

Auger-Italia meeting

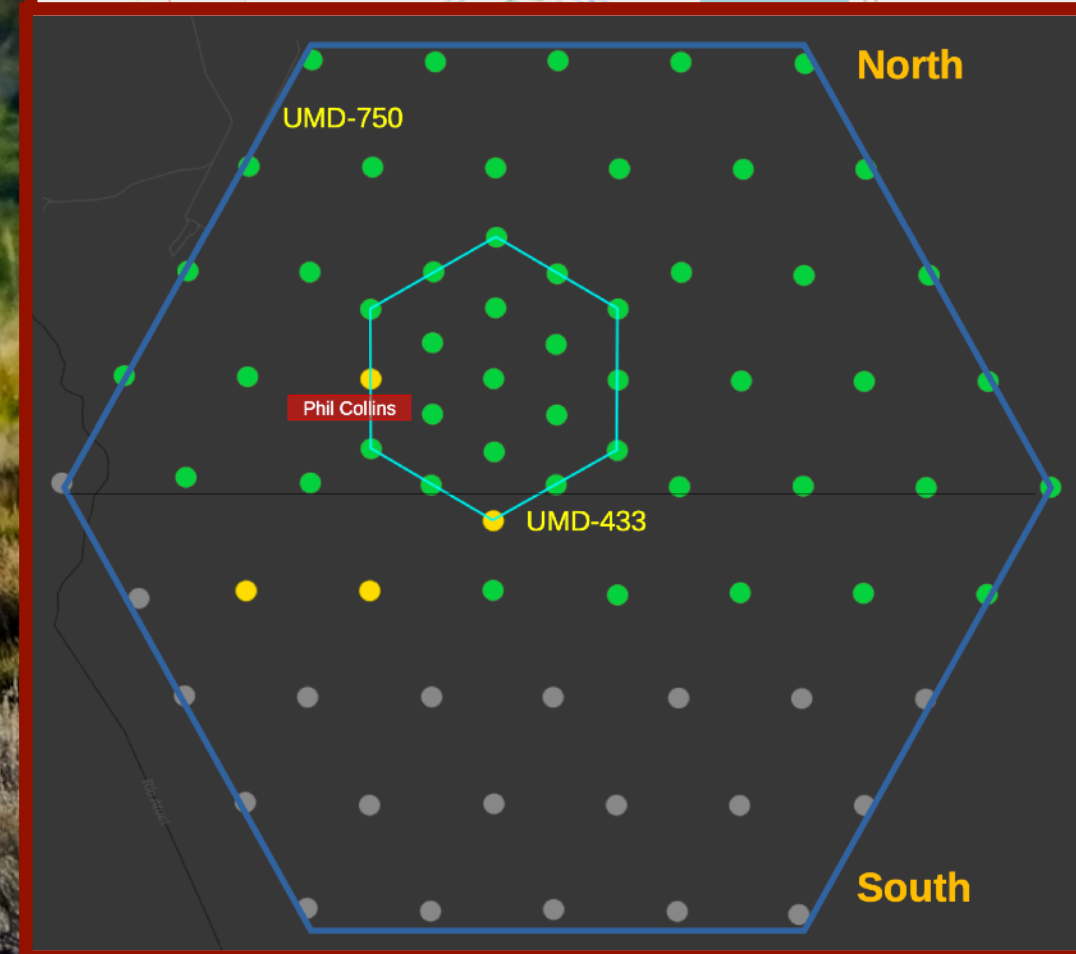
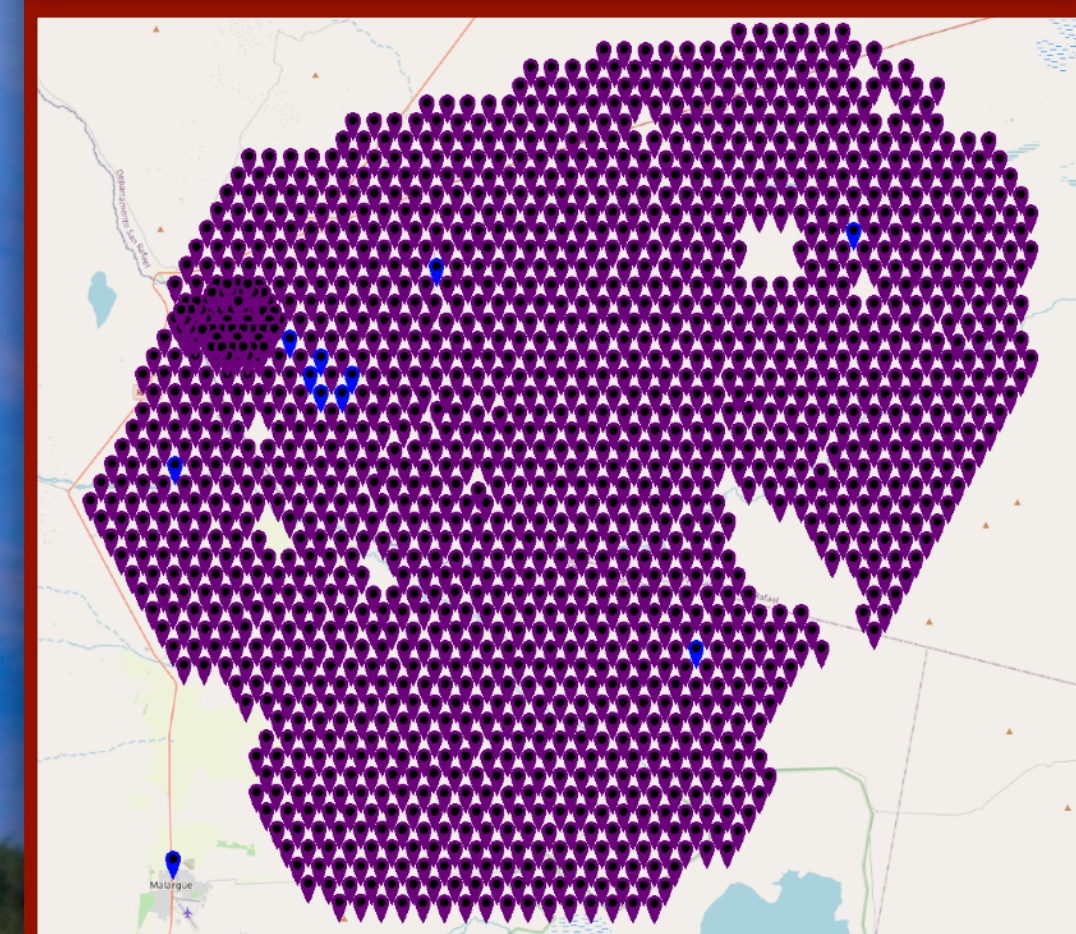
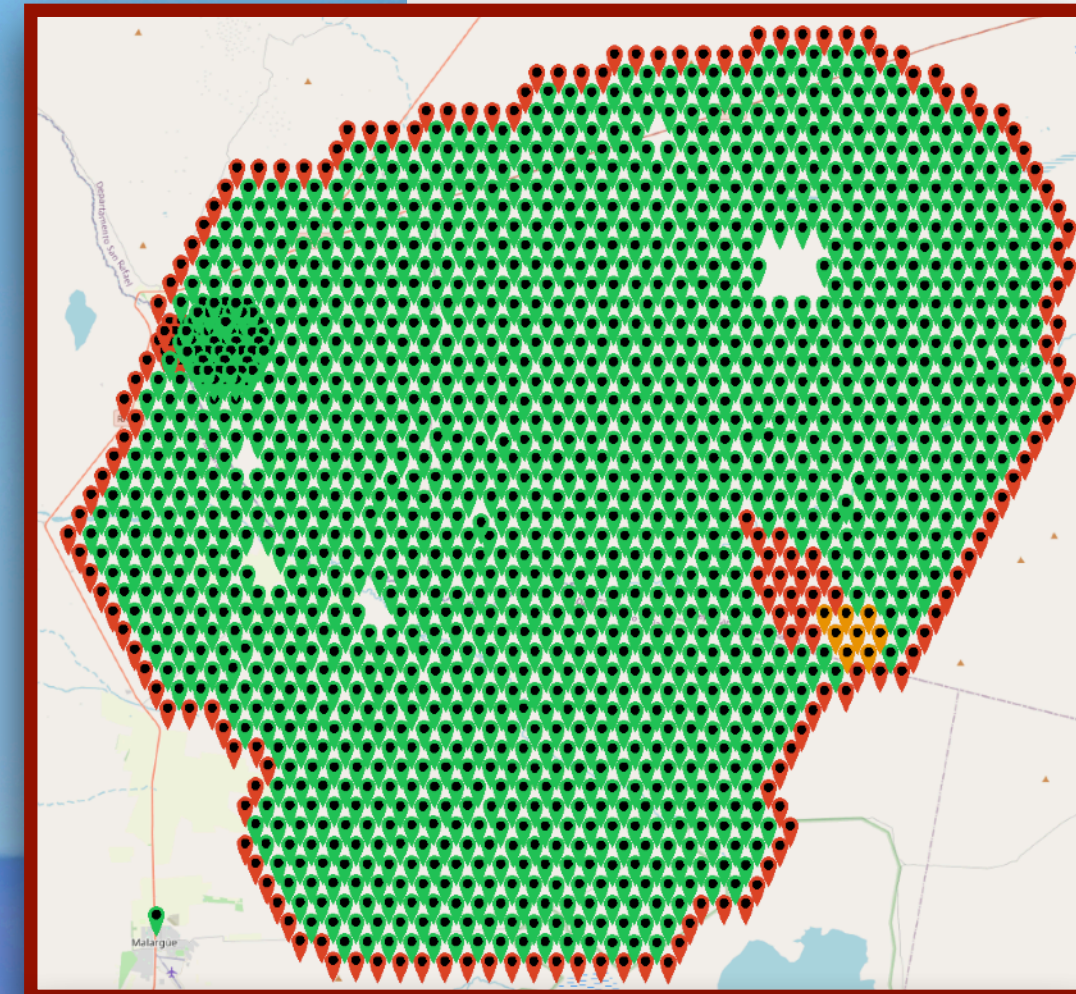
Antonella Castellina

