

# Application of a long-range swept source optical coherence tomographybased scheme for dimensional characterization of multilayer transparent objects

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## Abstract:

This work presents the use of a recently developed interferometric system based on the swept source optical coherence tomography (SS-OCT) technique, which allows the characterization of transparent and semitransparent multilayer systems employing a tunable fiber-optic laser with a coherence length suitable for achieving long-deep range imaging (>10 cm). The inclusion of fiber Bragg gratings in the system allows it to perform a self-calibration in each sweep of the light source. Measurements carried out on cuvettes, ampoules, small bottles, and glass containers used in the pharmaceutical industry are presented. The thicknesses of the walls and the distance between them were determined. Transparent and semitransparent objects of a multilayer type of different thicknesses were also measured. The configuration presented allows extension of the measurement range obtainable with the usual OCT systems, demonstrating the potentiality of the proposed scheme to carry out quality control in industrial applications.

Keywords: optical coherence tomography; optical metrology; nondestructive testing; interferometry; laser applications.