# Annual Meeting 2025

**Felipe Espinoza Arancibia**
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CAMK PAN

A novel q-PED method: precise physical properties of a merger-origin binary Cepheid OGLE-LMC-CEP-1347

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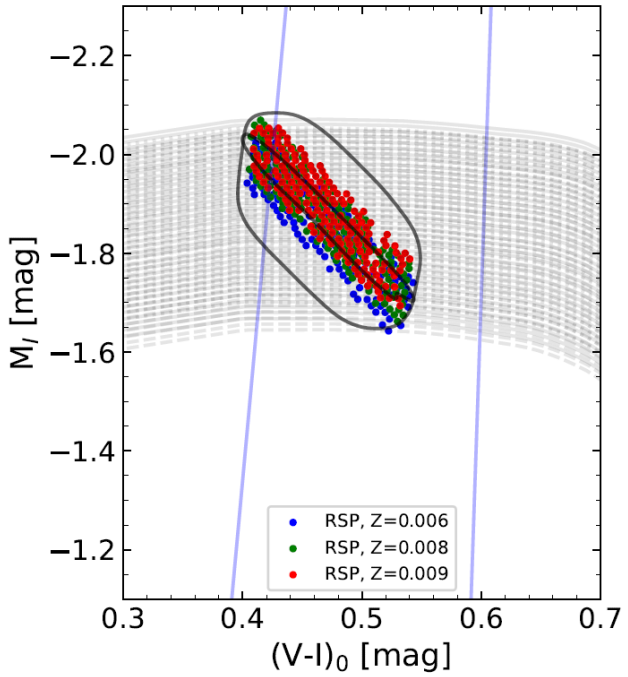
**Submitted to ApJL.**

