



Contribution ID: 2307 Contribution code: THPM078

Type: **Poster Presentation**

VHEE and ultra high dose rate radiotherapy studies in the CLEAR user facility

Thursday, 11 May 2023 16:30 (2 hours)

Given the current availability of high-gradient accelerator technology for cost effective and compact electron LINACs in the 100-200 MeV energy range, using Very High Energy Electron (VHEE) radiotherapy (RT) for cancer treatment recently gained a lot of interest. The Ultra High Dose Rate (UHDR) or FLASH dose regime, in which cancerous cells are damaged while healthy tissues are largely spared is one of the main topics studied. VHEE beams are especially adapted for FLASH RT, given their penetration depth and the high beam current, needed to treat large deep-seated tumors. In the CERN Linear Accelerator for Research (CLEAR) facility, numerous unique experiments have been initiated on VHEE and FLASH RT issues, in collaboration with several multidisciplinary user groups, including dosimetric, chemical and biological studies. The dedicated systems, techniques and methods used for VHEE/UHDR RT studies, locally developed by members of the CLEAR operation team, are presented in this paper together with a summary of the main results obtained in collaboration with the user groups.

Funding Agency

Footnotes

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Yes

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Session Classification: Thursday Poster Session

Track Classification: MC8: Applications of Accelerators, Technology Transfer and Industrial Relations and Outreach; MC8.U01: Medical Applications