Abstract Submitted
for the DFD20 Meeting of
The American Physical Society

Open siphon on a capillary channel KAIZHE WANG, New York University Courant Institute, Applied Math Lab, JUN ZHANG, New York University, Shanghai, LEIF RISTROPH, New York University Courant Institute, Applied Math Lab — A conventional siphon is an everyday device for transferring liquids that consists of a tube with inverted U shape. Flow up and over can be established and maintained only if the tube is closed so air does not enter and break the line. Here we describe a siphoning mechanism that operates when entirely open to the atmosphere by exploiting surface tension effects. This capillary siphoning is demonstrated by hanging paper or fabric over the edge of a glass or tub of water, and we conduct experiments on a more subtle and controlled version that involves a single groove-like and curved capillary channel. The dependence of flow rate on the siphon geometry is well accounted for by a model that solves for the spatially-dependent shape of the fluid interface, speed and pressure.

Kaizhe Wang
New York University Courant Institute, Applied Math Lab

Date submitted: 10 Aug 2020 Electronic form version 1.4