

## ONLINE GAS MONITORING USING A MID-INFRARED OPO BASED DUAL COMB SPECTROMETER

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A dual-frequency comb-based spectrometer for the mid-infrared (3-5 micrometer) wavelength region will open many opportunities for spectroscopic applications. Non-linear conversion provides a wide spectral coverage in the mid-infrared using Optical Parametric Oscillators, keeping the optical properties of the well-established near infrared frequency combs with good frequency accuracy, high spectral resolution at seconds time scale. A number of challenges remain when OPOs are used for optical conversion, because the OPO cavity generate frequency and intensity fluctuation in the combs. Here, we present how these variations are measured and used, in real-time, to correct the recorded broadband spectrum. By monitoring the frequency and amplitude variations of a single absorption line in a reference gas cell, each individual spectrum is normalized in amplitude and corrected by an offset-frequency. As such, real-time averaging is achieved over minutes with minor losses in spectral resolution or degradation, leading to an improvement in spectral resolution. A high-to-noise ratio of about 2400 is achieved with such spectral resolution, demonstrating the efficiency of the proposed method.