

# KIC 009284741

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009284741-01	OBS	7153.01	20.729491	134.545377	346074.0	5.000	12529.0	-1.0	0.80	5256	43.24	24.52
009284741-02	OBS	No	20.729093	141.232029	356992.9	3.000	10905.5	-1.0	0.80	5256	43.76	24.52
009284741-03	OBS	No	10.365191	140.540206	0.8	8.170	892.9	0.0	0.80	5256	0.12	61.78
009284741-04	OBS	No	10.364570	141.455326	18208.8	15.000	852.4	-1.0	0.80	5256	10.61	61.79
009284741-05	OBS	No	20.731308	136.462727	2953.5	12.500	101.0	-1.0	0.80	5256	4.27	24.52

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009284741-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_ALT—MOD_ODDEVEN_ALT—HAS_SEC_TCE—CENT_NOFITS
009284741-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE—CENT_NOFITS
009284741-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—SAME_NTL_PERIOD—CENT_FEW_DIFFS
009284741-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—LPP_DV—LPP_ALT—MOD_TER_ALT—MOD_POS_ALT—SAME_NTL_PERIOD—CENT_NOFITS
009284741-05	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_POS_ALT—SAME_NTL_PERIOD—CENT_NOFITS

**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 009284741-01

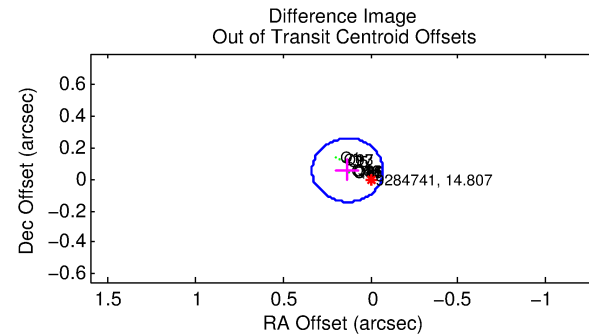
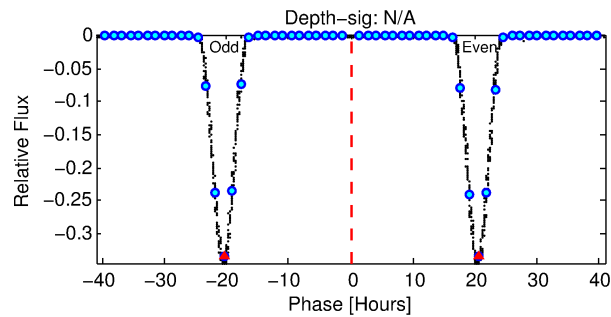
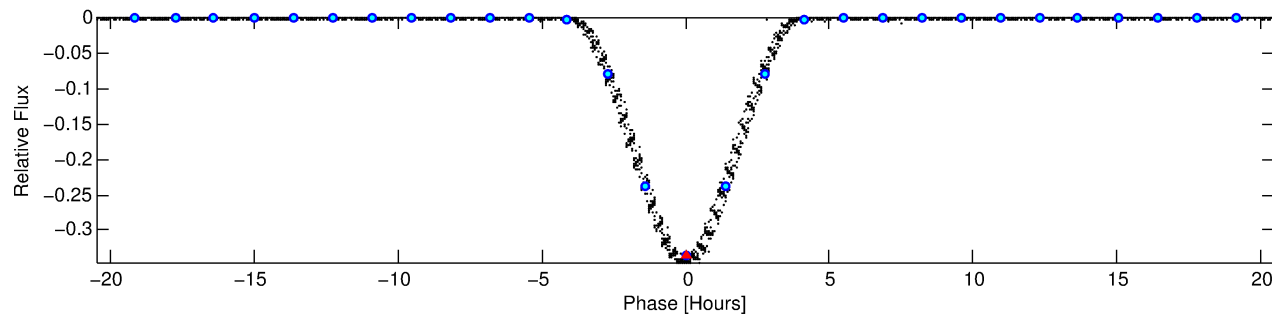
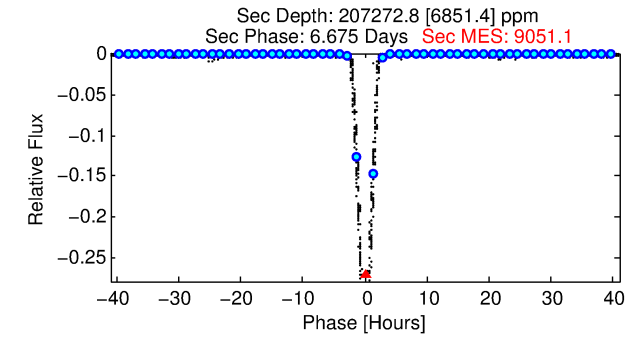
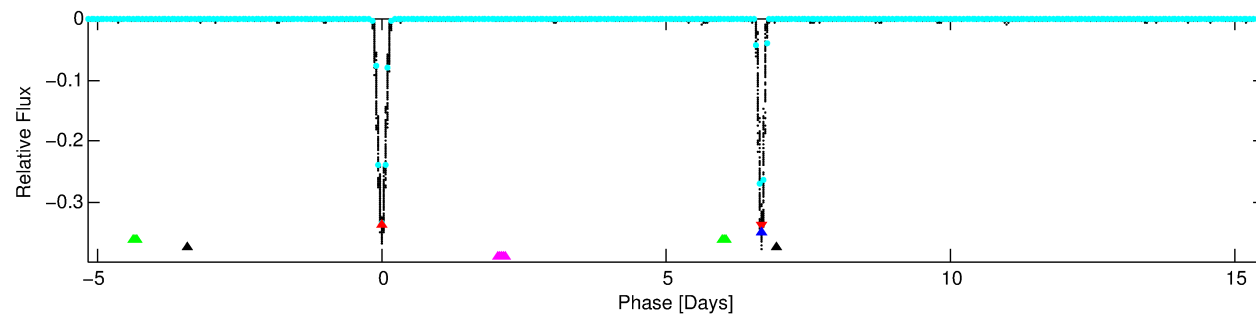
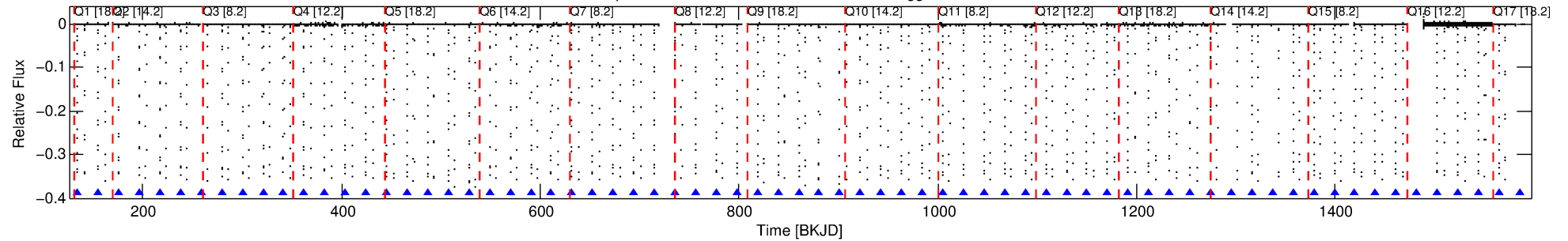
No Significant Match Found

# DV One-Page Summary

KIC: 9284741 Candidate: 1 of 5 Period: 20.729 d

KOI: K07153.01 Corr: 0.815

Kp: 14.81 R\*: 0.80 Rs Teff: 5256.0 K Logg: 4.50 Fe/H: -0.260



## TPS TCE Results:

Period = 20.72949 d  
Epoch = 134.5454 BKJD

DV fit results are unavailable

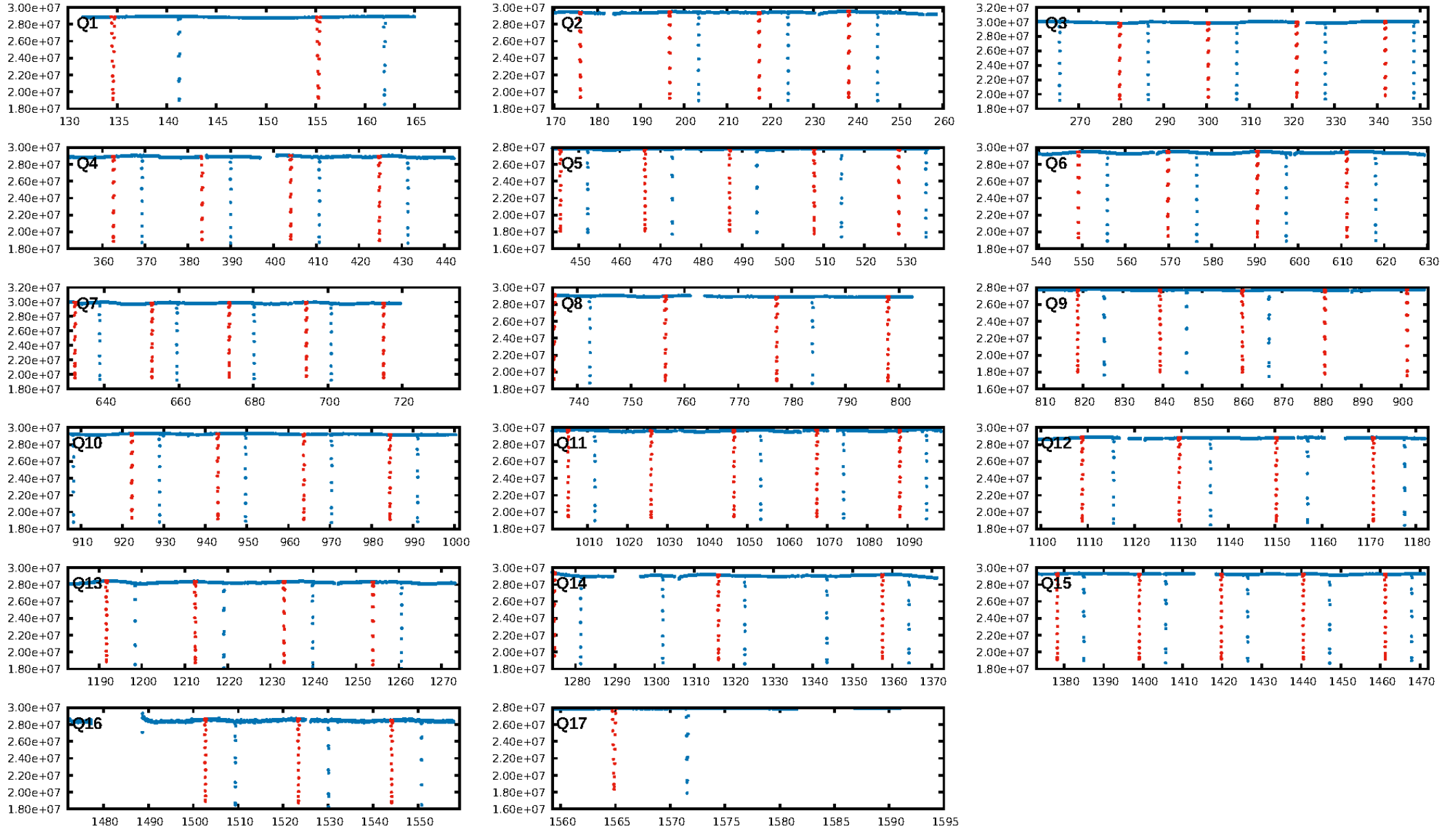
## DV Diagnostic Results:

ShortPeriod-sig: 0.1% [0.00σ]  
LongPeriod-sig: 0.3% [0.00σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [63/63]  
GhostDiagnostic-chr: 2.472  
Centroid-sig: 0.0%  
Centroid-so: 0.147 arcsec [207.08σ]  
OotOffset-rm: 0.145 arcsec [2.16σ]  
KicOffset-rm: 0.081 arcsec [1.21σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 1.00 [17/17]  
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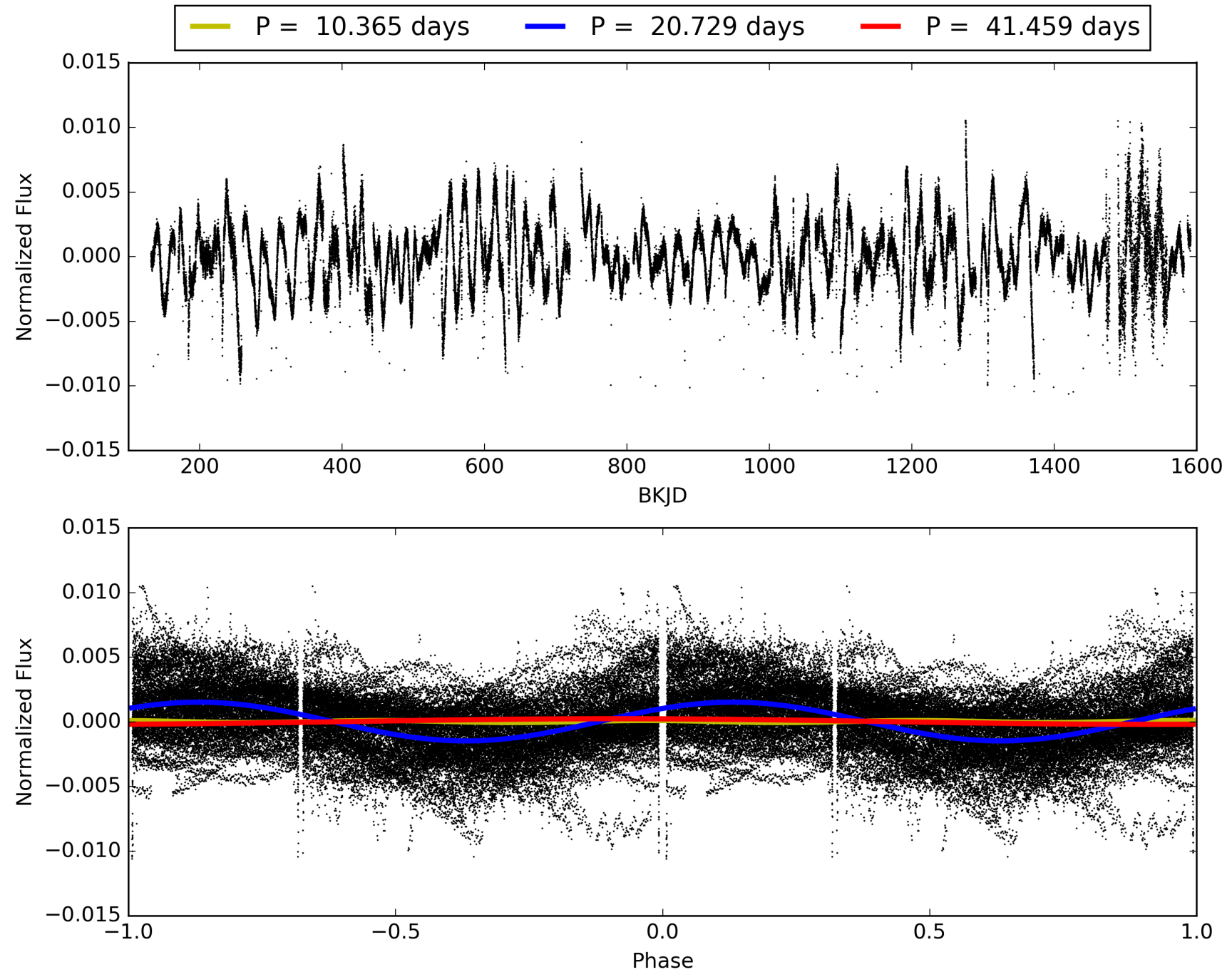
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 22:27:38 Z

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

# TCE 009284741-01, PDC Light Curves



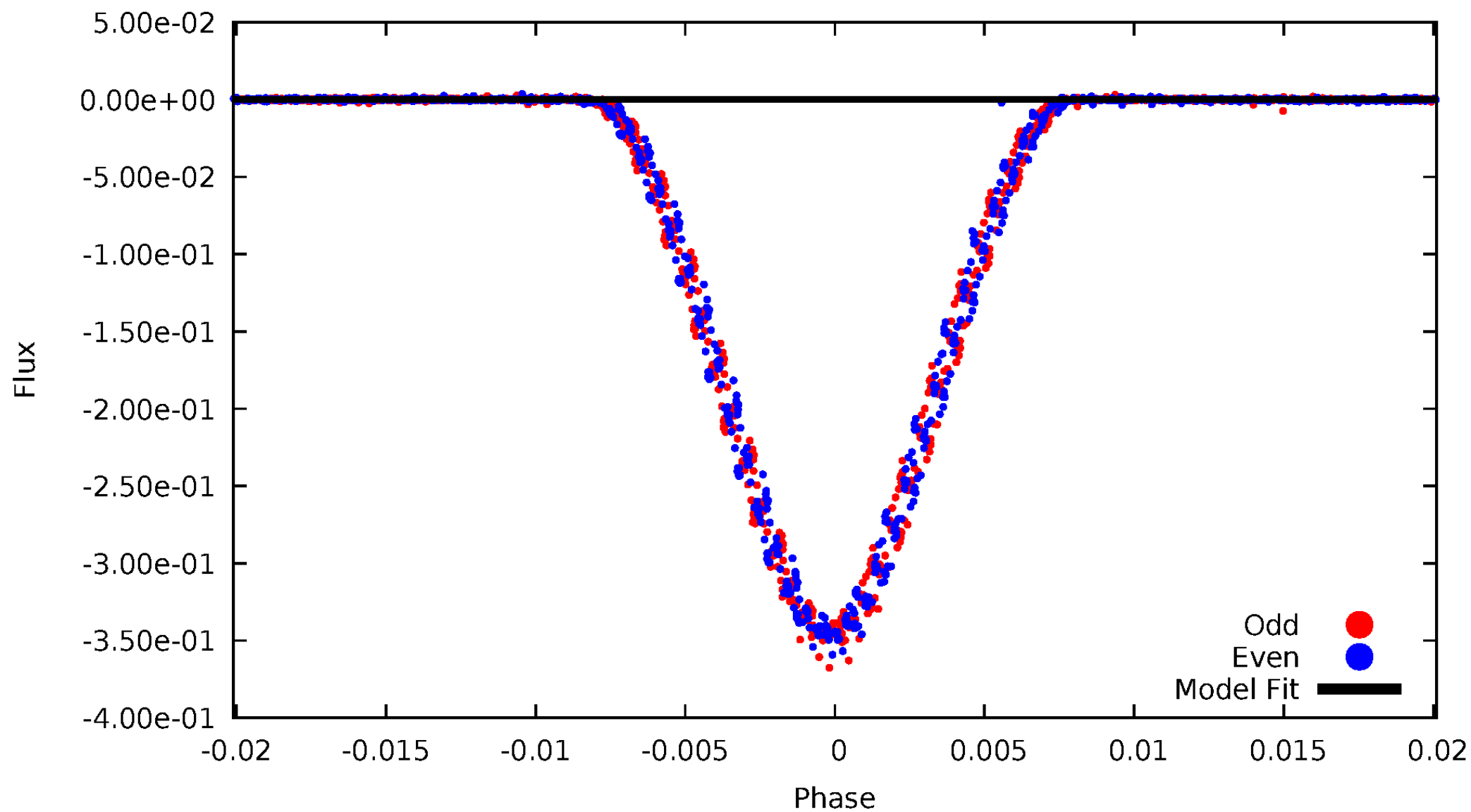
TCE 009284741-01





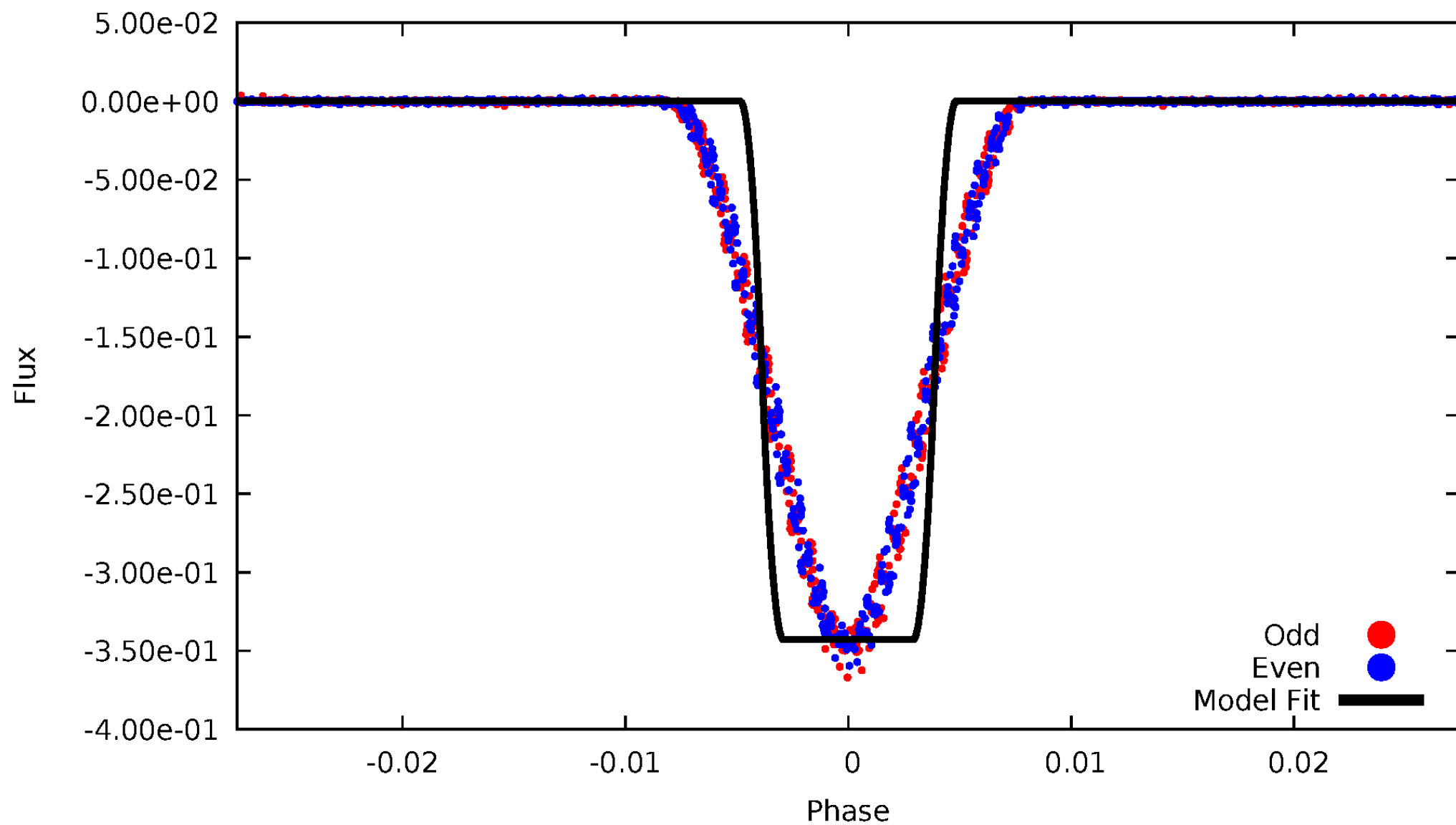
# DV Odd/Even

TCE 009284741-01



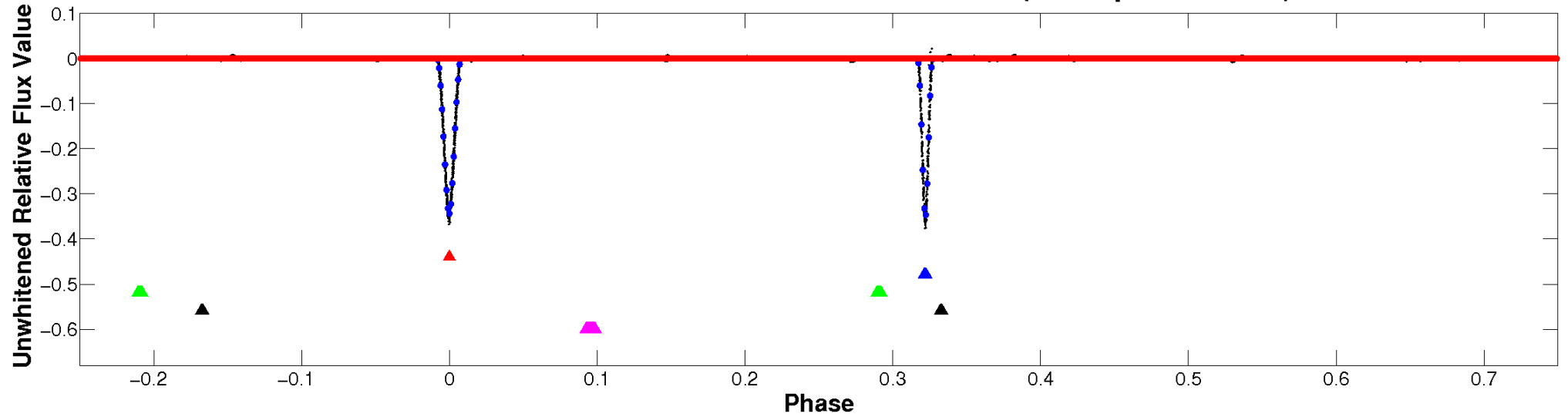
# ALT Odd/Even

TCE 009284741-01



# Non-Whitened Vs. Whitened Light Curve

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

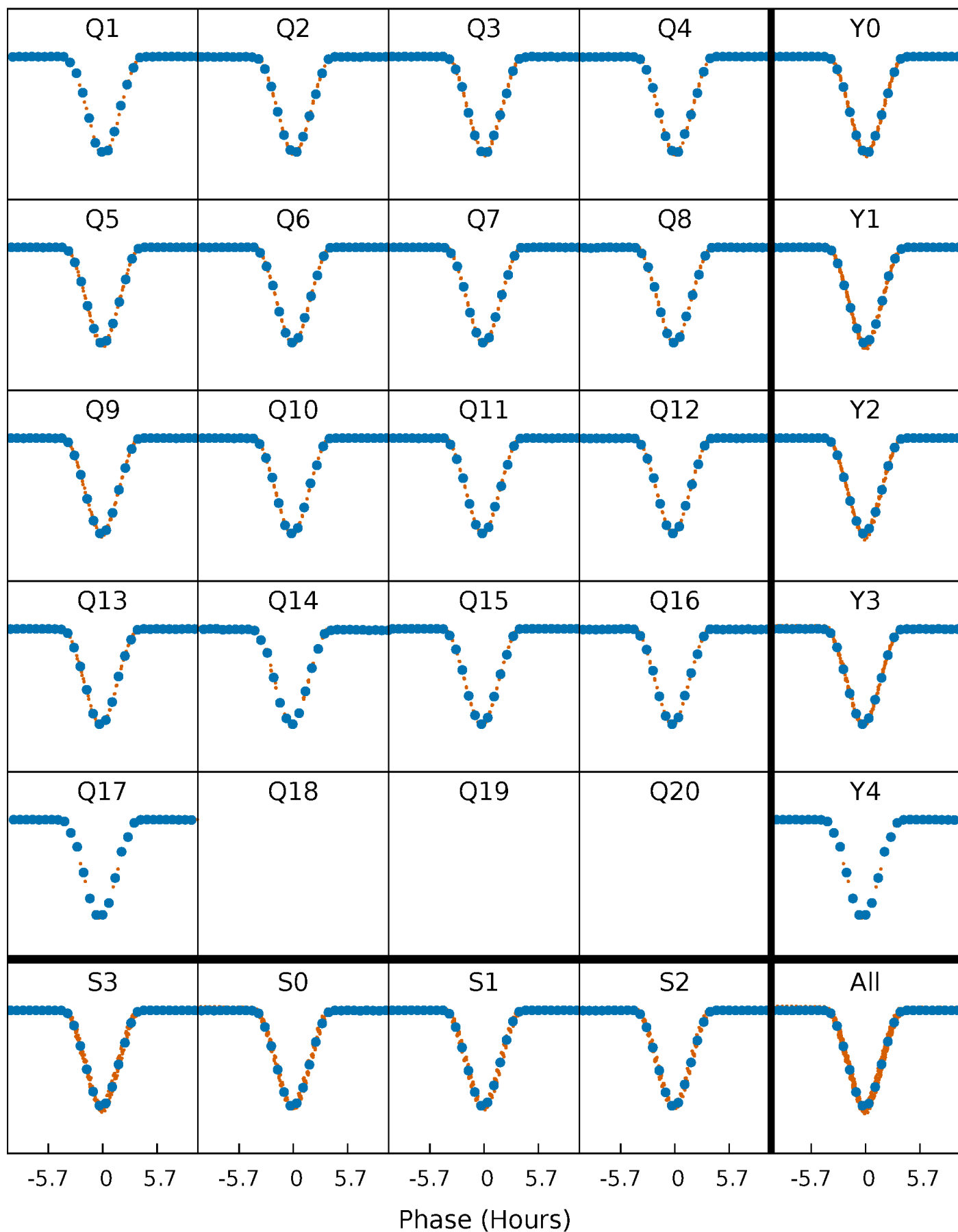


Planet 1 : Phased Whitened Flux Time Series (TPS Epoch/Period)



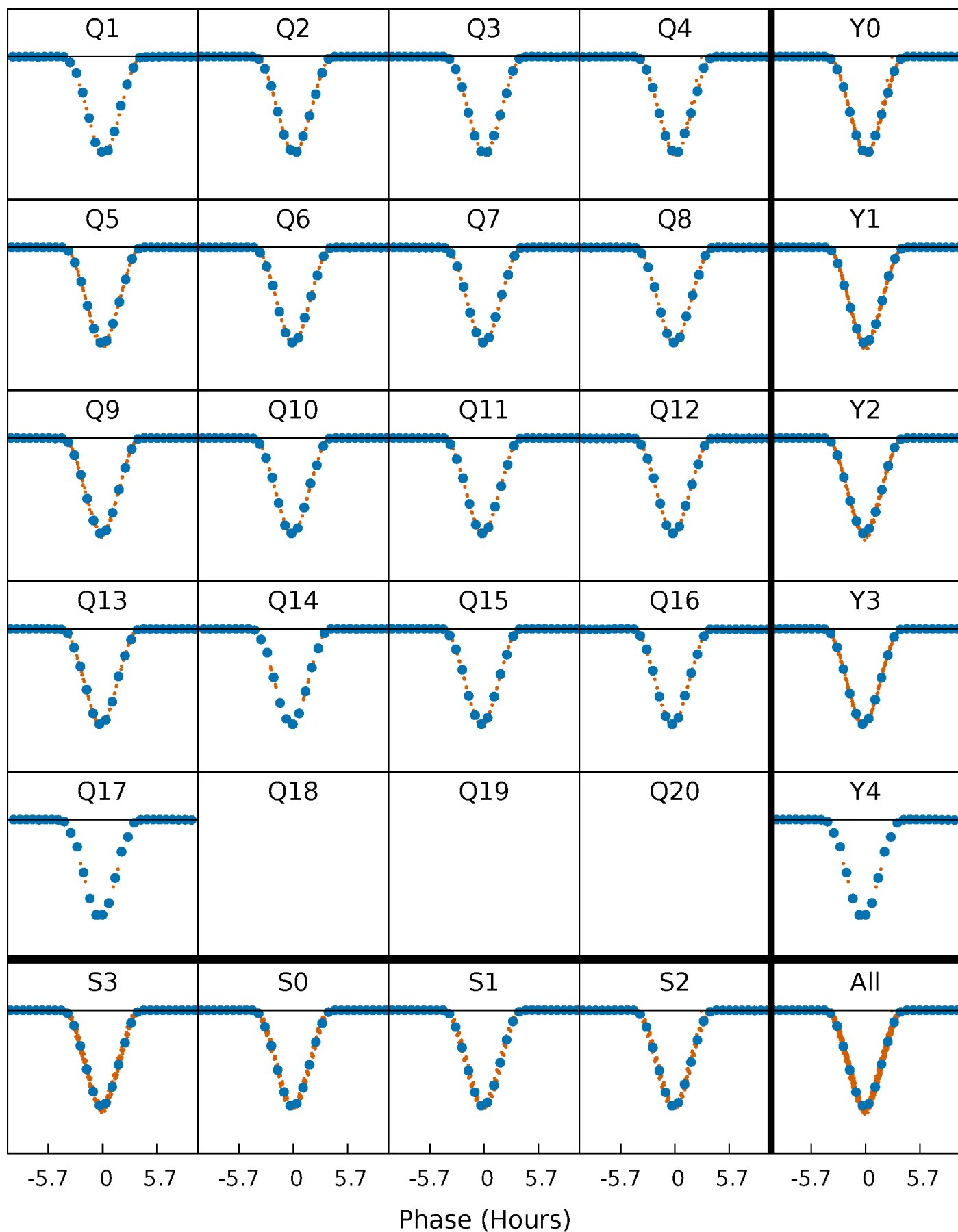
# PDC Quarter-Phased Transit Curves

TCE 009284741-01 P= 20.729491 Days  $T_0=134.545378$  (BKJD)



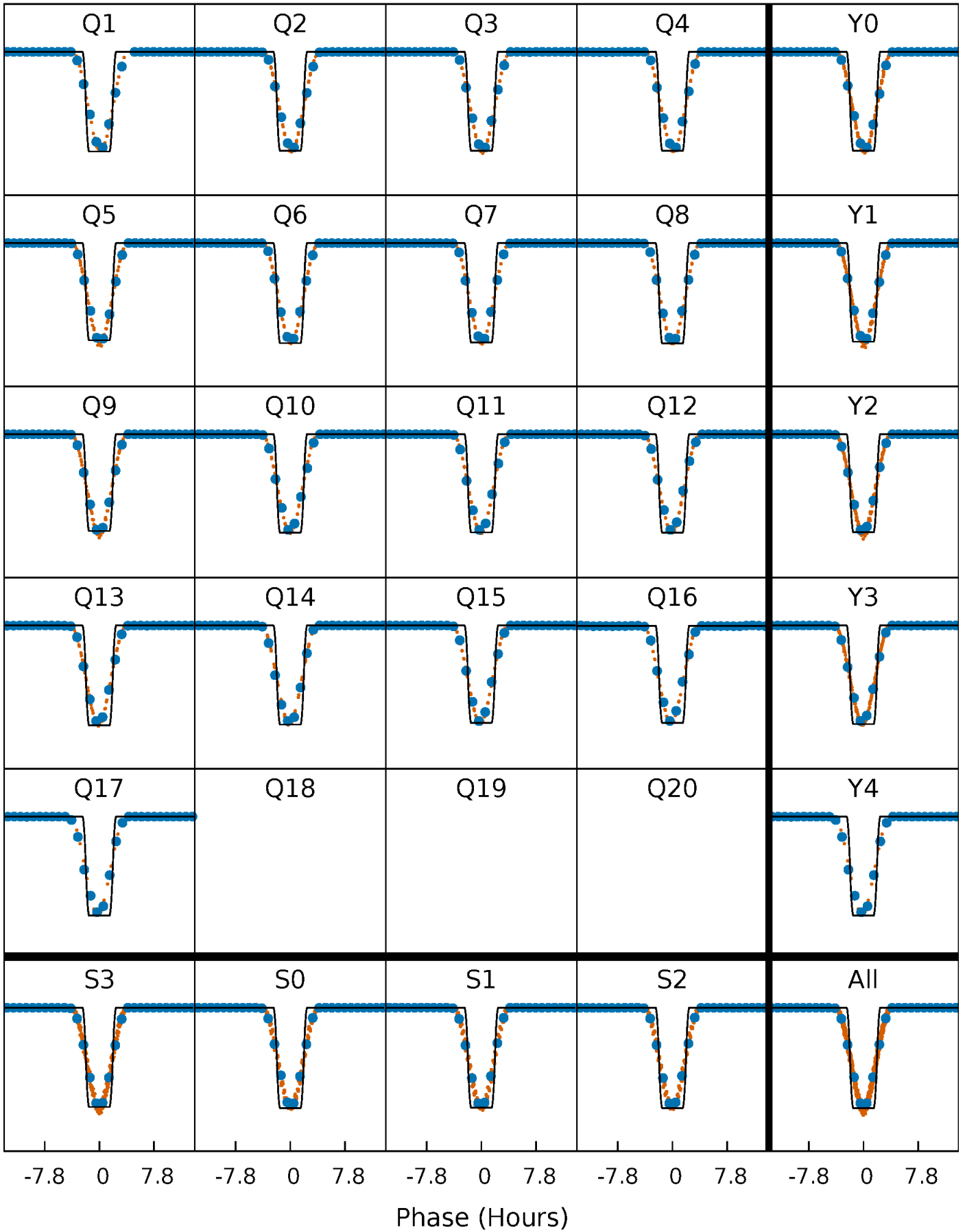
# DV Quarter-Phased Transit Curves

TCE 009284741-01 P= 20.729491 Days  $T_0=134.545378$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

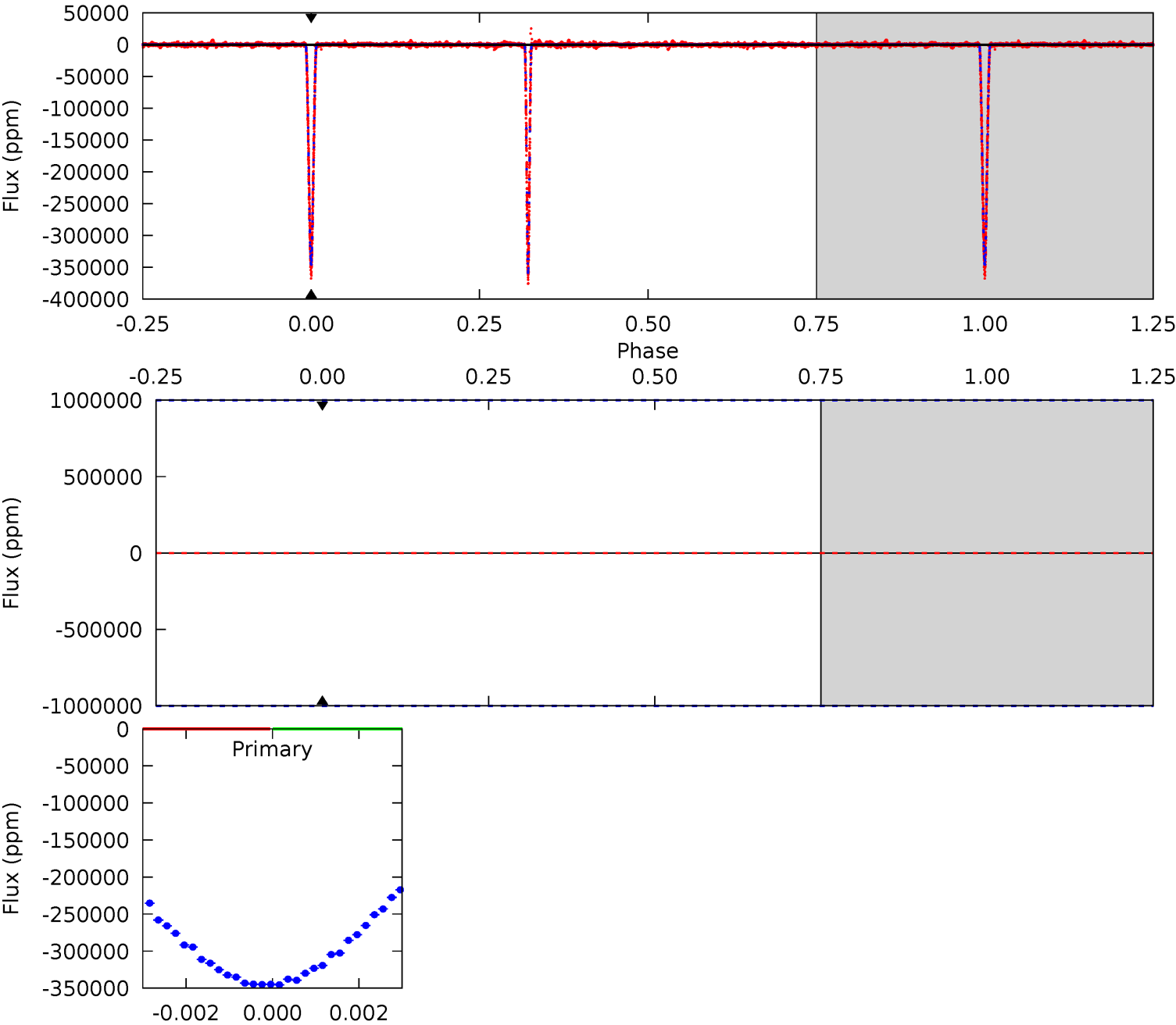
TCE 009284741-01 P= 20.729491 Days  $T_0=134.542551$  (BKJD)



# DV Model-Shift Uniqueness Test

009284741-01, P = 20.729491 Days, E = 113.815887 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0

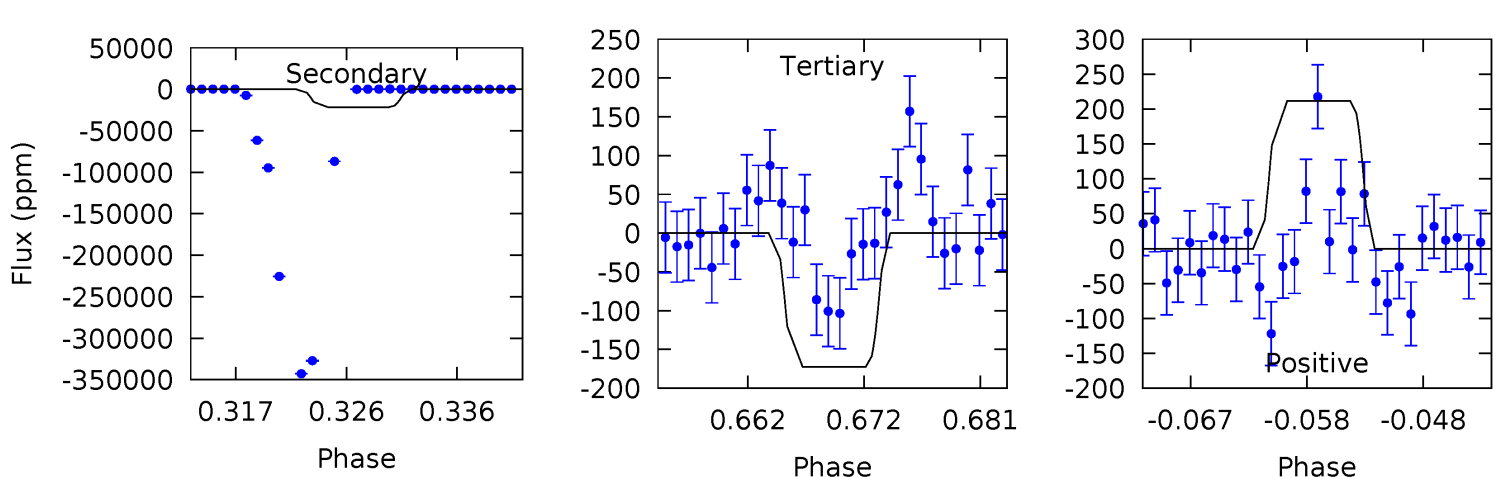
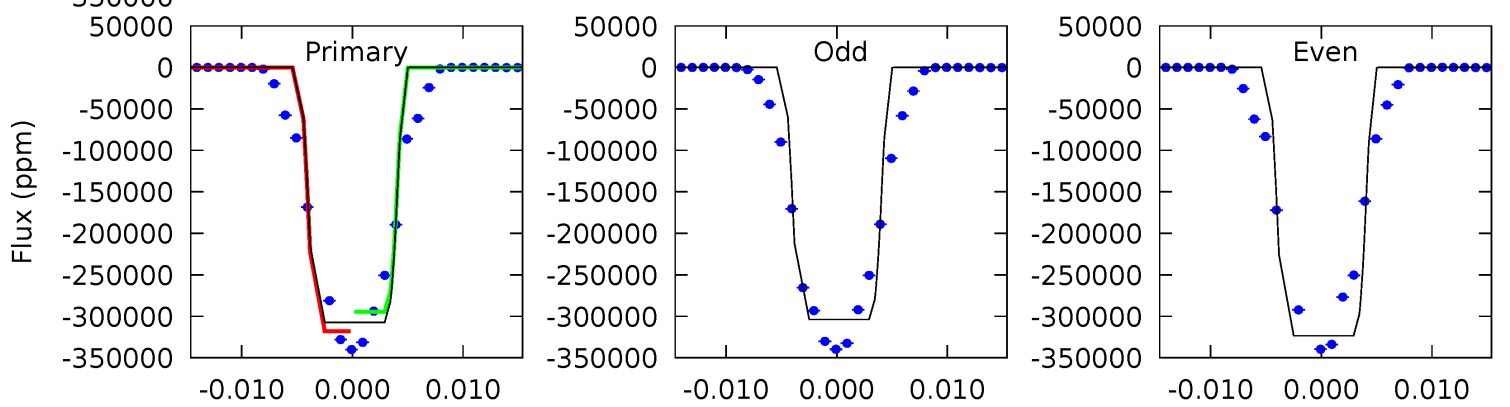
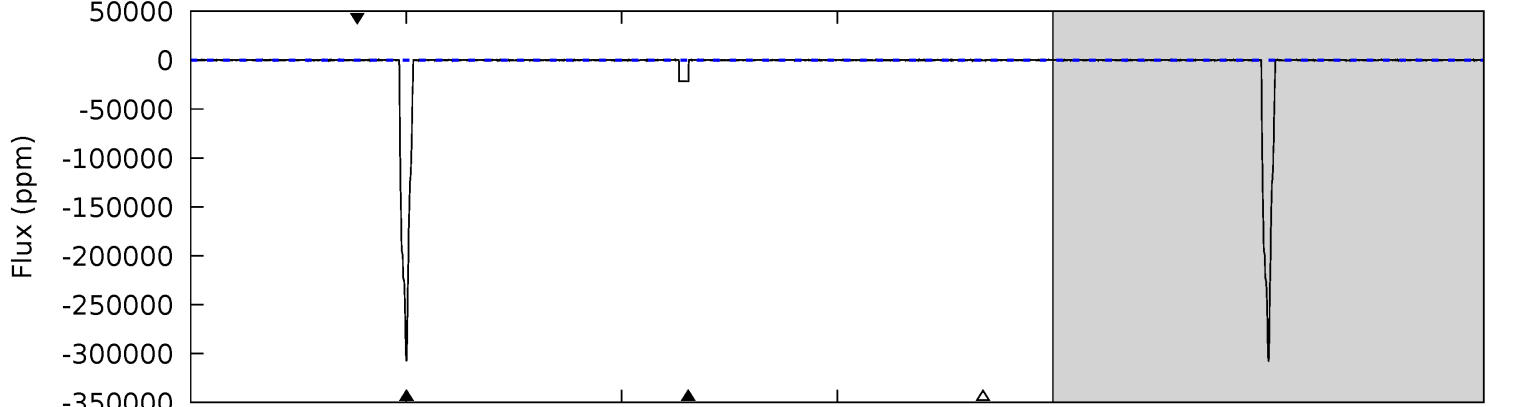
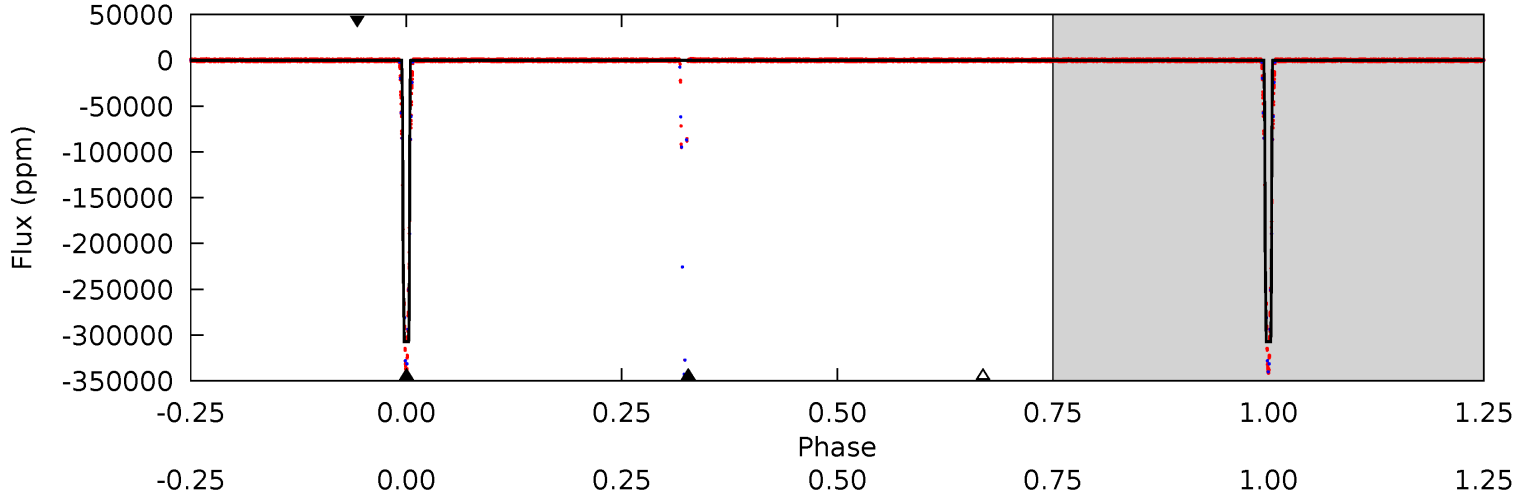




# Alt Model-Shift Uniqueness Test

009284741-01, P = 20.729491 Days, E = 113.813060 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
6474	458.4	3.64	4.46	5.03	2.59	10.3	6471	6470	454.8	453.9	208.1	1.00	0.00	0



### Stellar Parameters For KIC 009284741

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5256^{+158}_{-142}$	$4.502^{+0.100}_{-0.137}$	$-0.260^{+0.350}_{-0.250}$	$0.802^{+0.120}_{-0.098}$	$0.745^{+0.112}_{-0.052}$	$2.036^{+0.790}_{-0.689}$
	+3%/-3%	+2%/-3%	+135%/-96%	+15%/-12%	+15%/-7%	+39%/-34%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 009284741-01 / KOI 7153.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$0 \pm 1000000$	$43.85^{+9.37}_{-8.85}$	$797^{+41}_{-37}$	$-2579^{+7125}_{-1784}$	$-14.673^{+649.844}_{-491.661}$
Alt.	$-21745 \pm 47$	$53.20^{+10.21}_{-10.49}$	$801^{+42}_{-39}$	$3201^{+207}_{-148}$	$79^{+40}_{-23}$

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

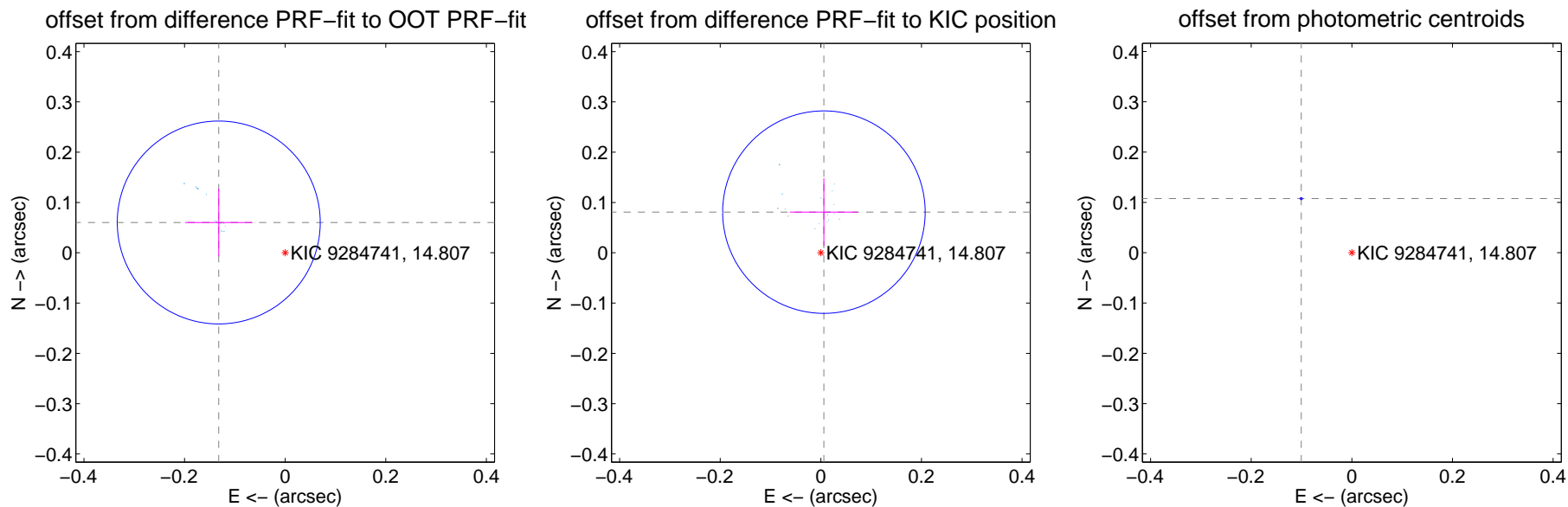
## DV Centroid Data

Supplemental centroid analysis for 009284741-01. Kepler magnitude: 14.81. Transit SNR -1.00

