

2nd Swiss CTA Day

January 12, 2022

Institutional support to The Cherenkov Telescope Array (CTA)
infrastructure

B. Galliot, Vice-rector for Research



UNIVERSITÉ
DE GENÈVE

CTA in Switzerland today

1st Swiss CTA day

Geneva Observatory

Nov 24, 2020

2nd Swiss CTA day

EPFL

Jan 12, 2022



SWISS CTA Day

24 November 2020
University of Geneva
Department of Astronomy,

Main Auditorium
Chemin des Maillettes 51,
1290 Versoix

Agenda: <https://indico.cern.ch/e/SwissCTA2020>

Invited Speakers

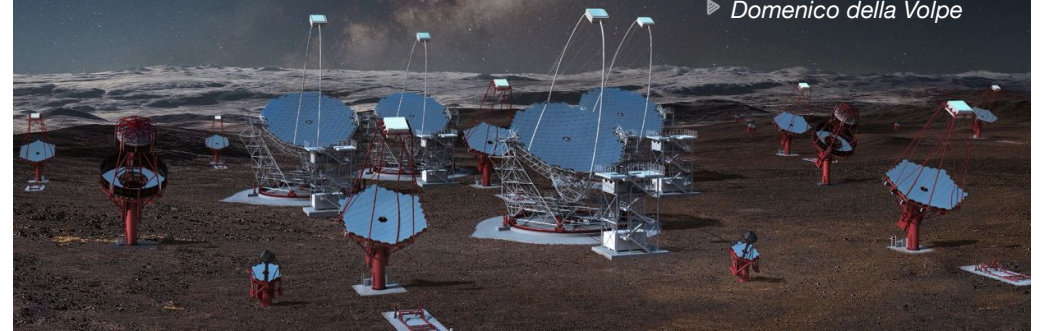
F. Ferrini	CTAO
M. Teshima	MPI
W. Hofmann	MPIK
A. Biland	ETH
J.P. Kneib	EPFL
T. Montaruli	UNIGE
P. Saha	UNIZH
V. Savchenko	UNIGE
A. Tramacere	UNIGE
R. Walter	UNIGE
B. Galliot	UNIGE
X. Reymond	SERI

.....more to come

Join us to discuss the status of the project, the Swiss involvement
and its endeavour in CTA Science!

Local Organising Committee:

- ▶ Teresa Montaruli
- ▶ Roland Walter
- ▶ Domenico della Volpe



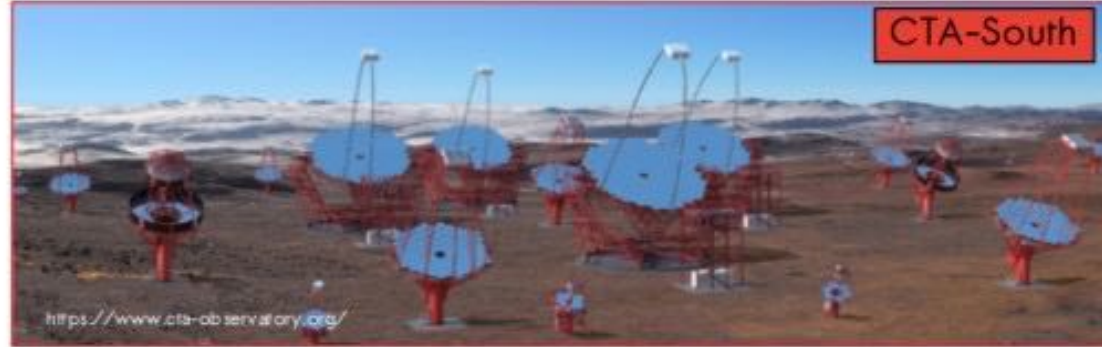
CTA, the largest ground-based gamma-ray detection observatory

CTA-North



CTA will be the largest ground-based gamma-ray detection observatory in the world

