

# KIC 009412462

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009412462-01	OBS	7171.01	10.186440	132.536077	341911.5	6.000	14270.8	-1.0	0.92	5557	40.92	93.79
009412462-02	OBS	No	5.093279	132.386231	255401.6	6.000	10971.4	-1.0	0.92	5557	34.64	236.33
009412462-03	OBS	No	5.093253	136.558083	4099.0	15.000	504.5	-1.0	0.92	5557	5.78	236.33
009412462-04	OBS	No	5.093374	133.641277	2538.7	16.921	146.4	37.5	0.92	5557	8.79	236.33

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009412462-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_ALT—MOD_ODDEVEN_ALT—HAS_SEC_TCE—CENT_NOFITS
009412462-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE—CENT_NOFITS
009412462-03	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—SAME_NTL_PERIOD—CENT_NOFITS
009412462-04	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD—CENT_FEW_DIFFS

**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 009412462-01

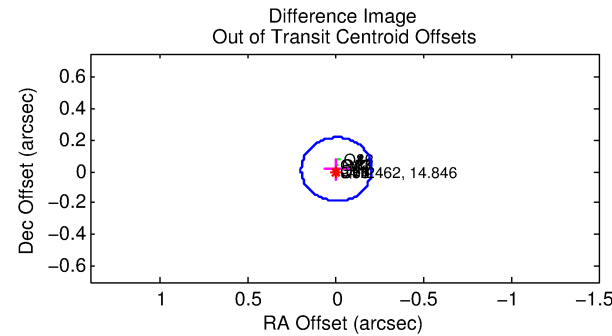
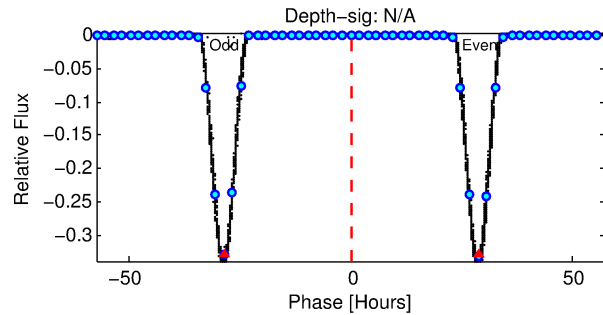
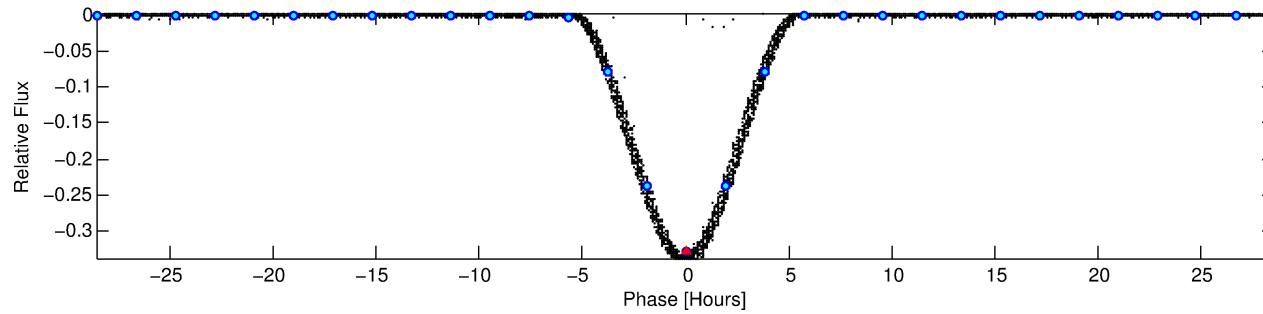
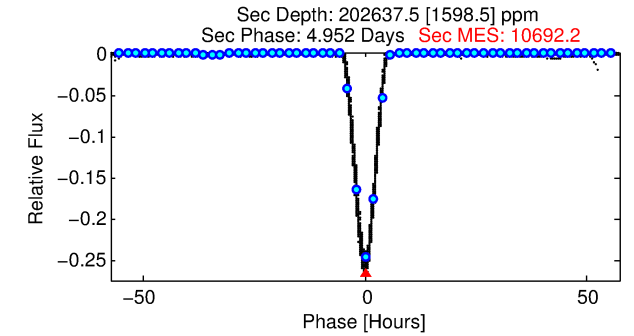
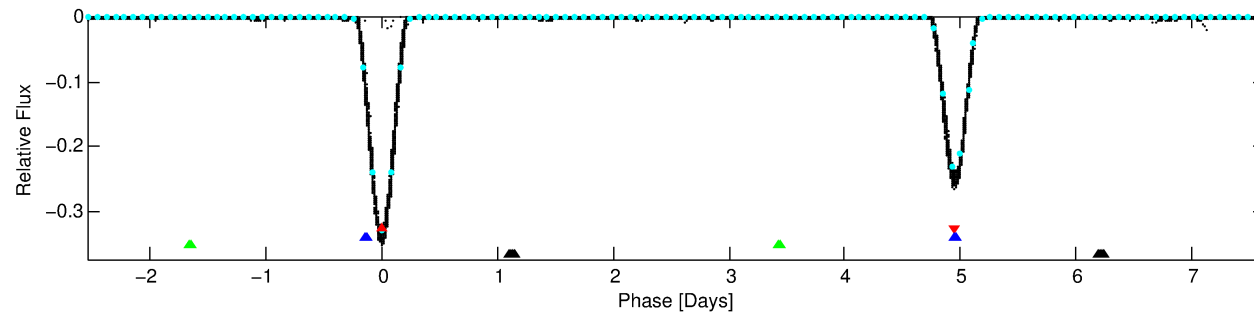
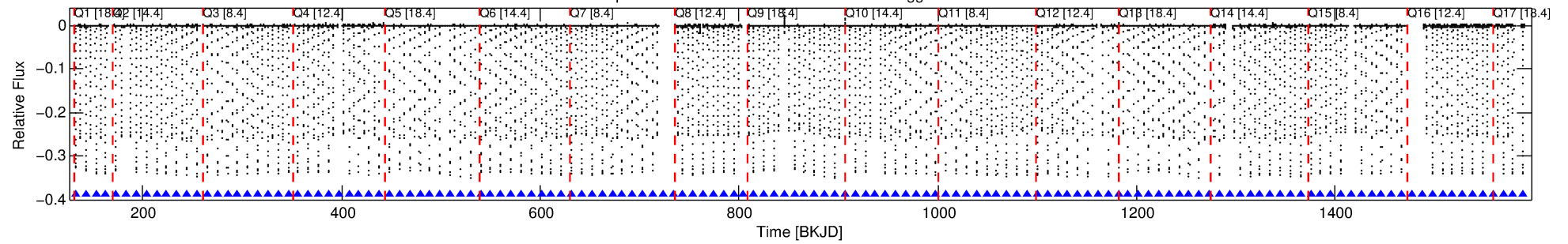
No Significant Match Found

# DV One-Page Summary

KIC: 9412462 Candidate: 1 of 4 Period: 10.186 d

KOI: K07171.01 Corr: 0.752

Kp: 14.85 R\*: 0.92 Rs Teff: 5557.0 K Logg: 4.45 Fe/H: -0.120



## TPS TCE Results:

Period = 10.18644 d  
Epoch = 132.5361 BKJD

DV fit results are unavailable

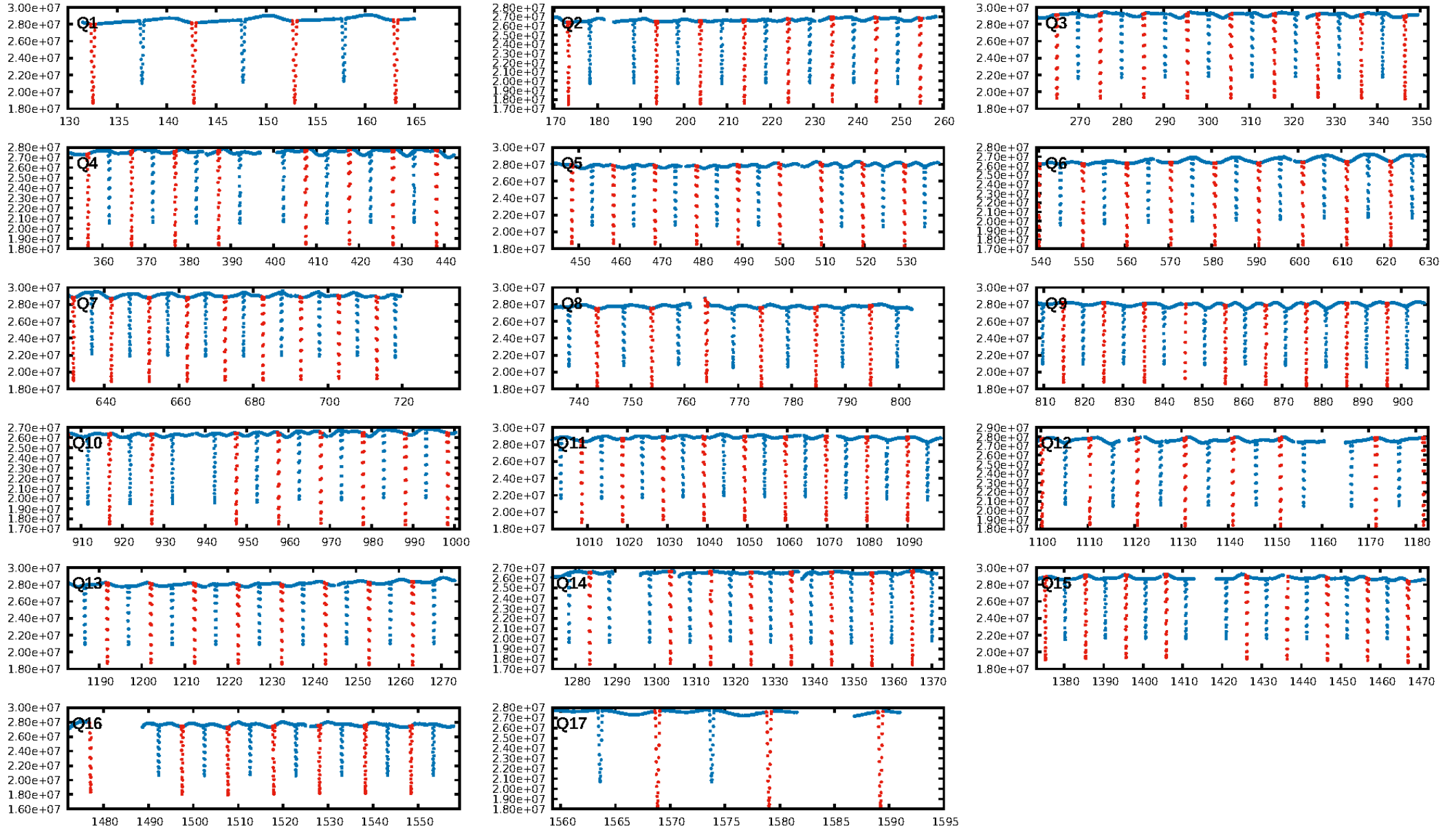
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [6.81 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [124/124]  
GhostDiagnostic-chr: 0.8558  
Centroid-sig: N/A  
Centroid-so: 0.146 arcsec [258.69 $\sigma$ ]  
OotOffset-rm: 0.016 arcsec [0.24 $\sigma$ ]  
KicOffset-rm: 0.090 arcsec [1.33 $\sigma$ ]  
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]

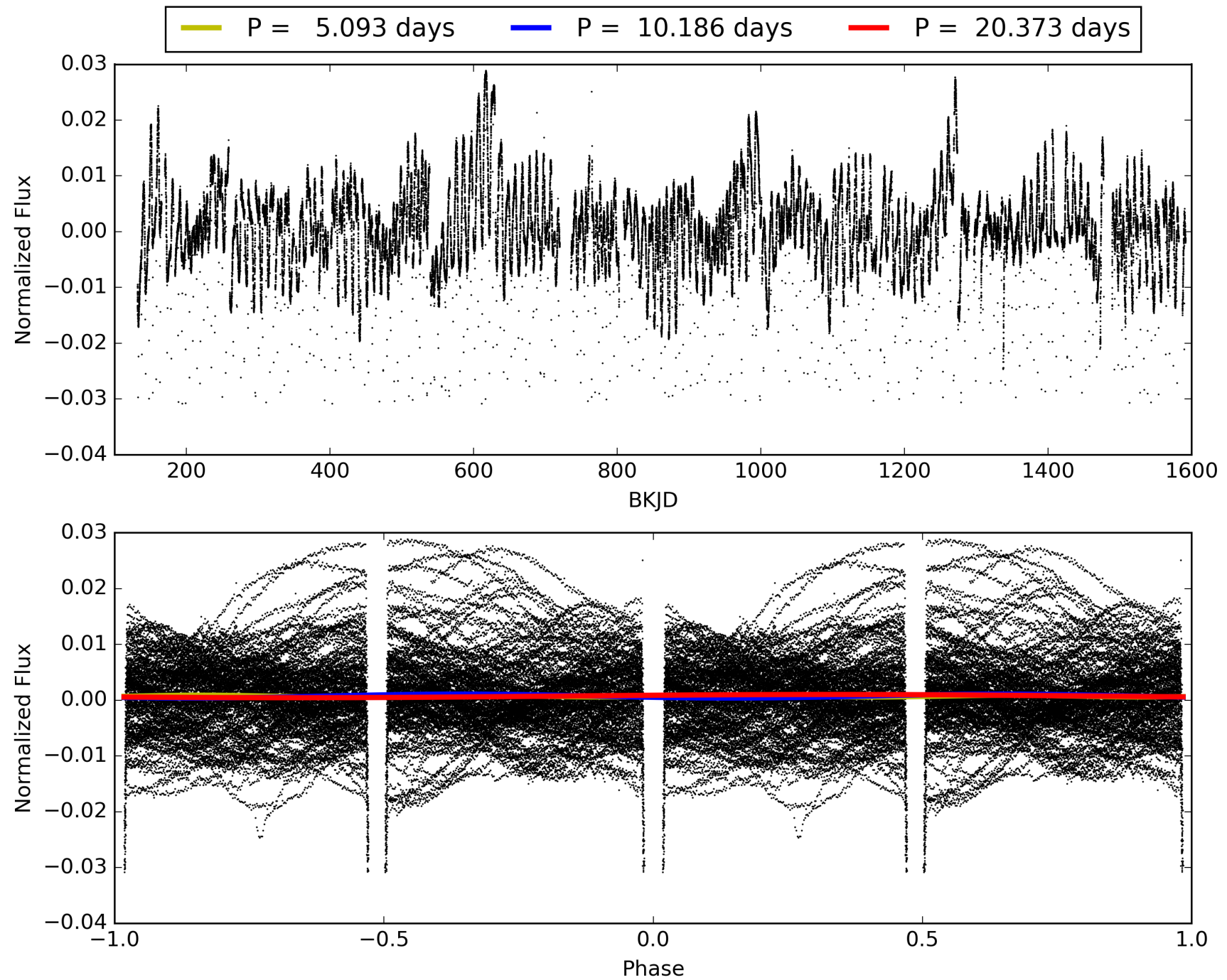
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 03-Feb-2016 02:05:48 Z

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

# TCE 009412462-01, PDC Light Curves



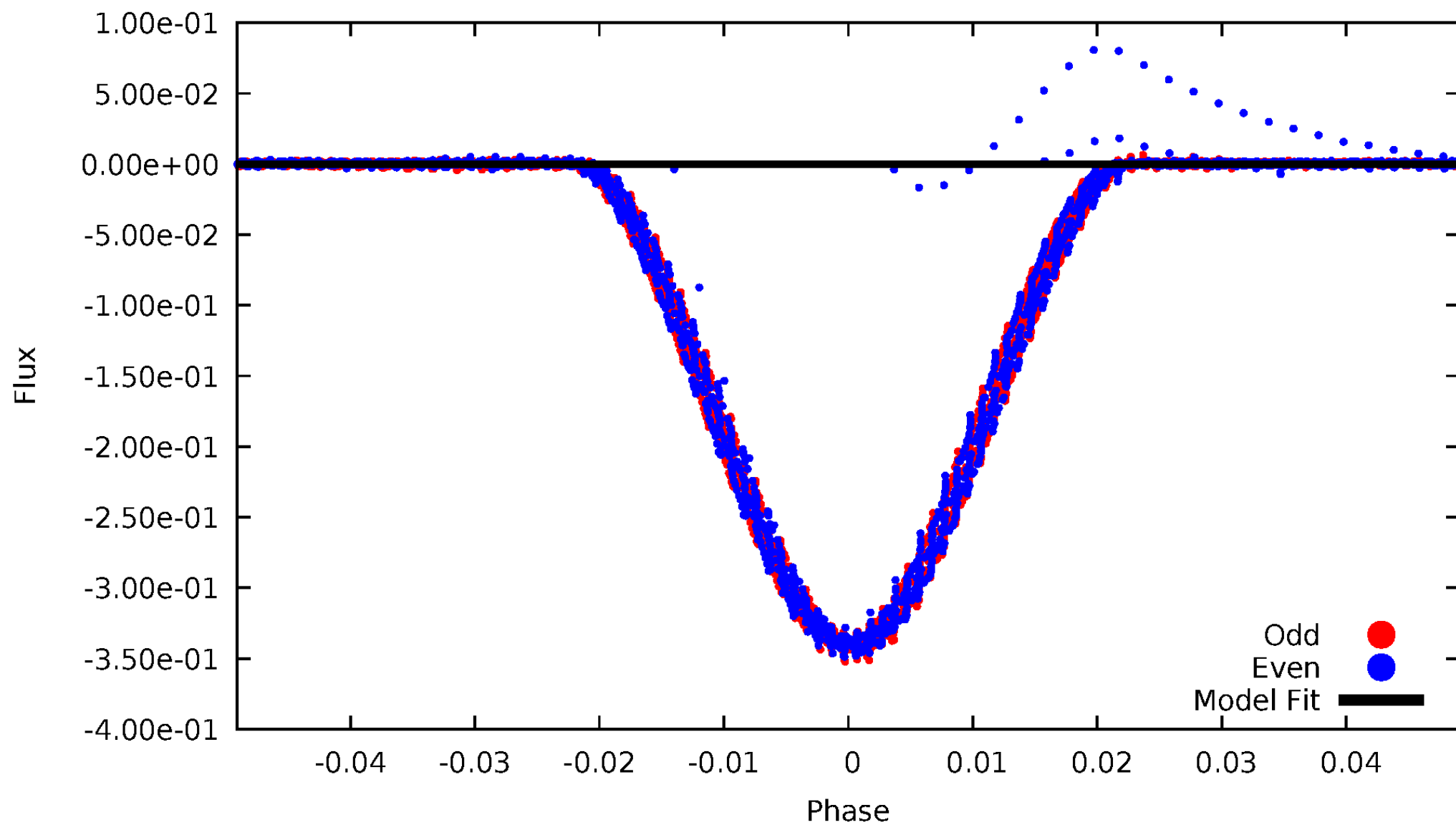
TCE 009412462-01





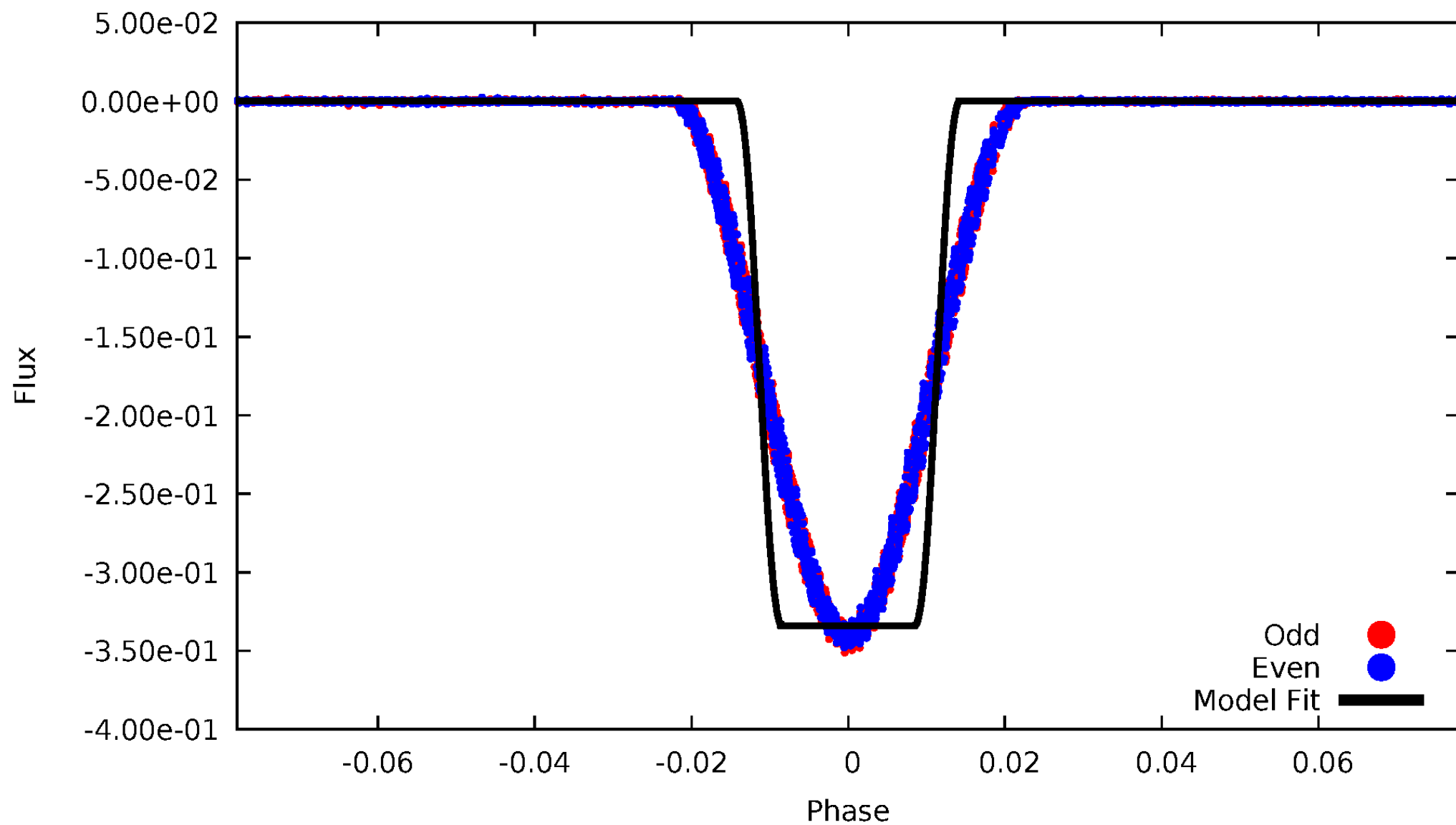
# DV Odd/Even

TCE 009412462-01



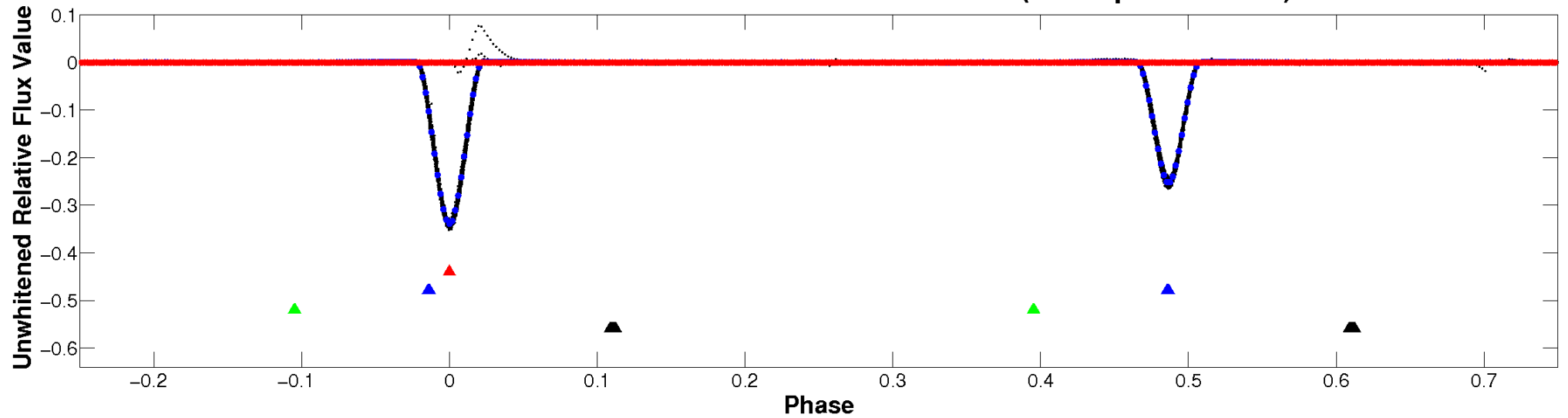
# ALT Odd/Even

TCE 009412462-01



# Non-Whitened Vs. Whitened Light Curve

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

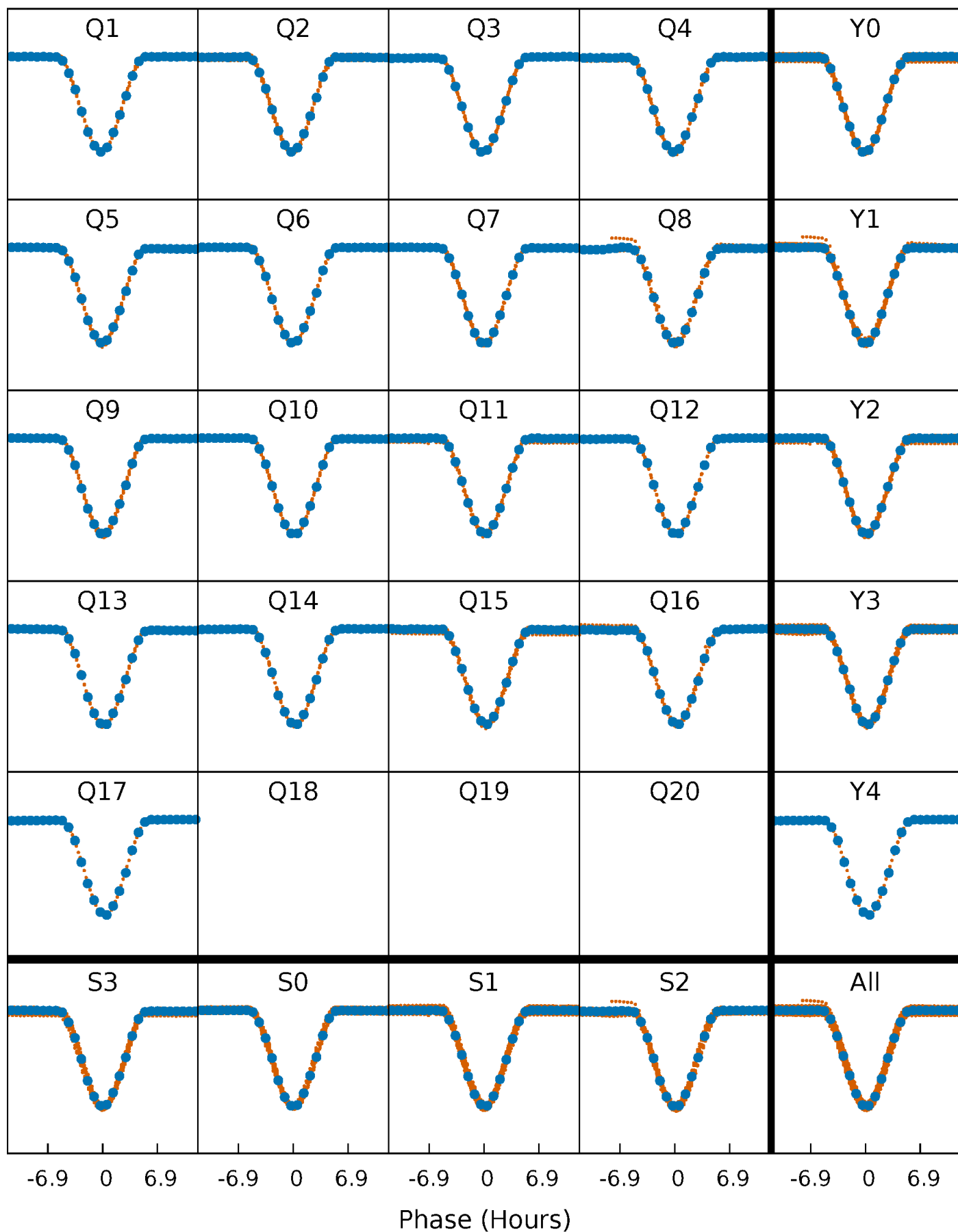


**Planet 1 : Phased Whitened Flux Time Series (TPS Epoch/Period)**



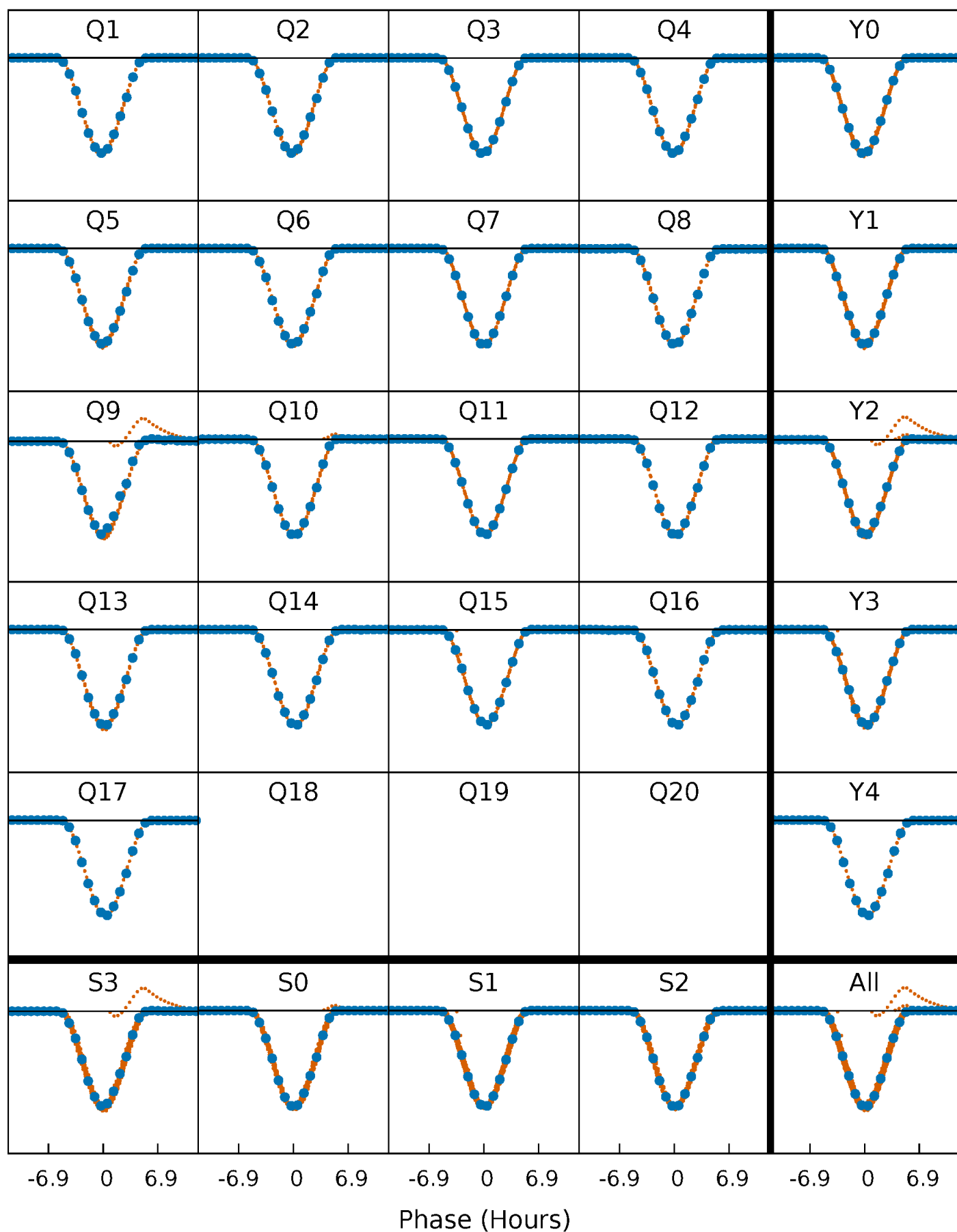
# PDC Quarter-Phased Transit Curves

TCE 009412462-01 P= 10.186440 Days  $T_0=132.536077$  (BKJD)



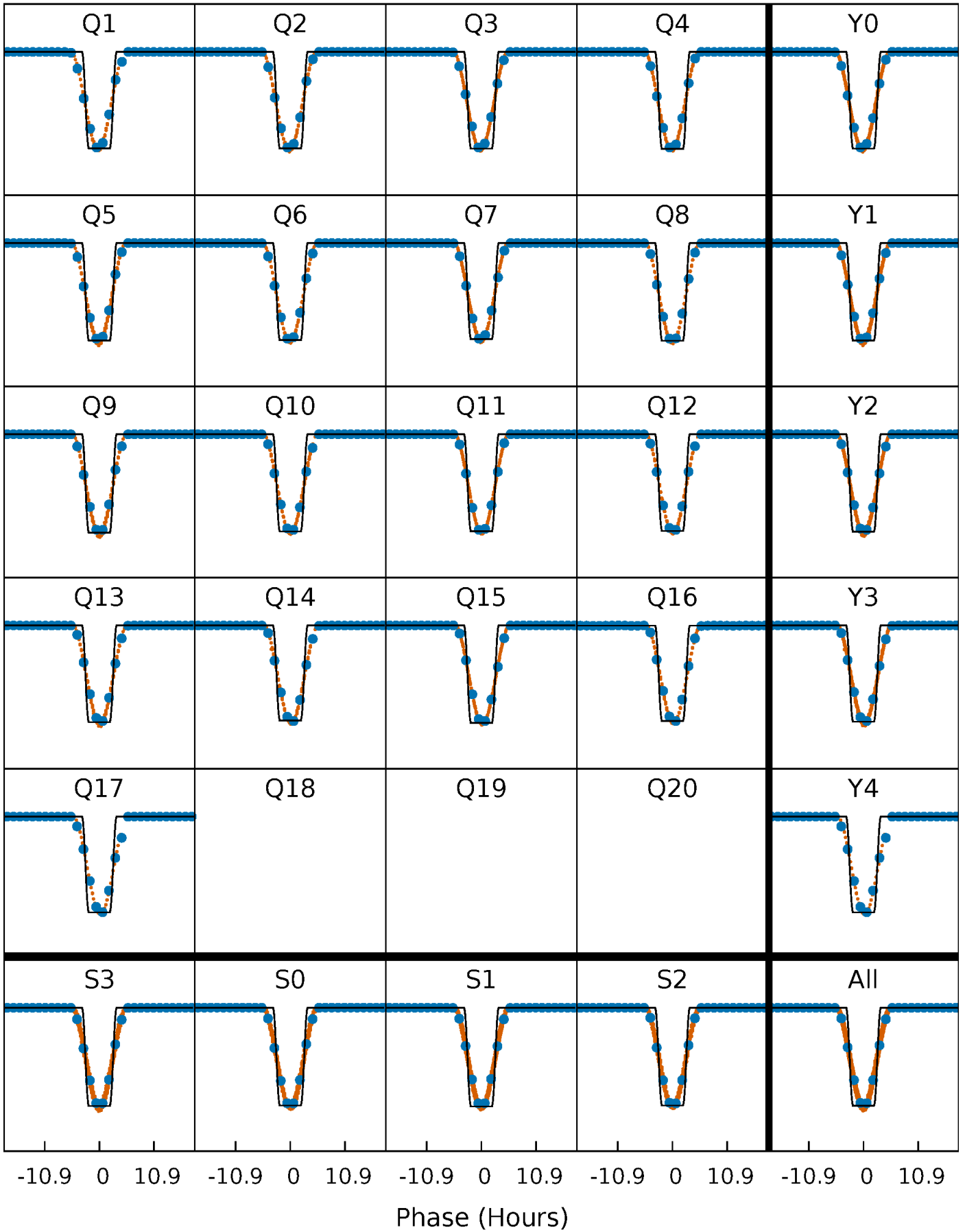
# DV Quarter-Phased Transit Curves

TCE 009412462-01 P= 10.186440 Days  $T_0=132.536077$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 009412462-01 P= 10.186440 Days  $T_0=132.538337$  (BKJD)

