

GALANTE:
finding all the
optically accessible Galactic
O+B+WR stars
in the northern hemisphere

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Teruel, Tuesday 3 October 2017

Talk structure

1. Motivation.

- ★ Spectroscopic surveys of OB stars: GOSSS and WEAVE.
- ★ Photometric surveys of the Galactic Plane: EGAPS and Gaia.

2. GALANTE.

- ★ Project description.
- ★ Current status and future plans.

GOSSS description

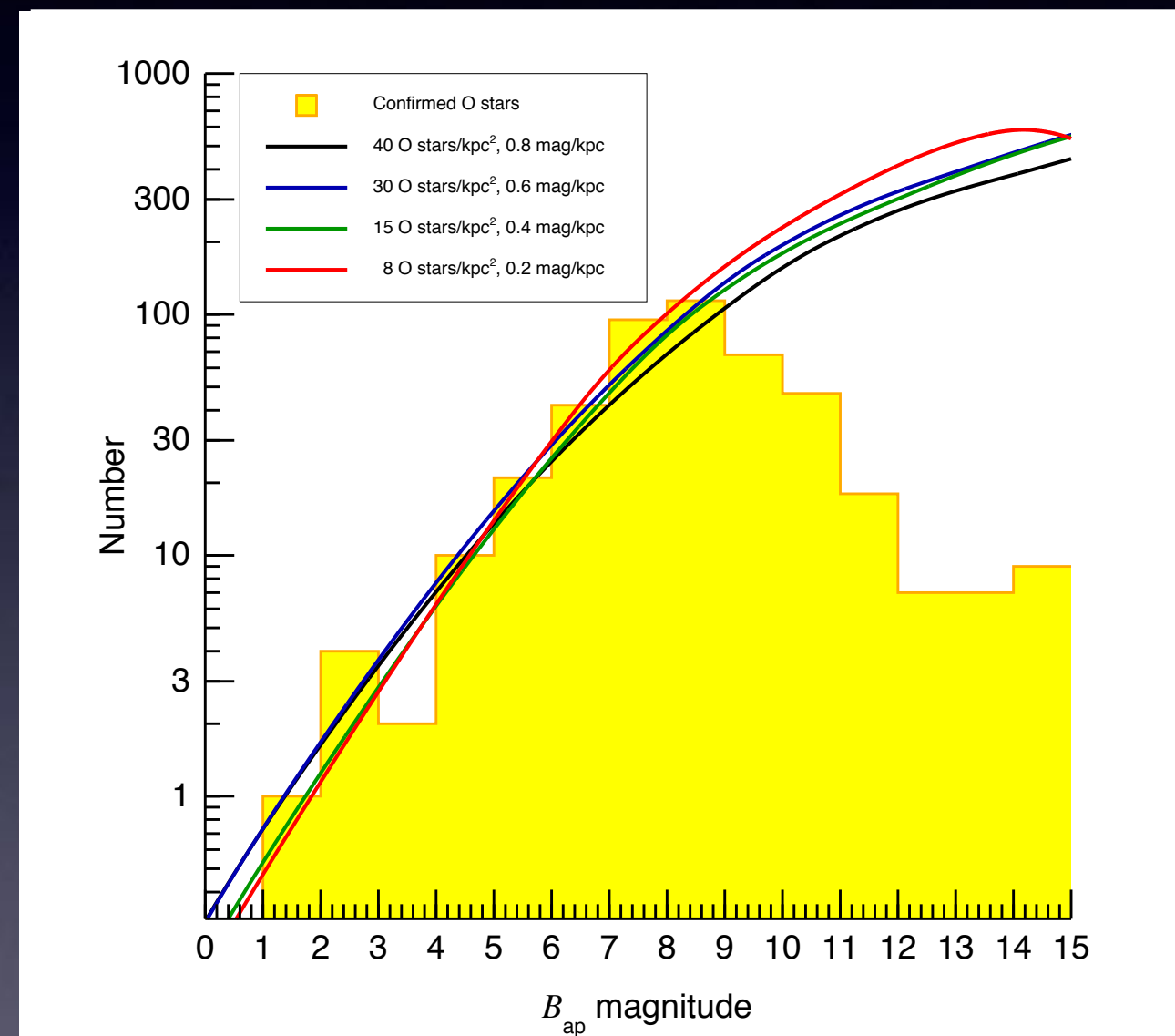
- Long-slit spectroscopy of OB stars with $R \sim 2500$ and $S/N > 200$ in 3900-5100 Å.
- Initial selection from the Galactic O-Star Catalog (GOSC).
- Telescopes and spectrographs:
 - ★ OSN 1.5 m (Albireo): $\delta > -20^\circ$, $B < 11$
 - ★ LT 2.0 m (FRODOspec): $\delta > -35^\circ$, $B < 11$
 - ★ CAHA 3.5 m (TWIN): $\delta > -20^\circ$, $11 < B < 14$
 - ★ WHT 4.2 m (ISIS): $\delta > -35^\circ$, $11 < B < 14$
 - ★ GTC 11.4 m (OSIRIS): $\delta > -30^\circ$, $14 < B < 17$
 - ★ LCO 2.5 m (B&C): $\delta < +20^\circ$, $B < 13$
 - ★ SOAR 4.1 m (GHTS): $\delta < +20^\circ$, $13 < B < 15$
 - ★ Gemini South 8.1 m (GMOS): $\delta < +20^\circ$, $13 < B < 16$
- 2721 stars (4318 spectra) processed (+ ~800 unproc.), compl. for $B < 8$.
- 590 O type-systems in three major papers (I:2011, II:2014, III:2016).

WEAVE: the instrument

- Double-arm optical Multi-Object Spectrograph for the 4.2 m WHT.
- ~950 fibers (+20 mIFUs and 1 LIFU).
- 2 degrees diameter FOV.
- Low resolution mode ($R \sim 5000$): 3700 - 10 000 Å.
- High resolution ($R \sim 20\,000$).
- Survey-oriented.

WEAVE: Galactic Plane Stellar, Circumstellar, and Interstellar Physics

- OBA-stars-centered survey with $\sim 10\%$ of WEAVE survey time.
- Also ISM in emission, Cepheids, evolved low-mass stars, and other young stars.
- $R \sim 5000$, whole optical range.
- Galactic Plane with longitudes from 20 deg. to 225 deg.
- 1200 sq. deg.
- $2-3 \cdot 10^5$ targets: selection?

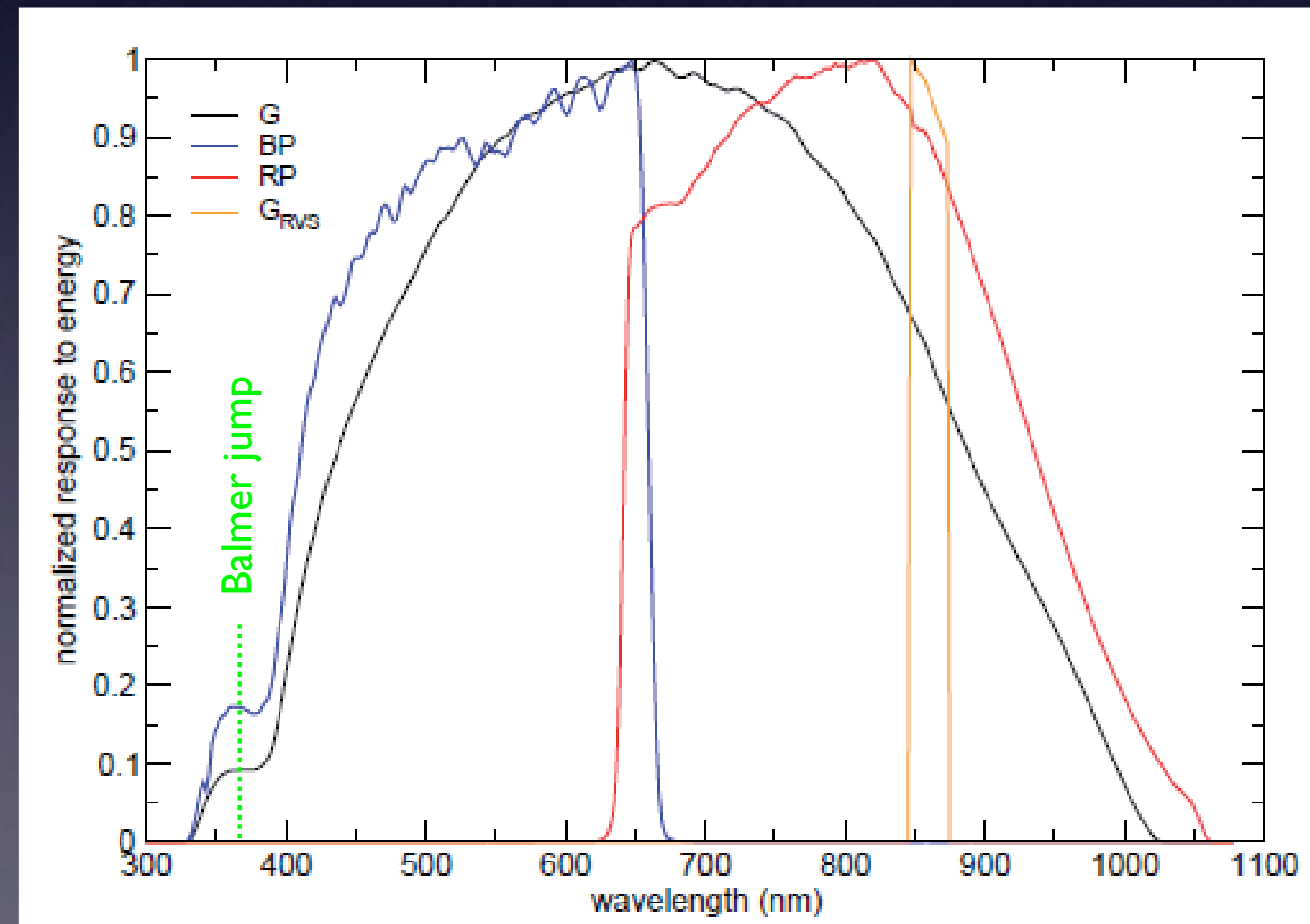


EGAPS

- Galactic Plane: IPHAS + UVEX + VPHAS+.
- $u' + g' + r' + i' + H\alpha + (\text{He I } 5876)$.
- $360^\circ \times 10^\circ$ started in 2003 (N) 2011 (S), continuing.
- 13-21 magnitudes, FOV 0.3 (N) 1.0 (S) sq. dg.
- Issues:
 - ★ Saturation.
 - ★ Calibration (FOV, gaps, u' band).

