# Practicalities

[redacted]

# The CREW at IdeaSquare

**Lauri Valtonen**
Research and CIJ

**Laura Wirtavuori**
Edu programmes

**Ole Werner**
Edu Programmes

**Dina Zimmermann**
Prototyping

**Markus Nordberg**
Fixing things

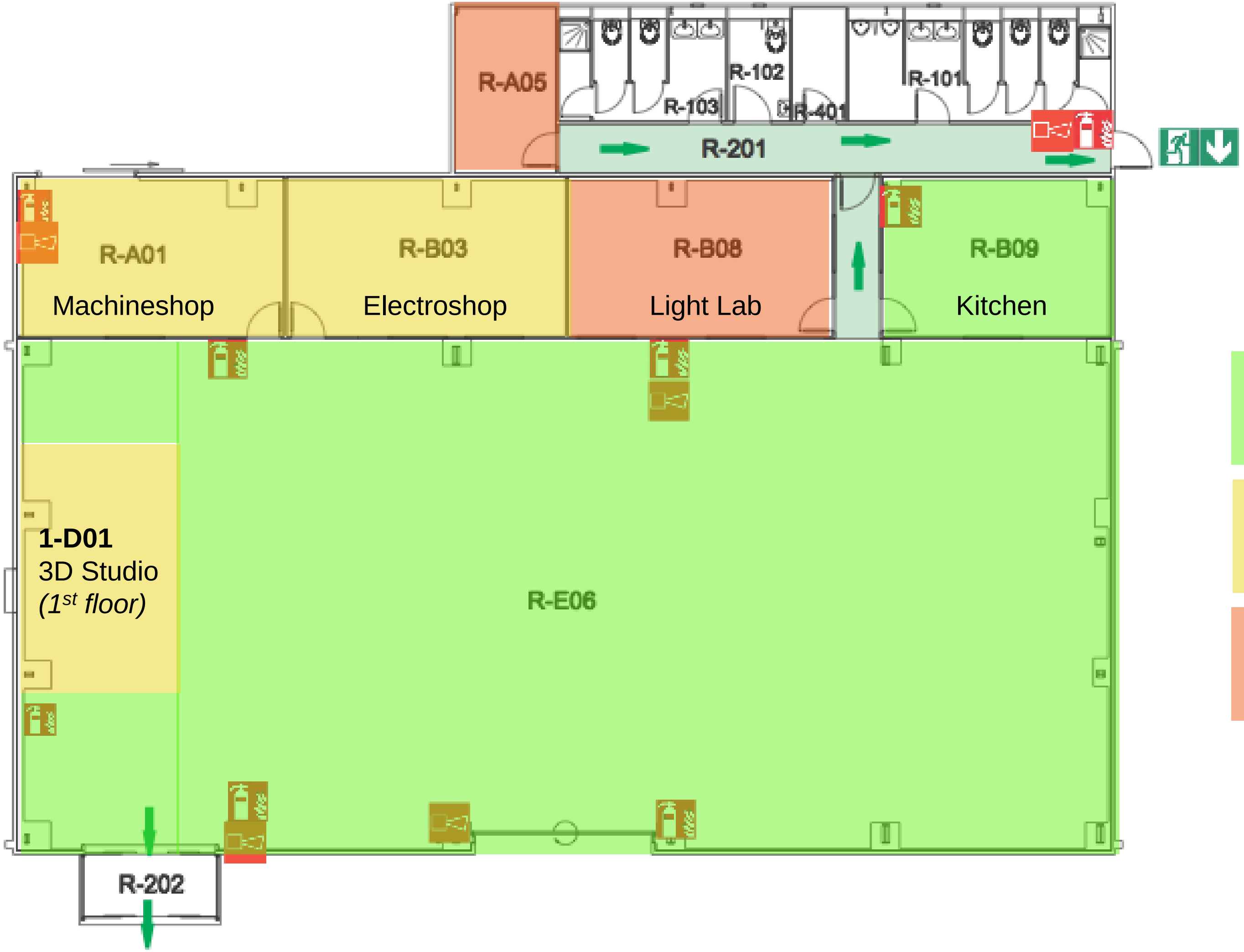
**Pablo Garcia Tello**
The bear from Mowgli

**Laëtitia Pedroso**
Events

**Catarina Batista**
Edu programmes

**Jimmy Poulaillon**
Communications

**Tuuli Utriainen**
Cosmic collaborator

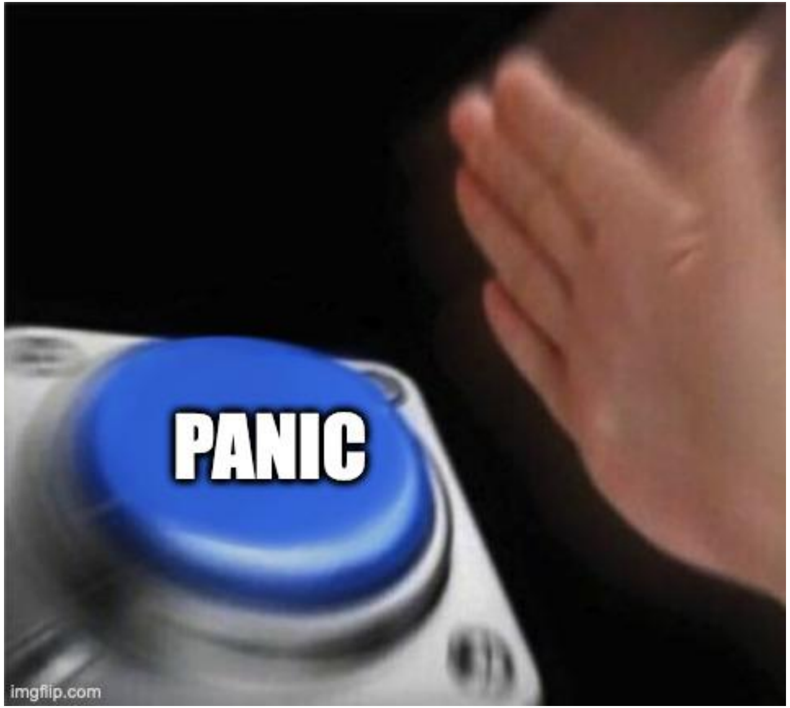



Free to use

Work under supervision

Restricted area - Forbidden

# WHERE'S THE INTERNET?!




1. Go to wifi and **select "CERN visitor"**

2. Accept the terms and conditions of use

2. Enter your phone number and e-mail

4. You should receive an SMS code, put it in and you are all set!

5. Except… repeat every day and for all devices!

# Keep in mind that you are on CERN site

- CERN is fun, but not an amusement park. Respect the work of others, keep your voice down when walking in CERN corridors.
- While moving around CERN, you should always have your visitor badge and an ID with you.

