Long-range frequency domain low-coherence interferometry detector for industrial applications

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Resumen:
A low-cost long-range frequency domain low-coherence interferometry (LCI) detector is presented: time Fourier domain LCI (TFD-LCI). Combining ideas of time domain and frequency domain techniques, the TFD-LCI detects the analog Fourier transform of the optical interference signal with no limitation for the maximum optical path, measuring the thickness of several centimeters with micrometer resolution. A complete characterization of the technique is presented with a mathematical demonstration, simulations, and experimental results. An evaluation of repeatability and accuracy is also included. Measurements of small and large monolayer and multilayer thicknesses were done. Characterization of the internal and external thicknesses of industrial products such as transparent packages and glass windshield is presented, showing the potentiality of TFD-LCI for industrial applications

Palabras claves: FD-LCI , LOW COHERENCE INTERFEROMETRY, SPECTRAL DETECTORS, industrial application, long range