

# KIC 003642289

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003642289-01	OBS	0301.01	6.002540	135.699560	199.4	4.178	55.5	62.5	1.36	6204	2.30	505.24
003642289-02	OBS	0301.02	11.448642	141.385579	75.2	5.015	16.9	18.6	1.36	6204	1.39	213.60

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003642289-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
003642289-02	OBS	PC	1.00	0	0	0	0	NO_COMMENT

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

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

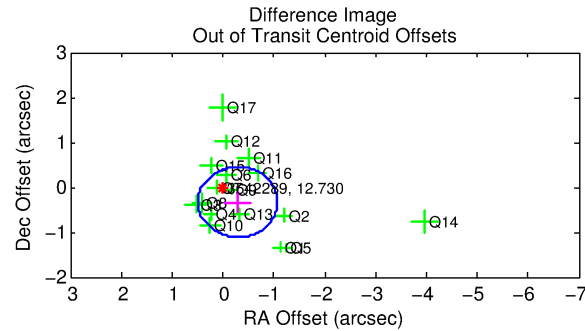
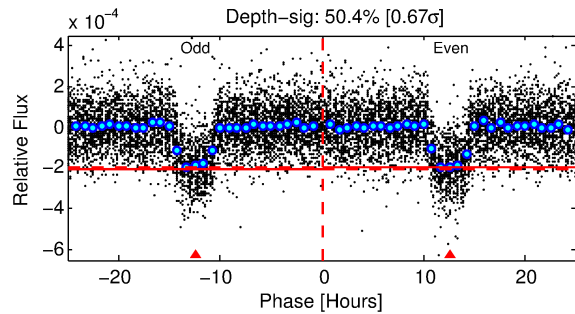
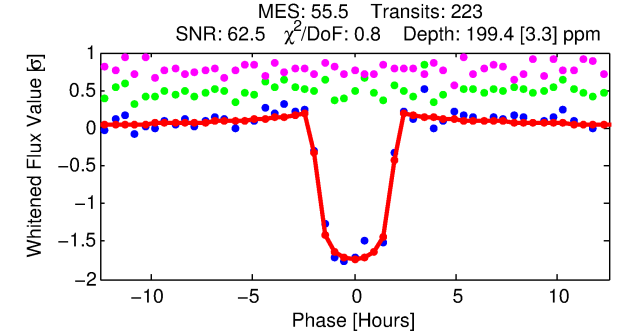
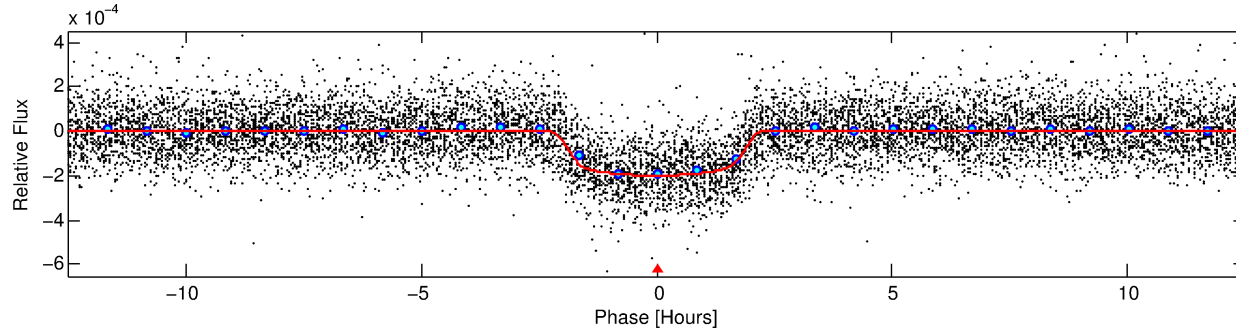
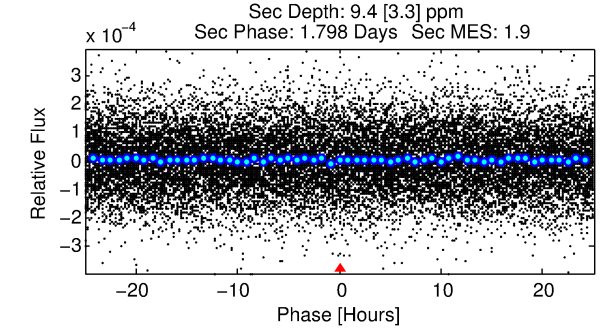
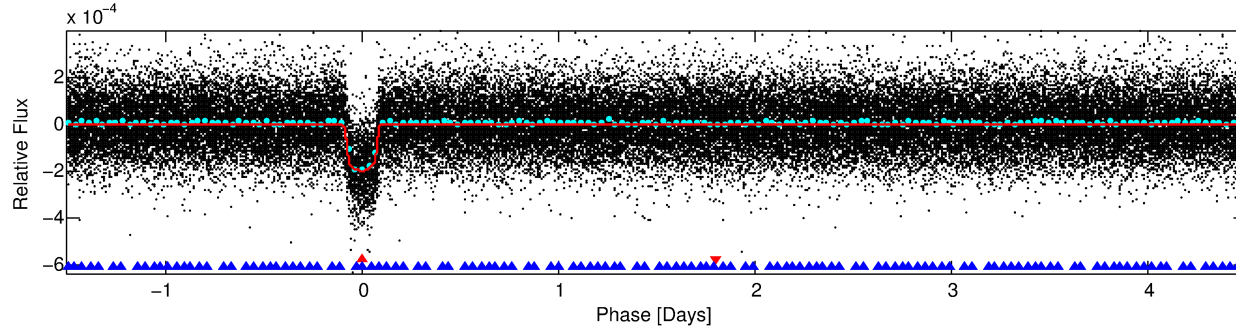
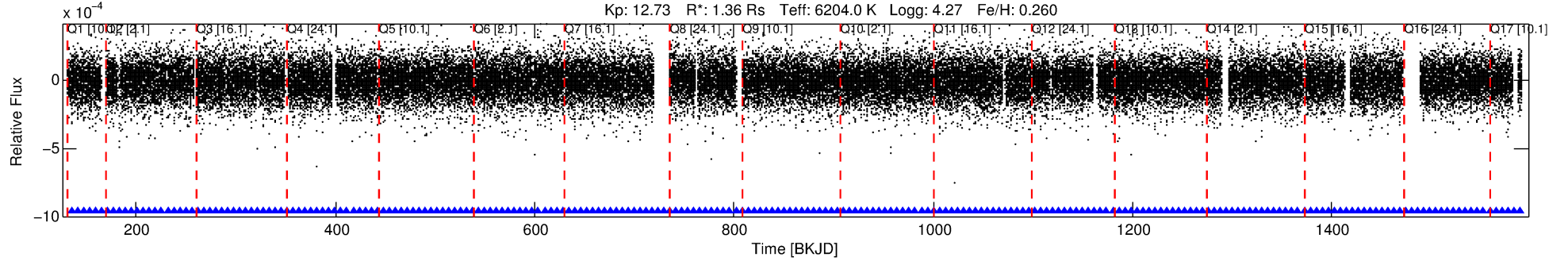
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 003642289-01

No Significant Match Found

# DV One-Page Summary

KIC: 3642289 Candidate: 1 of 2 Period: 6.003 d  
KOI: K00301.01 Name: Kepler-135b Corr: 0.967



## DV Fit Results:

Period = 6.00254 [0.00001] d  
Epoch = 135.6996 [0.0011] BKJD  
Rp/R\* = 0.0155 [0.0007]  
a/R\* = 4.93 [1.11]  
b = 0.91 [0.04]  
Seff = 505.24 [115.09]  
Teq = 1209 [69] K  
Rp = 2.30 [0.40] Re  
a = 0.0697 [0.0100] AU  
Ag = 4.76 [2.01] [1.87σ]  
Teffp = 2760 [259] K [5.78σ]

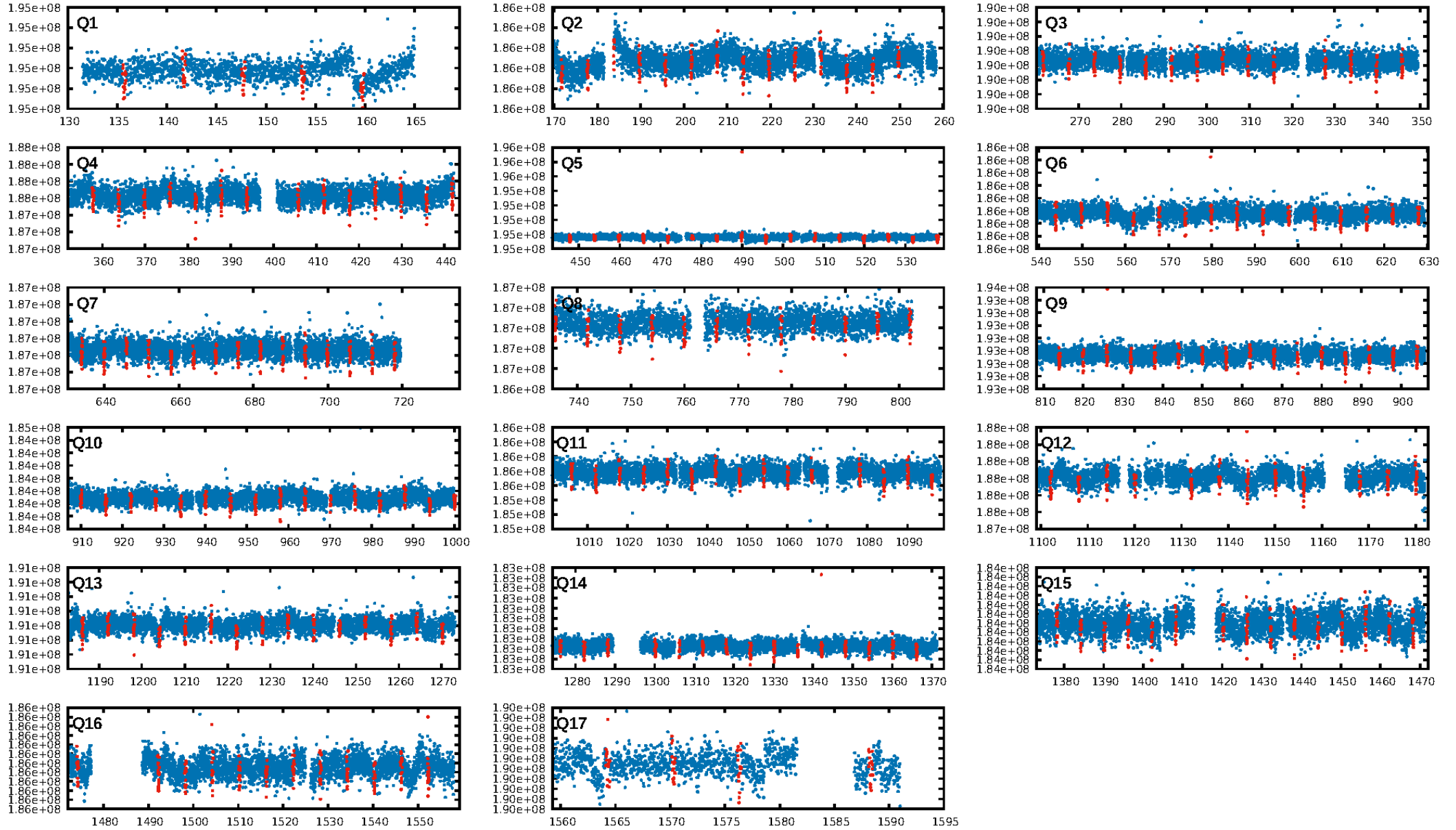
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [20.03σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGoF-sig: N/A  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 1.00 [214/214]  
GhostDiagnostic-chr: 6.932  
Centroid-sig: 22.4%  
Centroid-so: 0.151 arcsec [0.68σ]  
OotOffset-rm: 0.442 arcsec [1.70σ]  
KicOffset-rm: 0.510 arcsec [1.93σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 0.94 [16/17]  
DiffImageOverlap-fno: 1.00 [17/17]

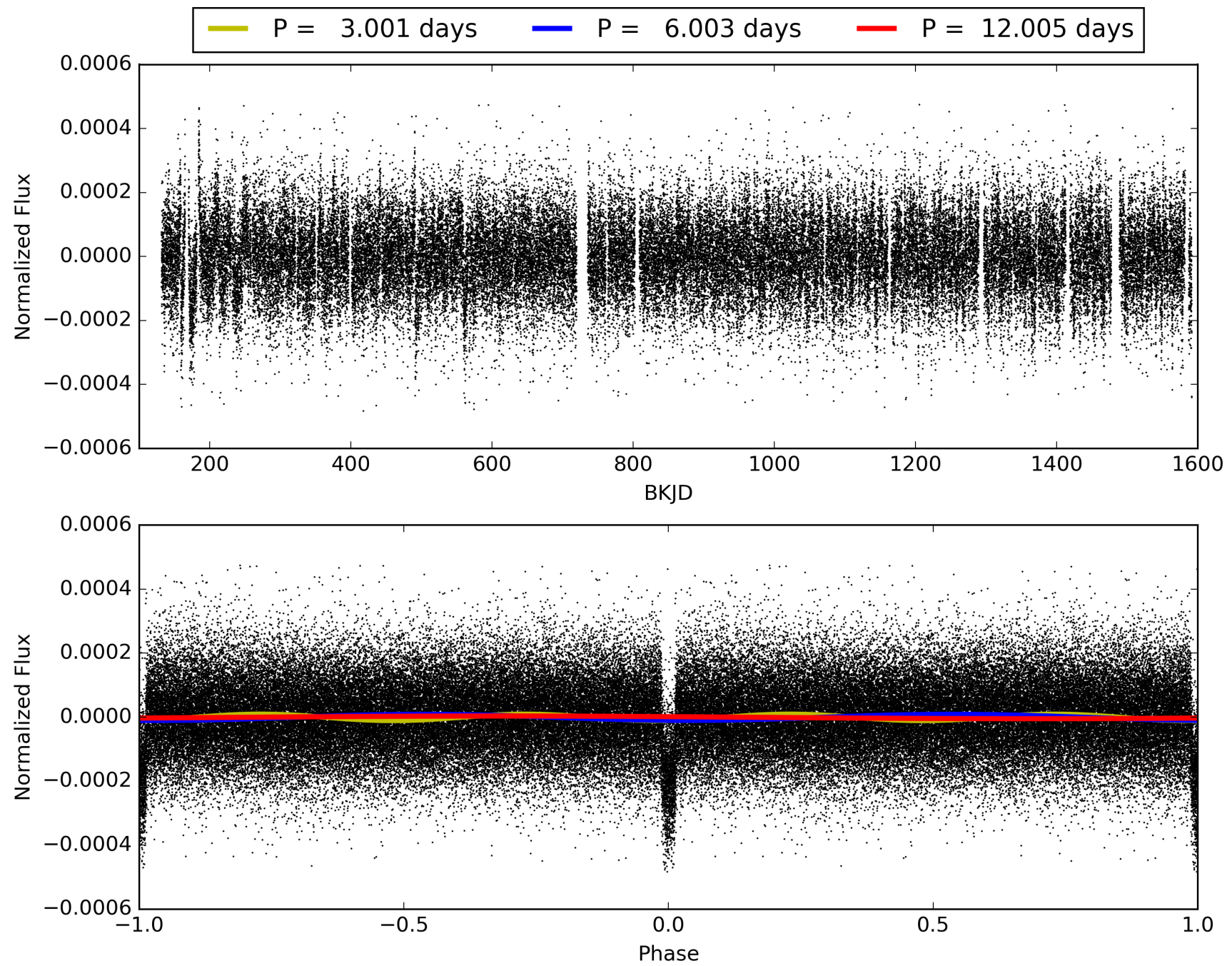
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 21:33:09 Z

