

**Center for Fluid Mechanics, Division of Applied Mathematics
Fluids, Thermal and Chemical Processes Group, School of Engineering
Joint Seminar Series**

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Induced-Charge Electrokinetic Phenomena

Microfluidics has rekindled interest in electrokinetics, the study of electrically driven fluid flow past charged surfaces ("electro-osmosis") and the related motion of charged particles ("electrophoresis"). Classical electrokinetic phenomena are linear in the applied voltage, but a much richer class of nonlinear electrokinetic phenomena can occur around polarizable surfaces, where an electric field acts on its own induced charge. This talk presents the basic physics of "induced-charge electro-osmosis" and describes some engineering applications. Examples include microfluidic pumping by an electro-osmotic "fluid conveyor belt", and transverse electrophoresis of metallo-dielectric Janus particles in AC fields. These remarkable phenomena also raise fundamental questions about electrokinetics at large induced voltages, leading to new nanoscale models accounting for the crowding of ions against highly charged surfaces.

**Tuesday October 19, 2010
3:00 PM
Barus & Holley Room 190**