

# KIC 003647812

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003647812-01	OBS	No	1.025744	131.805103	48.0	4.726	7.9	8.2	0.88	5534	0.62	1755.22
003647812-02	OBS	No	108.387733	214.706028	405.5	11.124	15.8	2.7	0.88	5534	1.81	3.51
003647812-03	OBS	No	122.338718	194.660074	645.6	1.634	13.3	3.5	0.88	5534	2.46	2.99
003647812-04	OBS	No	117.477275	177.043792	1139.6	6.892	13.3	7.2	0.88	5534	4.16	3.16
003647812-05	OBS	No	215.837817	173.340947	2077.4	38.867	15.1	6.2	0.88	5534	4.50	1.40
003647812-06	OBS	No	113.689287	146.161820	1122.9	12.795	10.8	6.5	0.88	5534	3.74	3.30
003647812-07	OBS	No	325.149215	316.828480	2109.5	7.212	11.6	9.2	0.88	5534	5.07	0.81
003647812-08	OBS	No	323.187877	145.543042	4343.2	27.204	11.6	7.9	0.88	5534	6.94	0.82

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003647812-01	OBS	FP	0.00	1	0	0	0	LPP_DV
003647812-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS
003647812-03	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
003647812-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
003647812-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—INCONSISTENT_TRANS—HALO_GHOST
003647812-06	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—INCONSISTENT_TRANS—HALO_GHOST
003647812-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—ALL_TRANS_CHASES—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—SAME_NTL_PERIOD—CENT_FEW_DIFFS
003647812-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—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.

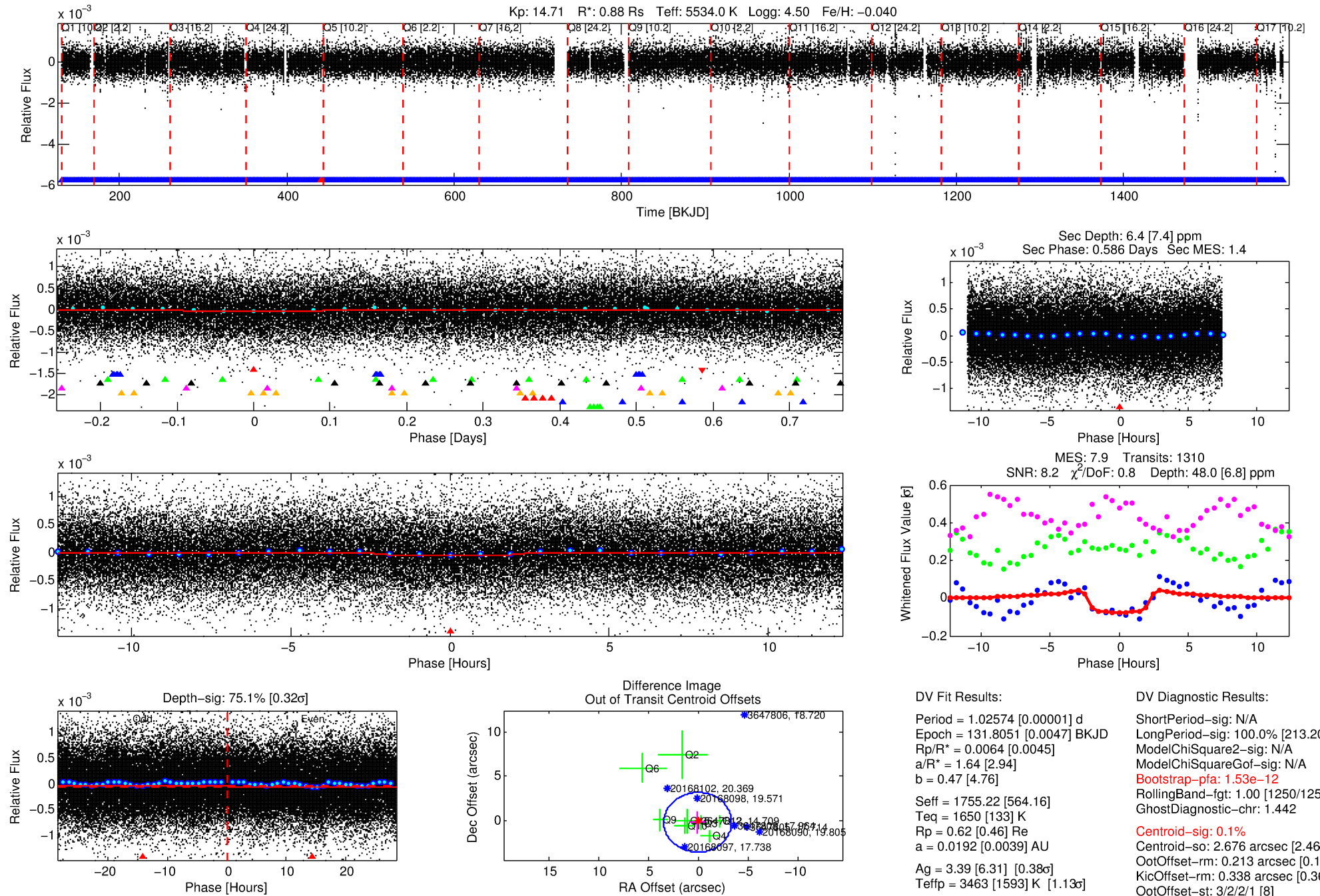
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 003647812-01

No Significant Match Found

# DV One-Page Summary

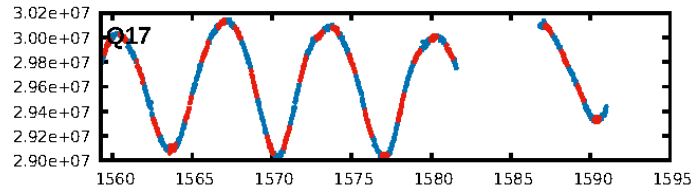
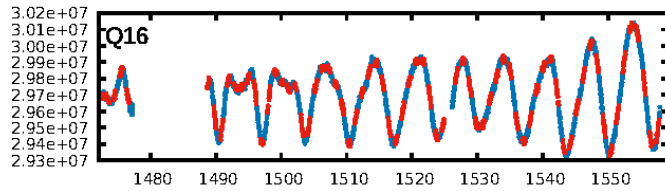
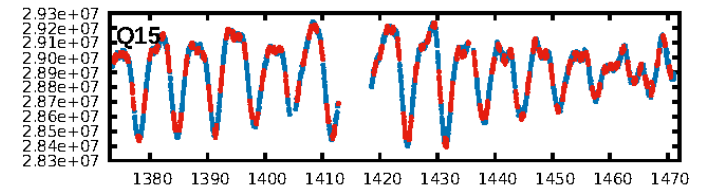
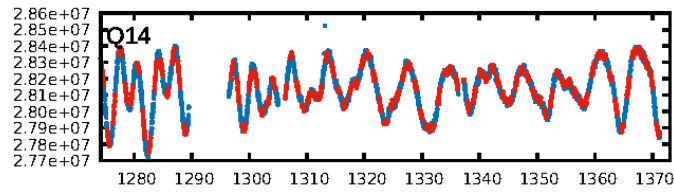
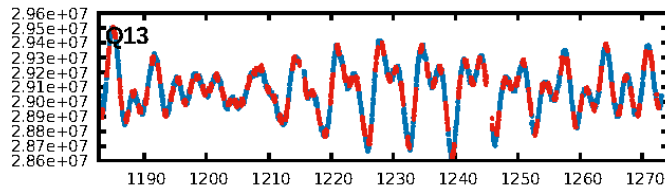
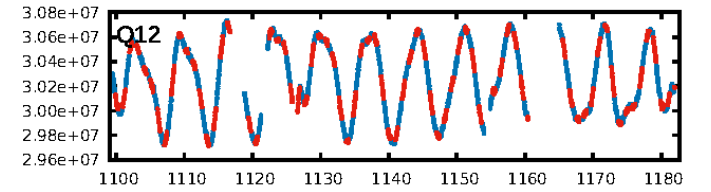
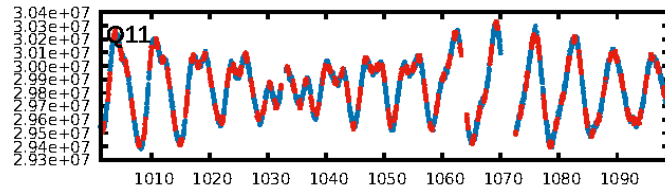
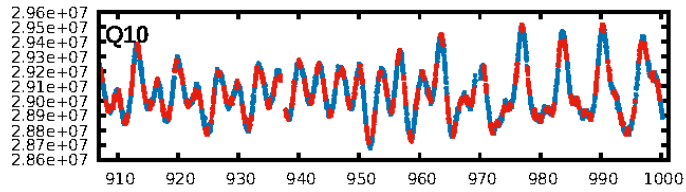
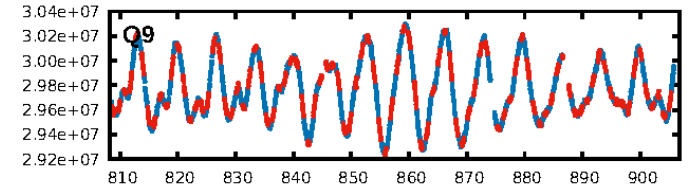
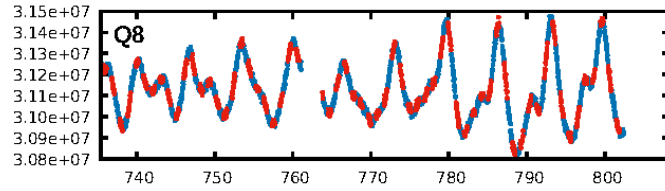
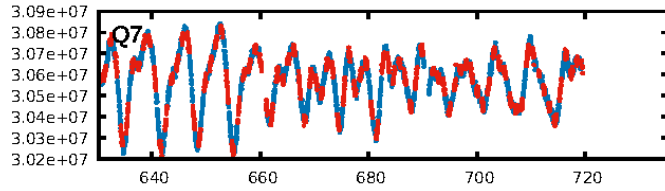
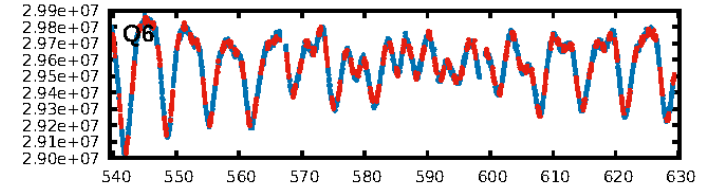
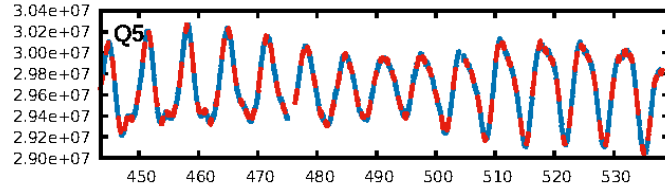
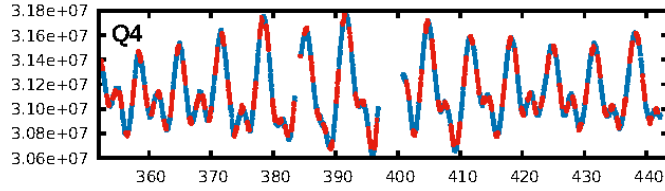
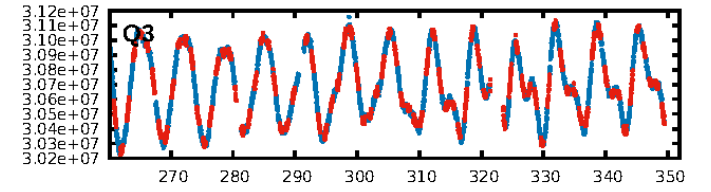
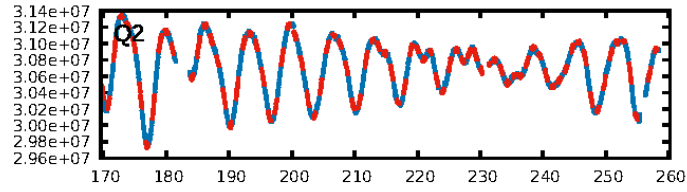
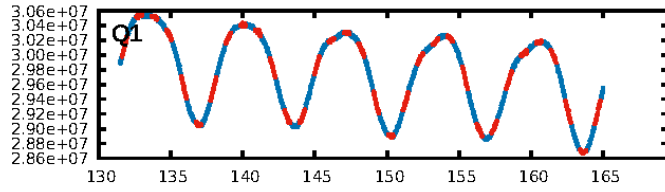
KIC: 3647812 Candidate: 1 of 9 Period: 1.026 d



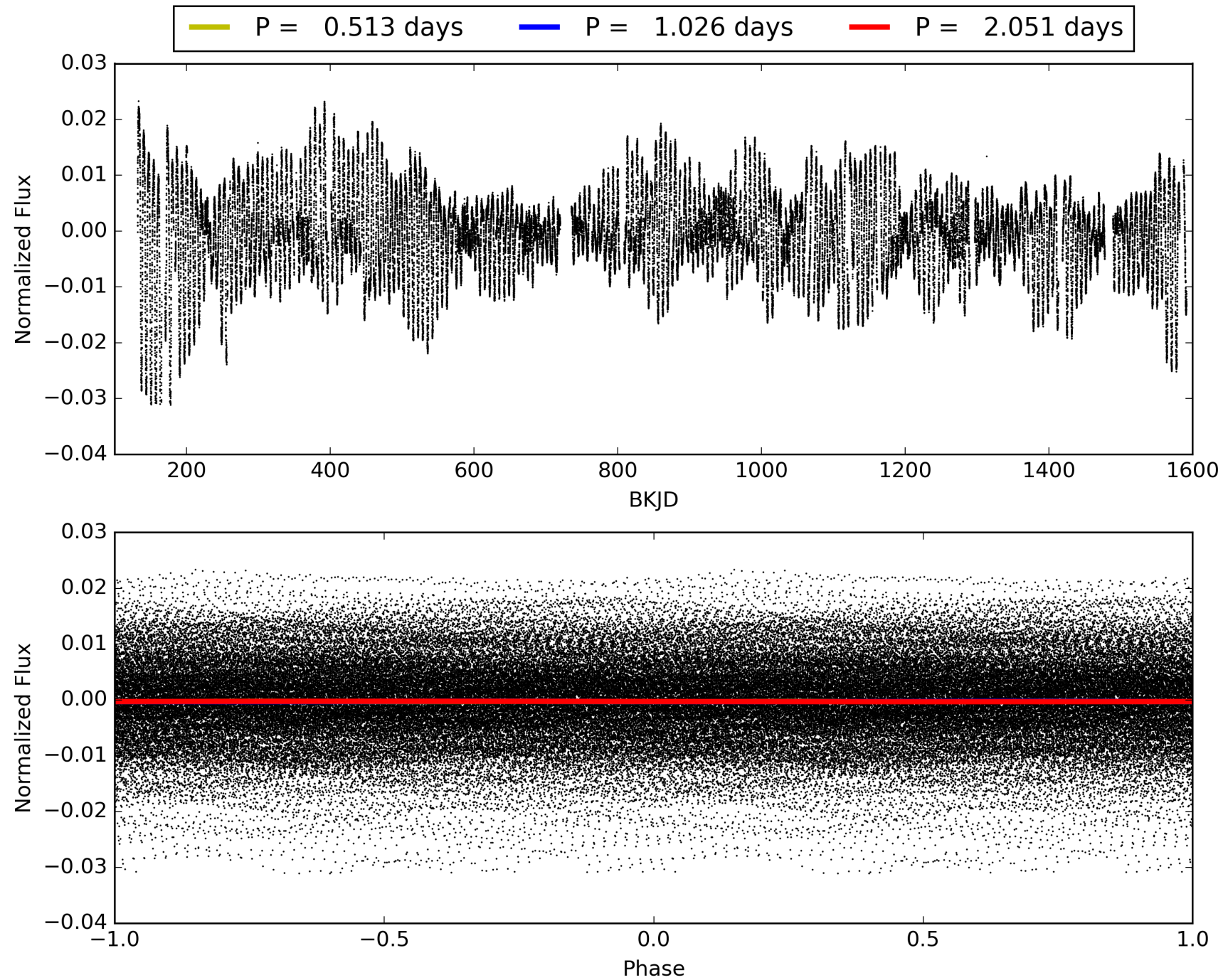
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 003647812-01, PDC Light Curves



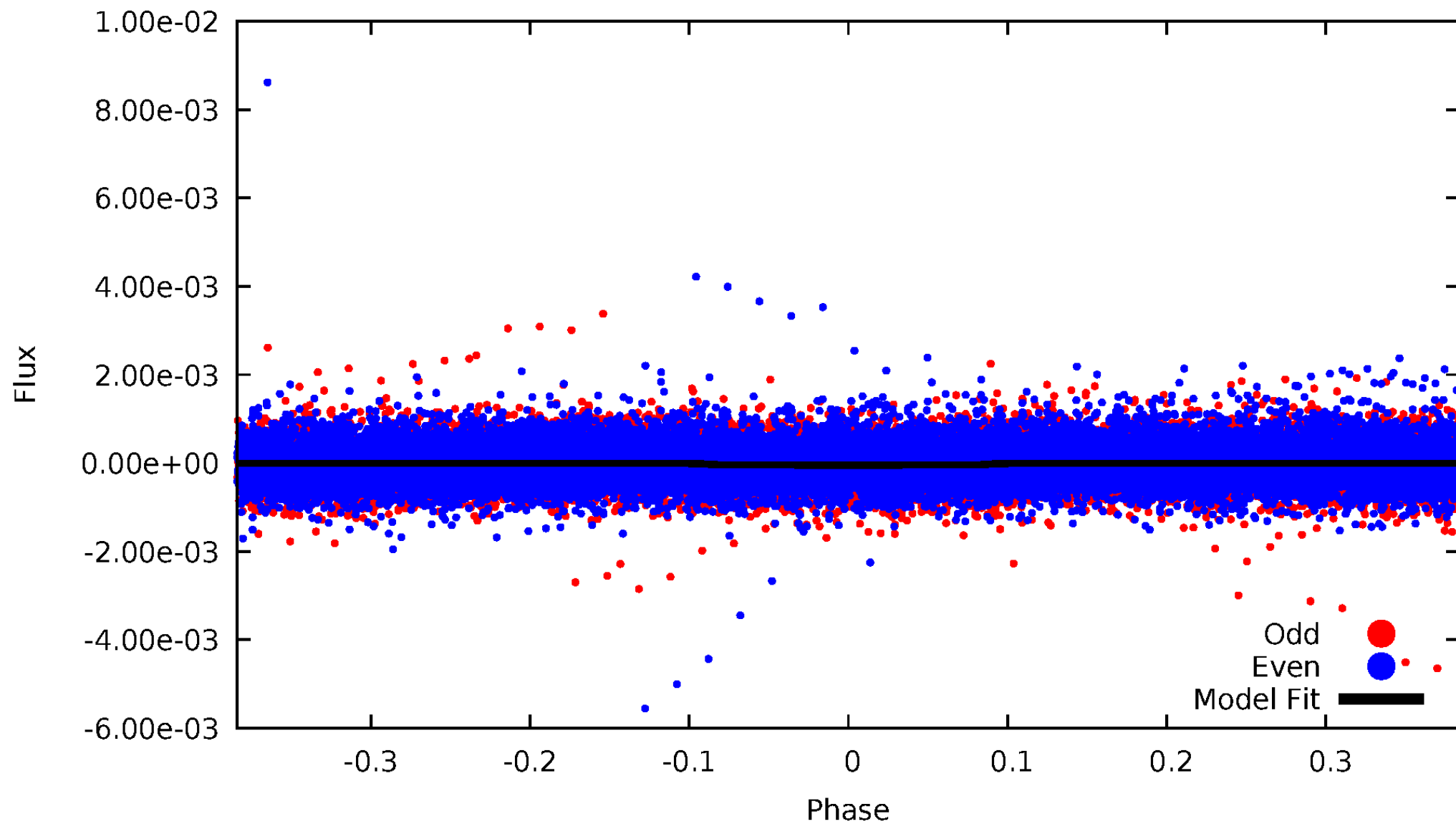
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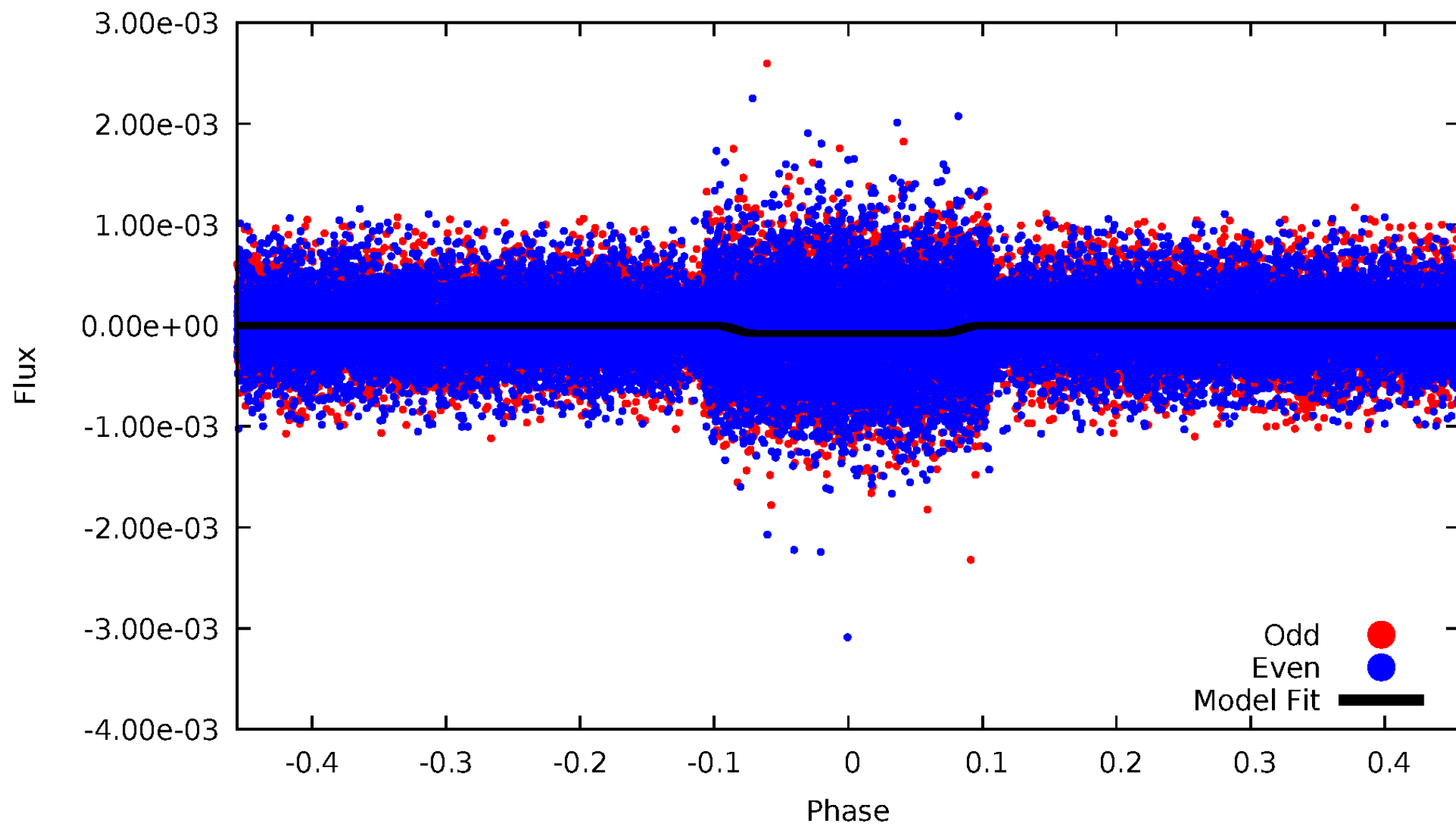
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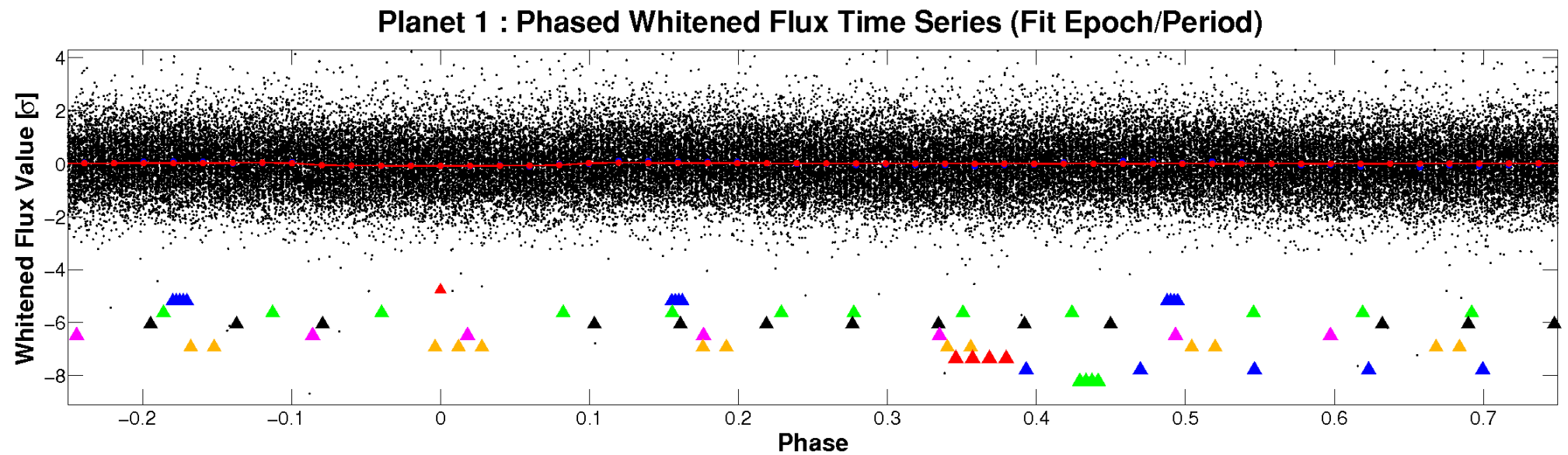
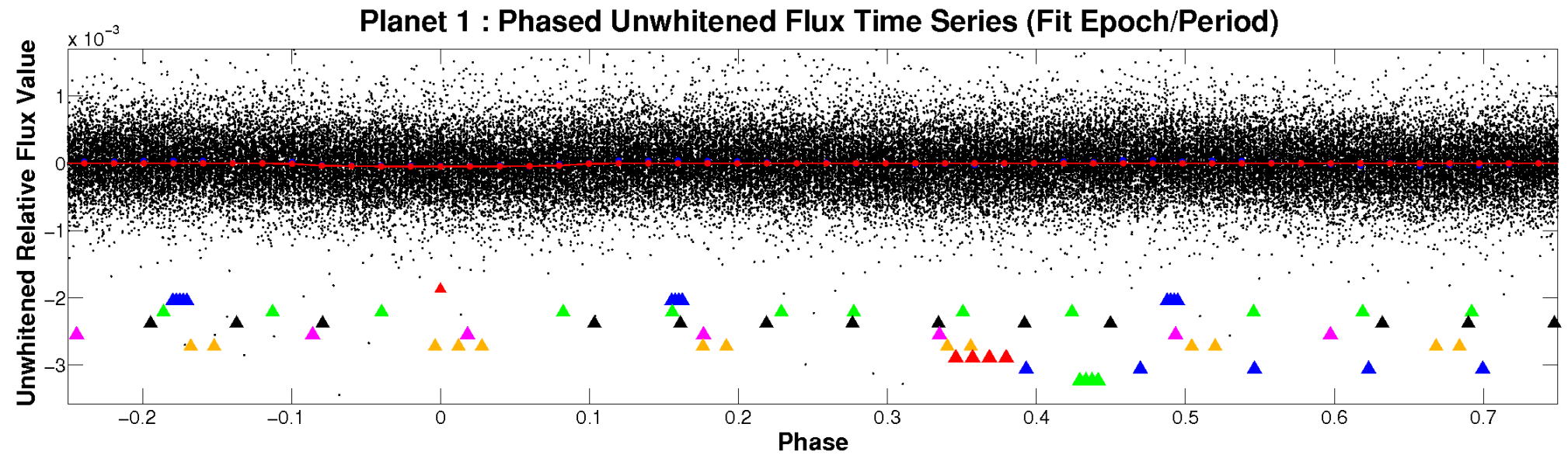


# ALT Odd/Even

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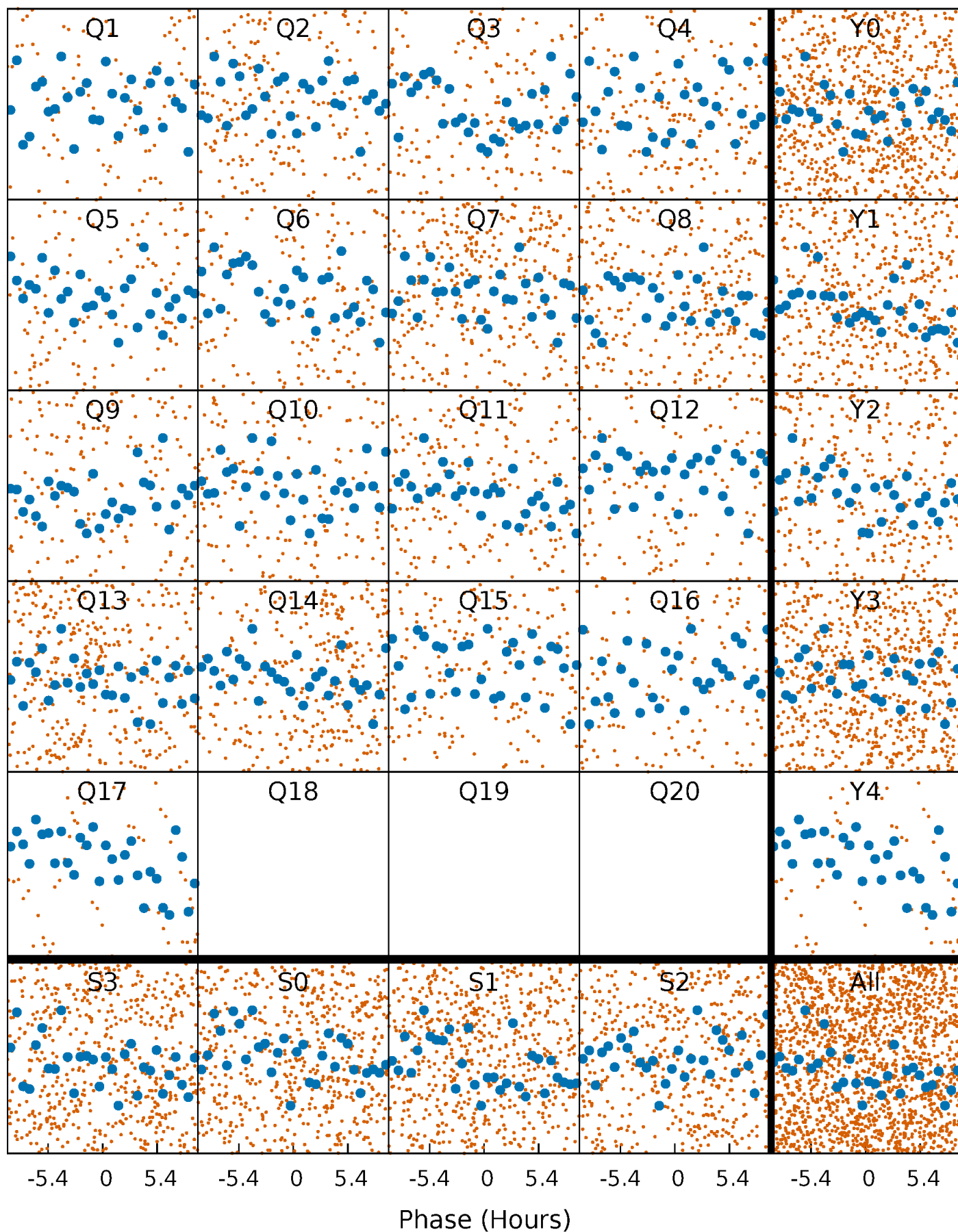


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

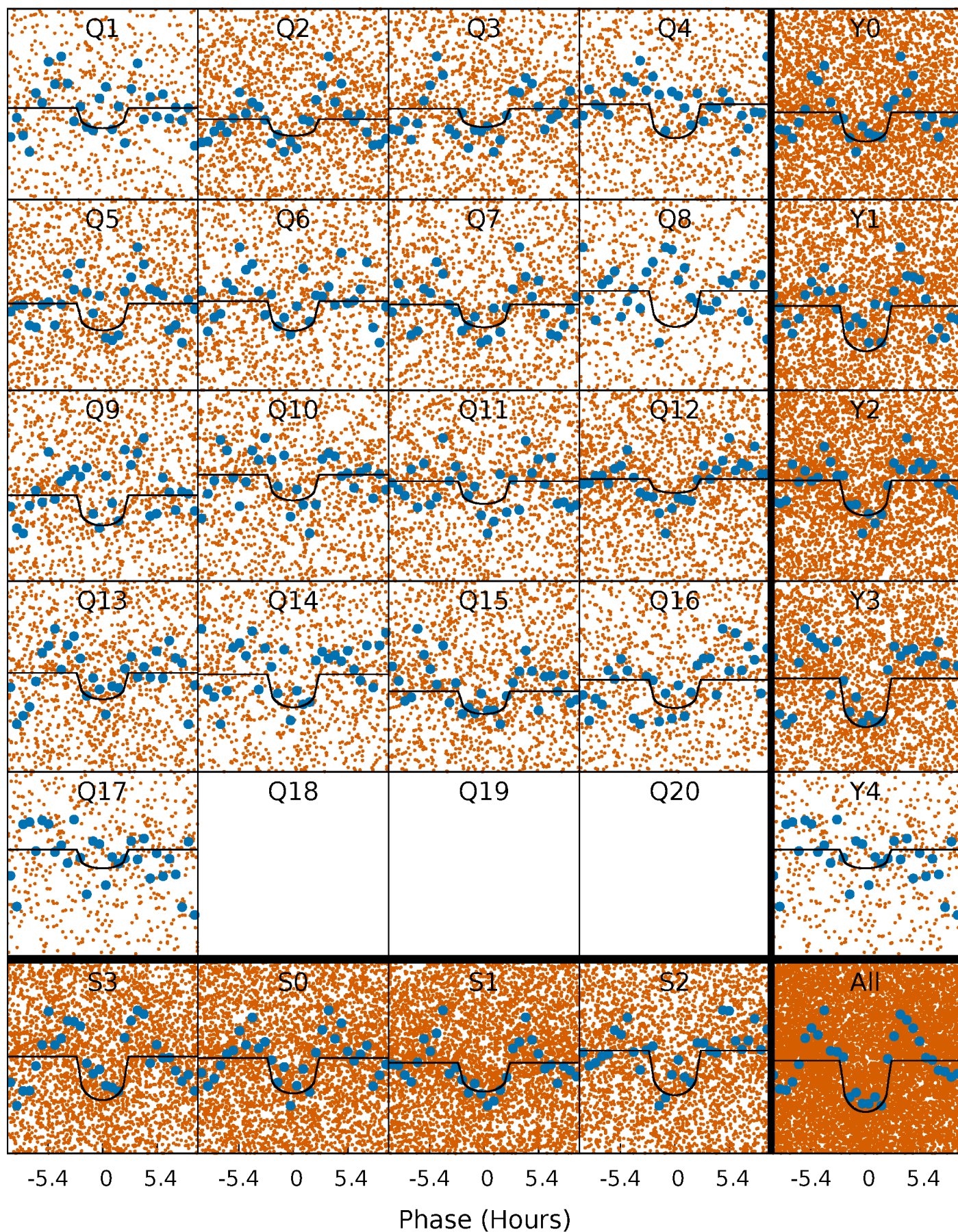
TCE 003647812-01 P= 1.025744 Days  $T_0=131.805103$  (BKJD)