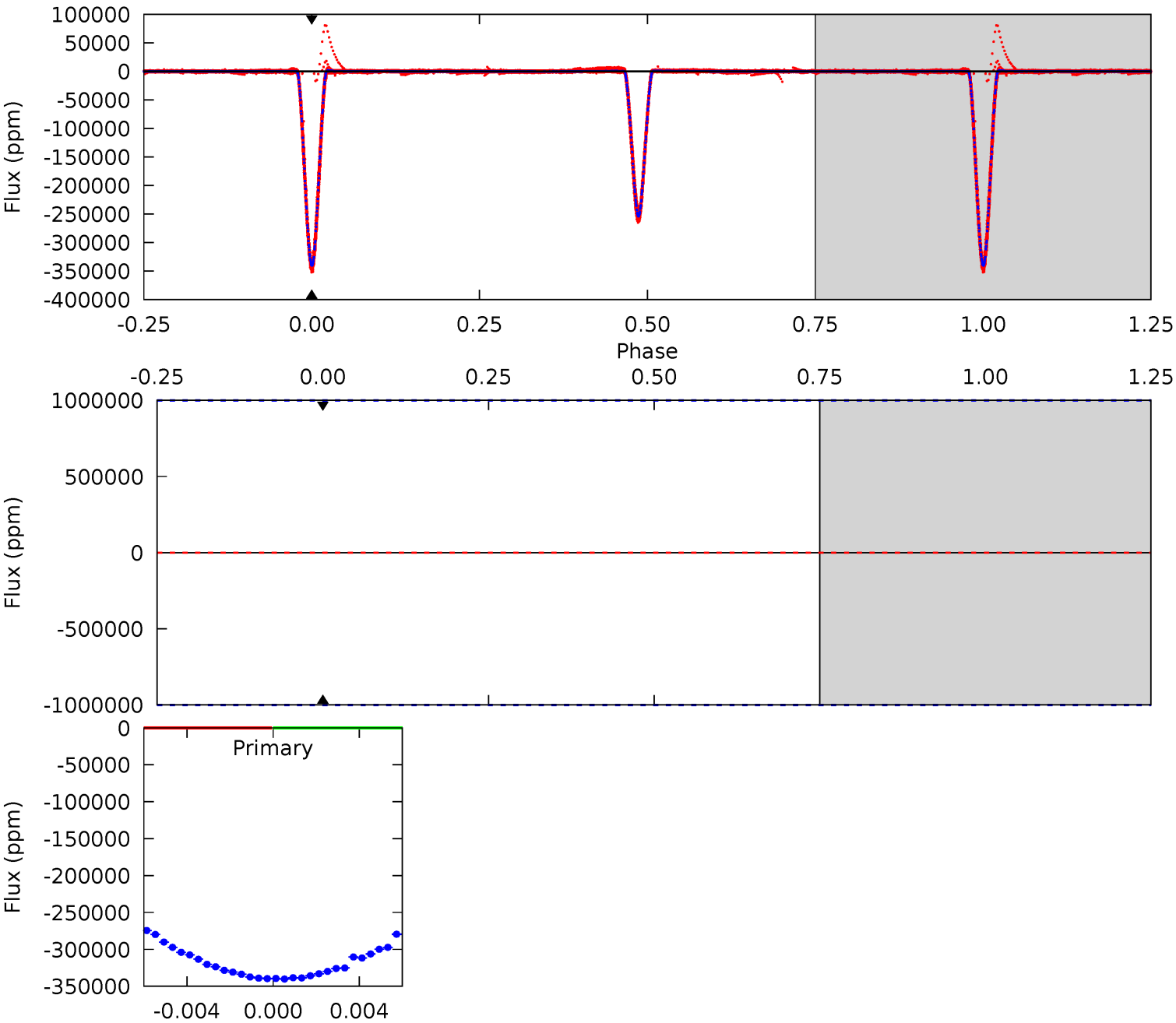




# DV Model-Shift Uniqueness Test

009412462-01, P = 10.186440 Days, E = 122.349637 Days

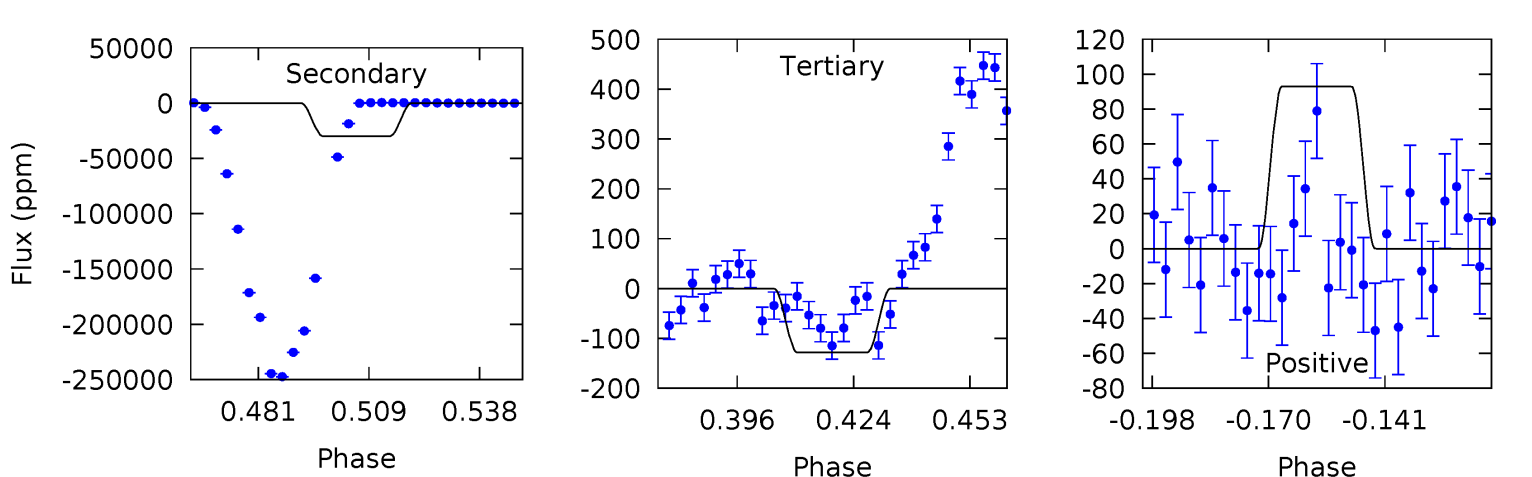
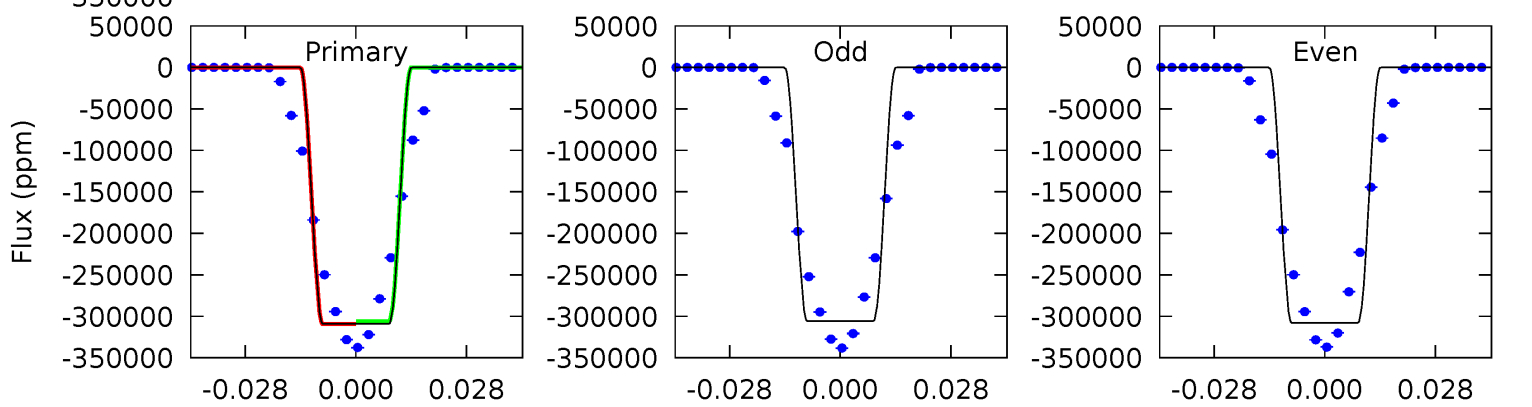
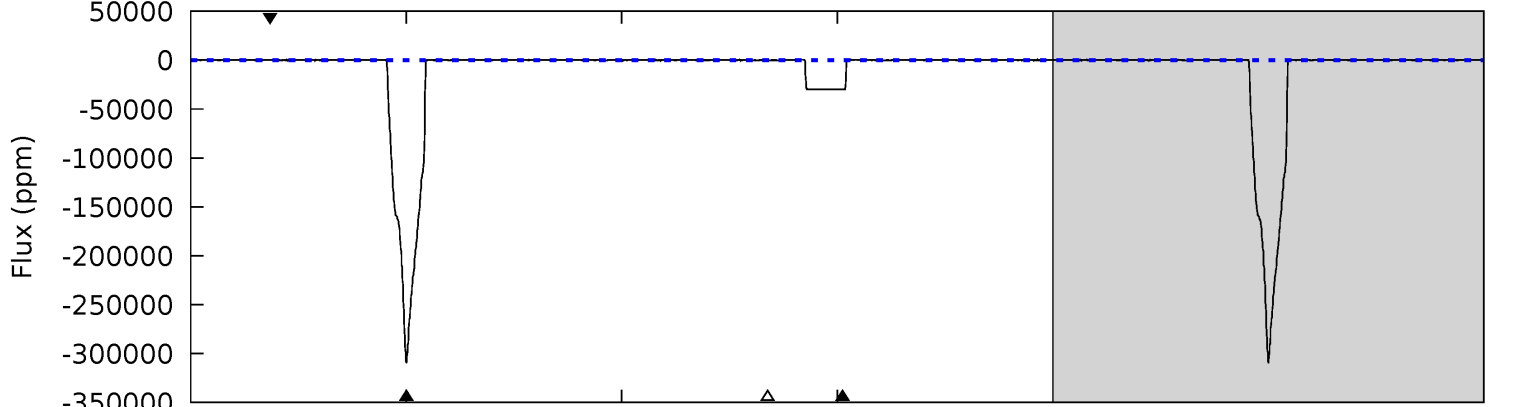
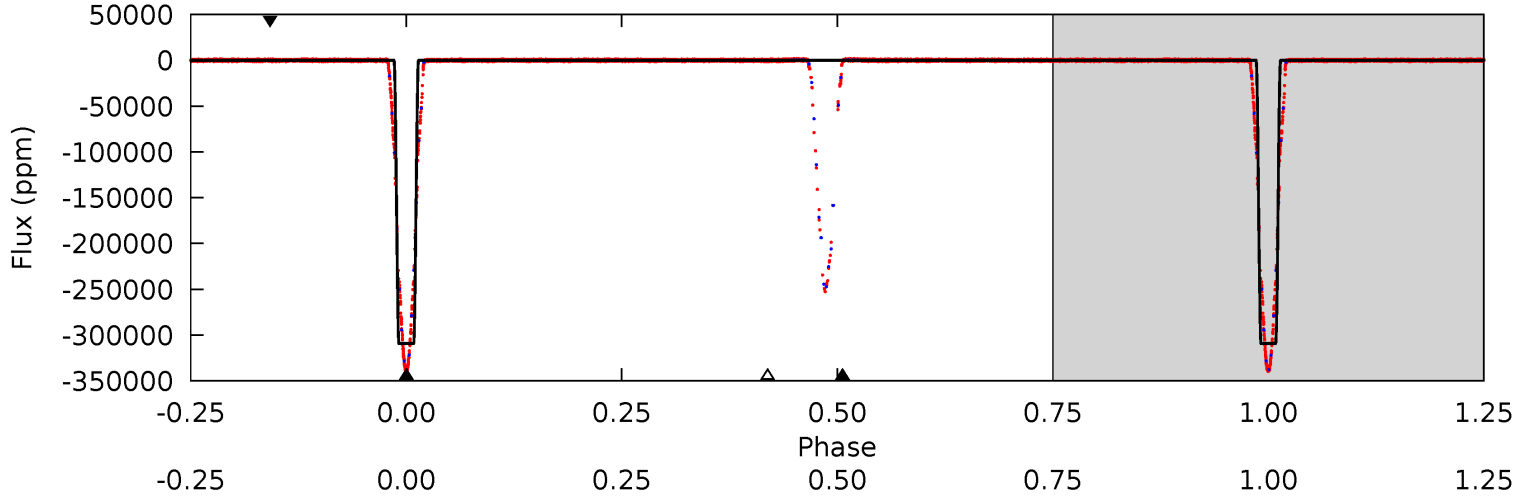
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



# Alt Model-Shift Uniqueness Test

009412462-01, P = 10.186440 Days, E = 122.351897 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
3950	382.3	1.64	1.19	4.82	2.19	13.6	3949	3949	380.6	381.1	43.9	1.00	0.00	0



### Stellar Parameters For KIC 009412462

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5557^{+166}_{-149}$	$4.448^{+0.108}_{-0.175}$	$-0.120^{+0.300}_{-0.300}$	$0.916^{+0.228}_{-0.123}$	$0.859^{+0.111}_{-0.074}$	$1.575^{+0.661}_{-0.715}$
	+3%/-3%	+2%/-4%	+250%/-250%	+25%/-13%	+13%/-9%	+42%/-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 009412462-01 / KOI 7171.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$0 \pm 1000000$	$42.12^{+11.47}_{-10.73}$	$1122^{+77}_{-59}$	$-2701^{+7907}_{-2218}$	$-6.063^{+303.391}_{-223.589}$
Alt.	$-29914 \pm 78$	$59.15^{+12.41}_{-11.73}$	$1117^{+74}_{-58}$	$3526^{+219}_{-193}$	$37^{+19}_{-11}$

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

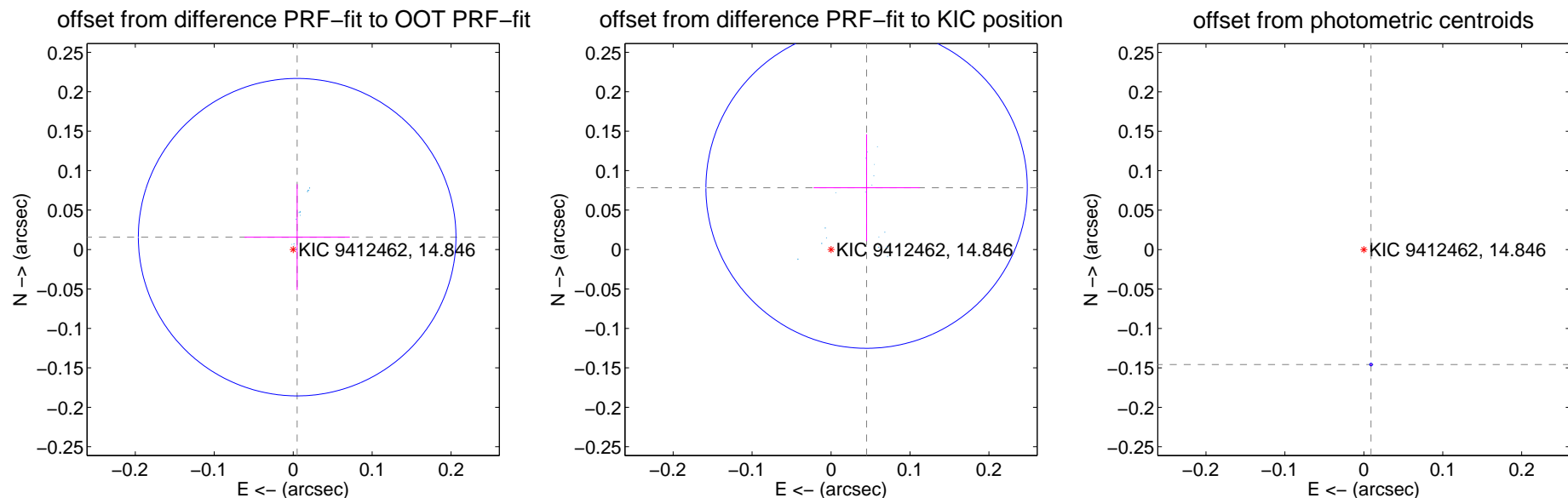
## DV Centroid Data

Supplemental centroid analysis for 009412462-01. Kepler magnitude: 14.85. Transit SNR -1.00

There are 17 quarters with good PRF difference image offsets

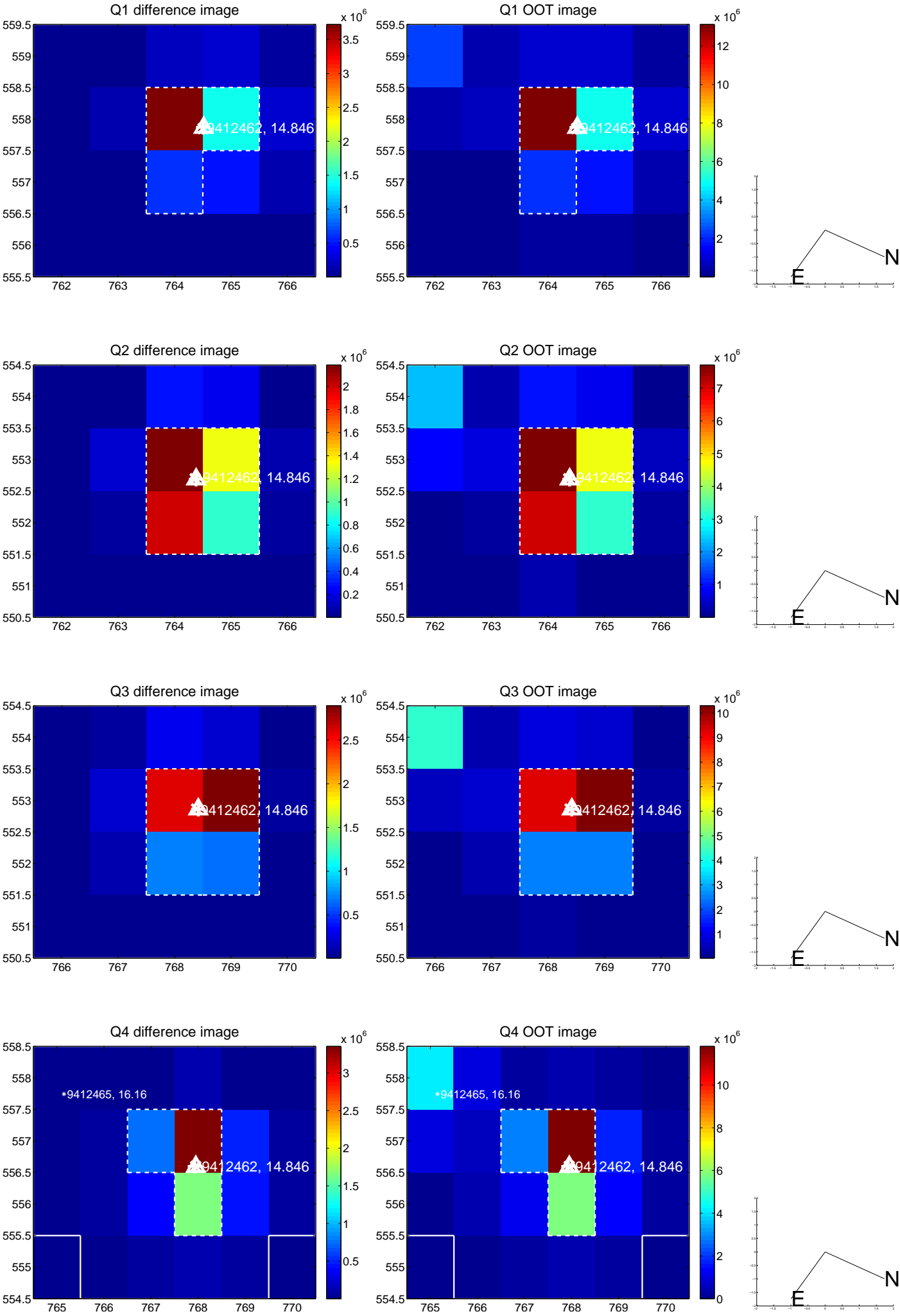
The direct PRF centroid is offset from the target star catalog position by about 0.07 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.016 \pm 0.067$	0.24	$-0.005 \pm 0.067$	$0.016 \pm 0.067$
PRF-fit source offset from KIC position	$0.090 \pm 0.068$	1.33	$-0.045 \pm 0.067$	$0.078 \pm 0.068$
photometric centroid source offset	$0.15 \pm 0.00$	258.69	$-0.01 \pm 0.00$	$-0.15 \pm 0.00$

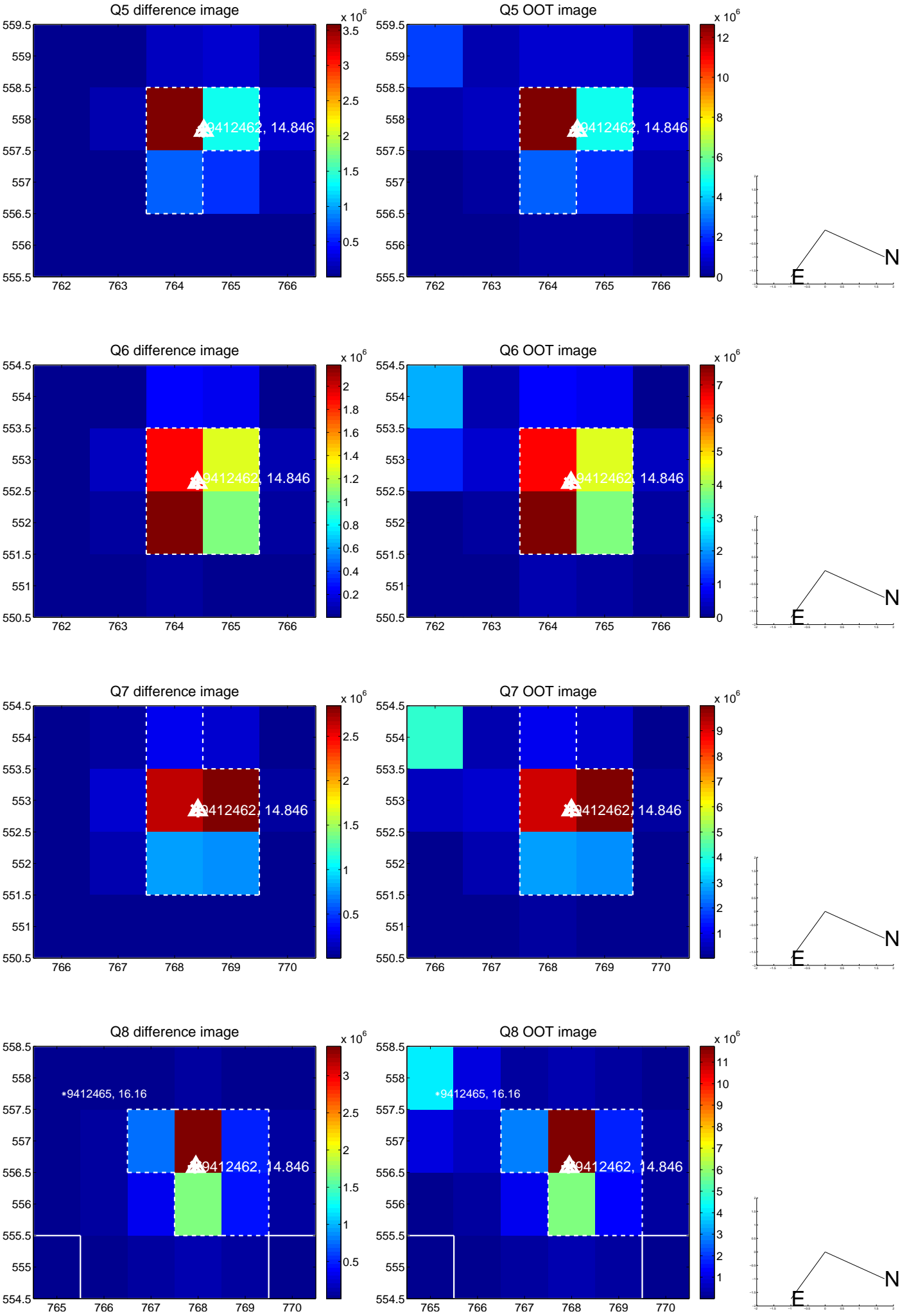


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

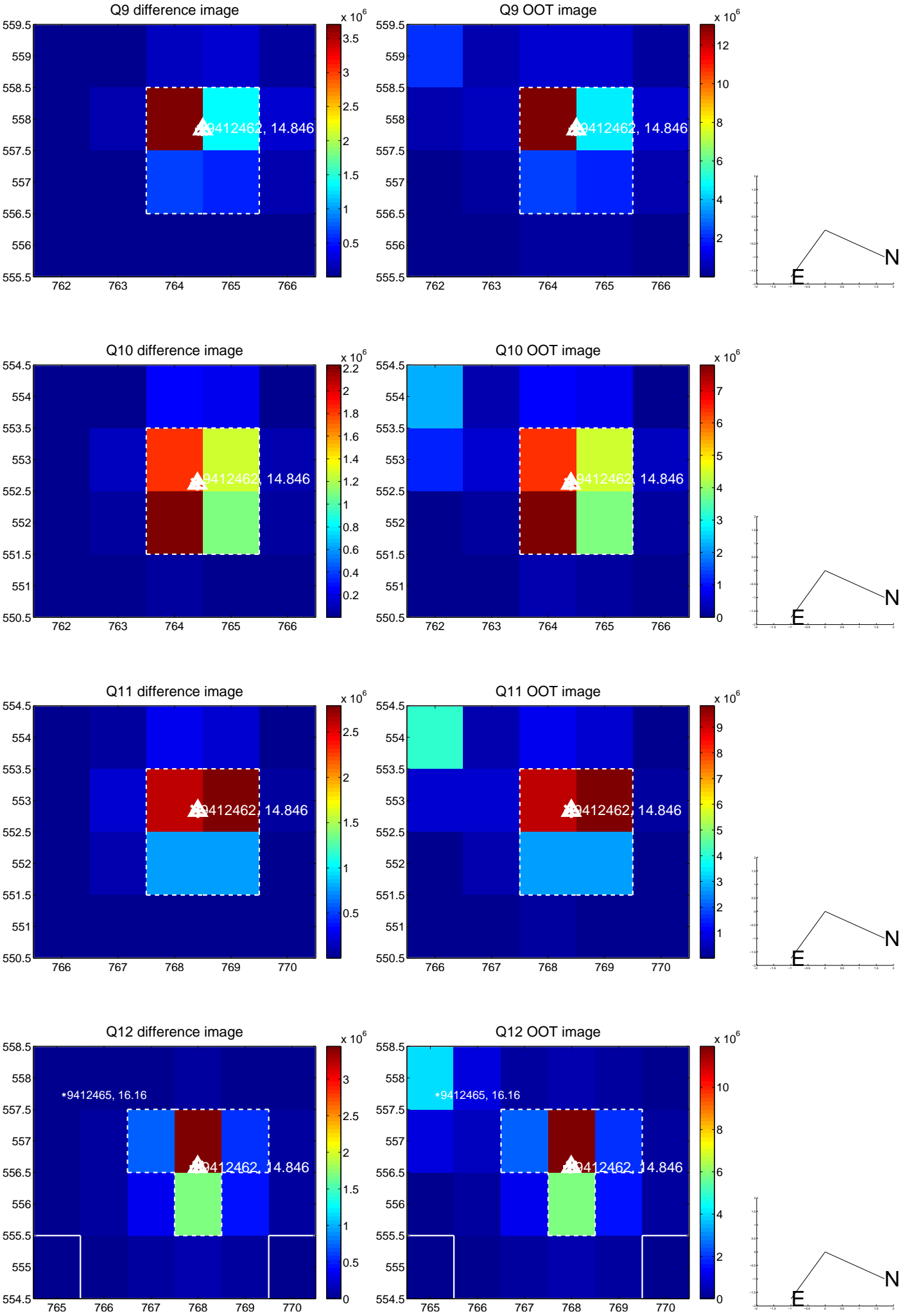


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

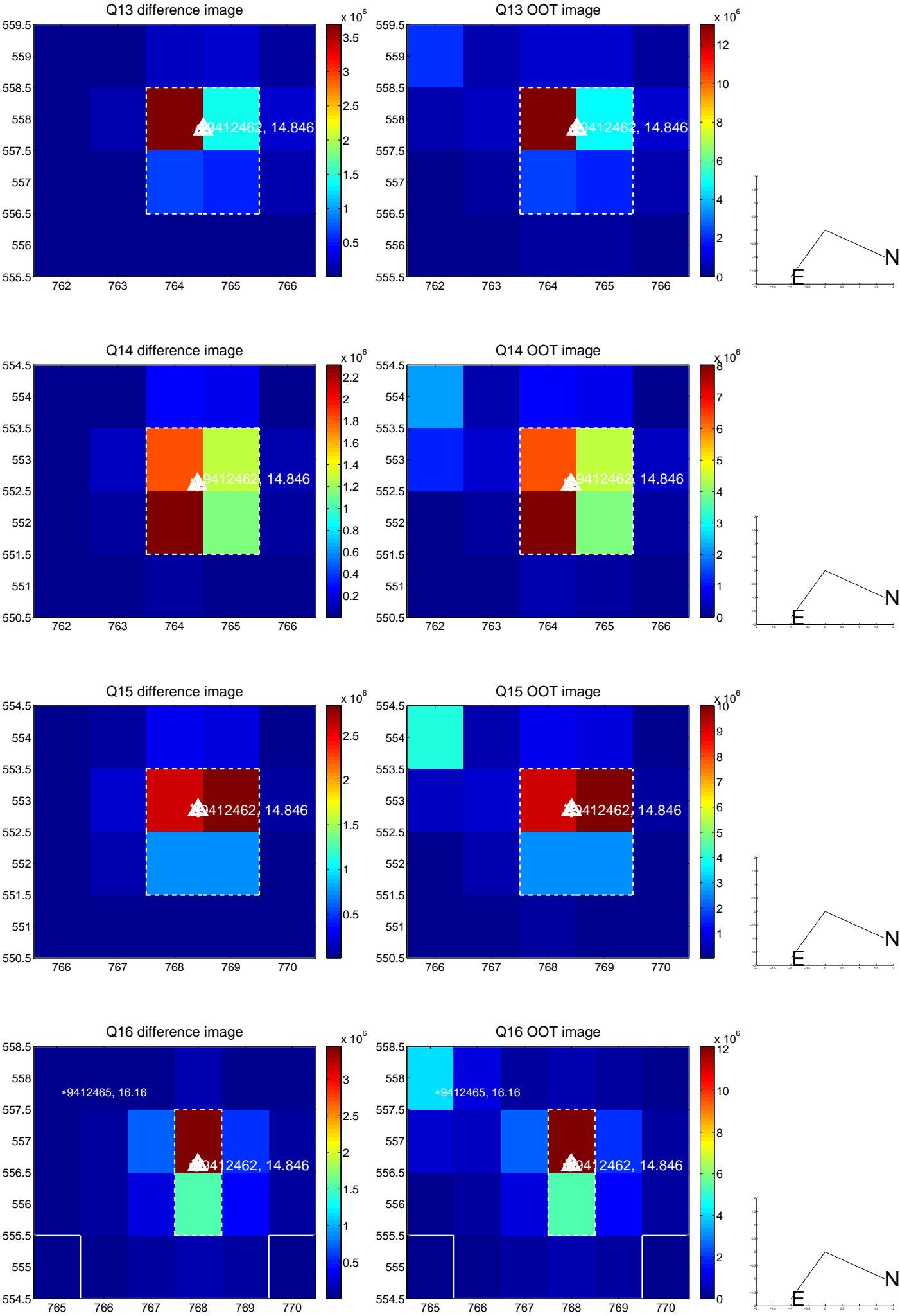




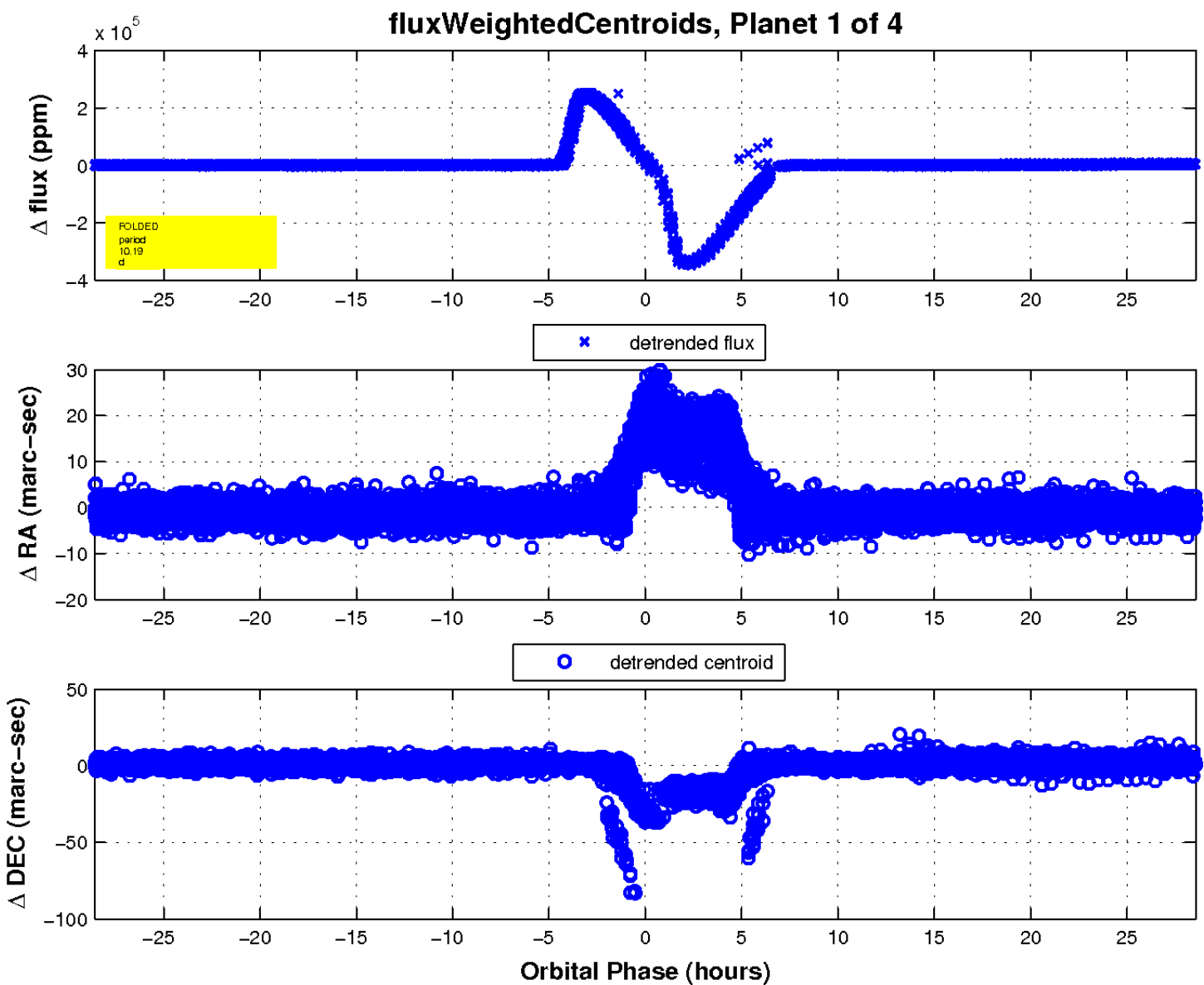
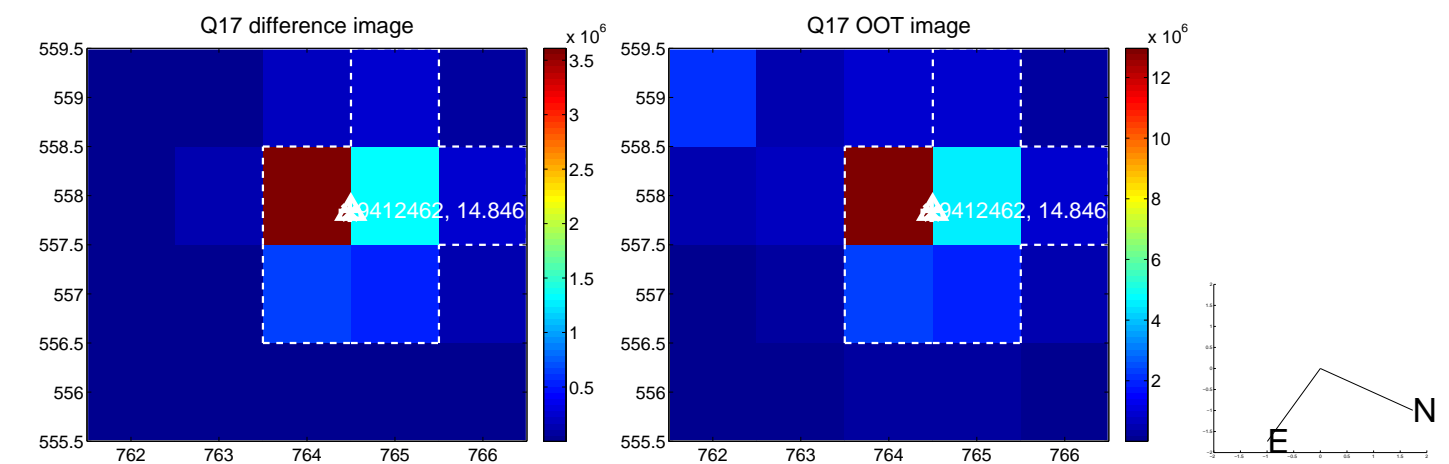
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

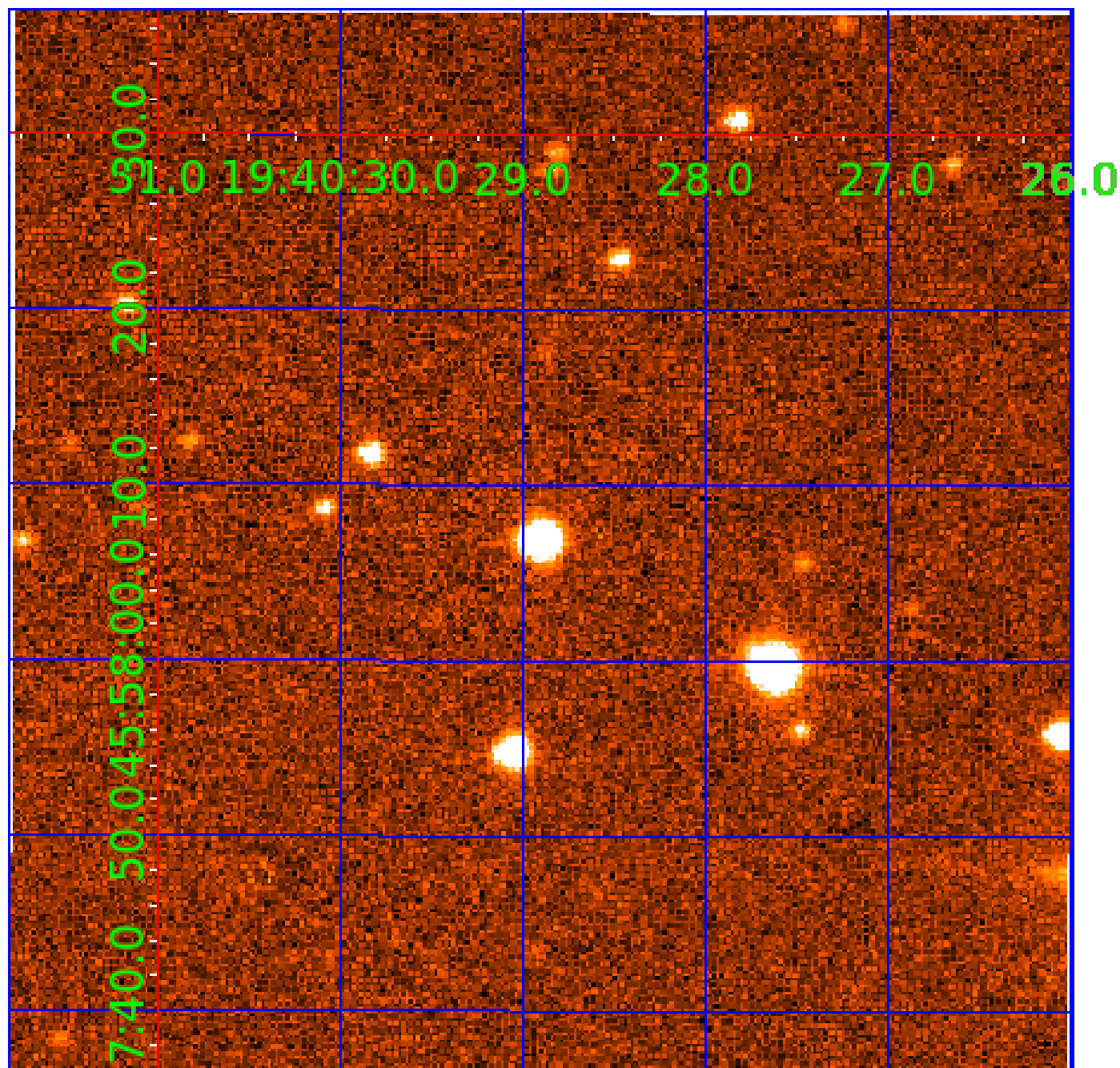


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 009412462

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009412462-01	OBS	7171.01	10.186440	132.536077	341911.5	6.000	14270.8	-1.0	0.92	5557	40.92	93.79
009412462-02	OBS	No	5.093279	132.386231	255401.6	6.000	10971.4	-1.0	0.92	5557	34.64	236.33
009412462-03	OBS	No	5.093253	136.558083	4099.0	15.000	504.5	-1.0	0.92	5557	5.78	236.33
009412462-04	OBS	No	5.093374	133.641277	2538.7	16.921	146.4	37.5	0.92	5557	8.79	236.33

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009412462-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_ALT—MOD_ODDEVEN_ALT—HAS_SEC_TCE—CENT_NOFITS
009412462-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE—CENT_NOFITS
009412462-03	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—SAME_NTL_PERIOD—CENT_NOFITS
009412462-04	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD—CENT_FEW_DIFFS

**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.

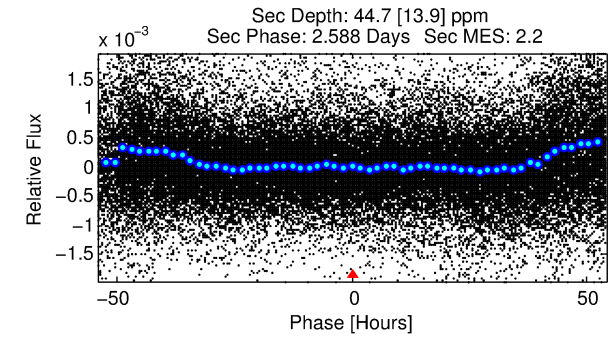
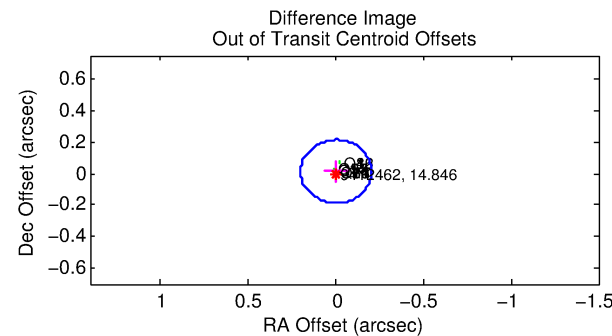
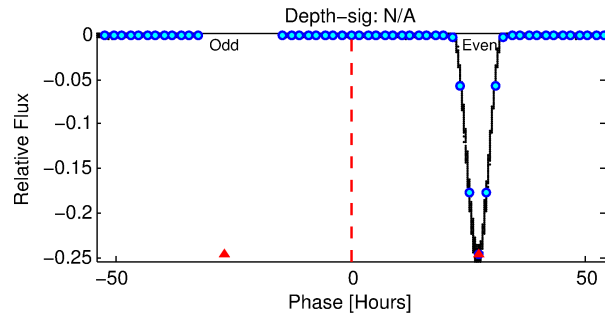
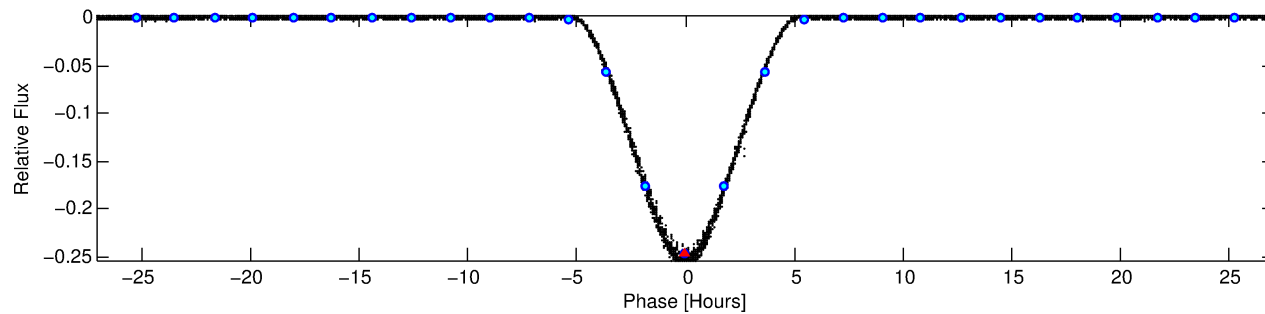
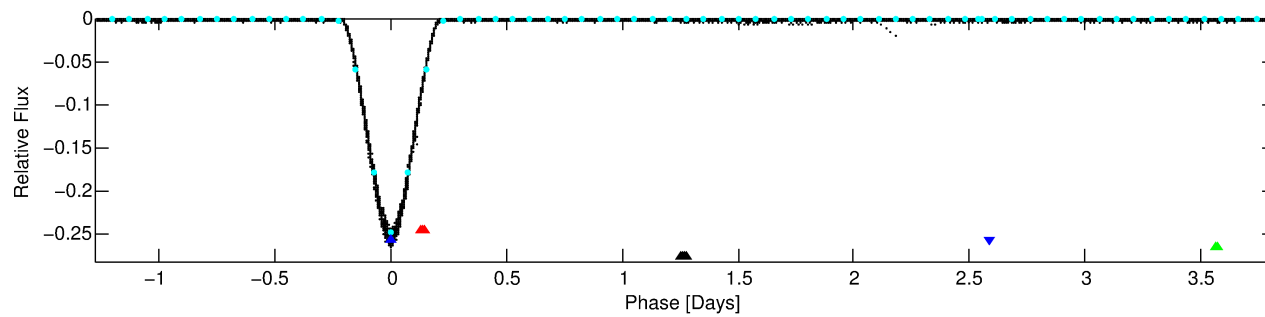
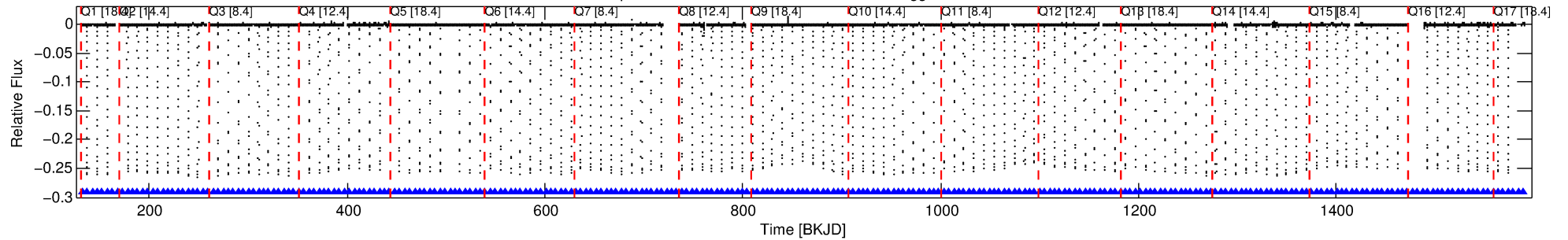
Ephemeris Match Information For 009412462-02

