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Transport properties of touching molecules THOMAS FREDERIKSEN, Donostia International Physics Center, Donostia-San Sebastián, Spain, GUILLAUME SCHULL, CNRS - IPCMS - DSI, Strasbourg, France, MADS BRANDBYGE, DTU Nanotech, Technical University of Denmark, Lyngby, Denmark, RICHARD BERNDT, Institut für Experimentelle und Angewandte Physik, Christian-Albrechts-Universität zu Kiel, Germany — Advances in the understanding of transport through individual molecules make the next critical issue to characterize charge transport from one single molecule to another one. This talk addresses recent results on electron transport between two touching C_{60} molecules [Phys. Rev. Lett. 103, 206803 (2009)]. The tip of a scanning tunneling microscope was used to pick up single C_{60} molecules from C_{60} islands prepared on Au or Cu substrates. With such C_{60}-tips contact experiments were performed on both clean surfaces and on other C_{60} molecules. We found that while the contact conductance of a single molecule between two Cu electrodes can vary up to a factor of 3 depending on electrode geometry, the conductance of a C_{60}-C_{60} contact is consistently lower by 2 orders of magnitude. First-principles transport calculations reproduce the experimental results, allow a determination of the actual C_{60}-C_{60} distances, and identify the essential roles of the molecule-metal interface and the intermolecular link on the contact conductance. The theoretical analysis thereby provides insight into the limiting factors for transport in C_{60} junctions.

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