# DV Quarter-Phased Transit Curves

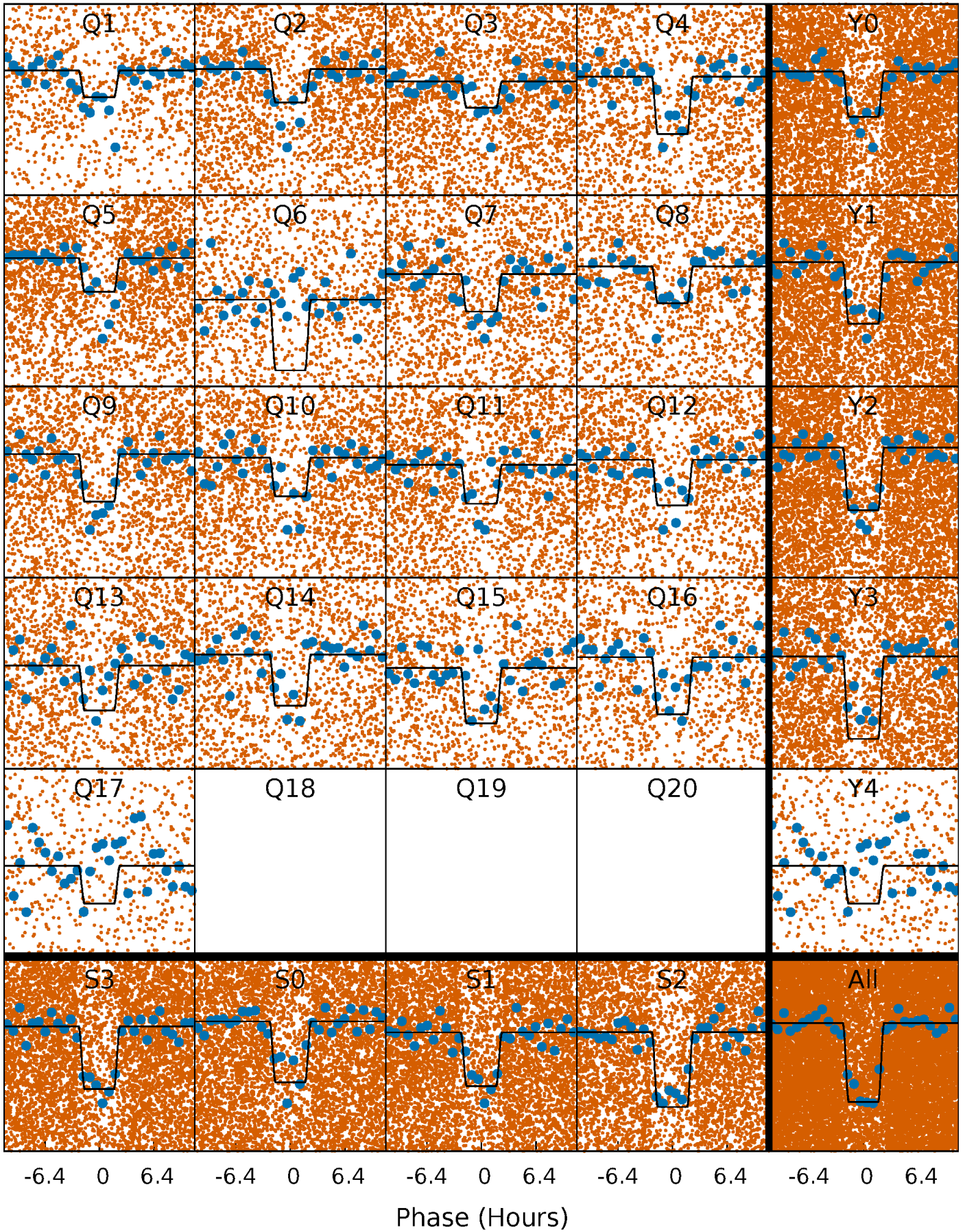
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# Alt. Detrend Quarter-Phased Transit Curves

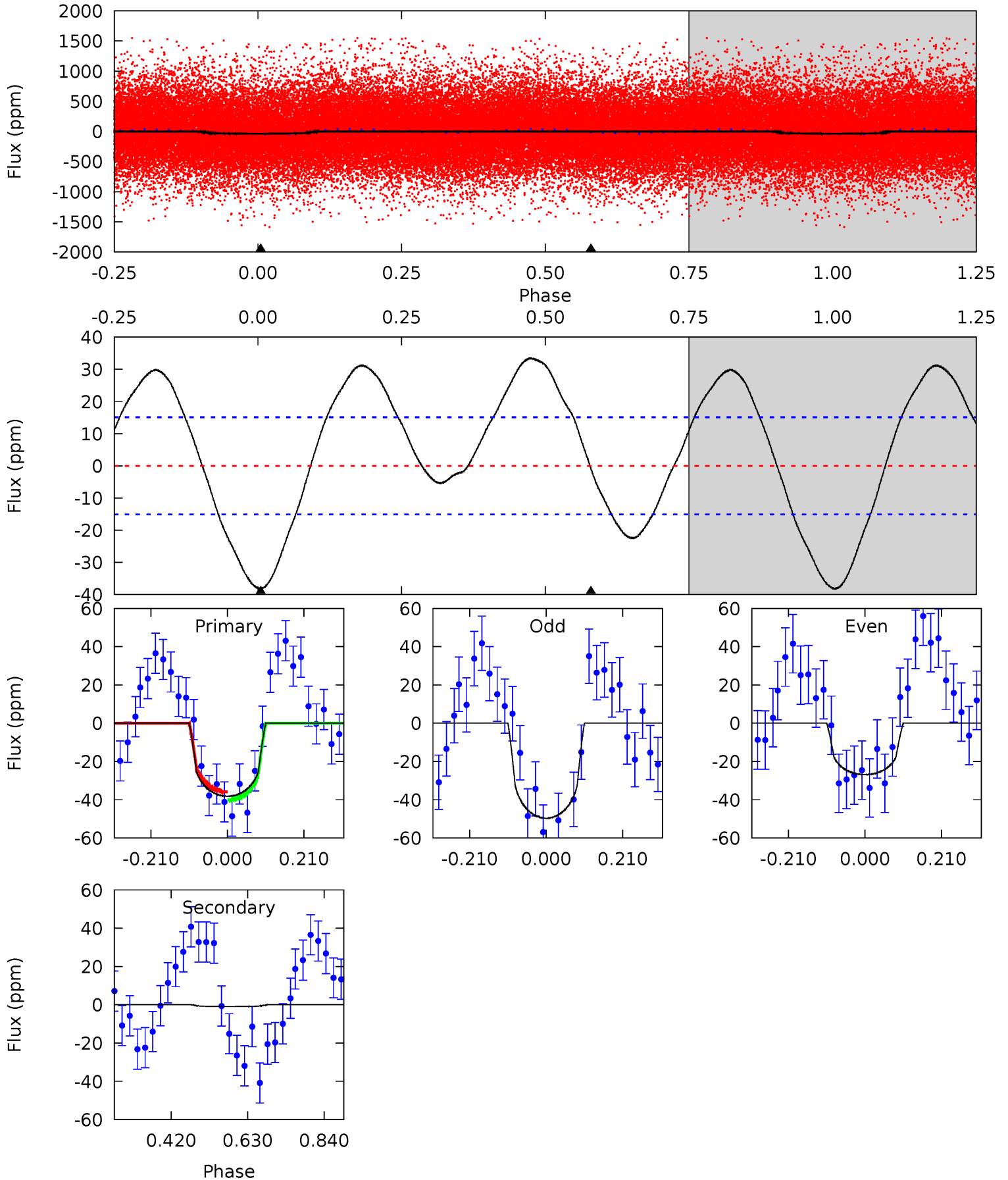
TCE 003647812-01 P= 1.025741 Days  $T_0=131.820128$  (BKJD)



# DV Model-Shift Uniqueness Test

003647812-01, P = 1.025744 Days, E = 130.779359 Days

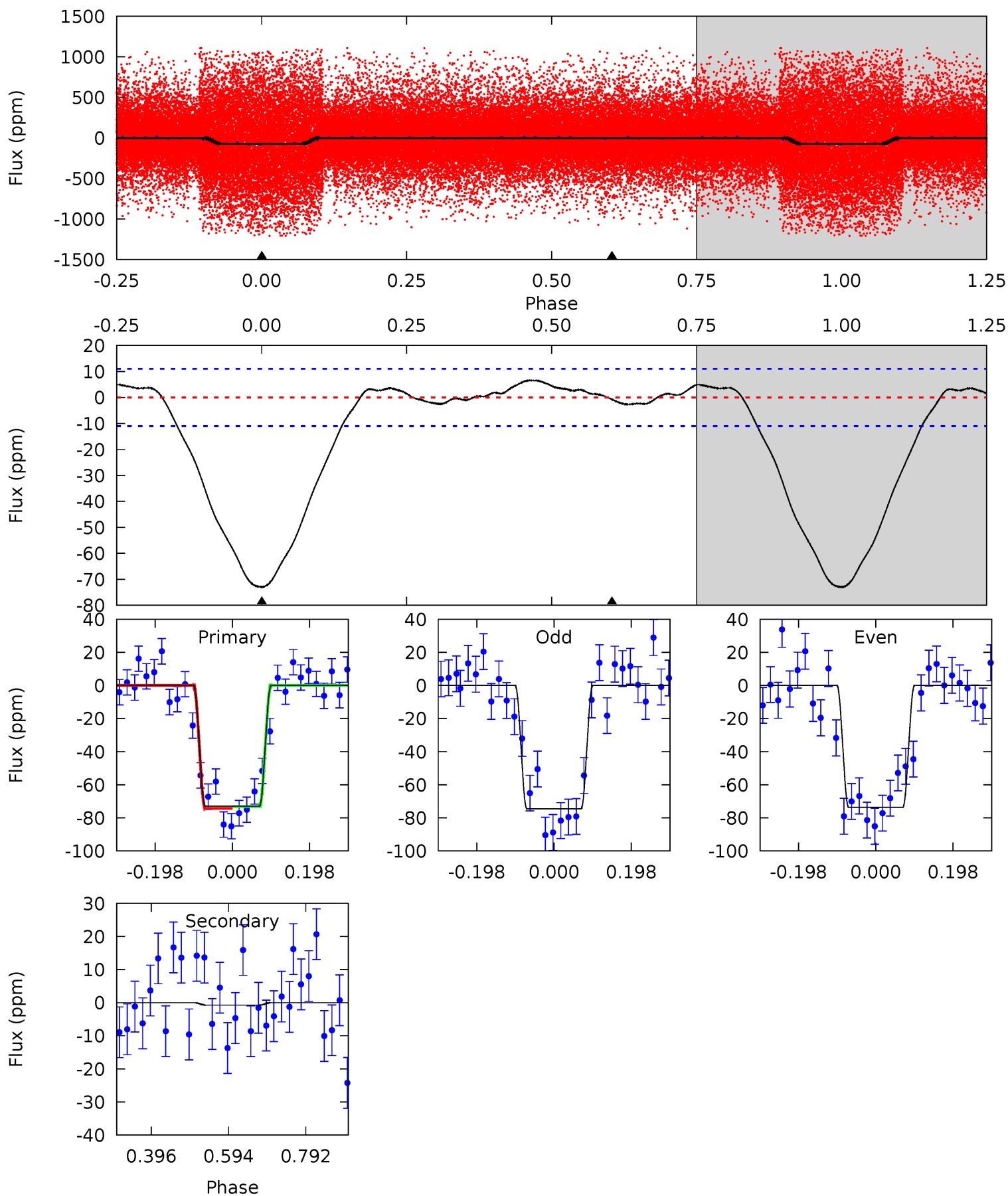
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.1	0.27	0	0	4.41	1.25	2.96	11.1	11.1	0.27	0.27	3.33	0.86	0.47	0.63



# Alt Model-Shift Uniqueness Test

003647812-01, P = 1.025741 Days, E = 130.794387 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
29.3	0.29	0	0	4.42	1.29	0.73	29.3	29.3	0.29	0.29	0.18	1.02	0.08	0.23





### Stellar Parameters For KIC 003647812

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5534^{+166}_{-166}$	$4.504^{+0.066}_{-0.165}$	$-0.040^{+0.300}_{-0.300}$	$0.877^{+0.207}_{-0.095}$	$0.896^{+0.102}_{-0.083}$	$1.870^{+0.529}_{-0.824}$
	+3%/-3%	+1%/-4%	+750%/-750%	+24%/-11%	+11%/-9%	+28%/-44%
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 003647812-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-1\pm3$	$0.69^{+0.43}_{-0.39}$	$2335^{+135}_{-106}$	$-2235^{+5891}_{-1159}$	$0.242^{+2.535}_{-1.485}$
Alt.	$-1\pm2$	$0.88^{+0.45}_{-0.43}$	$2329^{+148}_{-110}$	$-2459^{+5611}_{-618}$	$0.163^{+1.034}_{-0.610}$

$T_{max}$  = 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

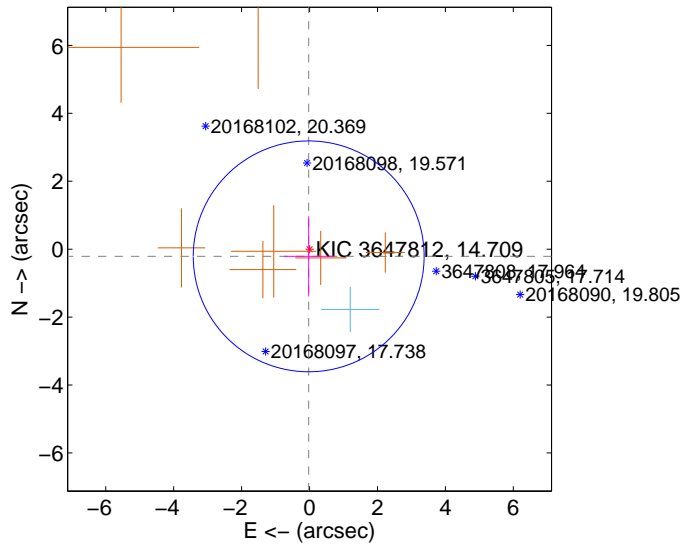
Supplemental centroid analysis for 003647812-01. Kepler magnitude: 14.71. Transit SNR 8.23

There are 1 quarters with good PRF difference image offsets

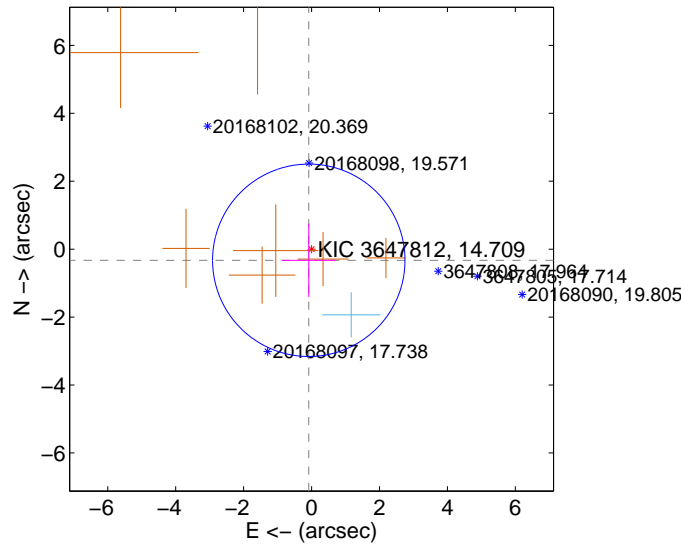
The direct PRF centroid is offset from the target star catalog position by about 0.02 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.213 \pm 1.133$	0.19	$0.025 \pm 0.728$	$-0.212 \pm 1.181$
PRF-fit source offset from KIC position	$0.338 \pm 0.945$	0.36	$0.082 \pm 0.790$	$-0.328 \pm 1.084$
photometric centroid source offset	$2.68 \pm 1.09$	2.46	$2.32 \pm 1.06$	$-1.34 \pm 1.16$

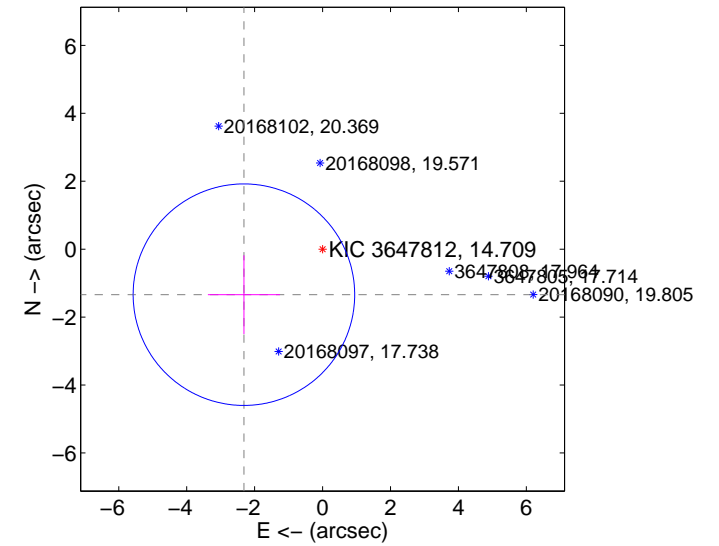
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

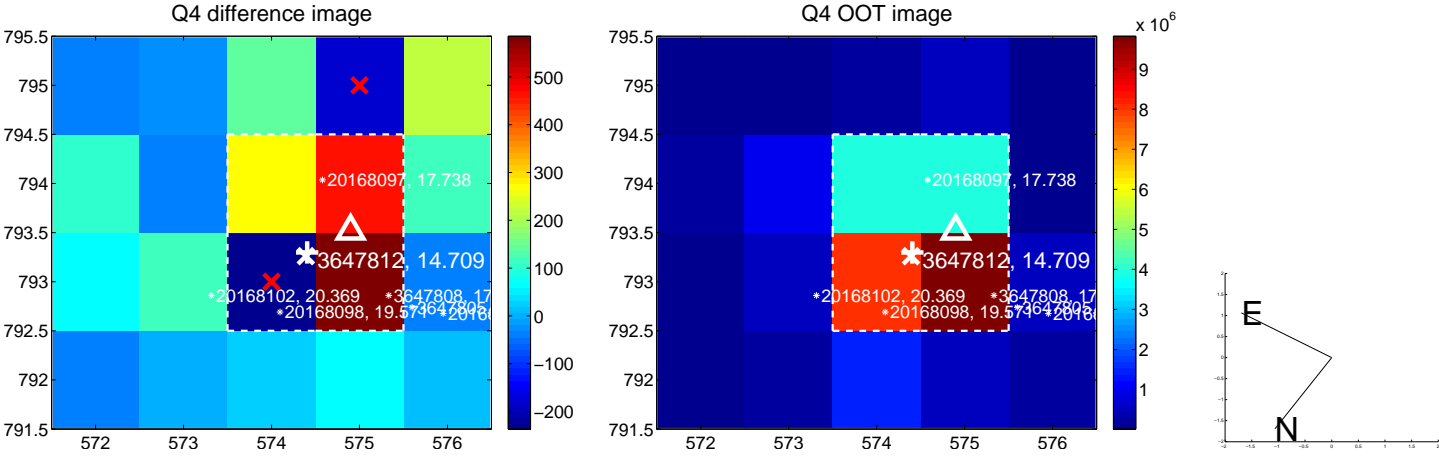
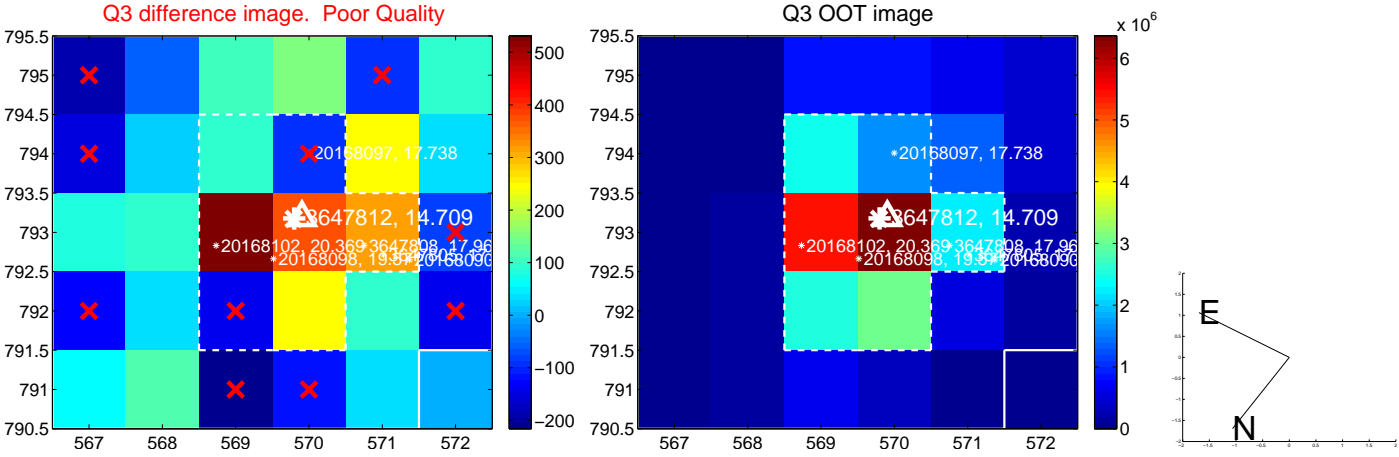
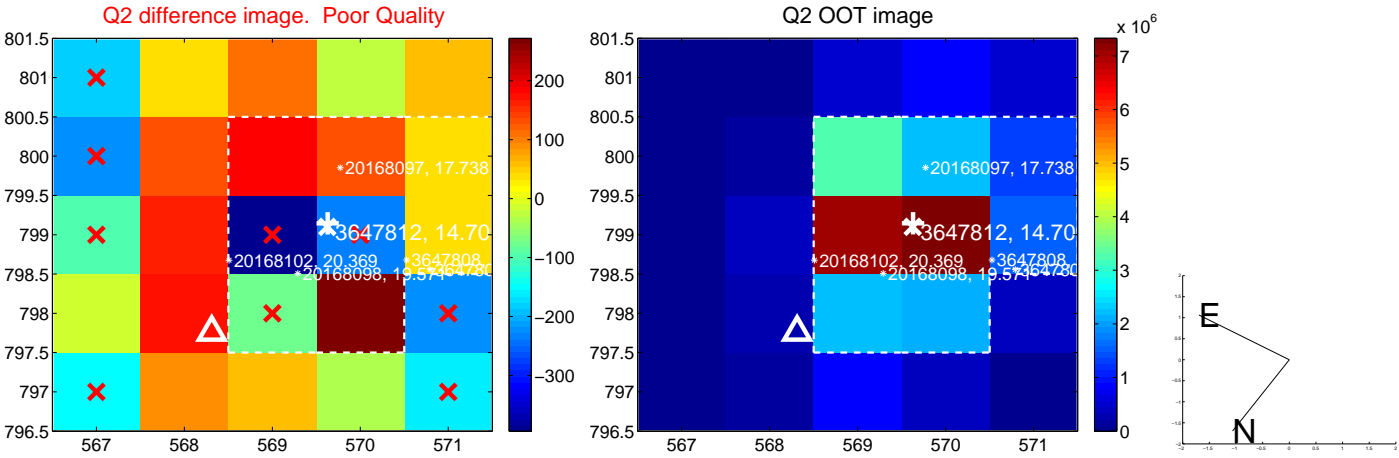
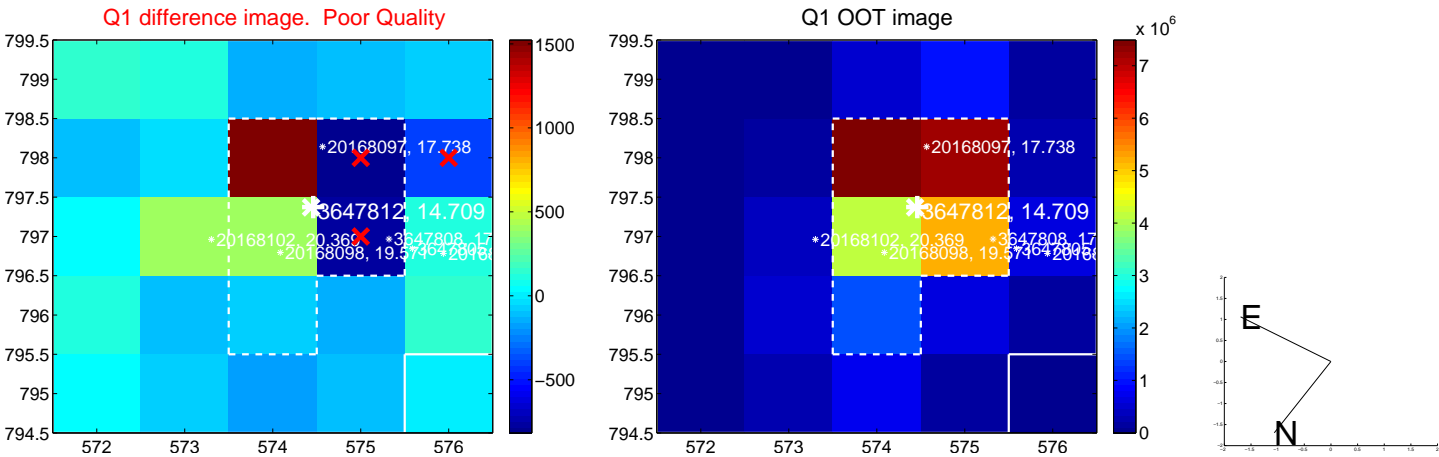


offset from photometric centroids

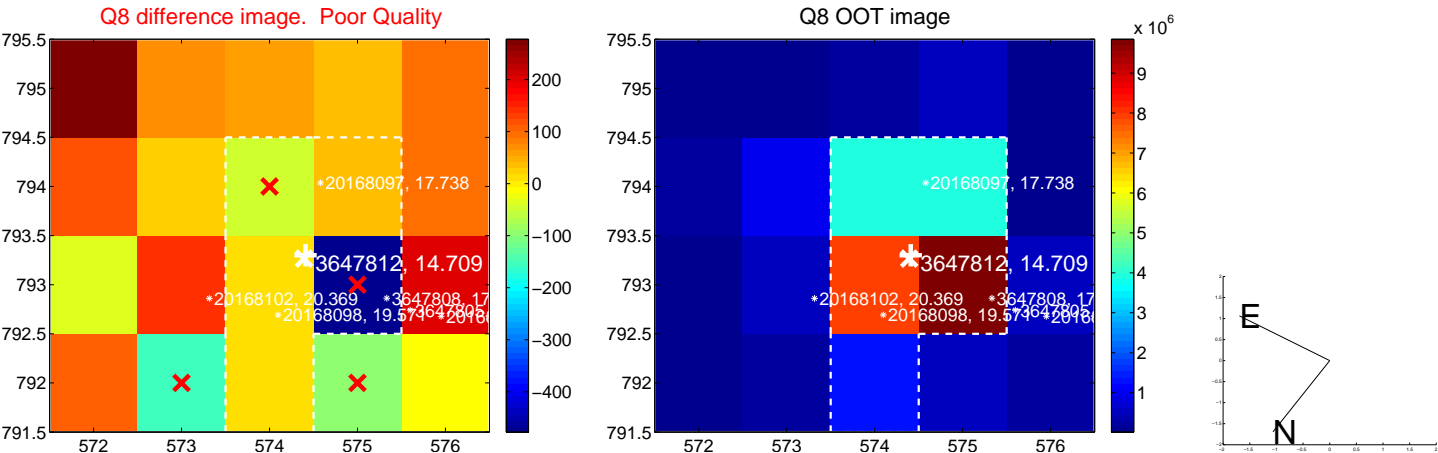
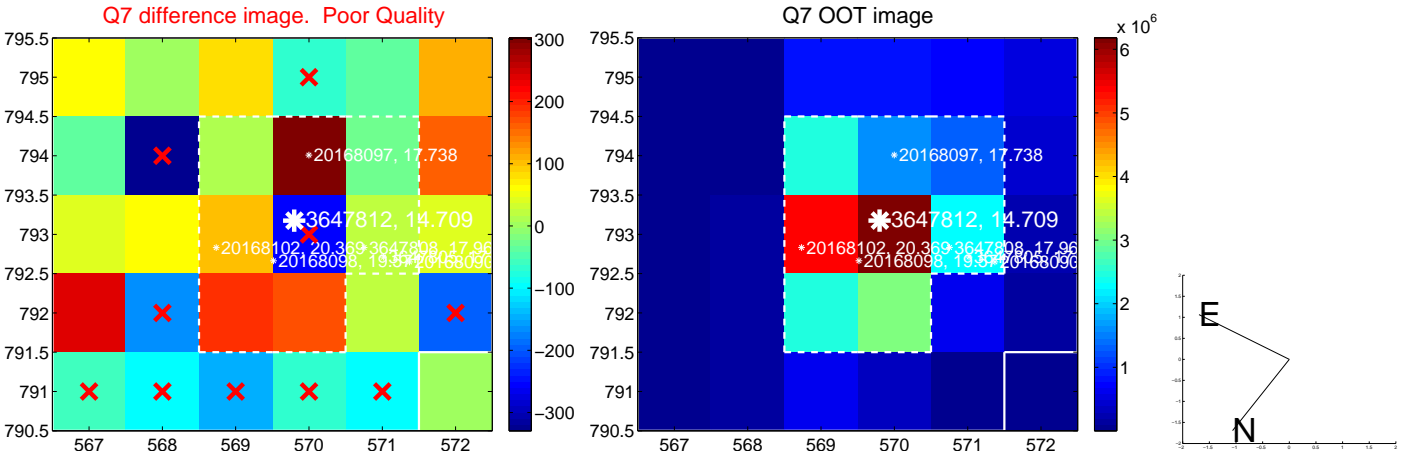
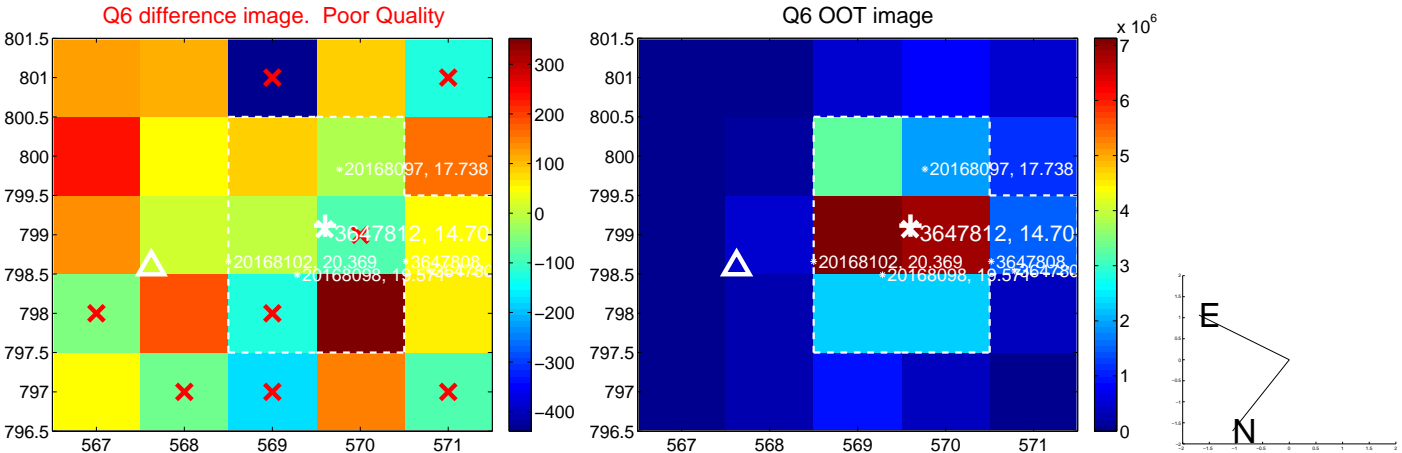
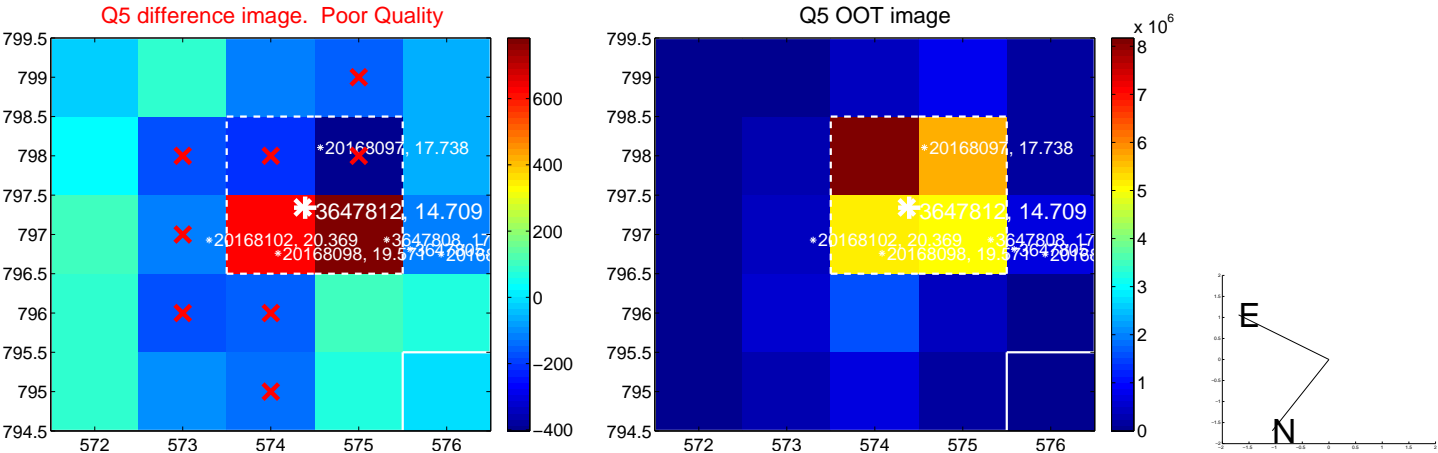


