SPECTRAL SIGNATURES OF NEW MODES BORN IN BIFURCATIONS OF HIGHLY EXCITED NORMAL MODES

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A separate abstract describes new modes born in bifurcations when the low-energy normal modes model breaks down at high energy with the onset of dynamical chaos. Now we describe spectral signatures of the new dynamics. General spectral patterns are first discussed. Then, particular applications are made to highly excited bending spectra of acetylene. For spectra with excitation of both the total bend quantum number N_b and the vibrational angular momentum quantum number ℓ, a spectral "phase diagram" is obtained with a tetracritical point. Spectral patterns including quantum monodromy and moment of inertial backbending are investigated, using the fit of existing experimental spectra from the group of Professor R.W. Field. Extensions to general rotation-vibration spectra with Coriolis couplings are discussed.

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