# In case of emergency

While evacuating, always **go away from the danger!**

**Do NOT return** to collect your belongings

**Walk quickly and calmly** to your building's designated **assembly point** or as advised by an Emergency Guide or Fire Brigade personnel

**Wait at the assembly point until counted and released** by the TSO/DSO or the Fire Brigade.

Give to the Fire Brigade all the information they need! **+41 22 767 44 44**

# DO…

- … forget about climbing on top of the containers or the bus
- ... refrain from consuming or storing alcohol inside IdeaSquare
- … leave using illegal software or downloading illegally to when you are not connected to the CERN network

# Keeping places tidy

Entropy has been proven to have an effect also on CERN premises

- Clean more than you mess.
- Bring all coffee cups, plates, dishes to kitchen, and put them inside the dish washer. If dishwasher is full, put it on. If it’s done, empty it. Wash large things such as pans yourself, dry them, and stove away.

## Monday, 18 September

09:00 → 09:20 **Welcome to IdeaSquare** — 20m
**Speaker**: Laura Wirtavuori

09:20 → 10:00 **CERN, IdeaSquare, and the agenda** — 40m
**Speaker**: Laura Wirtavuori

10:00 → 10:30 **Who are we?** — 30m
Pecha Kuchas - each student and teacher presents themselves in 60 seconds with three pictures (20s per picture) - to be collected by Saule.

10:30 → 10:45 Breathe — 15m

10:45 → 12:15 **Prototyping and exponential thinking** — 1h 30m
A prototyping exercise to start getting in the right mindset
**Speaker**: Laura Wirtavuori

12:15 → 13:45 Lunch — 1h 30m

13:45 → 17:40 **Visit - data center, Antimatter Factory, the main workshop and SC** — 3h 55m
**Speaker**: Prof. Christoph Schaefer (CERN)

## Tuesday, 19 September

09:00 → 10:00 **Presenting our projects** — 1h
8 projects, 3 min elevator pitch per project, 2min for questions per team

10:00 → 13:00 **Ideation - Beyond the Pale Blue Dot** — 3h
What if we left Earth and implemented our solution on a different planet, without existing boundary conditions? Only the cosmos is the limit!
**Speaker**: Laura Wirtavuori

10:30 → 13:00 **The Holodeck Experience** — 2h 30m
Gamified learning
**Speaker**: Ole Anton Werner

13:00 → 14:15 Lunch — 1h 15m

14:15 → 16:45 **SERIOUS FUN: Games & playfulness to experience the complexity of future risks** — 2h 30m
By Pablo Suarez

## Wednesday, 20 September

09:00 → 10:30 **Behavior change** — 1h 30m
**Speaker**: Ole Anton Werner

10:30 → 12:30 **Coming back to the future on Earth** — 2h
How do we think our idea for the exoplanet could be implemented on Earth - in 2035?
**Speaker**: Laura Wirtavuori

12:30 → 14:00 Lunch — 1h 30m

14:00 → 15:30 **More on games - gravity play (optionally use time for teamwork)** — 1h 30m
With pablo S

15:30 → 16:30 **Arts at CERN** — 1h
**Speaker**: Monica Bello (CERN)

16:30 → 17:30 **Optional: Time for teamwork at IdeaSquare** — 1h

17:30 → 19:30 Dinner and drinks at R1 with Ole — 2h

## Thursday, 21 September

09:00 → 10:30 **Systems mapping exercise** — 1h 30m
**Speaker**: Laura Wirtavuori

10:30 → 12:30 **empathy map and value proposition - Kaunas students coach Vilnius teams** — 2h

12:30 → 14:00 Lunch — 1h

14:00 → 15:00 **Meeting with KT - how does CERN do Knowledge Transfer?** — 1h

15:00 → 17:00 **Back to the present** — 2h
What does your idea for 2035 tell you about what you need to do now?
**Speaker**: Laura Wirtavuori

## Friday, 22 September

09:00 → 11:00 **How to convince an audience - workshop** — 2h
**Speaker**: Ole Anton Werner

11:00 → 14:00 **Finalise outcomes and prepare to present** — 3h

14:00 → 15:30 **Presentations** — 1h 30m

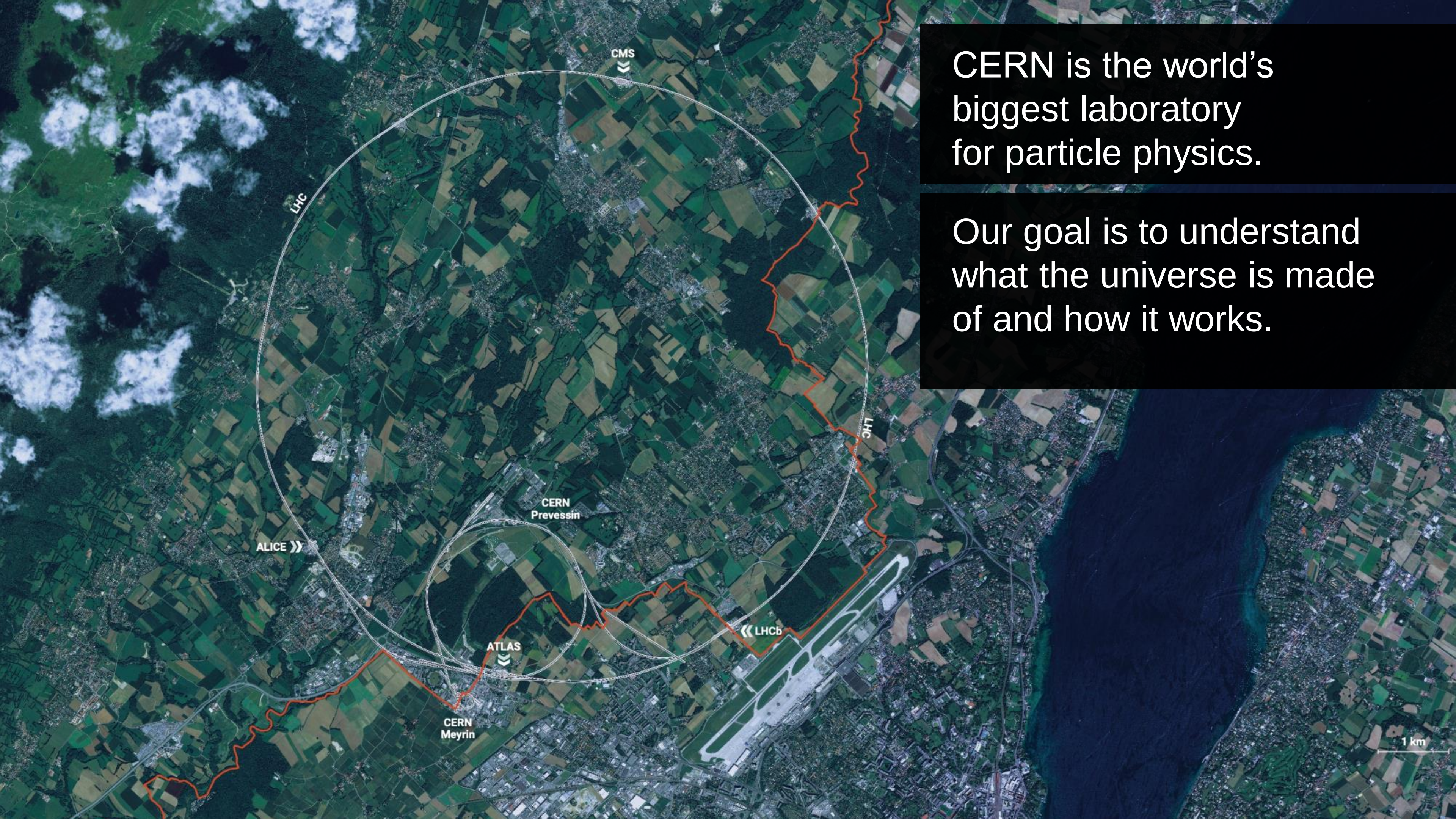
15:30 → 16:30 **Clean Up and wrap up** — 1h
Goodbyes and pictures

