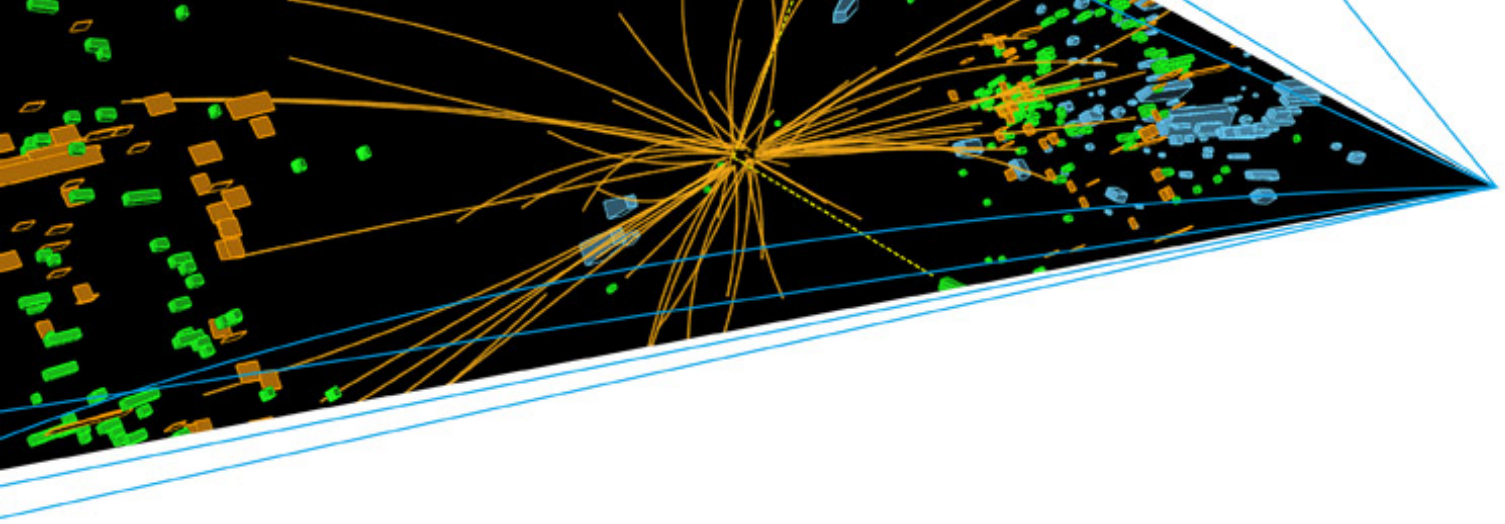


KET
Komitee für
Elementarteilchenphysik

KET-Activities and Plans

- Strategy of the KET
- Computing
- Education and Outreach
- HEP and the Helmholtz Association

