

Protons and Ions for Europe

2026-02-24, 14:00 CET – 17:00 CET by Zoom

We had discussion on the following WPs:

- WP2 Linacs
- WP3 Rings
- WP4 Targets and Moderators

WP2 Linacs

We discussed potential avenues of research for linacs. There was some tension between specific design studies and more general technology R&D. Overall lattice design was discussed for ESSnuSB and SPL/muon collider (noting that they are quite related).

Tensions were also highlighted in the different technology options relevant to CW and pulsed linacs, which can have somewhat different parameter dependencies. The need to develop RF structures as a part of linac development was also considered.

A few specific tasks were identified:

- Ion source development was identified as a useful avenue; both development of a superconducting ECR ion source and reliability of ECR ion sources.
- Cavity compensation and handling of RF failures was also identified (could be in/shared with WP8 computing for example).
- Novel RF structure development was identified, although it might be necessary to develop scale models to fit within the budget envelope.
- Linac development for ESSnuSB & muon collider
- “Light weight”/top-down parameter development

There was some discussion later regarding meander kicker/chopper design. This could also go in linacs WP.

WP3 Rings

We had good agreement that the focus should be on longitudinal structure. We proposed 3 different tasks/study areas:

- Short beams < 10 ns (typically required for muons)
- Mid-length beams ~ 10 microseconds (may be advantageous for neutrons)
- Accumulation/stacking in FFAs to increase instantaneous bunch charge (useful for neutrons and muon collider)

There was discussion particularly around the very short beams task. The large instantaneous charge may induce instability in the bunch; Landau damping is suppressed owing to the bunch structure. FAIR may be seeing similar issues and this is an area of interest.

There was some discussion of how this might be tied to the diagnostics. For example the dynamic range between 1 ns and 1 microsecond bunch lengths may be challenging to measure.

We filled the spreadsheet with preliminary task list and resource estimates.

Comment received after the discussion:- it would be good to have more on instability management e.g. dampers and impedance management techniques (RF screens etc).

WP4 Target

We discussed several possible avenues that could be explored around the target R&D.

- Target instrumentation techniques, for example thermocouples. Various optical monitoring techniques were discussed e.g. luminescent coatings, laser doppler vibrometry, target & fibre optics, light emission from Li evaporation or IR radiation arising from hot targets.
- Novel target designs e.g. advanced target wheels and tungsten powder flow target.
- Advanced materials e.g. material hardening using magnetron sputtering, which may also improve emissivity/cooling properties.
- Remote handling techniques

We felt that we had a good list. There is also some discussion with CERN on liquid metal targets that may be relevant. We agreed to take it back to institutes and reflect in a couple of weeks.