

Preface

There have been many advances in elementary particle physics since the U.S. High Energy Physics (HEP) community last met at Snowmass, CO in 1996. New results have made the need for a linear collider able to reach TeV energies with high luminosity more compelling than ever. International research and development for such a linear collider has kept pace, and the technology for such a collider now exists.

Work in the United States on the Next Linear Collider (NLC), and the writing of this Report, is led by the Stanford Linear Accelerator Center (SLAC), Fermi National Accelerator Laboratory (FNAL), Lawrence Berkeley National Laboratory (LBNL), and Lawrence Livermore National Laboratory (LLNL). Teams from Bechtel Nevada, the University of California at Davis, Los Alamos National Laboratory, the University of Massachusetts, and Stanford University have also made major contributions to the results in this Report.

There is broad international collaboration on R&D needed for the NLC. Scientists and engineers from the University of British Columbia, the Budker Institute of Nuclear Physics, Oxford University, Brunel University, and Royal Holloway University of London have contributed to the work reported here. The CLIC Study group at CERN has also collaborated on numerous topics. A long history of collaboration on X-Band technologies exists between the NLC development team and the Japanese Linear Collider (JLC) group. The content of this Report overlaps extensively with that of the SLAC-KEK ISG Report, *International Study Group Progress Report on Linear Collider Development*, N. Toge, ed., KEK Report 2000-7, SLAC-R-559, April 2000, and much of this work can also be found in the 1997 report of the JLC study group, *JLC Design Study*, JLC Design Study Group, N. Toge, ed., KEK Report 97-1, 1997.

This *2001 Report on the Next Linear Collider* has been prepared as a contribution to the 2001 DPF/DPB Snowmass Summer Study. It is an update of the *Zeroth-Order Design Report* that was prepared for Snowmass in 1996. This document provides a broad description of the NLC that touches on major issues and results in the development of the collider, but is not intended as a complete design document and much detail and discussion is left for presentation and discussion at Snowmass. Chapters 1, 2 and 3 provide an introduction to the NLC for the general Snowmass audience. Chapters 4, 5, 6 and 7 provide a basis for discussions that will be held in the Snowmass machine working groups. Chapter 8 outlines work in progress on the possible use of the NLC beams to produce high-energy photon-photon collisions.

The world is entering a time of increasingly global planning for exploration of the HEP frontier. The U.S. physics community will meet at Snowmass with the DOE/NSF High Energy Physics Advisory Panel to recommend a long-range plan for HEP in the United States. These recommendations will be an important part of a global strategy for HEP for decades to come.