IdeaSquare
The innovation space at CERN

# What is CERN

CERN is the world’s biggest laboratory for particle physics.

Our goal is to understand what the universe is made of and how it works.



# CERN’s Mission

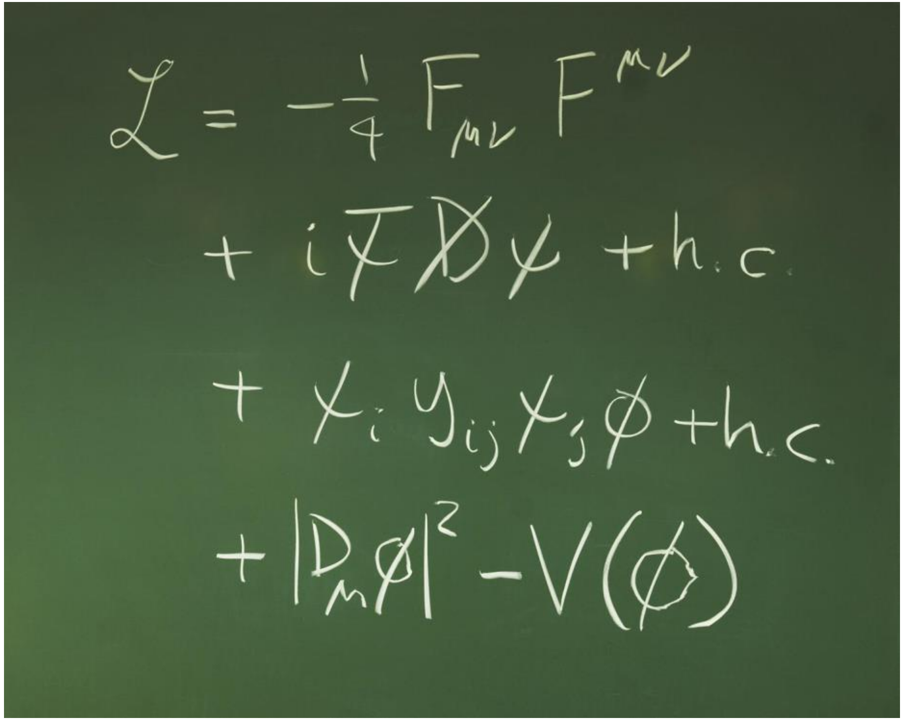
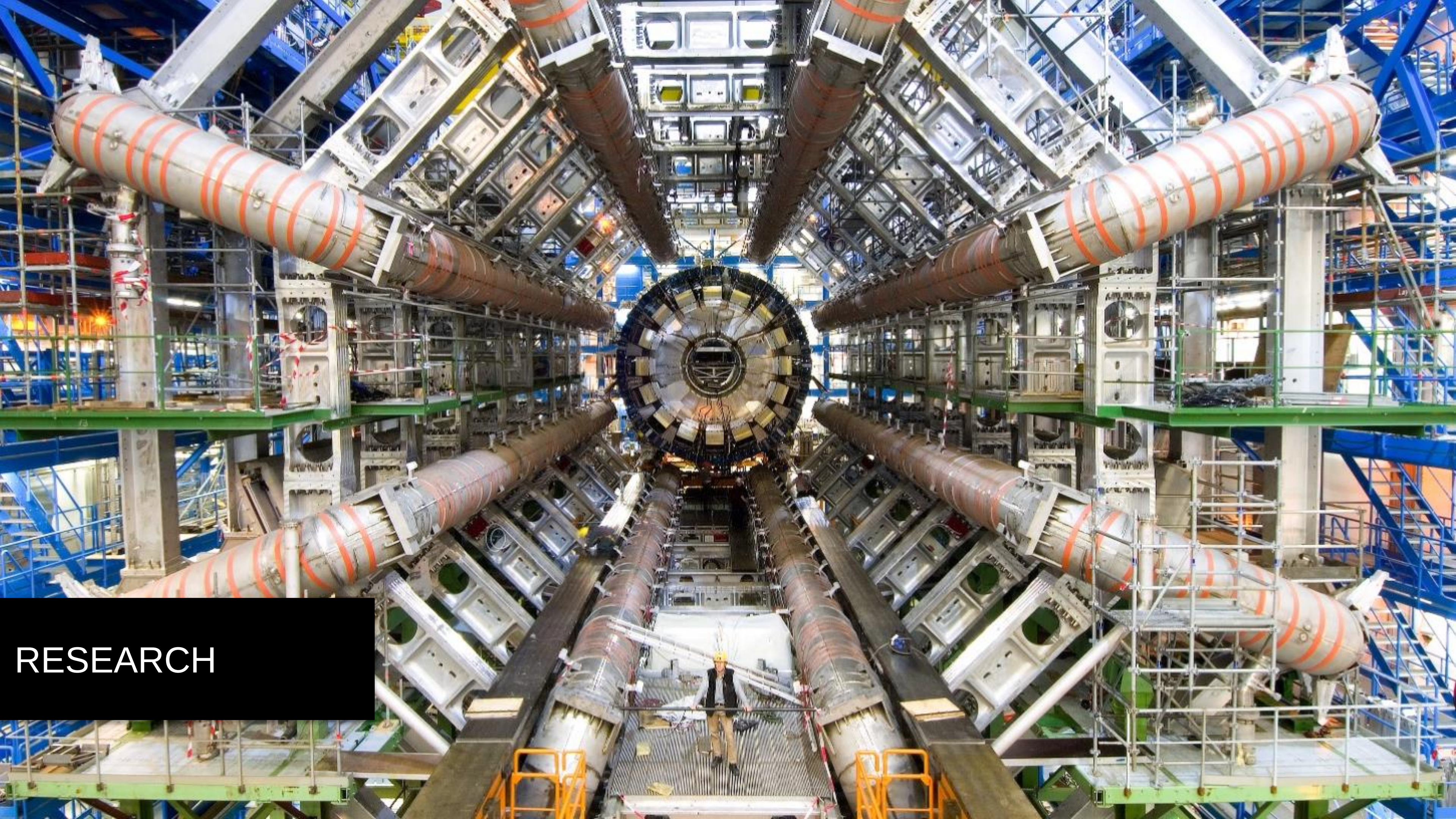



