Present and future science with
CARMENES (RIA), February 20-21, 2019

Calar Alto observatory

Jesús Aceituno
CAHA director

CAHA status

- During the last EC meeting held in Madrid May 2018, Junta de Andalucía announced:
  - The commitment to become as new member of CAHA in January 1st, 2019 as substitute of MPG.
  - Contribute to the partnership of the observatory. 50% CSIC-50% Junta de Andalucía.
  - Keep the same legal structure and working mode.
  - Involve to the Andalusia Universities into the operation of the observatory.

CAHA status

- CAHA has signed a three-way action protocol with CSIC and the University of Almería and recently with Sevilla. Granada and Jaen coming soon.
- The main actions are:
  - Scientific and technical collaborations
  - Involve to students (internships, work order degree, master order degree).
  - Activities focused into the academic collaboration. Summer schools, complementary studies.
  - Outreach:
    - Guiding visits to CAHA
    - Talks, outreach presentations, specific courses, outings for observations.

CAHA status

- Last Oct-2nd, The governing board of JA finally approved the commitment.
- Members assembly celebrated December 2018.
- CAHA (Centro Astronómico Hispánico en Andalucía).
- Valuation report is pending. Share participation authorization.
- 80% of the time shared by CSIC and Junta de Andalucía, 20% open time as ICTS

Christian Dahm

Emilio Gutierrez. Astroburgos

CARMENES status

- Strategic scientific program during the next decade.
- 2016-2018 to end the survey. Around 230 pending nights. Initial goal 750 ones.
- 240 nights foreseen to be allocated in 2019.
- 50 nights will be dedicated to TESS- follow-up.
- Phase-II in negotiation when new CAHA EC is named.

CARMENES operations

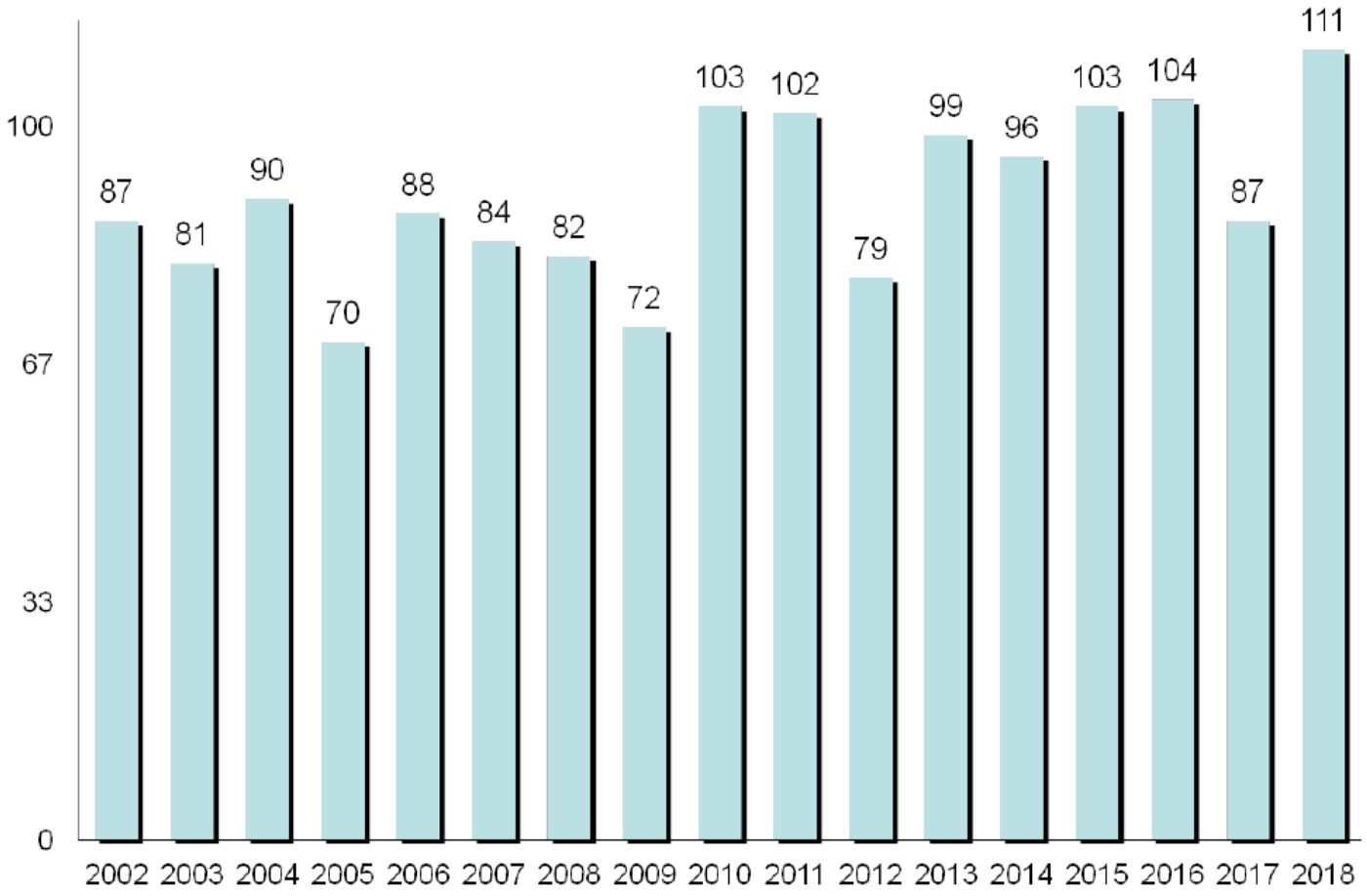
- Azzaro's talk will provide details about CARMENES access rooms.
- At least 3h maintenance job, LN2 refilling, etc… for 1140 days!.
- Scientific operations for almost 1000 nights!.
- 3142 operation hours and 45 hours lost (2,47%)
- Excellent instrument know-how.
- Very well defined internal protocol for each CAHA instrument.

