

# KIC 006286155

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006286155-01	OBS	3803.01	14.541743	137.587957	1076.1	5.325	70.9	45.9	5.92	5032	35.55	1178.55
006286155-02	OBS	No	14.541503	144.280446	421.3	8.442	32.4	23.4	5.92	5032	16.70	1178.57

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006286155-01	OBS	FP	0.00	0	1	1	1	MOD_SEC_DV—MOD_SEC_ALT—DEEP_V_SHAPED—HAS_SEC_TCE—CENT_RESOLVED_OFFSET—EPHEM_MATCH
006286155-02	OBS	FP	0.00	1	1	1	1	IS_SEC_TCE—CENT_RESOLVED_OFFSET—EPHEM_MATCH

**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 006286155-01

TCE (1)	KIC	Parent (2)	Parent KIC	$P_1:P_2$	Dist ( $''$ )	$\Delta$ Row	$\Delta$ Col	$m_2$	$m_1$	$D_2/D_1$	Mechanism	Flag	$\sigma_P$	$\sigma_T$
006286155-01	6286155	006286161-01	6286161	1:1	7.5	-1	-2	16.71	13.76	323.36	Direct-PRF	0	0.12	0.11

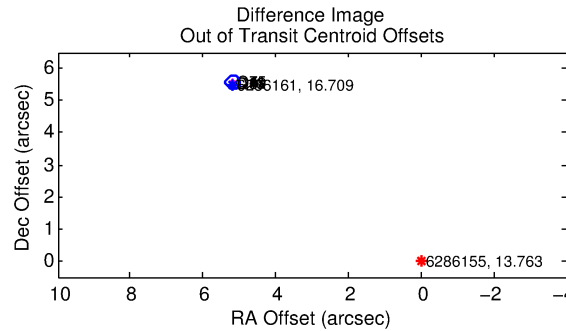
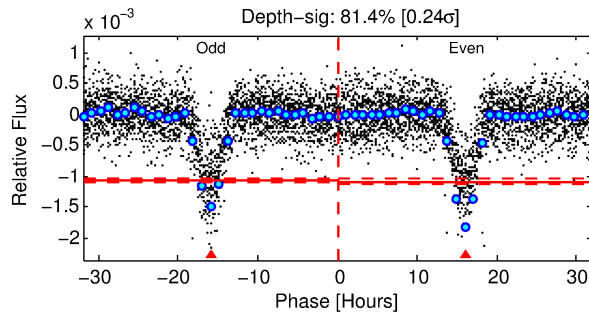
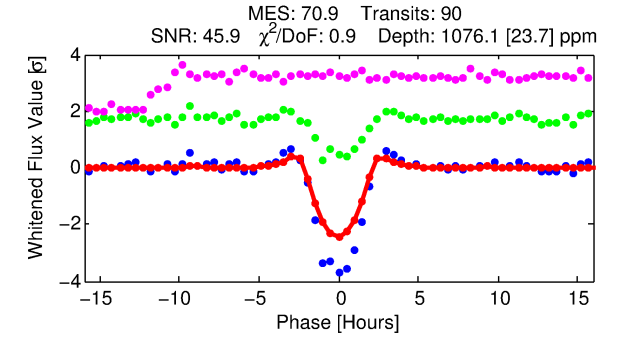
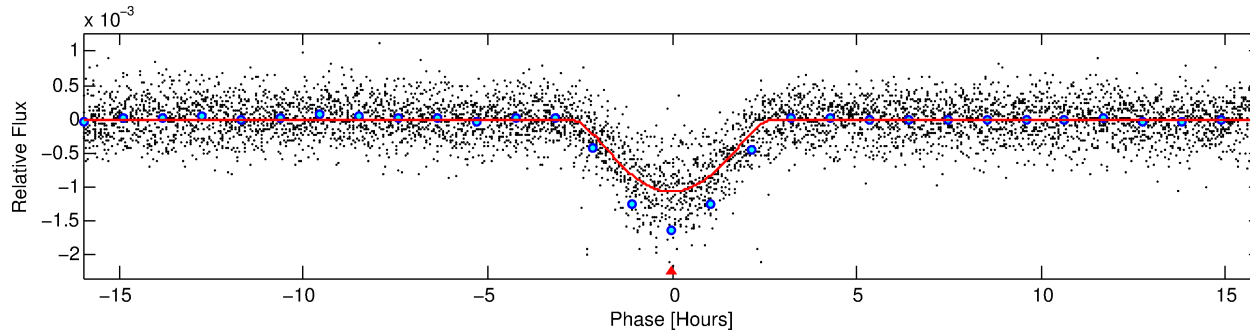
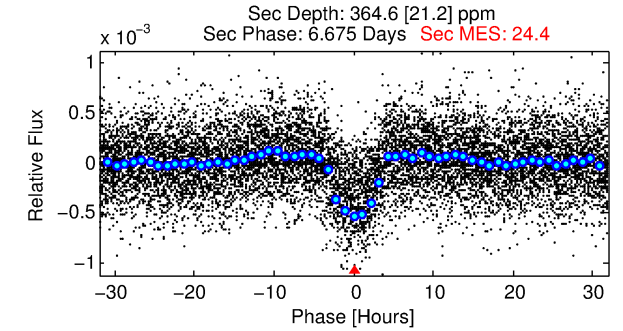
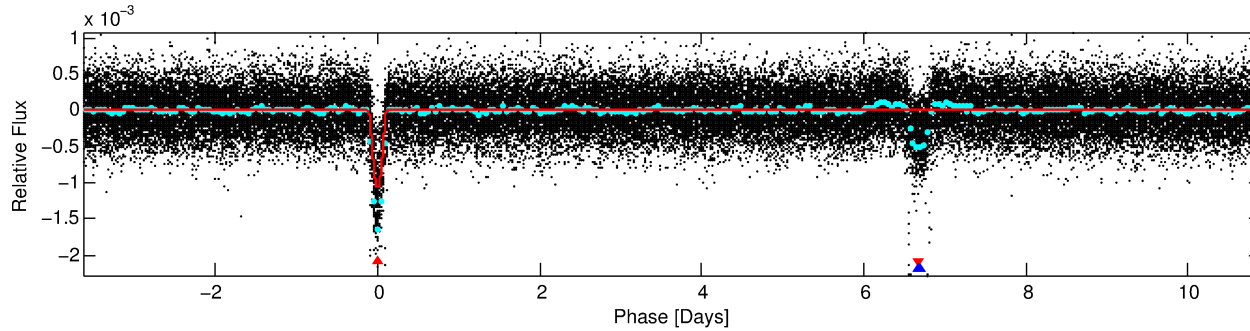
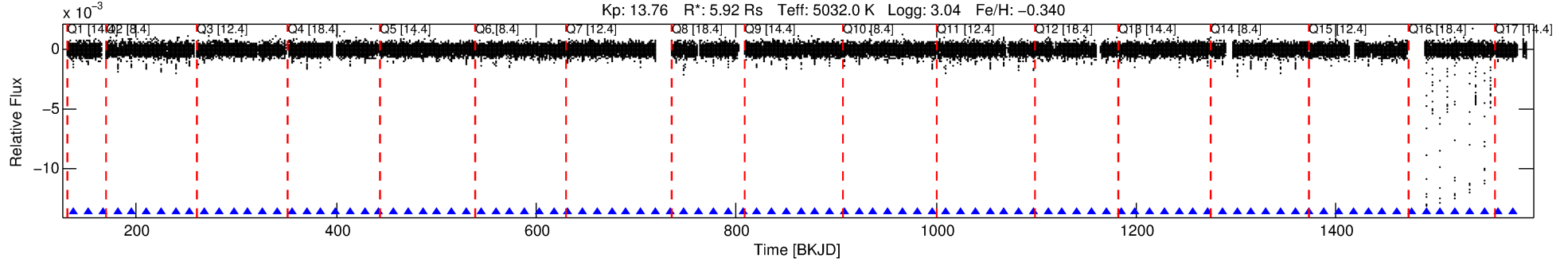
**Notes:**  $P_1:P_2$  is the period ratio. Dist is the distance in arcseconds.  $\Delta$ Row and  $\Delta$ Col are the number of pixels apart in row and column.  $m_2$  and  $m_1$  are the magnitudes of the parent and child.  $D_2/D_1$  is the parent's transit depth divided by the child's.  $\sigma_P$  and  $\sigma_T$  are the significance of the match in period and epoch. For a match to be considered significant  $\sigma_P < 5.0$  and  $\sigma_T < 5.0$ . Matches which have  $\sigma_P$  and  $\sigma_T$  very close to this cutoff should receive extra scrutiny, especially if the period ratio is very large.

# DV One-Page Summary

KIC: 6286155 Candidate: 1 of 2 Period: 14.542 d

KOI: K03803.01 Corr: 0.964

Kp: 13.76 R\*: 5.92 Rs Teff: 5032.0 K Logg: 3.04 Fe/H: -0.340



## DV Fit Results:

Period = 14.54174 [0.00004] d  
Epoch = 137.5880 [0.0023] BKJD  
Rp/R\* = 0.0550 [0.0208]  
a/R\* = 7.57 [0.74]  
b = 0.99 [0.03]  
Seff = 1178.55 [161.48]  
Teq = 1494 [51] K  
Rp = 35.55 [14.62] Re  
a = 0.1307 [0.0144] AU  
Ag = 2.71 [2.08] [0.82σ]  
Teffp = 2964 [565] K [2.59σ]

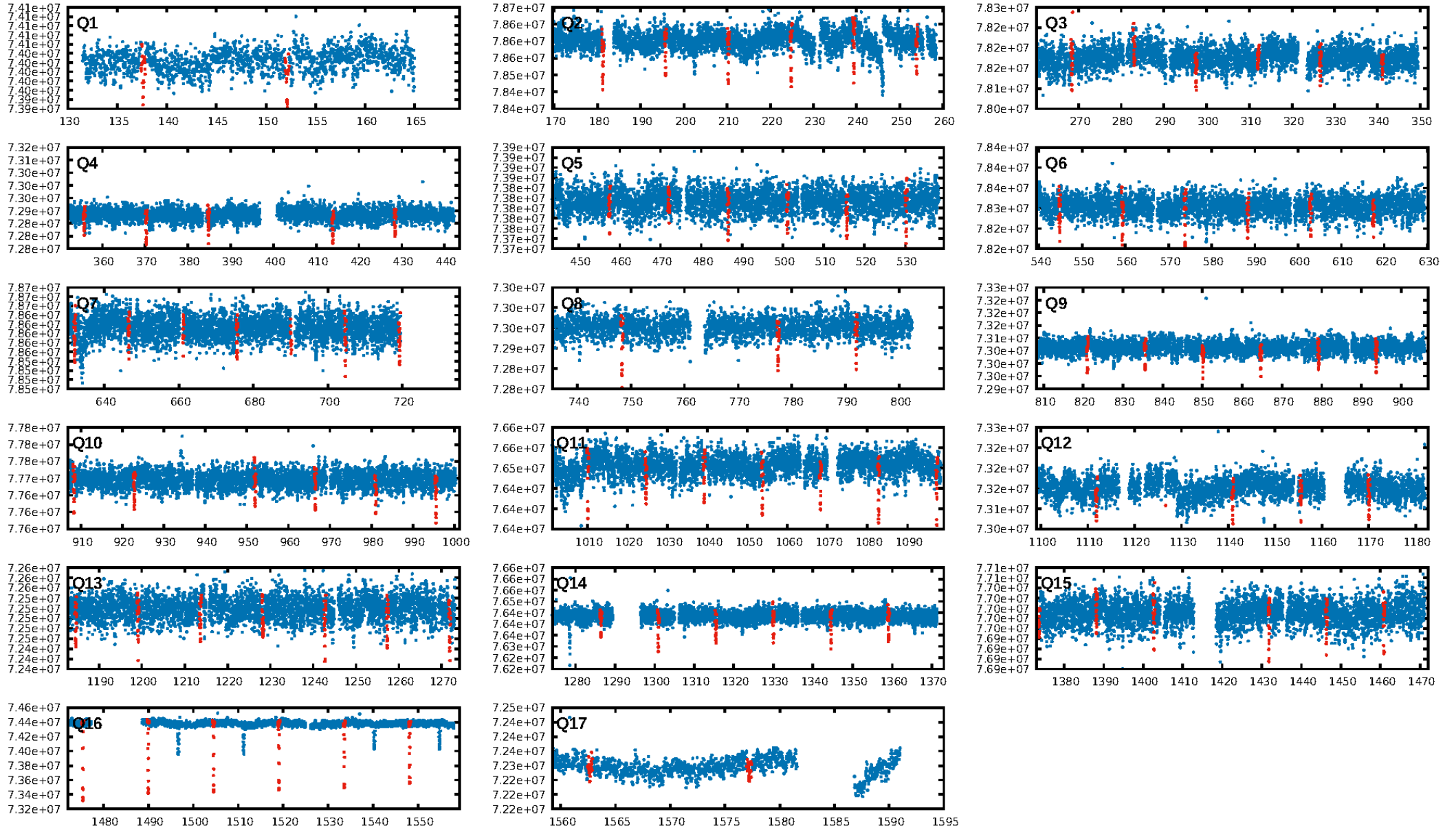
## DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 1.00 [86/86]  
GhostDiagnostic-chr: -0.5406  
Centroid-sig: 0.0%  
Centroid-so: 84.458 arcsec [806.27σ]  
OotOffset-rm: 7.615 arcsec [113.76σ]  
KicOffset-rm: 7.538 arcsec [104.60σ]  
OotOffset-st: 0/4/4/0 [8]  
KicOffset-st: 0/4/4/0 [8]  
DiffImageQuality-fgm: 1.00 [8/8]  
DiffImageOverlap-fno: 1.00 [17/17]

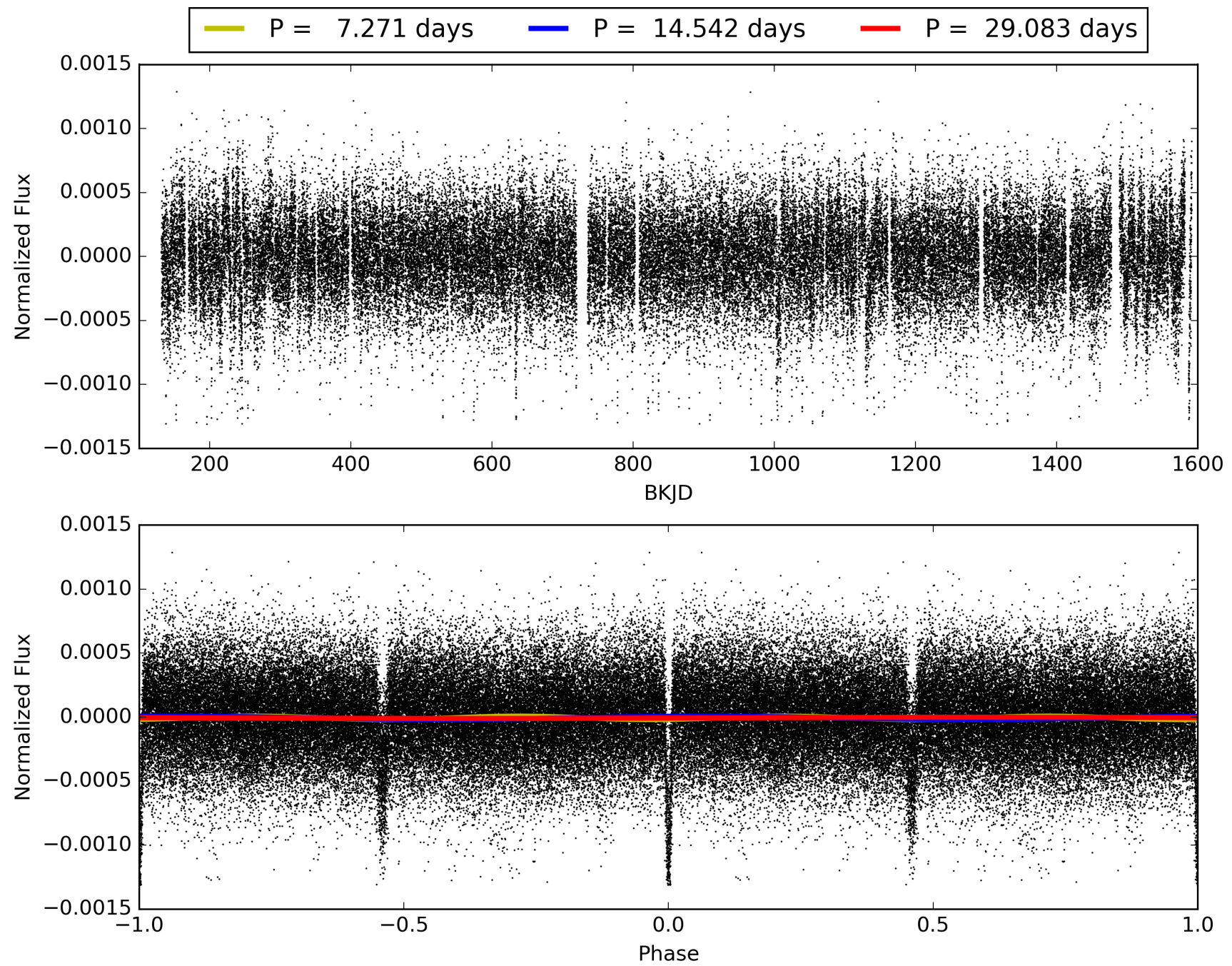
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 23:11:52 Z