Photo by Claudia Marcelloni

CERN provides a range of particle accelerators for scientists to push the frontiers of knowledge.

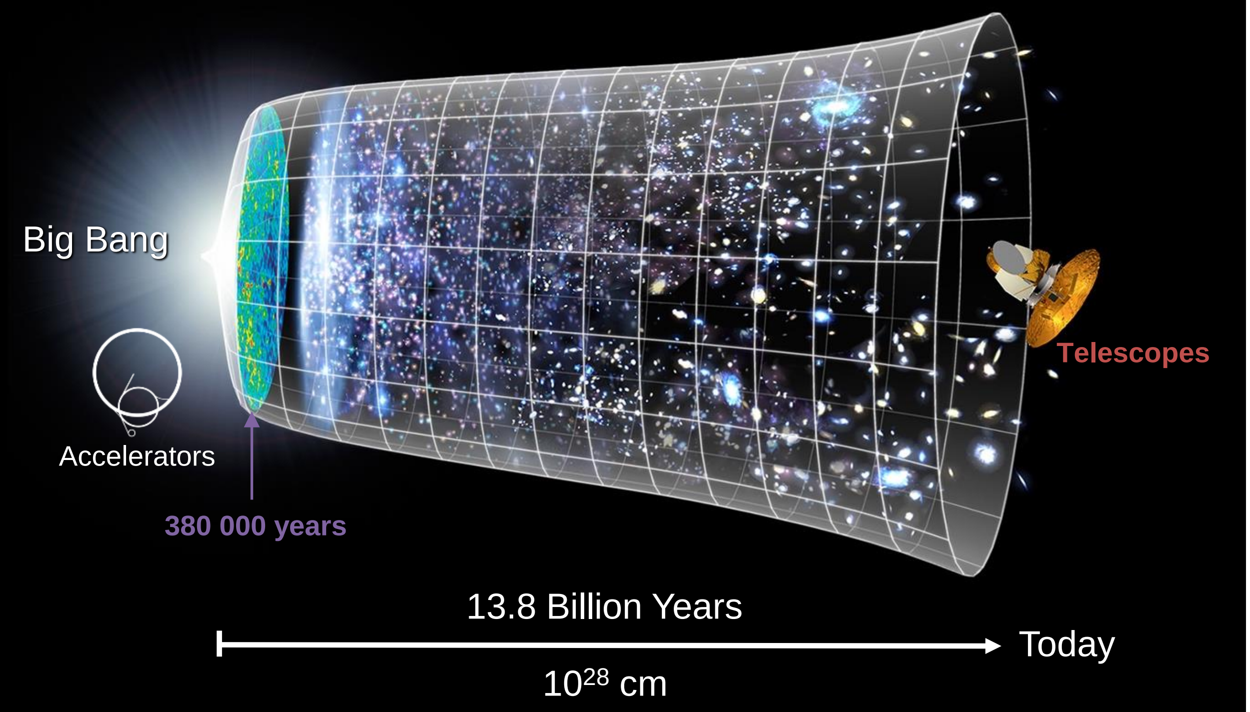
CERN is a peace project, funded in the wake of the second world war.



# RESEARCH

# How did the universe begin?

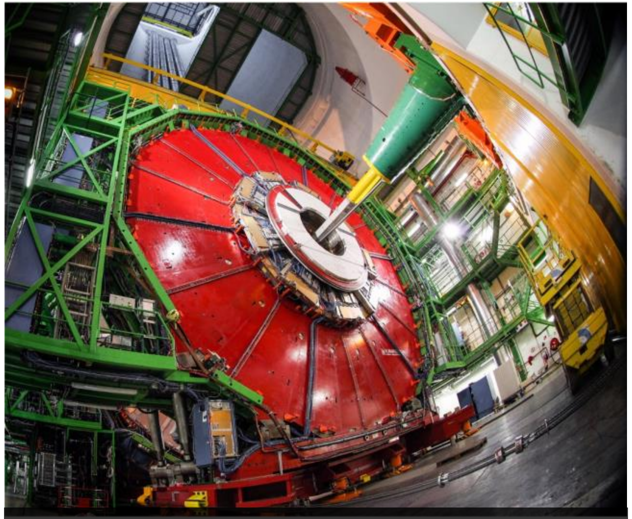
We reproduce the conditions a fraction of a second after the Big Bang, to gain insight into the structure and evolution
of the universe.



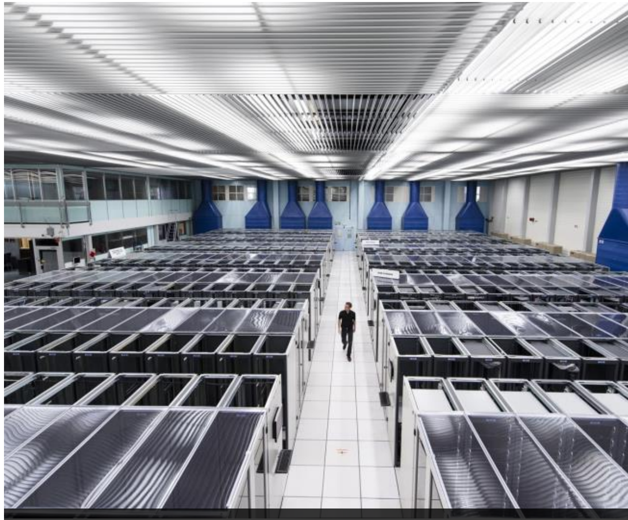
# How do we do it?

