Observatorio Astrofísico de Javalambre
Call for Proposals
Director Discretionary Time
Semester 2025B
JST250

Proposals are expected to be submitted via:

http://oajweb.cefca.es/

by 31 December 2025 at 23:59 CET.

1 Announcement of Opportunity

The Observatorio Astrofísico de Javalambre (OAJ) opens the **Call for Proposals** for Director Discretionary Time (DDT) for semester **2025B (1st July 2025 - 31th December 2025)** with the Javalambre Survey Telescope.

Proposals can be submitted until 31 December 2025 at 23:59 CET

2 Introduction

The OAJ (https://oajweb.cefca.es), located at the Sierra de Javalambre, in Teruel (Spain), is aimed to lead large-sky multi-filter surveys of the Northern hemisphere over the next years. The OAJ consists of two main telescopes of large field of view (FoV): the 2.5m Javalambre Survey Telescope (JST250) and the 80cm Javalambre Auxiliary Survey Telescope (JAST80), with polychromatic, seeing-limited images in their unobscured FoVs of 7 $\deg^2$ and 3 $\deg^2$, respectively. Both telescopes are equipped with panoramic instrumentation: JPCam, with $\sim$ 1.2 Gpix distributed in a mosaic of 14 large-format CCDs covering 3.4 $\deg^2$ at the JST250 focal plane and T80Cam, at the JAST80 telescope, providing a 2 $\deg^2$ FoV at the focal plane. A specific data center for the reduction and archiving of the large volume of data acquired at the OAJ (up to 1.5 TB per night when the two telescopes are in operation) completes the main OAJ infrastructures. It deploys a storage capacity of more than 5 PBs and a computing power of 450 cores with 3.5 TB RAM memory.

JST250 is devoted to conduct the Javalambre Physics of the Accelerating Universe Astrophysical Survey (J-PAS; https://www.j-pas.org), mapping 8500 $\deg^2$ of the sky with a set of 54 narrow-band contiguous optical filters plus 3 broader ones. JPCam is currently attached to the JST250, which is currently mostly devoted to conduct the J-PAS survey. J-PAS Early Data Release (November 2024) (J-PAS EDR https://www.j-pas.org/datareleases/jpas_early_data_release) has made publicly available 12 $\deg^2$ observed with all the J-PAS filters. JAST80 is currently mostly devoted to conduct the Javalambre Photometric Local Universe Survey (J-PLUS; https://www.j-plus.es), with 12 narrow, intermediate and broad-band filters. J-PLUS survey started in November 2015 and released the first $\sim$1020 $\deg^2$ of data through the DR1 by July 2018 and more than 2000 $\deg^2$ of data in 2020 data release (DR2). The last data release (DR3) with more than 3000 $\deg^2$ was published in December 2022 and more than 5000 $\deg^2$ have been already observed with T80Cam. (https://archive.cefca.es/catalogues). Both J-PAS and J-PLUS will provide powerful 3D views of the Universe and unprecedented multicolor information for many fields of the Astrophysics that will be made publicly available to the community as legacy projects.

Since September 2014, the OAJ was included in the Spanish map of Infraestructuras Científico-Técnicas Singulares (ICTS). As such, the OAJ offers

at least 20% of Open Time to the astronomical community in the modalities of Legacy Surveys (LS), Regular Programs (RP) and Director discretionary time (DDT).

We offer observing time with JPCam on the JST250. A total of 30 hours is offered for DDT programs in semester 2025B.

This document describes the DDT observing time offered by the OAJ for the JST250 in semester 2025B, including the proposal submission process, available instrumentation, and other relevant information for observers.

3 Available Instrumentation

The instrumentation available for semesters 2025B is JPCam at the JST250 telescope.

3.1 JST250

The JST250 telescope is a 2.55 m, F#3.5 alt-azimuthal telescope with a Ritchey-Chrétien-like configuration. The focal plane corresponds to a Cassegrain layout. The M1 and M2 mirrors have hyperbolic aspheric surfaces. The telescope is equipped with a field corrector, located beyond the central hole of M1. This field corrector consists of three lenses made of fused silica, with four aspheric surfaces and diameters in the range of 500–600 mm.

