

# KIC 007512982

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
007512982-01	OBS	1480.01	20.381809	142.312546	1568.4	4.037	38.1	39.9	0.81	4883	3.61	18.41
007512982-02	OBS	1480.02	7.004577	137.890792	219.7	2.799	8.4	8.6	0.81	4883	1.47	76.45

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007512982-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
007512982-02	OBS	PC	0.98	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 007512982-01

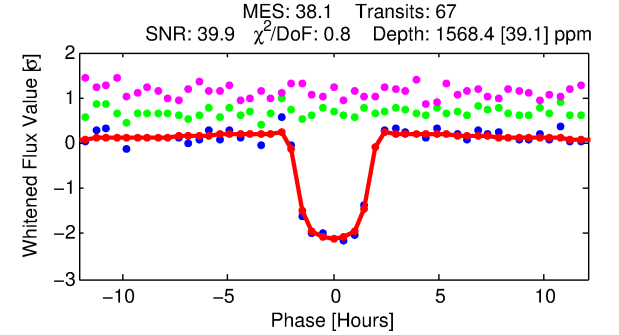
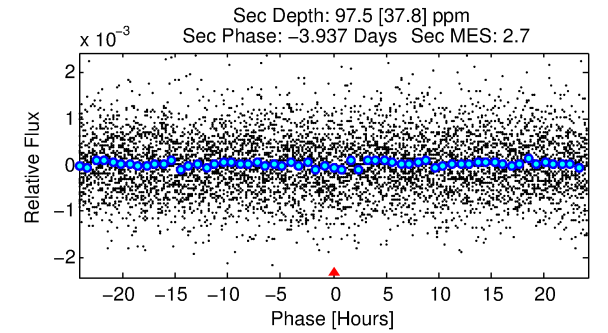
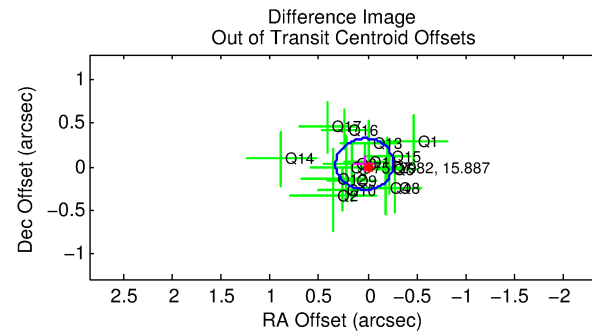
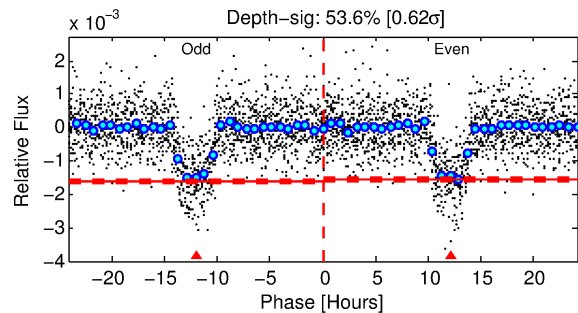
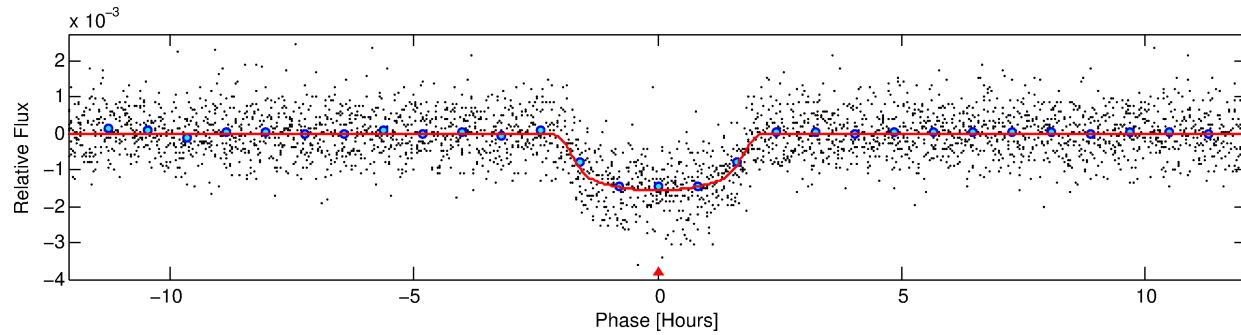
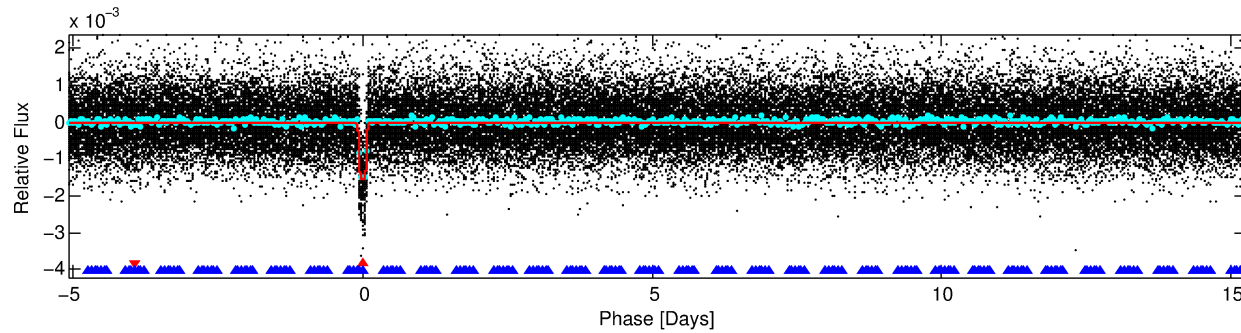
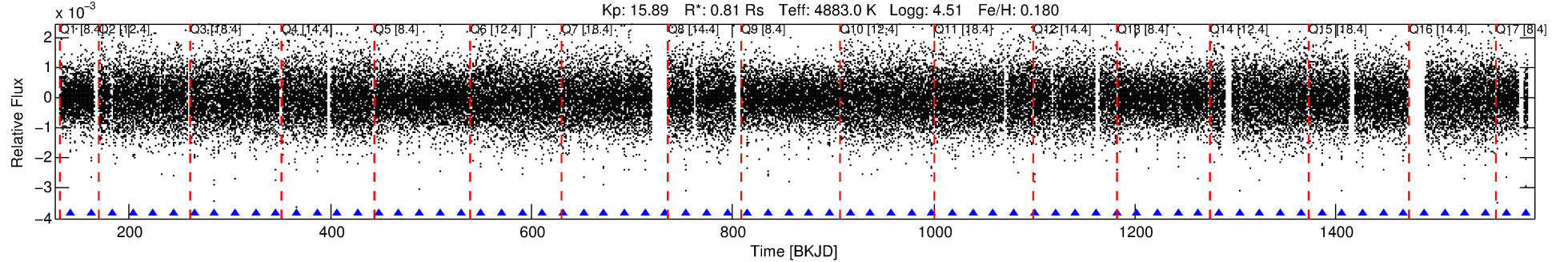
No Significant Match Found

# DV One-Page Summary

KIC: 7512982 Candidate: 1 of 2 Period: 20.382 d

KOI: K01480.01 Corr: 0.963

Kp: 15.89 R\*: 0.81 Rs Teff: 4883.0 K Logg: 4.51 Fe/H: 0.180



## DV Fit Results:

Period = 20.38181 [0.00005] d  
Epoch = 142.3125 [0.0021] BKJD  
Rp/R\* = 0.0410 [0.0040]  
a/R\* = 25.35 [8.31]  
b = 0.81 [0.15]  
Seff = 18.40 [2.38]  
Teq = 528 [17] K  
Rp = 3.61 [0.43] Re  
a = 0.1344 [0.0090] AU  
Ag = 74.20 [33.21] [2.20σ]  
Teffp = 2397 [264] K [7.07σ]

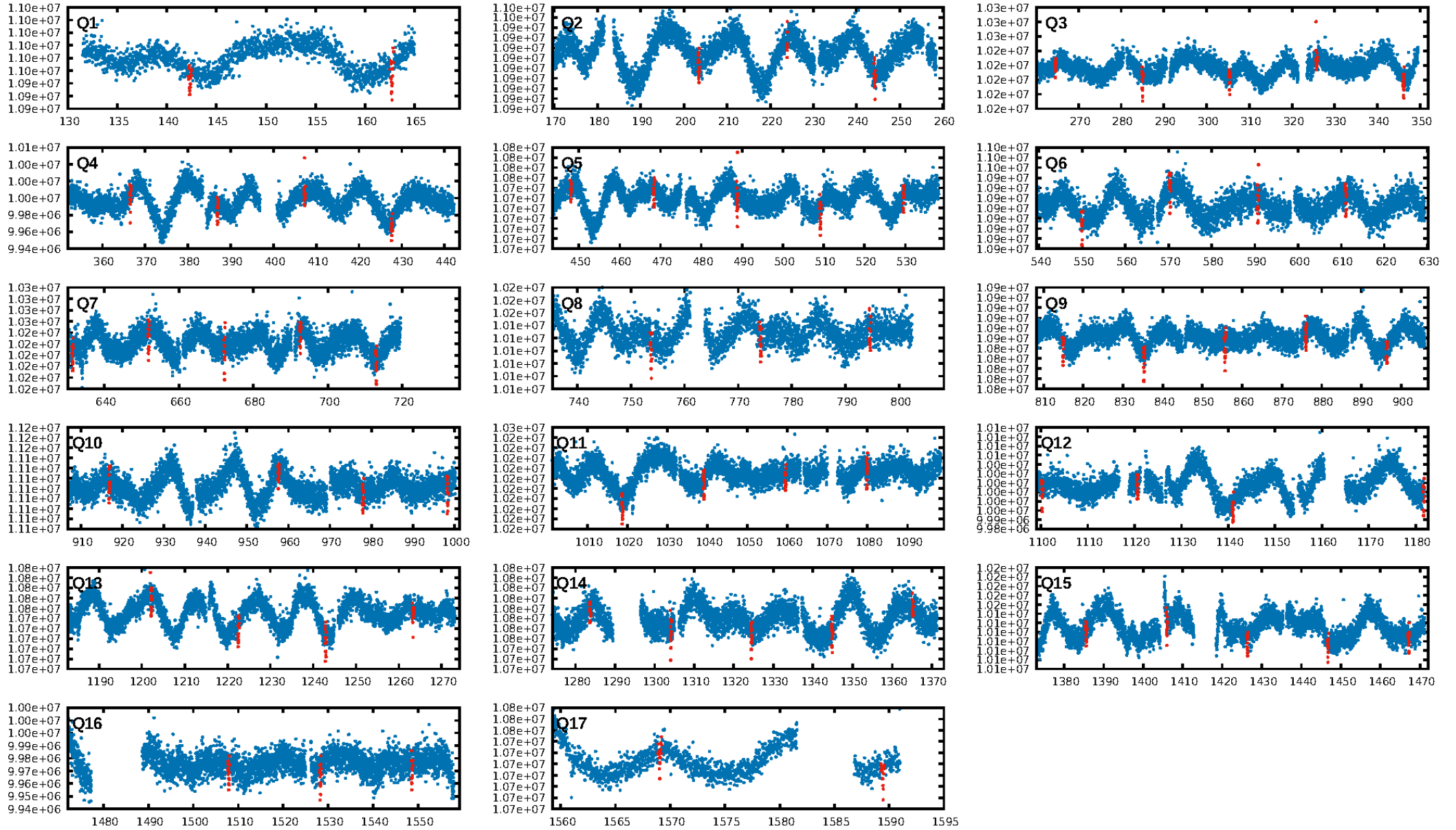
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [65.35σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 81.2%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 6.25e-293  
RollingBand-fgt: 1.00 [63/63]  
GhostDiagnostic-chr: 7.832  
Centroid-sig: 0.4%  
Centroid-so: 0.805 arcsec [2.70σ]  
OotOffset-rm: 0.047 arcsec [0.47σ]  
KicOffset-rm: 0.149 arcsec [1.56σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 1.00 [17/17]  
DiffImageOverlap-fno: 1.00 [17/17]

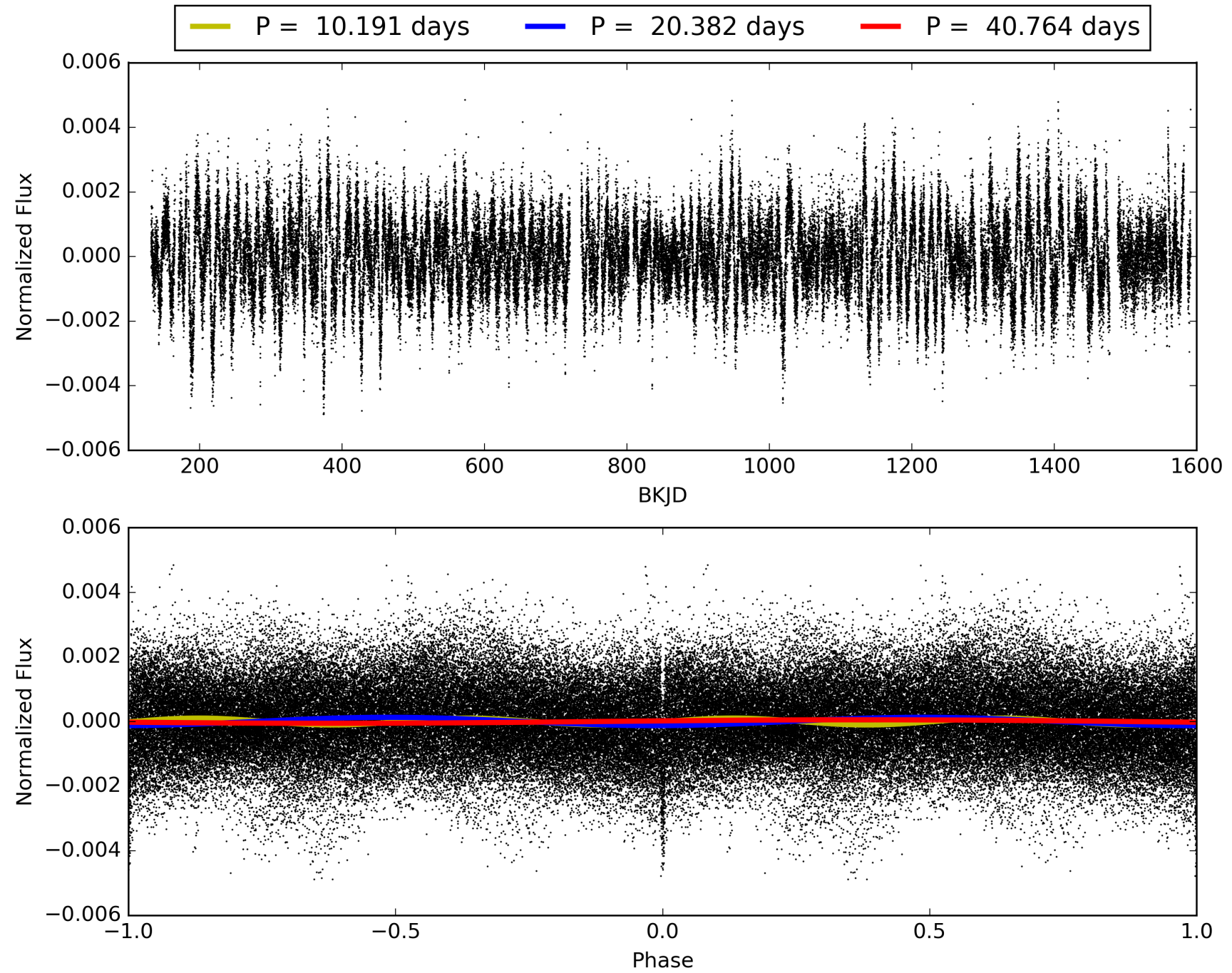
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 03:10:13 Z

