

Abstract Submitted
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Wave and flow field phenomena in planar falling films by simultaneous Laser-Induced Fluorescence and Particle Image/Tracking Velocimetry¹ ALEXANDROS CHAROGIANNIS, IVAN ZADRAZIL, CHRISTOS MARKIDES, Imperial College London — Falling films along an inclined flat plane test section were investigated using simultaneous Laser-Induced Fluorescence and Particle Image/Tracking Velocimetry techniques. The investigated conditions covered a range of Reynolds (2.2 – 8.2) and Kapitza numbers (28.6 – 41.4). The main challenge of the research is the development of routines that allow for simultaneous detailed measurements of liquid film topology as well as the instantaneous velocity fields within the liquid film while correcting for the refractive index discrepancy at the solid-liquid and gas-liquid interfaces. The uncertainties of the laser-based measurement techniques used to determine the local film thickness were compared with a micrometer based measurements as well as with the solution to the Navier-Stokes equations based on the assumptions for 1-D steady and fully developed flow. The results presented consist of in-detail characterisation of the aforementioned conditions as well as of flows with inlet pulsation frequencies in the range 1 – 8 Hz.

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