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Active Shear Superpositon Micromixer

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We present a theoretical and experimental study of the mixing in a Micro Electro Mechanical System (MEMS). The mixer is an active micromixer. Its design consists of a main mixing channel where the main flow is perturbed by jet flows emanating from a series of secondary channels. The lateral flows oscillate in time and reorient the lamination of passive tracers from streamwise to cross-stream. The micromixer is a silicon-etched device where the main channel is 2h wide, 13h long and h deep (h = 100 microns). The secondary channels are 5h long and h/2 wide. The parameters (flow rate, frequency, and amplitude of oscillation) are accurately controlled. The mixing process is studied numerically and experimentally using flow visualizations techniques. The numerical simulations are performed for the 3-D flow. We present some flow properties using the Mixing Variance Coefficient (MVC).

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