The two mirrors and the three lenses are designed to optimize the polychromatic image quality and maintain low distortion over the entire field of view, which has a diameter of 3 degrees (476 mm). A baffling system consisting of three conical baffles prevents stray light at the focal plane, whether from direct glimmer on the detector or unwanted reflections on M1 and M2. Overall, the JST250 provides an effective collecting surface of 3.89 m^2 (after accounting for the obscurations due to M2, the spider, and the baffles).

Because of the large field of view (FoV) and fast optics, the JST250 secondary mirror and the JPCam focal plane are actively controlled using two hexapod actuators: the M2 hexapod and the JPCam Actuator System. The M2 hexapod controls the secondary mirror, while the JPCam Actuator System-an additional hexapod-controls the cryogenic camera. This system utilizes wavefront sensors located at the periphery of the cryogenic camera focal plane. The actuator system attaches the cryogenic camera to the telescope and provides the required focus and tip-tilt adjustments to compensate for telescope deformations caused by gravity and/or temperature variations.

A software limit is set at 20 deg elevation, below which observations cannot be performed. Non-sidereal tracking capabilities are available.

3.1.1 JPCam standard observing modes

JPCam (http://www.cefca.es/observatory/jpcam) is a 1.2 GPixel panoramic camera mounted on the JST250. It is a direct imaging, large field-of-view (FoV) instrument designed to perform J-PAS. The camera consists of a 14-CCD mosaic using large-format, 9.2k-by-9.2k, 10 μm-pixel Teledyne-e2V detectors. JPCam is installed at the Cassegrain focus of the JST250, providing an unvignetted FoV of 3.4 square degrees with a pixel scale of 0.2267 arcsec/pixel.

For this call, **the standard available readout modes of the CCDs are "mode 02" for g, r, and i filters, and "mode 03" for the rest of the filters**, with the following characteristics:

	Mode 02	Mode 03
Filter Tray	T5, T6, T7 broad band (g, r, and i)	T1, T2, T3, T4 narrow band
Readout noise	5.5e$^-$	5.5e$^-$
Gain	2.274e$^-$ADU^{-1}	2.274e$^-$ADU^{-1}
Binning	1×1	2×2
Readout time	10.9s	6.1s

For operational reasons, in the standard observing mode, **the longest integration time offered for a single exposure is 300 s, while the minimum is** 0.1 s.

3.1.2 JPCam non-standard observing mode

A project may require observations that differ from the standard modes offered in this document and the previous section (e.g., different filter distribution, no filter, longer exposure times, different readout modes, etc.). DDT programs can be used to test the feasibility of non-standard modes for future time requests. In such cases, contacting the OAJ is recommended to perform an initial assessment of the proposal's feasibility.

3.1.3 Filter system

JPCam admits 5 filter trays, each of which has 14 filter holders, one for each of the CCDs. This system allows all J-PAS filters to be simultaneously installed on the camera, so no night-to-night filter exchange is required to execute J-PAS observations. However, additional filter trays can be exchanged during day-time if needed by other observation programs.

We identify trays 1 to 4 as T1 to T4. T1 to T4 are equipped with the J-PAS filter system (Fig. 1), composed of 54 narrow-band filters (approximately 14.5 nm FWHM), contiguous and equally spaced between 370 and 920 nm, plus

2 medium-band filters. Therefore, each CCD observes only its corresponding filter. The distribution of the filters in these trays is shown in Fig. 2.

Additionally, three broad-band SDSS filters are available (g, r, i). Sufficient copies of the SDSS filters are available to place the same filter over all 14 CCDs, *i.e.*, trays T5 to T7 are equipped with 14 copies of the same filter: i, r, and g, respectively. These trays, T5 to T7, can also be identified by the name of the filter, as they are composed of a single filter repeated in all 14 holders. Table 1 summarizes the characteristics of the filters.

