

Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Multicatheter Device for Brachytherapy Treatment CARLOS VELASCO, PAUL GUEYE, CYNTHIA KEPPEL, Hampton University, CAMI TEAM — Low dose rate brachytherapy treatment for prostate cancer encompasses the delivery of capsules containing radioactive material into the prostate's cancerous tissue via injection through needles. High dose rate brachytherapy treatment for prostate cancer follows the same concept with the difference that the radioactive source has a higher activity and it is placed temporarily into the patient. For this reason, the source is driven by an afterloading device that moves the source into the catheters and back into a shielded container. From both HDR and LDR brachytherapy, two issues remain unaddressed: homogeneity and localization. Sources not being homogeneous result in a delivered dose that does not correspond to the treatment plan. In the case of HDR, the afterloader not always places the source where it should within the catheter. This results in undertreatment of the cancerous tissue as well as damage to healthy tissue. To address both issues we have placed scintillating fiber into brachytherapy needles. If placed geometrically around the radioactive seeds we are able to check for homogeneity in the sources. At the same time, by analyzing the detected signals we are trying to determine the exact physical position of the seeds within the catheter. Using a radioactive source, we have taken measurements to calibrate the device and measurements under water to simulate living tissue environment. Results are discussed.

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Date submitted: 03 Dec 2006

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