

13:00 - 13:25	20+5 min	Valerio	"Introduzione, richieste complessive e CF"
13:25 - 13:50	20+5 min	Antonella	"Stato Auger (upgrade, review FB, ...)"
13:50 - 14:05	10+5 min	attività/richieste CT	Rossella
14:05 - 14:20	10+5 min.	attività/richieste GSGC	Francesco (remoto)
14:20 - 14:35	10+5 min.	attività/richieste LE	Lorenzo P.
14:35 - 14:50	10+5 min.	attività/richieste MI	Federico M. M. e Lorenzo C.
14:50 - 15:05	10+5 min.	attività/richieste NA	Laura
15:05 - 15:20	10+5 min.	attività/richieste RM2	Valerio
15:20 - 15:35	10+5 min.	attività/richieste TO	Antonella
15:35 - 16:00			discussione finale e tempo di backup per eventuali ritardi
16:00 - 17:00			riunione tra i referee

Osservatorio Pierre Auger

Stato e richieste finanziarie

V. Verzi

INFN – Roma “Tor Vergata”



17-07-2023



Sezioni INFN
CT LE
CSGC MI
NA RM2 TO

PIERRE AUGER OBSERVATORY

Malargüe - Argentina

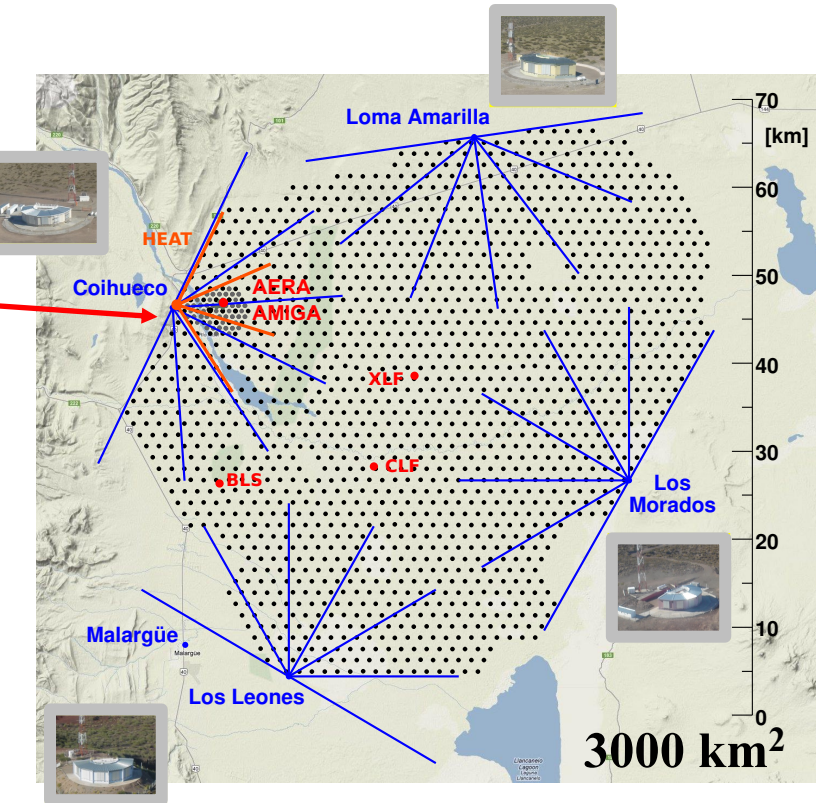
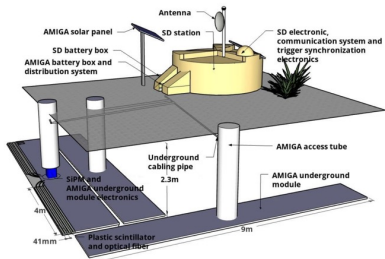
35° S latitude ≈ 1400 m
height ≈ 875 g/cm²

750 m array with 63
detectors – 23.4 km²

3 high elevation telescopes



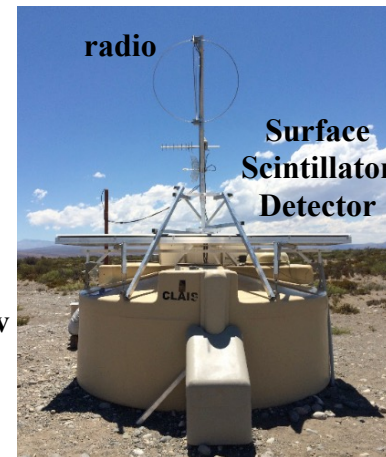
Underground muon detector



atmospheric
monitoring

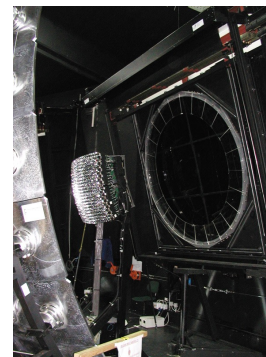


Upgraded Surface
Detector (1600)



Water
Cherenkov
Detector

Upgraded Unified Board
+ small PMT in the tank



Fluorescence
Detector
(24 telescopes)

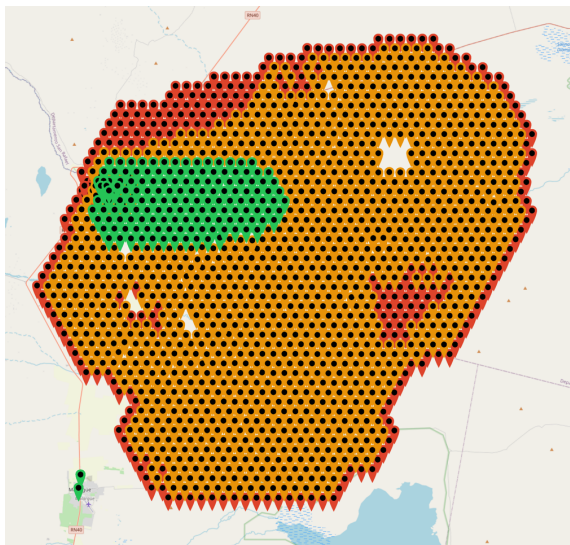
Status of the installation of AugerPrime