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

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

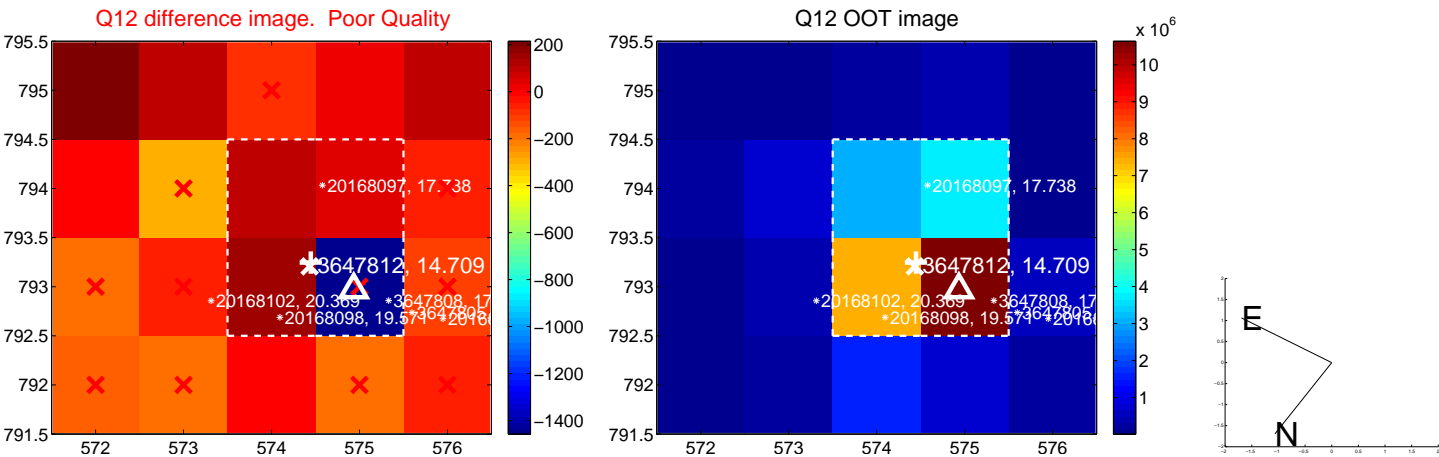
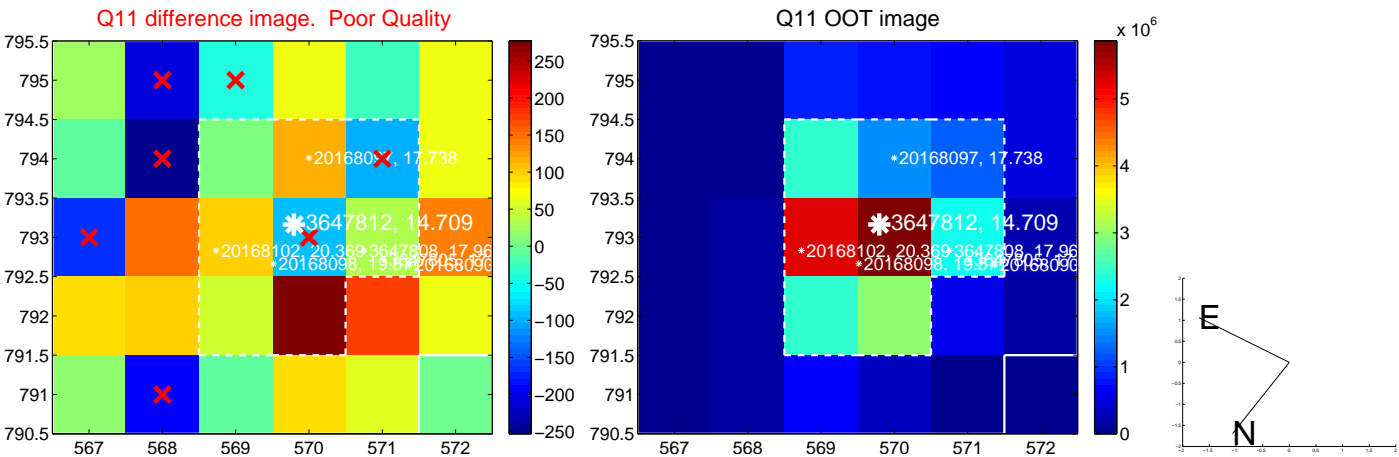
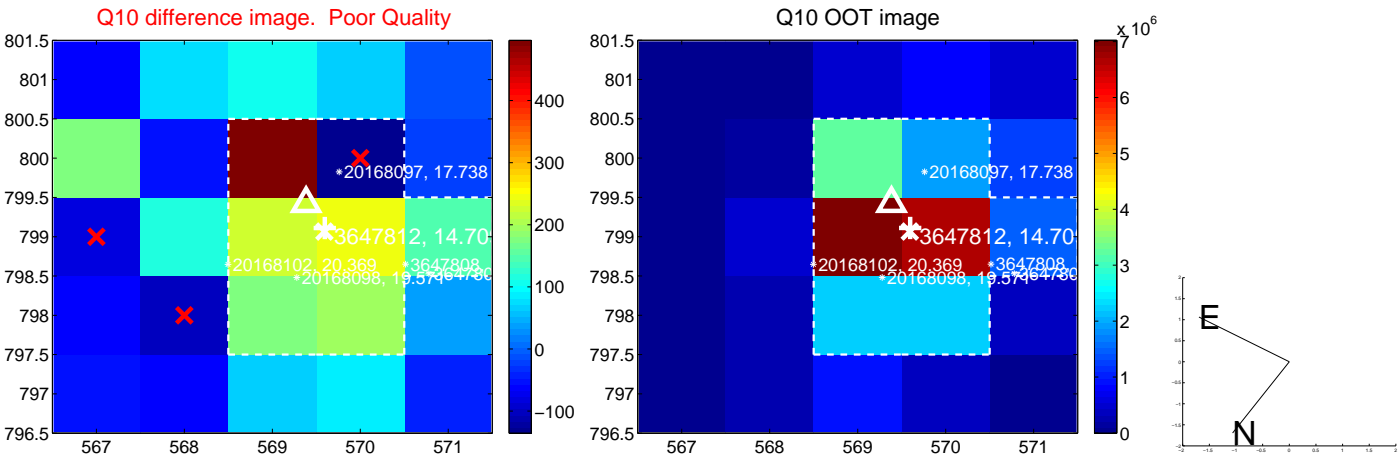
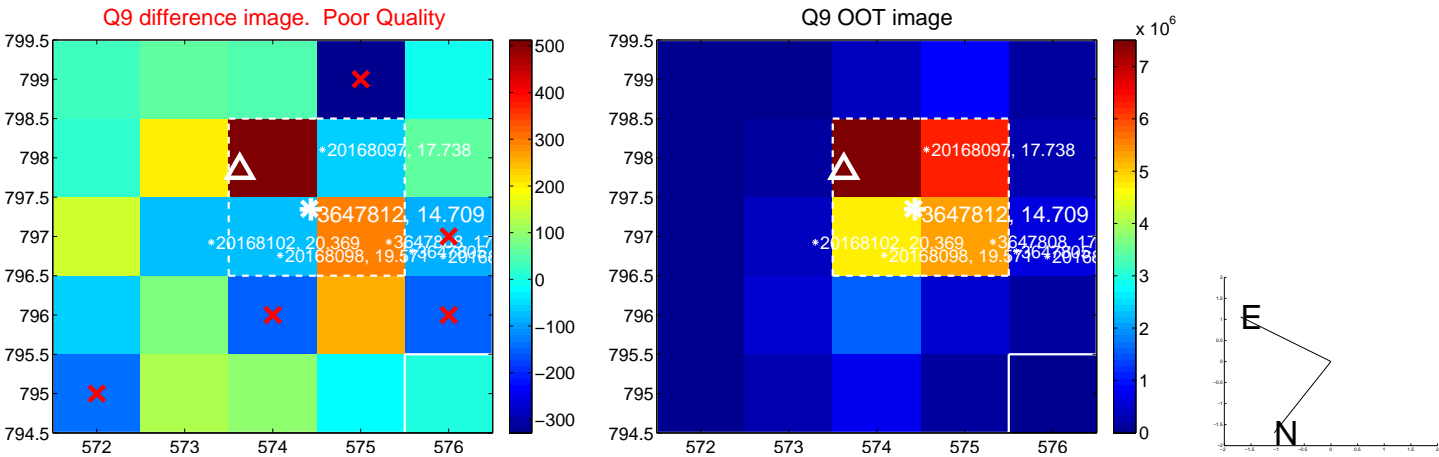


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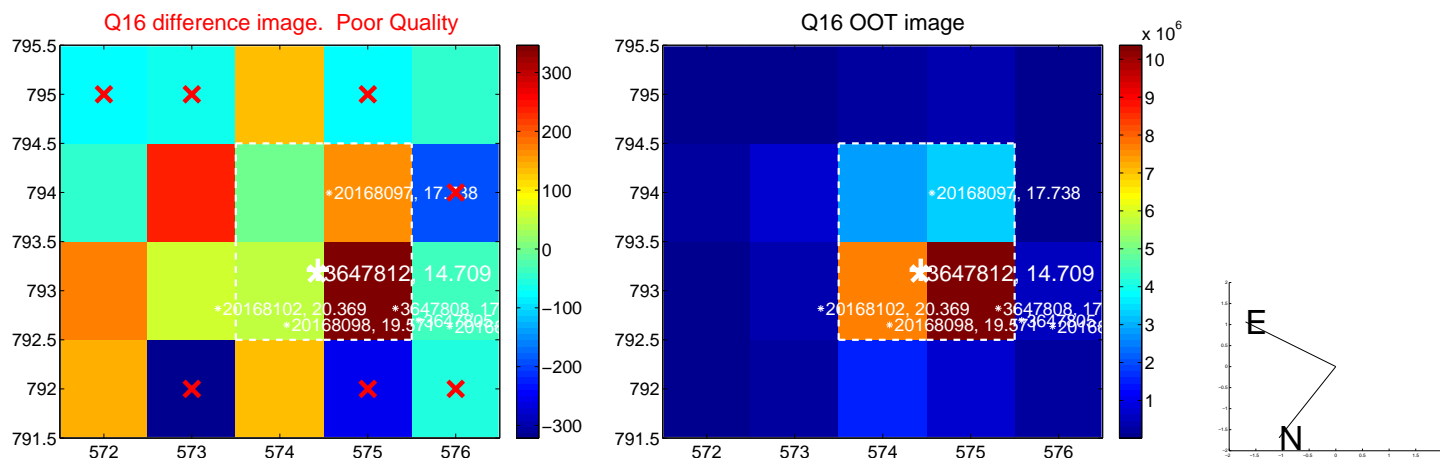
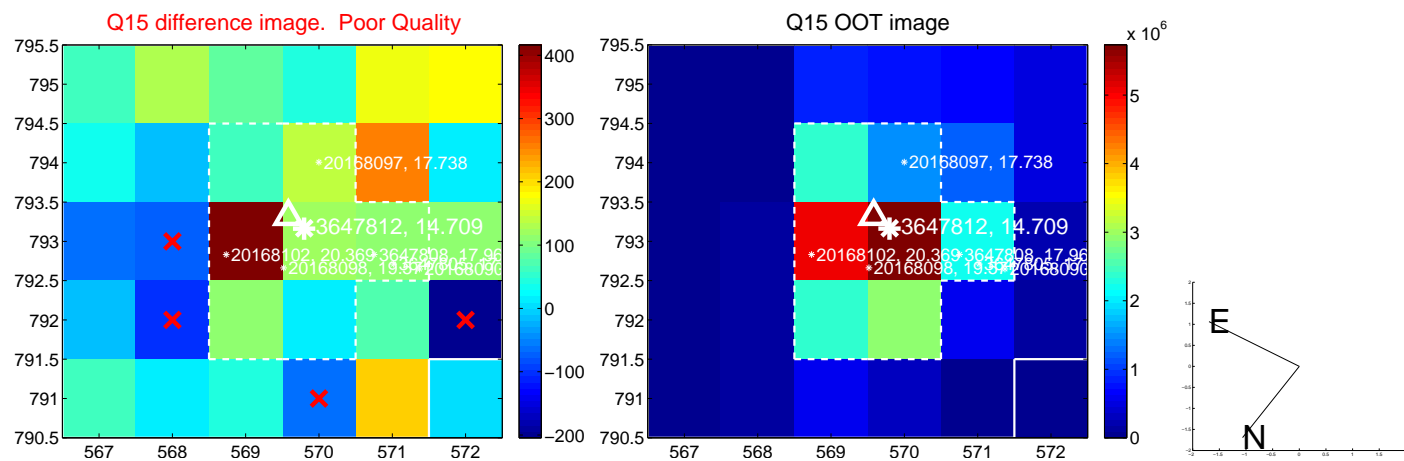
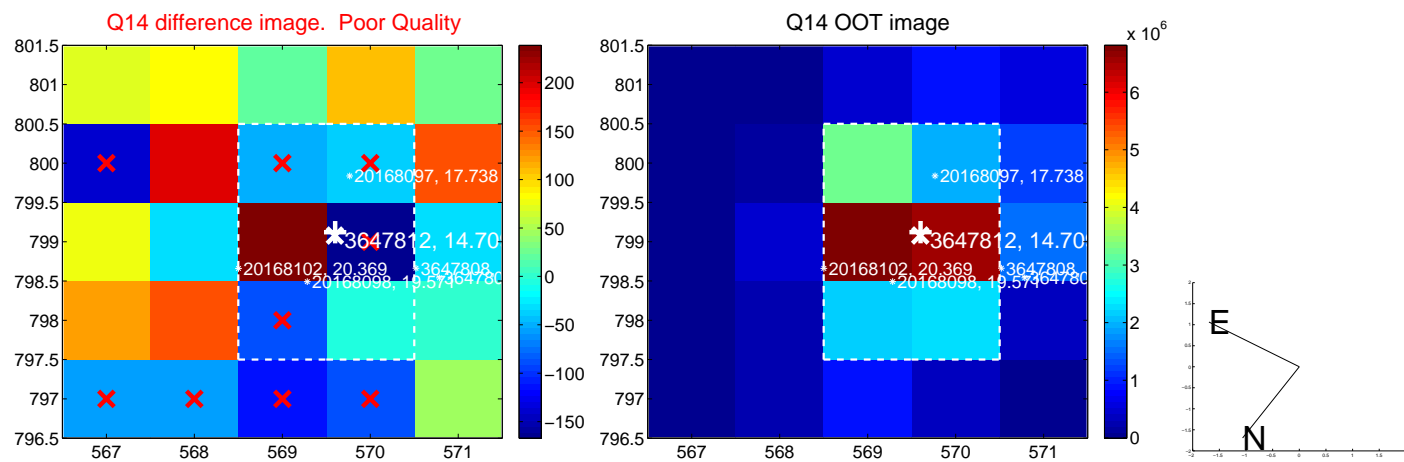
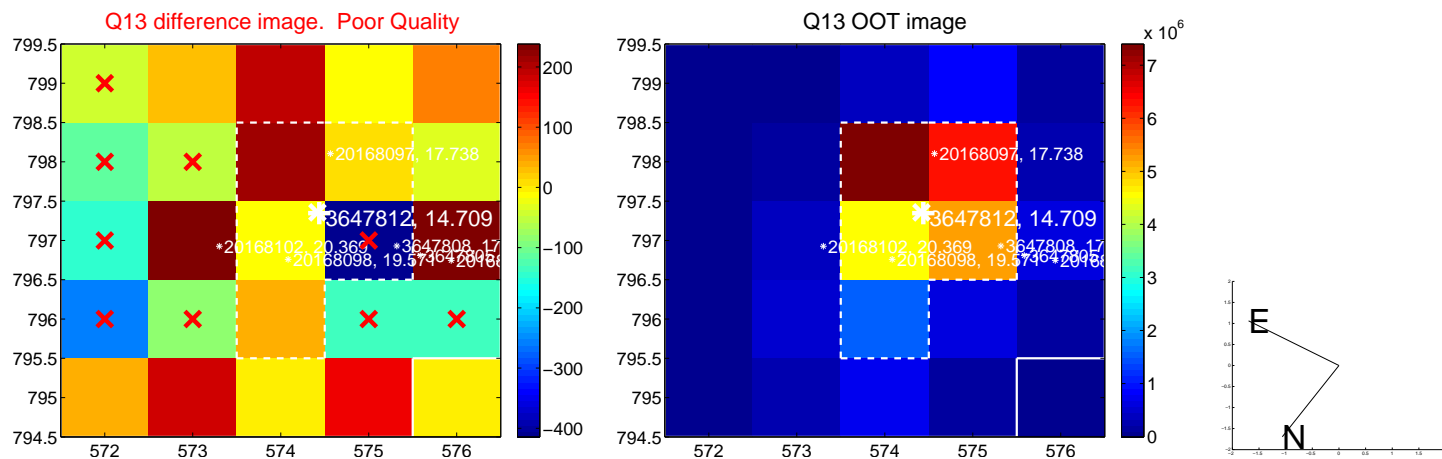




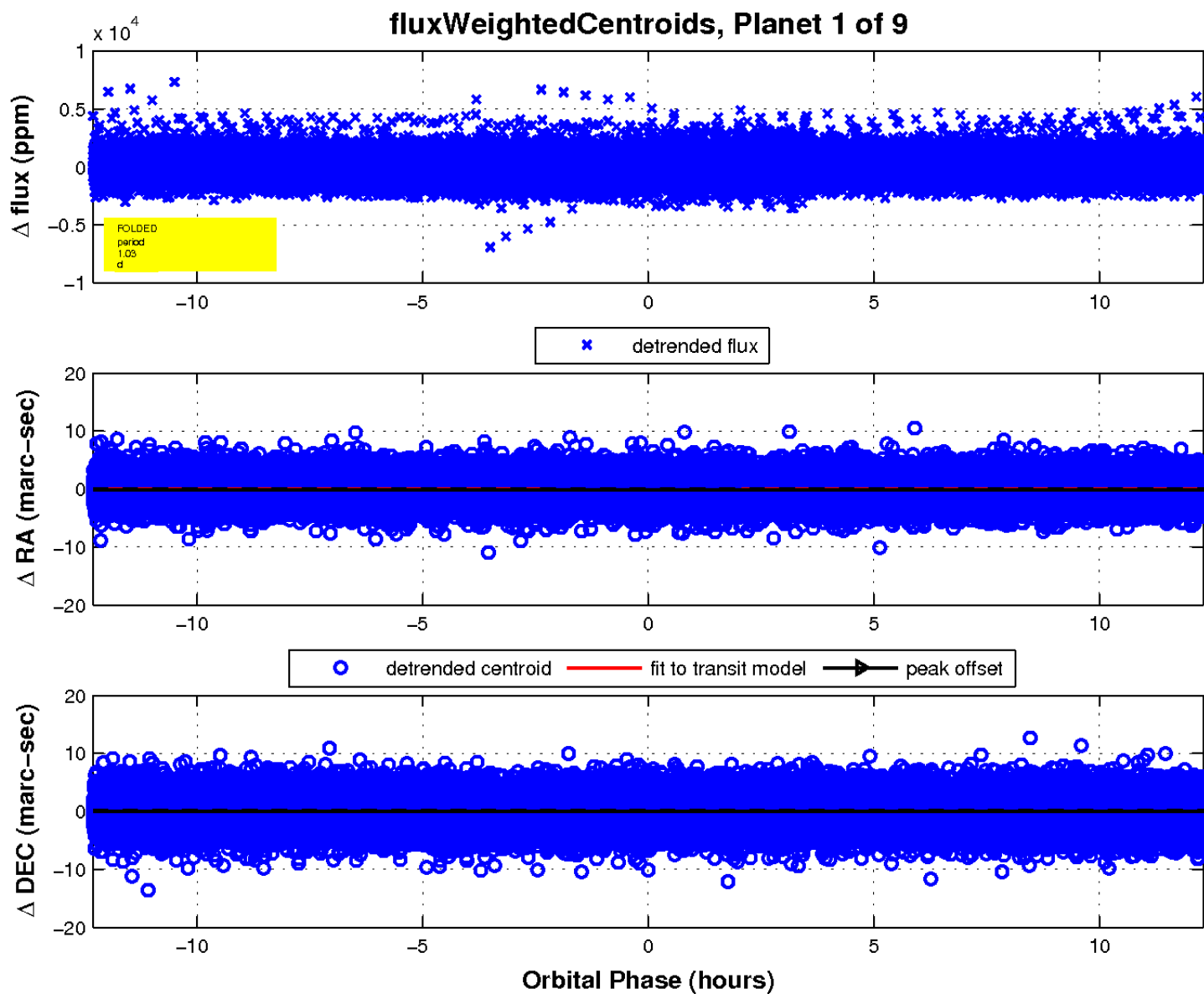
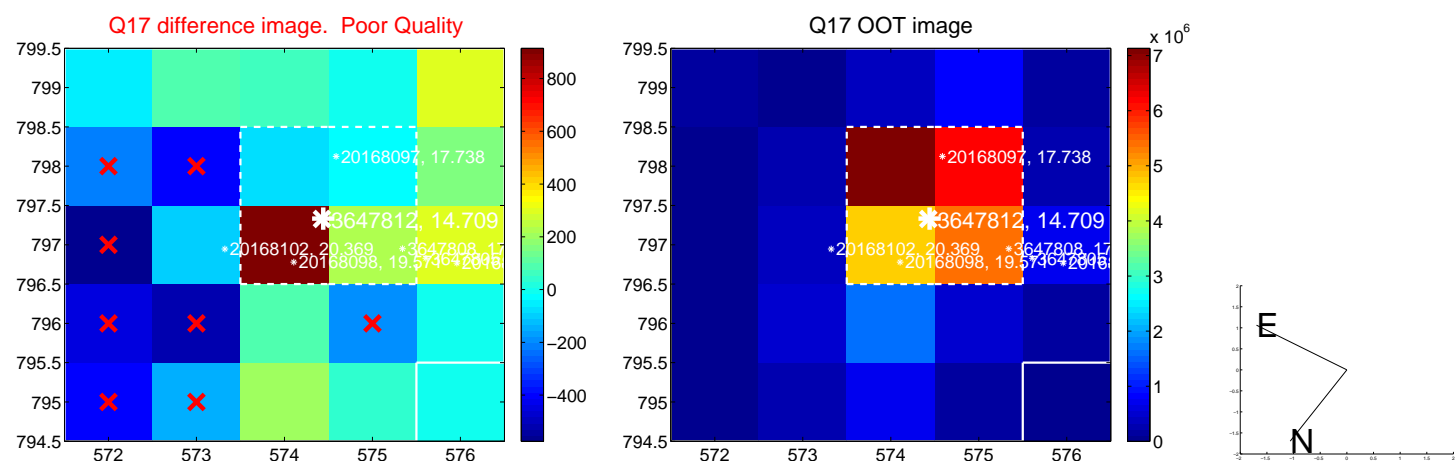
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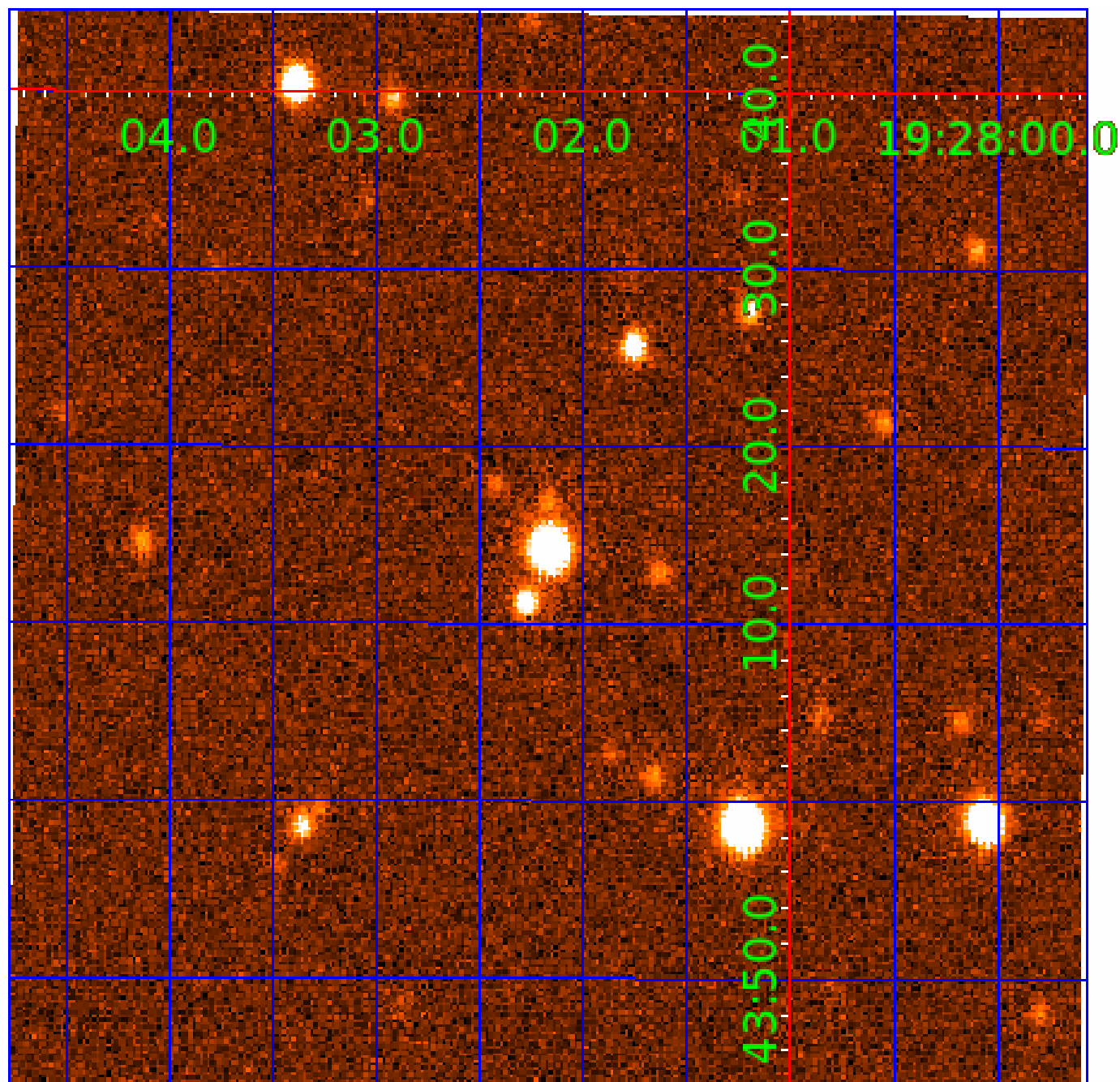


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UKIRT Image

Declination





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003647812-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—INCONSISTENT_TRANS—HALO_GHOST
003647812-06	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—INCONSISTENT_TRANS—HALO_GHOST
003647812-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—ALL_TRANS_CHASES—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—SAME_NTL_PERIOD—CENT_FEW_DIFFS
003647812-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—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.

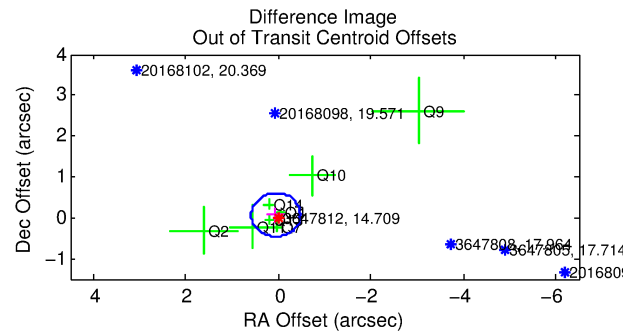
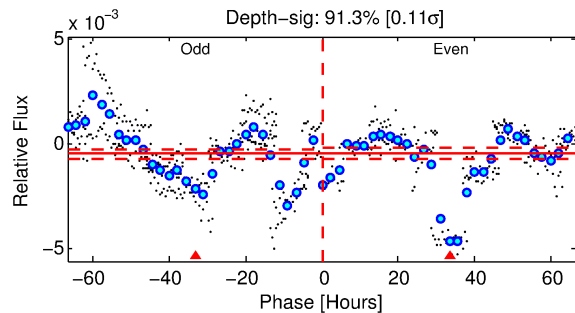
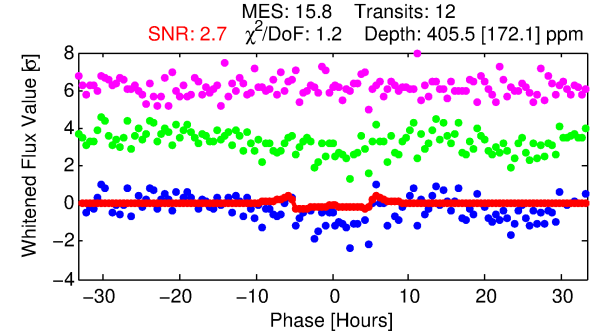
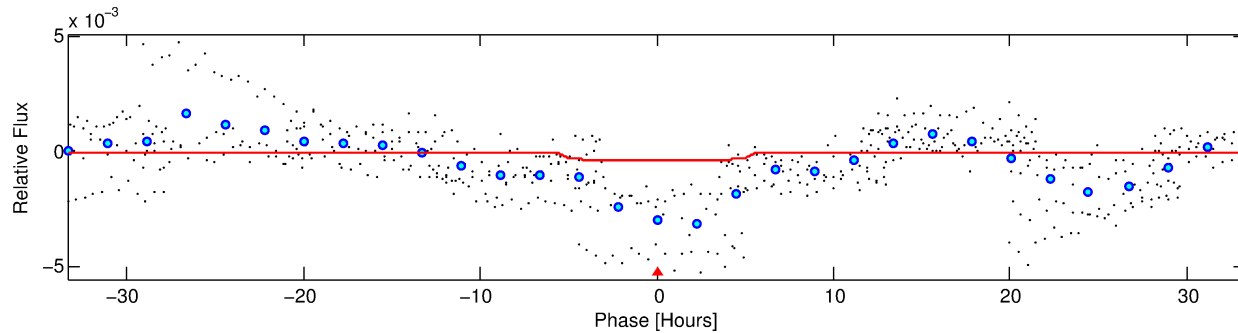
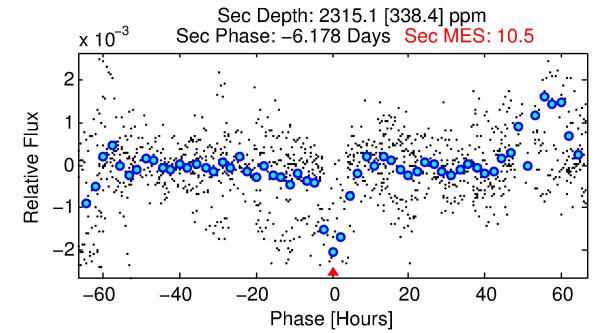
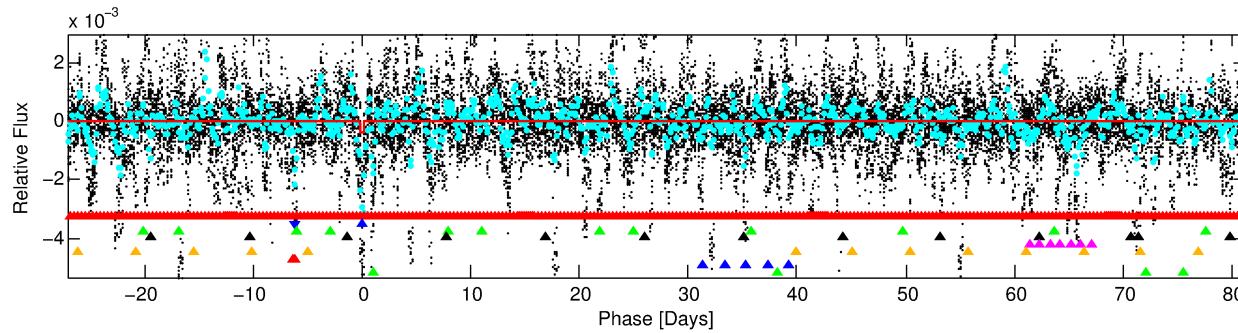
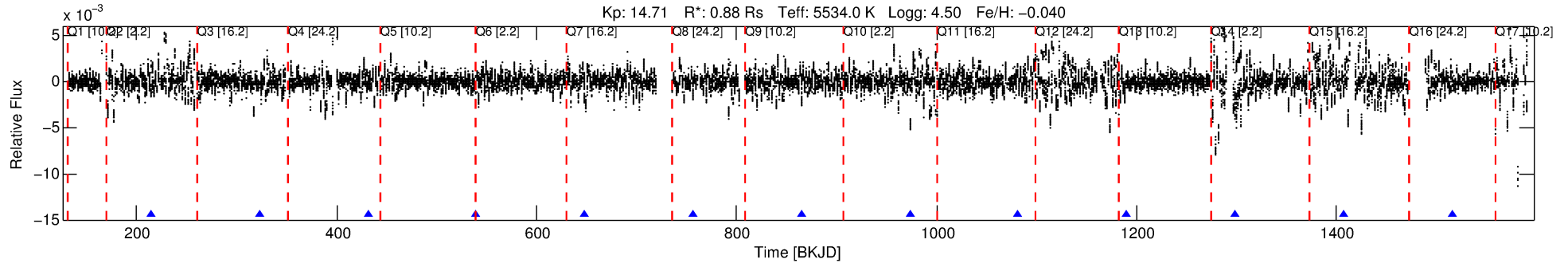
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 003647812-02

No Significant Match Found

# DV One-Page Summary

KIC: 3647812 Candidate: 2 of 9 Period: 108.388 d



## DV Fit Results:

Period = 108.38773 [0.00361] d  
Epoch = 214.7060 [0.0261] BKJD  
Rp/R\* = 0.0190 [0.0199]  
a/R\* = 63.82 [265.73]  
b = 0.55 [5.30]  
Seff = 3.51 [1.13]  
Teq = 349 [28] K  
Rp = 1.81 [1.95] Re  
a = 0.4289 [0.0866] AU  
Ag = 71231.79 [151136.69] [0.47σ]  
Teffp = 8818 [4639] K [1.83σ]

