Abstract Submitted
for the DFD13 Meeting of
The American Physical Society

**Surface wetting effects on drop passage through a confining orifice**[1] ANKUR BORDOLOI, ELLEN LONGMIRE, Aerospace Engineering and Mechanics, University of Minnesota — The motion of gravity-driven drops (Bo $\sim$ 2-10) through a sharp-edged confining orifice is studied in a liquid/liquid system for both hydrophobic (HPB) and hydrophilic (HPL) orifice surfaces. The drop interface is tracked by high-speed imaging, and fluid velocity fields are obtained by PIV. When a drop impacts the leading edge of the orifice, the drop fluid contacts the solid surface immediately, and the resulting interfacial contact lines begin propagating away from the edge. The final drop outcome (capture, release or break-up) is influenced by the motion of the contact lines as well as the contact force between the drop fluid and the orifice surface. In the HPB case, the contact line motion is limited, and the contact force acting against drop passage is weak. In the HPL case, the contact line motion strongly inhibits drop passage by spreading fluid across the upper surface of the orifice plate. For drops that break into multiple volumes, the wettability influences both the break-up location and fractional volume of the resulting satellite drop.

[1]Supported by DOE (DOE EERE-PMC-10EE0002764).

Ankur Bordoloi
Aerospace Engineering and Mechanics, University of Minnesota

Date submitted: 01 Aug 2013 Electronic form version 1.4