Interference modes in laser induced fluorescence thermometry applied to particle-laden flows

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ABSTRACT

The influence of interference from solid particles on gas-phase temperature measurements using two-colour laser induced fluorescence (LIF) thermometry was analysed for two different particle types, PMMA and ZnO:Zn. The signal from interactions of the particles with the incident laser sheet (from Mie scattering, fluorescence and phosphorescence) was measured in the collection wavelength bands for two-colour toluene LIF thermometry. The intensity of the signal from the PMMA particles was significantly stronger than from the ZnO:Zn particles, due to particle fluorescence in the two-colour wavelength bands. The intensity from both particle types was also stronger relative to the toluene fluorescent emission intensity in the wavelength of 315±10 nm than 285±5 nm.