INFN, Sezione di Torino

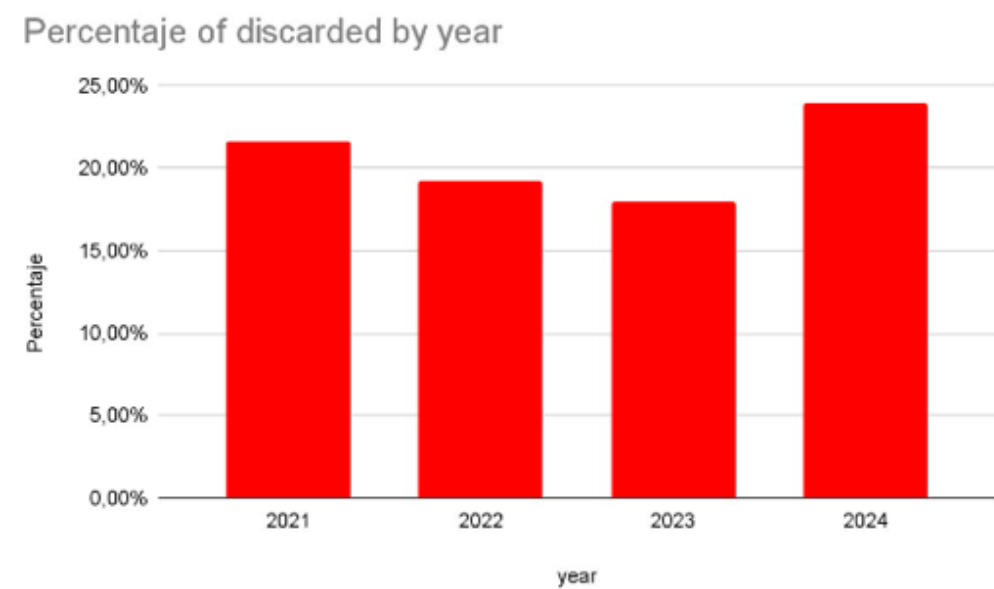
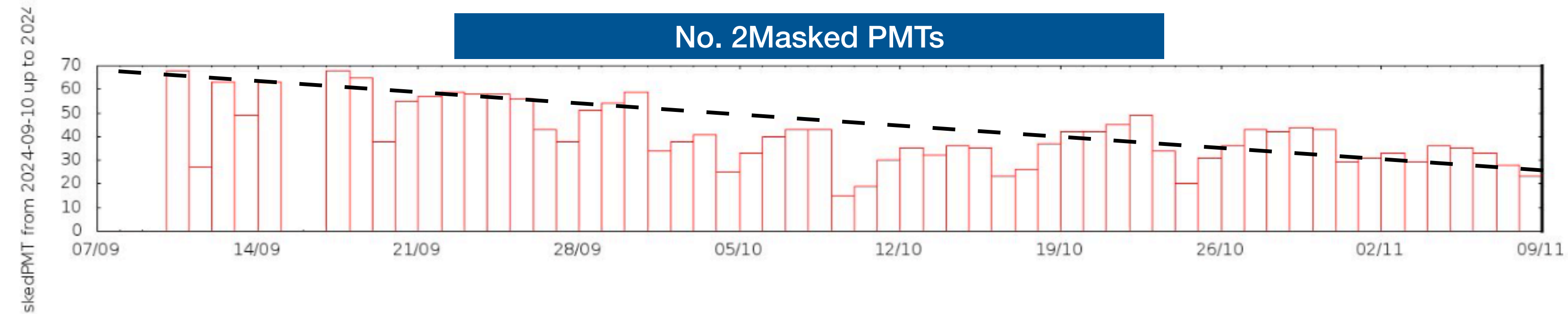
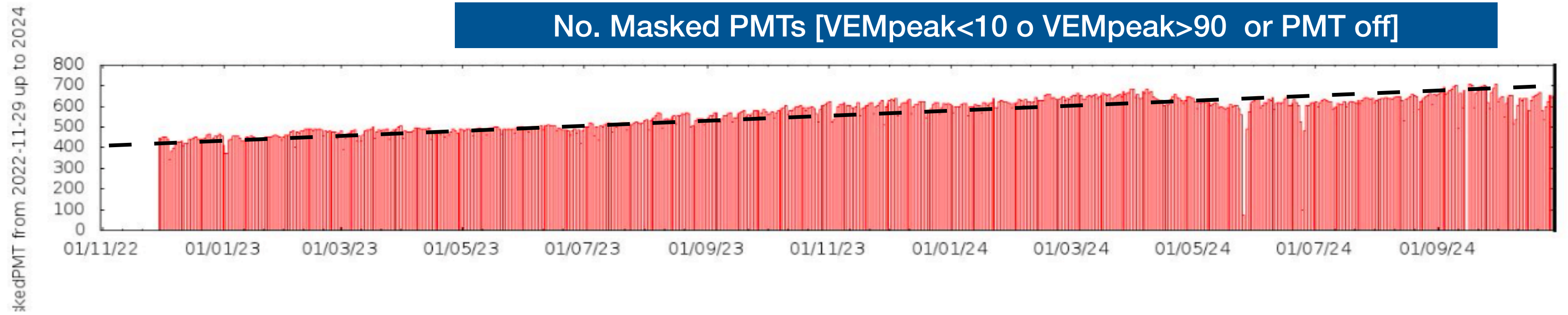
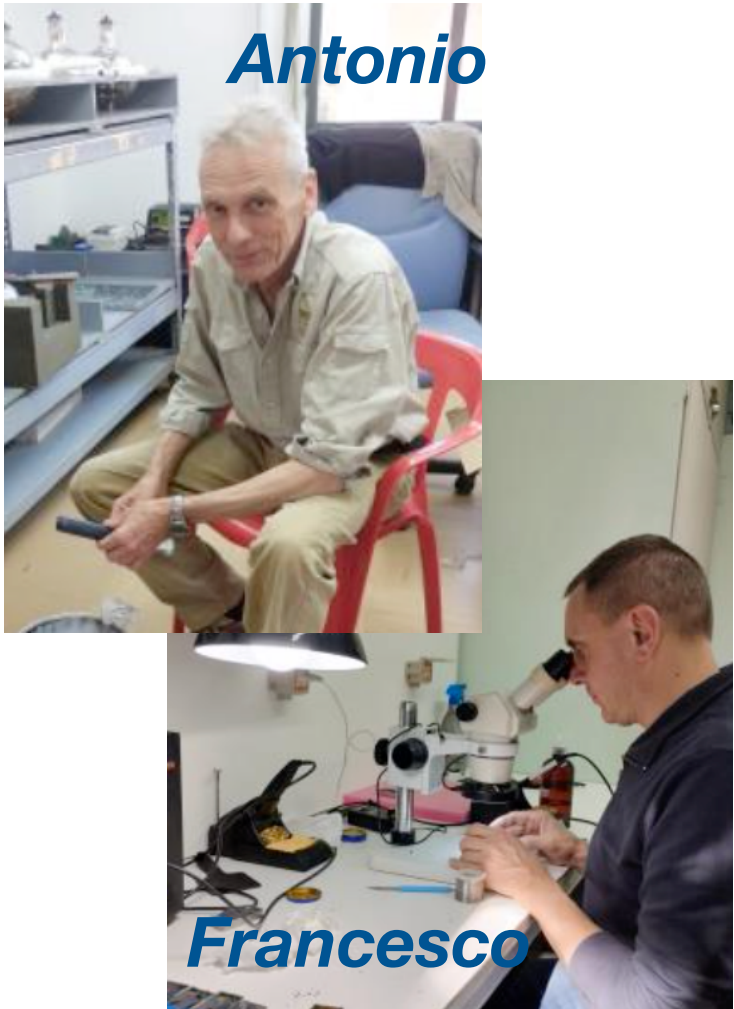
Torino 3-5 Febbraio 2025



