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Abstract:In this Letter, we propose an engineered design of optical cloaks based on the scattering cancellation technique and intended to reduce the observability of cylindrical objects. The cover, consisting of a periodic arrangement of core - shell nanospheres, is designed in such a way to exhibit near-zero values of the real part of the homogenized effective permittivity at optical frequencies. Full-wave numerical simulations, considering the measured data of the dielectric function of the plasmonic material composing the shell, show that the cloak is able to reduce by about 6 dB the scattering cross section of a finite-length cylinder at around 740 THz with a -3 dB fractional bandwidth of about 7%. We show also that this result is not significantly affected by the perturbation of the periodic alignment of the core - shell nanospheres, due to possible fabrication issues or to an amorphous arrangement.
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