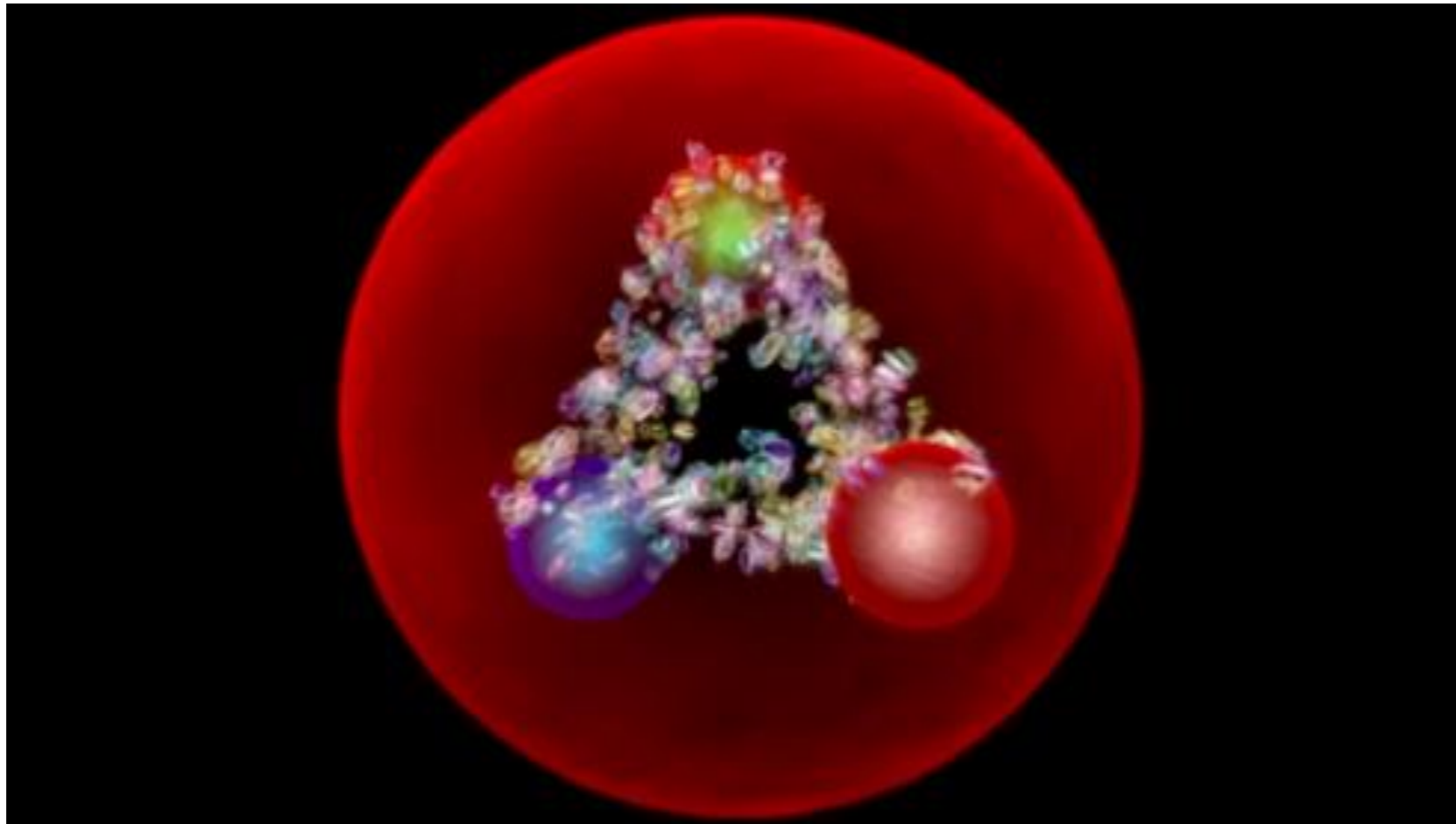




CERN - Education Resources



Rolf Landua

CERN

Head of Education and Public Outreach

Animations and Posters

<http://cern60.web.cern.ch/en/cern-exhibitions-content>

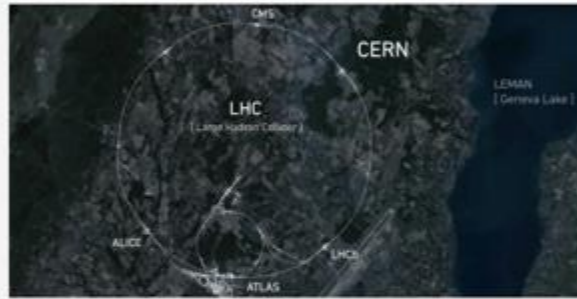
Build your own exhibition

Pick your favourite animations

Build your own exhibition

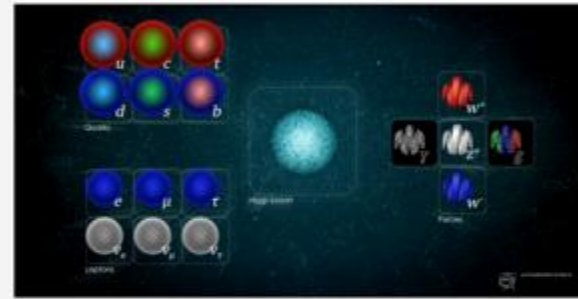
CERN exhibitions content

Overview



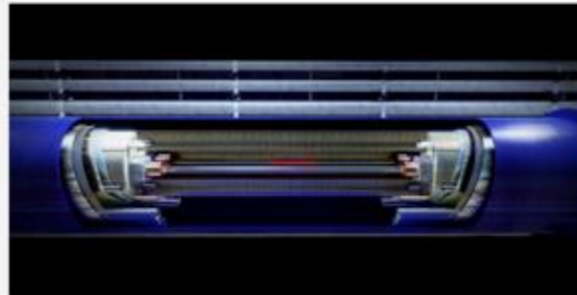
[VIEW CONTENT >](#)

