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Cross sectional image of the pipe flow with periodical side flow injection¹ TOSHIHISA UEDA, YUUSUKE SUGIKAWA, NAOTAKA HIGUCHI, Keio University — Mixing is one of the essential processes in most industries. The enhancement of mixing and reaction in laminar conditions plays an important role in high viscous fluids, a flow in microsystems, chemical- and bio- reactors. In the present study, periodical flow motion is investigated to enhance the mixing. The experimental apparatus consists of a main flow pipe and four branching flow pipes which is installed normal to the main pipe. Glycerin is used as a working fluid. The glycerin flows in a steady state condition in the main pipe while the branching flow is injected periodically from four pipes. The cross sectional image of the mixing of main flow and branching flows is visualized by inserting the Rodamin B in the first branching flow. The laser sheet is formed at the test cross section and the location of the branching flow is visualized. When only one branching flow is periodically injected, a simple circle pattern is periodically formed at the cross section. When the number of the branching flow is increased, the cross sectional pattern becomes complex and the interface between main flow and branching flow increases, which results in an increase in the molecular diffusion and enhance the mixing.

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