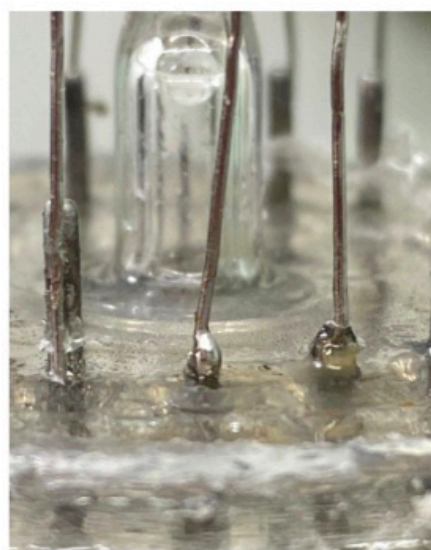
Running in AugerPrime mode...



Maintenance



In 2024, 24% LPMTs discarded
Current stock not enough to cover
10 years more

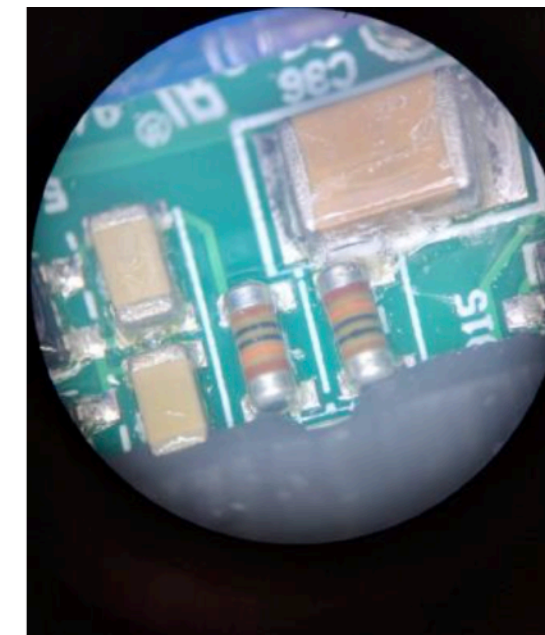
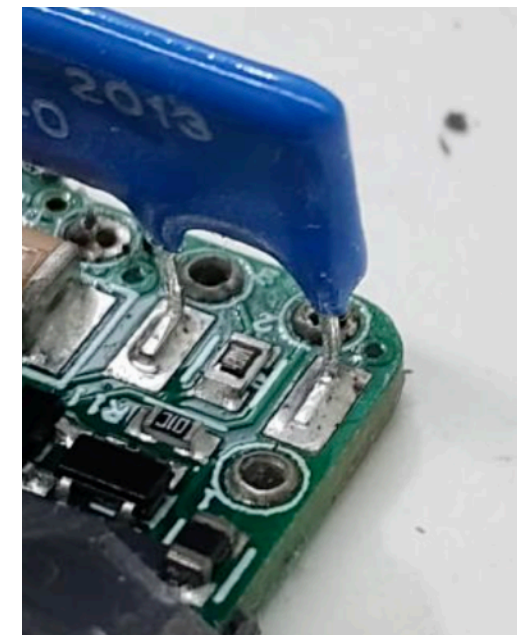


An example of a pmt discarded by
pin cut too close to the glass



PMT 4089, Recovered from SD Joise that
burned down in 2017

Recovery of “lost” LPMTs sometimes possible
12 recovered from our cemetery



~120 Sens-Tech HV modules repaired in 2024
~180 waiting to be repaired
Some (~30-40) brought to Torino to be repaired