Gaia

- Whole sky.
- (Spectro)photometry from 3 instruments:
 - ★ Astrometric (G).
 - ★ RVS (RVS).
 - ★ Photometric (BP+RP).
- Issues:
 - ★ BP and the Balmer jump.
 - ★ Crowding.
 - ★ Nebular contamination.

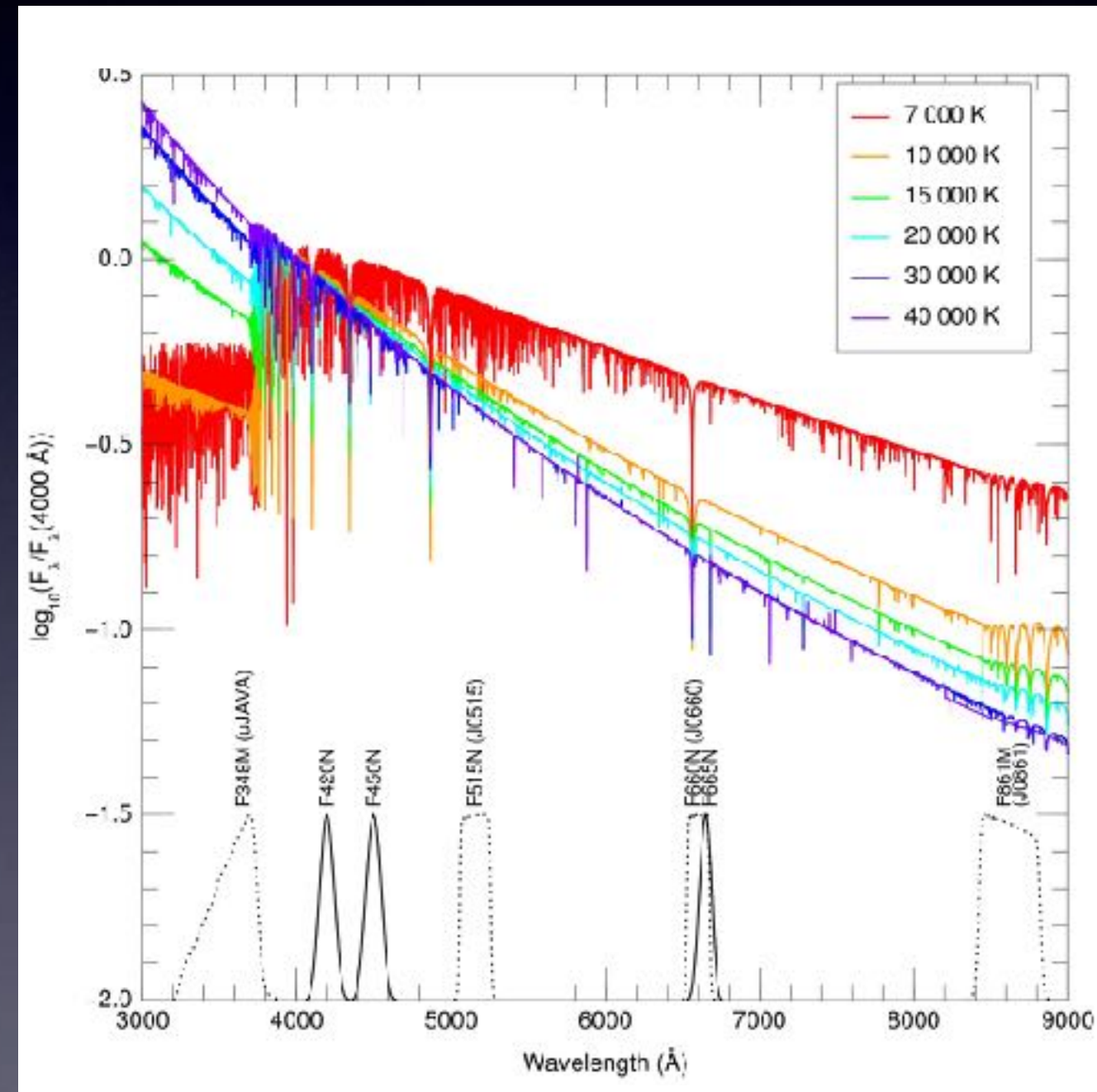


Why GALANTE?

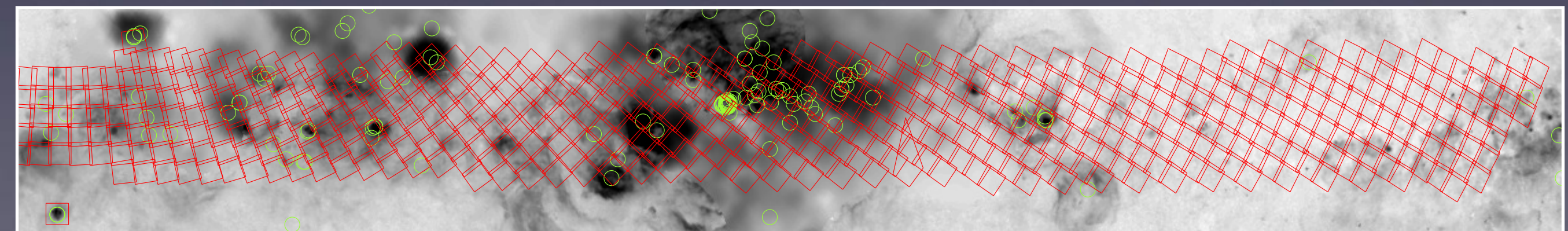
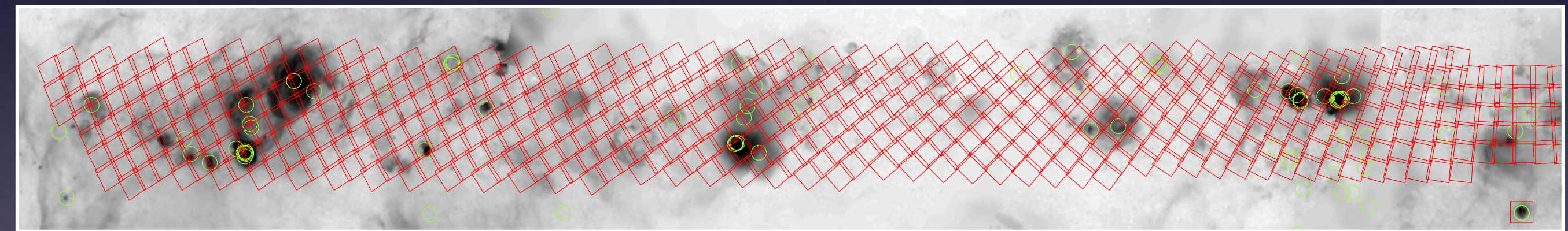
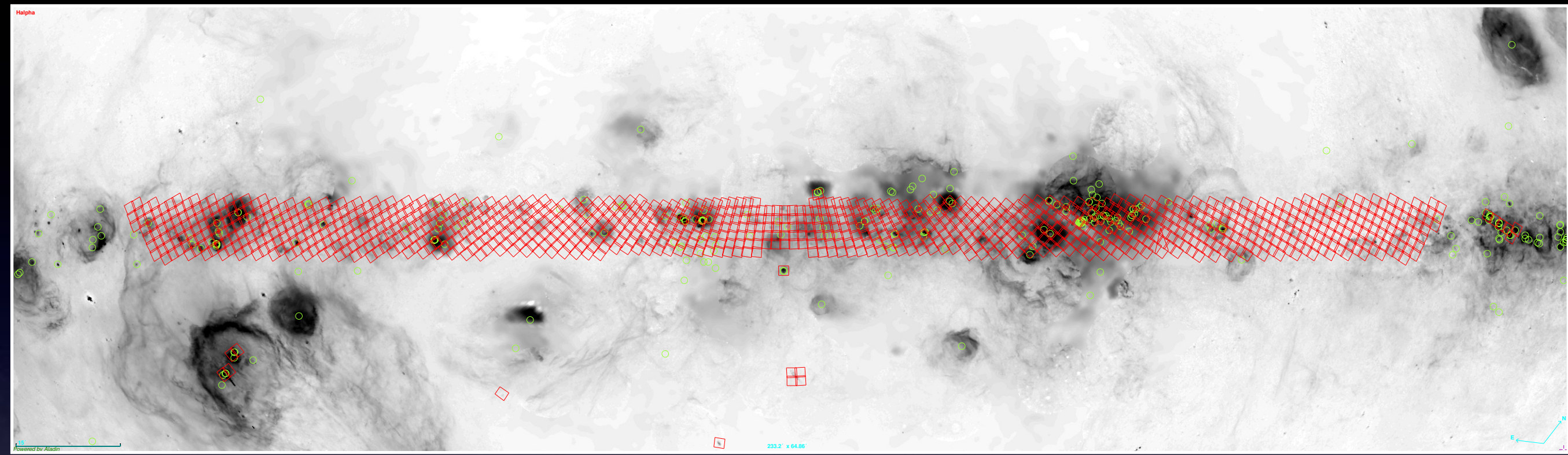
- Some problems with photometric surveys for OB stars:
 - ★ Saturation.
 - ★ Filter selection.
 - ★ Footprint.
 - ★ Field of view and old instrumentation.
 - ★ Long-term instrument stability and repeatability.
- The T80 is the ideal telescope.