- We build the largest machines to study the smallest particles in the universe.
- We prototype! Developing technology to advance the limits of what is possible.

ACCELERATORS



DETECTORS

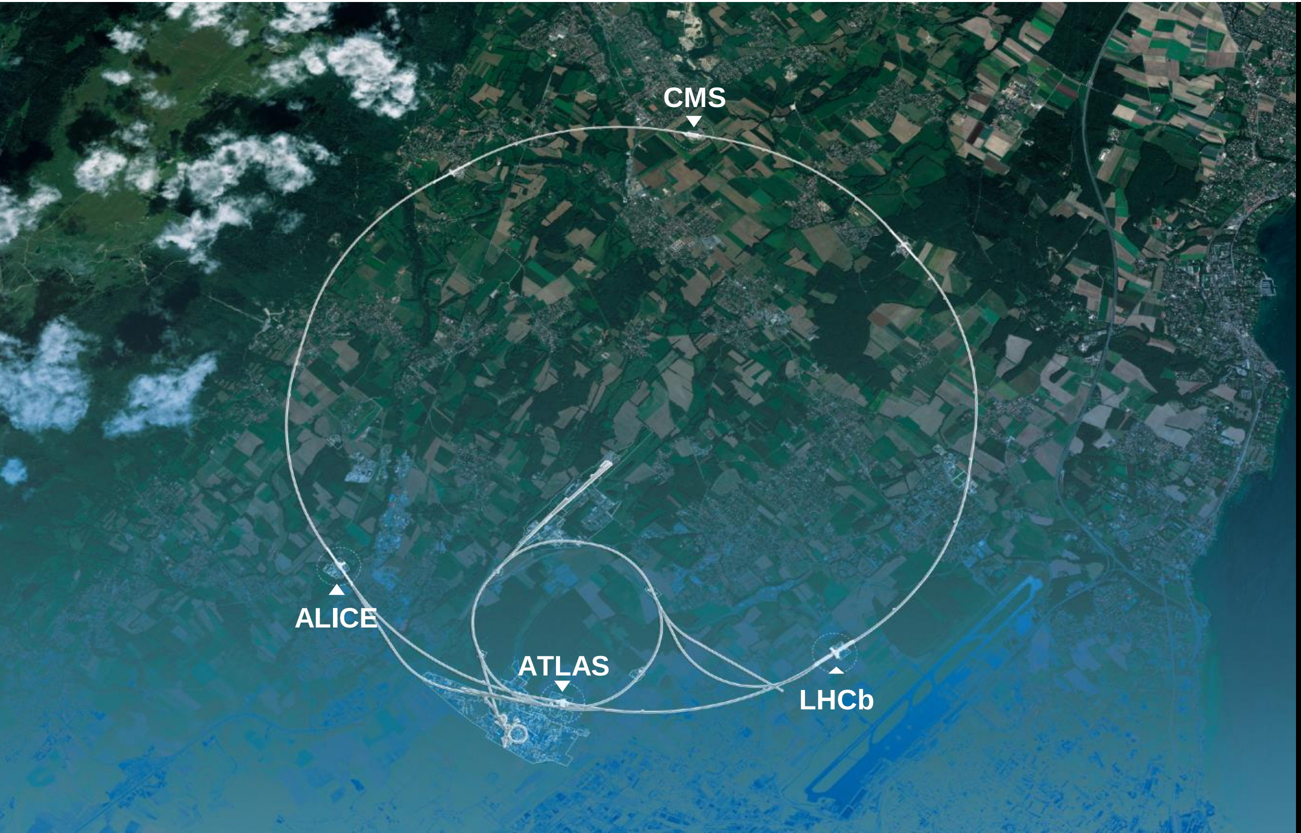


COMPUTING

# Large Hadron Collider (LHC)

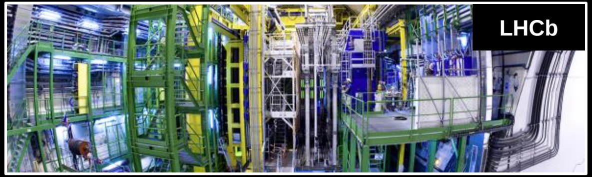
- 27 km in circumference
- About 100 m underground
- Superconducting magnets steer the particles around the ring
- Particles are accelerated to close to the speed of light

