SYMPOSIUM & CELEBRATION PROGRAM

Thursday 14 November

09:00 - 09:45 Symposium Registration
09:45 - 13:00 Scientific Symposium
Science Fair (in parallel)
13:00 - 15:00 Lunch (on your own)
15:00 - 18:00 Scientific Symposium
Science Fair (in parallel)
18:00 - 19:30 Light reception

Friday 15 November

09:00 - 13:00 Scientific Symposium
Science Fair (in parallel)
13:00 - 18:00 Tour of the Auger Observatory
(Lunch provided)
20:30 - 22:00 General public talk in Spanish

Saturday 16 November

09:00 - 11:00 Finance Board closed meeting
09:30 - 12:00 Malargüe Parade (downtown)
13:00 - 15:00 Lunch (on your own)
16:00 - 18:00 Celebration (Auger campus)
20:00 - 23:00 Reception

Picture credits: The Pierre Auger Collaboration

PIERRE AUGER OBSERVATORY

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Argentina

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Secretariat:
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PIERRE AUGER OBSERVATORY

Celebration of the first 20 years of the

PIERRE AUGER OBSERVATORY

Malargüe, Argentina
November 14-16, 2019

ULTRA-HIGH ENERGY COSMIC-RAYS

Cosmic-rays are charged particles constantly bombarding the Earth and are one of the cosmic messengers that help us understand our Universe. At the highest energies, they are less deflected by the Galactic and extra-Galactic magnetic fields, possibly opening a new window in charged-particle astronomy. The goal of the Pierre Auger Observatory is to study the nature and origin of those Ultra-Energy Cosmic-Rays (UHECRs).

A BRIEF HISTORY OF THE OBSERVATORY

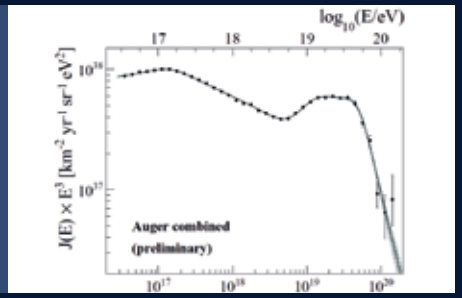
The Pierre Auger Observatory was conceived by Jim Cronin and Alan Watson at the 1991 International Cosmic Ray Conference in Dublin to address the mysteries of the origin and nature of the highest-energy cosmic rays. It was clear to them that only a very large detector would have the exposure to collect enough events to answer the questions raised by a century of earlier experiments.

The Observatory design evolved into a „hybrid“ detector system consisting of a 3000 km^2 array of 1660 particle detectors overlooked by 27 optical telescopes. These complementary detector techniques would record both the particles and the faint fluorescence light resulting from the particle cascade initiated in the atmosphere by these mysterious cosmic rays.

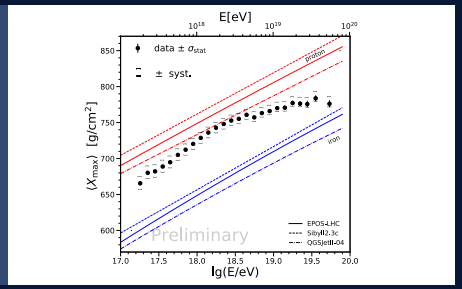
1991 Concept of the Pierre Auger Observatory
1995 Observatory design
1999 International Agreement signed
2001 Construction initiated with the Engineering Array
2004 First science results
2008 Construction complete, Inauguration
2015 International Agreement renewed
2016 First upgraded detectors in the field
2019 First antenna of the Radio Upgrade

MAIN RESULTS OF THE OBSERVATORY

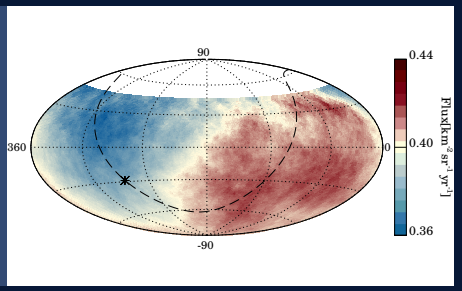
Confirmation of the existence of a strong flux suppression at the highest energies. Its origin is not yet fully explained.
[PoS(ICRC2019)450]



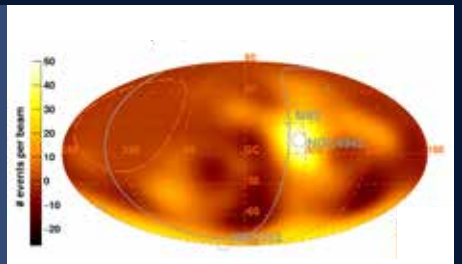
First indication that the primary composition of ultra-high energy cosmic-rays is getting heavier at higher energies.
[PoS(ICRC2019)482]



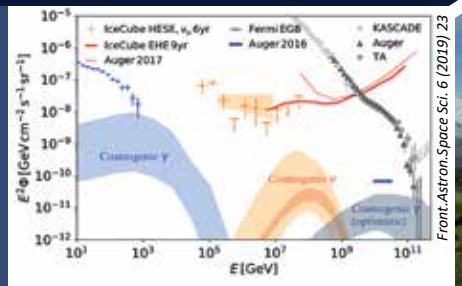
Discovery of a large scale anisotropy in the arrival directions of ultra-high energy cosmic-rays indicating that their origin is outside our Galaxy.
[Science 357 (2017) 1266.]



Intermediate scale anisotropies suggested by correlation with different astrophysical catalogs.
[ApJL 853:L29, 2018]



Best upper limits on the flux of UHE neutral primaries and a key role in the field of multi-messenger astrophysics.
[JCAP 1910 (2019) 022]
[JCAP 1704 (2017) 009]



Front.Astron.Space Sci. 6 (2019) 23

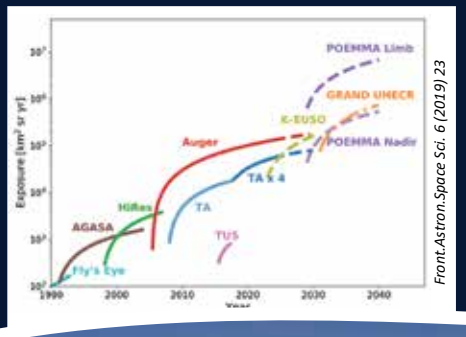
A BRIGHT FUTURE

Spurred by the science results obtained so far, the Observatory is currently undergoing an upgrade („AugerPrime“), mostly aimed at improving the sensitivity of the surface detector to primary mass composition. This is done by installing new electronics, and a small PMT, and additional and complementary detectors, allowing for a better separation of the electromagnetic and muonic components of cosmic-ray showers on an event-by-event basis,

- surface scintillator detectors, a slab of scintillator and
- radio antennas (30-80 MHz), recording the radio signal from extensive air showers, both to be installed atop of the existing stations, and
- an array of buried muon counters in the dense part of the array (AMIGA).

The added observables are critical to select the subset of showers likely arising from lighter primaries, which in turn may hold the key to identifying and studying the cosmic accelerators outside our own galaxy.

More generally, the data collected with AugerPrime will also be used to explore fundamental particle physics at energies beyond those accessible at terrestrial accelerators, and perhaps yield the observation of new physics phenomena.



Front.Astron.Space Sci. 6 (2019) 23