

## Terms of Reference for the review of the LhARA collaboration's "R&D proposal for the preliminary and pre-construction phases"

The Laser-hybrid Accelerator for Radiobiological Applications (LhARA) formed the basis of the [STFC proposal to the UKRI Infrastructure Advisory Committee](#) to establish the Ion Therapy Research Facility (ITRF). The LhARA collaboration has prepared a [proposal for a five-year programme of R&D](#) that is designed to be carried out during the Preliminary Activity and Preconstruction phases of the development of the Ion Therapy Research Facility (ITRF).

It is anticipated that a budget of £2M over two years will be provided to support the development of the ITRF. This two-year Preliminary Activity will deliver the conceptual design report (CDR) for the facility. The ITRF budget will provide support for the initial development of LhARA and for the consideration of conventional alternatives as potential "off ramps" in recognition of the technical risks presented by the LhARA project.

The ITRF Preliminary Activity funding line will provide a total of £1.81M to support the development of LhARA to serve the ITRF. This total has been broken down to provide £1.49M to support LhARA technical-risk mitigation and £0.32M to support the evaluation of the conventional technical facilities and to produce a cost estimate of the facility for inclusion in the CDR.

The panel is invited to assess and comment on:

- The quality of the science and technology involved in the proposal, the stated scientific and technical objectives, and to consider whether the proposal is likely to achieve those objectives;
- The likely scientific impact of the project within the UK and internationally, and the degree to which the LhARA collaboration's aims and objectives are supported by the relevant scientific communities;
- The timeliness of the project and its relevance with respect to alternative approaches;
- The standing of the groups and collaborators involved in the project, including the track records of the proponents;
- The project management structure, including the alignment between the LhARA collaboration and the ITRF, and the procedures required to ensure that the stated project goals are achieved;
- The scientific, technical, schedule, and financial risks attendant on the project and the degree to which the proposed activity addresses these risks;
- The costing and the proposed milestones against which the project will be monitored; and
- The industrial-engagement, outreach, involvement, and engagement plans.

The panel is requested to provide the Executive Board of the LhARA collaboration with a written report suitable for transmission to the STFC and other stakeholders within 30 days of the completion of the review.

### Process and review panel:

The review will take place remotely and will be split into two parts focussing on:

1. The machine and associated technology; and
2. Radiobiology and longer-term ambitions.

In addition to the International Advisory Board of Imperial's Centre for the Clinical Application of Particles (the CCAP), around 3-4 external reviewers will be invited with expertise in relevant scientific, technical, and project-management fields. The present panel membership is:

- CCAP IAB participants:
  - Mike Lamont (CERN, Chair)

- Brita Singers Sørensen ()
- Paul Bolton ()
- Michael Baumann ()

The two expert panels:

- Part I: Machine and associated technology
  - Chair:
    - Gianluigi Arduini
  - Additional experts:
    - Malek Haj Tahar (PSI)
    - Christian Carli (CERN)
- Part II: Radiobiology and longer term ambitions
  - Chair/additional experts: to be confirmed