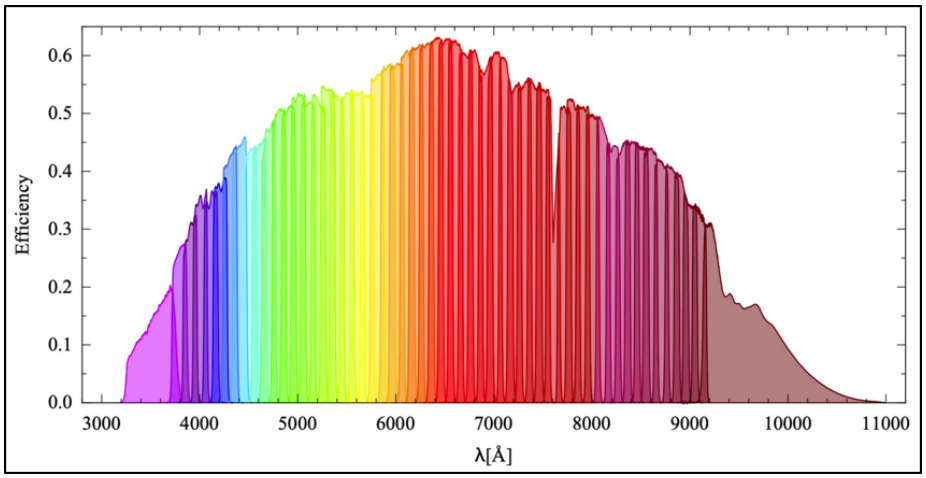

Figure 1: Measured transmission curves of the J-PAS filters including effects of the CCD quantum efficiency, the entire optical system of the JST250 telescope and sky absorption.

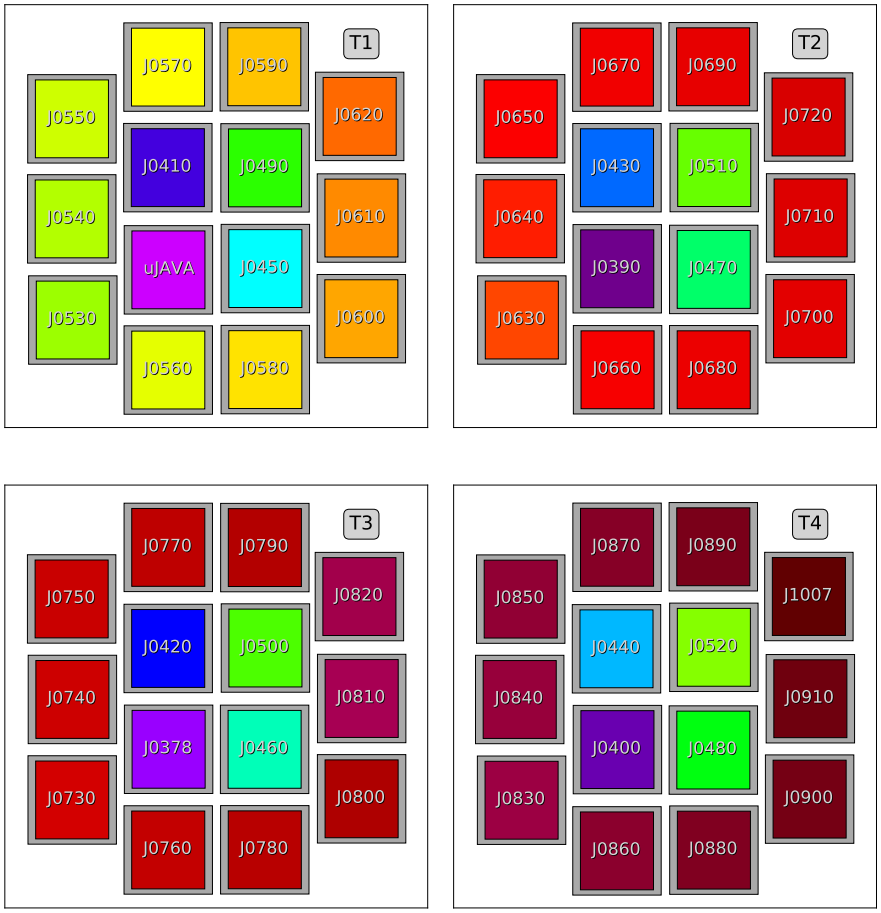

Figure 2: J-PAS filters distribution among JPCam filter tray assemblies from T1 to T4.

