

# KIC 008520433

## Q1-17 DR25 TCE Parameters

| TCE          | Run Type | KOI? | Period (Days) | Epoch (BKJD) | Depth (ppm) | Duration (Hours) | MES  | SNR | $R_{\star}$ ( $R_{\odot}$ ) | $T_{\star}$ (K) | $R_p$ ( $R_{\oplus}$ ) | $S_p$ ( $S_{\oplus}$ ) |
|--------------|----------|------|---------------|--------------|-------------|------------------|------|-----|-----------------------------|-----------------|------------------------|------------------------|
| 008520433-01 | OBS      | No   | 0.522257      | 131.843223   | 9.8         | 4.429            | 11.2 | 2.9 | 1.98                        | 6959            | 0.64                   | 43686.37               |

## Robovetter Results

| TCE          | Run Type | Disp | Score | N | S | C | E | Comments                      |
|--------------|----------|------|-------|---|---|---|---|-------------------------------|
| 008520433-01 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | LPP_DV—LPP_ALT—CENT_SATURATED |

**Notes:** OBS = Observed. INJ = Injected. INV = Inverted. SCR = Scrambled.

N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

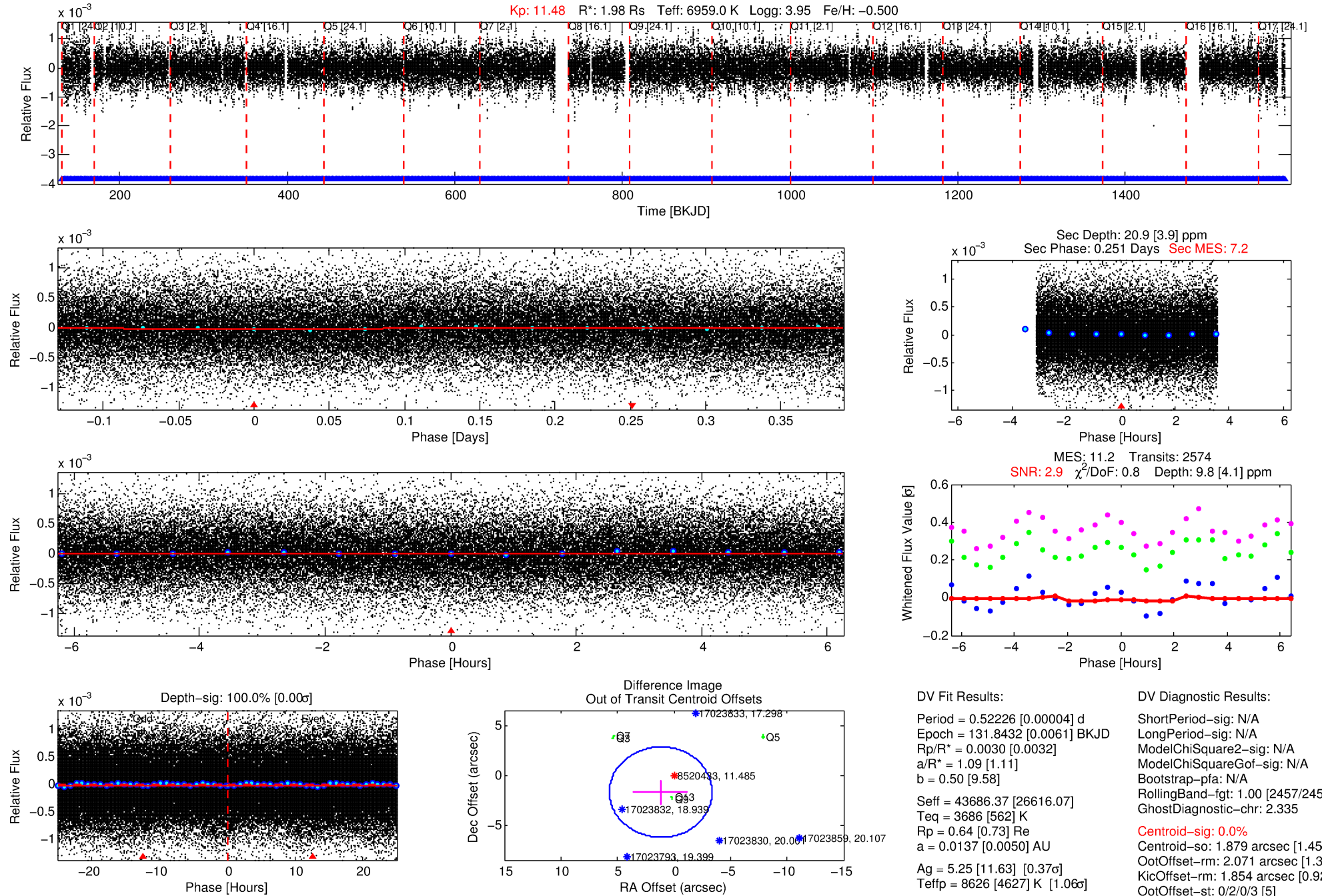
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 008520433-01

No Significant Match Found

# DV One-Page Summary

KIC: 8520433 Candidate: 1 of 1 Period: 0.522 d



## DV Fit Results:

Period = 0.52226 [0.00004] d  
Epoch = 131.8432 [0.0061] BKJD  
Rp/R\* = 0.0030 [0.0032]  
a/R\* = 1.09 [1.11]  
b = 0.50 [9.58]  
Seff = 43686.37 [26616.07]  
Teq = 3686 [562] K  
Rp = 0.64 [0.73] Re  
a = 0.0137 [0.0050] AU  
Ag = 5.25 [11.63] [0.37σ]  
Teffp = 8626 [4627] K [1.06σ]

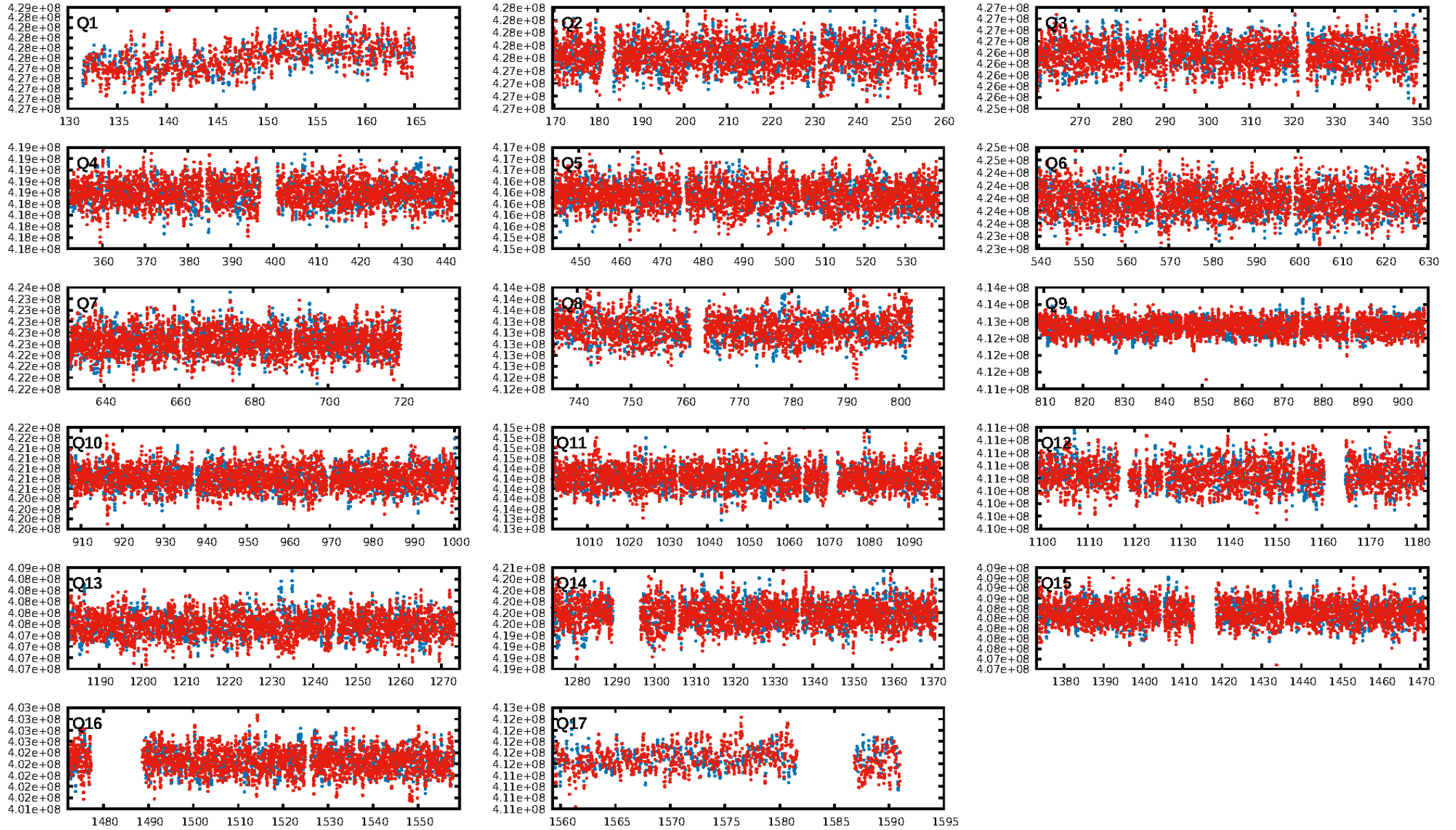
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [2457/2457]  
GhostDiagnostic-chr: 2.335  
Centroid-sig: 0.0%  
Centroid-so: 1.879 arcsec [1.45σ]  
OotOffset-rm: 2.071 arcsec [1.37σ]  
KicOffset-rm: 1.854 arcsec [0.92σ]  
OotOffset-st: 0/2/0/3 [5]  
KicOffset-st: 0/2/0/3 [5]  
DiffImageQuality-fgm: 0.40 [2/5]  
DiffImageOverlap-fno: 1.00 [17/17]

