

The dip on TIC 421781407 is KV Cep

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Tustin, California. Research note from the 1.106–1.200 degree ring around V345 Lac, 15 October 2026.
Nothing in this note has been submitted to VSX.

Abstract

A periodic dip in the QLP light curve of TIC 421781407 repeats on the period of KV Cep, an eclipsing binary already in VSX. KV Cep is TIC 421927598, 60 arcsec away. On that star the QLP minimum falls to 0.595 of the sector median. On TIC 421781407 the same times fall to 0.942. The signal on the target is the diluted eclipse of KV Cep. TIC 421781407 is not filed as a new variable. This note is not a VSX submission.

1. How it was found

Public TESS Quick-Look Pipeline light curves around V345 Lacertae were searched on stars brighter than about $V = 12.5$. This star is 1.160° from V345 Lac, in the ring from 1.106° to 1.200° (253 stars). A dip was kept when quality-zero cadences fell about 1.2 percent or more below the local median, stayed down for several cadences, and did not bounce straight back. The same pass recovered known variables. Those are not given new notes here. Sectors 16 and 17 are 30-minute cadence and use KSPSAP_FLUX. Sectors 56, 57, 83 and 84 are 200-second cadence and use DET_FLUX where that column is present. Sectors 76 and 77 have no QLP v01 file for these TICs. Cadences with a nonzero quality flag were removed, including the QLP poor-quality bit. Each sector was divided by its own median. Catalog values are from the TESS Input Catalog, Gaia DR3, 2MASS and AllWISE. No new observations were obtained.

The search on this star returned a period near 0.43 days and a second description near 0.86 days. Both are the same clock. VSX lists KV Cep at 60 arcsec with period 0.85883 days and type EB. That is the clock.

2. The star that was measured

TIC 421781407 is TYC 3986-01792-1, Gaia DR3 2006021413999028864, 2MASS J22190273+5550050, at 22h 19m 02.74s, $+55^\circ 50' 05.0''$. It is 70 arcmin north of V345 Lac. The TIC lists $V = 12.21$, $T = 11.67$, $B = 12.19$, $T_{\text{eff}} = 6420$ K, $\log g = 3.28$, radius 4.31 solar radii, and contamination ratio 0.29. Gaia DR3 gives parallax 0.774 ± 0.012 mas, RUWE = 0.96, $G = 12.12$, BP = 12.47, RP = 11.60, GSP-Phot $T_{\text{eff}} = 6782$ K and $\log g = 3.49$, and the non-single-star flag is 0. The inverse-parallax distance is about 1290 pc. Those Gaia values are for this star. They do not make the dip its own. 2MASS gives J, H, Ks = 10.975, 10.748, 10.659.

3. The eclipse belongs to KV Cep

KV Cep is TIC 421927598, Gaia DR3 2006021242200344576, at 22h 19m 09.15s, $+55^\circ 49' 38.7''$. The TIC lists $V = 13.02$ and $T = 12.38$. VSX, queried 15 October 2026, lists KV Cep as type EB, period 0.85883 days, range 14.1 to 14.8 in a photographic band. The separation from TIC 421781407 is 60 arcsec. A linear fit to the QLP minima of TIC 421927598 gives

$$\text{Min (KV Cep)} = \text{BTJD } 2858.4545 + 0.85884 \text{ E}$$

156 minima, rms 10 minutes, median flux 0.595 (0.56 mag). The period is 0.8588386 ± 0.0000007 d. It agrees with the VSX period 0.85883 days. Gaia DR3 gives this star a parallax of 0.504 ± 0.015 mas and RUWE 1.12, $G = 12.64$. The inverse-parallax distance is about 1990 pc. The GSP-Phot temperature is not used. At those same times, TIC 421781407 has median minimum flux 0.942 (0.06 mag, 156 events). Folded on this period, the deepest bin of KV Cep away from phase 0 is flux 0.802 at phase 0.505. The target's matching bin is flux 0.978 at phase 0.515. The shallow second dip on the target is the second minimum of KV Cep, diluted by the same aperture. A 40 percent eclipse diluted to about 6 percent means roughly 15 percent of the light in the target's QLP aperture is KV Cep. The TIC contamination ratio of the target is 0.29, so that fraction is plausible. The target's centroid at these phases shifts by sector 16: +29, -63 millipixels, sector 17: -14, +58 millipixels, sector 56: -27, +27 millipixels, sector 57: -17, +47 millipixels, sector 83: -24, +32 millipixels, sector 84: -13, +44

millipixels. The shift repeats from sector to sector in the later visits, which fits light that is not centered on TIC 421781407. It is not used as a position of KV Cep. The depths and the catalog identity are the argument.

