

## HIGH RESOLUTION SPECTROSCOPY OF EXPLOSIVE TAGGANTS USING INTRACAVITY MILLIMETER-WAVE SPECTROMETER

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Cavity measurements are well established for sensitive infrared measurements of gas-phase compounds. A recent development of a Fabry-Perot cavity by Hindle et al. [Optica, 2019, 6, 1449-1454] has allowed to adapt this technique in the sub millimeter-wave range for rotational spectral measurements using cavity enhanced absorption spectroscopy (CEAS) and cavity ring-down spectroscopy (CRDS) around 620 GHz.

Recently, we have developed a similar cavity for larger wavelengths in the 150-215 GHz range in order to measure at trace levels semi-volatile organic compounds. The capability of the spectrometer to measure semi-volatiles explosive taggants such as dinitrotoluenes or 2,3-dimethyl-2,3-dinitrobutane (DMNB) and to measure at ppm level nitromethane in this spectral range will be presented. In particular, the recent measurement in cavity and the spectral analysis of DMNB based on quantum chemistry calculations and microwave spectral analysis performed at the PhLAM laboratory will be presented.