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

# TCE 006286155-01, PDC Light Curves

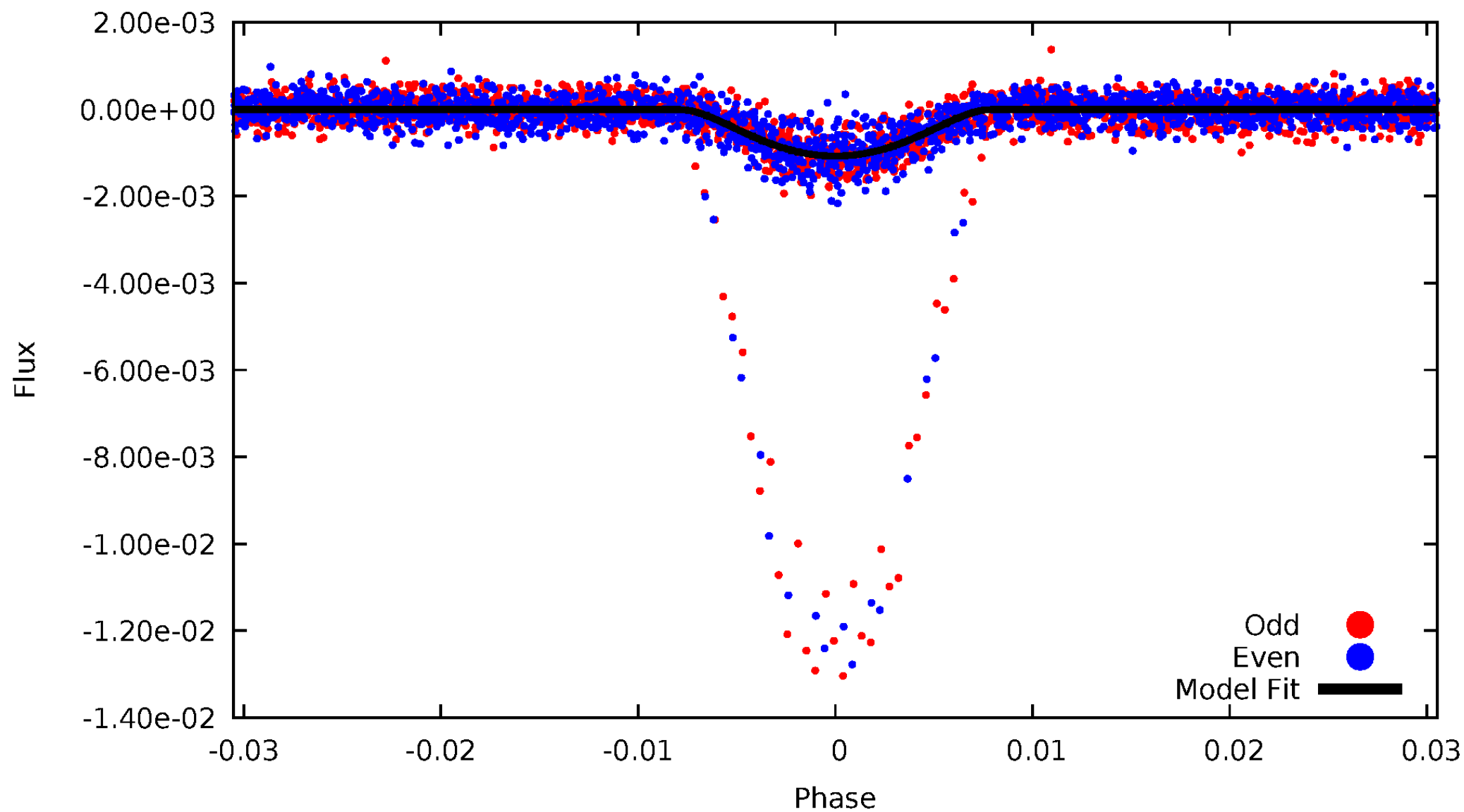


TCE 006286155-01



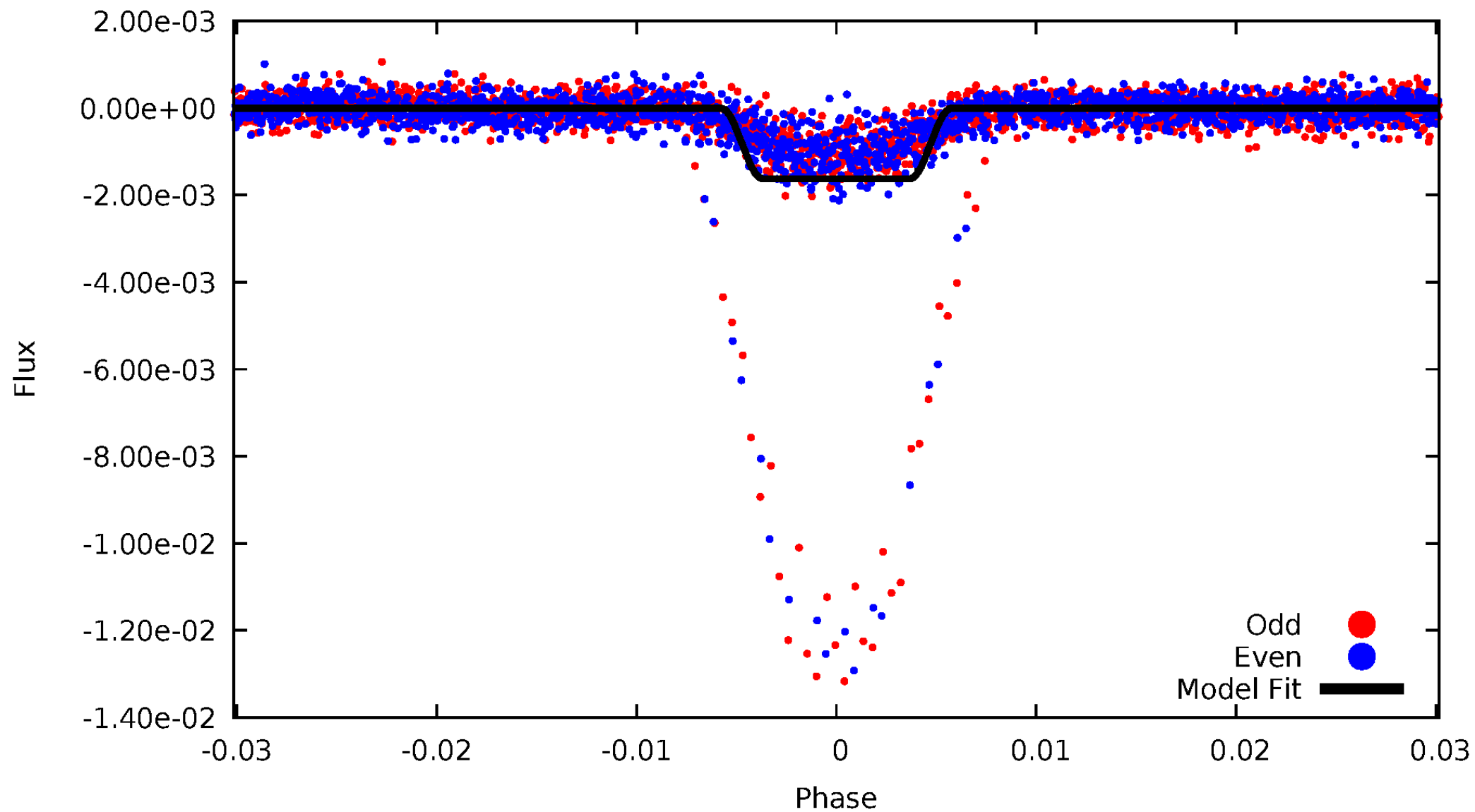
DV Odd/Even

TCE 006286155-01



# ALT Odd/Even

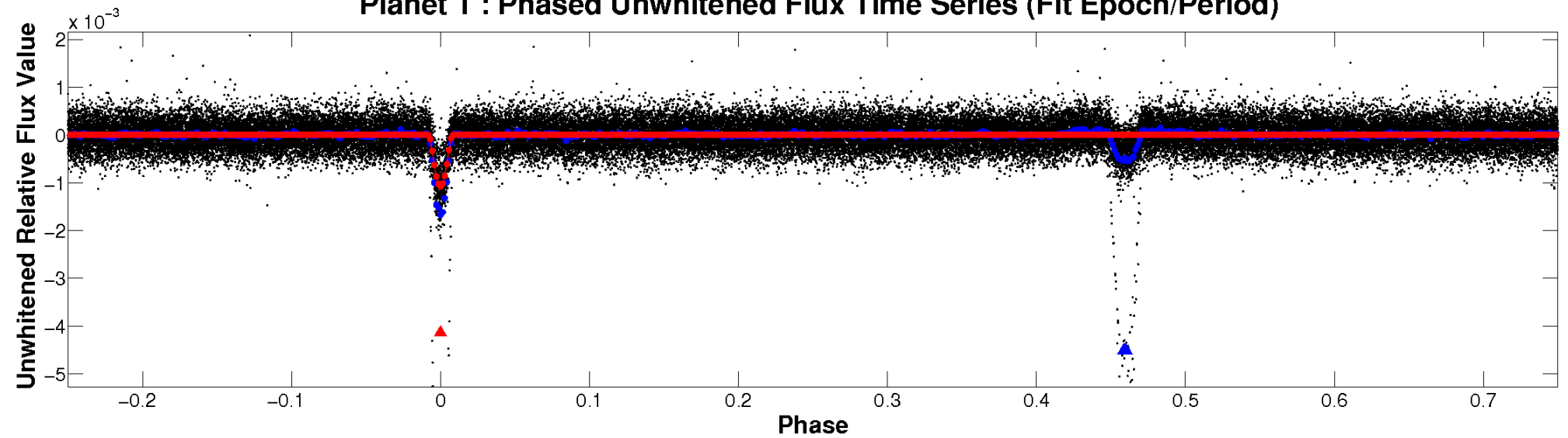
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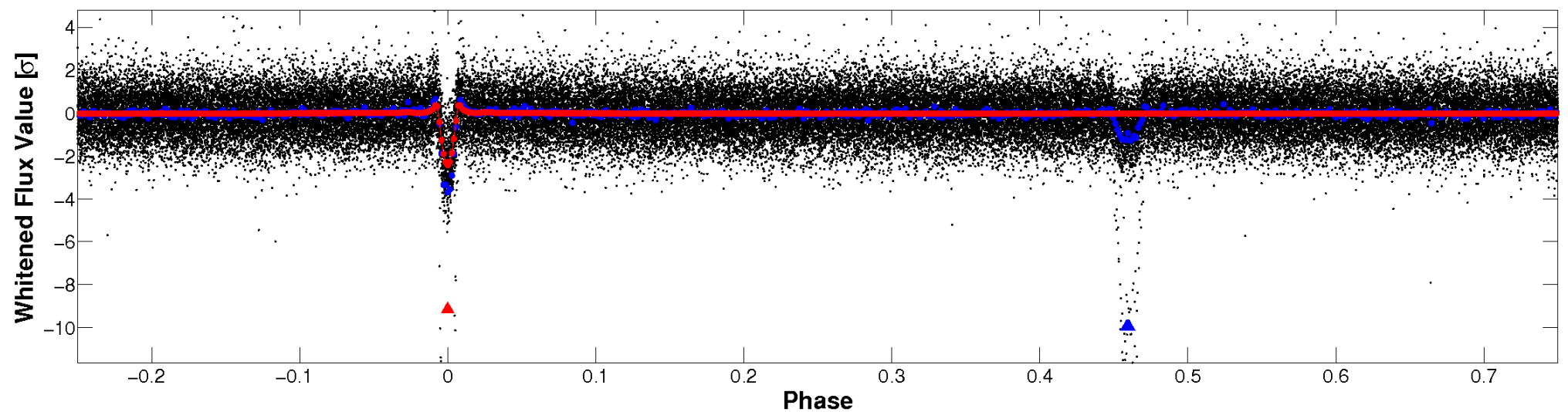


# Non-Whitened Vs. Whitened Light Curve

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

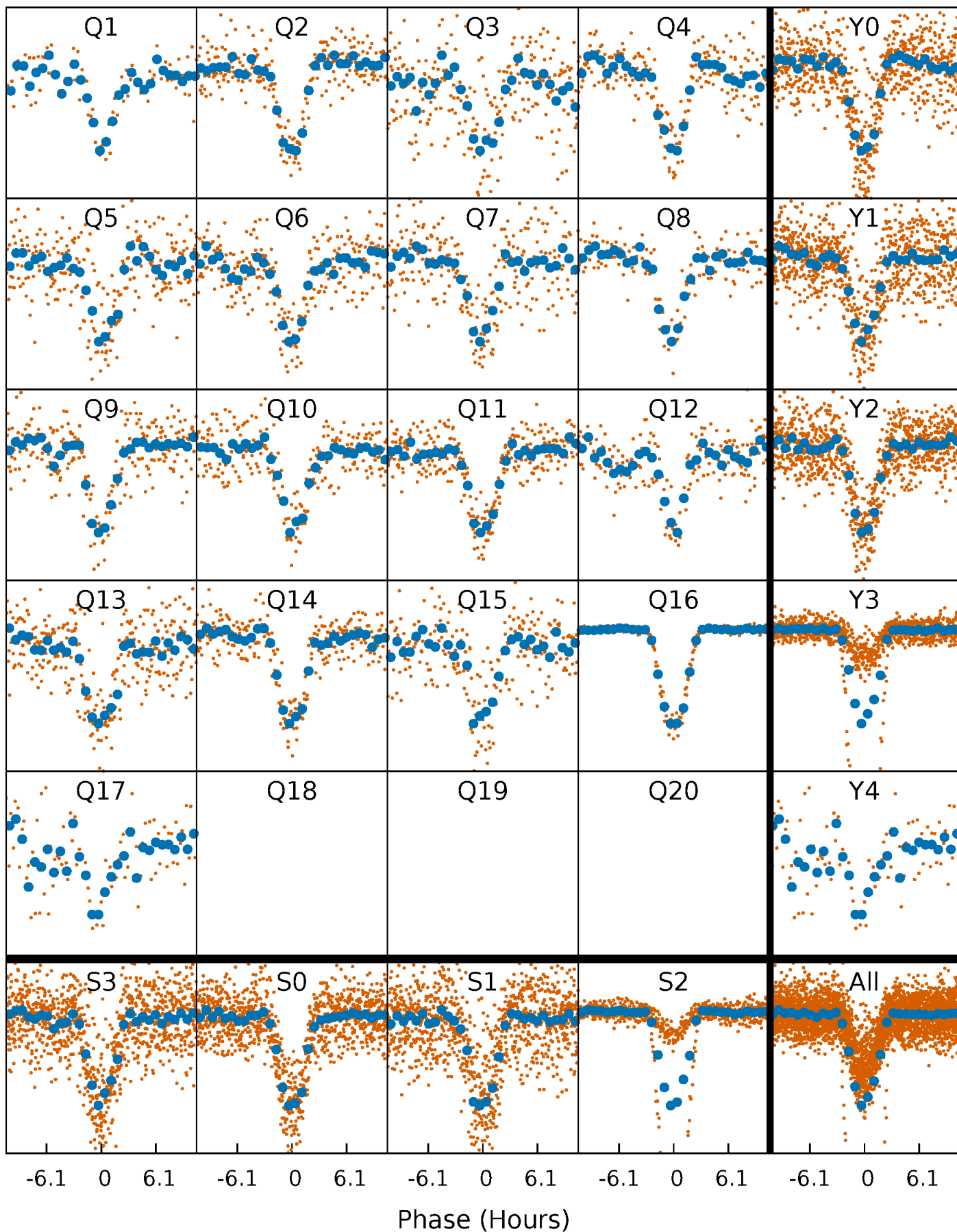


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

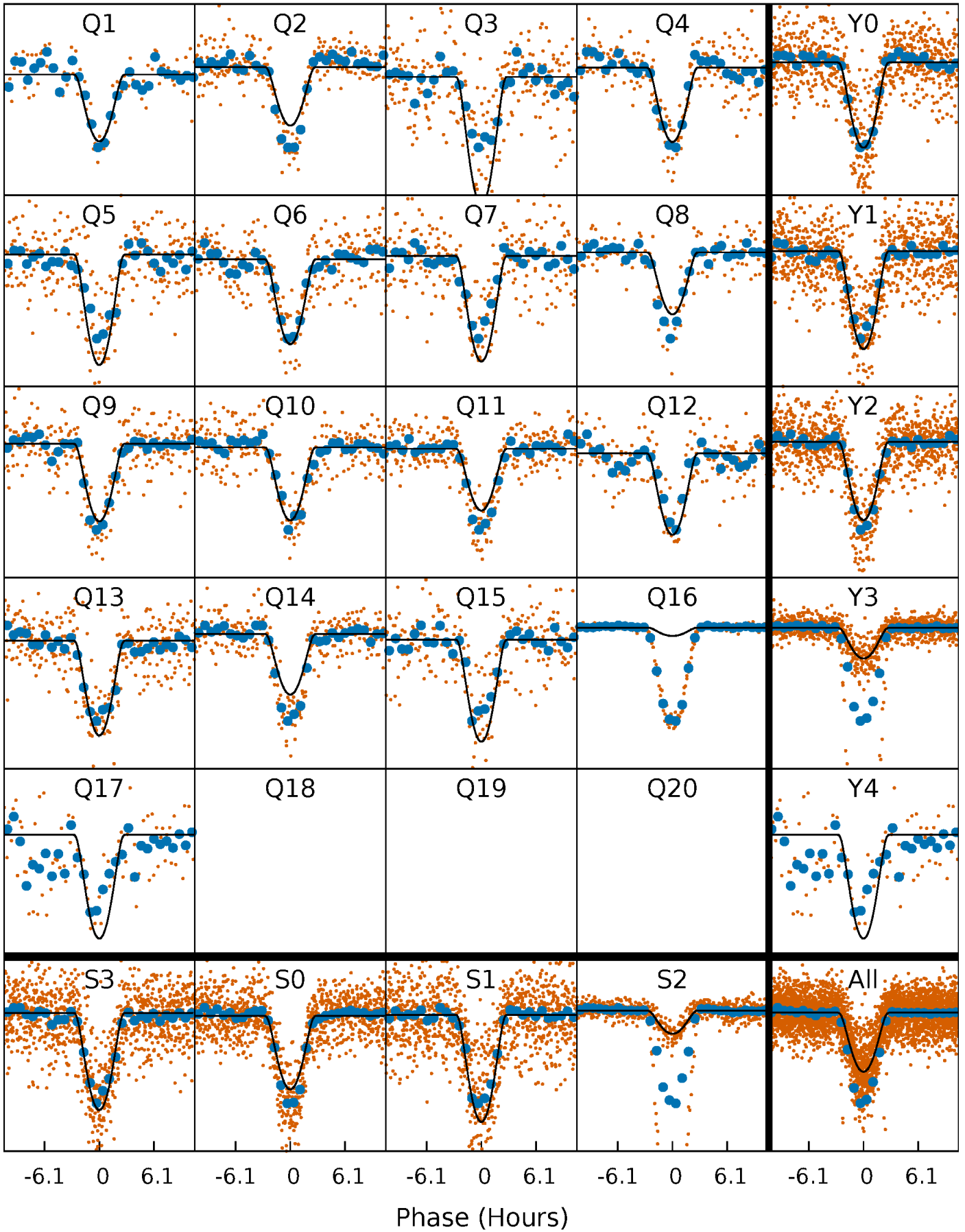
TCE 006286155-01 P= 14.541743 Days  $T_0=137.587957$  (BKJD)