No Significant Match Found

# DV One-Page Summary

KIC: 9412462 Candidate: 2 of 4 Period: 5.093 d  
KOI: K07171 Corr: No Ephemeris Match

Kp: 14.85 R\*: 0.92 Rs Teff: 5557.0 K Logg: 4.45 Fe/H: -0.120



## TPS TCE Results:

Period = 5.09328 d  
Epoch = 132.3862 BKJD

DV fit results are unavailable

## DV Diagnostic Results:

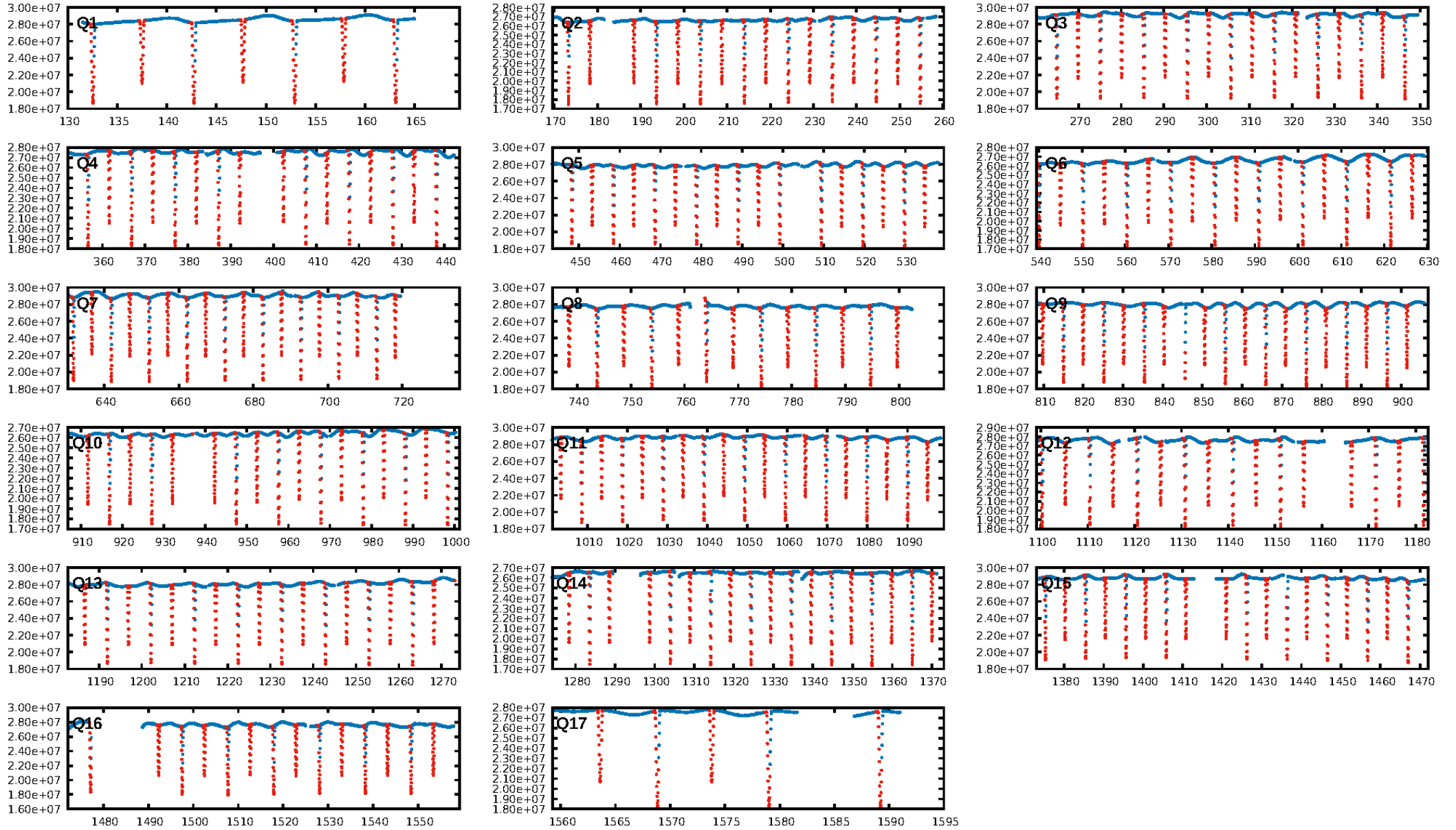
ShortPeriod-sig: 0.0% [0.00 $\sigma$ ]  
LongPeriod-sig: 0.0% [0.00 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [129/129]  
GhostDiagnostic-chr: 0.6991  
Centroid-sig: N/A  
Centroid-so: 0.180 arcsec [327.35 $\sigma$ ]  
OotOffset-rm: 0.014 arcsec [0.22 $\sigma$ ]  
KicOffset-rm: 0.090 arcsec [1.32 $\sigma$ ]  
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: 03-Feb-2016 02:05:53 Z

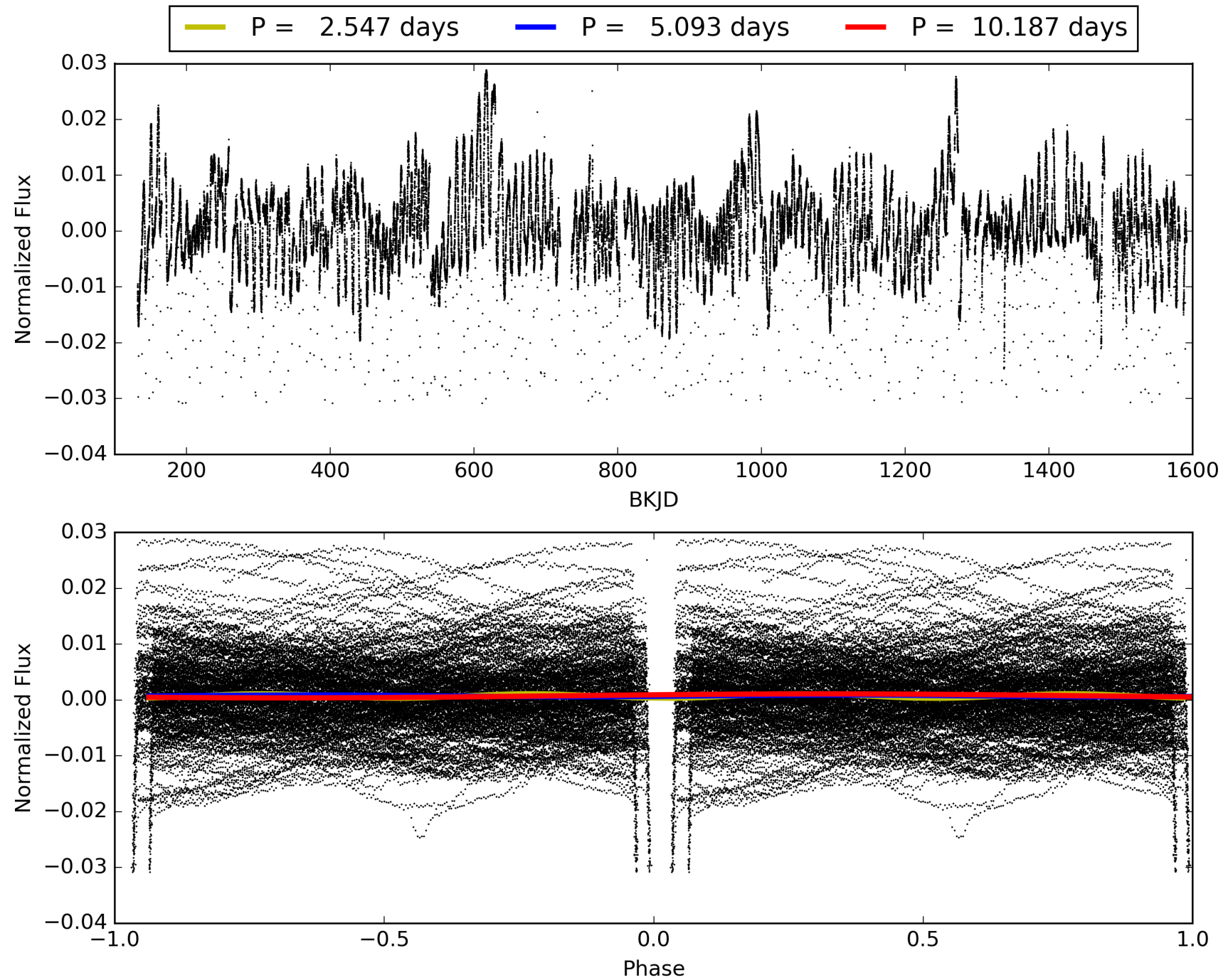
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 009412462-02, PDC Light Curves

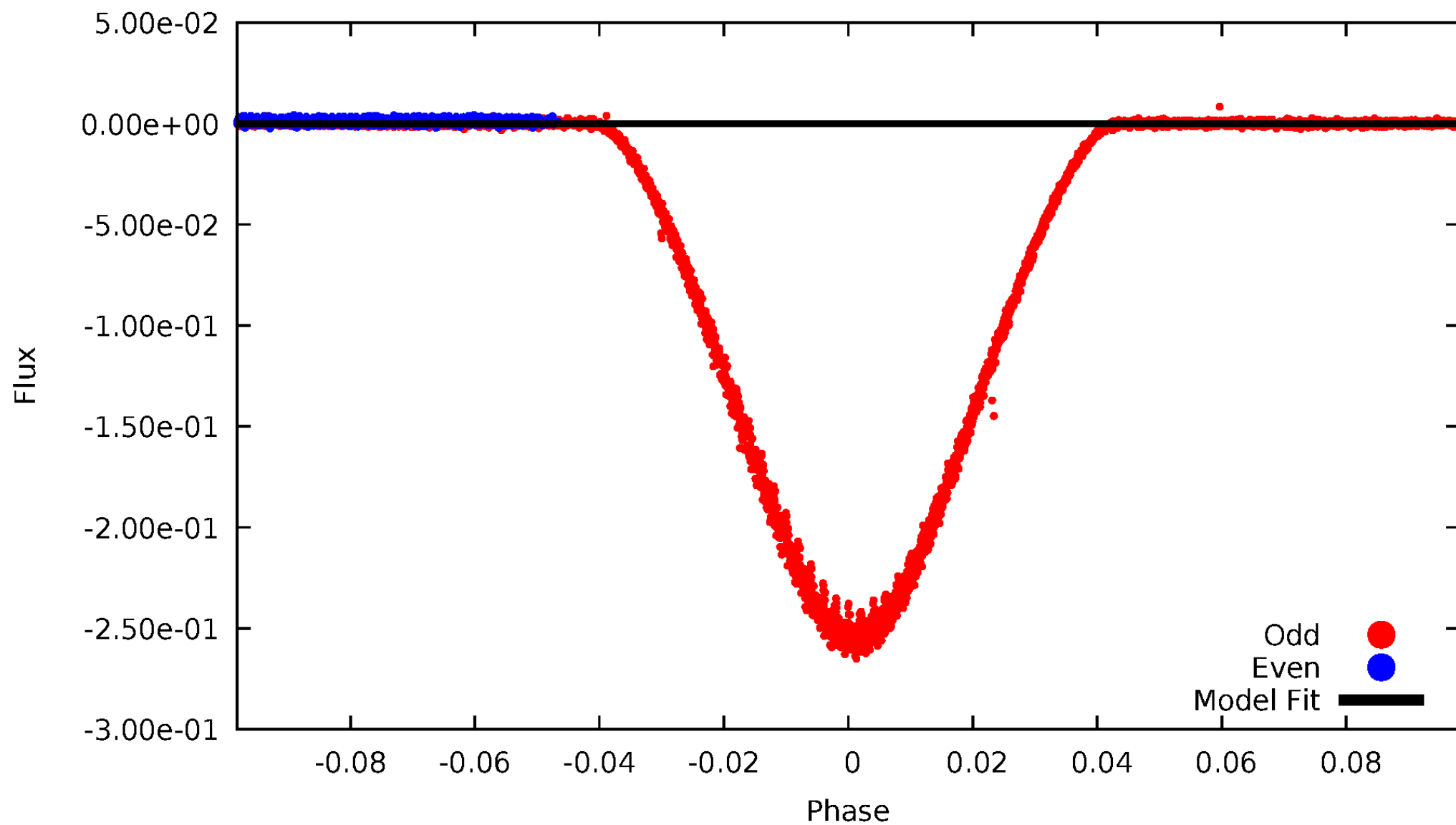


TCE 009412462-02



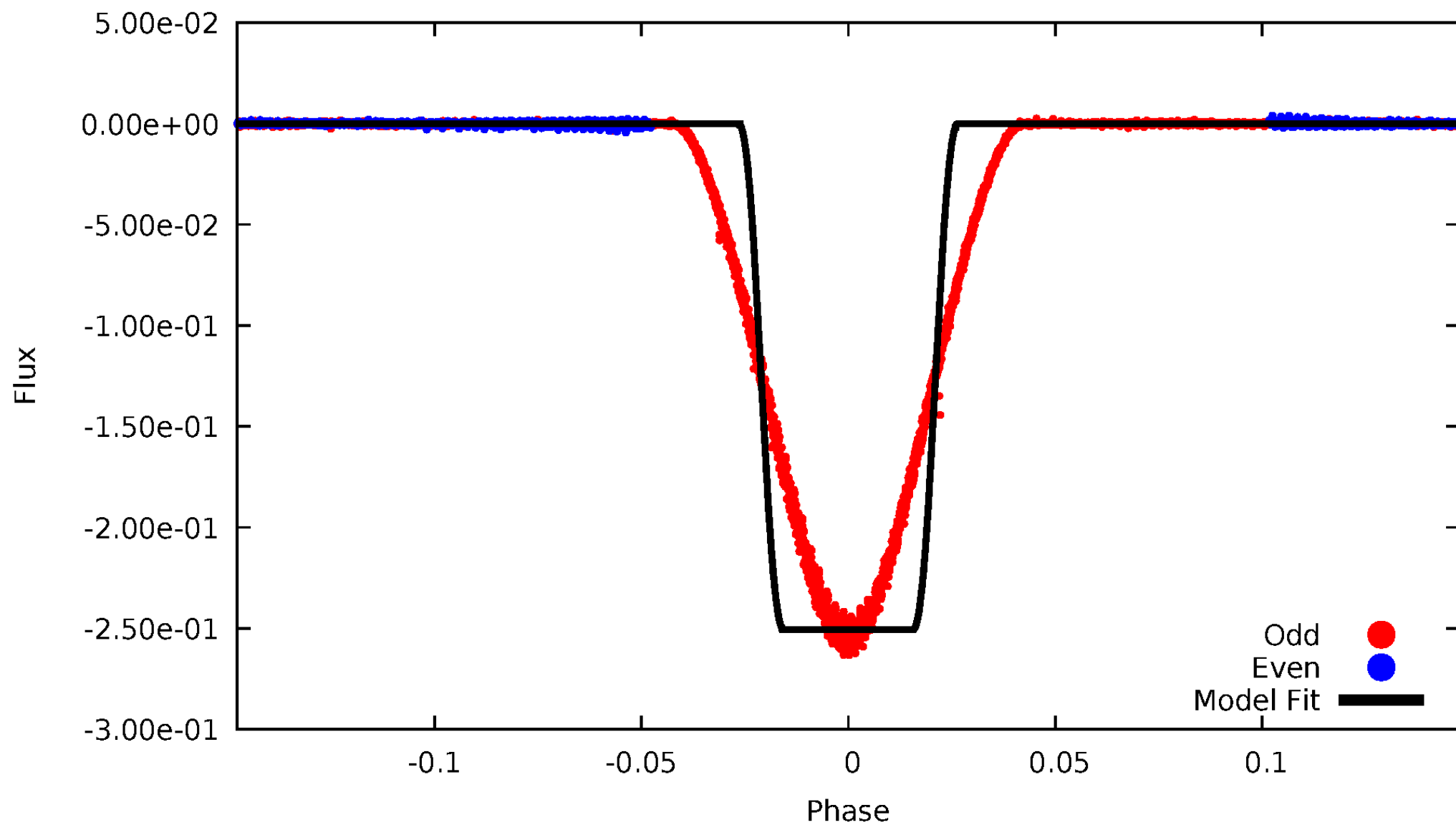
# DV Odd/Even

TCE 009412462-02



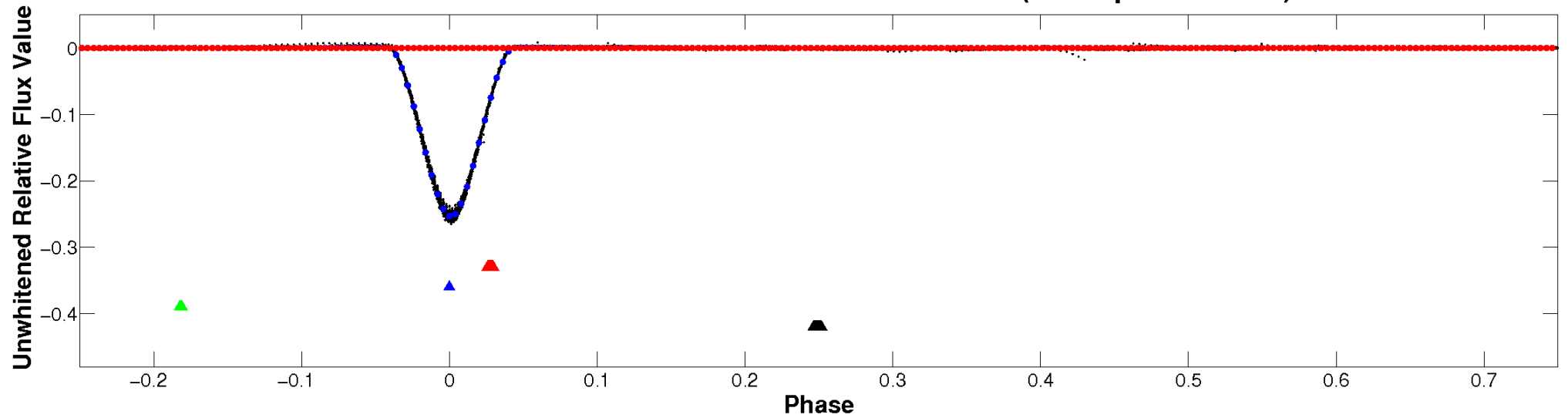
# ALT Odd/Even

TCE 009412462-02

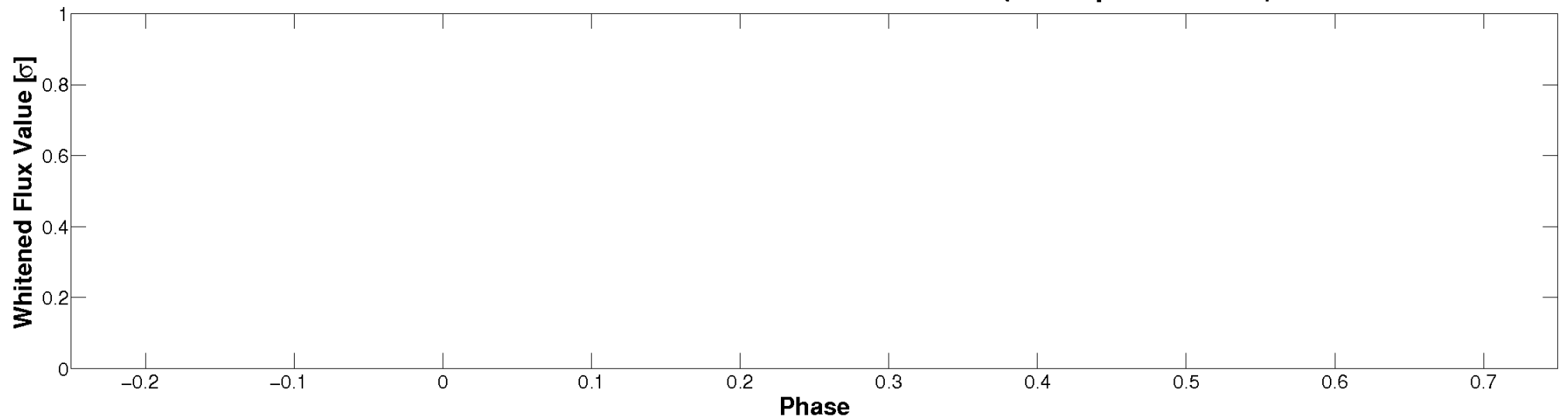


# Non-Whitened Vs. Whitened Light Curve

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

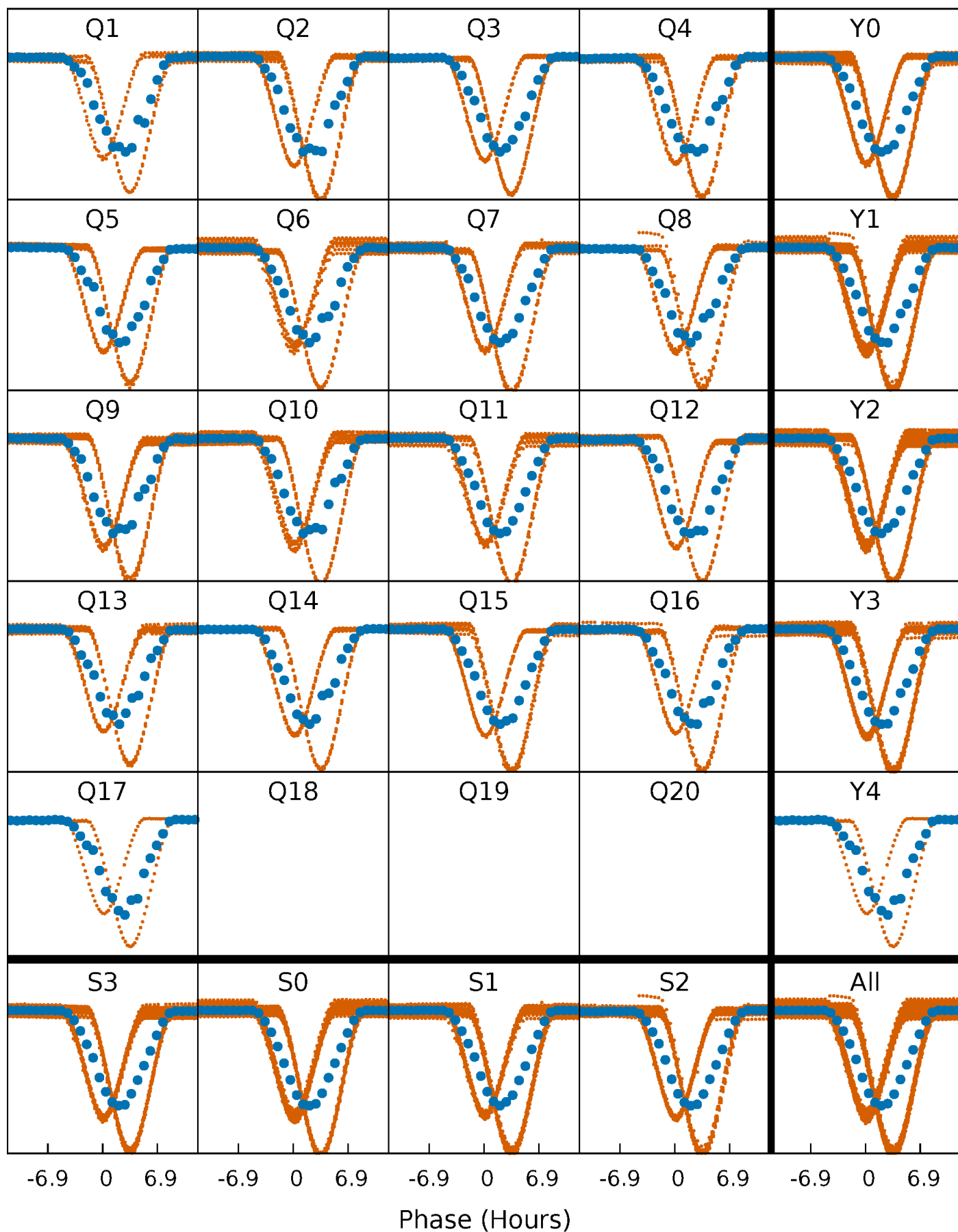


**Planet 2 : Phased Whitened Flux Time Series (TPS Epoch/Period)**



# PDC Quarter-Phased Transit Curves

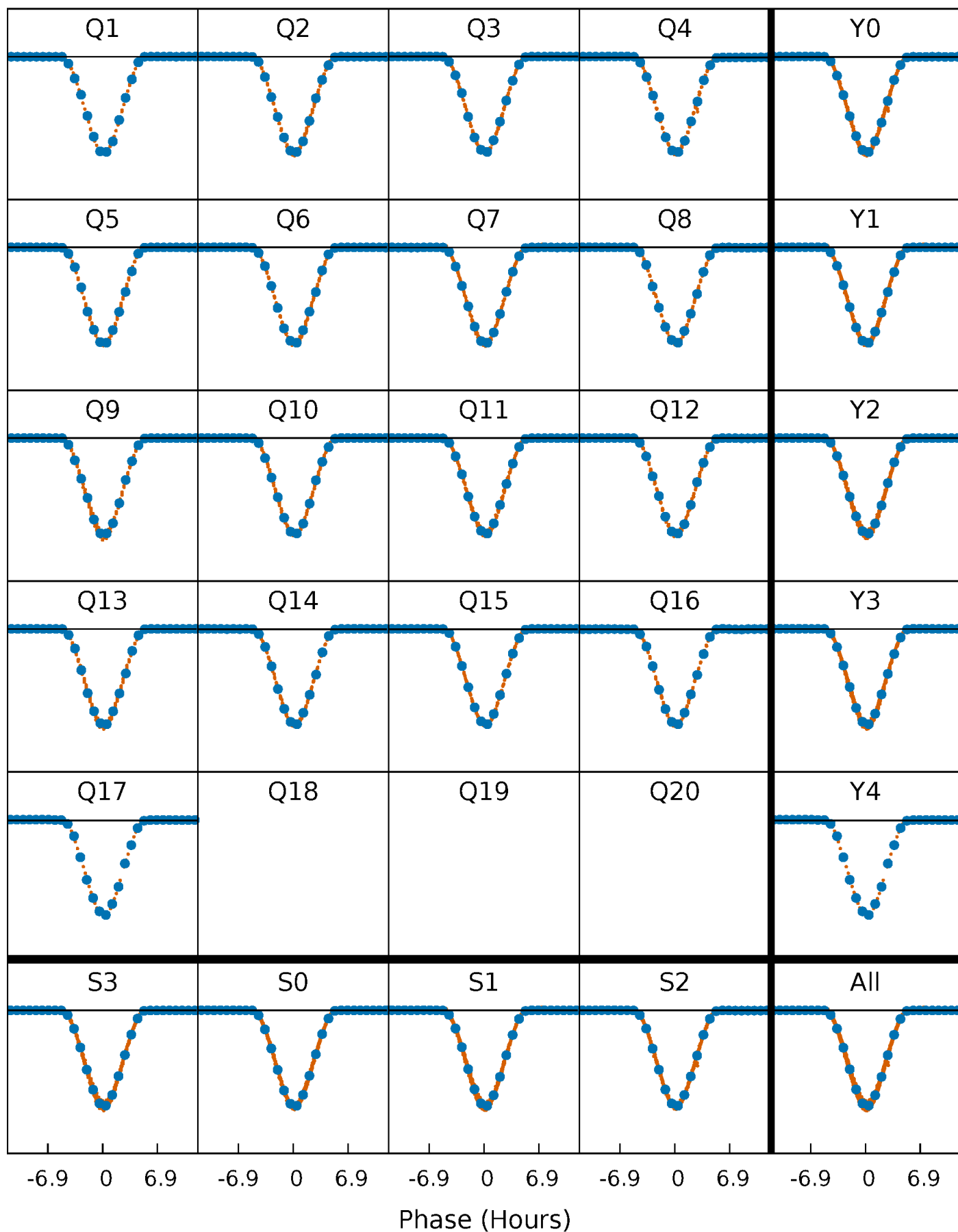
TCE 009412462-02   P= 5.093279 Days    $T_0=132.386231$  (BKJD)





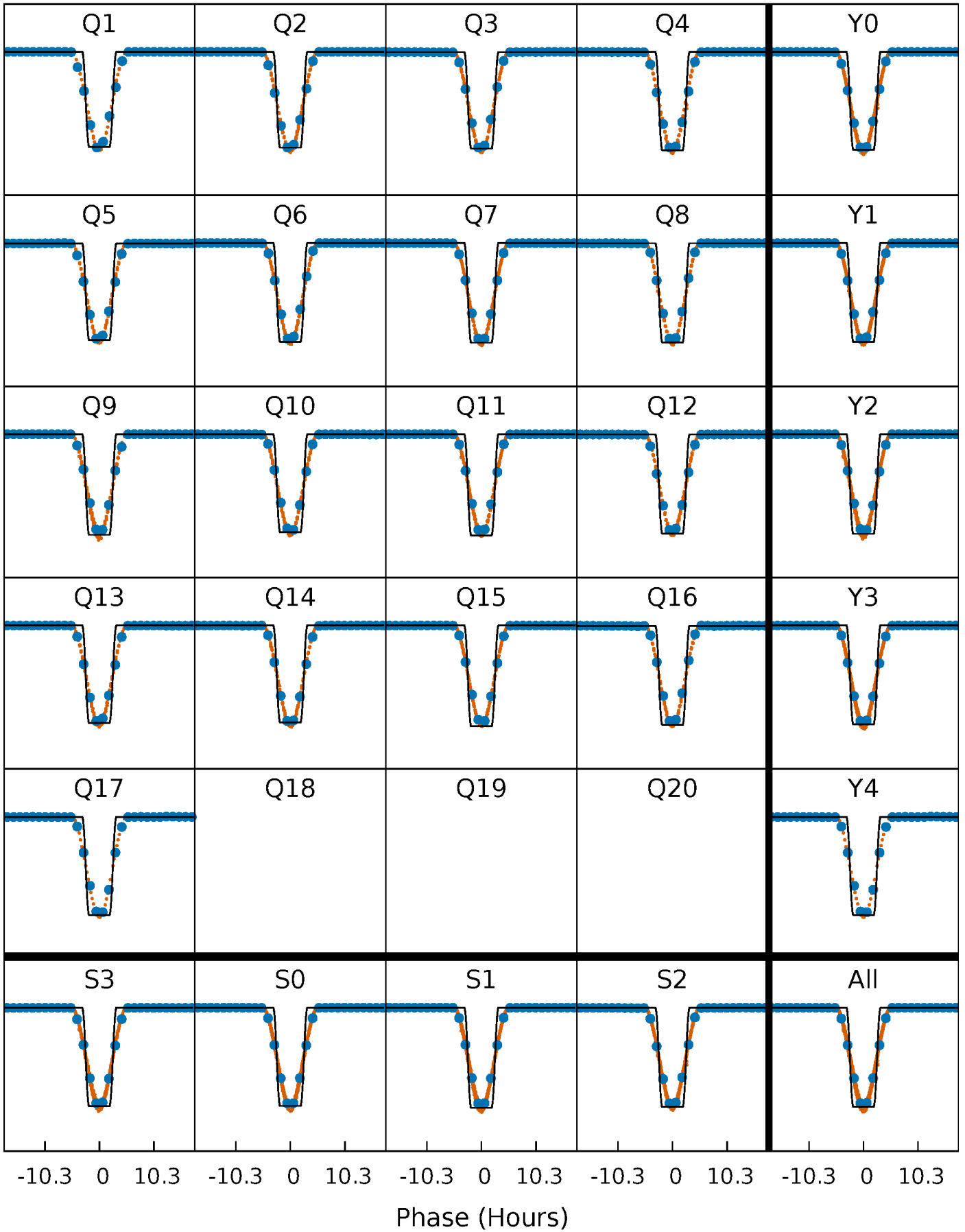
# DV Quarter-Phased Transit Curves

TCE 009412462-02   P= 5.093279 Days    $T_0=132.386231$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

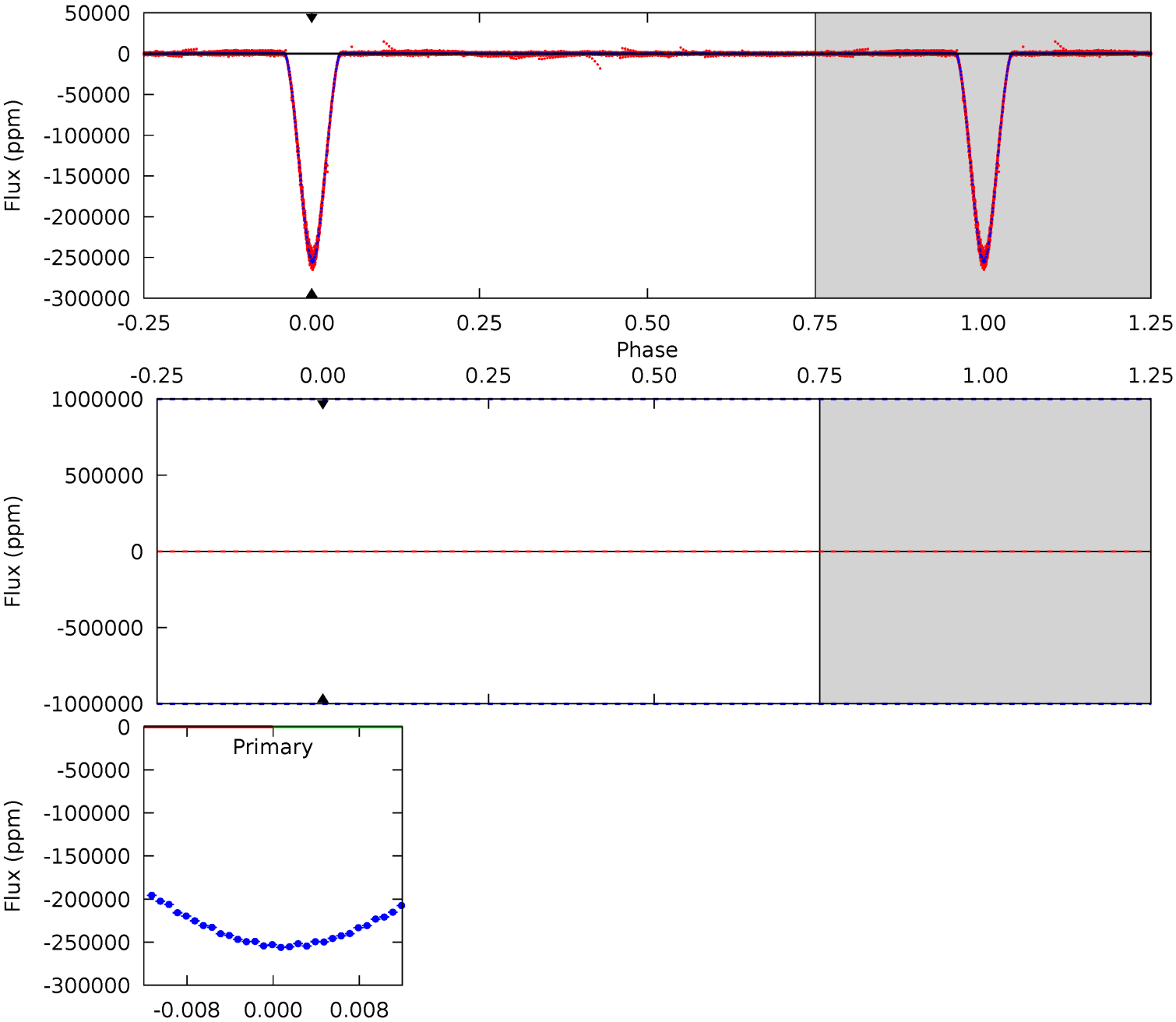
TCE 009412462-02     $P = 5.093279$  Days     $T_0 = 132.392111$  (BKJD)



# DV Model-Shift Uniqueness Test

009412462-02, P = 5.093279 Days, E = 127.292952 Days

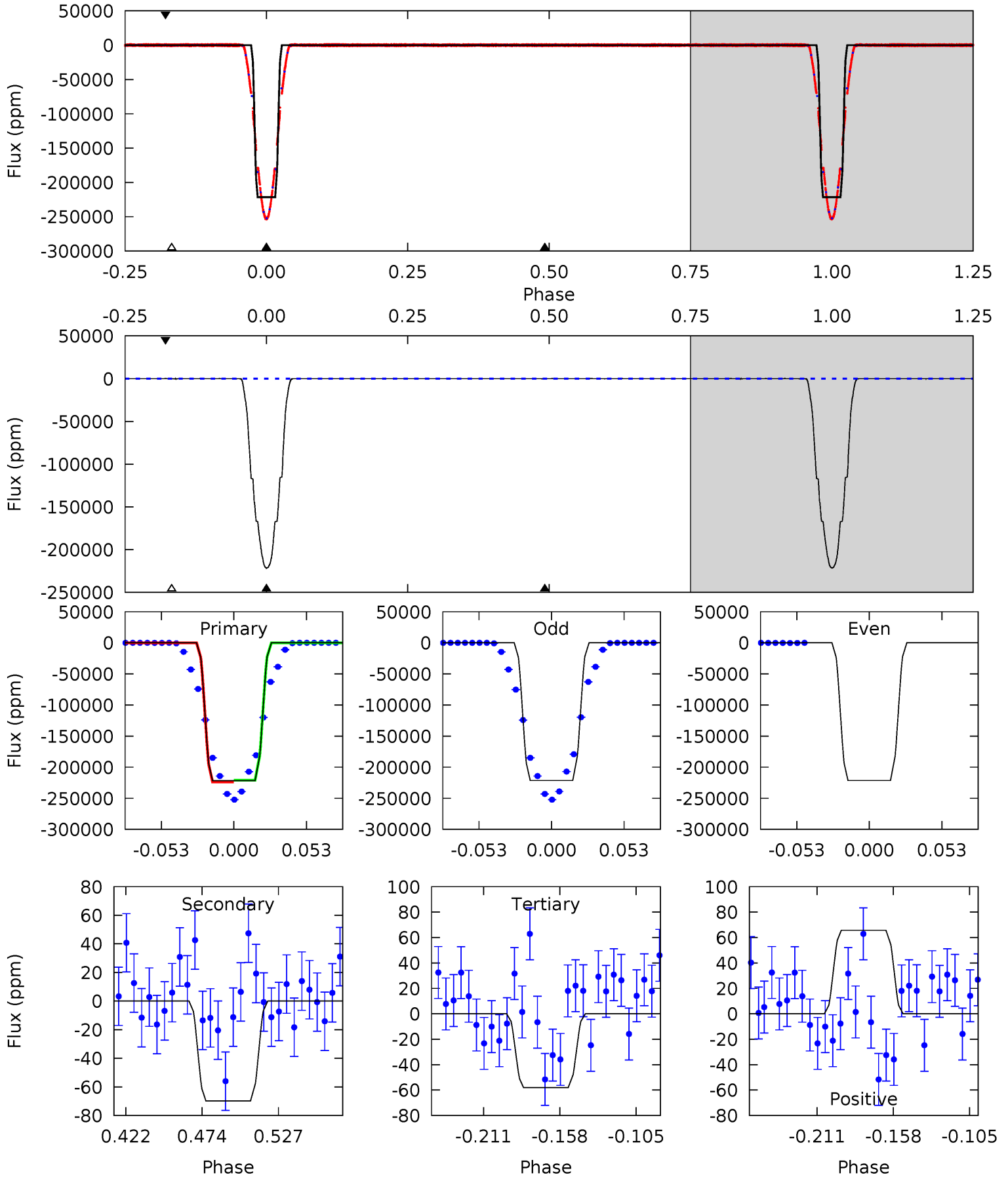
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



# Alt Model-Shift Uniqueness Test

009412462-02, P = 5.093279 Days, E = 127.298832 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
11863	3.73	3.11	3.52	4.70	1.94	1.19	11860	11860	0.63	0.21	0	1.00	0.00	0



### Stellar Parameters For KIC 009412462

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5557^{+166}_{-149}$	$4.448^{+0.108}_{-0.175}$	$-0.120^{+0.300}_{-0.300}$	$0.916^{+0.228}_{-0.123}$	$0.859^{+0.111}_{-0.074}$	$1.575^{+0.661}_{-0.715}$
	+3%/-3%	+2%/-4%	+250%/-250%	+25%/-13%	+13%/-9%	+42%/-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 009412462-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$0 \pm 1000000$	$34.88^{+11.20}_{-10.69}$	$1409^{+90}_{-66}$	$3031^{+2667}_{-8517}$	$6.001^{+174.664}_{-160.639}$
Alt.	$-70 \pm 19$	$51.46^{+12.60}_{-10.76}$	$1411^{+95}_{-67}$	$-2085^{+57}_{-71}$	$0.044^{+0.031}_{-0.017}$

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

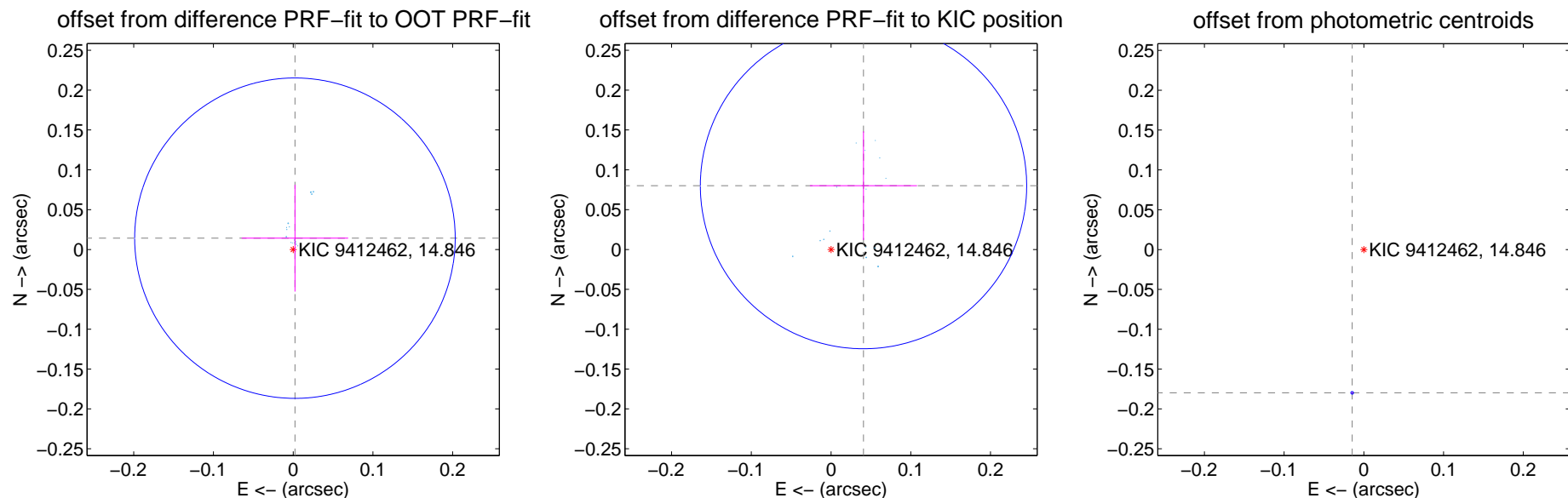
## DV Centroid Data

Supplemental centroid analysis for 009412462-02. Kepler magnitude: 14.85. Transit SNR -1.00

