

# KIC 005021899

## 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) | $R_p$ ( $R_{\oplus}$ ) | $S_p$ ( $S_{\oplus}$ ) |
|--------------|----------|---------|---------------|--------------|-------------|------------------|------|------|-----------------------------|-----------------|------------------------|------------------------|
| 005021899-01 | OBS      | 0821.01 | 21.812964     | 152.198114   | 1223.8      | 4.534            | 31.2 | 34.8 | 1.00                        | 5601            | 3.72                   | 39.39                  |

## Robovetter Results

| TCE          | Run Type | Disp | Score | N | S | C | E | Comments   |
|--------------|----------|------|-------|---|---|---|---|------------|
| 005021899-01 | OBS      | PC   | 1.00  | 0 | 0 | 0 | 0 | NO_COMMENT |

**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 005021899-01

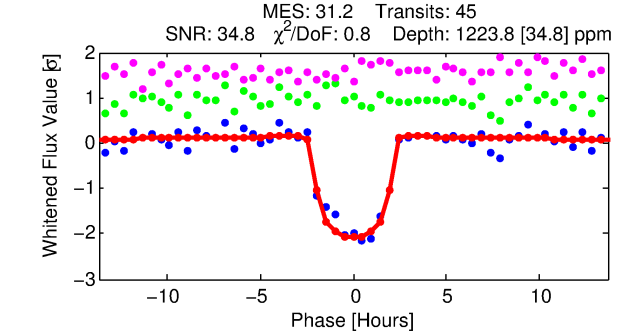
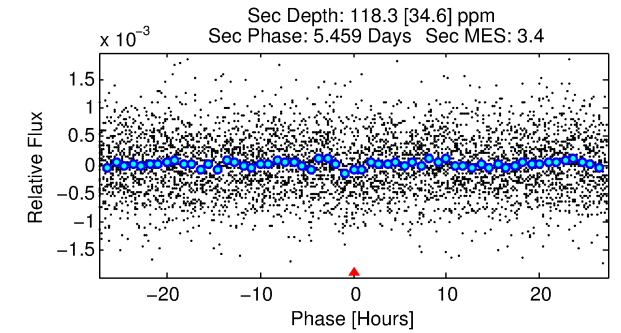
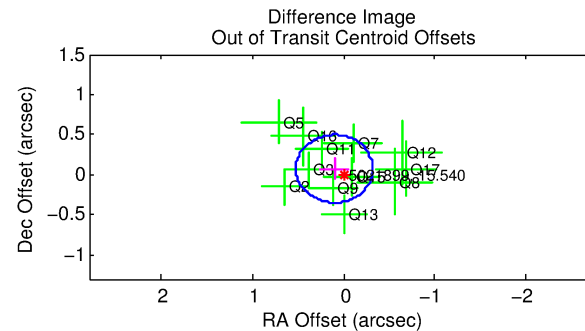
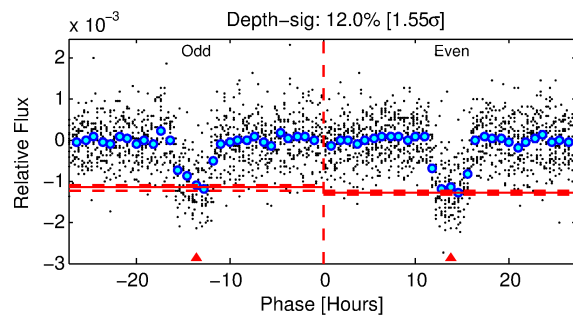
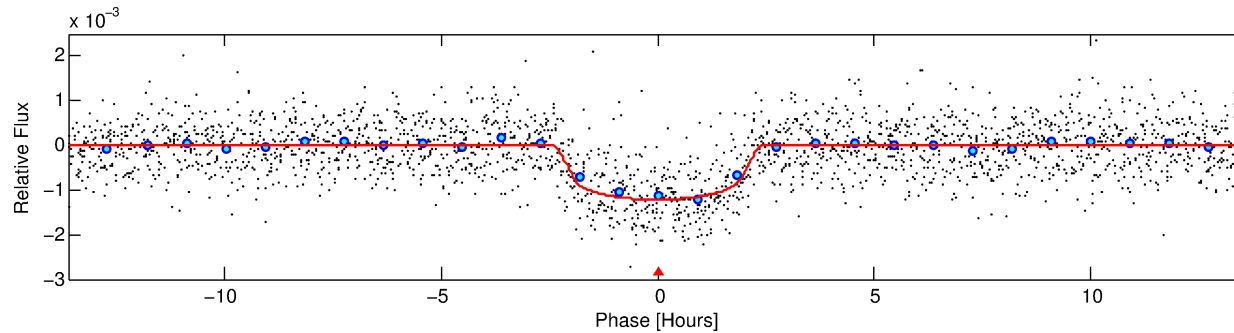
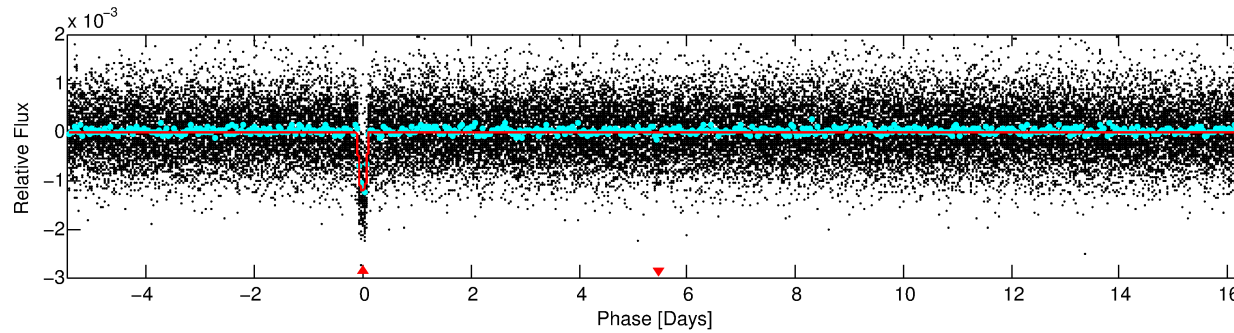
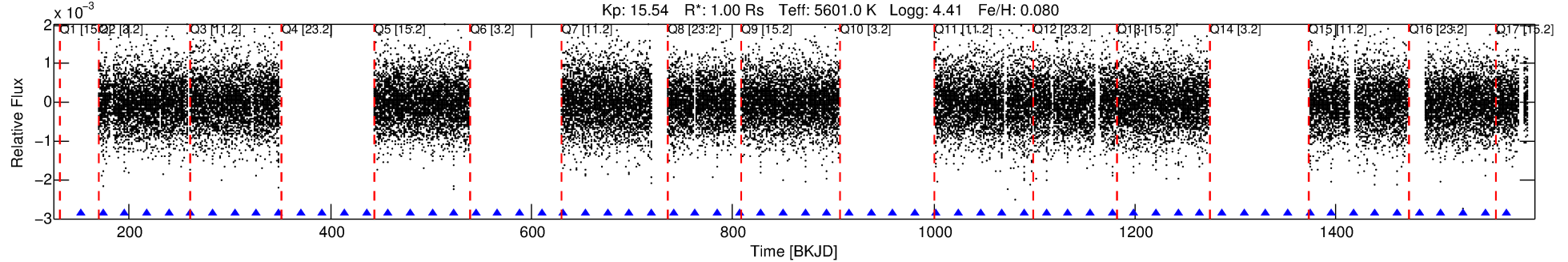
No Significant Match Found

# DV One-Page Summary

KIC: 5021899 Candidate: 1 of 1 Period: 21.813 d

KOI: K00821.01 Corr: 0.985

Kp: 15.54 R\*: 1.00 Rs Teff: 5601.0 K Logg: 4.41 Fe/H: 0.080



## DV Fit Results:

Period = 21.81296 [0.00007] d  
Epoch = 152.1981 [0.0027] BKJD  
Rp/R\* = 0.0341 [0.0073]  
a/R\* = 28.29 [24.59]  
b = 0.69 [0.67]  
Seff = 39.39 [14.18]  
Teq = 639 [57] K  
Rp = 3.72 [1.28] Re  
a = 0.1495 [0.0344] AU  
Ag = 105.12 [65.09] [1.60σ]  
Teffp = 3163 [420] K [5.96σ]

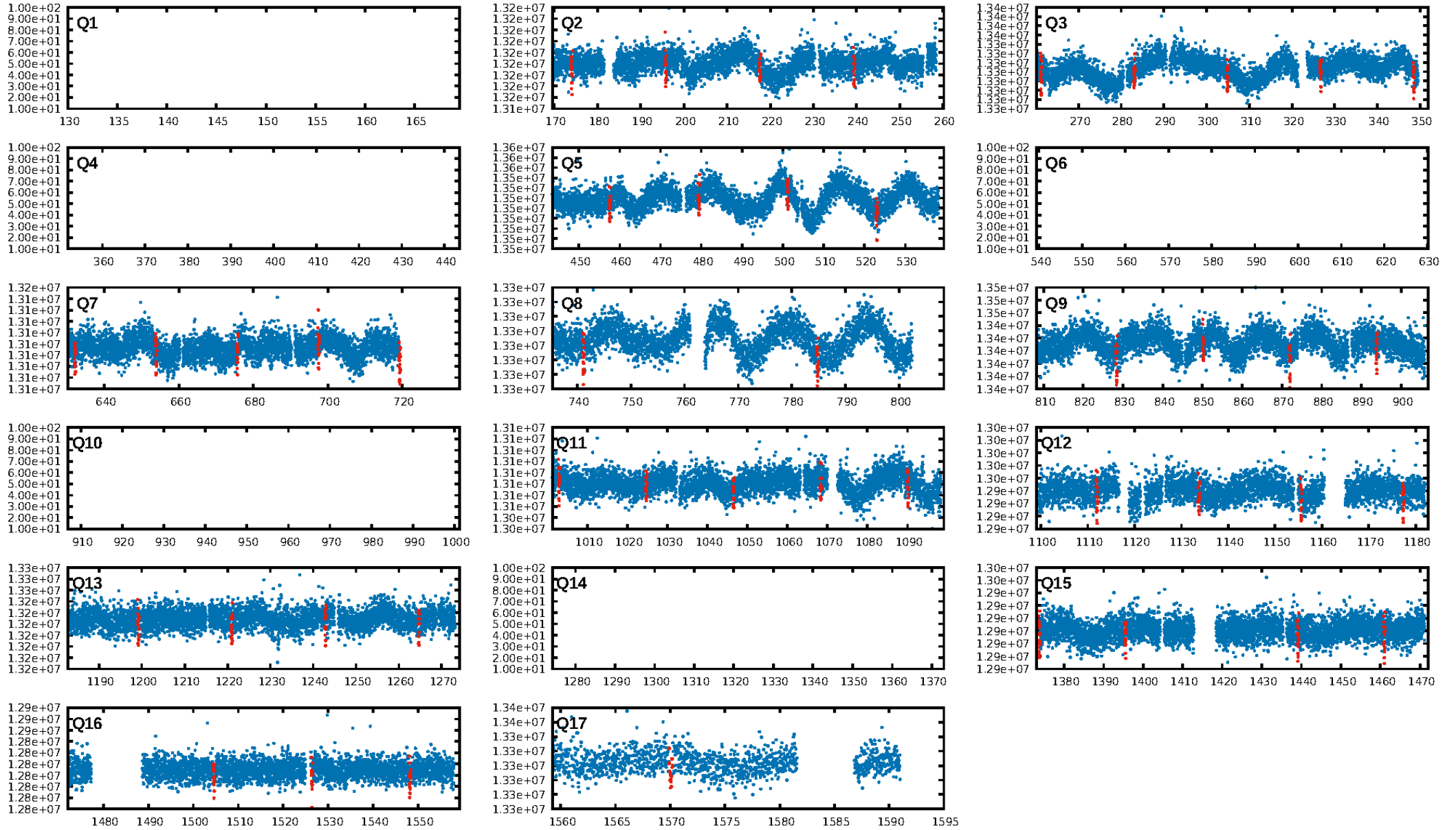
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 94.6%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 9.10e-209  
RollingBand-fgt: 1.00 [44/44]  
GhostDiagnostic-chr: 3.243  
Centroid-sig: 44.8%  
Centroid-so: 0.316 arcsec [0.79σ]  
OotOffset-rm: 0.127 arcsec [0.90σ]  
KicOffset-rm: 0.018 arcsec [0.11σ]  
OotOffset-st: 1/4/3/4 [12]  
KicOffset-st: 1/4/3/4 [12]  
DiffImageQuality-fgm: 1.00 [12/12]  
DiffImageOverlap-fno: 1.00 [12/12]

