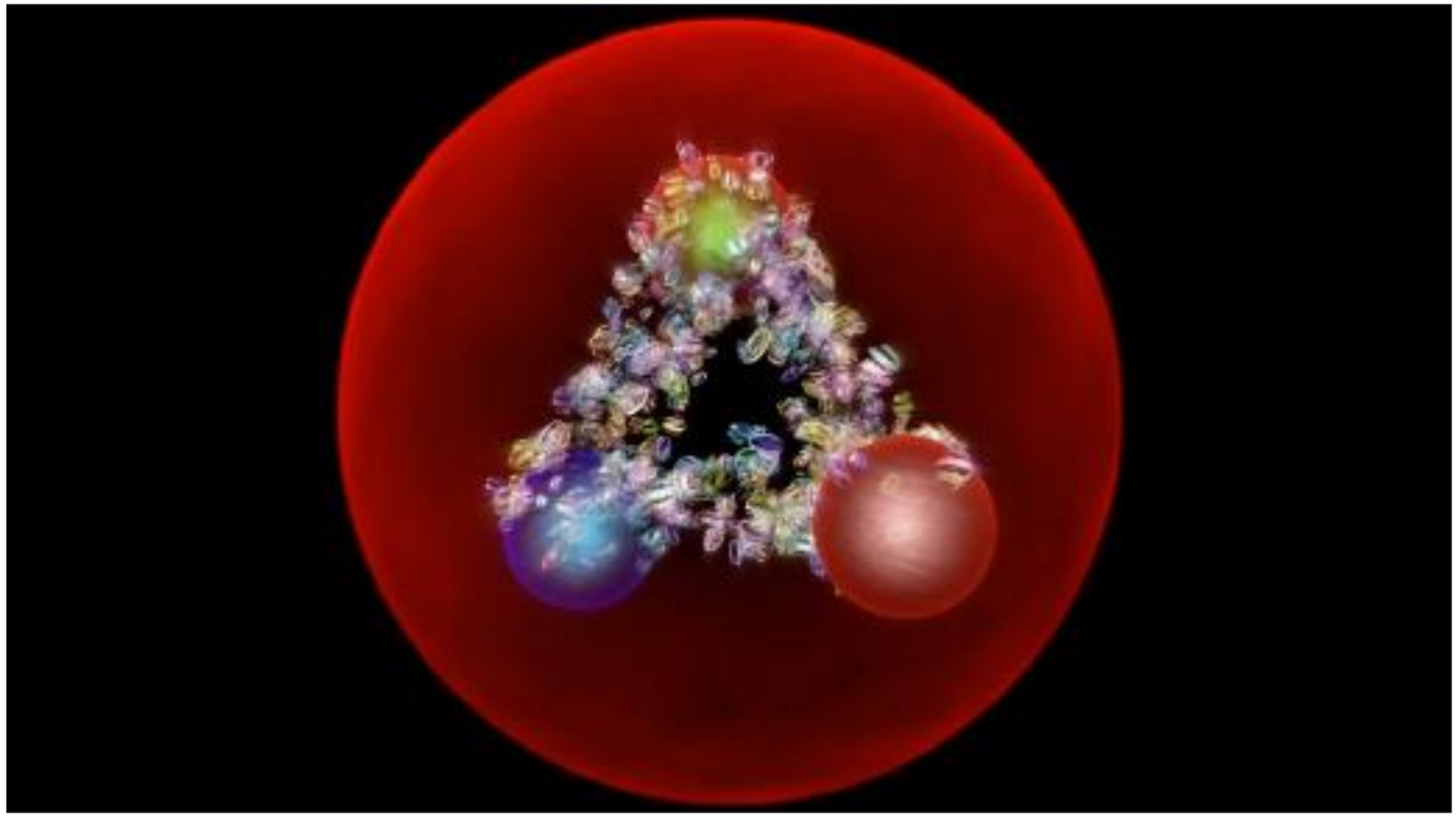
CERN - Education Resources



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

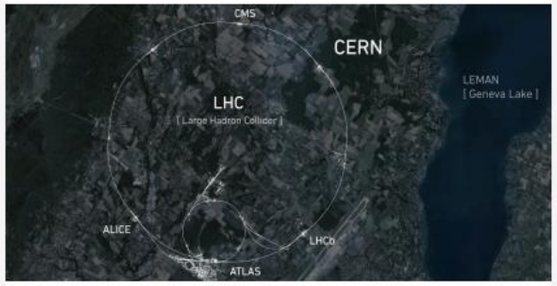
Pick your favourite animations

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

Build your own exhibition

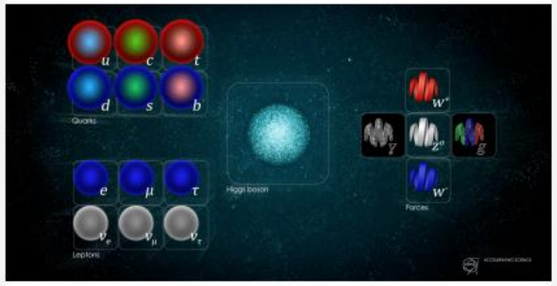
CERN exhibitions content