Name	CW (Å)	Width (Å)
uJava	3545.16	345.29
J0378	3796.72	147.53
J0390	3904.35	132.92
J0400	4007.05	136.80
J0410	4116.21	139.40
J0420	4209.93	141.16
J0430	4310.85	141.40
J0440	4408.62	143.66
J0450	4515.05	143.74
J0460	4608.91	143.95
J0470	4705.05	140.72
J0480	4808.56	140.71
J0490	4906.78	148.71
J0500	5005.77	148.39
J0510	5102.18	146.66
J0520	5208.42	149.27
J0530	5304.05	150.59
J0540	5397.35	149.54
J0550	5502.11	146.03
J0560	5604.63	148.23
J0570	5710.16	148.83
J0580	5811.75	146.34
J0590	5920.18	147.62
J0600	6010.29	148.38
J0610	6117.67	146.63
J0620	6209.24	147.18
J0630	6312.87	147.53
J0640	6410.68	146.51
J0650	6507.56	146.86
J0660	6607.63	148.55
J0670	6713.15	146.19
J0680	6810.86	146.51
J0690	6916.25	143.56
J0700	7008.56	146.00
J0710	7121.87	144.31
J0720	7212.05	145.13
J0730	7312.16	144.38
J0740	7416.10	146.84
J0750	7501.82	140.78
J0760	7599.48	121.91
J0770	7720.67	139.48
J0780	7808.15	141.48
J0790	7908.32	140.88
J0800	8007.07	140.45
J0810	8114.29	138.52
J0820	8216.72	139.89
J0830	8318.81	144.33
J0840	8410.94	146.73
J0850	8509.07	144.48
J0860	8598.06	146.20
J0870	8709.04	145.76
J0880	8819.03	145.39
J0890	8910.48	142.99
J0900	9003.26	140.91
J0910	9095.89	141.03
J1007	9590.54	619.54
gSDSS	4767.98	1206.30
rSDSS	6245.36	1373.40
iSDSS	7656.20	1399.82

Table 1: Main characteristics of the J-PAS and SDSS filters mounted on JPCam.

3.2 JPCam Observing tools

To help PIs prepare the best possible proposal, the OAJ has developed the following support tools.

3.2.1 JPCam Observing Planner

Different observational strategies arise from using T1 to T4, referred to as the narrow-band strategy, where each CCD observes a different filter, in contrast to using T5 to T7, referred to as the broad-band strategy. To design

specific pointings for the area of interest for each project, OAJ has developed the JPCam Observing Planner (JOP), available at https://www.cefca.es/jop/plan/field.html.

Documentation has been created to describe these strategies (https://www.cefca.es/jop/plan/static/help.html) and to provide guidance on using the JOP tool.

3.2.2 Exposure Time Calculator

The depths reachable by JPCam can be obtained using the JPCam Exposure Time Calculator (JETC), available at https://www.cefca.es/jop/. We strongly recommend reading the documentation of the JETC carefully and using it to determine the exposure times required to achieve the scientific goals of interest.

An example of designing an observation for the nearby galaxy M101 is available here: https://oajweb.cefca.es/doc/tac/observingtools/example_case.pdf.

4 Proposing for Semester 2025B

4.1 Proposal Types

The OAJ Open Time is split in two semesters as given below:

- **Semester A**: January 1st - June 30th
- **Semester B**: July 1st - December 31st

As previously mentioned, the OAJ, as an ICTS, offers at least 20% of Open Time to the astronomical community. Currently, it is offering 30 hours as Director Discretionary Time (DDT) for semester 2025B with JPCam at the JST250.

Program	Total time offered
Director Discretionary time	30 h

Table 2: Programs properties.

- **OAJ JST250 Director Discretionary Time Programs (OAJ-JST250-DDTs)** are reserved for testing the feasibility of potential future observing cases of great scientific impact, for the follow-up of objects in which a quick response is key for the scientific return, or for unexpected events. OAJ-DDT proposals are evaluated by an internal committee chaired by the Director of CEFCA.

4.2 Access to the OAJ Open Time

OAJ proposals are directed to researchers from institutions from all over the world. A proposal can have up to two Principal Investigators (PIs). OAJ-DDT proposals can be requested at any time.

4.3 Observing at the OAJ

In semester 2025B the DDT proposals are executed in queue mode only. The visitor mode can be considered upon request depending on the available resources and logistics at the OAJ.

