HI($v=2,\ J=0$) PHOTOLYSIS, AND A GLOBAL REANALYSIS OF HI AND DI PHOTODISSOCIATION SPECTRA

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Photodissociation of HI($v = 2,\ J = 0$) prepared by direct laser excitation, followed by REMPI detection of the product H atoms coupled with core-extraction time-of-flight mass spectrometry, is used to provide the first photofragment branching ratio and anisotropy measurements of vibrationally excited HI. Results were obtained at seven photolysis wavelengths on the interval $297 - 360$ nm, which effectively probes molecular properties at radial distances spanning the outermost loop of the HI($v=2,\ J=0$) vibrational wavefunction. These data are combined with all existing total absorption coefficient and branching fraction data for HI and DI in a global analysis to provide a new empirical determination of the final-state potential curves and transition moment functions for the four excited electronic states contributing to the A-band UV absorption continuum of HI. This analysis yields two models for the radial dependence of the excited state potential energy curves and transition moment functions which accurately represent (on average) all of the available data. Although the existing data cannot unambiguously identify which is the best model, this work clearly identifies a range of experiments which would do so.