Abstract Submitted
for the MAS17 Meeting of
The American Physical Society

Nanoscopic Wetting at Solid-Liquid Interfaces JOHN TOMKO, ASHUTOSH GIRI, University of Virginia, SEAN O'MALLEY, Rutgers University - Camden, PATRICK HOPKINS, University of Virginia — Understanding the effects and limitations of solid-liquid interfaces on energy transport is crucial to applications ranging from micro-scale thermal energineering to batch-scale chemical synthesis. Up to now, the majority of understanding of solid-liquid interactions has been limited to macroscale observation and experiments, with development in theory and simulation of nanoscale phenomenon only recently gaining popularity, and an even further lag in experimental exploration. In this study, we expand on current nanoscale thermal measurement techniques in order to more fully understand solid-liquid interfacial energy transport. As explored in previous works, we use thermal ablation threshold measurements of thick Au films in various liquids as a metric of thermal transport at the Au/liquid interface. Further, using ultrafast pump-probe experiments, we gain insight of energy transport through picosecond ultrasonic coupling at solid-liquid interfaces. These results are compared to macroscopic observations. We find significant variation in both ablation threshold and damping of the acoustic modes within the Au films relative to the predicted transport determined from macroscopic metrics, thermal conductivity or measured contact angle.

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Date submitted: 22 Aug 2017 Electronic form version 1.4