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PNRR – SAFEST (SApienza Flash Electron Source for radio-Therapy)

ABSTRACT

The FLASH effect is a promising technique in Radiotherapy that protects healthy tissues while maintaining treatment effectiveness on the cure of tumors. It requires very high dose-rate irradiation (>100 Gy/s), short beam radiation time (<100 ms), and large doses in the pulse (>1 Gy). Very High Electron Energy (VHEE) beams could be useful for treating deep tumors and translating the FLASH effect into clinical use. With the SAFEST project, we propose a VHEE linac based on a C-band system that includes high gradient accelerating structures, up to 45 MeV/m. A promising preliminary design of a VHEE linac for FLASH RT with maximum energy of 130 MeV and a peak current of 200 mA was performed by a joint Sapienza-Infn team. The proposal was funded by the National Recovery and Resilience Plan (PNNR) within the project HEAL ITALIA - *Health Extended Alliance for Innovative Therapies, Advanced Lab-Research, and Integrated Approaches of Precision Medicine* (PE6).