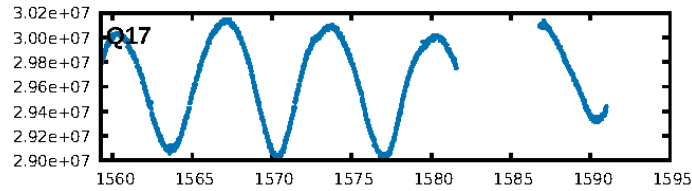
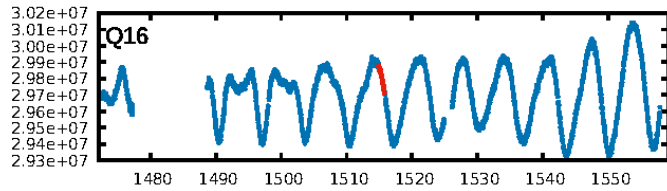
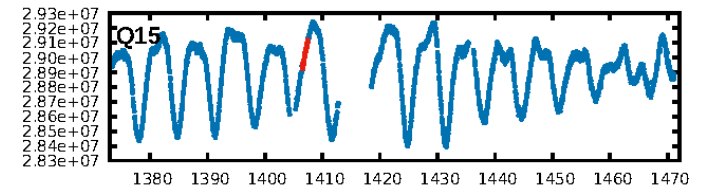
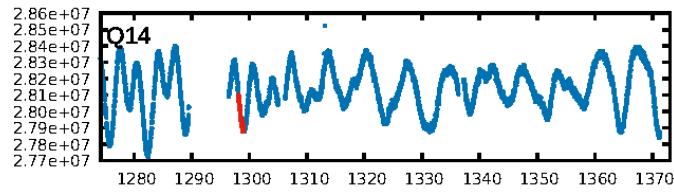
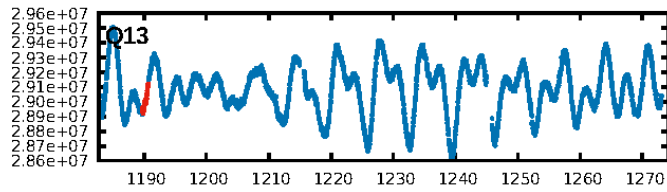
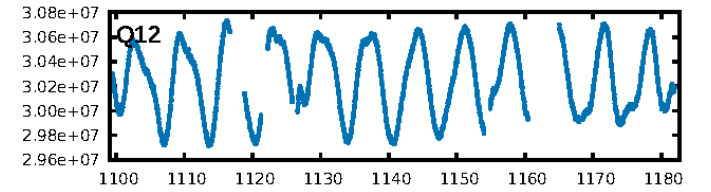
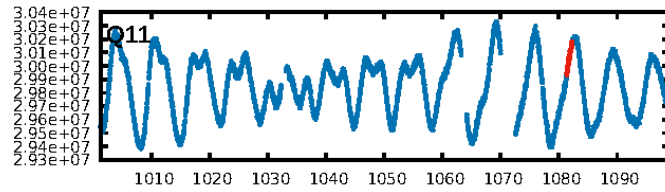
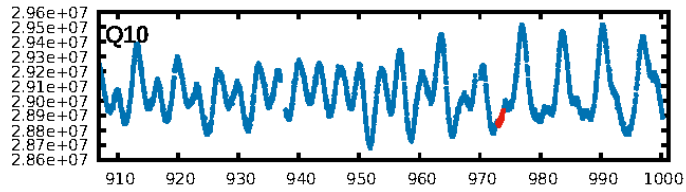
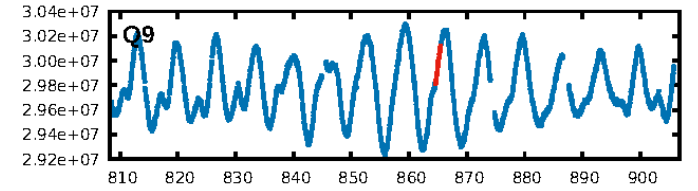
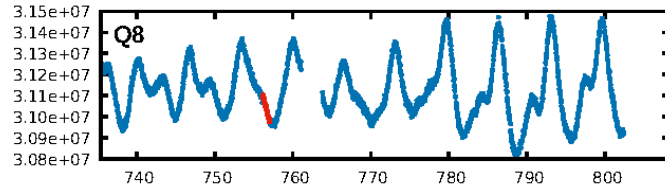
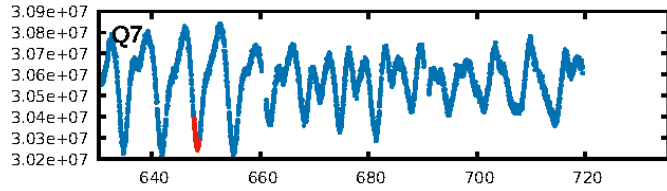
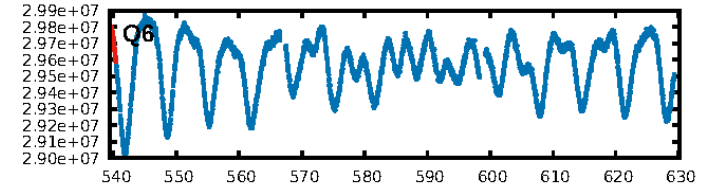
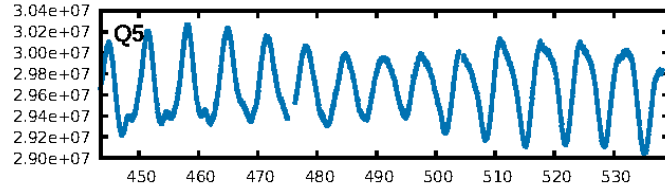
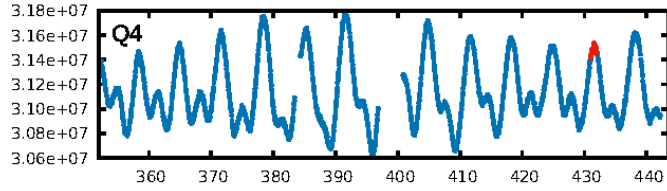
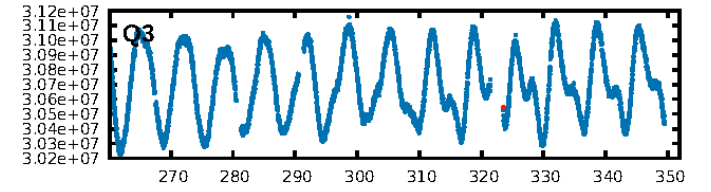
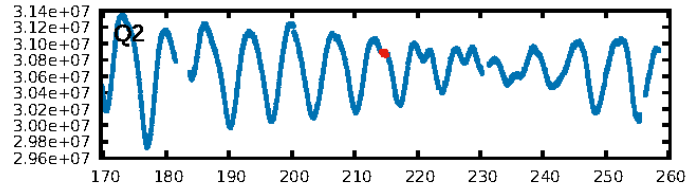
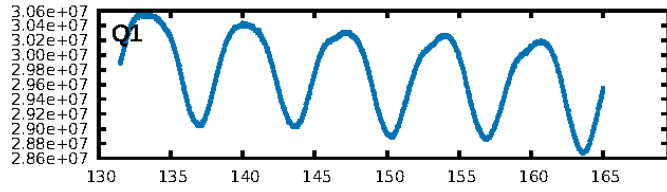
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [213.20σ]  
LongPeriod-sig: 100.0% [7.50σ]  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 1.61e-22  
RollingBand-fgt: 1.00 [12/12]  
GhostDiagnostic-chr: -7.119  
Centroid-sig: 11.7%  
Centroid-so: 1.433 arcsec [1.46σ]  
OotOffset-rm: 0.091 arcsec [0.51σ]  
OotOffset-st: 3/2/1/2 [8]  
KicOffset-rm: 0.089 arcsec [0.18σ]  
KicOffset-st: 3/2/1/2 [8]  
DiffImageQuality-fgm: 0.50 [4/8]  
DiffImageOverlap-fno: 0.00 [0/9]

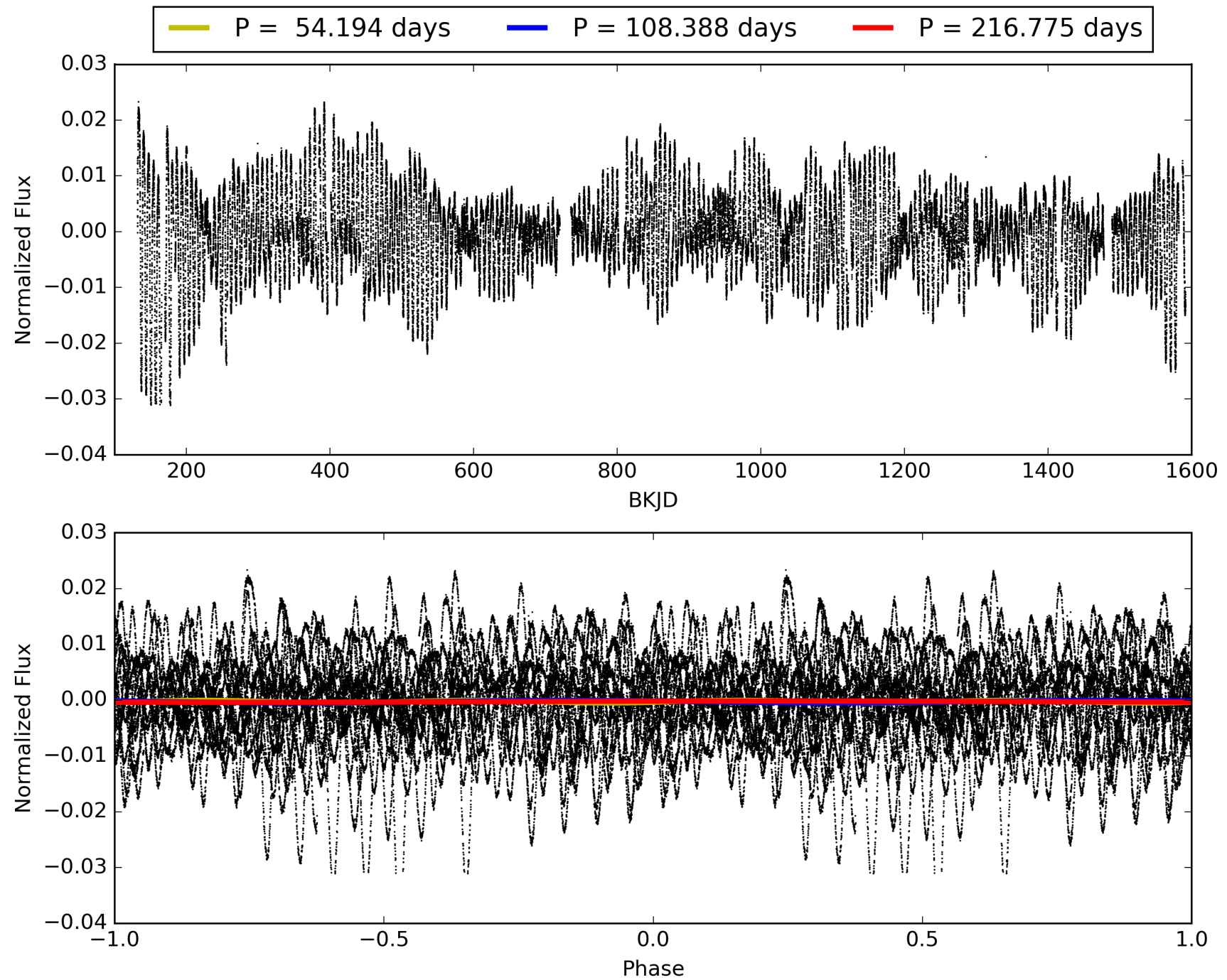
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 04:14:18 Z

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

# TCE 003647812-02, PDC Light Curves

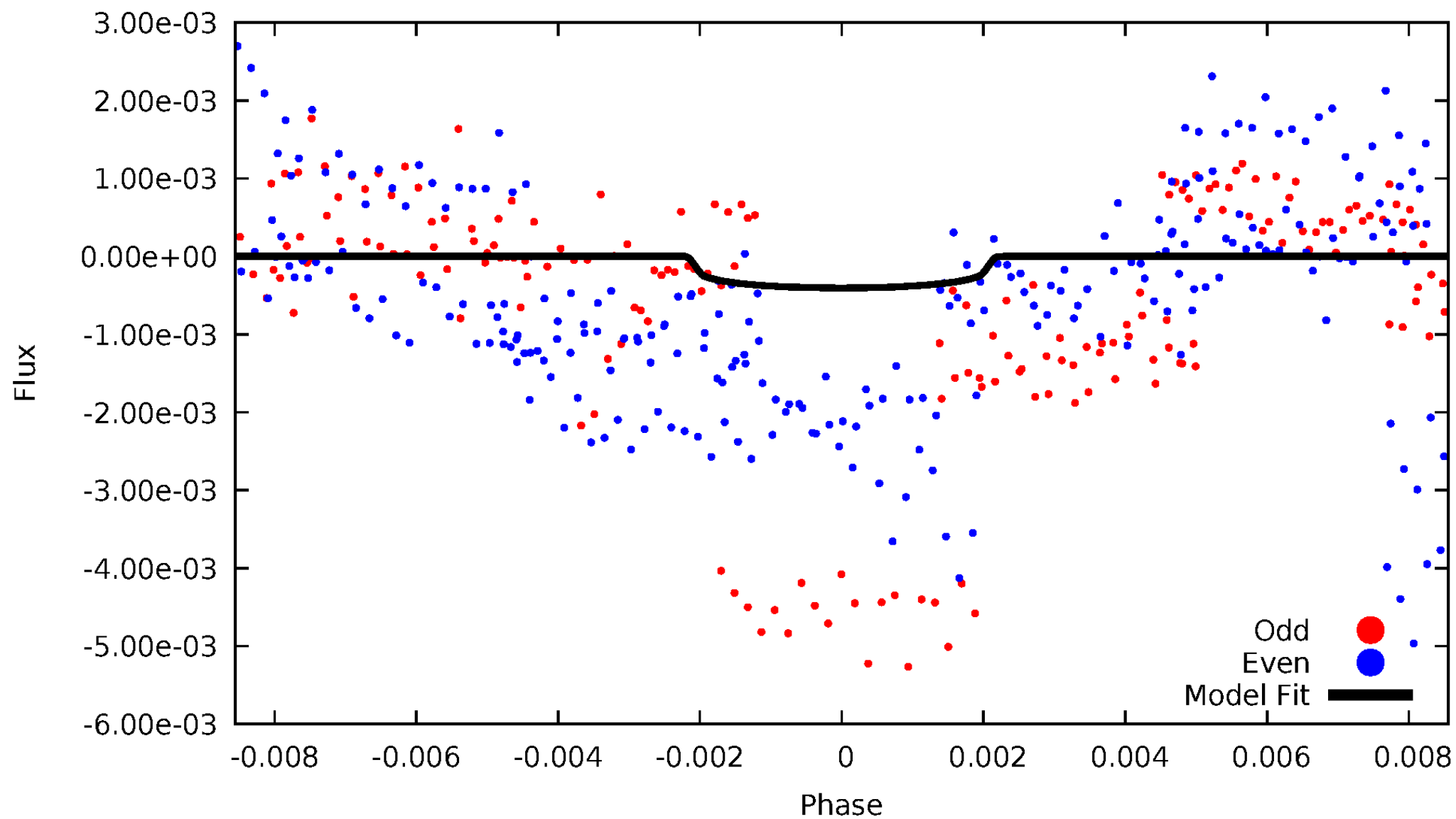


# TCE 003647812-02



# DV Odd/Even

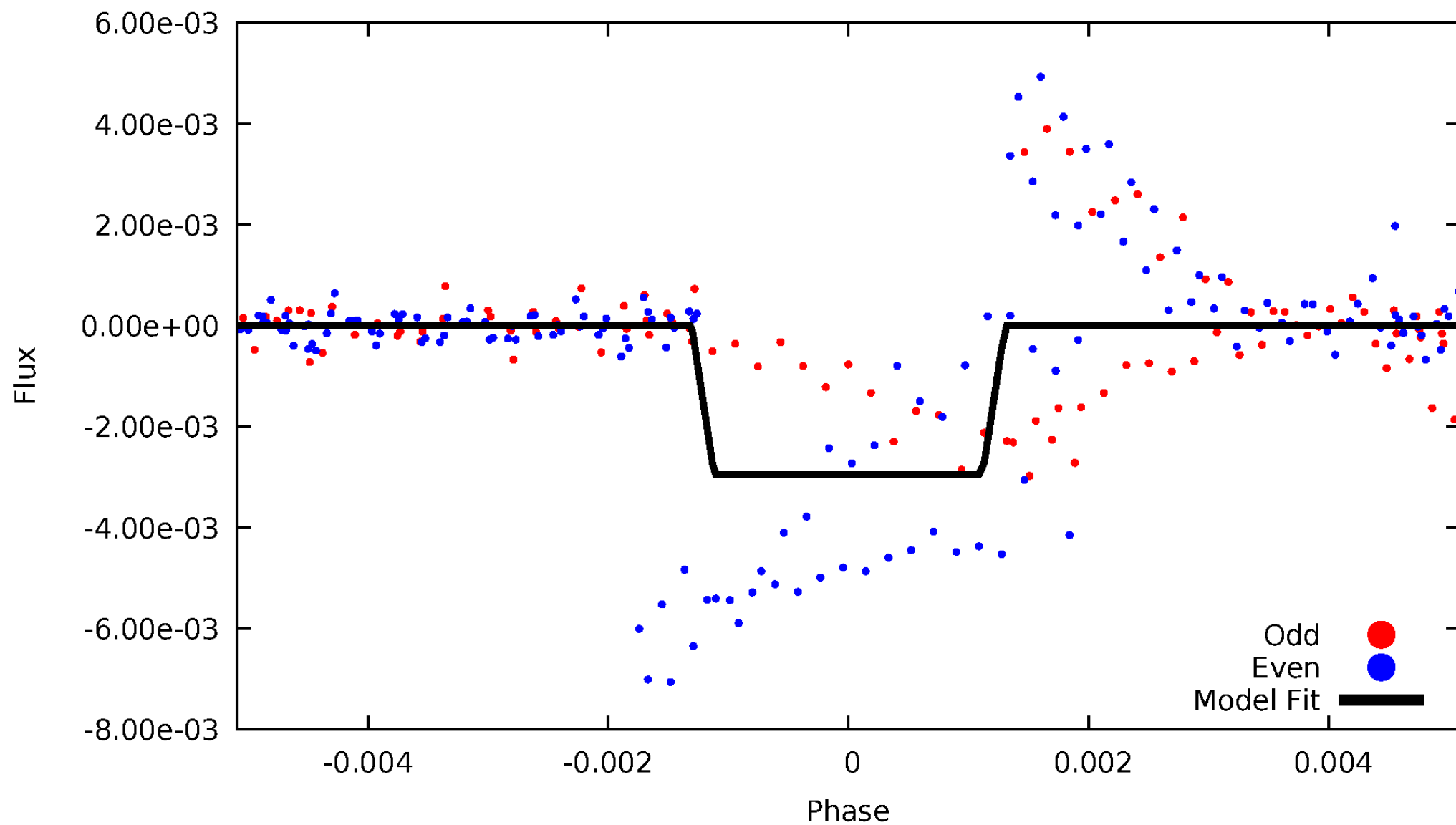
TCE 003647812-02





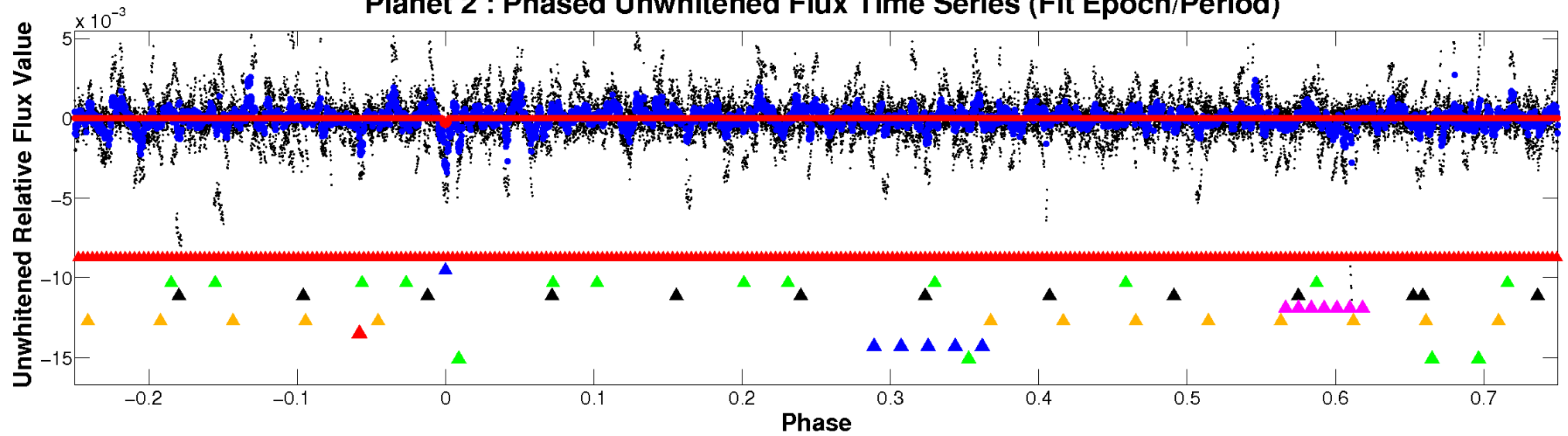
# ALT Odd/Even

TCE 003647812-02

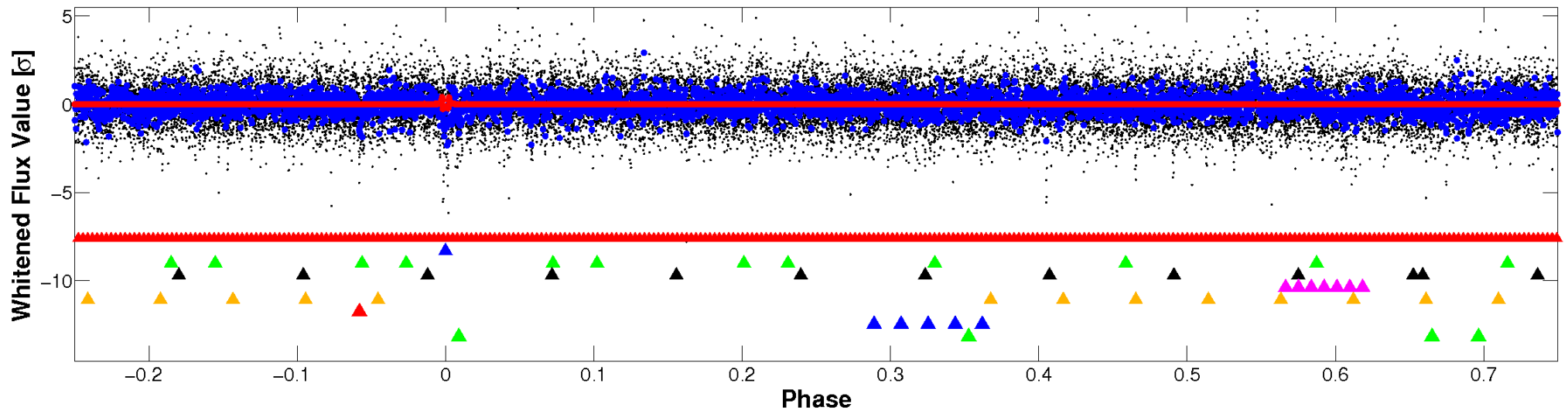


# Non-Whitened Vs. Whitened Light Curve

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

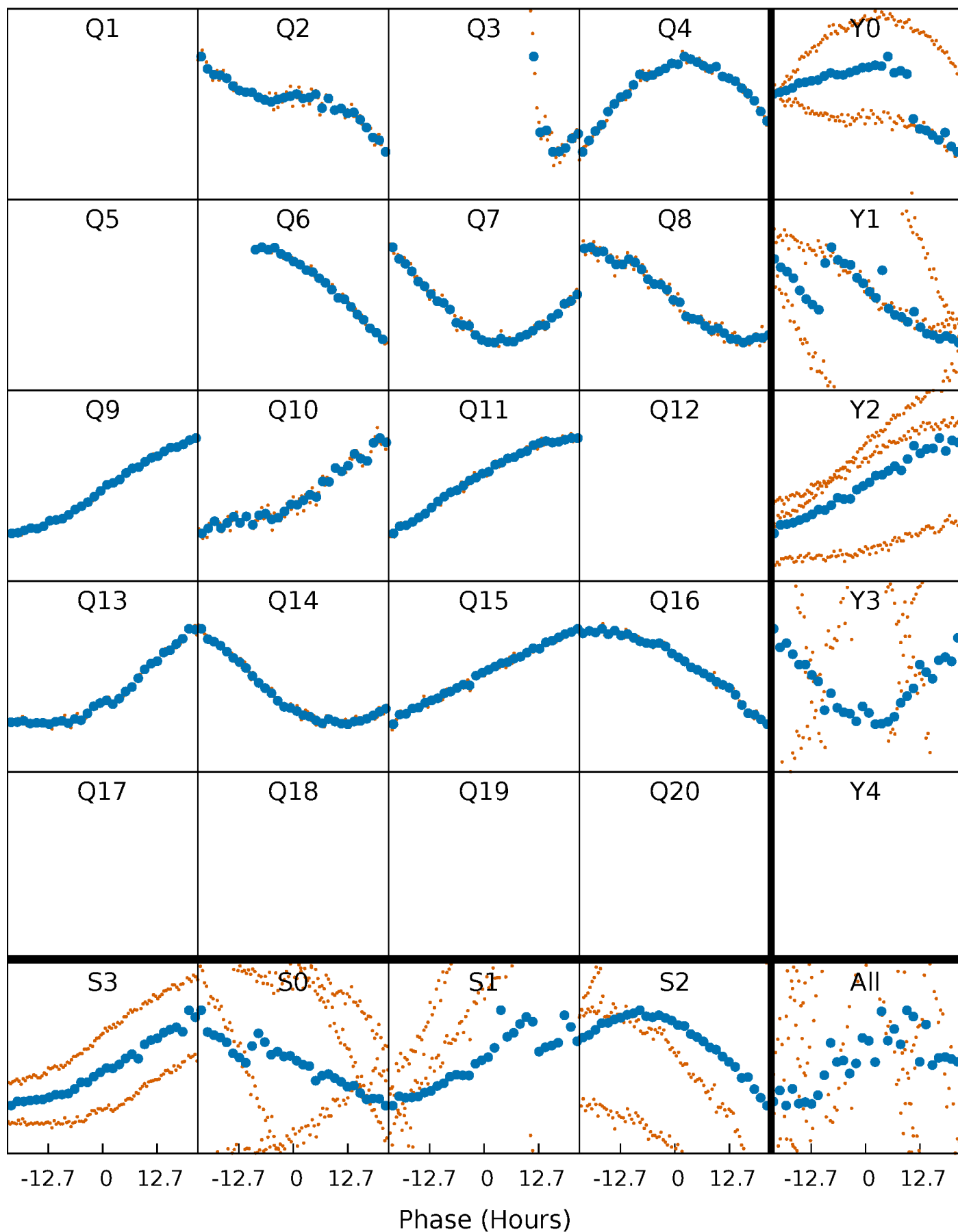


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



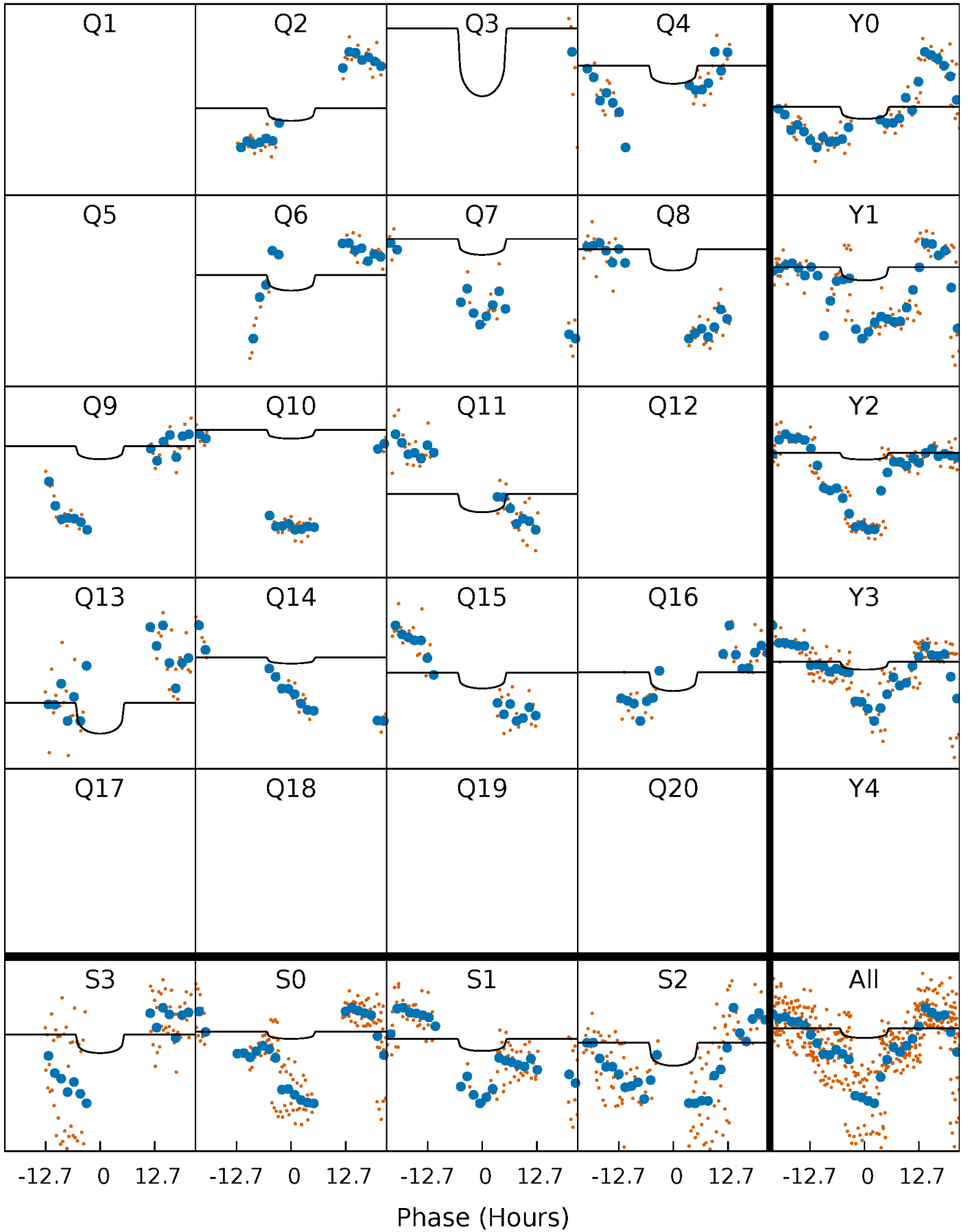
# PDC Quarter-Phased Transit Curves

TCE 003647812-02 P=108.387733 Days  $T_0=214.706028$  (BKJD)



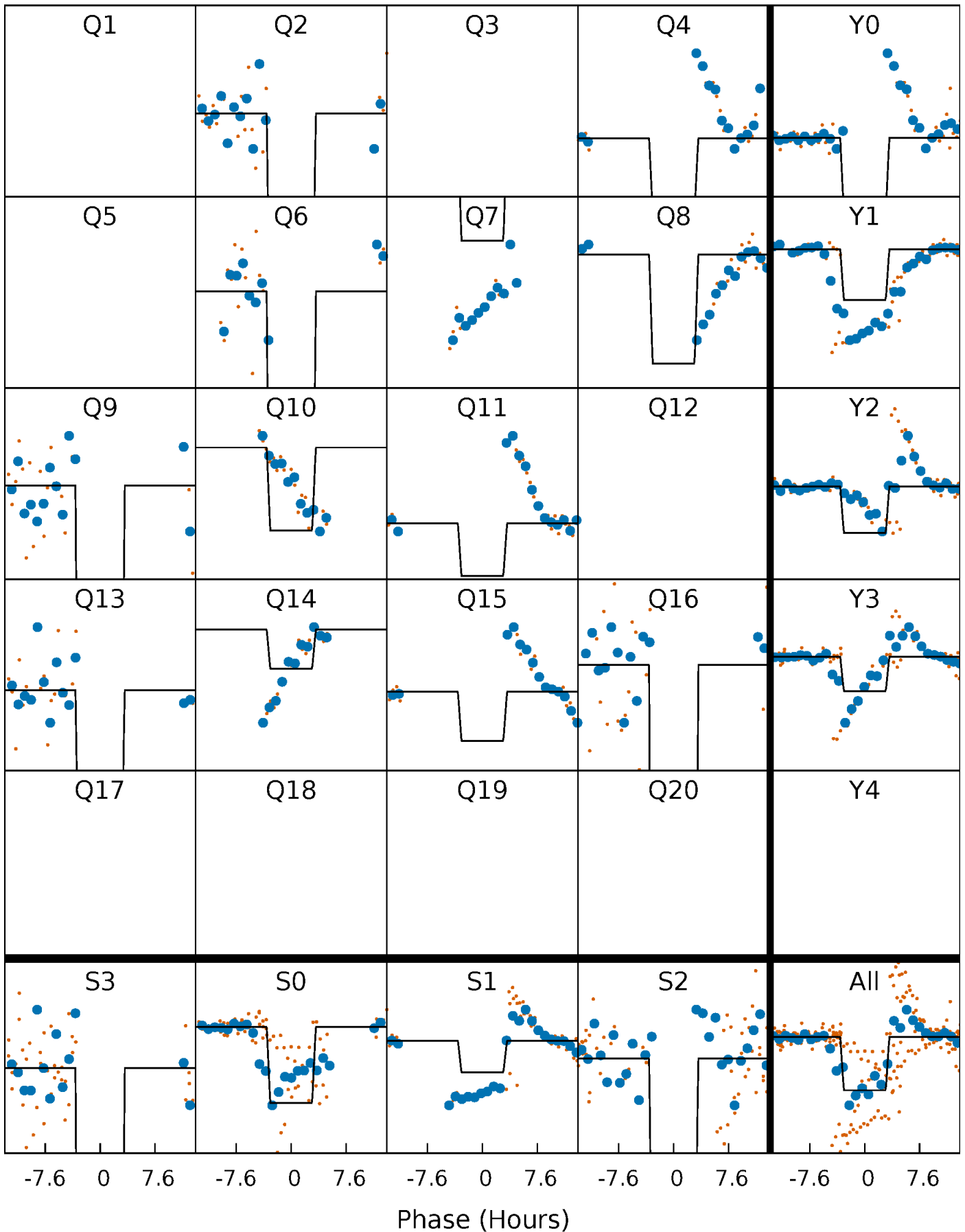
# DV Quarter-Phased Transit Curves

TCE 003647812-02 P=108.387733 Days  $T_0=214.706028$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 003647812-02 P=108.385531 Days  $T_0=214.721031$  (BKJD)

