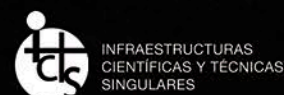


CAHA

**Centro Astronómico
Hispano en Andalucía**

Annual Report
2023



www.caha.es



CAHA Annual report 2023
May 2024

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Index

- 5 Preface
- 6 CAHA Organizational chart
- 7 Internal organization
- 9 Main facilities
- 9 Instrumentation
- 10 Observing time
- 12 Publications
- 13 Press releases
- 16 Technological activities
- 17 Education and outreach
- 18 50 years of Calar Alto (1973-2023)
- 21 List of Publications



Preface

The Centro Astronómico Hispano en Andalucía (CAHA) is an Economic Interest Group (AIE) whose main goal is the management of the Calar Alto Astronomical Observatory, a key institution for the international astronomical community, hosting highly competitive facilities.

Being heir to the original Centro Astronómico Hispano Alemán (also called CAHA) that started its trajectory in 1973 after the signature of an international agreement between the German and Spanish governments, CAHA has gone through different legal statuses until nowadays.

Since 2019, CAHA is co-partnered by the Spanish National Research Council (CSIC), and the Junta de Andalucía (JdA).

The Instituto de Astrofísica de Andalucía (IAA-CSIC), accredited as a Severo Ochoa centre of excellence by the Spanish Ministry of Science and Innovation, plays the role of the reference institute of CAHA, advising on the scientific and technological strategy.

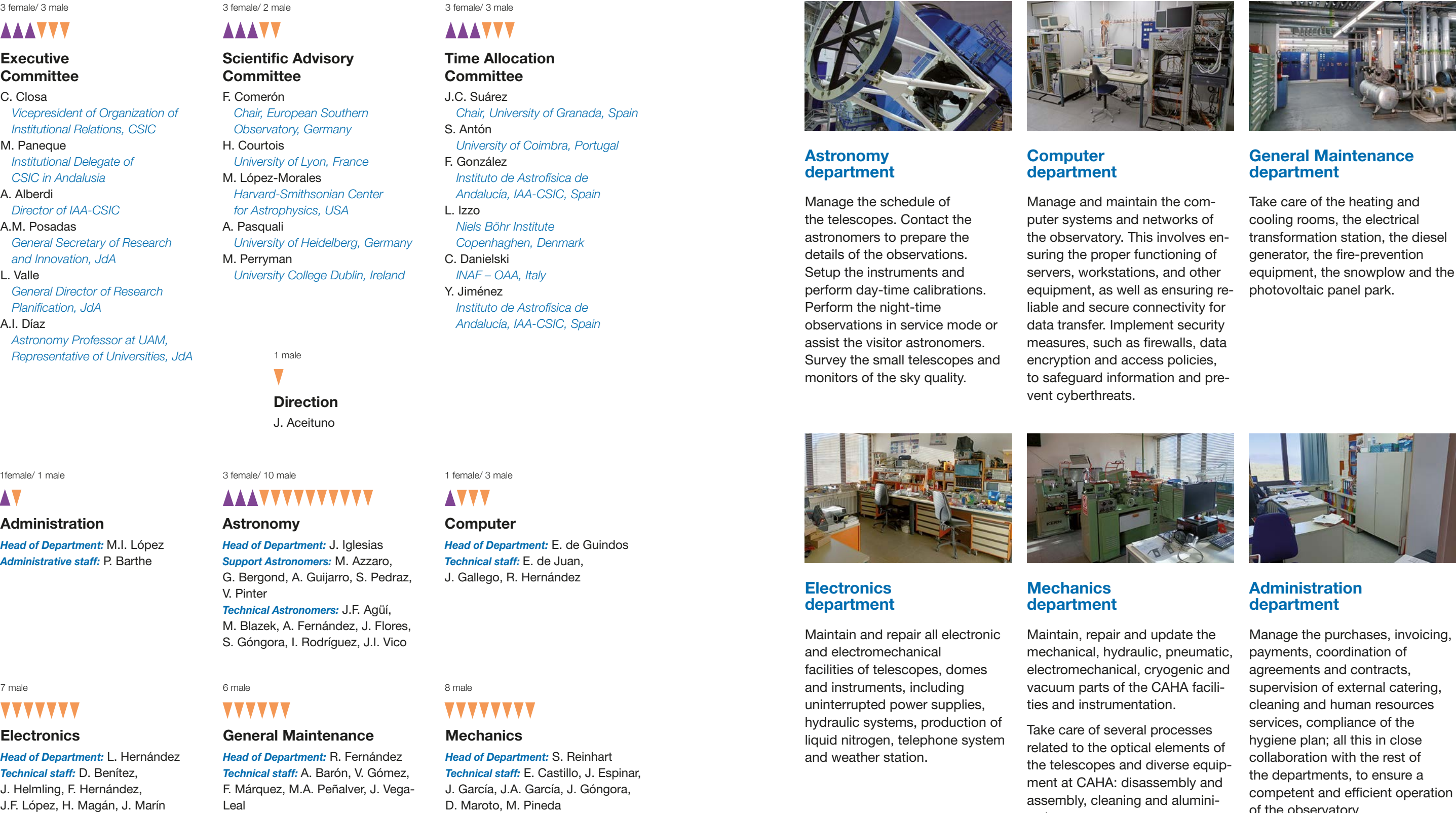
Calar Alto is located in the Sierra de los Filabres, in the province of Almería, at an altitude of 2168 m, and divides its land between the municipalities of Gérgal, Bacares and Serón.

CAHA is managed by an Executive Committee (EC), composed of three members of CSIC and three members of JdA, that designates the CAHA director and establishes the legal statute of the AIE. A Scientific Advisory Committee (SAC) composed of five international renowned astronomers provides advice on scientific and technological issues like the selection of new long-term legacy projects and new instrumentation. Finally, a Time Allocation Committee (TAC) composed of six senior international astronomers meets twice per year to evaluate the Open Time observing proposals.

The CAHA staff is organized in six departments that carry out all the tasks required for a regular and efficient operation of the observatory.

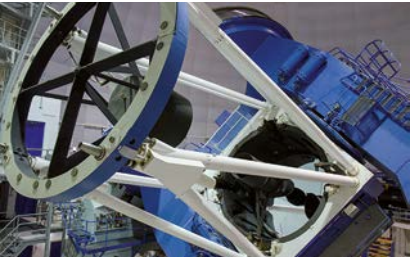
CAHA

Organizational chart *



Internal organization

Main tasks of the CAHA departments:



Astronomy department

Manage the schedule of the telescopes. Contact the astronomers to prepare the details of the observations. Setup the instruments and perform day-time calibrations. Perform the night-time observations in service mode or assist the visitor astronomers. Survey the small telescopes and monitors of the sky quality.



Computer department

Manage and maintain the computer systems and networks of the observatory. This involves ensuring the proper functioning of servers, workstations, and other equipment, as well as ensuring reliable and secure connectivity for data transfer. Implement security measures, such as firewalls, data encryption and access policies, to safeguard information and prevent cyberthreats.



General Maintenance department

Take care of the heating and cooling rooms, the electrical transformation station, the diesel generator, the fire-prevention equipment, the snowplow and the photovoltaic panel park.



Electronics department

Maintain and repair all electronic and electromechanical facilities of telescopes, domes and instruments, including uninterrupted power supplies, hydraulic systems, production of liquid nitrogen, telephone system and weather station.



Mechanics department

Maintain, repair and update the mechanical, hydraulic, pneumatic, electromechanical, cryogenic and vacuum parts of the CAHA facilities and instrumentation. Take care of several processes related to the optical elements of the telescopes and diverse equipment at CAHA: disassembly and assembly, cleaning and aluminization.



Administration department

Manage the purchases, invoicing, payments, coordination of agreements and contracts, supervision of external catering, cleaning and human resources services, compliance of the hygiene plan; all this in close collaboration with the rest of the departments, to ensure a competent and efficient operation of the observatory.

* Composition of the CAHA active staff and committees as of December 31st 2023



Main facilities

CAHA owns four telescopes with primary mirror diameter larger than 1 m: the **1.23 m telescope** (1975), the **Schmidt camera** (1980), the **2.2 m telescope** (1979), and the **3.5 m telescope** (1984). Also present in the vicinities is a **1.52 m telescope**, owned by the Instituto Geográfico Nacional, and operated by the Observatorio Astronómico Nacional.

In addition to these large telescopes, CAHA hosts other **small telescopes** and a **weather station** devoted to monitor the sky and atmospheric quality at the observatory.

Instrumentation

CAHA offers a large variety of instruments for its telescopes, combining capacities for imaging and spectroscopy, in the visible and in the Near Infra-Red ranges.

Twice a year, a call for proposals is done to apply for observing time each semester, **semester A** from January 1 to June 30 and **semester B** from July 1 to December 31.