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

# TCE 007512982-01, PDC Light Curves

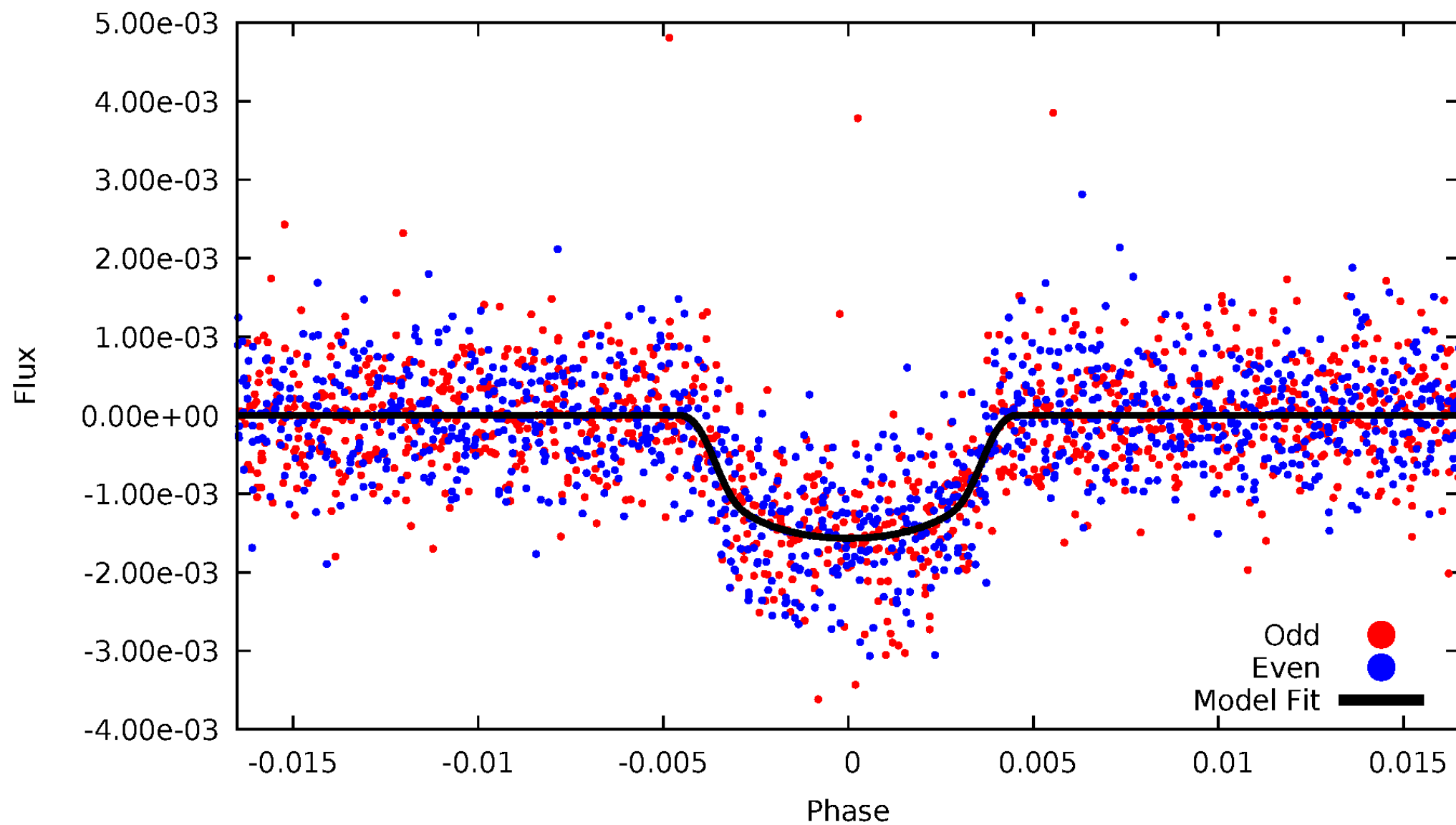


TCE 007512982-01



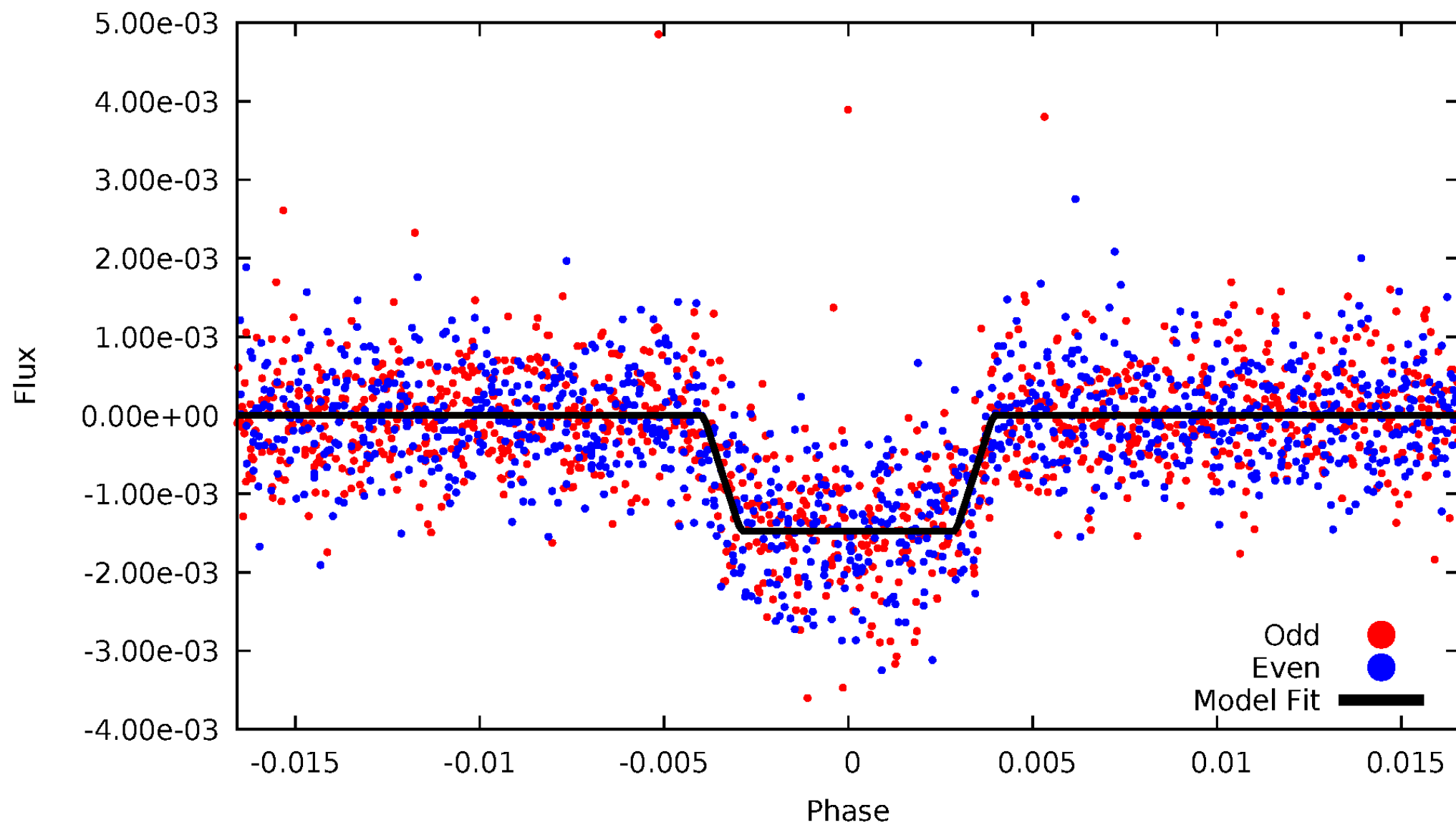
# DV Odd/Even

TCE 007512982-01



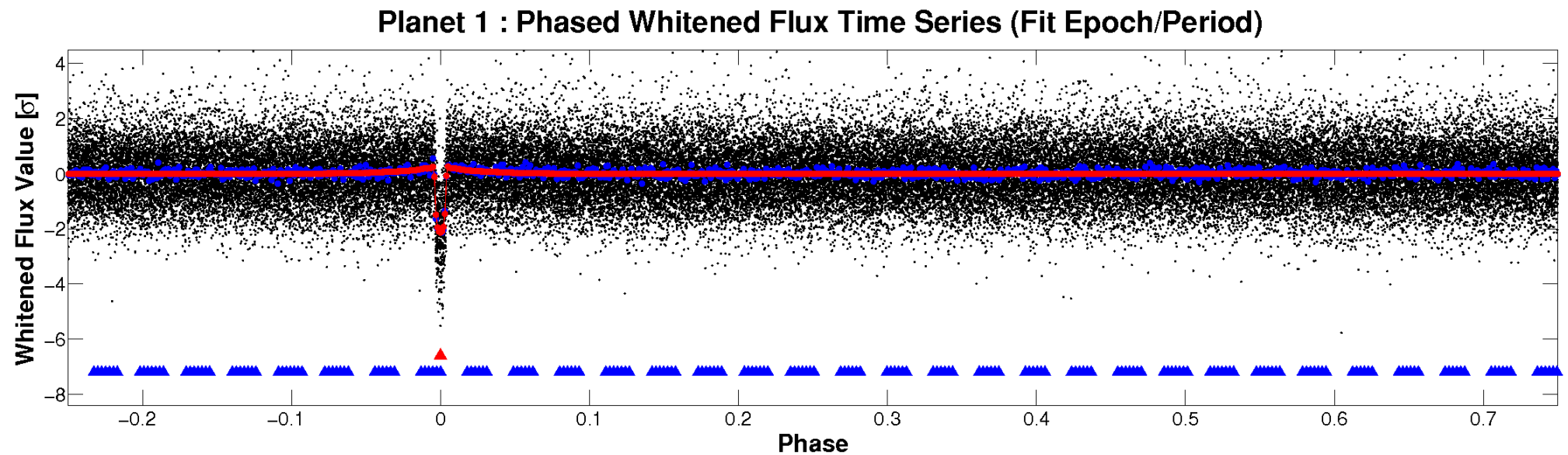
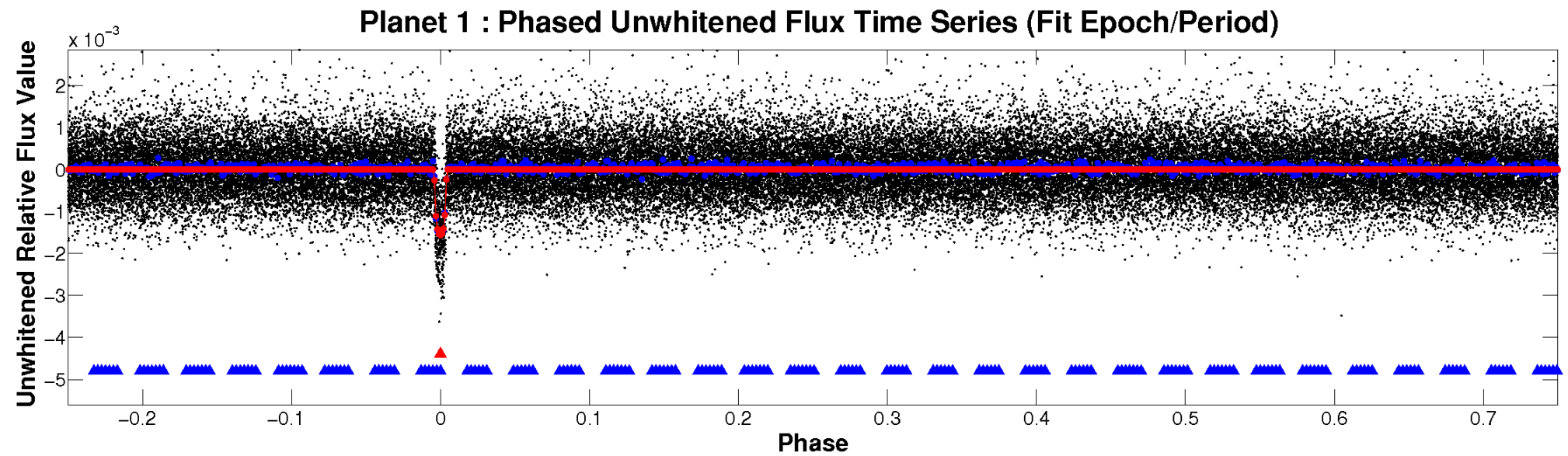
# ALT Odd/Even

TCE 007512982-01



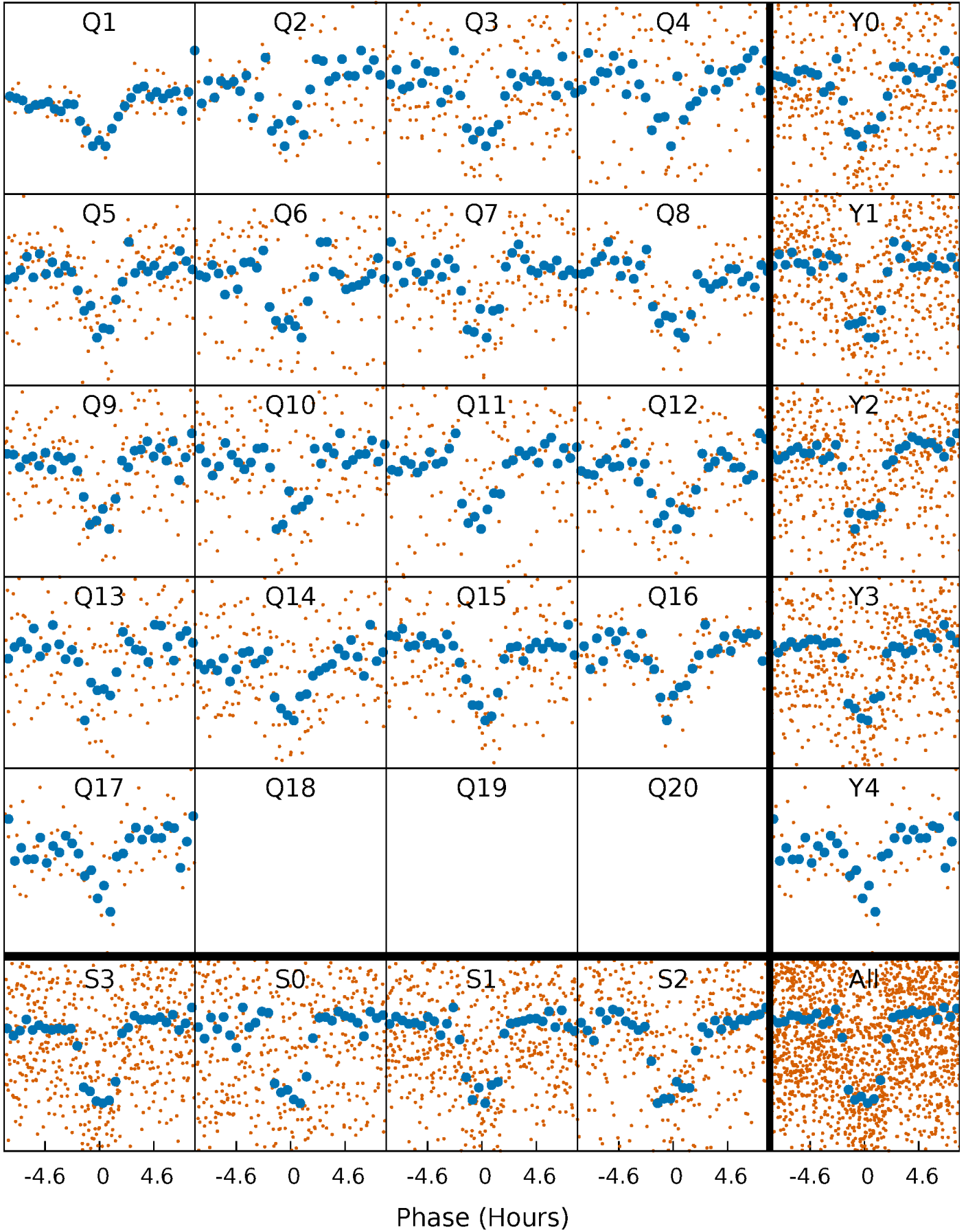


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

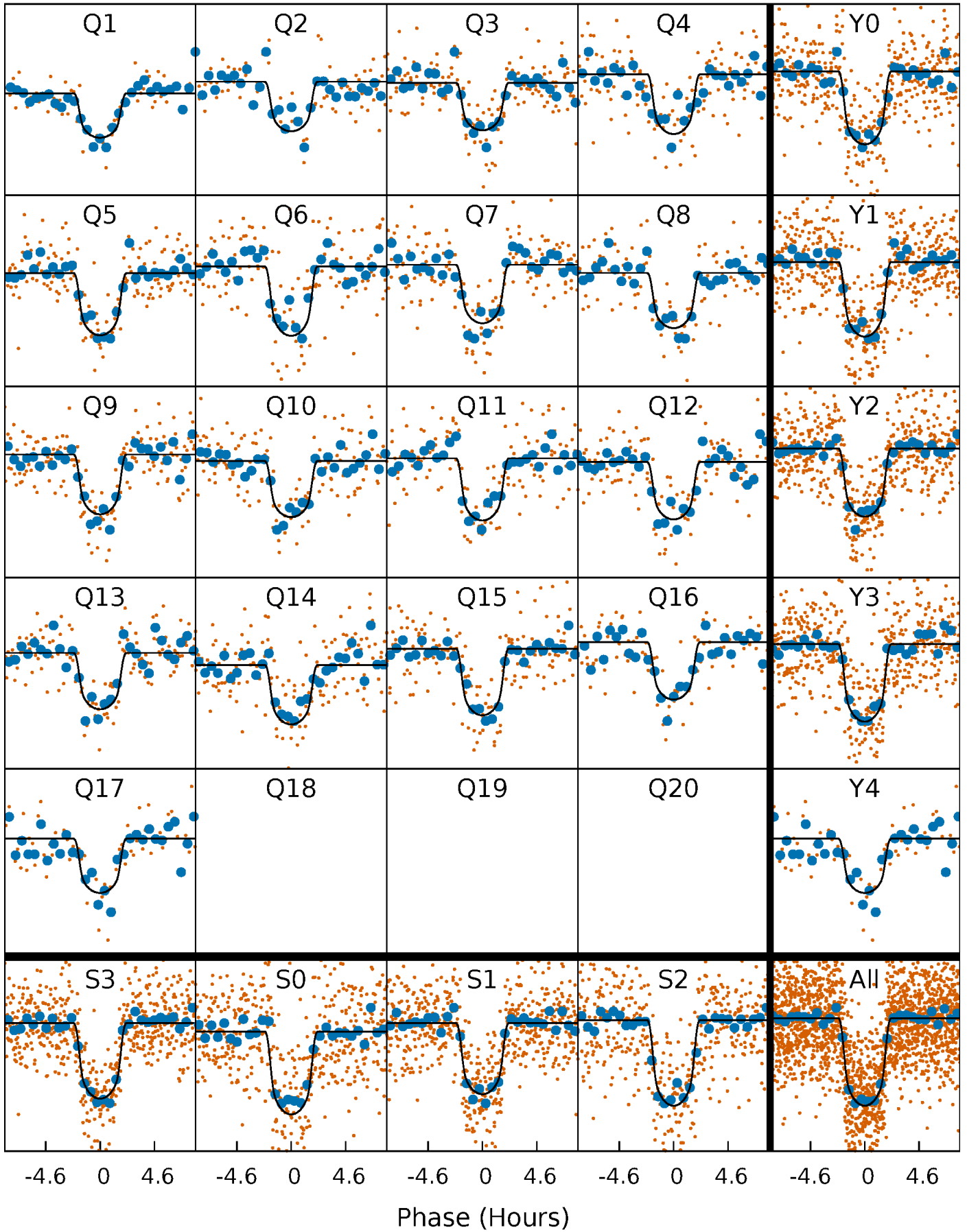
TCE 007512982-01 P= 20.381809 Days  $T_0=142.312545$  (BKJD)





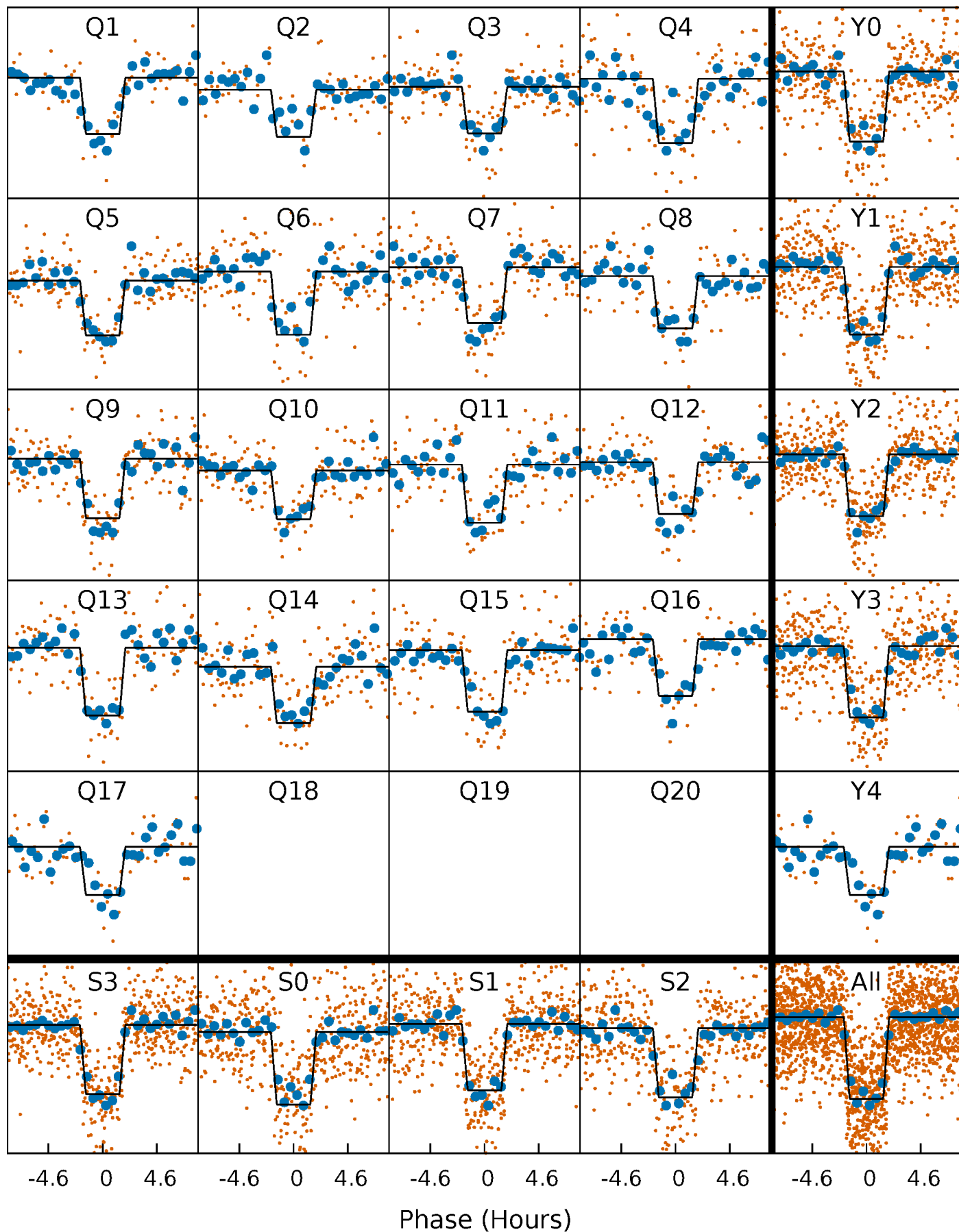
# DV Quarter-Phased Transit Curves

TCE 007512982-01 P= 20.381809 Days  $T_0=142.312545$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

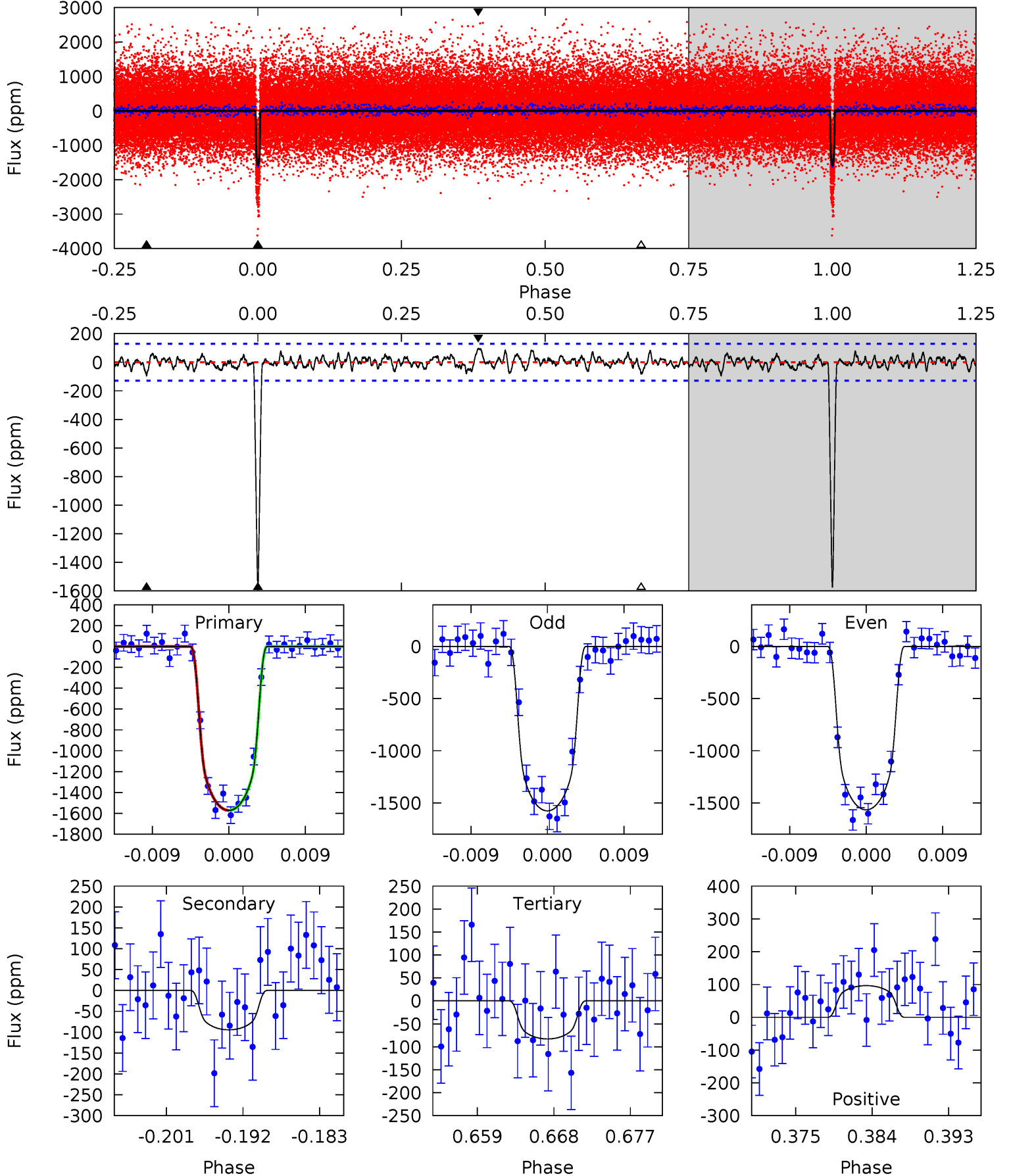
TCE 007512982-01 P= 20.381563 Days  $T_0=142.321173$  (BKJD)



# DV Model-Shift Uniqueness Test

007512982-01,  $P = 20.381809$  Days,  $E = 121.930736$  Days

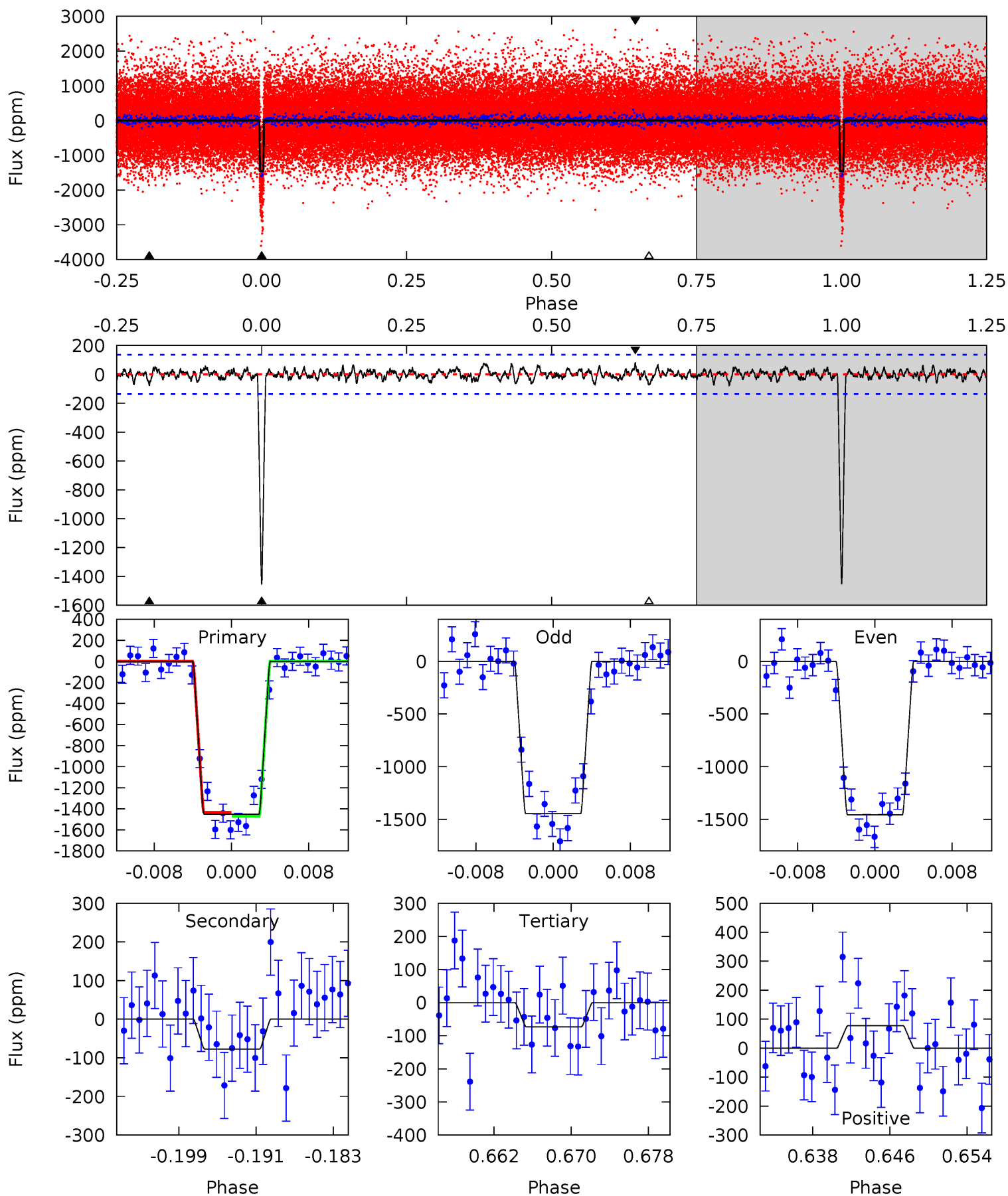
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
61.2	3.68	3.23	3.76	5.04	2.61	1.17	58.0	57.5	0.45	-0.08	0.18	0.98	0.06	0.01



# Alt Model-Shift Uniqueness Test

007512982-01,  $P = 20.381563$  Days,  $E = 121.939610$  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
53.9	2.87	2.71	2.89	5.07	2.65	0.94	51.2	51.0	0.16	-0.02	0.20	0.99	0.05	0



