

# Outreach and educational activities of ALICE in the times of the pandemic

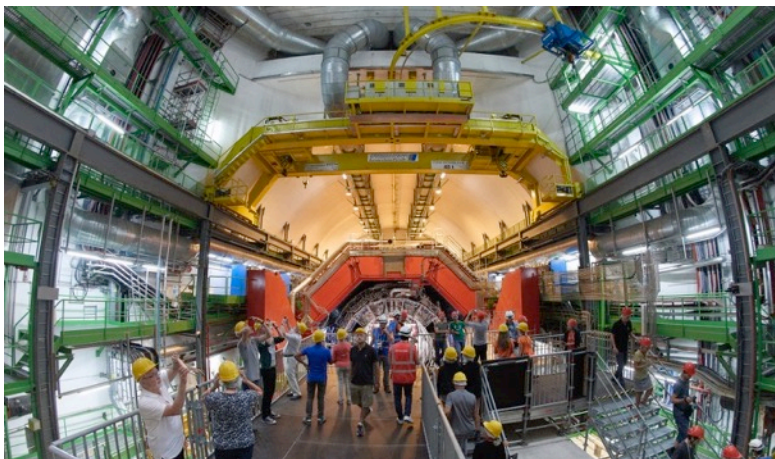
**Despina Hatzifotiadou**

**INFN Bologna**

**on behalf of the ALICE Collaboration**

**ICHEP2022 - XLI International Conference on High Energy Physics  
Bologna 6-16 July 2022**

# ALICE VISITS



March 2020  
cancellation  
of visits

During 2019 : 1000 visits (groups) > 12 000 visitors  
CERN Open Days September 2019 : 4600 visitors underground

September 2021 : visits resumed with restrictions  
2 people in the lift; 8 maximum in the cavern, CERN people only

Since LHC started operations: visits to the surface exhibition





# ALICE VIRTUAL VISITS



... after years of doing ad-hoc virtual visits with personal laptops or phones

Installed video-conferencing equipment inside the ALICE Run Control Centre (ARC)

+

one fixed camera (to show the speaker) one robot camera (with preset positions showing ARC, big screens, ..)

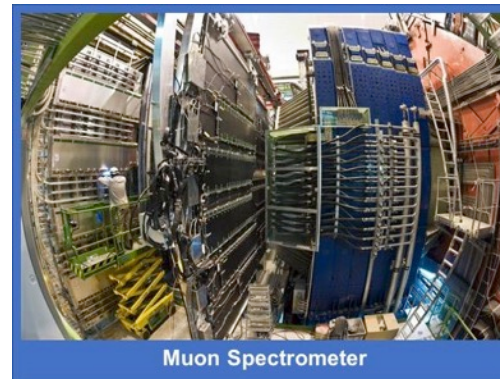
When CERN returned to “normality” after the first lockdown virtual visits became the norm

Dedicated mobile equipment for cavern visits

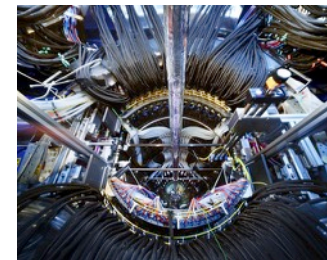
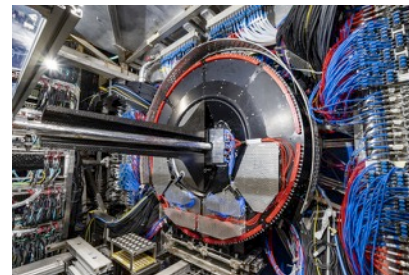
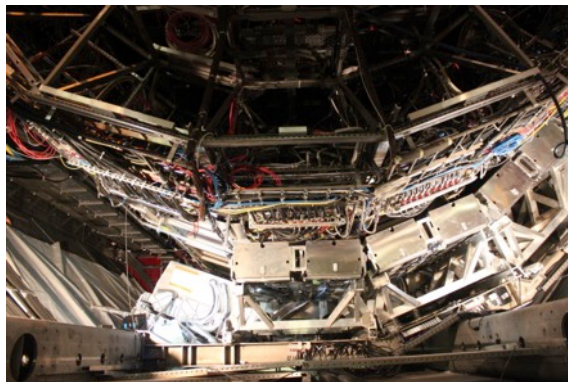
- Samsung mobile phone with good camera
- Gimbal (stabilizer arm)
- Headphones paired with the phone



# ALICE VIRTUAL VISITS



Virtual visitors  
got to see more  
than during an  
in-person visit...



