



ARTEMIS: Bound-Electron g -Factor Measurements by Double-Resonance Spectroscopy

Magnetic moments of electrons bound in highly charged ions provide access to effects of quantum electrodynamics (QED) in the extreme fields close to the ionic nucleus. The cryogenic Penning trap setup ARTEMIS is dedicated to determine the electronic g -factors of highly charged ions such as boron-like argon (Ar^{13+}) via the method of double-resonance spectroscopy. A closed cycle between the fine-structure levels $2^2P_{1/2} - 2^2P_{3/2}$ is driven by a laser whereas microwaves are tuned to excite transitions between Zeeman sublevels. With this Larmor frequency and the measurement of the ion cyclotron frequency the g -factor can be determined with an expected accuracy of 10^{-9} or better. Such measurements are also able to resolve higher-order contributions to the Zeeman effect. In this poster we report the commissioning of the novel half-open double trap with in-trap ion creation, characterization of the trap and first measurements performed at ARTEMIS which is part of the experimental program of the HITRAP facility. The double-resonance method can also be applied to g -factor measurements of the hyperfine structures of heavy hydrogen-like ions.

Primary author: Mr EBRAHIMI, M. Sadegh (GSI Darmstadt and Universität Heidelberg)

Co-authors: Mr VON LINDENFELS, David (GSI Darmstadt, Universität Heidelberg and MPI-K Heidelberg); Prof. BIRKL, Gerhard (TU Darmstadt); Dr VOGEL, Manuel (GSI Darmstadt and TU Darmstadt); WIESEL, Marco (GSI Darmstadt, Universität Heidelberg and TU Darmstadt); Dr QUINT, Wolfgang (GSI Darmstadt and Universität Heidelberg); Mr MARTIN, alexander (TU Darmstadt)

Presenter: Mr EBRAHIMI, M. Sadegh (GSI Darmstadt and Universität Heidelberg)