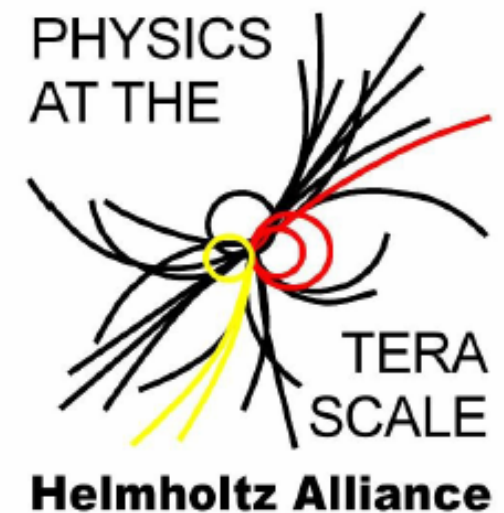


Helmholtz-Alliance and Hamburg/DESY CMS

what does/can/should it mean?



Achim Geiser, DESY, Hamburg/DESY CMS meeting, 19.12.07

Introduction for discussion:

- Goals of Alliance
- Which of our activities could fit these goals?
- Are the structures proposed so far adequate?
If so, how do our activities fit in?
- Should we make specific proposals to make them
fit better?

These slides reflect my current limited understanding of existing and planned structures and people involved
Please correct/complement where necessary

more info: www.terascale.de

Physics at the Terascale

	Physics Analysis	Grid Computing	Detector Science	Accelerator Science
Scientific Goals	Data Analysis - Understanding LHC Detectors - Physics at the LHC - The path to the ILC	Improved Grid - Virtualization - Application-driven monitoring - Development of NAF tools	ILC Detectors - Vertex Detector - Tracking - Calorimetry - Forward Detectors	Optimizing the ILC - Acceleration Technology - Sources - Beam Dynamics
	Analysis Tools - Algorithms and Techniques - Simulation Tools			
	Theory/Phenomenology - Monte Carlo Generators - Precise Predictions - New Models	Data Storage + Retrieval - Mass storage - Data Access	(s)LHC Detectors - Vertex Detectors - Tracking - Trigger - Luminosity Monitor	
Work Packages	Analysis Network - Alliance Working Groups - Monte Carlo Group - Virtual Theory Institute	Virtual Computing Centre - Tier 2 - National Analysis Facility - High performance network	Virtual Detector Lab - VLSI & Electronics - Support Sensor Design & Characterization - Detectors Systems Support	Advancing Accelerator Science
	Analysis Centre at DESY	R&D on Grid Tools: - Mass storage - Collaborative & Interactive tools - User friendliness	R&D Projects	R&D Projects
	Training and Exchange	Grid Training		
04/1	Backbone Activities Management – Young Investigator Groups - Fellowships – Equal Opportunities – Outreach – Interim Professorships			

