GALANTE is an optical (3000-9000 Å) photometric survey with seven intermediate/narrow filters that has been covering the Galactic Plane since 2016 using the Javalambre JAST/T80. The GALANTE photometric system (defined in Lorenzo et al. 2019) is designed to identify the majority of the early-type massive stars within several kpc of the Sun and derive estimations for stellar parameters (Maíz Apellániz & Sota 2008; Maíz Apellániz et al. 2014). The calibration scheme make use of external 2MASS and Gaia (photometric and astrometric) data. As of mid 2020, 21% of the project observations have been completed, resulting in over 300 1.4°x1.4° astronomical fields. The pipeline is functional and here we focus on our test field, Berkeley 59, showing preliminary results. The collaboration will ultimately provide a 7-filter photometric catalog of stars with a precision of several mili-magnitudes.
GALANTE is a long-term ongoing observational project (2016-2025) contributing to the study of Galactic star populations. Specifically, GALANTE associated photometric system is designed to identify all Galactic O+B+WR stars with AB magnitudes 6-17 and derive estimations for $T_{\text{eff}}$, log ($g$), metallicity, and amount and type of extinction: $E(4405-4595)$ and $R_{5495}$.

Some characteristics of the survey are:

- Galactic Plane coverage + interesting out-of-plane fields: JAST/T80 at OAJ.

- $1.4^\circ \times 1.4^\circ$ FOV, 0.55$''$/px, no gaps.

- Exp. Times: $2 \times (0.1s + 1s + 10s + 2 \times 50/100\ s$, at two different airmasses). AB mag 6-17 with S/N > 100.

- Seven Medium and Narrow band filters. Four J-PLUS filters (F348M, F515N, F660N, and F861M) & three developed by the GALANTE team (F420N, F450N, and F665N).

- Photometric and astrometric 2MASS and GaiaDR2 data for the input calibration catalog, and deriving synthetic photometry with CHORIZOS*.

*CHORIZOS is a $\chi^2$ minimization algorithm for parametrized modelling and characterization of photometry and spectrophotometry (developed by Jesús Maíz Apellániz). The code is written in IDL and is available to the astronomical community.
★ **150/1063** Northern fields finished, 90 partially observed (GALANTE or JPLUS filters). ~20% GALANTE North.

After receiving the reduced images from the pipeline, most steps of the calibration are now operative including:
- Astrometric correction
- Background calculation
- Additional moon-flat correction
- Aperture photometry
- Flux calibration

Test results, calibration, and evaluation of the last two are discussed here.

A first DR0 catalog of the sample field Berkeley 59 is discussed here, and will be soon publicly available.
**Steps are:**

- Generate *synthetic photometry* of each star with 2MASS+GaiaDR2 data. Estimations for temperature and extinction are inferred in this process.
- Obtain the *combined uncalibrated magnitude* for each star, using all exp. times, and minor diffraction corrections. Uncertainty used as weight.
- Define a *calibration sample* of stars in the field using photometric quality flags, colour cuts, and limiting to low extinction stars, ~100 stars.
- The synthetic photometry of the calibration sample is used as standard values to derive a unique *zero point*, which is applied to the rest of the field sample.

**Non-consecutive exposures** present a similar result, but with higher effects on both ends of the magnitude range.

**Relative calibration** (testing aperture photometry)

- Reproducibility dominates random error, which median is below 0.02 mag
- Fainter stars produce worse photometry, but we compensate with appropriate uncert.
- Non-linearity near saturation is clear, stars with uncalibrated mag < -9 are discarded for absolute calibration

**Absolute calibration** (testing flux calibration)

- Red dots: Calibration sample 81 stars with extinction $E(4405-5495) = [0.0,0.25]$
- After zero point correction differences with synthetic photometry are of the order of ± 0.02 mag
**DR0 available:** aperture photometry of one test field

Berkeley 59

- Magnitudes and uncertainties for 7 filters + synthetic photometry
- ~78,500 stars considered in the field, >6,000 with results in bluer filters, >55,000 in redder ones.

Berkeley 59

F861M+F660N+F515N

**Colour-Colour Diagram**

Models come from synthetic photometry, considering different E(4405-5495)

Comparison with models: appropriate zero point, and stars with known spectral type also consistent

GALANTE DR0 – Berkeley 59

XIV.0 Reunión Científica

GALANTE – Gonzalo Holgado et al.

13-15 julio 2020
GALANTE will ultimately provide:

- Identification of all OB+WR stars in the Northern Galactic plane down to magnitude 17
- Estimate $T_{\text{eff}}$ for that sample
- Measurements of $E(4405-5495)$ and $R_{5495}$ for the OBA sample, by cross-matching with 2MASS

Some additional future objectives include:

- The study of emission-line stars
- The IMF of large-area clusters and associations
- A continuum-subtracted Hα map with subarcseconds pixel resolution
- Gaia cross-calibration and WEAVE source identification
- Generation of a set of standards, accurate photometric optical spectral SEDs to be used as a reference for improving the flux calibration of existing and future empirical stellar libraries

Post-pipeline steps pending:

- **Extrapolate** the obstacles solved during the reduction procedure of the test field
- PSF photometry
- **Alternative calibration** strategies: stars in overlapped fields, and spectrophotometry of selected stars in each field