

**Report to the IUPAP Council and Commission Chairs Meeting of IUPAP
Rio de Janeiro, October 5/6, 2007**

The work of the commission is carried out through regular monthly phone conferences of the Chair, Vice-chair and the secretary. The yearly commission meeting has been held during the XXIII International Symposium on Lepton-Photon Interactions at High Energy (LP07) in Daegu/Korea on August 16, 2007. For this report to IUPAP a short summary is given about recent developments in particle physics and about the main activities of C11.

Recent developments in Particle Physics

During the past year there have been several interesting developments in the field of accelerator based particle physics. At two Electron-Positron Colliders in KEK, Japan, and SLAC, USA, the decay properties of hadrons containing the heavy b-quark are studied. The measurements of the CP violation and the determination of the elements of the CKM quark mixing matrix have reached a precision which is better than expected at the start of the project. These measurements provide a very stringent test of the standard model of particle physics.

Important results of b-quark physics have also come from experiments at the Tevatron, Fermilab, USA. For the first time the mixing parameters of B_s – mesons could be measured, providing a further test of the validity of the Standard Model. The same experiments have also improved their data on top-quark production and decay. Because of the increase of luminosity at the Tevatron the experiments will be sensitive soon to the production of the hypothetical Higgs Boson. Depending on its mass the Tevatron experiments could find a signal prior to the start of the LHC.

An important milestone has been reached in 2007 with the completion of the HERA program on electron-proton collisions at DESY, Hamburg. For more than 10 years these experiments have provided a stringent test of the strong interactions and have helped to establish Quantum Chromodynamics (QCD) as the theory of strong interactions. The results of HERA on the quark and gluon content of the proton will provide crucial input for the measurements at the Large Hadron Collider (LHC).

Another active area of research is the study of neutrino properties. After the discovery of neutrino oscillations several years ago the focus is now on the precise determination of the elements of the neutrino mixing matrix. These experiments are done with neutrino beams from accelerators, reactors and astrophysical sources as well as radioactive decays.

The construction of the LHC accelerator and the experiments proceeds well and the particle physics community looks forward to 2008, when the LHC will start with high energy proton-proton collisions. The LHC will increase the accessible center-of-mass energy by nearly one order of magnitude and will be able to probe for the first time the

TeV energy range, where many models of particle physics predict completely new types of elementary particles.

A lot of activity is devoted to the R&D for future accelerators and detectors. A very active field is the development of technology for a high energy linear electron-positron collider, based on well advanced superconducting RF technology (ILC) or novel two-beam accelerating schemes (CLIC). In addition, intensive R&D is conducted to produce high intensity neutrino beams and neutrino factories with the long term goal to fully measure the neutrino mixing matrix and to explore CP violating effects in the neutrino sector.

The interaction between particle physics and astrophysics continues to yield interesting new results in the fields of cosmology, astrophysical origin of cosmic rays, gamma ray astronomy, neutrino astronomy and dark matter searches. These fields profit from the combined competence of particle physicists and astrophysicists.

The research activity proceed in close cooperation between experiment and theory. During the past year a lot of theoretical activity has gone into the interpretation of recent measurements with the aim to test the standard model (SM) and to place limits on models predicting effects beyond the SM. A variety of new theoretical approaches for theories beyond the SM have been proposed, awaiting the verdict of the LHC about the path which nature has chosen. Another field of theoretical particle physics, the lattice gauge calculations of low energy strong interactions, has made significant progress in the past years and provides now very stringent tests of the theory of strong interactions, the Quantum Chromodynamics (QCD).

Sponsored Conferences

Traditionally C11 is involved in the preparation and supervision of the two major international Conferences in Particle Physics, the International Conference of High Energy Physics (ICHEP) and the International Symposium on Lepton-Photon Interactions at High Energy (LP). Both conferences are held in alternative years. In 2007 the LP07 has been held in Daegu /Korea. In the coming years the main conferences will be ICHEP08 in Philadelphia/USA and LP09 in Hamburg, Germany. Traditionally IUPAP has only sponsored the ICHEP and LP conferences in particle physics. This year C11, together with C4 and C12, proposes in addition for sponsorship the XXIII International Conference on Neutrino Physics and Astrophysics in Christchurch, New Zealand.

Instrumentation Conference

Research and development for instrumentation in particle physics and related fields is a very active field. Despite of the close international collaborations of many research groups and the intensive preparation for global projects, like the International Linear Collider (ILC), the field of particle physics lacks a large and truly international conference on instrumentation. Therefore C11 has taken the initiative to establish such a conference. It will be based on the successful SLAC Novosibirsk Instrumentation

Conference (SNIC), but will be extended in scope and it will be truly international. The new name of the conference will be Technology and Instrumentation in Particle Physics (TIPP). The first conference of this series will be held at KEK, Japan, 12-17 March 2009. C11 will ask IUPAP for sponsorship of TIPP09 as type B conference.

ICFA

There is close communication between C11 and ICFA. The membership of ICFA is updated and confirmed by C11 on a regular basis. ICFA has submitted a report to IUPAP. Therefore ICFA activities are not reported here in further detail.

Young Scientist Prize

The first Young Scientist Prize in Particle Physics will be given during the ICHEP08 summer conference. Letters will be sent out in the fall in the fall 2007 to encourage nominations for the prize.

Working group on assessment of scientific achievements

C11 has initiated a new working group on assessment of scientific achievements in particle physics. The motivation is that with the increasing size of experiments in particle physics it will be more difficult to assess the scientific achievements of individuals. C11 sees a clear disadvantage of particle physicists compared to other fields in competing for academic positions, prizes and promotions. In general, the criteria used to assess the scientific achievements are mainly based on publication lists and impact factors of papers with few authors, clearly disfavoring fields of science, where large international collaborations are required to make significant progress in the understanding of nature. The aim of the working group is therefore to propose further criteria which should be taken into account in assessing the scientific achievements of scientists, who perform their research in large research group. The working group consists of representatives from C11 and members of the large HEP collaborations. The first WG meeting has taken place during the LP07 Conference in Daegu. The final report is expected for the summer 2008. The findings of the WG could be model for other fields in science, where large collaborations are needed.

September 29, 2007

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Chair of C11