Physics



[VIEW CONTENT >](#)

LHC Accelerators



[VIEW CONTENT >](#)

Experiments



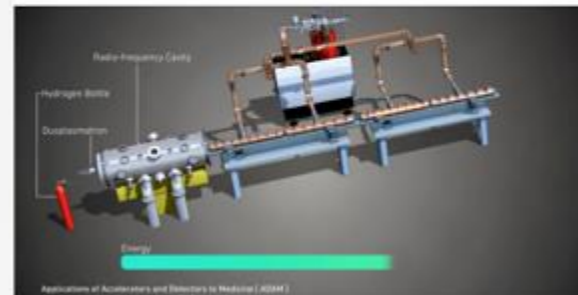
[VIEW CONTENT >](#)

Computing



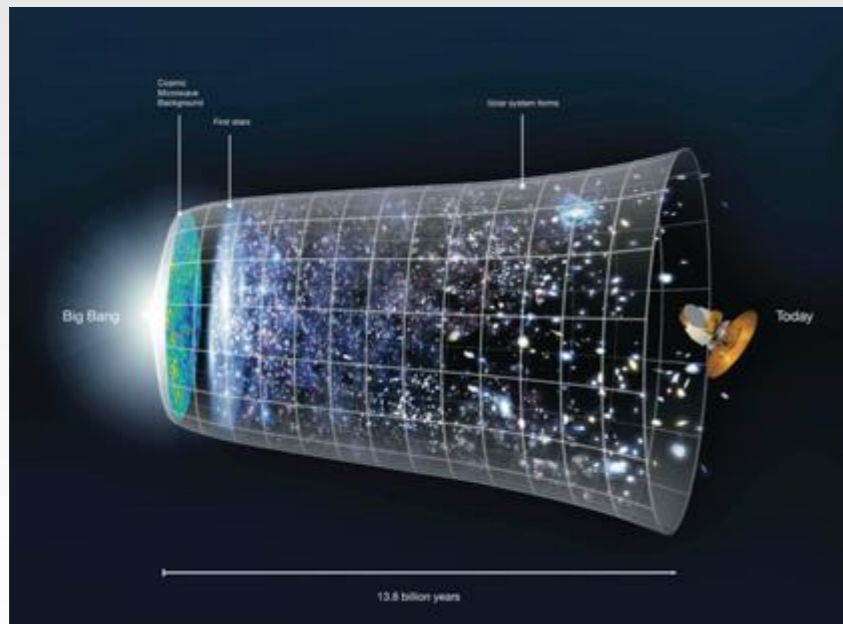
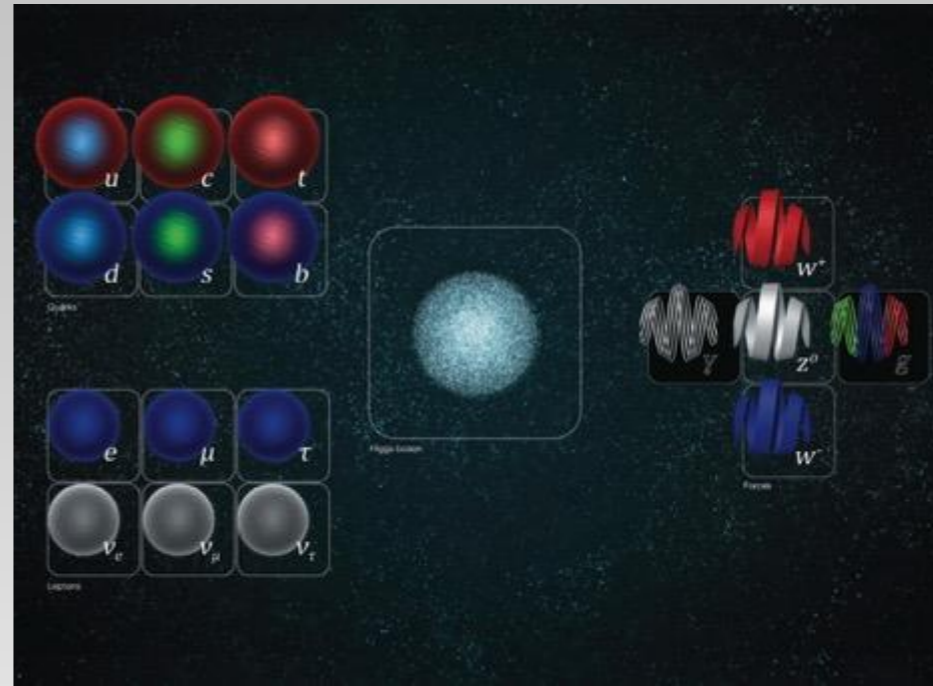
[VIEW CONTENT >](#)

