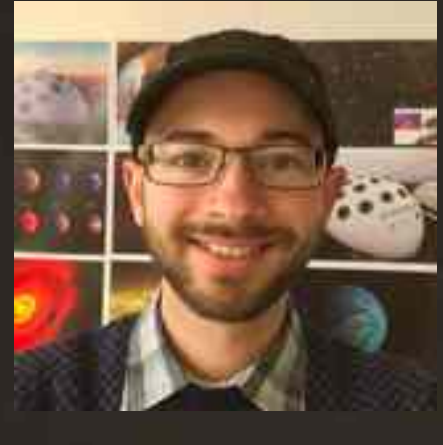


The EvryFlare survey: superflares, spots, and stellar rotation of the cool stars in Evryscope and TESS



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Key EvryFlare survey results

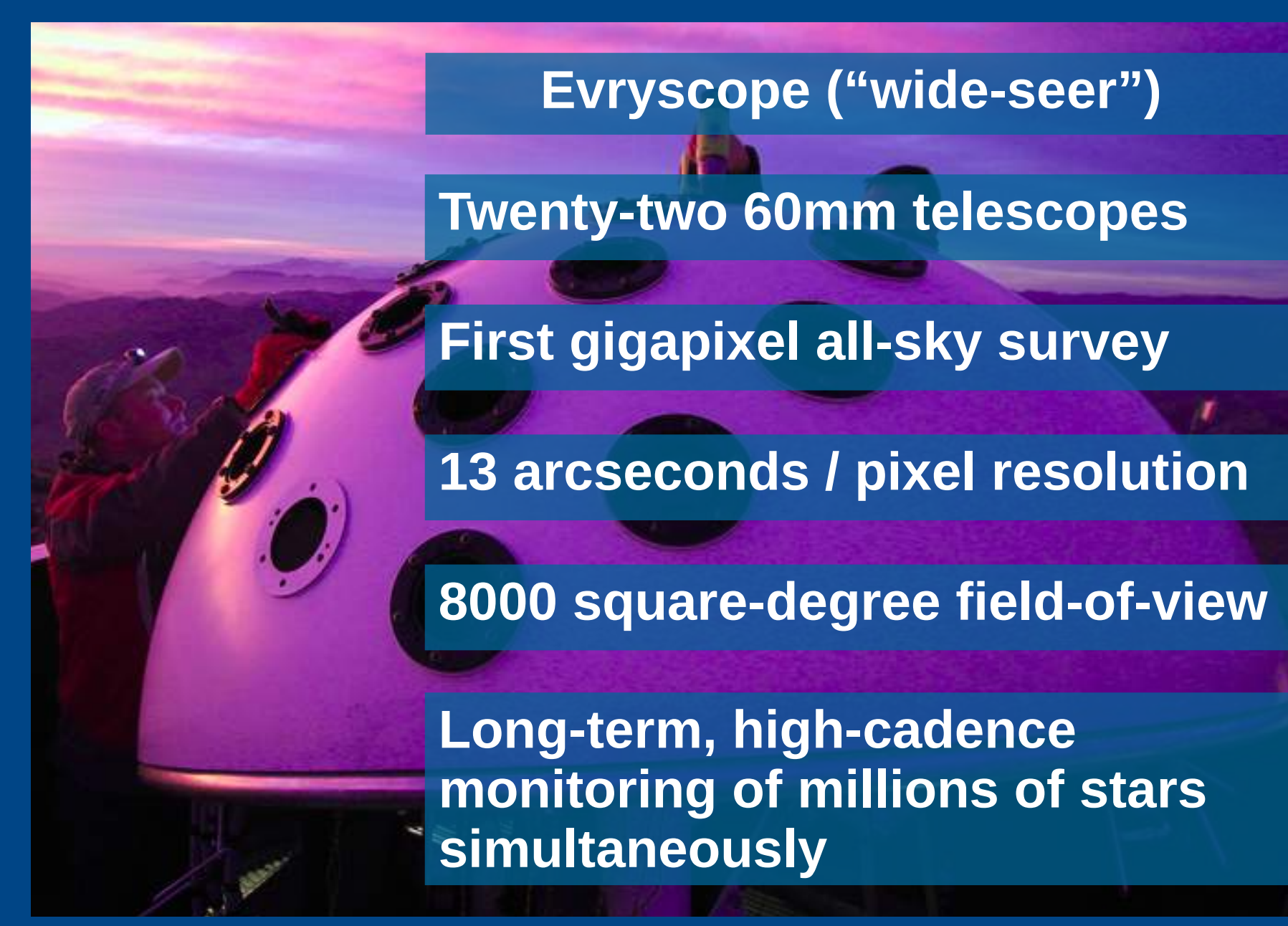
We search 4068 cool stars for flares in 2+ years of Evryscope photometry, focusing on stars with high-cadence data obtained by both Evryscope and TESS.

