Spectral representation theory of graded composite materials K.L. CHAN, C.M. KWOK, K.W. YU, The Chinese University of Hong Kong — In graded composite materials, the physical properties can vary continuously in space and it may give different physical phenomena when compared with homogeneous materials. The Bergman-Milton spectral representation is a rigorous mathematical formalism to express the effective dielectric constant of nongraded composite materials [1]. In this study, we consider a material (rather than microsture [2]) graded composites, and generalize the Bergman-Milton spectral representation to extract the spectral density function for the effective dielectric constant of this graded composite material in the frequency domain [3]. Analytic and numerical solution will be presented for graded films and graded spheres.

[1] **D. J. Bergman,** *Phys. Rev. B* **14**, *4304 (1976).*
[2] **J. P. Huang, K. W. Yu, G. Q. Gu, M. Karttunen,** *Phys. Rev. E* **67**, *051405 (2003).*
[3] **L. Gao, J. P. Huang, K.W. Yu,** *Eur. Phys. J. B* **36**, *475 (2003).*

K.L. Chan
The Chinese University of Hong Kong