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COLLOQUIA DI DOTTORATO, A.A. 2024/2025

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A101, Dipartimento di Fisica  
Giovedì 20 marzo 2025 ore 16:00

# ***FLASH Radiotherapy: Advances, Challenges, and Future Directions in Ultra-High Dose Rate Cancer Treatment***

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FLASH radiotherapy (FLASH-RT) is an innovative cancer treatment that delivers ultra-high dose rates ( $\geq 40$  Gy/s) in less than 200 ms. This irradiation modality elicits a biological effect called FLASH effect, that significantly reduces damage to normal tissues while maintaining tumor control.

Despite promising preclinical results, the precise mechanisms underlying this effect remain unclear, with hypotheses including transient oxygen depletion and reactive oxygen species dynamics. The clinical implementation of FLASH-RT faces challenges such as compact radiation sources, accurate dosimetry and reliable equipment for beam monitoring and delivery. This seminar reviews the latest advancements, technological challenges and future directions for FLASH-RT in clinical practice.

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*The seminar is in presence up to the maximum occupancy of the lecture hall.*