

## INTERNATIONAL LINEAR COLLIDER

### Memorandum of Understanding for the Global Design Effort

#### Preamble

In response to the interest of the worldwide elementary particle physics community in TeV scale physics, the International Linear Collider Steering Committee (ILCSC), a subcommittee of the International Committee for Future Accelerators (ICFA), is exploring research and development (R&D) efforts towards a 500 GeV to 1 TeV electron-positron linear collider. The ILCSC intends to globalize the International Linear Collider (ILC) technical design effort and broaden collaborative efforts internationally and interregionally as well as with national laboratories and universities.

Major laboratories around the world have invested substantial R&D efforts in ILC technology for more than ten years and a number of test facilities have been developed, including the Next Linear Collider Test Accelerator (NLCTA) at SLAC in the United States; the Accelerator Test Facility (ATF) and the Global Linear Collider Test Facility (GLCTA) at KEK in Japan; and the TESLA Test Facility (TTF) at DESY in Germany.

Significant resources have been devoted to the technical preparation of the Linear Collider and numerous design reports and cost estimates have been generated in Asia, Europe and the United States. Based on R&D developments, the ILCSC created an International Technology Recommendation Panel (ITRP) that has recommended the linac technology on which the ILC design is to be based, and this recommendation has been accepted by ICFA.

A Linear Collider in the 500 GeV to 1 TeV energy range is complementary to the Large Hadron Collider (LHC) currently under construction at CERN because the Linear Collider would be capable of performing well-defined precision measurements on phenomena discovered by the LHC, as well as having the potential to make its own discoveries. In addition, the ILC would provide essential elements for the understanding of TeV region physics which are needed to advance the frontiers of high energy physics. The physics programs contemplated for the ILC would be synergetic were they to run in parallel with the physics program at the LHC. For this reason, the high-energy physics community seeks to move forward swiftly toward construction.

The Meeting of the Organization for Economic Co-operation and Development (OECD) Committee for Scientific and Technological Policy at the Ministerial Level held in January 2004 noted the world-wide consensus of the scientific community, which has chosen an electron-positron linear collider as the next accelerator-based facility to complement and expand on the discoveries that are likely to emerge from the LHC. The ministers agreed that the planning and implementation of such a large, multi-year project should be carried out on a global basis, and should involve consultation among not just scientists, but also representatives of science funding agencies from interested countries.

#### 1. Nature of this Memorandum of Understanding (MOU)

This MOU establishes an understanding of the collaborative effort among the Parties. It does not constitute a legal contractual obligation on the part of any of the Parties. The Parties' rights and obligations in carrying out the tasks are governed by their contractual agreements with their

respective funding agencies and the controlling laws, regulations and policies of their respective governments.

## **2. Definitions**

For purposes of this MOU:

- (a) “Cooperative activity” means any activity which the Parties recognize as being pursuant to this MOU, and includes joint research;
- (b) “Information” means scientific or technical data, results or methods of research and development stemming from joint research, and any other data relating to cooperative activities;
- (c) “Intellectual Property” shall have the meaning in Article 2 of the Convention establishing the World Intellectual Property Organization, done at Stockholm, 14 July 1967 and subject to the annexes which would be negotiated by each Party in the future and attached to this MOU;
- (d) “Interregional” means supranational entities, including international groups, from various geographical regions of the world;
- (e) “Joint research” means research recognized by the Central Team Director as relevant to the goal, that is implemented with financial support from one or more Parties and that involves collaborative research and is designated as joint research in writing by the Parties or their scientific and technological organizations and agencies, or in the case where there is funding by only one Party, by that Party and the participants in that project; and,
- (f) “Parties” means scientific and technological organizations, research centers, universities, or other legal entities, which provide direct financial support to the cooperative activities and recognize the management structure, established by ICFA, and sign this MOU.

## **3. Purpose of this MOU**

The purpose of this MOU is to provide a framework to internationalize the technical design of the ILC. To further this effort, the Parties agree to initiate jointly the Global Design Effort (GDE) for the ILC along the general lines of the “Report of the ILCSC Task Force for Establishment of the International Linear Collider Global Design Initiative,” dated March 31, 2004. (Attachment 1). The structure of the organization to be established under the GDE and relevant to this MOU will be outlined in an annex which will become an integral part of this document.

The initial task of the GDE is to develop a Conceptual Design Report (CDR), and detail the R&D work needed to complete the Technical Design Report (TDR) for the ILC.

## **4. Parties’ Undertaking**

4.1. The Parties agree to:

- (a) Provide such resources as the Parties deem appropriate to cooperative activities, including the support of the Central Team Directorate;

(b) Undertake R&D, design, and pre-industrialization activities under the guidance of the Central Team; and

(c) Support the cost-estimating effort.

