

# KIC 003660006

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003660006-01	OBS	No	0.542788	131.566015	191.3	3.031	11.3	11.7	3.11	7872	5.01	117708.64
003660006-02	OBS	No	0.992769	131.925897	710.1	7.513	12.8	19.9	3.11	7872	15.59	52624.07

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003660006-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV
003660006-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—TRANS_GAPPED—LPP_DV—LPP_ALT

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

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

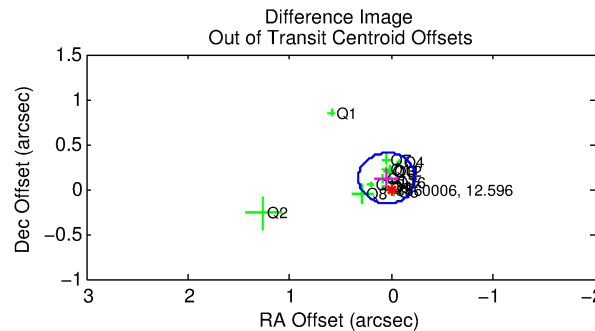
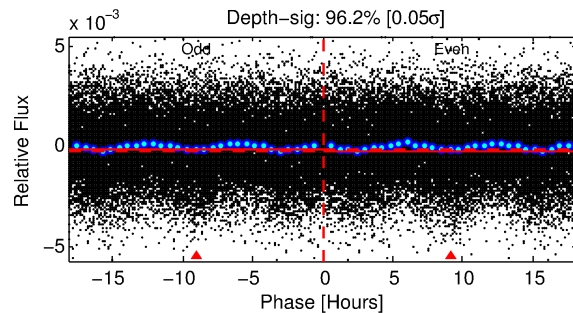
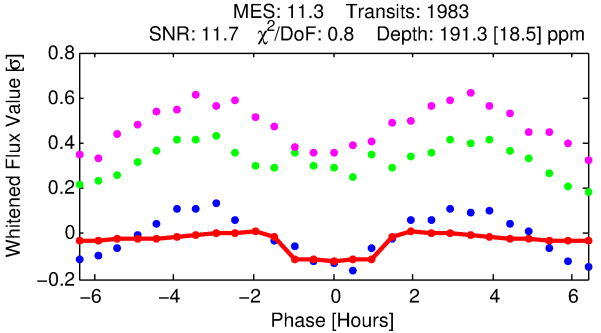
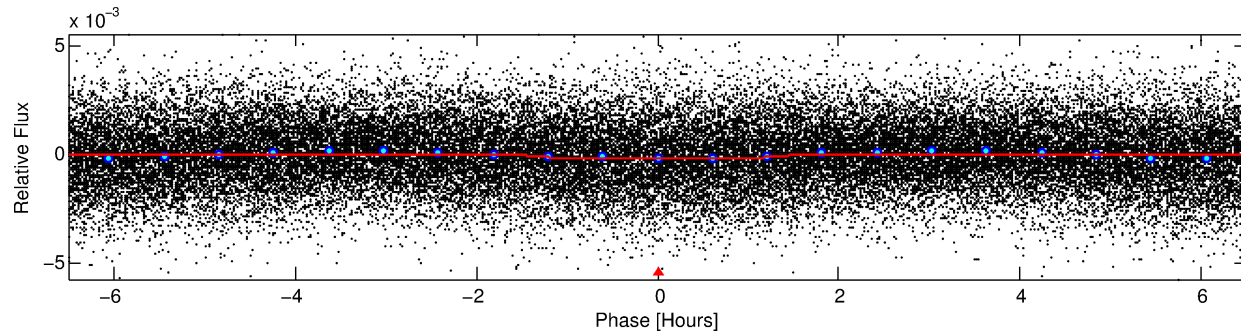
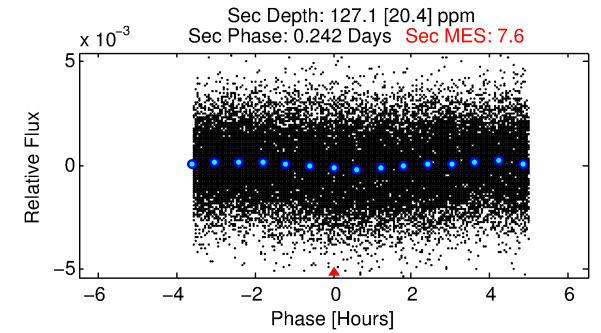
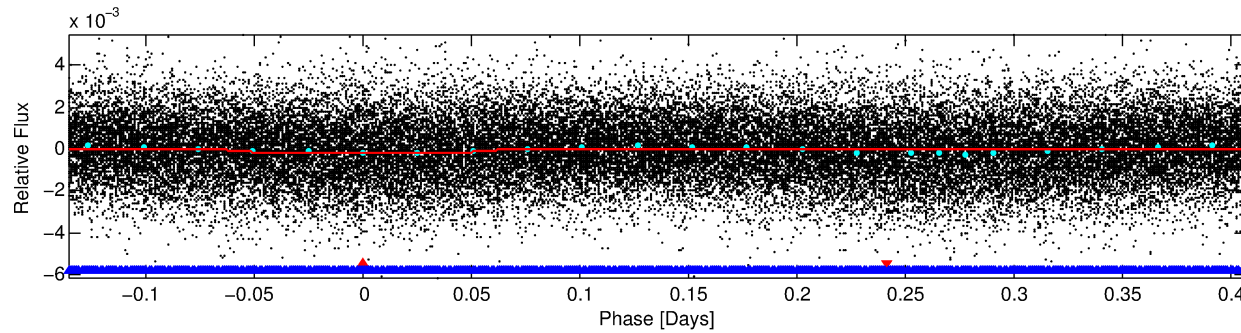
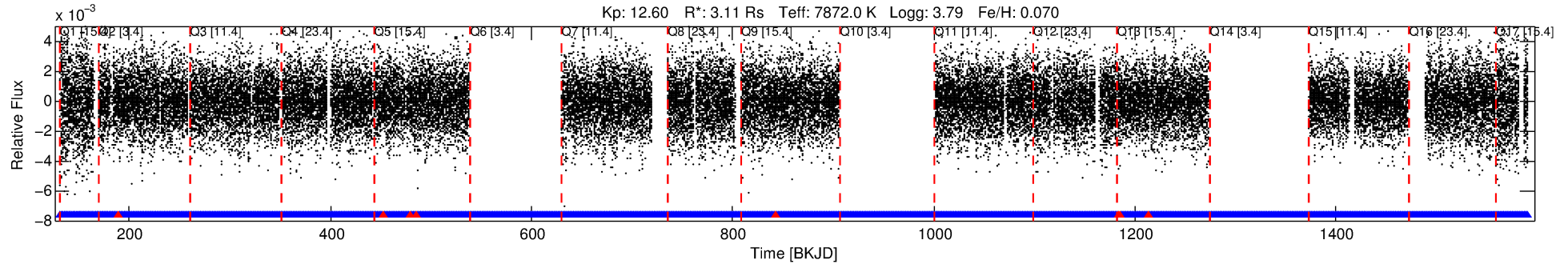
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 003660006-01

No Significant Match Found

# DV One-Page Summary

KIC: 3660006 Candidate: 1 of 2 Period: 0.543 d



## DV Fit Results:

Period = 0.54279 [0.00001] d  
Epoch = 131.5660 [0.0025] BKJD  
Rp/R\* = 0.0148 [0.0034]  
a/R\* = 1.14 [0.36]  
b = 0.90 [0.29]  
Seff = 117708.64 [71192.67]  
Teq = 4723 [714] K  
Rp = 5.01 [2.30] Re  
a = 0.0168 [0.0062] AU  
Ag = 0.79 [0.60] [-0.36σ]  
Teffp = 6879 [881] K [1.90σ]

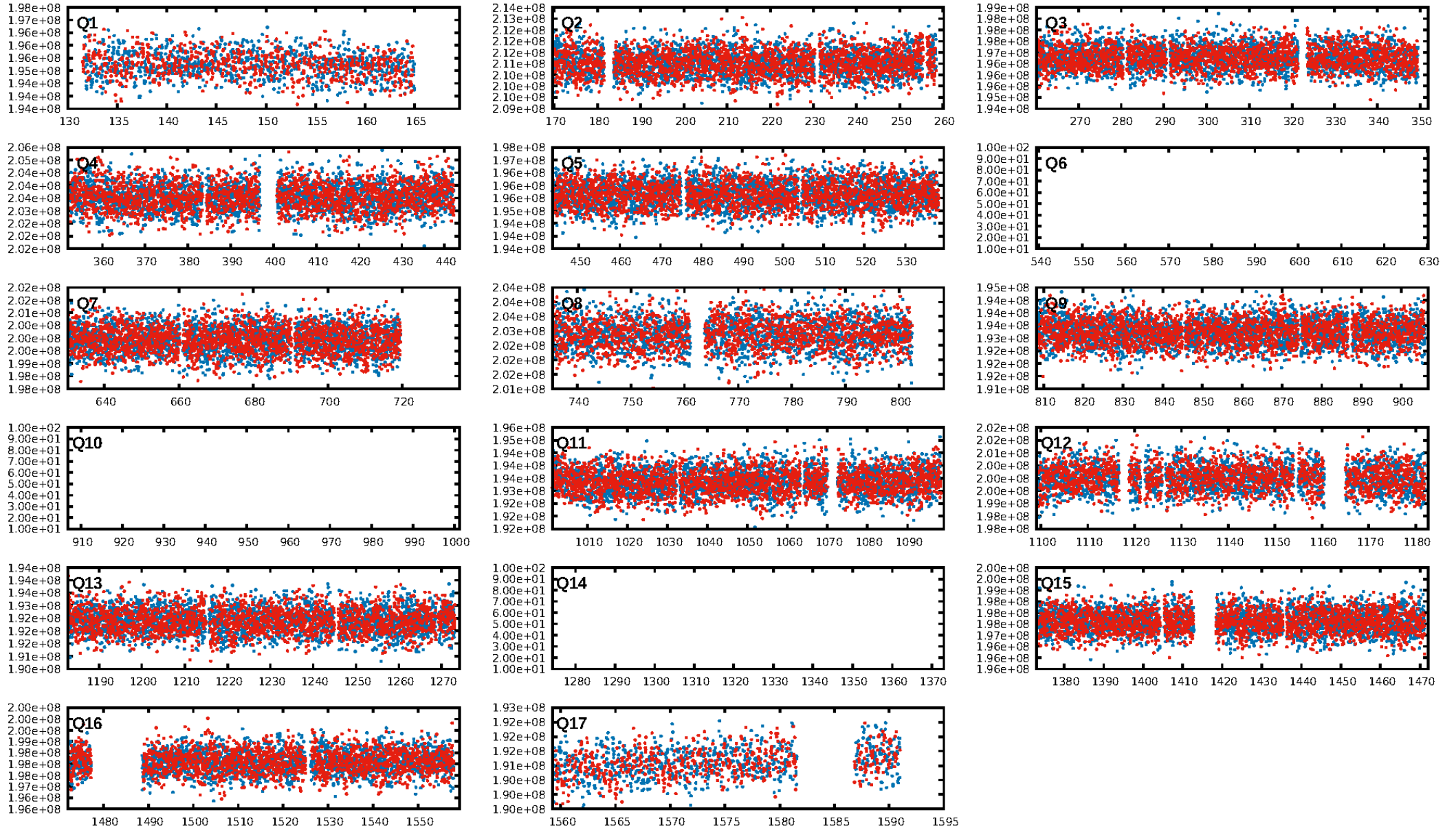
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 81.8% [1.33σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [1864/1872]  
GhostDiagnostic-chr: 1.396  
Centroid-sig: 54.6%  
Centroid-so: 0.219 arcsec [1.93σ]  
OotOffset-rm: 0.130 arcsec [1.39σ]  
OotOffset-st: 1/4/4/5 [14]  
KicOffset-rm: 0.145 arcsec [1.42σ]  
KicOffset-st: 1/4/4/5 [14]  
DiffImageQuality-fgm: 1.00 [14/14]  
DiffImageOverlap-fno: 1.00 [14/14]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 21:14:56 Z

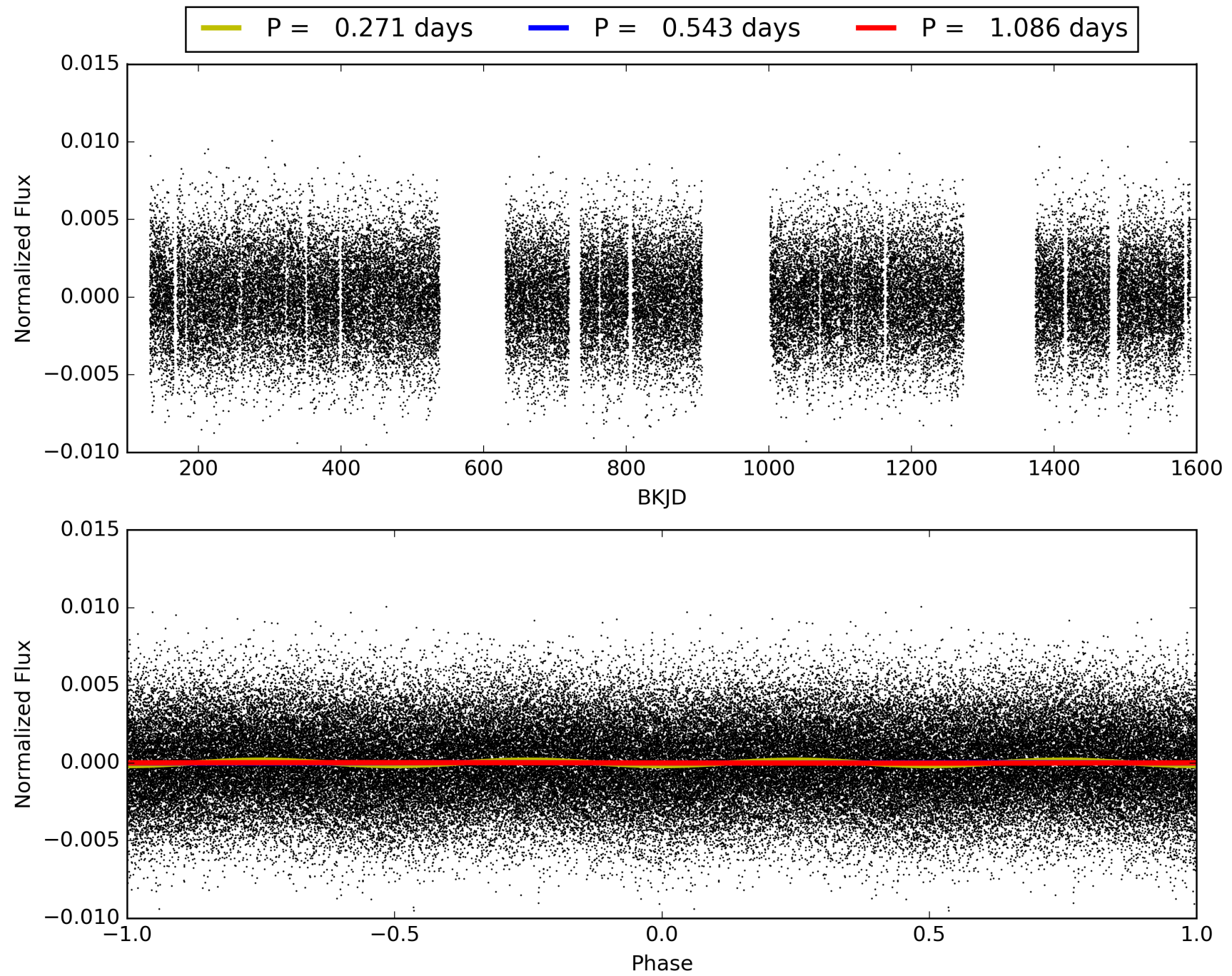
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 003660006-01, PDC Light Curves



