

AbstractID: 11100 Title: Importance of Contamination Signal Removal on HDR Brachytherapy In Vivo Dosimetry when Using a Scintillating Fiber Dosimeter.

Purpose: To quantify the importance of removing the contamination signal, composed of Cerenkov and fluorescence light, from the output of an in vivo scintillating fiber dosimeter during Iridium-192 HDR brachytherapy treatments. **Method and Materials:** The scintillating fiber dosimetry system is composed of a miniature monochrome CCD camera (Apogee Alta U-4000) detecting light from optical fibers. Two fibers were used for the purpose of this study: one of those had a 3 mm x 1 mm cylindrical scintillator (BCF-60) coupled to its extremity. Integrating light coming out from both fibers under the same irradiation conditions allows, following proper calibration, to determine the scintillation and the contamination components of the detector signal. This study has been conducted in a solid water phantom. Components of the detector signal have been studied as a function of angular, longitudinal and radial position of the Ir-192 source with respect to the detecting volume (i.e. scintillator). **Results:** The contamination component ranged from 4% to 42% of the detector signal, depending on the relative source to scintillator and fiber positions. The highest ratio was obtained when the source was the closest to the scintillator. The lowest was obtained when the source is longitudinally the furthest from the source. The ratio increased from 4% to 10% with the source going from 1cm to 5cm on the radial axis of the scintillator. Angular study reveals that both contamination and scintillation components of the signal varies under 3.4 percents over the complete angles range. **Conclusion:** Dose determination is proportional to the amount of scintillating light measured. Based on our measurements, the necessity of removing the contamination component of the signal is obvious to obtain an accurate dose calculation. Any scintillating fiber dosimeter for in vivo brachytherapy dosimetry should then include an efficient removal technique of the contamination signal.