(e,3e) and (e,3-1e) for the double ionization of thymine

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Theoretical results of the fivefold and fourfold differential cross sections (FDCS) in the case of the double ionization of the thymine molecule by electron impact are reported. The theoretical approach uses the first Born approximation, where an accurate single center wave function is used to describe the initial state in the case of the ionization of valence electrons. It has been shown in a recent paper [1] that the valence electrons can be described by single center wave functions with few partial waves.

The incident and the scattered electrons are represented by a plane wave while the ejected electrons are described by Coulomb wave functions. A correlation factor which takes into account the interaction between the two ejected electrons is included in our calculations.

Because there is no calculation and no experimental data up to now to compare with our results, we calculate our cross sections using the experimental conditions of the Orsay group for (e,3e) and (e,3-1e) double ionization of small molecules, 612 eV for the electron impact energy, 12 eV and 37 eV for the ejected electrons and $\bar{}_s$ = 6° for the scattered angle.

We remember that experimental data about the ionization of biological systems are needed, for instance in heavy-ion cancer therapy.

References:
[1] C Dal Cappello et al. Phys. Rev. A. **84** 032711(2011)
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