Helmholtz Alliance

PHYSICS AT THE TERASCALE

Deutsches Elektronen-Synchrotron DESY +++ Karlsruher Institut für Technologie - Großforschungsbereich +++ Max-Planck-Institut für Physik +++ Rheinisch-Westfälische Technische Hochschule Aachen +++ Humboldt-Universität zu Berlin +++ Rheinische Friedrich-Wilhelms-Universität Bonn +++ Technische Universität Dortmund +++ Technische Universität Dresden +++ Albert-Ludwigs-Universität Freiburg +++ Justus-Liebig-Universität Gießen +++ Georg-August-Universität Göttingen +++ Universität Hamburg +++ Ruprecht-Karls-Universität Heidelberg +++ Karlsruher Institut für Technologie - Universitätsbereich +++ Johannes Gutenberg-Universität Mainz +++ Ludwig-Maximilians-Universität München +++ Universität Regensburg +++ Universität Rostock +++ Universität Siegen +++ Julius-Maximilians-Universität Würzburg +++ Bergische Universität Wuppertal +++

Introductory

School on Statistics Tools 2011

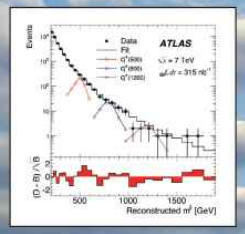
4-7 April 2011

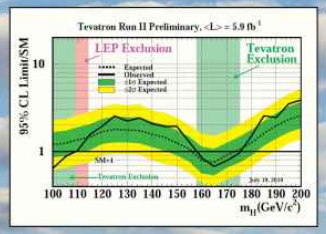
Johannes Gutenberg-Universität Mainz

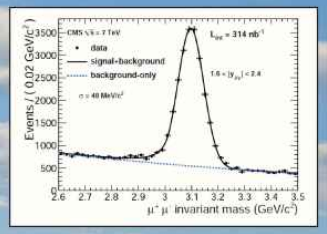
7+8 April 2011: special tutorial: Bayesian Analysis Toolkit (BAT)

The 2011 School on Statistics Tools aims at students and young postdocs wishing to improve their knowledge of basic statistical methods and tools.
The programme comprises lectures and tutorials on the following topics:

- **Probability and basic probability distributions**
- **Parameter estimation and fitting techniques**
- **Limit determination**
- **Data unfolding**
- **Multivariate analysis techniques**
- **Systematic uncertainties and their evaluation**







Organisation: Frank Ellinghaus (Uni Mainz), Gero Flucke (DESY), Thomas Schörner-Sadenius (DESY), Stefan Tapprogge (Uni Mainz)
The school fee is 50 Euro. Registration deadline is 1 March 2011. Special tutorial: extra fee: 10 Euro (http://www.mppmu.mpg.de/bat)
For more details and in order to register, especially on the hotel block reservations in Mainz held until 1 March 2011, please go to the school home page or contact anacen@desy.de

http://www.terascale.de/statistics2011

Welcome to Mainz!