There are 17 quarters with good PRF difference image offsets

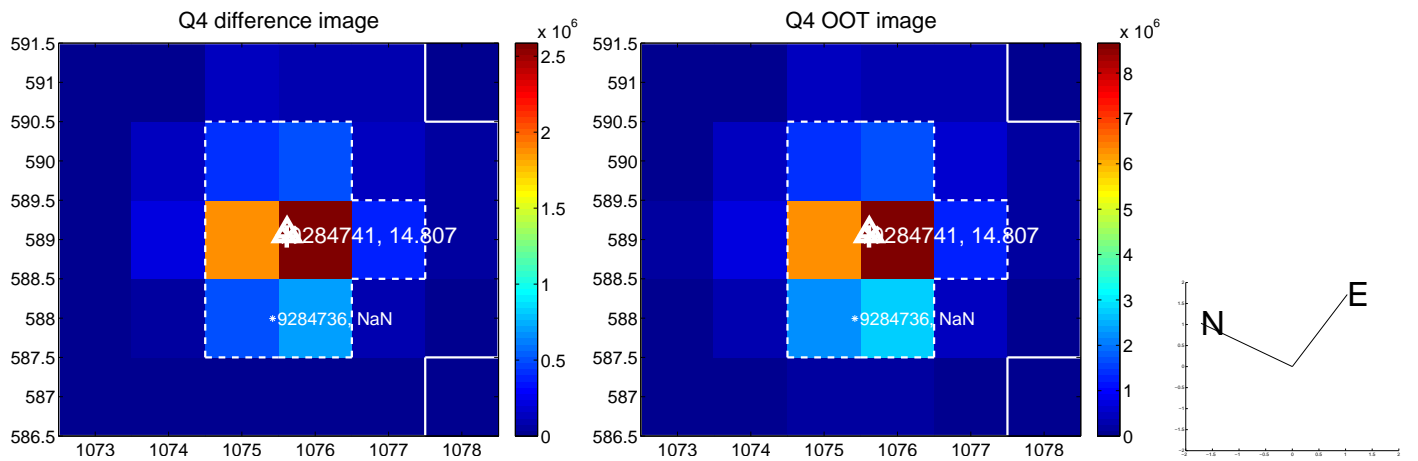
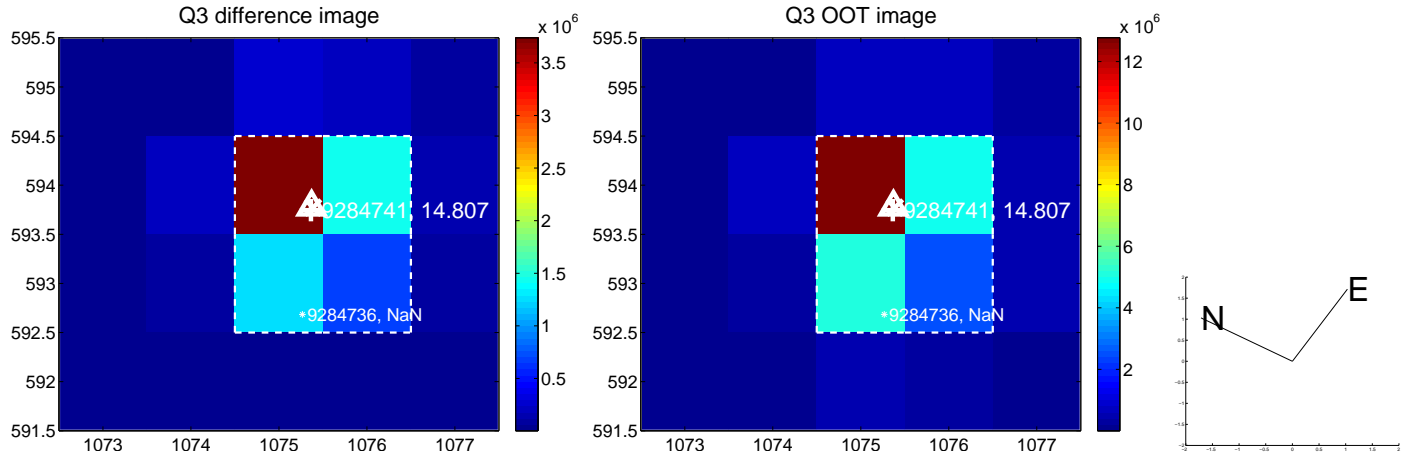
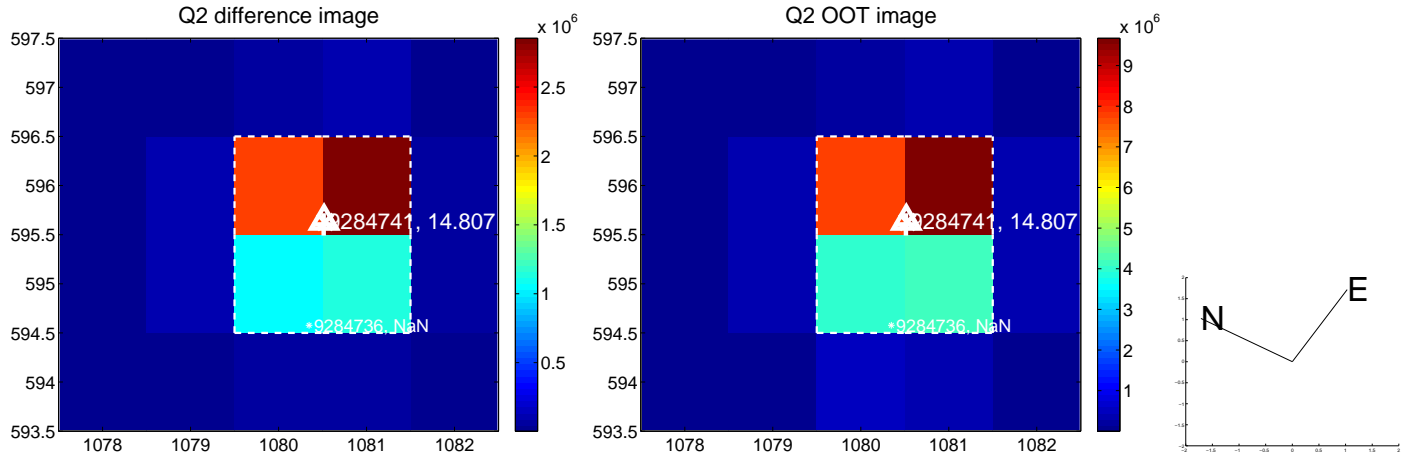
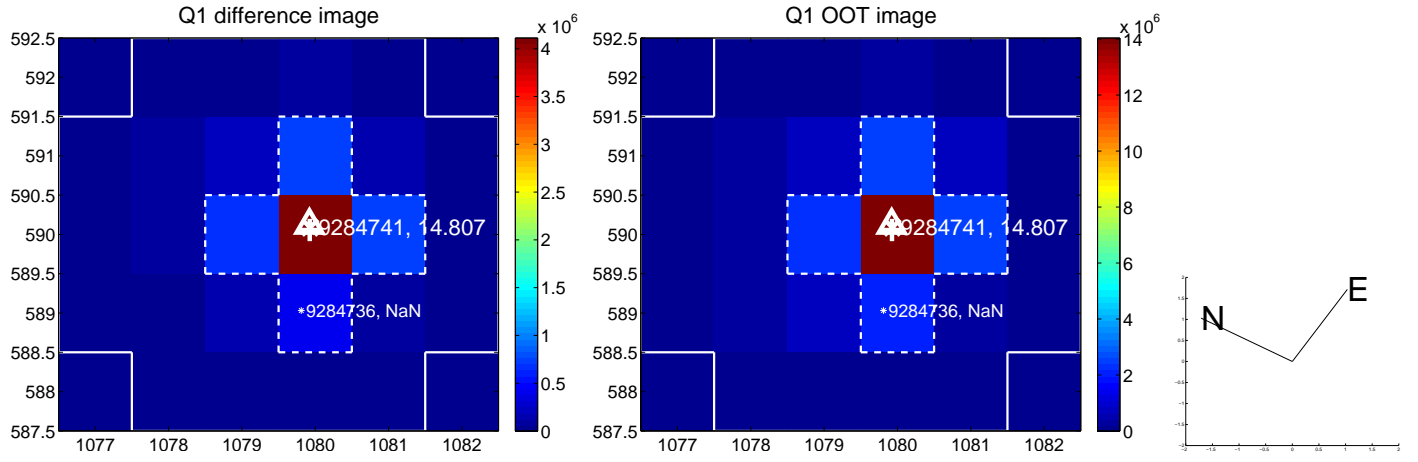
The direct PRF centroid is offset from the target star catalog position by about 0.10 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.145 \pm 0.067$	2.16	$0.132 \pm 0.067$	$0.060 \pm 0.067$
PRF-fit source offset from KIC position	$0.081 \pm 0.067$	1.21	$-0.006 \pm 0.067$	$0.081 \pm 0.067$
photometric centroid source offset	$0.15 \pm 0.00$	207.08	$0.10 \pm 0.00$	$0.11 \pm 0.00$

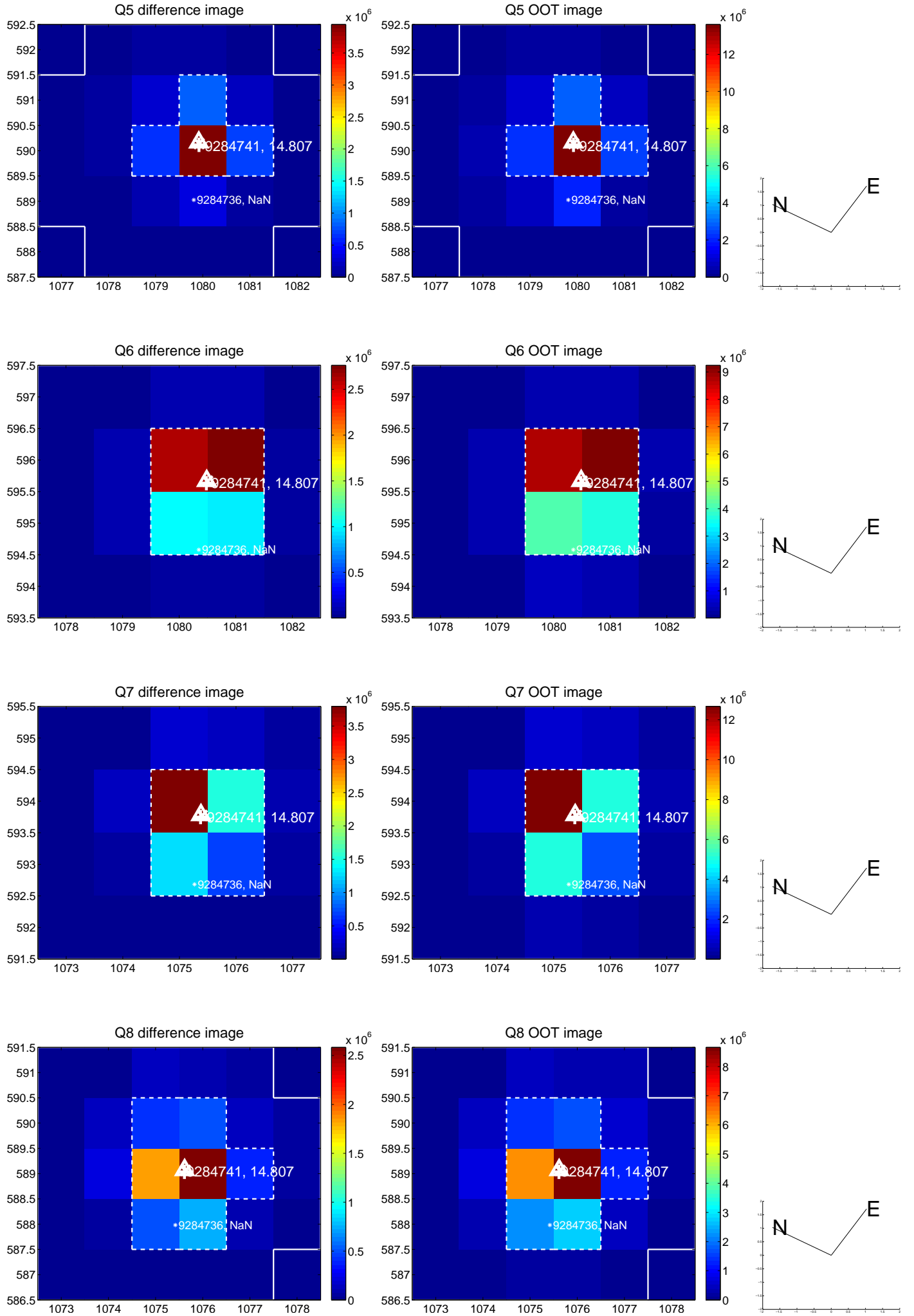


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

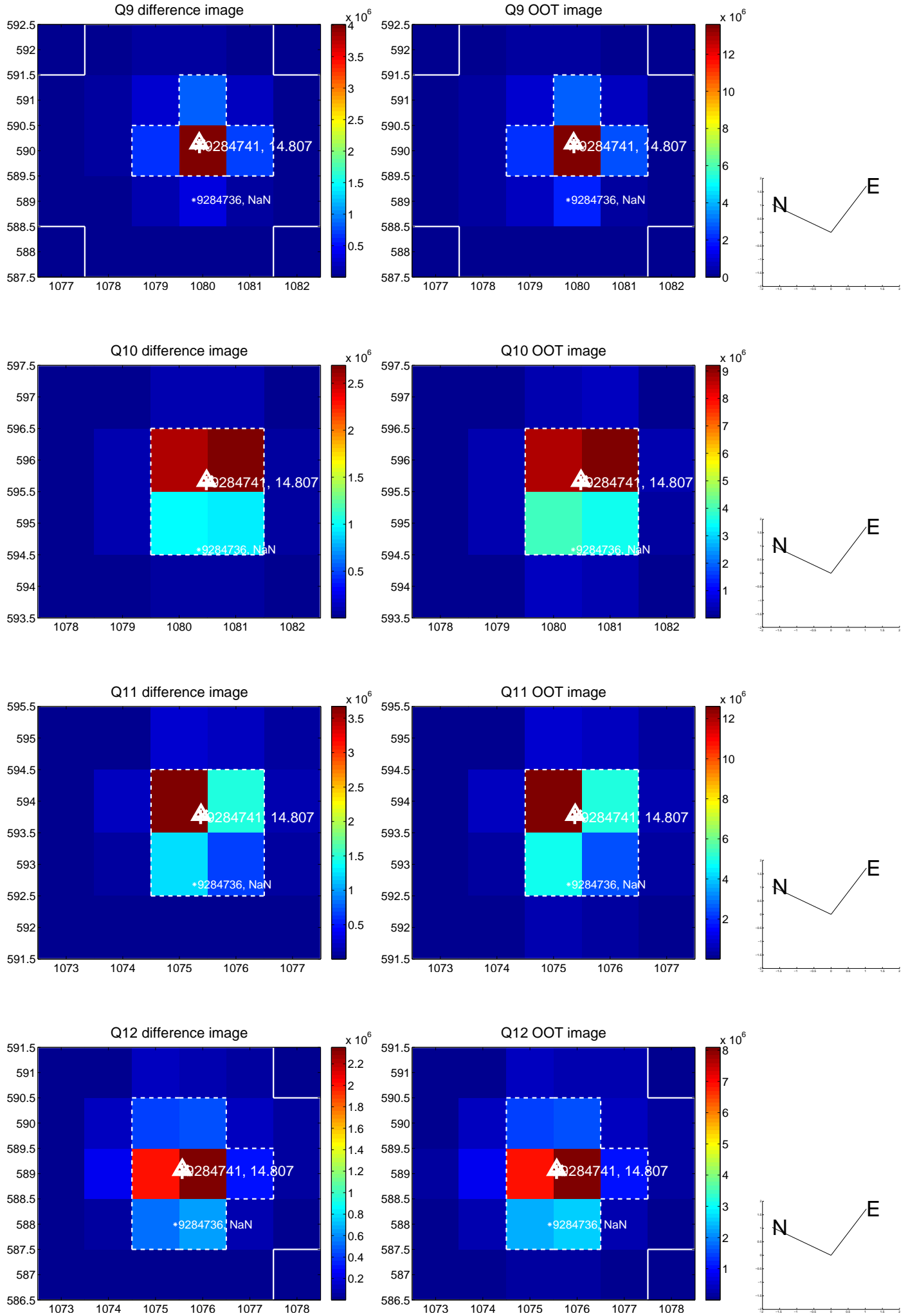
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



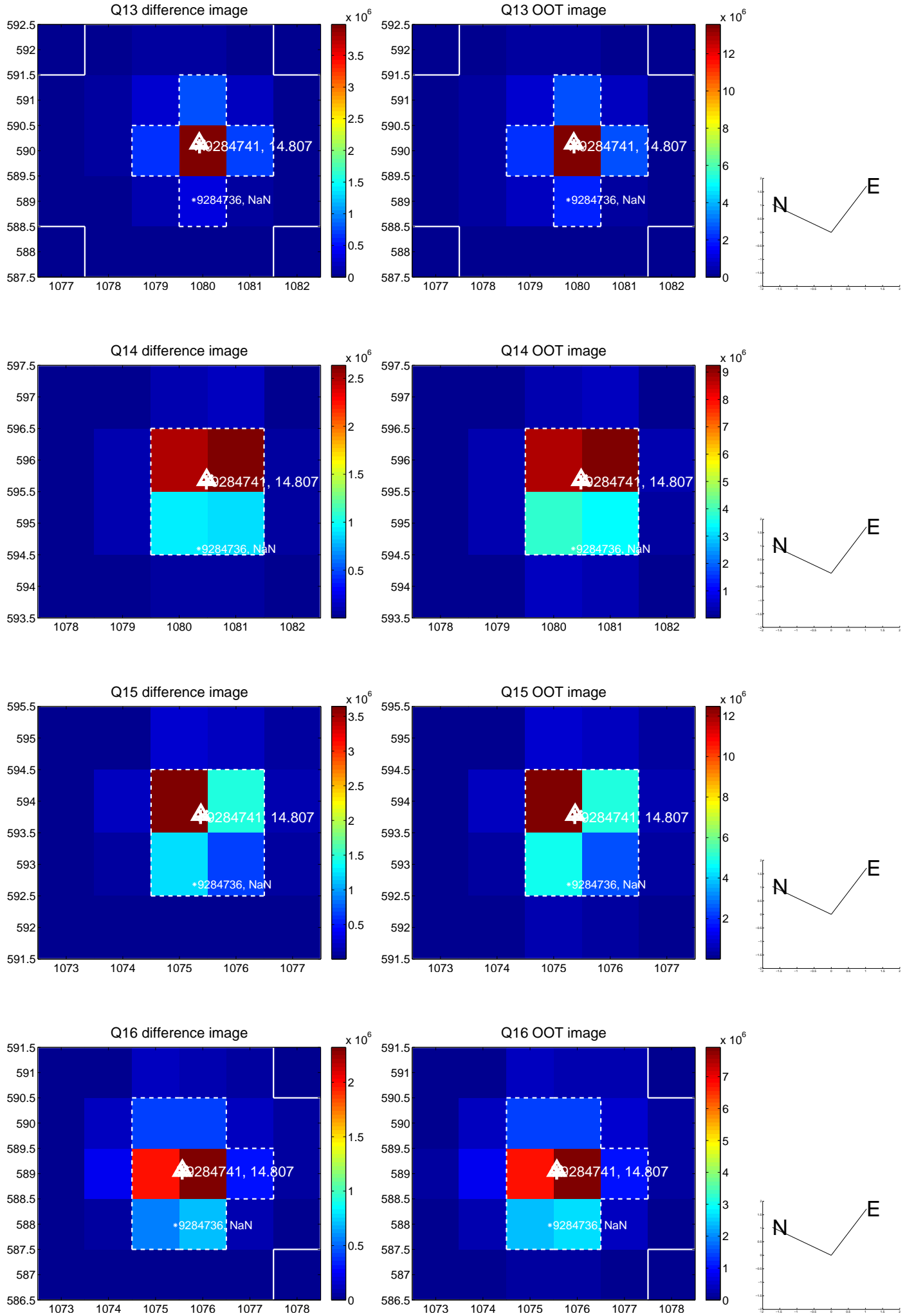
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

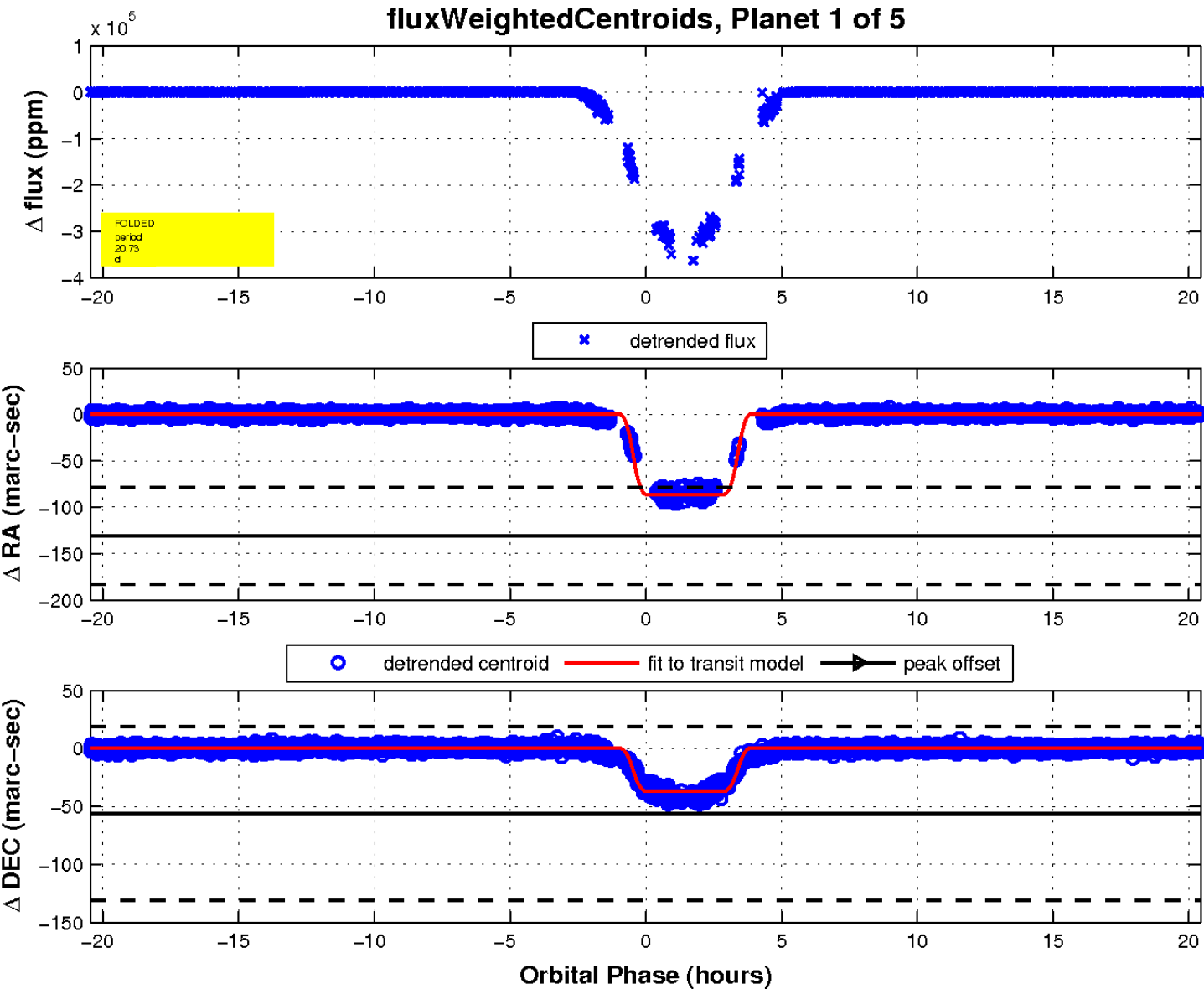
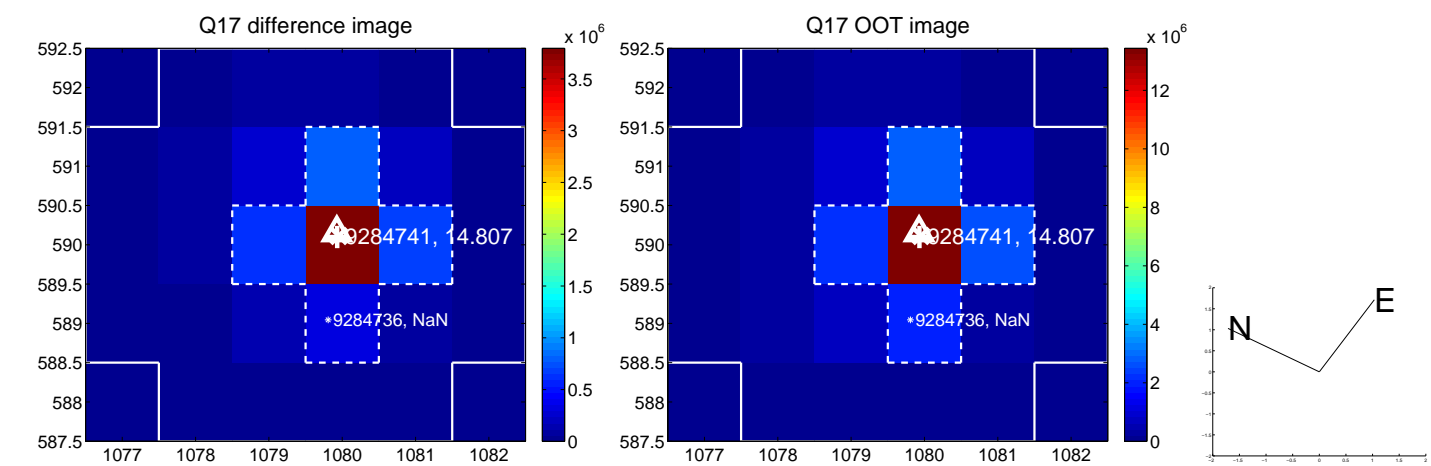


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

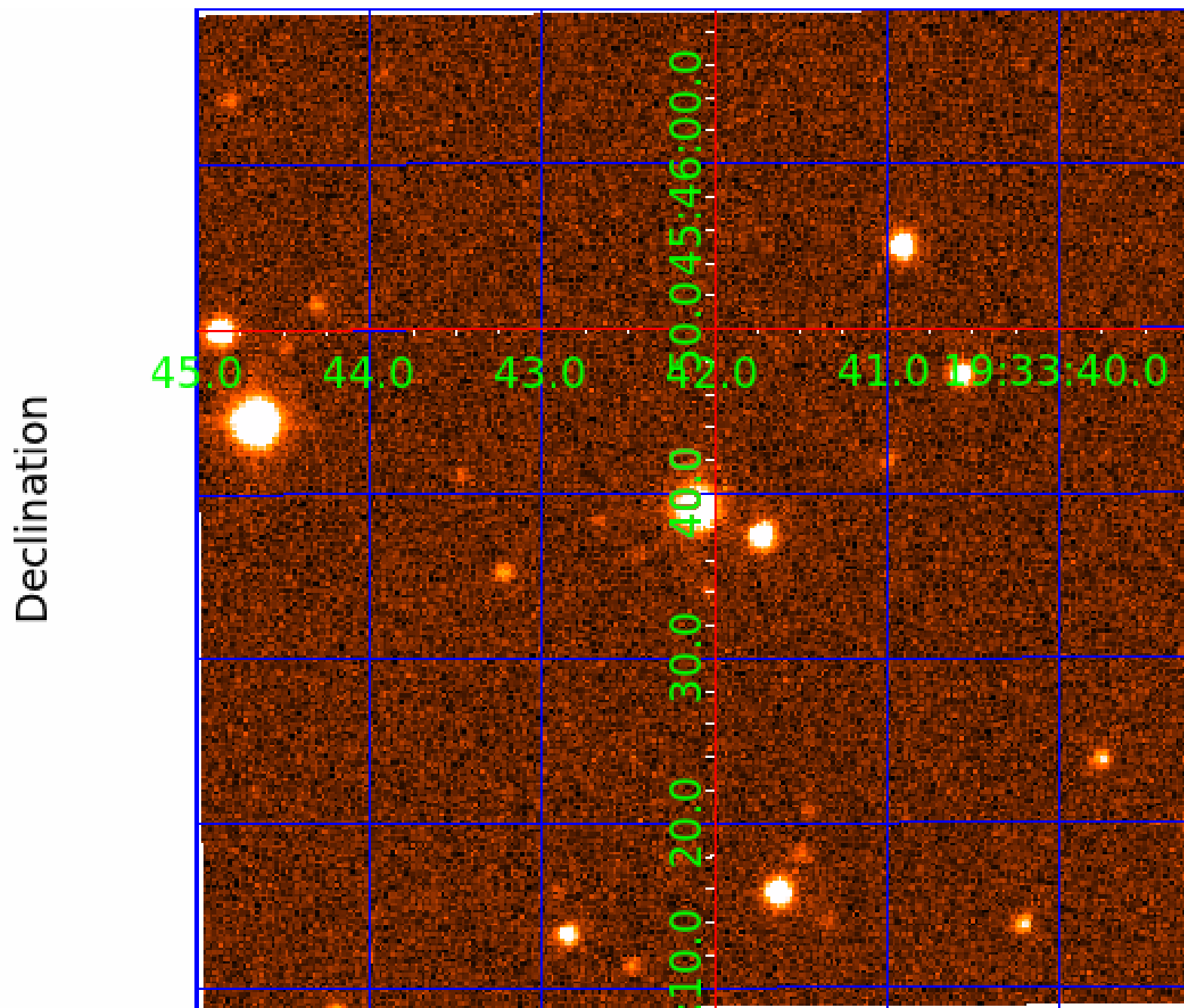




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image



# KIC 009284741

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009284741-01	OBS	7153.01	20.729491	134.545377	346074.0	5.000	12529.0	-1.0	0.80	5256	43.24	24.52
009284741-02	OBS	No	20.729093	141.232029	356992.9	3.000	10905.5	-1.0	0.80	5256	43.76	24.52
009284741-03	OBS	No	10.365191	140.540206	0.8	8.170	892.9	0.0	0.80	5256	0.12	61.78
009284741-04	OBS	No	10.364570	141.455326	18208.8	15.000	852.4	-1.0	0.80	5256	10.61	61.79
009284741-05	OBS	No	20.731308	136.462727	2953.5	12.500	101.0	-1.0	0.80	5256	4.27	24.52

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009284741-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_ALT—MOD_ODDEVEN_ALT—HAS_SEC_TCE—CENT_NOFITS
009284741-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE—CENT_NOFITS
009284741-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—SAME_NTL_PERIOD—CENT_FEW_DIFFS
009284741-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—LPP_DV—LPP_ALT—MOD_TER_ALT—MOD_POS_ALT—SAME_NTL_PERIOD—CENT_NOFITS
009284741-05	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_POS_ALT—SAME_NTL_PERIOD—CENT_NOFITS

**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.

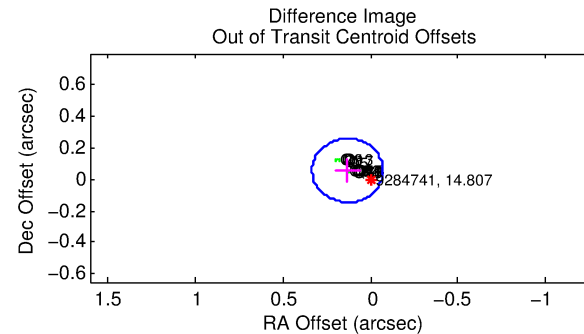
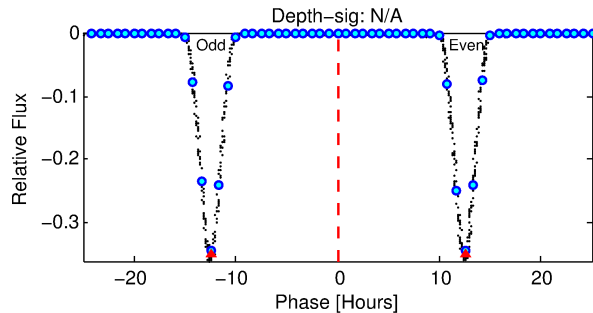
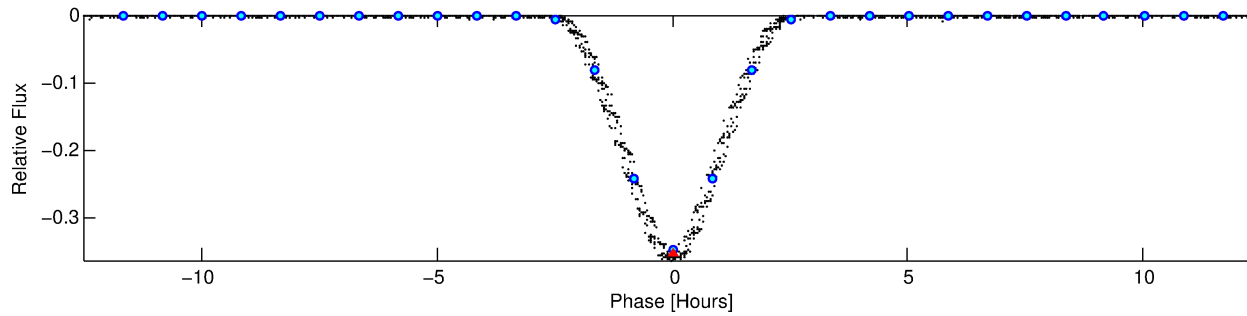
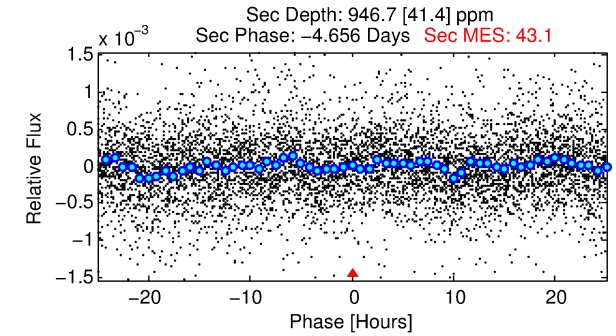
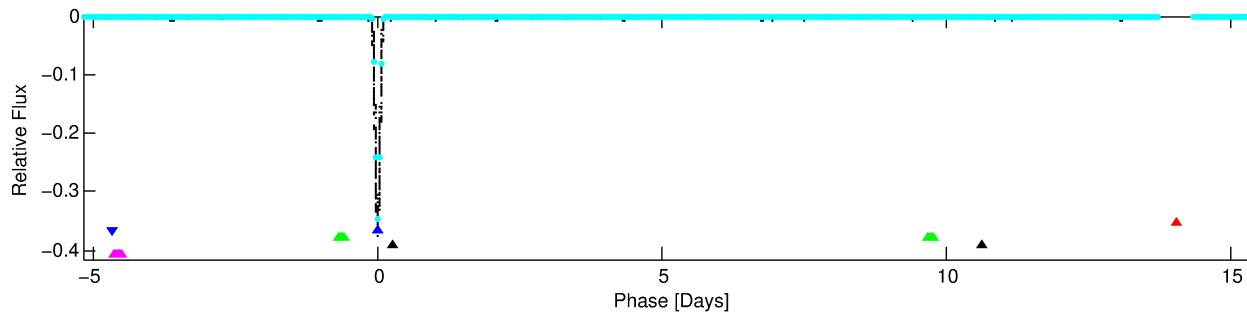
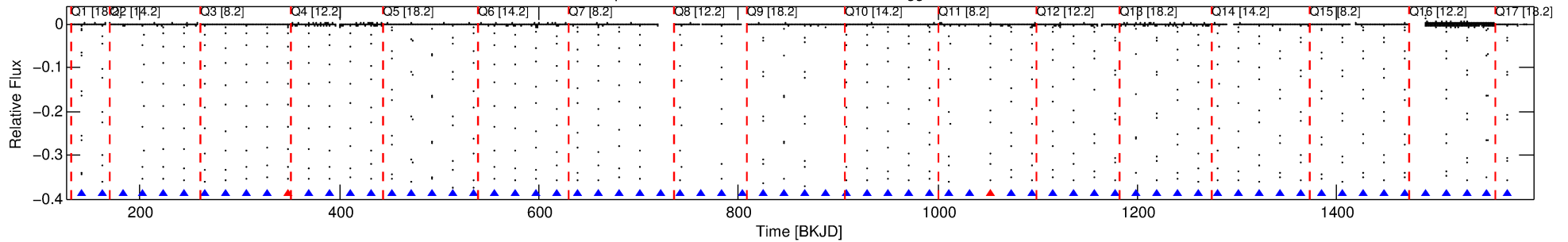
Ephemeris Match Information For 009284741-02

No Significant Match Found

# DV One-Page Summary

KIC: 9284741 Candidate: 2 of 5 Period: 20.729 d  
KOI: K07153 Corr: No Ephemeris Match

Kp: 14.81 R\*: 0.80 Rs Teff: 5256.0 K Logg: 4.50 Fe/H: -0.260



## TPS TCE Results:

Period = 20.72909 d  
Epoch = 141.2320 BKJD

DV fit results are unavailable

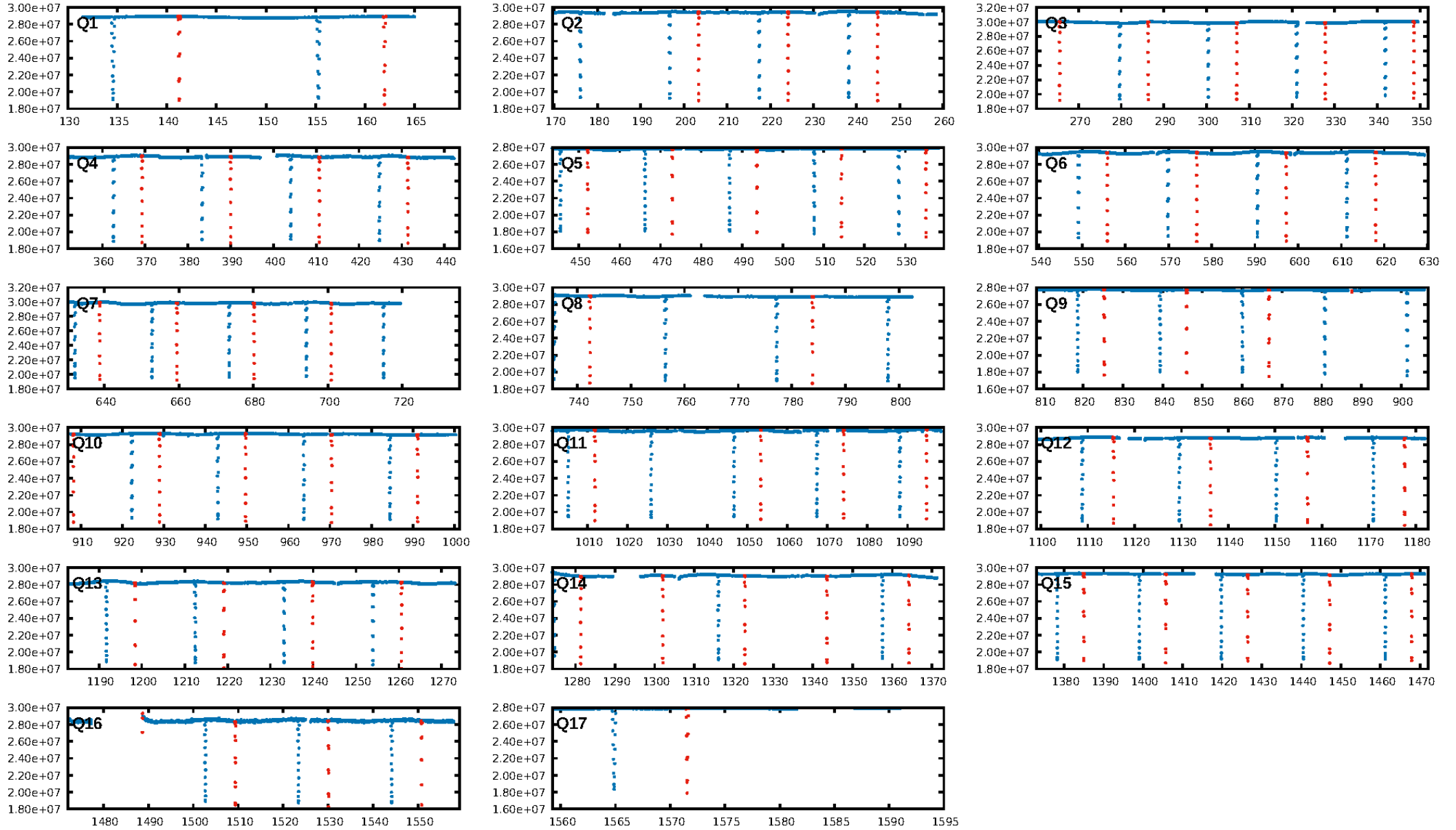
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [28.58 $\sigma$ ]  
LongPeriod-sig: 0.1% [0.00 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 0.97 [60/62]  
GhostDiagnostic-chr: 5.466  
Centroid-sig: 0.0%  
Centroid-so: 0.164 arcsec [195.43 $\sigma$ ]  
OotOffset-rm: 0.143 arcsec [2.13 $\sigma$ ]  
KicOffset-rm: 0.080 arcsec [1.20 $\sigma$ ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 1.00 [17/17]  
DiffImageOverlap-fno: 0.00 [0/17]

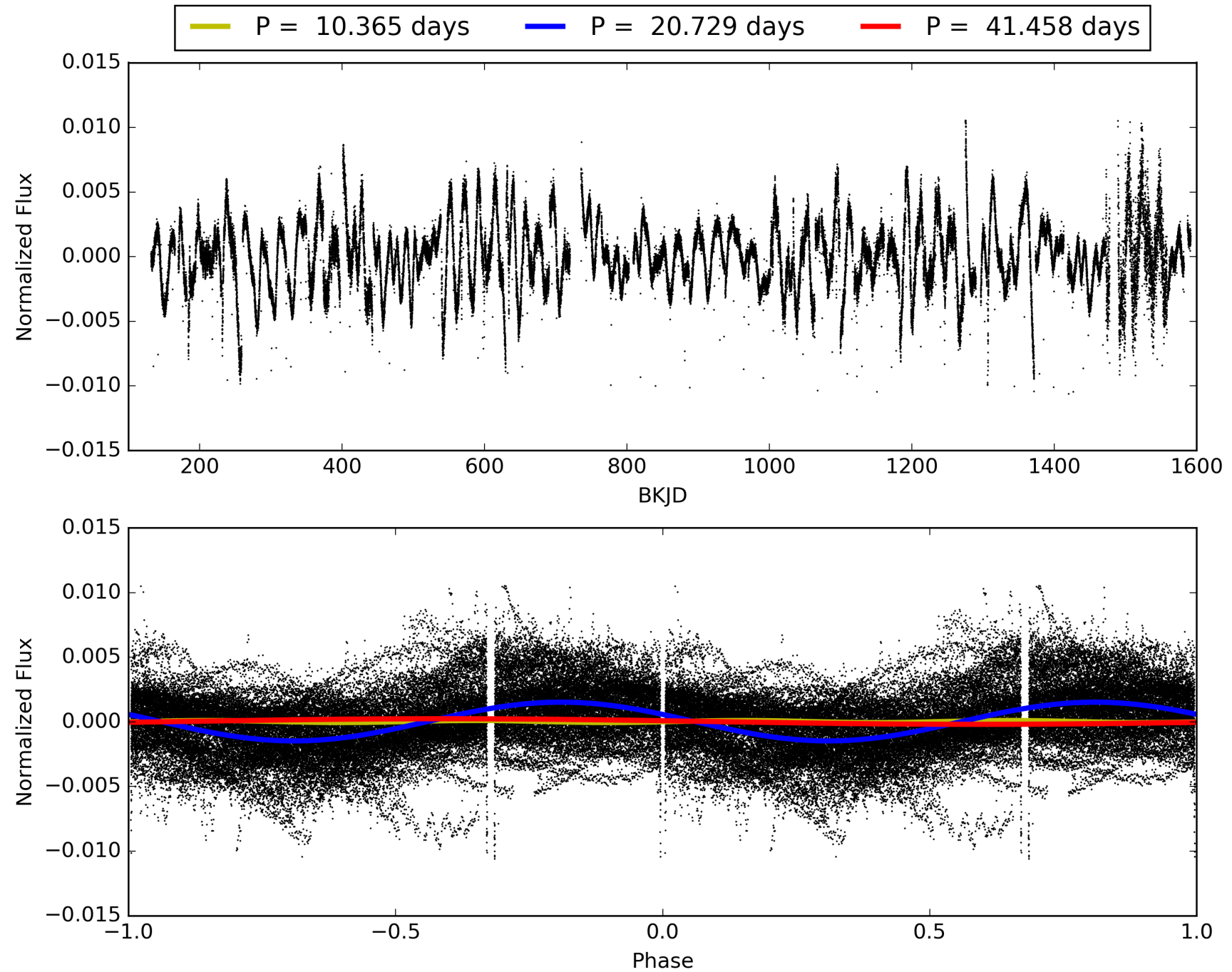
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 22:27:41 Z