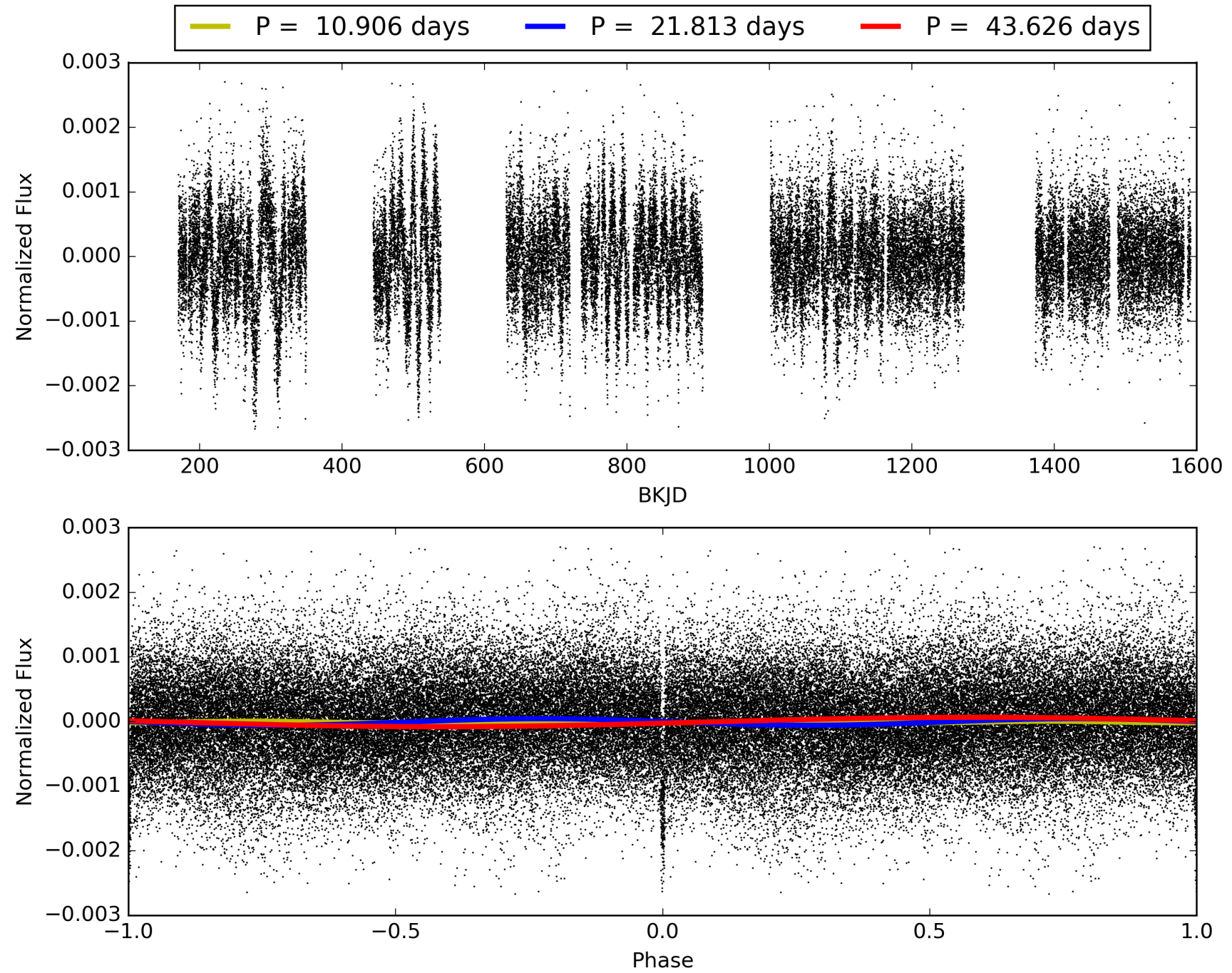
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 19:30:29 Z