We detect 575 large flares from 284 cool stars. Of these, the largest increased the stellar brightness by 5.6 mag and released $10^{36.2}$ erg.

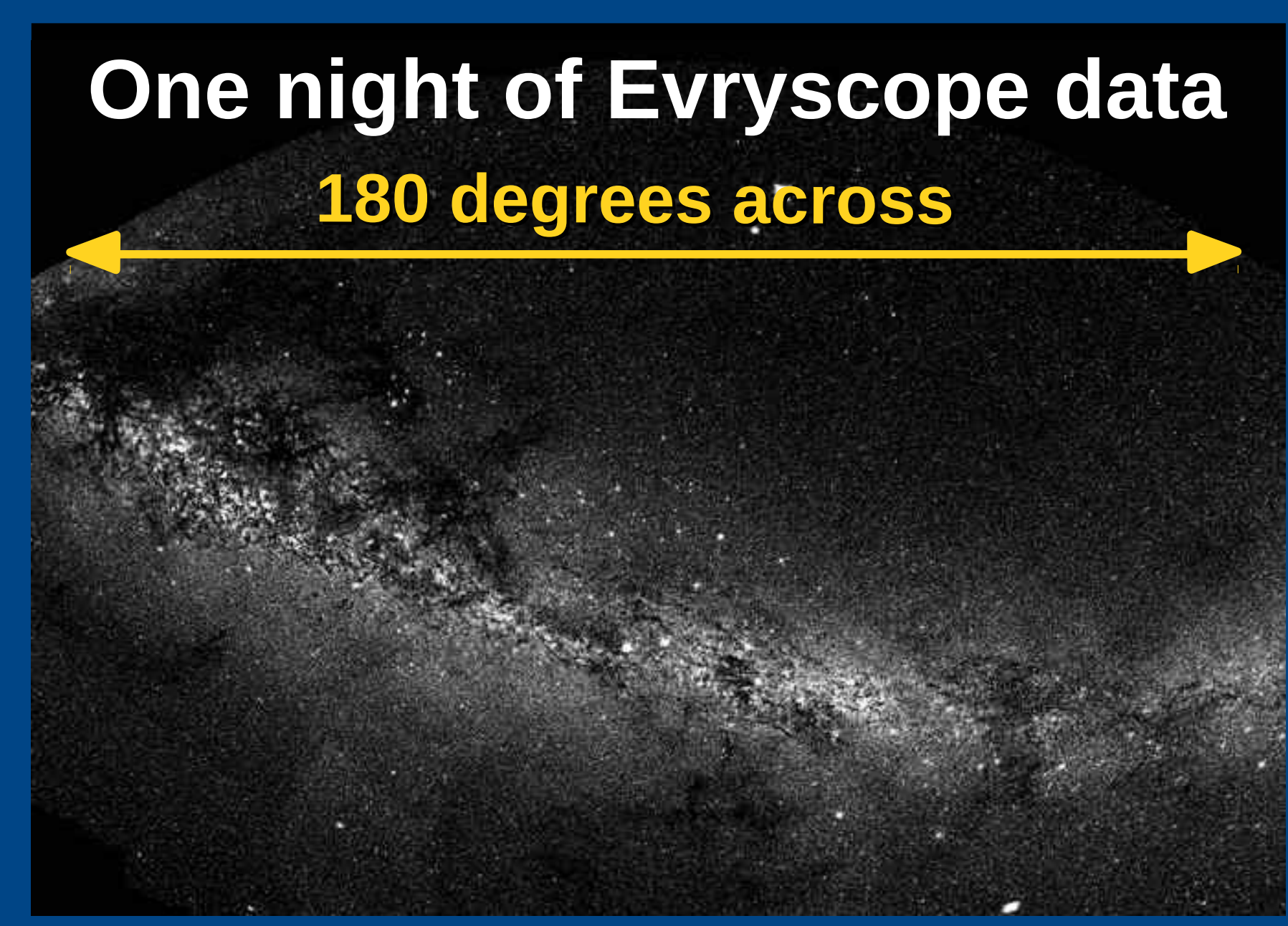
We observe a superflare from the triple M-dwarf system, LTT 1445. The system hosts the closest exoplanet transiting an M-dwarf¹.

