

Abstract Submitted
for the CAL10 Meeting of
The American Physical Society

Multipole Excitation of Fullerene C₆₀ Molecules in a Semi-Classical Model KRISHNA LAMICHHANE, University of Nevada, Reno, MATTHIAS BRACK, University of Regensburg, Germany, PETER WINKLER, University of Nevada, Reno — The local current approximation (LCA) is introduced and derived from a general variational principle. This approach serves as a semiclassical description of strongly collective excitations in finite fermions systems. Here it is first applied to study the coupling of surface and volume dipole oscillations in the fullerene C₆₀ molecules. The spectrum obtained for the coupling of the pure translational mode with compressional volume modes in the semiclassical LCA shows the close agreement with the experimentally observed spectra. Applying the same approach to the photoionization cross section of C₆₀, we discuss the results of higher multipole resonances of fullerene molecules. The comparison to data obtained from electron scattering experiments reveals the adequacy of the semi-classical approach as well as the collective nature of several high angular momentum resonances. Similar to the results of the dipole case, the coupling of surface and volume Plasmon modes in C₆₀ molecules is seen to shift both peaks slightly towards lower energies.

Krishna Lamichhane
University of Nevada, Reno

Date submitted: 29 Sep 2010

Electronic form version 1.4