

# KIC 002306740

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
002306740-01	OBS	6265.01	10.306853	133.431748	341526.1	7.500	12864.7	-1.0	1.22	5912	44.76	201.31
002306740-02	OBS	No	5.153438	133.595217	300051.5	3.500	13343.3	-1.0	1.22	5912	50.55	507.26
002306740-03	OBS	No	164.914654	241.810326	72180.2	17.275	260.5	254.7	1.22	5912	55.66	4.99
002306740-04	OBS	No	7.730062	135.945076	19188.2	15.000	836.5	-1.0	1.22	5912	16.82	295.43

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002306740-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_ALT—HAS_SEC_TCE—CENT_NOFITS
002306740-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE—CENT_NOFITS
002306740-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_ZUMA_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT— MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
002306740-04	OBS	FP	0.00	1	0	0	0	LPP_DV—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.

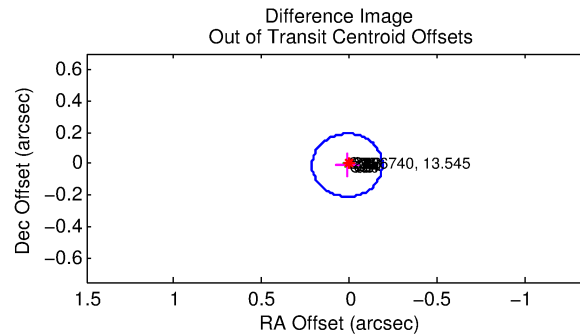
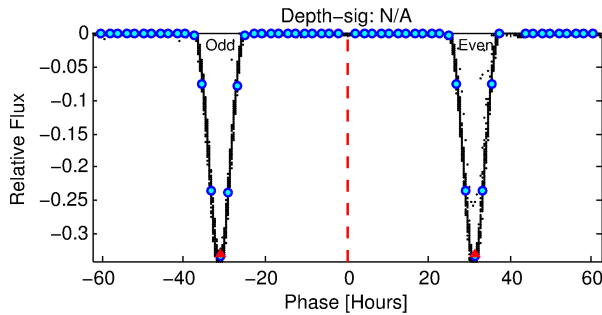
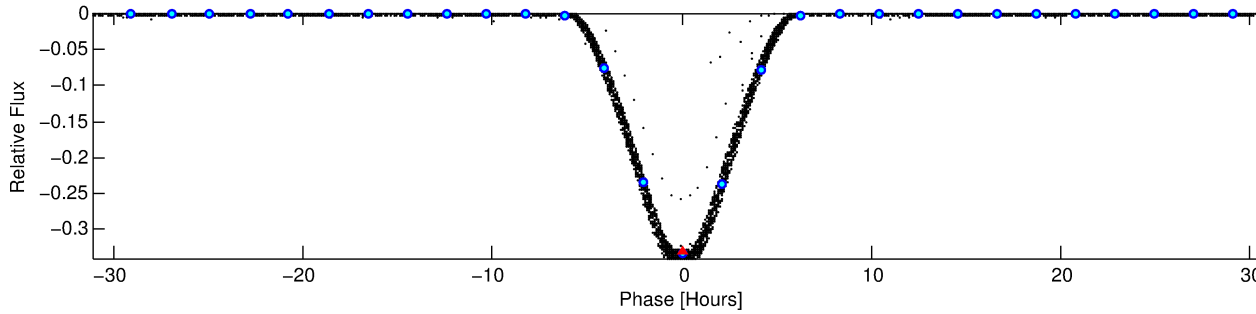
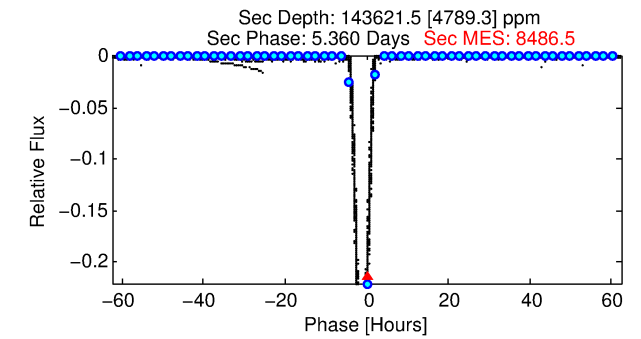
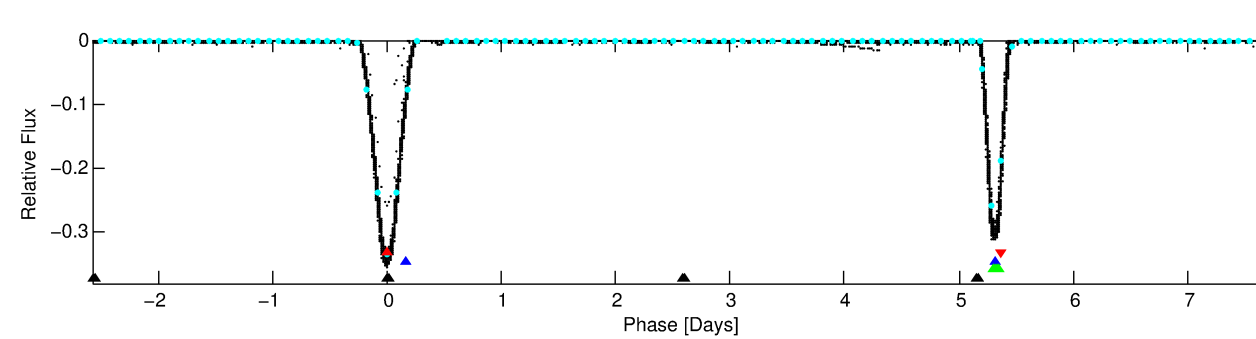
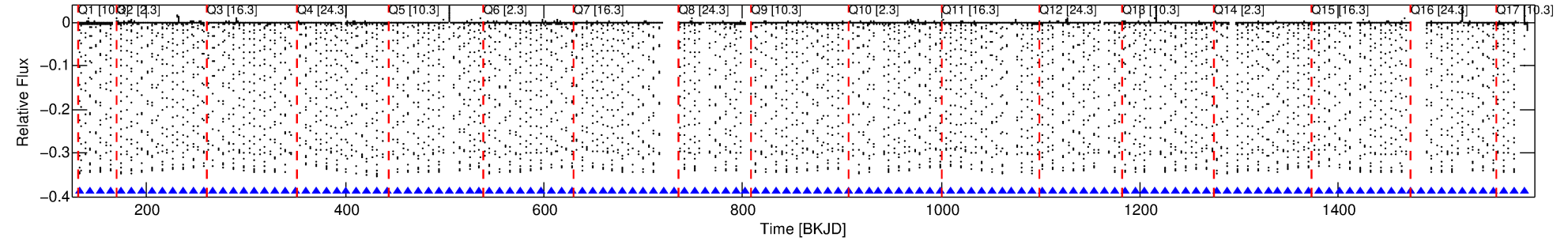
## Ephemeris Match Information For 002306740-01

No Significant Match Found

# DV One-Page Summary

KIC: 2306740 Candidate: 1 of 4 Period: 10.307 d  
KOI: K06265.01 Corr: 0.809

Kp: 13.55 R\*: 1.22 Rs Teff: 5912.0 K Logg: 4.22 Fe/H: -0.300



## TPS TCE Results:

Period = 10.30685 d  
Epoch = 133.4317 BKJD

DV fit results are unavailable

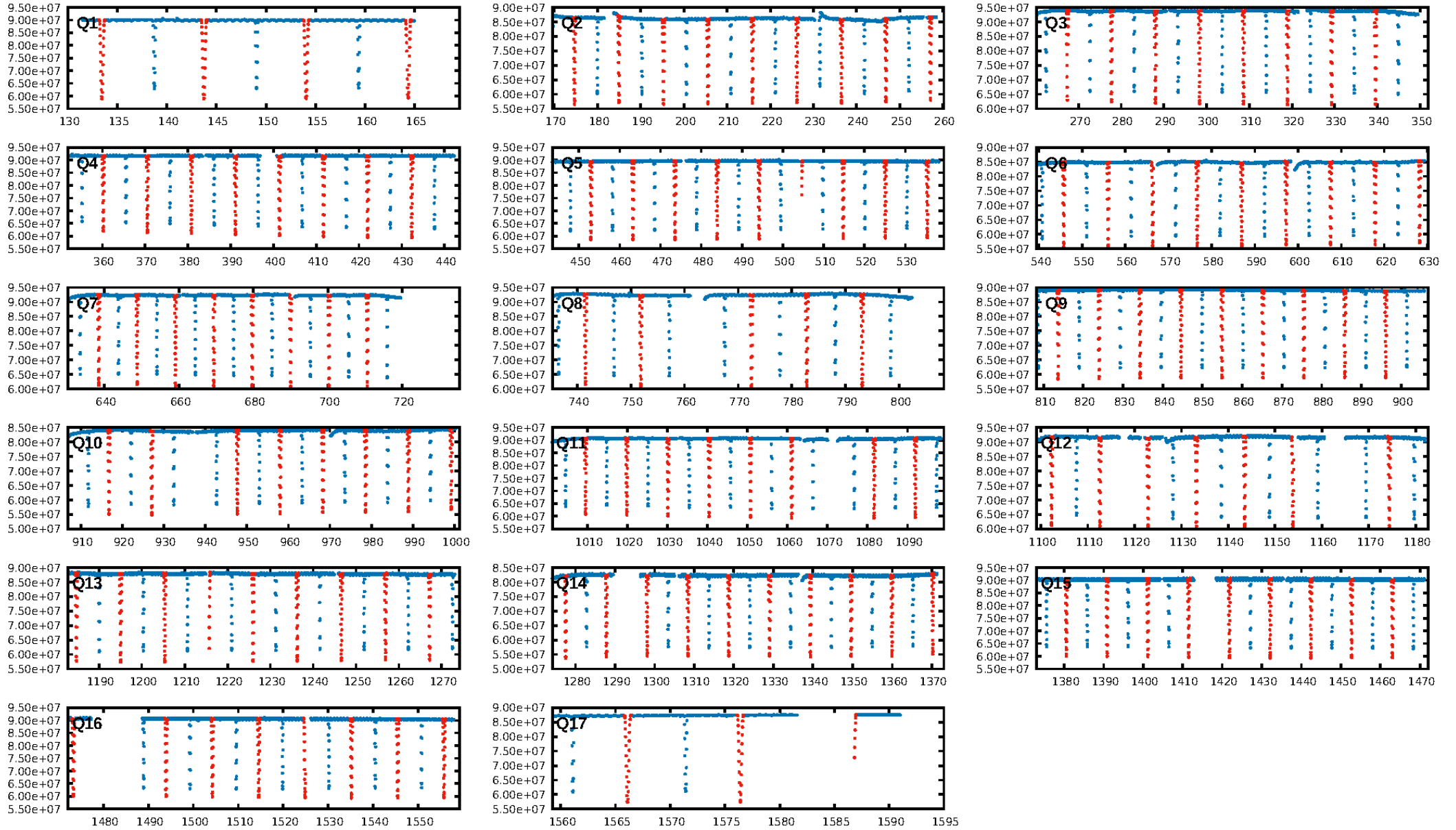
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [3.69 $\sigma$ ]  
LongPeriod-sig: 100.0% [197.03 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [123/123]  
GhostDiagnostic-chr: 1.478  
Centroid-sig: N/A  
Centroid-so: 0.568 arcsec [1573.97 $\sigma$ ]  
OotOffset-rm: 0.016 arcsec [0.24 $\sigma$ ]  
KicOffset-rm: 0.087 arcsec [1.29 $\sigma$ ]  
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]

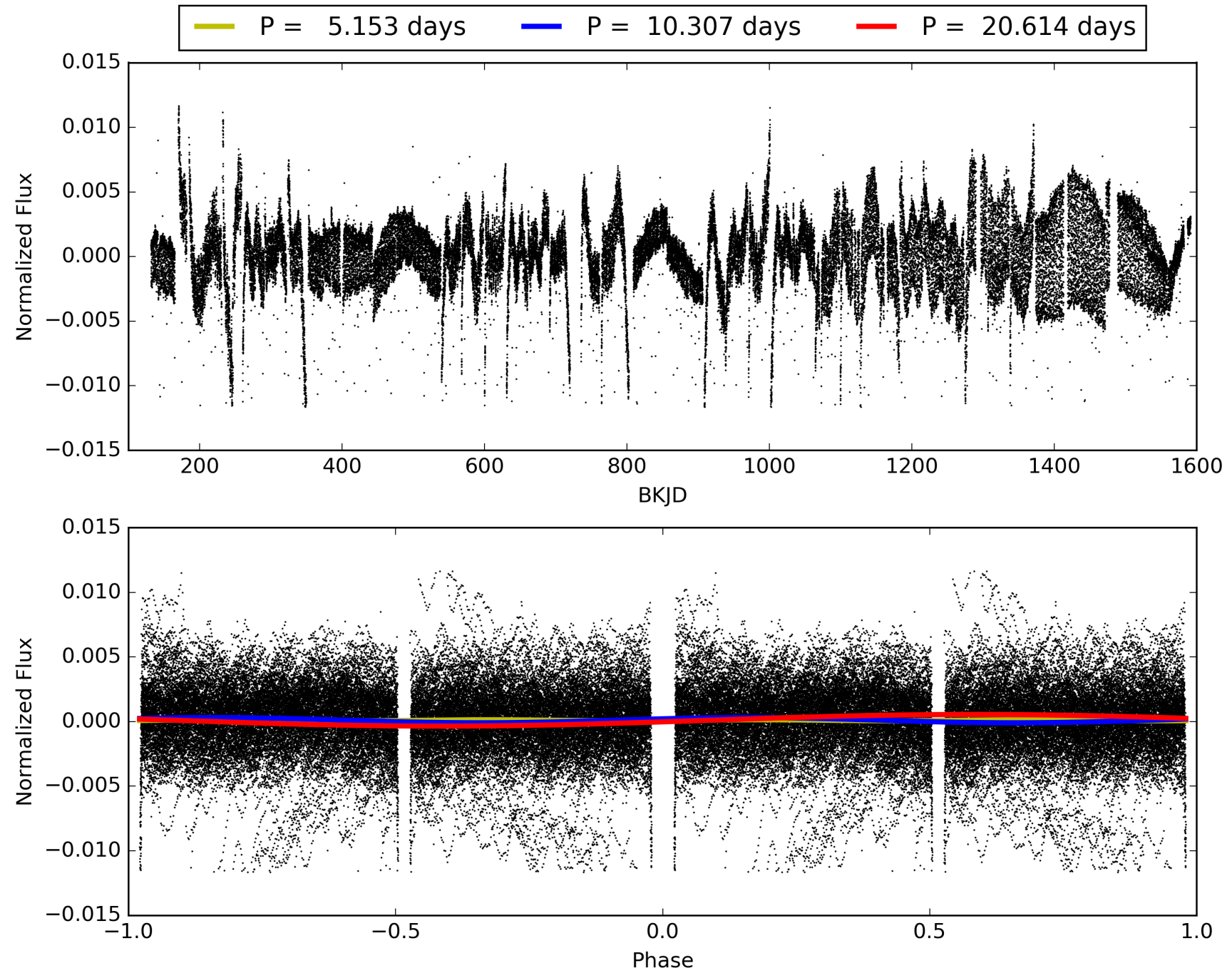
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 07:07:59 Z

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

# TCE 002306740-01, PDC Light Curves

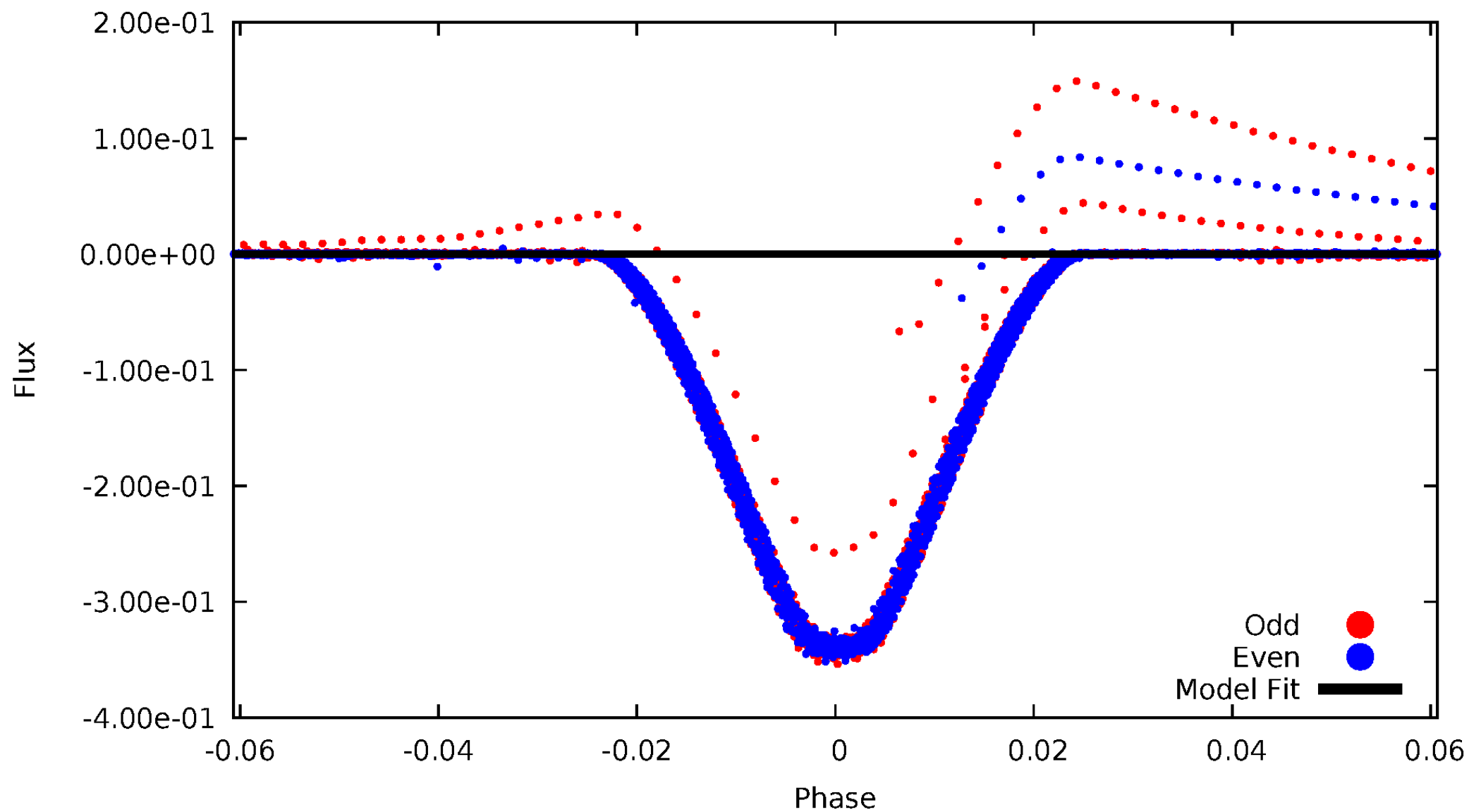


TCE 002306740-01



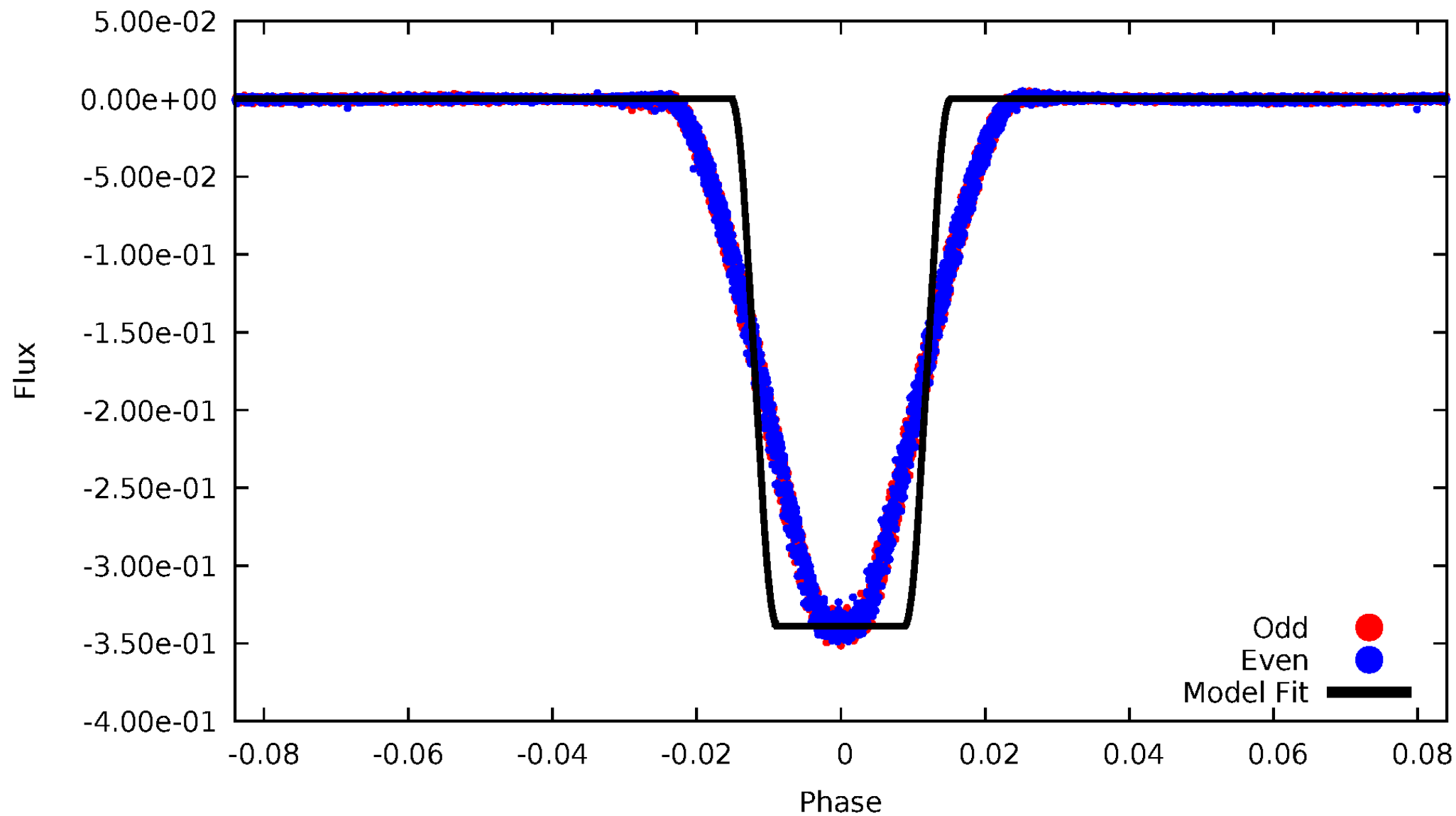
# DV Odd/Even

TCE 002306740-01



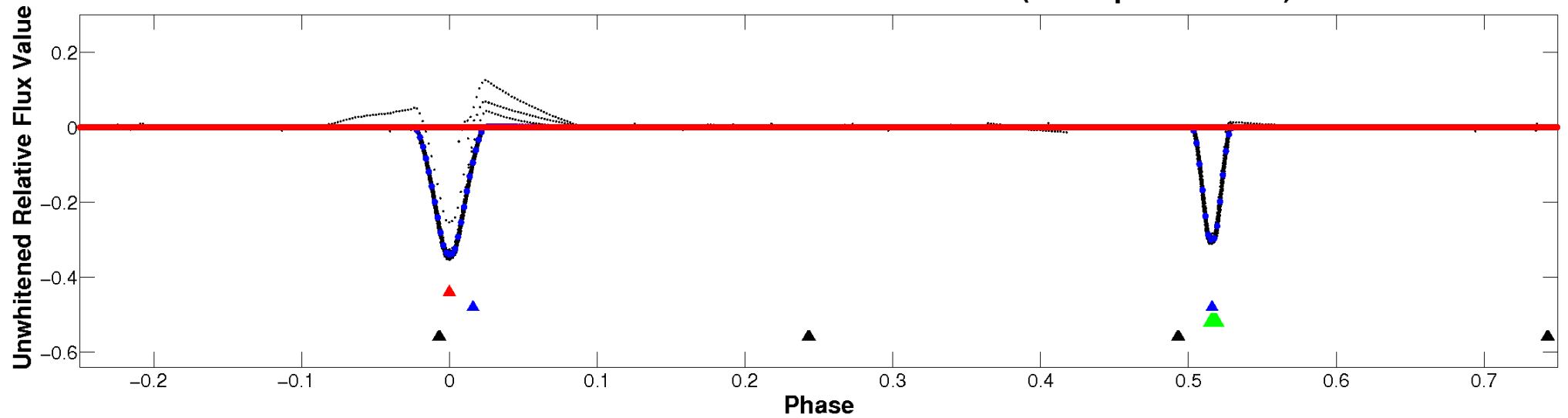
# ALT Odd/Even

TCE 002306740-01

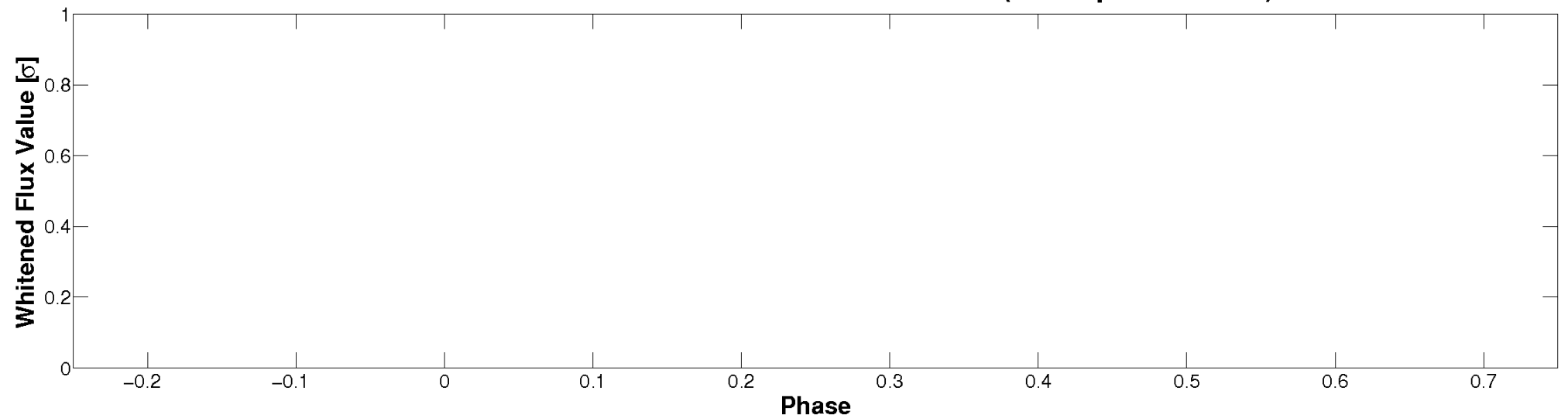


# Non-Whitened Vs. Whitened Light Curve

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

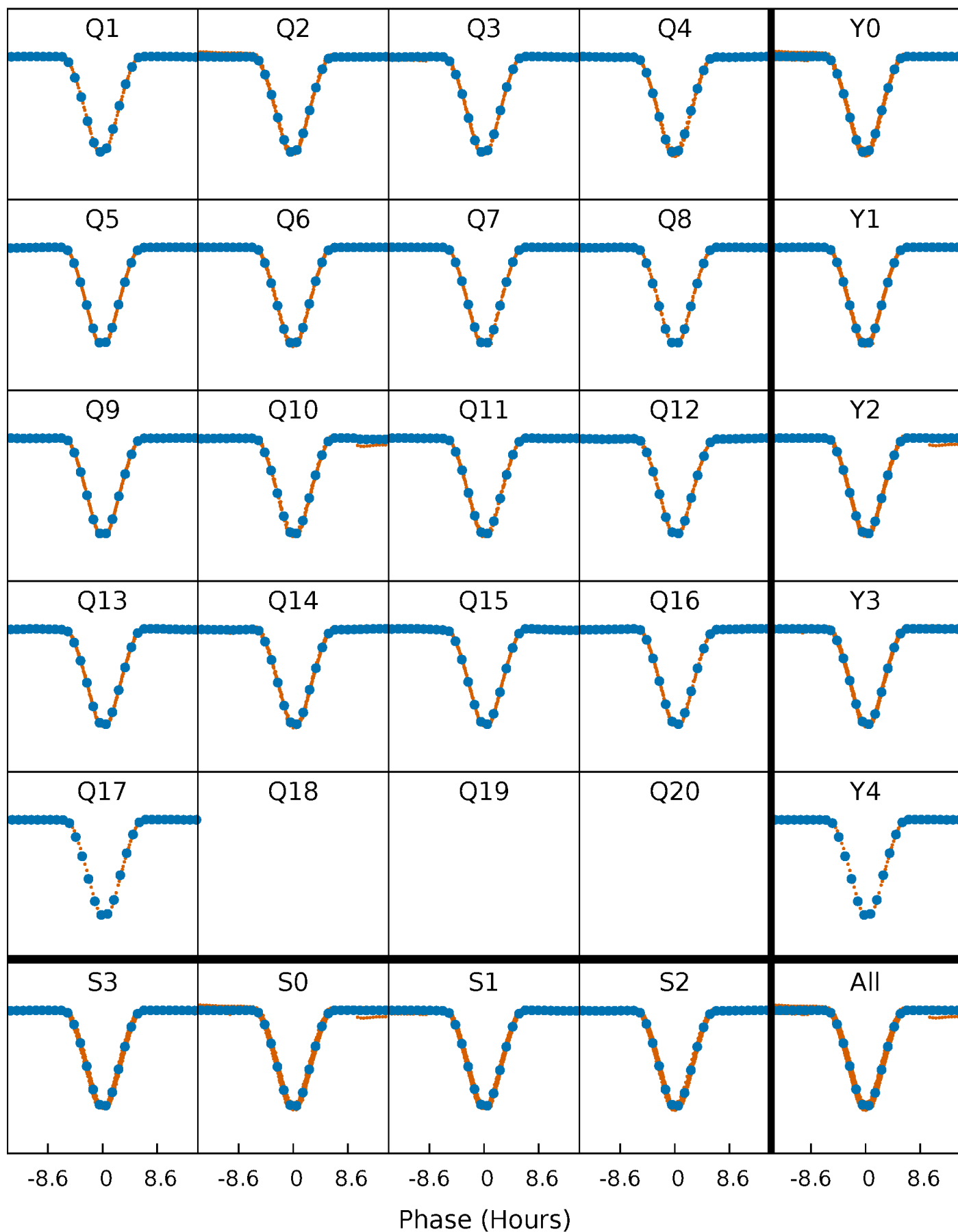


Planet 1 : Phased Whitened Flux Time Series (TPS Epoch/Period)



# PDC Quarter-Phased Transit Curves

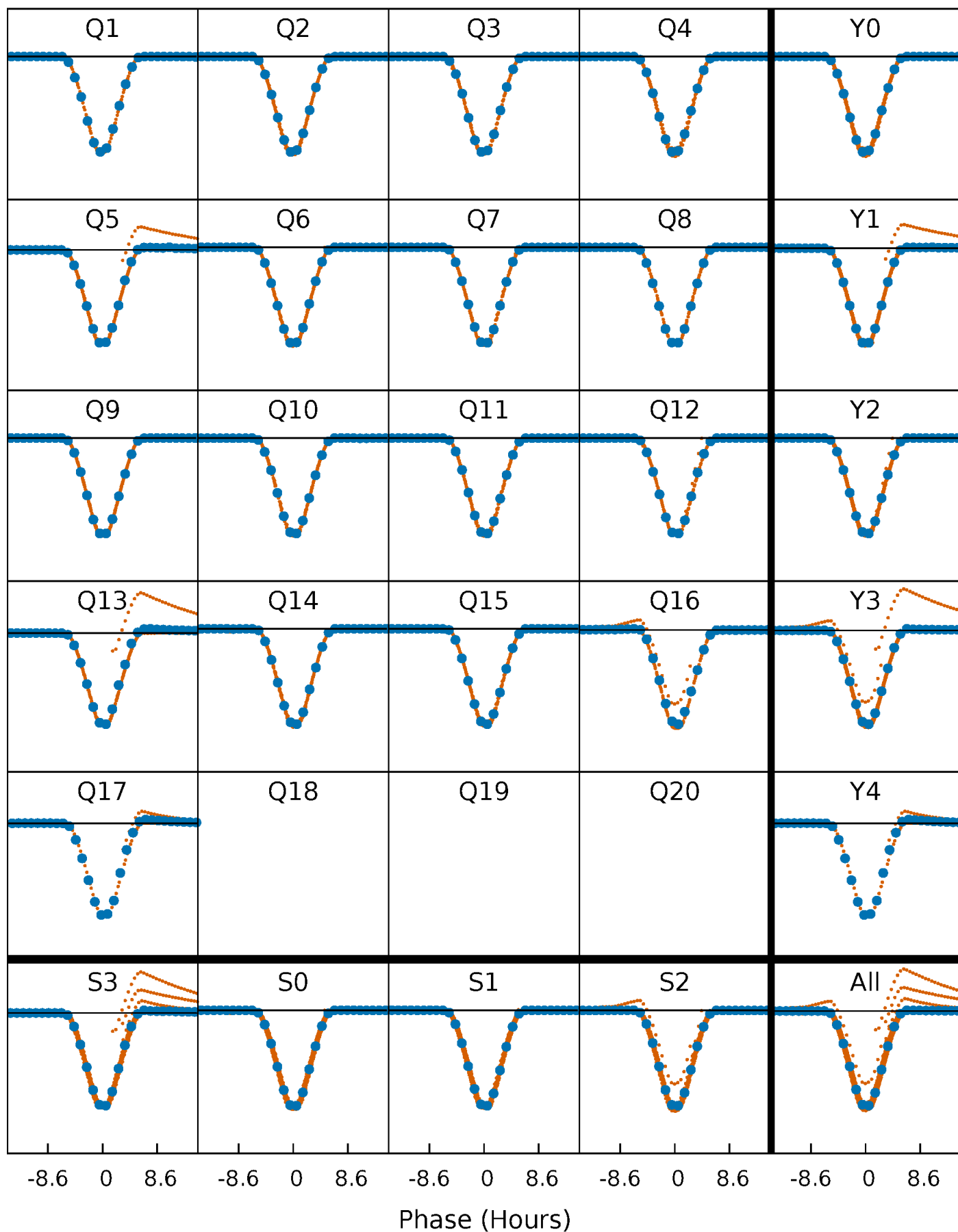
TCE 002306740-01 P= 10.306853 Days  $T_0=133.431748$  (BKJD)





