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Thermal effects in non-linear electronic transport in metallic carbon nanotubes¹ MARCELO KURODA, Beckman Institute and Dept. of Physics, University of Illinois at Urbana-Champaign, JEAN-PIERRE LEBURTON, Beckman Institute and Dept. of Electrical and Computer Engineering, University of Illinois at Urbana-Champaign — Recent experiments have shown that metallic carbon nanotubes exhibit different IV characteristics depending on whether or not they lie on a substrate. These interesting features range from current saturation to negative differential resistance at high bias. In this talk, we present a model based on the solution of the Boltzmann transport equation that accounts for the interplay between thermal and electronic transport in the metallic system. Our results reproduce the experimental observations and emphasize the role of heat dissipation in the nanotube non-linear characteristics.

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