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Disordered Metamaterials[1] ISABEL YAJAIRA ROJAS MARTINEZ, ALMA KAREN GONZALEZ ALCALDE, ALEJANDRO REYES CORONADO, Universidad Nacional Autonoma de Mexico UNAM — Spherical particles present strong multipolar Mie-type resonances. In particular, high-permittivity dielectric particles present strong electric and magnetic resonances within the optical and infrared frequency range; plasmonic particles exhibit only electric resonances. The interference of different resonances lead to the so-called Kerker conditions, that enables the suppression of back- or forward scattering. In order to determine the parameters where Kerker conditions can be achieved, we analyze the optical response of an isolated particle by means of standard Mie theory. We consider particles made either of a plasmonic (gold and bismuth) or dielectric (silicon and silicon carbide) material. Using as starting point the analysis of isolated particles, we design disordered metasurfaces that are capable to suppress the reflection of light for a wide range of wavelengths and angles of incidence. Therefore, we study the optical properties of a disordered array of identical spherical particles, by analyzing theoretically their reflectance and transmittance as a function of relevant parameters: radius of the particles, surface coverage, wavelength and polarization state of light. The analysis is made by means of a recently developed theoretical model named coherent scattering model.

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