Anthony Lonsdale

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Effect of Magnetic Moment on Thermal Conductivity

Insulating non-magnetic solids conduct heat through the lattice vibrations, also colloquially known as phonons. However, in magnetic solids, additional channel for the heat transport is available through the interaction of magnetic moments with each-other. On the other hand, lattice vibrations couple with the magnetic moments on the atoms and thus provide additional resistance to the heat flow. Currently, there is no complete understanding of the magnitudes of these contributions and the overall effect of the magnetic contribution is largely unknown. Using a combination of spin dynamics and molecular dynamics simulations, we simulated the contribution of the magnetic subsystem to the lattice thermal conductivity across ferromagnetic to paramagnetic transitions in elemental Iron. Application of the approach to the anti-ferromagnetic materials are discussed on the example of technologically important material, uranium dioxide.

Anthony Lonsdale is a Junior undergraduate studying Physics at Missouri S&T. He is from Kansas City, Missouri and his interests include software development, financial markets and algorithmic finance. Anthony is an Eagle Scout, National level swimmer and entrepreneur. He started working with Dr. Chernatynskiy in the fall of 2019 under the FYRE program and presented his research for the Fuller Research Competition in the spring of 2020. He is currently working under the OURE program, and plans to continue until graduation. Anthony plans on developing a startup financial services company and working in the investment banking industry upon graduation.