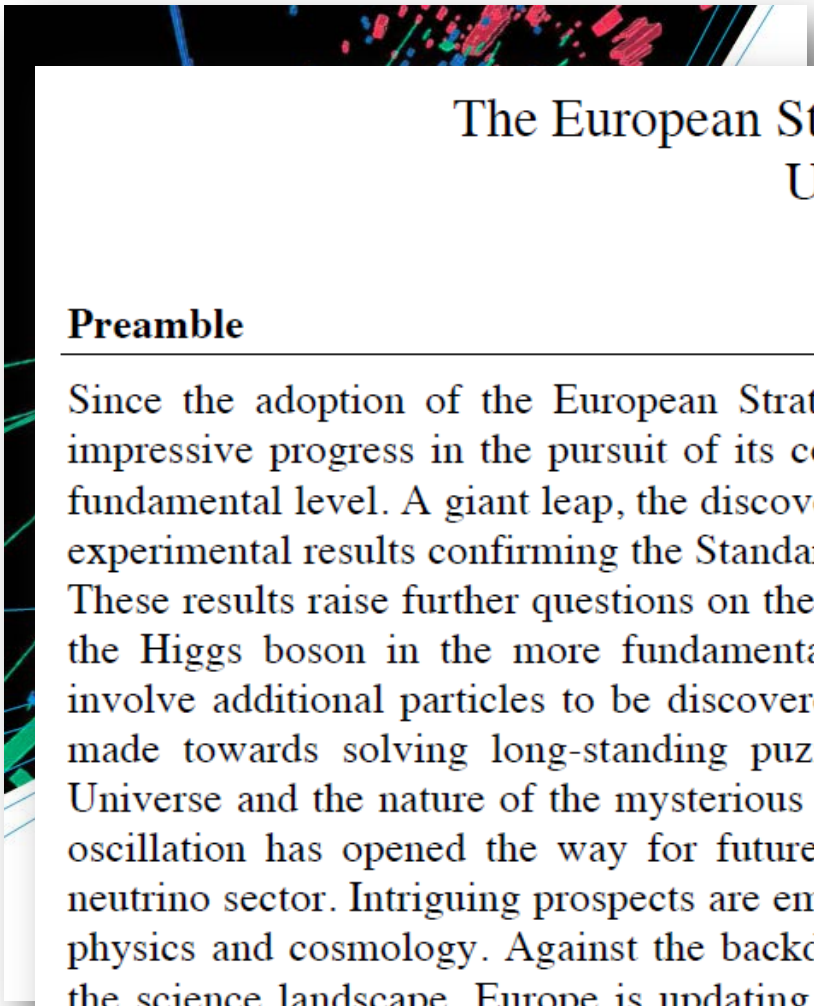
The Komitee für Teilchenphysik (2015-2018)
K. Borras, V. Büscher, M. Elsing, A. Frey, M. Kobel, M. Schumacher,
G. Weiglein, C. Zeitnitz, D. Zeppenfeld
S. Bethke (Council), K. Desch (DPG), T. Hebbeker (GA), W. Hollik (MPG), J. Mnich (DESY), P. Schleper (RECFA)

Current European HEP Strategy

Die Empfehlungen des KET

1. Das wissenschaftliche Potenzial des LHC bestmöglich nutzen.
2. Den LHC und seine Experimente für größere Energie und Kollisionsraten ausbauen.
3. Zur Realisierung eines internationalen Linearbeschleunigers als nächstes Großprojekt der Teilchenphysik aktiv beitragen.
4. Internationale Präzisionsexperimente mit B-Mesonen vorantreiben.
5. Beteiligung an weiteren internationalen Projekten der Teilchenphysik, insbesondere in der Neutrinophysik, ermöglichen.
6. Neue Beschleunigertechnologien und Detektorkonzepte entwickeln.
7. Ein starkes Theorie-Programm weiterführen, das die experimentellen Projekte begleitet.

