Quantum-interference-enhanced thermoelectricity in single-molecule junctions

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Abstract

Although the dream of manipulating quantum interference in single molecules has been discussed for many years, experimental evidence of the effect of quantum interference on the room-temperature electrical conductance of single-molecules was reported only recently[1].

In this talk, I will present a brief outline of current understanding of quantum interference in single-molecules[2] and then discuss our recent results[3] demonstrating how quantum interference can be exploited to increase the thermoelectric performance of single molecules and assemblies of molecules connected to nano-gap electrodes.

1. *J. Am. Chem. Soc., 2011, **133**, 11426, Nature Nano. 2012, **7**, 305; Nat. Nano., 2012, **7**, 663, Phys. Rev. Lett. 2012, **109**, 056801; Nano. Lett. 2012, **6,** 1643-1647; JACS 2012, **134**, 5262; Beilstein J. Nanotech. 2011, **2,** 699* and refs. therein
2. Lambert, *Chem. Soc. Rev.* **44,** 875-888 (2015); Geng, et al., *J. Am. Chem. Soc*. **137**, 4469 (2015); Sangtarash et al., *J. Am. Chem. Soc*. **137** 11425 (2015); D. Manrique, et al., *Nature Comm*. 6 6389 (2015); Berritta et al, *Nanoscale* 7 1096 (2015)
3. Evangeli et al., *Nano Letters* **13,** 2141-2145 (2013); Garcia-Suarez et al, *Nanotechnology* **25,** 205402 (2014); Sadeghi et al, *Nano Lett*. **15**, 7467-7472 (2015); Manrique et al., *Nano. Lett.* **16**, 1308−1316 (2016); Ismael et al, *Nanoscale* 7 17338 (2015); Rincón-García at al, *Nature Materials*, **15**, 289–293 (2016); Han et al., *Nature Comm.* **7** 11281 (2016); M. Noori et al, Nanoscale 9 (16), 5299-5304 (2017); Q. Al-Galiby et al, *Nanoscale* 9 (14), 4819-4825 (2017)