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Title:Enhanced optical dichroism of graphene nanoribbons
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Abstract:The optical conductivity of graphene nanoribbons is analytical and exactly derived. It is shown that the absence of translational invariance along the transverse direction allows considerable intraband absorption in a narrow frequency window that varies with the ribbon width, and lies in the THz range domain for ribbons 10-100 nm wide. In this spectral region the absorption anisotropy can be as high as two orders of magnitude, which renders the medium strongly dichroic, and allows for a very high degree of polarization (up to ~85%) with just a single layer of graphene. Using a cavity for impedance enhancement, or a stack of few layer nanoribbons, these values can reach almost 100%. This opens a potential prospect of employing graphene ribbon structures as efficient polarizers in the far IR and THz frequencies.
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Inspec controlled terms:dichroism - graphene - infrared spectra - nanoribbons - optical conductivity - terahertz wave spectra
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Inspec classification codes:A7865V Optical properties of fullerenes and related materials (thin films/low-dimensional structures) - A6146 Structure of solid clusters, nanoparticles, nanotubes and nanostructured materials - A7820D Optical constants and parameters (condensed matter) - A7870G Microwave and radiofrequency interactions with condensed matter - A7830G Infrared and Raman spectra in inorganic crystals - A6865 Low-dimensional structures: growth, structure and nonelectronic properties - A7820F Birefringence (condensed matter)
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