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Preface

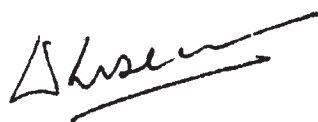
The progress of elementary particle physics in the past century has by now brought a world-wide consensus among our research community that an electron-positron linear collider is crucially required to obtain a deeper understanding of the fundamental principles of Nature. GLC is the highest energy electron-positron linear collider project, which will be carried out by a global-scale scientific cooperation for the forefront research in basic science in the 21st century.

Asian Committee for Future Accelerators (ACFA), Japan Association of High Energy Physicists (JAHEP), and High Energy Accelerator Research Organization (KEK) have been promoting early construction of an electron-positron linear collider in the Asia-Pacific region as the next major high-energy-physics project. ACFA issued two statements in 1997 and 2001, endorsing the linear collider project, and established Asian Linear Collider Steering Committee (ALCSC) in 2002. ACFA Linear Collider Working Group published a report on “Particle Physics Experiments at JLC” in 2001. Accelerator R&D has been continued by international collaborations at various levels. Under Linear Collider Project Committee at KEK, careful studies have been made for conventional facilities, cost estimation, site, and organizational issues. Based on these activities, this document was prepared by ACFA, Japan High Energy Physics Committee (JHEPC) under JAHEP, and KEK.

When the initial studies towards this project began two decades ago, the project was called “JLC” by Japanese colleagues. Since then, the project has grown to have a substantially more international nature. With this development, ACFA in late 2002 initiated a public call for a more appropriate project name, which more clearly states its international nature. In response, over sixty candidate names were submitted by ACFA community members. After a series of discussions, in April, 2003, ACFA chose a new project name “GLC”, which stands for “Global Linear Collider”.¹

¹A brief history that led to the selection of the new project name is discussed at <http://ccwww.kek.jp/acfa/LCName.html> .

This document presents a technical outline of the GLC project. Descriptions are given of its scientific goals, accelerator design, accelerator R&D programs, project cost evaluation, and studies on possible site candidates for building the accelerator complex. In addition, discussions are given on the organizational structure which is desired for successful project execution. Our view on a possible roadmap towards early realization of this project is also presented. We hope that this document helps the concept of the GLC project be exposed to a wide range of readers, thereby stimulating active world-wide discussions and efforts for this important next step in studies of fundamental science.



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The research effort concerning the physics and accelerators at GLC involved a large number of scientists and engineers from many laboratories and universities.

In addition, in many cases this effort has greatly benefited from the work done for projects other than GLC. In the area of accelerator development, the authors would like to express gratitude to the members of the NLC group, including the scientists and engineers from SLAC, LBNL, LLNL, FNAL and BNL, for a very active R&D cooperation on linear colliders with room temperature accelerator structures. Discussions and exchanges of ideas with the members of TESLA and CLIC accelerator groups at numerous workshops and conferences have been very helpful, too. The authors would like to thank the members of the SCSS-group at SPring-8, for collaborative R&D on the C-band accelerator and an X-ray FEL. In the area of research in physics and detector development, many studies have been carried out in close cooperation with colleagues from Europe and North America, especially under the framework of the “Worldwide Study of the Physics and Detectors for Future Linear e^+e^- Colliders”.

Attempts are made to attribute proper credit in the reference section of each chapter to those who contributed important ideas to the development of GLC, irrespective of the country or organization. However, due to the extent of the work, it is not necessarily always possible to accurately identify the original sources of various ideas or designs. The authors of this document express gratitude for all the contributions, and extend apologize in advance for any possible omissions.

Special thanks must go to the members of the “JLC Globalization Committee”, many of whom participated from overseas laboratories and institutes.² Their insight and thoughtful inputs have

²The JLC Globalization Committee consisted of the following members: W. Bartel (DESY), A.E. Bondar (BINP), M. Gomita (KEK), W-S.Hou (National Taiwan Univ), K. Hübner (CERN), J-S. Kang (Korea Univ.), S. Komamiya (Univ.Tokyo), S. Kurokawa (KEK), D.W.G.S. Leith (SLAC), M. Nozaki (Kobe Univ.), S. Olsen (Hawaii Univ.),

critically contributed to the development of our concept on international cooperation required for realization of GLC.

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