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Advanced electron sources for novel radiotherapy applications

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FLASH radiotherapy is an emerging and highly promising technique in cancer treatment that delivers ultra-high dose rate radiation in extremely short pulses—typically within milliseconds.

This novel mode of dose delivery triggers the so-called FLASH effect, which has demonstrated the remarkable ability to spare healthy tissues while maintaining effective tumor control, potentially revolutionizing the therapeutic ratio in radiotherapy.

In this lecture, we will explore the origins and current understanding of the FLASH effect from both biological and physical perspectives, analyzing the key parameters, such as dose rate, total dose, and pulse structure, that govern its onset. Special attention will be given to recent advancements in electron radiation sources specifically designed or adapted for FLASH applications, including developments in accelerator technology and experimental setups.

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