Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Electromagnetic transparency by graded metallic coating[1] L. SUN, K.W. YU, The Chinese University of Hong Kong — Recently there has been an increasing interest in achieving cloaking or invisible devices for electromagnetic fields. The study has been based on Pendry's transformation media concept. In this work, we have studied electromagnetic scattering by coated spheres with a homogeneous core and a radially inhomogeneous dielectric shell described by the lossless graded Drude model $\epsilon(r) = 1 - \omega_p^2(r)/\omega^2$. The plasma frequency depends on r as $\omega_p^2 = 1 - cr^k$, where c and k are positive constants. The electromagnetic field distribution has been calculated within the fully electromagnetic Mie scattering theory. When $k = 2$, exact analytic solutions can be obtained for the field distribution in terms of Whittaker functions. The total scattering cross section can be obtained from the scattering field amplitudes and is found to be dependent on both the graded profile and the cross-shell ratio. The analytic expressions of the total scattering cross section allow us to assess the conditions for achieving better transparency[1], resulting in tunable electromagnetic cloaking. [1]. A. Alù and N. Engheta, Phys. Rev. E 72, 016623 (2005)

[1]Work supported by the General Research Fund of the Hong Kong SAR Government.

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Date submitted: 25 Nov 2008 Electronic form version 1.4