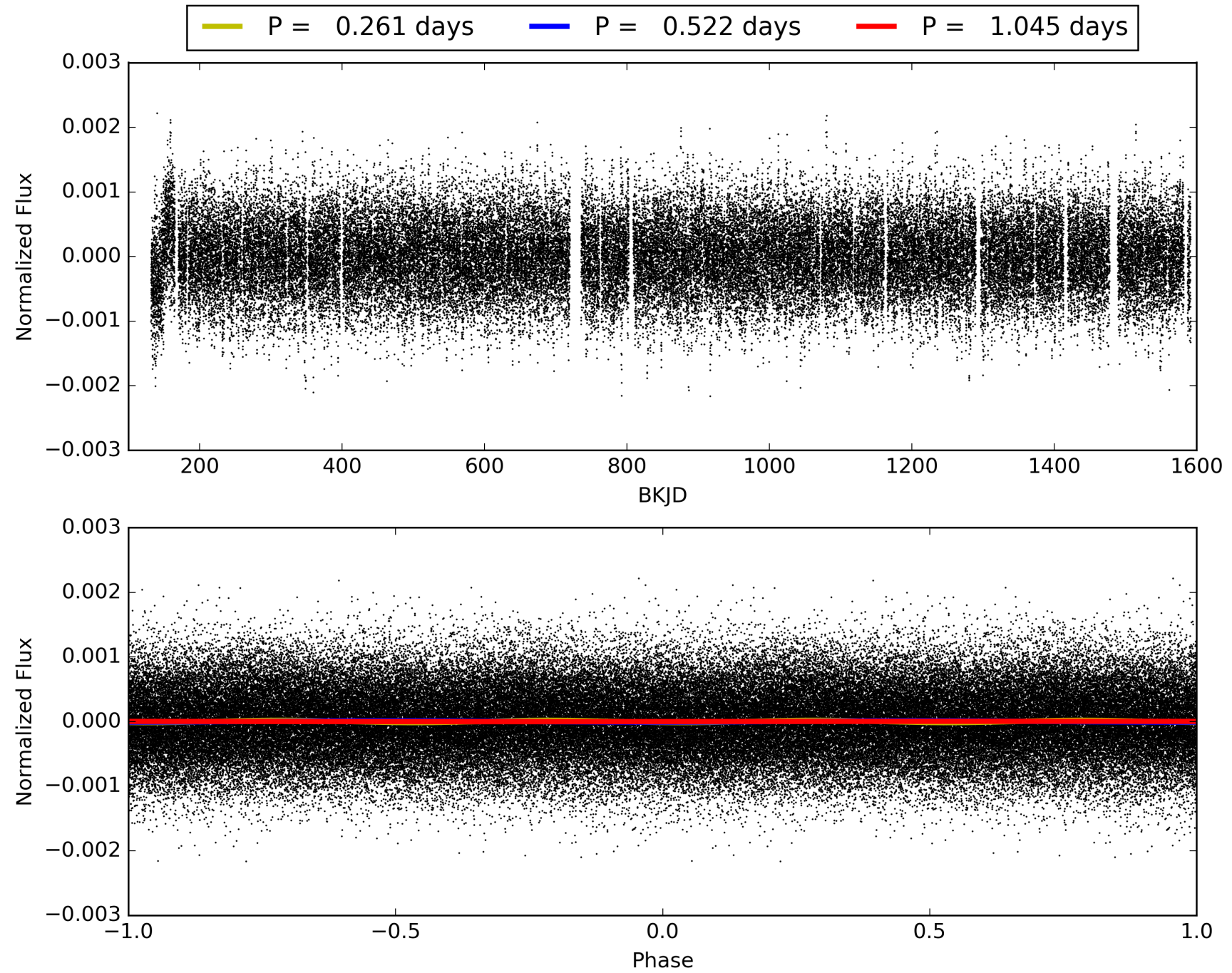
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 18:52:00 Z

This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 008520433-01, PDC Light Curves



