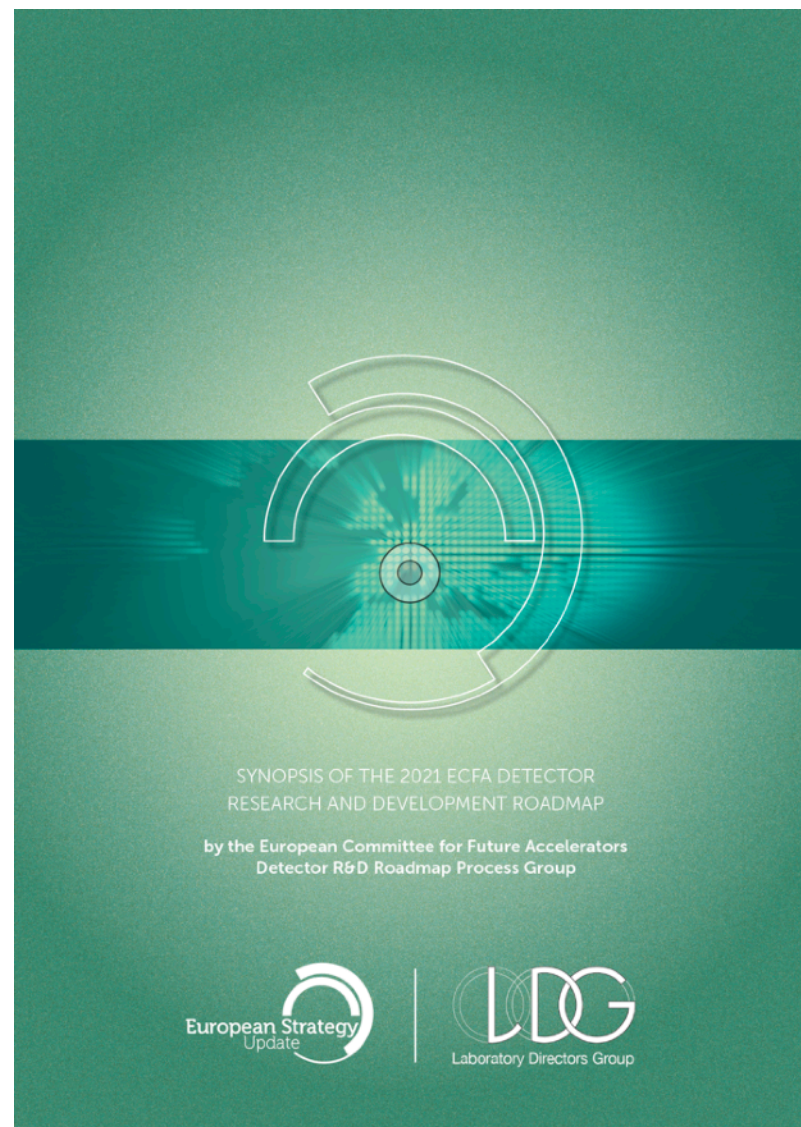
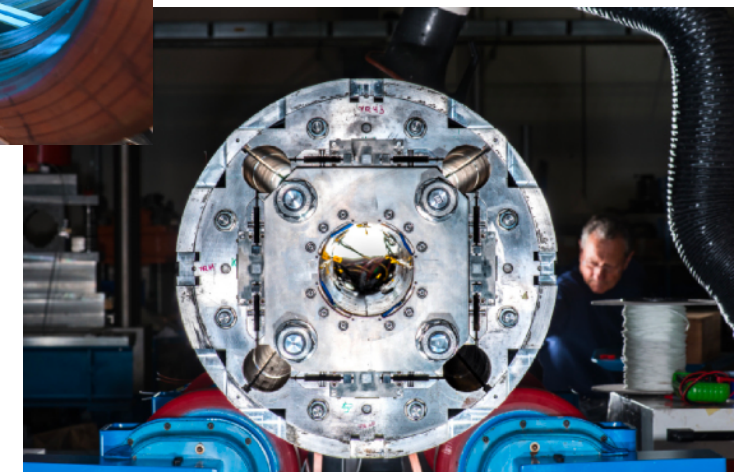
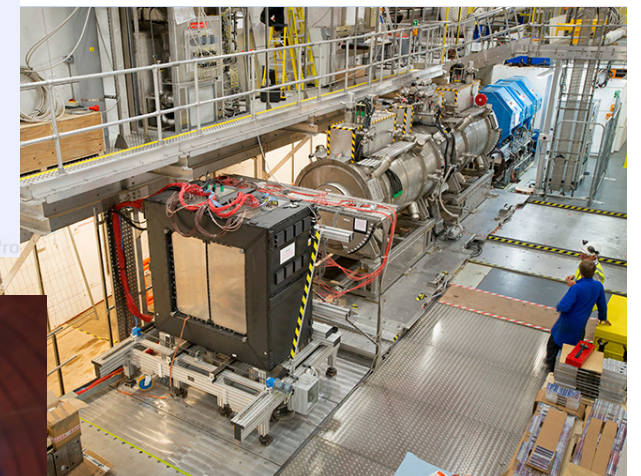
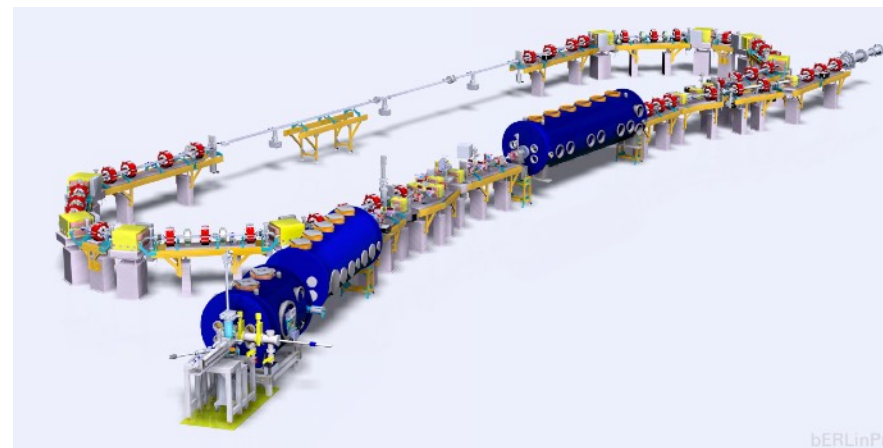


