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**Electrical transport through tunable pn junctions in suspended carbon nanotubes** FERDINAND KUEMMETH, SHAHAL ILANI, P. L. MCEUEN, D. C. RALPH, Physics Dept., Cornell University, Ithaca, NY 14853 — Energy barriers play a crucial role within many carbon nanotube electronic devices, but their properties are often complicated by disorder induced by a substrate. Here we study well-controlled pn junctions in suspended carbon nanotubes whose transparency and position can be tuned using electrostatic gates. To achieve this we suspend individual single walled nanotubes above two separate gate electrodes and monitor the tube's conductance while changing the gate voltages in various ways; by varying the voltage difference between both gates we can tune the pn junction's width, whereas offsetting both gates by a common voltage controls its position. In small bandgap nanotubes we can additionally tune the junction's transparency by axial magnetic fields. At low temperature, these devices allow measurements of quantum dots with a tunable length and coupling to the leads.

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