Installation of UUB (+ sPMT + SSD-PMT) concluded



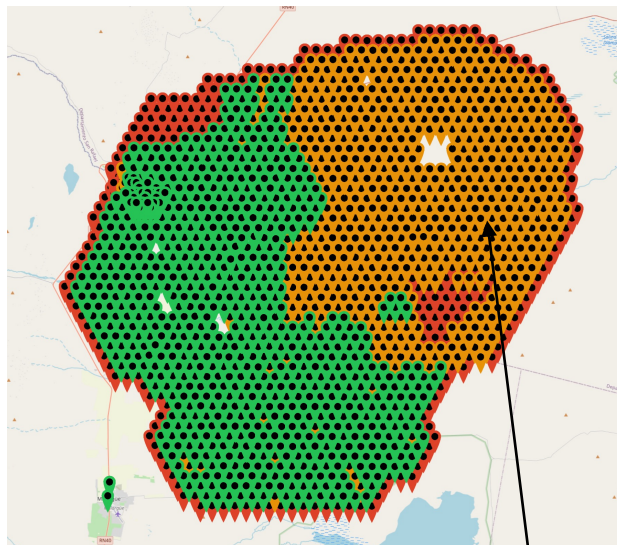
SITAEL

Nov 2021



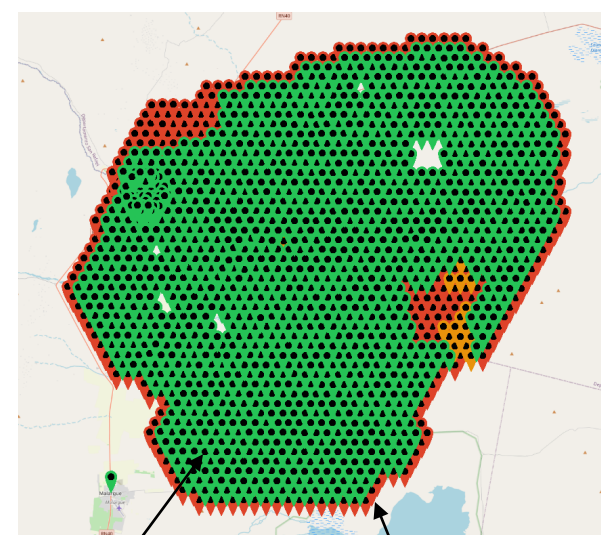
installation SSD concluded past summer

Nov 2022



old
electronics

June 2023

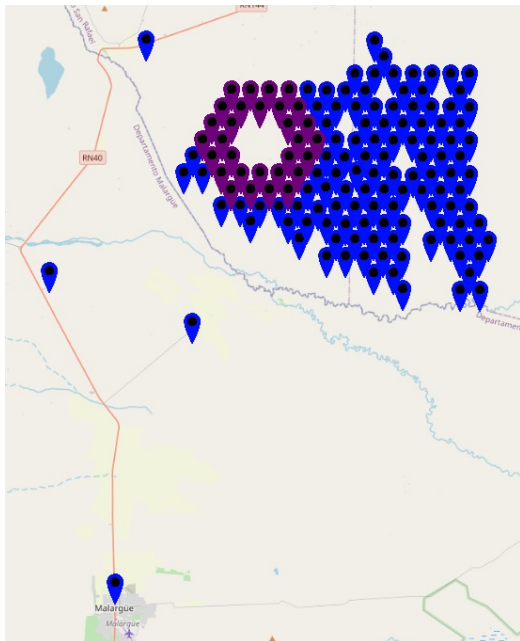


upgraded
stations

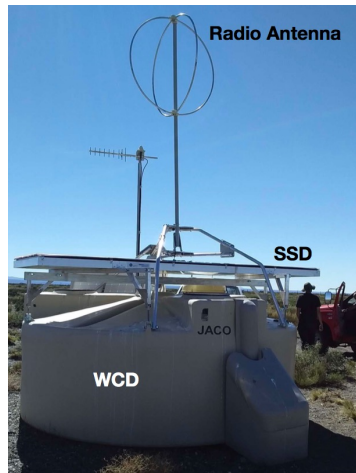
without
SSD

Status of the installation of AugerPrime

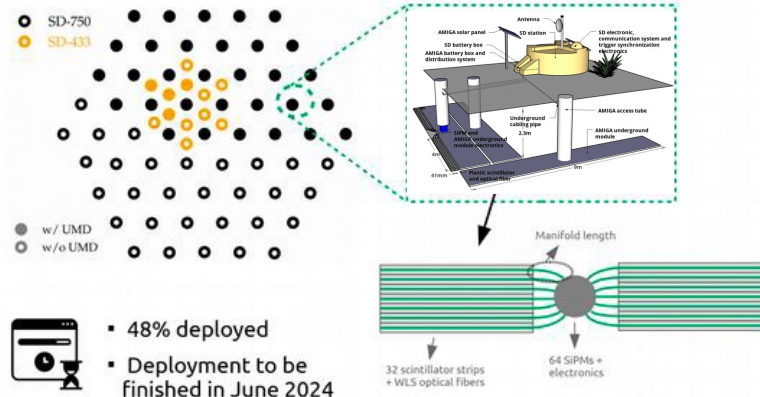
SALLA Installed (30 detectors)
 with Antenna (148 detectors)
 with Digitizer (30 detectors)



