

Abstract Submitted  
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**Multiple light scattering methods for multiphase flow diagnostics** JORDI ESTEVADEORDAL, North Dakota State Univ — Multiphase flows of gases and liquids containing droplets, bubbles, or particulates present light scattering imaging challenges due to the interference from each phase, such as secondary reflections, extinctions, absorptions, and refractions. These factors often prevent the unambiguous detection of each phase and also produce undesired beam steering. The effects can be especially complex in presence of dense phases, multispecies flows, and high pressure environments. This investigation reports new methods for overcoming these effects for quantitative measurements of velocity, density, and temperature fields. The methods are based on light scattering techniques combining Mie and filtered Rayleigh scattering and light extinction analyses and measurements. The optical layout is designed to perform multiple property measurements with improved signal from each phase via laser spectral and polarization characterization, etalon decontamination, and use of multiple wavelengths and imaging detectors.

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