1.23 m telescope

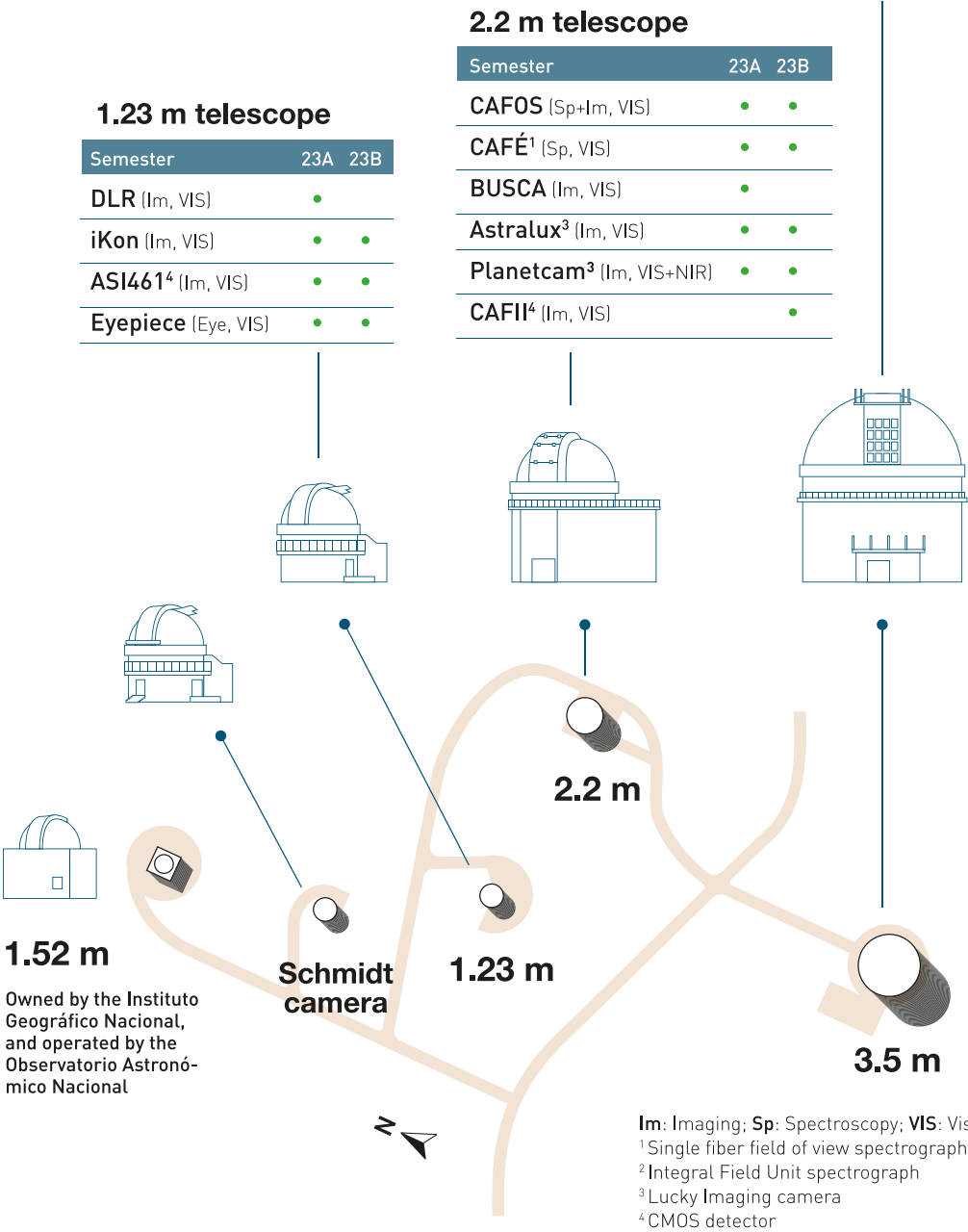
Semester	23A	23B
DLR (Im, VIS)	•	
iKon (Im, VIS)	•	•
ASI461 ⁴ (Im, VIS)	•	•
Eyepiece (Eye, VIS)	•	•

2.2 m telescope

Semester	23A	23B
CAFOS (Sp+Im, VIS)	•	•
CAFÉ ¹ (Sp, VIS)	•	•
BUSCA (Im, VIS)	•	
Astralux ³ (Im, VIS)	•	•
Planetcam ³ (Im, VIS+NIR)	•	•
CAFI ⁴ (Im, VIS)		•

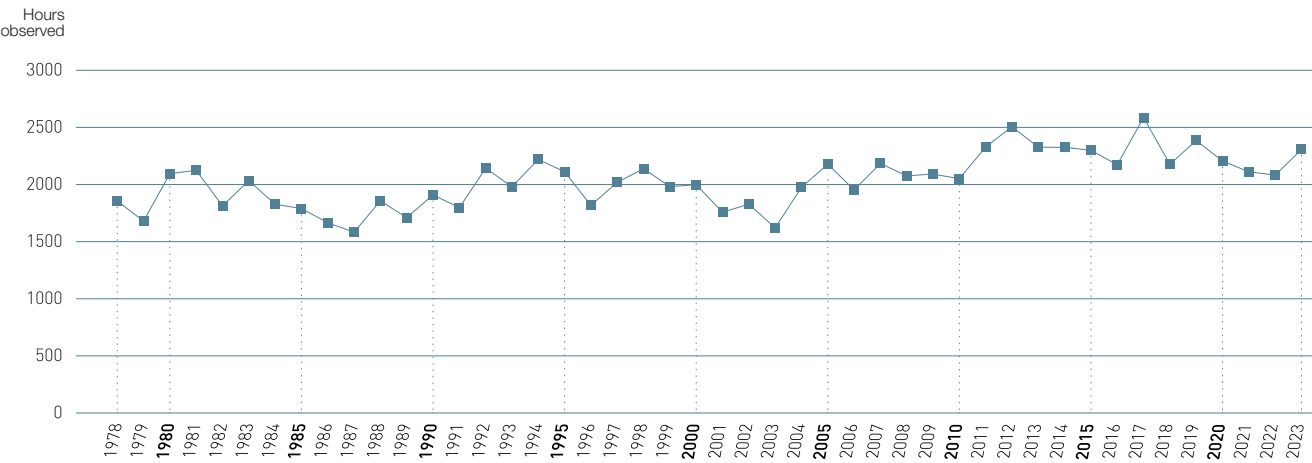
3.5 m telescope

Semester	23A	23B
CARMENES ¹ (Sp, VIS+NIR)	•	•
PMAS ² (Sp, VIS)	•	•
Omega2000 (Im, NIR)	•	•



Observing time

During 2023, a total of **2279 night hours** were observable in Calar Alto. The figure below shows the comparison with the historical series, confirming the overall trend increasing this quantity along the last 20 years.



Telescopes 1.23 m and Schmidt

The **1.23 m telescope** has allocated its observing time to several scientific programs, and to educational and outreach activities. This telescope is the largest in Europe offering the possibility to observe through an eyepiece.

The **Schmidt camera** is subject to an agreement with the European Spatial Agency (ESA) that uses this telescope to survey Solar System objects.

Telescopes 2.2 m and 3.5 m

The time lost due to technical problems in the two largest telescopes of Calar Alto was less than 3% in 2023. This shows that these two telescopes and their associated instrumentation are efficiently maintained by the CAHA technical staff. In addition to this, the availability of the CAHA astronomical staff to perform service observations in these telescopes results in a privileged exploitation of the weather conditions, allowing an optimal return of the astronomical observations.

The 2.2 m and 3.5 m telescopes have allocated part of their time to long-term projects, previously approved by the CAHA EC and SAC. The table below shows the details of the observations devoted to those projects.

Project	Nights (23A/23B)	Telescope	Instrument
BHOLE	110/110	2.2 m	CAFOS
CARMENES Legacy+	50/50	3.5 m	CARMENES
KOBE	35/35	3.5 m	CARMENES
CAVITY	25/25	3.5 m	PMAS

More nights were also allocated to proposals received from:

- the **general Call for Proposals** (Open Time), accesible to astronomers from Spanish institutions.
- the **ORP Call for Proposals**, supported via the Opticon Radionet Pilot Transnational Access program, accesible to astronomers from any nation.
- the **Director’s Discretionary Time** (DDT) program.
- the **Director’s Guaranteed Time** (DGT) program.

On the right follows the distribution of proposals performed during 2023 separated by the different ways of access.

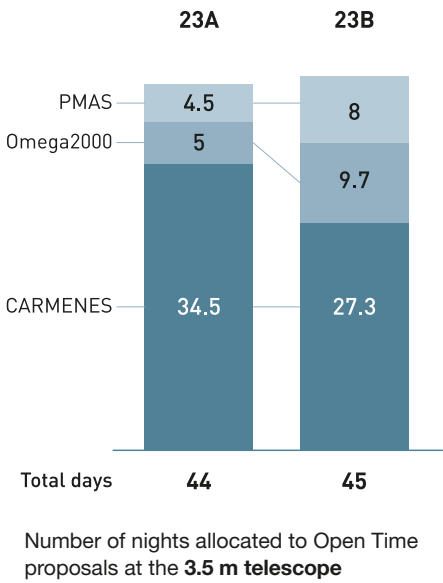
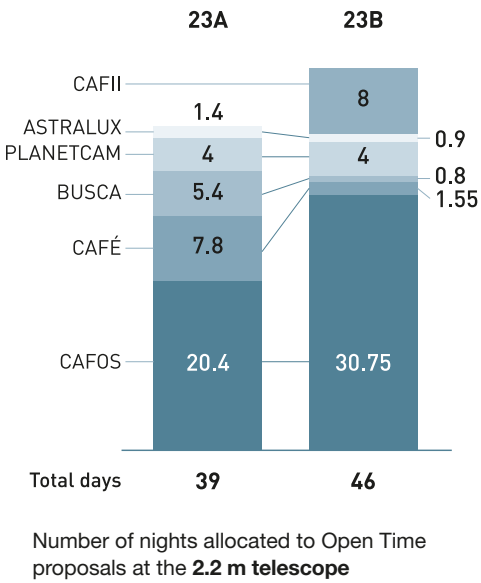
	23A		23B	
	2.2 m	3.5 m	2.2 m	3.5 m
Open Time	16	12	22	18
OPTICON	-	2	1	8
DDT	2	6	2	4
DGT	-	1	-	2

The remaining nights were devoted to aluminization of mirrors, academies of different universities and commissioning of the PANIC NIR camera (at the 2.2 m).

