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Orbital revolution of a pair of bubbles in an acoustic field MINORI SHIROTA, Hirosaki University, KOU YAMASHITA, TAKAO INAMURA — This experimental study aims to clarify the mechanism of orbital motion of two oscillating bubbles in an acoustic field. Trajectory of the orbital motion was observed using a high-speed video camera. Because of a good repeatability in volume oscillation of bubbles, we were also able to observe the radial motion driven at 24 kHz by stroboscopic like imaging; the cyclic bubble oscillation was appeared to slow down by capturing images at the framing rate close to the forcing frequency. The orbital motions of bubbles raging from 0.13 to 0.18 mm were examined with different forcing amplitude and in different viscous oils. As a result, we found that pairs of bubbles revolve along a circular orbit around the center of mass of the orbiting two bubbles. We also found that the two bubbles perform anti-phase radial oscillation. Although this radial oscillation should result in a repulsive secondary Bjerknes force, the bubbles kept a constant separate distance of about 1 mm, which indicates the existence of centripetal primary Bjerknes force. The angular velocity of orbital revolution increases linearly with the increase in Bjerknes force.

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