Radio antenna



Underground Muon Detector

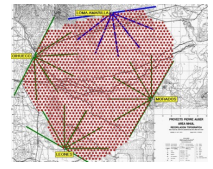


Radio & UMD: installation will be concluded in 2024

International agreement


Professor Enzo Iarocci
President of INFN
Rome, Italy

End of construction of the Observatory



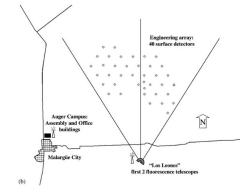
New International agreement


Prof. Fernando Ferroni
President
Date: 16 NOV. 2015

20th Anniversary Symposium



Engineering Array NIM A 523 (2004) 50-59



PDR AugerPrime



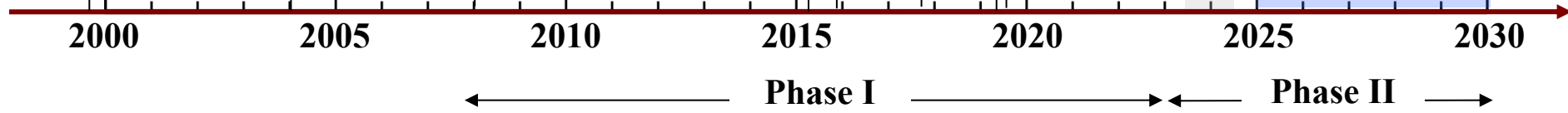
FB approves Auger Prime

Foreseen end of AugerPrime construction



array of 77 SSDs

Extension of data taking (to be finalized)

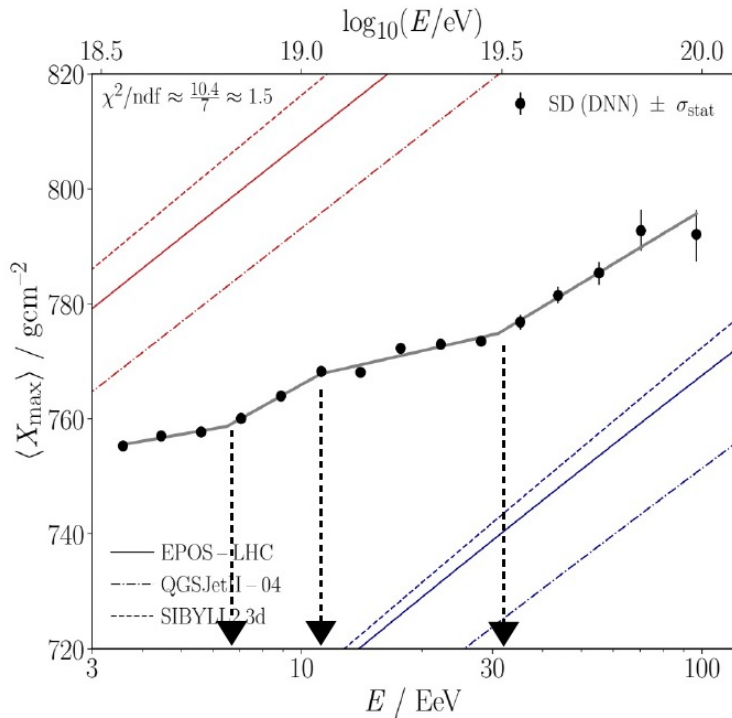


Analisi dati Phase 1: 120,000 km² sr yr

Commissioning AugerPrime

Review Finance Board per estensione della presa dati

X_{\max} from SD using Deep Neural Network

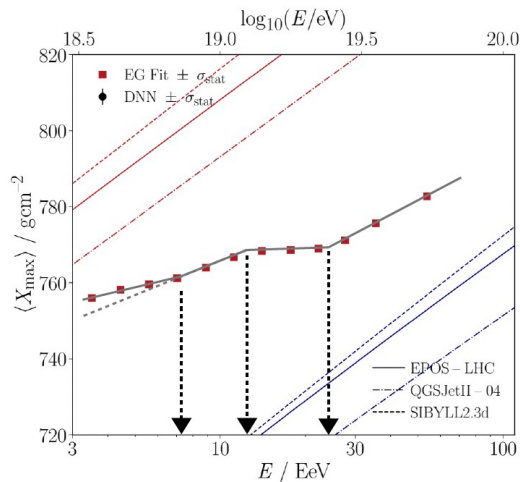
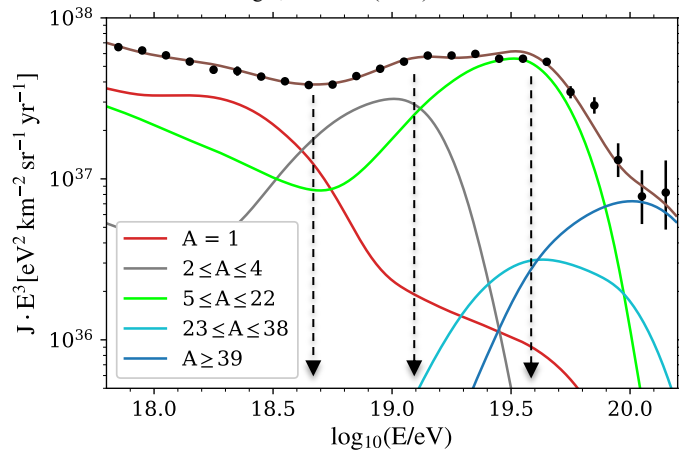


