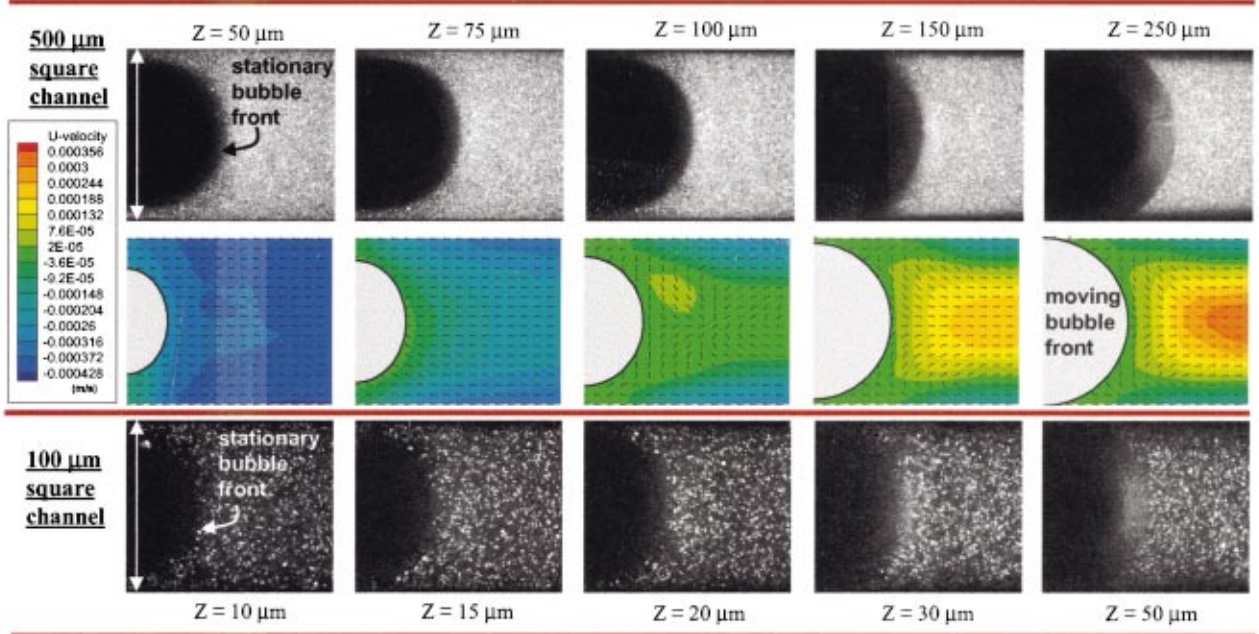


**Capillary Number**  
 $Ca = \mu U / \sigma$   
 500 μm channel:  $Ca = 6.11 \times 10^{-6}$   
 100 μm channel:  $Ca = 1.39 \times 10^{-6}$



**Optically-Sectioned Micro PIV Measurements Using CLSM\***

- Full-field flow mapping at the bubble front advancing in a rectangular cross-sectioned microchannel -  
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The **Confocal Laser Scanning Microscope\*** (CLSM) enables optically sectioned  $\mu$ -PIV measurements with extremely shallow field-of-depth of 1.0- $\mu$ m and a lateral resolution better than 0.5- $\mu$ m. Hollow sphere, 200-nm fluorescent particles are used as tracers to achieve a full-field, optically sectioned flow velocity vector mapping, for the region at the gas bubble front, advancing in two different microchannels of 500- $\mu$ m by 500- $\mu$ m (Capillary number =  $6.11 \times 10^{-6}$ ), and 100- $\mu$ m by 100- $\mu$ m ( $Ca = 1.39 \times 10^{-6}$ ) square cross-sections. This work is supported by the NASA OBPR-Fluid Physics Research Grant (NAG3-2712) and the CLSM was purchased by the Permanent University Facility Award from Texas A&M University.

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