There are 17 quarters with good PRF difference image offsets

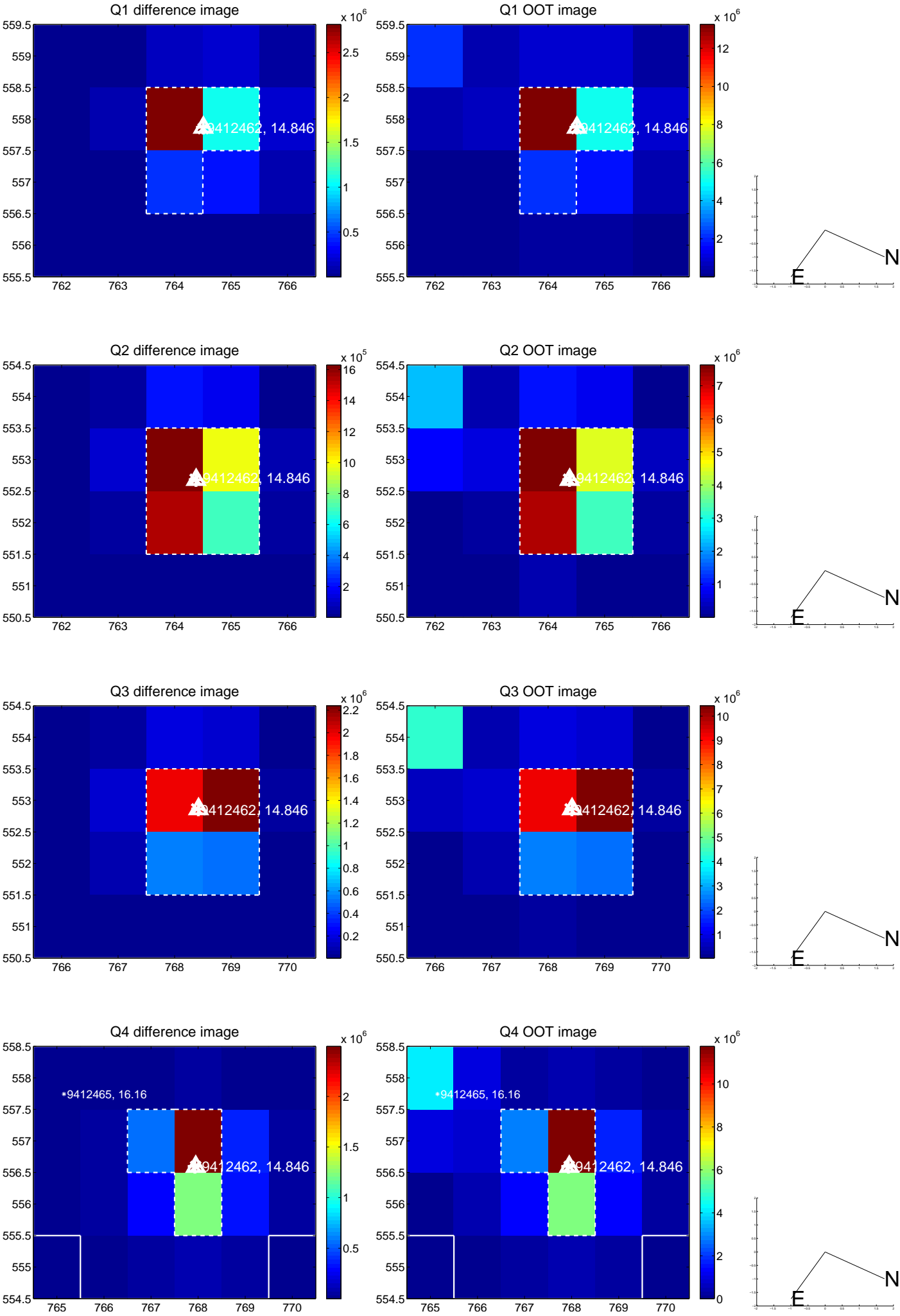
The direct PRF centroid is offset from the target star catalog position by about 0.07 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.014 \pm 0.067$	0.22	$-0.002 \pm 0.067$	$0.014 \pm 0.067$
PRF-fit source offset from KIC position	$0.090 \pm 0.068$	1.32	$-0.041 \pm 0.067$	$0.080 \pm 0.068$
photometric centroid source offset	$0.18 \pm 0.00$	<b>327.35</b>	$0.01 \pm 0.00$	$-0.18 \pm 0.00$

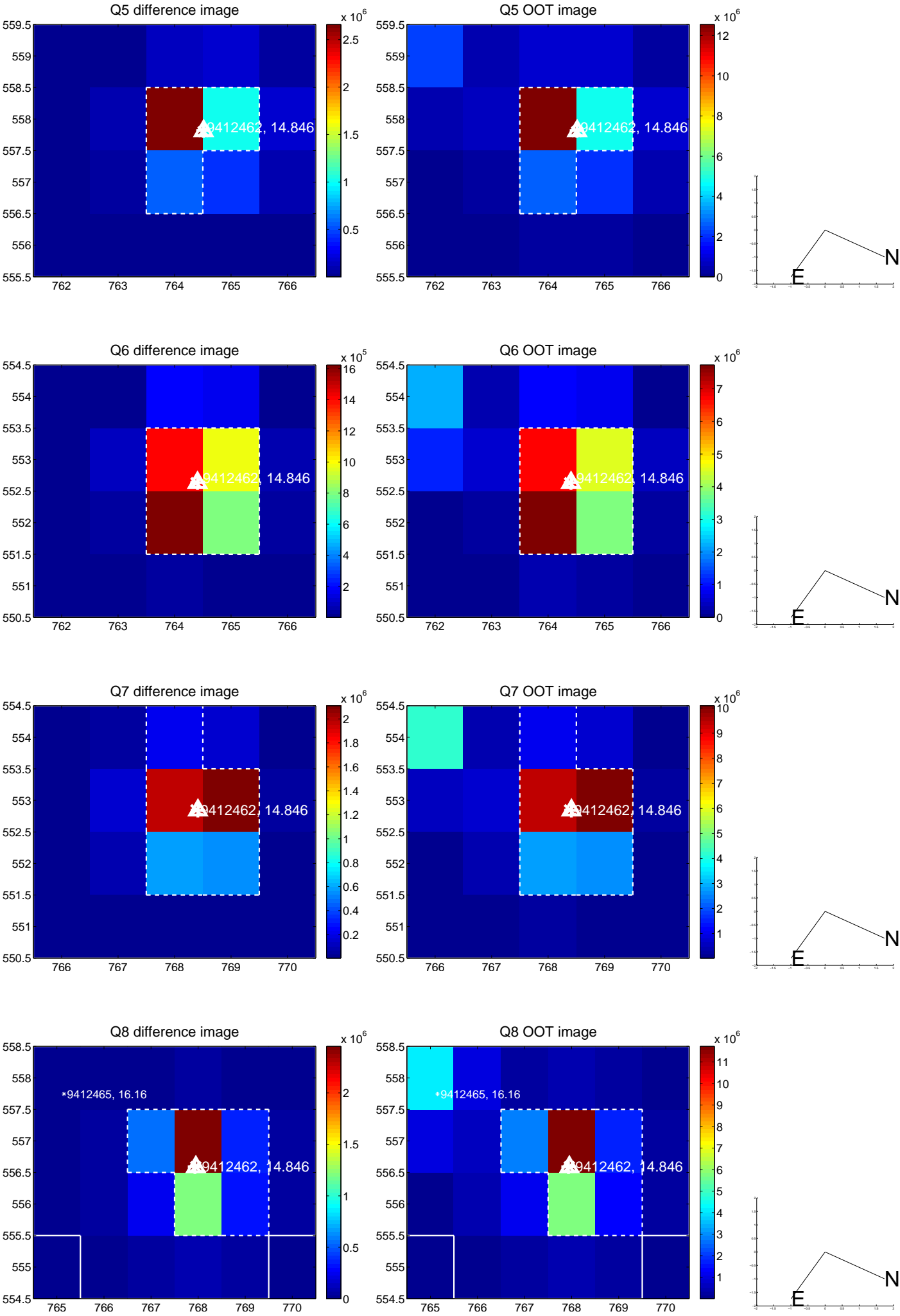


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

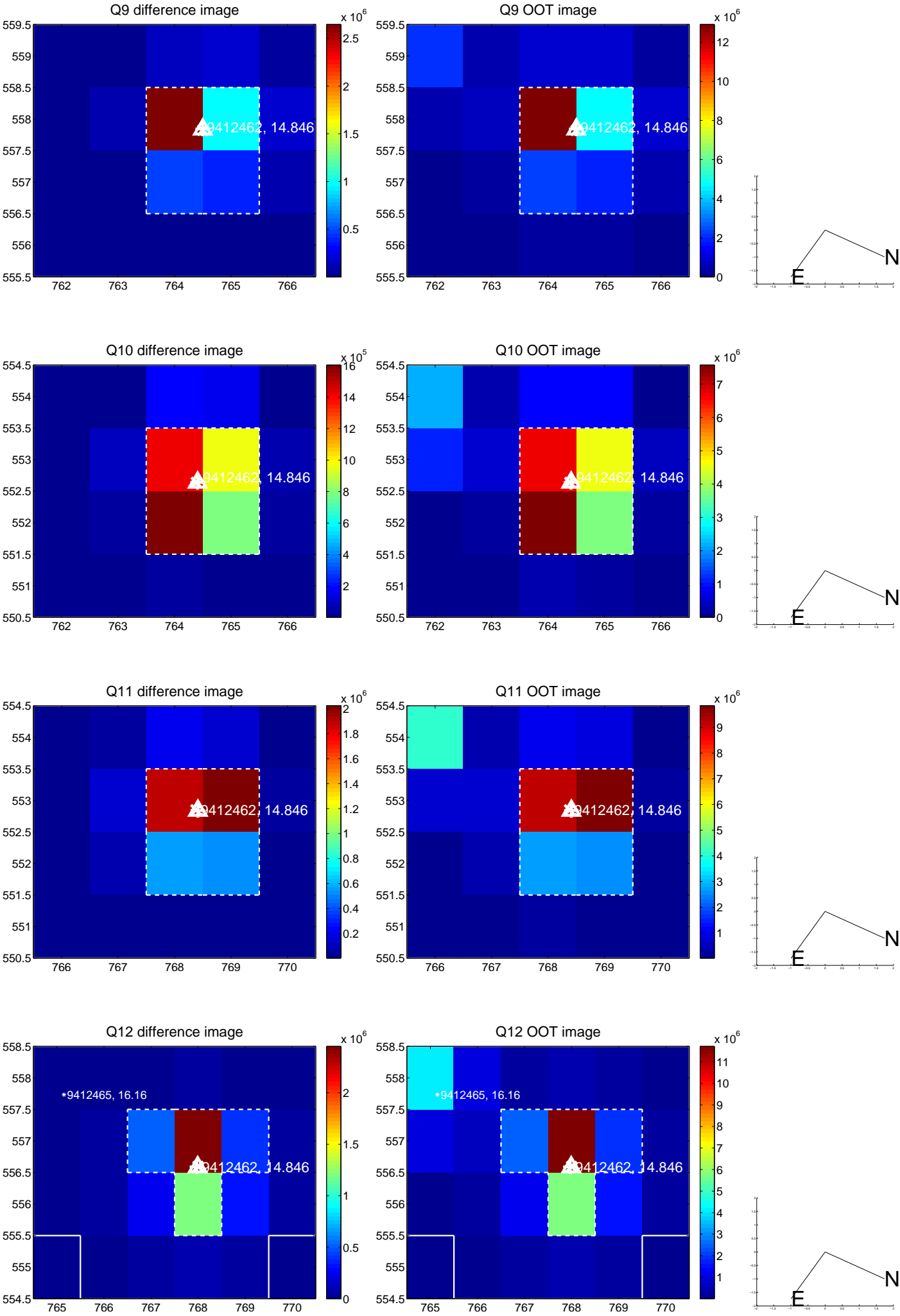


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

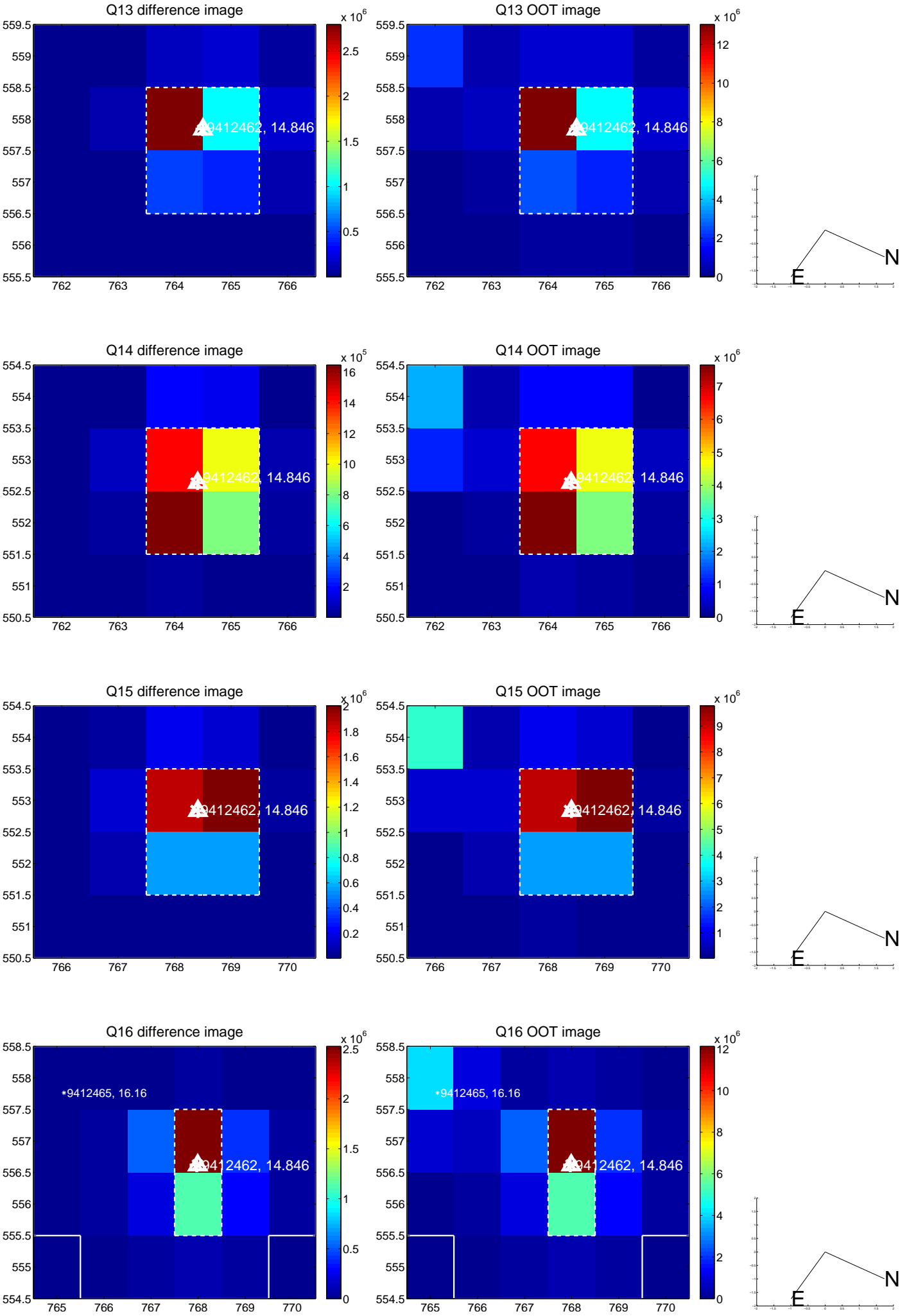




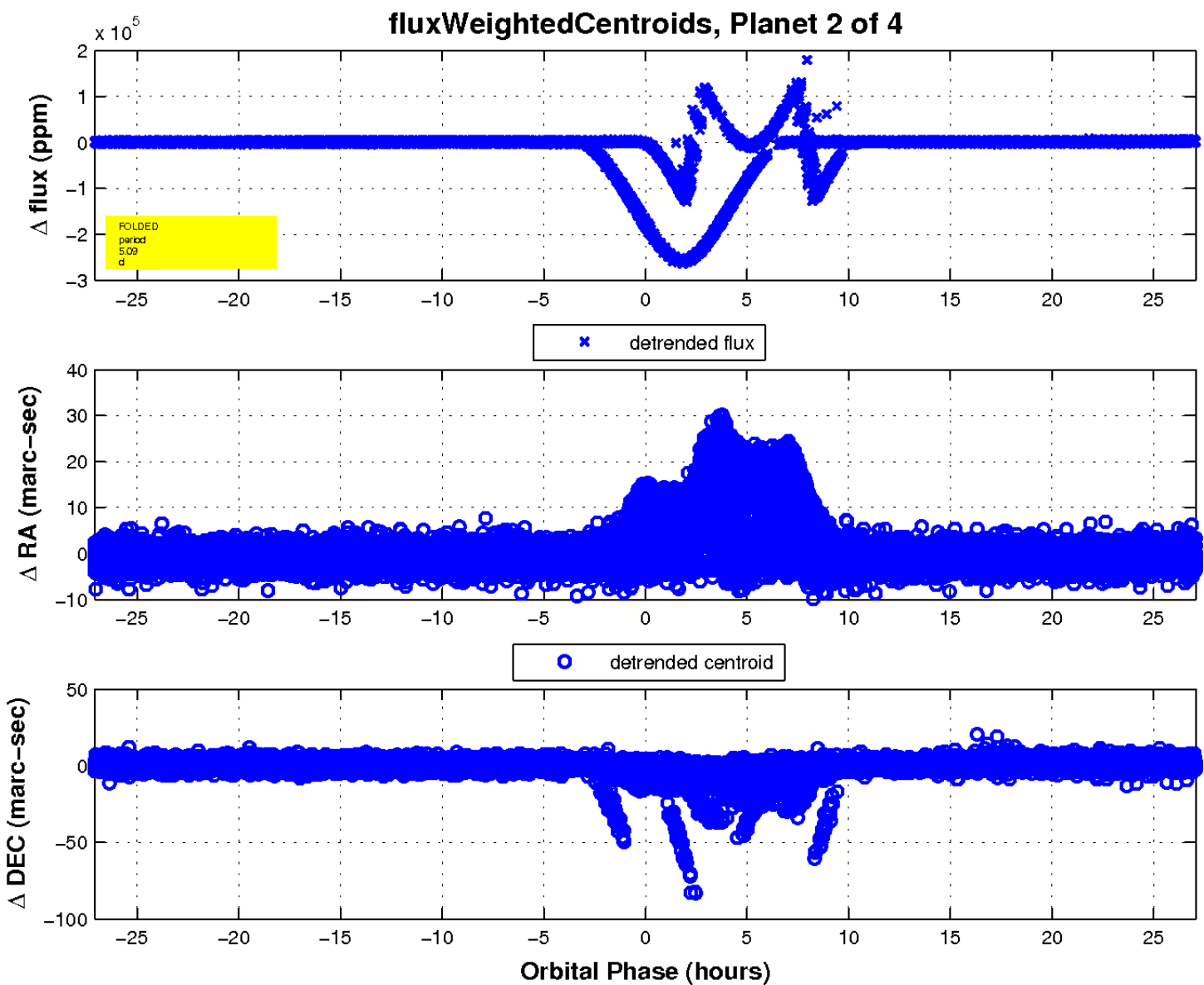
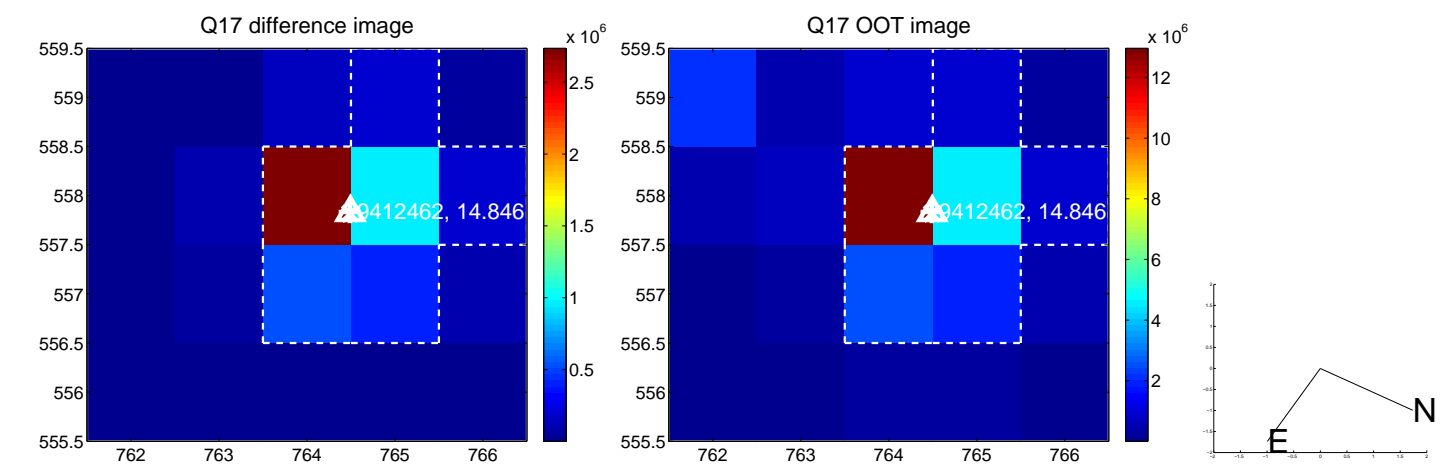
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

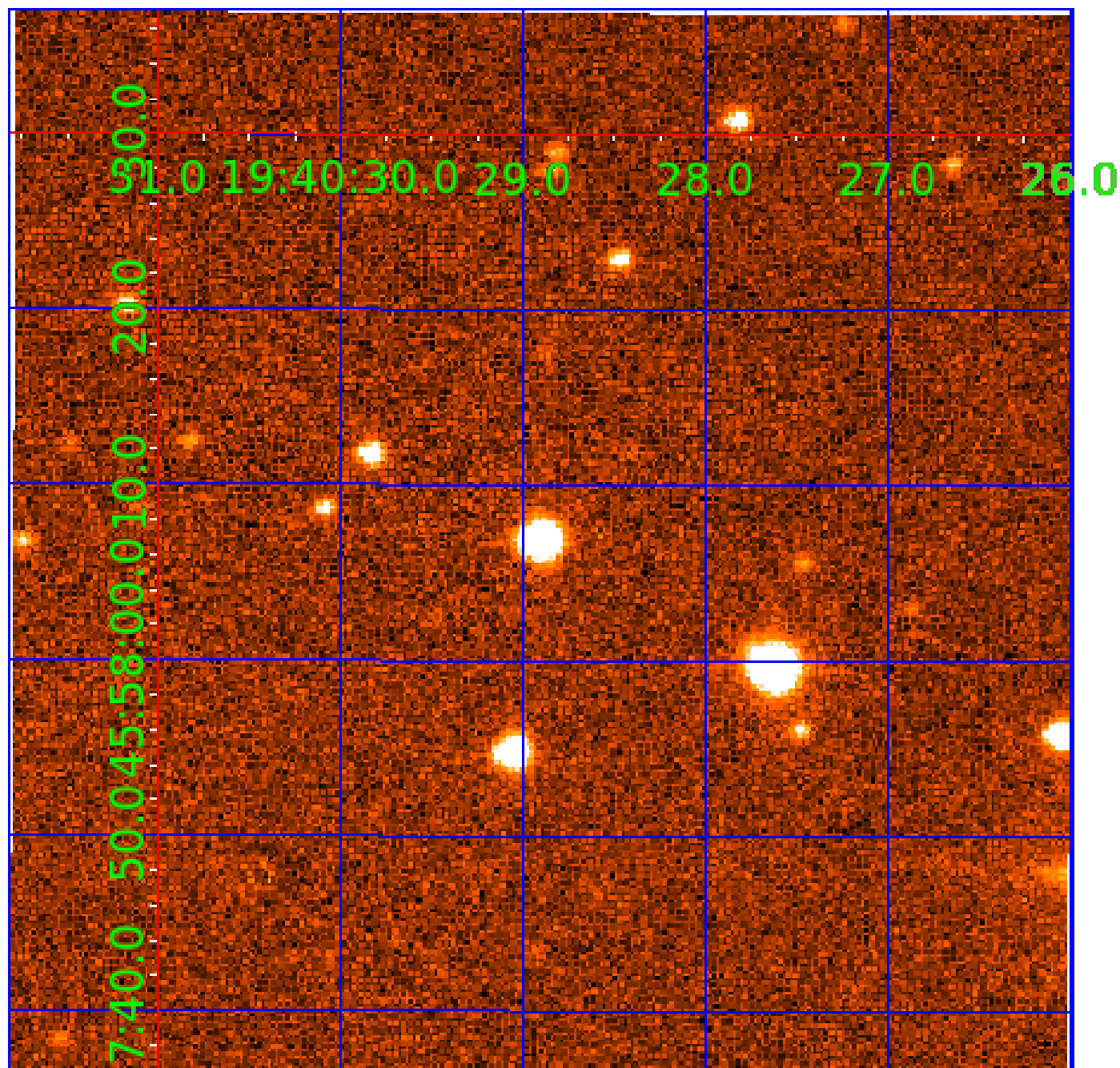


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 009412462

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009412462-01	OBS	7171.01	10.186440	132.536077	341911.5	6.000	14270.8	-1.0	0.92	5557	40.92	93.79
009412462-02	OBS	No	5.093279	132.386231	255401.6	6.000	10971.4	-1.0	0.92	5557	34.64	236.33
009412462-03	OBS	No	5.093253	136.558083	4099.0	15.000	504.5	-1.0	0.92	5557	5.78	236.33
009412462-04	OBS	No	5.093374	133.641277	2538.7	16.921	146.4	37.5	0.92	5557	8.79	236.33

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009412462-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_ALT—MOD_ODDEVEN_ALT—HAS_SEC_TCE—CENT_NOFITS
009412462-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE—CENT_NOFITS
009412462-03	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—SAME_NTL_PERIOD—CENT_NOFITS
009412462-04	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD—CENT_FEW_DIFFS

**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 009412462-03

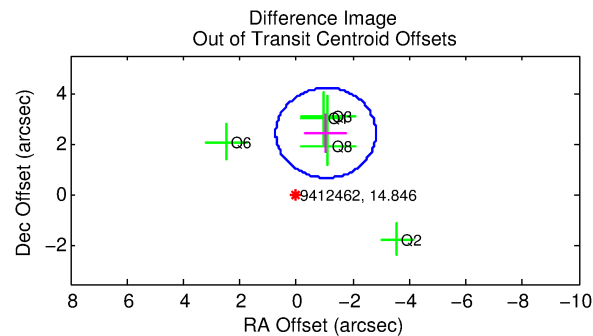
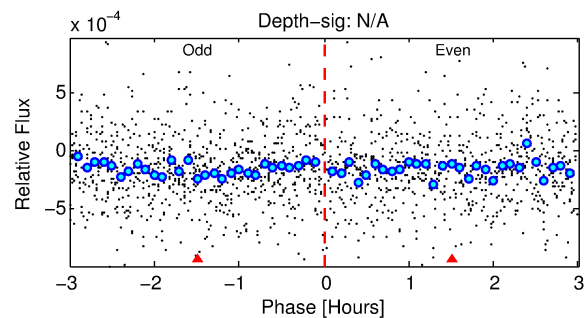
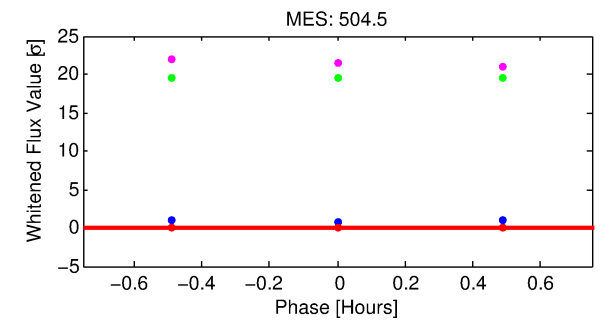
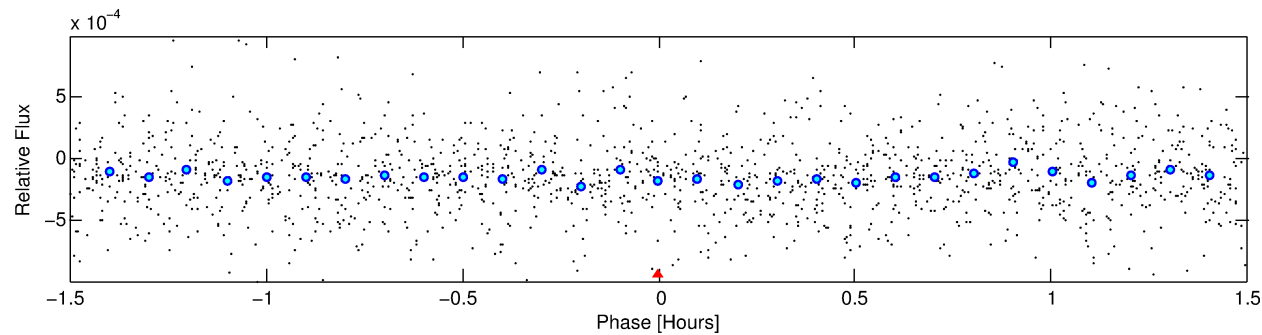
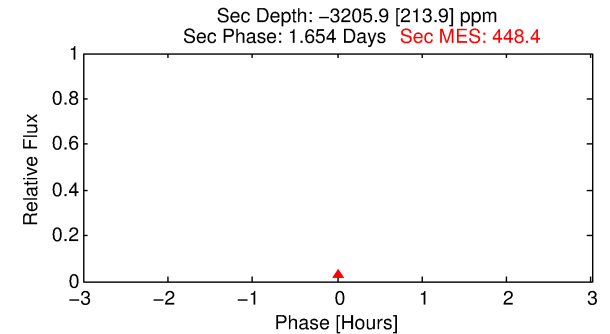
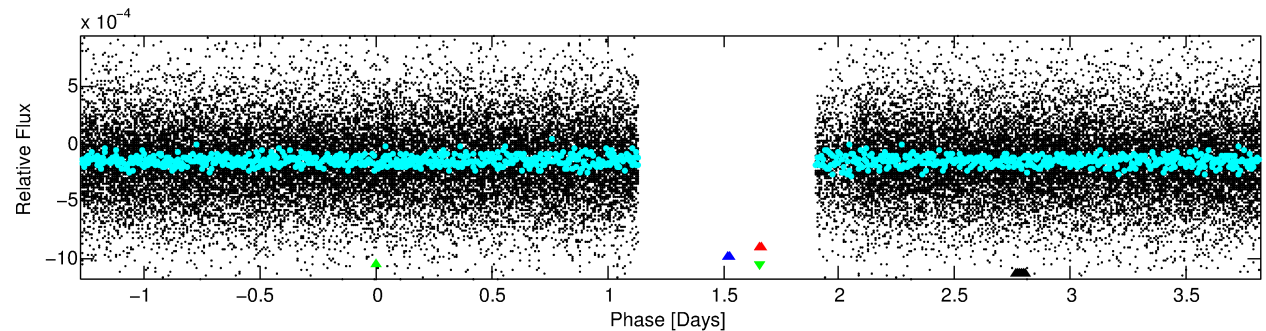
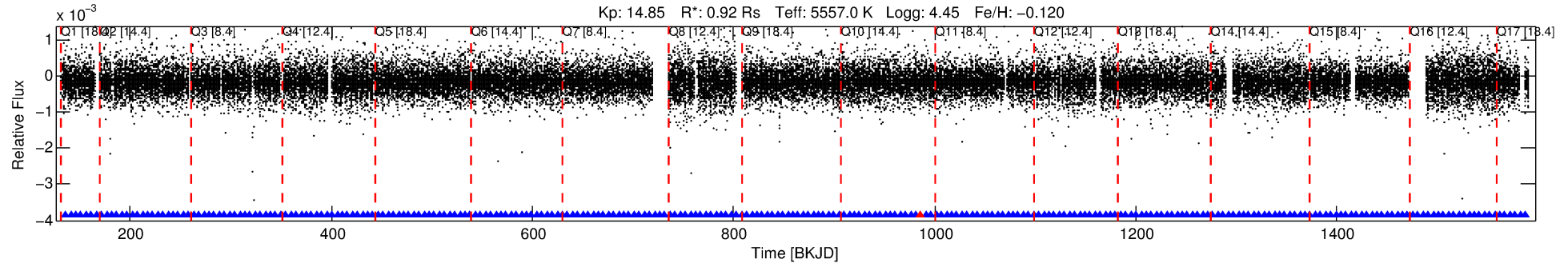
No Significant Match Found

# DV One-Page Summary

KIC: 9412462 Candidate: 3 of 4 Period: 5.093 d

KOI: K07171 Corr: No Ephemeris Match

Kp: 14.85 R\*: 0.92 Rs Teff: 5557.0 K Logg: 4.45 Fe/H: -0.120



TPS TCE Results:

Period = 5.09325 d  
Epoch = 136.5581 BKJD

DV fit results are unavailable

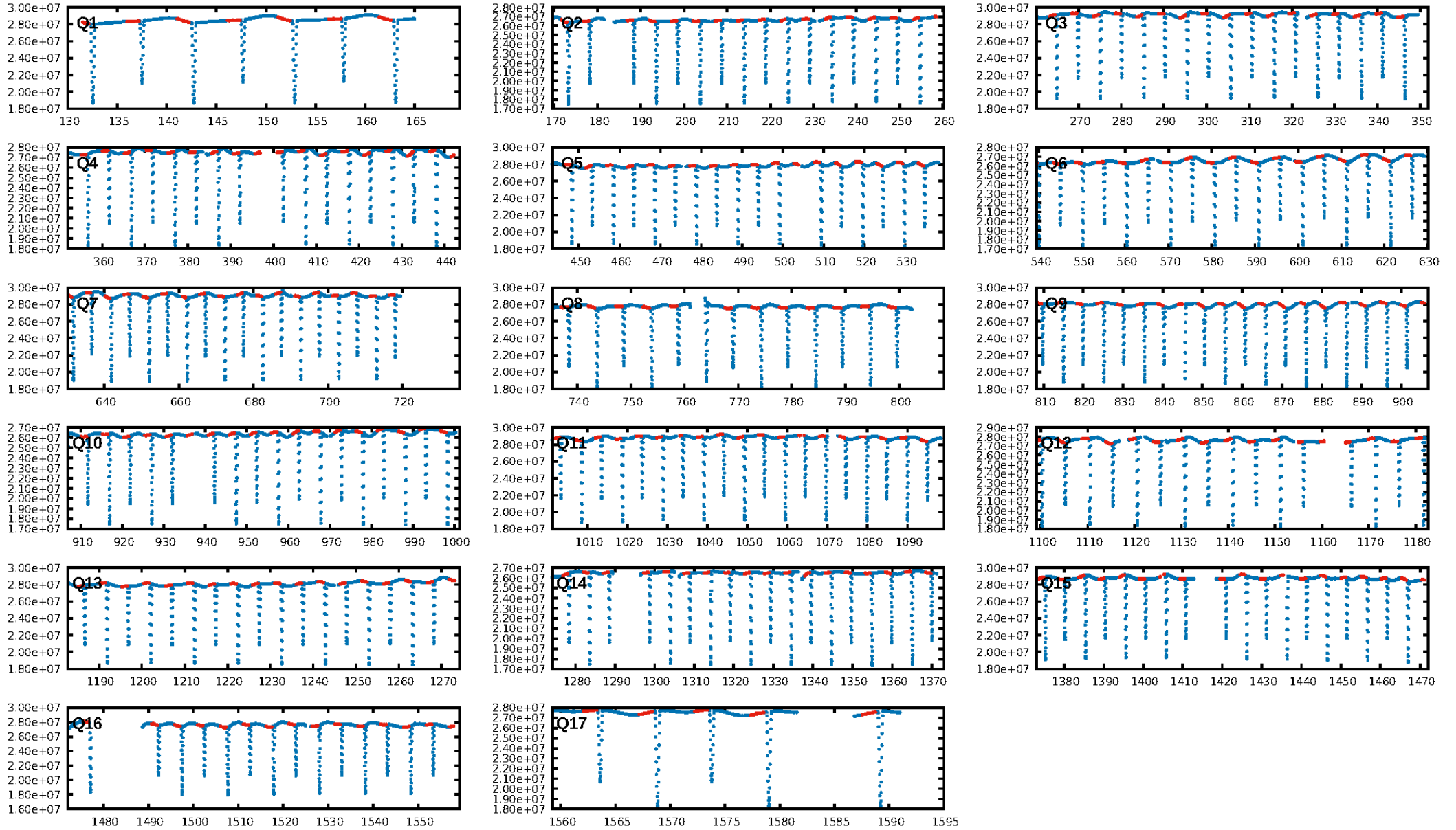
DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.0% [0.00σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 1.00 [249/250]  
GhostDiagnostic-chr: -2.888  
Centroid-sig: N/A  
Centroid-so: 26.465 arcsec [0.81σ]  
OotOffset-rm: 2.667 arcsec [4.52σ]  
KicOffset-rm: 2.705 arcsec [4.71σ]  
OotOffset-st: 2/1/1/1 [5]  
KicOffset-st: 2/1/1/1 [5]  
DiffImageQuality-fgm: 0.00 [0/5]  
DiffImageOverlap-fno: 1.00 [17/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 03-Feb-2016 02:05:59 Z

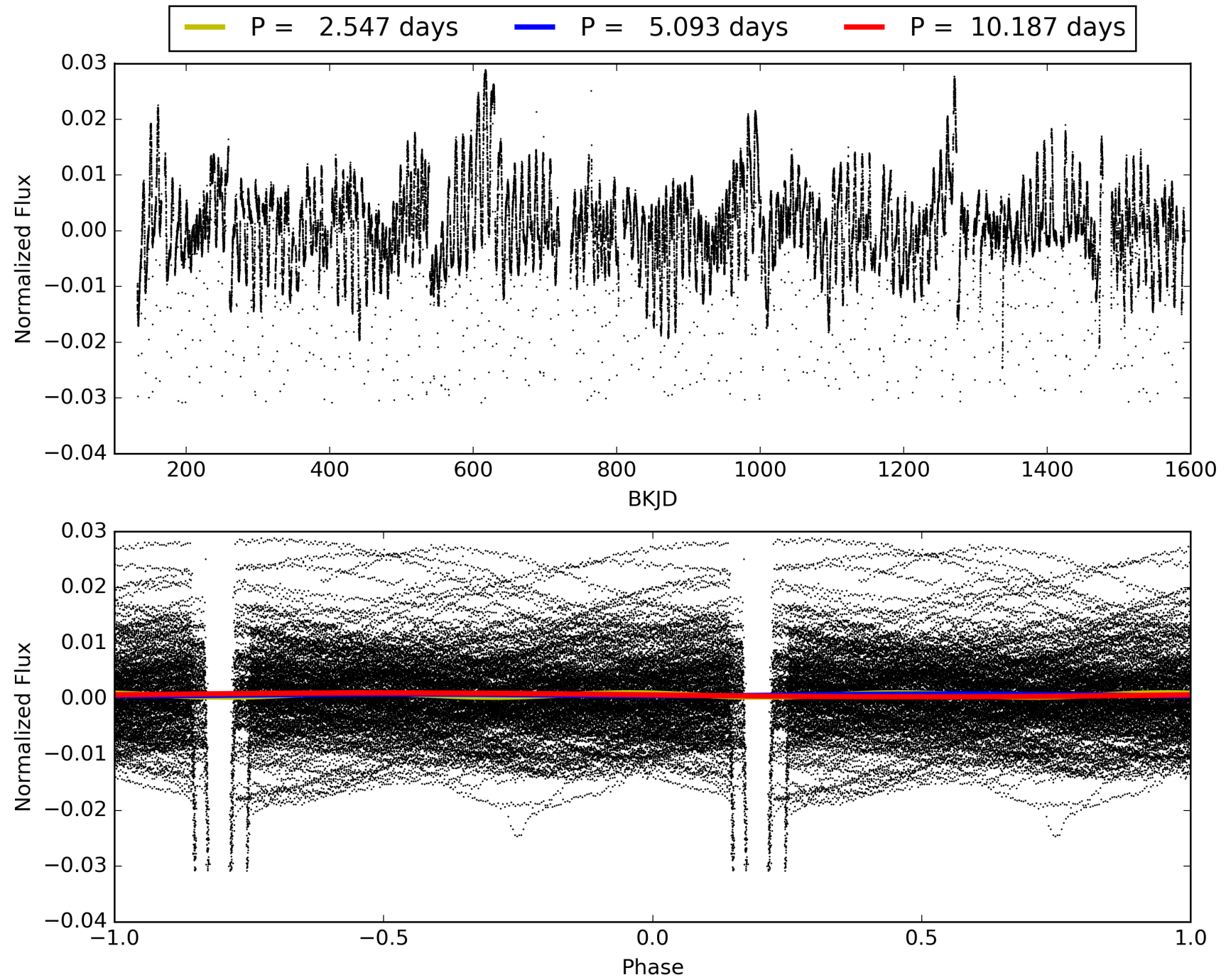
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 009412462-03, PDC Light Curves





