

## ACFA Statement on the $e^+ e^-$ Linear Collider

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*The 5th ACFA Statement was issued on September 18, 2001 at the 6th ACFA meeting.*

Since the previous statement on the  $e^+ e^-$  Linear Collider (LC) was issued by ACFA in 1997, the project has been pursued along the line of the statement. ACFA highly regards the progress made in both accelerator R&D and physics studies. A remarkable progress on development of components for main linac and creation of small emittance beams at ATF are the major success on the accelerator R&D. It is a great pleasure to receive the report from the ACFA working group on physics and experimental feasibility studies for the LC.

The principal physics motivation of LC has never changed, and it has become even stronger as the ACFA physics studies conclude. The existence of a light Higgs boson suggested by precise measurements of electroweak physics would lead us to a new paradigm beyond the Standard Model, such as supersymmetry and grand unification. Furthermore, if the unification scenario based on the current knowledge is not realized, a completely new physics must be discovered in the next energy region. Both the physics studies and the past history convince us that concurrent running of hadron and  $e^+ e^-$  colliders is essential to discover and to understand new physics behind new discoveries.

Turning attention to ongoing activities in Asia on particle physics, tremendous achievements were made by various projects, such as BEPC, KEKB, Superkamiokande and K2K, which have been highly esteemed by the world community. The strength and competence of Asian industries, especially in accelerator technology, has been proven by these successful projects as well as others for material science and nuclear physics.

Now the strategy on the LC project becomes clearer and the community matured, the time is ripe to define new steps towards the realization of the LC. (for the better understanding of this statement, see an attached document);

- The  $e^+ e^-$  LC must start operation when the high luminosity run of LHC starts around 2009-2010. The center of mass energy of the LC should be 250-500 GeV where urgent and critical physics is expected. Including its energy upgrade to higher than 1 TeV, the project as a whole is foreseen to evolve for a quarter of a century.
- ACFA strongly endorses the plan to construct such a collider in the Asian-Pacific region with Japan as the host, and urges KEK to take initiative to investigate possible and practical form of globalization for the construction, commissioning and operation of the collider.
- ACFA urges the Japanese Government to arrange a preparatory budget for KEK to pursue an engineering design of the collider, to study site and civil engineering, as well as to investigate the process for the globalization.

The LC project gains the common asset for us the human-kind towards the knowledge of the ultimate structure of Nature, hence it contributes crucially to the human culture. Since the project is based on various types of ultramodern technologies, it promotes all kinds of technologies and hence enormously contributes to the industries. Especially an X-ray free electron laser (XFEL) is a direct application of the LC technology for material science, nano-technology, studies on chemical reactions, and structural biology.

The international LC collaborations based on Asia will help promote a mutual understanding of the cultural differences and similarities. To promote the energy frontier machine in Asia motivates the world high energy physics community to be truly global.