

عنوان مقاله:

Evaluation of MLC Thickness and Composite Effects on Collimation Parameters using EGSnrc and IAEA Phase Space Data

محل انتشار:

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خلاصه مقاله:

Background: Recently, multileaf collimators (MLC) have become an important part of any LINAC collimation system because they reduce the treatment planning time and improve the conformity. Important factors that affect MLCs collimation performance are leaves material composition and their thickness. Objective: In this study, we investigate main dosimetric parameters of a typical MLC including dose in the buildup point, physical penumbra as well as average and end leaf leakages. Effects of the leaves geometry and density on these parameters are evaluated. Materials and Methods: In this analytical study, calculations were performed by using phase space data for Varian ix just above MLC and BEAMnrc/DOSXYZnrc for SSD=100cm and in a water phantom. Results: Based on the results, a new MLC with improved dosimetric parameters is proposed. The physical penumbra for proposed MLC is 4.7mm was compared to 5.16 mm for Millennium 120 leaf. Average leakage in our design is reduced to 1.16% compared to 1.73% for Millennium 120 leaf, the end leaf leakage suggested design also reduced to 4.86% compared to 7.26% for Millennium 120 leaf. Conclusion: The results show that the proposed MLC could improve the dosimetric parameters and conformity of treatment planning.

کلمات کلیدی:

Phantoms, Imaging, Radiometry, Particle Accelerators

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