

## LINEAR RYDBERG STATES OF WATER

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We have studied the spectrum of the water molecule above the ionization limit using resonant excitation through a linear intermediate state. 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 118.5 nm pumped selected rotational levels of the  $(\tilde{A}^2 A_1)3p b_2^1 B_2$  linear electronic state, followed by further excitation by a scanning dye laser. We observed transitions to Rydberg states which we have tentatively identified as belonging primarily to linear states converging to the  $\tilde{A}^2 A_1$  electronic state of the ion. These electronically autoionizing states perturb the bent Rydberg states which we have studied previously.