

# KIC 005039053

## 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) | $R_p$ ( $R_{\oplus}$ ) | $S_p$ ( $S_{\oplus}$ ) |
|--------------|----------|---------|---------------|--------------|-------------|------------------|-----|------|-----------------------------|-----------------|------------------------|------------------------|
| 005039053-01 | OBS      | 5121.01 | 401.390151    | 328.573299   | 170.1       | 31.606           | 8.9 | 10.8 | 1.50                        | 5858            | 2.03                   | 1.98                   |

## Robovetter Results

| TCE          | Run Type | Disp | Score | N | S | C | E | Comments                            |
|--------------|----------|------|-------|---|---|---|---|-------------------------------------|
| 005039053-01 | OBS      | FP   | 0.00  | 1 | 0 | 0 | 0 | INDIV_TRANS_MARSHALL—CENT_FEW_DIFFS |

**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 005039053-01

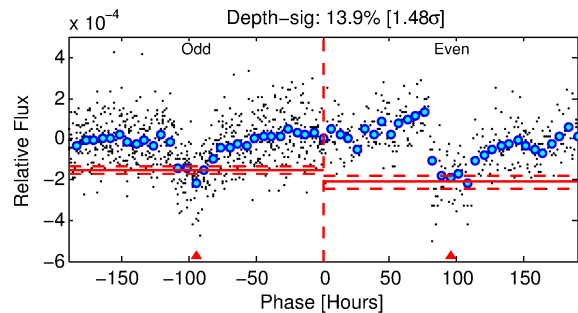
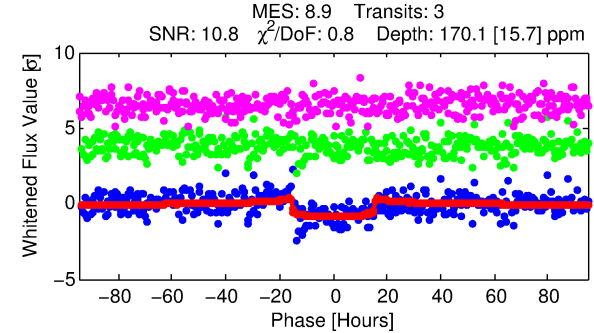
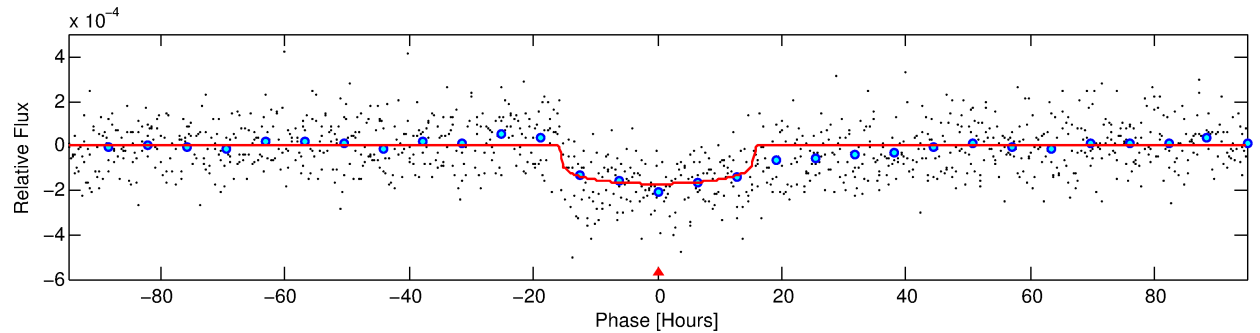
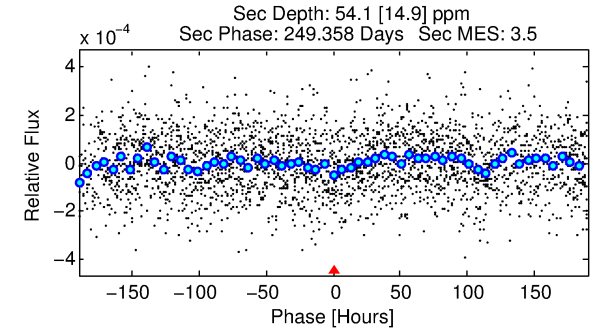
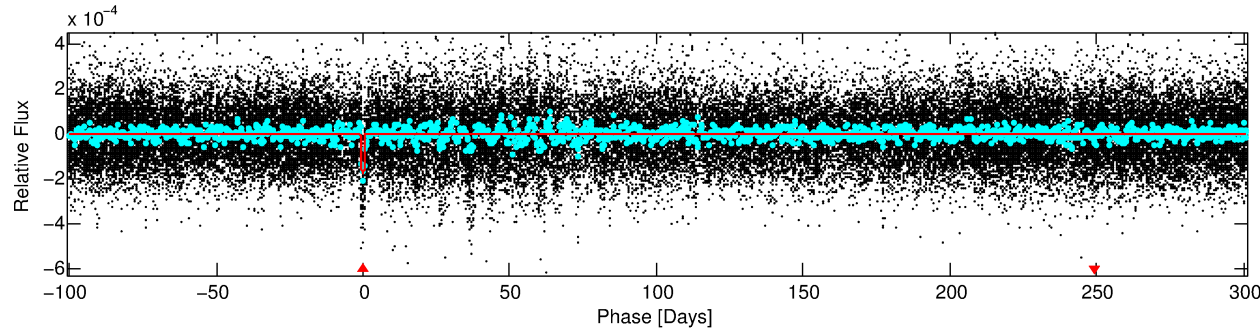
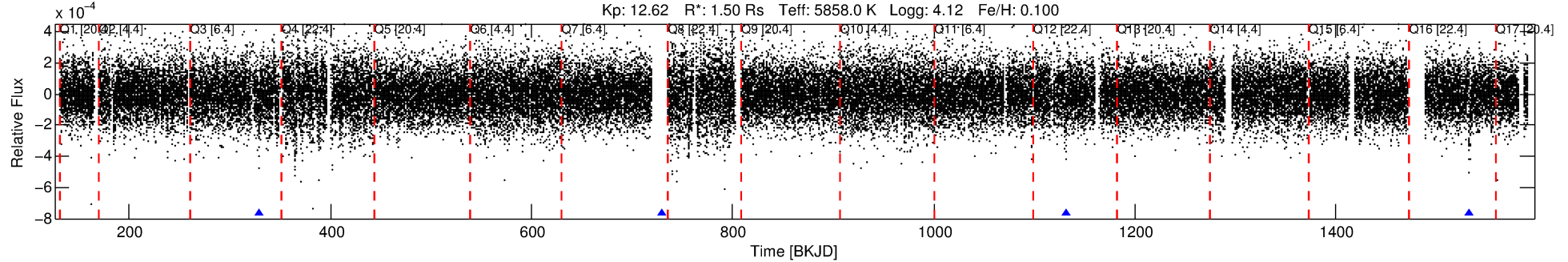
No Significant Match Found

