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Applications and prospects of LPA and VHEE beams in Radiotherapy

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Radiotherapy is a primary modality of cancer treatment and the discovery of the FLASH effect has shed new light on the potential applications of Laser Plasma Accelerators as a source for Very High Energy Electron beams.

Flash radiotherapy (FLASH-RT) is a relatively recent irradiation technology that involves the ultra-fast delivery of radiation treatment at dose rates ($>40\text{Gy/s}$) orders of magnitude higher than conventional RT ($\approx\text{Gy/min}$). Many recent studies have also highlighted the potential benefits of using VHEE over photons or protons as they exhibit enhanced sparing of the surrounding healthy tissue and reduced susceptibility to tissue inhomogeneities.

In this perspective, laser driven particle sources are promising sources as they can produce short bunches (femtosecond scales) of very high energy electrons (tens of MeV) translating to peak dose rates of up to 10^{11}Gy/s . We will present prospects of LPA as a source for studying the FLASH effect and strategies for dose measurement of high-dose rate sources.

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