

PREFACE

This annual report of the *Maier-Leibnitz-Laboratory for Nuclear-, Particle- and Accelerator-Physics of the Ludwig-Maximilians-Universität München and the Technischen Universität München* (MLL) will summarize the highlights of the local and external research work in 2008.

In the past year the MLL groups have continued to perform most of their work with the additional support of the DFG clusters of excellence *Origin and Structure of the Universe* and *Munich Center for Advanced Photonics* MAP. Due to this support several new appointments of junior group leaders (W1 and W2 Professors) have now been made and the new faculty members have been a welcome addition.

The contributions in this annual report describe a broad spectrum of experimental and theoretical investigations of MLL groups as well as user groups covering the scientific areas of nuclear and hadron physics, elementary particle physics, tests of fundamental symmetries, astro-particle physics, new acceleration concepts, as well as applications of nuclear physics methods. Also a significant number of instrumental and technical developments are described which benefit from the MLL laboratory infrastructure and support.

The MLL Tandem accelerator continues to be very productive with activities from nuclear physics and nuclear astrophysics to applied work in the areas of material science and radiation biology. The local nuclear structure investigations are complemented heavily by the study of exotic nuclei at external facilities, such as CERN/ISOLDE and GSI Darmstadt.

The external investigations of elementary particle physics concentrates on one hand on the analysis of D0 data while an intense preparation is under way for the first data from ATLAS at the LHC. The TIER-2 GRID center in Munich is supported by the MLL.

The internal structure of the nucleon is investigated at the CERN SPS with the COMPASS experiment. The HADES spectrometer at GSI Darmstadt continues its successful program on the investigation of the properties of hadrons in hot and dense nuclear matter. Preparations for the experiments investigating the fundamental properties of the neutron at the FRM II, PSI, and ILL are underway. The construction of the source for ultra-cold neutrons at the FRM II is progressing well and first test experiments at the TRIGA reactor in Mainz are very promising.

While the BOREXINO neutrino experiment is successfully taking data the CRESST-II experiment, which searches for the signals of WIMP dark matter particles, is being commissioned at Gran Sasso.

MLL groups are involved in many technical developments of innovative particle detector systems and read out electronics, which are only possible due to the available laboratory infrastructure and the cross-fertilization between the groups working in very different research areas within the MLL.

The experimental work is complemented by an intense effort in investigating the theory of elementary particles and the structure of QCD as well as the study of possible extensions of the standard model.

Through major outside funding and the two Clusters of Excellence *Universe* and *MAP* the laboratory is perfectly positioned to continue its significant contributions to the fields of nuclear and hadron physics, elementary particle physics, astro-particle physics, new acceleration concepts, as well as applications of nuclear physics methods. The budget of the MLL provided by the Freistaat Bayern has been the necessary base funding to secure substantial grants by the BMBF, the DFG, the DAAD, the European Union, the Alexander-von-Humboldt Stiftung, and the Bayerische Forschungsförderung. This annual report provides information to our sponsors, friends, and colleagues about the work of the past year. We would like to thank them for their support.