# AbstractID: 10607 Title: Megavoltage electron beam energy estimation using thermoluminescent dosimeters

**Purpose:** To explore the possibility of using a combination of thermoluminescent (TL) materials to estimate electron beam energy from a range of TL materials which exhibit energy dependent TL response to electrons. **Method and Materials:** Five different types of thermoluminescence dosimeters (TLD100, TLD100H, TLD200, TLD400 and TLD500) were irradiated with five electron energies available from a Siemens Primus linear accelerator. All types of TLDs were irradiated at depth of maximum dose to a dose of 1 Gy and the process was repeated three times. TL Response per Gy dose delivered was calculated for all the materials. Ratios of TL sensitivity of different combinations of TL materials for all five electron beams were determined.**Results:** All TL materials showed different magnitudes of variation in electron beam energy dependent response. The reproducibility of each type of TLD was; TLD100 2%, TLD200 3%, TLD400 1%, TLD500 5% and TLD100H 2%. The sensitivity ratios of combination TLD400-TLD100 and TLD400H-TLD100H showed the highest variation with electron energy. **Conclusion:** Lithium Fluoride (LiF) based TL materials are commonly employed in dosimetry audits conducted by IAEA/WHO. In electron dosimetry intercomparison and audits where the beam energy may not be accurately known, error in dose estimation can occur where LiF based materials are employed. However, if a combination of two TL materials is employed, the energy of the electron beam can be estimated. The present study has demonstrated that the combination of TLD100 and TLD 400 has the highest sensitivity to variation in electron energy in the nominal electron energy ($E_0$) range of 5-14 MeV. In IAEA/WHO dosimetry audits when a combination of these two TL dosimeters (instead of a single TL dosimeter) is used, it has the potential to improve the accuracy of electron dosimetry by providing an energy dependent correction factor.