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Gate Modulation of Contacts in Carbon Nanotube Devices

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As the size of electronic devices is reduced, the electrical contacts play an increasingly important role. This is particularly true for contacts to nanomaterials, where new contact phenomena are often observed. In this talk, I will discuss recent numerical simulations to analyze experimental measurements of short-channel carbon nanotube transistors. The results indicate a strong gate modulation of the contact properties, an effect that is distinct from that observed in Schottky barrier nanotube transistors. This modulation of the contacts by the gate allows for the realization of superior subthreshold swings and improved scaling behavior, as observed experimentally. These results further elucidate the behavior of carbon nanotube/metal contacts, and should be useful in the design and optimization of high performance carbon nanotube electronics.