4.2 Cooperative activities shall be conducted on the basis of the following principles:

(a) Mutual benefit based on an overall balance of advantages;

(b) Reciprocal opportunities to engage in cooperative activities;

(c) Equitable and fair treatment;

(d) Timely exchange of information which may affect cooperative activities; and

(e) All work performed by a Party as part of the ILC collaboration would be consistent with the laws, regulations, policies and programs of the Party's government and its funding agencies.

## **5. Funding**

(a) Cooperative activities shall be subject to the availability of appropriated funds and to the applicable laws, regulations, policies and programs of the Parties' governments.

(b) Cooperative activities are supported by funding of the Parties, which shall attempt to secure reasonable funding to allow for the successful and timely completion of the activities described in this document. Each of the Parties must notify the Central Team Director in writing that their respective internal procedures necessary for funding and support have been completed. The contributions by the Parties should be recognized by the Central Team Director as relevant to the goal.

## **6. Personnel and Equipment**

Each Party shall take all reasonable steps and use its best efforts, within applicable laws and regulations, to facilitate entry to and exit from its territory of persons, material, data, and equipment involved in or used in collaborative activities under this MOU.

## **7. Ownership of Equipment**

All equipment purchased or fabricated using funds of a Party or its collaborating institution remains the property of that Party or its collaborating institution and shall be subject to the property management system of that Party or its collaborating institution. It is the intent of the Parties that all equipment purchased or fabricated by a Party or its collaborating institution and incorporated into the ILC prototype or a test facility would remain with the prototype effort or test facility until it is determined by the Central Team Director that such equipment is no longer needed. At that time the property would be returned to that Party or its collaborating institution at their expense.

## **8. Intellectual Property Rights**

The allocation and protection of intellectual property rights under this MOU shall be in accordance with the annexes which would be negotiated by each party in the future. The annexes will form an integral part of this MOU.

## **9. Publications**

All scientific and technological results produced by the activities covered by this MOU shall be in the public domain. Any special procedural agreements required for publication resulting from the activities under this MOU shall be defined in the annexes to this MOU. All other publications developed under this collaboration by an institution are subject to the procedures of that institution and to the laws, regulations, policies and programs of its funding entity.

Publication will be collaborative, although any Party has the right to publish information in part or in whole, independent of the others subject to informing the other Parties in writing of their intention to do so. Consent to publish may be denied in writing by a Party if proprietary information is involved. Disputes will be settled through mutual cooperation befitting the scientific goals of the project.

All publications are required to indicate the contribution made by each of the Parties.

## **10. New Parties**

This MOU is open to other international participants including national laboratories, universities, scientific and technological organizations and agencies, research centers, subsidiaries of international and national entities, or any other form of legal entity that seeks to collaborate in cooperative activities and which is recognized as making important contributions to the common goal. The acceptance of a new Party is subject to agreement by the existing Parties.

## **11. Resignation of a Party**

Any signatory of this MOU may resign upon giving one year written notice to the other signatories. Property of the signatory being used in collective activities of the signatories is regulated as set forth in Section 7 (Ownership of Equipment).

## **12. Settlement of Dispute**

- (a) All Parties subject to this MOU shall approach all activities in the spirit of mutual cooperation befitting the common scientific goals.
- (b) The Parties shall consult with each other on any dispute arising out of the interpretation or implementation of this MOU. The Parties shall use their best efforts to settle disputes promptly through consultation.
- (c) If any issue that is not settled through such consultations still needs to be resolved, the Parties may, if they agree, submit the issue to a mutually acceptable form of dispute resolution such as conciliation or mediation. If agreed to by the Parties, this could include submission of the dispute to an international arbitration tribunal, if appropriate.

## **13. Amendments**

This MOU may be modified or amended as deemed necessary by written agreement of all the Parties.

## **14. Language**

This MOU is done in the English language only, in as many copies as there are Parties, each of them equally valid.

**15. Duration**

This MOU shall become effective upon the date of the last signature of the Parties listed below. It shall remain in effect until superseded or amended, or three years from the effective date, whichever comes first, and be renewed unless the Parties agree otherwise,

It is anticipated that completion of the CDR would initiate the next stage of activities, including preparation of the Technical Design Report (TDR) which includes reliable cost and schedule estimates. At such time in order to suitably re-define the required activities and the roles of participants, this MOU will be reviewed. Any future legally enforceable contractual obligations shall be set forth in bilateral or multilateral agreements between governments, the Parties, and the organization responsible for drafting the TDR.

