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Mechanism of efficient production of standing sonoplasmas with the help of a punching metal plate K. SASAKI, Y. IWATA, S. TOMIOKA, S. NISHIYAMA, Hokkaido University, N. TAKADA, Nagoya University — We have reported an efficient method for producing standing sonoplasmas. This method employs a punching metal plate which is inserted just below the water surface with the irradiation of ultrasonic wave. In this work, we carried out two experiments to investigate the mechanism of the efficient production of standing sonoplasmas. One was the measurement of the intensity distribution of the ultrasonic wave using an optical microphone. As a result, it was found that, at the optimum depth of water for producing sonoplasmas, the intensity of the ultrasonic wave was strong in the neighboring region to the water surface where the punching metal plate was inserted. In addition, we observed a local minimum in the distribution of the ultrasonic wave intensity. The location of the local minimum coincided with the standing point of cavitation bubbles or sonoplasmas. The other experiment was the shadowgraph imaging of cavitation bubbles. As a result, we found the efficient formation of seed bubbles in the adjacent region to the punching metal plate. The seed bubbles were transported to the local minimum of the ultrasonic wave intensity. We will discuss the mechanism of the efficient production of standing sonoplasmas on the basis of these experimental observations.

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