

# KIC 008557374

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008557374-01	OBS	0692.01	2.462339	132.446508	171.7	1.933	32.4	39.8	1.01	5736	1.60	731.99
008557374-02	OBS	0692.02	4.822973	134.435109	327.4	0.868	25.6	34.8	1.01	5736	2.21	298.69

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008557374-01	OBS	PC	1.00	0	0	0	0	CENT_KIC_POS
008557374-02	OBS	PC	1.00	0	0	0	0	CENT_KIC_POS

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

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

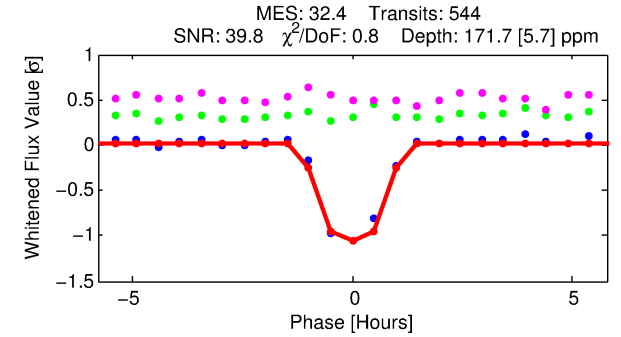
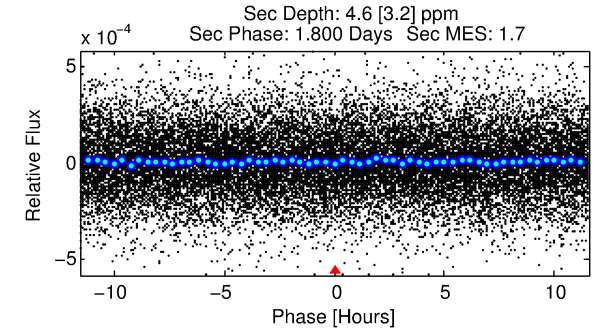
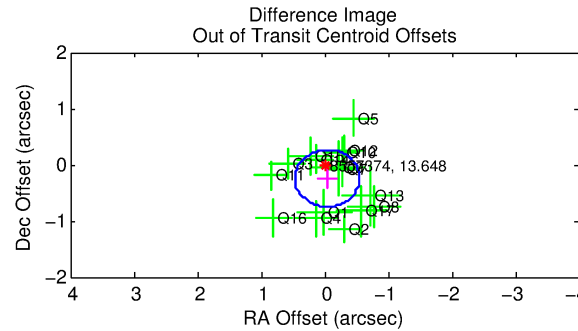
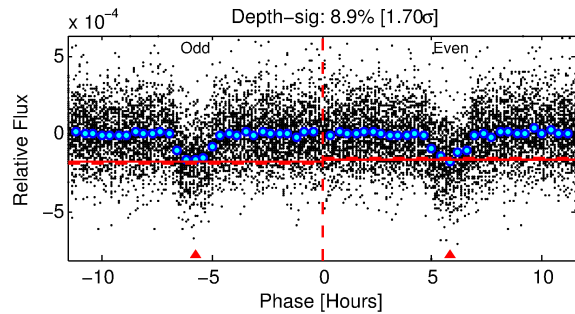
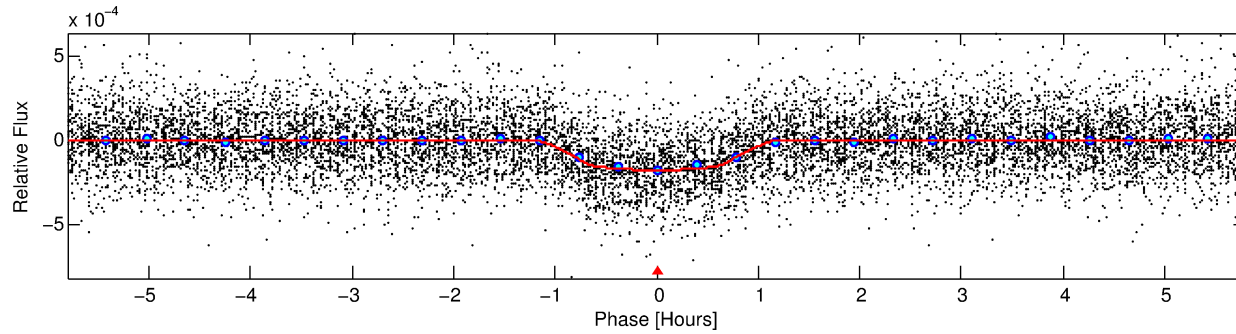
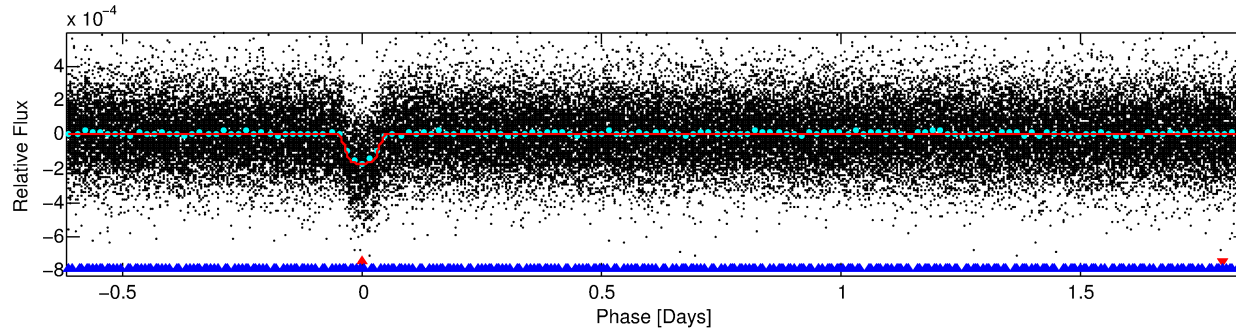
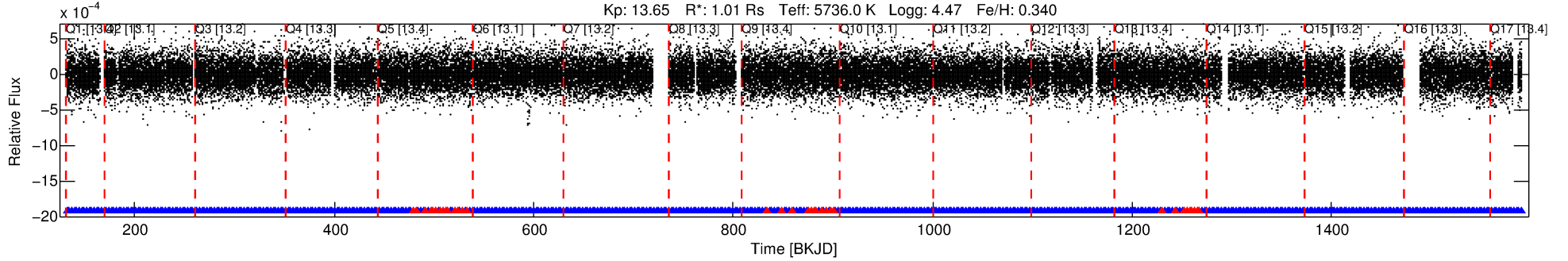
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 008557374-01

No Significant Match Found

# DV One-Page Summary

KIC: 8557374 Candidate: 1 of 2 Period: 2.462 d  
KOI: K00692.01 Name: Kepler-213b Corr: 0.966



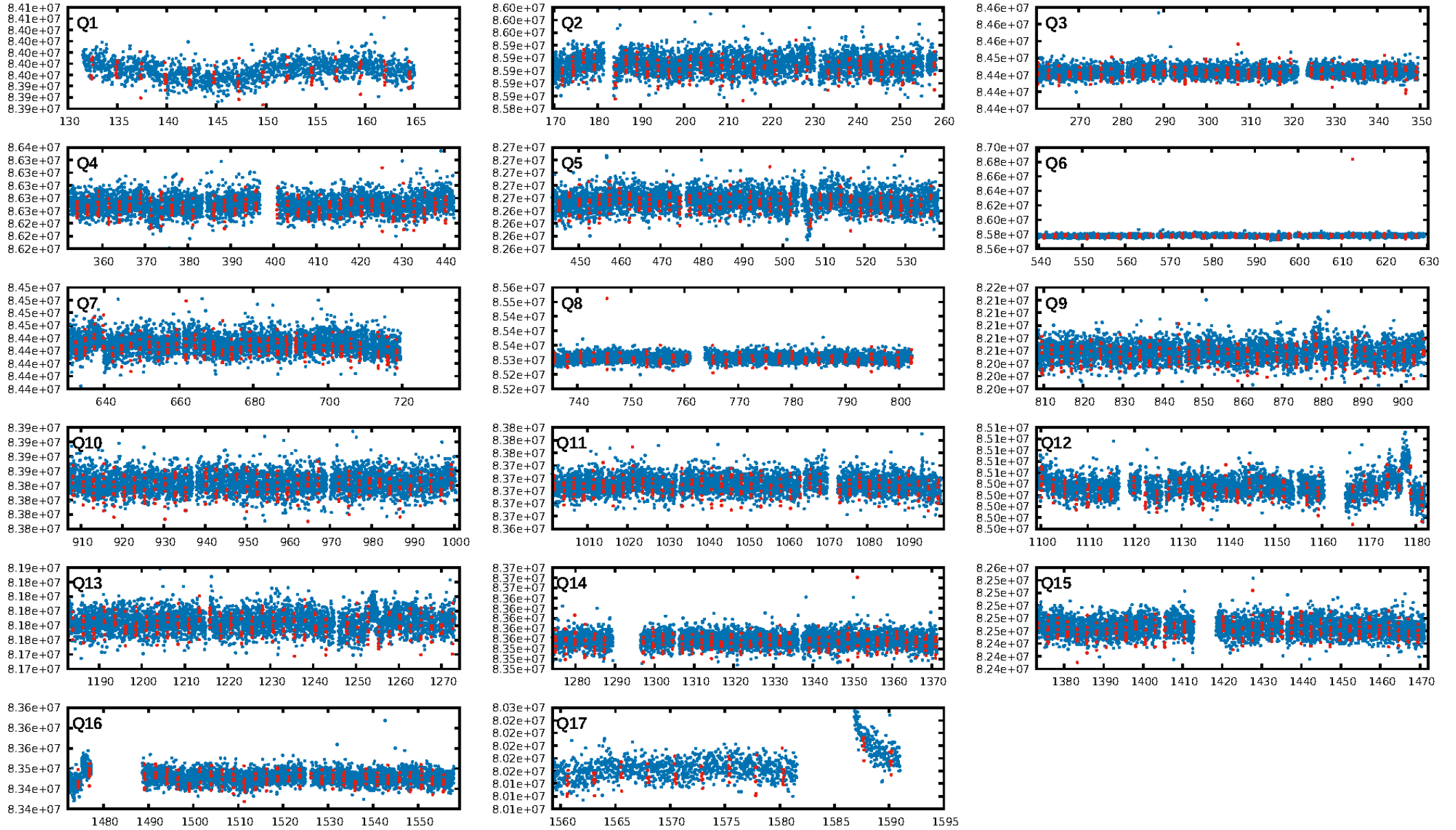
## DV Fit Results:

Period = 2.46234 [0.00000] d  
Epoch = 132.4465 [0.0008] BKJD  
Rp/R\* = 0.0146 [0.0029]  
a/R\* = 4.42 [3.86]  
b = 0.91 [0.17]  
Seff = 731.99 [167.86]  
Teq = 1326 [76] K  
Rp = 1.60 [0.41] Re  
a = 0.0367 [0.0051] AU  
Ag = 1.31 [1.11] [0.28 $\sigma$ ]  
Teffp = 2195 [450] K [1.90 $\sigma$ ]

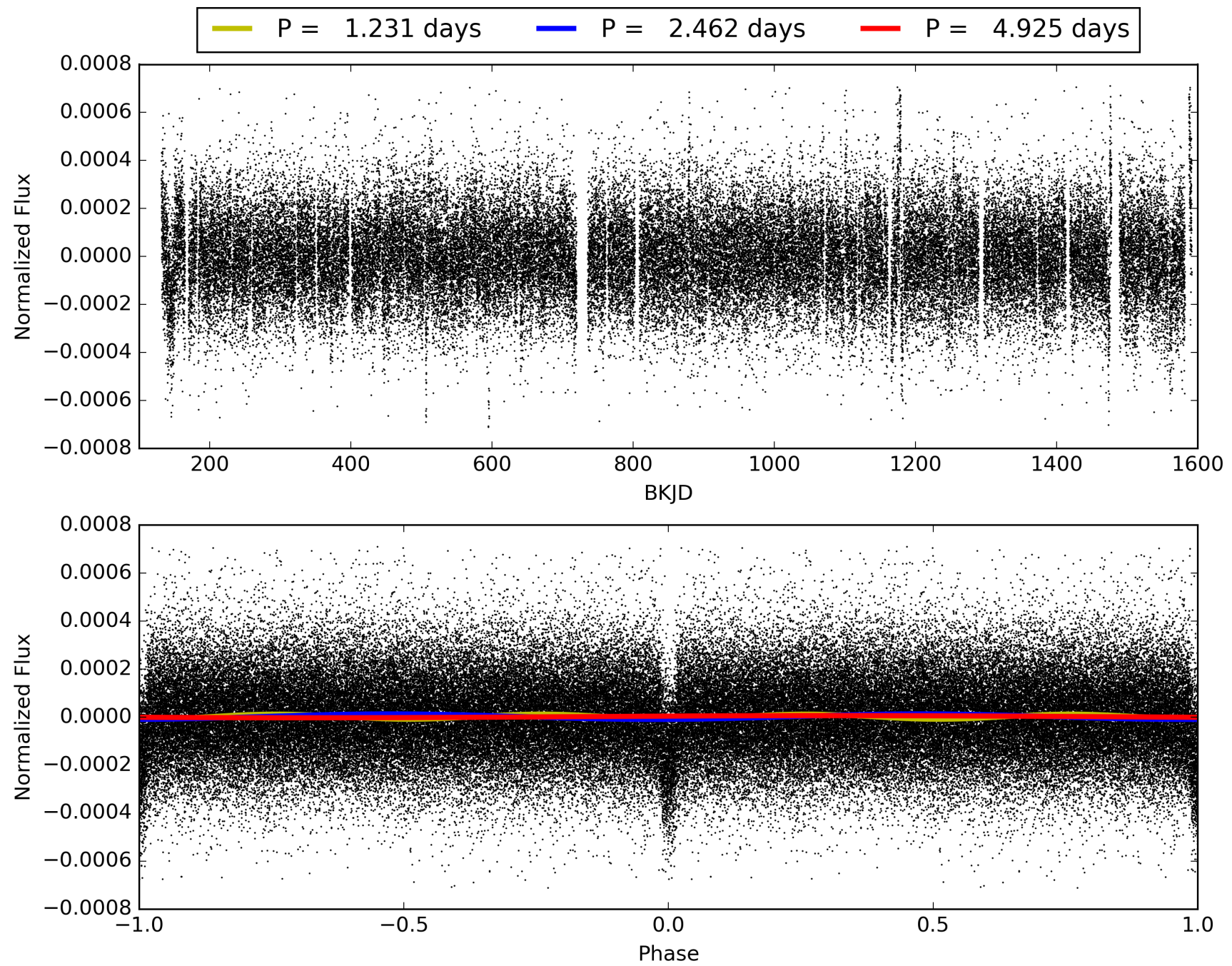
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [26.75 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 7.78e-225  
RollingBand-fgt: 0.93 [485/519]  
GhostDiagnostic-chr: 8.981  
Centroid-sig: 10.7%  
Centroid-so: 0.811 arcsec [2.14 $\sigma$ ]  
OotOffset-rm: 0.247 arcsec [1.46 $\sigma$ ]  
KicOffset-rm: 0.164 arcsec [0.97 $\sigma$ ]  
OotOffset-st: 3/4/4/5 [16]  
KicOffset-st: 3/4/4/5 [16]  
DiffImageQuality-fgm: 1.00 [16/16]  
DiffImageOverlap-fno: 1.00 [17/17]

