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Femtosecond Time-Resolved Photoelectron Imaging of Excited Doped Helium Nanodroplets CATHERINE SALADRIGAS, CAMILA BACELLAR, STEPHEN R. LEONE, DANIEL M. NEUMARK, University of California Berkeley, OLIVER GESSNER, Lawrence Berkeley National Lab — Helium nanodroplets are excellent matrices for high resolution spectroscopy and the study of ultracold chemistry. They are optically transparent. In their electronic ground state, interact very weakly with any atomic or molecular dopant. Electronically excited droplets, however, can strongly interact with dopants through a variety of relaxation mechanisms. Previously, these host-dopant interactions were studied in the energy domain, revealing Penning ionization processes enabled by energy transfer between the droplet host and atomic dopants. Using femtosecond time resolved XUV photoelectron imaging, we plan to perform complementary experiments in the time domain to gain deeper insight into the timescales of energy transfer processes and how they compete with internal droplet relaxation. First experiments will be performed using noble gas dopants, such as Kr and Ne, which will be compared to previous energy-domain studies. Femtosecond XUV pulses produced by high harmonic generation will be used to excite the droplets, IR and near-UV light will be used to monitor the relaxation dynamics. Using velocity map imaging, both photoelectron kinetic energies and angular distributions will be recorded as a function of time. Preliminary results and proposed experiments will be presented.

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