ABSOLUTE MEASUREMENTS OF NEAR-INFRARED CO_2 TRANSITION FREQUENCIES AT THE kHz-LEVEL

DAVID A. LONG, GAR-WING TRUONG, JOSEPH T. HODGES, *Material Measurement Laboratory, National Institute of Standards and Technology, 100 Bureau Drive, Gaithersburg, MD 20899, USA*; and CHARLES E. MILLER, *Jet Propulsion Laboratory, California Institute of Technology, 4800 Oak Grove Drive, Pasadena, CA 91109, USA*.

Measurements were made of Doppler broadened CO_2 transitions in the (30013) $\longleftarrow$ (00001) band near 1.6 μm using frequency-stabilized cavity ring-down spectroscopy (FS-CRDS). These absolute measurements were directly linked to a cesium atomic clock by the use of an octave-spanning, self-referenced optical frequency comb. Combined standard uncertainties as low as 18 kHz were achieved for these weak transitions. A global fit was then performed which included these measurements as well as an ensemble of absolute mid-infrared and far-infrared data. The resulting spectroscopic parameters provide secondary frequency standards over a wide spectral region and should benefit atmospheric remote sensing missions.