### Stellar Parameters For KIC 007512982

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4883^{+77}_{-87}$	$4.515^{+0.064}_{-0.020}$	$0.180^{+0.150}_{-0.150}$	$0.808^{+0.028}_{-0.055}$	$0.779^{+0.043}_{-0.028}$	$2.084^{+0.486}_{-0.179}$
	+2%/-2%	+1%/-0%	+83%/-83%	+3%/-7%	+6%/-4%	+23%/-9%
Source	SPE90	SPE90	SPE90	DSEP		

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

### Secondary Eclipse Parameters for KIC 007512982-01 / KOI 1480.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-94 \pm 26$	$3.58^{+0.37}_{-0.36}$	$734^{+14}_{-18}$	$2991^{+149}_{-148}$	$74^{+28}_{-23}$
Alt.	$-77 \pm 27$	$3.35^{+0.35}_{-0.39}$	$733^{+16}_{-19}$	$2957^{+163}_{-187}$	$68^{+30}_{-26}$

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



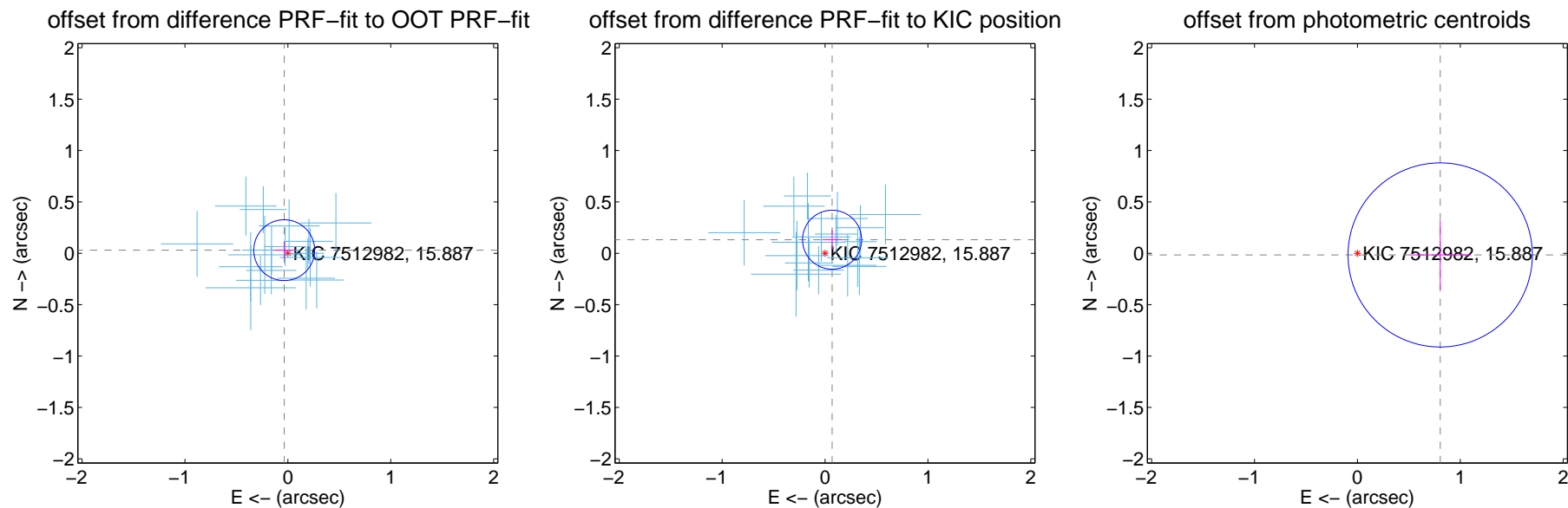
## DV Centroid Data

Supplemental centroid analysis for 007512982-01. Kepler magnitude: 15.89. Transit SNR 39.90

There are 17 quarters with good PRF difference image offsets

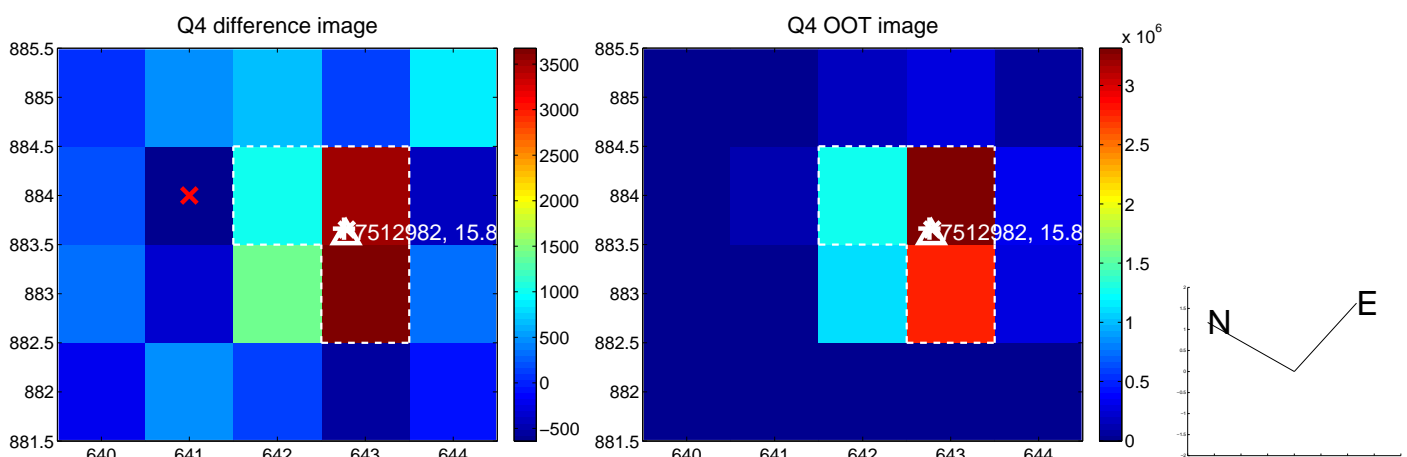
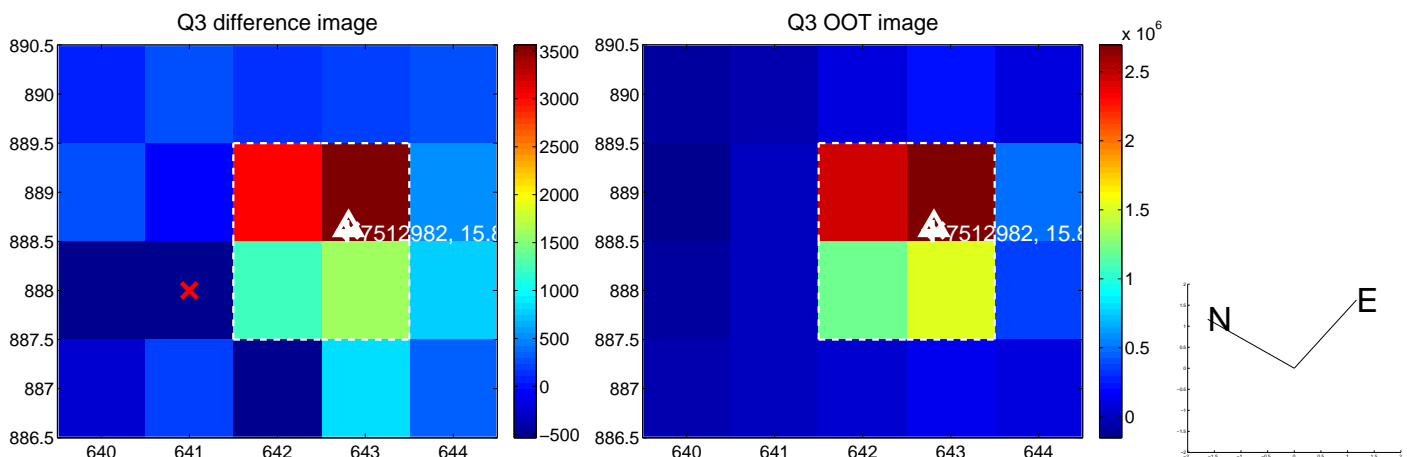
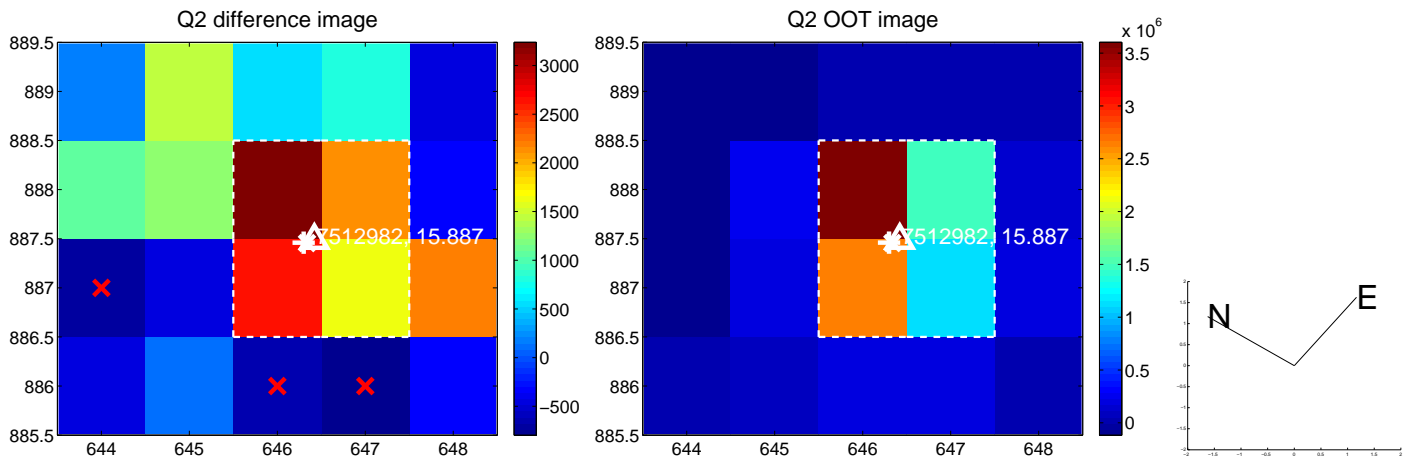
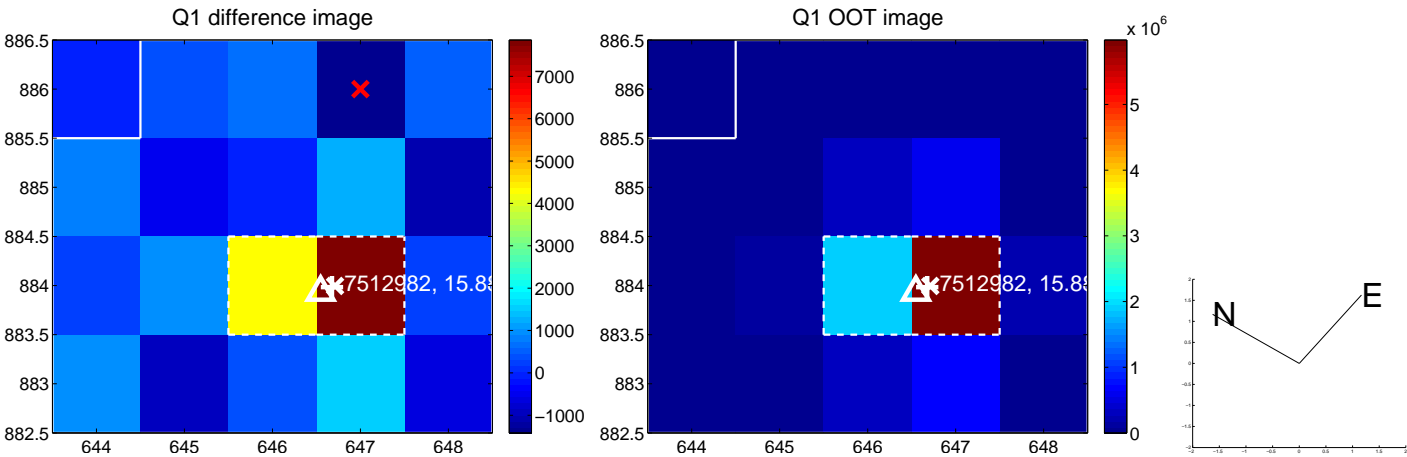
The direct PRF centroid is offset from the target star catalog position by about 0.11 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.047 \pm 0.099$	0.47	$0.035 \pm 0.107$	$0.030 \pm 0.086$
PRF-fit source offset from KIC position	$0.149 \pm 0.096$	1.56	$-0.069 \pm 0.097$	$0.132 \pm 0.095$
photometric centroid source offset	$0.80 \pm 0.30$	2.70	$-0.80 \pm 0.30$	$-0.02 \pm 0.34$

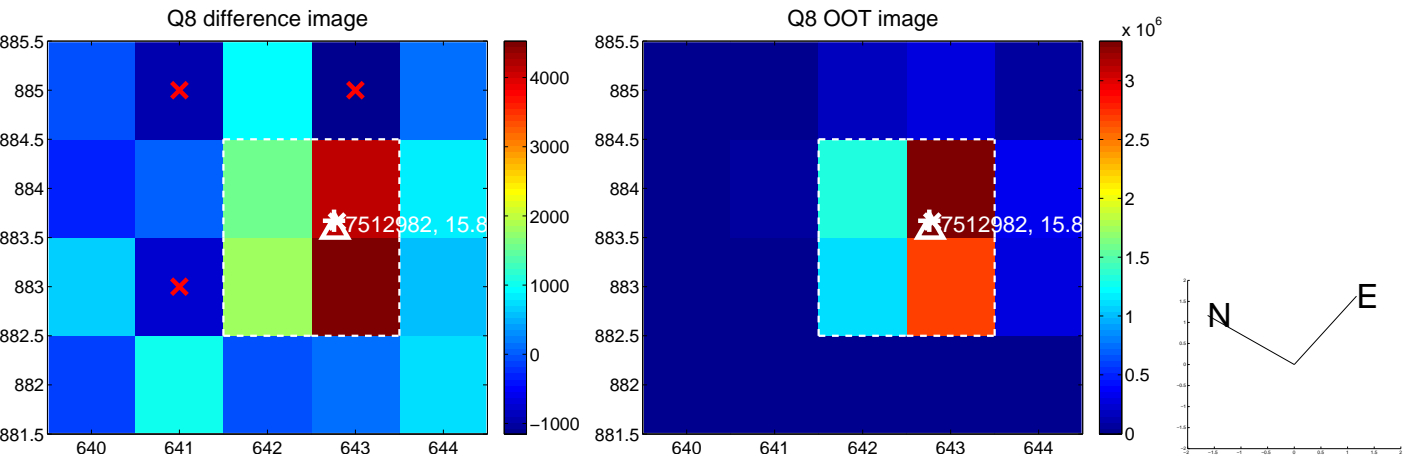
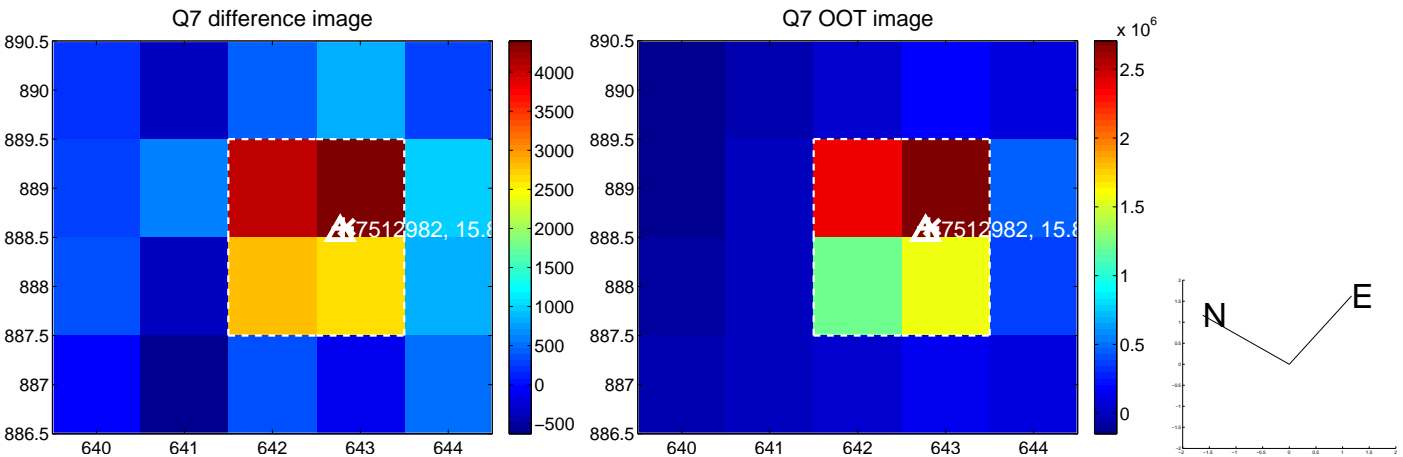
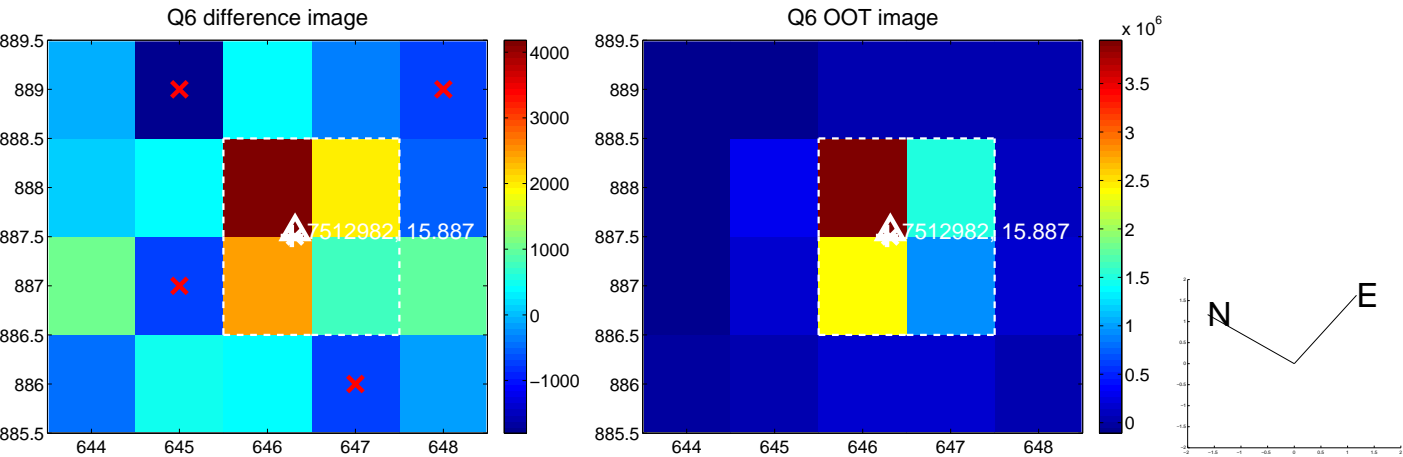
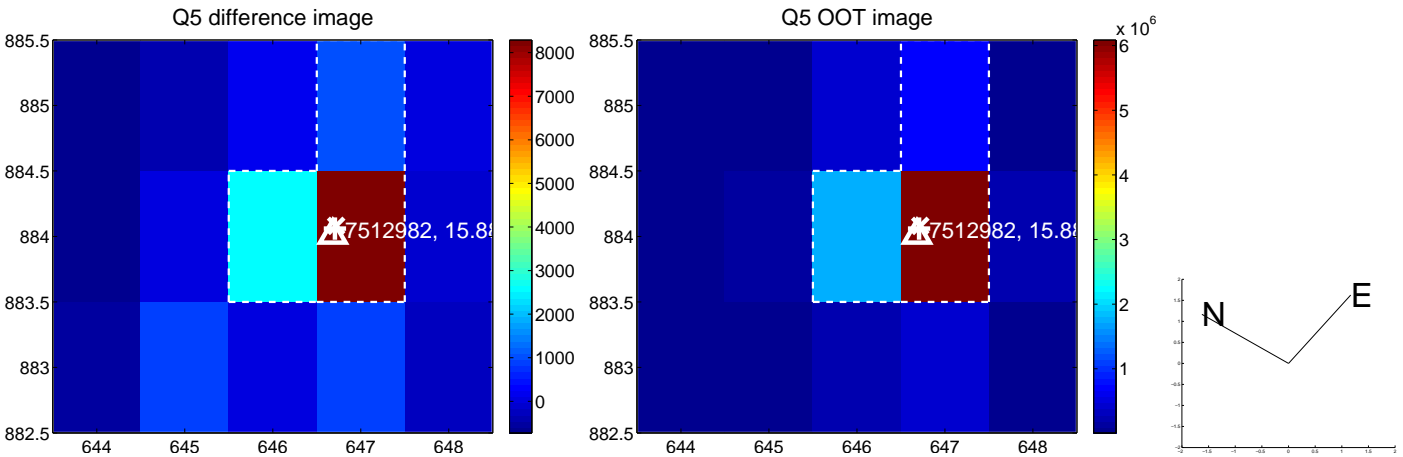