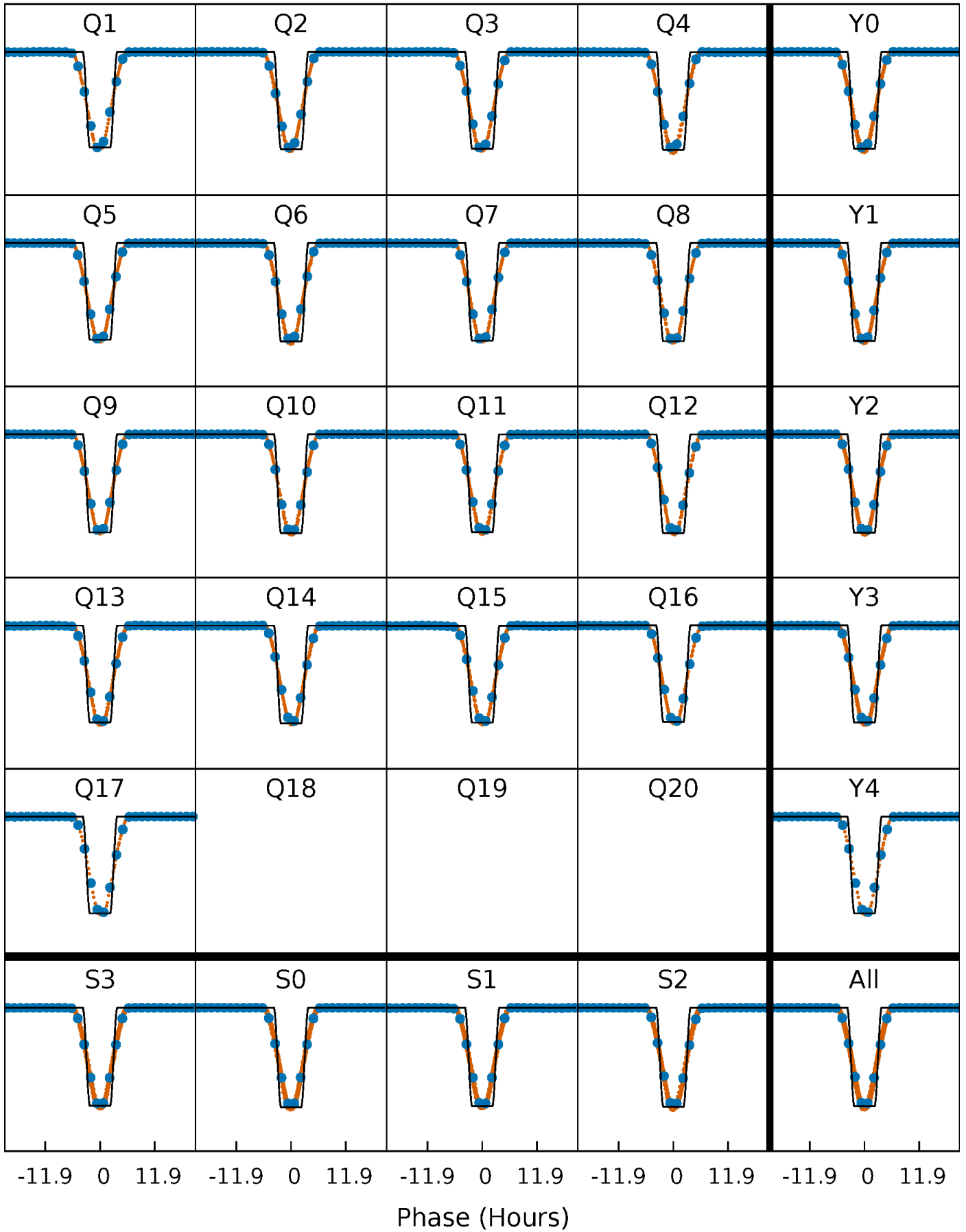
# DV Quarter-Phased Transit Curves

TCE 002306740-01 P= 10.306853 Days  $T_0=133.431748$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

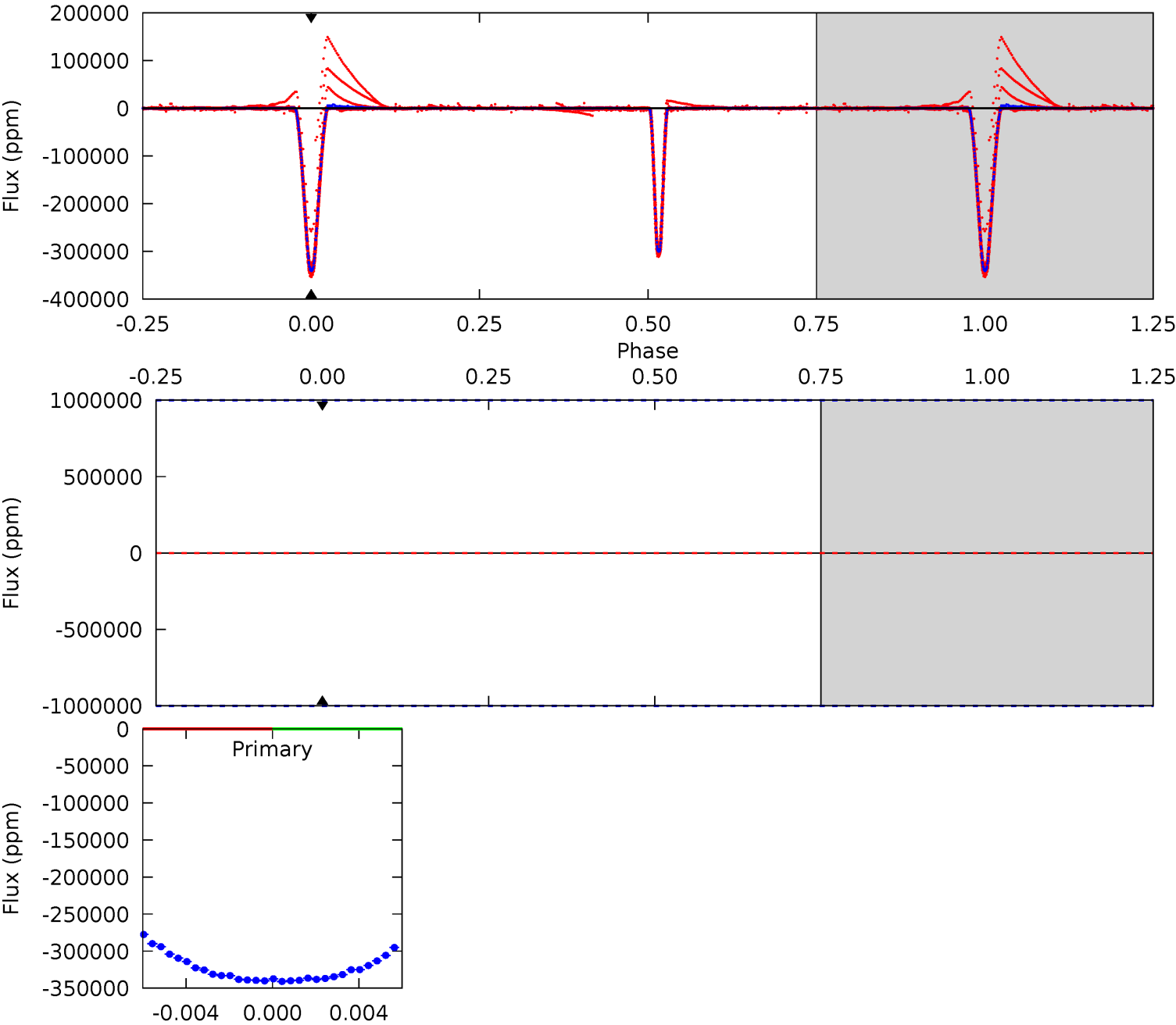
TCE 002306740-01 P= 10.306853 Days  $T_0=133.434156$  (BKJD)



# DV Model-Shift Uniqueness Test

002306740-01, P = 10.306853 Days, E = 123.124895 Days

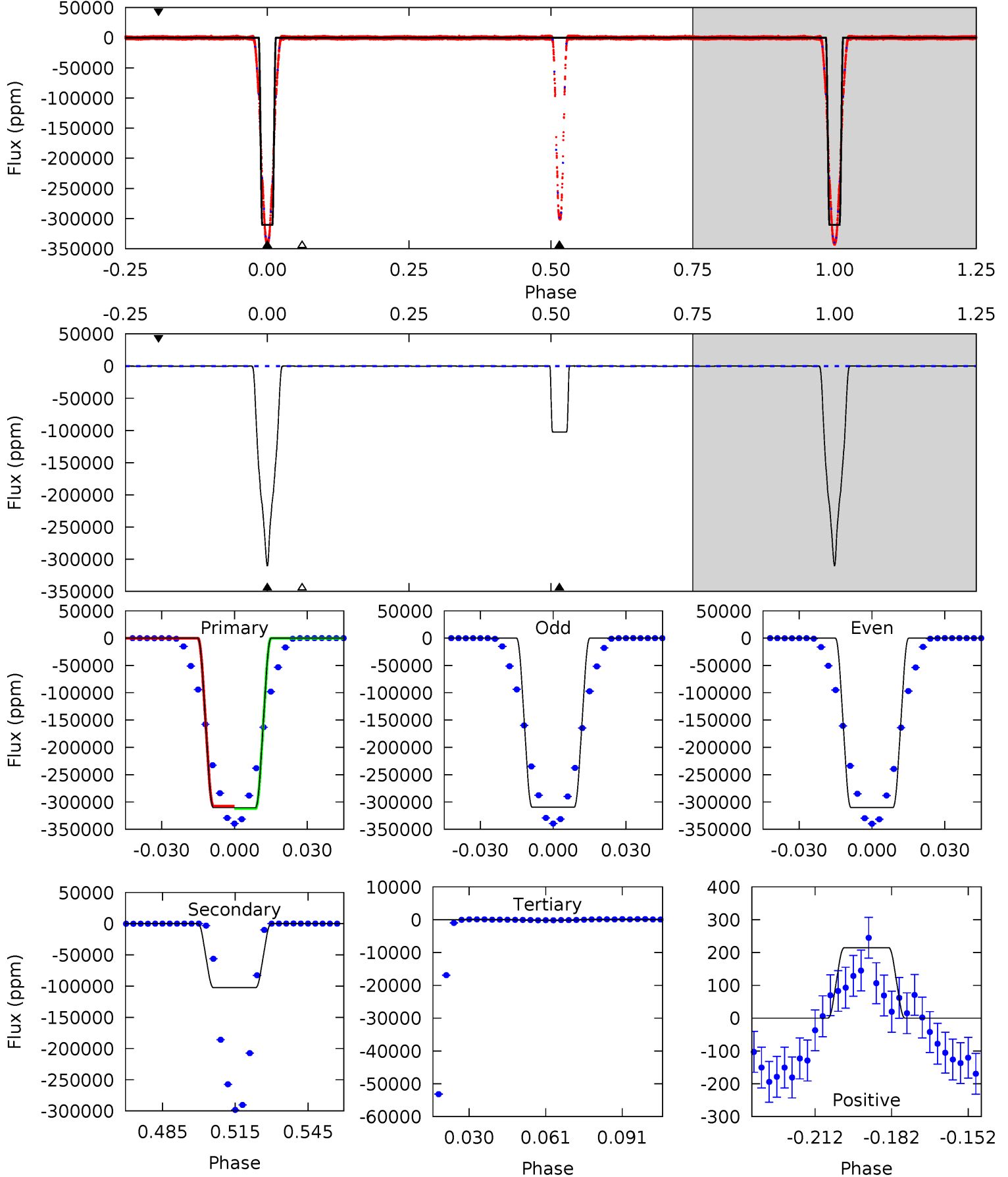
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



# Alt Model-Shift Uniqueness Test

002306740-01, P = 10.306853 Days, E = 123.127303 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
8022	2650	4.86	5.55	4.81	2.17	2.45	8017	8016	2645	2644	8.03	1.01	0.00	0



### Stellar Parameters For KIC 002306740

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5912^{+160}_{-160}$	$4.225^{+0.258}_{-0.172}$	$-0.300^{+0.300}_{-0.300}$	$1.217^{+0.326}_{-0.326}$	$0.907^{+0.131}_{-0.087}$	$0.709^{+1.056}_{-0.319}$
	+3%/-3%	+6%/-4%	+100%/-100%	+27%/-27%	+14%/-10%	+149%/-45%
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 002306740-01 / KOI 6265.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$0 \pm 1000000$	$43.62^{+15.93}_{-13.08}$	$1337^{+95}_{-112}$	$-2590^{+8658}_{-3136}$	$-1.159^{+320.800}_{-239.475}$
Alt.	$-102515 \pm 39$	$76.43^{+17.94}_{-15.72}$	$1341^{+107}_{-107}$	$4672^{+388}_{-327}$	$85^{+56}_{-28}$

$T_{max}$  = Theoretical Maximum Planetary Temperature  
 $T_{obs}$  = Observed Planetary Temperature (Assuming  $A=0.3$ )  
 $A_{obs}$  = Observed Albedo (Assuming  $T=0$ )

If a secondary eclipse is present, the system is likely an EB if  $T_{obs} \gg T_{max}$  AND  $A_{obs} \gg 1.0$

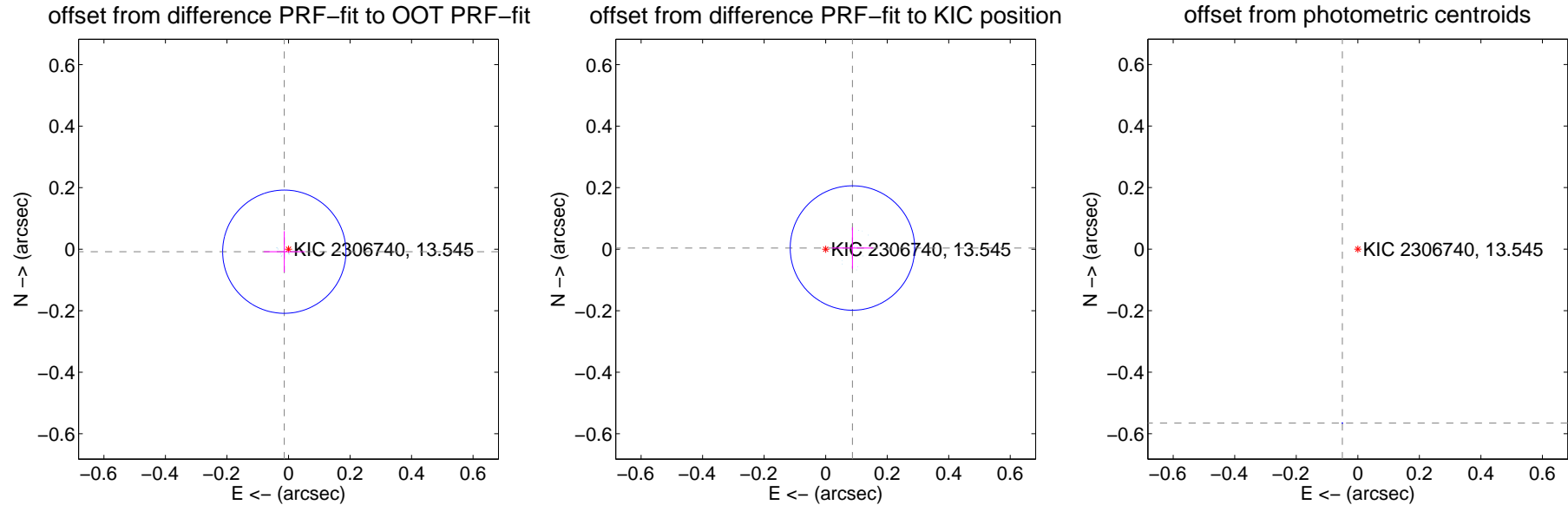
## DV Centroid Data

Supplemental centroid analysis for 002306740-01. Kepler magnitude: 13.54. Transit SNR -1.00

There are 17 quarters with good PRF difference image offsets

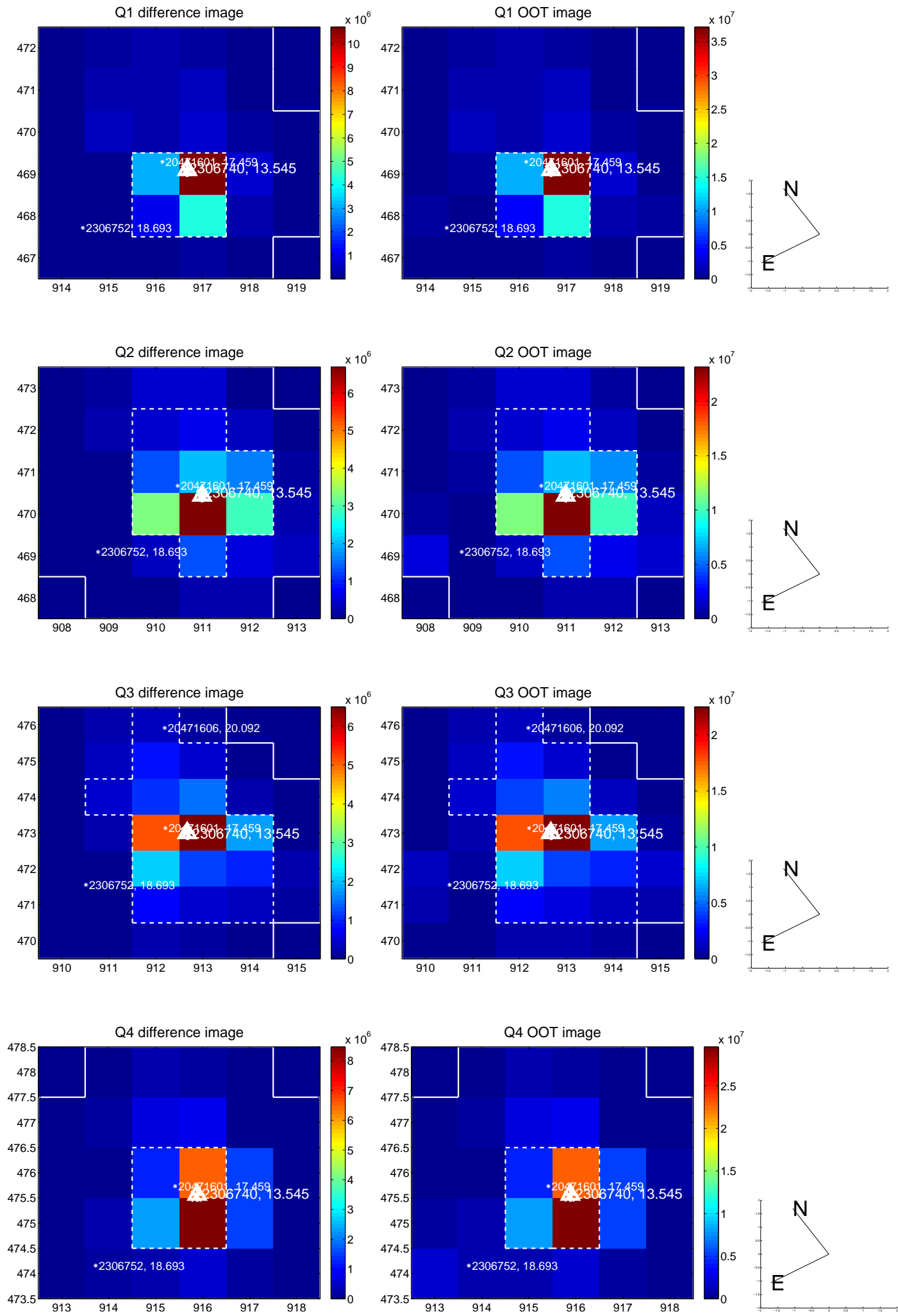
The direct PRF centroid is offset from the target star catalog position by about 0.14 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.016 \pm 0.067$	0.24	$0.014 \pm 0.067$	$-0.008 \pm 0.067$
PRF-fit source offset from KIC position	$0.087 \pm 0.067$	1.29	$-0.087 \pm 0.067$	$0.004 \pm 0.067$
photometric centroid source offset	$0.57 \pm 0.00$	$1573.97$	$0.05 \pm 0.00$	$-0.57 \pm 0.00$

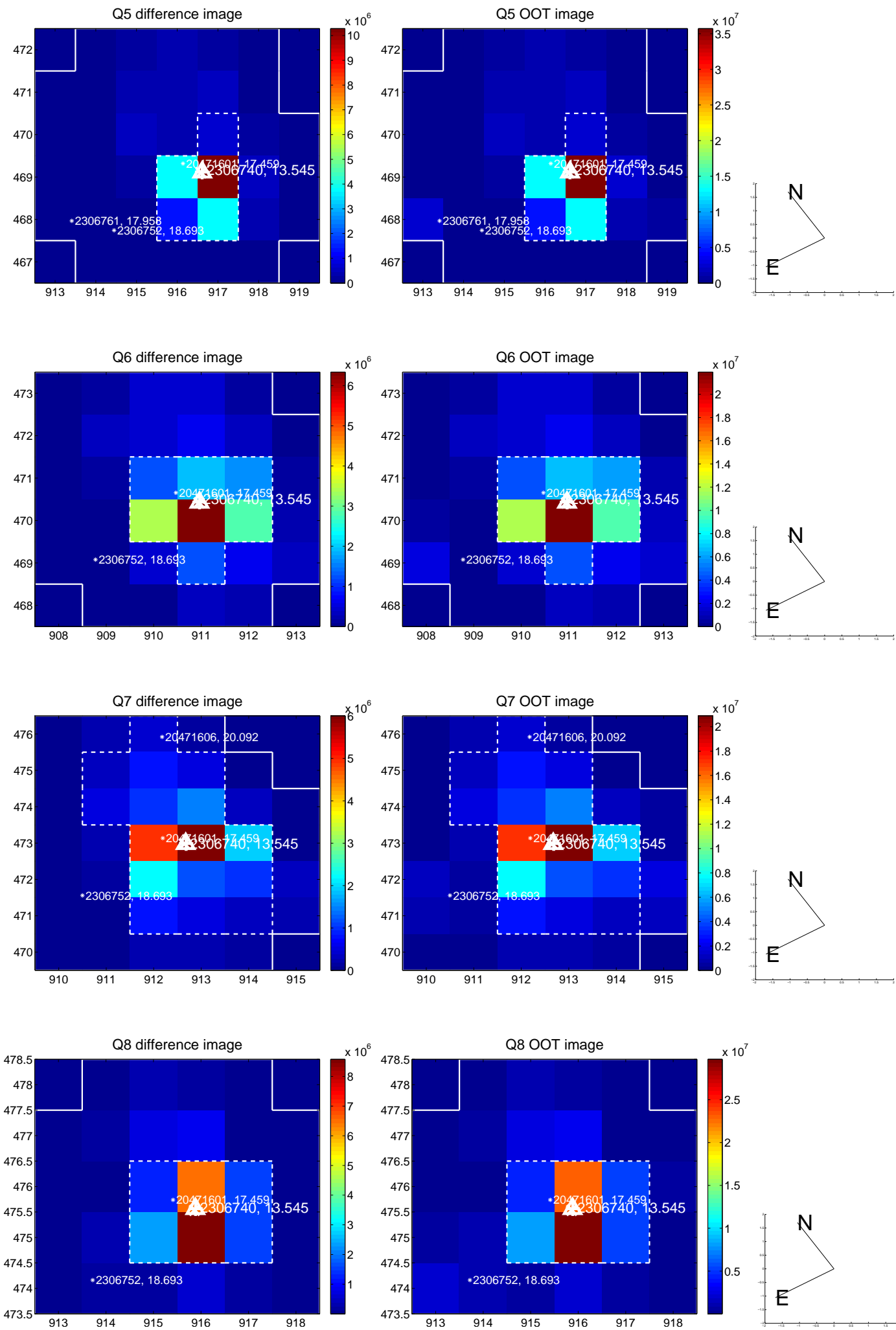


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

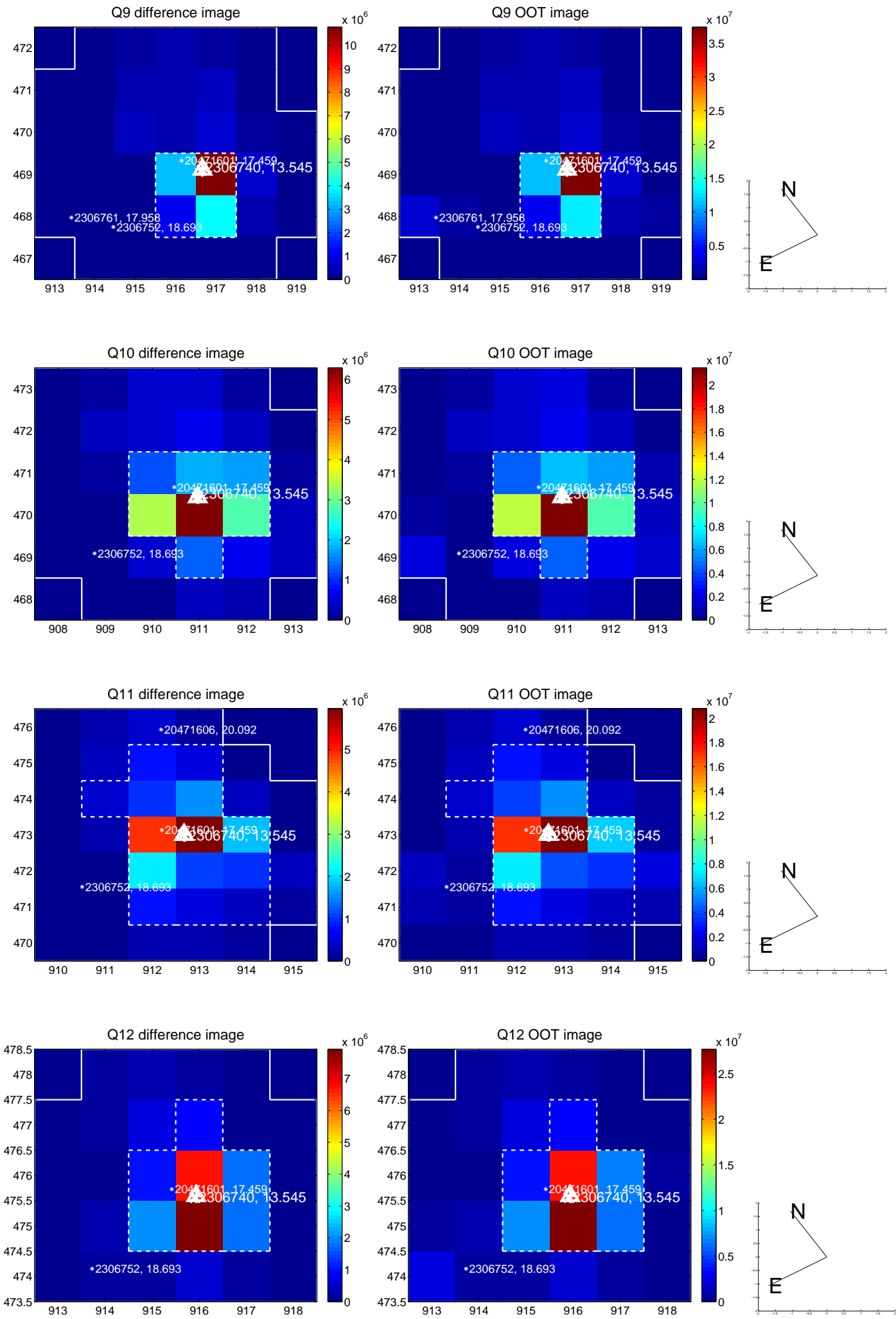


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

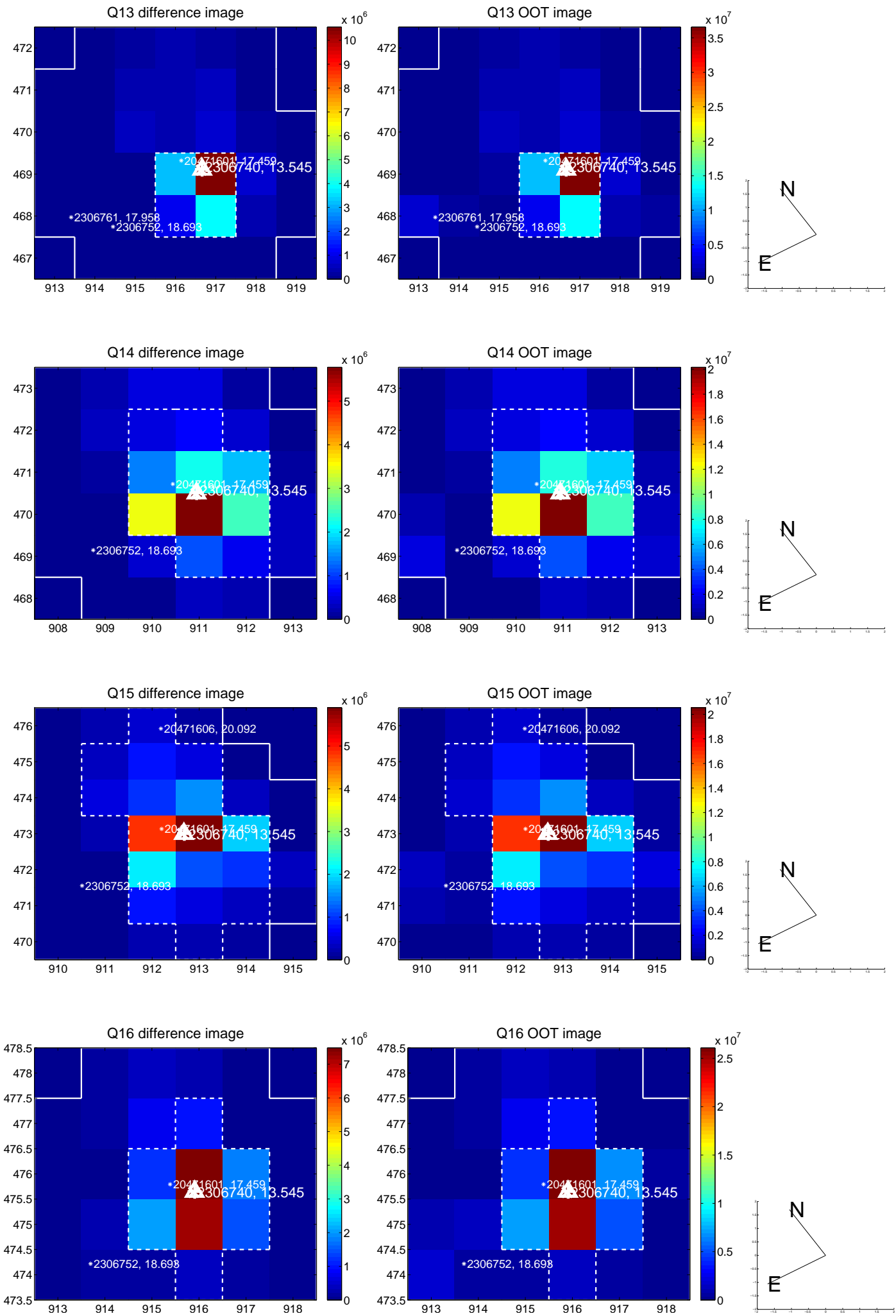




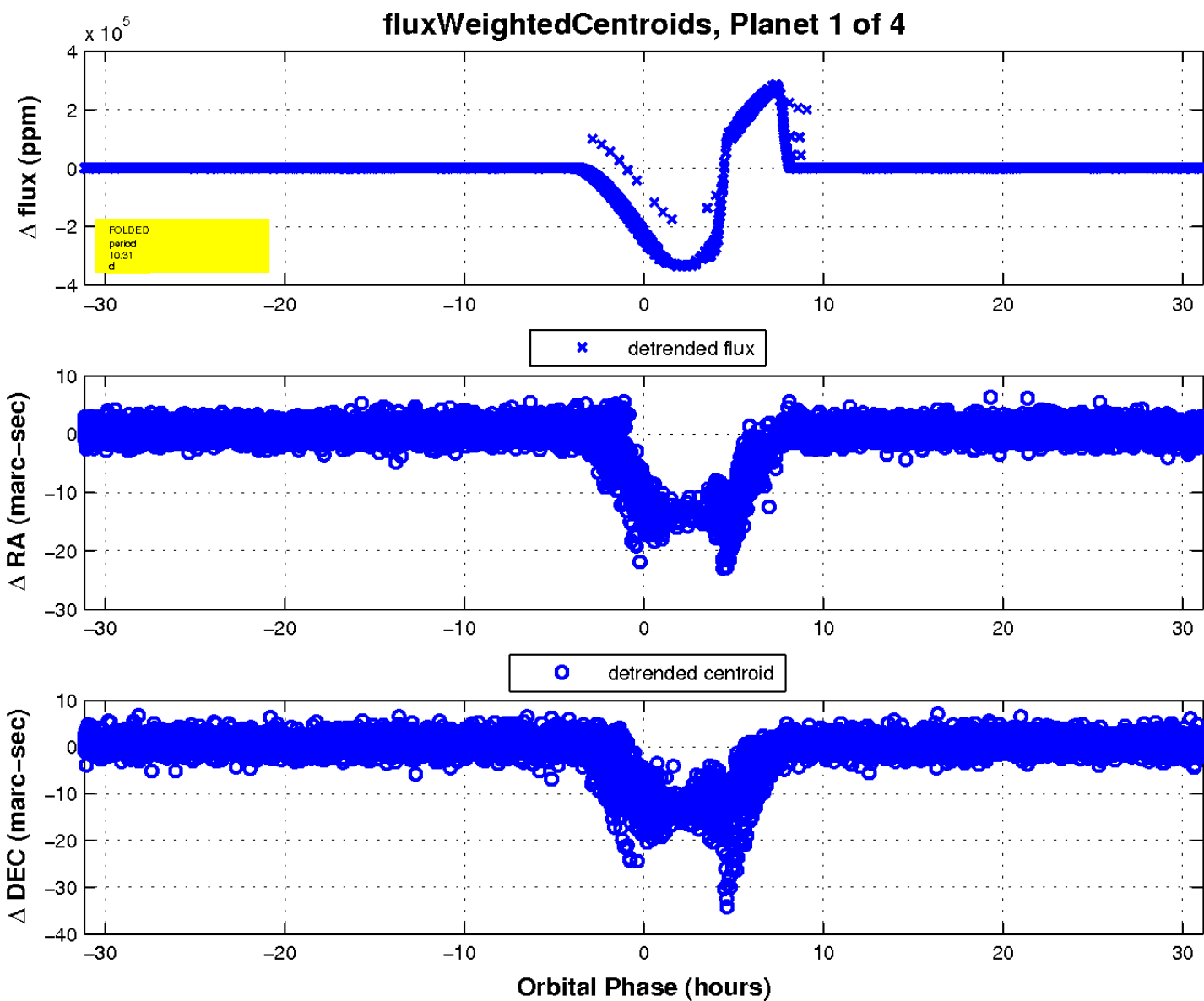
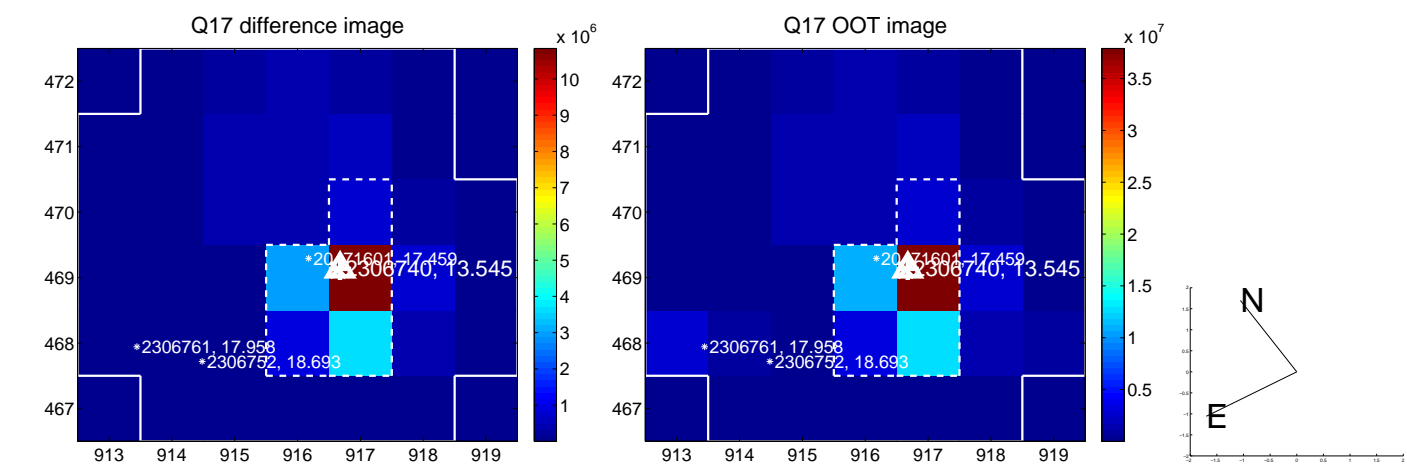
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