...depending on installation work in the cavern during LS2

# ALICE VIRTUAL VISITS PROCEDURE

Virtual visits for groups, requested by schools, universities, local events,...

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

Open virtual visits for individuals (done regularly, in English, French, Italian)

Booked on indico <https://indico.cern.ch/category/13603/>

Announced on social media (FB, Twitter) and <https://visit.cern/virtual>

Zoom or zoom webinar used

Content:

Short introduction – visit to the cavern – tour of the ARC – Q&A

Typical duration : 1-1.5 hours (depending on number of questions from participants)

## ALICE VIRTUAL VISITS: SOME STATISTICS

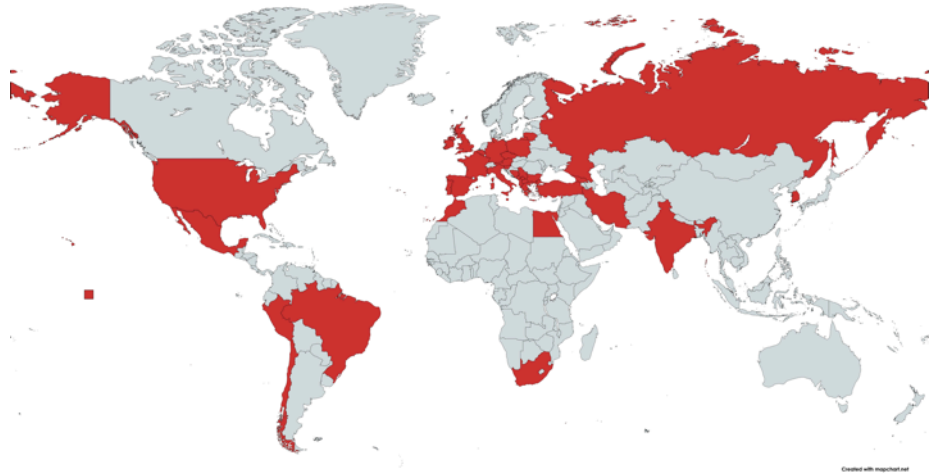
~ 160 virtual visits since 2013  
~ 110 virtual visits since September 2020  
> 35 countries reached  
Some thousands of people

In: English, French, Italian, Spanish, Greek,  
Portuguese, German, Czech, Russian, Polish

Virtual visitors: elementary, middle, high-  
school students, university students, physics  
teachers, artists, participants of masterclasses,  
& other outreach events, general public

Virtual guides : ALICE colleagues (to satisfy requests for virtual visits in different language more ALICE members involved)

People who could not visit in-person are reached => not only solution to COVID restrictions but an additional opportunity !







SPECIAL EVENT \ Tuesday, 29 June 2021

## V&A and CERN Classroom Live (June 2021)

As part of our Alice: Curiouser and Curiouser exhibition, join us to go down the rabbit hole and experience a livestreamed guided tour of CERN's A.L.I.C.E detector (A Large Ion Collider Experiment).



Organised by V&A in collaboration with arts@CERN and ALICE

271 primary and secondary schools in the UK took part, as well as schools in Taipei, Los Angeles, Warsaw, Komorow, and Haaksbergen. Some 5000 students aged 11-18 joined the event!

An exciting chance to go behind the scenes and find out about the work of physicists, artists and curators at CERN. Students will hear how creativity, Science, Technology, Engineering, Art and Maths combine at CERN, the European Organisation for Nuclear Research and one of the world's largest and most respected centres for scientific research.

