FOURIER TRANSFORM MICROWAVE DETECTION OF FREE RADICALS RELEVANT TO COMBUSTIONAND ATMOSPHERIC CHEMISTRY

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We report on first applications of a Laser Photolysis-Molecular Beam-Fourier Transform Microwave (LP-MB-FTMW) spectrometer in the spectral region 8 to 40 GHz, constructed for investigations of rotational spectra of free radicals. The experimental set-up consists of a near semi-confocal Fabry-Perot type microwave resonator mounted in a stainless steel vacuum chamber. The cavity resonance can be adjusted by moving the spherical mirror. A current actuated slit nozzle valve is situated near the center of the flat mirror, just above the microwave antennas. The performance of the spectrometer was optimized by recording SO ($X^3\Sigma$) microwave spectra. SO radicals were produced by 193 nm photodissociation of SO_2 in a pulsed supersonic free jet expansion in Ar. Additionally, first results of the LP-MB-FTMW detection of the C_2H_3O (vinoxy) and of CF_2 radicals will be presented.