results presented for the first time at ICRC 2023

breaks consistent with the spectrum features

rigidity cut-off at the source: $E_{\max} \approx 5 \times Z \text{ EeV}$

Auger, JCAP 05 (2023) 024





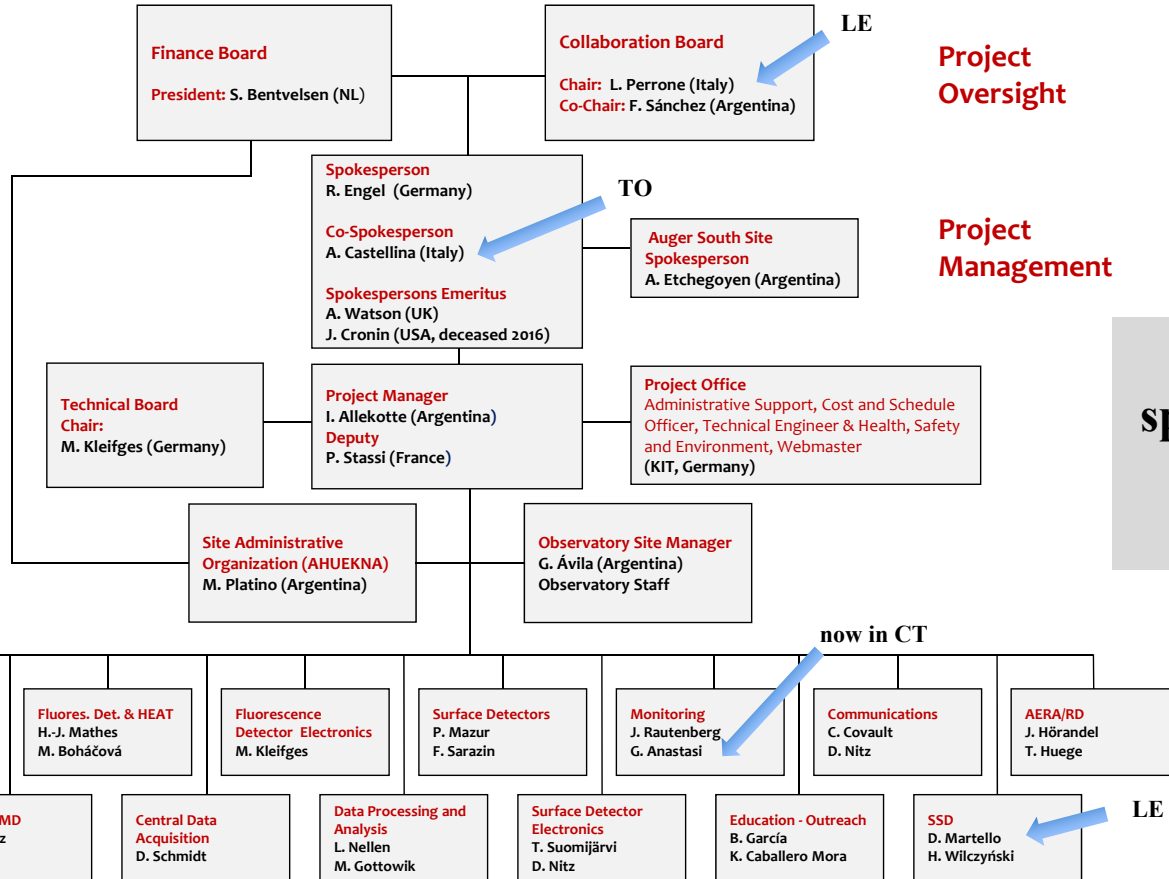
PIERRE
AUGER
OBSERVATORY

17 Countries
98 Institutions
~400 Scientists



55 Scientists
CT LE
CSGC MI
NA RM2 TO

Organization of the AUGER Observatory

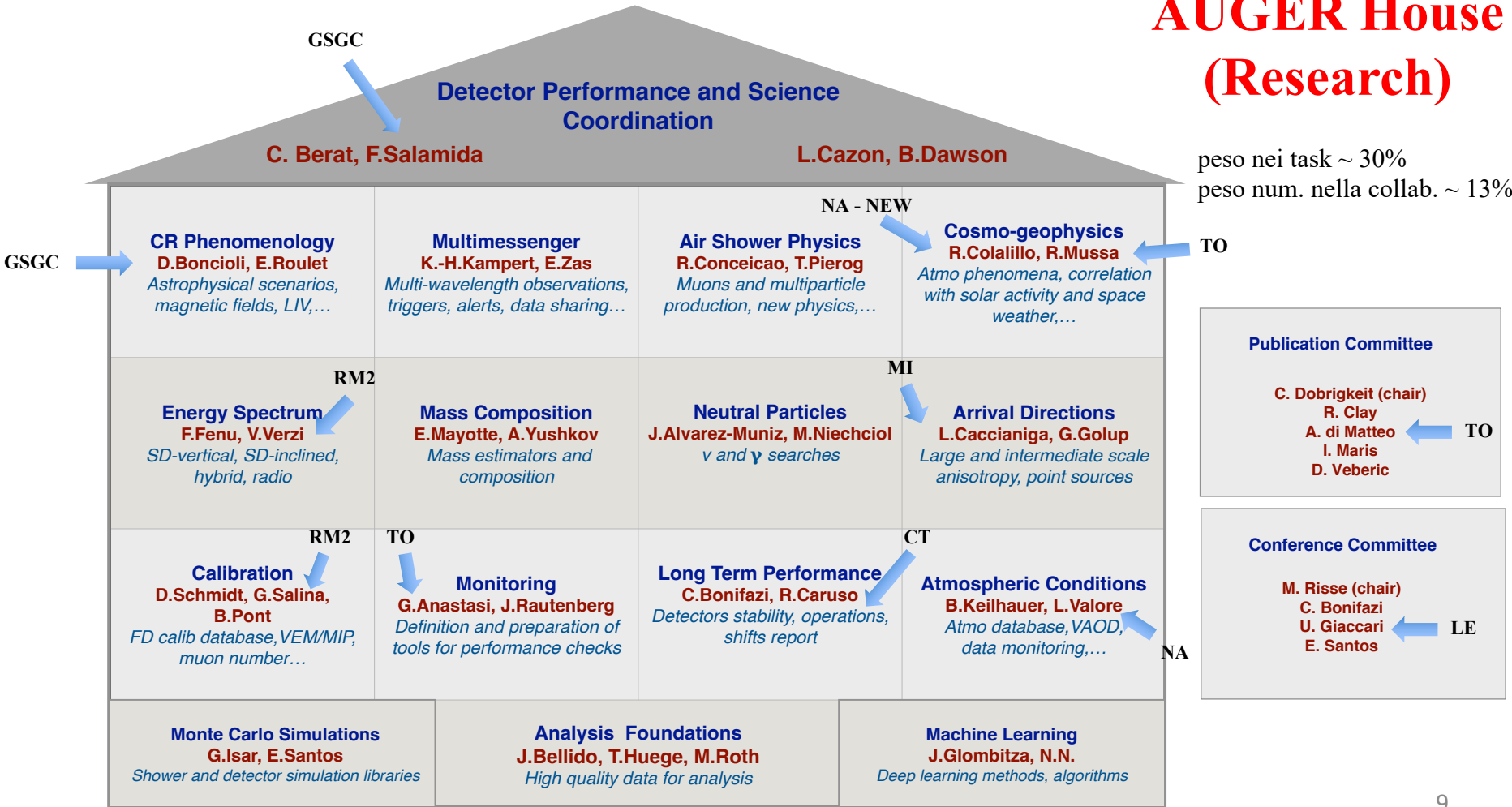


Project Oversight

Project Management

Elezioni
spokespersons
prossimo
Novembre

AUGER House (Research)