Knowledge Transfer

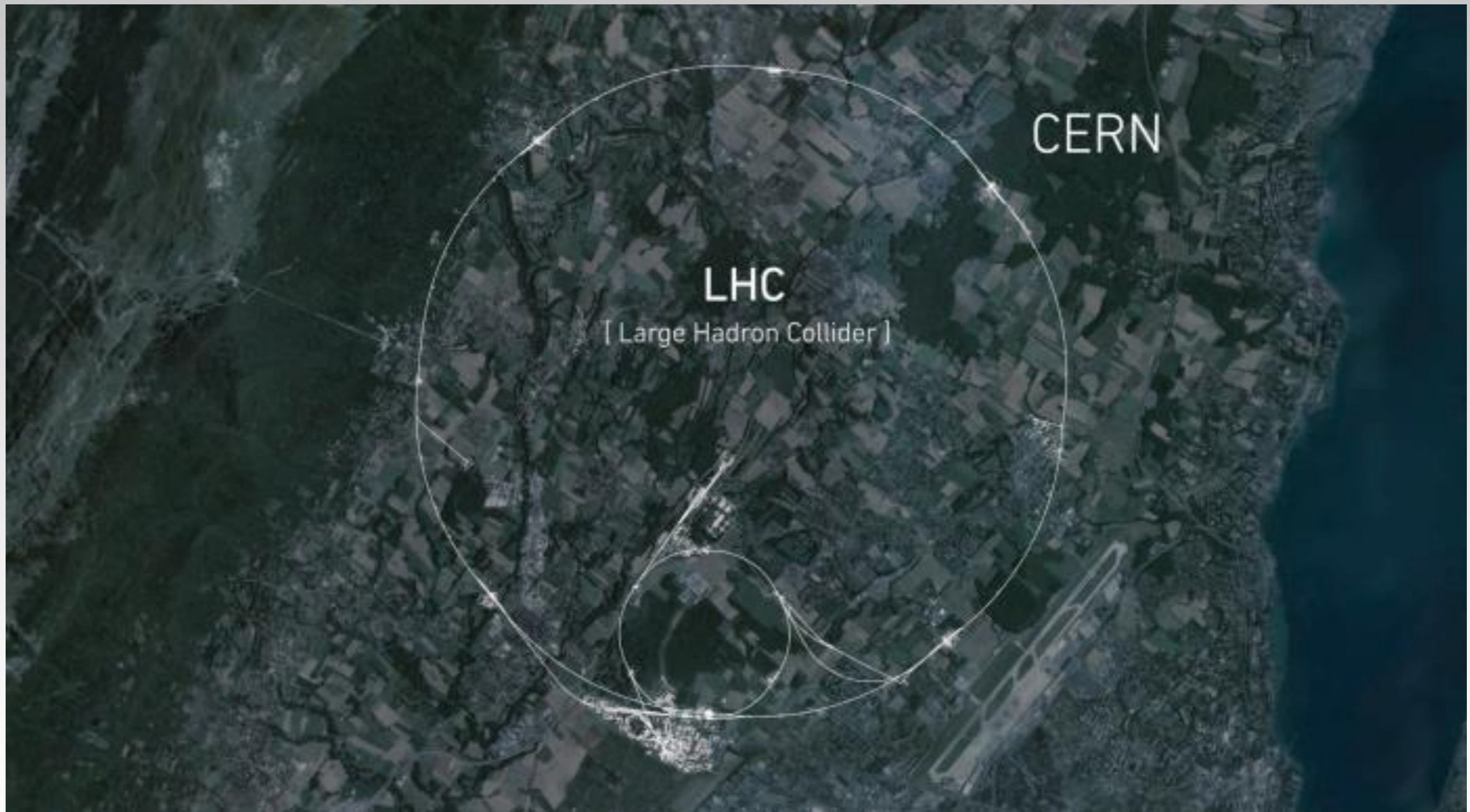


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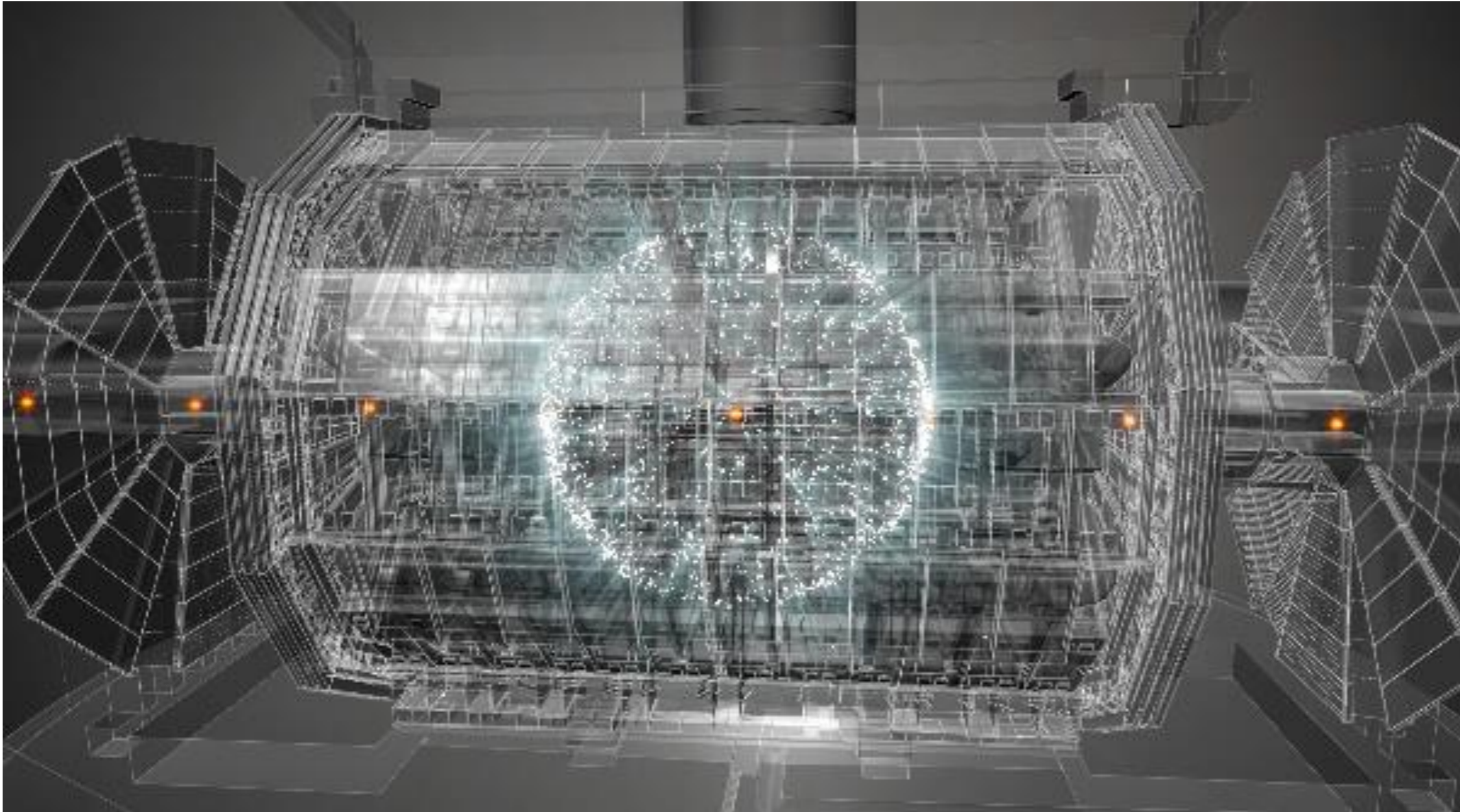
Posters - some examples