Current European HEP Strategy



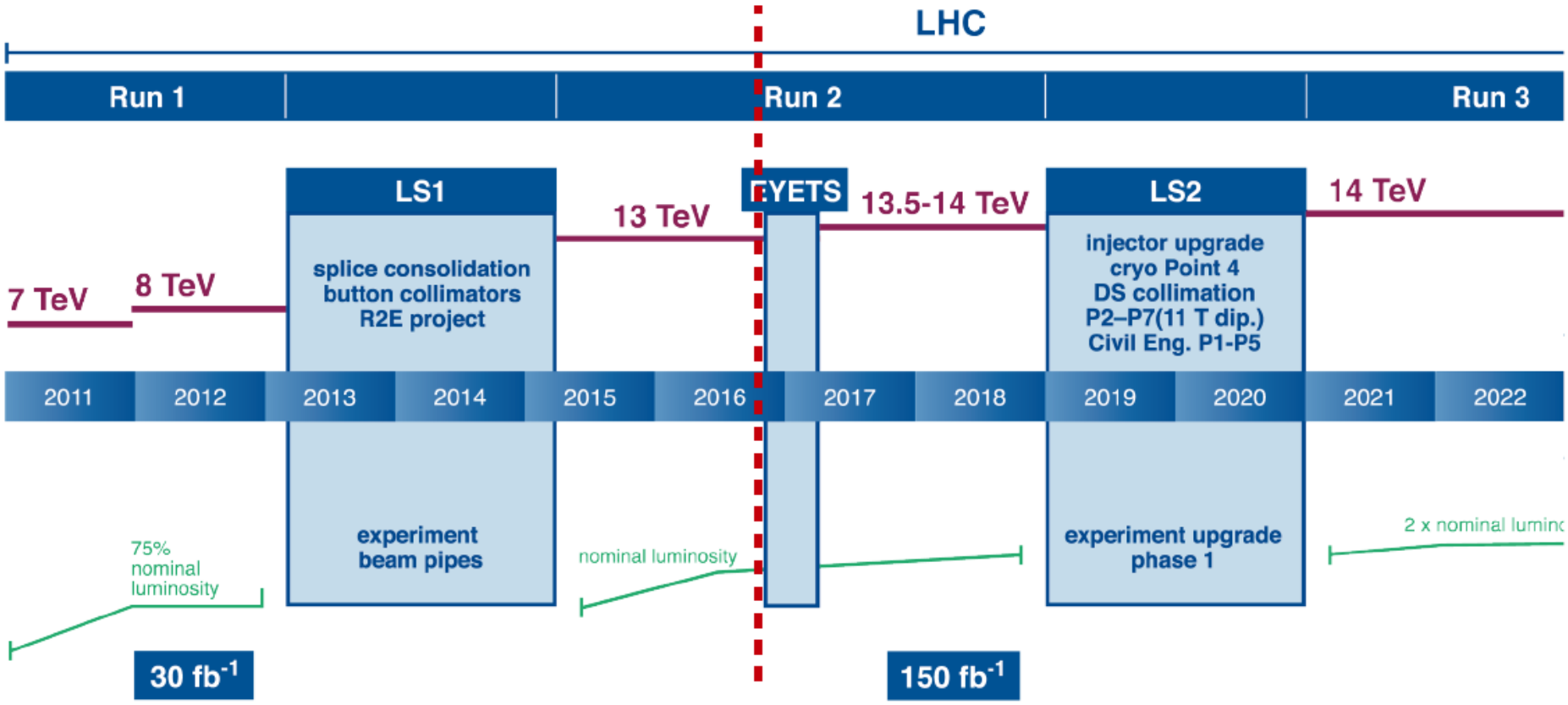
Die Empfehlungen des KET

The European Strategy for Particle Physics
Update 2013

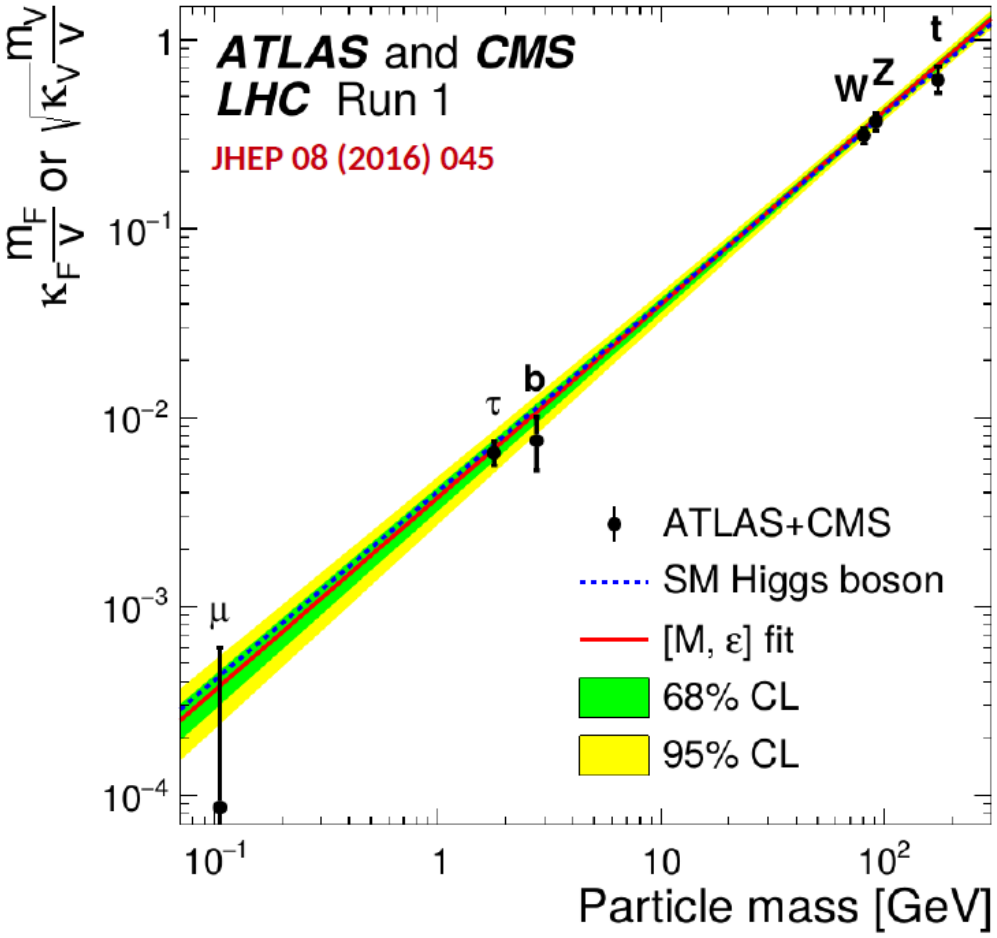
Preamble

Since the adoption of the European Strategy for Particle Physics in 2006, the field has made impressive progress in the pursuit of its core mission, elucidating the laws of nature at the most fundamental level. A giant leap, the discovery of the Higgs boson, has been accompanied by many experimental results confirming the Standard Model beyond the previously explored energy scales. These results raise further questions on the origin of elementary particle masses and on the role of the Higgs boson in the more fundamental theory underlying the Standard Model, which may involve additional particles to be discovered around the TeV scale. Significant progress is being made towards solving long-standing puzzles such as the matter-antimatter asymmetry of the Universe and the nature of the mysterious dark matter. The observation of a new type of neutrino oscillation has opened the way for future investigations of matter-antimatter asymmetry in the neutrino sector. Intriguing prospects are emerging for experiments at the overlap with astroparticle physics and cosmology. Against the backdrop of dramatic developments in our understanding of the science landscape, Europe is updating its Strategy for Particle Physics in order to define the community's direction for the coming years and to prepare for the long-term future of the field.

Highest Priority: LHC



Higgs-coupling vs. particle mass



Future Strategy

- Development of the German future strategy
  - What are the physics topics to address?
  - What are the future HEP projects?
  - Workshop series
    - KET Workshop on future e^+e^--Collider (May 2016 , München)
