Here we present a new mid-infrared frequency comb system for rapid spectral acquisition using a virtually imaged phased array (VIPA) spectrometer. A difference-frequency generation comb, tuneable from 4.4 μm to 4.7 μm, was used to interrogate a single-pass absorption cell containing either N₂O or CO dilute in either N₂ or air. Precision molecular spectroscopy capabilities at timescales of less than 1 ms will be presented, and progress toward cavity-enhanced and time-resolved comb spectroscopies will be discussed.

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