The table on the right shows the number of nights offered to **Open Time proposals** and the pressure factors for the 2.2 m and 3.5 m telescopes in semesters 23A and 23B.

	23A		23B	
	2.2 m	3.5 m	2.2 m	3.5 m
Nights offered	39	44	46	45
Pressure factor	2.4	1.5	2.5	1.8

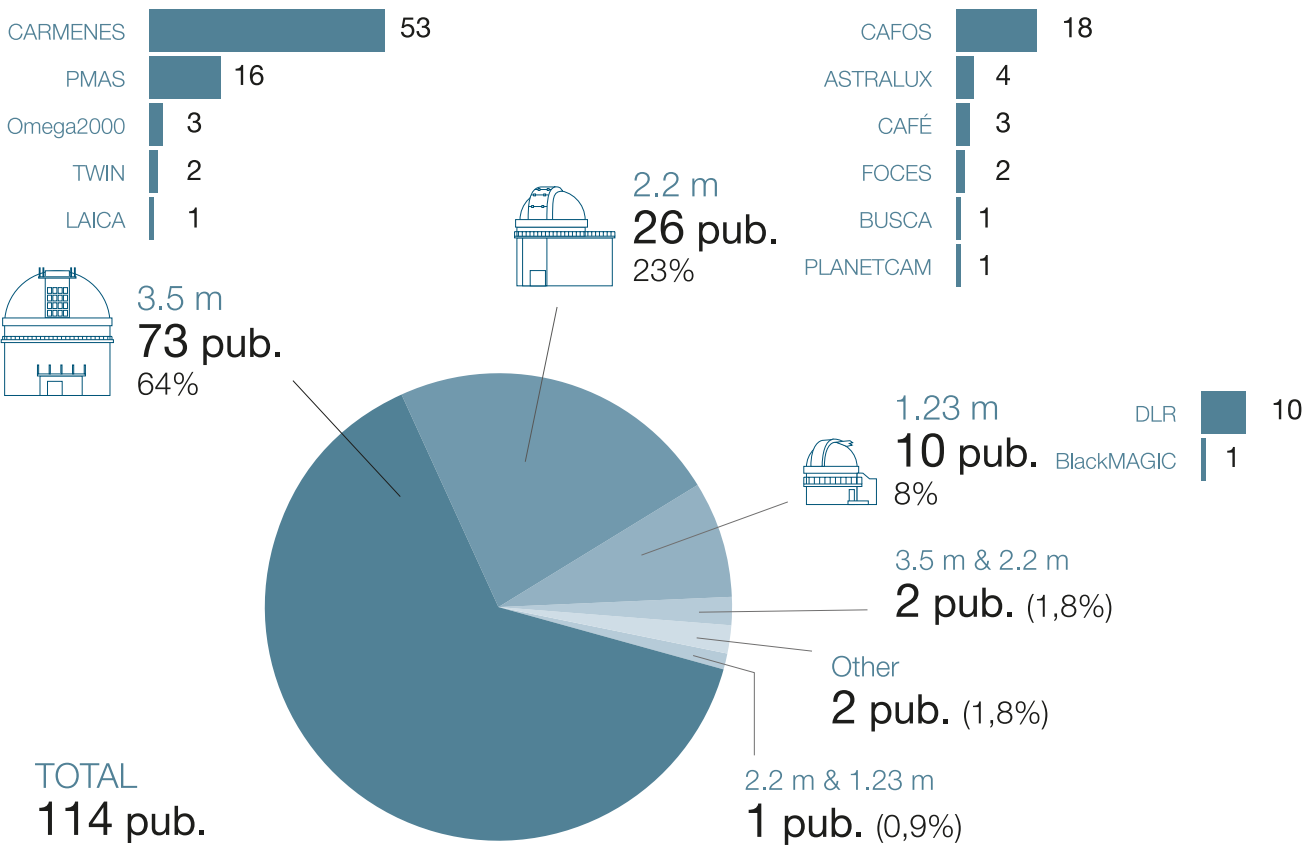
Below follows the distribution of nights allocated to Open Time proposals at both telescopes, **split by instrument**.



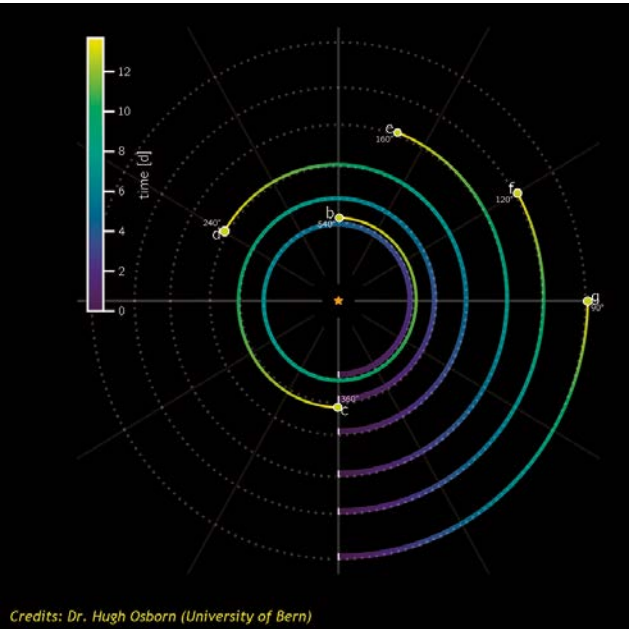
Publications

A total of **114 articles** have been published in different high impact scientific journals based on data obtained using the Calar Alto facilities. Below follow the details of those publications, split by telescopes and instruments.

A detailed list of publications is included at the end of this Annual.



Press releases



A sextuplet of planets found orbiting a bright star in a synchronous way

Using images from space telescopes, an international team of astronomers has found a remarkable system of six planets orbiting in a synchronized manner - in resonance - the relatively bright and nearby star HD110067.

The planetary system, first detected by dedicated satellites catching the tiny eclipses provoked by the planets passing in front of their star, was followed-up with the CARMENES spectrograph at Calar Alto, to infer the masses of the planets, all found to be in the sub-Neptune regime. The sizes of the six planets were all found to be around 2 to 3 Earth radii.

HD110067 is to date the closest, rare resonant planetary system unperturbed for over a billion years. It will be further monitored with CARMENES on the CAHA 3.5 m telescope.

This very special case may be key to understand better the mechanisms of birth and evolution of planetary systems.

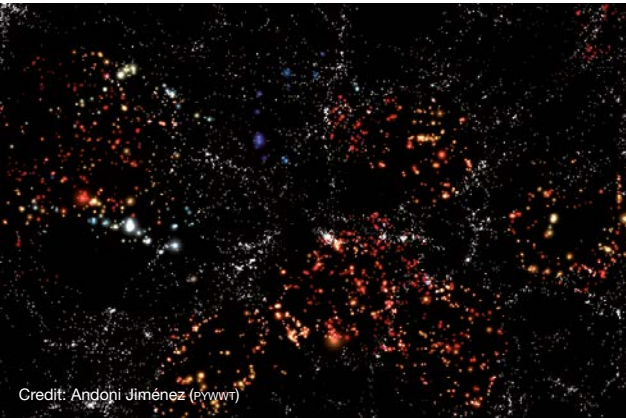


CARMENES studies the puffiest known exoplanet atmosphere

An international team of researchers used the CARMENES spectrograph to study the atmosphere of HAT-P-67b, the largest but least dense transiting gas giant known to date. Exoplanet atmospheres are most often studied by measuring how different gases absorb different colors of starlight as the exoplanet transits in front of its star. The resulting spectral signals are typically over a thousand times fainter than the brightness from the hot star, so detecting them requires exquisite precision.

HAT-P-67b is in a temperature regime where we expect atomic and molecular gases to co-exist. CARMENES observations showed Sodium and ionized Calcium, as well as Hydrogen and Helium in the atmosphere of HAT-P-67b. The presence of ionized Calcium, which was not predicted by the models, and is observed in hotter planets, might be caused by a highly ionized atmosphere.

In addition to this, the absorption in the Hydrogen and Helium lines usually indicates that part of the atmosphere is escaping to the space. If this was the case, the planet HAT-P-67b could be losing its puffy atmosphere at a rate of 10 million tons per second.



Galaxies in cosmic voids evolve slowly

Galaxies are mass concentrations in which the gas from the Universe condenses under the action of gravity forming thousands of millions of stars. As the bricks of a house, the galaxies are the fundamental building blocks that conform the large-scale structure of the Universe. These galaxies are distributed in a sponge-like web characterized by the different large scale structure environments: dense clusters, elongated filaments, sheet-like walls and low density regions called “cosmic voids”. Approximately 80% of the volume of the Universe is occupied by these cosmic voids, that contain around 10% of the total mass. This makes the cosmic voids the least dense regions of the Universe.

