

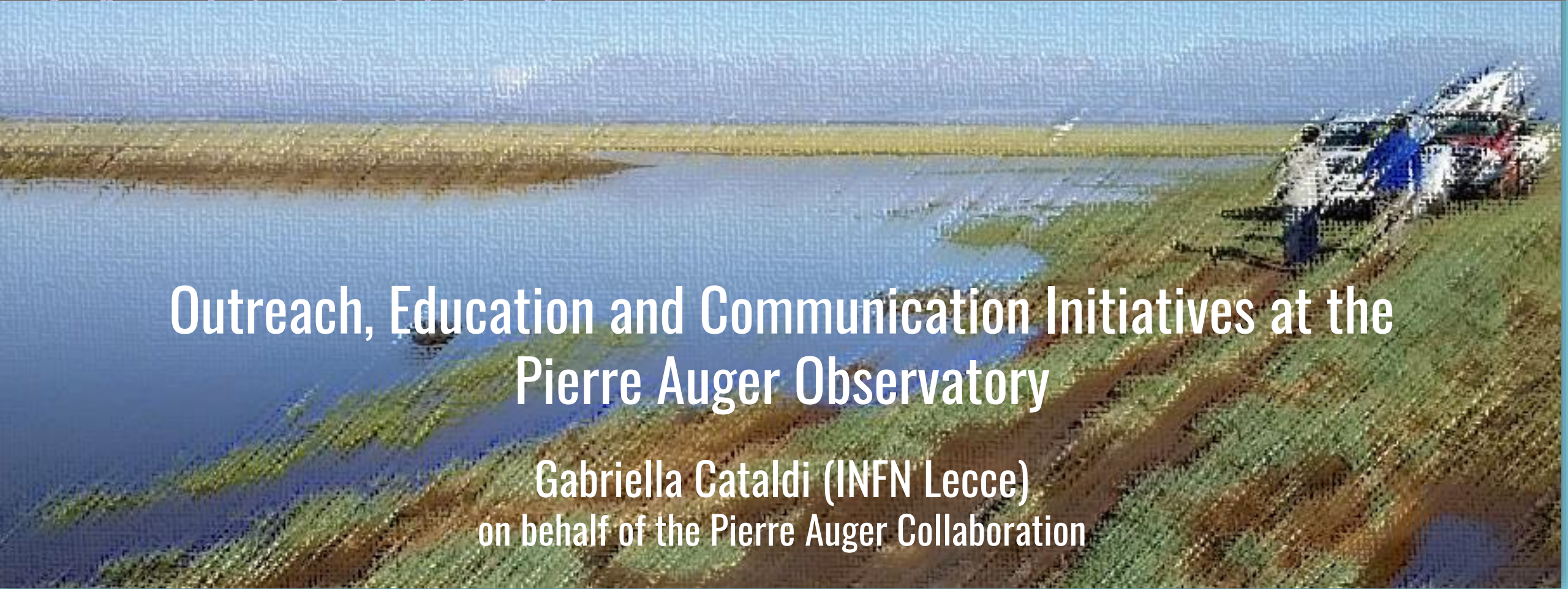


ICHEP 2022
BOLOGNA

ICHEP 2022
XLI

International Conference
on High Energy Physics
Bologna (Italy)

6
13 07 2022



Outreach, Education and Communication Initiatives at the Pierre Auger Observatory

Gabriella Cataldi (INFN Lecce)
on behalf of the Pierre Auger Collaboration

The Pierre Auger Observatory



Radio antenna array
(153 antennas, 17 km²)



Loma Amarilla



Underground muon detectors (24+)



Coihueco

HEAT

AERA
AMIGA

Sub-array of 750 m
(63 stations, 23.4 km²)



LIDARs and lasers facilities



High elevation telescopes (3)



4 Fluorescence detectors
(24 telescopes up to 30°)

Los
Morados



1665 surface detectors: water-Cherenkov
tanks (grid of 1.5 km, 3000 km²)

Central
Campus

Los Leones



Pierre Auger Observatory

More than 400 members, 98 institutes,
17 countries

Southern hemisphere:
Malargue, Province Mendoza, Argentina

Phase 1 : data taking from 2004 on (from 2008 full array in operation):

- ✓ Over 120, 000 km² sr yr for anisotropy studies
- ✓ Over 90, 000 km² sr yr for spectrum studies