Of the 1822 stars around which TESS may discover temperate rocky planets², we observe $14.6 \pm 2\%$ emit large flares.

References: [1] Winters et al. (2019), Accepted in AJ, arXiv:1906.10147v2 [2] Kaltenegger et al. (2019), ApJ, 874L, 8K



Evryscope ("wide-seer")
 Twenty-two 60mm telescopes
 First gigapixel all-sky survey
 13 arcseconds / pixel resolution
 8000 square-degree field-of-view
 Long-term, high-cadence monitoring of millions of stars simultaneously



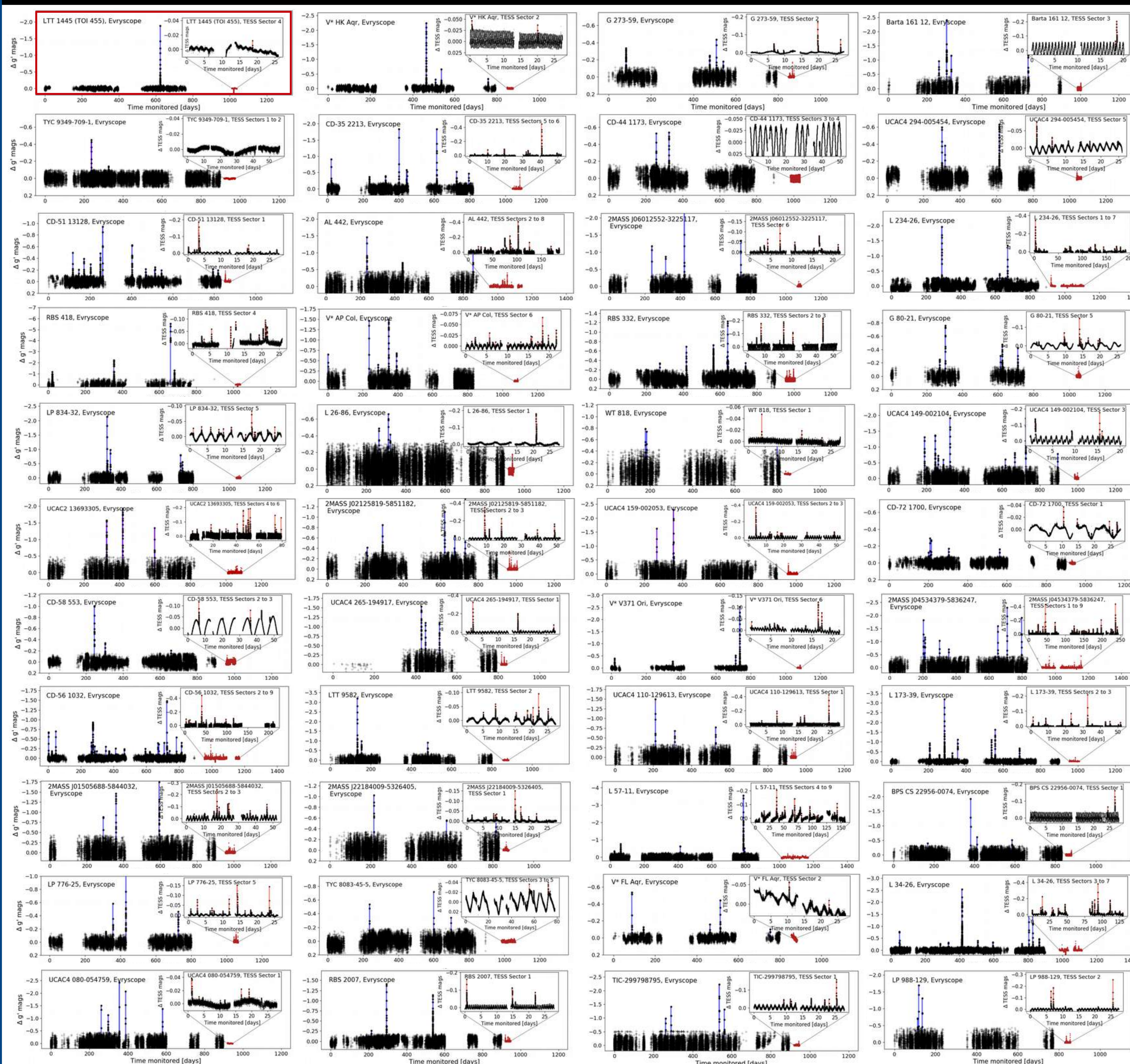
One night of Evryscope data
 180 degrees across

EvryFlare I (arXiv:1904.10421v2, in press ) , EvryFlare II (arXiv:1907.10735, submitted )

All stellar flare and stellar rotation data in the EvryFlare paper series is available in machine-readable form. Raw Evryscope light curves are usually available by request.

