Abstract Submitted
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Separation dynamics of dense dispersions in laminar pipe flows: An experimental and numerical study[1] VICTOR VOULGAROPOULOS, RASHID JAMSHIDI, M.I.I. ZAINAL ABIDIN, PANAGIOTA ANGELI, ThAMeS Multiphase, Department of Chemical Engineering, University College London — The physical mechanisms governing the separation of dense liquid dispersed flows in pipes are not well understood. In this work, both experiments and numerical simulations are performed to investigate these mechanisms. Liquid-liquid dispersions are generated using a static mixer and their evolution is studied along a horizontal pipe (26mm ID) at laminar flow and input dispersed phase volume fractions up to 50%. To conduct optical measurements (PLIF and PIV) in the dense dispersions, the refractive index of both liquids is matched. Measurements are carried out at two axial locations downstream the mixer (15D and 135D, where D is the pipe diameter). Homogeneous dispersions, observed at 15D, segregate at 135D. The packing of the drops results in asymmetric velocity profiles and high slip velocities. The mixture approach is used in the numerical simulations, including gravity and shear-induced diffusion of drops. The predictions on separation and on velocity fields agree well with the experiments.

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