Agreement with Peking University

- For the study of black holes with the 2,2m telescope

  - Mass of the BH with high precision
  - Reverberation mapping technique (R-L relation)
  - Homogeneously map both ends of low and high luminous AGN
  - Some objects have already shown a clear lags between Hβ-FeII to the varying continuum, breaking the well-known R-L in normal AGNs and quasars
  - High cadence, high S/N ratio spectra for a large sample
  - Get the 3D structure of the Broad Line Region

Referred papers



Future instrumentation

- RIA funded the workshop of future instrumentation and legacy projects for Calar Alto observatory celebrated in Oct-2016 at IAA-CSIC headquaters.

- Last May 11th, Call for letters of intent for the construction of the next generation instrument for CAHA 3.5m telescope:
  - competitive science cases and associated instrumentation concepts for its flagship telescope, the CAHA 3.5m.
  - Junta de Andalucia granted 100k€ for the feasibility.
  - 4 science cases and the corresponding instrumental ideas were received.

ISAC CAHA 2018

- Following the RIA protocol for new instrumentation, iSAC for CAHA was designed and last July-10th 2018, was met to evaluate the proposals. The main conclusions are the following:

- **This Committee recommended pursuing the required steps to perform the feasibility study of the project so called LUCA**. The final development of this new instrument could have a clear benefit for the institution in terms of competitiveness and leadership in a specific area of Modern Astrophysics.

- As CARMENES instrument will be in operation likely in the next decade, it should be upgraded with the improvements presented for this call. The benefits for the observatory are also clearly ensured.

- RIA has positively assessed the initiative for the future instrumentation of CAHA.