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

# TCE 003642289-01, PDC Light Curves

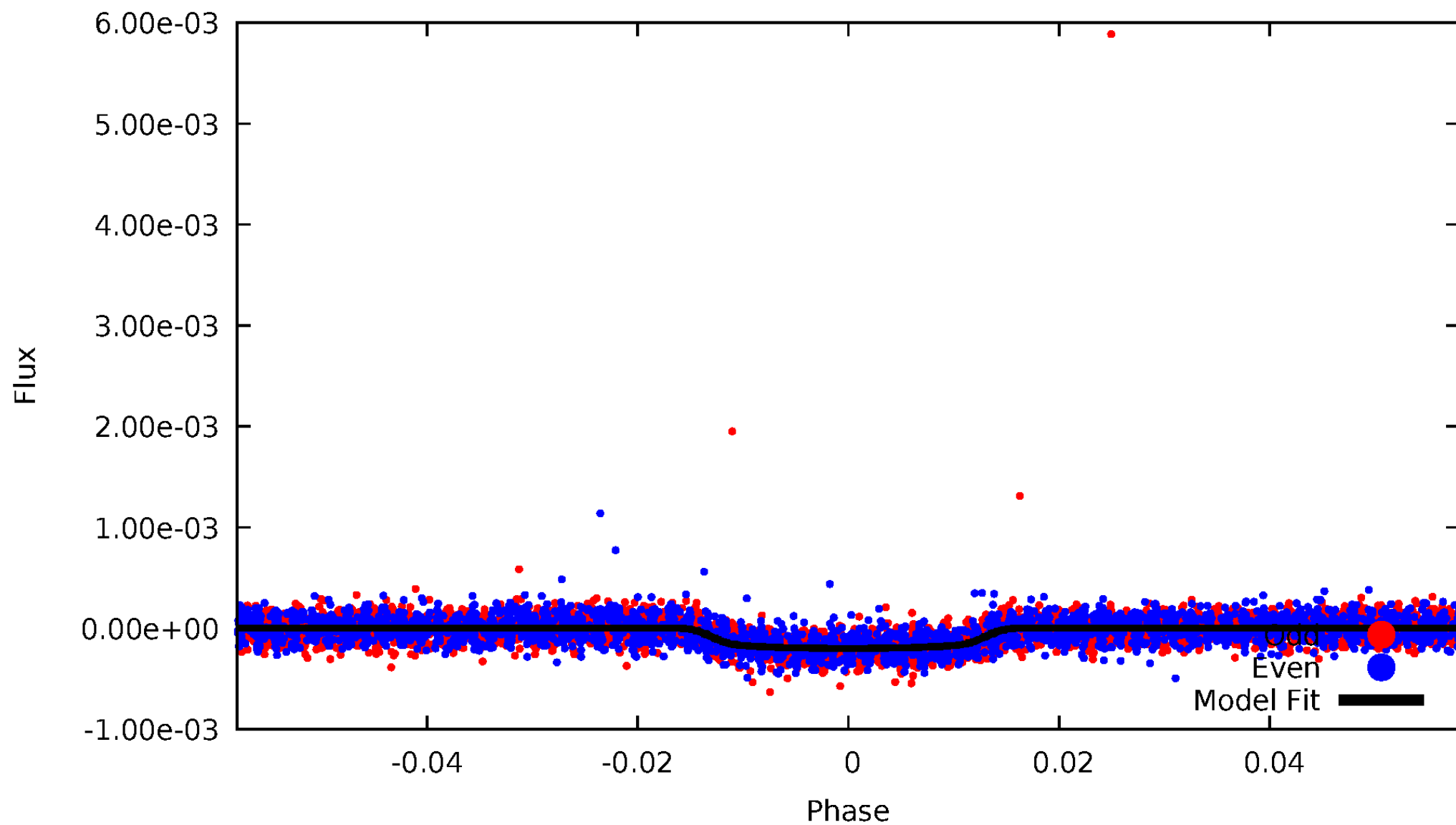


TCE 003642289-01



# DV Odd/Even

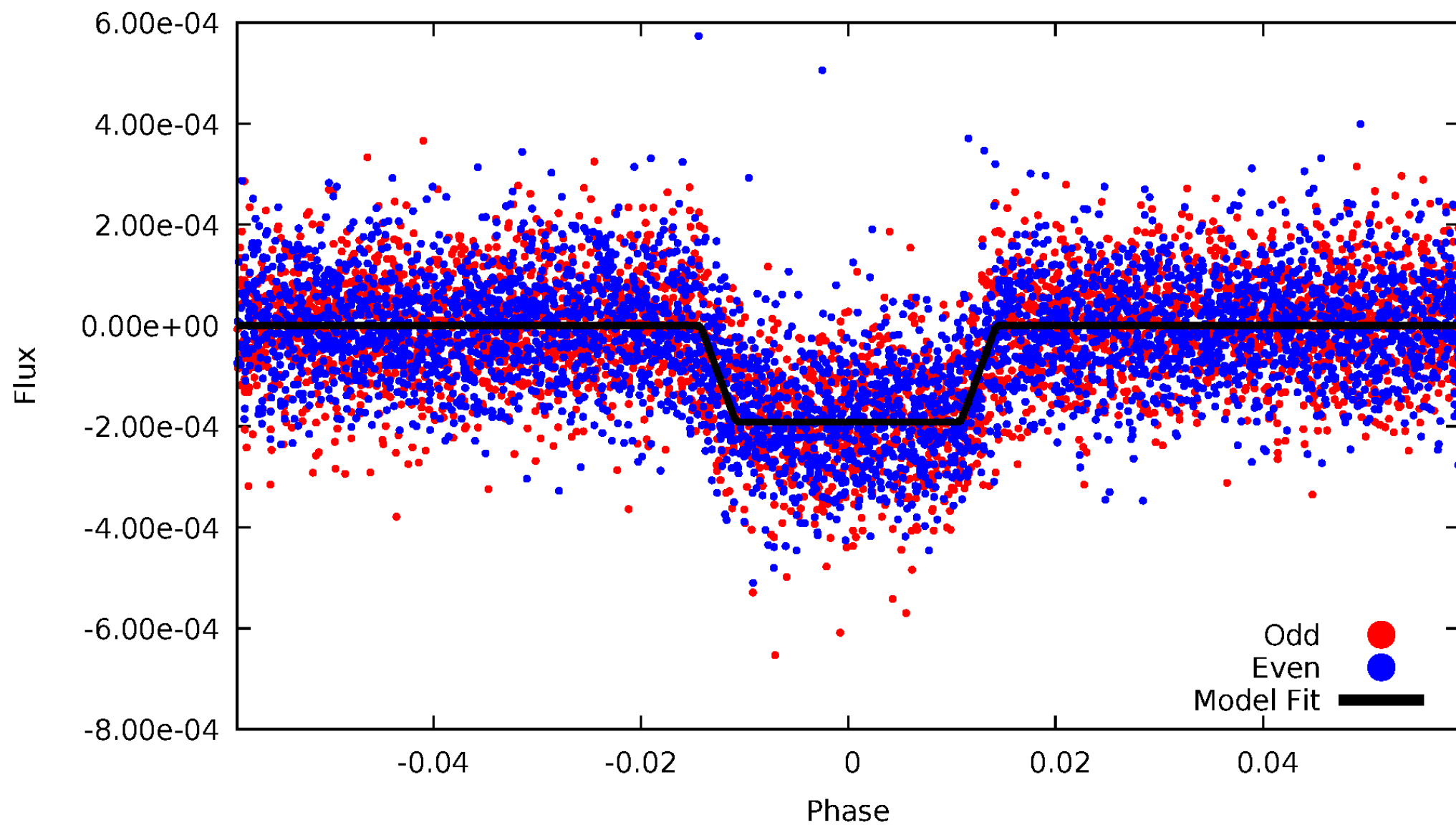
TCE 003642289-01





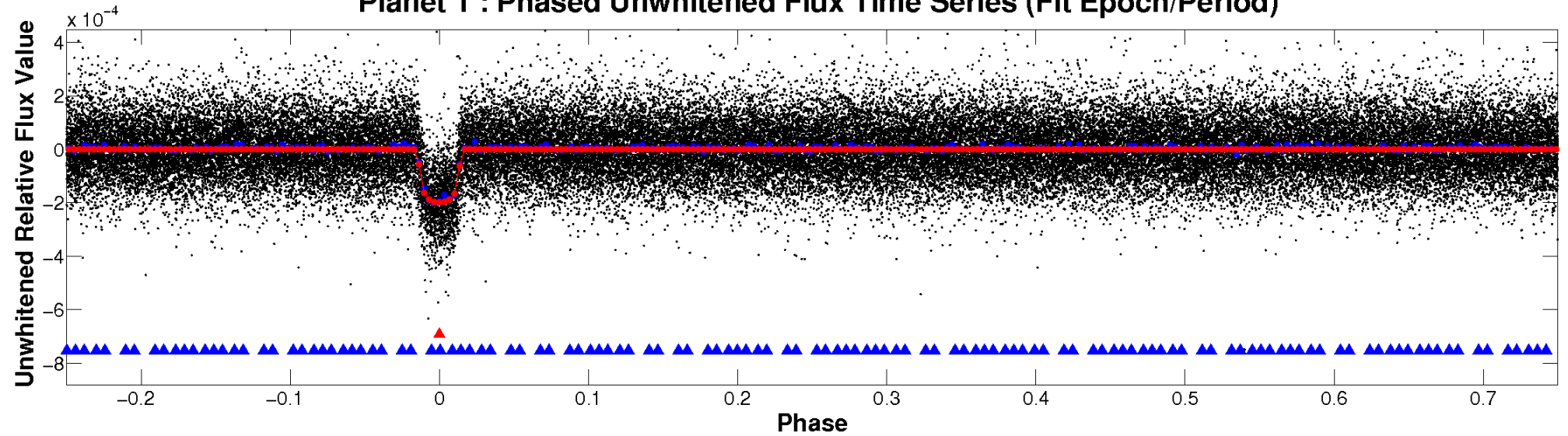
# ALT Odd/Even

TCE 003642289-01

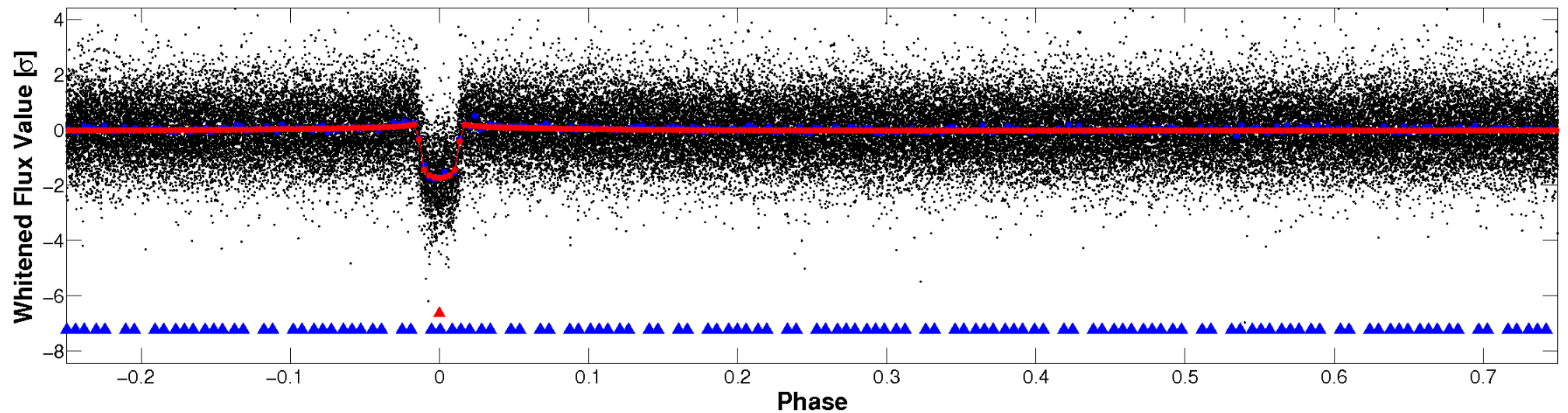


# Non-Whitened Vs. Whitened Light Curve

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

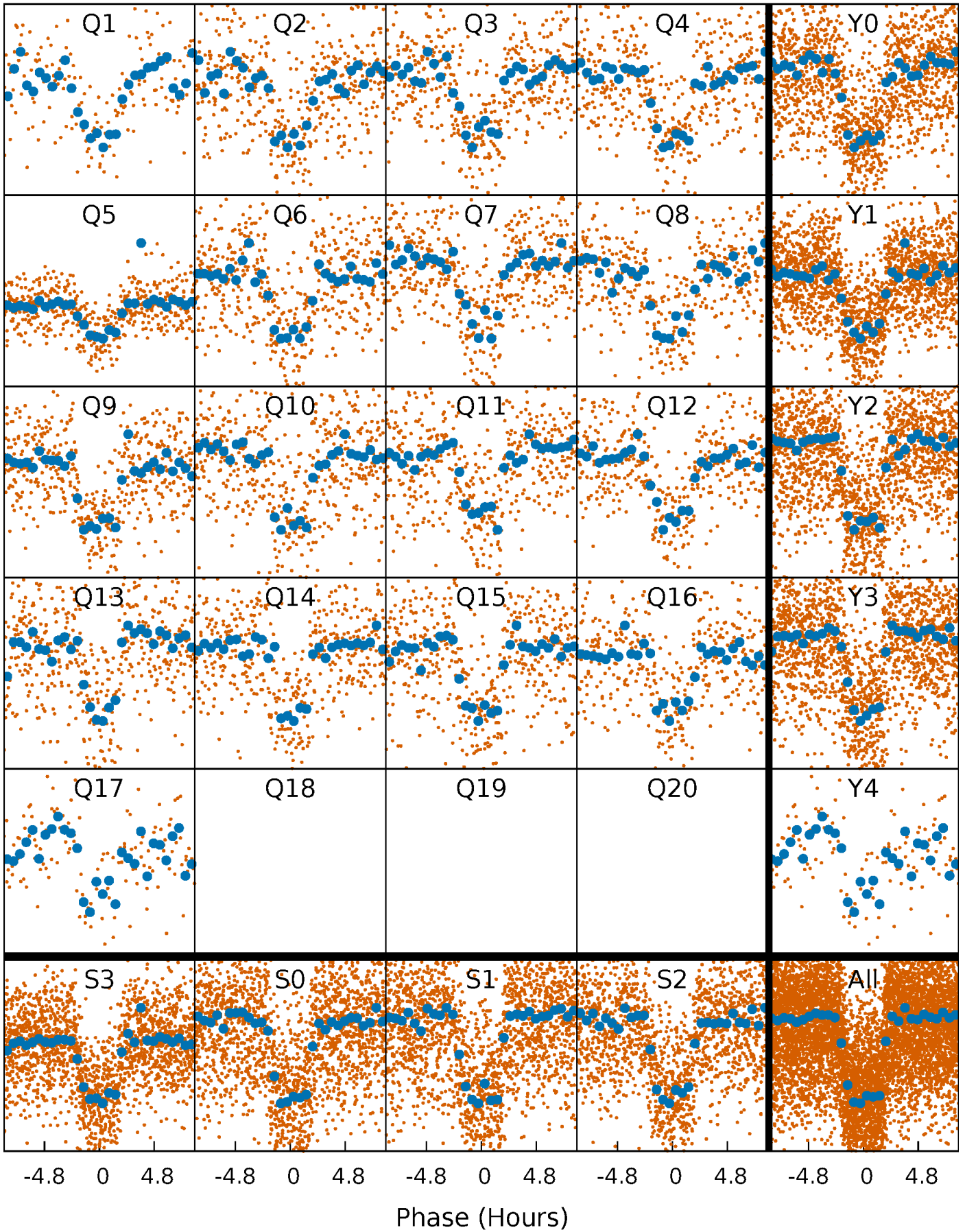


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

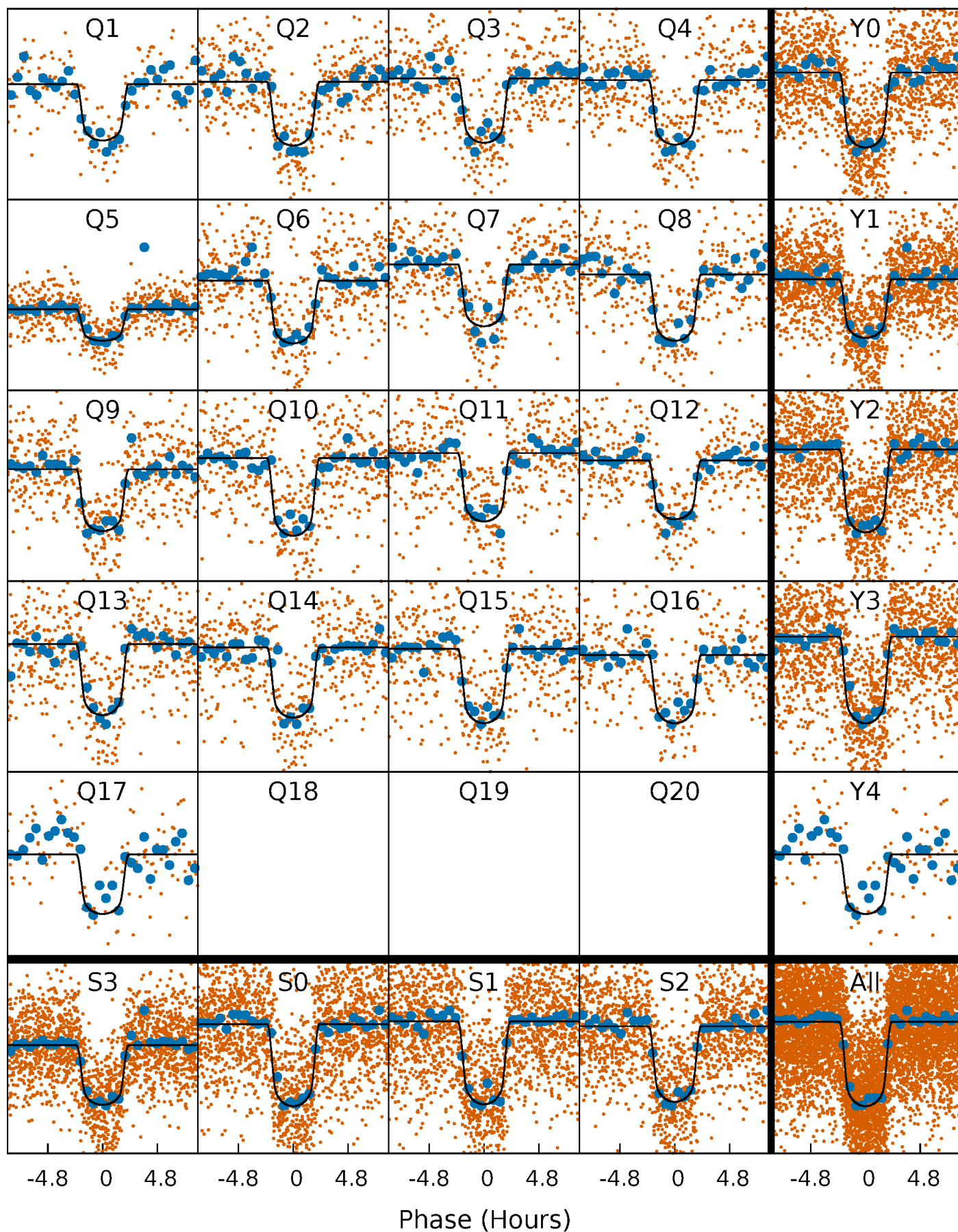
TCE 003642289-01 P= 6.002540 Days  $T_0=135.699560$  (BKJD)





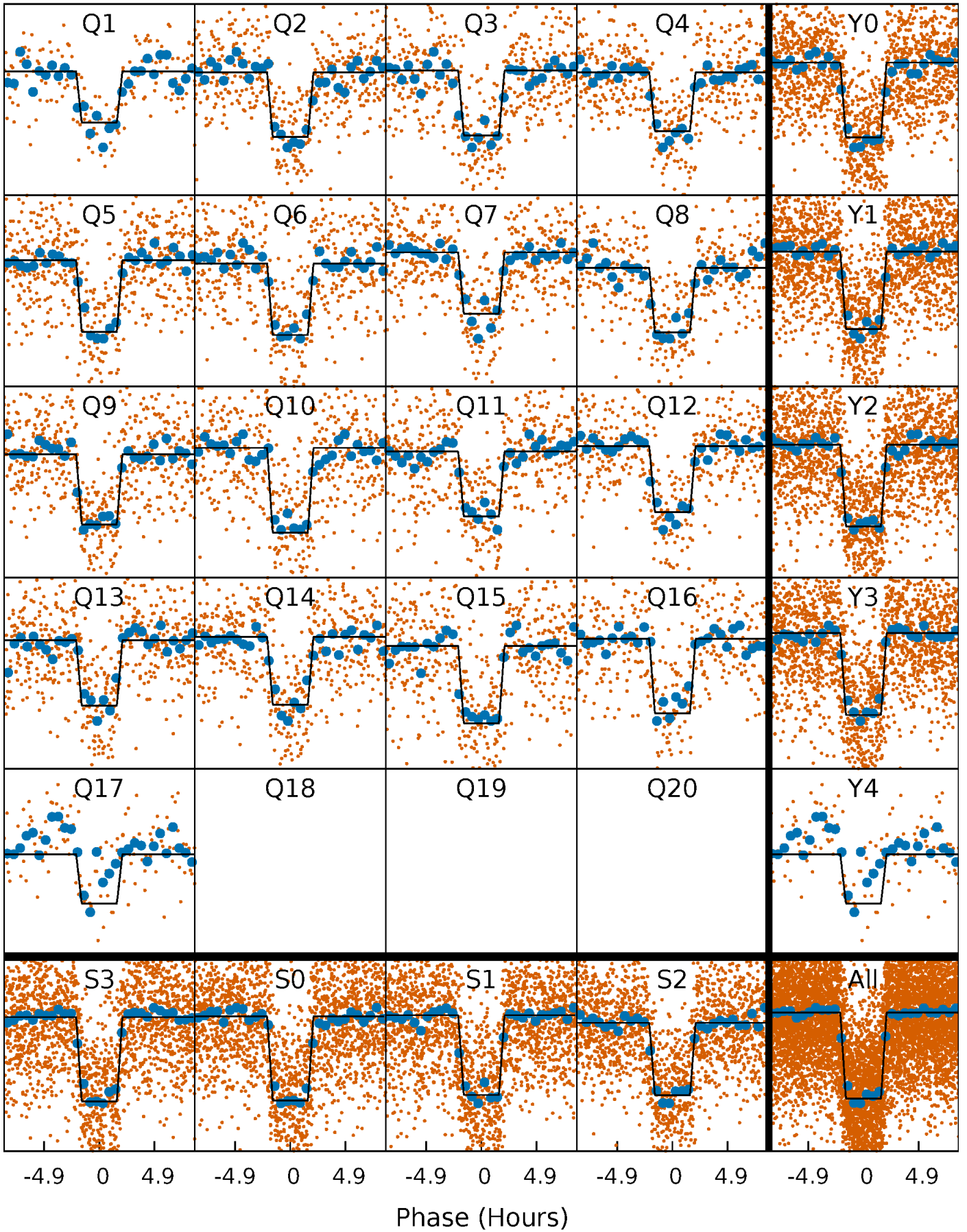
# DV Quarter-Phased Transit Curves

TCE 003642289-01 P= 6.002540 Days  $T_0=135.699560$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