# Giant detectors record the particles formed at the four collision points



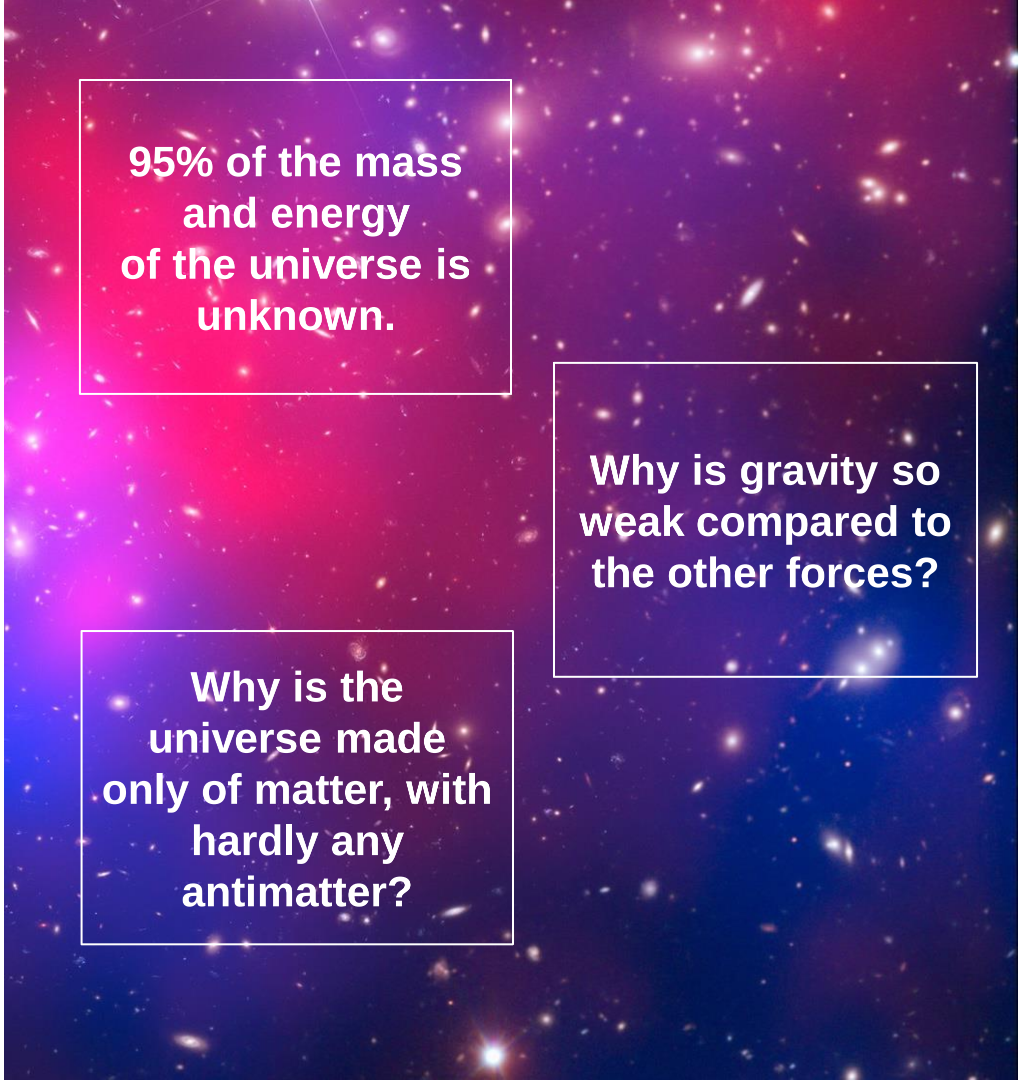






# Are we done?
# Not quite…

There are many unanswered questions in fundamental physics



# COLLABORATION

# A laboratory for people around the world

Geographical & cultural diversity
Users of **110 nationalities**
**~ 23% women**

## Member States 6632

**Austria** 82 – **Belgium** 122 – **Bulgaria** 37 – **Czech Republic** 221
**Denmark** 35 – **Finland** 79 – **France** 794 – **Germany** 1185
**Greece** 138 – **Hungary** 67 – **Israel** 63 – **Italy** 1388
**Netherlands** 166 – **Norway** 78 – **Poland** 272 – **Portugal** 80
**Romania** 99 – **Serbia** 35 – **Slovakia** 66 – **Spain** 325
**Sweden** 96 – **Switzerland** 329 – **United Kingdom** 875

## Associate Member States **27**
## in the pre-stage to membership

**Cyprus** 11 – **Slovenia** 16

## Associate Member States **390**

**Croatia** 38 – **India** 151 – **Lithuania** 13 – **Pakistan** 35
**Turkey** 124 – **Ukraine** 29

## Observers **2050**

**Japan** 211 – **United States of America** 1839

## Other countries **1279**

**Algeria** 2 – **Argentina** 15 – **Armenia** 10 – **Australia** 23 – **Azerbaijan** 2 – **Bahrain** 2 – **Belarus** 26 – **Brazil** 108 **Canada** 196 – **Chile** 22 –
**Colombia** 15 – **Cuba** 3 – **Ecuador** 4 – **Egypt** 14 – **Estonia** 26 – **Georgia** 35
**Hong Kong** 20 – **Iceland** 3 – **Indonesia** 7 – **Iran** 13 – **Ireland** 6 **Kuwait** 2 – **Latvia** 6 – **Lebanon** 17
**Malaysia** 4 – **Malta** 3 – **Mexico** 49 – **Montenegro** 5 – **Morocco** 18 – **New Zealand** 11 – **Oman** 1
**People's Republic of China** 334 – **Peru** 2 – **Puerto Rico** 2 – **Republic of Korea** 132 – **Singapore** 3
**South Africa** 57 – **Sri Lanka** 8 – **Taiwan** 50 **Thailand** 16 – **United Arab Emirates** 2

# Charged-particle multiplicities in $pp$ interactions at $\sqrt{s} = 900$ GeV measured with the ATLAS detector at the LHC ☆,☆☆

ATLAS Collaboration

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ABSTRACT

The first measurements from proton–proton collisions recorded with the ATLAS detector at the
are presented. Data were collected in December 2009 using a minimum-bias trigger during colli
at a centre-of-mass energy of 900 GeV. The charged-particle multiplicity, its dependence on trans
momentum and pseudorapidity, and the relationship between mean transverse momentum and cha
particle multiplicity are measured for events with at least one charged particle in the kinematic
$|\eta| < 2.5$ and $p_T > 500$ MeV. The measurements are compared to Monte Carlo models of proton–p
collisions and to results from other experiments at the same centre-of-mass energy. The charged-pa
multiplicity per event and unit of pseudorapidity at $\eta = 0$ is measured to be $1.333 \pm 0.003$(sta
0.040(syst.), which is 5–15% higher than the Monte Carlo models predict.



## 1. Introduction

Inclusive charged-particle distributions have been measured in $pp$ and $p\bar{p}$ collisions at a range of different centre-
13]. Many of these measurements have been used to constrain phenomenological models of soft-hadronic interac
properties at higher centre-of-mass energies. Most of the previous charged-particle multiplicity measurements were
data with a double-arm coincidence trigger, thus removing large fractions of diffractive events. The data were then
remove the remaining single-diffractive component. This selection is referred to as non-single-diffractive (NSD). In so
as inelastic non-diffractive, the residual double-diffractive component was also subtracted. The selection of NSD or ine
charged-particle spectra involves model-dependent corrections for the diffractive components and for effects of the
events with no charged particles within the acceptance of the detector. The measurement presented in this Letter in
strategy, which uses a single-arm trigger overlapping with the acceptance of the tracking volume. Results are pr
inelastic distributions, with minimal model-dependence, by requiring one charged particle within the acceptance of t

This Letter reports on a measurement of primary charged particles with a momentum component transverse to
$p_T >$ 500 MeV and in the pseudorapidity range $|\eta| < 2.5$. Primary charged particles are defined as charged particles
$\tau > 0.3 \times 10^{-10}$ s directly produced in $pp$ interactions or from subsequent decays of particles with a shorter lifetime
tracks reconstructed in the ATLAS inner detector were corrected to obtain the particle-level distributions:

$$\frac{1}{N_{ev}} \cdot \frac{dN_{ch}}{d\eta}, \quad \frac{1}{N_{ev}} \cdot \frac{1}{2\pi p_T} \cdot \frac{d^2 N_{ch}}{d\eta \, dp_T}, \quad \frac{1}{N_{ev}} \cdot \frac{dN_{ev}}{dn_{ch}} \quad \text{and} \quad \langle p_T \rangle \text{ vs. } n_{ch},$$

where $N_{ev}$ is the number of events with at least one charged particle inside the selected kinematic range, $N_{ch}$ is
charged particles, $n_{ch}$ is the number of charged particles in an event and $\langle p_T \rangle$ is the average $p_T$ for a given number

