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VHEE FLASH radiotherapy: cutting-edge research at CLEAR, the CERN Linear Electron Accelerator for Research

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With the current availability of cost-effective and compact electron LINACs operating in the 100-200 MeV energy range, there has been a growing interest in using Very High Energy Electron (VHEE) radiotherapy (RT) for cancer treatment. A particularly intriguing aspect is the Ultra High Dose Rate (UHDR) or FLASH dose regime, which focuses on damaging cancerous cells while sparing healthy tissues. VHEE beams are well-suited for FLASH RT, given their deep penetration and high beam current, making them effective for treating large, deep-seated tumors.
The CLEAR (CERN Linear Electron Accelerator for Research) facility has been at the forefront of exploring VHEE and FLASH RT, conducting numerous unique experiments in collaboration with multidisciplinary user groups having experience in dosimetric, chemical, and biological studies. This paper introduces recent measurements, techniques, and methods used to observe the FLASH effect at CLEAR.

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