

# KIC 004819564

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004819564-01	OBS	No	0.632927	132.184327	11.6	3.227	12.5	0.6	0.72	4312	0.23	958.84
004819564-02	OBS	No	117.748607	136.394344	3758.1	5.403	9.5	7.1	0.72	4312	4.36	0.90

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004819564-01	OBS	FP	0.00	1	0	1	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—HALO_GHOST
004819564-02	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—HALO_GHOST

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

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

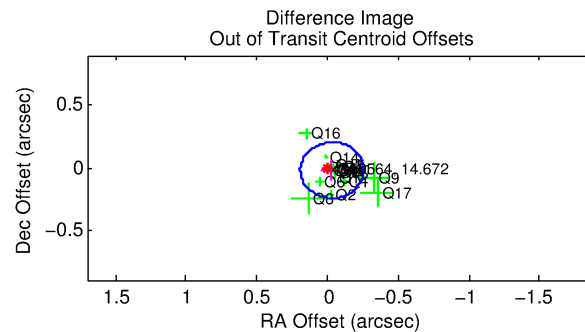
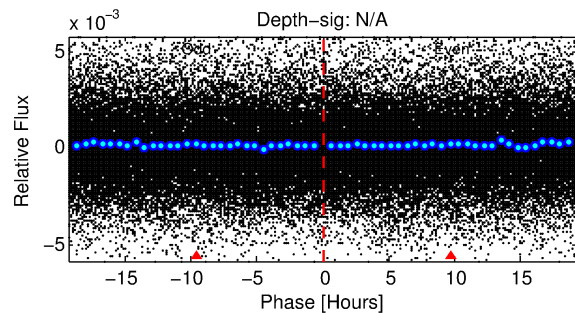
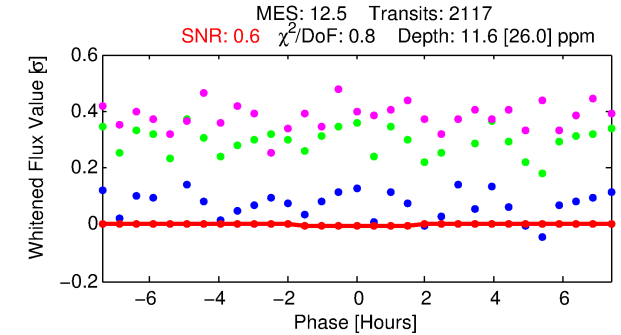
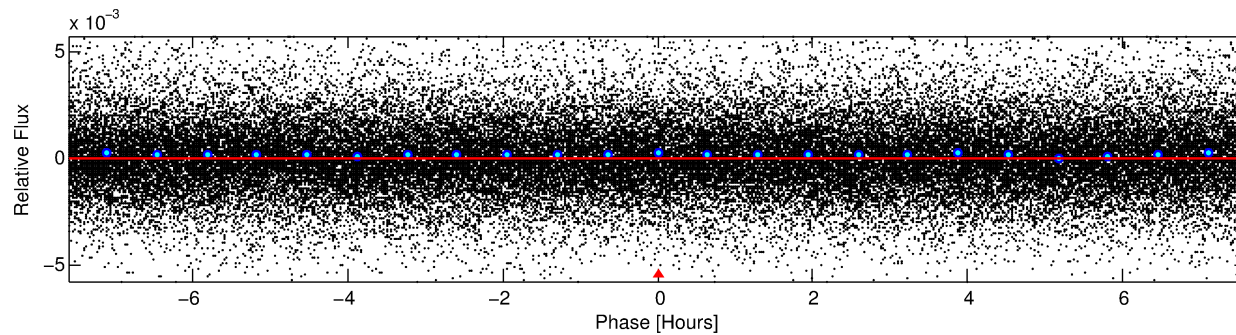
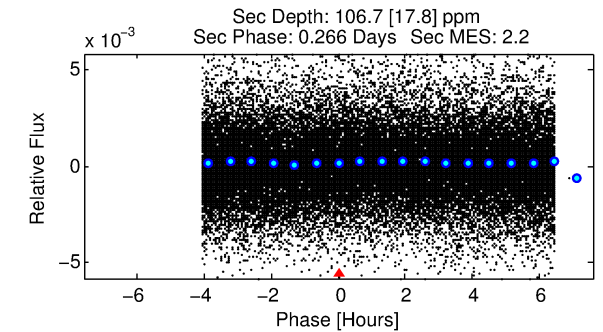
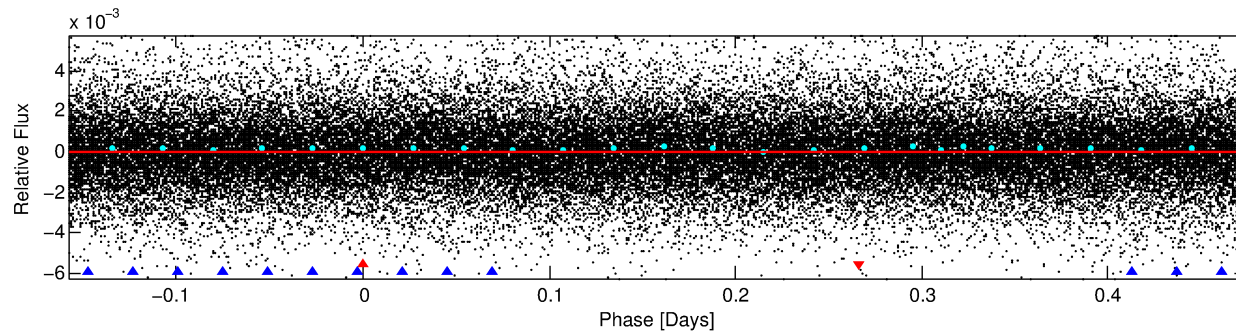
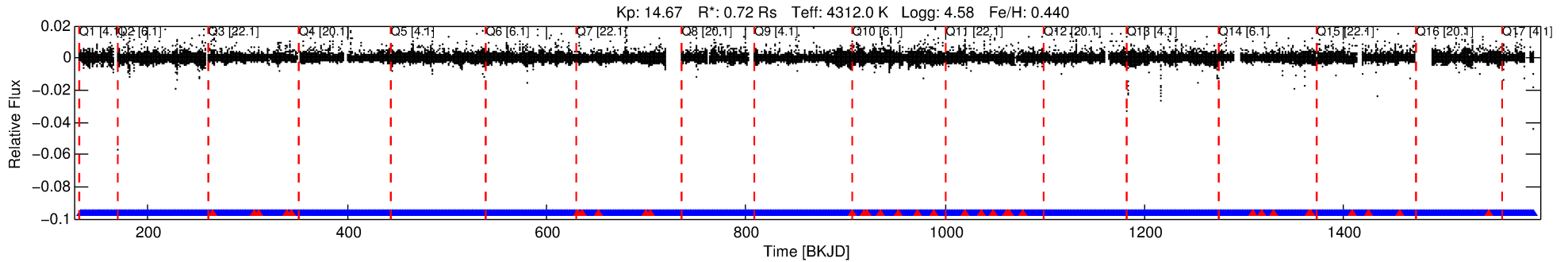
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 004819564-01

No Significant Match Found

# DV One-Page Summary

KIC: 4819564 Candidate: 1 of 2 Period: 0.633 d



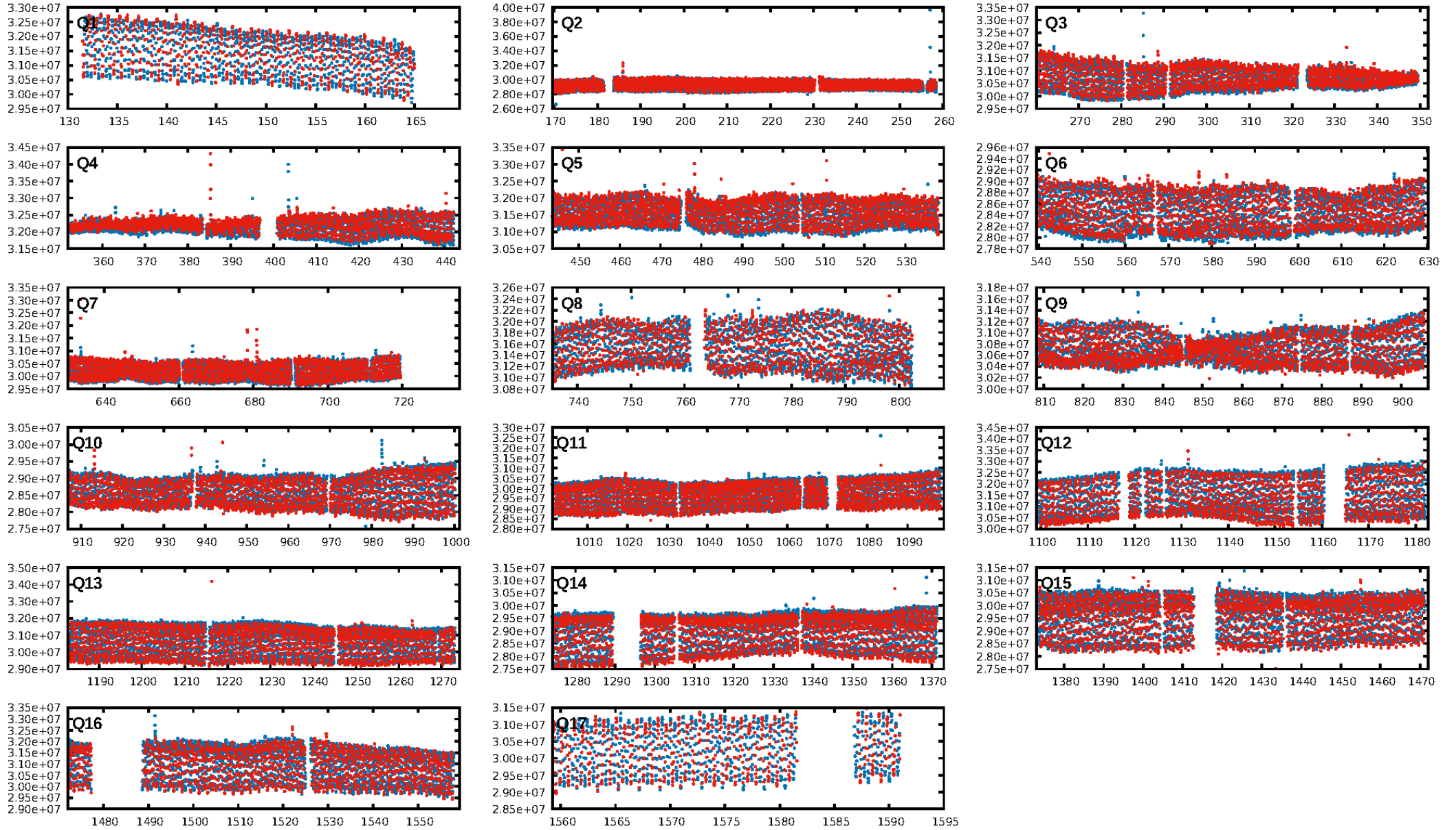
## DV Fit Results:

Period = 0.63293 [0.00017] d  
Epoch = 132.1843 [0.0328] BKJD  
Rp/R\* = 0.0030 [0.0156]  
a/R\* = 1.62 [14.47]  
b = 0.04 [400.86]  
Seff = 958.84 [181.14]  
Teq = 1419 [67] K  
Rp = 0.23 [1.22] Re  
a = 0.0129 [0.0010] AU  
Ag = 182.22 [1918.50] [0.09σ]  
Teffp = 8060 [21217] K [0.31σ]

## DV Diagnostic Results:

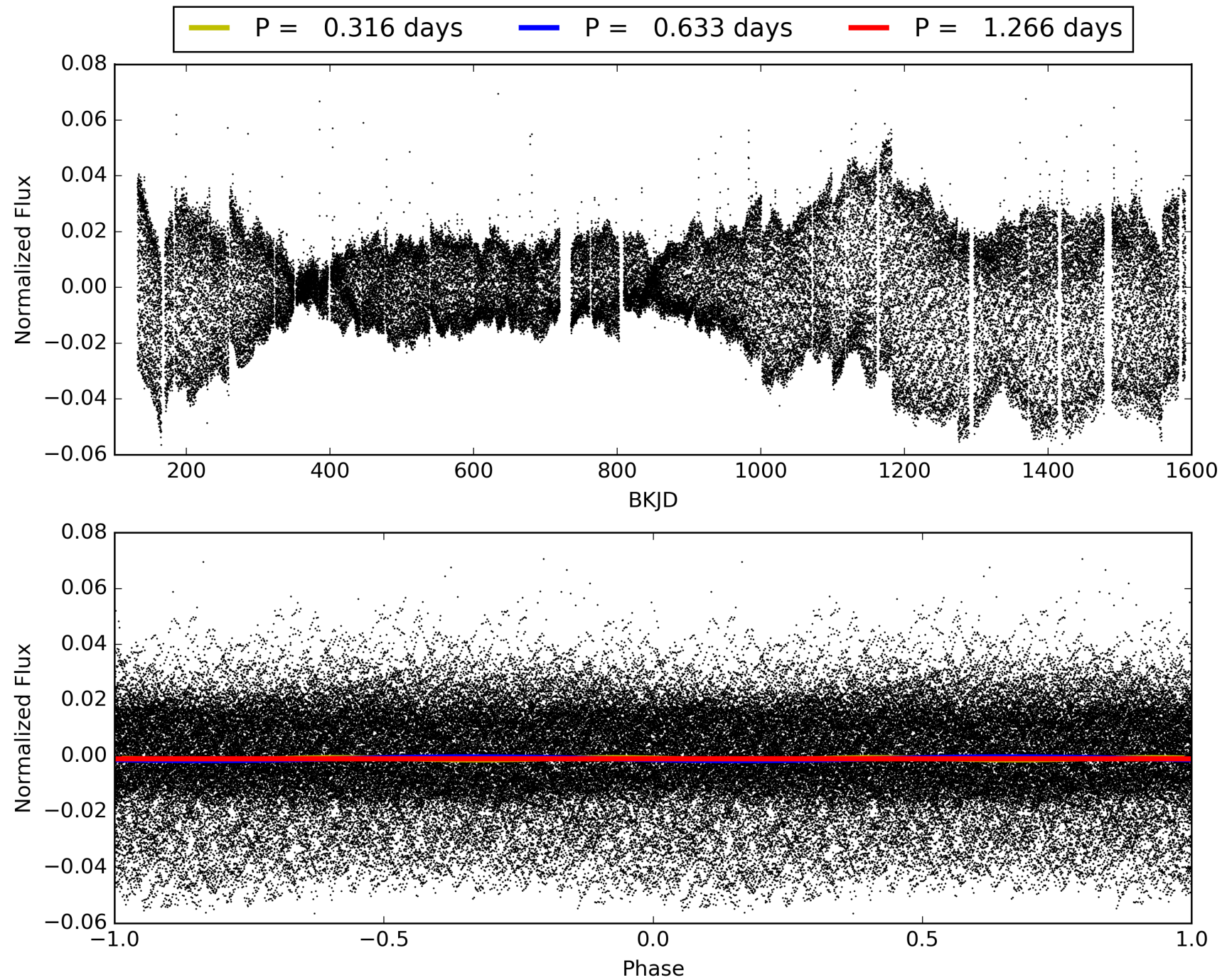
ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [446.61σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 3.19e-25  
RollingBand-fgt: 0.98 [1990/2022]  
GhostDiagnostic-chr: -0.2155  
Centroid-sig: 98.1%  
Centroid-so: 0.280 arcsec [0.08σ]  
OotOffset-rm: 0.038 arcsec [0.51σ]  
KicOffset-rm: 0.154 arcsec [1.95σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 0.41 [7/17]  
DiffImageOverlap-fno: 1.00 [17/17]

