

Extending low-coherence interferometry dynamic range using heterodyne detection

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Low-coherence interferometry (LCI) technique is generating considerable interest in industrial applications where there is a need for larger measurements with high resolution. Conventional Fourier domain systems reach a limiting depth of around 3 mm, mainly due to the spectrometers used as detectors. In this work, we present an optical detection system that performs the Fourier transform of the LCI signals, based on a spatial heterodyne spectrometer. This device avoids the fall-off effect of the spectrometer, allowing to reach measurable optical depths of almost 5 cm without losing resolution. We describe the theory underlying this detection system and present experimental results which are in great accordance