

Abstract Submitted  
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**Large Thermoelectric Figure of Merit in Thin Ablated Skutterudite Films** HARSHA ATTANAYAKE, DILUPAMA DIVARATNE, ROBERT BOUGHTON, Dept. Physics and Astronomy, Bowling Green State University — Thin 40% lanthanum-filled skutterudite films were prepared by pulsed laser ablation on glass substrates. In general, laser ablated film characteristics exhibit up to 70% amorphous structure and vary in thickness by about 20% from center to edge. The thermoelectric figure of merit was determined using Harman's<sup>1</sup> method at room temperature, which involves voltage measurement under isothermal and adiabatic conditions. A total of 16 samples prepared in three ablation runs were measured as a function of substrate thickness in order to determine the limiting figure of merit ( $ZT = S^2 T / \rho \kappa$ ) in the thin film geometry. The average film thickness was determined to be 95 nm. The extrapolated behavior predicts a very large value of the thermoelectric figure of merit for this material, approaching 15, far exceeding values obtained with bulk samples. We attribute the high value to several possible factors: enhanced Seebeck coefficient and size limited thermal conductivity in both electronic and lattice components. Possible applications are discussed. 1. T. C. Harman, S. E. Miller, H. L. Goering, *J. Phys. Chem. Solids*, **2**, 181 (1957).

Robert Boughton  
Dept. Physics and Astronomy, Bowling Green State University

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