In comparison, filaments, walls and clusters are much denser, occupying around 90% of the mass of the Universe in only 20% of the total volume. Galaxies recede from each other as the Universe expands. According to the current cosmological paradigm, at the beginning, the Universe was extremely hot, dense, small, and uniform. From these early times the Universe has continued to expand, lowering its density and temperature, and creating the sponge-like structure that characterizes the present Universe. Therefore, it is expected that the properties of galaxies will be affected by the large scale environment in which they live. Indeed, previous studies have shown that the galaxies that reside in cosmic voids tend to hold properties more characteristic of younger, less evolved systems.

In the framework of the CAVITY project, an ongoing legacy program at Calar Alto, researchers from the University of Granada show, for the first time, that galaxies located in cosmic voids assemble their stars more slowly than galaxies in filaments, walls and clusters.



A not so borealis aurora

The cameras that monitor permanently the Calar Alto sky have been able to record an aurora borealis on the night of Sunday, April 23, 2023, an exceptional sighting in Andalusia.

The visibility of the phenomenon at the latitude of the observatory confirms the power of the solar eruption that took place a couple of days before and the exquisite transparency of the skies over Calar Alto.

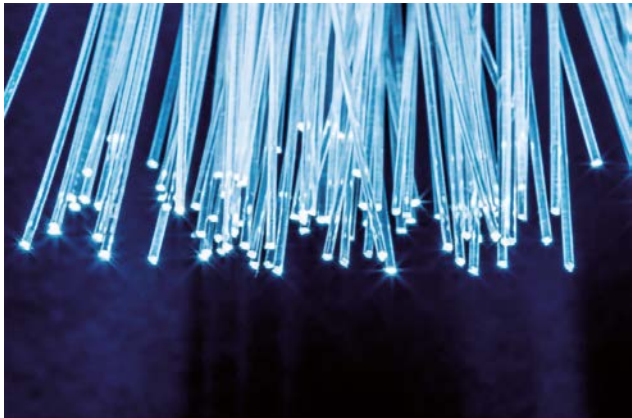
During an aurora borealis (and australis), the night sky gets illuminated from red to blue and green colors. This is due to the solar wind, a variable stream of charged particles (protons and electrons) emitted by our star, which interacts with the upper atmosphere following Earth’s magnetic field lines that pass through the poles.



CARMENES boosts the number of known exoplanets in the Solar Neighborhood

The consortium of the CARMENES project published the data for about twenty thousand observations of a sample of 362 nearby, cool dwarf stars, taken between 2016 and 2020. The project CARMENES, co-led by the IAA-CSIC and the ICE-CSIC, focuses on the search for Earth-like exoplanets (rocky and temperate), with the possibility of having liquid water on the surface if they are in the habitable zone around their star. Among the many data released in 2023 are those that have led to the discovery of 59 exoplanets, a dozen being potentially habitable.

In fact, the observations taken with the CARMENES spectrograph have boosted the number of known exoplanets around nearby cool stars. This first data release gives full open access to the international scientific community. This will increase the scientific production of CARMENES, which has observed almost half of all nearby dwarf stars (a part of them can only be observed from the southern hemisphere). In addition, the spectra obtained also provide valuable information about the photospheres of the stars and the atmospheres of their planets.



Calar Alto joins the “Dark Side” of the Spanish national network of optical fibre

Calar Alto is located on top of a mountain, in the Sierra de los Filabres at an altitude of 2168 m. This location, quite far away from the cities, offers indeed the clearest and most stable skies in continental Europe. But its relative isolation also implies a more complicated access for the road and the external communication networks, with the unstoppable development of the internet in the 90s of the 20th century.

Like for any current large science center, an internet connection offering stability and a high capacity is critical for the Calar Alto observatory, in particular to distribute to the astronomical community the data collected every night by its telescopes and instruments. From now on, the Calar Alto observatory will be integrated into RedIRIS-NOVA, the Spanish RedIRIS network of high-capacity dark fibre. This EU investment with MRR funds, worth about €2 million, will allow a better accessibility to the various datasets generated each night of observation by the multiple instruments of its telescopes, as well as open the possibility to access future research projects that require high bandwidth.

Technological activities

MARCOT

The Multi-Array of Combined Telescopes (MARCOT), is a modular astronomical infrastructure facility for high resolution spectroscopy and large field of view, high dynamic range imaging at subarcsec spatial resolution. The primary objective of the MARCOT Project is to carry out the conceptual design and establish a plan for the construction of a new European telescope concept with a large effective aperture and low cost.

The idea consists of the combination of multiple *identical* optical elements (identical mirrors or optical assemblies within manufacturing tolerances) resulting in a new infrastructure facility with a large effective aperture. This technique would allow the development of the next generation of very large effective-aperture telescopes with substantially reduced budget, serving two main purposes: high-resolution spectroscopy and large field of view seeing-limited high dynamic range imaging, also capable of achieving very fast cadences. The project has already developed a prototype unit of the array at Calar Alto observatory.

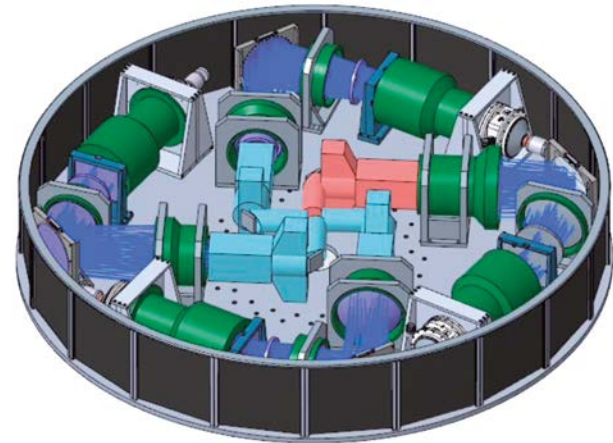


TARSIS

The Tetra-ARmed Super-Ifu Spectrograph (TARSIS), is a wide-FoV, integral field unit spectrograph with intermediate spectral resolution and optimized for the blue range for the 3.5 m telescope of Calar Alto. This will be a unique instrument that is able to explore large areas of the sky (~8 arcmin²) reaching relatively unexplored wavelengths as blue as 320 nm and until 810 nm.

CATARSIS, the scientific project associated to TARSIS, will occupy most of the nights of the 3.5 m telescope during the first years of TARSIS operations. It will observe a sample of 16 cluster galaxies, some of them with known filaments, in the redshift range $0.15 < z < 0.23$ up to a distance of several virial radii, which will allow to answer questions related to the mass profile of the cluster, as well as the nature of the physical processes acting on the evolution of galaxies not only within the clusters, but also in the connecting filaments.

The institutions involved in the TARSIS project are the IAA-CSIC, UCM, Univ. Sevilla, Univ. Almería, CAB/INTA-CSIC, INAOE, the company FRACTAL S.L.N.E., and the Calar Alto observatory. TARSIS completed the scientific and technical review of the conceptual design in 2023, and tentatively will face its preliminary design phase in 2024.



Education and outreach

Calar Alto Academy

CAHA continues with its Academy program, playing an important role in the education of the future astronomers. In 2023, students from **7 European universities** (UAM, UCM, UB, UCDublin, UGr, VIU, UNIR) had the possibility to observe with the 2.2 m and 1.23 m telescopes in the same conditions as the professional astronomers.

Calar Alto and the society

The observatory has been present in several activities in collaboration with the **Universidad de Almería**: Feria de la Ciencia, Cursos de Verano, and Noche Europea de los Investigadores.

In addition to this, the observatory has hosted several observing campaigns at the 1.23 m telescope for the **SEA ProAm** collaboration, and the international network **Europlanet**.

Visits to Calar Alto

During 2023, a large number of people had the opportunity to enjoy visiting the main facilities of Calar Alto guided by the staff of the company **Azimuth**, intimately linked to the outreach plan of the observatory.

4179
visitors

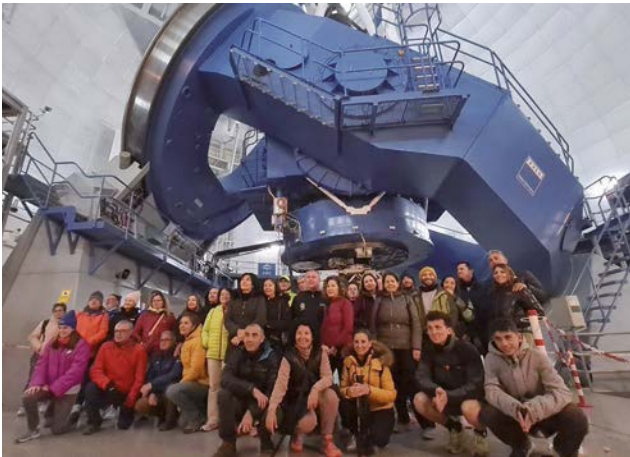
172
events

Awards

The relevant role of Calar Alto in the society has been rewarded with two institutional honours in 2023: Calar Alto was awarded the **ASEMPAL prize** (“Distinción Planeta”), and the **IDEAL prize**.

