

DOSIMETRY OF SMALL FIELD

Small fields on order of few millimeters are now being used in specialized radiation treatments such as intensity modulated radiation therapy (IMRT), stereotactic radiosurgery (SRS), cyber-knife and gamma-knife. Small-field dosimetry is challenging due to finite source size, lack of electronic equilibrium, size of detectors, changes in energy spectrum with associated dosimetric parameters and stopping power ratio. Source size is dependent on the design of the accelerator and could be obstructed by the collimating system with decreasing field sizes. Electronic equilibrium is a phenomenon associated with the range of secondary particles and hence dependent on the beam energy, spectrum and the composition of the medium (homogeneous vs inhomogeneous).

This session will elaborate on current understanding of the small field dosimetry. It will provide insight of the new IAEA/AAPM non-complainant dosimetry (1) IPEM report 103 (2) and AAPM task group report 155(3). Explanation of the difficulties and possible solutions to accurately measure dose in small fields using ion chamber, diode, diamond, TLD, films (radiographic and Gafchromic), MOSFET, bang gel, and Monte Carlo simulation will be elaborated. Also possible modeling of the treatment planning will be discussed. Consequences in accuracy for patient care will also be discussed.

Learning Objectives:

1. Understand the meaning of small field in radiation dosimetry
 2. Understanding the IAEA/AAPM methodology for calibration of small fields
 3. How to measure dose in small field
 4. TPS verification for small fields
 5. Highlight of the consequences
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1. Alfonso P, Andreo P, Capote R, *et al.* A new formalism for reference dosimetry of small and nonstandard fields. *Med Phys* 2008;35:5179-5186.
 2. Aspradakis MM. Report No 103: Small Field MV dosimetry. York, England: IPEM; 2010.
 3. Das IJ, Francescon P, Ahnesjö A, *et al.* Task Group 155 report: Small fields and non-equilibrium condition photon beam dosimetry. *Med Phys* (under review).