Future instrumentation for CAHA

1. **LUCA (Local Universe from Calar Alto)**
   - Survey of nearby galaxies in the Local Volume (< 15Mpc) and the Virgo cluster, to map their stellar populations, kinematics, interstellar medium properties, and chemical compositions with spatial scales < 100 pc down to few pc in M31 and M33 (LORCA at Schmidt CAHA telescope)
   - Super-IFU 3x3 arcmin^2
   - 9 cloned spectrograph with a fiber size of 2.5 arcsec
   - Optical range 3500-7000 Å
   - Resolution 2000
   - Viability study funded by the Junta de Andalucía

Future instrumentation of CAHA

2. **CARMENES upgrade:**
   - Goal: to improve the **RV accuracy down to 1m/s on both channels** (on sky).
   - Actions:
     - New Calibration Units (including two Fabry-Perot anchored to a single laser comb)
     - Upgrade of CARMENES NIR cooling system
   - Big chance for a future collaboration!!!

MINECO Grants

Title	Program	Reference	Status	Ammount
Improvement of the capabilities of instrumental and computational infrastructures of Calar Alto.	Mejora equipamiento e infraestructuras	CAHA15-CE-3902	**Approved**	**998.953€**
Improve of the instrumentation of CAHA.	Programa FEDER 2014-2020)	FICTS1420-04-08	**Approved**	**1.129.098€**
National cofunding (20%) of FICTS1420-04-08	ICTS	CAHA16-CE-3978	**Approved**	**225.820€**

- New detector 4x4K for PANIC
- Energetic island, 200KW photovoltaic, biomass boiler, electric cars
- Upgrade of CAFÉ, new grating and climatic room control.

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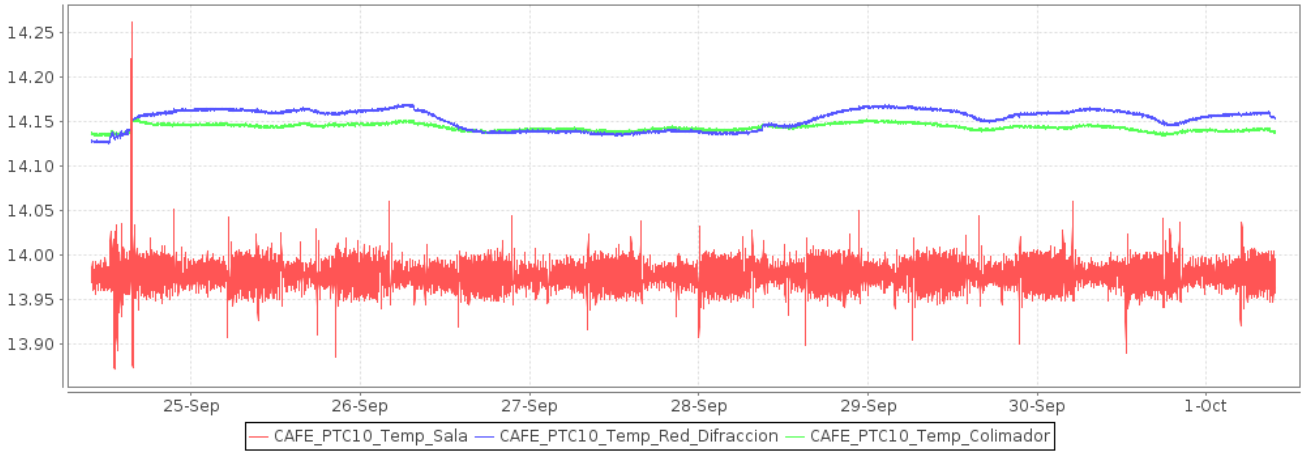
CAFE

- CAFÉ upgrade:
  - New grating. Efficiency of the instrument achieves again the original values. Mag 14th with 3600s, SNR 16.
  - Temperature control system. Room temperature stable within 0.02C.



  - New Pipeline . Dr. Jorge Lillo-Box
  - Fabry-Perot Calibration unit.
  - Goal RV about 10m/s.

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Summary

- Long-standing history and **Promising future** for the observatory
- Junta de Andalucia and CSIC will provide an **stable financial and legal environment** for the incoming years

- New relationship with the Universities.

- Outstanding instrumentation and future frontline projects. **CAHA as an upgraded observatory**. Modern facilities.

- Excellent sky quality and high scientific productivity

- All this is possible, thanks to the best staff any observatory may have.