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

# TCE 005021899-01, PDC Light Curves

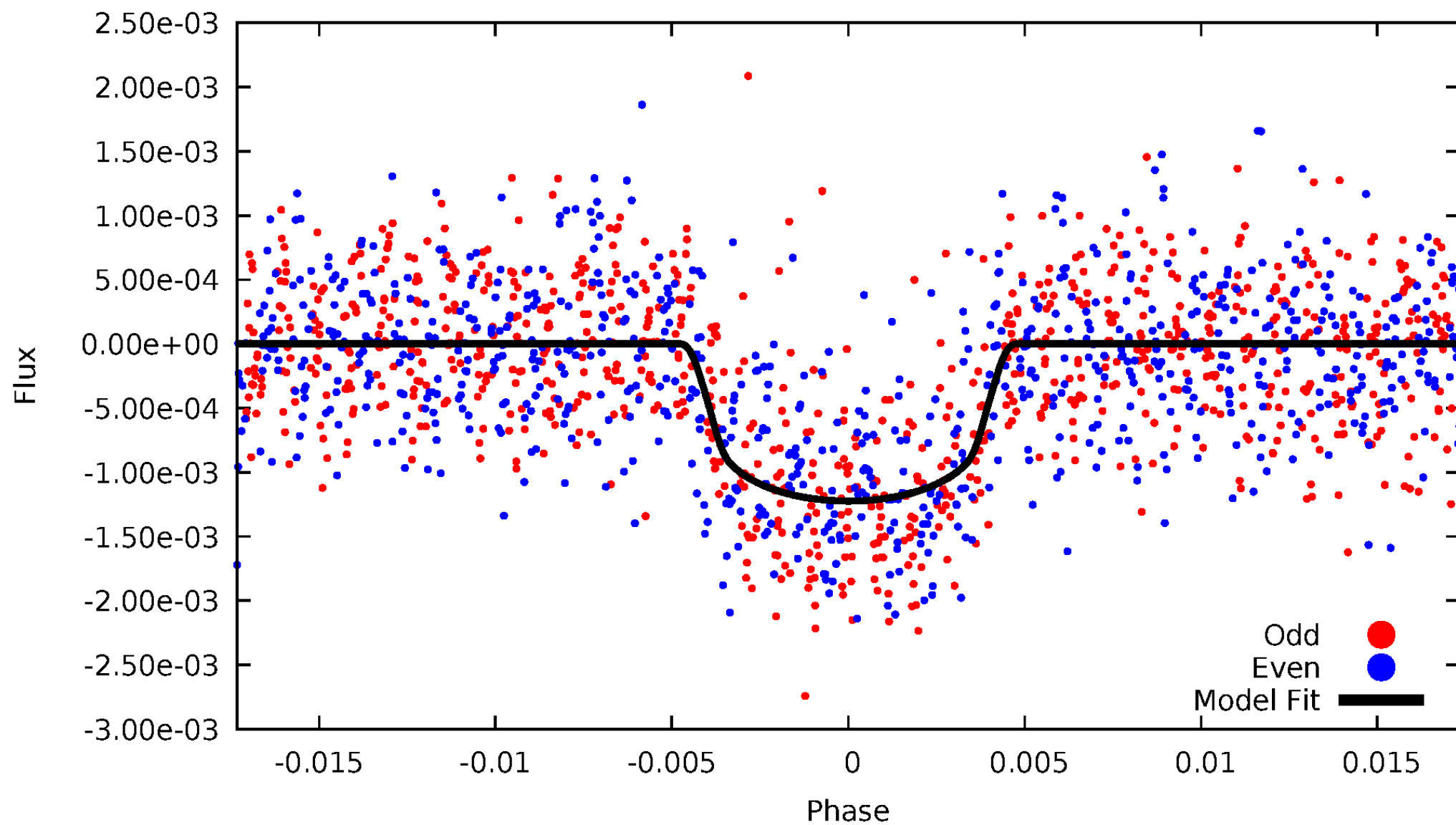


TCE 005021899-01



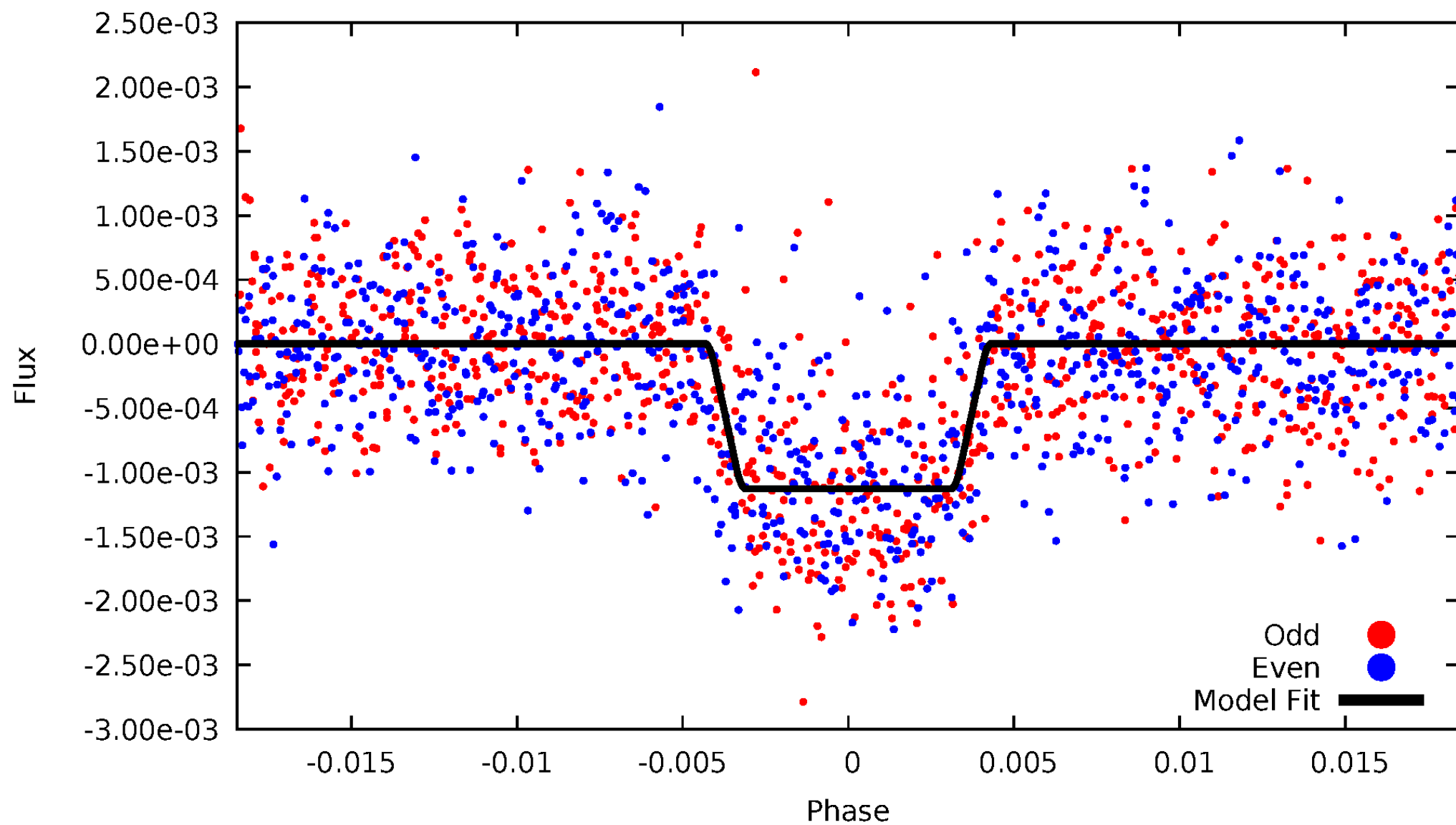
# DV Odd/Even

TCE 005021899-01



# ALT Odd/Even

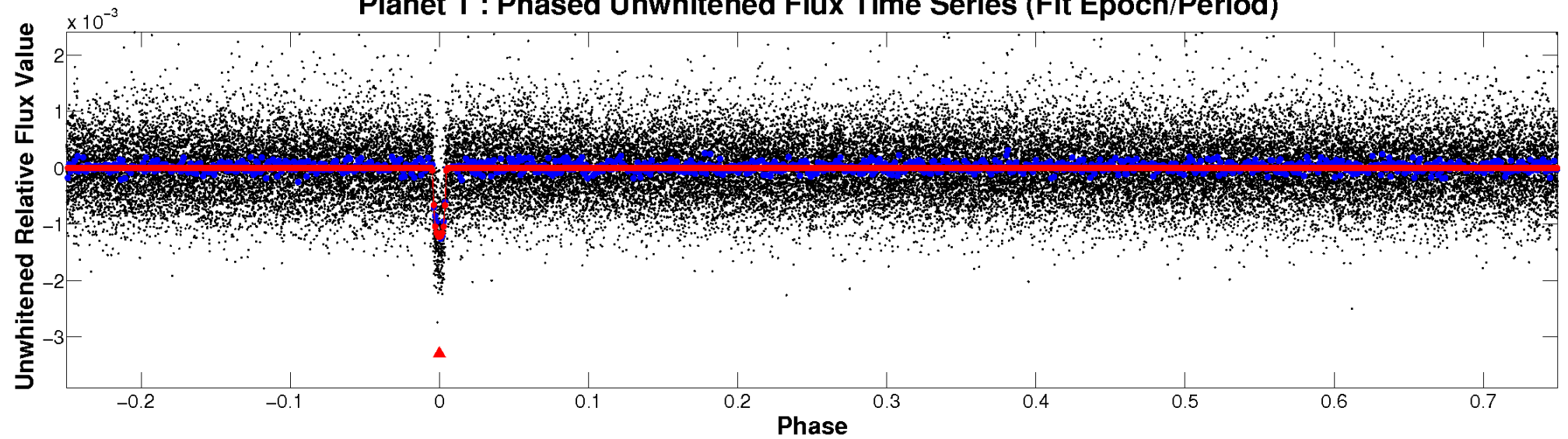
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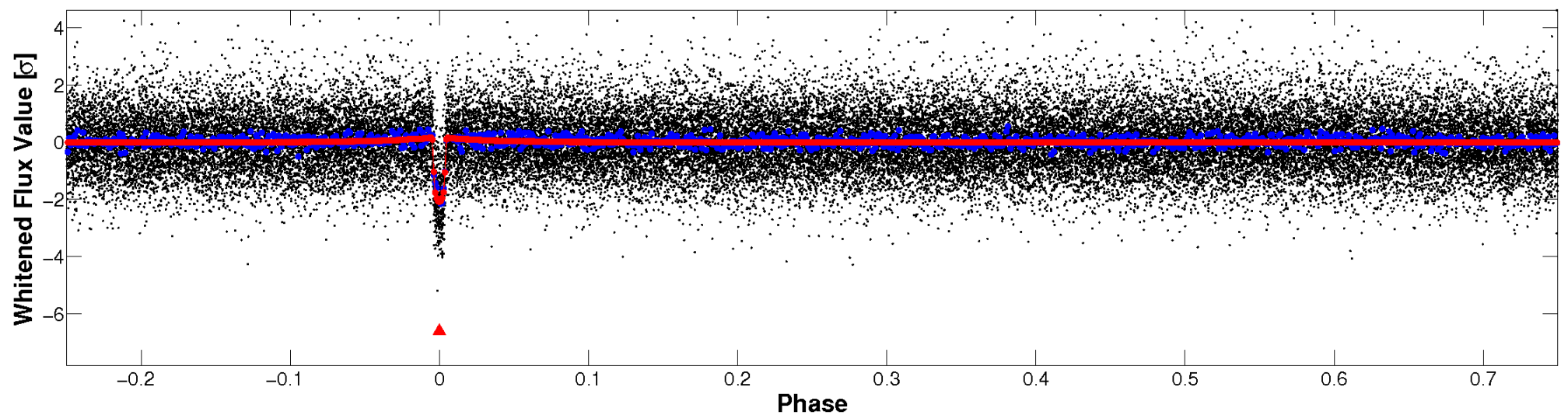


