

Abstract Submitted
for the APR05 Meeting of
The American Physical Society

Helix Pre-Tilted Monomer - Polymer Liquid Crystal System for Measurement of Shear Stress Vector¹ DEVENDRA PARMAR, ALPHONSO SMITH, Department of Electrical Engineering, Hampton University, Hampton, VA 23668, DANNY SPRINKLE, NASA Langley Research Center, Hampton, VA 23681, JAG SINGH, NASA Langley Research Center, Hampton, VA 23681 (Ret.) — The direction and magnitude of air flow-induced shear stress vector have been measured selective reflection optical response of a pre-tilted shear sensitive cholesteric helix in a monomer-polymer liquid crystal (LC). Optical wavelength, λ , of the selectively reflected light measured normal to the test surface for a white light incident at $\sim 20^\circ$ to the normal varies linearly (slope ~ 0.38 nm/Torr for the investigated system of a monomer LC and a polymer LC Vectra A130) with the shear stress measured in terms the of air flow differential pressure, Δp . This method offers an unique experimental for shear stress vector measurement. Effects of the change in direction of incidence have been discussed from first principles based on a shear stress induced helix tilt and its deformation. It implies from the suggested model that in case of shear stress associated helix deformation, the optical response is likely to reverse on interchanging the directions of the incidence and the reflection for a given shear stress vector. ** Distinguished Research Scientist (Ret.)

¹Work done in part at NASA Langley Research Center

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Date submitted: 18 Jan 2005

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