

## **Conceptual Design for LhARA - Laser Hybrid Accelerator for Radiobiological Applications**

The Laser-hybrid Accelerator for Radiobiological Applications (LhARA) will be a uniquely flexible facility dedicated to the study of radiobiology. The technologies demonstrated in LhARA have the potential to be developed for use in future hadron-therapy facilities. The laser-hybrid system, in which strong-focusing plasma (Gabor) lenses capture and transport the beam will allow radiobiological studies to be carried out in completely new regimes, delivering a variety of ion species in 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. It is proposed that LhARA be developed in two stages. In the first stage laser-driven ion beams will be captured, focussed and transported using Gabor lenses, quadrupoles and bending magnets to serve a programme of in-vitro experiments. In the second stage the ion beam will be accelerated in a Fixed Field Accelerator (FFA) to serve programmes in both in-vitro and in-vivo radiobiology. The conceptual design of LhARA is presented in this paper.