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

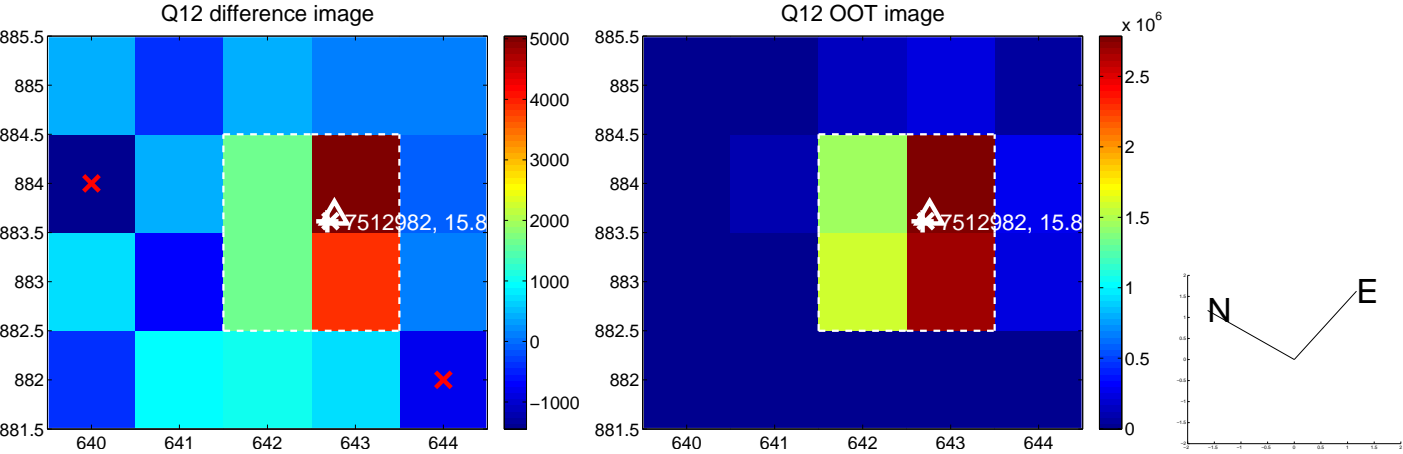
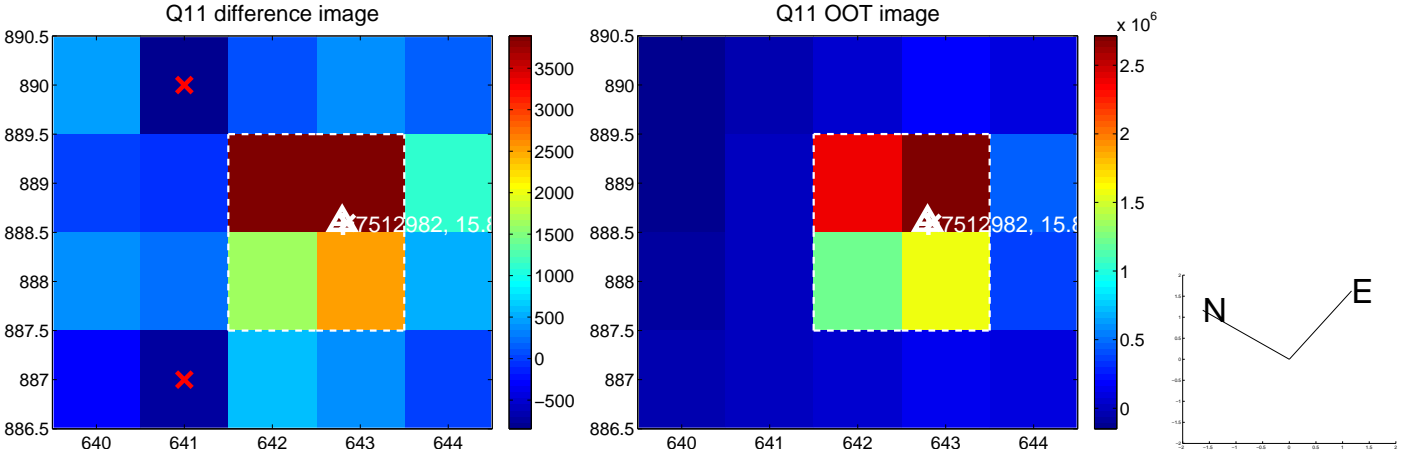
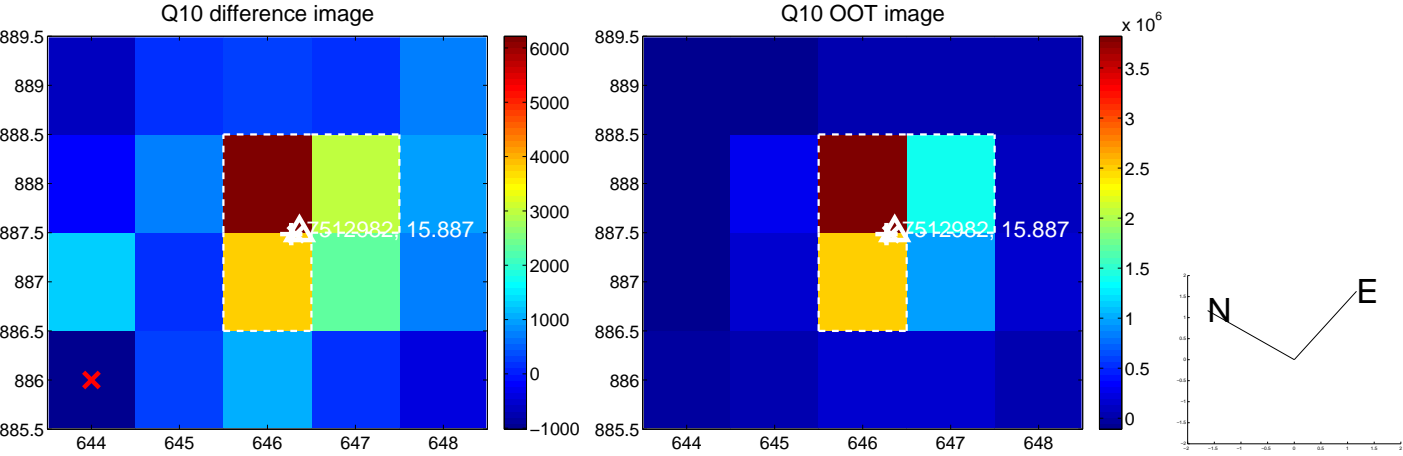
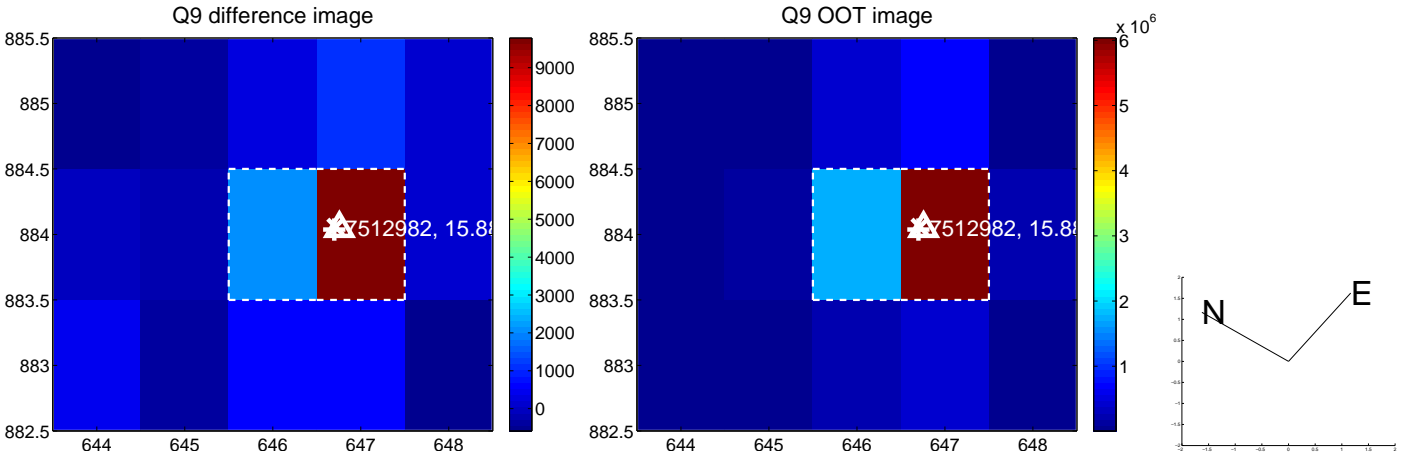
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



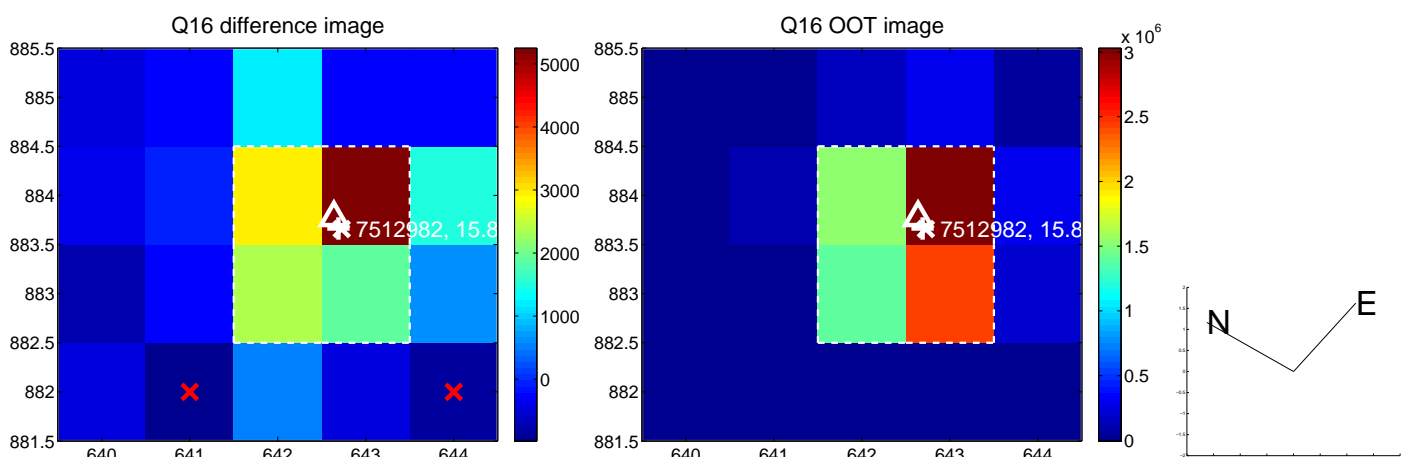
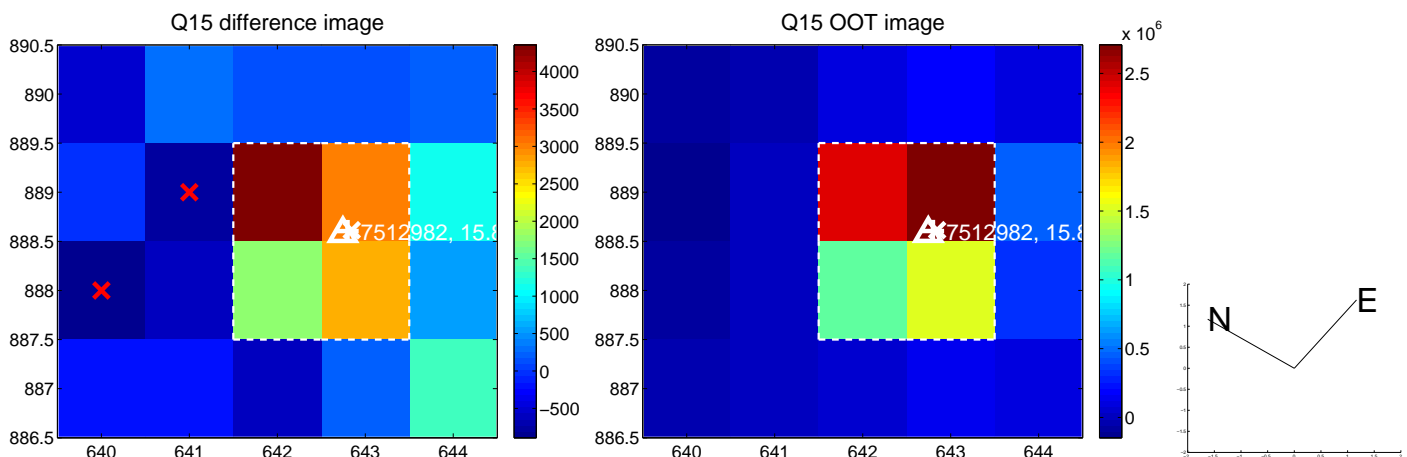
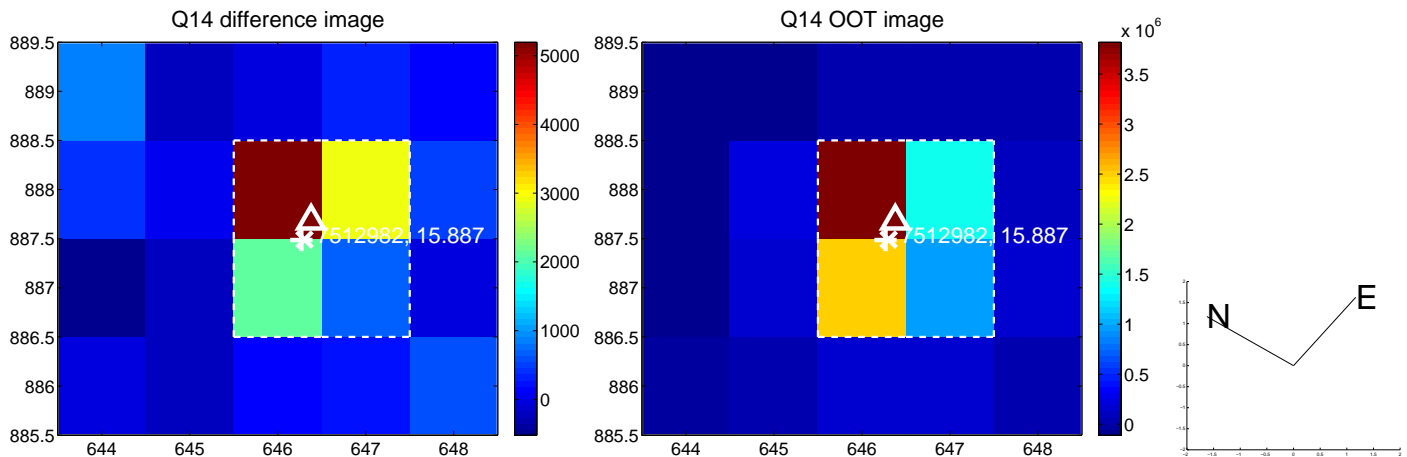
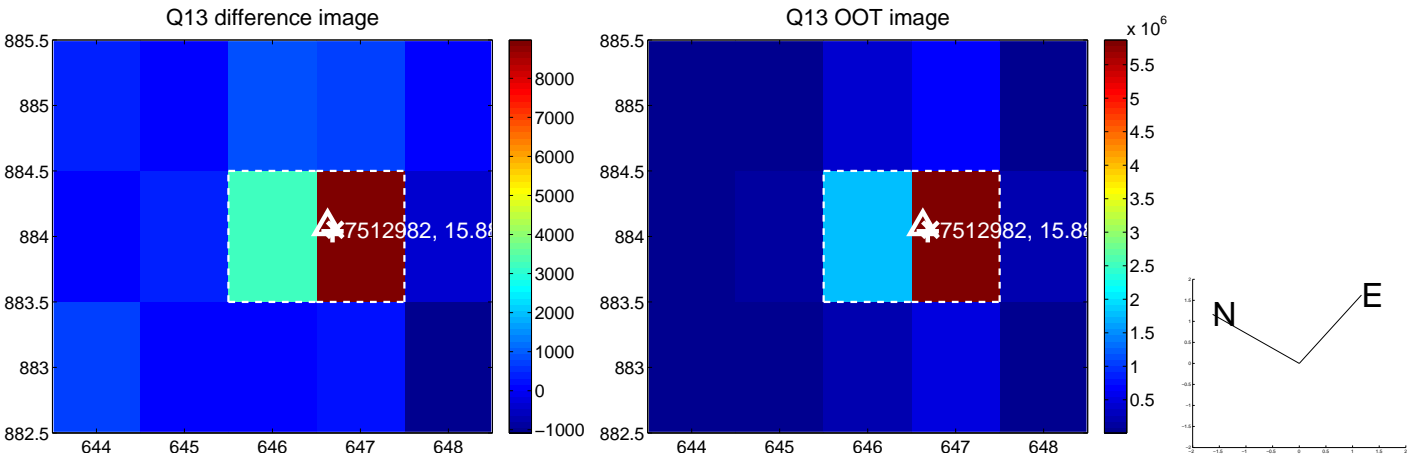
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

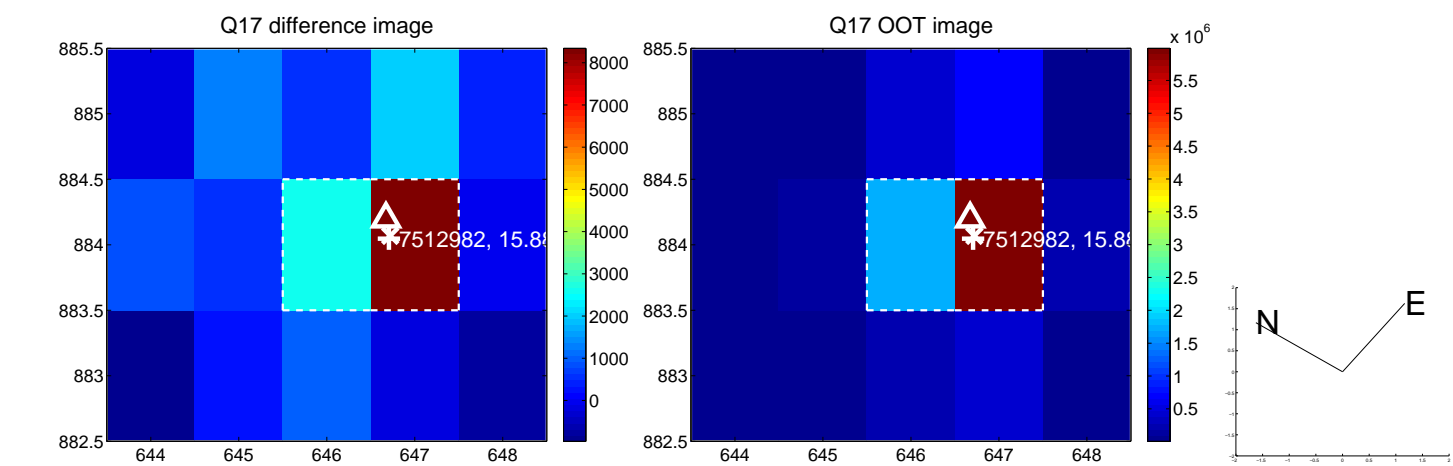


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

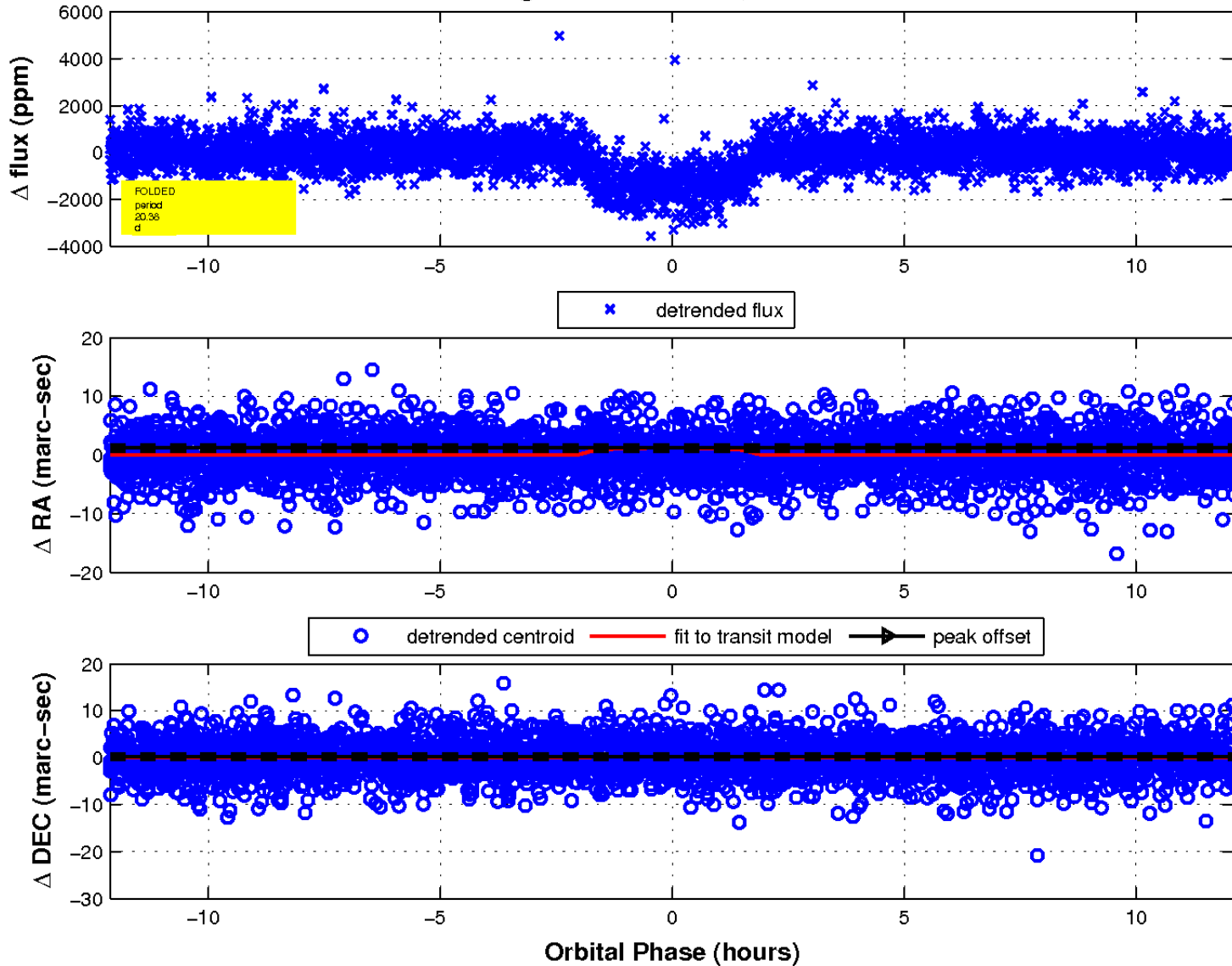




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

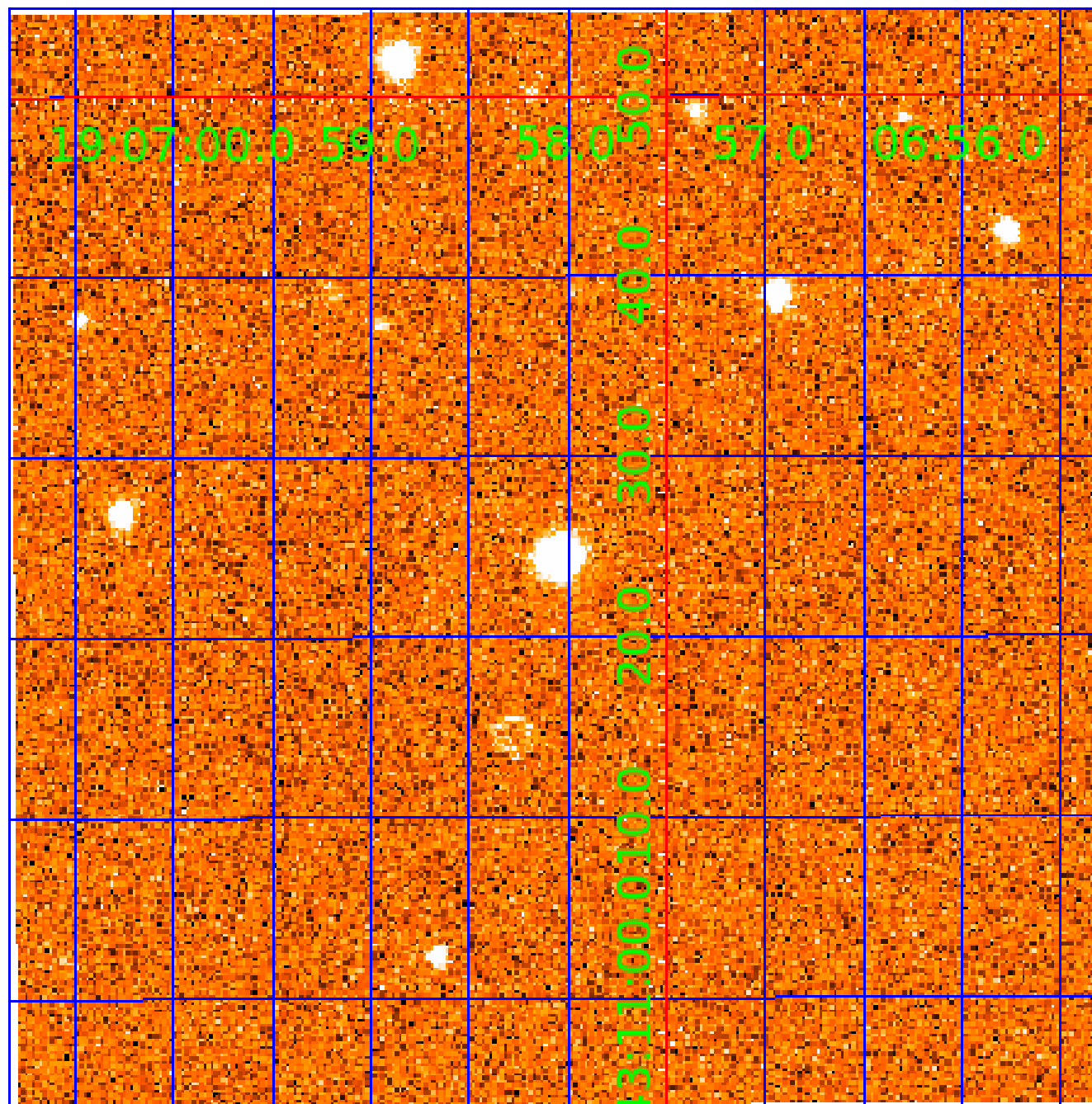


fluxWeightedCentroids, Planet 1 of 2



# UKIRT Image

Declination



# KIC 007512982

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
007512982-01	OBS	1480.01	20.381809	142.312546	1568.4	4.037	38.1	39.9	0.81	4883	3.61	18.41
007512982-02	OBS	1480.02	7.004577	137.890792	219.7	2.799	8.4	8.6	0.81	4883	1.47	76.45

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007512982-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
007512982-02	OBS	PC	0.98	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.