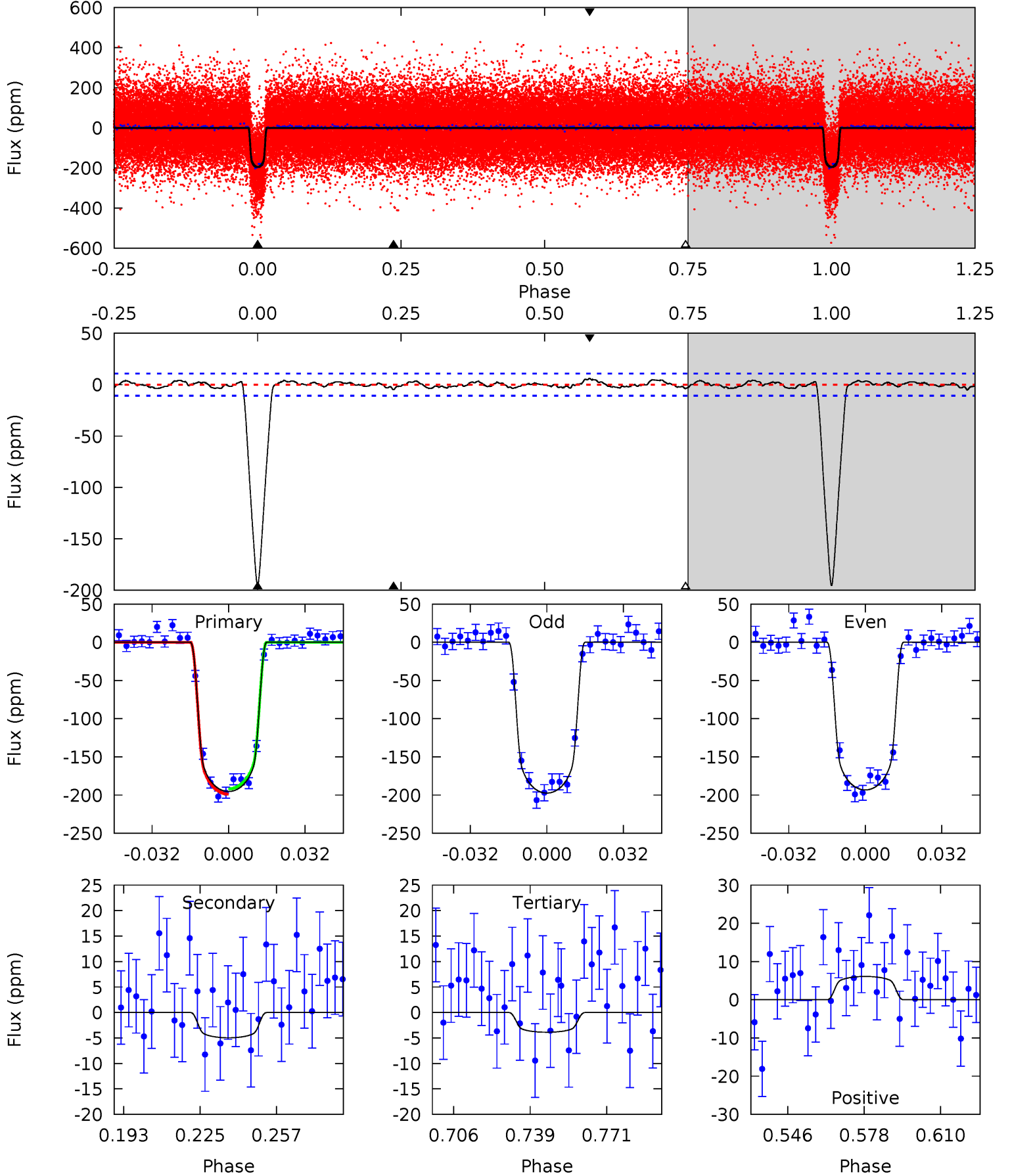
TCE 003642289-01 P= 6.002574 Days  $T_0=135.695954$  (BKJD)



# DV Model-Shift Uniqueness Test

003642289-01, P = 6.002540 Days, E = 129.697020 Days

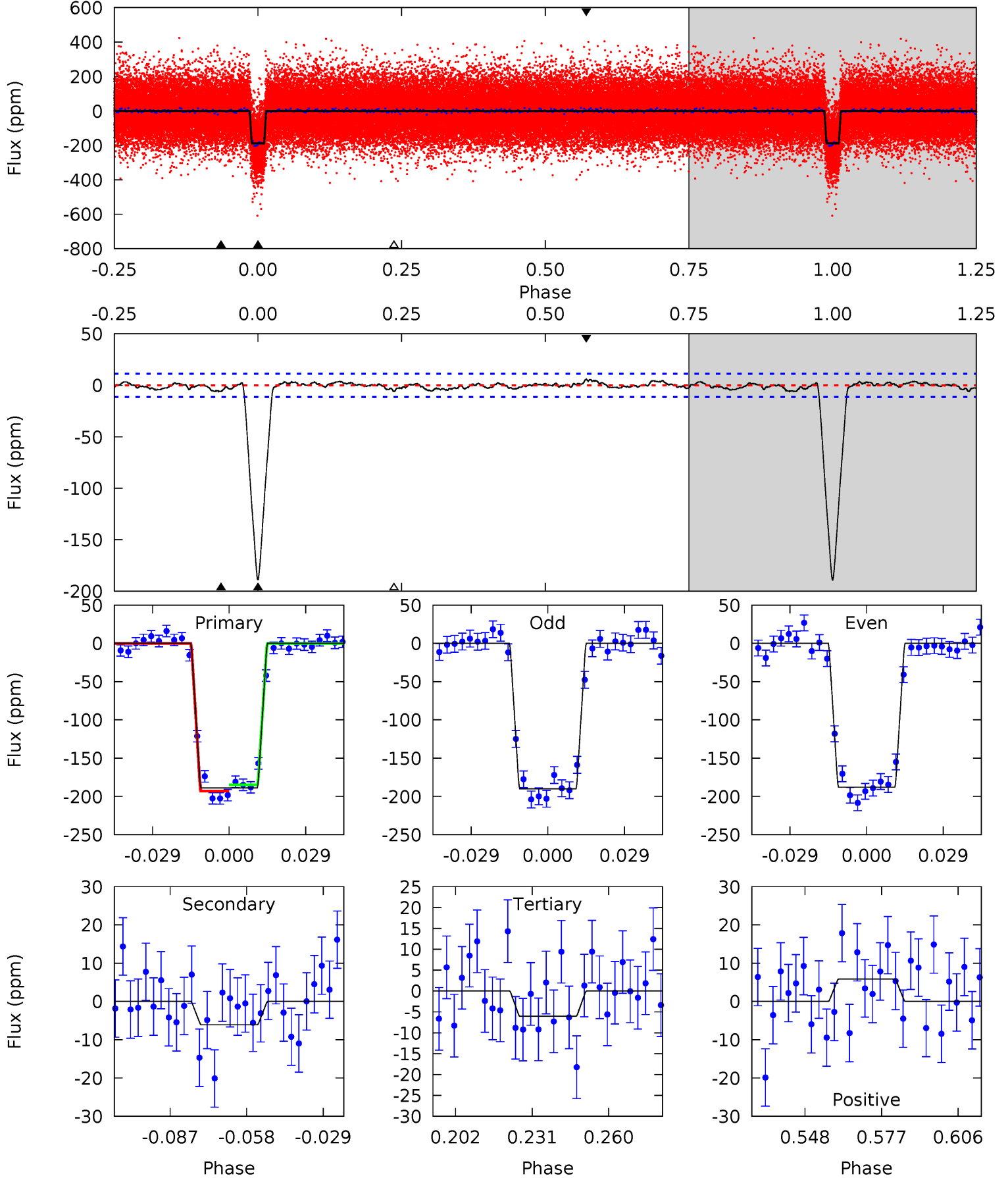
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
87.5	2.22	1.74	2.73	4.80	2.14	0.98	85.7	84.7	0.49	-0.50	0.93	0.98	0.03	1.55



# Alt Model-Shift Uniqueness Test

003642289-01, P = 6.002574 Days, E = 129.693380 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
80.4	2.58	2.58	2.50	4.82	2.19	0.96	77.9	77.9	0.01	0.08	0.46	0.99	0.03	1.74



### Stellar Parameters For KIC 003642289

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6204^{+111}_{-136}$	$4.269^{+0.084}_{-0.116}$	$0.260^{+0.150}_{-0.150}$	$1.360^{+0.228}_{-0.166}$	$1.257^{+0.087}_{-0.097}$	$0.704^{+0.251}_{-0.242}$
	+2%/-2%	+2%/-3%	+58%/-58%	+17%/-12%	+7%/-8%	+36%/-34%
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 003642289-01 / KOI 0301.01

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-5 \pm 2$	$2.33^{+0.23}_{-0.20}$	$1700^{+74}_{-70}$	$2954^{+191}_{-283}$	$2.408^{+1.263}_{-1.132}$
Alt.	$-6 \pm 2$	$2.07^{+0.22}_{-0.18}$	$1695^{+70}_{-65}$	$3163^{+188}_{-250}$	$3.662^{+1.756}_{-1.532}$

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



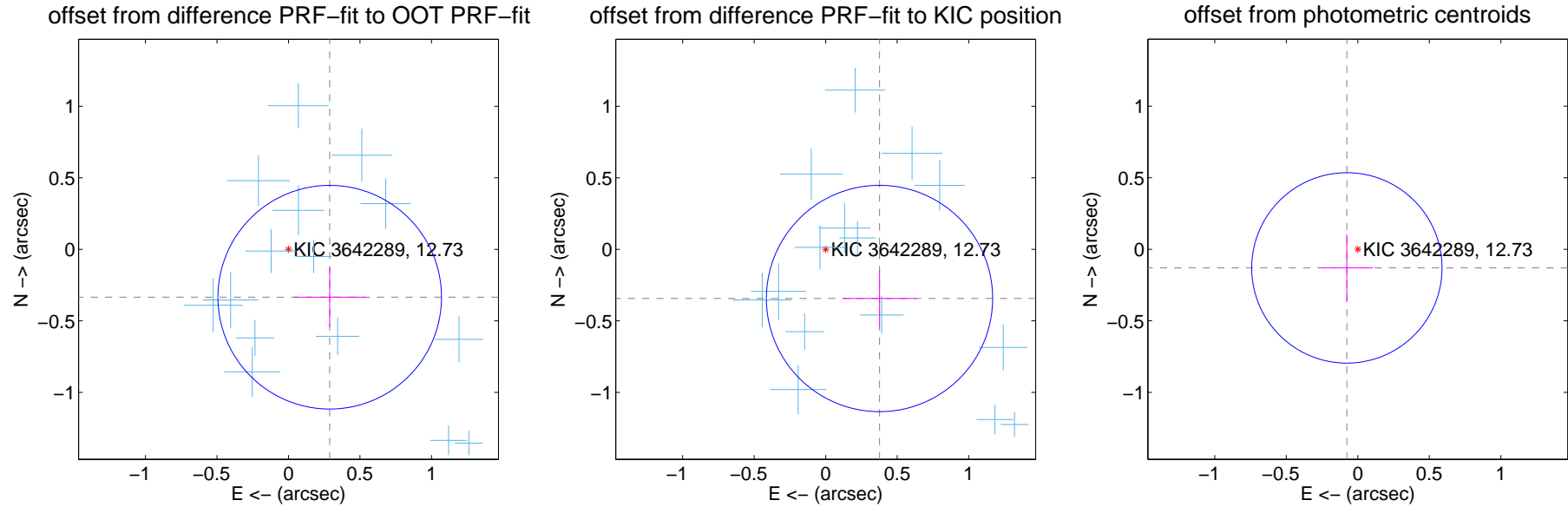
## DV Centroid Data

Supplemental centroid analysis for 003642289-01. Kepler magnitude: 12.73. Transit SNR 62.54

There are 16 quarters with good PRF difference image offsets

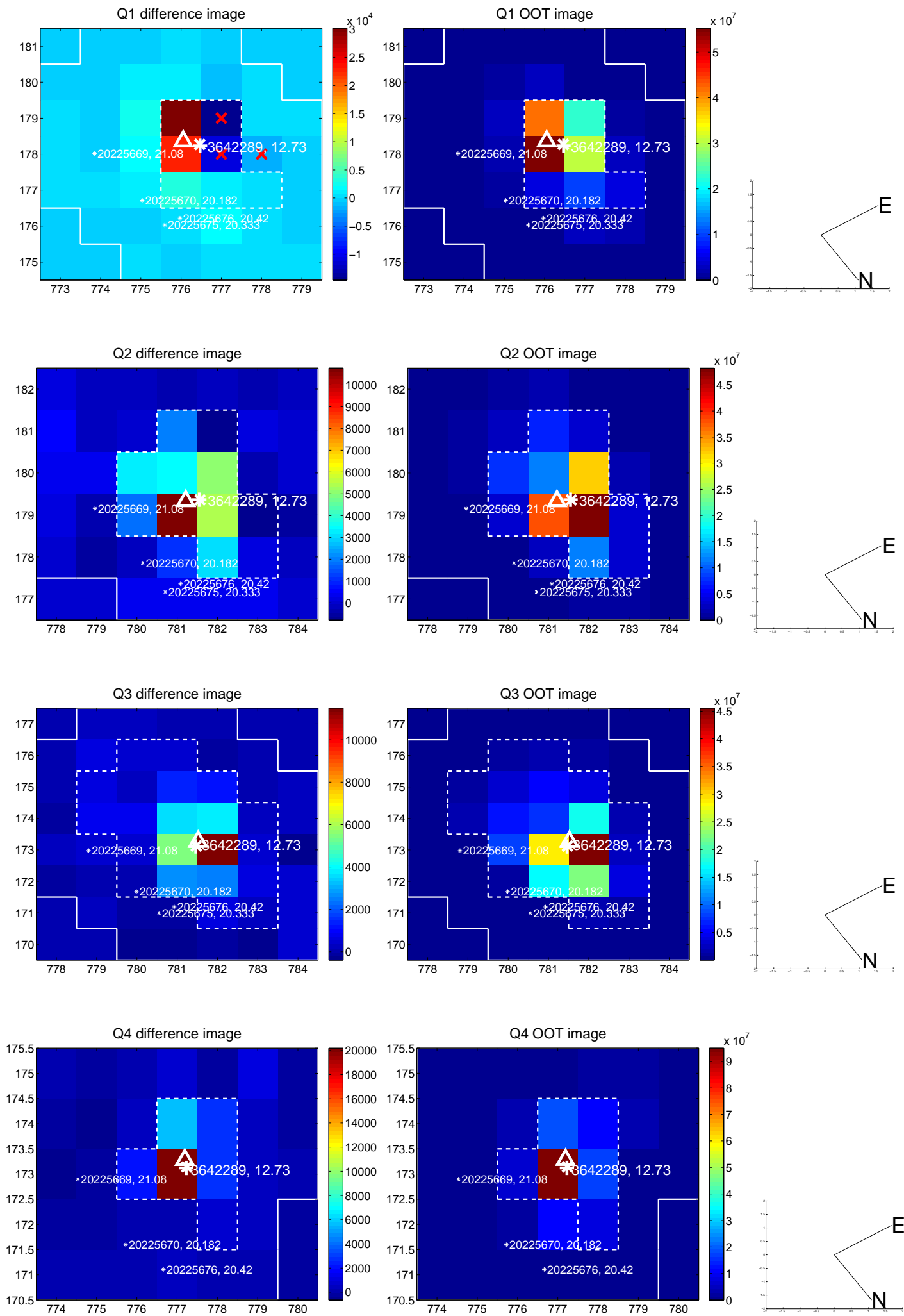
The direct PRF centroid is offset from the target star catalog position by about 0.17 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.442 \pm 0.260$	1.70	$-0.288 \pm 0.251$	$-0.335 \pm 0.210$
PRF-fit source offset from KIC position	$0.510 \pm 0.264$	1.93	$-0.376 \pm 0.258$	$-0.344 \pm 0.197$
photometric centroid source offset	$0.15 \pm 0.22$	0.68	$0.08 \pm 0.18$	$-0.13 \pm 0.23$

