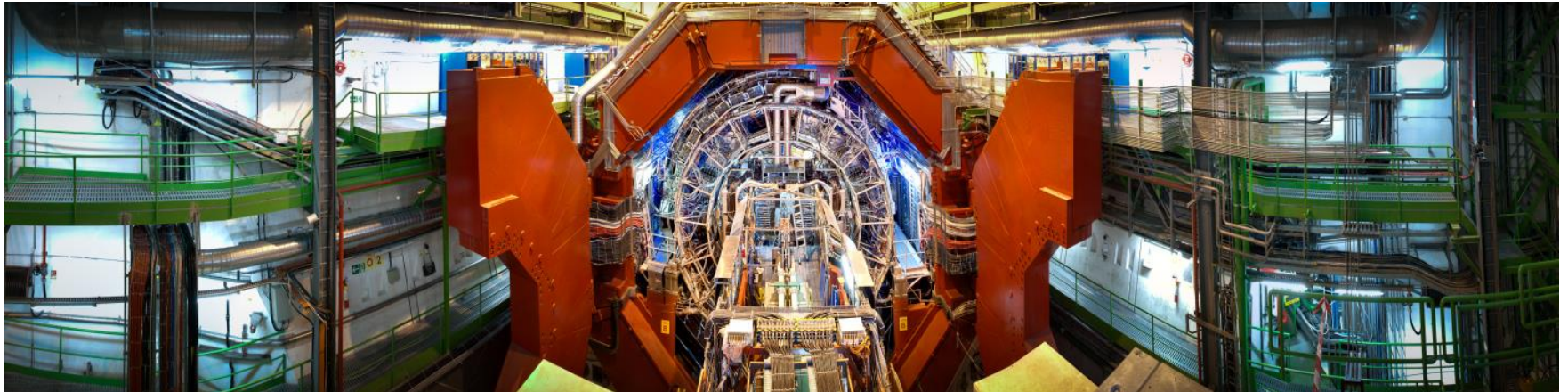




OUTREACH ACTIVITIES OF THE ALICE EXPERIMENT



Despina Hatzifotiadou
INFN Bologna and CERN
on behalf of the ALICE Collaboration

International Conference on New Frontiers in Physics
Orthodox Academy of Kolymbari, Crete, 21-29 August 2019



WHY OUTREACH

Outreach refers to activities designed to **raise awareness, appreciation and understanding of particle physics, the research methods and the experimental results** to a mainly non-scientific audience. It is an integral part of the scientific process.

Goals:

- demystify scientific research and increase scientific literacy
- Inform public –Inspire youth – prepare next generation of scientists
- Ensure (continuation of) support and funding
- Tell contributors the outcome of their efforts
- Inform media (strong amplification factor)

Outreach is of particular importance nowadays, when there is a lot of:

- Wrong information and even mud-throwing on science all over the web
- Conspiracy theories which have some impact - at least to a certain percentage of the public



METHODS AND TOOLS

“CONVENTIONAL”

- Visits
- Virtual visits
- Masterclasses in particle physics
- Participation in events (European Researchers' Night, CERN Open Days,..)

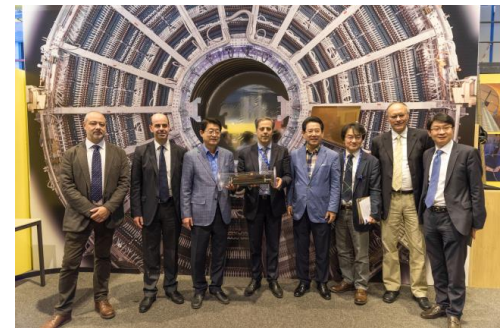
“DIGITAL”

- Online Newsletter
- Social media
- Facebook live



ALICE VISITS

- Underground visits : the highlights!
 - During LS1 > 15000 visitors
 - Open Days Sept. 2013 ~3500
 - During LS2 : many hundreds / week
 - Possible only during limited periods
- Surface visits
 - Complementary to cavern visit
 - Possible at all times





ALICE

ALICE VISITORS' CENTRE

- Real-size poster of ALICE cross section
 - Explain basic ALICE components

- ARC (ALICE Run Control Centre)
 - Explain LHC operation, data taking
 - See physicists at work

- Interactive Window at ARC
 - Describe ALICE / its components
 - ALICE sociology

- VIEW OF SHAFT, PAD, MAD

- NEW ALICE EXHIBITION





ALICE

ALICE INTERACTIVE WINDOW





ALICE

ALICE INTERACTIVE WINDOW

CERN

ALICE Detectors

- Free View
- Size
- Weight
- Inner Detectors
- Outer Detectors
- Muon arm
- Technology

🏠 TPC TRD ITS MUON EMCAL PHOS PMD TOF AD ZDC ALL < >



ALICE

ALICE INTERACTIVE WINDOW

CERN

Collaborators and Projects

Select a flag to see the details of the associated country.

