

# Exploring Electrical Conductance of Amorphous Non-conducting Polymers under Vibrational Strong Coupling

*Monday 2 October 2023 09:00 (40 minutes)*

Achieving electrical conductance in amorphous non-doped polymers is a challenging task. In my talk, I present how a serendipitous experiment led us to the finding that the vibrational strong coupling (VSC) of amorphous polymers such as polystyrene, deuterated polystyrene, poly (benzyl methacrylate), and a few other polystyrene derivatives enhance the electrical conductance by orders of magnitude. Remarkably, the electrical conductance enhancement in these polymers is selective to the VSC of its aromatic C-H(D) out-of-plane bending modes. The conductance characteristics vary from diffusive to ballistic, depending on the strong coupling strengths. The electrical characterizations are performed without external light excitation, demonstrating the role of quantum light in enhancing the long-range coherent transport even in amorphous non-conducting polymers.

Reference:

1. Kumar, S.; Biswas, S.; Rashid, U.; Mony, K. S.; Vergauwe, R.; Kaliginedi, V.; Thomas, A. Extraordinary Electrical Conductance of Non-Conducting Polymers Under Vibrational Strong Coupling. arXiv 2023.<https://doi.org/10.48550/arXiv.2303.03777>.

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**Session Classification:** Morning session