Maintenance

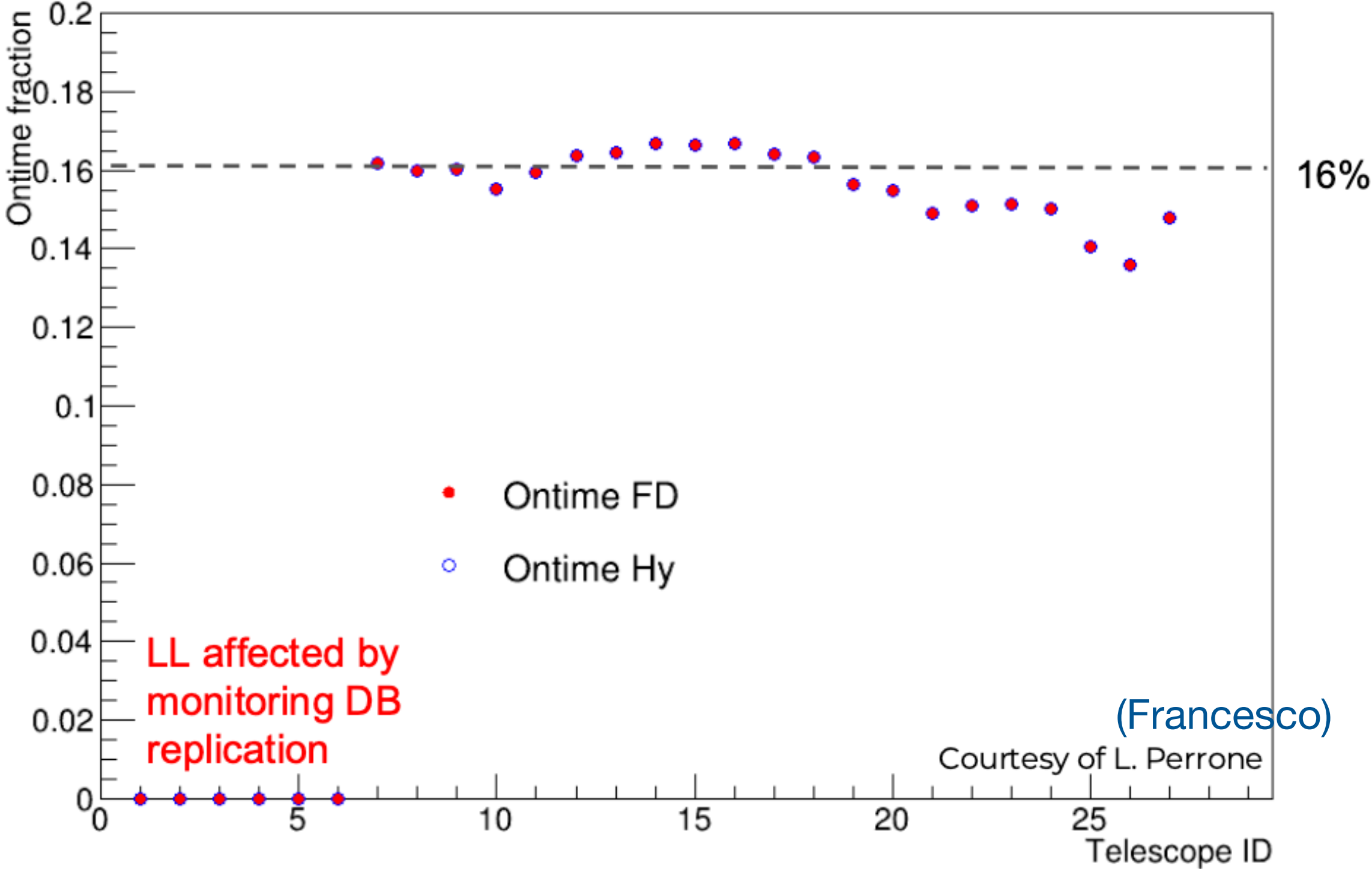


New FD observer
Yosel Balibrea



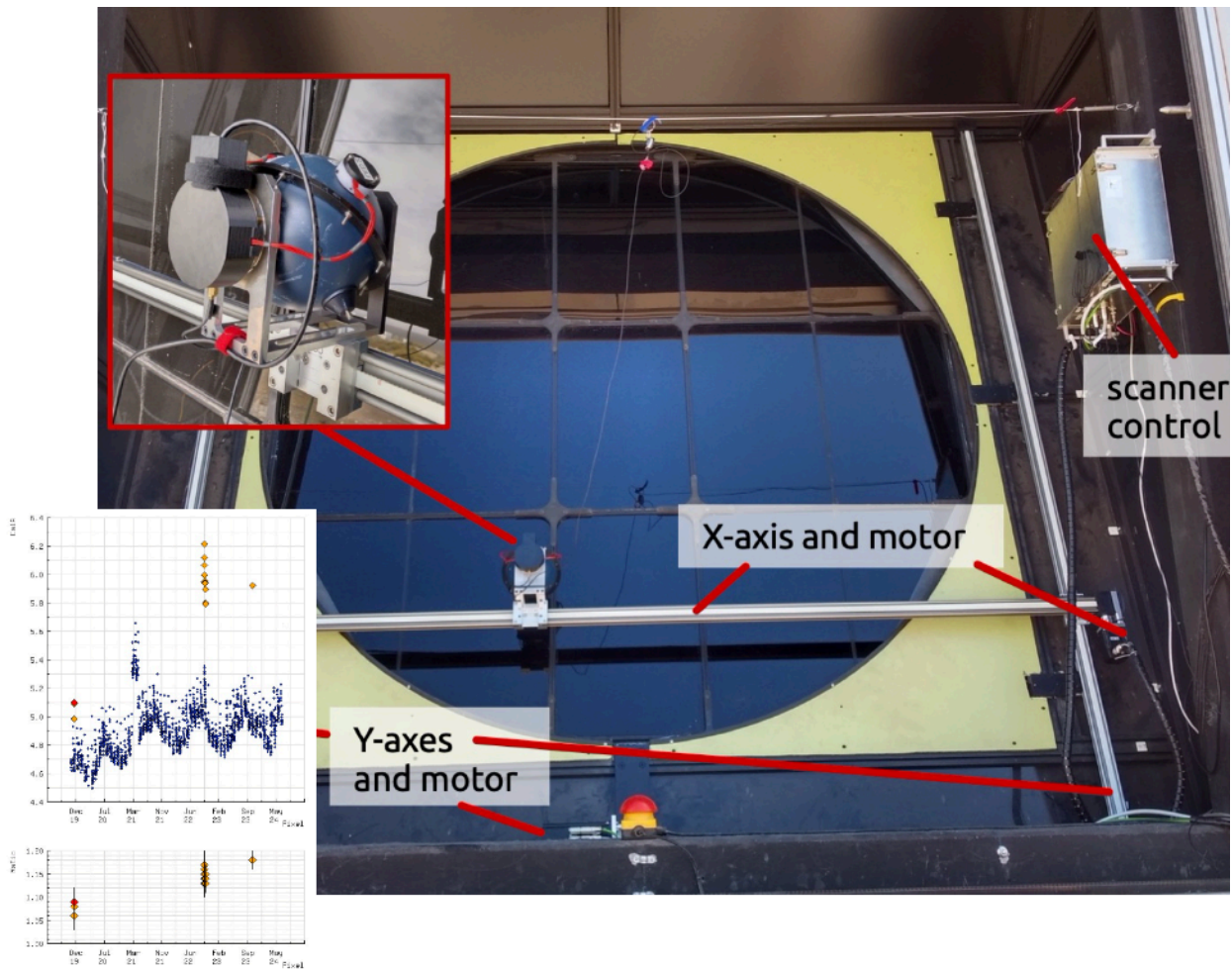
CLF stopped working on April 24, 2024
Restarted after campaign in November 2024 !

Raman Lidar working fine, although laser energy ~80% of the nominal value (Vincenzo)



Elastic LIDAR database ready up to April 2023

HEAT-Co cross calibration database needed ! More news later...



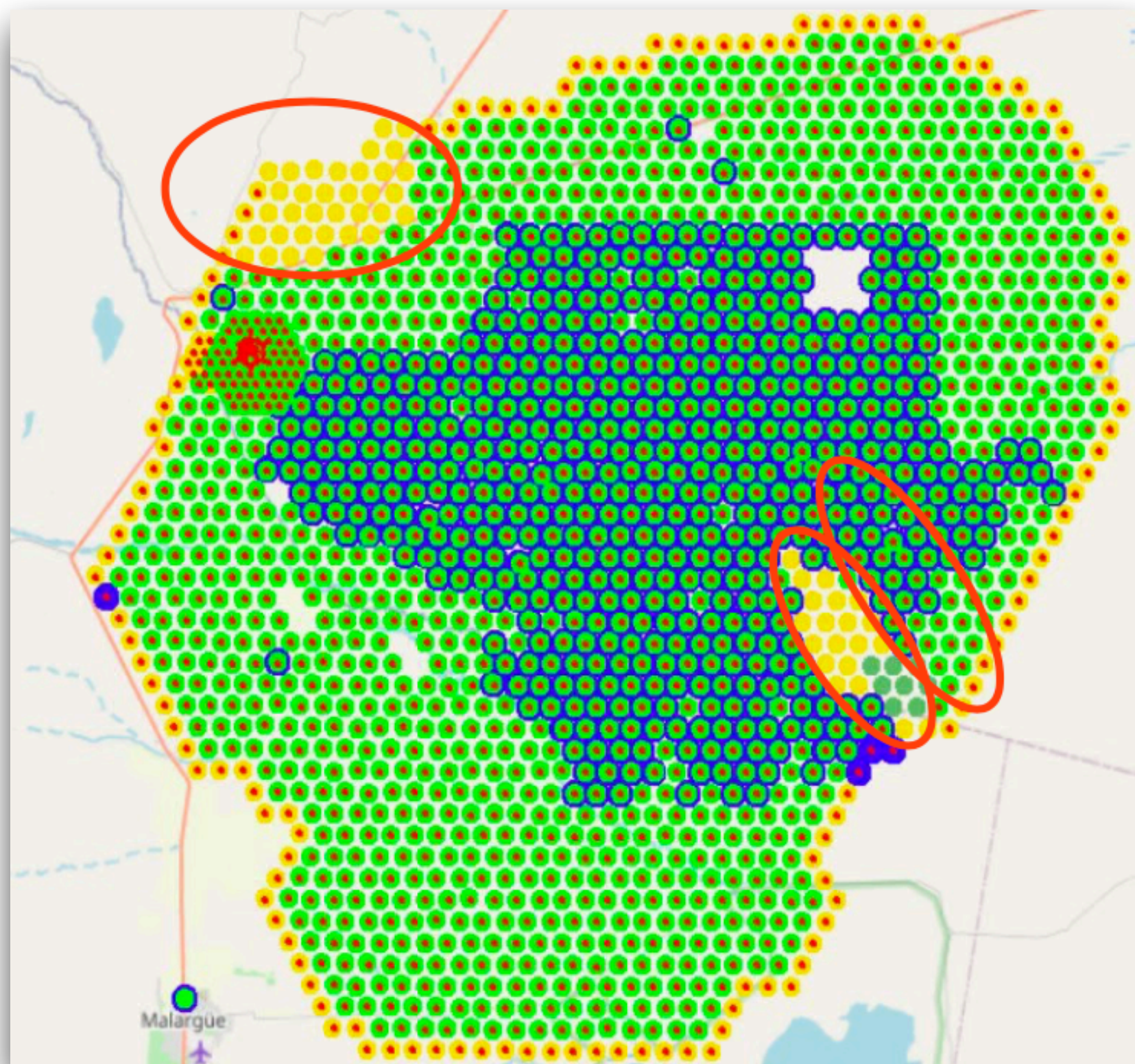
Absolute calibrations updated as of July 2024

X-Y scanner : differences with CalA are investigated (Gaetano)

More info

Staff

2 technicians from CNAE, part time
3 AugerPrime technicians will remain in staff
22 interns from Isazky School



Computing

Ruben Squartini contract ended December 2024
Very difficult to hire him for few months to help
with data transfer and sincronization

Juan Pablo Behler hired

Data transfer work ongoing (Lorenzo)