CTA-South



<https://www.cta-observatory.org/>

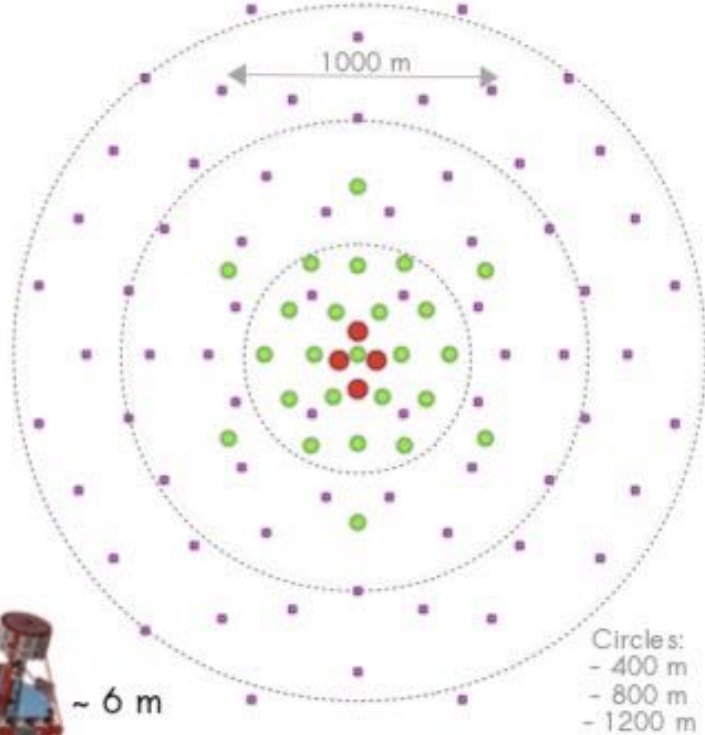


LTS-1 !!!

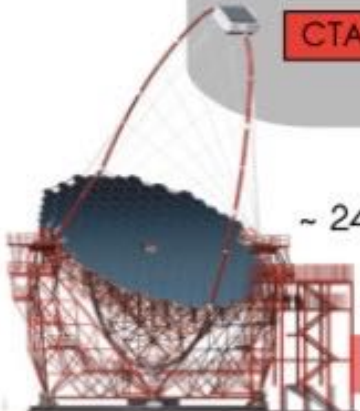


CTA-North

CTA-South

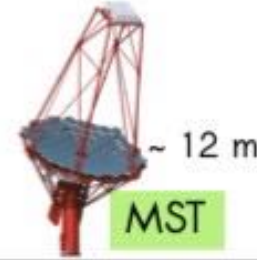


Circles:
- 400 m
- 800 m
- 1200 m



~ 24 m

LTS



~ 12 m

MST



~ 6 m

SST

30 GeV

~ 150 GeV

Current generation of IACTs ~ 10 TeV

300 TeV

Photon energy

CTA in a nutshell



- CTA is a unique initiative that supports the emergence of a new astronomy focused on the most energetic acceleration processes in the universe. The CTAO is a laboratory for understanding relativistic phenomena, the galaxy, the dark matter it contains and the functioning of compact accelerators such as pulsars and black holes, the origin of cosmic rays and their role in the galaxy.
- About 1500 scientists from more than 30 countries
- 4 sites for the **Cherenkov Telescope Array Observatory (CTAO)**:
 - 2 arrays in SOUTH: Paranal, Chile and NORTH: La Palma, Canadian Islands
 - CTAO Headquarters in Bologna: CTAO-ERIC - European Research Infrastructures Consortium –
 - Science Data Management Centre in DESY, Zeuthen (Germany)
- Endorsed by **APPEC (AstroParticle Physics European Consortium)** Roadmap as priority n. 1
- In the roadmaps of **Swiss Astronomy** and **CHIPP (Swiss Institute for Particle Physics)**

CTA in Switzerland



- 2004
- 2015
- 2018
- 2019 -> SEFRI support extended in 2020
 - Geneva ...
 - Geneva represents Switzerland at the CTAO headquarters
 - Science Data Management Centre in DESY, Zeuthen (Germany)
- 2021 – 2024
- What future for CTA in Switzerland?



Why UNIGE support to CTAO ?

- **Multi-Messenger strategies** are multi-disciplinaries across various departments (Astronomy, Particle Physics, space and ground), Computer science and Technology development with cooperation with industry
- **Huge discovery potential** in fundamental physics, astrophysics, cosmology
- **Quality of the consortium:** Involve large number of international partners
- **Innovation:** Large potential in tech transfer and societal benefit aspects

Why UNIGE support to CTAO ?

Cooperation with Major Institutes (ETHZ, EPFL, UZH, CSCS)

- **CSCS** is already the provider of LHC Tier2
- **Big Data in Astronomy** are relevant in view of large projects in which UNIGE is involved (e.g. EUCLID, SKAO, CTAO, ...) and in other fields ...
- **Artificial Intelligence (AI)** is a strong point of synergy between Computing science and Physics
- **Quantum physics** might also become another field of expansion (e.g. for CTA stellar intensity interferometry)
- **Technology development on photosensors** is also key for synergy with medical / biology applications...