The GALANTE survey

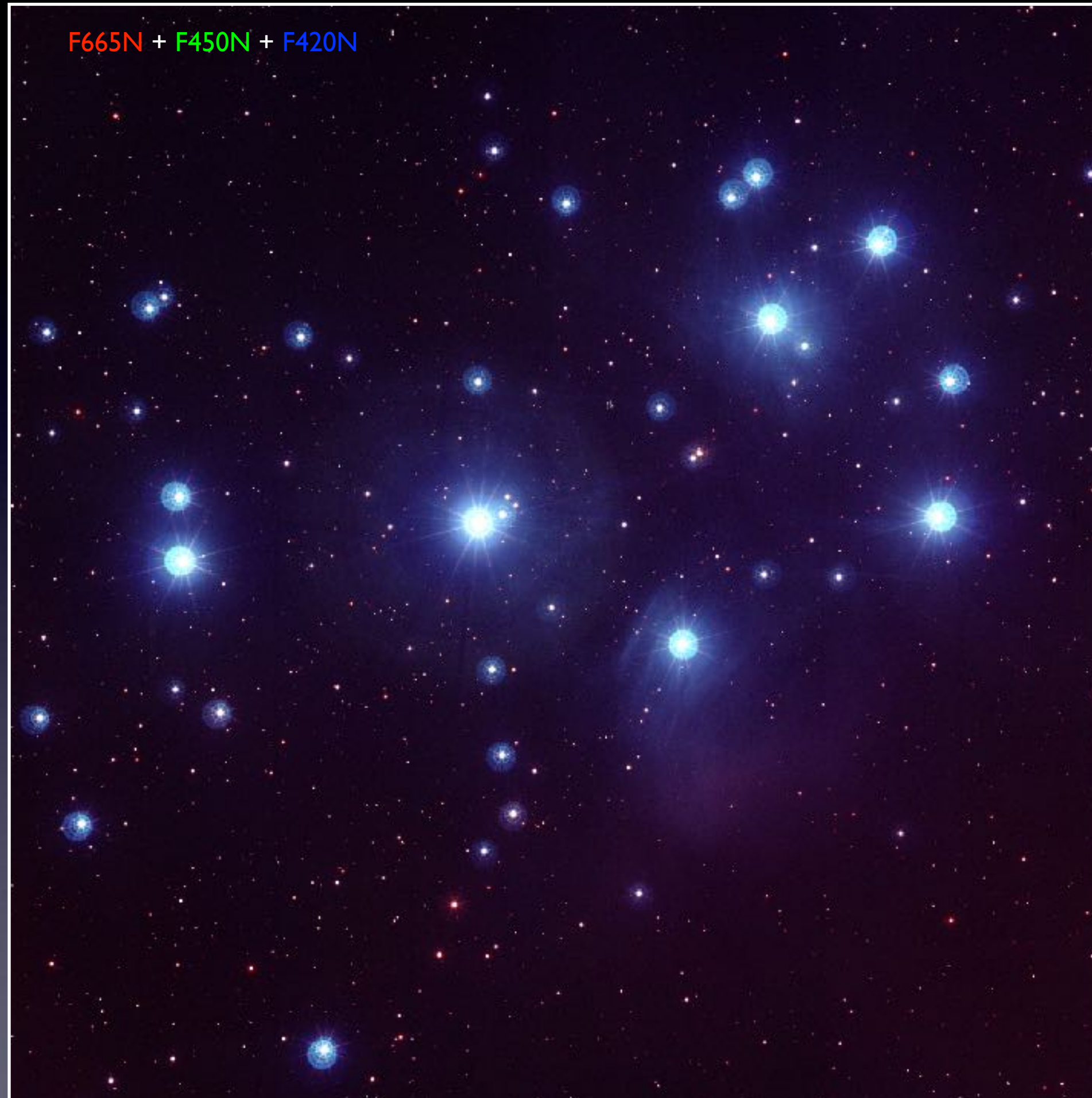
- Northern Galactic Plane.
- ~3 nights/month in the T80.
- Exp. times from 0.1 to 50/100 s.
 - ★ Saturation at mag ~3 (PSF to ~0).
 - ★ S/N ~100 at mag 17 (det. to ~19).
- Seven filters:
 - ★ F348M + F420N + F450N.
 - ★ F515N + F861M.
 - ★ F660N + F665N.