In addition to the individual honours:

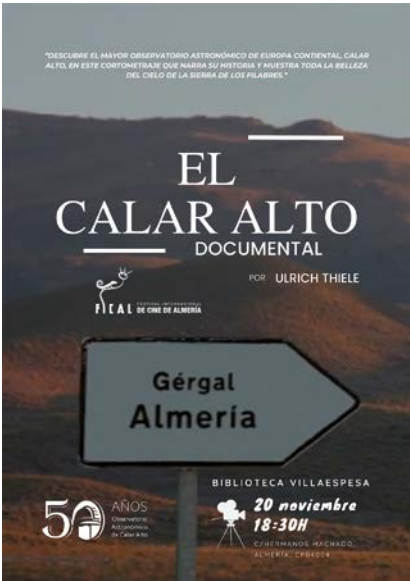
- **Ana Guijarro** received the honour of “Influential women of Almería” (STEM category).
- **Jesús Aceituno** was awarded the “Perpetual ambassador” of the Fiñana village.



50 years of Calar Alto (1973-2023)

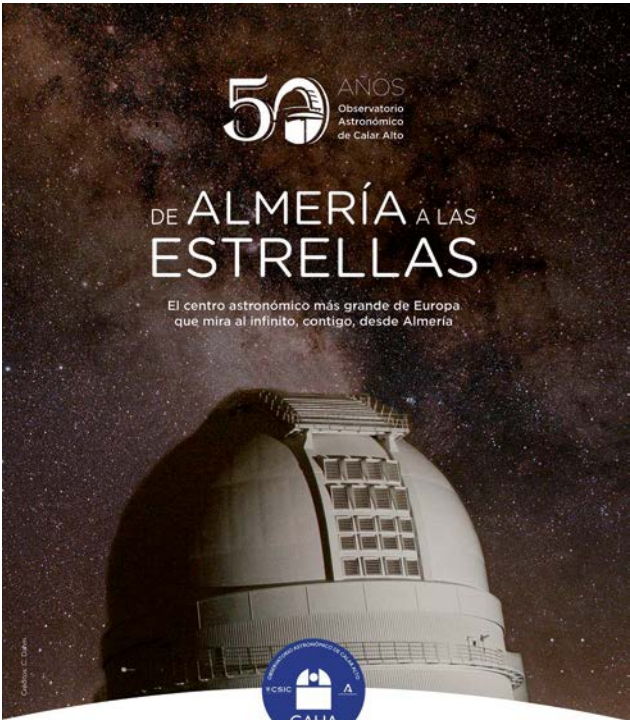


CAHA started its activities in 1973, one year after the signature of the agreement between the Spanish and German governments. For this reason, during 2023 the observatory has organized a special open doors program to position Calar Alto closer to the Almerian society. In addition to this, the city of Almería hosted several activities aimed at highlighting the relevance of the observatory as an international scientific institution; among them we mention a photographic exhibition in the popular street Paseo de Almería, an astronomical concert in the jazz club Clasi jazz, and the participation in the international cinema festival FICAL, and in the associated gastronomical contest Platos de Película.



ABOVE
Celebration of the 50th anniversary in September 2023.
From left to right: Roland Kurt Gredel (director 1998–2006), Félix Lahulla Fornies (co-director 1976–1979), Joao Manuel Farinha Alves (director 2006–2010), Jesús Aceituno Castro (director 2016–present), David Barrado Navascues (director 2010–2013), Pilar Duro, widow of Kurt Birkle (director 1973–1998) and Delma Martínez, widow of Teodoro Vives Soteras (co-director 1982–2003).
Credit: César Hernández/CSIC

BELOW
Construction of the 2.2 m telescope dome ca. 1977.
Credit: Pere Iglesias Teixidor



EXPOSICIÓN FOTOGRÁFICA
DE ALMERÍA A LAS ESTRELLAS
PASEO DE ALMERÍA
Del 28 de Julio al 20 de Septiembre
www.caha.es



List of Publications

A total of **114 publications** have been published in different high impact scientific journals based on data obtained using the Calar Alto facilities in 2023. These publications are listed below, with indication of telescope (*Tlspe*) and instruments.

1. Title: Shape Models of Lucy Targets (3548) Eurybates and (21900) Orus from Disk-integrated Photometry

Authors: Mottola, Stefano; et al.

DOI: 10.3847/PSJ/aca79

Tlspe: 1.23m DLR

2. Title: Benchmarking MESA isochrones against the Hyades single star sequence

Authors: Brandner, Wolfgang; Calissendorff, Per; Kopytova, Taisiya

DOI: 10.1093/mnras/stac2247

Tlspe: 2.2m Astralux

3. Title: X-Ray Polarization Observations of BL Lacertae

Authors: Middei, Riccardo; et al.

DOI: 10.3847/2041-8213/aca281

Tlspe: 2.2m CAFOS

4. Title: Tidally locked rotation of the dwarf planet (136199) Eris discovered via long-term ground-based and space photometry

Authors: Szakáts, R.; et al.

DOI: 10.1051/0004-6361/202245234

Tlspe:2.2m CAFOS

5. Title: The multichord stellar occultation by the centaur Bienor on January 11, 2019

Authors: Fernández-Valenzuela, E.; et al.

DOI: 10.1051/0004-6361/202243214

Tlspe: 1.23m DLR

6. Title: DREAM. I. Orbital architecture orrery

Authors: Bourrier, V.; et al.

DOI: 10.1051/0004-6361/202245004

Tlspe: 3.5m CARMENES

7. Title: HD 191939 revisited: New and refined planet mass determinations, and a new planet in the habitable zone

Authors: Orell-Miquel, J.; et al.

DOI: 10.1051/0004-6361/202244120

Tlspe: 3.5m CARMENES

8. Title: Star formation in IC1396: Kinematics and subcluster structure revealed by Gaia

Authors: Pelayo-Baldarrago, Mara E.; et al.

DOI: 10.1051/0004-6361/202244265

Tlspe: 2.2m CAFOS; 3.5m Omega2000

9. Title: KOBESim: A Bayesian observing strategy algorithm for planet detection in radial velocity blind-search surveys

Authors: Balsalobre-Ruza, O.; et al.

DOI: 10.1051/0004-6361/202243938

Tlspe: 3.5m CARMENES

10. Title: Dark matter halos and scaling relations of extremely massive spiral galaxies from extended H I rotation curves

Authors: Di Teodoro, Enrico M.; et al.

DOI: 10.1093/mnras/stac3424

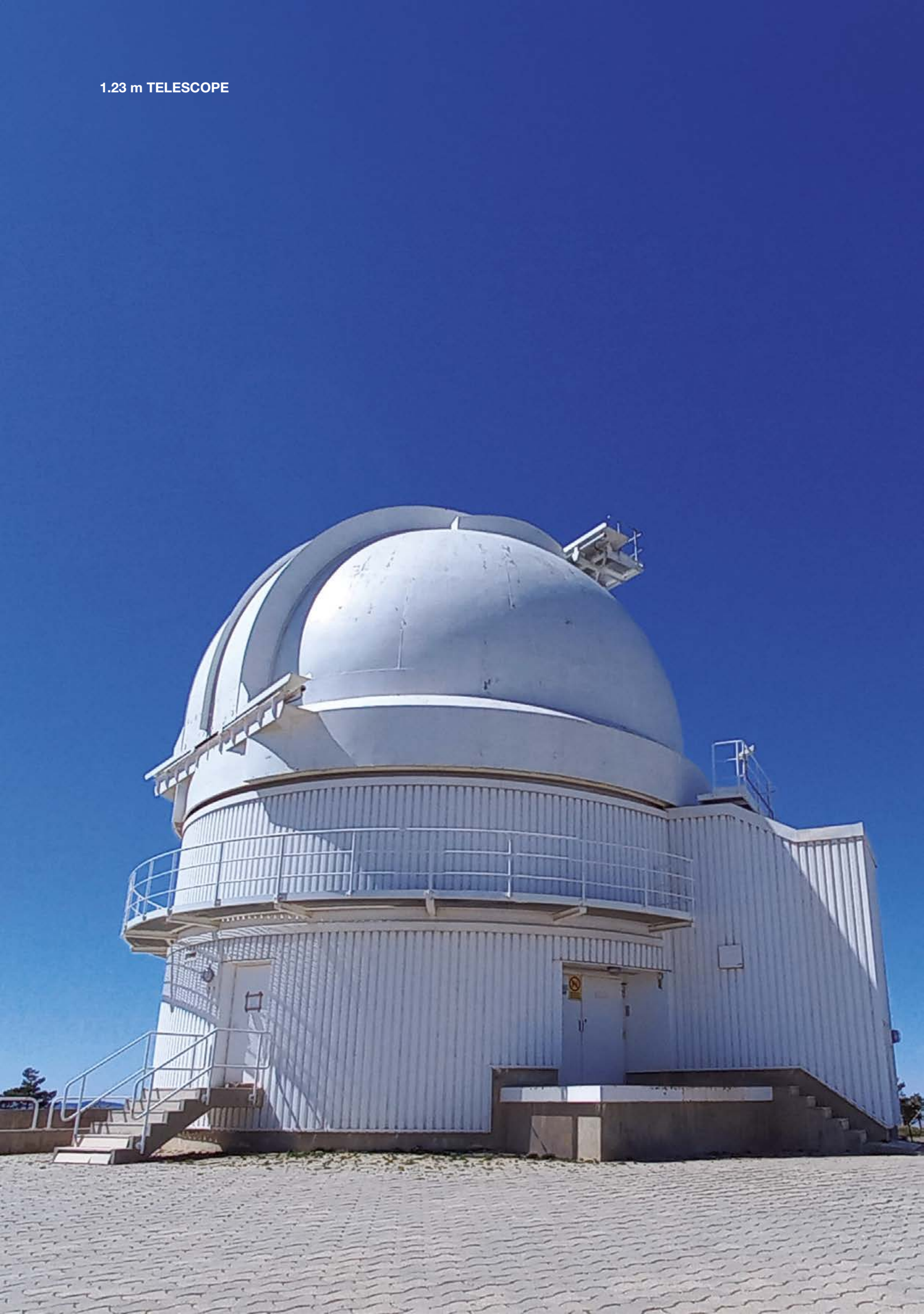
Tlspe: 3.5m PMAS

11. Title: A Low-mass, Pre-main-sequence Eclipsing Binary in the 40 Myr Columba Association-Fundamental Stellar Parameters and Modeling the Effect of Star Spots

Authors: Tofflemire, Benjamin M.; et al.