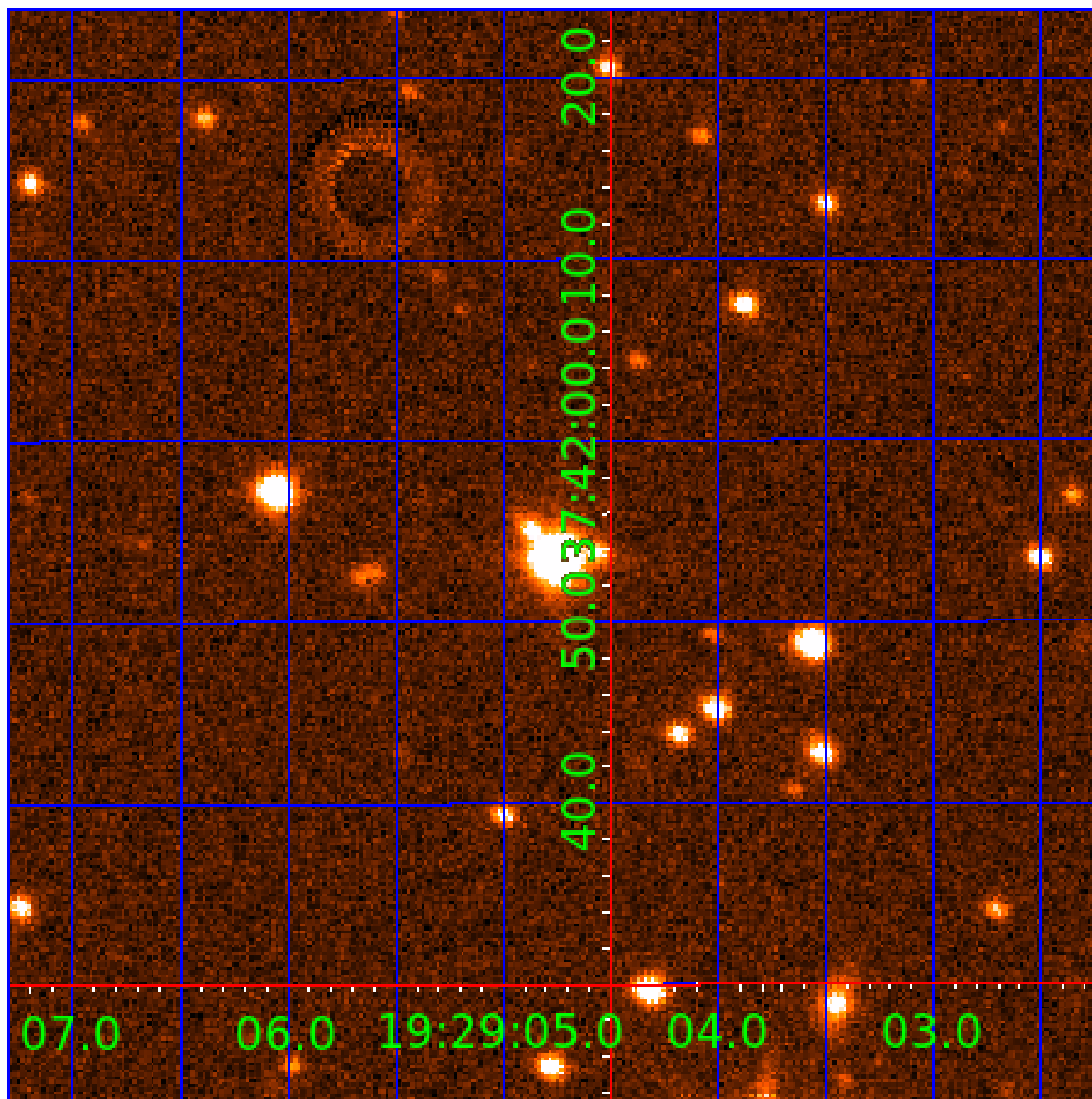


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 002306740

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
002306740-01	OBS	6265.01	10.306853	133.431748	341526.1	7.500	12864.7	-1.0	1.22	5912	44.76	201.31
002306740-02	OBS	No	5.153438	133.595217	300051.5	3.500	13343.3	-1.0	1.22	5912	50.55	507.26
002306740-03	OBS	No	164.914654	241.810326	72180.2	17.275	260.5	254.7	1.22	5912	55.66	4.99
002306740-04	OBS	No	7.730062	135.945076	19188.2	15.000	836.5	-1.0	1.22	5912	16.82	295.43

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002306740-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_ALT—HAS_SEC_TCE—CENT_NOFITS
002306740-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE—CENT_NOFITS
002306740-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_ZUMA_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT— MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
002306740-04	OBS	FP	0.00	1	0	0	0	LPP_DV—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.

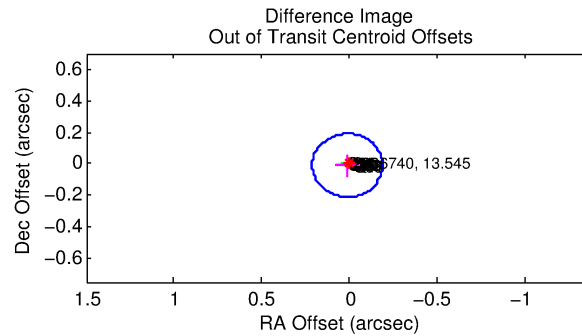
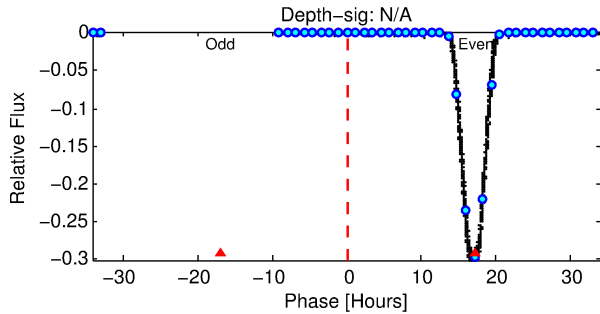
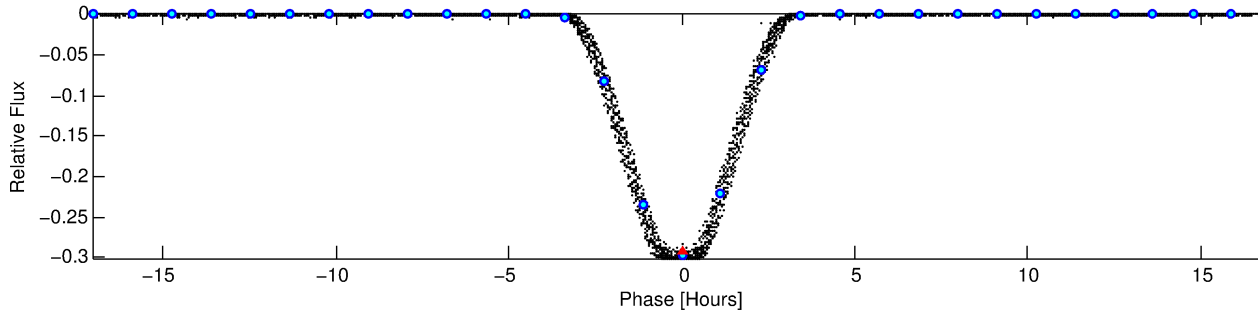
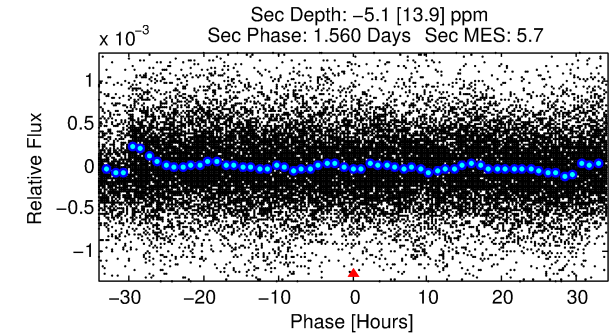
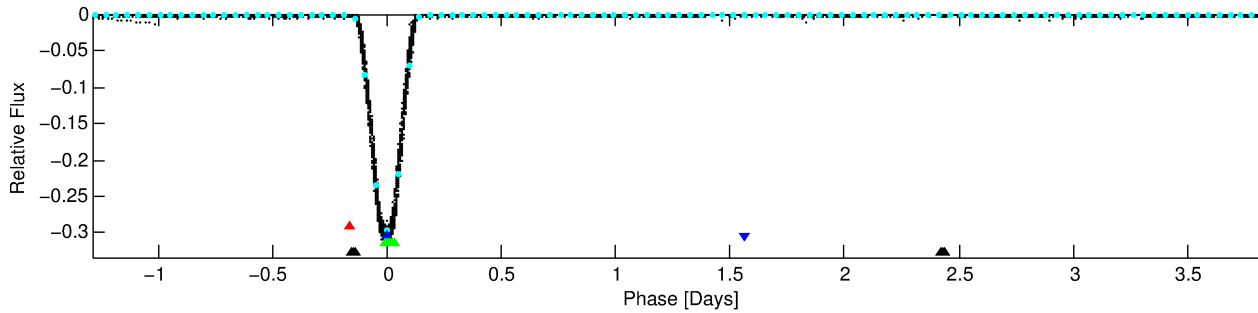
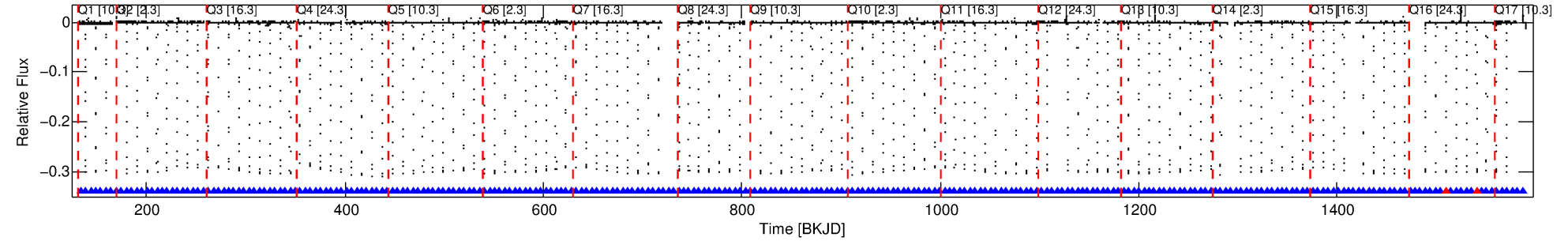
## Ephemeris Match Information For 002306740-02

No Significant Match Found

# DV One-Page Summary

KIC: 2306740 Candidate: 2 of 4 Period: 5.153 d  
KOI: K06265 Corr: No Ephemeris Match

Kp: 13.55 R\*: 1.22 Rs Teff: 5912.0 K Logg: 4.22 Fe/H: -0.300



## TPS TCE Results:

Period = 5.15344 d  
Epoch = 133.5952 BKJD

DV fit results are unavailable

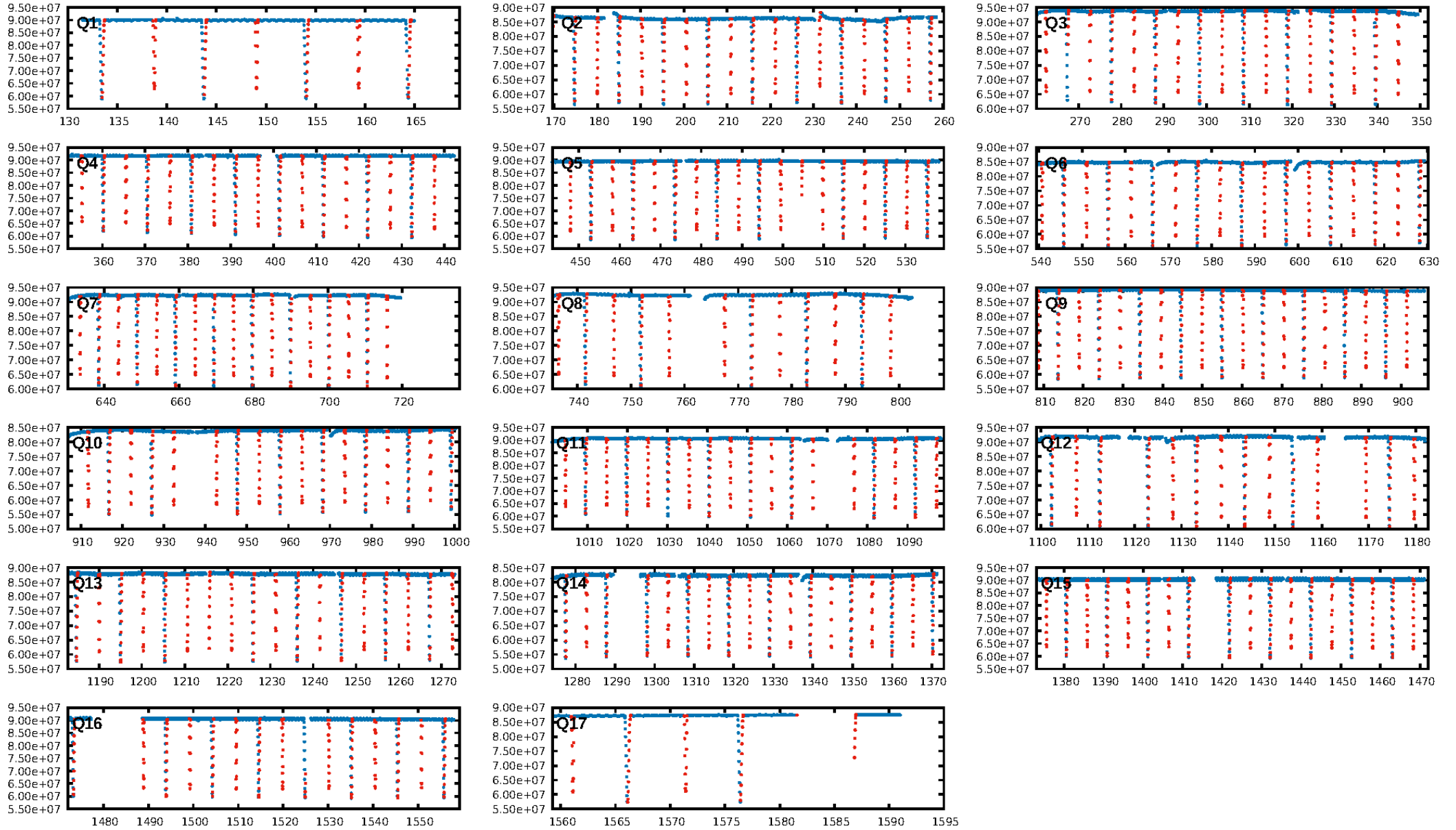
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [4.01σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 0.98 [127/129]  
GhostDiagnostic-chr: 1.325  
Centroid-sig: N/A  
Centroid-so: 0.584 arcsec [1662.43σ]  
OotOffset-rm: 0.015 arcsec [0.23σ]  
KicOffset-rm: 0.091 arcsec [1.36σ]  
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]

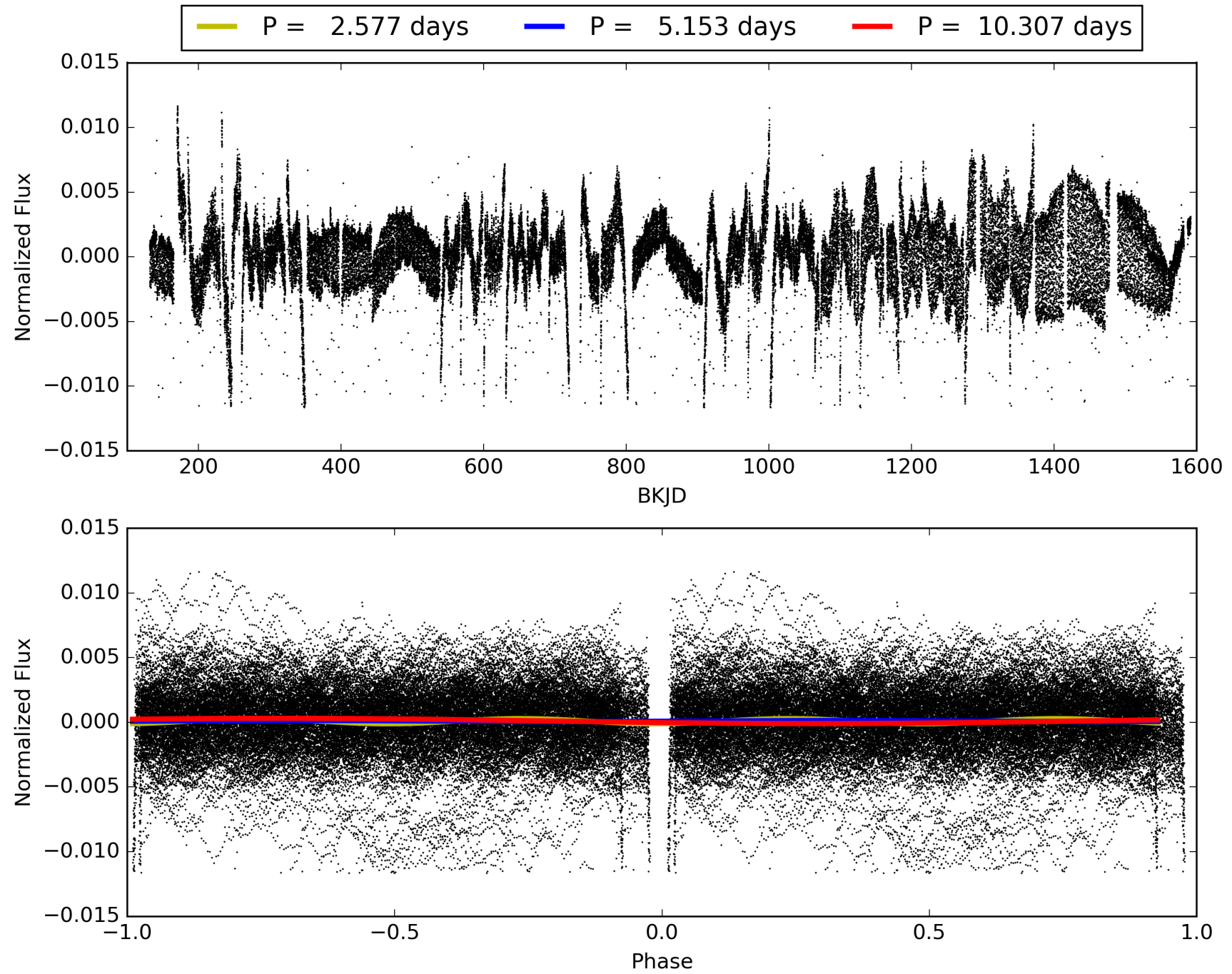
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 07:08:03 Z

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

# TCE 002306740-02, PDC Light Curves



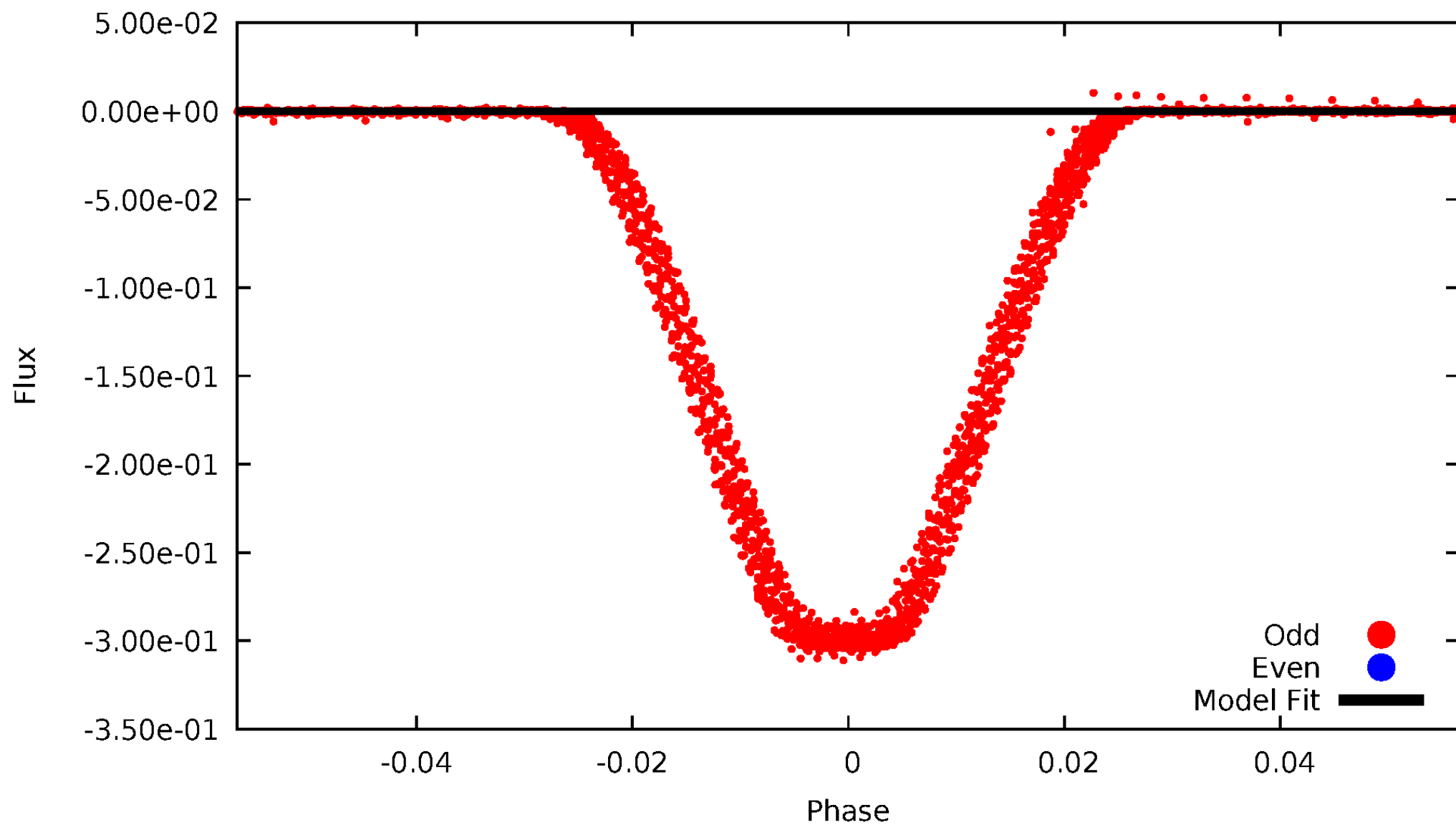
TCE 002306740-02





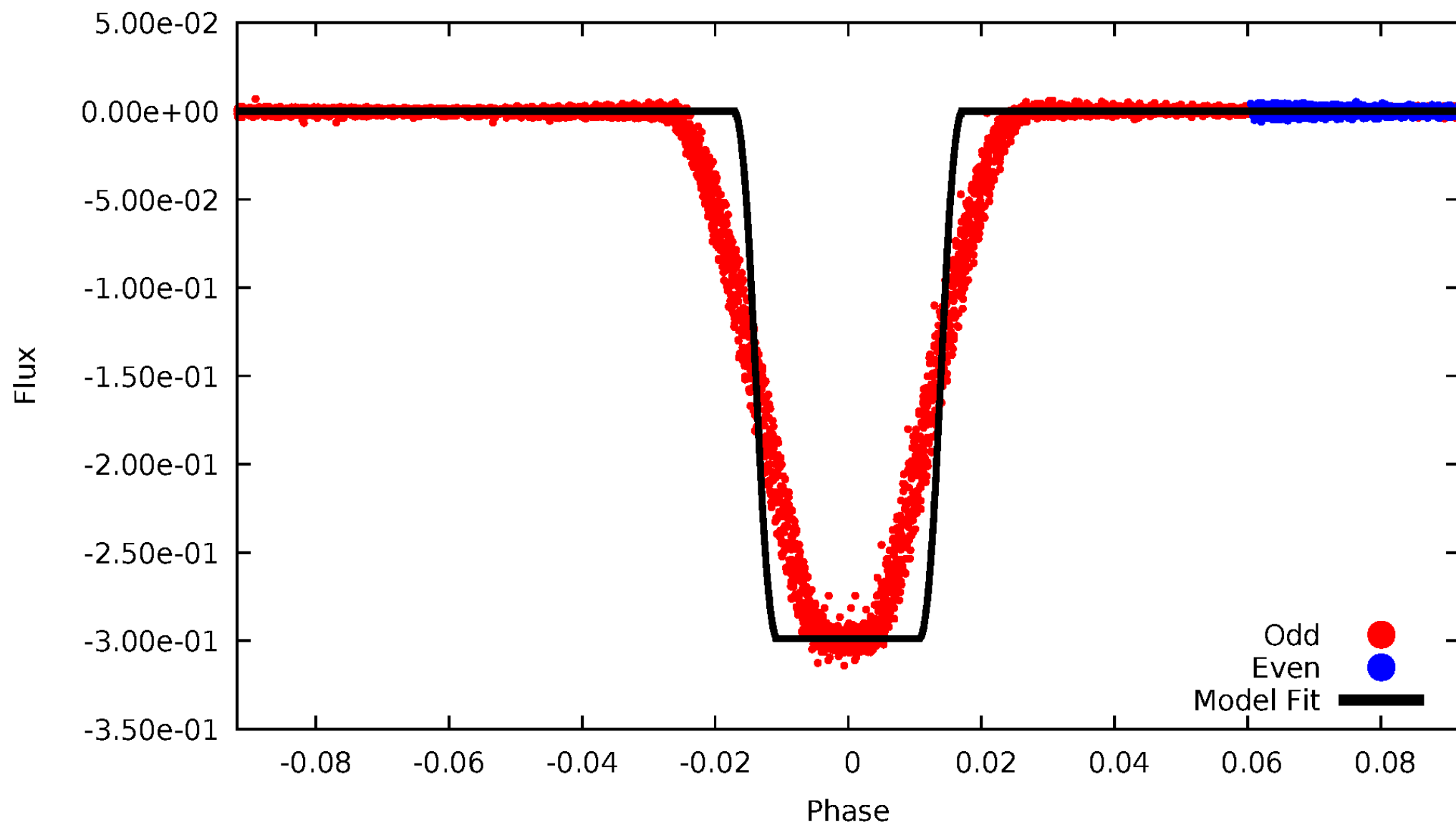
# DV Odd/Even

TCE 002306740-02



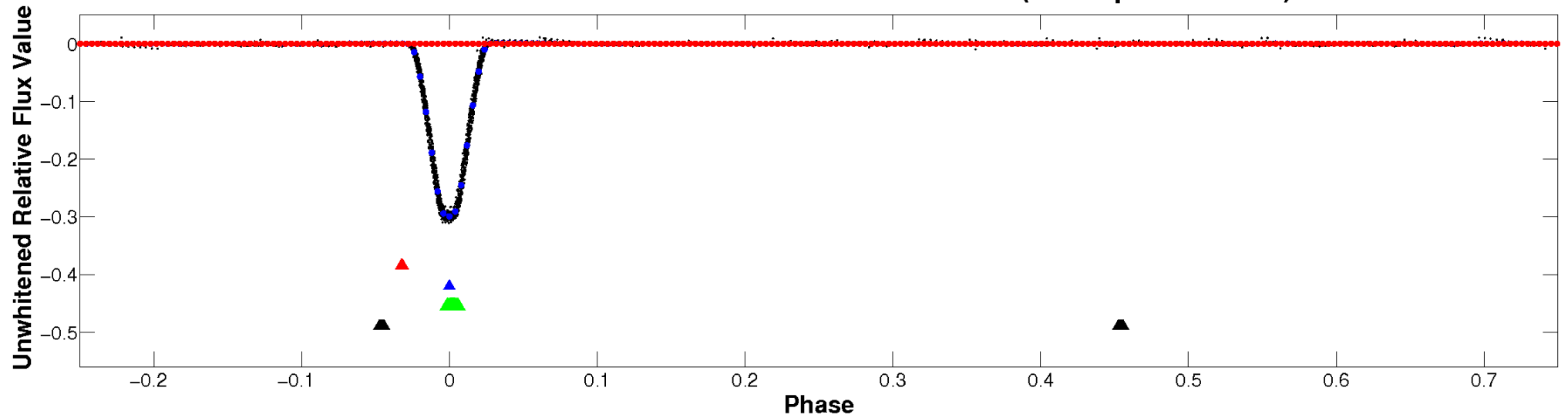
# ALT Odd/Even

TCE 002306740-02



# Non-Whitened Vs. Whitened Light Curve

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

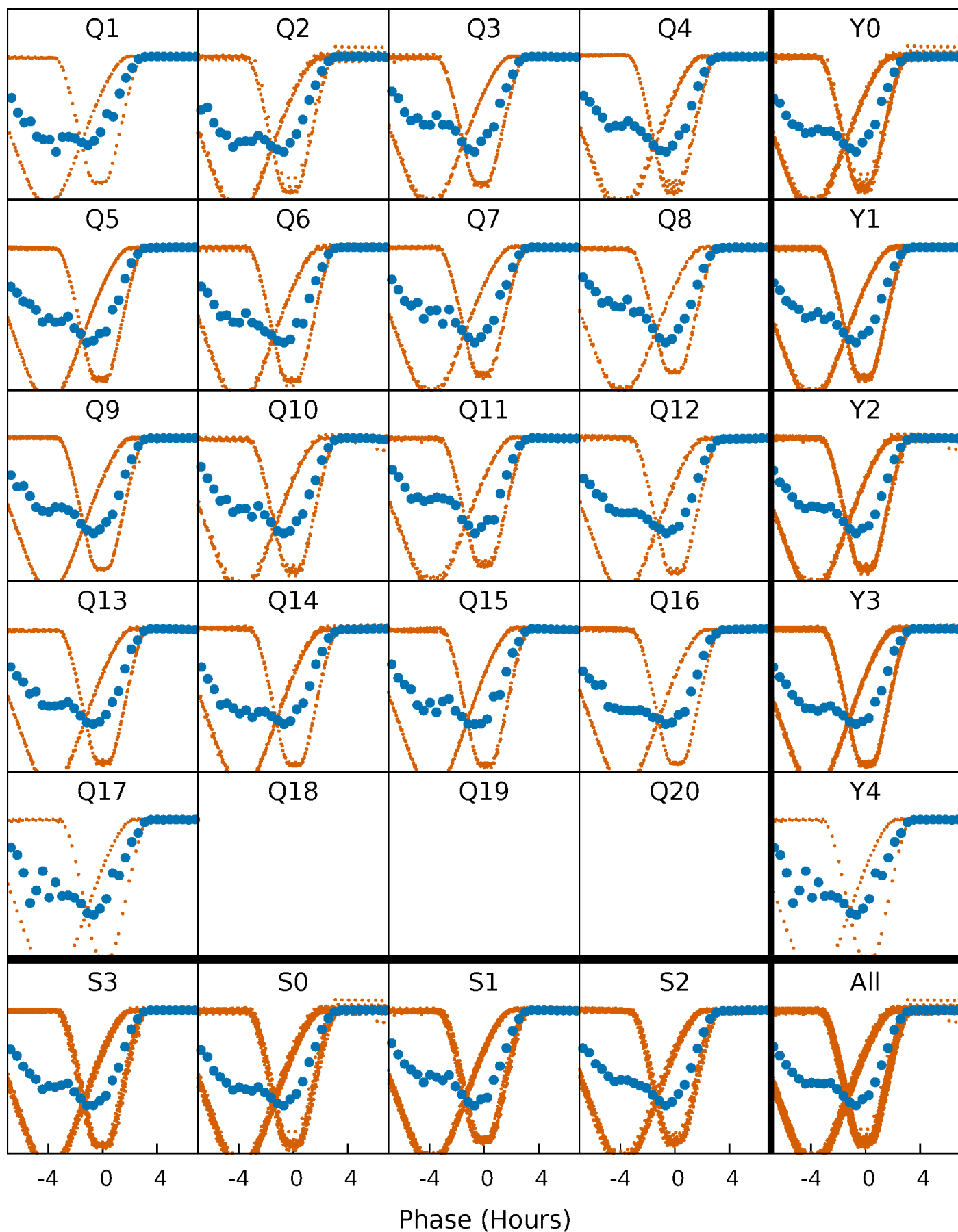


**Planet 2 : Phased Whitened Flux Time Series (TPS Epoch/Period)**



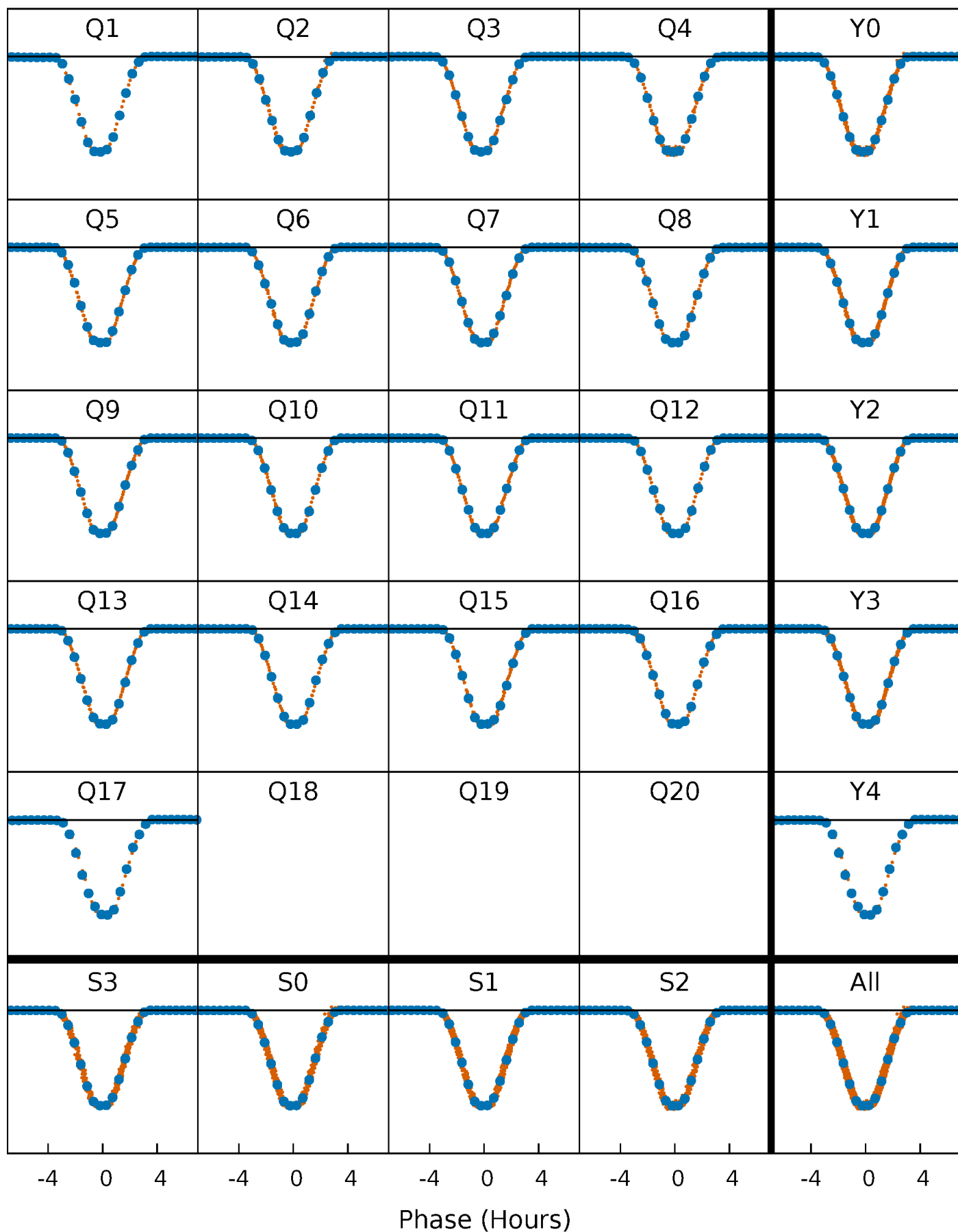
# PDC Quarter-Phased Transit Curves

TCE 002306740-02 P= 5.153438 Days  $T_0=133.595217$  (BKJD)