GALANTE footprint



GALANTE T80 images



GALANTE T80 images

F665N + F450N + F420N

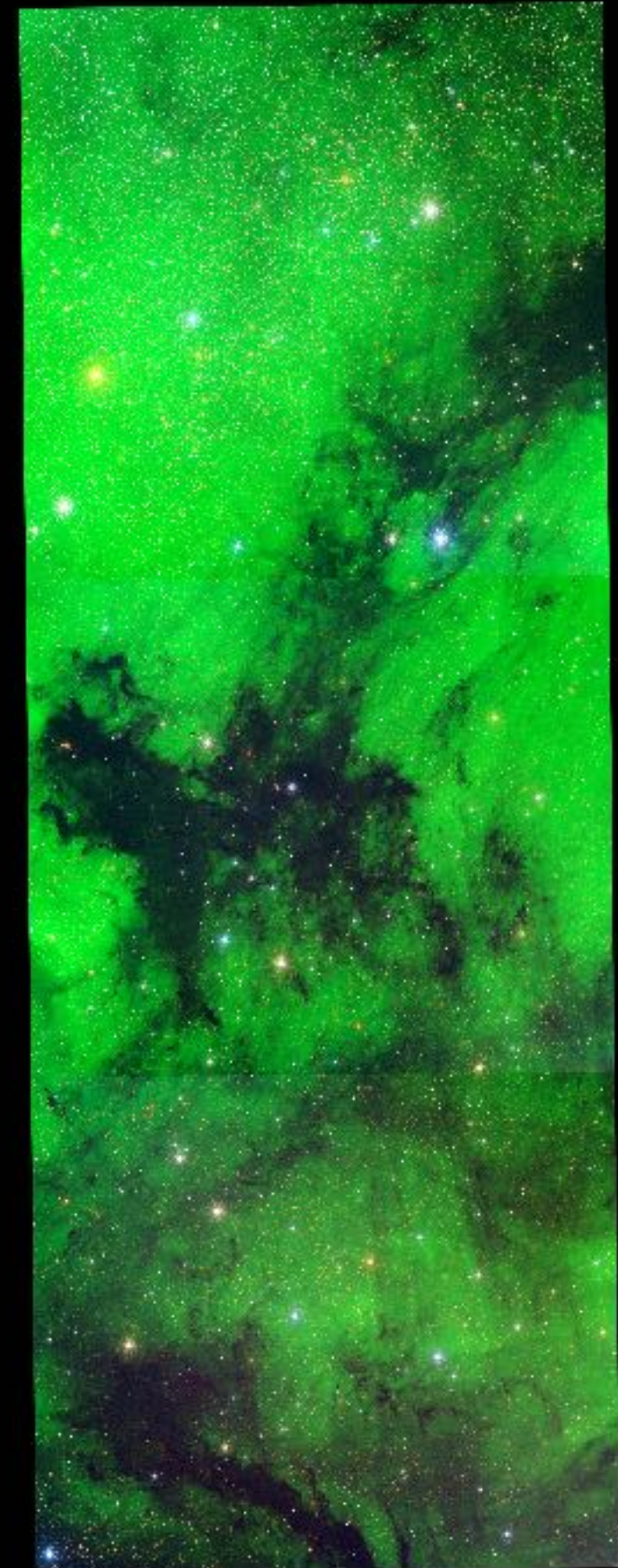


GALANTE T80 images



GALANTE T80 images

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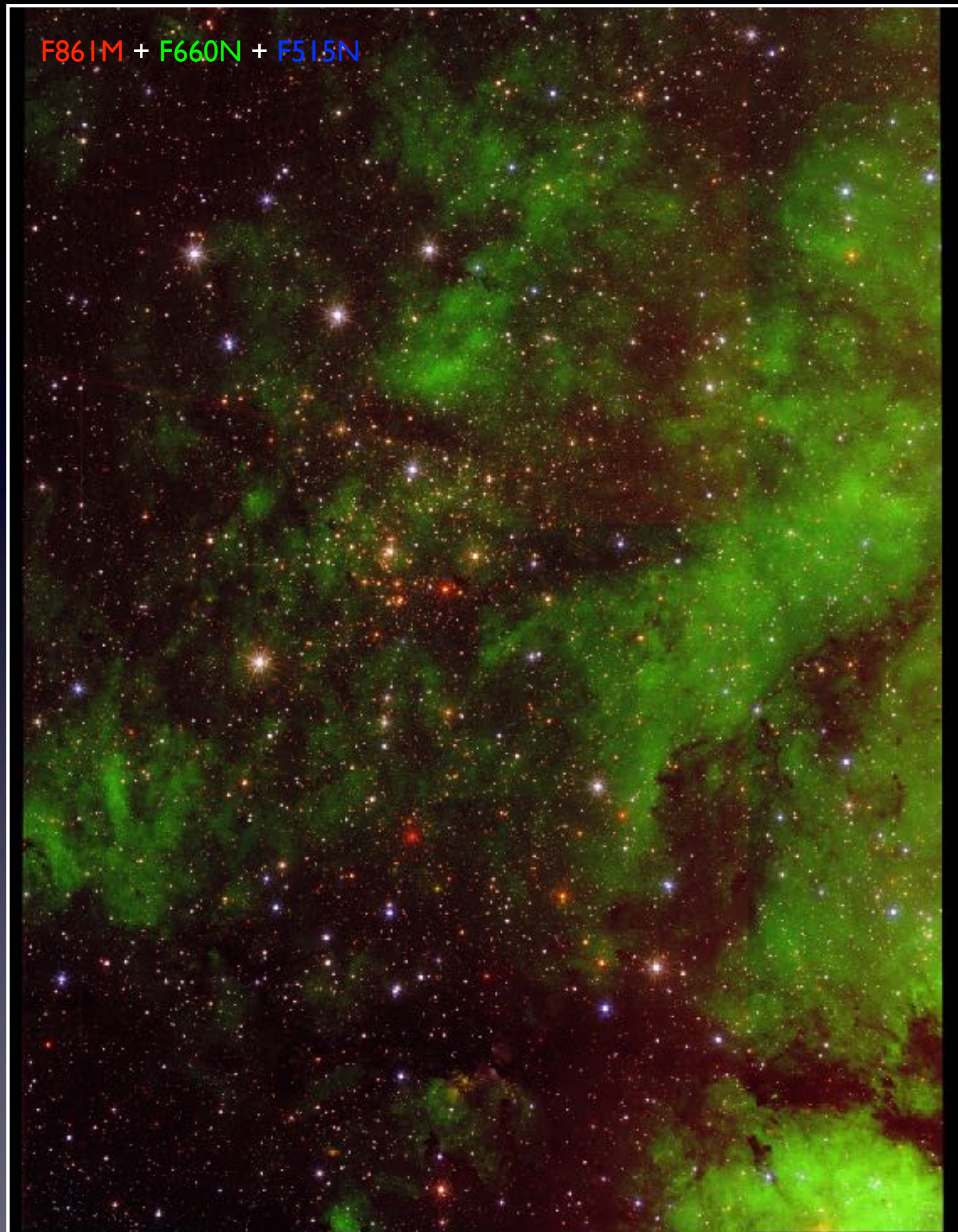


