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Design of cloaking metamaterials using spectral representation theory LAI LAI LEUNG, TAI HANG FUNG, KIN WAH YU, Chinese University of Hong Kong — Controlling the propagation of electromagnetic (EM) waves, for instance in cloaking problem, has become an important topic in nanophotonics. So far, following the cloaking model proposed by Pendry et al. [1], the experimental realization was only limited to the microwave region [2]. Since practical application lies in the visible range, we have extended the investigation to that region by utilizing nanocomposites with reference to the material parameters proposed by Pendry et al. and Shalaev et al. [3]. The calculations can be made much simpler by invoking the spectral representation theory [4]. The loss and dispersion effects, as well as the propagation of EM waves are assessed for the designed cloaking models in order to investigate the cloaking performance. Further analyses show that our models can accomplish the desired cloaking effect in the visible range. Moreover, the loss and dispersion effects are found to be small and acceptable.

[1] J. B. Pendry, D. Schurig, and D. R. Smith, *Science* 312, 1780 (2006).

[2] D. Schurig, J. J. Mock, B. J. Justice, S. A. Cummer, J. B. Pendry, A. F. Starr, D. R. Smith *Science* 314, 5801 (2006).

[3] Wenshan Cai, Uday K. Chettiar, Alexander V. Kildishev and Vladimir M. Shalaev, *Nature photonics* 1 (2007).

[4] L. Dong, Mikko Karttunen, K. W. Yu, *Phys. Rev. E* 72, 016613 (2005).

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