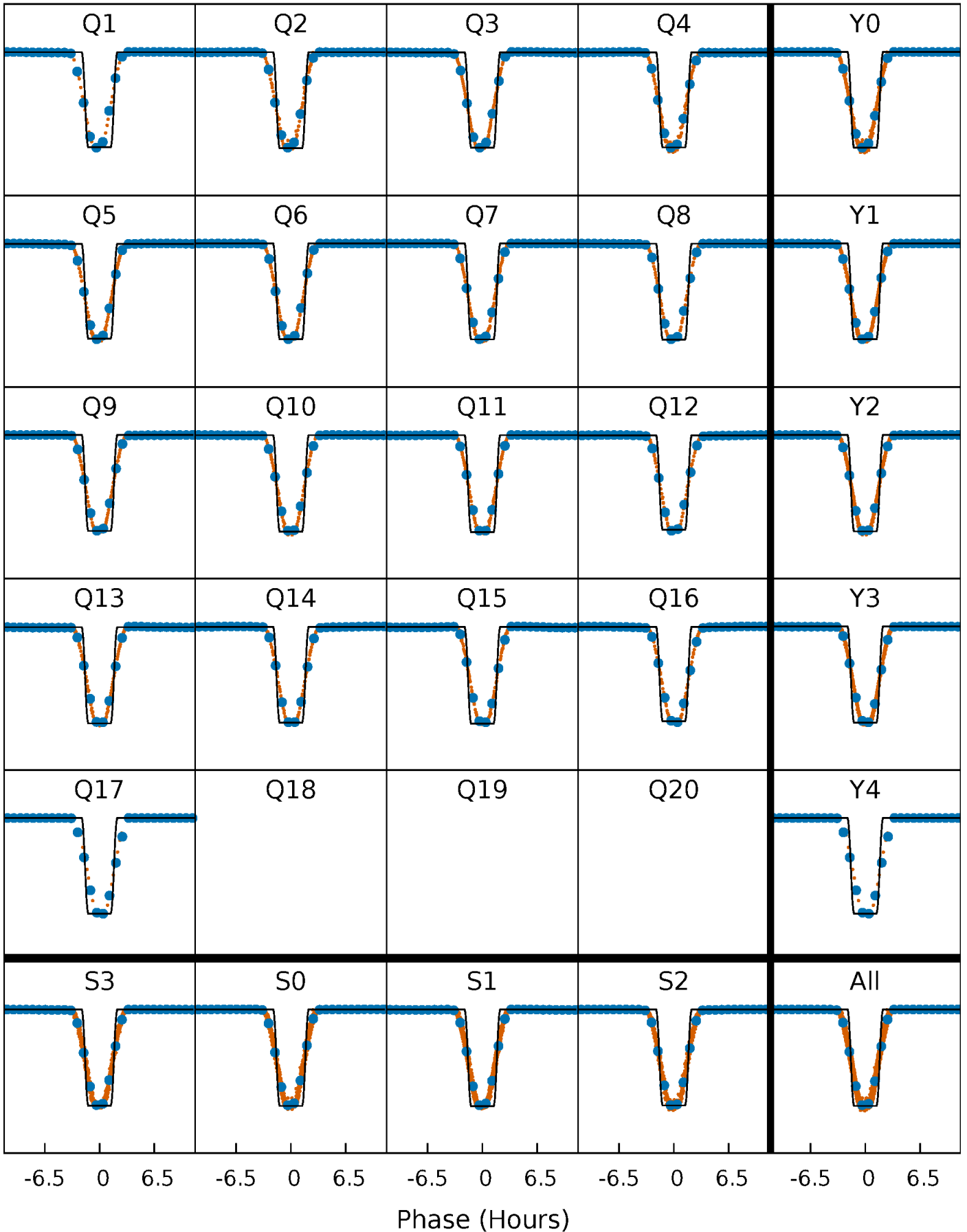
# DV Quarter-Phased Transit Curves

TCE 002306740-02   P= 5.153438 Days    $T_0=133.595217$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

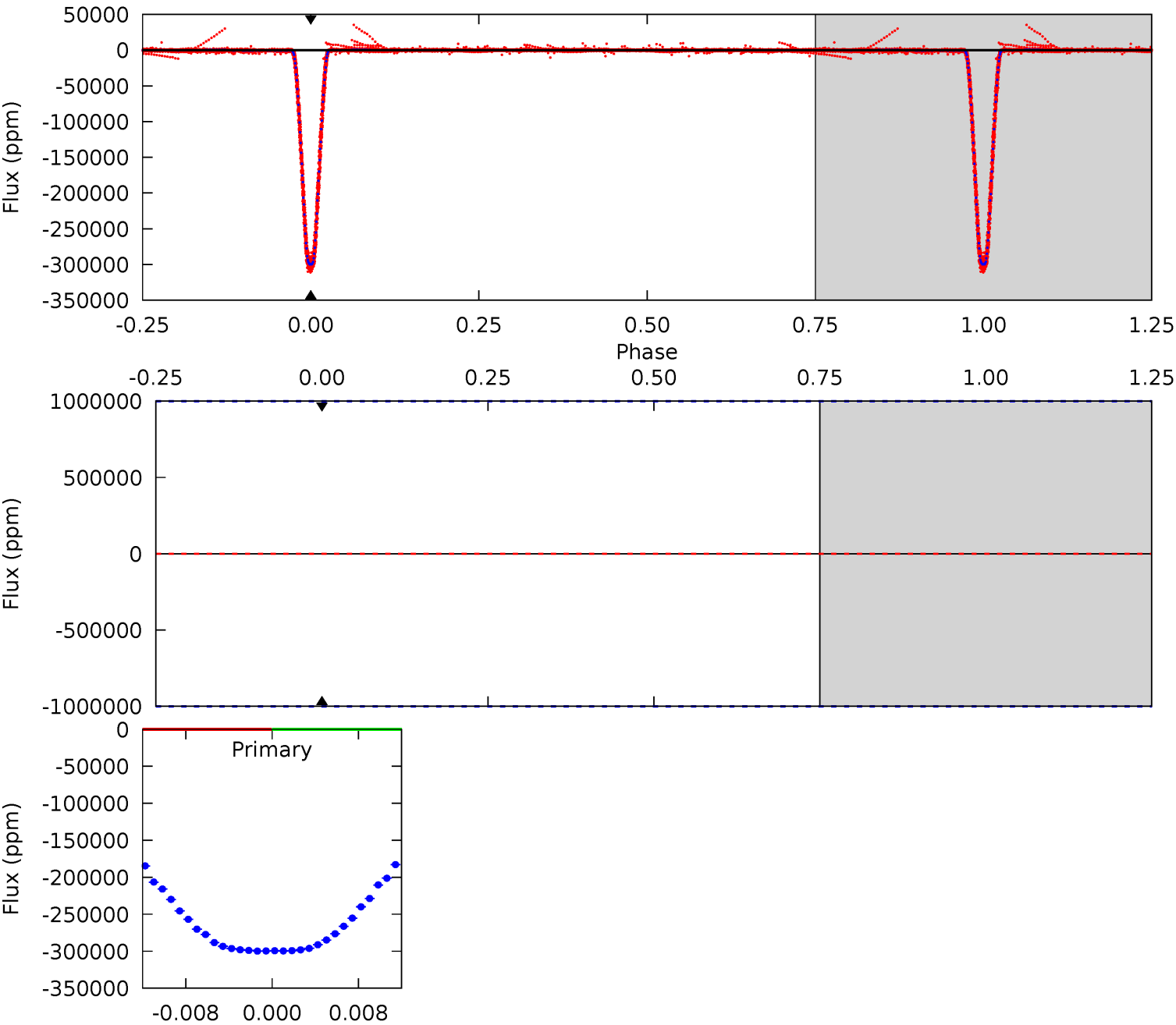
TCE 002306740-02   P= 5.153438 Days    $T_0=133.596057$  (BKJD)



# DV Model-Shift Uniqueness Test

002306740-02, P = 5.153438 Days, E = 128.441779 Days

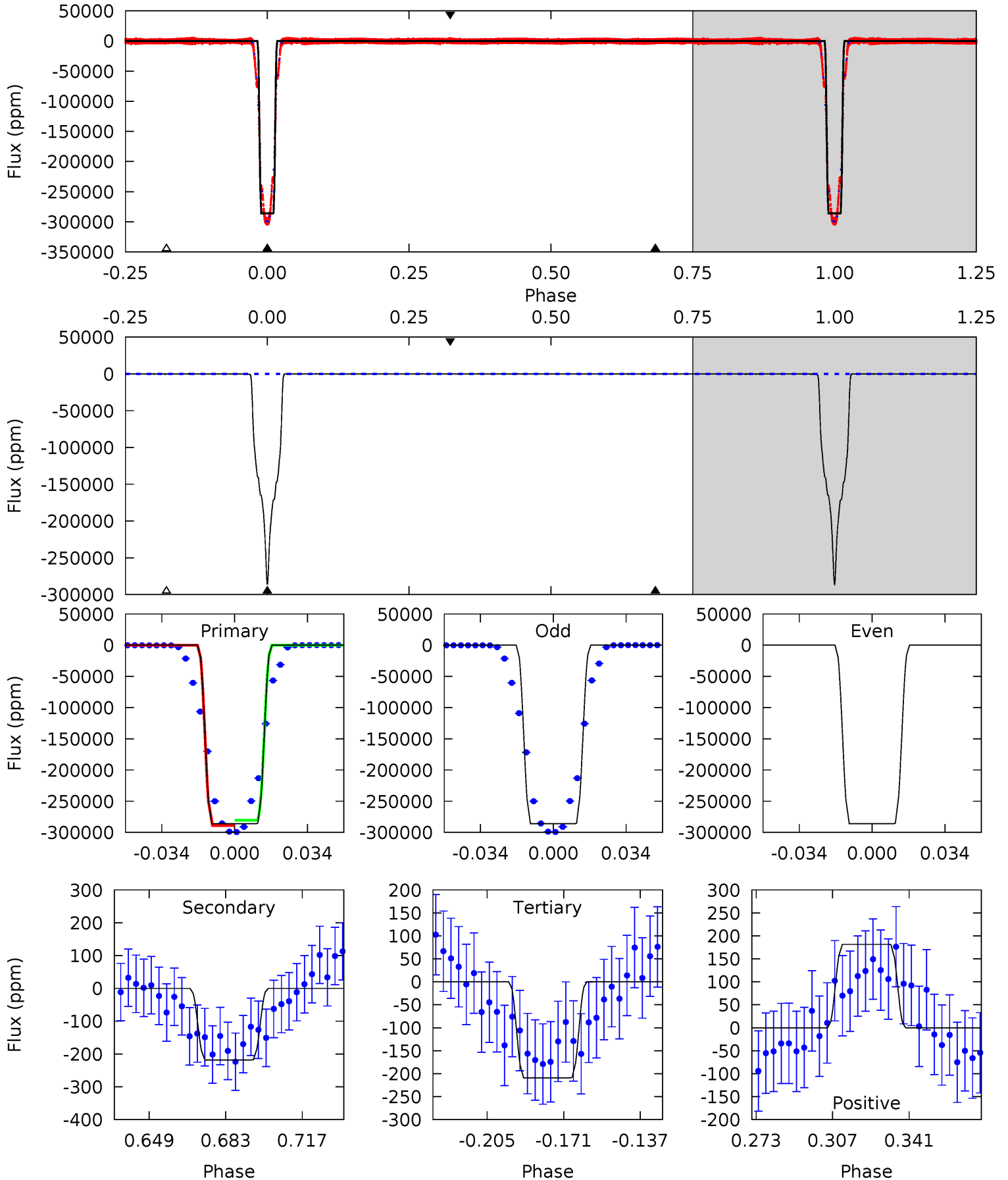
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



# Alt Model-Shift Uniqueness Test

002306740-02, P = 5.153438 Days, E = 128.442619 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
4247	3.24	3.10	2.69	4.79	2.12	1.41	4244	4244	0.14	0.55	0	1.00	0.00	63.6





### Stellar Parameters For KIC 002306740

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5912^{+160}_{-160}$	$4.225^{+0.258}_{-0.172}$	$-0.300^{+0.300}_{-0.300}$	$1.217^{+0.326}_{-0.326}$	$0.907^{+0.131}_{-0.087}$	$0.709^{+1.056}_{-0.319}$
	+3%/-3%	+6%/-4%	+100%/-100%	+27%/-27%	+14%/-10%	+149%/-45%
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 002306740-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$0 \pm 1000000$	$49.97^{+15.80}_{-13.58}$	$1683^{+128}_{-137}$	$-2583^{+8213}_{-2823}$	$-0.588^{+84.001}_{-71.452}$
Alt.	$-218 \pm 67$	$70.77^{+18.27}_{-16.35}$	$1681^{+131}_{-125}$	$-2219^{+139}_{-103}$	$0.078^{+0.060}_{-0.035}$

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

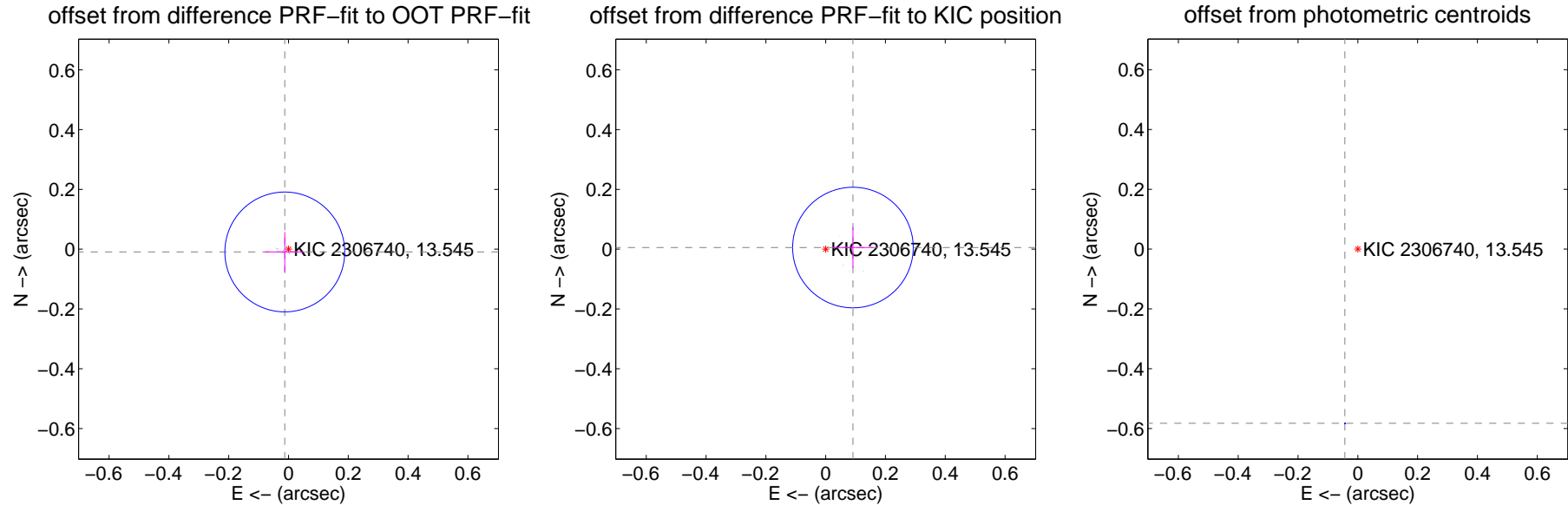
## DV Centroid Data

Supplemental centroid analysis for 002306740-02. Kepler magnitude: 13.54. Transit SNR -1.00

There are 17 quarters with good PRF difference image offsets

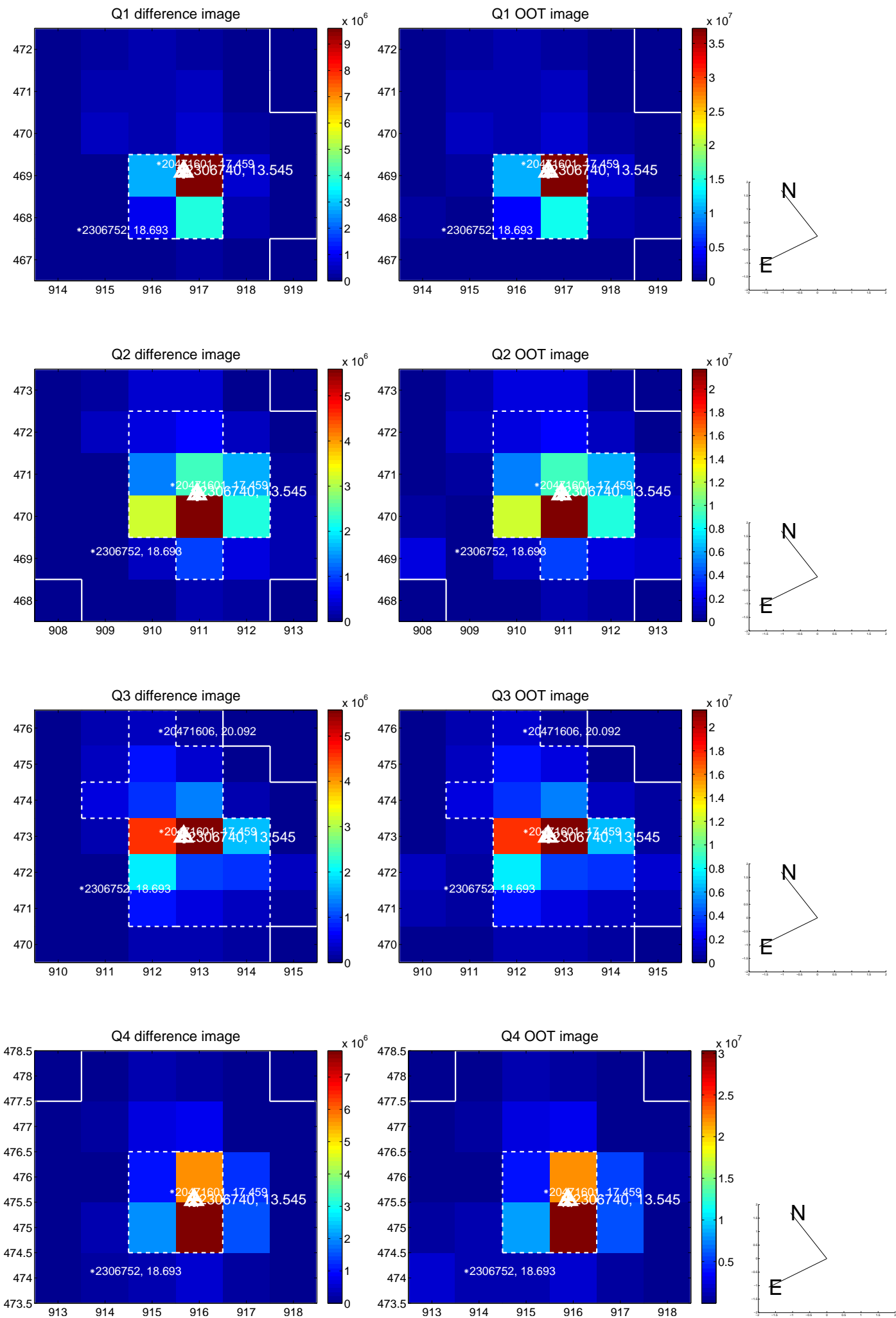
The direct PRF centroid is offset from the target star catalog position by about 0.14 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.015 \pm 0.067$	0.23	$0.012 \pm 0.067$	$-0.009 \pm 0.067$
PRF-fit source offset from KIC position	$0.091 \pm 0.067$	1.36	$-0.091 \pm 0.067$	$0.005 \pm 0.068$
photometric centroid source offset	$0.58 \pm 0.00$	1662.43	$0.04 \pm 0.00$	$-0.58 \pm 0.00$

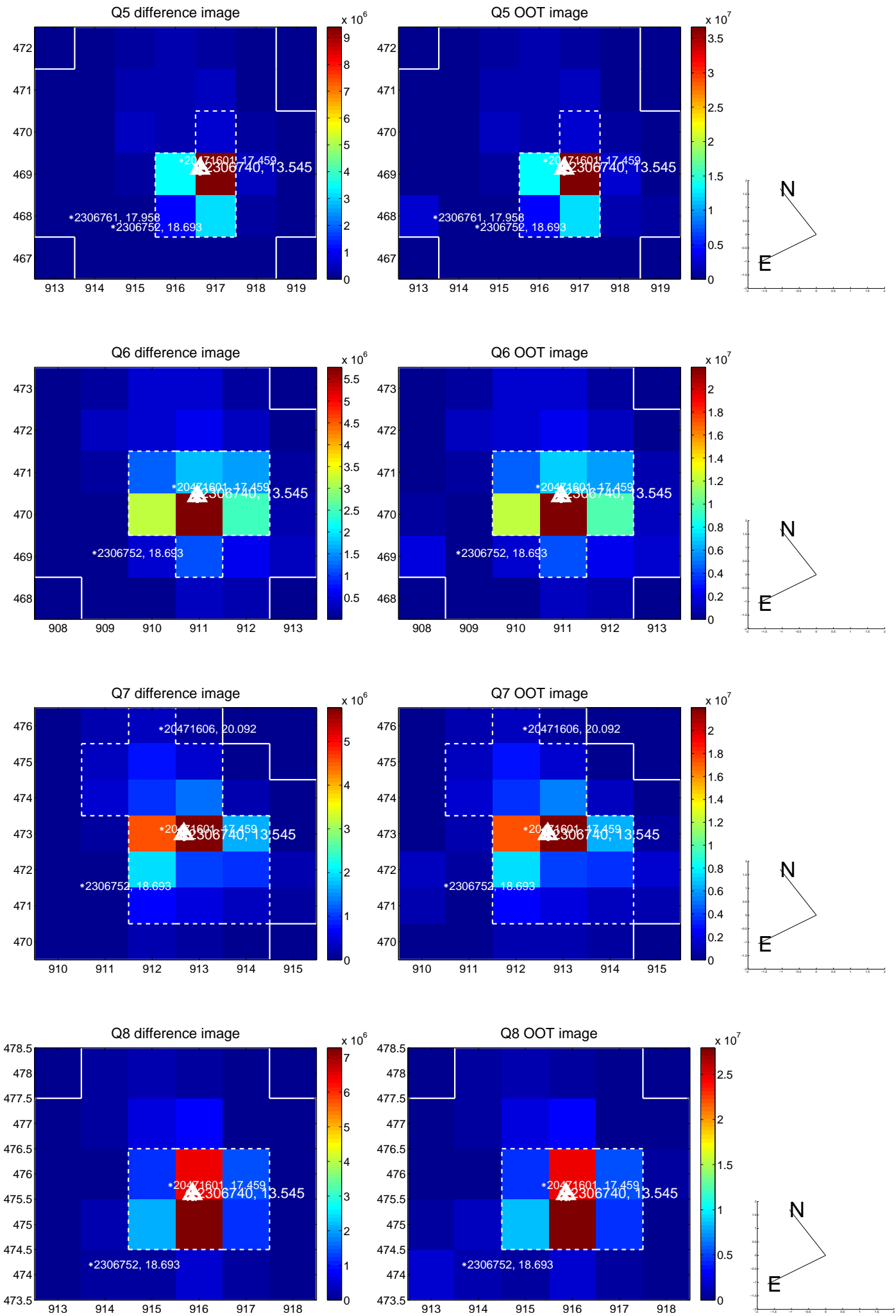


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

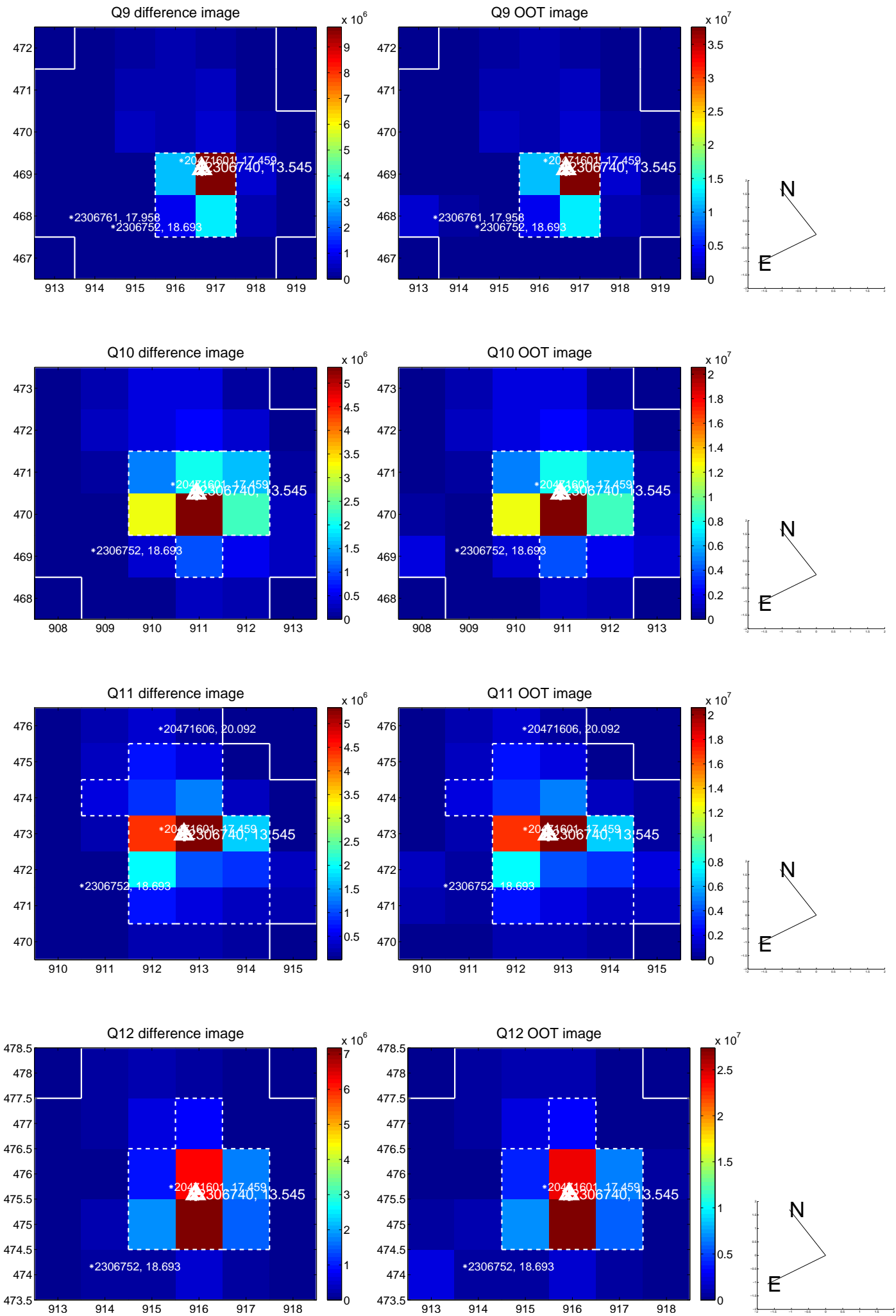
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



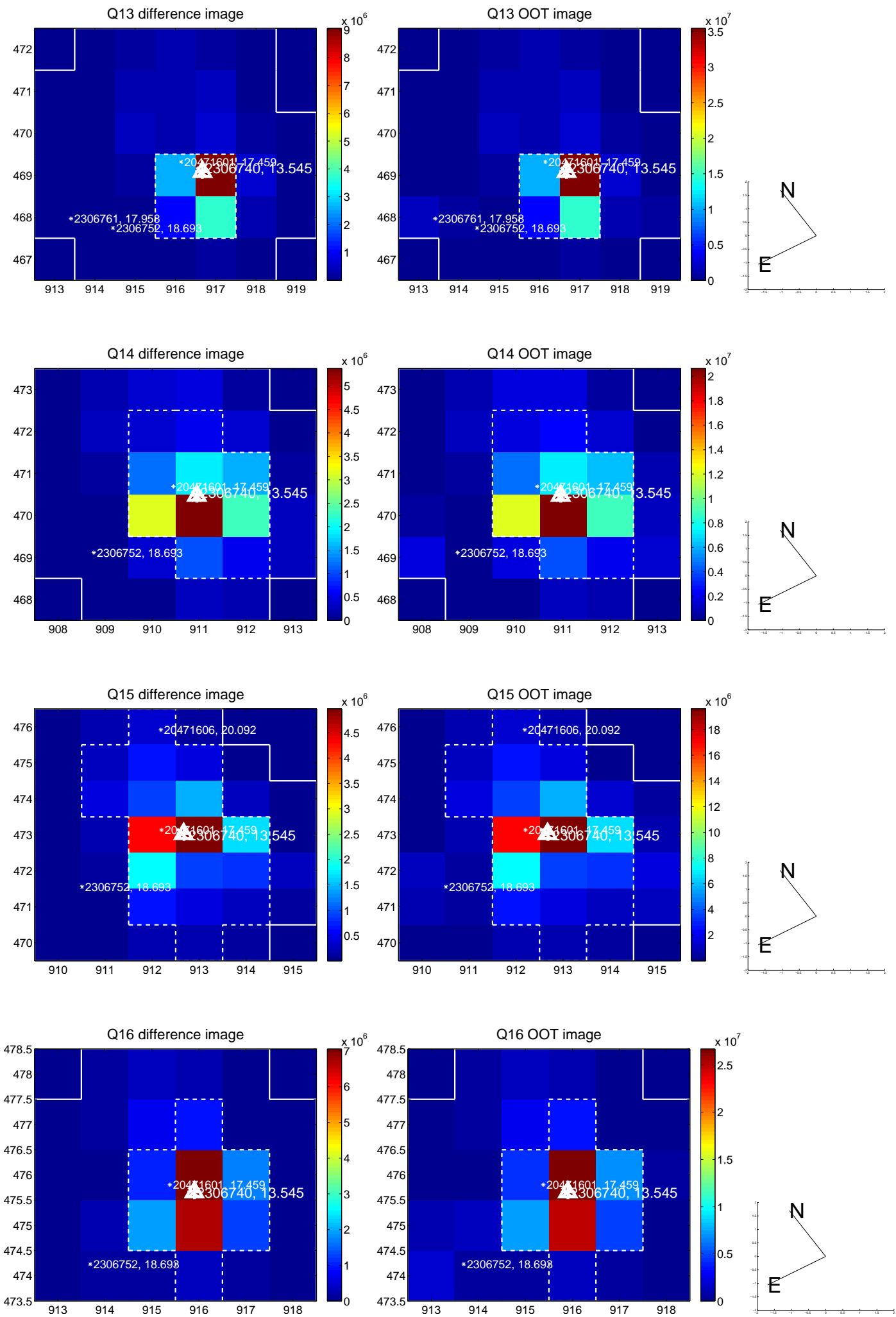
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