# TCE 004819564-01, PDC Light Curves



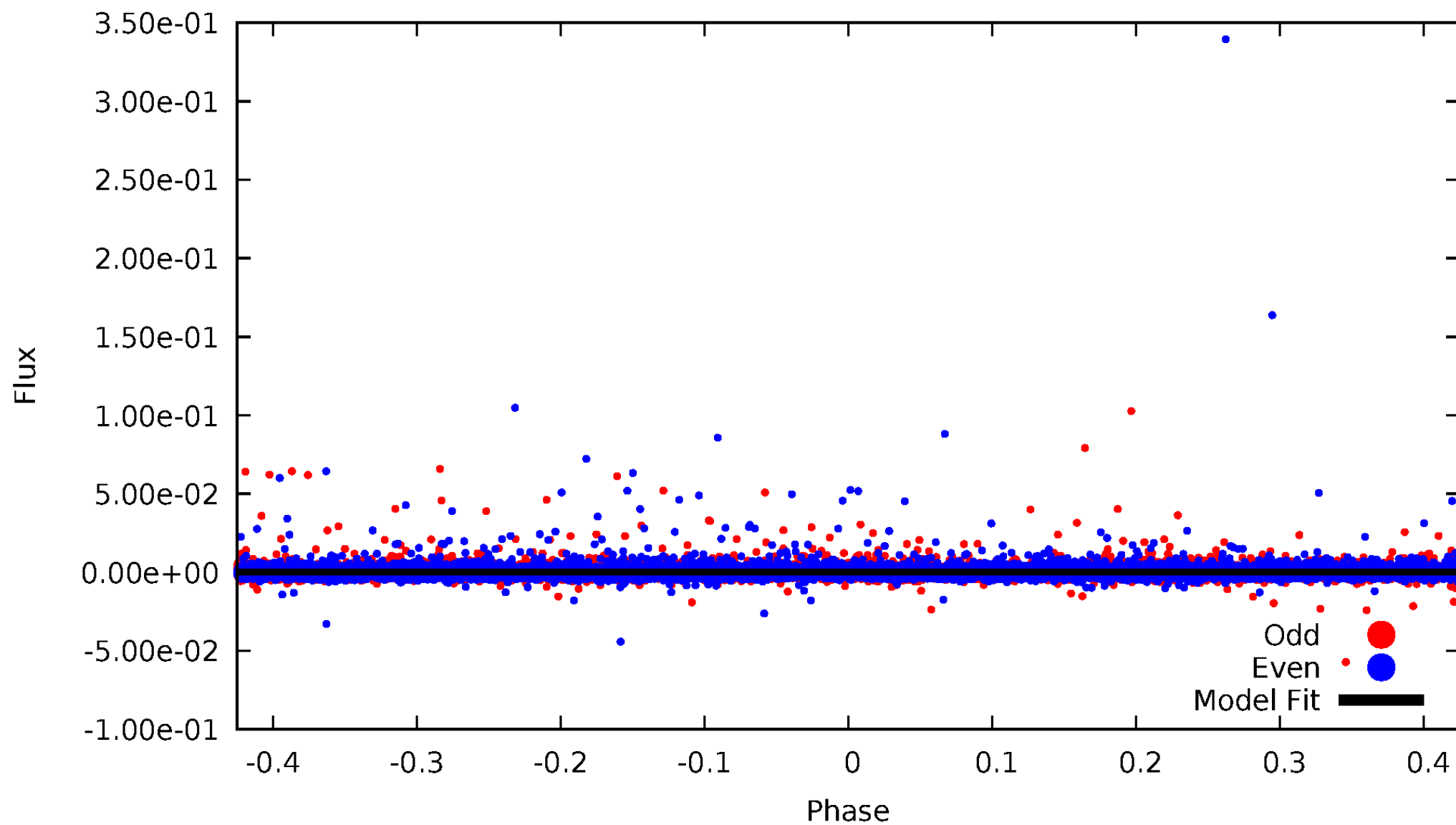


TCE 004819564-01



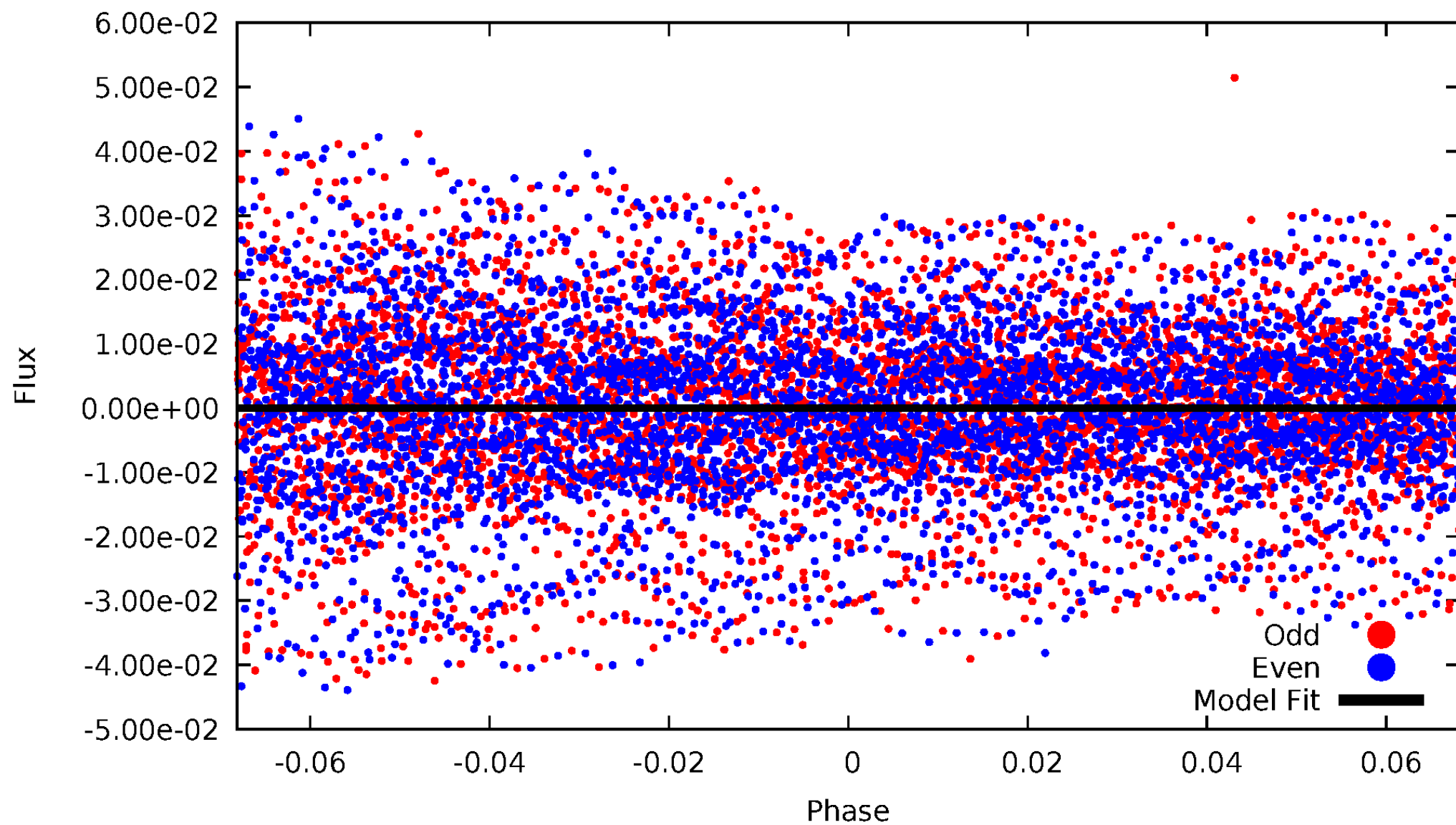
# DV Odd/Even

TCE 004819564-01

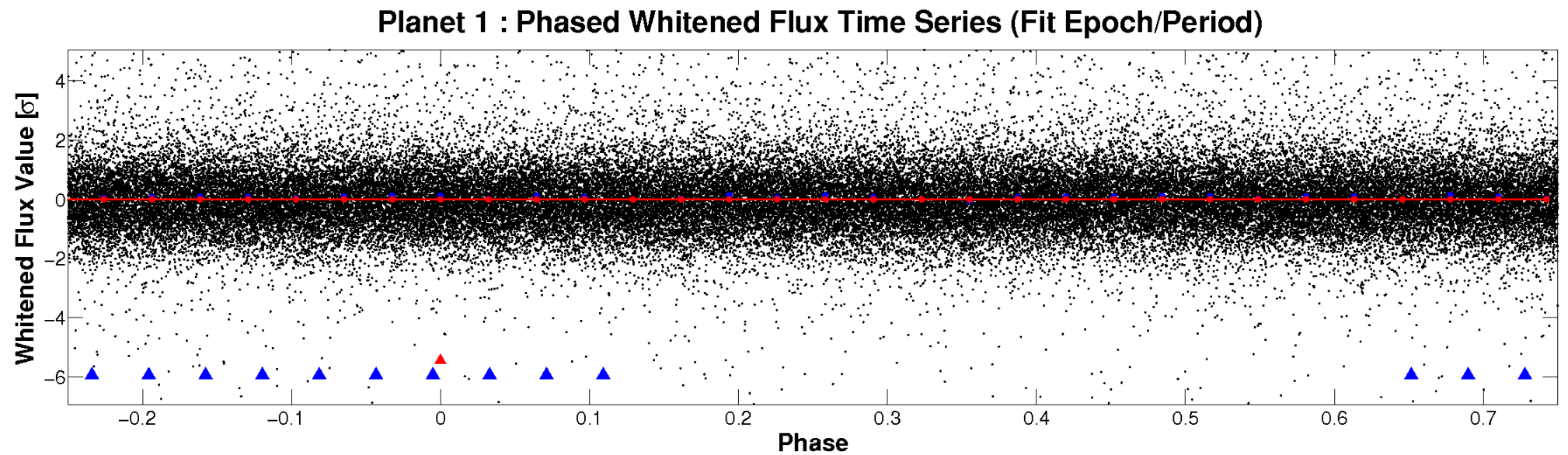
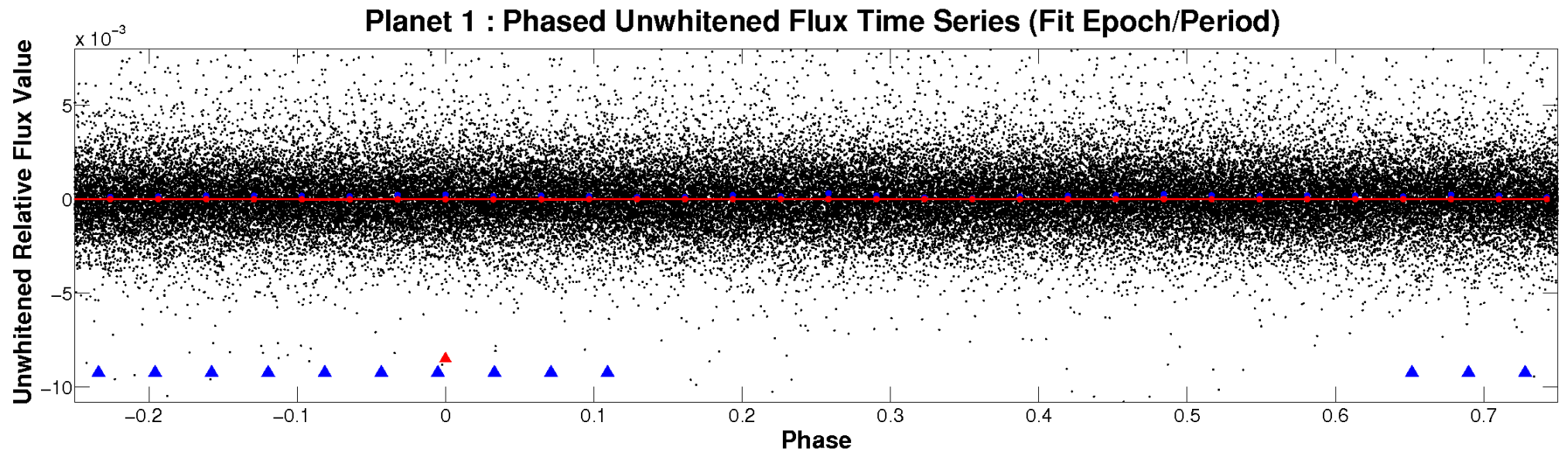


# ALT Odd/Even

TCE 004819564-01



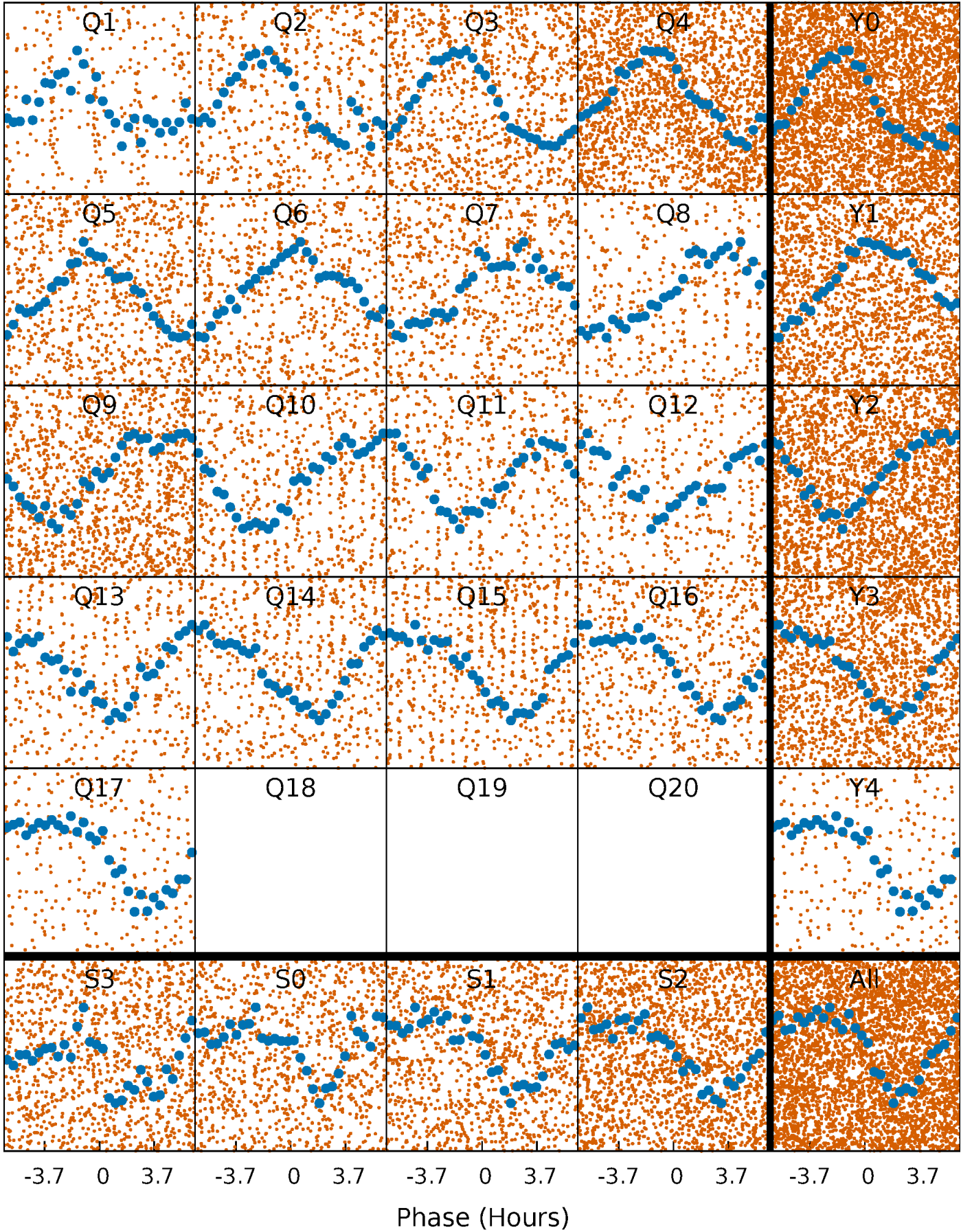
# Non-Whitened Vs. Whitened Light Curve





# PDC Quarter-Phased Transit Curves

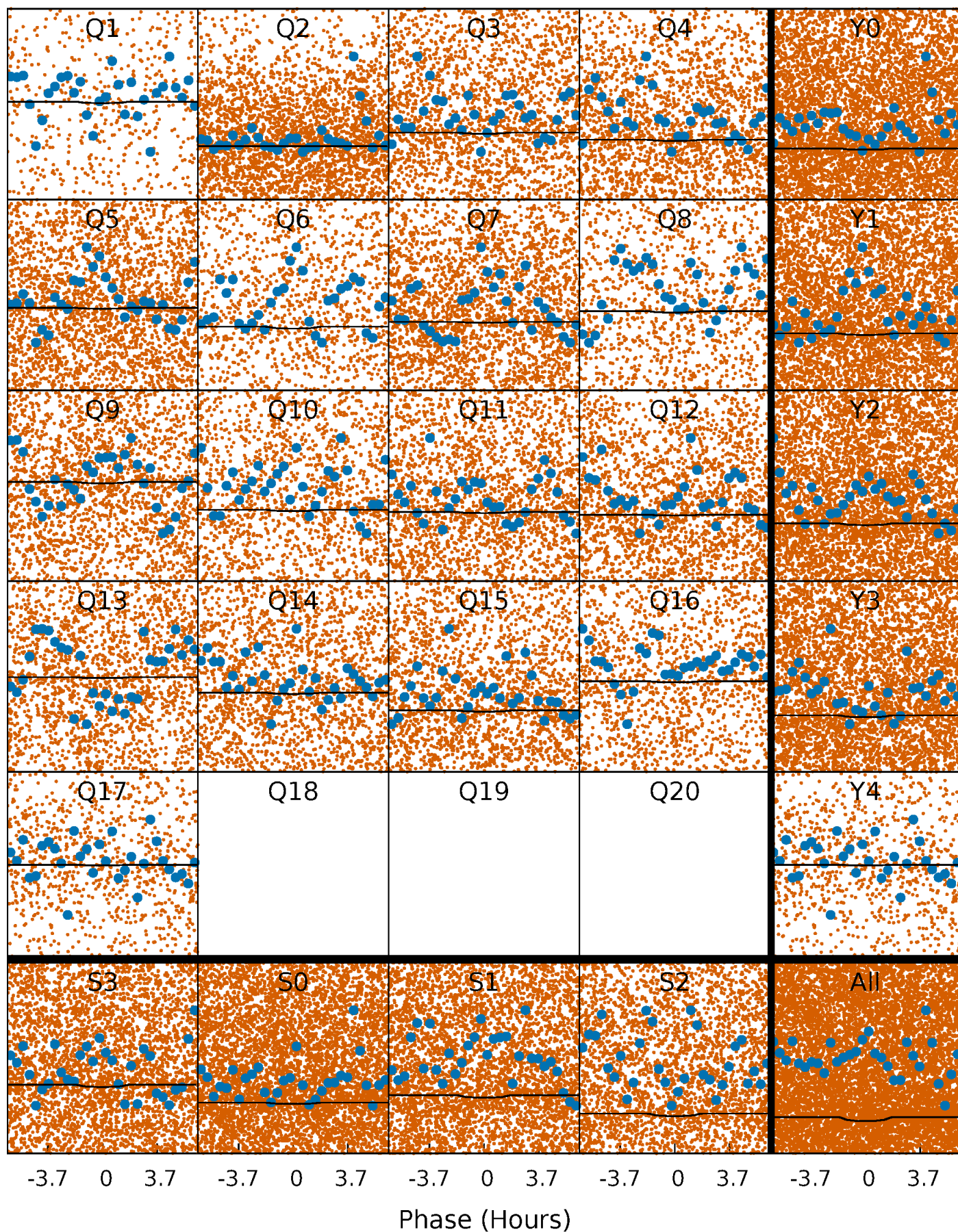
TCE 004819564-01   P= 0.632927 Days    $T_0=132.184327$  (BKJD)





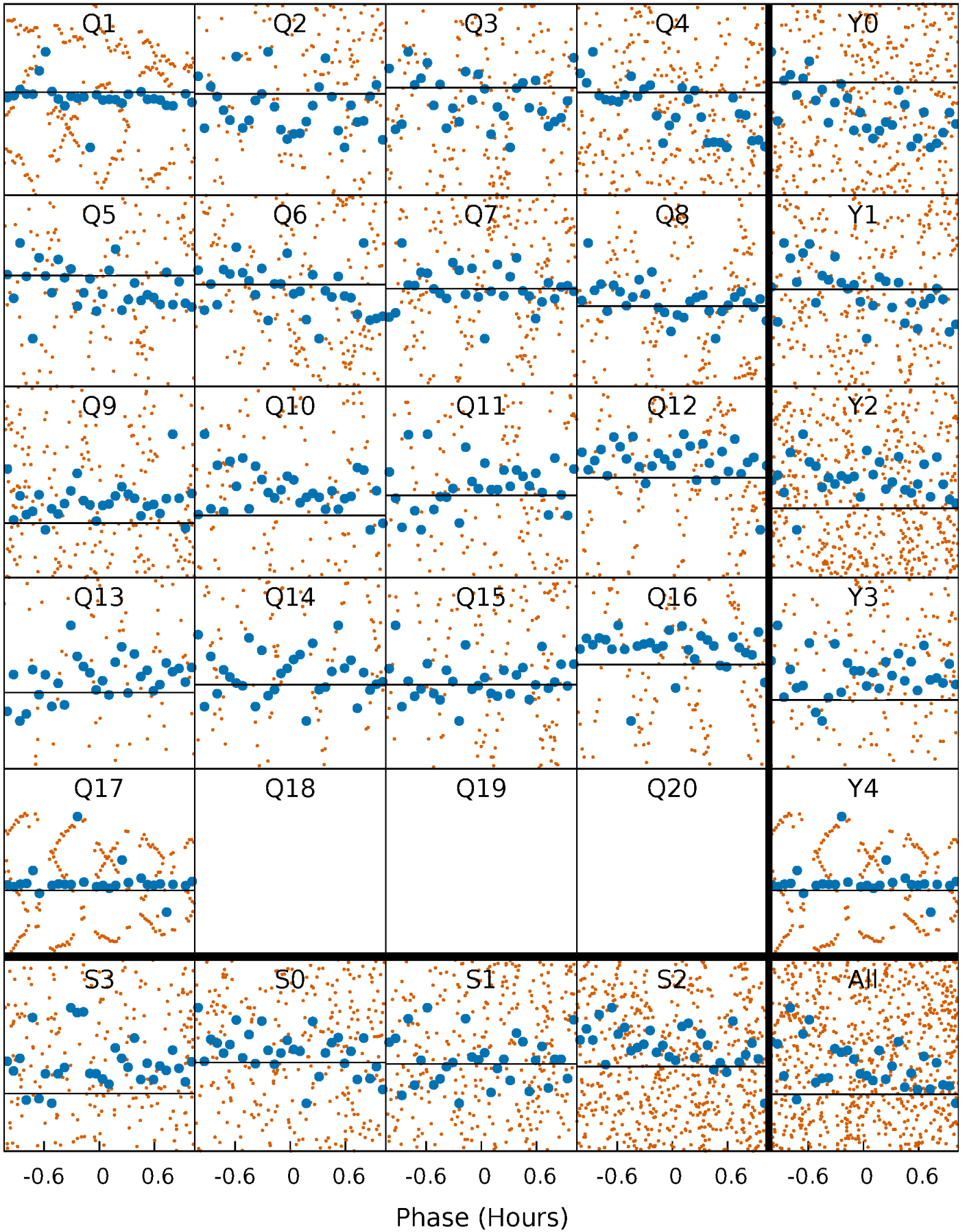
# DV Quarter-Phased Transit Curves

TCE 004819564-01 P= 0.632927 Days  $T_0=132.184327$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

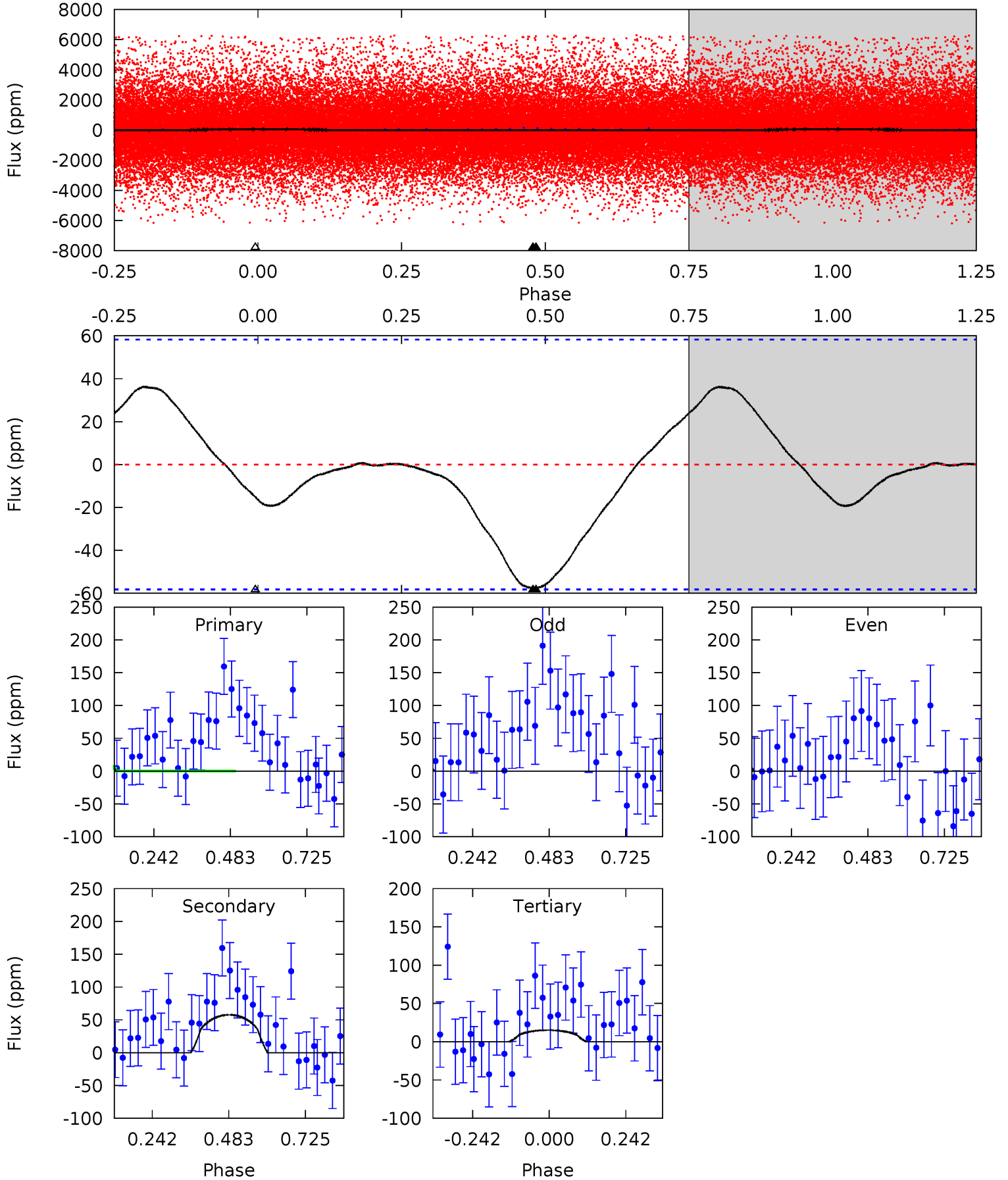
TCE 004819564-01 P= 0.633150 Days  $T_0=132.230474$  (BKJD)



