Abstract Submitted
for the DFD07 Meeting of
The American Physical Society

Modeling of the dielectrophoretic conveyer-belt assembling microparticles into large-scale structures[1] BORIS KHUSID, New Jersey Institute of Technology, University Heights, Newark, NJ 07102, DAVID JACQMIN, NASA Glenn Research Center, Cleveland, OH 44135, ANIL KUMAR, Pall Life Sciences, 50 Bearfoot Road, Northborough, MA 01532, ANDREAS ACRIVOS, The Levich Institute, The City College of New York, 140th St, New York, NY 10031 — A dielectrophoretic conveyor-belt method for assembling negatively polarized microparticles into large-scale structures was recently developed (APL 90, 154104, 2007). To do this, first, an array of microelectrodes is energized to generate a spatially periodic AC electric field that causes the particles to aggregate into boluses in positions of the field intensity- minima, which are located mid-way along the height of the channel. The minima and their associated boluses are then moved by periodically grounding and energizing the electrode array so as to generate an electrical field moving along the electrode array. We simulate this experiment numerically via a two- dimensional electro-hydrodynamic model (PRE 69, 021402, 2004). The numerical results are in qualitative agreement with experiments in that they show similar particle aggregation rates, bolus sizes and bolus transport speeds.

[1]This work was supported in part by grants NSF CTS-0307099 and NSF/Sandia NIRT/NER-0330703

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Date submitted: 02 Aug 2007 Electronic form version 1.4