# TCE 008557374-01, PDC Light Curves

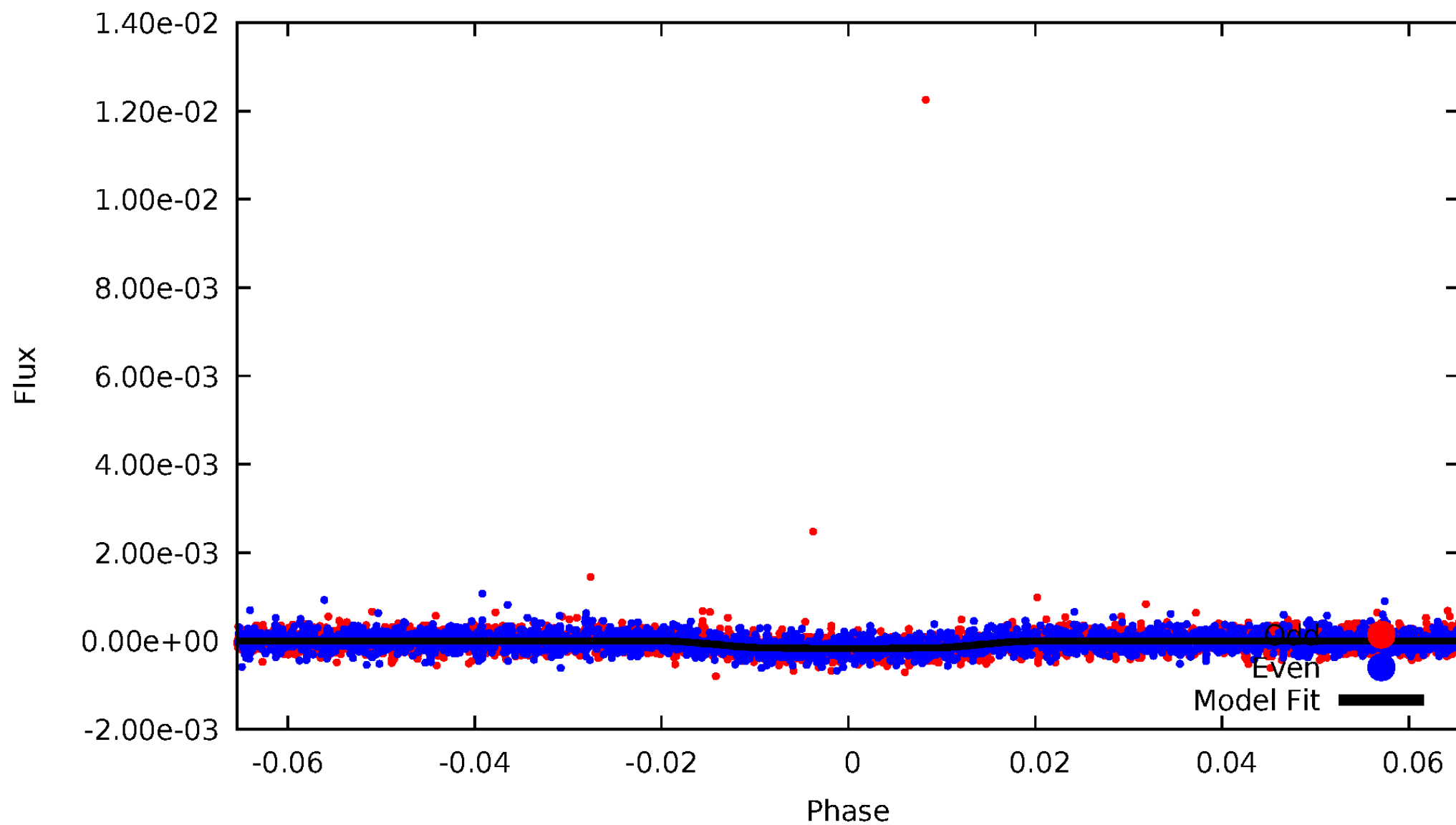


TCE 008557374-01



# DV Odd/Even

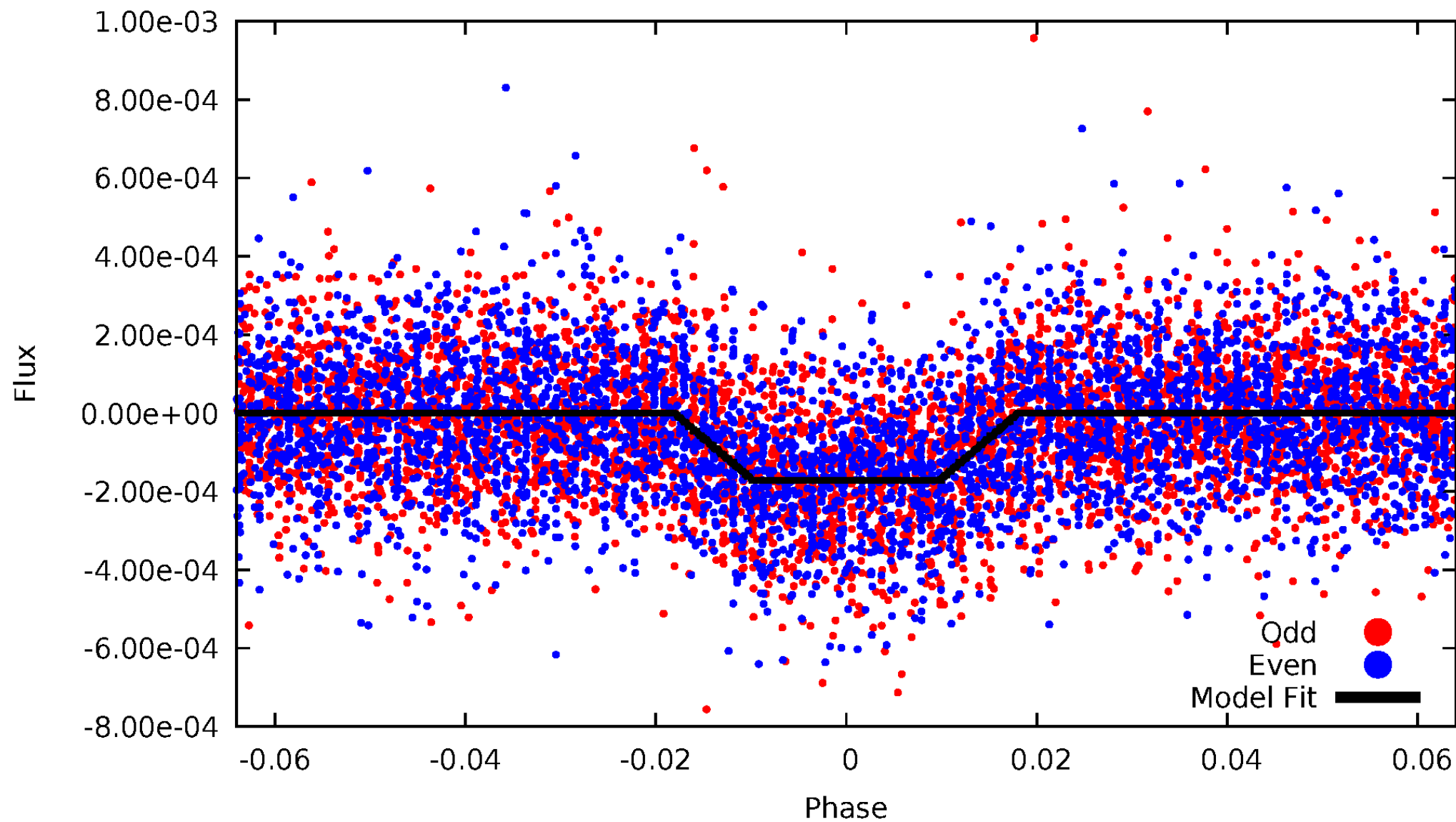
TCE 008557374-01



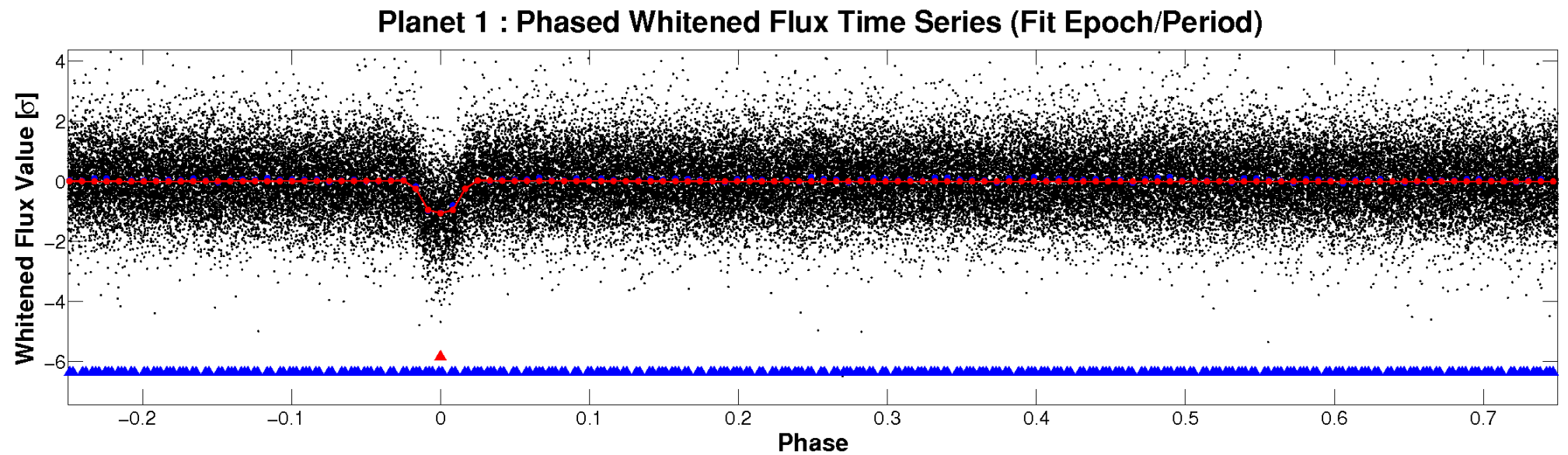
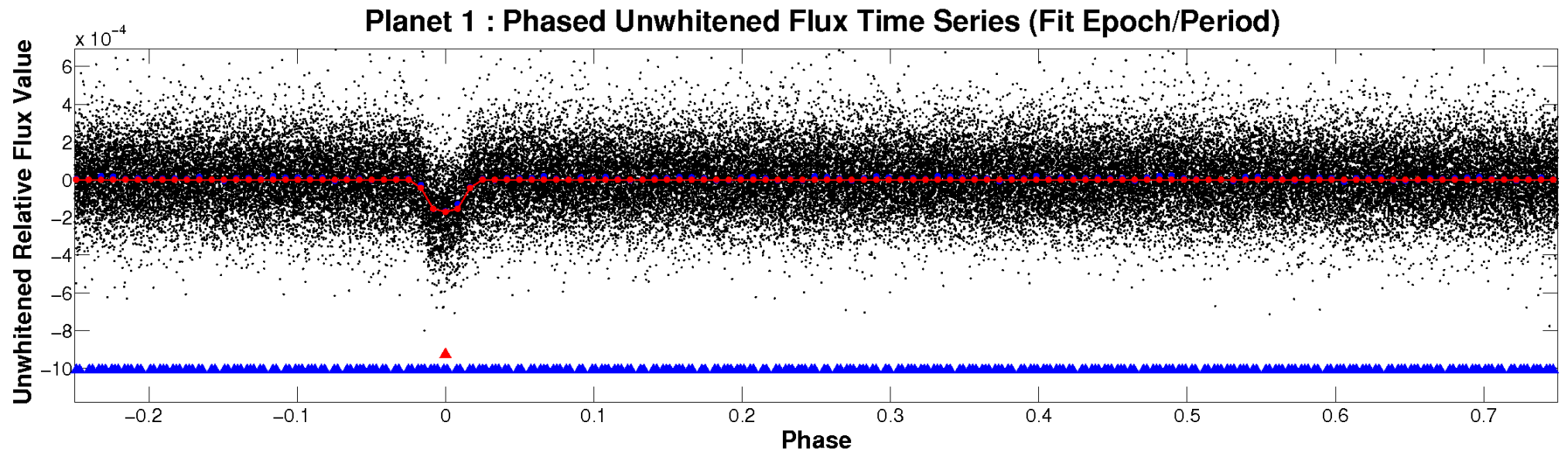


# ALT Odd/Even

TCE 008557374-01

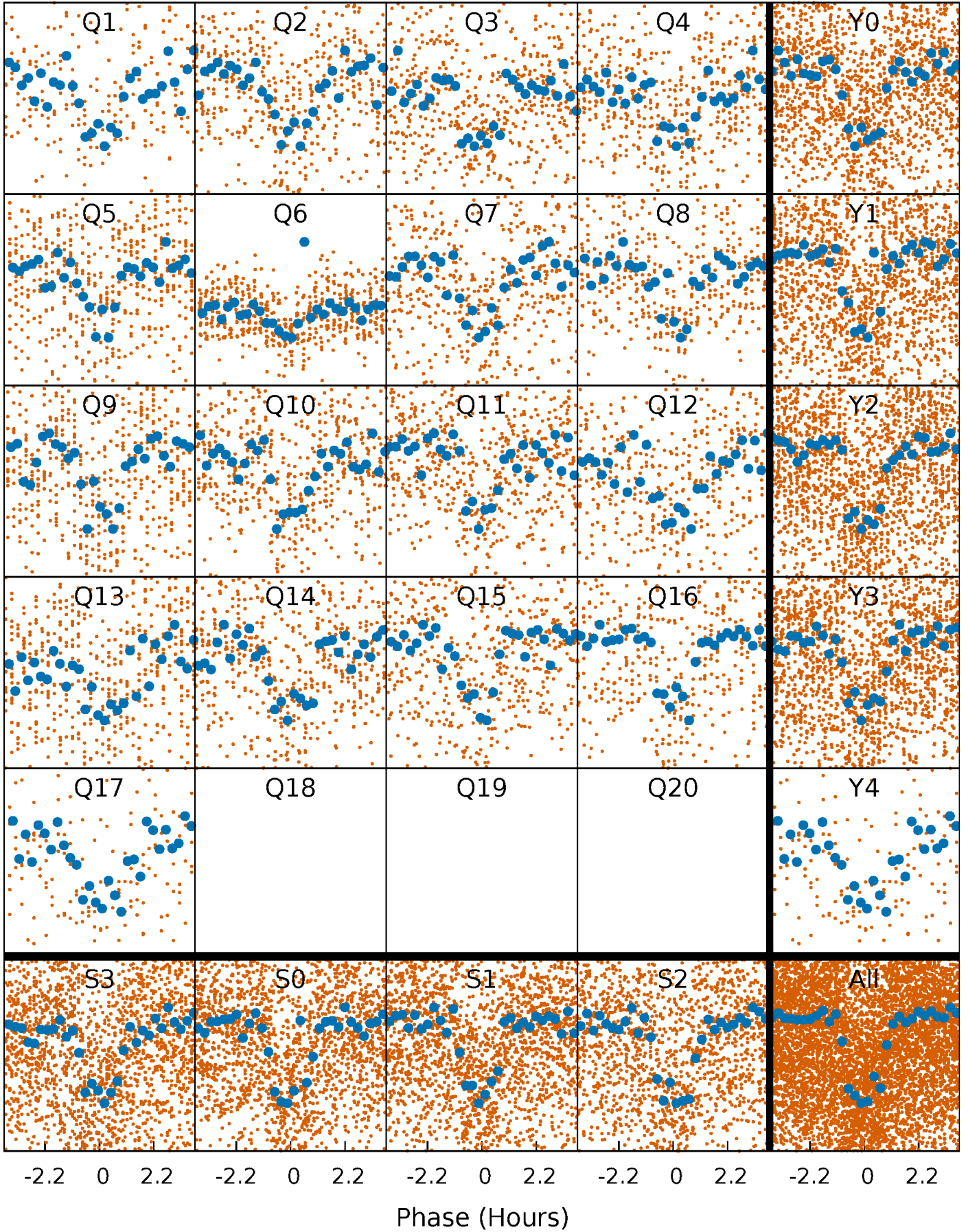


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

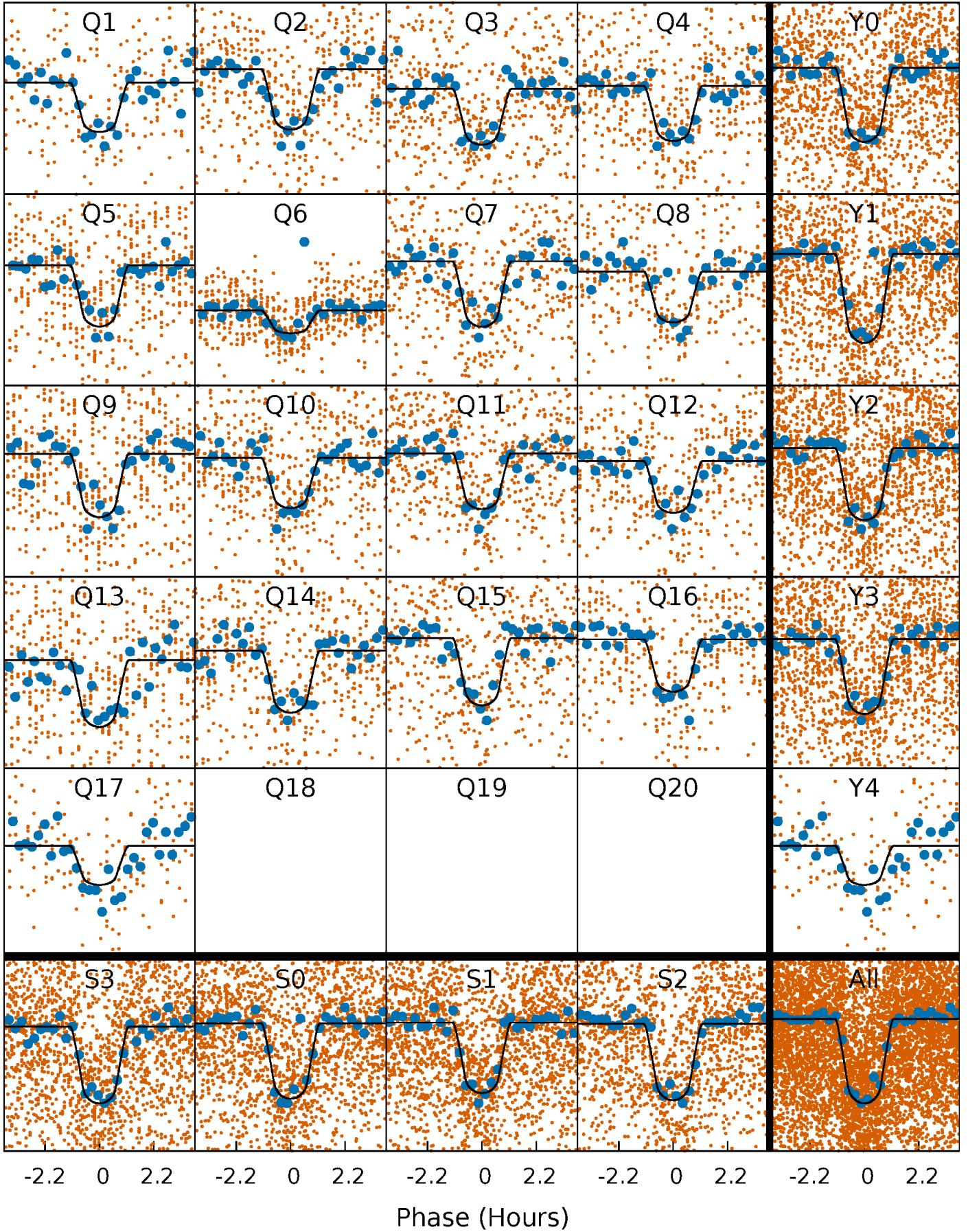
TCE 008557374-01 P= 2.462339 Days  $T_0=132.446508$  (BKJD)





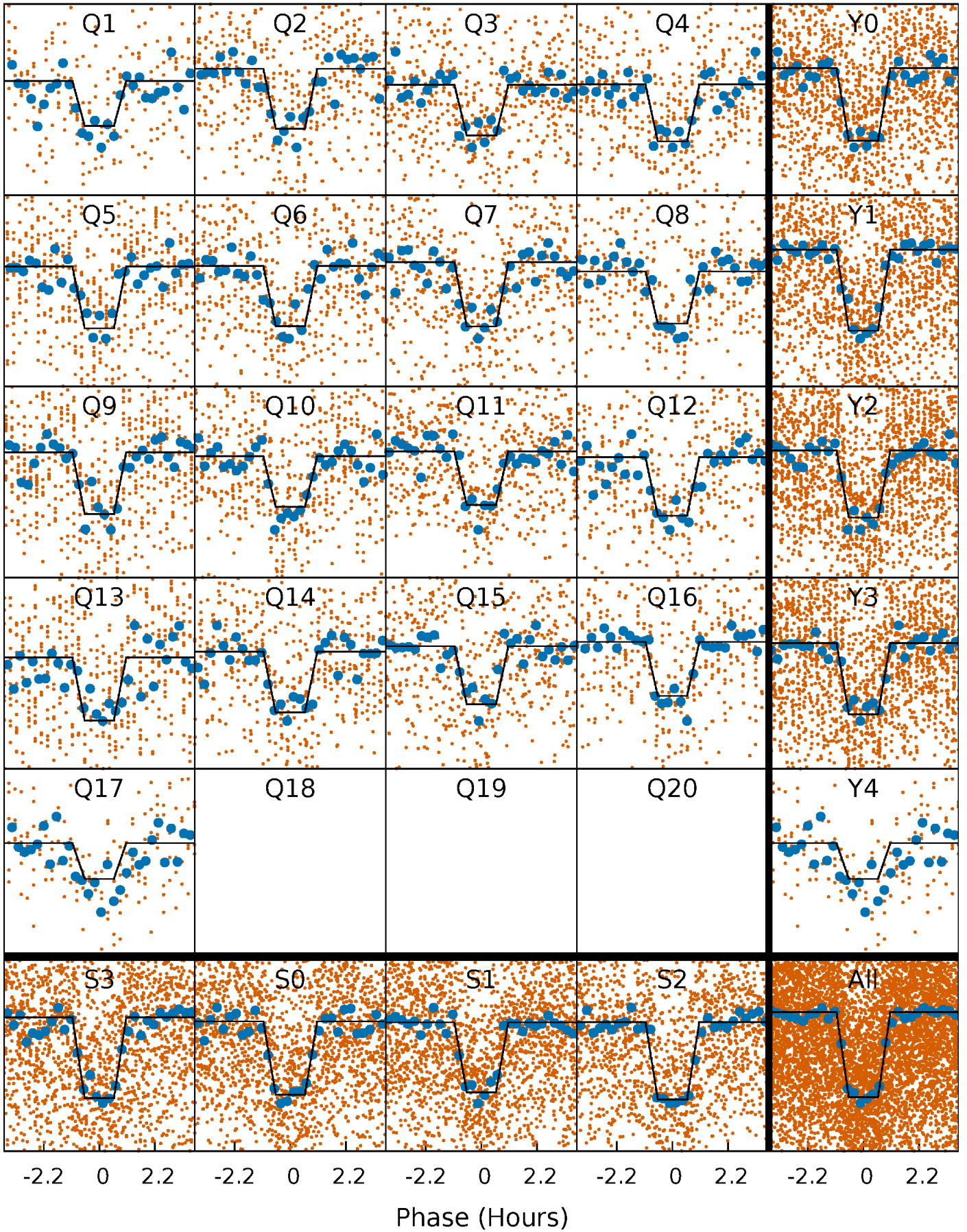
# DV Quarter-Phased Transit Curves

TCE 008557374-01   P= 2.462339 Days    $T_0=132.446508$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

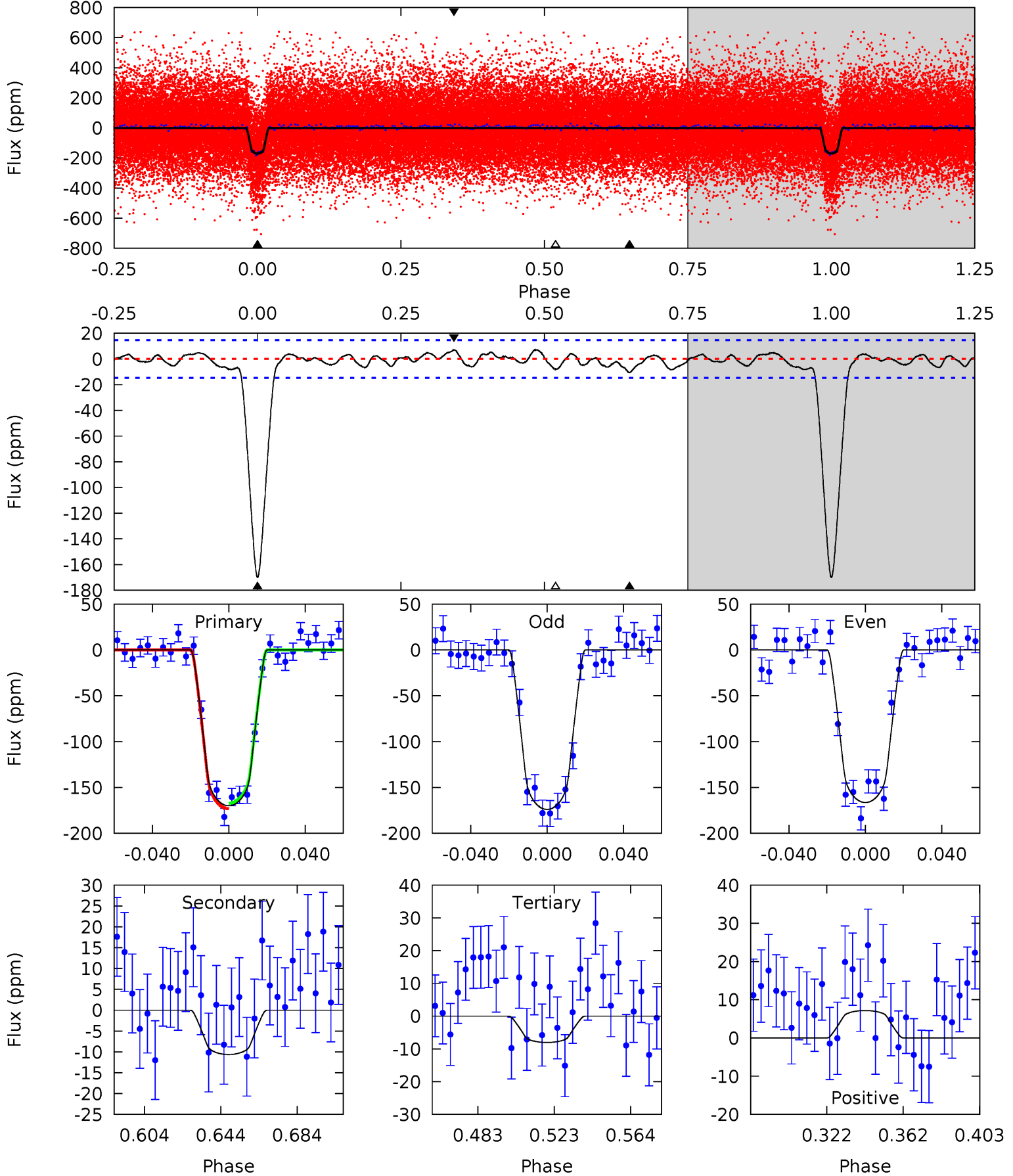
TCE 008557374-01 P= 2.462333 Days  $T_0=132.448253$  (BKJD)



