ELECTRON EMISSION AND FRAGMENTATION OF DNA/RNA COMPONENTS INDUCED BY PROTON IMPACT

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The effects of radiation on biological systems can be related to alterations of DNA by bases damages, single and/or double strand breaks.

We have investigated the ionization of RNA/DNA bases induced by proton impact in the 25-100keV energy range. The ≈100 keV energy corresponds to the maximun of the deposited dose by a fast proton moving through a biological medium just before it is stopped. This maximum of dose, called the Bragg peak, is used in protontherapy for the treatment of cancerous tumours.

The ionization of the nucleic bases produces an electronic emission. By electron spectrometry techniques we have obtained absolute values for the Double Differential Cross Sections.. Our results show a preferential emission of low energy electrons, causing damages in biological material through Dissociative Electron Attachment. Computer simulations of the ionization process via a Classical Trajectory Monte Carlo (CTMC) method have been performed and give a reasonable agreement with the experimental data [1].

Most of the resulting (single or double) ionized molecules are no longer stable and dissociation processes occur. The different dissociation channels have been determined by a multicorrelation time of flight technique.

References:

[1] P.Moretto-Capelle and A.Le Padellec Phys.Rev.A, **74**, 062705 (2006)