Abstract Submitted
for the DFD06 Meeting of
The American Physical Society

An experimental investigation of air entrainment through viscous liquids in a horizontally rotating cylinder ANTONINO CARNEVALI, Morehead State University — Flow patterns produced inside a cylinder partly filled with a viscous liquid and rotated about its horizontal axis of symmetry have been discussed by many authors. We report here on a similar experiment where we have observed *new* flow patterns at filling fractions $\geq 50\%$. We will focus on the production of thin films of air triangular in shape but otherwise similar to those produced in a very different geometry by a viscous jet plunging into a bath, as elucidated by J. Eggers [Phys. Rev. Lett. **86**, 19] and E. Lorenceau and D. Quere' [Phys. Rev. Lett. **93**, 254501]. Two-dimensional drops of the viscous liquid move inside the thin film as a stable associated feature. As the angular velocity is lowered, the triangular area of the film becomes smaller and smaller until it squeezes the remaining drop into a cusp. Further decrease of the angular velocity causes the film to burst and squeeze the drop out into the surrounding liquid. One final observation unreported elsewhere is the formation of an inverted tear-drop bubble that remains stationary in the apparatus while the liquid rotates at significant speeds.

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Date submitted: 04 Aug 2006 Electronic form version 1.4