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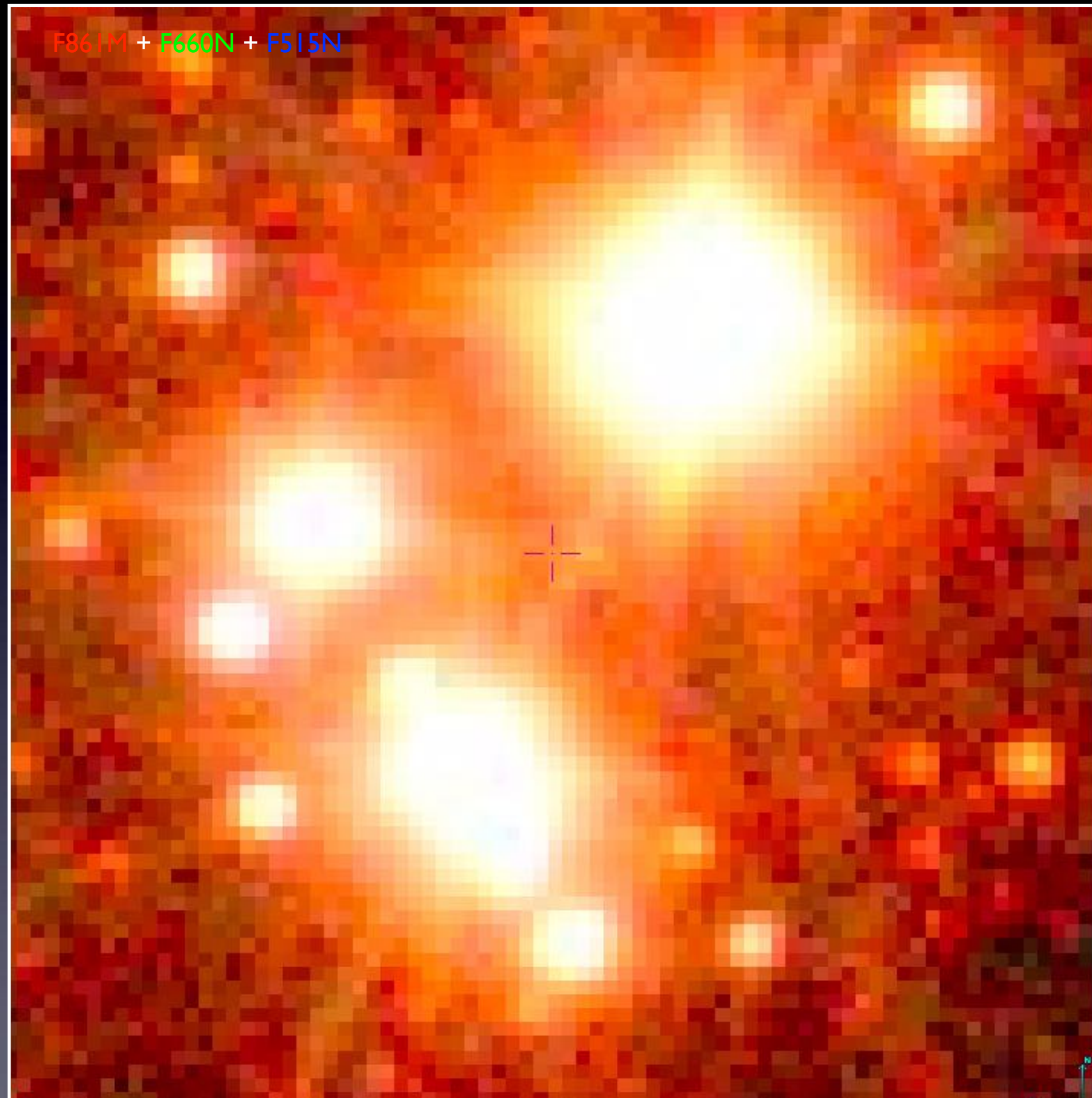
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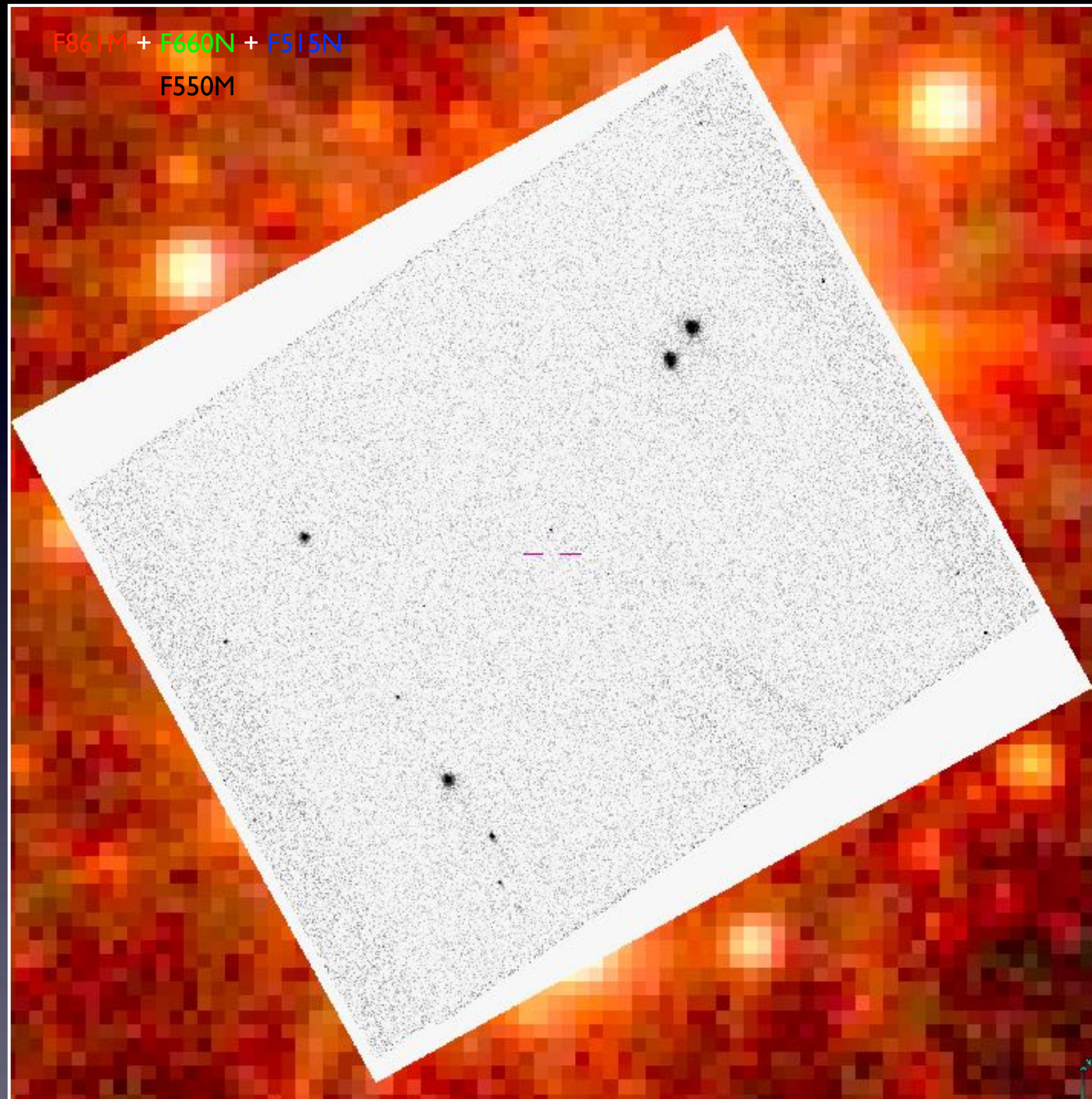
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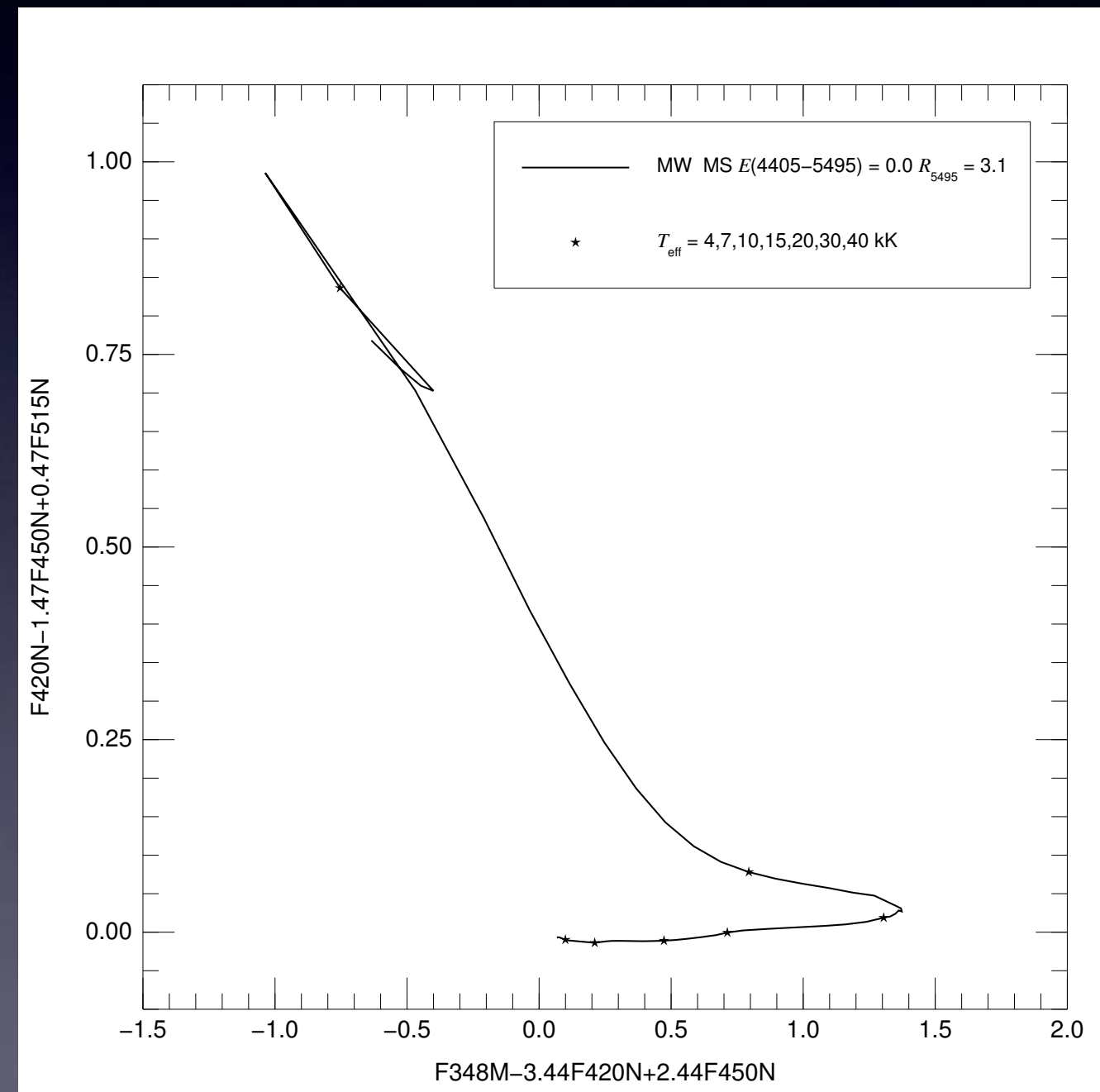