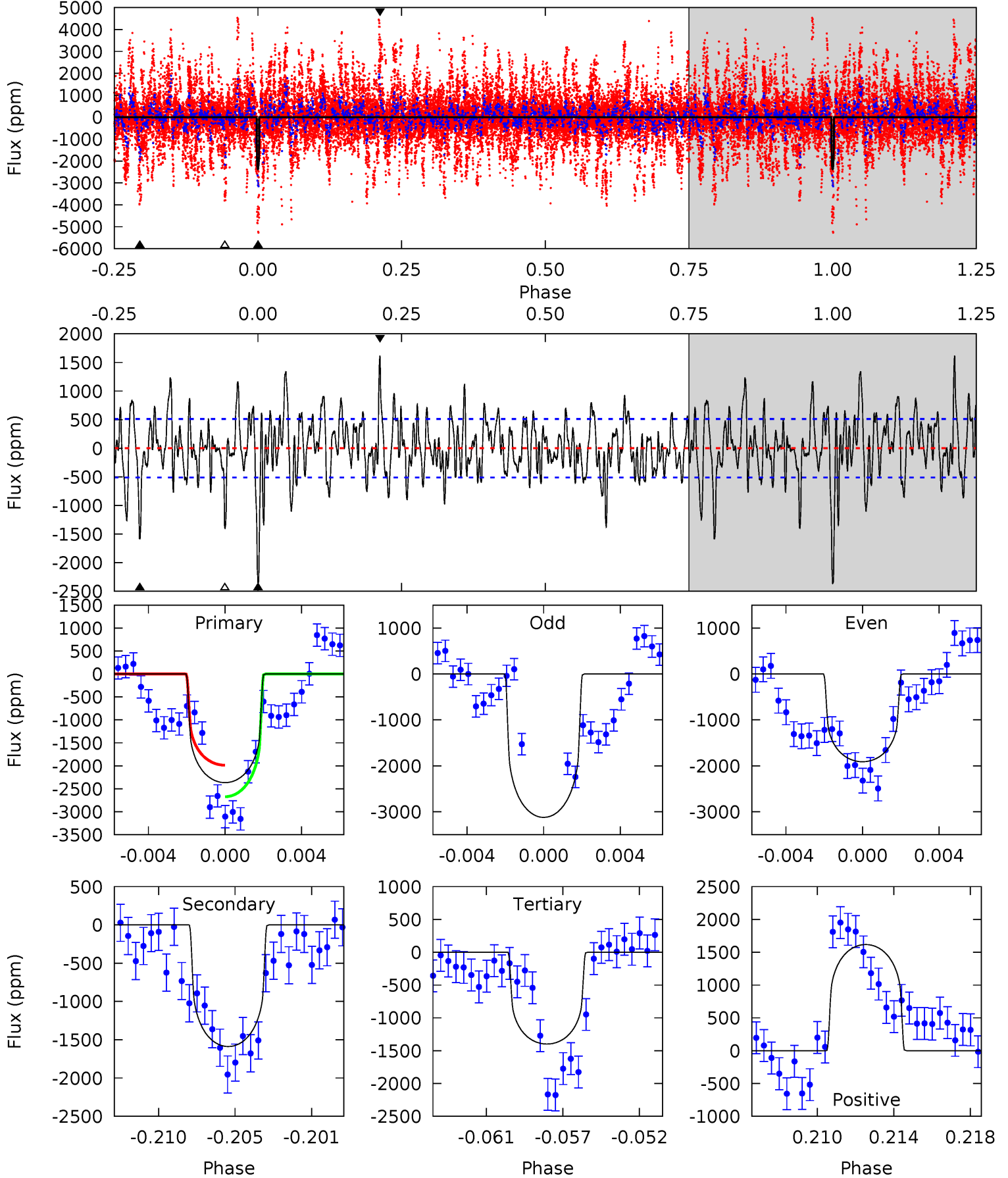




# DV Model-Shift Uniqueness Test

003647812-02, P = 108.387733 Days, E = 106.318295 Days

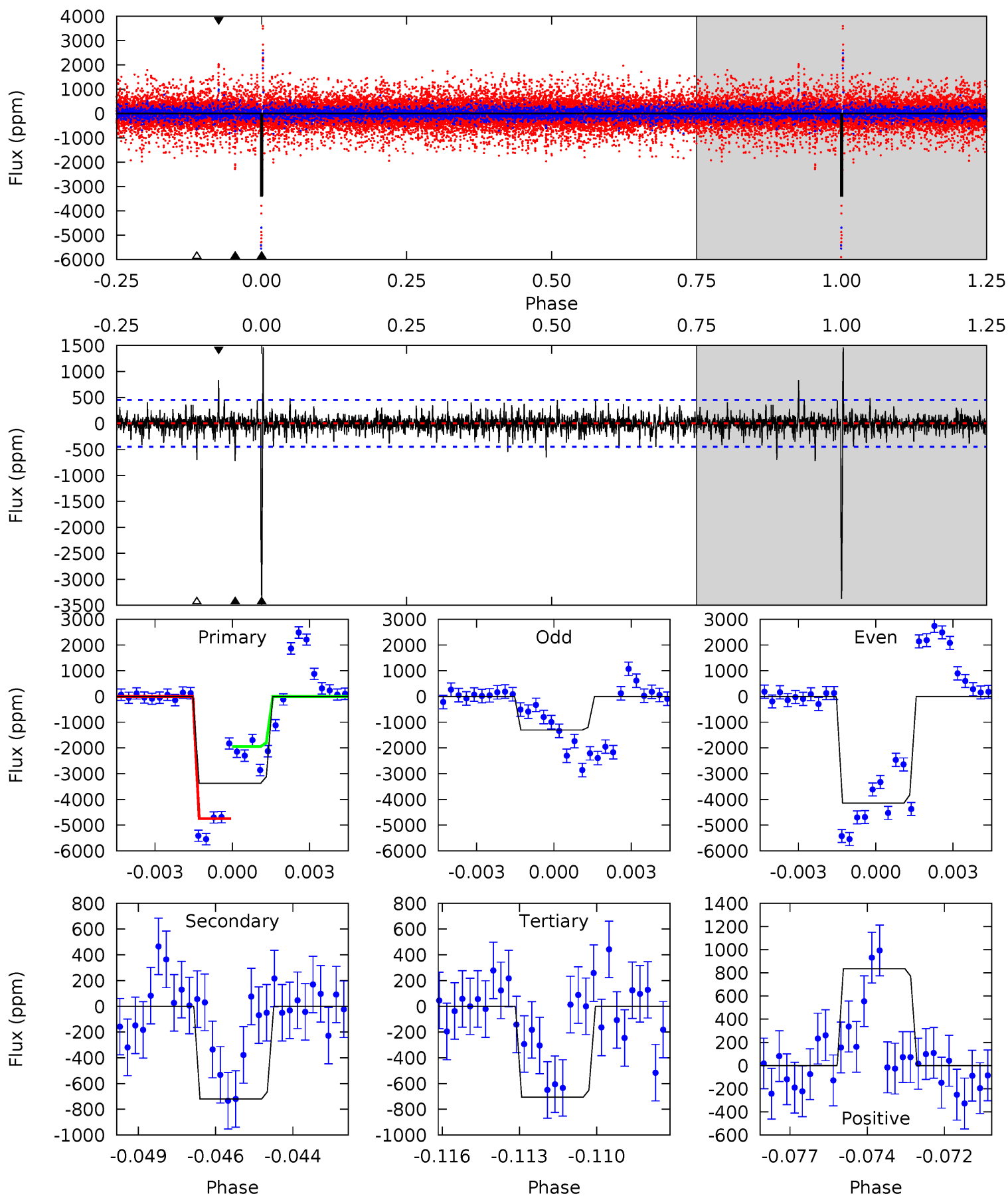
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
23.9	16.1	14.2	16.4	5.18	2.85	4.32	9.79	7.58	1.92	-0.29	5.55	1.26	0.41	3.46



# Alt Model-Shift Uniqueness Test

003647812-02, P = 108.385531 Days, E = 106.335500 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
39.7	8.46	8.29	9.80	5.28	3.02	1.42	31.4	29.8	0.17	-1.35	18.9	1.05	0.30	16.8



### Stellar Parameters For KIC 003647812

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5534^{+166}_{-166}$	$4.504^{+0.066}_{-0.165}$	$-0.040^{+0.300}_{-0.300}$	$0.877^{+0.207}_{-0.095}$	$0.896^{+0.102}_{-0.083}$	$1.870^{+0.529}_{-0.824}$
	+3%/-3%	+1%/-4%	+750%/-750%	+24%/-11%	+11%/-9%	+28%/-44%
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 003647812-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-1589 \pm 99$	$2.23^{+1.84}_{-1.41}$	$495^{+27}_{-21}$	$7378^{+8293}_{-1946}$	$31716^{+199937}_{-22111}$
Alt.	$-720 \pm 85$	$5.26^{+2.00}_{-1.99}$	$495^{+29}_{-24}$	$4189^{+844}_{-456}$	$2651^{+3999}_{-1269}$

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

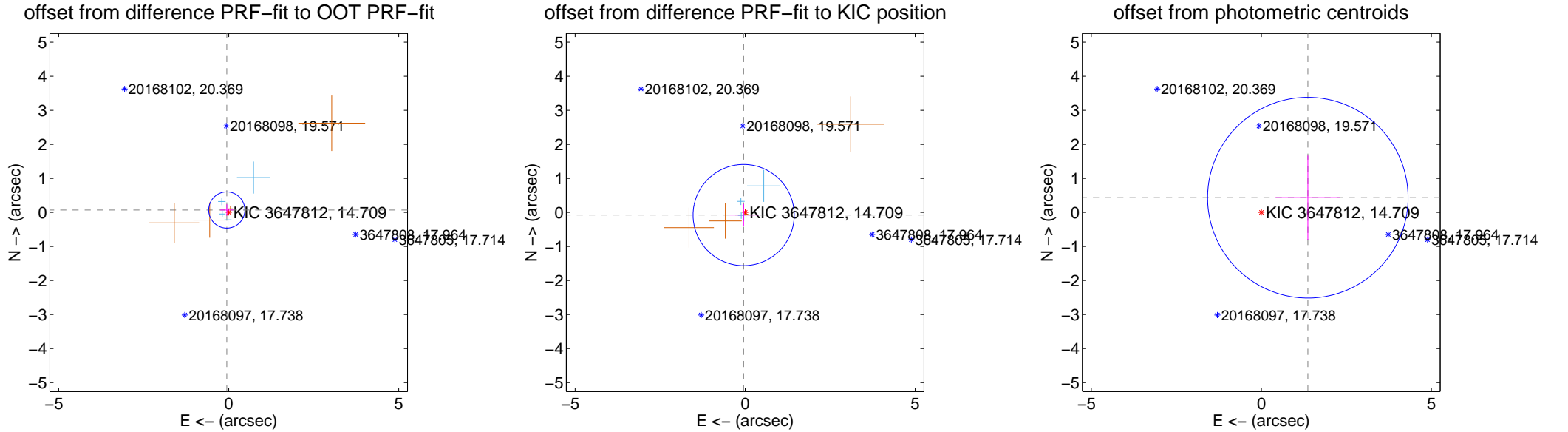
## DV Centroid Data

Supplemental centroid analysis for 003647812-02. Kepler magnitude: 14.71. Transit SNR 2.72

There are 4 quarters with good PRF difference image offsets

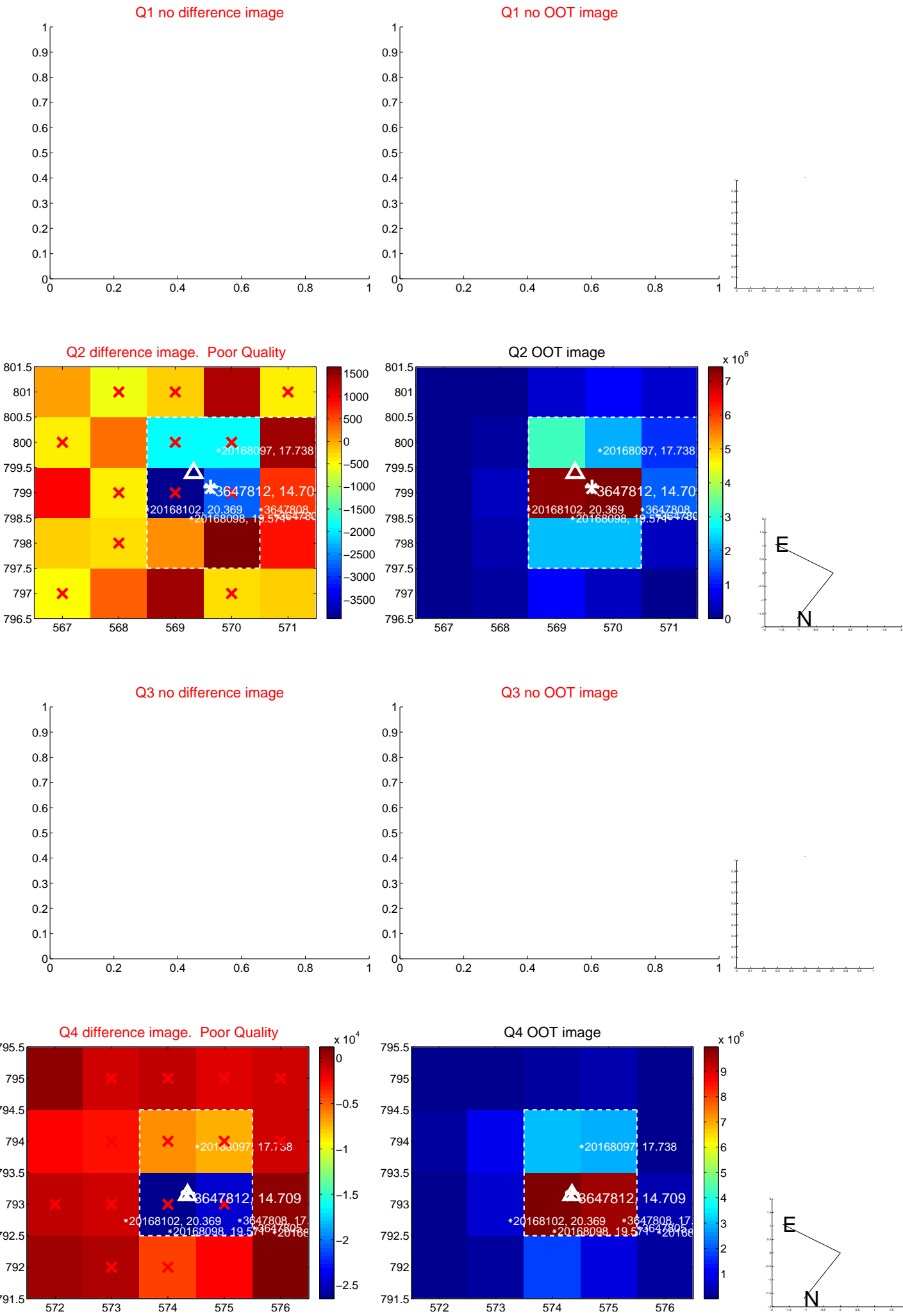
The direct PRF centroid is offset from the target star catalog position by about 0.08 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.091 \pm 0.177$	0.51	$0.057 \pm 0.189$	$0.071 \pm 0.169$
PRF-fit source offset from KIC position	$0.089 \pm 0.496$	0.18	$0.045 \pm 0.445$	$-0.077 \pm 0.324$
photometric centroid source offset	$1.43 \pm 0.98$	1.46	$-1.37 \pm 0.95$	$0.43 \pm 1.24$



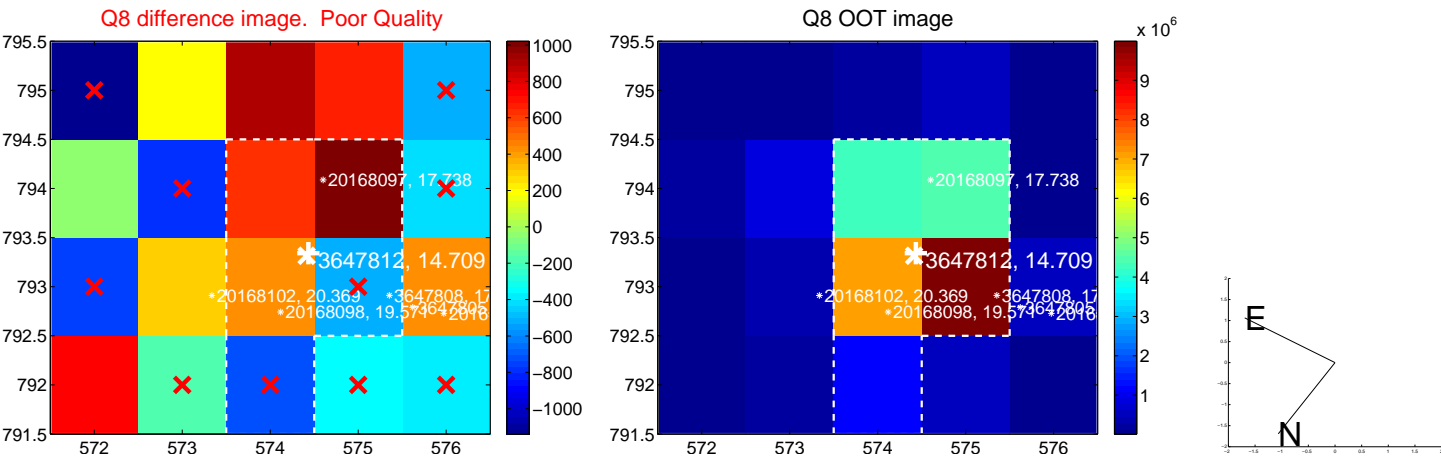
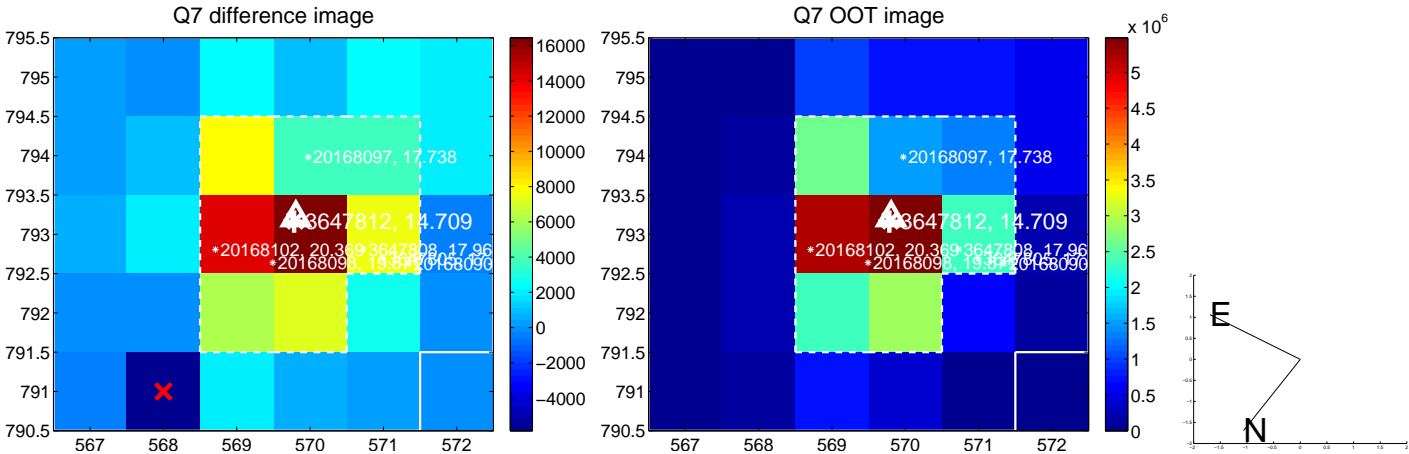
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

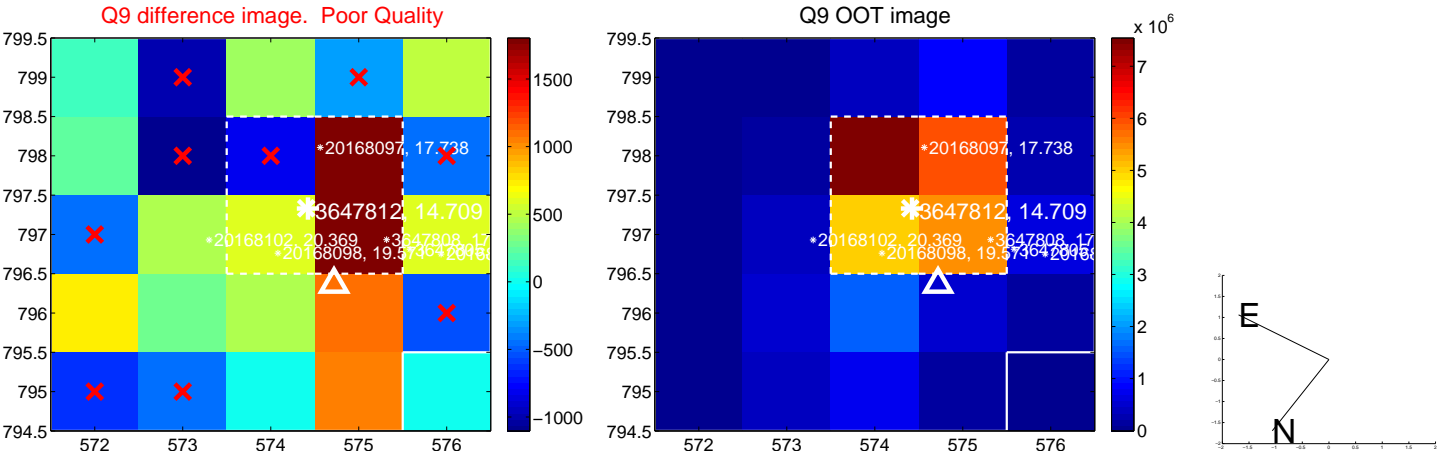




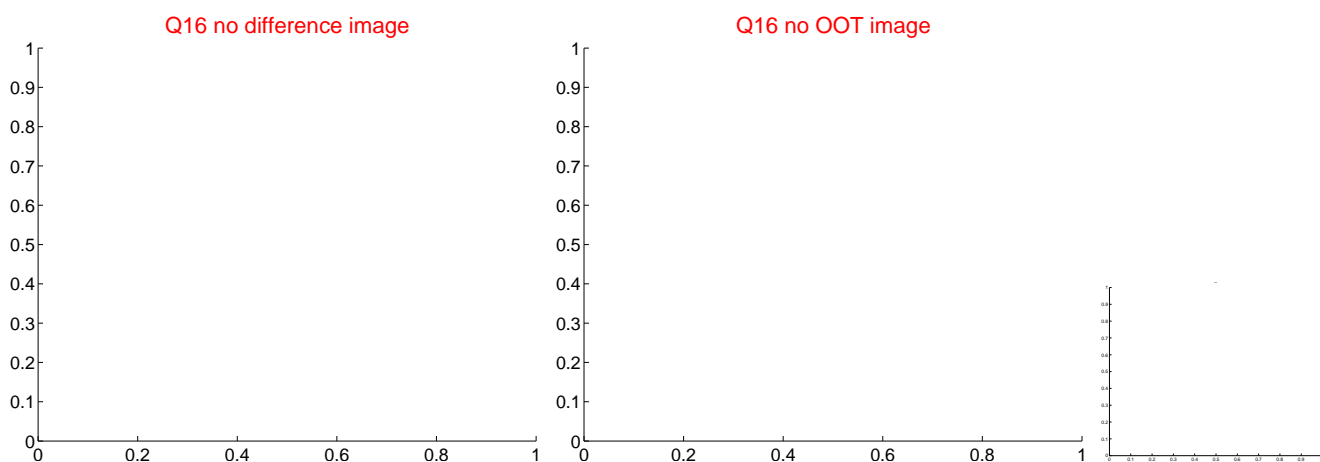
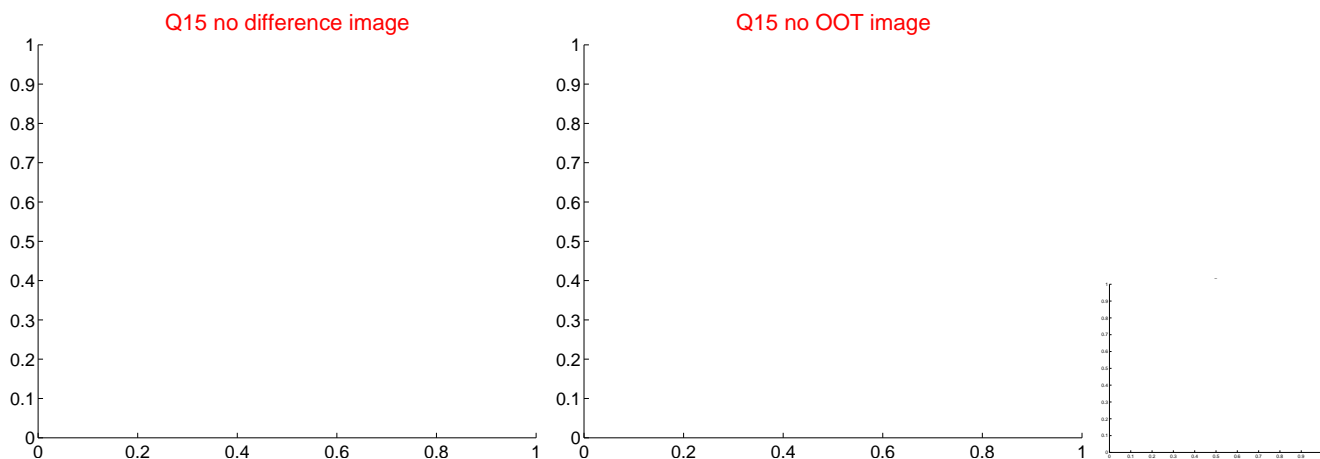
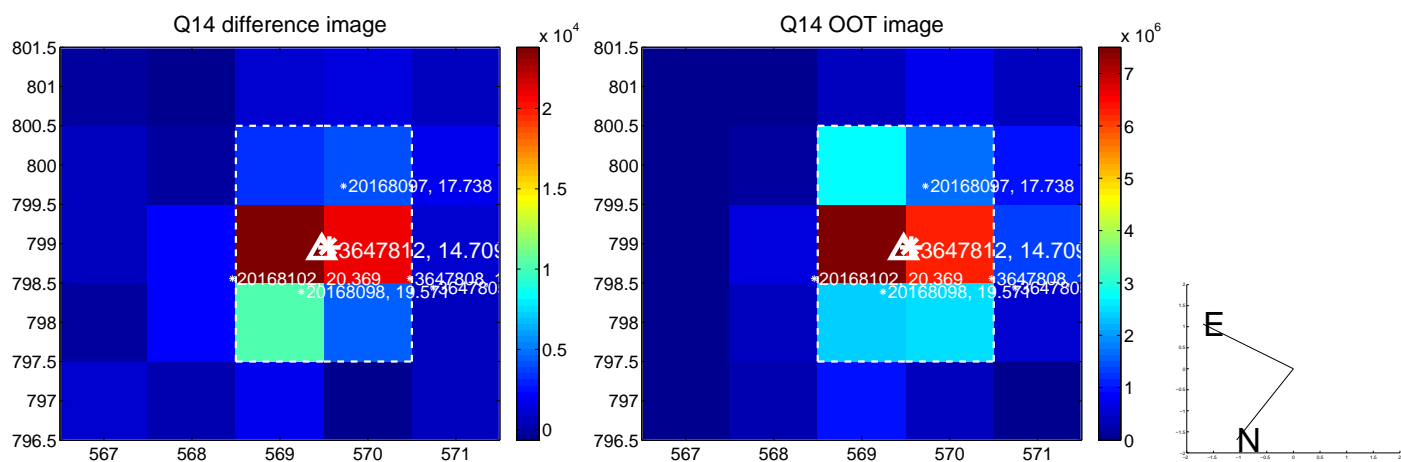
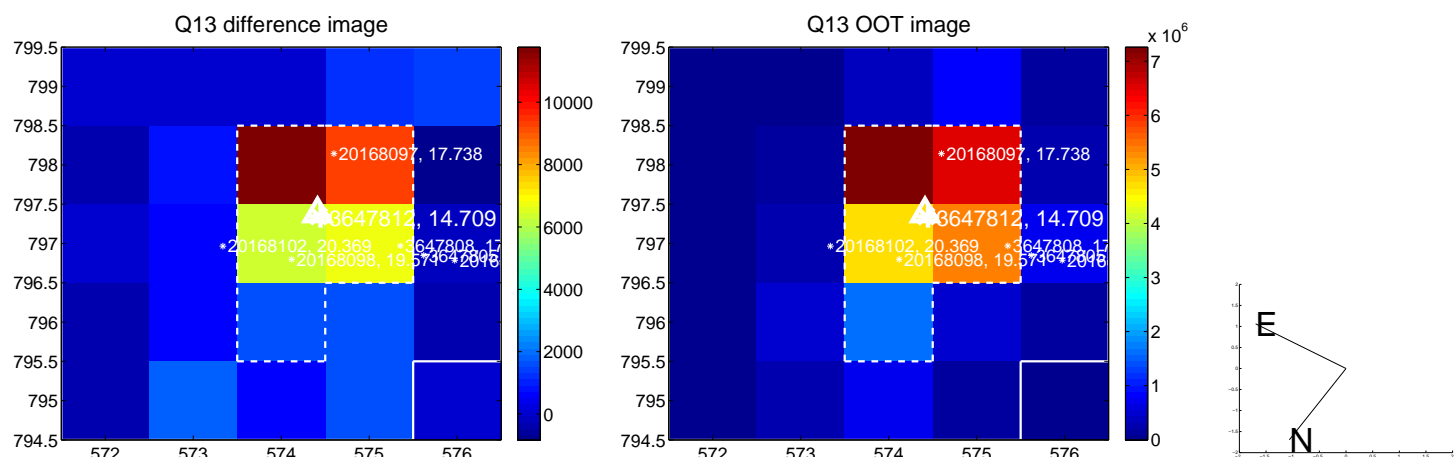
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



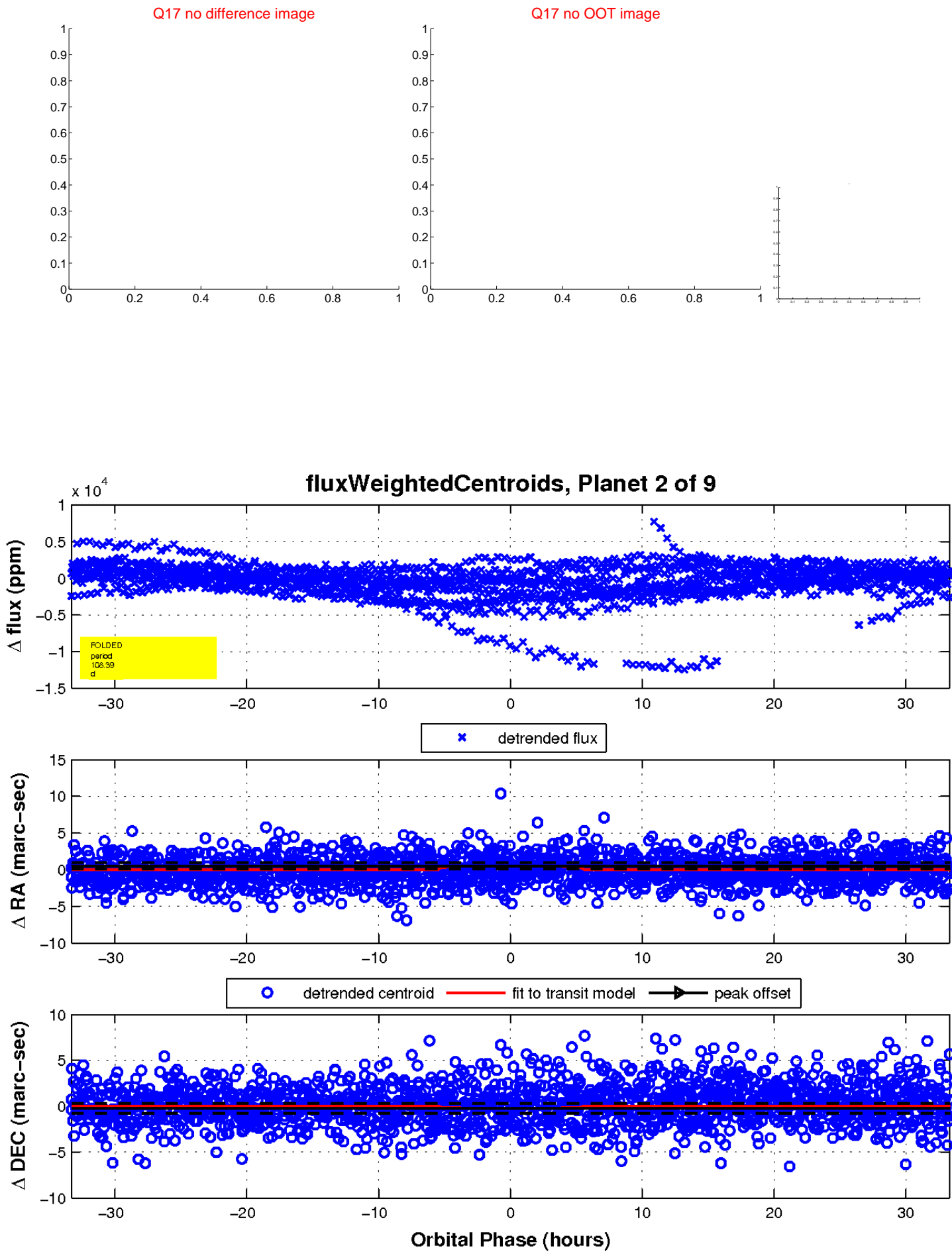
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

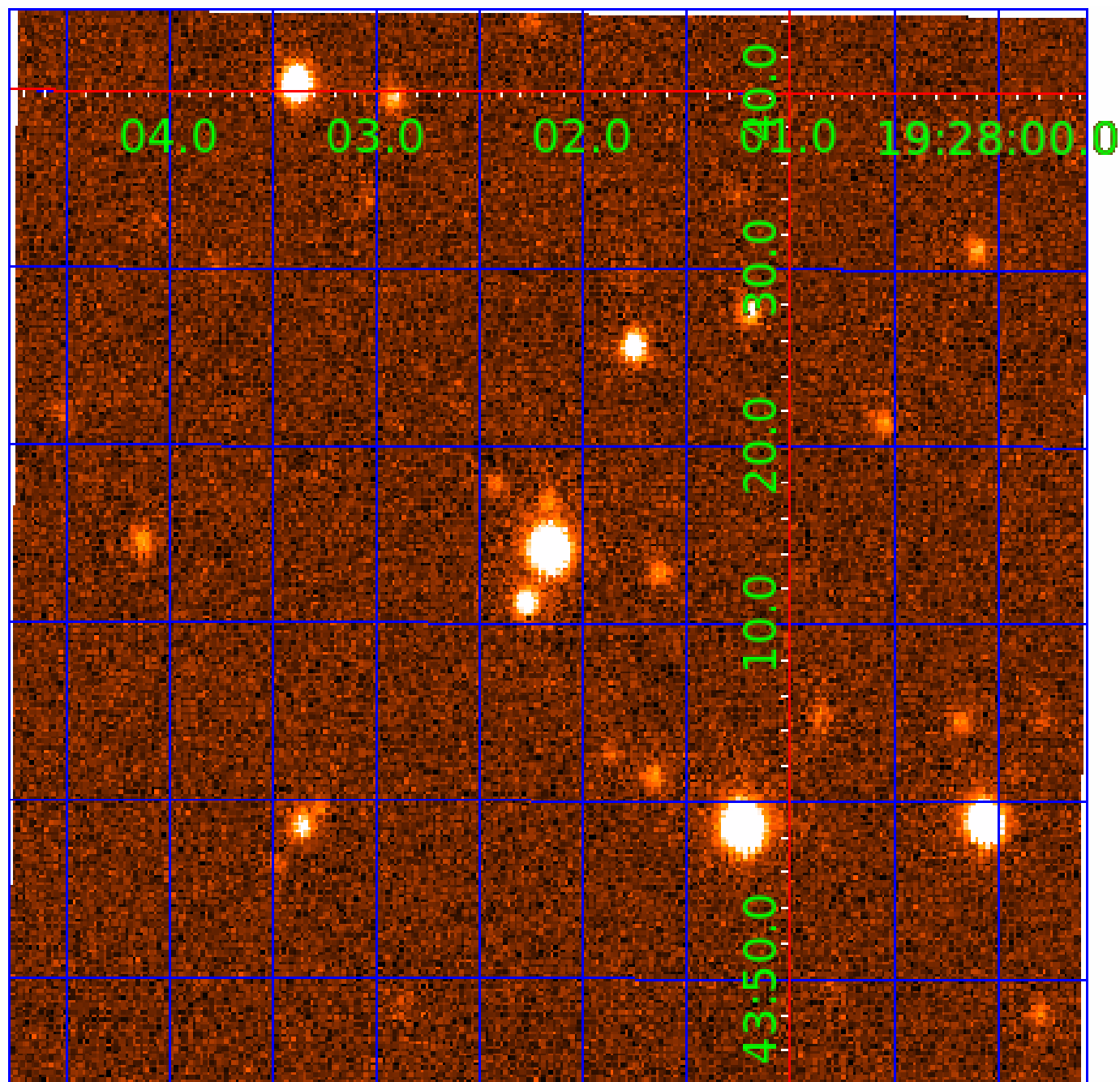


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 003647812

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003647812-01	OBS	No	1.025744	131.805103	48.0	4.726	7.9	8.2	0.88	5534	0.62	1755.22
003647812-02	OBS	No	108.387733	214.706028	405.5	11.124	15.8	2.7	0.88	5534	1.81	3.51
003647812-03	OBS	No	122.338718	194.660074	645.6	1.634	13.3	3.5	0.88	5534	2.46	2.99
003647812-04	OBS	No	117.477275	177.043792	1139.6	6.892	13.3	7.2	0.88	5534	4.16	3.16
003647812-05	OBS	No	215.837817	173.340947	2077.4	38.867	15.1	6.2	0.88	5534	4.50	1.40
003647812-06	OBS	No	113.689287	146.161820	1122.9	12.795	10.8	6.5	0.88	5534	3.74	3.30
003647812-07	OBS	No	325.149215	316.828480	2109.5	7.212	11.6	9.2	0.88	5534	5.07	0.81
003647812-08	OBS	No	323.187877	145.543042	4343.2	27.204	11.6	7.9	0.88	5534	6.94	0.82

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003647812-01	OBS	FP	0.00	1	0	0	0	LPP_DV
003647812-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS
003647812-03	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
003647812-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
003647812-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—INCONSISTENT_TRANS—HALO_GHOST
003647812-06	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—INCONSISTENT_TRANS—HALO_GHOST
003647812-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—ALL_TRANS_CHASES—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—SAME_NTL_PERIOD—CENT_FEW_DIFFS
003647812-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—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.

