

## How does electricity flow through a single molecule?

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Our ability to learn about charge transport through single molecules has been accelerated by the development of gated nanogaps in graphene ribbons. In the simplest experiments, the molecule behaves like a quantum dot in a single electron transistor. But it is possible to go much further, to discover how interactions between quantum states, such as interference and resonance, can allow for greater degrees of quantum control, and phenomena such as thermoelectricity. Reduction and oxidation are accompanied by reconfiguration of the molecule, and we have developed a comprehensive account of this using a master equation. Crucial to yield and reproducibility is the choice of anchor groups for attaching the molecules to the graphene contacts. The advances in our fundamental understanding will provide the knowledge base for eventual technologies that cannot be achieved by conventional approaches.

*Reference:* Understanding resonant charge transport through weakly coupled single-molecule junctions, Nature Communications (2019, in press)