DOI: 10.3847/1538-3881/aca60f

Tlspe: 3.5m CARMENES



12. Title: Independent Validation of the Temperate Super-Earth HD 79211 b using HARPS-N

Authors: DiTomasso, Victoria; et al.

DOI: 10.3847/1538-3881/ac9ccd

Tlspe: [3.5m CARMENES](#)

13. Title: The CARMENES search for exoplanets around M dwarfs. Guaranteed time observations Data Release 1 (2016-2020)

Authors: Ribas, I.; et al.

DOI: 10.1051/0004-6361/202244879

Tlspe: [3.5m CARMENES](#)

14. Title: The CARMENES search for exoplanets around M dwarfs. Variability on long timescales as seen in chromospheric indicators

Authors: Fuhrmeister, B.; et al.

DOI: 10.1051/0004-6361/202244829

Tlspe: [3.5m CARMENES](#)

15. Title: Two temperate Earth-mass planets orbiting the nearby star GJ 1002

Authors: Suárez Mascareño, A.; et al.

DOI: 10.1051/0004-6361/202244991

Tlspe: [3.5m CARMENES](#)

16. Title: Ageing and quenching through the ageing diagram: predictions from simulations and observational constraints

Authors: Corcho-Caballero, Pablo; et al.

DOI: 10.1093/mnras/stad147

Tlspe: [3.5m PMAS](#)

17. Title: Multiwavelength study of the luminous GRB 210619B observed with Fermi and ASIM

Authors: Caballero-García, M. D.; et al.

DOI: 10.1093/mnras/stac3629

Tlspe: [2.2m CAFOS](#)

18. Title: Study of Variability in Long-term Multiwavelength Optical Lightcurves of Blazar AO 0235+164

Authors: Roy, Abhradeep; et al.

DOI: 10.3847/1538-4365/acb059

Tlspe: [2.2m CAFOS](#)

19. Title: The Origin of the Nuclear Star-forming Ring in NGC 3182

Authors: Pak, Mina; et al.

DOI: 10.3847/1538-3881/ac7b83

Tlspe: [3.5m PMAS](#)

20. Title: Dynamical masses of two young transiting sub-Neptunes orbiting HD 63433

Authors: Mallorquín, M.; et al.

DOI: 10.1051/0004-6361/202245397

Tlspe: [3.5m CARMENES](#)

21. Title: The CARMENES search for exoplanets around M dwarfs. A long-period planet around GJ 1151 measured with CARMENES and HARPS-N data

Authors: Blanco-Pozo, J.; et al.

DOI: 10.1051/0004-6361/202245053

Tlspe: [3.5m CARMENES](#)

22. Title: Quantitative spectroscopy of late O-type main-sequence stars with a hybrid non-LTE method

Authors: Aschenbrenner, P.; Przybilla, N.; Butler, K.

DOI: 10.1051/0004-6361/202244906

Tlspe: [2.2m FOCES](#)

23. Title: Search for planets around stars with wide brown dwarfs

Authors: Šubjak, J.; et al.

DOI: 10.1051/0004-6361/202244238

Tlspe: [3.5m CARMENES](#)

24. Title: The TIME Table: rotation and ages of cool exoplanet host stars

Authors: Gaidos, Eric; et al.

DOI: 10.1093/mnras/stad343

Tlspe: [3.5m CARMENES](#)

25. Title: Identifying meteorite droppers among the population of bright ‘sporadic’ bolides imaged by the Spanish Meteor Network during the spring of 2022

Authors: Peña-Asensio, E.; et al.

DOI: 10.1093/mnras/stad102

Tlspe: [SPMN](#)

26. Title: A Possible Surviving Companion of the SN Ia in the Galactic SNR G272.2-3.2

Authors: Ruiz-Lapuente, P.; et al.

DOI: 10.3847/1538-4357/acad74

Tlspe: [3.5m CARMENES](#)

27. Title: EDEN Survey: Small Transiting Planet Detection Limits and Constraints on the Occurrence Rates of Planets around Late-M Dwarfs within 15 pc

Authors: Dietrich, Jeremy; et al.

DOI: 10.3847/1538-3881/acba0b

Tlspe: [1.23m DLR](#)

28. Title: A machine learning approach for correcting radial velocities using physical observables

Authors: Perger, M.; et al.

DOI: 10.1051/0004-6361/202245092

Tlspe: [3.5m CARMENES](#)

29. Title: HIP 67506 C: MagAO-X confirmation of a new low-mass stellar companion to HIP 67506 A

Authors: Pearce, Logan A.; et al.

DOI: 10.1093/mnras/stad859

Tlspe: [3.5m CARMENES](#)

30. Title: Photometric study of the late-time near-infrared plateau in Type Ia supernovae

Authors: Deckers, M.; et al.

DOI: 10.1093/mnras/stad841

Tlspe: [3.5m Omega2000](#)

31. Title: Revising the properties of low mass eclipsing binary stars using TESS light curves

Authors: Jennings, Z.; et al.

DOI: 10.1093/mnras/stad519

Tlspe: [1.23m DLR](#); [2.2m BUSCA](#)

32. Title: The Calar Alto CAFOS direct imaging first data release

Authors: Cortés-Contreras, M.; et al.

DOI: 10.1093/mnras/stad744

Tlspe: [2.2m CAFOS](#)

33. Title: Absence of extended atmospheres in low-mass star radius-gap planets

Authors: Krishnamurthy, Vigneshwaran; et al.

DOI: 10.1093/mnras/stad404

Tlspe: [3.5m CARMENES](#)

34. Title: Transit timing variation analysis of the low-mass brown dwarf KELT-1 b

Authors: Baştürk, Ö.; et al.

DOI: 10.1093/mnras/stad248

Tlspe: [1.23m DLR](#)

35. Title: Uranus ring occultation observations: 1977-2006

Authors: French, Richard G.; et al.

DOI: 10.1016/j.icarus.2023.115474

Tlspe: [1.23m BlackMAGIC](#)

36. Title: X-Ray Polarization of BL Lacertae in Outburst

Authors: Peirson, Abel L.; et al.

DOI: 10.3847/2041-8213/acd242

Tlspe: [2.2m CAFOS](#)

37. Title: Revisiting the Red Giant Branch Hosts KOI-3886 and ι Draconis. Detailed Asteroseismic Modeling and Consolidated Stellar Parameters

Authors: Campante, Tiago L.; et al.

DOI: 10.3847/1538-3881/acc9c1

Tlspe: [3.5m CARMENES](#)

38. Title: High-resolution Emission Spectroscopy of the Ultrahot Jupiter KELT-9b: Little Variation in Day- and Nightside Emission Line Contrasts

Authors: Ridden-Harper, Andrew; et al.

DOI: 10.3847/1538-3881/acc654

Tlspe: [3.5m CARMENES](#)

39. Title: Coronal X-Ray Emission from Nearby, Low-mass, Exoplanet Host Stars Observed by the MUSCLES and Mega-MUSCLES HST Treasury Survey Projects

Authors: Brown, Alexander; et al.

DOI: 10.3847/1538-3881/acc38a

Tlspe: [3.5m CARMENES](#)

40. Title: Contemporaneous Observations of H α Luminosities and Photometric Amplitudes for M Dwarfs

Authors: García Soto, Aylin; et al.

DOI: 10.3847/1538-3881/acc2ba

Tlspe: [3.5m CARMENES](#)

41. Title: The Mantis Network. III. Expanding the limits of chemical searches within ultra-hot Jupiters: New detections of Ca I, V I, Ti I, Cr I, Ni I, Sr II, Ba II, and Tb II in KELT-9 b

Authors: Borsato, N. W.; et al.

DOI: 10.1051/0004-6361/202245121

Tlspe: [3.5m CARMENES](#)

42. Title: Characterisation of the upper atmospheres of HAT-P-32 b, WASP-69 b, GJ 1214 b, and WASP-76 b through their He I triplet absorption

Authors: Lampón, M.; et al.

DOI: 10.1051/0004-6361/202245649

Tlspe: [3.5m CARMENES](#)

43. Title: The CARMENES search for exoplanets around M dwarfs. A deep transfer learning method to determine Teff and [M/H] of target stars

Authors: Bello-García, A.; et al.