# DV One-Page Summary

KIC: 5039053 Candidate: 1 of 1 Period: 401.390 d

KOI: K05121 Corr: No Ephemeris Match

Kp: 12.62 R\*: 1.50 Rs Teff: 5858.0 K Logg: 4.12 Fe/H: 0.100



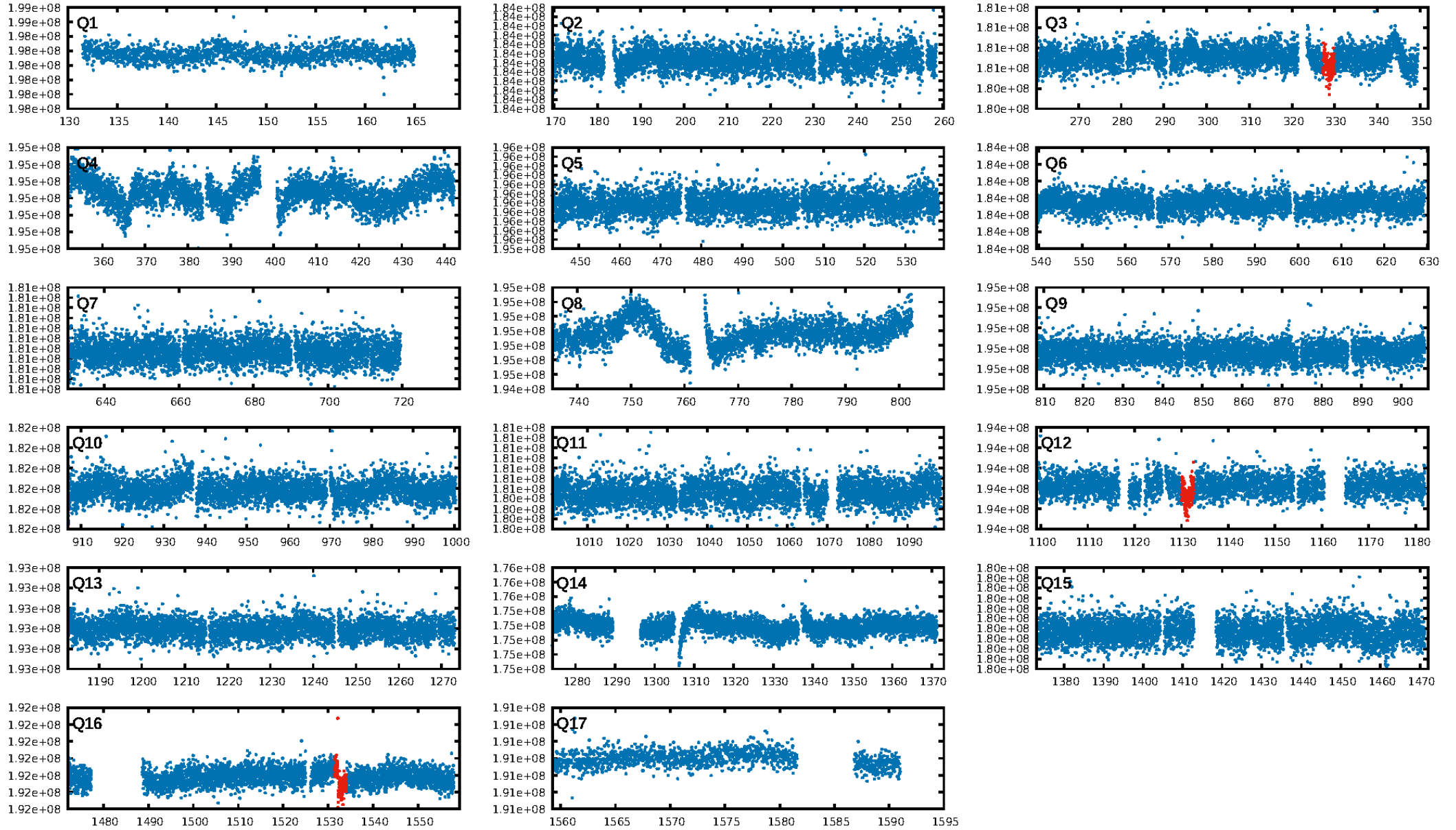
## DV Fit Results:

Period = 401.39015 [0.01076] d  
Epoch = 328.5733 [0.0232] BKJD  
Rp/R\* = 0.0124 [0.0027]  
a/R\* = 80.02 [76.22]  
b = 0.59 [1.07]  
Seff = 1.98 [0.59]  
Teq = 303 [23] K  
Rp = 2.03 [0.61] Re  
a = 1.0925 [0.2074] AU  
Ag = 8643.26 [5125.19] [1.69σ]  
Teffp = 4511 [585] K [7.19σ]

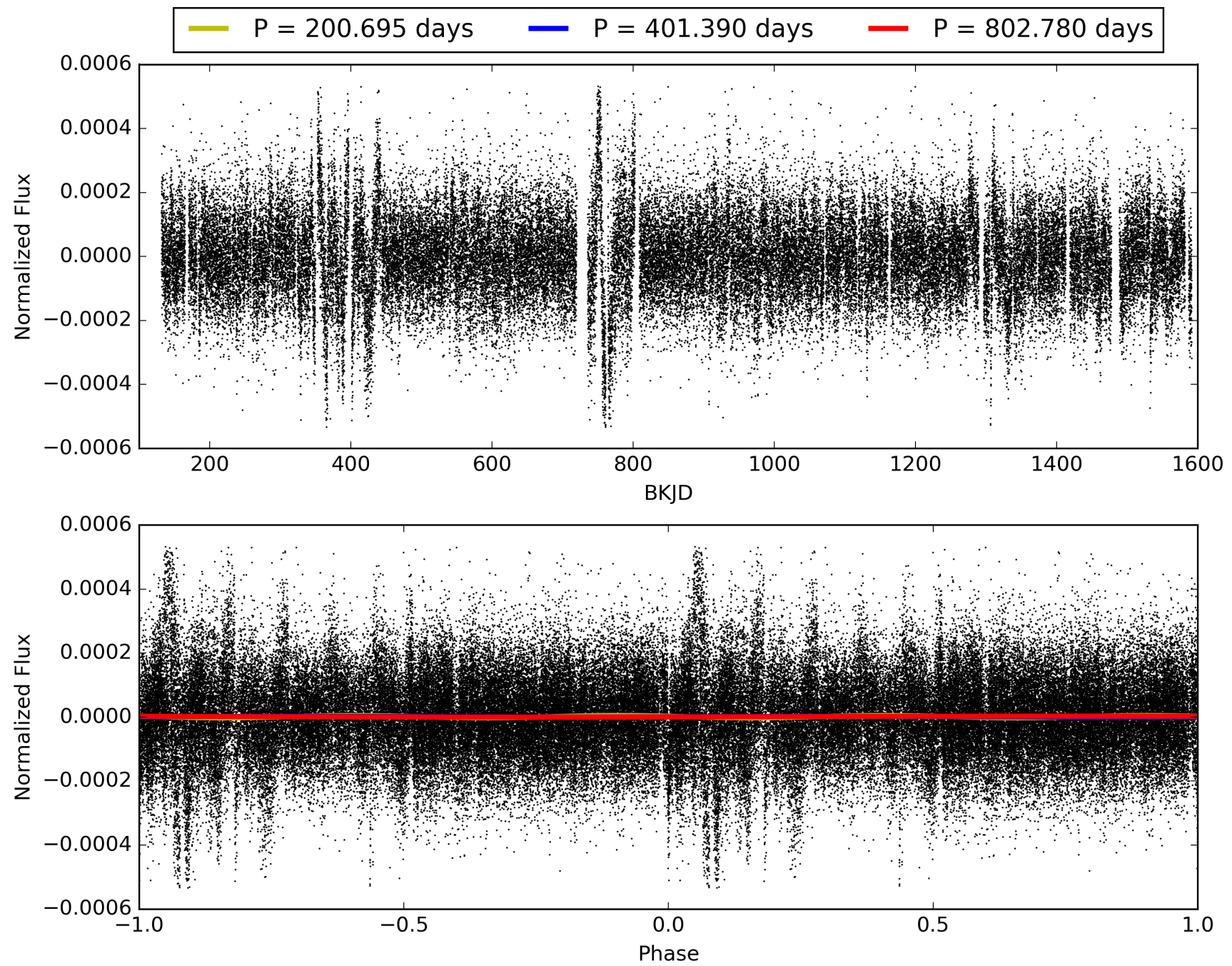
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 18.4%  
ModelChiSquareGoF-sig: 100.0%  
Bootstrap-pfa: 1.59e-16  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 14.21  
Centroid-sig: 8.6%  
Centroid-so: 1.842 arcsec [1.47σ]  
OotOffset-rm: N/A  
KicOffset-rm: N/A  
OotOffset-st: 0/0/0/0 [0]  
KicOffset-st: 0/0/0/0 [0]  
DiffImageQuality-fgm: N/A  
DiffImageOverlap-fno: 1.00 [1/1]

