APPLICATION OF A COAXIALLY CONFIGURED SUB-MILLIMETER PULSE JET SPECTROMETER FOR INVESTIGATION OF THE STRUCTURE AND DYNAMICS OF HI DIMER

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A coaxially configured pulsed jet sub-millimeter wave spectrometer has been used to investigate the low frequency vibration centered at approximately 17.08 cm^{-1} in $(HI)_2$ with a resolution of better than 37 kHz. The iodine quadrupole substructure of certain transitions are demonstrated to be completely resolved and have intensities consistent with ortho and para states in this hydrogen bonded dimer. The results of this submillimeter investigation are then combined with data from supersonic slit jet infrared diode laser spectroscopy and used to scale and shift an ab-initio calculated potential generating a four dimensional morphed potential energy surface. The structure and dynamics of this heavy hydrogen halide dimer will shown to differ from previously investigated lighter members of the homologous series of hydrogen halide dimers.