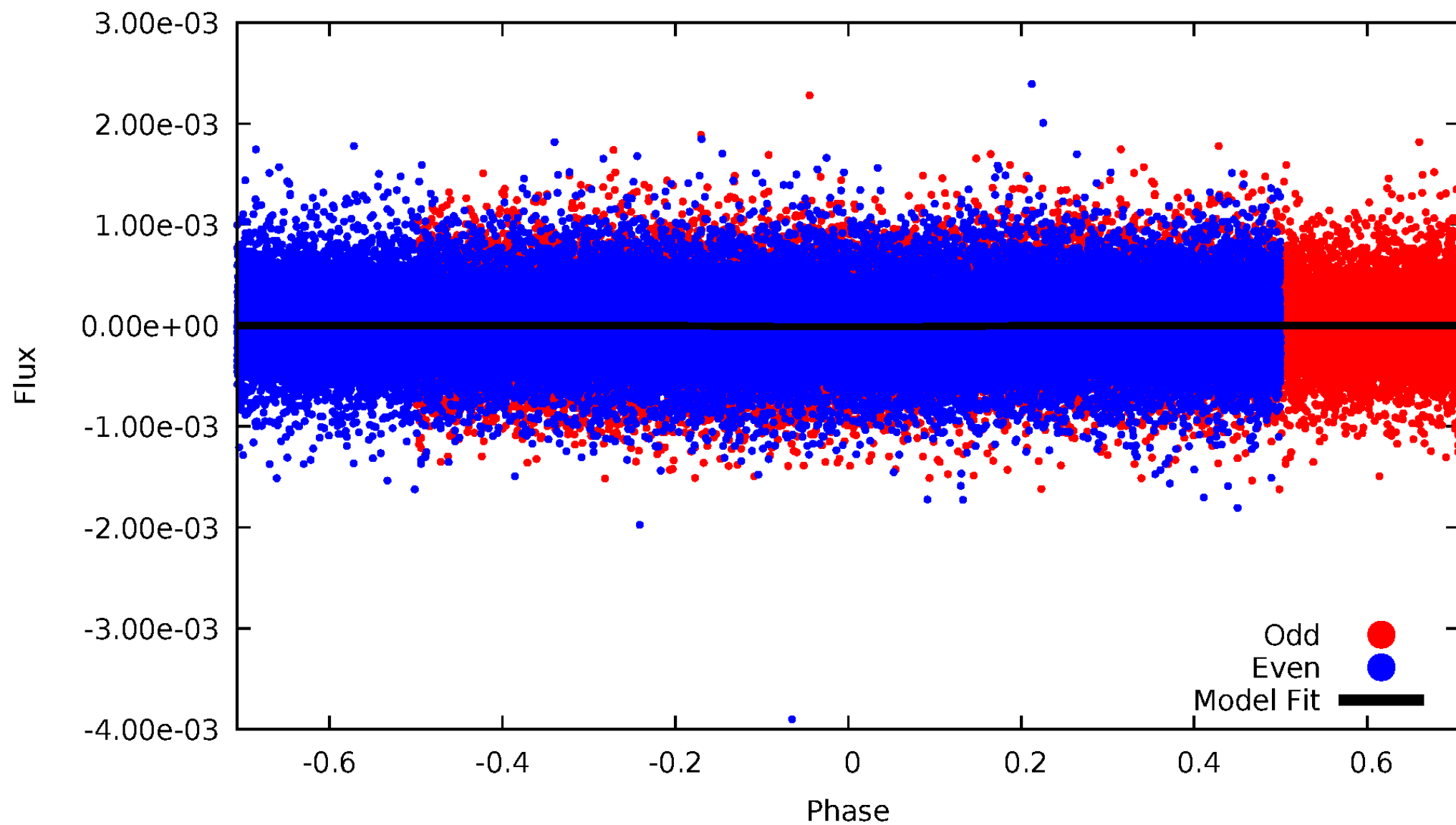
TCE 008520433-01





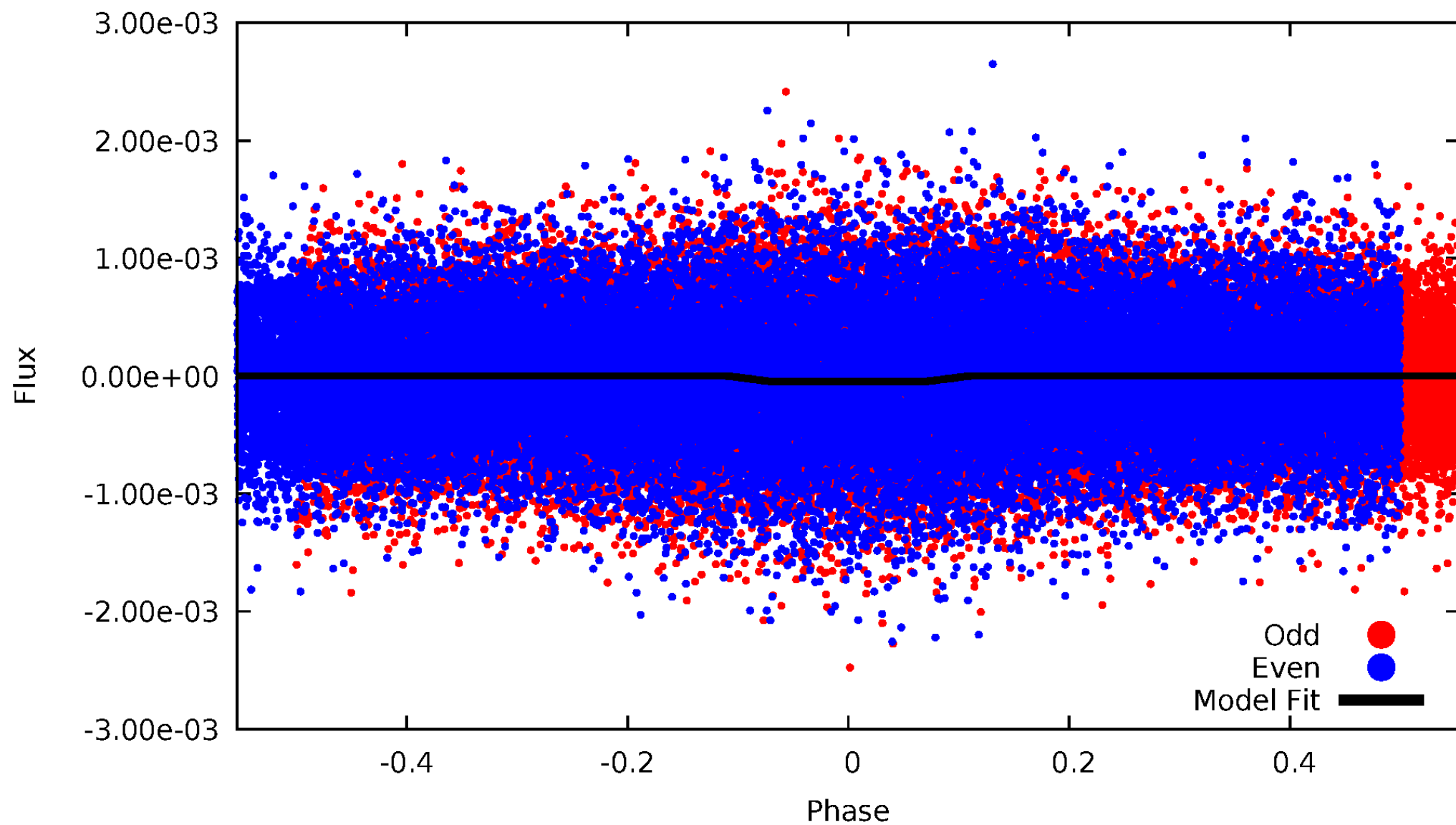
# DV Odd/Even

TCE 008520433-01



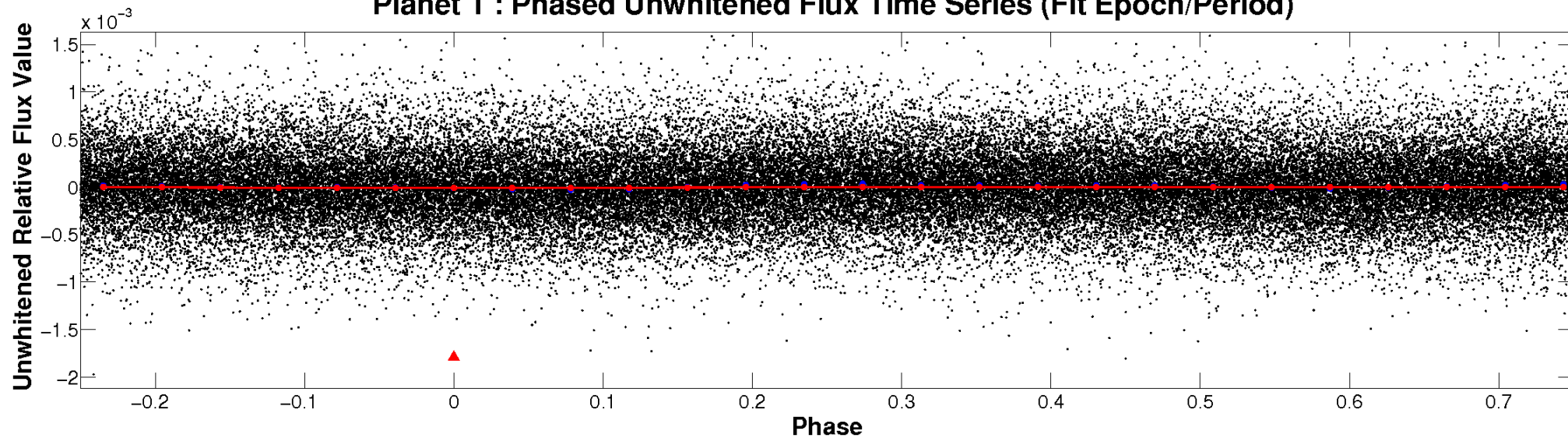
# ALT Odd/Even

TCE 008520433-01

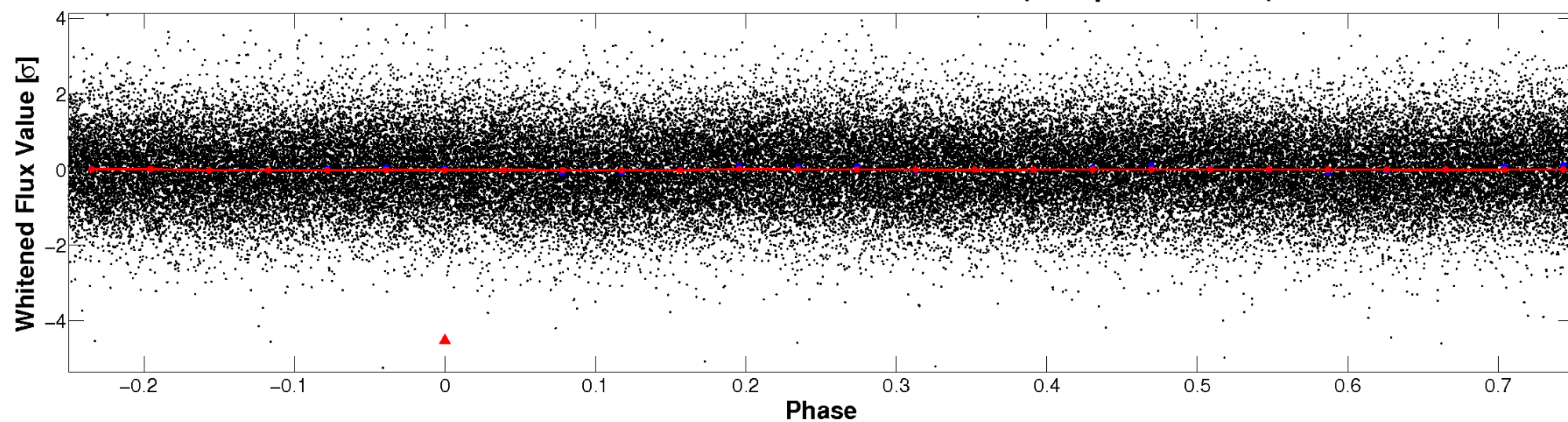


# Non-Whitened Vs. Whitened Light Curve

**Planet 1 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)**

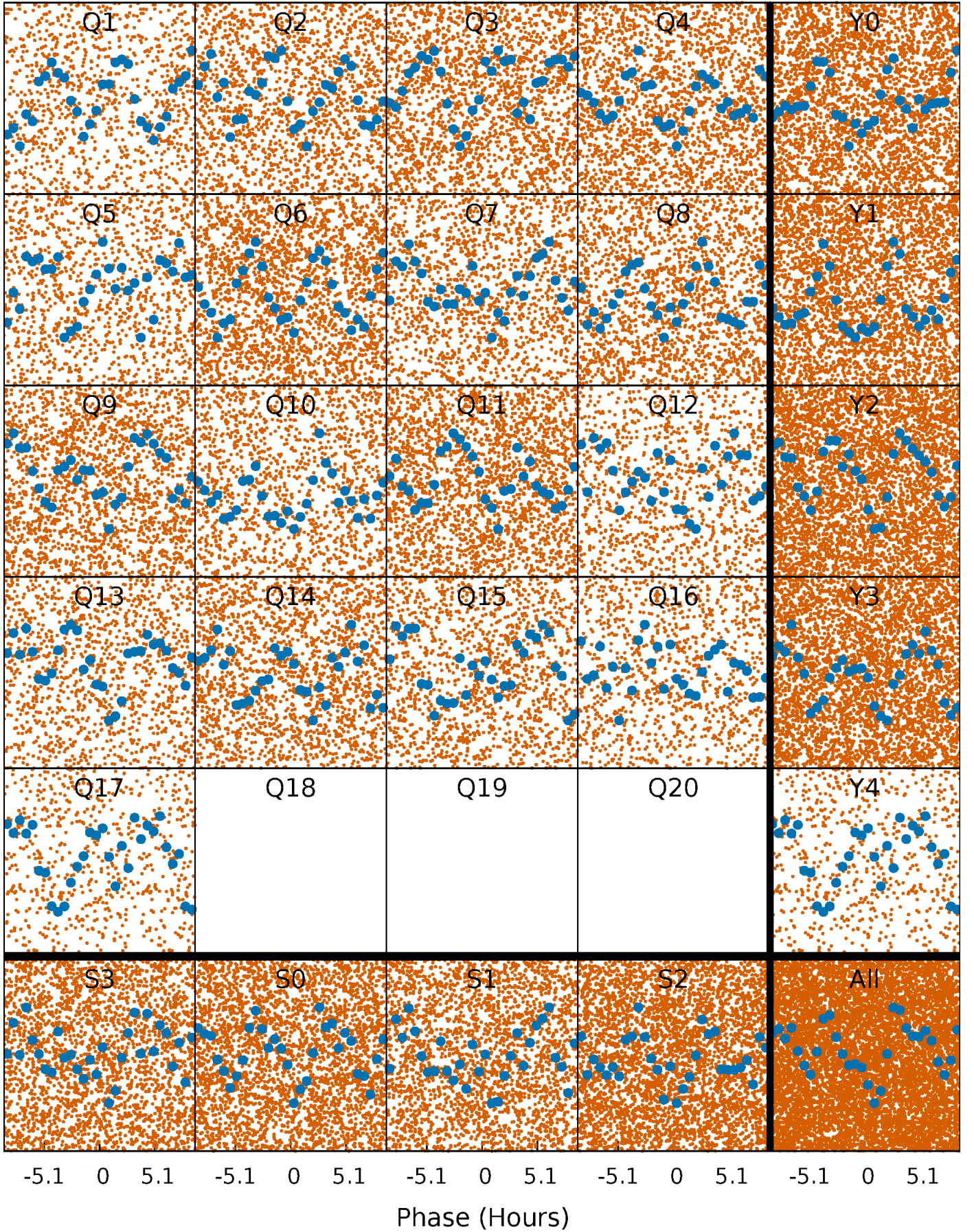


