

Abstract Submitted  
for the OSS05 Meeting of  
The American Physical Society

**Random-phase approximation of core-electron energy-loss spectra in solids** KOFI NUROH, Department of Mathematical Sciences, Kent State University — The interference between bound-bound transition and bound-free transition in an electron-impact excitation of a core-electron in systems with narrow bands is discussed within the context of diagrammatic perturbation of ladder and ring diagrams in the spirit of random-phase approximation (RPA). [1, 2] The resulting excitation spectrum has been formulated by introducing Fano line shape parameters for the associated autoionization and characteristic decay channels. Along with line widths for these channels, a generalized asymmetric Fano line shape expression is obtained. It is found that while the ring diagrams contribute little numerically to the excitation spectrum in absolute terms, their retention is necessary to provide the asymmetry found in the ratio of experimental electron energy-loss spectrum of metallic cerium to lanthanum.

- [1] K. Nuroh, Phys. Rev. B 66, 155126 (2002).
- [2] K. Nuroh, Phys. Rev. B 70, 205115 (2004).

Kofi Nuroh  
Department of Mathematical Sciences, Kent State University

Date submitted: 20 Oct 2006

Electronic form version 1.4