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Testing the pseudospin conjecture in carbon nanotubes: transport measurement to determine the scattering strength of charged impurity as a function of chirality[1] RYUICHI TSUCHIKAWA, Department of Physics and Nanoscience Technology Center, University of Central Florida, ZHENGYI ZHANG, Department of Mechanical Engineering, Columbia University, DANIEL HELIGMAN, Department of Physics and Nanoscience Technology Center, University of Central Florida, JAMES HONE, Department of Mechanical Engineering, Columbia University, MASA ISHIGAMI, Department of Physics and Nanoscience Technology Center, University of Central Florida — Metallic carbon nanotubes are predicted to be resilient to scattering by charged impurities while semiconducting carbon nanotubes are susceptible to the same impurities as a result of the pseudospin degree of freedom. However, this pseudospin conjecture has never been tested directly. We have measured the resistivity of nanotubes as a function of the density of charged impurities and determined their scattering cross section as a function of chirality to test this conjecture. We found that the charged impurities affect transport properties of both metallic and semiconducting nanotubes. We will discuss the implication of our results on the pseudospin conjecture.

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