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-dwarf. Of the 1822 stars around which TESS may discover temperate rocky planets, we observe 14.6 ± 2% emit large flares.

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.

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.

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.