Abstract Submitted
for the DFD11 Meeting of
The American Physical Society

**Aquatic vegetation in flow: To buoy or not to buoy** MITUL LUHAR, HEIDI NEPF, Massachusetts Institute of Technology — Previous studies show that the flexural stiffness and buoyancy of many species of aquatic vegetation change in response to hydrodynamic conditions. We present a theoretical and experimental study that describes the flow-induced reconfiguration of aquatic vegetation across the natural range of vegetation buoyancy and stiffness. We show how posture and drag depend on two dimensionless parameters that represent the relative magnitudes of the hydrodynamic forcing, and the restoring forces due to stiffness and buoyancy. Reconfiguration leads to a transition away from the classical quadratic drag law. We present scaling laws that describe the relationship between drag and velocity for both stiffness- and buoyancy-dominated reconfiguration. Our results may explain the morphological plasticity observed for aquatic vegetation.

Mitul Luhar
Massachusetts Institute of Technology

Date submitted: 02 Aug 2011 Electronic form version 1.4