



Beitrag ID: 8

Typ: Poster

High-Resolution Dielectronic Recombination of Berylliumlike Gold Ions at the CRYRING@ESR Storage Ring

Montag, 15. September 2025 16:30 (1 h 30m)

Electron-ion collision spectroscopy is a very successful approach for studying the properties of highly-charged ions [1], in particular if low-energy dielectronic recombination (DR) resonances are scrutinized. The heavy-ion storage ring CRYRING@ESR at the international FAIR facility in Darmstadt, Germany, is especially attractive for dielectronic recombination studies, since it is equipped with an electron cooler that provides an ultra-cold electron beam promising highest experimental resolving power and precision [2–4]. Thanks to its high precision, DR spectroscopy of excitation energies at the CRYRING@ESR will allow us to sensitively probe higher order contributions to state-of-the-art quantum-electrodynamical (QED) calculations in strong fields [5, 6]. We will report on some preliminary DR results of berylliumlike gold ions, which were injected into the CRYRING ($\sim 5 \cdot 10^6$ ions/cycle, with an energy of 12 MeV/u) from the full chain of GSI accelerators consisting of the linear accelerator UNILAC, the heavy-ion synchrotron SIS18, and the high-energy storage ring ESR. The recorded DR spectra in the collision-energy range 0–300 eV exhibit a number of Rydberg resonances which are associated with different excitations of the Be-like ion core. Preliminary analysis of a few partial energy intervals will be presented in form of a poster during the SPARC workshop.

References:

- [1] Schippers S et al. 2015 Nucl. Instrum. Methods Phys. 350 61
- [2] Fogle M et al. 2003 J. Phys. B 36 2563
- [3] Lestinsky M et al. 2016 Eur. Phys. J. ST 225 797
- [4] Brandau C et al. 2025 Chin. Phys. C 49 064001
- [5] Malyshev A et al. 2025 Phys. Rev. A 110 062824
- [6] Schippers S et al. submitted (see also <https://arxiv.org/abs/2502.15433>)

Autor: LOOSHORN, Mirko (Justus-Liebig-Universität Gießen(JULGi))

Co-Autoren: BRANDAU, Carsten (GSI Helmholtzzentrum für Schwerionenforschung GmbH(GSI)); KRANTZ, Claude (GSI Helmholtzzentrum für Schwerionenforschung GmbH(GSI)); HANU, Elena-Oana (GSI Helmholtzzentrum für Schwerionenforschung GmbH(GSI)); MENZ, Esther Babette (GSI Helmholtzzentrum für Schwerionenforschung GmbH(GSI)); GLORIUS, Jan (GSI Helmholtzzentrum für Schwerionenforschung GmbH(GSI)); Herr UEBERHOLZ, Ken (Universität Münster(UMs-IKP)); FOGLE, Michael (Auburn University); LESTINSKY, Michael (GSI Helmholtzzentrum für Schwerionenforschung GmbH(GSI)); Dr. HILLENBRAND, Pierre-Michel (GSI Helmholtzzentrum für Schwerionenforschung GmbH(GSI)); SCHUCH, Reinhold (Stockholm university); Dr. WANG, Shuxing (Atom- und Molekülphysik I. Physikalisches Institut Justus-Liebig-Universität Gießen); SCHIPPERS, Stefan (JLU Giessen); SPILLMANN, Uwe (GSI Helmholtzzentrum für Schwerionenforschung GmbH(GSI)); HANNEN, Volker (Institut für Kernphysik, Uni Münster)

Vortragende(r): LOOSHORN, Mirko (Justus-Liebig-Universität Gießen(JULGi))

Sitzung Einordnung: Poster Session