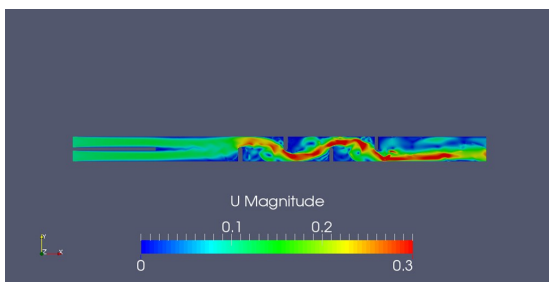


Investigation on time break up using static mixer for an emulsion oil/water.



Challenge

The work is focussed on the computational understanding of the phenomena and the validation of experimental results obtained with PLIF.

Background

The performance of Kenics (KM) and Sulzer (SMX+) designs of static mixer has been investigated for the mixing of immiscible fluids using situ optical measurements. The fluids used are water as the continuous phase and either silicone oil in the presence ODF surfactant (Sodium Lauryl Ether Sulfate), or Lytol mineral oil in the presence of a nonionic surfactant (Span 80). The dispersed phase volume fraction was between 0,0072% and 0,028% and the superficial velocities ranged from 0,16 to 0,9 m/s. The pipe diameter was 0,0127 m and 6 or 12 mixing elements were used for each mixer type. For this work we are using the CFD software OpenFoam 2.3.1 an open source. We want reproduce a turbulent flow in a pipe , with inside a static mixer module and two different phases. This case requires a numerical model which can consider :

- the turbulent flow
- the presence of two immiscible phases
- the interface changings between the two phases

Results and Geometry

The first part of this work will focus on the setting of right parameters to find the right turbulent model and the right solver, in a 2D geometry. After that we will extend the same study on a 3D geometry.

Case study



Client Profile

Domenico Daraio
School of Chemical Engineering
University of Birmingham
B15 2TT

Contact Details

Email : dx429@bham.ac.uk

Product Used

OpenFoam 2.3.1

Contributors

Federico Alberini
Alessio Alexiadis

Submitted July 2015