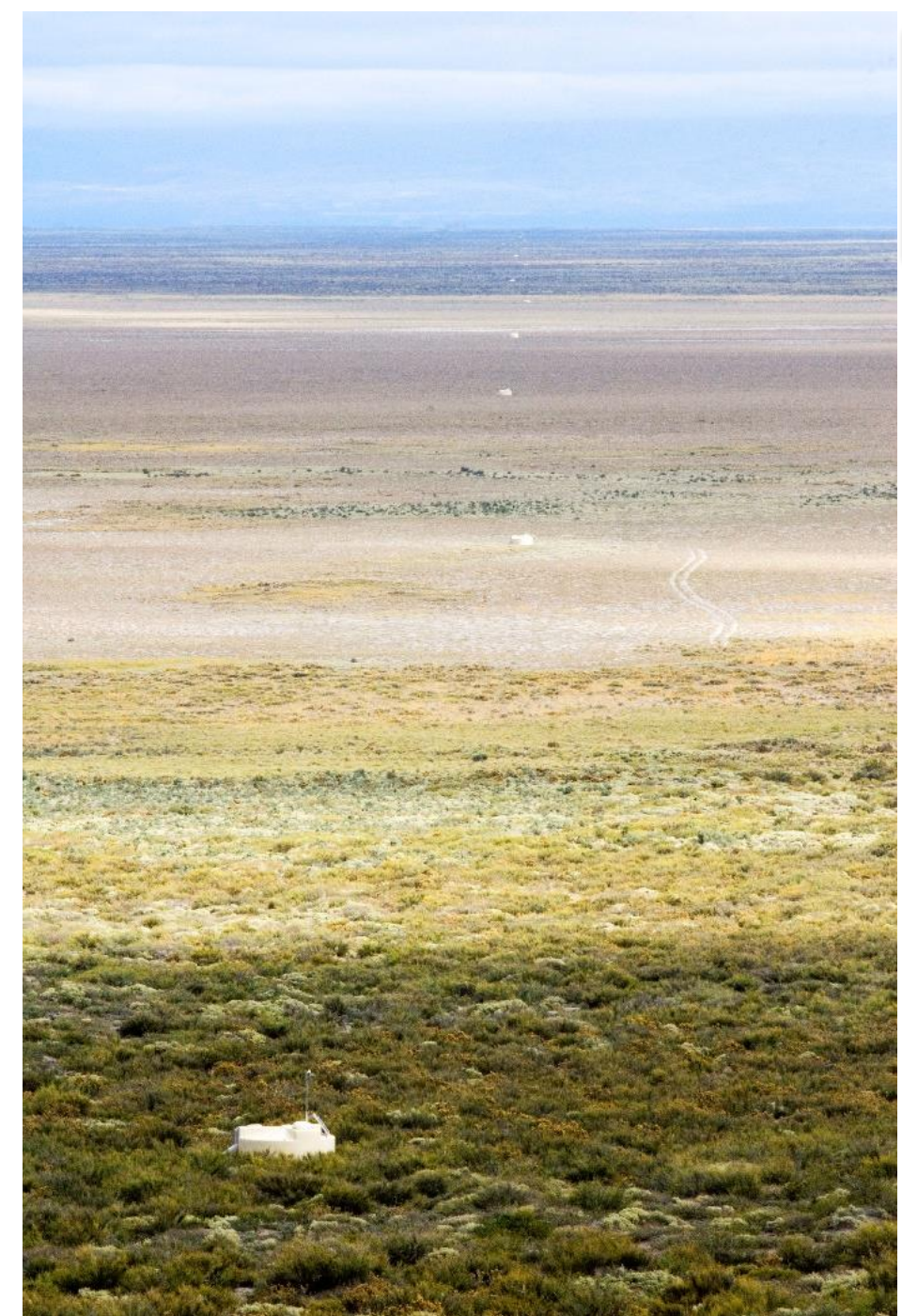
Phase 2 - the AugerPrime upgrade Data taking from 2023 to 2030...