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

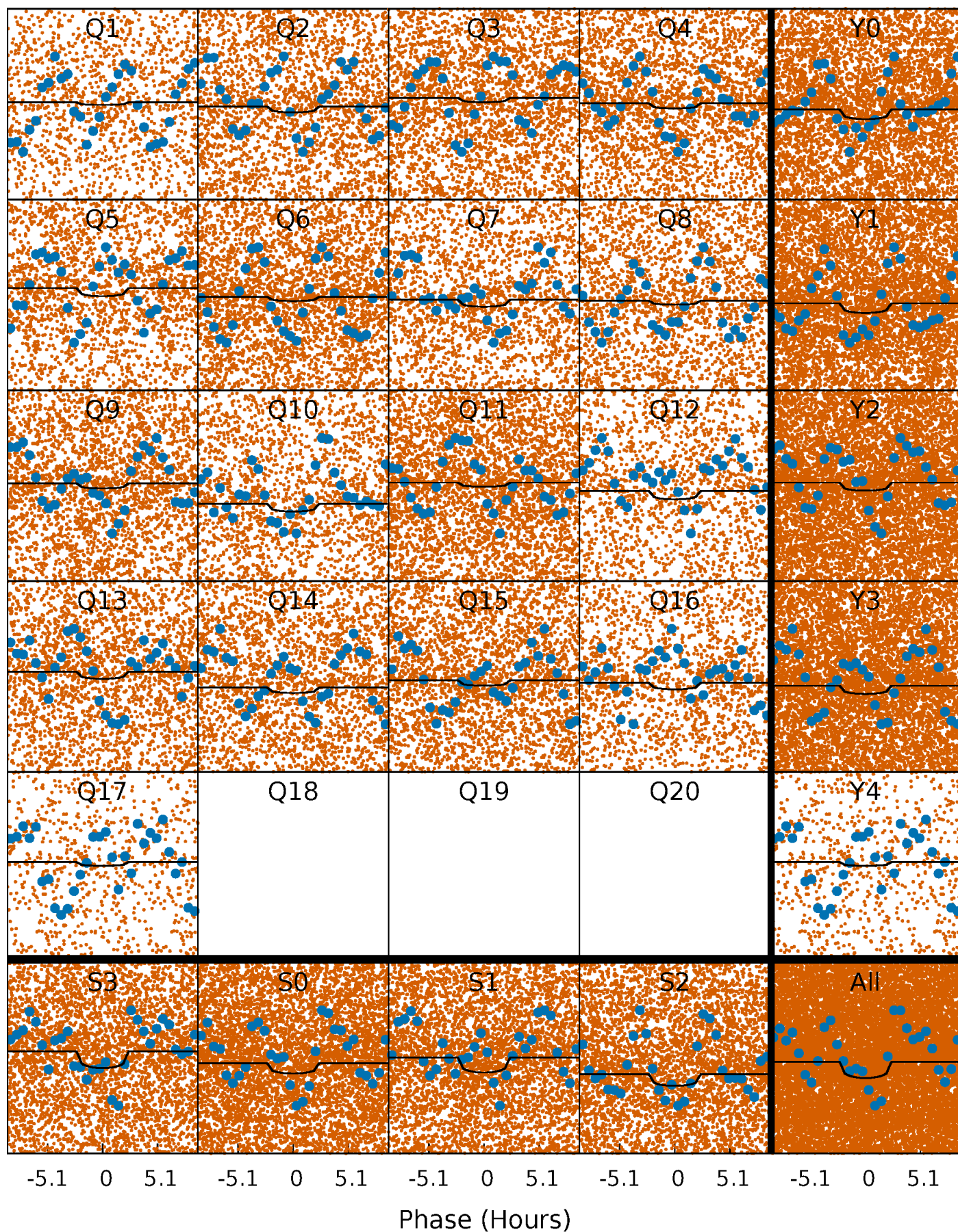
TCE 008520433-01 P= 0.522257 Days  $T_0=131.843223$  (BKJD)





# DV Quarter-Phased Transit Curves

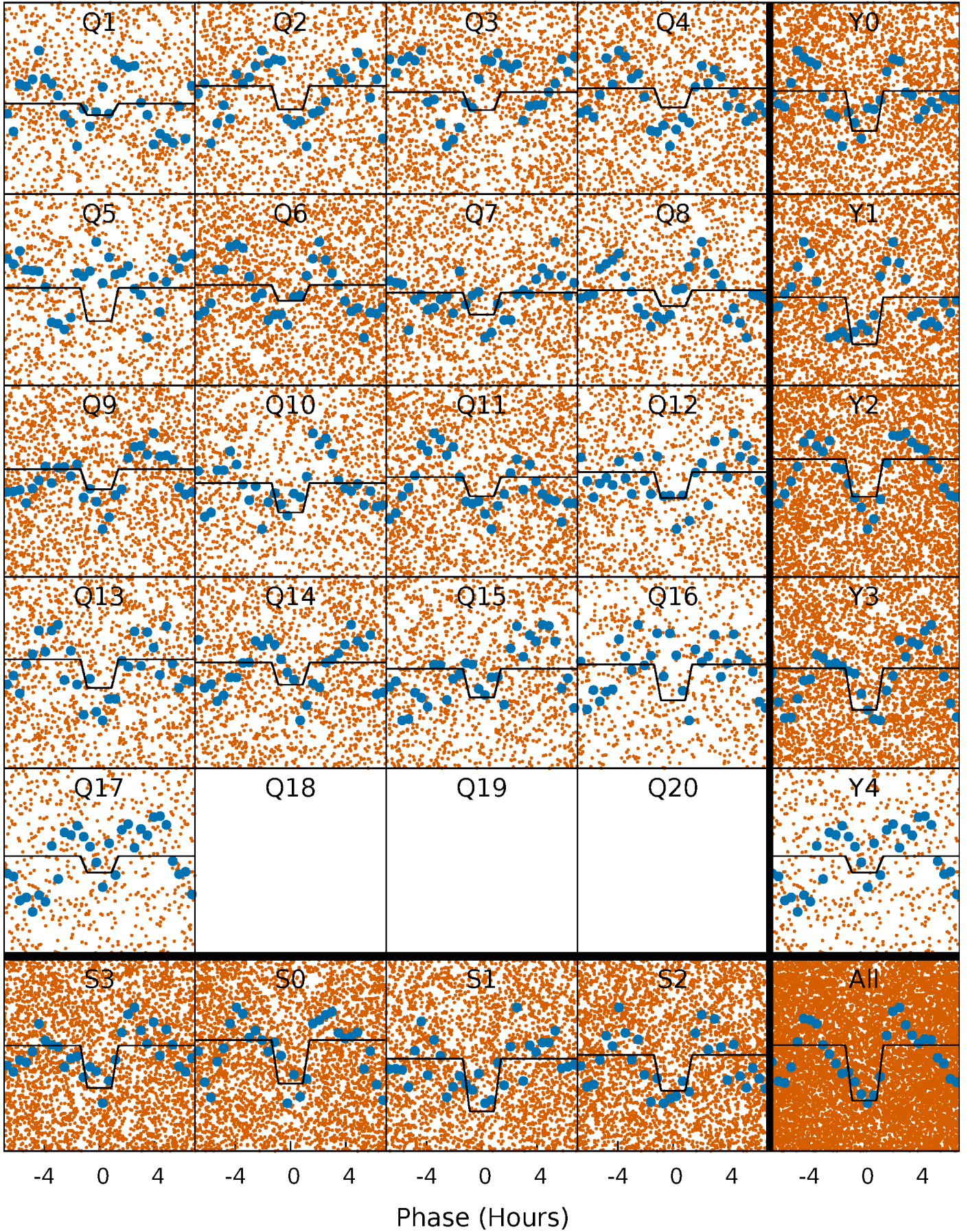
TCE 008520433-01 P= 0.522257 Days  $T_0=131.843223$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

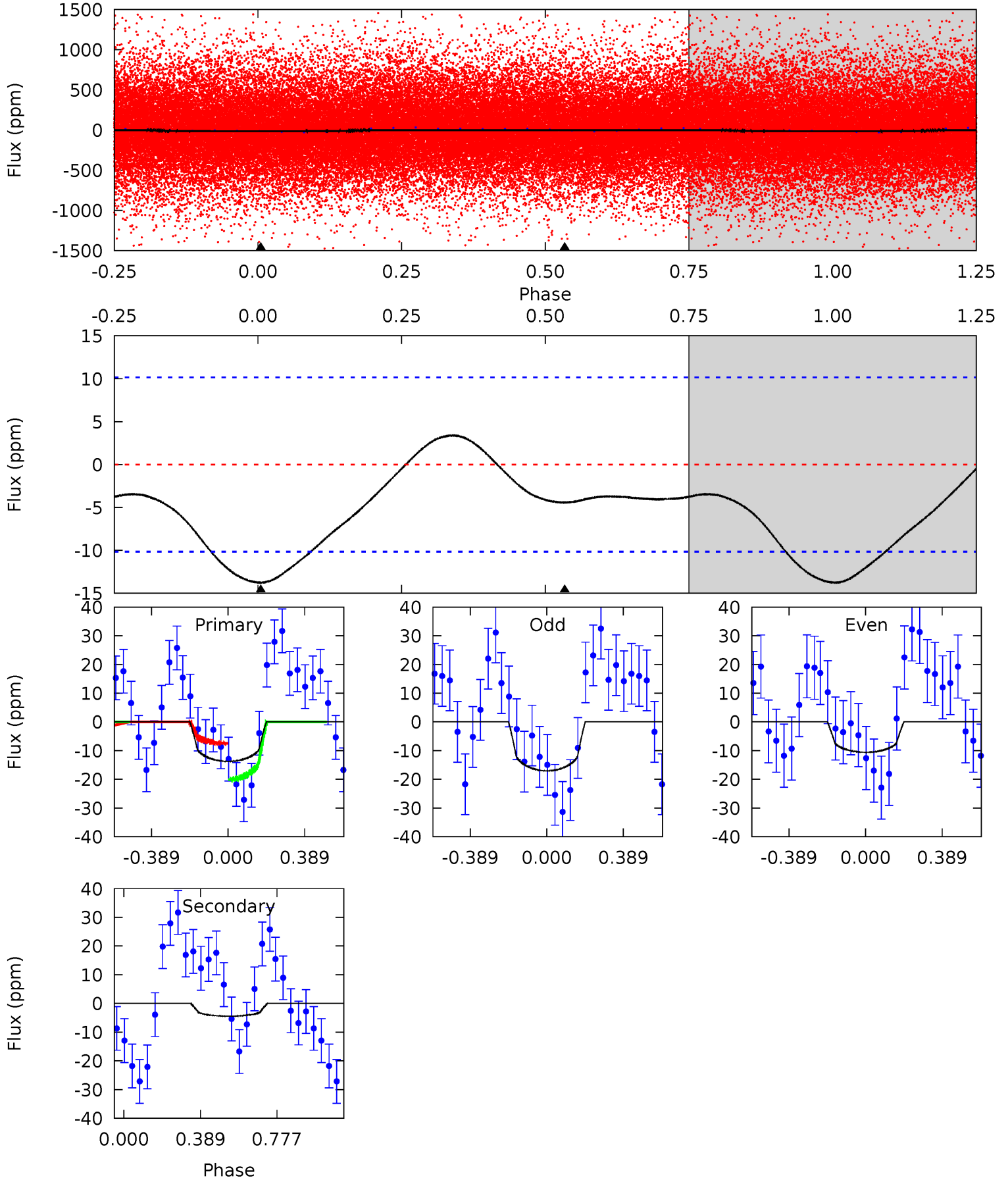
TCE 008520433-01 P= 0.522274 Days  $T_0=131.849181$  (BKJD)