# DV Model-Shift Uniqueness Test

008557374-01, P = 2.462339 Days, E = 129.984169 Days

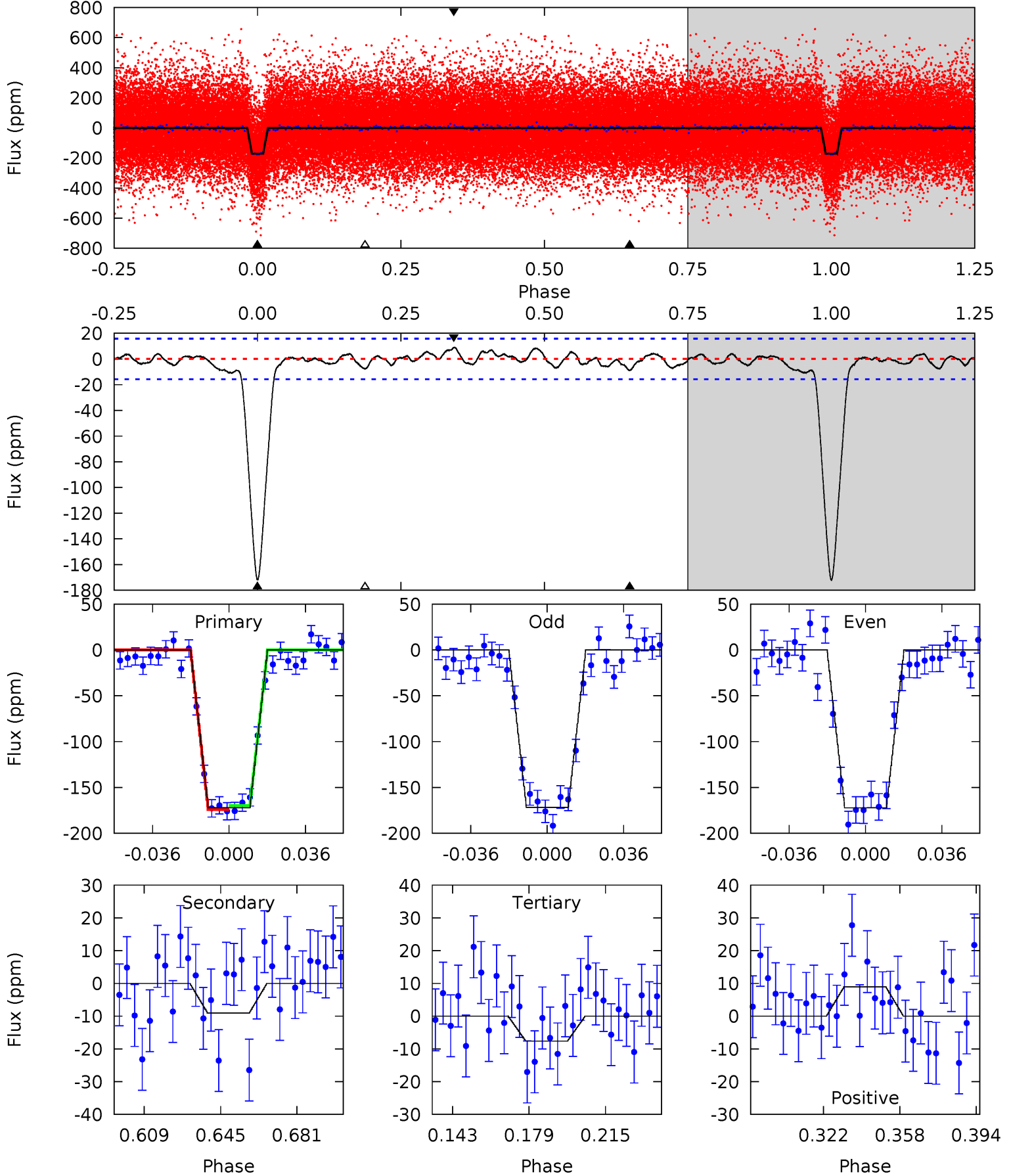
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
55.0	3.44	2.60	2.32	4.75	2.05	1.17	52.4	52.7	0.84	1.12	1.22	0.95	0.04	0.97



# Alt Model-Shift Uniqueness Test

008557374-01, P = 2.462333 Days, E = 129.985920 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
52.0	2.74	2.30	2.71	4.78	2.10	1.19	49.7	49.3	0.43	0.03	0.07	1.01	0.05	0.68





### Stellar Parameters For KIC 008557374

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5736^{+103}_{-125}$	$4.467^{+0.030}_{-0.120}$	$0.340^{+0.100}_{-0.150}$	$1.008^{+0.159}_{-0.057}$	$1.087^{+0.050}_{-0.072}$	$1.493^{+0.212}_{-0.518}$
	+2%/-2%	+1%/-3%	+29%/-44%	+16%/-6%	+5%/-7%	+14%/-35%
Source	SPE59	SPE59	SPE59	DSEP		

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

### Secondary Eclipse Parameters for KIC 008557374-01 / KOI 0692.01

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-11 \pm 3$	$1.66^{+0.34}_{-0.36}$	$1873^{+82}_{-56}$	$3220^{+279}_{-248}$	$2.899^{+1.911}_{-1.128}$
Alt.	$-9 \pm 3$	$1.49^{+0.34}_{-0.36}$	$1874^{+68}_{-56}$	$3250^{+337}_{-313}$	$3.027^{+2.455}_{-1.344}$

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

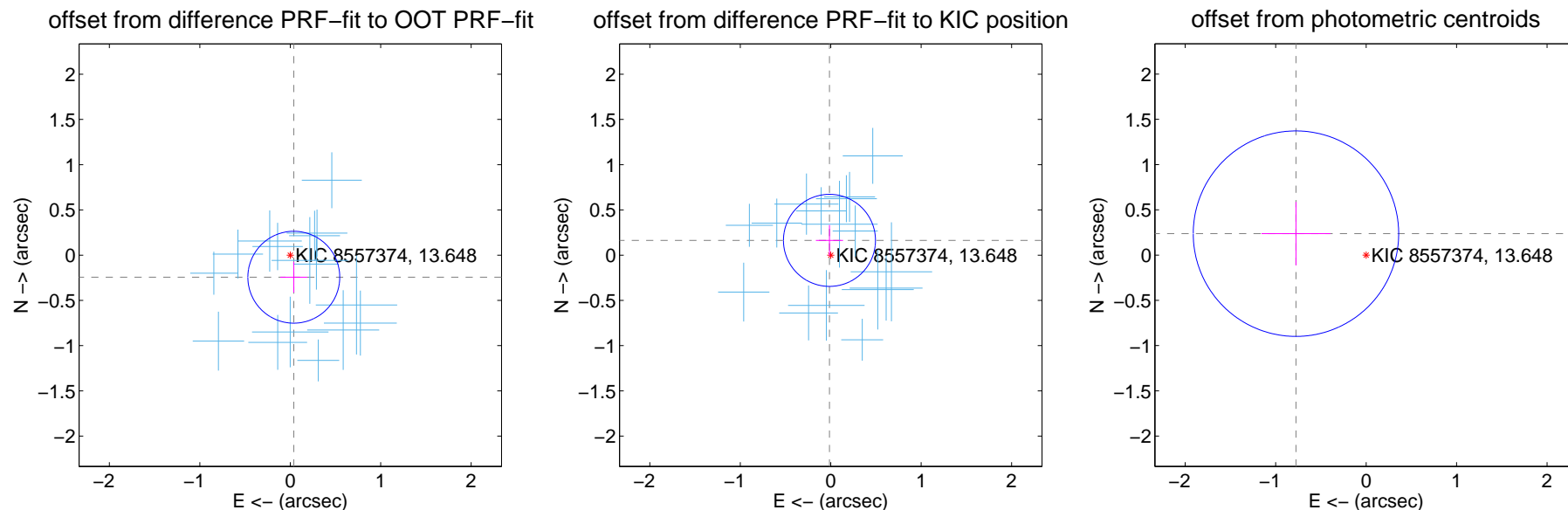
## DV Centroid Data

Supplemental centroid analysis for 008557374-01. Kepler magnitude: 13.65. Transit SNR 39.85

There are 16 quarters with good PRF difference image offsets

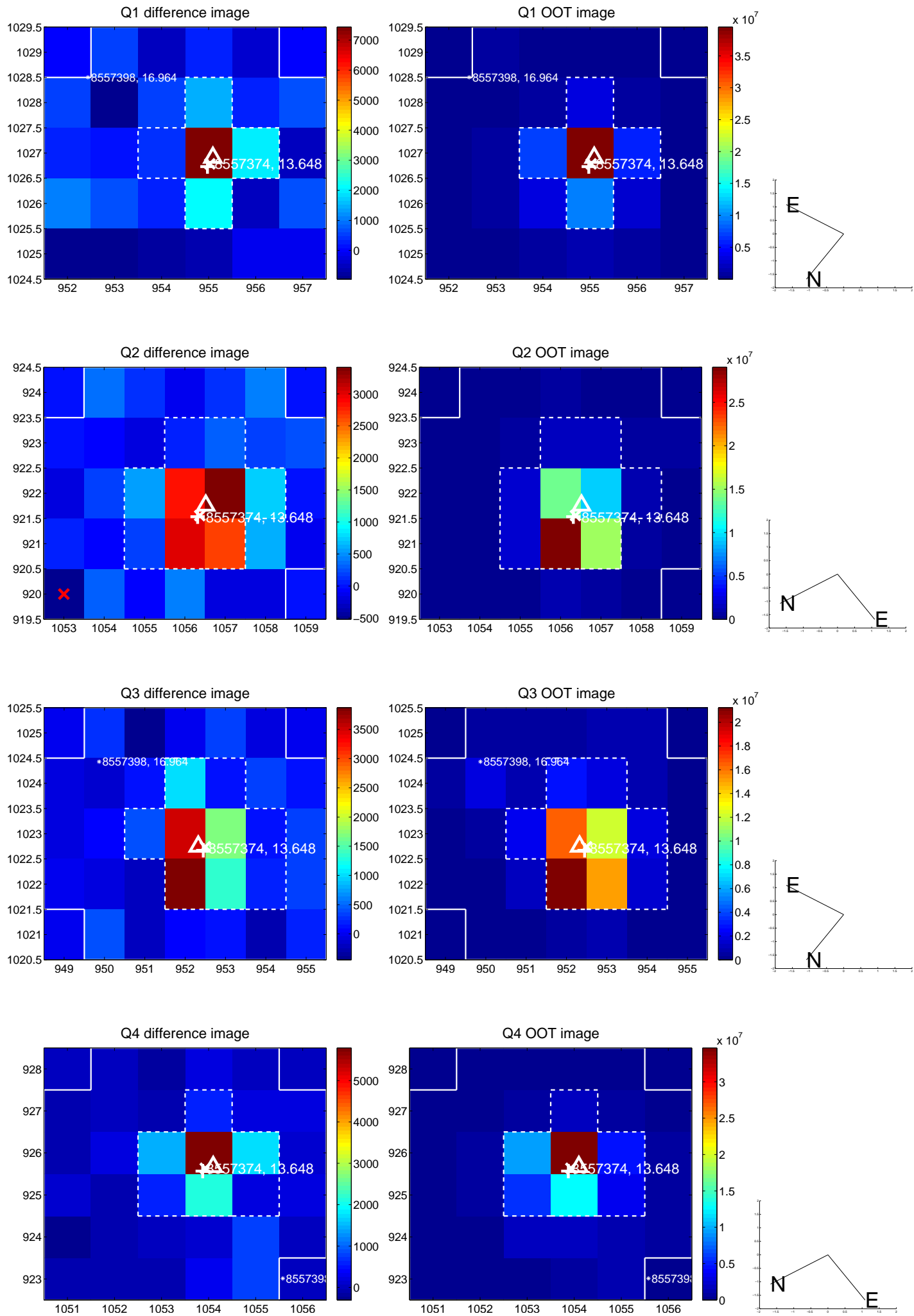
The direct PRF centroid is offset from the target star catalog position by about 0.45 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.247 \pm 0.169$	1.46	$-0.039 \pm 0.149$	$-0.244 \pm 0.170$
PRF-fit source offset from KIC position	$0.164 \pm 0.170$	0.97	$0.014 \pm 0.150$	$0.163 \pm 0.170$
photometric centroid source offset	$0.81 \pm 0.38$	2.14	$0.78 \pm 0.38$	$0.24 \pm 0.35$

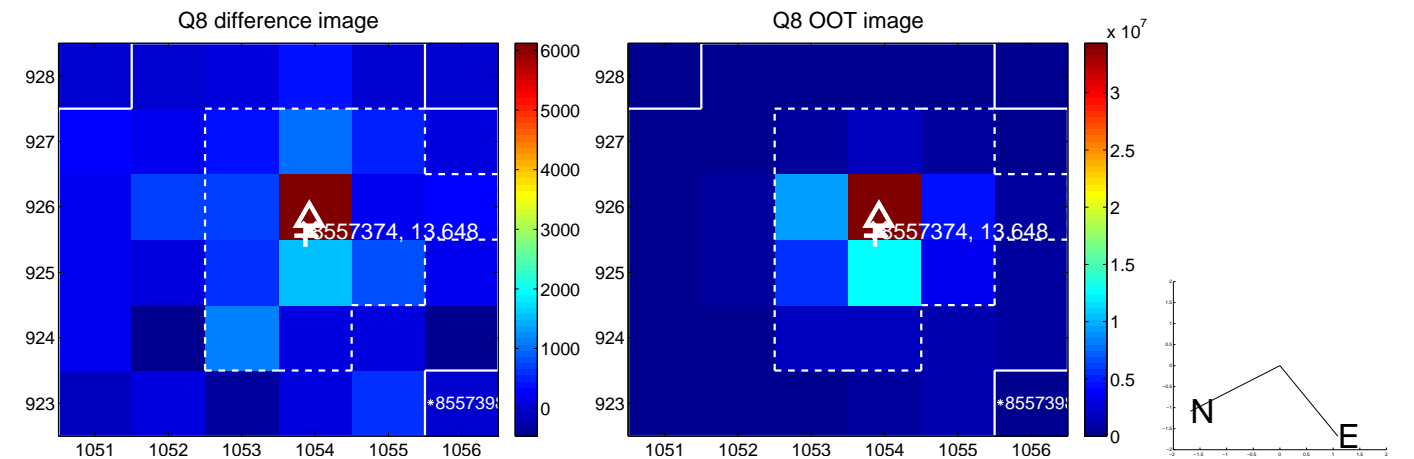
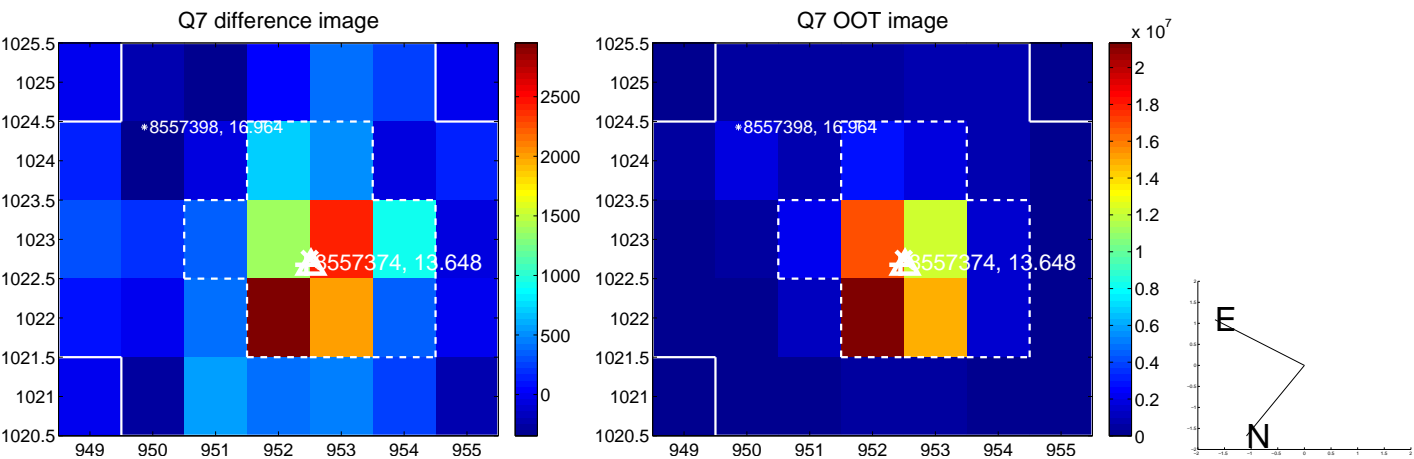
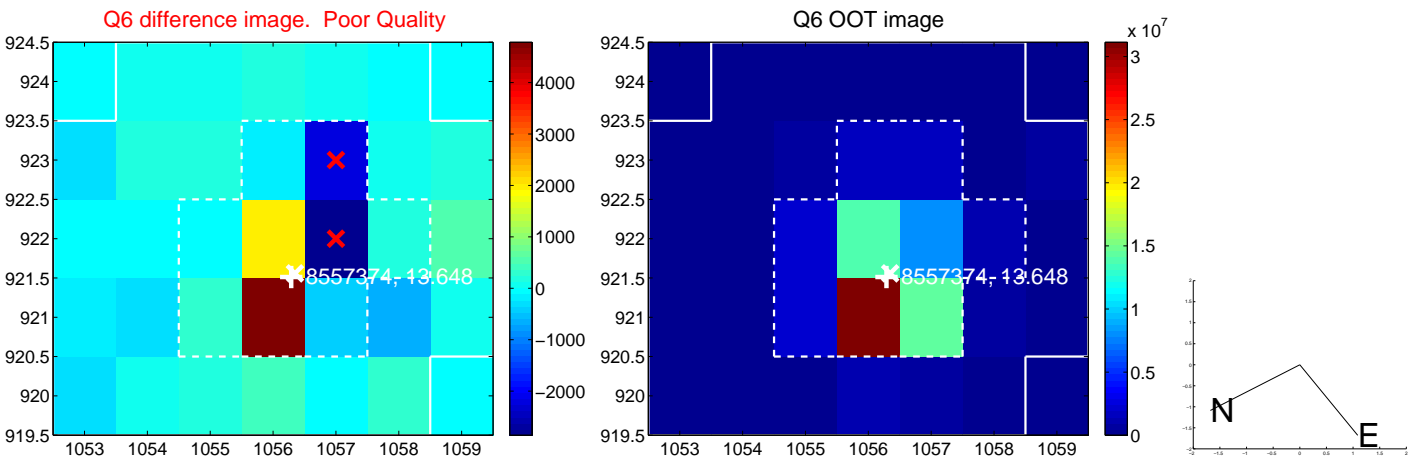
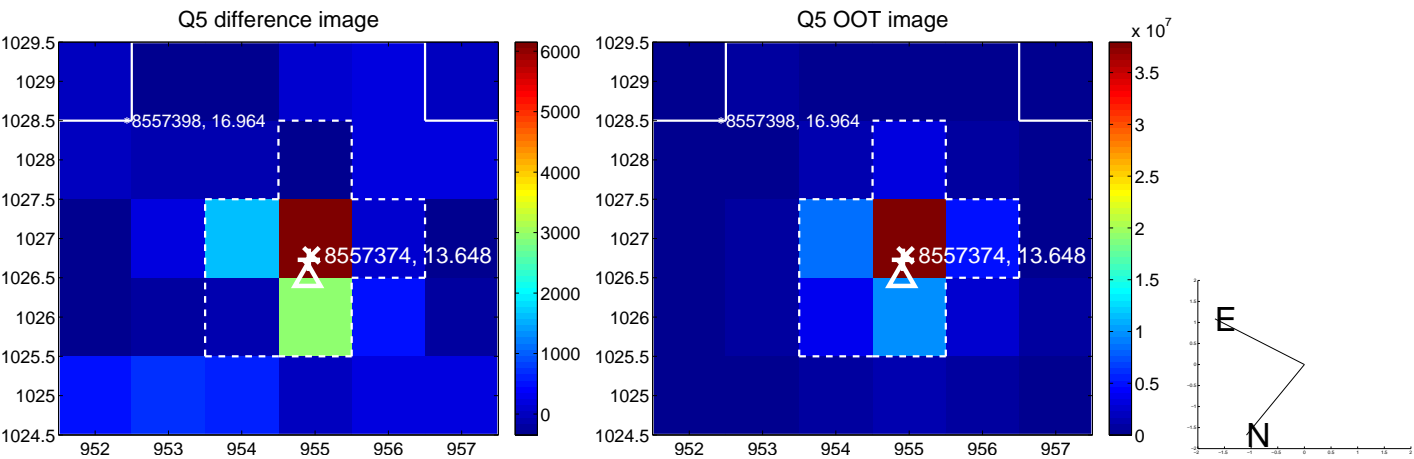