Publications

2 under collaboration review

- Testing **Hadronic-Model** Predictions of Depth of Maximum of Air-Shower Profiles and Ground-Particle Signals using Hybrid Data of the Pierre Auger Observatory
- Search for Ultra-High-Energy **Neutrinos** from **Binary Black Hole Mergers** with the Pierre Auger Observatory

3 submitted

- Demonstrating Agreement between **Radio** and Fluorescence Measurements of the **Depth of Maximum** of Extensive Air Showers at the Pierre Auger Observatory
- **Radio** Measurements of the **Depths of Air Shower Maxima** at the Pierre Auger Observatory
- **Constraining models** for the origin of ultra-high-energy cosmic rays with a novel **combined** analysis of **arrival directions, spectrum, and composition** data measured at the Pierre Auger Observatory

submitted to PRL
submitted to PRD
submitted to JCAP

6 in 2023

- **Constraining the sources** of ultra-high-energy cosmic rays across and above the ankle with the **spectrum** and **composition** data measured at the Pierre Auger Observatory
- Search for **photons** above 10^{19} eV with the surface detector of the Pierre Auger Observatory
- Limits to gauge coupling in the dark sector set by the non-observation of instanton-induced decay of **Super-Heavy Dark Matter** in the Pierre Auger Observatory data
- Cosmological implications of photon-flux upper limits at ultra-high energies in scenarios of Planckian-interacting massive particles for **dark matter**
- **A Catalog of the Highest-Energy Cosmic Rays** recorded during Phase I of Operation of the Pierre Auger Observatory
- Search for UHE Photons from Gravitational Wave Sources with the Pierre Auger Observatory

JCAP 05 (2023) 024
JCAP 05 (2023) 021
Phys. Rev. Lett. 130 (2023) 061001
Phys. Rev. D 107 (2023) 042002
Astrophys. J. Suppl. S. 264 (2023) 50
Accepted in Astrophys. J.

5 in 2022

- Searches for Ultra-High-Energy **Photons** at the Pierre Auger Observatory
- **Arrival Directions** of Cosmic Rays above 32 EeV from Phase One of the Pierre Auger Observatory
- Search for Spatial Correlations of **Neutrinos** with Ultra-High-Energy Cosmic Rays
- A search for **photons** with energies above 2×10^{17} eV using hybrid data from the low-energy extensions of the Pierre Auger Observatory
- Testing effects of **Lorentz Invariance Violation** in the propagation of astroparticles with the Pierre Auger Observatory

Universe 8 (2022) 579
Astrophys. J. 935 (2022) 170
Astrophys. J. 934 (2022) 164
Astrophys. J. 933 (2022) 125
JCAP 01 (2022) 023

Presentations at ICRC in Nagoya

44 contributions (23 oral and 21 poster). 6 in collaboration with other experiments (mainly with TA)

Highlight talk by F.Salamida

Title

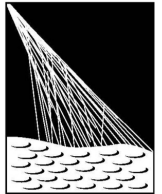
[The second knee in the cosmic ray spectrum observed with the surface detector of the Pierre Auger Observatory](#)
[An update on the arrival direction studies made with data from the Pierre Auger Observatory](#)
[Search for evidence of neutron fluxes using Pierre Auger Observatory data](#)
[Constraining models for the origin of ultra-high-energy cosmic rays with spectrum, composition, and arrival direction data measured at the Pierre Auger Observatory](#)
[Measurement of the mass composition of ultra-high-energy cosmic rays at the Pierre Auger Observatory](#)
[Mass Composition from 3 EeV to 100 EeV using the Depth of Maximum of Air-Shower Profiles Estimated with Deep Learning using Surface Detector Data of the Pierre Auger Observatory](#)
[Depth of Maximum of Air-Shower Profiles above \$10^{17.8}\$ eV Measured with the Fluorescence Detector of the Pierre Auger Observatory and Mass Composition Implications](#)
[Measuring the muon content of inclined air showers using AERA and the water-Cherenkov detector of the Pierre Auger Observatory](#)
[Measurement of the composition of cosmic rays and proton-proton interaction cross sections at ultra-high energies with the Pierre Auger Observatory](#)
[The number of muons measured in hybrid events detected by the Pierre Auger Observatory](#)
[Combined fit to the spectrum and composition data measured by the Pierre Auger Observatory including magnetic horizon effects](#)
[Constraints on UHECR characteristics from cosmogenic neutrino limits with the measurements of the Pierre Auger Observatory **](#)
[Investigating multiple elves and halos above strong lightning with the fluorescence detectors of the Pierre Auger Observatory**](#)
[Study of downward Terrestrial Gamma-ray Flashes with the surface detector of the Pierre Auger Observatory](#)
[Constraints on upward-going air showers using the Pierre Auger Observatory data](#)
[Constraints on BSM scenarios from upper limits to upward-going air showers at the Pierre Auger Observatory](#)
[Search for primary photons at tens of PeV with the Pierre Auger Observatory](#)
[Latest results from the searches for ultra-high-energy photons and neutrinos at the Pierre Auger Observatory](#)
[Reconstruction of muon number of air showers with the surface detector of the Pierre Auger Observatory using neural networks **](#)
[Deep-Learning-Based Cosmic-Ray Mass Reconstruction Using the Water-Cherenkov and Scintillation Detectors of AugerPrime](#)
[Investigations of a Novel Energy Estimator using Deep Learning for the Surface Detector of the Pierre Auger Observatory](#)
[Measurement of UHECR energy spectrum with the Pierre Auger Observatory and the Telescope Array](#)
[Update on the searches for anisotropies in UHECR arrival directions with the Pierre Auger Observatory and the Telescope Array](#)
[Possible interpretations of the joint observations of UHECR arrival directions using data recorded at the Telescope Array and the Pierre Auger Observatory](#)
[Depth of maximum of air-shower profiles: testing the compatibility of the measurements at the Pierre Auger Observatory and the Telescope Array](#)
[An update on the combined analysis of muon data from nine air-shower experiments at cosmic-ray energies above 1 PeV](#)
[Auger@TA: An Auger-like surface detector micro-array embedded within the Telescope Array Project](#)
[Long-term calibration and stability of the Auger Engineering Radio Array using the diffuse Galactic radio emission **](#)
[Radio Interferometry applied to air showers recorded by the Auger Engineering Radio Array](#)
[Reconstruction of Longitudinal Shower Profiles with the Fluorescence Detector of the Pierre Auger Observatory](#)
[The Time Evolution of the Surface Detector of the Pierre Auger Observatory **](#)
[Monitoring the inter-calibration of the HEAT and Caihueco fluorescence telescopes of the Pierre Auger Observatory with measurements of the brightness of the night sky](#)
[A new cross-check and review of aerosol attenuation measurements at the Pierre Auger Observatory](#)
[Measurements of Cloud Base Height and Coverage using Elastic Multiangle Lidar Scans at Pierre Auger Observatory](#)
[A Novel Tool for the Absolute End-to-End Calibration of Fluorescence Telescopes -- The XY-Scanner](#)
[Update on the Offline Framework for AugerPrime and production of reference simulation libraries using the VO auger grid resources](#)
[Portals to data of the Pierre Auger Observatory](#)
[International Masterclasses as part of the Pierre Auger Observatory program of Outreach and Education](#)
[Status and Performance of the Underground Muon Detector of the Pierre Auger Observatory **](#)
[AugerPrime implementation in the DAQ systems of the Pierre Auger Observatory**](#)
[The performance of the upgraded surface detector stations of AugerPrime](#)
[The dynamic range of the upgraded surface detector stations of AugerPrime **](#)
[Status and expected performance of the AugerPrime Radio Detector **](#)