# Non-Whitened Vs. Whitened Light Curve

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

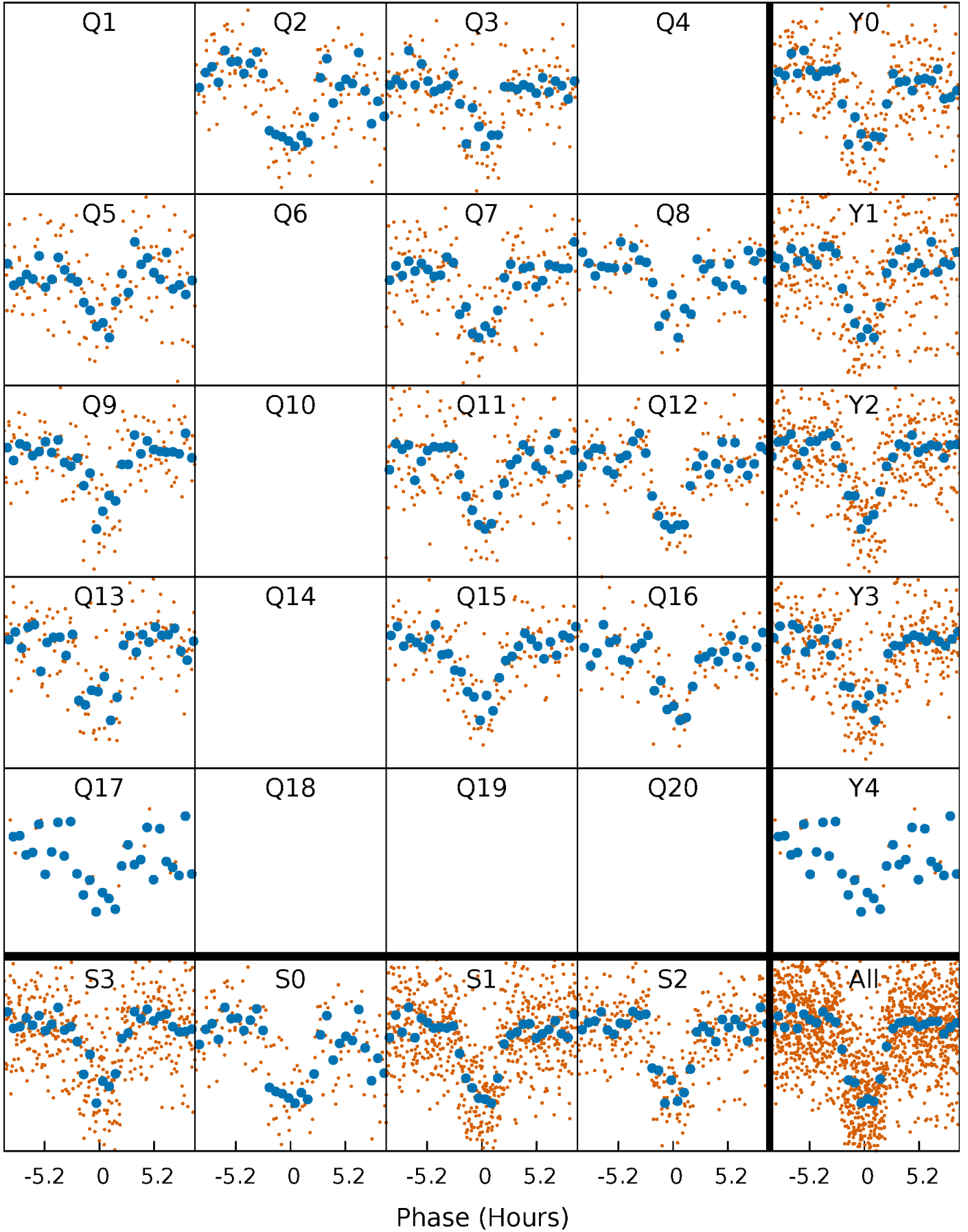


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

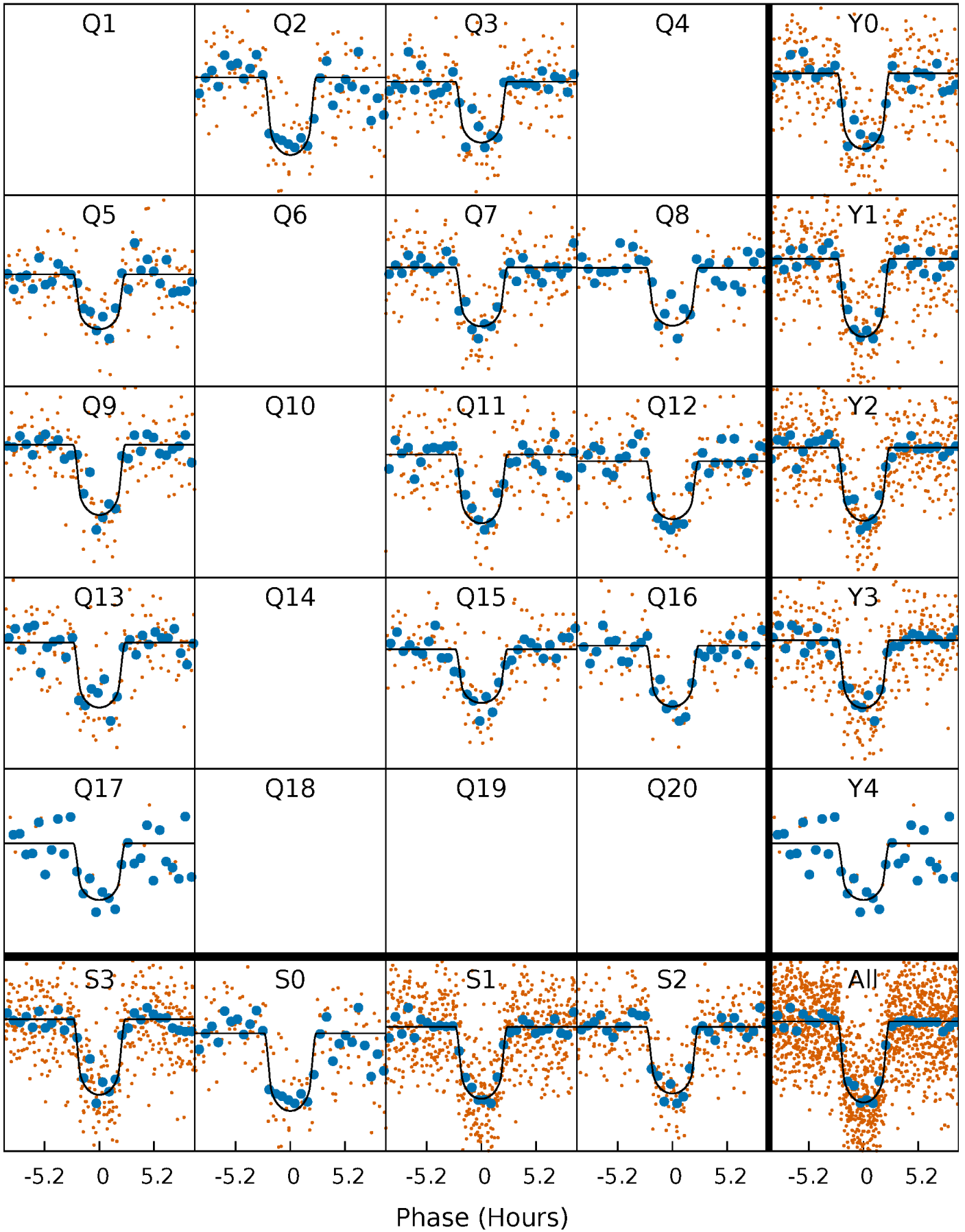
TCE 005021899-01   P= 21.812964 Days    $T_0=152.198114$  (BKJD)





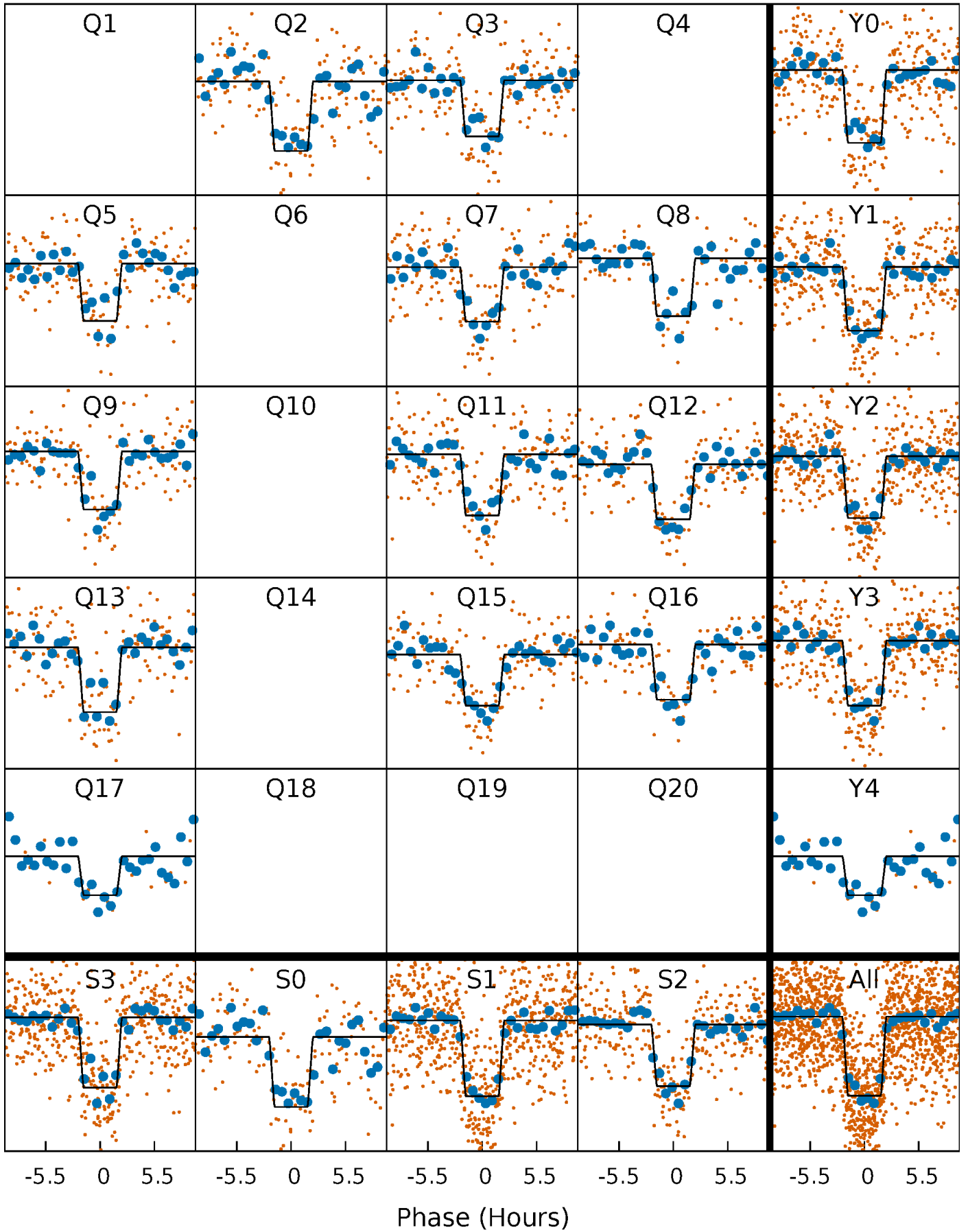
# DV Quarter-Phased Transit Curves

TCE 005021899-01   P= 21.812964 Days    $T_0=152.198114$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

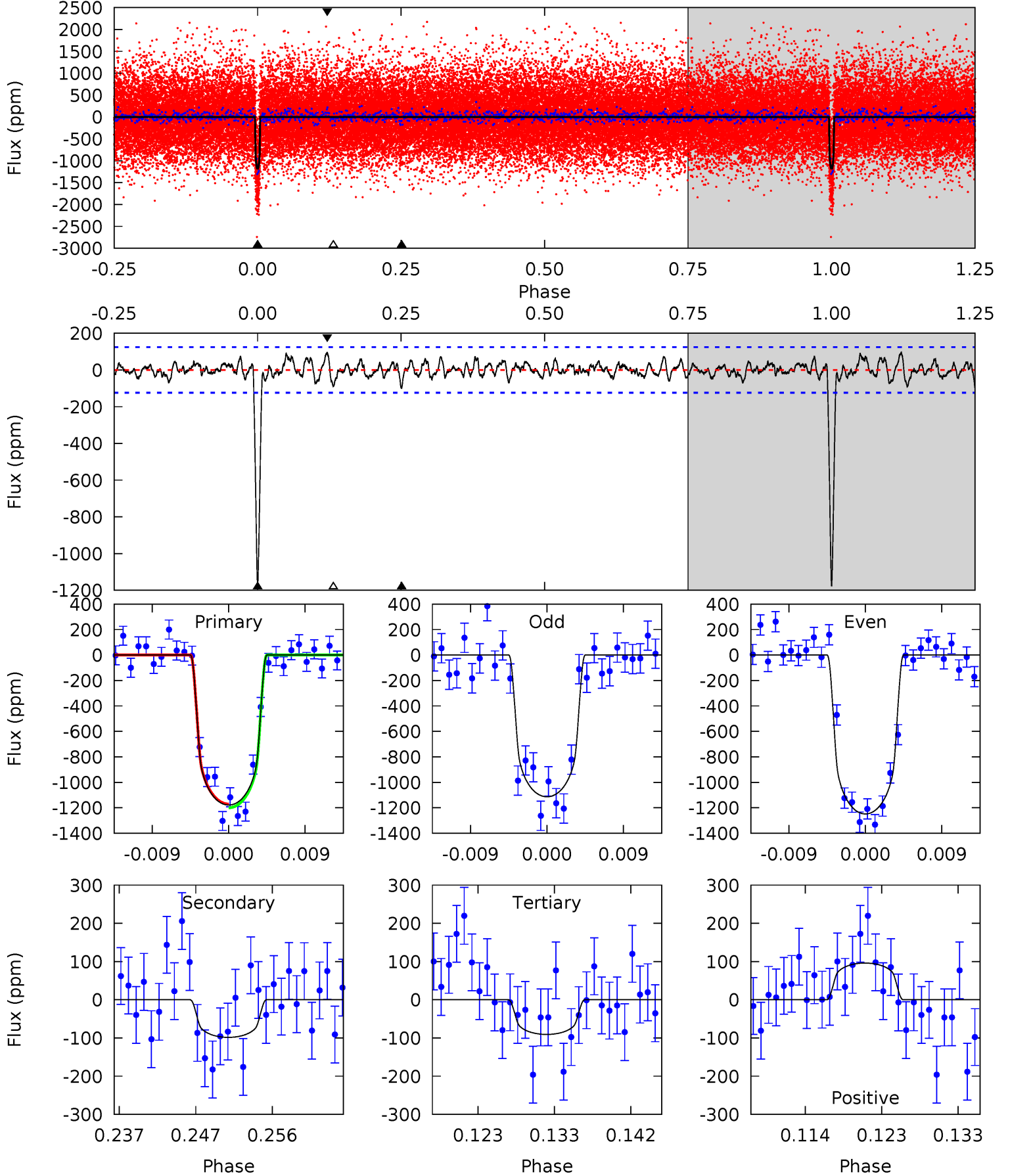
TCE 005021899-01 P= 21.813071 Days  $T_0=152.194471$  (BKJD)