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

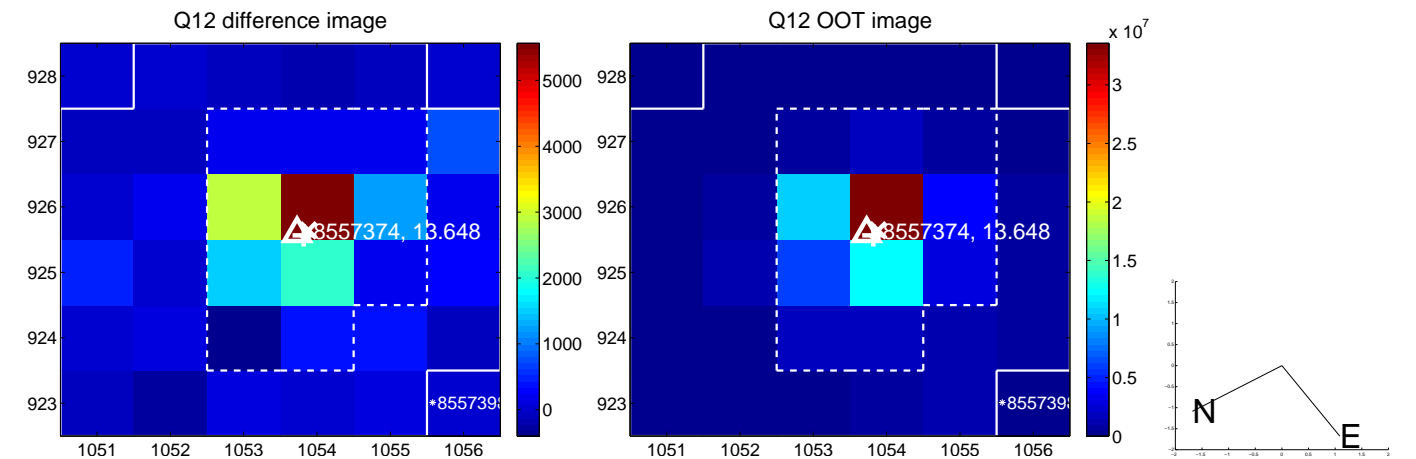
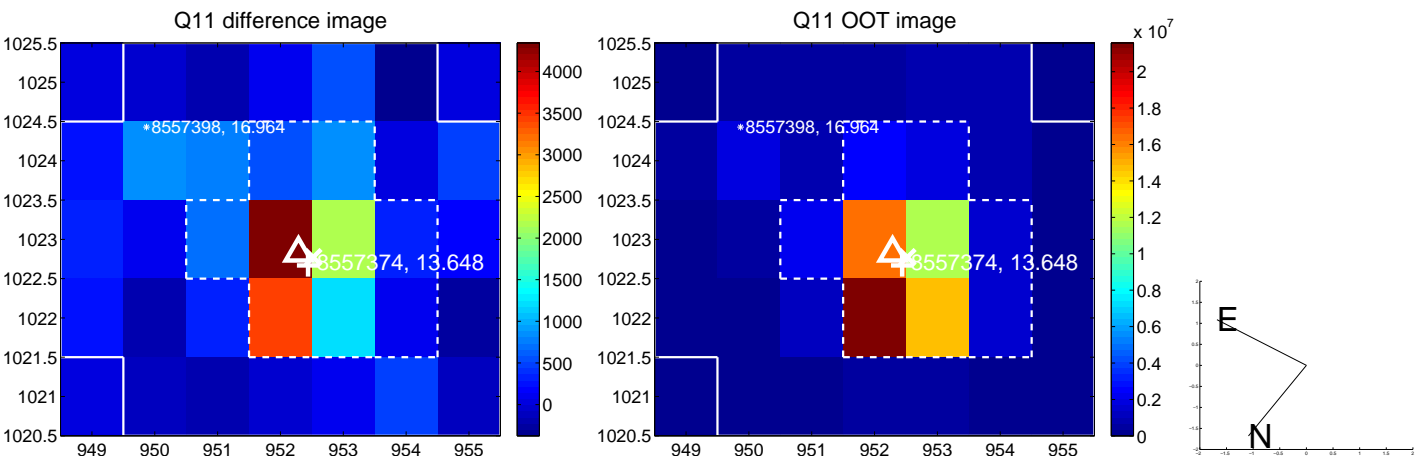
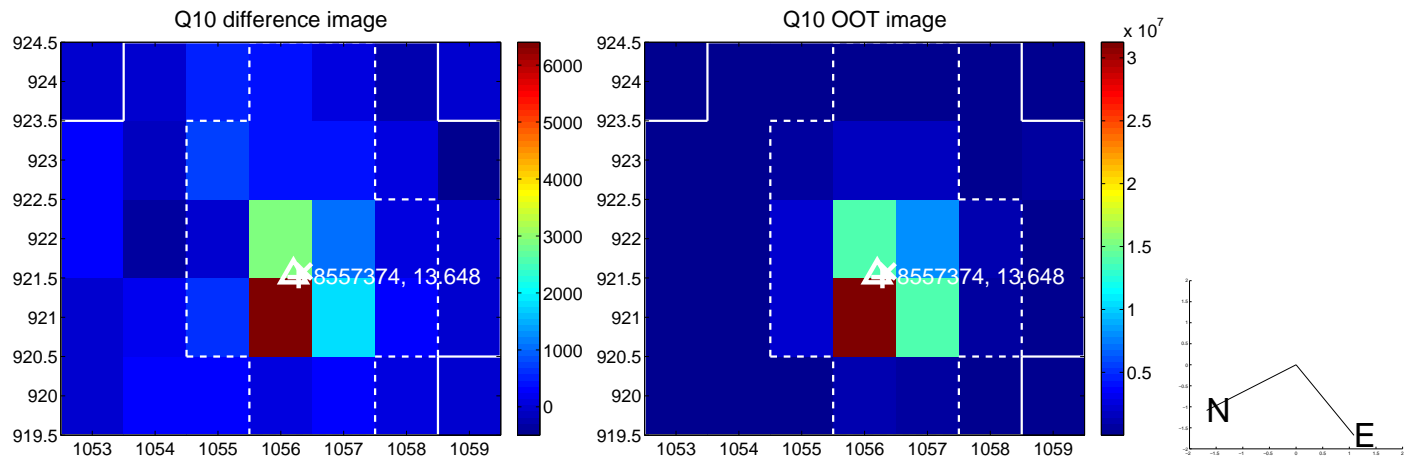
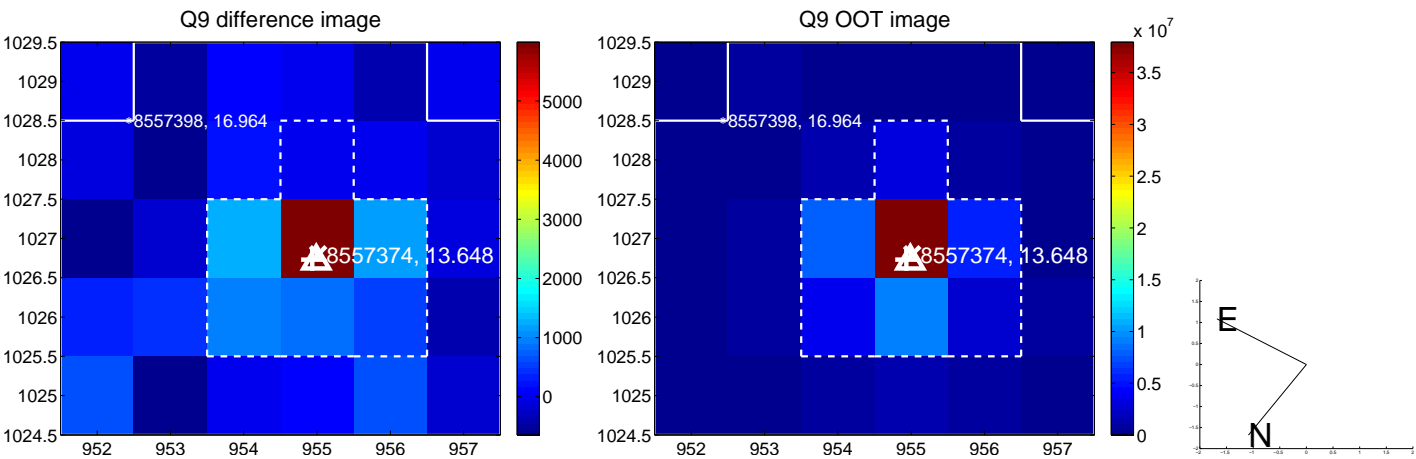


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

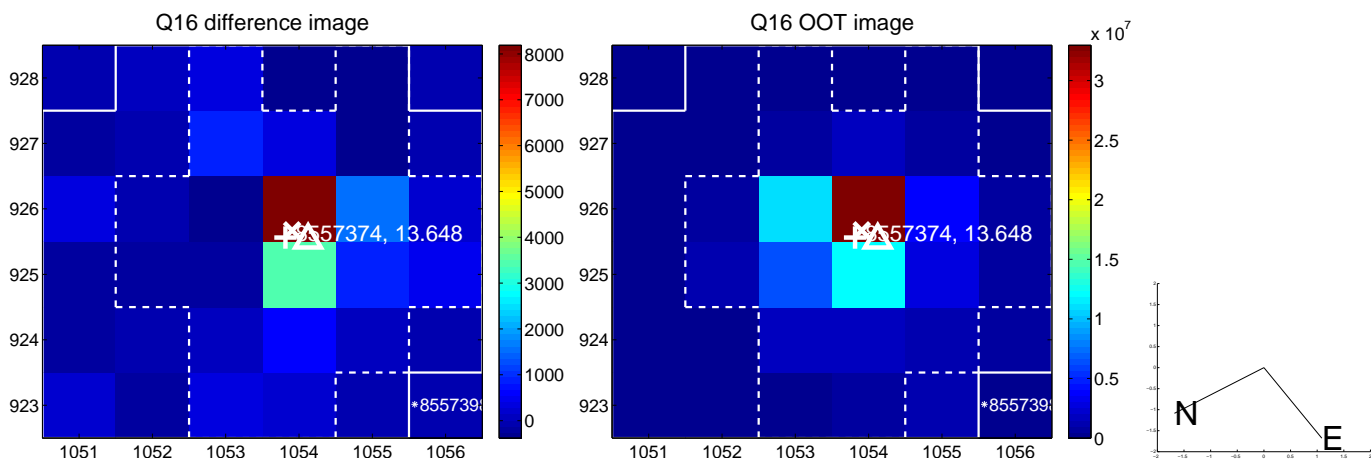
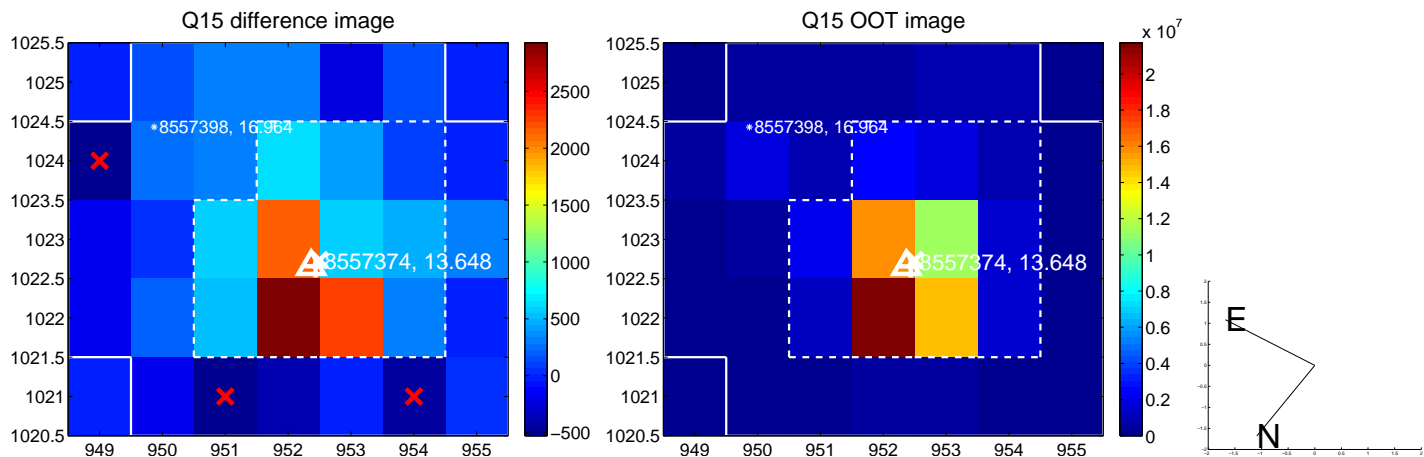
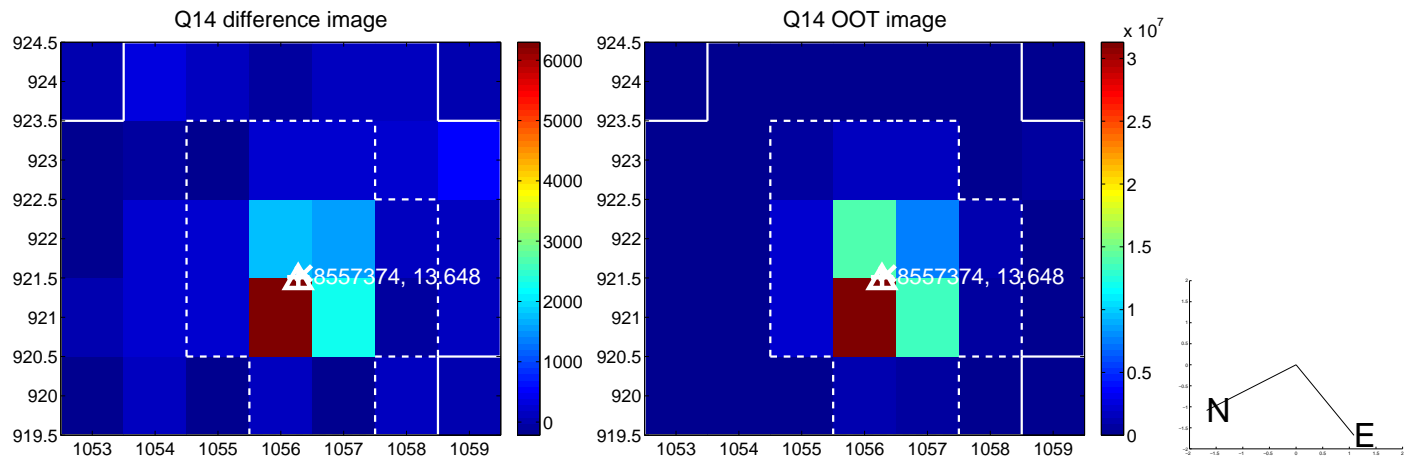
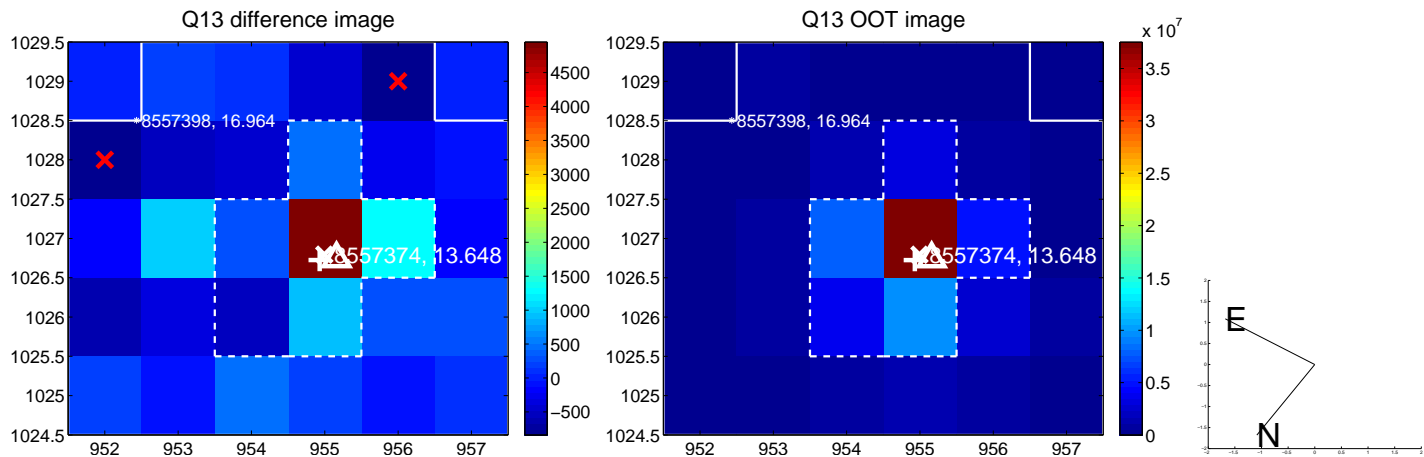




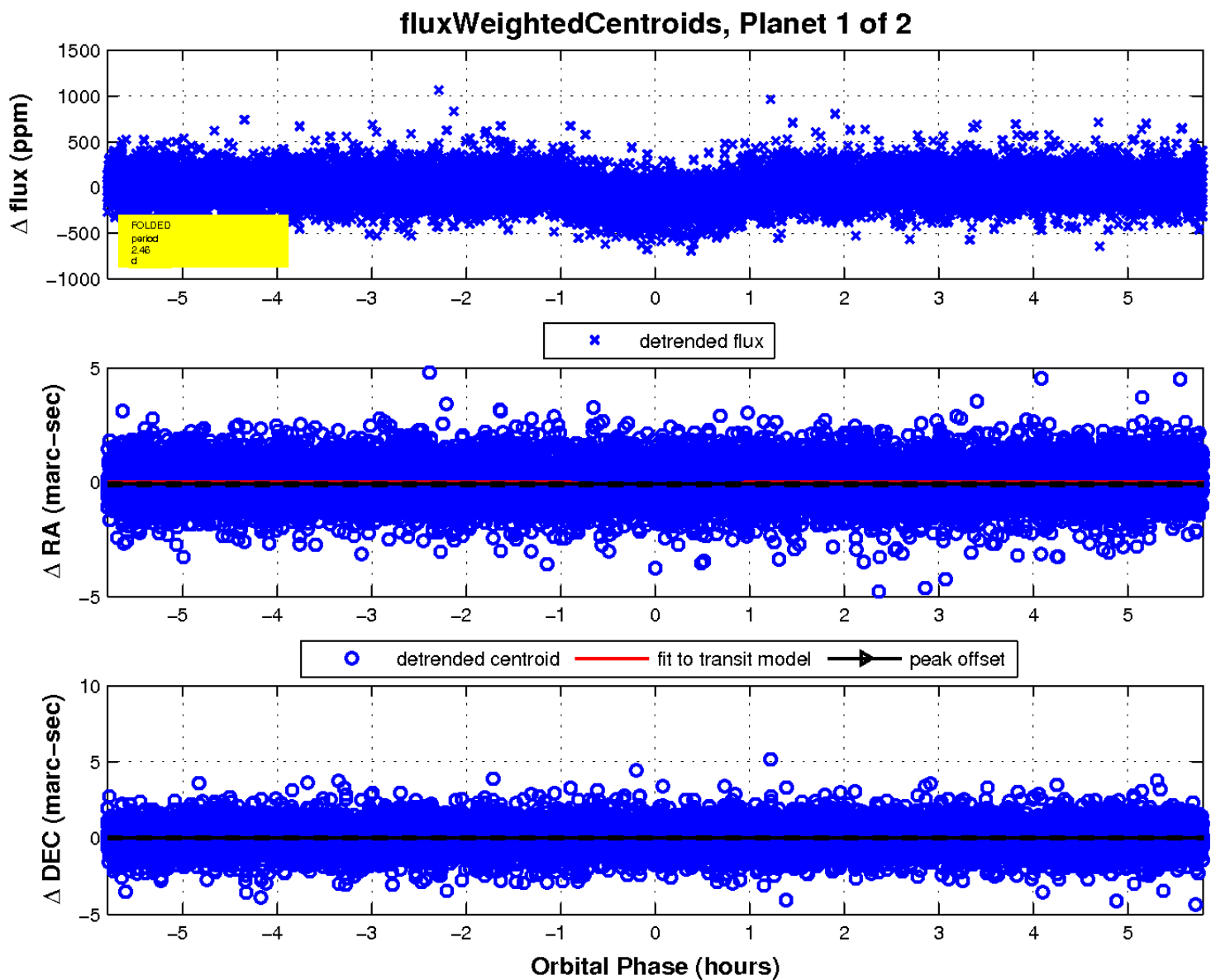
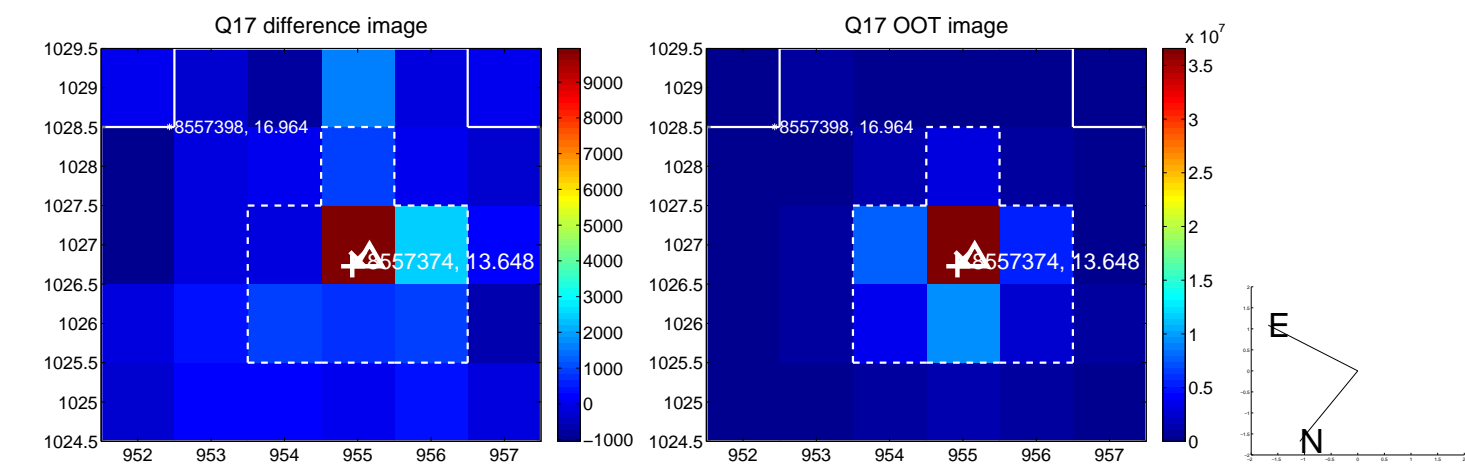
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