# DV Model-Shift Uniqueness Test

004819564-01, P = 0.632927 Days, E = 130.918473 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
4.34	4.34	1.14	0	4.38	1.17	1.31	3.21	4.34	3.20	4.34	1.25	4.72	0.39	0.39

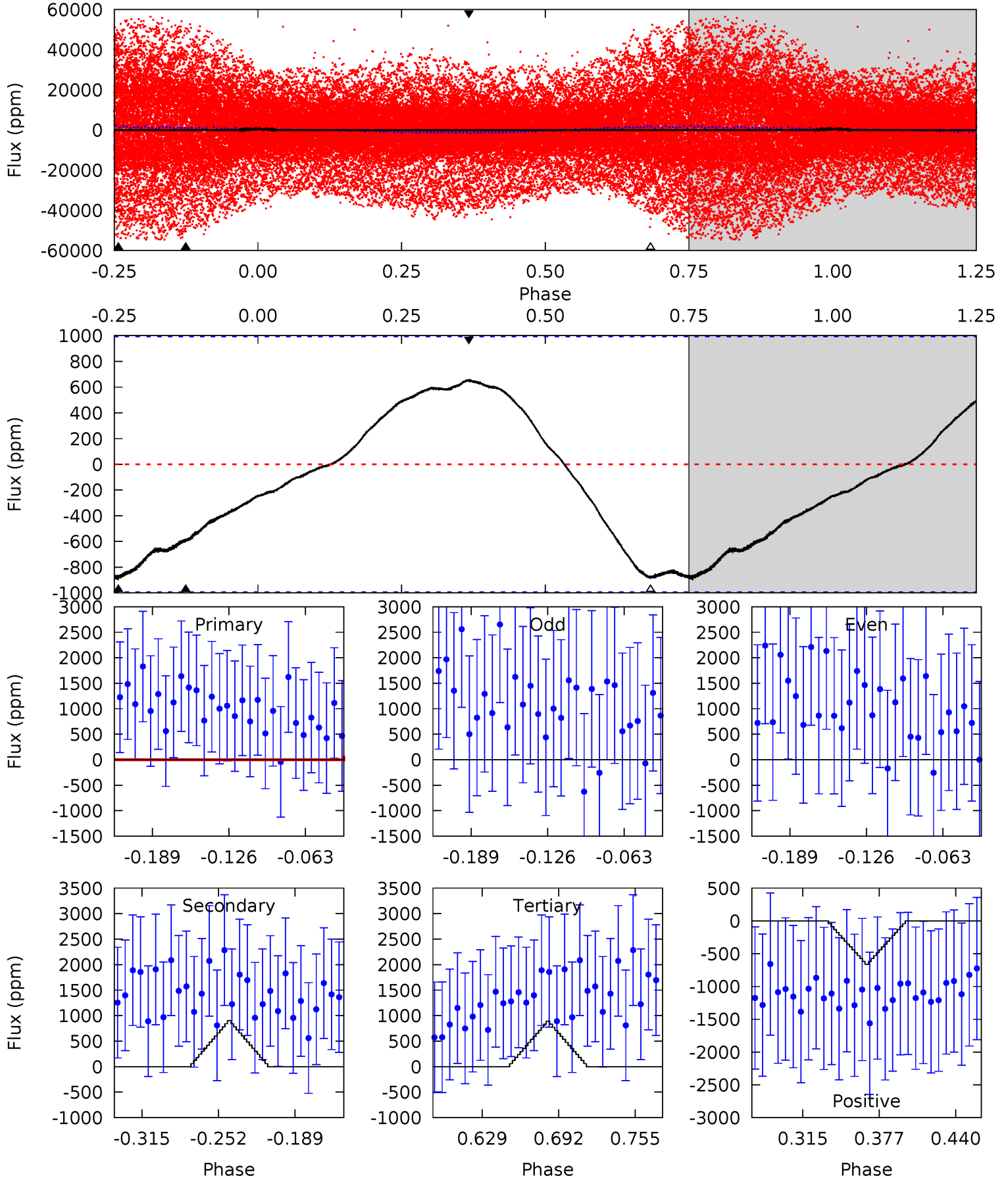




# Alt Model-Shift Uniqueness Test

004819564-01, P = 0.633150 Days, E = 130.964174 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
2.82	4.22	4.16	3.10	4.66	1.86	2.25	-1.34	-0.28	0.06	1.12	0.06	0.96	0.42	0.36





### Stellar Parameters For KIC 004819564

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4312^{+150}_{-165}$	$4.579^{+0.060}_{-0.016}$	$0.440^{+0.050}_{-0.300}$	$0.716^{+0.024}_{-0.066}$	$0.710^{+0.040}_{-0.049}$	$2.723^{+0.738}_{-0.158}$
	+3%/-4%	+1%/-0%	+11%/-68%	+3%/-9%	+6%/-7%	+27%/-6%
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 004819564-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-58 \pm 13$	$0.93^{+0.84}_{-0.65}$	$1964^{+76}_{-88}$	$3608^{+2302}_{-747}$	$6.094^{+62.734}_{-4.594}$
Alt.	$-901 \pm 214$	$0.80^{+0.95}_{-0.54}$	$1964^{+74}_{-80}$	$6800^{+9545}_{-2039}$	$121^{+1138}_{-95}$

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

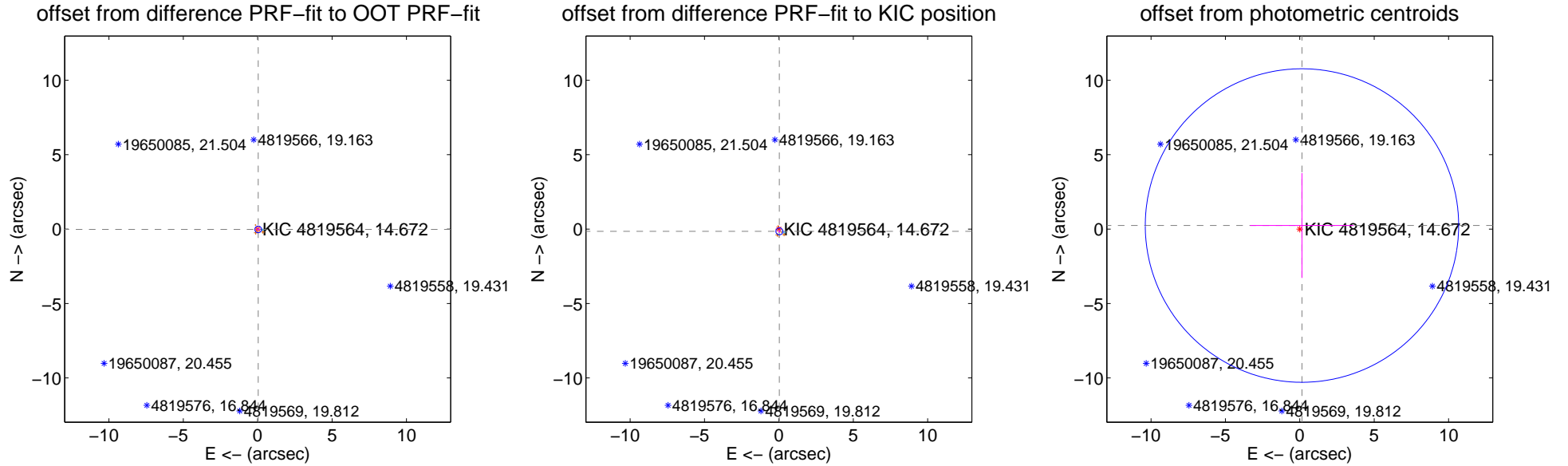
## DV Centroid Data

Supplemental centroid analysis for 004819564-01. Kepler magnitude: 14.67. Transit SNR 0.57

There are 7 quarters with good PRF difference image offsets

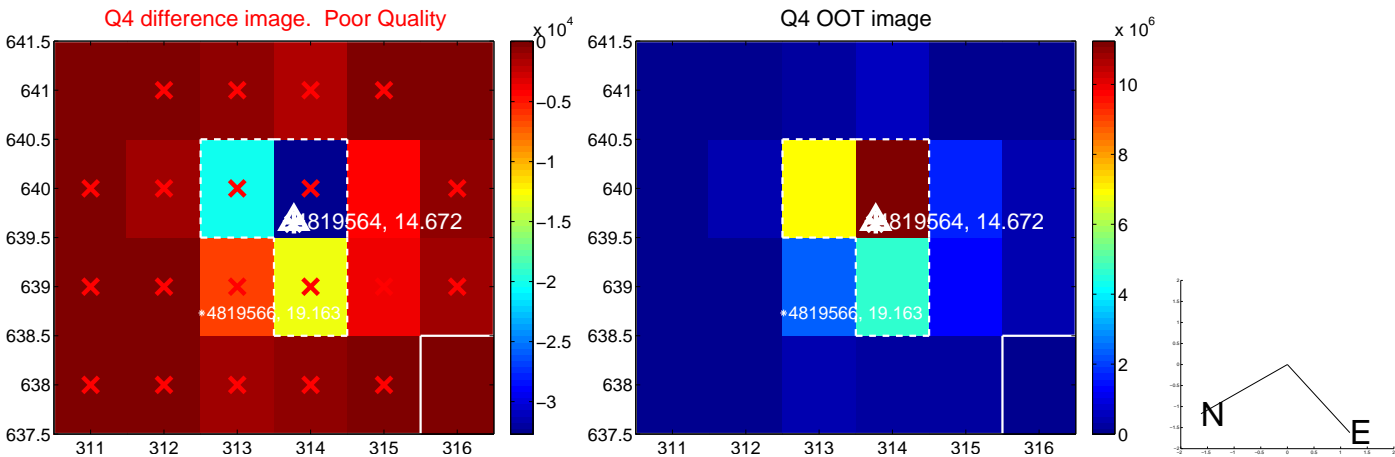
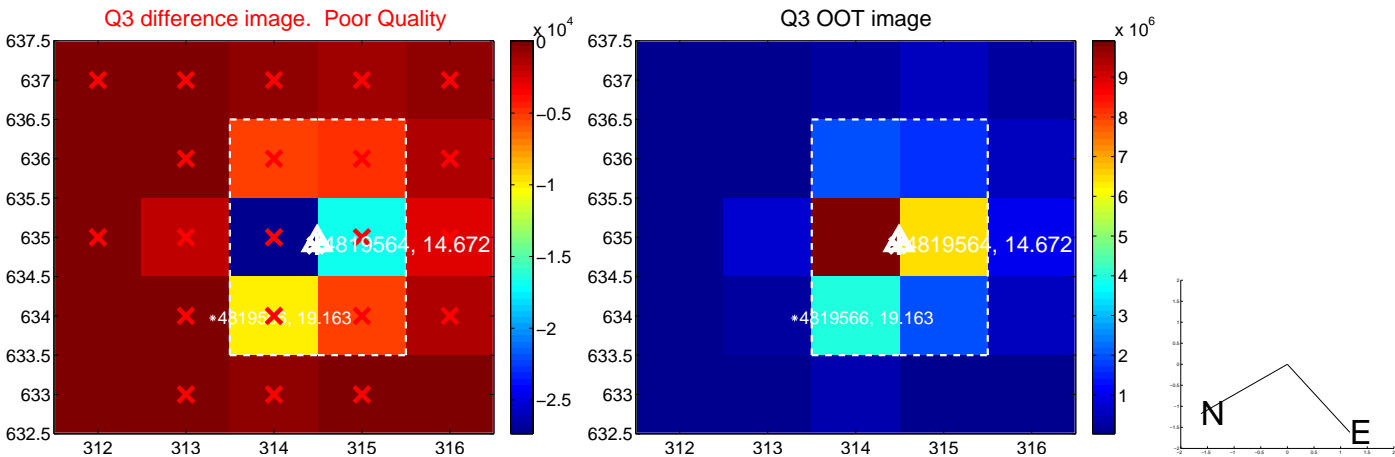
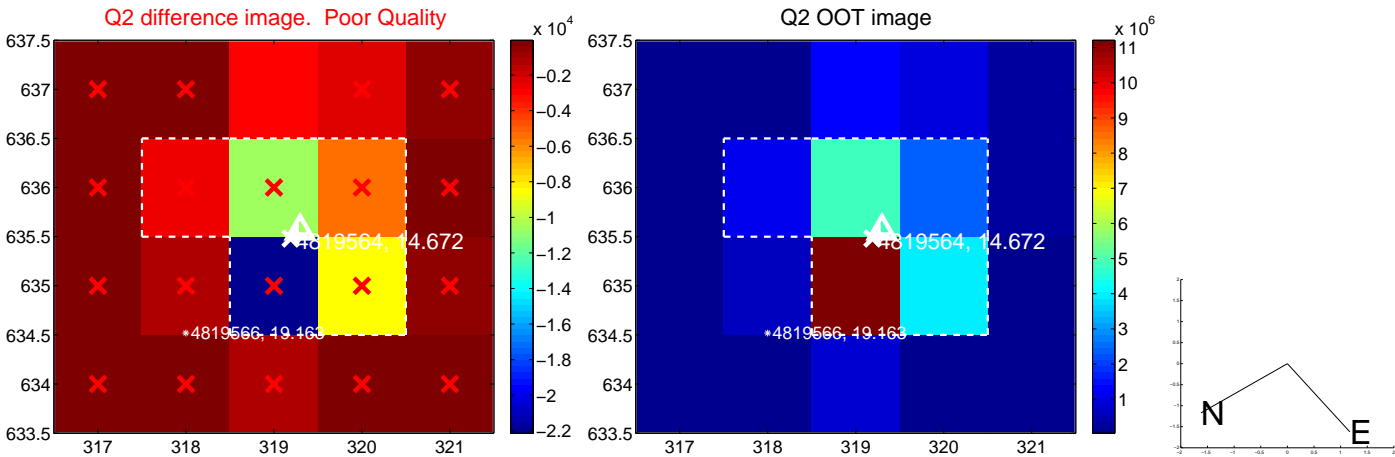
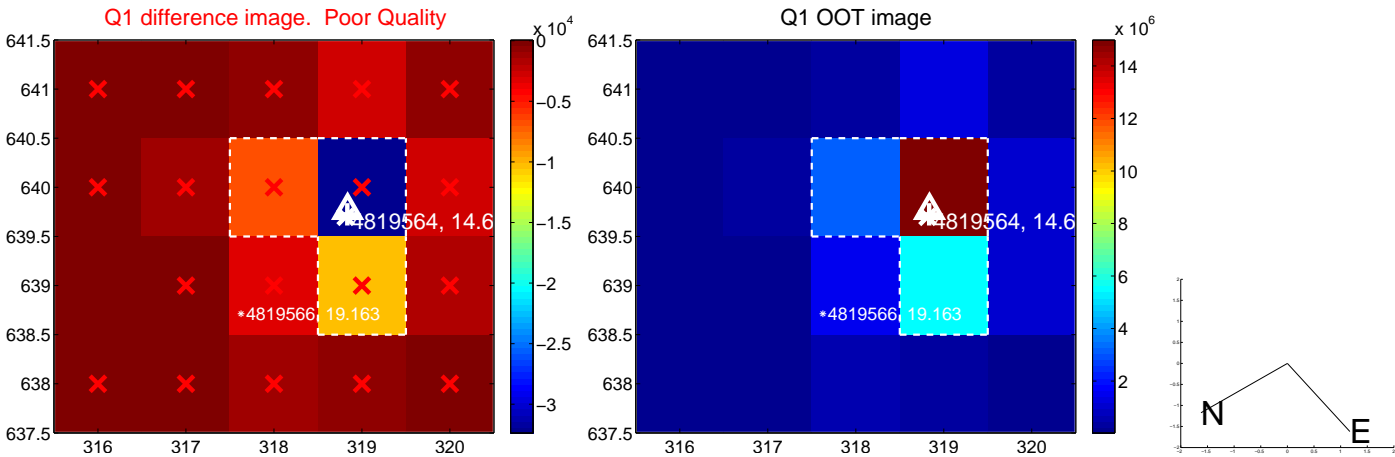
The direct PRF centroid is offset from the target star catalog position by about 0.17 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.038 \pm 0.075$	0.51	$-0.032 \pm 0.074$	$-0.021 \pm 0.072$
PRF-fit source offset from KIC position	$0.154 \pm 0.079$	1.95	$-0.031 \pm 0.073$	$-0.150 \pm 0.078$
photometric centroid source offset	$0.28 \pm 3.51$	0.08	$-0.14 \pm 3.48$	$0.24 \pm 3.52$