Overview



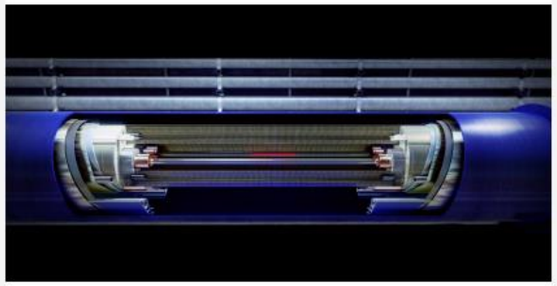
VIEW CONTENT >

Physics



VIEW CONTENT >

LHC Accelerators



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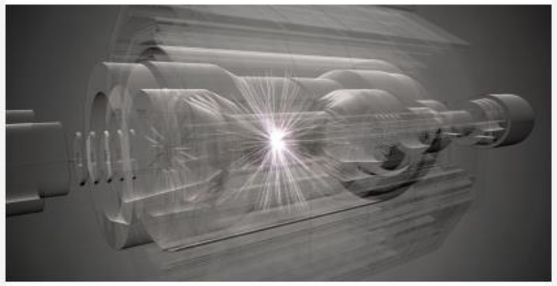
Experiments



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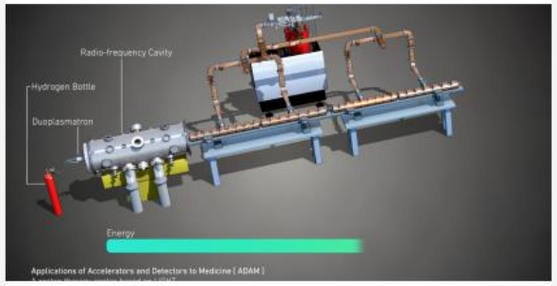
Computing