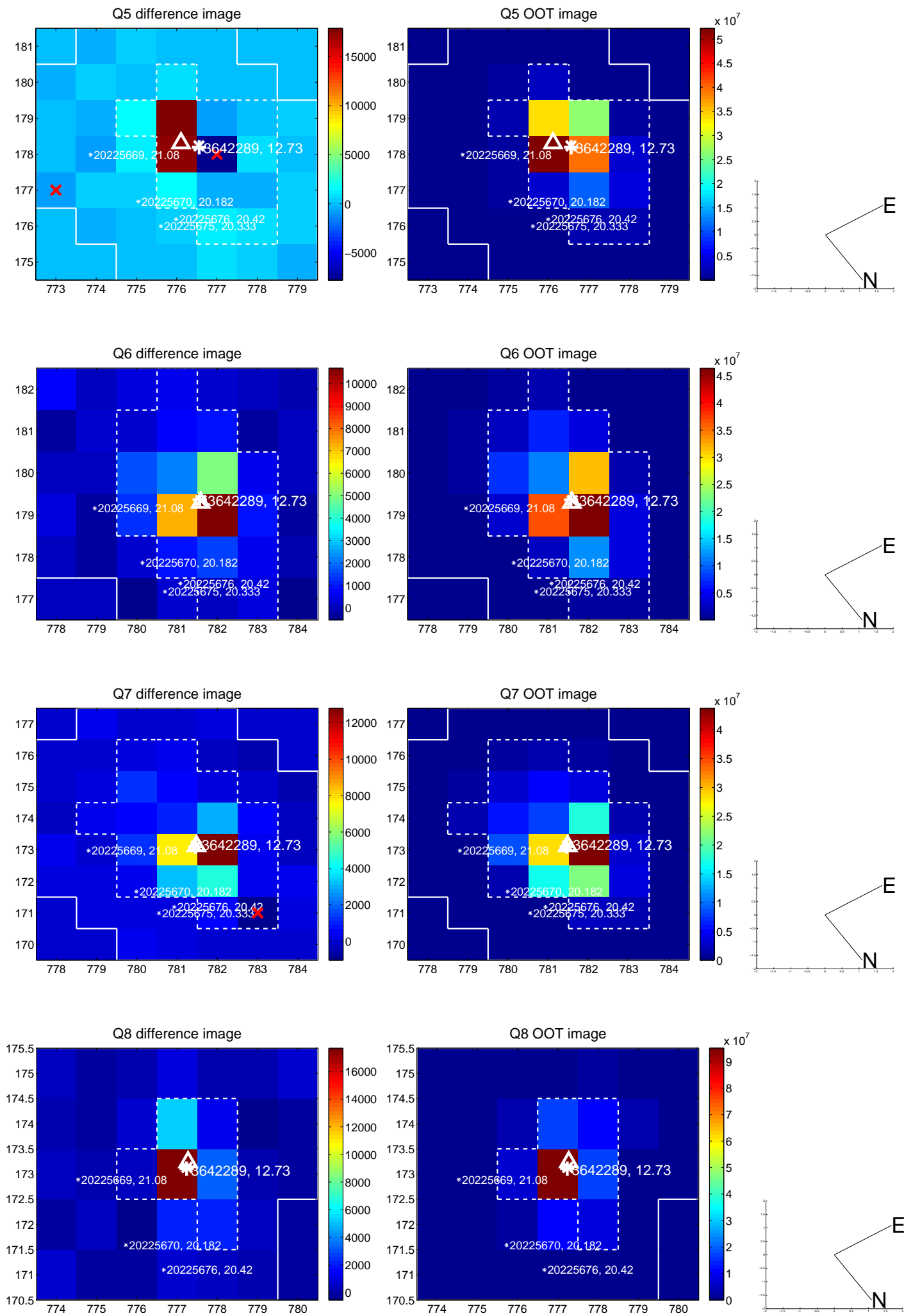


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

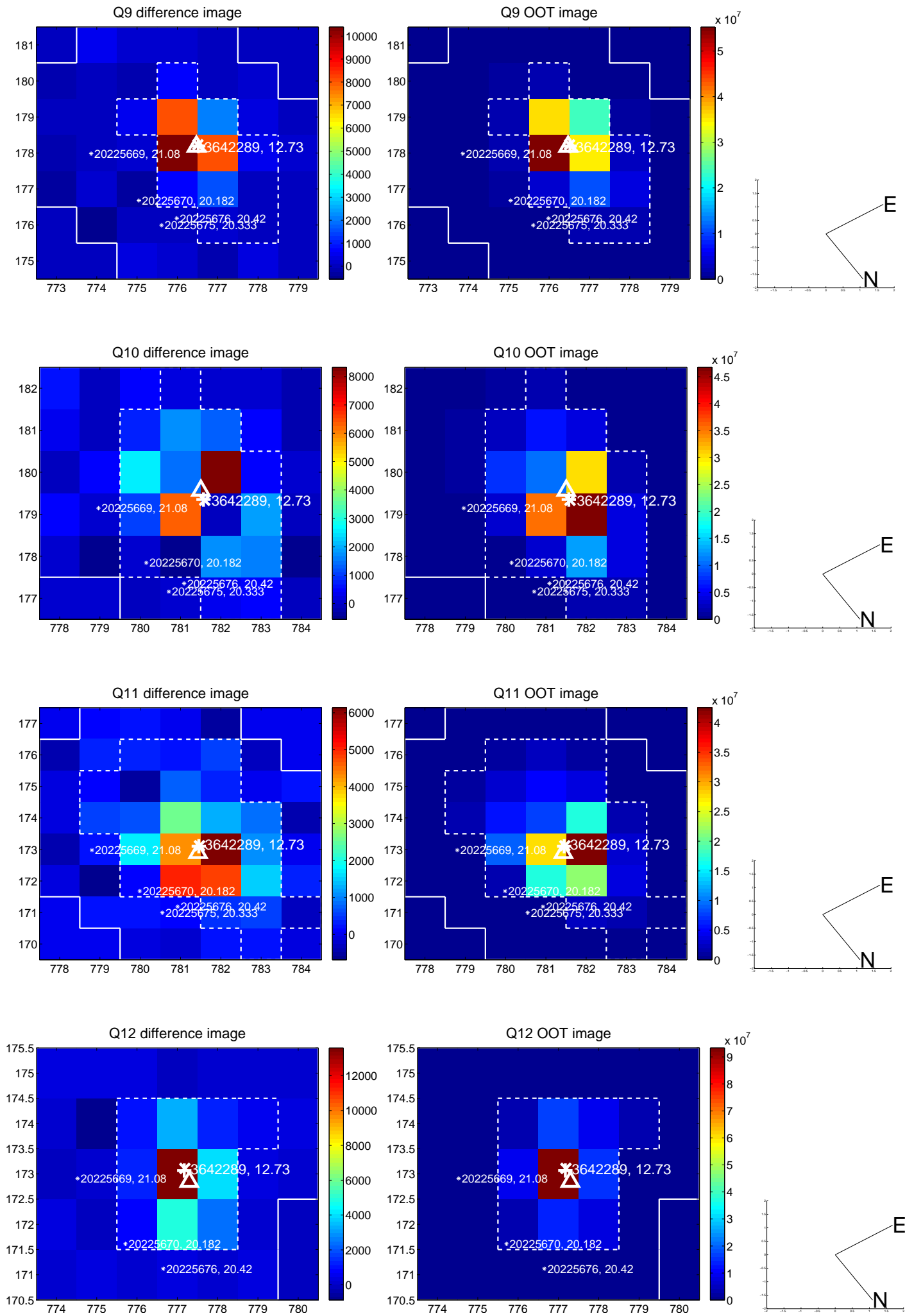
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



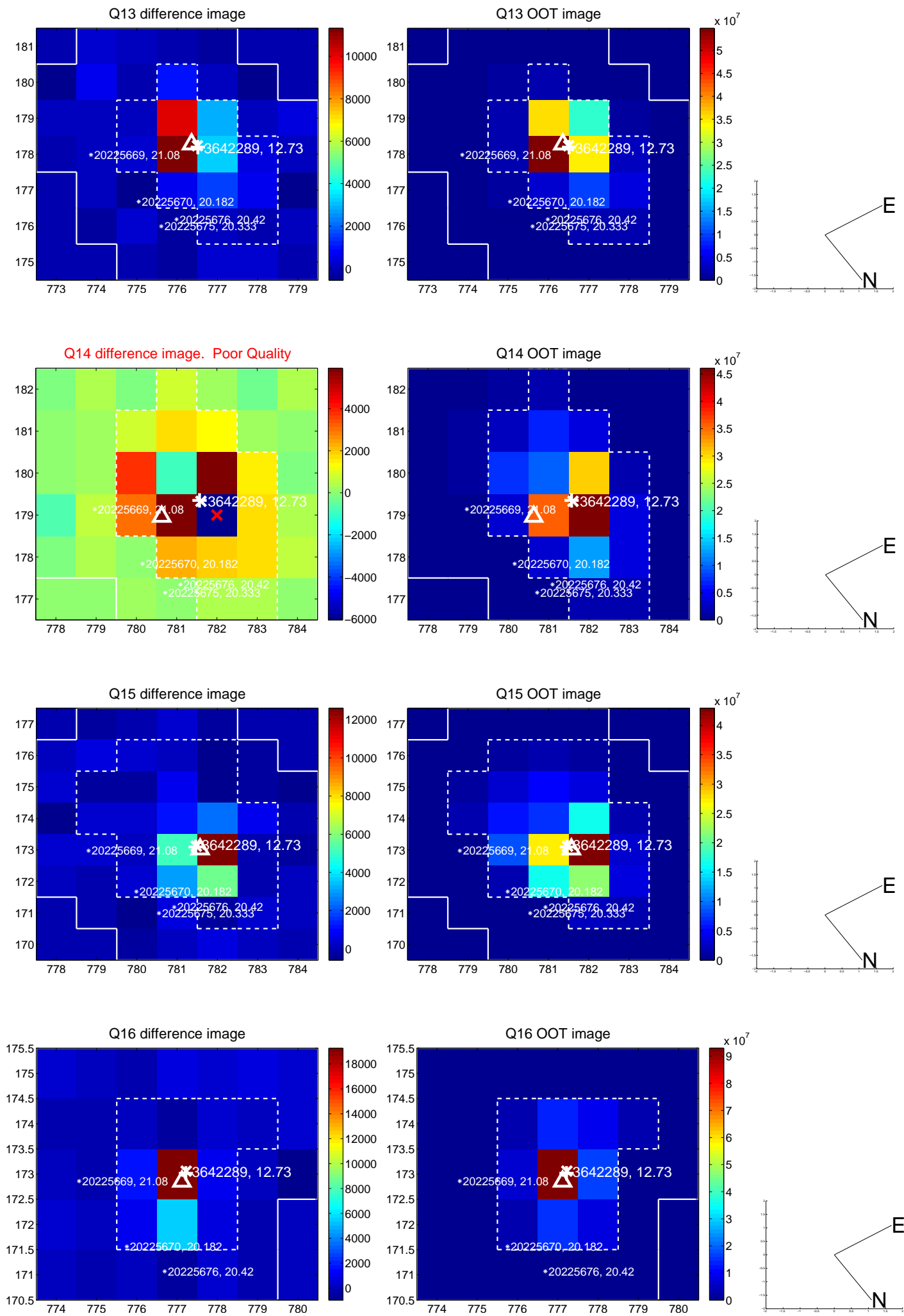
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

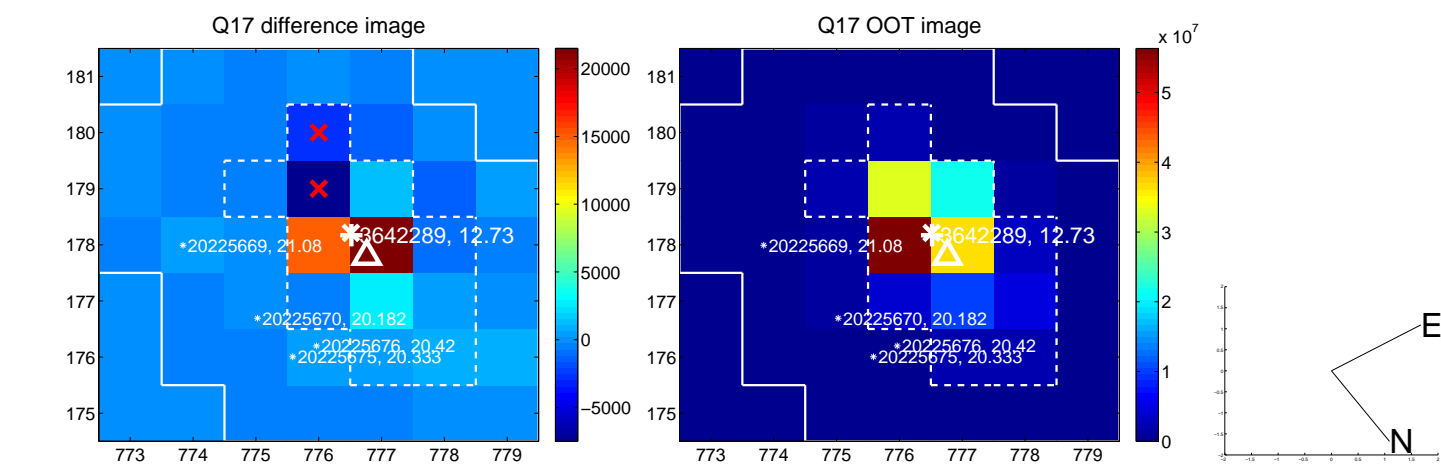


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

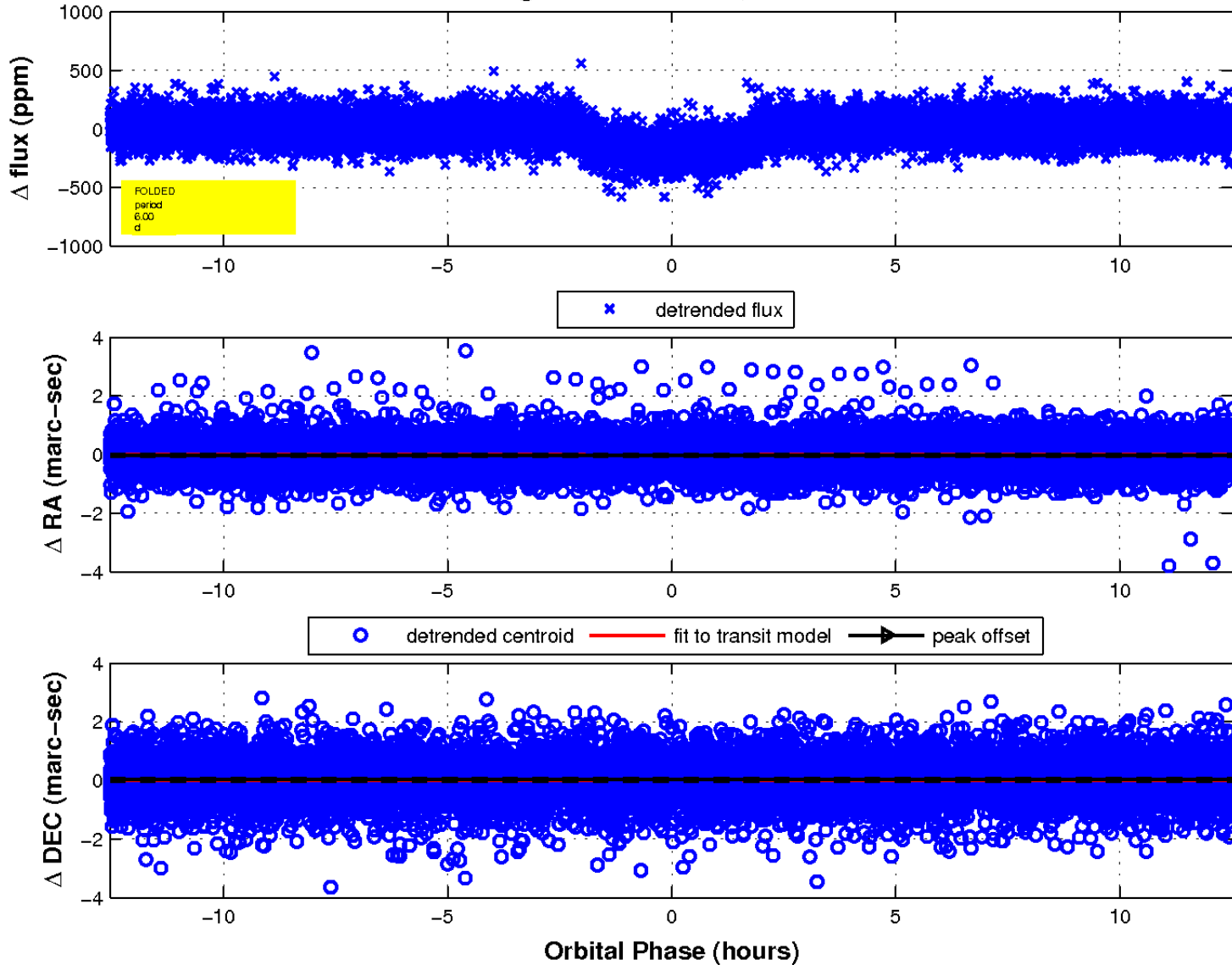




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

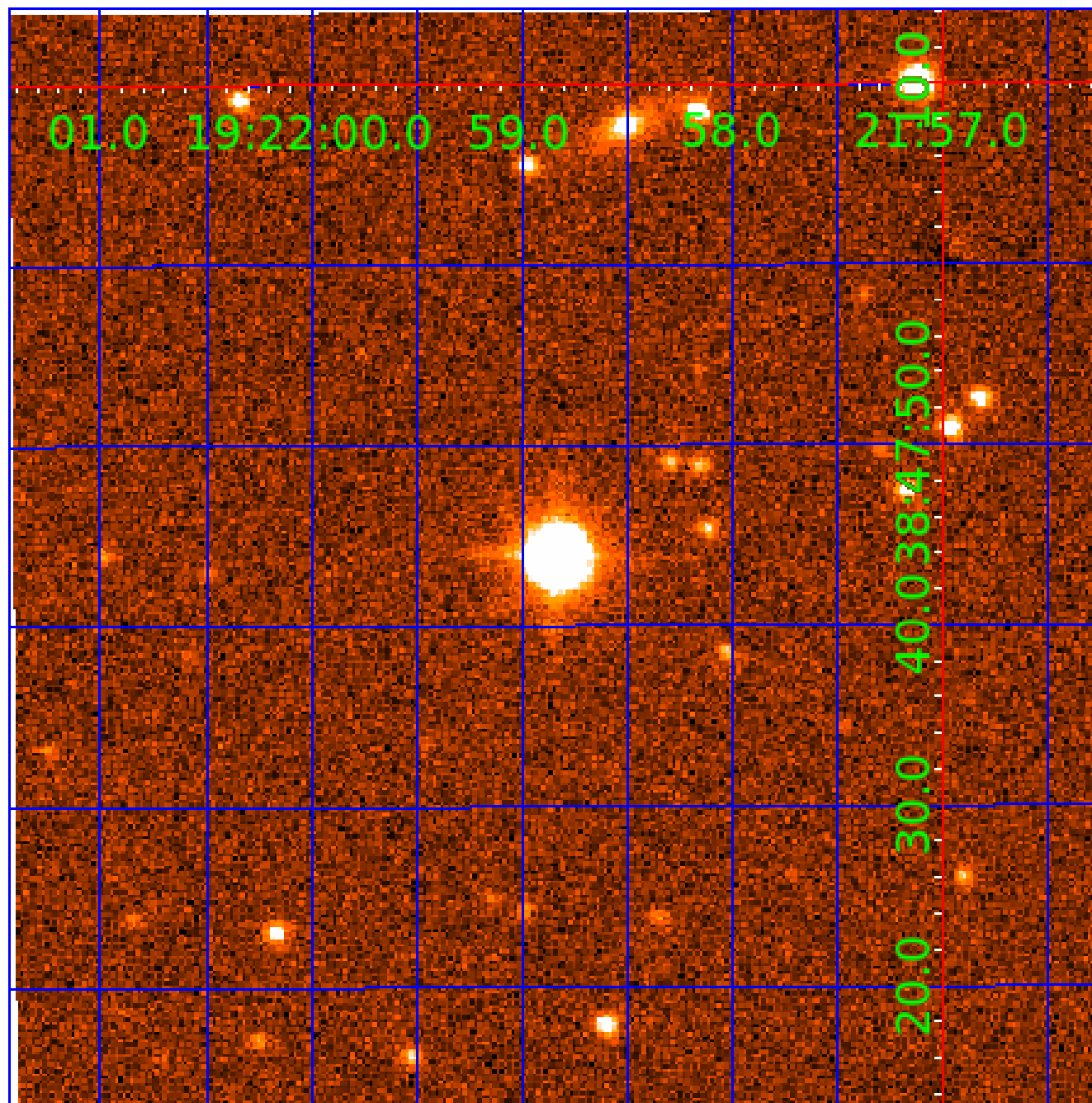


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination



# KIC 003642289

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003642289-01	OBS	0301.01	6.002540	135.699560	199.4	4.178	55.5	62.5	1.36	6204	2.30	505.24
003642289-02	OBS	0301.02	11.448642	141.385579	75.2	5.015	16.9	18.6	1.36	6204	1.39	213.60