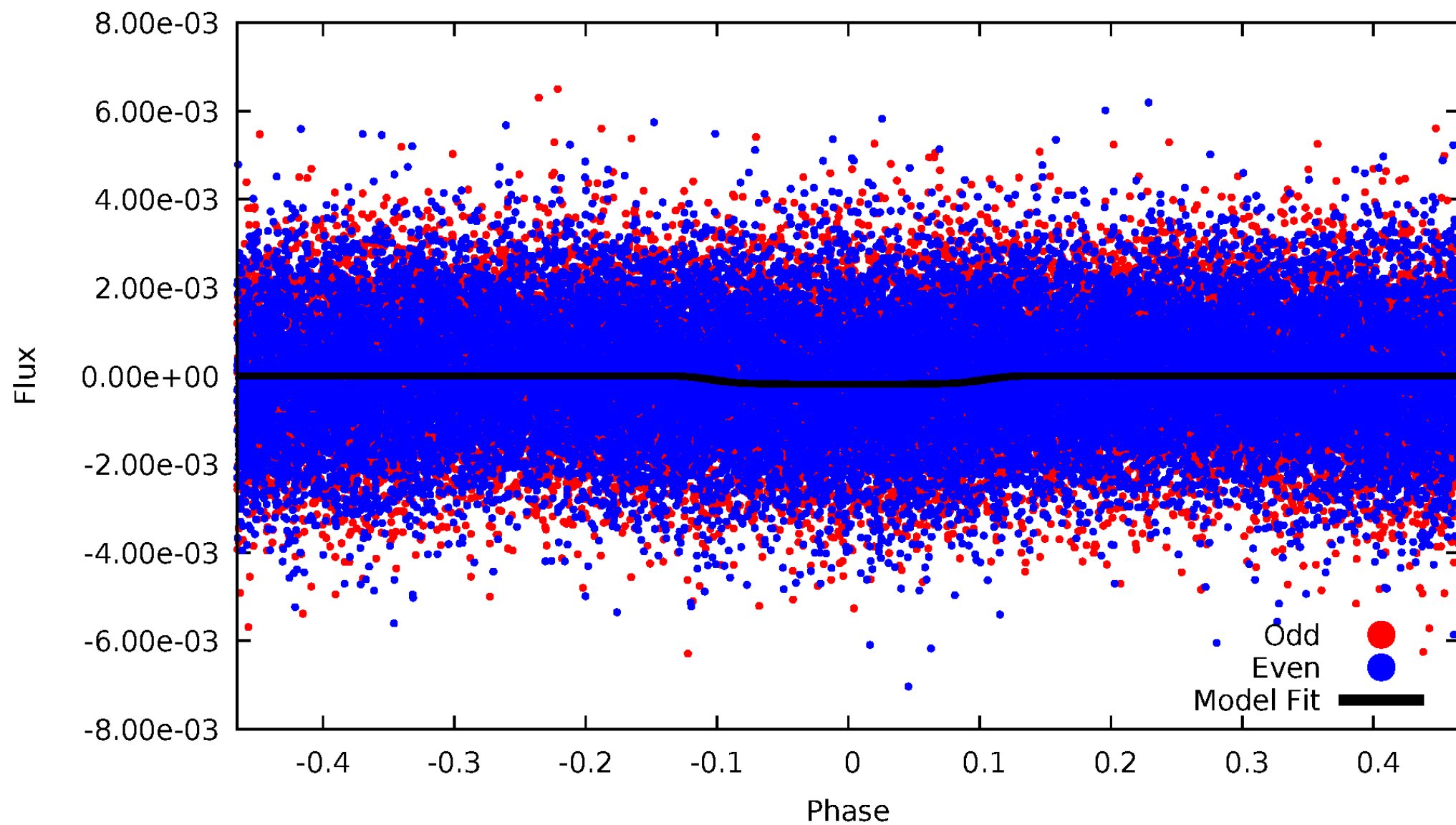


TCE 003660006-01



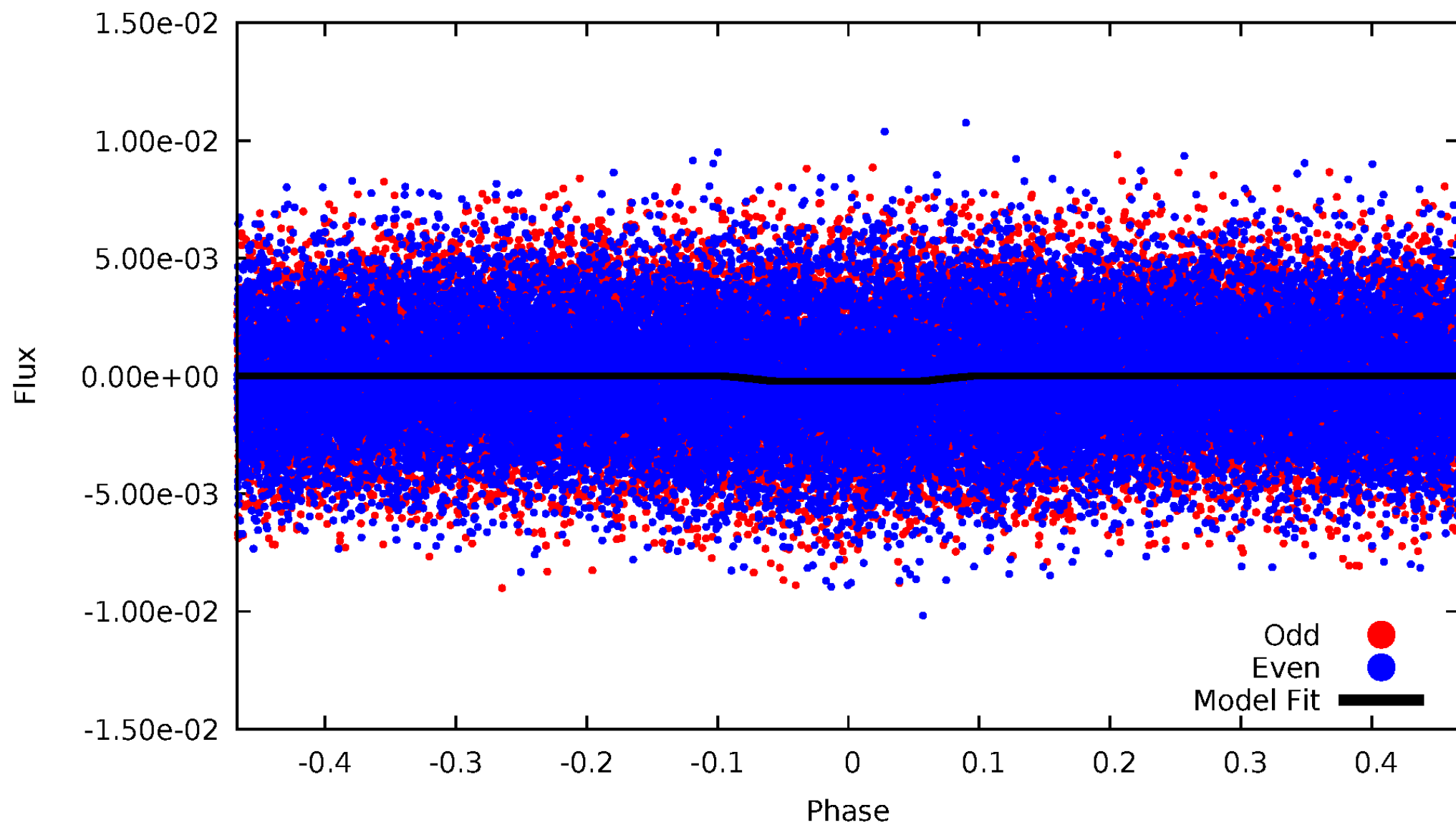
# DV Odd/Even

TCE 003660006-01



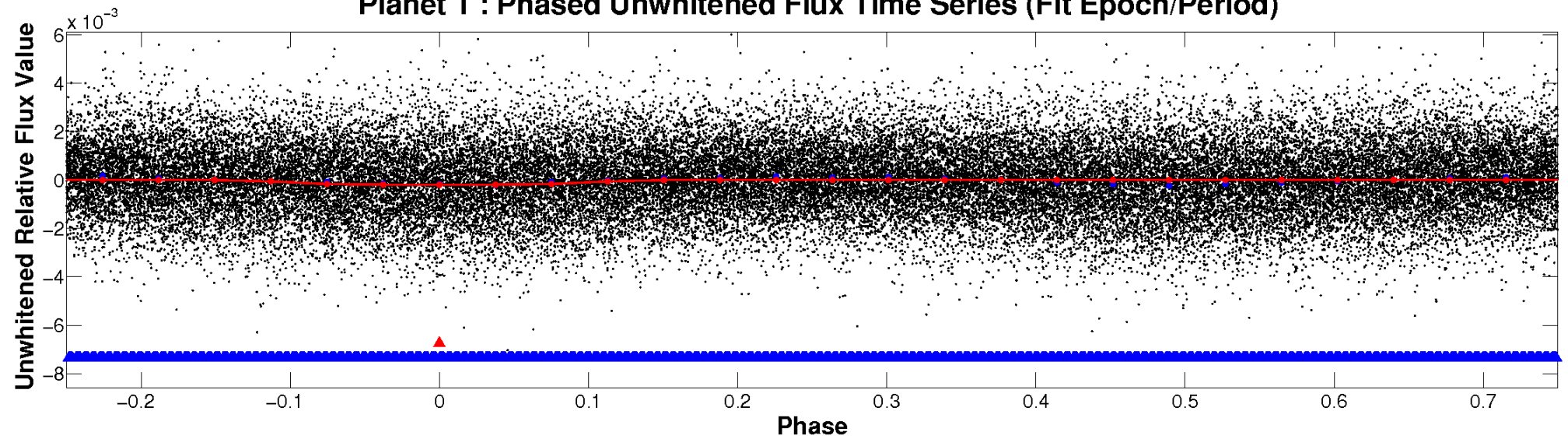
# ALT Odd/Even

TCE 003660006-01

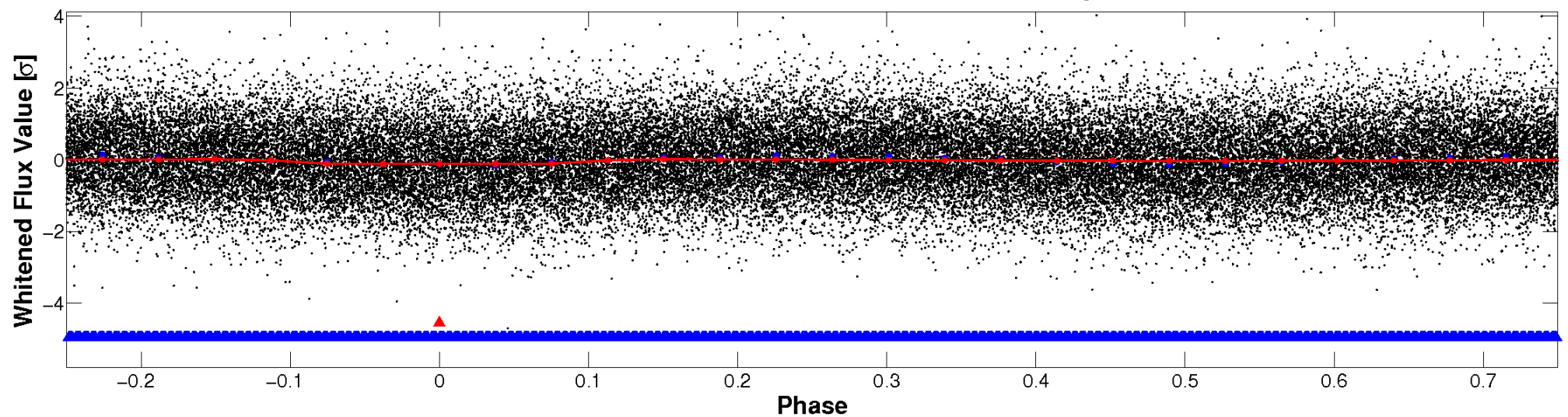


# Non-Whitened Vs. Whitened Light Curve

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



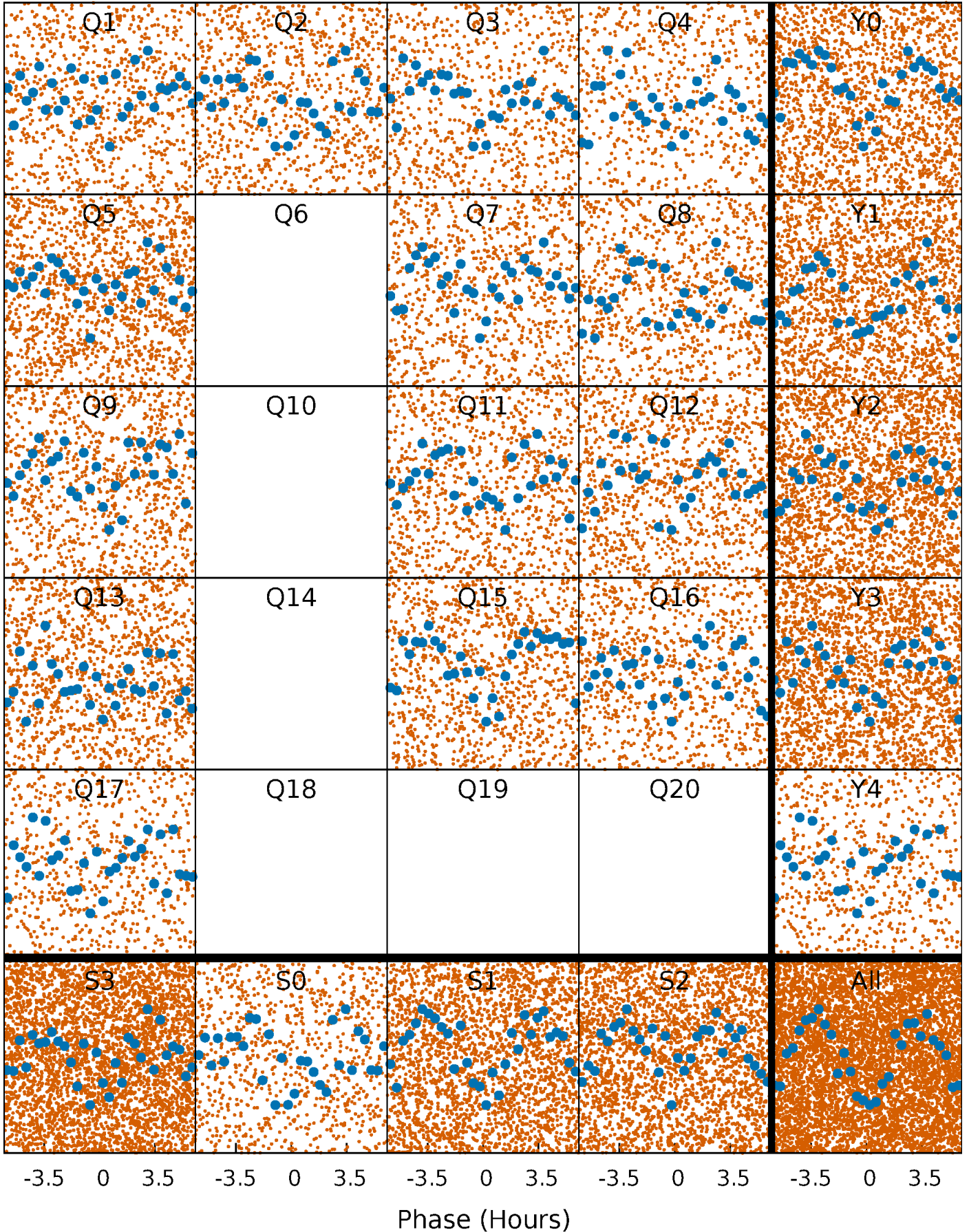
**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**





# PDC Quarter-Phased Transit Curves

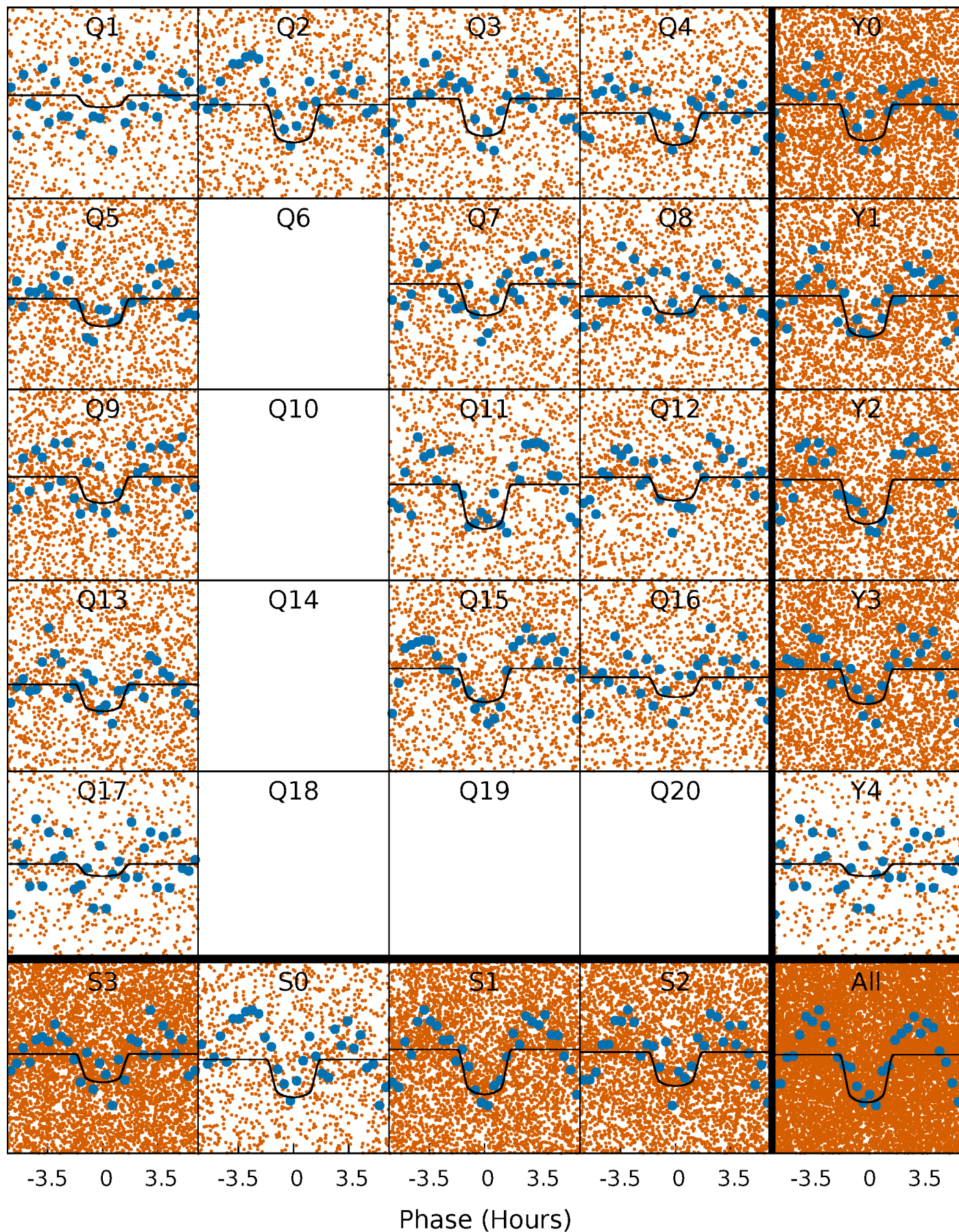
TCE 003660006-01   P= 0.542788 Days    $T_0=131.566015$  (BKJD)





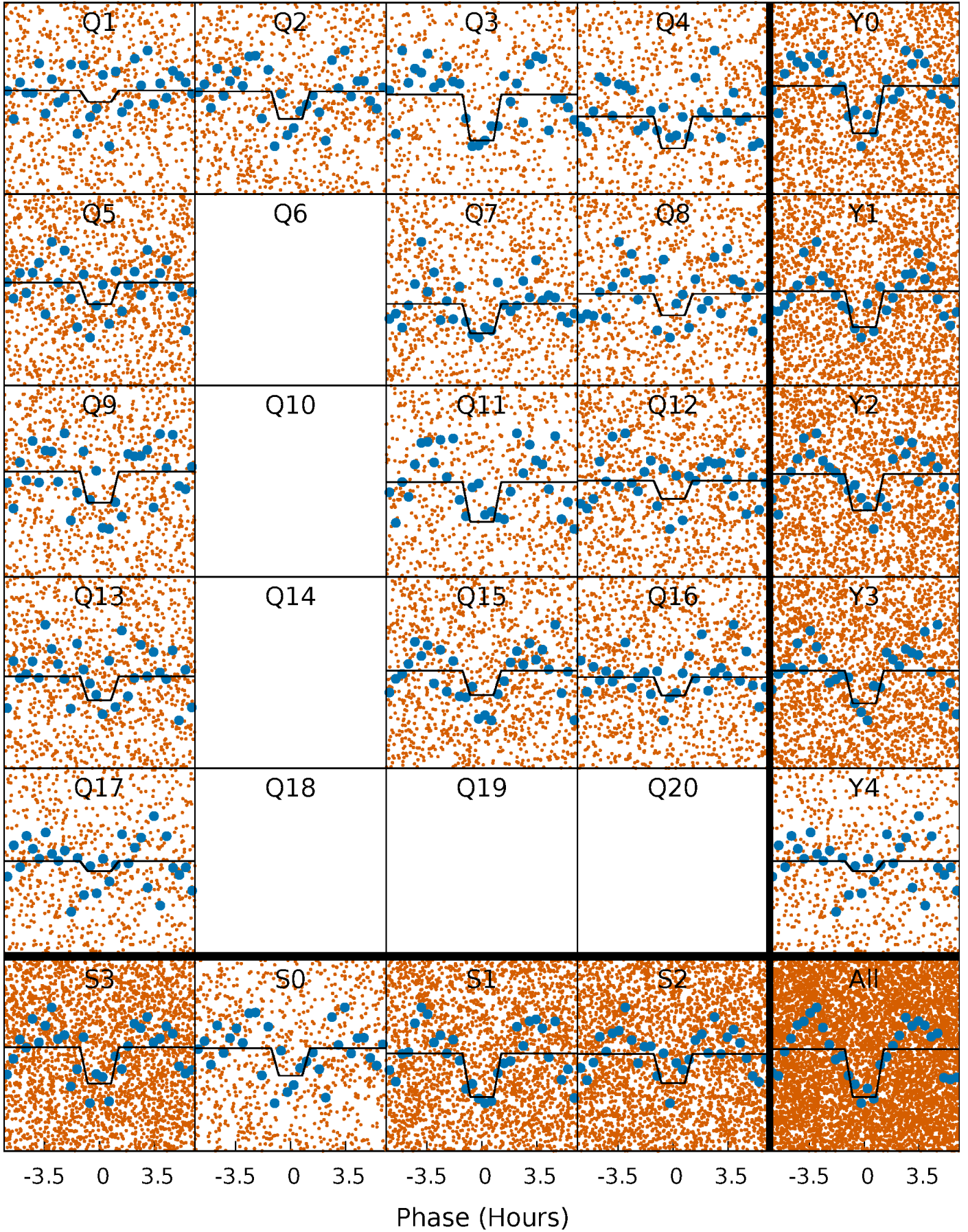
# DV Quarter-Phased Transit Curves

TCE 003660006-01 P= 0.542788 Days  $T_0=131.566015$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 003660006-01   P= 0.542792 Days    $T_0=131.565773$  (BKJD)

