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Photoionization of single-walled and double-walled fullerenes MATT MCCUNE, DALE HOPPER, RUMA DE CHAKRABORTY, HIMADRI CHAKRABORTY, Northwest Missouri State University, Maryville, MO 64468, MOHAMED MADJET, Free University, D-14195 Berlin, Germany — We theoretically investigate the ionization of various spherical-type fullerenes illuminated by the synchrotron light. The molecular core, comprising of tetravalent carbon ions, is modeled by a classical jellium shell and the local density formalism is used to describe the ground state structure formed by the delocalized valence electrons. The ionization is then treated by a linearized time-dependent formalism [1]. At lower photon energies two plasmon resonances are obtained in the cross sections of the single-walled fullerenes. The height and the width of the giant low energy resonance show a systematic dependence on the number of the carbon atoms. But the behavior of the higher energy resonance as a function of the carbon-atom number is complicated. For the double-walled fullerenes, strong hybridization between the electrons of two carbon layers is obtained. This hybridization is found to affect the electrons collective motion, resulting in significant modifications in the plasmons.

[1] Madjet et al., J. Phys. B **41**, 105101 (2008).

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