Select the name of a project to explore it.

To proceed, select the bottom-right arrow.

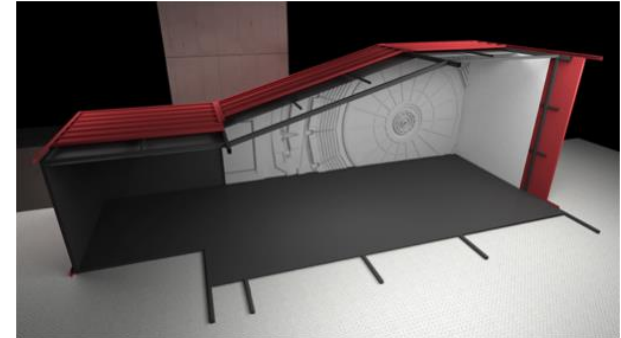
DATA ACQUISITION Upgrade 02



THE NEW ALICE EXHIBITION

ALICE

- INSTALL INSIDE CLOSED STRUCTURE
 - Ensure acoustic insulation
 - Illuminate objects
- REAL SIZE MOCKUP OF ALICE CROSS SECTION
 - Video mapping projection
 - Embed detector items in their real position
- INTRODUCTORY VIDEO
 - Brief description of physics & experiment
- ADDITIONAL EXHIBITS INSIDE SHOWCASES
 - detector and DAQ items (+screens)
- EXPLORE ALICE IN REAL TIME
 - Periscope : 2 computer-controlled cameras in the cavern + screens in the exhibition