Juan Pablo Behler

Landowners

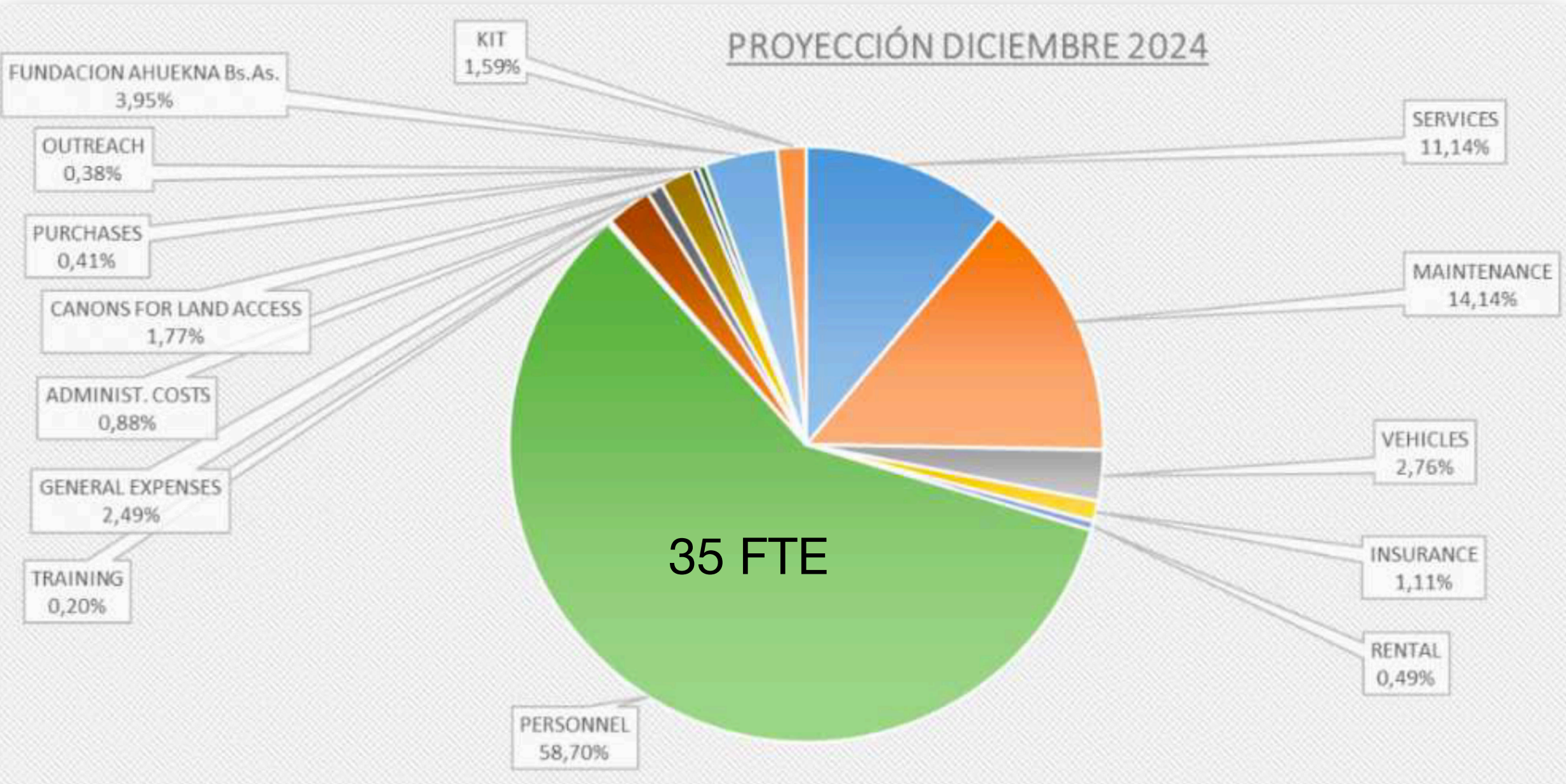
Only 1 conflict on 101 properties
3 with special agreement with Mendoza Province
7 with incomplete documentation
2 new

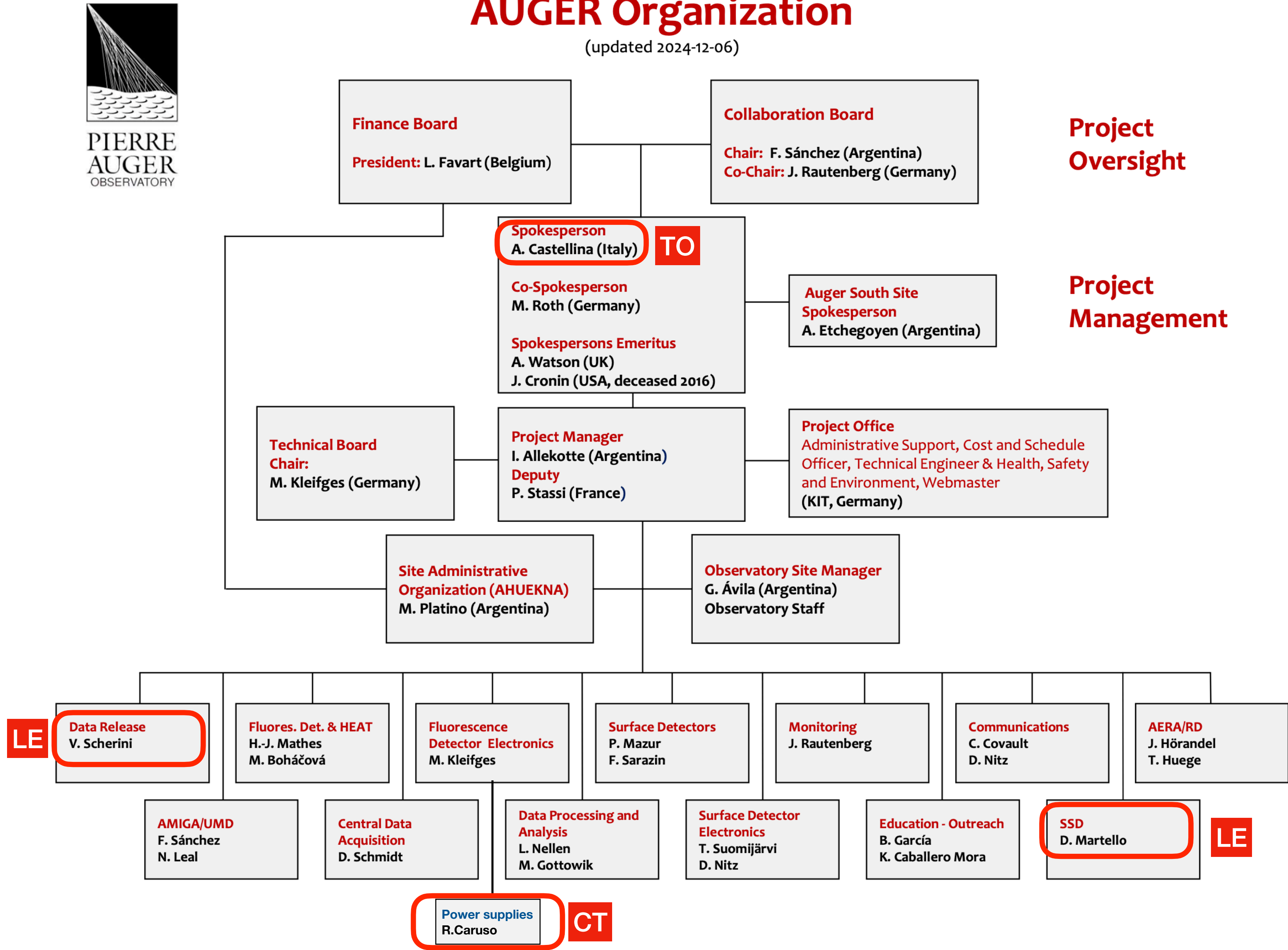
SE: one solved, one under negotiation
NW: solved (despite 19 successors!)

