

A CHIRPED-PULSE FOURIER TRANSFORM SPECTROMETER OPERATING FROM 110 TO 170 GHz

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A chirped-pulse Fourier transform spectrometer operating from 110 - 170 GHz was constructed. The design of this spectrometer is directly adapted from that of the 260 - 295 GHz chirped-pulse spectrometer built by Steber and co-workers at the University of Virginia^a. In this instrument, an arbitrary waveform generator (AWG) produces a chirped pulse which is frequency shifted to a range between 9.2 and 14.1 GHz and then multiplied by a factor of 12 via an active multiplier chain to a range between 110 and 170 GHz. As in the Pate lab design, the AWG also serves as a local oscillator (LO) source; this LO is multiplied and used to downconvert the molecular emission, allowing it to be collected by a 40 GS/s digitizer. Benchmark measurements were taken for methanol at room temperature, and details of the instrument's performance will be discussed.

^aA.L. Steber, B.J. Harris, J.L. Neill, and B.H. Pate, *J. Mol. Spectrosc.*, 280, 3 (2012)