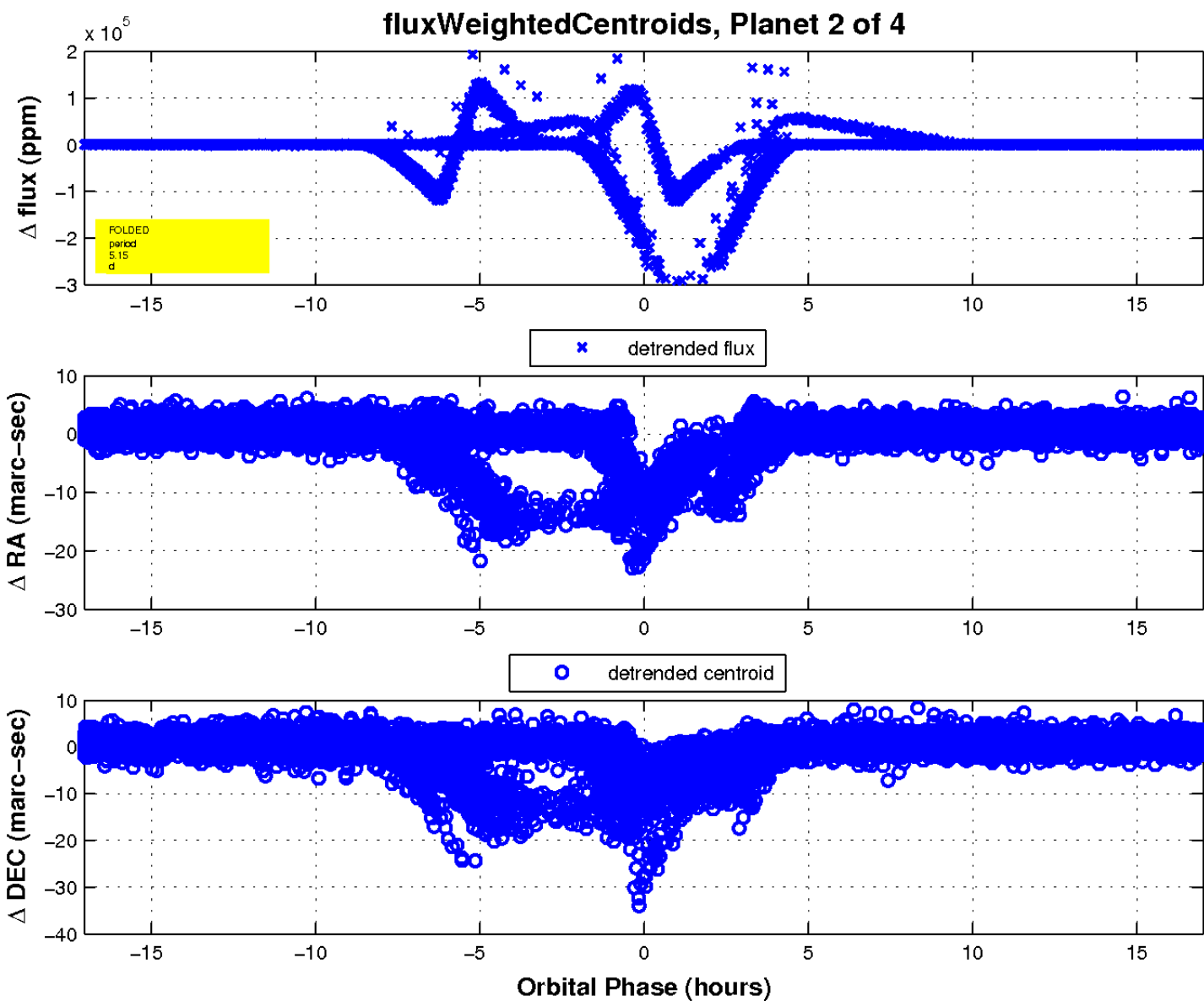
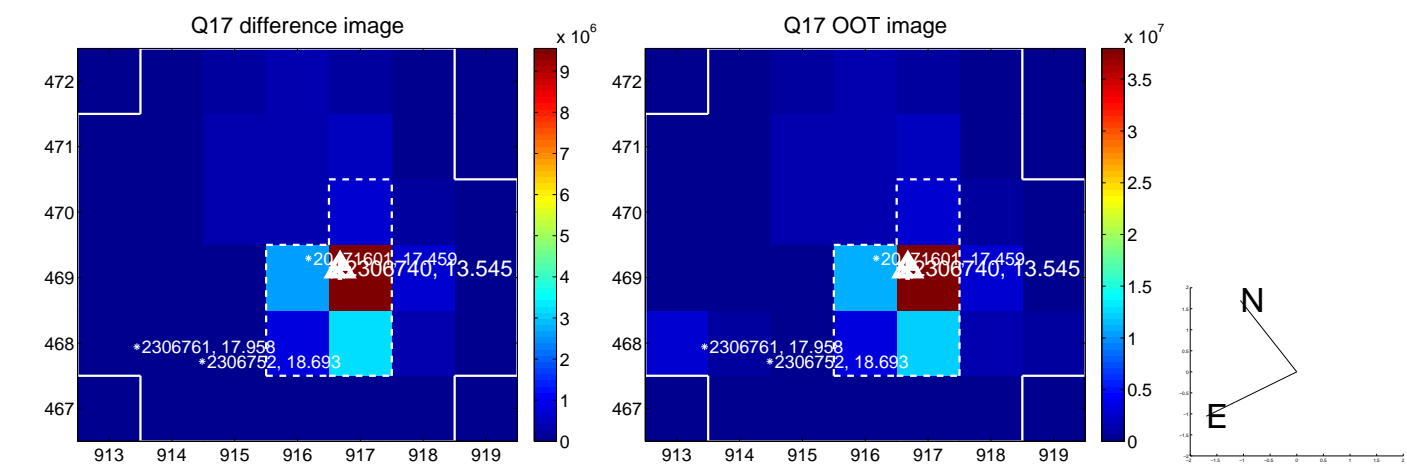
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

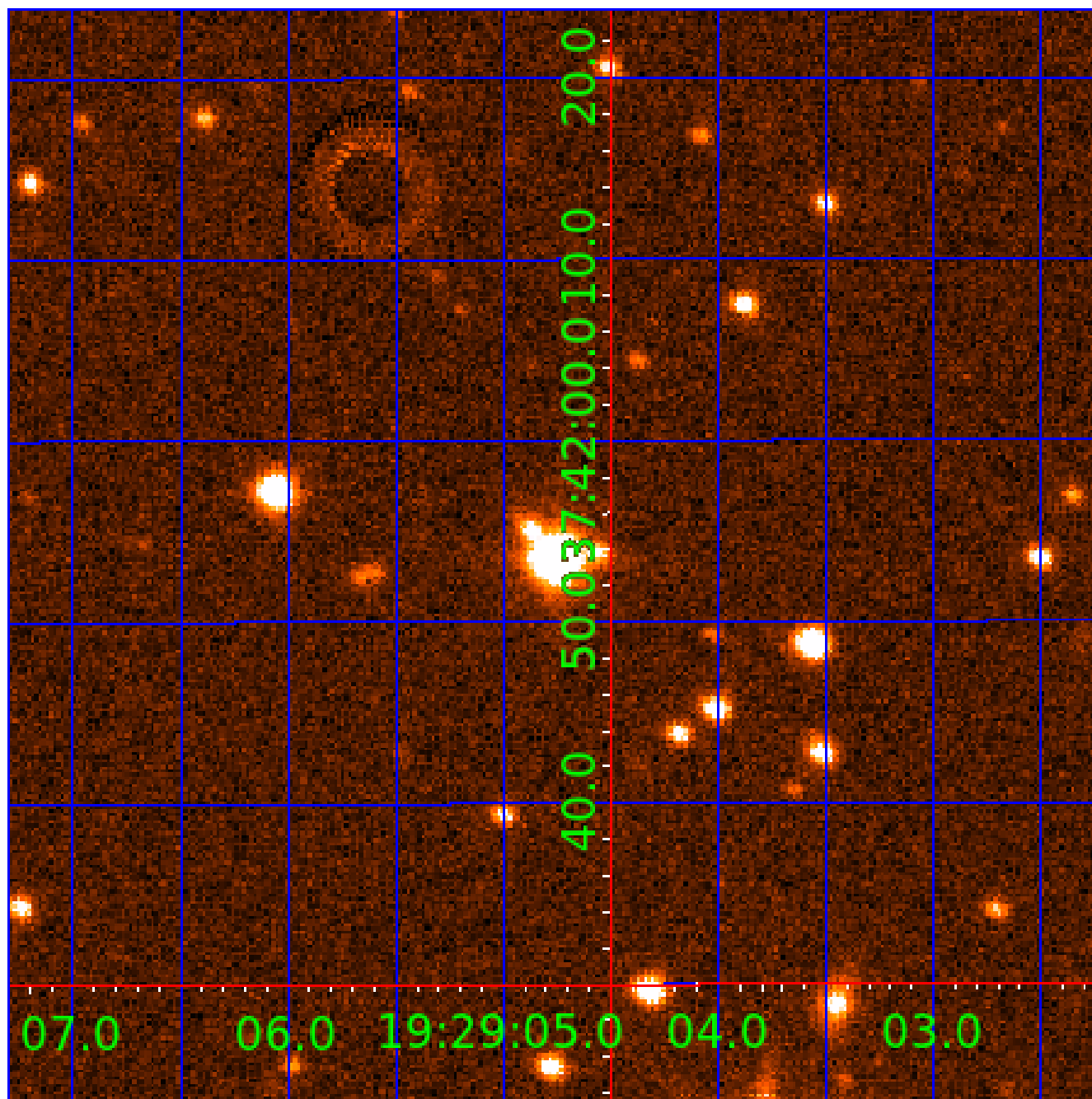


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 002306740

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
002306740-01	OBS	6265.01	10.306853	133.431748	341526.1	7.500	12864.7	-1.0	1.22	5912	44.76	201.31
002306740-02	OBS	No	5.153438	133.595217	300051.5	3.500	13343.3	-1.0	1.22	5912	50.55	507.26
002306740-03	OBS	No	164.914654	241.810326	72180.2	17.275	260.5	254.7	1.22	5912	55.66	4.99
002306740-04	OBS	No	7.730062	135.945076	19188.2	15.000	836.5	-1.0	1.22	5912	16.82	295.43

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002306740-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_ALT—HAS_SEC_TCE—CENT_NOFITS
002306740-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE—CENT_NOFITS
002306740-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_ZUMA_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT— MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
002306740-04	OBS	FP	0.00	1	0	0	0	LPP_DV—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.

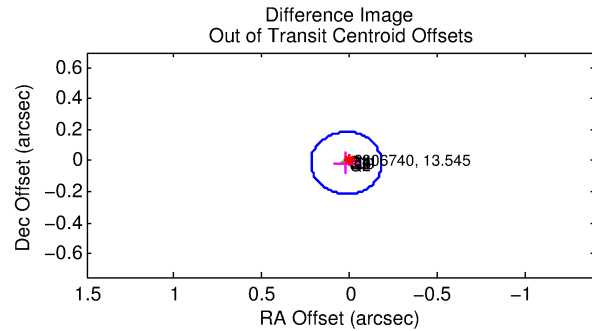
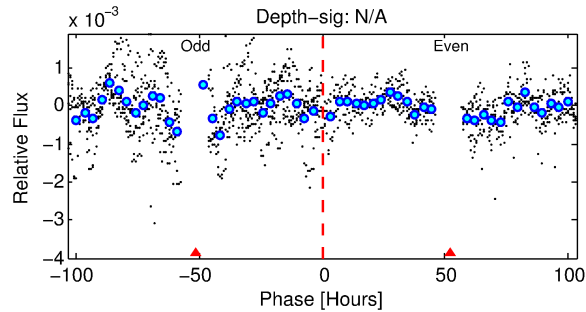
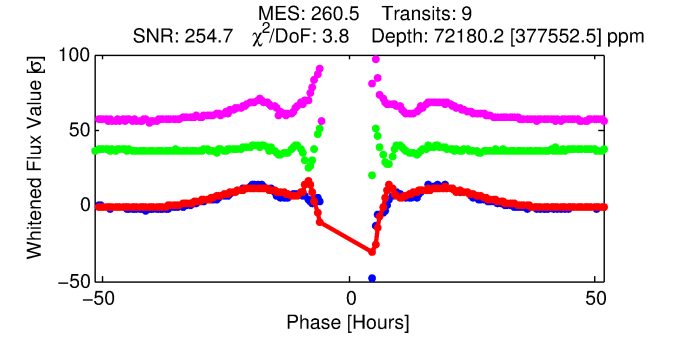
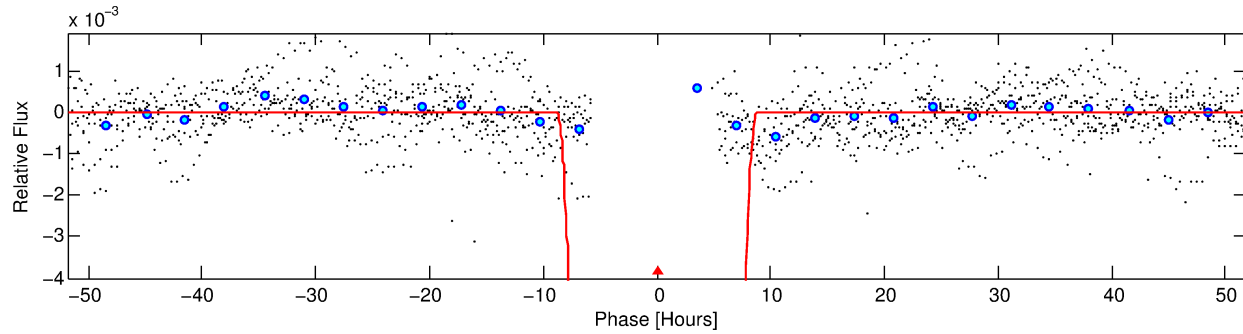
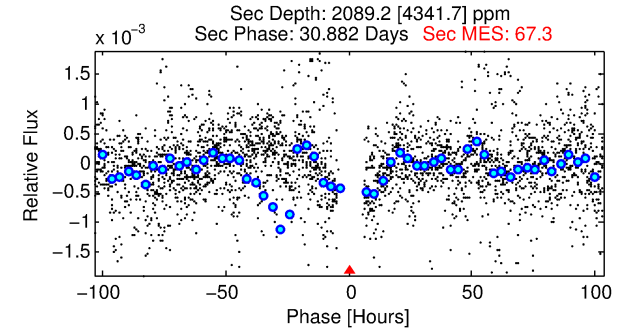
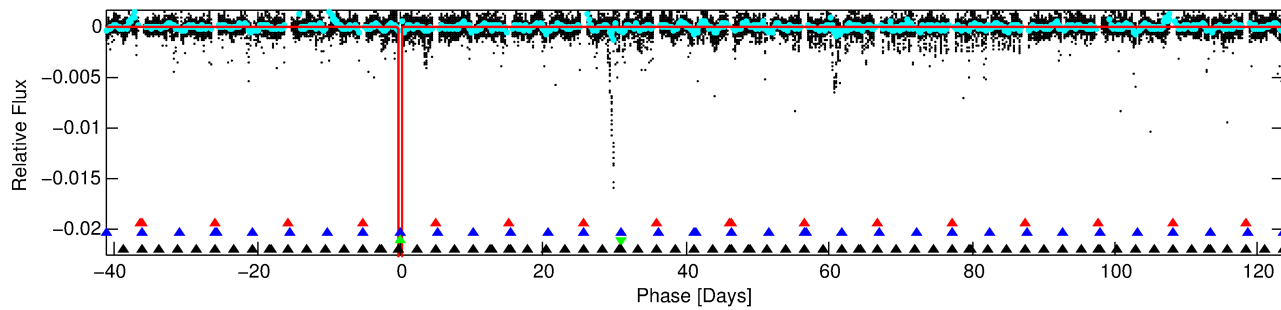
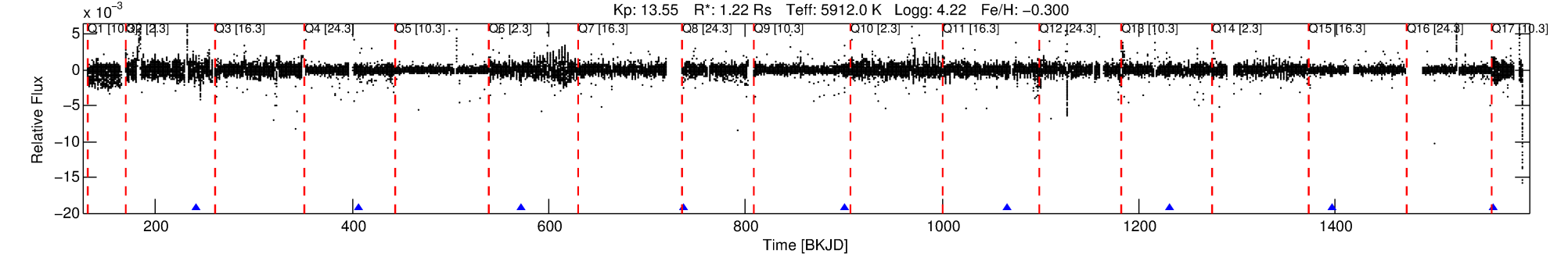
## Ephemeris Match Information For 002306740-03

No Significant Match Found

# DV One-Page Summary

KIC: 2306740 Candidate: 3 of 4 Period: 164.915 d  
KOI: K06265 Corr: No Ephemeris Match

Kp: 13.55 R\*: 1.22 Rs Teff: 5912.0 K Logg: 4.22 Fe/H: -0.300



## DV Fit Results:

Period = 164.91465 [0.00031] d  
Epoch = 241.8103 [0.0015] BKJD  
Rp/R\* = 0.4192 [0.4471]  
a/R\* = 73.45 [3.00]  
b = 1.00 [0.82]  
Seff = 4.99 [2.24]  
Teq = 381 [43] K  
Rp = 55.66 [61.22] Re  
a = 0.5698 [0.1519] AU  
Ag = 120.44 [362.48] [0.33σ]  
Teffp = 1952 [1455] K [1.08σ]

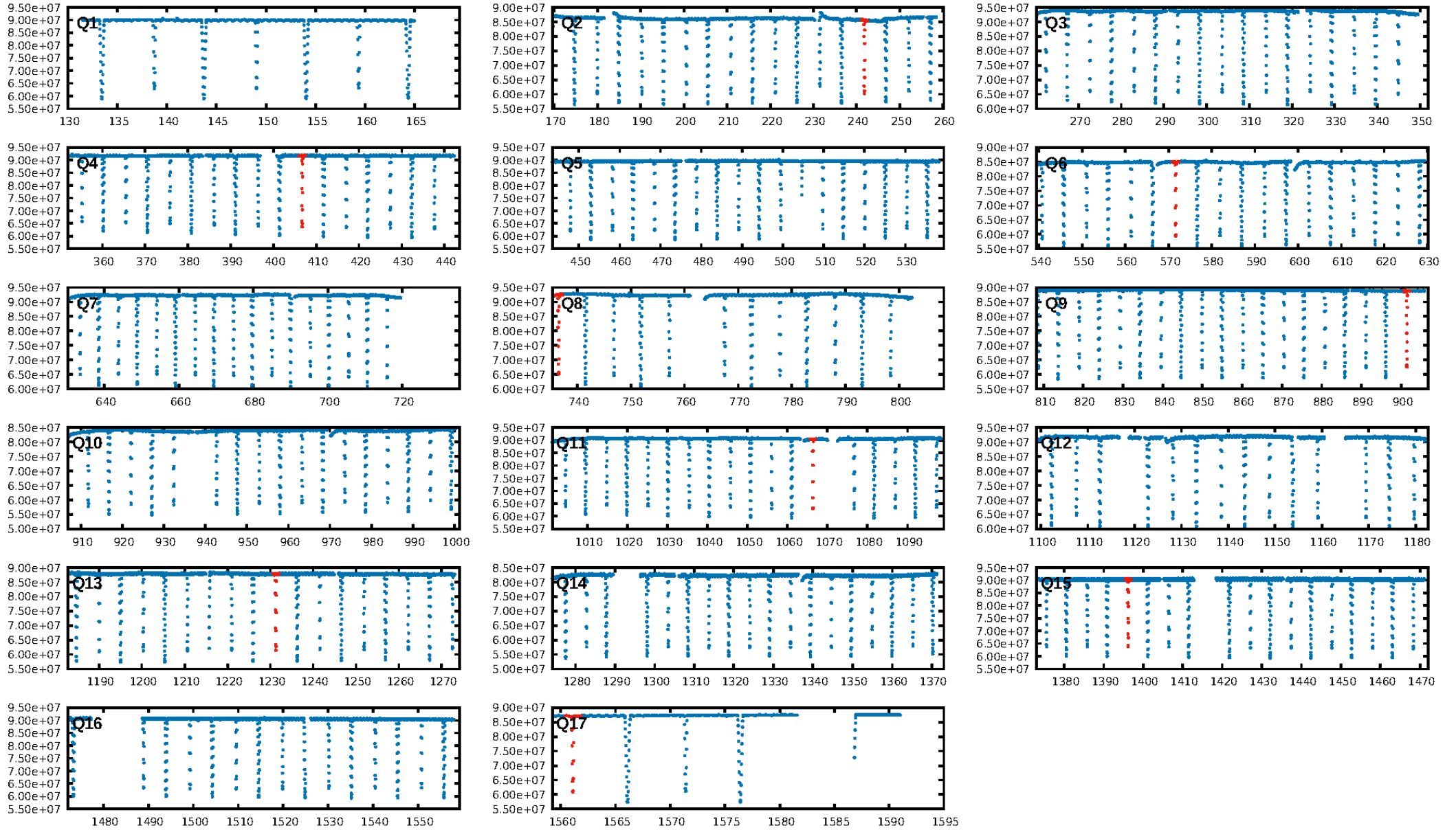
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [197.03σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [8/8]  
GhostDiagnostic-chr: 2.688  
Centroid-sig: N/A  
Centroid-so: 0.599 arcsec [168.33σ]  
OotOffset-rm: 0.024 arcsec [0.36σ]  
KicOffset-rm: 0.044 arcsec [0.57σ]  
OotOffset-st: 2/1/1/1 [5]  
KicOffset-st: 2/1/1/1 [5]  
DiffImageQuality-fgm: 1.00 [5/5]  
DiffImageOverlap-fno: 0.00 [0/5]

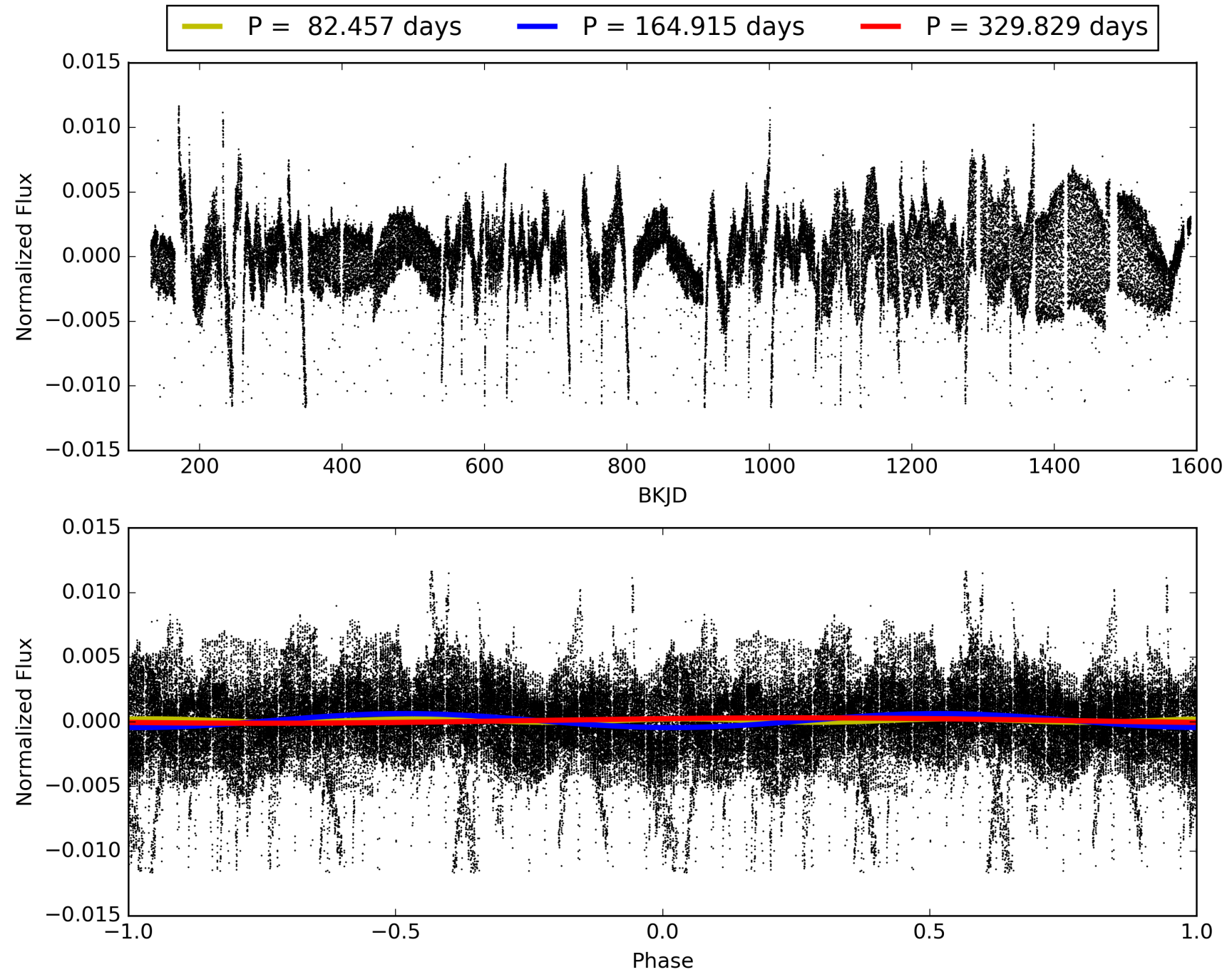
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 07:08:08 Z

