

Abstract Submitted  
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**Ultrafast Dynamics in Helium Nanodroplets Probed by Femtosecond Time-Resolved EUV Photoelectron and Ion Imaging**  
OLEG KORNILOV, Max-Born-Institut, OLIVER BÜNERMANN, Georg-August-University, ALI EFTEKHARI-BAFROOEI, Lawrence Berkeley National Laboratory, STEPHEN R. LEONE, DANIEL M. NEUMARK, University of California-Berkeley, OLIVER GESSNER, Lawrence Berkeley National Laboratory — Femtosecond time-resolved EUV photoelectron and ion imaging are employed to study the relaxation dynamics of electronically excited helium nanodroplets. Excitation into a broad droplet absorption band ( $\sim 23.8$  eV) is followed by ionization with a delayed IR pulse. The transient photoelectron spectra and angular distributions indicate that electronically excited helium atoms are predominantly emitted in either an aligned  $1s4p$  Rydberg state within less than  $\sim 100$  fs or in a non-aligned  $1s3d$  state within  $\sim 200$  fs. The transient ion imaging results suggest that different Rydberg atoms are emitted with significantly different kinetic energy distributions that closely resemble Maxwell-Boltzmann distributions with temperatures of 2700 K ( $1s3d$ ) and 490 K ( $1s4p$ ). The results are interpreted in terms of a dynamic model that is based on the local density dependent blue shift of atomic Rydberg states in the droplet environment.

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