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P.F. Giraud [29], P. Girtler [62], D. Giugni [89a], P. Giu



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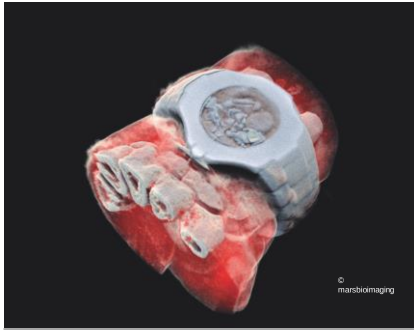
# TECHNOLOGY & INNOVATION


CERN
World Wide Web Initiative
About the Laboratory
EIZO

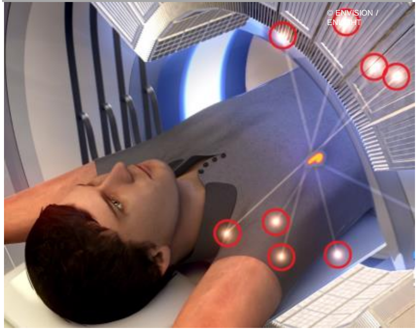
# CERN’s technological innovations have important applications in medicine and healthcare


Technologies applied at CERN are also used in PET, for medical imaging and diagnostics.




CERN produces innovative radioisotopes for nuclear medicine research.

Accelerator technologies are applied in cancer radiotherapy with protons, ions and electrons.




Pixel detector technologies are used for high resolution 3D colour X-ray imaging.

# EDUCATION
# & TRAINING

# CERN trains the next generation of physicists, engineers and technicians

PhD students, Technical Students in applied physics, engineering and computing, administrative students, fellows, undergraduate students in summer programmes, KT run student programmes, and IdeaSquare!

# CERN Science Gateway

- CERN’s new education and outreach centre for all publics aged 5-plus.
- Opening fall 2023
- Immersive exhibitions, education labs, events and shows.

IdeaSquare
The innovation space at CERN

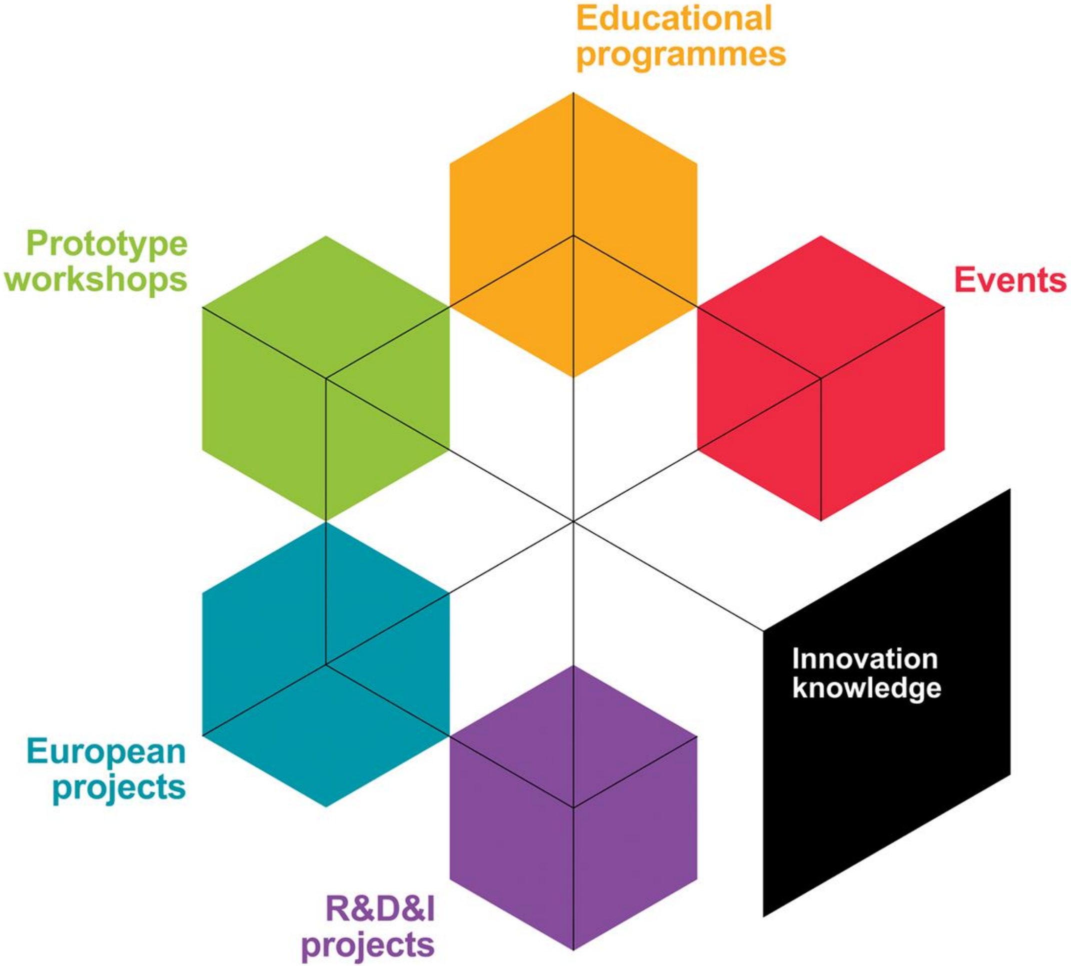
# IdeaSquare

## The Small Human Collider

# IdeaSquare

**The Innovation Space at CERN**

- collaborative methodologies
- access to CERN expertise
- cross-connectivity



European projects

# Linking science innovation and the SDGs

# #ATTRACT

- Provides funding for developing early-stage ideas and prototypes on detection and imaging
- Focuses on innovation with high potential outside research
- Engages with MSc-level, cross-disciplinary student activities, seeking for unforeseen entrepreneurial opportunities for the young
- Purpose is to create a new innovation ecosystem in Europe
- ATTRACT is coordinated by CERN (IdeaSquare)

Events

CERN Ideas

# Connecting curious minds

# Events, workshops and hackatons


When the building is not in full use, Ideasquare can offer access to its open work areas, rapid prototyping facilities and its meeting rooms for short, deadline driven Challenge Events, such as :

- Innovation Events,
- Workshops
- Hackathons ( an event compressed into a short number of days where participants work towards a concept prototype).