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

# TCE 002306740-03, PDC Light Curves

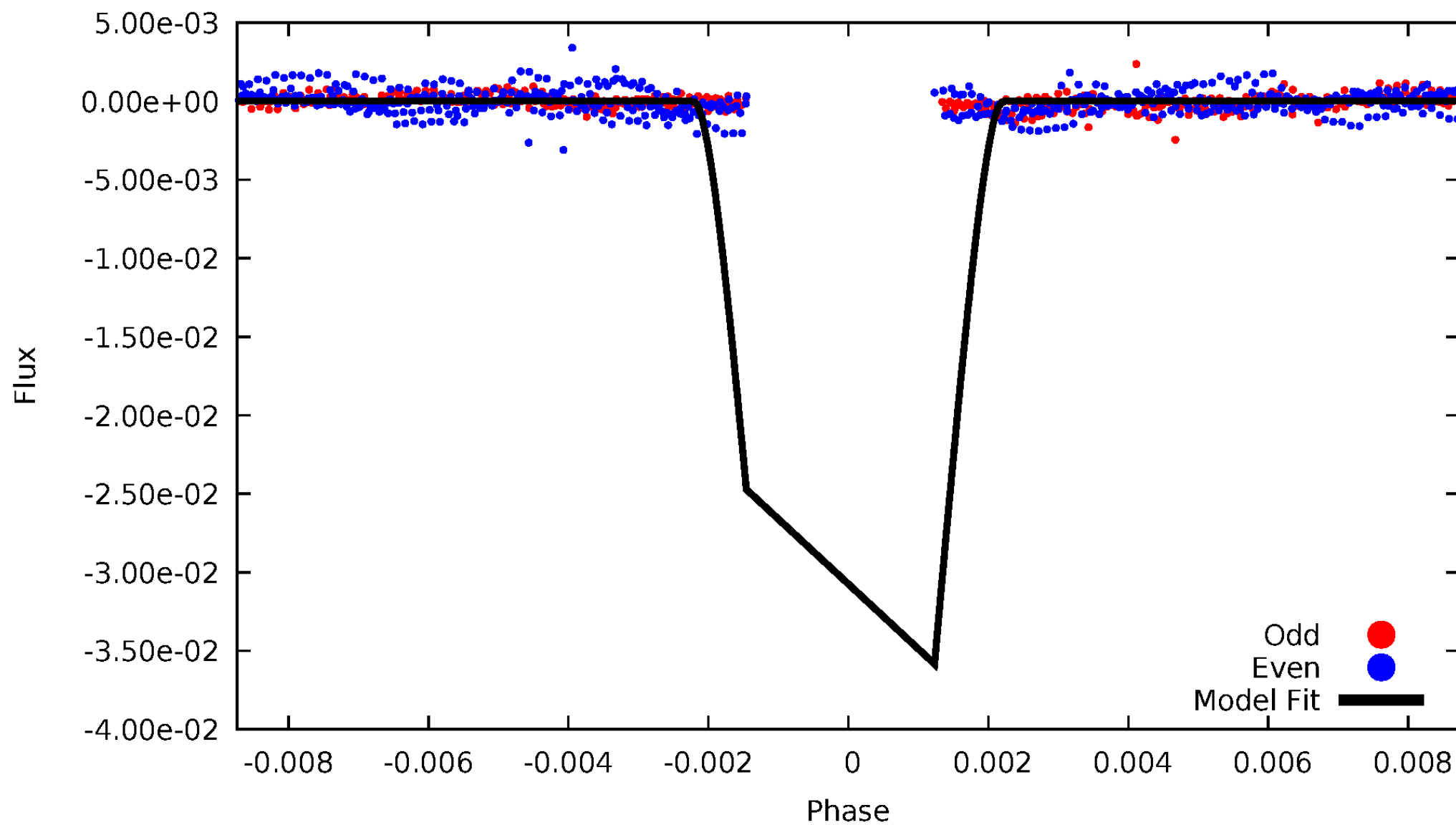


TCE 002306740-03



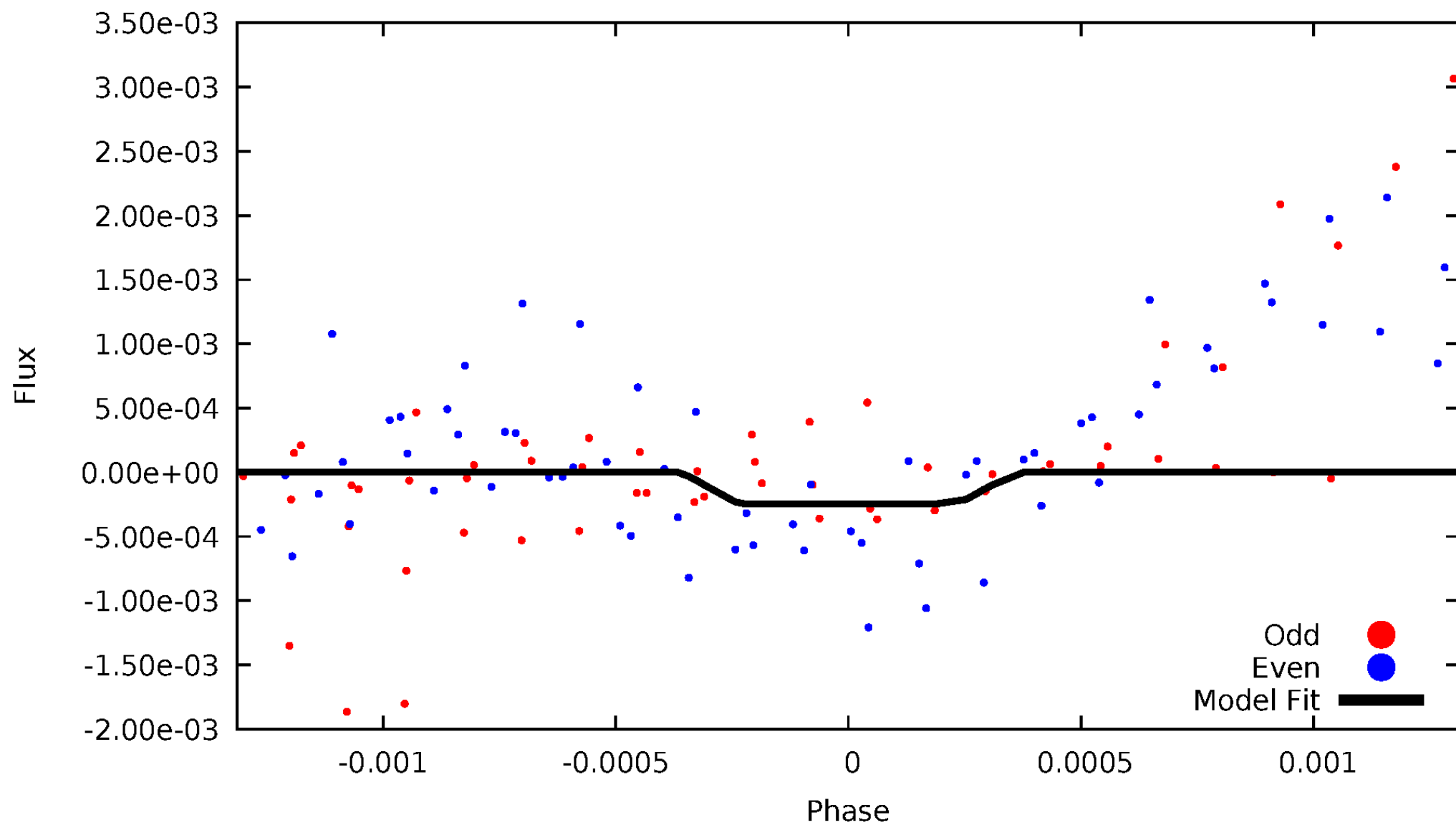
DV Odd/Even

TCE 002306740-03



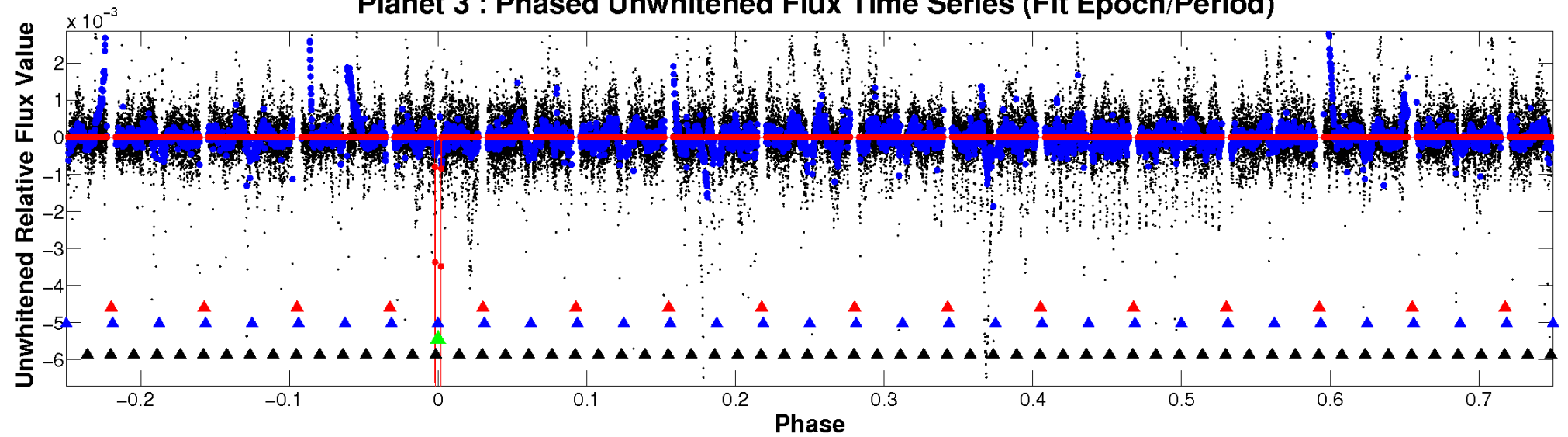
# ALT Odd/Even

TCE 002306740-03

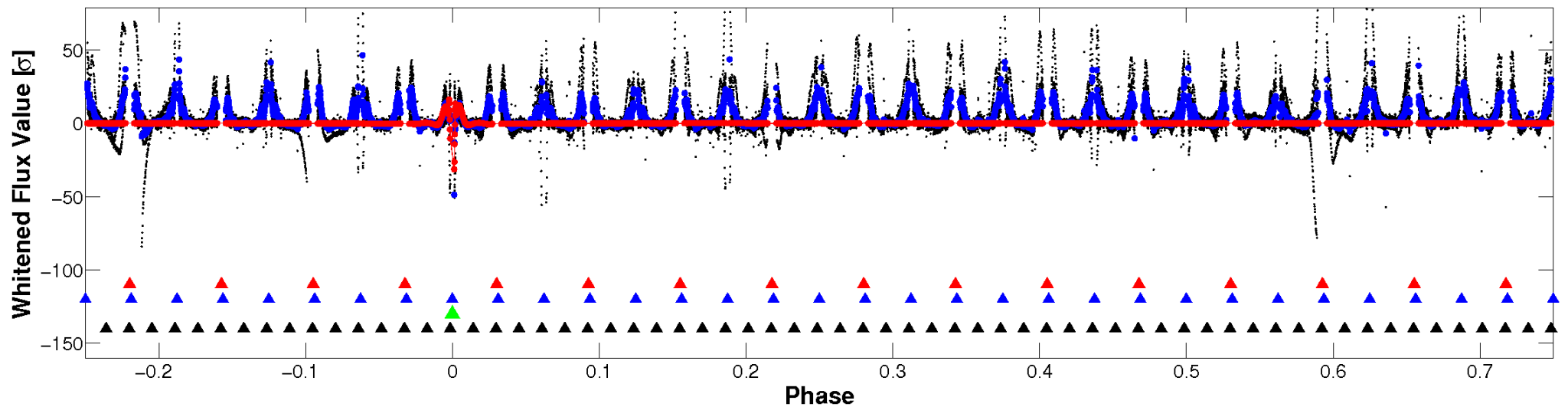


# Non-Whitened Vs. Whitened Light Curve

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

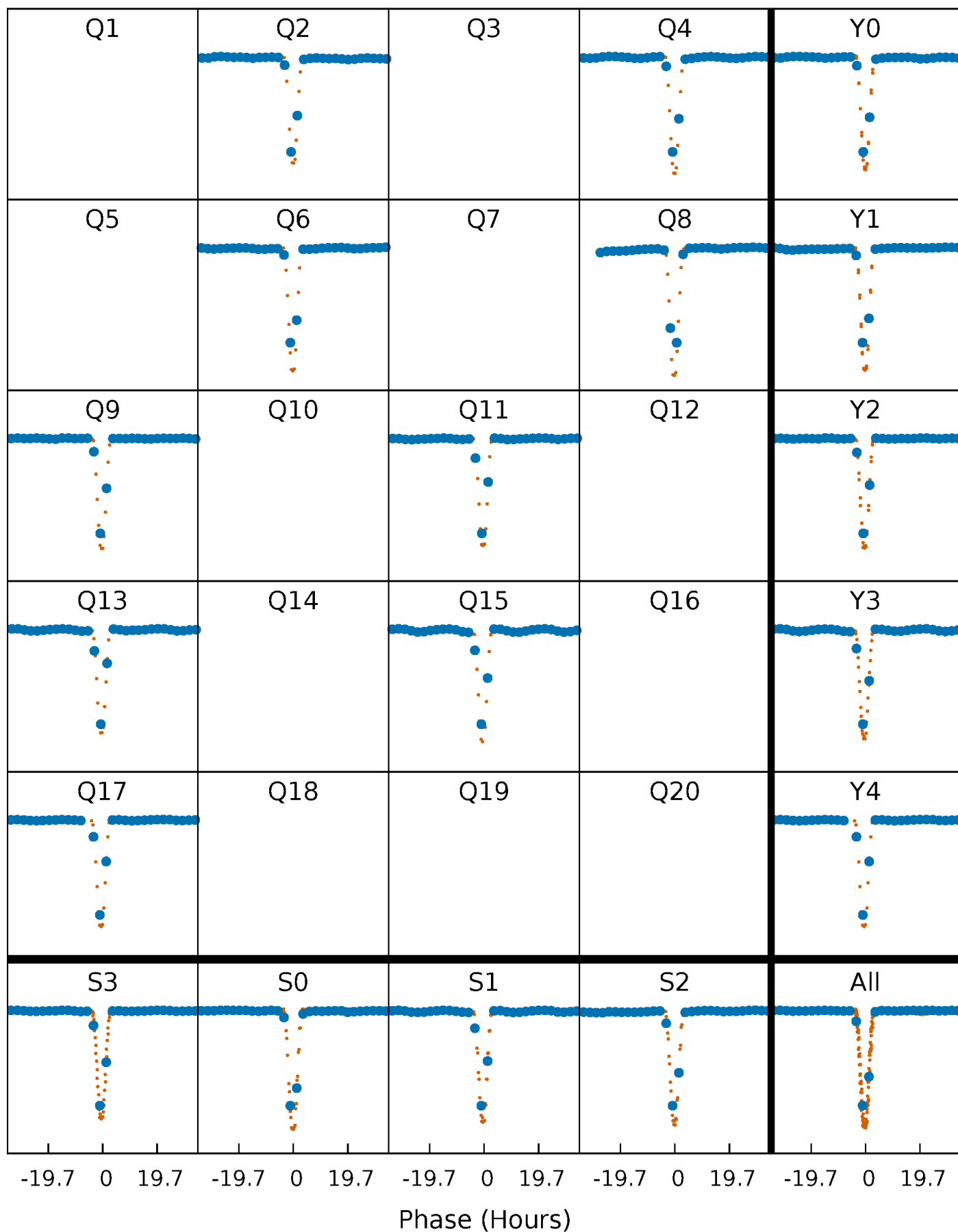


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

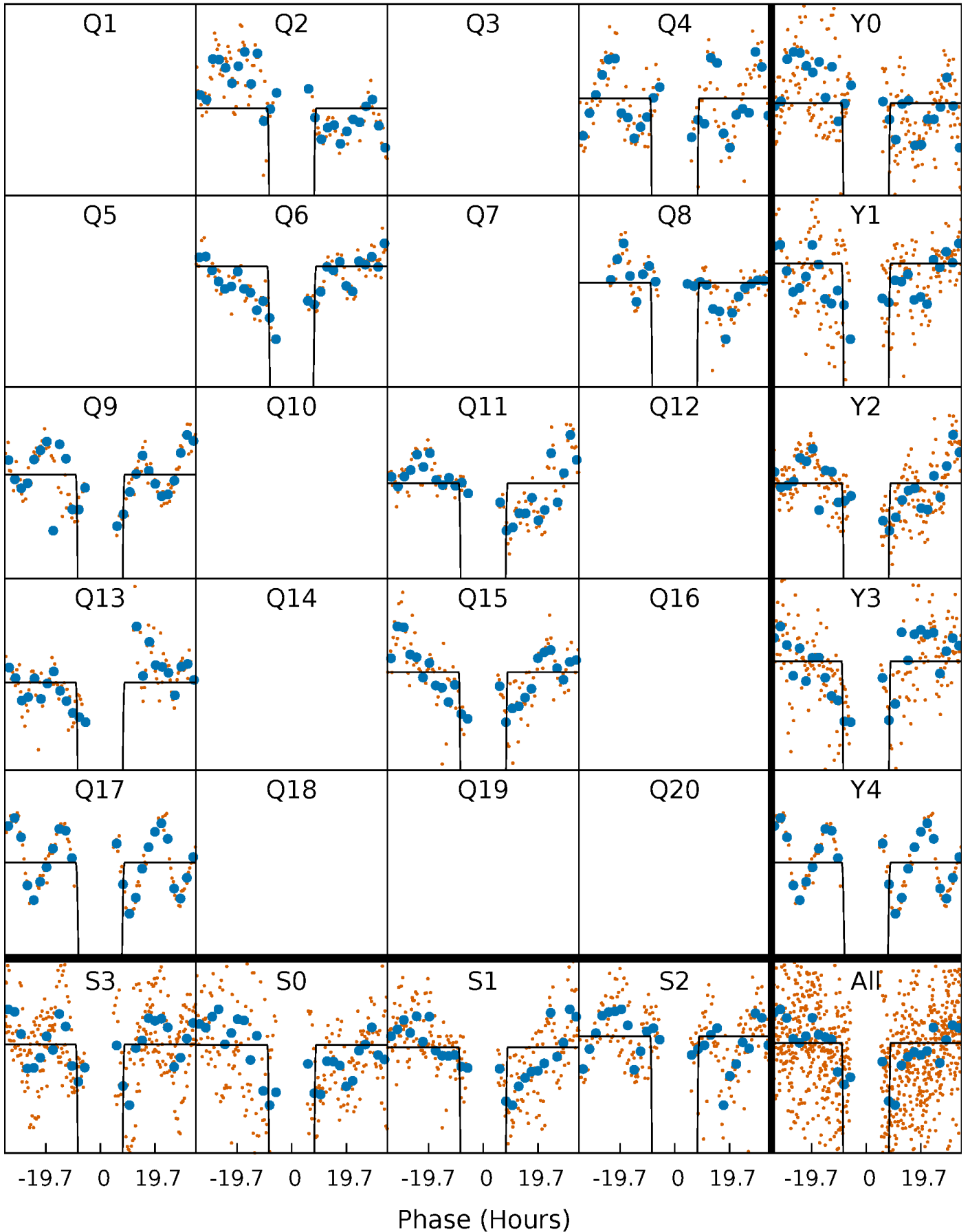
TCE 002306740-03 P=164.914654 Days  $T_0=241.810326$  (BKJD)





# DV Quarter-Phased Transit Curves

TCE 002306740-03 P=164.914654 Days  $T_0=241.810326$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

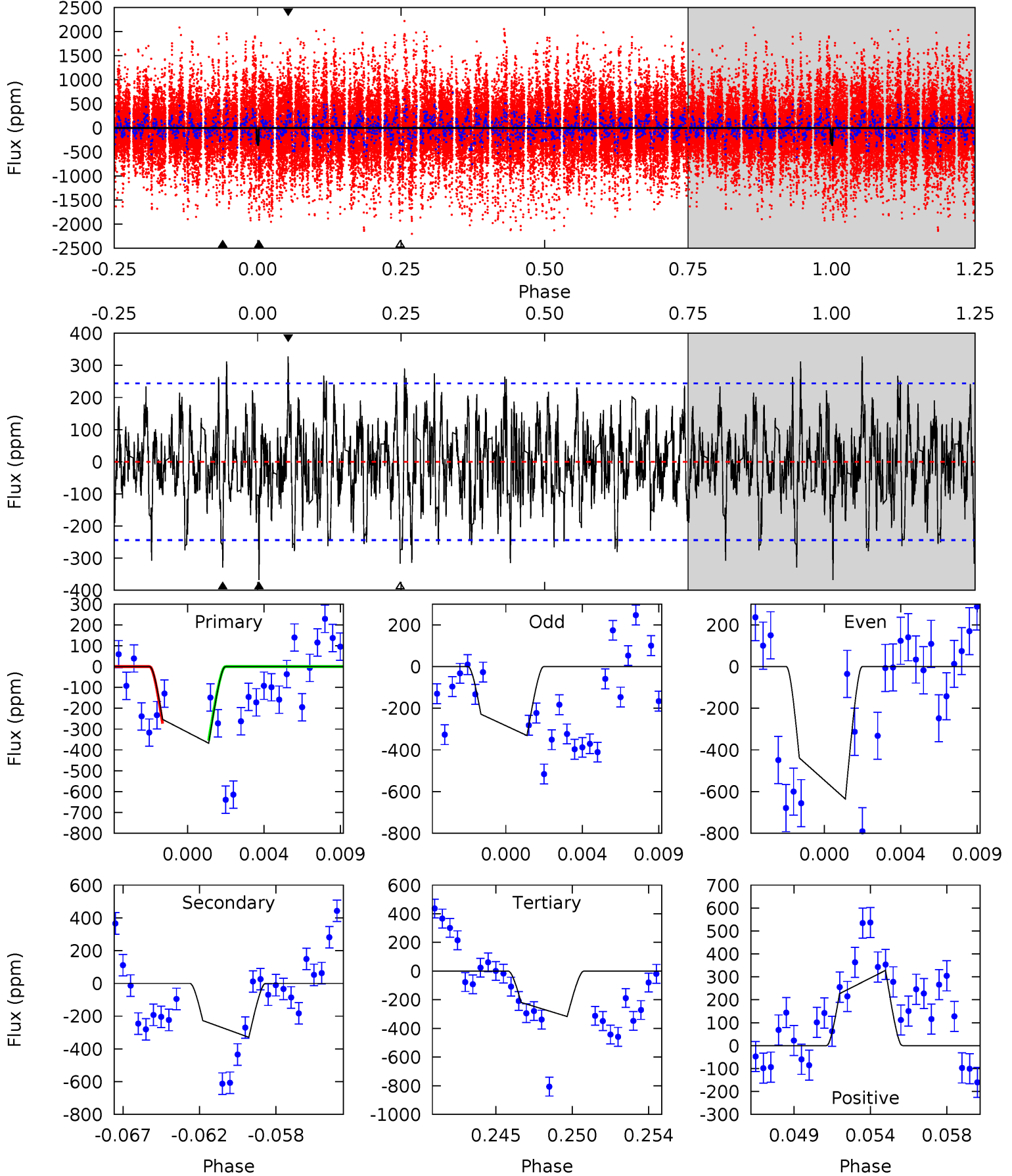
TCE 002306740-03     $P=164.992487$  Days     $T_0=241.154063$  (BKJD)



# DV Model-Shift Uniqueness Test

002306740-03, P = 164.914654 Days, E = 76.895672 Days

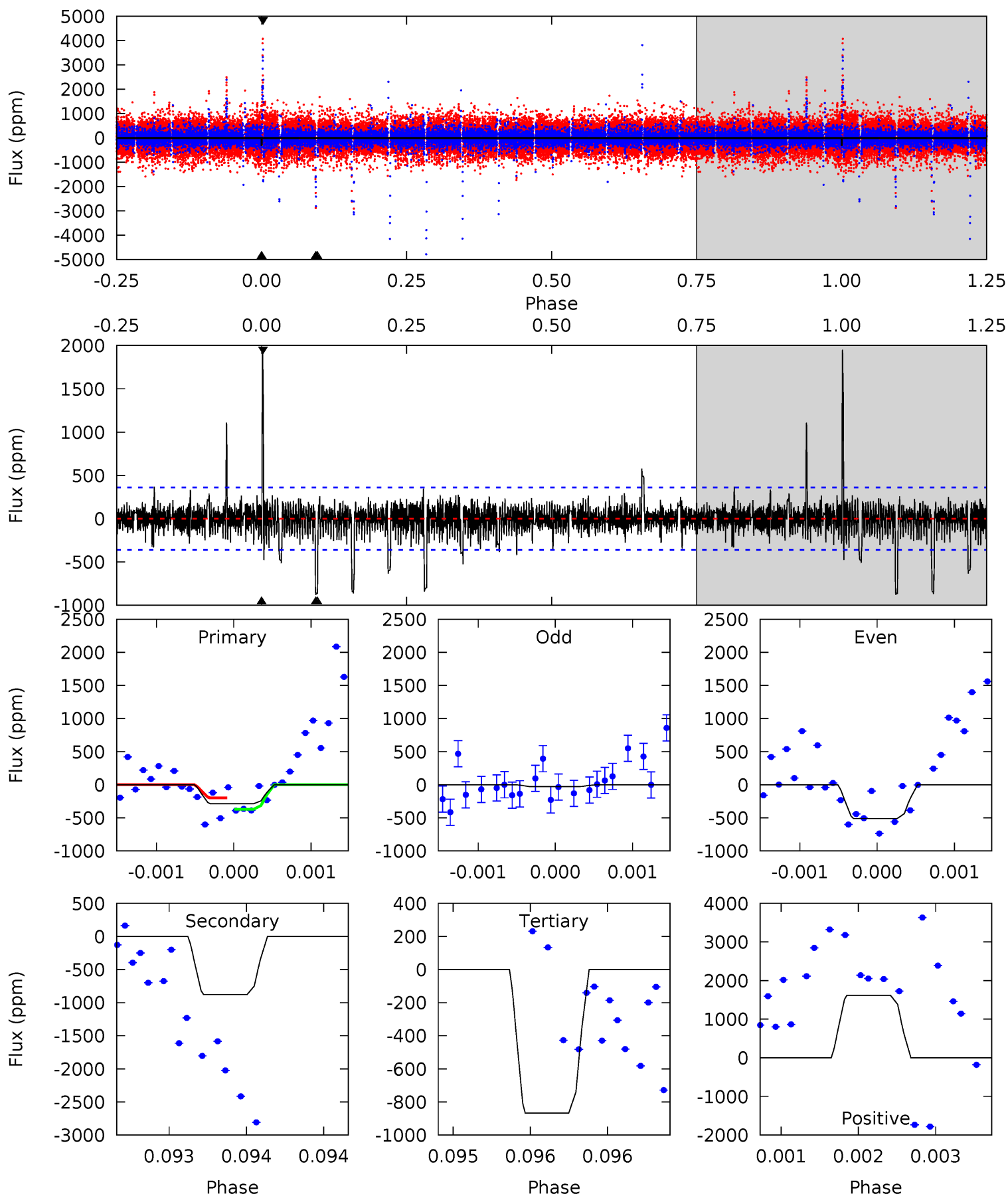
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.80	6.98	6.72	6.96	5.18	2.84	2.10	1.08	0.84	0.26	0.02	3.27	1.25	0.47	0.87



# Alt Model-Shift Uniqueness Test

002306740-03, P = 164.992487 Days, E = 76.161576 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
4.40	13.4	13.3	24.8	5.51	3.38	1.74	-8.88	-20.4	0.16	-11.4	3.58	0.89	0.69	1.31



### Stellar Parameters For KIC 002306740

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5912^{+160}_{-160}$	$4.225^{+0.258}_{-0.172}$	$-0.300^{+0.300}_{-0.300}$	$1.217^{+0.326}_{-0.326}$	$0.907^{+0.131}_{-0.087}$	$0.709^{+1.056}_{-0.319}$
	+3%/-3%	+6%/-4%	+100%/-100%	+27%/-27%	+14%/-10%	+149%/-45%
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 002306740-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-329 \pm 47$	$67.61^{+55.42}_{-41.83}$	$528^{+44}_{-40}$	$2081^{+531}_{-237}$	$13^{+79}_{-9}$
Alt.	$-878 \pm 65$	$44.60^{+42.76}_{-29.78}$	$530^{+39}_{-41}$	$2579^{+946}_{-379}$	$78^{+663}_{-58}$

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

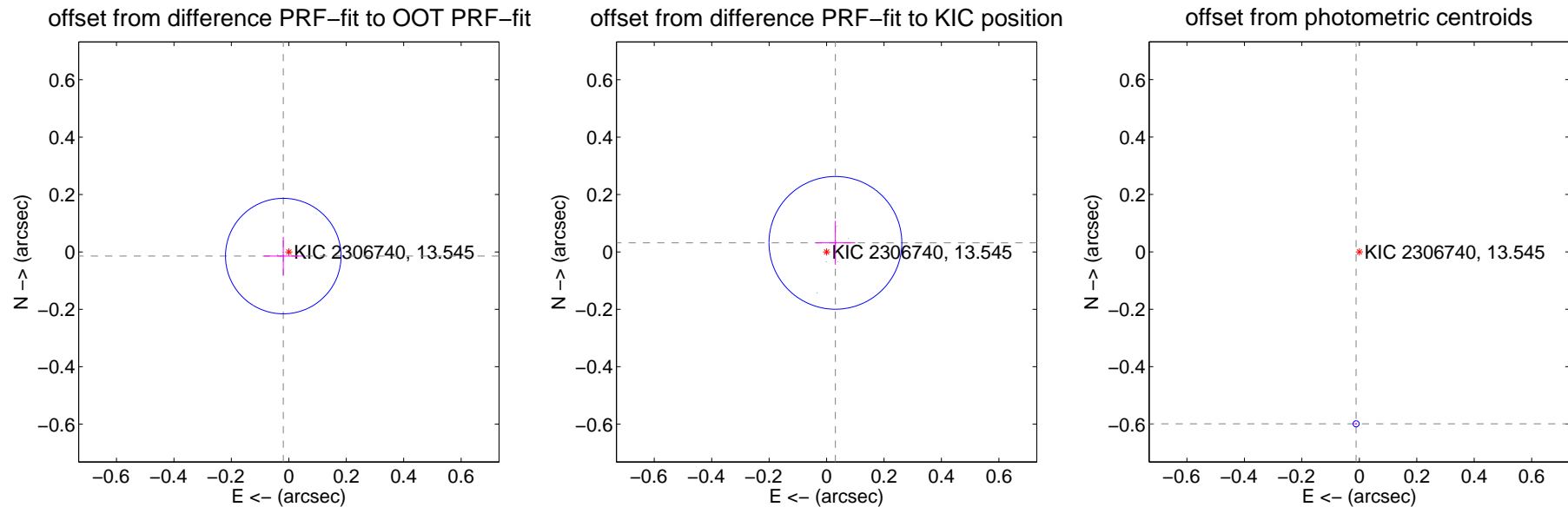
## DV Centroid Data

Supplemental centroid analysis for 002306740-03. Kepler magnitude: 13.54. Transit SNR 254.72

There are 5 quarters with good PRF difference image offsets

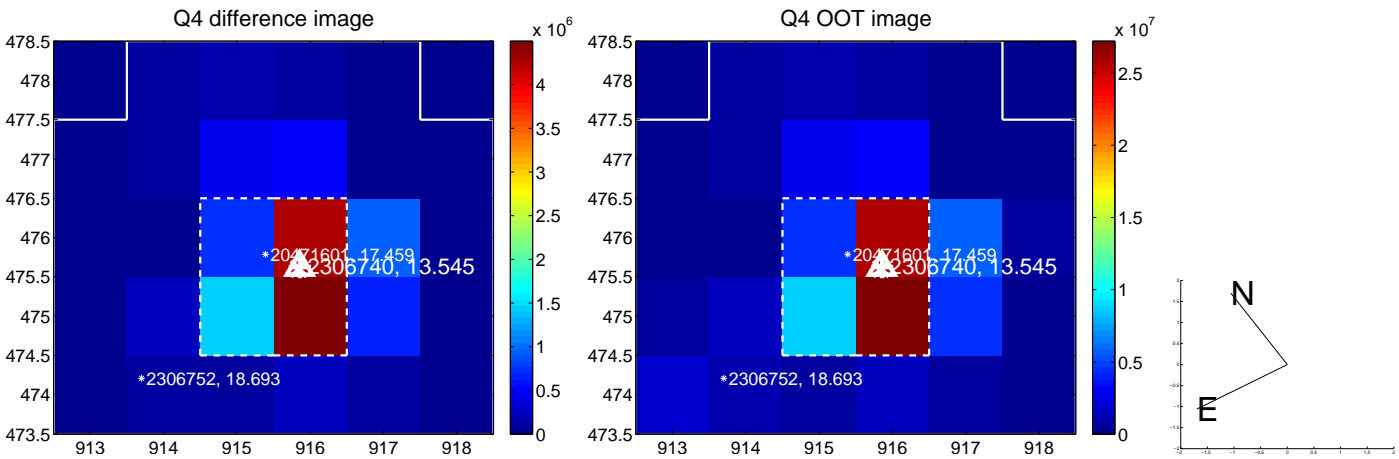
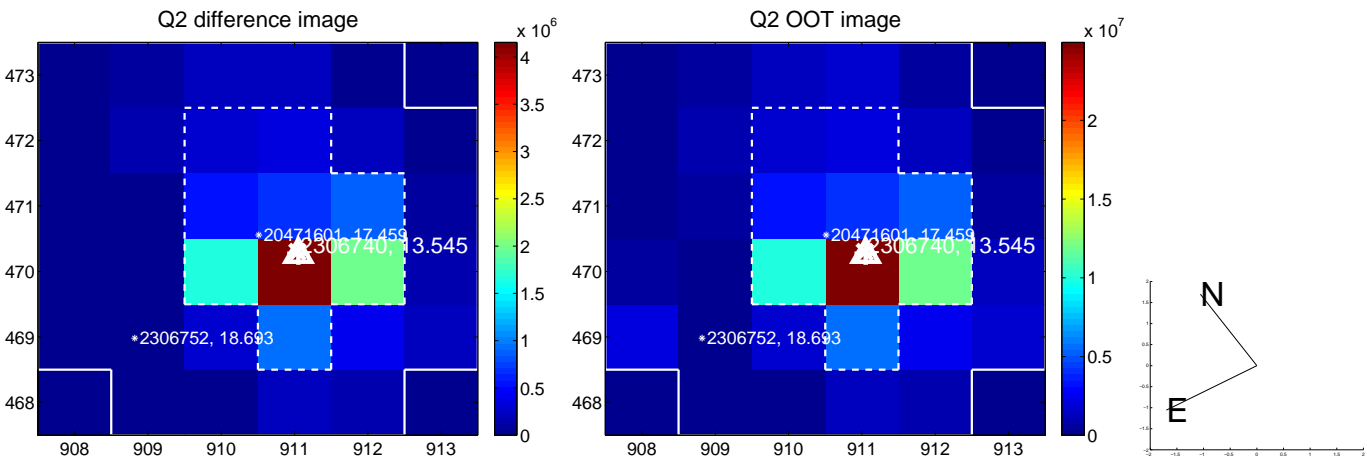
The direct PRF centroid is offset from the target star catalog position by about 0.04 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.024 \pm 0.067$	0.36	$0.019 \pm 0.067$	$-0.015 \pm 0.067$
PRF-fit source offset from KIC position	$0.044 \pm 0.077$	0.57	$-0.031 \pm 0.069$	$0.032 \pm 0.077$
photometric centroid source offset	$0.60 \pm 0.00$	168.33	$0.01 \pm 0.00$	$-0.60 \pm 0.00$

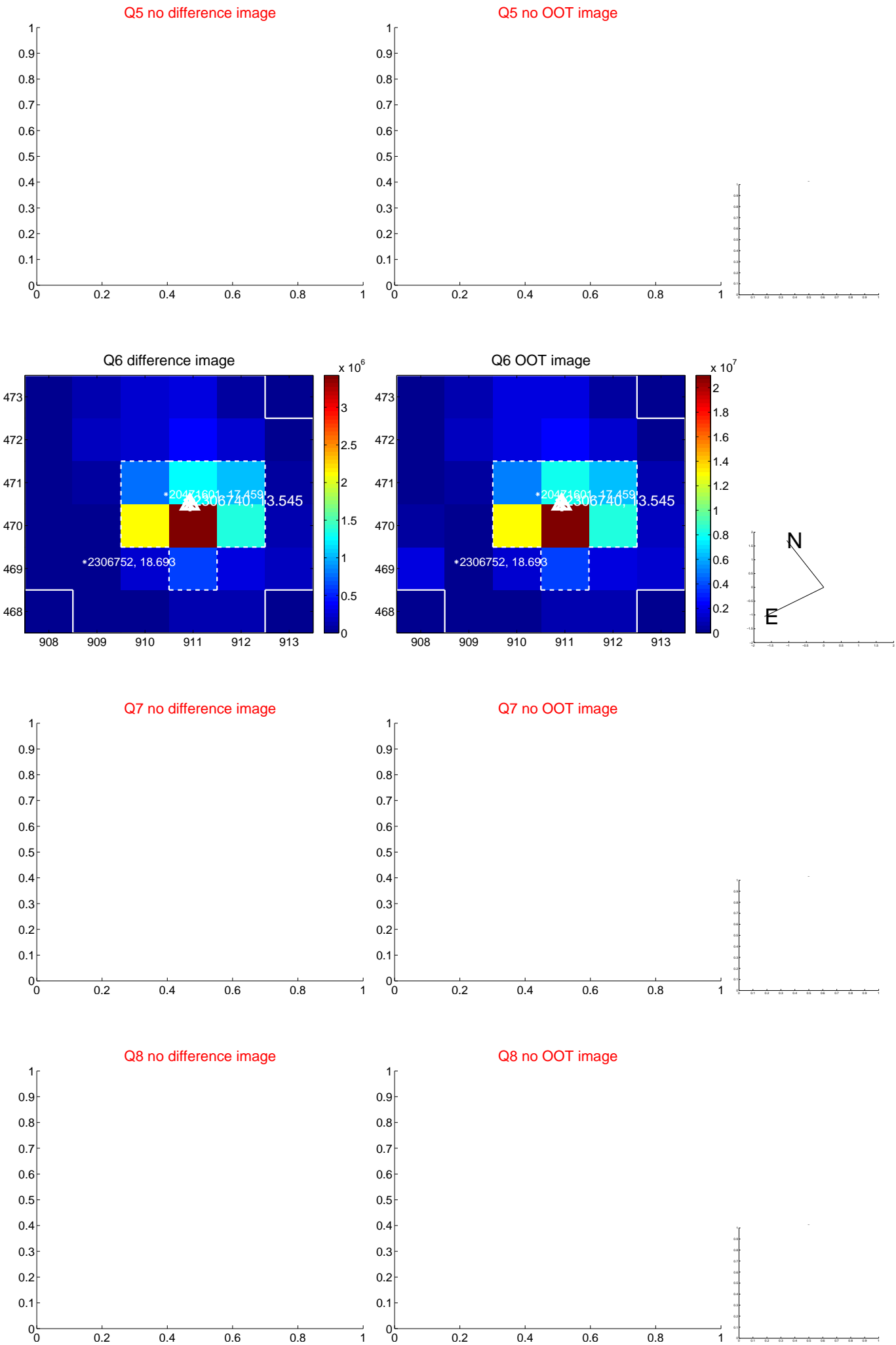


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

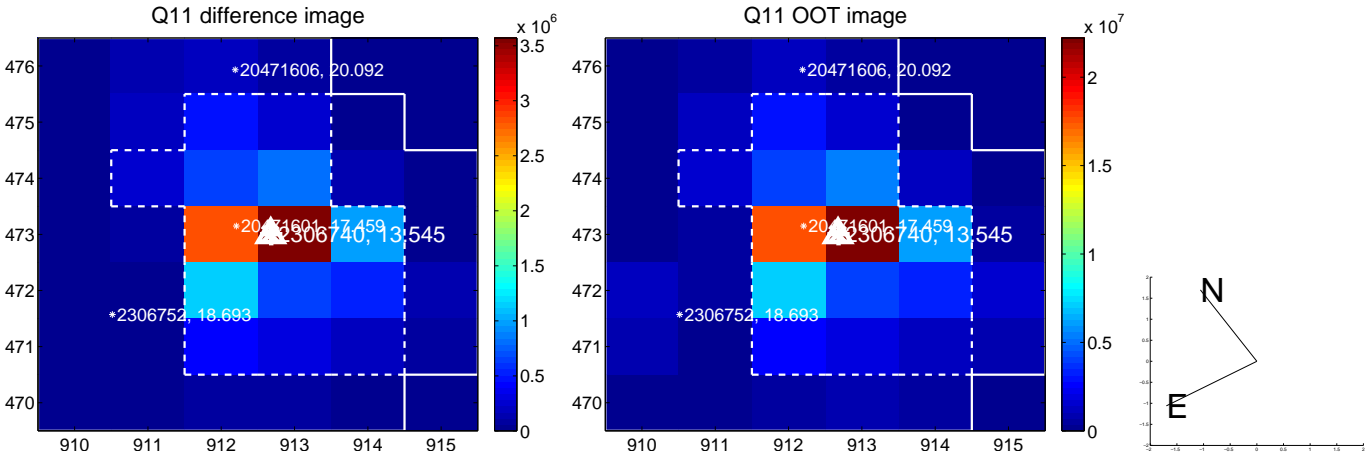
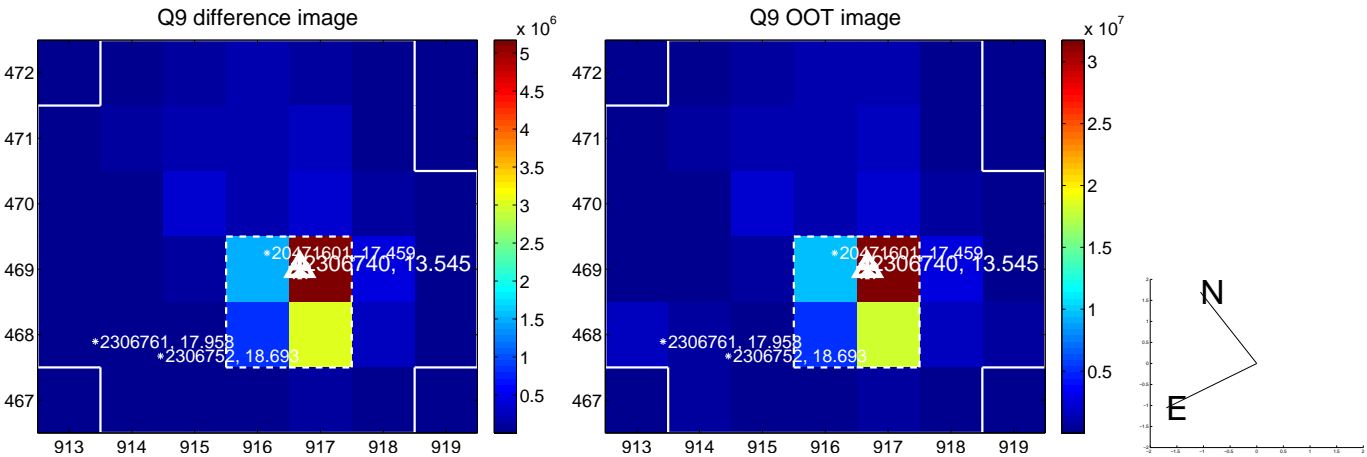