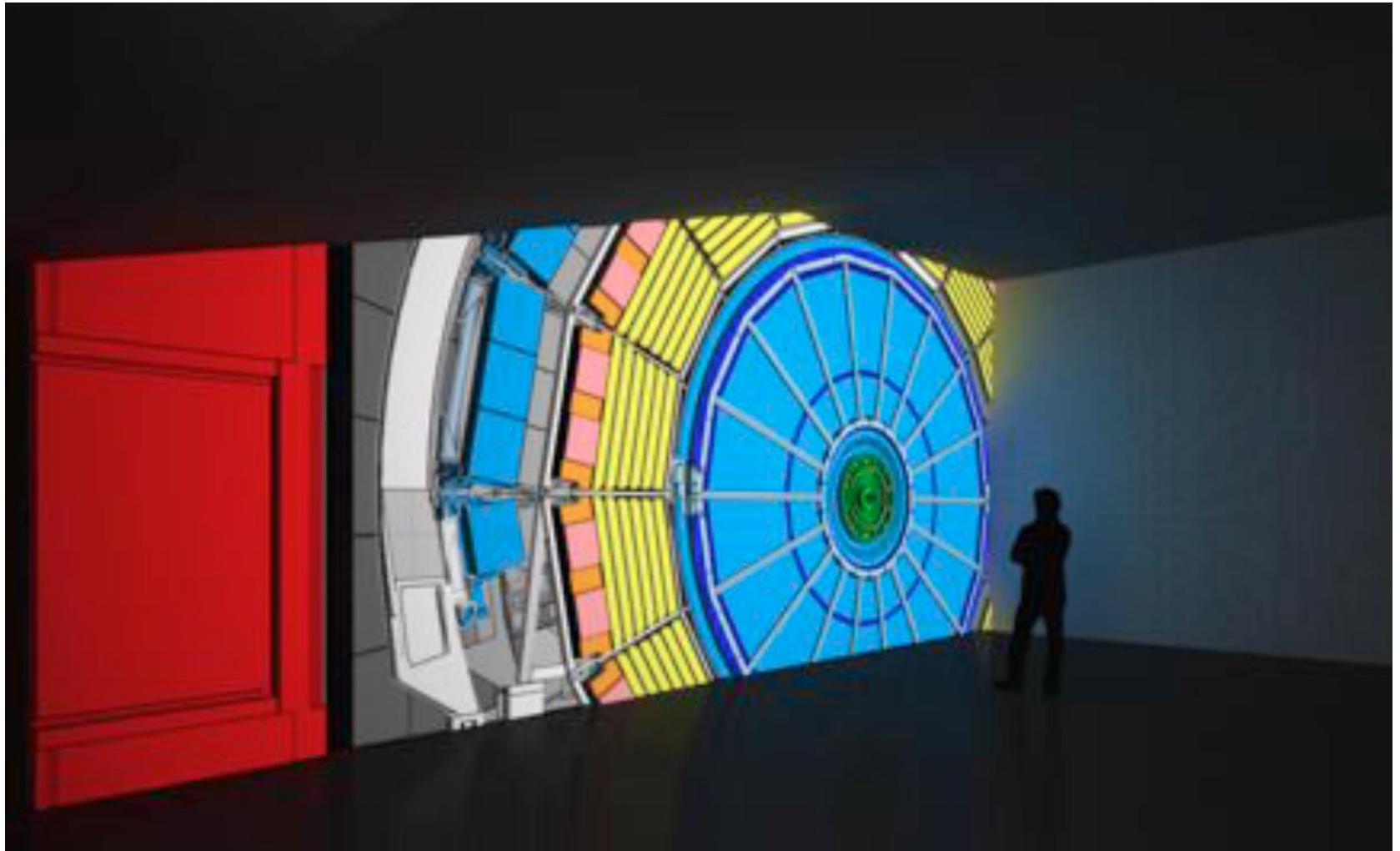
REAL SIZE MOCKUP + EMBEDDED OBJECTS





ALICE

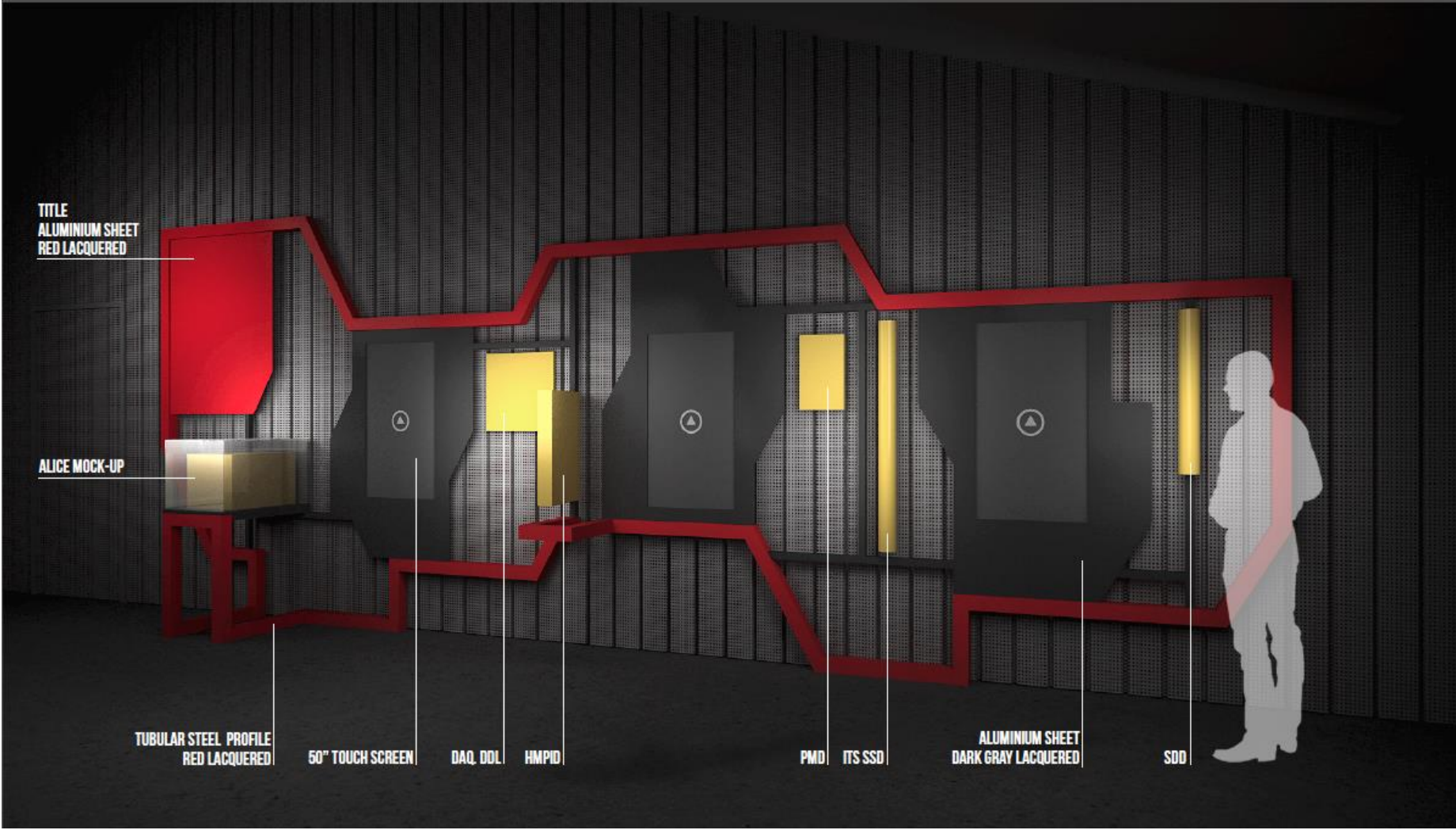
PROJECTION MAPPING ON THE MOCKUP





ALICE

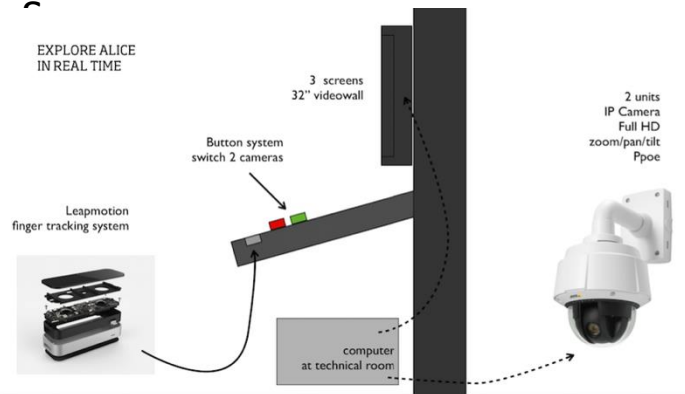
SHOWCASES





ALICE

EXPLORE ALICE IN REAL TIME



Camera controlled by periscope – sends live images to screen + periscope display

VIRTUAL VISITS

Virtual visits were first introduced by the ATLAS and CMS collaborations
Dedicated web sites, system for booking virtual visits etc.

- Allow access to new audiences who cannot visit CERN due to geographical or economic limitations
- Engage with the world of research and share the excitement

ALICE members have been doing ad-hoc virtual visits (with their laptop, tablet ,...)

Installed proper videoconferencing equipment in the Alice Run Control Centre including two cameras, one fixed (to show the speaker) and one movable (to show different views while explaining about data taking)

During LS2, virtual visits from ARC combined with vv of the ALICE cavern (with tablet/phone)





ALICE

VIRTUAL VISITS

Combined with local events

Researchers Night

(last Friday in September)

Public events during conferences

(4 virtual visits during LHCP2019)

...