# TCE 005039053-01, PDC Light Curves

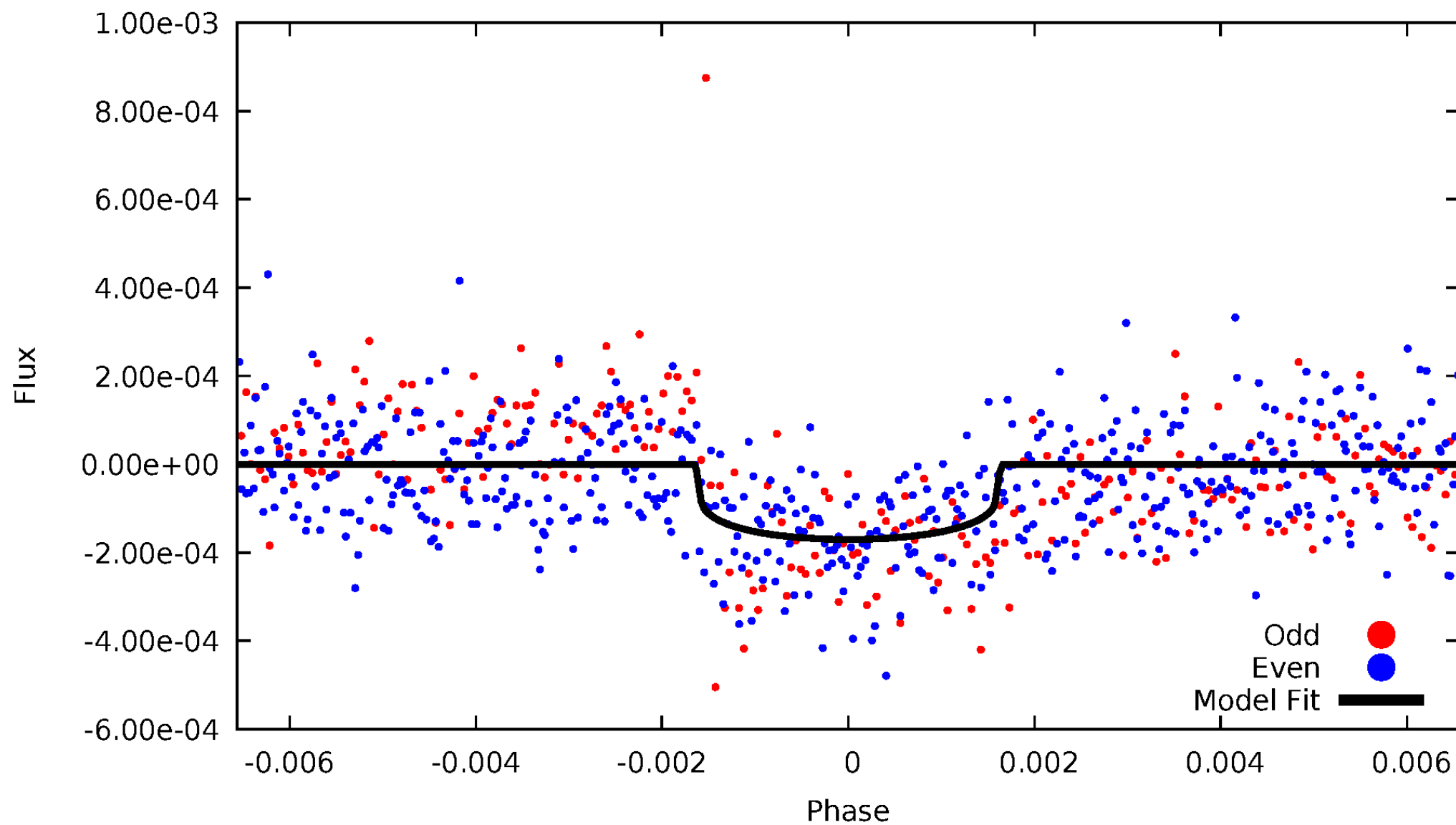


TCE 005039053-01



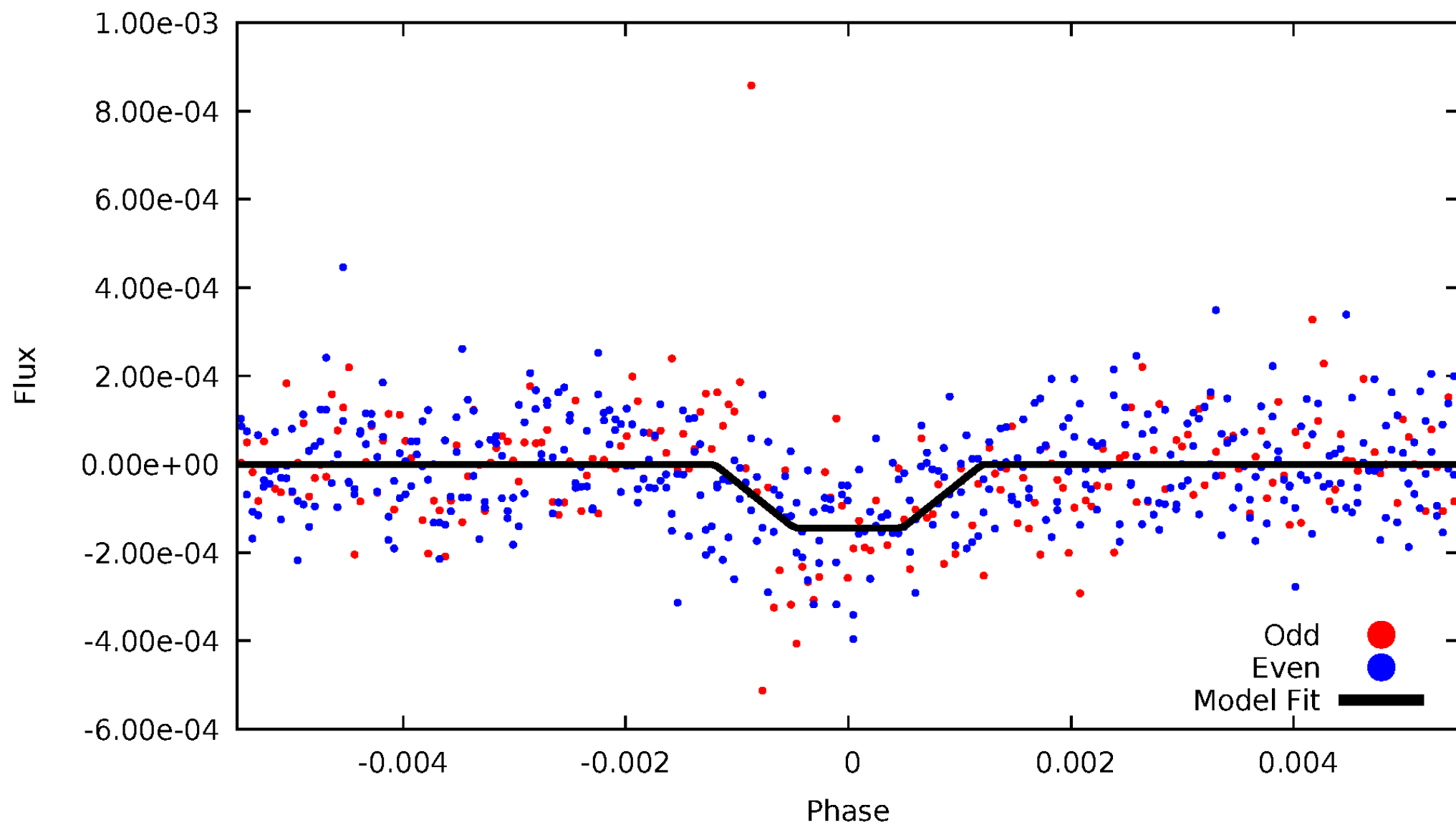
# DV Odd/Even

TCE 005039053-01



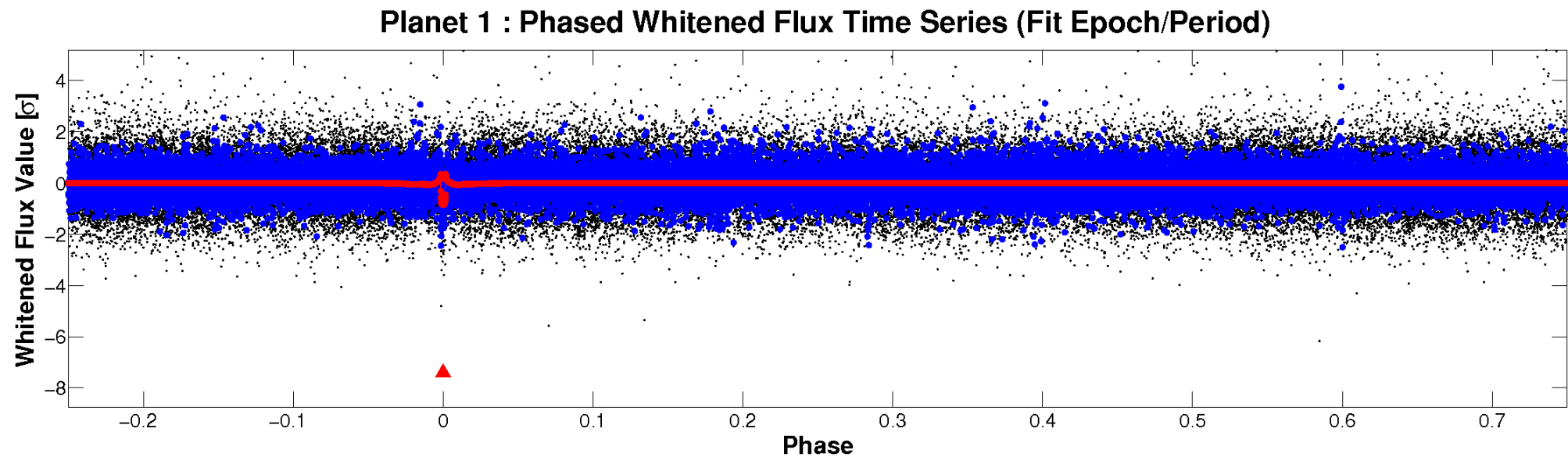
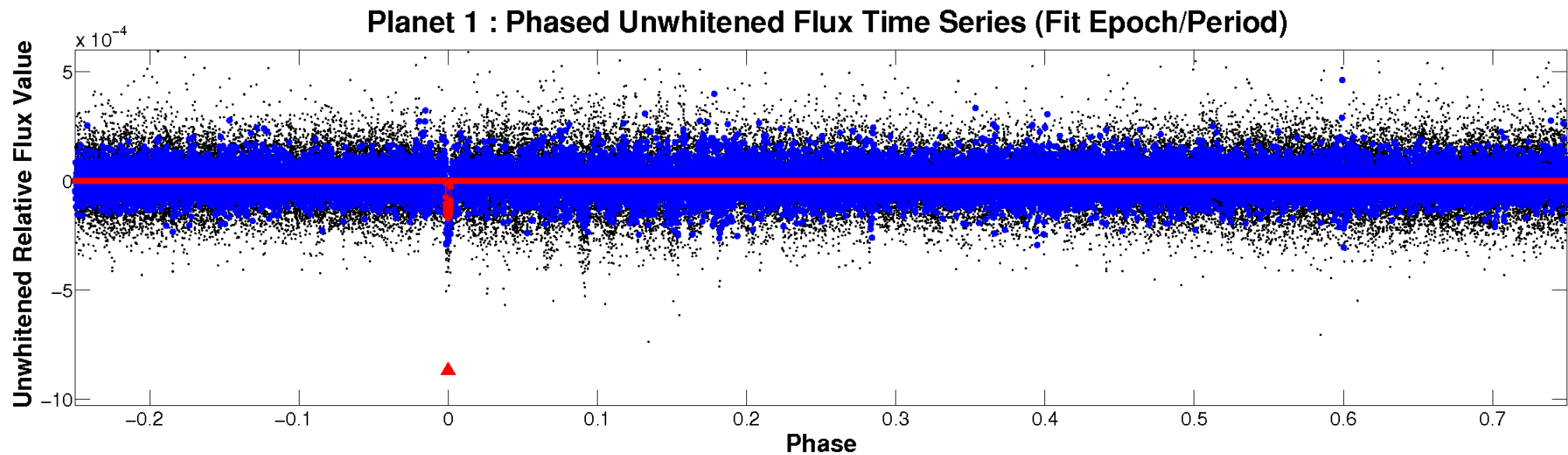
# ALT Odd/Even

