A HIGHLY-INTEGRATED SUPERSONIC-JET FOURIER TRANSFORM MICROWAVE SPECTROMETER

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A highly integrated supersonic-jet Fourier-transform microwave spectrometer of coaxially oriented beam-resonator arrangement (COBRA) type, covering 2-20GHz, has been recently built at Chongqing University, China. Built up almost entirely in an NI PXIe chassis, we take the advantage of the NI PXIe-5451 Dual-channel arbitrary waveform generator and the PXIe-5654 RF signal generator to create a spectrometer with wobbling capacity for fast resonator tuning. Based on the I/Q modulation, associate with PXI control and sequence boards built at the Leibniz Universitat Hannover, the design of the spectrometer is much simpler and very compact. The Fabry–Pérot resonator is semi-confocal with a spherical reflector of 630 mm diameter and a radius of 900 mm curvature and one circulator plate reflector of 630 mm diameter. The vacuum is effectuated by a three-stage mechanical (two-stage rotary vane and roots booster) pump at the fore line of a DN630 ISO-F 20000 L/s oil-diffusion pump. The supersonic-jet expansion is pulsed by a general valve Series 9 solenoid valve which is controlled by a general valve IOTA one driver governed by the experiment-sequence generation. First molecular examples to illustrate the performance of the new setup will include OCS and CF_3CHFCl.