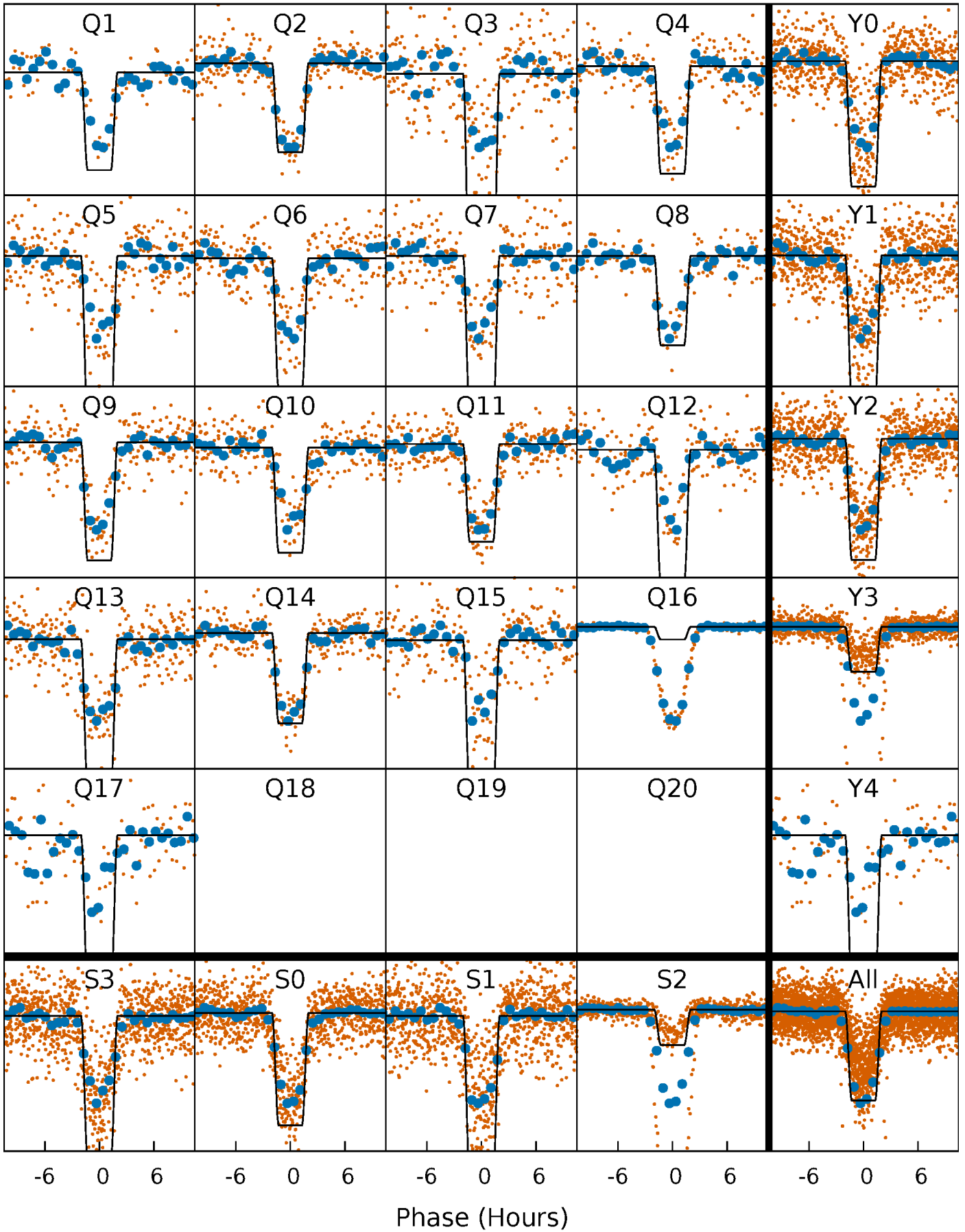
# DV Quarter-Phased Transit Curves

TCE 006286155-01 P= 14.541743 Days  $T_0=137.587957$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

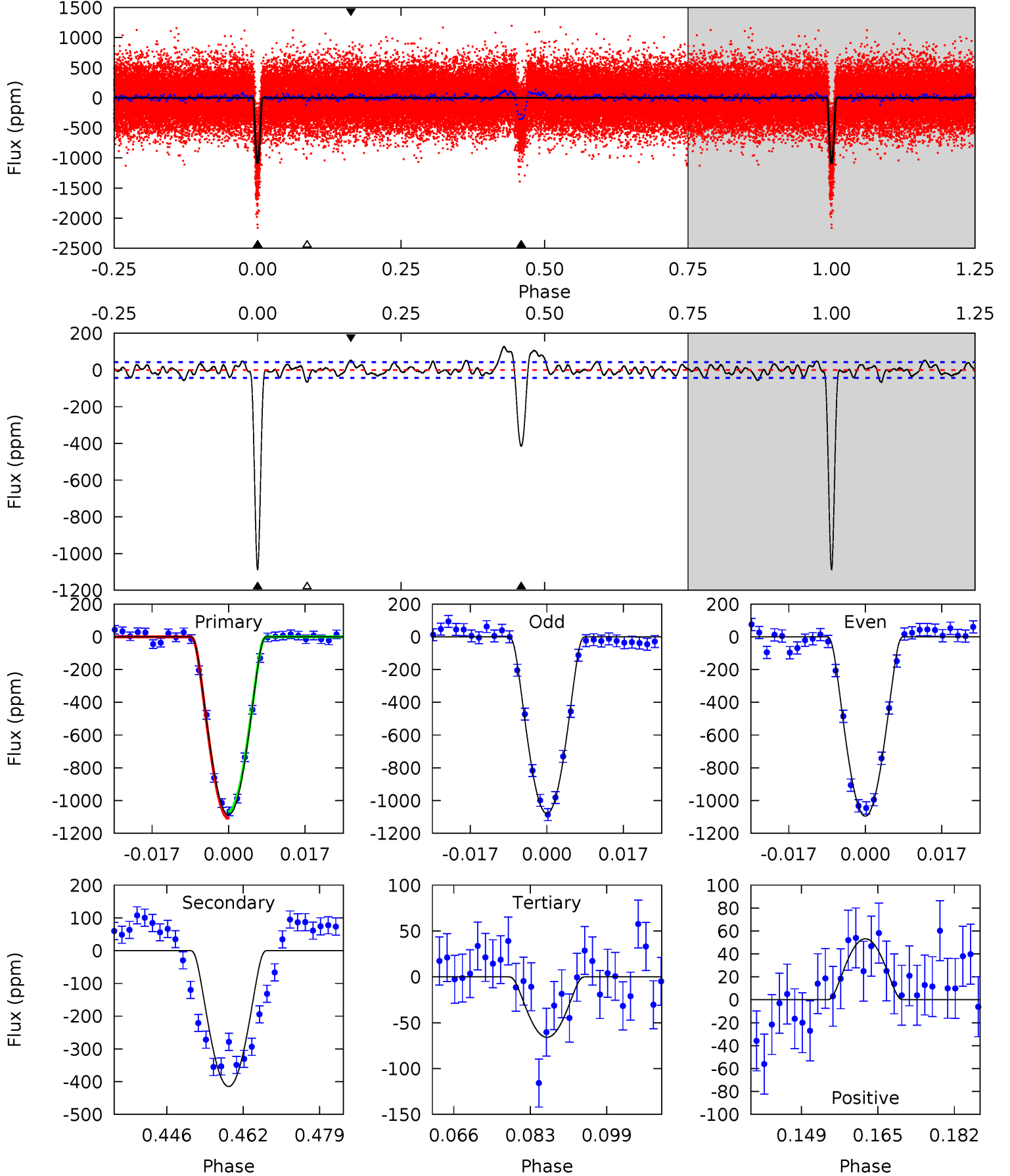
TCE 006286155-01 P= 14.541749 Days  $T_0=137.587205$  (BKJD)



# DV Model-Shift Uniqueness Test

006286155-01, P = 14.541743 Days, E = 123.046214 Days

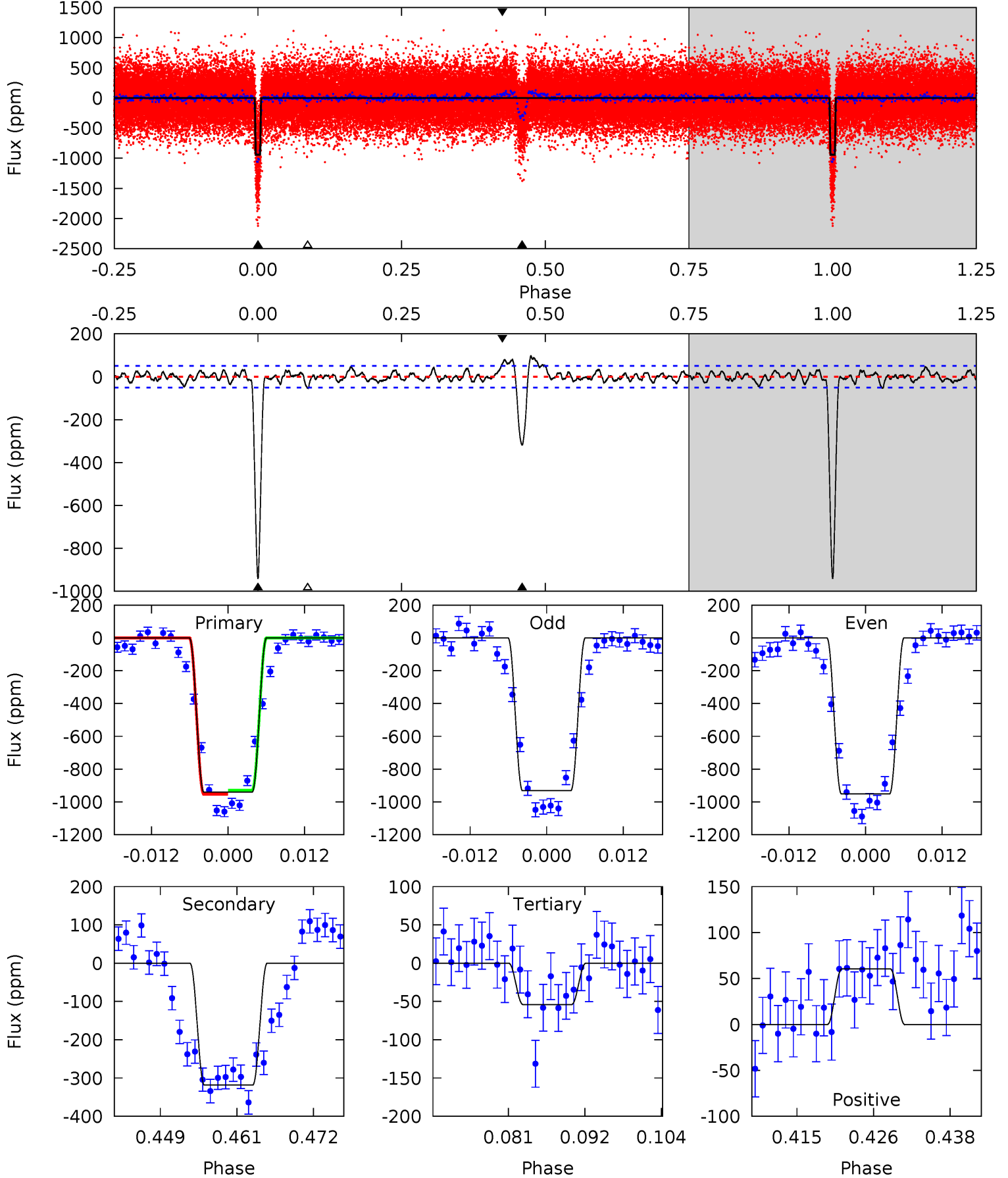
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
124.4	47.5	7.55	6.09	4.93	2.40	3.33	116.9	118.3	39.9	41.4	0.92	1.62	0.10	2.39



# Alt Model-Shift Uniqueness Test

006286155-01, P = 14.541749 Days, E = 123.045456 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
92.5	31.3	5.32	5.95	5.00	2.53	2.19	87.2	86.6	26.0	25.4	0.93	1.65	0.09	1.16



### Stellar Parameters For KIC 006286155

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5032^{+80}_{-90}$	$3.042^{+0.030}_{-0.030}$	$-0.340^{+0.150}_{-0.200}$	$5.922^{+0.477}_{-0.954}$	$1.410^{+0.215}_{-0.399}$	$0.010^{+0.002}_{-0.001}$
	+2%/-2%	+1%/-1%	+44%/-59%	+8%/-16%	+15%/-28%	+23%/-11%
Source	PHO56	AST56	PHO56	DSEP		

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

### Secondary Eclipse Parameters for KIC 006286155-01 / KOI 3803.01

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-415 \pm 9$	$35.91^{+14.09}_{-14.44}$	$2092^{+47}_{-54}$	$3426^{+704}_{-351}$	$3.032^{+5.470}_{-1.435}$
Alt.	$-318 \pm 10$	$26.26^{+13.30}_{-13.10}$	$2090^{+49}_{-53}$	$3655^{+1019}_{-476}$	$4.384^{+12.510}_{-2.433}$

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

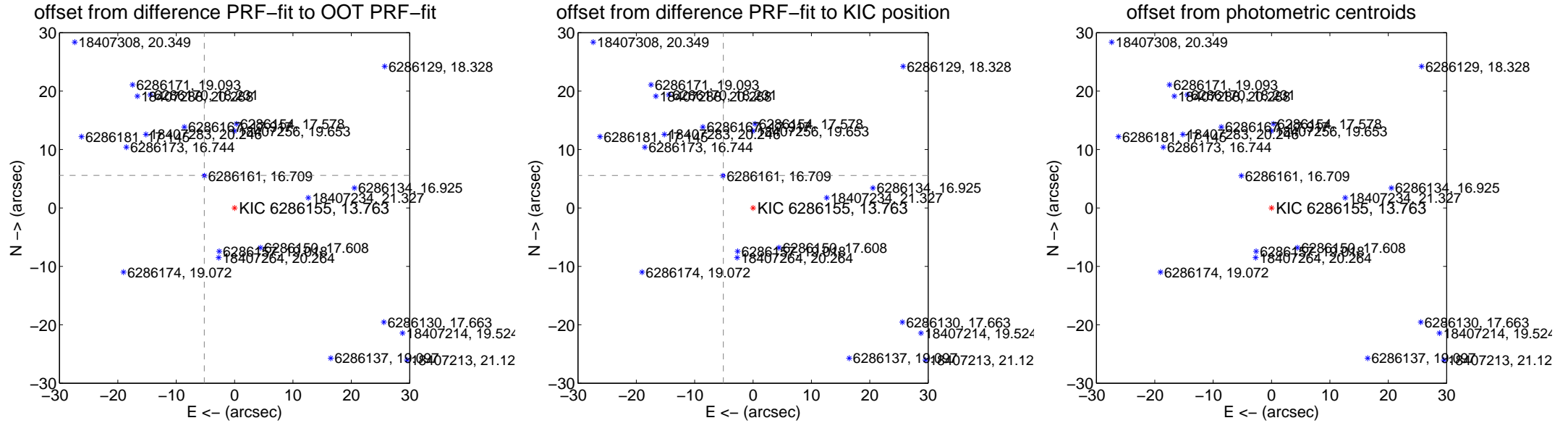
## DV Centroid Data

Supplemental centroid analysis for 006286155-01. Kepler magnitude: 13.76. Transit SNR 45.94

There are 8 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.19 arcsec

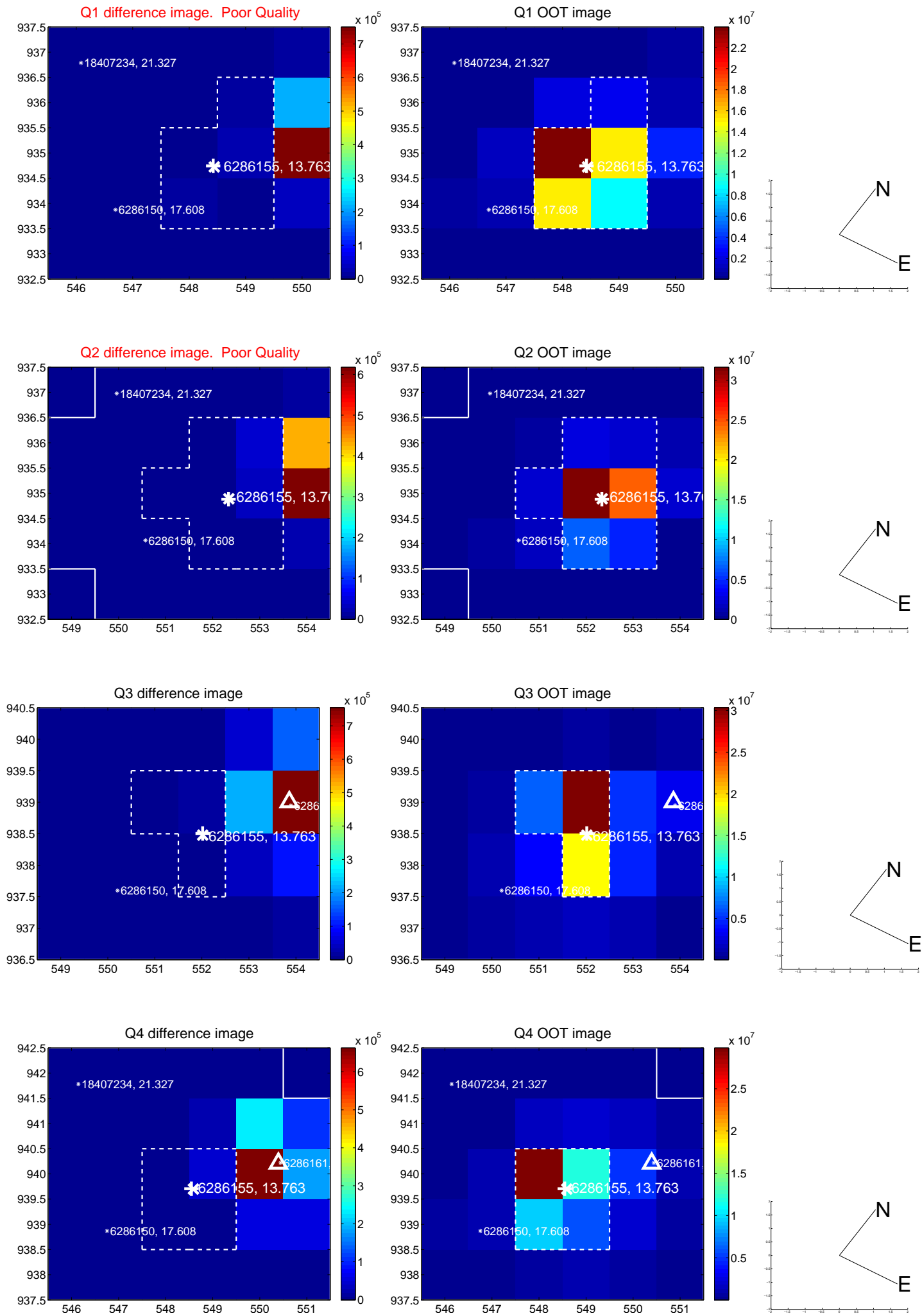
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b>7.615 <math>\pm</math> 0.067</b>	<b>113.76</b>	5.195 $\pm$ 0.067	5.568 $\pm$ 0.067
PRF-fit source offset from KIC position	<b>7.538 <math>\pm</math> 0.072</b>	<b>104.60</b>	5.084 $\pm$ 0.069	5.565 $\pm$ 0.071
photometric centroid source offset	<b>84.45 <math>\pm</math> 0.10</b>	<b>806.27</b>	54.30 $\pm$ 0.10	64.68 $\pm$ 0.11



