A FABRY-PERÓT CAVITY PULSED FOURIER TRANSFORM W-BAND SPECTROMETER WITH A PULSED NOZZLE SOURCE

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We will present the design and operation of a simple Balle-Flygare-type spectrometer operable between 75 and 110 GHz (W-band). W-band frequencies are generated through the use of active multiplier chains. The circuit uses single side-band modulation with an IF of 180 MHz. The Fabry-Perót cavity consists of two opposing spherically concave mirrors, 70 mm in diameter with a 250 mm radius of curvature. The mirrors have been machined from copper and diamond polished to achieve a maximum surface defect of 135 nm. A solenoid valve admits pulses of gas into the cavity which is housed in a small vacuum chamber maintained at a resting pressure of $<10^{-7}$ bar using a turbomolecular pump. The instruments use and sensitivity will be demonstrated using some simple gas phase species.