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Femtosecond Time-Resolved Energy Transfer Dynamics in Excited Doped Helium Nanodroplets CATHERINE SALADRIGAS, STEPHEN R. LEONE, DANIEL M. NEUMARK, University of California Berkeley, OLIVER GESSNER, Lawrence Berkeley National Lab — Helium nanodroplets offer superb possibilities to study host-dopant energy and charge transfer processes in complex systems approaching macroscopic dimensions. When electronically excited, the droplet can undergo a variety of relaxation mechanisms. We are interested in studying the energy transfer processes that occur when a dopant atom is introduced into an excited droplet environment. In a previous, static experiment, energy transfer to noble gas dopants was observed. At sufficiently high droplet excitation energies, the energy transfer results in indirect ionization of the dopant. We are preparing a complimentary time resolved experiment to observe the timescales of the energy transfer processes and learn how they compete with internal droplet relaxation mechanisms. Using a high harmonic generated femtosecond XUV pulse to electronically excite the droplet and a femtosecond UV probe pulse to deplete the energy transfer signal, we can detect the photoelectrons produced from the energy transfer with velocity map imaging as a function of pump-probe time delay. Based on the time it takes for signals to rise back in after an initial depletion, we can gain information on the timescales of energy transfer. Preliminary results and future directions will be presented.

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