IR/THZ DOUBLE RESONANCE SPECTROSCOPY IN THE PRESSURE BROADENED REGIME: A PATH TOWARDS ATMOSPHERIC GAS SENSING

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IR/THz double resonance (DR) spectroscopy is a technique which has been historically applied to study molecular collision dynamics in the gas phase and in understanding optically pumped far infrared (THz) lasers. The high level of molecule specific spectroscopic specificity achieved through this technique has led to the proposal of this technique as an attractive candidate for remote sensing at atmospheric pressures. The relaxation of the stringent pump coincidence requirements due to pressure broadening at elevated pressures gives an added advantage of providing additional pump coincidences with the IR vibrational modes, which can be used to obtain a molecule specific enhanced DR specificity matrix. As a first step to this approach we present analytical predictions and first experimental observation of new DR signatures of methyl chloride in the pressure broadened regime.