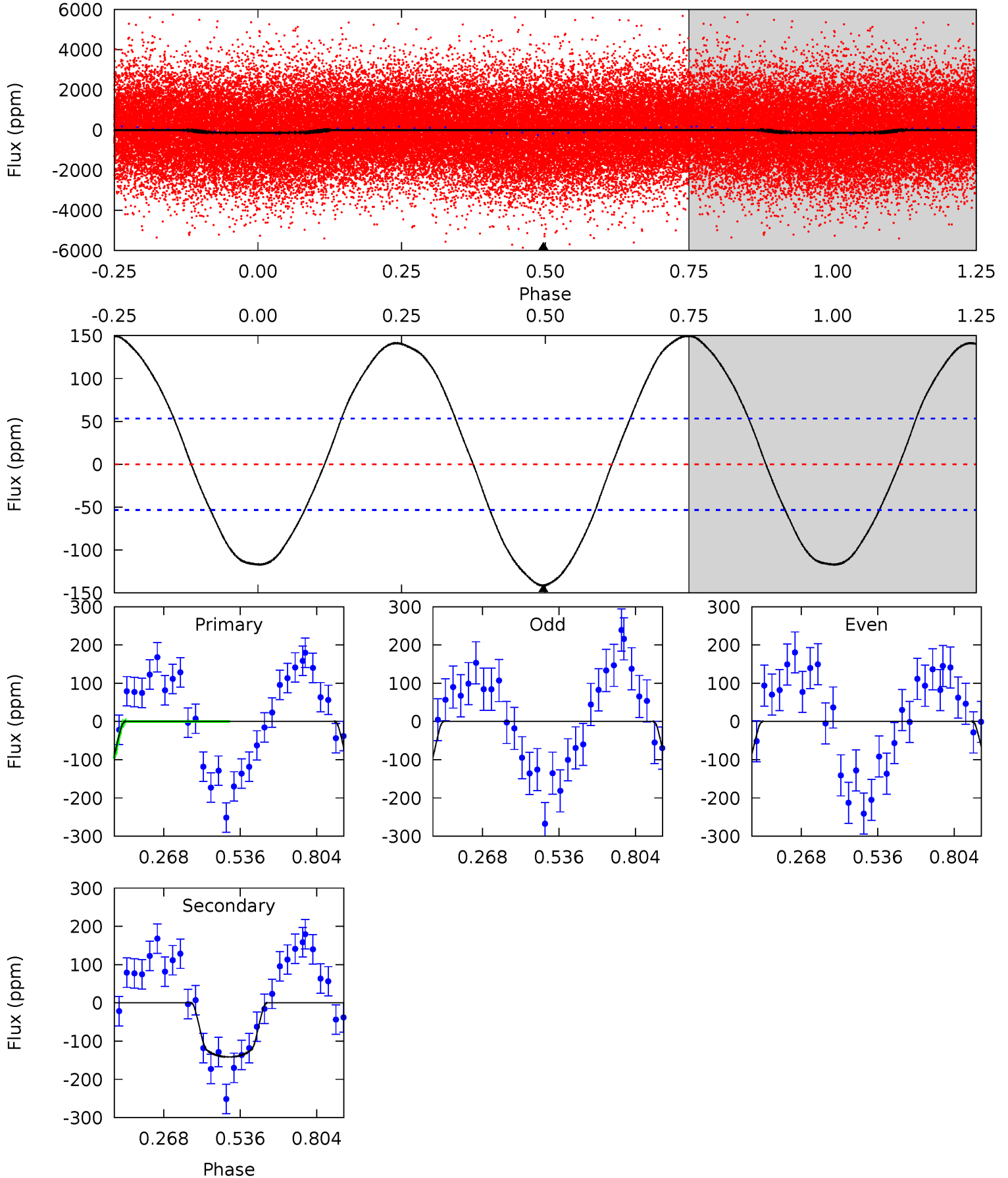




# DV Model-Shift Uniqueness Test

003660006-01, P = 0.542788 Days, E = 131.023227 Days

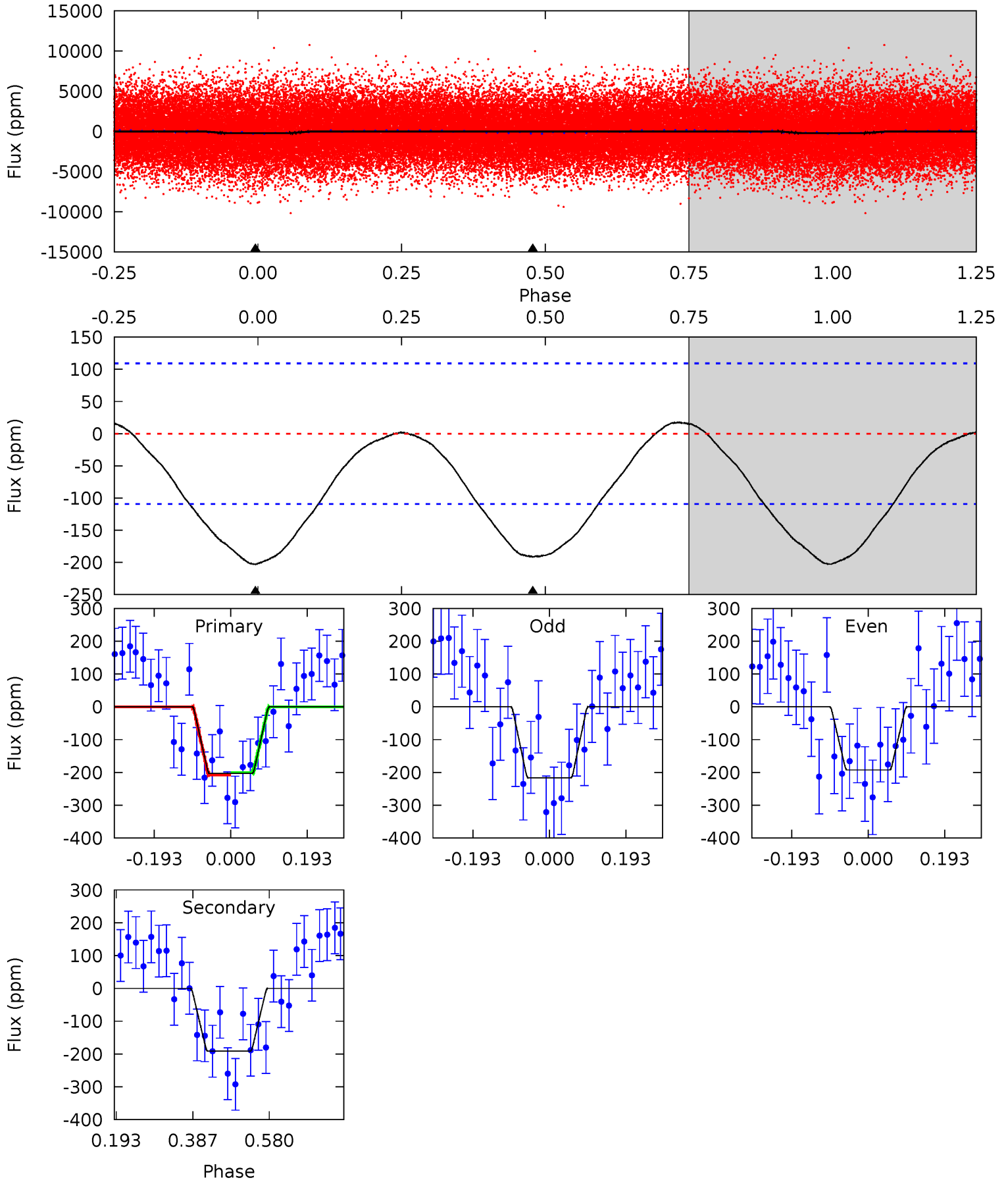
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.5	11.5	0	0	4.35	1.11	7.36	11.5	11.5	11.5	11.5	0.49	1.45	0.51	0.73



# Alt Model-Shift Uniqueness Test

003660006-01, P = 0.542792 Days, E = 131.022981 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
8.21	7.73	0	0	4.42	1.30	0.43	8.21	8.21	7.73	7.73	0.49	1.05	0.08	0.15





### Stellar Parameters For KIC 003660006

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7872^{+218}_{-327}$	$3.785^{+0.337}_{-0.112}$	$0.070^{+0.200}_{-0.350}$	$3.109^{+0.667}_{-1.239}$	$2.150^{+0.309}_{-0.574}$	$0.101^{+0.276}_{-0.036}$
	+3%/-4%	+9%/-3%	+286%/-500%	+21%/-40%	+14%/-27%	+274%/-35%
Source	KIC0	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 003660006-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-141 \pm 12$	$4.59^{+1.48}_{-1.32}$	$6413^{+524}_{-671}$	$6291^{+1363}_{-954}$	$1.029^{+0.983}_{-0.423}$
Alt.	$-191 \pm 25$	$4.67^{+1.44}_{-1.31}$	$6419^{+465}_{-638}$	$7028^{+1494}_{-1119}$	$1.372^{+1.245}_{-0.571}$

$T_{\text{max}}$  = Theoretical Maximum Planetary Temperature

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

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

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

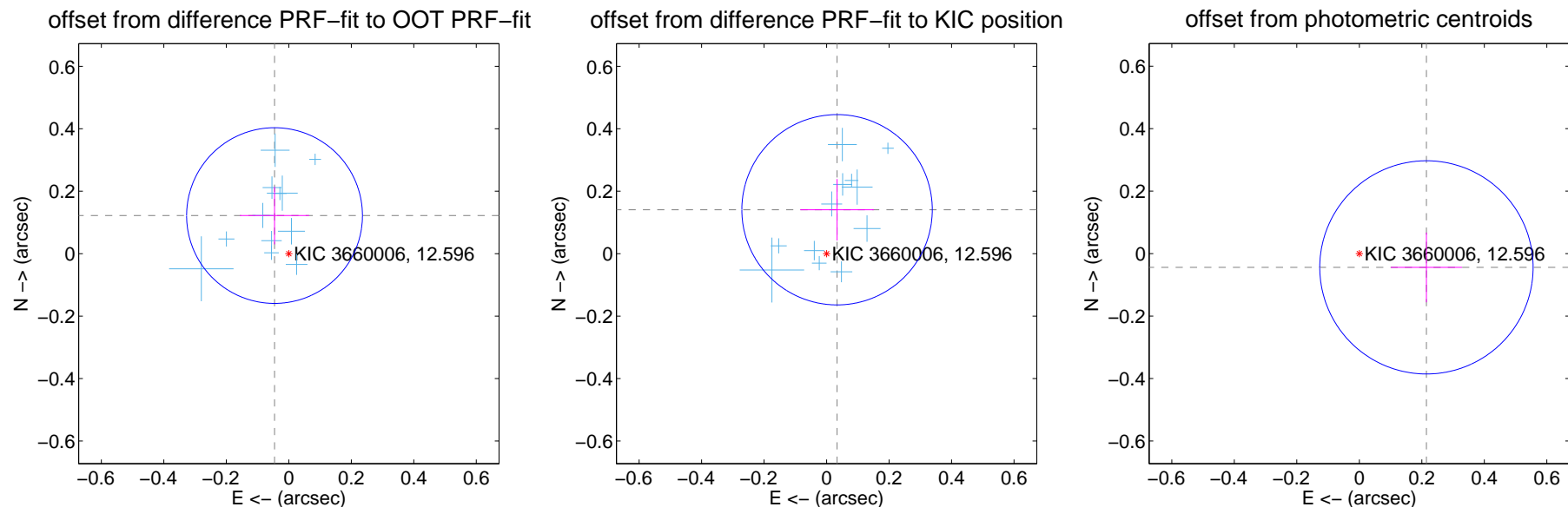
## DV Centroid Data

Supplemental centroid analysis for 003660006-01. Kepler magnitude: 12.60. Transit SNR 11.71

There are 14 quarters with good PRF difference image offsets

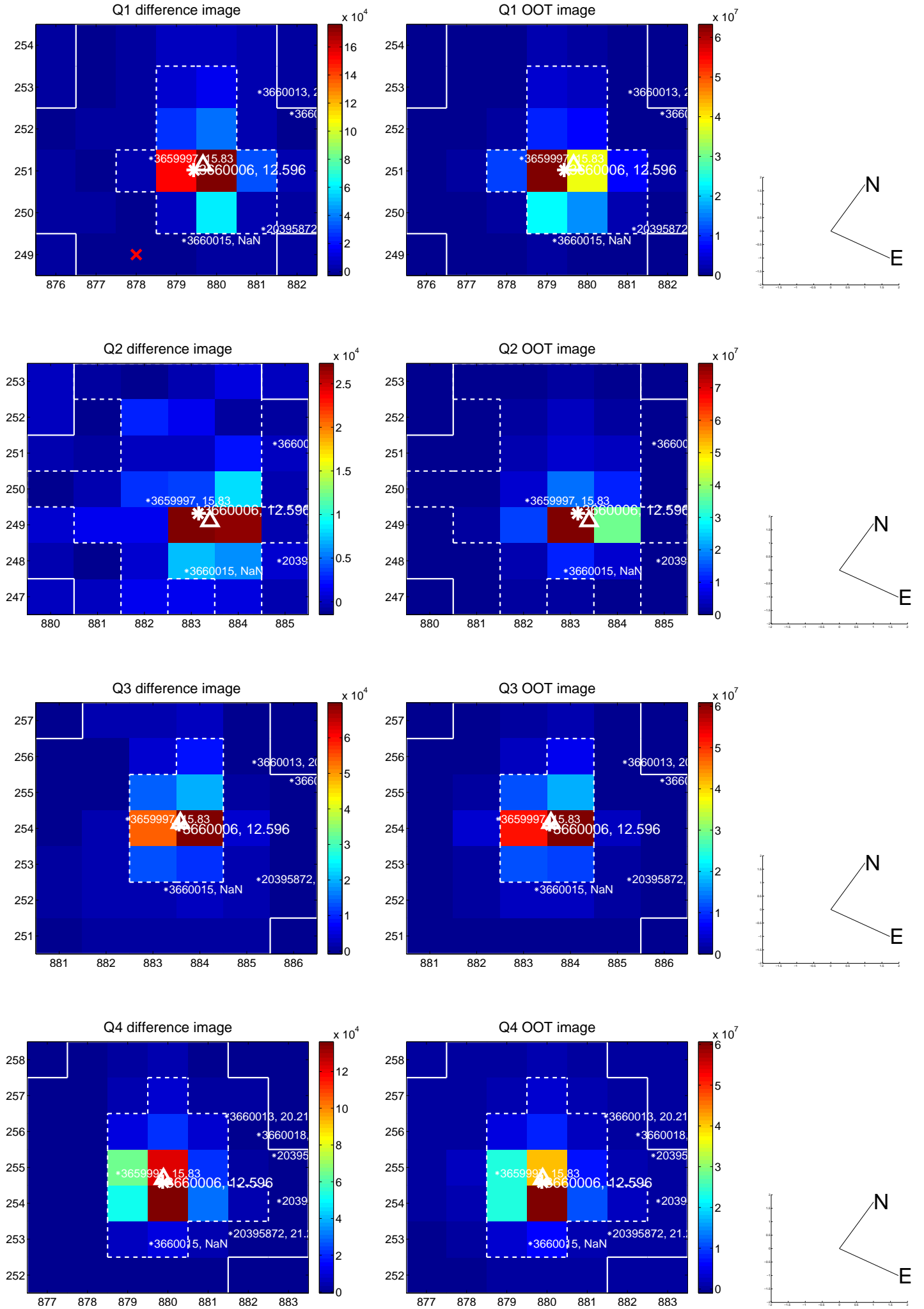
The direct PRF centroid is offset from the target star catalog position by about 0.04 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.130 \pm 0.094$	1.39	$0.046 \pm 0.111$	$0.122 \pm 0.092$
PRF-fit source offset from KIC position	$0.145 \pm 0.102$	1.42	$-0.034 \pm 0.118$	$0.141 \pm 0.098$
photometric centroid source offset	$0.22 \pm 0.11$	1.93	$-0.21 \pm 0.11$	$-0.04 \pm 0.11$

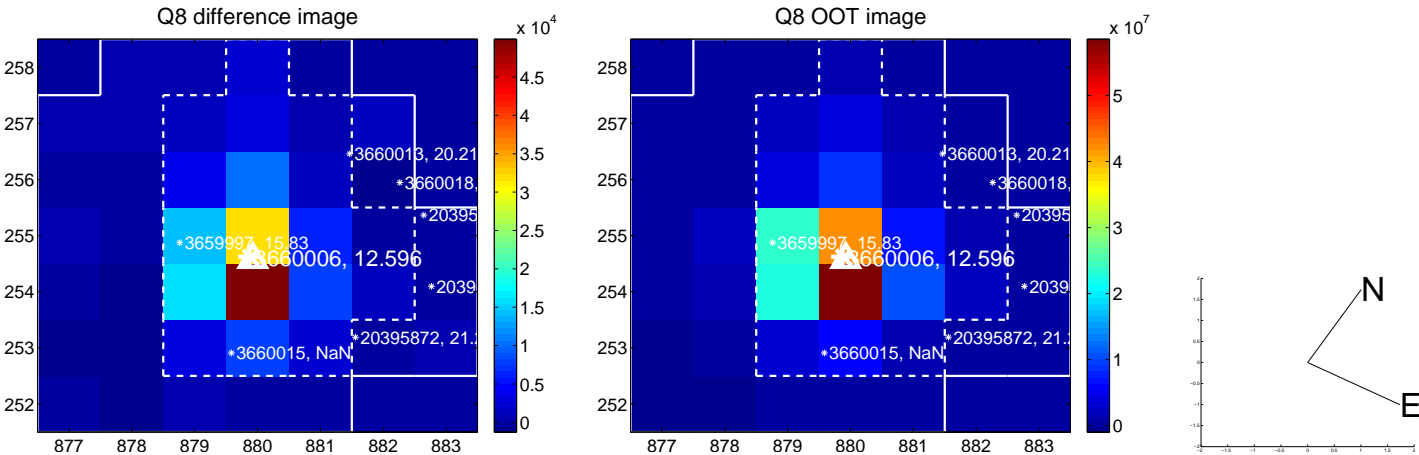
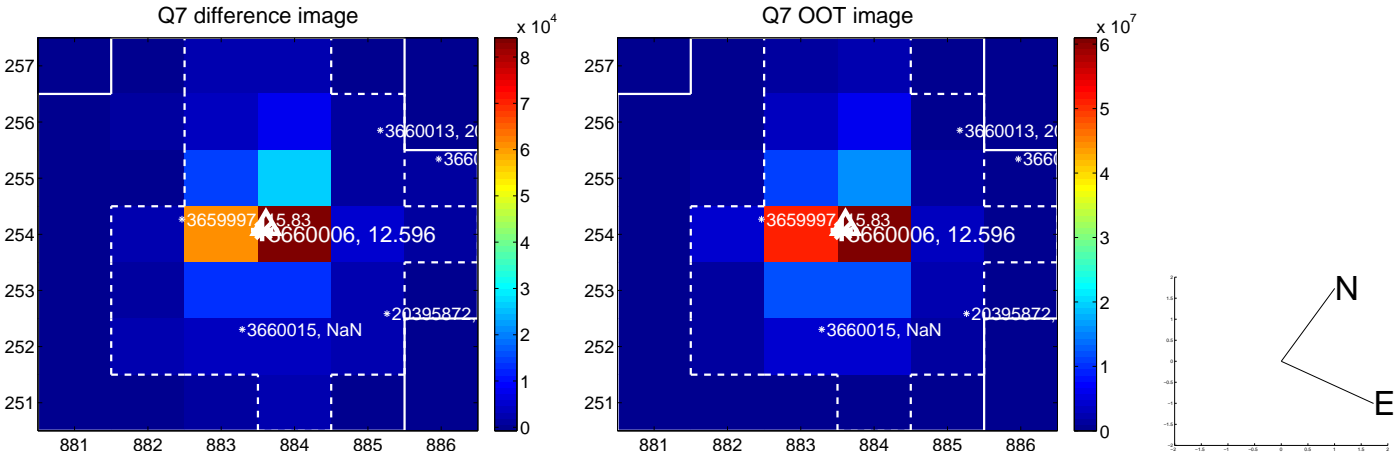
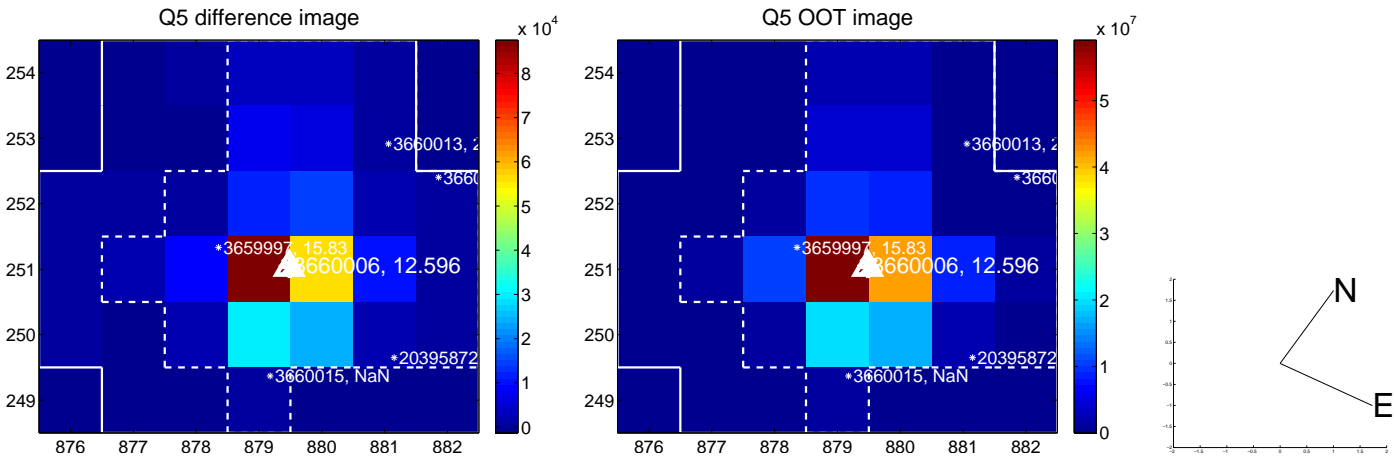


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: 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.