Frank Ellinghaus &
Stefan Tapprogge

Institut für Physik

JOHANNES GUTENBERG UNIVERSITÄT MAINZ

Johannes Gutenberg-Universität Mainz

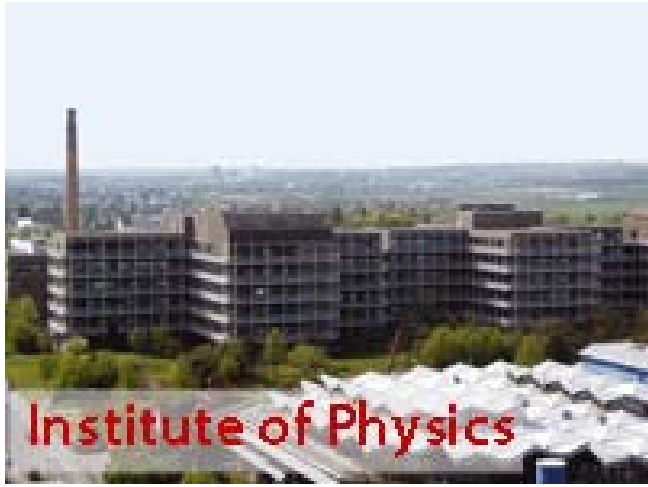
- one of the largest universities in Germany
  - the research center of the federal state of Rhineland-Palatinate
- founded in 1477: one of the oldest German universities
  - named after the famous fifteenth-century printer who revolutionized printing with movable types
- a few numbers
  - ~ 480 professors and ~2,400 academic staff members
  - 10 departments and 150 institutes
    - 9 Collaborative Research Centers, 11 Research Units, and 8 Research Training Groups,
      - funded by the German Research Foundation (DFG),
    - home to the Max Planck Institutes for Polymer Research and Chemistry
  - some 35,000 students, 14 percent of them from abroad
- degree programs for >90 subjects
  - range of courses covers all areas, be it the humanities, social studies, law, economics, or medicine
  - unique integration of the Academy of Fine Arts and the School of Music in the German landscape.

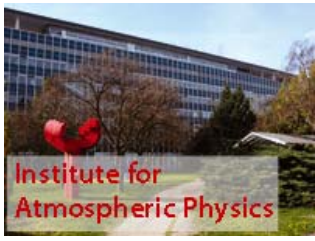
JG|U
JOHANNES GUTENBERG UNIVERSITÄT MAINZ

JOHANNES GUTENBERG UNIVERSITÄT MAINZ

Department of Physics, Mathematics and Computer Science

- ~ 60 professors, ~ 220 academic staff members
- physics research areas (theory and experiment)
  - atmospheric physics
  - atomic physics (incl. quantum optics)
  - solid state physics
  - nuclear and particle physics
- ~ 800 physics students
  - incl. ~ 200 Bachelor/Master of Education (“Lehramt”)
- contribution to
  - six Collaborative Research Centers, 4 Research Units and 3 Research Training Groups
    - all funded by the German Research Foundation (DFG)
  - collaboration with the Max Planck Institutes for Polymer Research and Chemistry
- ETAP group
    - “Experimentelle Teilchen- und Astroteilchen-Physik”
  - about 75 members
  - ATLAS and D0, NA48/62, IceCube, Xenon





Statistics Tools School 2011

chaired by Thomas Schoerner-Sadenius (DESY) , Gero Flucke (DESY) , Stefan Tapprogge (Johannes Gutenberg-Universität Mainz) , Frank Ellinghaus (University of Mainz)

from Monday 04 April 2011 at **13:00** to Friday 08 April 2011 at **12:30** (Europe/Berlin)
at Uni Mainz, Institut fuer Physik

Description The school aims at providing education for the most relevant statistics related tasks, problems and methods for physics data analysis in the LHC era.
It is mainly targeted at Graduate (Diploma/Master) and PhD students.
The sessions consist of lectures interleaved with "hands on" practical work (paper, computer exercises and/or tutorials).
A guided tour to the MAMI accelerator and its experiments completes the program.

The topics covered are:
- General introduction: probabilities, basic distributions
- Parameter estimation, likelihood fits, constrained fits
- Limit determination
- Data unfolding
- Systematic uncertainties
- Multivariate analysis techniques, TMVA
- Optional: Bayesian Analysis Toolkit (BAT)

Agenda

Monday 04 April 2011

13:00 - 18:30 Welcome, Basics, Fitting 1

- 13:00 **Registration** *1h00'*
- 14:00 **Welcome** *15'*
  Speakers: Stefan Tapprogge (Johannes Gutenberg-Universität
- 14:15 **Lecture: Concepts of Statistics** *1h30'*
  Speakers: Roger Barlow (Manchester)
- 15:45 Coffee break *30'*
- 16:15 **Tutorial: Parameter estimation (Fitting) 1** *2h15'*
  Speakers: Olaf Behnke (DESY)