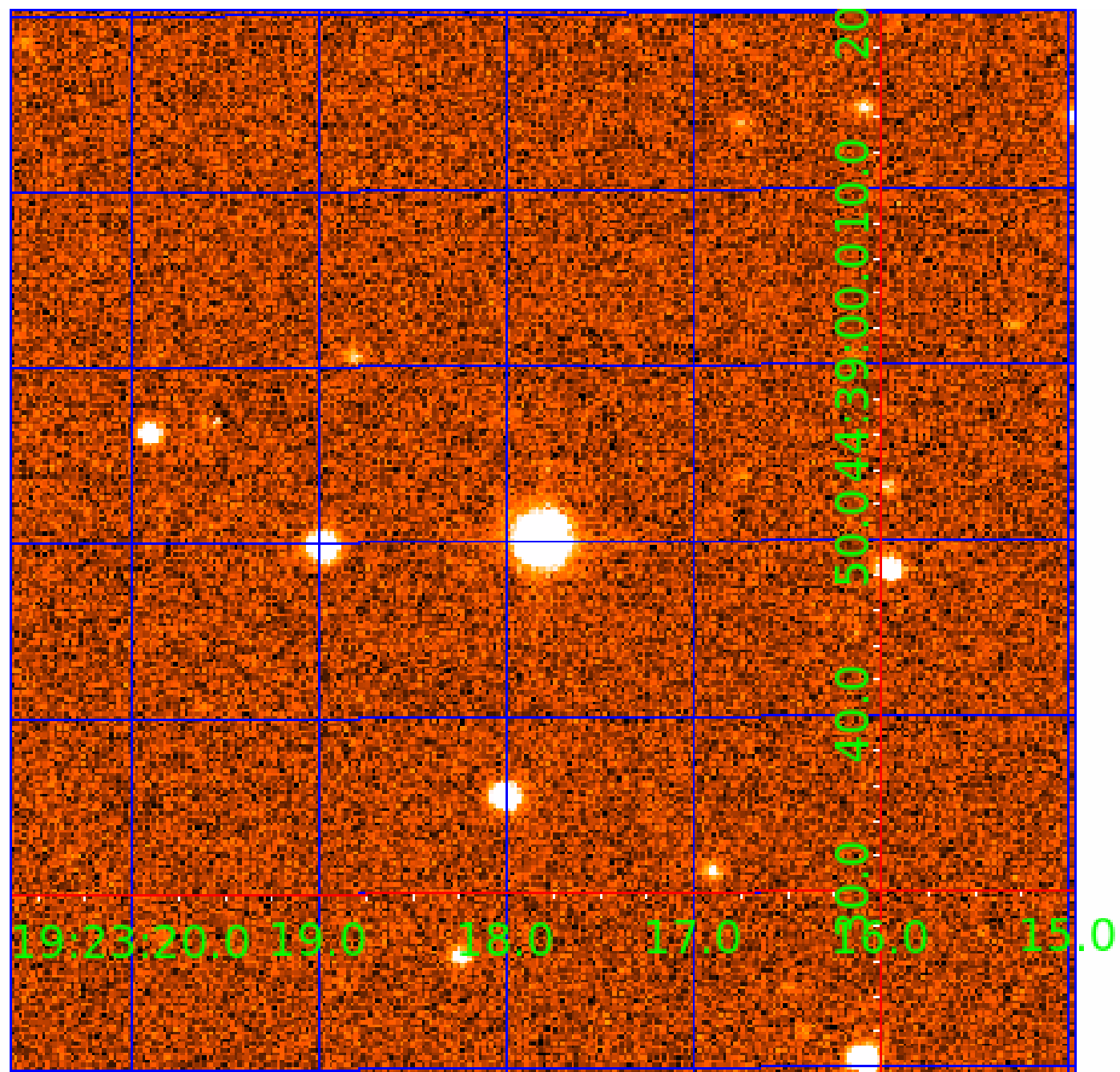


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



# UKIRT Image

Declination





# KIC 008557374

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008557374-01	OBS	0692.01	2.462339	132.446508	171.7	1.933	32.4	39.8	1.01	5736	1.60	731.99
008557374-02	OBS	0692.02	4.822973	134.435109	327.4	0.868	25.6	34.8	1.01	5736	2.21	298.69

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008557374-01	OBS	PC	1.00	0	0	0	0	CENT_KIC_POS
008557374-02	OBS	PC	1.00	0	0	0	0	CENT_KIC_POS

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

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

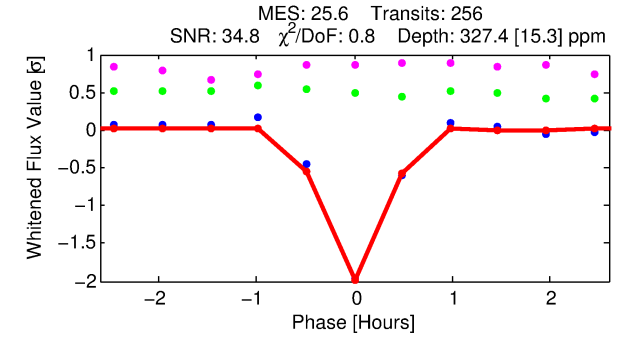
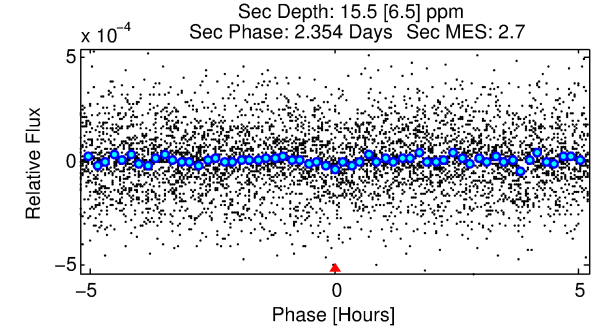
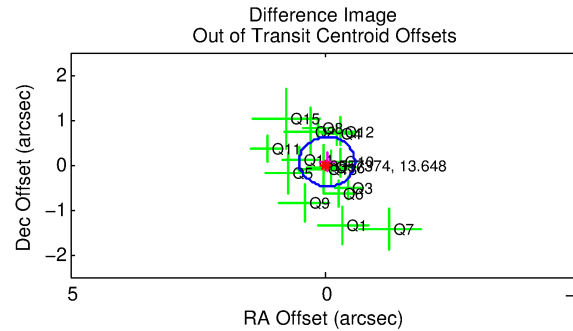
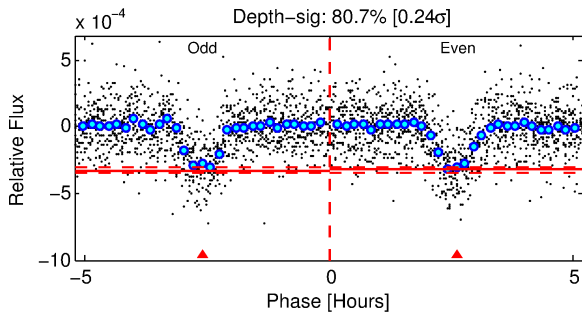
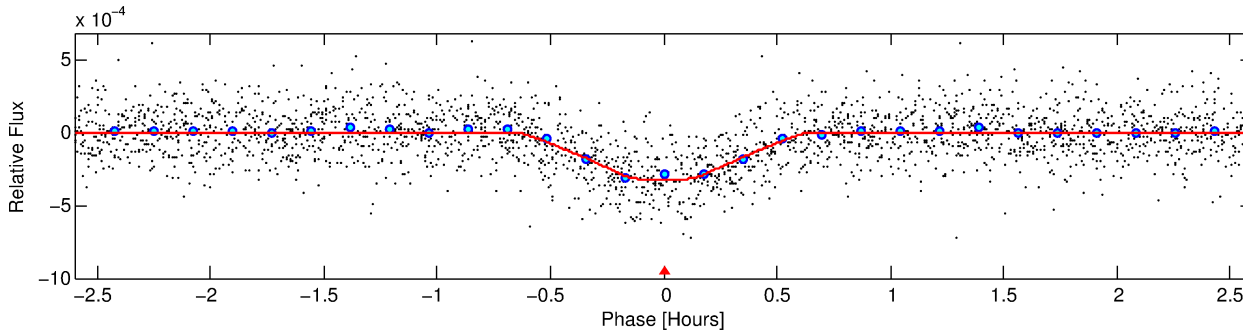
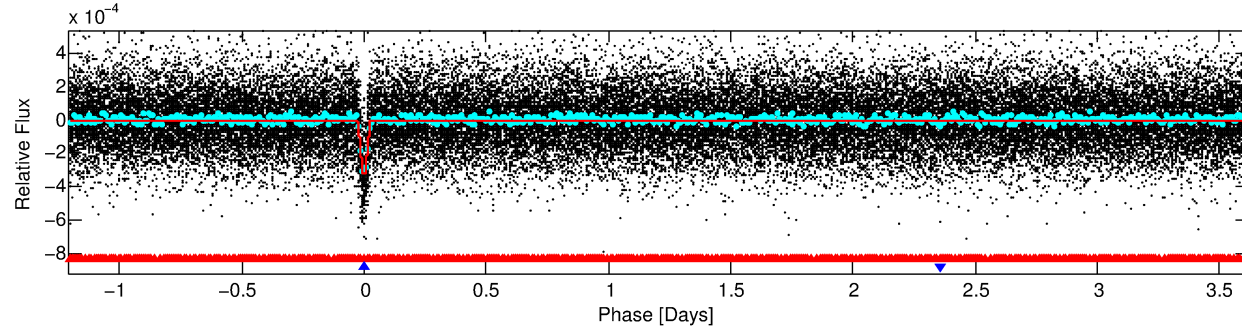
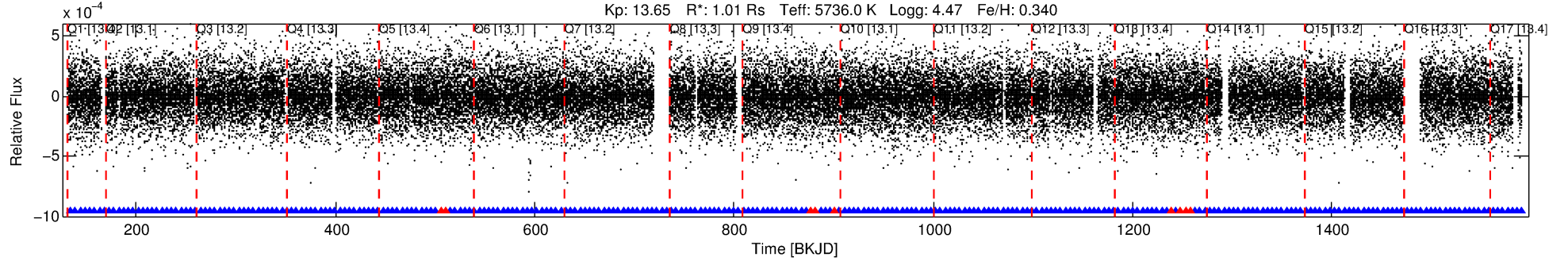
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 008557374-02

No Significant Match Found

# DV One-Page Summary

KIC: 8557374 Candidate: 2 of 2 Period: 4.823 d  
KOI: K00692.02 Name: Kepler-213c Corr: 0.975



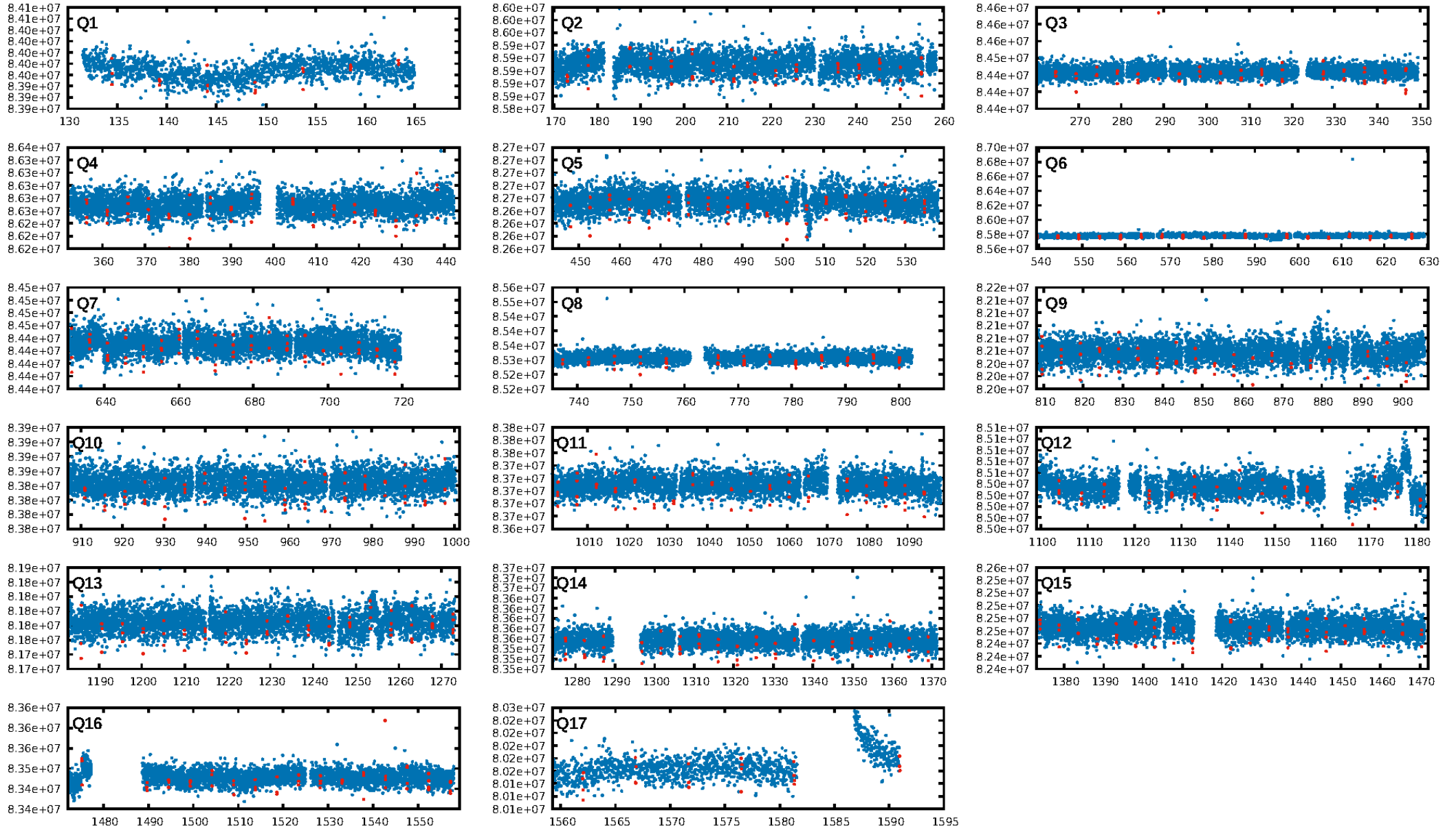
## DV Fit Results:

Period = 4.82297 [0.00000] d  
Epoch = 134.4351 [0.0006] BKJD  
Rp/R\* = 0.0201 [0.0045]  
a/R\* = 20.43 [20.49]  
b = 0.90 [0.22]  
Seff = 298.69 [68.50]  
Teff = 1060 [61] K  
Rp = 2.21 [0.61] Re  
a = 0.0574 [0.0080] AU  
Ag = 5.74 [3.73] [1.27 $\sigma$ ]  
Teffp = 2536 [393] K [3.71 $\sigma$ ]

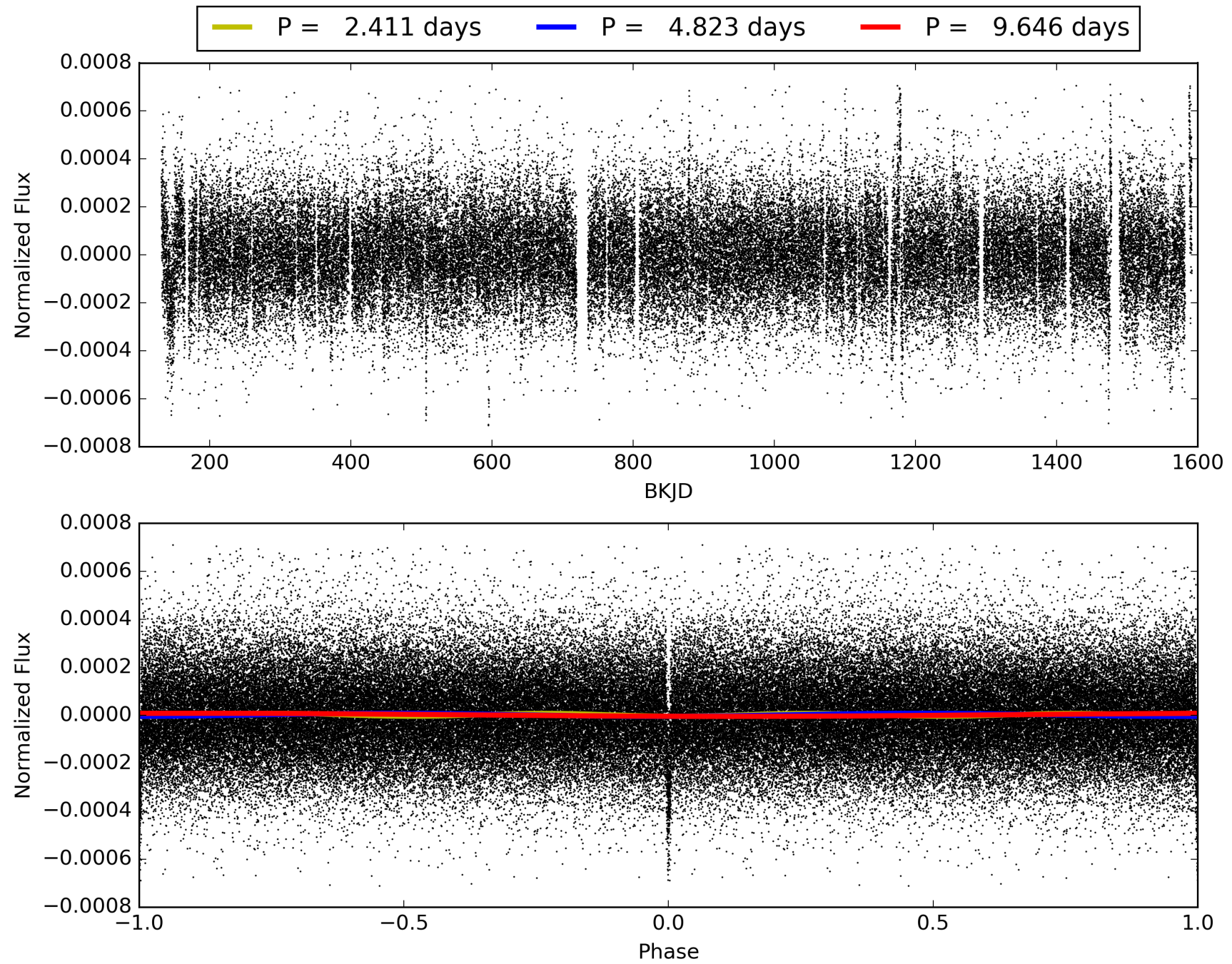
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [26.75 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 2.34e-141  
RollingBand-fgt: 0.96 [234/243]  
GhostDiagnostic-chr: 4.71  
Centroid-sig: 35.0%  
Centroid-so: 0.710 arcsec [1.66 $\sigma$ ]  
OotOffset-rm: 0.080 arcsec [0.44 $\sigma$ ]  
OotOffset-st: 4/4/4/4 [16]  
KicOffset-rm: 0.450 arcsec [2.16 $\sigma$ ]  
KicOffset-st: 4/4/4/4 [16]  
DiffImageQuality-fgm: 1.00 [16/16]  
DiffImageOverlap-fno: 1.00 [17/17]

