Abstract Submitted
for the DFD08 Meeting of
The American Physical Society

Experimental Research on Turbulent Bubbly Mixing Layer Flow with Polymer Additives FANG GUO, BIN CHEN, FUDE GUO, State Key Laboratory of Multiphase Flow in Power Engineering, Xi'an Jiaotong University — Based on turbulent mixing layer flow with polymer additives, bubbly two-phase mixing layer with polymer additives were experimentally investigated by PIV to study the interaction between bubble and coherent structure in viscoelastic fluid with The velocity ratio 4:1. Gas bubbles with gas fraction 0.5% were injected both of water with and without 200ppm Polymer additives from high speed side, low speed side and central line of the mixing layer. Similar with single-phase Newtonian and viscoelastic fluid, the Reynolds stress and voticity of two-phase flow cases still concentrate in a coniform area of central mixing flow field part and the width will increase with increasing the Reynolds number. It also shows that the mixing layer spreads linearly and the Reynolds stresses are self-similar both in single phase, but it is quite different in multiphase. However, compared with single-phase, the peak value of Reynolds shear stress will decrease and there will be fluctuations when bubbles were injected into water with and without polymer additives. As to the maximum value of vorticity on different cross-section, it will decrease with the development of mixing layer and the injection of bubbles will slower the speed of this tendency.

Fang Guo
State Key Laboratory of Multiphase Flow in Power Engineering,
Xi'an Jiaotong University

Date submitted: 31 Jul 2008 Electronic form version 1.4