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003642289-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
003642289-02	OBS	PC	1.00	0	0	0	0	NO_COMMENT

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

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

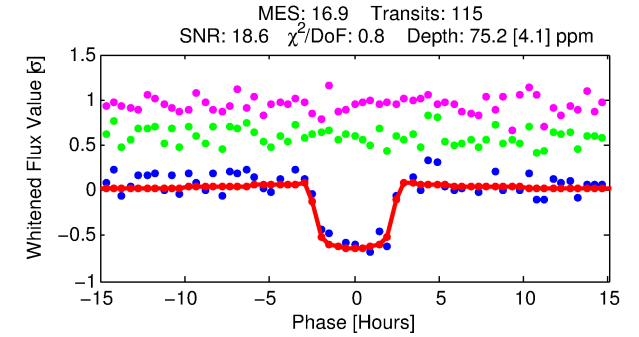
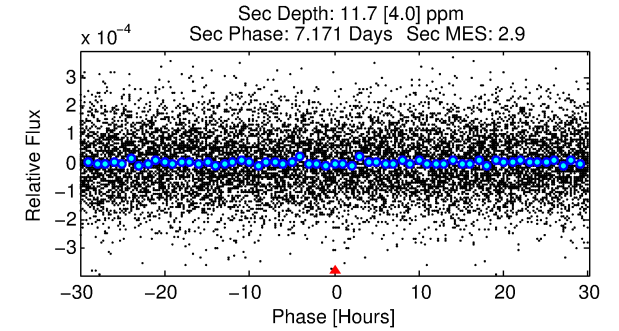
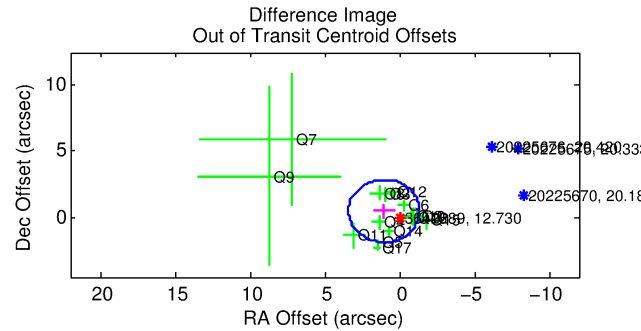
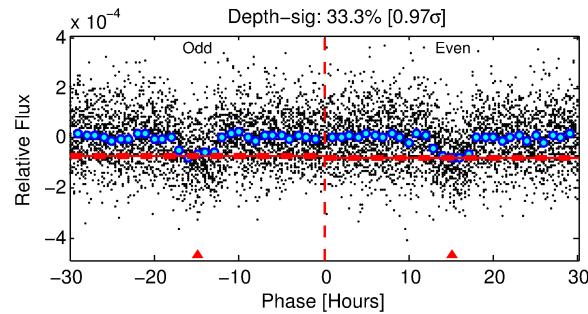
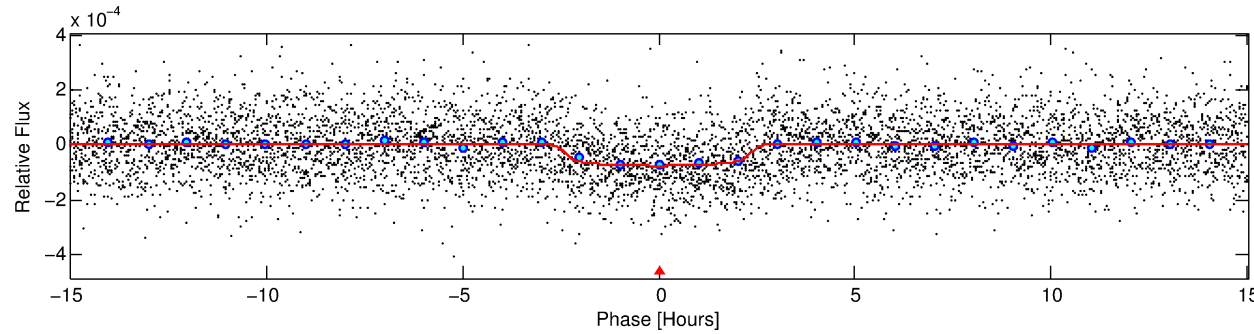
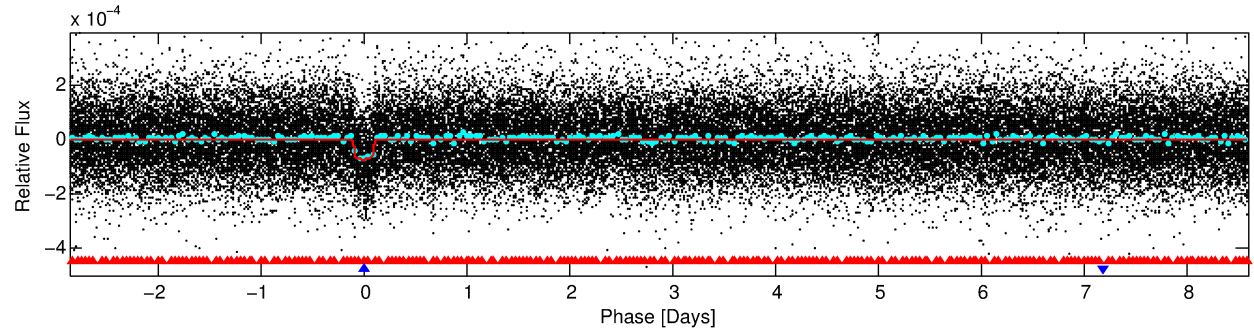
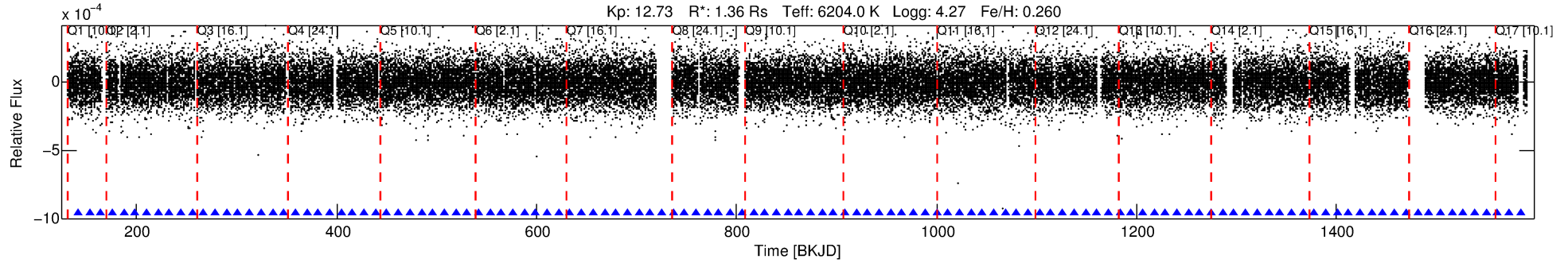
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 003642289-02

No Significant Match Found

# DV One-Page Summary

KIC: 3642289 Candidate: 2 of 2 Period: 11.449 d  
KOI: K00301.02 Name: Kepler-135c Corr: 0.986



## DV Fit Results:

Period = 11.44864 [0.00007] d  
Epoch = 141.3856 [0.0048] BKJD  
Rp/R\* = 0.0094 [0.0021]  
a/R\* = 8.04 [9.11]  
b = 0.90 [0.25]  
Seff = 213.60 [48.66]  
Teq = 975 [56] K  
Rp = 1.39 [0.39] Re  
a = 0.1072 [0.0153] AU  
Ag = 38.17 [22.97] [1.62 $\sigma$ ]  
Teffp = 3746 [534] K [5.16 $\sigma$ ]

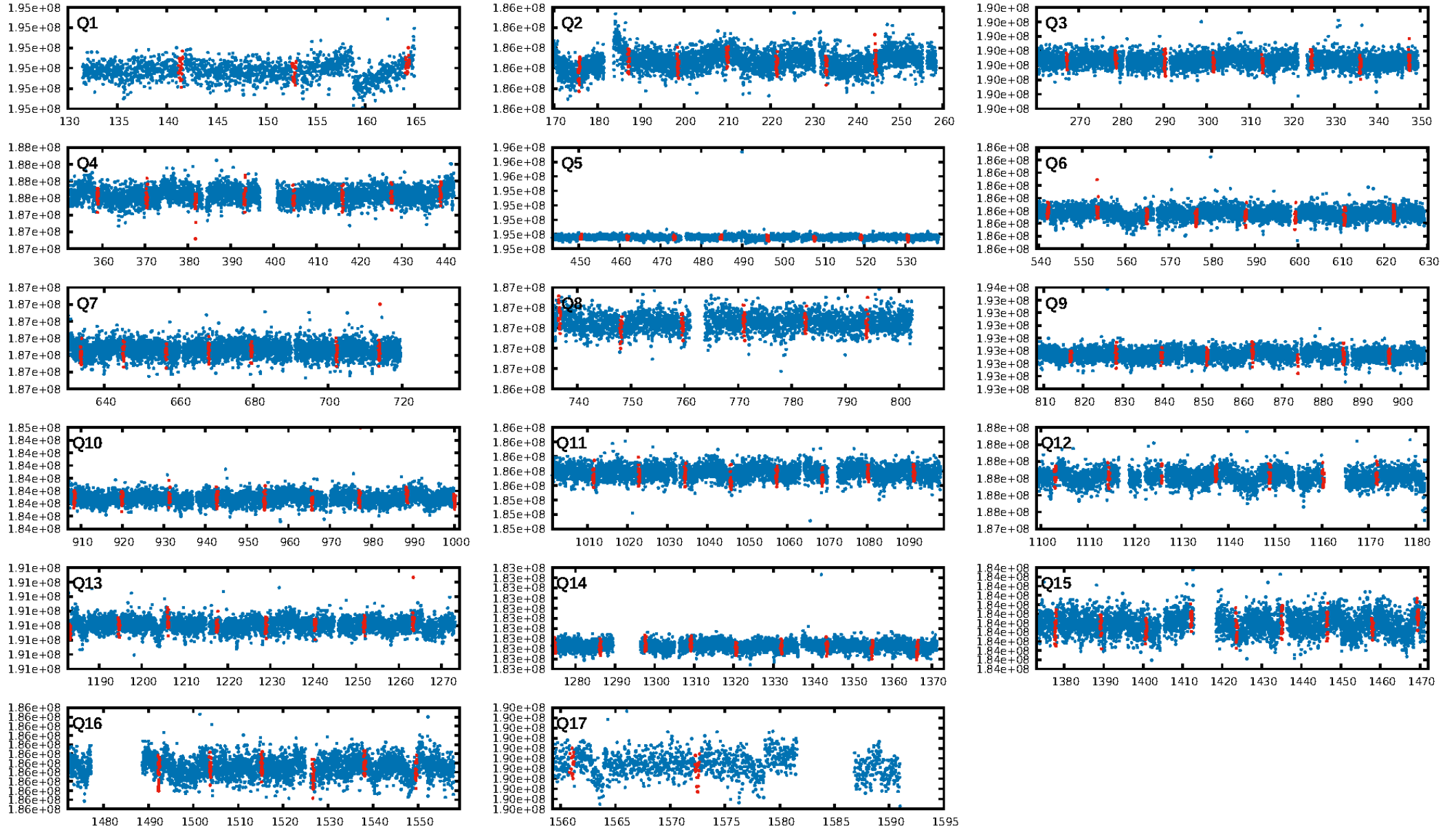
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [20.03 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 99.9%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 2.85e-60  
RollingBand-fgt: 1.00 [110/110]  
GhostDiagnostic-chr: 2.406  
Centroid-sig: 0.0%  
Centroid-so: 2.436 arcsec [3.54 $\sigma$ ]  
OotOffset-rm: 1.149 arcsec [1.45 $\sigma$ ]  
OotOffset-st: 4/4/4/3 [15]  
KicOffset-rm: 1.085 arcsec [1.33 $\sigma$ ]  
KicOffset-st: 4/4/4/3 [15]  
DiffImageQuality-fgm: 0.73 [11/15]  
DiffImageOverlap-fno: 1.00 [17/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 21:33:16 Z

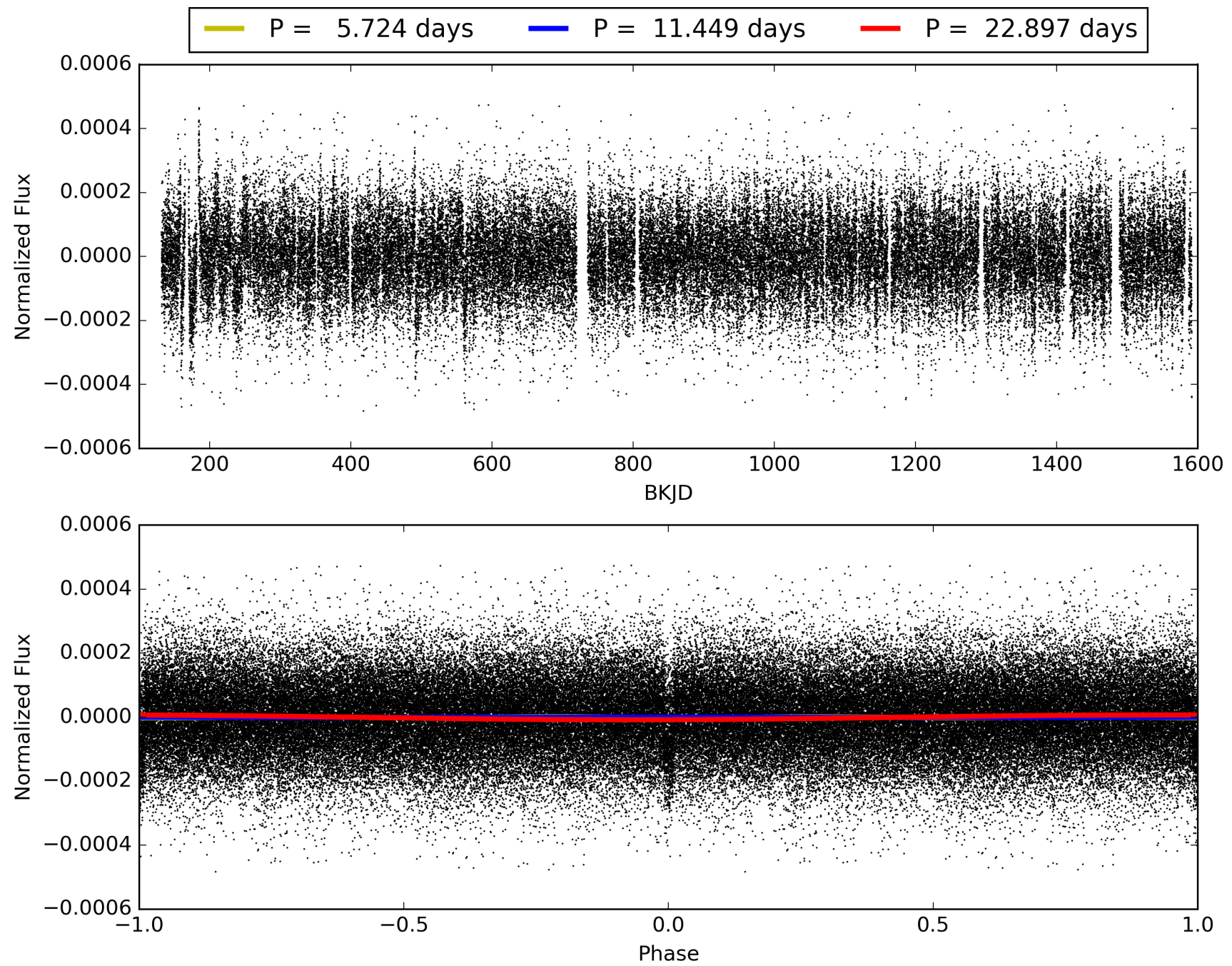
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 003642289-02, PDC Light Curves