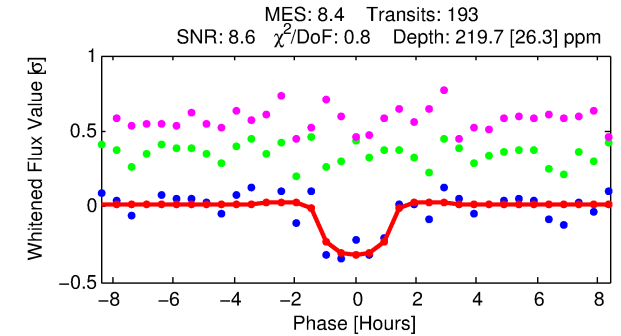
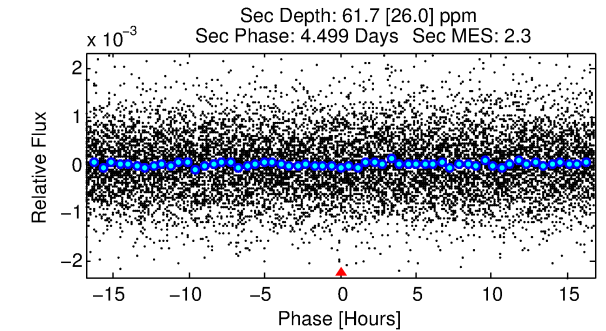
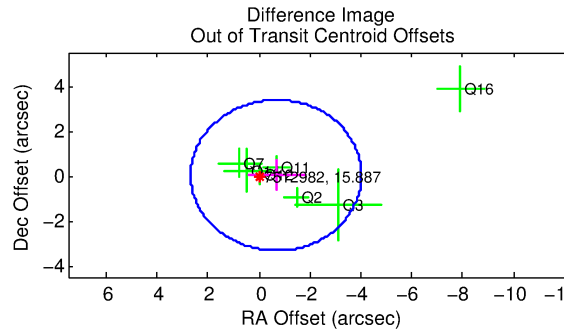
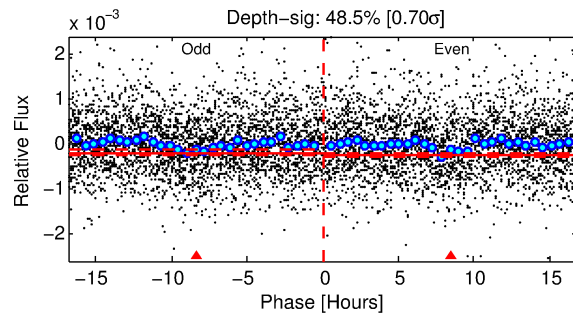
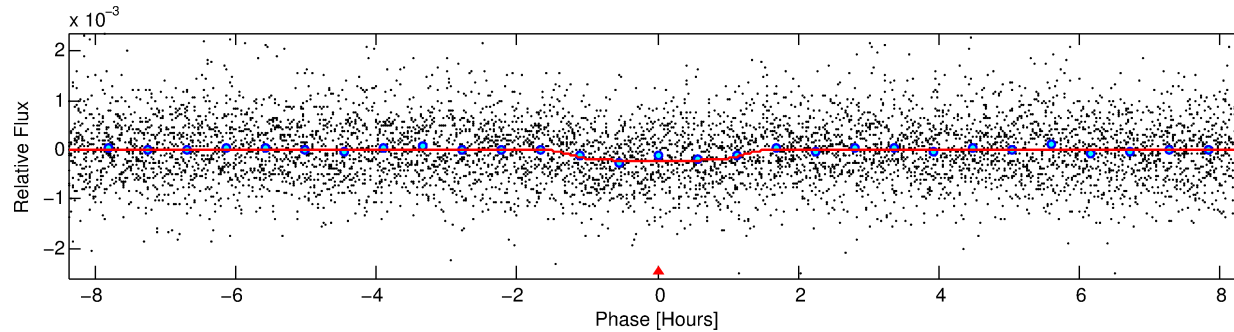
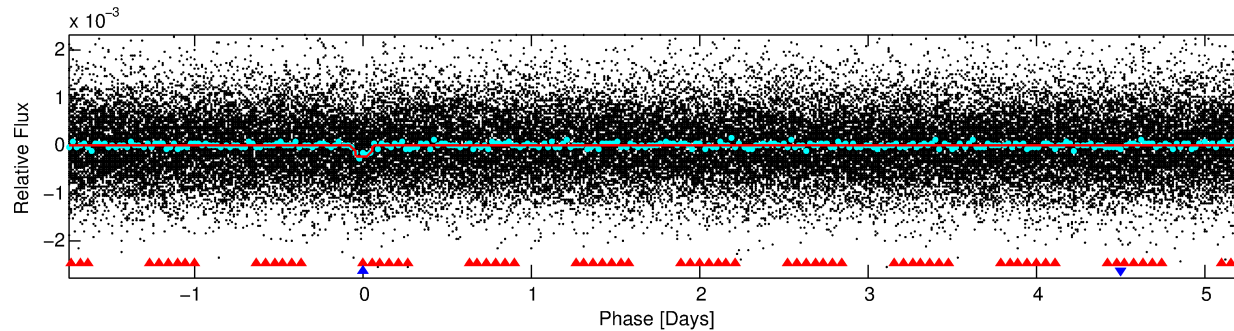
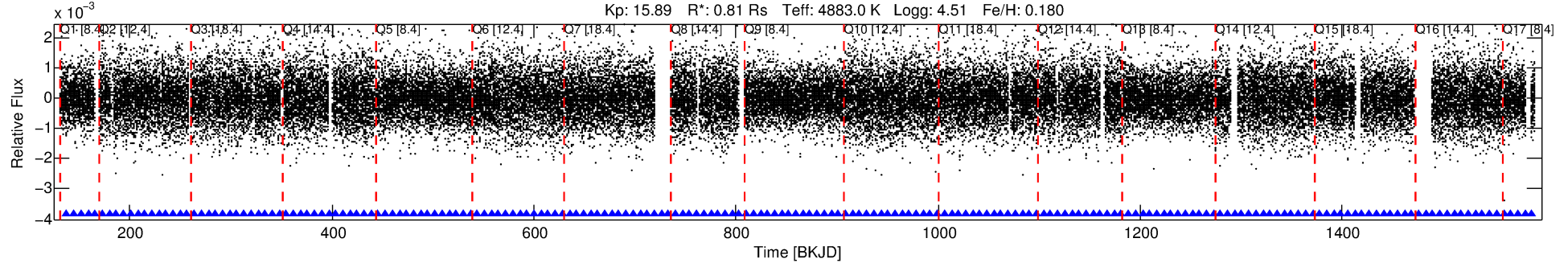
## Ephemeris Match Information For 007512982-02

No Significant Match Found

# DV One-Page Summary

KIC: 7512982 Candidate: 2 of 2 Period: 7.005 d  
KOI: K01480.02 Corr: 0.925

Kp: 15.89 R\*: 0.81 Rs Teff: 4883.0 K Logg: 4.51 Fe/H: 0.180



## DV Fit Results:

Period = 7.00458 [0.00006] d  
Epoch = 137.8908 [0.0063] BKJD  
Rp/R\* = 0.0166 [0.0133]  
a/R\* = 9.13 [27.93]  
b = 0.90 [0.68]  
Seff = 76.46 [9.91]  
Teq = 754 [24] K  
Rp = 1.47 [1.18] Re  
a = 0.0660 [0.0044] AU  
Ag = 68.69 [114.02] [0.59σ]  
Teffp = 3356 [1391] K [1.87σ]

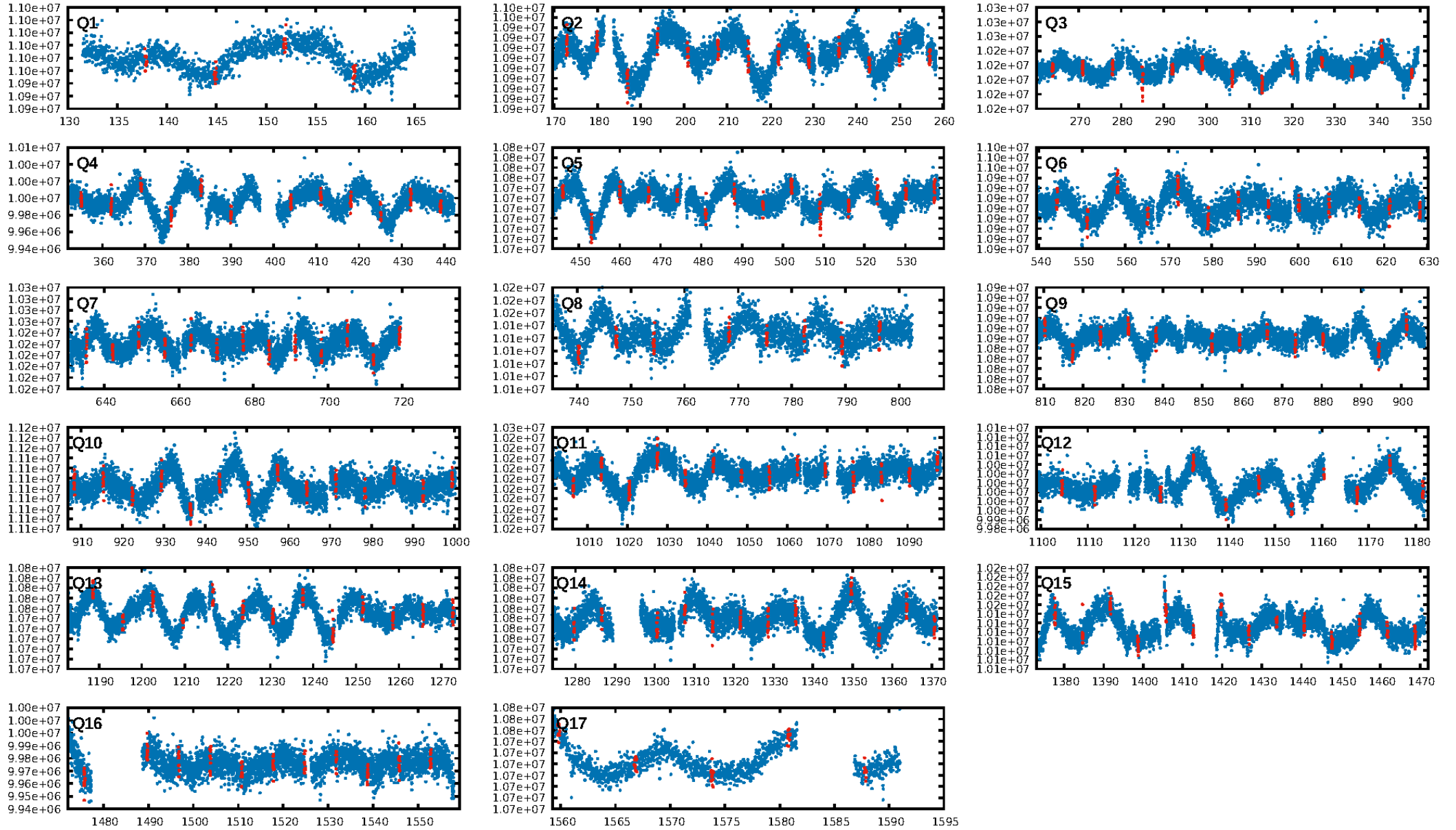
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [65.35σ]  
ModelChiSquare2-sig: 100.0%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 5.36e-16  
RollingBand-fgt: 1.00 [184/184]  
GhostDiagnostic-chr: 3.772  
Centroid-sig: 1.1%  
Centroid-so: 2.813 arcsec [1.67σ]  
OotOffset-rm: 0.672 arcsec [0.60σ]  
KicOffset-rm: 0.885 arcsec [0.84σ]  
OotOffset-st: 2/3/2/0 [7]  
KicOffset-st: 2/3/2/0 [7]  
DiffImageQuality-fgm: 0.57 [4/7]  
DiffImageOverlap-fno: 1.00 [17/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 03:10:20 Z

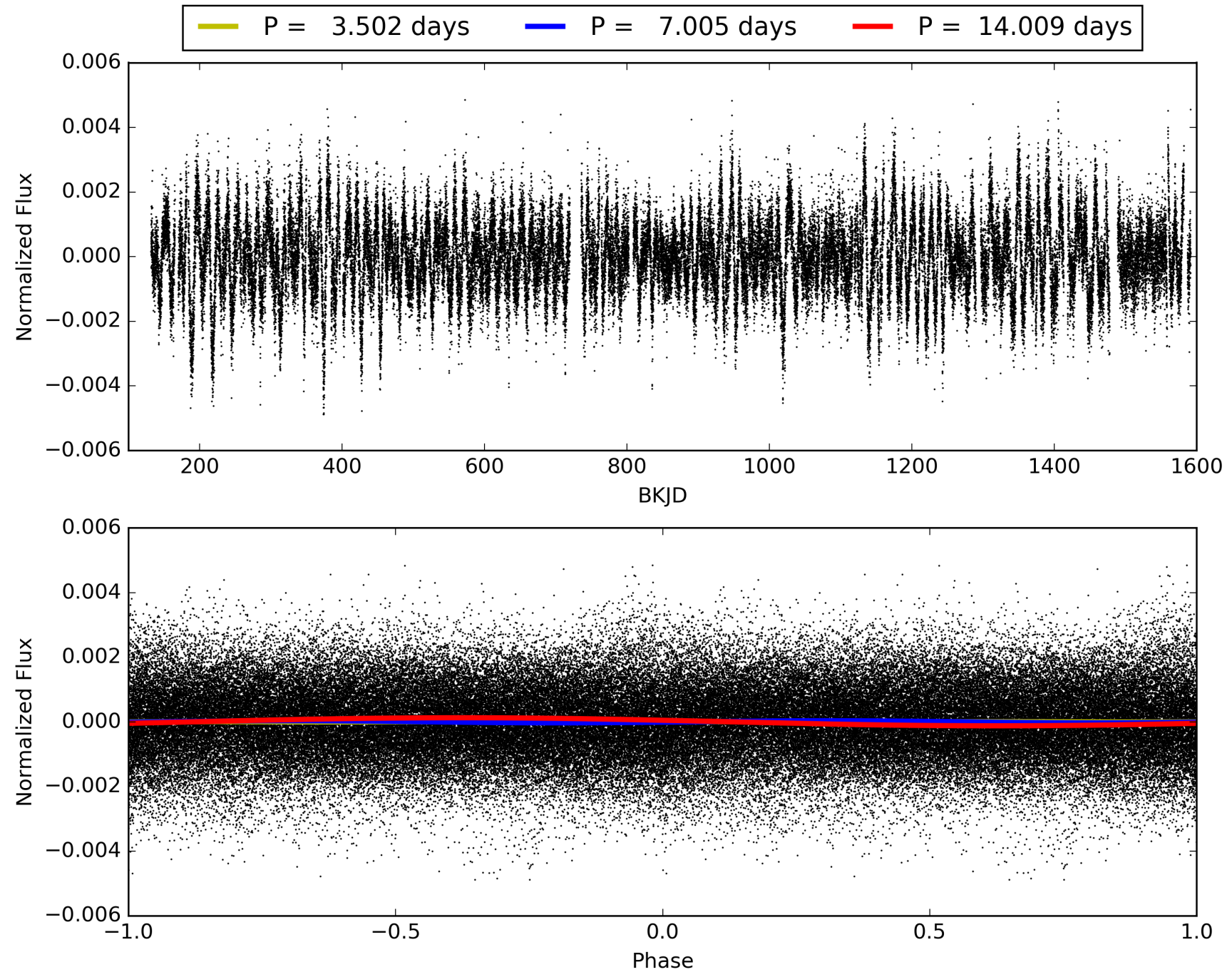
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 007512982-02, PDC Light Curves