# DV Model-Shift Uniqueness Test

005021899-01,  $P = 21.812964$  Days,  $E = 152.198114$  Days

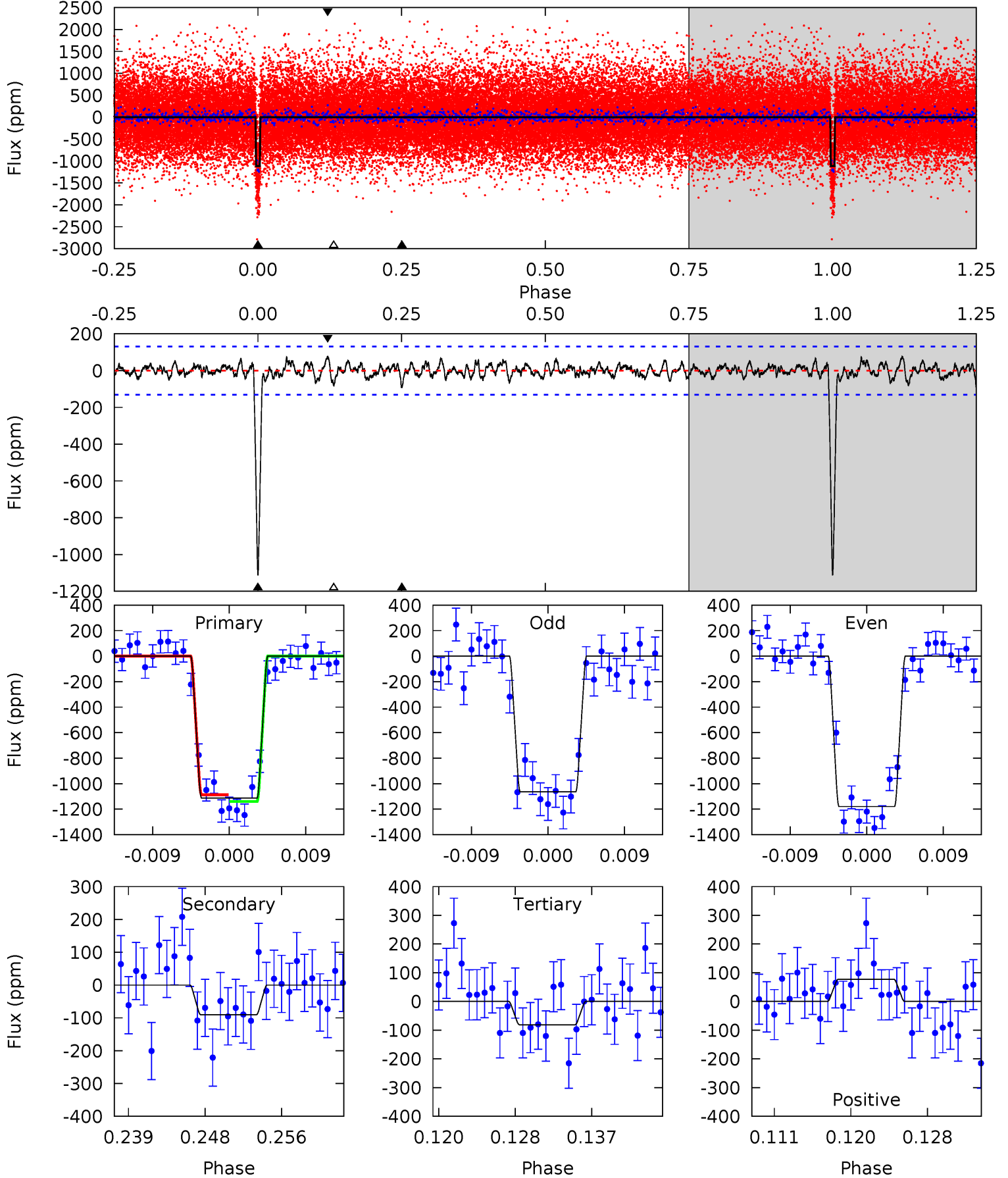
| Pri  | Sec  | Ter  | Pos  | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM  | Shape | TAT  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 47.7 | 3.99 | 3.68 | 3.89 | 5.04            | 2.59            | 1.22             | 44.1    | 43.8    | 0.31    | 0.10    | 2.72    | 0.98 | 0.08  | 0.59 |



# Alt Model-Shift Uniqueness Test

005021899-01,  $P = 21.813071$  Days,  $E = 152.194471$  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  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 43.0 | 3.50 | 3.14 | 2.99 | 5.06            | 2.63            | 1.02             | 39.9    | 40.0    | 0.36    | 0.51    | 2.23    | 0.99 | 0.06  | 1.01 |



### Stellar Parameters For KIC 005021899

|        | $T_{\text{eff}}(K)$  | $\log(g)$                 | [Fe/H]                    | $R$ ( $R_{\odot}$ )       | $M$ ( $M_{\odot}$ )       | $p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ ) |
|--------|----------------------|---------------------------|---------------------------|---------------------------|---------------------------|---|
|        | $5601^{+166}_{-166}$ | $4.410^{+0.116}_{-0.188}$ | $0.080^{+0.250}_{-0.300}$ | $0.999^{+0.269}_{-0.145}$ | $0.934^{+0.113}_{-0.085}$ | $1.318^{+0.693}_{-0.653}$                     |
|        | +3%/-3%              | +3%/-4%                   | +312%/-375%               | +27%/-15%                 | +12%/-9%                  | +53%/-50%                                     |
| Source | PHO1                 | KIC0                      | KIC0                      | DSEP                      |                           |   |

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

### Secondary Eclipse Parameters for KIC 005021899-01 / KOI 0821.01

| Detrend | Depth (ppm)  | $R_p$ ( $R_{\oplus}$ ) | $T_{max}$ (K)     | $T_{obs}$ (K)        | $A_{obs}$        |
|---------|--------------|------------------------|-------------------|----------------------|------------------|
| DV      | $-98 \pm 25$ | $3.80^{+0.98}_{-0.92}$ | $901^{+65}_{-52}$ | $3494^{+351}_{-265}$ | $84^{+70}_{-35}$ |
| Alt.    | $-91 \pm 26$ | $3.73^{+0.95}_{-0.90}$ | $901^{+63}_{-50}$ | $3464^{+337}_{-283}$ | $78^{+62}_{-34}$ |

$T_{max}$  = 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  $A_{obs} \gg 1.0$

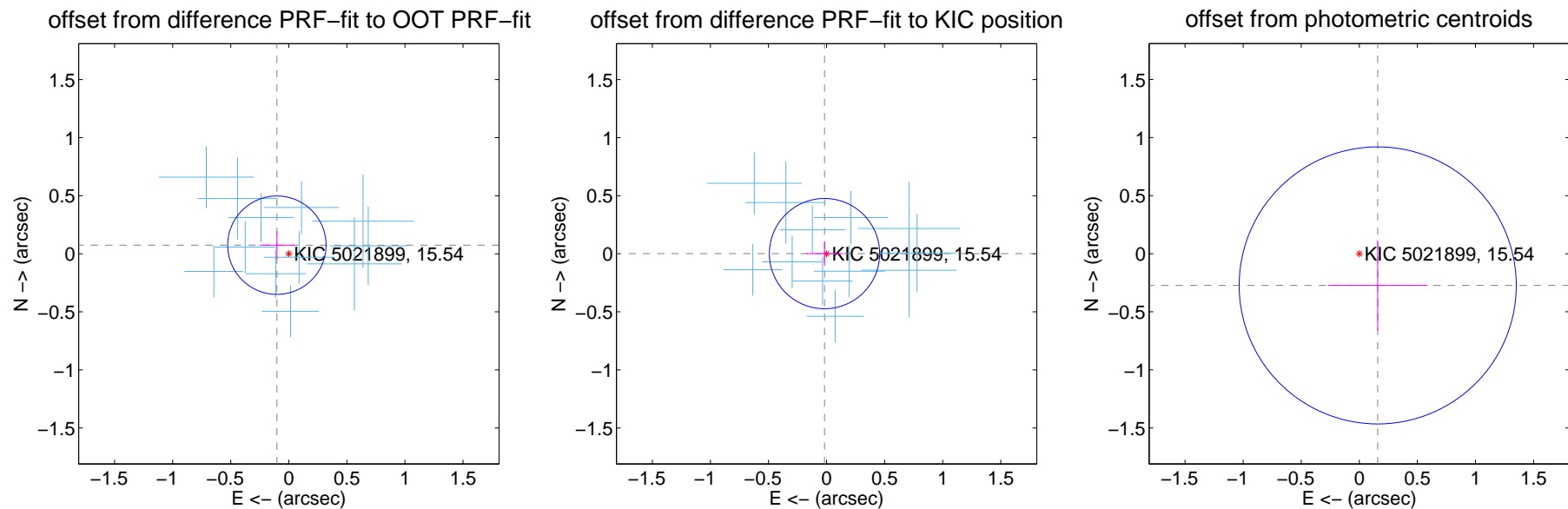
## DV Centroid Data

Supplemental centroid analysis for 005021899-01. Kepler magnitude: 15.54. Transit SNR 34.82

There are 12 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.11 arcsec

|   | Distance in arcsec | Distance / $\sigma$ | $\Delta$ RA       | $\Delta$ Dec      |
|---|--------------------|---------------------|-------------------|-------------------|
| PRF-fit source offset from OOT          | $0.127 \pm 0.141$  | 0.90                | $0.103 \pm 0.151$ | $0.074 \pm 0.121$ |
| PRF-fit source offset from KIC position | $0.018 \pm 0.158$  | 0.11                | $0.018 \pm 0.159$ | $0.002 \pm 0.107$ |
| photometric centroid source offset      | $0.32 \pm 0.40$    | 0.79                | $-0.16 \pm 0.43$  | $-0.27 \pm 0.39$  |



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.