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





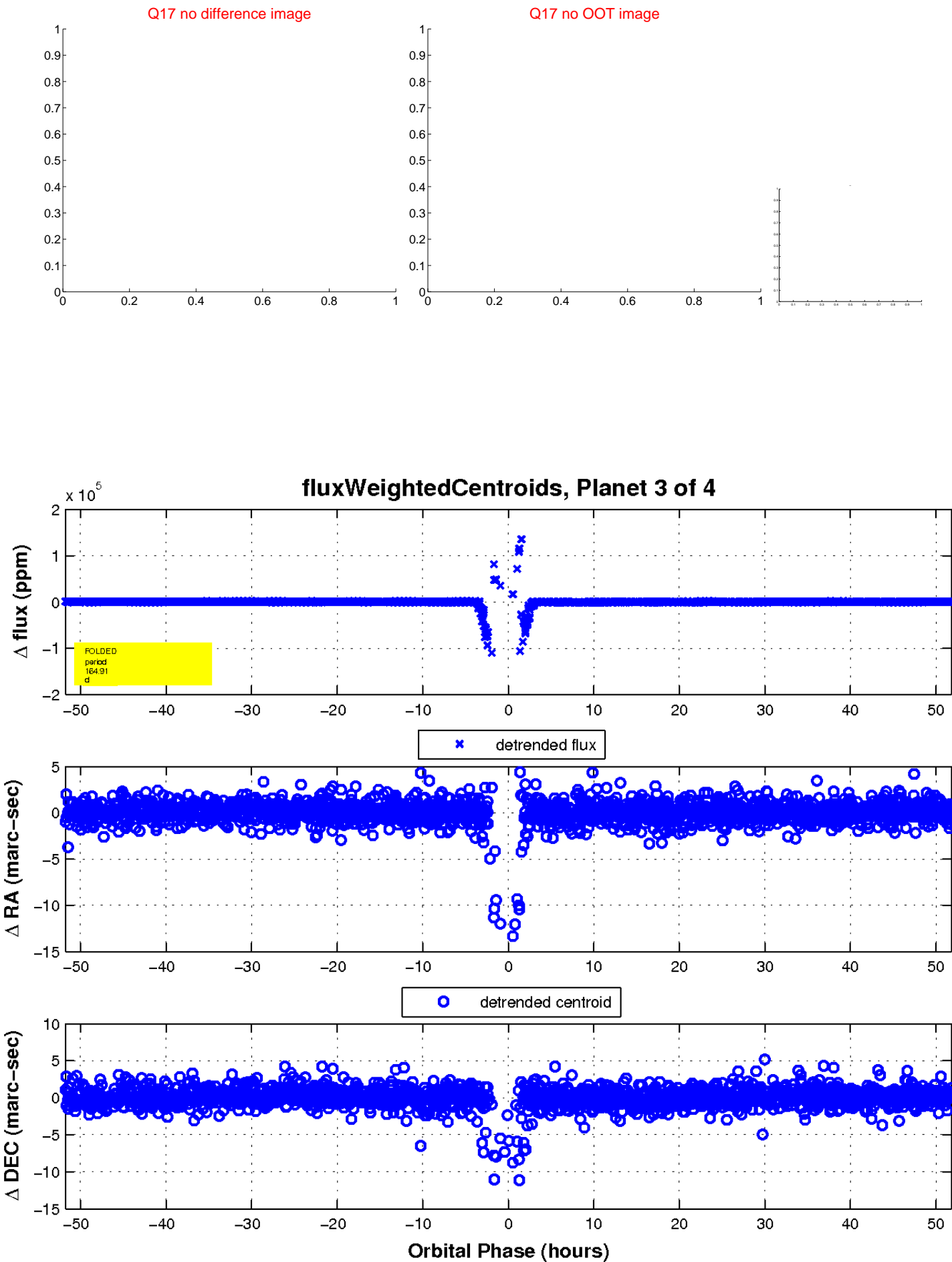
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

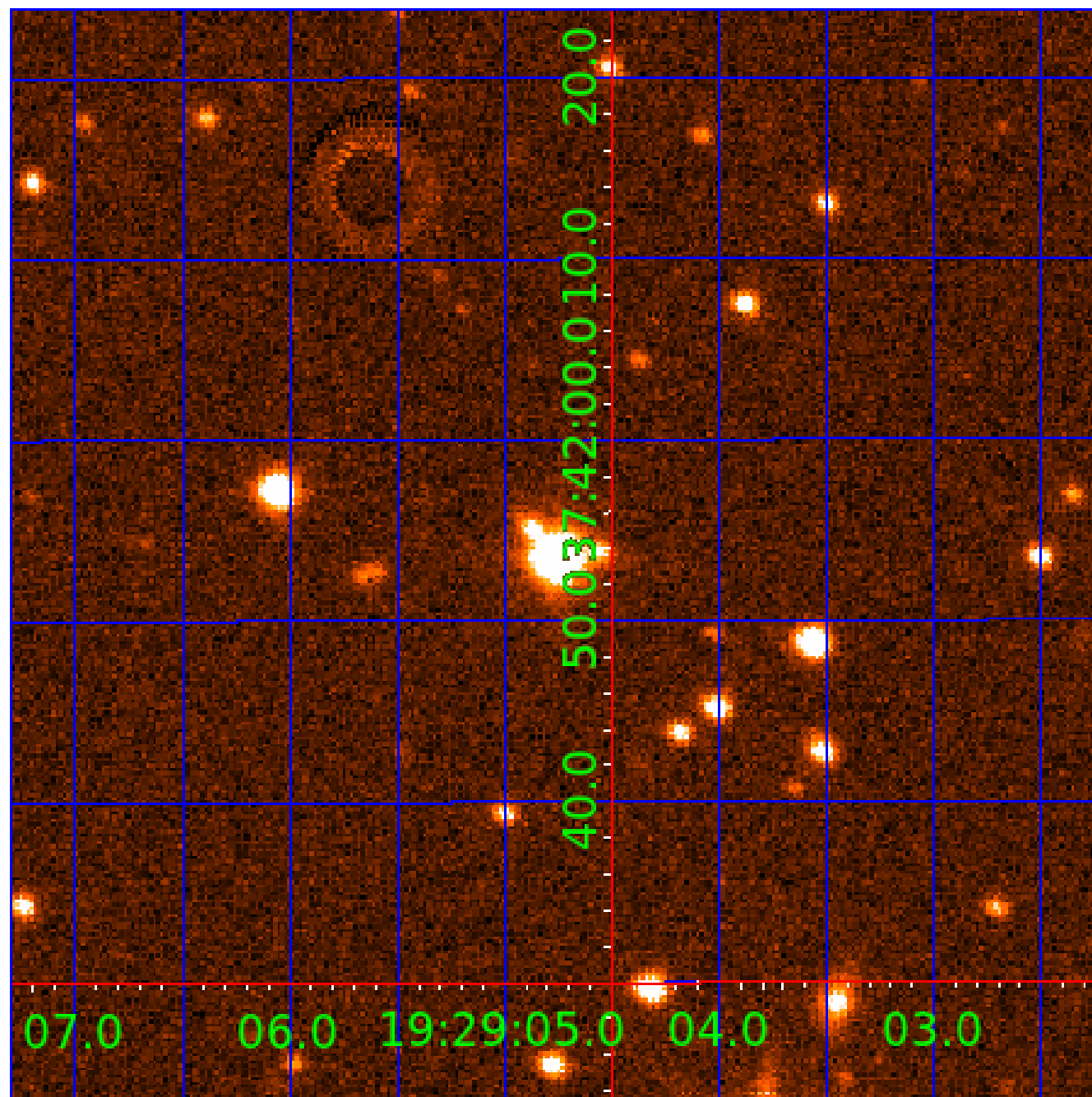


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 002306740

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
002306740-01	OBS	6265.01	10.306853	133.431748	341526.1	7.500	12864.7	-1.0	1.22	5912	44.76	201.31
002306740-02	OBS	No	5.153438	133.595217	300051.5	3.500	13343.3	-1.0	1.22	5912	50.55	507.26
002306740-03	OBS	No	164.914654	241.810326	72180.2	17.275	260.5	254.7	1.22	5912	55.66	4.99
002306740-04	OBS	No	7.730062	135.945076	19188.2	15.000	836.5	-1.0	1.22	5912	16.82	295.43

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002306740-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_ALT—HAS_SEC_TCE—CENT_NOFITS
002306740-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE—CENT_NOFITS
002306740-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_ZUMA_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT— MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
002306740-04	OBS	FP	0.00	1	0	0	0	LPP_DV—CENT_NOFITS

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

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

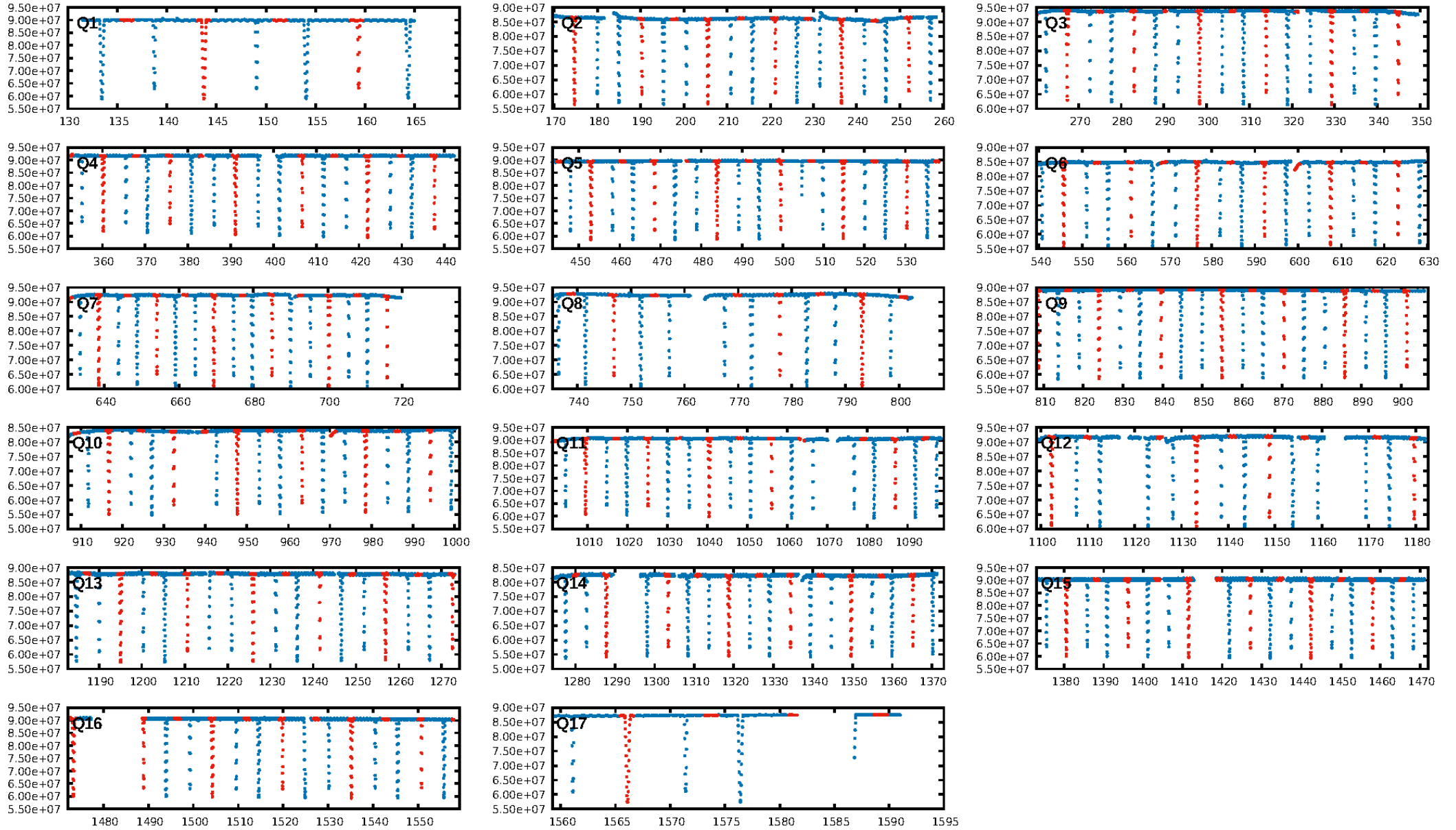
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 002306740-04

No Significant Match Found

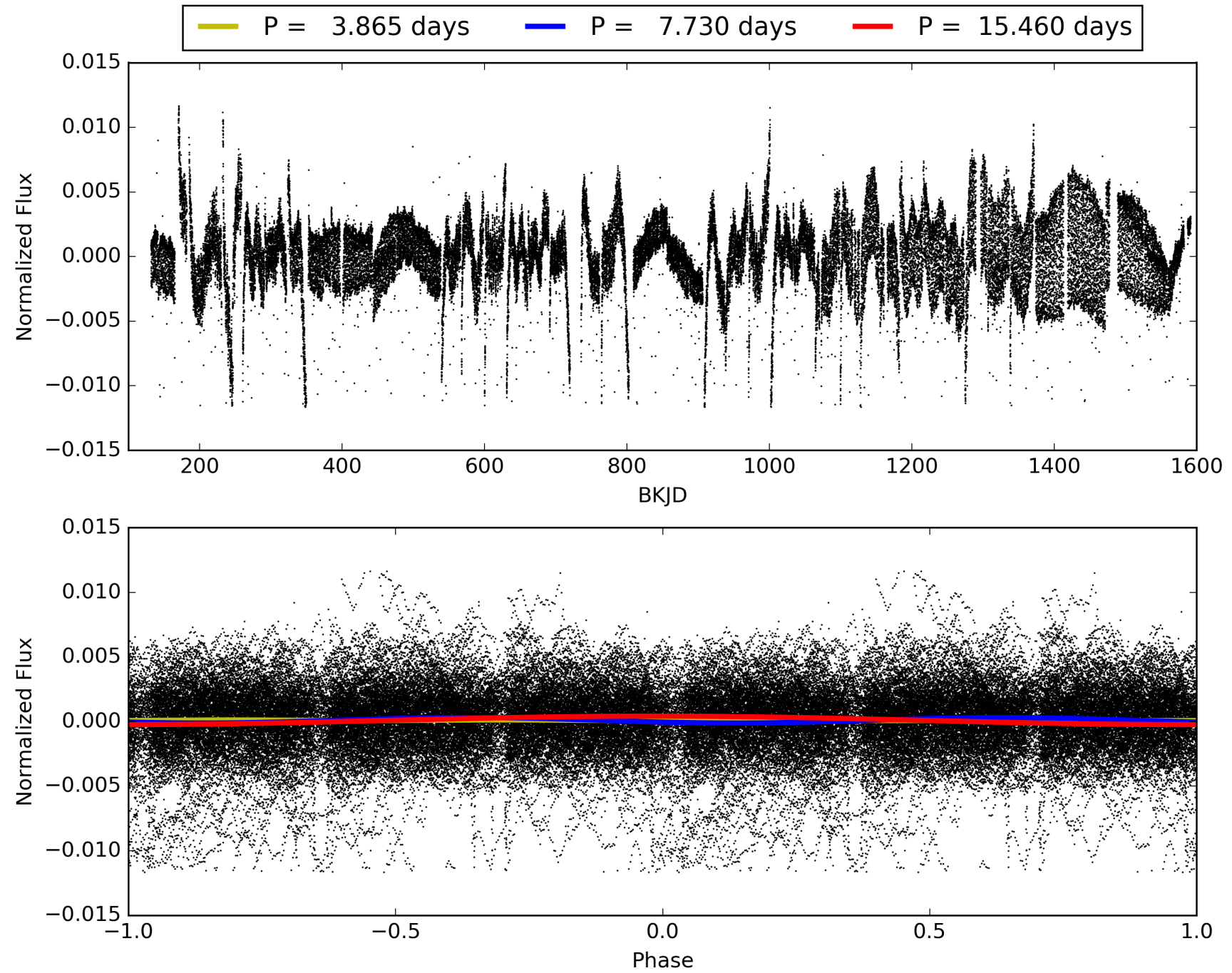
**This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center**

# TCE 002306740-04, PDC Light Curves





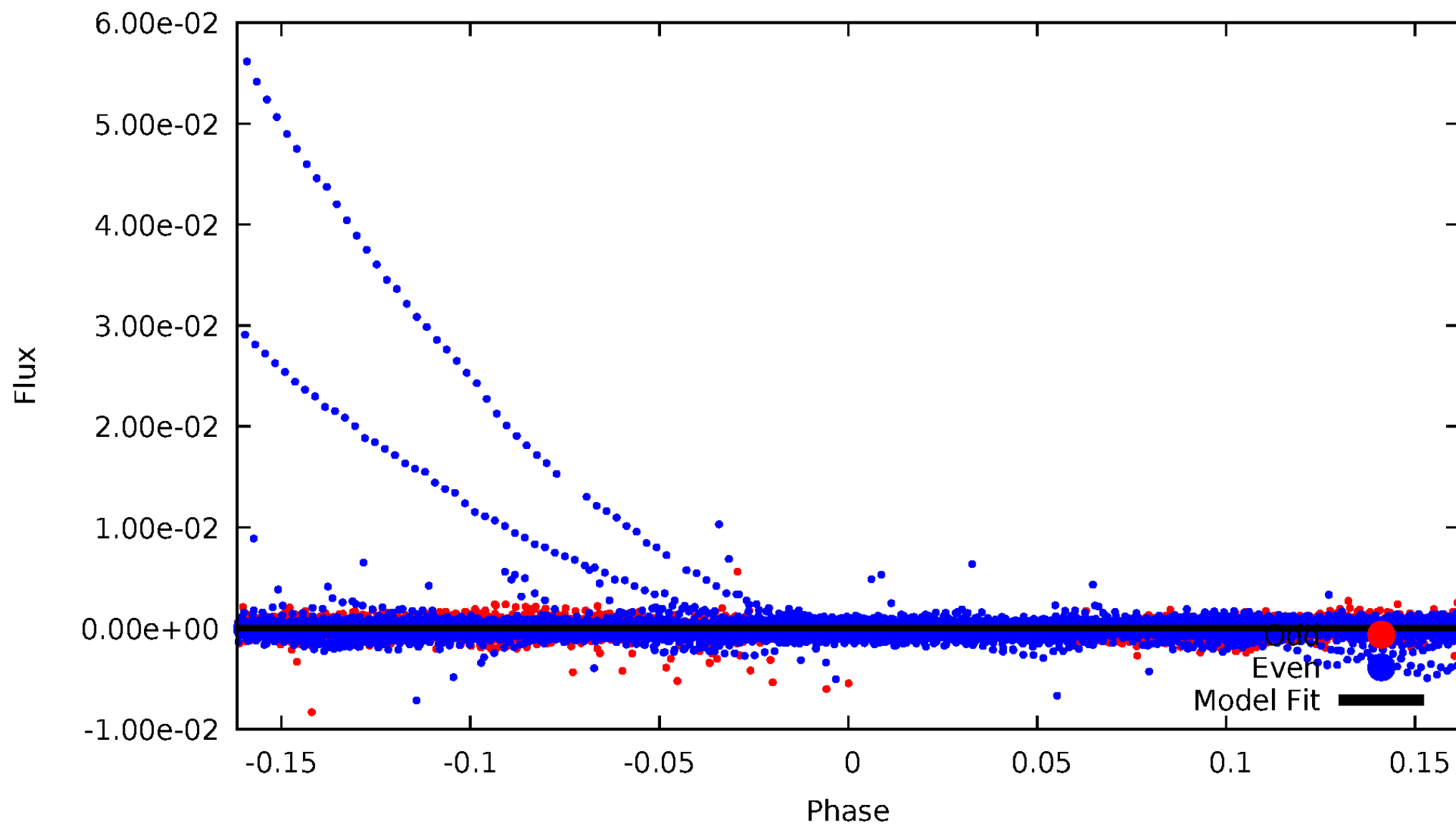
TCE 002306740-04





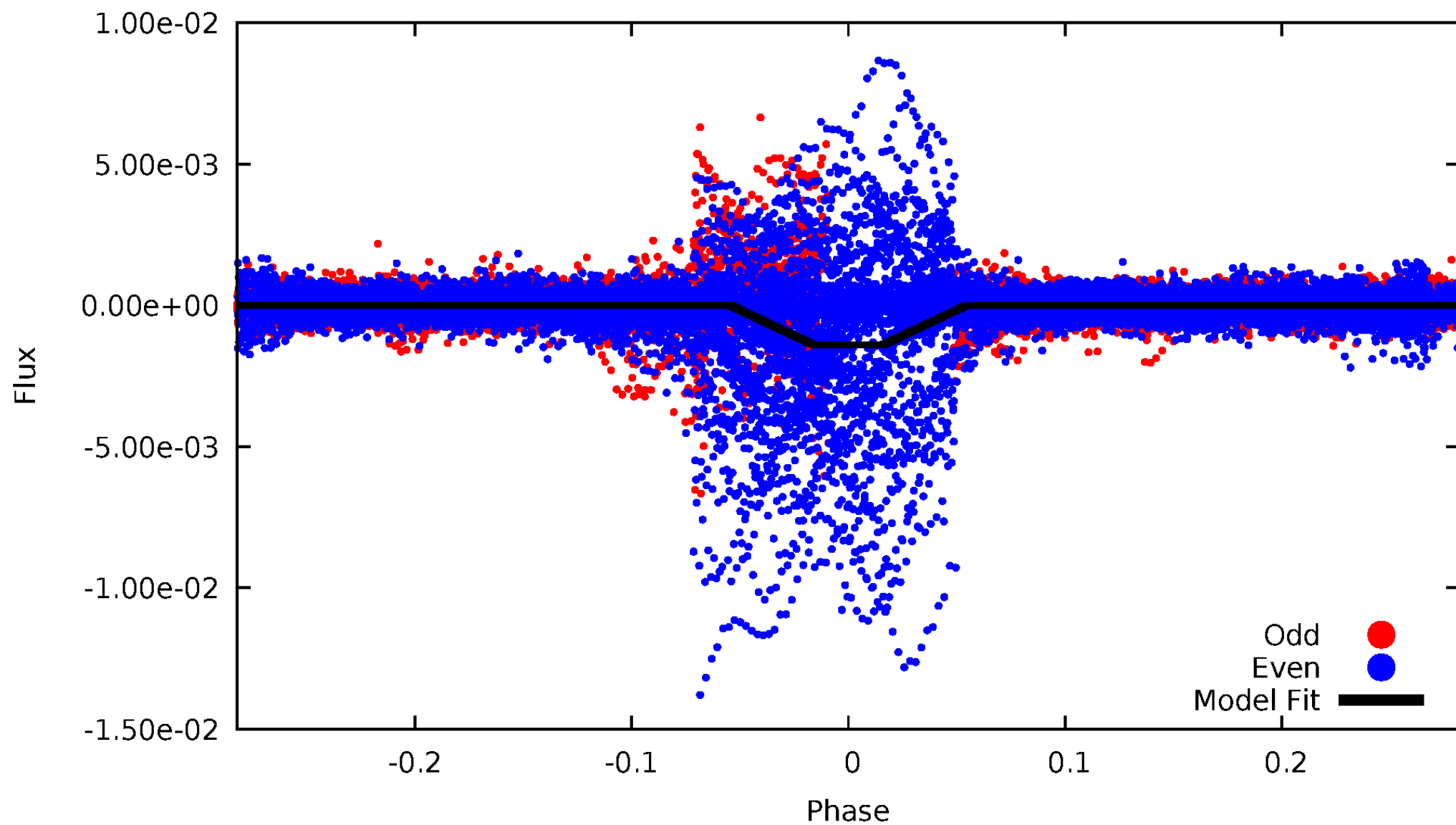
# DV Odd/Even

TCE 002306740-04



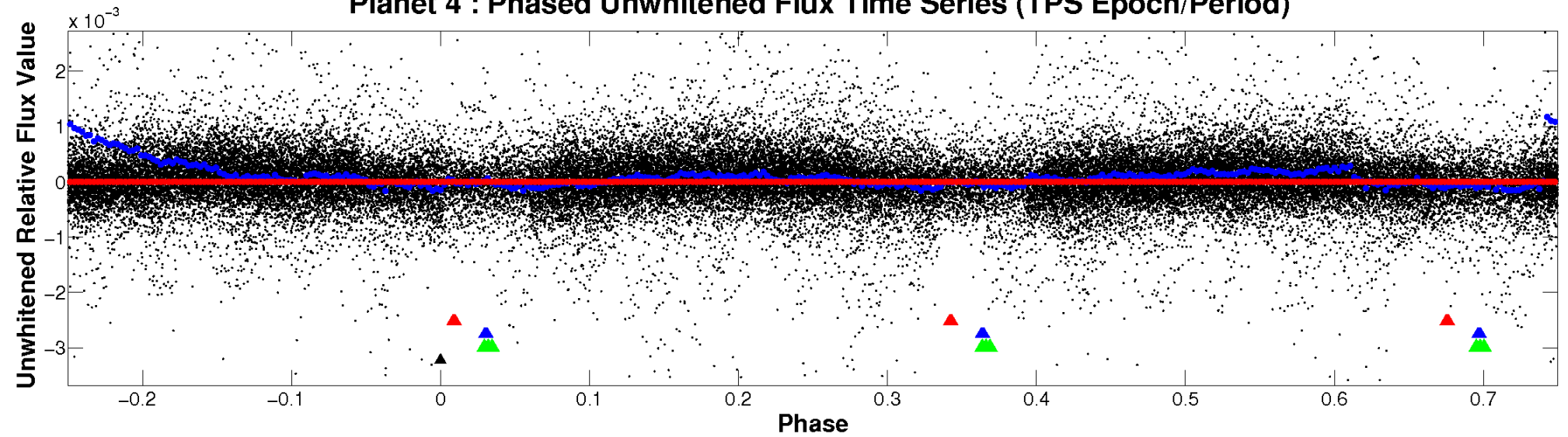
# ALT Odd/Even

TCE 002306740-04



# Non-Whitened Vs. Whitened Light Curve

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

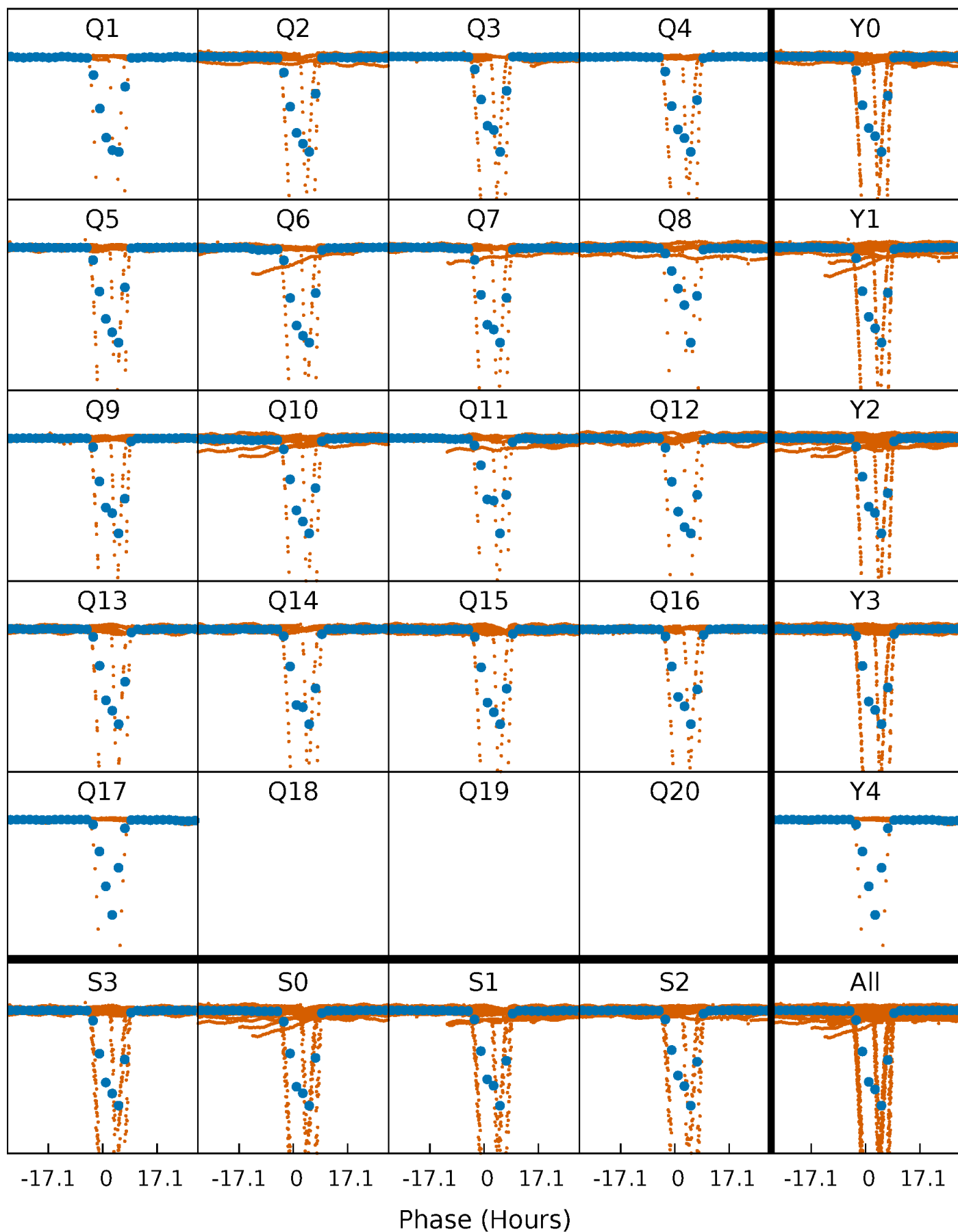


**Planet 4 : Phased Whitened Flux Time Series (TPS Epoch/Period)**



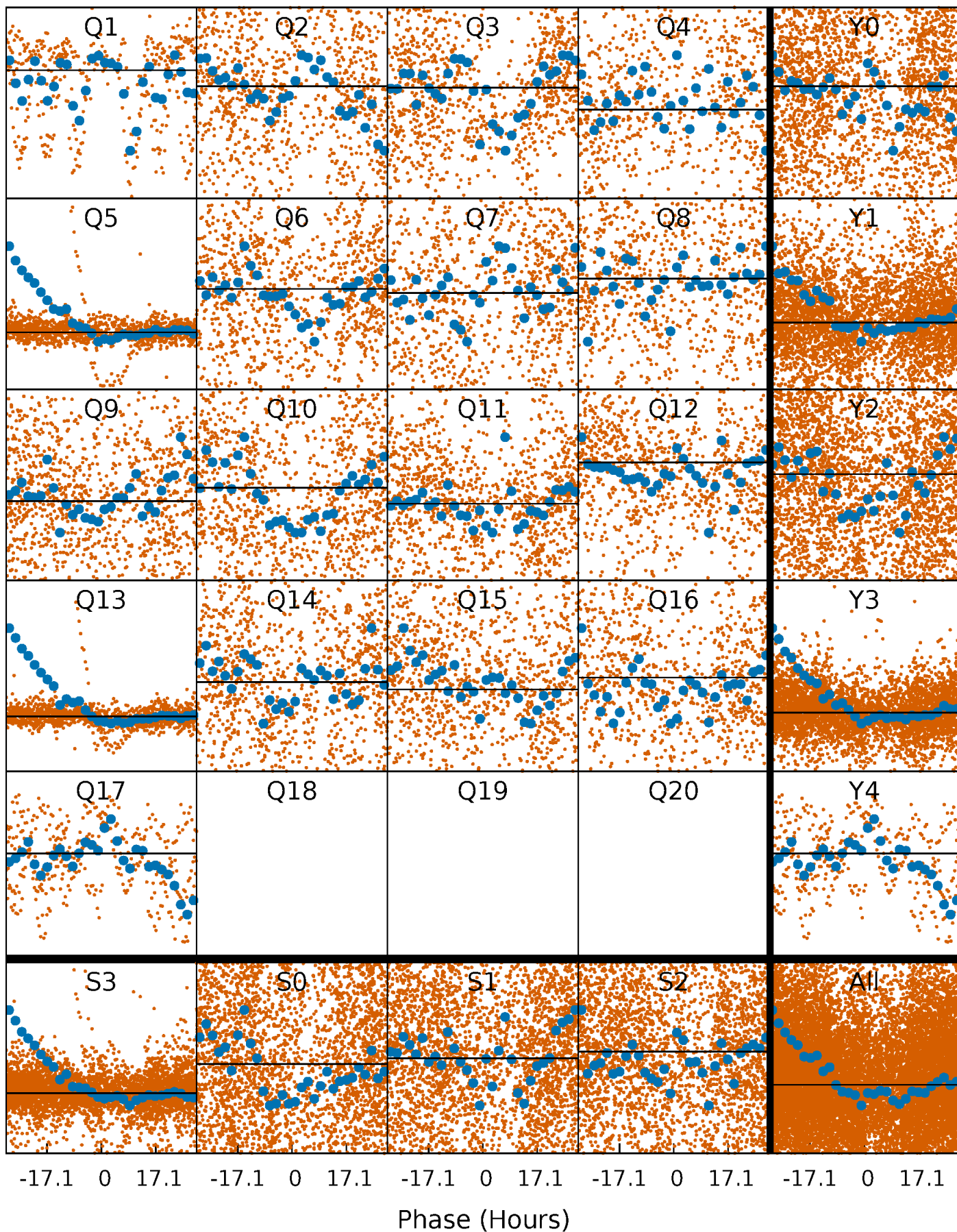
# PDC Quarter-Phased Transit Curves

TCE 002306740-04 P= 7.730062 Days  $T_0=135.945076$  (BKJD)