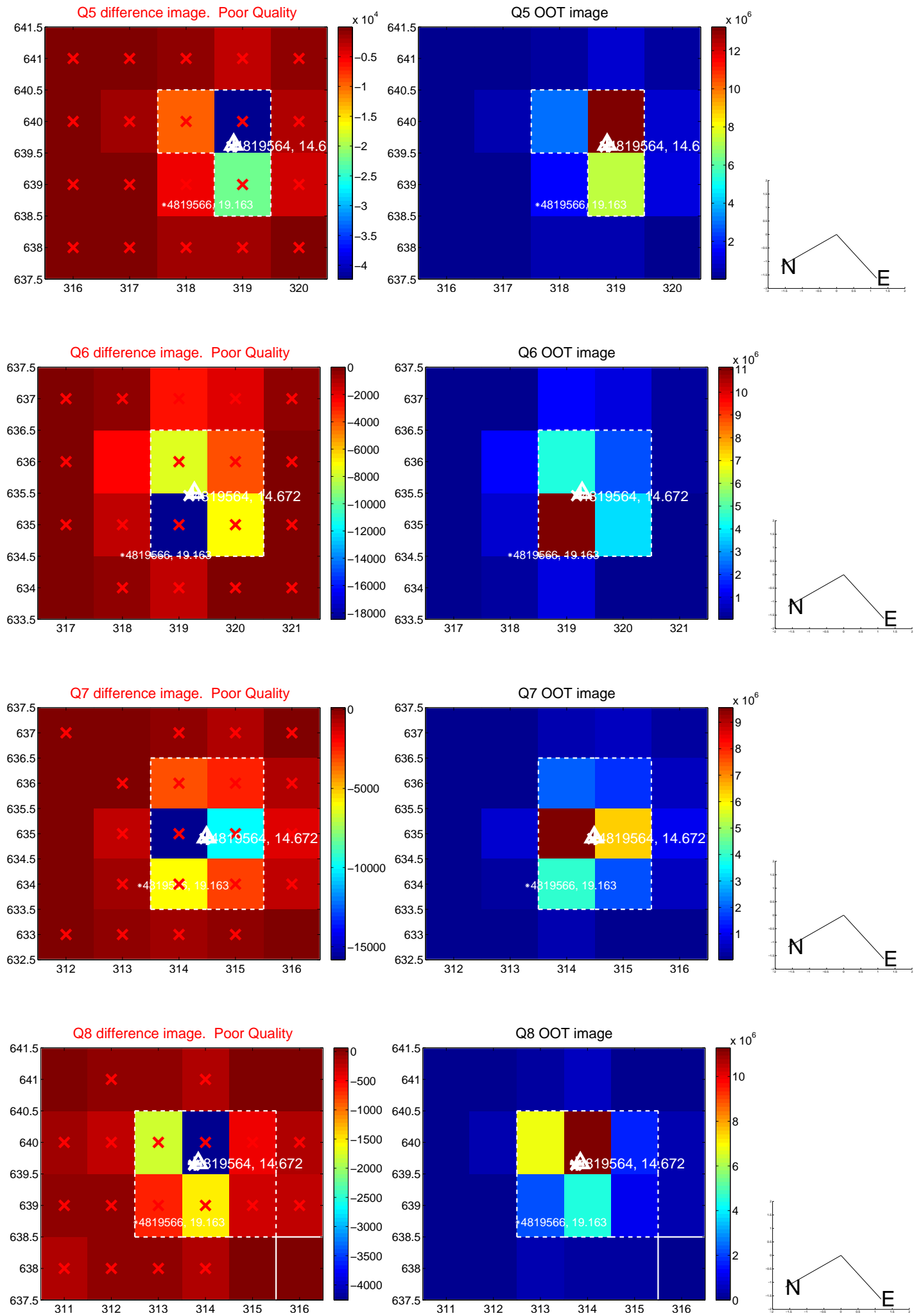


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

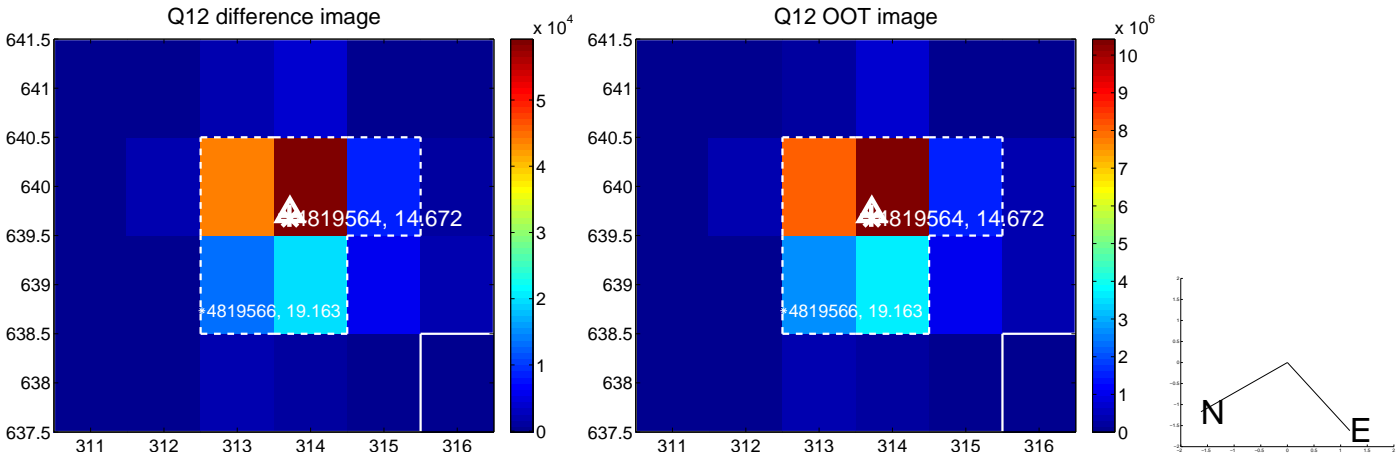
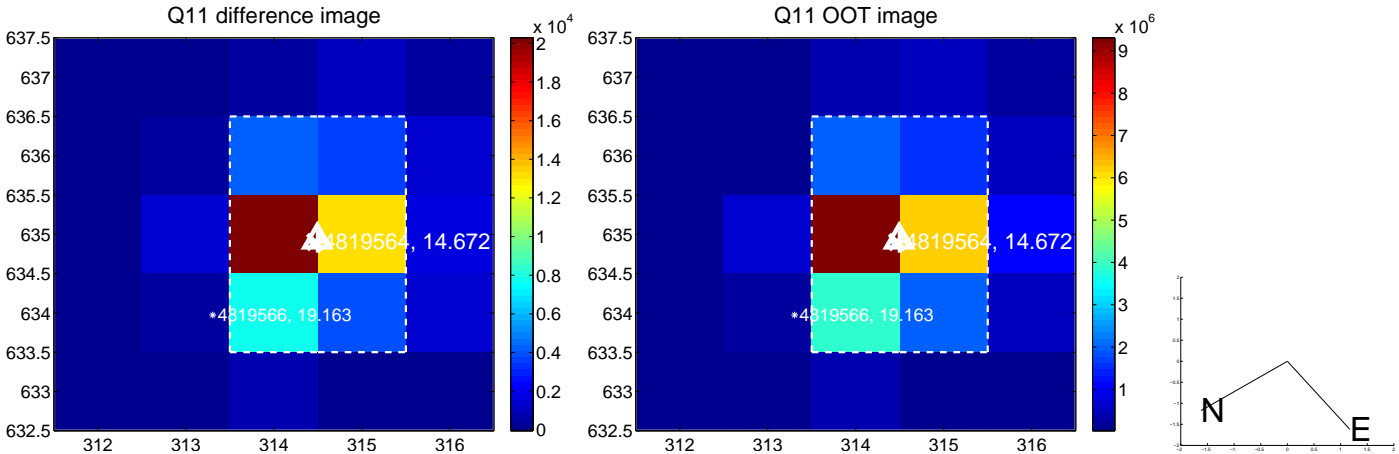
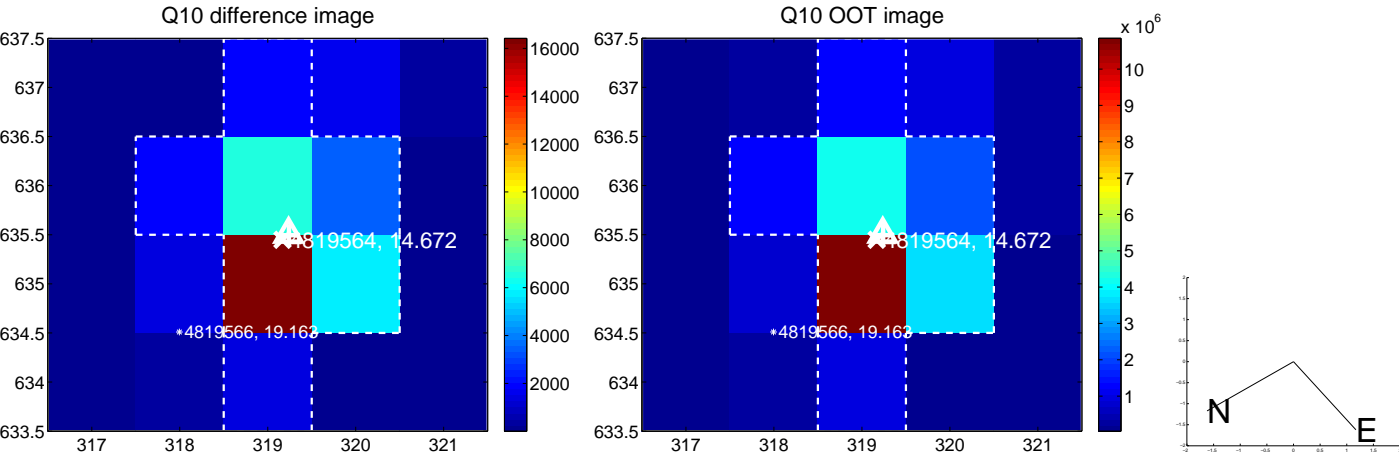
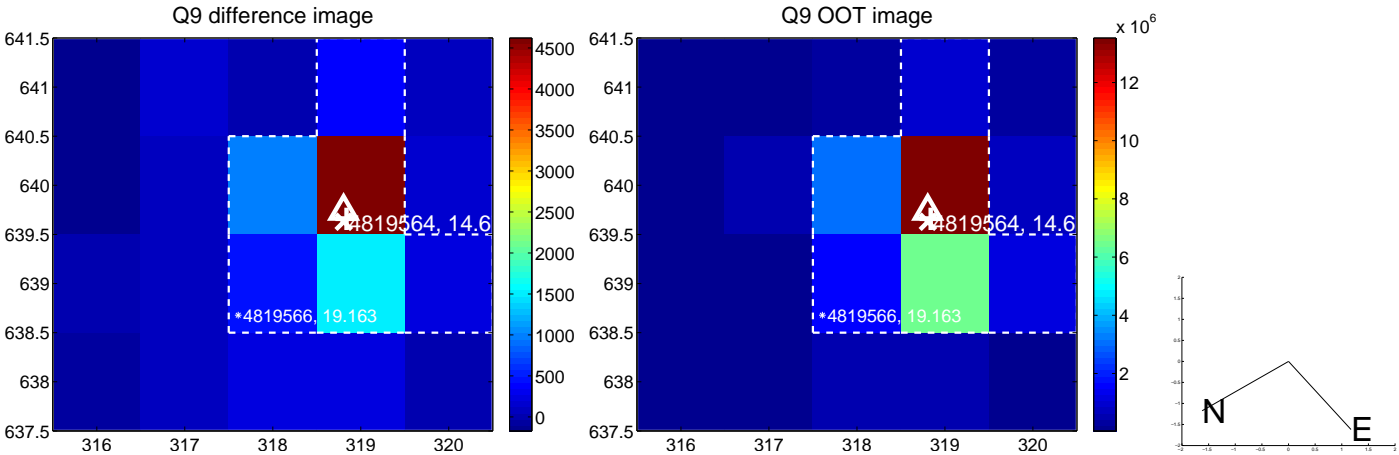


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

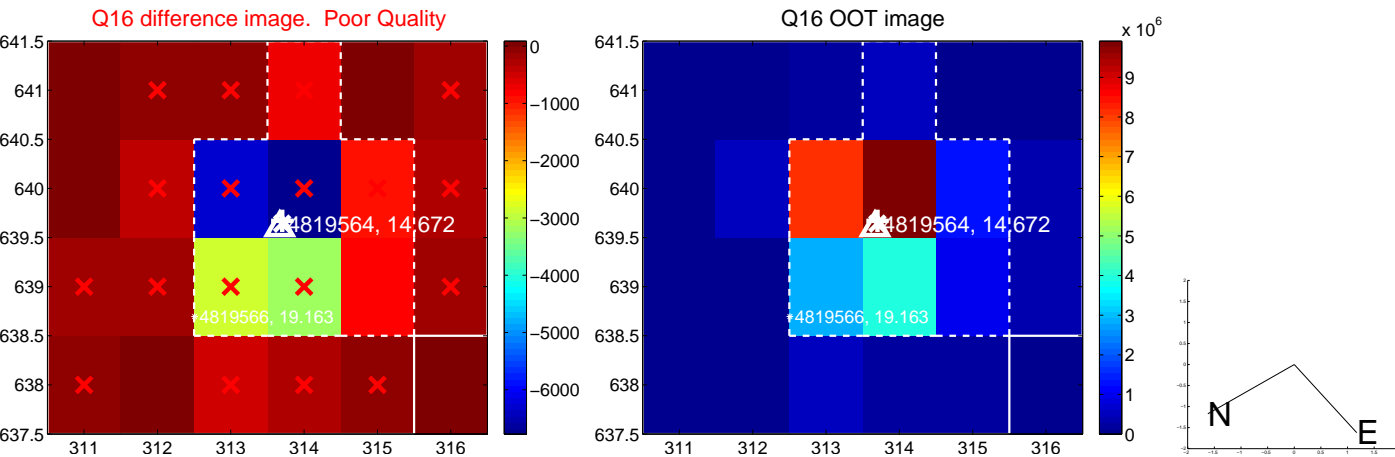
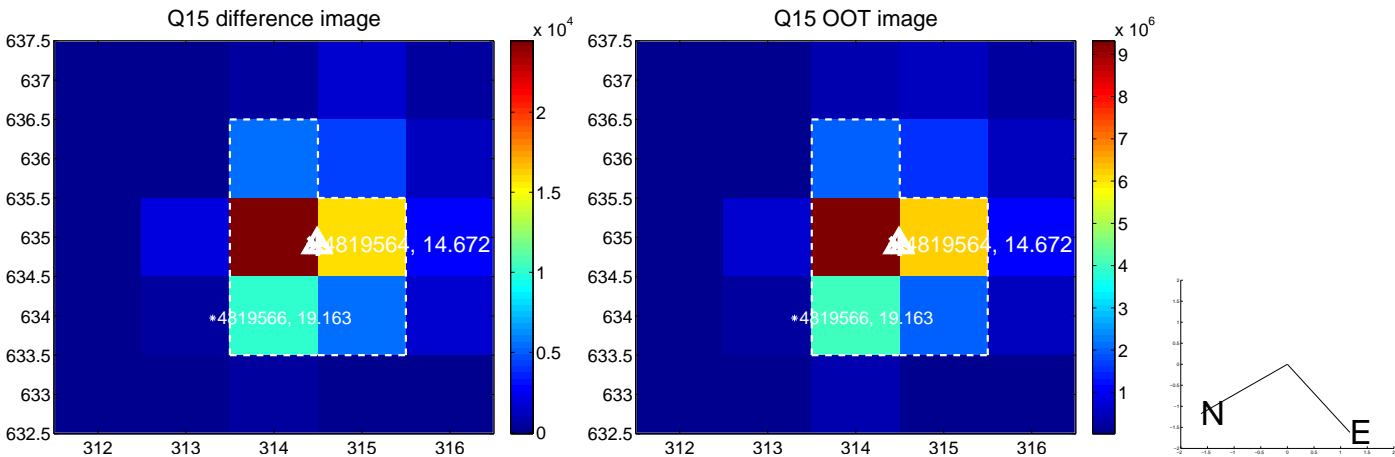
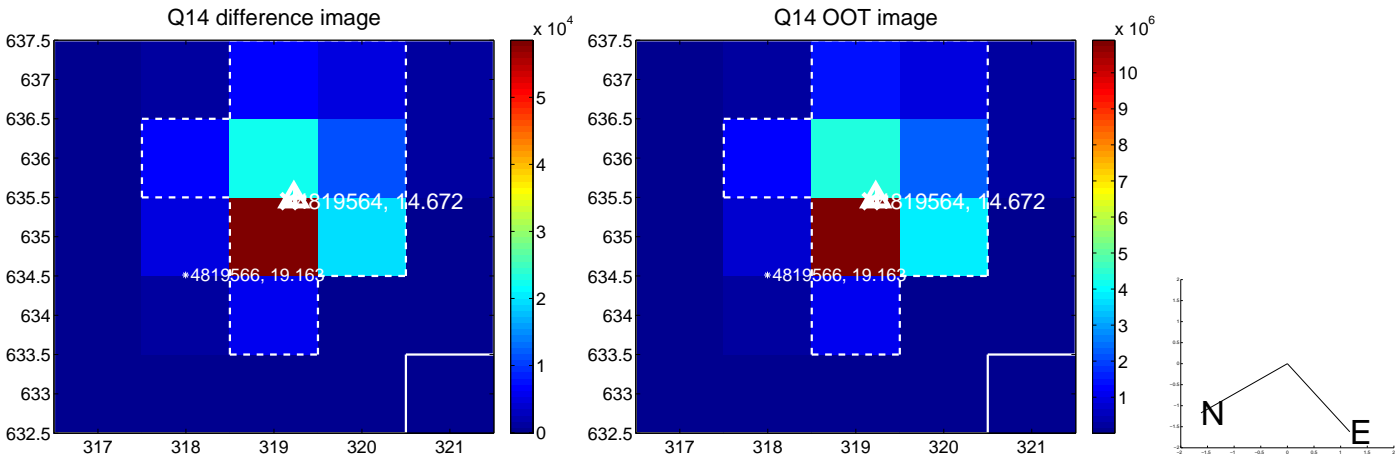
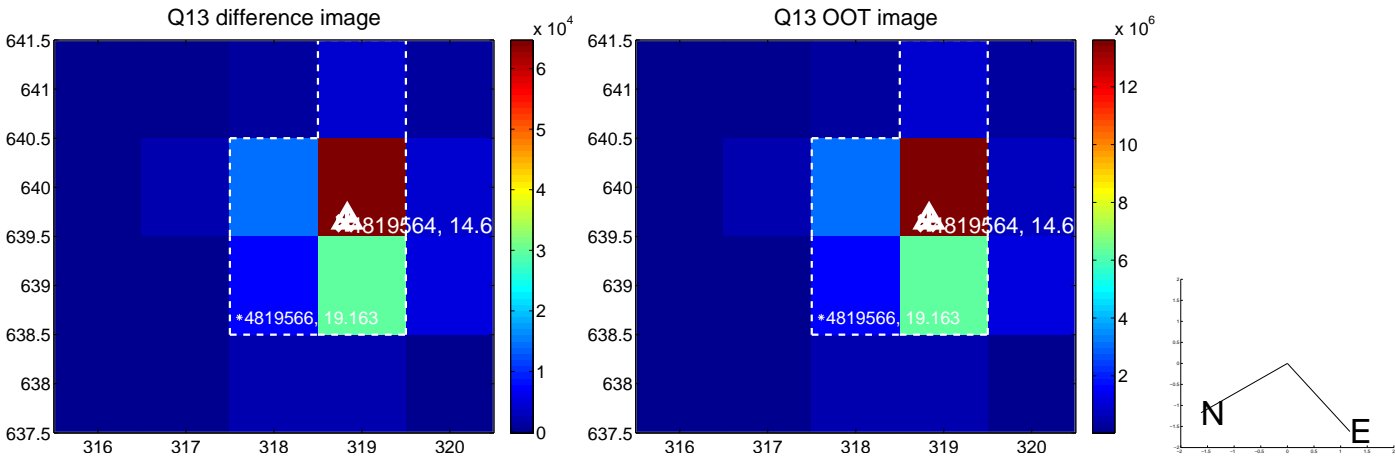




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



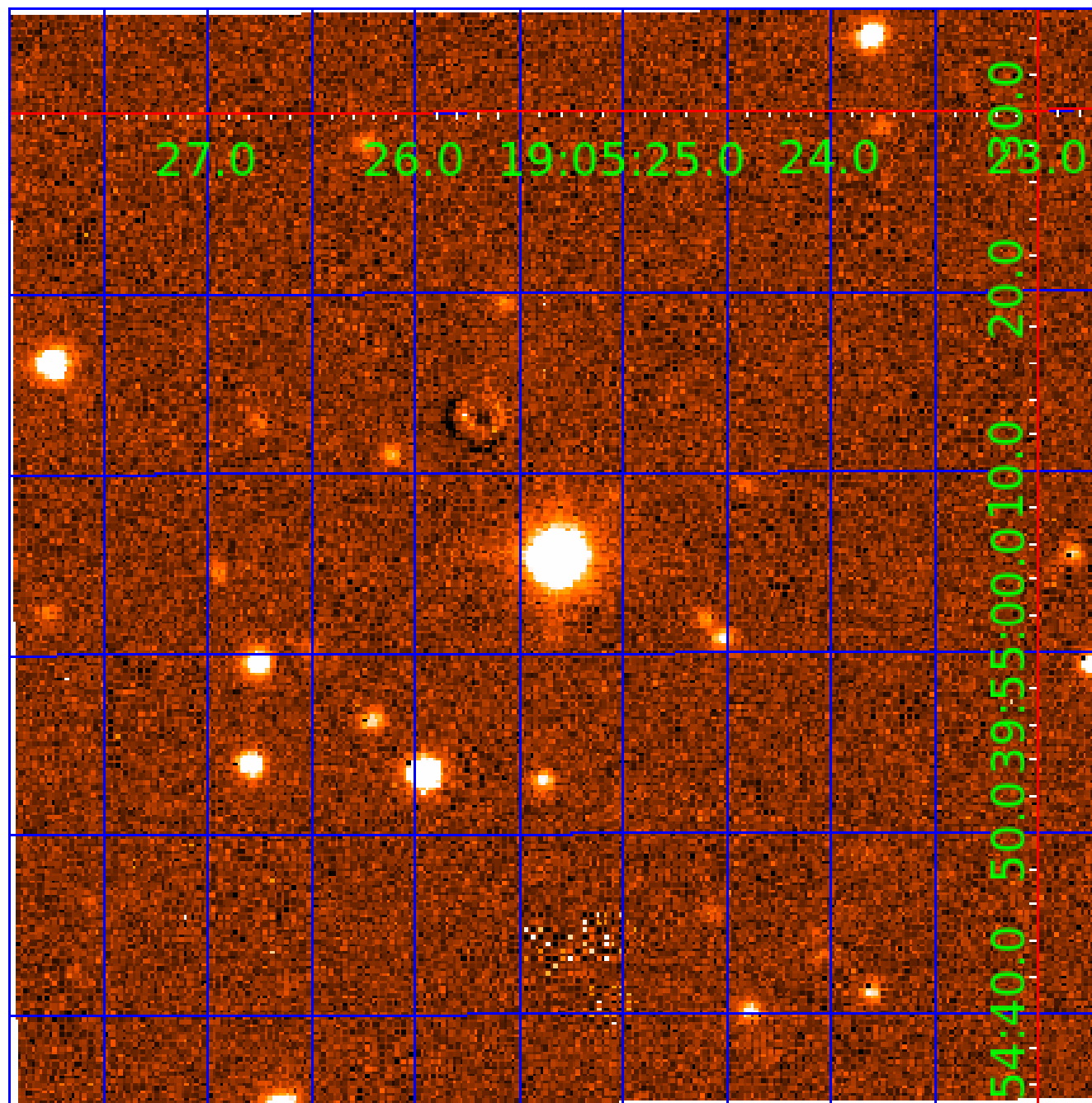
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





UKIRT Image

Declination





# KIC 004819564

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004819564-01	OBS	No	0.632927	132.184327	11.6	3.227	12.5	0.6	0.72	4312	0.23	958.84
004819564-02	OBS	No	117.748607	136.394344	3758.1	5.403	9.5	7.1	0.72	4312	4.36	0.90

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004819564-01	OBS	FP	0.00	1	0	1	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—HALO_GHOST
004819564-02	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—HALO_GHOST

