PREFACE

The report of the *Beschleunigerlaboratorium der Ludwig-Maximilians-Universität München und der Technischen Universität München* for the year 1995 provides information on experimental and theoretical studies performed by physicists from both universities in the field *Nuclear Physics and Related Topics.* The results were obtained in Munich and in projects performed at external research centres in which physicists from Munich played a major role.

The tandem accelerator and its components as ion sources, beam transport and data acquisition systems, worked reliably and according to specifications. Future improvements concern the ion sources for polarized beams and a special injector to be developed exclusively for accelerator mass spectroscopy experiments with stable isotopes.

Various test series were performed in order to study the beam guiding and beam dynamics of a pulsed sulfur ion beam inside the superconducting TRITRON post-accelerator. As a result of these the diagnostic system in the machine was considerably improved during the past year. At this moment work is being done to achieve a better radial alignment of the six single sectors inside the machine.

The scientific research program of the laboratory concerns two main aspects: on the one side, studies to understand nuclear structure, the mechanism of heavy ion reactions and the interaction of hadronic probes with nuclei, and secondly a broad spectrum of applications of experimental techniques developed by nuclear physicists in adjacent fields of the natural sciences.

We mention two examples for each of these topics: Extensive studies concerning the structure of nuclei close to the valley of nuclear stability were performed with the Q3D magnetic spectrograph in Munich. The data obtained in this "high-resolution spectroscopy" are worldwide unsurpassed with respect to their quality. Furthermore the spectroscopy and mass measurements of nuclei far away from the valley of stability was pushed to new frontiers. The data were obtained in experiments performed at the GSI and/or SARA, with the help of instrumentation developed in Munich.

We mention the use of accelerator mass spectrometry in studies of the physics of the atmosphere and in medicine, and the diagnostics and modification of condensed matter by energetic ion beams. Using the Q3D magnetic spectrograph it was possible to image single carbon-atom layers by depth-profile measurements using the elastic scattering of an iodine beam. A high-resolution diagnostics system is being developed for proton radiography at the PSI. All these experiments in the field of applications were performed in close cooperation with external groups.

Theoretical studies represent a broad spectrum of basic research in the field of hadrons and nuclei, and include some work relevant for applications, as to problems in astrophysics.

Large efforts were directed towards the preparation of future experiments in Munich and at external research centres, like work for HERMES, an ongoing experiment designed to study the substructure of the nucleon at DESY/HERA, extensive detector developments for the Di-Lepton-Spectrometer HADES to be used at the GSI, and low-level background studies necessary for the solar neutrino experiment BOREXINO in the Gran Sasso underground laboratory.

As in all previous years the funds to run these experiments and the laboratory were provided by the State of Bavaria. Specific projects were supported by grants from the DFG, the BMBF, the DAAD, the Volkswagen-Stiftung, and the Alexander-von-Humboldt-Stiftung. With this annual report we want to inform all our sponsors and our friends and collegues about our work, and we want to thank them.

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