Abstract Submitted
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Quantifying the Local Seebeck Coefficient using Scanning Thermoelectric Microscopy (SThEM)[1] JENNA WALRATH, YEN-HSIANG LIN, University of Michigan Department of Physics, KEVIN PIPE, University of Michigan Department of Mechanical Engineering, RACHEL GOLDMAN, University of Michigan Department of Materials Science and Engineering — Thermoelectric (TE) devices allow reliable solid-state conversion of heat to electricity. The efficiency of a TE device is determined by the figure of merit, ZT, which is sensitive to the Seebeck coefficient, S. A promising alternative to traditional macroscale measurements of S is scanning thermoelectric microscopy (SThEM), which can profile S with nm resolution [1]. In SThEM, an unheated scanning tunneling microscopy tip acts as a high-resolution voltmeter probe to measure the thermally-induced voltage, V, in a heated sample. However, the temperature (T) gradient is not localized to the sample, and the measured V is a convolution of voltages within the region of non-zero temperature gradient. Therefore we have developed a 1D Fourier heat conduction model to predict the T gradient in the tip and to deconvolute the measured V within the sample. This approach enables direct conversion between the measured V and the local S. [1] H.K. Lyeo et al., Science **303**, 816 (2004).

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