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

# TCE 009284741-02, PDC Light Curves

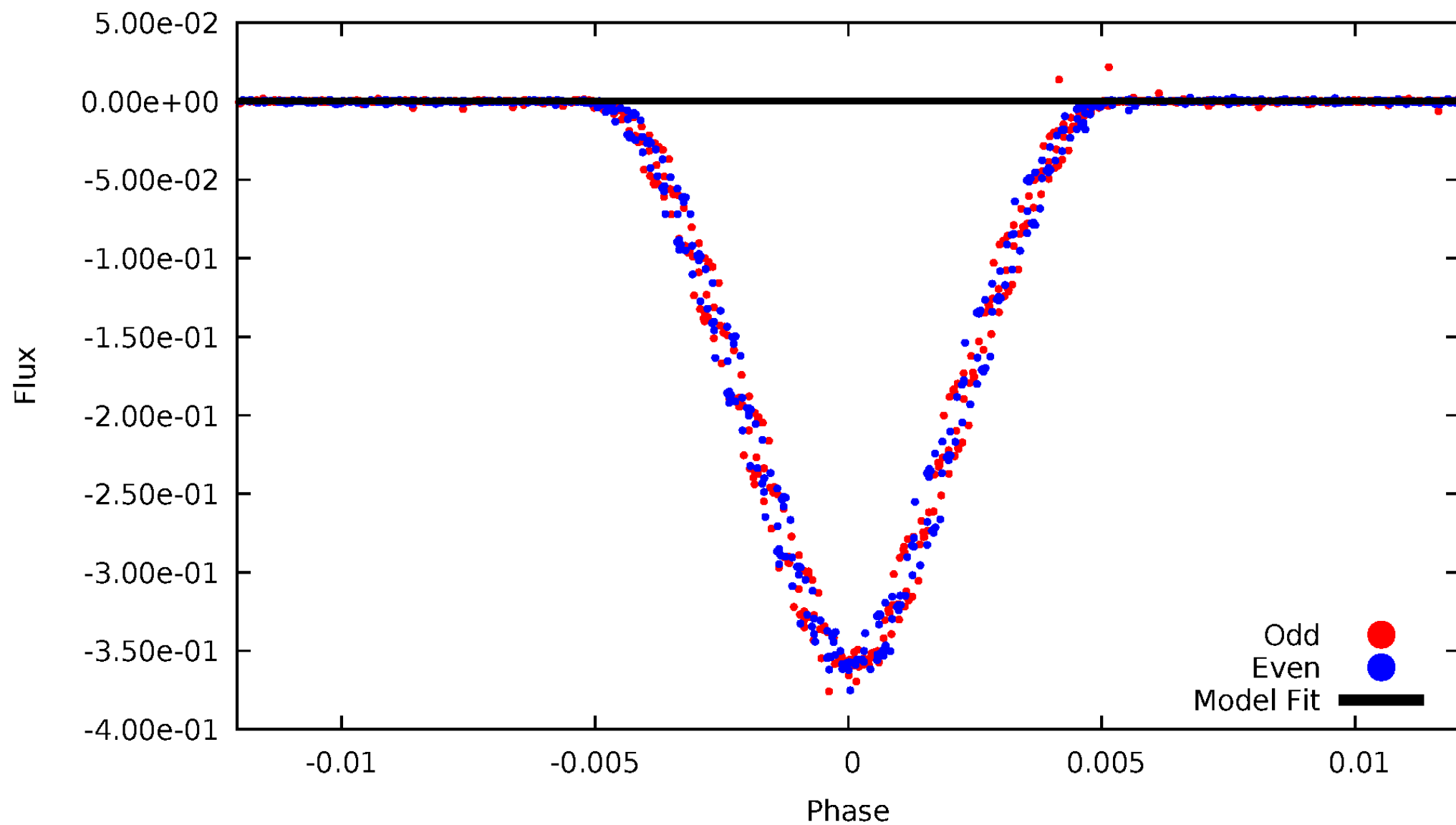


TCE 009284741-02



# DV Odd/Even

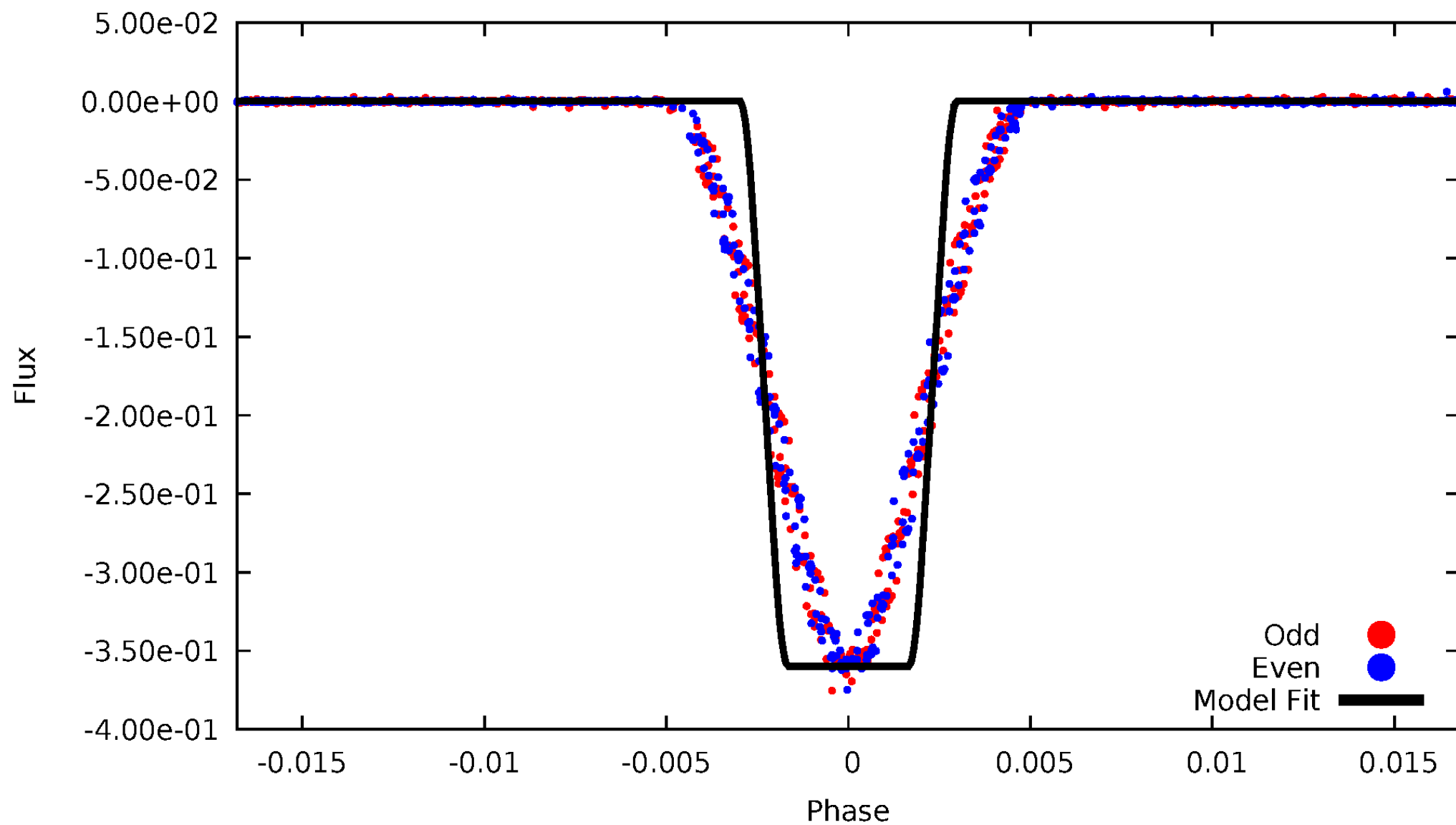
TCE 009284741-02





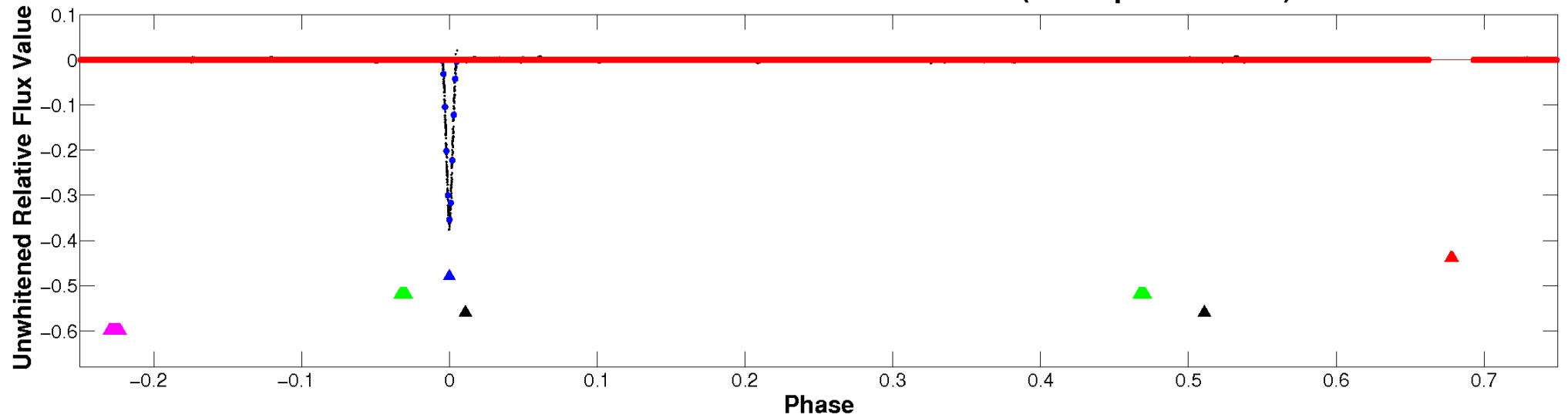
# ALT Odd/Even

TCE 009284741-02

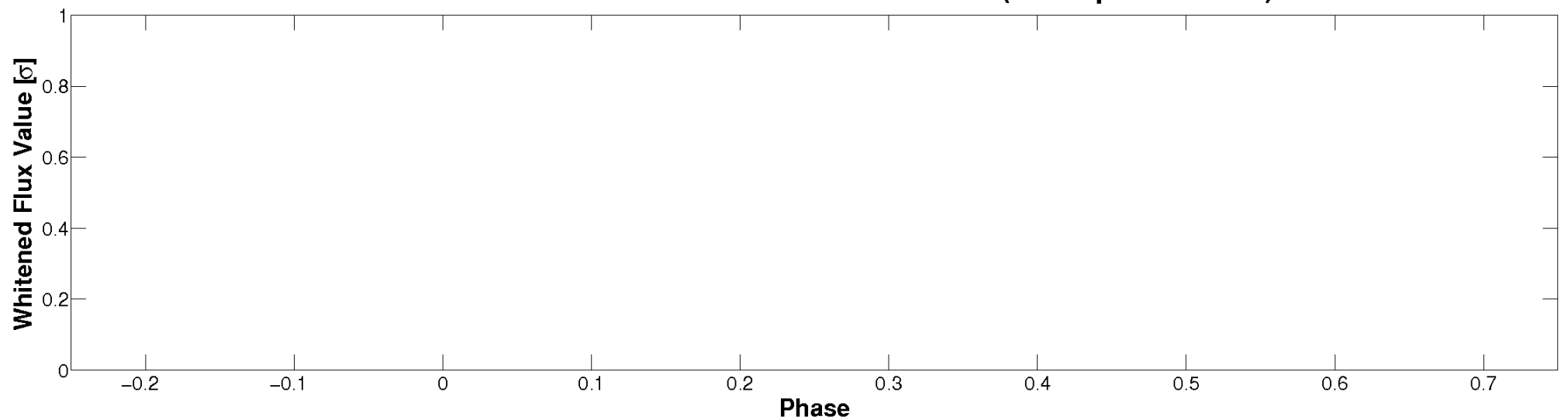


# Non-Whitened Vs. Whitened Light Curve

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

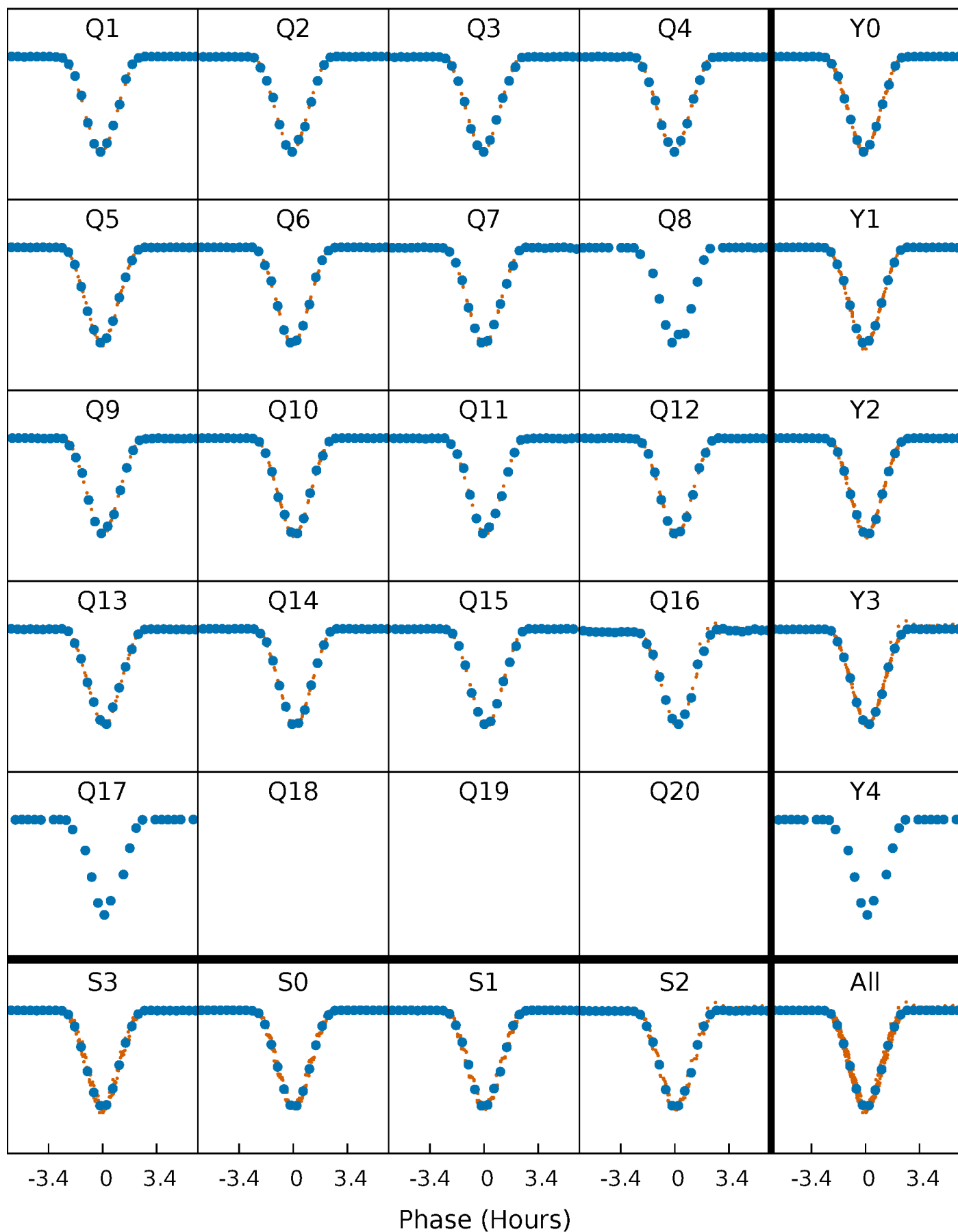


Planet 2 : Phased Whitened Flux Time Series (TPS Epoch/Period)



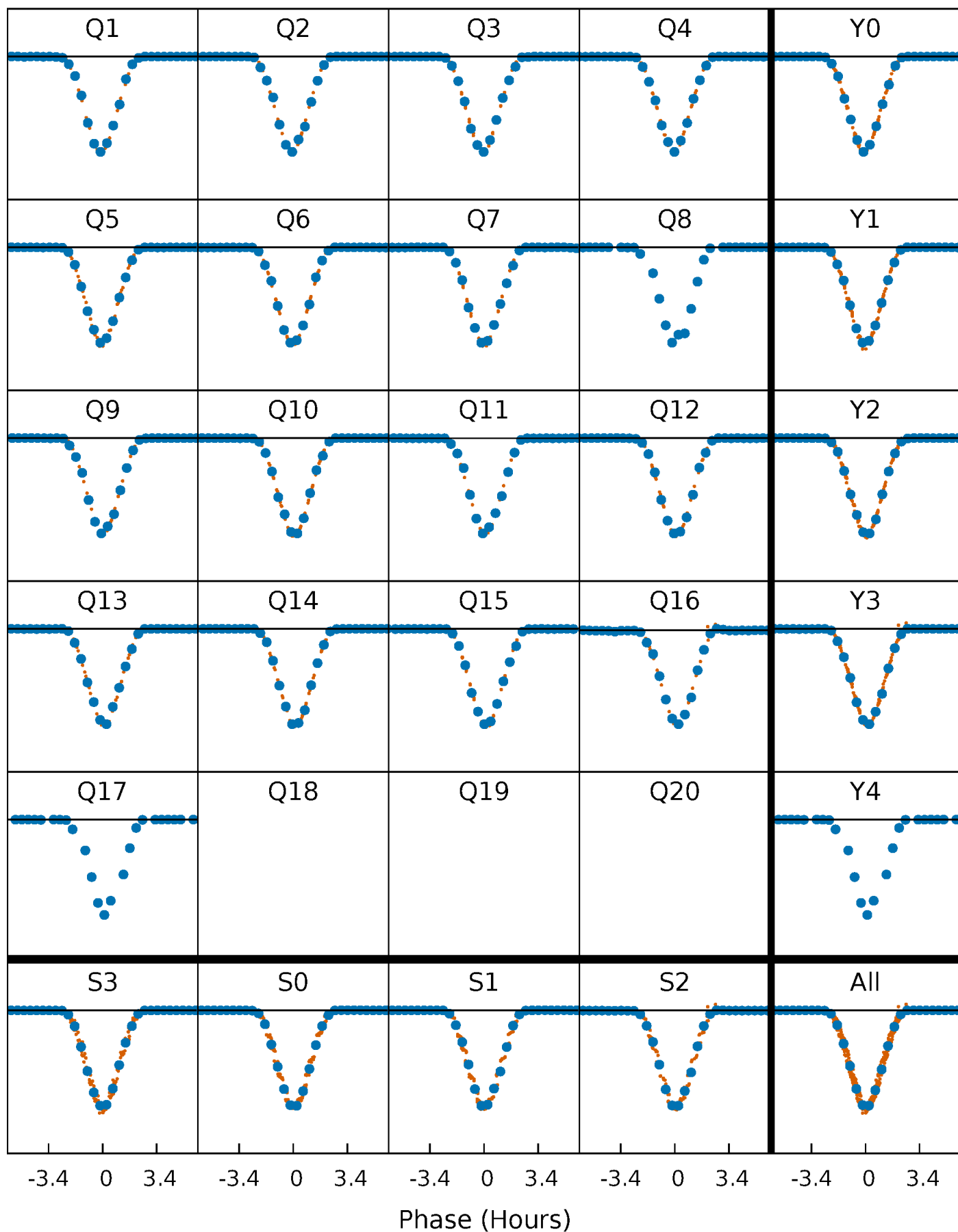
# PDC Quarter-Phased Transit Curves

TCE 009284741-02 P= 20.729093 Days  $T_0=141.232029$  (BKJD)



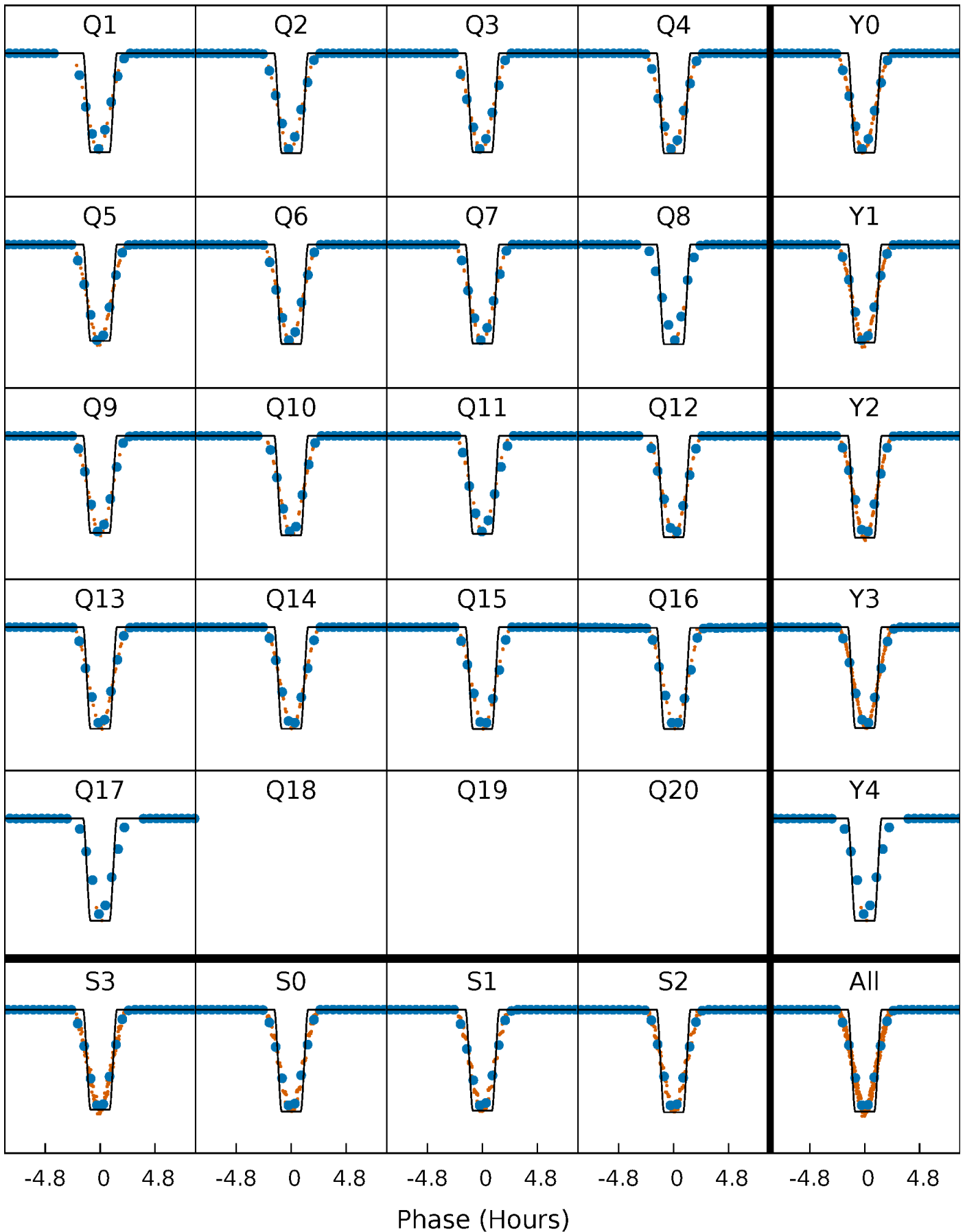
# DV Quarter-Phased Transit Curves

TCE 009284741-02 P= 20.729093 Days  $T_0=141.232029$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

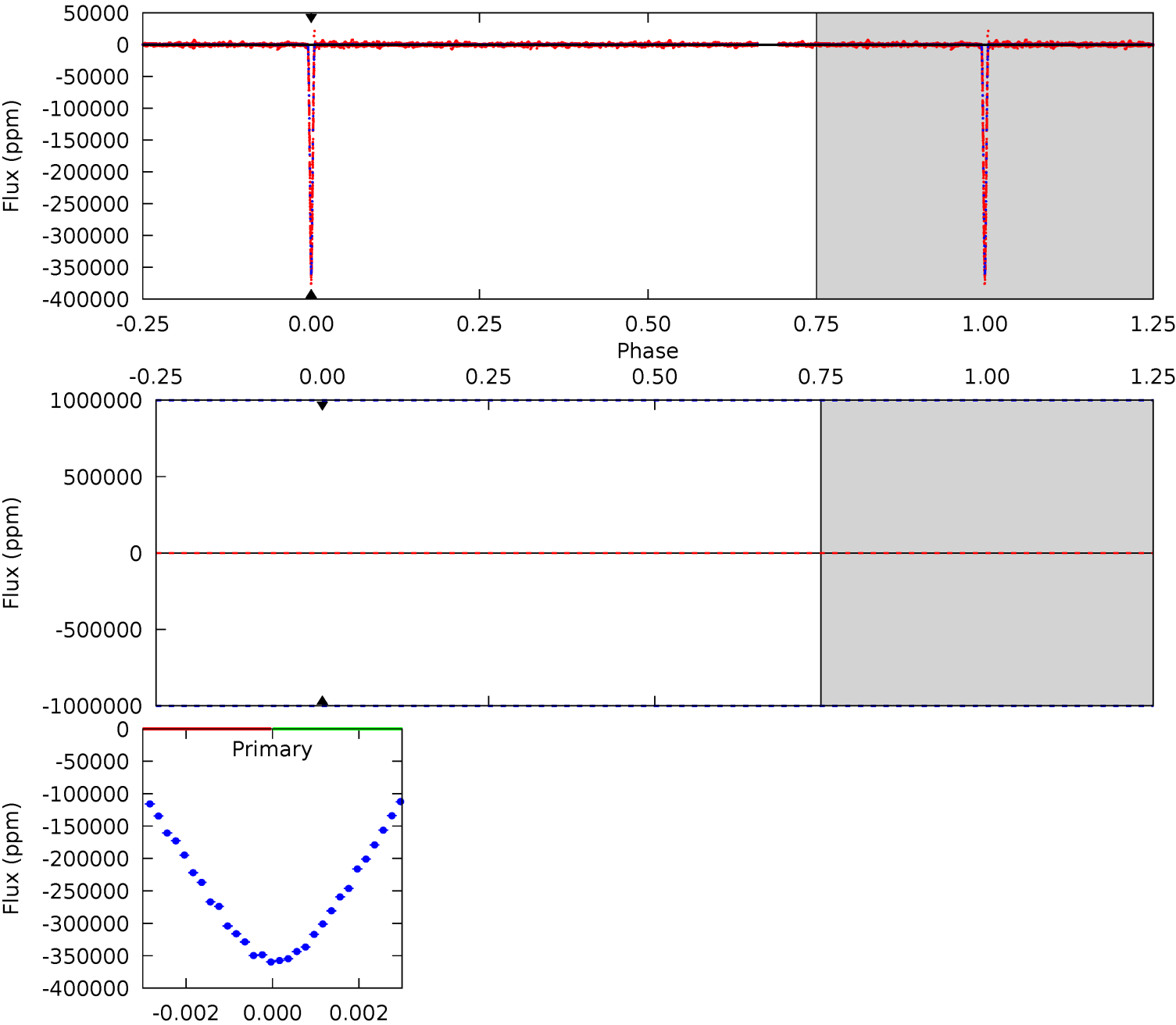
TCE 009284741-02 P= 20.729093 Days  $T_0=141.233400$  (BKJD)



# DV Model-Shift Uniqueness Test

009284741-02, P = 20.729093 Days, E = 120.502936 Days

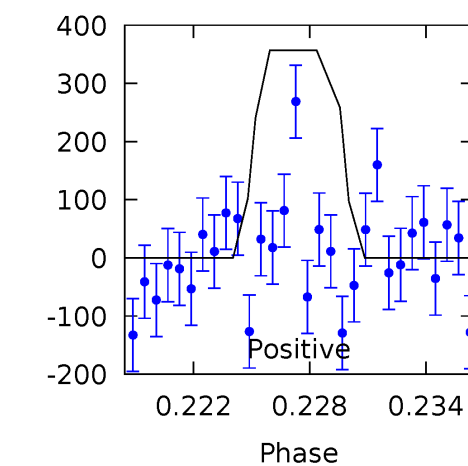
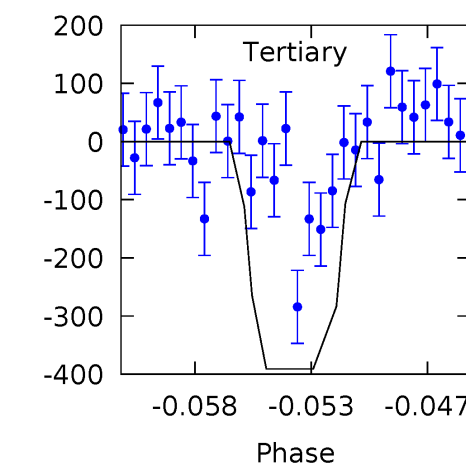
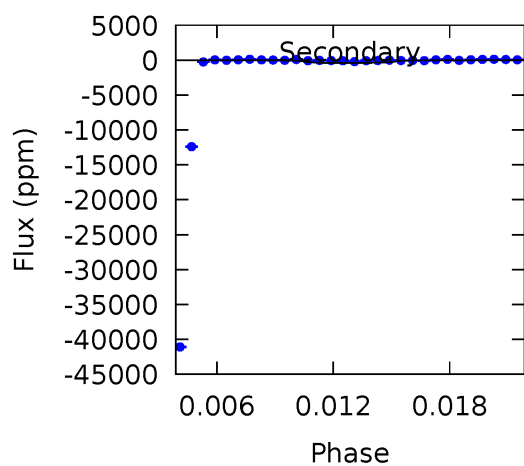
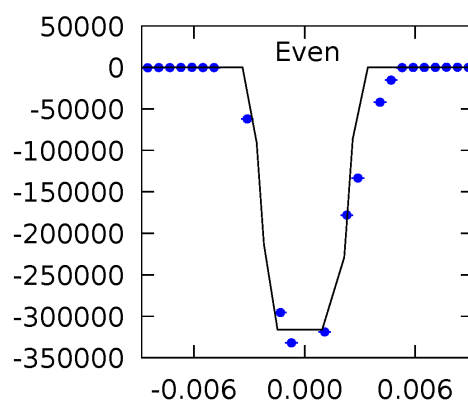
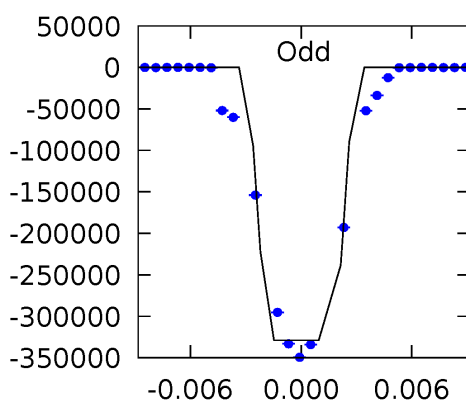
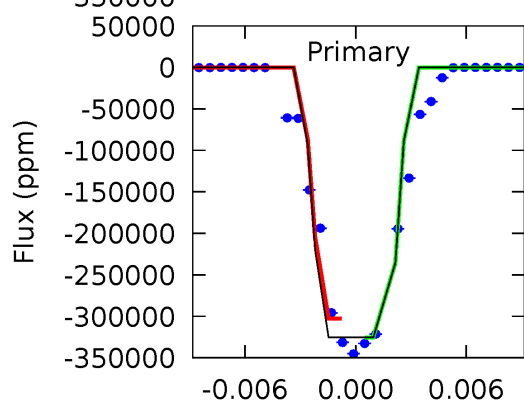
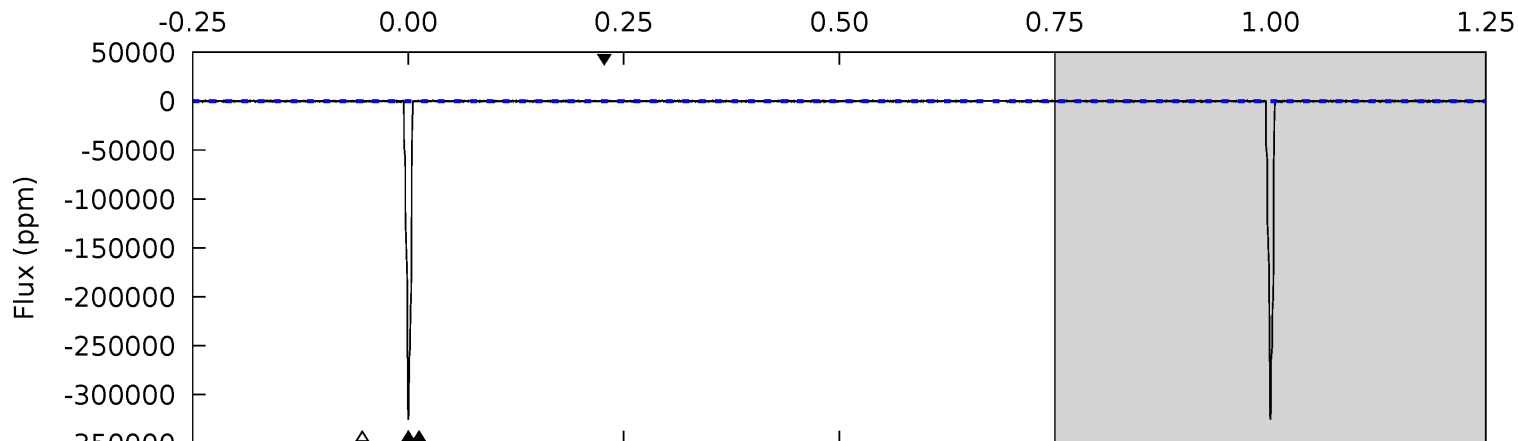
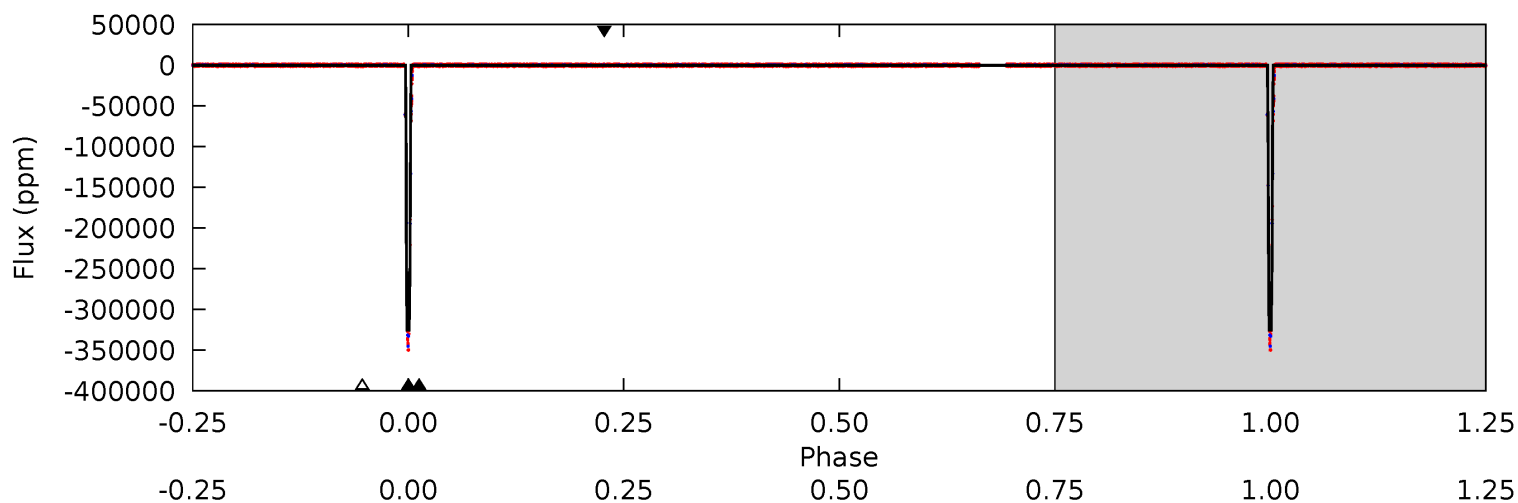
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



# Alt Model-Shift Uniqueness Test

009284741-02, P = 20.729093 Days, E = 120.504307 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
3893	4.69	4.68	4.27	5.13	2.76	1.10	3888	3888	0.01	0.42	76.0	1.00	0.00	0





### Stellar Parameters For KIC 009284741

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5256^{+158}_{-142}$	$4.502^{+0.100}_{-0.137}$	$-0.260^{+0.350}_{-0.250}$	$0.802^{+0.120}_{-0.098}$	$0.745^{+0.112}_{-0.052}$	$2.036^{+0.790}_{-0.689}$
	+3%/-3%	+2%/-3%	+135%/-96%	+15%/-12%	+15%/-7%	+39%/-34%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 009284741-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$0 \pm 1000000$	$44.97^{+9.16}_{-9.49}$	$800^{+42}_{-38}$	$2552^{+1962}_{-6830}$	$13^{+576}_{-462}$
Alt.	$-392 \pm 84$	$52.63^{+11.07}_{-9.17}$	$797^{+40}_{-37}$	$1907^{+106}_{-100}$	$1.354^{+0.764}_{-0.470}$

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

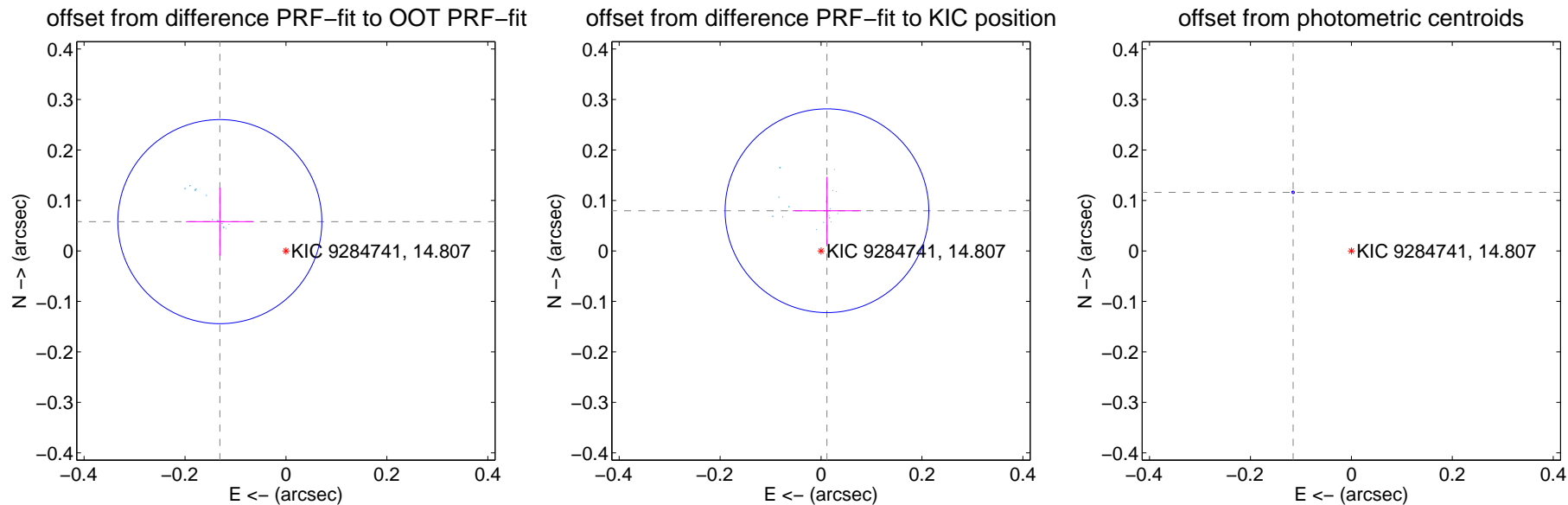
## DV Centroid Data

Supplemental centroid analysis for 009284741-02. Kepler magnitude: 14.81. Transit SNR -1.00

There are 17 quarters with good PRF difference image offsets

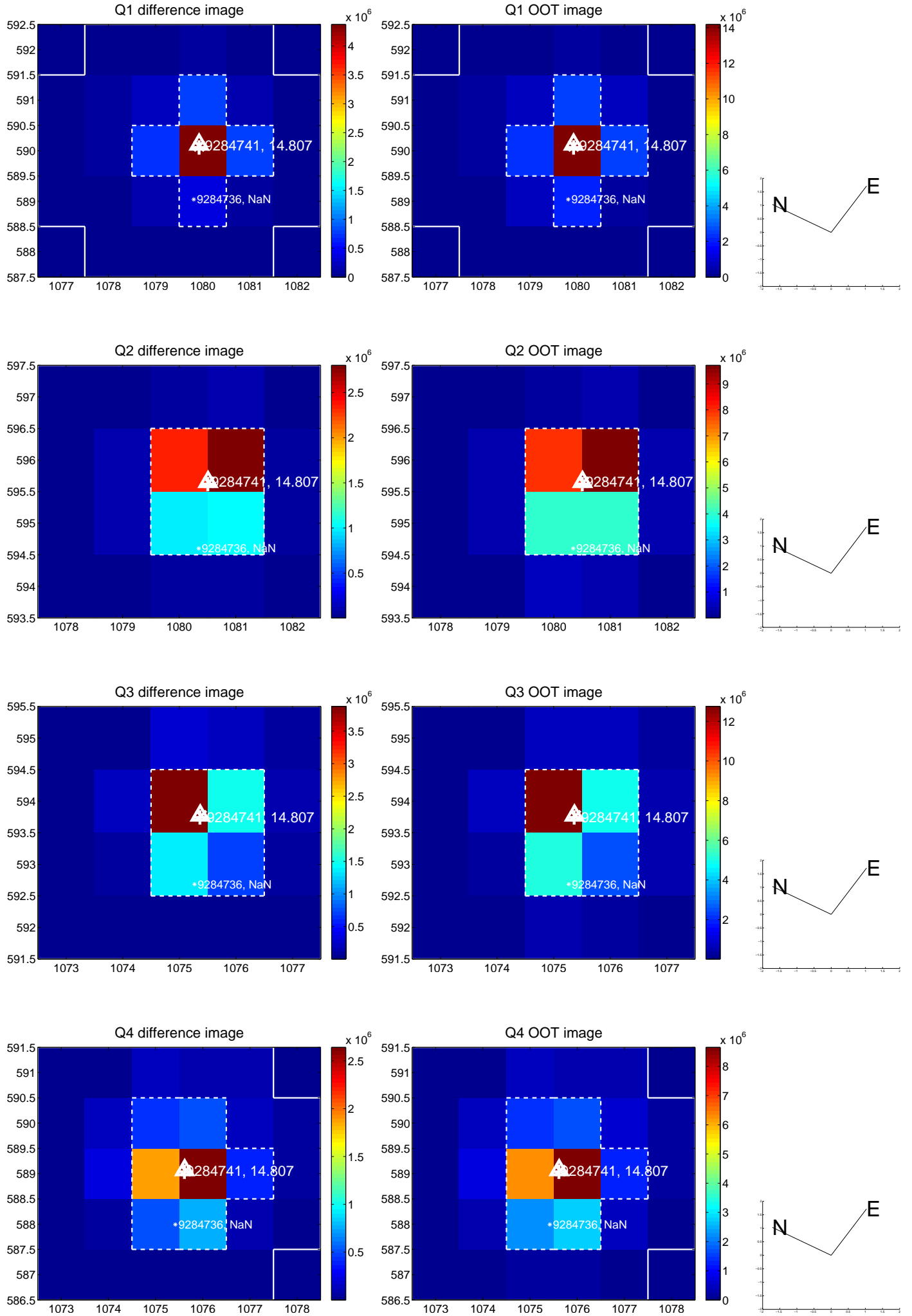
The direct PRF centroid is offset from the target star catalog position by about 0.11 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.143 \pm 0.067$	2.13	$0.131 \pm 0.067$	$0.058 \pm 0.067$
PRF-fit source offset from KIC position	$0.080 \pm 0.067$	1.20	$-0.012 \pm 0.068$	$0.080 \pm 0.067$
photometric centroid source offset	$0.16 \pm 0.00$	195.43	$0.12 \pm 0.00$	$0.12 \pm 0.00$

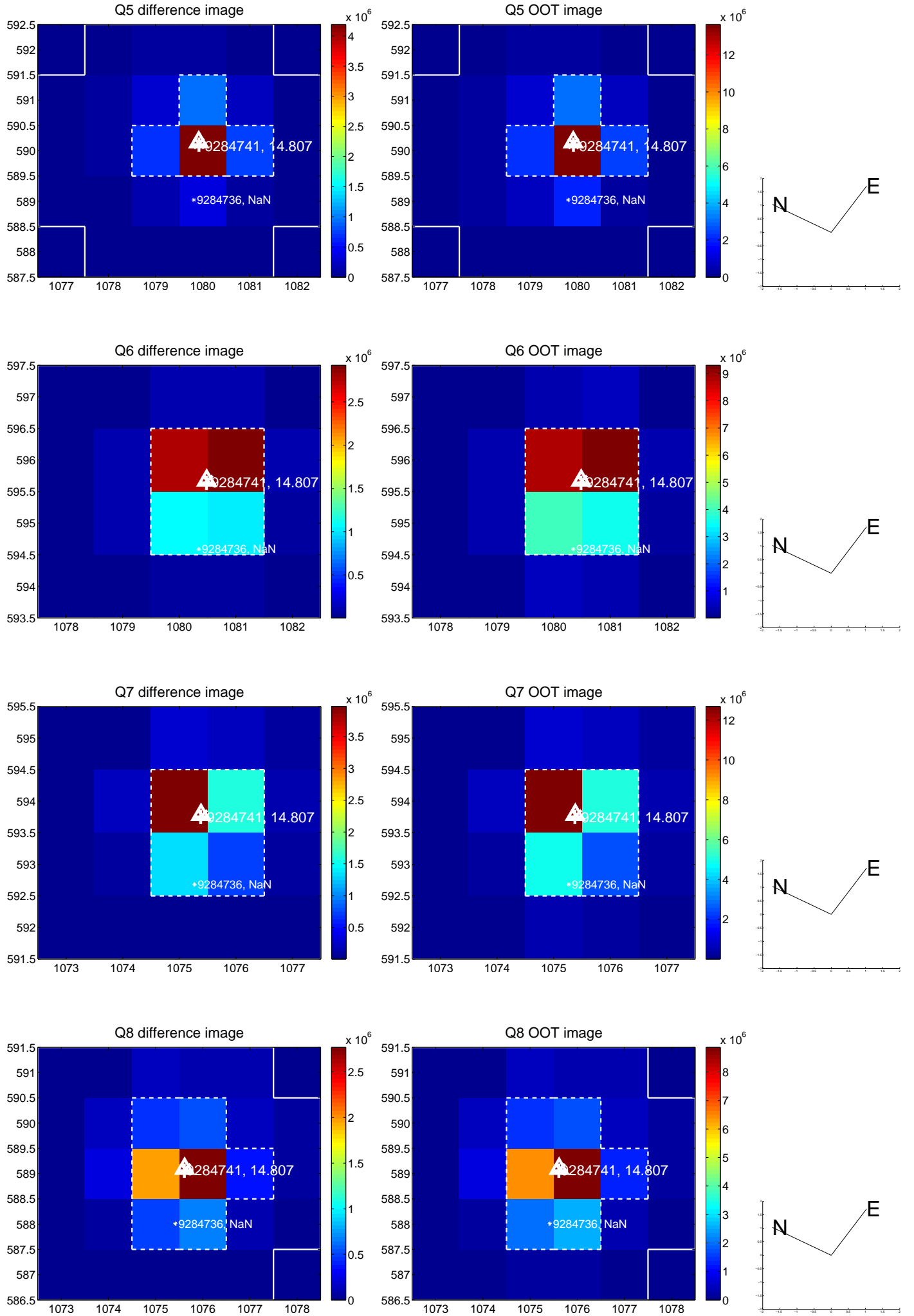


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three- $\sigma$ . Red \*: target star. Blue \*: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.

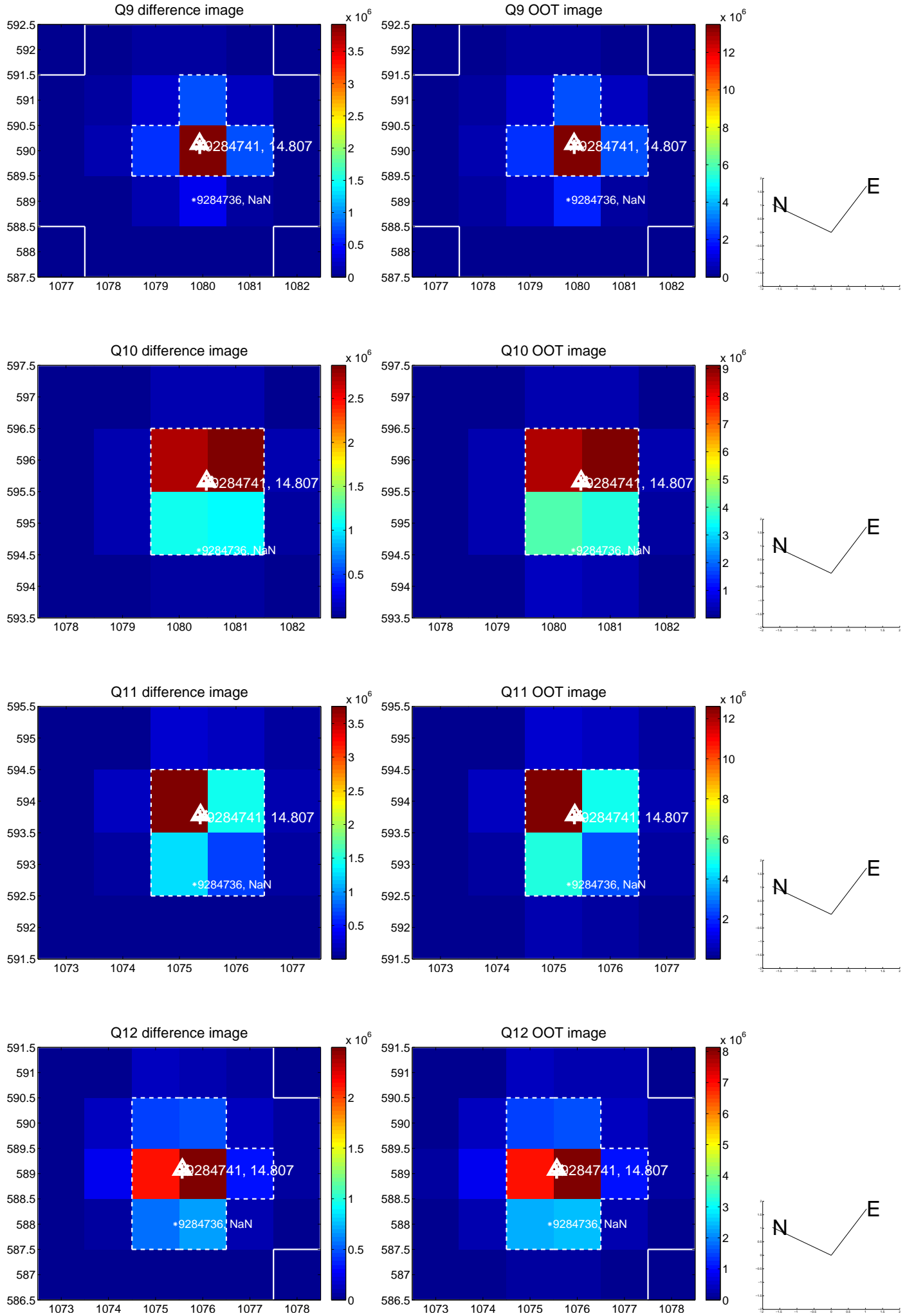
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



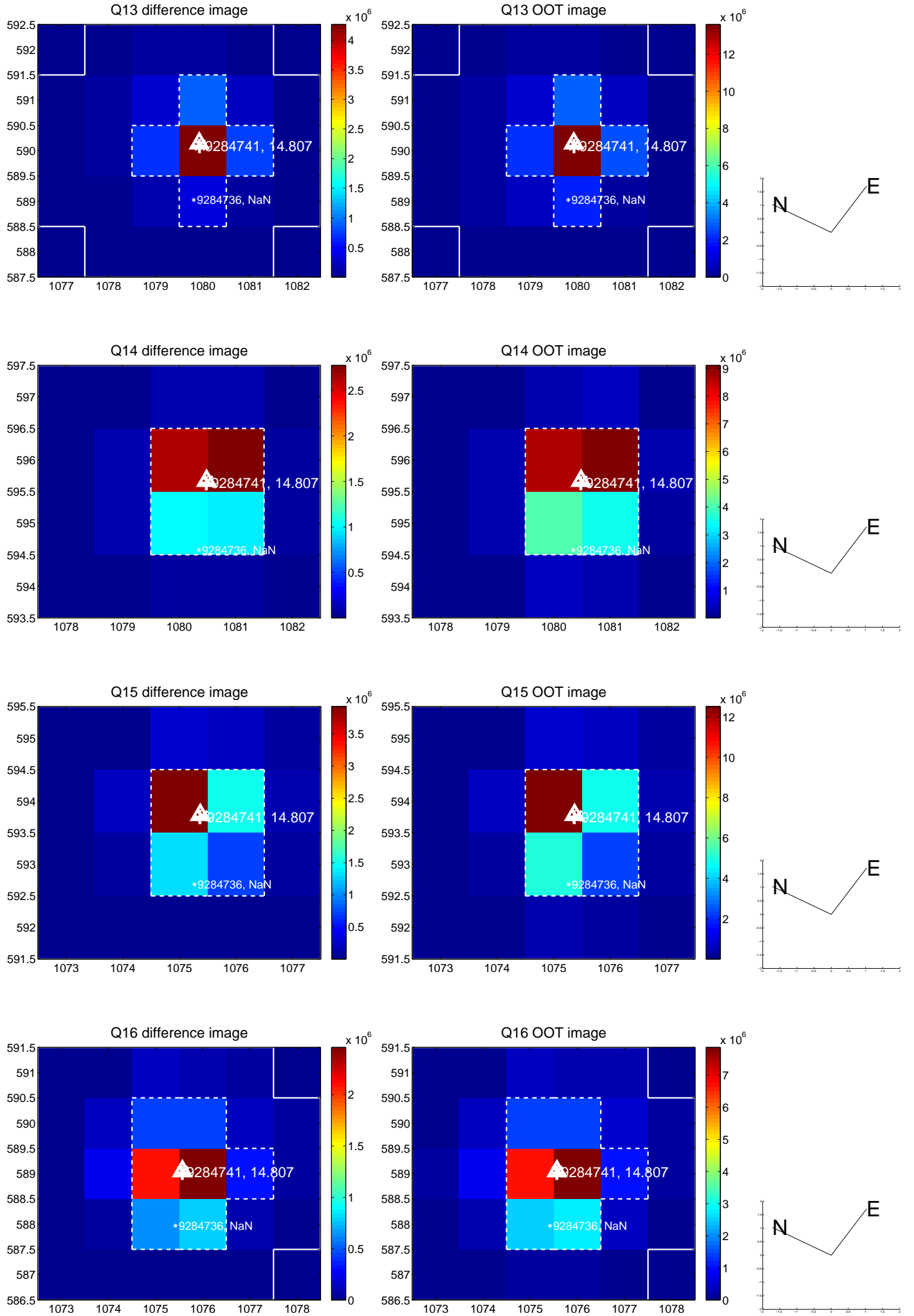
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

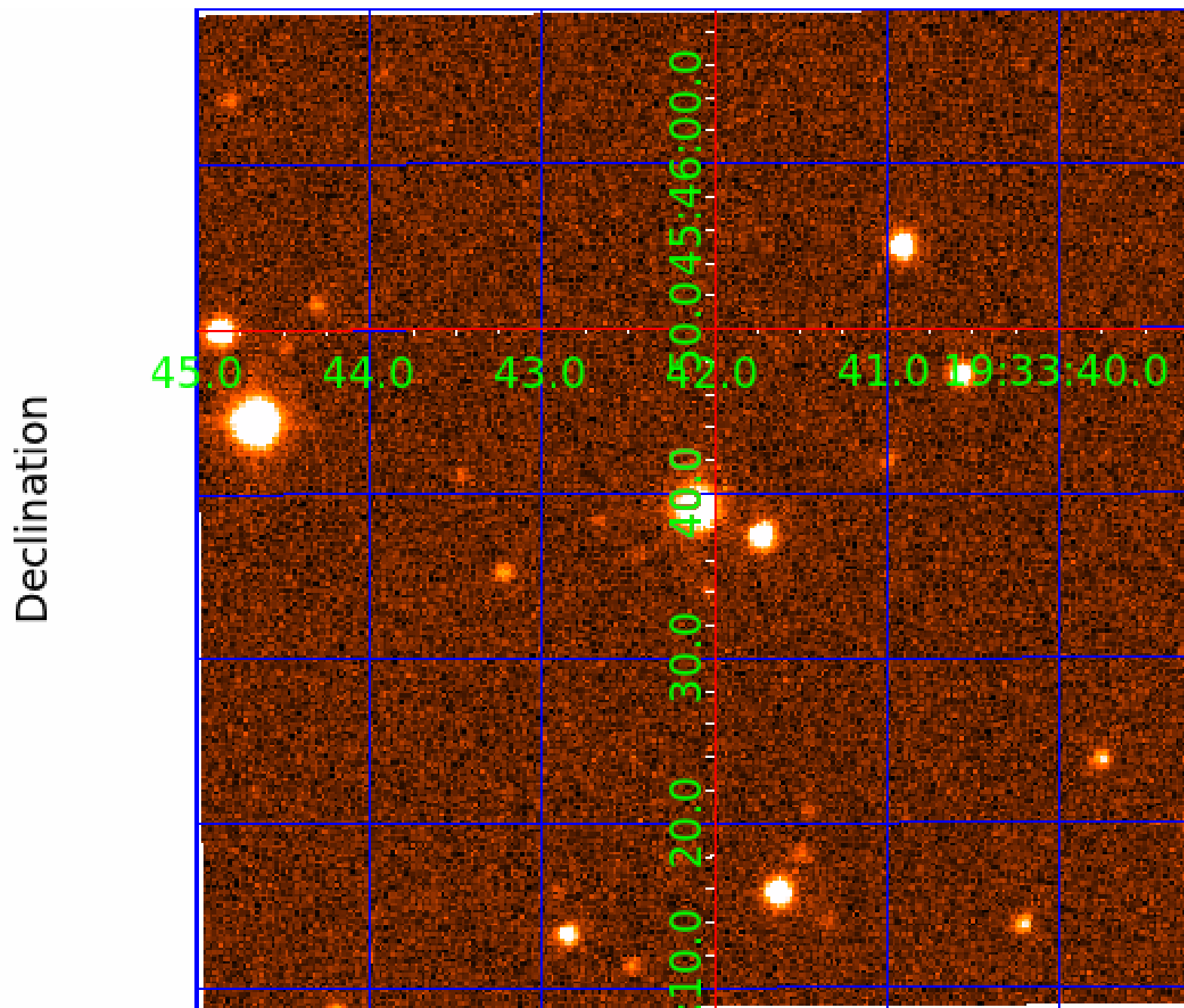


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





UKIRT Image





# KIC 009284741

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009284741-01	OBS	7153.01	20.729491	134.545377	346074.0	5.000	12529.0	-1.0	0.80	5256	43.24	24.52
009284741-02	OBS	No	20.729093	141.232029	356992.9	3.000	10905.5	-1.0	0.80	5256	43.76	24.52
009284741-03	OBS	No	10.365191	140.540206	0.8	8.170	892.9	0.0	0.80	5256	0.12	61.78
009284741-04	OBS	No	10.364570	141.455326	18208.8	15.000	852.4	-1.0	0.80	5256	10.61	61.79
009284741-05	OBS	No	20.731308	136.462727	2953.5	12.500	101.0	-1.0	0.80	5256	4.27	24.52