ICRC ID	Type	ICRC Presenter
1 SPEC1	O	Gabriel Bricchetto
2 AD1	O	Geraldina Golup
3 AD2	O	Danelise Franco
4 AD3/ PHENO3	O	Teresa Bister
5 MASS1/AD4	O	Eric Mayotte
6 MASS2/ ML4	O	Jonas Glombitza
7 MASS3	P	Thomas Fitoussi
8 EAS1	P	Marvin Gottowik
9 EAS2	O	Olena Tkachenko
10 EAS3	O	Max Stadelmaier
11 PHENO1	O	Juan Gonzalez
12 PHENO2 NEUT3	P	Camilla Petrucci
13 CGEO1	P	Roberto Mussa
14 CGEO2	O	Roberta Colalillo
15 MM1	O	Emanuele de Vito
16 MM2	O	Baobiao Yue
17 NEUT1	O	Nicolás M. González
18 NEUT2	O	Marcus Niechciol
19 ML1/FOUND	P	Steffen Hahn
20 ML2/PRIME	P	Niklas Langner
21 ML3/SPEC	P	Fiona Ellwanger
22 WG1	O	Yoshiki Tsunesada
23 WG2_1	O	Lorenzo Caccianiga
24 WG 2.2	P	Mikhail Kuznetsov (TA)?
25 WG3	O	Alexey Yushkov
26 WG4 WHISP	O	Juan Carlos Artega
27 WG5	P	Sonja Mayotte
28 FOUND1	P	Rogério M. de Almeida
29 FOUND2	P	Harm Schoorlemmer
30 FOUND3	P	Jose Bellido
31 O<P1/CAL1	P	Orazio Zapparrata
32 O<P2/FOUND	P	Alberto Segreto
33 ATM1	O	Violet M. Harvey
34 ATM2	P	Juan Pallotta, Jorge Rodriguez
35 CAL1	P	Christoph Schäfer
36 MC1/DPA1	P	Eva Santos
37 DRT1	O	Piera L. Ghia
38 OUT1	O	Raul Sarmento
39 PRIME1/UMD	P	Poquín de Jesús
40 PRIME2/CDAS	P	Ricardo Sato
41 PRIME3/ SDEU/SSD	O	Fabio Conventa
42 PRIME4/SDEU	P	Gioacchino Alex Anastasi
43 PRIME6/RD	P	Jannis Pawlowsky

**nel 2024
avremo un voto
in più: GSSI**

- **it meets in presence at all Collaboration meetings**
2023: March and November in Malargüe, June in Bruxelles
- **Italy has 7 members (RL sezioni INFN) → 7 votes (over 43)**
+ **Lorenzo P. as chair and Antonella C. ex-officio** } 9 in total
- **reports of the CB chairs to the FB** 1/year just after the November Collaboration meeting
- revision of the Project Management Plan
- new membership - ICAS-ICIFI (Argentina), Universidade Federal de Campina Grande (Brasil)
- search Committee for next spokespersons elections
- publication of the Collaboration Code of conduct and creation of the office of the Ombudspersons
- inclusion of the new archiving policy
- impact award for young people
- early career initiative
- gender balance in career
- MoU for data exchange (LAGO, AMON, Telescope Array, ...)
- participation to the International Particle Physics Outreach group
- **increase the open data from 10% to 30% (past June)**
- **internal and external projects ... install Grand Antennas at the Observatory (past June)**
- **spokespersons elections (next November)**