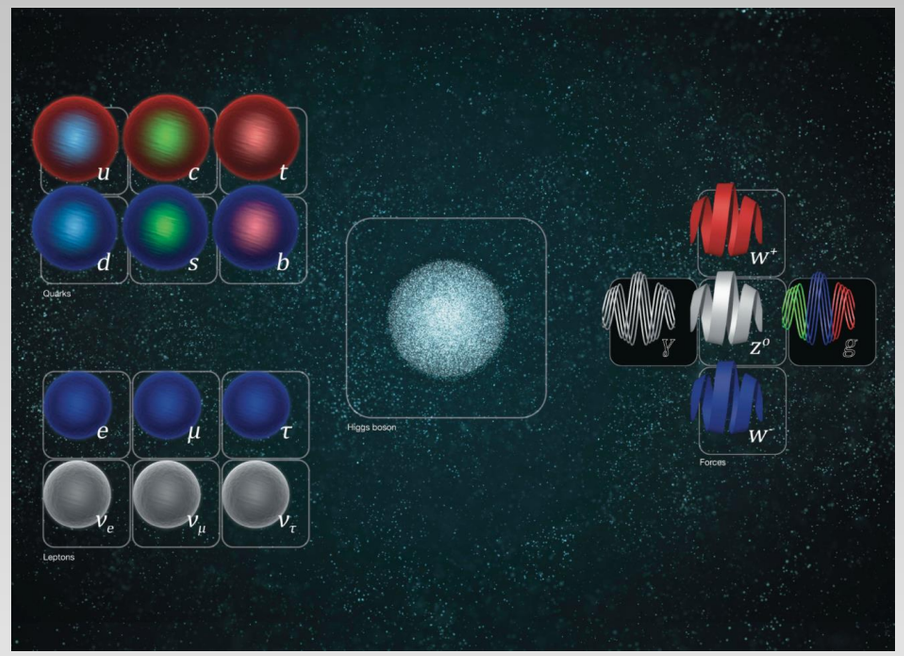
VIEW CONTENT >

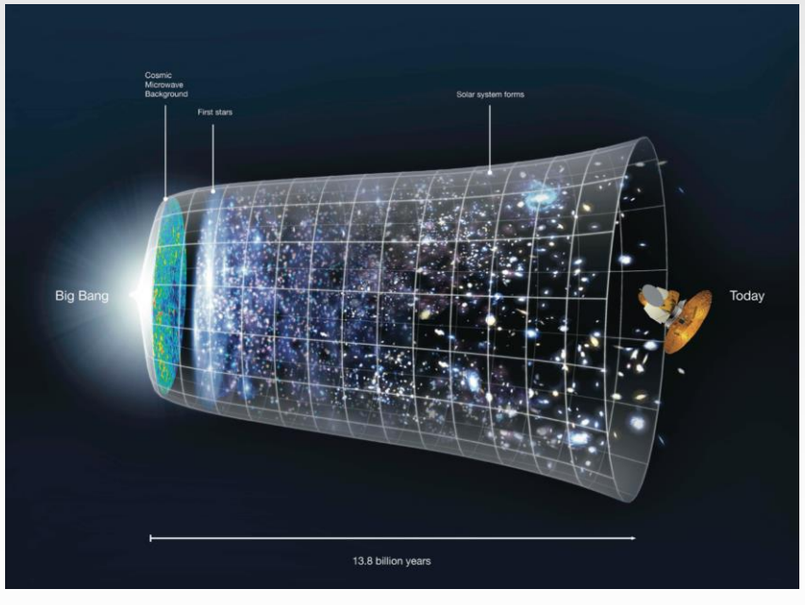
Knowledge Transfer

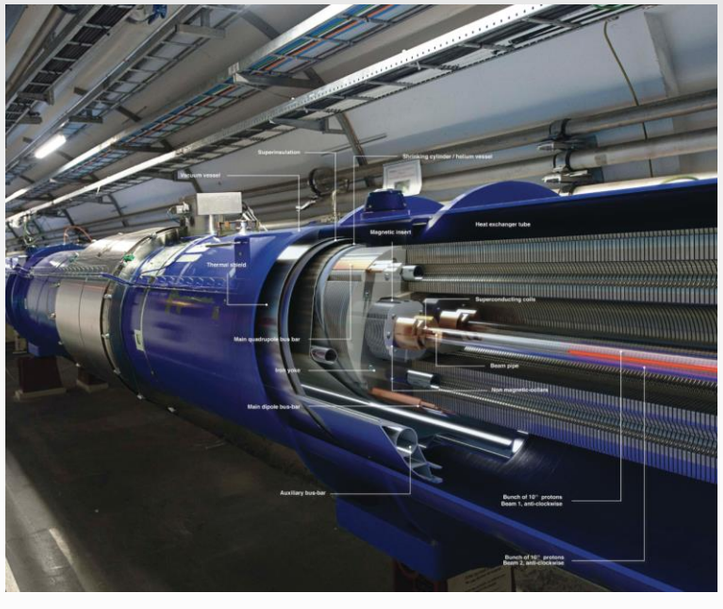


VIEW CONTENT >