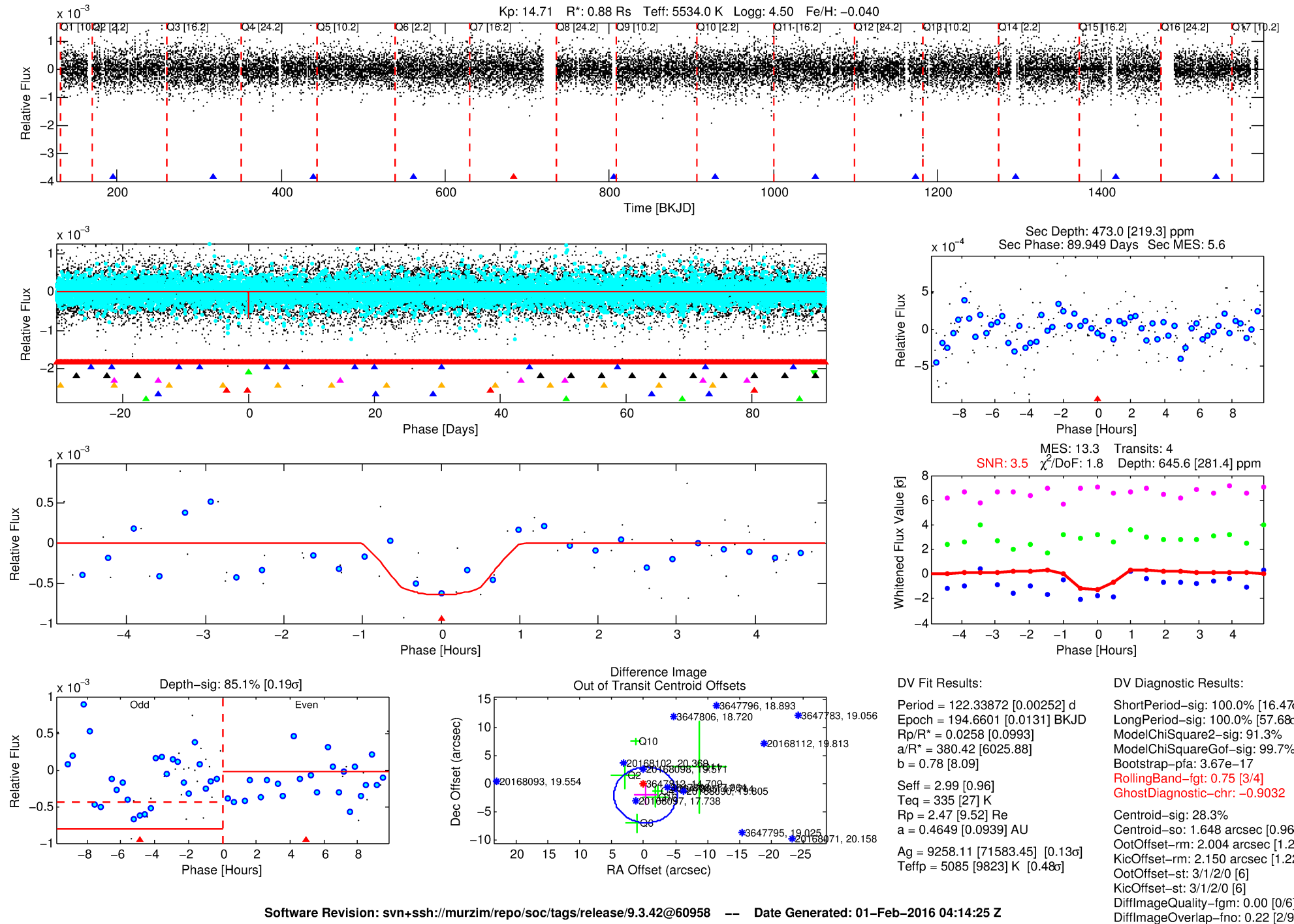
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 003647812-03

No Significant Match Found

# DV One-Page Summary

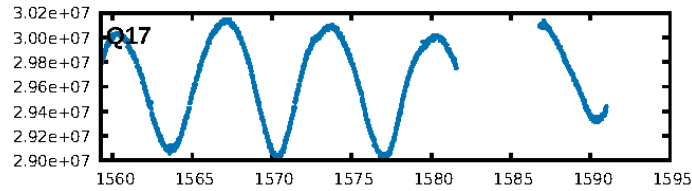
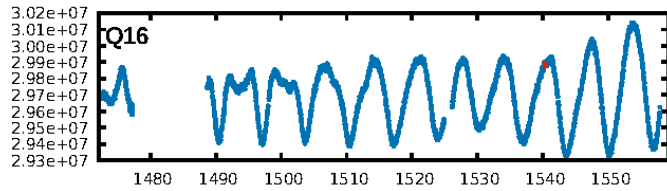
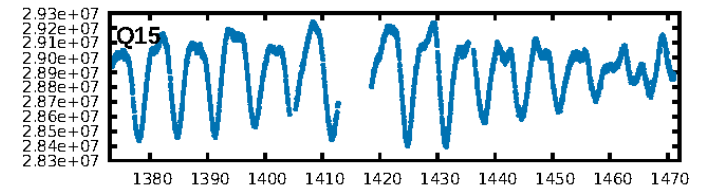
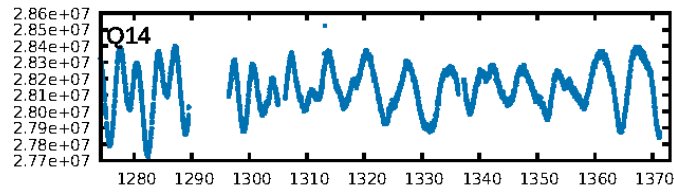
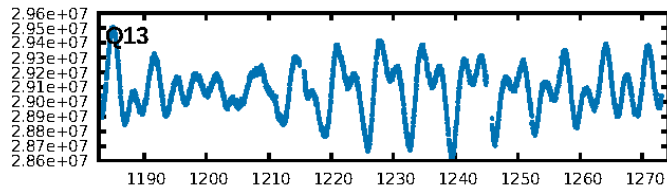
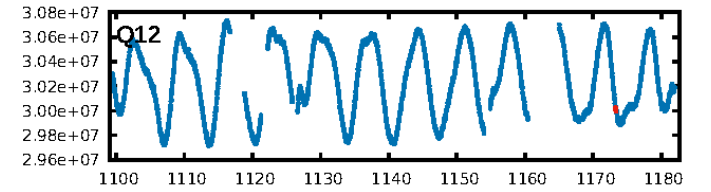
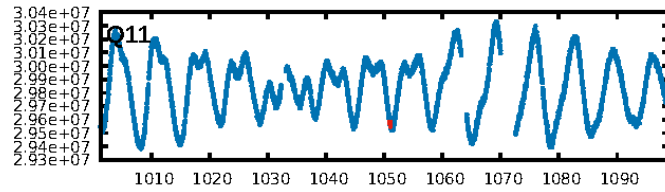
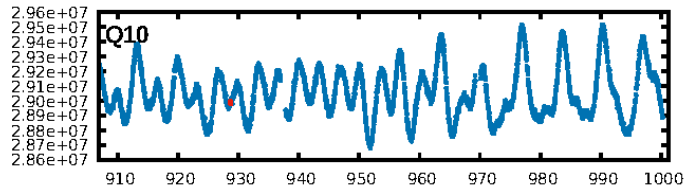
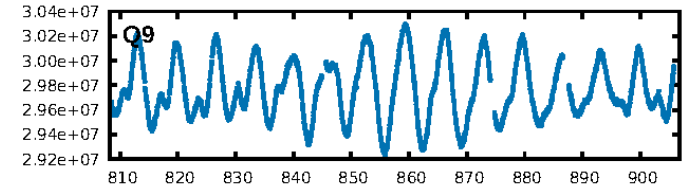
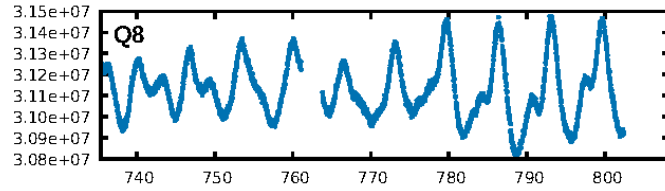
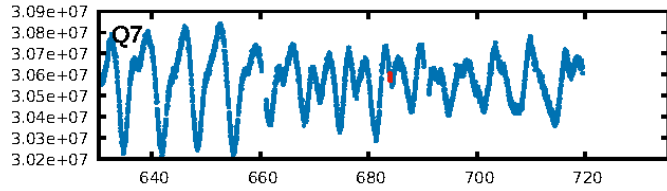
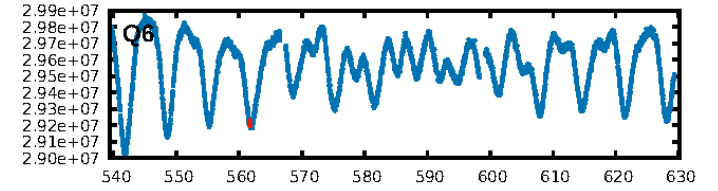
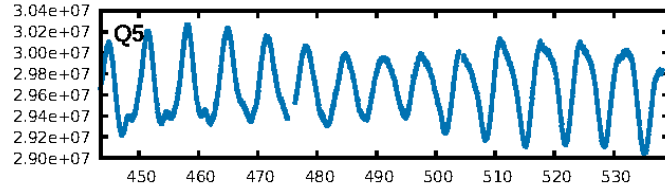
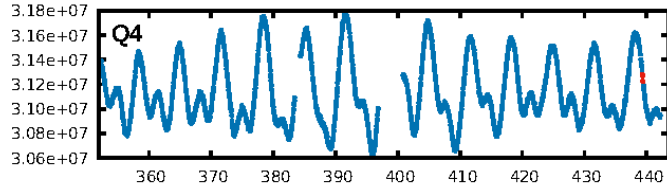
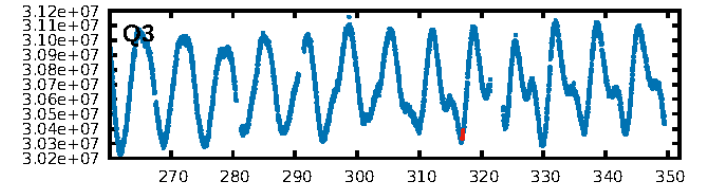
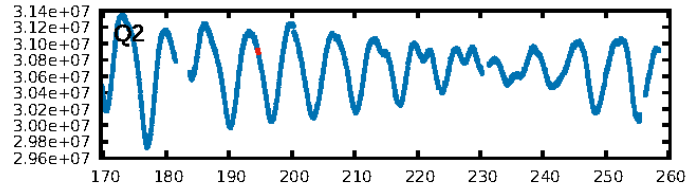
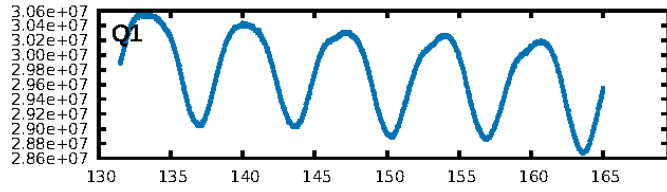
KIC: 3647812 Candidate: 3 of 9 Period: 122.339 d



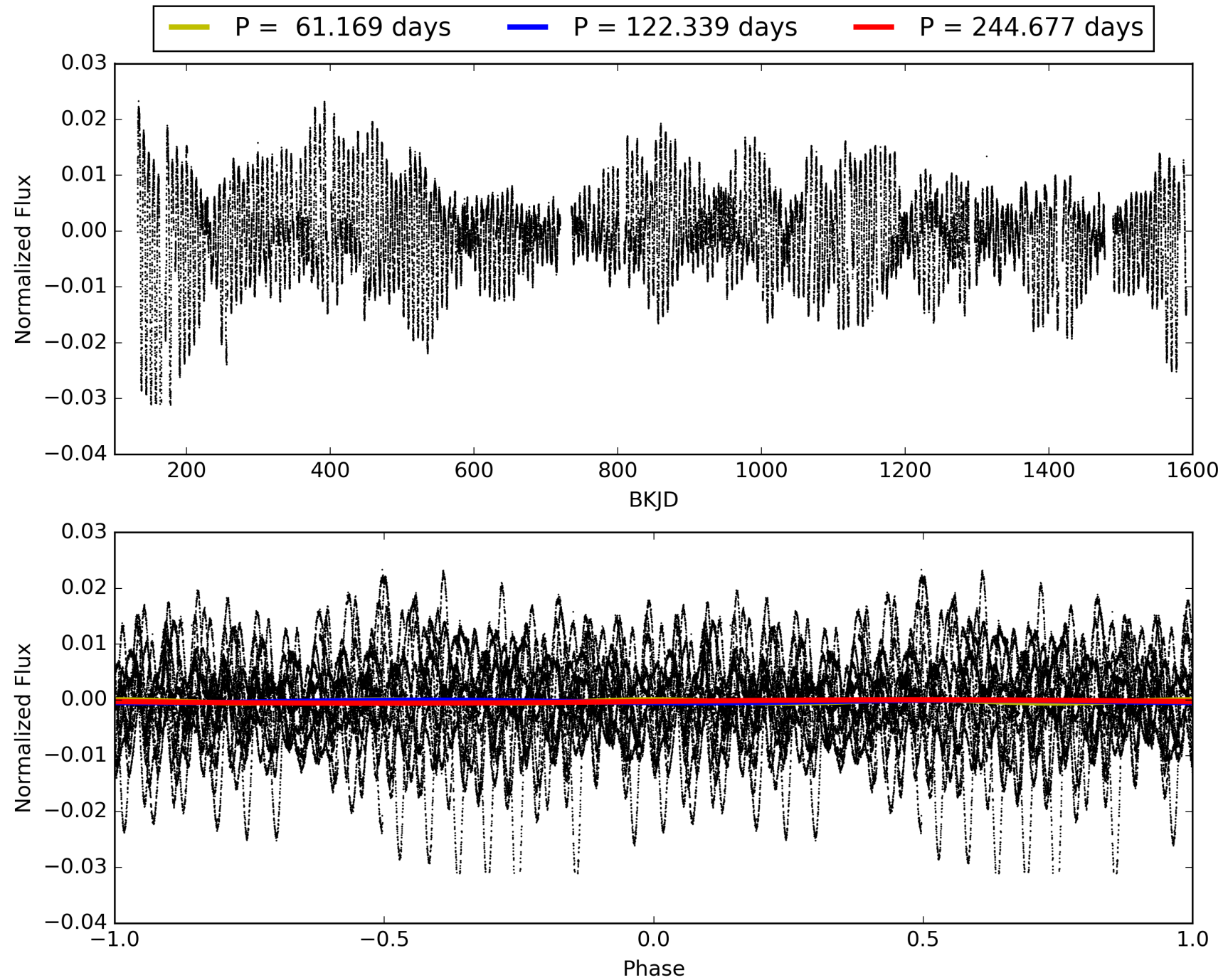
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 04:14:25 Z

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

# TCE 003647812-03, PDC Light Curves

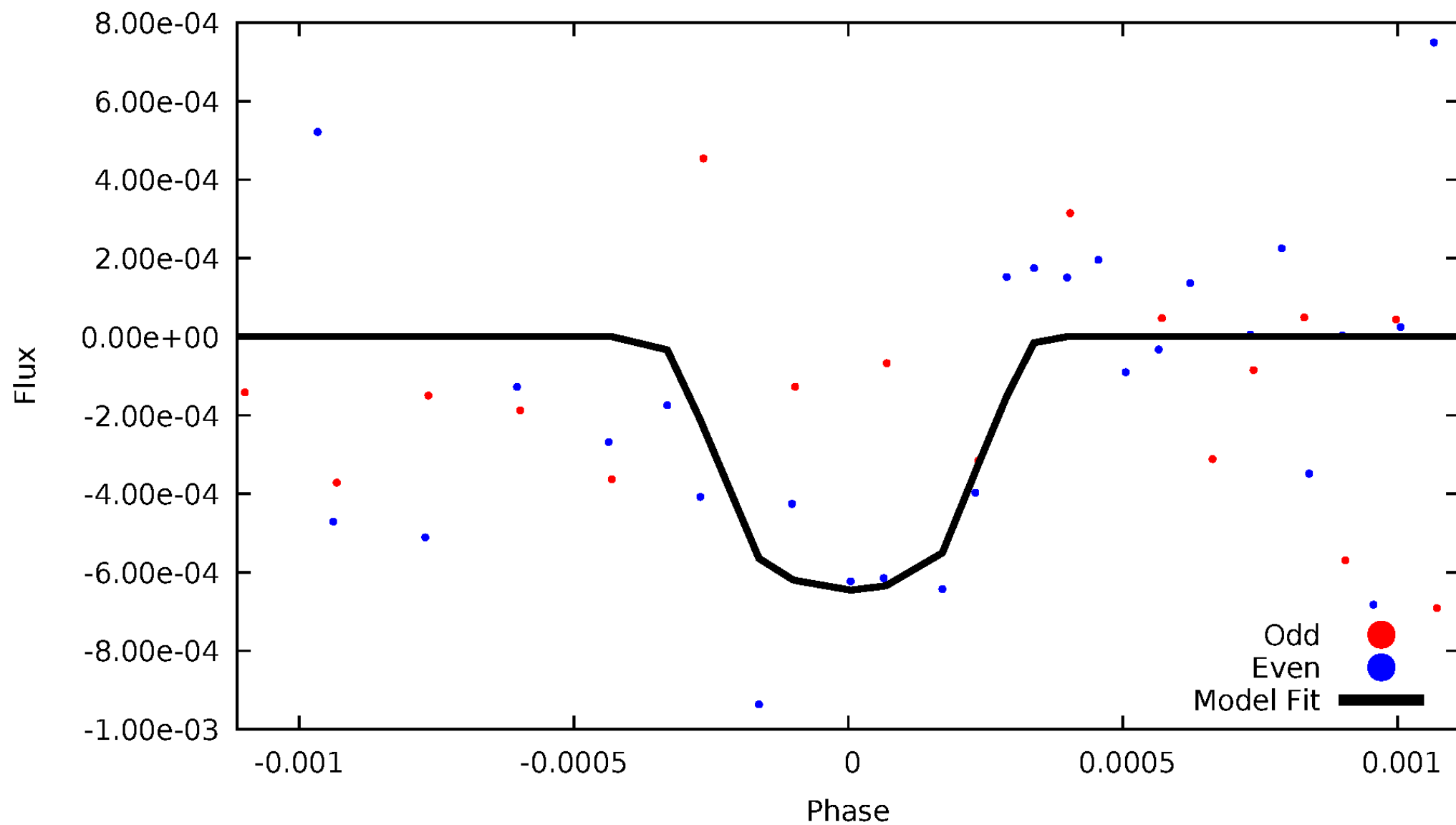


# TCE 003647812-03



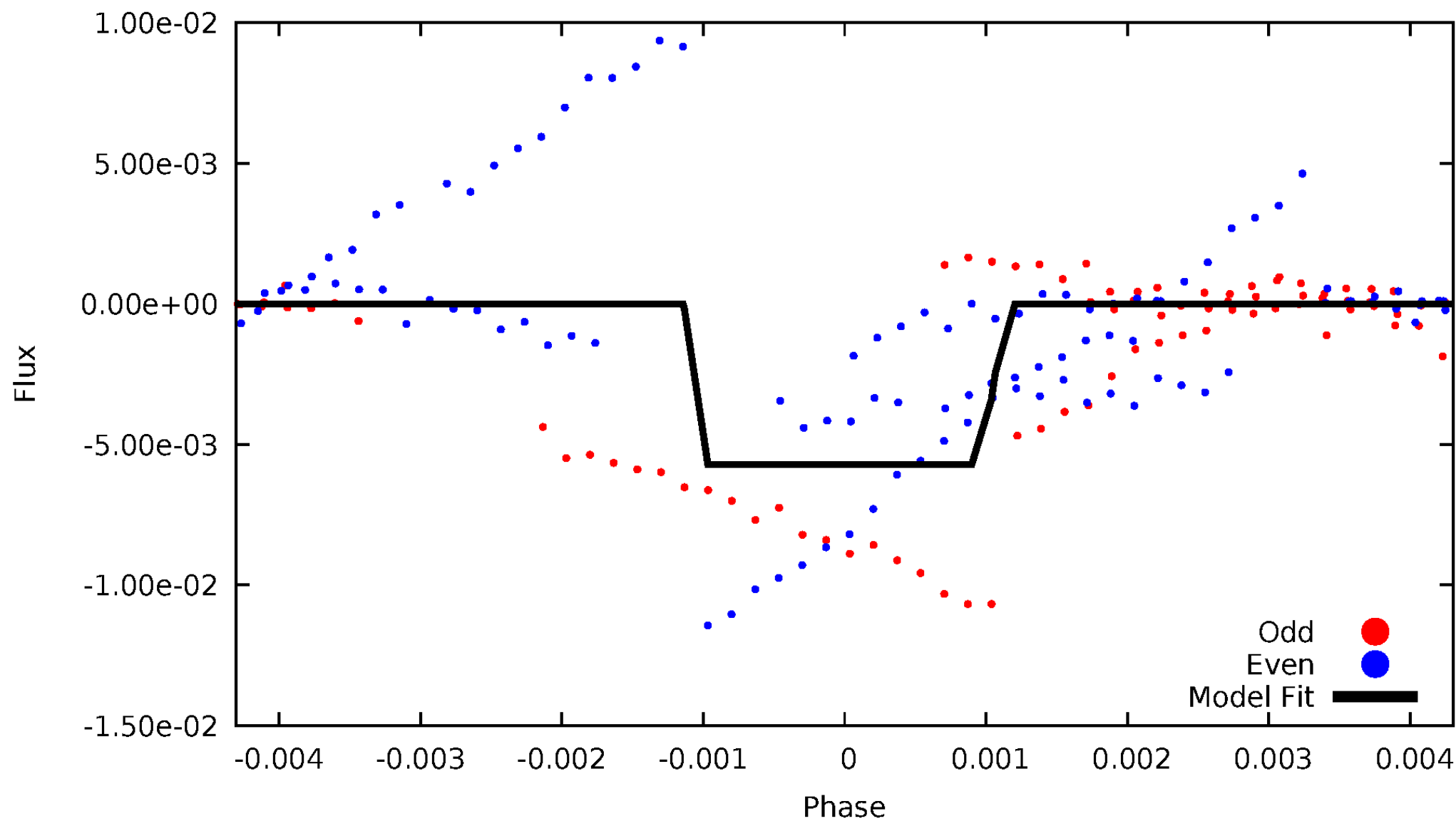
# DV Odd/Even

TCE 003647812-03



# ALT Odd/Even

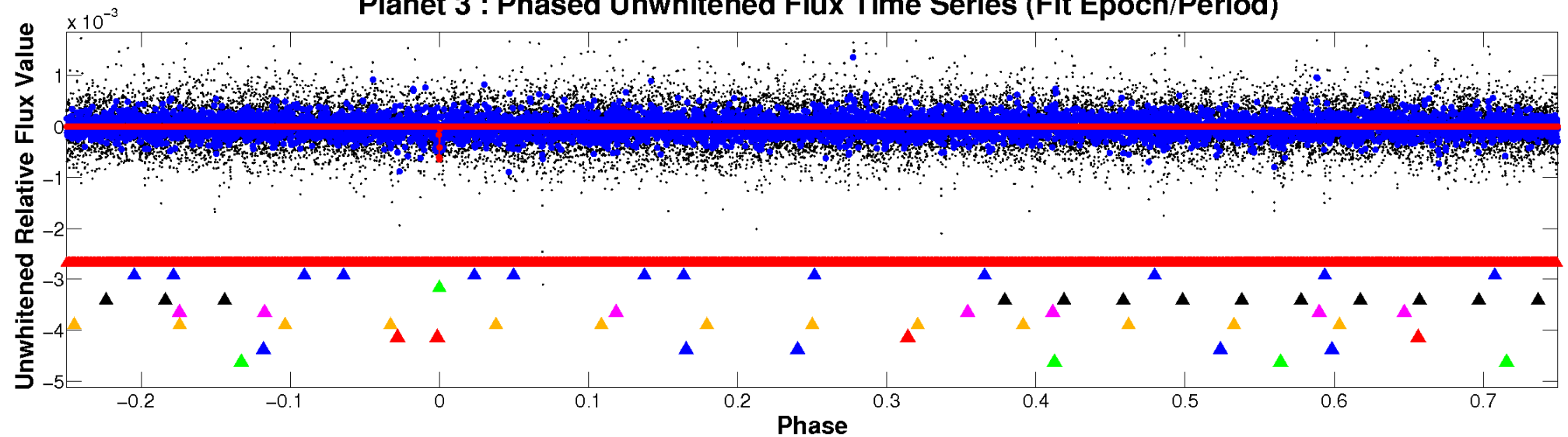
TCE 003647812-03



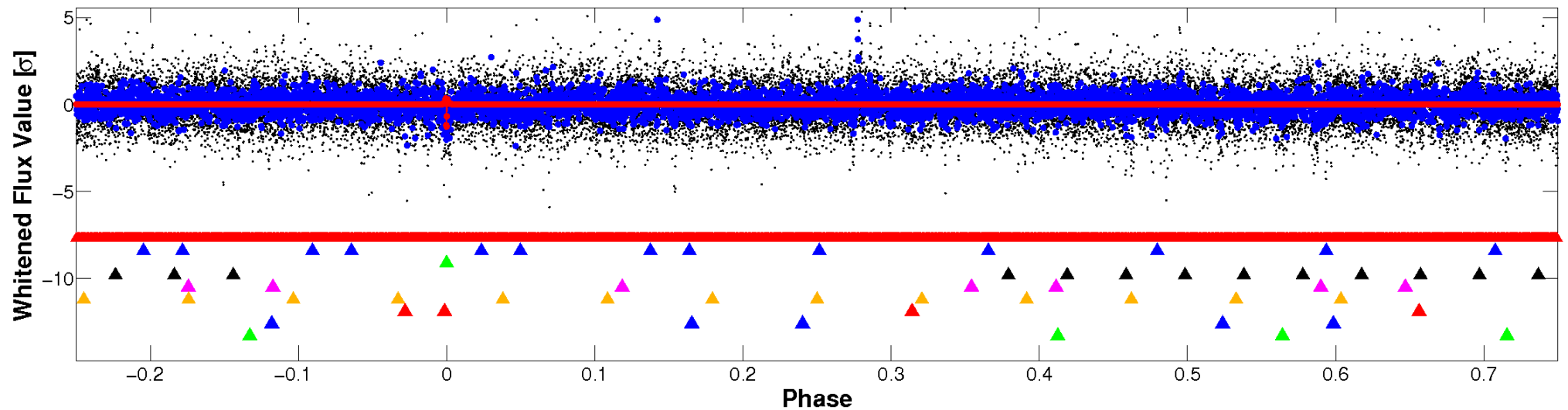


# Non-Whitened Vs. Whitened Light Curve

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

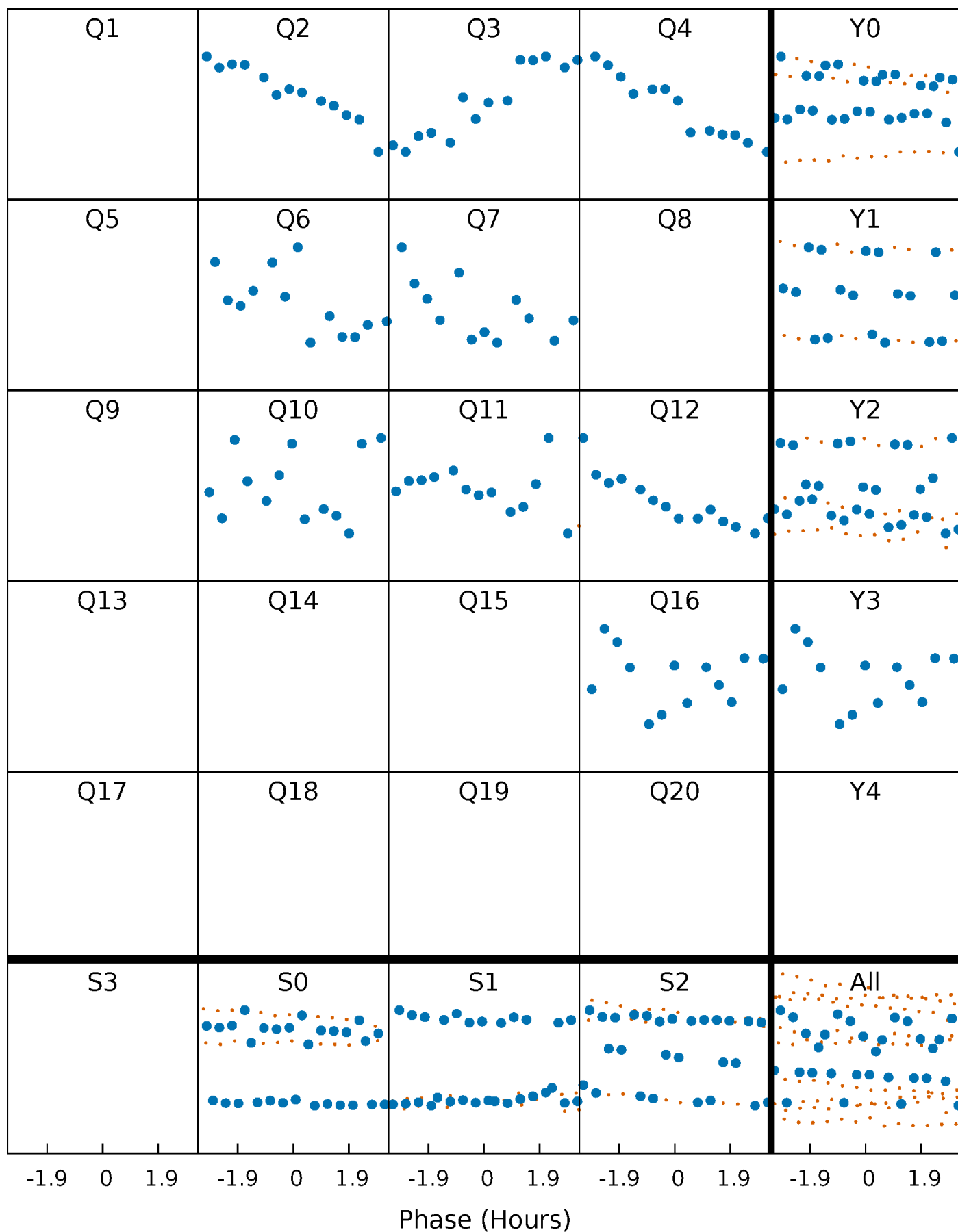


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



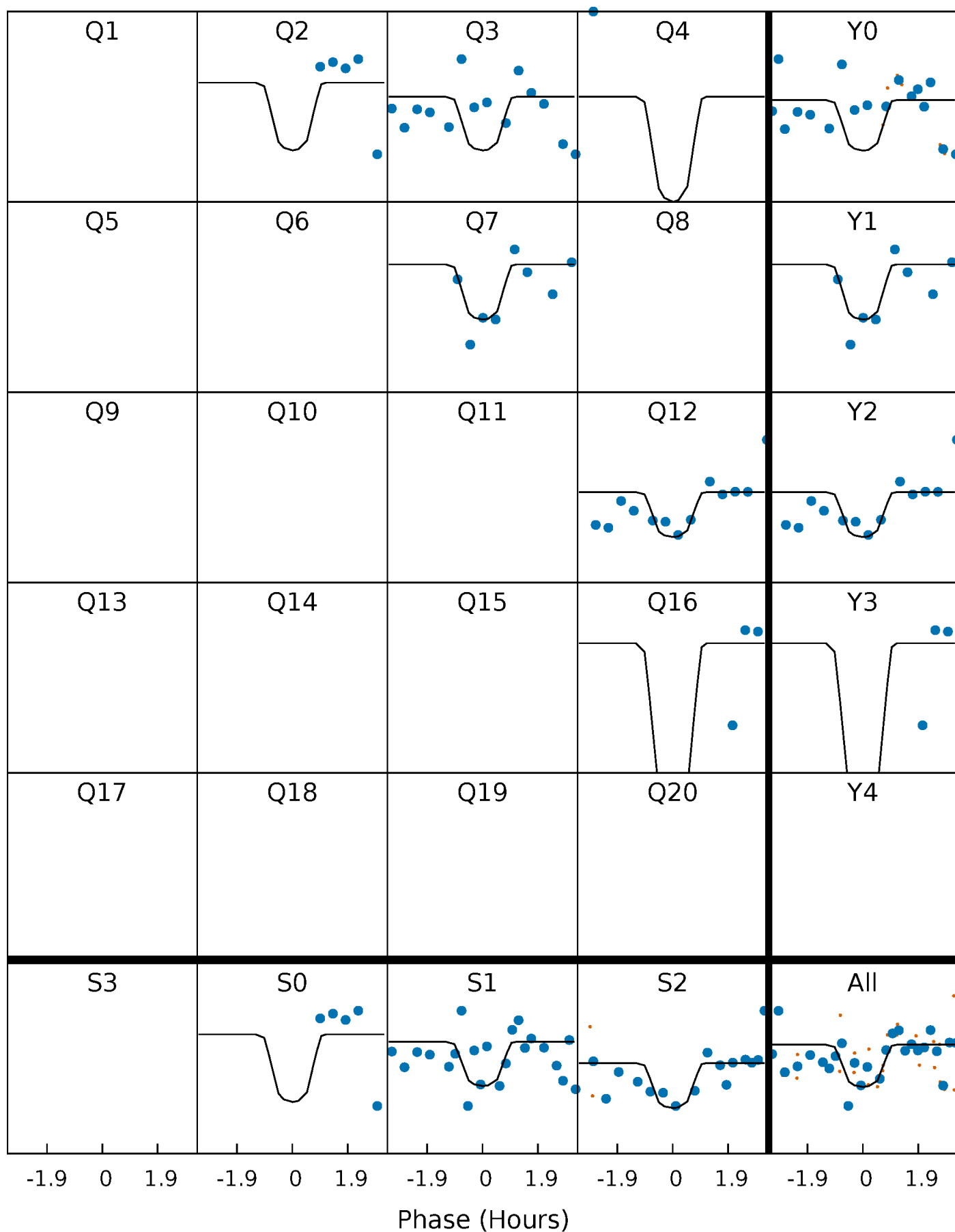
# PDC Quarter-Phased Transit Curves

TCE 003647812-03 P=122.338718 Days  $T_0=194.660074$  (BKJD)