- ✓ + 40, 000 km² sr yr
- ✓ Multi-hybrid events : FD, SD, SSD, RD, UMD

Traveling through the roads and highways inside the Observatory region, it is possible to distinguish the water tanks following straight lines which disappear in the distance



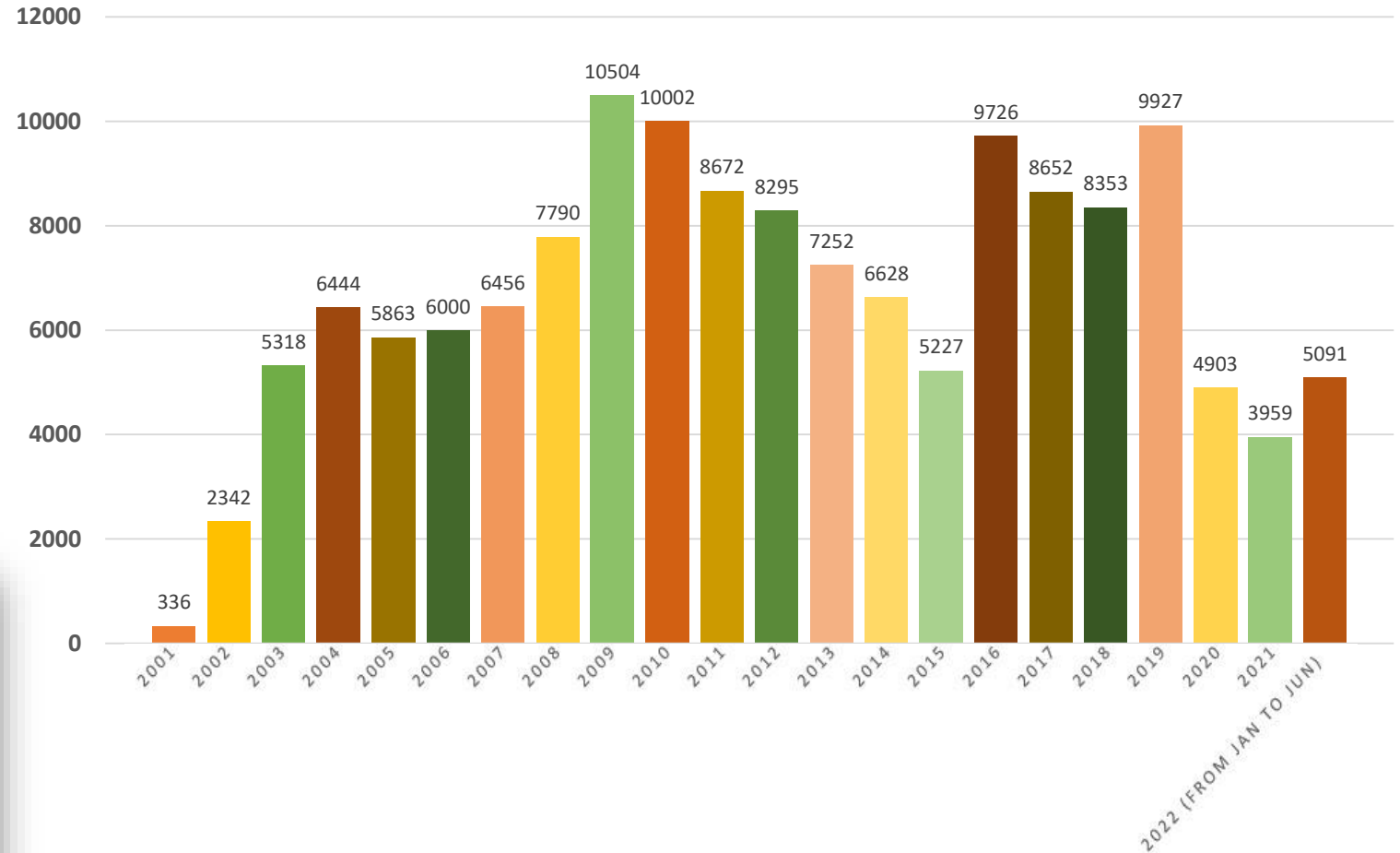
The growth of the observatory is bound to the interaction with the community of the place where it is located, Malargüe, Argentina.