Combined with masterclasses

Stand-alone events

(talk via video + Q&A + virtual visit)

To book a virtual visit write to

alice-outreach-virtual-visits@cern.ch

Dedicated indico category

<https://indico.cern.ch/category/10137/>



May 2019

- 24 May [Virtual Visit 4 with BUAP - LHCP2019](#)
- 23 May [Virtual Visit 3 with BUAP - LHCP2019](#)
- 22 May [Virtual Visit 2 with BUAP - LHCP2019](#)
- 21 May [Virtual Visit 1 with BUAP - LHCP2019](#)

April 2019

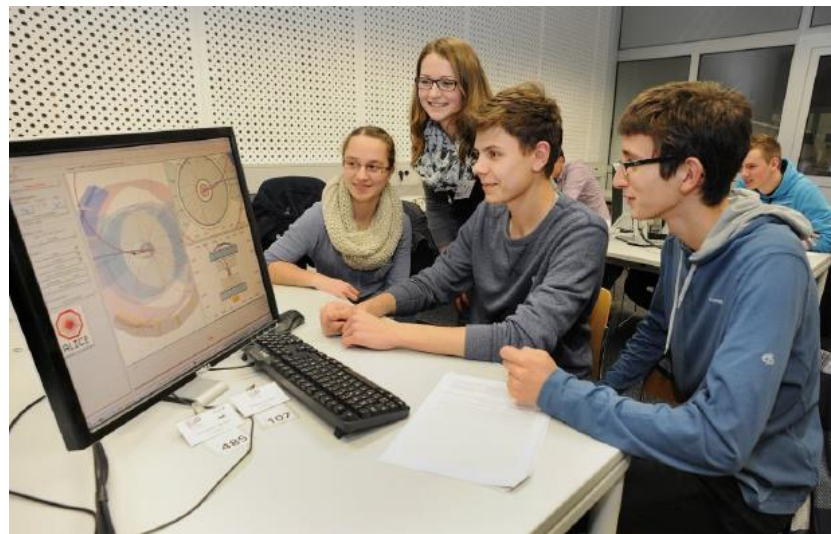
- 05 Apr [Virtual Visit with Sir Michelangelo Refalo Sixth Form - Gozo - Malta](#)
- 01 Apr [Virtual Visit with Trieste - ALICE Masterclasses 2](#)

March 2019

- 25 Mar [Meeting with Sarajevo - masterclasses](#) NEW
- 20 Mar [Virtual Visit with Montenegro - ALICE Masterclasses](#)
- 12 Mar [Virtual Visit with Trieste - ALICE Masterclasses 1](#)
- 05 Mar [Virtual Visit with Vrillissia - Christine](#)

MASTERCLASSES IN PARTICLE PHYSICS

- ALICE has been participating in International Masterclasses in Particle Physics since 2011, when the analysis of LEP data (up to 2010) was substituted by analysis of LHC data
- Looking for strange particles - Strangeness enhancement
- Nuclear modification factor
and introducing
- J/Ψ