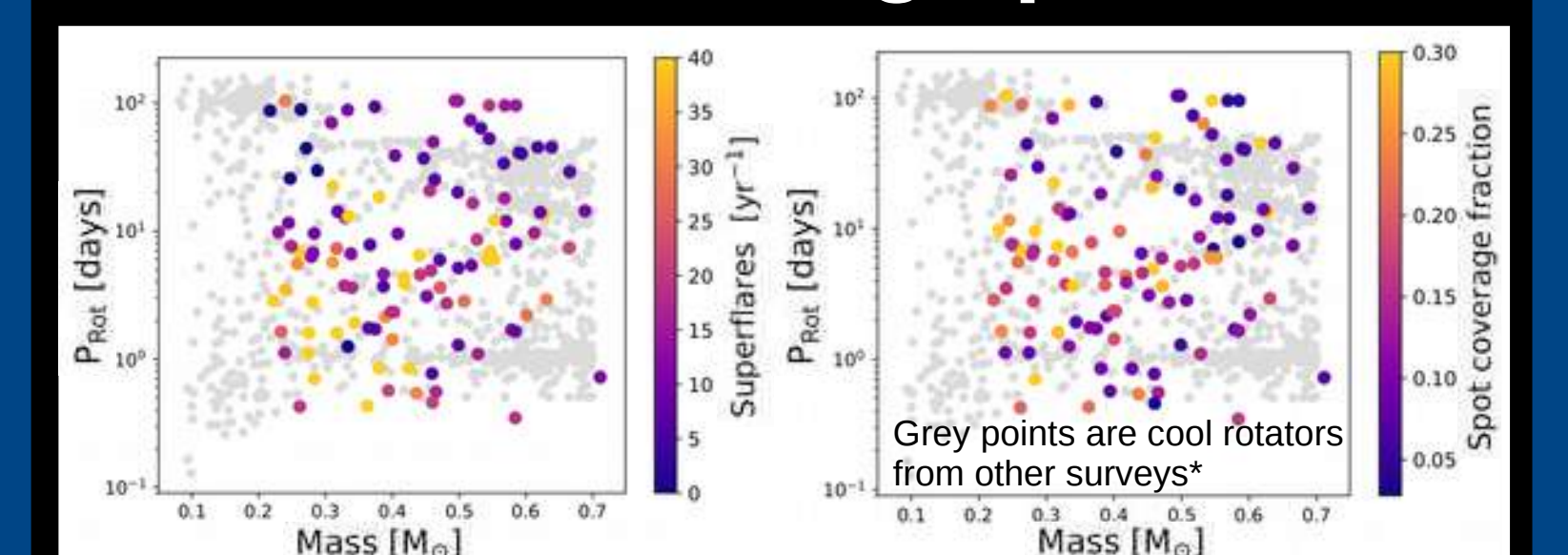
Flares in Evryscope and TESS light curves of 284 cool stars

Evryscope and inset TESS light curve of each flare star for a subset of 44 out of 284 stars. While several sectors of TESS observations capture frequent flares of lower energy, long-term Evryscope observations capture the rare, high-energy flares.



	EVRYSCOPE	TESS
Aperture	61mm	105mm
Precision @ 10 th -mag	5 mmag / hr	0.2 mmag / hr
Precision @ 16 th -mag	3% / hr	1% / hr
Pixel sampling	13"/pix	21"/pix
FoV	8000 sq. deg. (12000 sq. deg. / night)	2300 sq. deg.
Survey length	5+ years	27 days (most of sky)
Cadence	2 mins	15-30 mins (much faster for selected targets)
Filter	Blue	Red

Activity & rotation of 113 flare stars during spin-down



↑ Rotation periods detected in the Evryscope light curves of 113 active cool stars.

↑ Increased starspot coverage and superflare rate for low mass & short period rotators.

↓ TESS light curves in the red are folded to Evryscope-detected periods. Phase-folded & binned Evryscope light curves in the blue:

