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Impact of Thermal Fluctuations on Transport in Antiferromagnetic Semimetals

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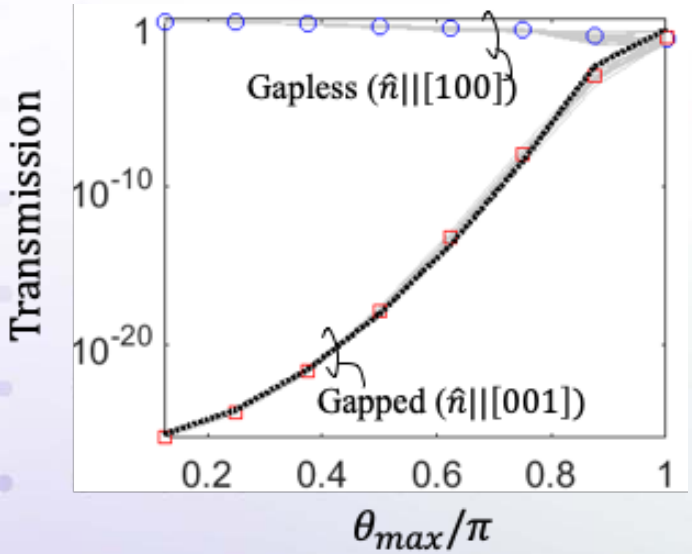
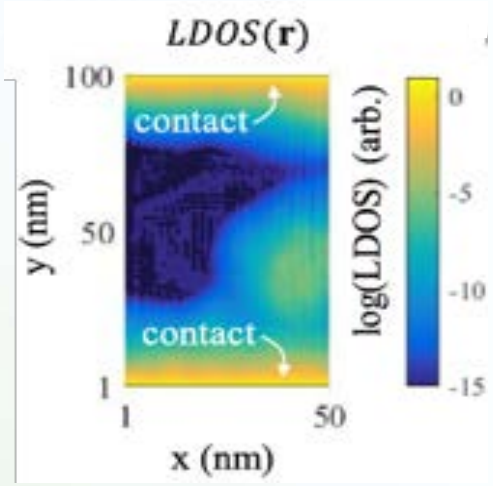
We have theoretically studied the impact of thermal fluctuations on electrical conduction in antiferromagnetic semimetals (AFS):

- Depending on the orientation of the magnetization, AFS may either be gapped or gapless.



- We find that the thermal fluctuations effectively decrease the magnitude of the magnetic order that makes it difficult to distinguish the two phases, as shown to the **left** where we plot the transmission against the fluctuation angle.
- At higher temperatures, the spins in the AFS randomly tilt making sections of the AFS appear gapless, as shown to the **right** where we plot the local density of states and see states in the AFS where there should be none.



Conclusion: Thermal effects will play a large role in understanding antiferromagnetic materials

[1] Y. Kim et al., Phys. Rev. B, 97, 134415 (2018).
[2] Y. Kim et al., Phys. Rev. B, 98, 024409 (2018).

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