AbstractID: 7467 Title: Real-time Optical Fiber in vivo Dosimeter with a novel method for eliminating the “stem effect”

An improved version of a copper-doped quartz fiber dosimeter for real-time *in vivo* dosimetry has been developed and tested. Previous papers have presented results based on testing of the *in vivo* monitor at the National Cancer Institute and at other institutions. The real-time *in vivo* monitor using the copper-doped quartz optical fiber dosimeter will accurately assess the dose to target organs and surrounding tissues during radiation therapy. A highly spatially resolved real-time patient dosimetry system will allow radiation therapists and physicists to verify, instantaneously, that the radiation dose is being delivered accurately to the intended target area. Global Dosimetry Solutions has licensed the technology and is commercializing the real-time fiber optic *in vivo* dosimeter for clinical dosimetry during accelerator radiotherapy as well as for lower energy and lower dose rate application such as brachytherapy and fluoroscopy. The heart of the *in vivo* monitor consists of a 0.4 mm diameter, approximately 1.0 mm long copper-doped fused quartz scintillator that is fusion-spliced to a commercial silica optical fiber. Photons produced in the scintillator are transmitted through the optical fiber and remotely detected with a photomultiplier tube. Problems associated with Cerenkov radiation and fluorescence, sometimes referred to as the “stem effect” have been circumvented by the use of gated data collection where the signal is collected between LINAC pulses when the beam is off. Gating was previously performed using separate trigger fiber to indicate when the LINAC beam was on. The trigger fiber works well for one or two channel dosimeters, but becomes problematical for multi-channel dosimeters, especially for IMRT type applications. Global Dosimetry Solutions has developed a simple modification to the design which allows elimination of the trigger fiber.