Abstract Submitted
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Streaming Flow in Branching Micro/Mini Channels[1] DONNA MEYER, ZONGQIN ZHANG, CHANG LIU, THOMAS BAREK, AHMED FADL, University of Rhode Island, MANFRED KRAFCZYK, Technical University of Braunschweig, Germany — A streaming-based study is presented in branching micro and minichannels of oscillating flows with no net mass flow. Zero-mean velocities result in distinct differences between forward and backward flow velocity profiles, causing near-wall particles in the fluid, and those near the channel center, to advance in opposite directions. Streaming velocities were found to be highly influenced by oscillating amplitude and frequency, as shown in numerical analyses and validated analytically. A kinematic viscosity of the fluid which is larger than the diffusivity of the particles were found to result in effective convective transport. Advantages of streaming flow-based phenomenon include enhanced mixing, pumpless fluid propulsion, multichannel fluid distribution, easy system integration with cost-effective operation. The distinguishing features of streaming flow lend themselves to numerous applications.

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