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**Photoelectron Recapture Investigation in Ar Using Two-Dimensional Photoelectron Spectroscopy** XIMAO FENG, ANTHONY WILLS, THOMAS GORCZYCA, Department of Physics, Western Michigan University, Kalamazoo, MI 49008, USA, EMMA SOKELL, Department of Experimental Physics, University College Dublin, Republic of Ireland, MARCO WIEDENHOEFT, NORA BERRAH, Department of Physics, Western Michigan University, Kalamazoo, MI 49008, USA — "Complete" two-dimensional photoelectron spectra of Ar in the vicinity of the $2p$ ionization thresholds have been measured allowing several features in the spectra to be explained. The photoelectron recapture probability above the $2p_{1/2}$ threshold has been studied by measuring directly the kinetic energies of the reemitted photoelectrons as a function of the photon energy. We find a recapture maximum at about 120 meV above the threshold. Our experimental results are compared with semiclassical calculations as well as with the quantum-mechanical calculation of Tulkki *et al.* [Phys. Rev. A 41, 181 (1990)] and are found to be in moderate agreement.

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