The
Pierre Auger Project



**PIERRE
AUGER**
OBSERVATORY

Project Management Plan
Including the
Pierre Auger Observatory Upgrade

Version 10 – 28 February 2022
EDMS: 2262890 v.10

Richieste finanziarie per il 2024

	missioni		consumo	trasporti		manutenzione		inventario	speservizi	totali	
	SJ			SJ		SJ				SJ	
CT	36		2	16.5		3	5			57.5	5
GSGC	62.5		4	7						73.5	
LE	63.5		5	9				2		77.5	
MI	26			2						28	
NA	25		2	2						29	
ROMA2	20			3					270	293	
TO	61.5	27	10	9.5				23		105.5	27
Totale	294.5	27	23	49		3	5	25	270	664	32
Tot. 2023	326.5	18	21	45	2	2	6	17	243	654.5	26

Tot. missioni includendo il SJ 321,5 k€

Turni e attività sui rivelatori 131,5 k€

Meeting Malargue (Apr. e Nov.) 117 k€

Meeting Collab. Italiana 30 k€

Altro 43 k€

turni presa dati FD e attività “prime” e “non prime”

nota: celebrazione AugerPrime a Novembre

include le missioni SJ all’esito delle elezioni

nota: richieste missione in preventivi 2016-2020 \approx 430 k€ (\approx 22 k€ per conferenze)

COMMON FUND

FB Nov. 2022: **8.080,81 \$/persona** (era 7.960,20 \$/persona)

nota: la quota dovuta nel 2024 la sapremo solo a Nov. 2023

quota CF pagata per tutti i senior associati all'INFN

dove per senior si intende: FTE > 50% contratto di lavoro > PhD

nota:

- PhD e pensionati (FTE=0%) firmano comunque gli articoli di Collaborazione
- le persone con contratto INAF sono a carico dell'INAF

una eccezione:
Anastasi Gioacchino Alex
contratto PNRR università
CT senza sigla affine

Numero senior in quota all'INFN: 36 (erano 33)

Cambio euro dollaro (media 2023): 1,08

+ Anastasi Gioacchino Alex da INAF a INFN (CT)
+ Convenga Fabio post-doc (GSGC)
+ De Vito Emanuele da PhD post-doc (LE)
+ Giaccari Ugo ricercatore INFN (LE)
- Coluccia Maria Rita (LE)

$$\text{CF} = 8.080,81 \times 36 / 1,08 \approx 270 \text{ k€}$$

(erano 243 k€)

22/01/2023

Regolamenti CSN2

Linee Guida per gli impegni del personale di ricerca negli esperimenti di CSN2

Autore	Verificato da	Approvato da
Gabriella Cataldi Emanuele Leonora Fabio Mantovani Gabriele Sirri	Oliviero Cremonesi	CSN2

Lista di distribuzione:

- pubblico

CF di operazione	
$R = CF(k€) / F$	$\langle FTE \rangle = FTE_Tot / F$
0-2	40 %
2-4	50 %
4-6	60 %
6-8	70 %
> 8	$\geq 70 \% **$

** Tutti i firmatari dell'esperimento devono avere una frazione pro-capite di FTE pari al 70%.

Firmatari (F) ≈ 50

FTE_Tot ≈ 35

$\langle FTE \rangle \approx 0,7$

R $\approx 5,5$

FTE

CT 4,5

GSGC 8,4

LE 9,0

MI 5,1

NA 2,6

RM2 1,5

TO 6,6

STATO ASSEGNAZIONI 2023

assegnazioni in k€	MISS		CONS		TRA		MAN		INV	
		SJ		SJ		SJ		SJ		SJ
inizio anno	91		10		25	4	2	3	15,5	
Aprile	128 (a)		15 (c)		26	4	2	3	15,5	
Luglio	168 (b)		15		26	4	5	-	15,5	

(a) +37 k€ di missione per arrivare sino all'estate

(b) +40 k€ di missione per la seconda parte dell'anno

(c) +5 k€ di consumo per acquisto copri cavo SSD

nota: assegnazioni missioni 2022 ("ritorno alla normalità") = 147,5 k€
 assegnazioni missioni pre-covid (2016-2019) ≈ 270 k€

PREVISIONI COMMON FUND

richieste presentate al FB ogni Novembre (subito dopo il meeting di Collaborazione)

year	2018	2019	2020	2021	2022	2023
total USD	1780	1720	1690	1640	1600	1600

- richiesta costante/leggermente ridotta negli anni nonostante "inflazione USD"
- inflazione in Argentina compensata dall'evoluzione del cambio USD/ARS
- cambio EUR/USD storicamente stabile (nota: minimo nel 2022 $\approx 0,98$)
- **previsione oltre il 2025: leggero incremento dei costi ($\sim 8\%$) legato ai nuovi rivelatori**

nota: il costo non dipende dal numero di ricercatori che afferiscono alla Collaborazione !

MILESTONES

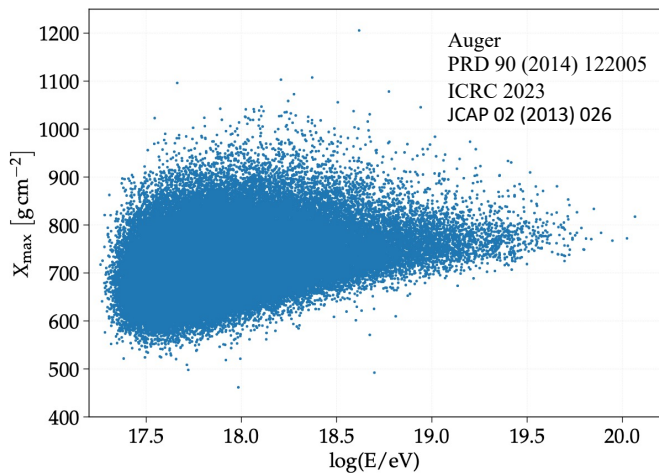
31-12-2023

- un articolo su rivista peer-reviewed riguardante SSD
- un articolo su rivista peer-reviewed riguardante la UUB e lo Small PMT
- un lavoro a stampa su commissioning e caso scientifico di AugerPrime per la review richiesta dal Financial Board