SUMMARY:

REQUEST: 1,716 KUSD (Operating) + 85 KUSD (Reserve) + C-O until 2023 = 1,801 KUSD + C-O

OCL PER PERSON: 9,529.10 USD





Publication Committee

R. Clay
B. Dawson
C. Dobrigkeit
I. Maris (chair)

L. Valore

NA

Conference Committee

C. Bonifazi
U. Giaccari
M. Risse (chair)
E. Santos

LE

Coordinators Board

Detector coordinators

D.Veberic, **F.Salamida**, AQ
J.Hoerandel, F.Sanchez

Science coordinators

AQ **D.Boncioli**, L.Cazon

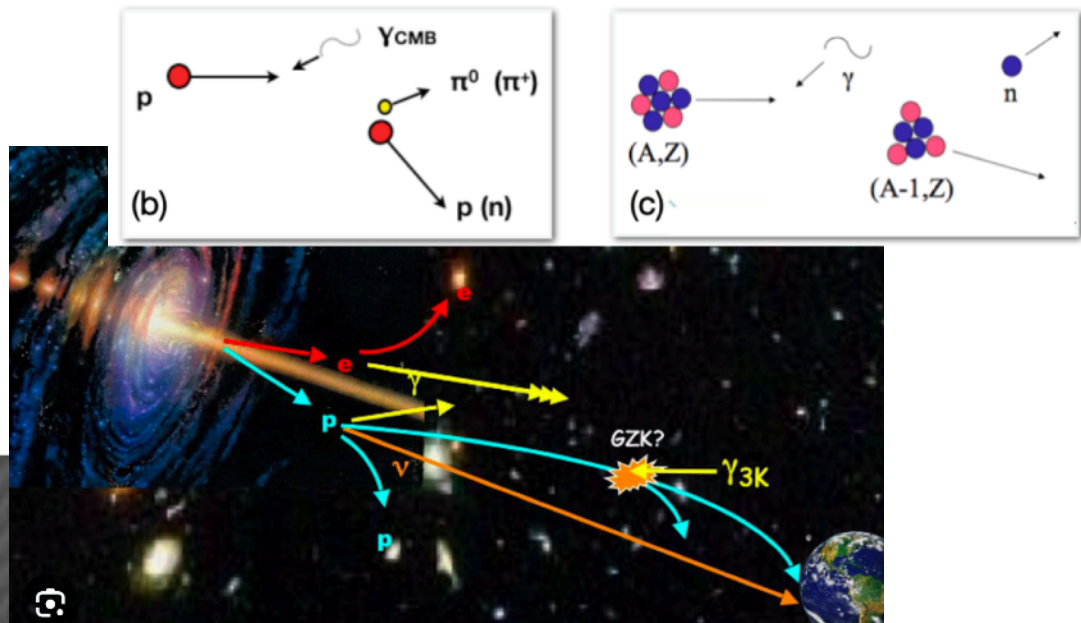
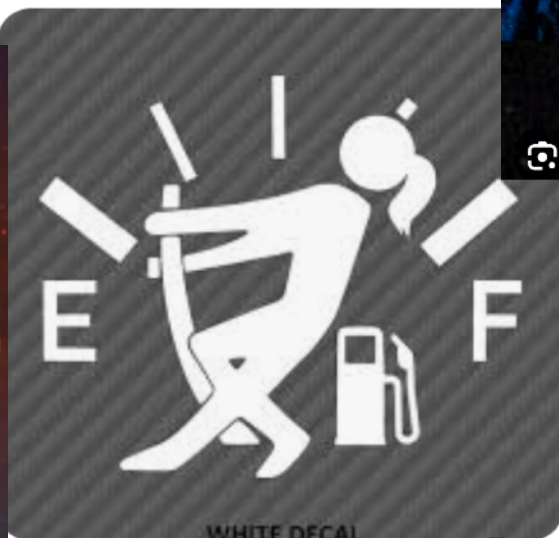
Science Analysis	CR phenomenology E.Roulet, A. Di Matteo TO <i>Astroph.scenarios, magnetic fields, new physics...</i>	Multimessenger K-H.Kampert, E.Zas <i>Multi-wavelength observations...</i>	Neutral Particles J.AlvarezMuniz, M.Niechciol <i>v and γ searches</i>	Cosmo-geophysics NA R.Colalillo, R.Mussa TO <i>TLE, solar activity and space weather,...</i>
Science pillars	Energy spectrum D.Ravignani, F.Riehn <i>SD-vertical & inclined, hybrid,radio</i>	Mass composition E.Mayotte, A.Yushkov <i>Charged particles mass estimators</i>	Arrival directions MI L.Caccianiga , G.Golup <i>Large and intermediate scale anisotropy, point sources</i>	Air Shower Physics R.Conceicao, J.Vicha <i>Muons and multi particle production, new physics,...</i>
Science tools	Shower simulations G.Isar, E.Santos <i>MC simulations for physics analyses</i>		Software framework L.Nellen, M.Gottowik <i>Analysis framework for reconstruction, production of data sets...</i>	Machine Learning J.Glombitza, S.Hahn <i>DNN techniques for physics analyses</i>
Analysis Foundations	Analysis Foundations D.Schmidt, V.Verzi , T.Huege, J.M.Figueira RM <i>High quality data for analysis</i>			
Detector Foundations	Calibration B.Pont, G.Salina , RM B.Andrada, R.Sarmiento <i>FD calib database,VEM/MIP, muon number...</i>	Atmospheric conditions B.Keilhauer, L.Valore NA <i>Atmo database,VAOD, data monitoring,...</i>	Triggers and UUB commissioning D.Nitz, M.Schimassek, T.Suomijarvi <i>Analysis of performances</i>	Monitoring and (O)LTP C.Bonifazi, F.Gollan, J.Rautenberg <i>Calib,VEM/MIP... Detectors stability, shifts report</i>

Auger as a test environment
I.Maris, S.Mayotte
New projects, R&D, links to hosted groups...

Rappresentanti dei giovani ricercatori
AQ **Fabio Convenga** Katarina Simkova

The open questions...

The origin of the flux suppression above $10^{19.5}$ eV



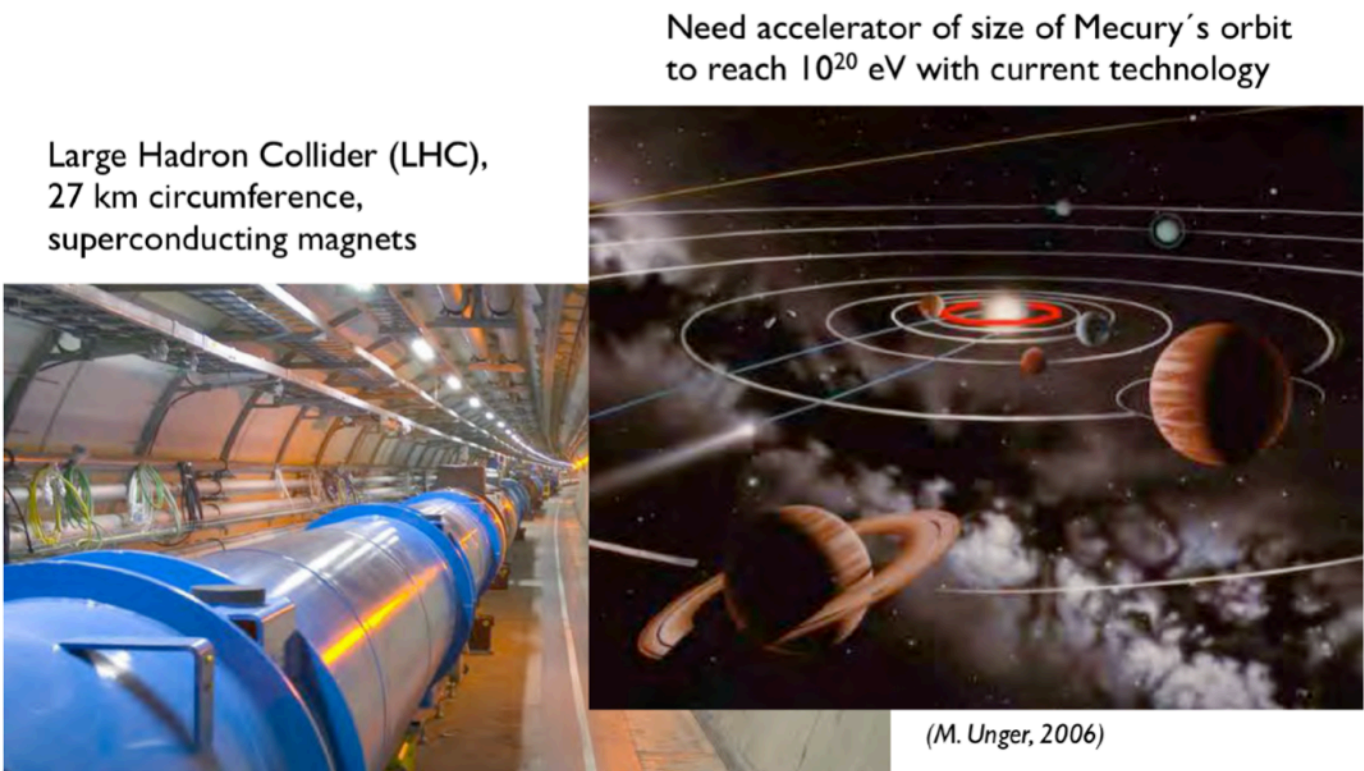
Do UHE photons and neutrinos exist?