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

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

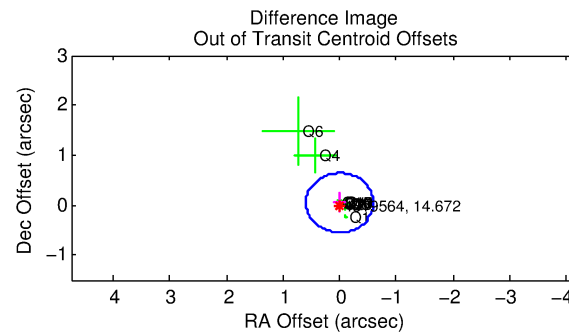
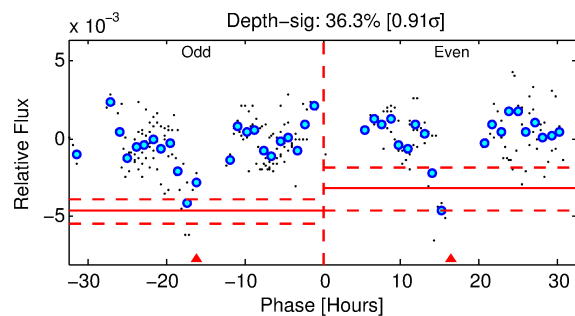
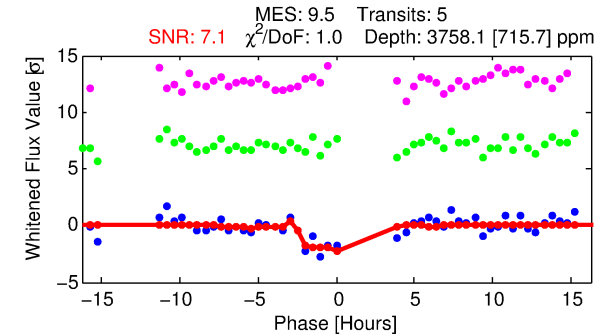
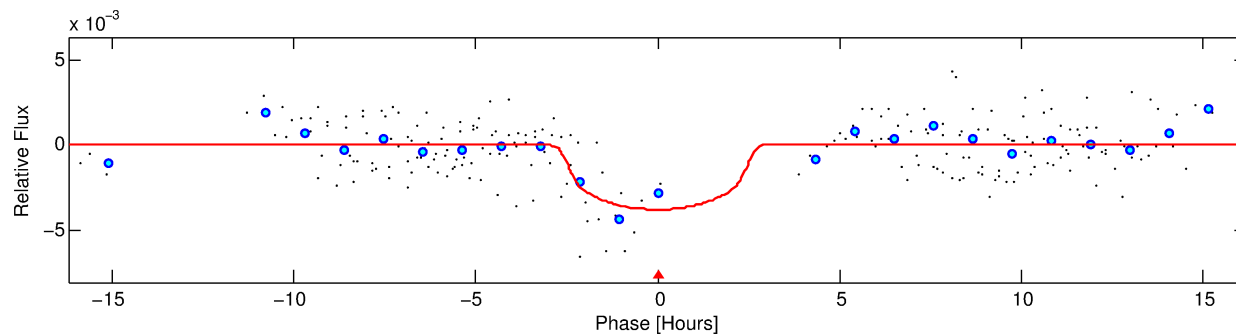
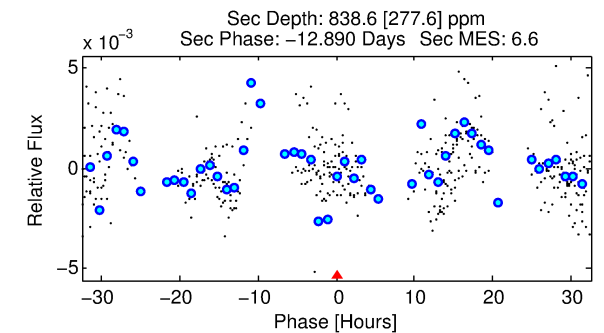
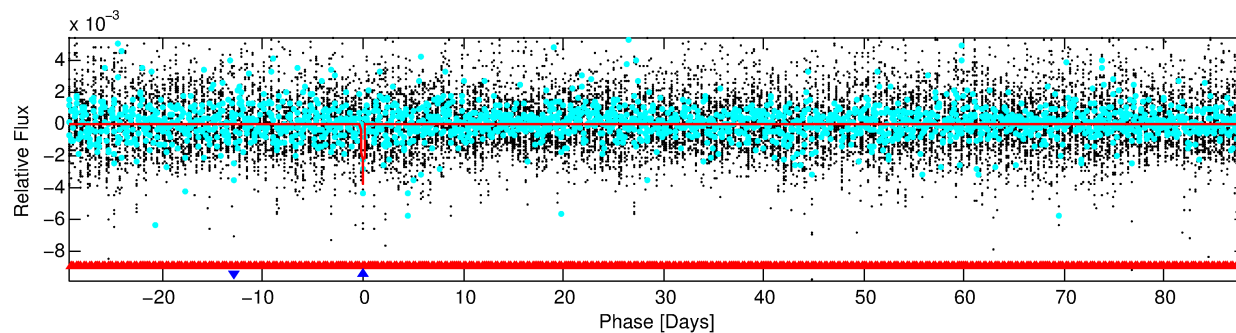
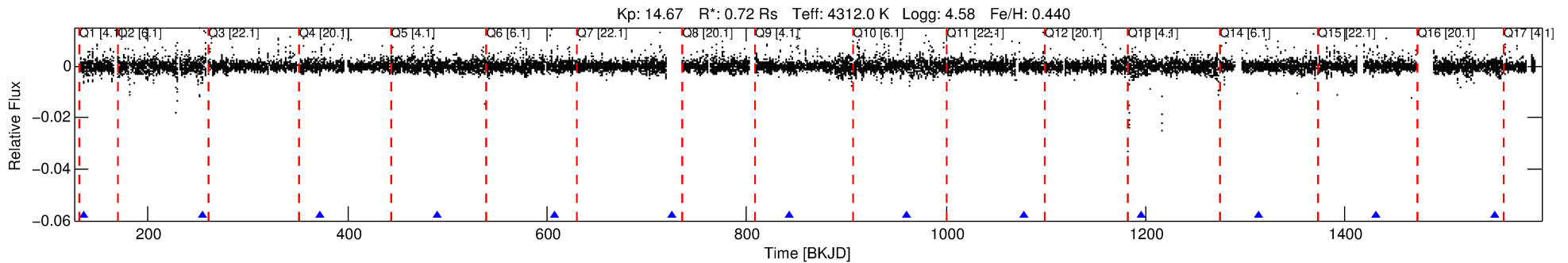
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 004819564-02

No Significant Match Found

# DV One-Page Summary

KIC: 4819564 Candidate: 2 of 2 Period: 117.749 d



## DV Fit Results:

Period = 117.74861 [0.00271] d  
Epoch = 136.3943 [0.0245] BKJD  
Rp/R\* = 0.0558 [0.0553]  
a/R\* = 156.85 [421.15]  
b = 0.48 [4.63]  
Seff = 0.90 [0.17]  
Teq = 249 [12] K  
Rp = 4.36 [4.34] Re  
a = 0.4194 [0.0322] AU  
Ag = 4275.74 [8609.51] [0.50σ]  
Teffp = 3108 [1566] K [1.83σ]

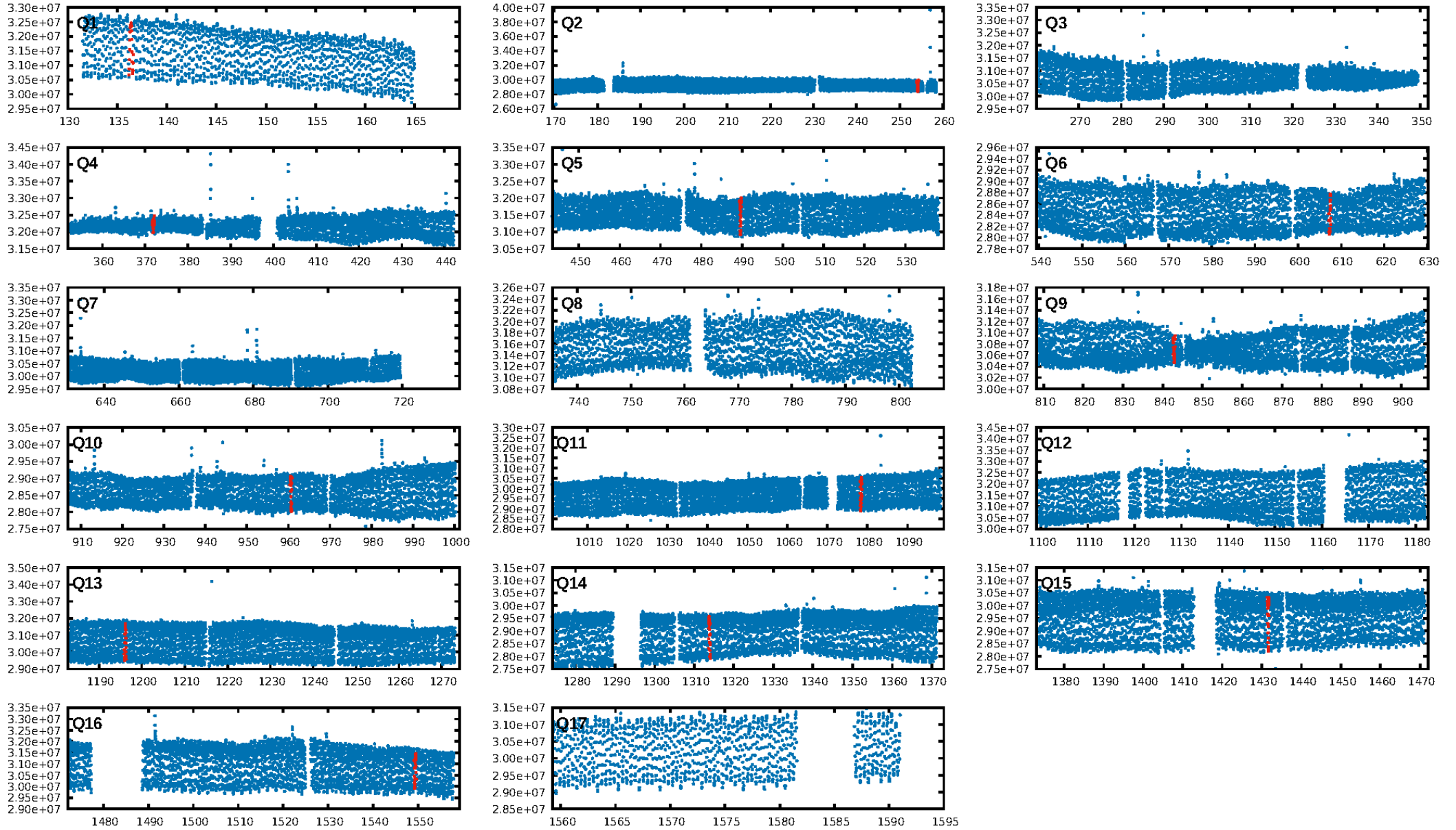
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [446.61σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 12.8%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 4.95e-09  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: -0.1379  
Centroid-sig: 0.2%  
Centroid-so: 0.105 arcsec [0.94σ]  
OotOffset-rm: 0.046 arcsec [0.23σ]  
KicOffset-rm: 0.161 arcsec [1.00σ]  
OotOffset-st: 3/2/1/4 [10]  
KicOffset-st: 3/2/1/4 [10]  
DiffImageQuality-fgm: 0.70 [7/10]  
DiffImageOverlap-fno: 0.00 [0/11]

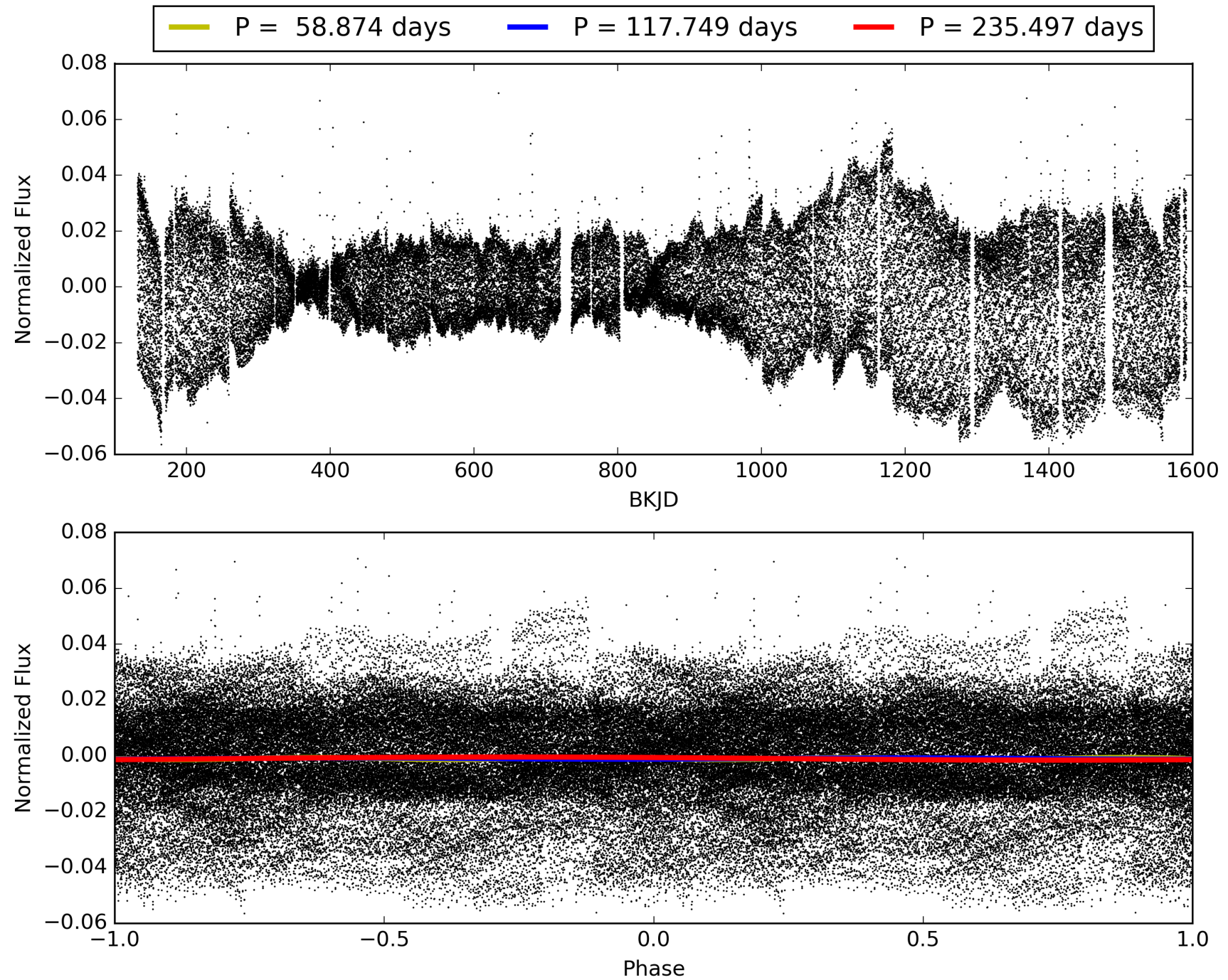
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 004819564-02, PDC Light Curves



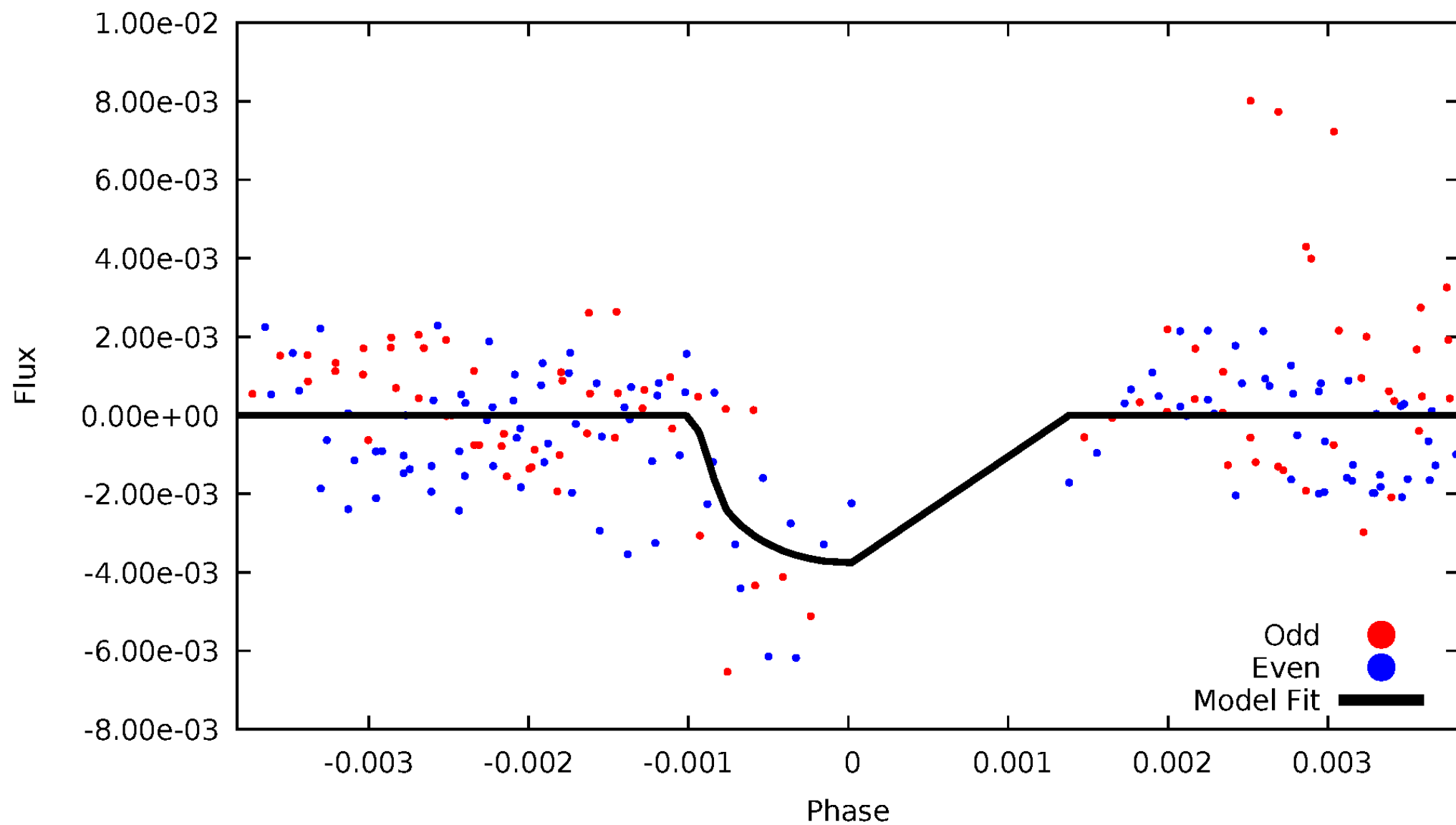
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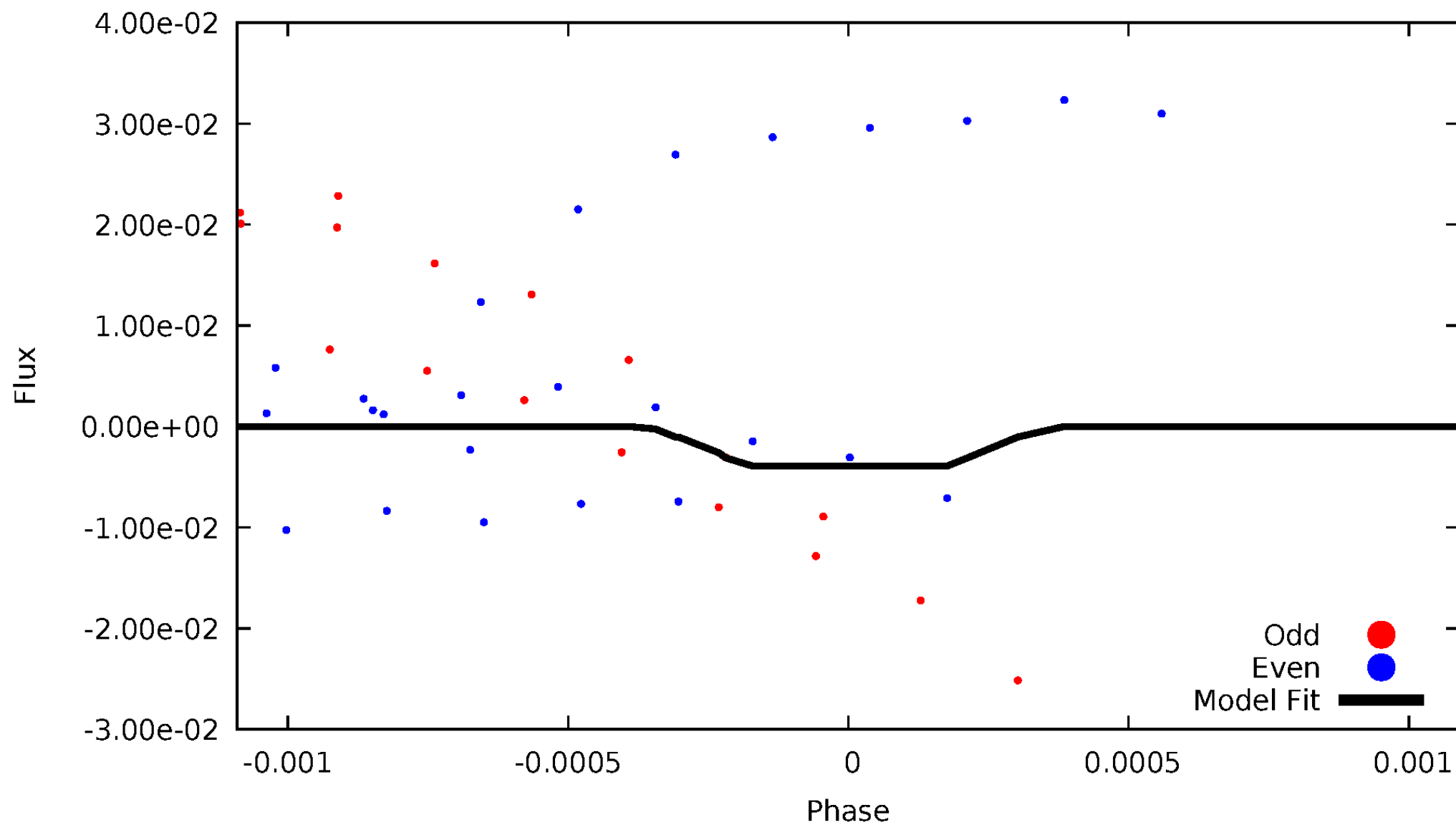
# DV Odd/Even