MASTERCLASSES IN PARTICLE PHYSICS

R_{AA} – Nuclear Modification Factor

- Pb-Pb collision \neq many independent pp collisions
- \rightarrow comparison of unidentified charged particle momentum spectra in pp and Pb-Pb collisions taking into account different collision centralities

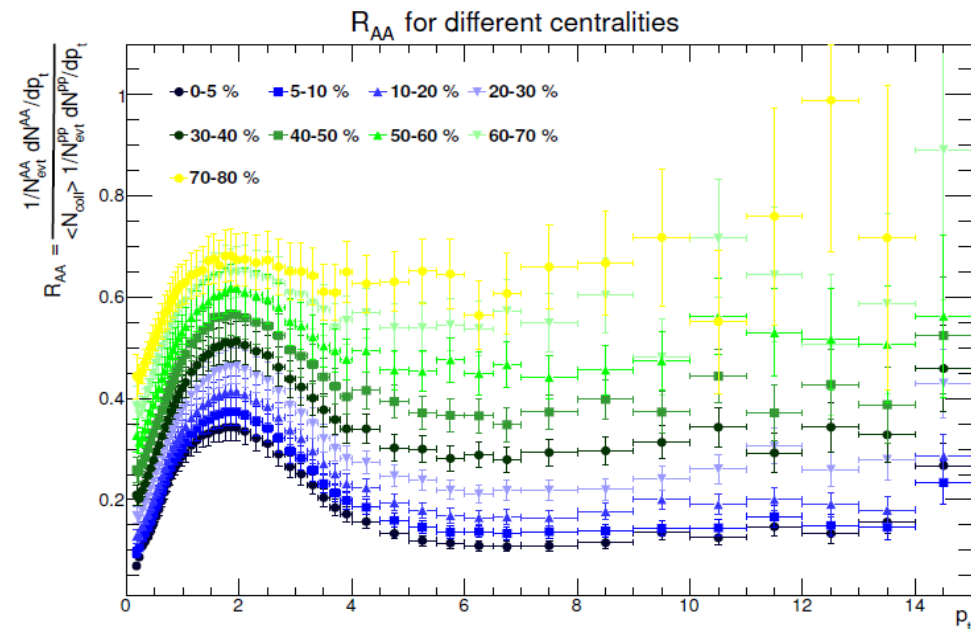
Count particle tracks

Determine their p_T

Visual analysis of few events followed
by large-scale analysis

Analysis using ROOT

<http://www-alice.gsi.de/masterclass/>





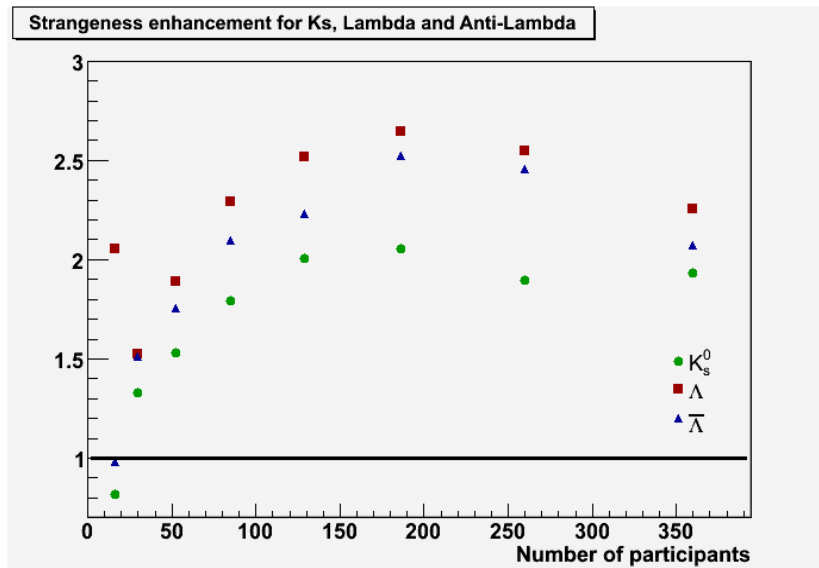
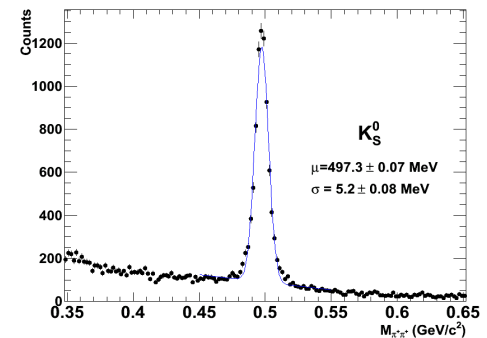
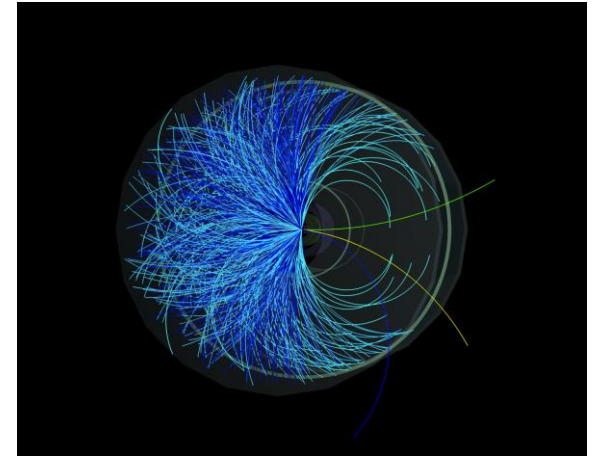
ALICE

