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Experimental study of the laser-induced ionization of heavy metal and metalloid ions: Au^+ and Si^{2+}

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We implement a liquid metal ion source\,(LMIS) in a 3D coincidence momentum spectroscopy setup for studying the interaction of ionic targets with intense laser pulses. Laser intensities of up to $4{\cdot}10^{16}$\,W/cm^2 allow for the observation of up to 10-fold ionization of Au^+-ions and double ionization of Si^{2+}-ions. Further, by utilizing two-color sculpted laser fields to control the ionization process on the attosecond time scale, we demonstrate the capability to resolve the recoil ion momenta of heavy metal atoms. Simulations based on a semiclassical model assuming purely sequential ionization reproduce the experimental data well.This work opens up the use of a range of metallic and metalloid ions, which have hardly been investigated in strong-field laser physics so far.

Primary authors: Mr YING, Bo (Friedrich-Schiller-Universität Jena(FSU-IOQ)); Dr MACHALETT, Frank (Friedrich-Schiller-Universität Jena, IOQ); Mrs HUTH, Vanessa (Institute of Optics and Quantum Electronics); Dr KÜBEL, Matthias (Institute of Optics and Quantum Electronics/Helmholtz Institute Jena); Prof. SAYLER, A.Max (Benedictine College); Prof. STÖHLKER, Thomas (GSI Helmholtzzentrum für Schwerionenforschung GmbH(GSI)); Prof. PAULUS, Gerhard G. (Institute of Optics and Quantum Electronics/Helmholtz Institute Jena); Dr WUSTELT, Philipp

Presenter: Mr YING, Bo (Friedrich-Schiller-Universität Jena(FSU-IOQ))

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