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Electric-field effects on the optical spectra of carbon nanotubes
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— The theoretical understanding of the optical properties of single-wall carbon nanotubes is an important problem to address since low energy lasers beam are being used to identify the chirality and diameter of the tubes and their electronic character. As well known, a single-wall carbon nanotube has many one-dimensional subbands, leading to Van Hove singularities on the local density of states. When a carbon nanotube is under the influence of a laser beam, optical transitions are allowed between the Van Hove singularities and they can be observed experimentally in the absorption spectra. In carbon nanotubes the optical absorption is suppressed for polarization of light perpendicular to the nanotube axis, due to the depolarization effect. External magnetic and electric fields modify the energy spectrum of carbon nanotubes inducing changes on the optical phenomena at low frequencies. In this work we present results, using a tight-binding description, for the inter-band absorption coefficient of carbon nanotubes under a magnetic field and an additional external electrostatic potential for different light polarizations.

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