

Abstract Submitted  
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**An experimental investigation of fingering instability and growth dynamics in inclined counter-current gas-liquid channel flow** JORDAN PURVIS, RAVI MISTRI, CHRISTOS MARKIDES, OMAR MATAR, Imperial College London — The results of an experimental study involving low Reynolds number, counter-current flows of glycerol and air on an inclined glass substrate inside a rectangular channel are presented. The interface forms a thickened front immediately upstream of a thin, precursor layer region. This front is vulnerable to spanwise perturbations which, under certain conditions, grow to acquire the shape of “fingers.” Decreasing the inclination angle has a stabilizing effect on the front: complete stability is achieved below a critical angle whose value depends on the remaining system parameters. Regions of transient finger formation are also observed. It is also found that increasing the ratio of the precursor to the inlet film thickness, and increasing the liquid and air flow-rates also exerts a stabilizing effect on the interface. Analyses of the initial finger growth-rate corroborate the findings of previous theoretical work, showing this growth-rate to be independent of inclination angle and liquid film Reynolds number, and weakly-dependent on the air flow-rate for low inclination angles.

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