Accelerator R&D Roadmap



[arXiv:2201.07895v2](https://arxiv.org/abs/2201.07895v2)



Dave Newbold, STFC
Chair, Laboratory Directors Group

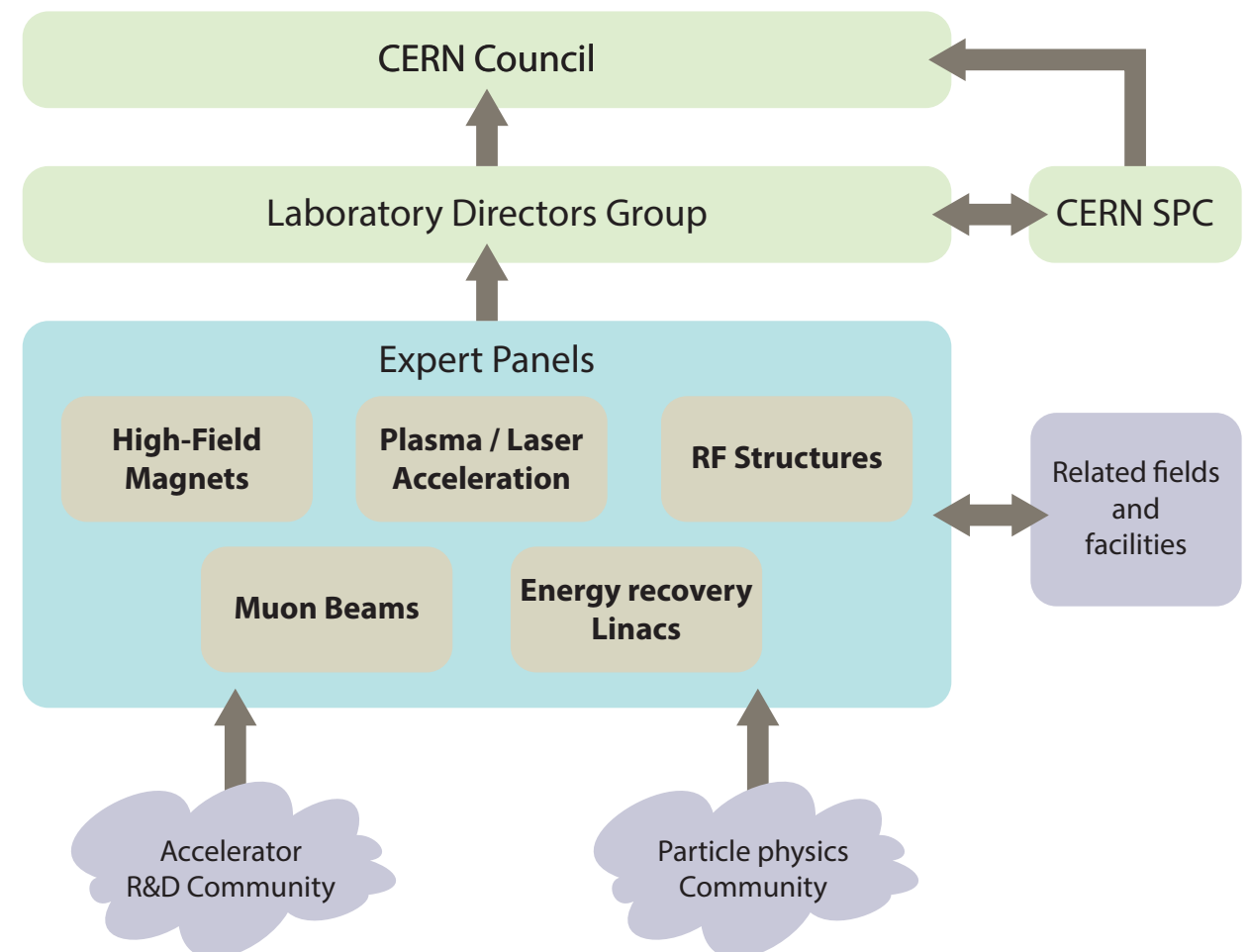
Motivation and Scope

▶ European Strategy contains clear recommendations on accelerator R&D:

- ▶ *The particle physics community should ramp up its R&D effort focused on advanced accelerator technologies.*
- ▶ *The European particle physics community must intensify accelerator R&D and sustain it with adequate resources; a roadmap should prioritise the technology.*
