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Optical properties of nanofluids and its implication in nPIV measurements ANOOP KANJIRAKAT, REZA SADR, Texas A&M University at Qatar, MICRO SCALE THERMOFLUIDS LABORATORY TEAM — Nanofluids have shown potential as heat transfer fluids in recent times due to their anomalous enhancement in heat transfer characteristics. Optical experimental methods are used to study near-wall flow characteristics in nanofluids to better understand this phenomenon. It is important to characterize the optical properties of the fluid under consideration as accuracy of these measurement techniques highly depends on these characteristics. For example, evanescent wave based nano-Particle Image Velocimetry (nPIV) technique, that measures near-wall velocity fields with an out of plane resolution of $O(100\text{nm})$, is an effective tool for such studies. In the present study, optical properties of SiO_2 -water nanofluids at various particle concentrations are investigated. Measurements of refractive indices and the optical transmittance of nanofluids, which are directly related to the out-of-plane resolution of nPIV measurements, are reported. The effects of the modification of these optical properties on the nPIV measurements of nanofluids in a micro channel are then discussed.

Reza Sadr
Texas A&M University at Qatar

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