

Abstract Submitted
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Uncertainty analysis of particle image thermometry using individual thermo-liquid crystal tracers RODRIGO SEGURA, CHRISTIAN CIERPKA, MASSIMILIANO ROSSI, CHRISTIAN KÄHLER — An analysis of the benefits and challenges in calibrating temperature measurements by tracking the color fluctuations of individual thermo-liquid crystals is presented. Flow thermometry using liquid crystals has long been investigated for the evaluation of temperature fields but a reliable experimental uncertainty analysis is yet to be made for individual particles. A study was performed on the temperature response of individual tracer particles. The fluctuations in color response of adjacent crystals in a constant temperature environment were evaluated as well as the aging effects due to continuous illumination. The hysteresis of the color response to temperature gradients was also evaluated, as well as overheating and overcooling effects on individual particles. Flow thermometry has been widely used in the past to evaluate average temperature fields but a more precise characterization is possible by tracking the temperature of the individual tracers.

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