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Photoelectron Angular Distributions from Xe in a DC Electric Field[1] STEPHEN T. PRATT, V. ALVIN SHUBERT, Argonne National Laboratory — Velocity map photoelectron imaging provides a powerful and efficient means to record both high resolution photoelectron spectra and photoelectron angular distributions simultaneously. As it is often implemented, however, the electric field in the interaction region is non-negligible, ranging from 50 - 1000 V/cm. We have used this aspect of the technique to study the decay of autoionizing Stark states of Xe in fields between 50 and 700 V/cm. Specifically, we have used two-photon excitation to prepare the Xe 6p'$[1/2]_0$ state, and probed one-photon transitions from that state to autoionizing resonances converging to the $^2P_{1/2}$ spin-orbit excited state of Xe^+. The polarization of the probe is aligned to excite only the M = 1 and -1 states. At low fields, the expected ns' and nd' Rydberg series are observed, but at higher external DC fields the np' series appear, as well the hydrogenic manifold of Stark states. Although the external field breaks the cylindrical symmetry required for the usual image reconstruction methods, the raw images provide insight into the nature of the decay mechanism and the Stark mixings.

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