The Visitor Center



Permanent exhibition:
exposition of instruments, interactive exhibits and immersive element.
Hands on Activities



on average 8000 visitors annually (excluding the 2 “pandemic” years)

Virtual visit to the Pierre Auger Observatory

Virtual tours were offered during pandemic with «live connection»

LUNEDÌ 12 LUGLIO 2021 DALLE ORE 18:00 ALLE 19:30 UTC +02

Virtual Visit to the Pierre Auger Observatory in Argentina

Facebook Live

Activity for <http://www.frontiers-project.eu>
Including also a survey on Cosmic Rays



Online AudioTour in spanish and english



Observatorio Pierre Auger Malargüe

5 gennaio · 🌐

Las visitas en Observatorio Pierre Auger son auto guiadas a lo largo de todo el año y también es posible realizarlas de manera virtual, a través de nuestra audioguía, en [izi.TRAVEL](https://izi.travel)



IZI.TRAVEL

Pierre Auger Observatory

El Observatorio Pierre Auger está destinado al estudio de los Rayos Cósmicos de ultra elevada...



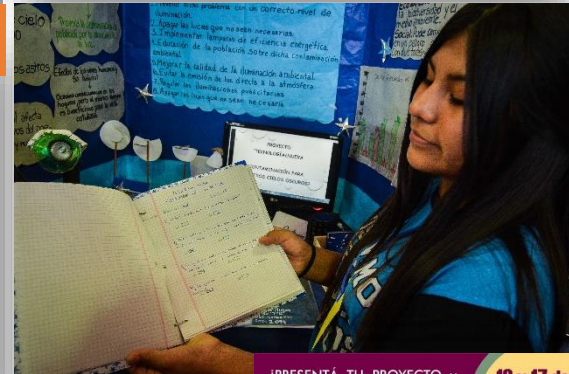
The Science Fair and the Parade



The Pierre Auger Observatory Science Fair provides a space where students can show their research skills and understanding for new scientific insights. The students exhibit their work developed together with their peers under the guidance of their teachers. They share and present the ideas to the international researcher of the Observatory.



2019



Every year in November happens the Malargue Day Parade. Students, (pre-)schoolchildren, teachers, nurses, dancers, all kind of sportclubs, gauchos, as well as the Pierre Auger Observatory parade the main street of Malargue!



Next in 2022



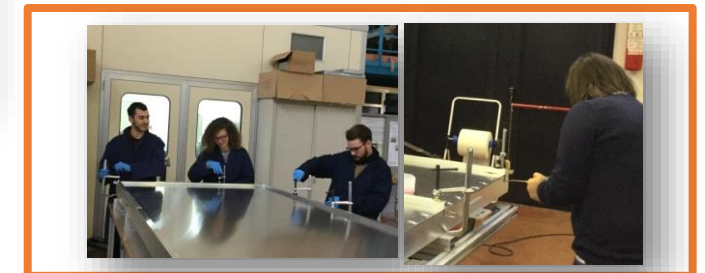
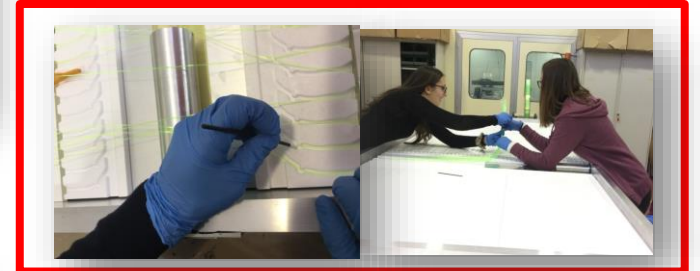
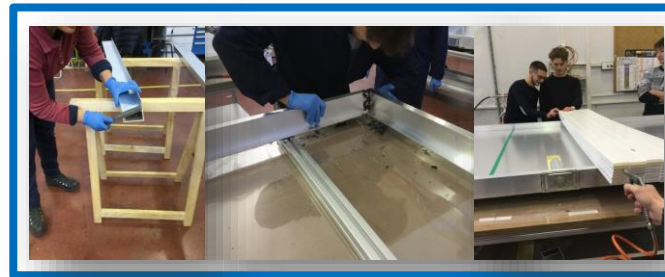
The Upgrade of the Observatory – cooperation with students

The upgrade of the Observatory includes, among others the production of around 1500 scintillator detectors modules. In Italy a specific project involving students has been introduced (UniSalento and INFN Lecce) – (pre-covid activity)

- Security training
- Introduction on Cosmic Rays and Auger (usually a small group 4/5 people interacting with a researcher-tutor 30 min)
- The students follow all the phases of production («DOING PHYSICS BY HANDS») while talking about detection methods, and physics related issues