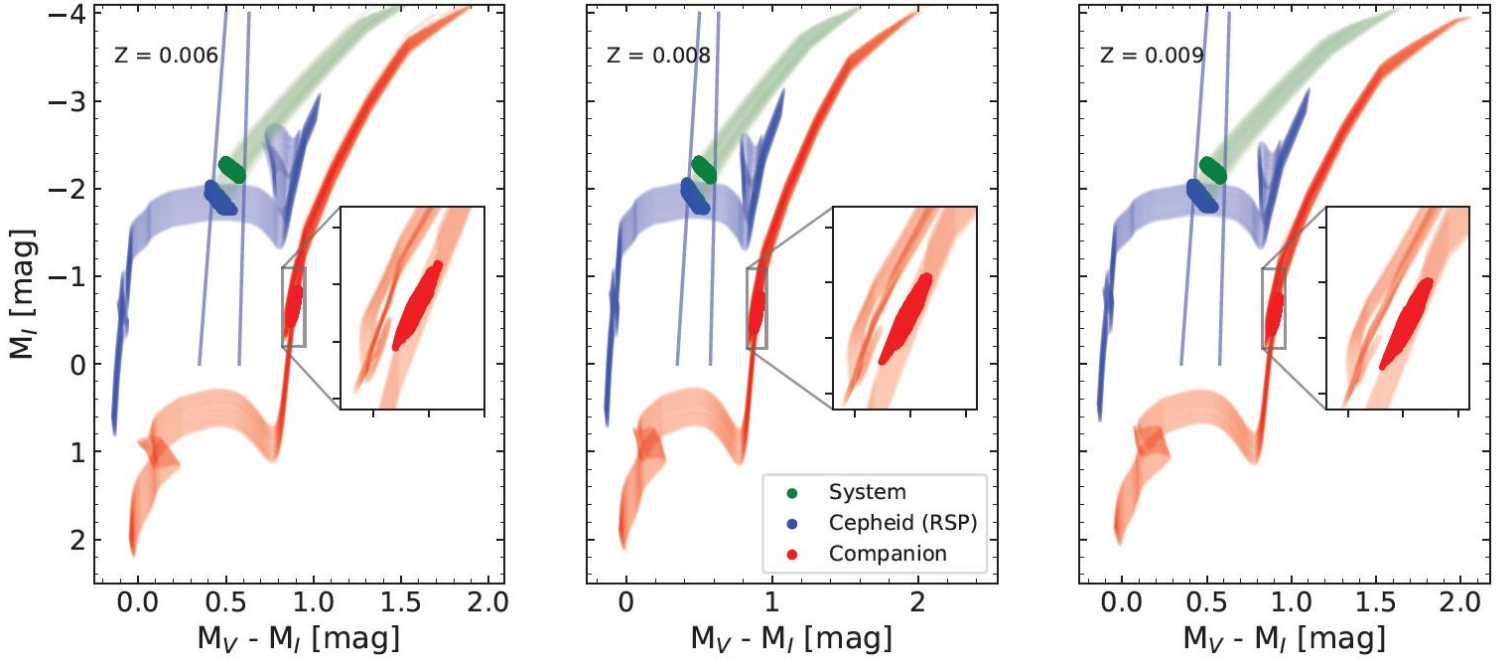
**arXiv:2501.09076**

**Pulsation + Evolutionary models + Mass ratio (q) + Distance (+ photometry)**

RSP




MESA



A novel q-PED method: precise physical properties of a merger-origin binary Cepheid OGLE-LMC-CEP-1347

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**q = 0.553 (Pilecki et al. 2022)**

