STARK EFFECT ON AUTOIONIZING STATES OF WATER

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We report on studies of the effects of a static electric field on vibrationally autoionizing states of water. Water vapor in a differentially pumped time-of-flight mass spectrometer was excited to the energy region above the first ionization limit using a stepwise resonant (1+1') REMPI process, in which intense VUV light near 120 nm pumped selected rotational lines of the $\tilde{C}(100) - \tilde{X}$ electronic transition, followed by further excitation by a scanning dye laser. Previous work has shown that the excitable zero-field autoionizing states in this region consist of both nd and nf states with a variety of quantum defects. Stark spectra of states with several different principal quantum numbers from n=6 to n=10 were recorded. The spectra revealed states which rapidly vanished into hydrogenic, linear Stark manifolds, as well as states which showed quadratic Stark shifts. Our results give direct information on which of these currently unidentified states have small quantum defects, and will therefore prove valuable in the determination of unambiguous identifications. We can also determine the ionization energy of the molecule by locating the high-l manifolds for different core rotational states.