physics
working
groups

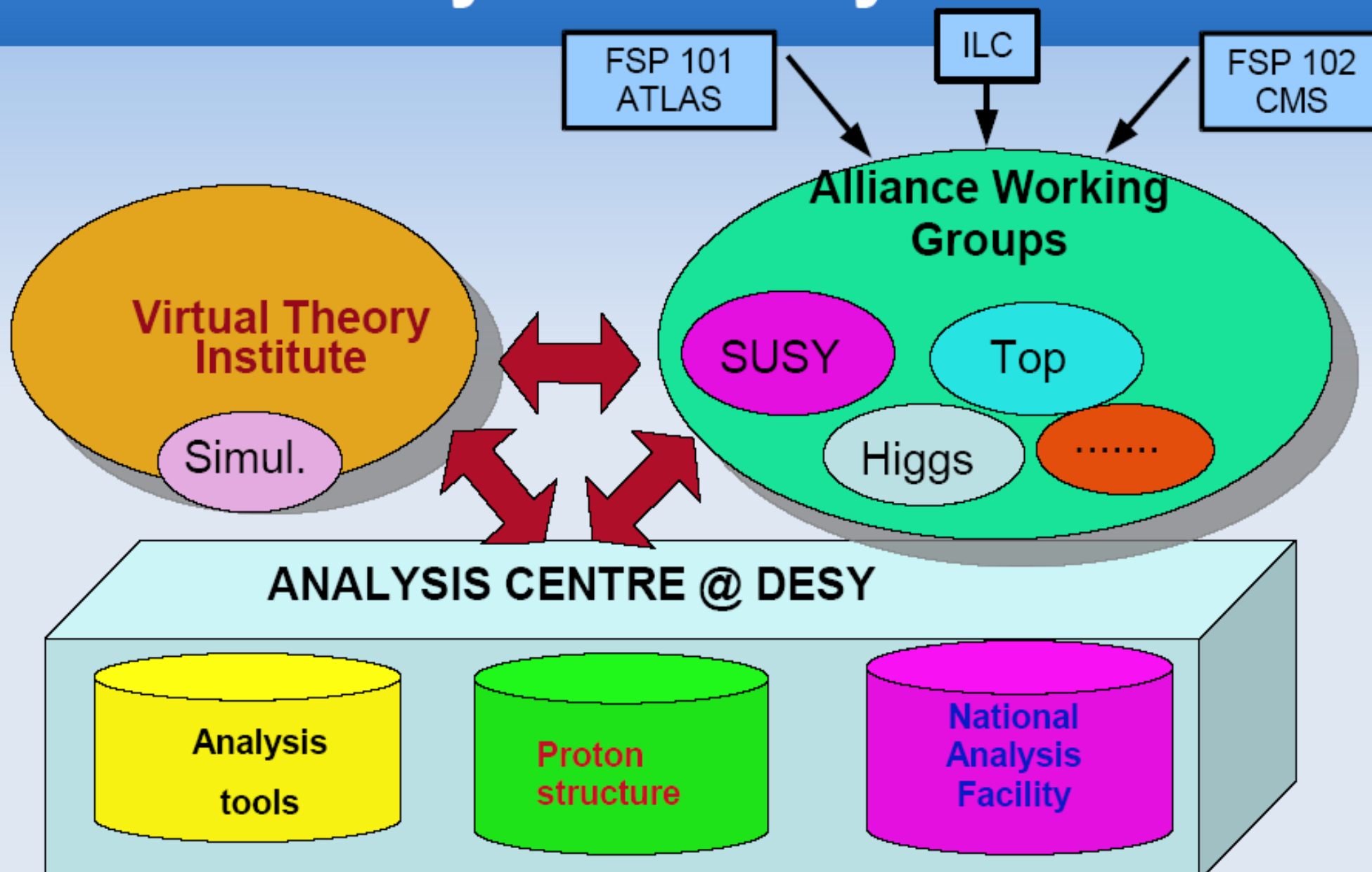
computing

alignment

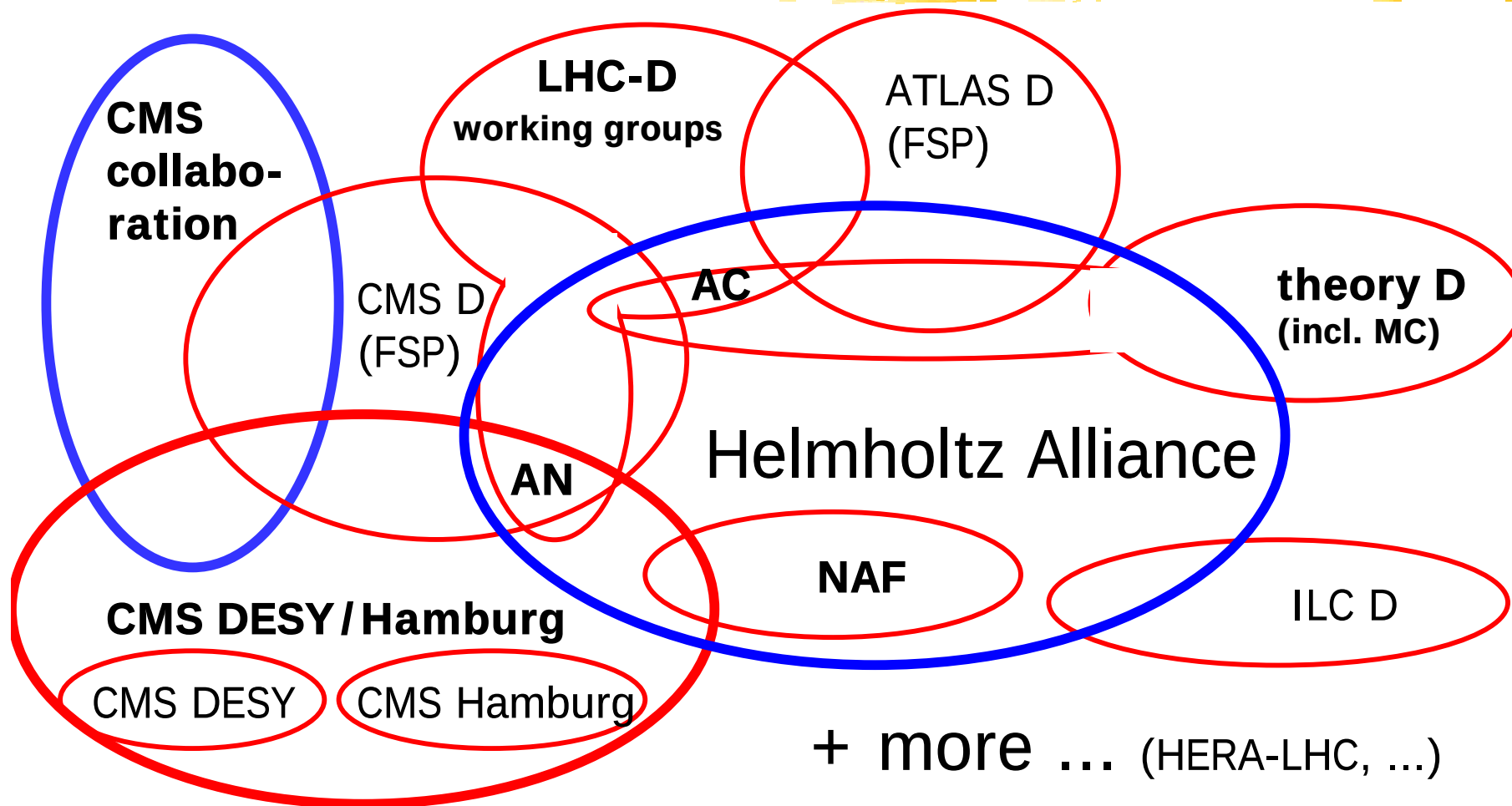
LHC-D

detector

Physics Analysis



Helmholtz Alliance – over-structured?



How can we make it useful
without creating additional layer?

Stated goals of the Alliance

- ... create new and improved structures for particle physics in Germany.
- A structured network ... as a tool for a more effective collaboration, in particular between experimentalists and theorists.
- The Alliance will cover ...
 - fundamental questions of particle physics
 - distributed computing
 - novel detector development
 - accelerator science
- ... creation of common infrastructures (to be used by partners)
- ... strengthen the position of the German groups ... in the international environment
- specific topics include
 - analysis platform ... in conjunction with long term support in computing and analysis tools
 - close collaboration between experimentalists and theorists
 - enlarged collaboration between the experiments, e.g. ... analysis tools, statistical methods
 - new or improved structures for novel detector development

Analysis Network (AN)



- **enable and support common projects and scientific exchange** ... for LHC data analysis and phenomenology
- **Instrument: Analysis Network, ... which allows for the formation of working groups** tailored to the needs of individual research questions ...
- **Analysis center at DESY as a central hub** ...
- **closer collaboration of theorists and experimentalists** ...
- **National Analysis Facility**

- **commissioning and calibration of detectors** (general real-event-based statistical procedures, e.g. using Z, W, tt events; interaction between experimentalists and theorists)

- **LHC data analysis**, e.g. Higgs, SUSY, standard model, top

- **MC tools:**
 - parton level generators
 - parton shower algorithms
 - hadronization tools
 - detector simulation programs

- **statistical methods**

- **theory**, e.g. matching NLO with parton showers

Analysis Center (AC)

■ **National Analysis Facility** -> computing

- make sure that necessary analysis resources are available
- > to be used by the working groups (see later)

■ **MC user support and tuning**

- **statistical tools** (comment: not really useful if this cannot be experiment specific ... investigating)
- people should share their time between research and tools

■ **Parton densities and HERA**

... this is studied within the framework of the HERA-LHC workshop.

The continuation of these studies ... will be strongly supported by the Alliance