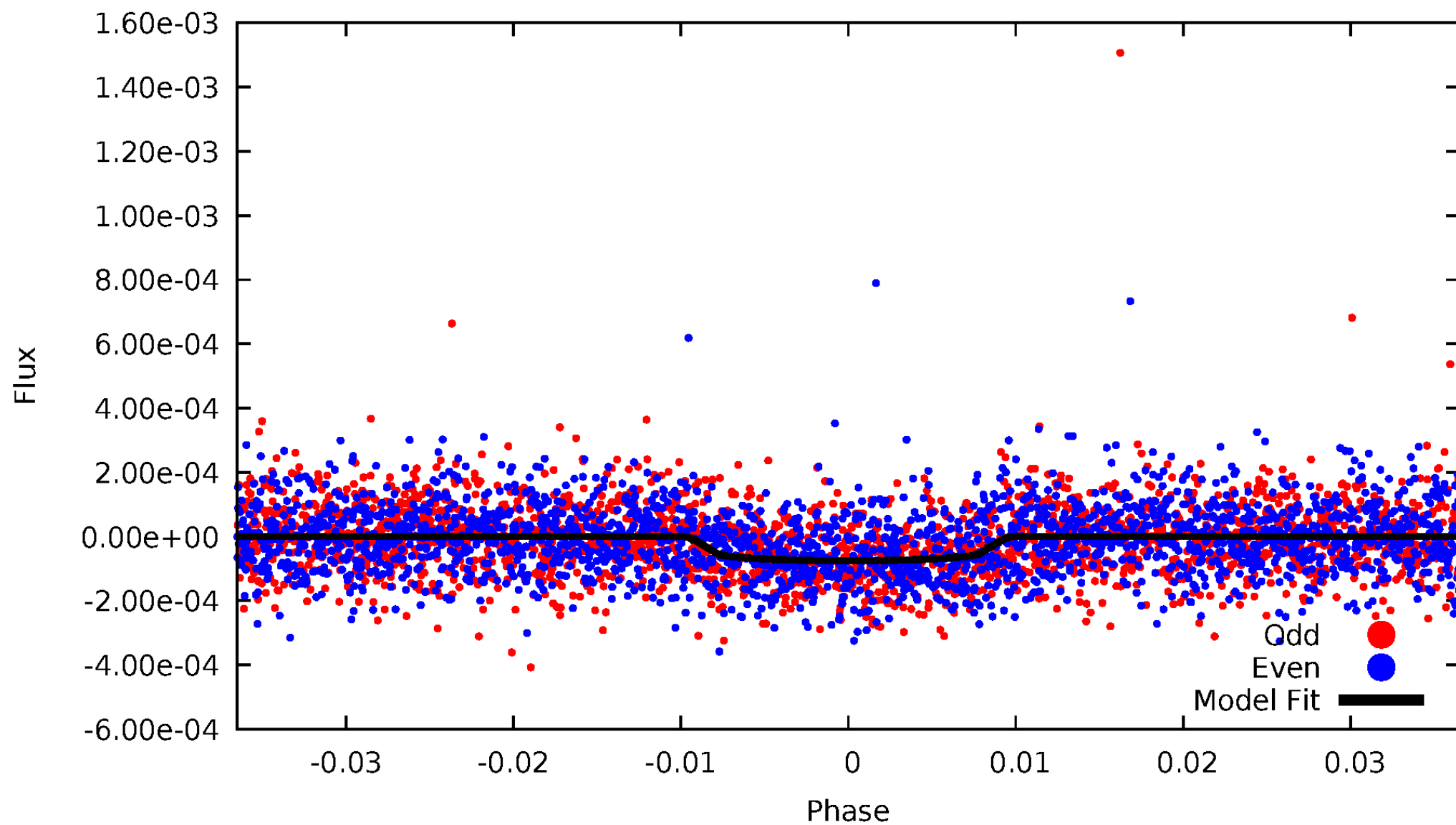


TCE 003642289-02



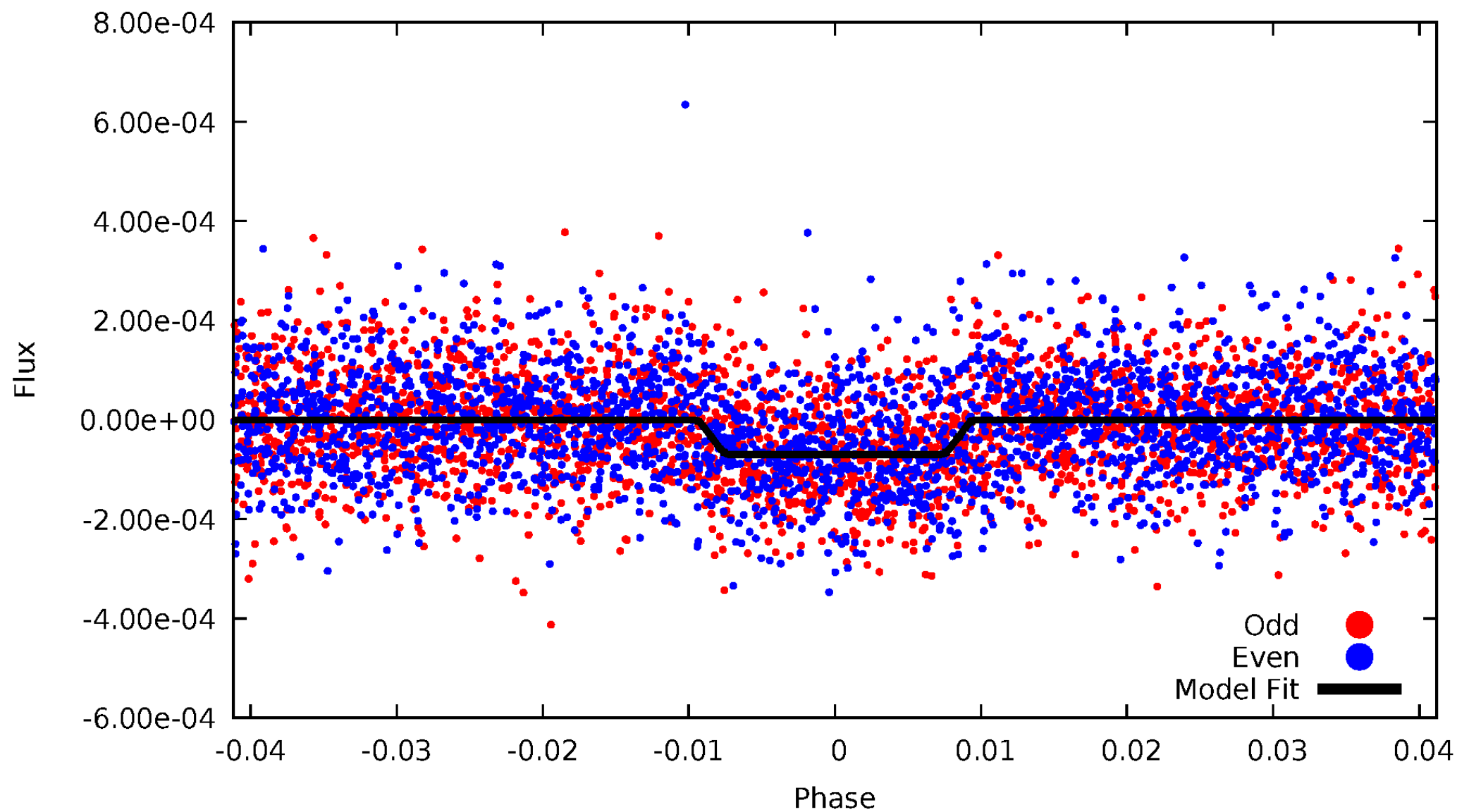
# DV Odd/Even

TCE 003642289-02



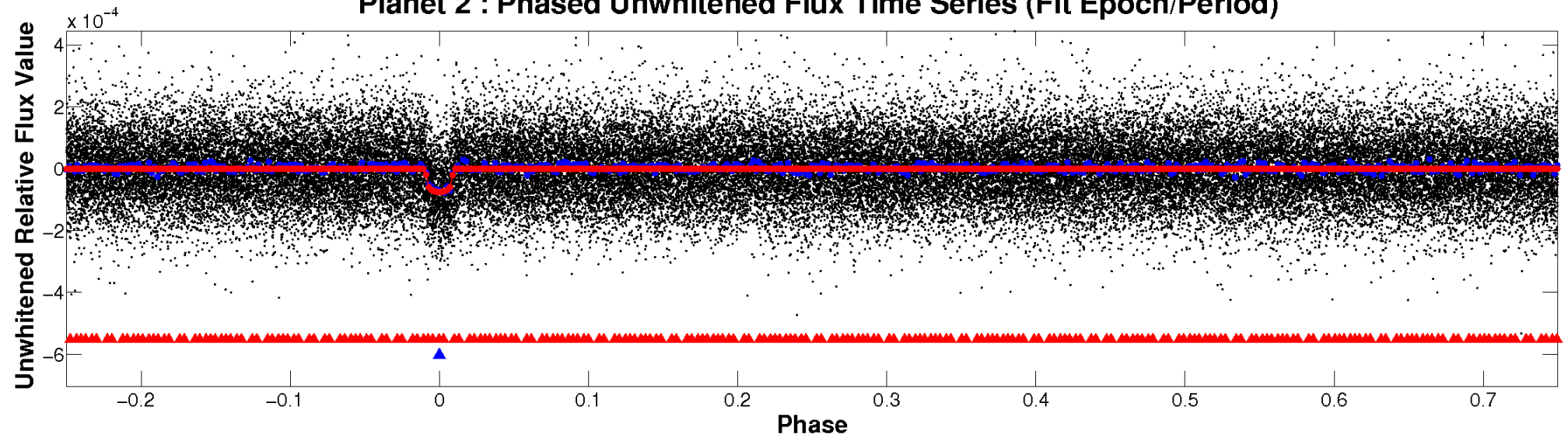
# ALT Odd/Even

TCE 003642289-02

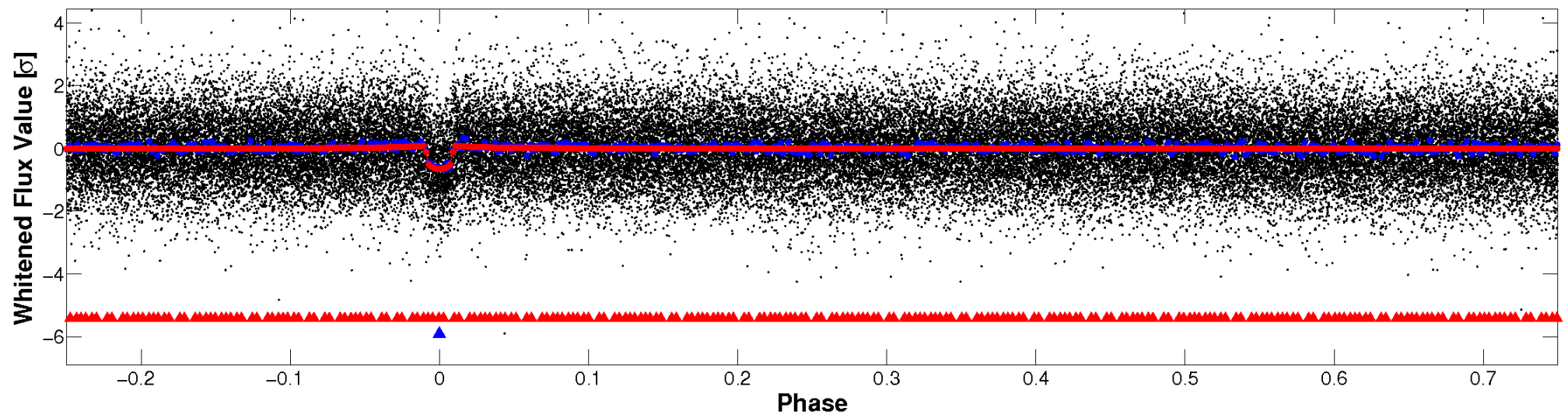


# Non-Whitened Vs. Whitened Light Curve

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



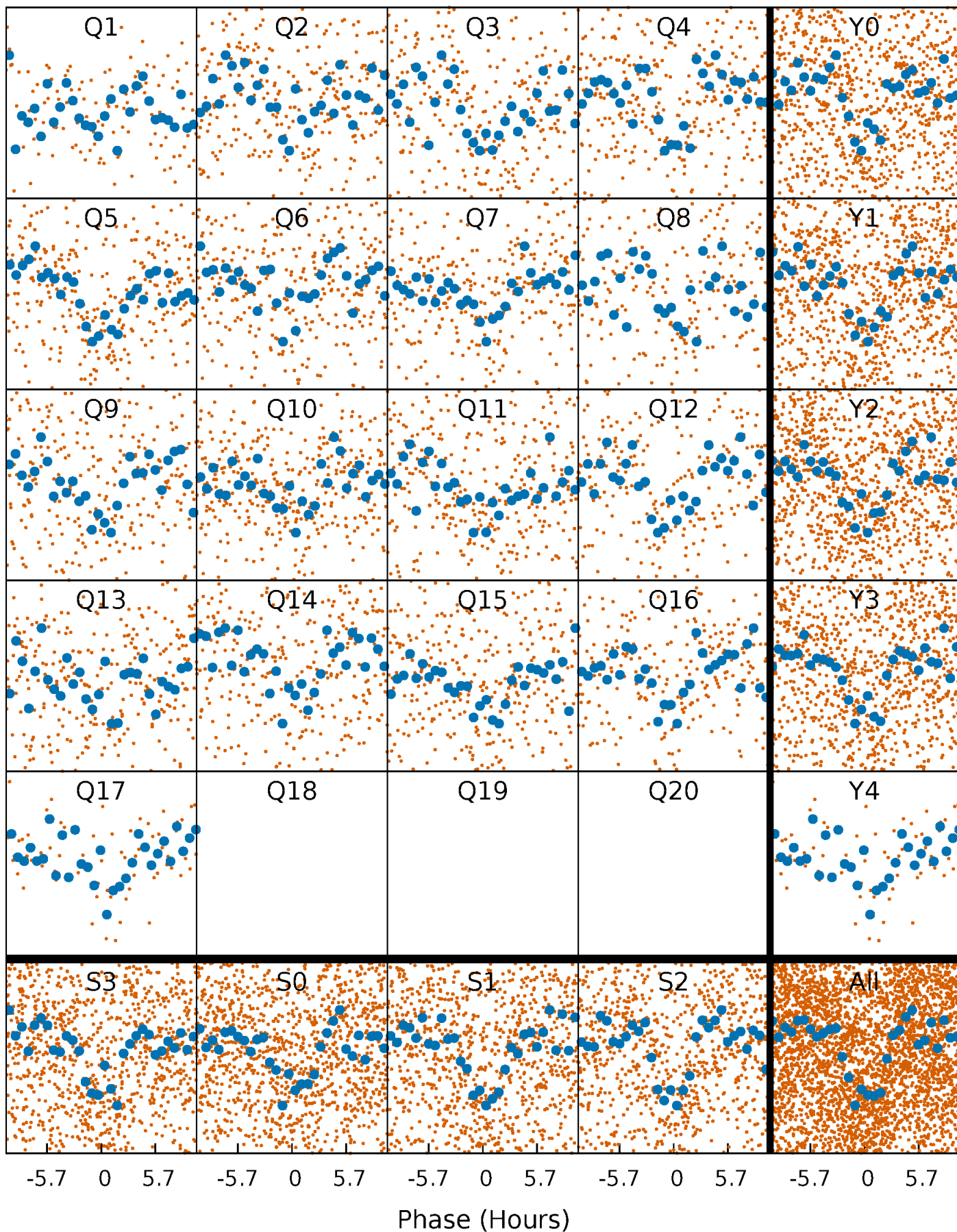
## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)





# PDC Quarter-Phased Transit Curves

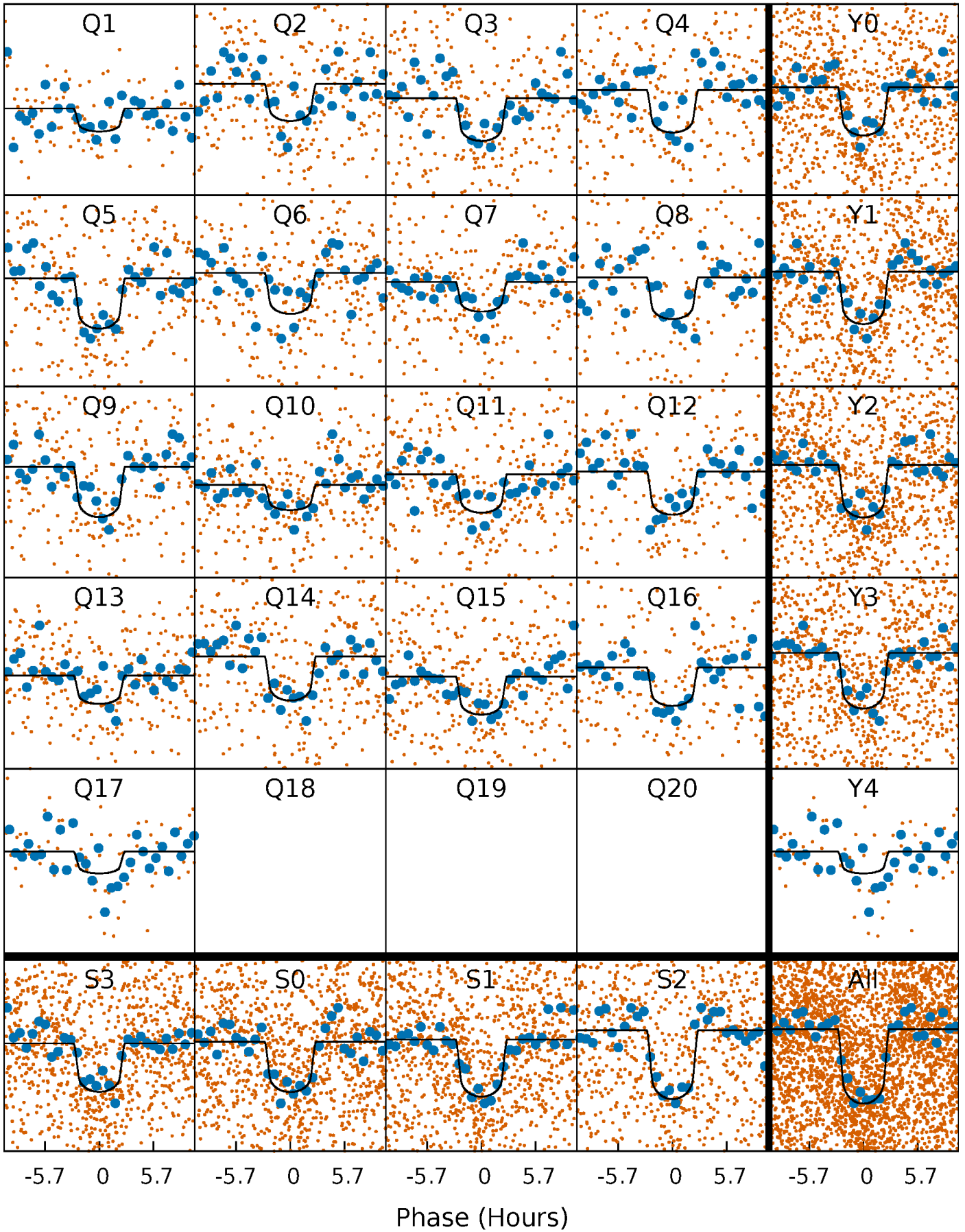
TCE 003642289-02 P= 11.448642 Days  $T_0=141.385579$  (BKJD)