19:00 - 20:00 Reception *1h00'*

Tuesday 05 April 2011

09:00 - 12:30 Fitting 2

- 09:00 **Tutorial: Parameter estimation (Fitting) 2** *45'*
  Speakers: Olaf Behnke (DESY)
- 09:45 Coffee break *20'*
- 10:05 **Tutorial: Constrained fitting** *2h25'*
  Speakers: Christian Sander (University of Hamburg)

14:00 - 18:30 Limits and discoveries

- 14:00 **Tutorial: Limit setting** *2h00'*
  Speakers: Stefan Schmitt (DESY)
- 16:00 Coffee break *20'*
- 16:20 **Tutorial: Limit setting II** *2h10'*

20:00 - 22:00 Dinner *2h00'*

- coffee breaks will be next door
  - registration as well

Wednesday 06 April 2011

09:00 - 14:15 Unfolding and systematics

- 09:00 **Lecture: Unfolding** *1h15'*
  Speakers: Günter Zech
- 10:15 Coffee break *20'*
- 10:35 **Lecture: Systematics I** *1h25'*
  Speakers: Rainer Wanke
- 13:30 **Lecture: Systematics II** *45'*
  Speakers: Rainer Wanke

14:30 - 17:30 Multivariate analysis 1

- 14:30 **Tutorial: Multivariate Analysis Part I** *1h00'*
  Speakers: Christoph Rosemann (DESY Hamburg) , Helge Voss
- 15:30 Coffee break *20'*
- 15:50 **Tutorial: Multivariate Analysis Part II** *1h40'*

18:00 - 19:00 MAMI Guided Tour *1h00'*

Thursday 07 April 2011

09:00 - 12:30 Multivariate analysis 2 and conclusion

- 09:00 **Tutorial: Multivariate Analysis Part III** *1h30'*
  Speakers: Christoph Rosemann (DESY Hamburg) , Helge Voss
- 10:30 Coffee break *20'*
- 10:50 **Tutorial: Multivariate Analysis Part IV** *1h40'*

14:30 - 18:30 Special session: Bayesian Analysis Toolkit 1

- 14:30 **Tutorial: Bayesian Analysis Toolkit (BAT) Part I** *1h30'*
  Speakers: Shabnaz Pashapour (University of Goettingen)
- 16:00 Coffee break *20'*
- 16:20 **BAT Part II** *1h40'*