Read more

SHARE



Tuesday, 29 June 2021

10.00 – 11.00

Online, Online

Download programme

Free event  
Online

BOOK NOW

<https://home.cern/news/news/knowledge-sharing/two-artworks-and-school-event-inspired-cern-victoria-albert-museum>

EXHIBITION

ALICE

On the occasion of :

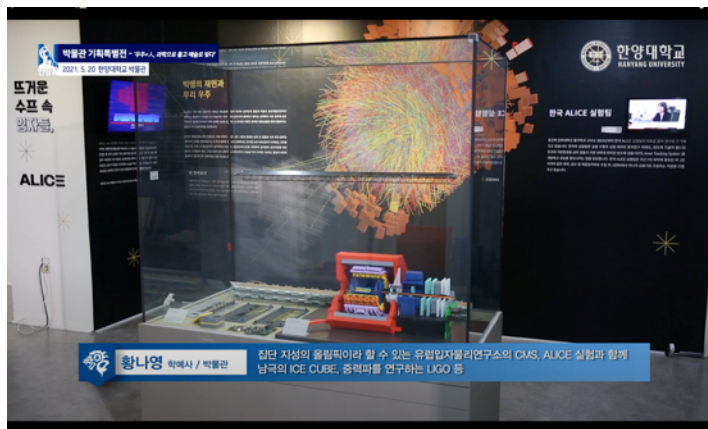
## “The Cosmonaut” art & science exhibition

Hanyang University Museum, Seoul, Korea

<http://www.hy2021cosmonaut.com/>

ORIGIN partners CMS, ALICE, LIGO, ICEcube

[http://www.hy2021cosmonaut.com/content/p\\_a](http://www.hy2021cosmonaut.com/content/p_a)



한양대학교박물관과  
함께 떠나는

October 2021

# CMS&ALICE Virtual Tour

반구석 1열에서 유럽입자물리연구소 CERN의 대형강입자충돌기 LHC로 떠나요!  
LHC의 대표적인 입자검출기인 CMS와 ALICE를 집에서도 실시간으로 만나보  
실 수 있습니다.

**실험 소개**  
양문기 교수(한국 CMS 실험팀 대표)  
윤진희 교수(한국 ALICE 실험팀 대표)

**전지 진행**  
김태정 교수(한양대학교 물리학과)  
김도원 교수(분당서울대학교병원 연구행정팀)

대 상 관심에 있는 누구나  
일 시 2021년 10월 7일 목요일 16:00~18:00(한국시간)  
신청방법 구글 폼으로 신청서 제출  
<https://forms.gle/jaX5eMSeErHTXGxp6>  
진행 ZOOM을 통한 실시간 화상강연  
\* 휴대전화와 이메일로 강의 URL 전송  
문의 한양대학교박물관 학예연구실 02-2220-1394  
※ 본 행사는 2021년 대학박물관 전문지원 사업으로 진행됩니다.

한양대학교 박물관  
한양대학교박물관운영처  
한양대학교박물관운영처



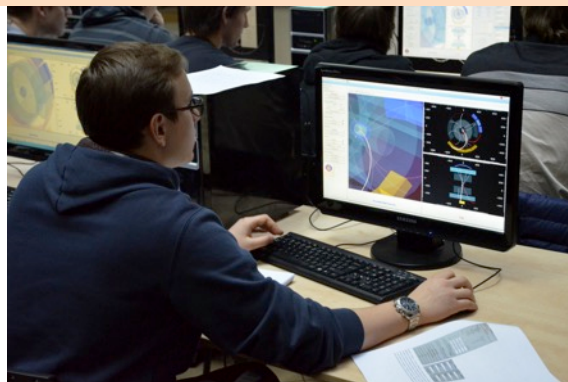
**We will be happy to organise a virtual tour to ALICE for all interested**

To request a virtual visit: [alice-outreach-virtual-visits@cern.ch](mailto:alice-outreach-virtual-visits@cern.ch)

