Abstract Submitted
for the DFD16 Meeting of
The American Physical Society

A hydrodynamic linear instability in a system of confined colloidal rollers[1] BLAISE DELMOTTE, ALEKSANDAR DONEV, Courant Institute of Mathematical Sciences, New York University, MICHELLE DRISCOLL, PAUL CHAIKIN, Department of Physics, New York University — In a typical flow instability, the fastest growing wavelength is selected by two or more competing stresses. In this talk I will discuss a very different kind of instability, controlled by a single geometric parameter. We study theoretically a new instability which has been observed experimentally and numerically: the fingering of a front of suspended microrollers near a floor. Our continuum model shows that this instability is linear and that the size scale selection arises only from hydrodynamic interactions between the particles and the wall, independently of the driving forces and viscosity. We believe that this instability mechanism is quite generic and selects the instability length scale in a number of suspension/colloid systems near a wall.

[1]This work was supported primarily by the Materials Research Science and Engineering Center (MRSEC) program of the National Science Foundation under Award Number DMR-1420073.

Aleksandar Donev
Courant Institute of Mathematical Sciences, New York University

Date submitted: 10 Nov 2016 Electronic form version 1.4