- **Training and exchange:** dedicated Alliance guest program for international collaboration
- **interim professorships**
- **tutorials and workshops**
 - introductory tutorials (new students, short)
 - expert tutorials (few days, Diplom, PhD, postdoc)
 - PhD/master training workshops (longer term, different locations)
 - publication workshops
 - **expert workshops -- LHC-D !!!! relabel?**

Alliance working groups

- foster collaboration and knowledge exchange **within** the experimental and the theory communities **and between** the theorists and experimentalists

-> **Alliance working groups**

- better **coordination of analysis activities** among partners
- provision of **direct guidance for PhD and Diploma students** ... by experienced members of the working group
- improved **communication through regular meetings** of these working groups during which questions concerning the progress of the analysis as well as “every day problems” can be tackled for efficiency:
- **small size: 2-3 experienced researchers + up to 5 PhD and Diploma students (“up to 10 people”)**
- **focus on a specific, well-restricted area of the analysis of high energy physics data or their theoretical interpretation**
- **involve physicists from different partners** (e.g. DESY + Hamburg + X)
- long term **expertise on experiment-specific aspects** should be provided through the Analysis Center
- postdocs -> official mandate, results public -> WWW -> **visibility**
- frequent video meetings (+ can ask for **travel funds**)

should we try to integrate our activities into such groups?

(how this should work exactly is not yet well-defined

=> room for influence on defining the rules)

Helmholtz Alliance working groups



proposals requested by Alliance. **Examples** (to be discussed):

- top production cross section from semileptonic decays in CMS
(Hamburg, DESY, Aachen?)
- top mass measurement at the LHC: theory and experiment
(with ATLAS and theory?)
- beauty PDF from HERA and b-induced cross sections at LHC
(with ZEUS/H1, ATLAS, theory?)
- gluon PDF from charm at HERA and top at LHC
integrate existing “Helmholtz Nachwuchsgruppe” (K. Lipka et al.)
into Alliance?? (no duplication!)

Other issues:



- **novel detector development:**
 - **do our CASTOR efforts fit within this scheme?**
- **analysis tools and statistical methods:**
 - **do our tracker alignment and HCAL calibration activities fit within this scheme?**
- **computing activities – how do they fit?**
- **Monte Carlo activities – how do they fit?**