UNIGE institutional support to CTAO

Consisted in:

- **Legal advice** (Andreas Schmaltz) on MoUs, Performance Agreement, CTAO-CH Cooperation Agreement
- **Administration advice** : Dr. Laure Ognois is representative in the Administrative and Finance Committee of CTA
- **UNIGE employ in-kind contribution to CTAO** is about 4.5 MCHF over 2 Departments of the Faculty of Science (DPNC @ Physics and Astronomy)
- UNIGE advanced money for salaries for the 2021-2024 frame

CTA proposal
from Swiss
researchers
for SERI
funding
Oct 2020

Proposal on Swiss participation to CTA

T. Montaruli¹, M. Heller¹, D. della Volpe¹, A. Biland², E. Charbon^{3,4}, C. Bruschini^{3,4}, E. Bernasconi^{3,4}, A. Koukab⁴, P. Saha⁵, and R. Walter⁶

¹Département de Physique Nucleaire et Corpusculaire (DPNC), Faculté de Sciences,
University of Geneva

²Institut für Teilchenphysik und Astrophysik, ETH Zürich

³Advanced Quantum Architectures Lab, École Polytechnique Fédérale de Lausanne,
2002 Neuchâtel, Switzerland

⁴Institute of Electrical Engineering, EPFL, Lausanne, Switzerland

⁵Physik-Institut University of Zurich, Zürich, Switzerland

⁶Département d'Astronomie (Astro), Faculté de Sciences, University of Geneva

October 2020

Astronomy
Department
involvement in
CTA Software:
ACADA (Array
control
software)
Nov 2019



CTAO gGmbH – Saupfercheckweg 1 – 69117 Heidelberg, DE

Roland Walter
Astronomy Department, University of Geneva
Chemin d'Ecogia 16
1290 Versoix

Heidelberg, 2019-10-23

Letter of Intent on Collaboration on the beta-version of the Array Control and Data Acquisition (ACADA) Software

Dear Roland,

Thank you for your availability to support the CTA-Project. I'd like to summarize the agreement we reached:

CTAO's efforts to develop the beta-version of the Array Control and Data Acquisition (ACADA) Software for the CTA-Project need to be reinforced now; waiting for the future CTAO ERIC to be set up would cause considerable delay that cannot be afforded. In Nov/Dec 2018 Igor Oya contacted institutes potentially interested in providing ACADA software subsystems or services asking them for proposals.

The University of Geneva has been chosen to coordinate the provision of the CTA Array Data Handler within the ACADA system, with details concerning the agreed scope of work, start date, milestones, final acceptance date, number of FTEs outlined in **Annex 1** attached. This subsystem will be developed by the University of Geneva and collaborators, at their own cost and under its own responsibility, following the CTAO ACADA Management Plan (issue, 1, rev t, 22/10/2019) and instructions. This assumes that the required support of the Swiss Confederation to the CTA In Kind Contributions (IKC) specifically needed for this project will be provided to the University of Geneva. The provision of the Array Data Handler sub system will be a combined effort of the University of Geneva (Switzerland), the Nicolaus Copernicus Astronomical Center (Poland) and the Max-Planck-Institut für Kernphysik (MPIK), with the University of Geneva as the leading party. Although various parts of the subsystem will be developed by various partners, the knowledge will be spread among them and with CTAO to reduce the long-term maintenance risk.

1. The manpower
as follow:
end of 2025 and 1 more

Data Handler is under the
tment of Astronomy contingent
the Confederation for this item.

Handwritten signature



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LST MoU
signed for the
construction of
4 LSTs in the
Northern site
of CTA
Oct 2020

Large Size Telescopes



Signees

The Université de Genève, 24 rue du Général-Dufour, 1211 Genève 4, Switzerland,
represented by Prof. Brigitte Galliot, Vice-Rector,

Signature and date

Prof. Teresa Montaruli
Département de Physique Nucléaire
et Corpusculaire

Signature and Date
6.10.20 Teresa Montaruli

Prof. Federico Sanchez Nieto
Director of the Département de
Physique Nucléaire et Corpusculaire

Signature and Date
6.10.20 [Signature]

Dr. Roland Walter
PI of CTA at the
Département d'Astronomie
et Corpusculaire

Signature and Date
[Signature]
28.9.20

Prof. Francesco Pepe
Director of the Département
d'Astronomie

Signature and Date
[Signature]
29.9.2020

Carea Technology

Cooperation Agreement on carea technology developments between UNIGE and ICCR (Tokyo University)

signed June 2021

Declaration of Intent (DoI)