TCE 005039053-01



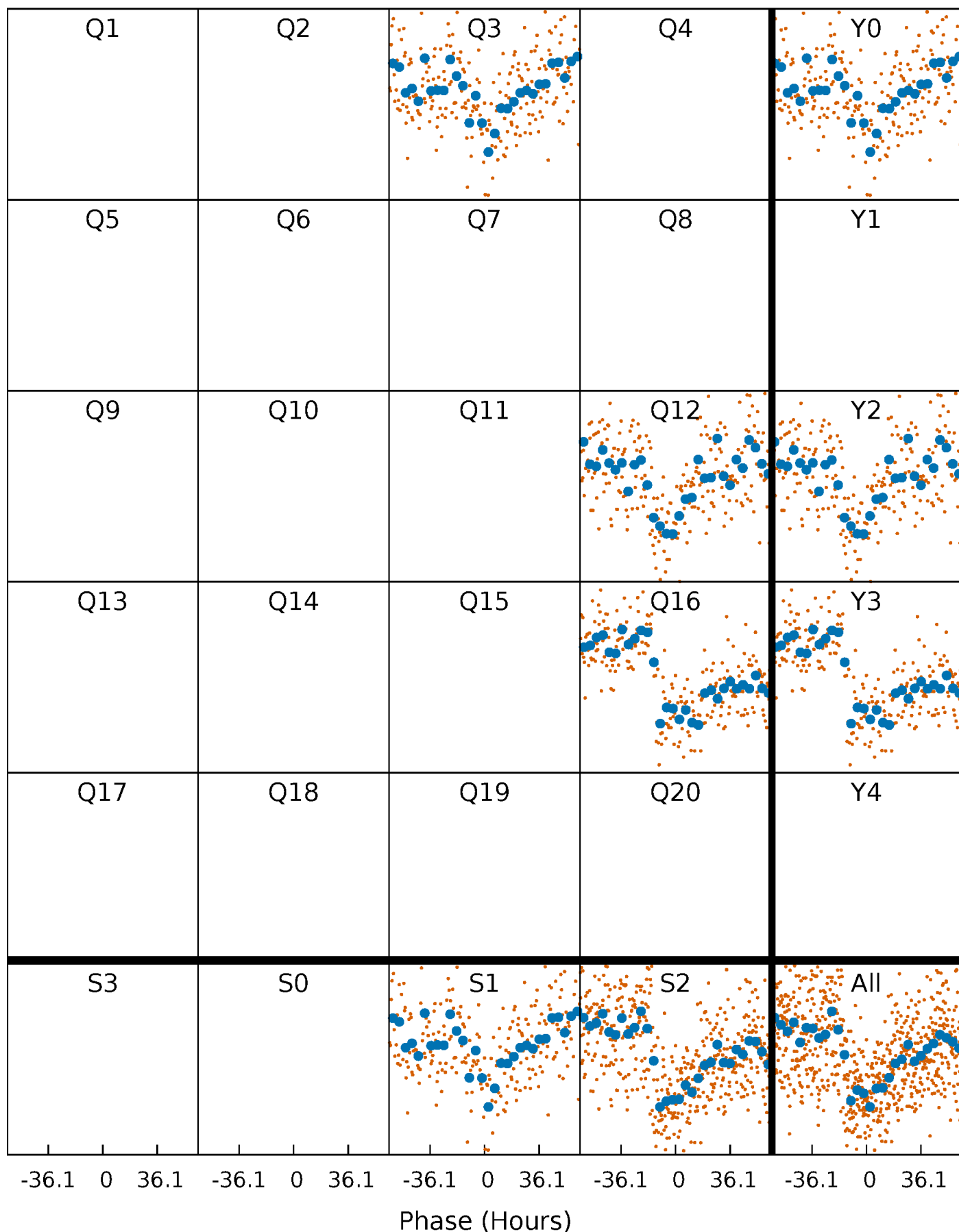


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

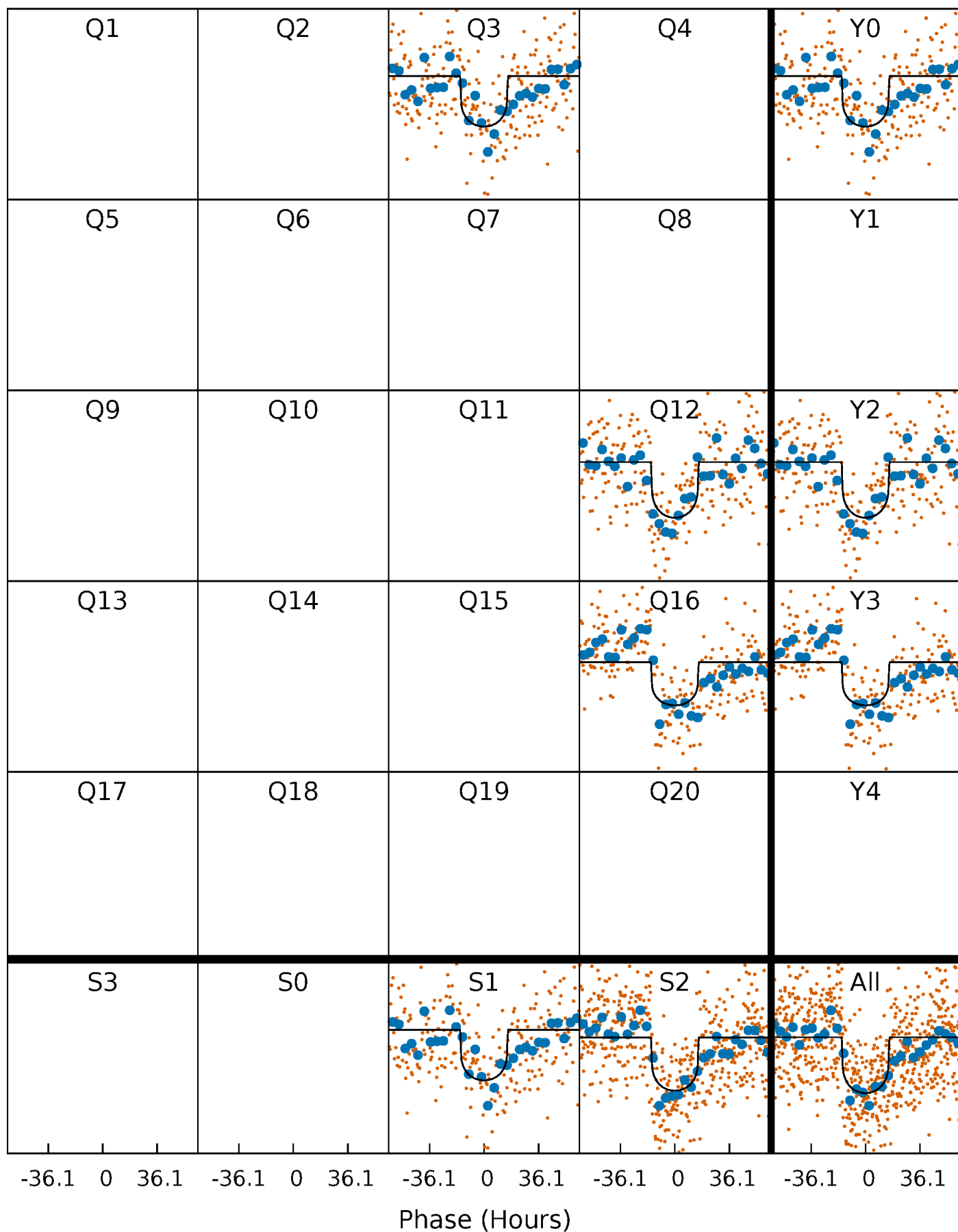
TCE 005039053-01 P=401.390151 Days  $T_0=328.573299$  (BKJD)





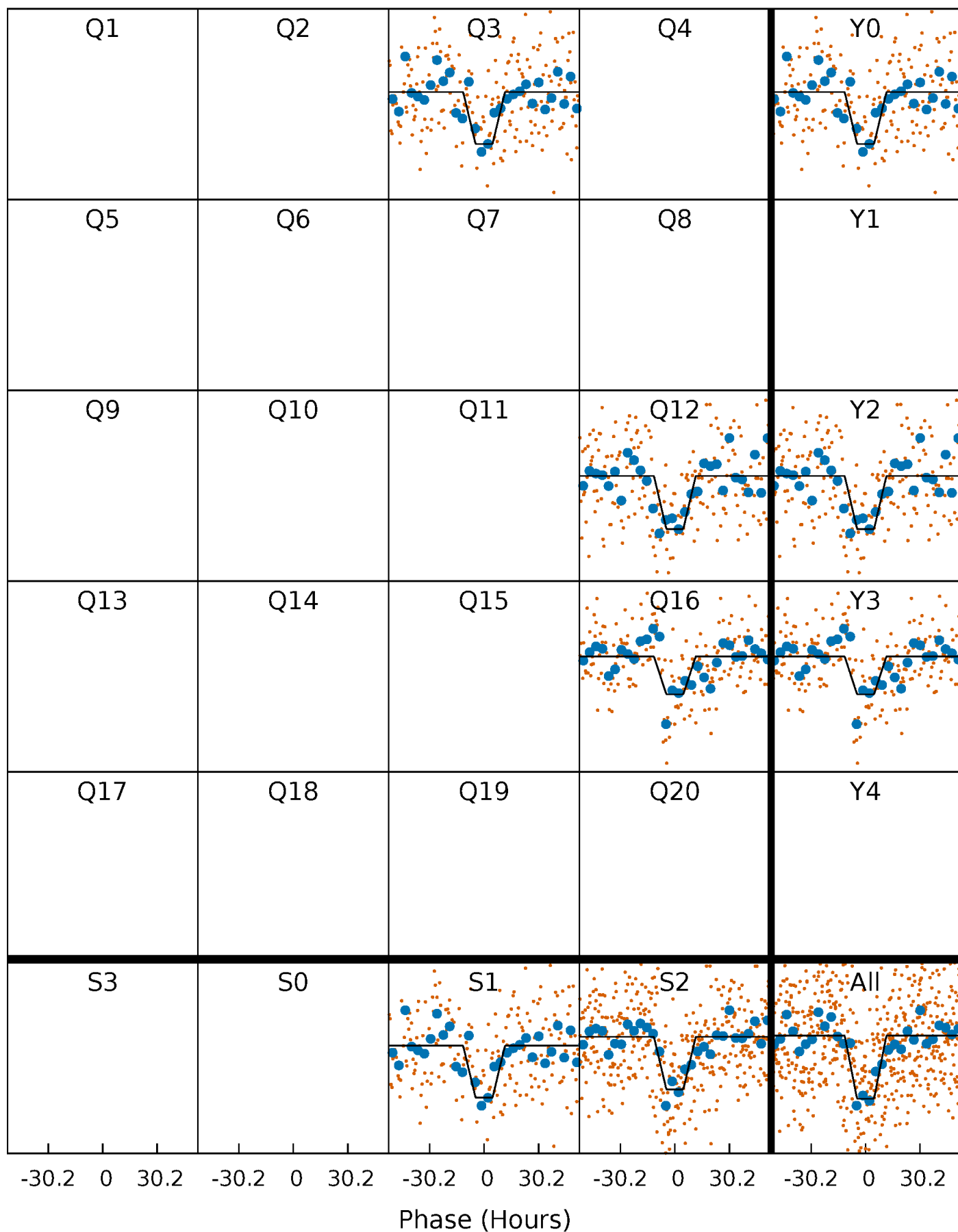
# DV Quarter-Phased Transit Curves

TCE 005039053-01 P=401.390151 Days  $T_0=328.573299$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

