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A low-energy satellite to K_α fluorescence has long been observed, which has been shown to result from the emission of **two** electrons and one photon.¹ This radiative Auger effect challenges our understanding of x-ray excitation and decay processes. Despite the identification of the radiative Auger effect for almost 30 years, no previous measurements have been made of the energy dependent behavior of the radiative Auger effect. All previous experiments were performed with incident photon and electron energies far above an absorption edge.¹

Our experiment compares the inelastic scattering from a Ge sample excited by synchrotron radiation tuned to the Ge K_α energy (9876 eV) to the inelastic scattering from the same Ge sample excited by synchrotron radiation tuned near and above the K edge (11103 eV). Above threshold, the atom interacts with both the primary radiation field (11103 eV) and the self emitted Ge K_α fluorescence (9876 eV). As shown in Fig. 1, there is a marked energy shift between the inelastic spectra excited above and below threshold in the vicinity of the radiative Auger satellite. The measurements with the sample excited by 9876 eV x-rays contain a resonant Raman scattering peak in the vicinity of the radiative Auger satellite energy. This asymmetric peak results from a resonant excitation of the K hole and subsequent filling of the hole by an L electron.² Hence the resonant Raman line is designated the Ge K-L resonant Raman peak. The measurements at and above threshold include both resonant Raman scattering and the radiative Auger satellite. As illustrated in Fig. 1, there is ~ 80 eV difference in energy at the leading edges marked by arrows.

[1] T. Aberg, J. Utriainen, Phys. Rev. Lett. **22**, 1346 (1969); O. Keski-Rahkonen, J. Utriainen, J. Phy. **B7**, 55 (1974) [2] C.J. Sparks, Phys. Rev. Lett. **33**, 262 (1974)

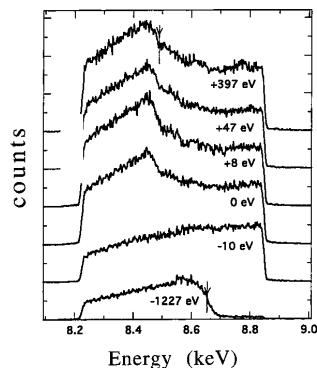


Figure 1. Inelastic resonant scattering from a Ge crystal excited with x-rays of energies which differ from the Ge K edge of 11103 eV by the energies shown. The incident energy for the resonant Raman curve labeled -1227 eV is Ge K at 11103 eV - 1227 eV = 9876 eV which is the Ge K_α energy.