Abstract Submitted
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Liquid crystal thermometry for micro-fluidic applications[1] TAIT POTTEBAUM, University of Southern California — Liquid crystal thermometry has been implemented in a micro-channel and the performance of the technique quantified. Implementation of the technique is subject to constraints on imaging and illumination configurations similar to the constraints on micro-PIV. In addition, the proximity of the measurements to interfaces and surfaces from which light scatters leads to high noise levels that cannot be reduced by wavelength filtering (such as with fluorescent particles) because the temperature information is contained in the color of the particles. Therefore, circular polarization filtering is used, exploiting the circular dichroism of the thermochromic liquid crystal (TLC). Encapsulated TLC particles were flowed through the micro-channel and subjected to a series of uniform temperatures for calibration. To validate the technique, a temperature gradient was imposed with no flow. Finally, the technique was applied to micro-channel flow with an imposed wall temperature gradient in the flow direction. Liquid crystal thermometry can now be applied to a wide range of micro-fluidic applications.

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Tait Pottebaum
University of Southern California

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