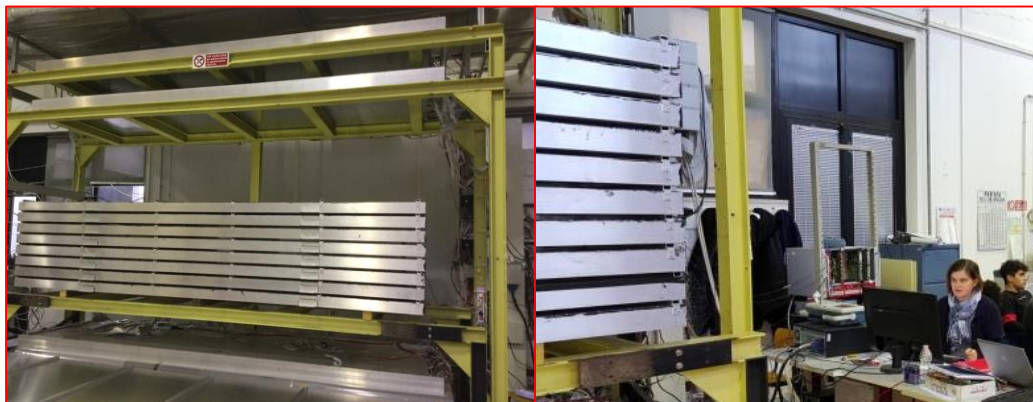


4 main production steps (frame assembling – fiber insertion – cookie alignment/cement – top closing).

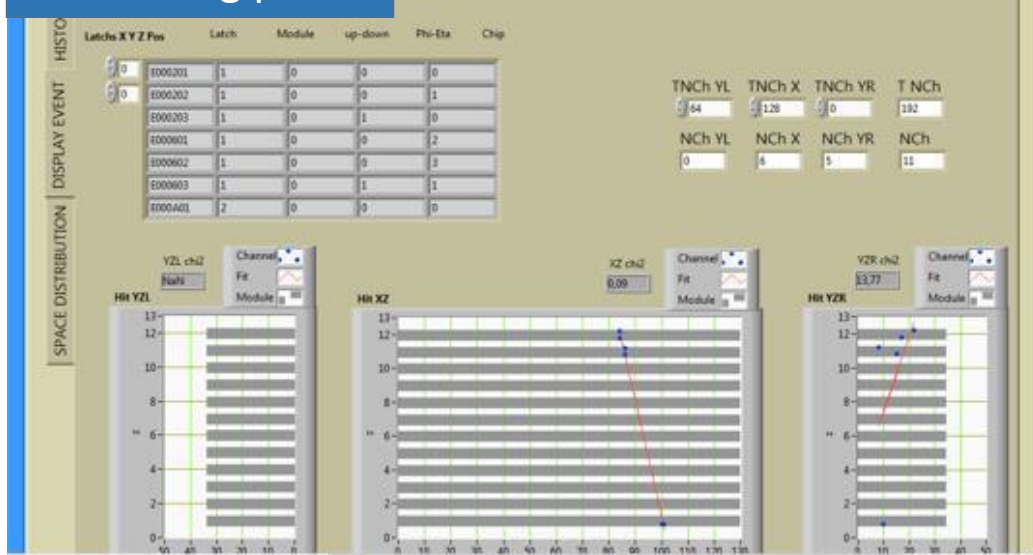


Interaction with collaborators from different institute/countries was often possible

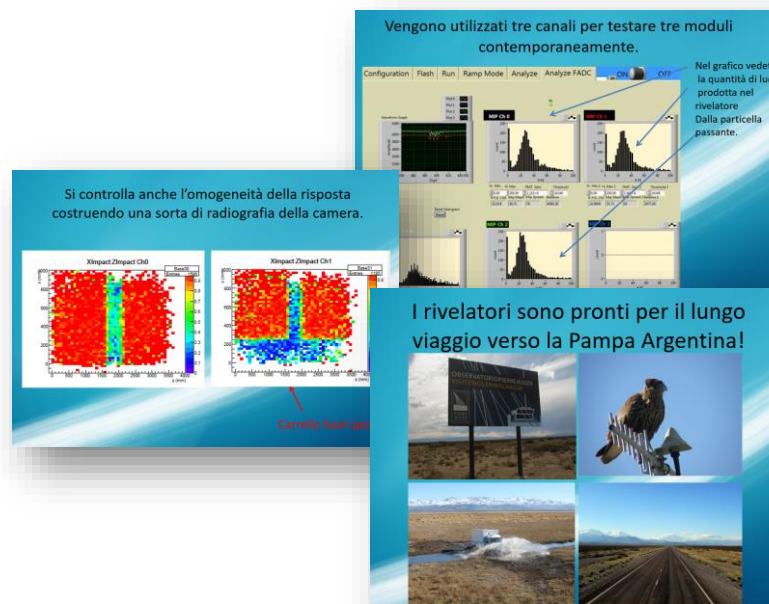
The Upgrade of the Observatory – cooperation with students