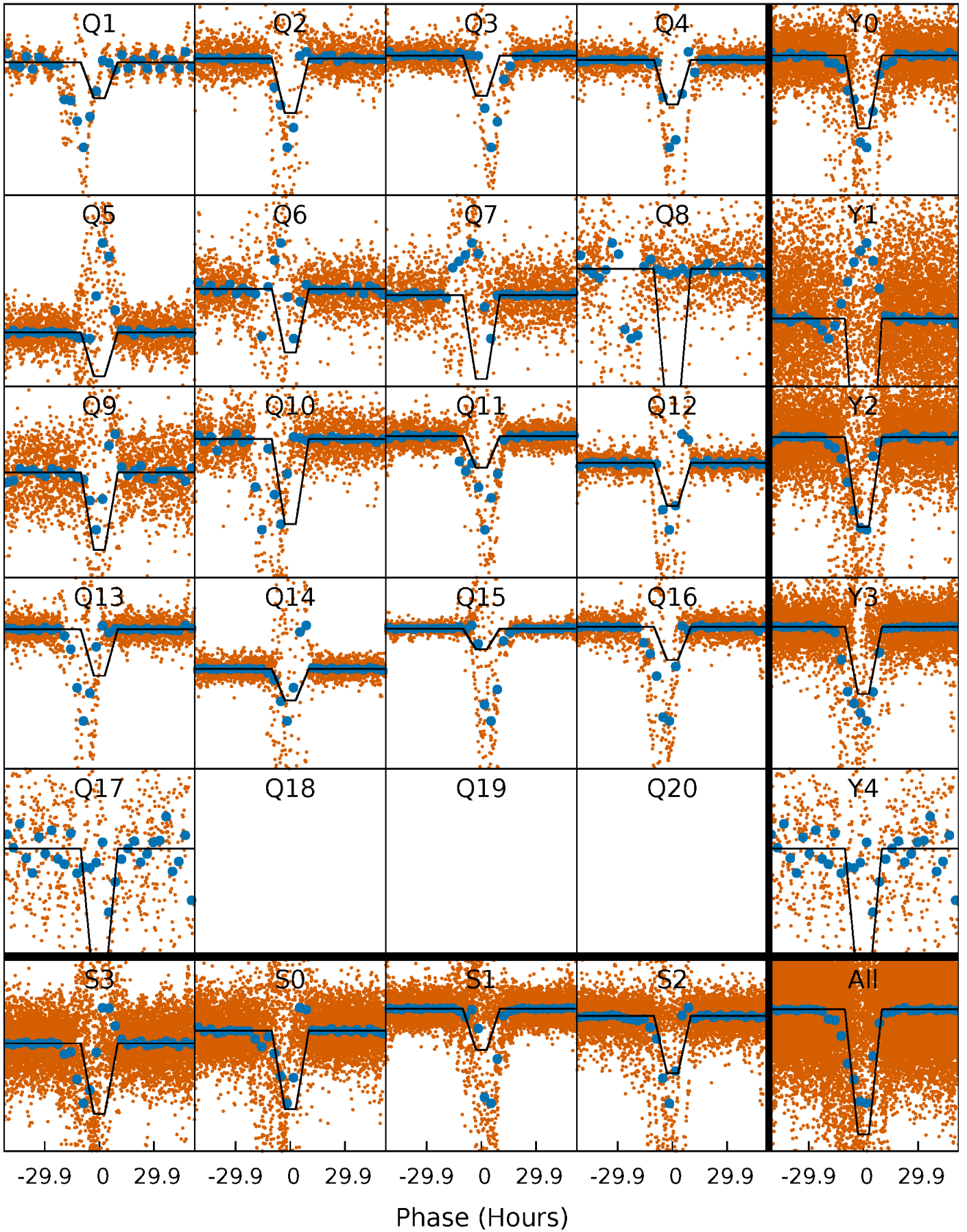
# DV Quarter-Phased Transit Curves

TCE 002306740-04   P= 7.730062 Days    $T_0=135.945076$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 002306740-04     $P = 7.730062$  Days     $T_0 = 136.031758$  (BKJD)

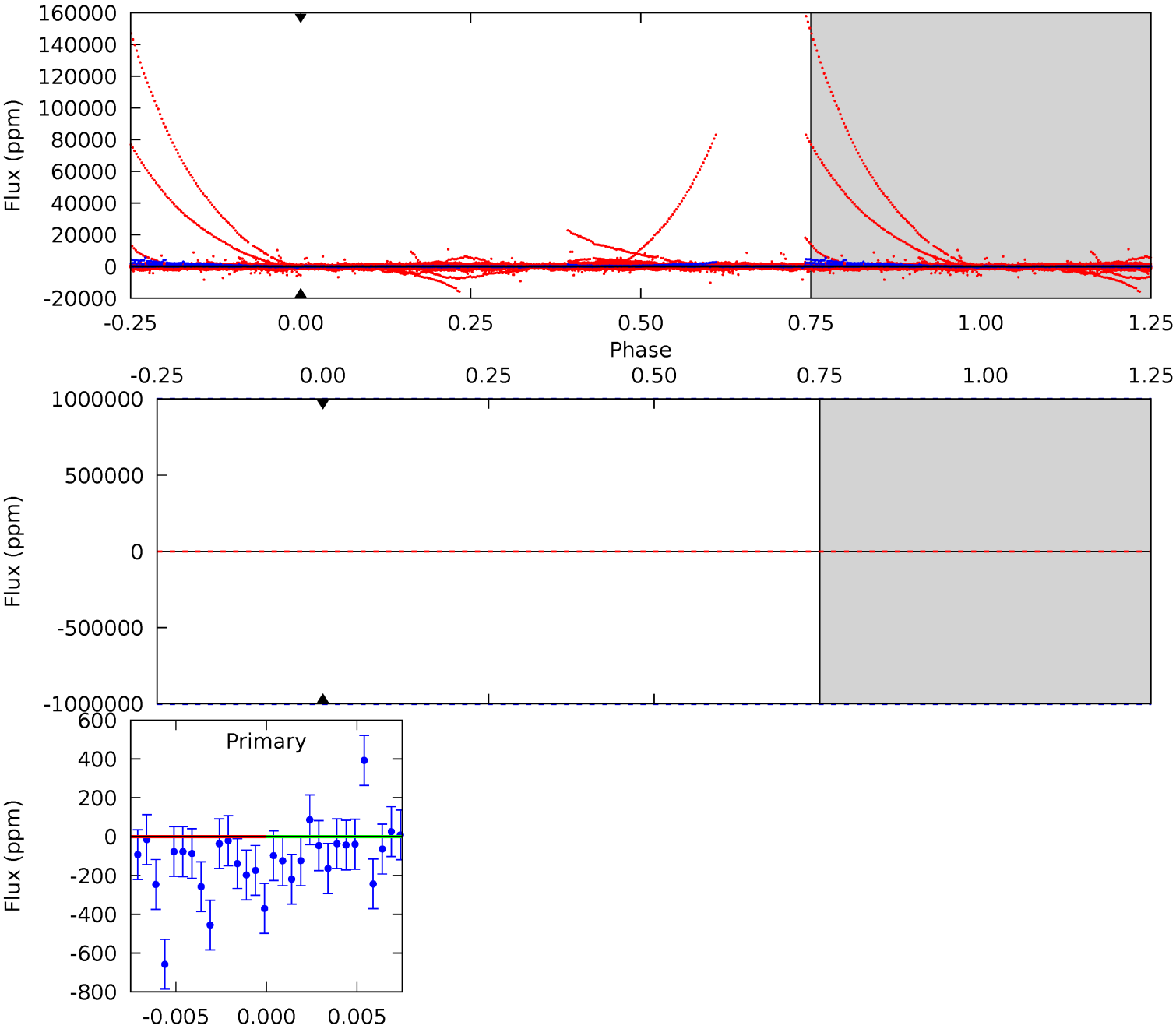




# DV Model-Shift Uniqueness Test

002306740-04, P = 7.730062 Days, E = 128.215014 Days

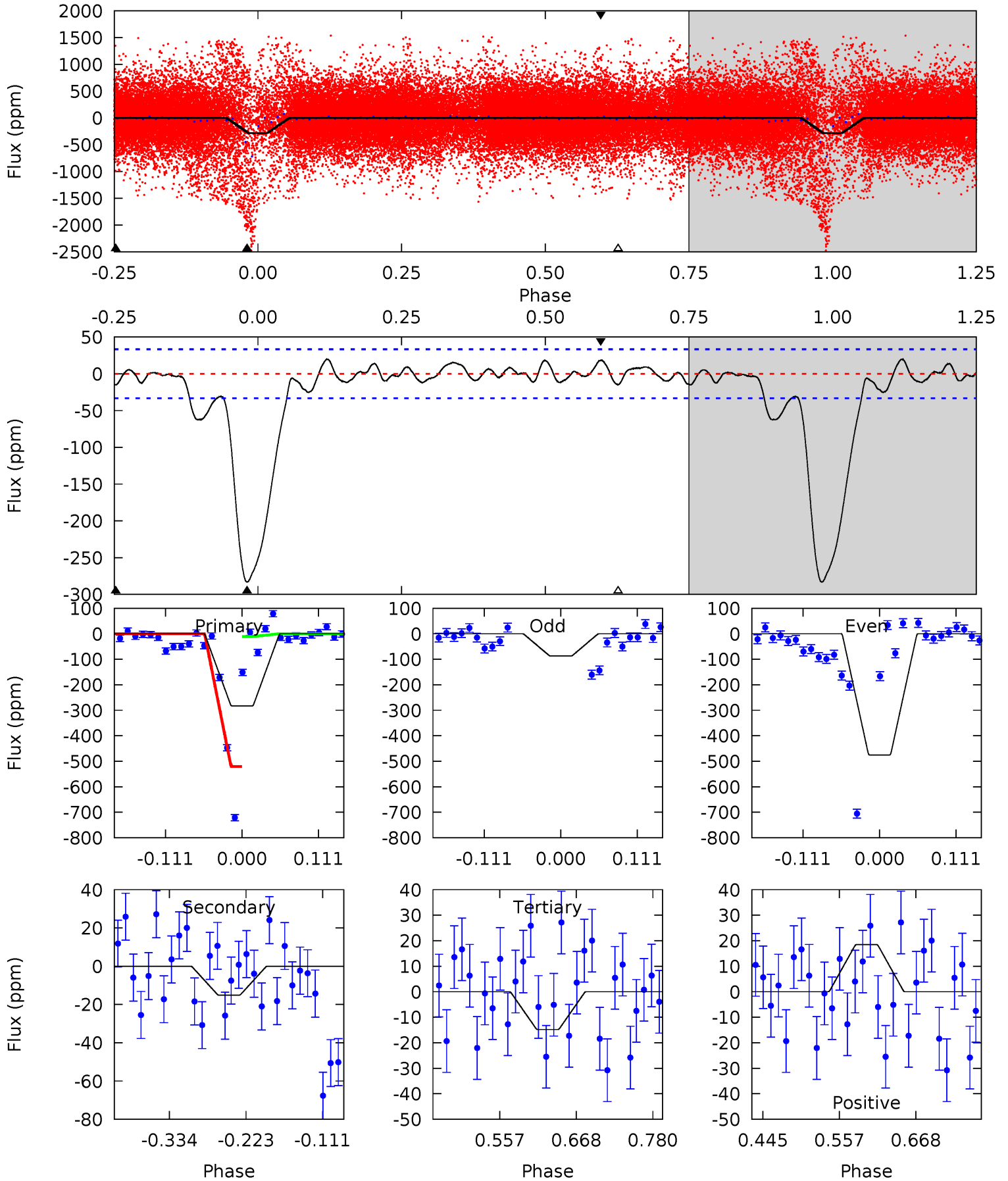
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



# Alt Model-Shift Uniqueness Test

002306740-04, P = 7.730062 Days, E = 128.301696 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
38.7	2.06	2.02	2.52	4.54	1.59	1.15	36.6	36.1	0.04	-0.46	22.6	3.00	0.07	0





### Stellar Parameters For KIC 002306740

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5912^{+160}_{-160}$	$4.225^{+0.258}_{-0.172}$	$-0.300^{+0.300}_{-0.300}$	$1.217^{+0.326}_{-0.326}$	$0.907^{+0.131}_{-0.087}$	$0.709^{+1.056}_{-0.319}$
	+3%/-3%	+6%/-4%	+100%/-100%	+27%/-27%	+14%/-10%	+149%/-45%
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 002306740-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$0 \pm 1000000$	$18.75^{+13.21}_{-11.43}$	$1469^{+121}_{-120}$	$-4123^{+14670}_{-6226}$	$-30.142^{+1415.282}_{-1115.254}$
Alt.	$-15 \pm 7$	$10.38^{+11.13}_{-7.59}$	$1461^{+105}_{-115}$	$1798^{+1259}_{-3899}$	$0.356^{+5.473}_{-0.275}$

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

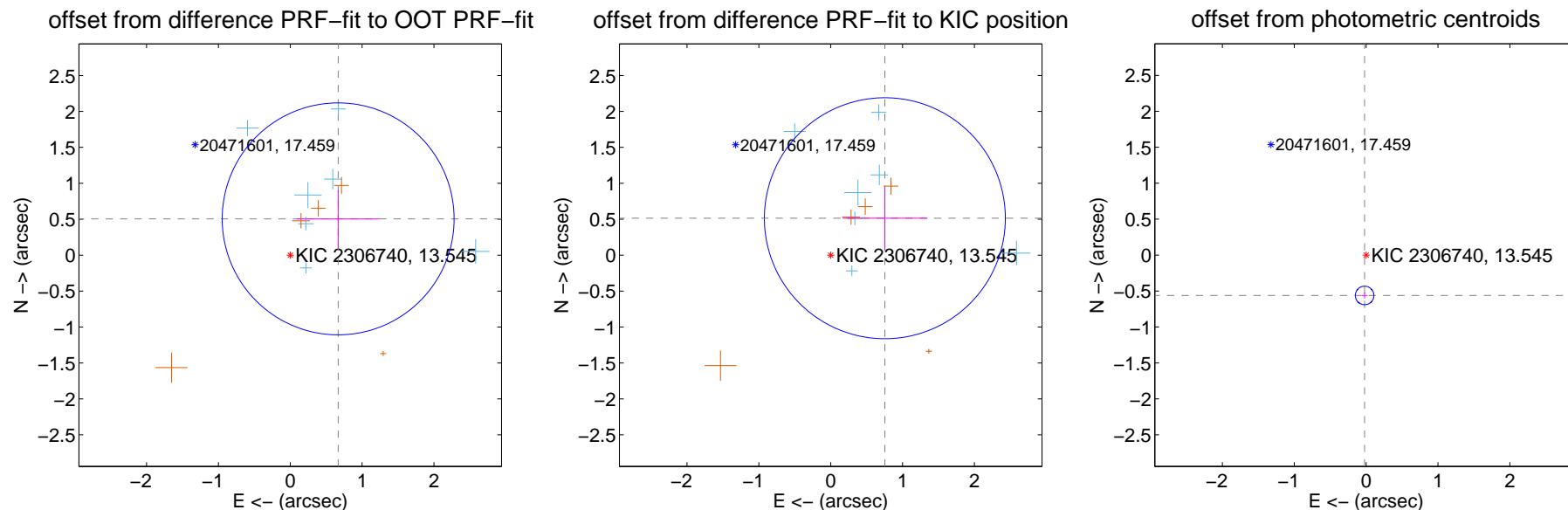
## DV Centroid Data

Supplemental centroid analysis for 002306740-04. Kepler magnitude: 13.54. Transit SNR -1.00

There are 7 quarters with good PRF difference image offsets

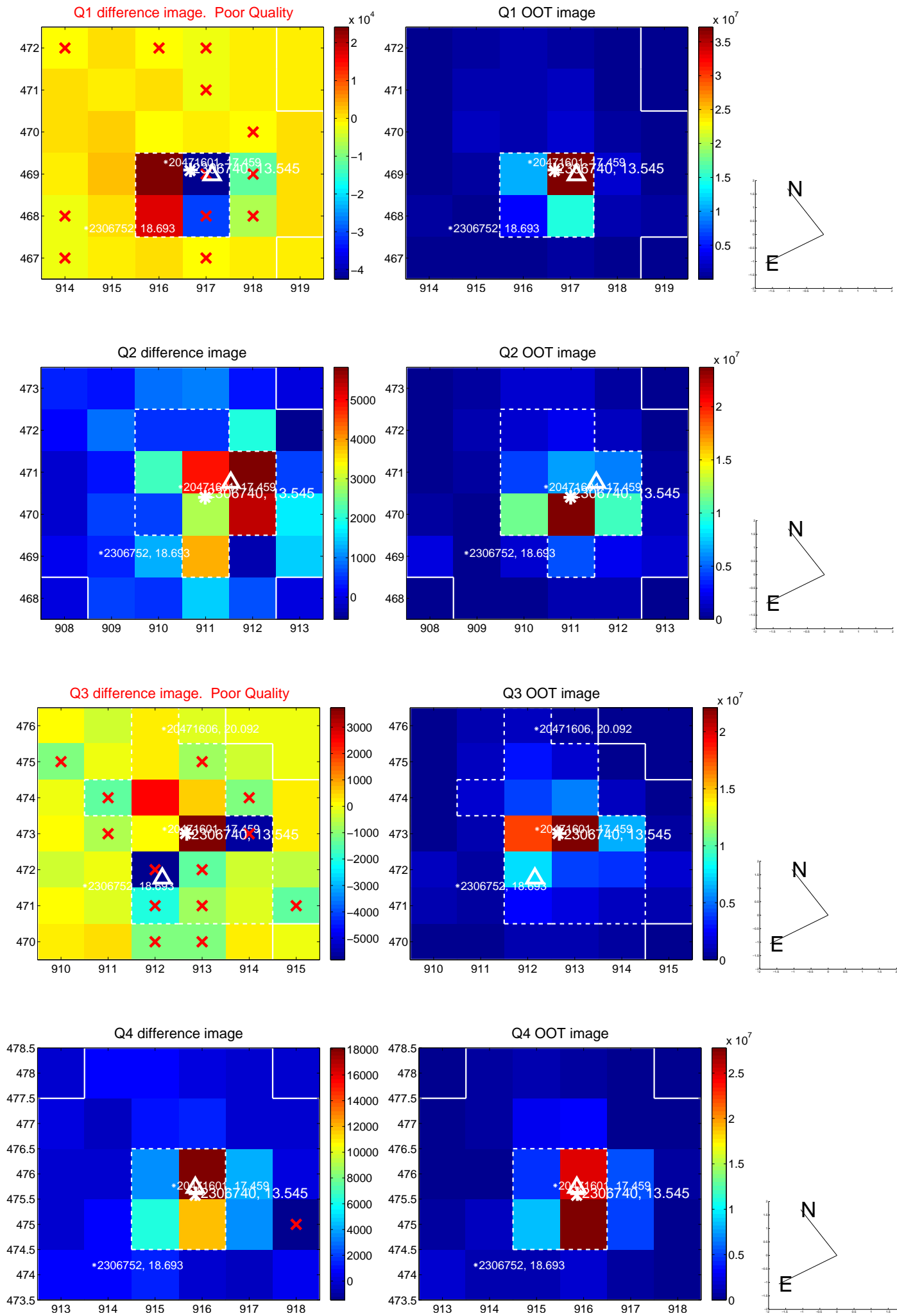
The direct PRF centroid is offset from the target star catalog position by about 0.12 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.836 \pm 0.538$	1.55	$-0.667 \pm 0.575$	$0.505 \pm 0.401$
PRF-fit source offset from KIC position	$0.912 \pm 0.559$	1.63	$-0.754 \pm 0.591$	$0.514 \pm 0.437$
photometric centroid source offset	$0.56 \pm 0.04$	13.08	$0.02 \pm 0.04$	$-0.56 \pm 0.04$

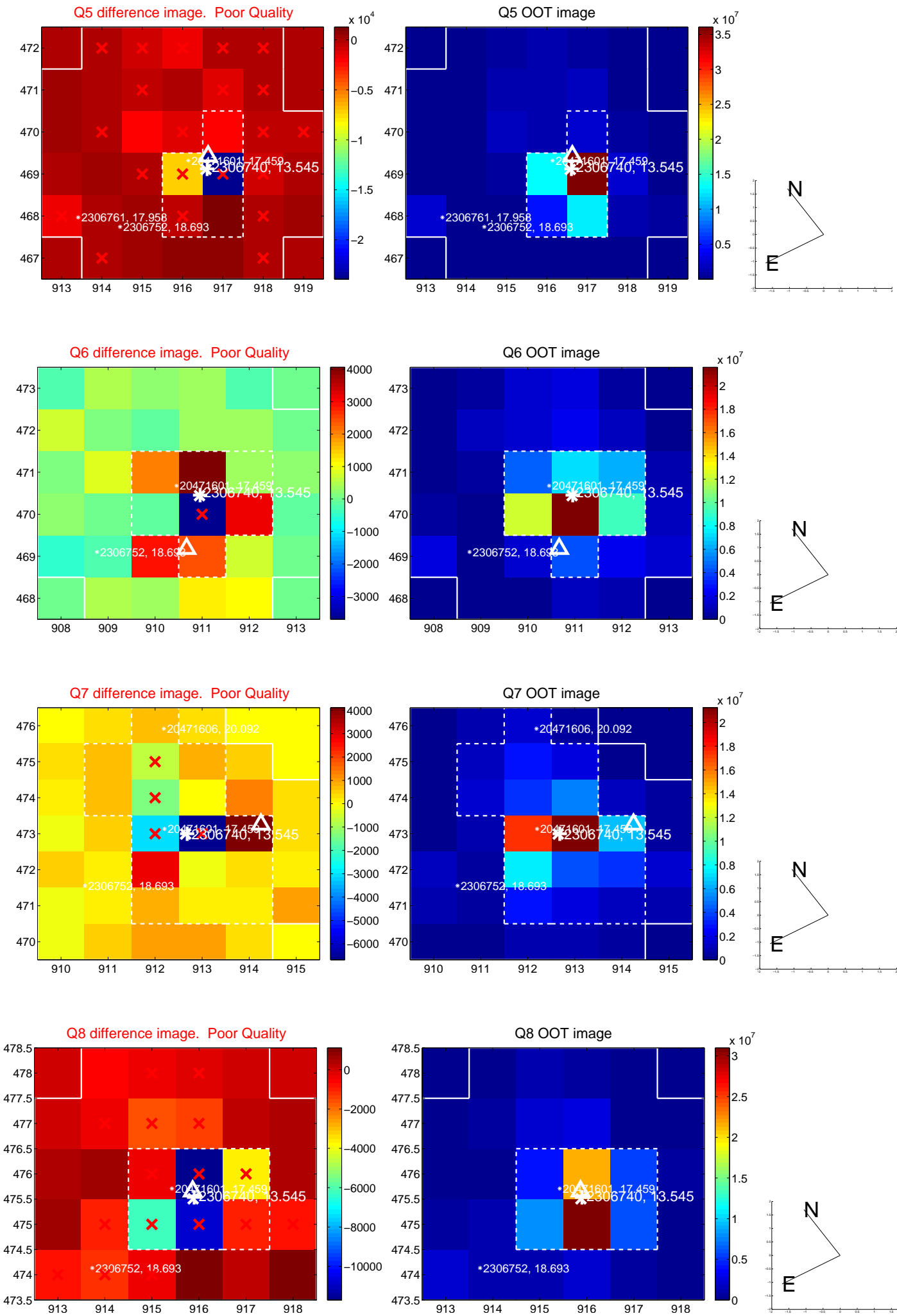


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

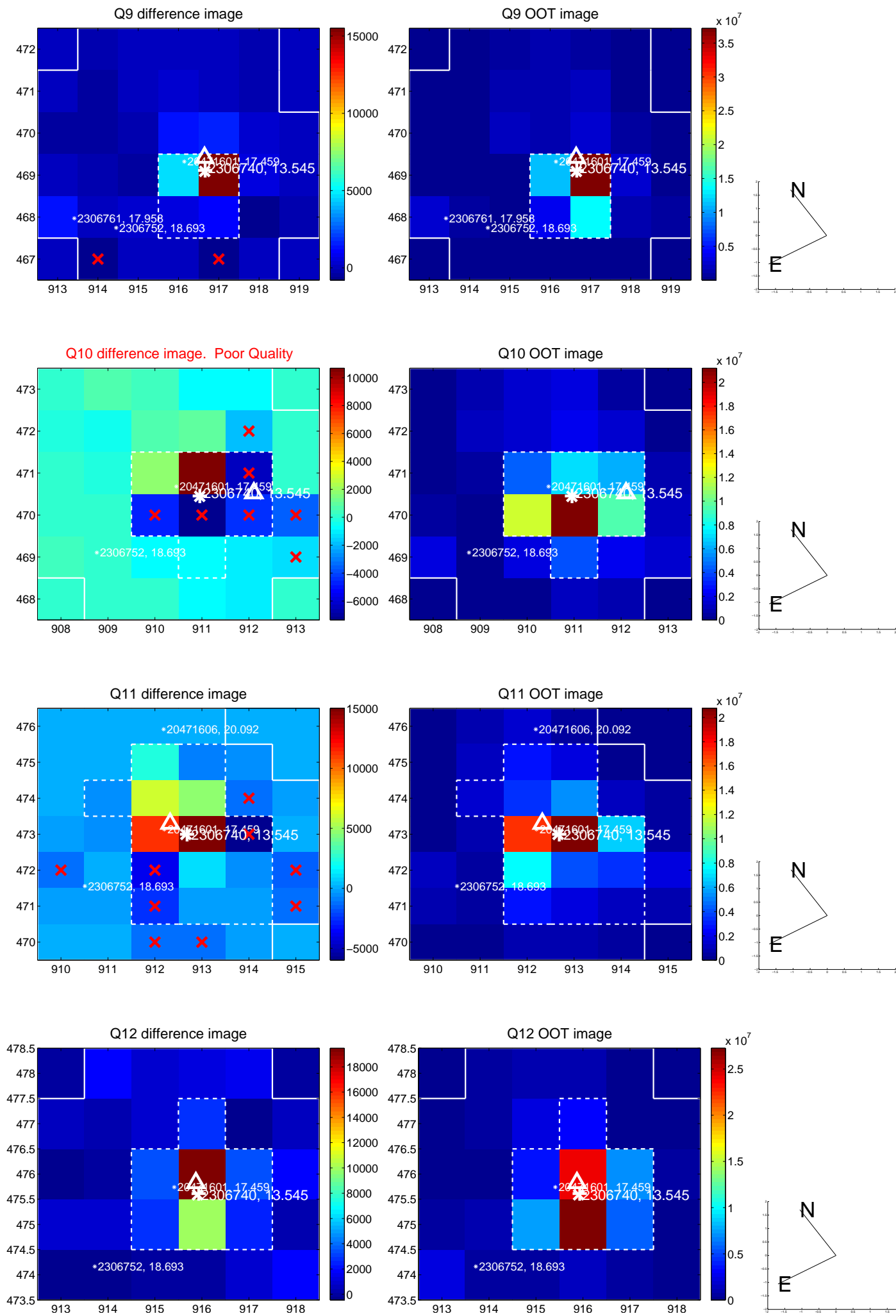
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



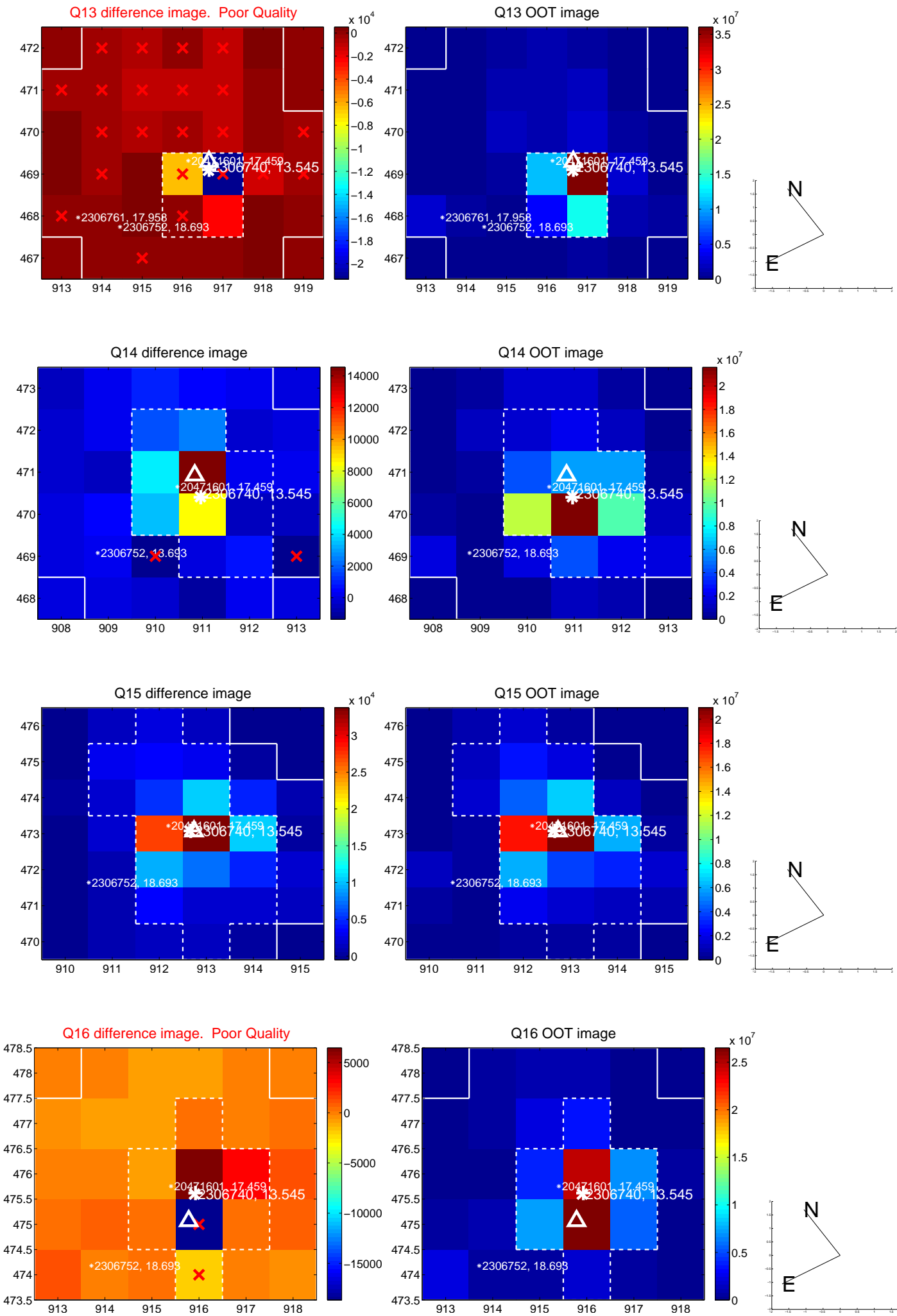
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



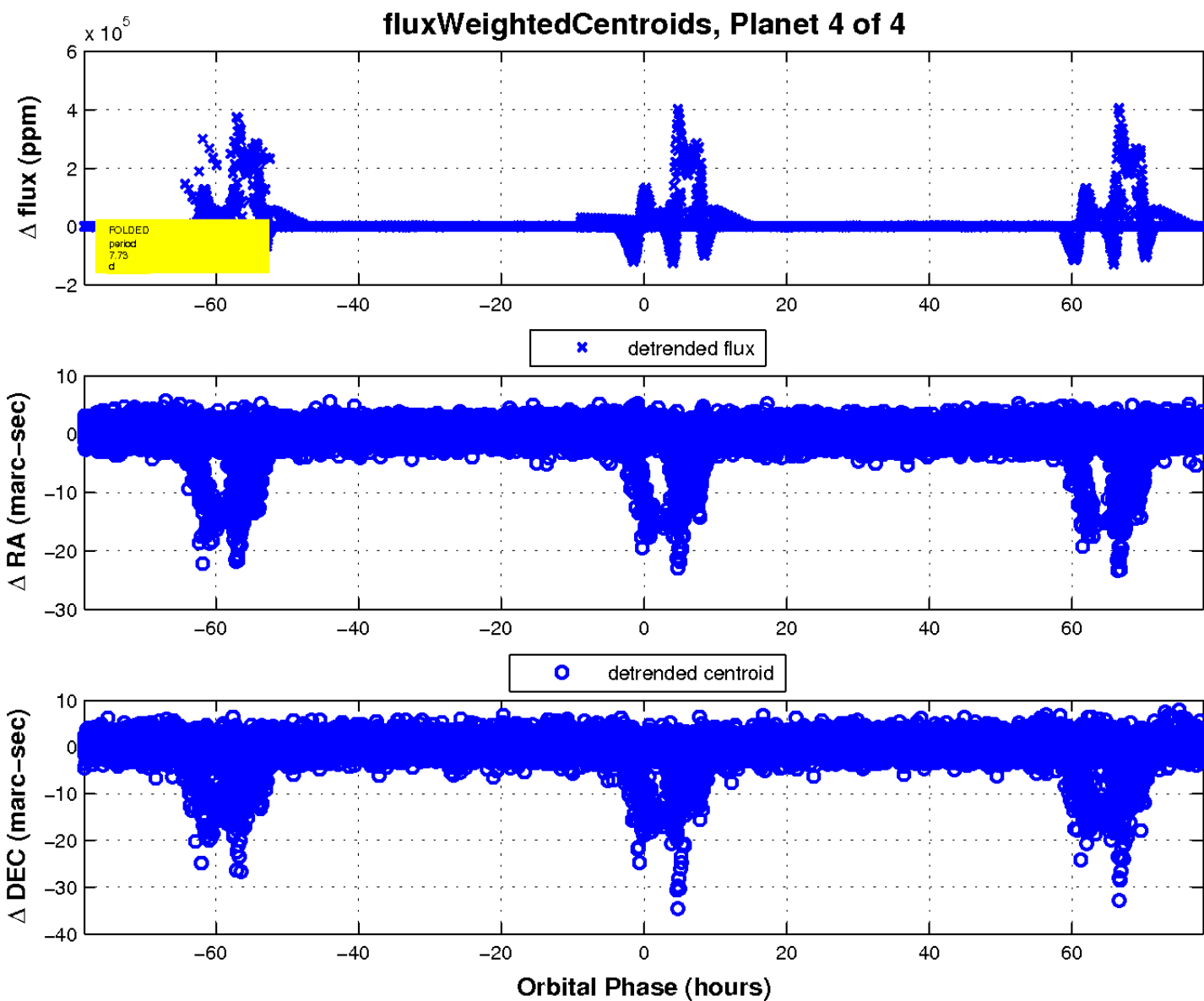
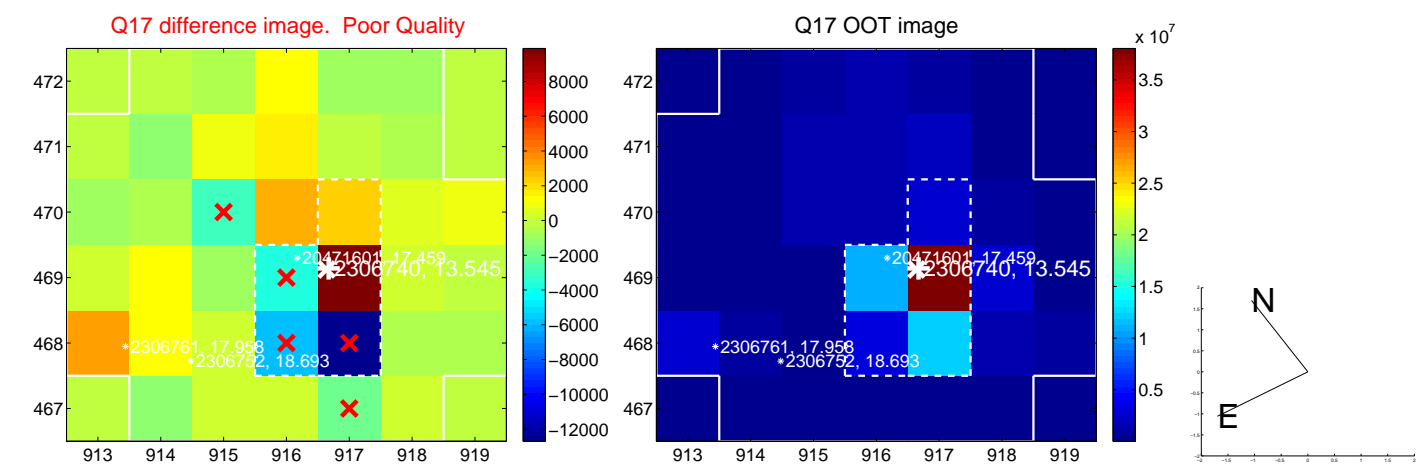
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



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



UKIRT Image

Declination

