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Slip-Enhanced Electrokinetic Energy Harvesting SHU WANG, STEPHEN ALBRIGHT, JONATHAN BELLER, YONGQIANG REN, DEREK STEIN, ENERGY HARVESTING TEAM — We experimentally investigate how hydrodynamic slip, the movement of fluid along a solid surface, affects the efficiency of a proposed electrokinetic energy conversion strategy. Mechanical work is transformed into electrical energy when a pressure-driven fluid flow drives an electrical streaming current, whose origin is the transport of counterions near the charged walls of a channel. We are studying streaming currents for different salt concentrations and surface treatments. To promote slip, the silica nanochannel surface is coated with a self-assembled monolayer of the hydrophobic molecule OTS. We wish to test the theoretical prediction that hydrodynamic slip should dramatically increase streaming currents, and thereby enhance the efficiency of electrokinetic energy conversion. In the future, bundled slip-enhanced nanochannels could be used to harvest power from situations where mechanical work is currently dissipated as heat, such as in the shocks of cars.

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