ACS/HRC



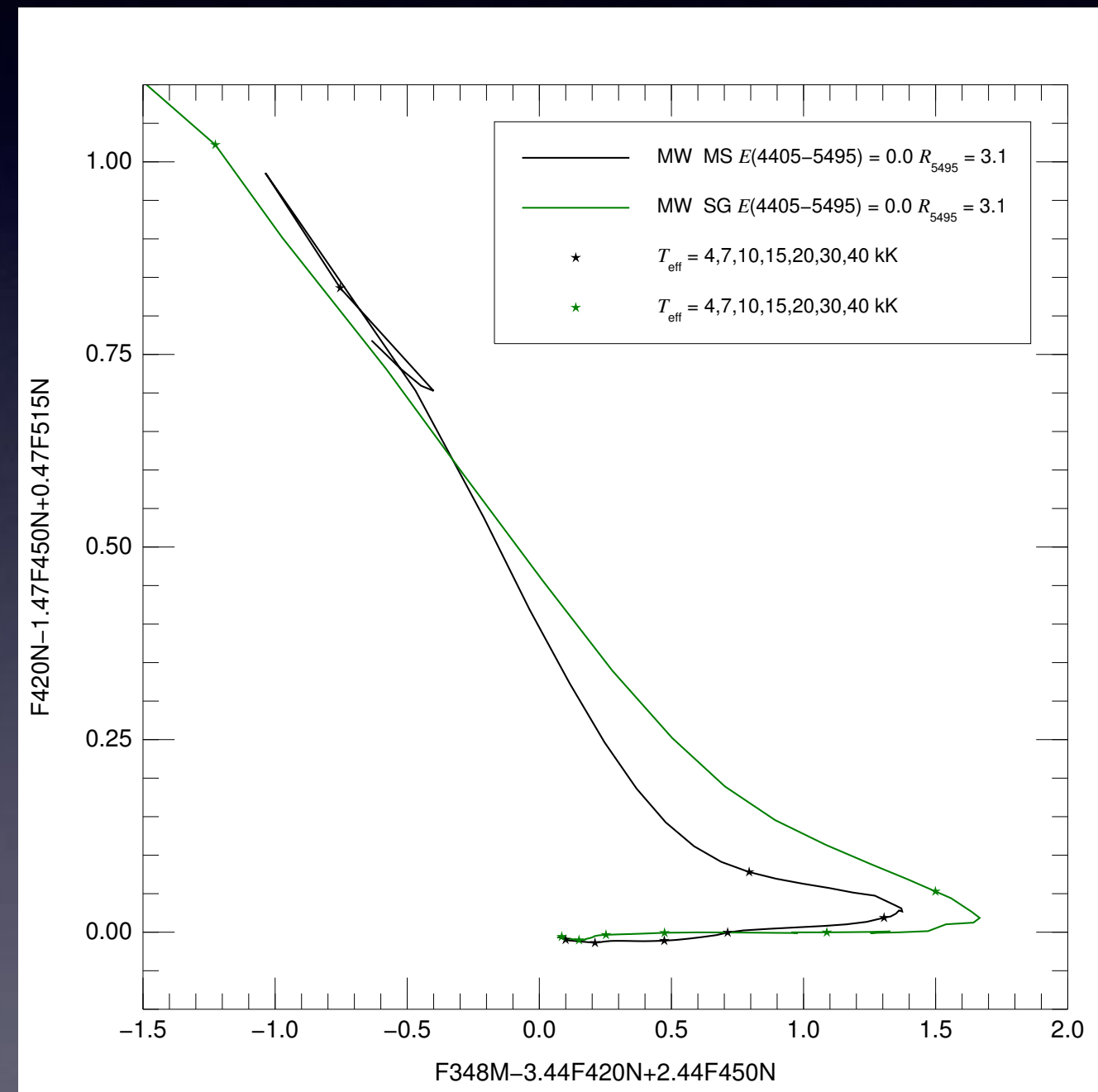
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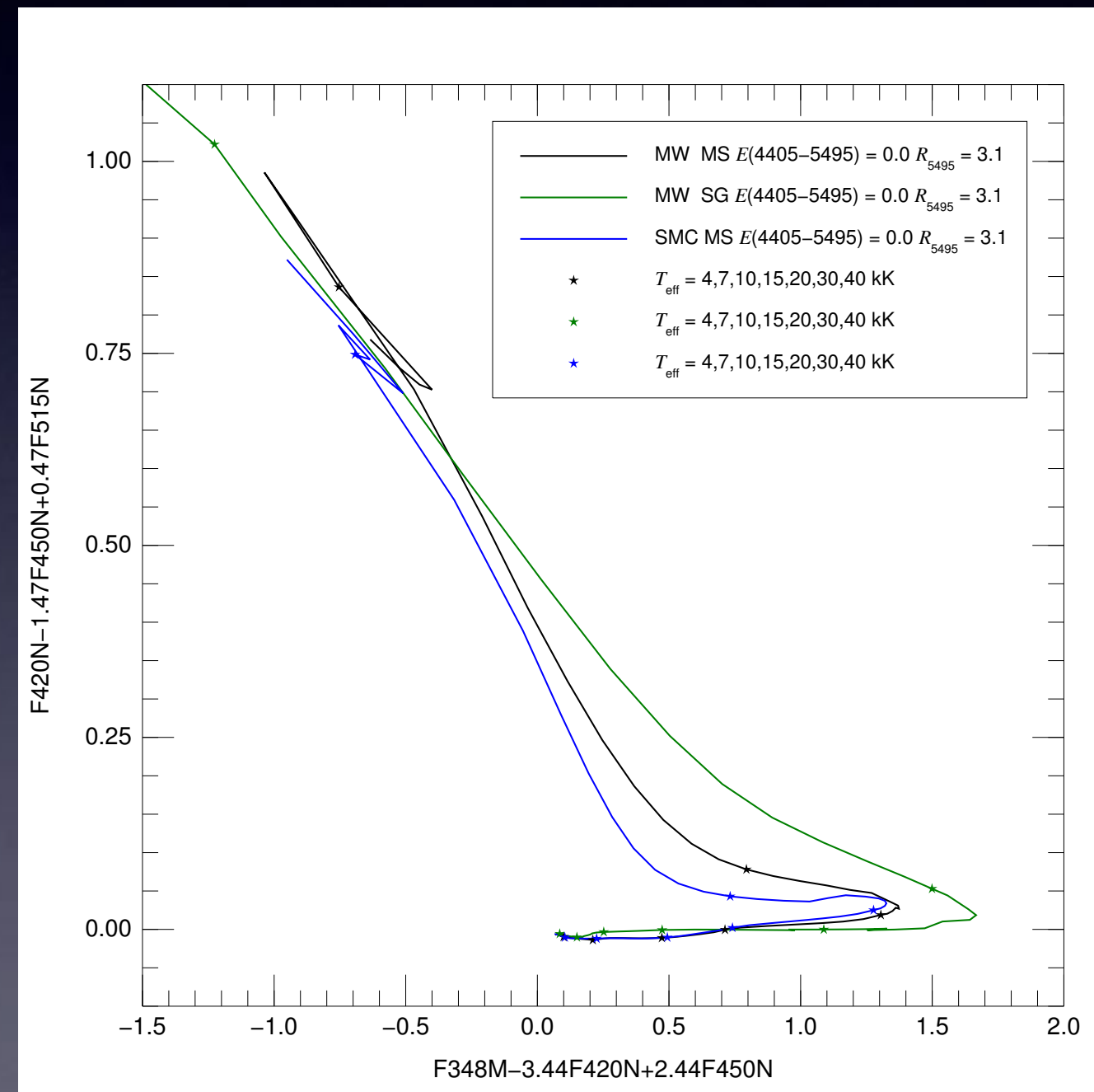
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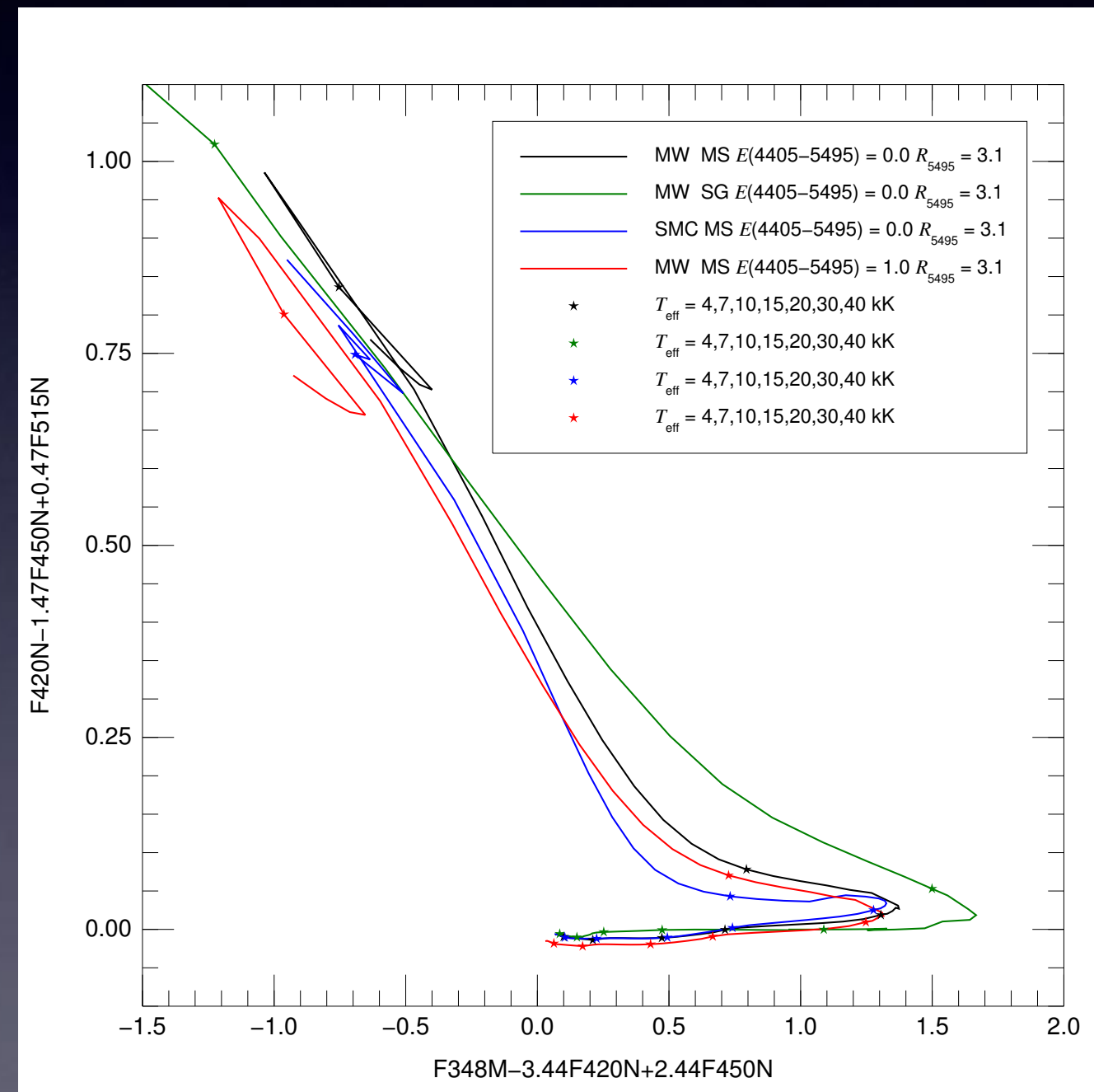