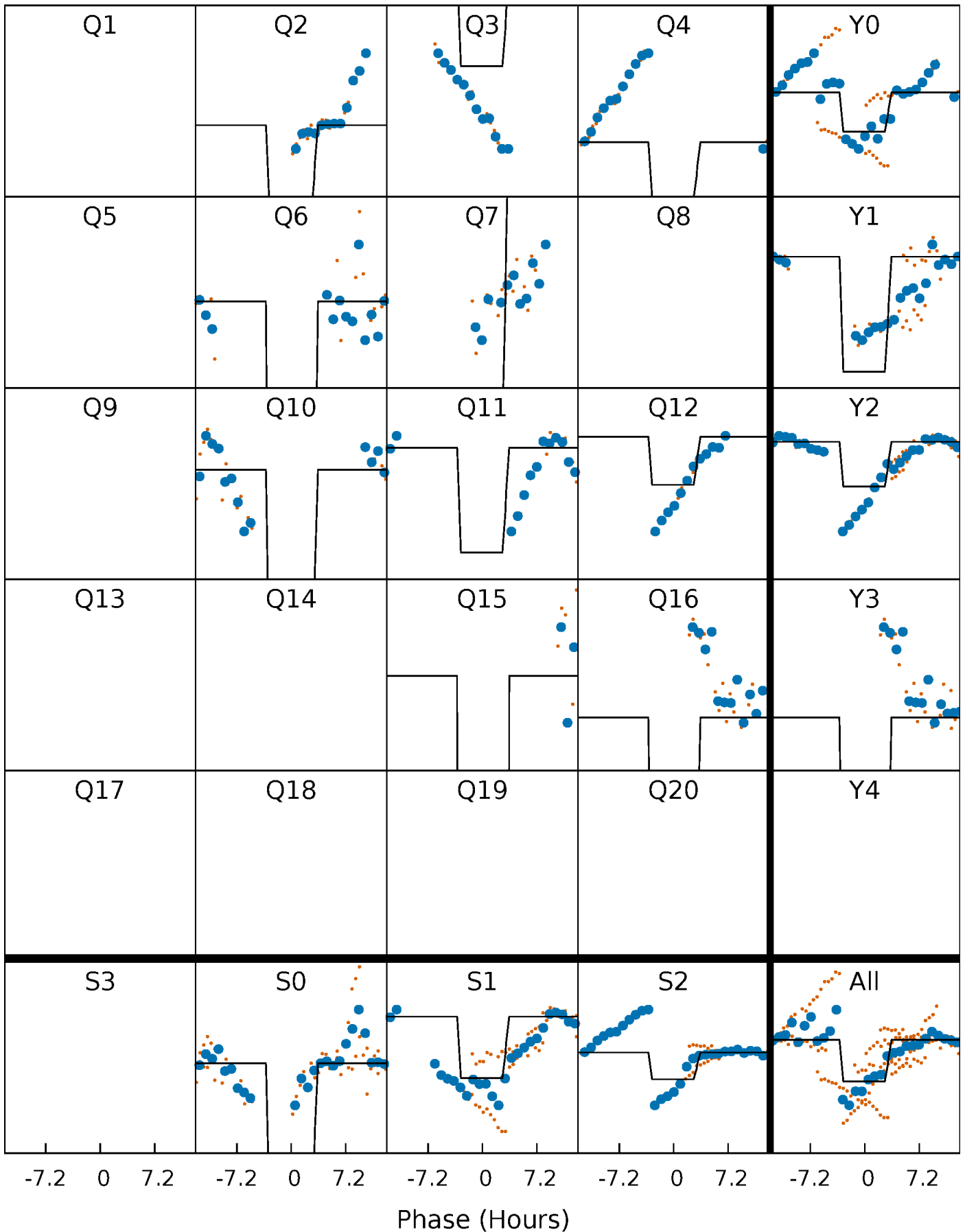
# DV Quarter-Phased Transit Curves

TCE 003647812-03 P=122.338718 Days  $T_0=194.660074$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

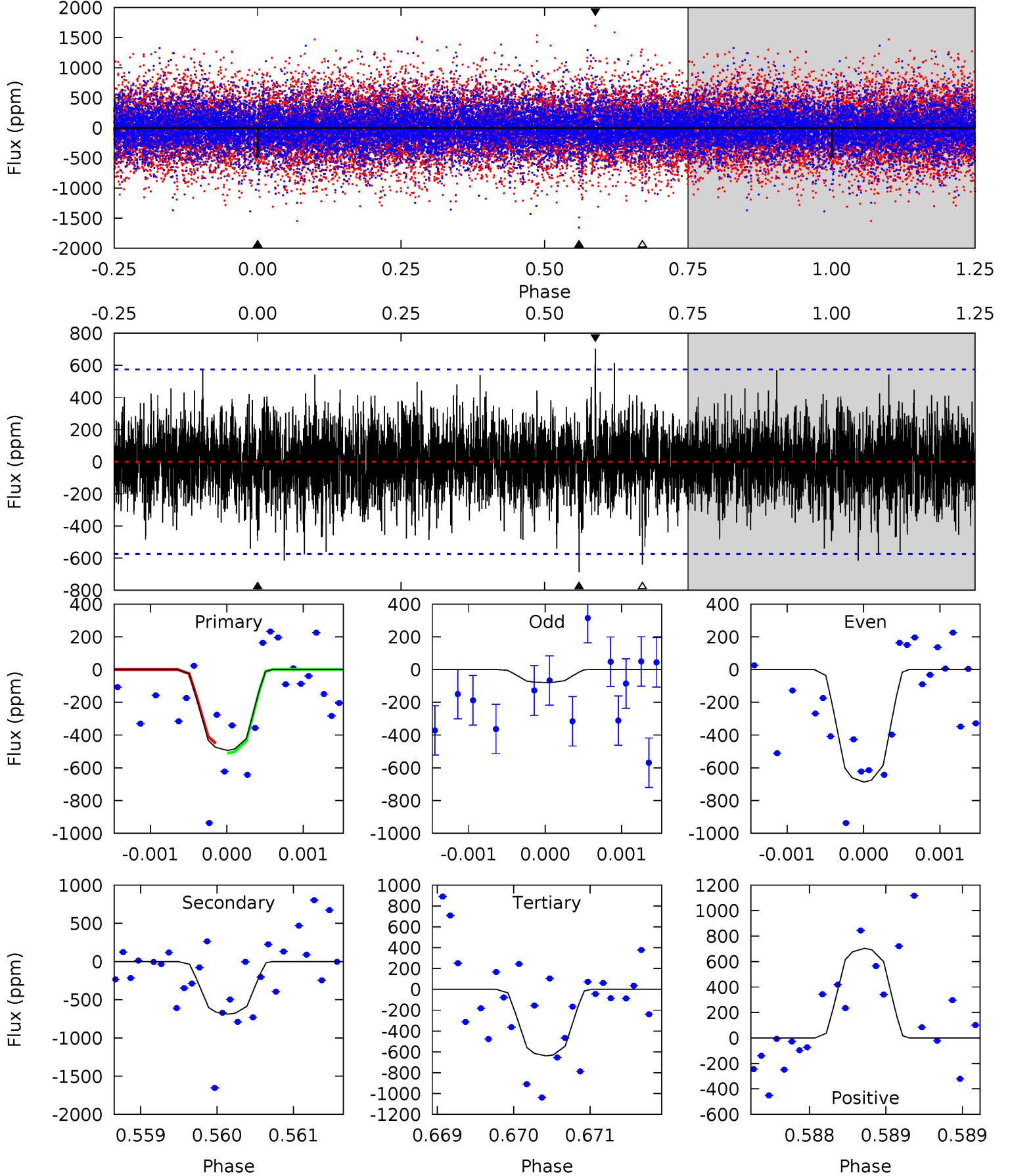
TCE 003647812-03 P=122.335724 Days  $T_0=194.687541$  (BKJD)



# DV Model-Shift Uniqueness Test

003647812-03, P = 122.338718 Days, E = 72.321356 Days

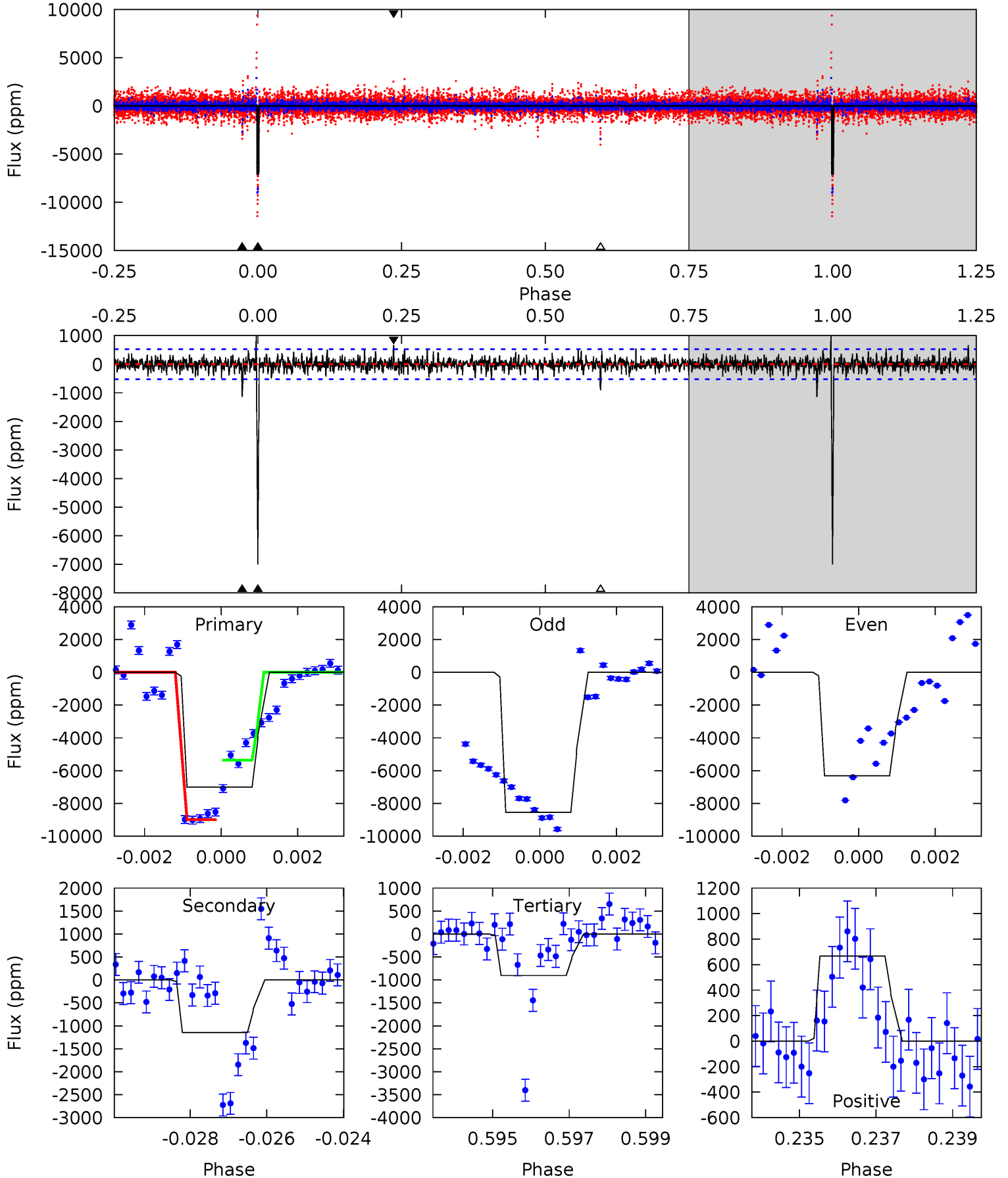
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
4.74	6.61	6.14	6.76	5.52	3.40	1.44	-1.40	-2.02	0.47	-0.15	2.76	0.83	0.51	0.29



# Alt Model-Shift Uniqueness Test

003647812-03, P = 122.335724 Days, E = 72.351817 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
70.8	11.6	9.14	6.73	5.31	3.07	1.45	61.6	64.0	2.44	4.84	9.50	1.03	0.12	0





### Stellar Parameters For KIC 003647812

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5534^{+166}_{-166}$	$4.504^{+0.066}_{-0.165}$	$-0.040^{+0.300}_{-0.300}$	$0.877^{+0.207}_{-0.095}$	$0.896^{+0.102}_{-0.083}$	$1.870^{+0.529}_{-0.824}$
	+3%/-3%	+1%/-4%	+750%/-750%	+24%/-11%	+11%/-9%	+28%/-44%
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 003647812-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-688 \pm 104$	$7.18^{+8.49}_{-4.46}$	$475^{+28}_{-22}$	$3713^{+1732}_{-794}$	$1581^{+8955}_{-1253}$
Alt.	$-1146 \pm 99$	$10.14^{+8.67}_{-6.49}$	$476^{+29}_{-21}$	$3645^{+1714}_{-650}$	$1346^{+9518}_{-958}$

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

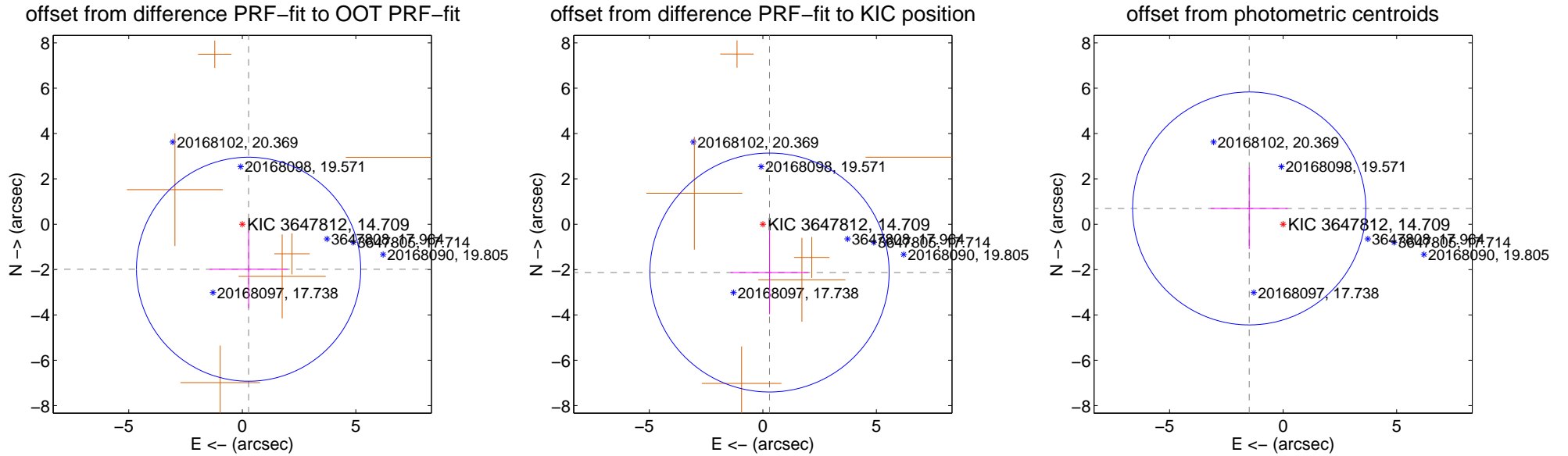
## DV Centroid Data

Supplemental centroid analysis for 003647812-03. Kepler magnitude: 14.71. Transit SNR 3.51

There are 0 quarters with good PRF difference image offsets

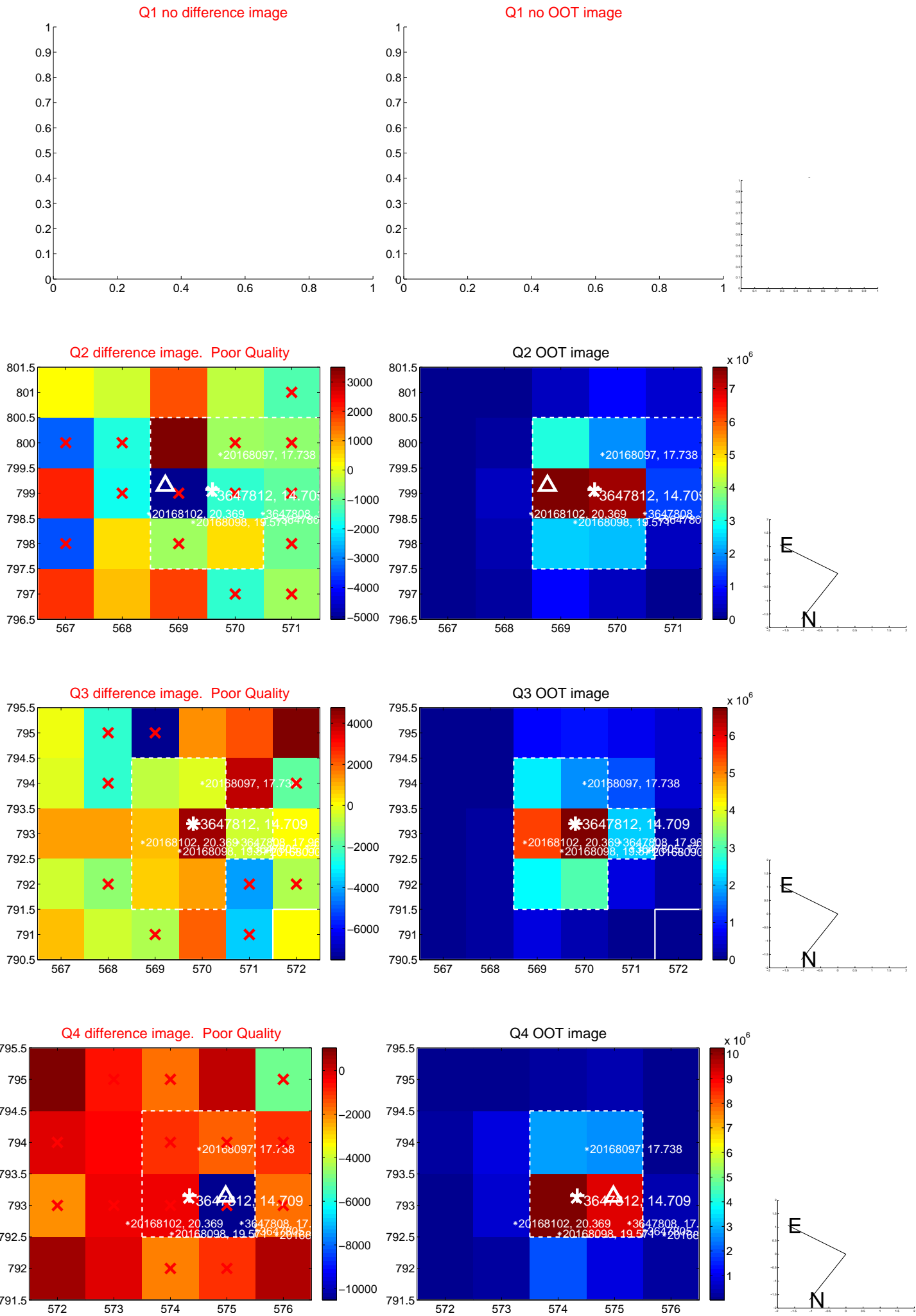
The direct PRF centroid is offset from the target star catalog position by about 0.15 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.004 \pm 1.646$	1.22	$-0.277 \pm 1.718$	$-1.984 \pm 1.707$
PRF-fit source offset from KIC position	$2.150 \pm 1.756$	1.22	$-0.295 \pm 1.715$	$-2.130 \pm 1.840$
photometric centroid source offset	$1.65 \pm 1.71$	0.96	$1.49 \pm 1.69$	$0.70 \pm 1.79$

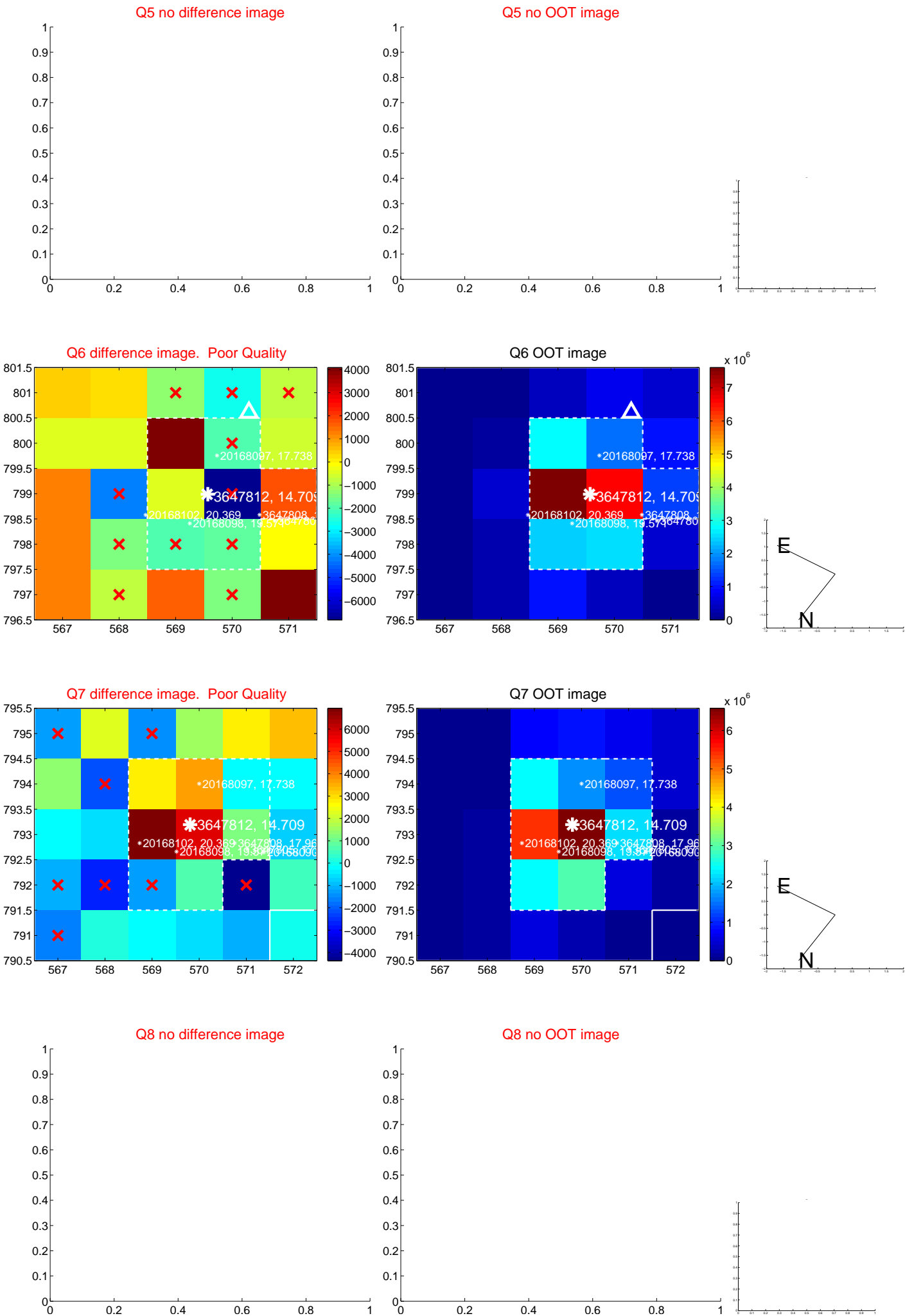


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

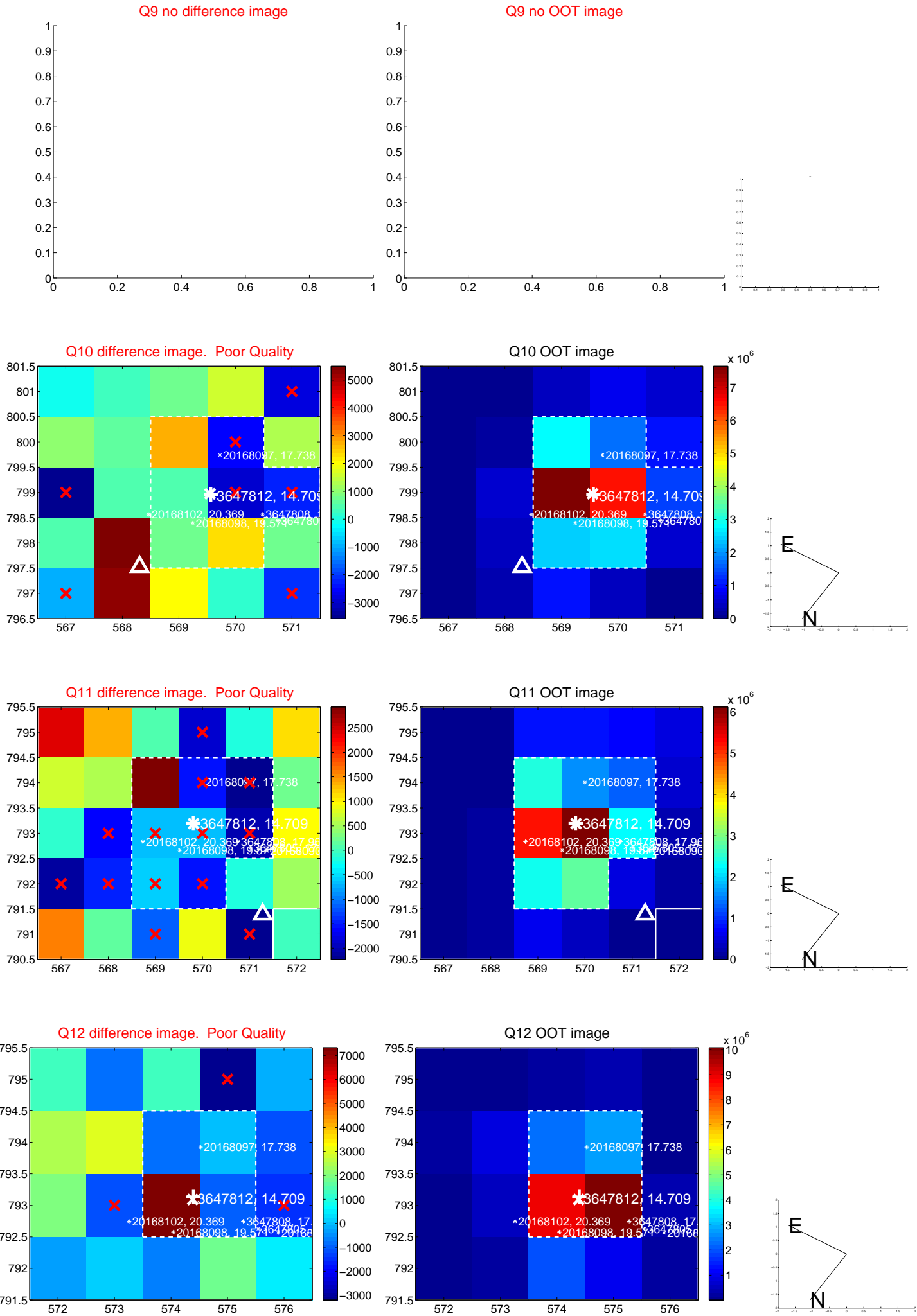
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



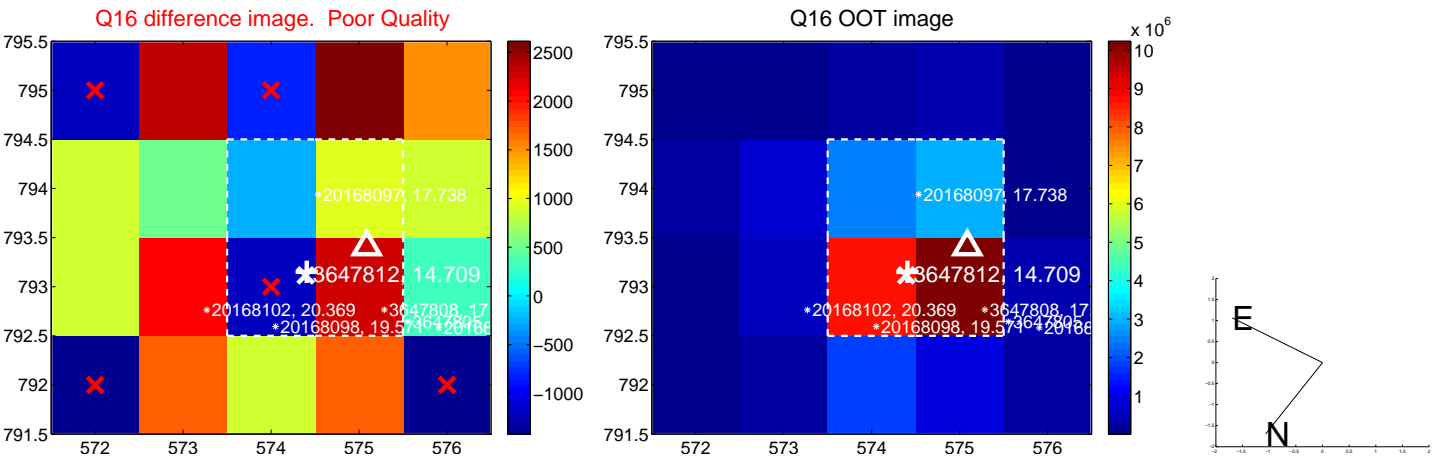
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