# DV Model-Shift Uniqueness Test

008520433-01, P = 0.522257 Days, E = 131.320966 Days

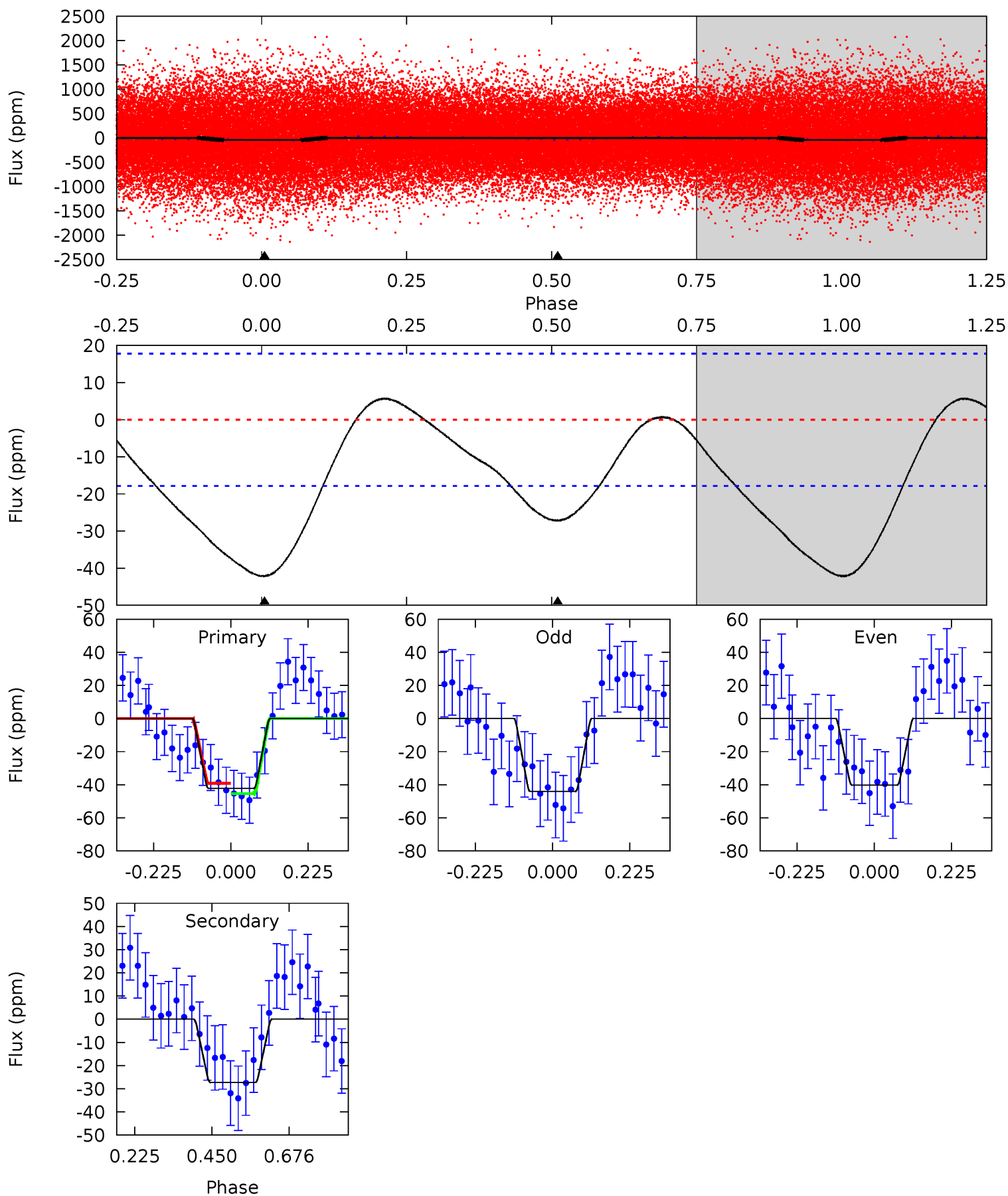
| Pri  | Sec  | Ter | Pos | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM  | Shape | TAT  |
|------|------|-----|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 5.79 | 1.87 | 0   | 0   | 4.27            | 0.86            | 0.92             | 5.79    | 5.79    | 1.87    | 1.87    | 1.36    | 0.87 | 0.20  | 2.64 |



# Alt Model-Shift Uniqueness Test

008520433-01, P = 0.522274 Days, E = 131.326907 Days

| Pri  | Sec  | Ter | Pos | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM  | Shape | TAT  |
|------|------|-----|-----|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 10.4 | 6.71 | 0   | 0   | 4.39            | 1.21            | 1.29             | 10.4    | 10.4    | 6.71    | 6.71    | 0.48    | 1.23 | 0.12  | 0.72 |





### Stellar Parameters For KIC 008520433

|        | $T_{\text{eff}}(K)$  | $\log(g)$                 | [Fe/H]                     | $R$ ( $R_{\odot}$ )       | $M$ ( $M_{\odot}$ )       | $p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ ) |
|--------|----------------------|---------------------------|----------------------------|---------------------------|---------------------------|---|
|        | $6959^{+214}_{-309}$ | $3.947^{+0.343}_{-0.123}$ | $-0.500^{+0.250}_{-0.300}$ | $1.980^{+0.495}_{-0.742}$ | $1.264^{+0.182}_{-0.223}$ | $0.229^{+0.600}_{-0.098}$                     |
|        | +3%/-4%              | +9%/-3%                   | +50%/-60%                  | +25%/-37%                 | +14%/-18%                 | +262%/-43%                                    |
| Source | PHO54                | PHO54                     | PHO54                      | DSEP                      |                           |   |

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology  
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

### Secondary Eclipse Parameters for KIC 008520433-01 / KOI

| Detrend | Depth (ppm) | $R_p$ ( $R_{\oplus}$ ) | $T_{max}$ (K)        | $T_{obs}$ (K)          | $A_{obs}$                 |
|---------|-------------|------------------------|----------------------|------------------------|---------------------------|
| DV      | $-4 \pm 2$  | $0.70^{+0.63}_{-0.45}$ | $5024^{+376}_{-534}$ | $4778^{+4397}_{-8380}$ | $0.876^{+5.962}_{-0.680}$ |
| Alt.    | $-27 \pm 4$ | $1.36^{+0.74}_{-0.61}$ | $5044^{+368}_{-485}$ | $5695^{+2698}_{-1255}$ | $1.524^{+3.651}_{-0.890}$ |

$T_{max}$  = Theoretical Maximum Planetary Temperature

$T_{obs}$  = Observed Planetary Temperature (Assuming  $A=0.3$ )

$A_{obs}$  = Observed Albedo (Assuming  $T=0$ )

If a secondary eclipse is present, the system is likely an EB if  $T_{obs} \gg T_{max}$  AND  $A_{obs} \gg 1.0$

## DV Centroid Data

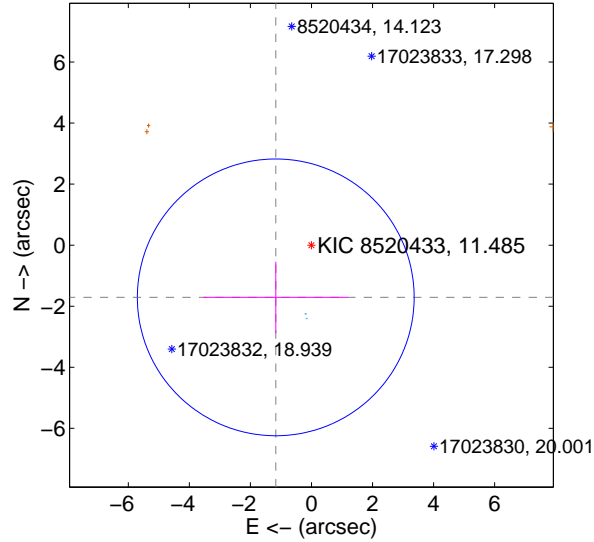
Supplemental centroid analysis for 008520433-01. **Kepler magnitude: 11.48.** Transit SNR 2.85

**There are 2 quarters with good PRF difference image offsets**

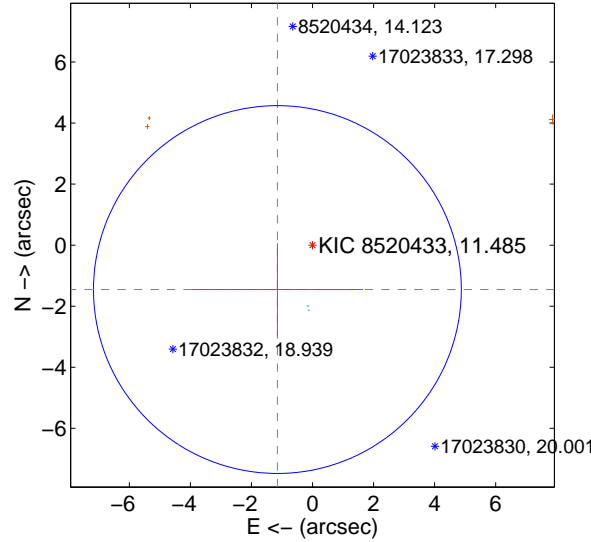
The direct PRF centroid is offset from the target star catalog position by about 0.26 arcsec

|   | Distance in arcsec | Distance / $\sigma$ | $\Delta$ RA       | $\Delta$ Dec       |
|---|--------------------|---------------------|-------------------|--------------------|
| PRF-fit source offset from OOT          | $2.071 \pm 1.511$  | 1.37                | $1.170 \pm 2.367$ | $-1.709 \pm 1.166$ |
| PRF-fit source offset from KIC position | $1.854 \pm 2.008$  | 0.92                | $1.151 \pm 2.812$ | $-1.454 \pm 1.514$ |
| photometric centroid source offset      | $1.88 \pm 1.30$    | 1.45                | $-0.27 \pm 0.91$  | $-1.86 \pm 1.30$   |

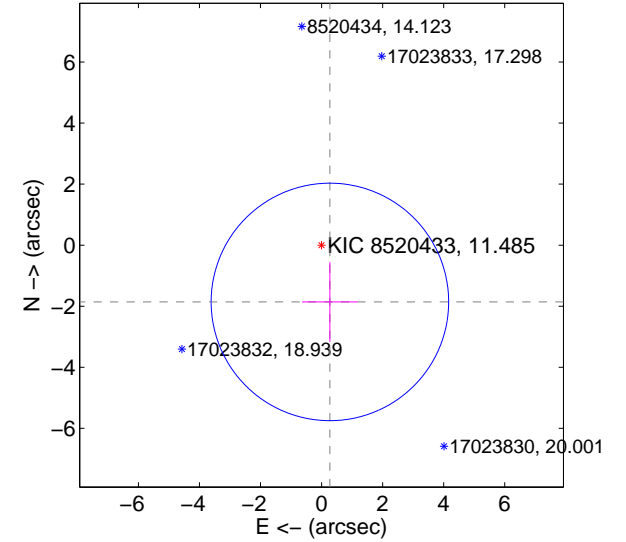
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