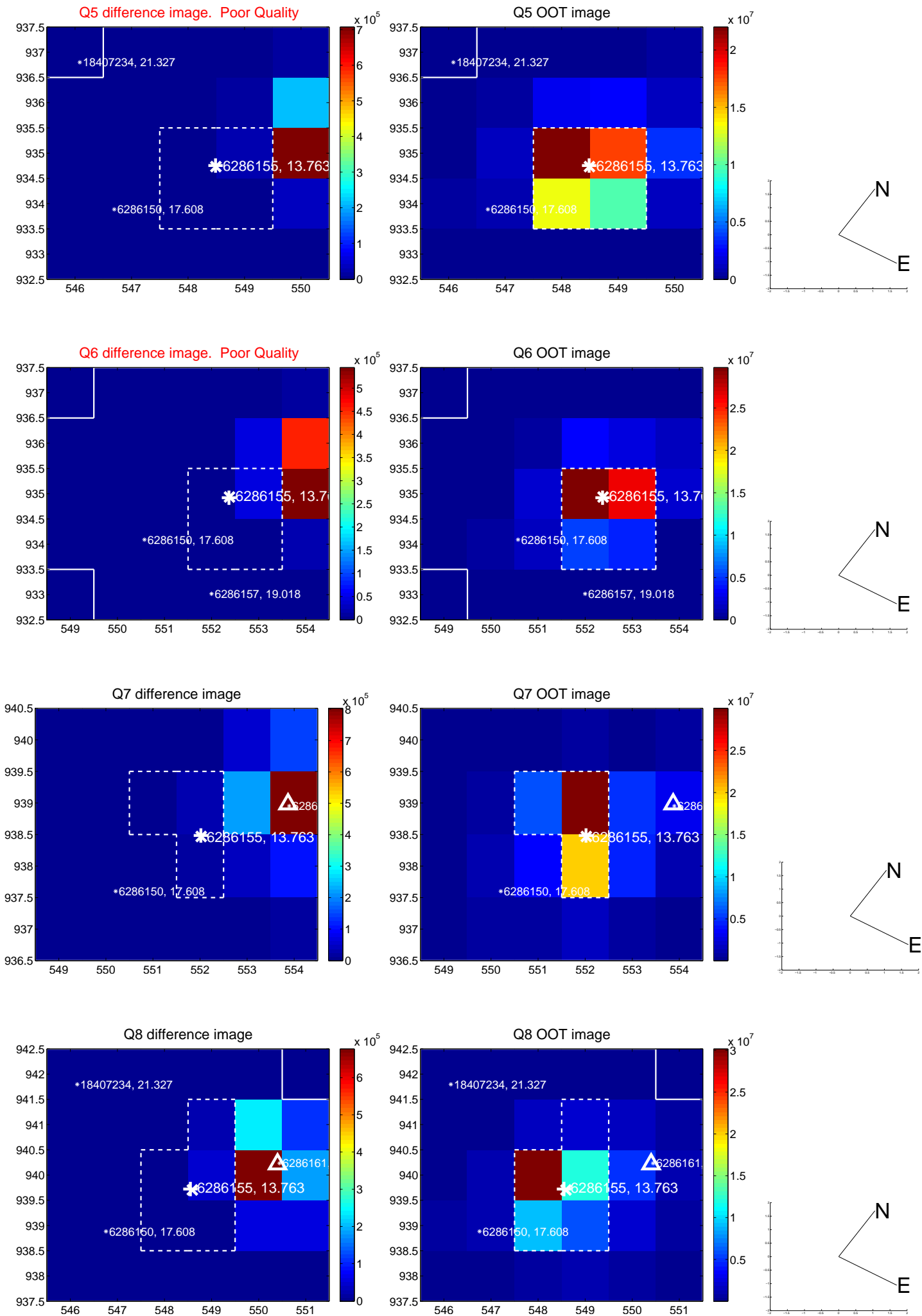
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



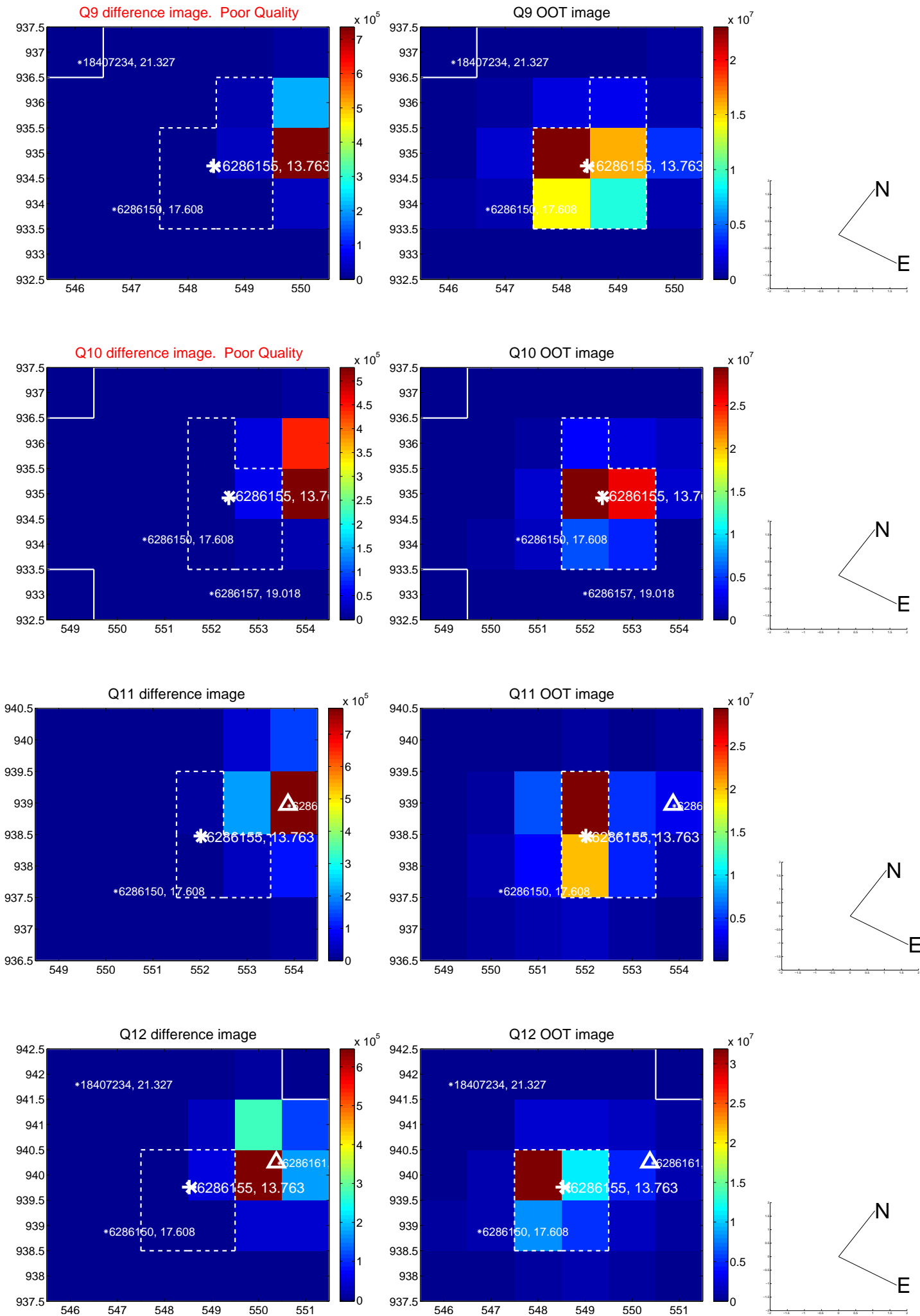
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



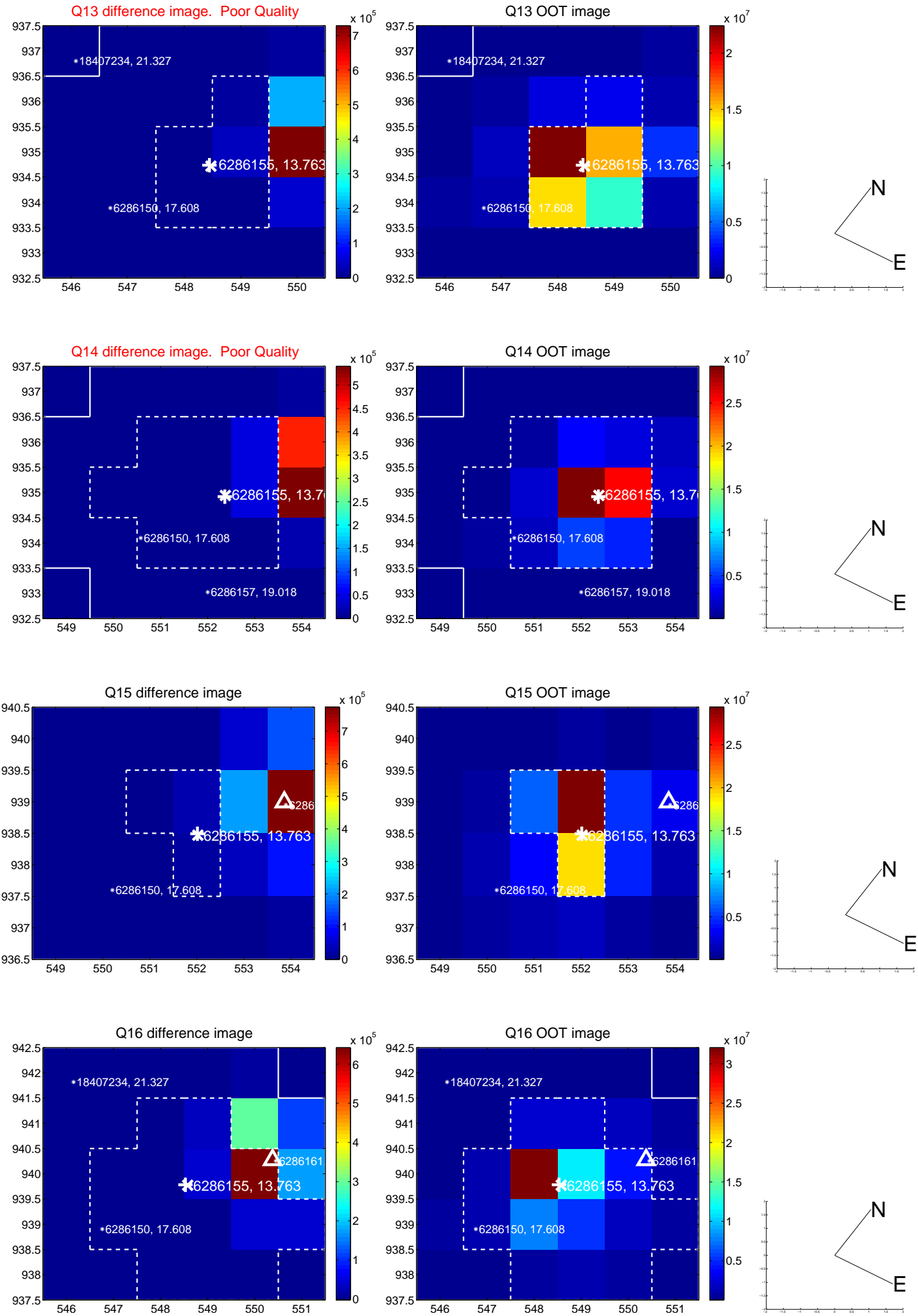
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



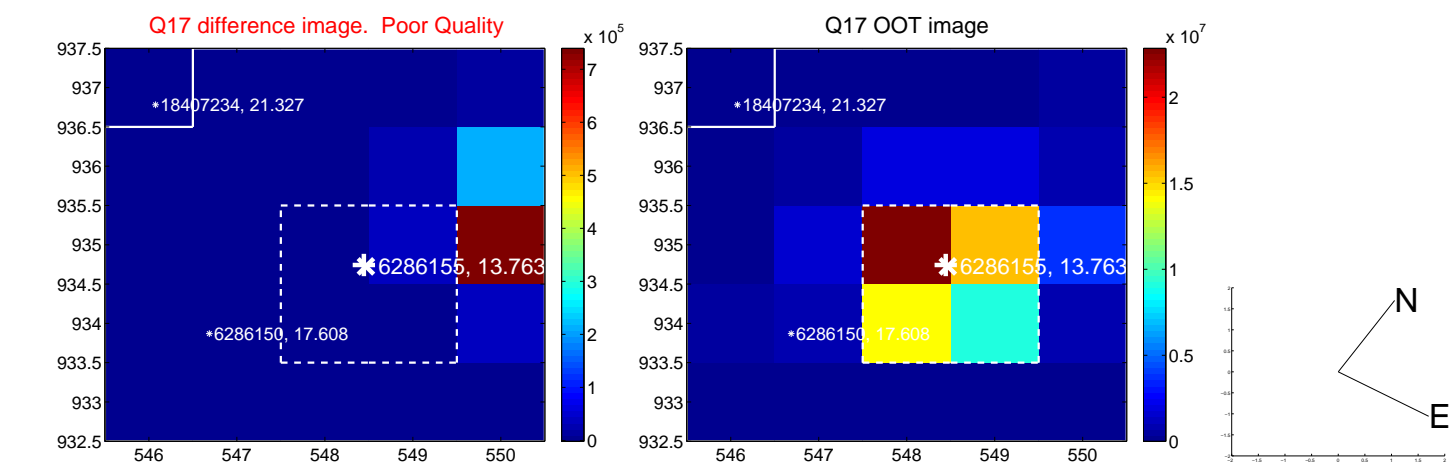
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



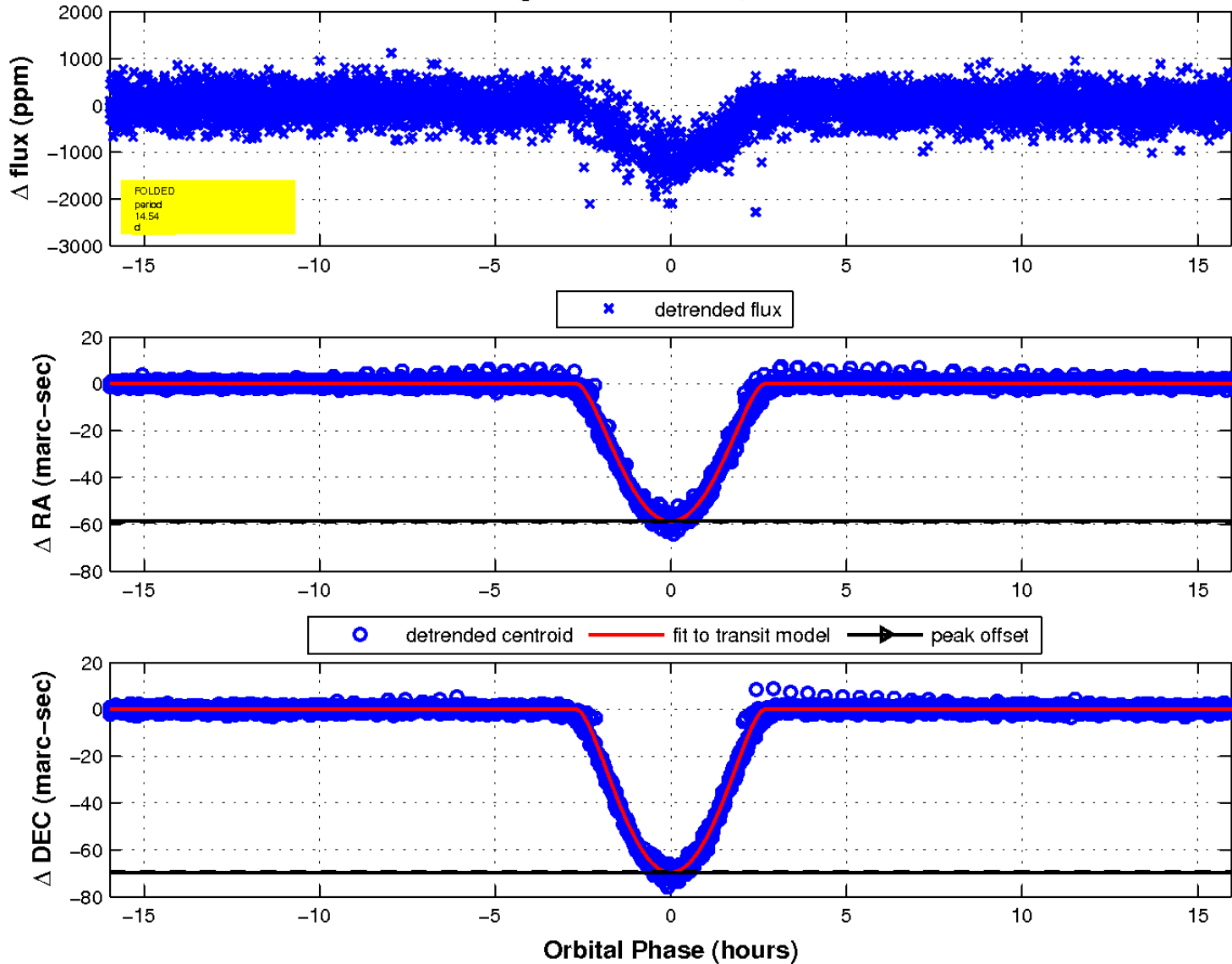
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

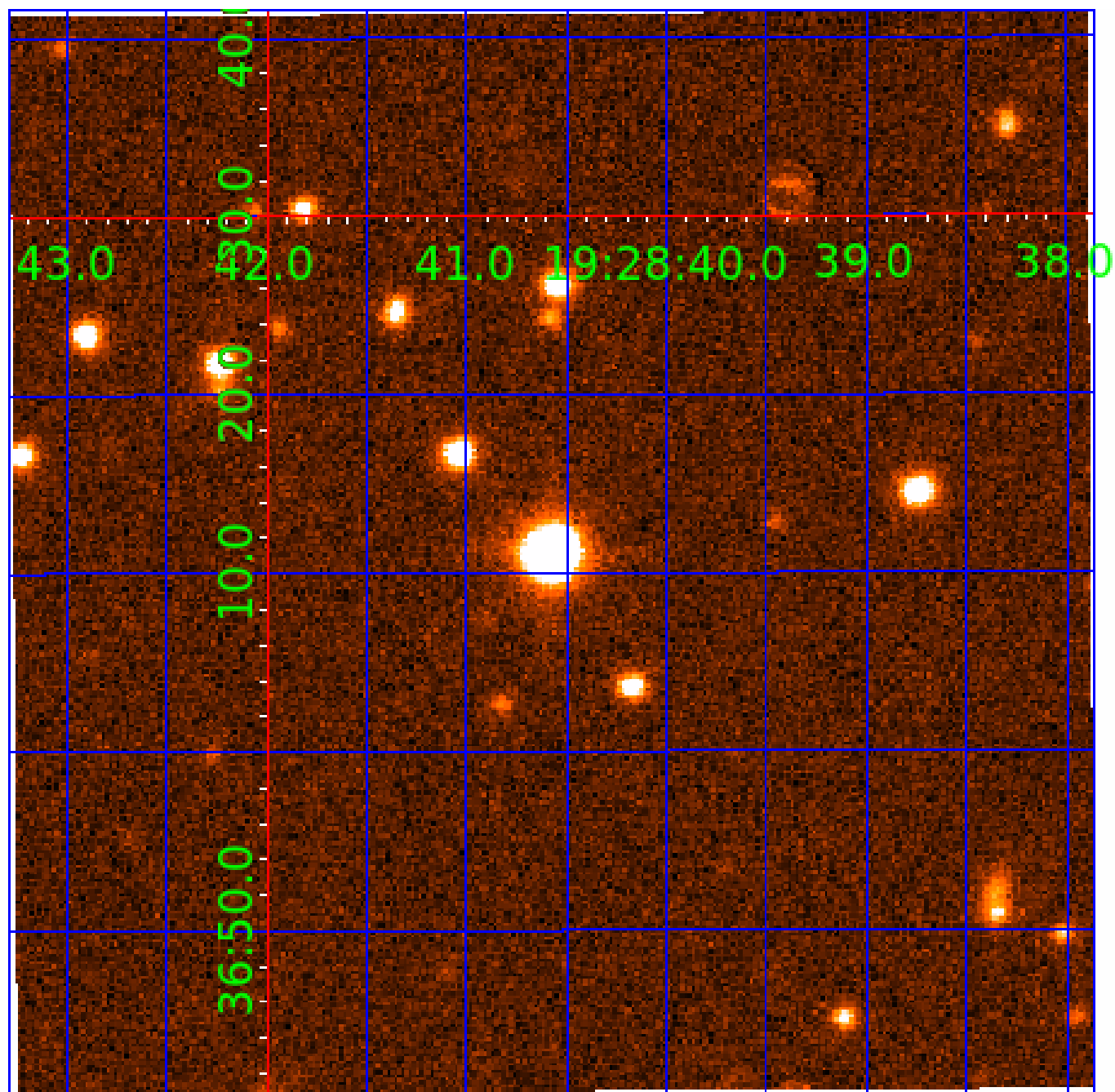


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination





# KIC 006286155

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006286155-01	OBS	3803.01	14.541743	137.587957	1076.1	5.325	70.9	45.9	5.92	5032	35.55	1178.55
006286155-02	OBS	No	14.541503	144.280446	421.3	8.442	32.4	23.4	5.92	5032	16.70	1178.57

