

## Present and Future Experiments with Stored Exotic Nuclei at Relativistic Energies

H. Geissel<sup>1,2</sup>, Yu.A. Litvinov<sup>1,2</sup>, K. Beckert<sup>1</sup>, P. Beller<sup>1</sup>, F. Bosch<sup>1</sup>,  
D. Boutin<sup>1</sup>, L. Chen<sup>2</sup>, M. Hausmann<sup>3</sup>, O. Klepper<sup>1</sup>, R. Knöbel<sup>2</sup>,  
C. Kozhuharov<sup>1</sup>, J. Kurcewicz<sup>1</sup>, S.A. Litvinov<sup>1</sup>, Z. Liu<sup>4</sup>, M. Mazzocco<sup>1</sup>,  
F. Montes<sup>1</sup>, G. Münzenberg<sup>1,7</sup>, A. Musumarra<sup>5</sup>, C. Nociforo<sup>1</sup>, F. Nolden<sup>1</sup>,  
W. Plass<sup>2</sup>, C. Scheidenberger<sup>1</sup>, M. Steck<sup>1</sup>, B. Sun<sup>1</sup>, P.M. Walker<sup>4</sup>,  
H. Weick<sup>1</sup>, M. Winkler<sup>1</sup>

<sup>1</sup> GSI, Darmstadt, Germany; <sup>2</sup> JLU, Giessen Germany; <sup>3</sup> MSU, East  
Lansing, U.S.A.; <sup>4</sup> Uni. Surrey, Guildford, U.K.;  
<sup>5</sup> INFN-LNS Catania, Italy;

High accuracy mass and lifetime measurements are performed with the combination of the in-flight separator FRS and the cooler storage-ring ESR at GSI. Unique experimental conditions with bare and few-electron fragments allow for the first time investigations for decay channels which are rare or forbidden in neutral atoms. New experimental developments and data are presented. The comparison of the experimental results with theoretical predictions strongly indicates the potential for improvements of nuclear models. A new generation of experiments will be possible with the advent of the proposed international Facility for Antiproton and Ion Research (FAIR).