DOI: 10.1051/0004-6361/202243934

Tlspe: [3.5m CARMENES](#)

44. Title: A UNIONS view of the brightest central galaxies of candidate fossil groups

Authors: Chu, A.; et al.

DOI: 10.1051/0004-6361/202346119

Tlspe: [2.2m CAFOS](#)

45. Title: Non-parametric galaxy morphology from stellar and nebular emission with the CALIFA sample

Authors: Nersesian, Angelos; et al.

DOI: 10.1051/0004-6361/202345962

Tlspe: [3.5m PMAS](#)

46. Title: A runaway T Tauri star leaving an extended Trail

Authors: Martí, Josep; Luque-Escamilla, Pedro L.; Sánchez-Ayaso, Estrella

DOI: 10.1051/0004-6361/202245179

Tlspe: [1.23m DLR](#)

47. Title: Photometric classification of quasars from ALHAMBRA survey using random forest

Authors: Arroquia-Cuadros, Benjamin; et al.

DOI: 10.1051/0004-6361/202245531

Tlspe: [3.5m LAICA](#)

48. Title: Bulgeless disks, dark galaxies, inverted color gradients, and other expected phenomena at higher z. The chromatic surface brightness modulation (CMOD) effect

Authors: Papaderos, Polychronis; Östlin, Göran; Breda, Iris

DOI: 10.1051/0004-6361/202245769

Tlspe: [3.5m PMAS](#)

49. Title: Optical and near-infrared stellar activity characterization of the early M dwarf Gl 205 with SOPHIE and SPIRou

Authors: Cortés-Zuleta, P.; et al.

DOI: 10.1051/0004-6361/202245131

Tlspe: [3.5m CARMENES](#)

50. Title: Robustness measures for molecular detections using high-resolution transmission spectroscopy of exoplanets

Authors: Cheverall, Connor J.; Madhusudhan, Nikku; Holmberg, Måns

DOI: 10.1093/mnras/stad648

Tlspe: [3.5m CARMENES](#)

51. Title: Analysis of the Activity of 11 K-type Dwarfs with Planets in the Habitable Zone

Authors: Savanov, I. S.

DOI: 10.1134/S1990341323020086

Tlspe: [3.5m CARMENES](#)

52. Title: Examining the Properties of Low-luminosity Hosts of Type Ia Supernovae from ASAS-SN

Authors: Holoien, Thomas W. -S.; et al.

DOI: 10.3847/1538-4357/acce35

Tlspe: [3.5m PMAS](#)

53. Title: Elemental Abundances of the Super-Neptune WASP-107b’s Host Star Using High-resolution, Near-infrared Spectroscopy

Authors: Hejazi, Neda; et al.

DOI: 10.3847/1538-4357/accb97

Tlspe: [3.5m CARMENES](#)

54. Title: Updated Planetary Mass Constraints of the Young V1298 Tau System Using MAROON-X

Authors: Sikora, James; et al.

DOI: 10.3847/1538-3881/acc865

Tlspe: [3.5m CARMENES](#)

55. Title: The CARMENES search for exoplanets around M dwarfs. Line-by-line sensitivity to activity in M dwarfs

Authors: Lafarga, M.; et al.

DOI: 10.1051/0004-6361/202245602

Tlspe: [3.5m CARMENES](#)

56. Title: Testing super-eddington accretion on to a supermassive black hole: reverberation mapping of PG 1119+120

Authors: Donnan, Fergus R.; et al.

DOI: 10.1093/mnras/stad1409

Tlspe: [2.2m CAFOS](#)

57. Title: Integral Field Spectroscopy of the cometary starburst galaxy NGC 4861

Authors: Roche, Nathan; et al.

DOI: 10.1093/mnras/stad1219

Tlspe: [3.5m PMAS](#)

58. Title: AGNs in the CALIFA survey: X-ray detection of nuclear sources

Authors: Osorio-Clavijo, N.; et al.

DOI: 10.1093/mnras/stad1262

Tlspe: [3.5m PMAS](#)

59. Title: Pulsation-induced Spectroscopic Variability of IRAS Z02229+6208

Authors: Začs, Laimons; Puķītis, Kārlis

DOI: 10.3847/1538-4357/acdcfe

Tlspe: [3.5m CARMENES](#)

60. Title: Two sub-Neptunes around the M dwarf TOI-1470

Authors: González-Álvarez, E.; et al.

DOI: 10.1051/0004-6361/202346292

Tlspe: [3.5m CARMENES](#)

61. Title: The CARMENES search for exoplanets around M dwarfs. A sub-Neptunian mass planet in the habitable zone of HN Lib

Authors: González-Álvarez, E.; et al.

DOI: 10.1051/0004-6361/202346276

Tlspe: [3.5m CARMENES](#)

62. Title: Two warm Neptunes transiting HIP 9618 revealed by TESS and Cheops

Authors: Osborn, H. P.; et al.

DOI: 10.1093/mnras/stad1319

Tlspe: [2.2m CAFÉ](#)

63. Title: IXPE and Multiwavelength Observations of Blazar PG 1553+113 Reveal an Orphan Optical Polarization Swing

Authors: Middei, Riccardo; et al.

DOI: 10.3847/2041-8213/acec3e

Tlspe: [2.2m CAFOS](#)

64. Title: ExoGemS Detection of a Metal Hydride in an Exoplanet Atmosphere at High Spectral Resolution

Authors: Flagg, Laura; et al.

DOI: 10.3847/2041-8213/ace529

Tlspe: [3.5m CARMENES](#)

65. Title: Exploring the Impact of Galactic Interactions and Mergers on the Central Star Formation of APEX/EDGE-CALIFA Galaxies

Authors: Garay-Solis, Yeny; et al.

DOI: 10.3847/1538-4357/acd781

Tlspe: [3.5m PMAS](#)

66. Title: Transmission Spectroscopy of the Lowest-density Gas Giant: Metals and a Potential Extended Outflow in HAT-P-67b

Authors: Bello-Arufe, Aaron; et al.

DOI: 10.3847/1538-3881/acd935

Tlspe: [3.5m CARMENES](#)

67. Title: Mind the Gap. I. H α Activity of M Dwarfs Near the Partially/Fully Convective Boundary and a New H α Emission Deficiency Zone on the Main Sequence

Authors: Jao, Wei-Chun; et al.

DOI: 10.3847/1538-3881/ace2bb

Tlspe: [3.5m CARMENES](#)

68. Title: Overfitting Affects the Reliability of Radial Velocity Mass Estimates of the V1298 Tau Planets

Authors: Blunt, Sarah; et al.

DOI: 10.3847/1538-3881/acde78

Tlspe: [3.5m CARMENES](#)

69. Title: A Mini-Neptune Orbiting the Metal-poor K Dwarf BD+29 2654

Authors: Dai, Fei; et al.

DOI: 10.3847/1538-3881/acdee8

Tlspe: [2.2m Astralux](#)

70. Title: Constraints on (2060) Chiron’s size, shape, and surrounding material from the November 2018 and September 2019 stellar occultations

Authors: Braga-Ribas, F.; et al.

DOI: 10.1051/0004-6361/202346749

Tlspe: [1.23m DLR](#)

71. Title: Simultaneous and panchromatic observations of the fast radio burst FRB 20180916B

Authors: Trudu, M.; et al.

DOI: 10.1051/0004-6361/202245303

Tlspe: [2.2m Astralux](#)

72. Title: Complete X-ray census of M dwarfs in the solar neighborhood. I. GJ 745 AB: Coronal-hole stars in the 10 pc sample

Authors: Caramazza, M.; et al.

DOI: 10.1051/0004-6361/202346470

Tlspe: [3.5m CARMENES](#)

73. Title: Characterizing asteroid (152830) Dinkinesh in preparation for the encounter with the NASA Lucy mission: a photometric study

Authors: Mottola, Stefano; et al.

DOI: 10.1093/mnras/slاد066

Tlspe: [1.23m DLR](#)

74. Title: Drift rates of major Neptunian features between 2018 and 2021

Authors: Chavez, Erandi; et al.

DOI: 10.1016/j.icarus.2023.115604

Tlspe: [2.2m Planetcam](#)

75. Title: The EDGE-CALIFA Survey: Spatially Resolved 13CO(1-0) Observations and Variations in 12CO(1-0)/13CO(1-0) in Nearby Galaxies on Kiloparsec Scales

Authors: Cao, Yixian; et al.

