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Approaching Terahertz Range with 3-color Broadband Coherent Raman Micro Spectroscopy[1] LASZLO UJJ, TREVOR OLSON, JAMES AMOS, Department of Physics, University of West Florida — The presentation reports the recent progress made on reliable signal recording and processing using 3-color broadband coherent Raman scattering (3C-BCRS). Signals are generated either from nanoparticle structures on surfaces or from bulk samples in transmission and in epi-detected mode. Spectra are recorded with a narrowband (at 532 nm) and a broadband radiation produced by a newly optimized optical parametric oscillator using the signal or idler beams. Vibrational and librational bands are measured over the 0.15-15 THz spectral range from solution and crystalline samples. Volumetric Brag-filter approach is introduced for recording 3C-BCRS spectra at the first time. The technical limitations and advantages of the narrowband filtering relative to the Notch-filter technic is clarified. The signal is proportional to the spectral autocorrelation of the broadband radiation therefore the present scheme gives a better signal-to-noise ratio relative to the traditional multiplex CRS methods. This makes the automation of non-model dependent signal processing more reliable to extract vibrational information which is very crucial in coherent Raman microscopy.

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