<https://alice-secretariat.web.cern.ch/virtual-visit>

<https://alice-secretariat.web.cern.ch/possible-scenario-virtual-visit>

# ALICE MASTERCLASSES BEFORE THE COVID PANDEMIC



Flagship activity of IPPOG

Day of immersion in particle physics: lectures, data analysis videoconference

Next talk by Uta Bilow:  
International Masterclasses :  
Forward from the Pandemic



ALICE present in International Physics Masterclasses since 2011  
(measurements with LHC data replaced measurements with LEP data)

Local masterclasses (in schools, without videoconference)

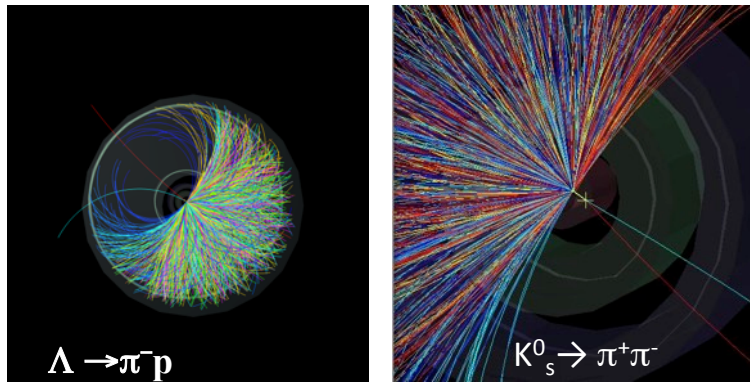
Masterclasses for physics teachers (Italian and Swedish teachers at CERN, Greek teachers in Greece,...)



# ALICE MASTERCLASSES : THE MEASUREMENTS

## LOOKING FOR STRANGE PARTICLES

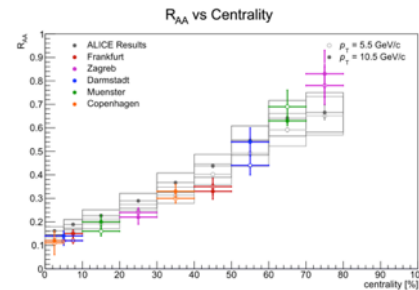
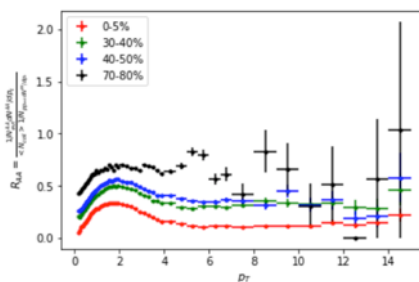
Search for strange particles from their V0-decays