MASTERCLASSES IN PARTICLE PHYSICS

Looking for strange particles

V0 decays of strange hadrons (K_s^0 , Λ , anti- Λ)

- Visual analysis of some events
- Analysis of large-statistics dataset
- Simplified ALICE event display based on ROOT
- Histograms, fitting etc : done with ROOT



- Calculate particle yields
- Observe strangeness enhancement

<http://aliceinfo.cern.ch/Public/MasterCL/MasterClassWebpage.html>



7.3 – 16.4.2019


Tues. 12.3 Tues. 19.3 Wedn. 20.3 Thurs. 28.3 Mond. 1.4 Wedn. 10.4 Tues. 16.4

VC 2: ALICE S.P.	VC 2: ALICE S.P.	VC 2: ALICE S.P.	VC 2: ALICE S.P.	VC 2: ALICE S.P.	VC 2: ALICE RAA	VC 2: ALICE S.P.
Trieste 	Nantes 	Maynooth 	St. Petersburg 	St. Petersburg 	Frankfurt 	Salerno
Vienna SMI 	Lyon 	Padova 	Heidelberg 	Geneva CERN 	Darmstadt 	Sarajevo
Nantes 	Mexico 	Montenegro 	Orsay IPN 	Trieste 	Copenhagen 	São Paulo USP
Strasbourg 	Thessaloniki Univ. 	Warsaw 	Copenhagen 	Bari 	Münster 	Cape Town iThemba
Pavia 	Cagliari 	Cape Town iThemba 				


7 days for ALICE masterclasses - 31 sessions in 26 institutes

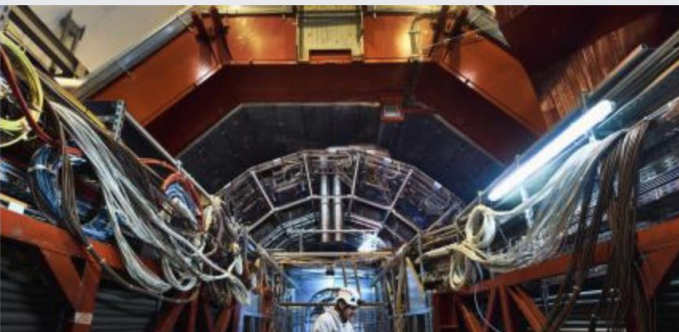
ALICE MATTERS

A Large Ion Collider Experiment



Home
Issues
About





"New" ALICE coming to life during LS2

With the conclusion of Run 2, ALICE has entered a new phase, during which a major upgrade of its detector, data-taking and data-processing systems will be implemented.

Q

Top Stories

"New" ALICE coming to life during LS2
 With the conclusion of Run 2, ALICE has entered a new phase, during which a major upgrade of its detector, data-taking and data-processing systems will be implemented.

Completion of a successful year of data taking
 Run 2, which started in 2015, has come to an end. During the last month of operation, the LHC delivered Pb-Pb collisions at 5.02 TeV of energy per nucleon pair, allowing ALICE to collect 0.9 nb⁻¹ of integrated luminosity with lead ions.

More stories

A passion for the weirdest stuff: interview with Barbara Jacak

In Memoriam of André Mischke

Interviews & Announcements

Focus on Audrey Francisco-Bosson

New "ALICE collection" available at the shop

Popular Articles

A desk cosmic ray detector for schools using the ALPIDE chip

Happy 30th birthday, heavy-ion physics!

Exciting times for ALICE:

Recent Comments

Congratulations 1 2 years 3 months ago

Farewell Paolo 2 years 7 months ago

Great Event 2 years 8 months ago

ICNFP2019 24.08.19

ALICE outreach activities - D. Hatzifotiadou

20



SOCIAL MEDIA

(20) ALICE Experiment (@ALICEexperiment) / Twitter

ALICE Experiment
1,195 Tweets



ALICE [Edit profile](#)

ALICE Experiment
@ALICEexperiment

A Large Ion Collider Experiment is one of the largest experiments in the world devoted to research in the physics of matter at an infinitely small scale.