TCE 004819564-02



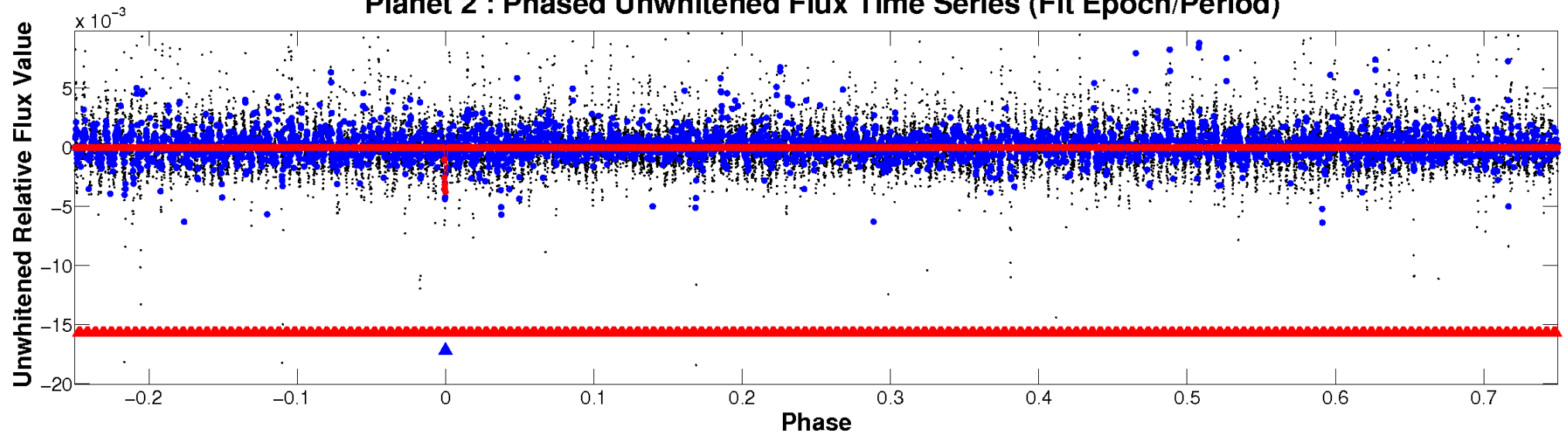
# ALT Odd/Even

TCE 004819564-02

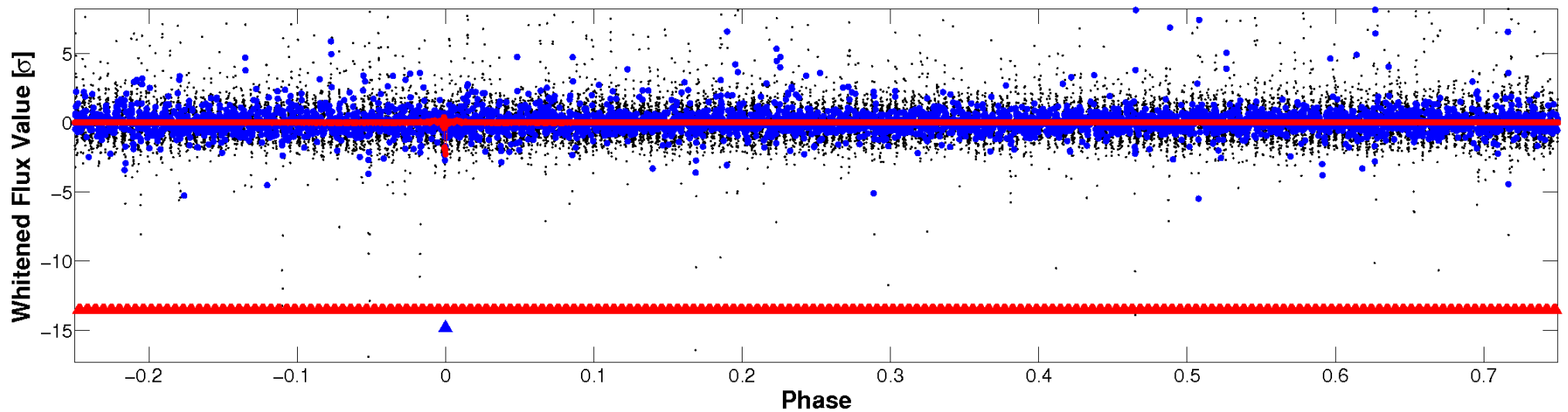


# Non-Whitened Vs. Whitened Light Curve

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

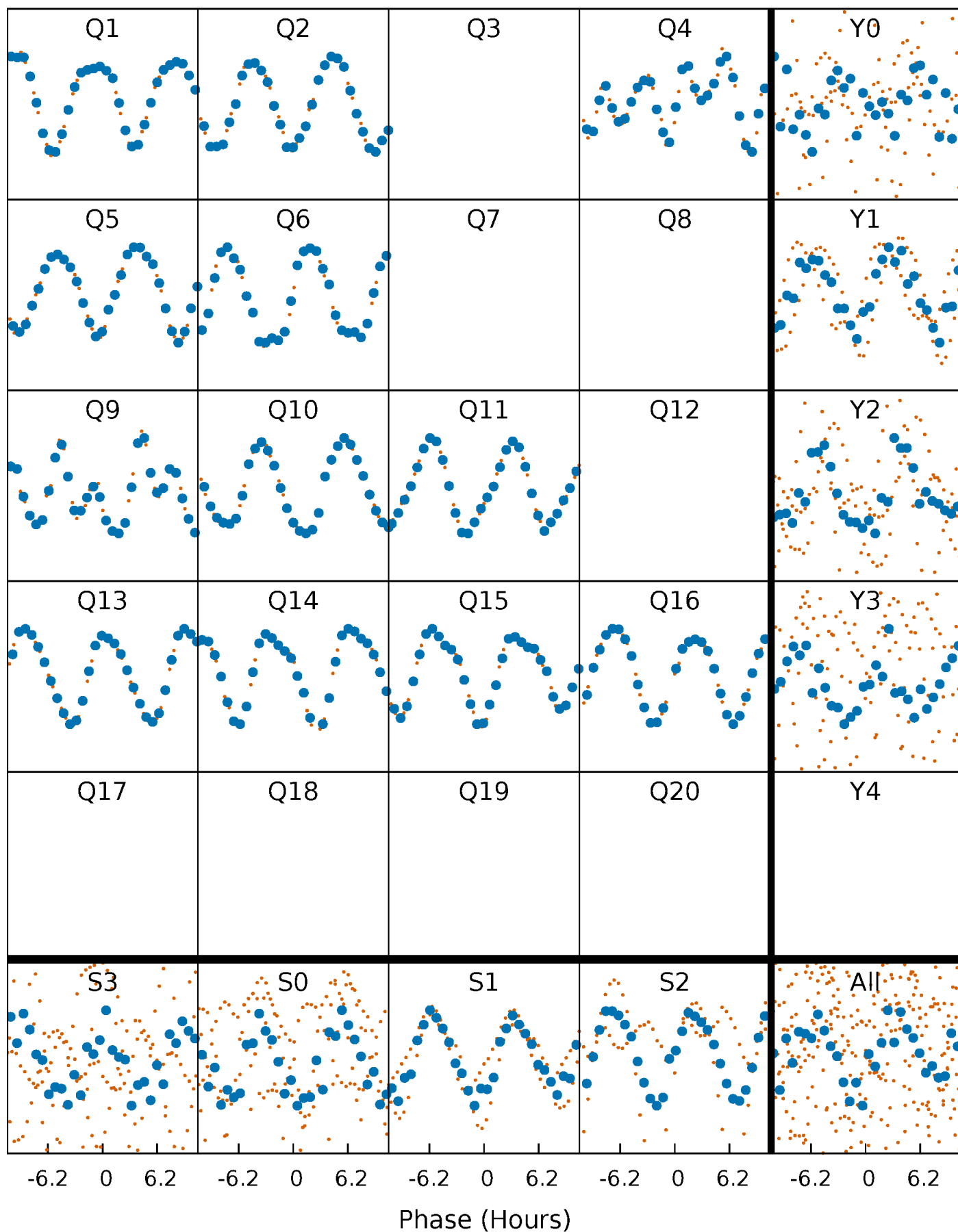


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



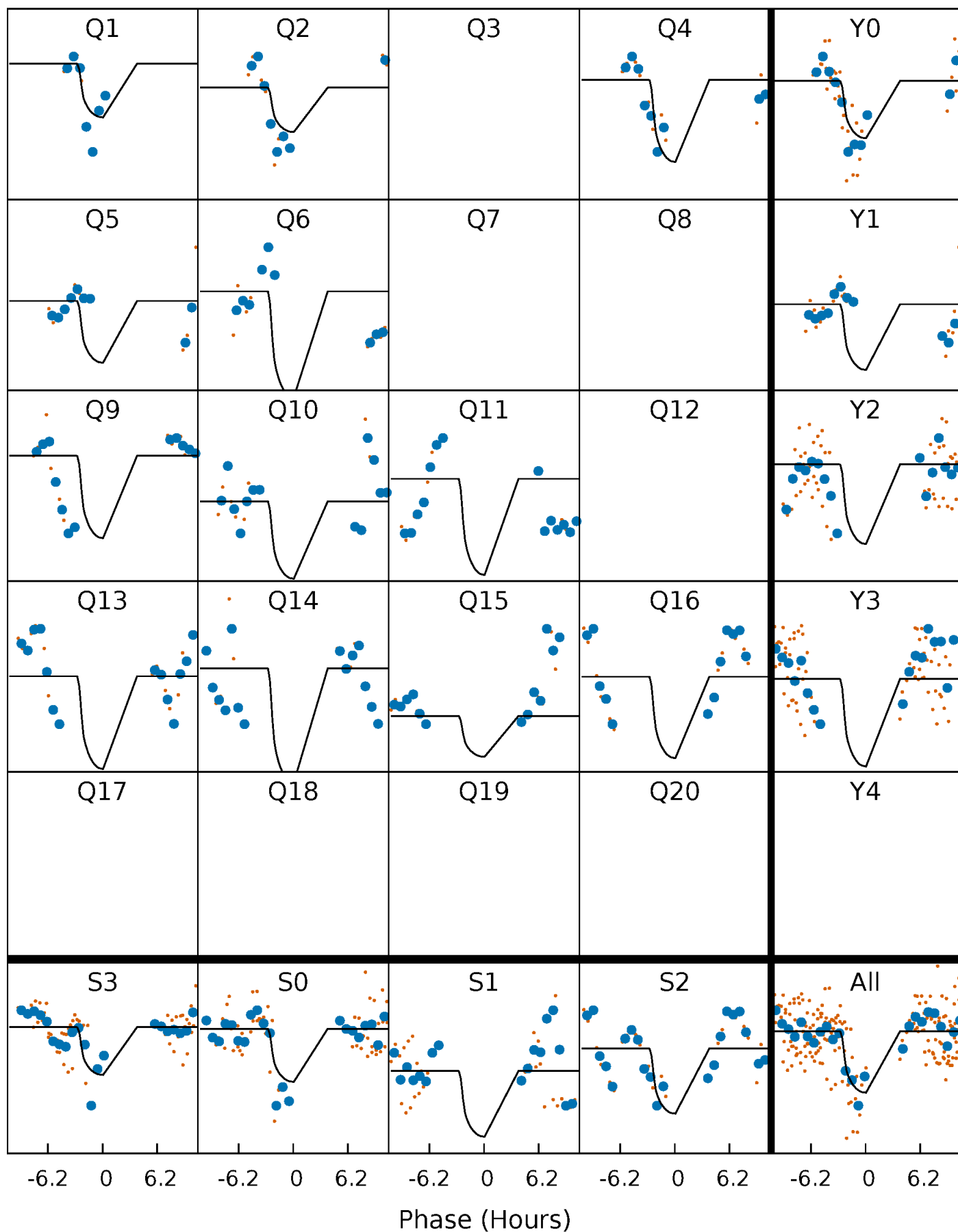
# PDC Quarter-Phased Transit Curves

TCE 004819564-02 P=117.748607 Days  $T_0=136.394344$  (BKJD)



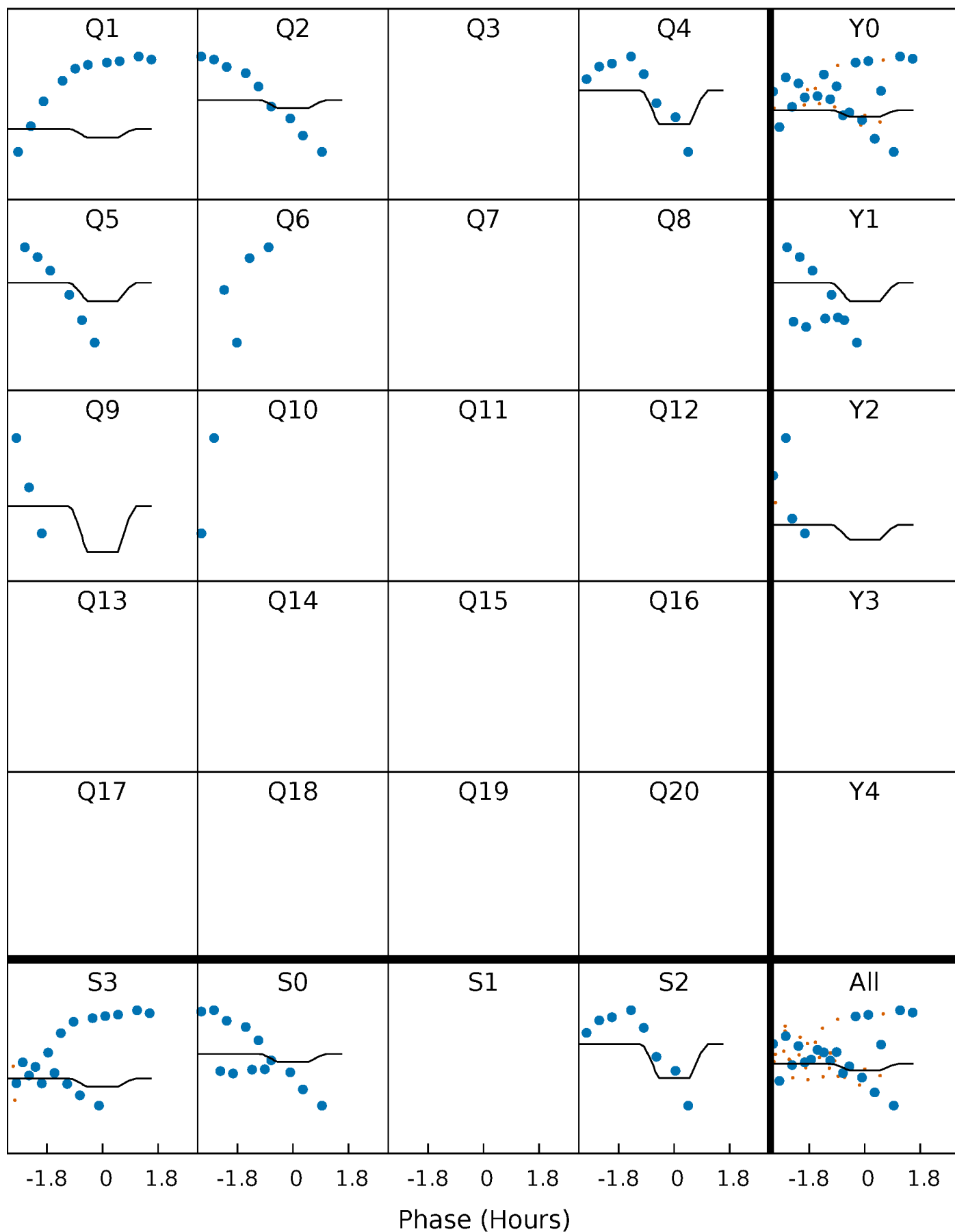
# DV Quarter-Phased Transit Curves

TCE 004819564-02 P=117.748607 Days  $T_0=136.394344$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 004819564-02 P=117.748728 Days  $T_0=136.330876$  (BKJD)

