

Abstract Submitted  
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**Wave Model for Valveless Pumping based on Impedance and Resonance** ANNA HICKERSON, MORTEZA GHARIB, California Institute of Technology — Valveless pumping can be achieved through the periodic compression of a pliant tube asymmetrically from its interfaces to different tubing or reservoirs. Flow and pressure measurements revealed resonant properties of the pump mechanics that suggest a mechanism of how the pump functions based on wave propagation and reflections. For each compression, a pair of pressure waves is created. These waves will travel, reflect, dissipate, distort and interact. The sum of these behaviors is responsible for the net pressures and flows observed. A simple mathematical model of wave interactions in conjunction with the geometric properties of the experiments showed remarkable agreement with the experimental results.

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