The identification of the sources



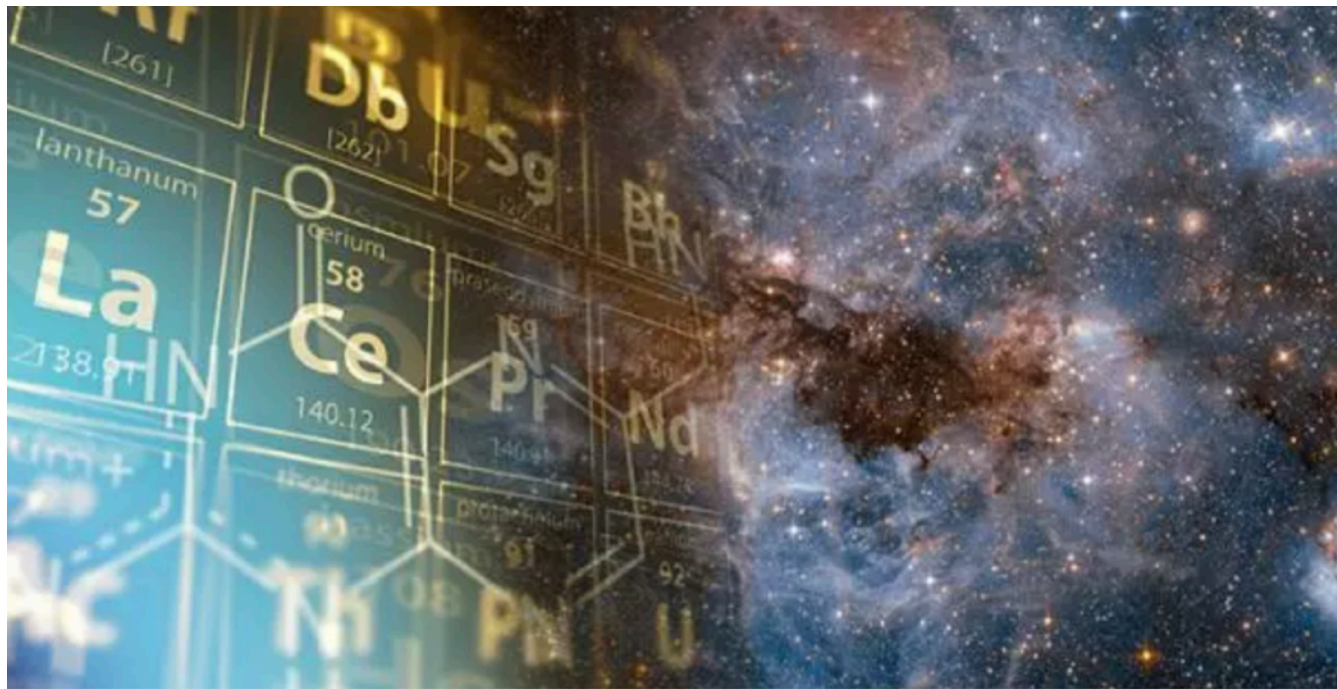
Particle interactions at UHE:
Hints for new physics?



Need accelerator of size of Mercury's orbit to reach 10^{20} eV with current technology

(M. Unger, 2006)

The nuclear composition at UHE



+ increase of statistics

Papers in the pipeline

Submitted to Journal

- Title: **Quasi-constant time gap in multiple rings of elves**
Author List: FAL: The Pierre Auger Collaboration
Citation: to be submitted to Journal of Geophysical Research: Space Physics, Roberto
- Title: **Scaler rates from the Pierre Auger Observatory: a new proxy of solar activity**
Author List: FAL: The Pierre Auger Collaboration
Citation: to be submitted to A&A, Carla
- Title: **A search for the anomalous events detected by ANITA using the Pierre Auger Observatory**
Author List: FAL: The Pierre Auger Collaboration
Citation: Submitted to PRL, Lorenzo, Emanuele
- Title: **The distribution of ultra-high-energy cosmic rays along the supergalactic plane measured at the Pierre Auger Observatory**
Author List: FAL: The Pierre Auger Collaboration
Citation: submitted to ApJ, Armando
- Title: **Search for photons with energies above tens of PeV at the Pierre Auger Observatory**
Author List: FAL: The Pierre Auger Collaboration
Citation: to be submitted to JCAP, Nicolás

Under Collaboration review

The Scintillator Surface Detector of the Pierre Auger Observatory

Coordinator(s): Henryk Wilczynski(coord), Daniele Martello, Gabriella Cataldi, François Montanet, Bruce Dawson, Corinne Bérat, Julian Raurenberg, Roger Clay

Editorial Boards

1. Content: **Search for point sources of neutrons in the data of the Pierre Auger Observatory**
Editorial Board:
Lorenzo Caccianiga (Coord.), Danelise Franco, Federico Maria Mariani, Paul Sommers, Geraldina Golup (observer), Esteban Roulet, Lorenzo Cazon (Science Coordinator)
PC: Carola
<https://www.auger.unam.mx/AugerWiki/UpdateTargetedNeutrons>
1. Content: **Constraining Lorentz Invariance Violation using the muon content of extensive air showers measured at the Pierre Auger Observatory**
Editorial Board:
Caterina Trimarelli (coord.), Tanguy Pierog, Ruben Conceição, Francesco Salamida, Denise Boncioli, Glennys Farrar, Lorenzo Cazon (science coord,)
PC: Ioana
<https://www.auger.unam.mx/AugerWiki/LIVinEAS>



ICRC 2025 - The Astroparticle Physics Conference

Important dates

October, 2024	First circular
December, 2024	Second circular
January 14, 2025	Opening of registration and abstract submission
March 1, 2025	Regular abstract submission deadline
May 1, 2025	Regular registration deadline
July 15-24, 2025	Conference

Our important dates

November, 2024 (this meeting)	proposals of contributions/posters Discussion (coordinators, Friday 15)
January, 2025 End of January	ICRC committee starts working speakers list defined
February, 2025	preparation of abstracts
End of February	Abstract submission

Physics Tasks

1 SPEC1 (o)	Vertical & inclined + declination dependence	→ (Valerio?)
2 AD1 (o)	Small Scale & Mass & Multiplets	
3 AD2 (o)	Large Scale & Mass	
4 AD3 (o)	Moon's Shadow	
5 PHENO1 (o) (if HEAT cal)	Extension of the fit to lower energies	
6 PHENO2/AD4 (o)	Backtracking the highest energy CR	→ Marta
7 MASS1 (o)	X_{\max} (FD, DNN, Radio, Univ.) + interpretation	
8 MASS2 (o)(p if minor update)	X_{\max} : S_{38} correlation	
9 MASS3/EAS4 (o)	Universality (X_{\max} + update of R_{μ})	
10 EAS1/PHENO3 (o)	Update on X_{\max} , S_{1000} fits + pheno interpretation	
11 EAS2 (o, if data)	New cross section	
12 EAS3 (o) - Prime	Neutrons in SSDs	
13 CGEO1 (o/p?)	Phenomena on TLE camera – ELVES	→ (Roberto?)
14 CGEO2 (o/p?)	TGFs	→ Roberta
15 CGEO3 (o - SH)	Ionospheric reflection & solar bursts with AERA	
16 CGEO4 (o - SH)	Solar activity study with scalers	→ Carla
17 MM1 (o - NU/MM)	GRB stacking analysis (fluence and lum. approach)	
18 NEUT1 (o - MM)	Photon search	
19 NEUT2/MM2 (o - MM/NU)	Neutrino search, cont. unblinding and new triggers	→ Pierpaolo

ICRC committee met 3 times; now discussing the comments/proposals from the task leaders

Speakers still not finalized.

Oral to poster not finalized (probably 2/3 vs 1/3) at the end

Gender/Country balance not yet considered

Foundations

20 ML1/FOUND6/NEUT3 (p)	GNN for photon classification
21 ML2 (p)	Event-level NNs for SD-750
22 WG1	TA-Augger spectrum
23 WG2	TA-Augger anisotropy
24 GAR1/WG3 (p, if data)	SD-Augger@TA
25 GAR2/WG4 (p)	IceCube-Gen2 @ Auger
26 FOUND1/EAS5 (o) - Prime	UMD results / UMD N_μ
27 FOUND2 (o)	Interferometric reconstruction with AERA
28 FOUND3 (o)	AERA energy-scale analysis
29 FOUND4 (p) - Prime	Auger-RD reconstruction
30 FOUND5 (o)	AERA summary (GalCal, no aging, X_{\max} , N_μ)

Performance, detectors

31 MOLTP1 (o) - Prime	MOLTP-Prime Status	
32 ATM1 (p)	updates atm. monitoring systematics: NSB, ...	→ (Laura?)
33 CAL1 (p) - Prime	Muon signal charge of UMD	
34 CAL2/FOUND7 (p) - Prime	SSD calibration/status/performance	→ Matteo C.
35 CAL3/ATM2/GAR3 (p)	EarthCare @ Auger	
36 MC1/DPA1 (p)	joint <u>Offline</u> and MC contribution	
37 DRT1 (o)	Increase to 30% of data release	→ Viviana
38 OUT1 (o - OUT)	Auger Social Impact Study	
39 Prime (o)	Status and first physics results	
40 CDAS (p) - Prime	Status and performance of CDAS	
41 SDEU (o) - Prime	Phase II SD-Electronics: specs, verifications & perform.	
42 RD (o) - Prime	Status, commissioning and first data	