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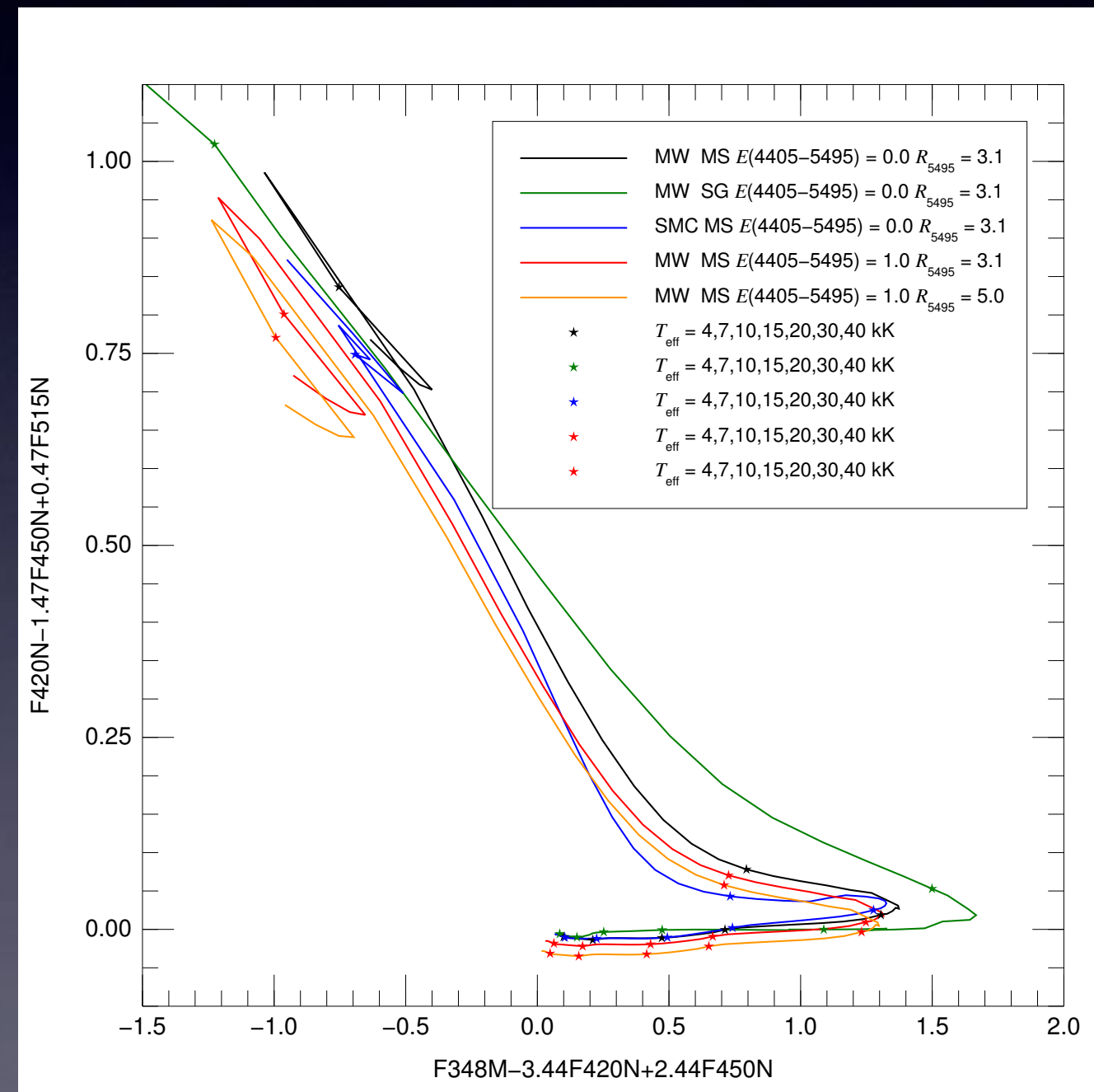
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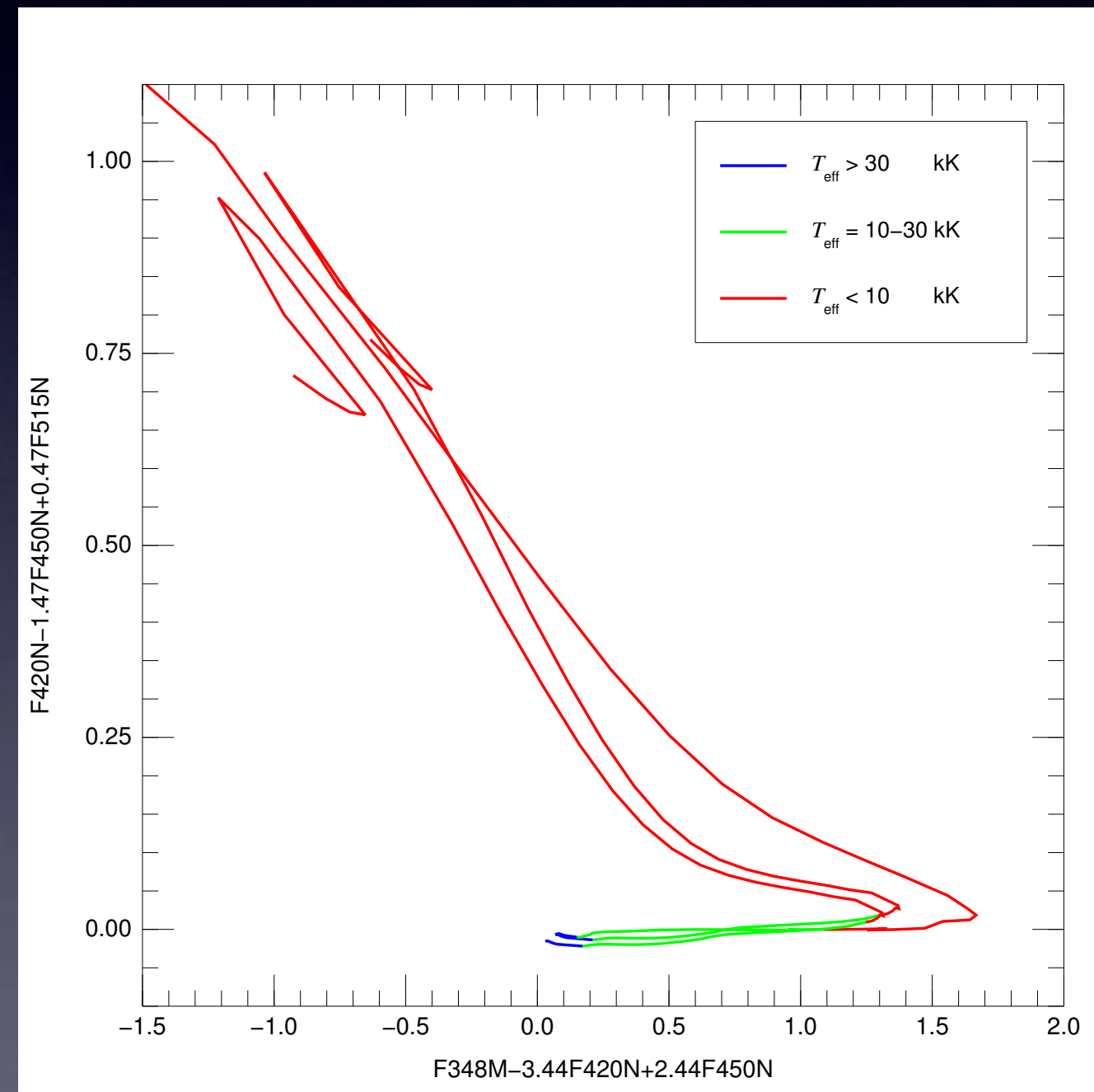
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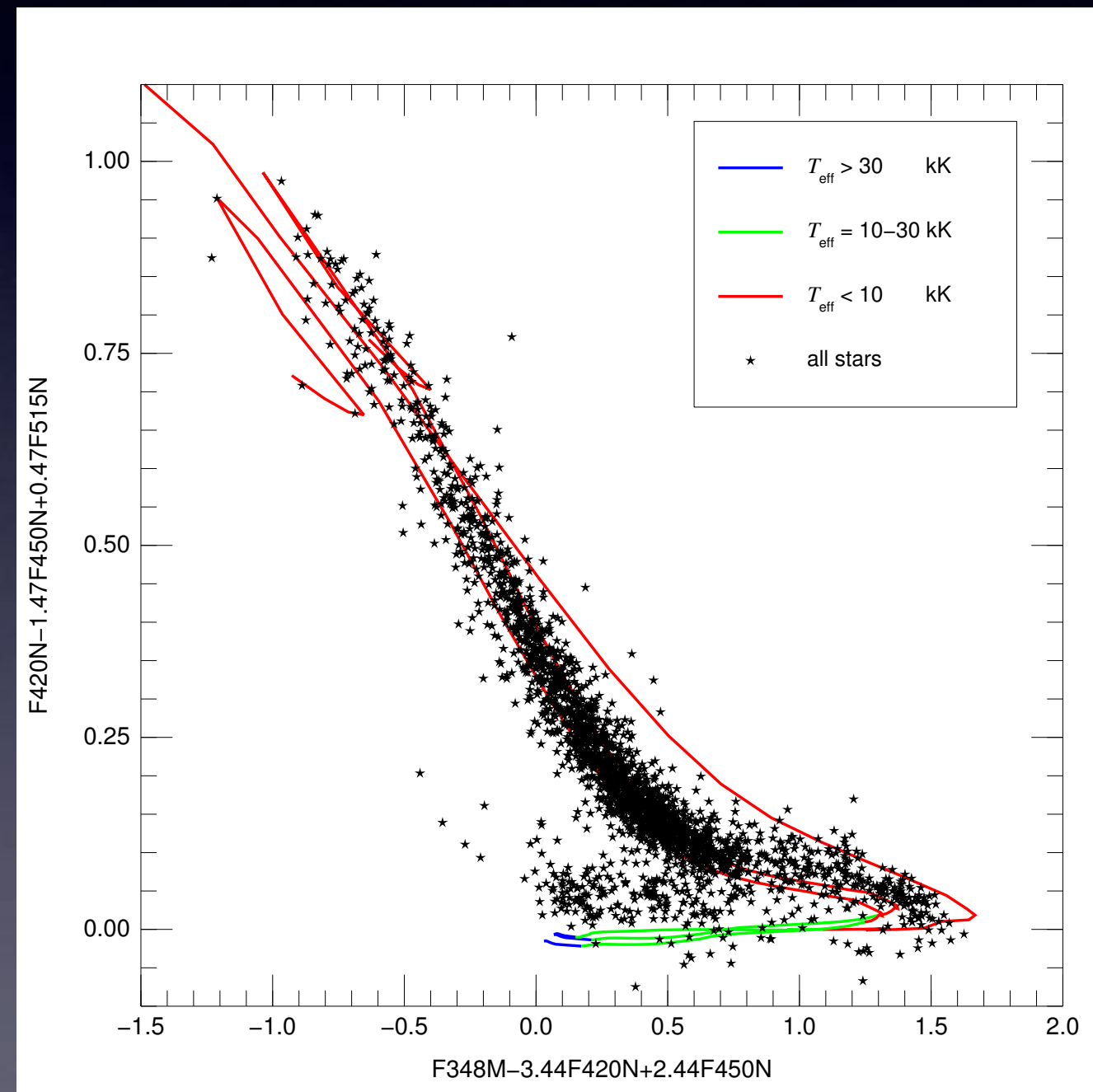
Measuring temperature