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009284741-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_ALT—MOD_ODDEVEN_ALT—HAS_SEC_TCE—CENT_NOFITS
009284741-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE—CENT_NOFITS
009284741-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—SAME_NTL_PERIOD—CENT_FEW_DIFFS
009284741-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—LPP_DV—LPP_ALT—MOD_TER_ALT—MOD_POS_ALT—SAME_NTL_PERIOD—CENT_NOFITS
009284741-05	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_POS_ALT—SAME_NTL_PERIOD—CENT_NOFITS

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

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

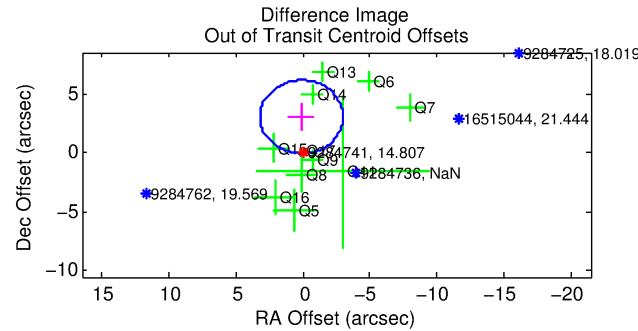
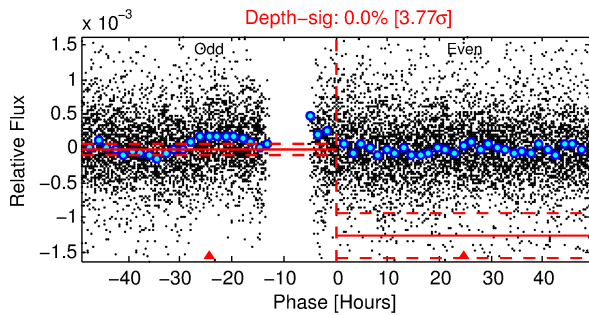
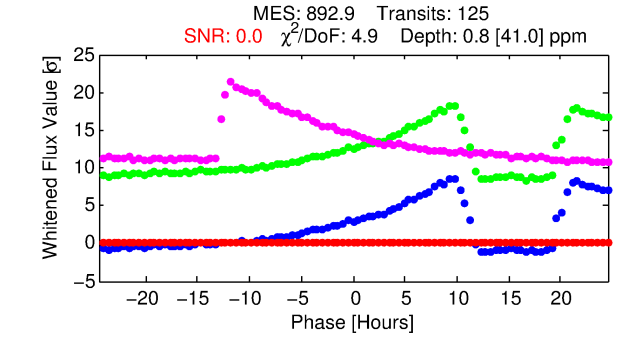
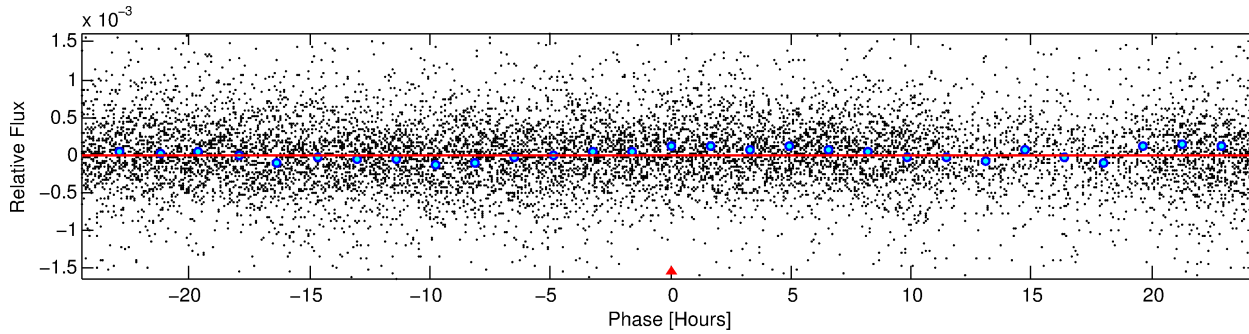
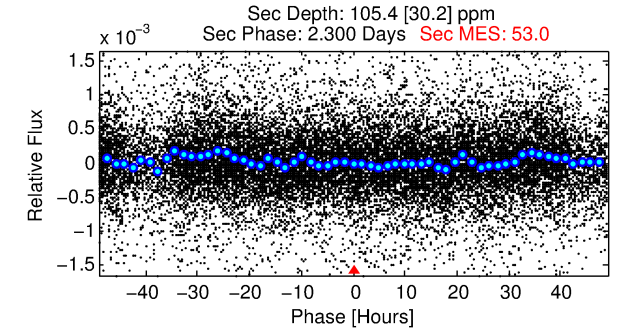
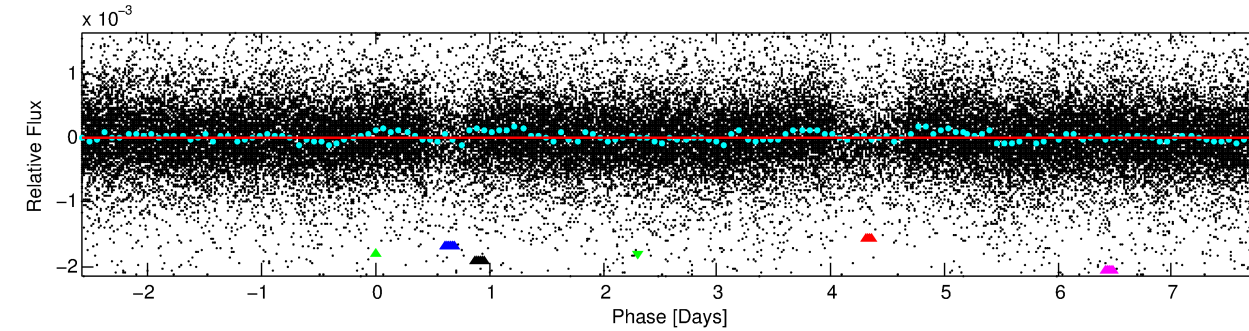
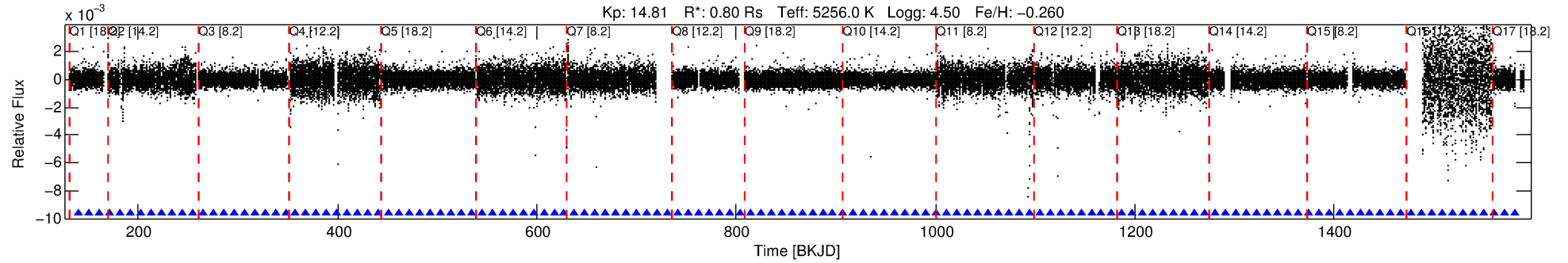
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 009284741-03

No Significant Match Found

# DV One-Page Summary

KIC: 9284741 Candidate: 3 of 5 Period: 10.365 d  
KOI: K07153 Corr: No Ephemeris Match



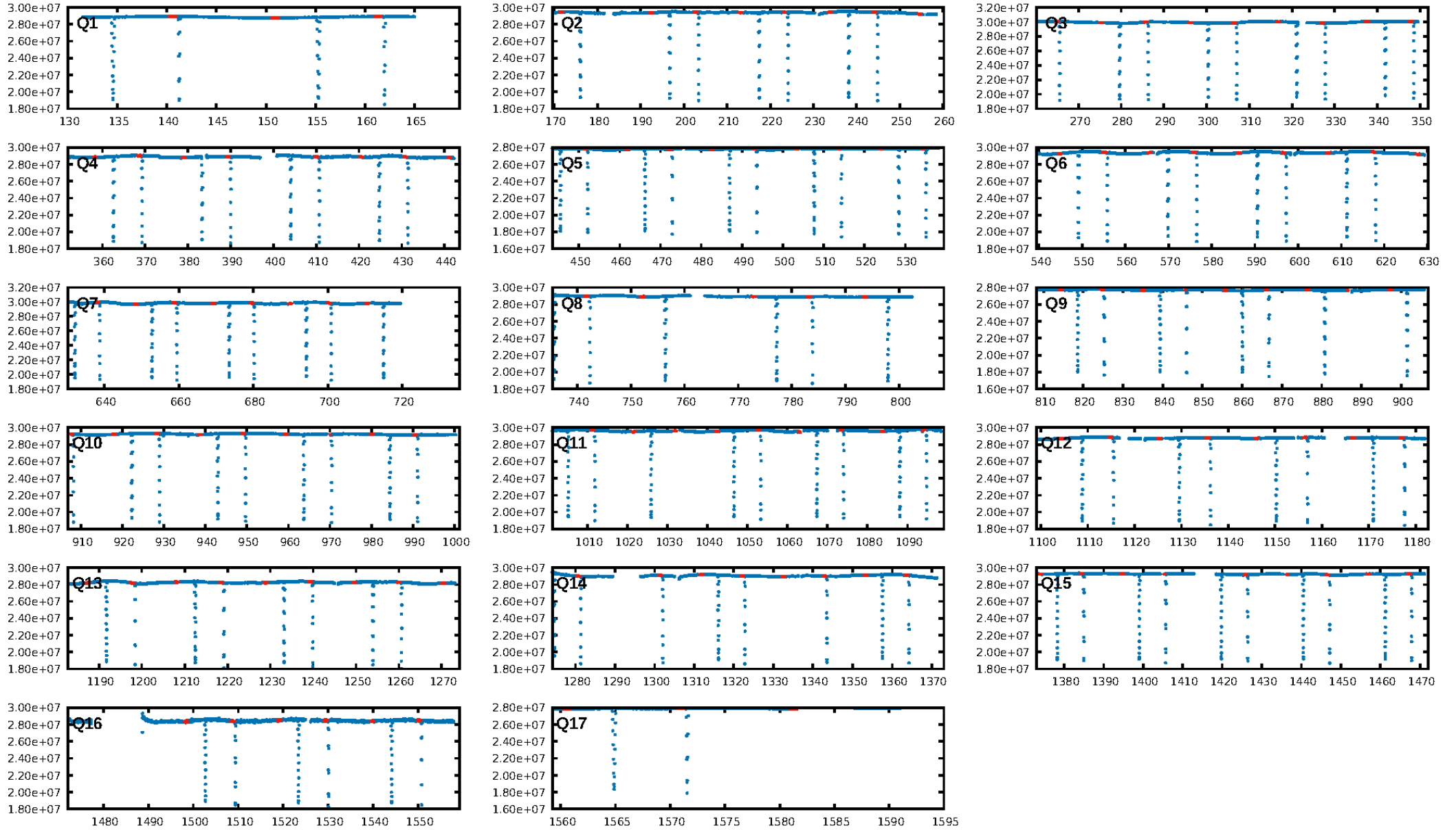
## DV Fit Results:

Period = 10.36519 [0.07429] d  
Epoch = 140.5402 [5.6199] BKJD  
Rp/R\* = 0.0013 [0.0376]  
a/R\* = 1.39 [67.62]  
b = 1.00 [0.77]  
Seff = 61.78 [16.20]  
Teff = 715 [47] K  
Rp = 0.12 [3.29] Re  
a = 0.0844 [0.0122] AU  
Ag = 30970.10 [1765952.27] [0.02 $\sigma$ ]  
Teffp = 14663 [209020] K [0.07 $\sigma$ ]

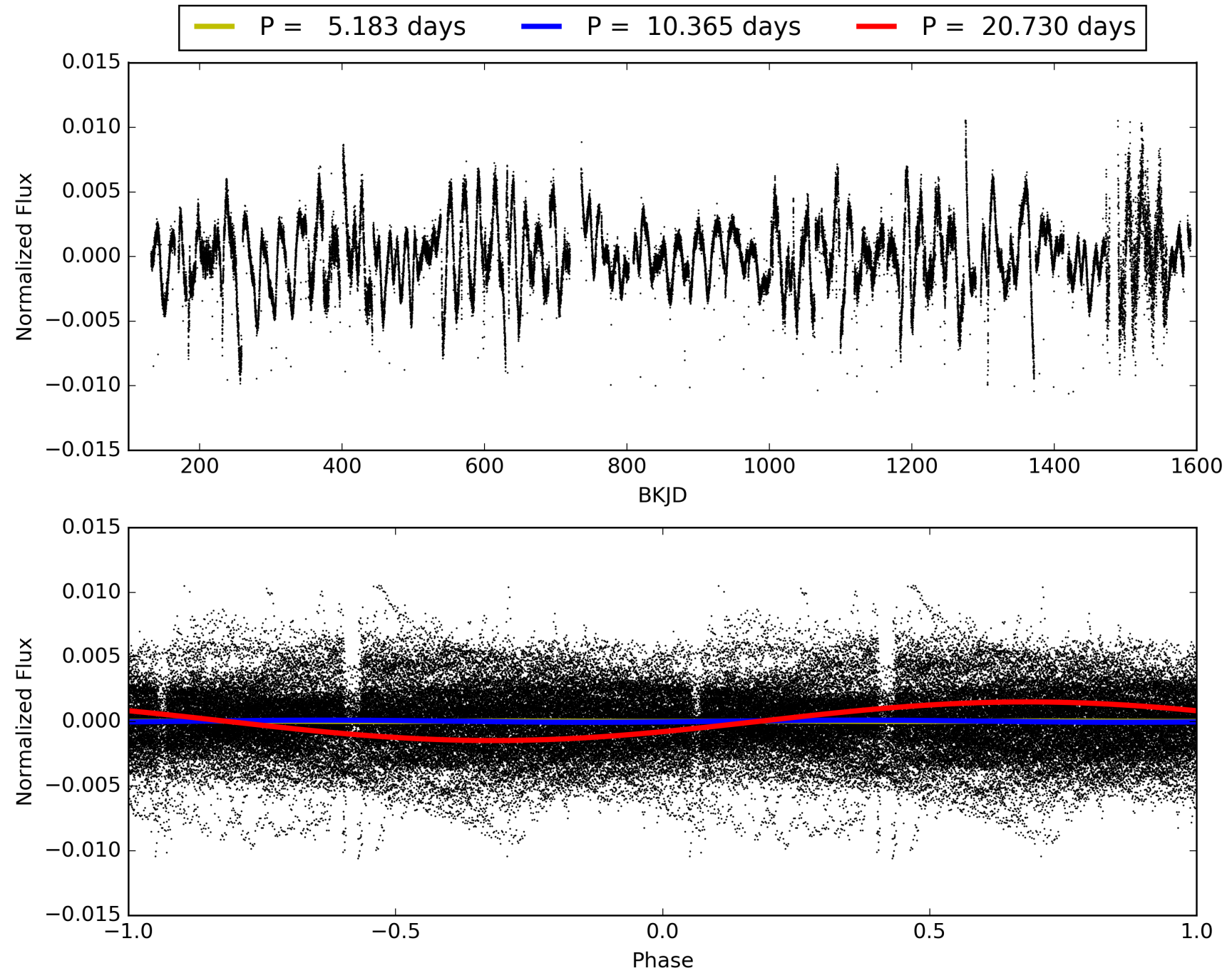
## DV Diagnostic Results:

ShortPeriod-sig: 0.1% [0.00 $\sigma$ ]  
LongPeriod-sig: 100.0% [28.58 $\sigma$ ]  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 0.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [119/119]  
GhostDiagnostic-chr: N/A  
Centroid-sig: N/A  
Centroid-so: N/A  
OotOffset-rm: 3.046 arcsec [2.95 $\sigma$ ]  
KicOffset-rm: 3.044 arcsec [2.74 $\sigma$ ]  
OotOffset-st: 2/3/2/4 [11]  
KicOffset-st: 2/3/2/4 [11]  
DiffImageQuality-fgm: 0.18 [2/11]  
DiffImageOverlap-fno: 0.94 [16/17]

# TCE 009284741-03, PDC Light Curves

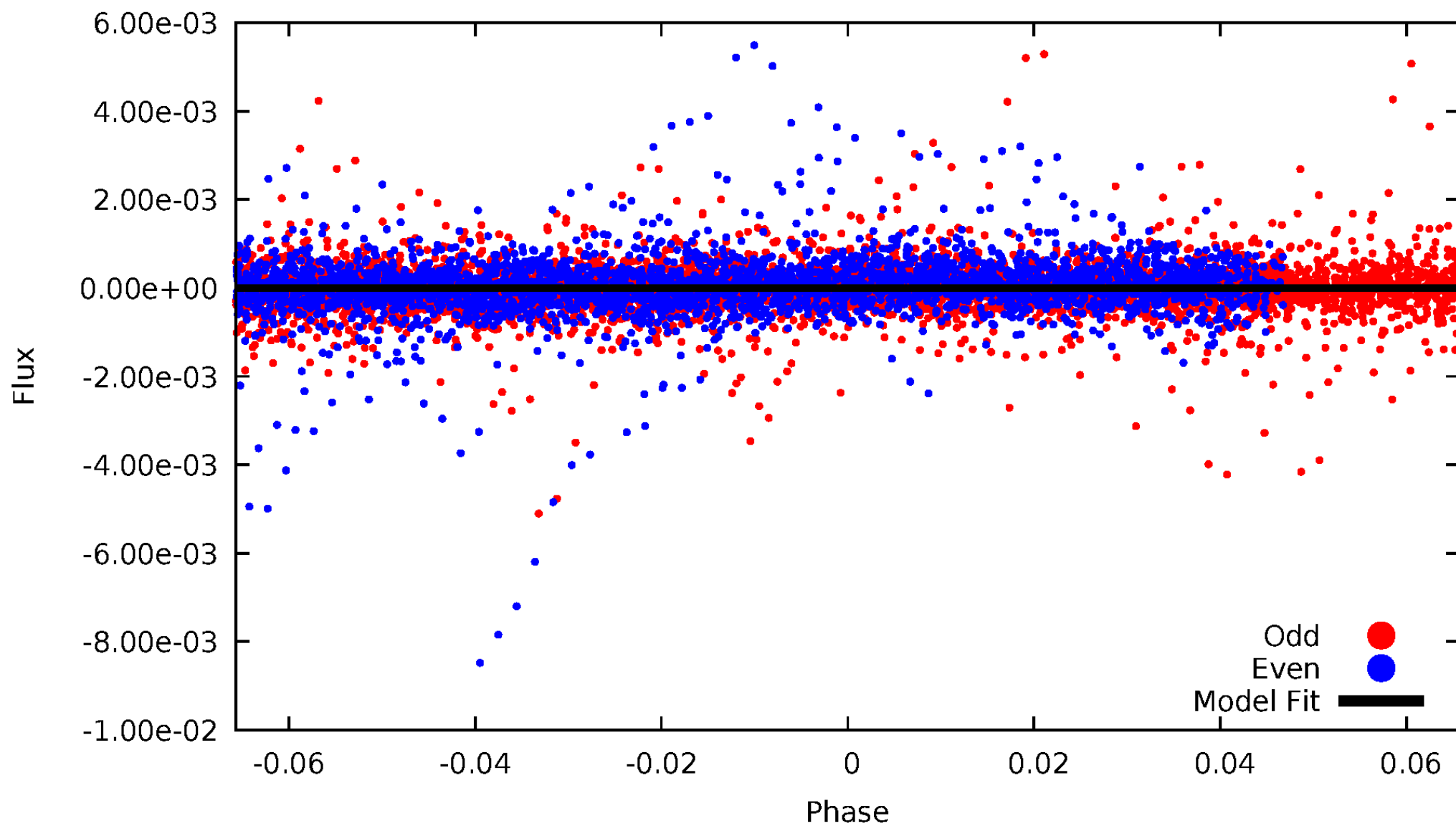


TCE 009284741-03



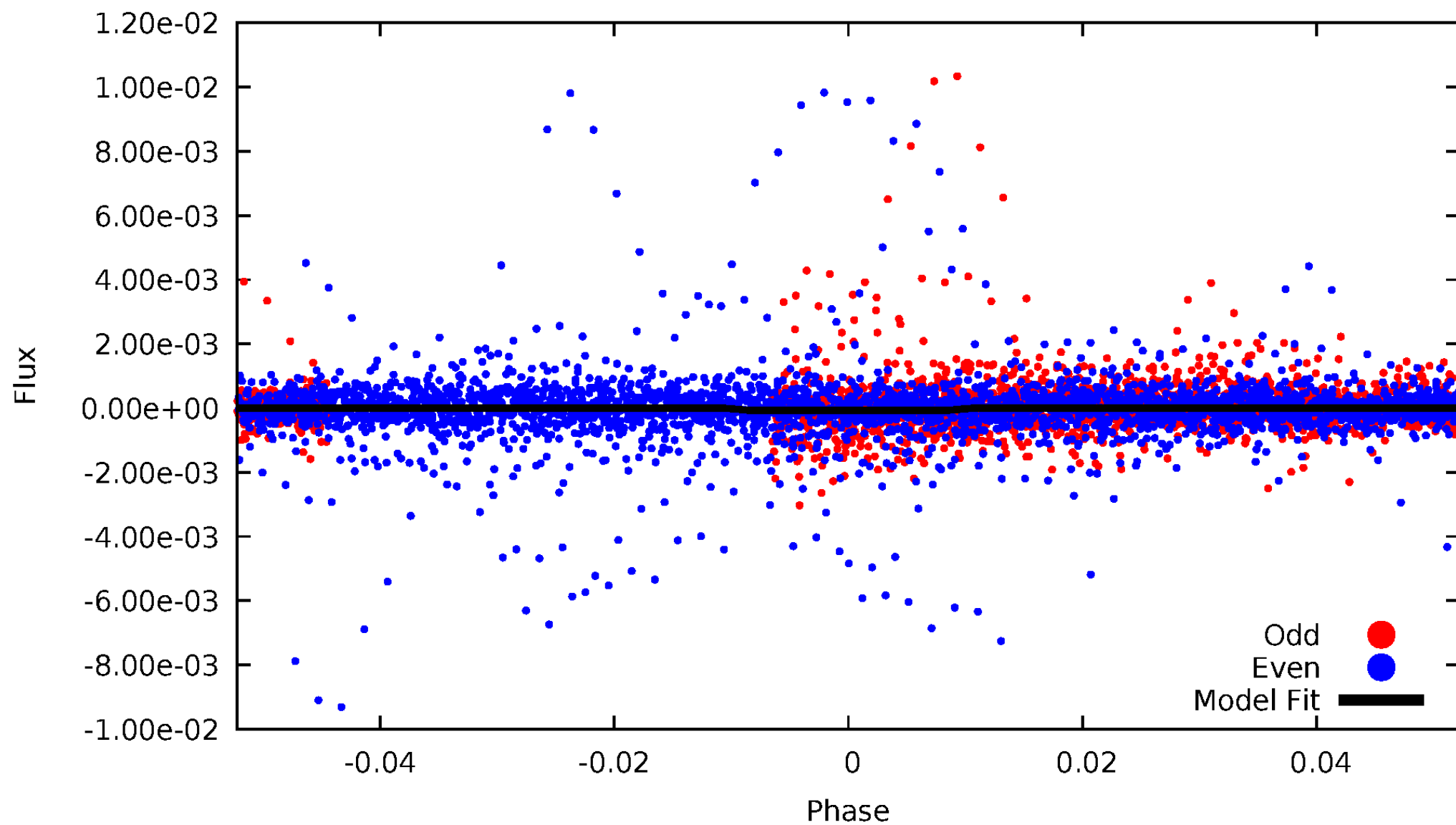
# DV Odd/Even

TCE 009284741-03



# ALT Odd/Even

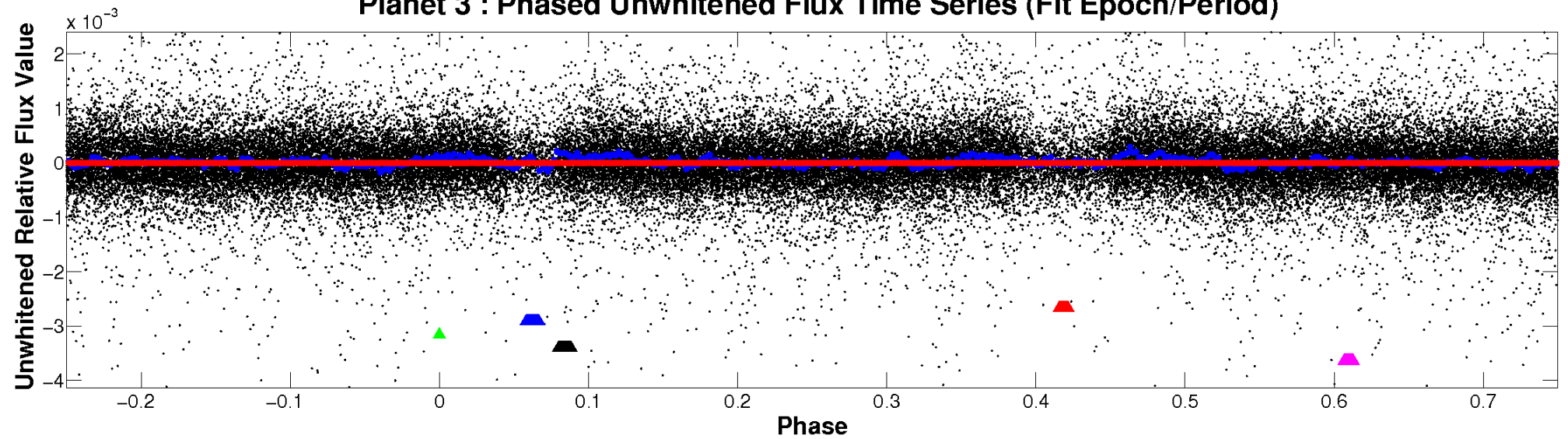
TCE 009284741-03



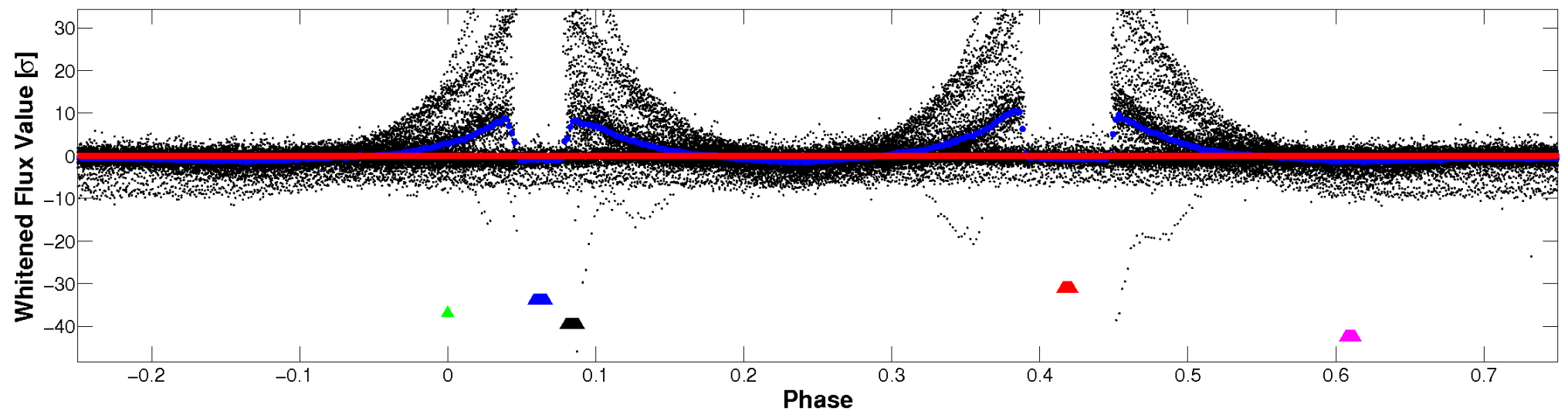


# Non-Whitened Vs. Whitened Light Curve

## Planet 3 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

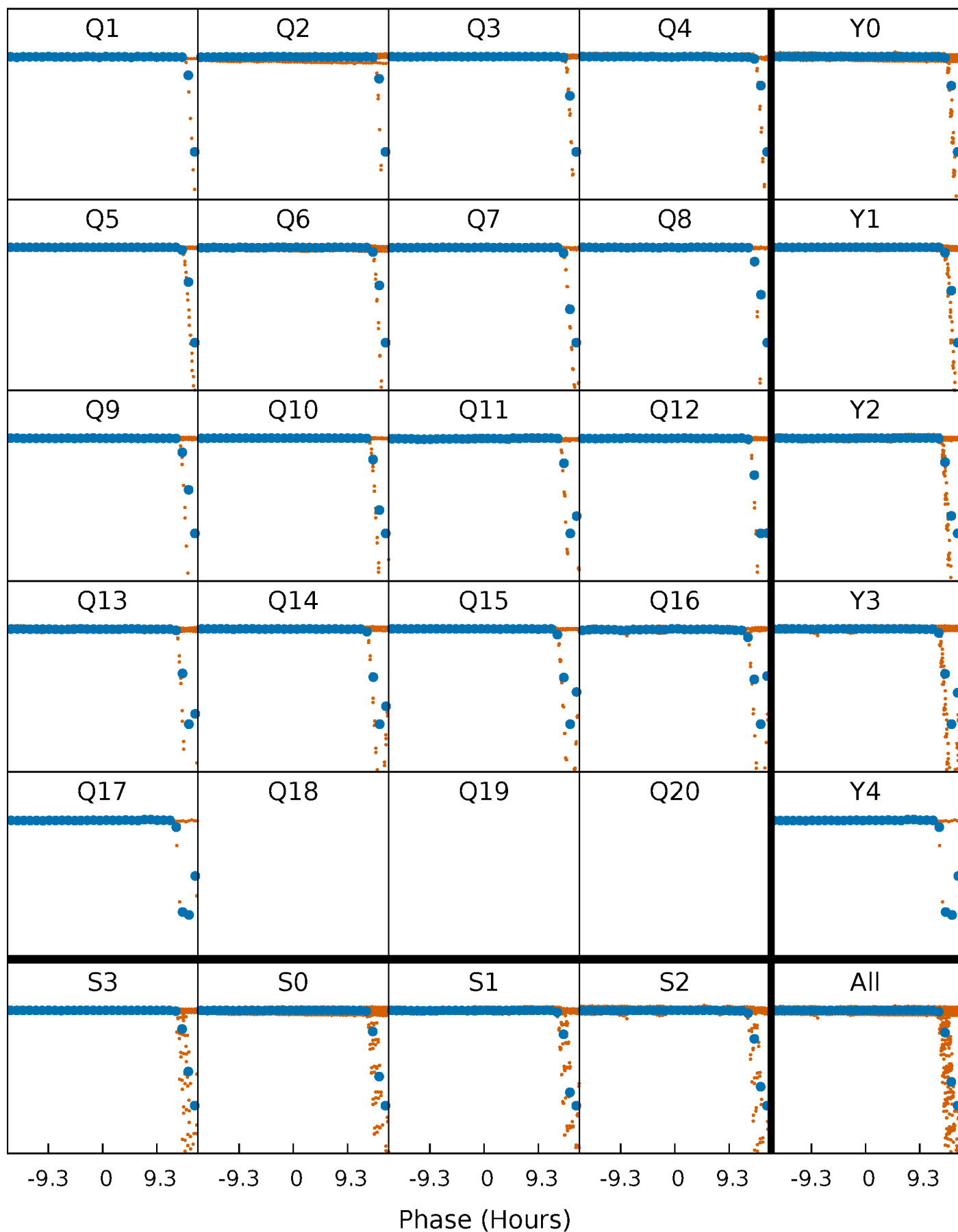


## Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

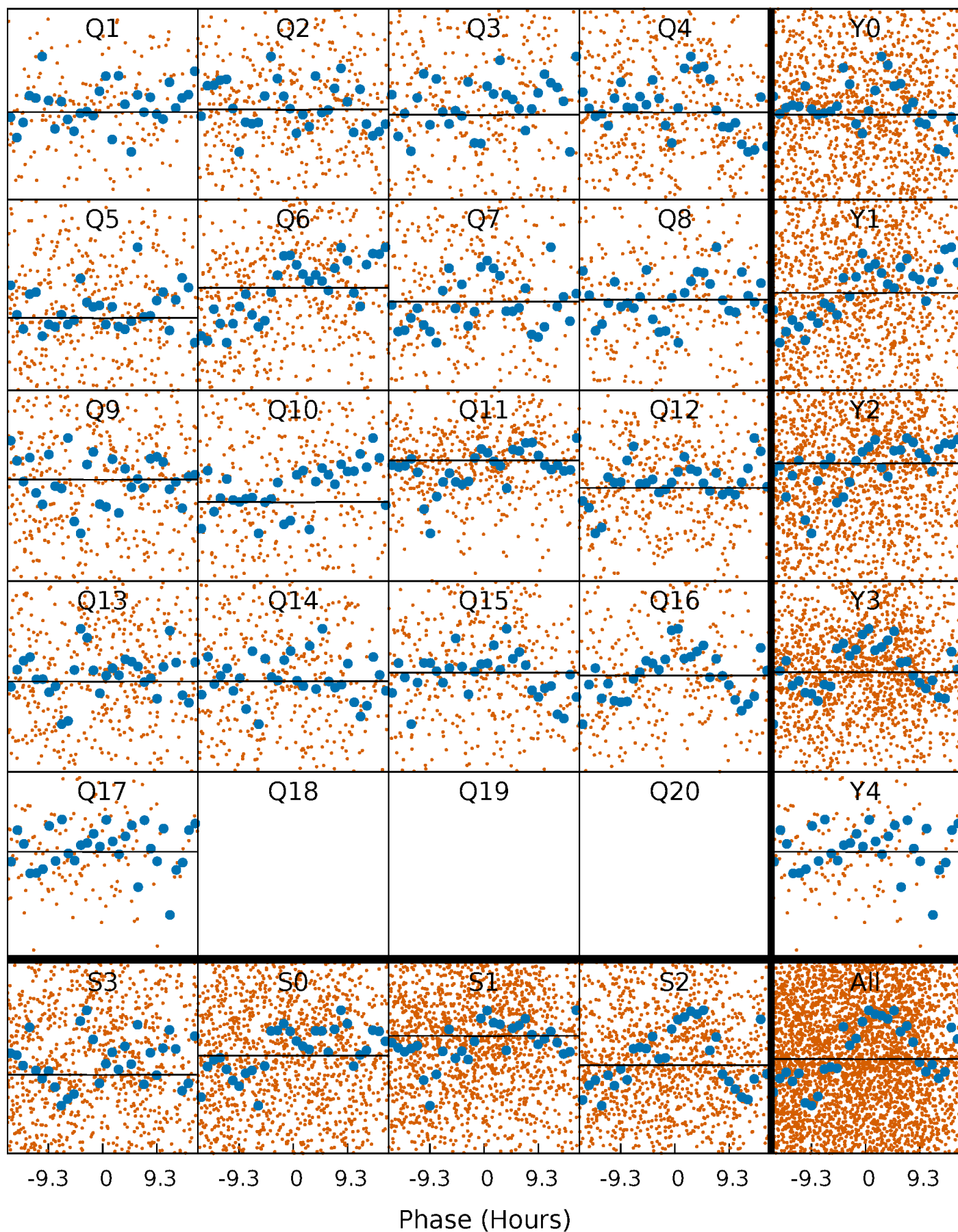
TCE 009284741-03 P= 10.365191 Days  $T_0=140.540206$  (BKJD)





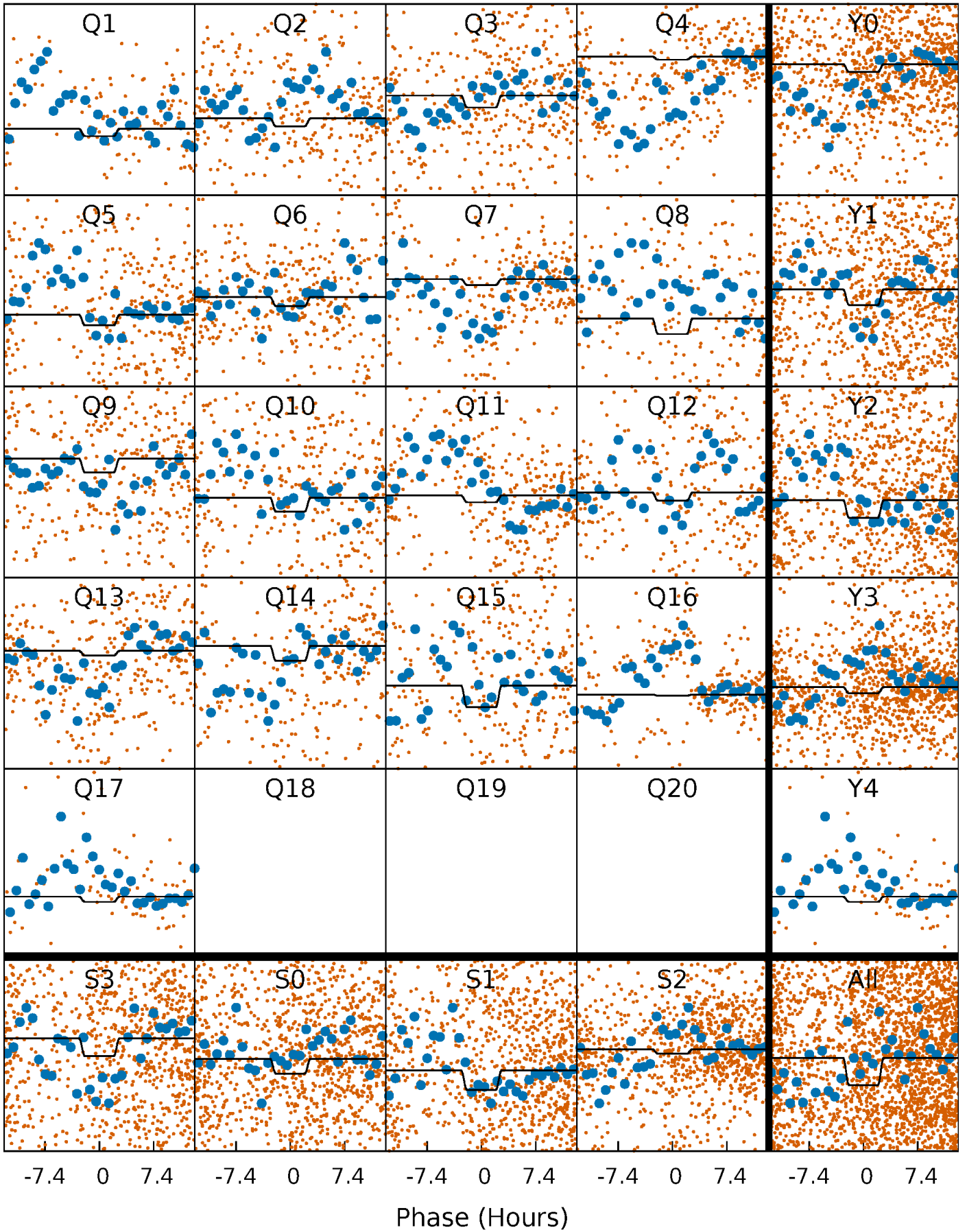
# DV Quarter-Phased Transit Curves

TCE 009284741-03 P= 10.365191 Days  $T_0=140.540206$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

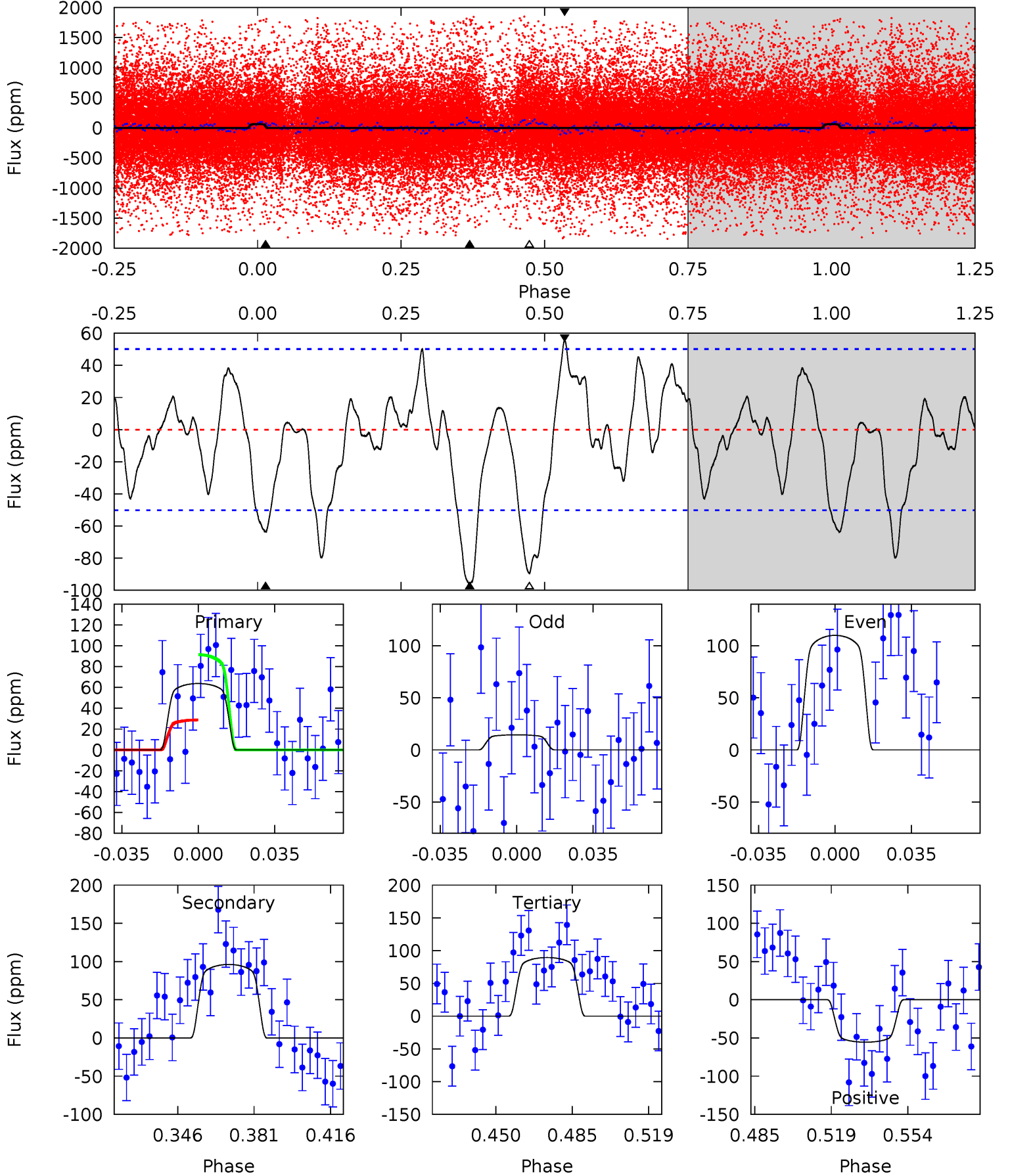
TCE 009284741-03 P= 10.364570 Days  $T_0=141.495140$  (BKJD)



# DV Model-Shift Uniqueness Test

009284741-03, P = 10.365191 Days, E = 130.175015 Days

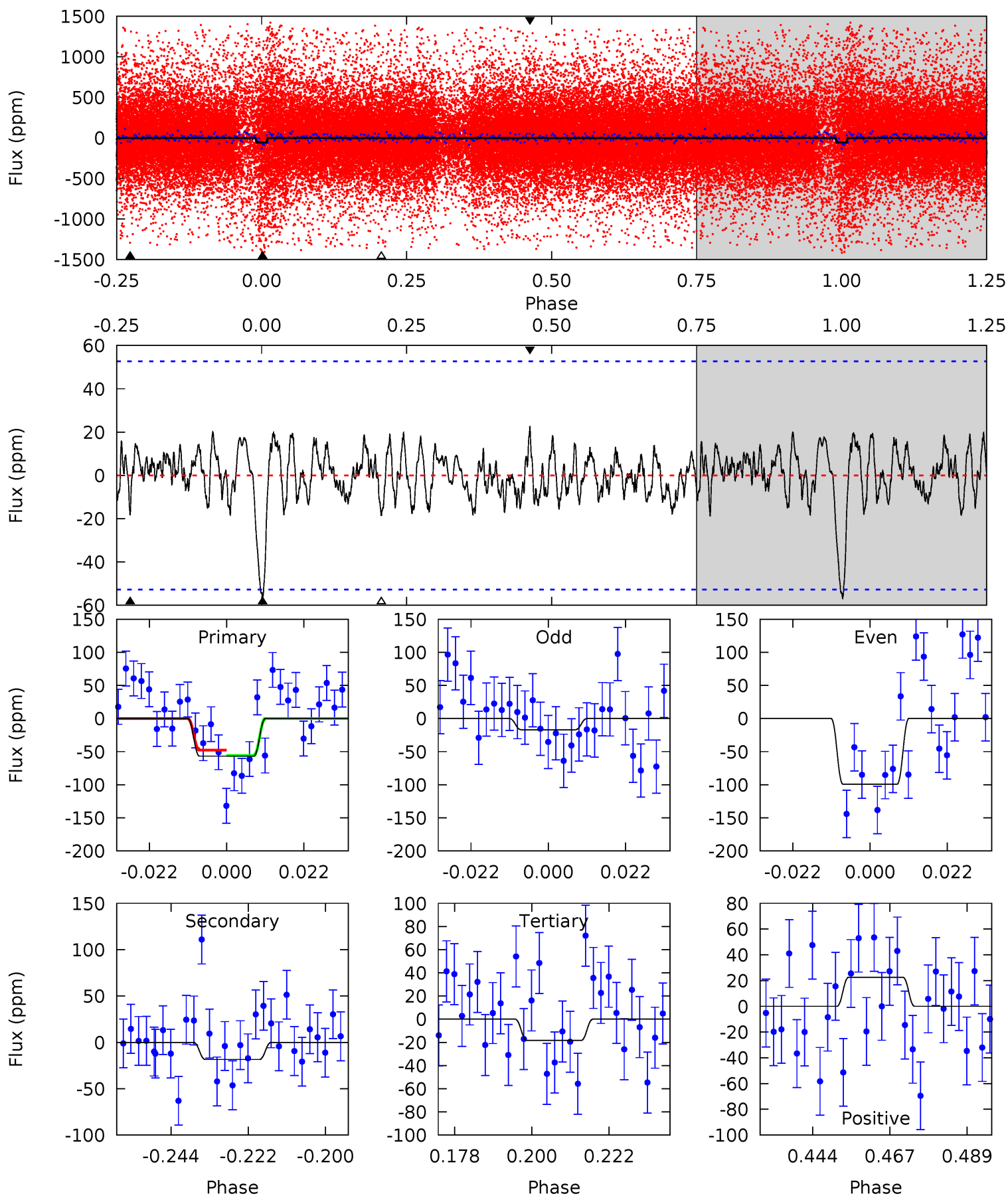
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.08	9.17	8.53	5.29	4.78	2.11	2.83	-2.45	0.78	0.64	3.87	4.60	2.11	0.37	3.02



# Alt Model-Shift Uniqueness Test

009284741-03, P = 10.364570 Days, E = 131.130570 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
5.25	1.71	1.70	2.08	4.87	2.29	0.79	3.55	3.16	0.01	-0.38	3.81	-0.42	0.28	0.38



### Stellar Parameters For KIC 009284741

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5256^{+158}_{-142}$	$4.502^{+0.100}_{-0.137}$	$-0.260^{+0.350}_{-0.250}$	$0.802^{+0.120}_{-0.098}$	$0.745^{+0.112}_{-0.052}$	$2.036^{+0.790}_{-0.689}$
	+3%/-3%	+2%/-3%	+135%/-96%	+15%/-12%	+15%/-7%	+39%/-34%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 009284741-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-96 \pm 10$	$2.36^{+2.65}_{-1.74}$	$1006^{+53}_{-49}$	$3643^{+2416}_{-753}$	$68^{+955}_{-53}$
Alt.	$-18 \pm 11$	$2.48^{+2.65}_{-1.69}$	$1003^{+55}_{-44}$	$2724^{+1163}_{-578}$	$11^{+97}_{-9}$

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



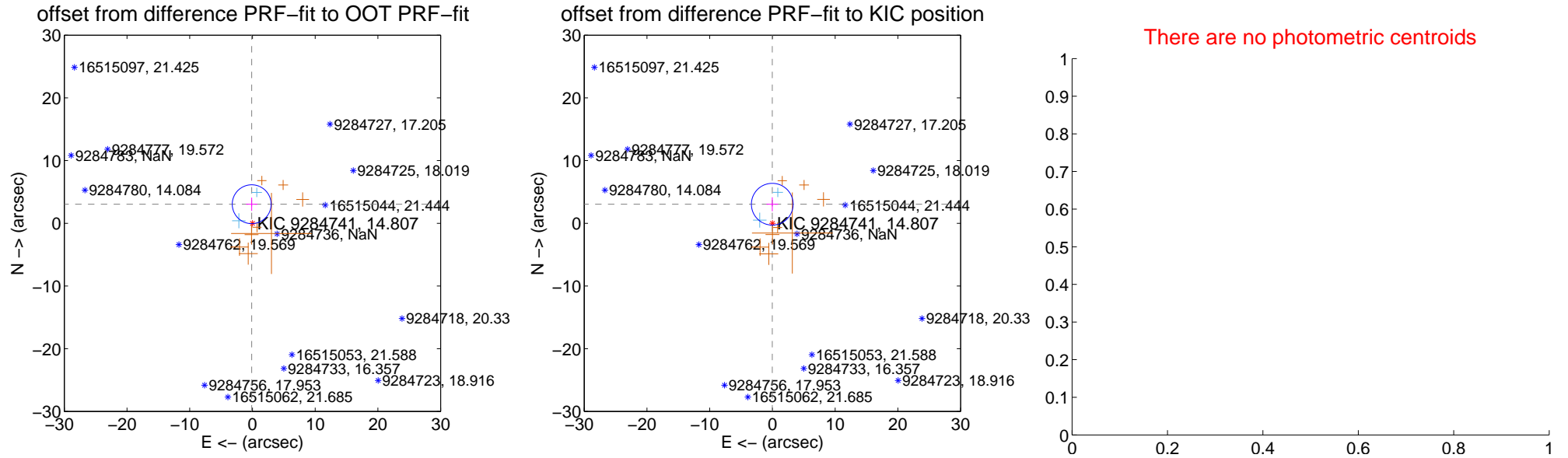
## DV Centroid Data

Supplemental centroid analysis for 009284741-03. Kepler magnitude: 14.81. Transit SNR 0.05

