NANOSCIENCE COLLOQUIUM

Interplay between Magnetoresistance and Kondo Resonance in Radical Single-Molecule Junctions

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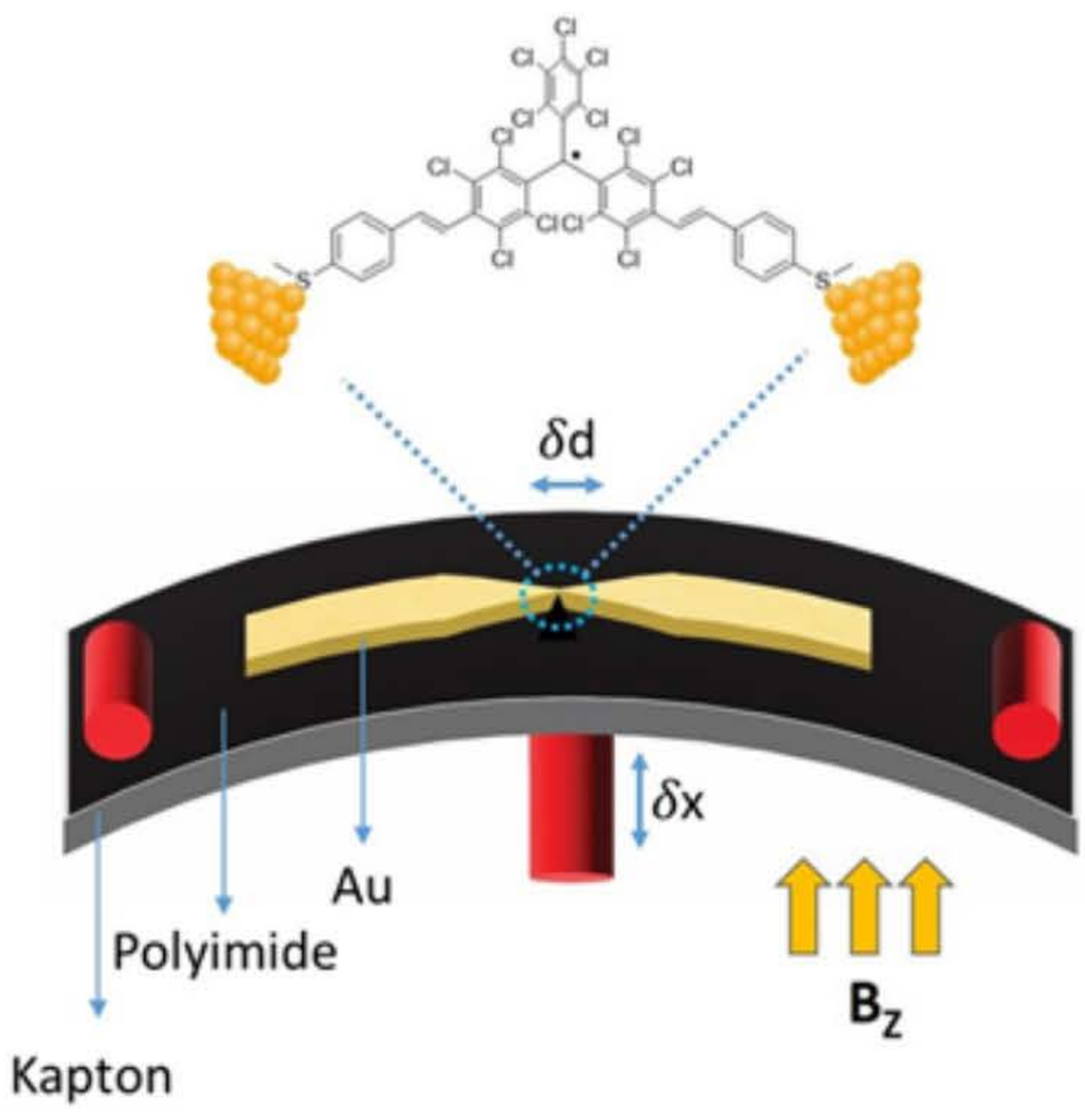
Abstract: The possibility to fabricate electronic devices with molecules as functional building blocks is a central goal of molecular electronics. One possible functionality is magnetic-field tunable charge transport. In this talk we report on magnetotransport measurements in tunable single-molecule junctions of two different classes of organic radical molecules contacted with gold electrodes at low temperature. The current-voltage characteristics of a subset of junctions shows zero-bias anomalies due to the Kondo effect and moderate magnetoresistance, while junctions without Kondo resonance reveal much stronger magnetoresistance. Furthermore we show that the amplitude of magnetoresistance can be tuned by mechanically stretching the junction. Based on these findings we attribute the high magnetoresistance to an interference effect involving spin-dependent scattering at the metal-molecule interface, while asymmetric junctions give rise to Kondo resonances.



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01.11.2022

1:15 pm | Bd.600 R.301 CHyN

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