

عنوان مقاله:

The effects of auger electrons on DNA damages for proton therapy treatment method

محل انتشار:

بیست و دومین همایش سالیانه پزشکی هسته ای ایران (سال: 1397)

تعداد صفحات اصل مقاله: 1

نویسندگان:

Zahra Ahmadi Ganjehe - *Department of Physics, Yazd University, Yazd, Iran*

Mohammad Eslami-Kalantari - *Department of Physics, Yazd University, Yazd, Iran*

Mahdy Ebrahimi Loushab - *Department of Physics, Faculty of Rajaee, Quchan Branch, Technical and Vocational University, Quchan, Khorasan Razavi*

Ali Asghar Mowlavic - *Department of Physics, Hakim Sabzevari University, Sabzevar, Iran - International Centre for Theoretical Physics (ICTP), Associate and Federation Schemes, Medical Physics Field, Trieste, Italy*

خلاصه مقاله:

Background: In this study to see the effects of Auger electrons on the DNA breaks, the number of DNA single-strand breaks (SSB) and double-strand breaks (DSB) due to direct effects of proton beams in a water phantom by considering Auger electrons and without them to predict the effect of proton therapy on the destruction of cancer cells has been calculated. **Methods:** A DNA model based on realistic data for the B-DNA atomic structure of nucleotide pair up to the chromatin fiber organization level is simulated by Monte Carlo simulations. The SSB and DSB calculated by using the Geant4-DNA toolkit at different depths of the phantom with considering Auger electrons. **Results:** The total SSB yield in the entrance point rather than the process without auger electrons is about %5 bigger and at the Bragg peak depth this percent is about %3. The effect of auger electrons on DSB damage yields that leads to destruction of cancer cells is more than this effect on the SSB yields and these percents are about %10 and %8 for the first and last point. **Conclusion:** In terms of the results in this study, the auger-electrons should be considered because of their short range in biological tissues and depositing their energy in volumes at the nanoscopic scale (of the order of DNA) and so they will cause enhanced DNA damages and as a result can increase the biologic effects of proton beams.

کلمات کلیدی:

DNA, strand breaks, Auger electrons, Geant4-DNA, Monte Carlo simulation

لینک ثابت مقاله در پایگاه سیویلیکا:

<https://civilica.com/doc/968656>

