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Generation of a Coherent, Continuous-Wave Spectrum with Two Octaves of Optical Bandwidth JOSHUA WEBER, DENIZ YAVUZ, University of Wisconsin - Madison — From a single input laser, we generate roughly 30 output beams with linewidths on the order of 10 kHz whose wavelengths range from 800 nm to 3.2 microns, nearly two octaves of optical bandwidth. We use continuous-wave (CW) stimulated Raman scattering inside a deuterium-filled, high-finesse cavity as a wavelength-independent molecular modulator for optical light. CW laser beams, whose frequency difference is slightly detuned from a molecular Raman resonance, are used to drive vibrational and rotational transitions in deuterium. The high intensity of these fields inside the cavity induces coherent rotations and vibrations, and in this coherent state the molecules act as a CW modulator. The modulation frequencies, which correspond to vibrational and rotational transitions in molecular deuterium, range from 5 to 90 THz.

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