- Testing it with real data.
 - ★ A field with strong differential extinction in Cyg OB2.
 - ★ Aperture photometry.
 - ★ Preliminary calibration!!!



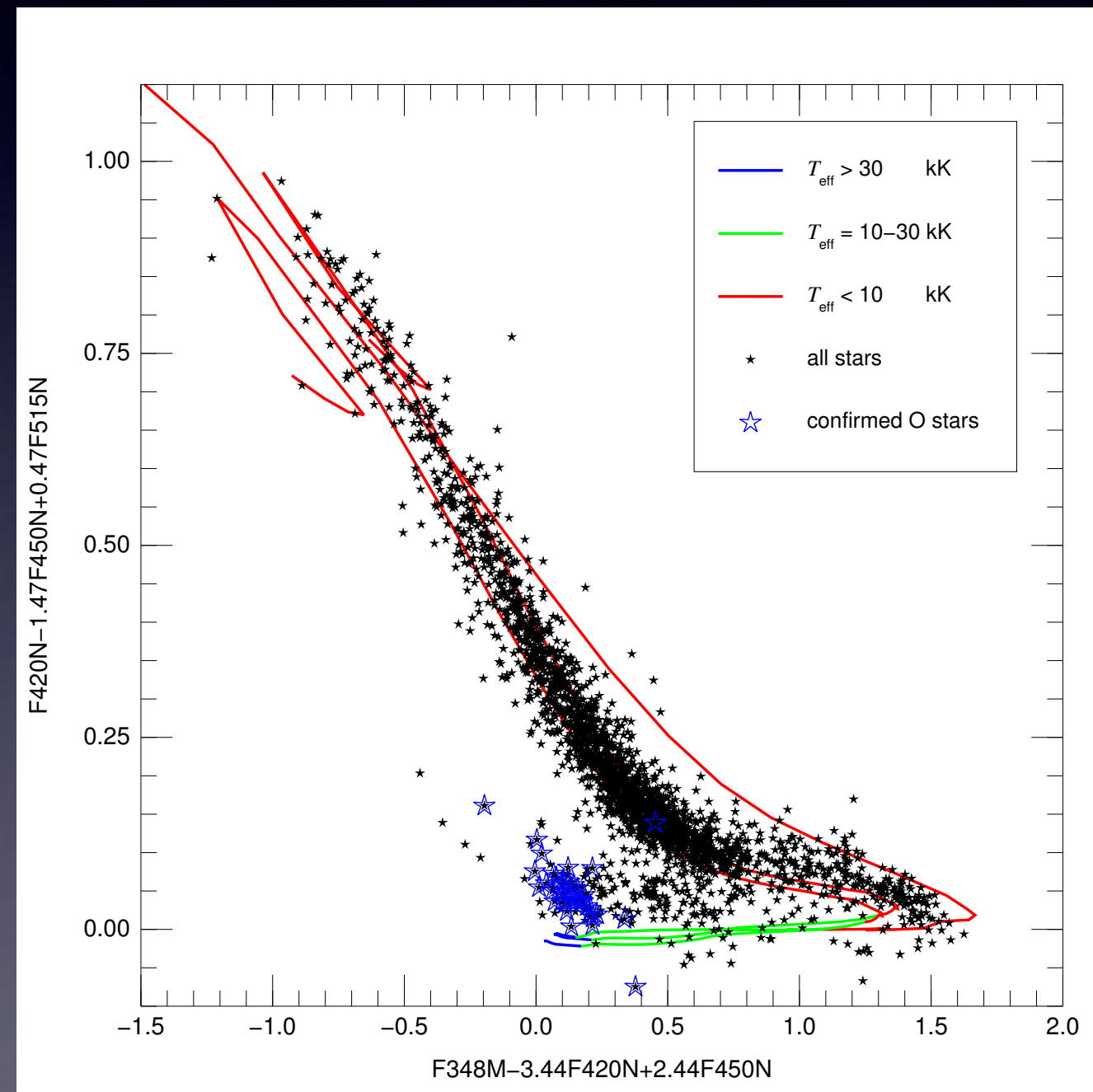
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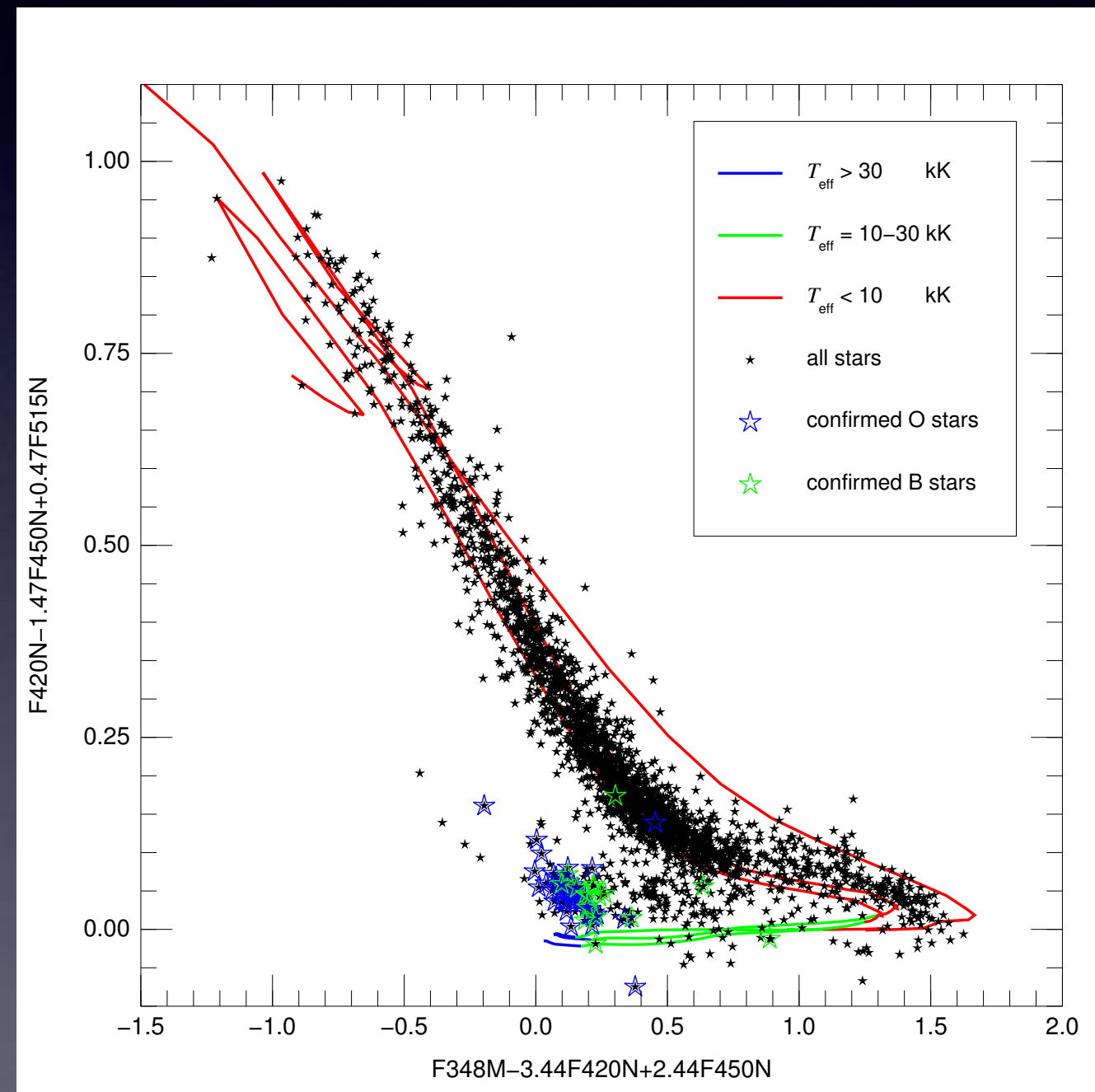
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What will we do with GALANTE?

- Main objectives:
 - ★ Identify all OB stars in the Northern Galactic Plane down to magnitude 17.
 - ★ Estimate T_{eff} for the sample above.
 - ★ Measure $E(4405-5495)$ and R_{5495} for the OBA stars in the sample by cross-matching with 2MASS.
- Sample additional objectives:
 - ★ Magnitude-limited catalog of emission-line stars.
 - ★ The IMF of large-area clusters and associations.
 - ★ Continuum-subtracted H α map with subarcsecond pixels.

Status and plans

- Timeline:
 - ★ Survey started in September 2016.
 - ★ Data taking expected until 2019A.
- Possible extensions:
 - ★ Deep surveys of interesting regions.
 - ★ The time domain.
 - ★ Additional filters: Na I D1+D2, TiO, continuum for extinction law...
 - ★ Twin telescope in the South.