- ▶ *Deliverables for this decade should be defined in a timely fashion and coordinated among CERN and national laboratories and institutes.*

▶ Key messages

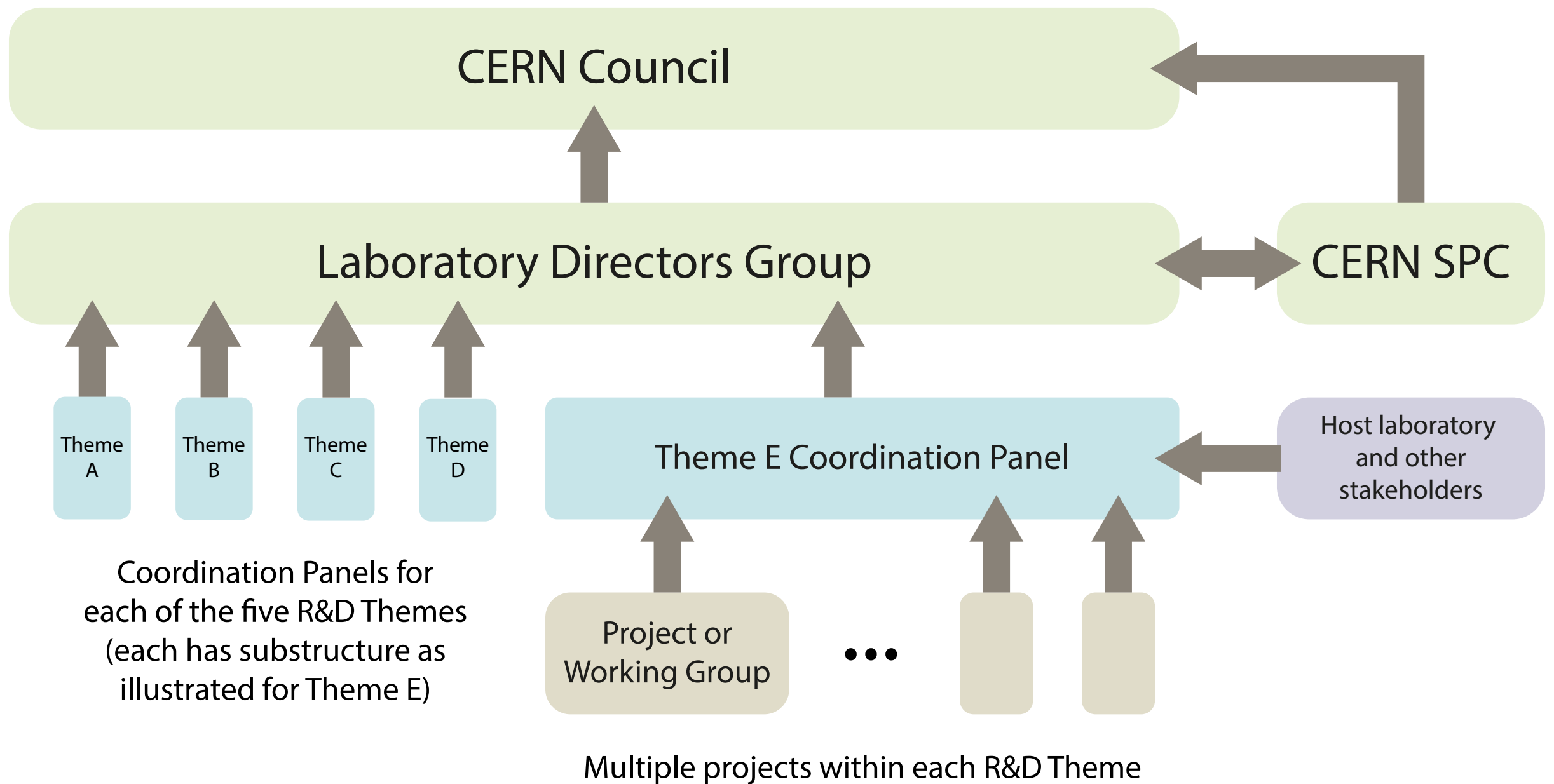
- ▶ Implementation is now under way
- ▶ Need to maintain focus on delivery of the future facilities for PP
 - ▶ Including any intermediate benefits of new technologies
- ▶ Ongoing engagement of the wider PP community is key