CERN accelerator ride - animation



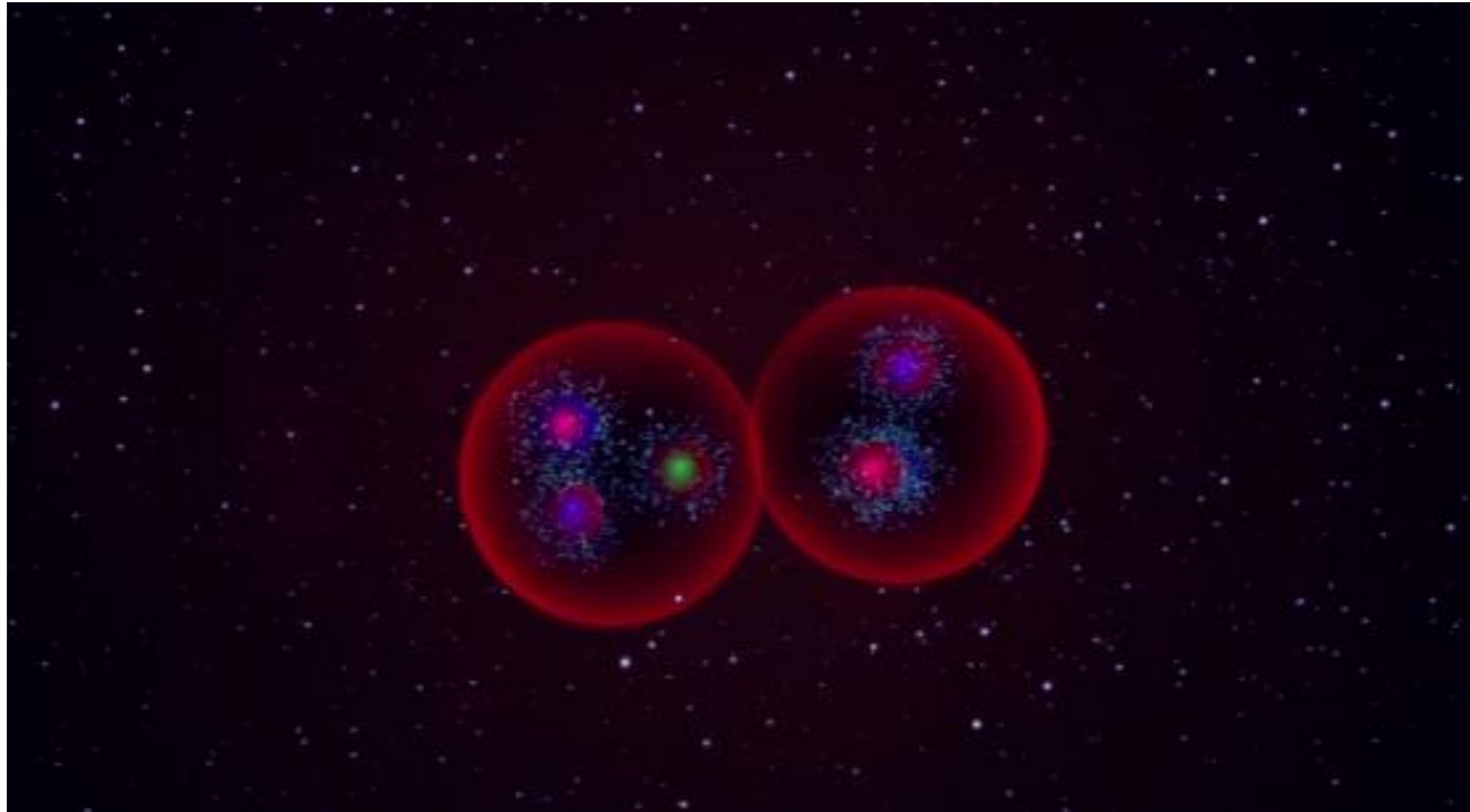
Teaching resources: Animations



Example: LHC and collisions in ATLAS detector

<http://cern60.web.cern.ch/en/cern-exhibitions-content>

Teaching resources: Animations



Example: Higgs boson production and decay

CERN data centre



Many animations about data analysis,
