Abstract Submitted
for the DFD05 Meeting of
The American Physical Society

**Spout States in the Selective Withdrawal System** SARAH CASE, SIDNEY NAGEL, University of Chicago, KIMBERLY WALKER, Dillard University
— In the selective withdrawal experiment, fluid is withdrawn, at rate Q, through a tube with its tip suspended a distance S above an unperturbed interface separating two immiscible fluids. For low Q only the upper fluid is withdrawn, and when Q is increased, or S is decreased, the interface undergoes a transition, and a spout of the lower fluid is entrained in the upper one. For a viscosity ratio of the two fluids $\lambda = \nu_{lower}/\nu_{upper} > 1$, we have observed that two distinct spout states exist. These are differentiated by their profiles as well as by the flows in the lower fluid. We have also categorized the shapes and flow patterns for systems with $\lambda < 1$. We also quantify the relationship of the spout width at the entry to the tube as a function of S and Q. This measurement can have impact on diverse applications, such as coating small particles [1]. [1] I. Cohen, et al., Science 292, 265-267 (2001); J. Wyman, et al., (to be published)

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Date submitted: 11 Aug 2005 Electronic form version 1.4