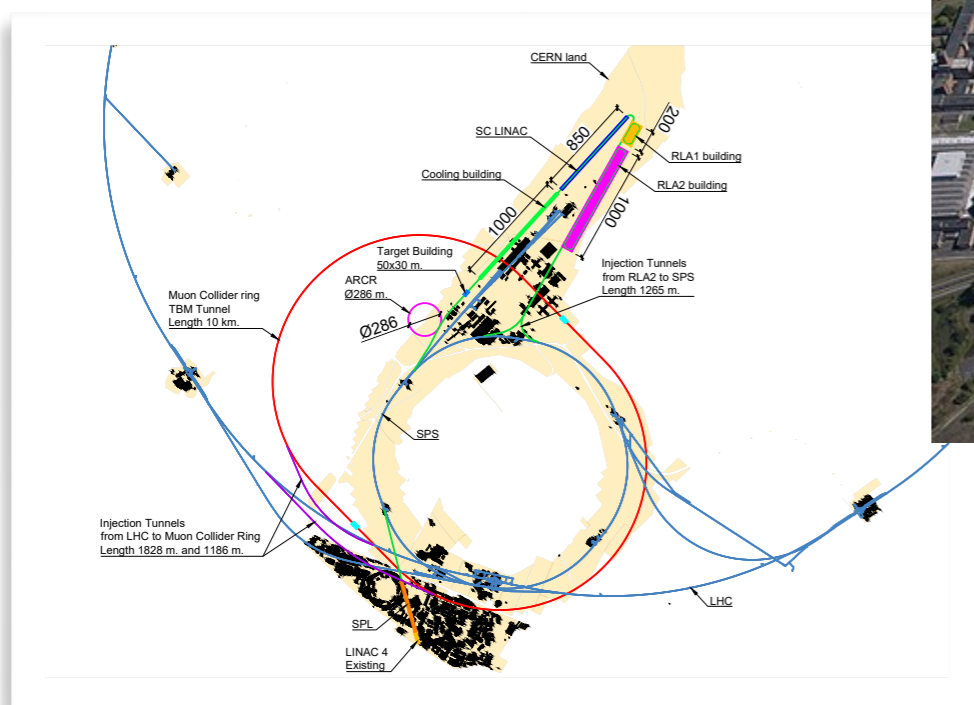
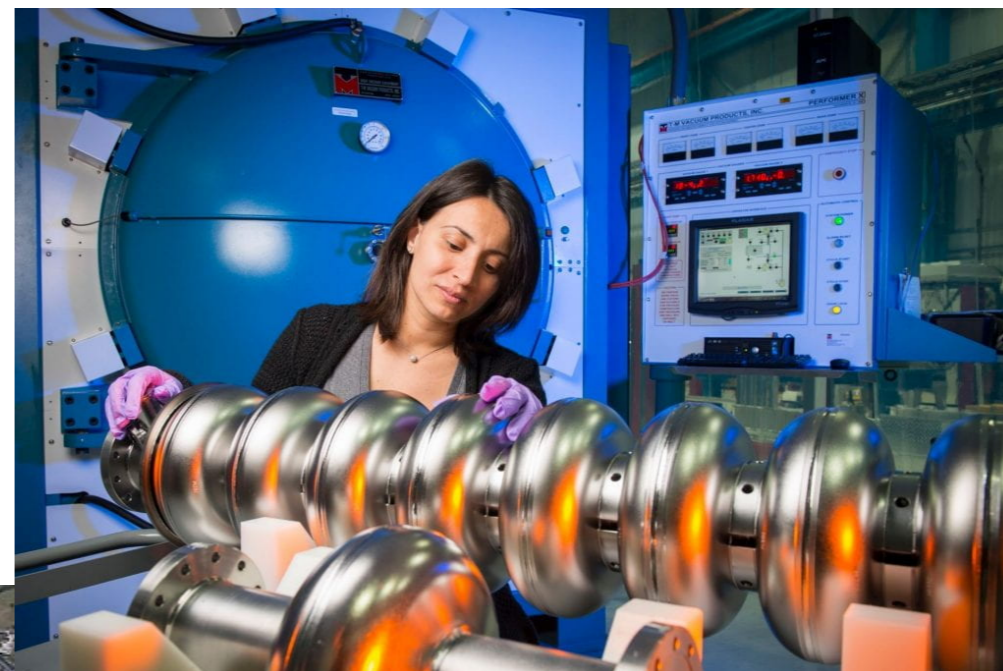


