

Activities of the Commission on Particles and Fields (C11)

November 2011 – October 2012

Hiroaki Aihara C11 Chair

1. Young Scientist Prize

The 2012 Young Scientist Prizes have been awarded to two experimentalists:

Dr. Tepei Katori (MIT) for his outstanding contributions to accelerator-based neutrino physics including a detailed measurement of the charged-current quasi-elastic scattering process with the MiniBooNE experiment and a search for possible Lorentz invariance violation, and

Dr. Phillip Urquijo (Bonn) for his broad contributions to heavy quark physics including a precise determination of the CKM elements V_{ub} and V_{cb} with the Belle experiment and measurements of the $pp \rightarrow bb$ cross section, b-hadron production fractions and the first observation of the $B_s \rightarrow D_{s2}^{*+} X_{\mu\nu}$ decay with the LHCb experiment.

2. Commission meeting

C11 meeting was held during the 36th International Conference on High Energy Physics, 4-11 July 2012 in Melbourne Australia. The committee reviewed reports from recent IUPAP-sponsored conferences (LP2011, ICHEP2012, NEUTRINO2012 and IPAC2012) and preparation status for future ones (LP2013, TIPP2014, ICHEP2014, NEUTRINO2014 and IPAC2013). The committee also decided that the venue of LP2015 be in Ljubljana, Slovenia.

3. ICFA: International Committee for Future Accelerators

The report on activities of the International Committee for Future Accelerators (ICFA) is provided separately and attached.

Activities of the International Committee for Future Accelerators (ICFA)

July 2011 – July 2012

Roy Rubinstein – ICFA Secretary

1. Introduction

During the past year there were three ICFA meetings: on 24 August 2011 during LP2011 in Mumbai; on 4 October 2011 during the ICFA Seminar at CERN; and on 2/3 February 2012 in Oxford. At the February meeting, which is the major annual ICFA meeting, directors of the world's leading particle physics laboratories were also invited, as has been the practice for the past ~ 2 decades. This allows a much more extensive discussion of the present and future status of particle physics.

The current ICFA membership is given in Appendix I.

2. Particle Physics---A Global Picture

A document, titled "Discovery's Horizon", was produced in October 2011 by ICFA to provide a global picture of particle physics. The key messages are: the compelling science of the field, with new tools providing the opportunities for discoveries not previously possible; accelerators and experiments are beyond the reach of a single region to build and operate; and particle physics gives a good example of cooperation in an international arena. The document was first presented publically at the ICFA Seminar held in October 2011; it is available at <http://www.interactions.org/beacons/>

3. ICFA Seminar

ICFA Seminars are held every three years, with the most recent being at CERN on 3-6 October 2011; these four-day Seminars allow for an international exchange of information primarily on plans for future facilities in the field of particle physics. Typical attendance is 150-200 invited leading members of the fields of accelerator and particle physics, together with leaders from related topics such as astroparticle physics, scientific computing, outreach, etc. Representatives of government funding

agencies are also invited. The agenda and transparencies of the October 2011 Seminar are available at

<https://indico.cern.ch/conferenceOtherViews.py?showSession=all&showDate=all&view=standard&confId=113370>

The next Seminar will be held in 2014 at IHEP/Beijing.

4. ILCSC

The International Linear Collider Steering Committee (ILCSC) was set up by ICFA to facilitate the global collaborative effort on the ILC.

There has been a wide-ranging discussion in ILCSC on how ILC planning should proceed after completion of the accelerator and detector design documents in late 2012 and their review. Although the discussion is still ongoing, with completion expected in summer 2012, the following is the current thinking:

- A Linear Collider Board (LCB) will be formed under ICFA to promote the construction of an electron-positron linear collider and its detectors as a world-wide collaborative project; it will replace the existing ILCSC. The timing and content of a linear collider proposal will be shaped by LHC physics data
- A Linear Collider Director, reporting to the LCB, will lead the global effort towards construction of a linear collider
- Under the Linear Collider Director will be three organizations:
 - (i) One to continue the GDE work on a superconducting RF linear collider
 - (ii) One to continue the CLIC work on a room-temperature two-beam linear collider
 - (iii) One to design and coordinate R&D on detectors for a linear collider

GDE has studied the governance of existing large science projects, and has produced recommendations on the governance of a future ILC.

In 2008, ILCSC set up the Project Advisory Committee (PAC) to assist it in the oversight of both the GDE accelerator activities and the ILC detector activities. The PAC holds two-day reviews of the status of the accelerator and detector work twice a year; its reports are made to ILCSC and are publicly available on the Web.

5. ILC: Accelerator

Significant progress has been made on SCRF cavity gradients over the past year, with the cavity yield at the goal gradient of 35 MV/m now 70%; 90% yield is expected by the time of the Technical Design Report (TDR) at the end of 2012. The TDR will contain an updated ILC cost estimate, and much current effort is going into cost control of the accelerator design.

6. ILC: Detectors

Both of the ILD and SiD detector collaborations have produced interim reports on their detectors, and the Detailed Baseline Design (DBD), which will include cost estimates, will be completed by the end of 2012. The collaborations are studying detector performance at 1 TeV, and CLIC is using modifications of these detector designs for a higher energy collider. There have been significant documented spin-offs from ILC detector R&D.

7. International Committee for Ultra Intense Lasers (ICUIL)

A joint task force between ICFA and the IUPAP International Committee on Ultra-High Intensity Lasers (ICUIL) has been set up to study the laser acceleration of particles. Several workshops have been held, and a White Paper on the topic has been produced on such accelerators and the technical challenges that still need to be overcome. In addition to particle physics accelerators, other possible uses are for radiation sources and medical accelerators. A key question at present is whether powerful enough lasers could be built which would make these projects feasible.

8. Neutrino Facilities

Several years ago the topic of future facilities for neutrino physics was brought to ICFA, and ICFA declined to become involved until there was a consensus in the community on which such facilities were needed. The field has progressed significantly since then, and the large fluxes of electron neutrinos from a neutrino factory could substantially advance this increasingly important area of particle physics. An interim neutrino factory report was produced in 2011 by an international design study, and the cost of such a facility will be completed early in 2013. ICFA is currently considering what it can do to further these efforts.

9. Reports

Reports were presented to ICFA meetings on activities of ICFA's Panels, and of each country and lab represented at the meeting; there were also reports given on InterAction (the particle physics communicators' organization) and the status of the CLIC project.

ICFA MEMBERSHIP

July 2012

CERN Member States

R. Heuer
M. Krammer
J. Mnich

USA

R. Brock
P. Drell
P. Oddone (Chair)

Japan

S. Komamiya
A. Suzuki

Russia

A. Bondar
S. Ivanov

Canada

W. Trischuk

China

Y. Wang

Other Countries

G. Alves
A. Roy
V. Tsakanov

C11

H. Aihara

(Secretary: R. Rubinstein)