There are 2 quarters with good PRF difference image offsets

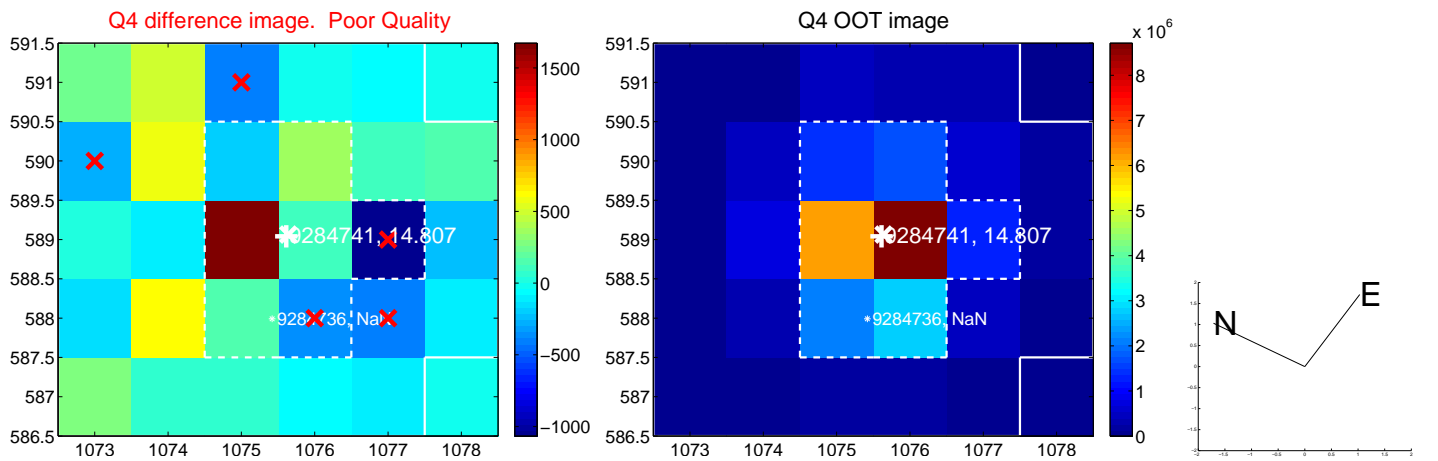
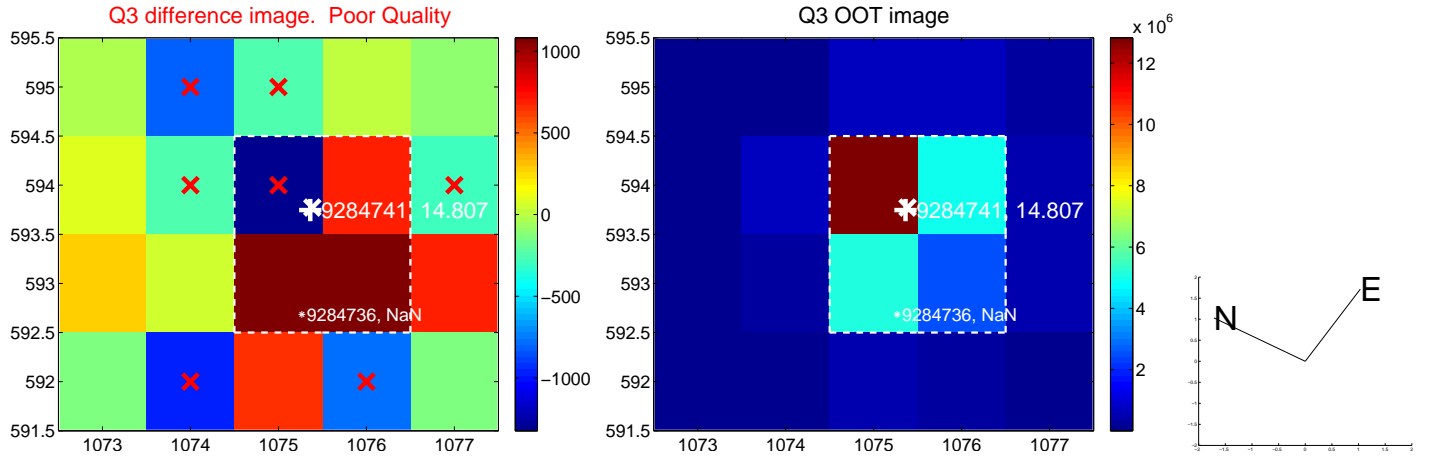
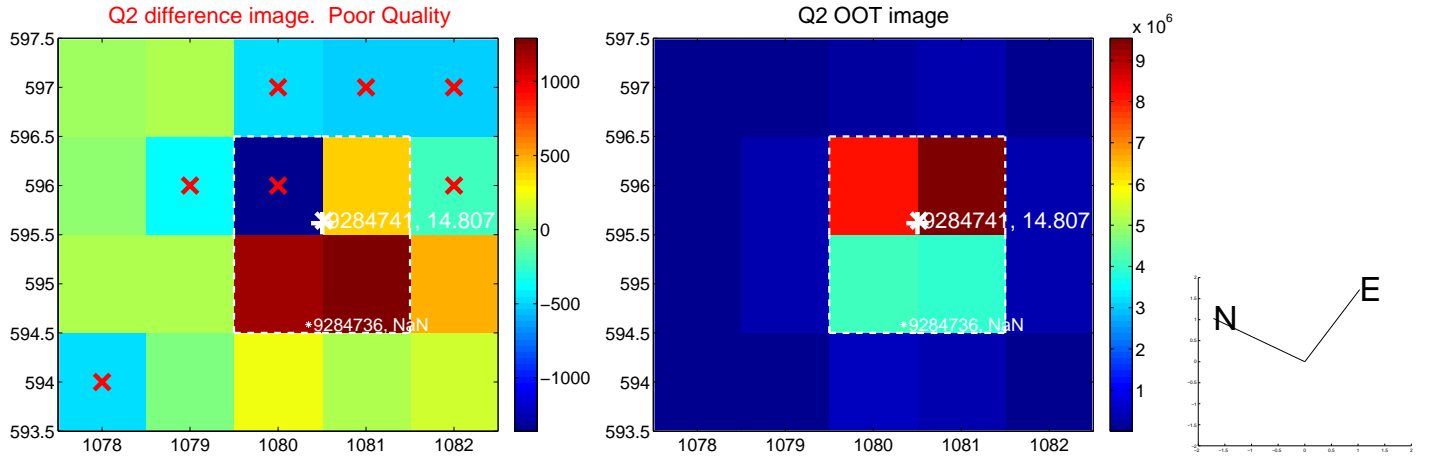
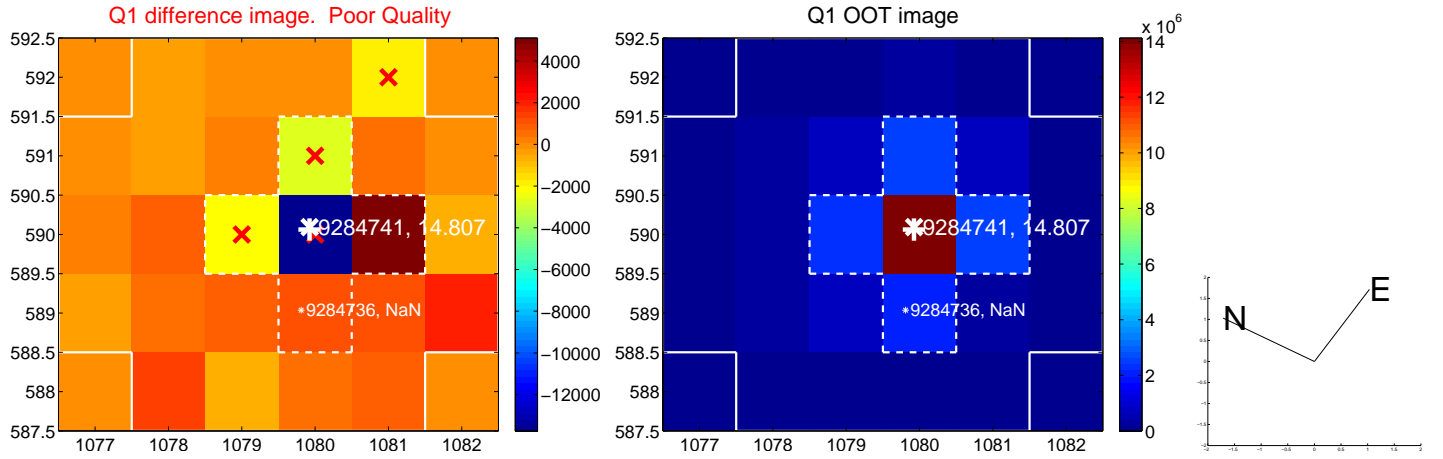
The direct PRF centroid is offset from the target star catalog position by about 0.11 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$3.046 \pm 1.033$	2.95	$0.123 \pm 0.892$	$3.043 \pm 1.051$
PRF-fit source offset from KIC position	$3.044 \pm 1.110$	2.74	$0.023 \pm 0.920$	$3.044 \pm 1.114$
photometric centroid source offset	—	—	—	—

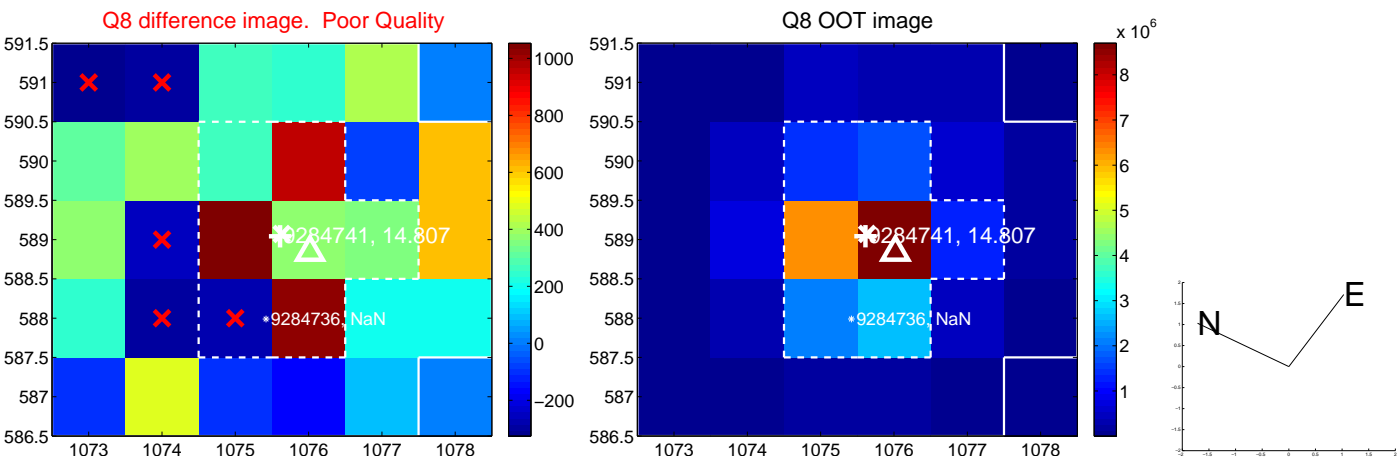
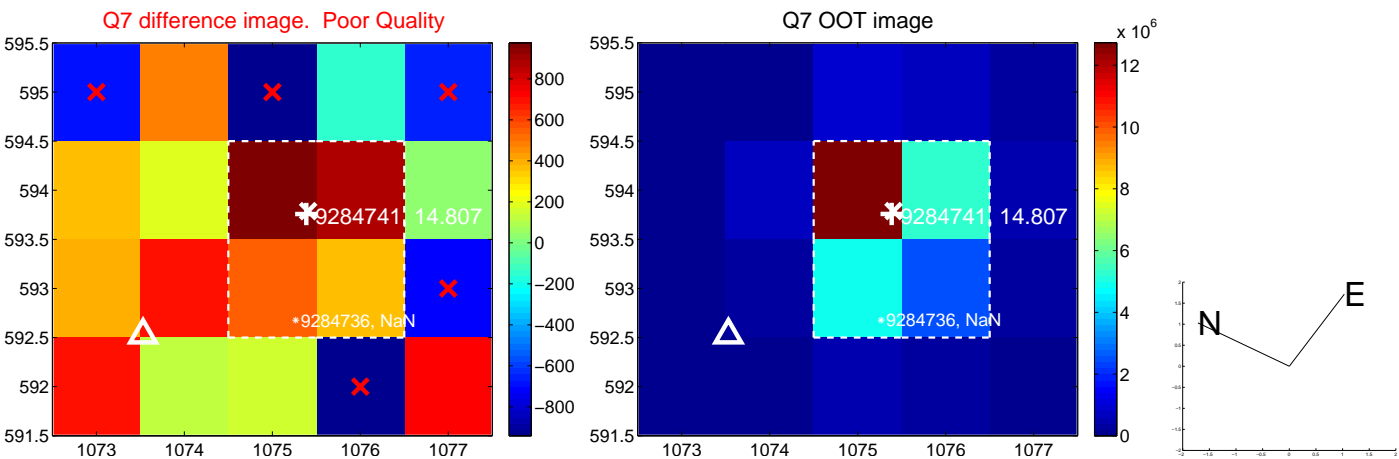
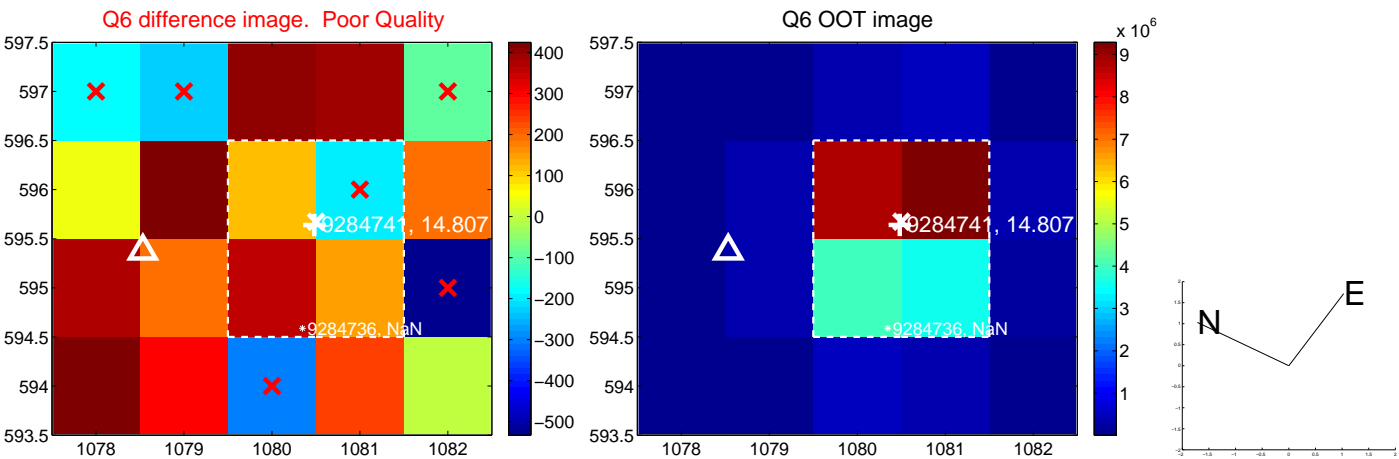
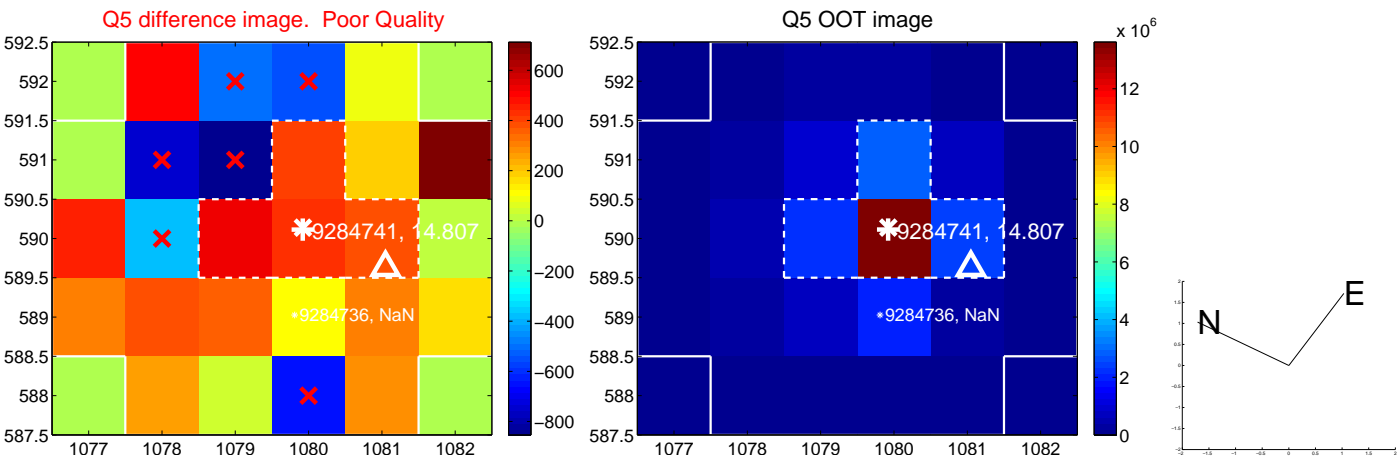


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

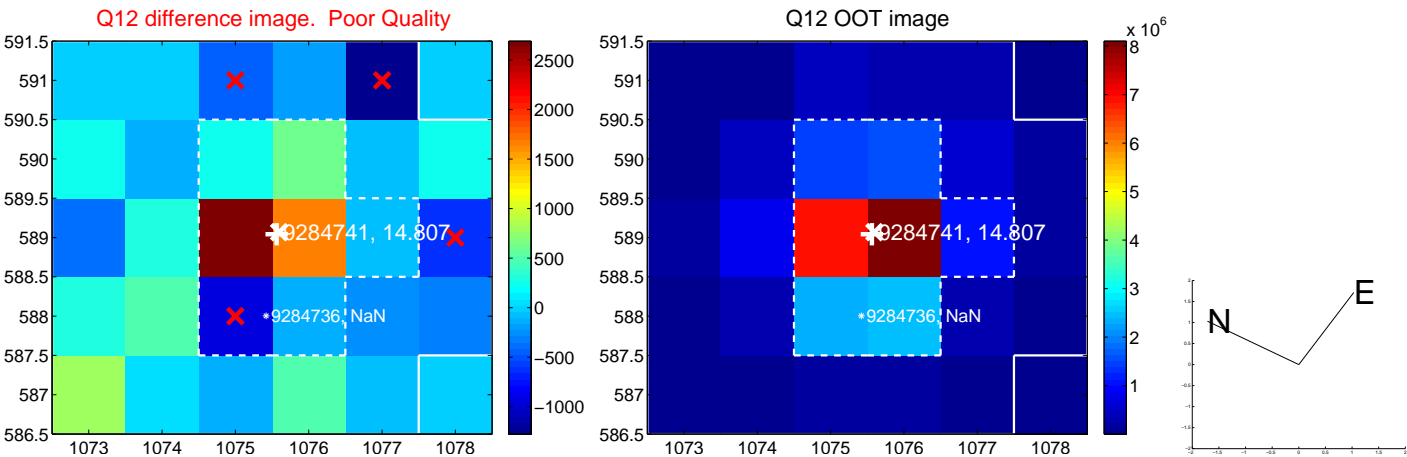
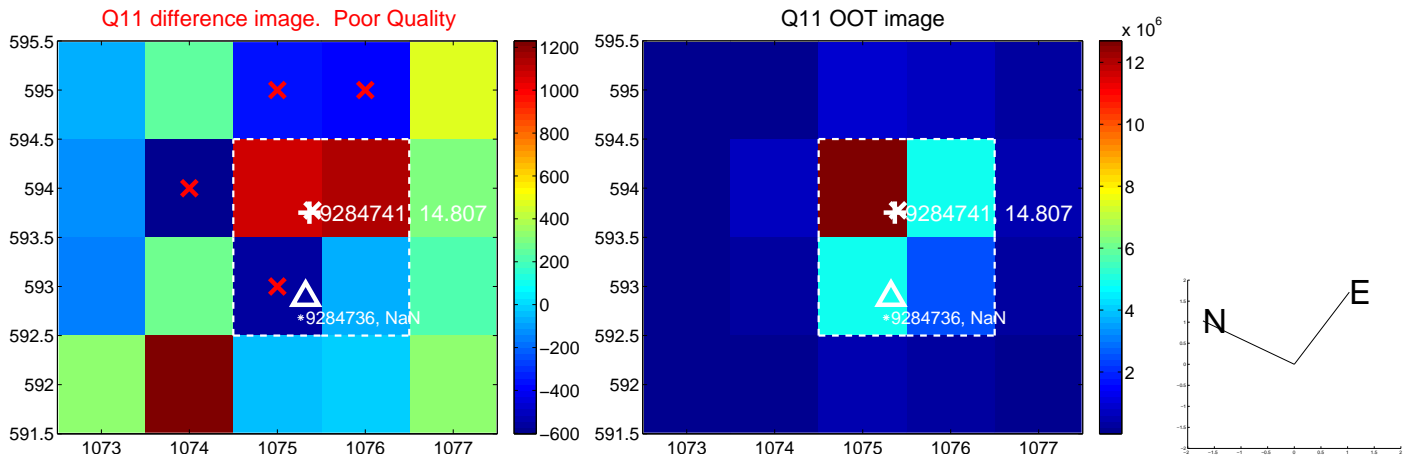
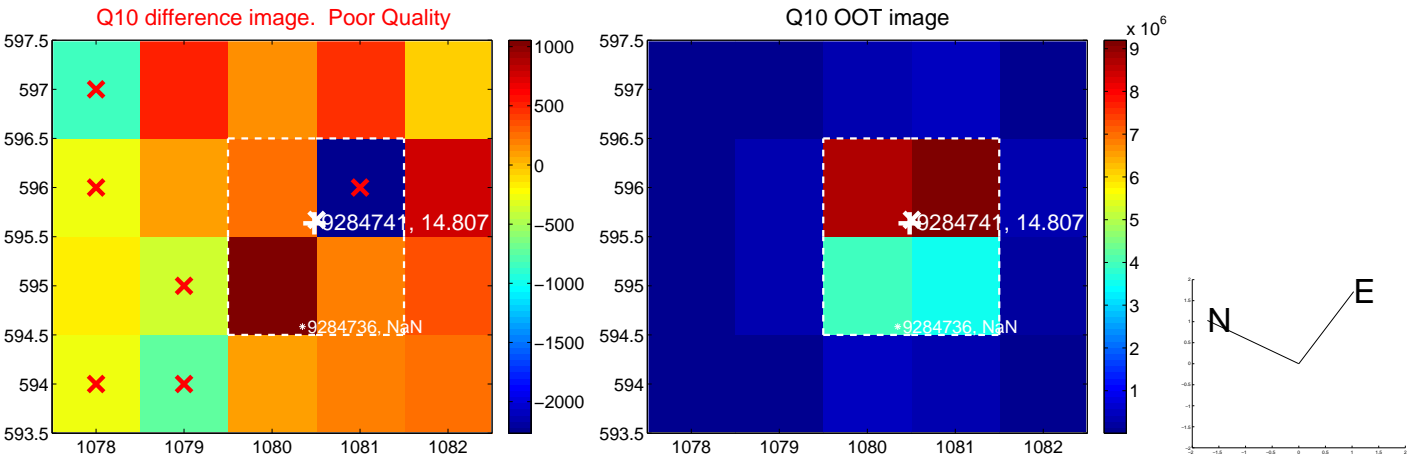
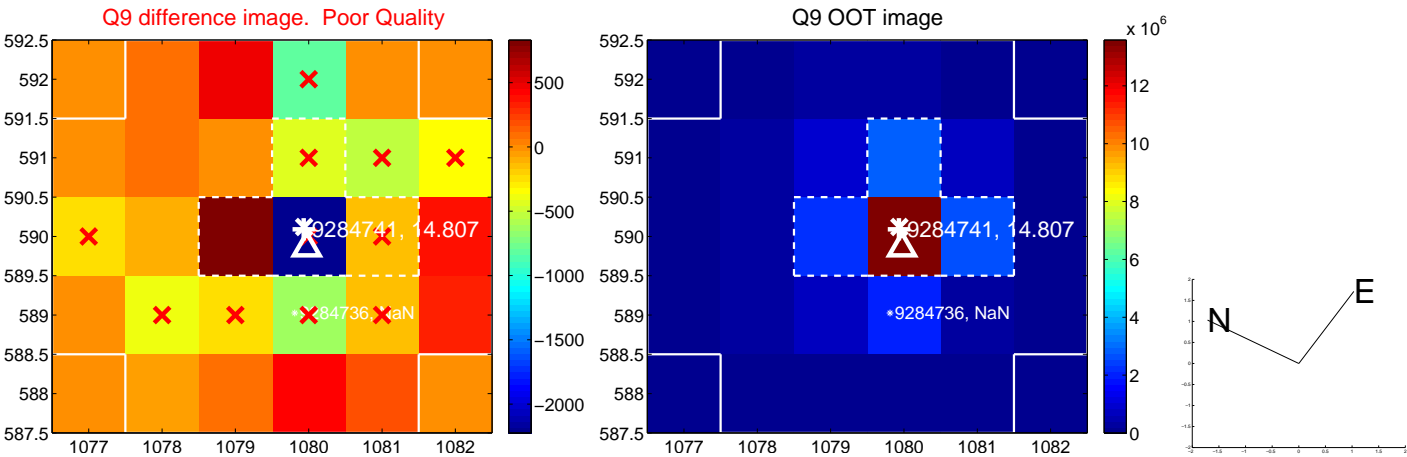


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

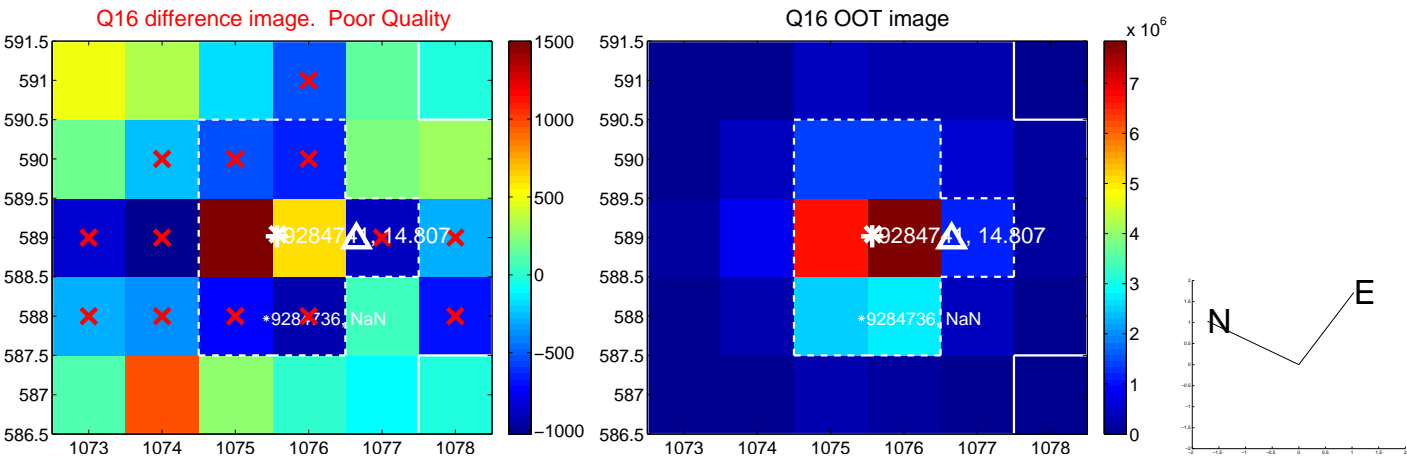
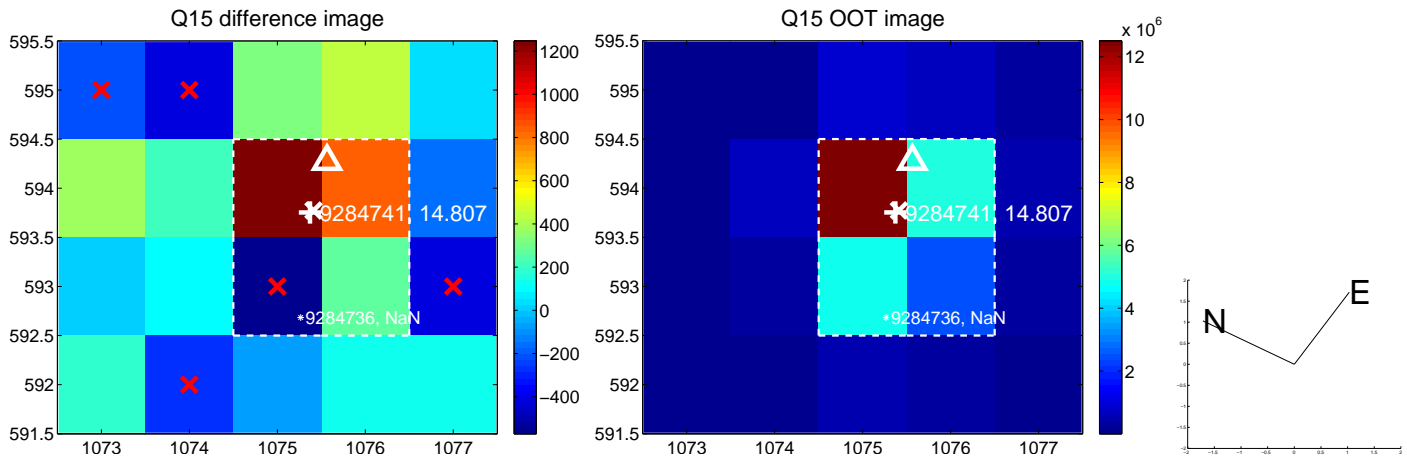
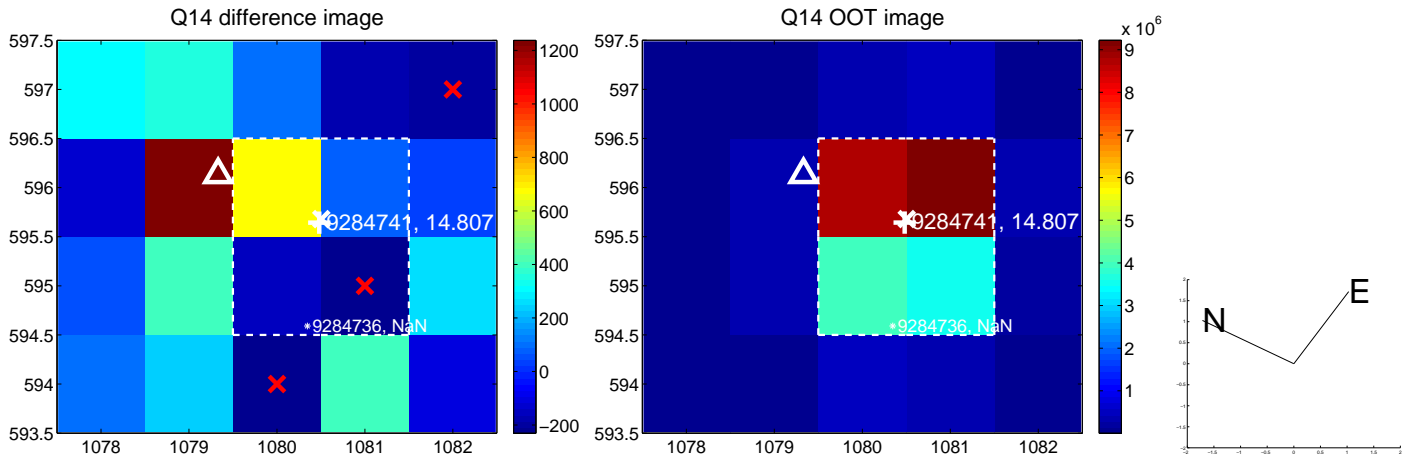
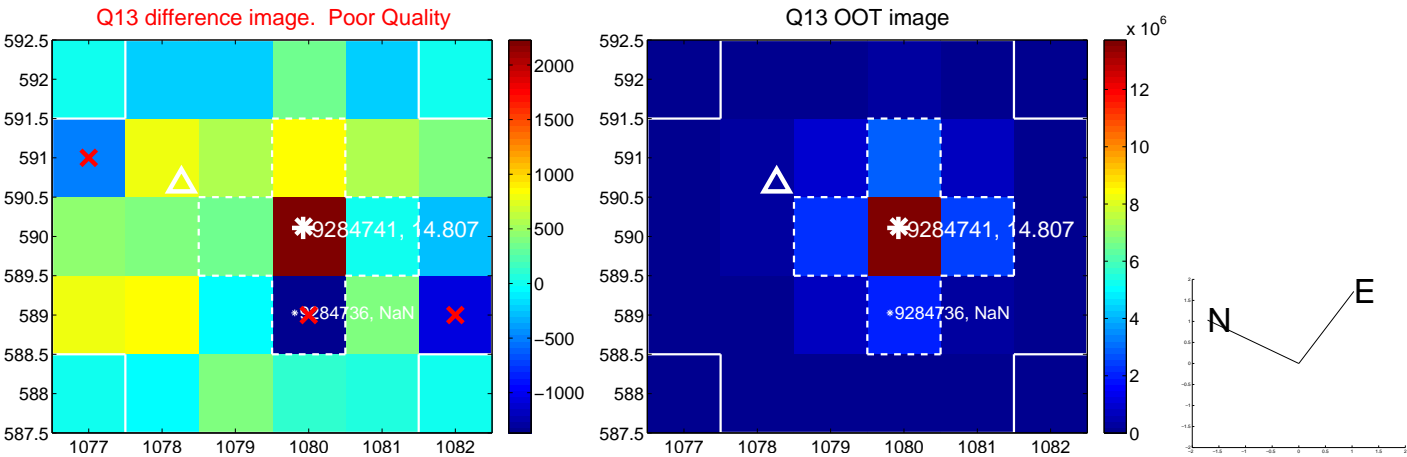




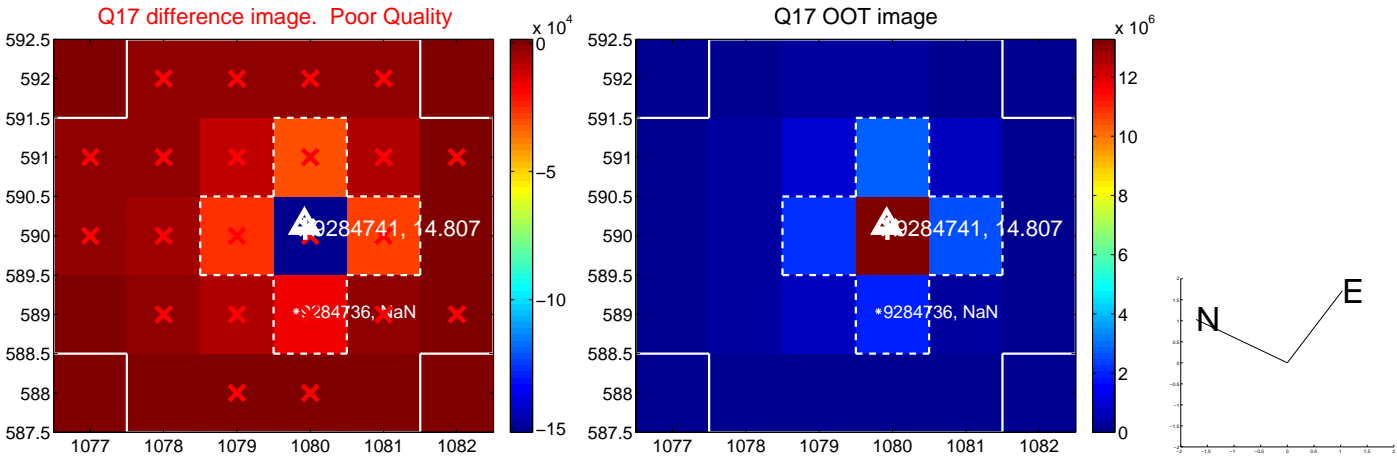
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

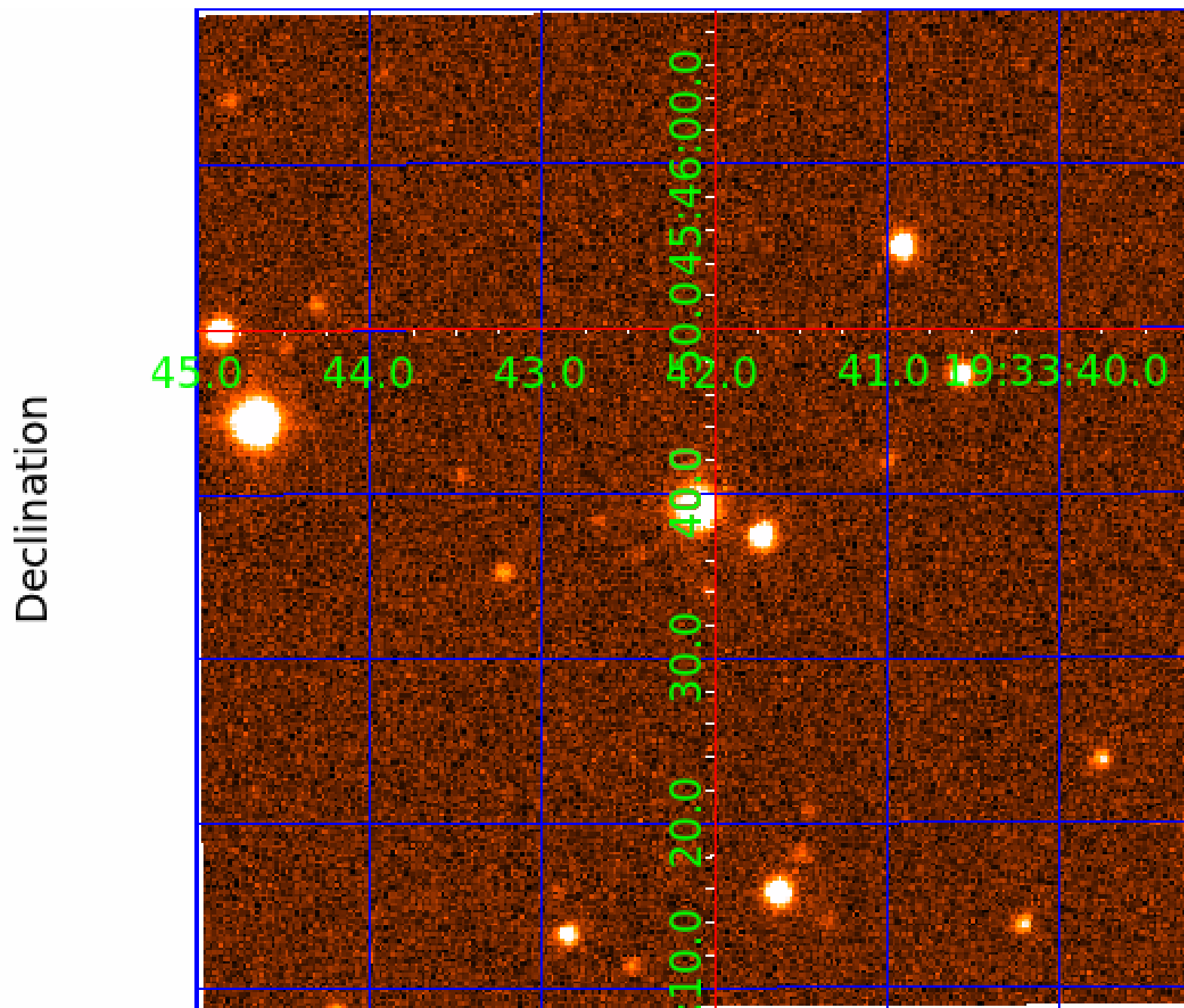


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



folded centroid time series figure for this object.

UKIRT Image



# KIC 009284741

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009284741-01	OBS	7153.01	20.729491	134.545377	346074.0	5.000	12529.0	-1.0	0.80	5256	43.24	24.52
009284741-02	OBS	No	20.729093	141.232029	356992.9	3.000	10905.5	-1.0	0.80	5256	43.76	24.52
009284741-03	OBS	No	10.365191	140.540206	0.8	8.170	892.9	0.0	0.80	5256	0.12	61.78
009284741-04	OBS	No	10.364570	141.455326	18208.8	15.000	852.4	-1.0	0.80	5256	10.61	61.79
009284741-05	OBS	No	20.731308	136.462727	2953.5	12.500	101.0	-1.0	0.80	5256	4.27	24.52

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009284741-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_ALT—MOD_ODDEVEN_ALT—HAS_SEC_TCE—CENT_NOFITS
009284741-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE—CENT_NOFITS
009284741-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—SAME_NTL_PERIOD—CENT_FEW_DIFFS
009284741-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—LPP_DV—LPP_ALT—MOD_TER_ALT—MOD_POS_ALT—SAME_NTL_PERIOD—CENT_NOFITS
009284741-05	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_POS_ALT—SAME_NTL_PERIOD—CENT_NOFITS

**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 009284741-04

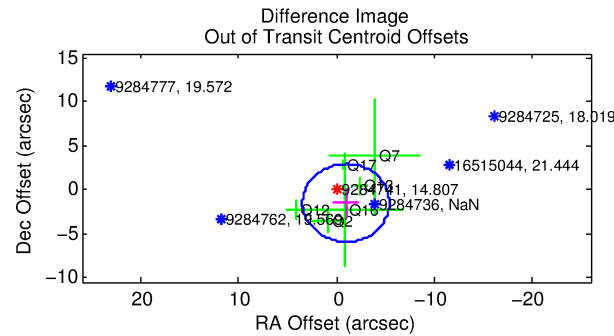
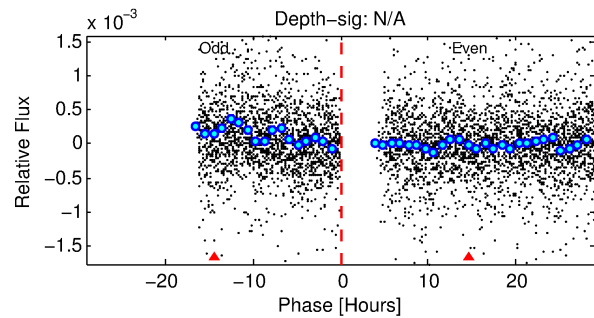
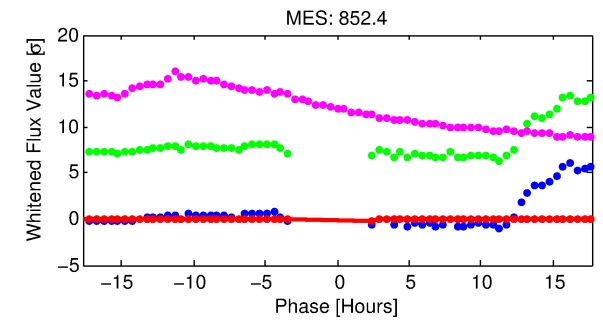
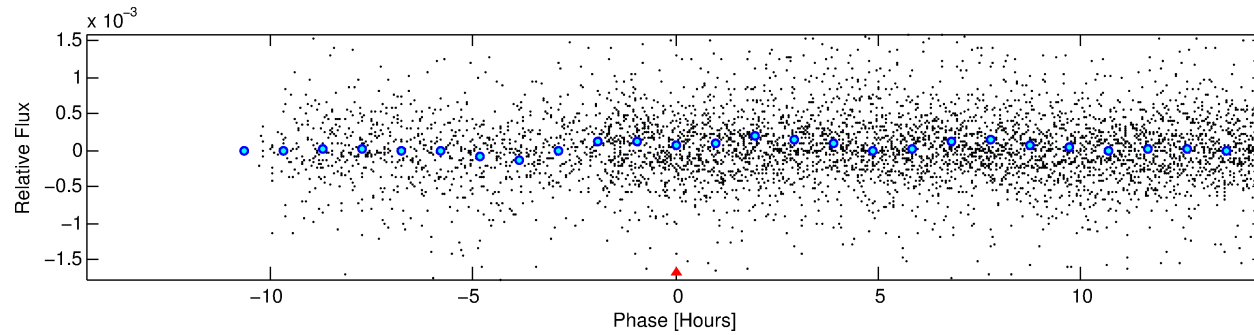
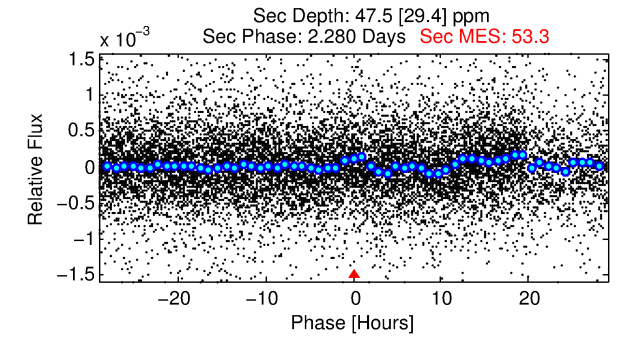
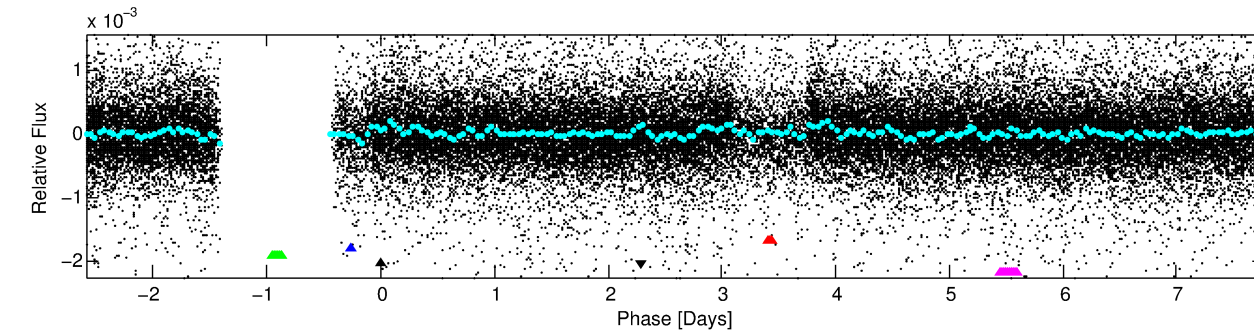
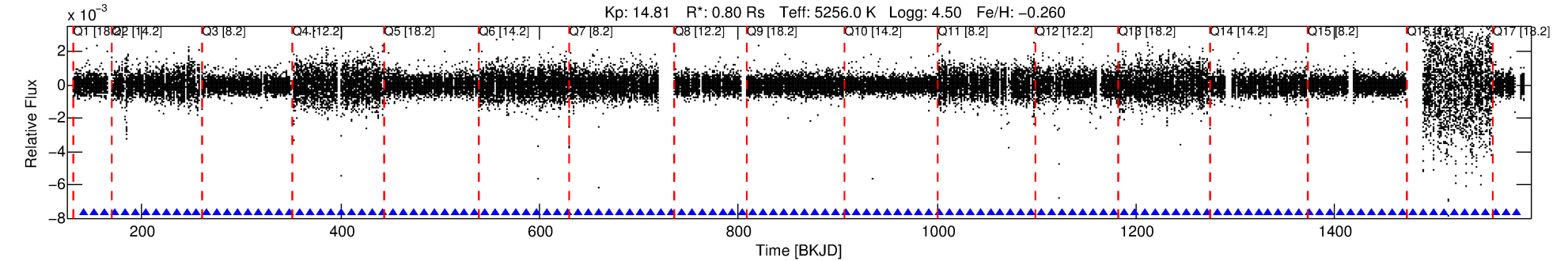
No Significant Match Found

# DV One-Page Summary

KIC: 9284741 Candidate: 4 of 5 Period: 10.365 d

KOI: K07153 Corr: No Ephemeris Match

Kp: 14.81 R\*: 0.80 Rs Teff: 5256.0 K Logg: 4.50 Fe/H: -0.260



TPS TCE Results:

Period = 10.36457 d

Epoch = 141.4553 BKJD

DV fit results are unavailable

DV Diagnostic Results:

ShortPeriod-sig: N/A

LongPeriod-sig: 0.1% [0.00σ]

ModelChiSquare2-sig: N/A

ModelChiSquareGof-sig: N/A

Bootstrap-pfa: N/A

RollingBand-fgt: 1.00 [118/118]

GhostDiagnostic-chr: 3.73

Centroid-sig: 26.1%

Centroid-so: 1.062 arcsec [0.92σ]

OotOffset-rm: 1.784 arcsec [1.21σ]

KicOffset-rm: 1.814 arcsec [1.24σ]

OotOffset-st: 1/1/2/2 [6]

KicOffset-st: 1/1/2/2 [6]

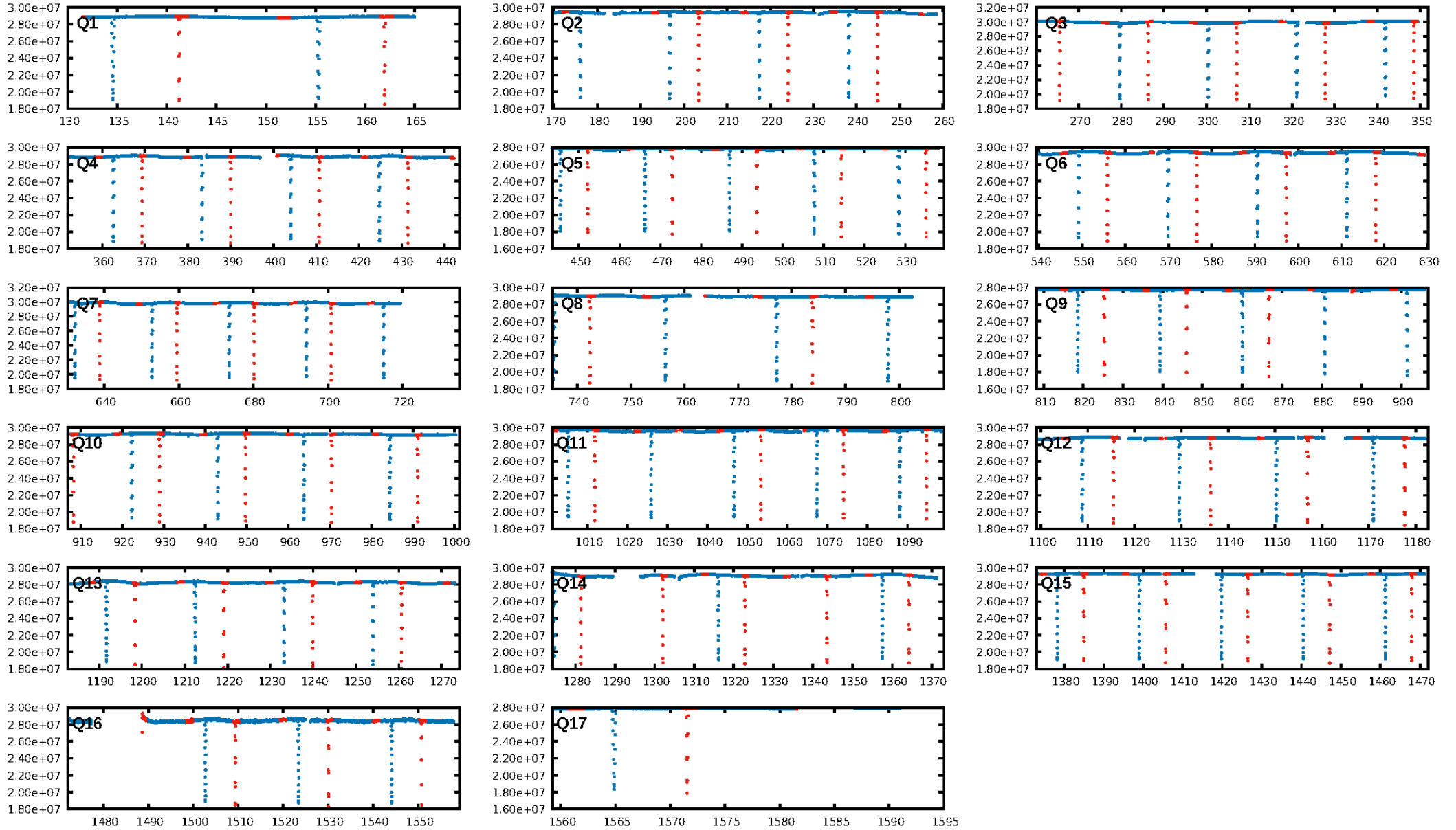
DiffImageQuality-fgm: 0.00 [0/6]

DiffImageOverlap-fno: 1.00 [17/17]