    - Future of Neutrino Physics (February 2017, Heidelberg)
    - Future non-Collider Projects (April 2017?) (w/o Neutrinos!)
    - Future Hadron Collider (fall/winter 2017)
    - Summary Workshop (spring 2018)
  - Neutrino/non-Collider and Hadron-Collider Workshops are jointly organized with KAT and KHuK
  - Note: Need a broad participation
- Results will be our input for the next European strategy (2019/20)

KET Wo e⁻-Collider

- 2./3. Ma München
- 74 regist
- Producti nse discussio
- Program
  - Theore
  - Linear
  - Summa lusion

KET Workshop on future e^+e^--Collider

- 2./3. May 2016 at MPI für Physik, München
- 74 registered participants
- Productive workshop with very intense discussions
- Program
  - Theoretical introduction
  - Linear and circular collider projects
  - Summary Session with a written conclusion

Conclusions of the e^+e^--Collider Workshop

1. The physics case for a future e^+e^- collider, covering energies from M_Z up to the TeV regime, is regarded to be very strong, justifying (and in fact requiring) the timely construction and operation of such a machine.
2. The ILC meets all the requirements discussed at this workshop. It is currently the only project in a mature technical state. Therefore this project, as proposed by the international community and discussed to be hosted in Japan, should be realised with urgency. As the result of this workshop, this project receives our strongest support.
3. FCC-ee, as a possible first stage of FCC-hh, and CEPC could well cover the low-energy part of the e^+e^- physics case, and would thus be complementary to the ILC.
4. CLIC has the potential to reach significantly higher energies than the ILC. CLIC R&D should be continued until a decision on future CERN projects, based on further LHC results and in the context of the 2019/2020 European Strategy, will be made.