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006286155-01	OBS	FP	0.00	0	1	1	1	MOD_SEC_DV—MOD_SEC_ALT—DEEP_V_SHAPED—HAS_SEC_TCE—CENT_RESOLVED_OFFSET—EPHEM_MATCH
006286155-02	OBS	FP	0.00	1	1	1	1	IS_SEC_TCE—CENT_RESOLVED_OFFSET—EPHEM_MATCH

**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 006286155-02

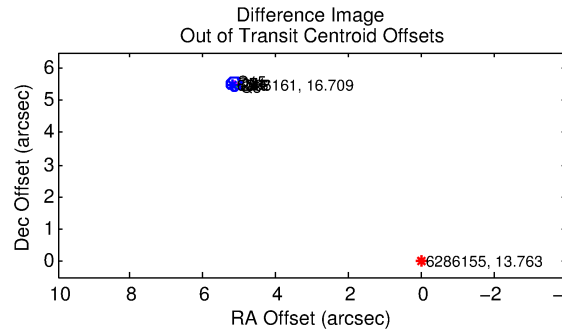
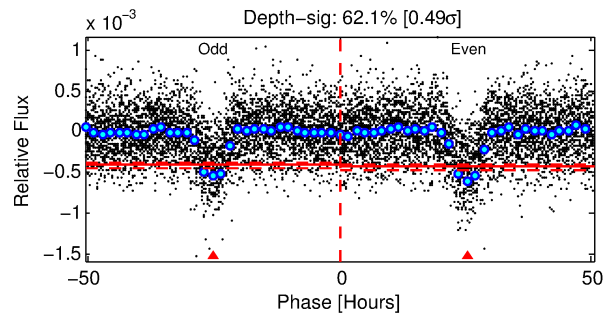
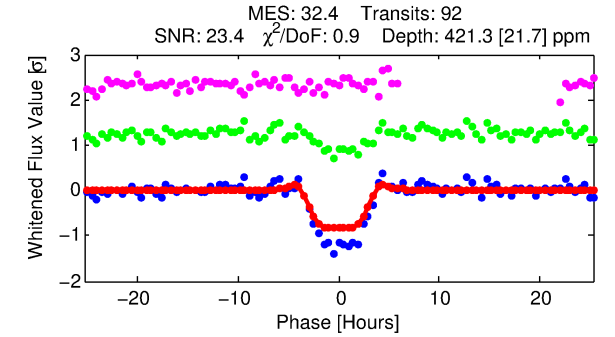
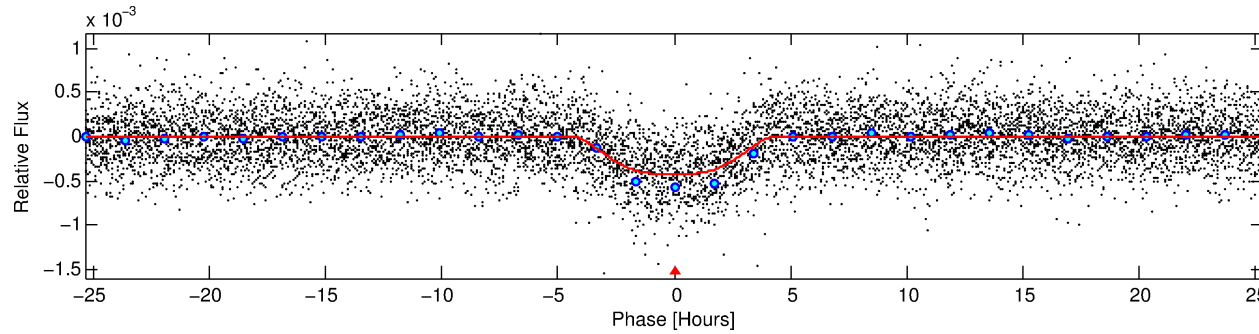
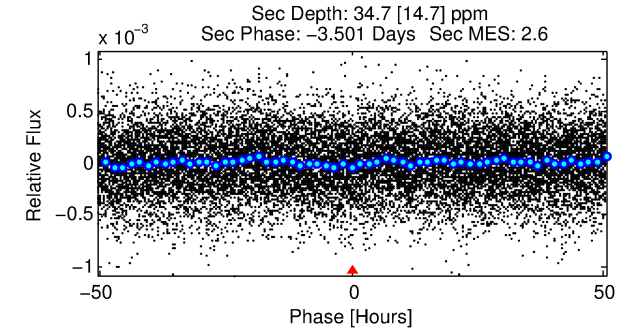
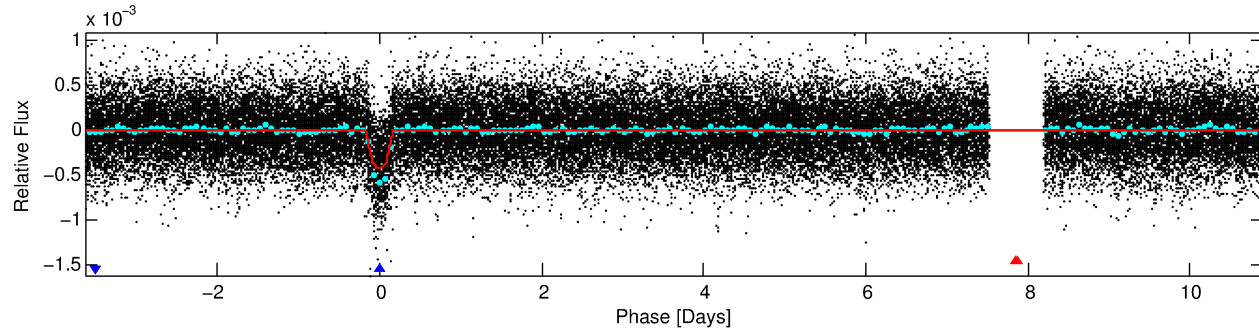
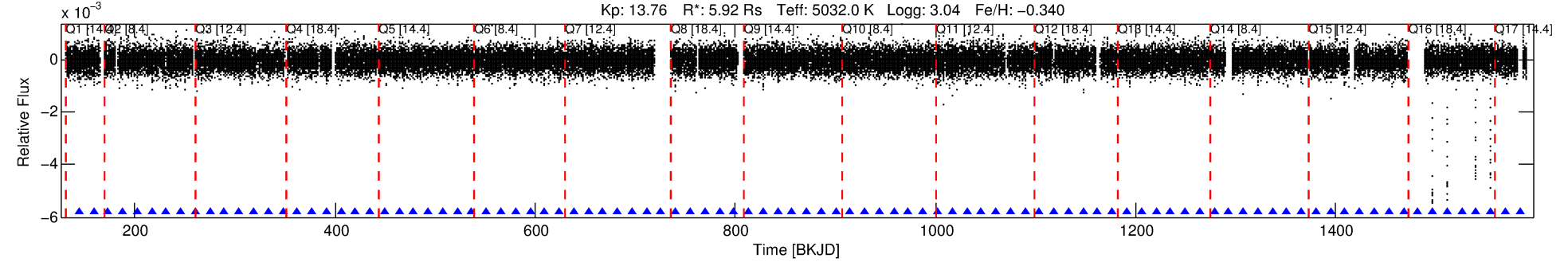
TCE (1)	KIC	Parent (2)	Parent KIC	$P_1:P_2$	Dist ( $''$ )	$\Delta$ Row	$\Delta$ Col	$m_2$	$m_1$	$D_2/D_1$	Mechanism	Flag	$\sigma_P$	$\sigma_T$
006286155-02	6286155	3501.01	6286161	1:1	7.5	-1	-2	16.71	13.76	385.75	Direct-PRF	0	0.62	0.29

**Notes:**  $P_1:P_2$  is the period ratio. Dist is the distance in arcseconds.  $\Delta$ Row and  $\Delta$ Col are the number of pixels apart in row and column.  $m_2$  and  $m_1$  are the magnitudes of the parent and child.  $D_2/D_1$  is the parent's transit depth divided by the child's.  $\sigma_P$  and  $\sigma_T$  are the significance of the match in period and epoch. For a match to be considered significant  $\sigma_P < 5.0$  and  $\sigma_T < 5.0$ . Matches which have  $\sigma_P$  and  $\sigma_T$  very close to this cutoff should receive extra scrutiny, especially if the period ratio is very large.

# DV One-Page Summary

KIC: 6286155 Candidate: 2 of 2 Period: 14.542 d  
KOI: K03803 Corr: No Ephemeris Match

Kp: 13.76 R\*: 5.92 Rs Teff: 5032.0 K Logg: 3.04 Fe/H: -0.340



## DV Fit Results:

Period = 14.54150 [0.00013] d  
Epoch = 144.2804 [0.0069] BKJD  
Rp/R\* = 0.0258 [0.0009]  
a/R\* = 4.52 [0.25]  
b = 0.97 [0.00]  
Seff = 1178.57 [161.48]  
Teq = 1494 [51] K  
Rp = 16.70 [2.75] Re  
a = 0.1307 [0.0144] AU  
Ag = 1.17 [0.52] [0.33σ]  
Teffp = 2403 [262] K [3.40σ]

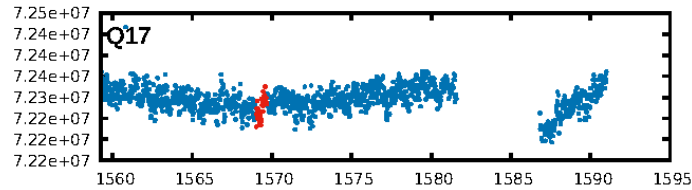
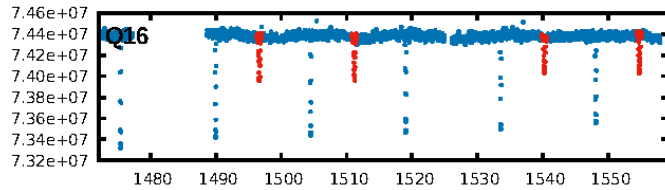
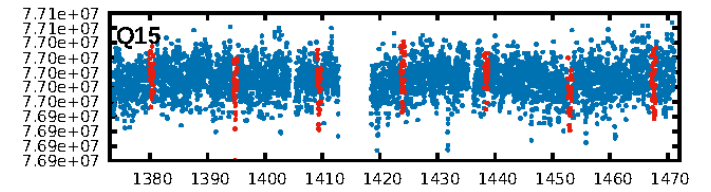
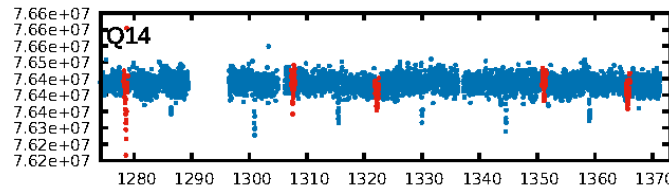
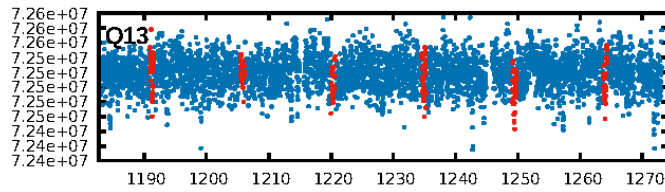
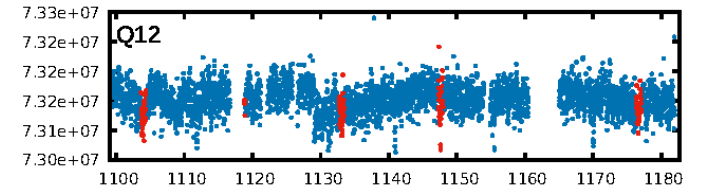
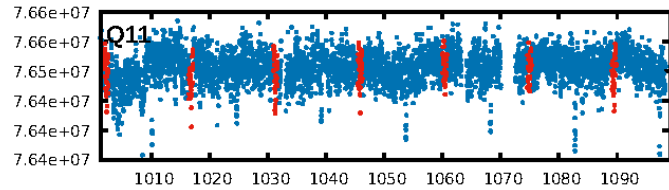
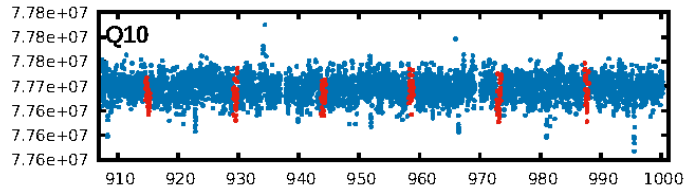
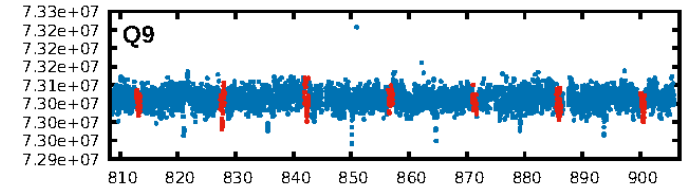
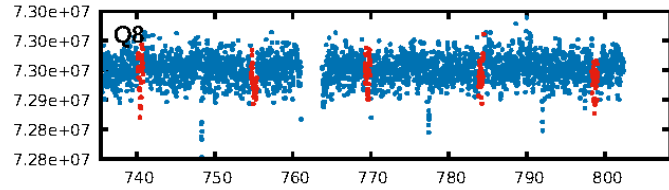
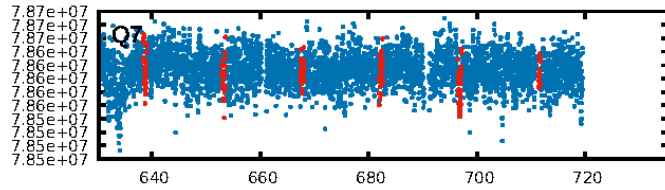
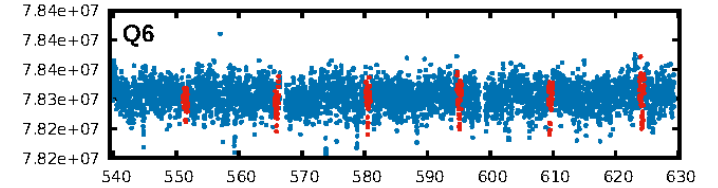
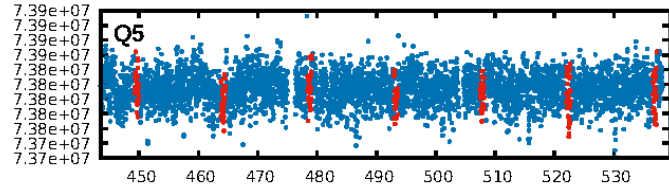
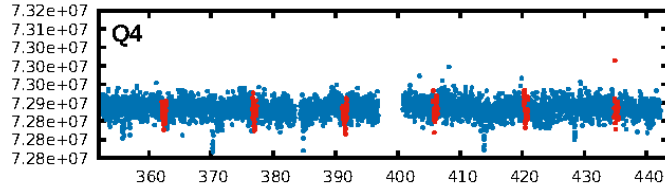
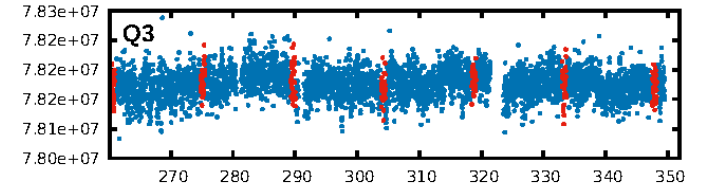
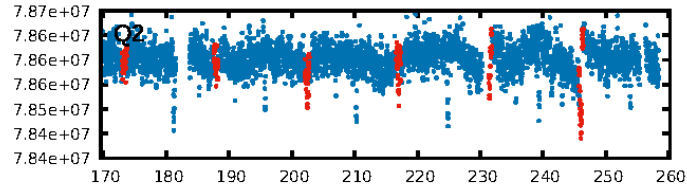
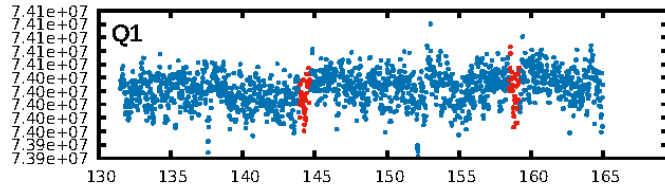
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.0% [0.00σ]  
ModelChiSquare2-sig: 0.1%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 1.31e-190  
RollingBand-fgt: 1.00 [89/89]  
GhostDiagnostic-chr: -0.3229  
Centroid-sig: 0.0%  
Centroid-so: 78.870 arcsec [366.80σ]  
OotOffset-rm: 7.553 arcsec [108.75σ]  
KicOffset-rm: 7.473 arcsec [91.86σ]  
OotOffset-st: 0/4/4/0 [8]  
KicOffset-st: 0/4/4/0 [8]  
DiffImageQuality-fgm: 1.00 [8/8]  
DiffImageOverlap-fno: 1.00 [17/17]

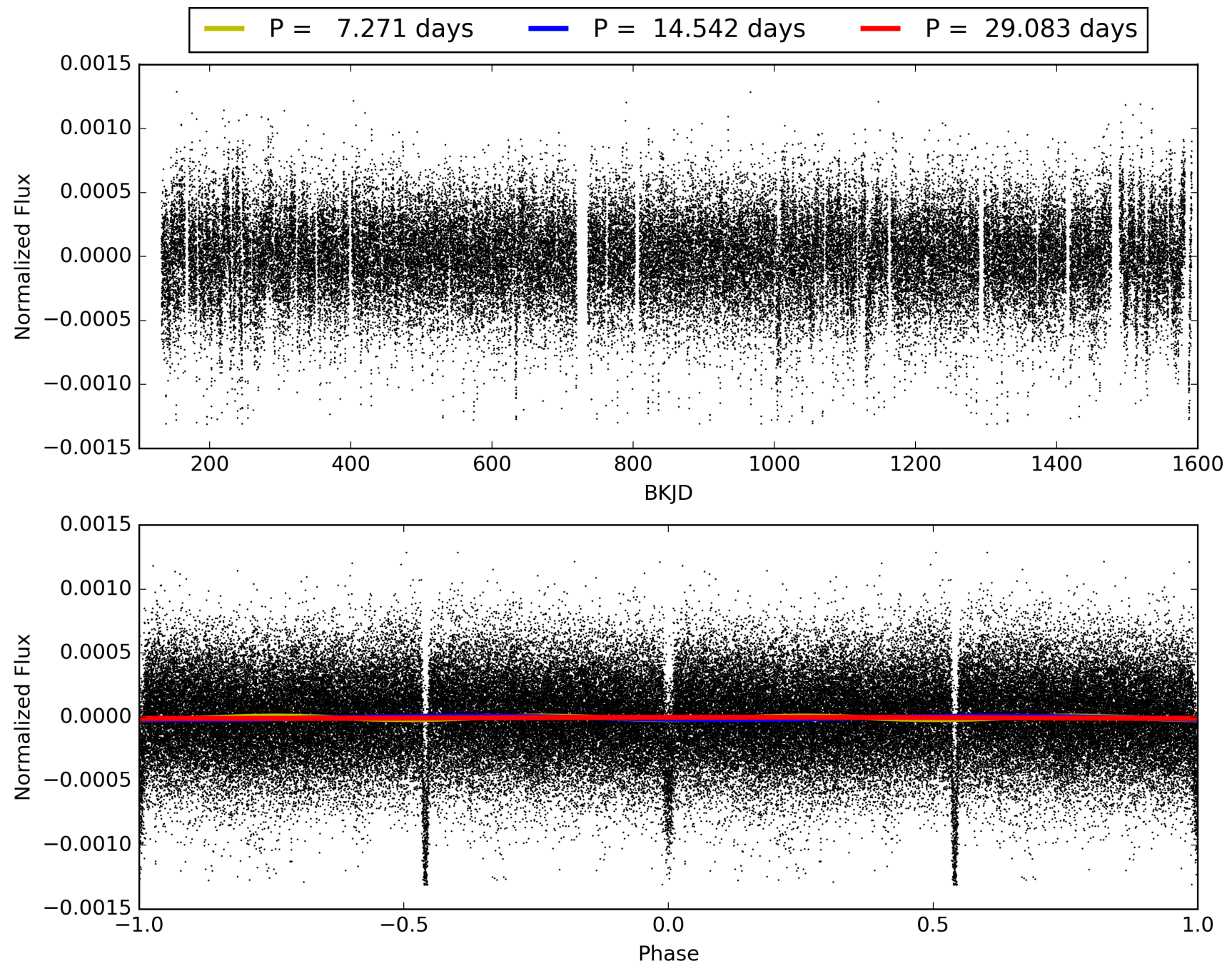
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 23:12:07 Z

