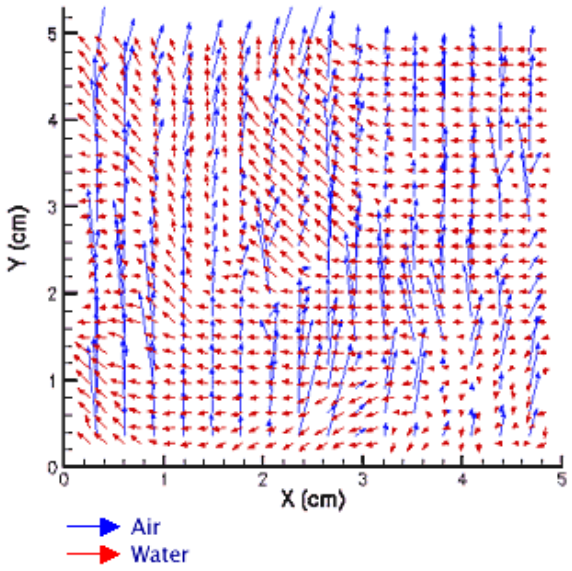
TWO-PHASE BUBBLY FLOW MEASUREMENTS

APPLICATION NOTE PIV-008

Obtaining the velocity fields associated with the gas and liquid phases in a two-phase flow has always been a matter of great interest.

A PowerView™ two-camera PIV system is used to diagnose a two-phase bubbly flow field. Both the cameras view a region of the flow illuminated by the laser light sheet.

In order to separate the two phases, the liquid phase is seeded using fluorescent particles. Laser Induced fluorescence signal from these particles will be at a wavelength different from that of the incident light. The light scattered by the bubbles will have the same wavelength as that of the incident light (532 nm) of the YAG laser. Thus the light "scattered" by the gas phase and liquid phase will be at different wavelengths.



Instantaneous velocity field in a bubbly two-phase flow

PIV imaging of the flow field is done using cameras with optical filters. The camera with the optical filter for the 532 nm (say, Camera 1) will be used to capture the image field of the bubbles. Similarly, the camera with the filter corresponding to the wavelength of the fluoresced light (Camera 2) will be capturing the image field of the liquid phase.

In order to get the velocity fields, the PIV system with the two cameras are triggered simultaneously along with the laser to capture two sets of image fields. INSIGHT-NT Stereo provided control of the hardware including lasers and cameras, acquisition of the images, and the analysis and display of results.

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