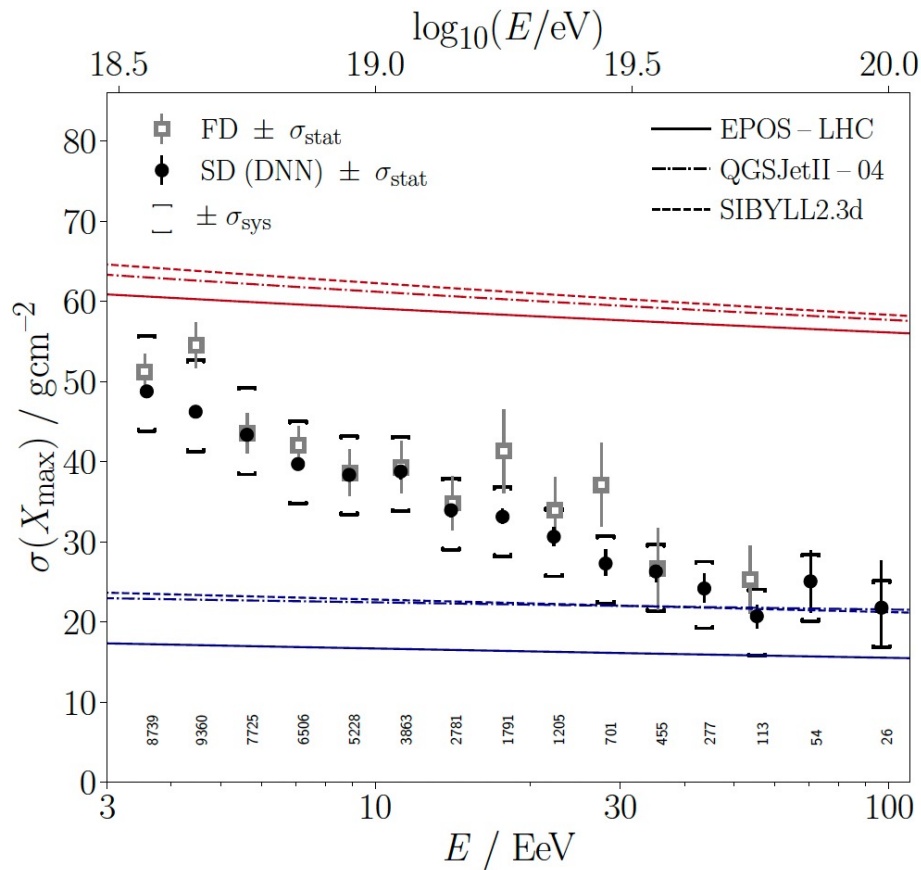
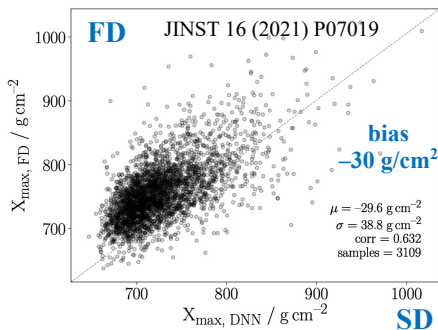
31-12-2024 (preliminare)

- ratifica da parte del FB dell'estensione della presa dati oltre il 2025
- completamento commissioning UUB/SSD/sPMT
- primi risultati scientifici con UUB/SSD/sPMT (es.: new LDF with sPMT and LDF for SSD)

END

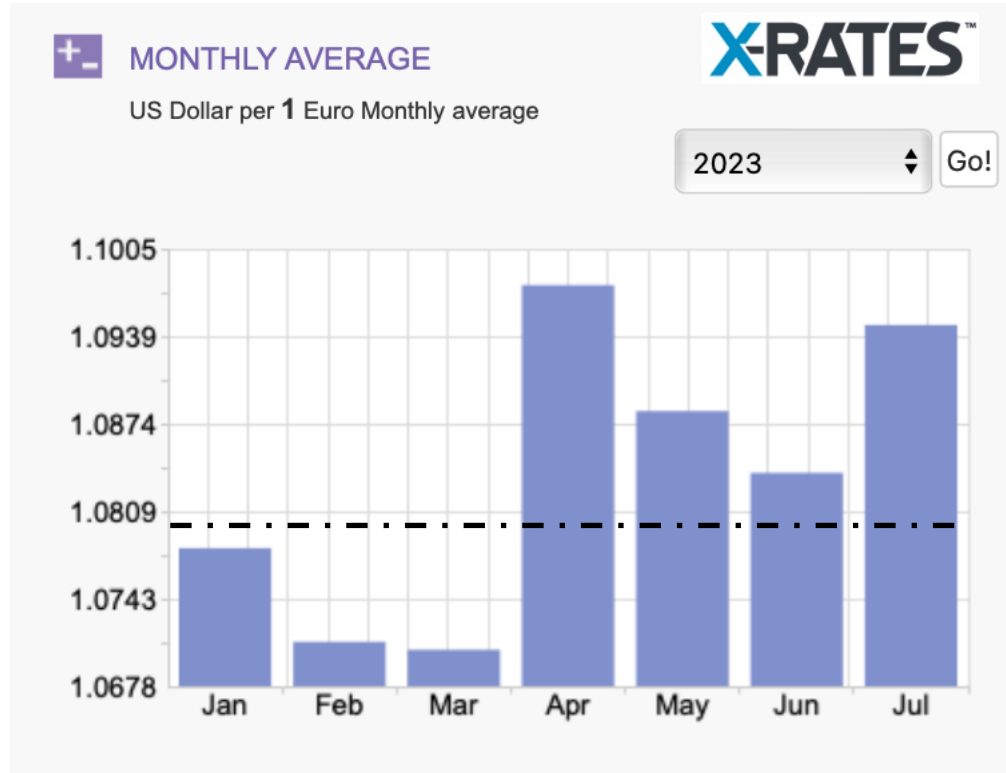


calibration against X_{\max} from FD



$\sigma(X_{\max})$ non dipende dalla calibrazione

EUR/USD exchange rate



average
in 2023
=
1,08