The observing time is split following the 1:2:1 ratio for Dark:Grey:Bright time conditions. Whenever possible, we encourage the users to consider less restrictive observing conditions for a higher success rate of their proposals.

4.4 Data Products

The data collected at the OAJ as part of an Open Time proposal will be provided to the contact person indicated in the proposal form through the OAJ-TACData webportal. For standard observing modes, the delivered data account for:

- The raw scientific data
- Calibration frames (bias/darks/flatfields)
- The scientific data reduced in a standard way with the most-recent OAJ pipelines developed by the CEFCA team for each instrument.

OAJ guarantees the storage of this data, which will be available once the raw images have been processed by the pipeline and validated at CEFCA.

CEFCA staff is continuously developing and implementing upgrades of the system to optimize the overall performances. Although we will try to notify important upgrades, take into account that the reduction pipeline may change and the offered processed data may be updated without prior notice. If you think this can be critical for your project, we encourage you to keep track of the data versions.

For standard observing modes, pre-reduced data can be provided upon request which must be scientifically justified during the observations' preparation phase.

Reduced data are delivered flux-calibrated. Flux calibration is tied to Gaia DR3, so there is no need to observe spectrophotometric standard stars. If the

recommended dither pattern of half a CCD is used (see documentation for details https://www.cefca.es/jop/plan/static/help.html), homogenization using overlapping areas allows us to achieve absolute flux calibration precisions of $< 1\%$. If such flux calibration precision is not required, a different dither pattern could be used, although the recommended pattern is still advised for accurate background subtraction.

For non-standard observing modes, the OAJ will deliver the raw scientific data and the requested calibration frames. On a best-effort basis, the processed data products could be also delivered.

After a proprietary time of one year, the data will be made public through the OAJ External Data Access Machine.

Additional support regarding the data could be provided by the OAJ staff on a best-effort basis. In case it is needed, please, contact `oaj-upad_at_cefca.es`.

4.5 Calibrations

The calibrations, which are taken as part of the standard calibration plan at the OAJ are:

- Bias
- Sky flats

If a user requires specific calibration frames or uses non-standard observing modes, the observing time needed for additional calibration frames will be charged as part of the proposal.

4.6 Submission Procedure

Proposals should be submitted in electronic form via:

http://oajweb.cefca.es/.

Both PIs and their collaborators must register to the website.

Anyone can create a proposal and the proposals can be edited until the deadline. If the proposal does not have all the required information, it is marked as "incomplete". The web form will provide feedback on the missing information.

Once the proposal is "complete", the PI can submit it. If a complete proposal has not been submitted by the deadline, it is considered submitted by default. If a proposal is not complete by the deadline, it is not submitted.

The web form should include the requested pointings as well as the exposure times. An estimate of the overheads (pointing, instrument setup, and readout

time) is already included in the automatic calculation of the total requested time. Overheads already include the average time spent in running the wavefront curvature sensing algorithms and applying the control law to optimise the image quality all over the entire FoV of JPCam.

4.7 Publications

You can find a list of all publications which were made using OAJ facilities at:

http://oajweb.cefca.es/publications/publications.

If you have already observed at OAJ and you are publishing a paper, we encourage you to inform us at oaj-support_at_cefca.es and we will post a link to your paper at our web page.

Publications derived or partly based on OAJ JST250 observations shall be acknowledged as follows:

"Based on observations made with the JST250 telescope at the Observatorio Astrofísico de Javalambre, in Teruel, owned, managed and operated by the Centro de Estudios de Física del Cosmos de Aragón."

In case of a publication derived from the OAJ DDT, the Acknowledgment section of the manuscript shall include the sentence:

"We thank the Centro de Estudios de Física del Cosmos de Aragón for allocation of Director's Discretionary Time to this program."

In case of a publication that makes use of OAJ data reduced by CEFCA with the OAJ pipelines, the Acknowledgment section of the manuscript shall include the sentence:

"We thank the OAJ Data Processing and Archiving Department (DPAD) for reducing and calibrating the OAJ data used in this work, as well as the distribution of the data products through a dedicated web portal."

Should you have questions, contact oaj-support_at_cefca.es