# TCE 008557374-02, PDC Light Curves



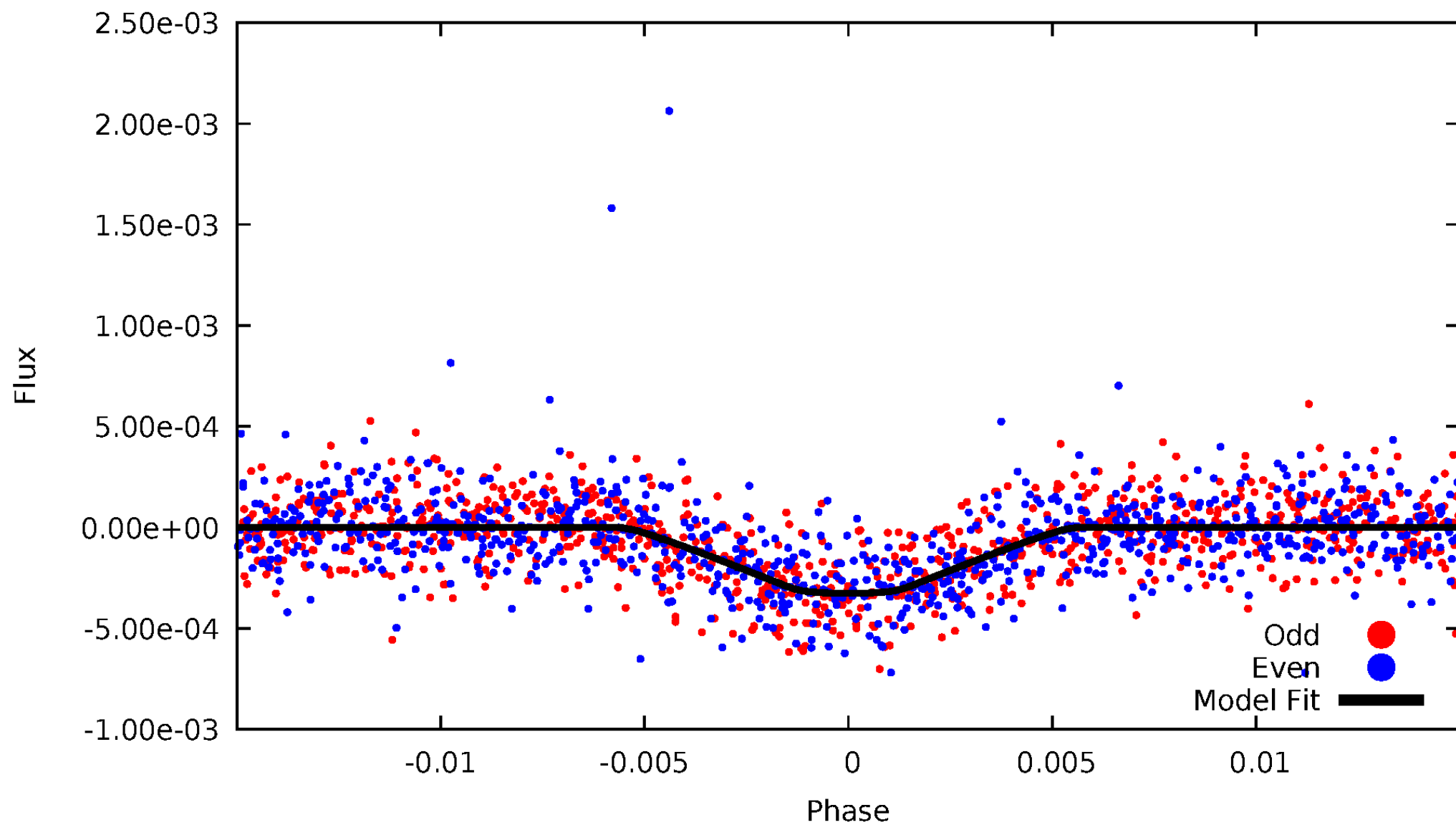
TCE 008557374-02





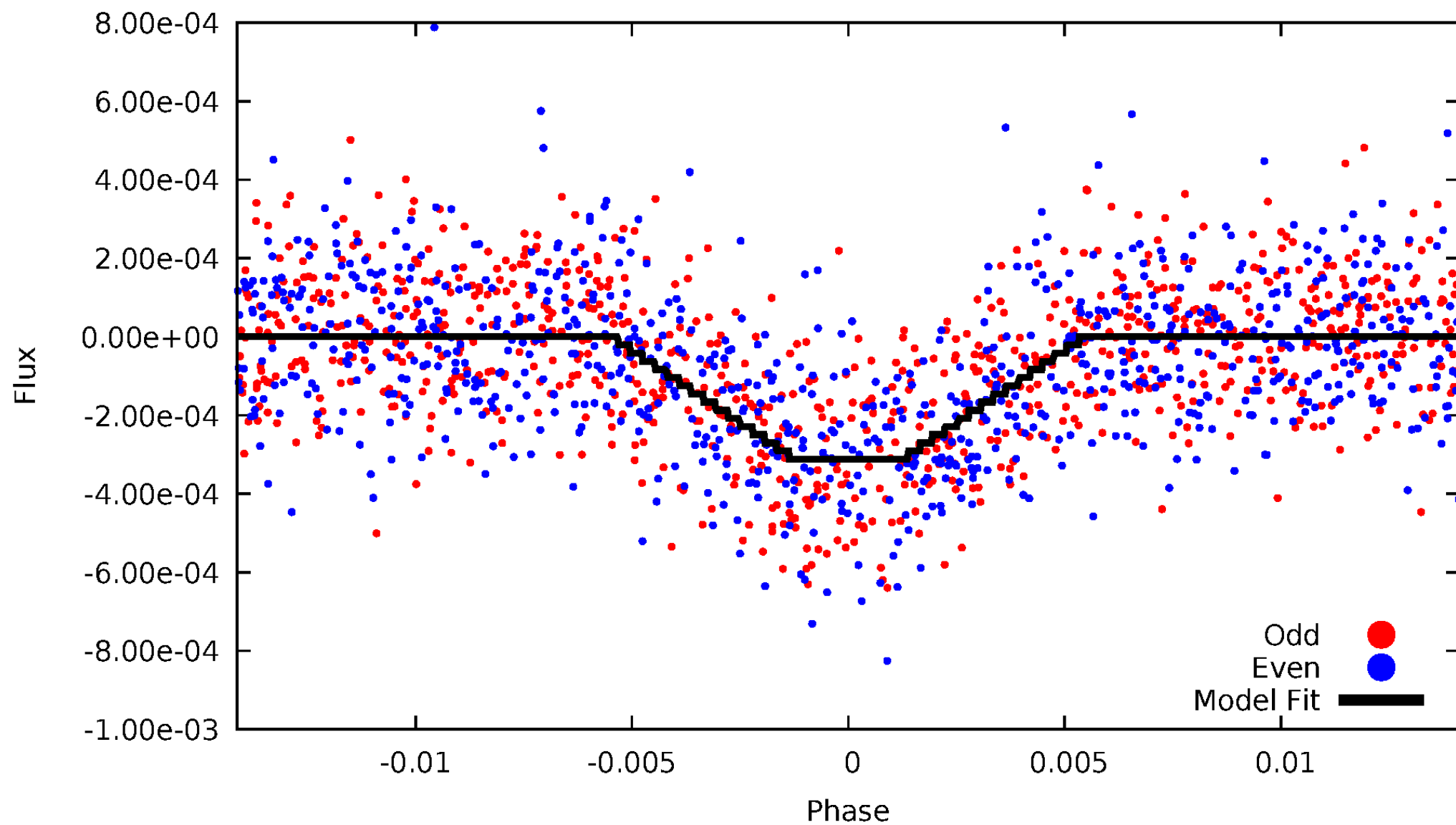
# DV Odd/Even

TCE 008557374-02



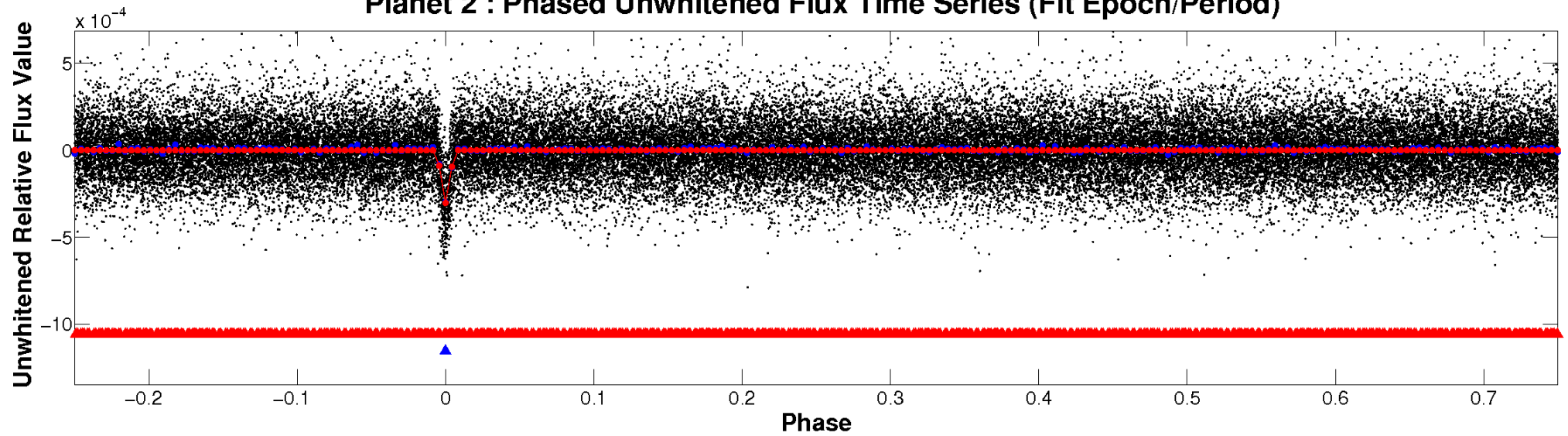
# ALT Odd/Even

TCE 008557374-02

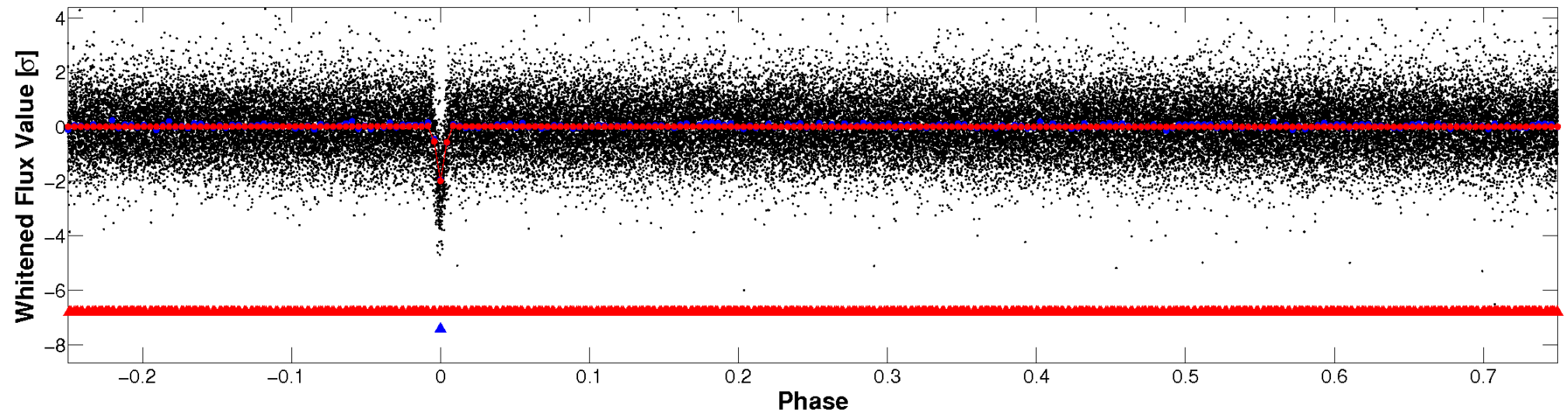


# Non-Whitened Vs. Whitened Light Curve

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

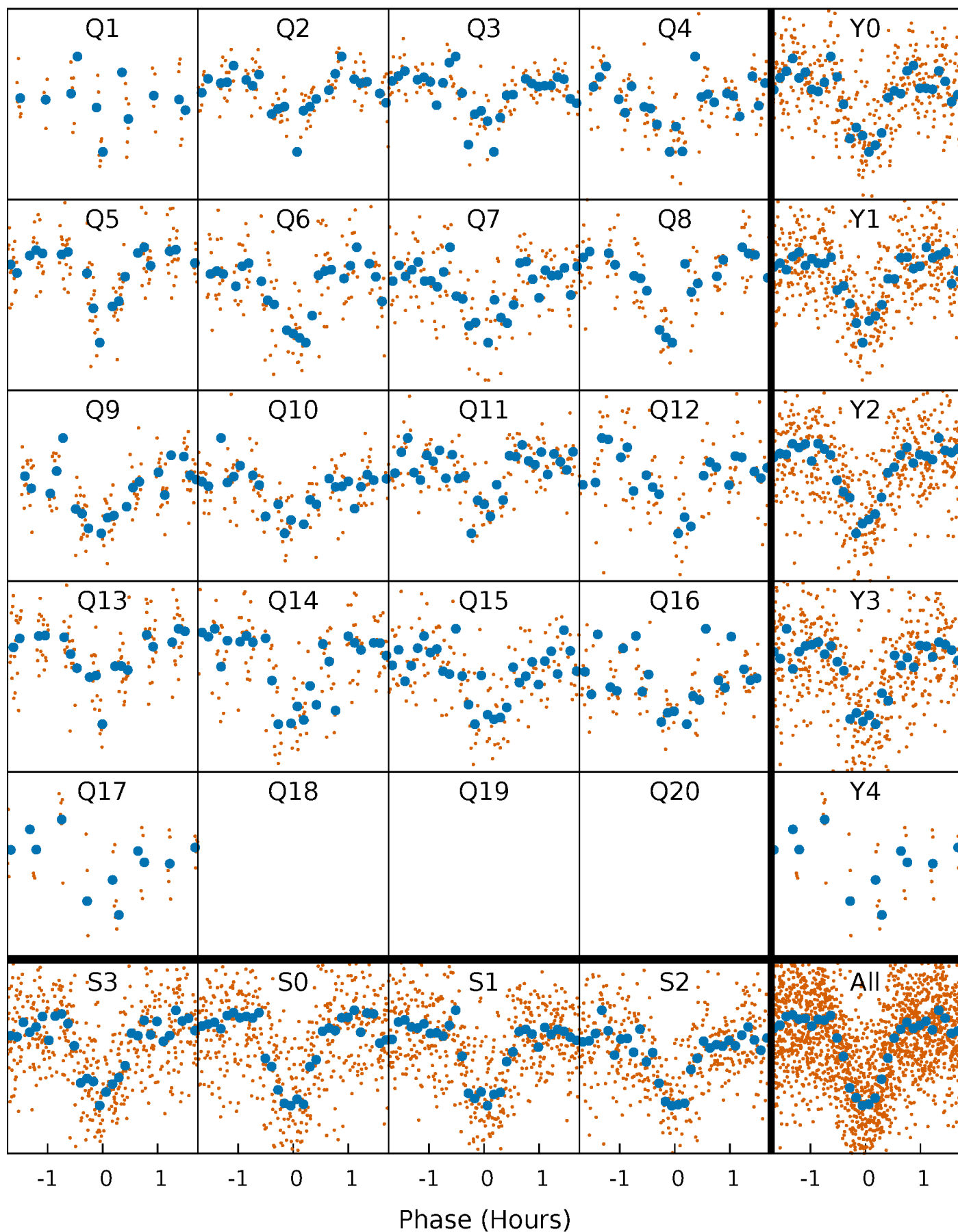


**Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



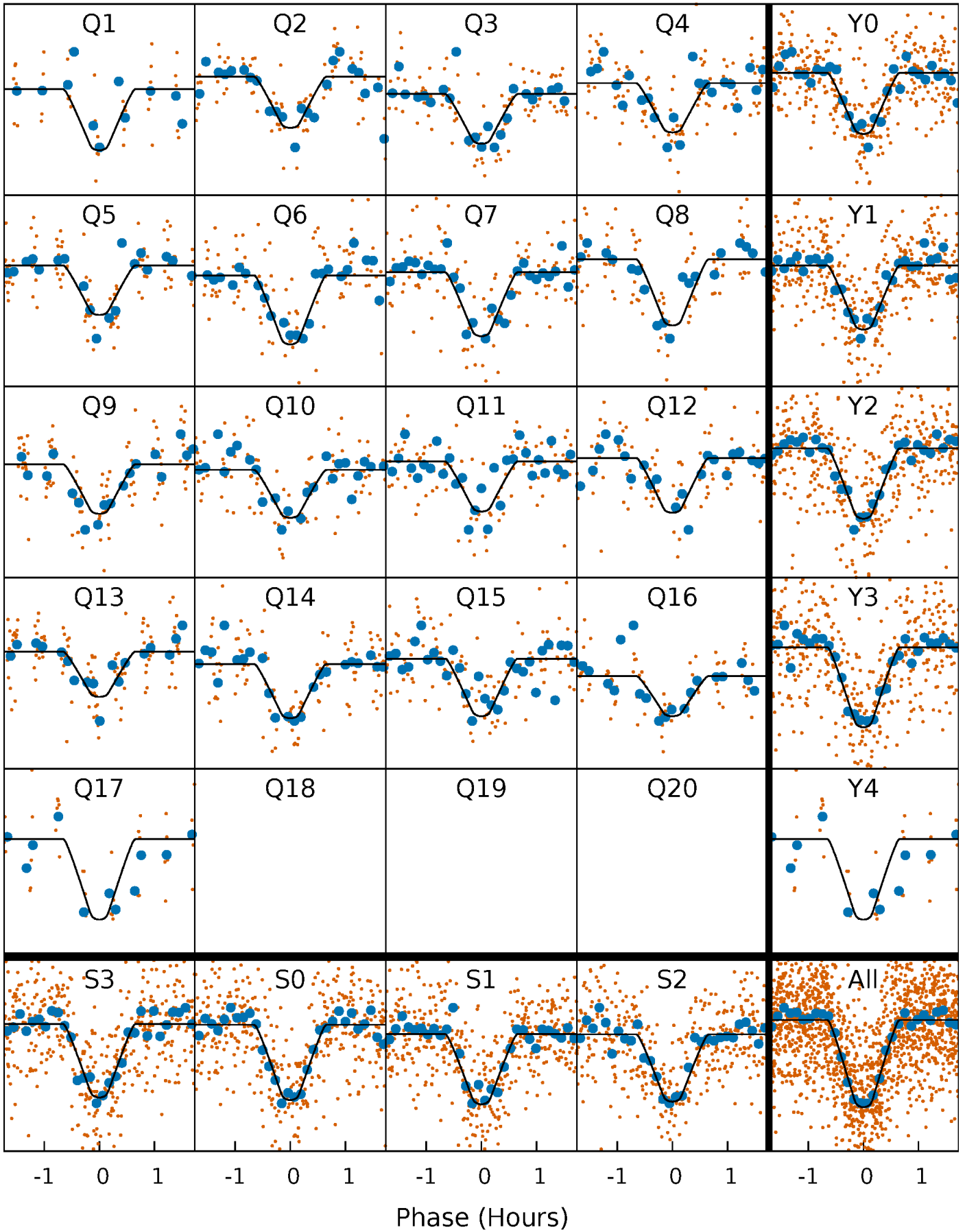
# PDC Quarter-Phased Transit Curves

TCE 008557374-02   P= 4.822973 Days    $T_0=134.435109$  (BKJD)



