Abstract Submitted
for the DFD14 Meeting of
The American Physical Society

Two layer flow of thin leaky dielectric films between electrodes ELIZAVETA DUBROVINA, RICHARD CRASTER, DEMETRIOS PAPAGEORGIOU, Imperial College London — The flow of two viscous conducting fluids between two electrodes is investigated. The fluids are assumed to be leaky dielectrics and two nonlinear coupled evolution equations are derived for the moving interface and the interfacial charge. These are solved numerically for three different cases in which the magnitude of the ratios of electric conductivities and permittivities is varied. A linear stability analysis indicates that electrical forces destabilize the system. These predictions are confirmed by numerical results which show that increasing the ratios of conductivities and permittivities leads to traveling waves that grow in amplitude.

Elizaveta Dubrovina
Imperial College London

Date submitted: 30 Jul 2014 Electronic form version 1.4