PROCEDURE FOR CONTROLLING POLARIZATION IN A SCANNING INTERFEROMETER

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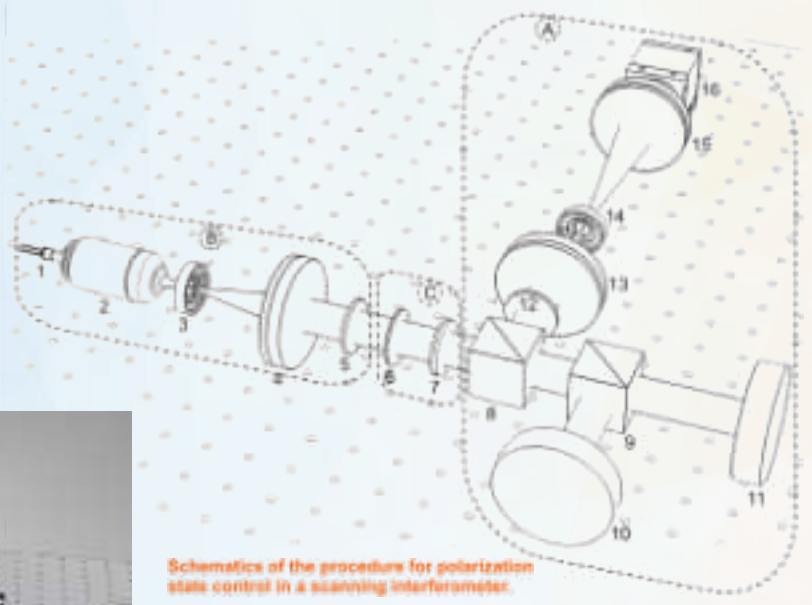
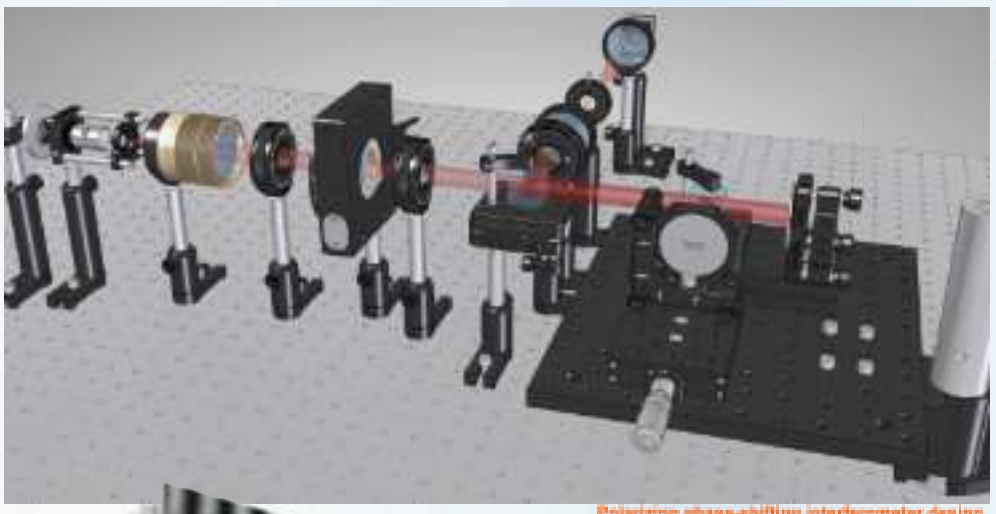
National patent application: A/ 00437/ 09.08.2023

The invention refers to a method of controlling the polarization of broadband radiation by manipulating the geometric phase in a polarizing interferometer. The problem addressed by this invention is to find a way to control the phase shifts necessary for interferometric measurements or to replace it with a more robust method, the traditional means requiring fine translational movements of the nanometer order.

The invention solves this problem by means of a method that uses geometric phase control in a polarizing interferometer (A) with collimated LED source (B) and polarizing phase shifter (C).

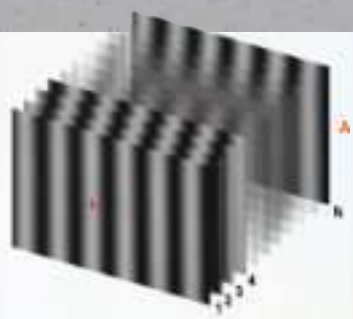


Schematics of the procedure for polarization state control in a scanning interferometer.

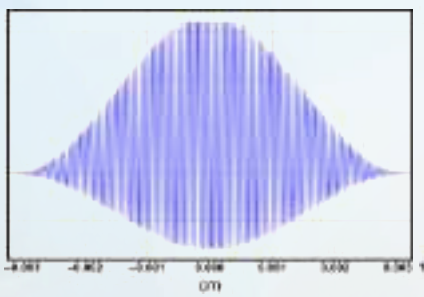


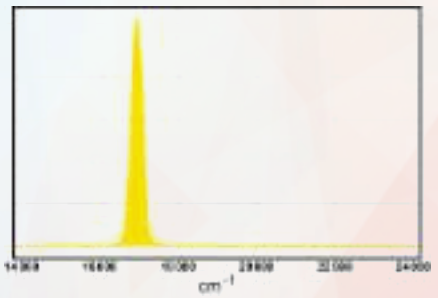
Polarizing phase-shifting interferometer design.

Thus, according to the procedure, it is proposed to control rotations of the order of degrees of arc of a half-wave plate (6) instead of translations of the order of nanometers of the mirror (10). Both optical profilometry and monochromatic radiation measurements in the visible range can be performed.

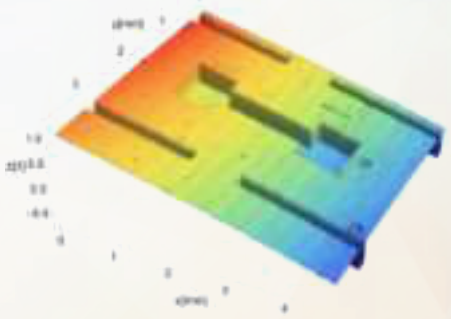


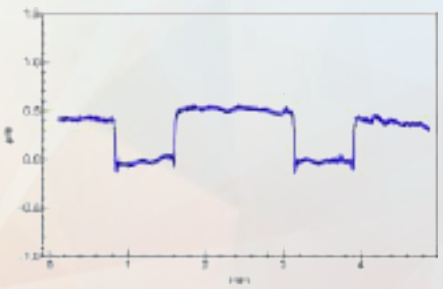
A set of phase-shifted interferograms.





Measurement example 1: Monochromatic radiation from an LED with a center wavelength of 590 nm, using Fourier transform spectroscopy.





Measurement example 2: Profile of a reflective sample by applying phase-shift interferometry and the two-wavelength method (590 nm and 475 nm), resulting in a synthetic wavelength of 2.44 m. Since phase-shift interferometry cannot correctly appreciate profiles smaller than /4, it was reconstructed at a synthetic wavelength by making two measurements at two distinct wavelengths.

CLAIMS:

- Phase shift control procedure in a scanning interferometer characterized by the fact that the geometric phase is manipulated instead of the dynamic one and rotational movements instead of translational ones.
- The method, according to claim 1, characterized in that it reduces the required precision of the phase shifter by two orders of magnitude, making it more robust and much less vulnerable to vibrations.

This work was supported by a grant of the Ministry of Research, Innovation and Digitization, CNCS - UEFISCDI, project number PN-III-P1-1.1-TE-2021-0949.

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