On

**Bilateral cooperation regarding the development of an innovative silicon-
photomultiplier camera for the Large Size Telescope (LST) of the Cherenkov Telescope
Array Observatory (CTAO)**

Between

For Swiss Institutes:

the Université de Genève (UNIGE)

And

For Japanese Institutes:

Institute for Cosmic Ray Research, University of Tokyo (ICRR)

(hereinafter jointly or individually referred to as “Signatories” or “Signatory”)

The Participants:

Prof. Teresa Montaruli, Dr. Matthieu Heller and Dr. D. della Volpe for UNIGE, Prof. Adrian Biland for ETHZ and Prof. Edoardo Charbon for EPFL for Switzerland ;

Prof. Masahiro Teshima, Prof. Daniel Mazin, Prof. Koji Noda and Prof. Takayuki Saito for ICRR, Prof. Tokonatsu Yamamoto from Konan University, Prof. Hidetoshi Kubo from Kyoto University and Prof. Hiro Tajima from Nagoya University for Japan;

have shared the views as follows and come to the understanding of the relevance of bilateral cooperation between researchers in both Switzerland and Japan to promote the research and development (R&D) of an innovative camera based on silicon photo-multipliers (SiPM) for the Large Size Telescope (LST) project of the CTAO. The LST is the project providing large size telescopes (LSTs) to the CTA Observatory.



**UNIVERSITÉ
DE GENÈVE**

Agreement on the distribution of SERI-CTAO funding

Nov 2021

Agreement on the Distribution of the SERI CTAO Funding

Between the Swiss Institutes participating in CTAO Projects

THE UNIVERSITÉ DE GENÈVE ("UNIGE"), having its registered office at Rue du Général-Dufour 24, 1211 Genève 4, Switzerland,

THE ECOLE POLYTECHNIQUE FÉDÉRALE DE LAUSANNE ("EPFL"), having its registered office at Batiment CE 3316, Station 1, 1015 Lausanne, Switzerland, and

THE EIDGENÖSSISCHE TECHNISCHE HOCHSCHULE ZÜRICH ("ETHZ"), having its registered office at Rämistrasse 101, 8092 Zürich, Switzerland,

THE UNIVERSITÄT ZÜRICH ("UZH"), having its registered office at Rämistrasse 71, 8006 Zürich, Switzerland,

THE CENTRO SVIZZERO DI CALCOLO SCIENTIFICO ("CSCS"), having its registered office at Via Trevano 131, 6900 Lugano, Switzerland

hereinafter referred to individually as "Participant" and collectively as "Participants".

**Performance
agreement
Signed with
SERI
Dec 2021**



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Confederation

Federal Department of Economic Affairs,
Education and Research EAER

**State Secretariat for Education,
Research and Innovation SERI**
The State Secretary

Performance Contract 2021-2024

of the Swiss Confederation

represented by the Federal Council

here acting through the

**State Secretariat for Education, Research and
Innovation**

(hereinafter "SERI")

represented by

State Secretary Martina Hirayama and
Vice-Director Gregor Haefliger

with the

**University of Geneva (hereinafter "UNIGE") as
coordinator of the Swiss CTAO Collaboration
(hereinafter "CTAO-CH")**

represented by the

Rector of the UNIGE Prof Yves Flückiger and
CTAO-CH Coordinator Prof Teresa Montaruli



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DE GENÈVE**

MAGIC MoU to support science commissioning of the 2 MAGIC telescopes close to LST

Dec 2021

MAGIC Telescopes

Addendum to the MAGIC collaboration MOU

The University of Geneva (represented by R. Walter from the astronomy department) was preliminary accepted as a member by the MAGIC collaboration on December 11, 2021 and contributed since then to improvements of the MAGIC telescope control and intensity interferometry prototype.

The collaboration board approved on november 2, 2022 that the University of Geneva could become a full member of the collaboration provided this addendum to the MAGIC MOU is duly signed by the undersigned authorized representatives



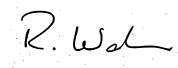
Signed onby the MAGIC collaboration board chair
Prof A. Biland, ETHZ



Signed onby the MAGIC spokesperson
Prof O. Blanch, IFAE

Signed onby the University of Geneva vice rector for Research

Prof. B. Gaillot, UniGE



Teresa Levi



UNIVERSITÉ DE GENÈVE

Bright

Future

For Swiss CTA

Thank you for your attention