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A Piezoelectric Micropumping Based on D31 Mode YAKUT ALI, CUIFANG KUANG, JAMIL KAHN, GUIREN WANG, Department of Mechanical Engineering, University of South Carolina, Columbia, SC, USA — A micropumping device has been developed, which may find application in different areas such as blood pumping and chemical reagents dosing in bioengineering or as an efficient thermal management solution scheme in space-constrained electronic devices, due to some of their unique properties such as lower noise generation and ease of miniaturization. In this presentation, liquid pumping effect is reported using a simple valveless piezoelectric dynamic pump in D31 mode based on acoustic streaming principle. The actuator tip configuration is found to have a significant effect on the pumping performance. Quantitative results of maximum local velocity are presented for different tip configuration of the same actuator for comparison. In addition, this work also demonstrates the quantitative measurements of the pumping performance such as the flow rate and pressure head generated as a function of different relevant parameters such as applied electrical field, AC frequency and length of the actuator.

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