

Abstract Submitted
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Energy Anomaly and Polarizability of Carbon Nanotubes¹

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LEONID LEVITOV, Department of Physics, MIT — Electron properties of carbon
nanotubes can change qualitatively by applying a strong perpendicular electric field.
In metallic tubes the sign of Fermi velocity can be reversed by a sufficiently strong
field, while in semiconducting tubes the effective mass can change sign. Changes
in the spectrum manifest themselves in a breakup of the Fermi surface and in the
energy gap suppression, respectively. The effect is controlled by the field inside the
tube which is screened due to the polarization induced on the tube. The theory of
screening is linked to the chiral anomaly for 1D fermions that reveals universality
and scale invariance of the response dominated by π electrons. [Phys. Rev. Lett.
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