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Tuning thermoelectric power factor by crystal-field and spin-orbit couplings in Kondo lattice materials[1] SEUNGMIN HONG, POUYAN GHAEMI, University of Illinois at Urbana-Champaign, JOEL MOORE, University of California, Berkeley, and Lawrence Berkeley National Laboratory, PHILIP PHILLIPS, University of Illinois at Urbana-Champaign — We study thermoelectric transport at low temperatures in correlated electron materials, motivated by the recent observation of a high thermoelectric figure of merit(ZT) in $FeSb_2$ at $T \sim 10K$. Even at room temperature, correlations have the potential to lead to high ZT, as in $YbAl_3$, one of the most widely used thermoelectric metals. At low temperature correlation effects are especially worthy of study because fixed band structures are unlikely to give rise to the very small energy gaps $E_g \sim 5K$ necessary for a weakly correlated material to function efficiently at low temperature. We explore the possibility of improving the thermoelectric properties of correlated Kondo insulators through tuning of crystal field and spin-orbit coupling and present a framework to design more efficient low-temperature thermoelectrics based on our results.

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