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A new bound on excess frequency noise in second harmonic generation in PPKTP at the 10^{-19} level[1] DAVID YEATON-MASSEY, RANA ADHIKARI, Caltech — Several experiments at the forefront of precision metrology and frequency standards use optical harmonic generation in their experiments. These include iodine stabilized Nd:YAG lasers, optical frequency combs, measurement of optical frequency ratios, and precision atomic spectroscopy. We present an experimental bound on the relative frequency fluctuations introduced in the nonlinear second harmonic generation process using PPKTP to double a 1064nm Nd:YAG laser. We report a measured amplitude spectral density of frequency noise with total RMS frequency deviation of 3mHz and a minimum value of 20 μHz/Hz$^{1/2}$ over 250 seconds with a measurement bandwidth of 128 Hz, corresponding to an Allan deviation of 10^{-19} at 20 seconds.

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