Abstract Submitted
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Detecting ionization fragments of ultracold quantum gases exposed to ultrashort laser pulses[1] PHILIPP WESSELS, TOBIAS KROKER, MARIO NEUNDORF, DONIKA IMERI, MARKUS DRESCHER, KLAUS SENGSTOCK, JULIETTE SIMONET, The Hamburg Centre for Ultrafast Imaging (CUI), University of Hamburg, Luruper Chaussee 149, 22761 Hamburg, Germany — Ultrashort laser pulses combined with ultracold quantum matter grant access to ultrafast time-scales and the possibility for controlled creation of ions and electrons in a quantum gas via strong-field ionization. Our dedicated quantum gas machine allows for simultaneous detection of charged ionization fragments and neutral atoms after an optical transport into a field-free region. Position sensitive high-speed micro-channel plate and phosphor screen detectors and simulations of the charged particle trajectories enable a mapping of the kinetic energies of the photoelectrons. We present first images of photoelectrons emitted out of a ^{87}Rb Bose-Einstein condensate after strong-field ionization by ultrashort laser pulses of 215 fs duration. The confined interaction region consisting of a localized cloud of ultracold atoms and a focused femtosecond laser beam permits essentially background free measurements of ionization products emerging out of a source with negligible initial kinetic energy.

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