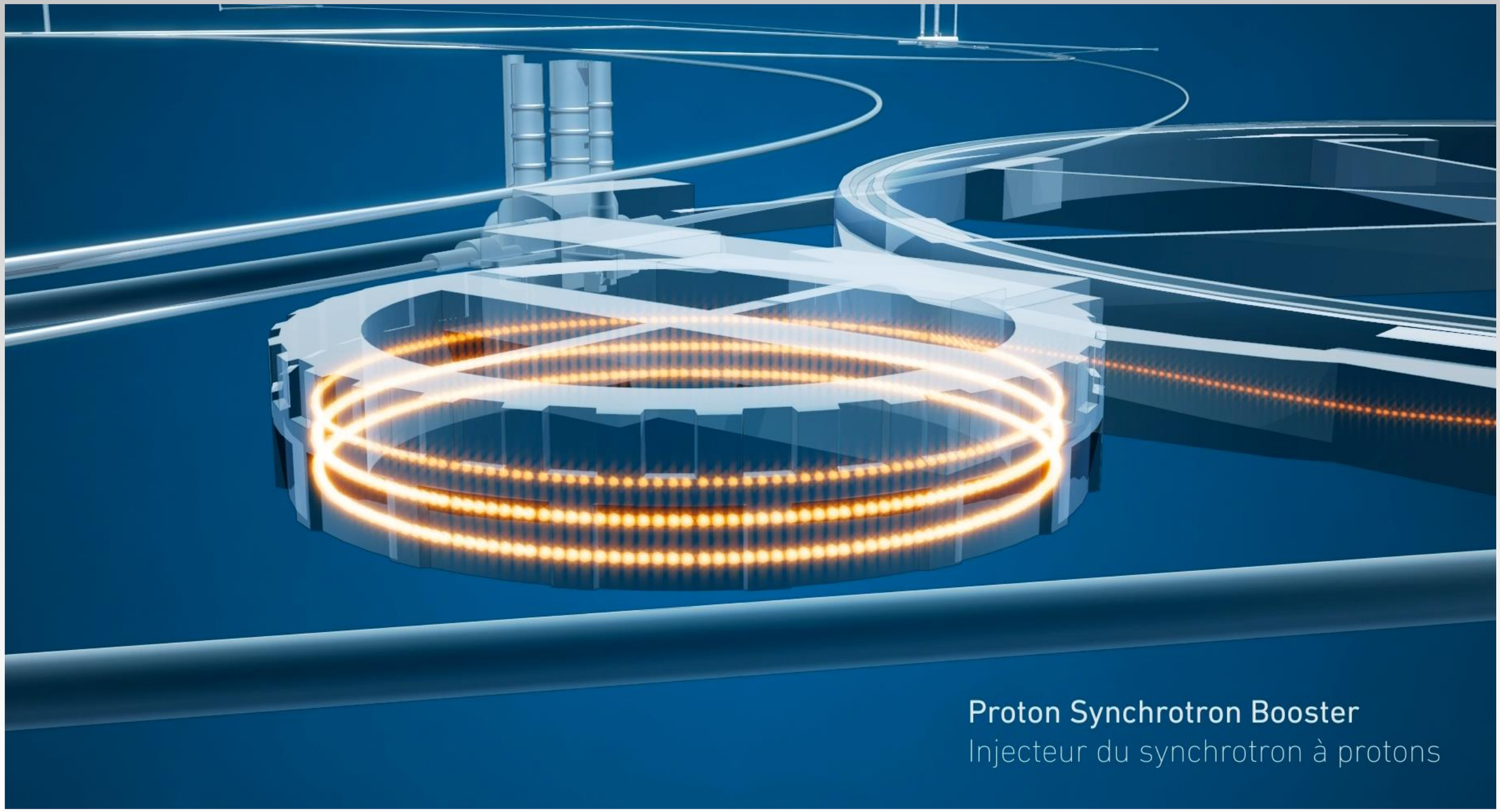
Posters - some examples



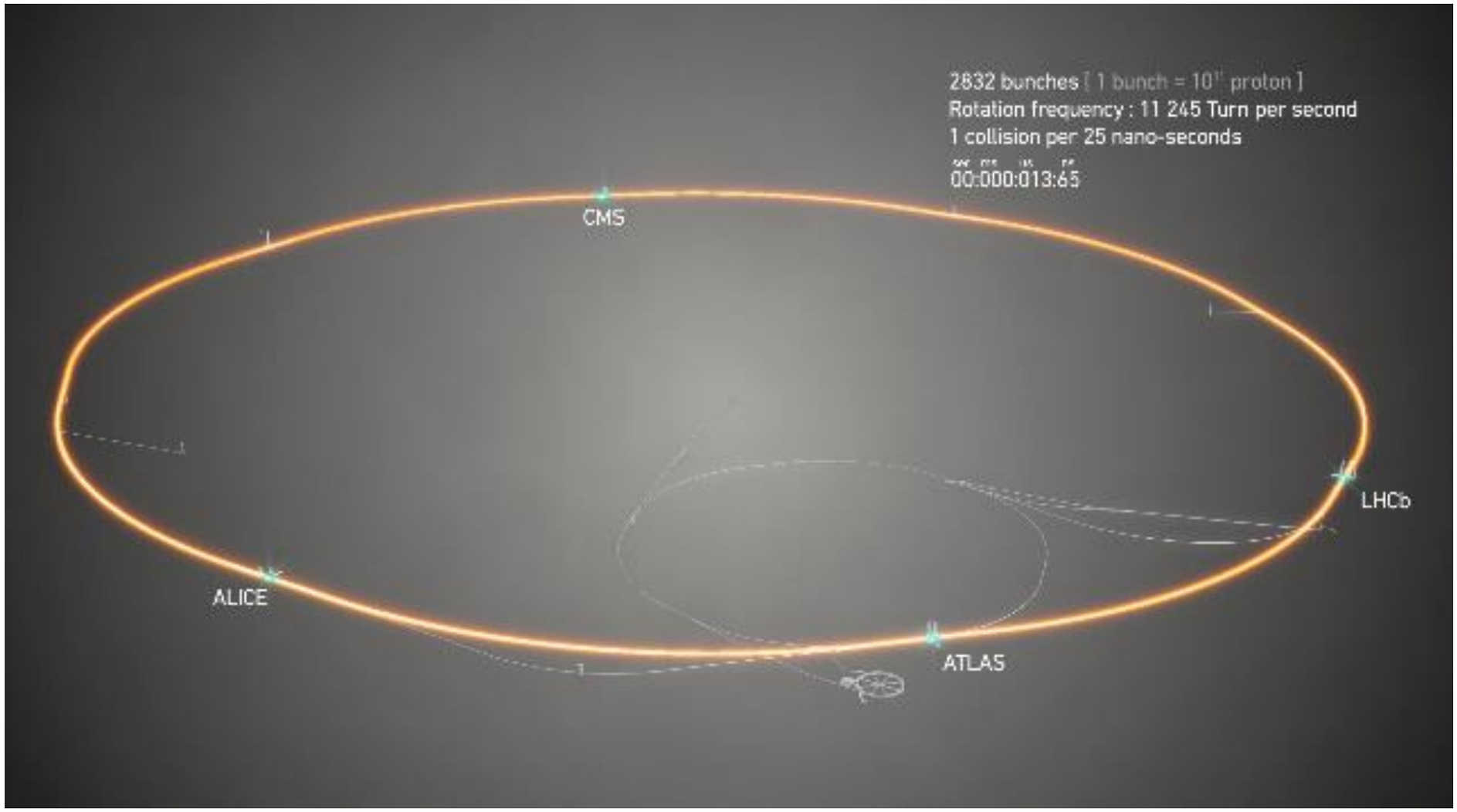




CERN accelerator ride - animation



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

Interactive LHC tunnel

“Virtual visits” with schools

Video chats

About 100 / year

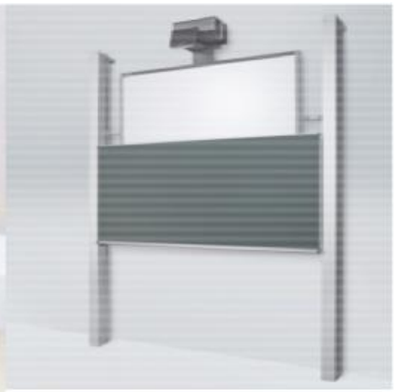
- Professional: Polycom/Tandberg
- Skype, EVO, Google+
- Excellent feedback