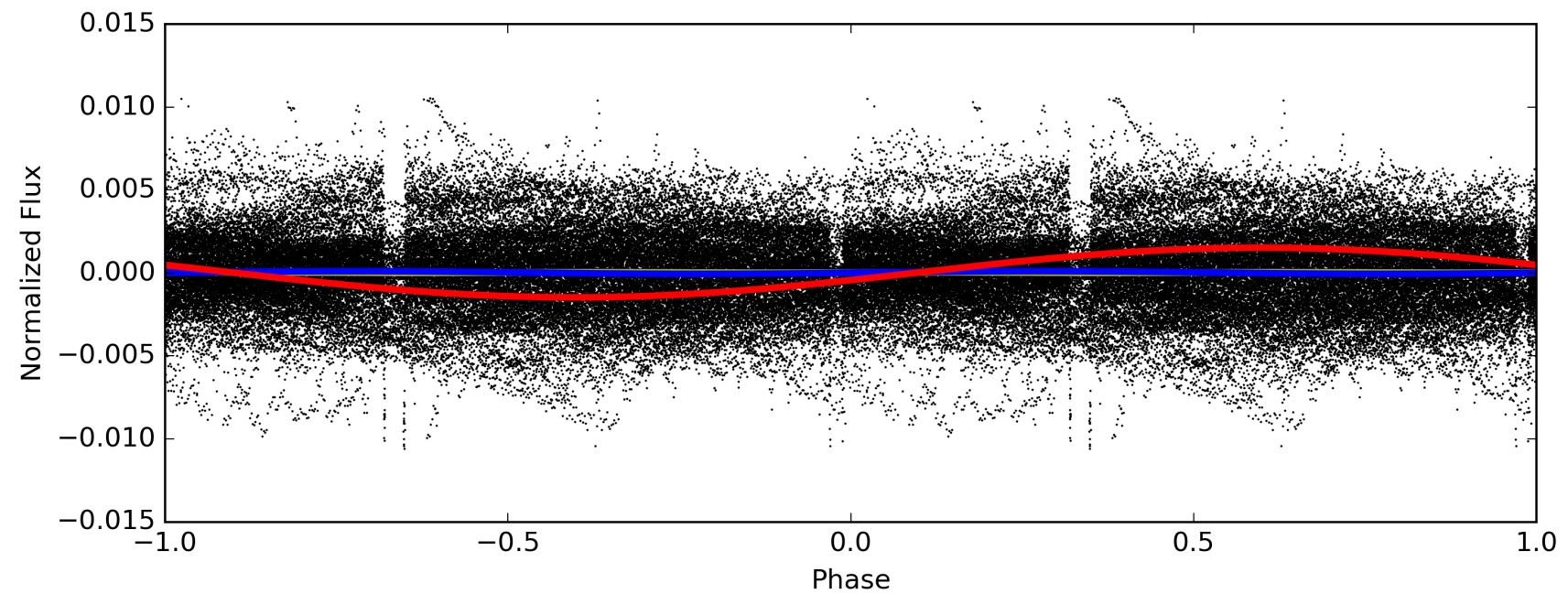
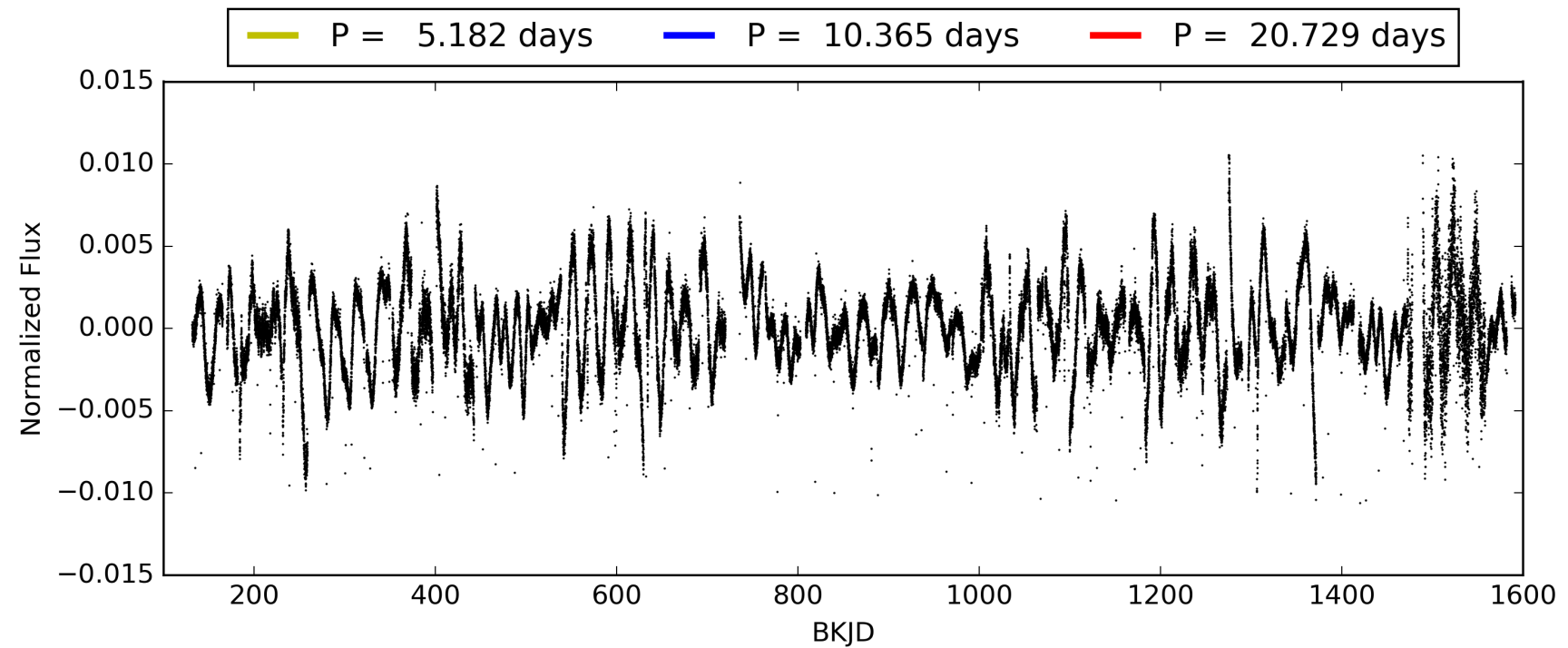
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 22:27:51 Z

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

# TCE 009284741-04, PDC Light Curves



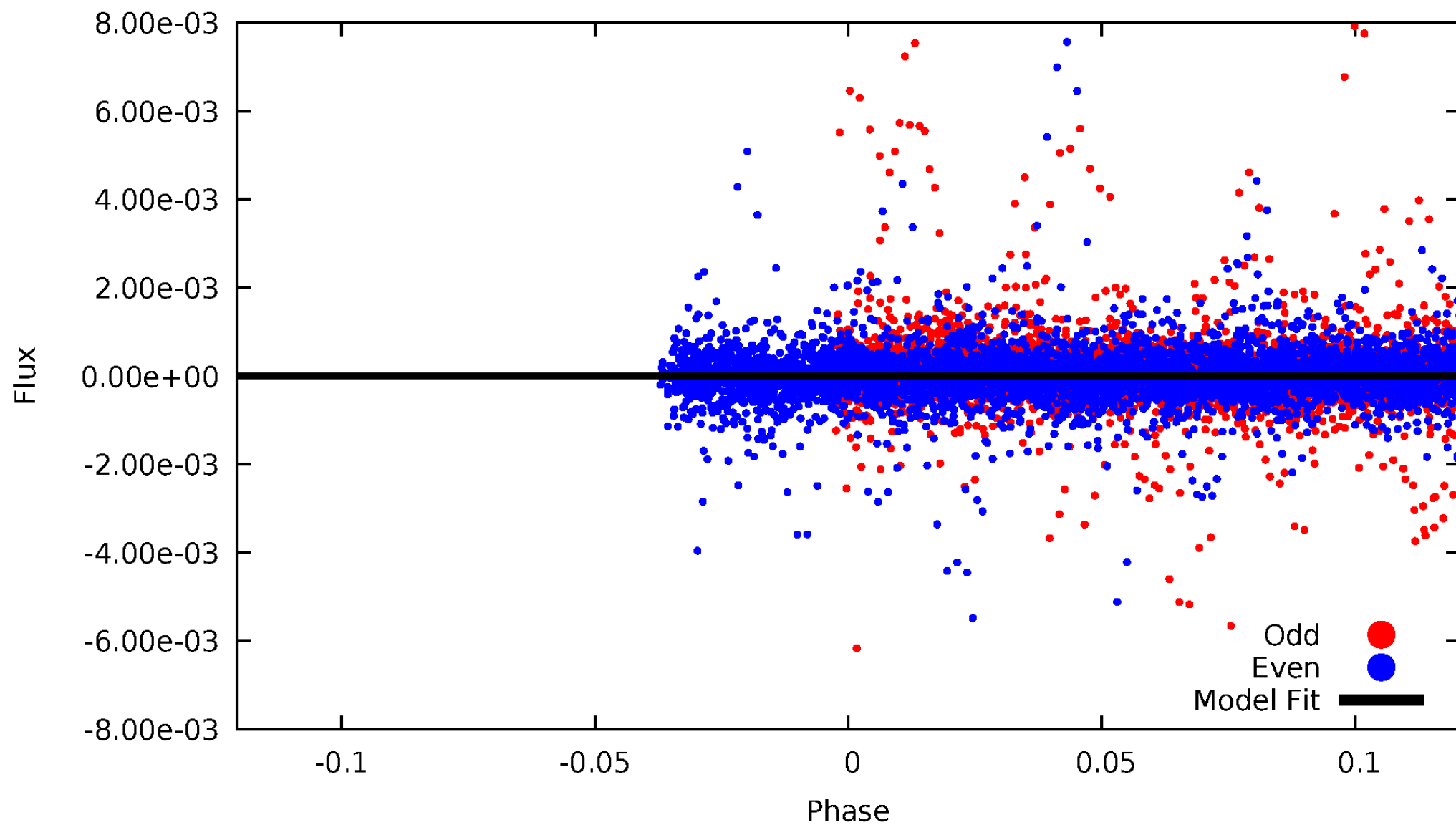
TCE 009284741-04





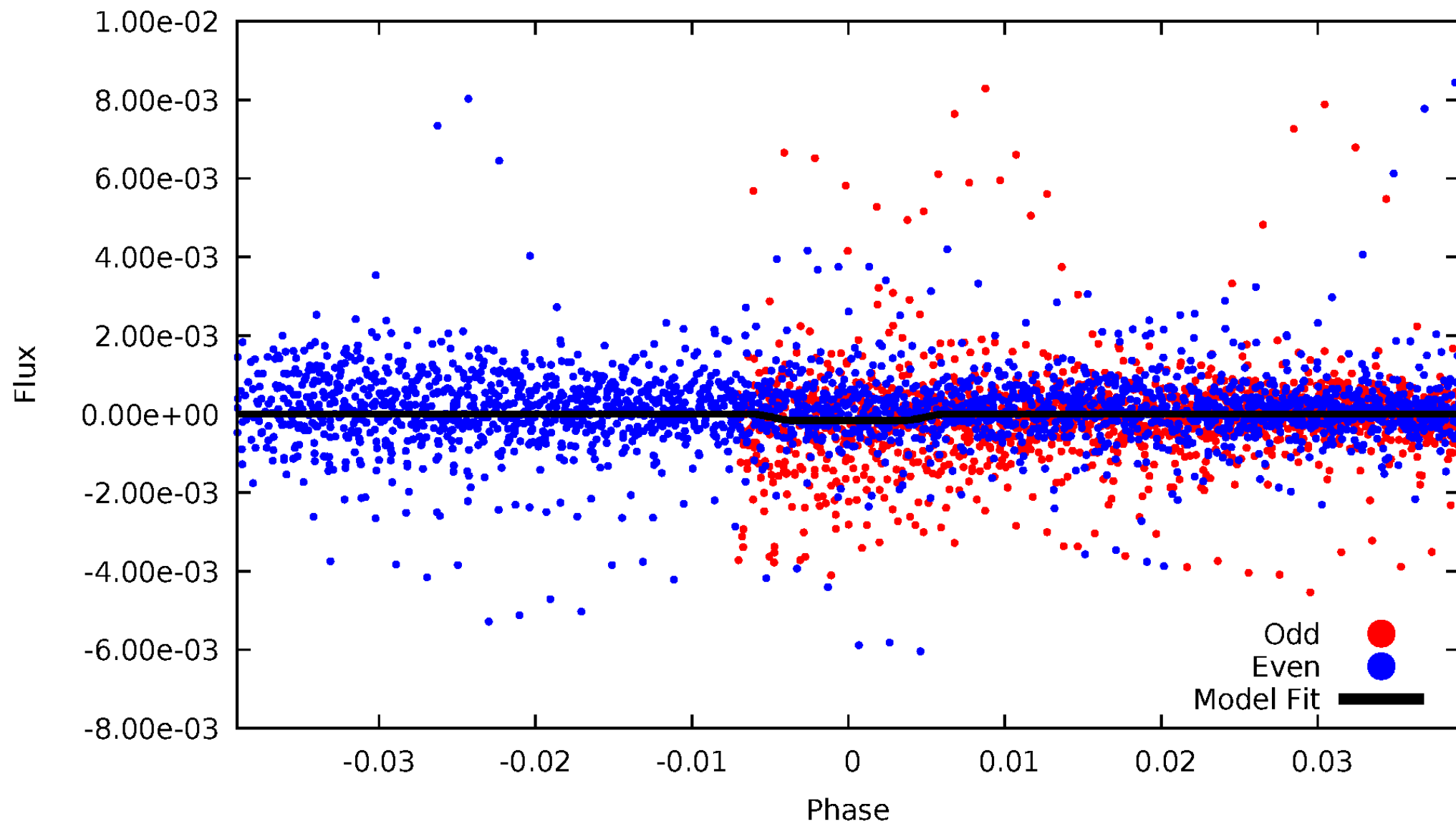
# DV Odd/Even

TCE 009284741-04



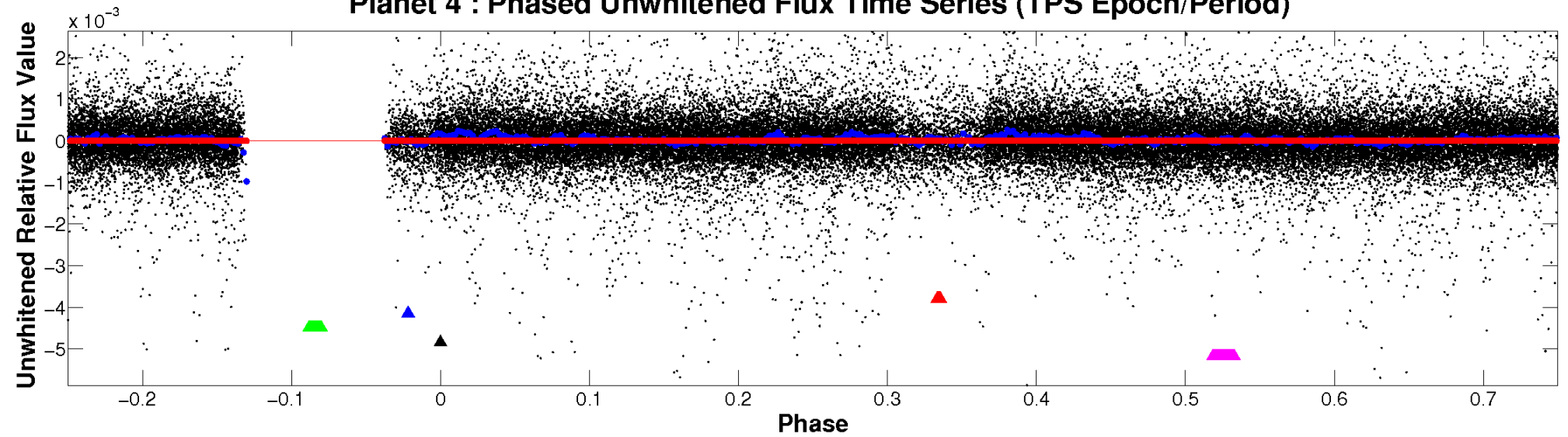
# ALT Odd/Even

TCE 009284741-04



# Non-Whitened Vs. Whitened Light Curve

**Planet 4 : Phased Unwhitened Flux Time Series (TPS Epoch/Period)**

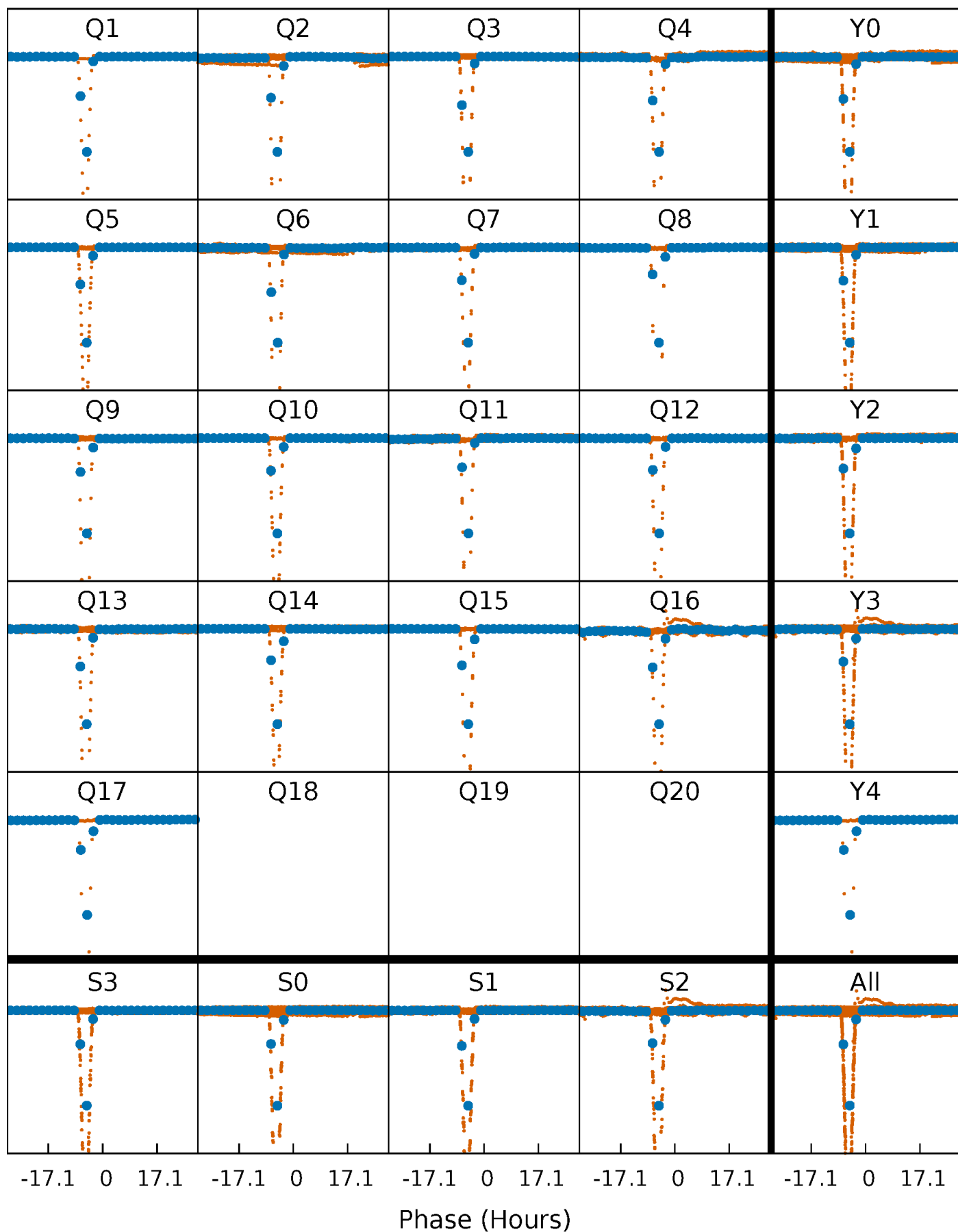


**Planet 4 : Phased Whitened Flux Time Series (TPS Epoch/Period)**



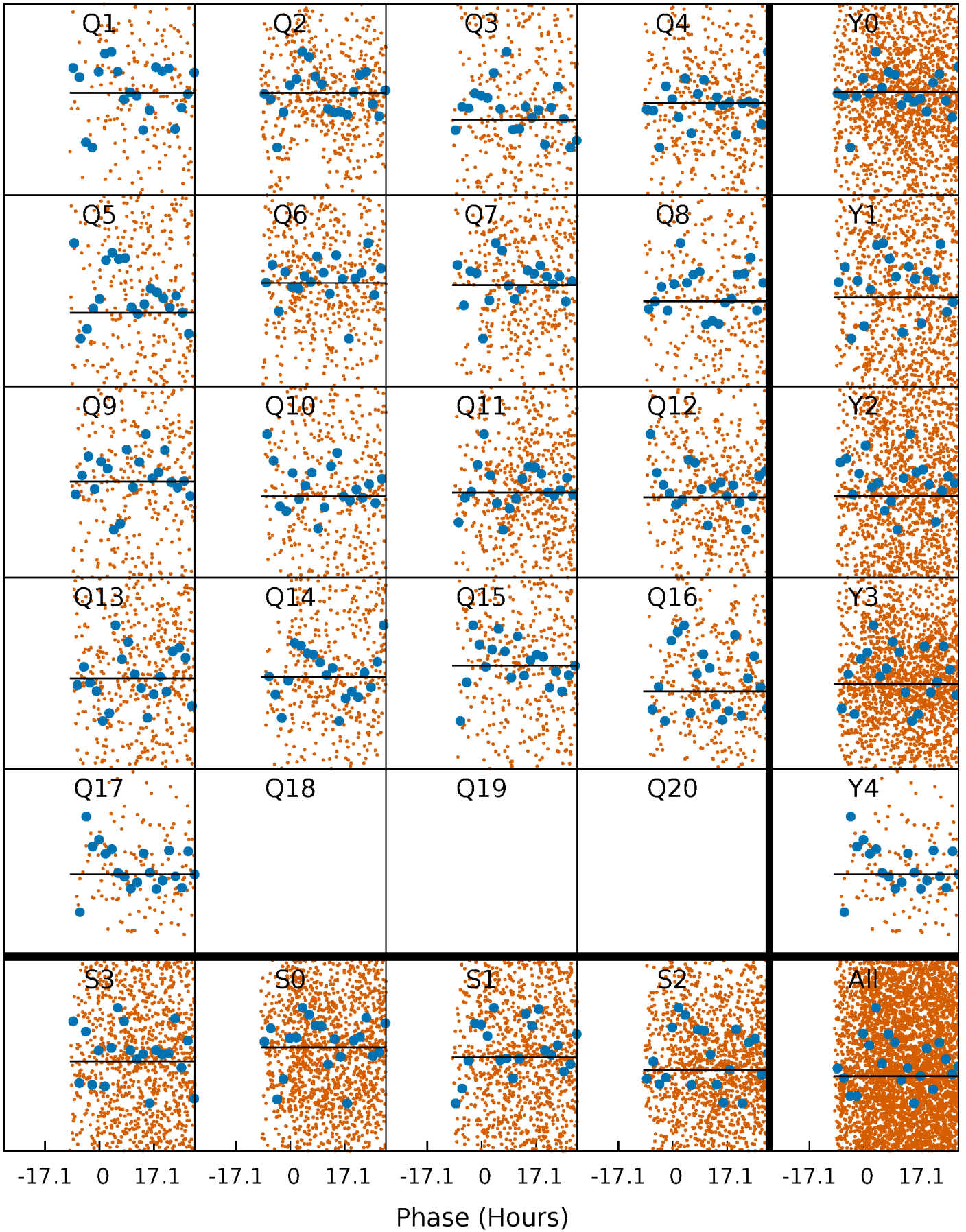
# PDC Quarter-Phased Transit Curves

TCE 009284741-04 P= 10.364570 Days  $T_0=141.455326$  (BKJD)



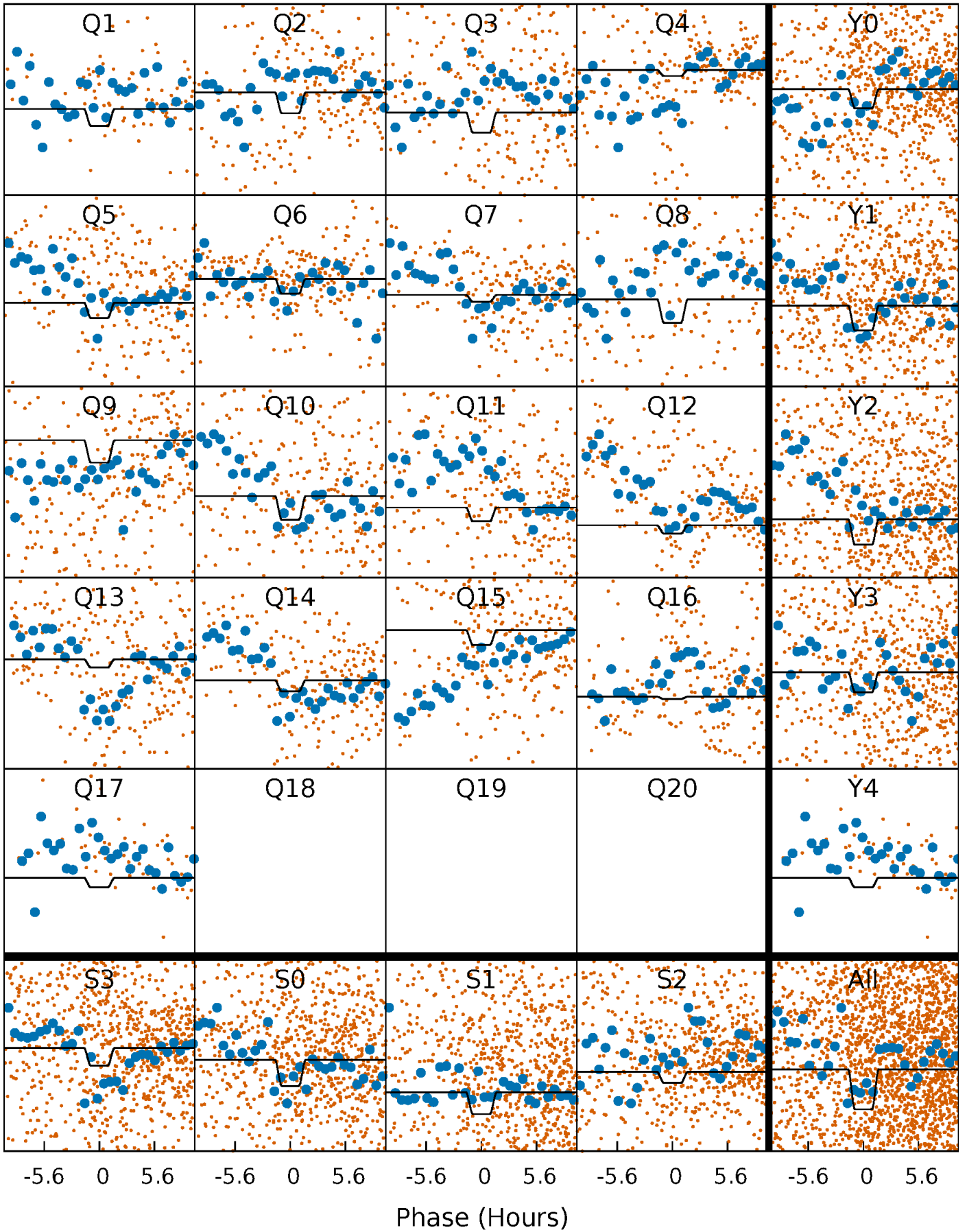
# DV Quarter-Phased Transit Curves

TCE 009284741-04     $P = 10.364570$  Days     $T_0 = 141.455326$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

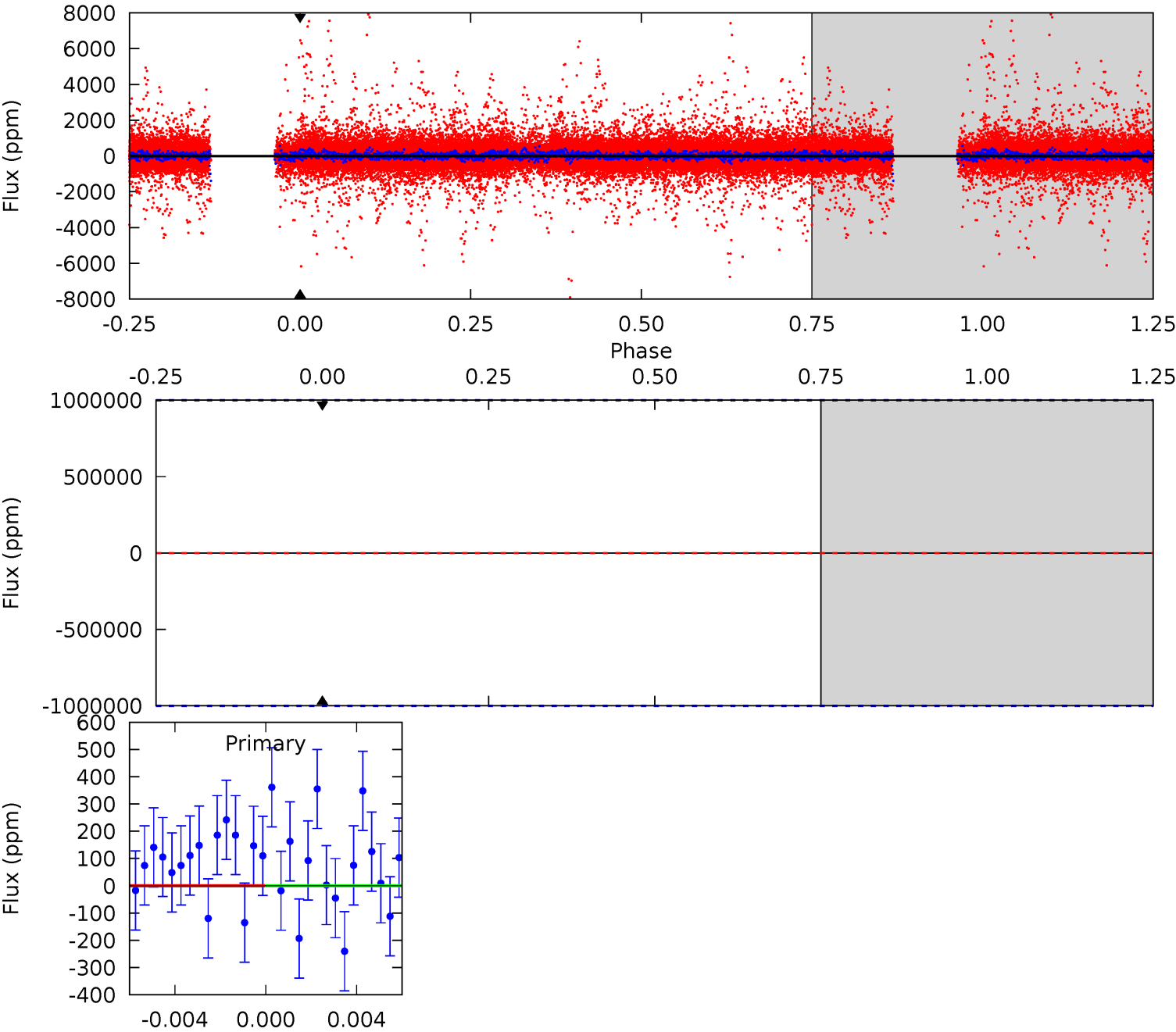
TCE 009284741-04 P= 10.364570 Days  $T_0=141.500756$  (BKJD)



DV Model-Shift Uniqueness Test

009284741-04, P = 10.364570 Days, E = 131.090756 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0

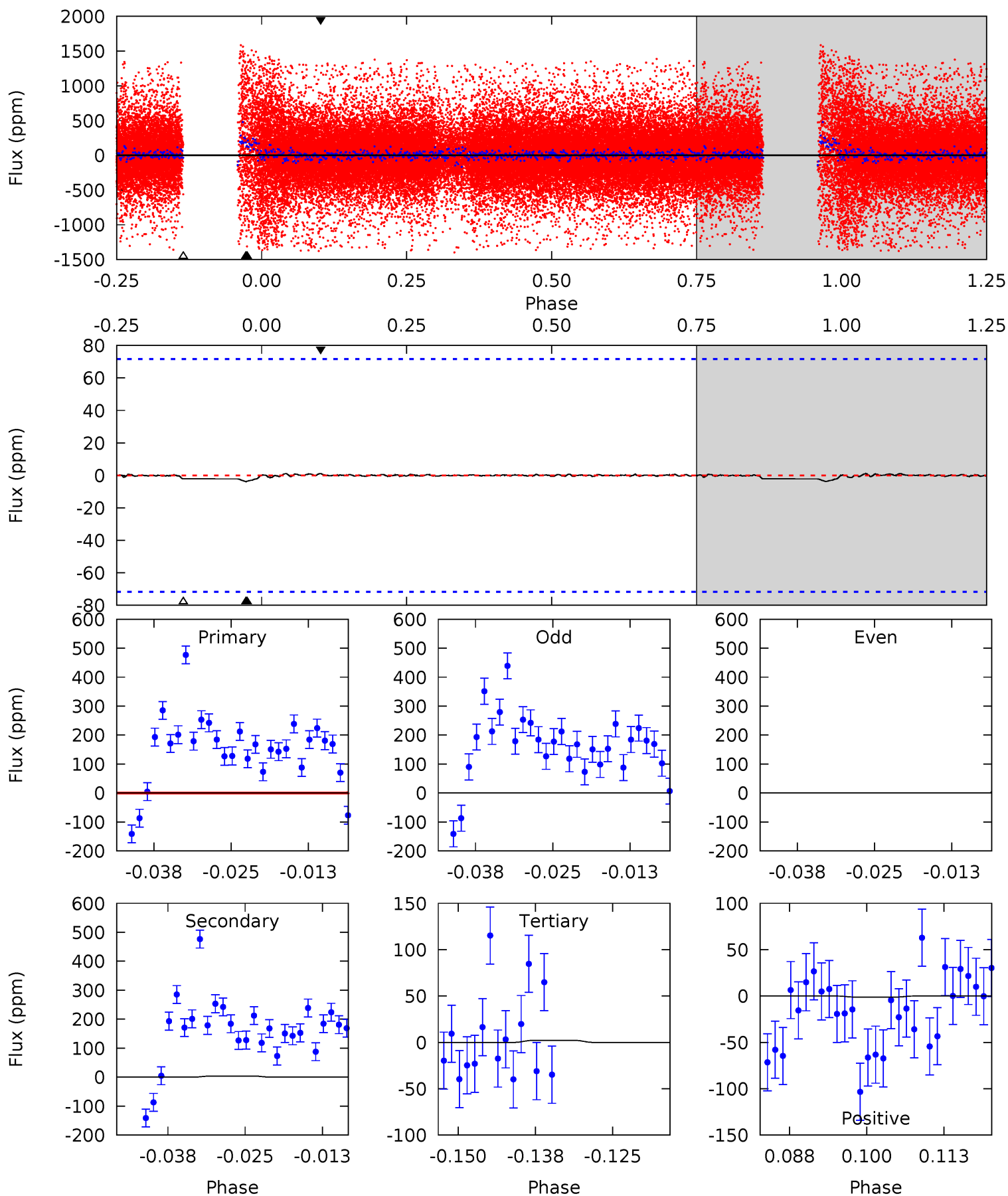




# Alt Model-Shift Uniqueness Test

009284741-04, P = 10.364570 Days, E = 131.136186 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0.25	0.26	0.15	0.08	4.98	2.50	0.03	0.10	0.17	0.11	0.18	4.47	3.93	0.23	0.51





### Stellar Parameters For KIC 009284741

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5256^{+158}_{-142}$	$4.502^{+0.100}_{-0.137}$	$-0.260^{+0.350}_{-0.250}$	$0.802^{+0.120}_{-0.098}$	$0.745^{+0.112}_{-0.052}$	$2.036^{+0.790}_{-0.689}$
	+3%/-3%	+2%/-3%	+135%/-96%	+15%/-12%	+15%/-7%	+39%/-34%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 009284741-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$0 \pm 1000000$	$12.23^{+7.99}_{-7.31}$	$1006^{+52}_{-51}$	$-3344^{+12398}_{-5661}$	$-47.753^{+3885.951}_{-3398.788}$
Alt.	$-4 \pm 14$	$6.62^{+6.82}_{-4.57}$	$1006^{+55}_{-50}$	$-1530^{+4042}_{-602}$	$0.263^{+5.227}_{-1.186}$

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

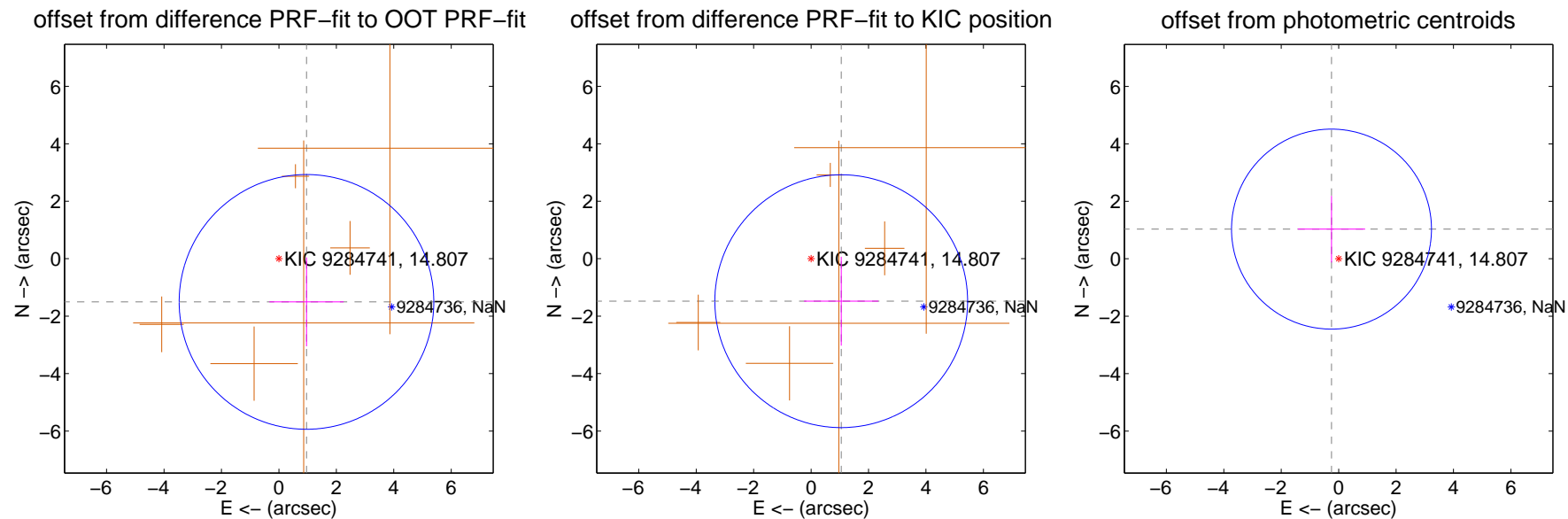
## DV Centroid Data

Supplemental centroid analysis for 009284741-04. Kepler magnitude: 14.81. Transit SNR -1.00

There are 0 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.10 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.784 \pm 1.478$	1.21	$-0.961 \pm 1.293$	$-1.504 \pm 1.547$
PRF-fit source offset from KIC position	$1.814 \pm 1.467$	1.24	$-1.049 \pm 1.293$	$-1.479 \pm 1.547$
photometric centroid source offset	$1.06 \pm 1.16$	0.92	$0.25 \pm 1.17$	$1.03 \pm 1.16$

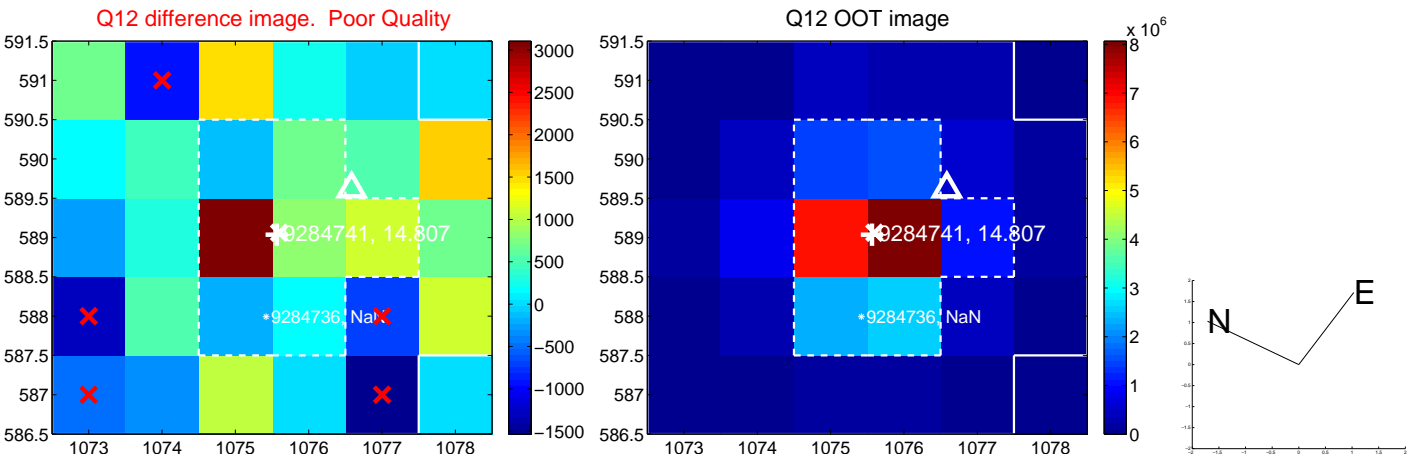
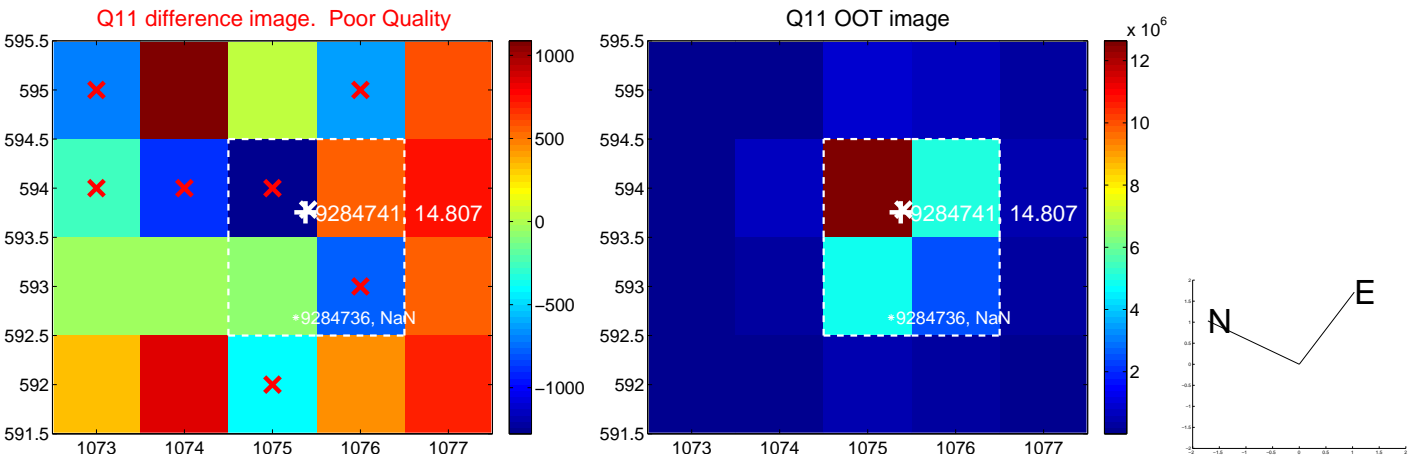
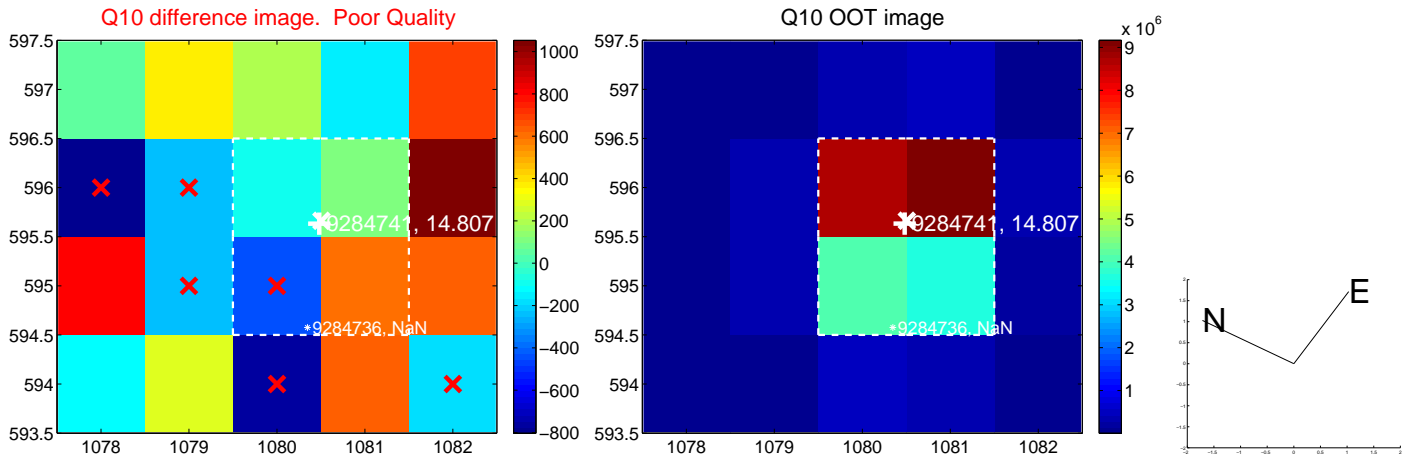
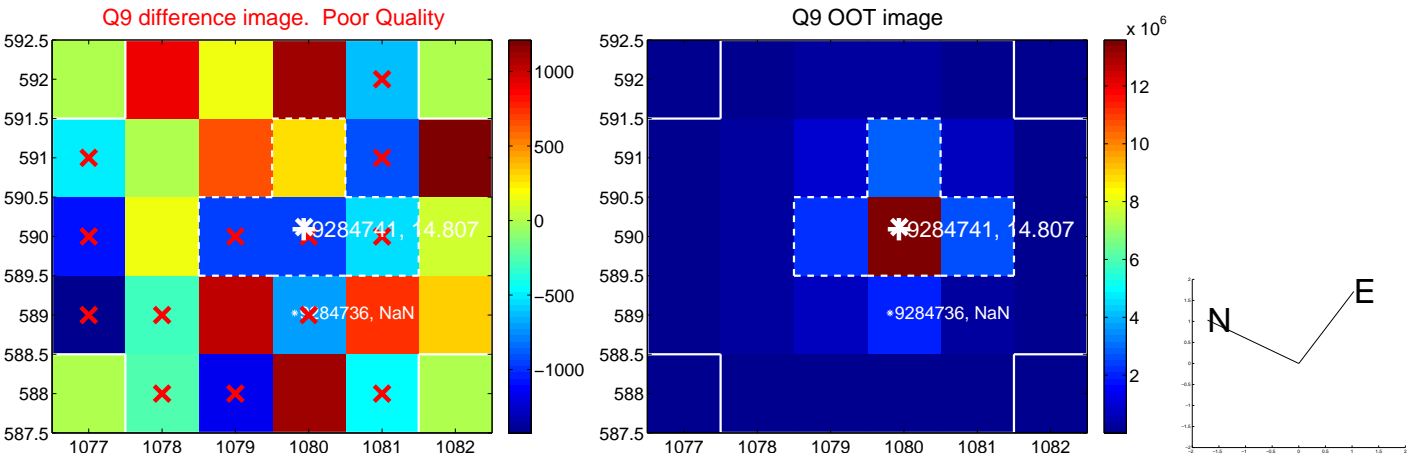


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

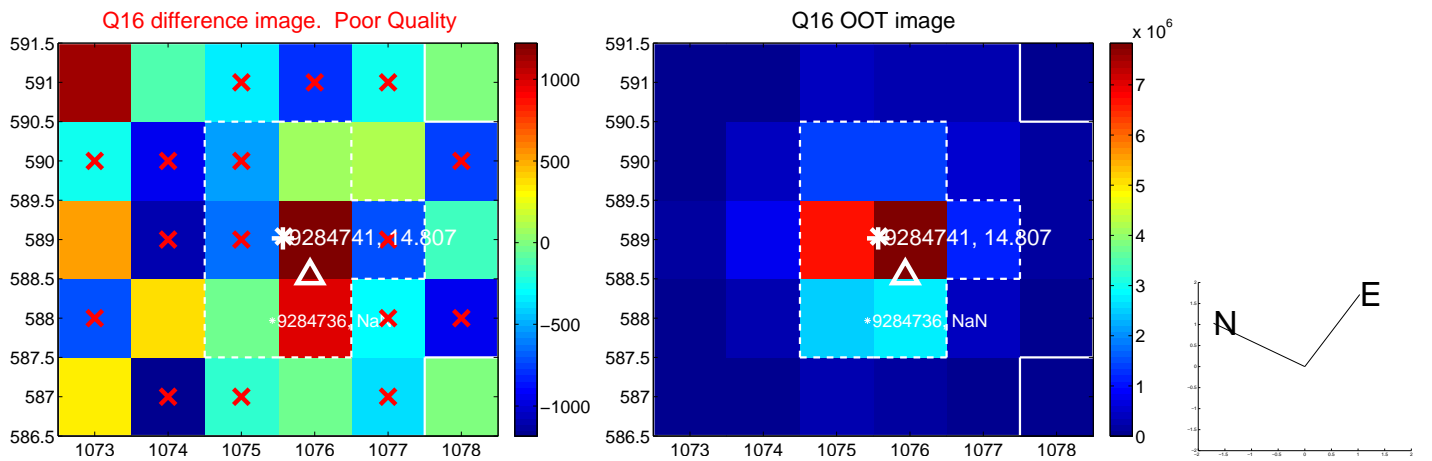
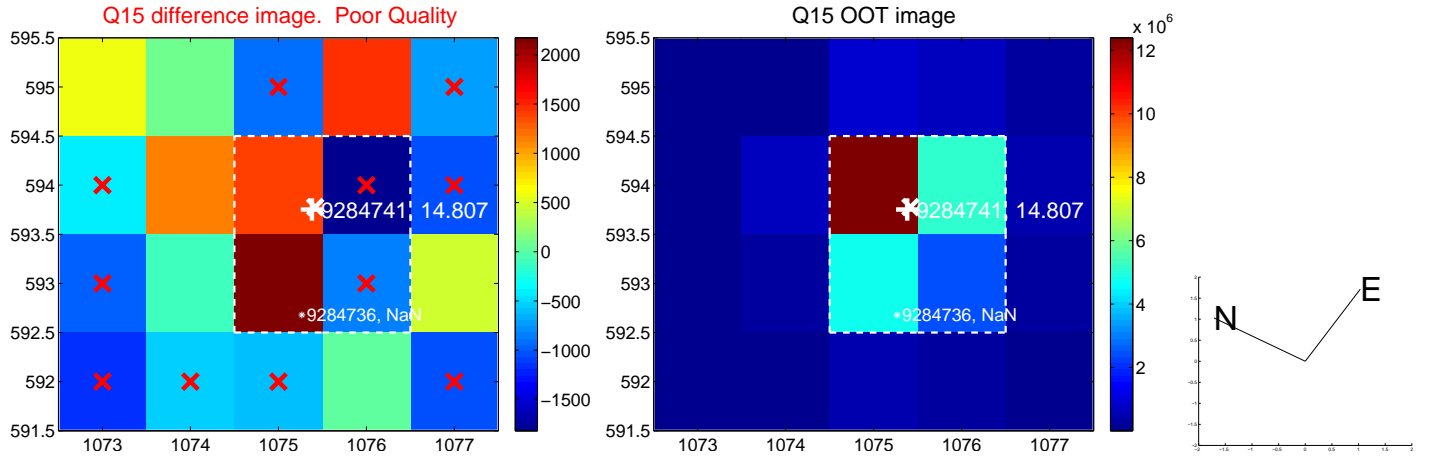
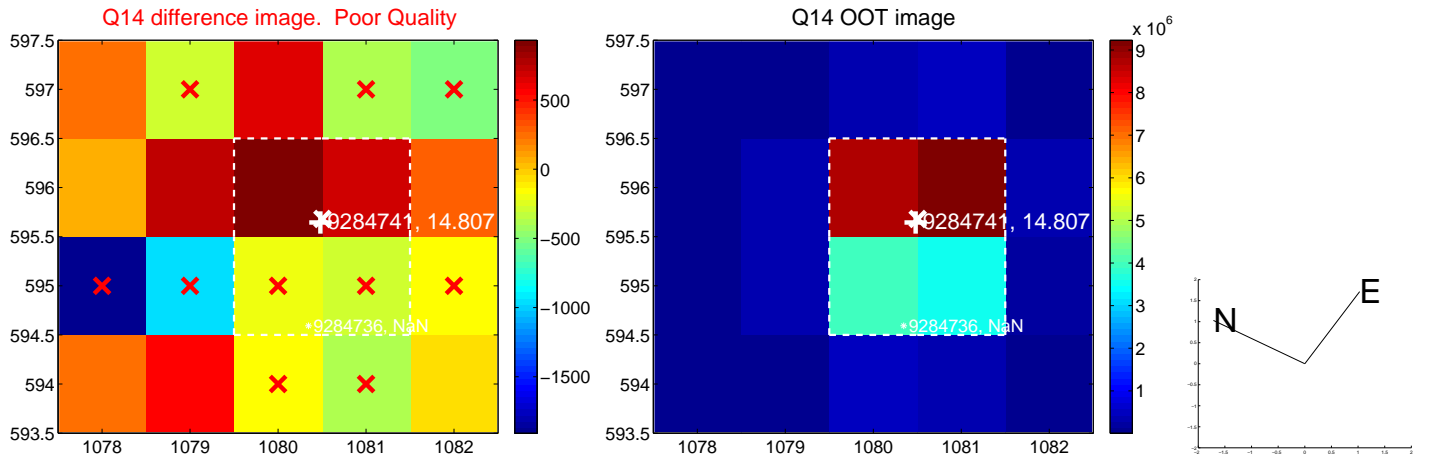
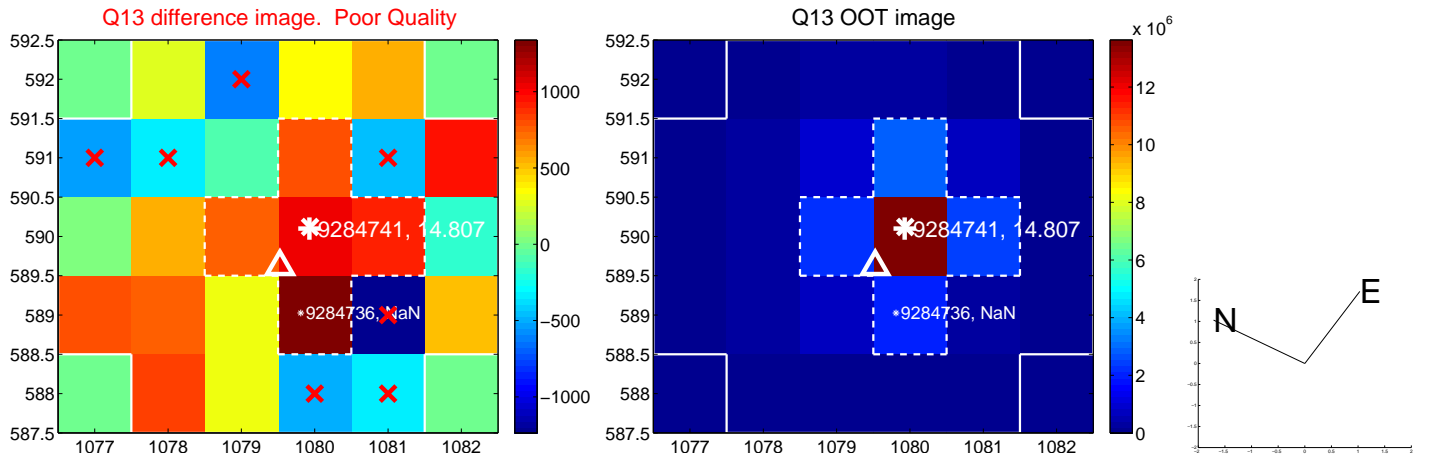




