

Pixelated silicon detectors for the measurement of small radiation fields in proton therapy

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Advanced imaging and treatment techniques in proton therapy allow conformal high dose irradiation of the target volume with high precision using pencil beam scanning or beam shaping apertures. These irradiation methods increasingly include small radiation fields with large dose gradients at the edges, which require the development of new micro dosimetry systems with precise spatial resolution and small sensitive volume for quality assurance.

Based on their good spatial resolution and high rate compatibility, pixelated silicon detectors could meet the new requirements.

To assess their usability for micro dosimetry in proton therapy, as well as to determine the absolute proton flux, ATLAS Pixel detectors with Silicon sensors are used to measure transverse beam profiles of different irradiation modes at WPE in Essen, Germany.

The aim is to compare these with the expected expansions and to draw conclusions about the dose gradient at the field edges.

The possibility of determining the proton flux as well as the energy distribution of the irradiation fields with pixelated silicon sensors shall be evaluated under consideration of the characterizing results.

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