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Quantum decrease of capacitance in a nanometer-sized tunnel junction[1] C. UNTIEDT, Universidad de Alicante, Spain, G. SAENZ, Universidad Nacional, Heredia, Costa Rica, B. OLIVERA, Universidad de Alicante, Spain, M. CORSO, Frei Universität Berlin, Germany, C. SABATER, Universidad de Alicante, Spain, J.I. PASCUAL, Frei Universität Berlin, Germany — We have studied the capacitance of the tunnel junction defined by the tip and sample of a Scanning Tunnelling Microscope through the measurement of the electrostatic forces and impedance of the junction. A decrease of the capacitance when a tunnel current is present has shown to be a more general phenomenon as previously reported in other systems [1]. On another hand, an unexpected reduction of the capacitance is also observed when increasing the applied voltage above the work function energy of the electrodes to the Field Emission (FE) regime, and the decrease of capacitance due to a single FE-Resonance has been characterized. All these effects should be considered when doing measurements of the electronic characteristics of nanometer-sized electronic devices and have been neglected up to date.

[1] J.G. Hou, B. Wang, J. Yang, X.R. Wang, H.Q. Wang, Q. Zhu, and X. Xiao. Phys. Rev. Lett. 86, 5321 (2001)

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Carlos Untied
Universidad de Alicante, Spain

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