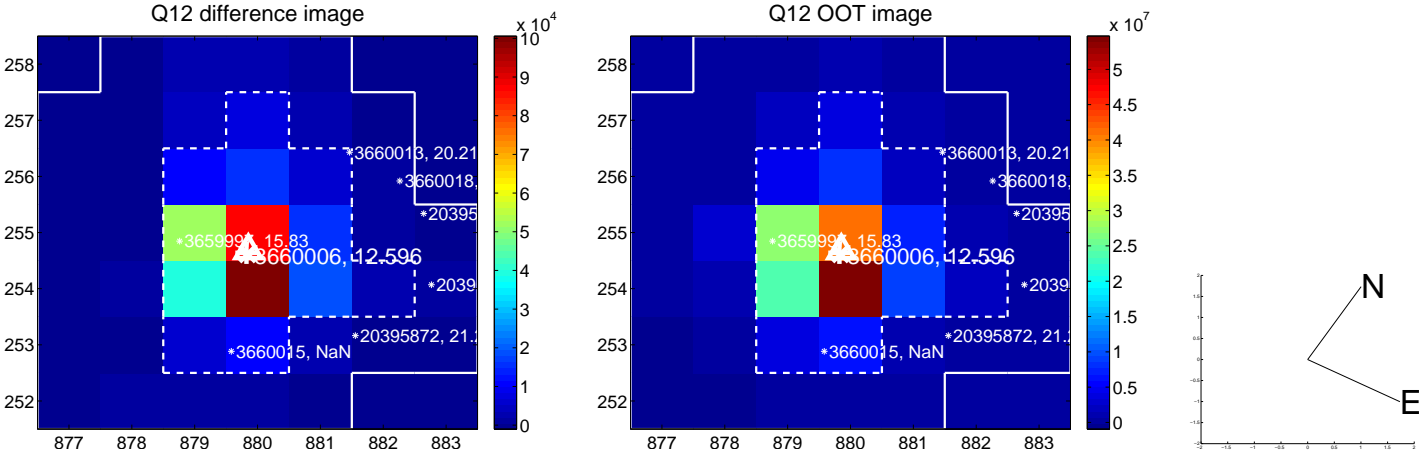
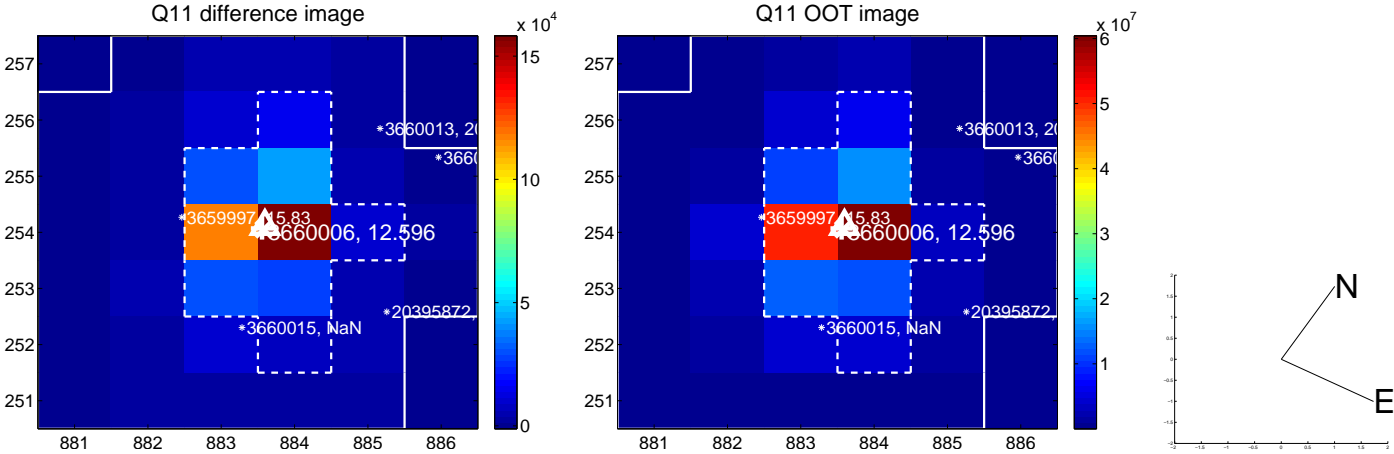
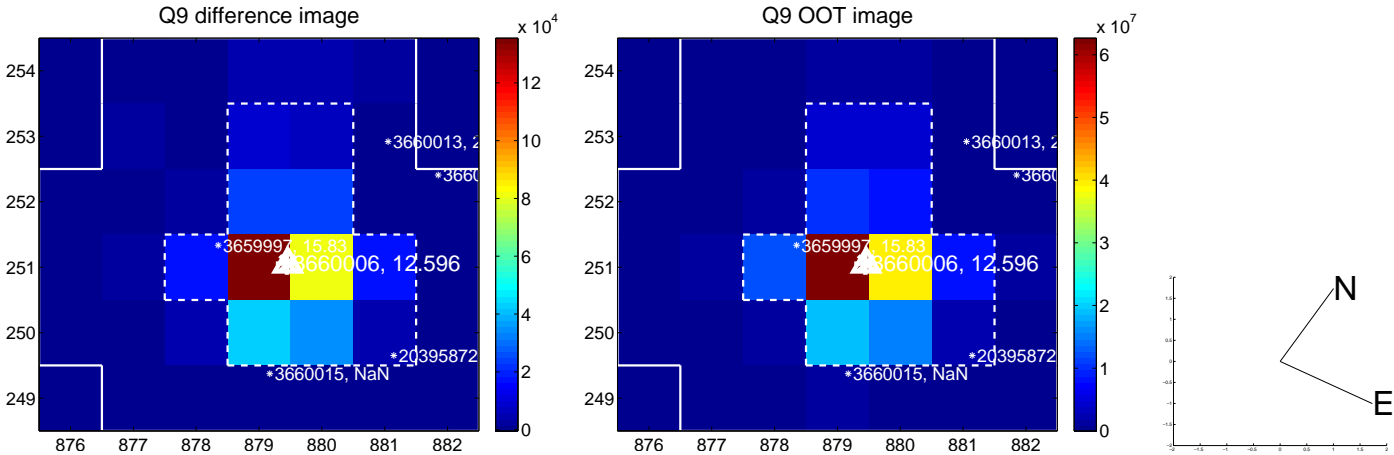


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

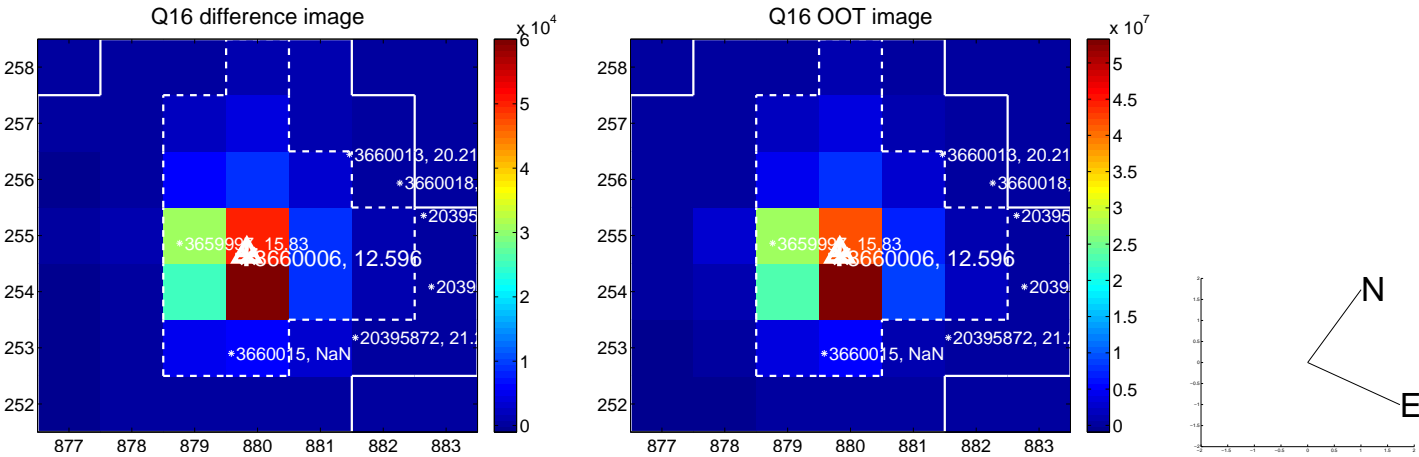
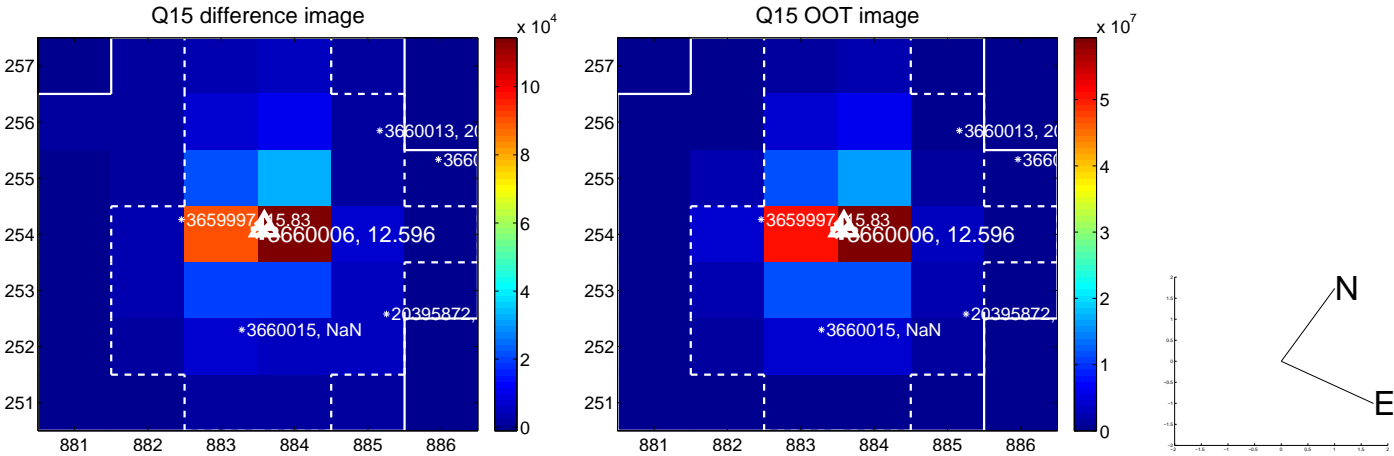
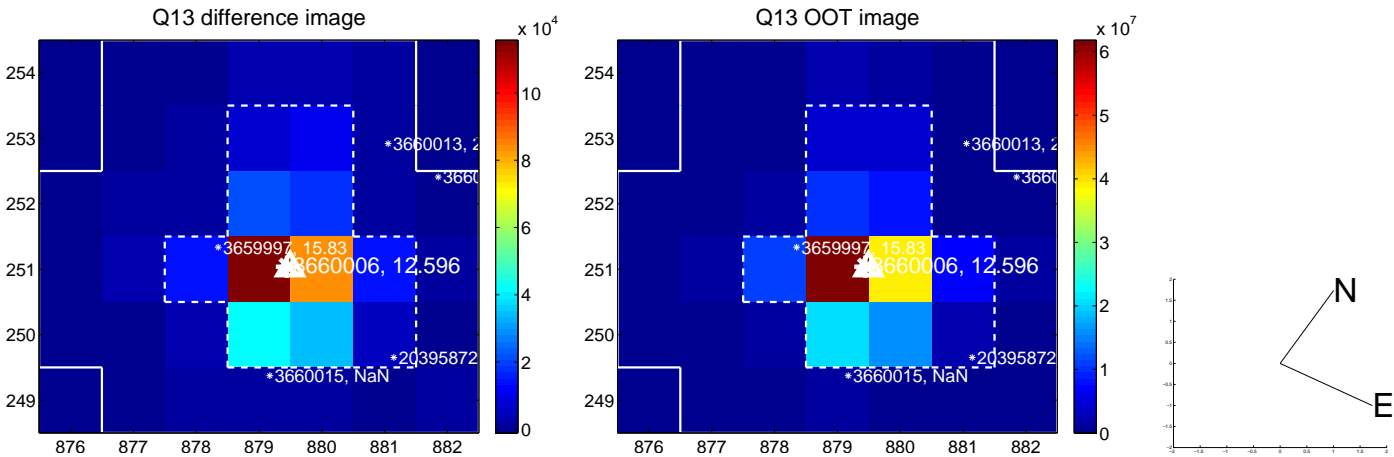




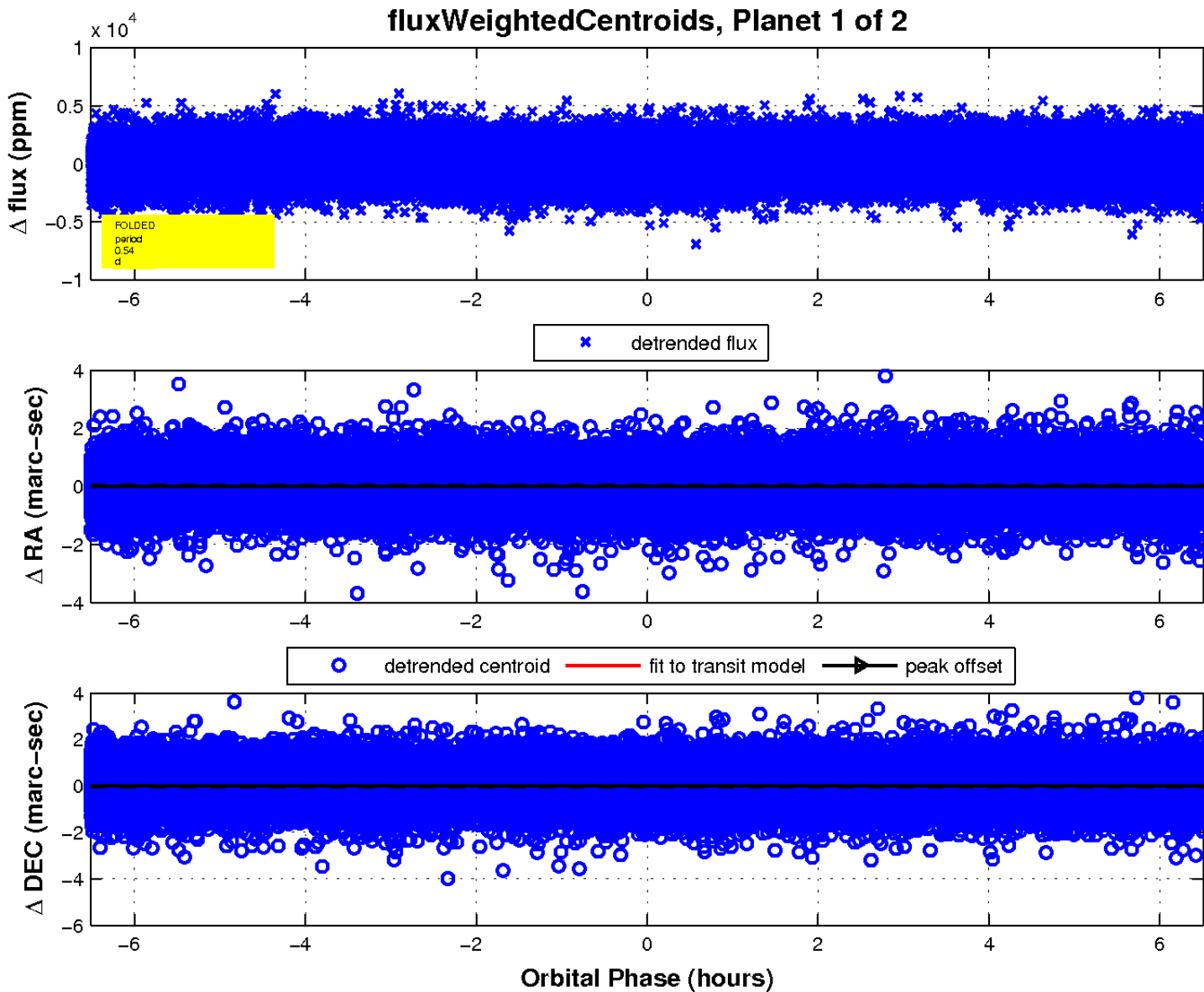
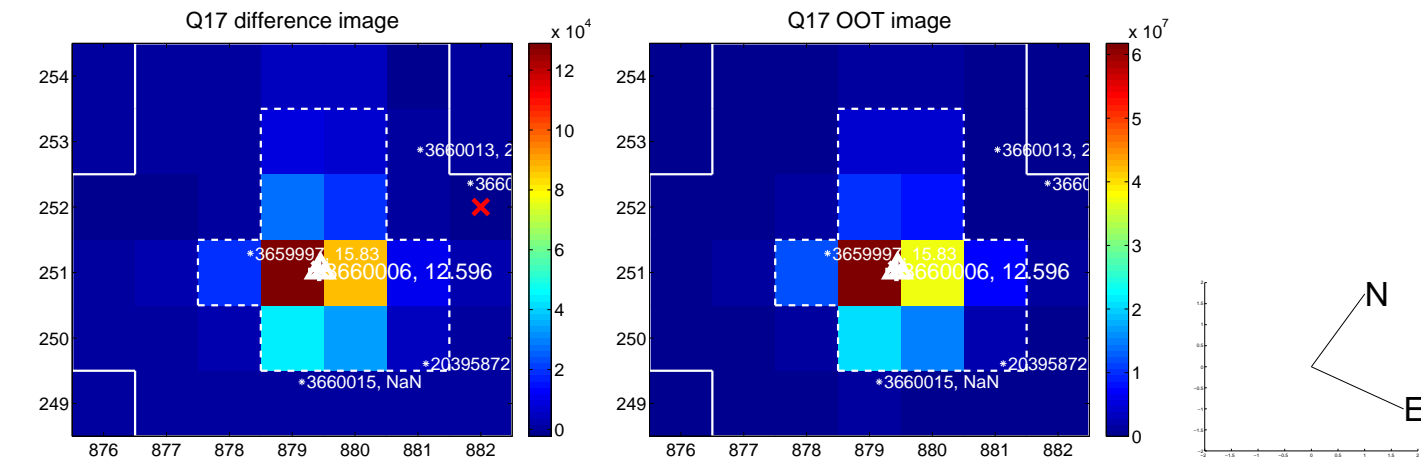
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

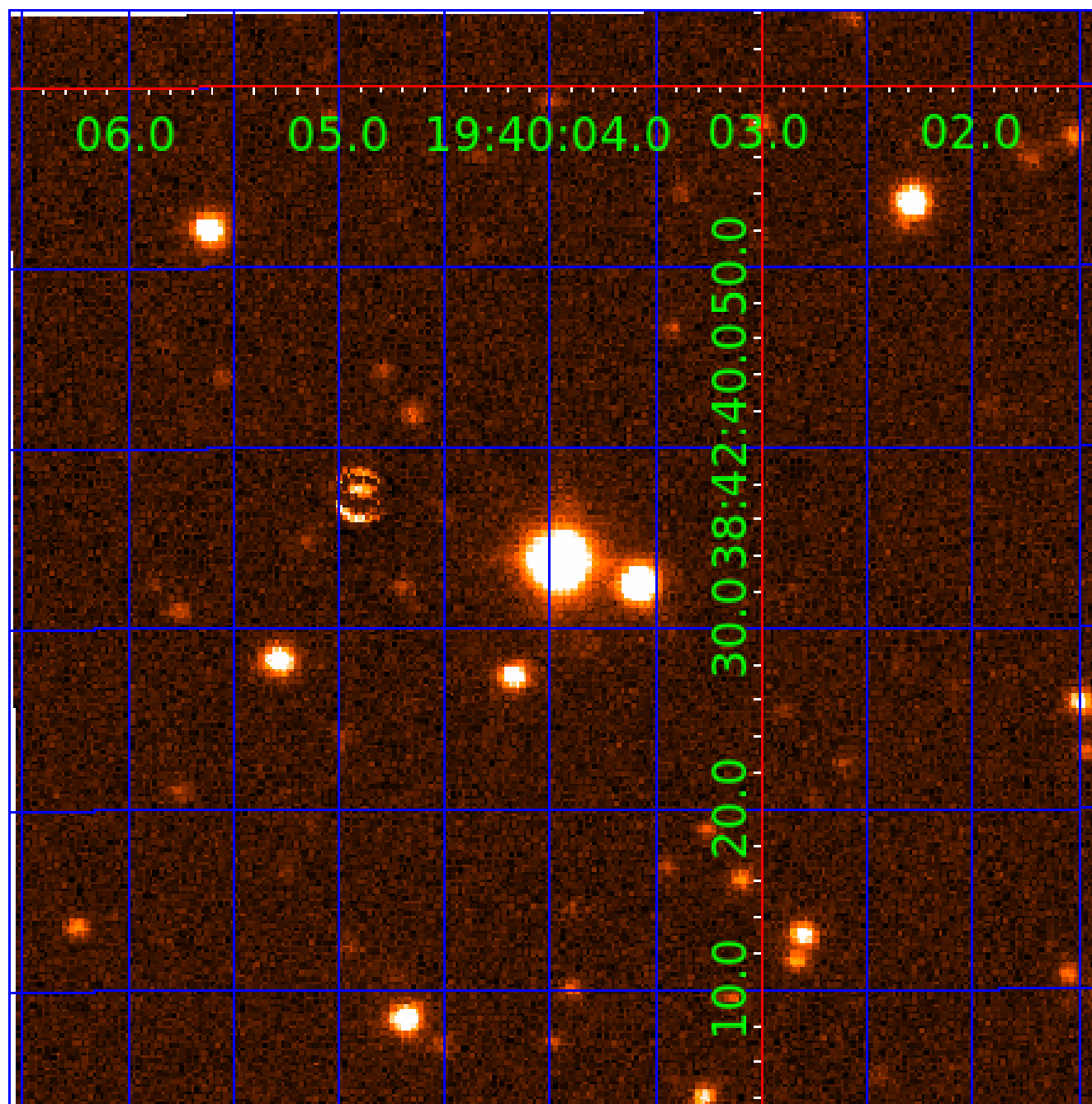


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 003660006

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003660006-01	OBS	No	0.542788	131.566015	191.3	3.031	11.3	11.7	3.11	7872	5.01	117708.64
003660006-02	OBS	No	0.992769	131.925897	710.1	7.513	12.8	19.9	3.11	7872	15.59	52624.07