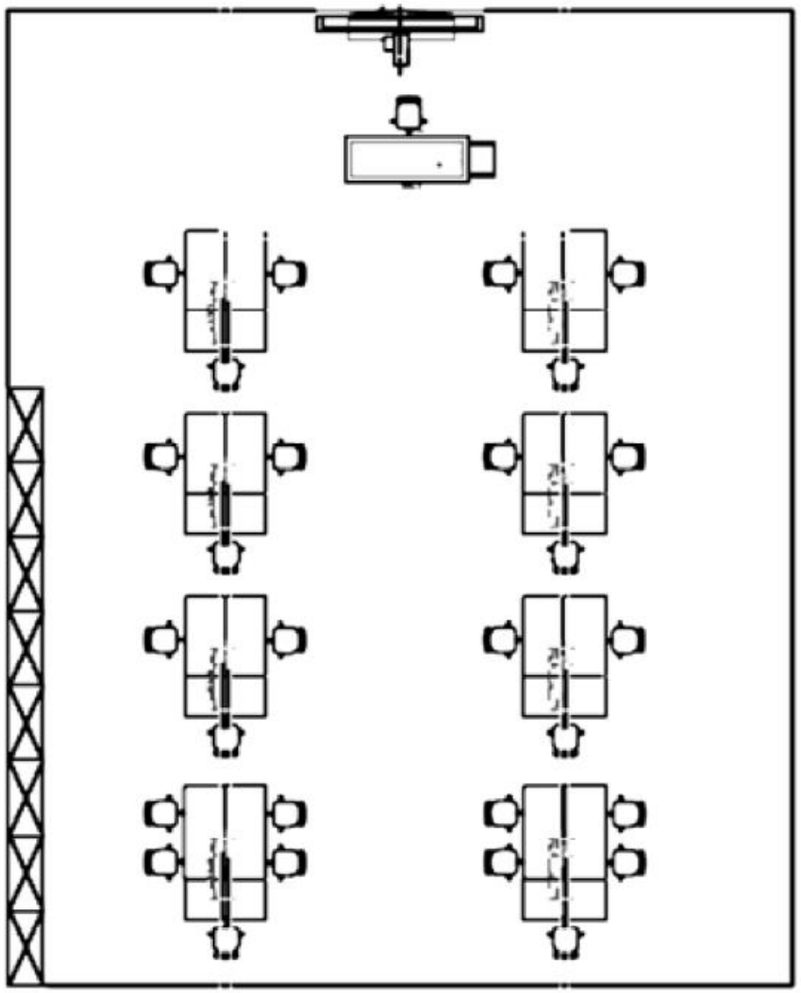
Google + ‘hangouts’