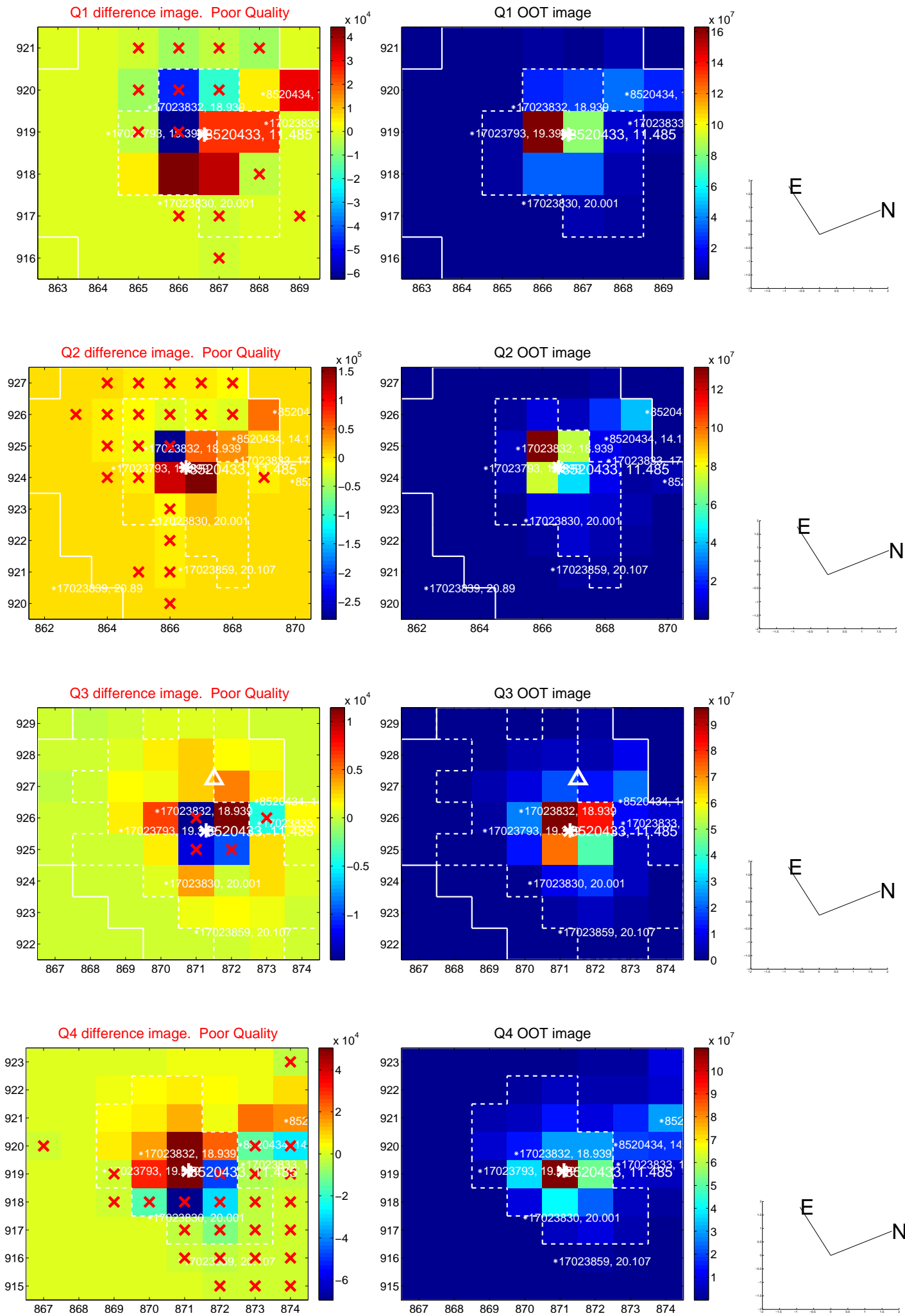


offset from photometric centroids

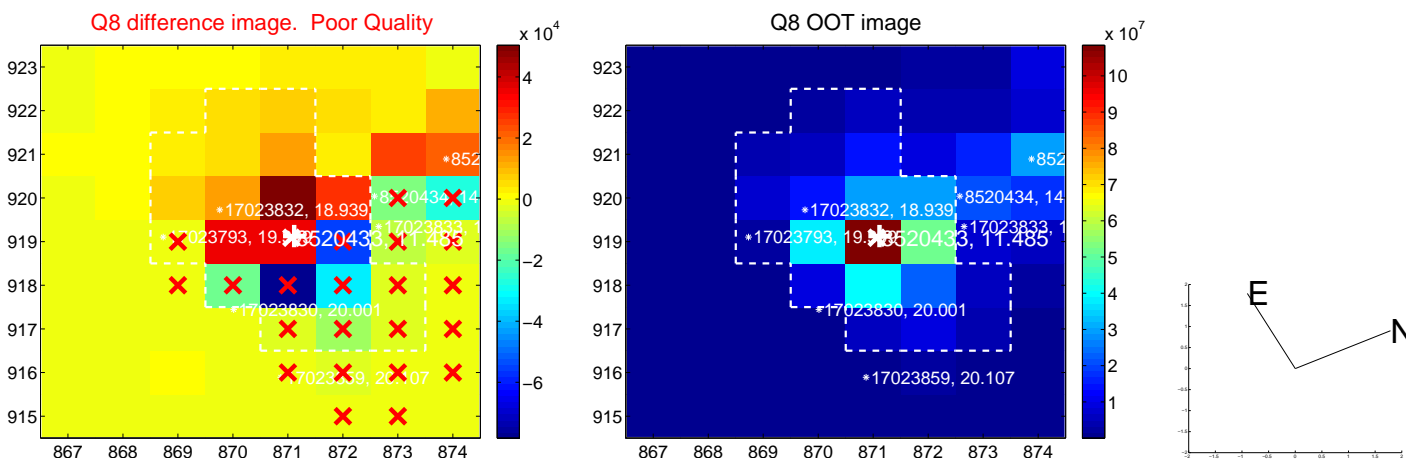
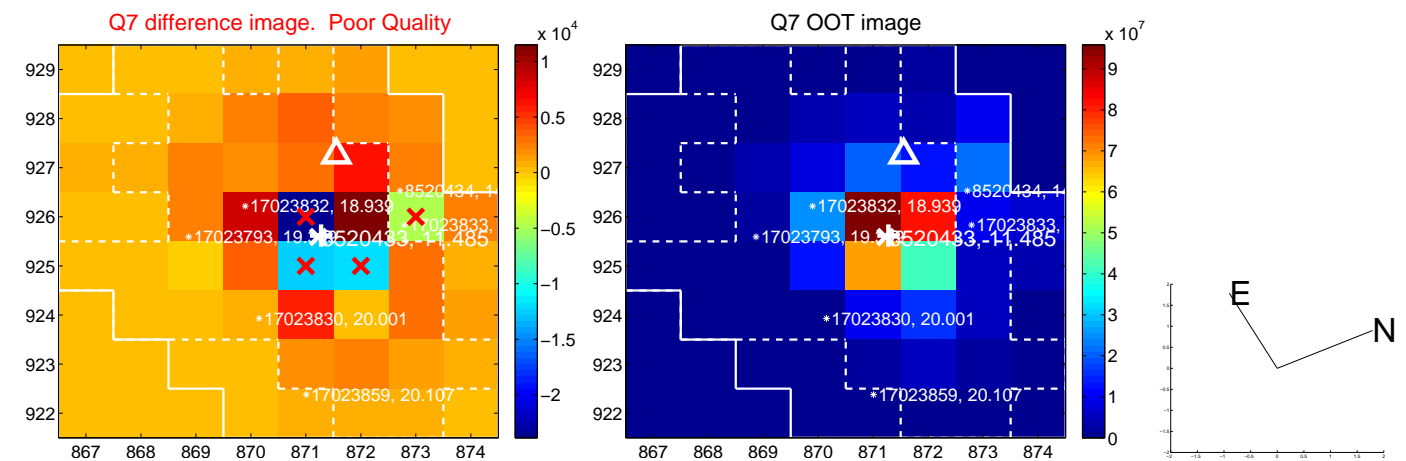
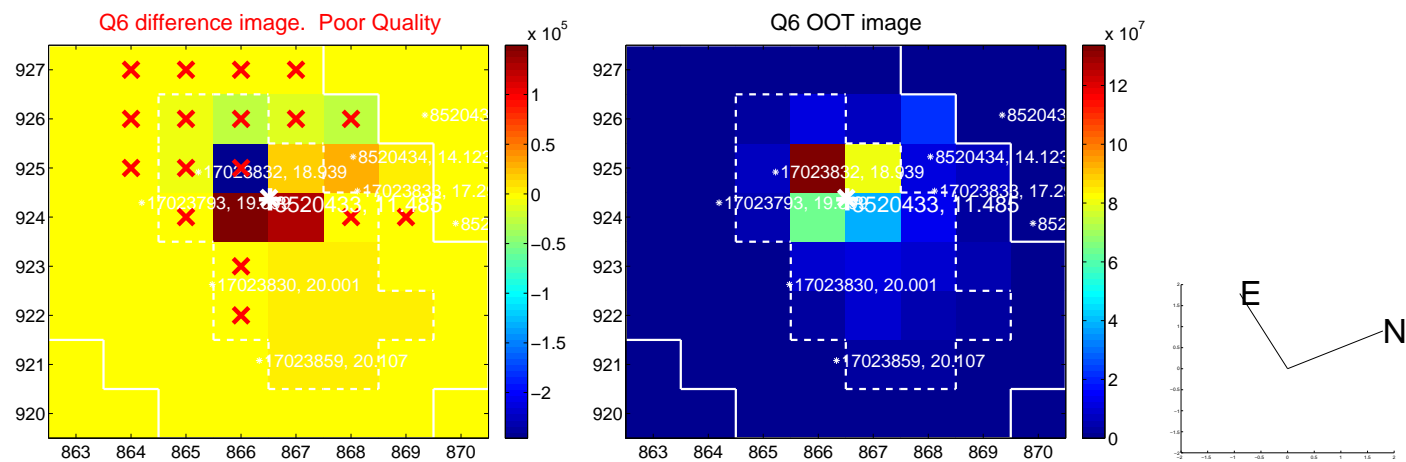
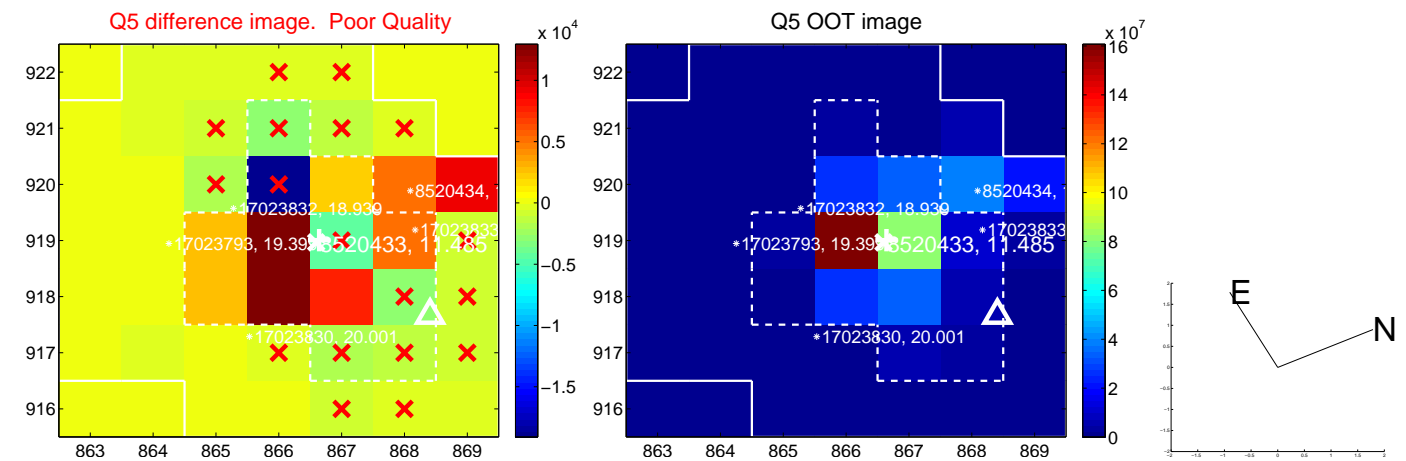