observe strangeness enhancement in Pb-Pb collisions comparing with pp collisions

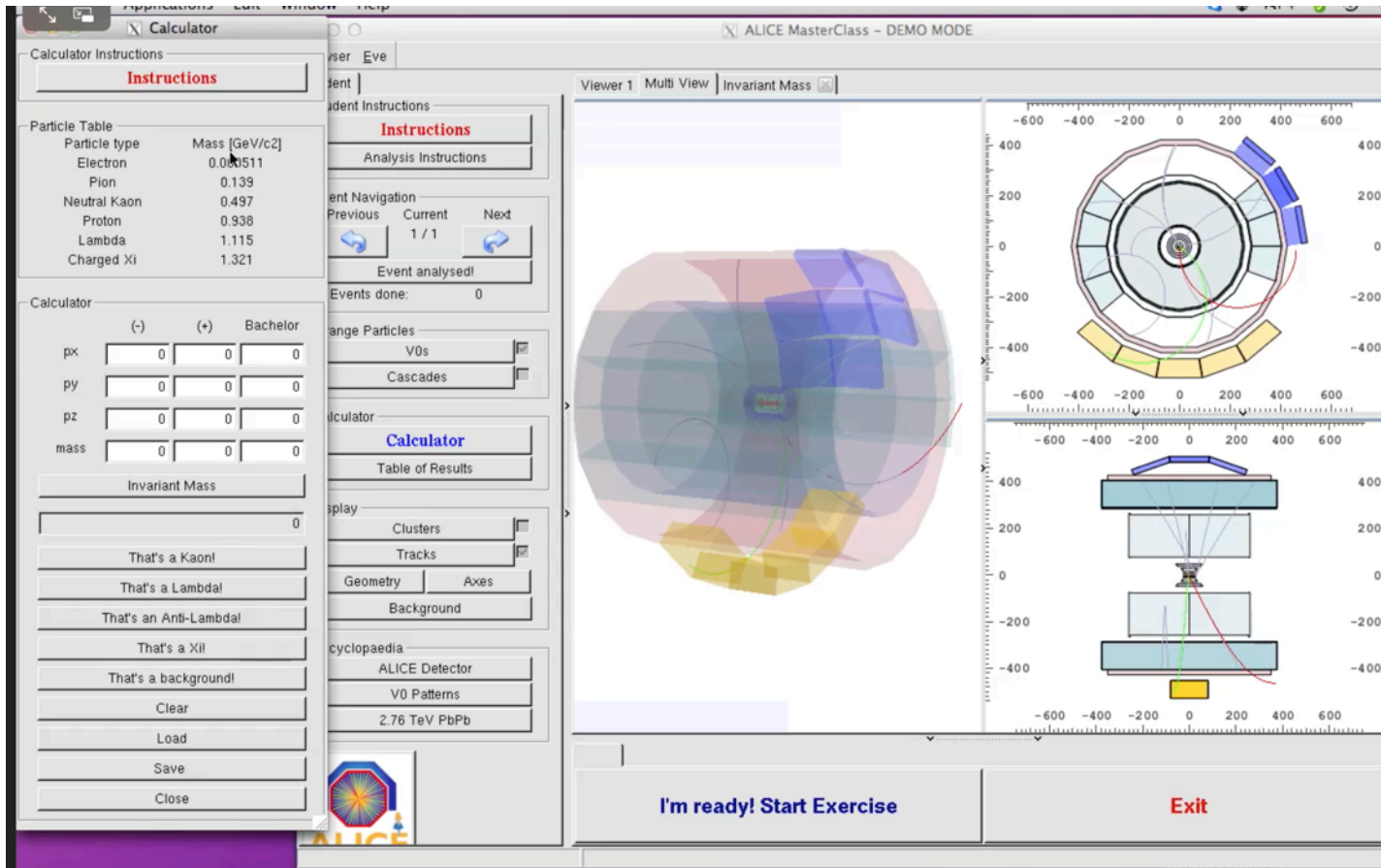
## NUCLEAR MODIFICATION FACTOR $R_{AA}$

comparison of unidentified charged particle momentum spectra in pp and Pb-Pb collisions taking into account different collision centralities



Pb-Pb collision  $\neq$  many independent pp collisions





Simplified version of  
ALICE event display  
based on ROOT

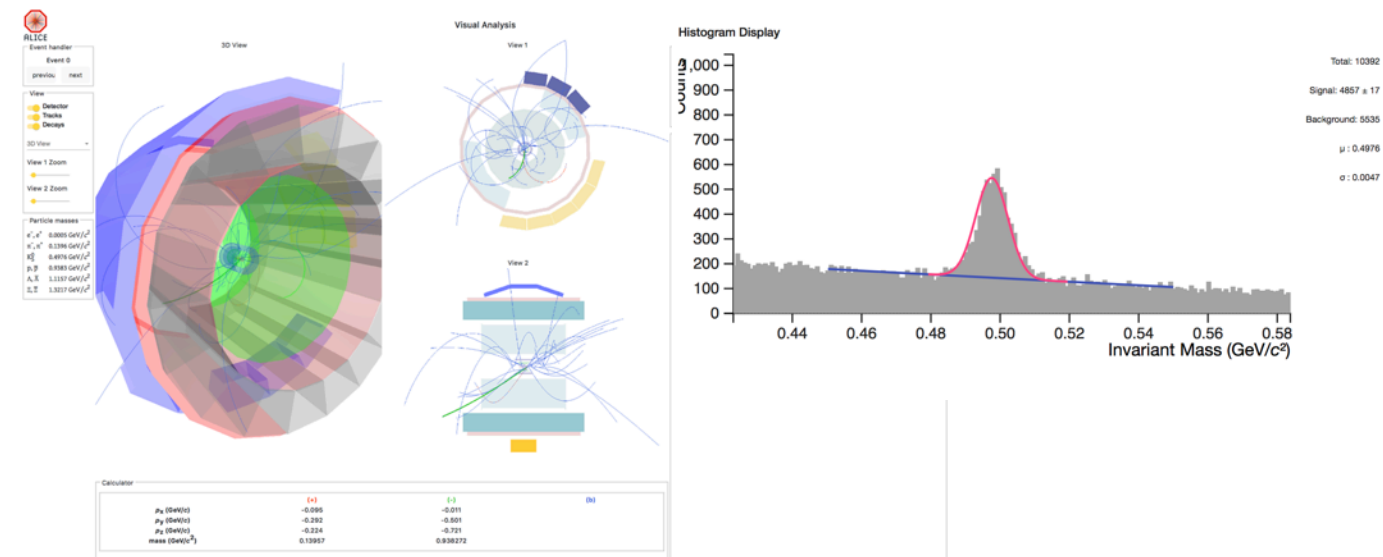
Prerequisite: ROOT  
installation

Compilation

Operating system  
dependent

Virtual box/virtual  
machine to run on all  
operating systems

Installation needed  
In all cases



Web-based version developed

no installation needed

online masterclasses for students at home possible

In 2022: new version, allowing saving of results on common server for merging and presentation

Useful tool for teachers, for extra-curriculum activities

Description of MC <https://alice-masterclass.web.cern.ch>

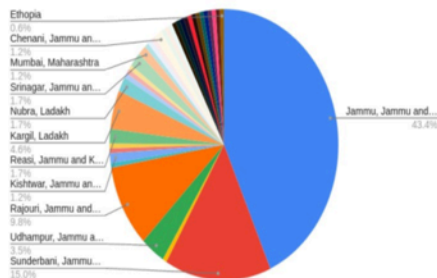
CERN server for web version of strangeness MC <https://alice-web-masterclass.app.cern.ch/home>

# INTERNATIONAL DAY OF WOMEN AND GIRLS IN SCIENCE: 11 FEBRUARY 2022

## Participants

Registrations: 182+4  
Girls 116  
Boys 70  
Outside country 4  
Outside UT(s) ~22

## Count of city, State






**University of Jammu**

DEPARTMENT OF PHYSICS,  
UNIVERSITY OF JAMMU

## 2<sup>nd</sup> INTERNATIONAL HANDS-ON PARTICLE PHYSICS MASTERCLASSES

on the occasion of  
International Day of Women and Girls in Science

February 11, 2021  
9:30 a.m. (IST)

**Dr. Ramni Gupta**  
Coordinator.





International Day of Women and Girls in Science - Masterclasses in Greece

Friday 11 Feb 2022, 08:30 → 18:00 Europe/Athens

**Greece + CERN**



hands on particle physics

The United Nations General Assembly adopted a resolution in December 2015 and declared February 11th as the **International Day of Women and Girls in Science**. This date should be recognised as a global celebration on equal participation and the accomplishments of female scientists.

International Masterclasses are launching Masterclass activities on the International Day of Women and Girls in Science. By arranging a special Masterclass event for girls we plan to support and promote the access of women and girls to science education and research activities.



Videoconference

## INTERNATIONAL DAY OF WOMEN AND GIRLS IN SCIENCE 2022

ALICE Masterclass @ Home (IDWGS)

11. Februar 2022  
09:00-18:00

Am 11. Februar haben die meisten Nationen zum ersten International Day of Women and Girls in Science auf, um auf die gleiche Beteiligung und die Leistungen von Wissenschaftlerinnen aufzuehen zu machen und diese sichtbar zu machen.

Zu diesem Anlass laden Wissenschaftlerinnen des ALICE Experimentes aus Darmstadt, Münster, München und Frankfurt bundesweit physikinteressierte Schülerinnen ab ca. 15 Jahren herzlich zu einem Online-Masterclass ein!

Werte für einen nachhaltigen Teilnahmepreis und erfahre mehr über das ALICE Experiment am CERN! Werte selbst testen und diskutieren sie in einer internationalen Schaltung mit Wissenschaftlerinnen am CERN, in Indien, Südafrika und Schweden.

Wäre im LHC das Atomkern mit unvorstellbarer Wucht aufeinanderstoßen, entstehen Bedingungen wie in den ersten Augenblicken des Universums. Da wird mit Forschung in die Geheimnisse des Kosmos blicken und mehr über die Grundbausteine der Materie und über die Kräfte, die im Universum wirken, erfahren.

Anmeldung online öffnen bis zum 10.02.2022

Register 11.02.2022, 15:30  
Bis 11.02.2022, 18:00

2022

International Day of Women and Girls in Science



## ONLINE MASTERCLASSES IN 2021 AND 2022

2021 : (Almost) all masterclasses held online : students at home

2022: [dedicated online week 7-11 March in 2022](#)

Zoom for introductory talks , Zoom breakout rooms for the analysis

Virtual visits to ALICE for most masterclass sessions : opportunity to see the experiment (before COVID, ALICE visits for CERN masterclasses only)

Lecturers in different places on occasions

Tutors based in different places (for masterclasses in Greece, volunteer tutors from Italy and Poland)

High-school physics teachers acted as tutors (recruited by local organisers)

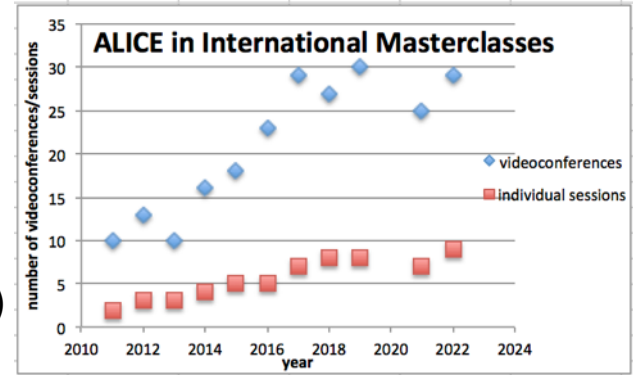
In Greece (Chania, Thessaloniki) and in Bosnia (Sarajevo)

Special training sessions for teachers held beforehand

Reached students in remote places, who could not participate when travelling to institutes was required

New institutes participated (Tehran in 2022)

Group of students from Luanda (Angola) together with Sao Paulo, Brazil in 2021



## OTHER MASTERCLASSES IN 2021 AND 2022

ALICE Masterclasses (online) for high-school students from European School Brussels III

in the frame of “Work Experience Week” (online internship, including talks, virtual visits and hands-on activities)

February 2021 and February 2022

ALICE (+ATLAS, CMS, LHCb) Masterclasses (in-person) for the ~ 180 participants of the

“2030 Leaders Programme” (by the MISK foundation, Saudi Arabia), organised through CERN-Ideasquare partnership

May-June 2022

# ALICE LEGO WORKSHOP

Friday 8.7.2022

ALICE in Public  
Outreach and  
in Bricks

talk by  
Christian Klein-  
Bösing





## SUMMARY AND CONCLUSIONS

The multitude of online platforms available helped ensure the continuity of outreach and educational activities during the pandemic; people all over the world were reached

**Virtual visits** : Allow remote audiences to get a glimpse of a CERN experiment and interact with scientists; often allow visitors to see much more than during a visit in-person

**Online masterclasses** : allow remote students to participate  
More freedom in organisation

We have resumed outreach activities with in-person participation

We will continue, in parallel, using online platforms, and organising online masterclasses, to give students in remote places the opportunity to participate

## THANKS FOR YOUR ATTENTION