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Experimental Characterization of Interchannel Mixing of Multiphase Flow Through a Narrow Gap SIMO A. MÄKIHARJU, Univ. of California, JAMES W. GOSE, Univ. of Michigan, JOHN R. BUCHANAN JR., ALEXANDER G. MYCHKOVSKY, KIRK T. LOWE, Naval Nuclear Laboratory, STEVEN L. CECCIO, Univ. of Michigan — Two-phase mass transfer through a gap connecting two adjacent channels was investigated as a function of gap geometry and flow conditions. An experiment with a simplified geometry was conducted to aid in the physical understanding and to provide data for validation of numerical computations. The flow loop consisted of two $(127 \text{ mm})^2$ channels connected by a 1,219 mm (L) x 229 mm (W) gap, the height of which could be adjusted from 0 to 50 mm. The inlet Reynolds number in each channel could be independently varied from 4×10^4 - 1×10^5. During previous experiments, the single phase mixing was extensively investigated. The inlet void fraction was varied from 1 to 20%. Gas was injected as nominally monodisperse bubbles with diameter O(5 mm). The mass transfer through the gap was determined from measurements of the flow rates of water and air, and tracer concentration taken at channel inlets/outlets. The void fraction, bubble diameter distribution and gas flux was determined at the inlets based on flow rate measurements prior to gas injection, optical probes and Wire Mesh Sensor (WMS) data. At the outlets the gas fluxes were based on WMS measurements and the liquid phase mixing was determined based on measurement of the tracer concentration and liquid flow rate after separation of gas. Imaging of fluorescent tracer dye was utilized for select conditions to examine the dynamics of the mixing.

James Gose
Univ. of Michigan

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