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three- $\sigma$ . Red \*: target star. Blue \*: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.

white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

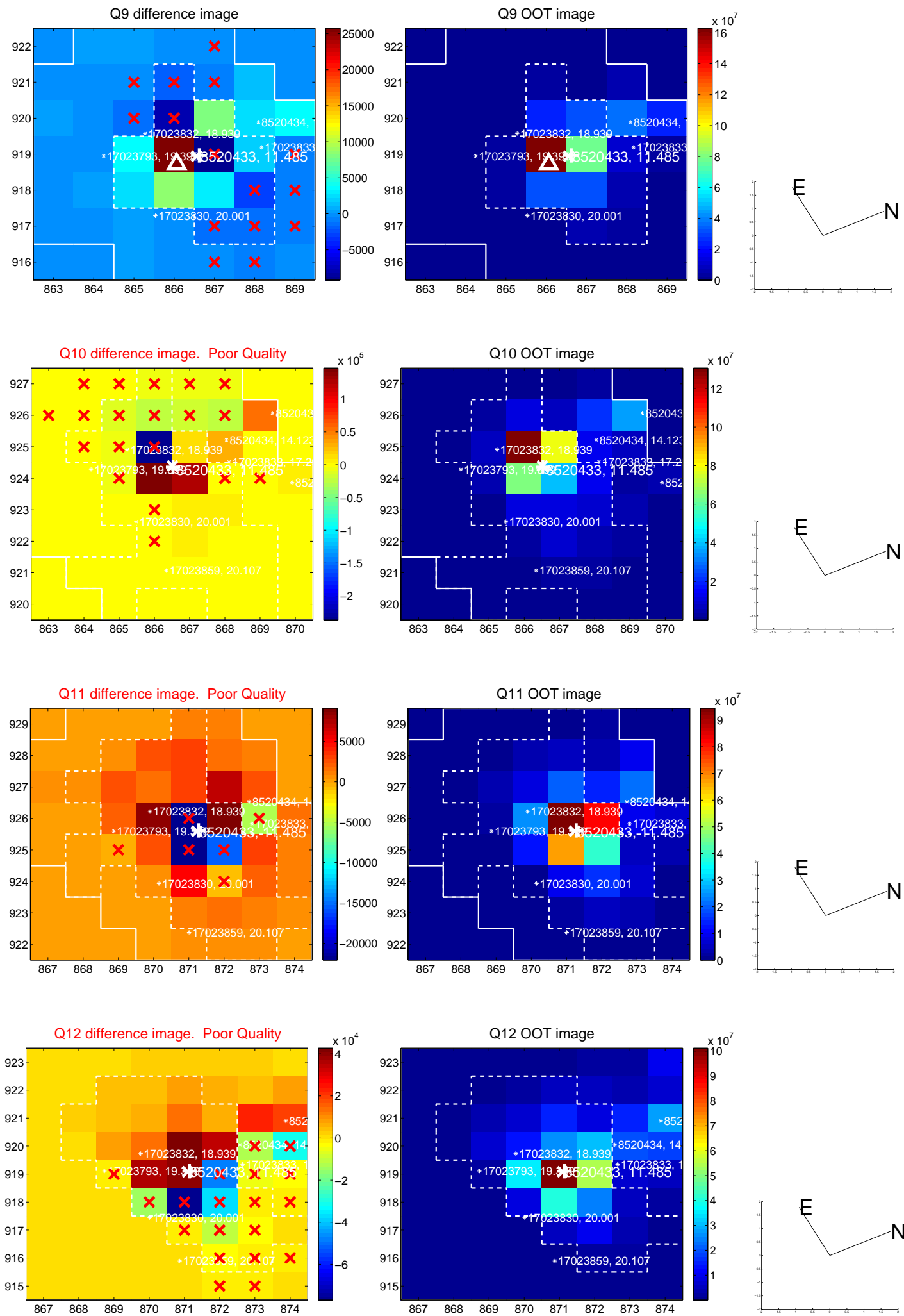


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