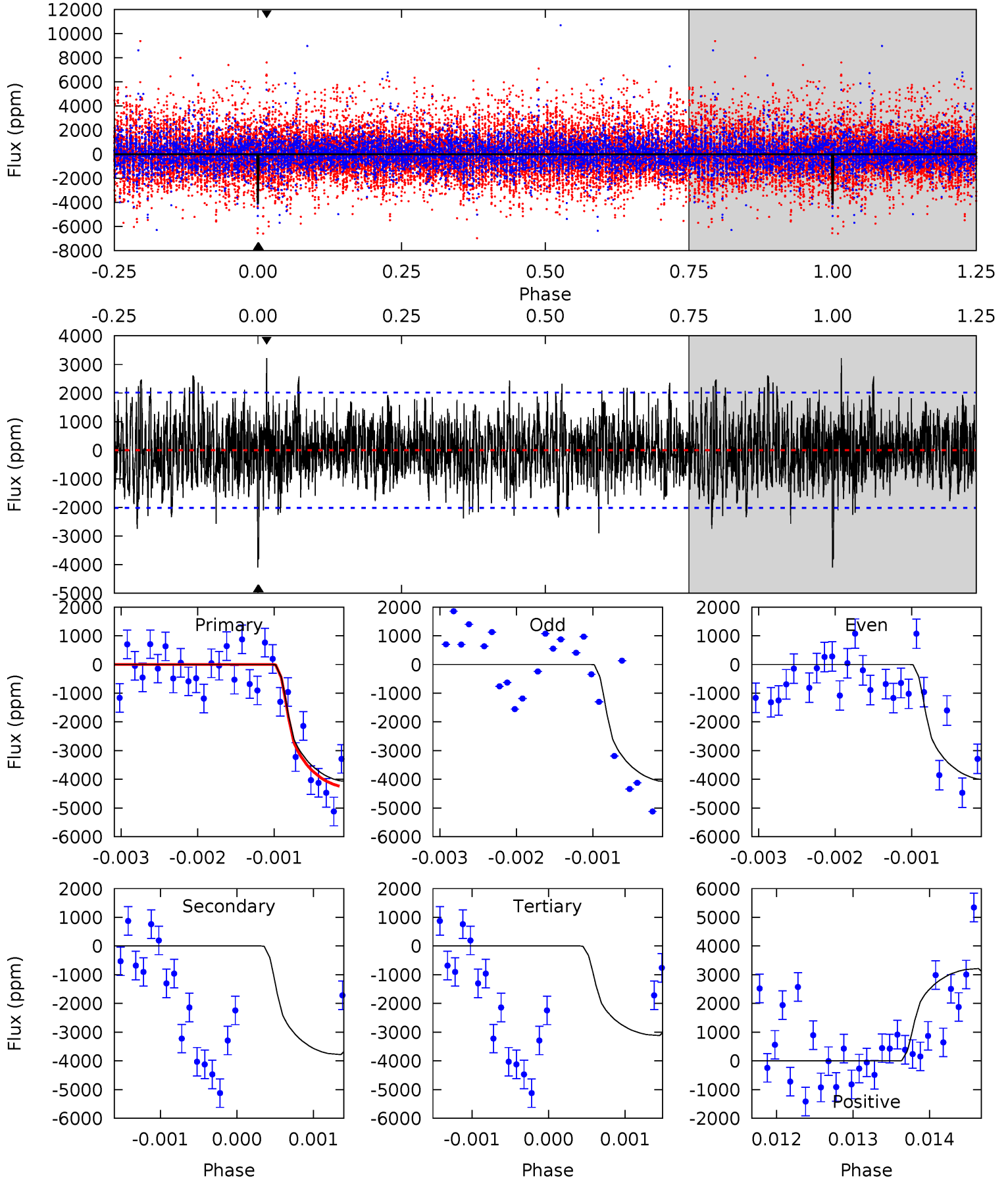




# DV Model-Shift Uniqueness Test

004819564-02, P = 117.748607 Days, E = 18.645737 Days

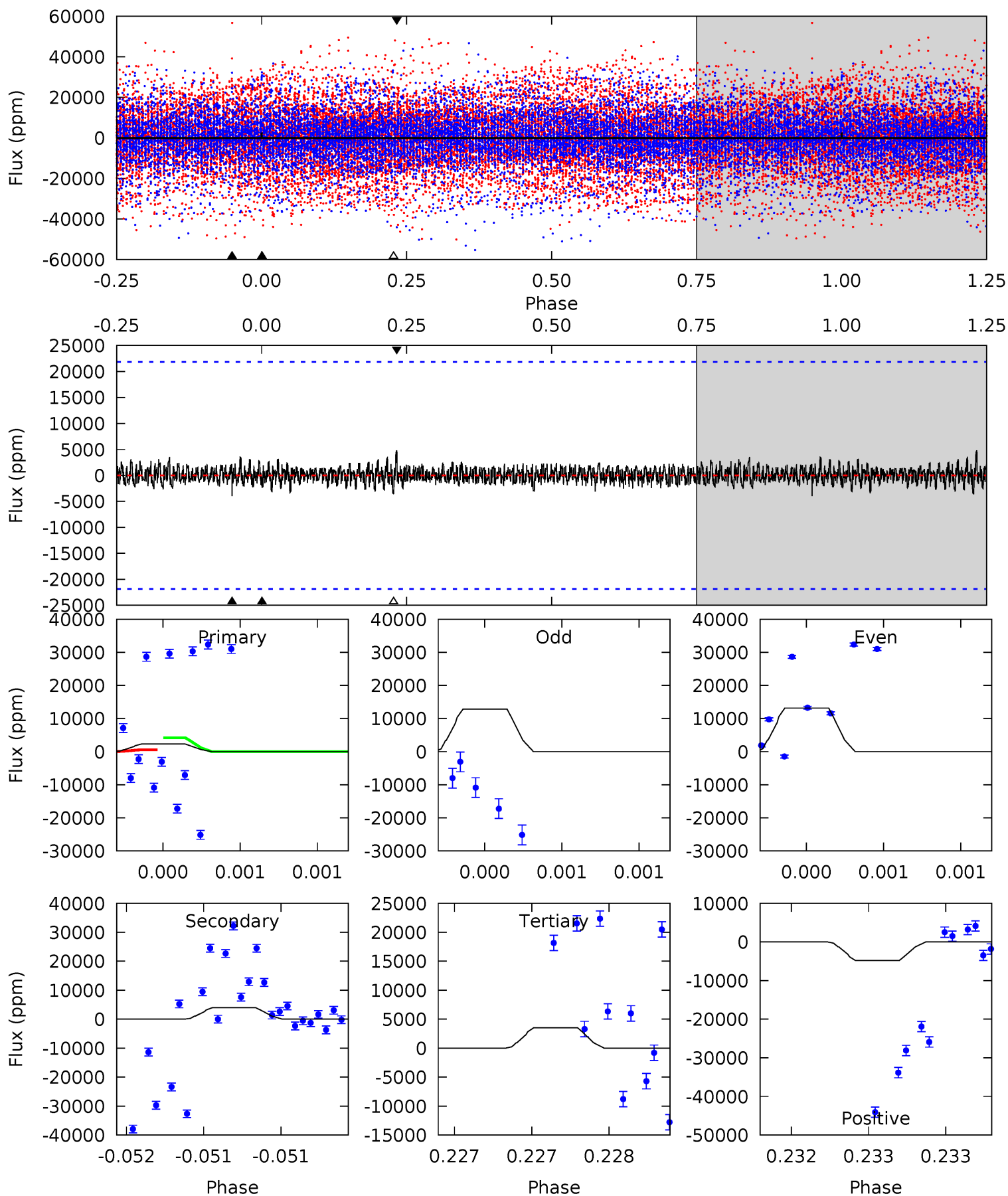
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.0	10.2	8.41	8.67	5.45	3.28	1.79	2.63	2.37	1.80	1.53	0.09	0	0.44	3.71



# Alt Model-Shift Uniqueness Test

004819564-02, P = 117.748728 Days, E = 18.582148 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
0.58	1.00	0.89	1.22	5.54	3.43	0.22	-0.32	-0.64	0.11	-0.22	0.04	-0.11	0.55	0.45



### Stellar Parameters For KIC 004819564

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4312^{+150}_{-165}$	$4.579^{+0.060}_{-0.016}$	$0.440^{+0.050}_{-0.300}$	$0.716^{+0.024}_{-0.066}$	$0.710^{+0.040}_{-0.049}$	$2.723^{+0.738}_{-0.158}$
	+3%/-4%	+1%/-0%	+11%/-68%	+3%/-9%	+6%/-7%	+27%/-6%
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 004819564-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-3784 \pm 371$	$5.22^{+3.81}_{-3.44}$	$344^{+13}_{-14}$	$4165^{+2467}_{-750}$	$13525^{+103612}_{-9173}$
Alt.	$-3948 \pm 3945$	$5.14^{+4.00}_{-3.03}$	$344^{+13}_{-14}$	$4045^{+1942}_{-6746}$	$11626^{+60520}_{-12433}$

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

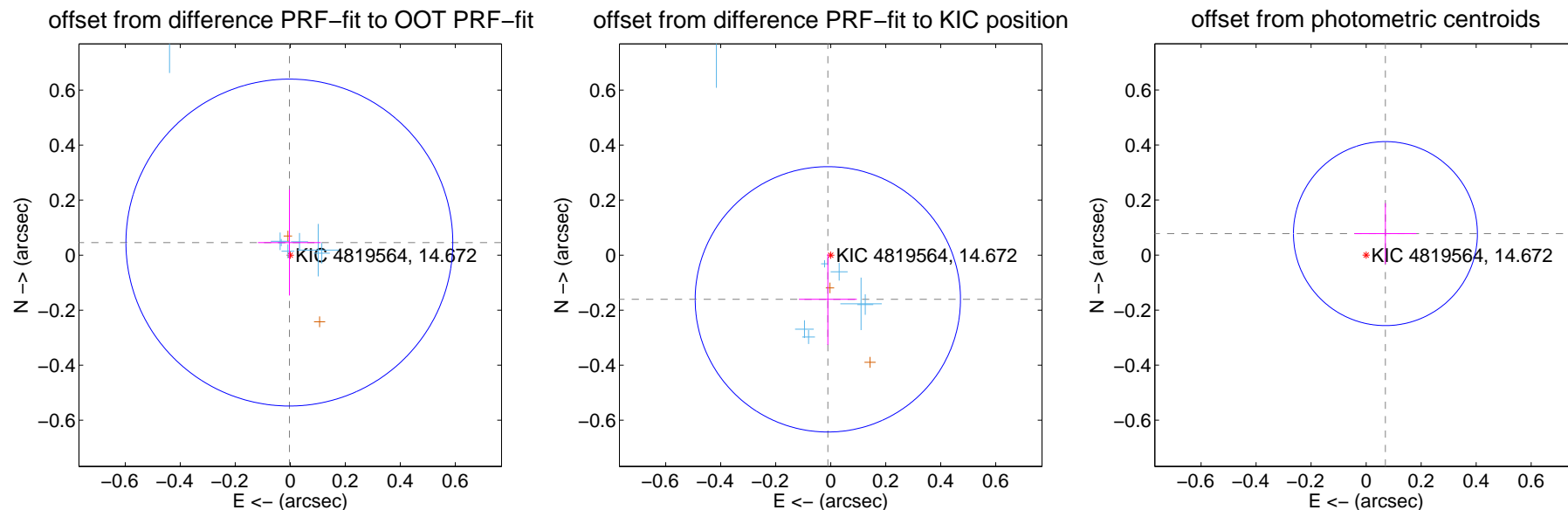
## DV Centroid Data

Supplemental centroid analysis for 004819564-02. Kepler magnitude: 14.67. Transit SNR 7.09

There are 7 quarters with good PRF difference image offsets

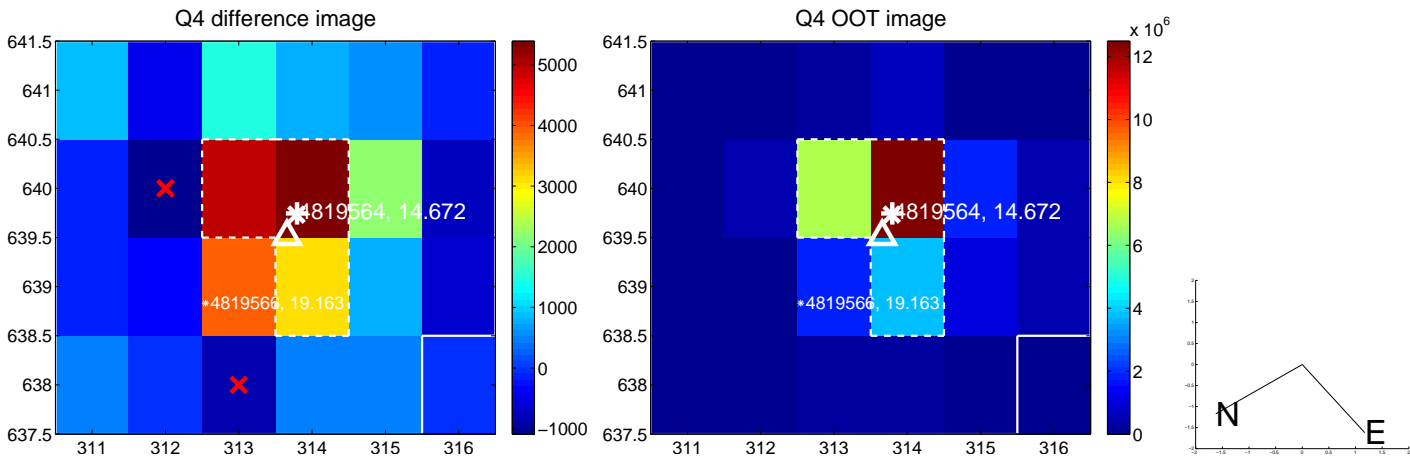
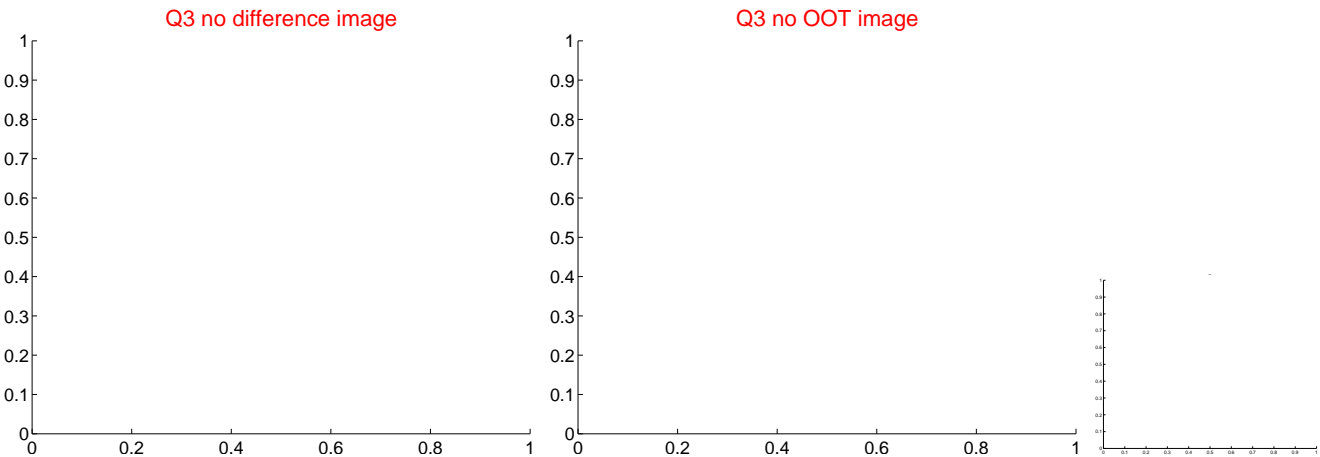
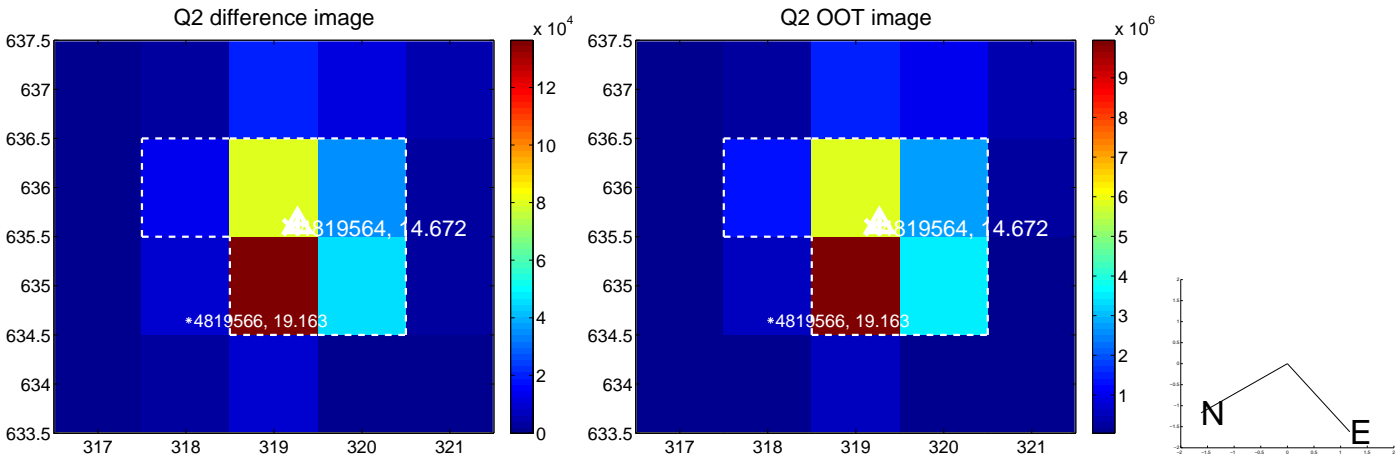
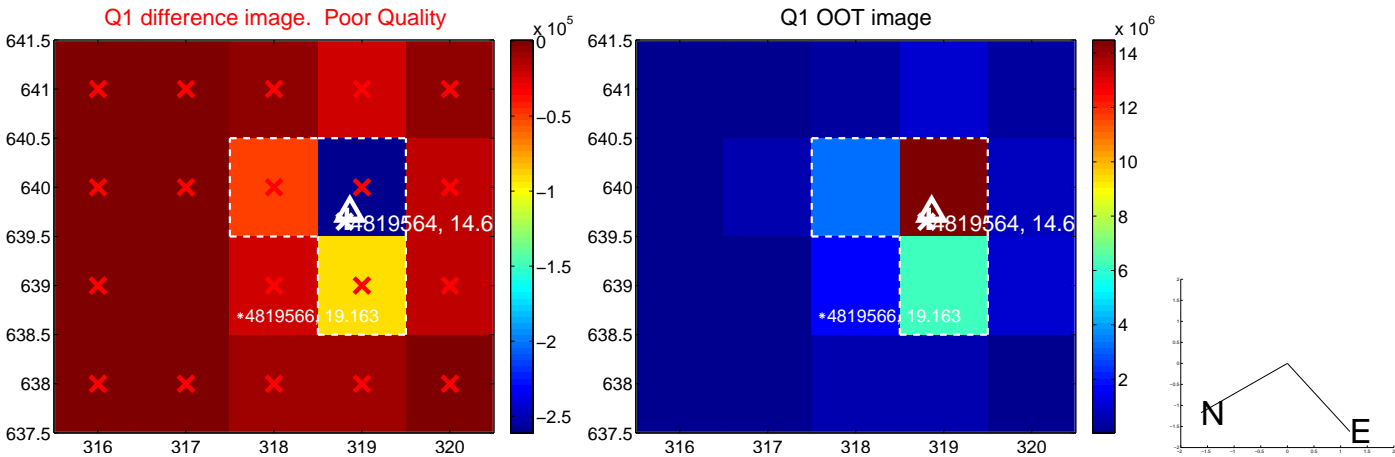
The direct PRF centroid is offset from the target star catalog position by about 0.08 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.046 \pm 0.198$	0.23	$0.003 \pm 0.114$	$0.046 \pm 0.192$
PRF-fit source offset from KIC position	$0.161 \pm 0.161$	1.00	$0.011 \pm 0.105$	$-0.161 \pm 0.165$
photometric centroid source offset	$0.10 \pm 0.11$	0.94	$-0.07 \pm 0.11$	$0.08 \pm 0.11$

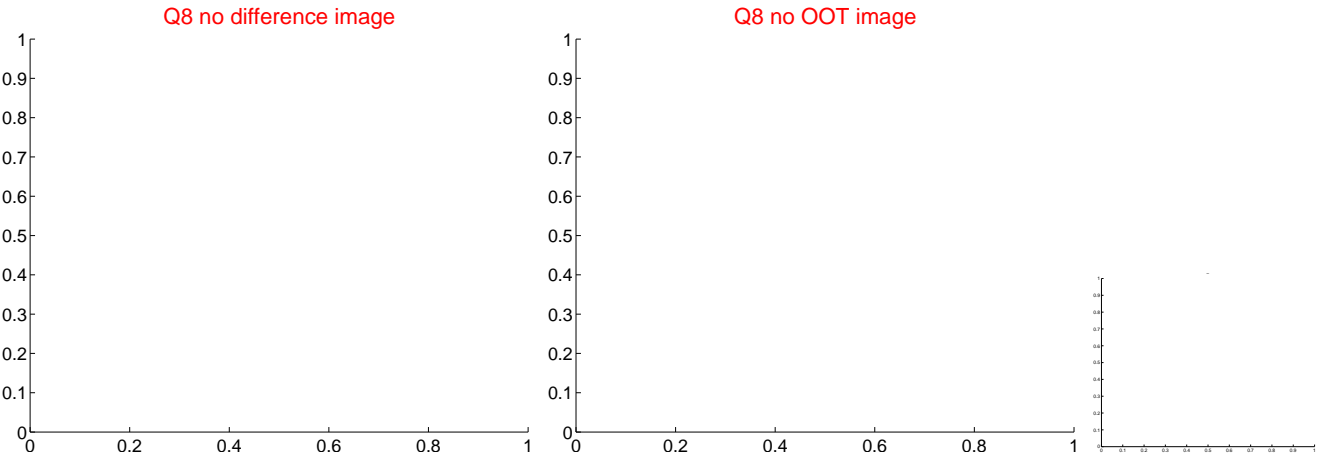
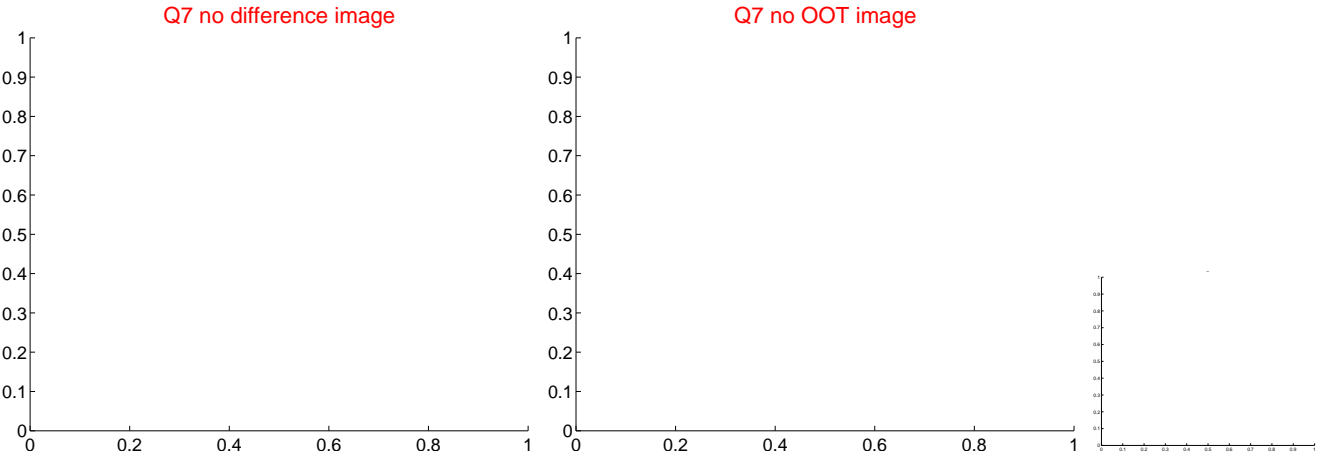
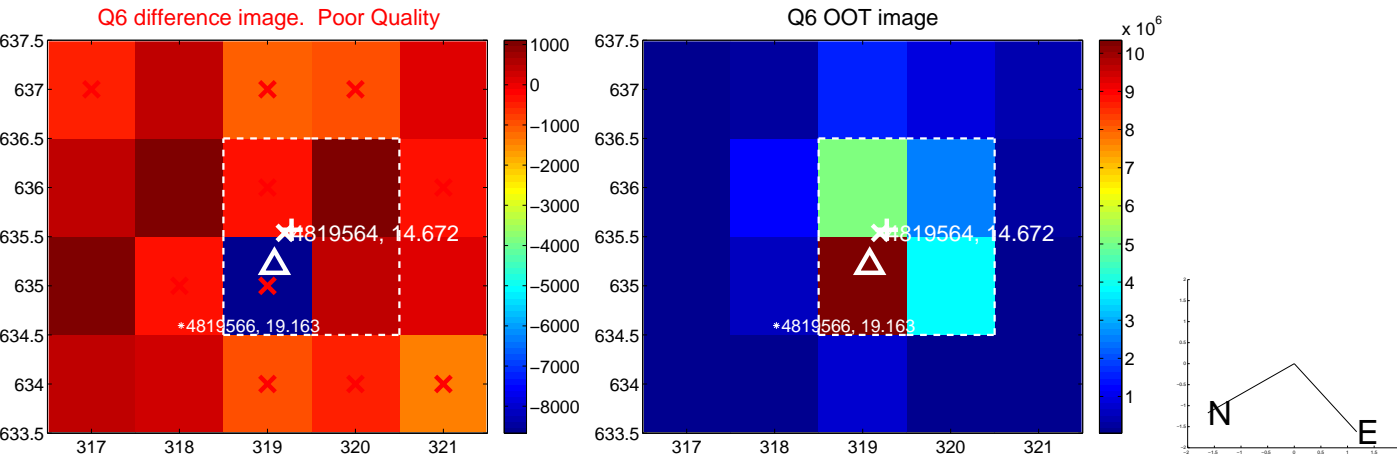
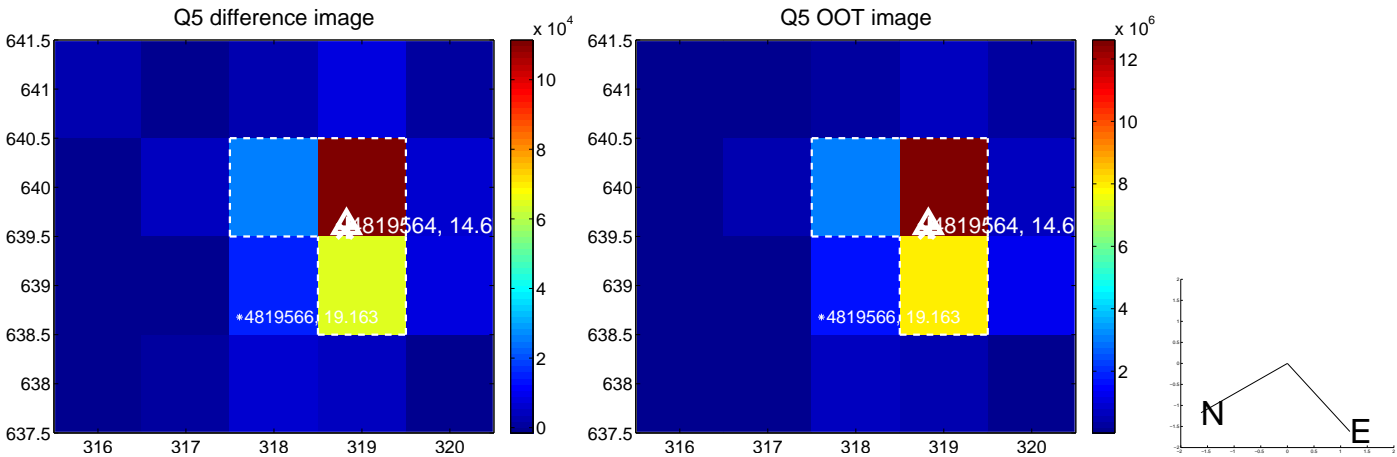


