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Invited Speaker

Quantum Interference in Single-Molecule Circuits

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Abstract:

Over the past decade, there has been tremendous progress in the measurement, modeling and understanding of structure-function relationships in single molecule circuits. Experimental techniques for reliable and reproducible single molecule junction measurements have led, in part, to this progress. In particular, the scanning tunneling microscope-based break-junction technique has enabled rapid, sequential measurement of large numbers of nanoscale junctions allowing a statistical analysis to readily distinguish reproducible characteristics. Although the break-junction technique is mostly used to measure electronic properties of single-molecule circuits, in this talk, I will demonstrate its versatile uses to understand both physical and chemical phenomena with single-molecule precision. I will discuss some recent experimental and analysis aimed at understanding quantum interference in single-molecule junctions. I will then show examples where molecular structures can be designed to utilize interference effects to create a highly non-linear device.

References:

Greenwald et al, Nature Nanotechnology, vol. 16, pages 313–317 (2021).