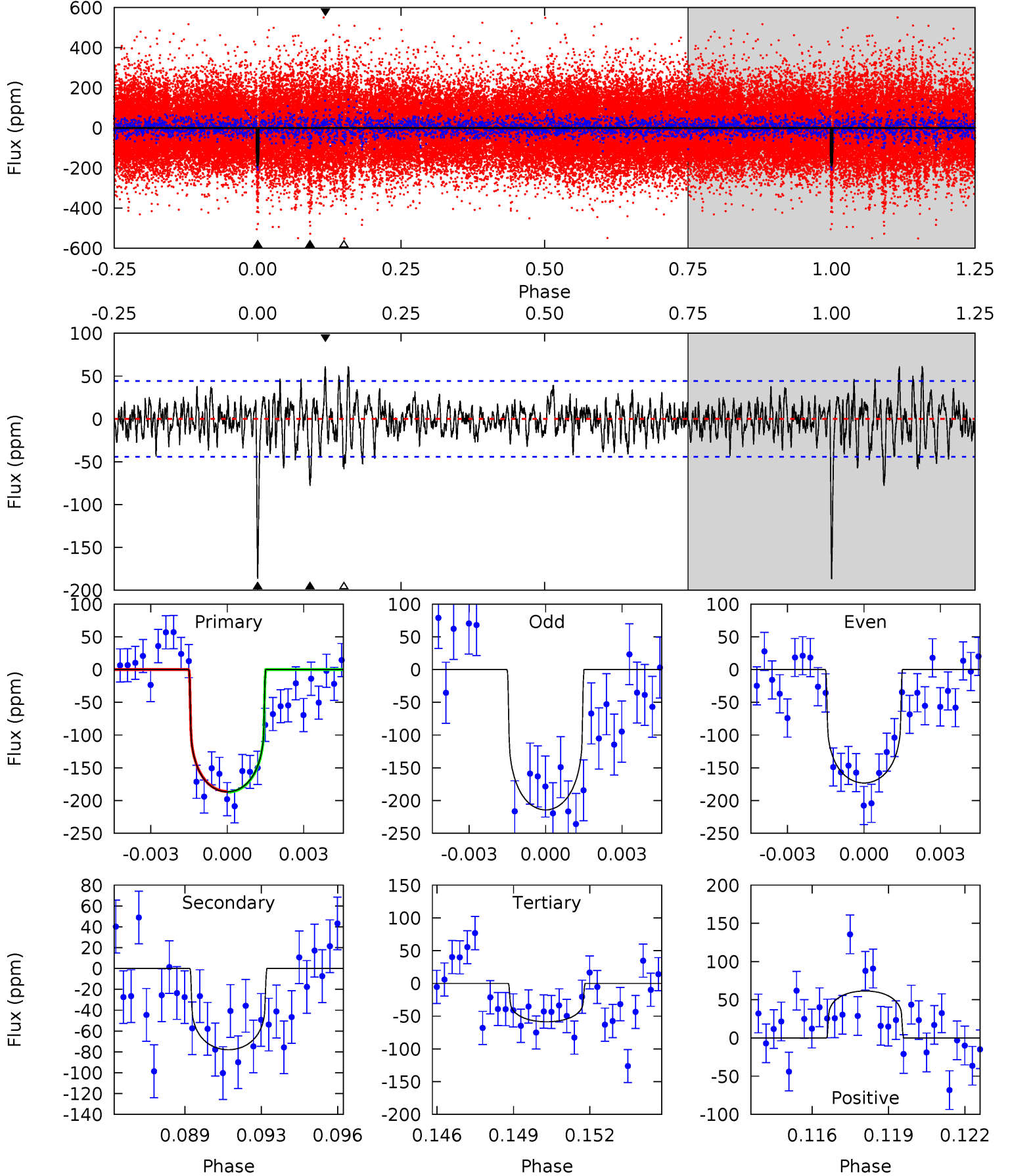
TCE 005039053-01 P=401.253818 Days  $T_0=328.718255$  (BKJD)



# DV Model-Shift Uniqueness Test

005039053-01, P = 401.390151 Days, E = 328.573299 Days

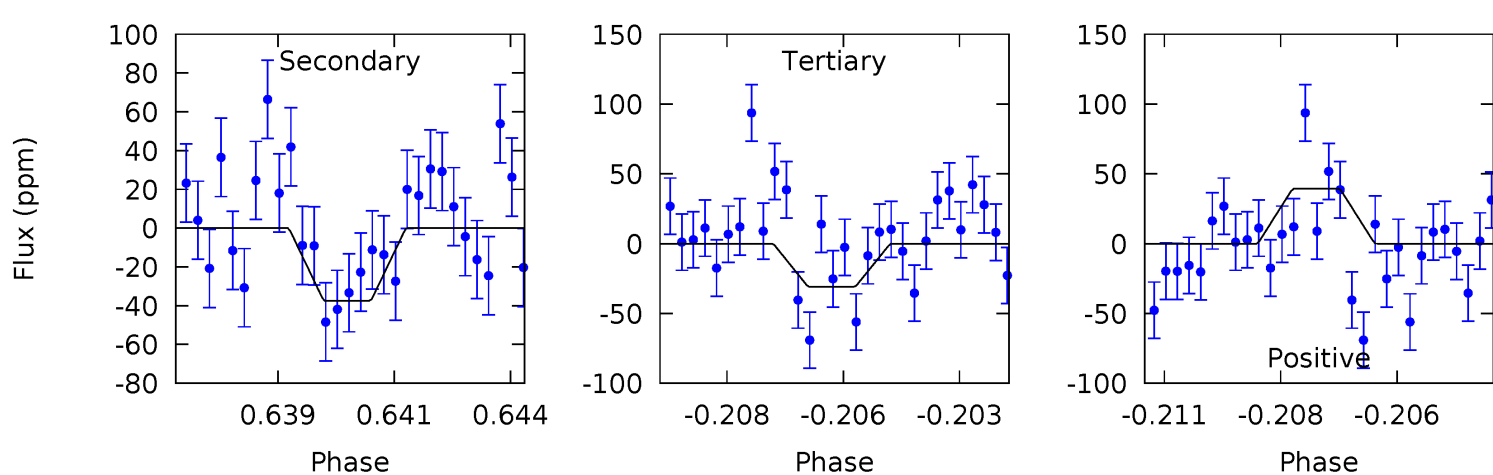
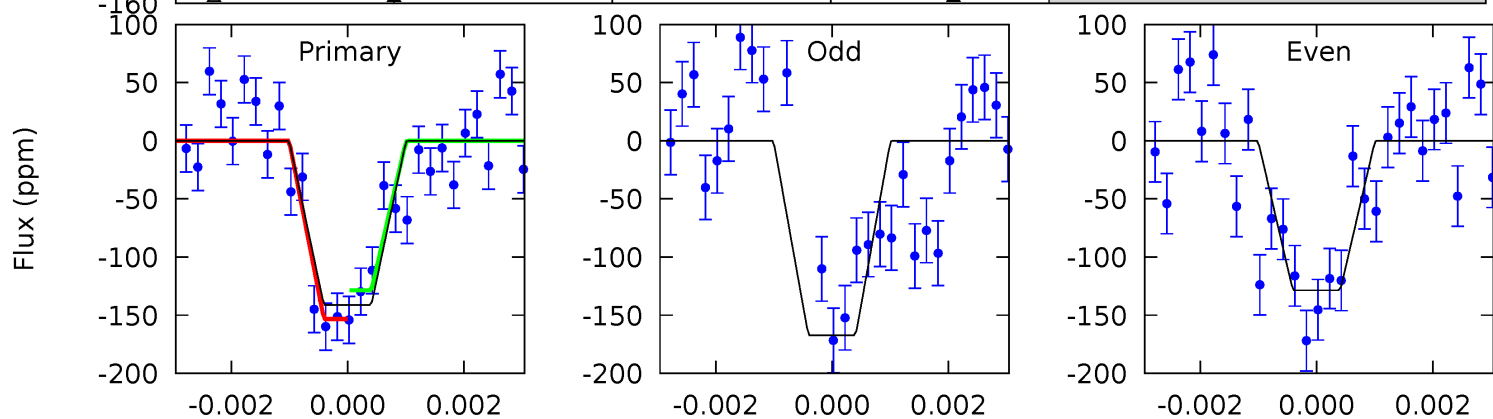
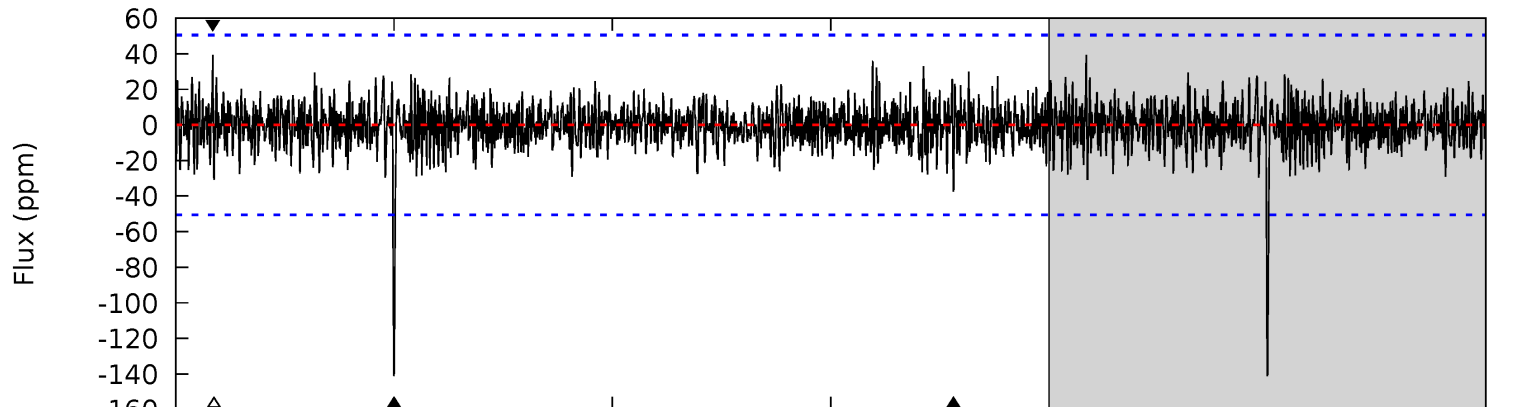
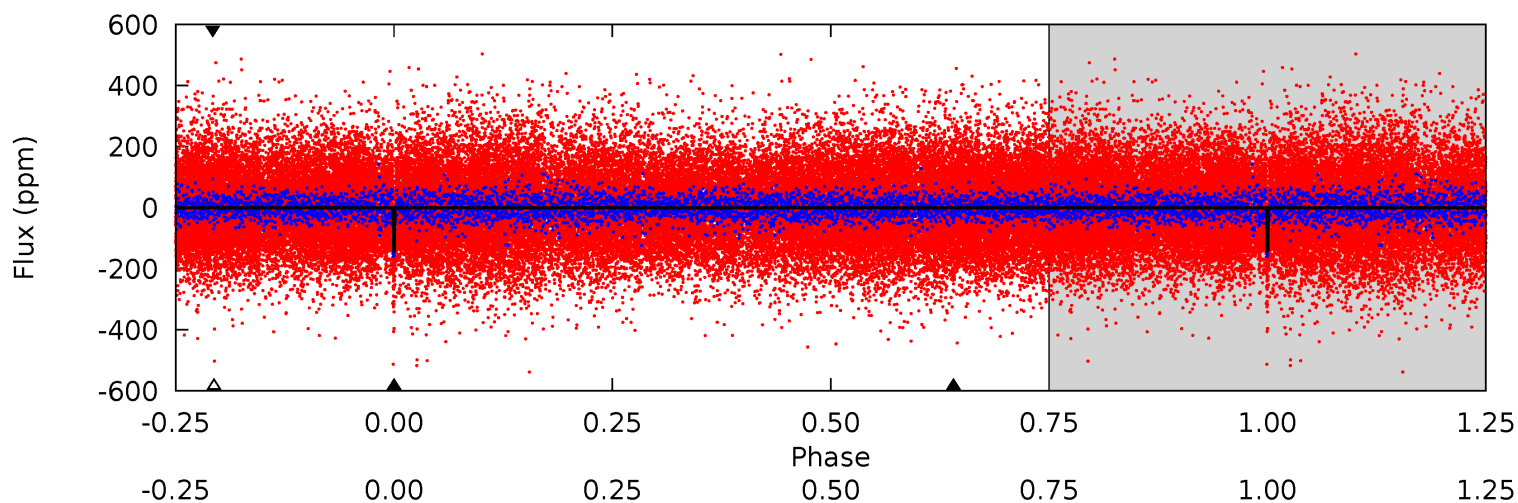
| Pri  | Sec  | Ter  | Pos  | FA <sub>1</sub> | FA <sub>2</sub> | F <sub>Red</sub> | Pri-Ter | Pri-Pos | Sec-Ter | Sec-Pos | Odd-Evn | DMM  | Shape | TAT  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 22.1 | 9.22 | 6.94 | 7.28 | 5.23            | 2.94            | 1.90             | 15.2    | 14.8    | 2.28    | 1.94    | 2.29    | 1.01 | 0.25  | 0.07 |



