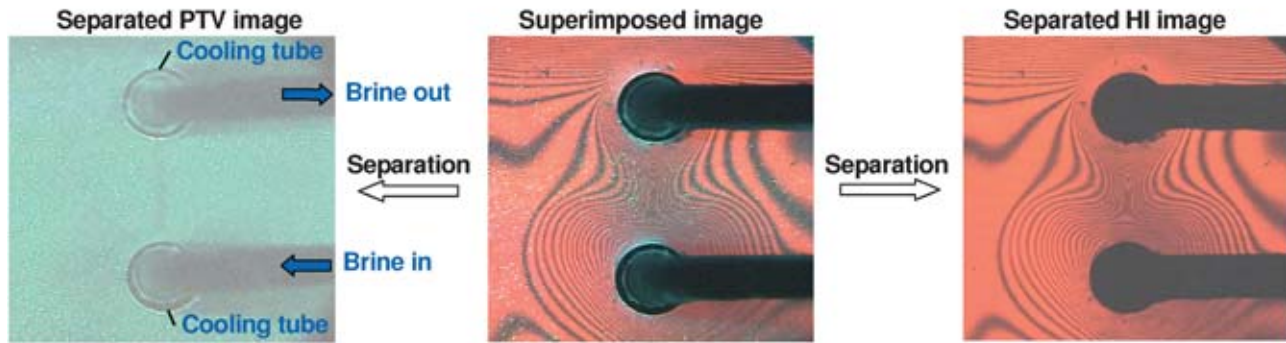
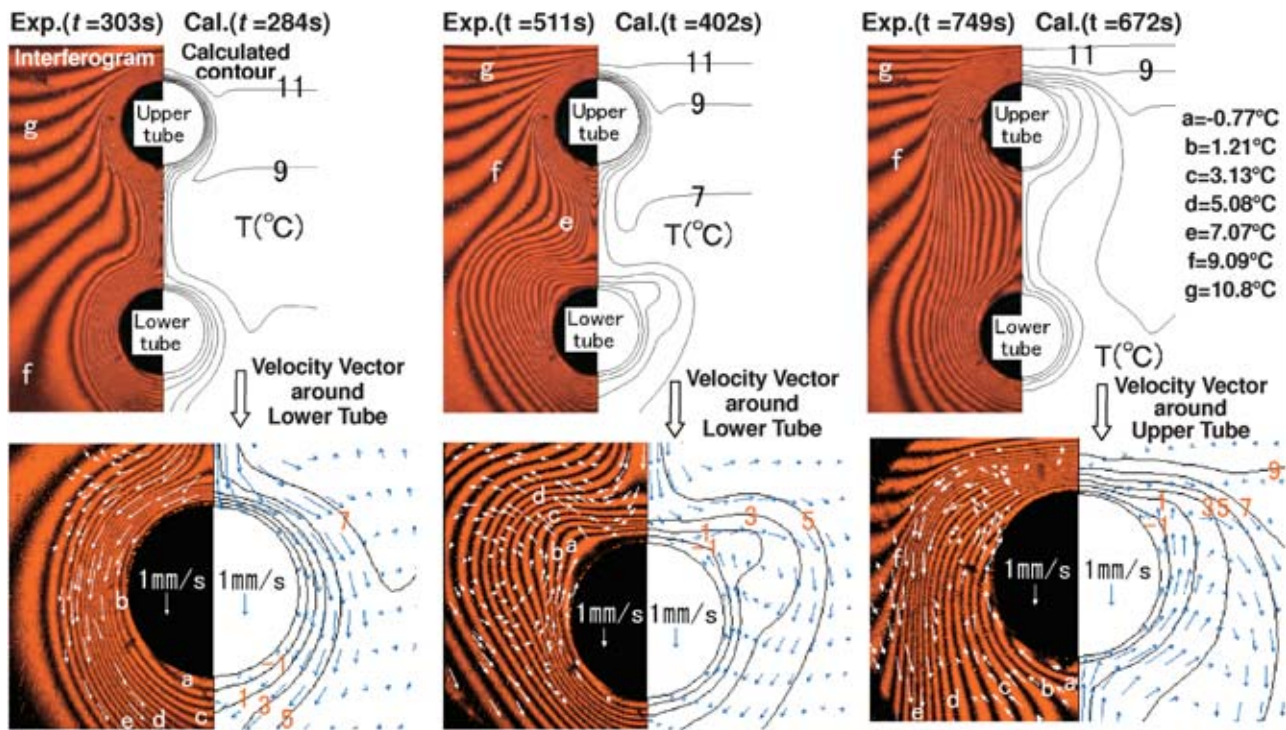


Superimposed and Separated Images Obtained by HI-PV



Comparison between Measured and Calculated Results



Simultaneous Visualization of Velocity and Temperature Fields of Transient Natural Convection

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A new visualization technique to measure transient 2-D profiles of velocity and temperature was developed. Particle tracking velocimetry (PTV) and real time holographic interferometry (HI) are combined into the new technique, and it will be called as HI-PV. HI-PV's accuracy depends on the clarity of separation of PTV and HI images. We propose two different techniques to separate PTV and HI images: (1) separate two images using a digital image processing after recording the superimposed image with a digital video camera and (2) record the two images separately by two digital video cameras attached with blue or red color filter.

HI-PV was applied to the transient natural convection of water around two cooling tubes. Water: initial temperature = 13°C was cooled by two tandem cooling tubes: surface temperature = -4.3°C, and natural convection with density inversion occurs. A numerical calculation was also made and its results were favorably compared to the corresponding visualized results by HI-PV. HI-PV is proven to be a very useful technique to measure simultaneously transient 2-D profiles of velocity and temperature.