Part I
Particle Physics

The various groups of the *Physik-Institut* in the fields of particle physics are using for their experiments external accelerators at the large international research institutions PSI (Villigen), CERN (Genf), DESY (Hamburg) and Brookhaven. Further activities in the field of particle physics which are connected to questions of astroparticle physics and cosmology do not require accelerators or they are carried out at a nuclear reactor.

Most of these experiments are motivated in a broader sense by the fact that the present, highly successful standard model of particle physics cannot be understood as the ultimate truth for several, often cited reasons: There are too many free parameters, the origin of the masses and the nature of the neutrinos is not known, no symmetry is known which leads to the conservation of the lepton number separately for the three generations, the strong force is not yet unified with the electroweak force, the quantization of the gravitational force is unsolved, the question of the existence of other forces is still open.

A test of the standard model can be done by either a search for new particles or states of matter at medium and high energies, or complementary by a search with high precision at low energies for forbidden lepton number violating processes, a search for the magnetic moment of the neutrino at a reactor power station or by the spectroscopy of Antimatter in the Antihydrogen-Atom.

Mainly on the basis of this motivation Part I of the annual report presents the following experiments:

- Tests of lepton-flavor conservation at PSI
- Rare kaon decays
- Meson spectroscopy at LEAR with the Crystal Barrel
- Particle physics at LHC/CMS
- Production and Spectroscopy of Antihydrogen
- Measurement of the Neutrino Magnetic Moment at the Bugey Nuclear Reactor
- Particle physics at DESY/HERA
- Neutrino masses and mixing
- Measurement of the gravitational constant G