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Spectral phase characterization of laser induced coherent vibration and its applications in Raman spectroscopy¹ XIAOJI XU², STANISLAV KONOROV, YAKUN CHEN, VALERY MILNER, JOHN HEPBURN, University of British Columbia — The spectral phase of laser induced molecular vibration in the coherent Raman process carries additional information about the molecular structure and dynamics of relaxation. Through a novel method of amplitude and phase characterization and reconstruction, experimental study on liquid ethanol sample shows an out of phase behavior between two set of resonances levels. The result demonstrated the ability to resolve the signal of the Raman susceptibility that is otherwise not available in spontaneous Raman spectroscopy. An interpretation of out of phase behavior between resonances is made using Density Functional Theory (DFT) calculation, and the result is found to be correlated with the symmetry of molecule. This study raises the awareness of symmetry-based intrinsic excitation phase difference in ultrafast coherent Raman spectroscopy on its potential applications to molecular orientation studies.

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