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

# TCE 006286155-02, PDC Light Curves

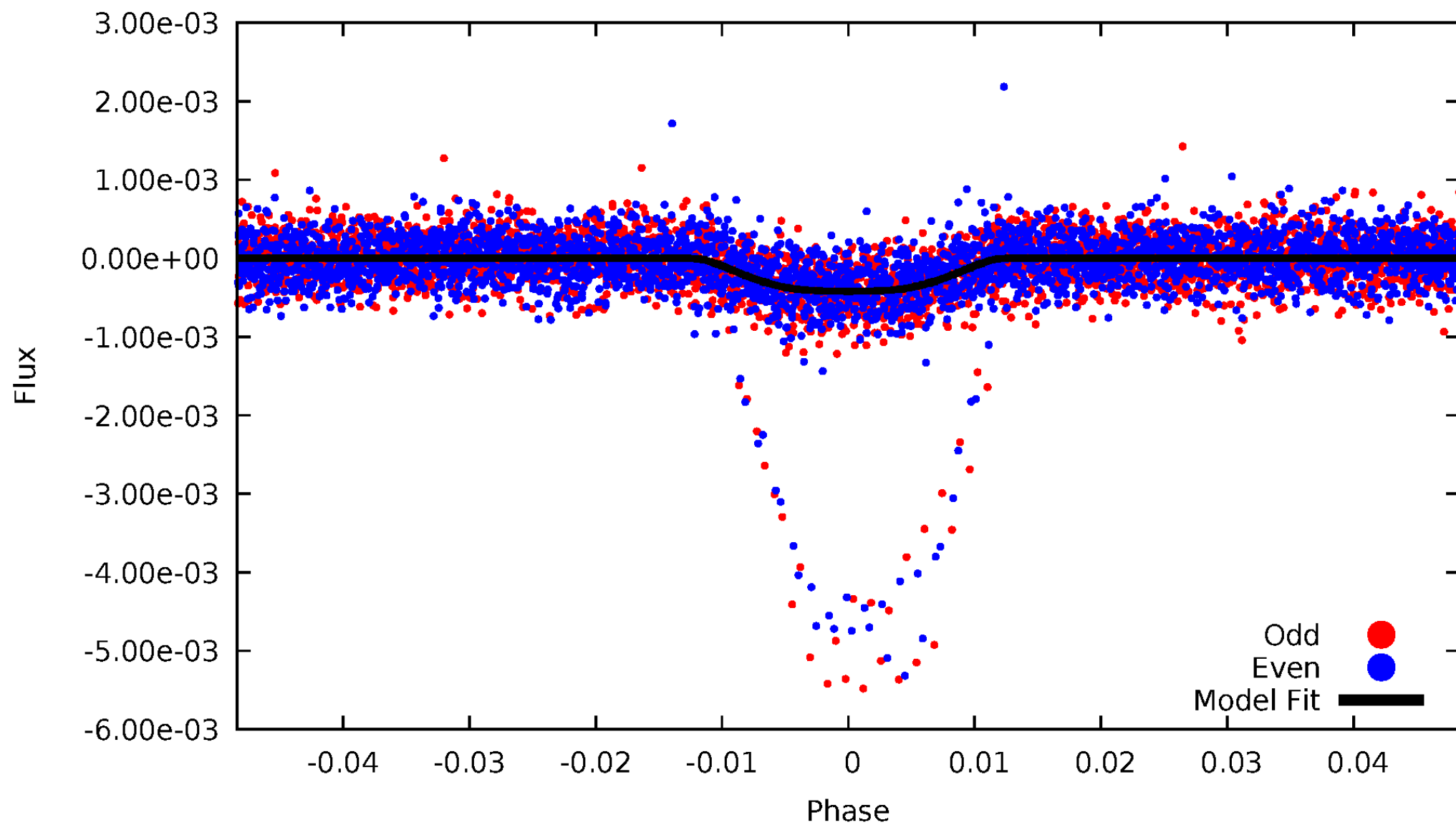


TCE 006286155-02



# DV Odd/Even

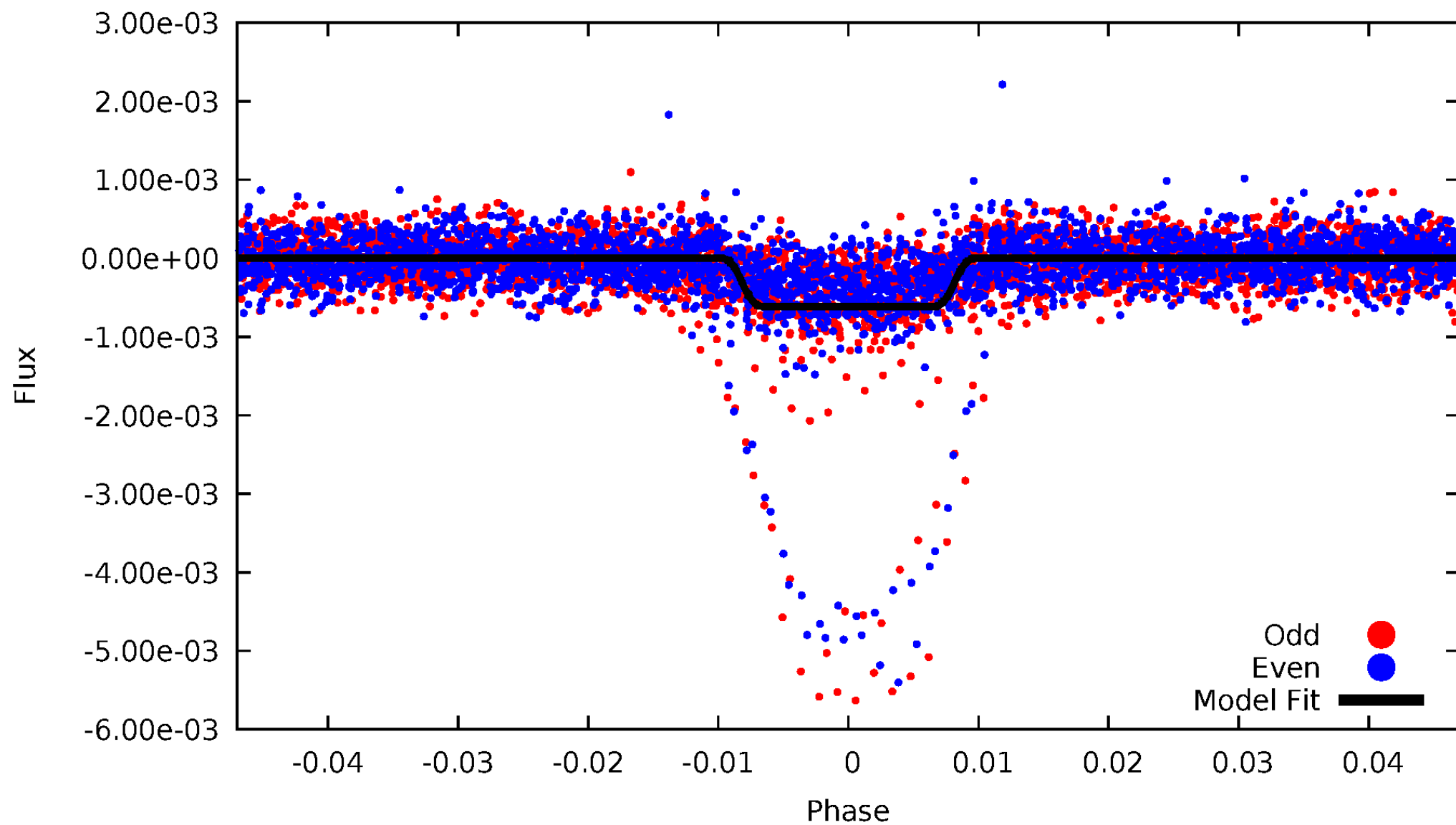
TCE 006286155-02





# ALT Odd/Even

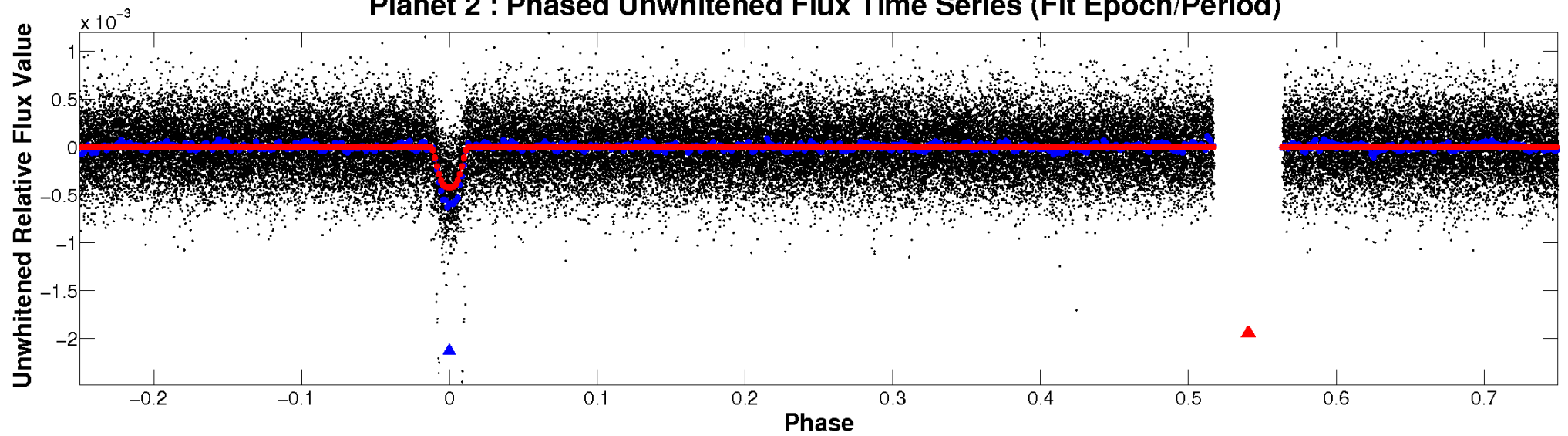
TCE 006286155-02



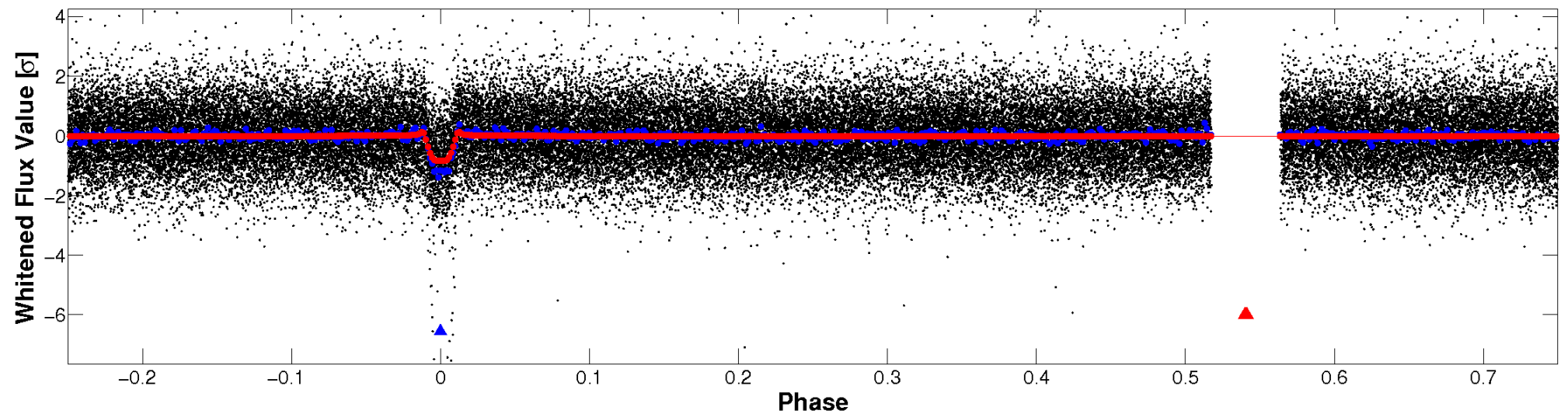


# Non-Whitened Vs. Whitened Light Curve

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

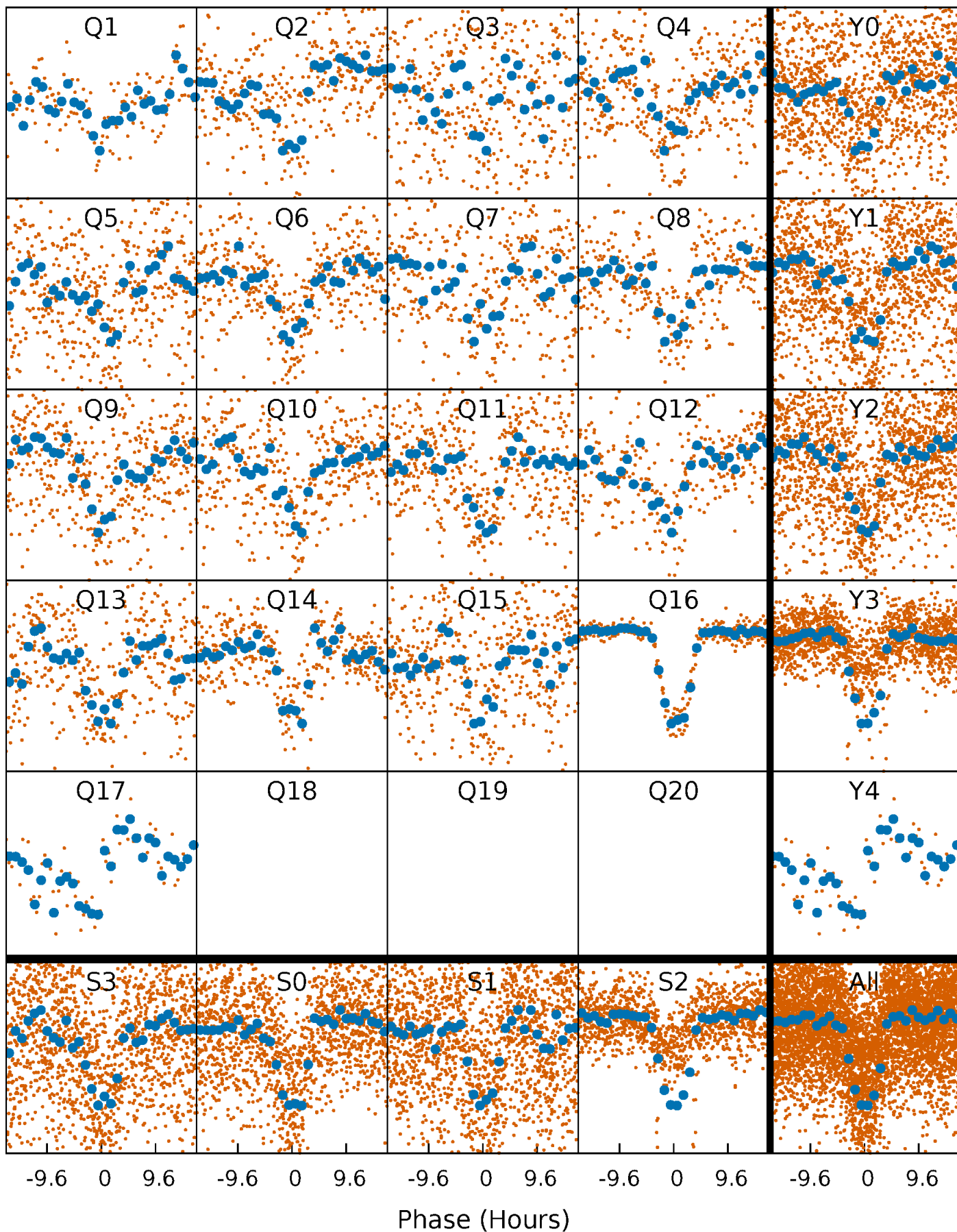


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



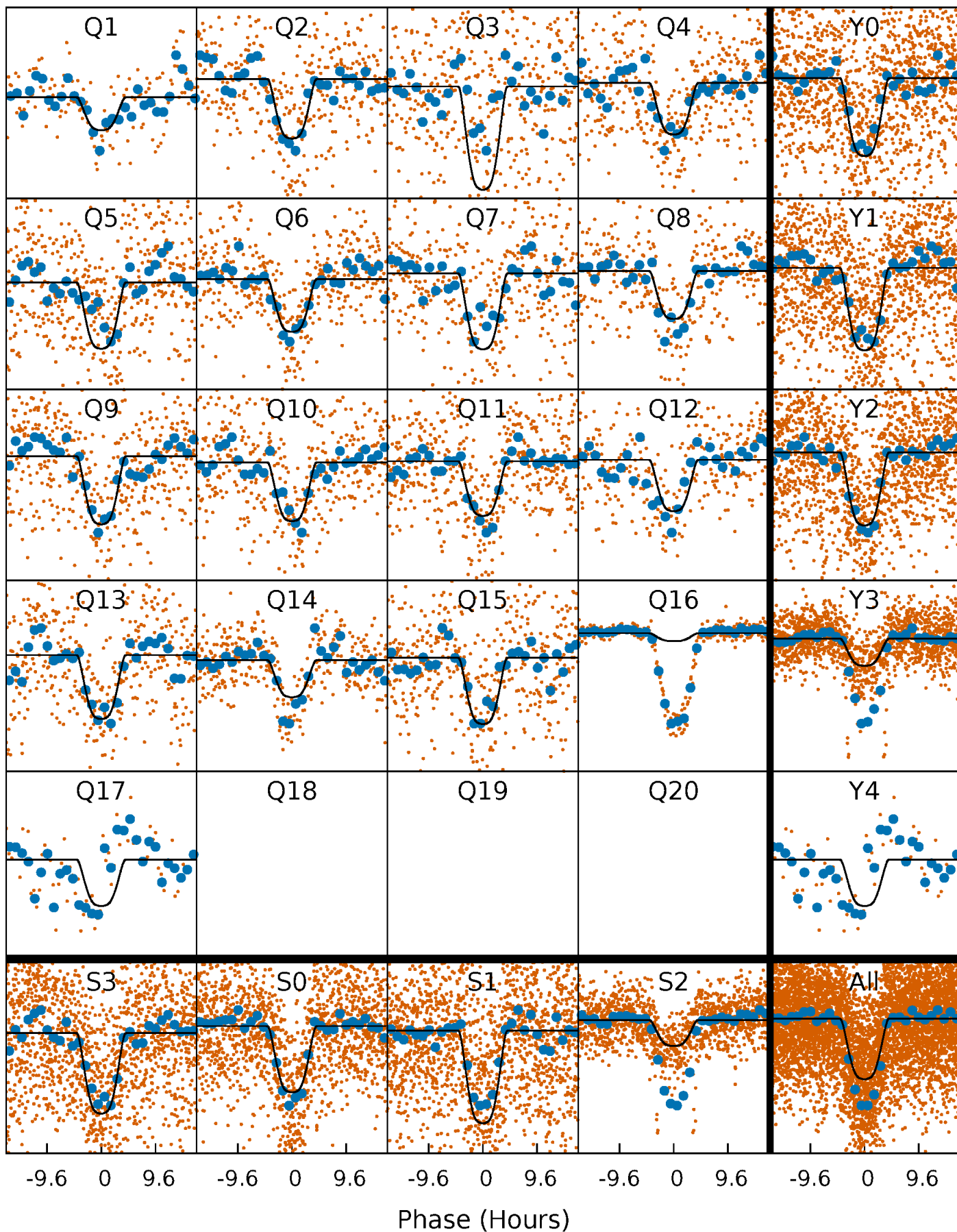
# PDC Quarter-Phased Transit Curves

TCE 006286155-02 P= 14.541503 Days  $T_0=144.280446$  (BKJD)



