

Small single MOSFET dosimeters (1mm wide) have proven to provide useful urethral dose profile measurements during LDR prostate brachytherapy¹. As this detector enables only a single dose point sampling, multiple and simultaneous dose measurements at critical locations of interest (urethra, rectum) are not possible. A new 5 MOSFET linear array dosimeter, packaged on a 1.5-mm wide flexible circuit, has been developed to overcome these drawbacks.

Array characteristics such as radiation sensitivity, isotropy of radiation response, reproducibility and linearity have been studied in ⁶⁰Co beam. High-sensitivity (Ar1002) and standard-sensitivity (Ar502) arrays, at either standard-sensitivity or high-sensitivity power supply settings, have been tested. The Ar1002 demonstrates an overall anisotropy of 2.7% (1SD) from the overall mean response, for 360° angles. The five individual MOSFETs show an SD from their means between 2 and 3.4%. These values are close to the 3% SD obtained for single MOSFET dosimeters. The Ar1002 and Ar502 have average calibration factors (CFs) of 6.34 and 2.41 mV/cGy, respectively, at standard sensitivity power setting. At high sensitivity setting the corresponding CFs are 9.51 and 3.33 mV/cGy. They are different from the CFs of single MOSFET dosimeters, due to the particular array circuit design. The response reproducibility is within 1.2% for repeated doses of 100 cGy. The array response with accumulated dose is linear in the 20000 mV range. Based on our results the linear MOSFET array is an excellent tool of choice for quality assurance and in-vivo dosimetry in radiotherapy.

¹J.E.Cygler et al. Med. Phys. **28**, 1180, 2001