

Abstract Submitted  
for the MAR06 Meeting of  
The American Physical Society

**Monte Carlo study of interseed attenuation and tissue composition effect for clinical cases of prostate permanent implants.** JEAN-FRANCOIS CARRIER, Hopital Notre-Dame du CHUM, LUC BEAULIEU, CHUQ, Pavillon Hotel-Dieu de Quebec — Monte Carlo simulations were used to study the interseed attenuation and the effect of tissue composition on prostate implant dosimetry. Using computed tomography images of postimplant analysis, the precise anatomy of the patient was considered voxel by voxel. The physical density of each voxel was set according to the Hounsfield Unit and the specific elemental composition of each voxel was set depending on the radiation-oncologist organ contours and the local density. Mixes of different tissues were available: muscle, prostate tissue, rectum tissue, adipose tissue, bone and prostate calcification. Typically, more than 300 combinations of elemental composition and density were used for each patient. The Monte Carlo dosimetry results were compared to the clinically approved TG43-based calculations for 30 patients. The results show an interseed attenuation of about 4.5% for the  $D_{90}$  parameter (minimal dose received by 90% of the target volume). The effect of the tissue composition varies from one patient to the other. Globally, the difference between the TG43-based calculations and the Monte Carlo results can reach more than 10 Gy for the  $D_{90}$  values. From a clinical perspective, the difference level can be non-negligible for the target volume and for the surrounding organs at risk.

Jean-Francois Carrier  
Hopital Notre-Dame du CHUM

Date submitted: 30 Nov 2005

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