

LhARA Presenter Brief:

LhARA's vision

The LhARA collaboration has been formed to:

Transform particle beam cancer therapy by harnessing the unique properties of laser-driven particle beams to:

Make the best treatments available to as many patients as possible by developing compact and affordable treatment facilities

To achieve these goals, the collaboration has defined three core objectives:

- Conduct world-leading research into the biological effects of particle beams;
- Prove the technical feasibility of laser-driven hybrid acceleration; and thereby
- Lay the foundations for the future of particle beam therapy.

At the heart of the collaboration is the Laser-hybrid Accelerator for Radiobiological Applications (LhARA). This system will underpin an international research facility, which will enable new discoveries in particle beam therapy and help shape the future of cancer treatment.

The proposed facility would provide:

- The flexibility to deliver multiple particle species across a wide spectrum of energies, dose distributions, and timings – enabling systematic studies of biological response and direct comparison of different particle types
- The advanced automation needed to study complex biological effects, including immune-system activation and the protection of healthy tissue in emerging treatment approaches such as FLASH and spatially fractionated radiotherapy
- Novel instrumentation to study the biological and biochemical processes that determine treatment effectiveness
- A platform to support pre-clinical research and biomedical R&D – helping to translate scientific discoveries into future clinical treatments