Friday 08 April 2011

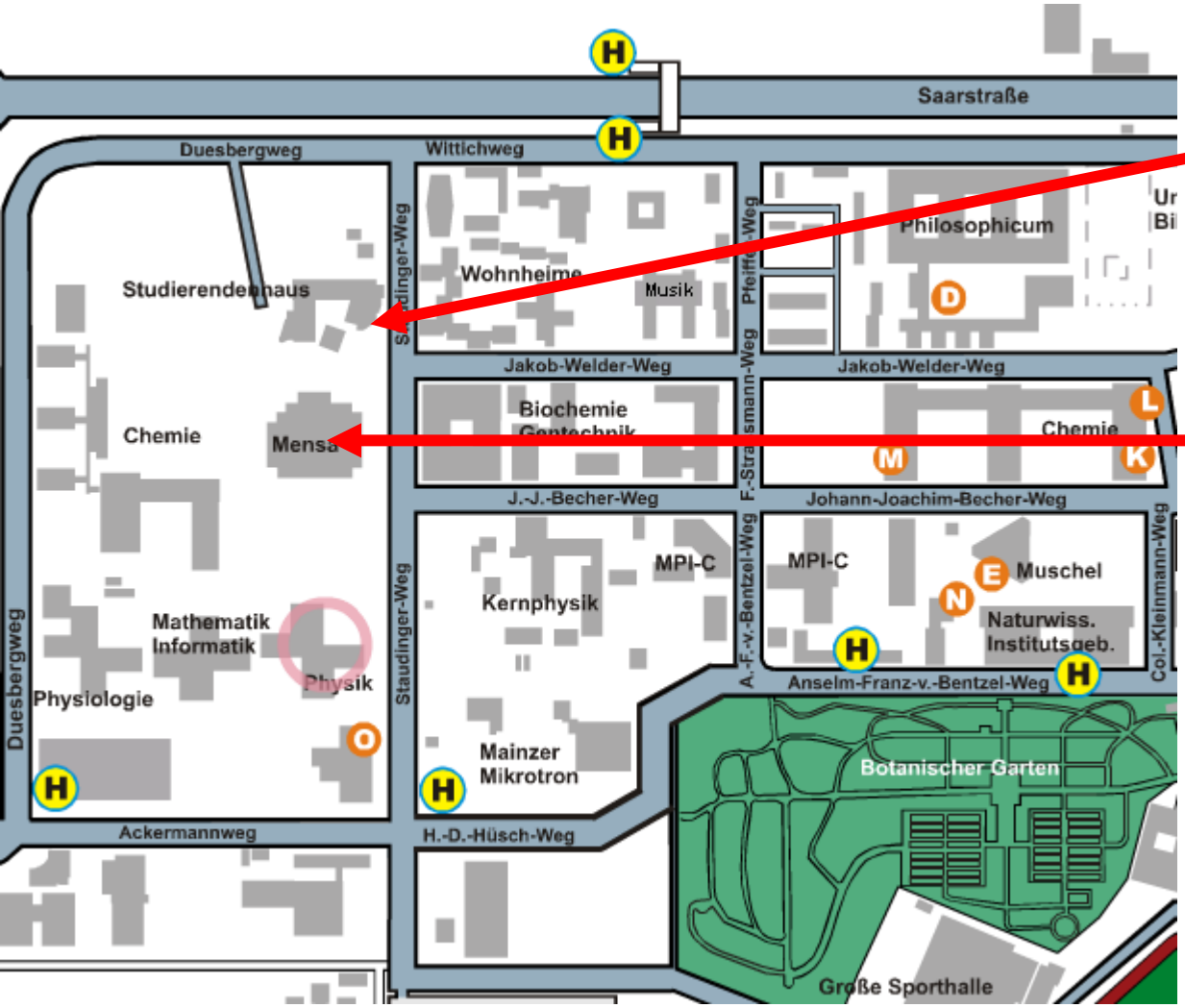
09:00 - 12:30 Special session: Bayesian Analysis Toolkit 2

- 09:00 **Tutorial: Bayesian Analysis Toolkit (BAT) Part III** *1h30'*
  Speakers: Shabnaz Pashapour (University of Goettingen)
- 10:30 Coffee break *20'*
- 10:50 **BAT Part IV** *1h40'*

Logistics

- Wireless: need “ZDV” account
  - registration desk
  - search for network “Winulum” (not encrypted)
  - open a browser
    - https://login.uni-mainz.de should appear automatically
- Alternatively: use “EDUROAM”
- Virtual machine should have been installed and tested beforehand
  - if not done, please check with the experts during the coffee break
    - no VM running – no coffee and no exercises

Lunch options



- Döner Campus
- Mensaria
  - main Mensa can only be used with a special cash card

School dinner (Tuesday, April 5th)

- Restaurant Heiliggeist
  - Mailandgasse 11
  - map and directions on the back of the agenda sheet
  - starting at 20:00

Last but not least

- even before the event has really started …

- support from the HGF Alliance “Physics at the Terascale”
  - non-local organizers: Gero Flucke, Thomas Schörner-Sadenius

- lecturers and tutors
  - Roger Barlow, Olaf Behnke, Shapnaz Pashapour, Christoph Rosemann, Christian Sander, Stefan Schmitt, Helge Voss, Rainer Wanke, Günter Zech
  - Eugen Ertel, Christian Göringer, Julia Grebenyuk, Tobias Hülsing, Fabian Kohn, Sebastian König, Andrea Neusiedl, Christian Schröder, Simon Wollstadt

- you, the participants

- local support
  - Silvia Müller, Rainer Othegraven