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003660006-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV
003660006-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—TRANS_GAPPED—LPP_DV—LPP_ALT

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

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

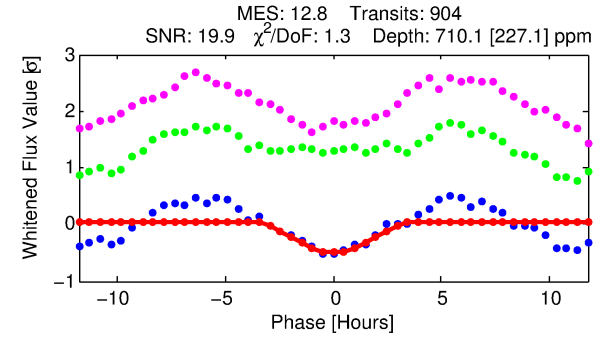
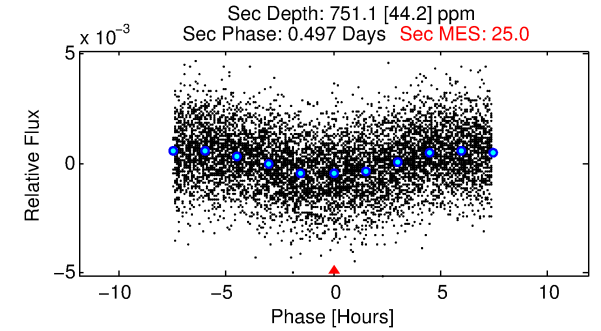
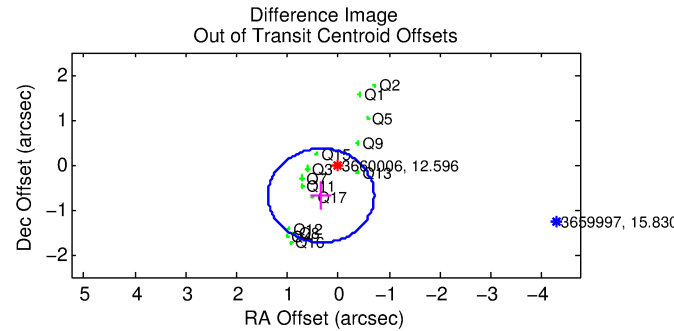
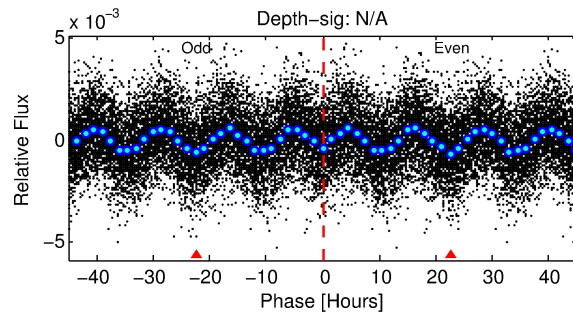
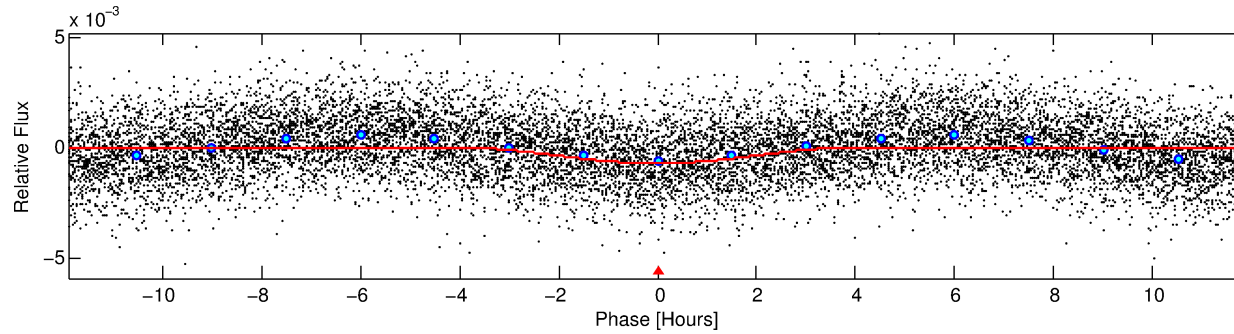
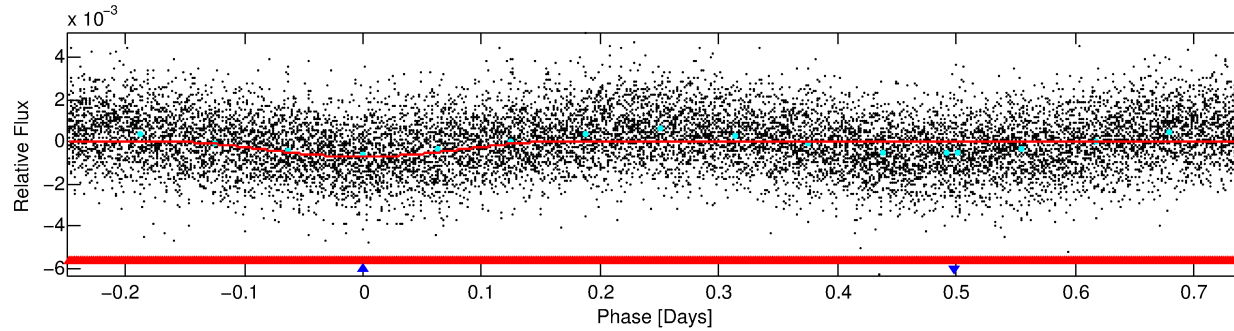
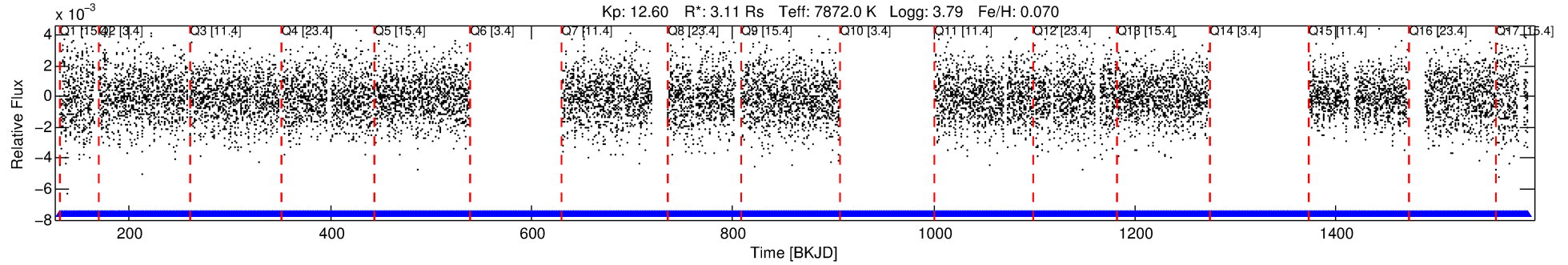
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 003660006-02

No Significant Match Found

# DV One-Page Summary

KIC: 3660006 Candidate: 2 of 2 Period: 0.993 d



## DV Fit Results:

Period = 0.99277 [0.00001] d  
Epoch = 131.9259 [0.0064] BKJD  
Rp/R\* = 0.0459 [0.0762]  
a/R\* = 1.07 [0.05]  
b = 1.00 [0.12]  
Seff = 52624.07 [31828.15]  
Teq = 3862 [584] K  
Rp = 15.59 [26.58] Re  
a = 0.0251 [0.0093] AU  
Ag = 1.07 [3.62] [0.02σ]  
Teffp = 6079 [5046] K [0.44σ]

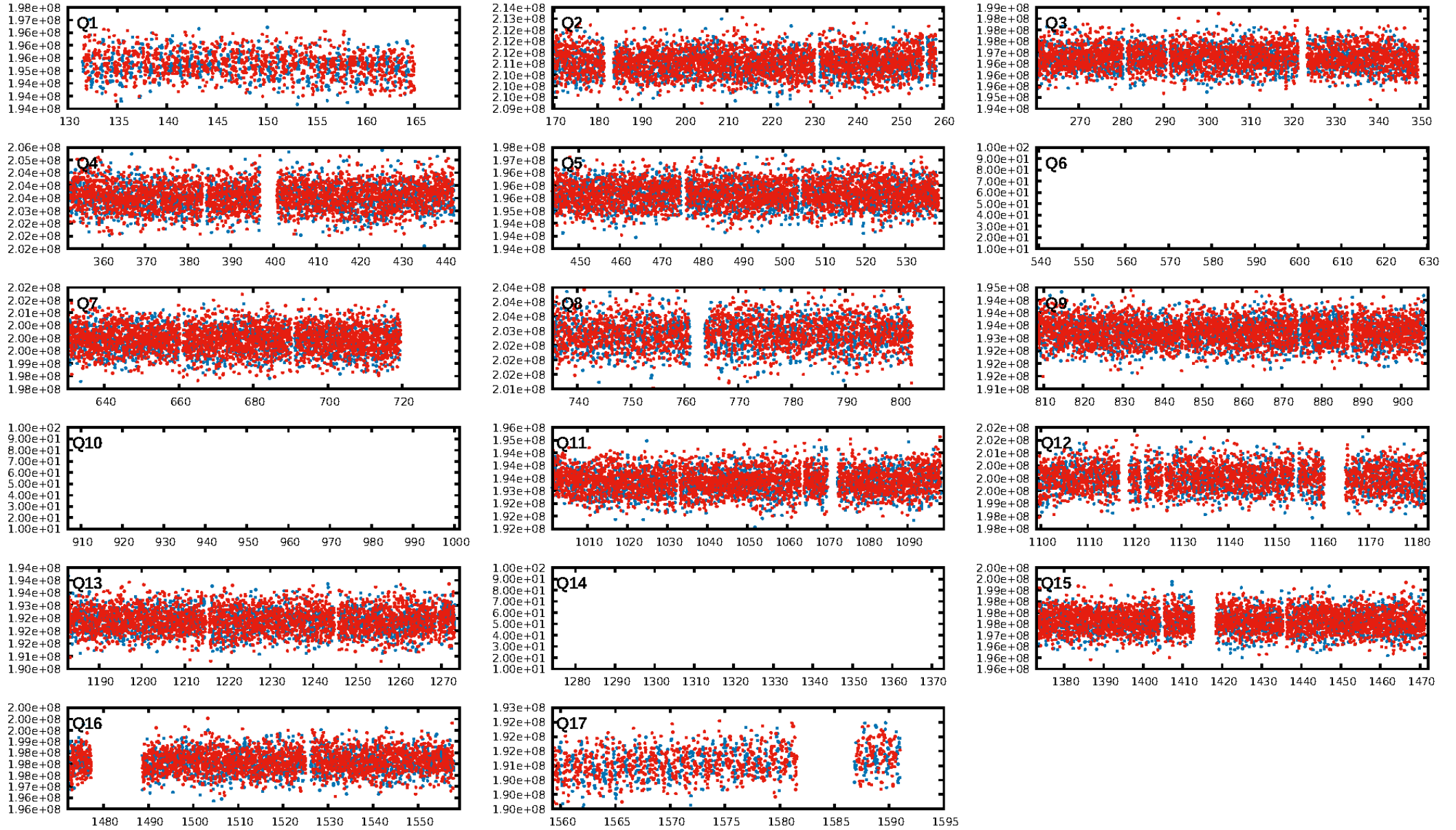
## DV Diagnostic Results:

ShortPeriod-sig: 81.8% [1.33σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [855/855]  
GhostDiagnostic-chr: 2.709  
**Centroid-sig: 0.0%**  
Centroid-so: 0.035 arcsec [0.94σ]  
OotOffset-rm: 0.765 arcsec [2.20σ]  
KicOffset-rm: 0.738 arcsec [2.13σ]  
OotOffset-st: 1/4/4/5 [14]  
KicOffset-st: 1/4/4/5 [14]  
DiffImageQuality-fgm: 1.00 [14/14]  
DiffImageOverlap-fno: 0.00 [0/14]

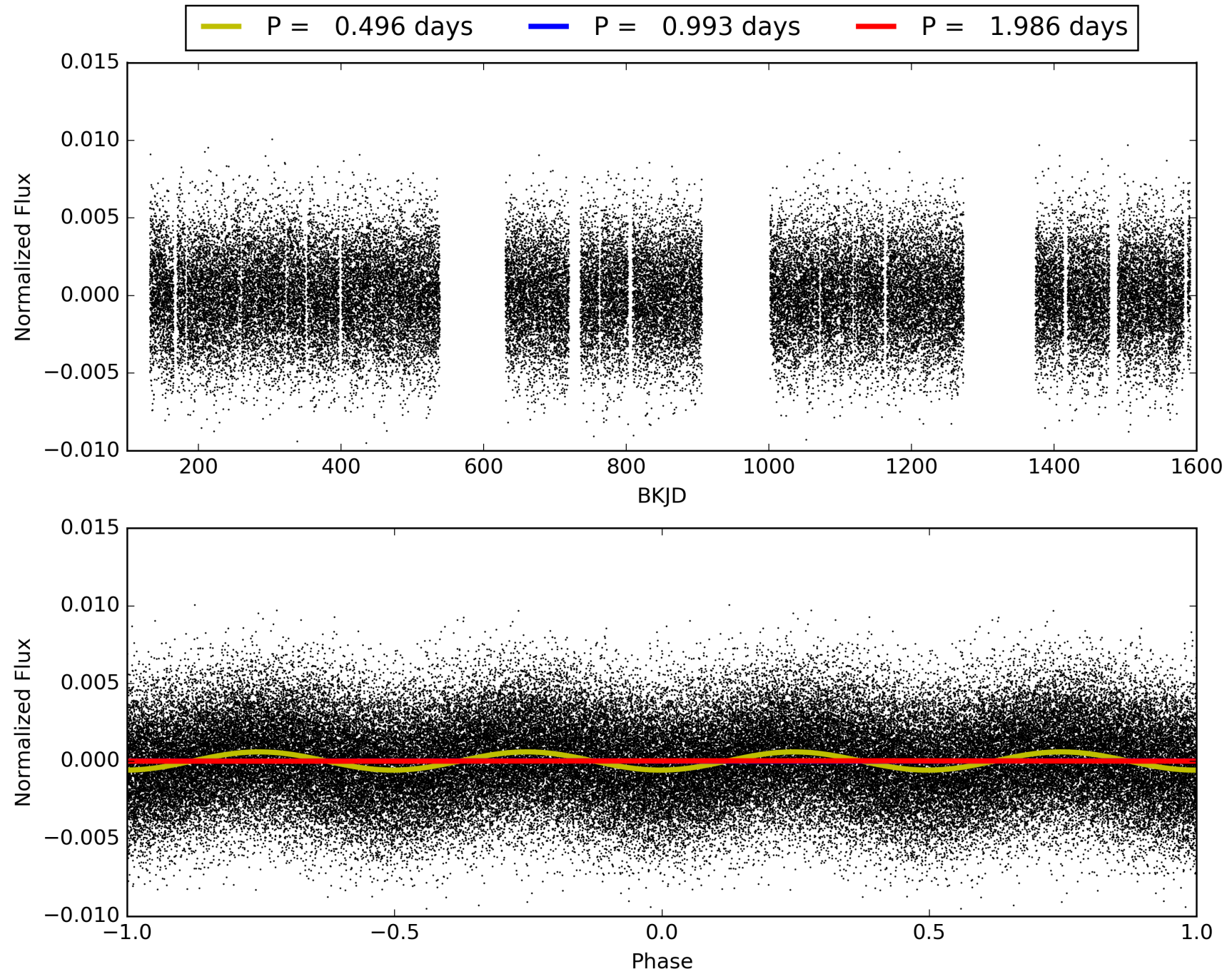
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 21:15:10 Z

