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Measurements of nonlinear transport and interactions in single-walled carbon nanotubes MICHAEL SHIMOGAWA, JIANG WEI, ZENGHUI WANG, IULIANA RADU, DAVID COBDEN — It has recently been emphasized that the nonlinear two-terminal conductance of a piece of material can be used to measure the strength of electron-electron interactions in that material. More precisely, contributions to the current which are quadratic in voltage bias and proportional to the applied magnetic field should be proportional to the interaction constant at low temperatures and to the interaction constant squared at high temperatures. The question of what role interactions and correlations play in one-dimensional conductors such as single-walled carbon nanotubes remains open, although it is generally agreed that the degenerate electron system in a pure nanotube behaves as a Luttinger liquid. With this in mind we have measured these nonlinear terms in single-walled carbon nanotubes, in both semiconducting and metallic regimes, and at high and low temperatures.

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