HGSFP

NEWSLETTER

Heidelberg Graduate School of Fundamental Physics

No. 7 / February 2012

Main Topics:

Editorial

The last year has been characterized by exceptional activity. In addition to our usual events taking place, we have been deeply involved in taking stock of the entire first funding period (5 years) and preparing ourselves for the next.

The results are simply delightful to see: the scientific output and quality of the research that has been performed in the past years is truly excellent. Our student representatives have, in addition, been extremely active and, with their various initiatives, helped move the School further steps forward. We thank all of you for your active participation and encourage you to keep going on this path of discovery and development.

Do remember that you are always welcome to provide contributions and feedback to us at any time

Sandra Klevansky and Markus Oberthaler

Students report back

■ The year 2011 started with the largest student project within the HGSFP, namely the 4th winter school. This winter school was, like its precursers, a great success. It gave the opportunity to get in touch with other doctoral students within the HGSFP and to learn from different scientific lectures within a unique location in the alps. This winter school is one of the well established events of the HGSFP and the 5th winter school took place in January 2012. Hopefully this event will be continued in the future.

The last year also saw two soccer tournaments, another well established event within the HGSFP, with winning teams coming from KIP and ITP.

An HGSFP student wiki (http://wiki.kip.uni-heidelberg.de/hgsfp/) was launched at the beginning of last year to provide a platform to share information concerning administrative issues, but also to provide help with organizing events. The content of the Wiki is growing and much useful information is already available. However, your help is still needed to improve the Wiki further. The results from the two student surveys that we performed this year can also be found there.

Participants of the 4th HGSFP winter school in Obergurgl

Two additional seminars on »Leadership skills for natural scientists« and an »Introduction to the Institut für Energie- und Umweltforschung (IFEU)« which were organized by Leo Pöttinger, complete the list of student activities 2011.

It is also worth mentioning that ten former and active doctoral students were part of the delegation for the evaluation of the next funding period of the HGSFP. Hopefully they were able to help to get the HGSFP+ approved and therefore to continue and improve the Graduate School further.

We would like to thank all students who contributed to all those projects mentioned above and especially we would like to thank Frederik Schönebeck (ARI) and Valerie Lang (KIP), who have taken over as new representatives (studentreps@gsfp.uni-heidelberg.de). ◀

Timeline HGSFP+

■ A delegation of 25 staff members of the HGSFP, including 10 students/alumni, presented the School´s concept for the coming 5 year period. The outcome – for all universities in Germany – will be announced on the 15th June, 2012. ◀

The »Graduate Days«

■ The spring »Graduate Days« will take place in autumn from the 10th to the 13th April 2012. As usual, one of the highlights of the »Graduate Days« is the Hans Jensen Lecture, which this time will be held by Boris Altshuler, from Columbia University on »How to tell quantum condensates from pendulum clocks?«. The lecture programme this time will again contain one soft skills course together with sets of lectures on various topics in both theoretical and experimental physics. The industry lecture will focus on energy markets - linking physics and finance.

Note that our student representatives also host a students welcome and information evening specially for new students - with helpful tips. Please attend and contribute to making this a lively event. ◀

Moving house

■ The central office of the Graduate School will be moving to the new »Physikalisches Institut« in Neuenheimer Feld in August, 2012. A »Graduate Lounge«, a place for graduate students to meet informally is planned. An inauguration will take place in the 2nd half of 2012. ◀

Carl Bender Visits

■ In April 2012 following the Graduate Days, Carl Bender, who is a joint professor at the Graduate School, will visit us. Students and staff are cordially invited to discuss with him. ◀

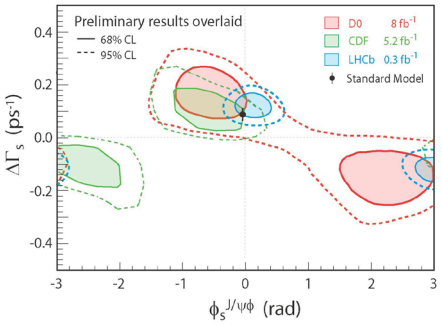
Perspectives in Fundamental Physics

■ A mini symposium on »Perspectives in Fundamental Physics« in which our young research group leaders will present their fields of interests and their results will take place on the 15th February, 2012. This event will take place from 10: 00 - 12:00 in the »Physikalisches Institut« gHS. All are welcome to attend. The topics are: Non-equilibrium properties of thermally isolated quantum systems, complex dynamics of ultracold atoms, galaxies and their environment, and the statistical properties of the cosmic large-scale structures. ◀

B Physics in Focus

■ The LHCb group at the »Physikalisches Institut« will once again host a workshop from the 22nd to the 24th February, 2012, covering an introduction to B Physics in the Standard Model, experimental aspects, statistical methods, precision measurements as well as some neutrino physics. The workshop is organised by Stephanie Hansmann-Menzemer and funded by the HGSFP.