**16. Signatories**

The Charter Members of this MOU are:

Asia:	Institute of High Energy Physics, Beijing (IHEP), <i>Chen Hesheng</i> High Energy Accelerator Research Organization (KEK), <i>Yi Totoku</i> Pohang Accelerator Laboratory (PAL) <i>W. Namkung</i>
Europe:	Budker Institute of Nuclear Physics (BINP), <i>Серебряков</i> LCABD with the Central Laboratory of the Research Councils (CCLRC) <i>Brian Fob</i> European Organization for Nuclear Research (CERN), <i>R. Aymar</i> Deutsches Elektronen-Synchrotron (DESY) <i>Stefan Weggen</i>
North America:	Brookhaven National Laboratory (BNL), <i>S. I.</i> Fermi National Accelerator Laboratory (Fermilab), <i>M. Witkowski</i> Laboratory for Elementary-Particle Physics, Cornell University (LEPP), <i>MJ</i> Stanford Linear Accelerator Center (SLAC) <i>Prof</i>

## **Annex 1**

### **Organizational Structure, Functioning and Governance of the ILC GDE**

#### **1. General Principles**

- 1.1. The ILCSC establishes the Central Team to coordinate and direct the effort of the teams in Asia, Europe and Americas that comprise the Global Design Effort (GDE).

#### **2. Function of the Central and Regional Teams**

- 2.1. The Central Team is the focal point for the ILC design effort, holding the schedule, major milestones, and parameter list, and providing intellectual leadership under the guidance of ILCSC representing ICFA.
- 2.2. Regional Teams perform the R&D and design work of ILC systems in close coordination with the Central Team.

#### **3. Composition of the Central Team**

- 3.1. The Central Team will be led by the Central Team Director.
- 3.2. The Central Team Director will be selected and appointed by the ILCSC with recommendations from the Regional Steering Committees.
- 3.3. The Central Team Director will appoint three Regional Directors in consultation with the respective Regional Steering Committees. Each Regional Director will be a member of the Central Team and as such will have primary loyalty to the Central Team.
- 3.4. The Central Team will have its own staff, estimated to be about 20 FTEs, covering various tasks charged to the Central Team.

#### **4. Responsibilities of the Central Team**

- 4.1. The responsibilities of the Central Team are to collectively:
  - 4.1.1. Manage the execution of the ILC design and associated R&D;
  - 4.1.2. Establish technical and administrative controls to ensure that the agreed-upon work toward the RDR and TDR is executed within their approved cost, schedule and technical scope under this MOU; and
  - 4.1.3. Maintain and control the machine parameters database and configuration

documents, and direct overall design effort.

## **5. Responsibility of the Central Team Director**

- 5.1. The Central Team Director will be responsible to the ILCSC for leading the Central Team to fulfill the responsibility of the Central Team.
- 5.2. Should the need for conflict resolution arise, the Central Team Director has the final authority in all areas of design and personnel in the Central Team.
- 5.3. He/she will be the primary representative for the project in interactions with external entities and in the project-status reporting.

## **6. Funding for the Central Team Activities**

- 6.1. Participating institutions will be expected to share the cost of common operations of the Central Team such as the administrative expenses including the secretarial support, purchase of web services, and other expenses as requested by the Central Team Director and endorsed by the ILCSC.
- 6.2. The Central Team Director will be supported by his/her funding agency.
- 6.3. The Regional Directors are expected to be supported by their respective institutions or their respective regional funding agency(ies).
- 6.4. The scientific and technical staffs on the Central Team are expected to be supported by their respective home institutions.

## **7. Composition of the Regional Teams**

- 7.1. The Regional Steering Committees will facilitate formation of their respective regional teams and the apportionment of regional resources to regional commitments to the GDE.
- 7.2. Members of the Regional Teams are employees of their home institutions, supported by local funding sources.
- 7.3. The number of people in a Regional Team will be determined by the scope of the tasks that each Team will be assigned to undertake by the Central Team Director.

## **8. Governance**

- 8.1 The ILCSC, representing ICFA, will provide oversight to the GDE Central Team with its Director directly reporting to the ILCSC.

- 8.2 Regional Steering Committees will advise and assist the respective Regional Teams to facilitate their activities and will not act as their oversight bodies.
- 8.3 The ILCSC will have a close consultative relationship with the FALC Group.
- 8.4 The Director of the GDE will keep the FALC Group well informed.
- 8.5 A Machine Advisory Committee (MAC) will be set-up to advise the ILCSC as well as the GDE on technical and other issues involved in the ILC accelerator. MAC members will be appointed by ILCSC with advice and consent from the GDE Central Team Director.
- 8.6 The World Wide Study (WWS) will continue to report to the ILCSC and advise it on ILC physics and detector issues, while maintaining close contact with the GDE on the development of detector concepts and R&D.



Annex 2.1

The following institution agrees to become a Party to the May 10, 2005 Memorandum of Understanding for the Global Design Effort of the International Linear Collider.

Institution

Center for High Energy Physics,  
Kyungpook National University (CHEP)

Signatory name

Dongchul Son

Date

30 Aug 2006

Signature