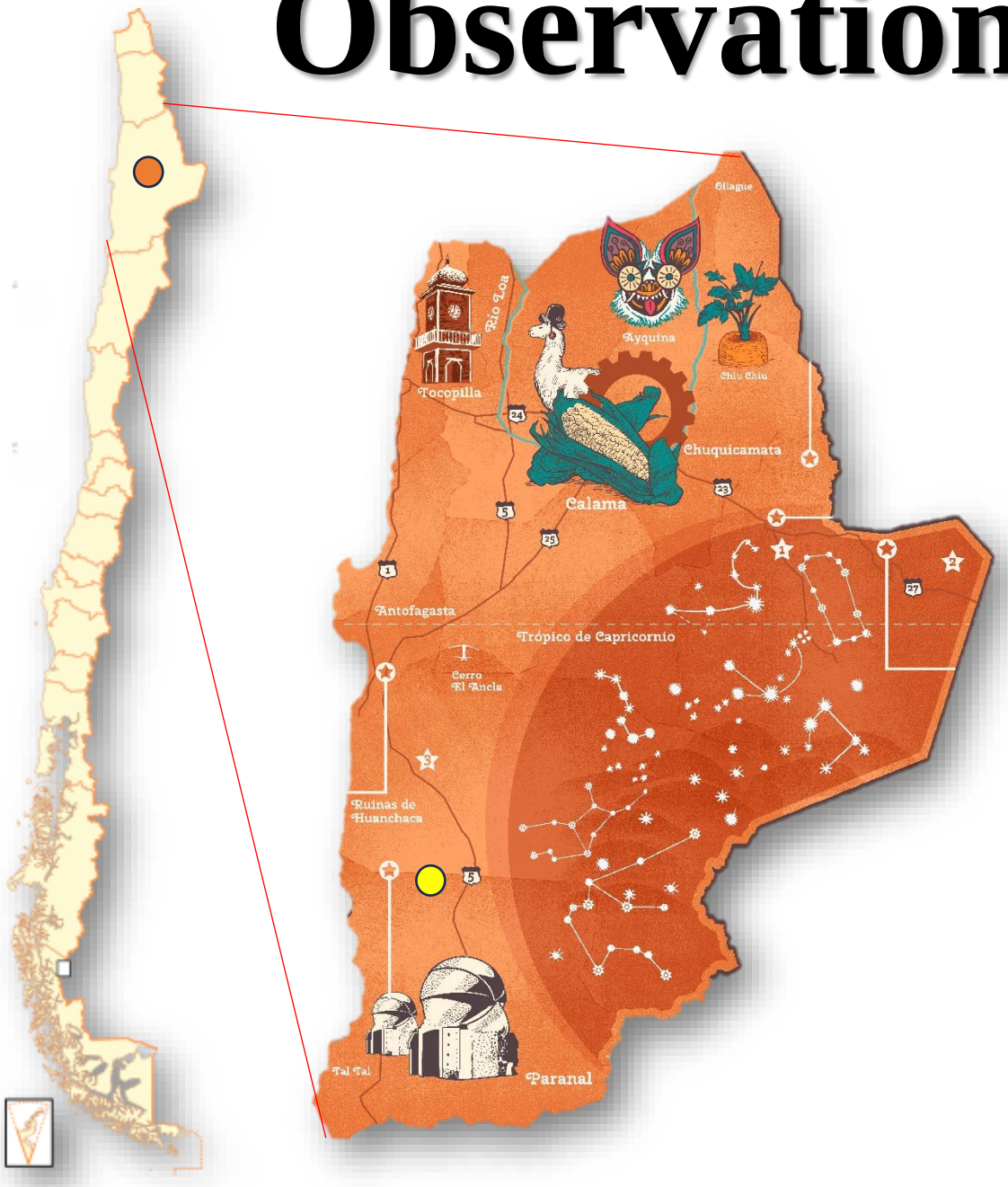
=

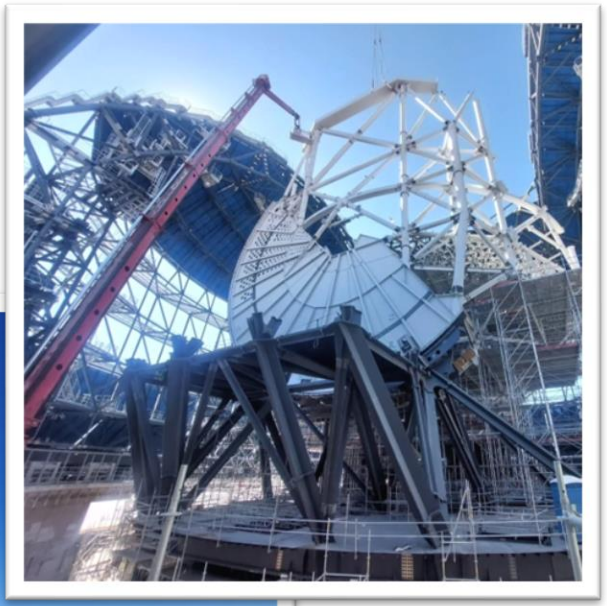
| Photometric band | Reference |
|---|---|
| V | OGLE-IV (Soszyński et al. 2015) |
| I | OGLE-IV (Soszyński et al. 2015) |
| J | Ripepi et al. (2022) |
| K | Ripepi et al. (2022) |
| H | 2MASS 6X (Cutri et al. 2012) |

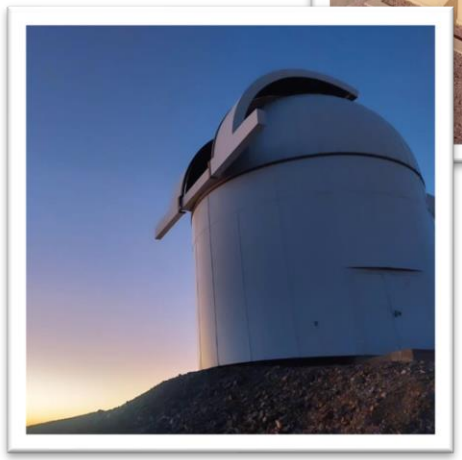
**Table 1.** Physical parameters of CEP-1347.

