

FAST SWEEPING DOUBLE RESONANCE MICROWAVE-(SUB)MILLIMETER SPECTROSCOPY BASED ON CHIRPED PULSE TECHNOLOGY

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Microwave-millimeter double resonance spectroscopy has been commonly applied by driving absorption with the millimeter light and then probing the resonance using a Fourier Transform Microwave (FTMW) spectrometer. We will present data from an inverse scheme, in which millimeter light is used to probe a transition whose intensity is modulated by the application of microwave radiation. This detection scheme is effective in aiding the assignment of millimeter-wave transitions by revealing which energy levels are associated with particular spectral lines. To increase the speed of this detection technique, we incorporated an arbitrary waveform generator into the microwave source to rapidly sweep the microwave radiation through a broad frequency range. We will discuss this approach as applied to pulsed valve experiments and in combination with a laser-induced chemistry experiment. Potential applications to other experimental designs will also be discussed.