

Abstract Submitted  
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**Interfacial Charge Effects on Sticky Bubble Morphology in a Microchannel**<sup>1</sup> JONATHAN HUI, PETER HUANG, Binghamton Univ — Many multiphase fluidic processes in small conduits, such as petroleum extraction and biochemical analysis, can encounter disastrous flow blockages due to the lodging of immiscible bubbles or droplets. The complete drainage of a thin-film lubrication layer surrounding an adhered bubble demands a significantly higher threshold pressure gradient in order to reinitiate bulk flows. In this work, we investigate bubble morphology due to the lubrication layer drainage process that results in bubble adhesion and study how an electrostatically charged bubble interface and charged channel wall may affect bubble morphology in preventing bubble adhesion. We report on our multiphysics computational analysis of an oversized gas bubble in a water-filled microchannel under the influence of surface tension and interfacial electrostatic forces.

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