computing, storage, GRID

Synchrocyclotron: early history of CERN

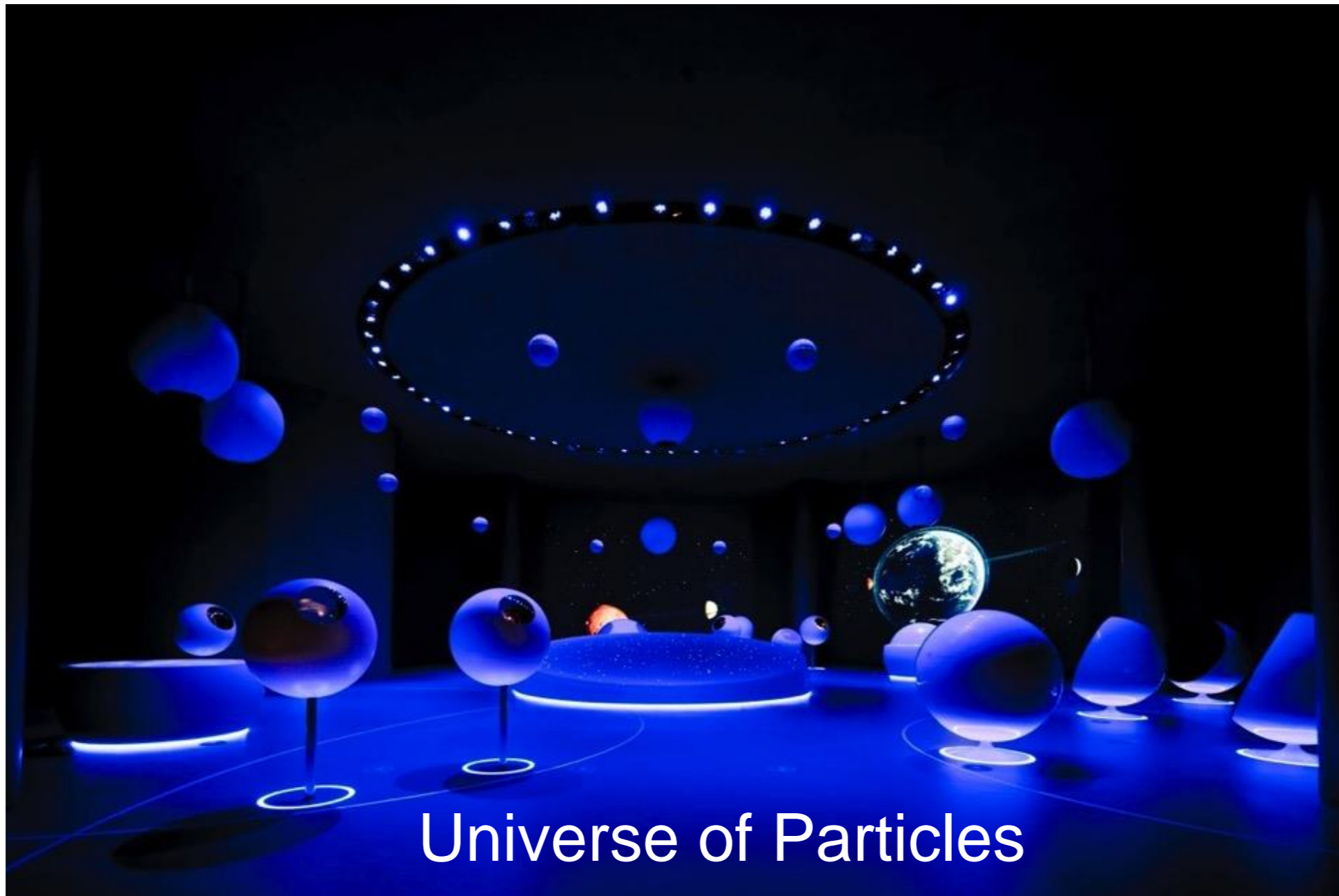


12 minute video and projection mapping on SC about the creation, the early history and the first scientific discoveries of CERN

https://www.youtube.com/watch?feature=player_embedded&v=uw5ze9Svfvo



Permanent exhibition “Universe of Particles”



