

Abstract Submitted
for the DFD15 Meeting of
The American Physical Society

Flow development investigation of concentrated unstable oil-water dispersions in turbulent pipe flows VICTOR VOULGAROPOULOS, WEHELIYE WEHELIYE, MAXIME CHINAUD, PANAGIOTA ANGELI, Department of Chemical Engineering, University College London, Torrington Place, London, WC1E 7JE, KAROLINA IOANNOU COLLABORATION¹ — This study explores the separation characteristics of unstable oil-water dispersed flows in pipes. The test section is a 7 m long acrylic pipe with a 37mm ID and the fluids used are tap water and an Exxsol oil (6.6cSt) An inlet system with more than a thousand capillary tubes of 1mm ID is implemented to actuate highly concentrated dispersions for a wider range of flow rates. High speed imaging combined with ring conductivity probes and pressure transducers are implemented in several axial positions along the pipe to study the flow development. Phase distribution and continuity are measured in the pipe cross-section and drop size information is acquired by high frequency dual impedance probes. The coalescence and sedimentation dynamics of the concentrated dispersions and the development of separate layers downstream the pipe are investigated. The experimental results are coupled with theoretical and semi-empirical models in an effort to predict the separation properties of the highly concentrated dispersed flows.

¹Chevron Energy Technology, Houston, USA

Victor Voulgaropoulos
Department of Chemical Engineering, University College London,
Torrington Place, London, WC1E 7JE

Date submitted: 31 Jul 2015

Electronic form version 1.4