The Statistics Tools Group

in the Analysis Centre of the Terascale Alliance
- Introductory Remarks

First Meeting
of the Statistics Tools Group
19 March 2009

HELMHOLTZ
| GEMEINSCHAFT

PHYSICS
AT THE

TERA
SCALE
Helmholtz Alliance

DESY

Welcome !

ORGANISATIONAL ISSUES

> The Statistics Tools Group:

- Lead by O. Behnke, C. Kleinwort, K. Kroeninger, S. Schmitt

- Many other people contributing (projects, organisation of schools, etc.)

- One dedicated position currently being filled → will have meeting with important players (ATLAS, CMS, group) soon to discuss and define tasks.

> Group meetings

- Monthly

- Both educational and technical / organisational

- Announced mainly via anacentre-statistics@desy.de (please subscribe)

> Further issues

- Further organisation of informal meetings @ DESY

- Fitting workshop end of March!

- Workshop on limits etc. in autumn.

- Numerous projects (see later slide)

STATISTICS PROJECTS

> **As discussed at November meeting (see WIKI pages of Alliance):**

Statistics Projects

site notice:

This page is intended as an overview of ongoing projects in the field of statistics within the Helmholtz Alliance. Please follow the links to the respective project if you are interested in more details.

- RooStatsCms, a combination and limit tool (D. Piparo, G. Schott, G. Quast).
- BAT - a Bayesian Analysis Tool (A. Caldwell, D. Kollar, K. Kroeninger - see also the arXiv paper
- Fittino - a tool for measuring MSSM parameters using collider and low-energy observables (P. Bechtle et al.)
- GFITTER - a generic fitting package for HEP model testing (M. Goebel, J. Haller et al.)
- Millepede II - linear least square fits with a large number of parameters] (V. Blobel)
- lvmini - a fitting tool for large-scale optimization (V. Blobel)
- Unfolding package (S. Schmitt)

> **(One) Aim of the Statistics Tools group:**

- Help turn these projects into accepted and successful tools!

- Contacts to ATLAS and CMS will help!

THE ANALYSIS CENTRE AND ITS GROUPS: TASKS

Member and community support and services

Education: Schools, workshops, seminars, lectures, discussion days
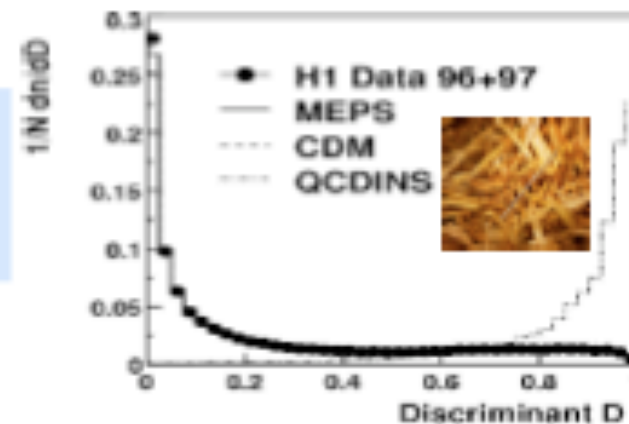
Analysis Centre and its groups

Networking and synergies: Bringing people together

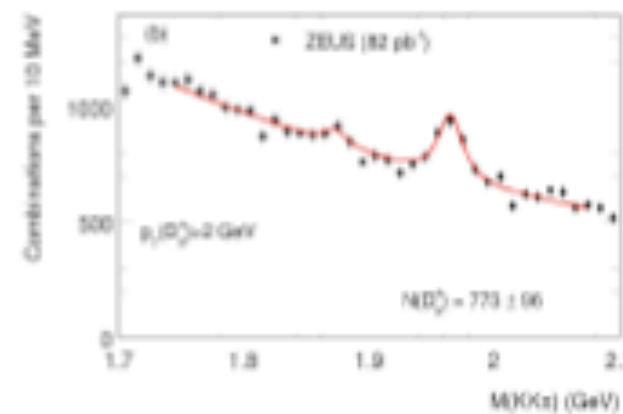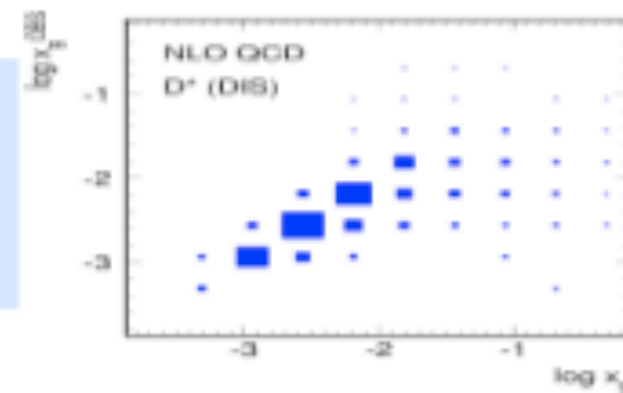Scientific contributions to LHC/ILC (analysis, products, methods, tools)

1. Optimal S/B separation

2. Signal searches, fits & limits

3. Data Corrections (unfolding etc.)

4. Systematic errors & other practical tasks

Phd thesis path

General goal:
To provide **tools, support, education** for physics analyses in ATLAS and CMS and elsewhere!

STATUS (FROM OLAF)

	2008	2009
Education & Events	✔ Miniworkshop 19.6. https://indico.desy.de/conferenceTimeTable.py?confId=1097 ✔ School on statistics Tools 29.9.-2.10. https://indico.desy.de/conferenceTimeTable.py?confId=1149 ✔ Alliance brief software review 20.11. https://indico.desy.de/conferenceDisplay.py?confId=1495	✔ Fitworkshop very soon: 30/3-1/4 ✔ Limits-workshop planned for autumn (hosted by Goettingen/Karsruhe) ✔ Informal monthly meetings (Q & A) every third thursday in month 10h00 ✔ More regular seminars on selected topics **Starting today**
Support	✔ Good ideas... but to be started...	✔ Use common wiki **DOKU** platform in analysis centre: ✔ **Moderated discussion forum** for all kind of statistics questions **Not quite there...**
Tools development	✔ Several project ideas collected ✔ New: Postdoc position **Filled** & can hopefully start soon	✔ Coordinate/develop/implement statistics tools, e.g. in ROOT ✔ Provide platform/visibility for alliance statistics tools

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DESY

THE ALLIANCE "PHYSICS AT THE TERASCALE"

> Motivated by complementarity of DESY and universities. DESY has long-term experience in

- Running large-scale facilities (accelerators, test beams, detector labs).

- Hosting and organising large groups.

- Issues of general relevance like, for example, Monte Carlo and PDFs.

> www.terascale.de: "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 Alliance acts as a tool for a more effective collaboration, in particular between experimentalists and theorists."

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THE ALLIANCE "PHYSICS AT THE TERASCALE"

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

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