Interactive • Immersive • Inspiring
65,000 visitors per year (since July 2010)



Interactive LHC tunnel



“Virtual visits” with schools



Video chats

About 100 / year

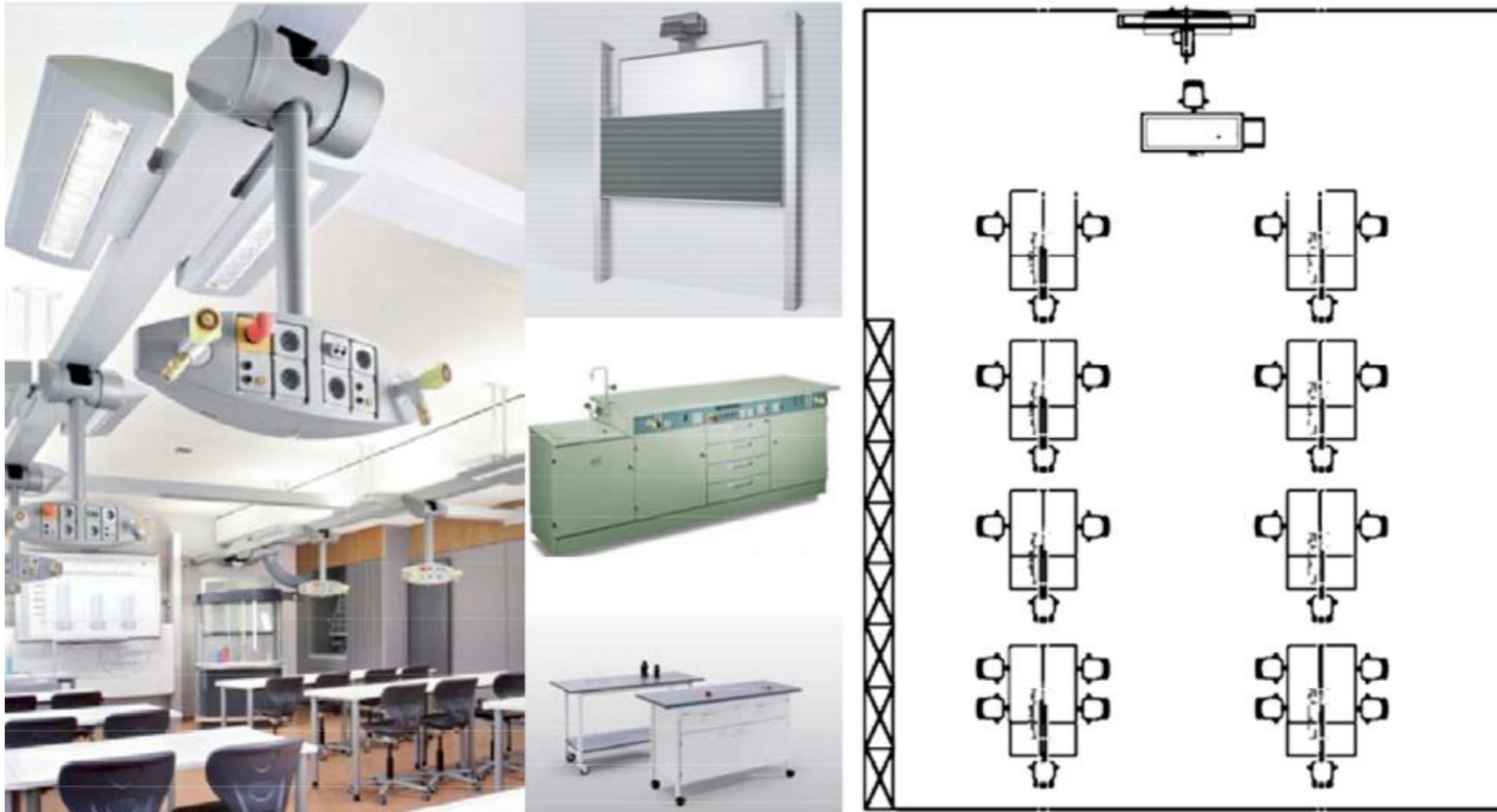
- Professional: Polycom/Tandberg
- Skype, EVO, Google+
- Excellent feedback

Google + ‘hangouts’

From ATLAS, CMS, CCC

- Questions and Answers
- Talking to ‘real’ LHC physicists !