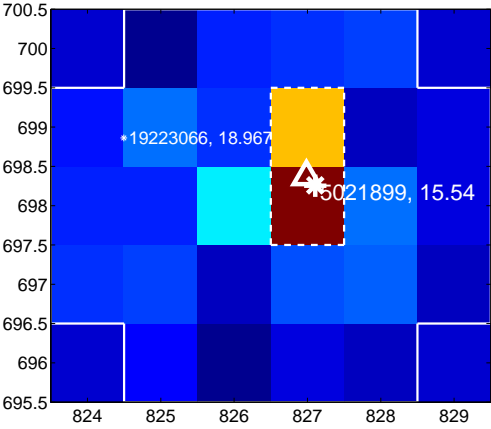
Q1 no difference image



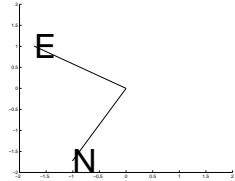
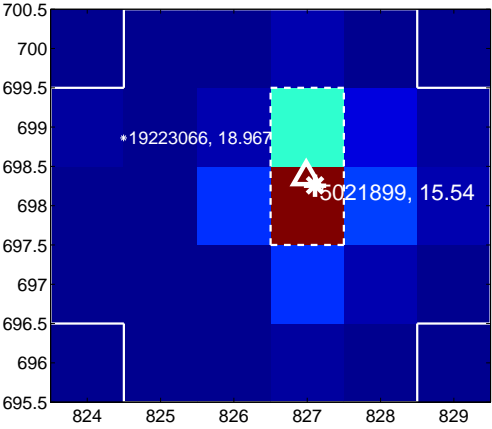
Q1 no OOT image



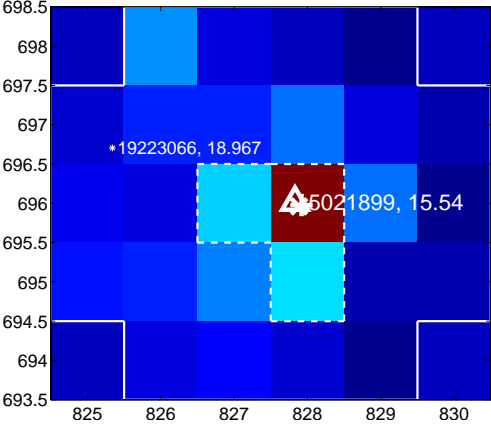
Q2 difference image



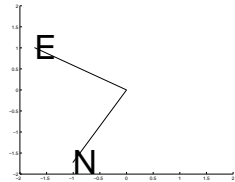
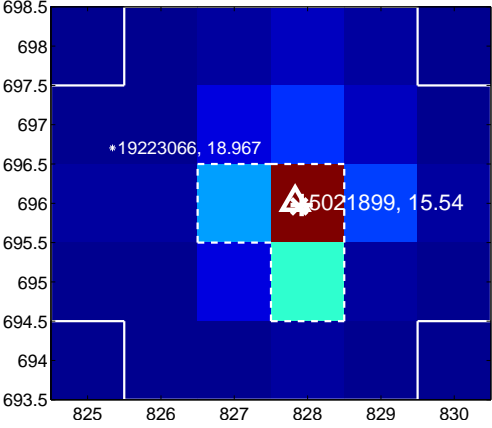
Q2 OOT image



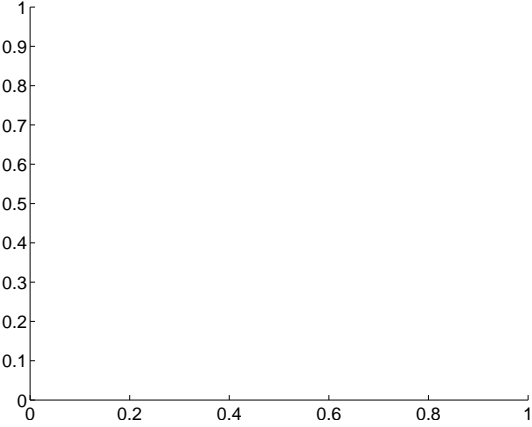
Q3 difference image



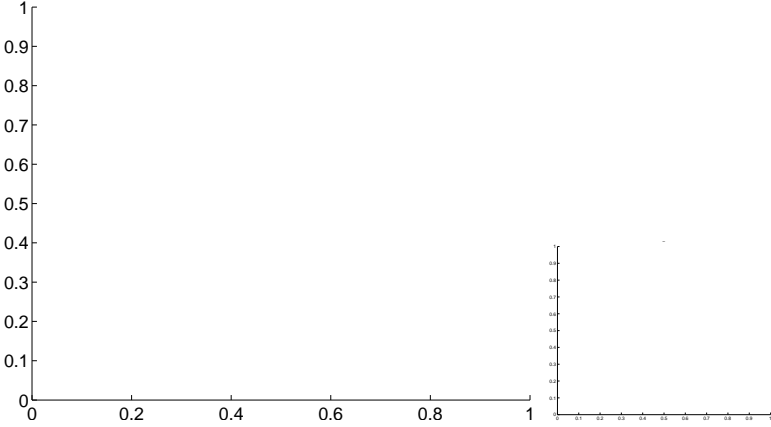
Q3 OOT image



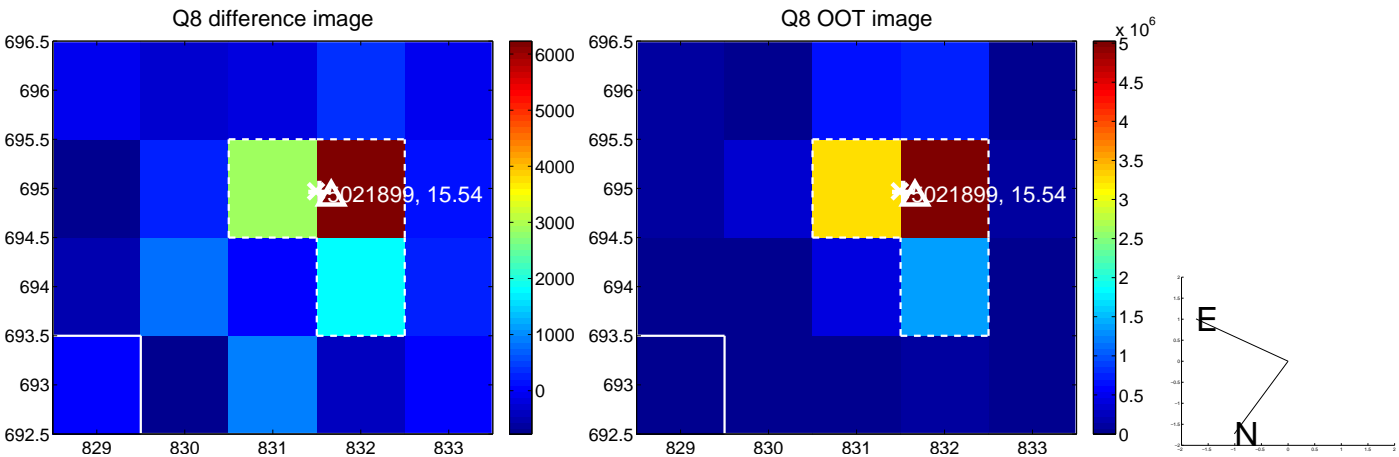
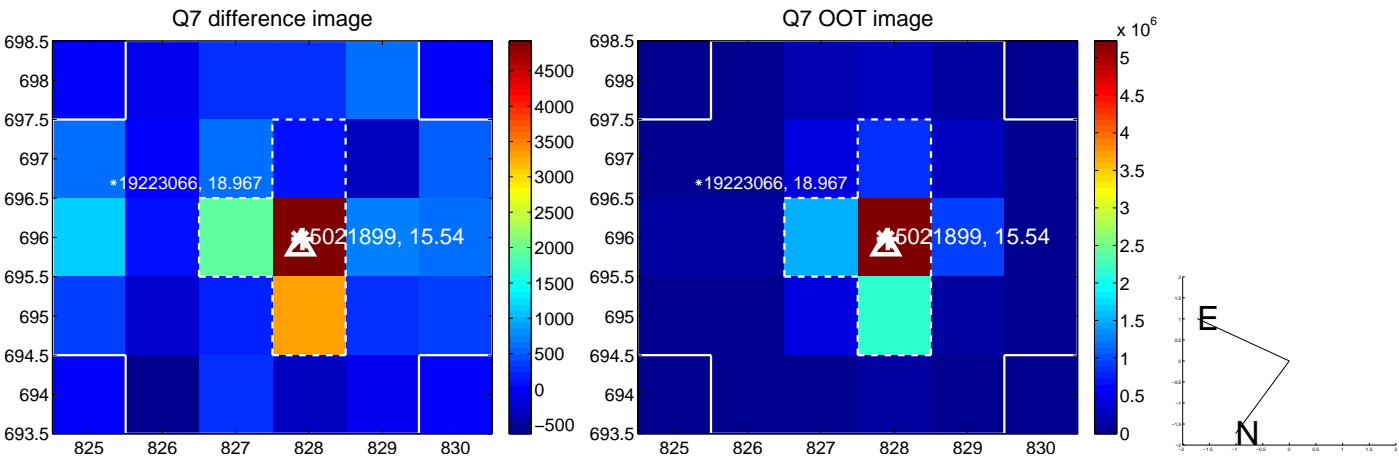
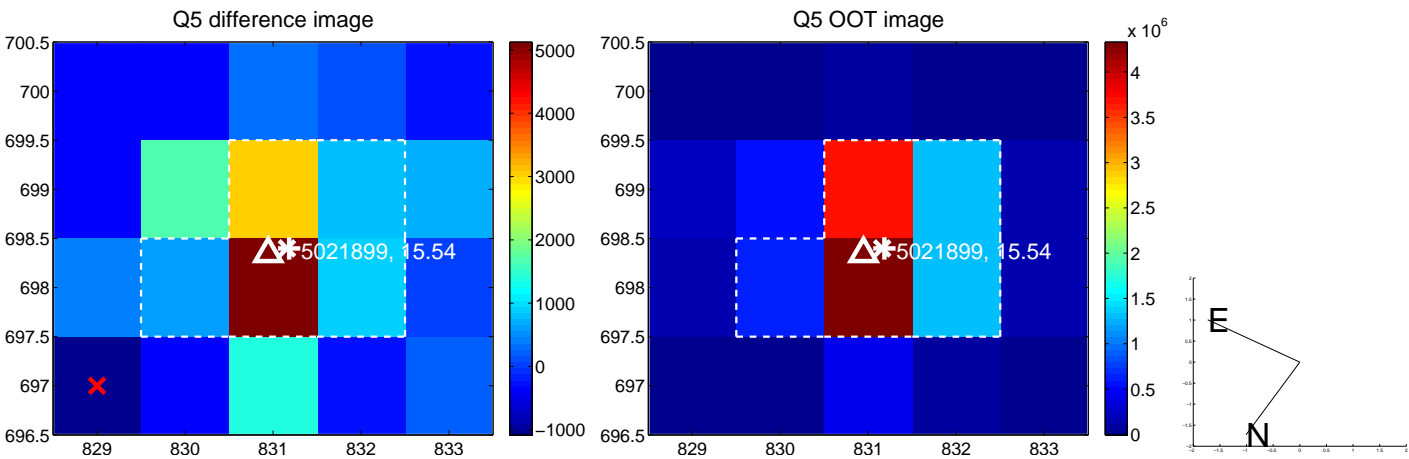
Q4 no difference image



