Bachelor/Master Thesis

Study of Near-Wall Bubble Dynamics Using Total Internal Reflection Fluorescence Technology

Total internal reflection fluorescence technology (Figure 1) has the advantages of high spatial resolution and a high signal-to-background ratio. It has been widely used in the biological field for cell membrane imaging and protein research. The penetration depth (or illumination area depth) of this technique is generally only 100 to 200 nanometers. These characteristics also allow the technology to capture changes at the interface between different phases, providing experimental data to support the boundary condition settings for numerical simulations.

In order to further promote the application of total internal reflection fluorescence technology in the industrial field, we have developed a high-frequency total internal reflection fluorescence technique and applied it to the study of cavitation bubble near-wall breakup dynamics (Figure 2).

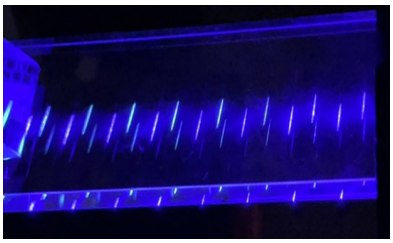

Fig. 1. TIR in a planar waveguide

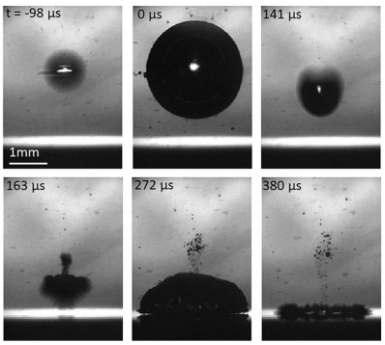

Fig. 2. Cavitation bubble, from Jonas Kühlmann et al., Tribology Letters 70(4).

Tasks

1. Experimental setup optimization

2. Performing Some Simple Post-Processing on the Image

Requirements

Degree in engineering or physics; interest/basic knowledge in optics, imaging, and measurement technologies; and enjoy experimental work. Initiative and ability to work in a team are expected. Basic programming skills in Matlab/Python.

Language requirements: English

Contact

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