- **Meeting in Aula C** : tutti i giorni tranne martedì 4 febbraio al mattino. Piano terra, prima a sinistra dopo la portineria
- **Meeting in Aula A** : martedì mattina. Piano terra, corridoio a destra degli ascensori

ID riunione: 924 9349 2789
Codice d’accesso: 20042035

Day 2: contributi dei singoli gruppi

		Mon 03/02	Tue 04/02	Wed 05/02	All days		
		<div>PrintPDFFull screenDetailed viewFilter</div>					
09:00	Anisotropia	Lorenzo Caccianiga					
10:00	Aula C, Dipartimento di Fisica	09:00 - 10:10					
11:00	Fenomenologia	Armando Di Matteo					
	Aula C, Dipartimento di Fisica	10:10 - 11:20					
	Coffee break	Aula C, Dipartimento di Fisica				11:20 - 11:50	
12:00	Particelle neutre	Lorenzo Perrone					
	Aula C, Dipartimento di Fisica	11:50 - 13:00					
15:00	Cosmo-geofisica	Roberta Colalillo					
	Aula C, Dipartimento di Fisica	14:30 - 15:30					
16:00	Scala di energia	Valerio Verzi					
	Aula C, Dipartimento di Fisica	15:30 - 16:20					
17:00	Coffee break	Aula C, Dipartimento di Fisica				16:20 - 16:50	
18:00	Studio dell'atmosfera	Laura Valore					
	Aula C, Dipartimento di Fisica	16:50 - 17:50					
18:00	Regione di transizione	Carmelo Evoli					
	Aula C, Dipartimento di Fisica	17:50 - 18:30					

Coffee break:
1° piano Istituto
vecchio, di fronte
all’Aula Wataghin



Day 1: overview delle attività

		Mon 03/02	Tue 04/02	Wed 05/02	All days		
		<div>PrintPDFFull screenDetailed viewFilter</div>					
14:00	Introduction	Antonella Castellina					
	Aula C, Dipartimento di Fisica	14:00 - 14:20					
	Overview: Auger science	denise boncioli					
	Aula C, Dipartimento di Fisica	14:20 - 15:00					
15:00	Overview: Beyond Standard Model: Overview: Beyond Standard Model	Roberto Aloisio					
	Aula C, Dipartimento di Fisica	15:00 - 15:40					
	Overview: Working Groups Auger - Telescope Array	Armando Di Matteo					
16:00	Aula C, Dipartimento di Fisica	15:40 - 16:20					
	Coffee break	Aula C, Dipartimento di Fisica				16:20 - 16:50	
17:00	Overview: Data Center	Lorenzo Perrone					
	Aula C, Dipartimento di Fisica	16:50 - 17:30					
	Open Data: Open Data	Viviana Scherini				17:30 - 18:00	
18:00	Open discussion: Open discussion						
	Aula C, Dipartimento di Fisica	18:00 - 19:00					
19:00							

Day 3: AugerPrime

		Mon 03/02	Tue 04/02	Wed 05/02	All days		
		<div>PrintPDFFull screenDetailed viewFilter</div>					
09:00	AugerPrime overview	Antonella Castellina					
	Aula C, Dipartimento di Fisica	09:00 - 09:20					
	AugerPrime: Commissioning						
	Aula C, Dipartimento di Fisica	09:20 - 10:40					
	Coffee break	Aula C, Dipartimento di Fisica				10:40 - 11:10	
	AugerPrime: verso l'ICRC2025						
	Aula C, Dipartimento di Fisica	11:10 - 13:10					

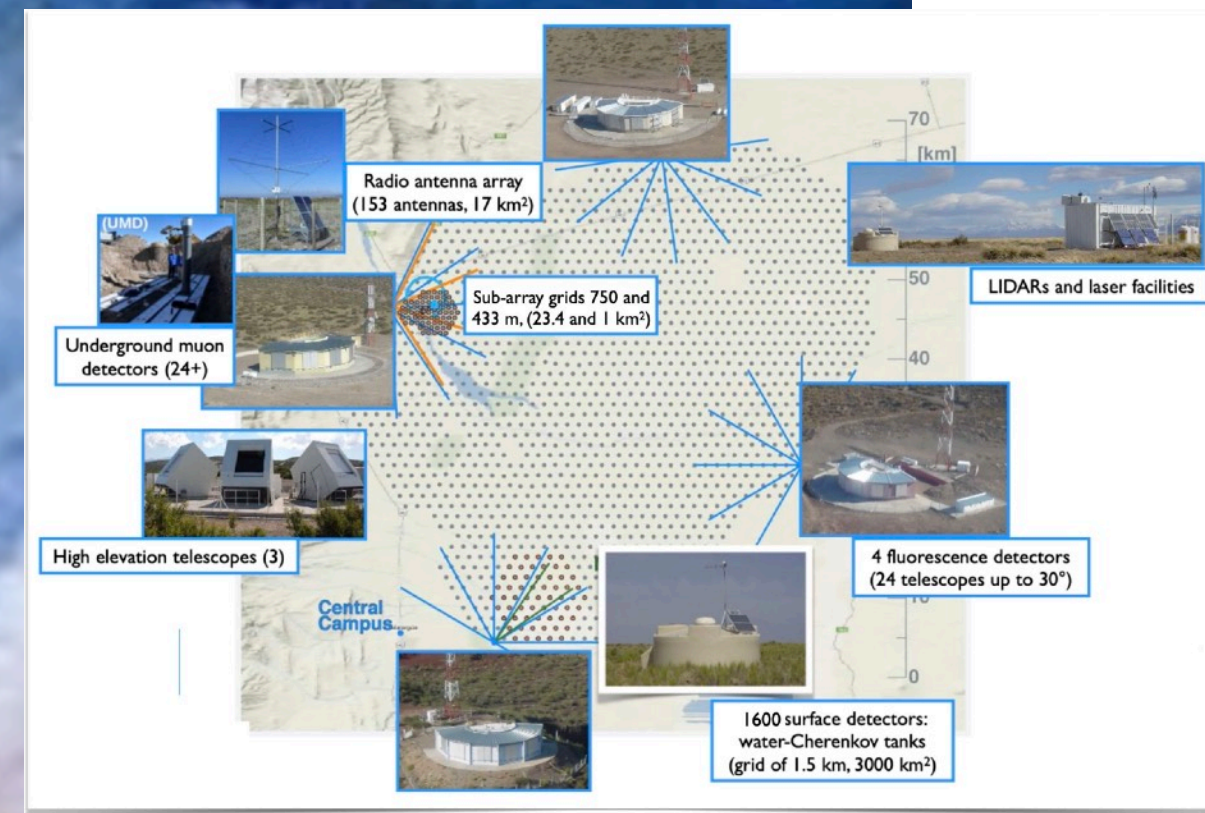
The Pierre Auger Observatory

Phase I [2004-2021]: a radical change
in our view of UHECRs



Phase II [2025-2035]: more statistics
and more insight on the UHECR
nuclear mass composition

Given the lack of human-power, it is mandatory to
clearly define
→ our responsibilities in the maintenance and services
→ the relevant analyses we want to get involved in



2025 PROJECTION

- Inflation may remain under control in 2025, however uncertainty in exchange rate. If present delay in exchange rate persists, costs will be higher than in previous years.
- Support from FAPESP for SD batteries
- Running in AugerPrime mode, increased maintenance and personnel costs: Phase I costs + 10%:

Estimation 1700 KUSD + increase of 10% = 1870 KUSD

Of which, 154 KUSD from carry-overs up to 2023

REQUEST: 1716 KUSD + REMAINING CARRY-OVER UNTIL 2023 (not including 2024)

OCL for 2025: at 189 (it was 192 in 2024)

ADDITIONAL REQUEST FOR RESERVE:

Due to delay in payment by some countries, we need to increase the Operational reserve by 85 KUSD.

- If delayed payments are received, reserve will increase necessary Severance Reserve at Ahuekna
- If delays continue, we request to be able to use this extra reserve in Operating 2025

SUMMARY:

REQUEST: 1,716 KUSD (Operating) + 85 KUSD (Reserve) + C-O until 2023 = 1,801 KUSD + C-O

OCL PER PERSON: 9,529.10 USD