# DV Quarter-Phased Transit Curves

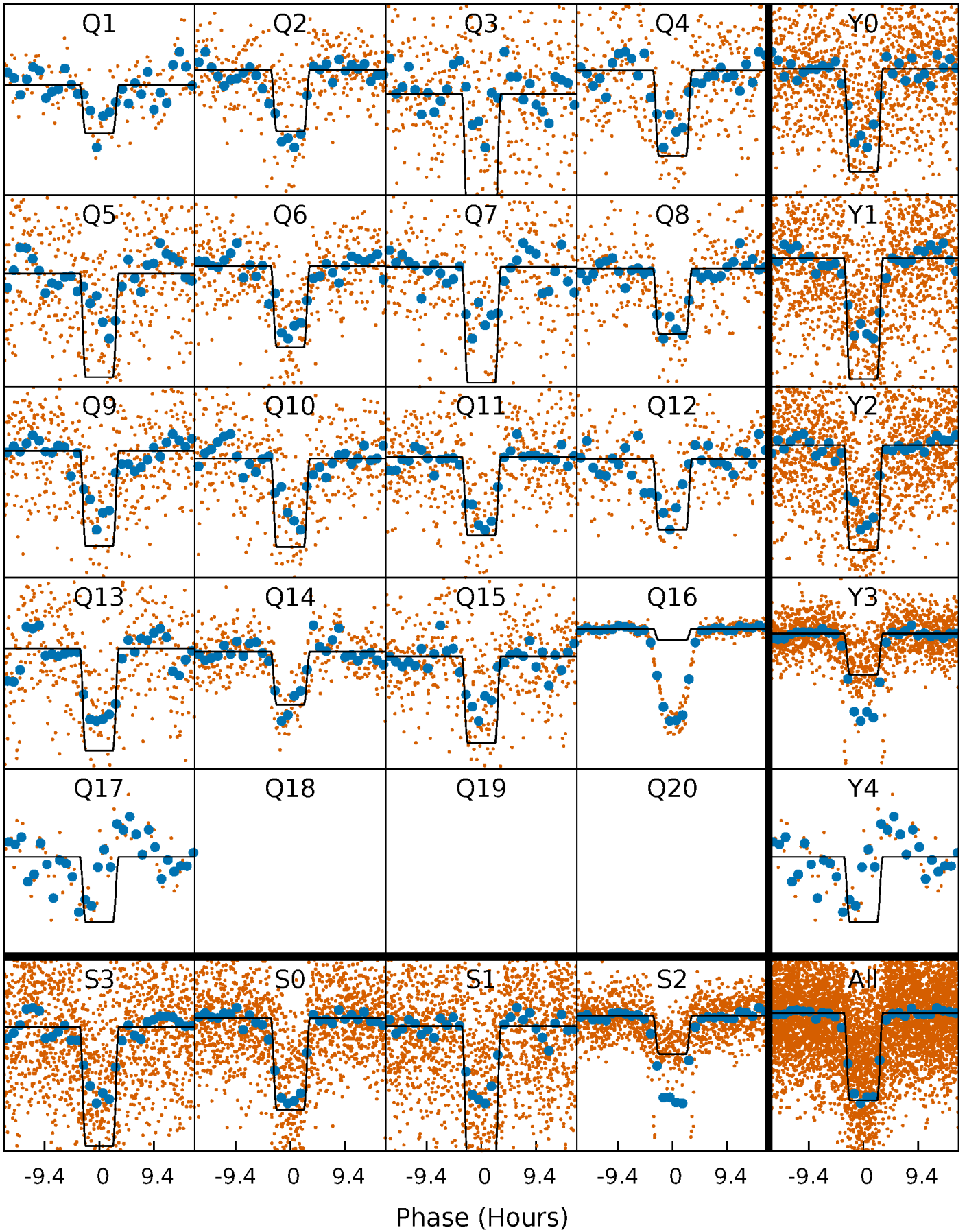
TCE 006286155-02 P= 14.541503 Days  $T_0=144.280446$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

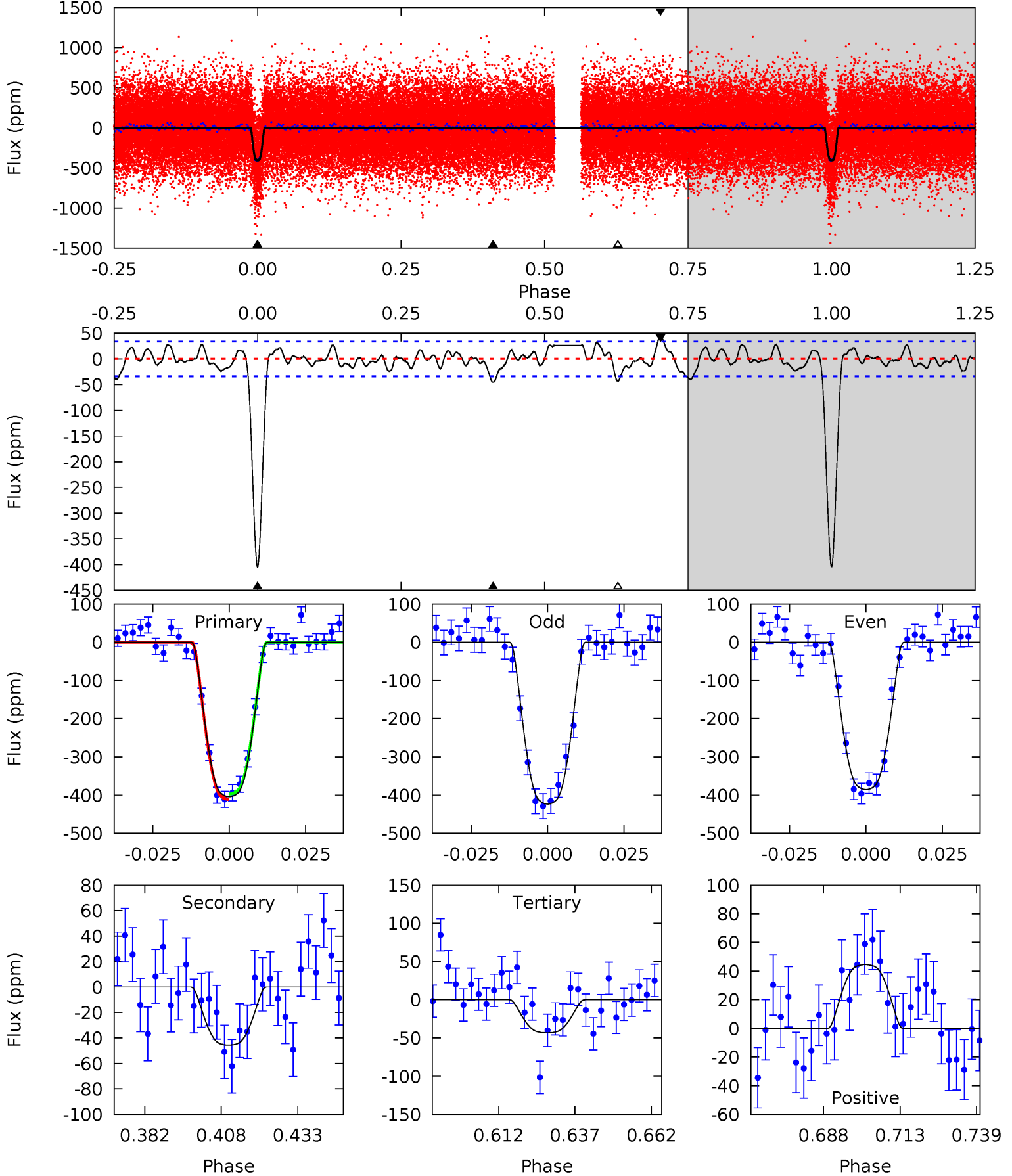
TCE 006286155-02 P= 14.541654 Days  $T_0=144.275398$  (BKJD)



# DV Model-Shift Uniqueness Test

006286155-02, P = 14.541503 Days, E = 129.738943 Days

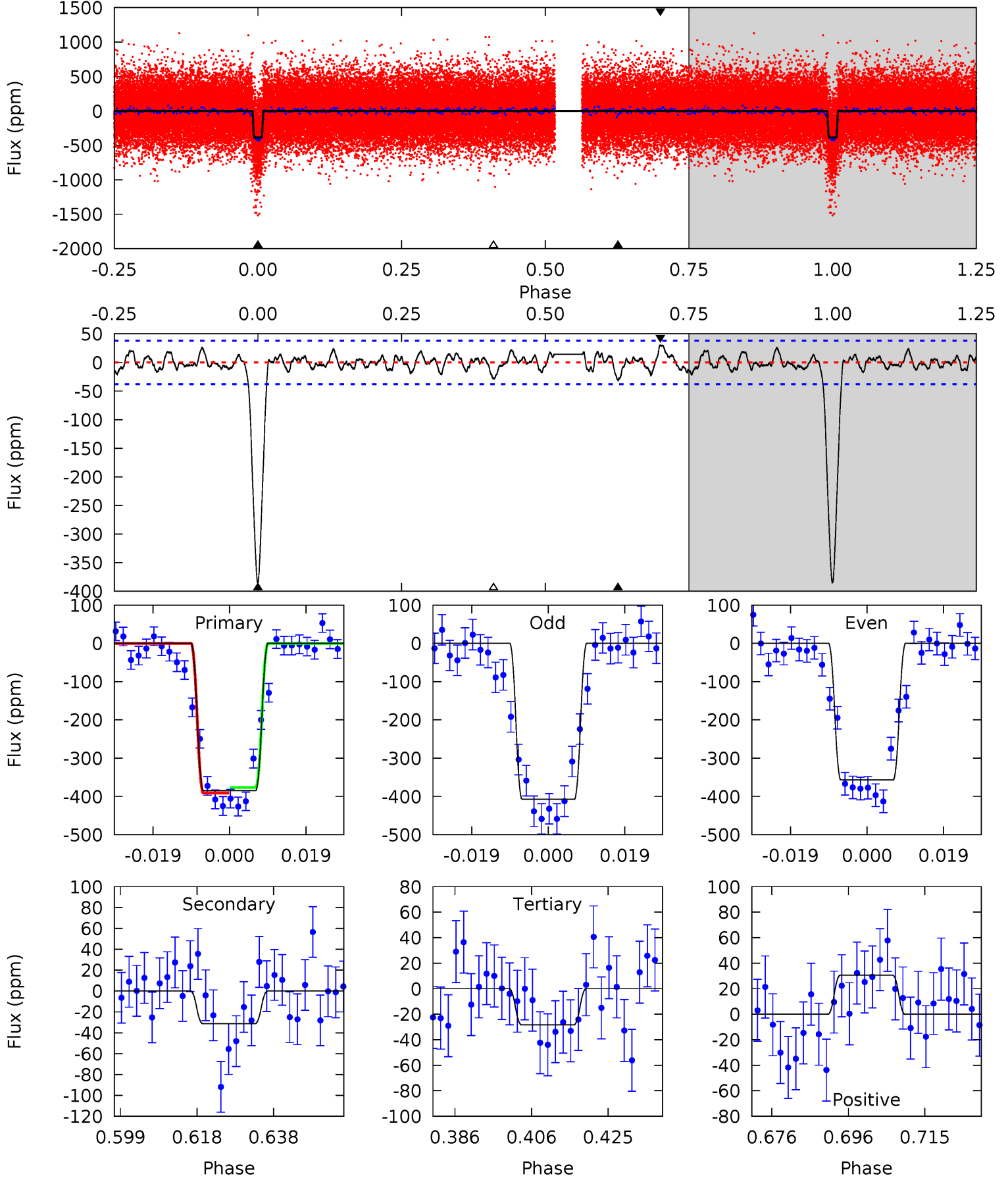
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
57.8	6.51	6.17	6.35	4.84	2.23	2.14	51.6	51.4	0.34	0.16	2.71	1.48	0.10	1.02



# Alt Model-Shift Uniqueness Test

006286155-02, P = 14.541654 Days, E = 129.733744 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
49.9	4.05	3.67	3.96	4.90	2.34	1.35	46.2	45.9	0.38	0.09	3.25	1.47	0.07	0.93





### Stellar Parameters For KIC 006286155

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5032^{+80}_{-90}$	$3.042^{+0.030}_{-0.030}$	$-0.340^{+0.150}_{-0.200}$	$5.922^{+0.477}_{-0.954}$	$1.410^{+0.215}_{-0.399}$	$0.010^{+0.002}_{-0.001}$
	+2%/-2%	+1%/-1%	+44%/-59%	+8%/-16%	+15%/-28%	+23%/-11%
Source	PHO56	AST56	PHO56	DSEP		

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

### Secondary Eclipse Parameters for KIC 006286155-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-46 \pm 7$	$17.10^{+1.05}_{-1.54}$	$2094^{+47}_{-52}$	$3044^{+100}_{-98}$	$1.514^{+0.321}_{-0.255}$
Alt.	$-31 \pm 8$	$16.31^{+1.04}_{-1.55}$	$2087^{+50}_{-50}$	$2890^{+117}_{-165}$	$1.134^{+0.302}_{-0.296}$

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

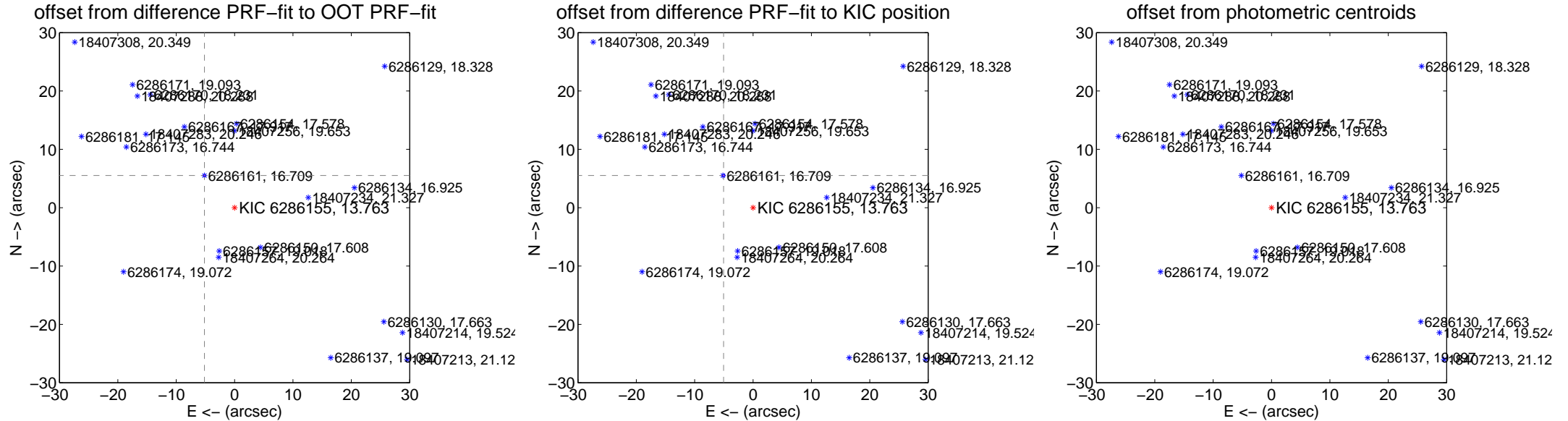
## DV Centroid Data

Supplemental centroid analysis for 006286155-02. Kepler magnitude: 13.76. Transit SNR 23.37

There are 8 quarters with good PRF difference image offsets

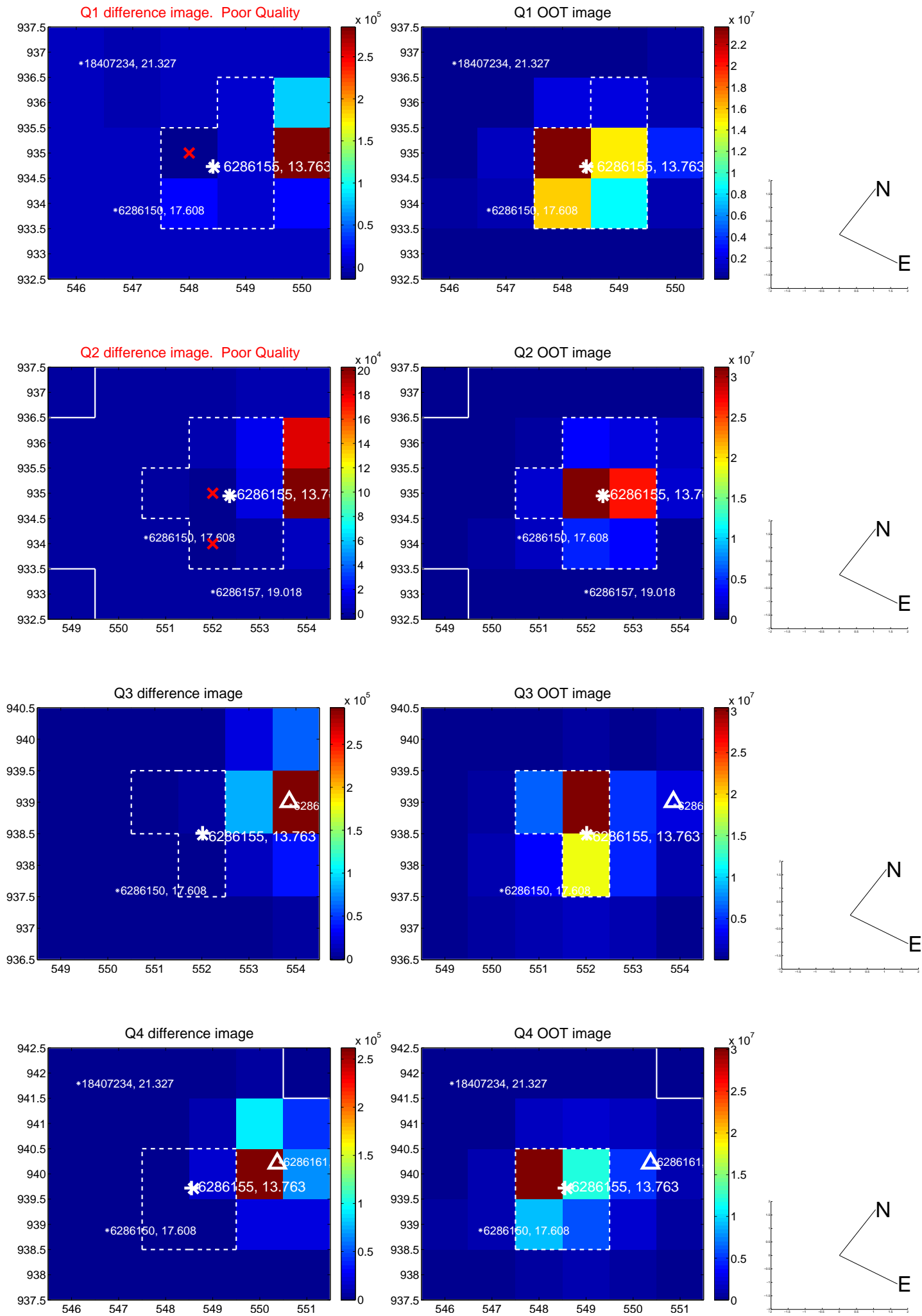
The direct PRF centroid is offset from the target star catalog position by about 0.20 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b>7.553 <math>\pm</math> 0.069</b>	<b>108.75</b>	5.159 $\pm$ 0.068	5.516 $\pm$ 0.068
PRF-fit source offset from KIC position	<b>7.473 <math>\pm</math> 0.081</b>	<b>91.86</b>	5.045 $\pm$ 0.074	5.512 $\pm$ 0.075
photometric centroid source offset	<b>78.86 <math>\pm</math> 0.22</b>	<b>366.79</b>	50.43 $\pm$ 0.21	60.63 $\pm$ 0.22