2014: CERN S'cool Lab



Modern physics experiments

Photoelectric effect

Rutherford experiment

Radioactivity

Franck-Hertz

Electron diffraction

Cloud chambers

Pixel detectors (MediPix)

Cosmic ray detectors

X-ray scattering

Superconductivity

high T_c materials

Up to 30 students

Teacher + 2 supervisors

**Also: remote connection via
videoconference !**

Teaching Resources for the class room



Lesson plans

- Antimatter
- Cosmic Rays
- Dark matter
- more to come

Posters

- Cosmic evolution
- Standard Model
- Collisions, aerial views



Cosmic Evolution (17 posters)

What is the Universe made of? How did it all begin? / L'Univers... Pourquoi? Comment?

This poster features a central image of Earth and Mars against a starry background. Text on the left asks 'What is the Universe made of? How did it all begin?' and provides a brief overview of the universe's composition and the challenges of studying it. Text on the right asks 'L'Univers... Pourquoi? Comment?' and discusses the beginning of the universe.

telescopes - télescopes accelerators - accélérateurs

Join us for a journey to the beginning of time / Une machine à remonter le temps

This poster shows a horizontal timeline starting from 'Today' on the left and moving towards 'BIG BANG' on the right. It includes various icons representing different stages of cosmic evolution. The CERN logo is prominently displayed at the bottom right.

Life on Earth / De la matière à la vie

This poster illustrates the timeline of life on Earth. It features a large image of Earth with various organisms and a human figure. Text on the left asks 'Life on Earth / De la matière à la vie' and provides details about the emergence of life. Text on the right asks 'L'Univers... Pourquoi? Comment?' and discusses the beginning of the universe.

A star is born / Une étoile est née

This poster depicts the formation of a star and its surrounding planets. It features a large orange star and several planets of different sizes and colors. Text on the left asks 'A star is born / Une étoile est née' and provides details about the process of star formation.

We are stardust / Poussière d'étoile

This poster shows a nebula and a star. Text on the left asks 'We are stardust / Poussière d'étoile' and provides details about the composition of the universe. Text on the right asks 'L'Univers... Pourquoi? Comment?' and discusses the beginning of the universe.

The Universe ignites / L'Univers s'embrase

This poster shows a starburst and galaxies. Text on the left asks 'The Universe ignites / L'Univers s'embrase' and provides details about the formation of the first stars. Text on the right asks 'L'Univers... Pourquoi? Comment?' and discusses the beginning of the universe.



Antimatter - TED education

TED Ed Lessons Worth Sharing Tour Blog Get Involved FAQ About

Lessons Series Community Clubs

Build a lesson around any TED-Ed Original, TED Talk or YouTube video

Create a Lesson

What happened to antimatter? - Rolf Landua

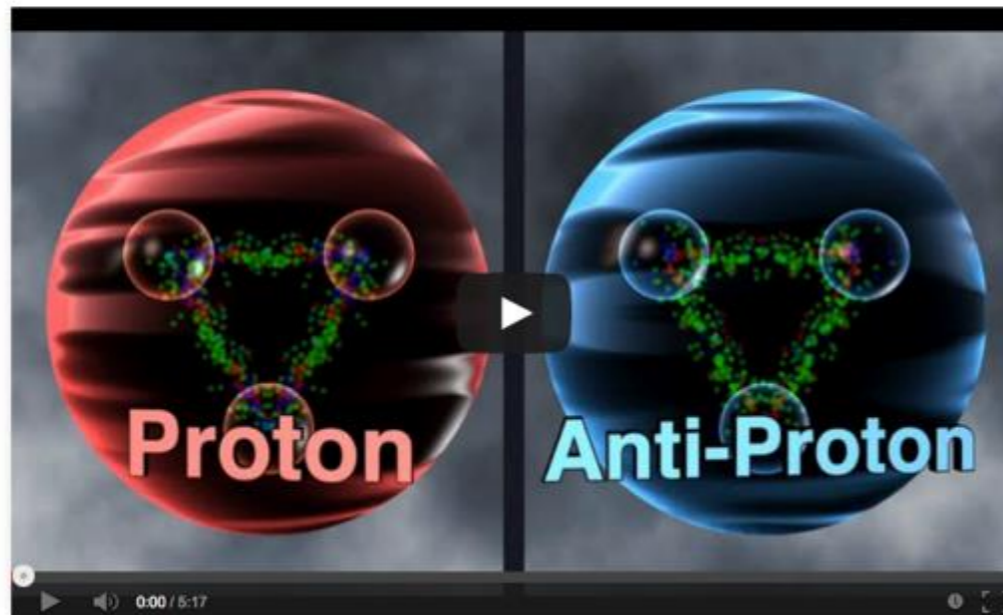


206,171 Views

487 Questions Answered

Let's Begin...

Particles come in pairs, which is why there should be an equal amount of matter and antimatter in the universe. Yet, scientists have not been able to detect any in the visible universe. Where is this missing antimatter? CERN scientist Rolf Landua returns to the seconds after the Big Bang to explain the disparity that allows humans to exist today.



Watch

Think

Dig Deeper

Discuss

Customize This Lesson

38

Create and share a new lesson based on this one.

About TED-Ed Originals

TED-Ed Original lessons feature the words and ideas of educators brought to life by professional animators. Are you an educator or animator interested in creating a TED-Ed original? [Nominate](#)

Meet The Creators



Franz Palomares
Director



Rolf Landua
Educator

Share





CERN on TED education



73,463 Views

Inventions that Shape History

Big Data - Tim Smith

There is a mind-boggling amount of data floating around our society. Physicists at CERN have...



