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Title: Small-field radiotherapy dosimetry with diamond and silicon systems.

Modern radiotherapy methods increasingly employ radiation fields that are comparable or smaller than the typical ionisation chambers used for commissioning of megavoltage photon beam generated by a therapeutic linear accelerator. This has lead to substantial errors in the dose delivered in some cases. Solid-state dosimeters have a high density of ionisation and capable of high sensitivity in a small form-factor, however their differing density and atomic number lead to departures from tissue-equivalence which is needed to accurately determine the dose in a complex, field-dependent spectrum of photons. Diamond detectors are closely tissue-equivalent over a broad energy range, but bring new issues including significant non-linearity as a function of dose-rate. Silicon detectors have a very different atomic number to that of tissue, leading to large variations in sensitivity with photon energy. Tissue-equivalence can be reintroduced by building detectors in a small form-factor, where the thickness of the detector is substantially smaller than the range of secondary electrons generated by the beam.