

SENSITIVITY SCALING OF DUAL FREQUENCY COMB SPECTROSCOPY

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Coherent dual comb spectroscopy can harness many inherent strengths of frequency combs to provide high-resolution, high-accuracy measurements of a sample response (in both magnitude and phase) on a single detector. We will discuss the noise scaling properties of this technique and show that a useful figure of merit is the product of the signal-to-noise ratio and the number of spectral elements. When normalized by the square root of the observation time, this figure of merit is 10^6 to 10^7 $\text{Hz}^{1/2}$ for a single detector and fiber-laser based system. We will discuss the scaling laws, performance, and corresponding strengths and weaknesses of coherent dual comb spectroscopy in the context of our recent results that achieved a figure of merit of 2×10^6 $\text{Hz}^{1/2}$ in a spectral band around 1560 nm.