

Abstract Submitted
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Two-colour micro-PIV and high speed shadowgraphy measurements for liquid-liquid plug flows¹ MAXIME CHINAUD, DIMITRIOS TSAOULIDIS, PANAGIOTA ANGELI, Department of Chemical Engineering, University College London, Torrington Place, London WC1E 7JE, UK, UNIVERSITY COLLEGE LONDON TEAM, MEMPHIS COLLABORATION — Two-colour micro-Particle Image Velocimetry (micro-PIV) is a relatively new technique that provides velocity fields simultaneously in both phases of a two-phase flow system. In this work, a laser emitting at two different wavelengths was used to excite two different types of particles, each added in one of the liquid phases of a two-phase, oil-water, system. The two types of particles emitted signals at separate wavelengths that were captured simultaneously by two different cameras. Instantaneous velocity fields could thus be obtained in both phases at the same time. This technique was used to study liquid-liquid plug flows in microchannels. Both plug propagation in the main channel and plug formation in the T-shaped inlet junction have been investigated. During plug propagation analysis of the velocity fields reveals recirculation patterns inside the dispersed plug and the continuous slug. These will be related to dimensionless numbers. The results on plug formation will be discussed against current models on plug size.

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Maxime Chinaud
University College London

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