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

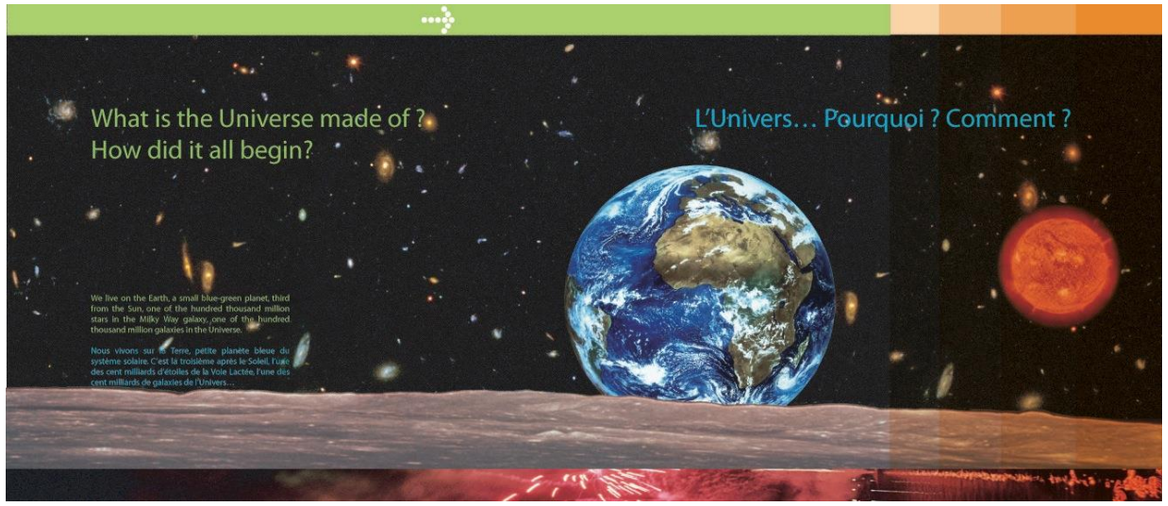
Lesson plans

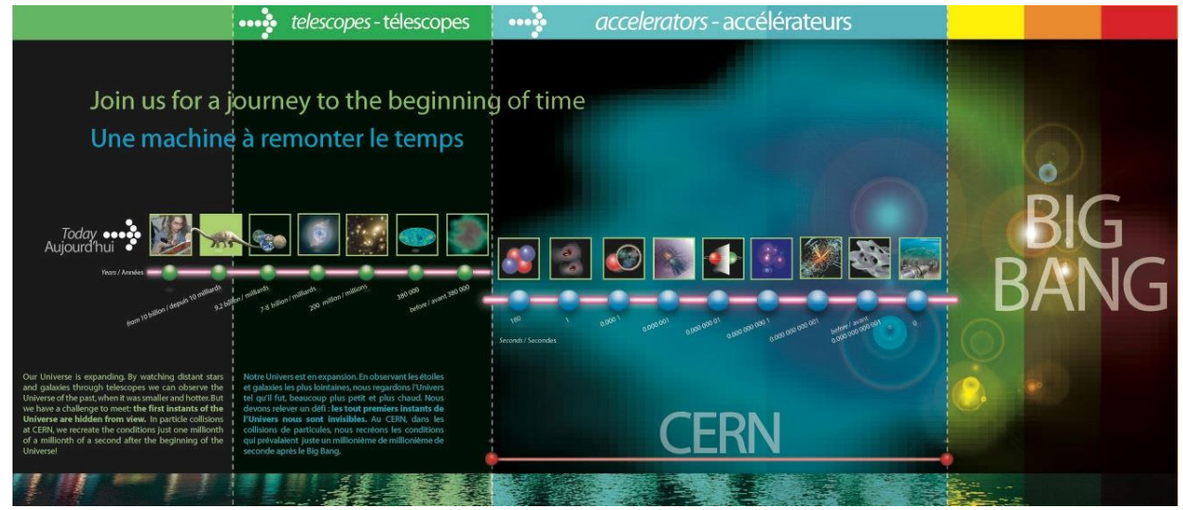
- Antimatter
- Cosmic Rays
- Dark matter
- more to come