Current Status

- The Roadmap indicated the broad R&D objectives and priorities
 - But not a detailed execution plan, informed by known resources
- R&D programme now in the ‘implementation phase’
 - Clear that in most areas this represents the start of a ramp-up
 - In some cases, a new community / organisation must be established
 - For HFM and muons, formal collaborations now exist at CERN
- Details in the talks from panel chairs to follow
- Implementation will be formally overseen by LDG
 - Working within the mandate conferred by CERN Council in March 2021
 - Symmetry with the ECFA oversight of the detector R&D programme
 - In both cases, the ‘practical work’ is done by self-organised groups within an approved scope
 - Frequent updates to SPC via LDG, plus an annual review of progress
- Participation of the wider HEP community
 - LDG can monitor and oversee, but does not represent ‘European HEP’ in the widest sense
 - Need to find routes for ongoing dialogue with / input by the community
 - The first community workshop on the R&D programme will be held in July 2023
- Noting that the European R&D is embedded in a wide international programme

Coordination Structure



- Important that the door is kept open for new participation in coming years
- Becoming clear that communication between panels is also a key aspect
 - e.g. strong overlap between RF, magnets and muons activities

Coordination Panel Terms of Reference

- ▶ Oversee the development of a detailed execution **plan** for each R&D Theme, and **coordinate** the necessary work
- ▶ Have representation from all **stakeholders**, including (as appropriate) participating laboratories, institutes, and national communities
- ▶ Include representation from **international partners**, ensuring that a uniform picture for both European and international oversight bodies
- ▶ Act as a **decision-making and prioritisation** body within the approved scope of each R&D Theme, based on a consensus of stakeholders
- ▶ Where changes of objectives or scope, or prioritisation between objectives, are needed, submit **recommendations and requests** for comment to the LDG
- ▶ Ensure that decisions are made on a **sound technical basis**, drawing on the expertise of the collaborating projects and institutions, and setting up any subsidiary technical working groups that may be needed

Coordination Panel Leadership

▶ HFM

- ▶ Mike Lamont (CERN)
- ▶ Pierre Vedrine (IRFU)

▶ RF

- ▶ Giovanni Bisoffi (INFN Padova)
- ▶ Peter McIntosh (DL)

▶ LPA

- ▶ Wim Leemans (DESY)
- ▶ Rajeev Pattahill (RAL)