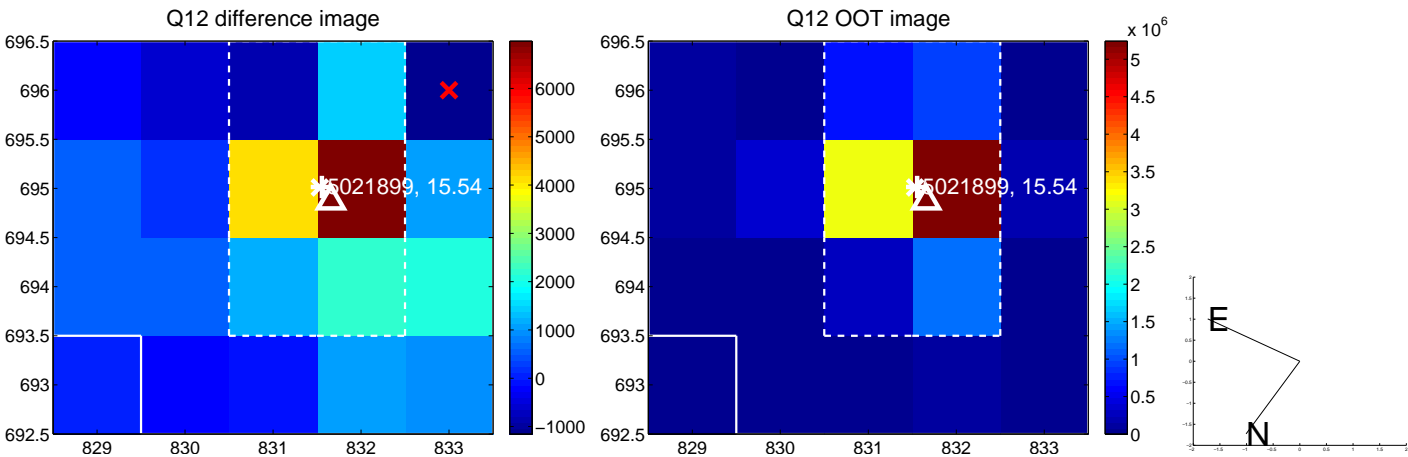
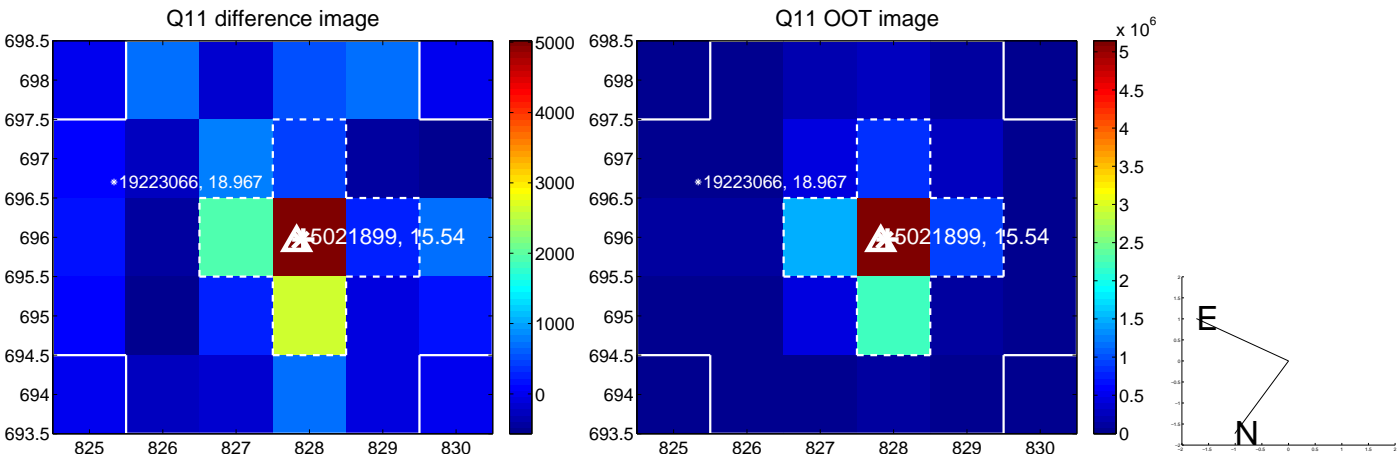
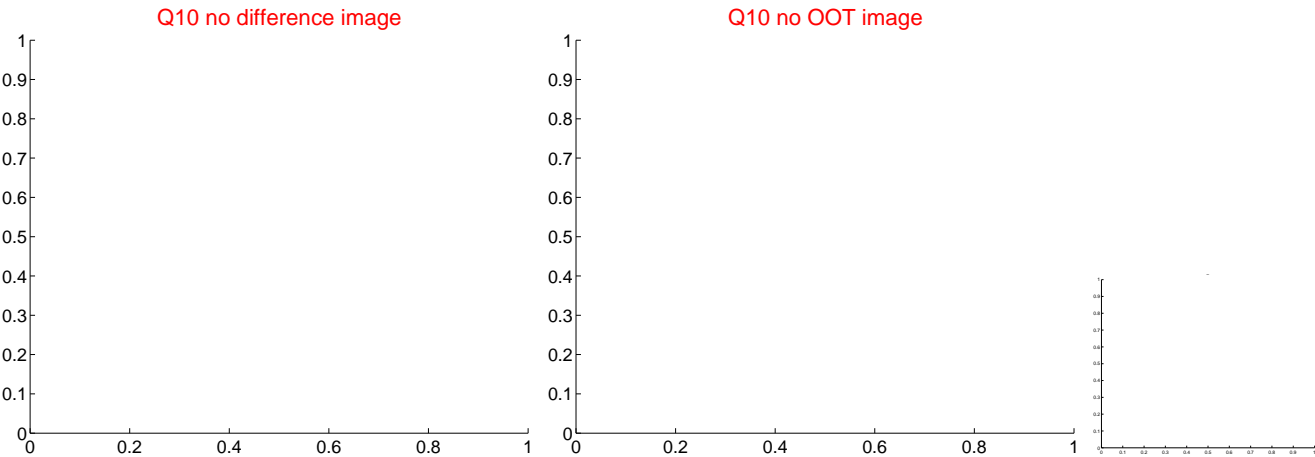
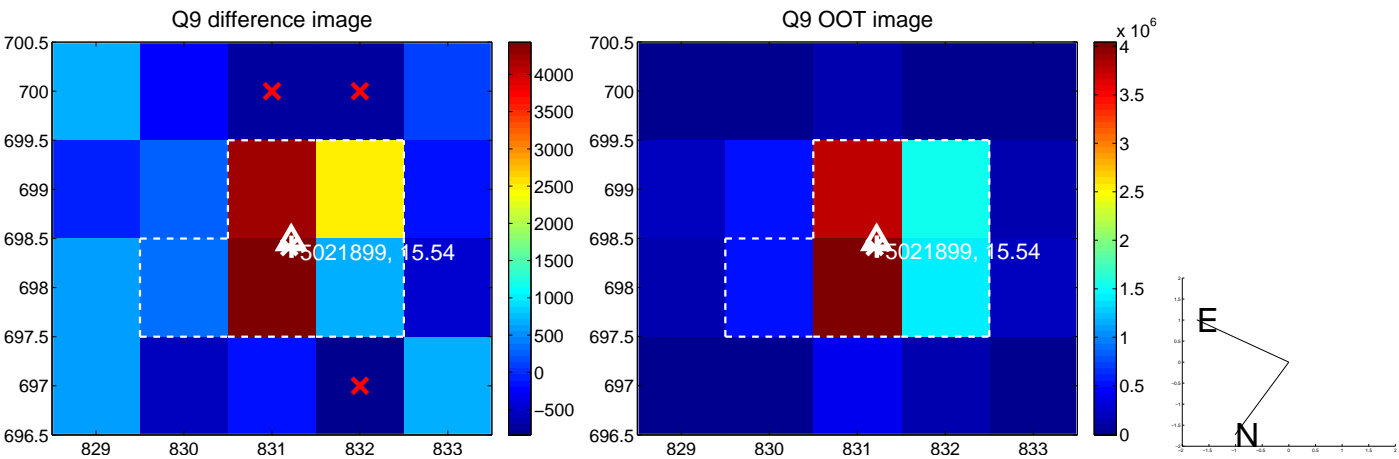
Q4 no OOT image



