

3D DOSE PLANNING SYSTEM FOR SIMULTANEOUS TREATMENT BY UHF-HYPERTHERMIA AND DISTANT BEAM THERAPY

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Using hyperthermia EM applicators under radiation treatment results in perturbation of radiation field incident on a patient and therefore the variation of absorbed dose distributions. The special technique has been developed to take into account attenuation and scattering of radiation in CFMA applicators. It has been implemented in 3D RTPS "AMFORA", which is used for planning of 3D electron-photon distant therapy. CFMA applicators can be positioned in any place on a patient body surface. A special module creates an integrated voxel density matrix including both CT-slices and applicators. The technique for dose distribution calculation is based on separation of the field onto primary and scattering components. It takes into account the variation of incident photon spectrum within irradiation field in dependence on a distance from a beam axis. A dose delivered by primary radiation is calculated on the basis of improved analytical model proposed by P. Nizin. The contribution to total dose from scattered radiation is calculated by using a finite size pencil beam model. A set of some empirical parameters should be determined preliminary for using of implemented calculation technique. These parameters were obtained from Monte Carlo calculations. The final adjustment of the parameters for particular dose delivery system was done on the basis of measured depth dose distributions and respective profiles. The comparison of dose distributions calculated by RTPS and Monte Carlo shows a good agreement. The maximal difference does not exceed 3%.