In the plot below, the recent LHCb measurement (blue) of the CP violating phase ϕ_S in the B_S system is shown. The result is consistent with the expected theory prediction within the Standard Model and supercedes previous measurements (red and green). ◀



LHCb measurement of the CP violating phase

Unlocking the Secrets of the Early Universe

■ Understanding the evolution of the early universe from first principles is a central aim of international research activities. The world's largest particle accelerator, the Large Hadron Collider (LHC), can create matter in conditions which were present only a tiniest fraction of a second after the Big Bang. The underlying complex phenomena can be understood using quantum field theories on computers. (The picture gives a schematic illustration of some characteristic stages of the evolution of the universe – NASA/WMAP Science Team).

This represents one field of interest of Jürgen Berges, who is located at the Institute for Theoretical Physics (ITP), Philosophenweg 19, and the Extreme Matter Institute EMMI at the GSI Helmholtzzentrum, Darmstadt. ◀

You're welcome:

... to send us suggestions of topics which you would like to be mentioned in the next newsletter: info@gsfp.uni-heidelberg.de

Valerie Lang

Frederik Schönebeck

Jürgen Berges

Personalia

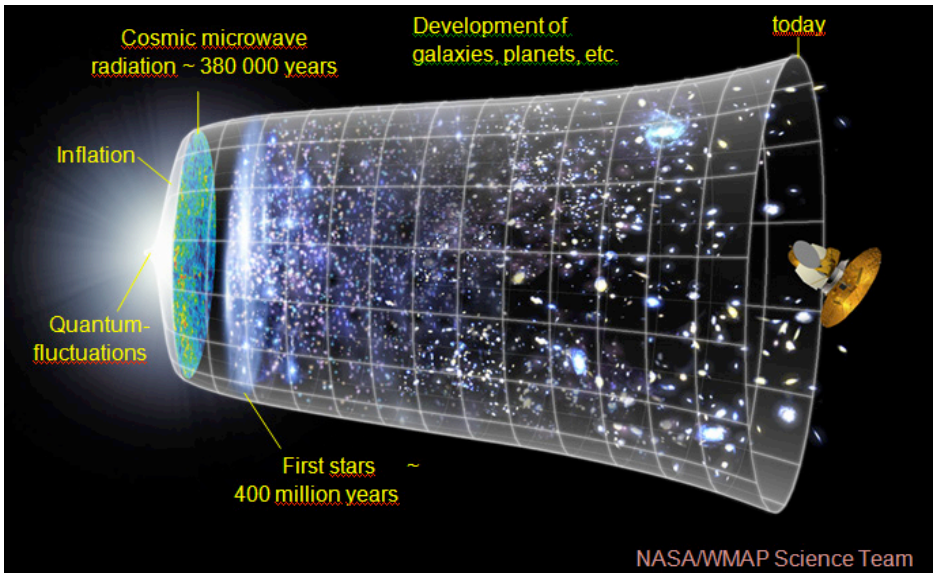
■ In this edition of our newsletter, we introduce our new student representatives Valerie Lang and Frederik Schönebeck, and. profile Jürgen Berges, who has joined us in this semester as a new professor.

Valerie Lang is working in the group of Hans-Christian Schultz-Coulon at the Kirchhoff Institute for Physics. In her doctoral thesis in experimental particle physics she is investigating specific experimental signatures in the ATLAS experiment at CERN with respect to hints of supersymmetry. Physics beyond the Standard Model of particle physics such as supersymmetry can provide explanations for a number of problems ranging from the nature of dark matter in the present day universe up to solving the hierarchy problem.

Frederik Schönebeck is working in the group of Eva Grebel at the »Astronomisches Rechen-Institut«. His fascination with the exploration of space goes back as far as he can remember. Thus it was only a question of time until he decided to contribute his share to today's astronomical research. His focus is set on multi-wavelength high-resolution spectroscopy of nearby globular star clusters in order to determine abundances of a variety of chemical elements, which, in turn, can be used to constrain the time evolution of our Milky Way. We look forward to new ideas from our student representatives!

Jürgen Berges is a theoretial physicist with many interests. His research topics include nonperturbative functional methods, non-equilibrium lattice gauge theory, relativistic heavy-ion collisions (the quark gluon plasma), particle production in the early universe (inflationary universe and reheating), compact stars (colour superconductivity), the dynamics of ultracold quantum gases, phase transitions and critical phenomena.

Jürgen Berges started his studies of physics at Osnabrück University, but changed to Heidelberg to complete his diplom in 1994, his dissertation in 1997 and his habilitation in 2003. Following his dissertation, he spent the years 1997-2000 at the Center for Theoretical Physics, MIT, Cambridge, USA. After having a further position in Heidelberg from 2000-2006, he took up a professorship at Darmstadt University of Technology. He has joined the Institute of Theoretical Physics in Heidelberg in conjuction with the Extreme Matter Institute EMMI ◀



Evolution of the Early Universe

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