Foreword

The workshop on 'Future Physics at HERA' started with a general meeting at DESY in September 1995 and is now completed a year later with these proceedings. With the experience of the first years of HERA running, it was the appropriate time to consider how to go ahead for the coming years. The HERA program must be carefully planned based on physics priorities and realism of what is feasible with possible upgrades of the accelerator complex and the detector systems, or even entirely new experiments. Thus, the aim of the workshop has been: 'To work out and review prospects for future physics at HERA, running in collider and fixed target modes. Options to be considered include high luminosity, polarized beams, light and heavy nuclei.'

With the assistance of the Advisory Committee (W. Buchmüller, J. Feltesse, A. Levy, H. Schröder, J. van den Brand, A. Wagner) we organized the work in nine study groups to cover different topics: HERA upgrades and impacts on experiments, structure functions, electroweak physics, heavy quark production and decay, jets and high-$E_\perp$ phenomena, diffractive hard scattering, polarized protons and electrons, light and heavy nuclei in HERA and, last but not least, physics beyond the standard model. For each working group conveners were appointed, both theorists and experimentalists to promote collaborative efforts. In February 1996 a mid-term plenary meeting was held to communicate the progress and the final general workshop meeting took place at DESY May 29-31, 1996, with summaries of the results from the working groups. The complete reports of the groups are now available in these proceedings.

An overview of all the interesting and important results can be obtained from the summary reports for each of the working groups. Some totally new aspects compared to what was treated in the 1987 and 1991 HERA workshops should be noted. Beams in HERA of polarized protons as well as light and heavy nuclei were studied seriously both regarding machine aspects and physics potential. New fixed target experiments were considered and the machine aspects of possible HERA upgrades and their impacts on experiments were studied.

It is our hope that these proceedings will be a valuable basis for the future of HERA. In particular, that they contribute to wise decisions concerning upgrades and running programs of HERA and the experiments.

These proceedings represent an enormous effort and dedication of the many participants. As organizers, we are particularly grateful to the conveners of the working groups, who shared our responsability to carry through the workshop. We are much indebted to our workshop secretary Ms. H. Haertel and also thank Ms. B. Bahr, Mr. A. Edin, Ms. S. Guenther, Ms. I. Harm, Ms. S. Lefay and Dr. G. Soehngen for their assistance. Finally, we gratefully acknowledge the strong support to this workshop from the DESY directorate.

Hamburg, September 1996

Gunnar Ingelman   Albert De Roeck   Robert Klanner