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The Importance of Complex Electronic Structures in Thermoelectric Materials[1]

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Thermoelectric performance as characterized by the figure of merit, ZT, is a counter-indicated property of matter, meaning that high ZT depends on a combination of transport properties that do not generally occur together. A particularly important conundrum in thermoelectrics is the requirements for simultaneously having high electrical conductivity and high thermopower. I will argue that the resolution of this conundrum is through complex band structures and discuss how these arise in various known and predicted high performance thermoelectric materials.

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