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Noise conductance of carbon nanotube transistors EMILIANO PALLECCHI, BERNARD PLACAIS, JULIEN CHASTE, PASCAL MORFIN, GWENDAL FEVE, TAKIS KONTOS, JEAN-MARC BERROIR, Ecole Normale Superieure, Paris, France, PERTTI HAKONEN, LTL-HUT, Helsinki, Finlande
— We report on radio-frequency transmission and noise measurements of high-transconductance carbon nanotube transistors. Gate capacitance C_g, drain conductance g_d, transconductance g_m and current-noise data are analyzed with a ballistic 1-dimensional nano-transistor model where the nanotube channel is described by a quantum capacitance C_q. Current is thermally activated with a transconductance controlled by a bias-dependent electronic temperature. Shot-noise is a thermal noise with a noise conductance g_n different from the drain conductance g_d. The 1-dimensional model gives a simple formula $g_n - g_d = g_m(C_q/2C_g)$ which is verified in the nanotube transistor. Finally we estimate the charge resolution of nanotube devices for applications as fast single-shot electron detectors.

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