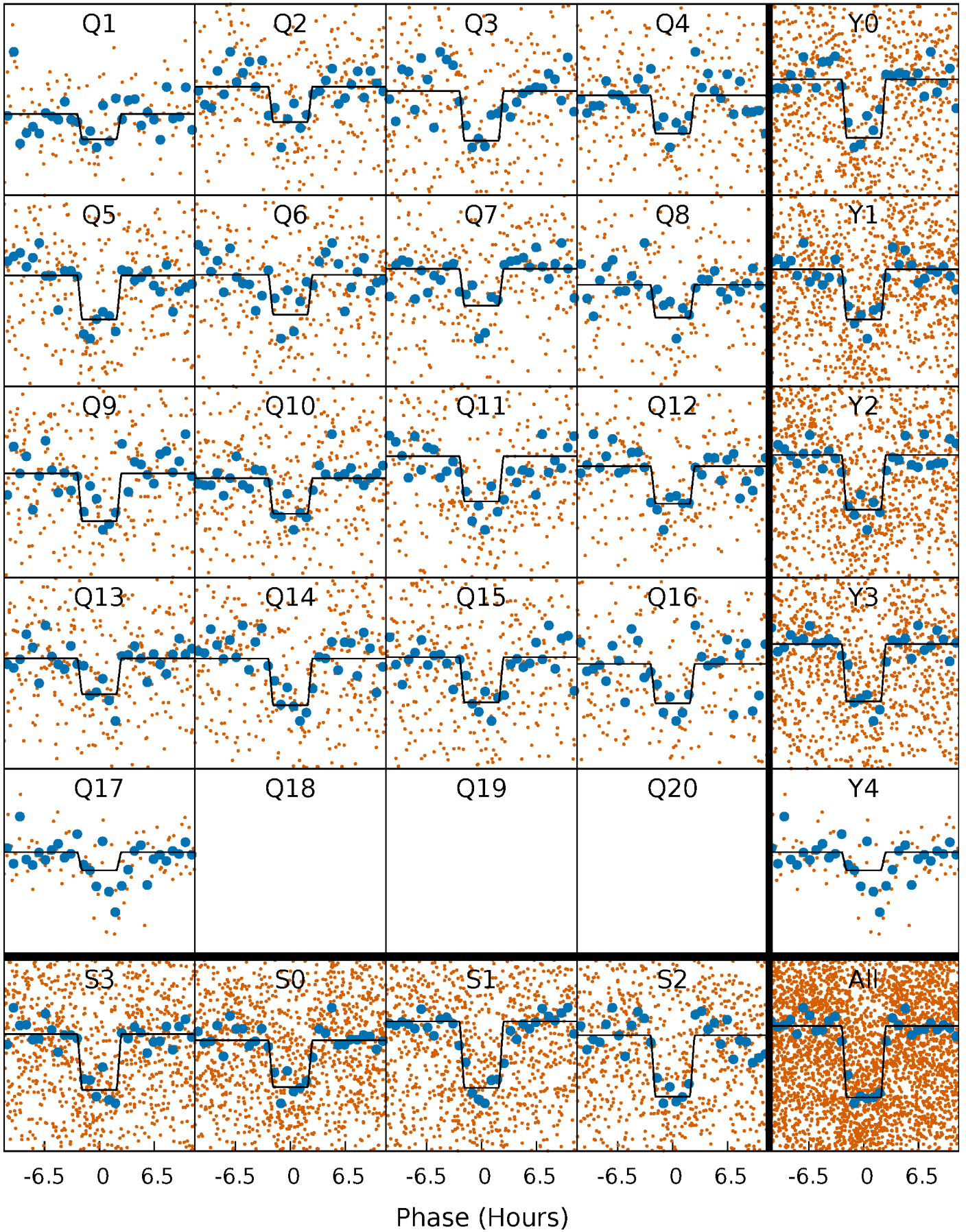
# DV Quarter-Phased Transit Curves

TCE 003642289-02 P= 11.448642 Days  $T_0=141.385579$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

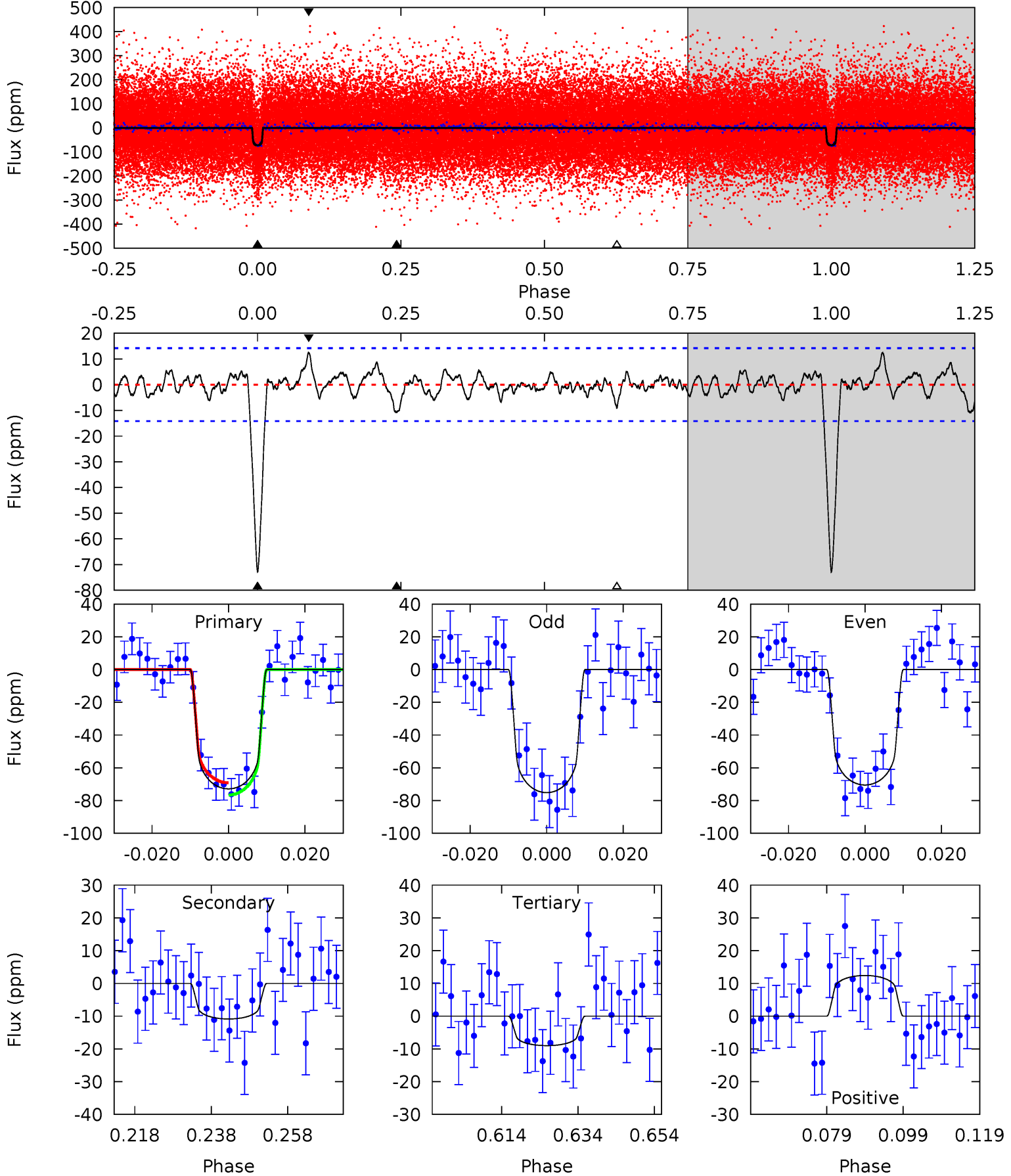
TCE 003642289-02 P= 11.448406 Days  $T_0=141.402110$  (BKJD)



# DV Model-Shift Uniqueness Test

003642289-02, P = 11.448642 Days, E = 129.936937 Days

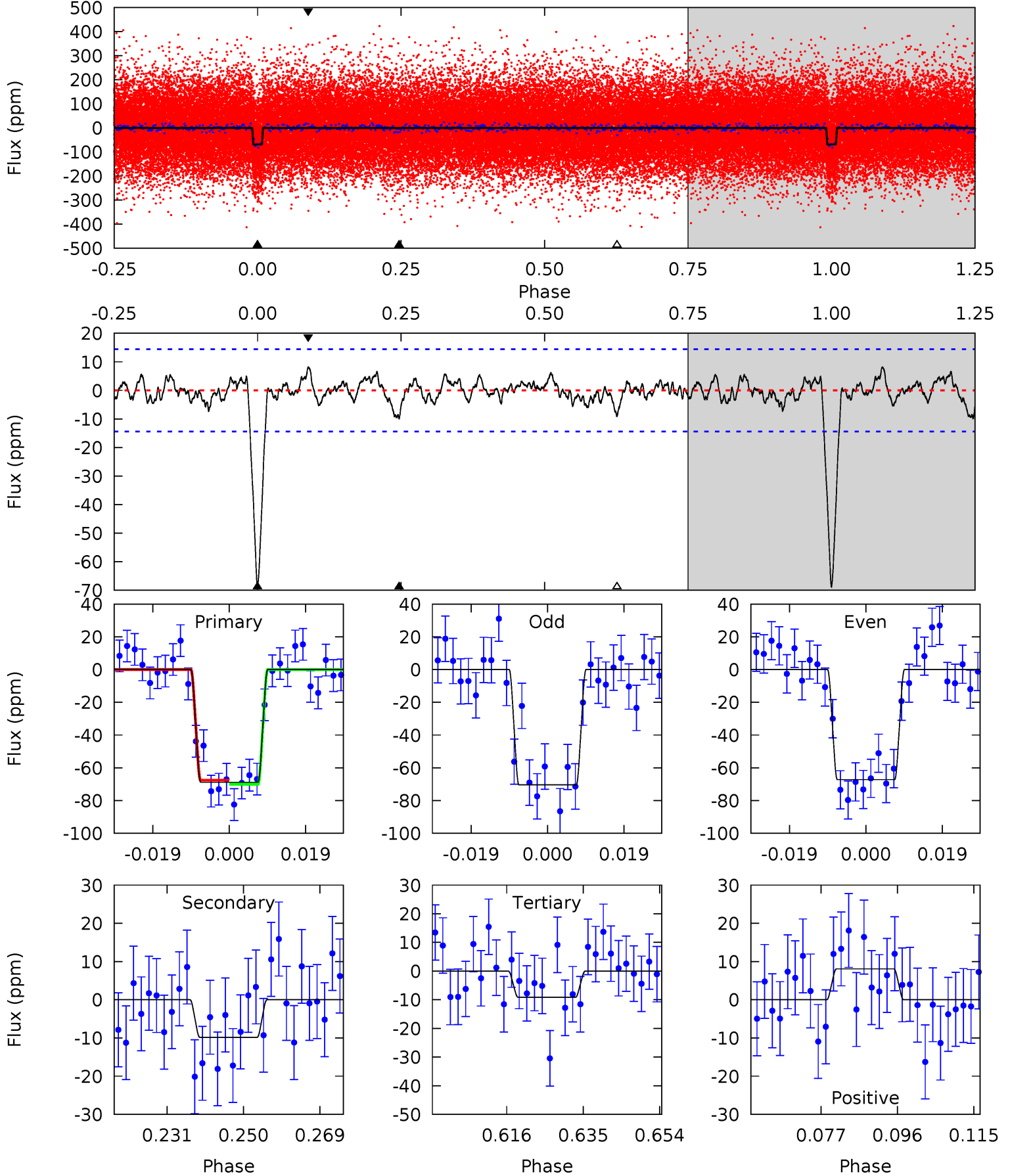
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
25.1	3.74	3.10	4.28	4.89	2.33	1.05	22.0	20.8	0.64	-0.53	0.80	0.99	0.15	1.29



# Alt Model-Shift Uniqueness Test

003642289-02, P = 11.448406 Days, E = 129.953704 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
23.4	3.35	3.11	2.75	4.90	2.34	0.95	20.3	20.7	0.24	0.60	0.54	0.93	0.11	0.41



### Stellar Parameters For KIC 003642289

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6204^{+111}_{-136}$	$4.269^{+0.084}_{-0.116}$	$0.260^{+0.150}_{-0.150}$	$1.360^{+0.228}_{-0.166}$	$1.257^{+0.087}_{-0.097}$	$0.704^{+0.251}_{-0.242}$
	+2%/-2%	+2%/-3%	+58%/-58%	+17%/-12%	+7%/-8%	+36%/-34%
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 003642289-02 / KOI 0301.02

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-11 \pm 3$	$1.41^{+0.36}_{-0.34}$	$1367^{+61}_{-56}$	$3967^{+477}_{-301}$	$34^{+27}_{-14}$
Alt.	$-10 \pm 3$	$1.26^{+0.33}_{-0.34}$	$1368^{+62}_{-56}$	$4091^{+536}_{-411}$	$39^{+39}_{-17}$

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

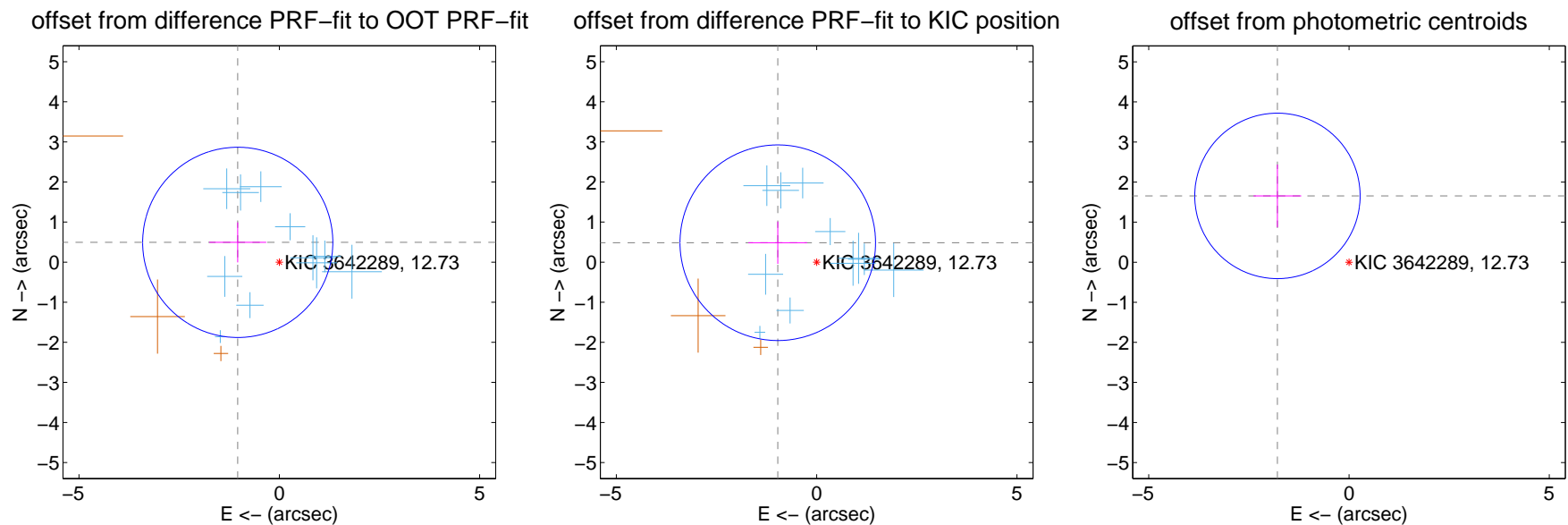
## DV Centroid Data

Supplemental centroid analysis for 003642289-02. Kepler magnitude: 12.73. Transit SNR 18.58

There are 11 quarters with good PRF difference image offsets

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

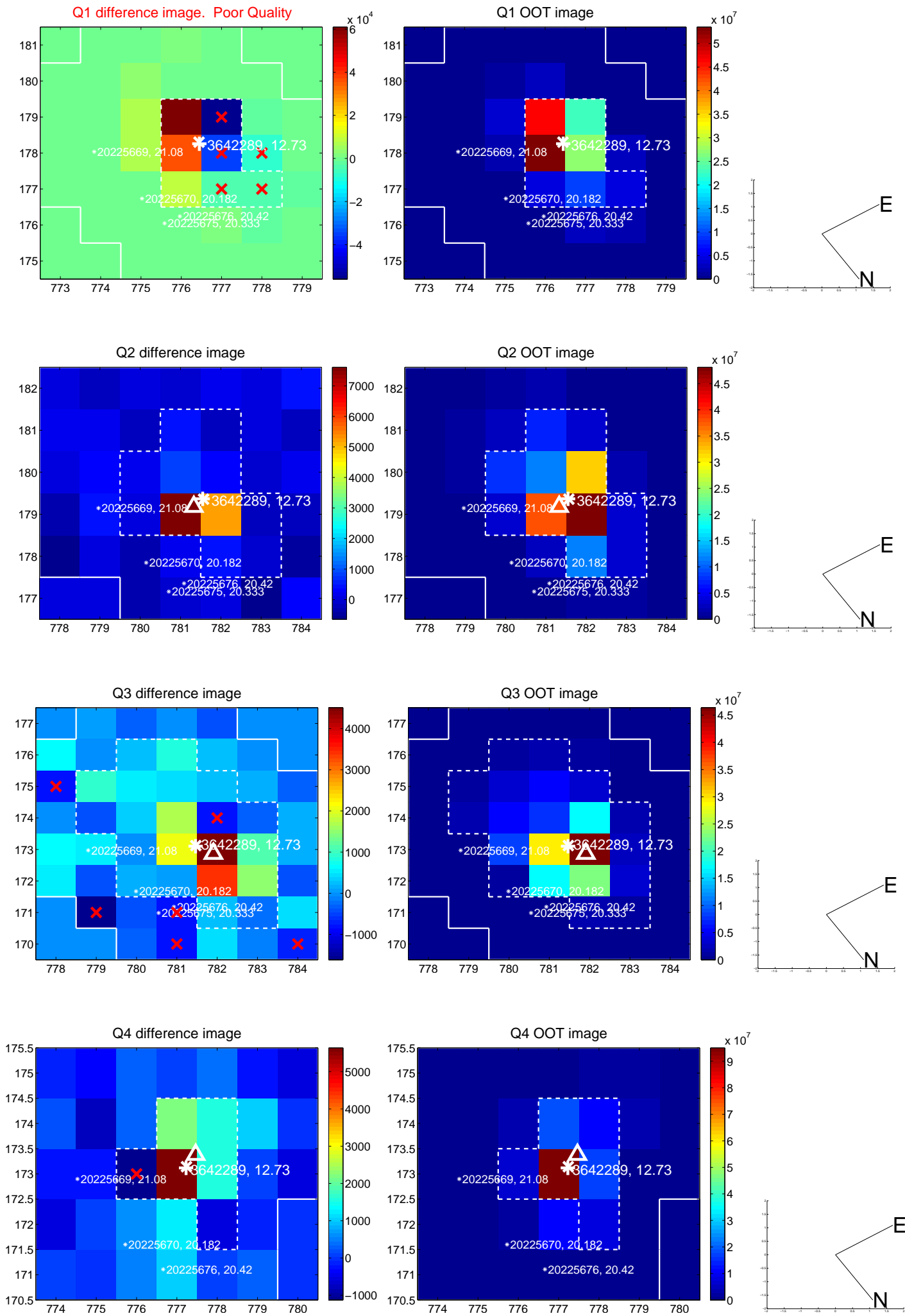
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.149 \pm 0.791$	1.45	$1.038 \pm 0.712$	$0.493 \pm 0.499$
PRF-fit source offset from KIC position	$1.085 \pm 0.813$	1.33	$0.971 \pm 0.733$	$0.484 \pm 0.527$
photometric centroid source offset	$2.44 \pm 0.69$	3.54	$1.79 \pm 0.60$	$1.66 \pm 0.78$



