



Contribution ID: 128

Type: **Poster**

Geant4 Simulations of a Scintillator and SiPM System for Medical Applications

Tuesday, 26 June 2018 16:00 (1 hour)

A detector system based on the use of plastic scintillators and silicon photomultipliers (SiPMs) can be mounted externally to a standard medical LINAC head in order to get the E-LINACs real-time 3D dose profile. To design such a system, the effect of plastic scintillators on the linac dose profile should be investigated. In this work, the effect of the dose distribution on the water phantom of 10 MeV electron beams were simulated using different thicknesses of plastic scintillators for a medical linac. For these simulations the Geant4 Monte Carlo simulation package was utilized together with Root6 toolkits and Paraview software. The simulation includes the major components of the linear accelerator (LINAC) with multi-leaf collimator and a homogeneous water phantom. Calculations were performed for the electron beam with treatment field sizes ranging from 5 cm × 5 cm at 100 cm distance from the source.

This simulation package has also the ability to simulate an intensity modulated radiotherapy scenario comparison with real time detector data. SiPM based and, LYSO scintillator coupled fiber grid system has been developed in the simulation as the detector layer where the beam pattern converted into two dimensional flux and energy based contour image to construct real time dose profile. In the light of this study, a design of a new three dimensional real time dosimeter system is undergoing, including relevant data collection systems and software.

Primary author: Mr LITIFU, Maihemutijang (Istanbul University)

Co-authors: Prof. ALPAT, Behcet (INFN Perugia); Prof. CONKA, Tuba (Turkish German University); Mr KAPLANOGLU, Tevfik (IRADETS); Dr YILDIZ, Ahmet (Turkish German University); Prof. OZKORUCUKLU, Suat (Istanbul University)

Presenter: Prof. CONKA, Tuba (Turkish German University)

Session Classification: Poster session