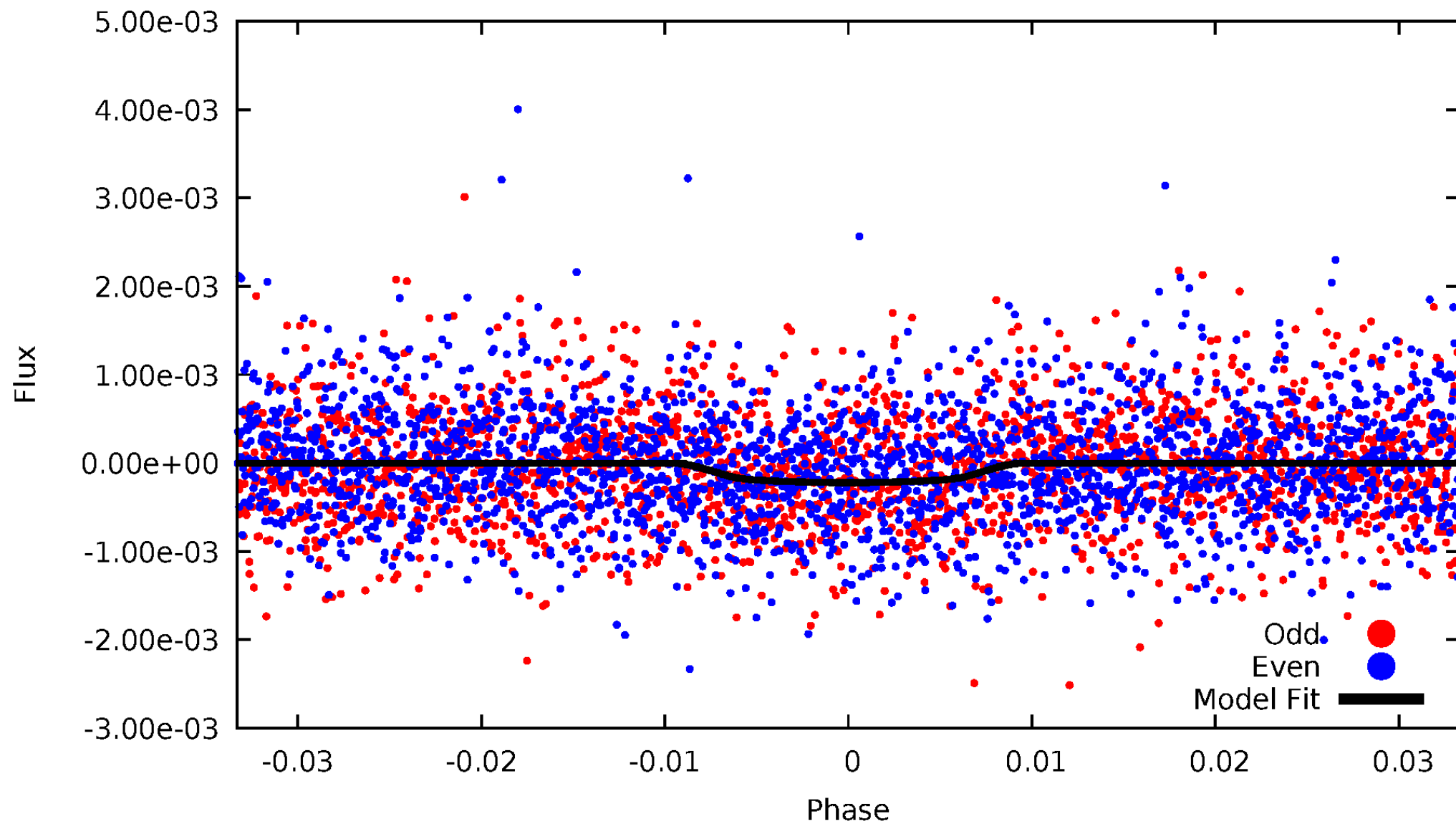


TCE 007512982-02



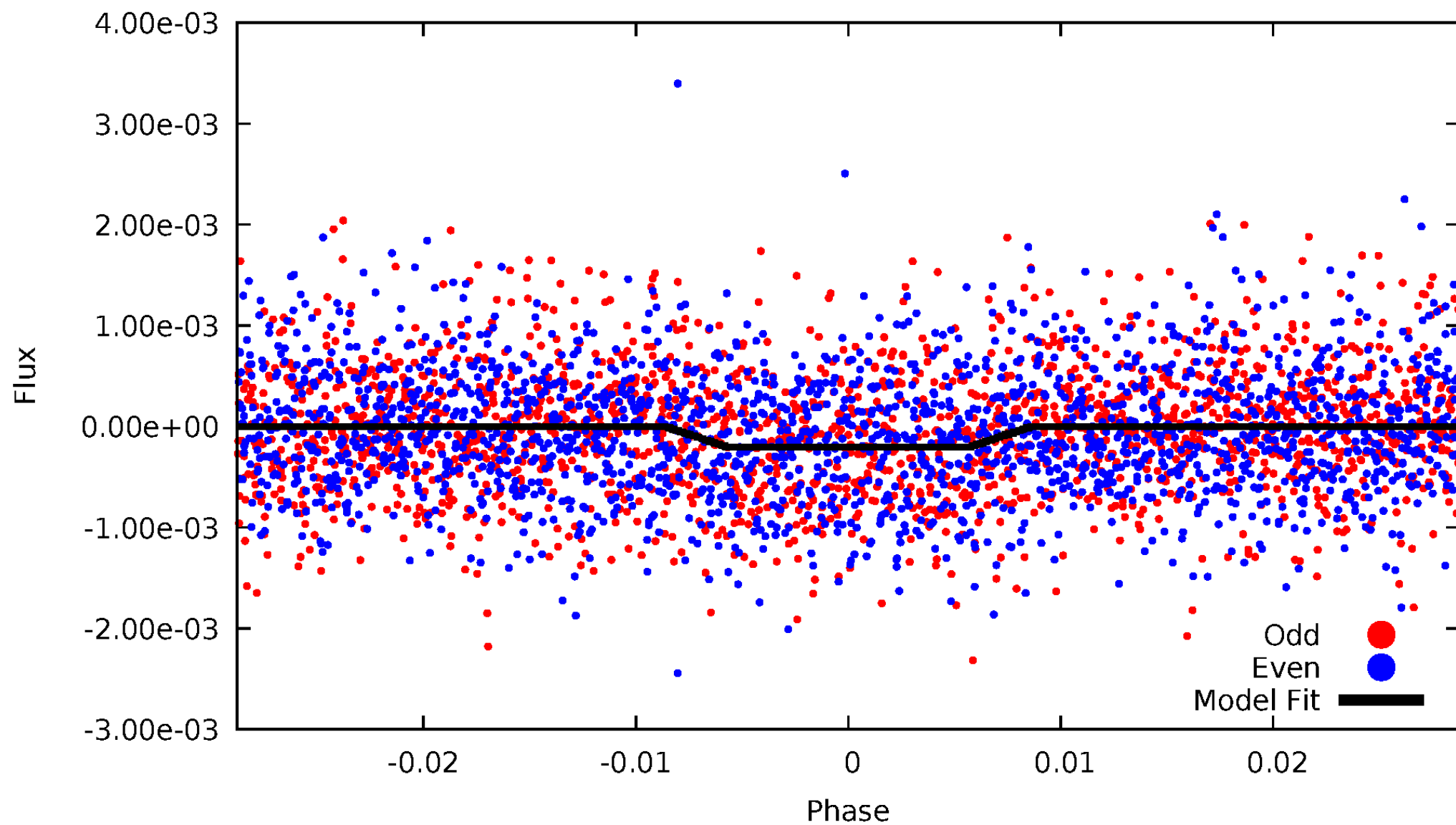
DV Odd/Even

TCE 007512982-02



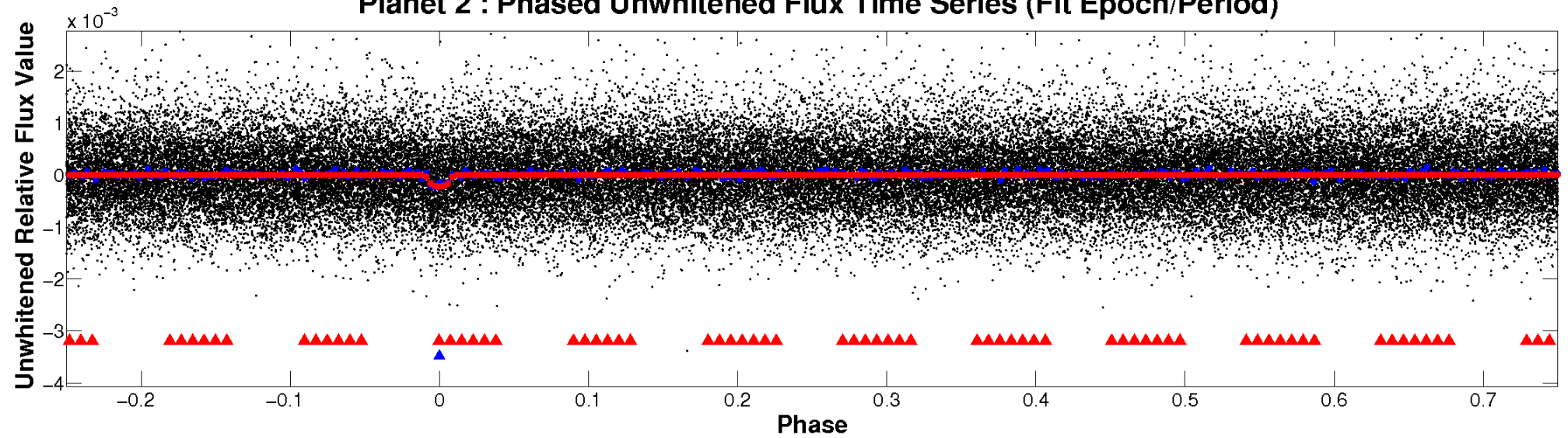
# ALT Odd/Even

TCE 007512982-02

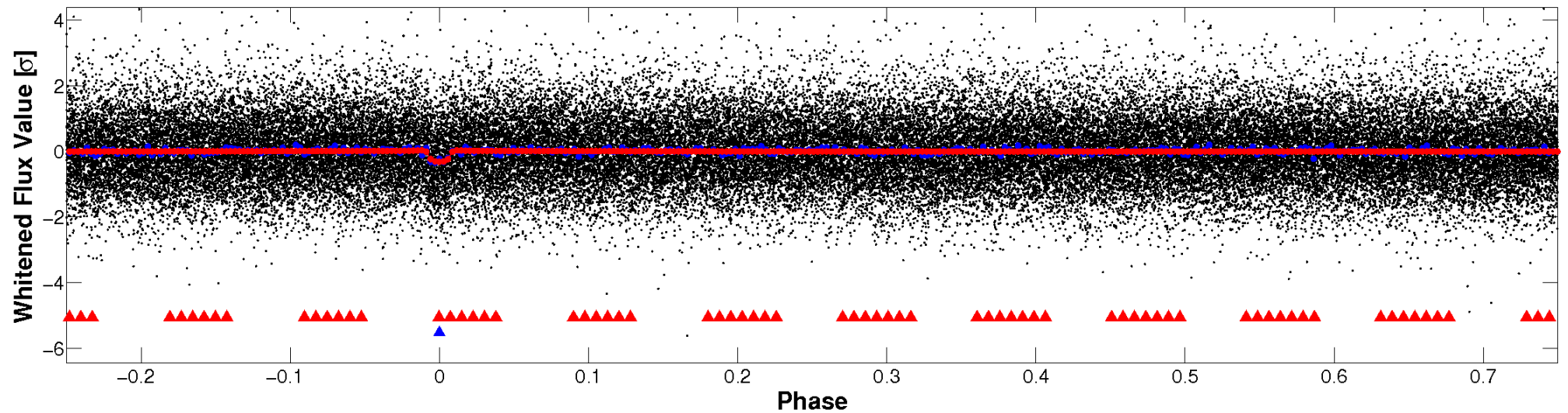


# Non-Whitened Vs. Whitened Light Curve

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

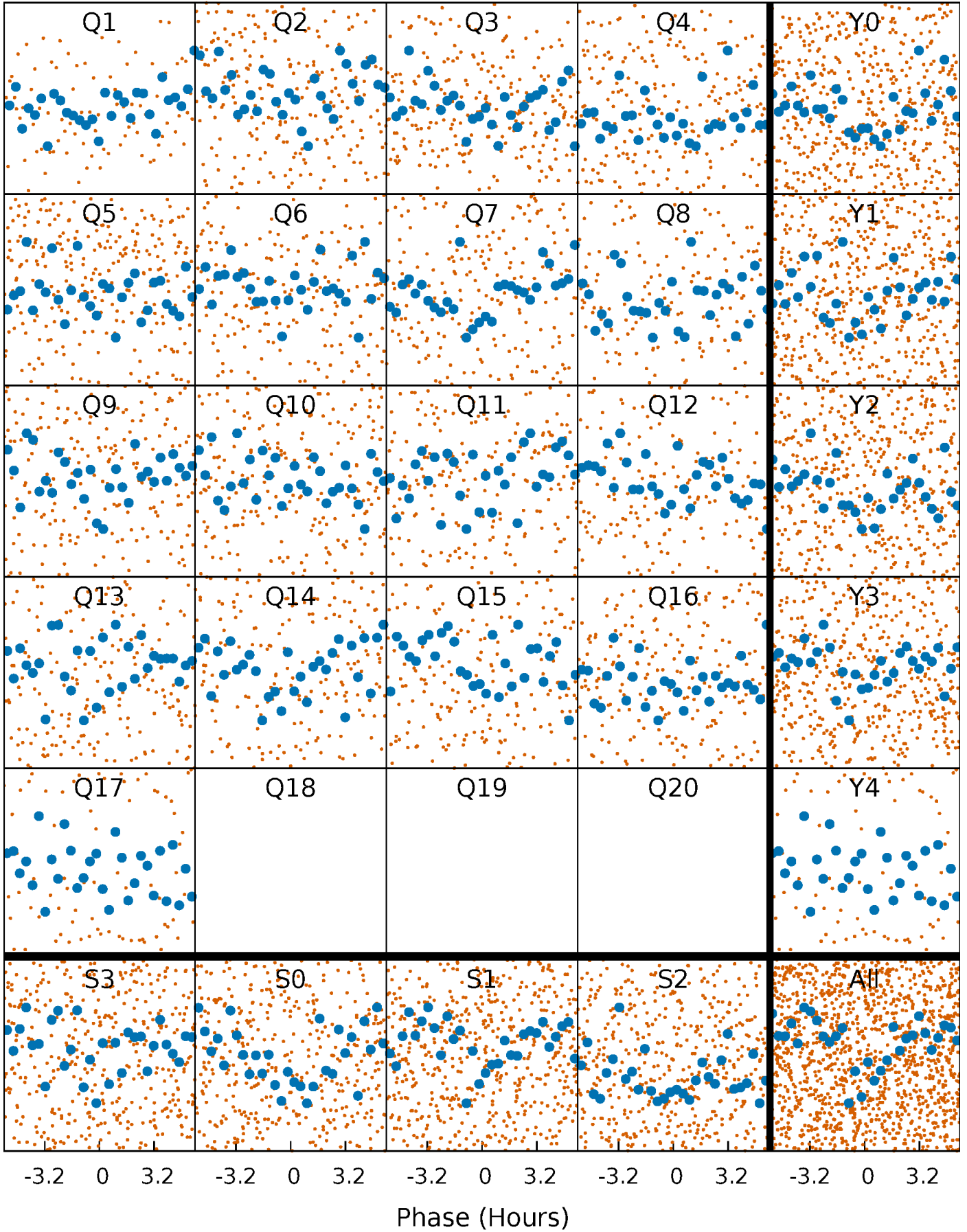


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

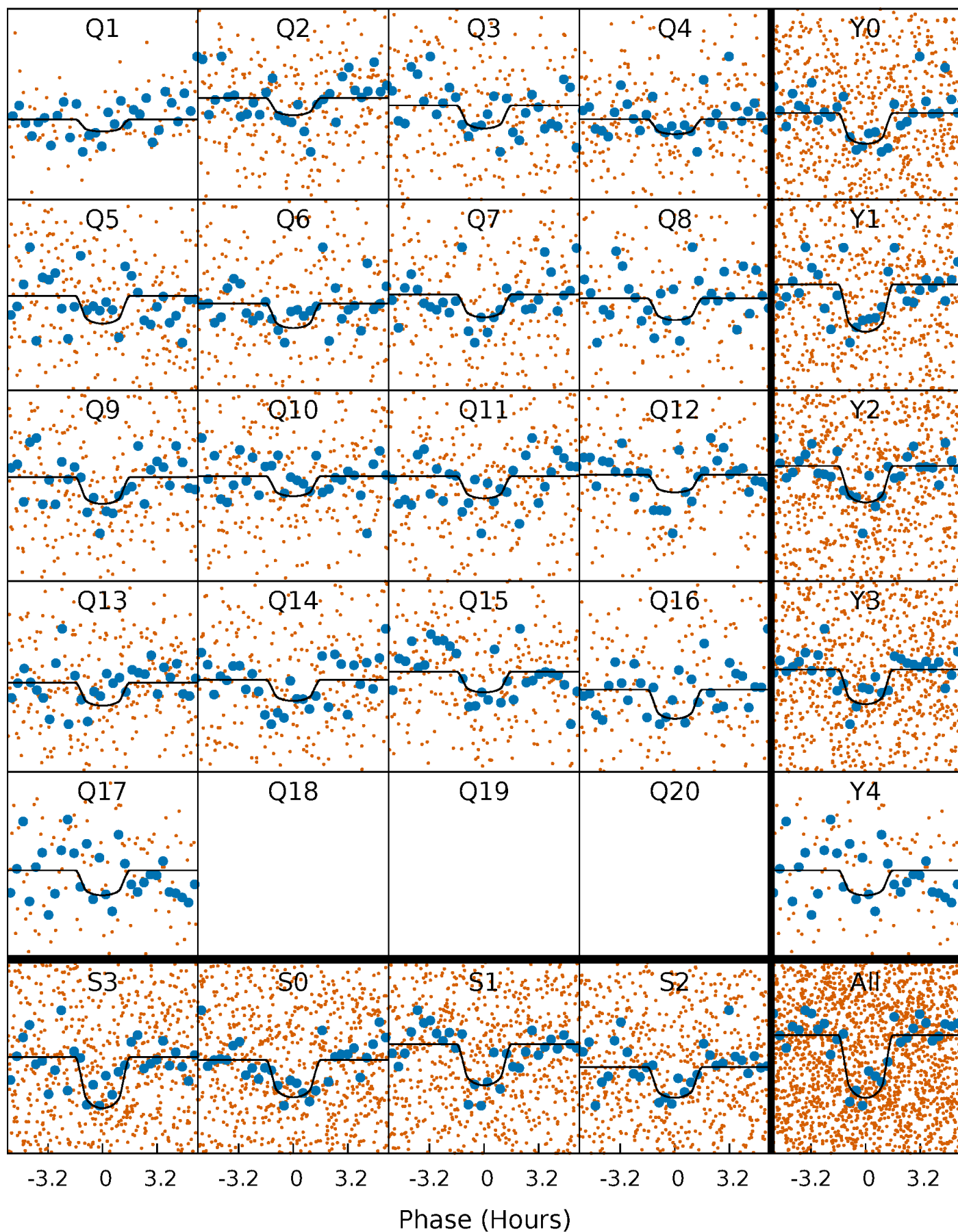
TCE 007512982-02   P= 7.004577 Days    $T_0=137.890792$  (BKJD)





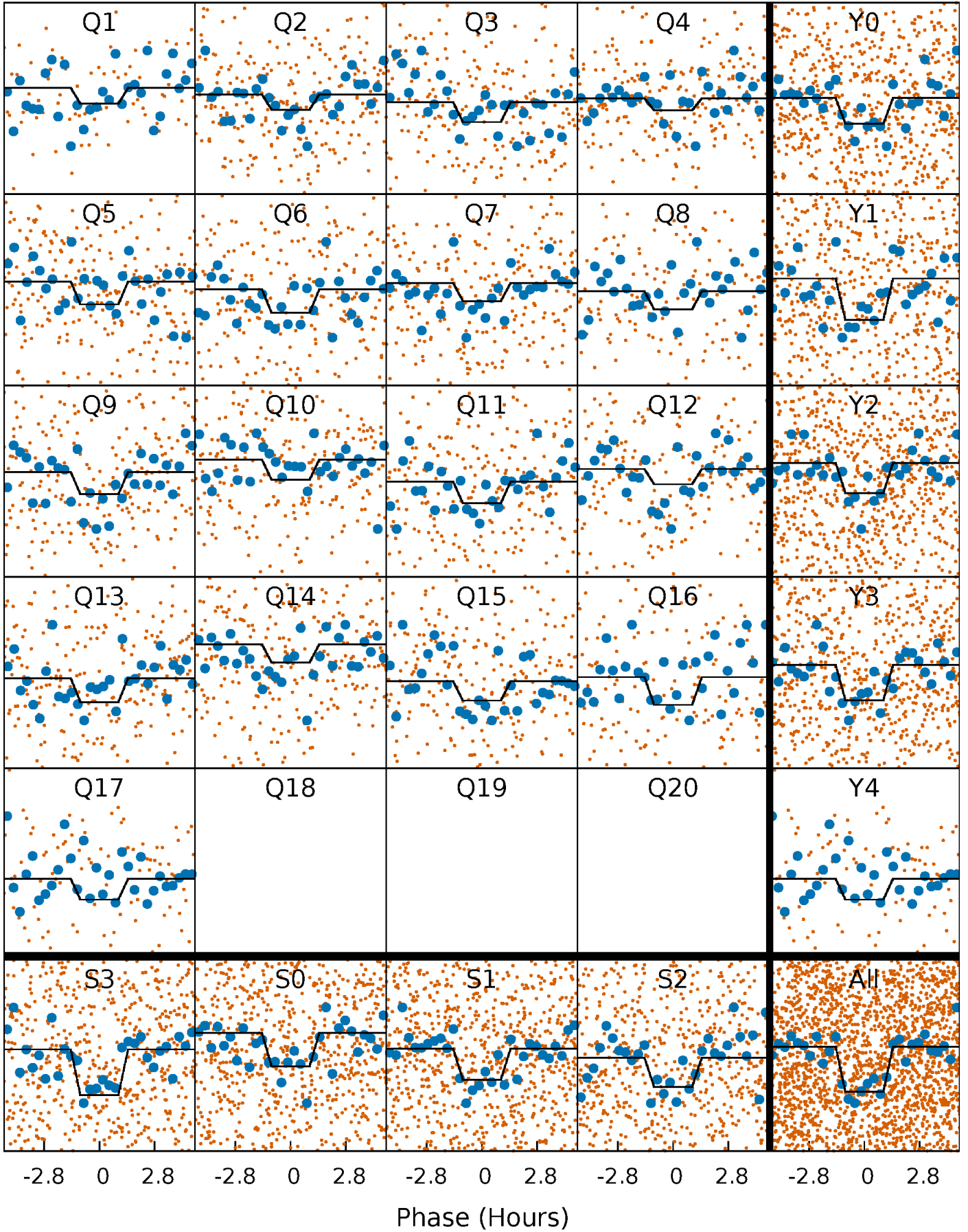
# DV Quarter-Phased Transit Curves

TCE 007512982-02 P= 7.004577 Days  $T_0=137.890792$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 007512982-02 P= 7.004507 Days  $T_0=137.898279$  (BKJD)

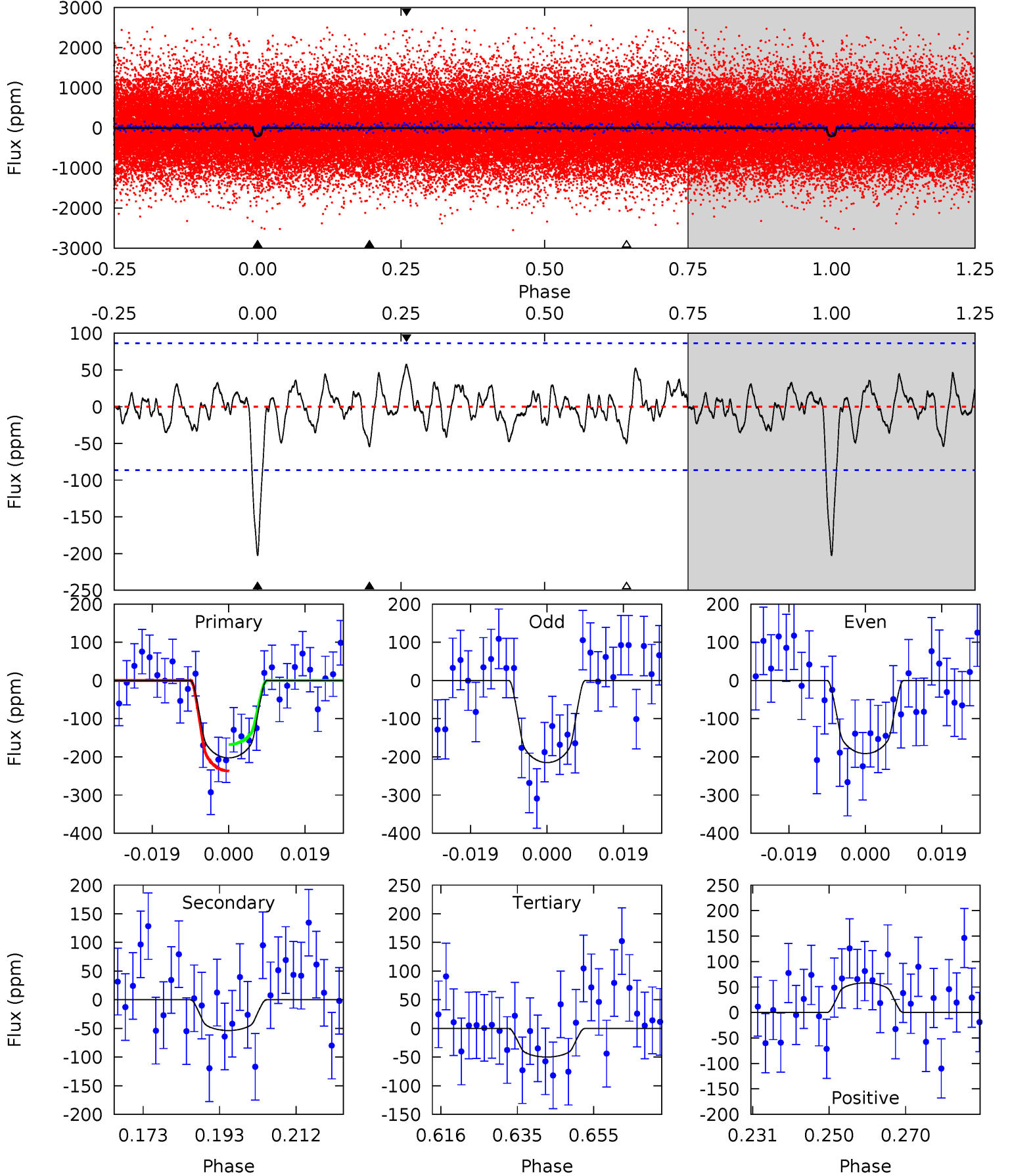




# DV Model-Shift Uniqueness Test

007512982-02, P = 7.004577 Days, E = 130.886215 Days

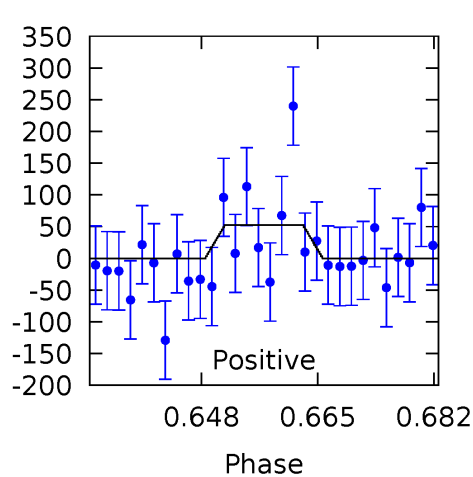
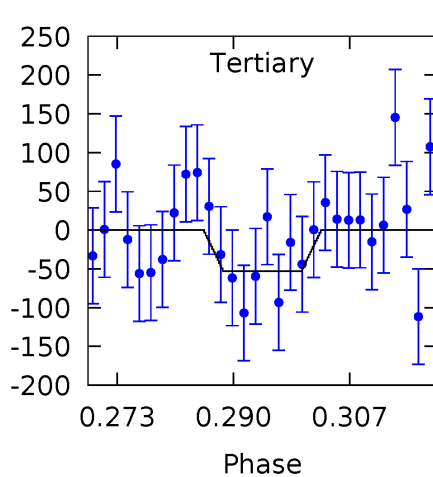
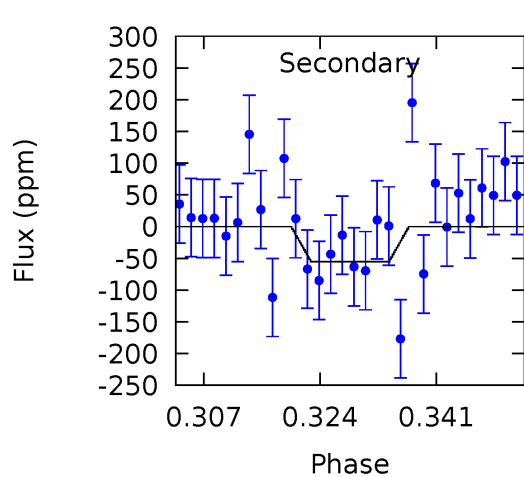
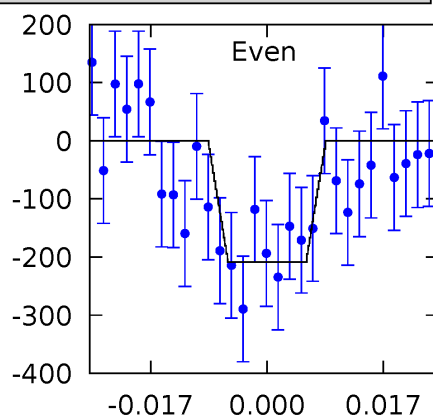
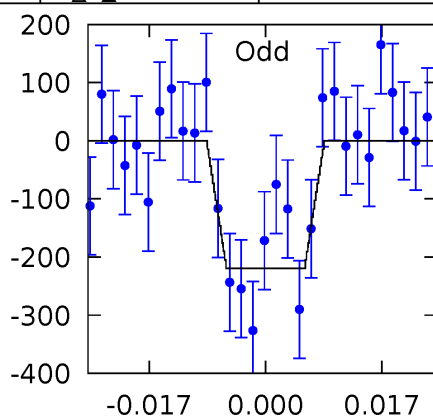
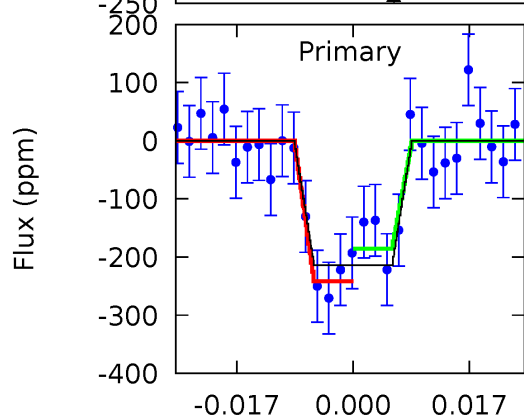
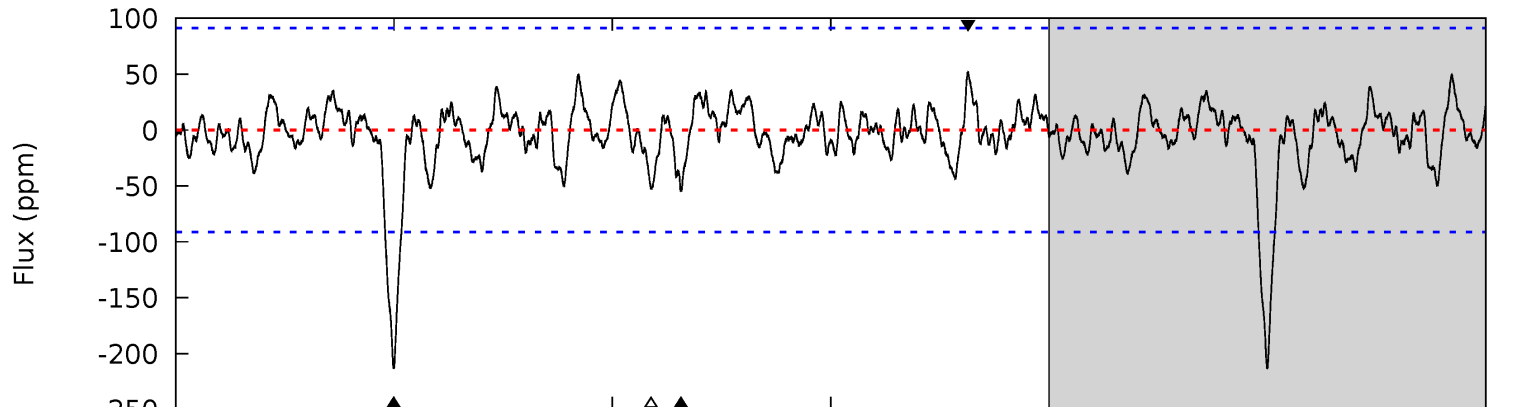
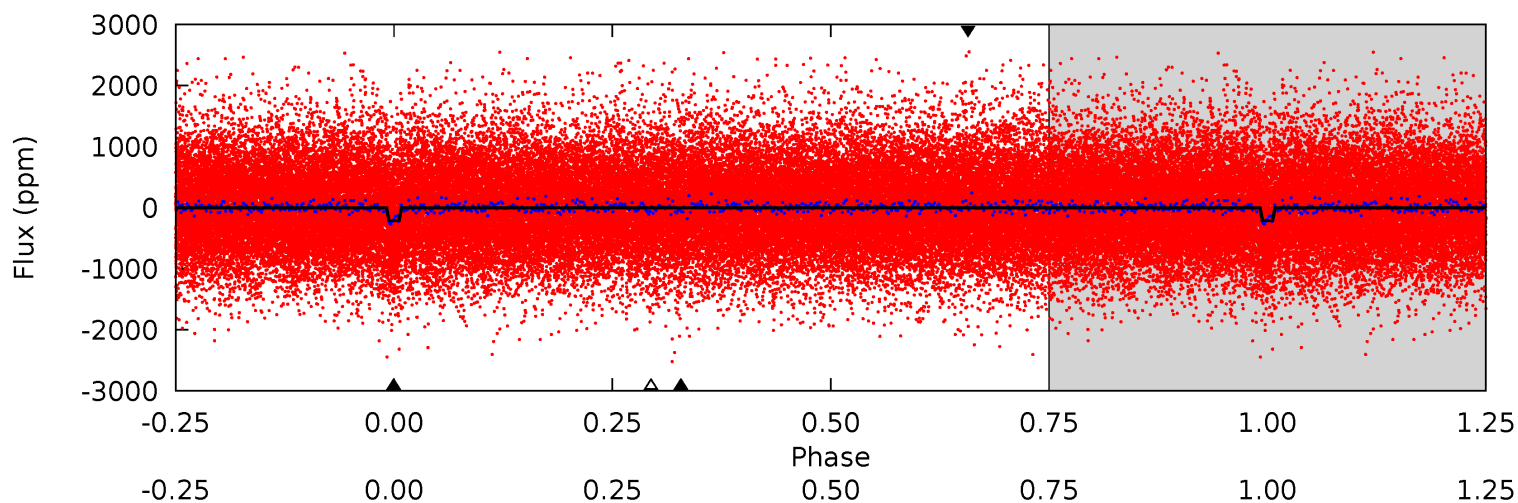
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.5	3.04	2.83	3.29	4.90	2.34	1.11	8.66	8.21	0.21	-0.25	0.67	1.00	0.22	1.97