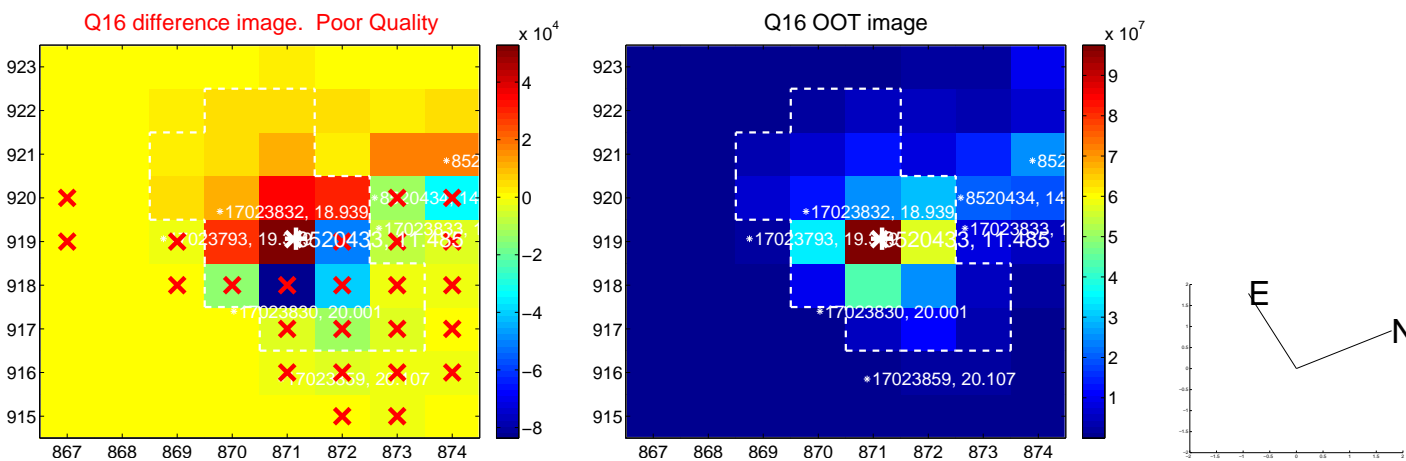
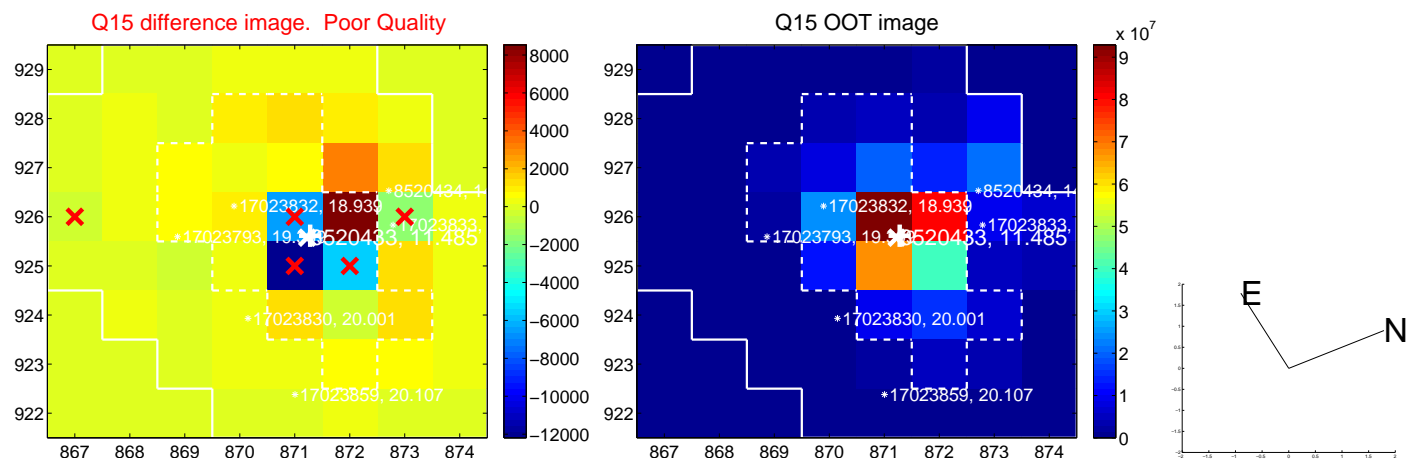
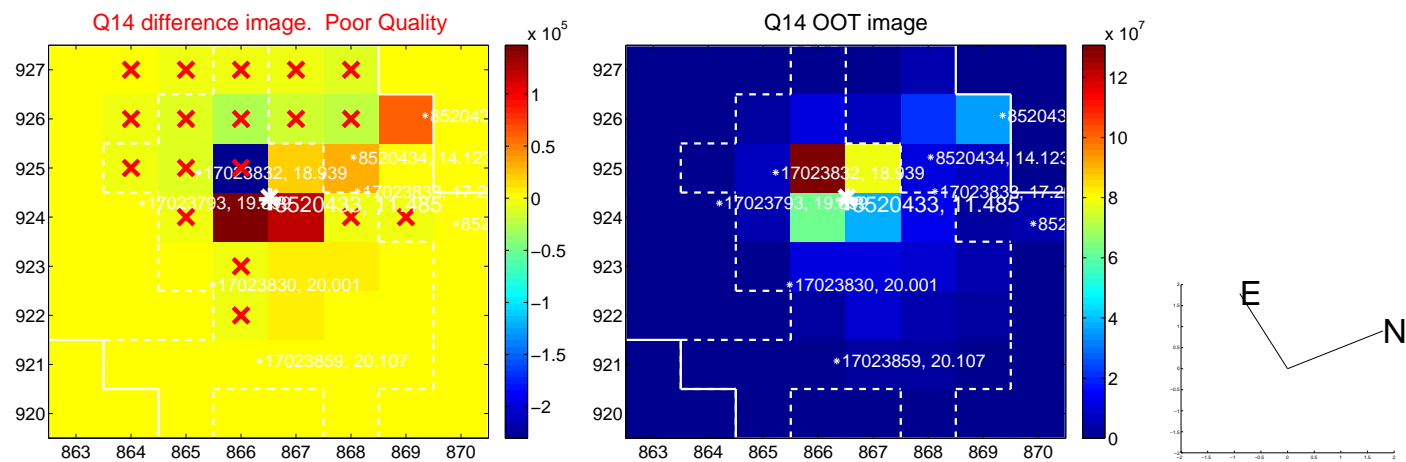
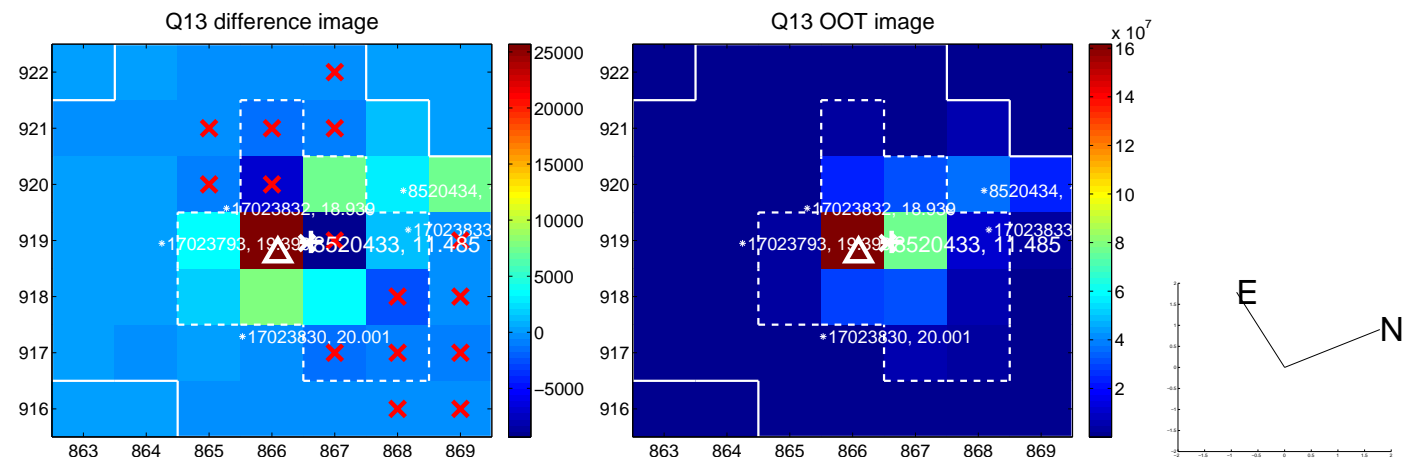




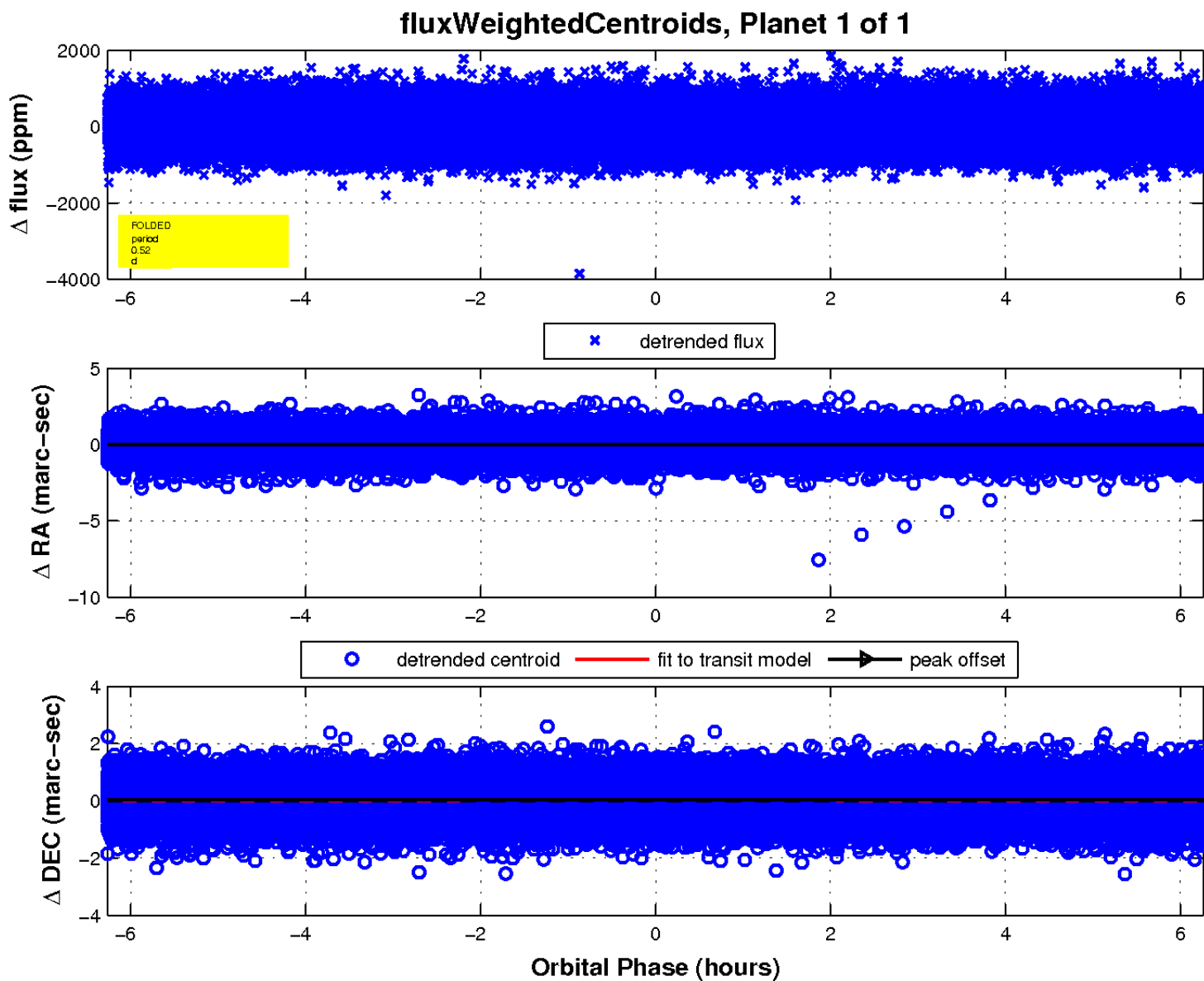
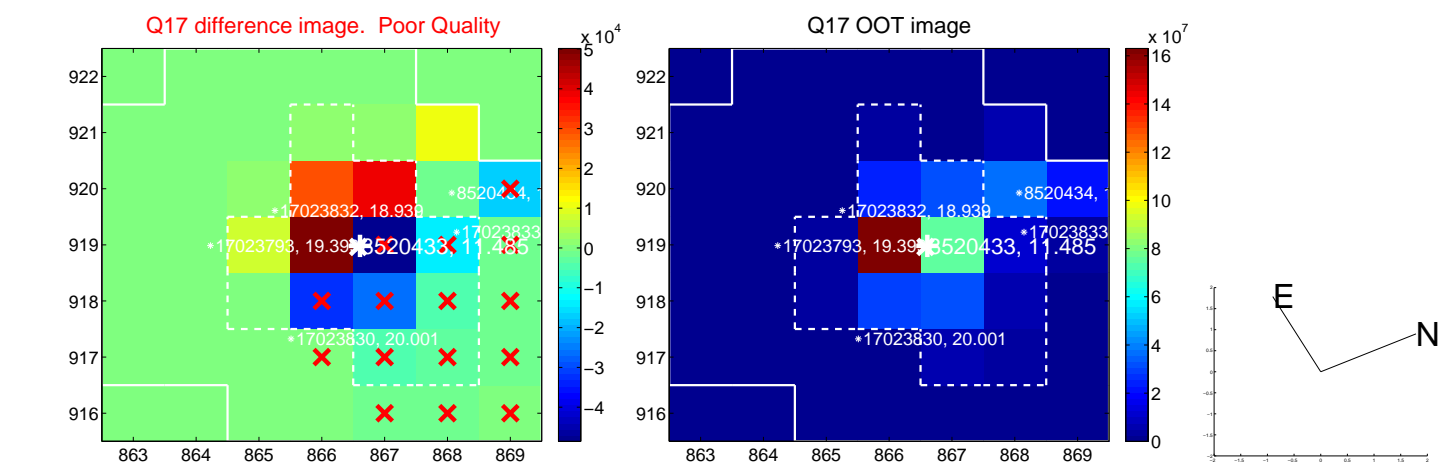
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

