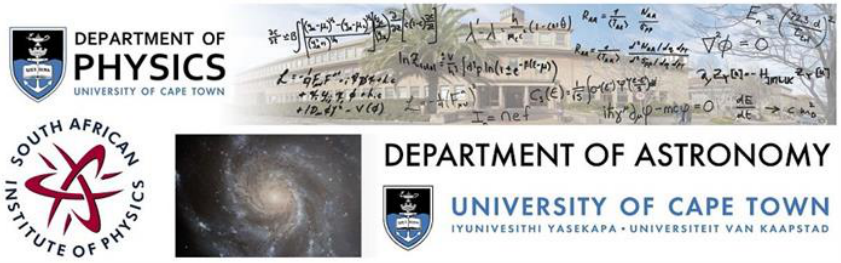

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Development of a free space, LED illuminated Spectral Domain Optical Coherence Tomography setup

Wednesday, 6 July 2016 14:00 (20 minutes)

Abstract content
   (Max 300 words)
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A Spectral Domain Optical Coherence Tomography (SD-OCT) setup has been developed. Axial reflectivity profiles of single reflectors have been simulated and determined. A Michelson interferometer model developed using Matlab was used to simulate broadband light interference. The simulated electric fields showed modulation of field oscillations in the frequency domain resulting in a Gaussian spectral interferogram. A high resolution monochromator using a Glaz line-scan CCD camera was locally assembled and calibrated using a Mercury lamp. A light emitting diode centered at 540 nm with a nominal spectral width of 35 nm was used as the light source in the interference experiments. Mirror reflectivity as a function of surface depth was obtained from inverse Fourier transforms of differential interferograms generated from measured reference, sample and source arm spectra. Measurements of the output spectral interferogram and source spectrum were stored in a 2048×2 matrix created by the line-scan camera data acquisition program. One dimensional OCT images for a fused Silica mirror and glass plates positioned at depths up to 100 μm were obtained. Measured input and output spectra as well as axial scans fairly compared to simulations, hence validating our methodology.

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