DOI: 10.3847/1538-4365/acd840

Tlspe: [3.5m PMAS](#)

76. Title: Modeling the Chromosphere and Transition Region of Planet-hosting Star GJ 436

Authors: Hintz, Dominik; et al.
DOI: 10.3847/1538-4357/ace103
Tlspe: [3.5m CARMENES](#)

77. Title: Two super-Earths at the edge of the habitable zone of the nearby M dwarf TOI-2095

Authors: Murgas, F.; et al.
DOI: 10.1051/0004-6361/202346692
Tlspe: [3.5m CARMENES](#)

78. Title: The blue supergiant Sher 25 revisited in the Gaia era

Authors: Weißmayer, D.; et al.
DOI: 10.1051/0004-6361/202347253
Tlspe: [2.2m FOCES](#)

79. Title: The GAPS programme at TNG. XLVI. Deep search for low-mass planets in late-dwarf systems hosting cold Jupiters

Authors: Pinamonti, M.; et al.
DOI: 10.1051/0004-6361/202346476
Tlspe: [3.5m CARMENES](#)

80. Title: Confirmation of an He I evaporating atmosphere around the 650-Myr-old sub-Neptune HD 235088 b (TOI-1430 b) with CARMENES

Authors: Orell-Miquel, J.; et al.
DOI: 10.1051/0004-6361/202346445
Tlspe: [3.5m CARMENES](#)

81. Title: Environmental dependence of Type IIIn supernova properties

Authors: Moriya, Takashi J.; et al.
DOI: 10.1051/0004-6361/202346703
Tlspe: [3.5m PMAS](#)

82. Title: TOI-1416: A system with a super-Earth planet with a 1.07 d period

Authors: Deeg, H. J.; et al.
DOI: 10.1051/0004-6361/202346370
Tlspe: [3.5m CARMENES](#)

83. Title: Secular Orbital Dynamics of the Possibly Habitable Planet K2-18 b with and without the Proposed Inner Companion

Authors: Makarov, Valeri V.; Goldin, Alexey
DOI: 10.3390/universe9110463
Tlspe: [3.5m CARMENES](#)

84. Title: Discovery of X-ray polarization angle rotation in the jet from blazar Mrk 421

Authors: Di Gesu, Laura; et al.
DOI: 10.1038/s41550-023-02032-7
Tlspe: [2.2m CAFOS](#)

85. Title: A hot super-Earth planet in the WASP-84 planetary system

Authors: Maciejewski, G.; et al.
DOI: 10.1093/mnras/slاد078
Tlspe: [2.2m Astralux](#)

86. Title: Density streams in the disc winds of Classical T Tauri stars

Authors: Petrov, P. P.; et al.
DOI: 10.1093/mnras/stad2252
Tlspe: [2.2m CAFE](#)

87. Title: Active Asteroid 311P/PanSTARRS: Rotational Instability as the Origin of its Multitails?

Authors: Liu, Bin; et al.
DOI: 10.3847/1538-3881/acf31c
Tlspe: [1.23m DLR](#)

88. Title: Characterizing planetary systems with SPIRou: M-dwarf planet-search survey and the multiplanet systems GJ 876 and GJ 1148

Authors: Moutou, C.; et al.
DOI: 10.1051/0004-6361/202346813
Tlspe: [3.5m CARMENES](#)

89. Title: A search for the afterglows, kilonovae, and host galaxies of two short GRBs: GRB 211106A and GRB 211227^a

Authors: Ferro, M.; et al.
DOI: 10.1051/0004-6361/202347113
Tlspe: [2.2m CAFOS](#)

90. Title: A review of planetary systems around HD 99492, HD 147379, and HD 190007 with HARPS-N

Authors: Stalport, M.; et al.
DOI: 10.1051/0004-6361/202346887
Tlspe: [3.5m CARMENES](#)

91. Title: GJ 806 (TOI-4481): A bright nearby multi-planetary system with a transiting hot low-density super-Earth

Authors: Palte, E.; et al.
DOI: 10.1051/0004-6361/202244261
Tlspe: [3.5m CARMENES](#)

92. Title: Spectropolarimetry of Type II supernovae. I. Sample, observational data, and interstellar polarization

Authors: Nagao, T.; et al.
DOI: 10.1051/0004-6361/202346713
Tlspe: [2.2m CAFOS](#)

93. Title: The CARMENES search for exoplanets around M dwarfs. Behaviour of the Paschen lines during flares and quiescence

Authors: Fuhrmeister, B.; et al.
DOI: 10.1051/0004-6361/202347161
Tlspe: [3.5m CARMENES](#)

94. Title: A resonant sextuplet of sub-Neptunes transiting the bright star HD 110067

Authors: Luque, R.; et al.
DOI: 10.1038/s41586-023-06692-3
Tlspe: [3.5m CARMENES](#)

95. Title: A LOFAR prompt search for radio emission accompanying X-ray flares in GRB 210112^a

Authors: Hennessy, A.; et al.
DOI: 10.1093/mnras/stad2670
Tlspe: [2.2m CAFOS](#)

96. Title: The spectroscopic orbit of HD 168112 A,B in NGC 6604: another massive binary target for interferometry

Authors: Putkuri, C.; et al.
DOI: 10.1093/mnras/stad2657
Tlspe: [2.2m CAFE](#); [3.5m TWIN](#)

97. Title: A 5MJup non-transiting coplanar circumbinary planet around Kepler-1660AB

Authors: Goldberg, Max; et al.
DOI: 10.1093/mnras/stad2568
Tlspe: [3.5m CARMENES](#)

98. Title: Optical and near-UV spectroscopic properties of low-redshift jetted quasars in the main sequence context

Authors: Mengistue, Shimeles Terefe; et al.
DOI: 10.1093/mnras/stad2467
Tlspe: [3.5m TWIN](#)

99. Title: On the accretion of a new group of galaxies onto Virgo - III. The stellar population radial gradients of dEs

Authors: Bidaran, Bahar; et al.
DOI: 10.1093/mnras/stad2546
Tlspe: [3.5m PMAS](#)

100. Title: CAHA/PPAK Integral-field Spectroscopic Observations of M81. II. Testing Photoionization Models in a Spatially Resolved LINER

Authors: Li, Zongnan; et al.
DOI: 10.3847/1538-4357/ad0299
Tlspe: [3.5m PMAS](#)

101. Title: Use of GNSS and ERA5 precipitable water vapor based standardized precipitation conversion index for drought monitoring in the Mediterranean coast: A first case study in Southern Spain

Authors: Retegui Schiettekatte, Leire; Selmira Garrido, María; Clara de Lacy, María
DOI: 10.1016/j.asr.2023.08.030
Tlspe: [Other](#)

102. Title: Spiral shocks induced in a galactic gaseous disk: Hydrodynamic understanding of observational properties of spiral galaxies

Authors: Aktar, Ramiz; et al.
DOI: 10.1051/0004-6361/202346624
Tlspe: [3.5m PMAS](#)

103. Title: Possible origin of AT2021any: A failed gamma-ray burst from a structured jet

Authors: Xu, Fan; Huang, Yong-Feng; Geng, Jin-Jun
DOI: 10.1051/0004-6361/202346674
Tlspe: [2.2m CAFOS](#)

104. Title: The Calar Alto Legacy Integral Field Area survey: extended and remastered data release

Authors: Sánchez, S. F.; et al.
DOI: 10.1093/mnras/stad3119
Tlspe: [3.5m PMAS](#)

105. Title: Extreme photometric and polarimetric variability of blazar S4 0954+65 at its maximum optical and γ -ray brightness levels

Authors: Raiteri, C. M.; et al.
DOI: 10.1093/mnras/stad3064
Tlspe: [2.2m CAFOS](#)

106. Title: No plateau observed in late-time near-infrared observations of the underluminous Type Ia supernova 2021qvv

Authors: Graur, O.; et al.
DOI: 10.1093/mnras/stad2960
Tlspe: [3.5m Omega2000](#)

107. *Title:* Star formation in CALIFA survey perturbed galaxies - III. Stellar and ionized-gas kinematic distributions

Authors: Morales-Vargas, A.; et al.

DOI: 10.1093/mnras/stad2865

Tlspe: [3.5m PMAS](#)

108. *Title:* Optical and Near-infrared Observations of the Distant but Bright “New Year’s Burst” GRB 220101A

Authors: Zhu, Zi-Pei; et al.

DOI: 10.3847/1538-4357/ad05c8

Tlspe: [2.2m CAFOS](#)

109. *Title:* X-Ray Polarization of the BL Lacertae Type Blazar 1ES 0229+200

Authors: Ehlert, Steven R.; et al.

DOI: 10.3847/1538-4357/ad05c4

Tlspe: [2.2m CAFOS](#)

110. *Title:* A Wolf 359 in Sheep’s Clothing: Hunting for Substellar Companions in the Fifth-closest System Using Combined High-contrast Imaging and Radial Velocity Analysis

Authors: Bowens-Rubin, Rachel; et al.

DOI: 10.3847/1538-3881/ad03e5

Tlspe: [3.5m CARMENES](#)

111. *Title:* TOI-1801 b: A temperate mini-Neptune around a young M0.5 dwarf

Authors: Mallorquín, M.; et al.

DOI: 10.1051/0004-6361/202347346

Tlspe: [3.5m CARMENES](#)

112. *Title:* The CARMENES search for exoplanets around M dwarfs. Telluric absorption corrected high S/N optical and near-infrared template spectra of 382 M dwarf stars

Authors: Nagel, E.; et al.

DOI: 10.1051/0004-6361/202346524

Tlspe: [3.5m CARMENES](#)

113. *Title:* Planetary companions orbiting the M dwarfs GJ 724 and GJ 3988. A CARMENES and IRD collaboration

Authors: Gorriini, P.; et al.

DOI: 10.1051/0004-6361/202347108

Tlspe: [3.5m CARMENES](#)

114. *Title:* Photometric follow-up of the 20 Myr old multi-planet host star V1298 Tau with CHEOPS and ground-based Tlspe

Authors: Damasso, M.; et al.

DOI: 10.1051/0004-6361/202346840

Tlspe: [1.23m DLR](#)