The testing phase



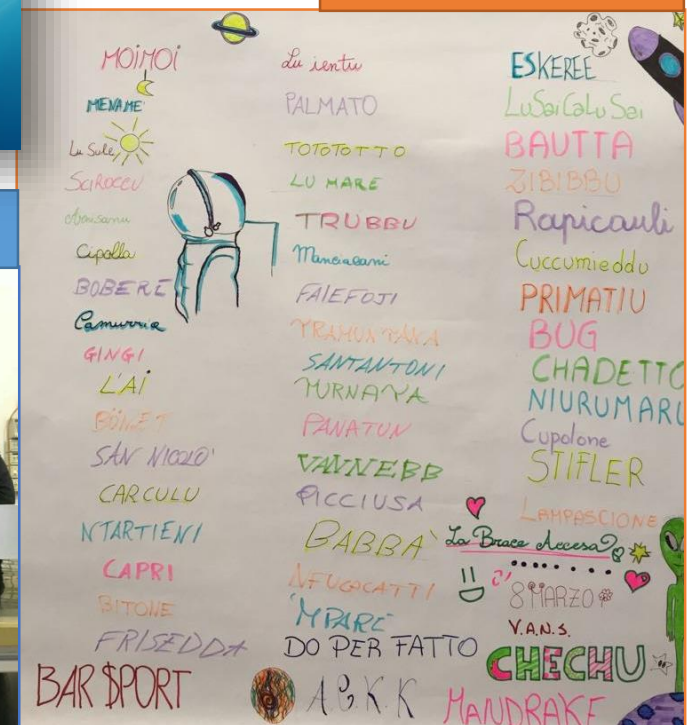
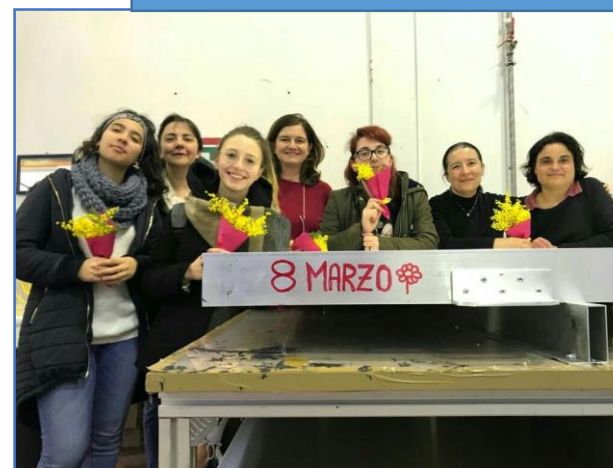
1 or 2 weeks activity



The REPORT: Presentation of the results and their work to the researcher.

#SSD Nicknames

Celebrating special DAY



Open Data - tutorial and training sessions for teachers/students

<https://opendata.auger.org/>

Pierre Auger Observatory Open Data

October 2021 release

The Pierre Auger 2021 Open Data is the public release of 10% of the Pierre Auger Observatory cosmic-ray data presented at the [36th International Cosmic Ray Conference](#) held in 2019 in Madison, USA, following the [Auger Collaboration Open Data Policy](#). The release also includes 100% of weather and space-weather data collected until 31 December 2020.

This website hosts the datasets for download. A brief overview of the [Pierre Auger Observatory](#) and of the [Auger Open Data](#) is set out below. An online event display to explore the released cosmic-ray events, and example analysis codes are provided. An outreach section dedicated to the general public is also available.