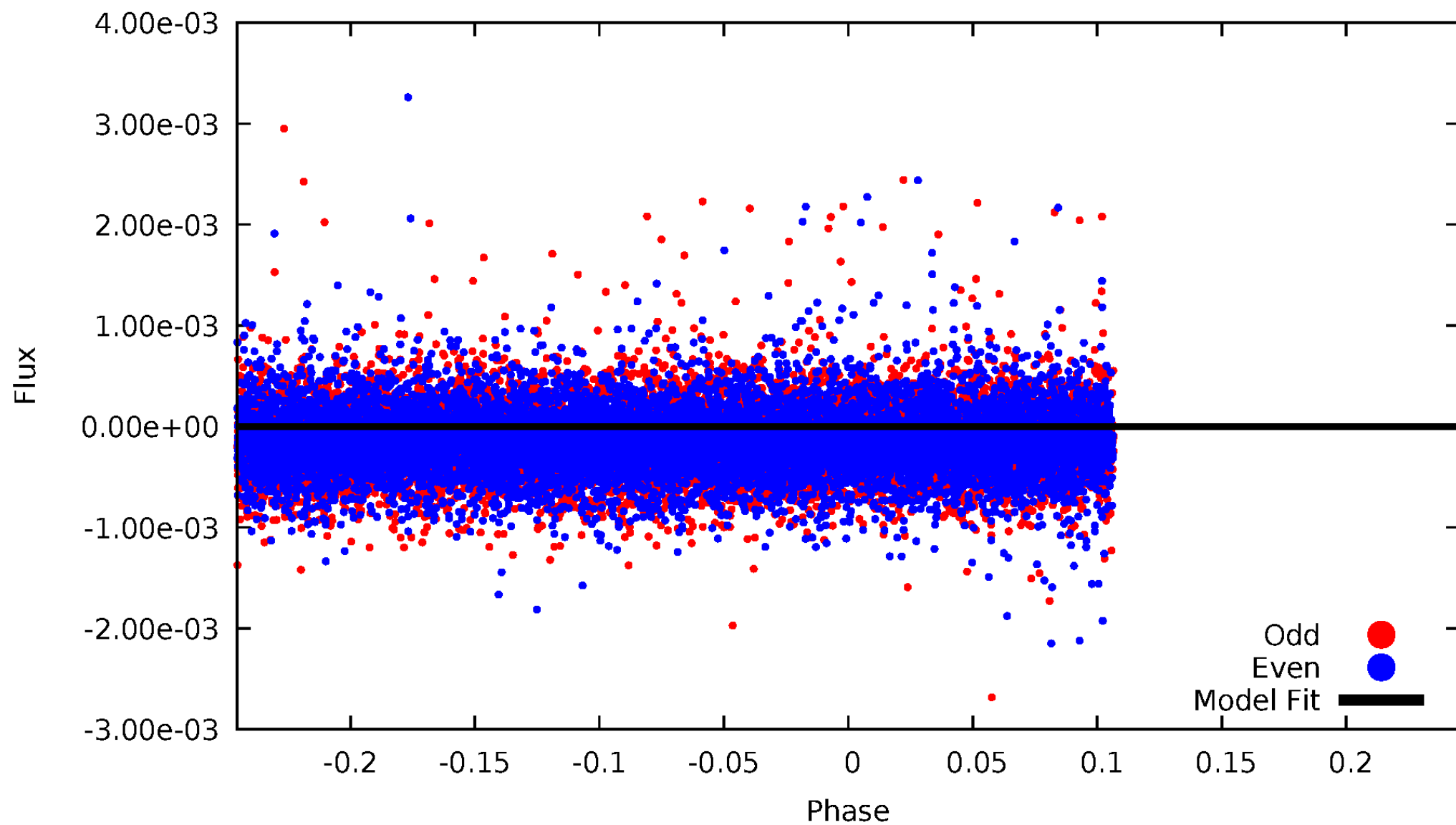
TCE 009412462-03





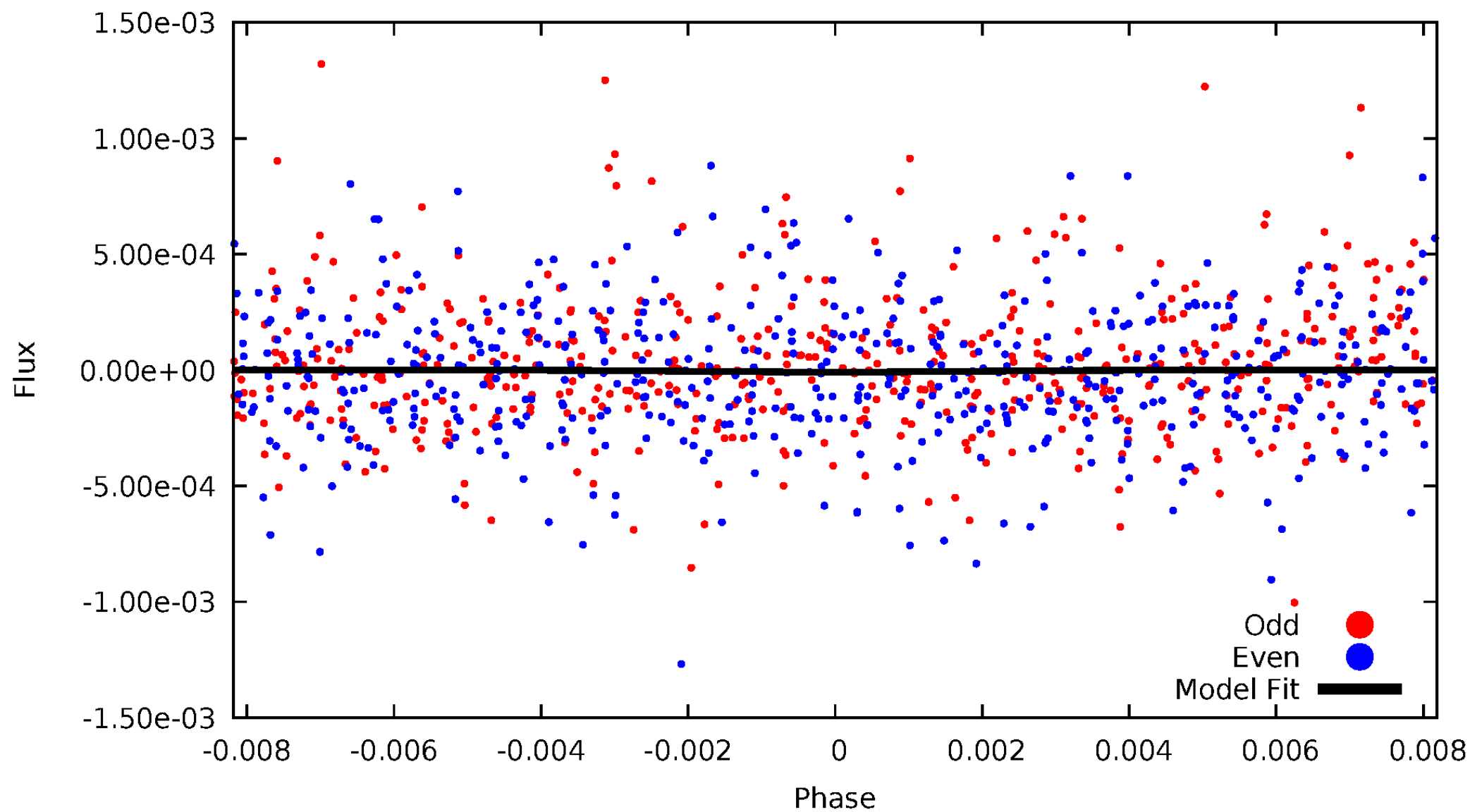
# DV Odd/Even

TCE 009412462-03

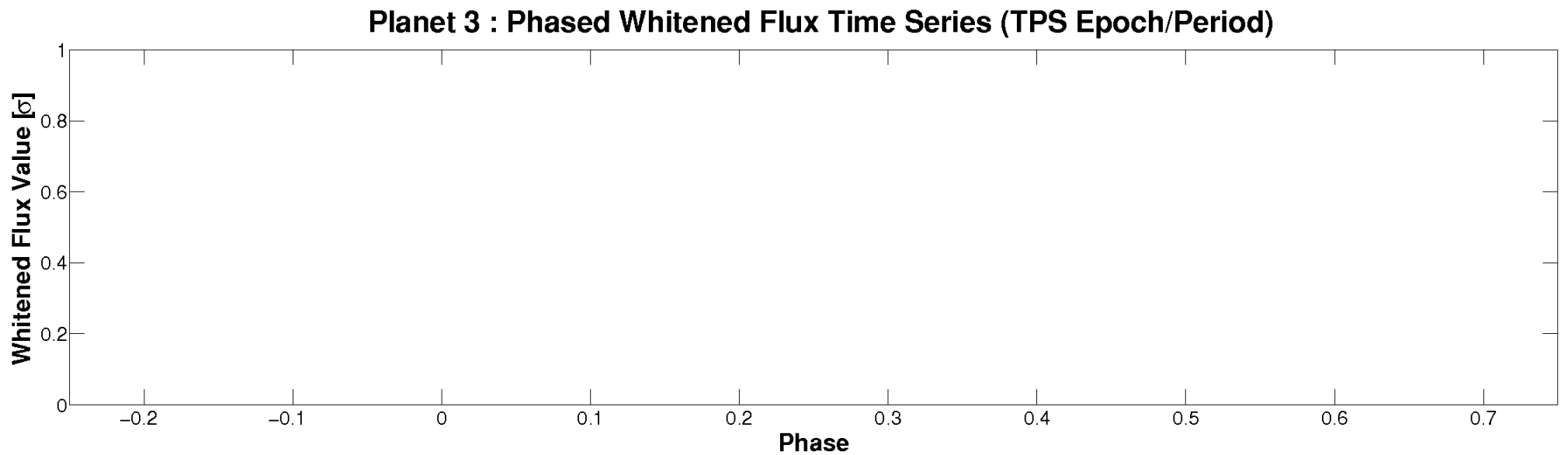
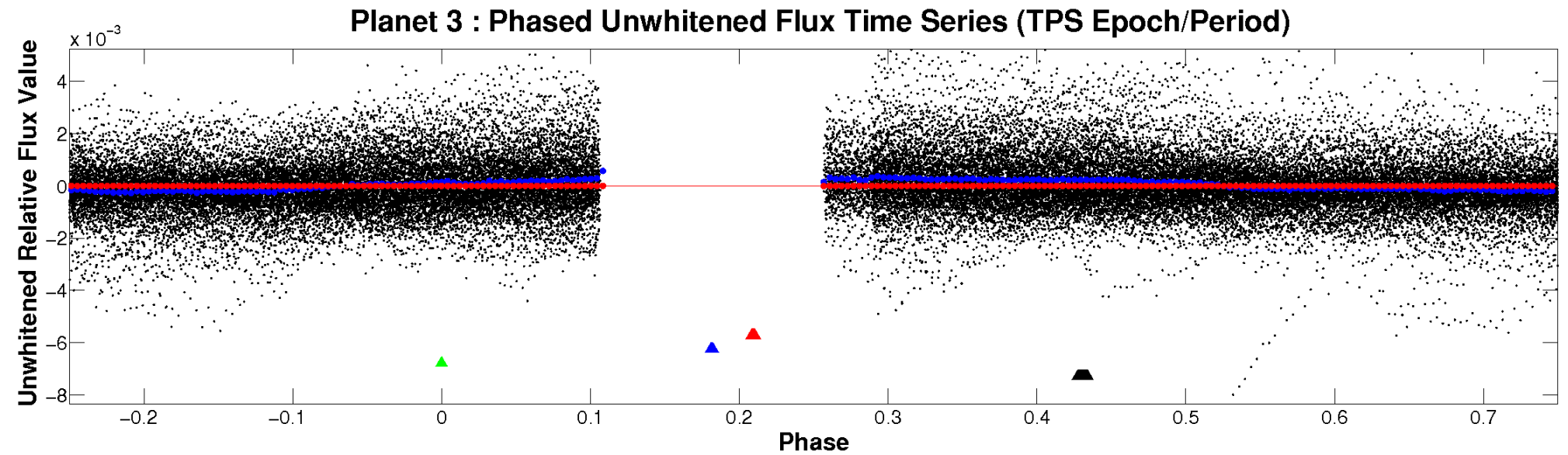


# ALT Odd/Even

TCE 009412462-03

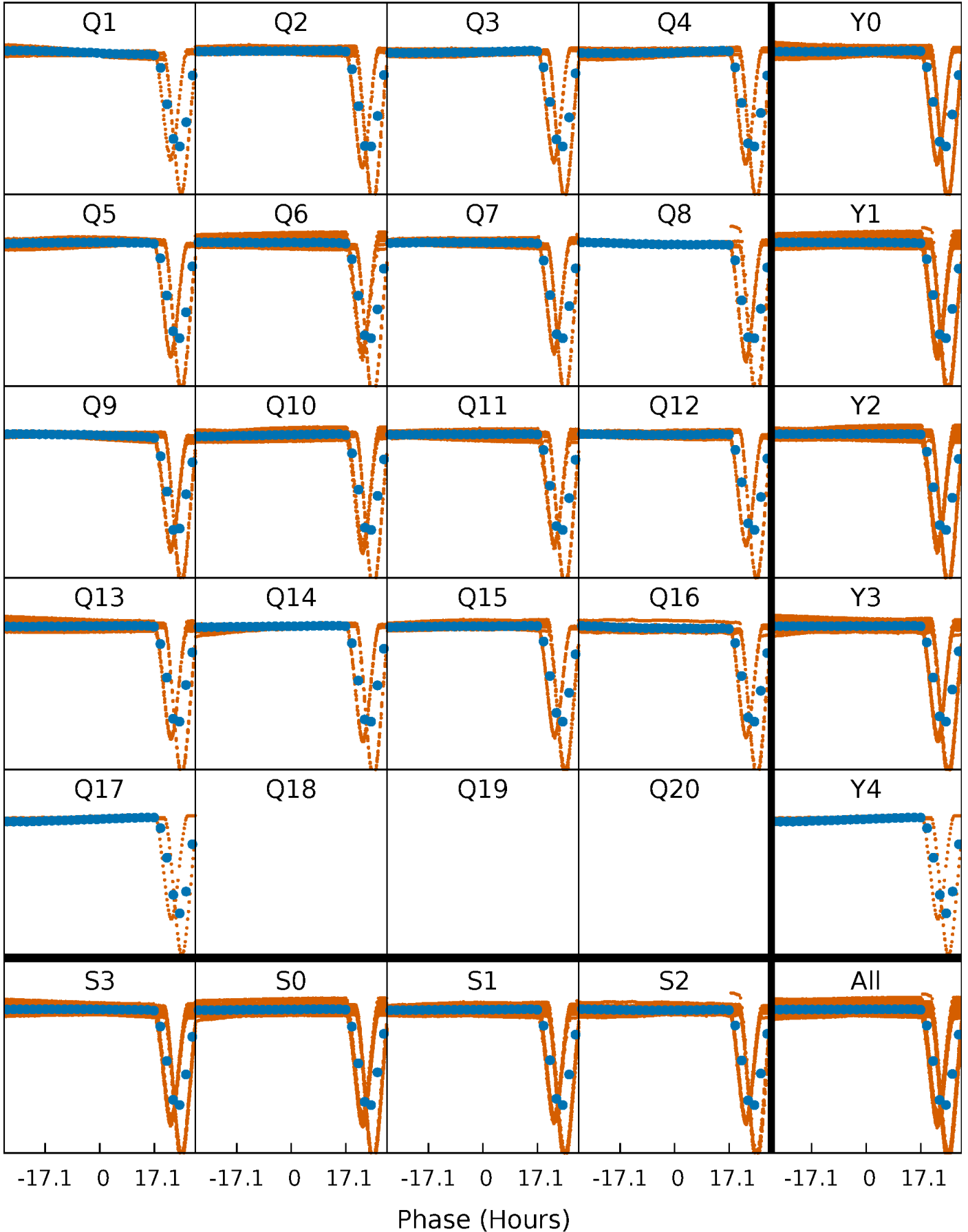


# Non-Whitened Vs. Whitened Light Curve



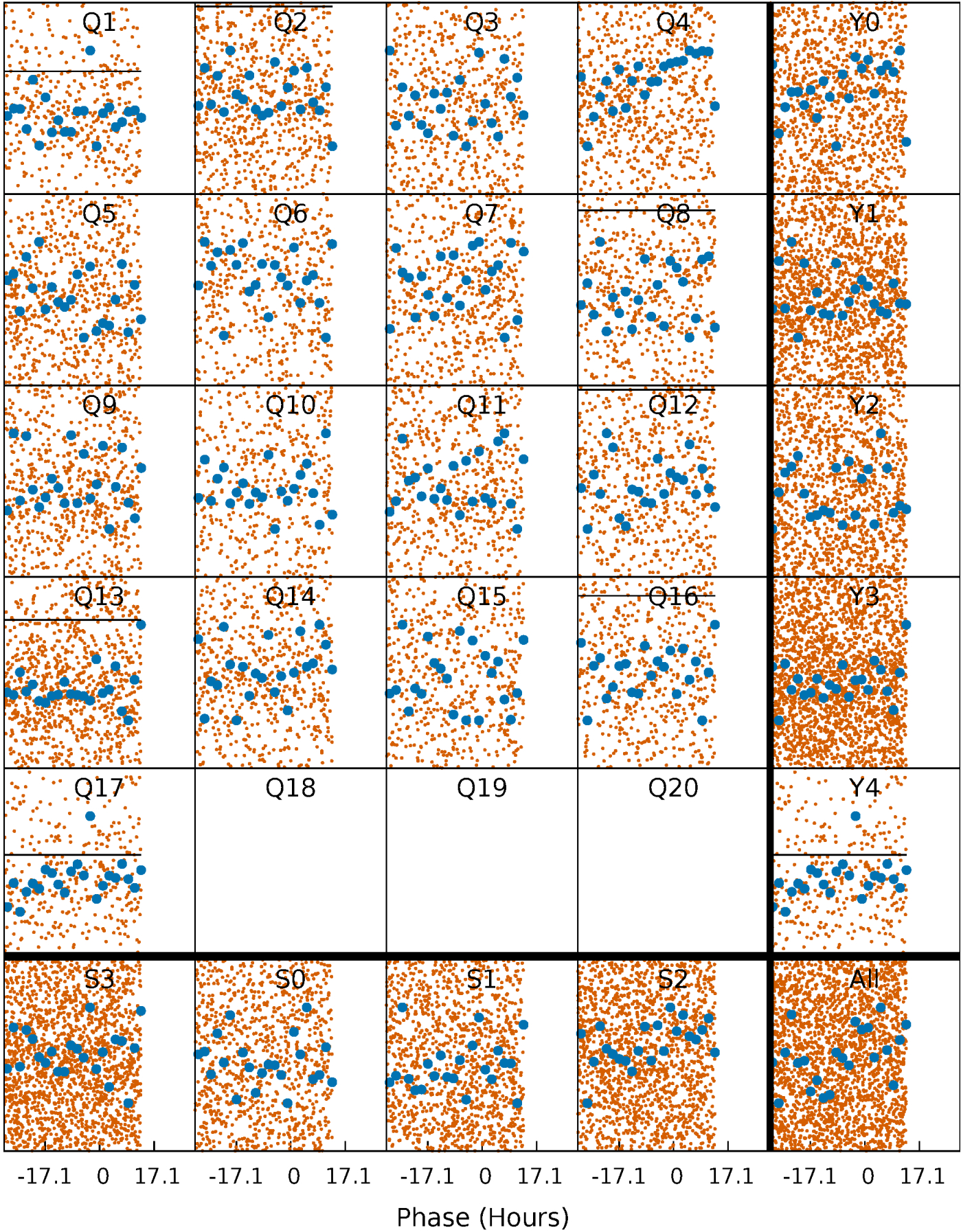
# PDC Quarter-Phased Transit Curves

TCE 009412462-03   P= 5.093253 Days    $T_0=136.558083$  (BKJD)



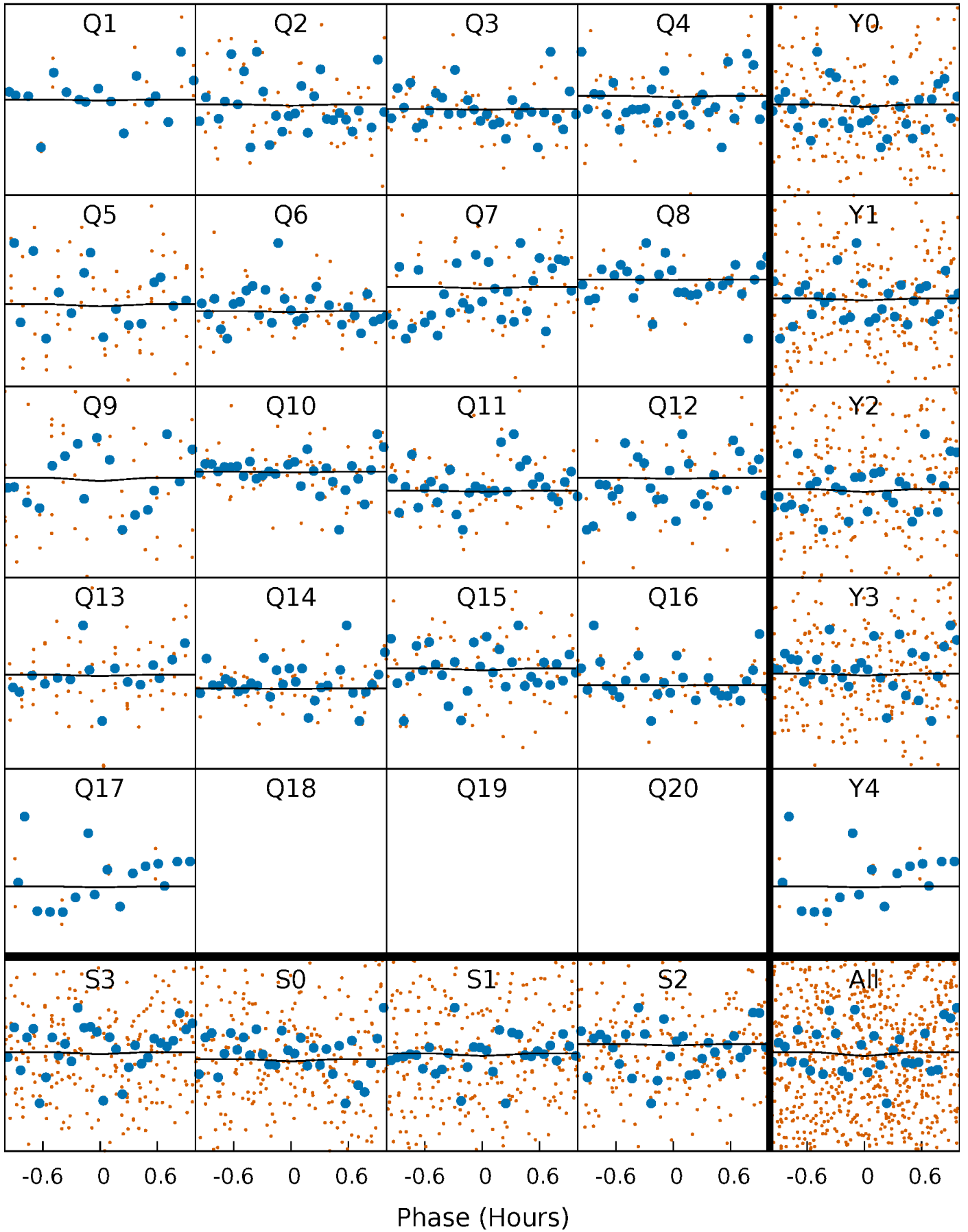
# DV Quarter-Phased Transit Curves

TCE 009412462-03    P= 5.093253 Days     $T_0=136.558083$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

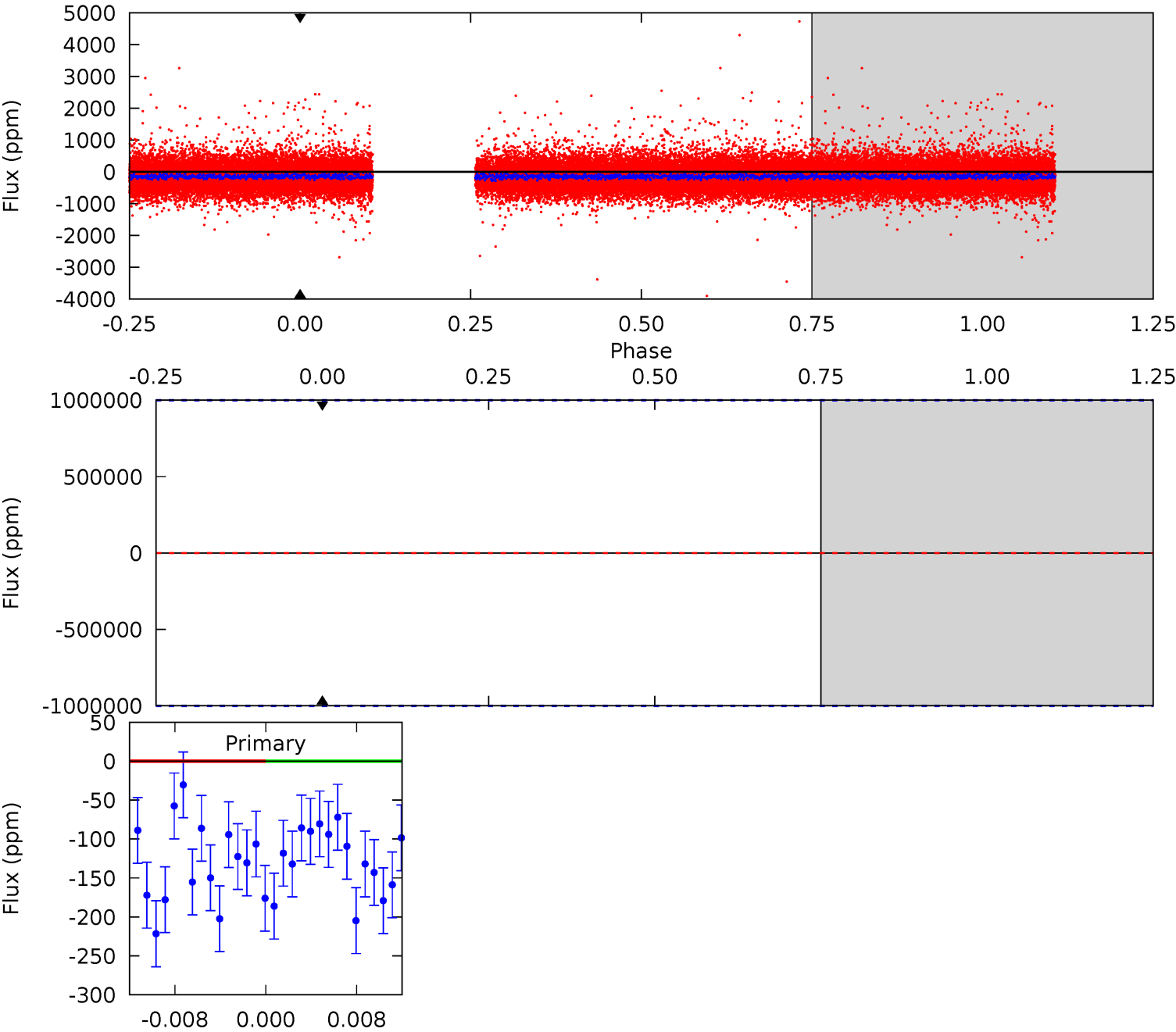
TCE 009412462-03   P= 5.093253 Days    $T_0=135.966848$  (BKJD)



# DV Model-Shift Uniqueness Test

009412462-03, P = 5.093253 Days, E = 131.464830 Days

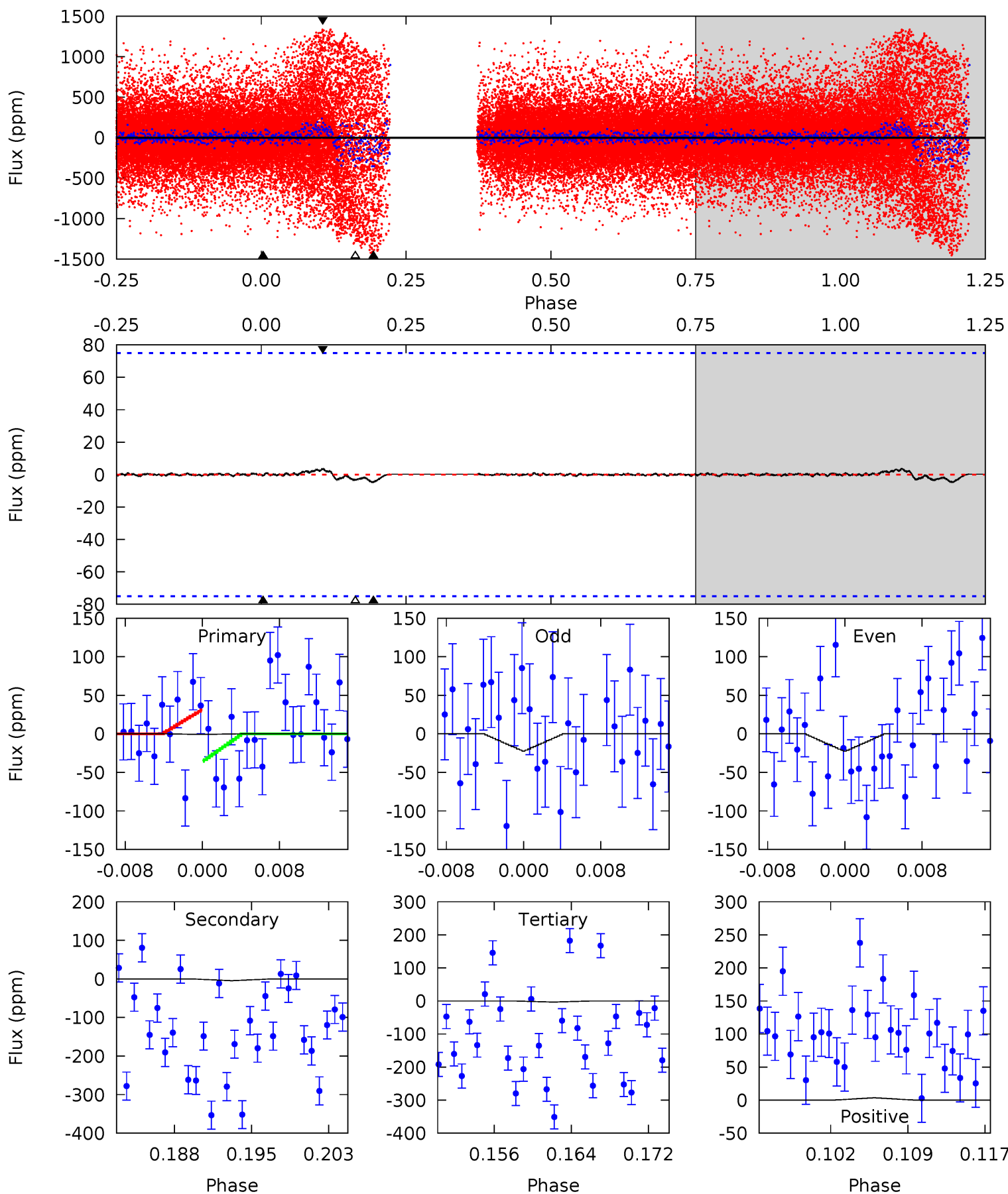
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



# Alt Model-Shift Uniqueness Test

009412462-03, P = 5.093253 Days, E = 130.873595 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
0.04	0.31	0.23	0.24	5.07	2.66	0.06	-0.19	-0.20	0.08	0.07	0.01	-1.52	0.44	0.13





### Stellar Parameters For KIC 009412462

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5557^{+166}_{-149}$	$4.448^{+0.108}_{-0.175}$	$-0.120^{+0.300}_{-0.300}$	$0.916^{+0.228}_{-0.123}$	$0.859^{+0.111}_{-0.074}$	$1.575^{+0.661}_{-0.715}$
	+3%/-3%	+2%/-4%	+250%/-250%	+25%/-13%	+13%/-9%	+42%/-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 009412462-03 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$0 \pm 1000000$	$9.42^{+8.81}_{-6.28}$	$1411^{+90}_{-71}$	$2756^{+12781}_{-16148}$	$3.126^{+3315.759}_{-2481.218}$
Alt.	$-5 \pm 15$	$6.45^{+8.26}_{-4.37}$	$1415^{+91}_{-74}$	$-2060^{+4557}_{-317}$	$0.079^{+1.447}_{-0.532}$

$T_{max}$  = Theoretical Maximum Planetary Temperature

$T_{obs}$  = Observed Planetary Temperature (Assuming  $A=0.3$ )

$A_{obs}$  = Observed Albedo (Assuming  $T=0$ )

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

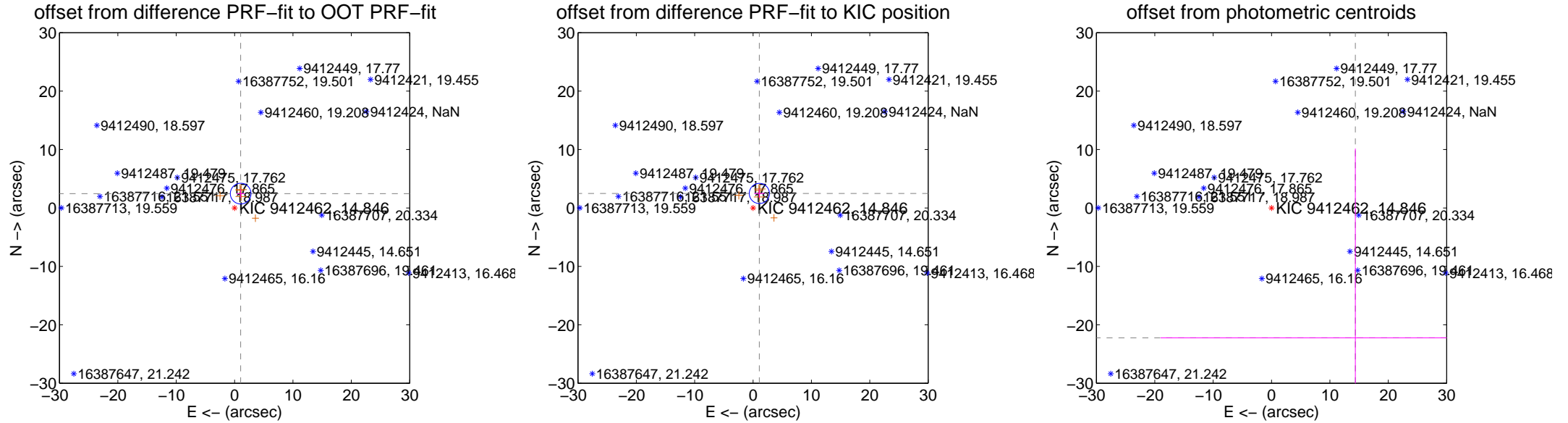
## DV Centroid Data

Supplemental centroid analysis for 009412462-03. Kepler magnitude: 14.85. Transit SNR -1.00

There are 0 quarters with good PRF difference image offsets

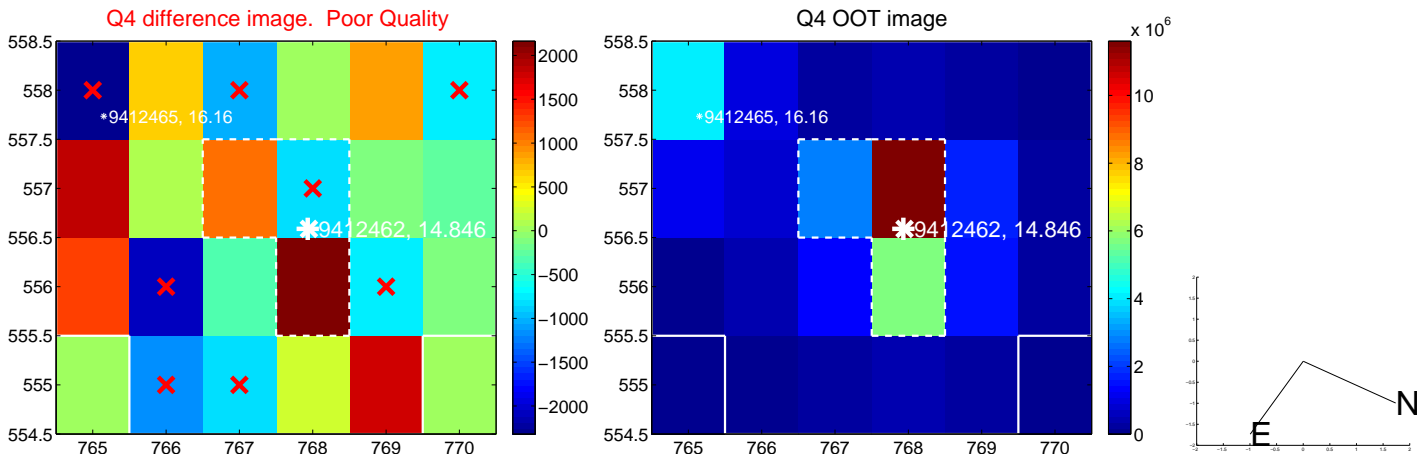
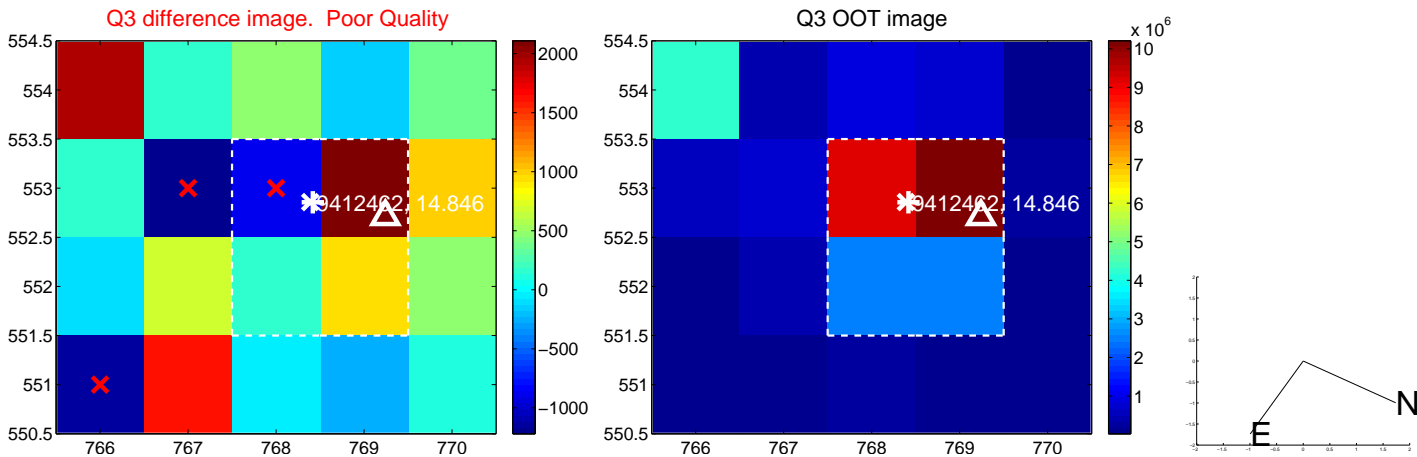
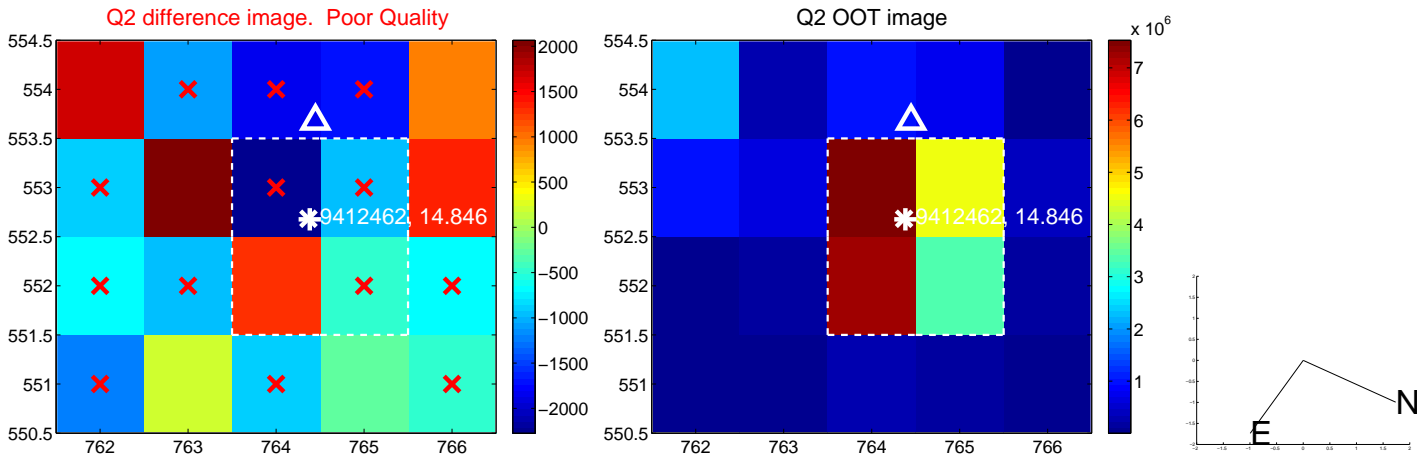
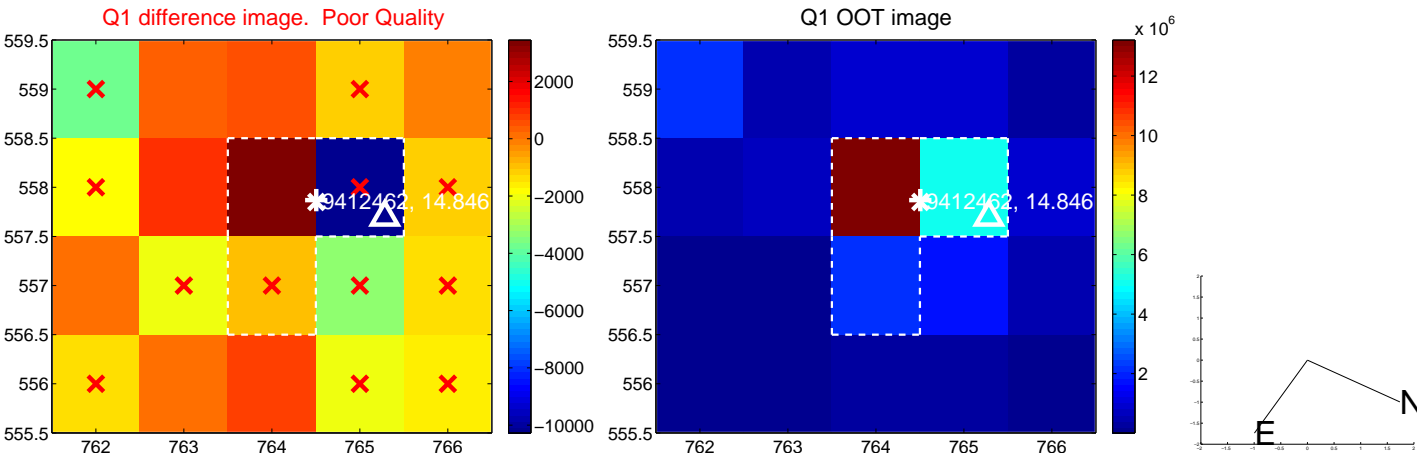
The direct PRF centroid is offset from the target star catalog position by about 0.07 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.667 \pm 0.590$	4.52	$-1.044 \pm 0.714$	$2.454 \pm 0.750$
PRF-fit source offset from KIC position	$2.705 \pm 0.575$	4.71	$-1.078 \pm 0.882$	$2.481 \pm 0.708$
photometric centroid source offset	$26.47 \pm 32.68$	0.81	$-14.36 \pm 33.36$	$-22.23 \pm 32.39$