# Alt Model-Shift Uniqueness Test

007512982-02, P = 7.004507 Days, E = 130.893772 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.5	2.97	2.84	2.84	4.92	2.39	0.99	8.68	8.69	0.13	0.13	0.30	1.06	0.20	1.51



### Stellar Parameters For KIC 007512982

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4883^{+77}_{-87}$	$4.515^{+0.064}_{-0.020}$	$0.180^{+0.150}_{-0.150}$	$0.808^{+0.028}_{-0.055}$	$0.779^{+0.043}_{-0.028}$	$2.084^{+0.486}_{-0.179}$
	+2%/-2%	+1%/-0%	+83%/-83%	+3%/-7%	+6%/-4%	+23%/-9%
Source	SPE90	SPE90	SPE90	DSEP		

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

### Secondary Eclipse Parameters for KIC 007512982-02 / KOI 1480.02

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-54 \pm 18$	$1.57^{+1.07}_{-0.92}$	$1045^{+22}_{-26}$	$3510^{+1286}_{-575}$	$51^{+244}_{-35}$
Alt.	$-55 \pm 19$	$1.42^{+1.09}_{-0.85}$	$1046^{+22}_{-23}$	$3618^{+1527}_{-617}$	$64^{+337}_{-45}$

$T_{\text{max}}$  = 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

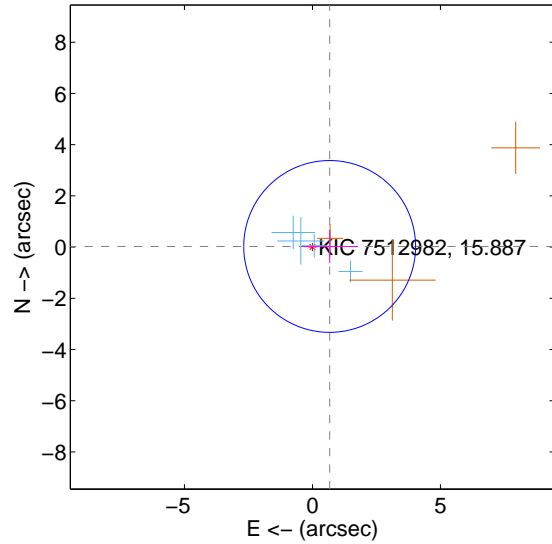
Supplemental centroid analysis for 007512982-02. Kepler magnitude: 15.89. Transit SNR 8.60

There are 4 quarters with good PRF difference image offsets

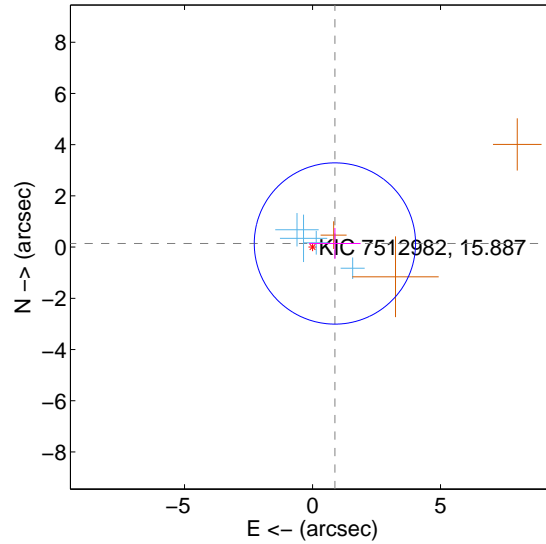
The direct PRF centroid is offset from the target star catalog position by about 0.15 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.672 \pm 1.118$	0.60	$-0.672 \pm 1.102$	$0.025 \pm 0.652$
PRF-fit source offset from KIC position	$0.885 \pm 1.050$	0.84	$-0.874 \pm 1.004$	$0.141 \pm 0.602$
photometric centroid source offset	$2.81 \pm 1.69$	1.67	$-0.26 \pm 1.49$	$2.80 \pm 1.69$

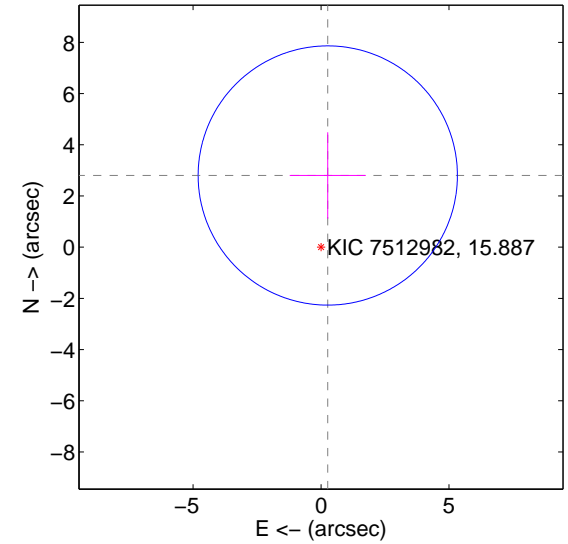
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

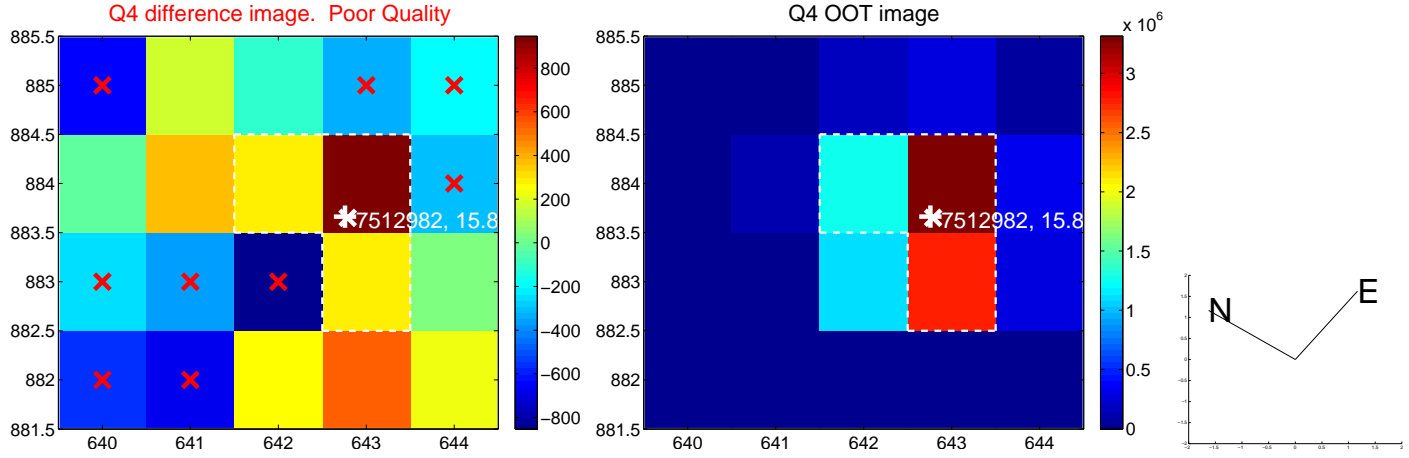
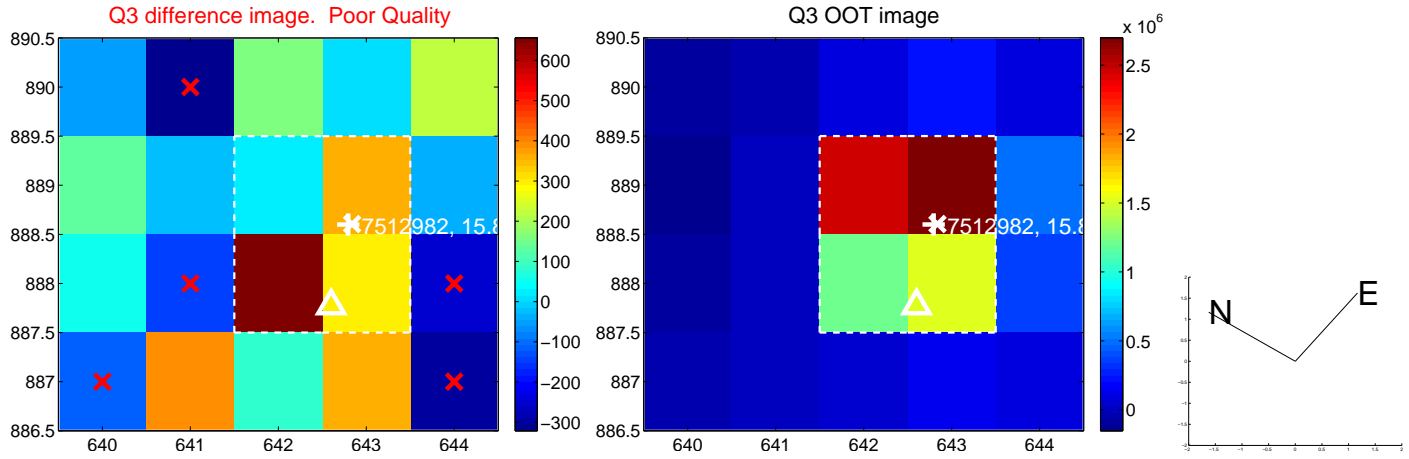
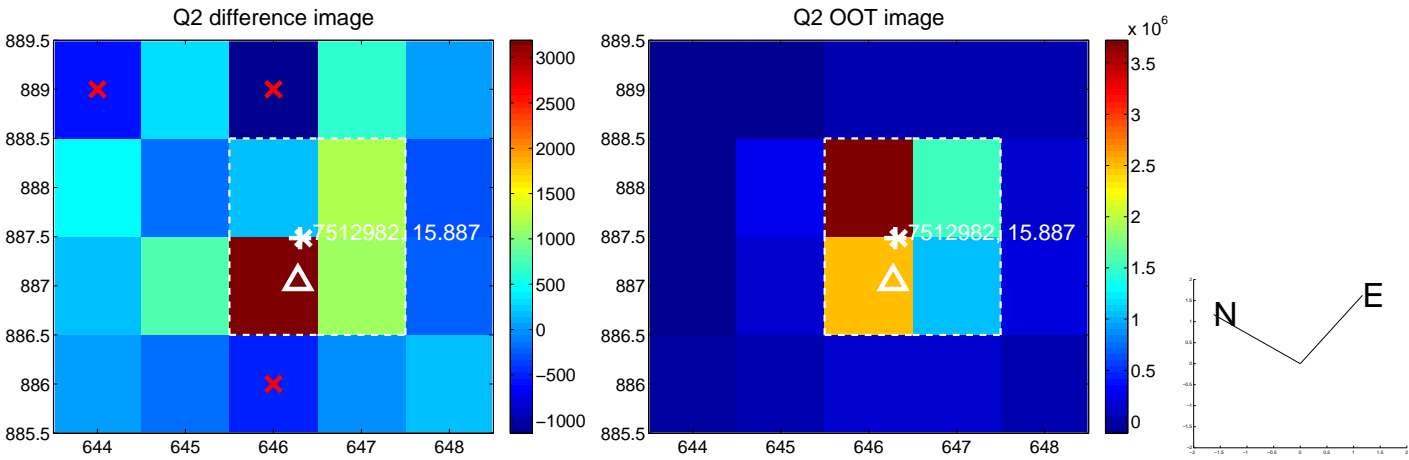
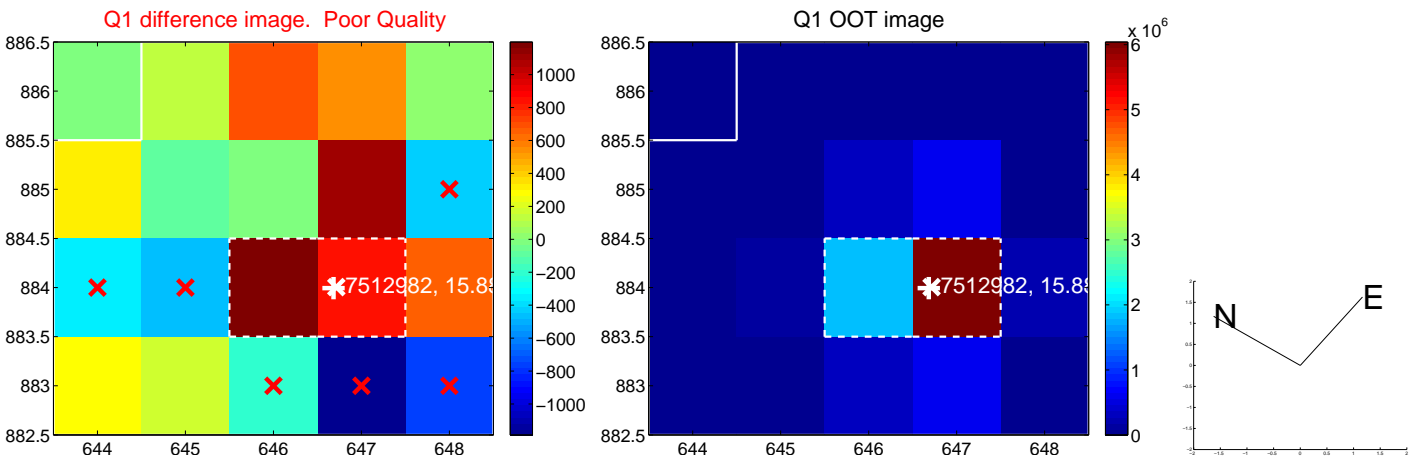


offset from photometric centroids

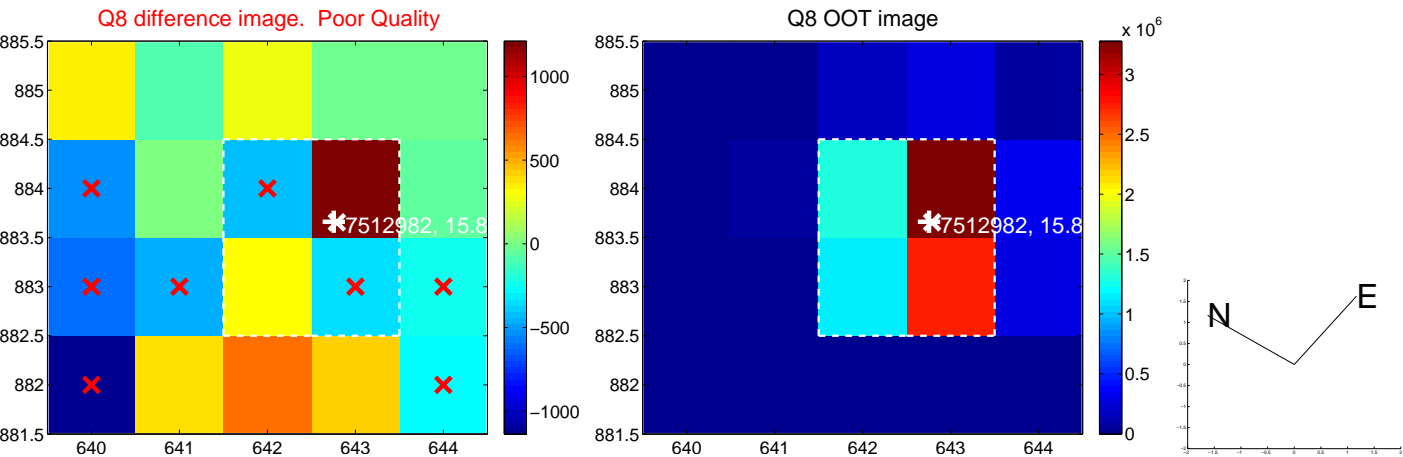
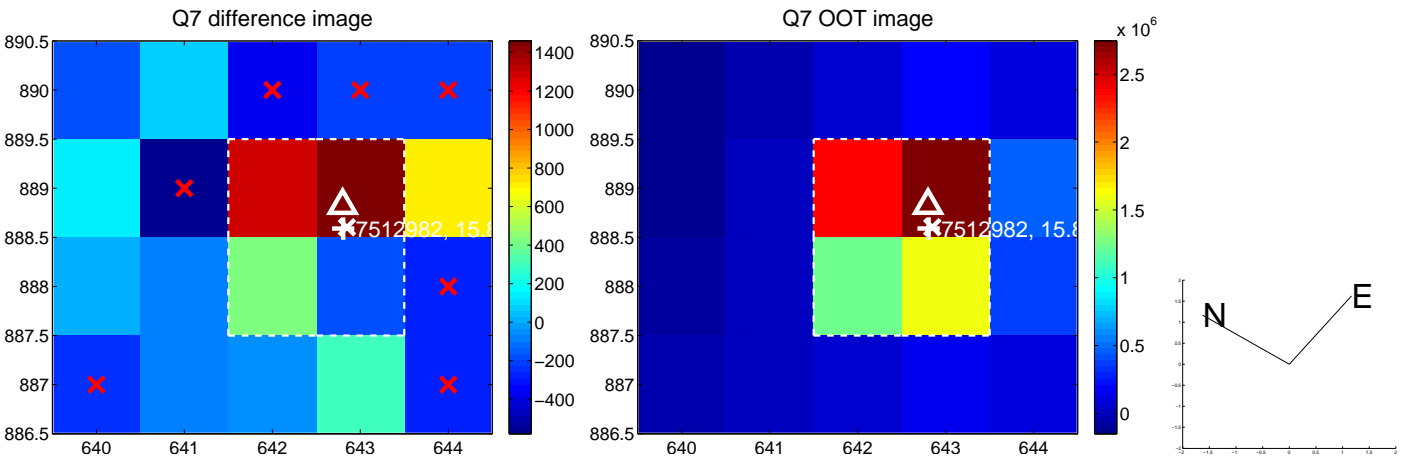
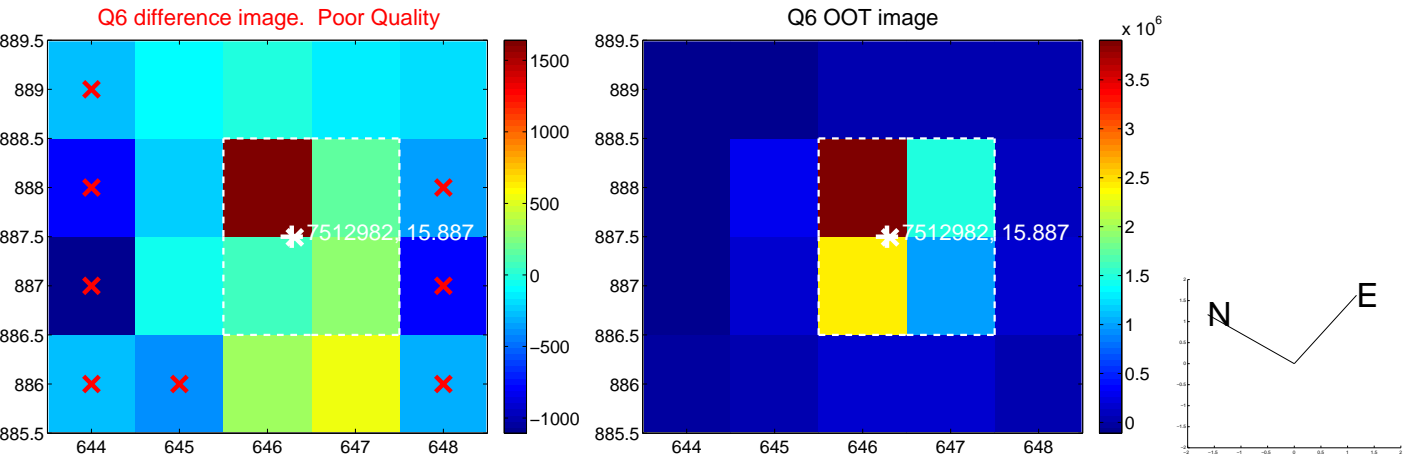
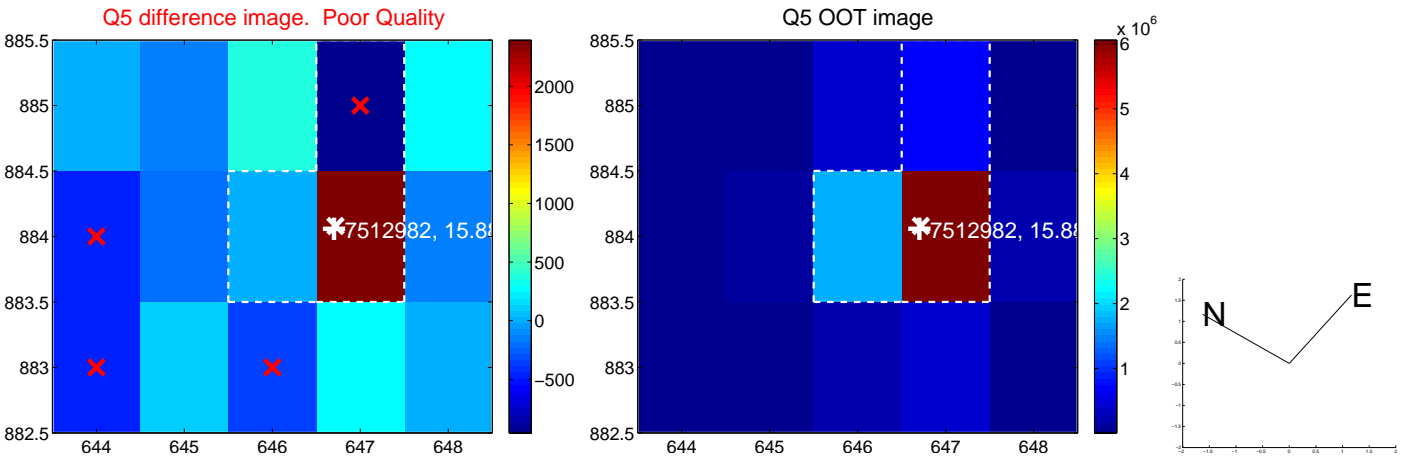