- ▶ LDG remit and composition
- ▶ Accelerator R&D progress
- ▶ LDG contribution to strategy
- ▶ Closing remarks



- ▶ Remit as mandated by CERN Council
  - ▶ Facilitate informal **dialogue** among the Directors of the LNLs and CERN
  - ▶ Provide direct **input** to the **European Strategy** for Particle Physics
  - ▶ **Liaise** with the European Commission and national funding agencies, research institutes and universities, ensuring that LNLs speak with a single voice
  - ▶ Maximise the regional and national **benefits** of investment in fundamental research and in CERN
  - ▶ Keep abreast of the activities ... being undertaken in laboratories outside CERN's Member States, and of other **coordinating groups** in particle physics and related fields, and foster dialogue with them
  - ▶ Draw up and maintain a prioritised accelerator R&D **roadmap** towards future large-scale facilities for particle physics
  - ▶ **Coordinate** the accelerator R&D activities on the roadmap, with the aim of strengthening cooperation and ensuring effective use of complementary capabilities



## ▶ Laboratory representatives

- ▶ J. D'Hondt (Nikhef, NL)
- ▶ P. Gianotti (LNF, IT)
- ▶ J. Clarke (DL, UK)
- ▶ N. Colino (CIEMAT, ES)
- ▶ F. Gianotti (CERN)
- ▶ B. Heinemann (DESY, DE)
  - ▶ *New DESY rep in 2025*
- ▶ S. Farrington (RAL, UK)
- ▶ E. Previtali (LNGS, IT)
- ▶ F. Sabatie (IRFU, FR)
- ▶ **M. Seidel (PSI, CH)**
- ▶ A. Stocchi (IJCLab, FR)



## ▶ Standing observers

- ▶ P. Sphicas (ECFA Chair)
- ▶ M. Lamont (CERN Directorate)
- ▶ J. Mnich (CERN Directorate)
- ▶ H. Montgomery (SPC Chair)

## ▶ Secretary

- ▶ E. Tsemelis (CERN)

## ▶ Extended LDG members

- ▶ G. Bisoffi (RF) + P. Macintosh
- ▶ W. Leemans (LPA) + R. Patahill
- ▶ S. Stapnes (Muons) + D. Schulte
- ▶ J. D'Hondt (ERL) + M. Klein
- ▶ P. Vedrine (HFM)
- ▶ C. Bloise + M. Titov (Sust. panel)

## ▶ ‘Regular’ LDG activities

- ▶ Accelerator R&D roadmap delivery reaching mid-point – excellent progress on many fronts, new funding and involvement secured
- ▶ Laboratories are engaged in construction of accelerators and detectors for late-2020s projects worldwide
  - ▶ HL-LHC, EIC, LBNF/DUNE, Hyper-K, Darkside, LEGEND, many others
- ▶ Many major infrastructure projects under way outside HEP
  - ▶ Neutron sources, light sources, nuclear physics, gravitational waves, computing, etc etc.
- ▶ Excellent LDG forum in BNL earlier in the year

## ▶ Topical activities around European Strategy Update

- ▶ LDG chair and membership participating in definition / setup of the strategy update process
- ▶ Working group on ‘assessment of sustainability of infrastructures’ progressing well, coordinating with ICFA
- ▶ Mid-term review of accelerator R&D programme scheduled for February
  - ▶ Will inform and support the work of the accelerators part of the strategy process

## ▶ Purpose of the R&D Roadmap

- ▶ Speed up progress through better coordination ✓
- ▶ Identify new mid-term science opportunities ✓
- ▶ Provide information on feasibility / cost / timescales to next strategy →
- ▶ Decision in 2022 to maintain a broad front of short- / long-term R&D ✓

