Abstract Submitted
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Numerical investigation of a turbulent hydraulic jump: Interface statistics and air entrainment[1] MILAD MORTAZAVI, Graduate student at Stanford University, DOKYUN KIM, Post-doctoral fellow at Stanford University, ALI MANI, Post-doctoral fellow at MIT, PARVIZ MOIN, Franklin and Caroline Johnson Professor of Mechanical Engineering, Stanford University — The objective of this study is to develop an understanding of formation of bubbles due to turbulence/interface interactions and nonlinear surface wave phenomena. As a model problem a statistically stationary turbulent hydraulic jump has been considered. Turbulent hydraulic jump with an inflow Froude number of 2 and Reynolds number of 88000–based on inflow height–has been numerically simulated. Based on typical air- water systems, a density ratio of 831 has been selected for our calculations. A refined level-set method is employed to track the detailed dynamics of the interface evolution. Comparison of flow statistics with experimental results of Murzyn et al. (Int. J. Multiphase Flow, 2005) will be presented. The probability density function of principal curvatures of the air- water interface and curvature distribution patterns in the chaotic regions are investigated. The importance of liquid impact events in bubble generation will be discussed.

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