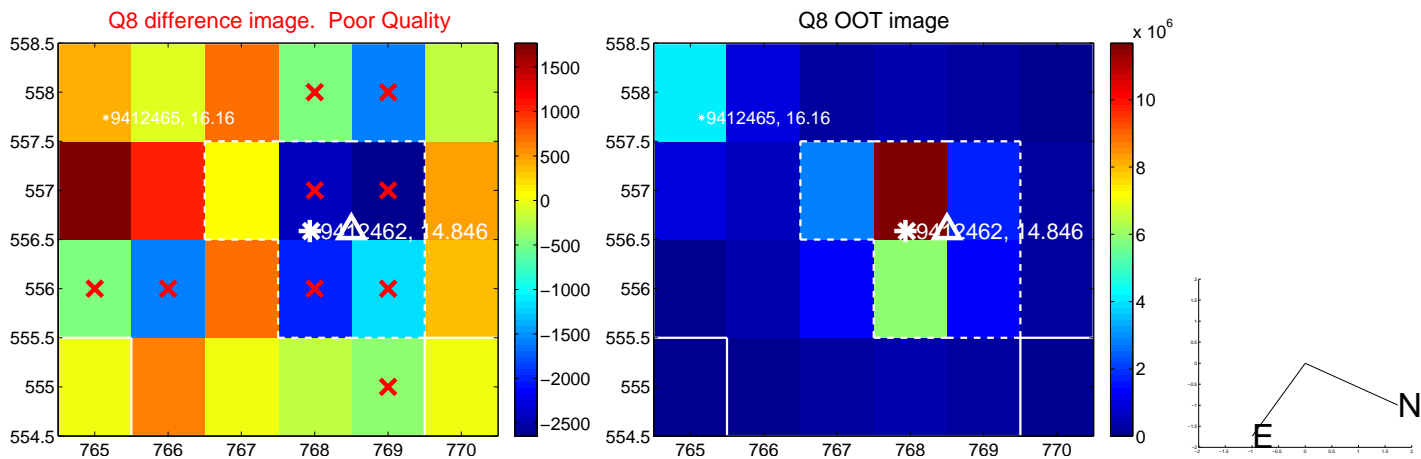
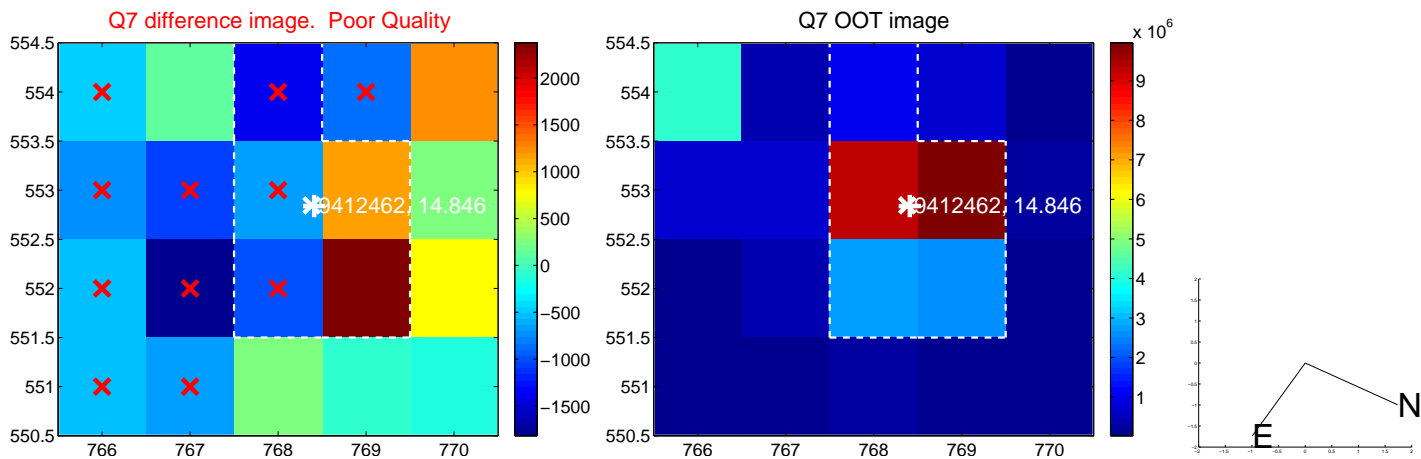
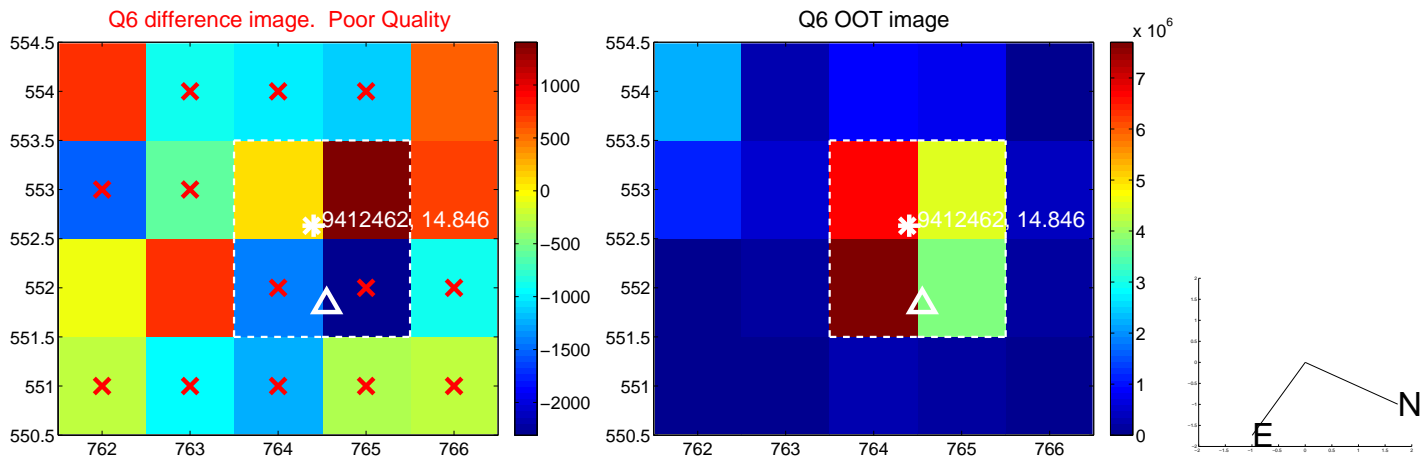
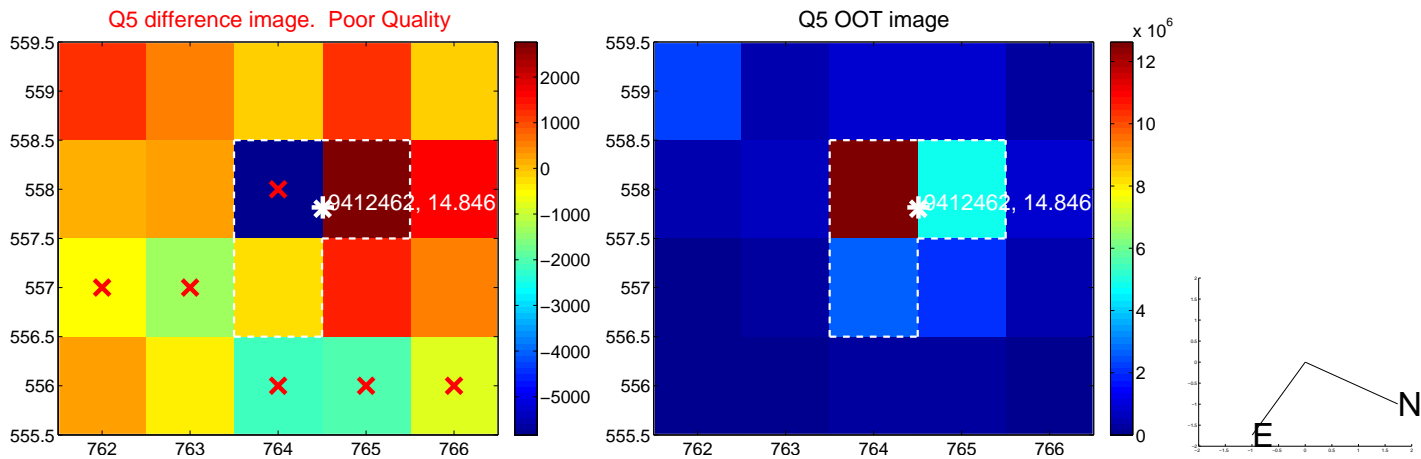


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

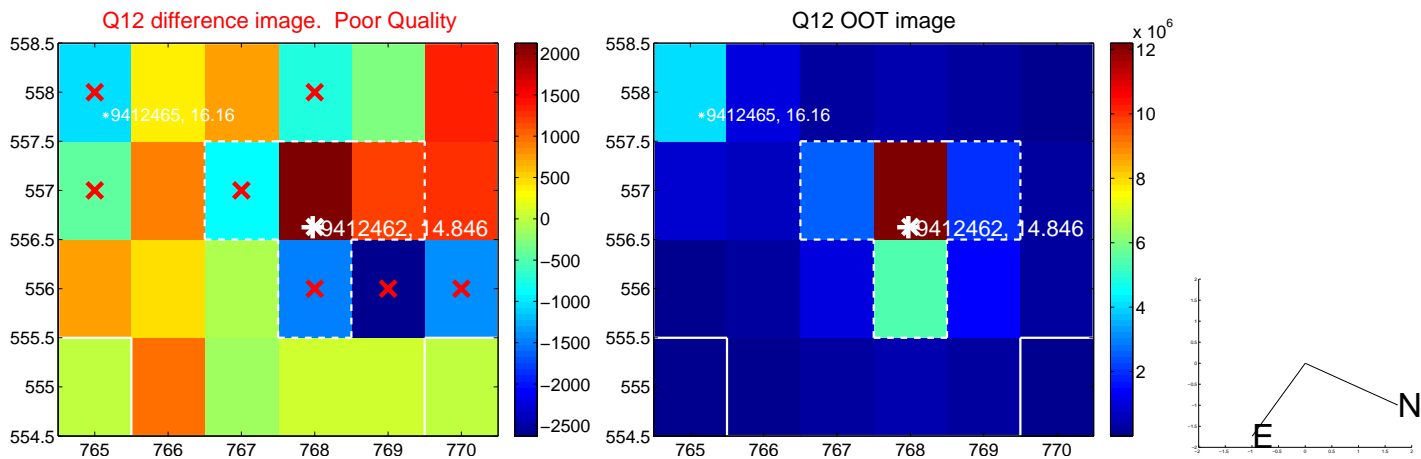
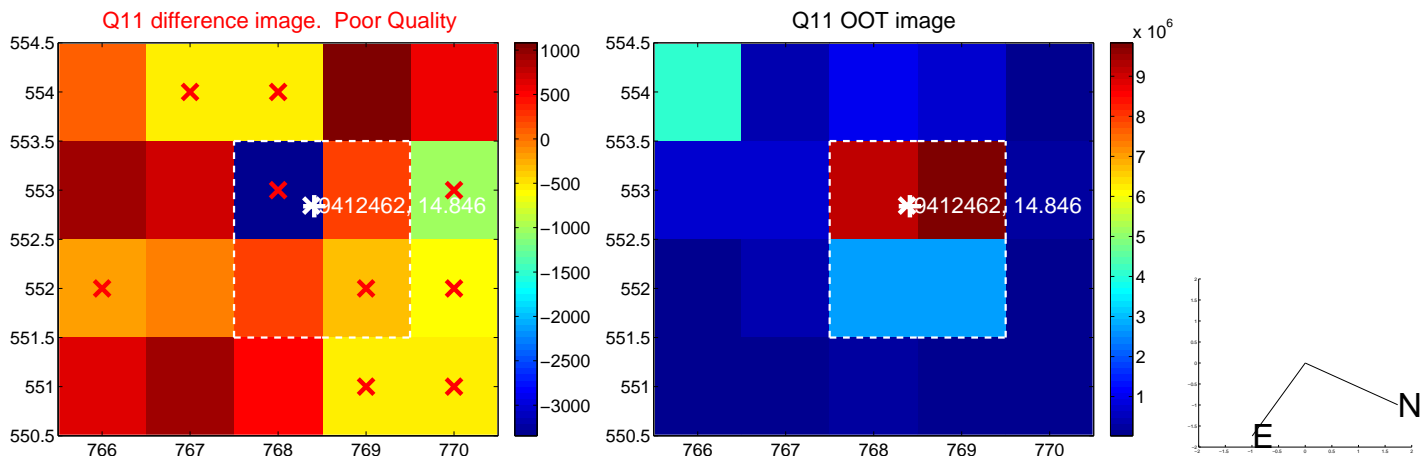
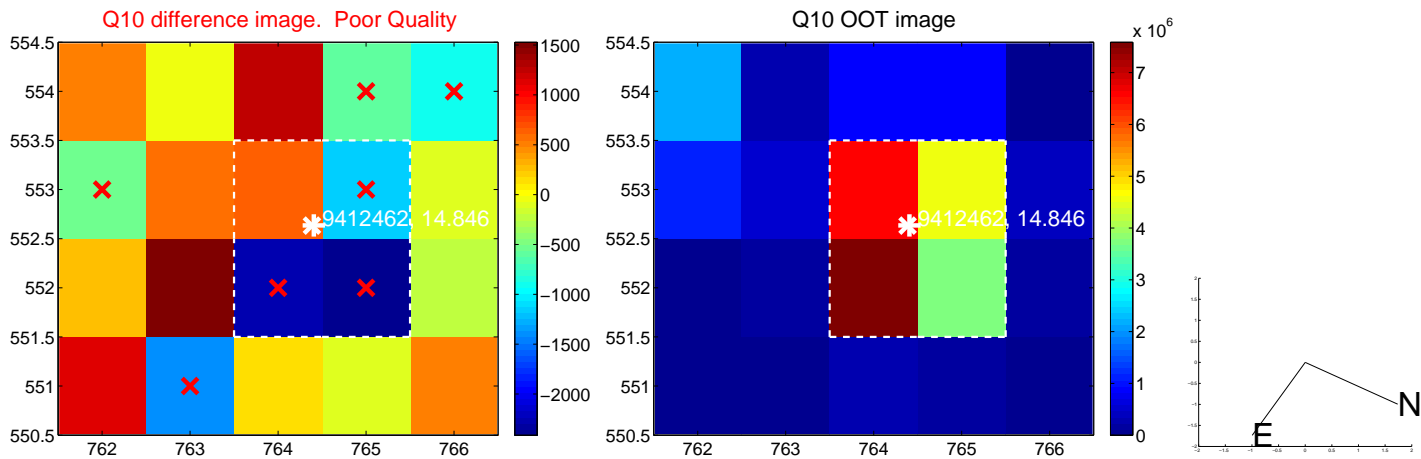
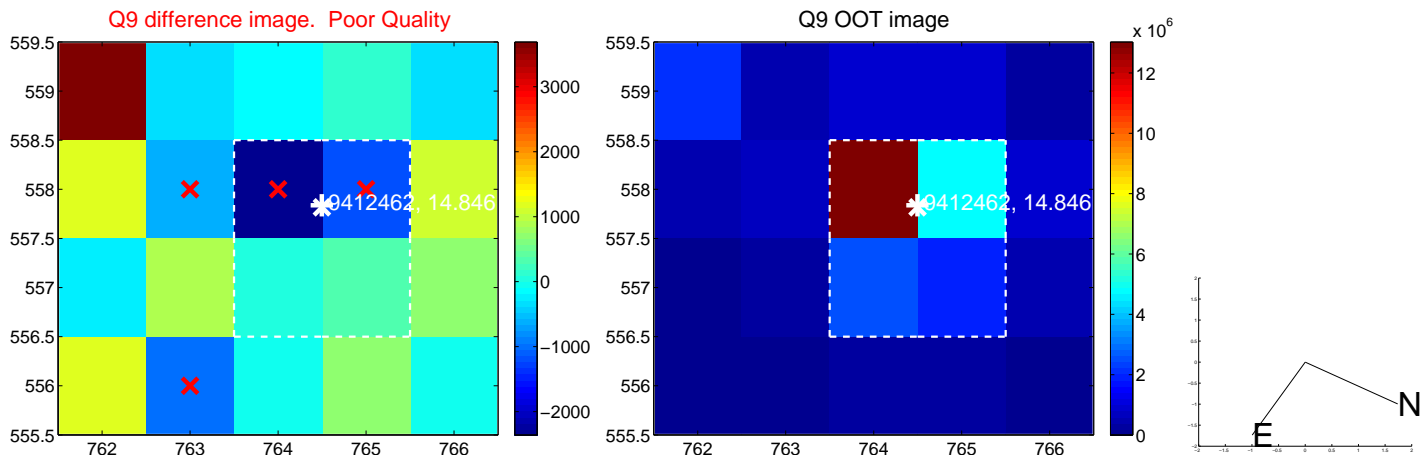
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



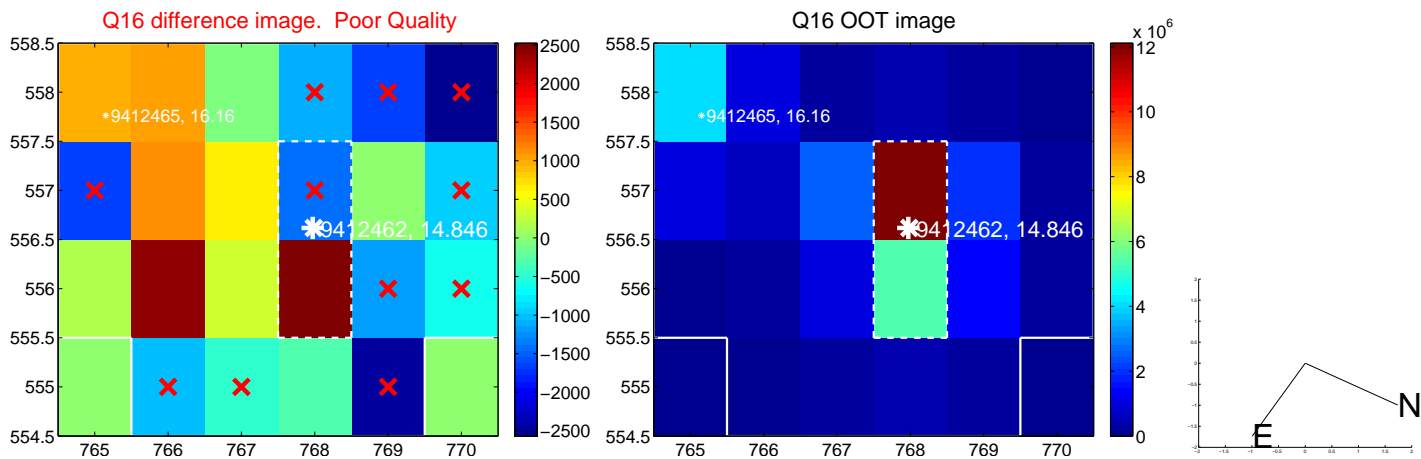
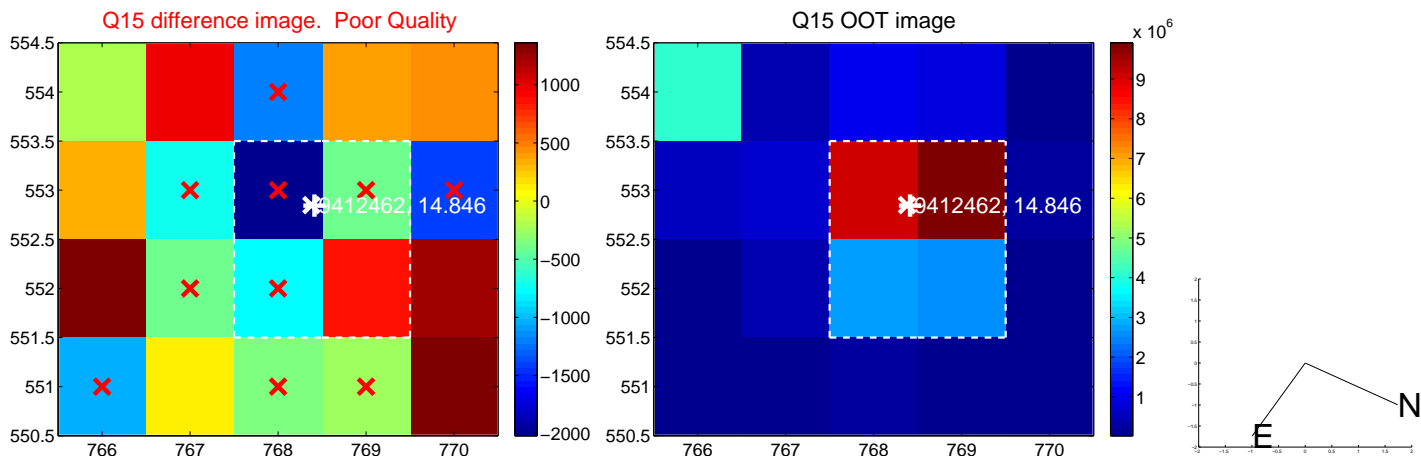
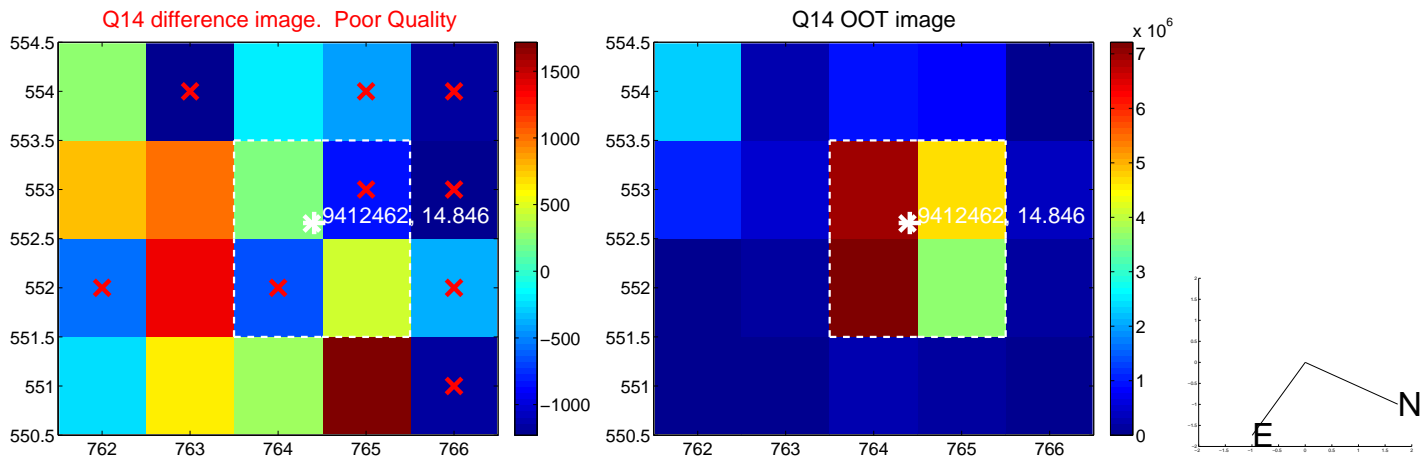
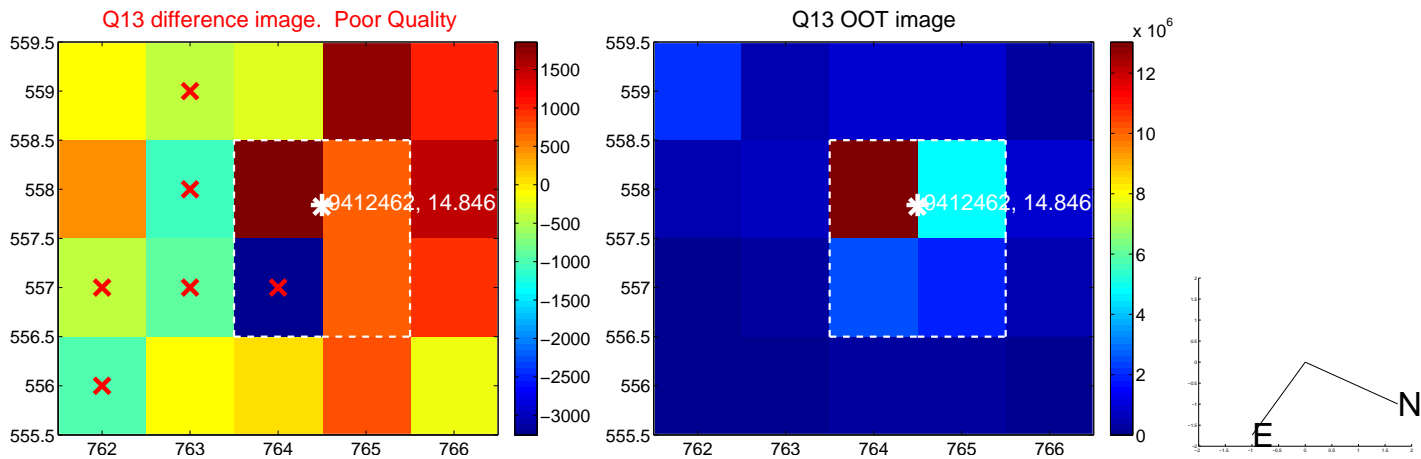
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



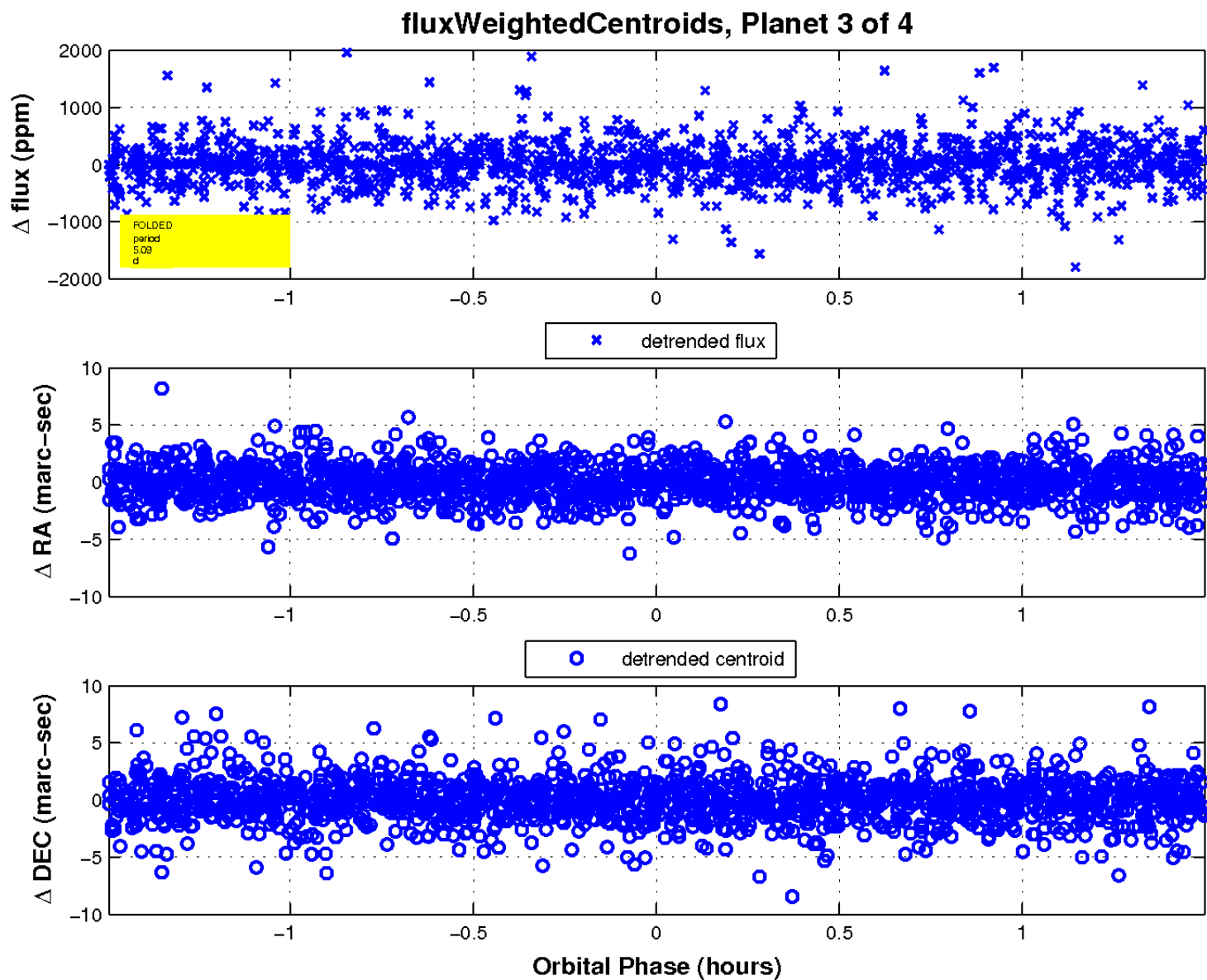
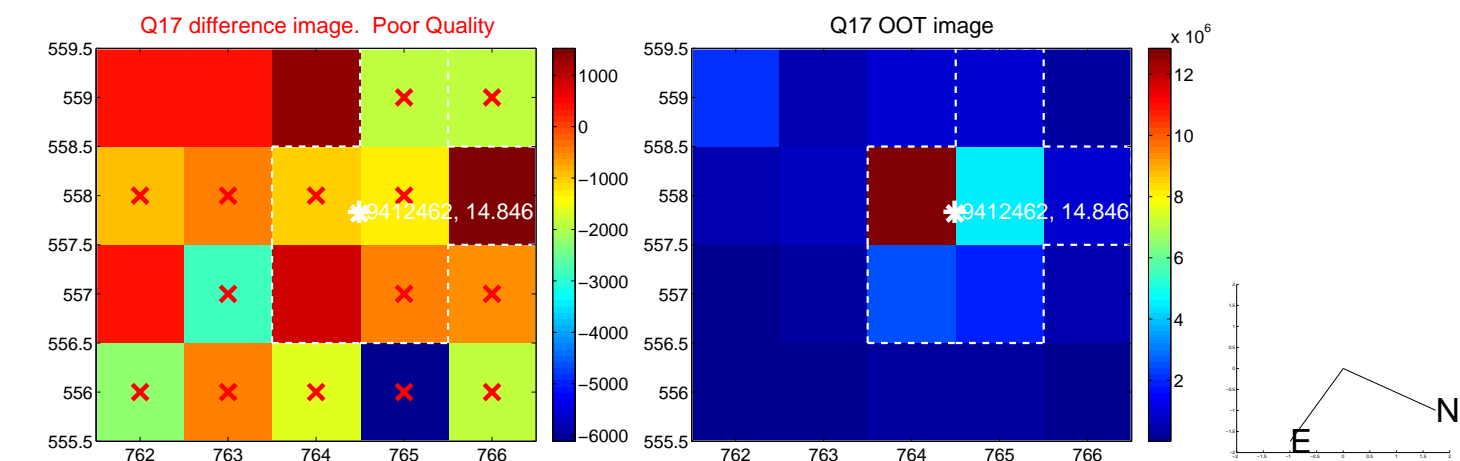
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

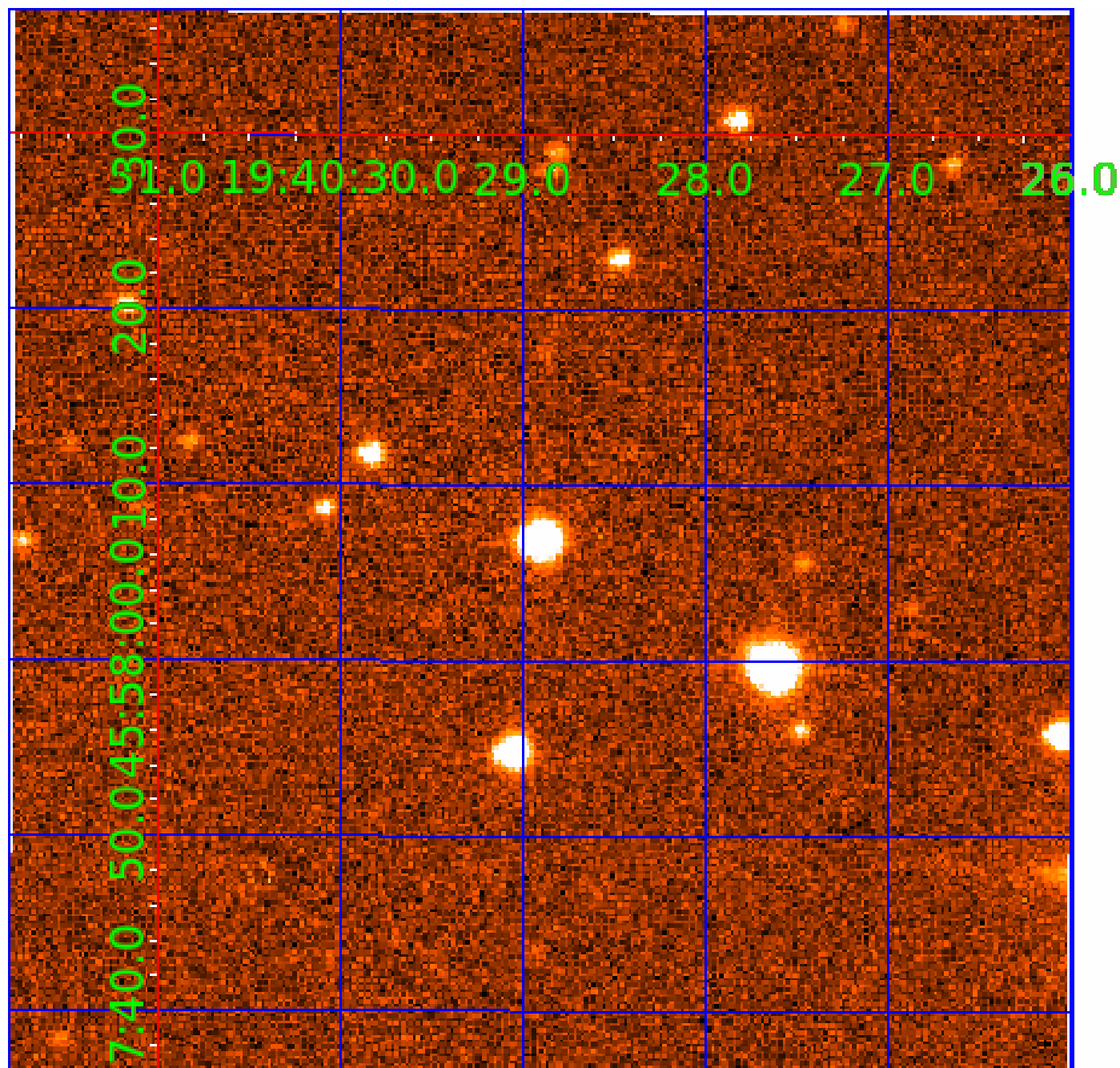


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 009412462

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009412462-01	OBS	7171.01	10.186440	132.536077	341911.5	6.000	14270.8	-1.0	0.92	5557	40.92	93.79
009412462-02	OBS	No	5.093279	132.386231	255401.6	6.000	10971.4	-1.0	0.92	5557	34.64	236.33
009412462-03	OBS	No	5.093253	136.558083	4099.0	15.000	504.5	-1.0	0.92	5557	5.78	236.33
009412462-04	OBS	No	5.093374	133.641277	2538.7	16.921	146.4	37.5	0.92	5557	8.79	236.33

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009412462-01	OBS	FP	0.00	0	1	0	0	MOD_SEC_ALT—MOD_ODDEVEN_ALT—HAS_SEC_TCE—CENT_NOFITS
009412462-02	OBS	FP	0.00	1	1	0	0	IS_SEC_TCE—CENT_NOFITS
009412462-03	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—SAME_NTL_PERIOD—CENT_NOFITS
009412462-04	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD—CENT_FEW_DIFFS

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

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

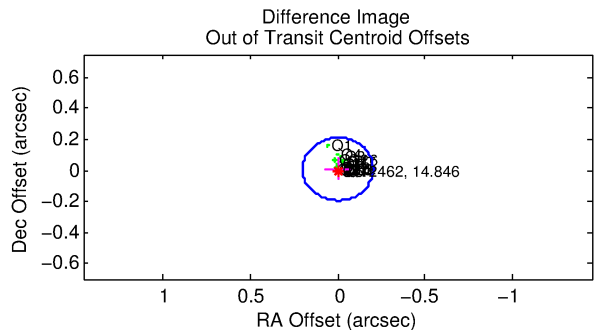
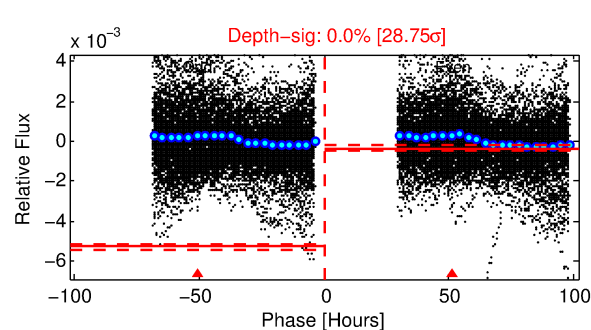
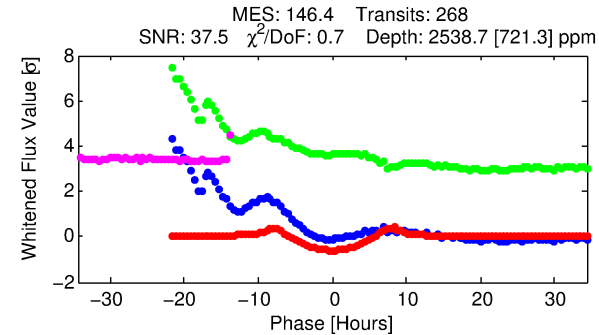
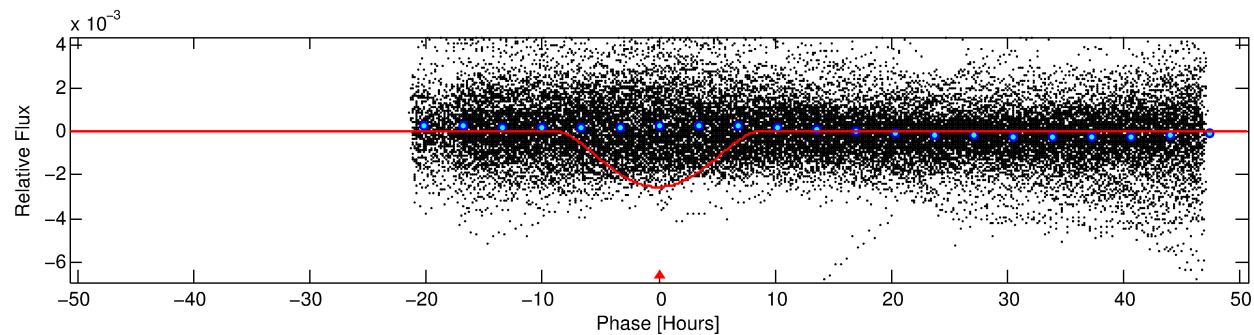
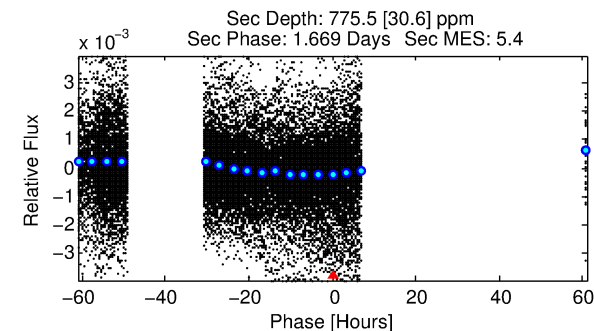
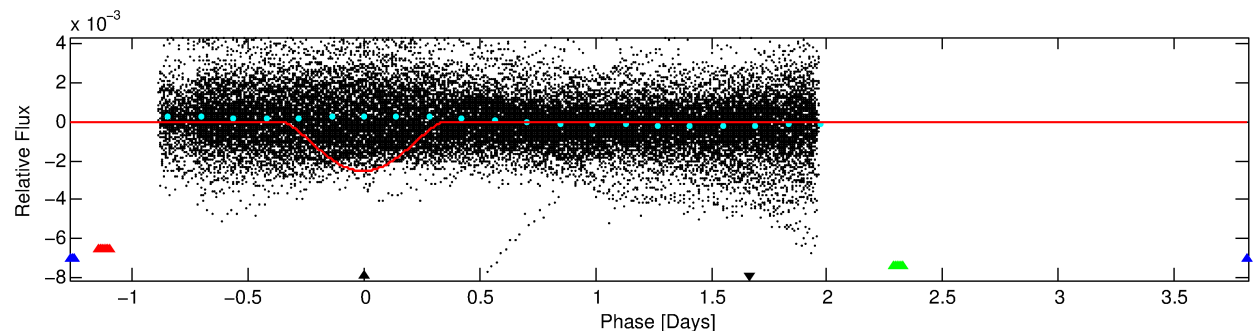
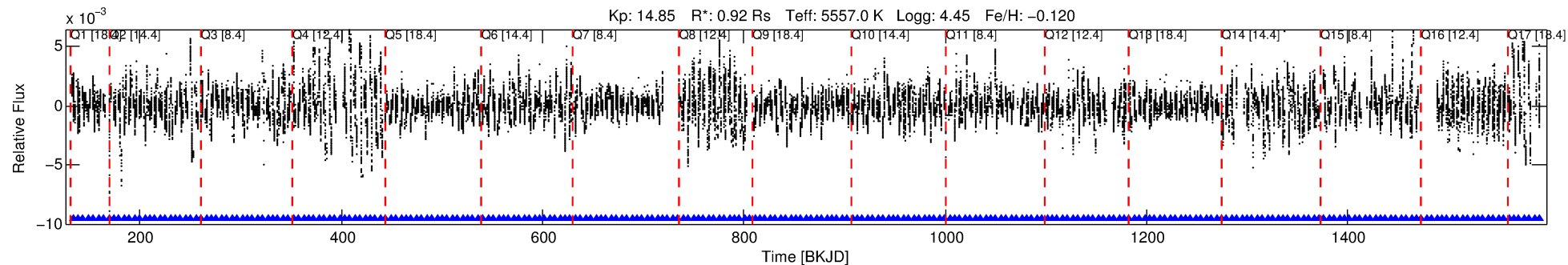
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 009412462-04

