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In situ calibration of volume concentration measurements using PTV correlation for particle-laden flows RAHUL MULINTI, KYLE CORFMAN, KEN KIGER, University of Maryland — Determination of the effective measurement volume is essential for making quantitative concentration measurements of a dispersed phase when using particle-imaging technique for two-phase flows. While nominally determined by the local light sheet thickness, the actual value depends also on the dispersed phase identification characteristics used to detect the particles (relative brightness, size, etc.), and stray illumination such as scattering by tracer particles and wall reflections, necessitating use of local calibration techniques. In the current work, a novel *in situ* method is proposed where the effective light sheet thickness is estimated using particle image correlation information of free falling dispersed-phase particles settling through a tilted light sheet. Increasing the delay time between the image pairs results in in-plane loss of correlation as the particle images move out of the light sheet. By employing a threshold on the height of the normalized mean correlation peak, and relating this to the actual particle image identification characteristics, the effective light sheet thickness is estimated. The effects of tracer particles and presence of a strong wall reflection on the effective light sheet thickness is also reported.

Ken Kiger
University of Maryland

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