IdeaSquare Open Doors event 2018

Prototype workshops

CERN Ideas

# Fast forward through prototyping

# Our Prototyping Facilities

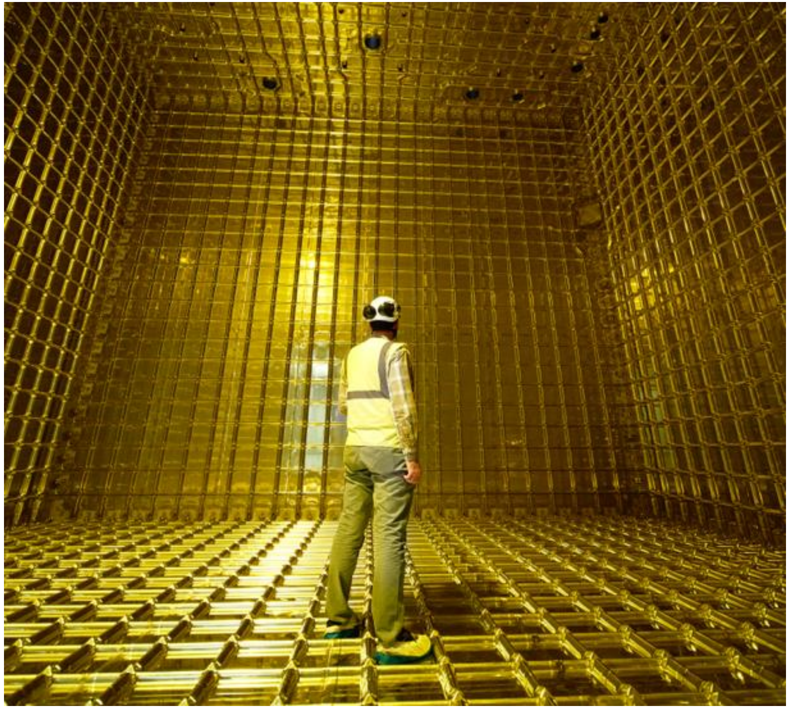
- An open space for ideation
- An electro shop
- A machine shop with a laser cutter
- 3D printing equipment

CMS Create

R&D&I
projects

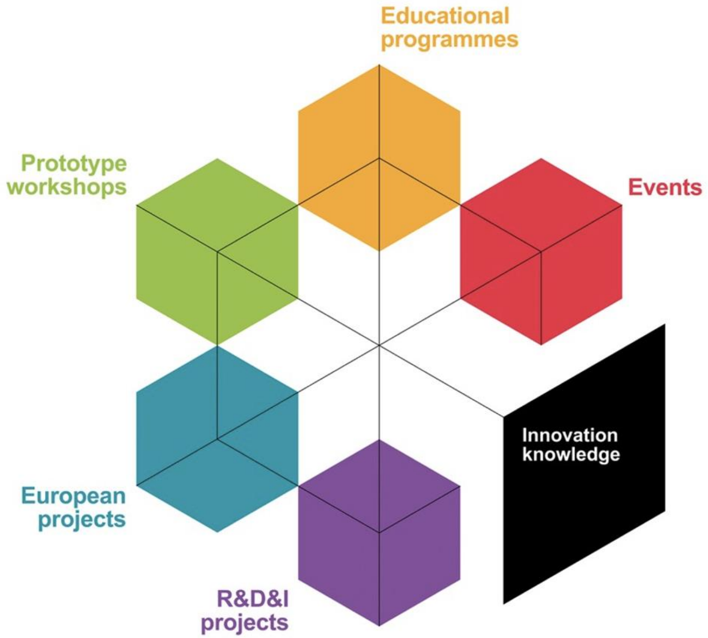
# Stimulating instrumentation in research

# Neutrino Platform



- Neutrino Platform (CENF) fosters fundamental research in the field of Neutrino Accelerator Physics
- CENF supports generic detector, neutrino beams R&D and large detector prototypes or demonstrators. It gives  technical, financial and logistics support to approved projects
- Currently includes seven projects, including significant involvement in (Proto) Dune
- CERN & IdeaSquare provides a facility for R&D on future technologies (HW and SW) and partner in several neutrino research programs

# Innovation Knowledge




- IdeaSquare is uniquely positioned to collect knowledge on innovation practices.
- To collect and share this knowledge, we established CIJ – an open journal for experimental innovation.
- Additionally, our blogs and videos from the innovation café aim to harvest the success (or experimentations) stories of those at CERN that use our space or collaborate with us in any of our activities.

Educational programmes

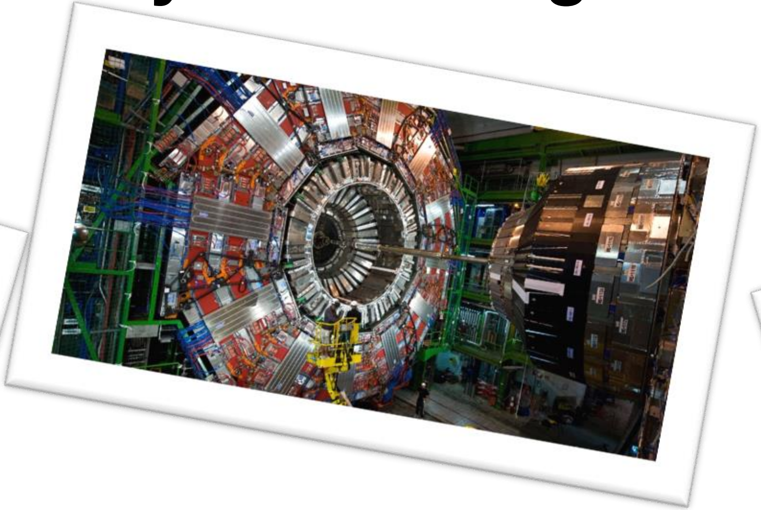
# Training and experimenting with the innovators of the future

# Educational programmes

- Ranging from two weeks to eight months in duration;
- Mostly with multidisciplinary teams;
- In collaboration with universities around the world;
- One proprietary course / methodology: Design the Future
- Incorporating sustainable development goals;
- Different outputs from conceptual videos to functioning prototypes, but with the same learning outcomes…

Students prototype to TEDxCERN installation

# IdeaSquare way of working



Business as usual is not in our DNA…

A place where people have the licence to dream!

# Why?

**We believe that for fundamental change to be made, we need more than traditional innovation methods and mindsets.**

**What we are here to do is to help you imagine a future worth fighting for, and to give you the tools and confidence to start building that future.**

**Contact us!**
#CERNIdeaSquare
ideasquare.cern

CERN
Ideas