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Induced molecular dissociations as a radiation damage descriptor: nanodosimetry

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Traditional dosimetry is based on the proportionality between the energy absorbed by the medium (absorbed dose) and the induced damage. This assumption applies for relatively high irradiated volumes and requires some equilibrium conditions. However, for small volumes being relatively far from the central irradiated areas these conditions are not observed and radiation damage is mainly driven by low energy secondary species (electrons and radicals) which induce molecular dissociations via electronic and vibrational excitations, electron attachment and chemical reactions. We will present here an integrated modelling procedure to simulate particle radiation tracks including those of all generated secondary species and their further interactions with the molecular constituent of the medium. For any selected volume of interest, this model provides not only the total energy transferred to that area but also the number and type of interactions taking place in it [1].

References

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