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The formation of side jets by streamwise vortices and a vortex ring in a controlled round jet AKINORI MURAMATSU, College of Science and Technology, Nihon University, KOHEI TANAKA, Graduate School of Science and Technology, Nihon University — When the density of jet fluid is sufficiently lower than that of the ambient fluid, branched flows are formed at the end of potential core in a jet. The branched flows are referred to as *side jets*. The formation of the side jets in a round jet is concerned with both the wavy deformation of vortex rings and a sinusoidal velocity fluctuation with relatively high level in the potential core. A round jet with the branched flows was artificially formed using synthetic jets, as shown in 2019 APS DFD. The controlled jet using three synthetic jets is used to investigate the mechanism for side-jets formation experimentally. The starting positions of the branched flow are fixed in the controlled jet, although the starting positions of the side jets vary unsteadily in the natural jet. The branched flows become a periodic phenomenon with synchronizing the roll-ups in the controlled jet. The time-resolved 3D imaging using a laser sheet, an oscillating mirror, and a high-speed camera and the measurement of a dynamic PIV were carried out in the controlled jet. It is found that the branched flow is formed by an induced flow at the top of wavy vortex ring from the experimental results. The induced flow is generated by a pair of streamwise vortices and a vortex ring.

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