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

# TCE 003660006-02, PDC Light Curves



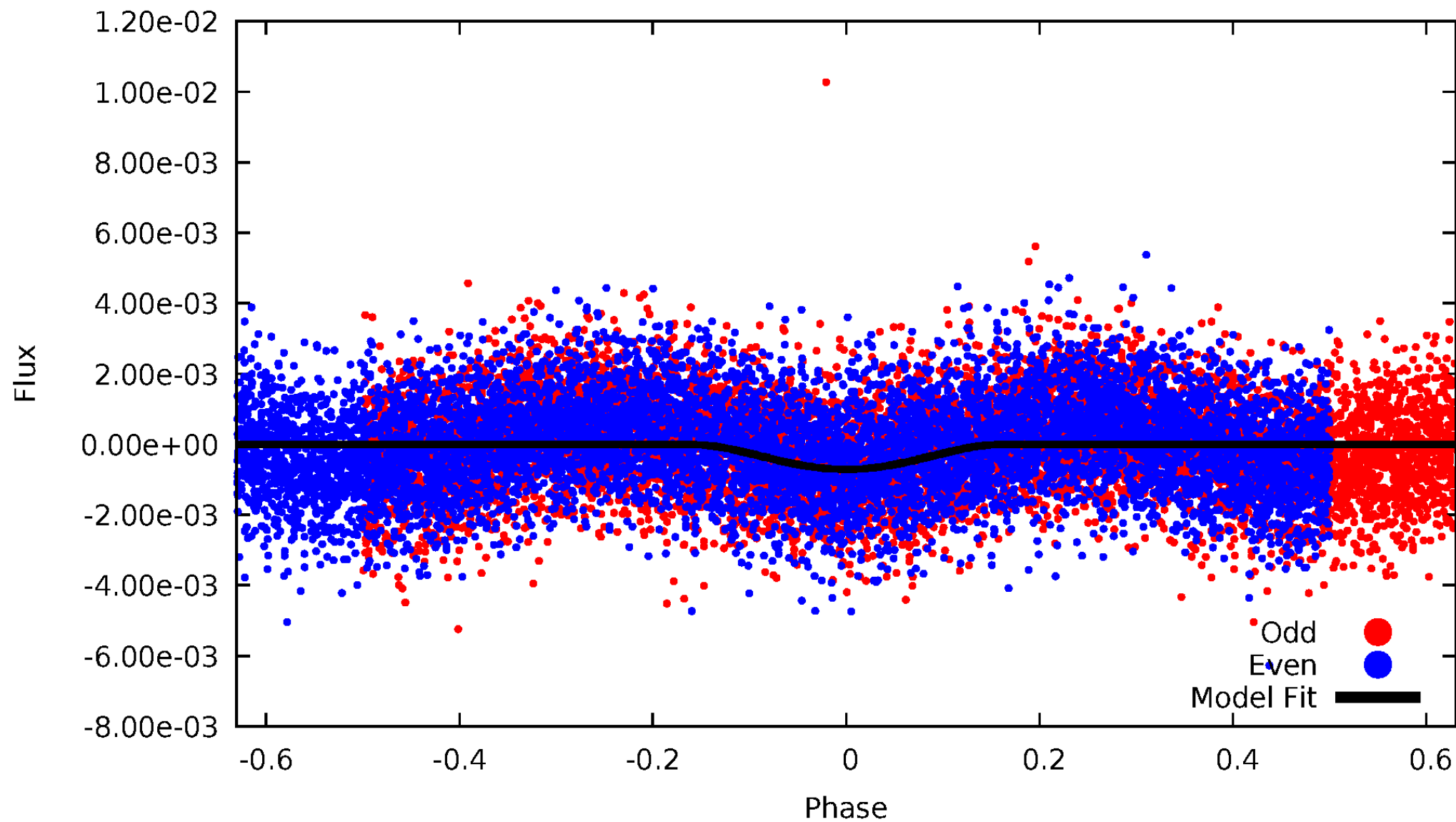
TCE 003660006-02





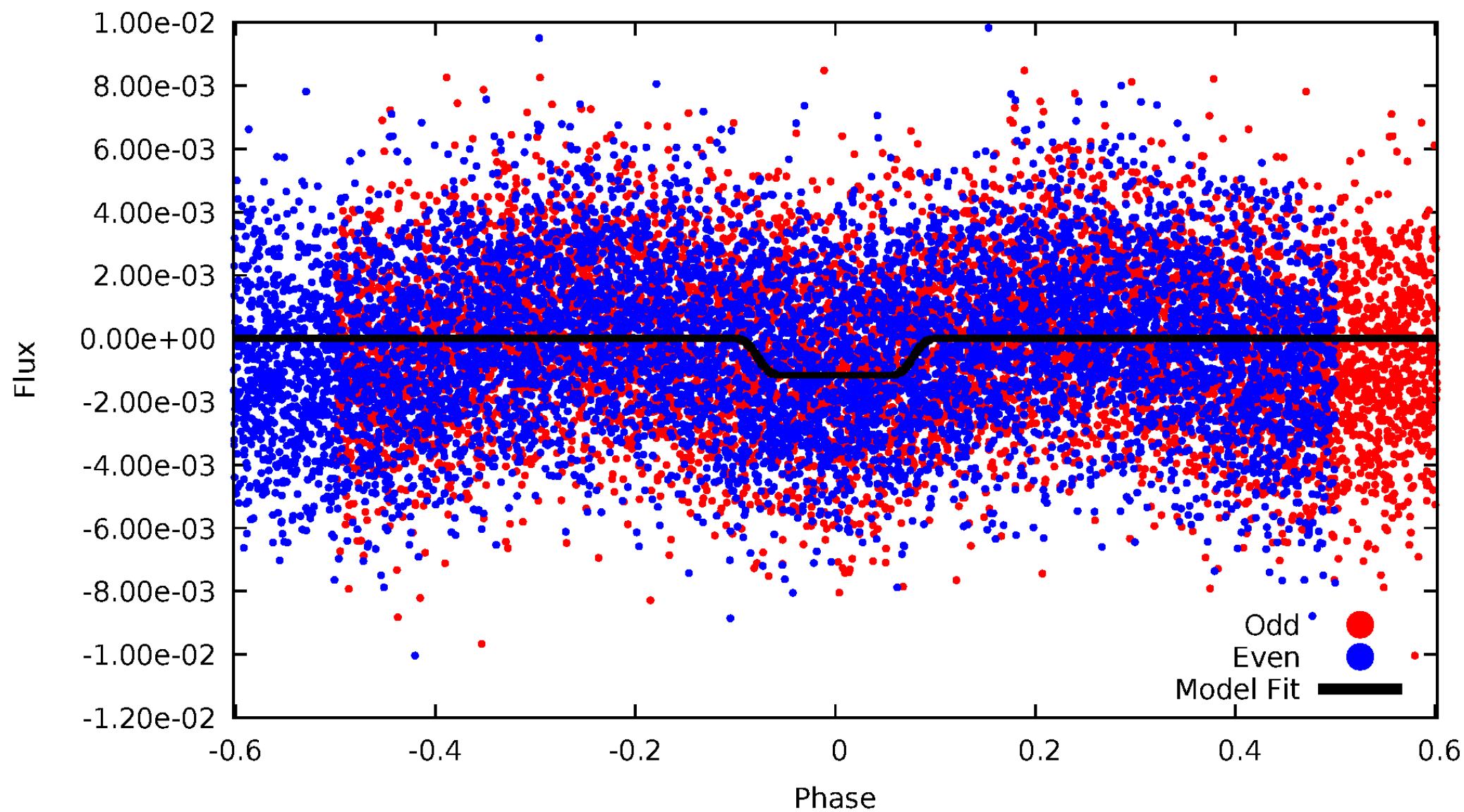
# DV Odd/Even

TCE 003660006-02



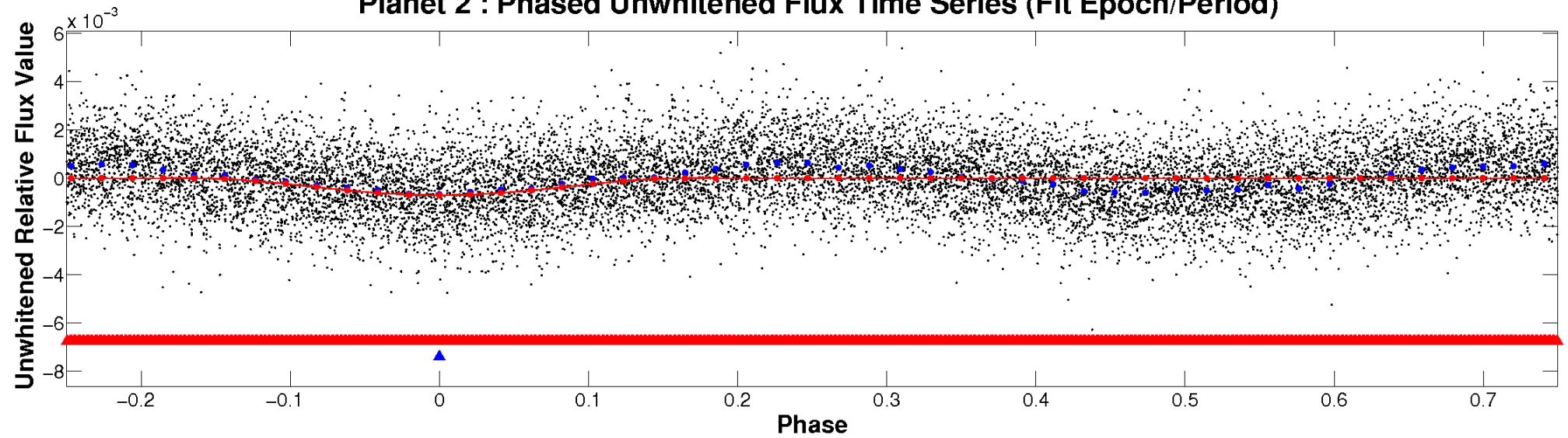
# ALT Odd/Even

TCE 003660006-02

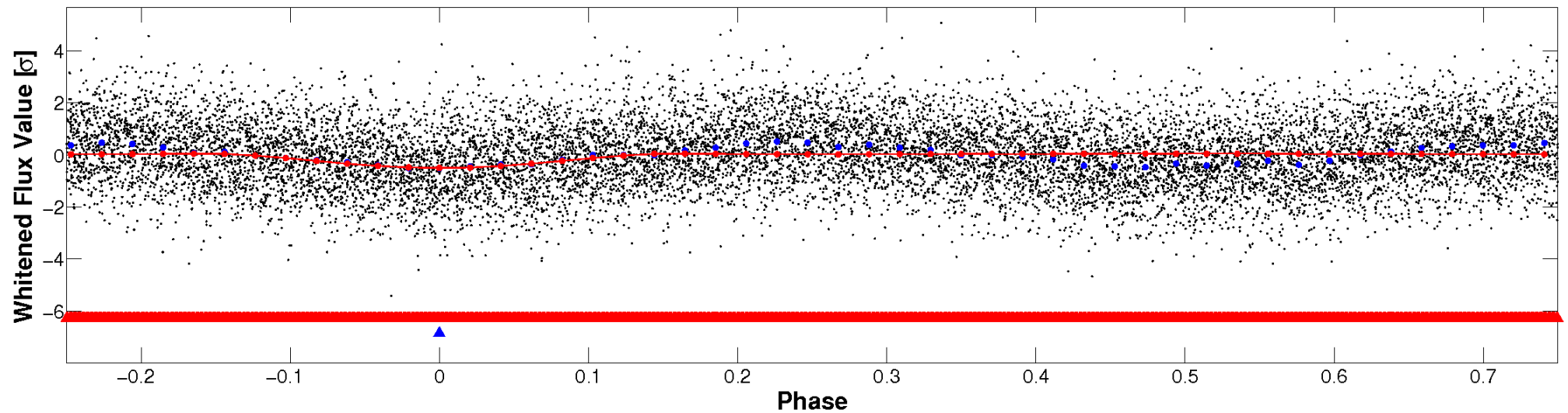


# Non-Whitened Vs. Whitened Light Curve

**Planet 2 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)**

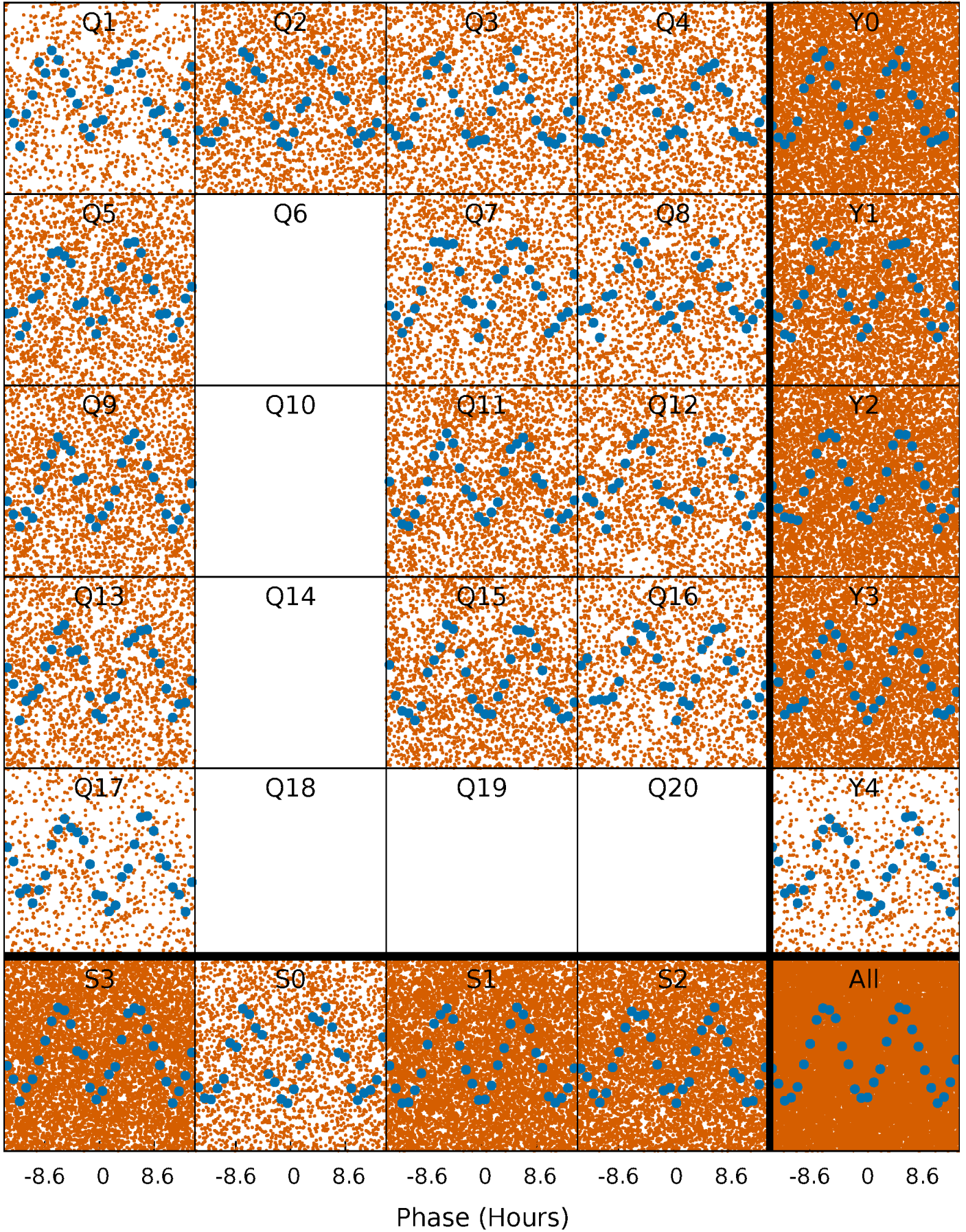


**Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

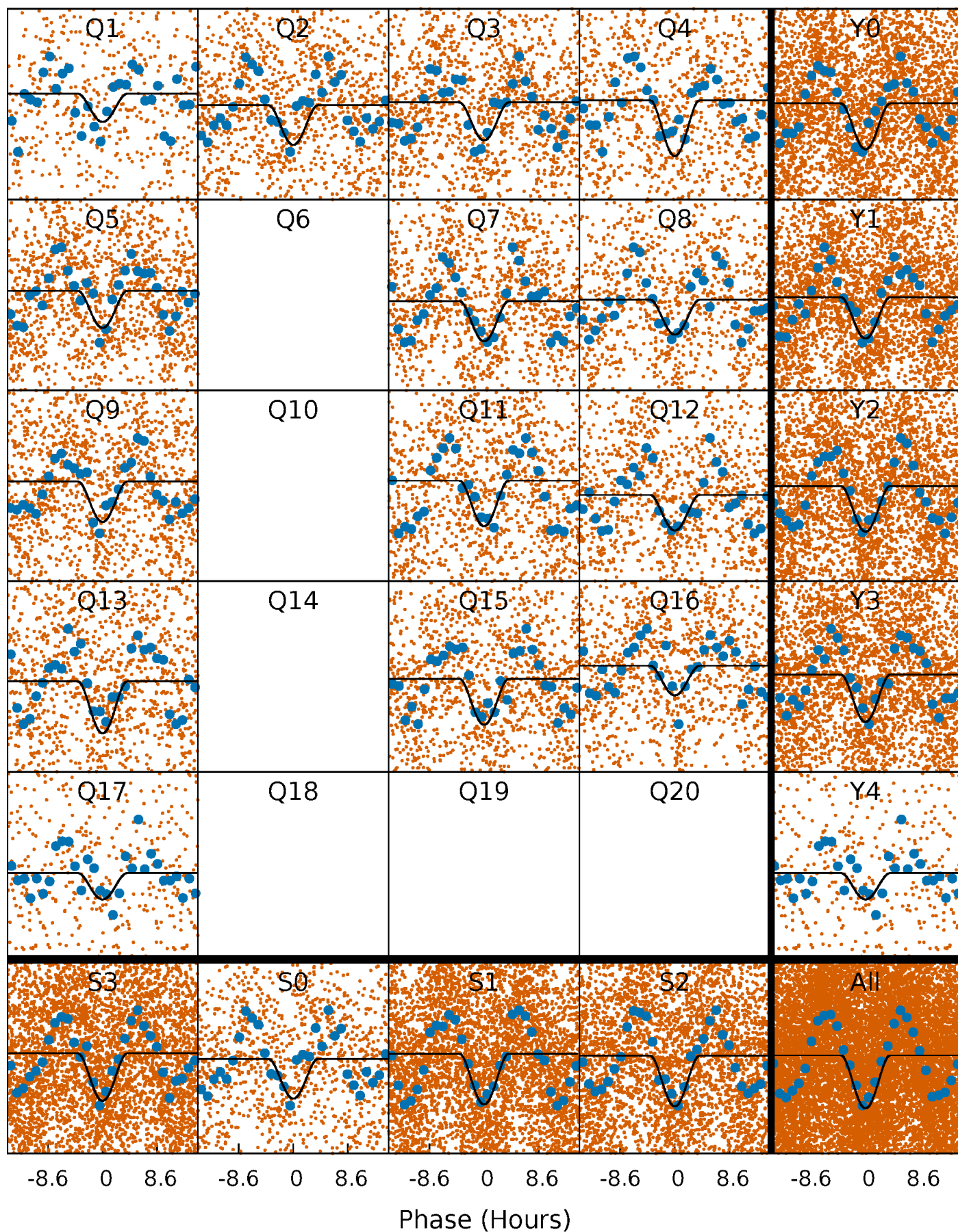
TCE 003660006-02   P= 0.992769 Days    $T_0=131.925897$  (BKJD)





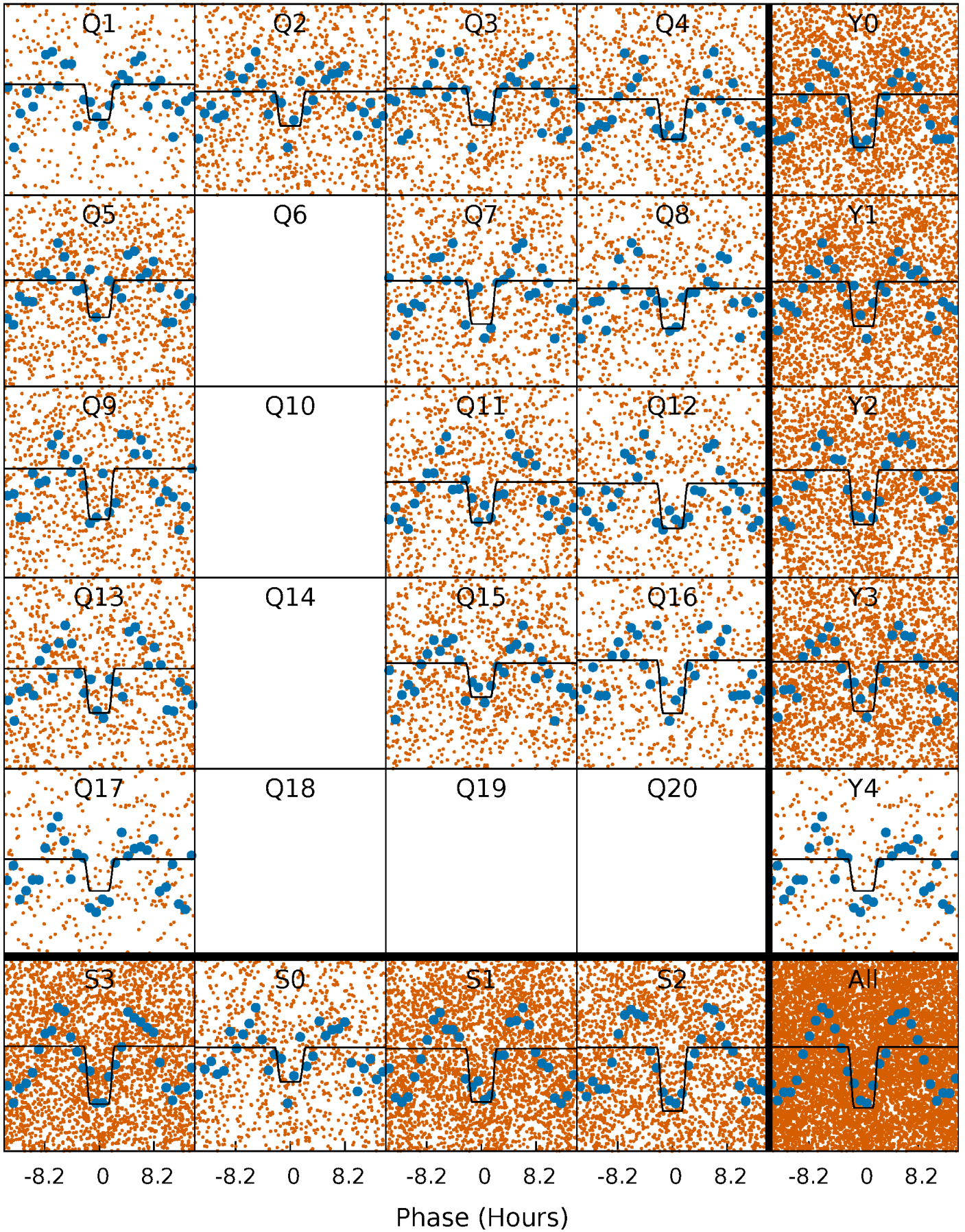
# DV Quarter-Phased Transit Curves

TCE 003660006-02   P= 0.992769 Days    $T_0=131.925897$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 003660006-02 P= 0.992819 Days  $T_0=131.889961$  (BKJD)

