ÖAW
Österreichische Akademie der Wissenschaften

Institut für Quantenoptik und Quanteninformation
Österreichische Akademie der Wissenschaften

MINISYMPOSIUM

FUTURE ASPECTS OF HIGH ENERGY PHYSICS

within the search for a Director of the Institute for High Energy Physics of the Austrian Academy of Science

28 – 29 SEP 2011

Ort: Faculty of Physics, Ernst-Mach-Hörsaal, 2nd Floor, Boltzmanngasse 5, 1090 Vienna

Claudia-Elisabeth Wulz (Institute of High Energy Physics, Vienna)**,** 28.09.2011, 13:30 - 14:15

Beyond Energy and Precision Frontiers - Shaping Austria's Future in Particle Physics

Intriguing physics results have emerged in the recent past. Data from the Tevatron and the LHC have possibly revealed glimpses of new particles. Neutrinos may travel faster than we believed. Neither supersymmetry nor other thought to be easy discoveries have materialized so far. The asymmetry between matter and antimatter needs to be further explored. Now is the time to look forward, to consider new models and event signatures, to redefine data analysis strategies, and to revisit planned experimental facilities and upgrade programs of current detectors. High-precision measurements will open a complementary path to new physics in the era of the LHC.
Austria must strive to be a major player in shaping the science of tomorrow. The Institute of High Energy Physics and the Stefan Meyer Institute are already contributing significantly, and, within the larger context of the planned Vienna physics centre, there is the chance to build up a unique institution that will help to transcend the current energy and precision frontiers.

Hans-Christian Schultz-Coulon (Kirchhoff-Institut für Physik, Heidelberg), 28.09.2011, 14:15 – 15:00

New Dimenions in Particle Physics

The start of the Large Hadron Collider (LHC) marks a new era of particle physics with the chance to reveal the secret of electroweak symmetry breaking and potentially discover new physics beyond the so-called Standard Model (SM). The expectations are huge. During the first 1.5 years the LHC experiments have recorded and analysed a great wealth of data showing up to now no hint for non-SM physics. The talk will give a brief status on performance and results from the ATLAS experiment; new ideas concerning a detector upgrade will also be presented. In addition, some recent developments concerning calorimetry and the application of silicon photomultipliers in future experiments are introduced.

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Stephanie Hansmann-Menzemer (Institute of Physics, University of Heidelberg), 28.09.2011, 15:30 - 16:15

t.b.a.

Marco Battaglia (University of California, Berkley), 28.09.2011, 16:15 - 17:00

t.b.a.

Frank Simon, (Max-Planck-Institute of Physics), 29.09.2011, 13:30 – 14:15

Discovery and Precision - Collider Physics at the IPP

With experiments at high energy colliders, particle physics is investigating the properties and the interactions of the fundamental building blocks of the Universe. Over the next years, discoveries are expected that will provide insight into the generation of mass, the origin of the matter dominance in the Universe and the nature of Dark Matter. HEPHY is well positioned to participate in this exciting phase, with the high discovery potential of CMS at the Large Hadron Collider and with precision measurements in the flavor sector with Belle and Belle-II at KEK. I will discuss a program that continues the combination of discovery and precision at the IPP in these projects, and provides a long-term perspective for particle physics at the energy frontier through a participation in future collider experiments.

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Ulrich Uwer (Institute of Physics, University of Heidelberg), 29.09.2011, 14:15 - 15:00

Probing Physics beyond the Standard Model with B Decays: Results from the LHCb Experiment

In the Standard Model, many rare b hadron decays are the effect of quantum-loop corrections. New contributions to the quantum-corrections from physics beyond the Standard Model can significantly alter the predicted decay properties of the heavy mesons. A comparison of precisely measured B properties with the Standard Model predictions allows therefore the search for new phenomena.
The LHCb experiment is a dedicated experiment to study b hadron decays at the LHC and exploits the unprecedented production rate of b hadrons in the high-energy proton-proton collisions of the LHC. First results of key measurements with high sensitivity to new physics phenomena will be discussed. The presentation concludes with an outlook on precision tests in the heavy flavor sector.

Martin zur Nedden (Humboldt Universität zu Berlin), 29.09.2011, 15:30 – 16:15

"Perspectives of Particle Physics in the Era of the Large Hadron Collider"

With the successful start of the LHC at CERN a new long term era for particle physics has been opened. This covers a large potential for fundamental discoveries to face open basic questions of particle physics.
With the first high quality data collected in 2011, sustainable tests of the Standard Model and of new theories for new physics alike could be realised.
The recent results will have a major influence on the research programs in the decade to come. This concerns not only the LHC, but also the upcoming projects as Belle II and the facility for antiproton and ion research FAIR in Darmstadt.
With respect to the rich research activities available at Vienna in the field of fundamental physics, this is a unique opportunity bringing together the different activities and to benefit from the mutual knowledge.

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Jochen Schieck (Ludwig-Maximilian-University, Munich), 29.09.2011, 16:15 - 17:00

Flavor - not a Matter of Taste

Currently all measurements in particle physics are in agreement with the standard model of particle physics and no significant deviation has been observed yet. However, we also know that the Standard Model is not able to provide answers to all open questions, like for example the baryon asymmetry in the universe. With the startup of the Large Hadron Collider at CERN the door to a new energy regime was opened, leading to a new era in particle physics. Besides the search for new phenomena at large scales, precision measurements in flavor physics offer a complementary path in the quest for physics beyond the Standard Model. I will discuss B-physics measurements using the ATLAS experiment at the LHC and will give an outlook on the upgrade of the Belle experiment at the KEK in Japan. This experiment offers an orthogonal approach in the search for new physics and might offer new insights in some of the open questions. Moreover this new generation of high precision experiments raises new challenges in the development of new detector technologies.