| Parameter | Cepheid | Companion | Unit |
|---|---|---|---|
| Mass | $3.42 \pm 0.09$ | $1.89 \pm 0.04$ | $M_\odot$ |
| Radius | $13.65 \pm 0.27$ | $12.5 \pm 0.62$ | $R_\odot$ |
| log g | $2.706 \pm 0.013$ | $2.522 \pm 0.049$ | cgs |
| Temperature | $6510 \pm 118$ | $4911 \pm 63$ | K |
| log L | $2.47 \pm 0.04$ | $1.91 \pm 0.03$ | $L_\odot$ |
| Age | $0.23 \pm 0.01$ | $1.09 \pm 0.08$ | Gyr |
| $E_{V-I}$ [1] | $0.10 \pm 0.03$ | | mag |
| Distance [2] | $49.8 \pm 0.5$ | | kpc |

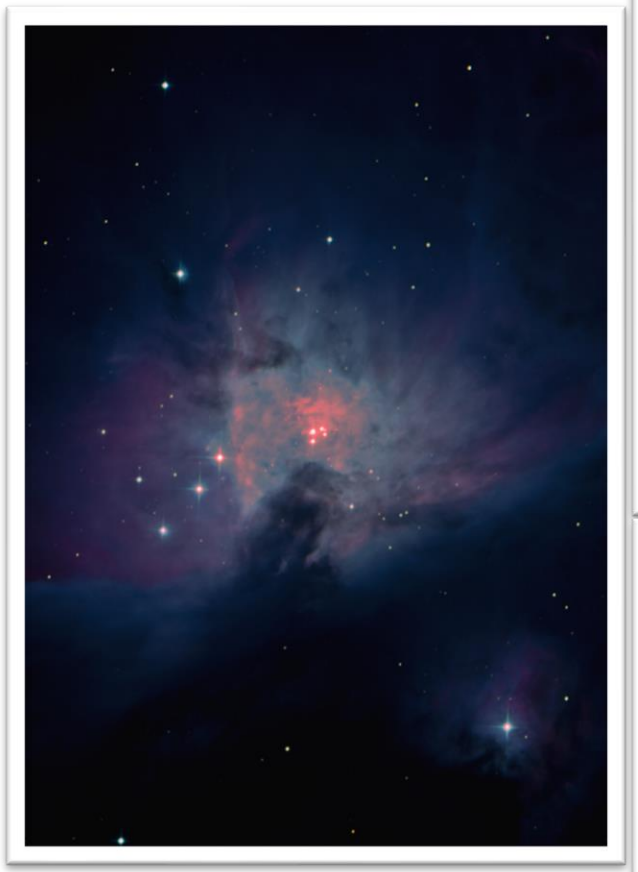
# Observations in OCM

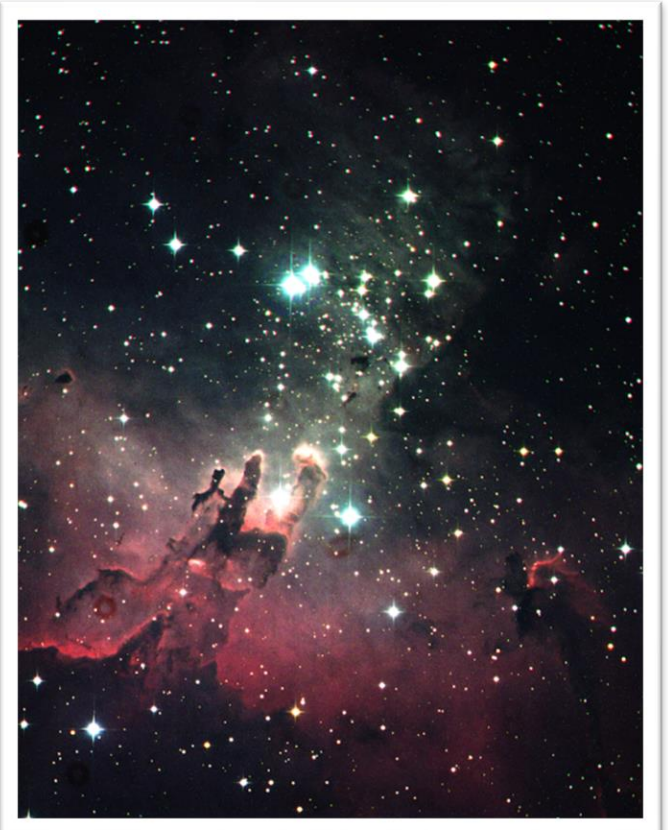


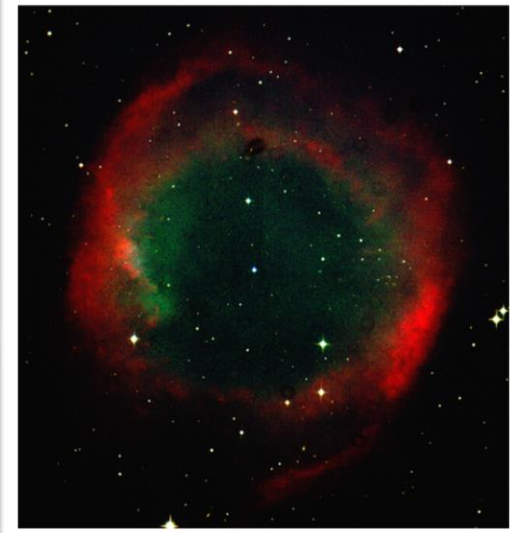





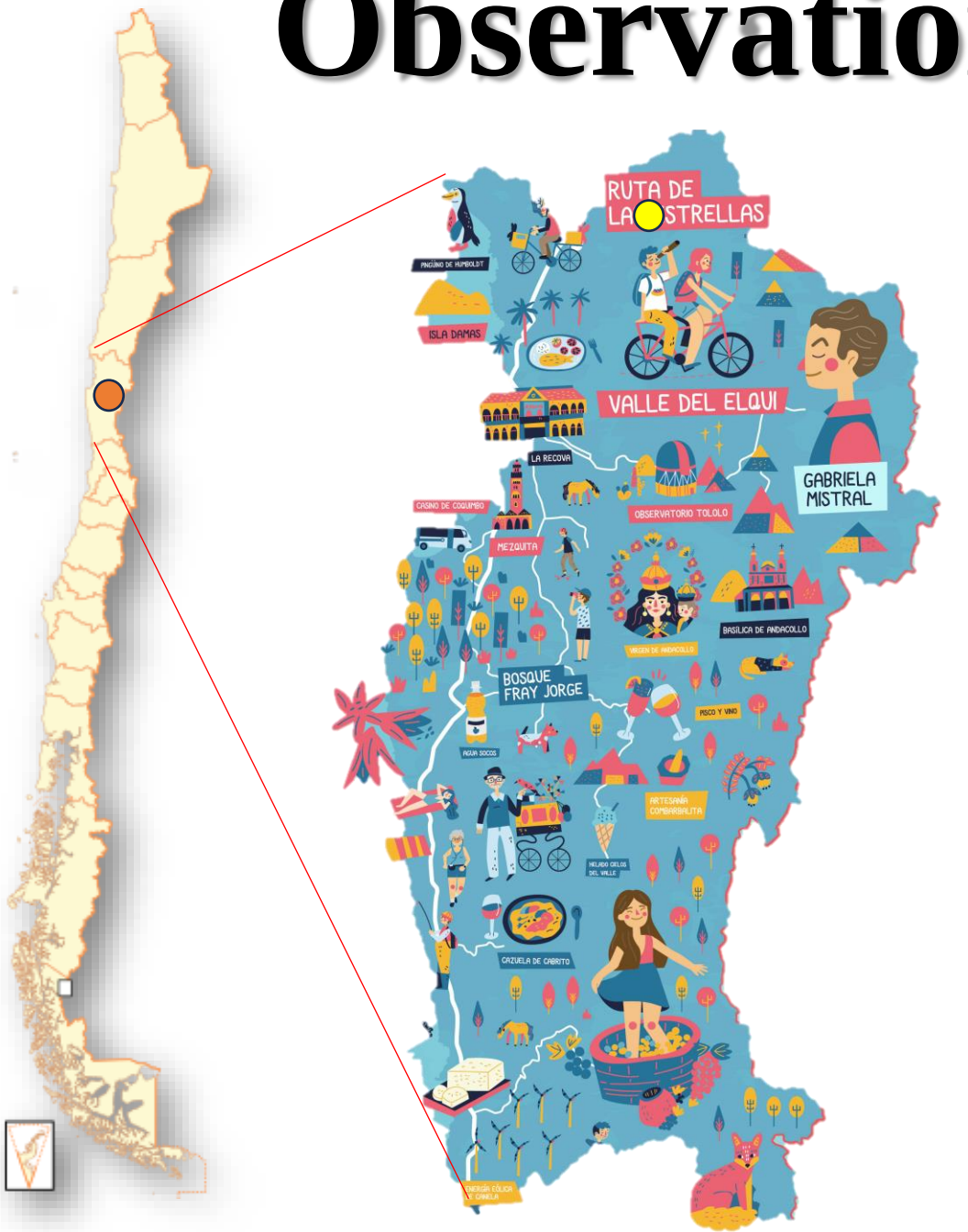
# Observations in OCM

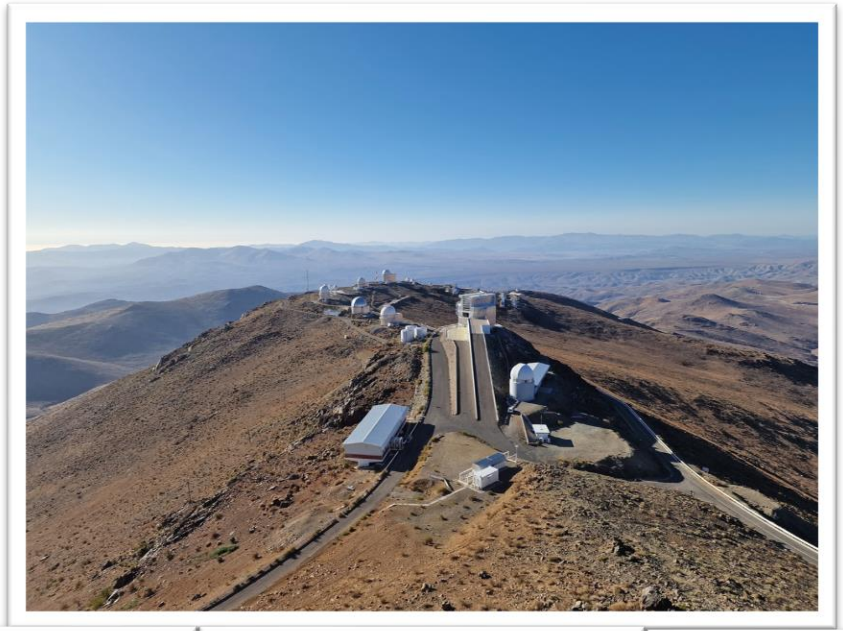







# Observations in La Silla



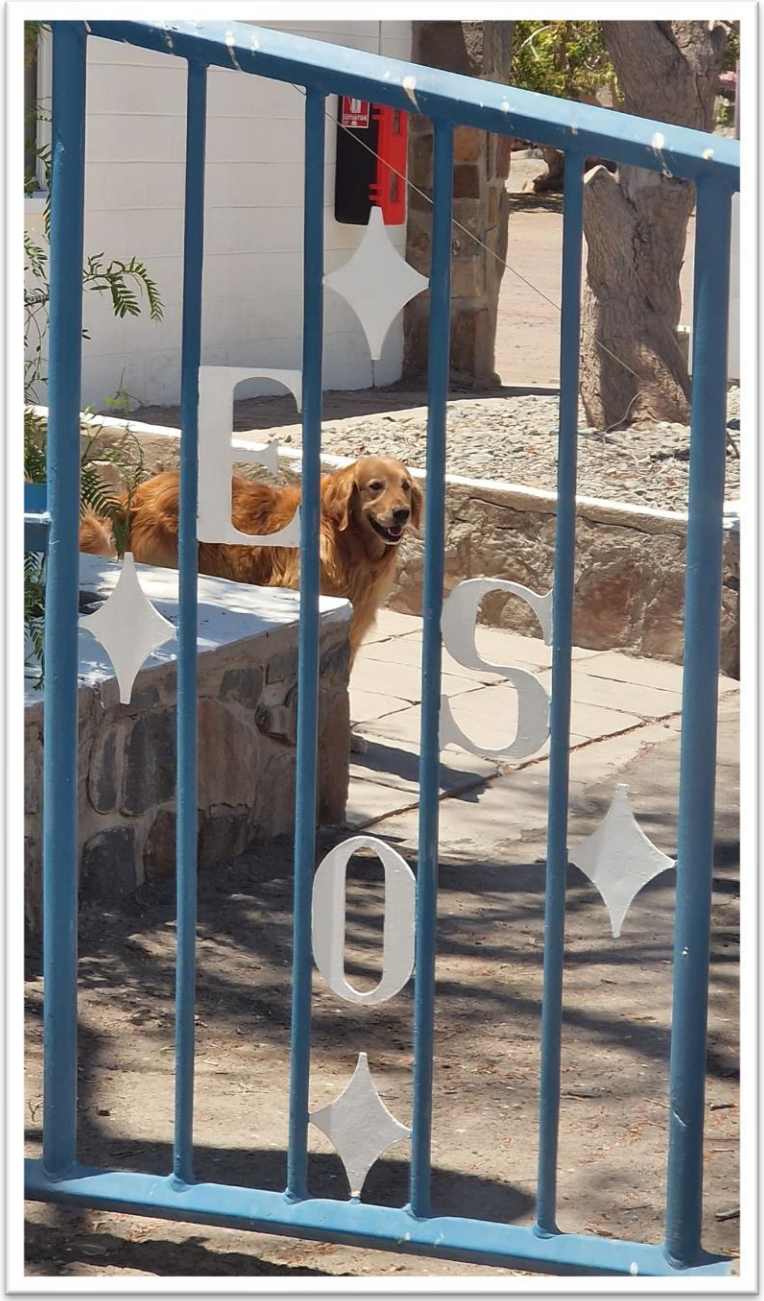



European Southern Observatory

# World's darkest and clearest skies at risk from industrial megaproject

10 January 2025

On December 24th, AES Andes, a subsidiary of the US power company AES Corporation, submitted a project for a massive industrial complex for environmental impact assessment. This complex threatens the pristine skies above ESO's Paranal Observatory in Chile's Atacama Desert, the darkest and clearest of any astronomical observatory in the world [1]. The industrial megaproject is planned to be located just 5 to 11 kilometres from telescopes at Paranal, which would cause irreparable damage to astronomical observations, in particular due to light pollution emitted throughout the project's operational life. Relocating the complex would save one of Earth's last truly pristine dark skies.



