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Progress on the conceptual design of the laser-hybrid accelerator for radiobiological applications (LhARA)

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LhARA, the Laser-hybrid Accelerator for Radiobiological Applications, is a proposed novel facility capable of delivering high intensity beams of protons and ions that will enable radiobiological research to be carried out in completely new regimes. A two-stage facility, the first stage utilizes laser-target acceleration to produce proton bunches of energies up to 15 MeV. A series of Gabor plasma lenses will efficiently capture the beam which will be delivered to an in-vitro end station. The second stage will accelerate protons in a fixed-field alternating-gradient ring up to 127 MeV, and ions up to 33.4 MeV/nucleon. The beams will subsequently be deliverable to either an in-vivo end station or a second in-vitro end station. The technologies demonstrated in LhARA have the potential to underpin the future of hadron therapy accelerators and will be capable of delivering a wide variety of time structures and spatial configurations at instantaneous dose rates up to and significantly beyond the ultra-high dose rate FLASH regime. We present here recent progress and the current status of the LhARA accelerator as we work towards a full conceptual design.

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Footnotes

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Yes

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