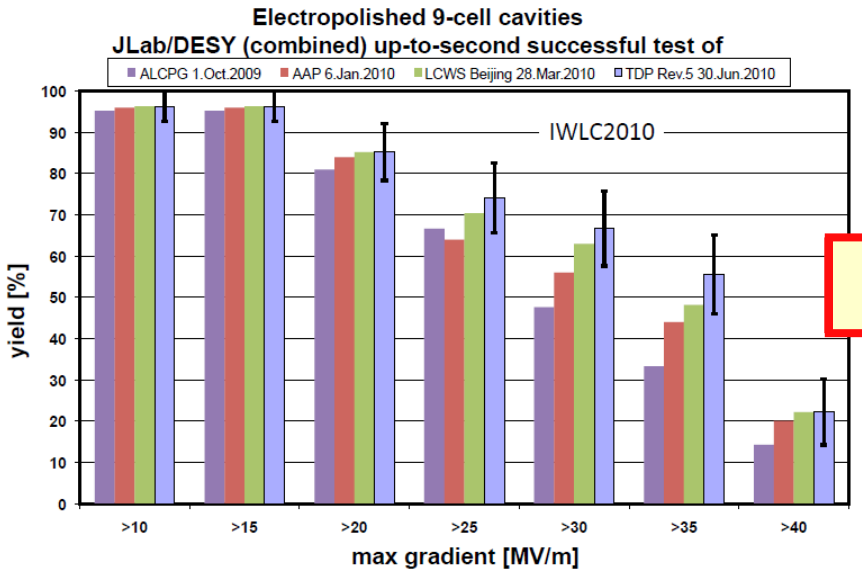
2009 second school in Dortmund

2010 no school

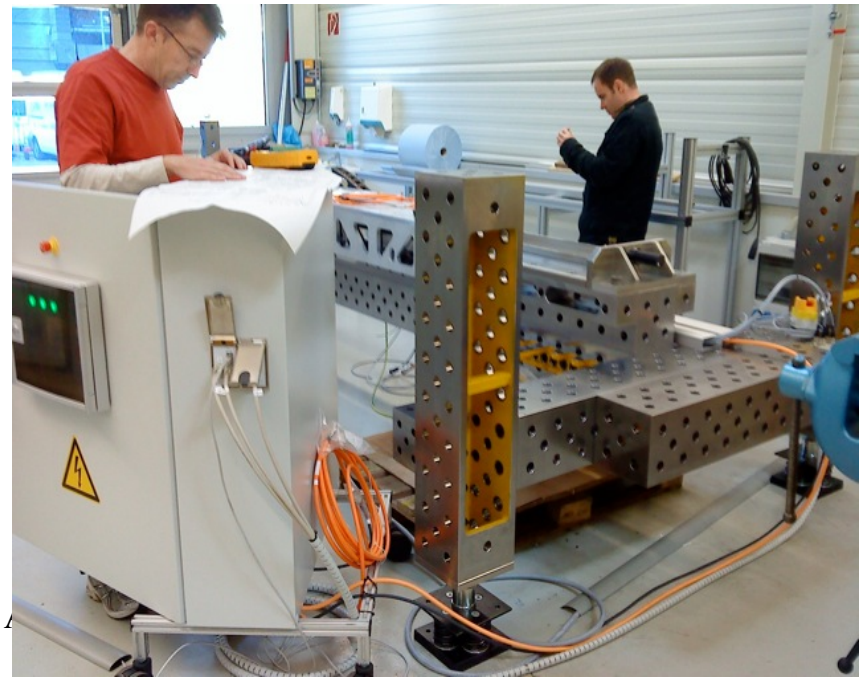
2011 next school planned.

Accelerator: Topics

High gradient superconducting RF (DESY/ Wuppertal)



2010 Milestone



Beam dynamics and polarisation: Bonn

Backbone Activities – Outreach I

International „Hands on Particle Physics" Masterclasses

- High school students
- perform measurement on LHC data (ATLAS, CMS, ALICE), video conference with other student groups

- 110 institutes worldwide, 6500 high school students (aged 15 – 19) , Germany 17 institutes
- central coordination: Uta Bilow (TU Dresden) (50 % Helmholtz Alliance, 2008 – 2012)

- new national program: Netzwerk Teilchenwelt, www.teilchenwelt.de
- central coordination: Anne Glück (TU Dresden) (BMBF, 2010 – 2012)

information stand outside (coffee break!), everybody is welcome, especially PhD students willing to engage in outreach

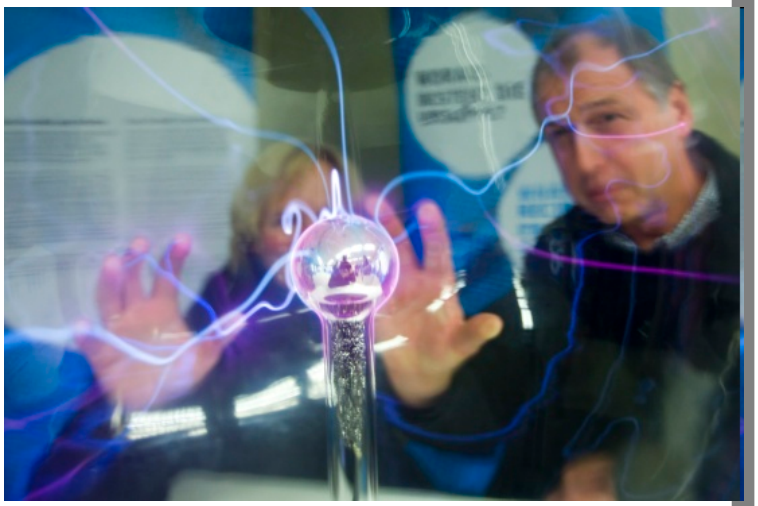
Backbone Activities – Outreach II

CERN/LHC communication

- Central communication: Gerrit Hoerentrup (DESY HH, PR) (50% BMBF, 50% Helmholtz Alliance)
- close cooperation with CERN press office

