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**Finding new thermoelectrics: Parabolic bands are (probably) not enough<sup>1</sup>**

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Thermoelectric performance as characterized by the figure of merit  $ZT$  is a counterindicated property of matter. While the electronic structure of common semiconductors is well understood in terms of band models, most commonly the parabolic band model, this type of electronic structure is not the best for finding high thermoelectric performance. Instead high  $ZT$  thermoelectrics often have unusual band structure features. Here I discuss some of those features, and their essential aspects in relation to thermoelectric performance and outline strategies for finding more high  $ZT$  materials based on them.

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