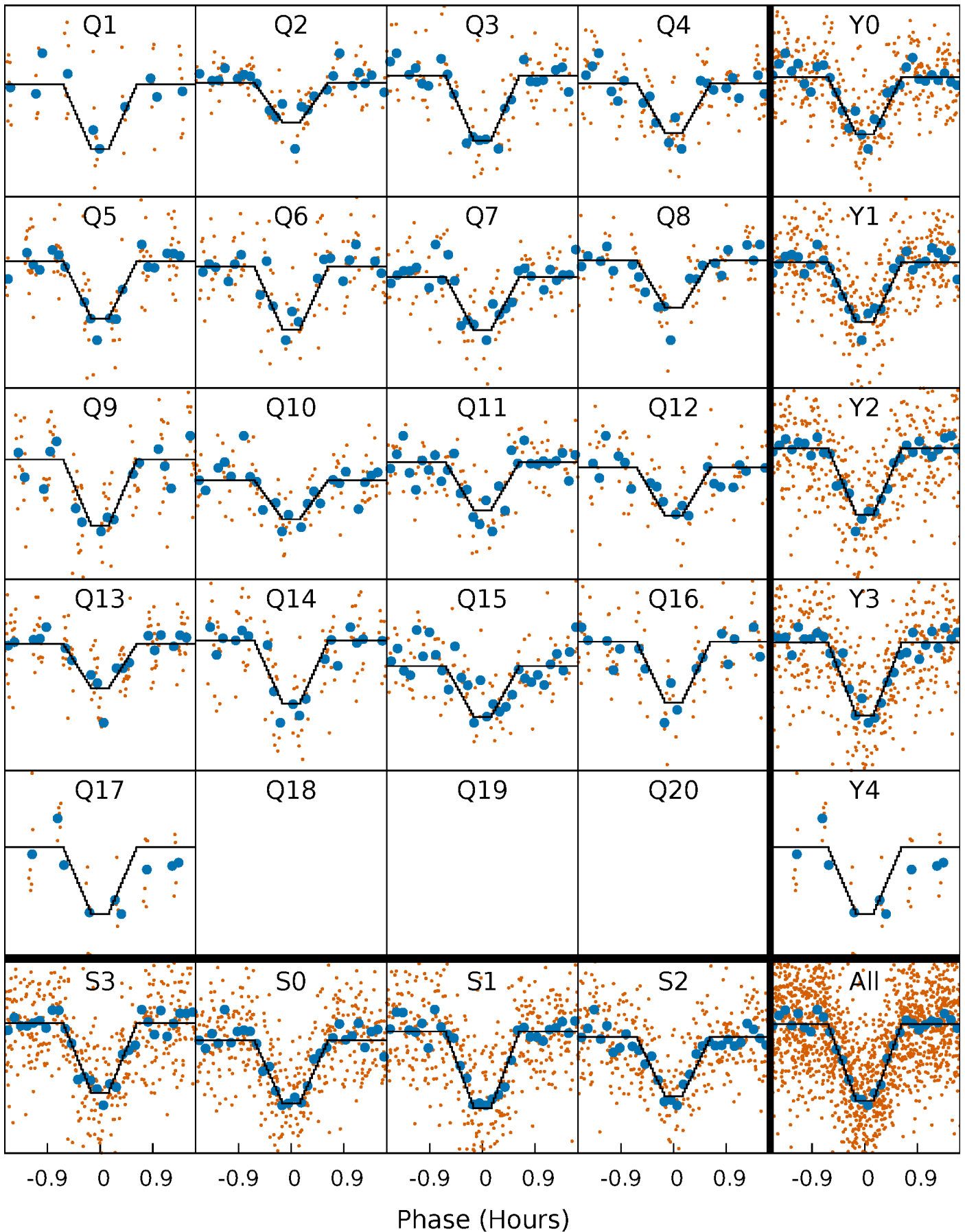
# DV Quarter-Phased Transit Curves

TCE 008557374-02   P= 4.822973 Days    $T_0=134.435109$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 008557374-02 P= 4.822960 Days  $T_0=134.436502$  (BKJD)

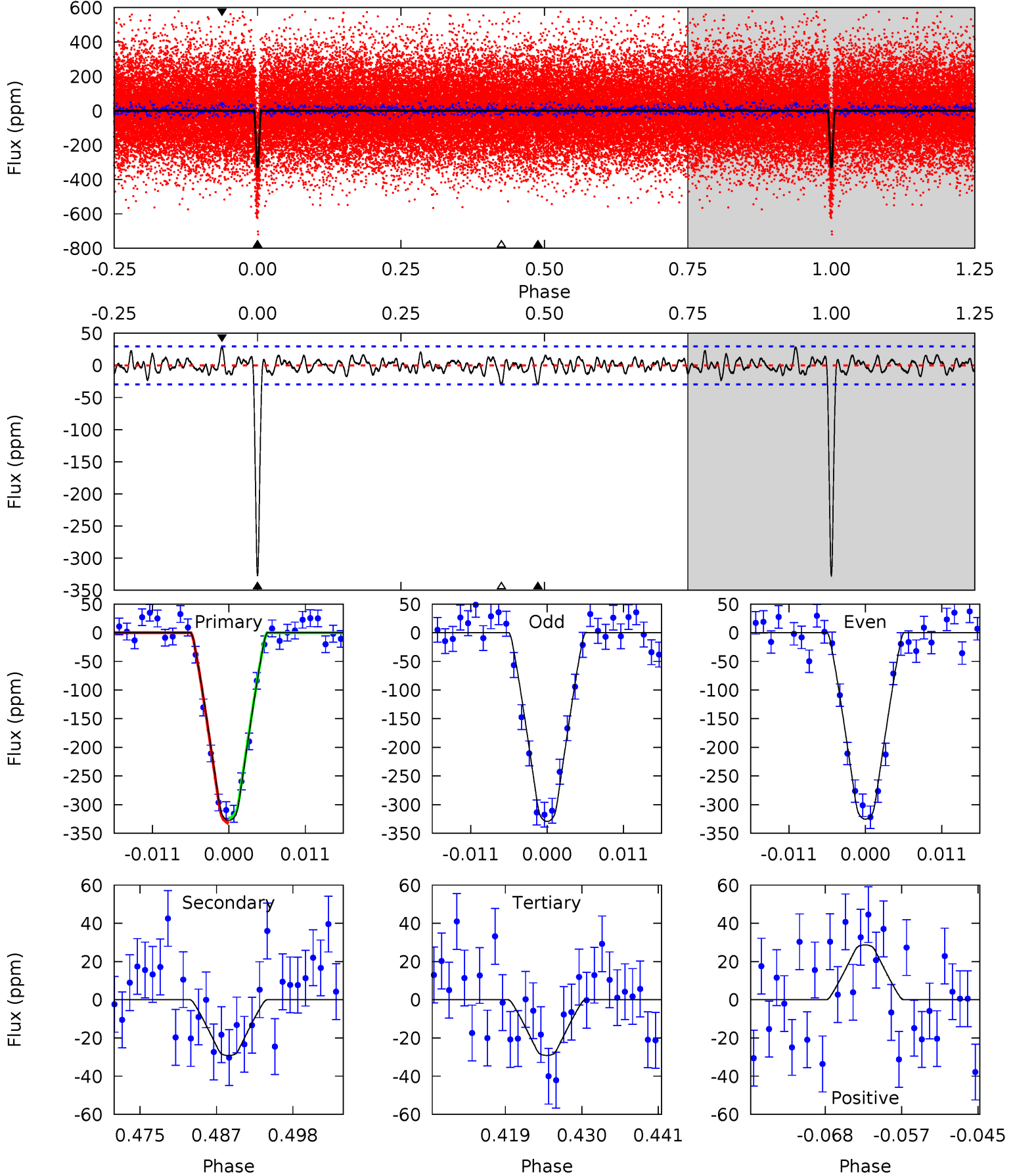




# DV Model-Shift Uniqueness Test

008557374-02, P = 4.822973 Days, E = 129.612136 Days

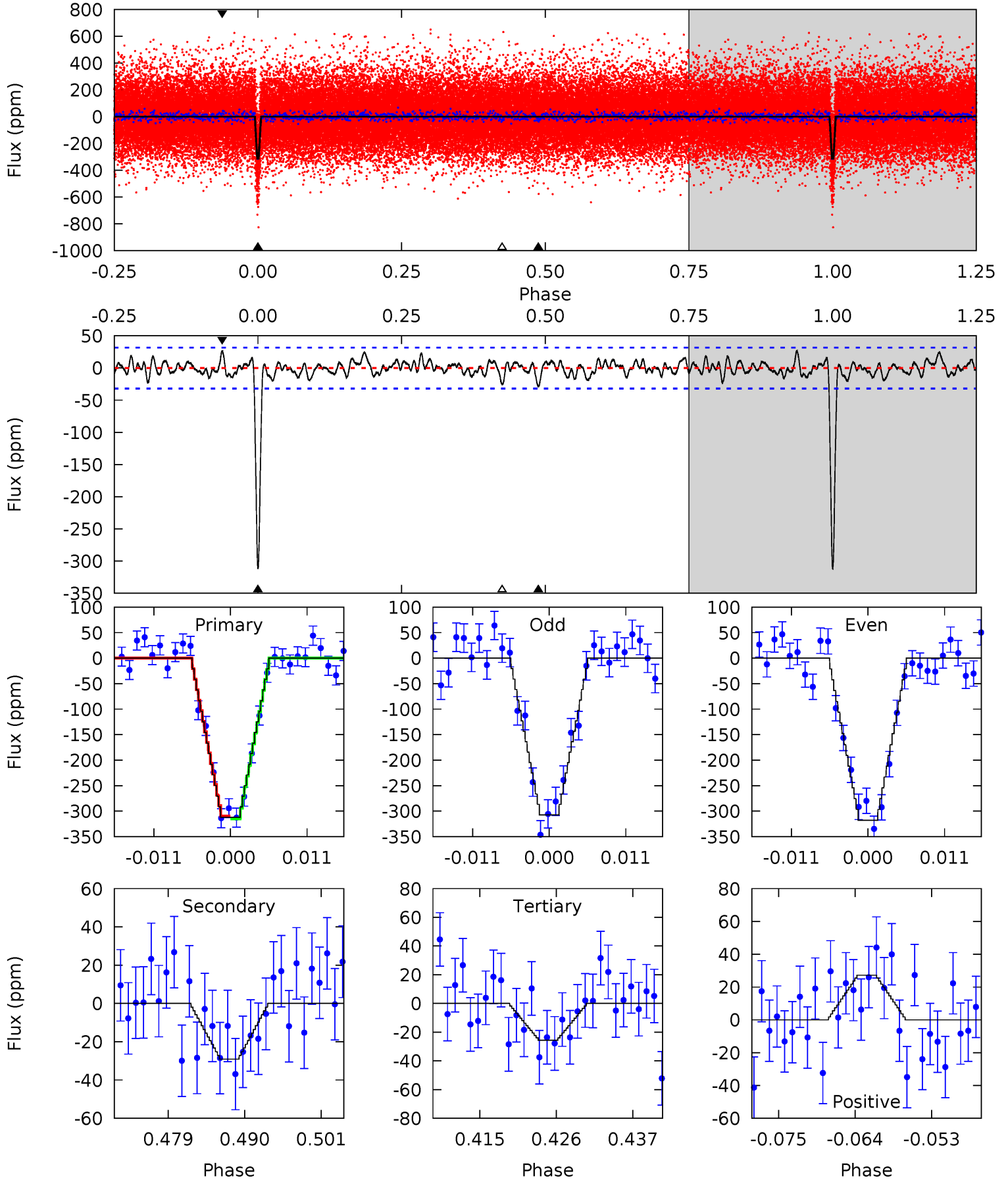
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
55.2	4.93	4.92	4.84	5.00	2.53	1.36	50.3	50.4	0.01	0.09	0.34	0.99	0.08	0.70



# Alt Model-Shift Uniqueness Test

008557374-02, P = 4.822960 Days, E = 129.613542 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
49.3	4.60	4.06	4.30	5.01	2.55	1.34	45.2	45.0	0.54	0.30	0.83	0.97	0.08	0.44



### Stellar Parameters For KIC 008557374

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5736^{+103}_{-125}$	$4.467^{+0.030}_{-0.120}$	$0.340^{+0.100}_{-0.150}$	$1.008^{+0.159}_{-0.057}$	$1.087^{+0.050}_{-0.072}$	$1.493^{+0.212}_{-0.518}$
	+2%/-2%	+1%/-3%	+29%/-44%	+16%/-6%	+5%/-7%	+14%/-35%
Source	SPE59	SPE59	SPE59	DSEP		

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

### Secondary Eclipse Parameters for KIC 008557374-02 / KOI 0692.02

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-29 \pm 6$	$2.22^{+0.57}_{-0.50}$	$1495^{+60}_{-42}$	$3446^{+322}_{-244}$	$10^{+7}_{-4}$
Alt.	$-29 \pm 6$	$1.99^{+0.53}_{-0.52}$	$1497^{+61}_{-43}$	$3583^{+438}_{-287}$	$13^{+13}_{-6}$

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

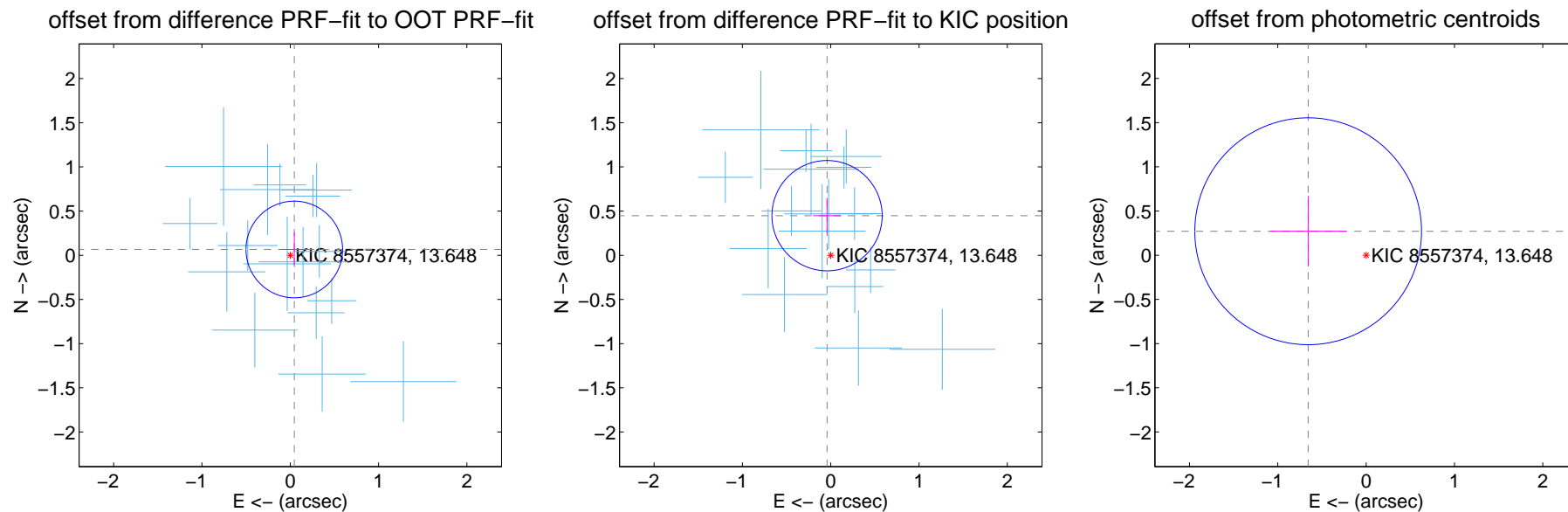
## DV Centroid Data

Supplemental centroid analysis for 008557374-02. Kepler magnitude: 13.65. Transit SNR 34.79

There are 16 quarters with good PRF difference image offsets

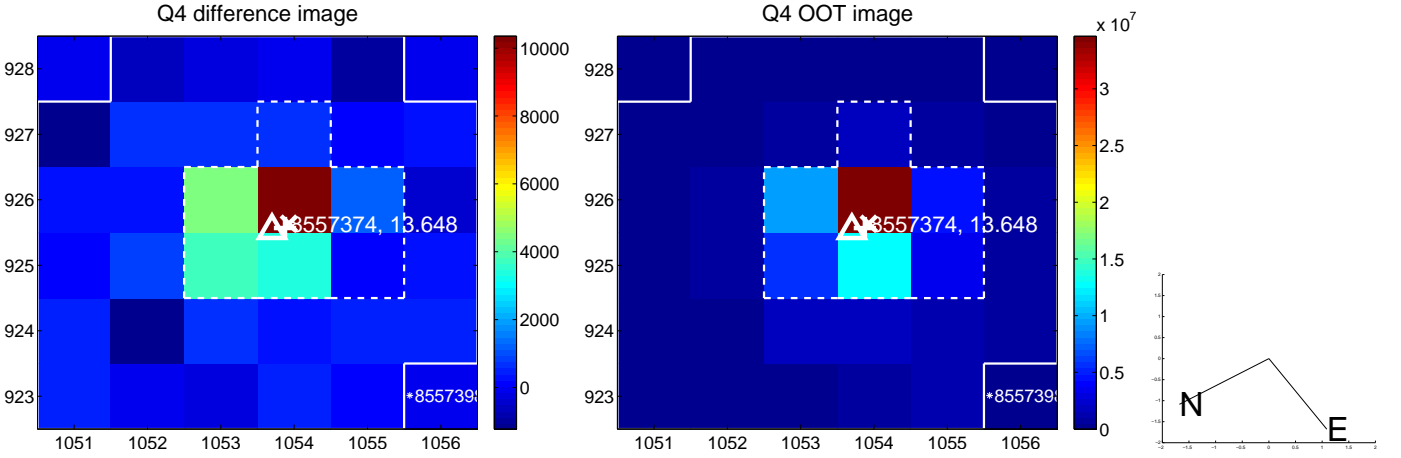
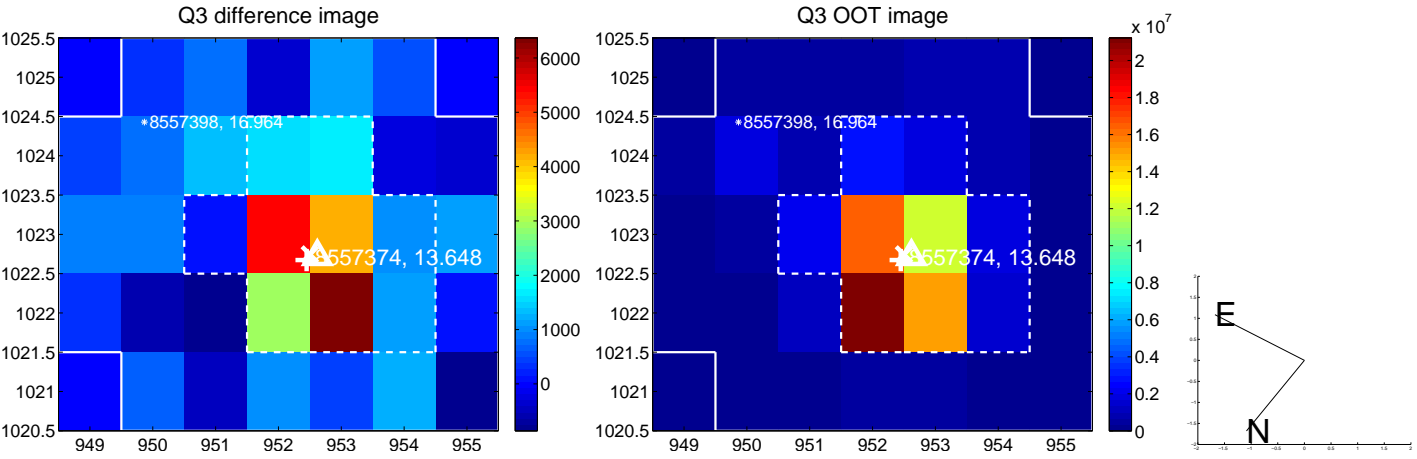
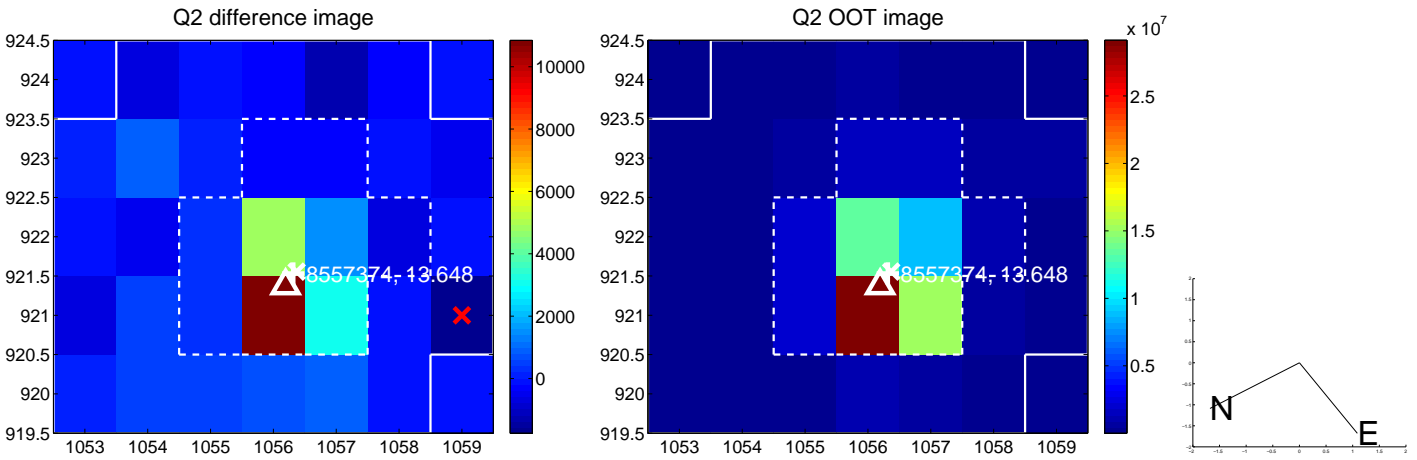
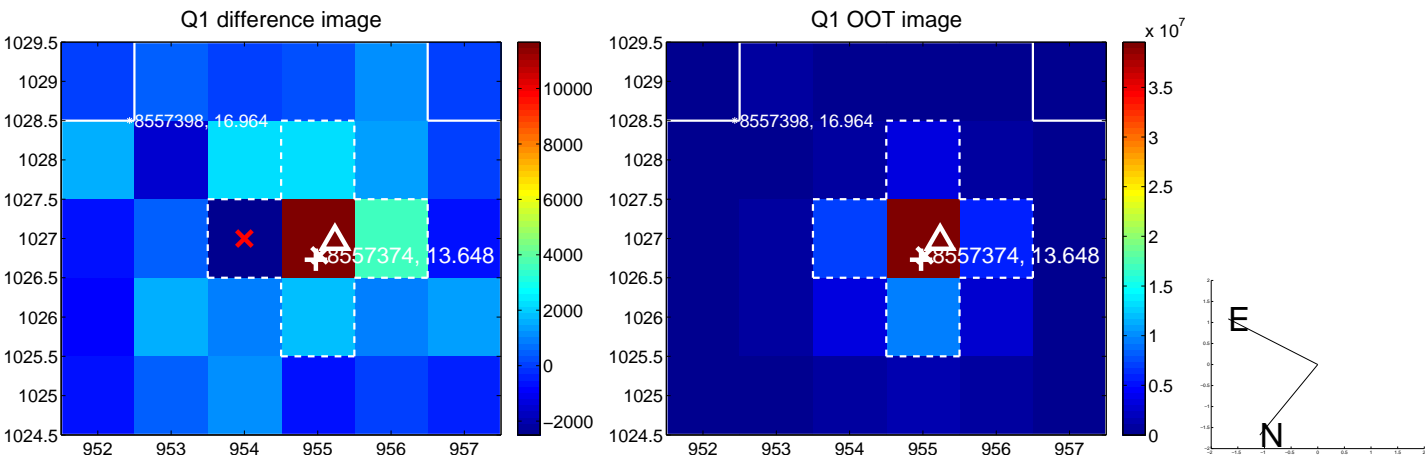
The direct PRF centroid is offset from the target star catalog position by about 0.57 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.080 \pm 0.182$	0.44	$-0.046 \pm 0.151$	$0.066 \pm 0.195$
PRF-fit source offset from KIC position	$0.450 \pm 0.208$	2.16	$0.042 \pm 0.160$	$0.448 \pm 0.201$
photometric centroid source offset	$0.71 \pm 0.43$	1.66	$0.66 \pm 0.43$	$0.27 \pm 0.40$

