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Observation of oscillations in the third dissociation continuum of molecular hydrogen[1] ELIZABETH F. MCCORMACK, DEBORAH FARRINGTON, DONALD P. FAHEY, Bryn Mawr College, ROBERT C. EKEY, JR., Mary Washington University — Double resonance spectroscopy via the$EF^1\Sigma_g^+, v'_{EF} = 6, J'$ state has been used to probe the energy region of the H(n=1) + H(n=3) dissociation threshold. Above threshold the continuum is detected by ionizing H(n=3) to produce H+, which is then detected by using a time-of-flight mass spectrometer. A notable modulation is observed in the H+ production above threshold. This observed structure is thought to be due to an extension of the series of vibrational levels belonging to the inner and outer wells of the *ungerade* double-well $B"\overline{B}(3)^1\Sigma_u^+$state into the continuum above threshold. Comparisons with previously measured single photon absorption spectra and calculated photodissociation cross sections support this explanation. Just below threshold many transitions have been observed for the first time and assignments and term energies are reported. The new energy measurements presented here provide significant constraints on *ab initio* calculations including nonadiabatic effects in the long-range $B"\overline{B}(3)^1\Sigma_u^+$state of this fundamental system.

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