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Measurements of electronics transport properties of single walled carbon nanotubes

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The aim of the talk is to discuss the electronic transport properties of metallic single walled nanotubes when defects are present. Two different type of defects will be considered: the first one is a strong localized defect produced by squashing the nanotube with the tip of an atomic force microscope. The radial deformation so induced produces a gap opening that decrease the low voltage conductance up to one order of magnitude. The second type of defects are weak defects uniformly distributed along the length of the nanotube . Consecutive ion irradiation doses are applied to nanotubes producing the uniform density of defects. After each dose the electrical characteristics of the same carbon nanotube are measured by using a conductive atomic force microscopy. Theoretical simulations demonstrate that only di-vacancies are relevant to explain the conductance drop induced by the irradiation. The data show that only a 0.1 % of defects cause the resistance of a 400 nm length nanotube to increase three orders of magnitude.