CERN, Geneva, Switzerland aliceinfo.cern.ch/Public/Welcome...
Joined November 2009

40 Following 31.3K Followers


Tweets Tweets & replies Media Likes

ALICE Experiment @ALICEexperiment · Jul 21
When arts and High Energy Physics meet...
[instagram.com/p/B0KtirXBur9/...](https://www.instagram.com/p/B0KtirXBur9/)

ALICE Experiment @ALICEexperiment · Jul 17
Congratulations to Iwona Sputowska, who won one of the poster prizes at #EPSHEP2019 for her poster on forward-backward multiplicity correlations in heavy ion collisions!

ALICE experiment 17K like this · Saint-Genis-Pouilly · Science · Jacek Otwinowski and Ma...


Jul 17 · 🌐 · Congratulations to Iwona Sputowska, for winning won one of the poster prizes at the EPS-HEP 2019 conference with her poster on forward-backward multiplicity correlations in heavy ion collisions!



62 13 Comments 5 Shares

ALICE experiment 17K like this · Saint-Genis-Pouilly · Science · At ALICE experiment

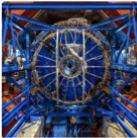
Jul 16 · 🌐 · ...straight (through ALICE) and bending (between ALICE and ATLAS). This is part of what visitors will see during the underground tour of ALICE.



Charitos Christos, Klaus Barth and 70 others 4 Comments 12 Shares

ALICE experiment shared CERN's post 17K like this · Saint-Genis-Pouilly · Science · Klaus Barth and Charitos ...

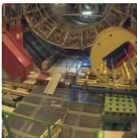
Jul 24 · 🌐 · ...#PhotoOfTheWeek shows renovation work on ALICE experiment, being carried out as part of #upgradingLHC. This is the time projection chamber, an imposing cylinder, measuring 5.1 metres in length and 5.6 metres in diameter, and weighing an...



Charitos Christos, Klaus Barth and 29 others 2 Shares

ALICE experiment 17K like this · Saint-Genis-Pouilly · Science · Gerardo Herrera Corral an...

Mar 25 · 🌐 · All cleaned up after the Live event of last week. The rotating frame is aligned with the DCal modules that will soon be extracted and taken to the surface. You can view the recording of the Live at:...



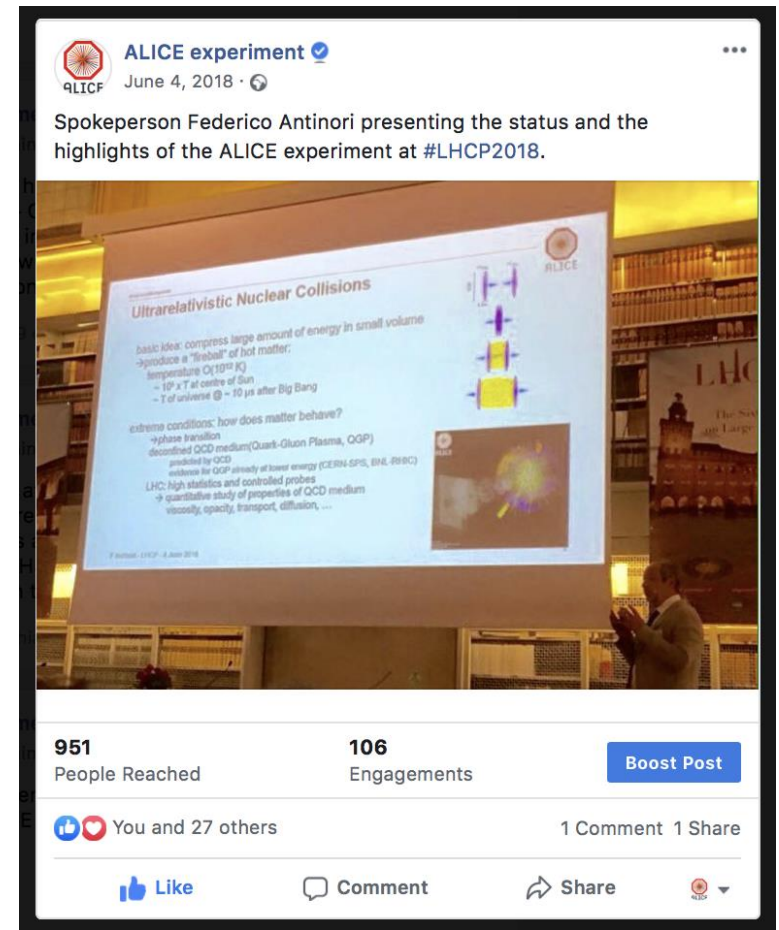
40 1 Comment 5 Shares

SOCIAL MEDIA : facebook, twitter

Post regularly, to keep interest of followers

- Updates about data-taking
- Updates about installation and upgrade work
- Physics results
- Prizes, promotions of ALICE members
- Articles on ALICE Matters

Coordinated campaign during important conferences, tweet/post simultaneously with presentations of ALICE results (done by dedicated persons)



ALICE experiment ✓
June 4, 2018 · 🌐

Spokeperson Federico Antinori presenting the status and the highlights of the ALICE experiment at #LHCP2018.

