FTMW/CVI: FOURIER TRANSFORM MICROWAVE / COHERENCE SPECTROSCOPY WITH VIRTUAL INSTRUMENTS

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Modern Fourier transform microwave (FTMW) spectroscopy, first implemented as an impulse excitation technique in a steady gas-waveguide apparatus[a], started only a quarter of a century ago. Soon after, the method was supplemented for special applications, e.g. Stark-effect[b], double resonance[c], and 2D[d] spectroscopy. The subsequent implementation of the technique in a supersonic jet-resonator apparatus[e] was followed by similar developments, i.e. Stark-effect[f], double resonance[g], laser ablation[h], and DC-discharge[i]. Automation[j] along with the "coaxially oriented beam-resonator arrangement"[k] (COBRA) has greatly increased efficiency, resolution, and sensitivity of current FTMW spectrometers.

We present the implementation of a complete COBRA-FTMW spectrometer featuring the capabilities given above. The entire experiment is operated, either interactivle or automatically, by a graphical user interface (GUI)-based program which is capable of waveguide and resonator applications. Developed in the C programming language, while following the concept of virtual instruments (VI), the software can co-operate with a wide variety of PCI and IEEE hardware components to build the instrument. Only one application specific logic circuit, which will also be presented, is needed.

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