# Alt Model-Shift Uniqueness Test

005039053-01, P = 401.253818 Days, E = 328.718255 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  |
|------|------|------|------|-----------------|-----------------|------------------|---------|---------|---------|---------|---------|------|-------|------|
| 14.8 | 3.92 | 3.23 | 4.12 | 5.29            | 3.04            | 1.02             | 11.6    | 10.7    | 0.69    | -0.20   | 1.89    | 0.96 | 0.22  | 1.29 |



### Stellar Parameters For KIC 005039053

|        | $T_{\text{eff}}(K)$ | $\log(g)$                 | [Fe/H]                    | $R$ ( $R_{\odot}$ )       | $M$ ( $M_{\odot}$ )       | $p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ ) |
|--------|---------------------|---------------------------|---------------------------|---------------------------|---------------------------|---|
|        | $5858^{+79}_{-79}$  | $4.120^{+0.168}_{-0.098}$ | $0.100^{+0.150}_{-0.150}$ | $1.498^{+0.256}_{-0.313}$ | $1.080^{+0.116}_{-0.080}$ | $0.453^{+0.418}_{-0.149}$                     |
|        | +1%/-1%             | +4%/-2%                   | +150%/-150%               | +17%/-21%                 | +11%/-7%                  | +92%/-33%                                     |
| Source | SPE90               | SPE90                     | SPE90                     | DSEP                      |                           |   |

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

### Secondary Eclipse Parameters for KIC 005039053-01 / KOI 5121.01

| Detrend | Depth (ppm)  | $R_p$ ( $R_{\oplus}$ ) | $T_{max}$ (K)     | $T_{obs}$ (K)        | $A_{obs}$               |
|---------|--------------|------------------------|-------------------|----------------------|-------------------------|
| DV      | $-78 \pm 8$  | $2.00^{+0.51}_{-0.49}$ | $422^{+18}_{-22}$ | $5037^{+651}_{-435}$ | $12965^{+9876}_{-4787}$ |
| Alt.    | $-37 \pm 10$ | $1.91^{+0.48}_{-0.48}$ | $420^{+19}_{-24}$ | $4393^{+562}_{-379}$ | $6773^{+5669}_{-2746}$  |

$T_{max}$  = 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

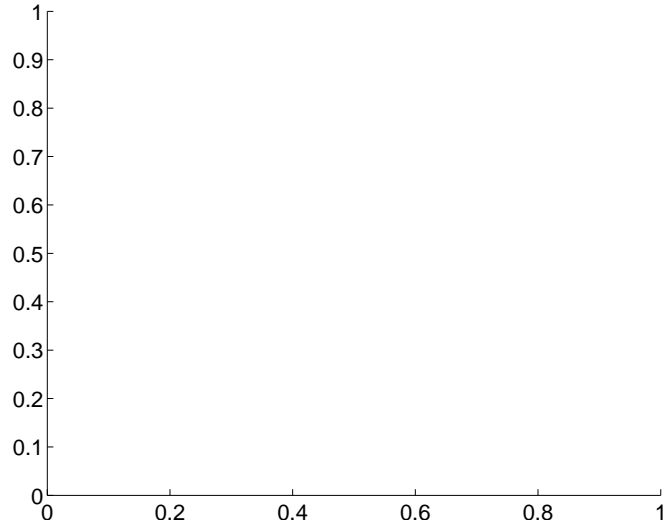
Supplemental centroid analysis for 005039053-01. Kepler magnitude: 12.62. Transit SNR 10.76

