

## **Simultaneous birefringence imaging and depth phase resolved measurement using a Fourier domain OCT system**

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### **Abstract**

A low cost optical coherence tomography (OCT) system to measure simultaneously the birefringence and the internal deformation of a porcine cornea is proposed. The optical system uses polarized light to recover simultaneously the s and p polarization states while a couple of cameras record a fringe pattern that serves to reconstruct the internal structure of the cornea. The p and s interference signals are registered separately in each 2D CMOS array which generates in a single shot an entire B-scan, a feature that allows the tracking of non-repeatable deformations. A birefringence map is generated within the tissue when the p and s polarization states are combined. The experiments were conducted on a cornea that is deformed using a hydro static pressure rig which introduces mechanical micro deformations on it, and the results show concomitantly the micro structure of the cornea, its birefringence and the mechanical micro deformation.