Electron transport in cable bacteria

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It was recently discovered experimentally that cable bacteria exhibit electric conduction, and that the temperature behaviour of electrical conducnptance is different at high and low temperatures. We show that the main features of this behaviour can be explained using the model of a hopping chain, choosing the hopping rates to be classical Marcus rates at high temperatures and quantum analog of the Marcus expression for low temperatures. There are however some experimental details which are not accounted for in this model and require further investigation.

[1] Jasper R. van der Veen, Silvia Hidalgo Martinez, Albert Wieland, Matteo De Pellegrin, Rick Verweij, Yaroslav M. Blanter, Herre S. J. van der Zant, Filip J. R. Meysman, arXiv:2308.09560

[2] Jasper R. van der Veen, Stephanie Valianti, Herre S. J. van der Zant, Yaroslav M. Blanter, Filip J. R. Meysman, Phys. Chem. Chem. Phys. 26, (2024) 3139