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Anomalous depolarization effect in metallic nanotubes[1] LEI SHAN, EUGENE MISHCHENKO, Department of Physics and Astronomy, University of Utah — Optical absorption in metallic nanotubes for the transitions between gapless and gapped subbands requires a transverse polarization of the external field. Accordingly, the magnitude of the absorption is determined by the depolarization effect which stems from the redistribution of conduction electrons around the circumference of the nanotube. Crudely, the electric field inside the nanotube might be determined by approximating the nanotube as a solid cylinder with some effective dielectric permittivity. We demonstrate that this intuitive picture does not adequately describe optical absorption: the depolarization effect is determined by many-body correlations within the gapless subbands, which dramatically modifies the spectral dependence near the absorption threshold.

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