TIC 421781407 · ticks are the KV Cep minima

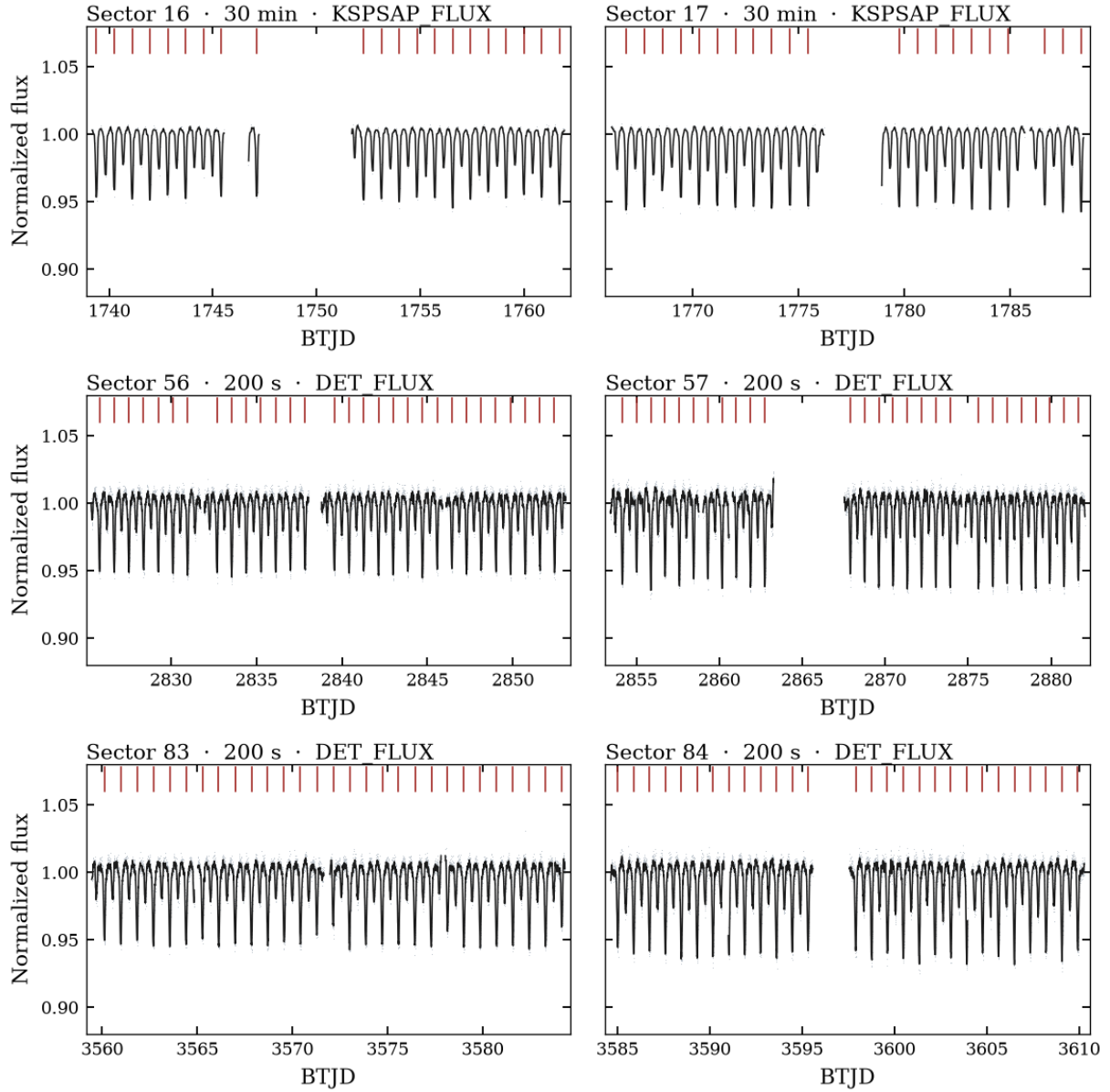


Figure 1. TIC 421781407. The ticks are KV Cep's minima, not a new ephemeris for this star.

The same time. KV Cep, 60 arcsec away, is the deep eclipse.