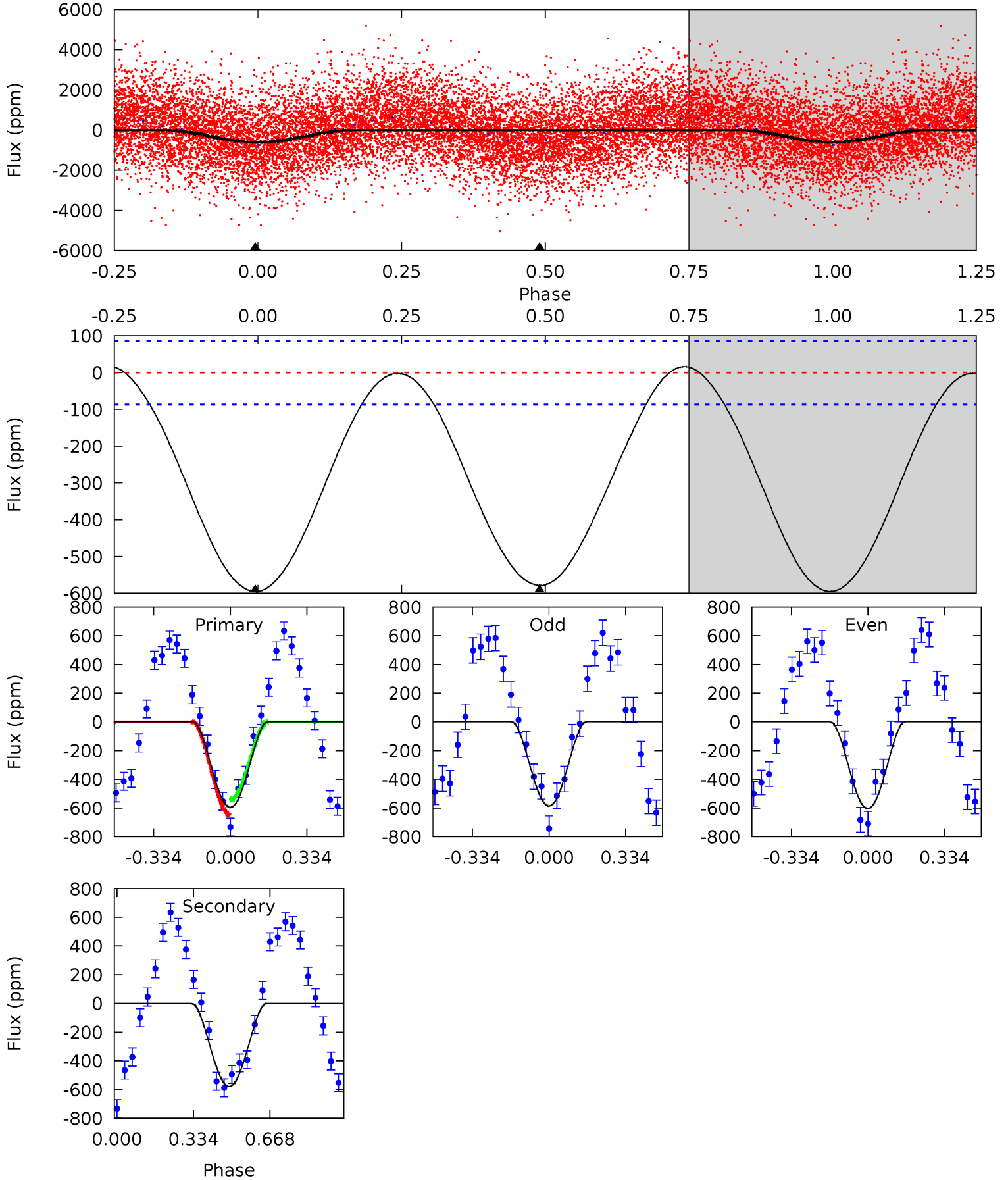




# DV Model-Shift Uniqueness Test

003660006-02, P = 0.992769 Days, E = 130.933128 Days

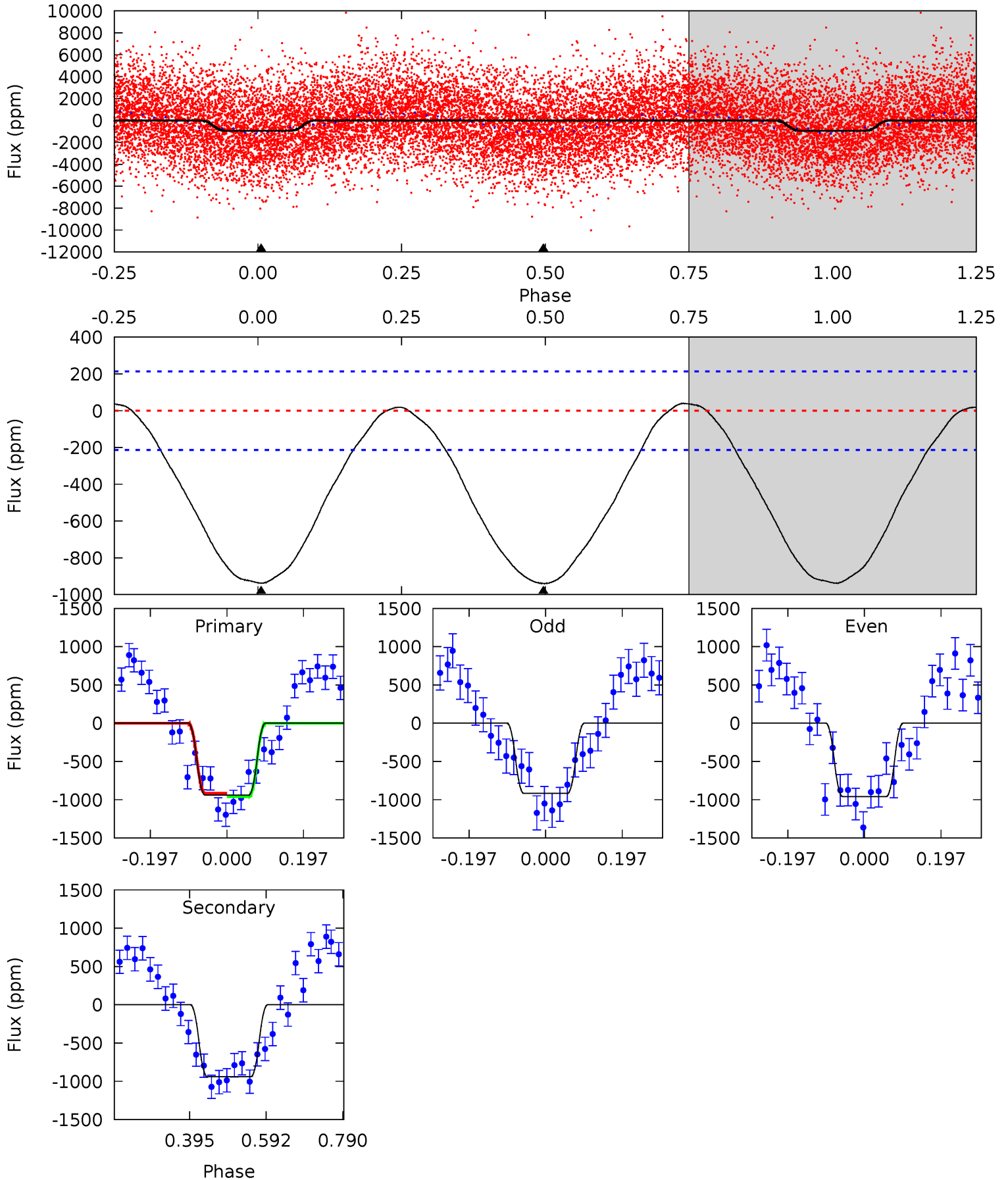
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
29.5	28.7	0	0	4.31	0.97	0.46	29.5	29.5	28.7	28.7	0.44	-0.75	0.03	2.81



# Alt Model-Shift Uniqueness Test

003660006-02, P = 0.992819 Days, E = 130.897142 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
19.4	19.4	0	0	4.42	1.29	0.74	19.4	19.4	19.4	19.4	0.43	1.04	0.04	0.44



### Stellar Parameters For KIC 003660006

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7872^{+218}_{-327}$	$3.785^{+0.337}_{-0.112}$	$0.070^{+0.200}_{-0.350}$	$3.109^{+0.667}_{-1.239}$	$2.150^{+0.309}_{-0.574}$	$0.101^{+0.276}_{-0.036}$
	+3%/-4%	+9%/-3%	+286%/-500%	+21%/-40%	+14%/-27%	+274%/-35%
Source	KIC0	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 003660006-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-579 \pm 20$	$22.83^{+23.40}_{-15.42}$	$5263^{+378}_{-558}$	$3426^{+4223}_{-7579}$	$0.377^{+3.390}_{-0.282}$
Alt.	$-940 \pm 48$	$19.66^{+22.85}_{-13.69}$	$5263^{+385}_{-540}$	$4863^{+5534}_{-8599}$	$0.833^{+8.344}_{-0.651}$

$T_{\text{max}}$  = Theoretical Maximum Planetary Temperature

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

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

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

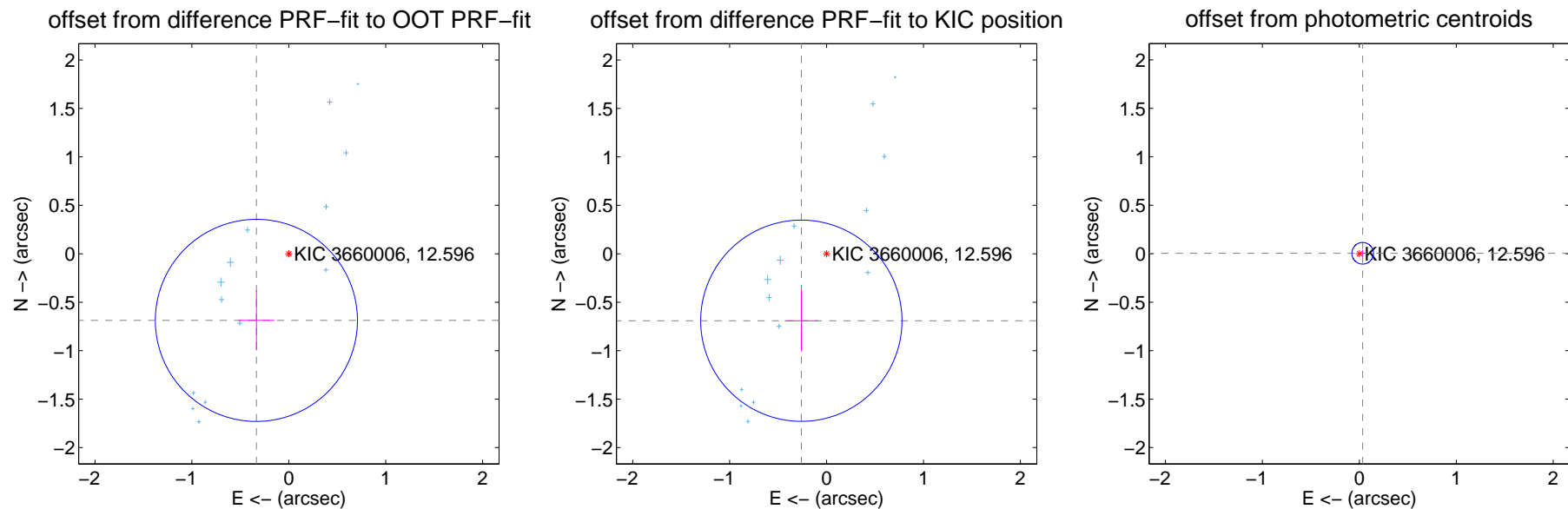
## DV Centroid Data

Supplemental centroid analysis for 003660006-02. Kepler magnitude: 12.60. Transit SNR 19.88

There are 14 quarters with good PRF difference image offsets

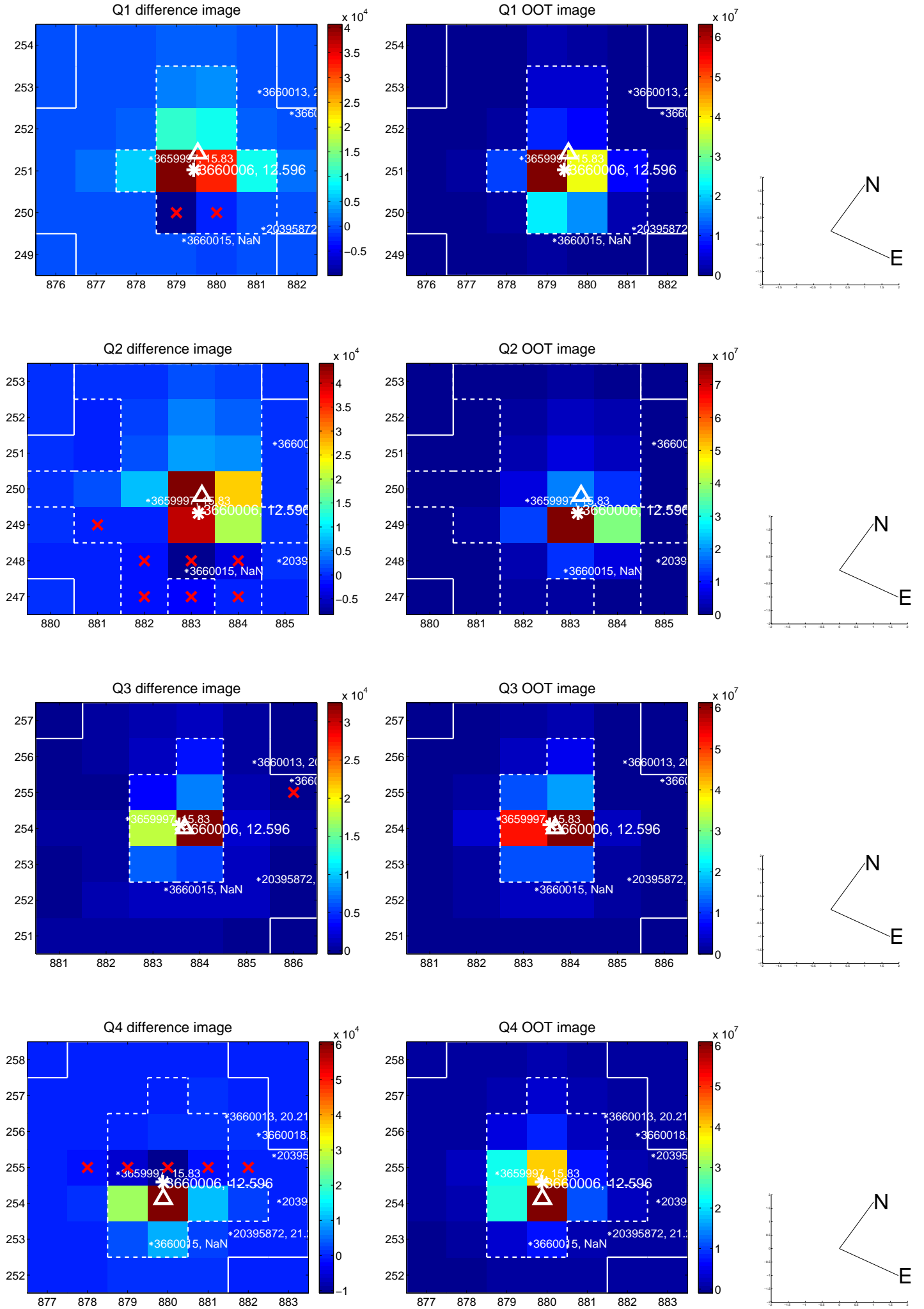
The direct PRF centroid is offset from the target star catalog position by about 0.04 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.765 \pm 0.348$	2.20	$0.335 \pm 0.185$	$-0.688 \pm 0.309$
PRF-fit source offset from KIC position	$0.738 \pm 0.346$	2.13	$0.260 \pm 0.172$	$-0.691 \pm 0.316$
photometric centroid source offset	$0.03 \pm 0.04$	0.94	$-0.03 \pm 0.04$	$0.00 \pm 0.04$

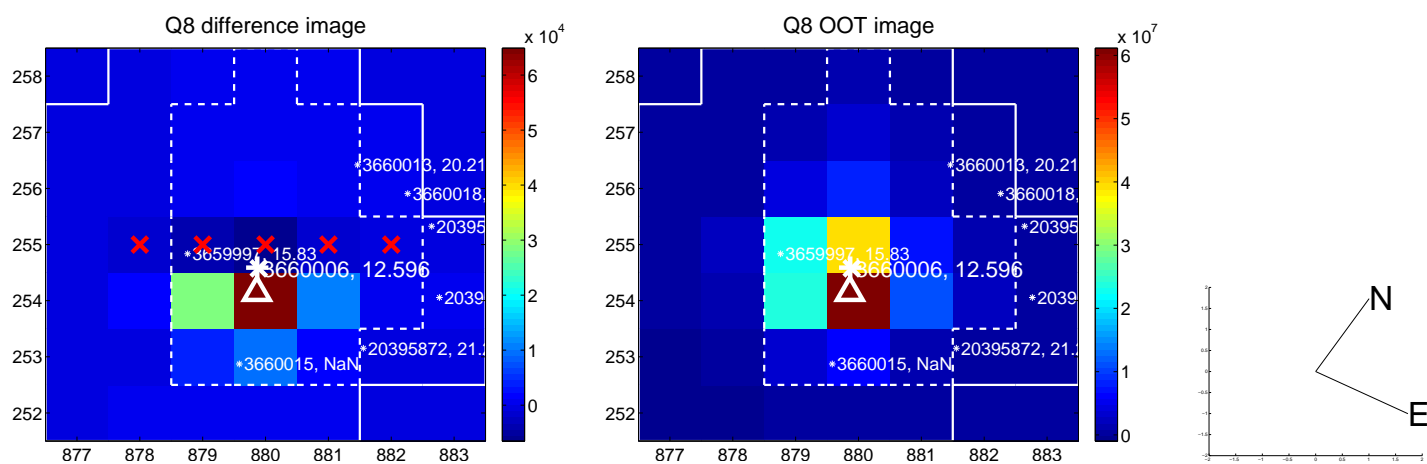
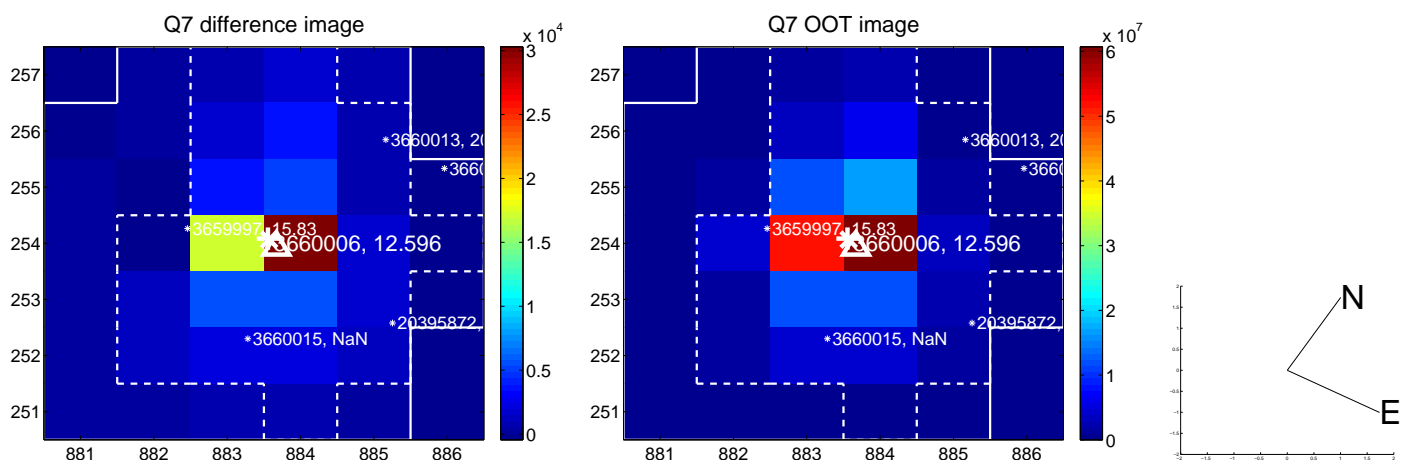
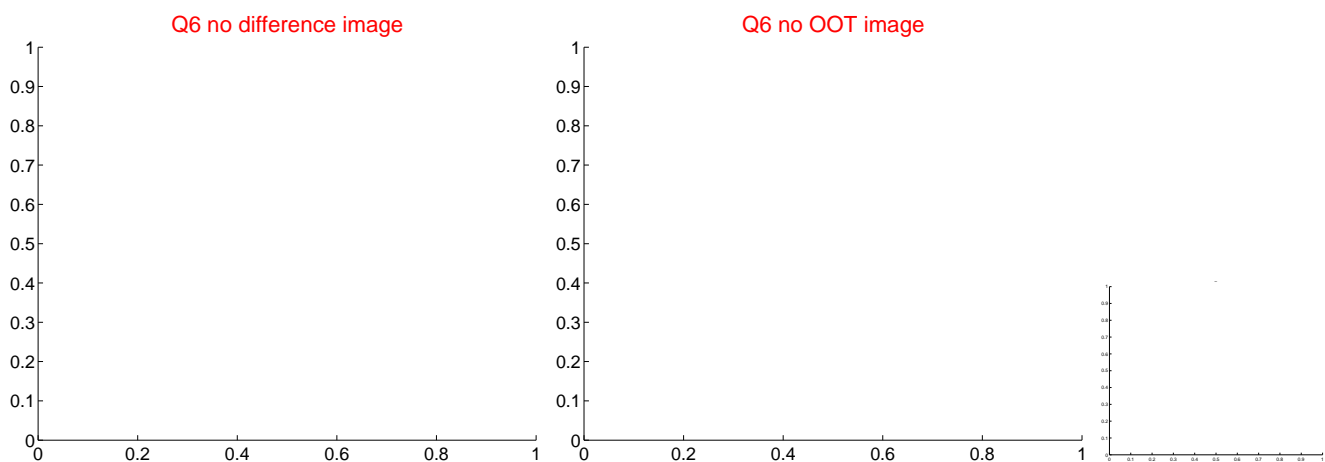
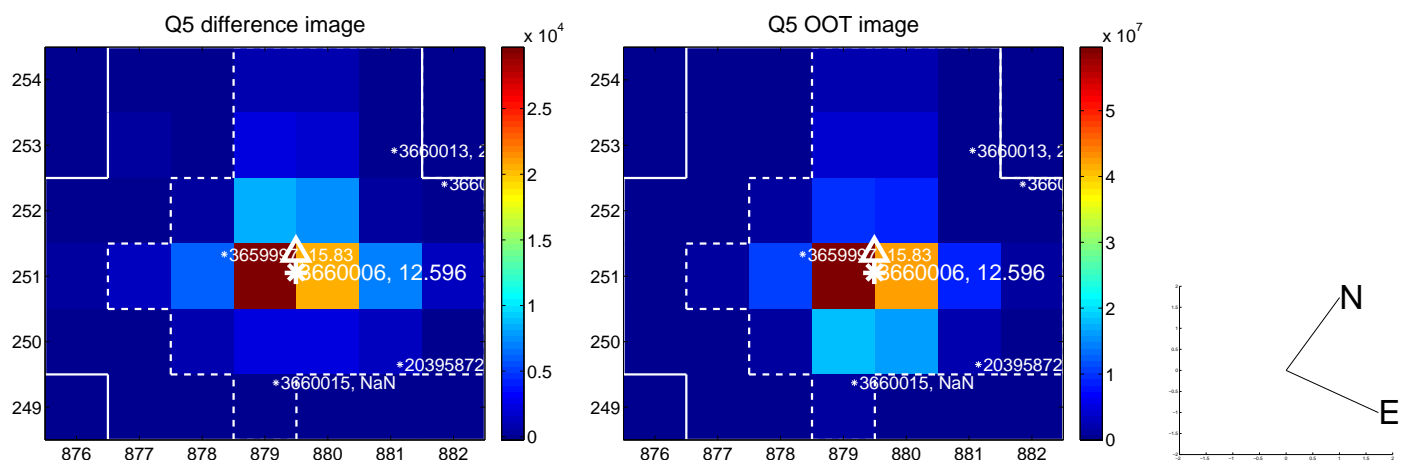


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: 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.

