

## Foreword

The international conference "Exotic atoms and related topics 2005" (EXA05) was the second such meeting organized by the Stefan Meyer Institute for Subatomic Physics of the Austrian Academy of Sciences in Vienna. The first meeting in 2002 started as an international workshop lasting three days, where 33 talks were presented and about 80 scientists attended. The current meeting was then organized as an international conference lasting four days, with 53 speakers and more than 120 attendants. The strong increase in speakers as well as attendants shows that the fields covered are highly active and progressing.

Both meetings presented the various parts of physics that can be investigated using exotic atoms, namely the study of fundamental symmetries and interactions. Examples are the test of CPT symmetry with atoms containing antiparticles and the investigation of low-energy QCD with hadronic atoms in low-lying states. For antiprotonic atoms, the spectroscopy of antiprotonic helium is delivering limits of the equality of proton and antiproton charge and mass with increasing accuracy. The formation and spectroscopy of antihydrogen, the potentially best candidate for precision tests of CPT symmetry in an atomic system, is actively pursued by several experiments at the Antiproton Decelerator of CERN, but is still in an early stage of formation studies. The future of low-energy antiproton physics seems promising due to the partial improvement of the FLAIR facility within the future FAIR facility at GSI.

The fastest developing field at the moment concerns the Kaon-Nucleon interaction, where the existence of a series of deeply bound states has been predicted and first experimental evidence has been shown during the conference. Further experiments in progress have been described, and if confirmed, these so-called "K-clusters" will open a possibility to study dense cold matter in the laboratory, since calculations predict nuclear densities in these systems that are as high as those in neutron stars. Another important event for the K-N interaction was the final result of the DEAR experiment which measured the strong interaction-induced shift and broadening of the 1s state of kaonic hydrogen with a factor 2 better precision than before. This result has strong impact to the theoretical description of low-energy QCD which was visible from the theoretical contributions to the conference.

Since new results are expected in these fields within the next two years, it was decided to continue the scientific meetings with EXA07, again to be organized by SMI in Vienna in early fall of 2007.

We are looking forward to welcoming you again in Vienna.

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