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Theoretical Considerations for Surface Thermal Lensing Studies Using Polarized Light MARSHALL THOMSEN, Eastern Michigan University — Surface Thermal Lensing (STL) is a well-established photothermal technique for locally probing the optical, thermal, and mechanical properties of a surface. A periodically chopped laser beam, the pump beam, irradiates a sample. A portion of the pump beam is absorbed by the sample and converted into thermal energy, resulting in a periodic local thermal expansion of the surface. A second, weaker and broader laser beam, the probe beam, is directed off- normal at the surface, covering the entire heated area. The result is a modulated diffraction pattern embedded in the reflected portion of the probe beam. The addition of polarizers both between the probe laser and the sample and between the sample and the detector opens up the possibility of gaining further information about the surface. In particular, the repeated flexing of the surface of a polymer sample may give rise to local realignment of polymer chains. The resulting asymmetry may be visible through a polarization analysis of STL signals.

Marshall Thomsen
Eastern Michigan University

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