Abstract Submitted
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Thermal conductivity measurements of amorphous metal thin films via the 3ω method[1] KAI ZHAN, JANET TATE, Department of Physics, Oregon State University, JOHN MCGLONE, JOHN WAGER, School of Electrical Engineering and Computer Science, Oregon State University, KRIS OLSEN, DOUGLAS KESZLER, Department of Chemistry, Oregon State University — Amorphous multicomponent metals have promising applications in novel electronic devices because of their atomically smooth surface morphology and lack of grain boundaries. It is important to understand the thermal transport properties of amorphous metals and an accurate measurement of their thermal conductivity will be essential for further improvement of device performance and reliability. Here, the 3ω method has been improved and extended to investigate the room temperature thermal conductivity of amorphous metals. Iterative, amorphous multicomponent metallic films are deposited on silicon substrate by magnetron sputter deposition. A thin layer of hafnium oxide film is deposited on top of amorphous metals by atomic layer deposition, providing a reliable insulation between an aluminum heater and the amorphous metal film. The room temperature thermal conductivities of thin-film hafnium oxide and silicon nitride are also measured to demonstrate the capability and reliability of the 3ω technique.

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Kai Zhan
Department of Physics, Oregon State University

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