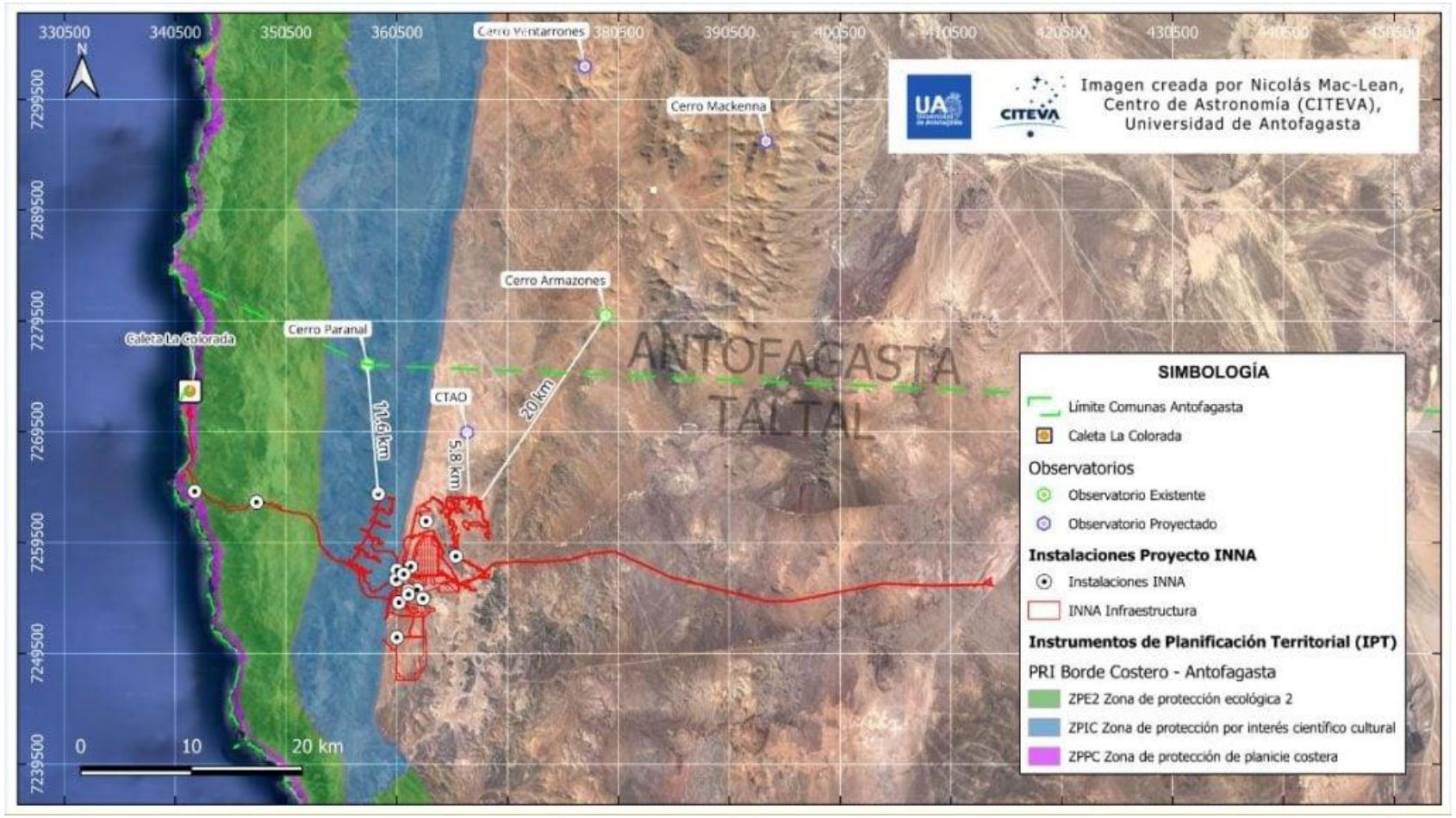

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Imagen creada por Nicolás Mac-Lean,
Centro de Astronomía (CITEVA),
Universidad de Antofagasta
Cerro Mackenna
Cerro Armazones
Caleta La Colorada
Cerro Paranal
CTAO
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5.8 km
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ANTOFAGASTA
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SIMBOLOGÍA
Límite Comunas Antofagasta
Caleta La Colorada
Observatorios
Observatorio Existente
Observatorio Proyectado
Instalaciones Proyecto INNA
Instalaciones INNA
INNA Infraestructura
Instrumentos de Planificación Territorial (IPT)
PRI Borde Costero - Antofagasta
ZPE2 Zona de protección ecológica 2
ZPIC Zona de protección por interés científico cultural
ZPPC Zona de protección de planicie costera