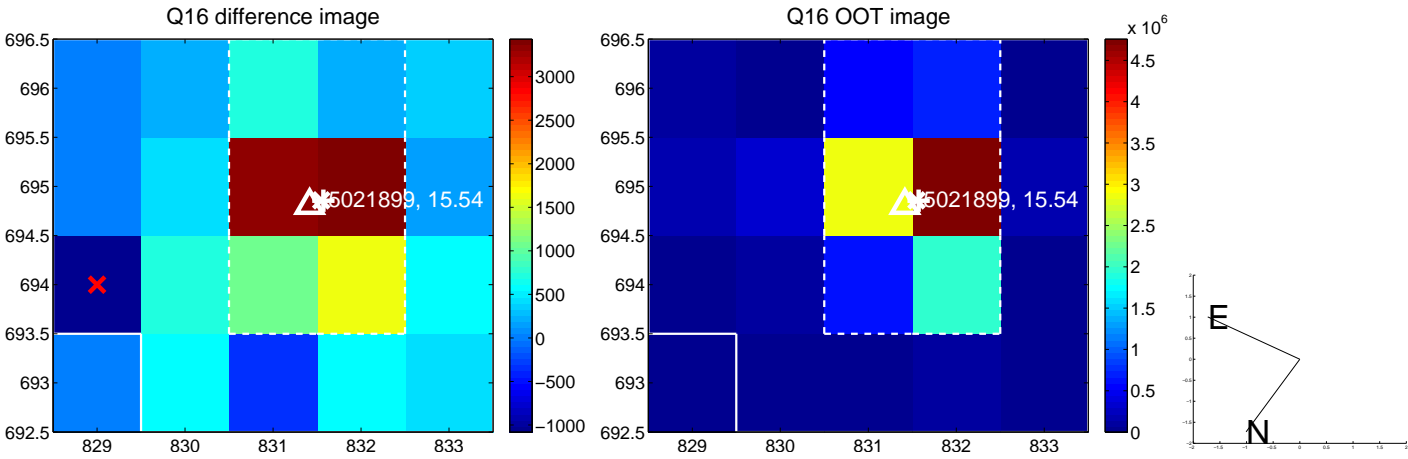
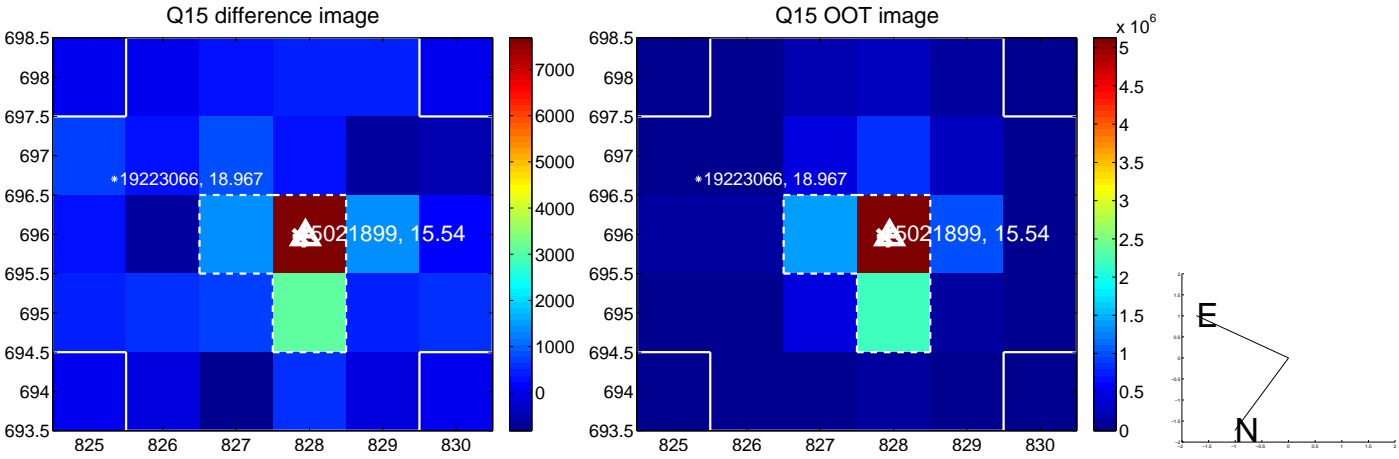
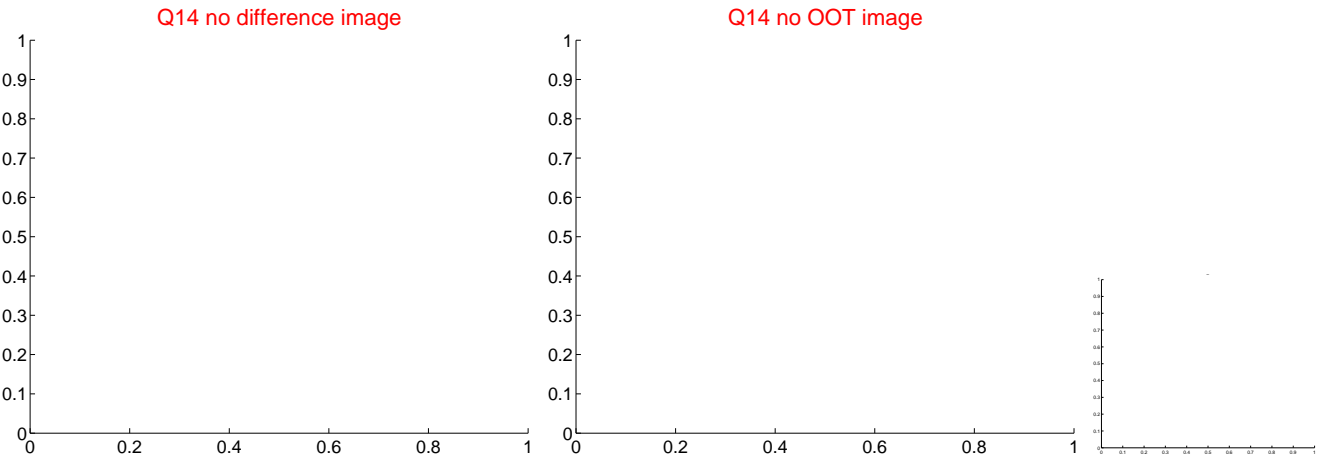
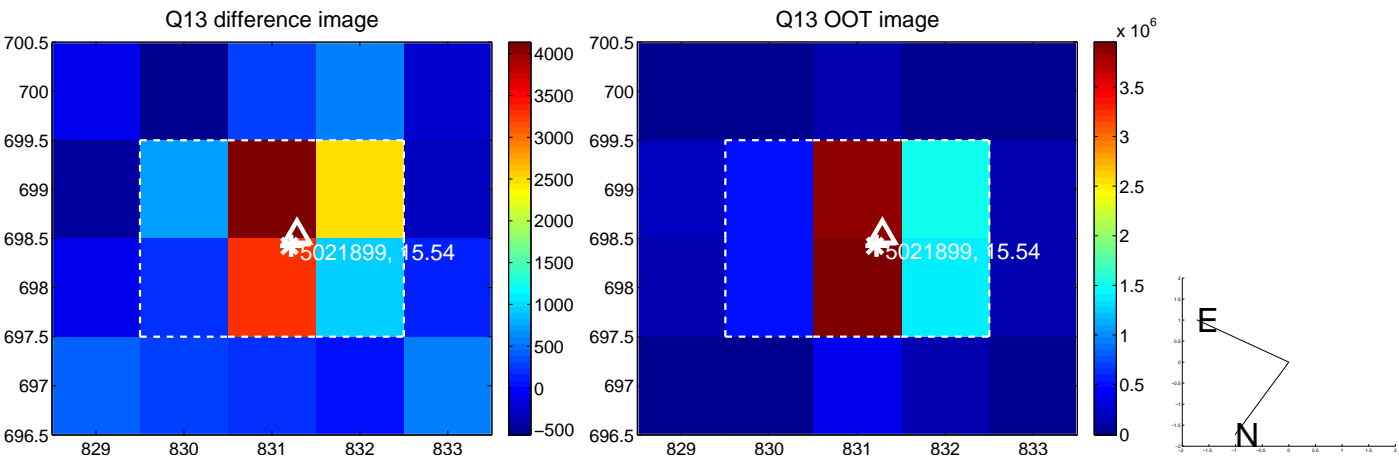
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



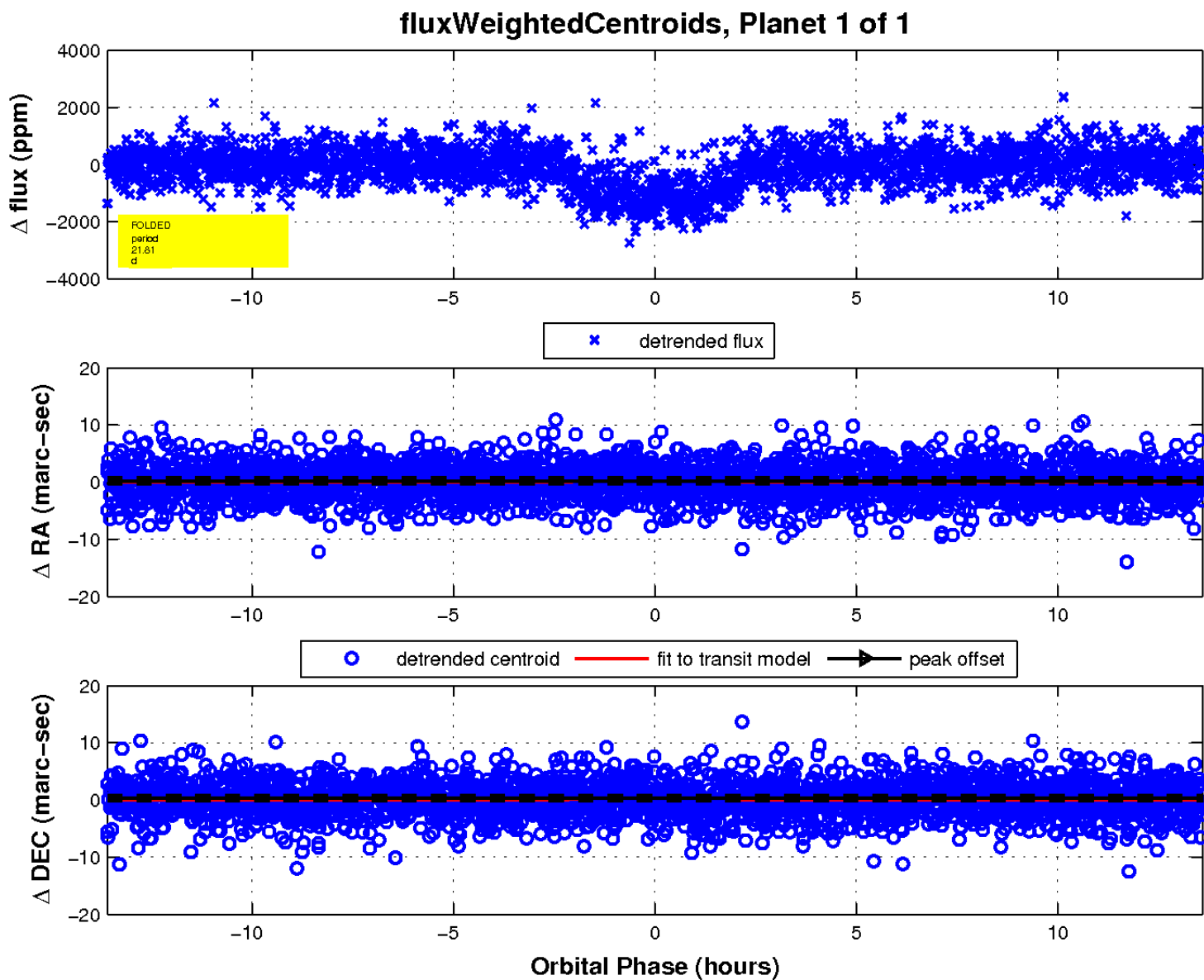
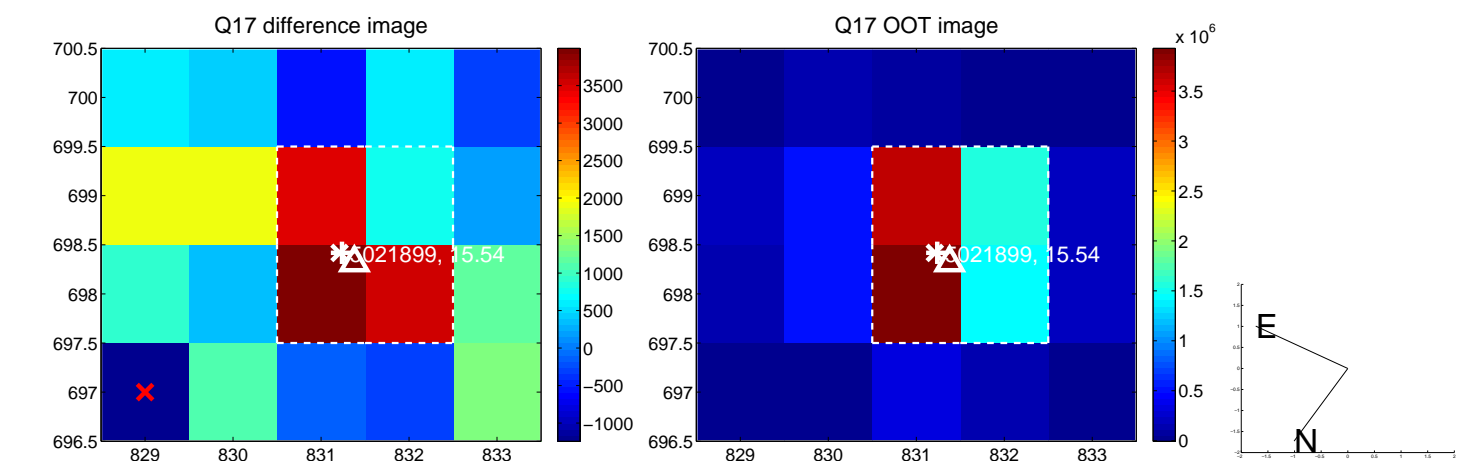
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image