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

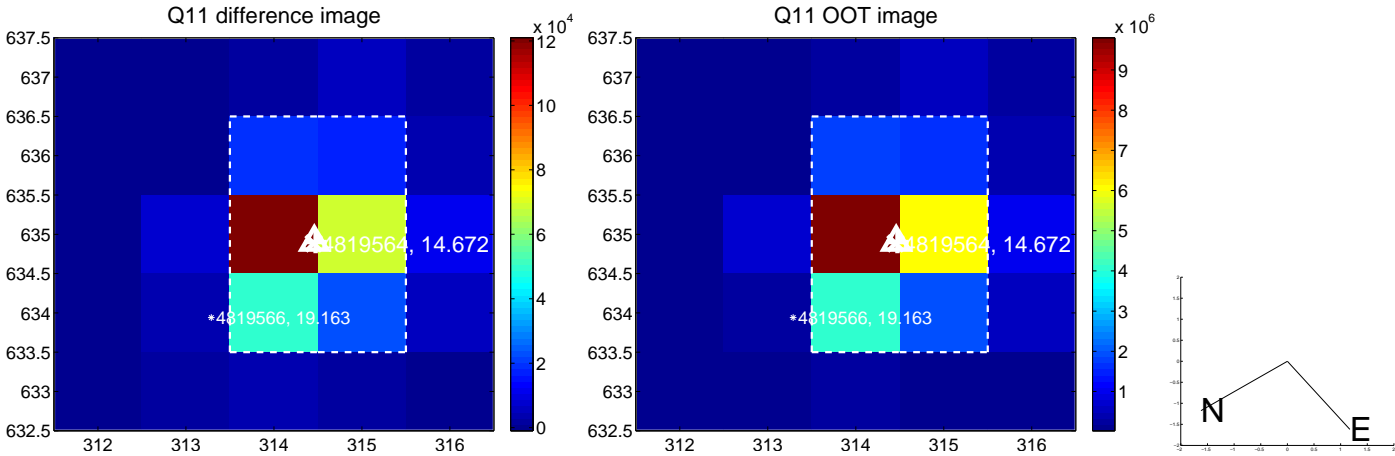
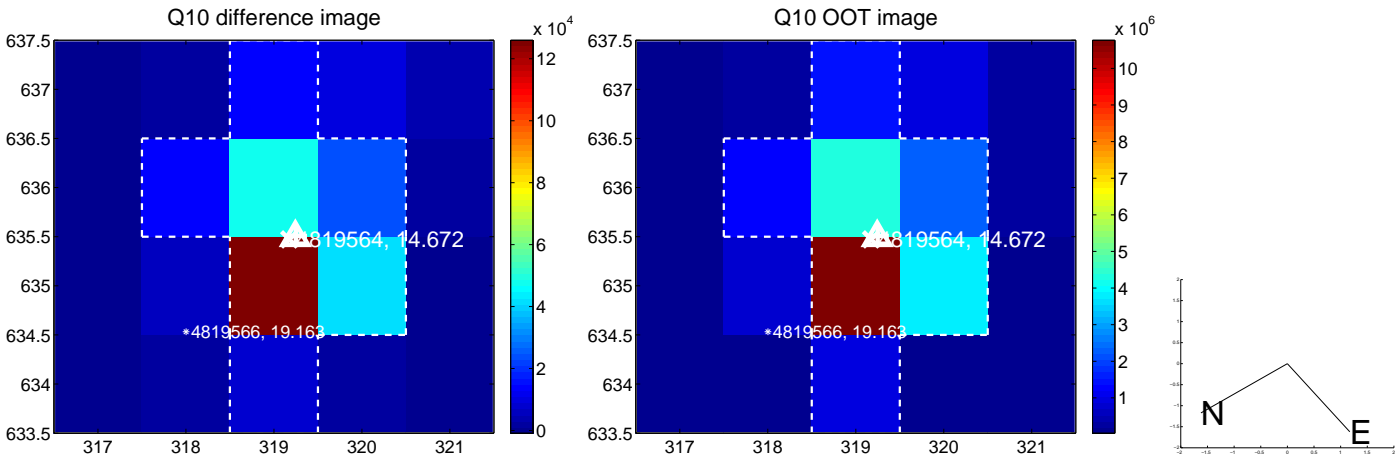
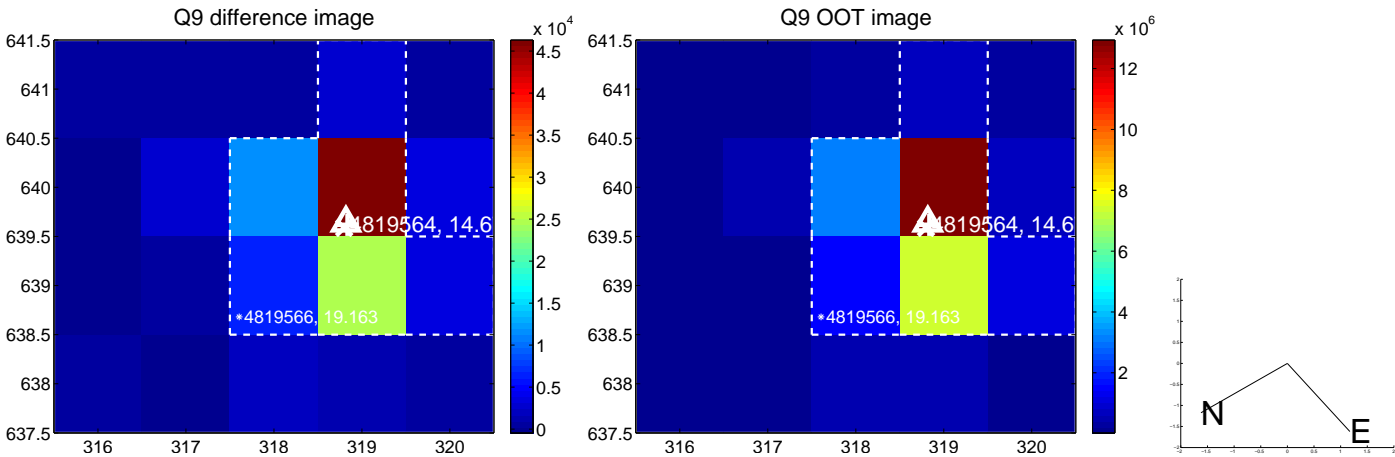


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

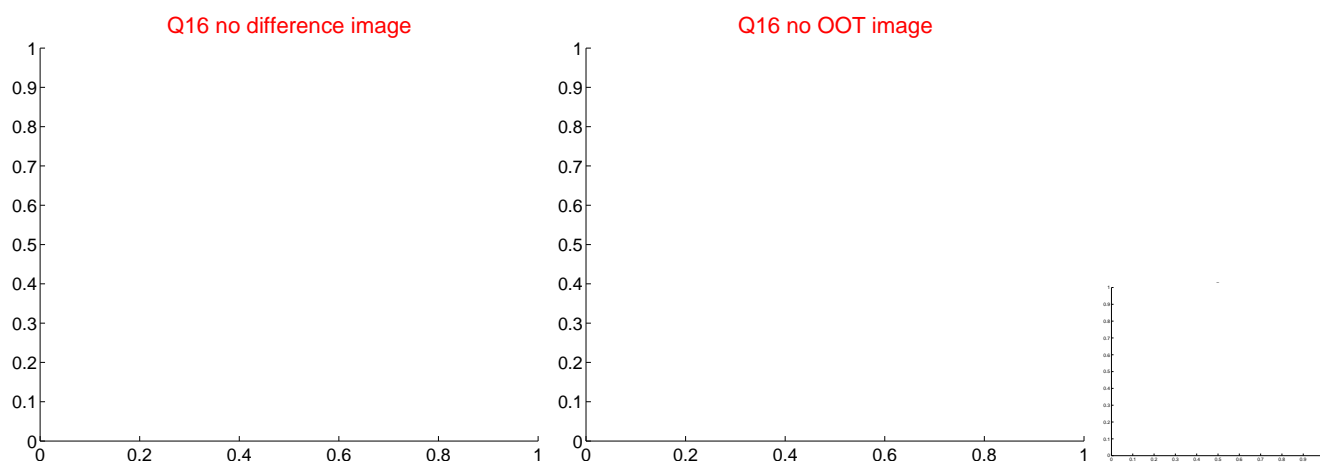
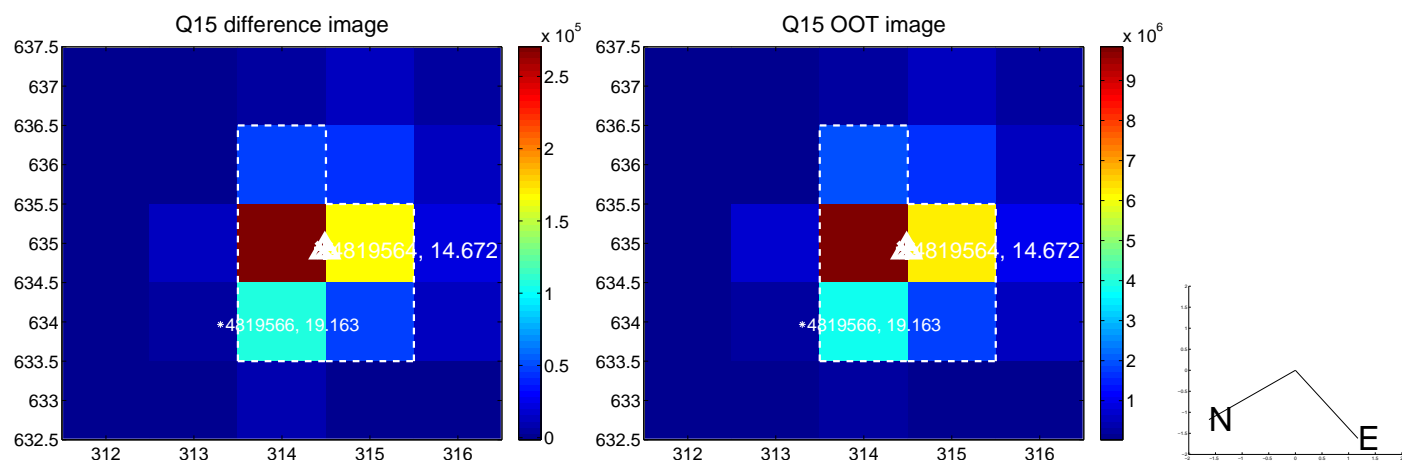
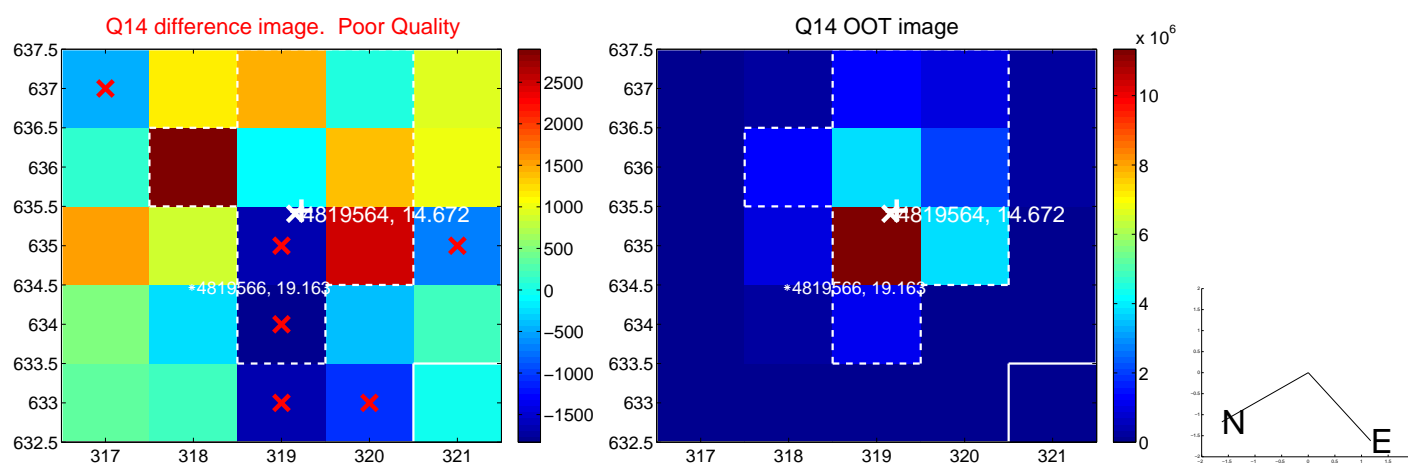
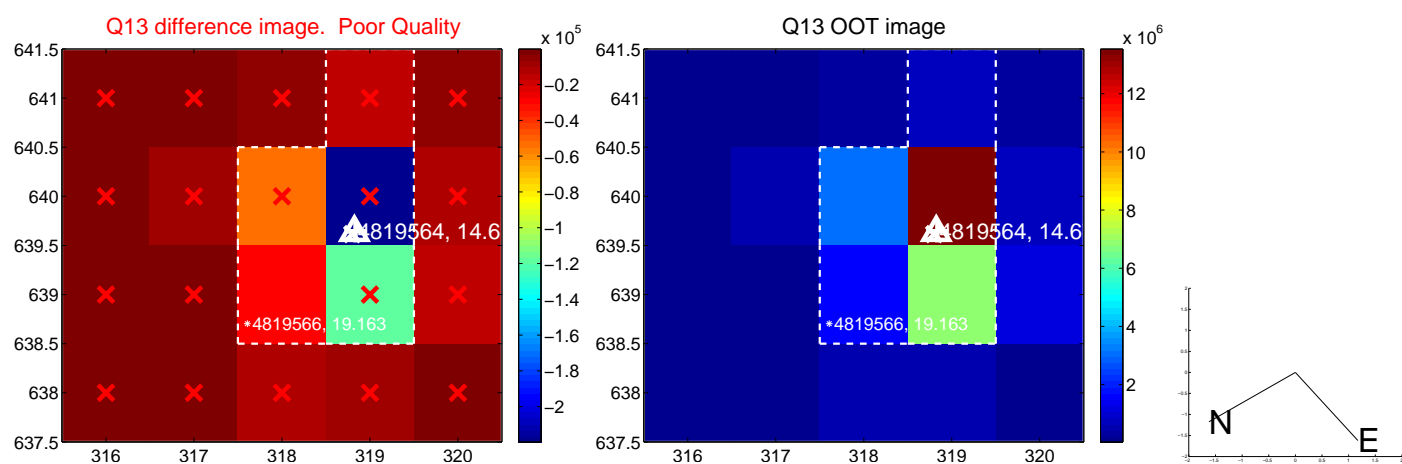




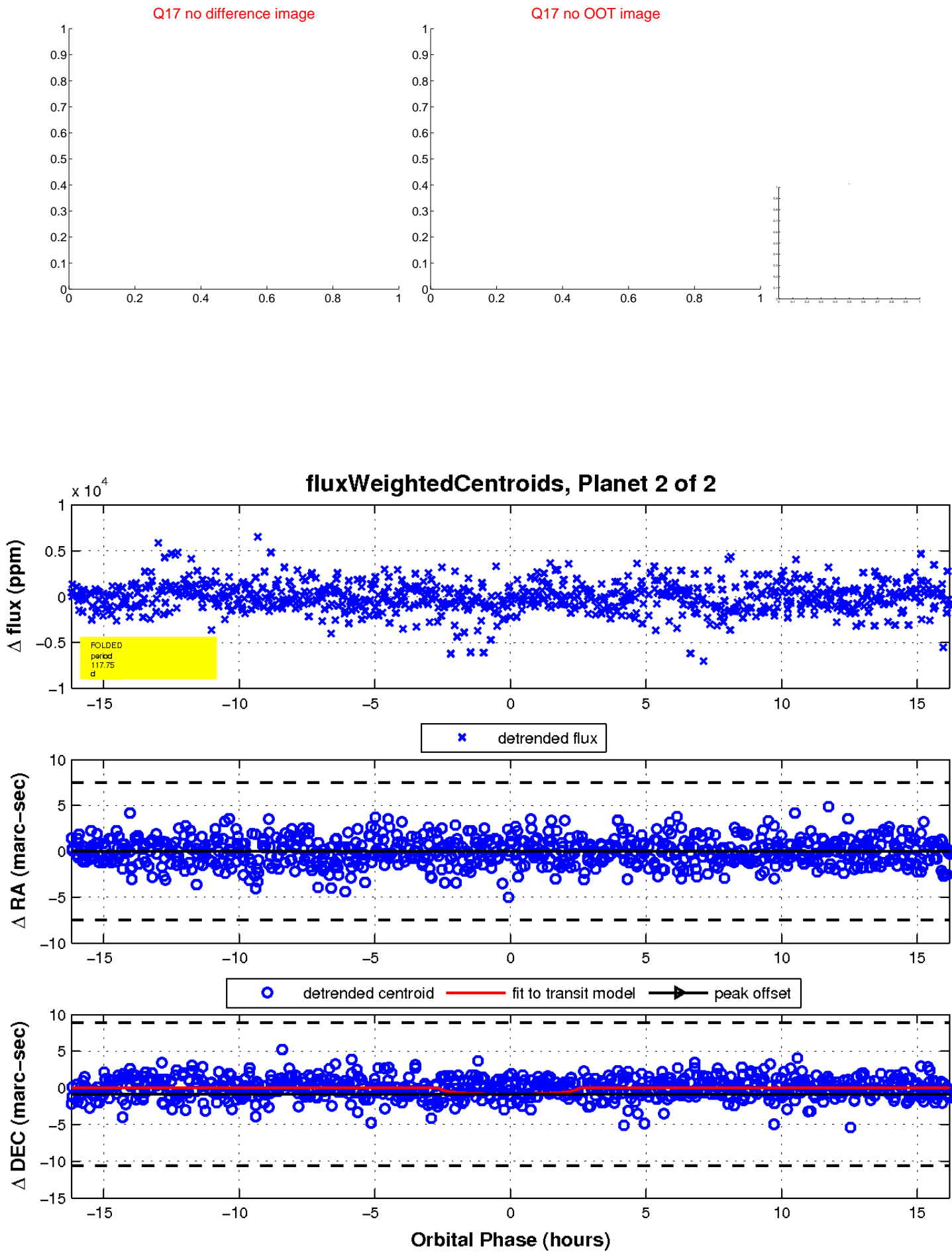
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white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination

