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Femtosecond time-resolved EUV photoion imaging studies of pure helium nanodroplets OLIVER BUENERMANN, OLEG KORNILOV, OLIVER GESSNER, STEPHEN R. LEONE, DANIEL M. NEUMARK — Helium nanodroplets provide a cryogenic, weakly interacting matrix for the isolation and spectroscopy of molecules and clusters. The relaxation dynamics of electronically excited helium nanodroplets are investigated by femtosecond time resolved photoion imaging studies. The droplets are excited into a broad absorption band centered at 23.8 eV. The electronic and nuclear dynamics following this excitation are monitored by photoionization with a 785nm probe pulse. A Wiley-McLaren time of flight spectrometer equipped with a time- and position sensitive delay line detector facilitates the measurement of mass selective ion kinetic energy distributions. First measurements reveal differences in the kinetic energy release of the Helium monomer, dimer and trimer ions. Furthermore, the pump-probe time-delay dependent ion spectra exhibit several features evolving on various timescales. The combination of these results with previously recorded photoelectron imaging measurements allows for a new level of insight into the electronic and nuclear dynamics of electronically excited helium nanodroplets.

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