Download the conclusions from the KET webpage

Conclusions of the e^+e^--Collider Workshop

1. The physics case for a future e^+e^- collider, covering energies from M_z u… in fa… m…
2. Th… s cu… is pr… d to be… of th…
3. FC… er th… co…
4. Cl… e IL… pr… 20… European strategy) will be made.

Topic	CEPC	FCC-ee	ILC	CLIC
Higgs Mass, couplings	+	+	+	+
Higgs self-coupling	-	-	+	+
Top physics	-	+	+	+
ew- precision parameters	+	+	+	-
BSM (direct searches)	-	-	+	+
Flexibility to new high mass signal	-	-	-	+
Maturity of project	-	-	+	-
Start by/before 2035	+	-	+	-

Download the conclusions from the [KET webpage]

What is next?

- Neutrino workshop February 23-24, 2017
  - Location: MPI für Kernphysik, Heidelberg
  - Jointly organized with KAT and KHuK
  - Link: https://www.mpi-hd.mpg.de/neutrinos/
- Non-collider projects (w/o Neutrinos)
  - Organization has just started
  - Fix date this week. Very likely April
  - Location: Humboldt University, Berlin

Please encourage especially young physicists to participate!

Software and Computing

- Software has become a basic pillar of HEP-Experiments and theory
- Missing structures for long term availability and maintenance
- International initiative started: HEP Software Foundation
- High quality software requires an educational effort
- Visibility of people strongly involved in software is insufficient
  - New journal: „Computing and Software for Big Science“ (Springer)
- Management of research data
  - Long term storage of raw data, derived data and software used for analyses
  - Publication of data for public usage (Open Data Portal)

contact: M. Elsing, M. Schumacher, C. Zeitnitz

Software and Computing (2)

- Computing resources for the LHC experiments
  - Excellent LHC performance has lead to resource bottleneck (especially for mass storage)
- Long term budget for computing is not secured
  - Complex funding situation due to involved institutions (Helmholtz, Max Planck, Universities)
- Computing is a cross-community topic
  - Already now multiple communities utilise GridKa
- Future computing concepts
  - Discussions started about structures and software framework
  - This has implications for the required hardware and network

topic for all three communities(KAT, KHuK and KET)