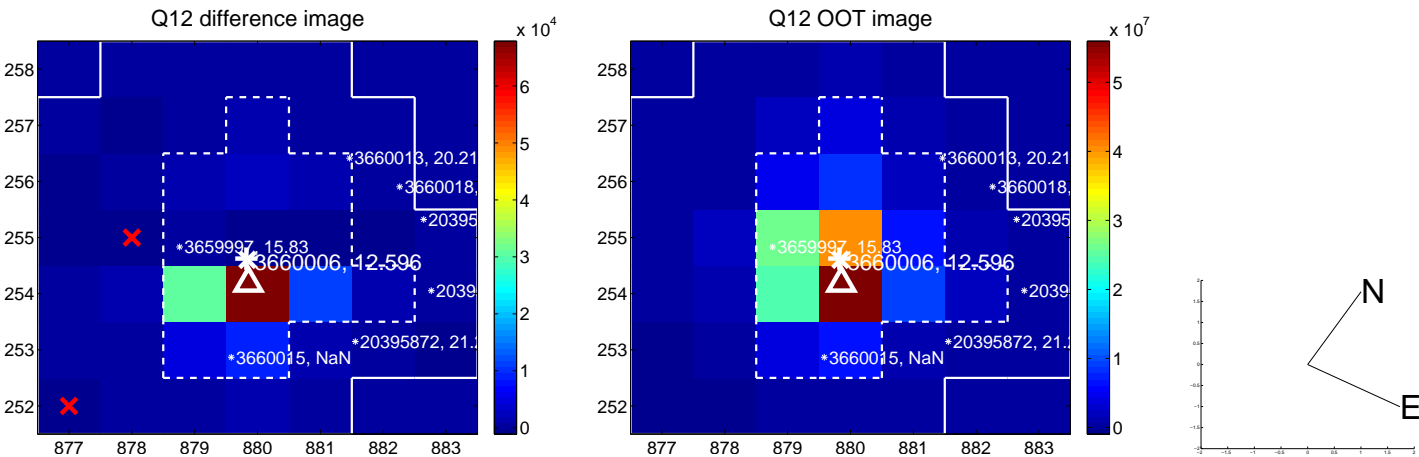
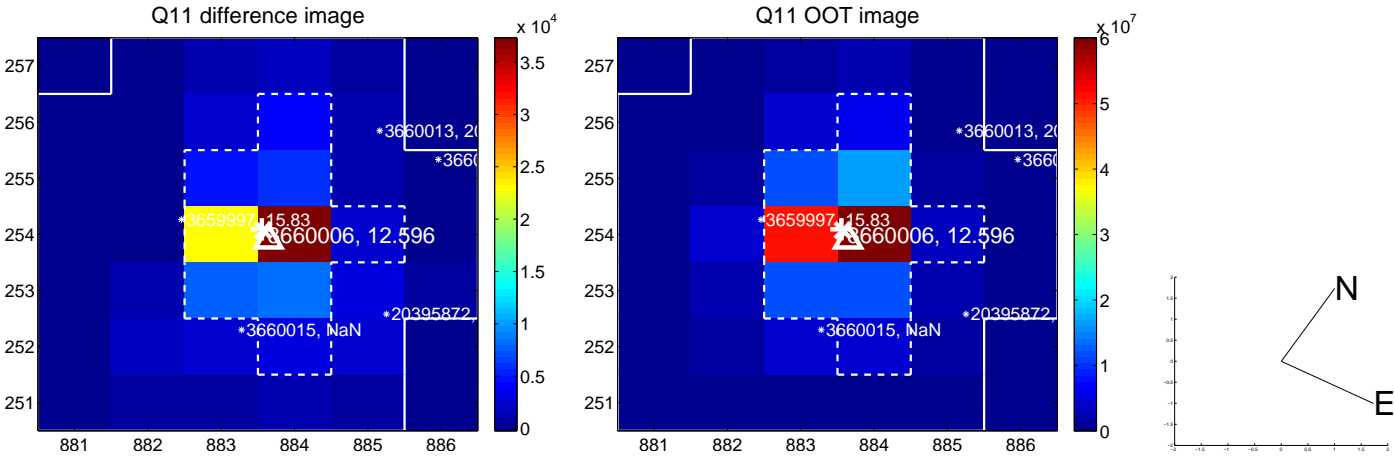
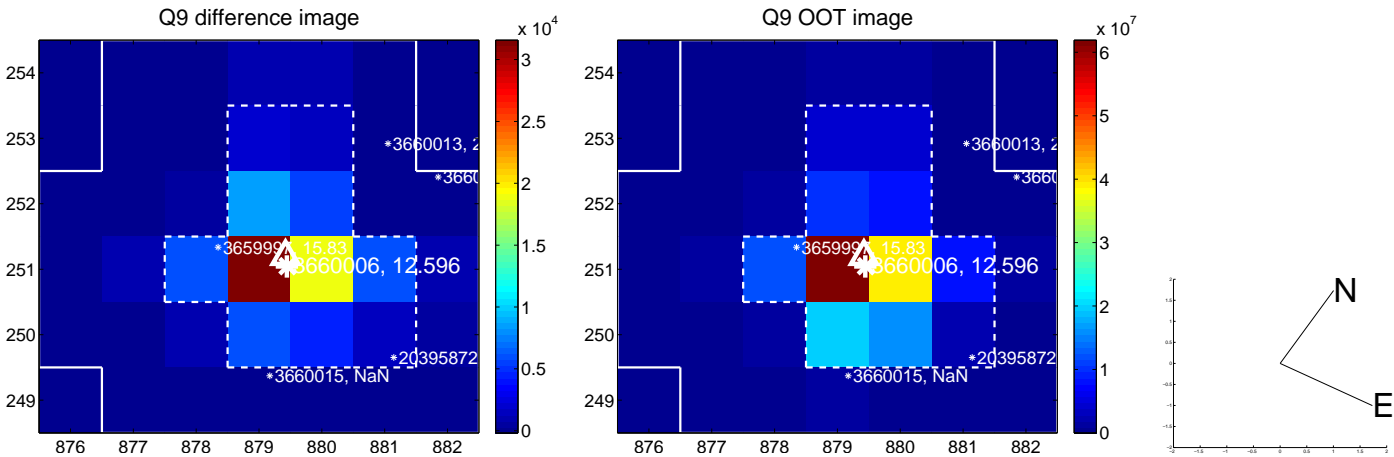


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

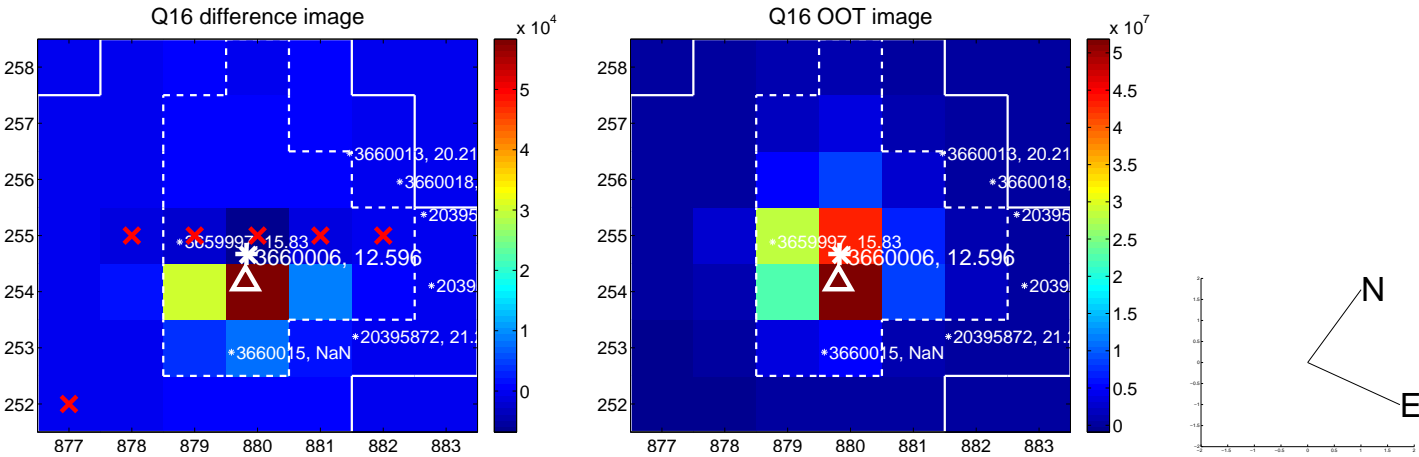
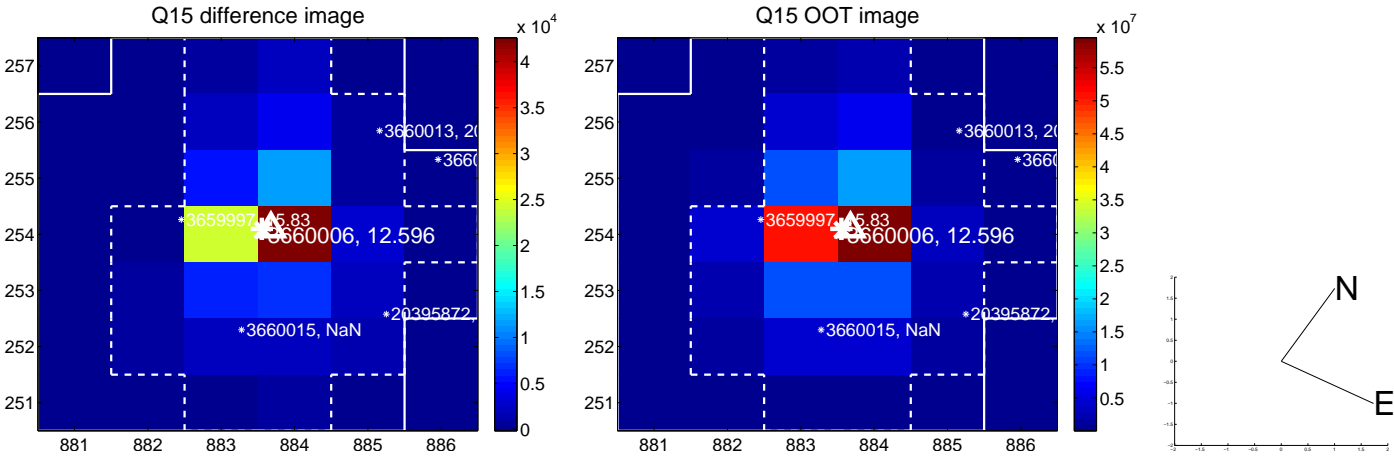
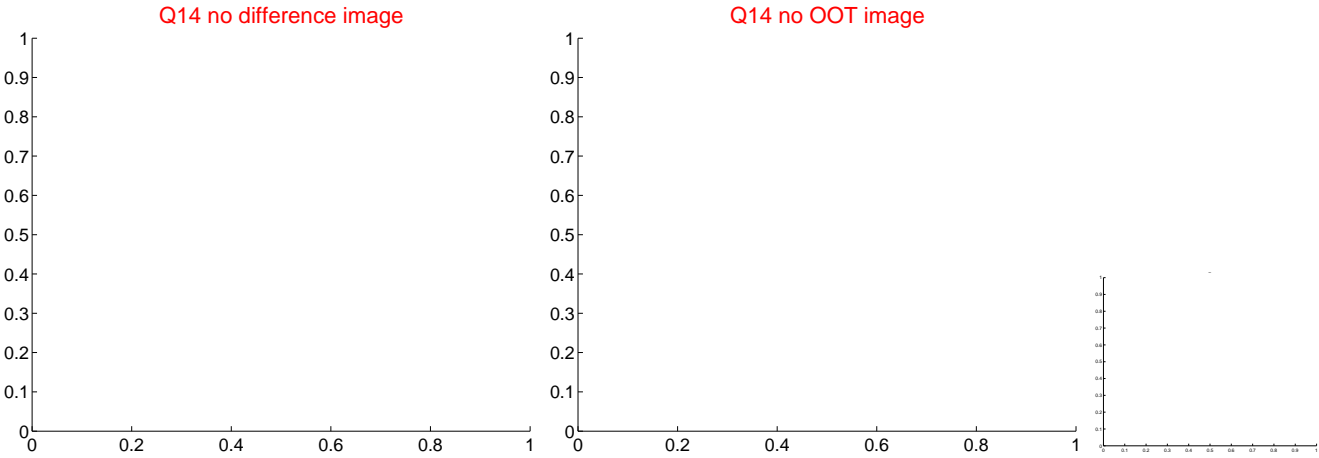
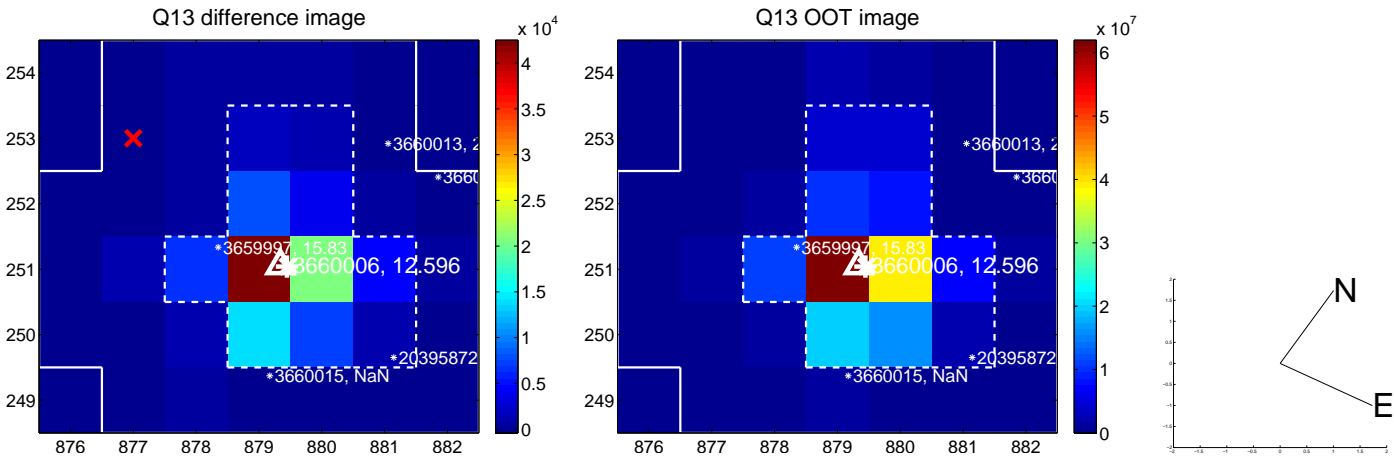




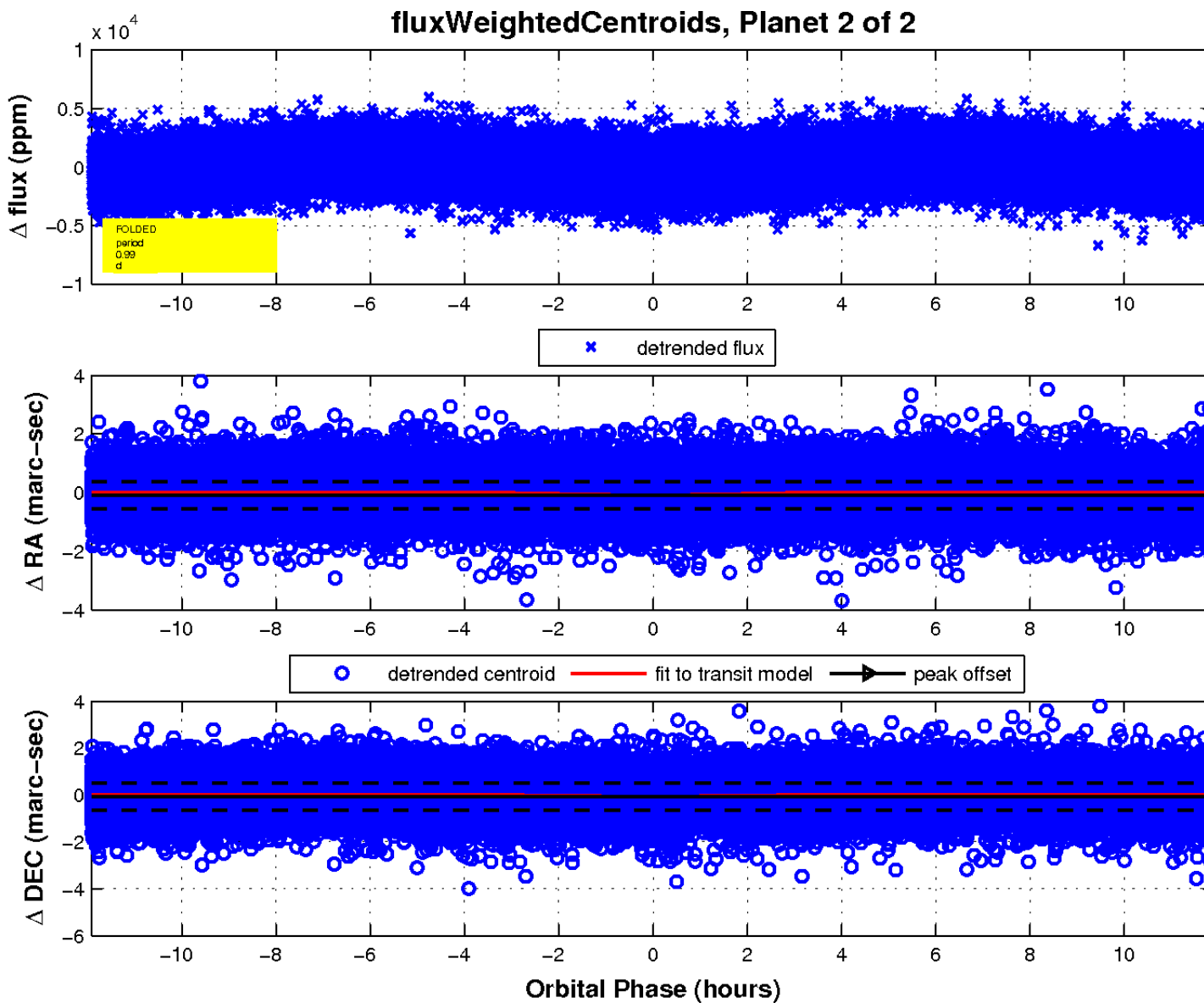
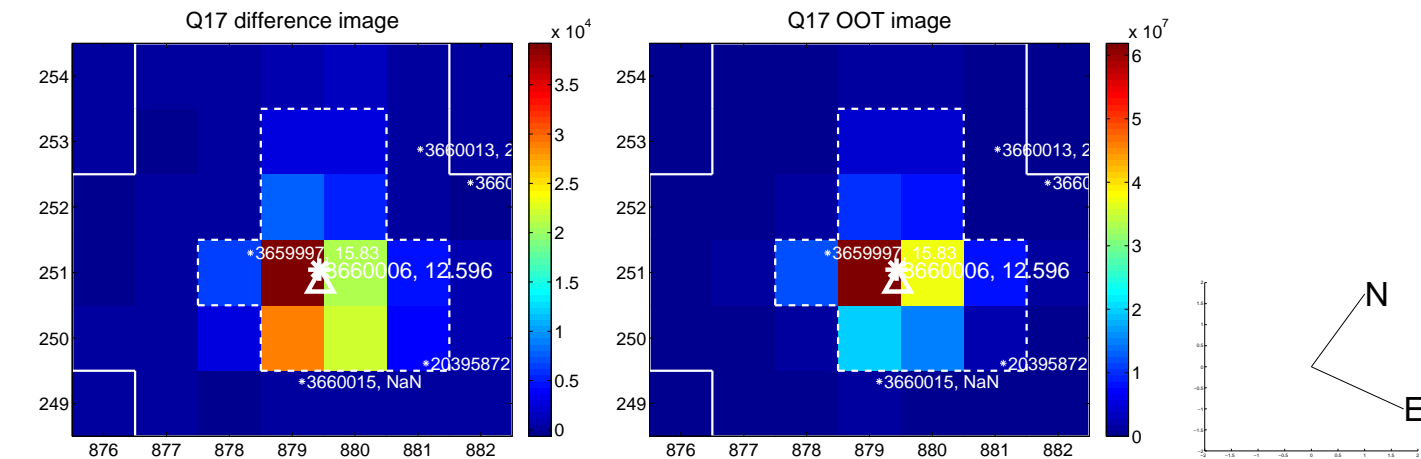
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

Declination