No Significant Match Found

# DV One-Page Summary

KIC: 9412462 Candidate: 4 of 4 Period: 5.093 d  
KOI: K07171 Corr: No Ephemeris Match



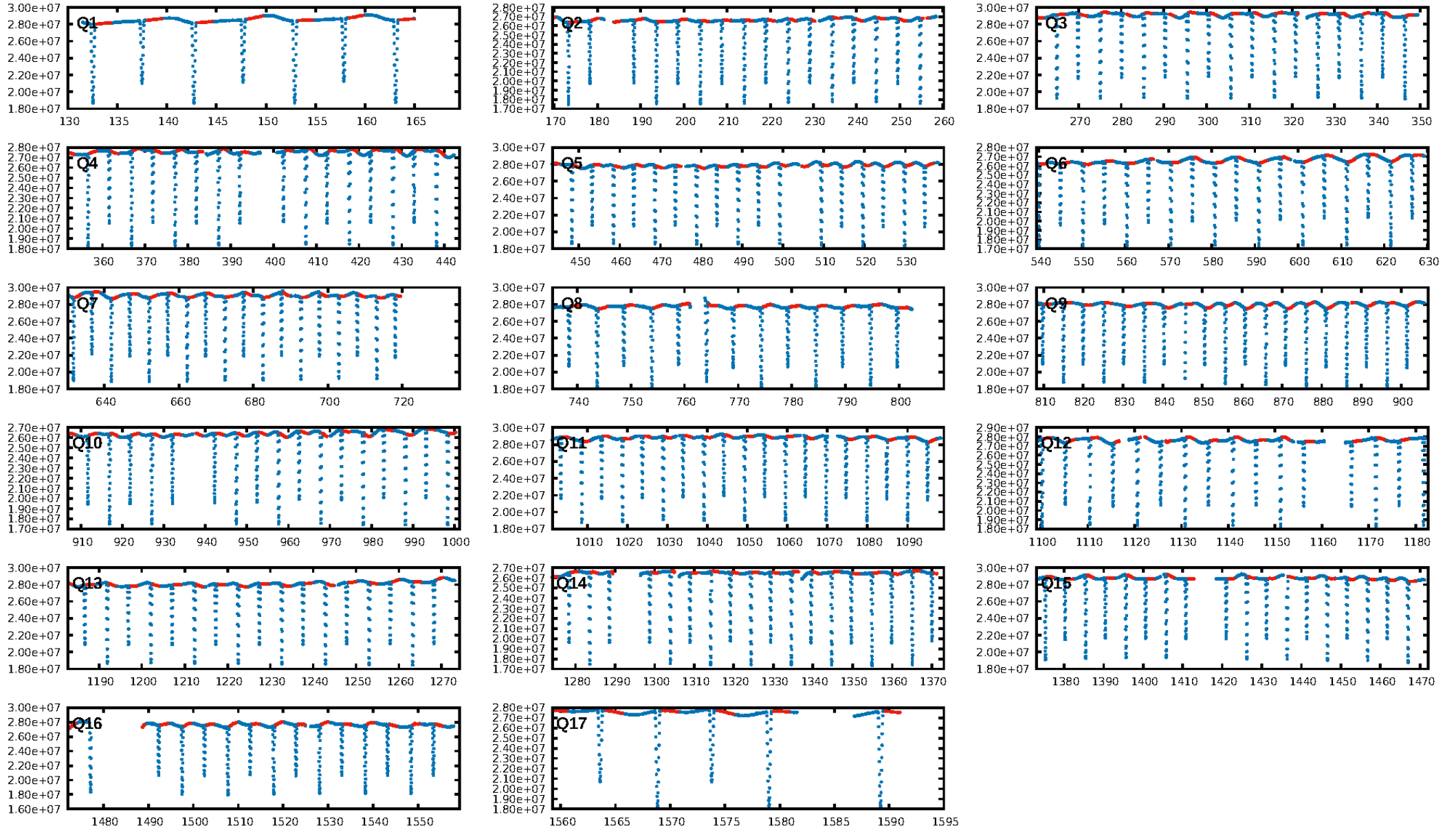
## DV Fit Results:

Period = 5.09337 [0.00003] d  
Epoch = 133.6413 [0.0053] BKJD  
Rp/R\* = 0.0880 [0.0241]  
a/R\* = 1.43 [0.02]  
b = 1.00 [0.05]  
Seff = 236.33 [79.79]  
Teq = 1000 [84] K  
Rp = 8.79 [3.25] Re  
a = 0.0551 [0.0118] AU  
Ag = 16.74 [10.60] [1.49σ]  
Teffp = 3127 [439] K [4.76σ]

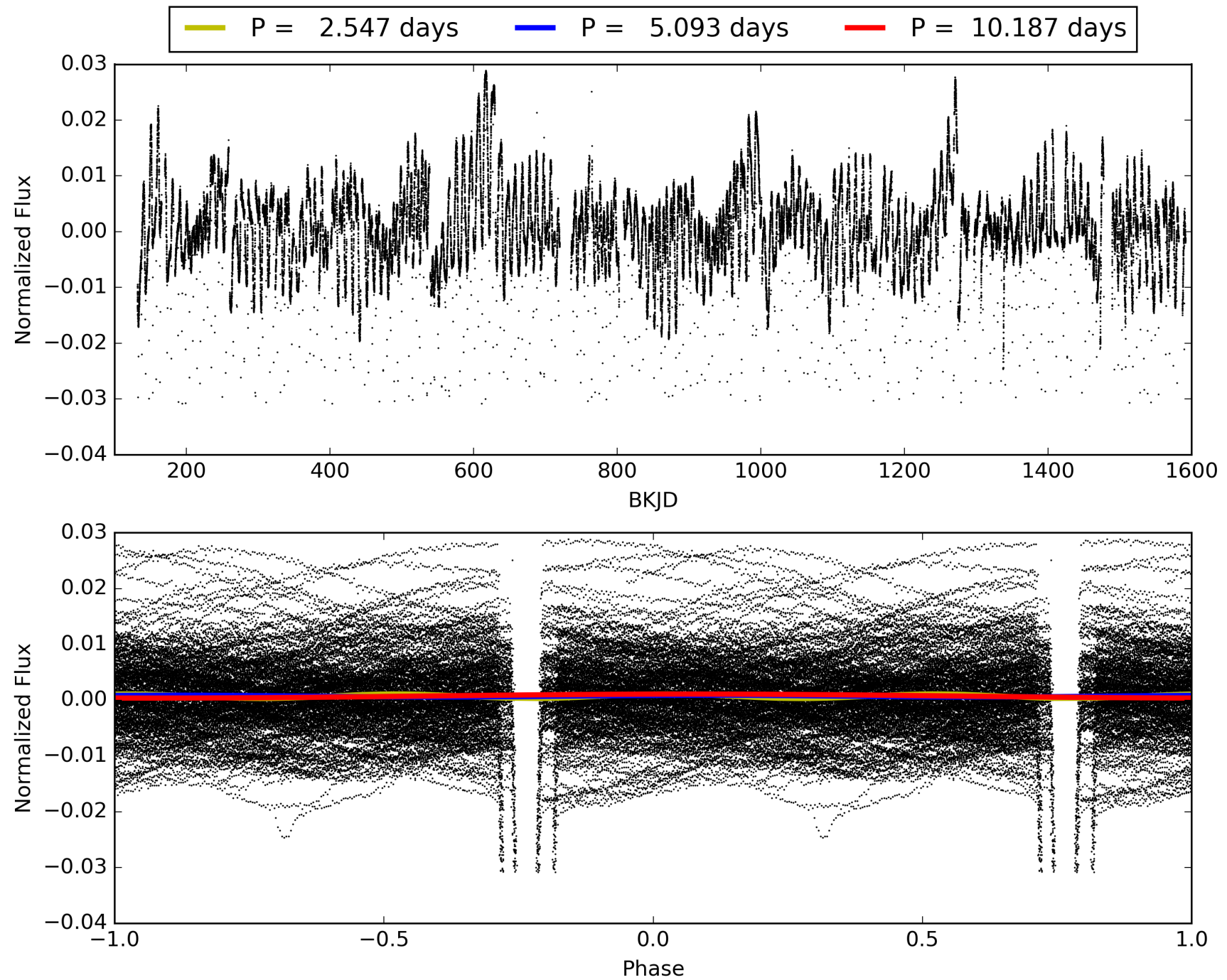
## DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]  
LongPeriod-sig: 100.0% [6.81σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 1.00 [255/255]  
GhostDiagnostic-chr: 3.262  
Centroid-sig: N/A  
Centroid-so: 0.316 arcsec [8.35σ]  
OotOffset-rm: 0.009 arcsec [0.14σ]  
KicOffset-rm: 0.091 arcsec [1.33σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 0.00 [0/17]  
DiffImageOverlap-fno: 0.00 [0/17]

# TCE 009412462-04, PDC Light Curves

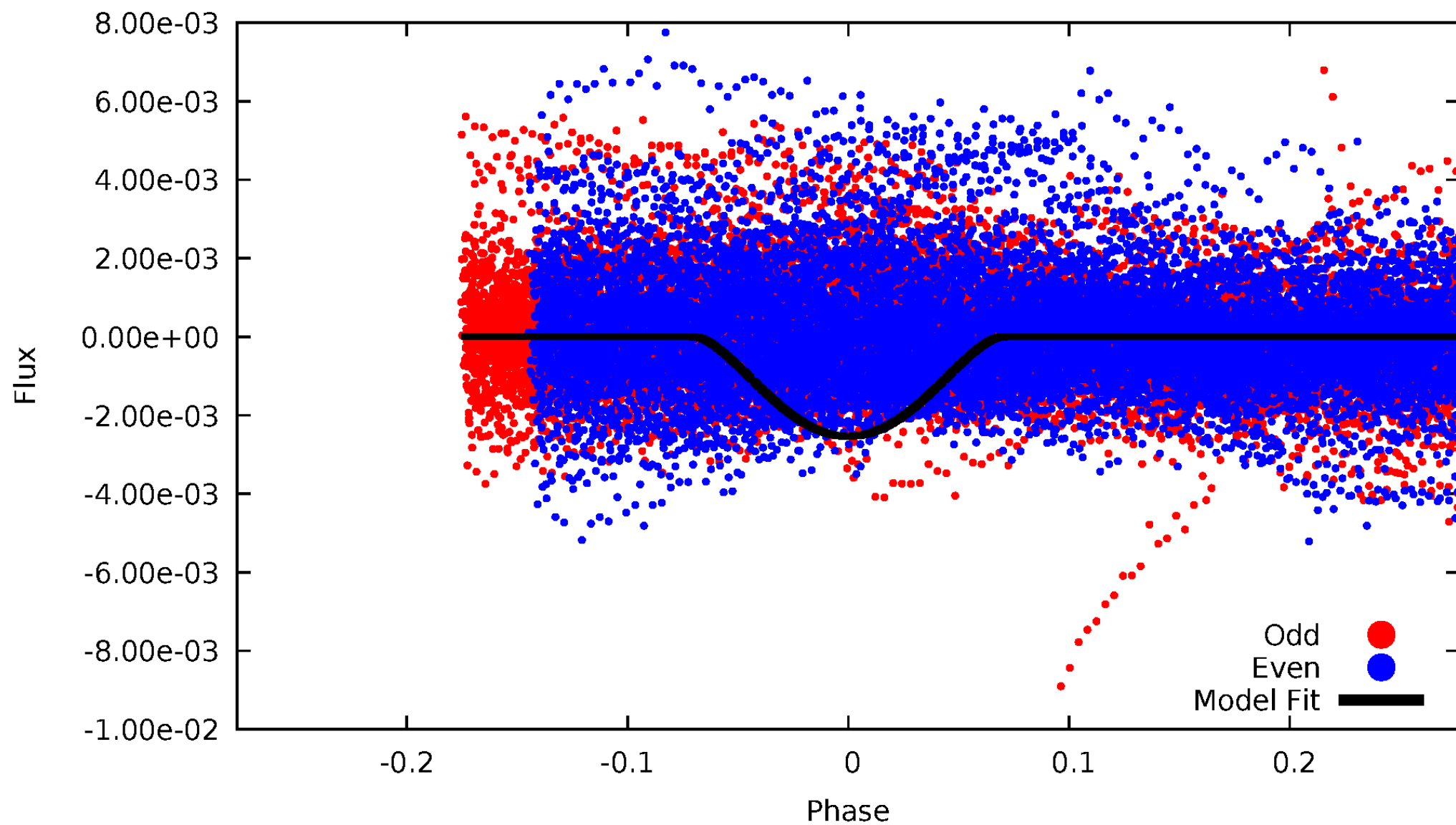


TCE 009412462-04



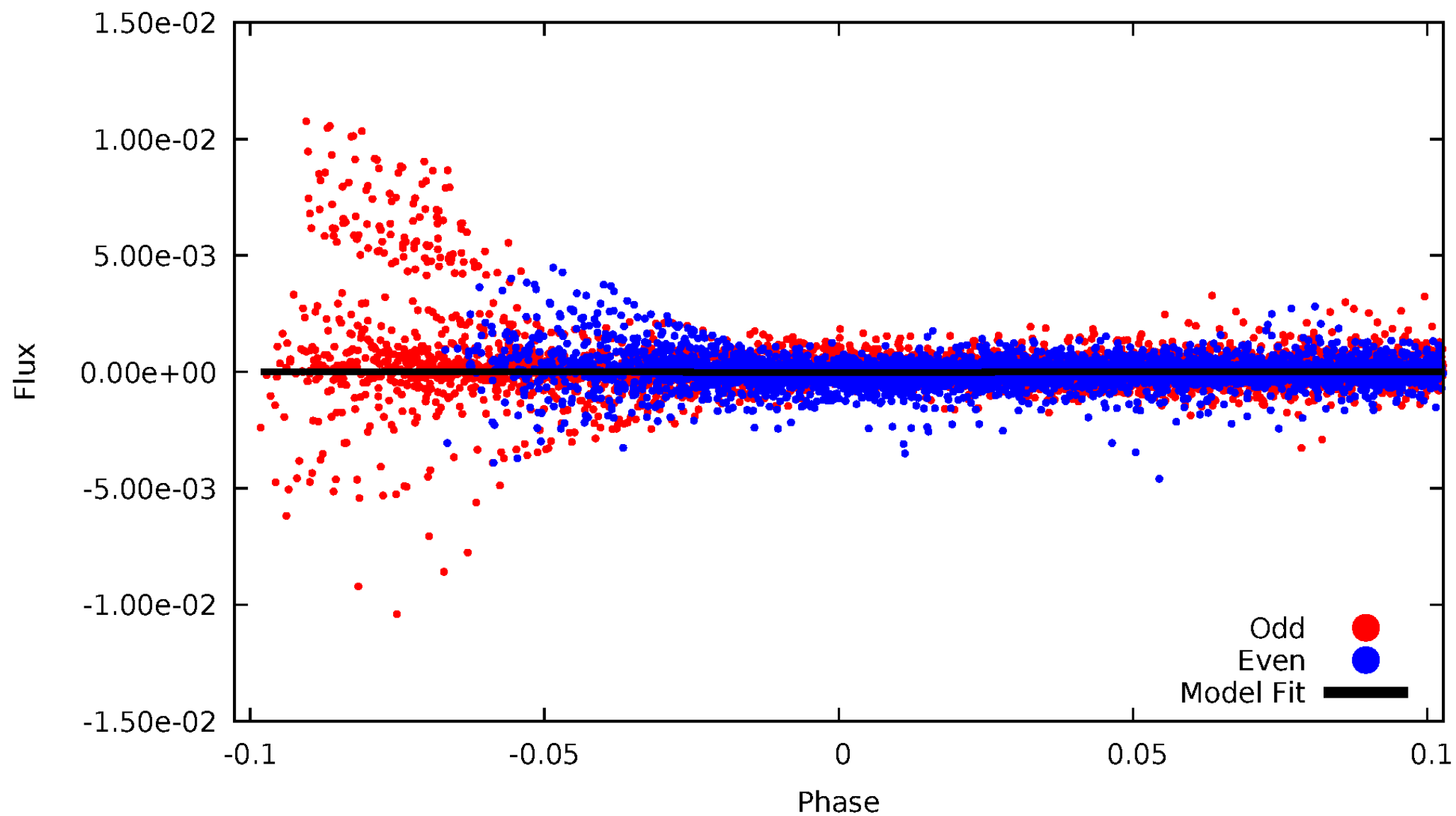
# DV Odd/Even

TCE 009412462-04



# ALT Odd/Even

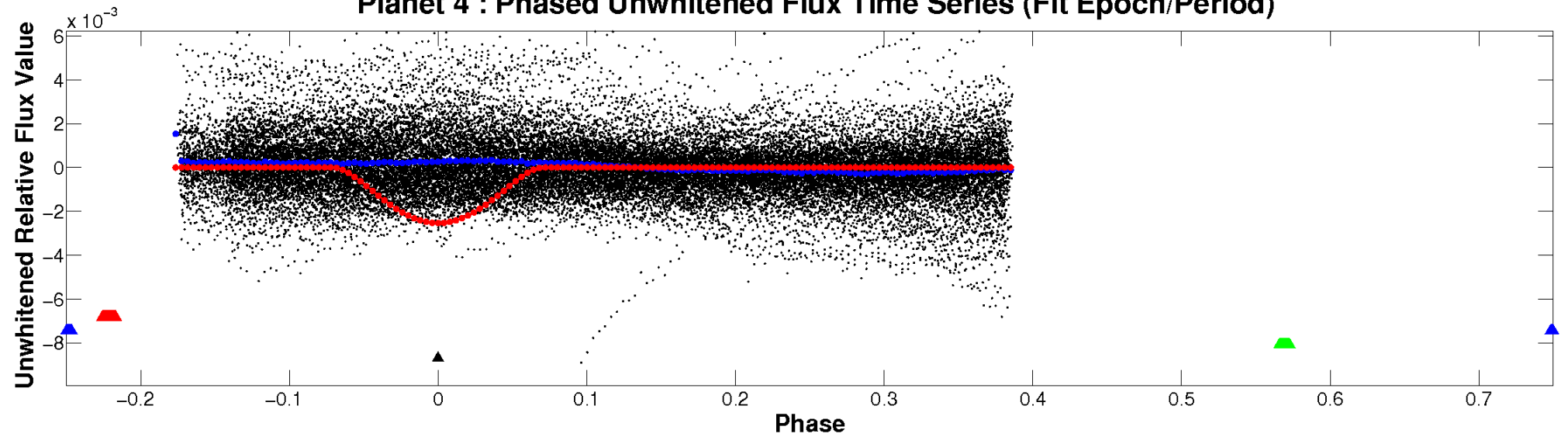
TCE 009412462-04



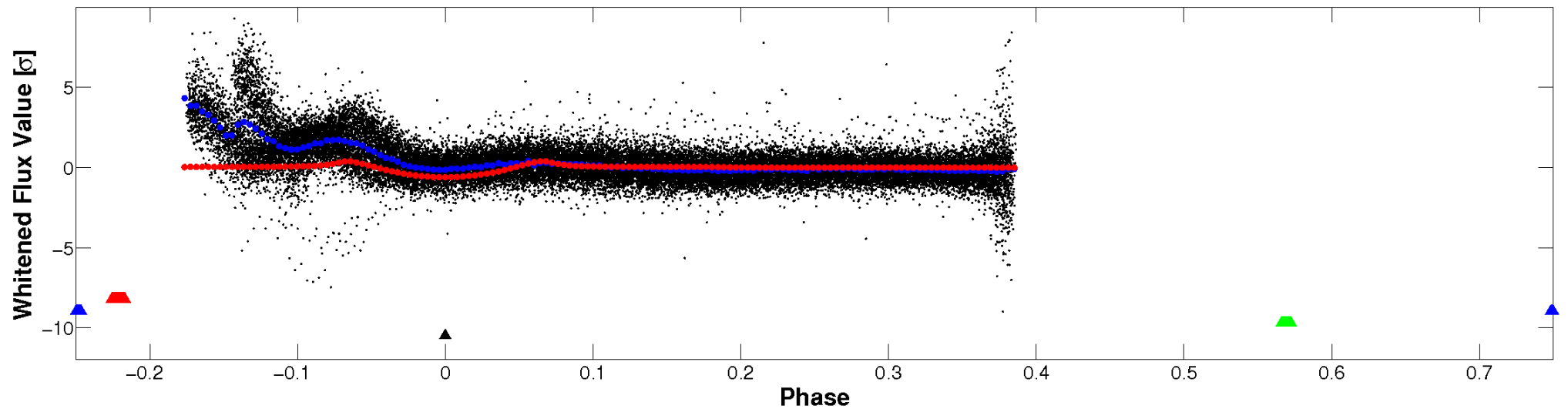


# Non-Whitened Vs. Whitened Light Curve

## Planet 4 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

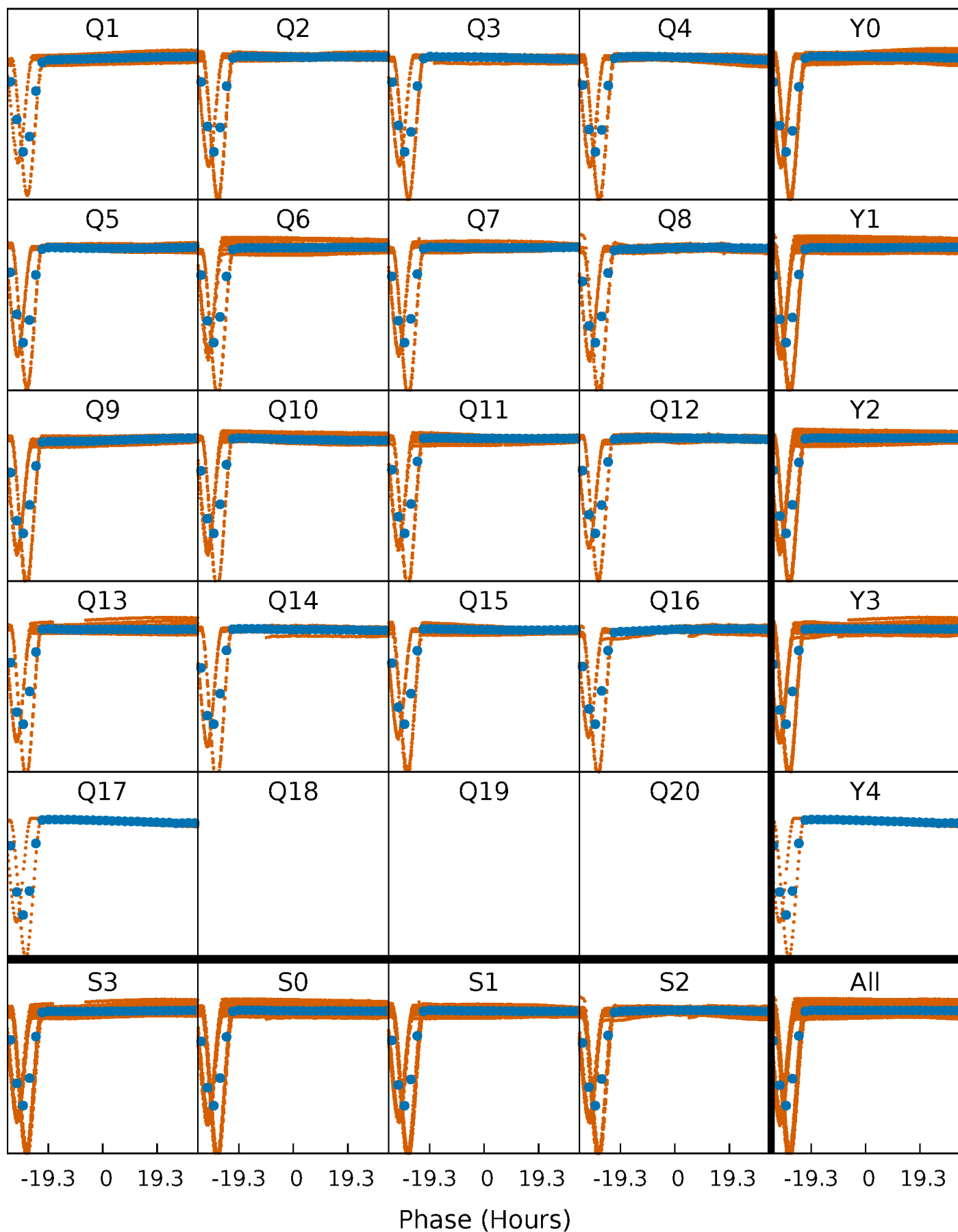


## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

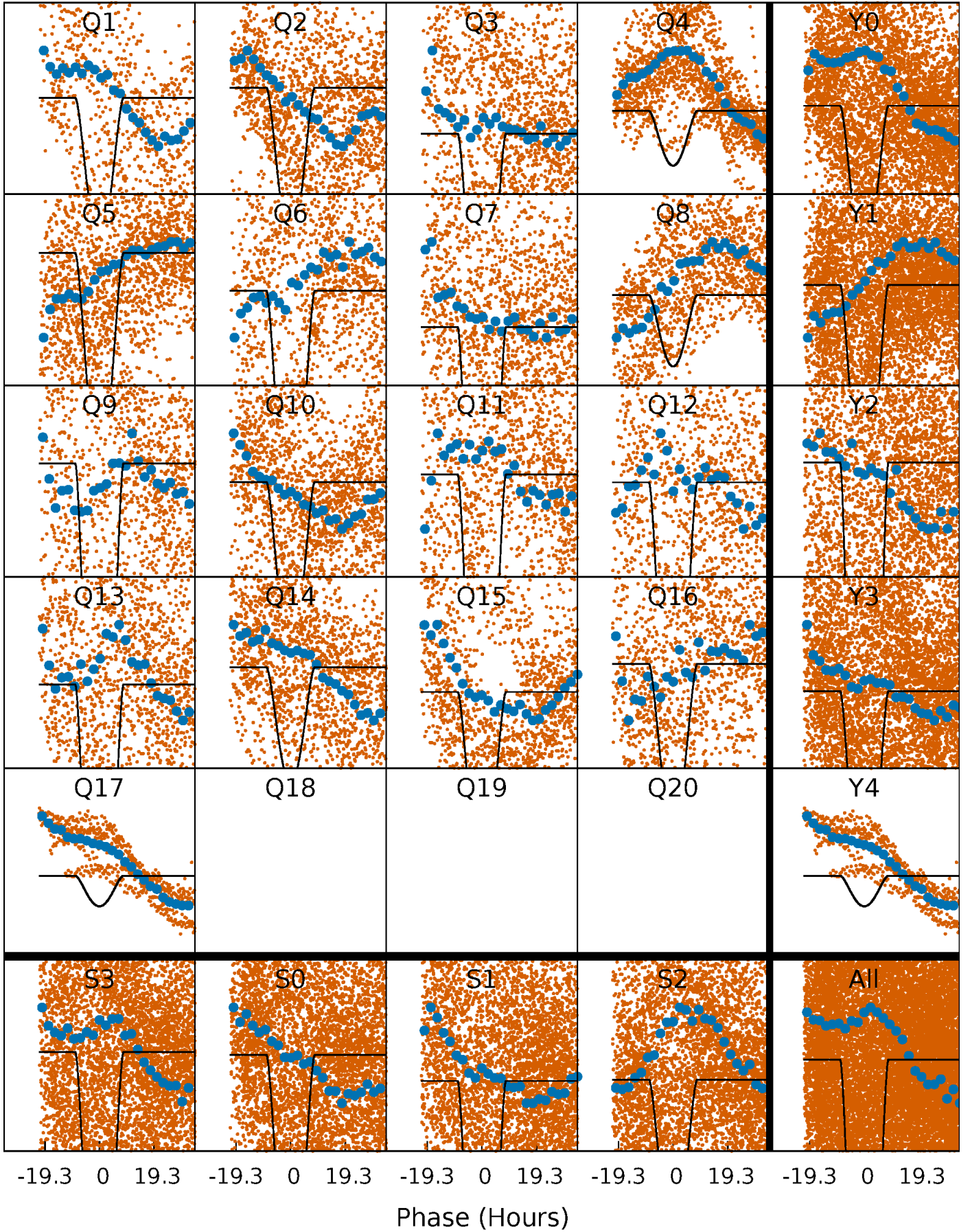
TCE 009412462-04   P= 5.093374 Days    $T_0=133.641277$  (BKJD)





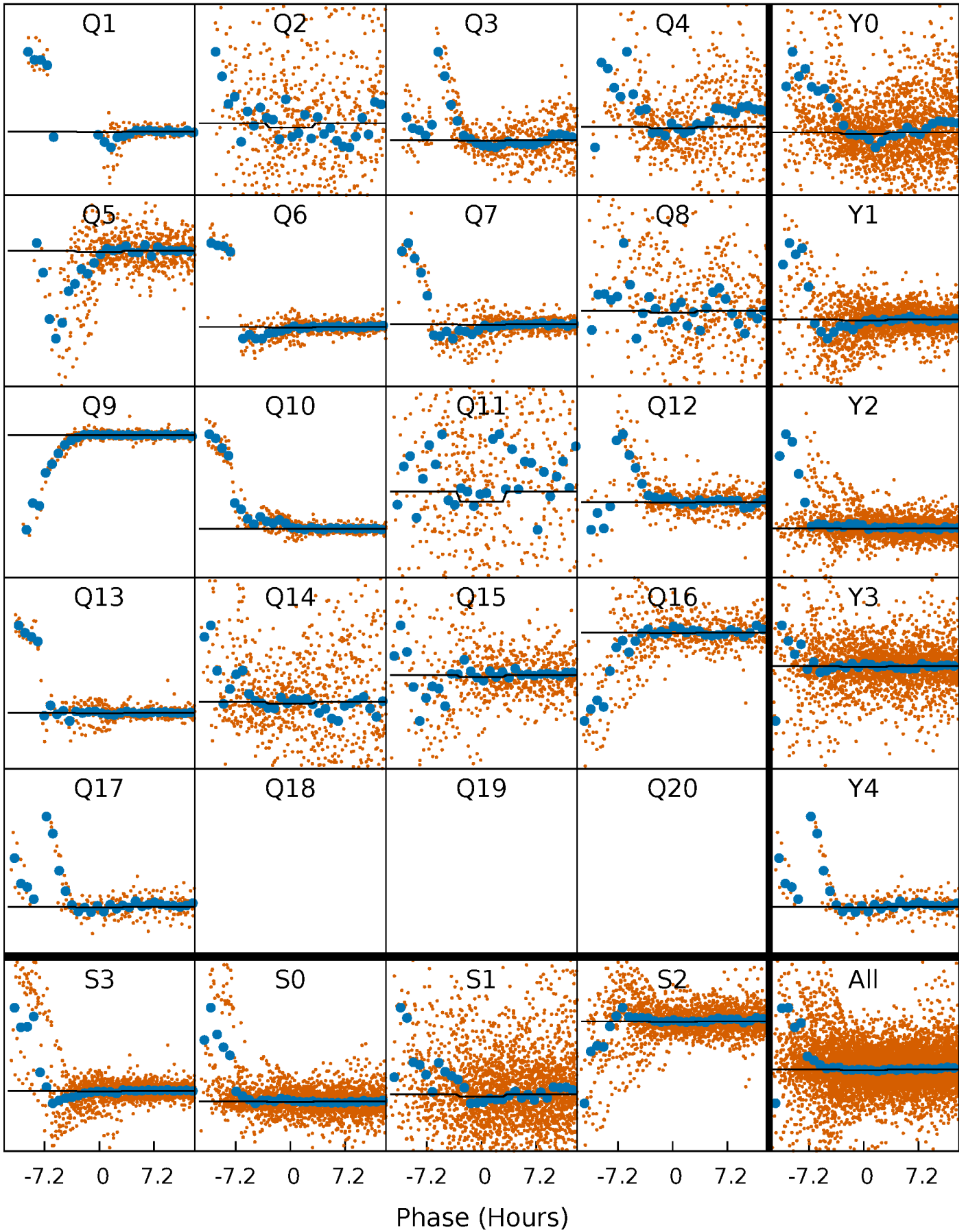
# DV Quarter-Phased Transit Curves

TCE 009412462-04   P= 5.093374 Days    $T_0=133.641277$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

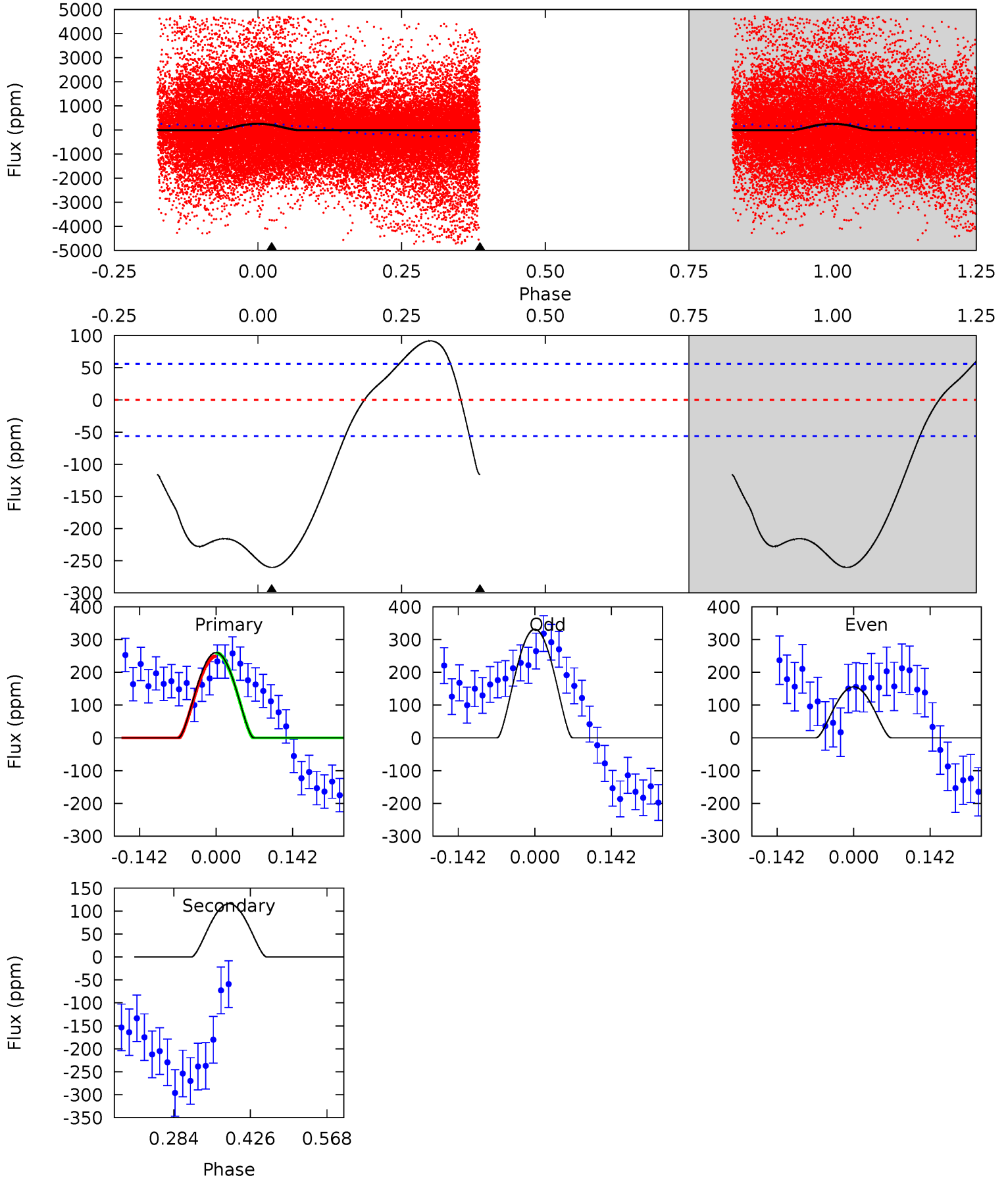
TCE 009412462-04   P= 5.093549 Days    $T_0=133.201369$  (BKJD)



# DV Model-Shift Uniqueness Test

009412462-04, P = 5.093374 Days, E = 128.547903 Days

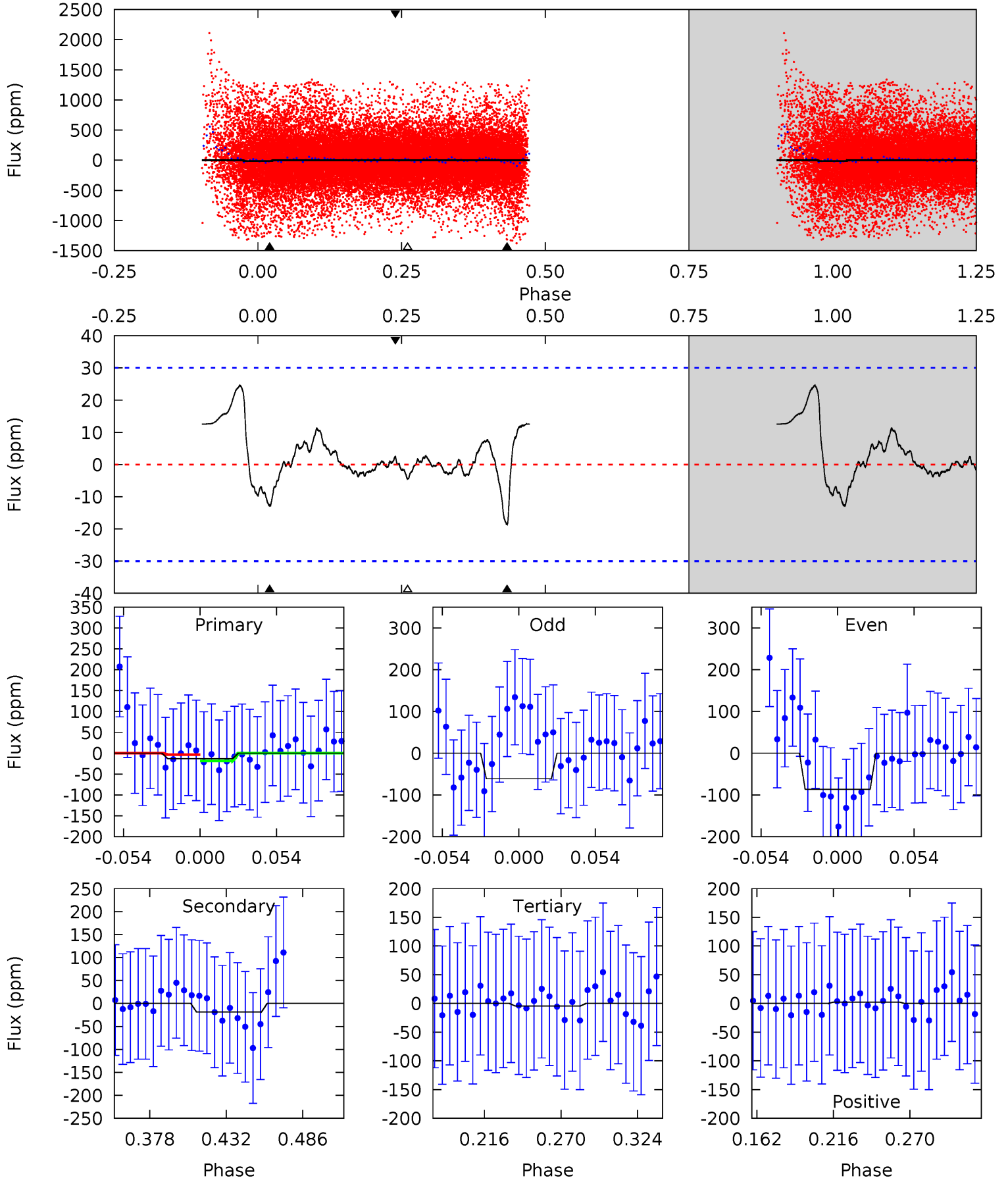
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
20.9	9.30	0	0	4.49	1.47	7.66	20.9	20.9	9.30	9.30	6.51	-25.4	0.26	0.36



# Alt Model-Shift Uniqueness Test

009412462-04, P = 5.093549 Days, E = 128.107820 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
2.00	2.91	0.70	0.39	4.69	1.93	0.77	1.30	1.61	2.21	2.52	2.02	23.0	0.57	0.63



### Stellar Parameters For KIC 009412462

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5557^{+166}_{-149}$	$4.448^{+0.108}_{-0.175}$	$-0.120^{+0.300}_{-0.300}$	$0.916^{+0.228}_{-0.123}$	$0.859^{+0.111}_{-0.074}$	$1.575^{+0.661}_{-0.715}$
	+3%/-3%	+2%/-4%	+250%/-250%	+25%/-13%	+13%/-9%	+42%/-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 009412462-04 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-116 \pm 12$	$9.02^{+2.60}_{-2.64}$	$1410^{+92}_{-80}$	$2677^{+284}_{-196}$	$2.413^{+2.479}_{-0.976}$
Alt.	$-19 \pm 6$	$1.85^{+2.05}_{-1.22}$	$1406^{+94}_{-69}$	$3214^{+1500}_{-623}$	$8.753^{+67.531}_{-6.810}$