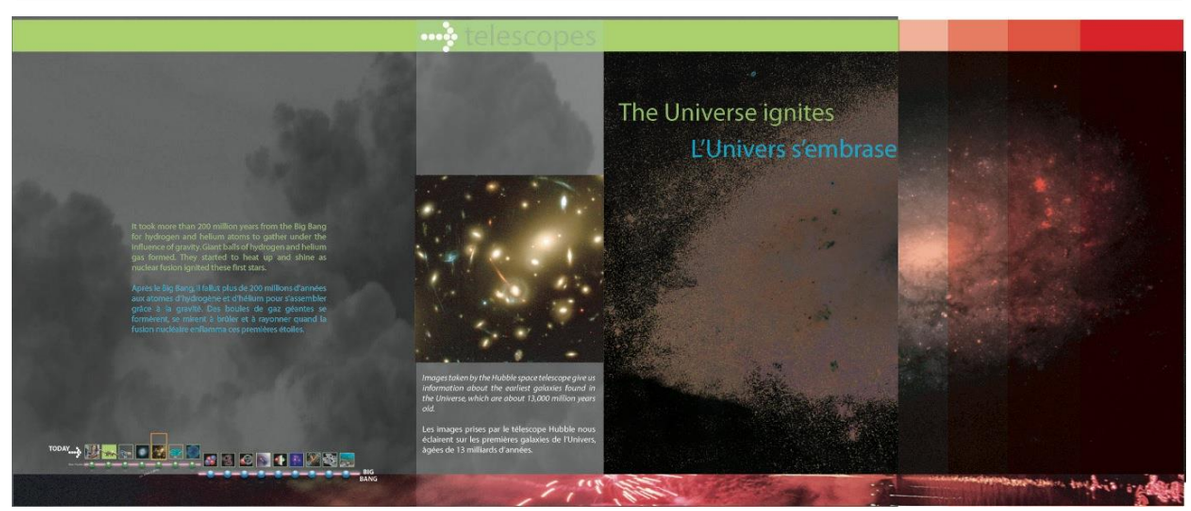
Posters

- Cosmic evolution
- Standard Model
- Collisions, aerial views

Cosmic Evolution (17 posters)







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

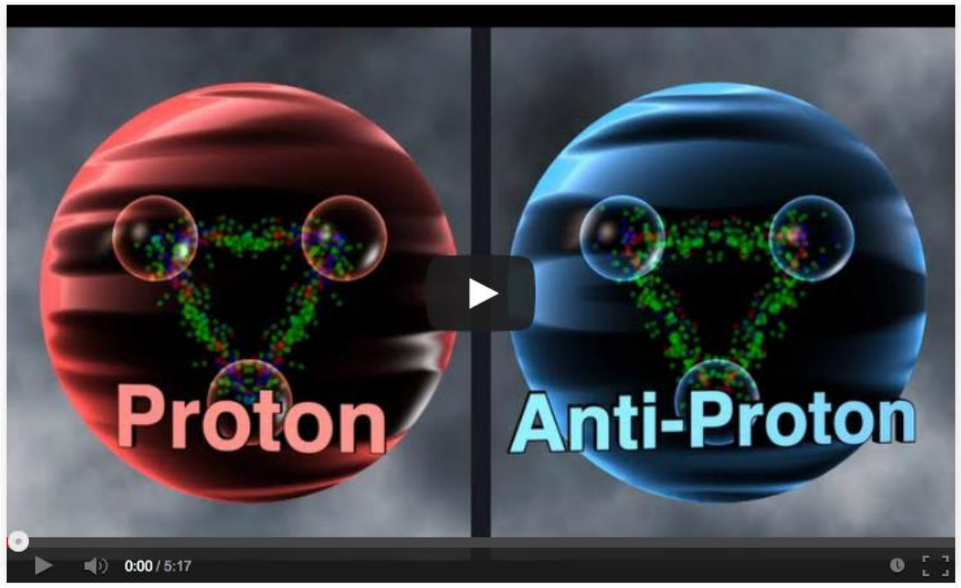
TED-Ed Original

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

Inventions that Shape History

Big Data - Tim Smith

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

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...

Out of This World

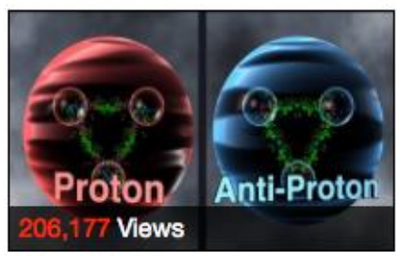
The beginning of the universe, for beginners - Tom Whyntie

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

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....



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...

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...

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...

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...

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...

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...

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...

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