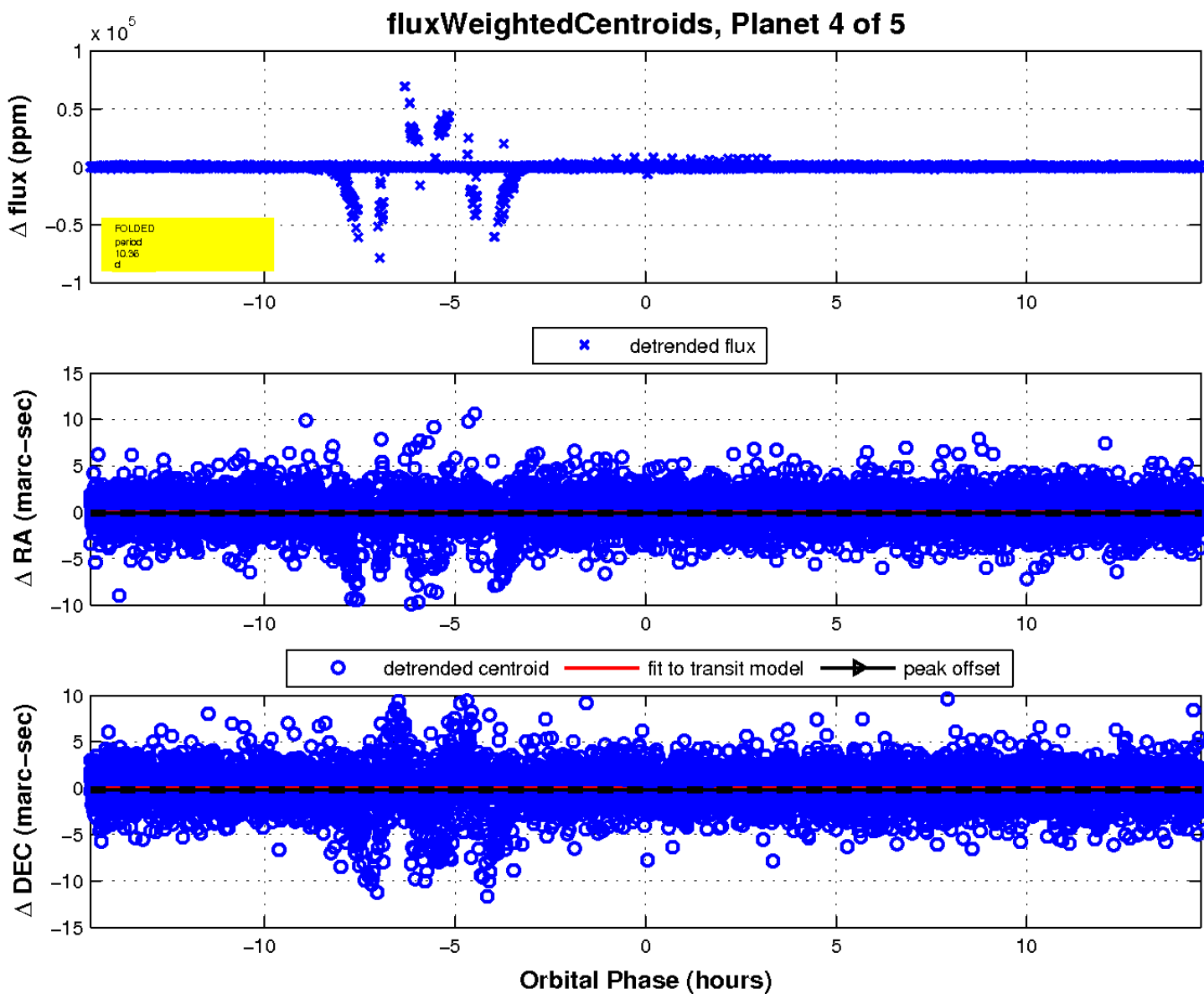
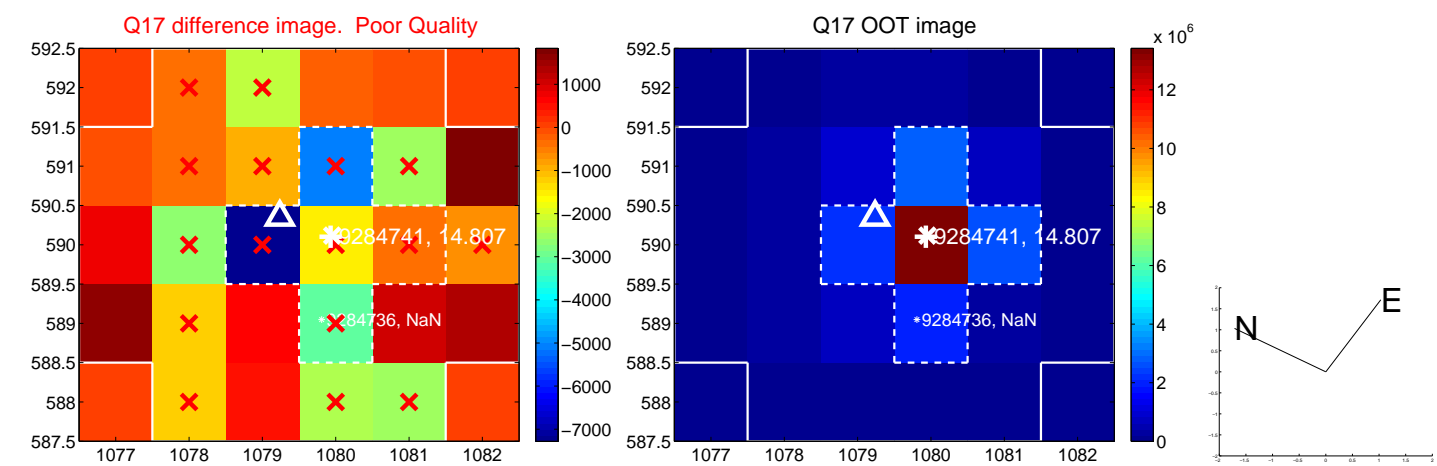
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



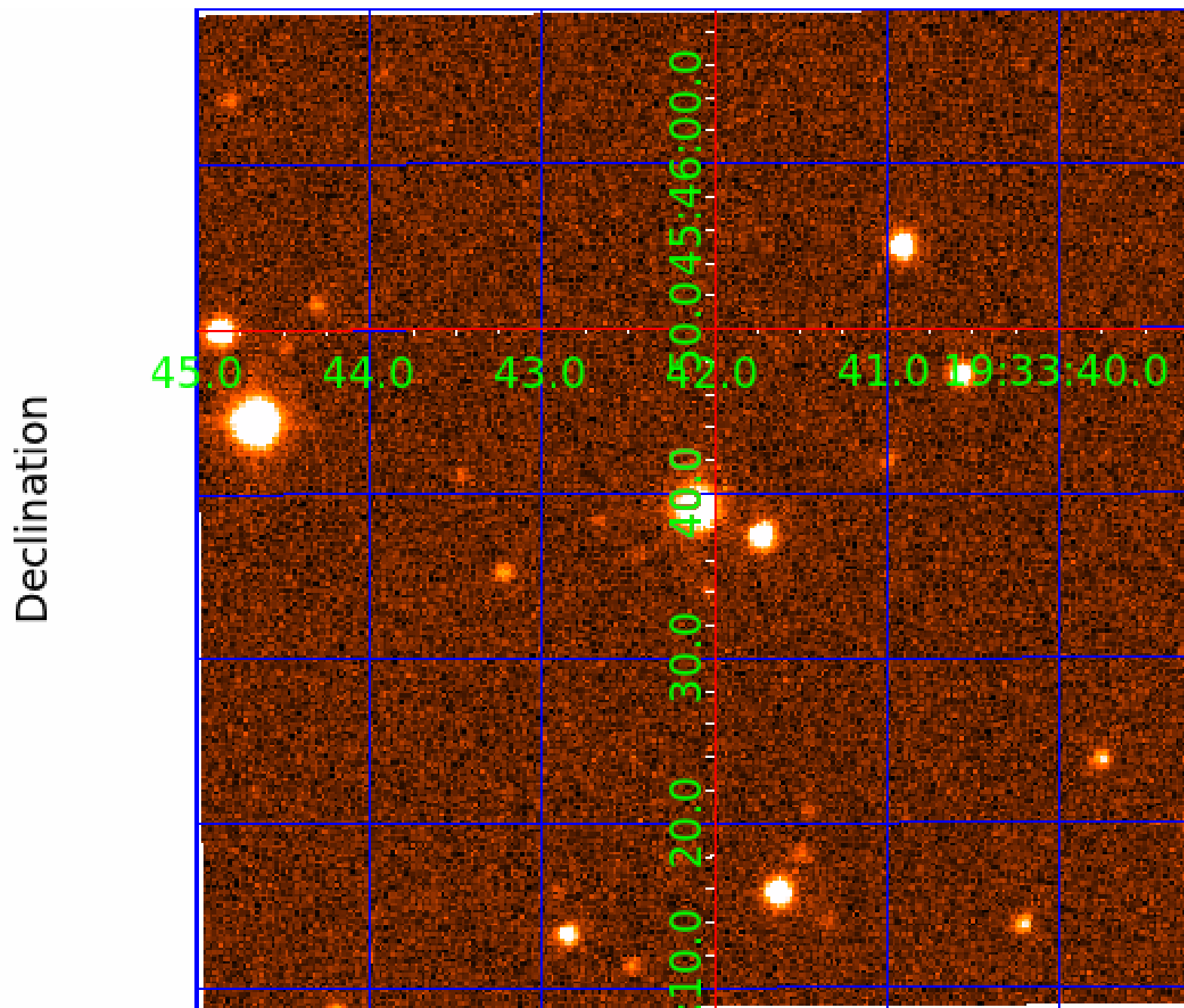
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image





# KIC 009284741

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009284741-01	OBS	7153.01	20.729491	134.545377	346074.0	5.000	12529.0	-1.0	0.80	5256	43.24	24.52
009284741-02	OBS	No	20.729093	141.232029	356992.9	3.000	10905.5	-1.0	0.80	5256	43.76	24.52
009284741-03	OBS	No	10.365191	140.540206	0.8	8.170	892.9	0.0	0.80	5256	0.12	61.78
009284741-04	OBS	No	10.364570	141.455326	18208.8	15.000	852.4	-1.0	0.80	5256	10.61	61.79
009284741-05	OBS	No	20.731308	136.462727	2953.5	12.500	101.0	-1.0	0.80	5256	4.27	24.52

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009284741-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_ALT—MOD_ODDEVEN_ALT—HAS_SEC_TCE—CENT_NOFITS
009284741-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE—CENT_NOFITS
009284741-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—SAME_NTL_PERIOD—CENT_FEW_DIFFS
009284741-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—LPP_DV—LPP_ALT—MOD_TER_ALT—MOD_POS_ALT—SAME_NTL_PERIOD—CENT_NOFITS
009284741-05	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_POS_ALT—SAME_NTL_PERIOD—CENT_NOFITS

**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 009284741-05

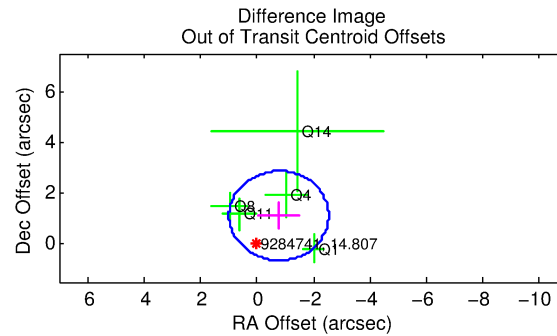
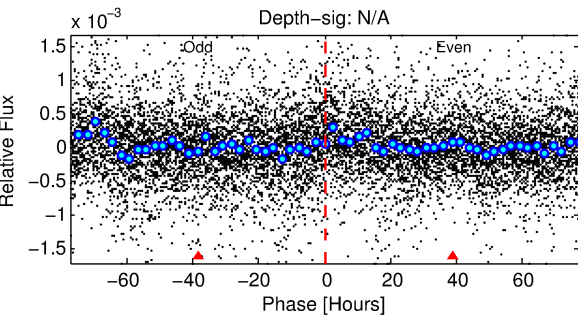
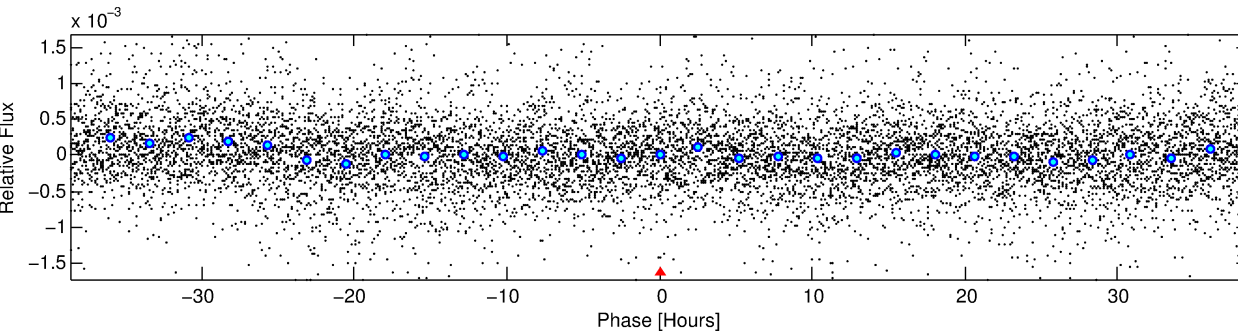
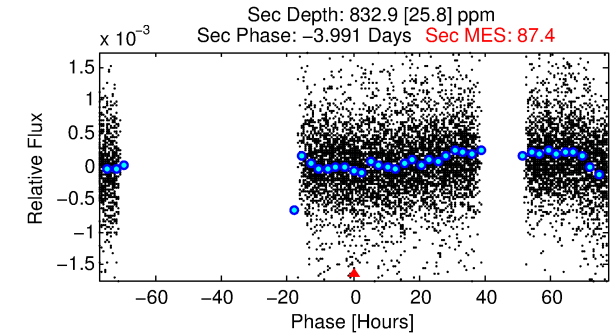
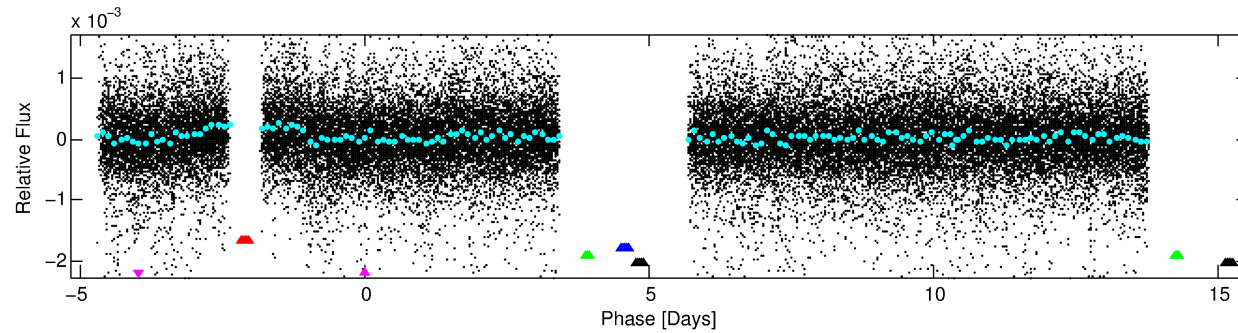
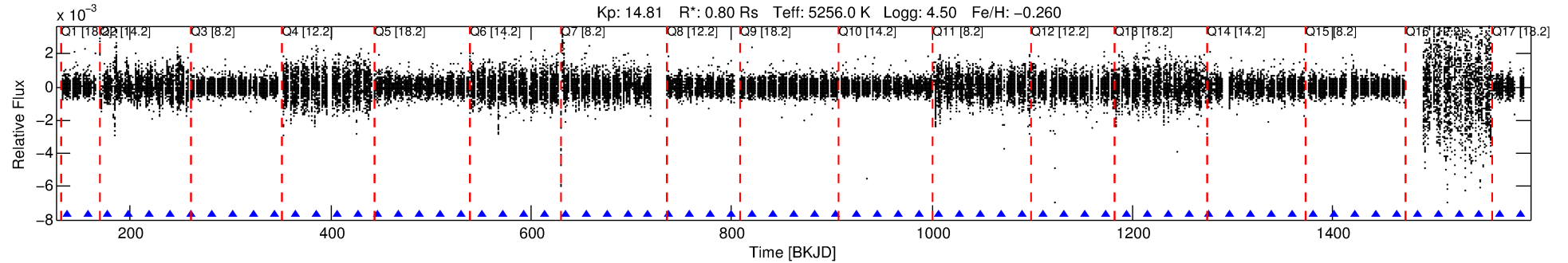
No Significant Match Found

# DV One-Page Summary

KIC: 9284741 Candidate: 5 of 5 Period: 20.731 d

KOI: K07153 Corr: No Ephemeris Match

Kp: 14.81 R\*: 0.80 Rs Teff: 5256.0 K Logg: 4.50 Fe/H: -0.260



TPS TCE Results:

Period = 20.73131 d  
Epoch = 136.4627 BKJD

DV fit results are unavailable

DV Diagnostic Results:

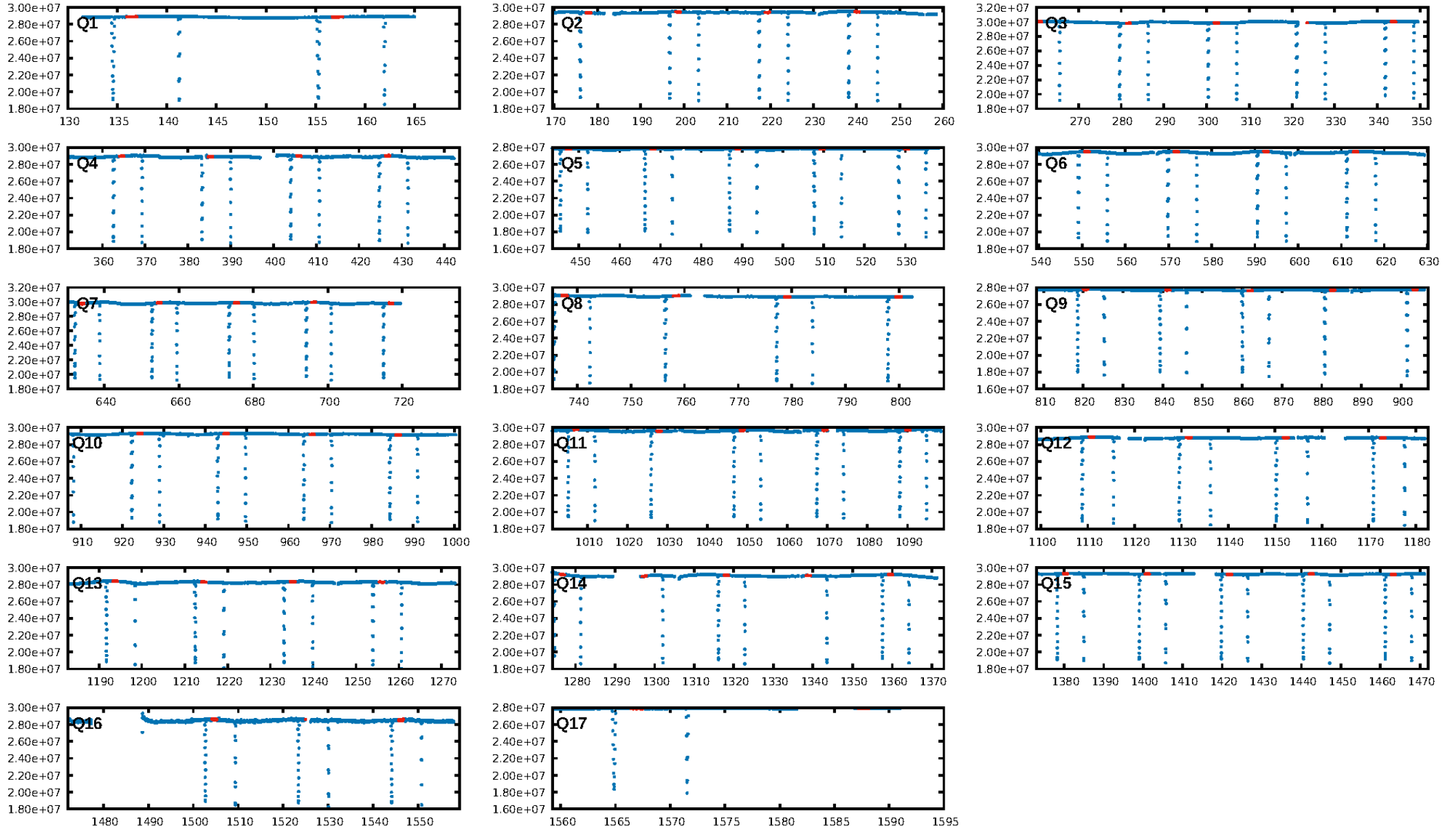
ShortPeriod-sig: 0.3% [0.00σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [64/64]  
GhostDiagnostic-chr: -0.358

Centroid-sig: 53.7%  
Centroid-so: 2.798 arcsec [0.63σ]  
OotOffset-rm: 1.354 arcsec [2.31σ]  
KicOffset-rm: 1.448 arcsec [2.40σ]  
OotOffset-st: 1/1/2/1 [5]  
KicOffset-st: 1/1/2/1 [5]  
DiffImageQuality-fgm: 0.00 [0/5]  
DiffImageOverlap-fno: 1.00 [16/16]

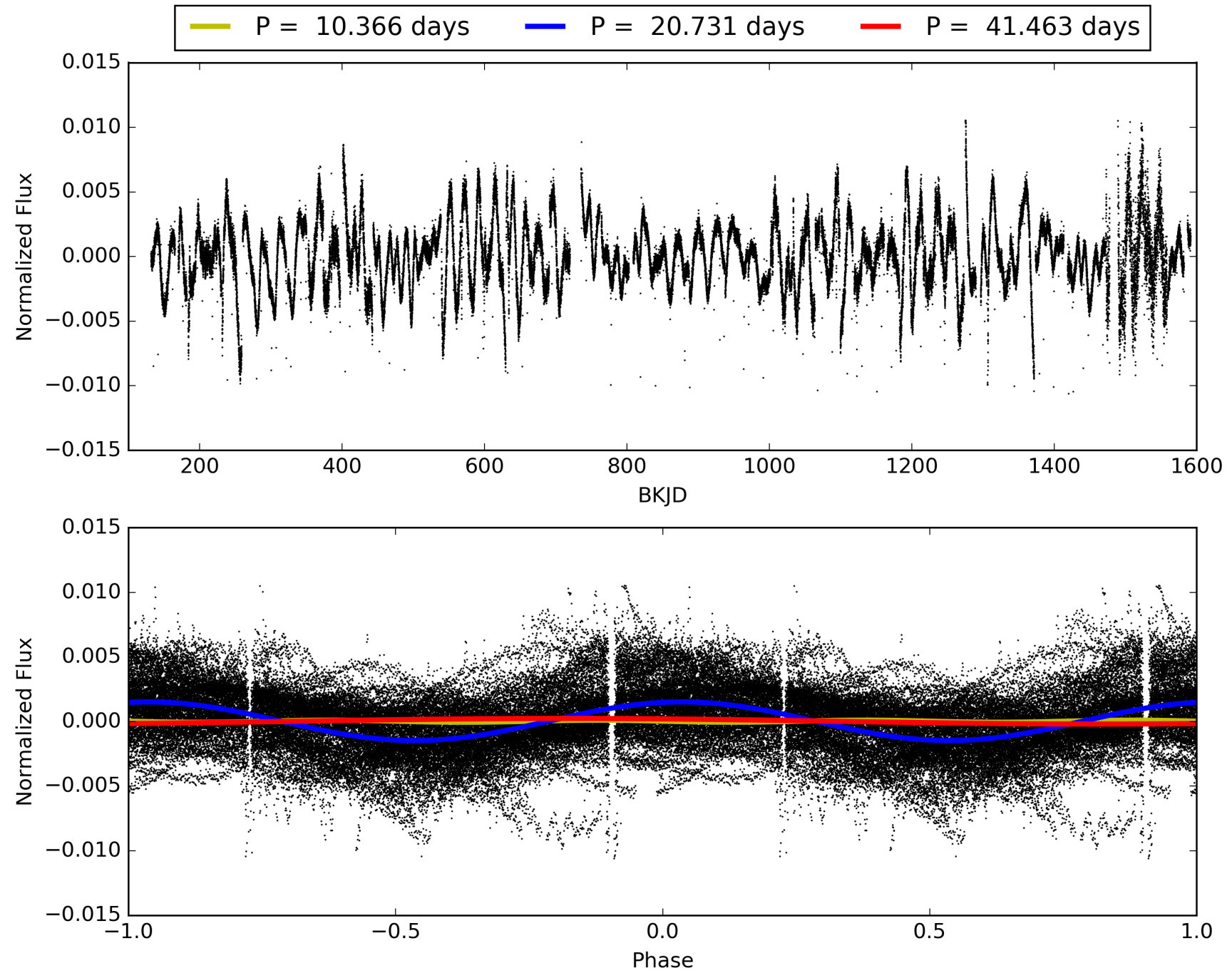
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 22:27:58 Z

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

# TCE 009284741-05, PDC Light Curves

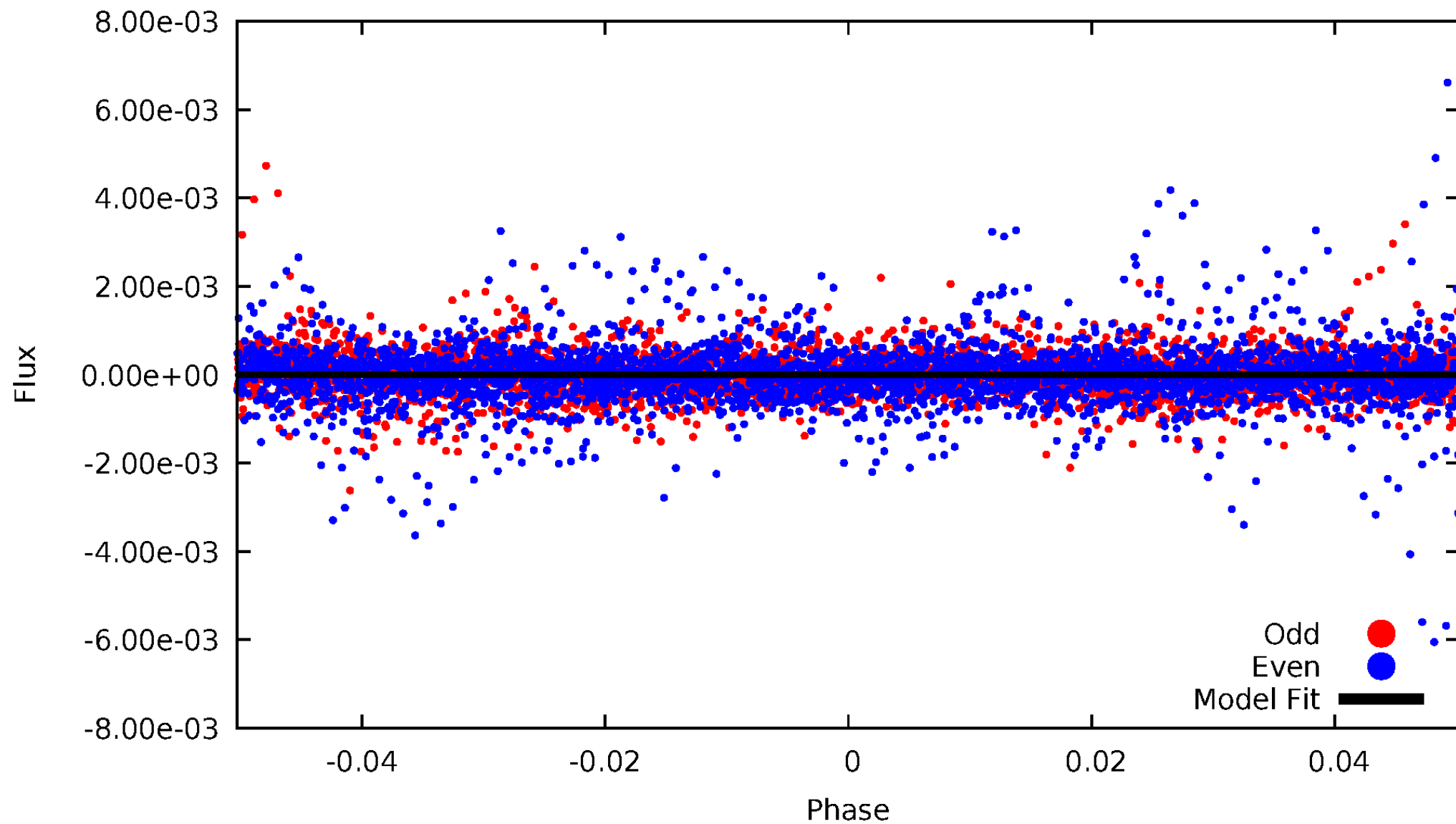


TCE 009284741-05



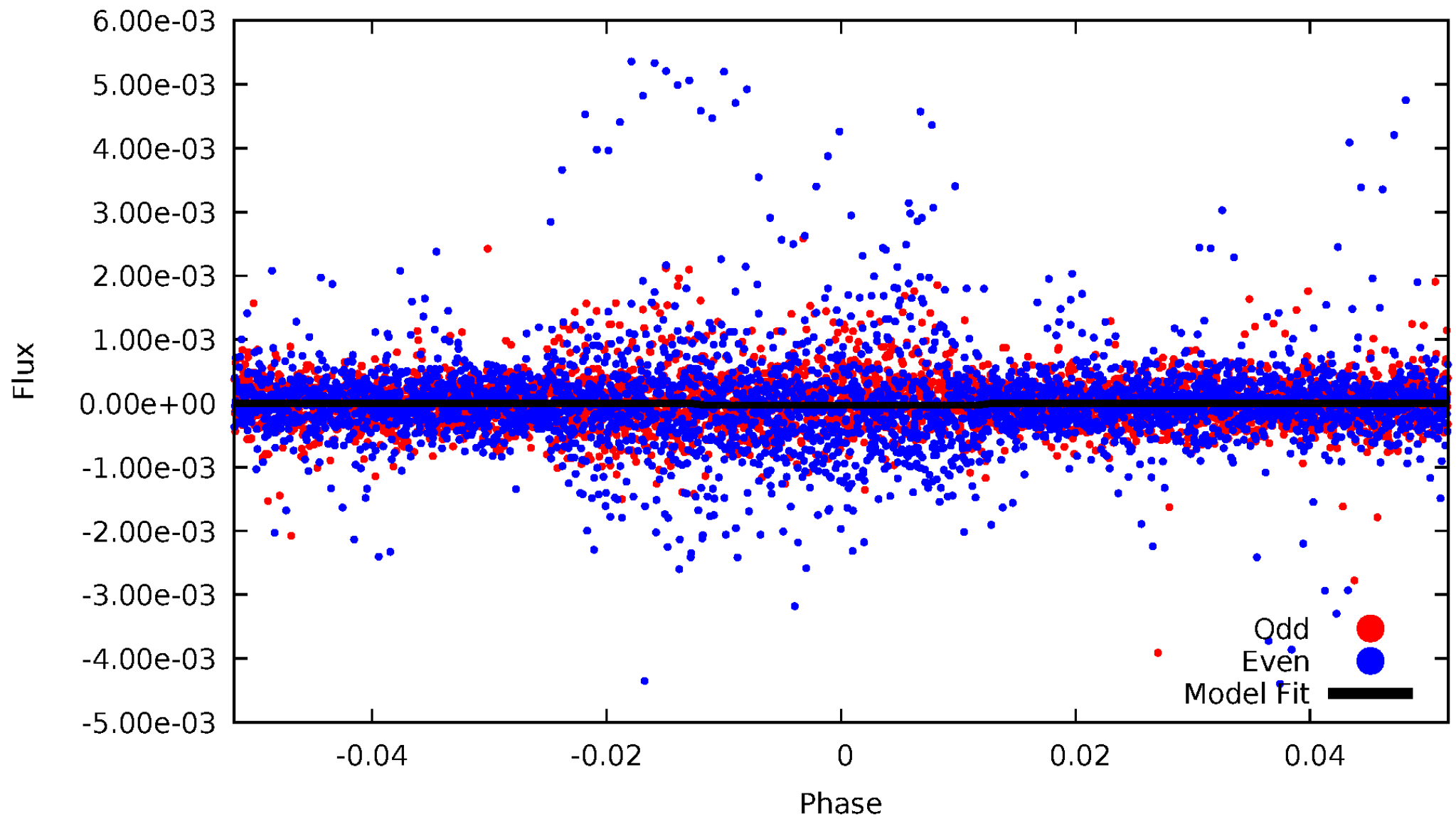
# DV Odd/Even

TCE 009284741-05



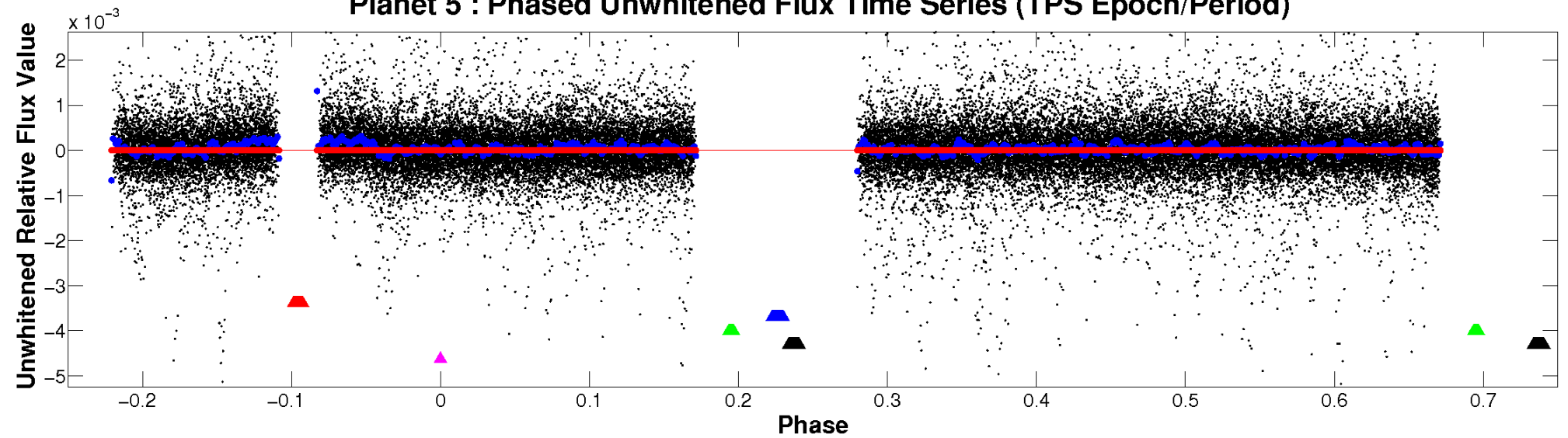
# ALT Odd/Even

TCE 009284741-05

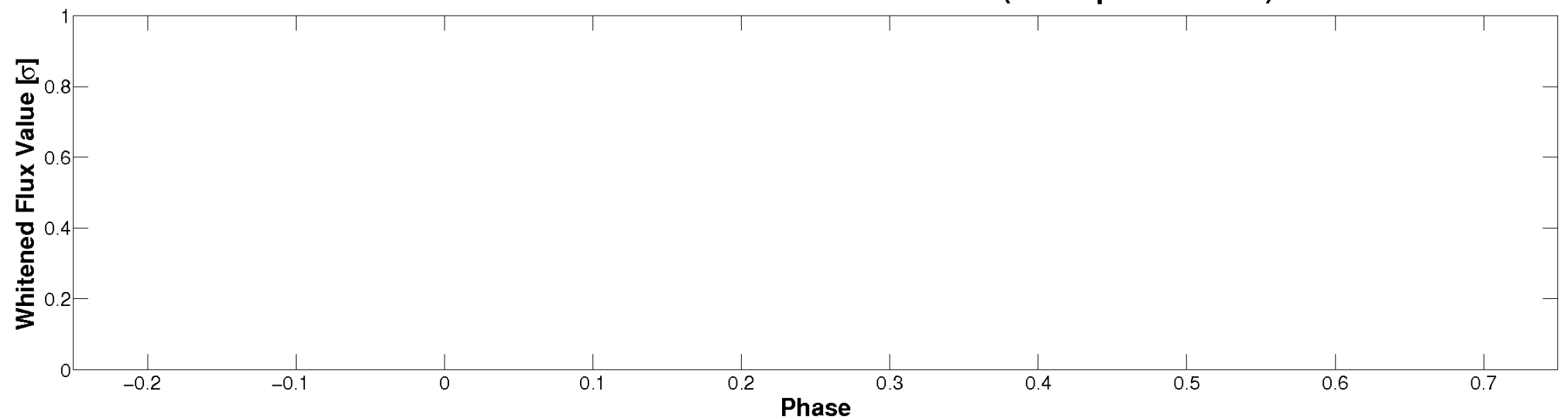


# Non-Whitened Vs. Whitened Light Curve

**Planet 5 : Phased Unwhitened Flux Time Series (TPS Epoch/Period)**



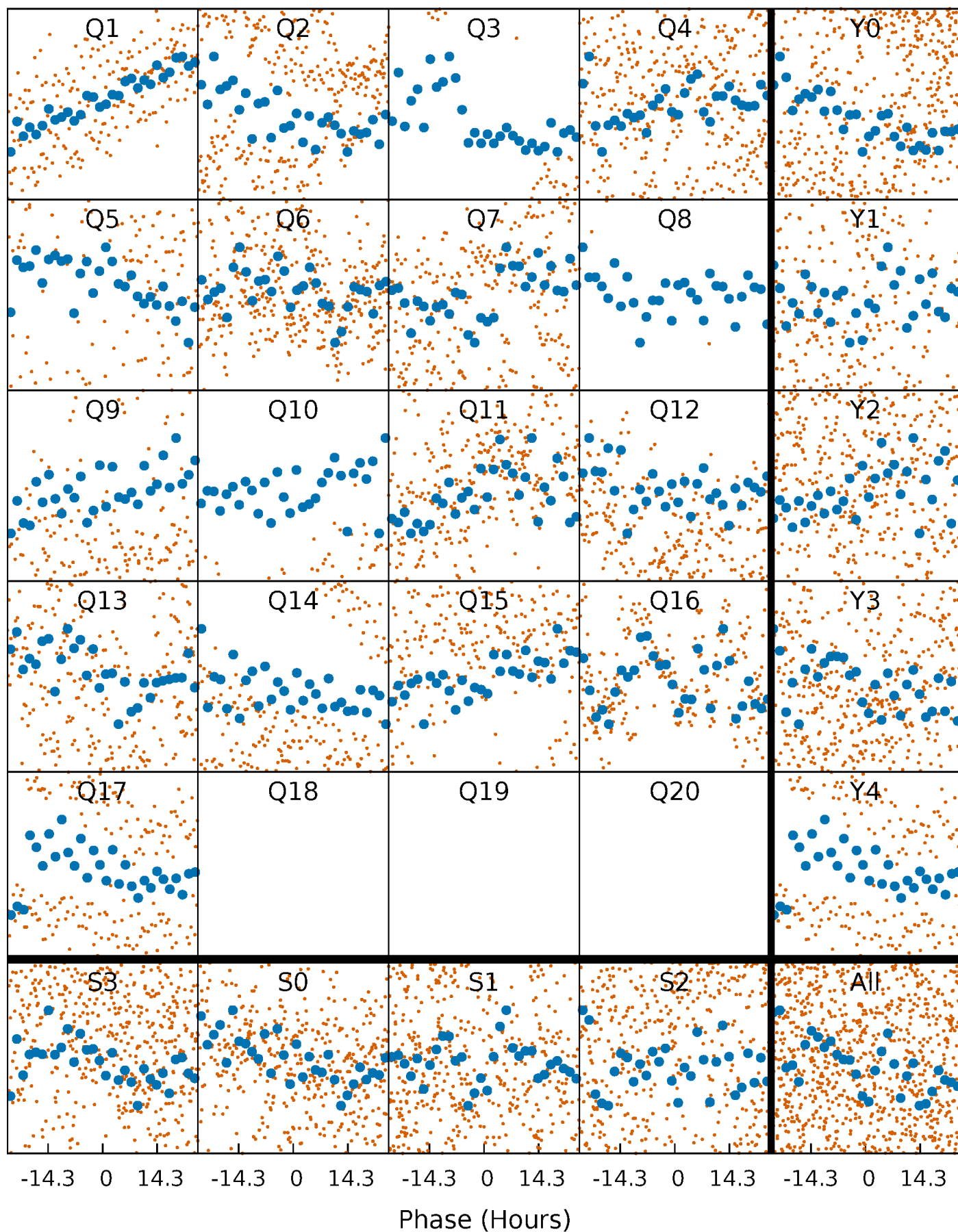
**Planet 5 : Phased Whitened Flux Time Series (TPS Epoch/Period)**





# PDC Quarter-Phased Transit Curves

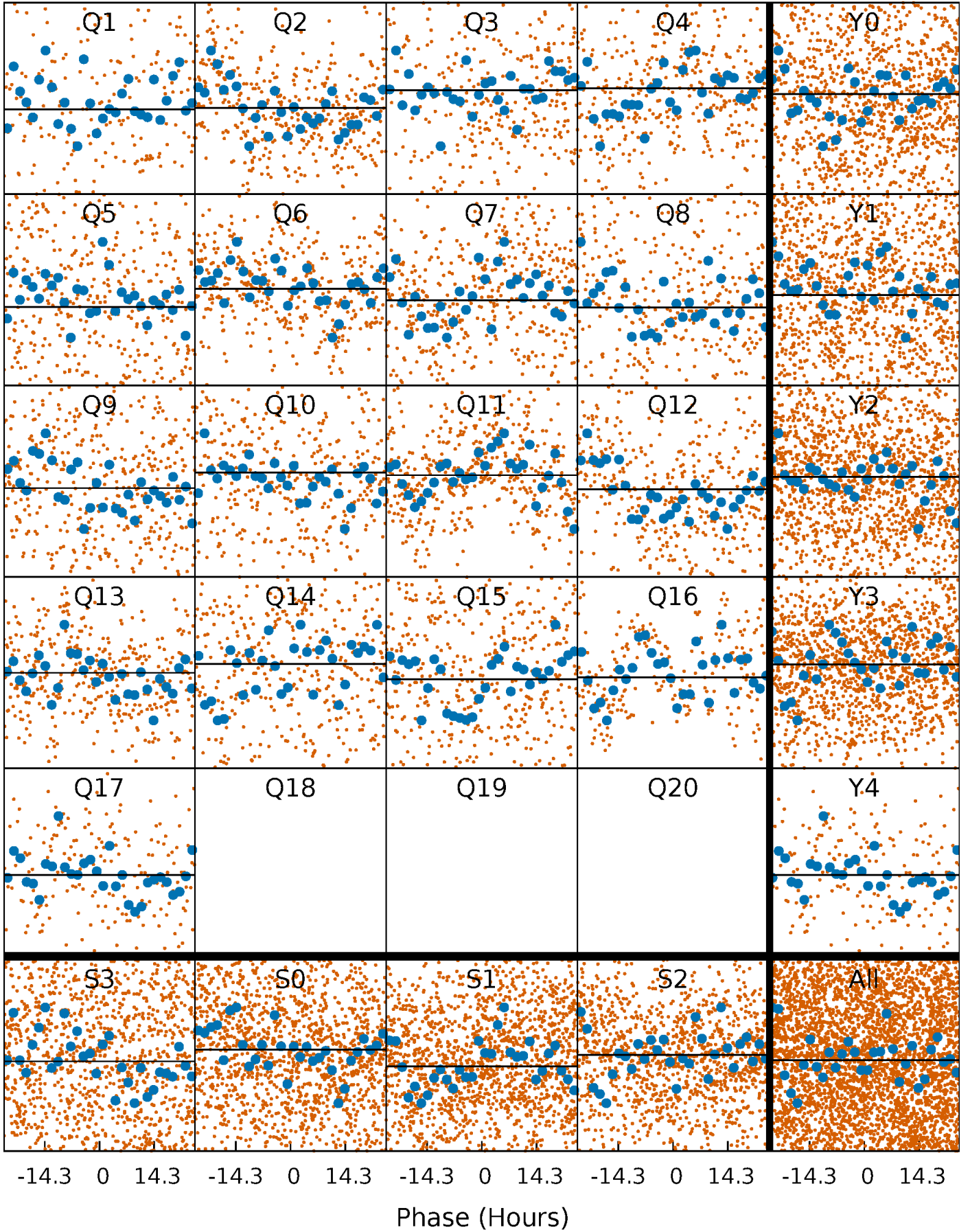
TCE 009284741-05   P= 20.731308 Days    $T_0=136.462727$  (BKJD)





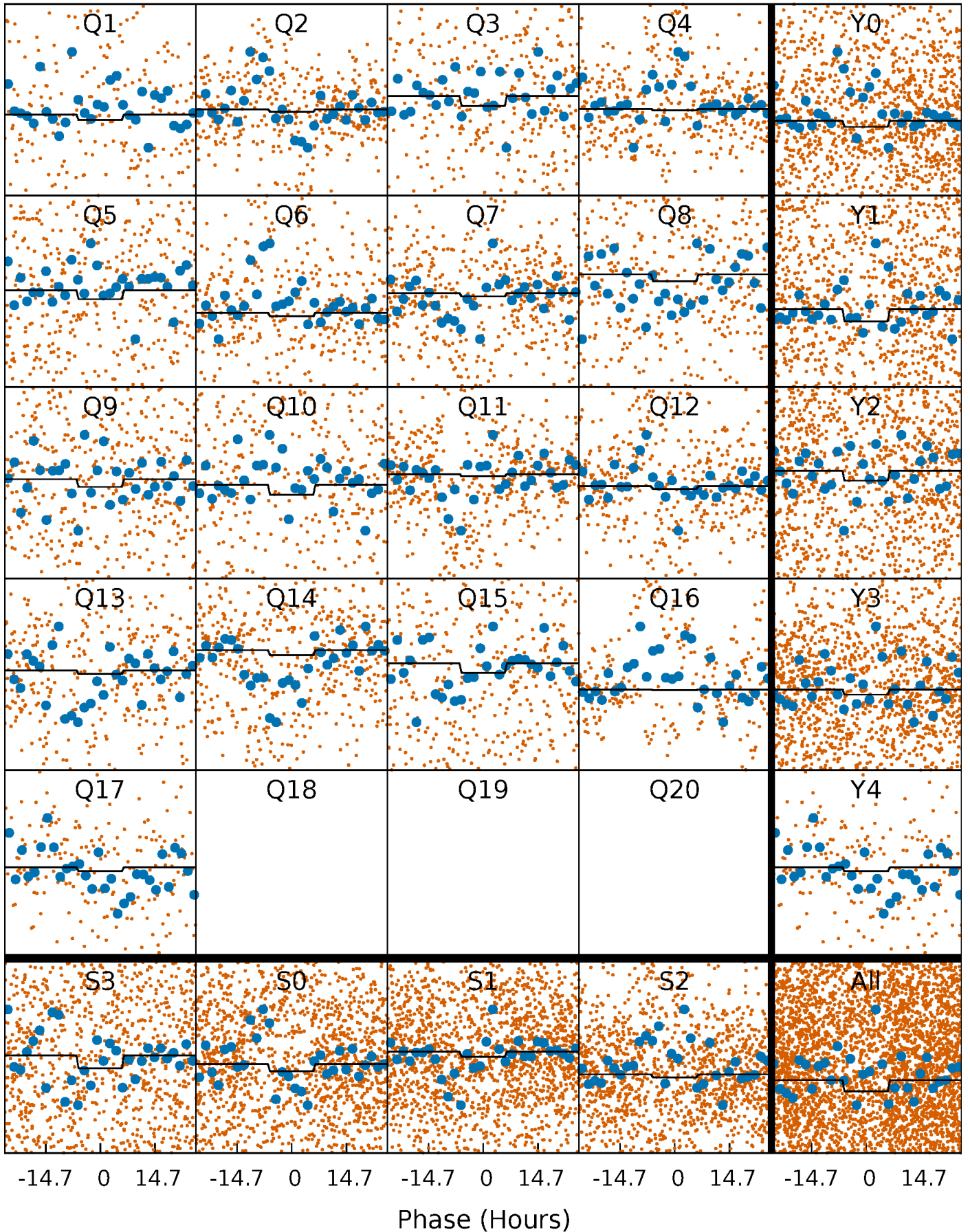
# DV Quarter-Phased Transit Curves

TCE 009284741-05     $P = 20.731308$  Days     $T_0 = 136.462727$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