150,104 Views

Before and After Einstein

The basics of the Higgs boson - Dave Barney and Steve Goldfarb

In 2012, scientists at CERN discovered evidence of the Higgs boson. The what? The Higgs boson...



450,843 Views

Out of This World

The beginning of the universe, for beginners - Tom Whyntie

How did the universe begin -- and how is it expanding? CERN physicist Tom Whyntie shows how...

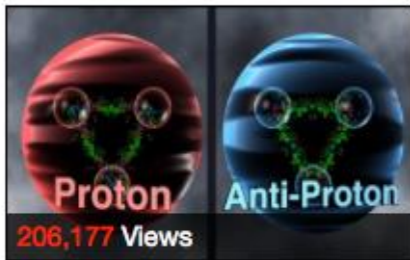


46,417 Views

Before and After Einstein

CERN's supercollider - Brian Cox

"Rock-star physicist" Brian Cox talks about his work on the Large Hadron Collider at CERN....



206,177 Views

Before and After Einstein

What happened to antimatter? - Rolf Landua

Particles come in pairs, which is why there should be an equal amount of matter and antimatter...



275,662 Views

Before and After Einstein

The fundamentals of space-time: Part 2 - Andrew Pontzen and Tom Whyntie

Light always travels at a speed of 299,792,458 meters per second. But if you're in motion...

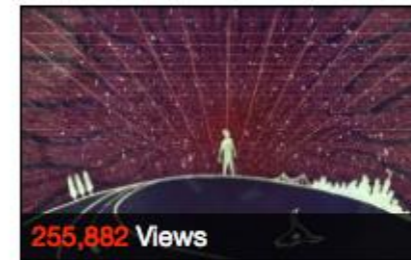


97,447 Views

Before and After Einstein

The fundamentals of space-time: Part 3 - Andrew Pontzen and Tom Whyntie

In the first two lessons of this series on space-time, we've dealt with objects moving at...



255,882 Views

Before and After Einstein

Dark matter: The matter we can't see - James Gillies

The Greeks had a simple and elegant formula for the universe: just earth, fire, wind, and...



166,384 Views

Before and After Einstein

The Higgs Field, explained - Don Lincoln

One of the most significant scientific discoveries of the early 21st century is surely the...



34,137 Views

Before and After Einstein

How cosmic rays help us understand the universe - Veronica Bindi

We only know 4% of what the universe is made up of. Can we also know what lies beyond our...



53,902 Views

Before and After Einstein

If matter falls down, does antimatter fall up? - Chloé Malbrunot

Like positive and negative, or debit and credit, matter and antimatter are equal and opposite. So...



62,691 Views

Out of This World

The history of our world in 18 minutes - David Christian

Backed by stunning illustrations, David Christian narrates a complete history of the universe,...



CERN: Useful teaching resource websites

CERN websites:

Large collection of exhibition posters and 3D animations (about LHC, detectors, computing):

<http://cern60.web.cern.ch/en/cern-exhibitions-content>

CERN animations on the LHC, beam control, acceleration

<https://cds.cern.ch/record/1750716>

Short video clips about CERN (3 minutes), Higgs boson news, and a “CERN teaser”:

http://mini-and-tunnel.web.cern.ch/Mini-and-Tunnel/CERN_New_Mini/Documentation/Film%20New%20Mini/

Collection of brochures and the LHC guide (useful as general overview and introduction):

<http://project-physicsteaching.web.cern.ch/project%2Dphysicsteaching/english/brochures.htm>

Teaching resources at CERN and NASA

(antimatter, cosmics, series of 17 posters on evolution of the Universe)

<http://education.web.cern.ch/education/Chapter2/Teaching/from-the-big-bang-to-lhc.html>

<http://helios.gsfc.nasa.gov/cosmic.html>

TEDED Lessons about particle physics, the Universe and Big Data

<http://ed.ted.com/lessons/the-beginning-of-the-universe-for-beginners-tom-whyntie>

<http://ed.ted.com/lessons/exploration-on-the-big-data-frontier-tim-smith>

<http://ed.ted.com/lessons/dark-matter-the-matter-we-can-t-see-james-gillies>

<http://ed.ted.com/lessons/what-happened-to-antimatter-rolf-landua>

<http://ed.ted.com/lessons/the-basics-of-boson-dave-barney-and-steve-goldfarb>



... and more websites

Teacher resources for the class room

(medical physics to quantum physics, astronomy and space, with lesson plans)

<http://www.iop.org/education/teacher/resources/index.html>

Particle physics - comprehensive teaching website

<http://particleadventure.org/>

Multimedia resources from the world's leading particle physics laboratories

(image bank with best photos from CERN, Fermilab, BNL, SLAC, and other labs)

<http://www.interactions.org/cms/>

Feynman Lectures - online

<http://www.feynmanlectures.info/>

Feynman Science videos

(photons, Feynman diagrams, reflection/transmission, particle interactions)

<http://vega.org.uk/video/subseries/8>

Neutrino physics

(what are neutrinos, how they were discovered, details of neutrino experiments)

<http://wwwlapp.in2p3.fr/neutrinos/aneut.html>

Thank you for your attention