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Beam instrumentation for real time FLASH dosimetry: experimental studies in the CLEAR facility

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Real-time dosimetry for ultra-high dose-rates (UHDR) and Very High Energy Electrons (VHEE) is a challenge which is currently being studied using the electron beam at CERN Linear Accelerator for Research (CLEAR). These studies are motivated by the demand for reliable dosimetry for FLASH radiotherapy. This mode of irradiation relies on UHDR, a dose rate regime where conventional dosimetry monitors such as ionization chambers saturate. One potential approach is the use of a calibrated beam-based dosimetry method. The existing beam instrumentation provides real-time information on charge and both transverse and longitudinal profiles of the pulses, as well as making possible a measurement of the beam Twiss parameters. In the context of achieving a real-time prediction of the dose deposition, this paper presents experimental studies of the correlation of these parameters with the read-out of passive and dose-rate independent methods such as radiochromic films, and compares them with simulation results.

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Footnotes

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