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Elastic electron scattering off A@C$_{60}$ versus off C$_{60}$ versus off a free atom[1] MAISEY HUNTER, MATTHEW COOPER, VALERIY DOLMATOV, University of North Alabama — The recent decade or so has seen much of research on the structure and spectra of endohedral fullerenes A@C$_{60}$. However, to the best of our knowledge, electron elastic scattering off A@C$_{60}$ has so far escaped its study, despite of its obvious basic significance. Can one detect the presence of an encapsulated atom A inside the hollow cage of C$_{60}$ by performing a e+A@C$_{60}$ elastic scattering experiment? If a "yes", how much does the atom A in A@C$_{60}$ contribute to electron scattering off A@C$_{60}$ compared to scattering off empty C$_{60}$? If the encapsulated atom has a non-zero spin, could this lead to appreciable differences between scattering of oppositely spin-polarized electrons off e+A@C$_{60}$? The present work unravels positive answers to the above questions within, so to speak, a zero-order approximation, as the very first step in understanding of e+A@C$_{60}$ scattering. There, the C$_{60}$ cage itself is modeled by a spherical potential shell [as in numerous A@C$_{60}$ photoionization studies, see, e.g., V. K. Dolmatov, Adv. Quant. Chem. **58**, 13 (2009)], the atom A is placed at the center of the shell, and, as a strong simplification of the problem, both the encapsulated atom A and C$_{60}$ cage are regarded as rigid, i.e., non-polarizable targets. This study itself, as well as differences between its results and (future) more sophisticated calculations, should be viewed as a first step in identifying measurements to perform.

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