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Quantum Shot Noise Suppression in Single-walled Carbon Nanotubes NA YOUNG KIM, JING KONG[1], WILLIAM OLIVER[2], HONGJIE DAI, YOSHIHISA YAMAMOTO, Stanford University — We investigate the nonequilibrium transport properties of individual single-walled carbon nanotubes via differential conductance and the low frequency current fluctuations at liquid helium temperature. Both the conductance and the shot noise show two distinct regimes separated by the size of the applied voltage relative to one-dimensional subband energy spacing. While the Fabry-Perot interference pattern in the differential conductance as evidence of ballistic transport in the tube device is clearly visible for low bias voltages, the pattern dies out as the bias voltage increases. In addition, the shot noise of the tubes is strongly suppressed for high bias voltages, and the degree of reduction exceeds the predicted estimate for a non-interaction electron system. Experimental results suggest the electron interactions in one-dimensional quantum wires play an important role.

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