Abstract Submitted
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Photoionization of spherical fullerenes: Dependence of the strength and lifetime of plasmon resonances on the number of carbon atoms[1] MATT MCCUNE, RUMA DE, HIMADRI CHAKRABORTY, Northwest Missouri State, Maryville, MOHAMED MADJET, DESY, Germany, STEVE MANSON, Georgia State, Atlanta — The time-dependent local density approximation is used to calculate the total and subshell-differential photoionization cross sections of a number of spherical carbon fullerenes C_N. For each system the core comprised of N number of C^{4+} ions is smeared into a classical jellium hull before treating the correlated motion of $4N$ valence electrons quantum mechanically in the Kohn-Sham formalism [1]. Results show two collective plasmon resonances in each fullerene system as expected from previous studies on C_{60} [2]. The peak values and the lifetimes of these resonances, however, exhibit diverse variations as a function of N. In general, while the maximum value of the low-energy plasmon (LEP) increases as the second power of N, deviations from such simple scaling are found for the high-energy plasmon (HEP). On the other hand, the lifetime of the LEP suggests a near linear increase with N but for the HEP the variation of the lifetime with N shows non-monotonic behavior.

[1] Madjet et al., *J. Phys.* B **41**, 105101 (2008);
[2] Scully et al., *Phys. Rev.Lett.* **94**, 065503 (2005).

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