

TIME CORRELATION AND CROSS-CORRELATION OF CONDUCTANCE IN ATOMIC QUANTUM POINT CONTACTS

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We present an innovative statistical methods for the study of stable atomic configurations in breaking nanowires. They are based on the 2D cross-correlation histogram analysis of conductance versus electrode separation traces, which is analogical to 2D correlation spectroscopy in magnetic resonance. This method can resolve conductance quantization in some transition metal nanojunctions up to high conductance values. A very regular atomic narrowing can be identified during the rupture of Ni, Fe, and V nanowires, which is absent in the majority of the metals. [1] By analyzing conductance traces as a function of time we can see some memory effects in the system. Time correlations can be found between conductance values of stable atomic configurations between different traces. We introduce effective way to describe them quantitatively.

[1] A. Halbritter, P. Makk, Sz. Mackowiak, Sz. Csonka, M. Wawrzyniak, and J. Martinek, Phys. Rev. Lett **105**, 266805 (2010).

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9.7 cm