Abstract Submitted
for the DFD16 Meeting of
The American Physical Society

Reverse Fluid Transport Due to Boundary Pulsations MIKHAIL COLOMA, DAVID SCHAFFER , PAUL CHIAROT , PETER HUANG , Binghamton University — We investigate a reverse fluid transport mechanism consisting of peristaltic flow and boundary wave reflections. The reverse flow occurs in a rectangular conduit aligned in parallel between two cylindrical channels embedded in an elastic PDMS medium. The pulsating flow in the cylindrical channels, driven by a peristaltic pump, deform the PDMS medium and induce a pulsating flow in the rectangular conduit. Waveforms along the conduit boundaries, and their transmission and reflections, can be controlled by changing the PDMS rigidity. Our results show that while the overall wave propagation direction is in the forward direction, a reverse flow in the rectangular conduit can be preferentially induced by varying the elastic rigidity in one of the cylindrical channels. We study the overall flow velocity and direction under various PDMS rigidities. The identified set of experimental parameters that leads to a reverse flow will provide insights in understanding metabolic waste transport within the arterial walls in the brain.

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Date submitted: 01 Aug 2016 Electronic form version 1.4