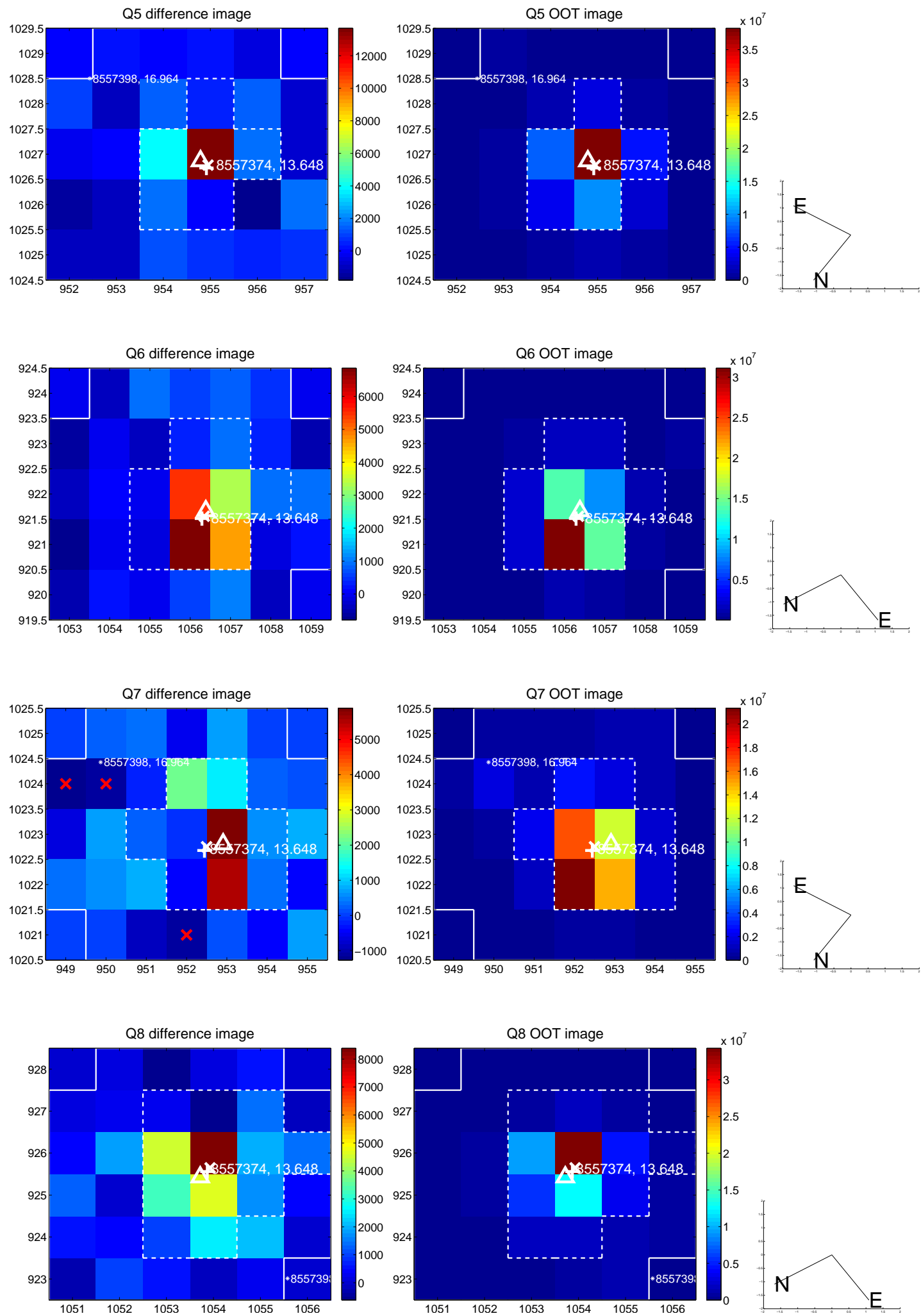


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

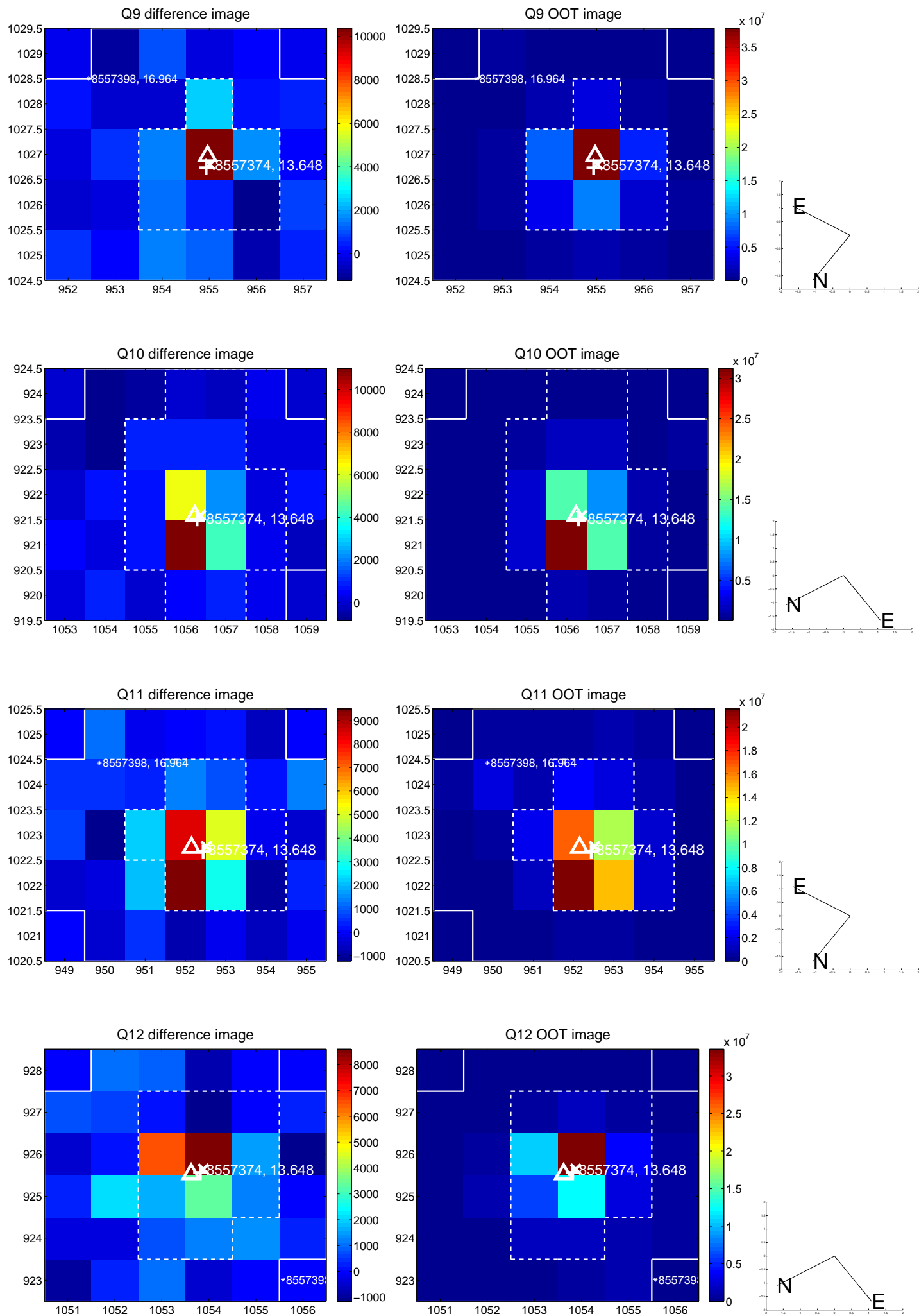


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

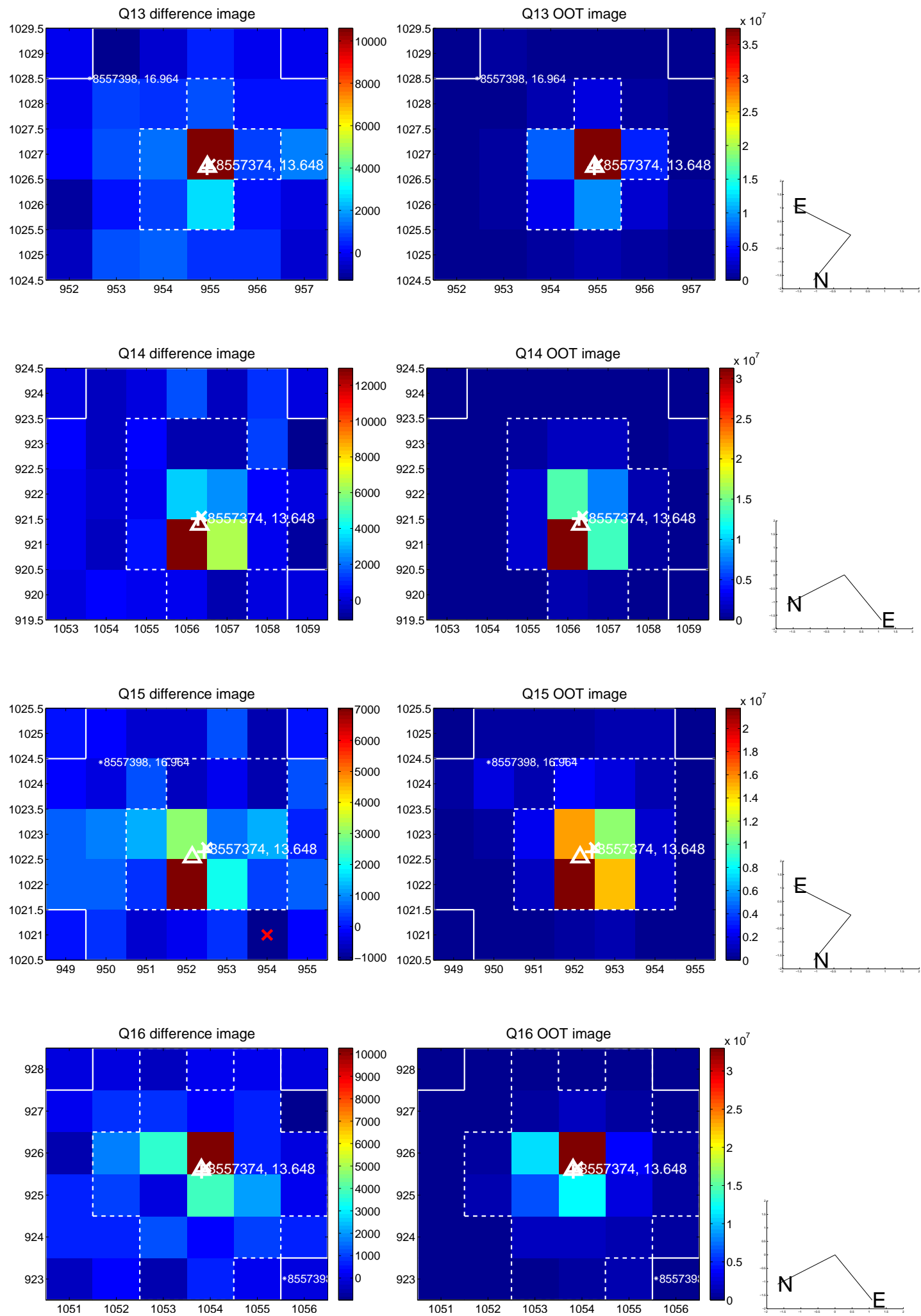




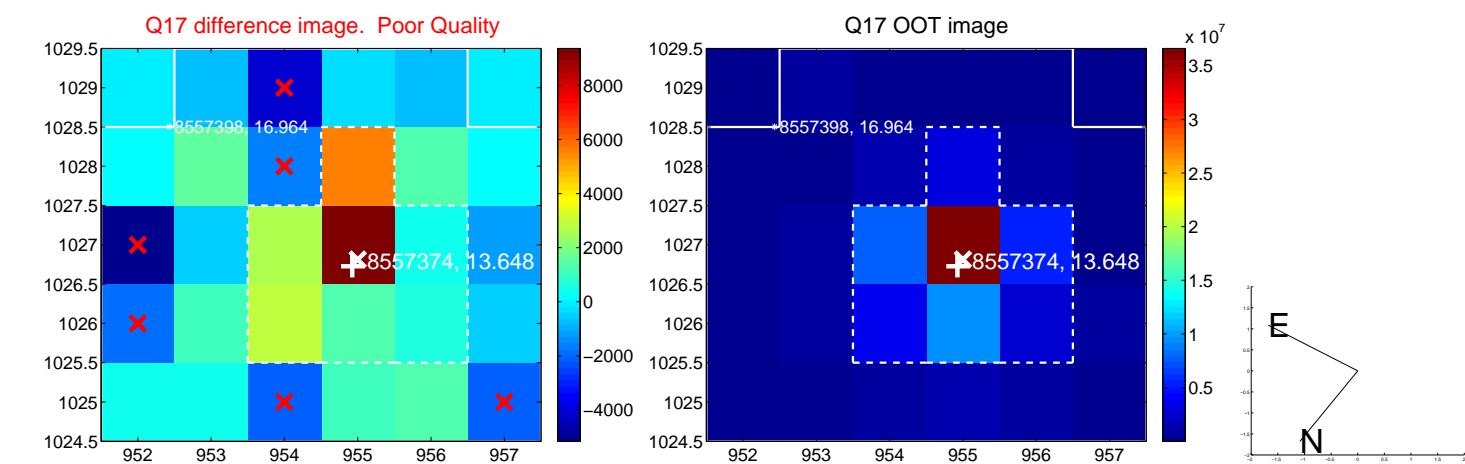
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



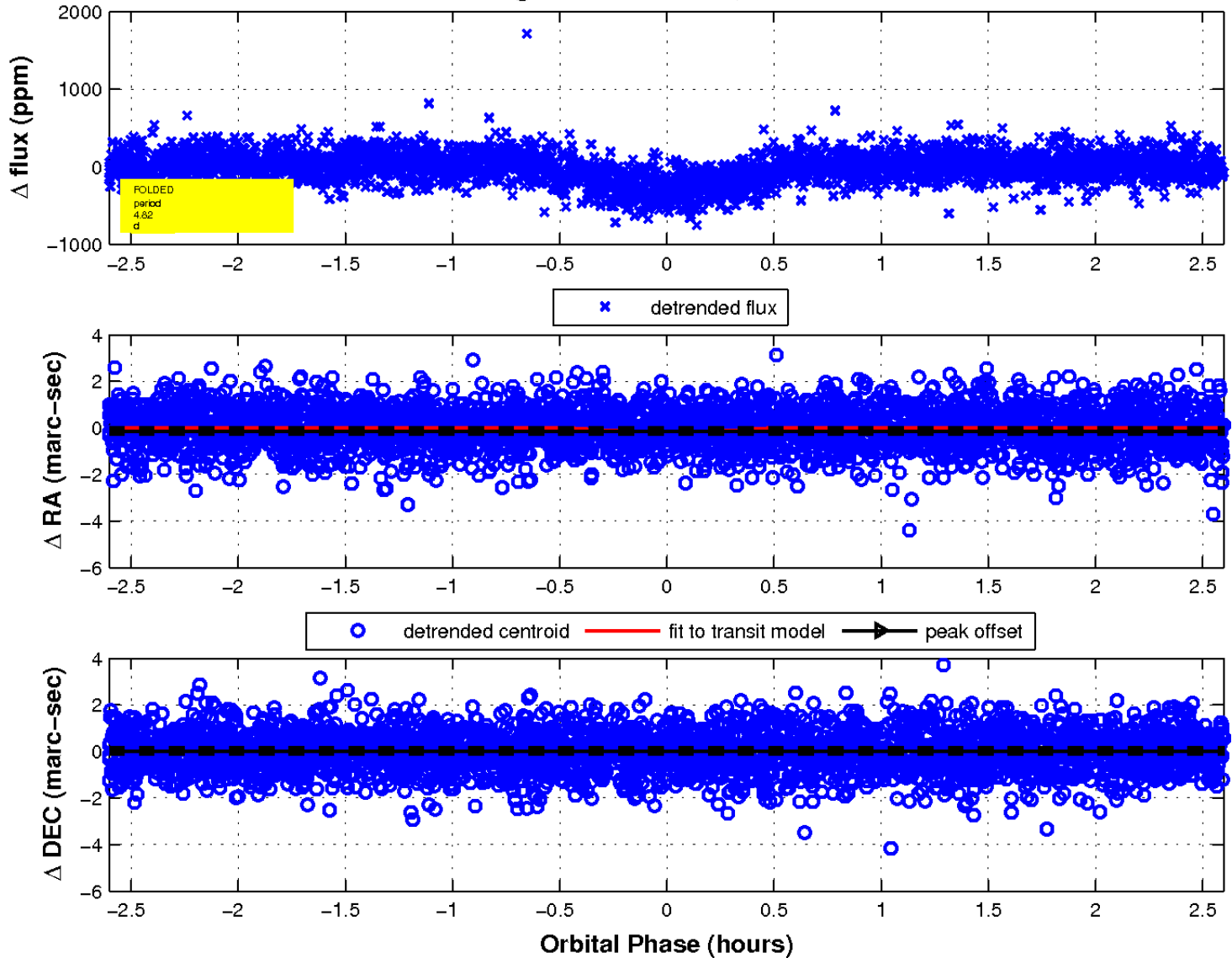
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



# UKIRT Image

Declination