Datasets

[the released datasets and their complementary data](#)



Visualize

[an online look at the released pseudo raw cosmic-ray data](#)



Analyze

[example analysis codes in online python notebooks to run on the datasets](#)



Outreach

[a page dedicated to the general public](#)

Specific training session for teachers/students on how to use the Open Data have been performed by specialized researcher

e.g. in Italy training session for teachers during public events



I RAGGI COSMICI A SCUOLA
workshop per insegnanti
ven 9 Luglio h 10
Castello di Malcavella
Palazzo di Esanatoglia (MC)

2021

INFN
Istituto Nazionale di Fisica Nucleare

a cura di
SILVIA MIOZZI
Ricercatrice Università di Roma Tor Vergata e INFN

introduce
GIORGIO CHIARELLI
Presidente Comitato di Coordinamento di Terza Missione dell'INFN

VIVIANA SCHIENINI
Ricercatrice Università del Salento e INFN

Auger Data Masterclasses (v0)

<https://wminho.lip.pt/augermasterclasses/>

PIERRE AUGER MASTERCLASSES

HOME ACTIVITIES DOWNLOADS

*First test of the International
masterclass went on 9th May 2022*
• *Total of 80 high-school students
analyzing Auger data
Portugal (LIP)-Italy (INFN)*

Welcome to the
**PIERRE
AUGER**
OBSERVATORY
Masterclasses

Experimental activity

- Students work by themselves in a computer, using a 3D interactive interface
- Printed exercise guides are provided and help also from tutors in the room



Event reconstruction

1. Stations selection
2. Reconstruction of ϕ , θ
3. Reconstruction of the energy

Event selection

4. Application of selection criteria

Analysis and discussion

- large-scale anisotropy sky map

Event-by-event
analysis of up to 50
Auger public events

Discussion by
videoconference of
the combined result

1 afternoon:

- Welcome
- Introductory talk (1h)
- Experimental Activity (1h)
- Video Conference (1 h)
- Discussion of the results (national/international)
- Quiz

Worldwide Inspirational Activities

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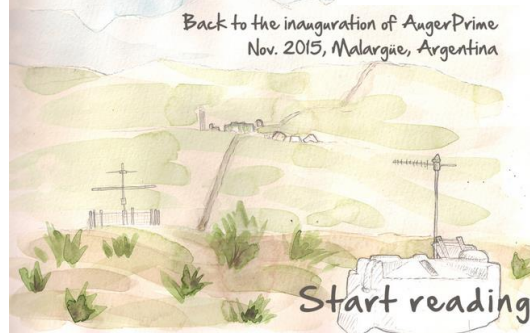
PIERRE
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OBSERVATORY

Several institutions and many different countries... <https://journeytoauger-blog.tumblr.com/>

<https://youtu.be/pX6JFwbZU2I>



Journey to Auger GERMANY

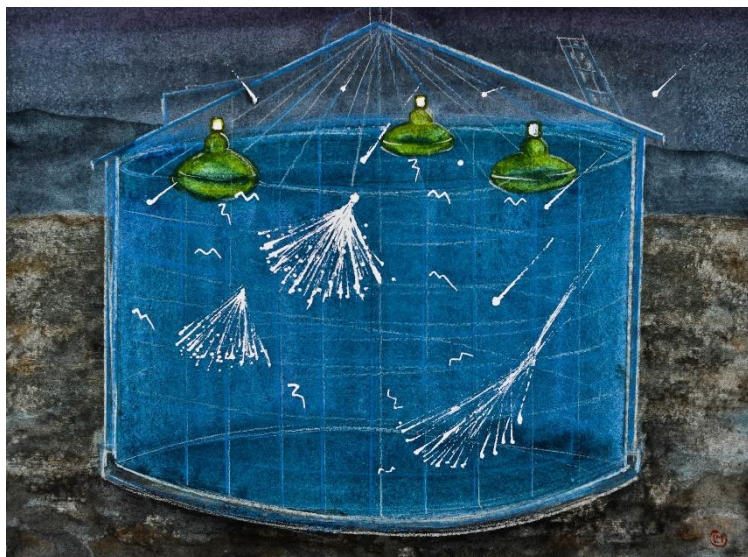


View on Coihueco in watercolor ink. We already posted [views from the field](#) to [Los Leones](#), but we were missing a view from the field to Coihueco. Marieno painted it, when we were already back in Karlsruhe.



installation of a projection
globe in USA

<http://www.space-science.ro/collaborations/auger/paintingsGallery.html>



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Pierre Auger Observatory APARECIDO
CROCHET MASK -ITALY

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