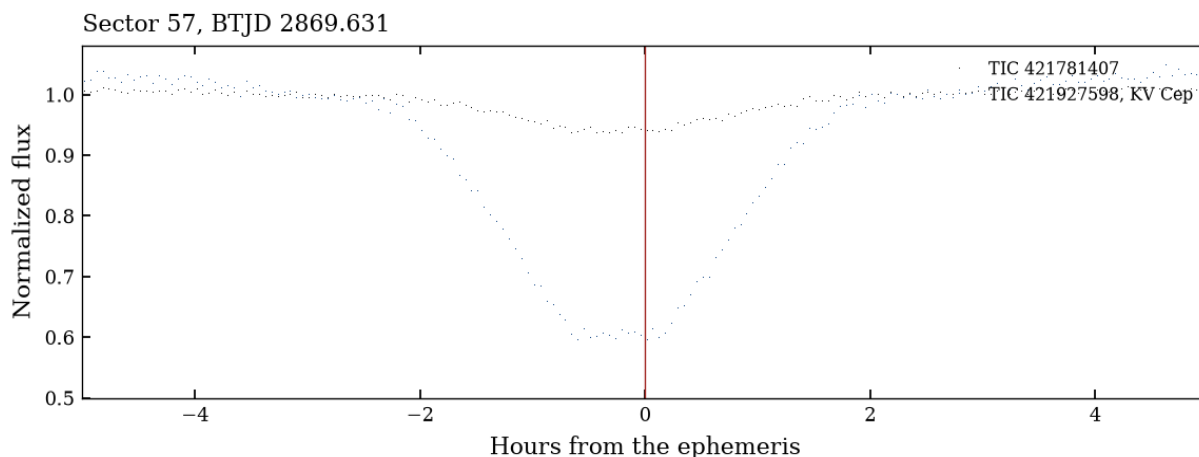


Figure 2. One minimum. Blue is KV Cep. Black is TIC 421781407, on a scale set by the deep eclipse.

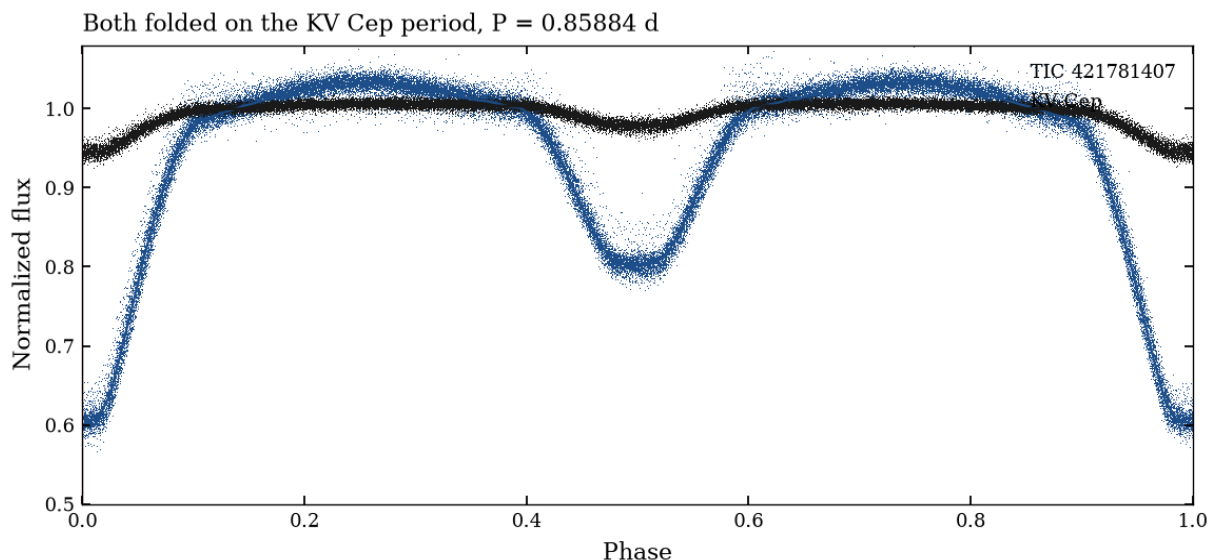


Figure 3. Both stars on the KV Cep period. Phase 0 is the KV Cep epoch above.

4. Other catalogued stars, and what was not done

A second VSX object, Gaia DR3 2006021448358772608, sits 42 arcsec from TIC 421781407. It is type VAR, period 0.0242892 days, $G = 16.52$ to 16.88 . That period is not the dip in these figures. Gaia DR3 2006021379639094528, 74 arcsec away, is type DSCT|GDOR|SXPHE, $G = 12.93$ to 12.98 . It is not KV Cep either. No new period is proposed for TIC 421781407. No next eclipse of this star is predicted. KV Cep is already in VSX, and this note does not revise it. Nothing here has been submitted.

References

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