# AbstractID: 10980 Title: Small field electron beam dosimetry using MOSFET detector

**Purpose:** The dosimetry of very small electron fields can be challenging due to relative shifts in percent depth-dose curves, including the location of $d_{max}$, and lack of lateral electronic equilibrium in an ion chamber when placed in the beam. Conventionally, a small parallel plate chamber or film is utilized to perform small field electron beam dosimetry. With the advent of electronic imaging, modern radiotherapy departments are moving to a filmless environment and an alternate clinical dosimeter is required for routine clinical dosimetry. In this work, we have studied the performance of MOSFET as a relative dosimeter for small field electron beams.
**Methods and materials:** The reproducibility, linearity and sensitivity of a high sensitivity micro MOSFET were investigated for clinical electron beams. In addition, the percent depth doses, output factors and profiles have been measured in a water tank with MOSFET and compared with those measured by an ion chamber and film for a range of field sizes from 1 cm diameter to $10\times10$ $cm^2$ for 6, 12, 16 and 20 MeV beams. Similar comparative measurements were also performed with MOSFET as well as with films in solid water phantom.
**Results:** The MOSFET sensitivity was found to be stable over the range of field sizes investigated. The dose response was found to be linear and reproducible (within ±1% for 100 cGy). For 1, 1.5, 2, 2.5, 3, 4, 5, 6 cm circular and 10 cm square field, excellent agreement (within ±2% and ±2mm) was observed among the central axis depth dose curves measured using MOSFET, film and ion chamber. The output factors measured with MOSFET for small fields agreed to within 2% with those measured by film dosimetry.
**Conclusion:** Overall results indicate that MOSFET can be utilized to perform dosimetry of small electron fields for routine clinical use.