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

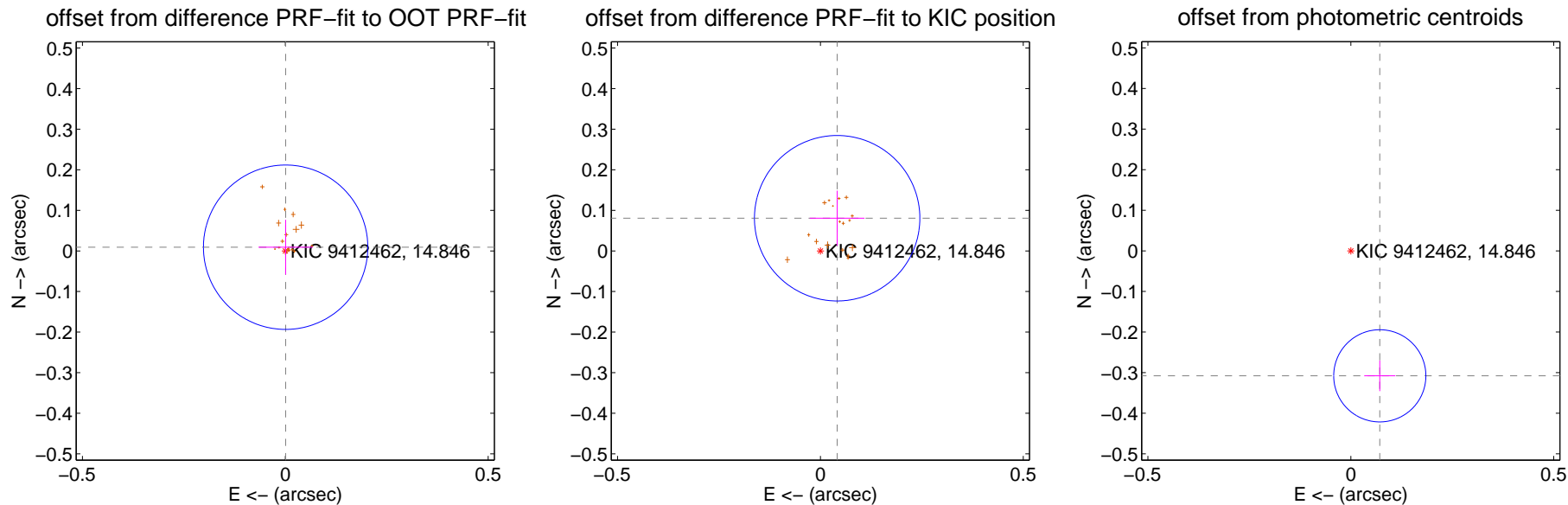
## DV Centroid Data

Supplemental centroid analysis for 009412462-04. Kepler magnitude: 14.85. Transit SNR 37.54

There are 0 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.07 arcsec

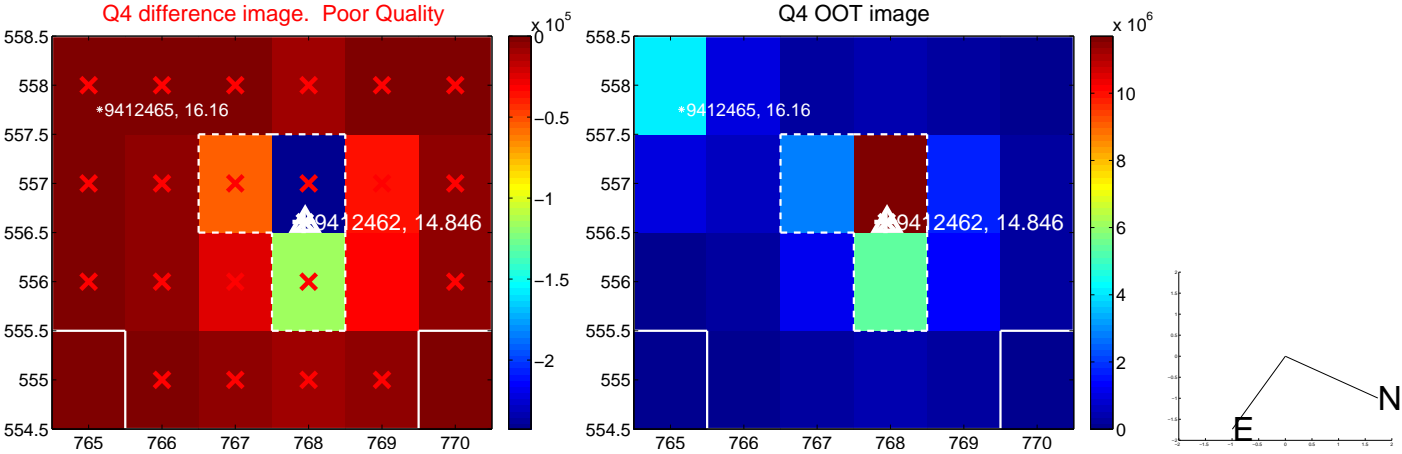
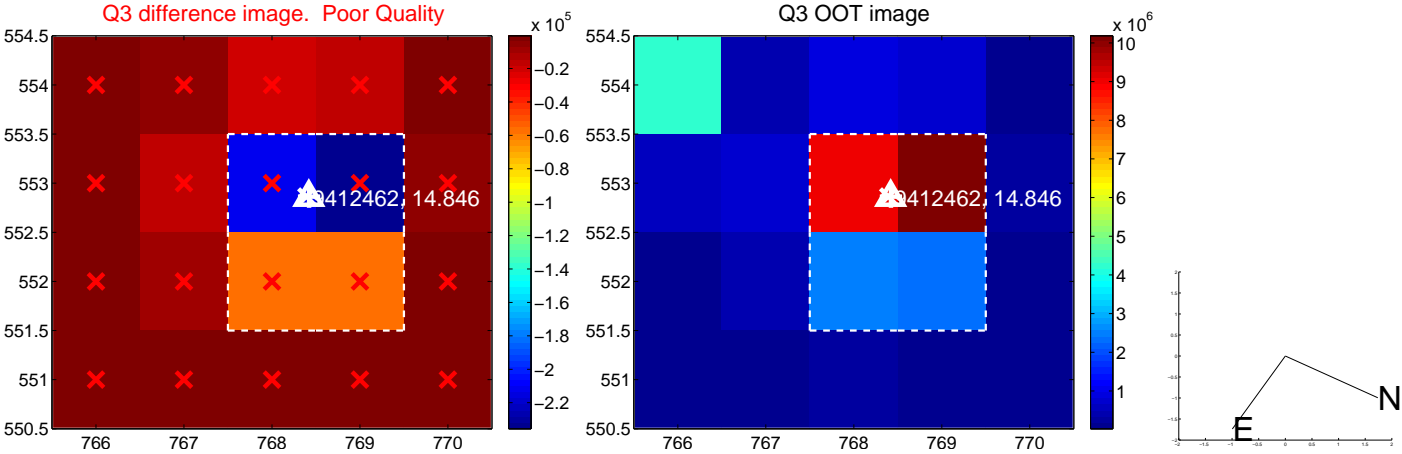
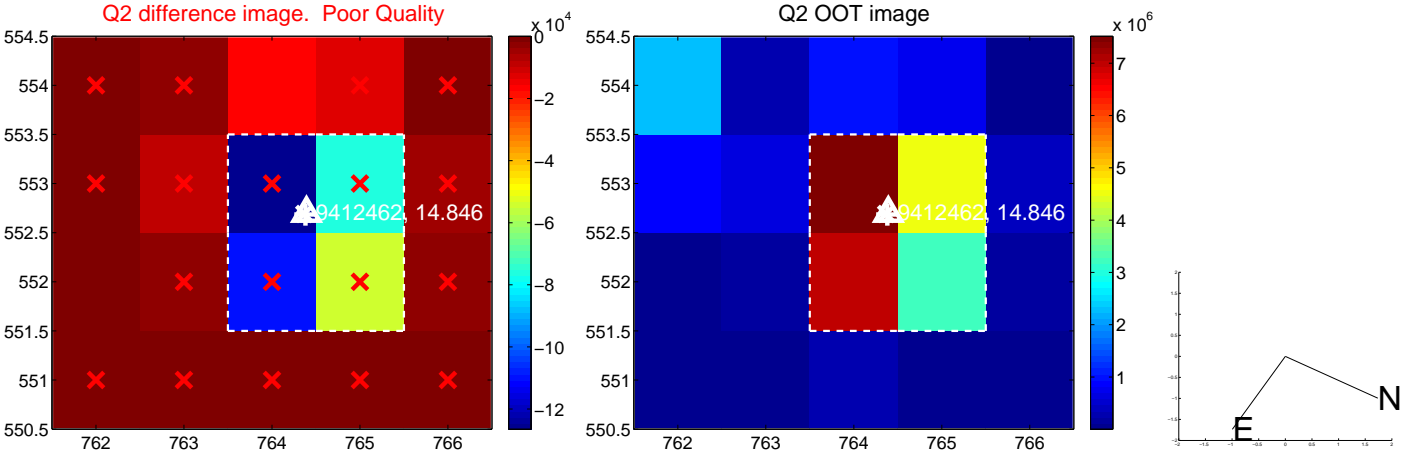
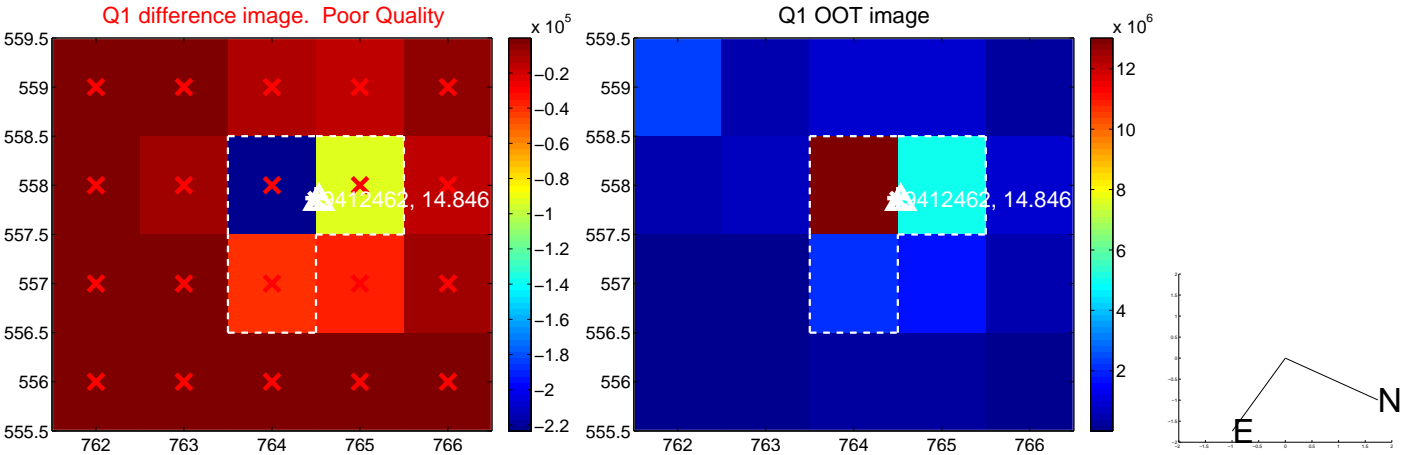
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.009 \pm 0.068$	0.14	$-0.001 \pm 0.067$	$0.009 \pm 0.068$
PRF-fit source offset from KIC position	$0.091 \pm 0.068$	1.33	$-0.041 \pm 0.067$	$0.081 \pm 0.068$
photometric centroid source offset	$0.32 \pm 0.04$	8.35	$-0.07 \pm 0.04$	$-0.31 \pm 0.04$



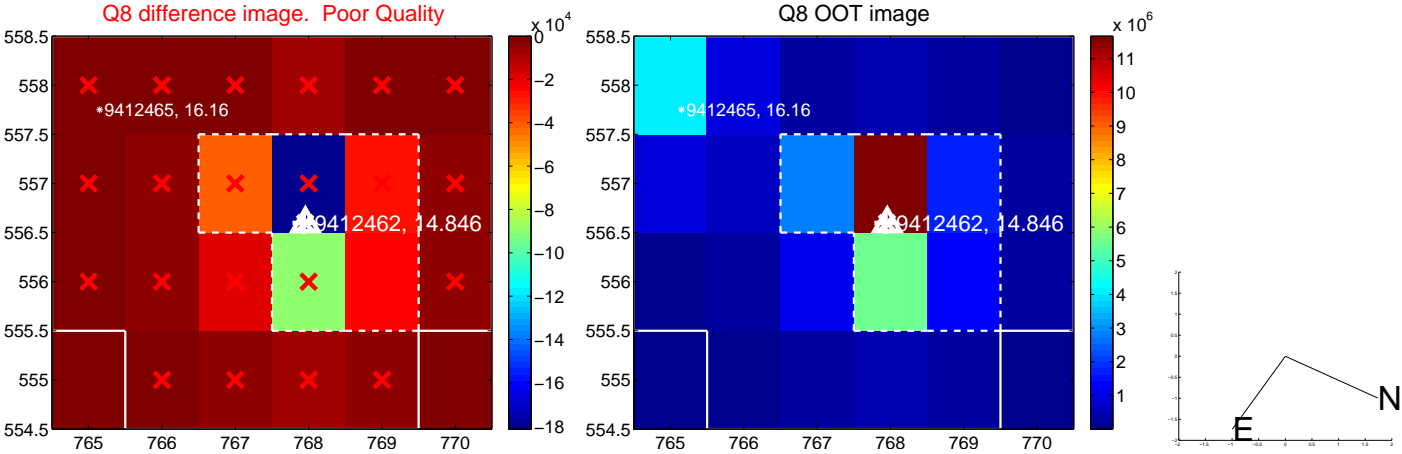
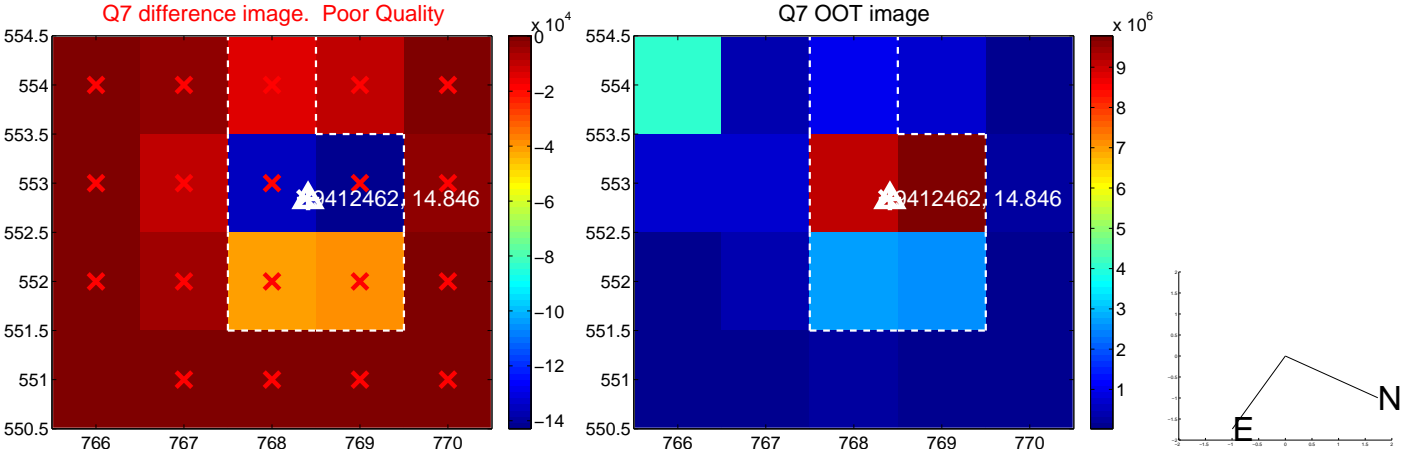
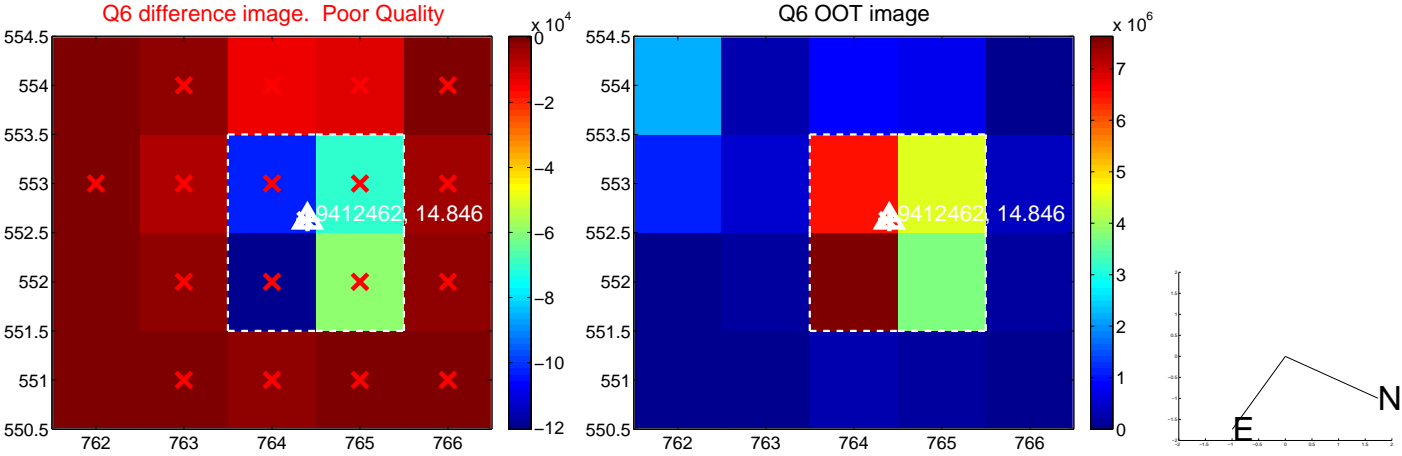
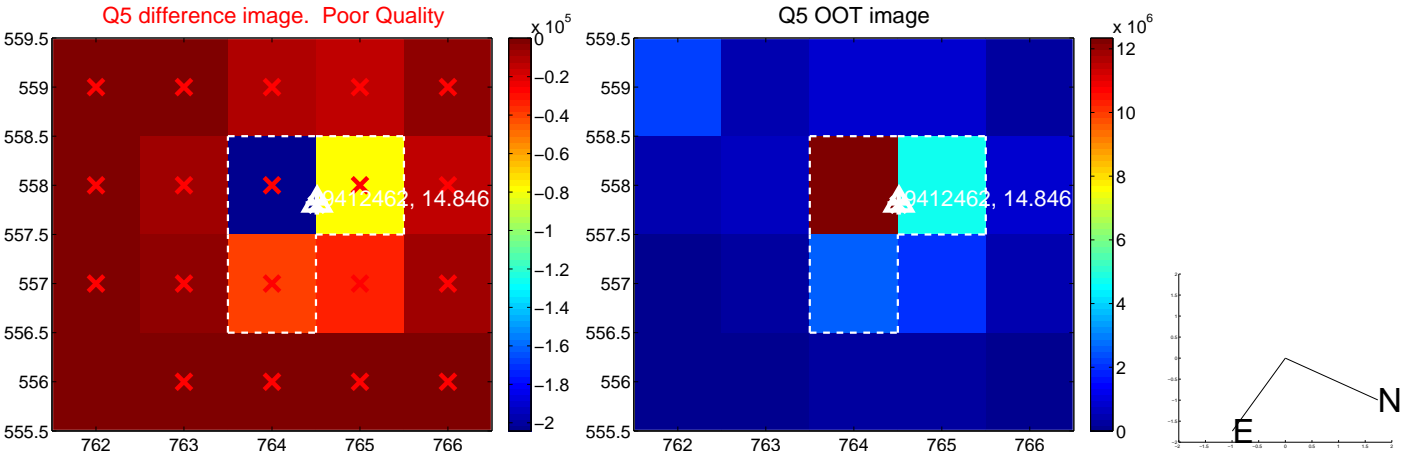
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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



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

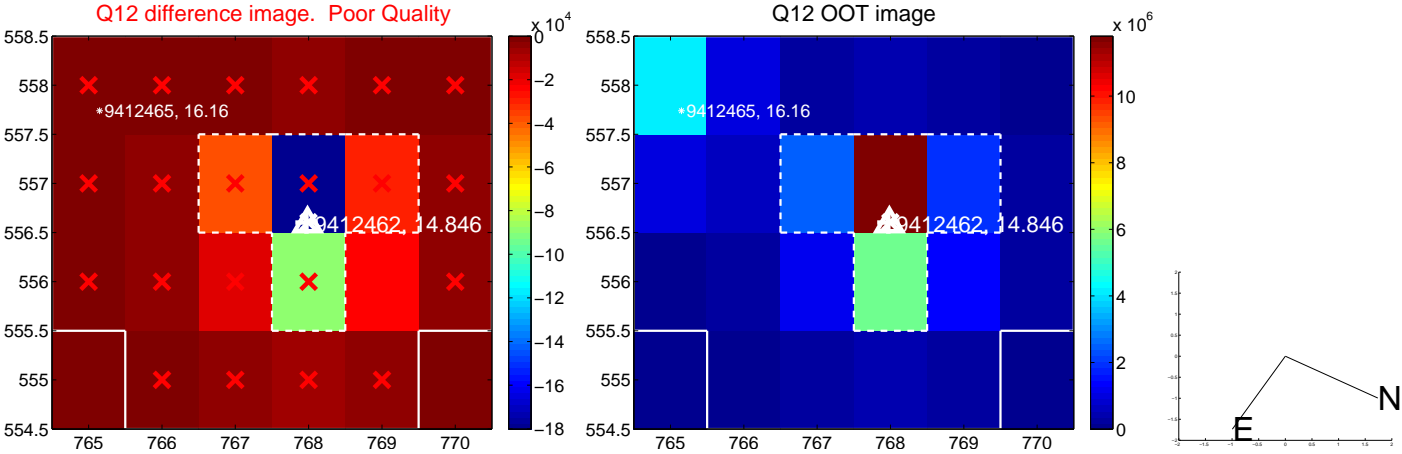
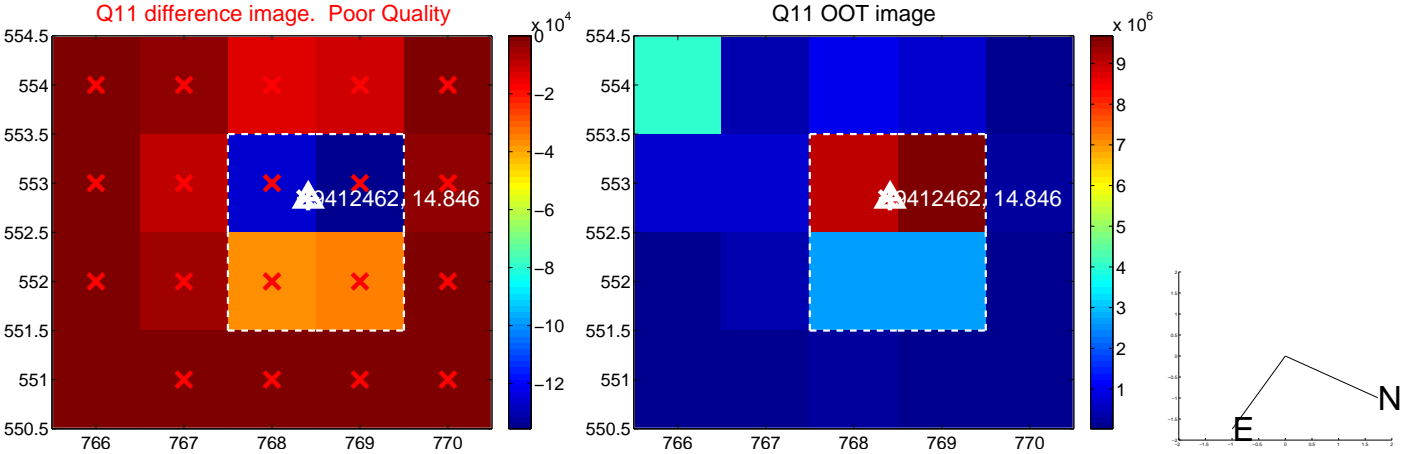
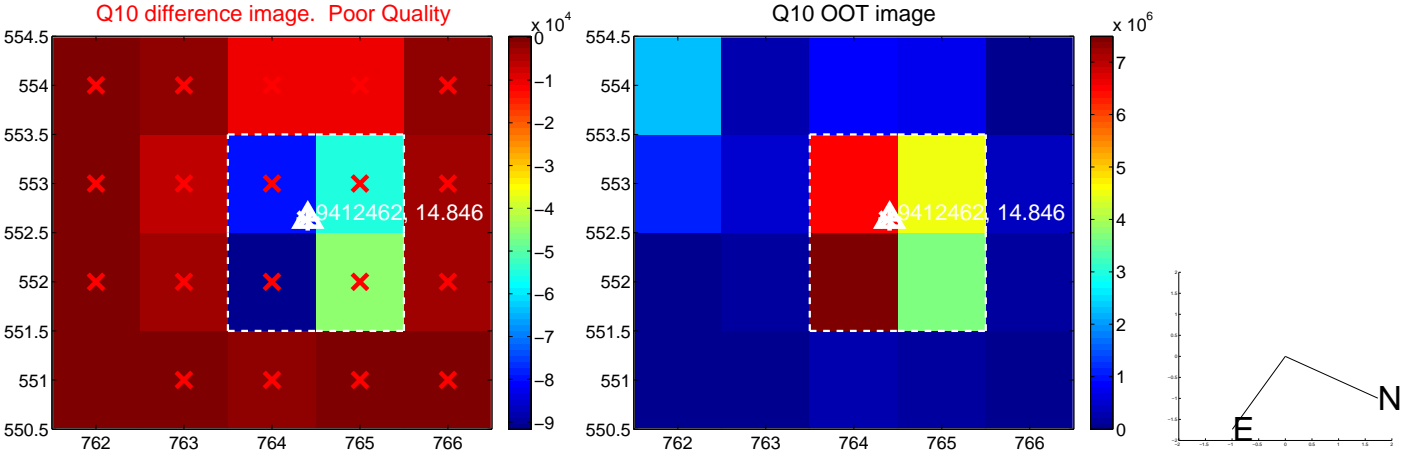
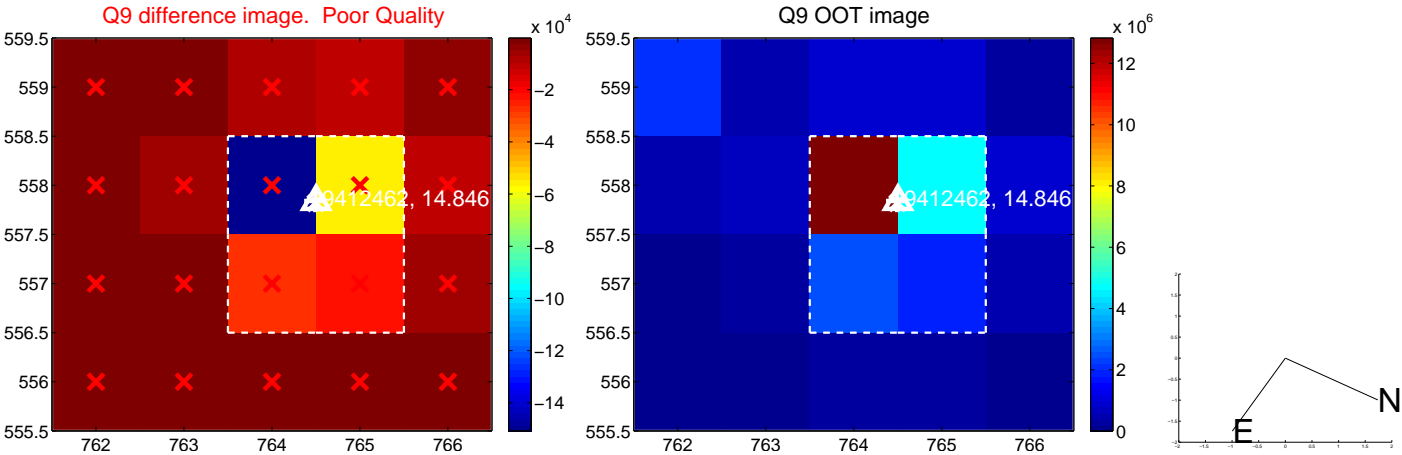


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

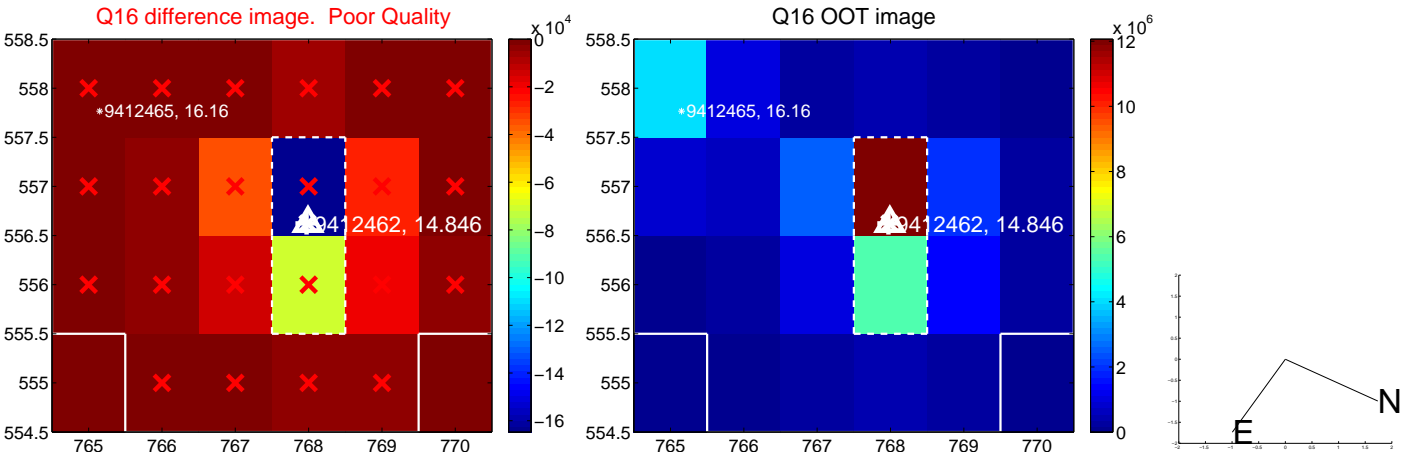
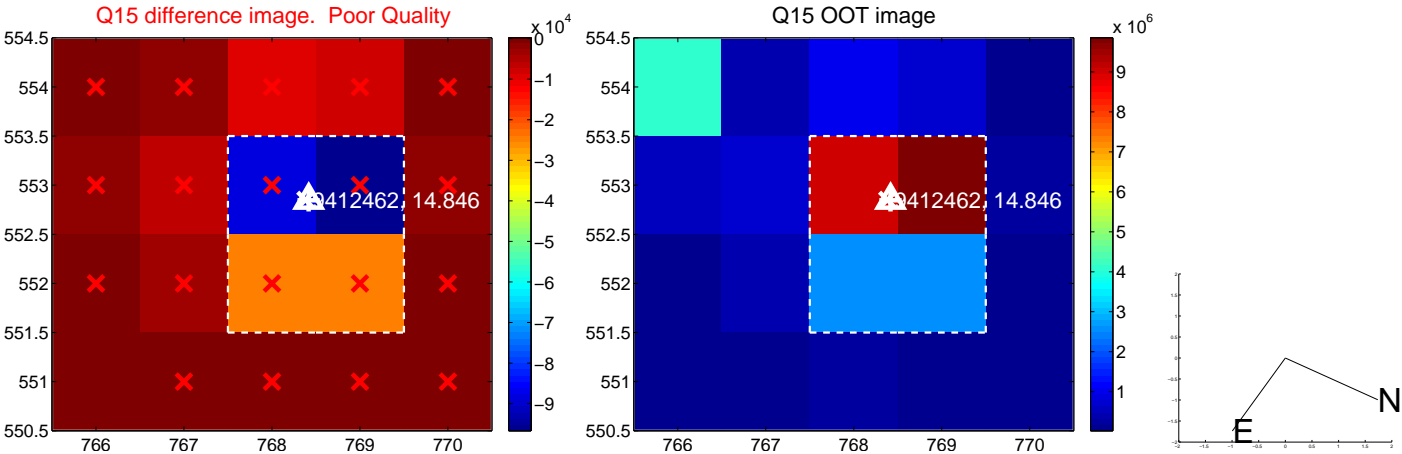
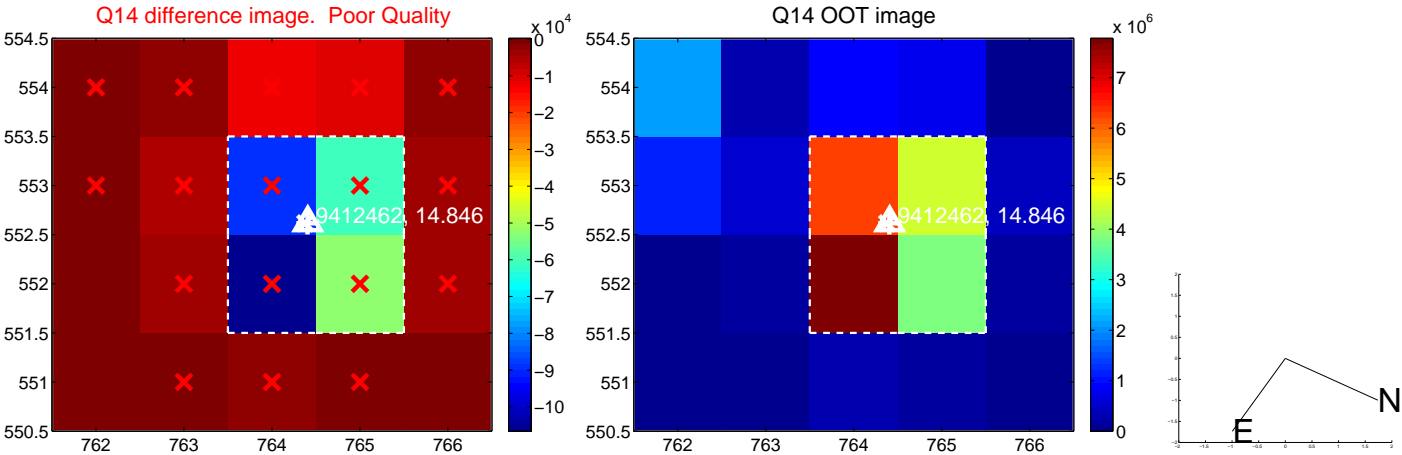
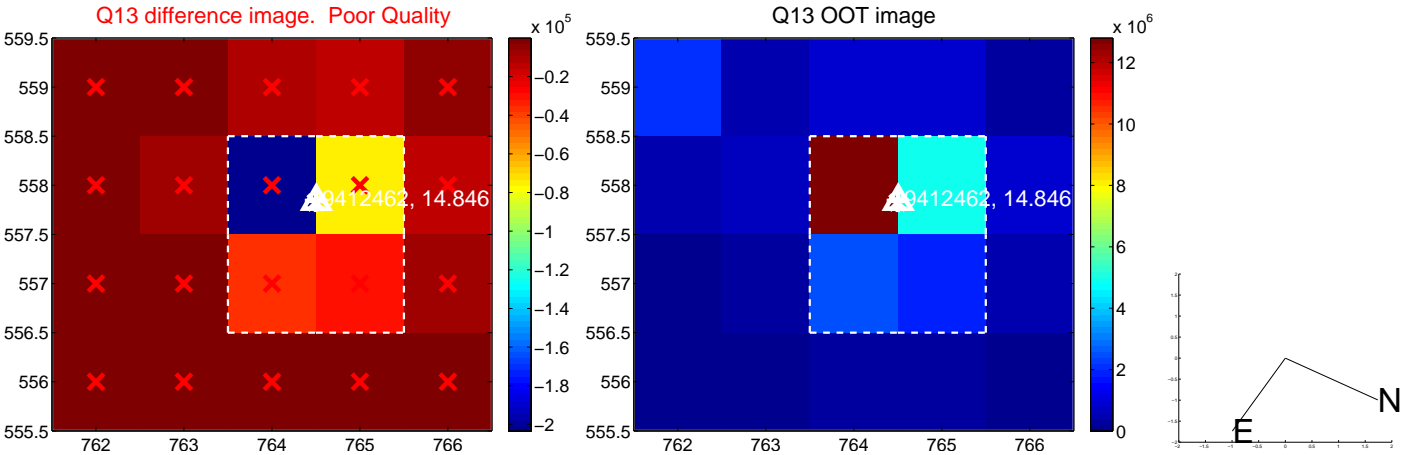




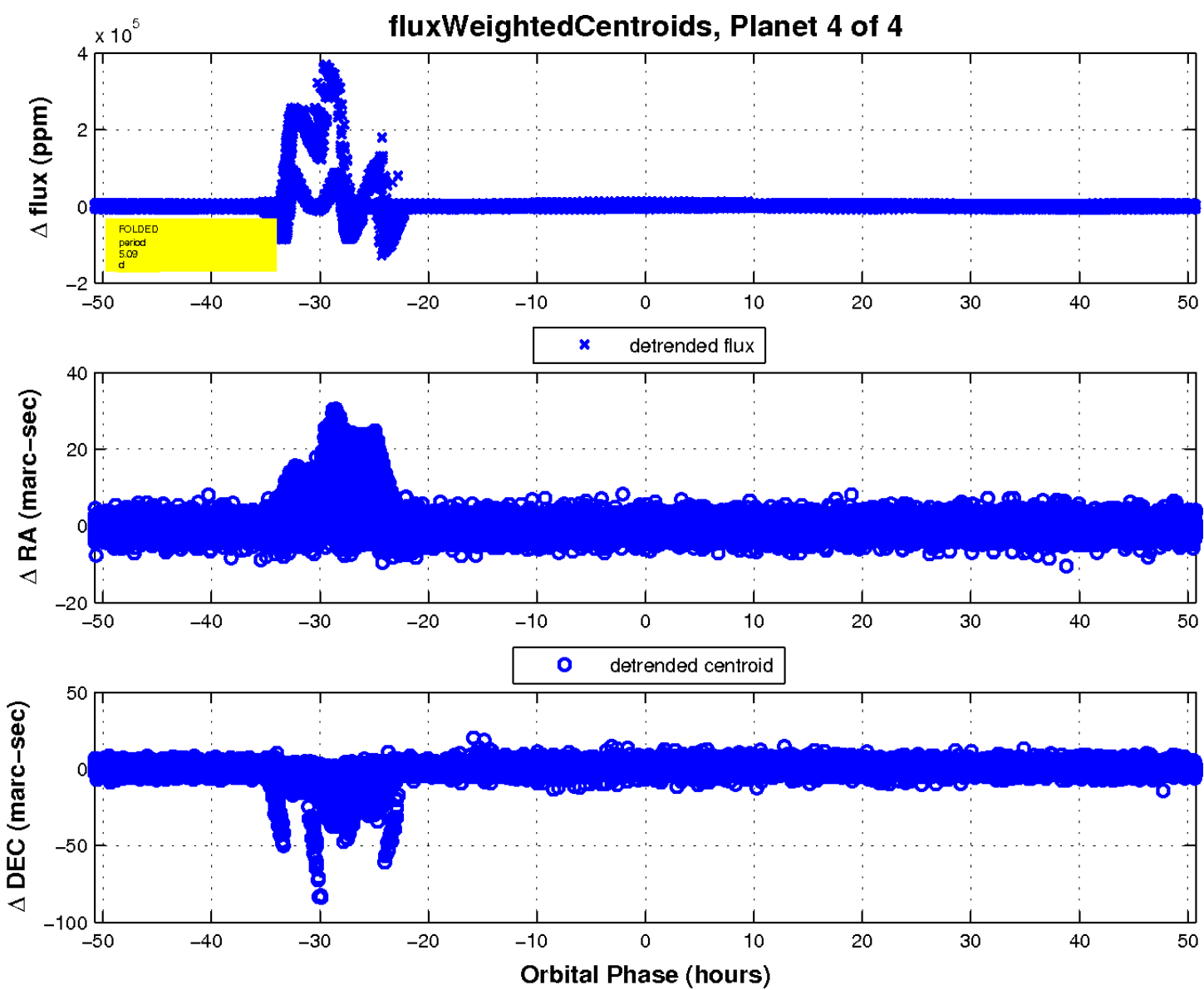
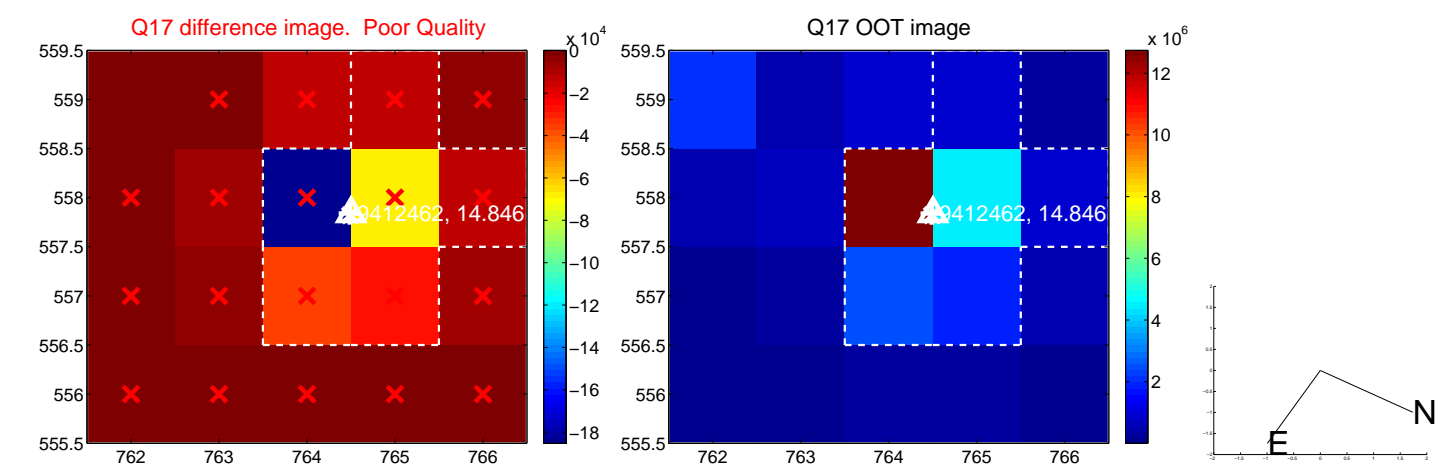
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