Ultrarelativistic Nuclear Collisions

basic idea: compress large amount of energy in small volume
 → produce a "bubble" of hot matter:
 temperature $Q(190 \text{ MeV})$
 - $10^{12} \times T$ at centre of Sun
 - T of universe @ ~ 10 ys after Big Bang

extreme conditions: how does matter behave?
 → phase transition
 deconfined QCD medium (Quark-Gluon Plasma, QGP)
 produced by QCD
 evidence for QGP already at lower energy (CERN-SPS, BNL-Relativistic Heavy Ion Collider)
 LHC: high statistics and controlled probes
 → quantitative study of properties of QCD medium
 viscosity, opacity, transport, diffusion, ...

951 People Reached 106 Engagements Boost Post

You and 27 others 1 Comment 1 Share

Like Comment Share



ALICE at youtube

ALICE

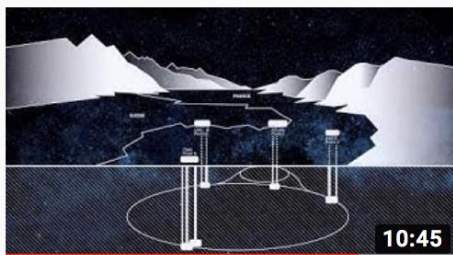
Showing results for *alice experiment* Search instead for *aliceexperiment*



Large Hadron Collider: ALICE Experiment

World Science Festival • 7.3K views • 4 years ago

ALICE is unique among the four major Large Hadron Collider experiments because it is the only experiment analyzing collisions ...



CERN Alice Experiment - Video for Open Days 2013

ALICE MATTERS • 6.9K views • 5 years ago

10 min video for general public, describing the physics aims of the ALICE experiment: the study of the primordial state of matter, ...



Flying over ALICE

ALICE Experiment ✓ 79K views • 4 years ago

Flying into an #LHC experiment: watch this exclusive aerial video sequence filmed flying a drone over the #ALICE experimental ...



ALICE

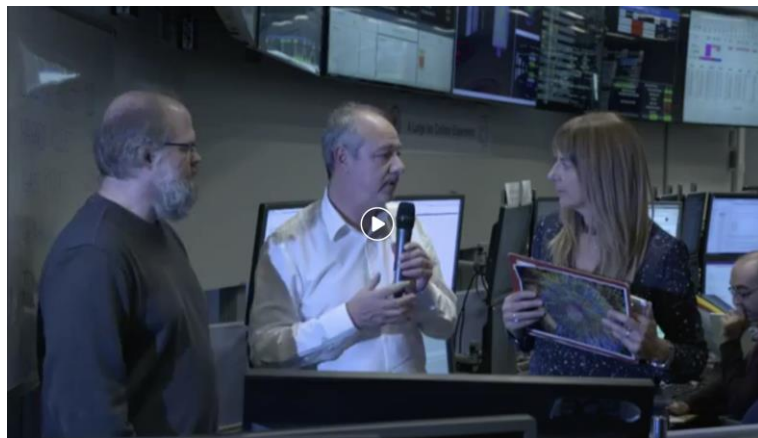
FACEBOOK LIVE

Live event broadcast on facebook

Followers submit written questions

Moderator chooses some to answer live

ALICE members post answers



ARC Heavy Ion Run 13 November 2018



30 May 2018 all LHC experiments



ALICE

FACEBOOK LIVE

21.3.2019





ALICE SHOP





CERN OPEN DAYS 2019

At Point 2 :



- Underground visits of the ALICE cavern / LHC tunnel
- Visits of the ALICE exhibition
- Activities for children (and adults)
- Detectors in 2285 (TRD supermodule)
- Presentations
- Food trucks

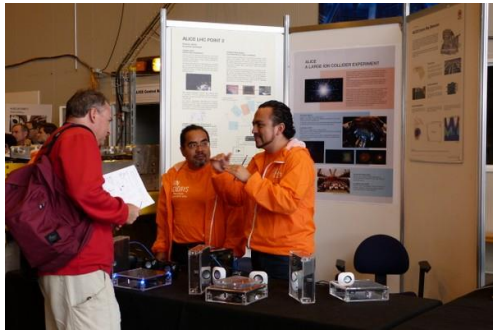


Collaboration with Open Days central coordination



ALICE

ACTIVITIES AT POINT 2 DURING CERN OPEN DAYS



Cosmic piano



simple experiments



Virtual Reality



Papercraft : build ALICE out of cardboard



Drole de physique : experiments with liquid nitrogen



THANKS FOR YOUR ATTENTION