There are 0 quarters with good PRF difference image offsets

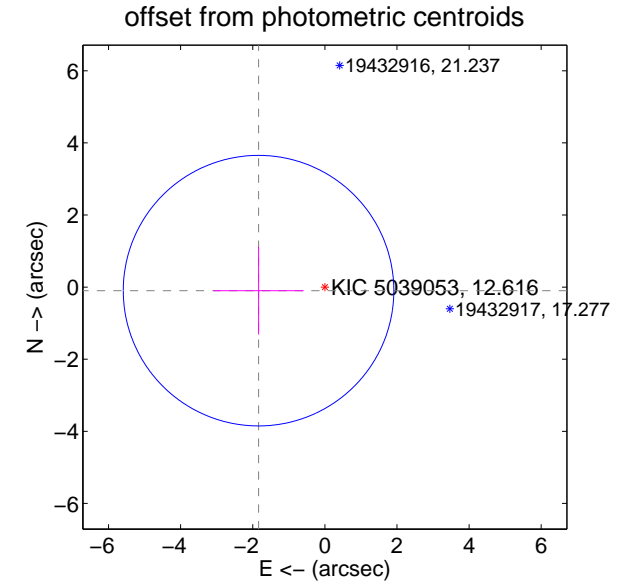
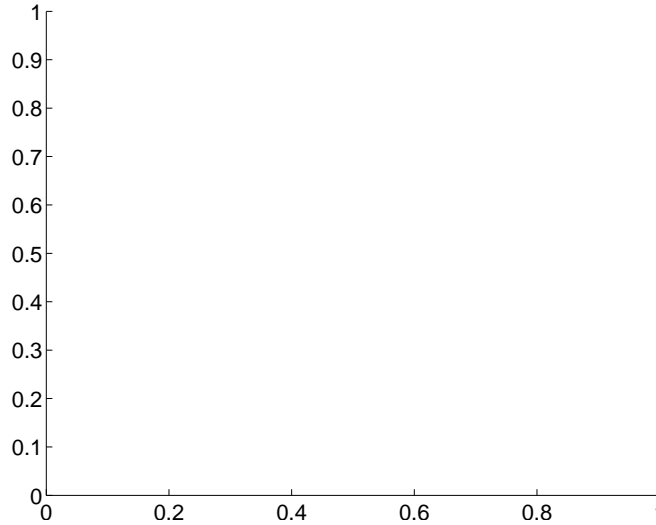
The direct PRF centroid is offset from the target star catalog position by about NaN arcsec

|   | Distance in arcsec | Distance / $\sigma$ | $\Delta$ RA     | $\Delta$ Dec     |
|---|--------------------|---------------------|-----------------|------------------|
| PRF-fit source offset from OOT          | —                  | —                   | —               | —                |
| PRF-fit source offset from KIC position | —                  | —                   | —               | —                |
| photometric centroid source offset      | $1.84 \pm 1.25$    | 1.47                | $1.84 \pm 1.25$ | $-0.10 \pm 1.22$ |

There is no PRF-fit offset from OOT-fit



There is no PRF-fit offset from KIC



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



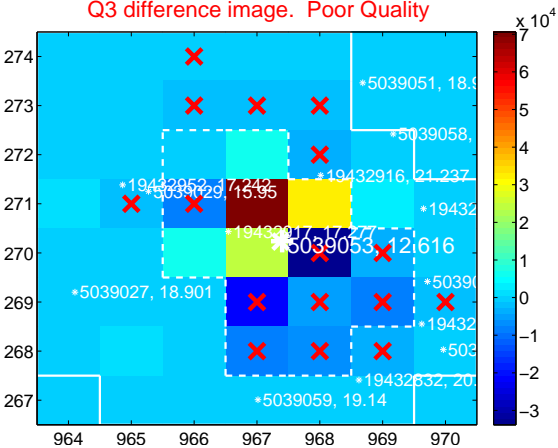
Q2 no difference image



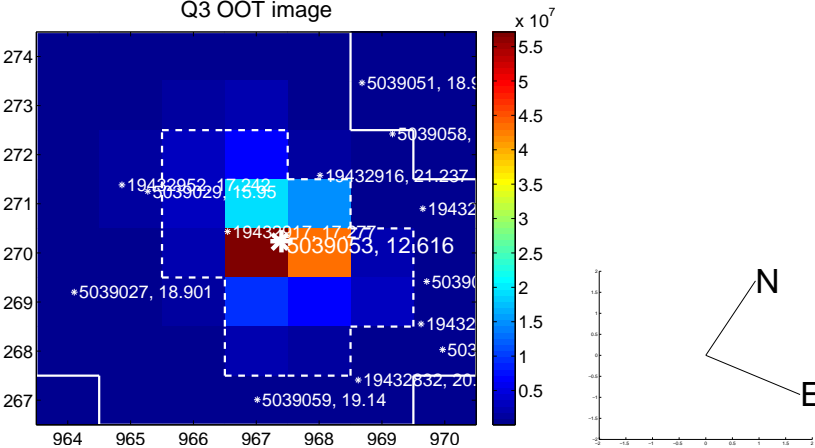
Q2 no OOT image



Q3 difference image. Poor Quality



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.



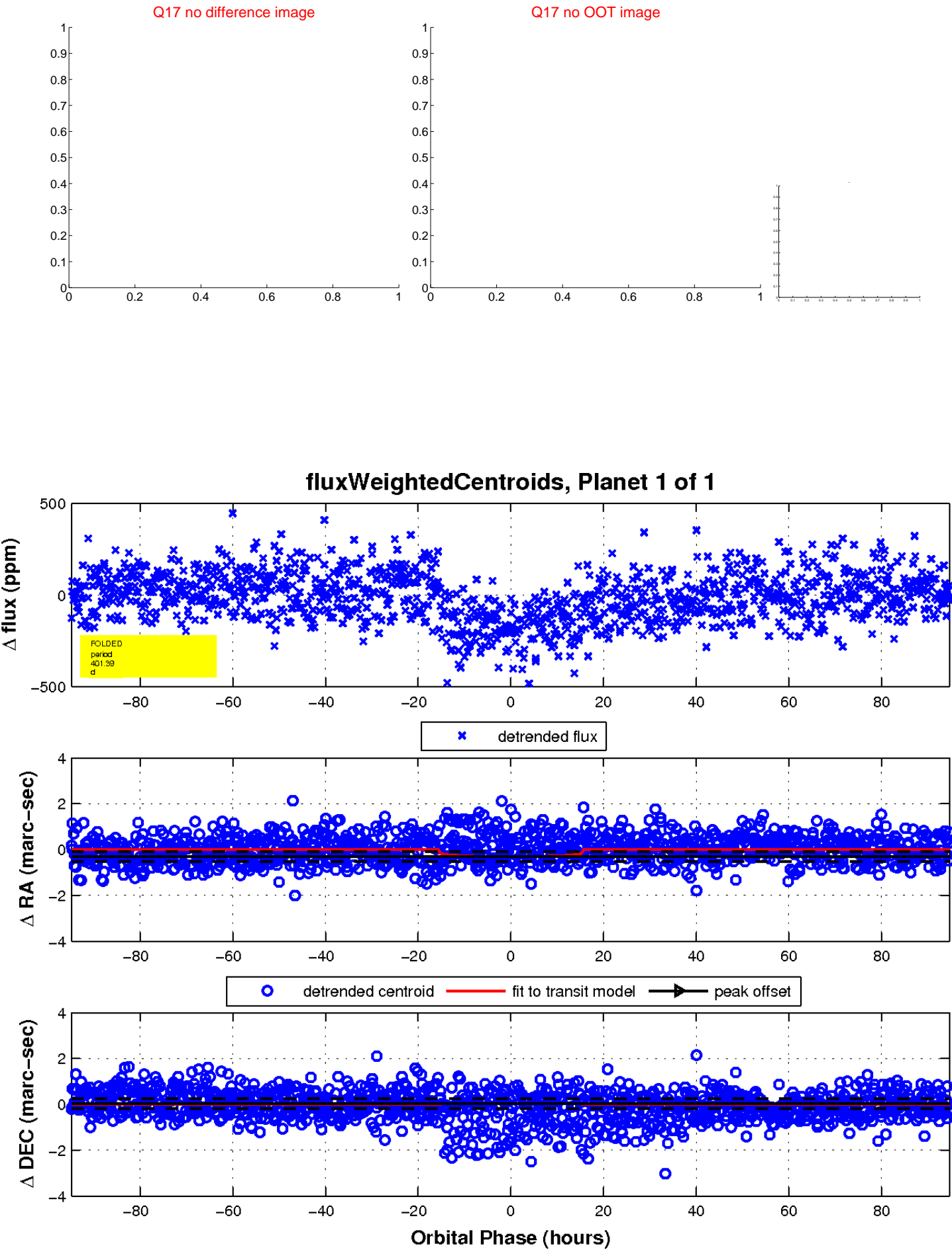
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

Declination

