

The New Robotic Telescope: Advancing Time-Domain Astronomy with Precision Engineering and Autonomous Operation

jueves, 19 de junio de 2025 15:00 (45 actas)

The New Robotic Telescope (NRT) is a 4-meter-class, robotic and fully autonomous optical telescope under development at the Roque de los Muchachos Observatory in La Palma, Canary Islands. The design of the NRT is motivated by the challenges of time-domain astronomy, aiming to support rapid-response observations of transient events such as supernovae, gamma-ray bursts, and variable active galactic nuclei.

The telescope's segmented primary mirror will be made up of 18 one-meter hexagonal segments. This design allows for a lighter structure and faster repositioning of the telescope, but it also requires precise alignment of the segments. To meet this challenge, a custom Shack-Hartmann wavefront sensor has been developed. Using a lenslet array, the sensor detects misalignments within individual segments as well as any tilt between the primary and secondary mirrors. It is built to be robust, cost-effective, and capable of functioning autonomously. The sensor has been successfully validated in laboratory tests and on the Liverpool Telescope.

Alongside the wavefront sensor, the other major subsystems of the NRT are progressing well through critical design phases. In particular, the M3 fold mirror system—which redirects the optical beam to various instrument ports—has completed manufacturing and is currently in the verification stage after a successful design review. The project remains on track for first light by 2030.

This presentation will review the scientific goals driving the NRT, discuss its technical architecture, and provide an update on the progress of key systems. Special attention will be given to the wavefront sensing strategy, which plays a vital role in achieving the precise alignment needed for the segmented primary mirror.

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Clasificación de la sesión: Presentaciones invitadas

Clasificación de temas: MOMA