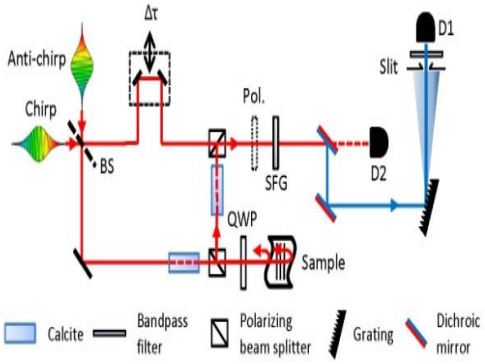
UNIVERSITY OF WATERLOO

TECHNOLOGY SUMMARY



Experimental Setup for axial profiling with chirped-pulse interferometry

Reference
8810-7234

Inventor(s)
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Patent status
US patent issued

Stage of development
Working Prototype &
Ongoing research

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Chirped-Pulse Interferometry

Background

Optical interferometry refers to a range of sensitive techniques which rely on the bright and dark regions created when two or more beams of light are superposed. It is an indispensable tool in a wide array of fields including, astronomy, biomedical imaging, precision metrology, and optical quantum information.

Description of the invention

The University of Waterloo has developed a new type of low-coherence interferometry with dramatic improvements over conventional methods, especially when making measurements in highly dispersive or lossy materials (e.g. biological specimens and photonic devices). Its signal is immune to the most significant cause of dispersive broadening, while offering increased resolution and high contrast interference despite high loss. The new interferometer was designed to produce the same characteristics as quantum interferometers without the need for entangled photon which are difficult to create, manipulate and detect.

Advantages

The technique has immediate application in imaging where material dispersion obscures features and limits resolution. The new technique relies on bright, “chirped” laser pulses (hence the name chirped-pulse interferometry) and provides the advantages associated with quantum interferometers including phase-insensitive interference, automatic dispersion cancellation, enhanced resolution, and robustness against loss but with 10 million times more signal than that achievable with entangled photons.

Potential applications

Amongst other interferometry applications, this technology is potentially applicable to biomedical imaging and optical coherence tomography (OCT).