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Imaging Photoelectron Dynamics in Doped Helium Droplets CHIA WANG, University of California, Berkeley, OLEG KORNILOV, Lawrence Berkeley Nat'l Lab, DARCY PETERKA, JEONG KIM, OLIVER GESSNER, Lawrence Berkeley Nat'l Lab, DANIEL NEUMARK, University of California, Berkeley — Photoionization of He droplets doped with Xe and Kr atoms have been investigated by photoelectron imaging utilizing VUV synchrotron radiation. Photoelectron images were recorded over a wide range of He droplet sizes, photon energies, and dopant pick-up conditions. Significant ionization of dopants was observed at 21.6 eV, the absorption maximum of 2^1Pelectronic excited state of He droplets, suggesting an indirect ionization via excitation transfer. Photoelectron images and spectra indicate multiple pathways for photoelectrons generated by this process to escape the droplet. Special attention is paid to the excitation transfer dynamics and the electron relaxation in He droplets. It is found that excitation transfer from 2^1Pstate to dopants competes with relaxation to the lower 2^1S state. The excitation is likely a localized exciton that transfers the energy to the dopant via a dipole-dipole hopping mechanism. The conduction band of He droplets as a function of droplet size is also observed. The conduction band edge reaches the bulk limit for the largest He droplets. The electron under the conduction band becomes trapped and forms an electron bubble that escapes the droplet by transcending a barrier near the liquid/vapor interface.

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