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**Spin-phonon interactions to control the thermal transport in uranium dioxide** K. GOFRYK, Idaho National Laboratory, S. DU, C.R. STANEK, J.C. LASHLEY, X.-Y. LIU, R.K. SCHULZE, J.L. SMITH, D.J. SAFARIK, D.D. BYLER, K.J. MCCLELLAN, B.P UBERUAGA, B.L. SCOTT, D.A. ANDERSSON, Los Alamos National Laboratory — Despite more than sixty years of intense research of uranium dioxide, a thorough understanding is lacking for the microscopic processes that control its transport and thermodynamic properties. In particular, it is not clear how different degrees of freedom and quasiparticle excitations interact and what is the relationship to the thermal behavior. We report our new experimental and theoretical studies on oriented and well characterized single crystals of uranium dioxide. Our results indicate that strong spin-phonon coupling and resonant scattering are important for understanding the general thermal behavior, and also explains the observed anisotropy in thermal conductivity by coupling to the applied temperature gradient and breaking cubic symmetry. We will discuss implications of these results.

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