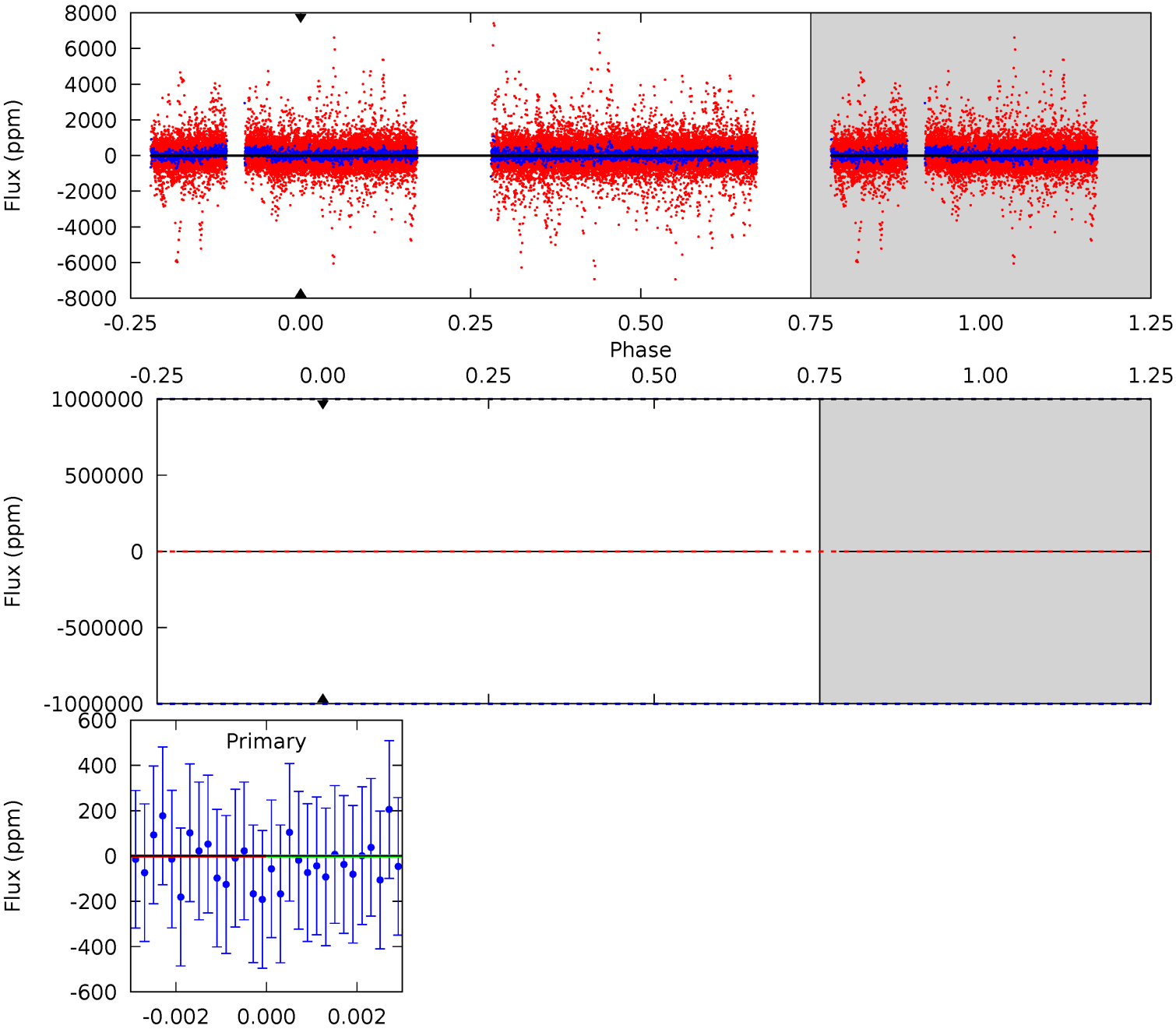
TCE 009284741-05     $P = 20.731308$  Days     $T_0 = 136.585562$  (BKJD)



# DV Model-Shift Uniqueness Test

009284741-05, P = 20.731308 Days, E = 115.731419 Days

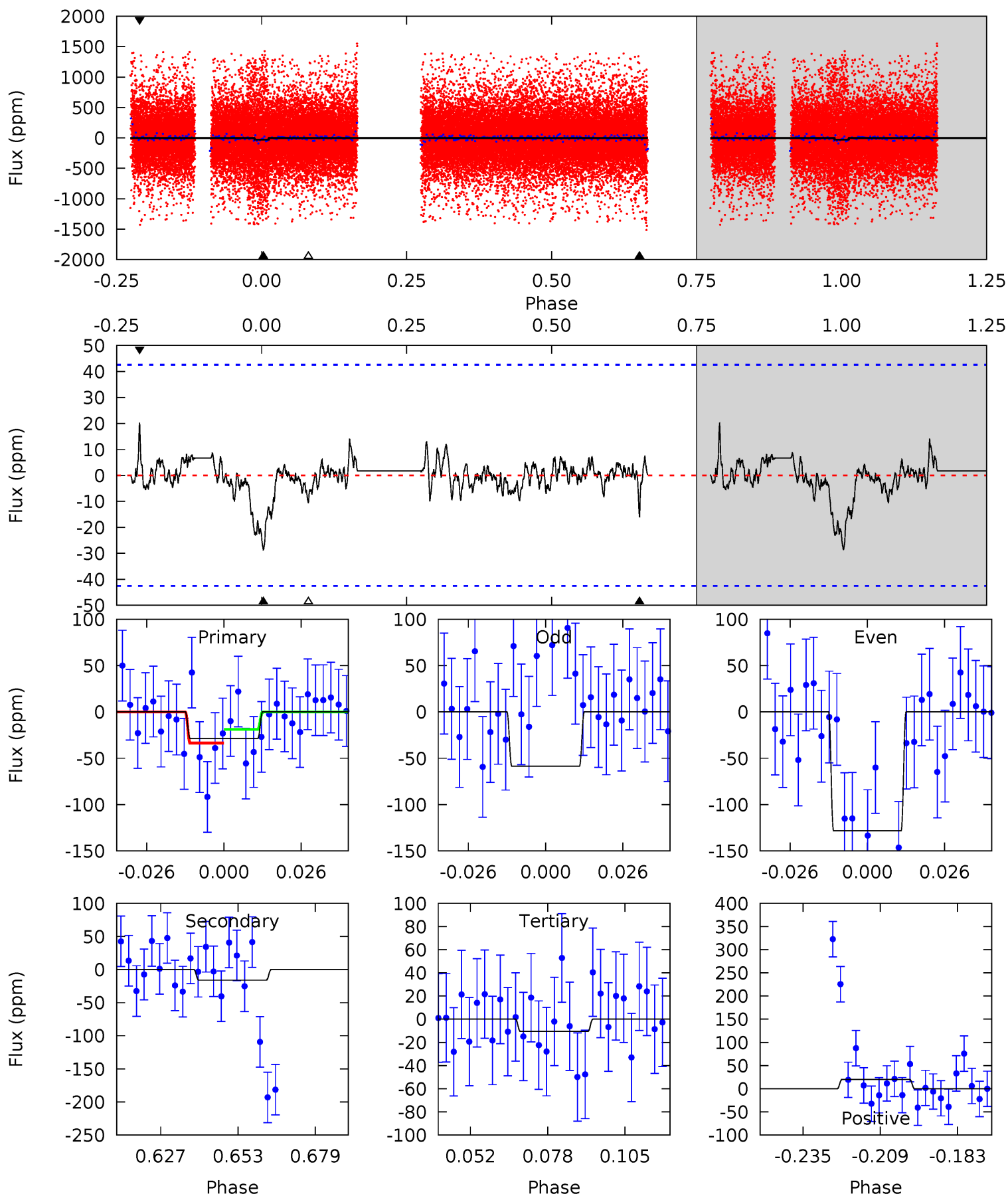
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



# Alt Model-Shift Uniqueness Test

009284741-05, P = 20.731308 Days, E = 115.854254 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
3.25	1.82	1.19	2.28	4.84	2.22	0.49	2.06	0.97	0.62	-0.47	3.98	-3.71	0.41	0



### Stellar Parameters For KIC 009284741

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5256^{+158}_{-142}$	$4.502^{+0.100}_{-0.137}$	$-0.260^{+0.350}_{-0.250}$	$0.802^{+0.120}_{-0.098}$	$0.745^{+0.112}_{-0.052}$	$2.036^{+0.790}_{-0.689}$
	+3%/-3%	+2%/-3%	+135%/-96%	+15%/-12%	+15%/-7%	+39%/-34%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 009284741-05 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$0 \pm 1000000$	$7.64^{+7.53}_{-5.27}$	$796^{+43}_{-37}$	$-2576^{+17570}_{-10627}$	$-19.660^{+31428.694}_{-24448.392}$
Alt.	$-16 \pm 9$	$6.13^{+6.68}_{-4.26}$	$798^{+44}_{-35}$	$2138^{+780}_{-411}$	$3.464^{+37.789}_{-2.770}$

$T_{\text{max}}$  = 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

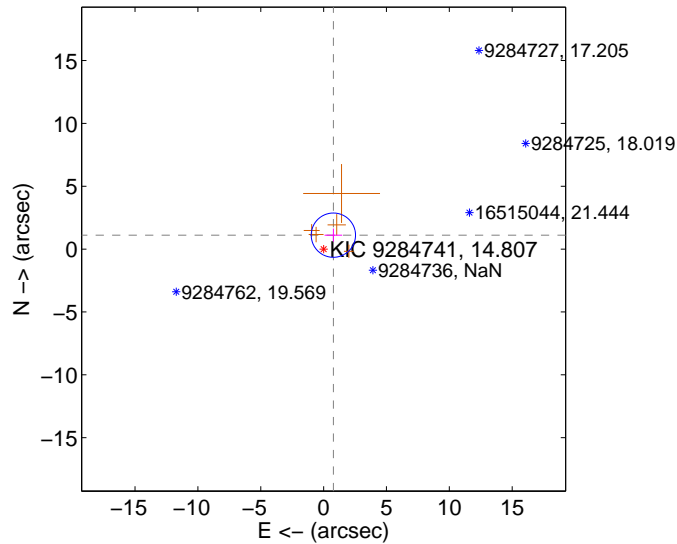
Supplemental centroid analysis for 009284741-05. Kepler magnitude: 14.81. Transit SNR -1.00

There are 0 quarters with good PRF difference image offsets

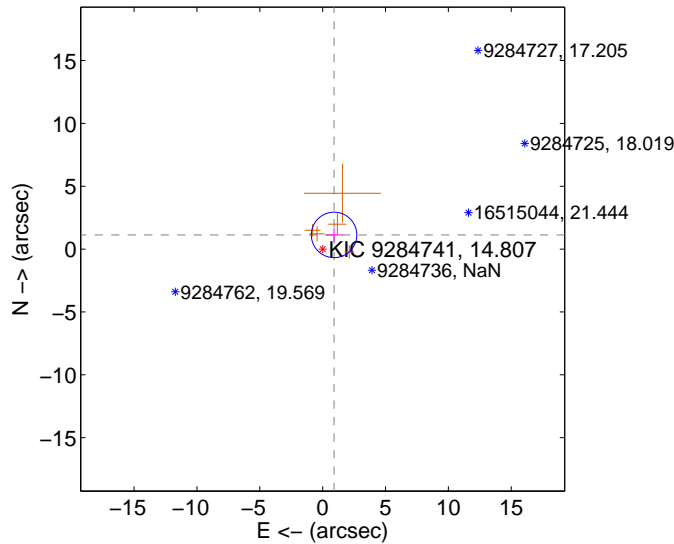
The direct PRF centroid is offset from the target star catalog position by about 0.14 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.354 \pm 0.587$	2.31	$-0.777 \pm 0.700$	$1.109 \pm 0.523$
PRF-fit source offset from KIC position	$1.448 \pm 0.603$	2.40	$-0.907 \pm 0.691$	$1.129 \pm 0.538$
photometric centroid source offset	$2.80 \pm 4.42$	0.63	$0.42 \pm 4.79$	$2.77 \pm 4.41$

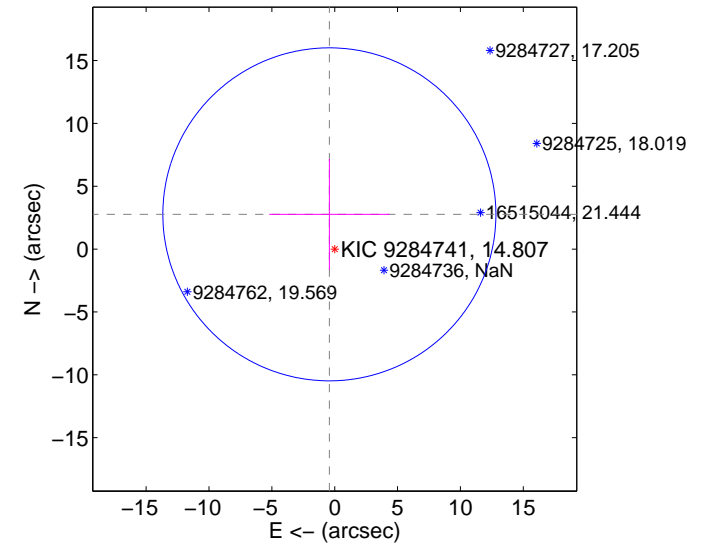
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



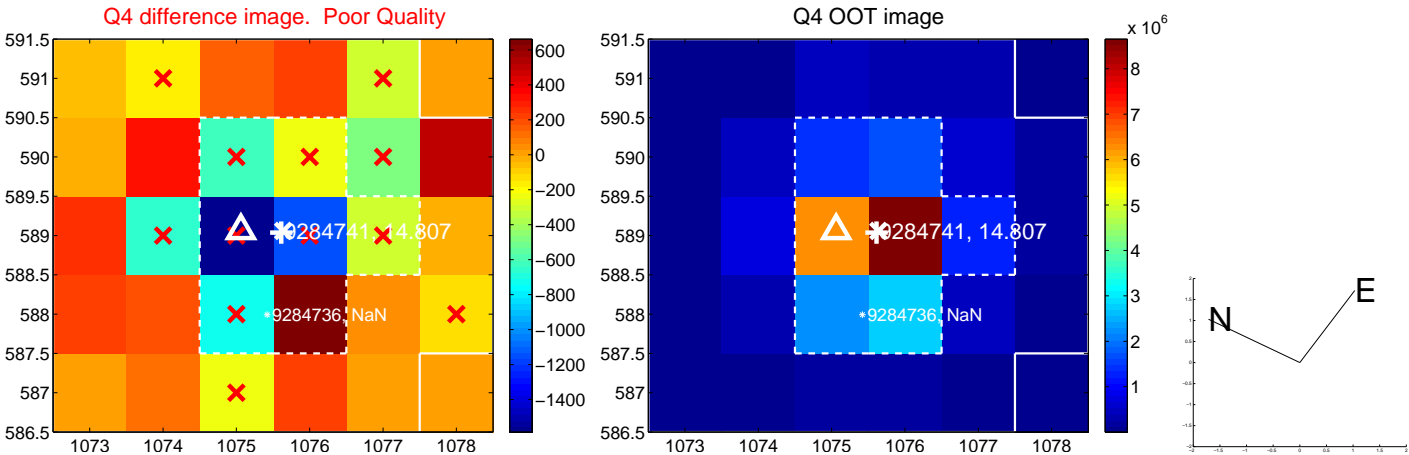
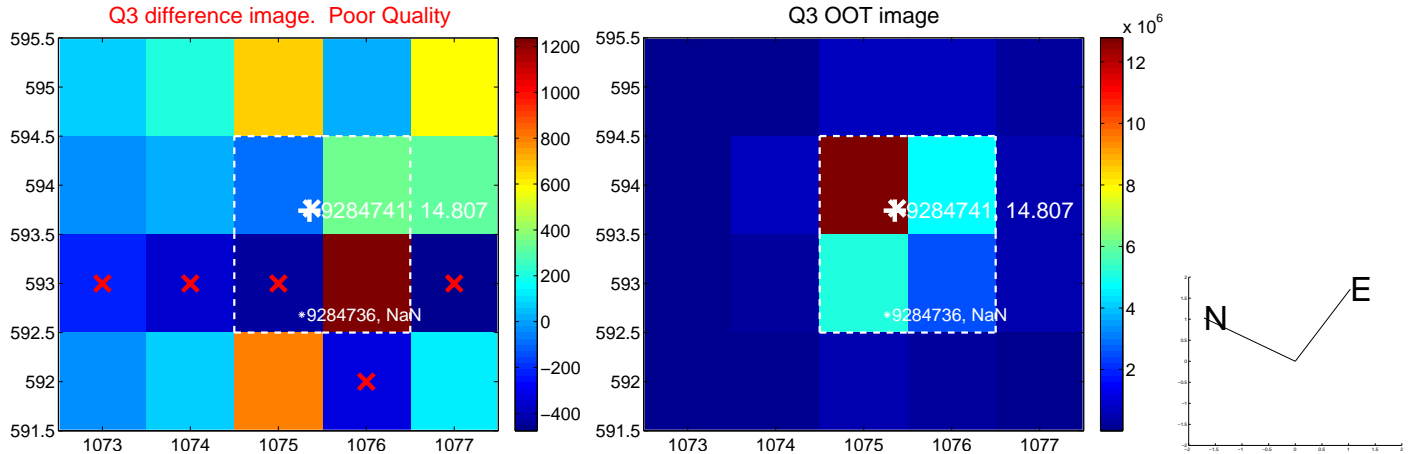
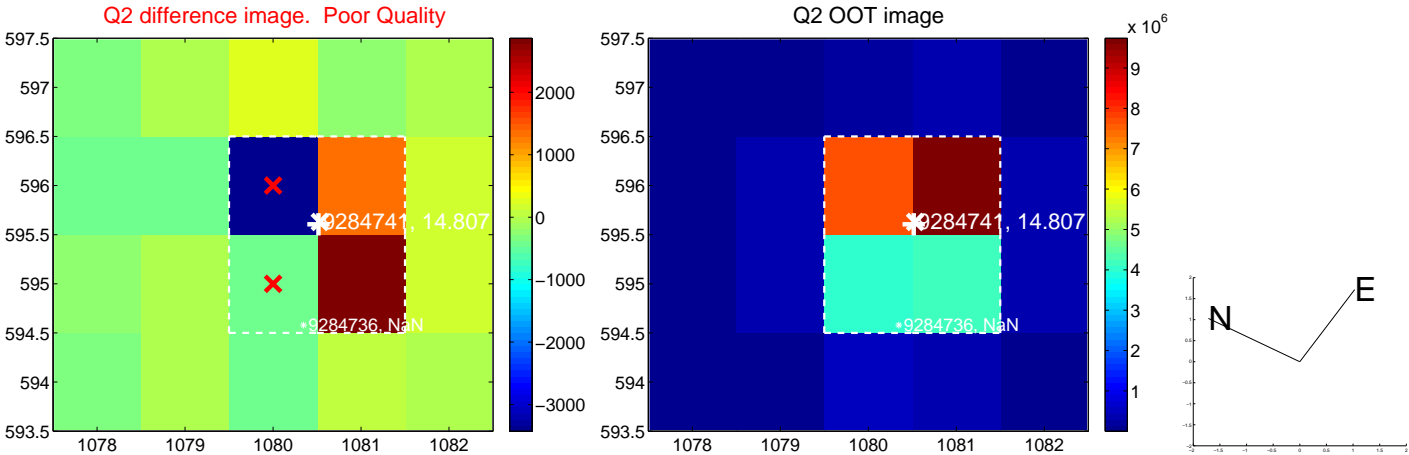
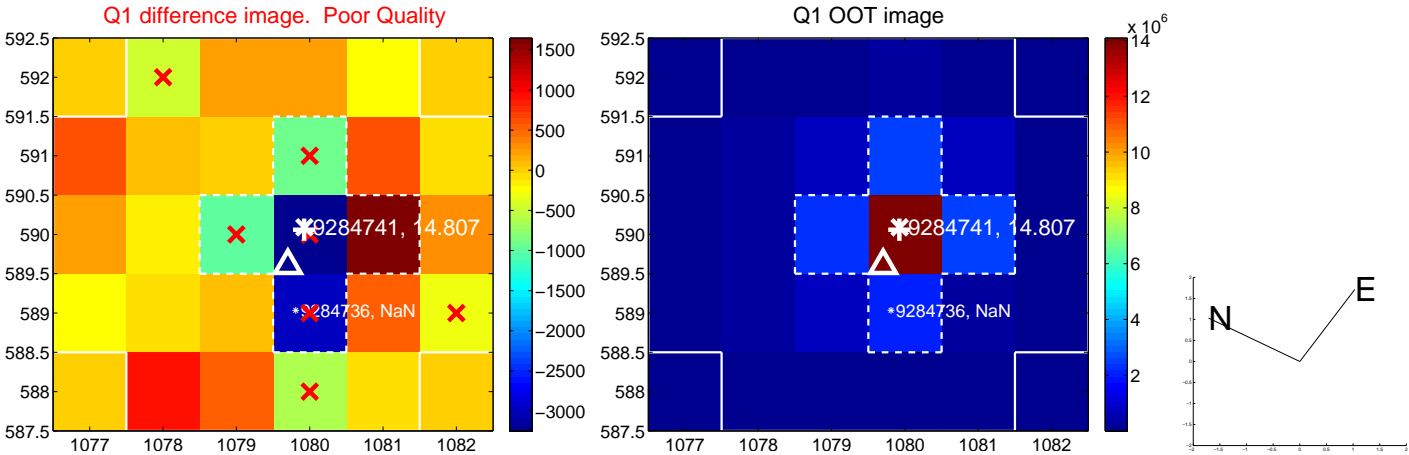
offset from photometric centroids



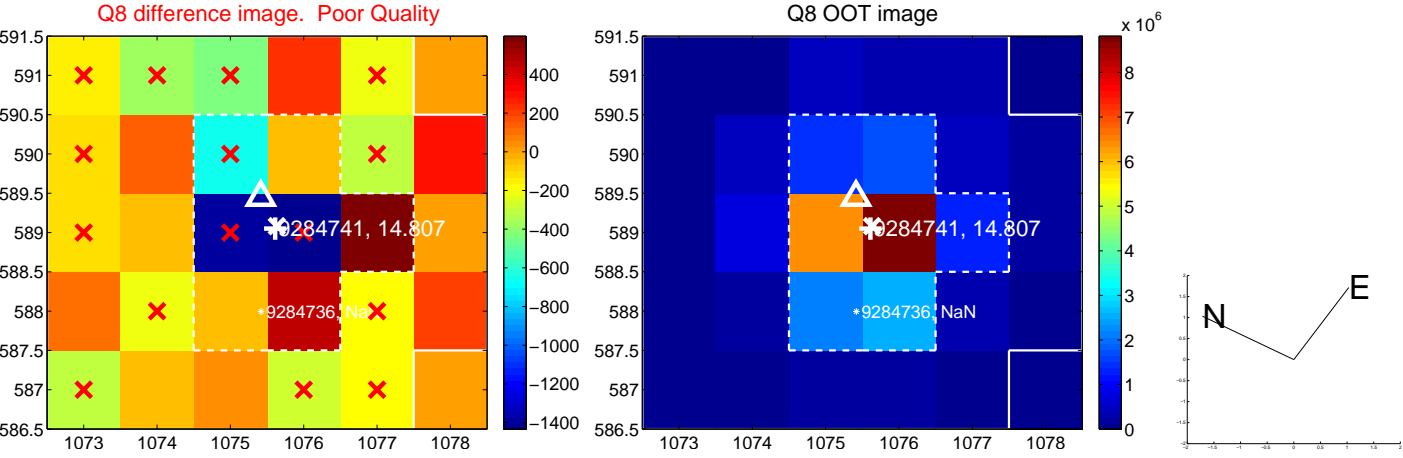
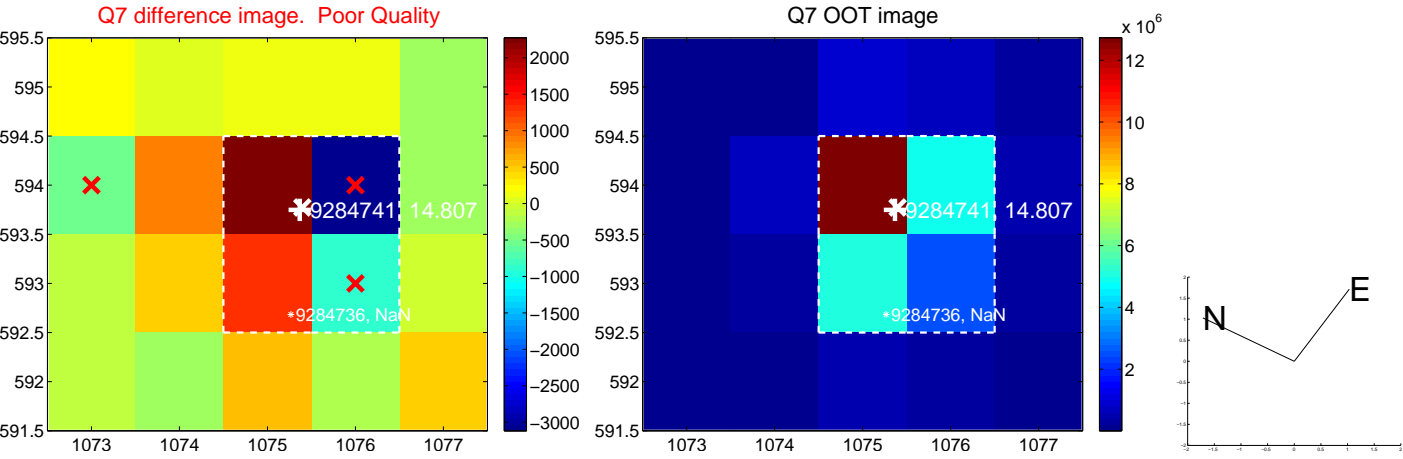
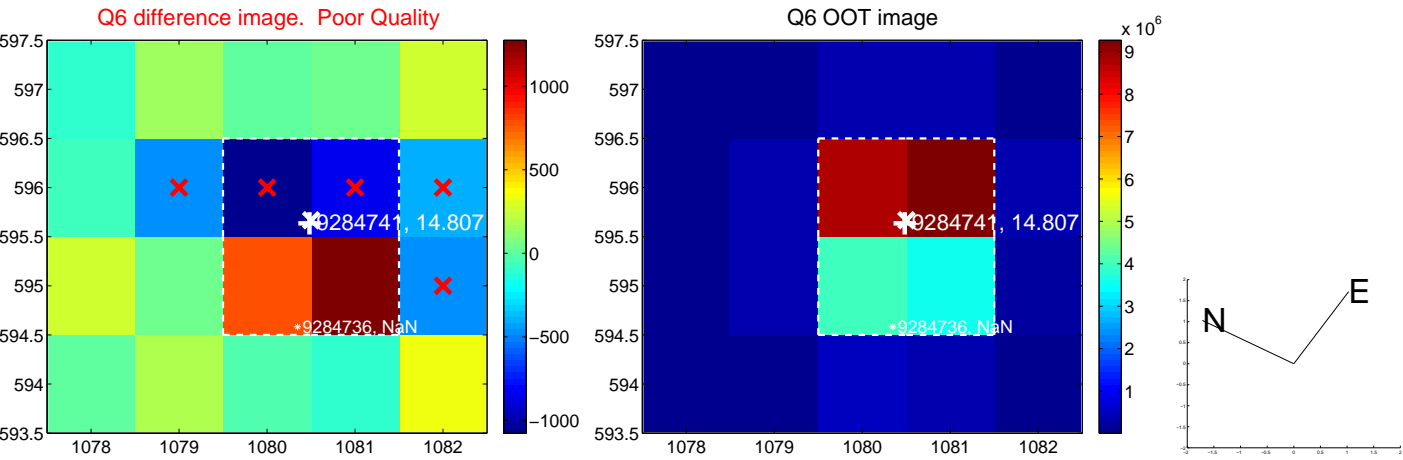
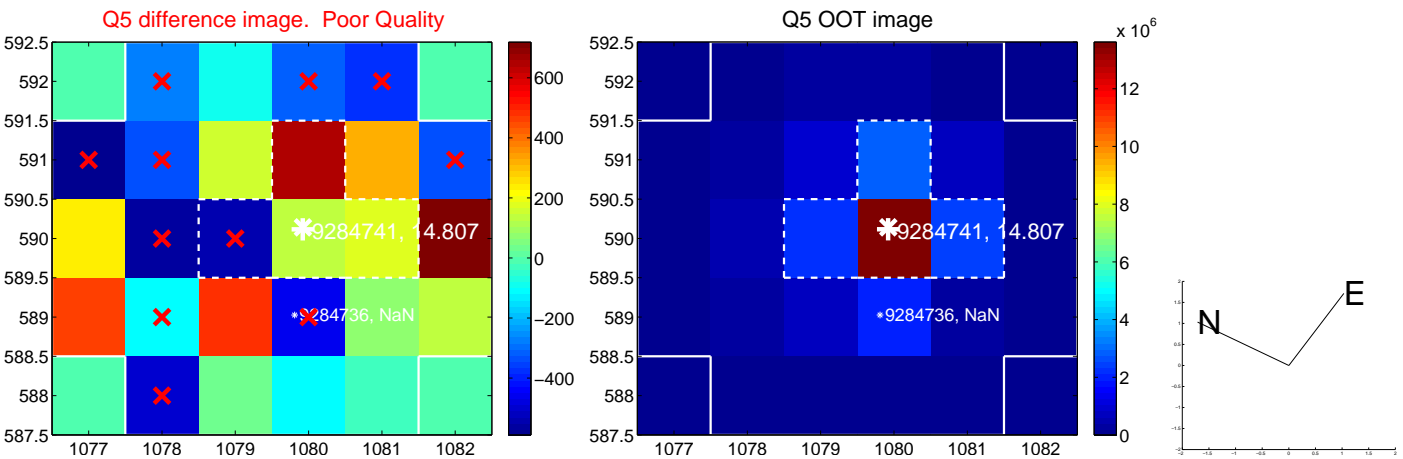
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

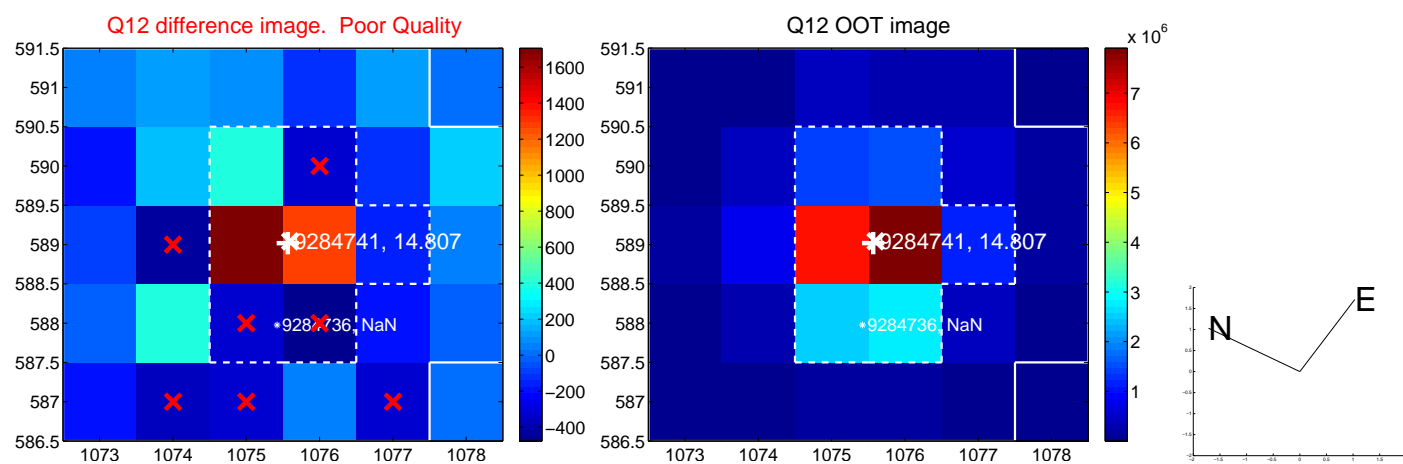
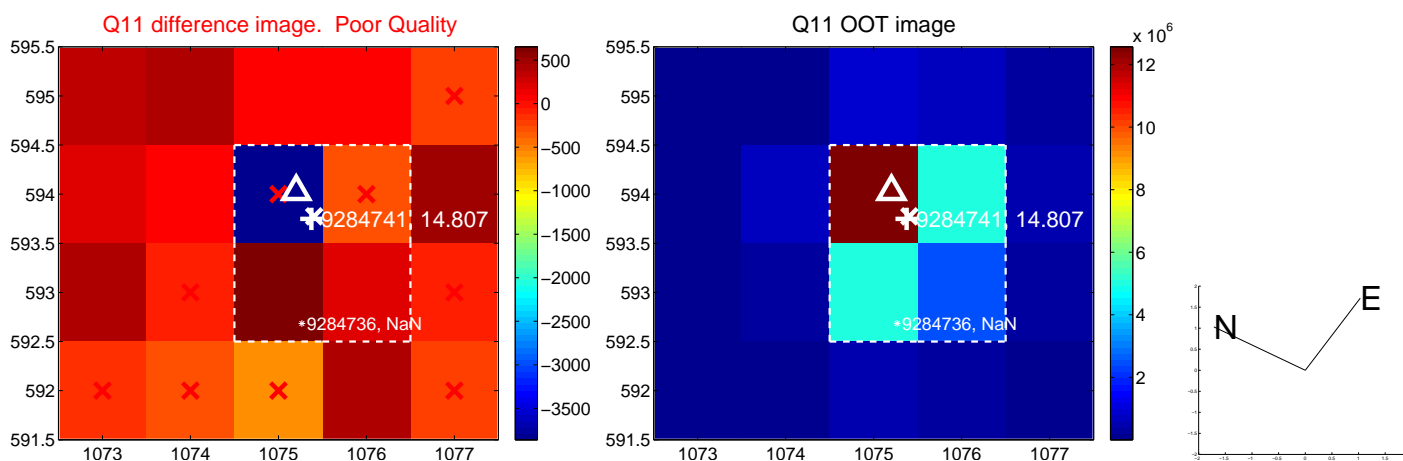
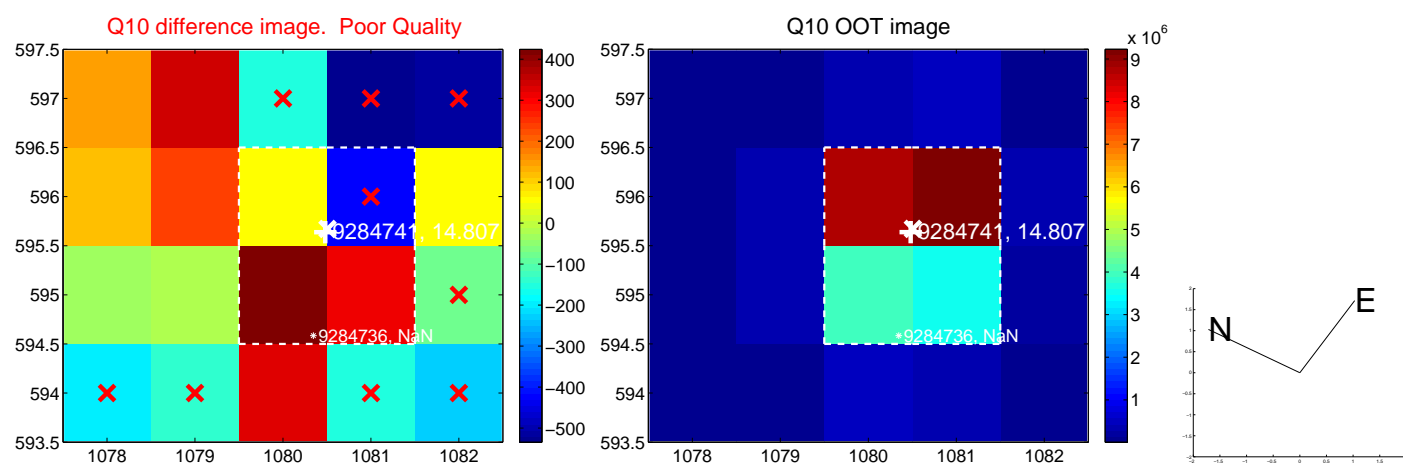
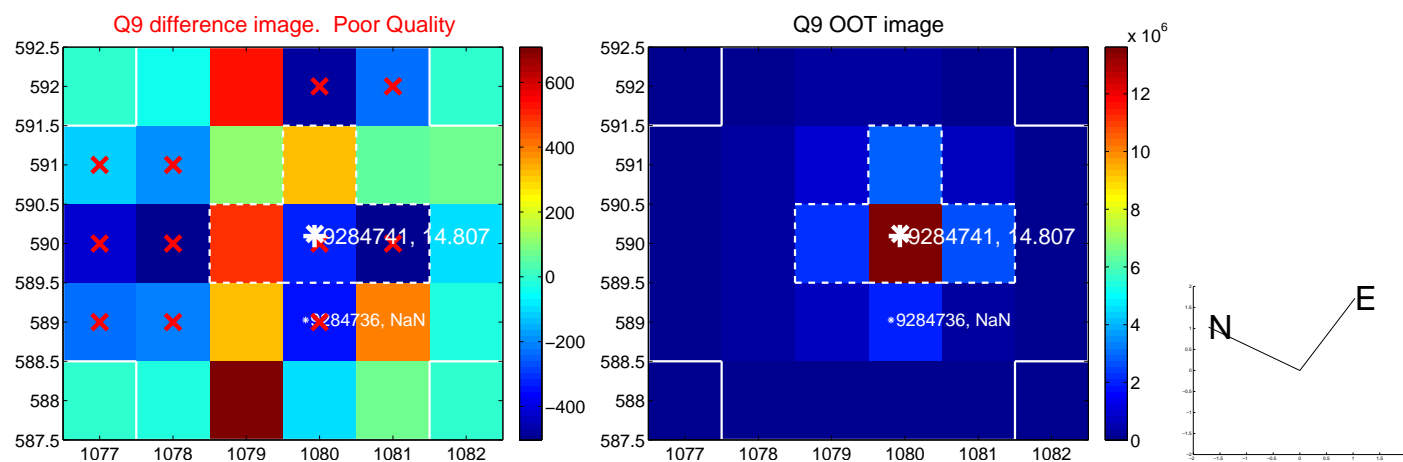


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

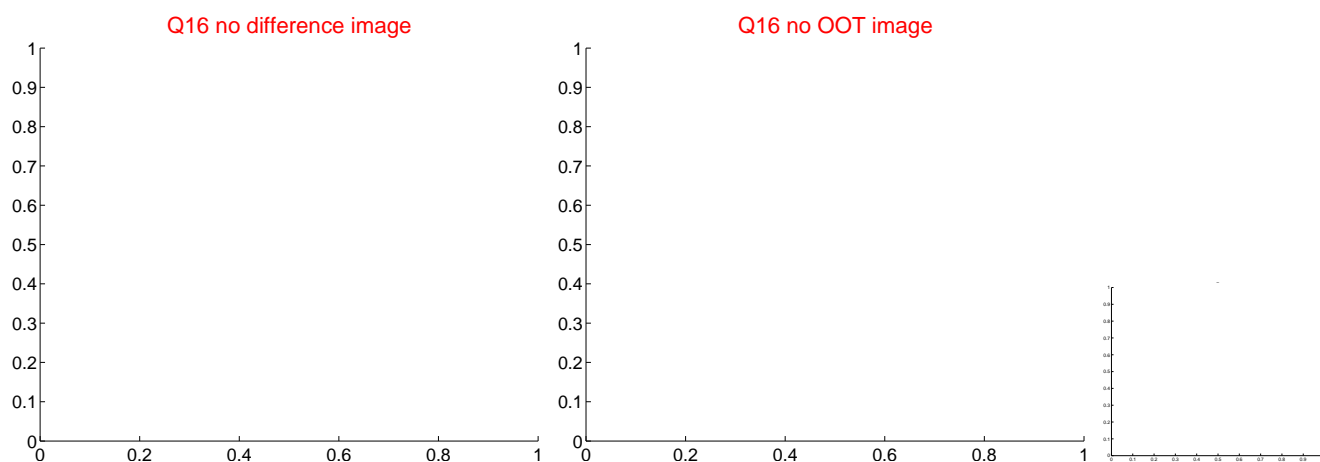
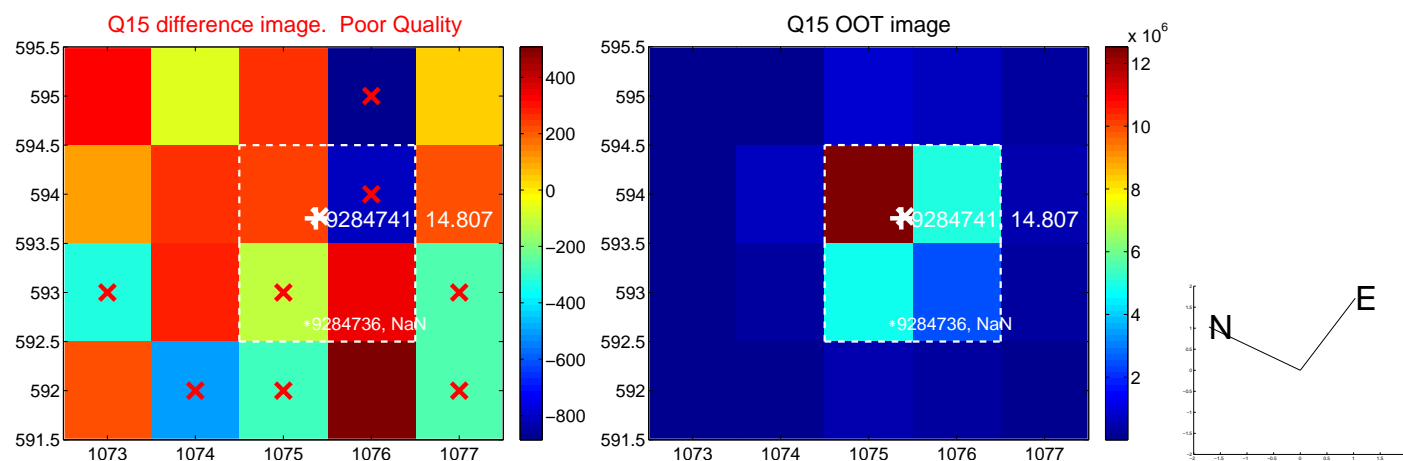
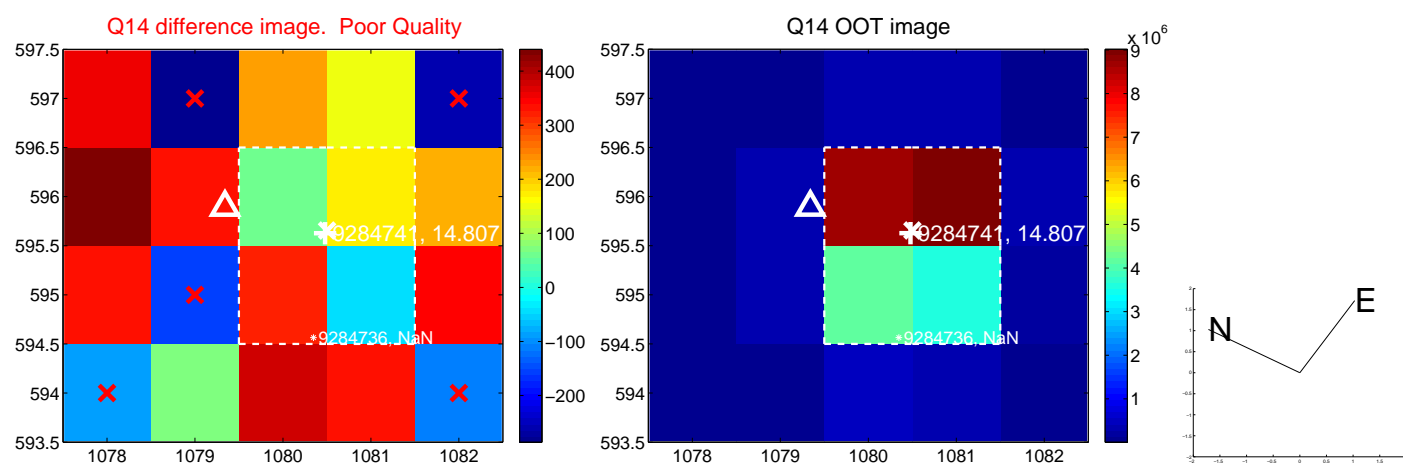
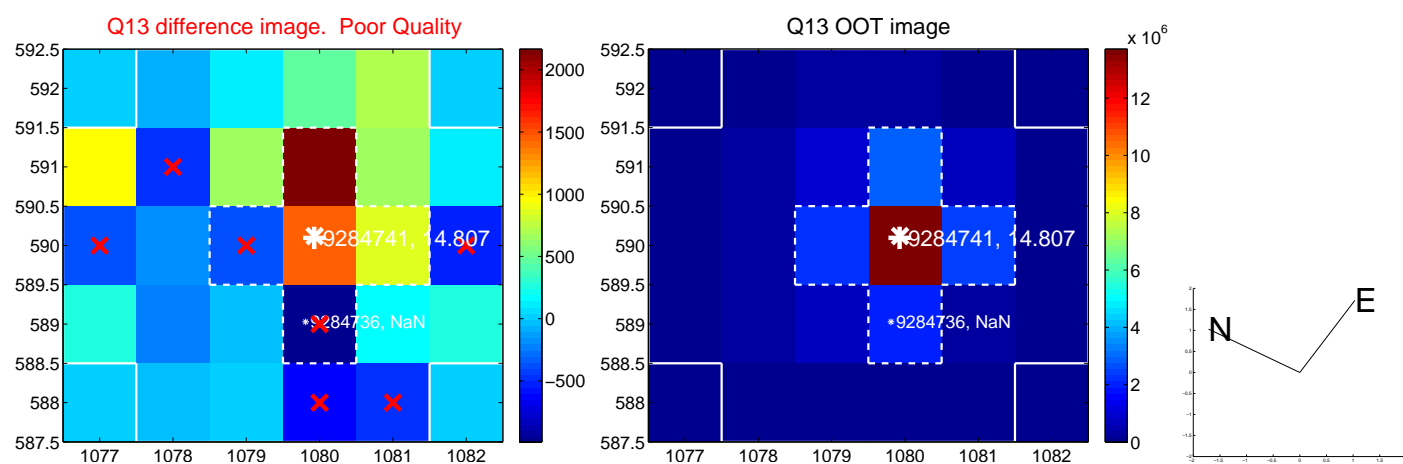




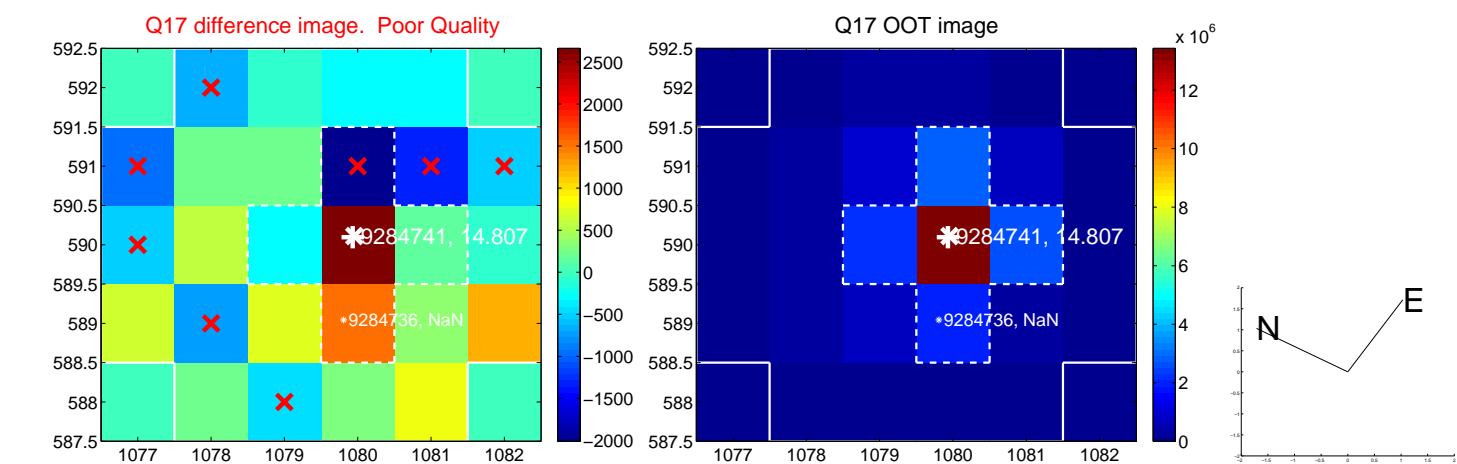
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



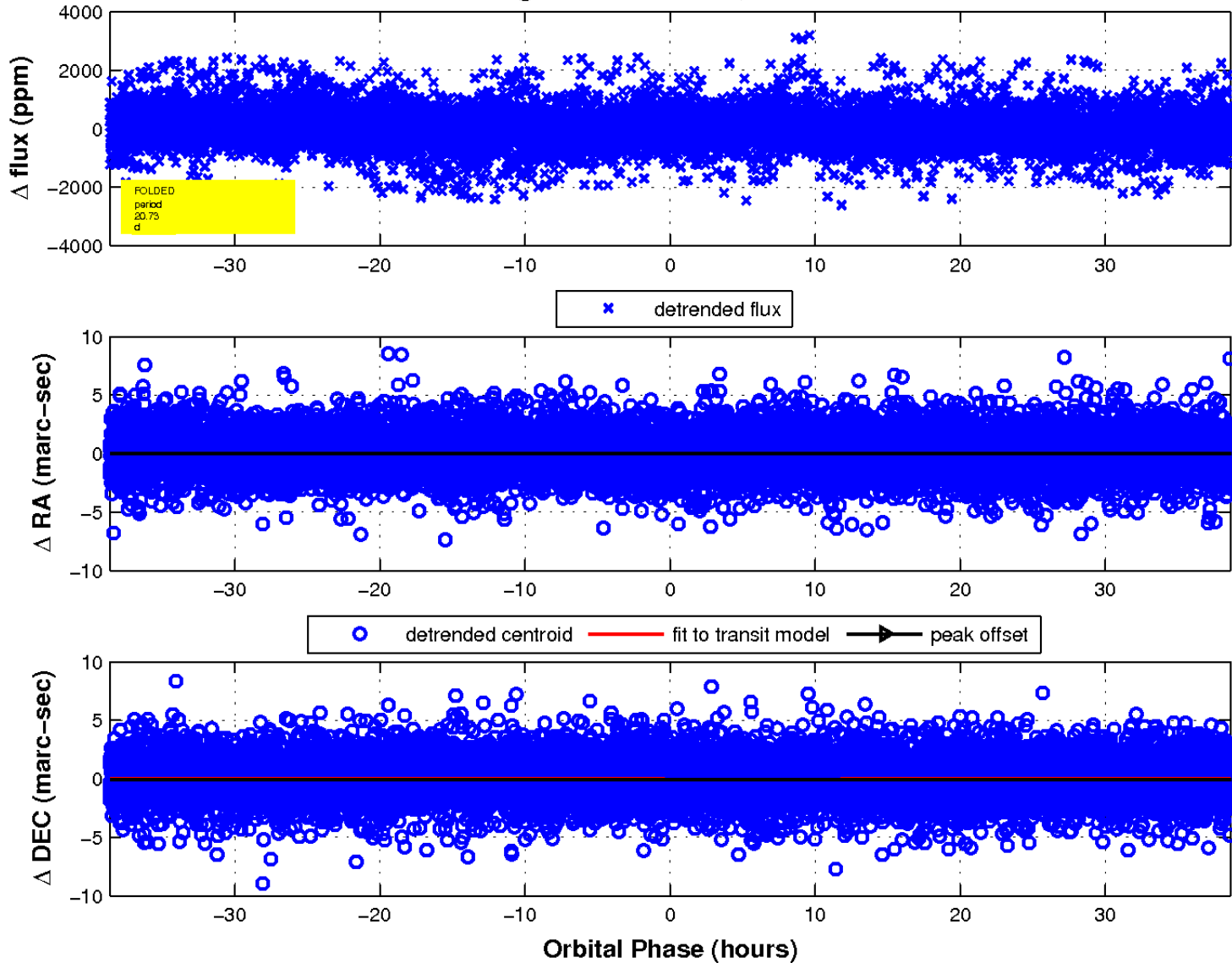
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value



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



fluxWeightedCentroids, Planet 5 of 5



UKIRT Image

