Abstract Submitted
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**Nature of hydrodynamic causation of Marangoni instabilities for the case of drop rising in a channel: visualisation and statistics**[1] MAKRAND KHANWALE, HRUSHIKESH KHADAMKAR, CHANNAMALLIKARJUN MATHPATI, Dept. of Chemical Engineering, Institute of Chemical Technology, Mumbai — The physics of drop rise with continuous transfer of interfacial tension depressant (acetone), is mainly influenced by the coupling of mass transfer of interfacial depressent fluid, relative motion of two phases, and interface deformation. We present a investigation which focuses on the nature of hydrodynamic causation of aforementioned mass transfer process, which arise due to non-uniform shear at the interface, also known as the Marangoni instabilities. The effects of relative motion of two phases, and interface deformation are eliminated by operating in the spherical shape range (Eötvös number, $Eo = 1.95$, and Morton number, $M = 78.20$) with creeping flow particle Reynolds number($Re_p = 0.053$). A improved technique for measurement and processing of data acquired from simultaneous planar PIV-PLIF is used to obtain velocity and concentration fields around the drop. A progressive non-Gaussian behaviour from large scales to small scales is seen, in scale wise wavelet energy decomposition of vorticity and concentration fields. This suggests similarity with high Schmidt and Reynolds number intermittent turbulence, even in the creeping flow region. Fourier spectra of concentration and velocity shows the plethora of length scales generated by the Marangoni instabilities.

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