Weltmaschine exhibition and website

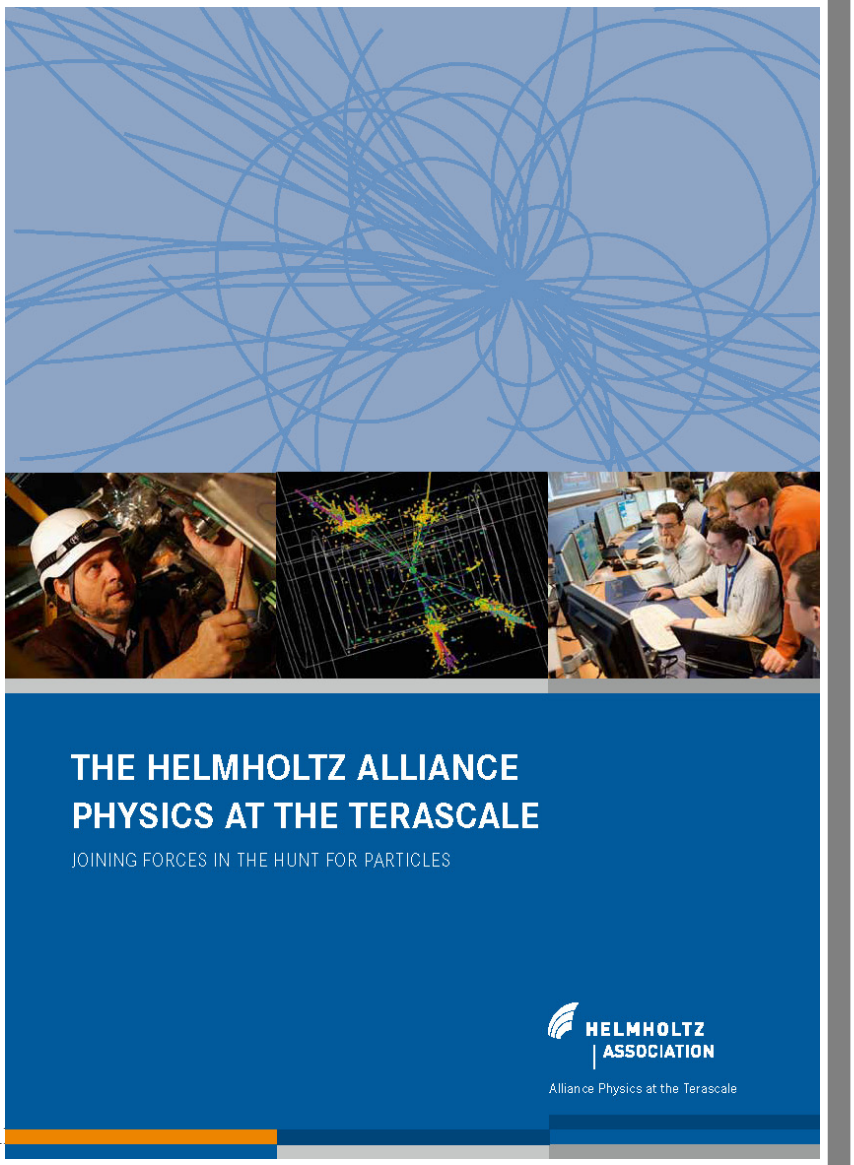
- start-up exhibition 2008 in Berlin: 30.000 visitors
- since 2009 travelling exhibition: about 100.000 visitors
- www.weltmaschine.de
- up-to-date, own content and background information on LHC and German participation
- photos, videos
- information on exhibition
- press and media relations work
- press resources
- media monitoring, press review
- media training for scientists
- network of experts



Alliance communication

Newsletter
- 4 times a year
- With news, upcoming events, …
- recent newsletters at
  www.terascale.de/news/alliance_newsletter

New brochure “Physics at the Terascale”
- PDF download available at
www.terascale.de
- Printed version available in January



Midterm Evaluation

- Evaluation last December by external committee (J. Engelen et al)

  Many thanks to all the Alliance members who contributed!

- 2 days at DESY

- Report from the committee:

  Very positive: Alliance is a real achievement.
  Committee recommends that ways are investigated to continue the Alliance structures beyond 2012

- Discussions have started on ways to continue beyond 2012

- This workshop: start the discussion on a broad basis:

  Your input is needed!

Conclusion

After 2.5 years the Alliance is in full swing

Most of the initial installations and infrastructures are in place

The Alliance is visible within and outside of Germany

The Alliance will run in its current form until the end of 2012

There are many opportunities within the Alliance on all levels

Use them!