WELCOME TO CERN

International Workshop on Hadron Structure and Spectroscopy – 2022

Pippa Wells – Deputy Director for Research and Computing
Large Hadron Collider
27 km circumference
100m underground

CERN has a diverse physics programme
LHC Run 3 is ongoing (2022-2025)

All CERN experimental areas now back in action after Long Shutdown 2. NA spill quality improved in 2022 compared to 2021.

Phase 1 upgrades of 4 big LHC experiments being commissioned – however, just started 4 week stop after cooling plant failure at point 4 (RF)
HL-LHC should deliver 10x more luminosity than original design to ATLAS and CMS – Phase II upgrades to be installed in LS3

ALICE and LHCb also plan major upgrades for LS4
Scientific priorities for the future

Implementation of the recommendations of the 2020 Update of the European Strategy for Particle Physics:

• Fully exploit the High-Luminosity LHC
• Build a Higgs factory to further understand this unique particle
• Investigate the technical and financial feasibility of a future energy-frontier ~100 km collider at CERN – mid-term report due in 2023
• Ramp up relevant R&D
• Continue supporting other projects around the world [including Physics Beyond Colliders]
North Area High Intensity Beams ECN3
Several experiments under study: HIKE, SHADOWS, Beam Dump Facility with SHiP, TauFV
Report on post LS3 options to SPSC in 2023

Consolidation Phase 1 (funded): 2019 – 2027

Consolidation Phase 2 (not yet funded): 2028 – 2033

Long lived particles (LLP) @ LHC:
Forward Physics Facility (in line of sight of ATLAS interaction point) – preparing EoI
LLP experiments at large angle to the beam line
LHC fixed target: gas targets; crystal extraction
CERN laboratory for people around the world

Distribution of all CERN Users by the country of their home institutes as of 31 December 2021

Geographical & cultural diversity
Users of 110 nationalities
19.4% women

Member States 6642
Austria 74 – Belgium 122 – Bulgaria 39 – Czech Republic 227
Denmark 42 – Finland 71 – France 811 – Germany 1129
Greece 133 – Hungary 69 – Israel 67 – Italy 1423
Netherlands 157 – Norway 69 – Poland 278 – Portugal 89
Romania 105 – Serbia 36 – Slovakia 66 – Spain 328
Sweden 88 – Switzerland 372 – United Kingdom 847

Associate Member States
in the pre-stage to membership 55
Cyprus 10 – Estonia 24 – Slovenia 21

Associate Member States 367
Croatia 36 – India 130 – Latvia 11 – Lithuania 12 – Pakistan 30
Türkiye 122 – Ukraine 26

Observers 2917
Japan 189 – Russia (suspended) 971 – United States of America 1757

Annual budget: 1200 MCHF
Employees:
2676 staff, 783 fellows
Associates:
11 175 users, 1556 others

Non-Member States and Territories 1194
Algeria 3 – Armenia 10 – Australia 20 – Azerbaijan 3 – Bahrain 2 – Belarus 24 – Brazil 106
Canada 189 – Chile 23 – Colombia 18 – Cuba 3 – Ecuador 6 – Egypt 16 – Georgia 36 – Hong Kong 17
Iceland 3 – Indonesia 6 – Iran 11 – Ireland 6 – Jordan 5 – Kuwait 5 – Lebanon 15 – Madagascar 1
Malaysia 4 – Malta 2 – Mexico 48 – Montenegro 5 – Morocco 18 – New Zealand 8 – Oman 1 – People’s
Sri Lanka 10 – Taiwan 45 – Thailand 18 – United Arab Emirates 6

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Applications of CERN technologies – accelerators, detectors and computing

Accelerator technologies for cancer radiotherapy with protons, ions and electrons.

Pixel detectors for radiation monitoring. (NASA – ISS)

Pixel detectors for high resolution 3D colour X-ray imaging.

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CERN Science Gateway

CERN’s new education and outreach centre for age 5-plus.

Increase visitor capacity from 150k to >300k per year

Opening summer 2023.
Recent anniversaries

Web@30 (2019), Higgs@10 (2022), and today: 25/20 years of COMPASS