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

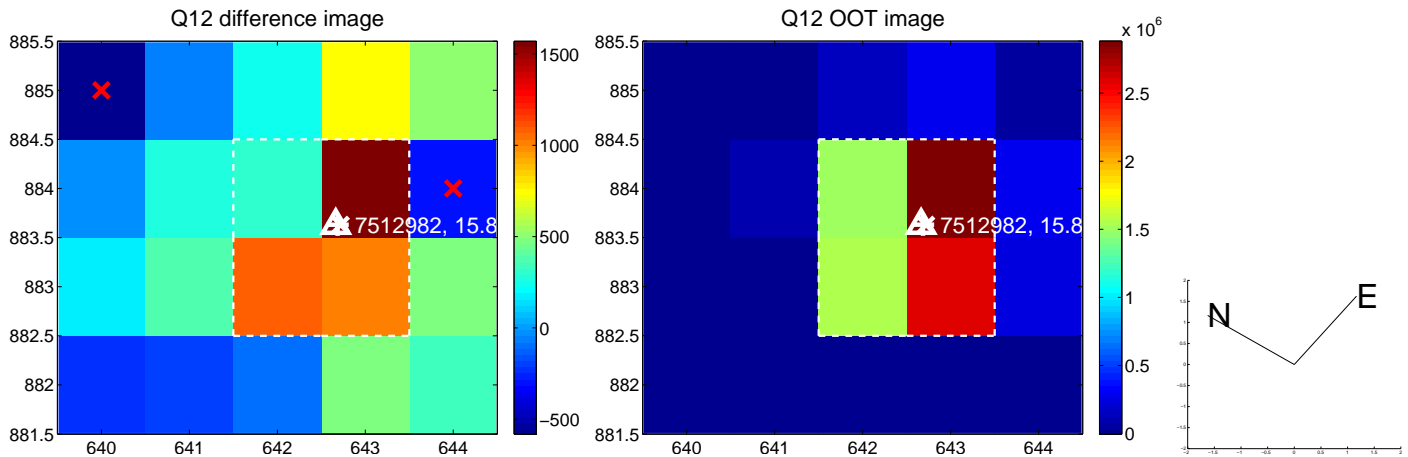
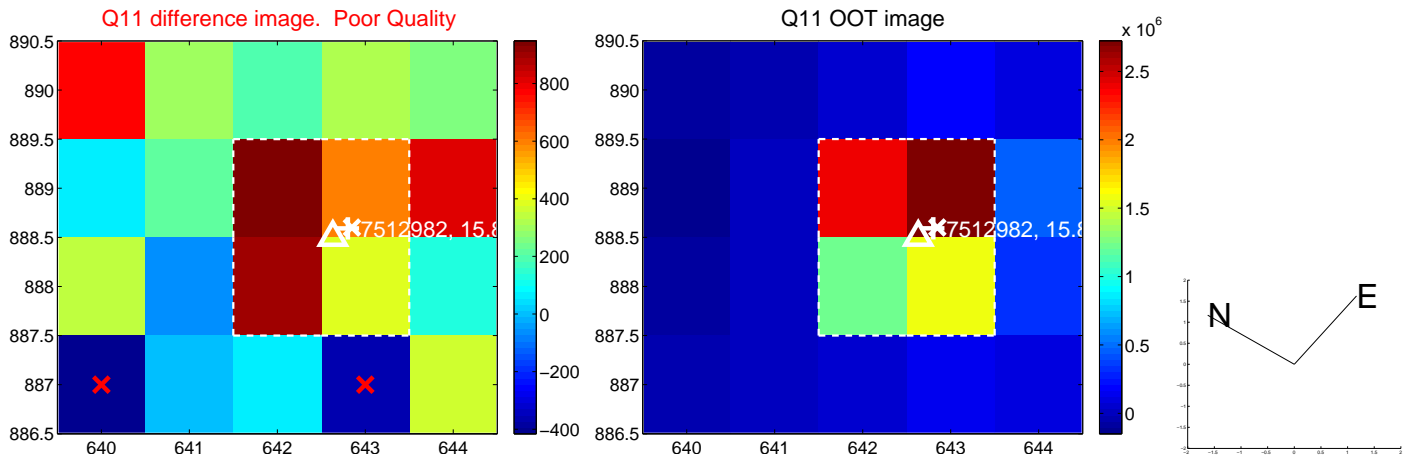
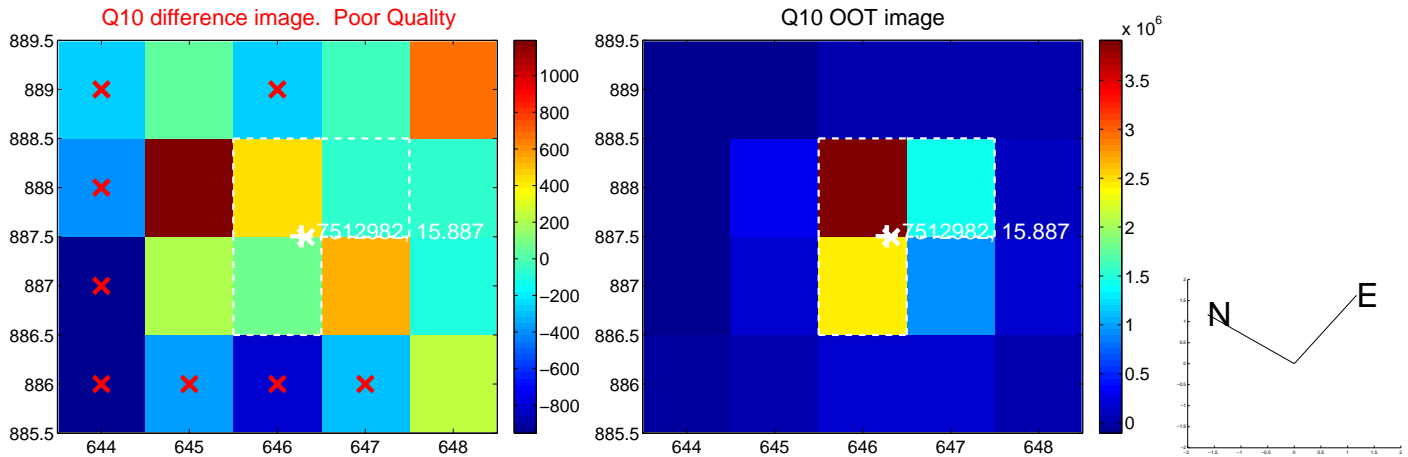
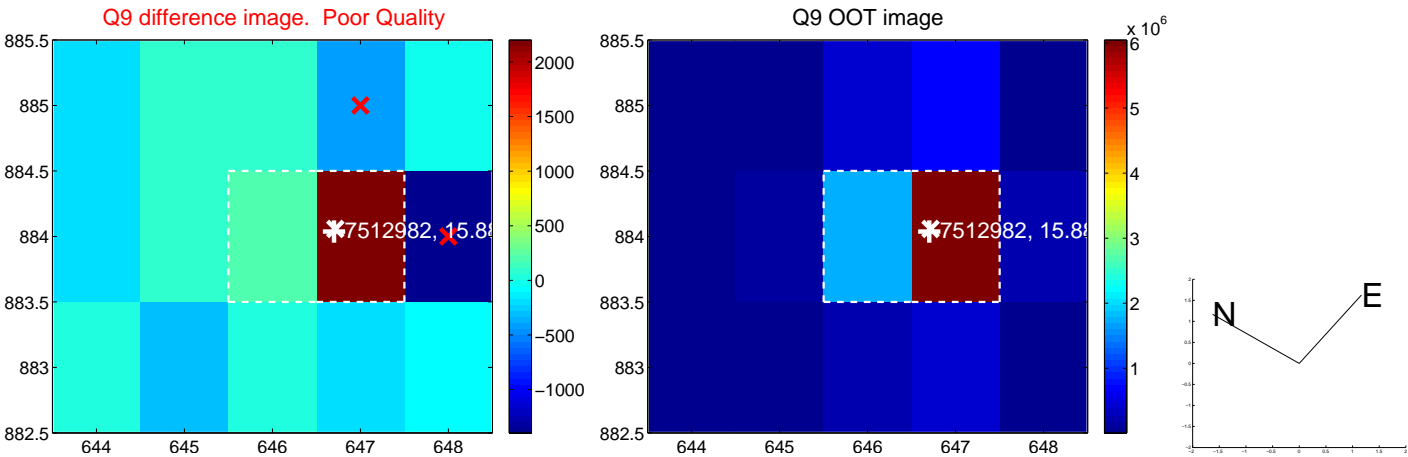
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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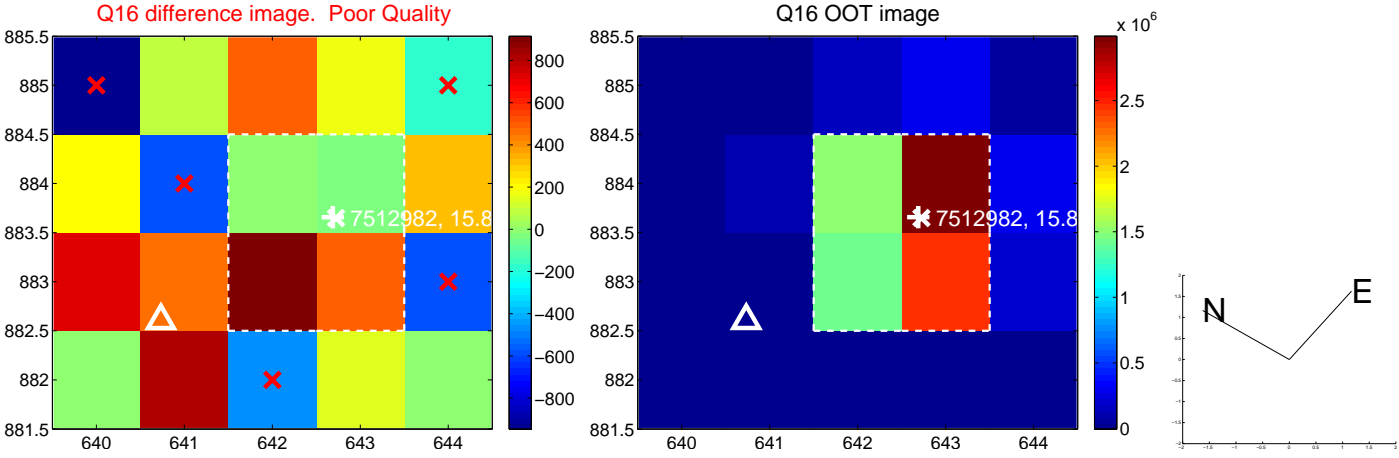
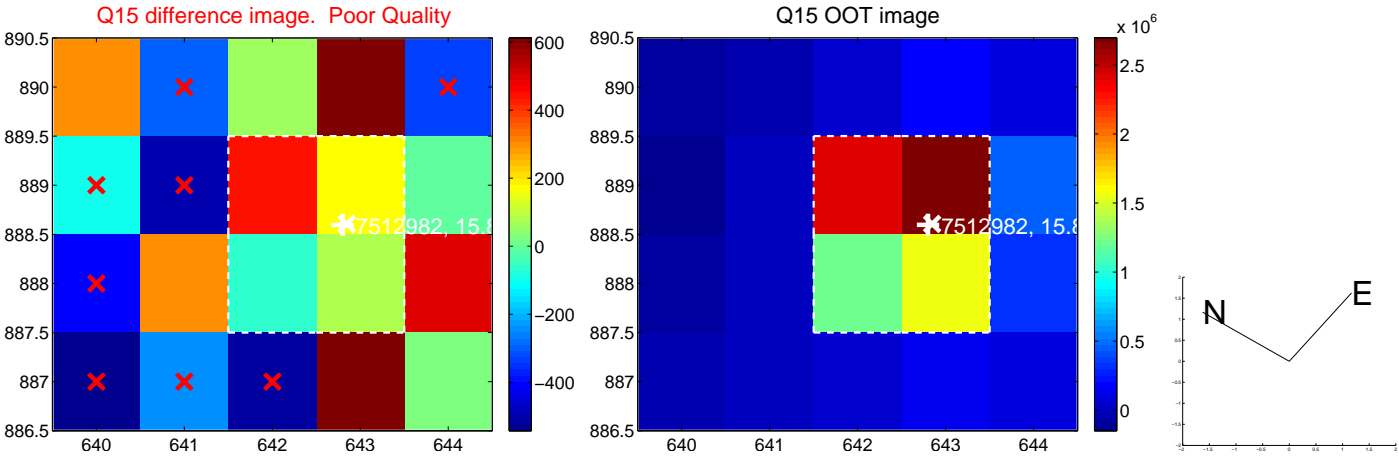
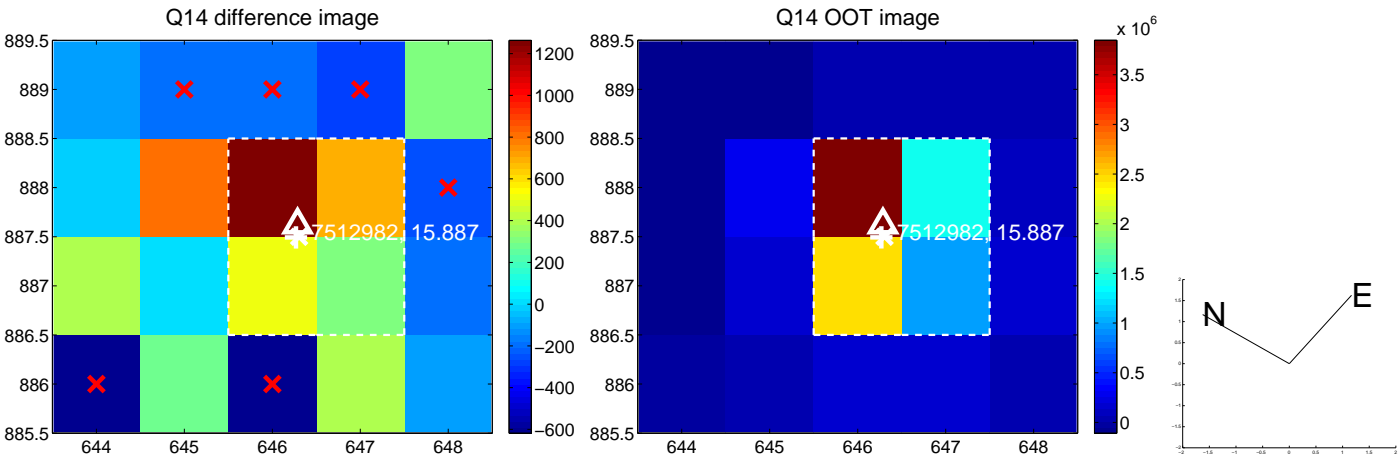
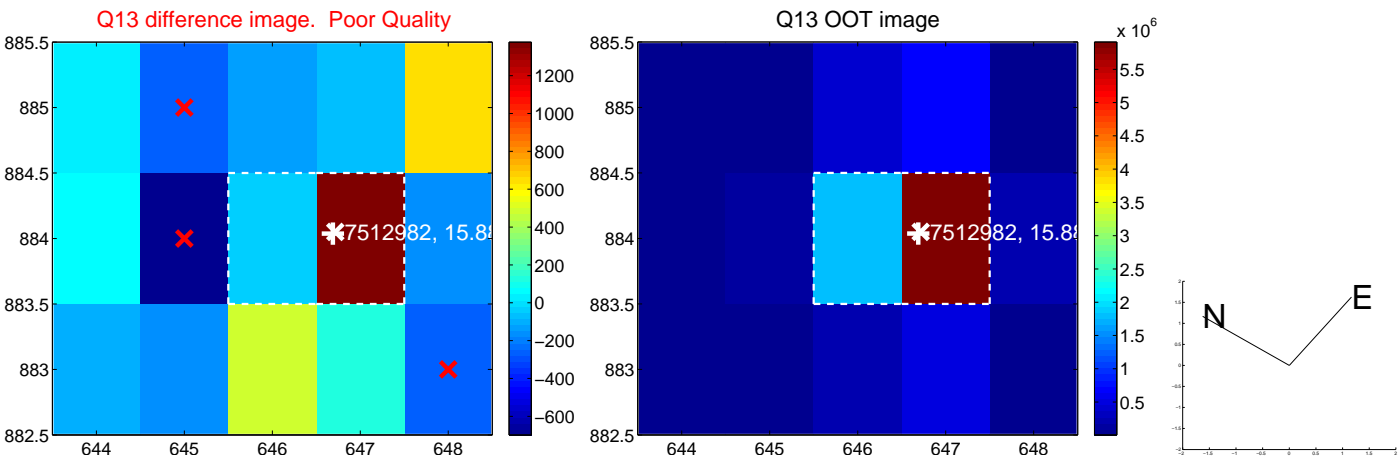


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

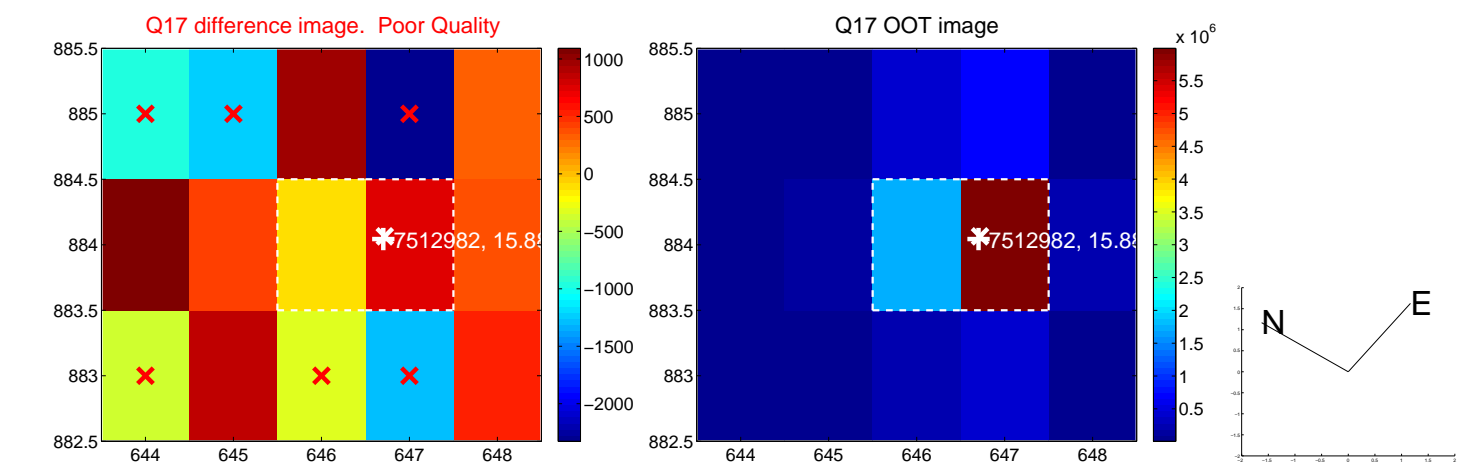




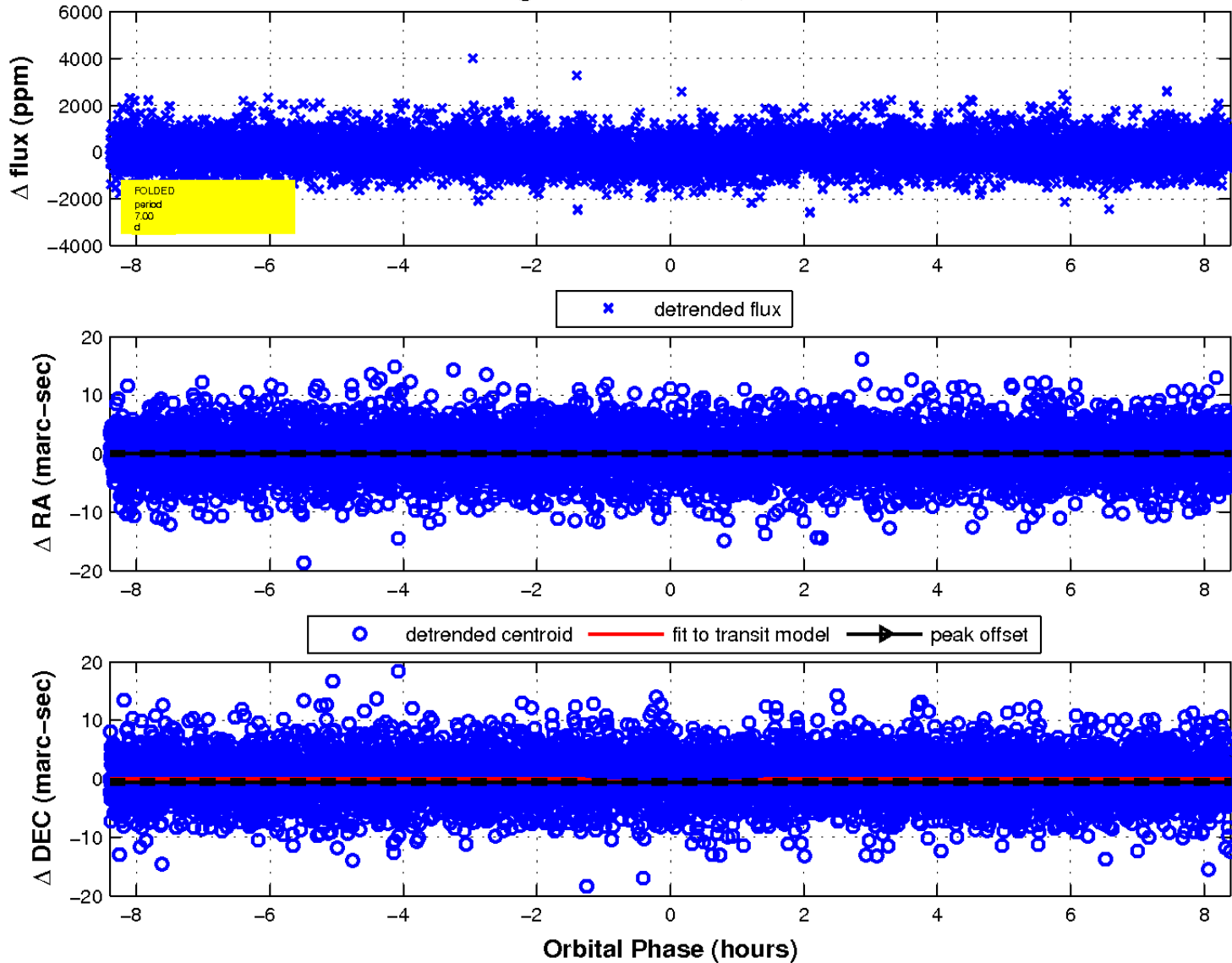
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



# UKIRT Image

Declination