Education and Outreach

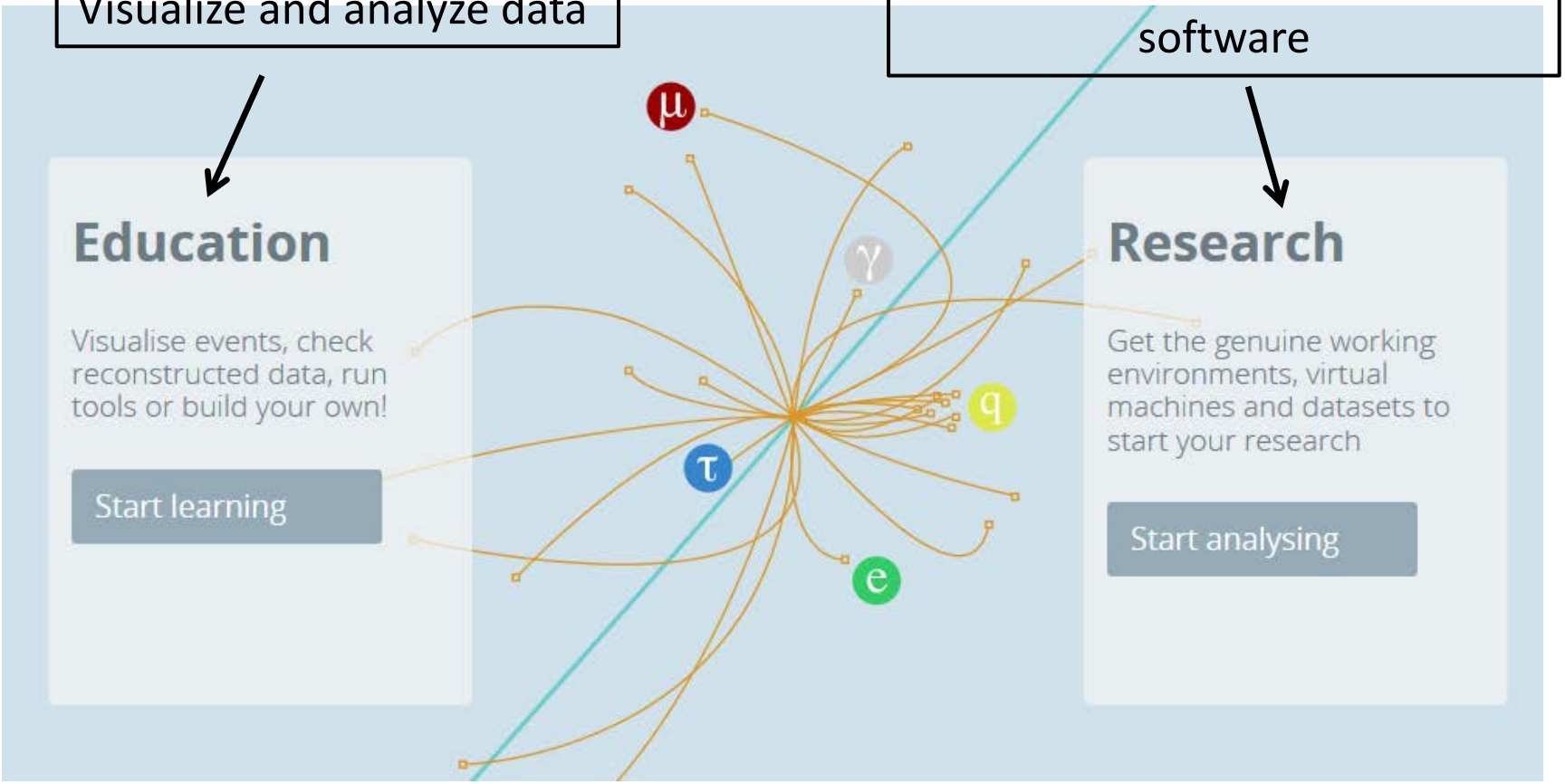
- International Particle Physics Outreach Group (IPPOG)
  - In the name of the HEP community DESY signed the MoU of the IPPOG collaboration
- “Netzwerk Teilchenwelt”
  - Multiple German states introduced particle physics into the school curriculum
  - Educating teachers: long term financial support by Hans-Riegel-Stiftunt (First events early 2017)
  - Lot of material available from the network
- Financial support by the BMBF for FSPs (ATLAS, ALICE, CMS,LHCb): „Spitzenforschung, Erkenntnisvermittlung und Nachwuchsgewinnung aus einer Hand “
- Open Data Portal

contact: M. Kobel, T. Naumann

CERN Open Data Portal

Pupils and students
Visualize and analyze data

Researchers
Data and simulation events and software

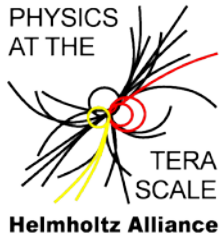


opendata.cern.ch

HEP and the Helmholtz Association

- DESY is the main laboratory for the HEP community in Germany
  - Big important contributions to a variety of experiments
  - Provides infrastructures, e.g. test beam facility
  - LHC-Upgrade of ATLAS and CMS
    - Only German lab with the resources to compete with other international labs to construct major components
  - Major player in accelerator technologies
  - Projects very often done in collaboration with Universities
- KIT (campus north)
  - Provides computing (GridKa) for a broad range of communities
    - Long term financial support not clear!

HEP and the Helmholtz Association (2)



- Legacy of the Terascale Alliance
  - DESY still provides financial resources for the workshop, schools and outreach activities
  - Integral part of the education of young HEP physicists in Germany
  - 10. Annual workshop well attended