▶ Muons

- ▶ Steinar Stapnes (CERN)
- ▶ Daniel Schulte (CERN)

▶ ERL

- ▶ Jorgen D'Hondt (VUB)
- ▶ Max Klein (U. Liverpool)

▶ Nominations invited from laboratories and funding agencies

- ▶ Sought to identify strong technical leadership, with a proper national balance
- ▶ Where a formal collaboration was already in place, names were drawn from the leadership bodies of the collaboration

▶ These people are now all in place and working (hard)

- ▶ Please feel free to address comments / questions / inputs directly to them

Panel Leadership Tasks

- Make **initial contact** with all projects, laboratories, institutes, and funding agencies with an interest in contributing to or supporting the R&D Theme
- Convene the Panel, where necessary, by calling for representatives from stakeholders, and hold **regular meetings** thereafter
- Organise, by consensus, an appropriate **long-term structure** for work within the R&D Theme
- Maintain ongoing contact with all stakeholders, including those with a future interest in the programme, working to **define and negotiate technical and financial contributions**
- Develop a **detailed plan** for the R&D programme, commensurate with the top-level priorities expressed in the R&D Roadmap and the available **resource profile**, drawing upon the expertise and capabilities of all participants
- Monitor progress against a clearly specified set of **milestones**, and track the usage of resources
- Act as **link persons to LDG** for reporting on plans and progress, including provision of progress reports at intervals agreed with LDG, and including a final report as input to the next European Strategy update
- Provide visible **leadership, organisation and advocacy** for the ongoing work of the Panel

Funding Agency Views

- ▶ Informal discussions with several funding agencies so far
 - ▶ Gain a first impression of interests, commitments, plans
 - ▶ Understand requirements for governance structure and reporting
 - ▶ By no means complete coverage – stand ready to discuss further
- ▶ Common themes
 - ▶ Pressure on budgets and personnel from existing projects – R&D will ramp up slowly
 - ▶ Need to tie R&D into broader national programmes of applied accelerator development (plus fusion, lasers)
 - ▶ Full recognition of careers pipeline / training issues
 - ▶ Obviously: attention to the feasibility and costs of beyond-next-generation machines
 - ▶ Including energy costs and long-term sustainability
 - ▶ In some cases: lack of transparency on funding, motivation and outcomes of R&D
- ▶ Arguments for proceeding with a large-scale R&D programme
 - ▶ The fundamental concerns on feasibility and energy can only be addressed via new ideas
 - ▶ Pressure on resources increases need for explicit coordination / cooperation
 - ▶ Many issues cannot be reasonably tackled without an international critical mass
 - ▶ Robust and visible organisational structure will provide transparency, offer opportunities for collaboration outside our field

Next Steps

▸ Coordination panel tasks

- Open dialogue with all (current and future) stakeholders
 - Including discussion of possible future resource levels, as input to planning
- Inaugurate suitable coordination structures – now well under way
- Define the concrete R&D deliverables for the coming four years
 - Establishing realistic goals and expectations for next strategy update

▸ First iteration of annual review cycle

- First LDG annual review of R&D progress on Monday 21st November
- Will report to SPC / Council in the December sessions

▸ Issues under discussion

- The style, composition, and schedule of the RRB
 - Ideally this should be in common with the Detector R&D
- Practical administrative support for panels & establishment of public presence
- Mechanisms to achieve long-term balance of the programme
 - Based on roadmap priorities but also new developments
 - Will be an active and ongoing discussion with FAs, keeping in mind the agreed position of maintaining progress on all five fronts on at least a minimal level

Community Workshop on Accelerator R&D

- ▶ *Pencilled in* for week of July 10th 2023, hosted at Frascati
 - ▶ Same week as the LDG ‘global laboratories forum’, postponed from 2021
 - ▶ Should ensure attendance of a wide spectrum of international partners in the R&D programme
 - ▶ Two-day event with remote participation possible
- ▶ Objectives of the workshop
 - ▶ Foster discussions between panels
 - ▶ Strengthen (further) connections between accelerator / HEP communities
 - ▶ Present and explain the detailed R&D implementation plan
 - ▶ (Re) identify connections from R&D to concrete future facilities
 - ▶ Identify potential science applications of intermediate R&D outputs
 - ▶ (Re) discuss the results and progress targeted for the next Strategy Update
- ▶ Formal announcement in the coming weeks
 - ▶ Feedback / comments from ECFA essential in shaping the programme