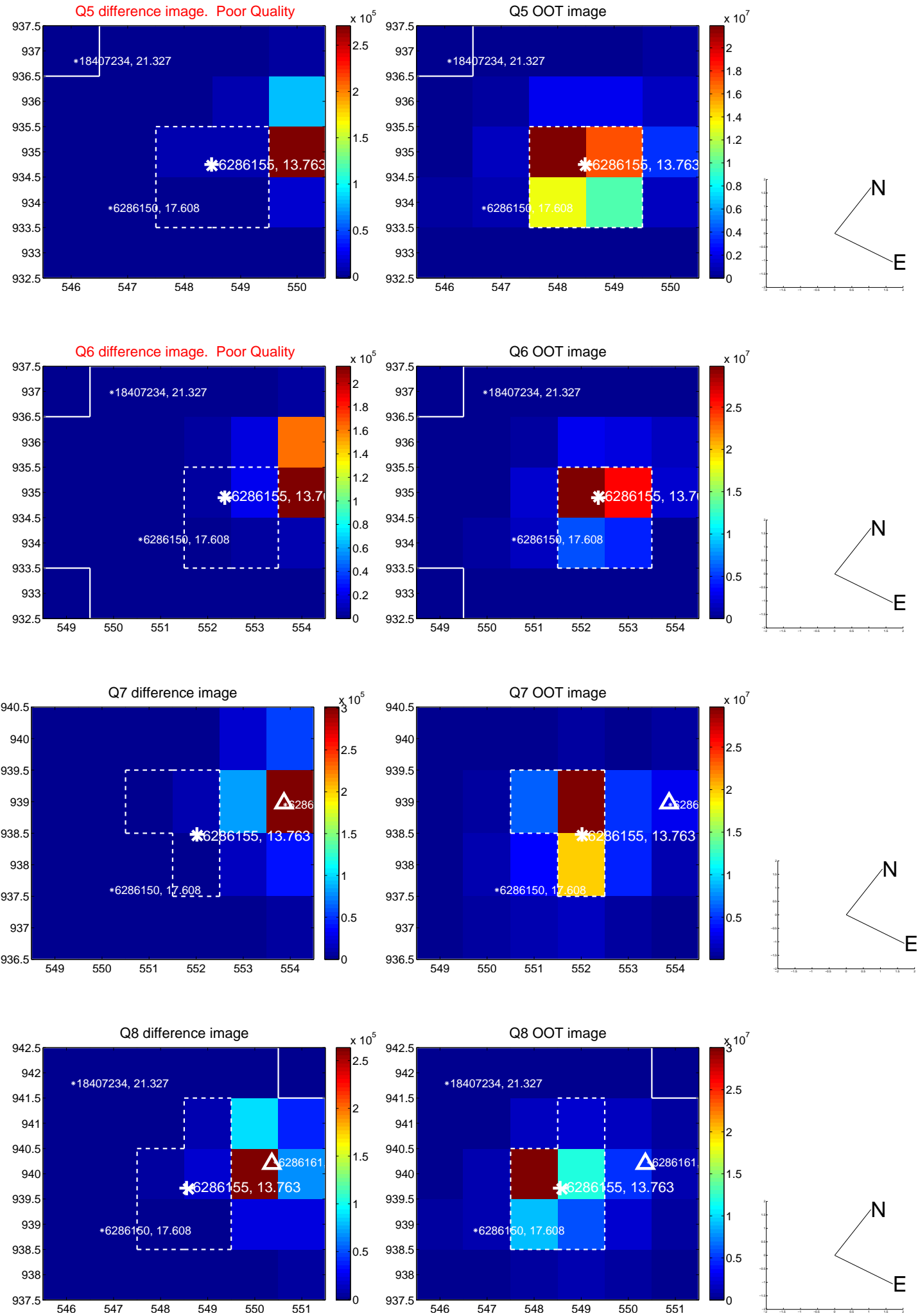


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

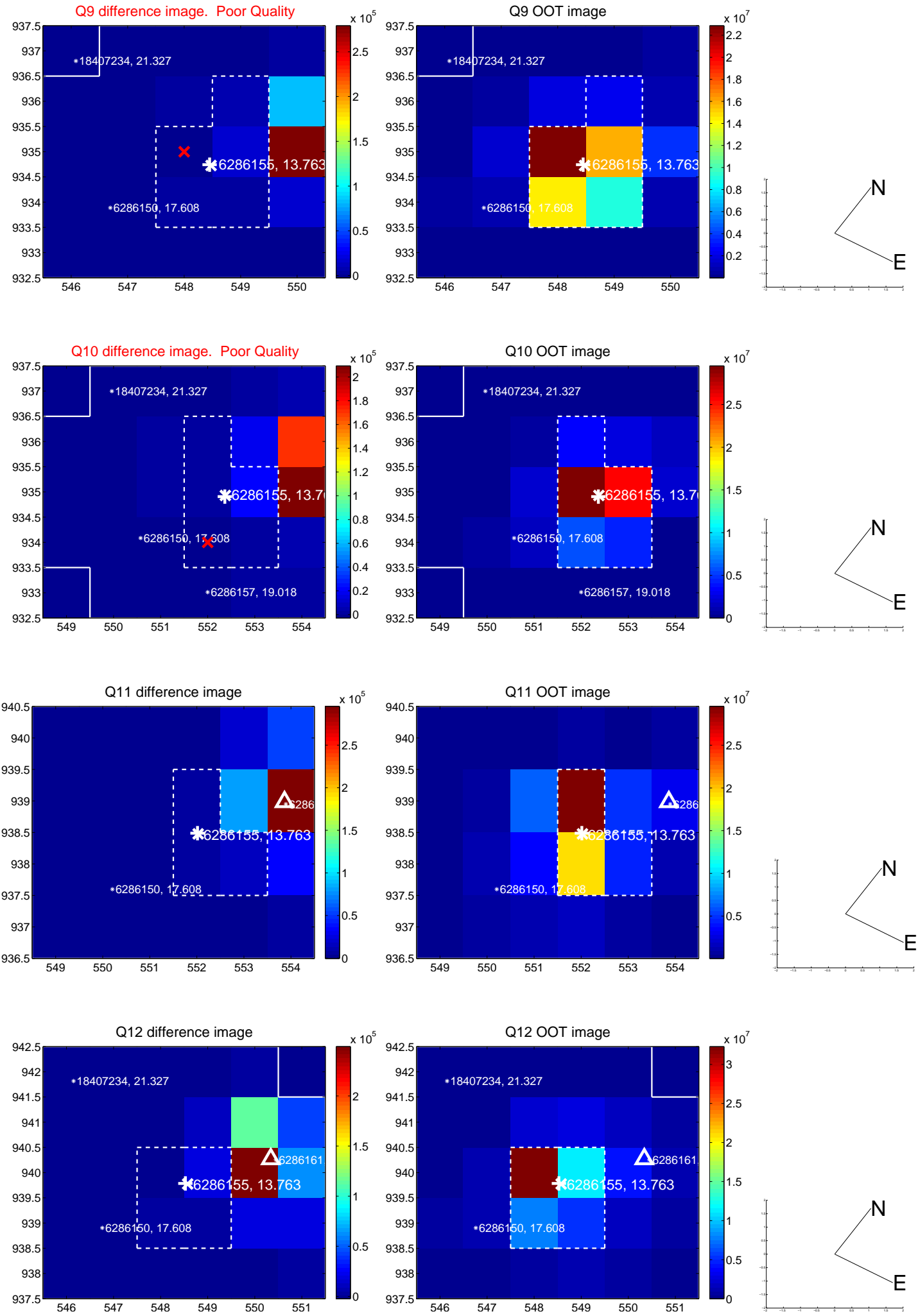
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



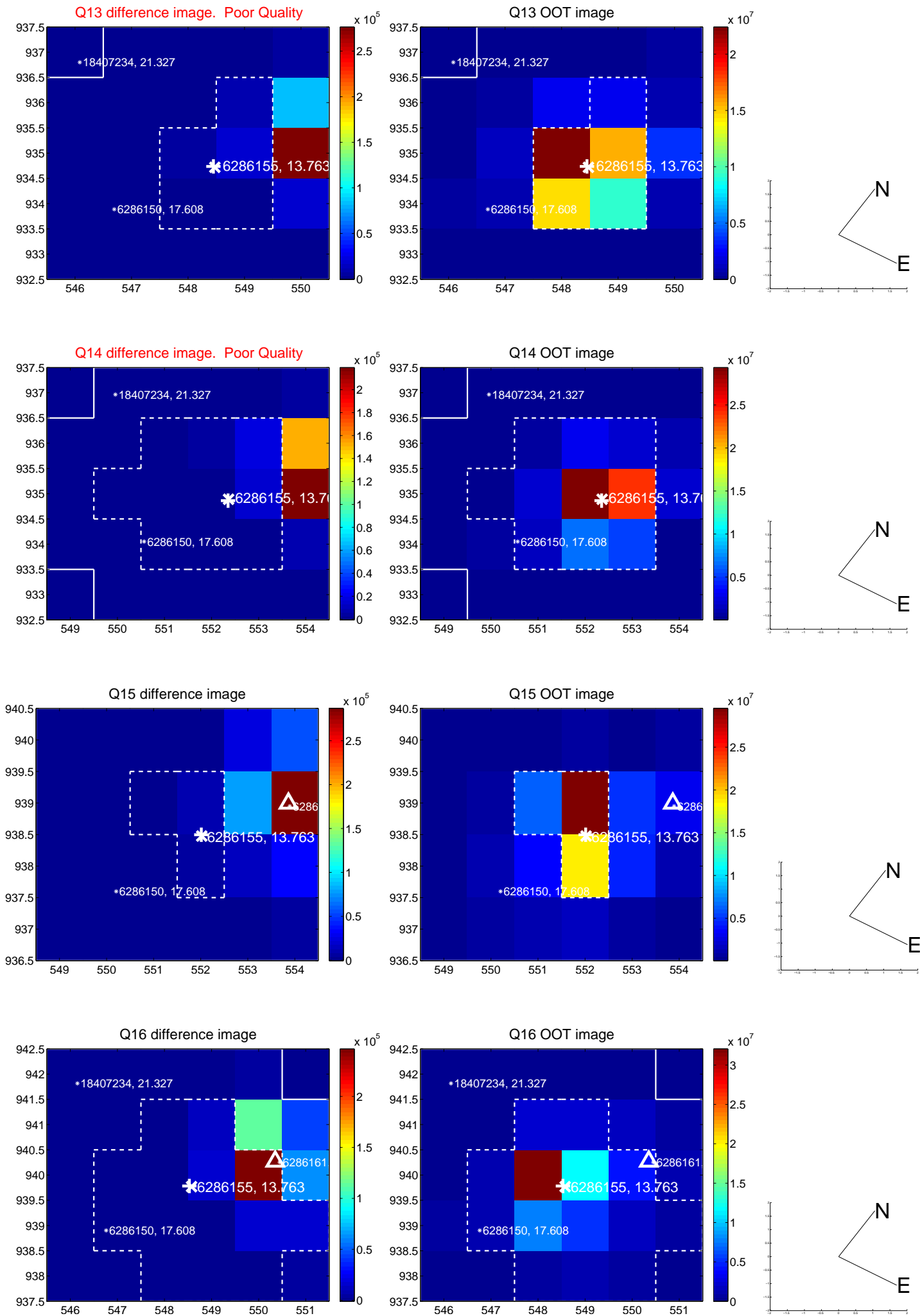
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



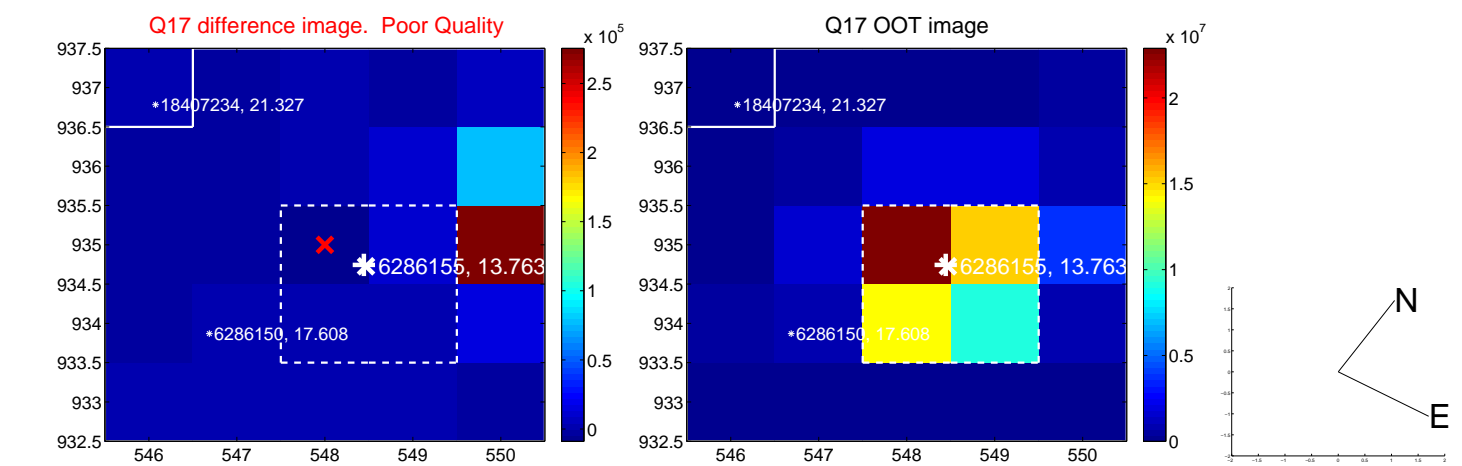
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



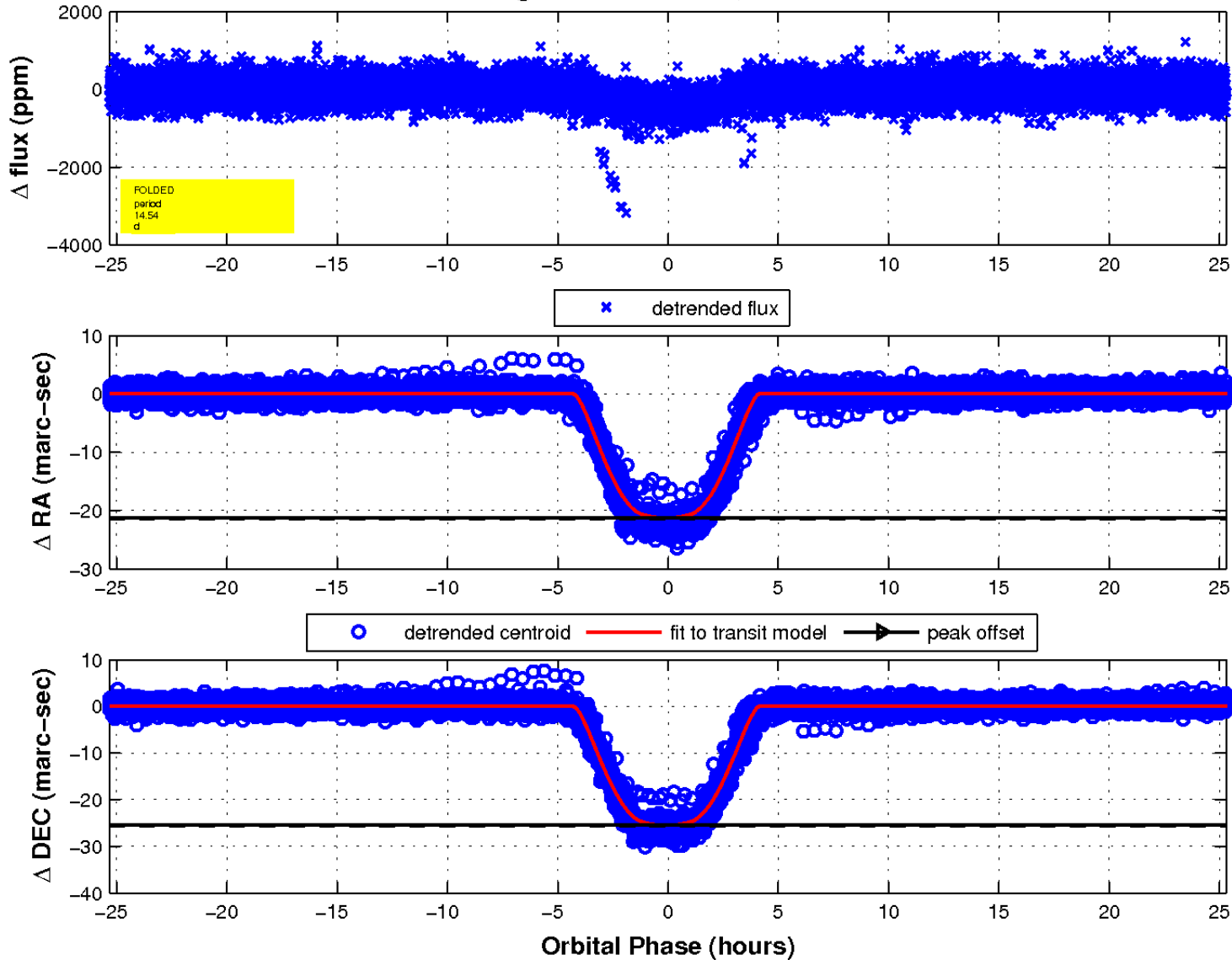
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2





UKIRT Image

Declination

