

Abstract Submitted  
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**Effects Of The Inhomogeneity of Brachytherapy Sources In Cancer Treatments** NNENNA ONUMAH, Hampton University, FOR CAMI COLLABORATION — Uniformity of radioactive sources is vital in delivering accurate doses in Brachytherapy. The International Atomic Energy Agency (IAEA) defines source uniformity as no more than a 20 % deviation from the average value of the dose along a transverse region. Brachytherapy induced cell damages occur at the microdosimetric levels, and as such, small deviations in dose delivered from different geometrical positions on the source can lead to huge deviations in proper treatment. A Geant4 simulation of a uniform source and a non-uniform source was simulated to check the validity of IAEA's proposed definition. A realistic source of non-uniformity, air bubbles of differing diameters (from 20 to 80 microns) were simulated and their uniformity checked against the model suggested by IAEA in two ways: (1) using the average obtained from the non-uniform source (2) using that obtained from the uniform source. Significant deviations of up to 50% were observed. These results validate the need for the scintillating fiber based detector currently in development within our research group.

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