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Current at Metal-Organic Interfaces

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Charge transport through atomic and molecular constrictions greatly affects the operation and performance of organic electronic devices. Much of our understanding of the charge injection and extraction processes in these systems relies on our knowledge of the electronic structure at the metal-organic interface. Despite significant experimental and theoretical advances in studying charge transport in nanoscale junctions, a microscopic understanding at the single atom/molecule level is missing. In the present talk I will present our recent results to probe directly the nanocontact between single molecules and a metal electrode using scanning probe microscopy and spectroscopy. The experiments provide unprecedented microscopic details of single molecule and atom junctions and open new avenues to study quantum critical and many body phenomena at the atomic scale. Implications for energy conversion devices and carbon based nanoelectronics will also be discussed.