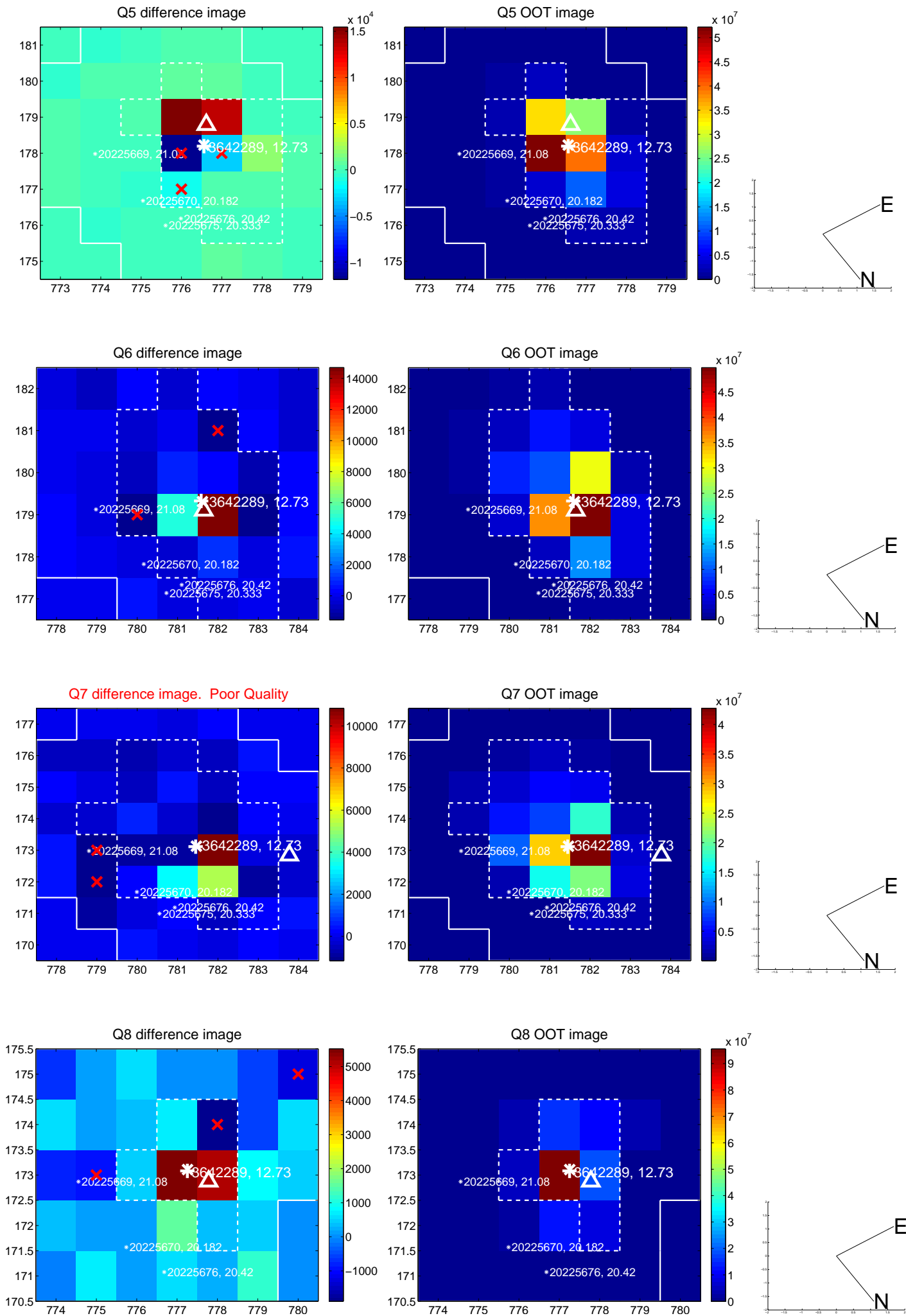
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



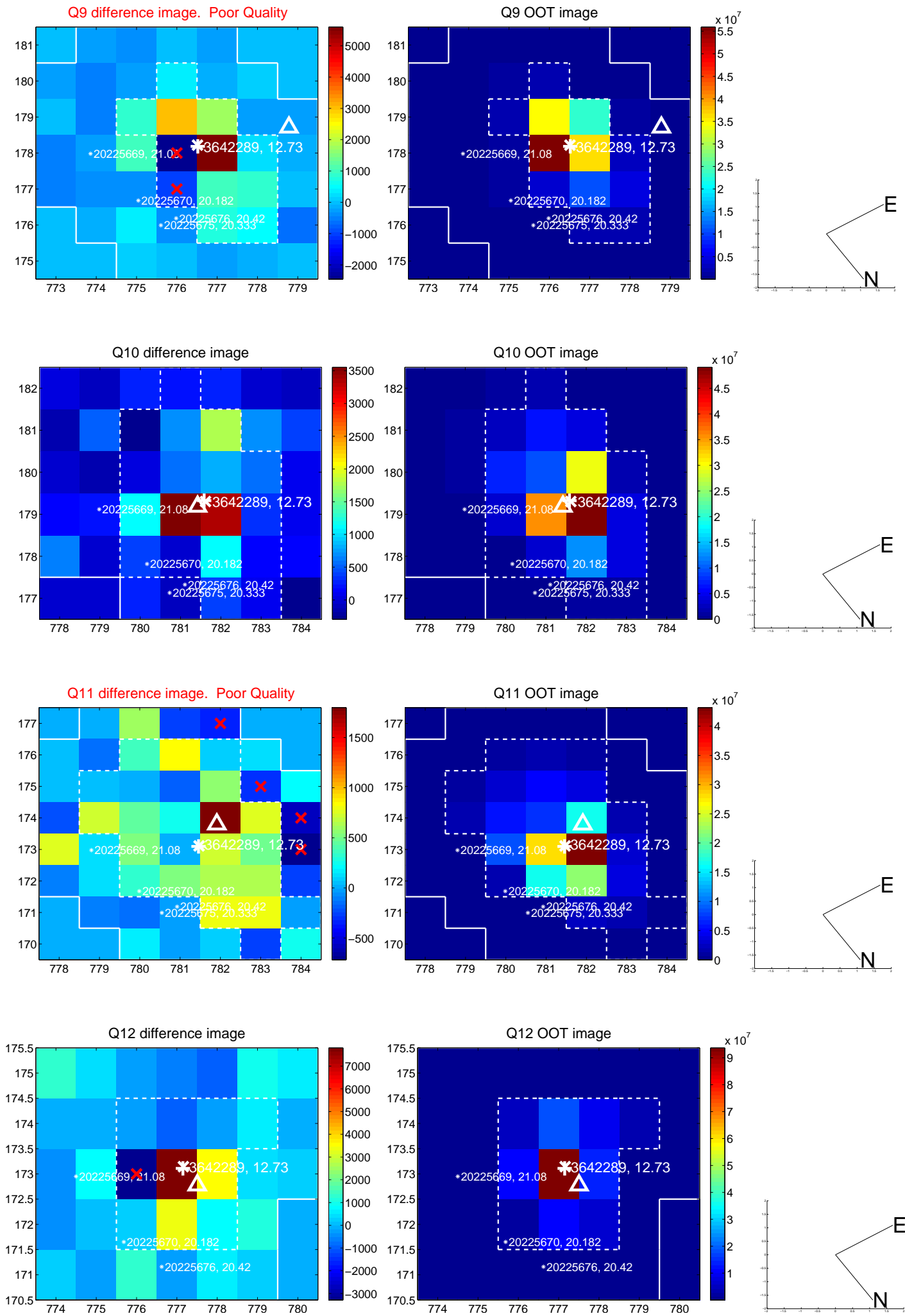
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



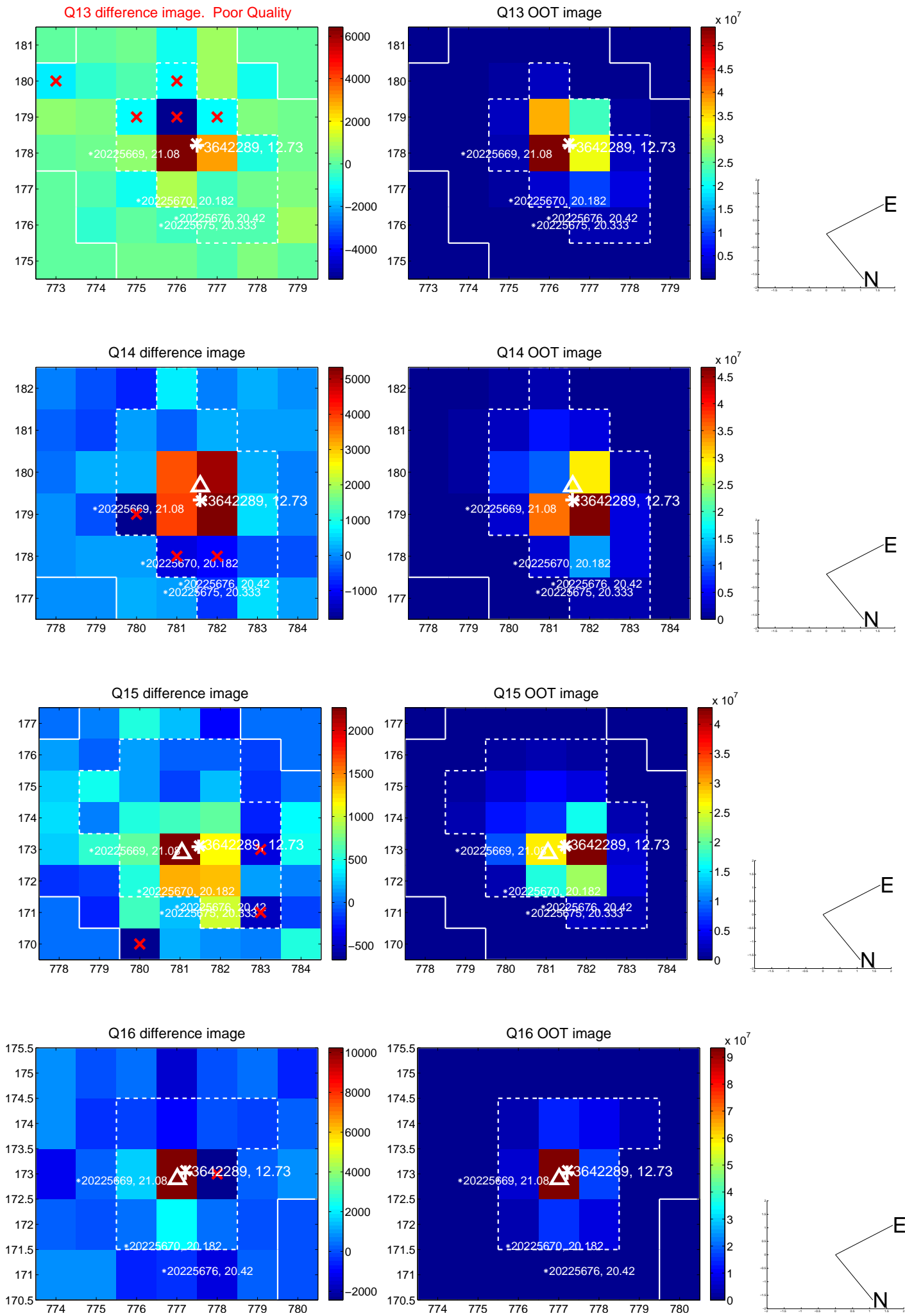
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



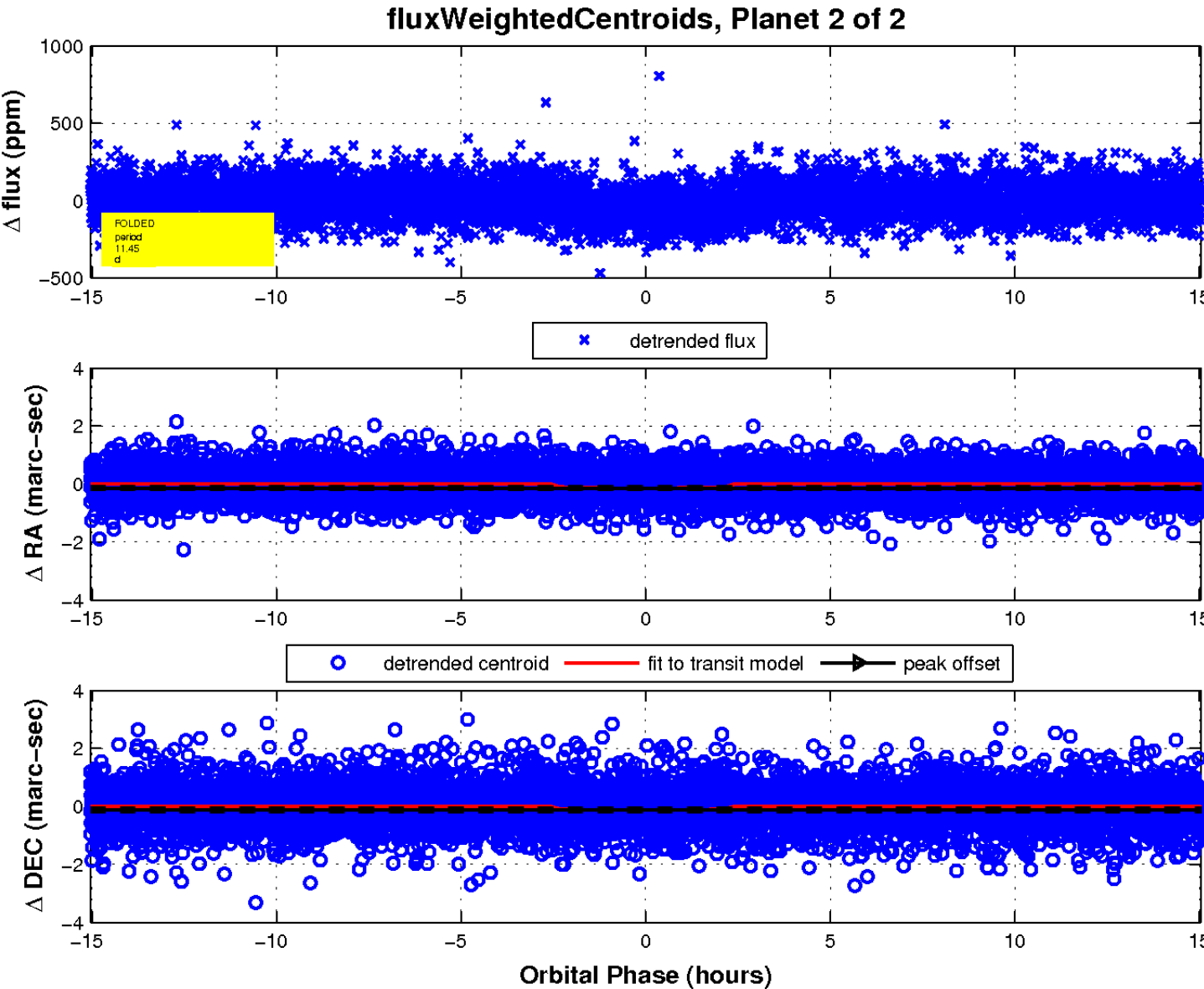
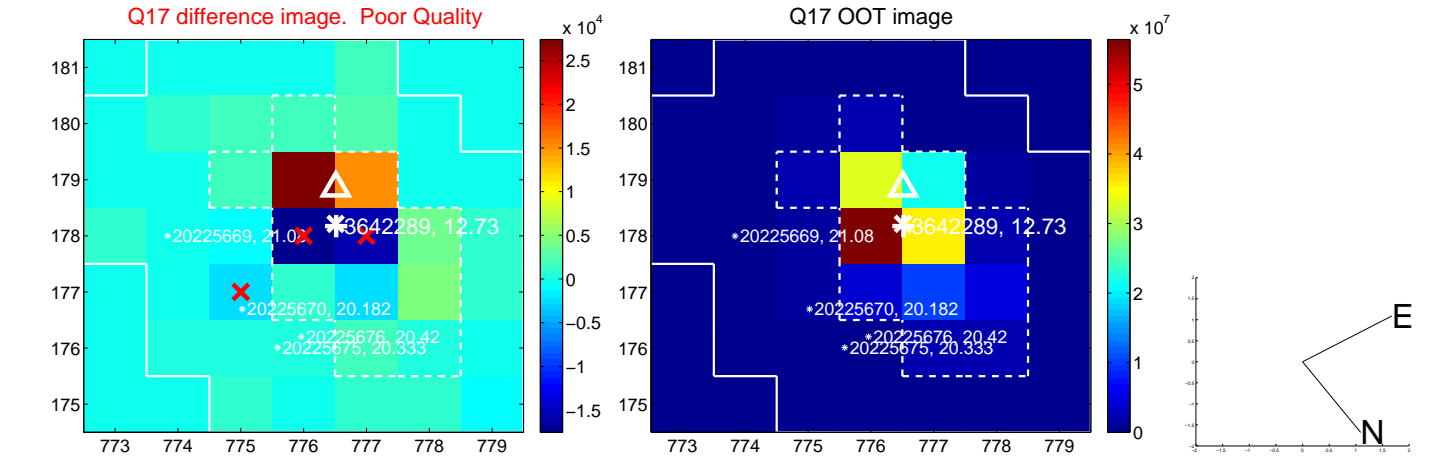
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

