Contribution ID: **16** Type: **not specified**

e-LINAC Beam Facility Characterization For Its Use For Space Detectors Performance Studies

Thursday, 19 August 2010 15:00 (20 minutes)

The aim of this work is to qualify and characterize beam of an electron LINAC of St. Maria Hospital which is located in Terni, Italy. The facility, of which its primary use is radiotherapy, will be used to test the performance of detector systems in particular those designed to operate in space (i.e. for European Space Agency based projects). The critical beam parameters are electron energy, profile and flux available at the surface of device to be tested. The present work consists in full simulation of the electron LINAC machine with changing parameters such as physics, particle production thresholds and step sizes. The energy range of electrons vary between 4 MeV and 20 MeV. The dose measurements have been performed by using an Advanced Markus Chamber which has a small sensitive volume, while the beam profile and flux are being measured by a double sided silicon micro-strip detector. A technique to convert the measured dosimetry values to beam energy and its validation with silicon detector data is also discussed.

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Session Classification: Plenary session VII - Accelerator simulation -