## ▶ Where are we today?

- ▶ Impressive – and accelerating – progress across all five work areas
- ▶ Limited in many areas by resources, but not by ingenuity or technical barriers
  - ▶ If you want faster progress, insert more coins (but people are finding ways...)
- ▶ Starting to establish clear timelines for R&D leading to next major facilities
- ▶ May need to consider the breadth / focus of R&D activities in the coming years
  - ▶ Decisions to focus resources on key topics for future facilities *may* be needed

## ▶ Links with strategy process

- ▶ Strategy addresses what *should* be done, but must reflect upon what *can* be done
- ▶ Questions of timelines, technologies, feasibility, resources cannot be avoided
- ▶ Essential that the PP community has a well-formed understanding of the challenges and trade-offs in process to build the next infrastructures

- ▶ Mid-term review, w / b February 24th, at CERN
  - ▶ In-depth review over three days, carried out by independent panel of experts
  - ▶ Panel report will form basis of submission for 31st March deadline
    - ▶ We anticipate that each panel / collaboration will also submit their own more detailed input
  - ▶ Examination of R&D for future machines will be by the PPG accelerator working group
    - ▶ But likely draw upon the engagement of the review panel for the next steps
  - ▶ Chaired by **N. Holtkamp** with two expert reviewers identified in each area
- ▶ Questions to be addressed by the review panel
  1. In relation to the goals and objectives of the 2022 Accelerator R&D Roadmap, is the progress and current status of R&D appropriate and sufficient?
  2. Are the plans for the remainder of the R&D period from 2025-26 adequate and have necessary decisions been taken to set priorities?
  3. Are the current organisational structures for R&D effective?
  4. Has the readiness of the key technologies been established at the present time, and at an appropriate future date for the application?
    - ▶ Anticipate a 'traffic light level' analysis of importance and maturity of technologies
  5. Are the plans presented by the panels for future topics and the next stages of R&D appropriate and well-justified?



- ▶ Key information from LDG laboratories
  - ▶ Review of R&D achievements, commentary on future prospects
    - ▶ What can be achieved, how long will it take, what resources and organisation are needed?
  - ▶ How can labs work together to ensure effective delivery of next major infrastructure at CERN?
    - ▶ And what lessons have we learnt from current projects?
  - ▶ What will the European HEP investments outside CERN look like?
  - ▶ How can we support / ensure sustainability of future projects?
    - ▶ This is now a technical, not philosophical / policy question
  - ▶ What issues exist around skills, training, mobility, careers, facilities?
- ▶ Anticipated formal inputs to strategy
  - ▶ Summary of R&D review and recommendations
  - ▶ LDG collective view on sustainable delivery of future projects
  - ▶ Report of the subgroup on environmental sustainability
  - ▶ Individual inputs from laboratories
    - ▶ As part of, and in addition to, national inputs
  - ▶ Individual inputs from the accelerator R&D areas

- ▶ Some reflections as a departing lab director...
- ▶ LDG finds itself with a crucial role
  - ▶ Oversight of the R&D that underpins the future programme
  - ▶ Route to inform the PP community / strategy on technology and feasibility
  - ▶ The voice of the laboratories in our future planning for delivery
- ▶ The next phase in our field
  - ▶ The next machine will be a global project, requiring focus by all
  - ▶ Science 'giga projects' will attract close scrutiny of schedule, resources, sustainability – but also the wider benefits for science and society
    - ▶ Large labs are already far down this road with non-PP infrastructures at the multi-GCHF scale
  - ▶ Strategy must lead to a robust delivery plan for our priority infrastructures, connecting and utilising our laboratories across Europe (and the world)
- ▶ LDG-ECFA cooperation
  - ▶ Thanks to Jorgen / Lenny / Karl for bringing these two worlds into closer contact
  - ▶ Has become an important relationship, essential for the next strategy and beyond
    - ▶ Please continue to work together!