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Behavior of a laser-induced bubble: effects of the volume variation of the liquid[1] SENNOSUKE KAWAMOTO, YOSHIYUKI TAGAWA, Tokyo Univ of Agri & Tech — We investigate both experimentally and theoretically the behavior (growth and contraction) of a laser-induced bubble generated in a narrow tube opened at one end. In experiments, the bubble behavior is observed using a high-speed camera. Immediately after the illumination of a laser pulse to a point inside a liquid, a generated bubble expands mainly toward the open end of the tube. The expanding bubble ejects a certain amount of liquid from the tube, resulting in the volume change of the liquid inside the tube. In order to describe the behavior of the bubble, we develop a model considering the volume variation of the liquid in the equation of motion. The boundary condition of this model is set at the open end as atmospheric pressure for the entire process. It is found that our model can describe the bubble behavior better than conventional models. Our results suggest the possibility of volumetric control with nano-litter precision for practical liquid transportation technologies using microjets.

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