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Capillary Flow in Weakly 3-Dimensional Conduits RYAN JENSON, YONGKANG CHEN, MARK WEISLOGEL, Department of Mechanical and Materials Engineering, Portland State University — A large literature exists for capillary driven flows along simple conduits of uniform cross section (i.e. right circular and regular polygonal cylinders, etc.). The work presented here extends the analysis to imbibing flows along conduits of increased geometric complexity with each possessing a slight taper along the primary flow path. Results are presented for transient flows in select conduits where power law time dependencies transition between regimes, depending on the time dependent boundary conditions. The experimental results of drop tower and spacecraft (ISS) tests support the analysis which is also compared with numerics. Such flows may be exploited for the passive manipulation of liquids in microfluidic systems on Earth as well as microgravity fluid systems aboard spacecraft.

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