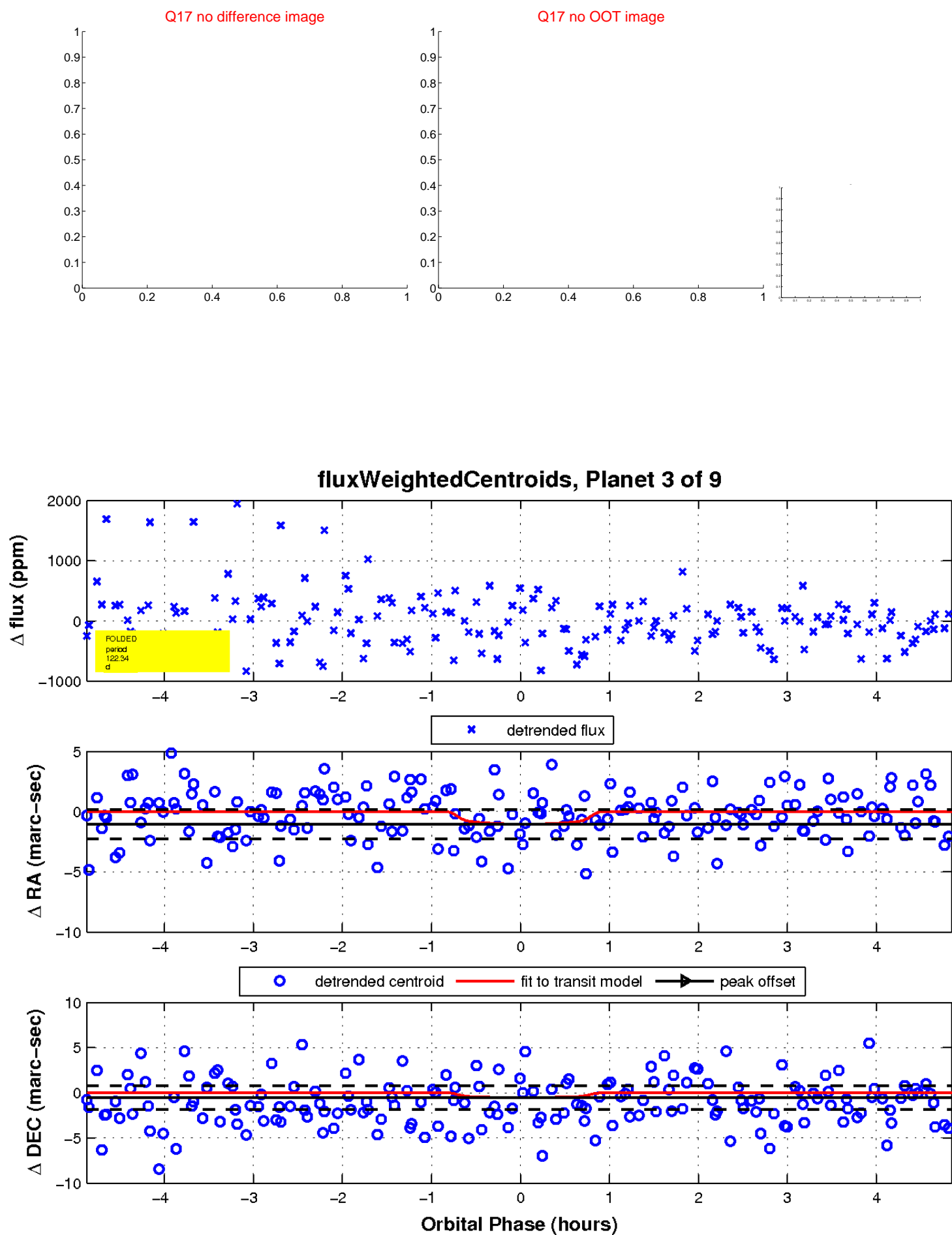
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



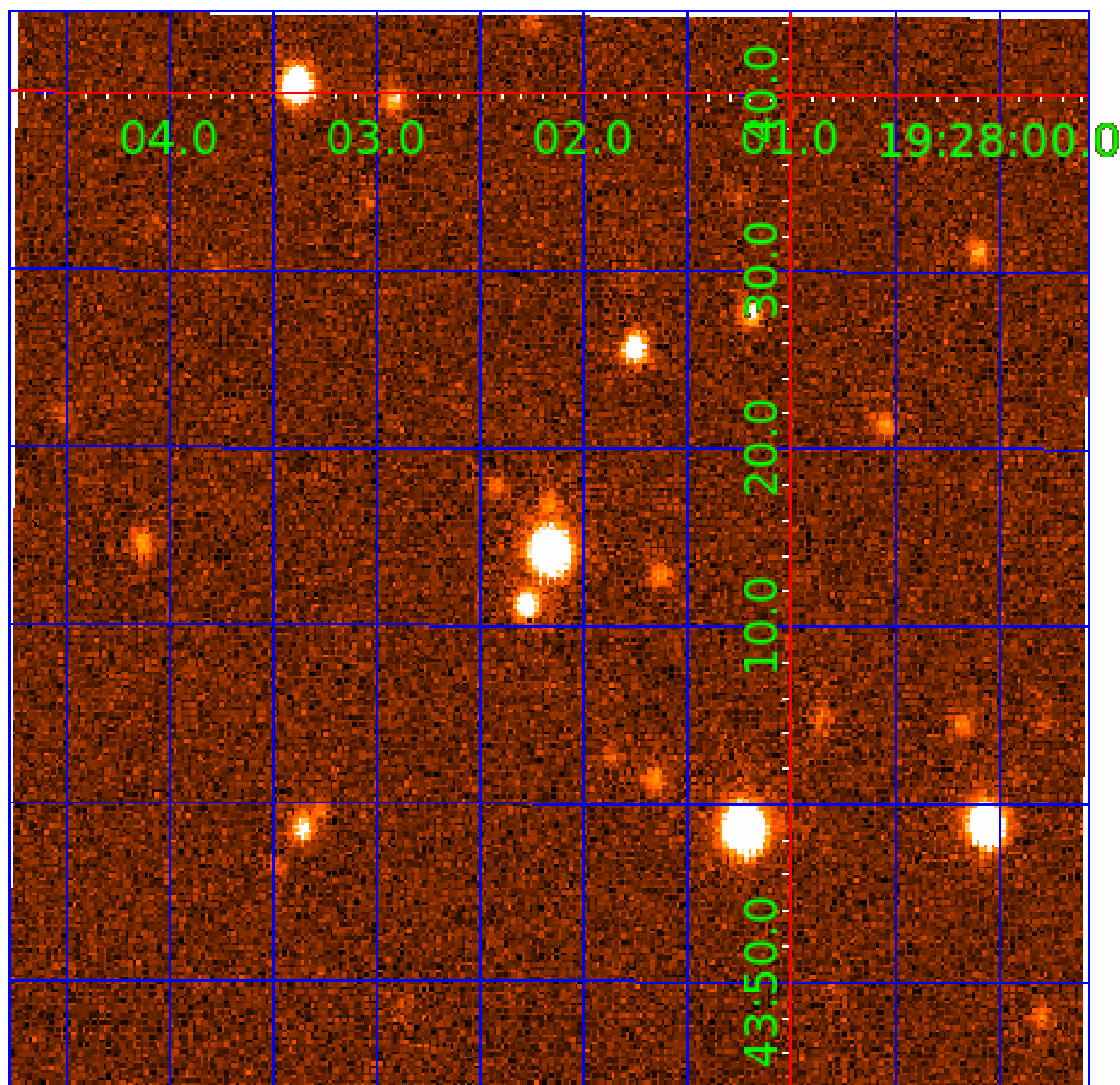
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





UKIRT Image

Declination



# KIC 003647812

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003647812-01	OBS	No	1.025744	131.805103	48.0	4.726	7.9	8.2	0.88	5534	0.62	1755.22
003647812-02	OBS	No	108.387733	214.706028	405.5	11.124	15.8	2.7	0.88	5534	1.81	3.51
003647812-03	OBS	No	122.338718	194.660074	645.6	1.634	13.3	3.5	0.88	5534	2.46	2.99
003647812-04	OBS	No	117.477275	177.043792	1139.6	6.892	13.3	7.2	0.88	5534	4.16	3.16
003647812-05	OBS	No	215.837817	173.340947	2077.4	38.867	15.1	6.2	0.88	5534	4.50	1.40
003647812-06	OBS	No	113.689287	146.161820	1122.9	12.795	10.8	6.5	0.88	5534	3.74	3.30
003647812-07	OBS	No	325.149215	316.828480	2109.5	7.212	11.6	9.2	0.88	5534	5.07	0.81
003647812-08	OBS	No	323.187877	145.543042	4343.2	27.204	11.6	7.9	0.88	5534	6.94	0.82

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003647812-01	OBS	FP	0.00	1	0	0	0	LPP_DV
003647812-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS
003647812-03	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
003647812-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
003647812-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—INCONSISTENT_TRANS—HALO_GHOST
003647812-06	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—INCONSISTENT_TRANS—HALO_GHOST
003647812-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—ALL_TRANS_CHASES—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—SAME_NTL_PERIOD—CENT_FEW_DIFFS
003647812-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—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.

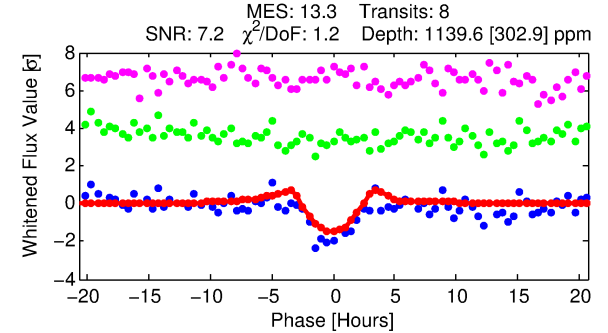
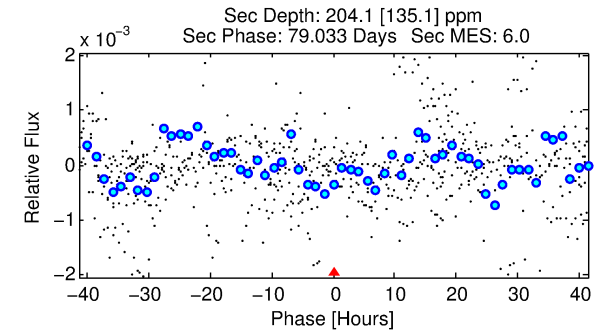
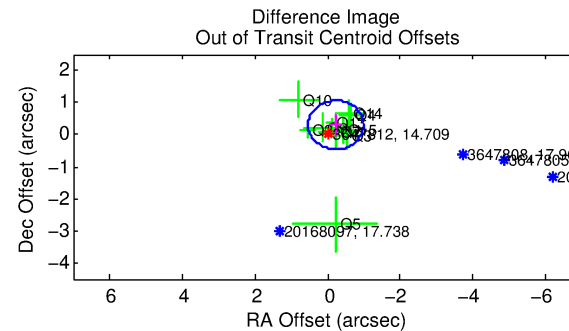
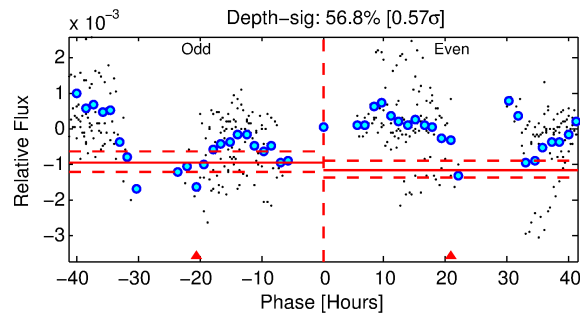
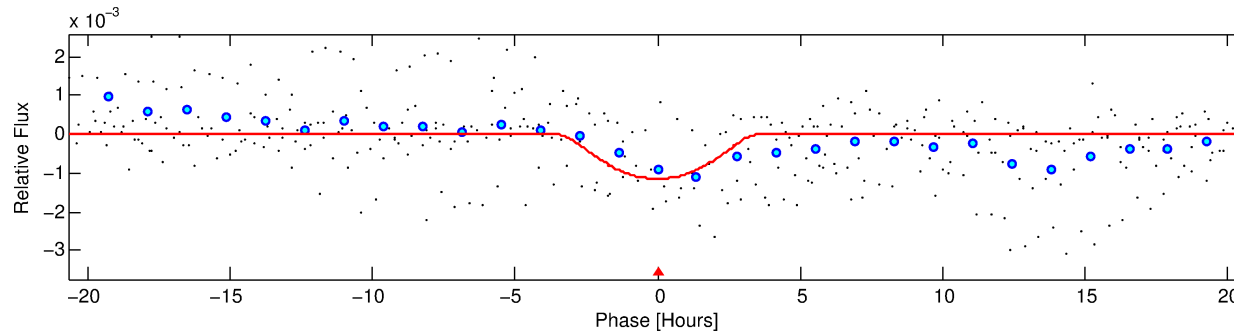
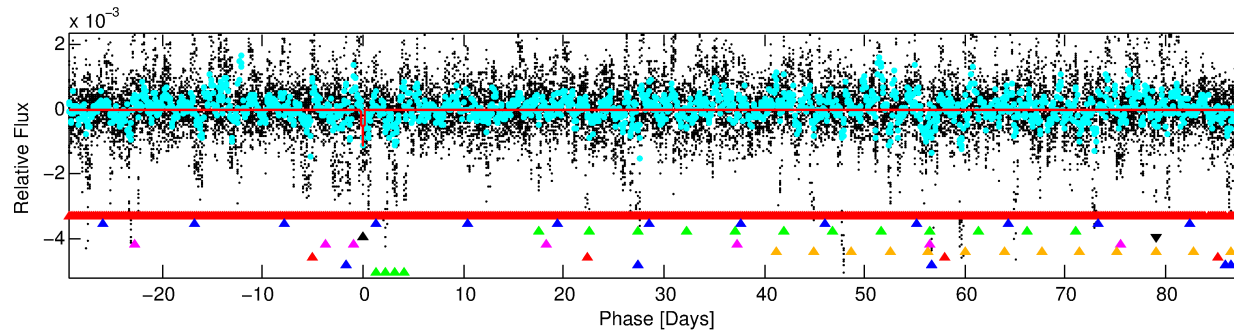
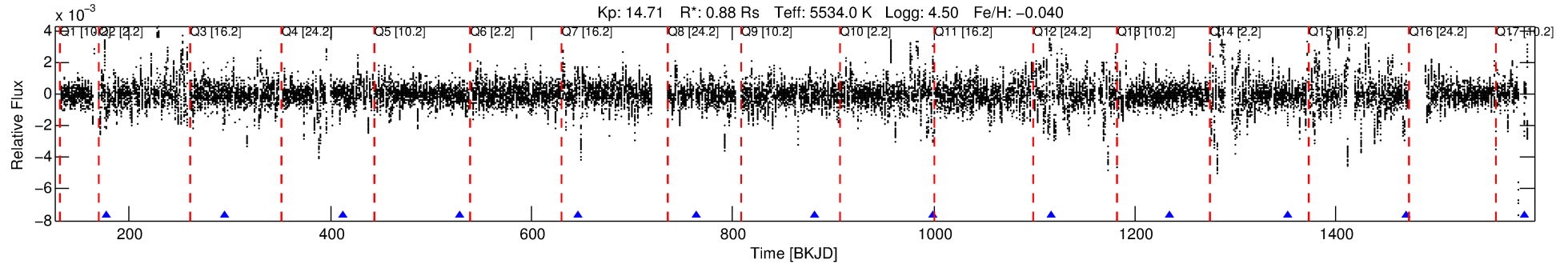
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 003647812-04

No Significant Match Found

# DV One-Page Summary

KIC: 3647812 Candidate: 4 of 9 Period: 117.477 d



## DV Fit Results:

Period = 117.47728 [0.00299] d  
Epoch = 177.0438 [0.0205] BKJD  
Rp/R\* = 0.0435 [0.0258]  
a/R\* = 50.55 [16.00]  
b = 0.97 [0.06]  
Seff = 3.16 [1.01]  
Teq = 340 [27] K  
Rp = 4.16 [2.66] Re  
a = 0.4525 [0.0914] AU  
Ag = 1327.01 [1845.98] [0.72 $\sigma$ ]  
Teffp = 3171 [1082] K [2.62 $\sigma$ ]

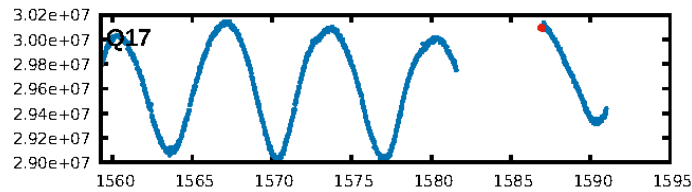
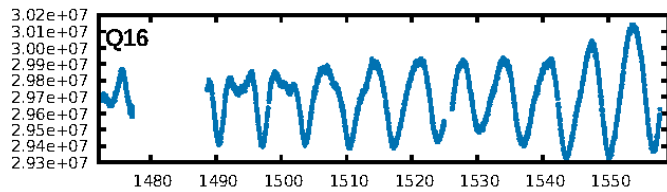
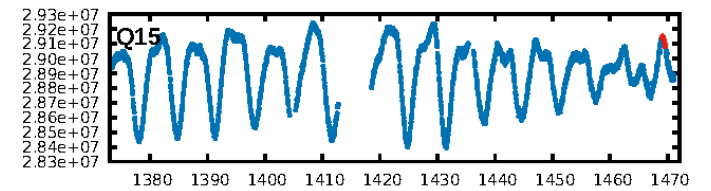
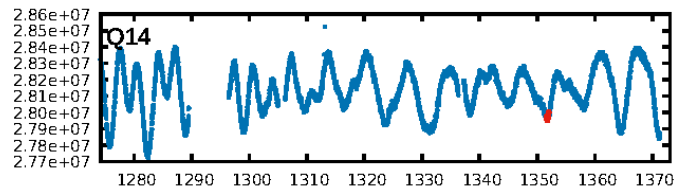
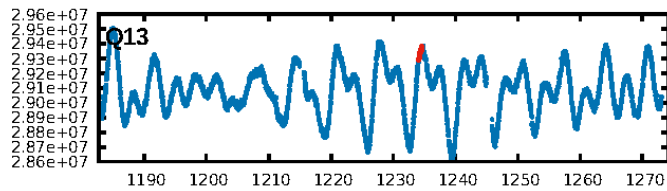
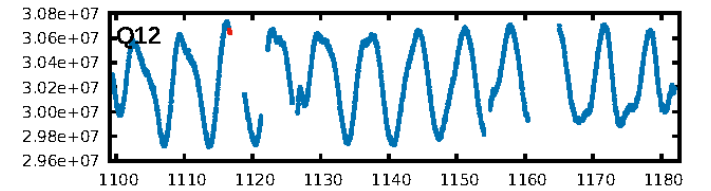
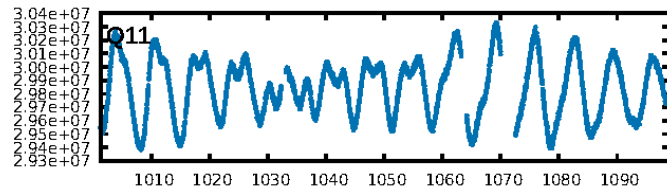
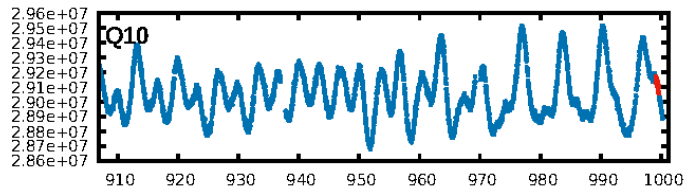
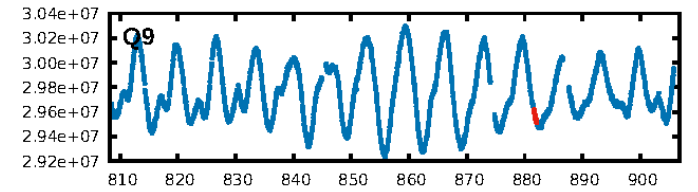
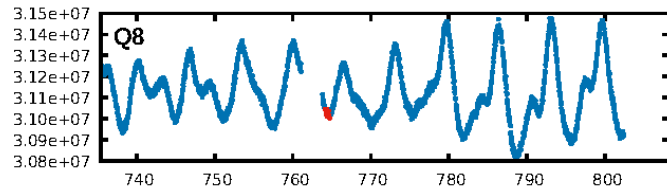
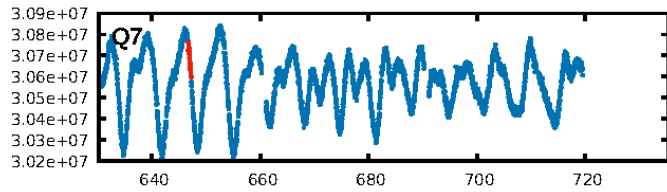
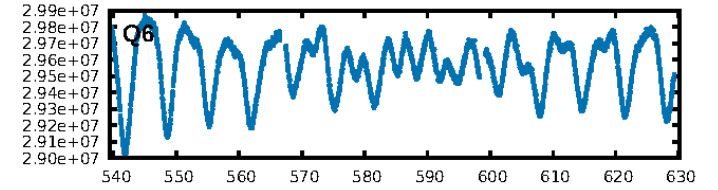
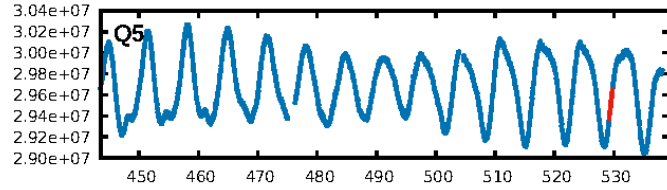
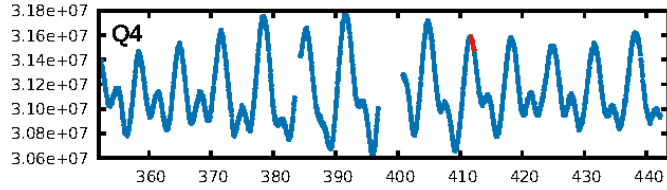
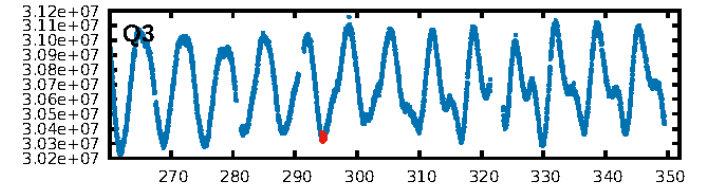
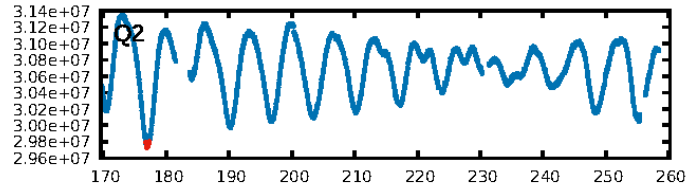
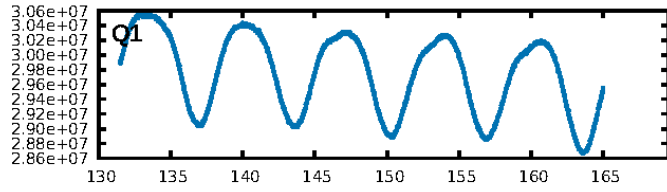
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [6.26 $\sigma$ ]  
LongPeriod-sig: 100.0% [16.47 $\sigma$ ]  
ModelChiSquare2-sig: 25.6%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 2.26e-21  
RollingBand-fgt: 1.00 [7/7]  
GhostDiagnostic-chr: -1.48  
Centroid-sig: 2.7%  
Centroid-so: 1.050 arcsec [1.75 $\sigma$ ]  
OotOffset-rm: 0.372 arcsec [1.47 $\sigma$ ]  
KicOffset-rm: 0.388 arcsec [1.81 $\sigma$ ]  
OotOffset-st: 3/3/1/3 [10]  
KicOffset-st: 3/3/1/3 [10]  
DiffImageQuality-fgm: 0.40 [4/10]  
DiffImageOverlap-fno: 0.00 [0/10]

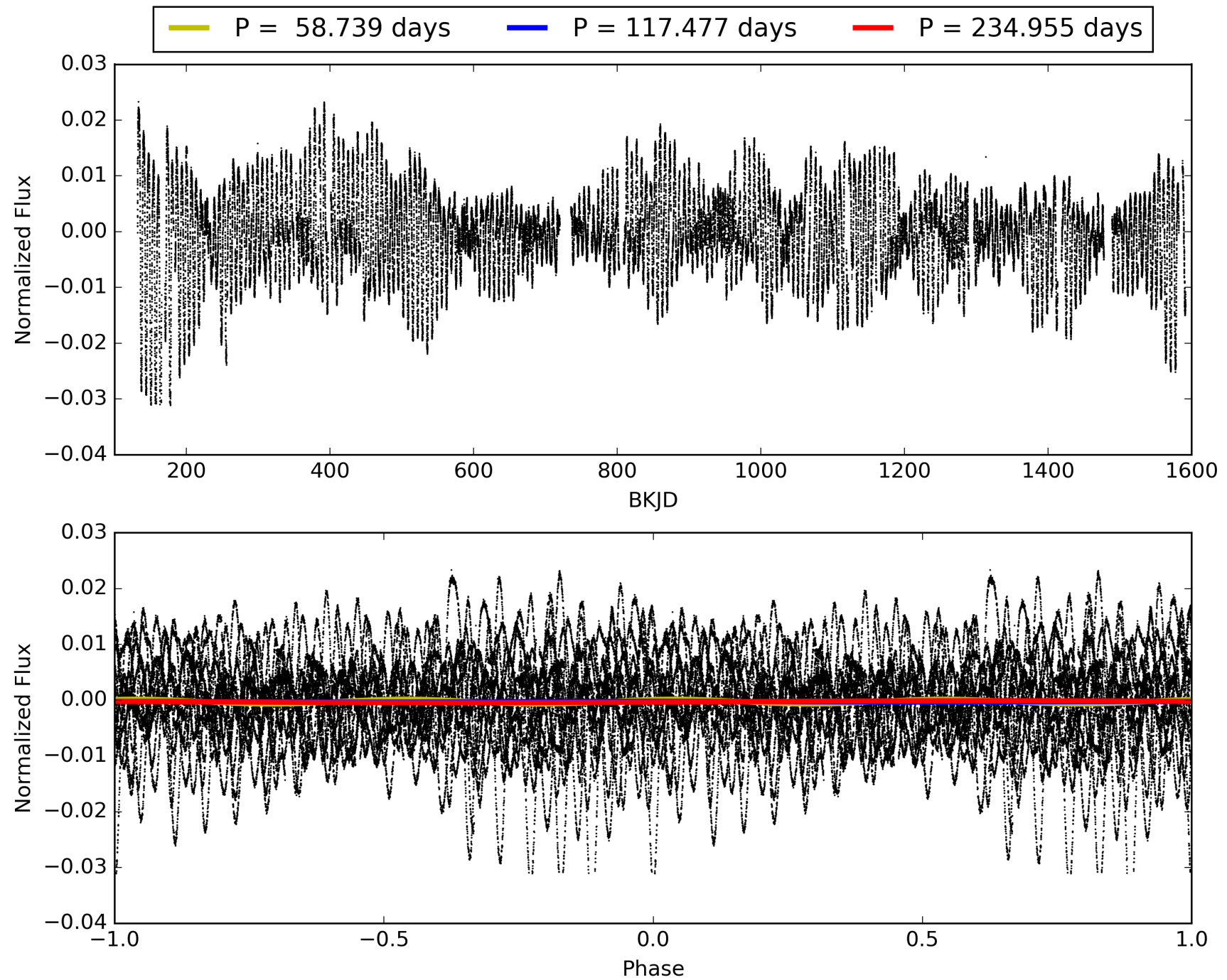
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 04:13:21 Z

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

# TCE 003647812-04, PDC Light Curves

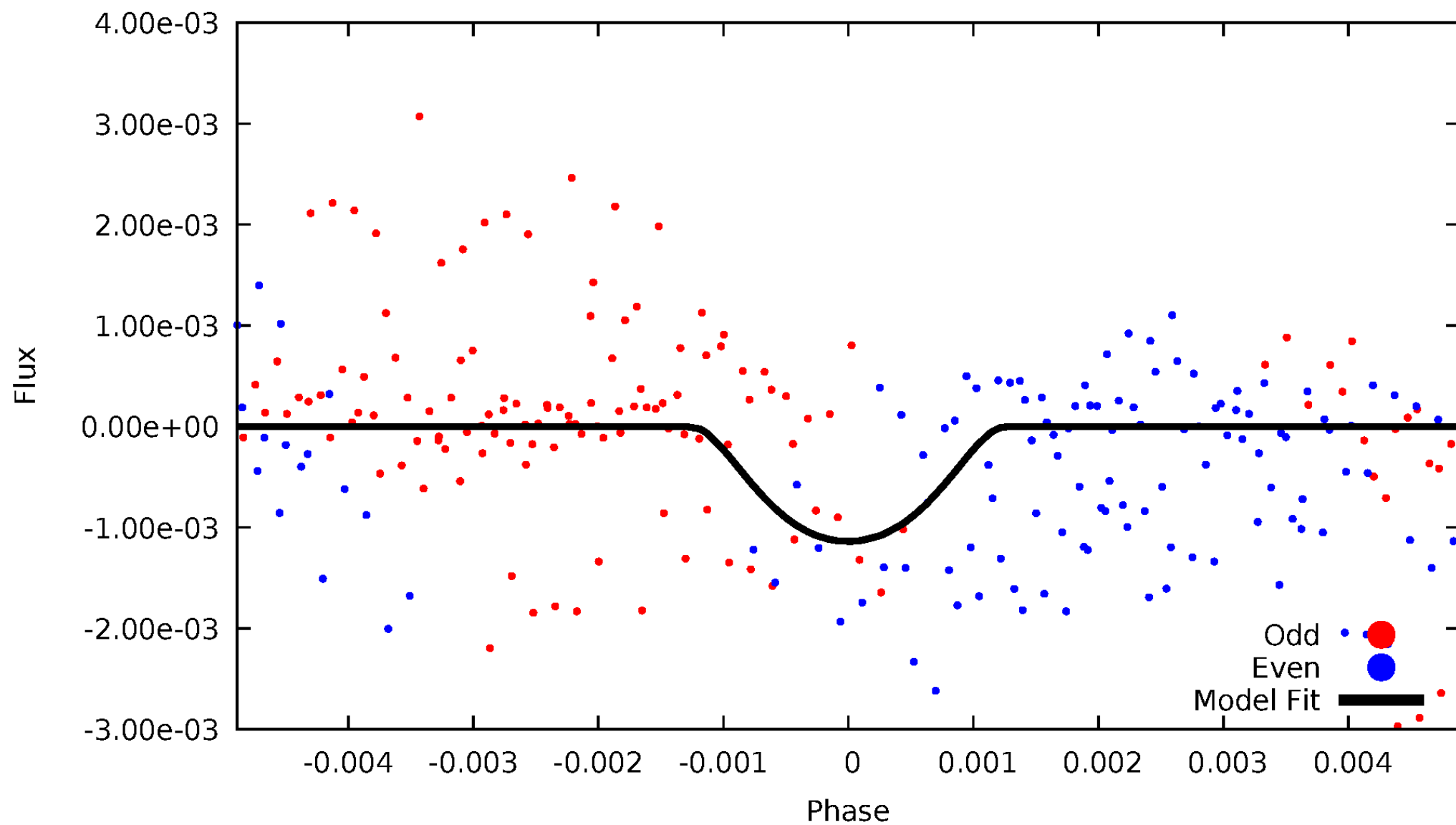


# TCE 003647812-04



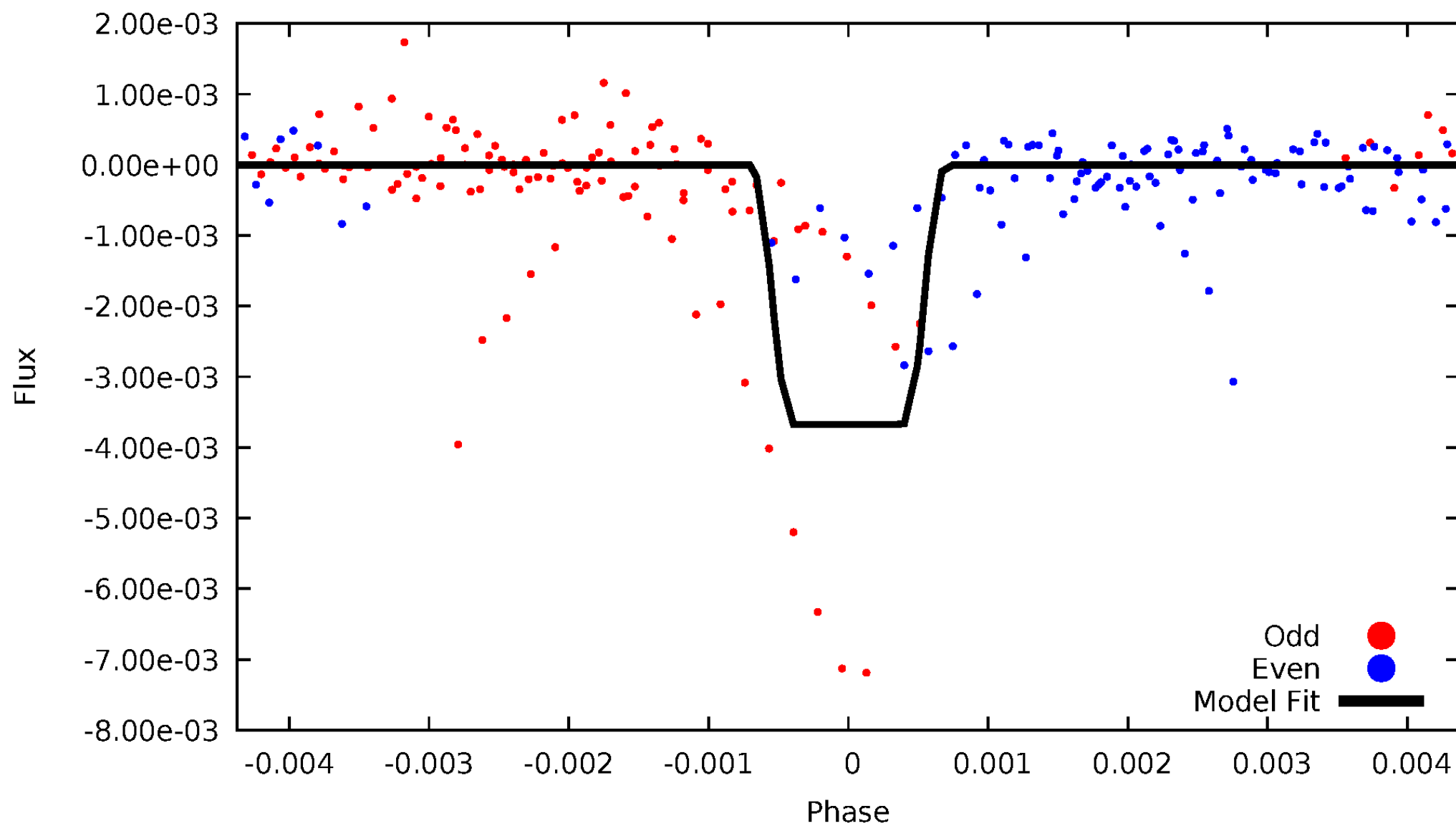
# DV Odd/Even

TCE 003647812-04



# ALT Odd/Even

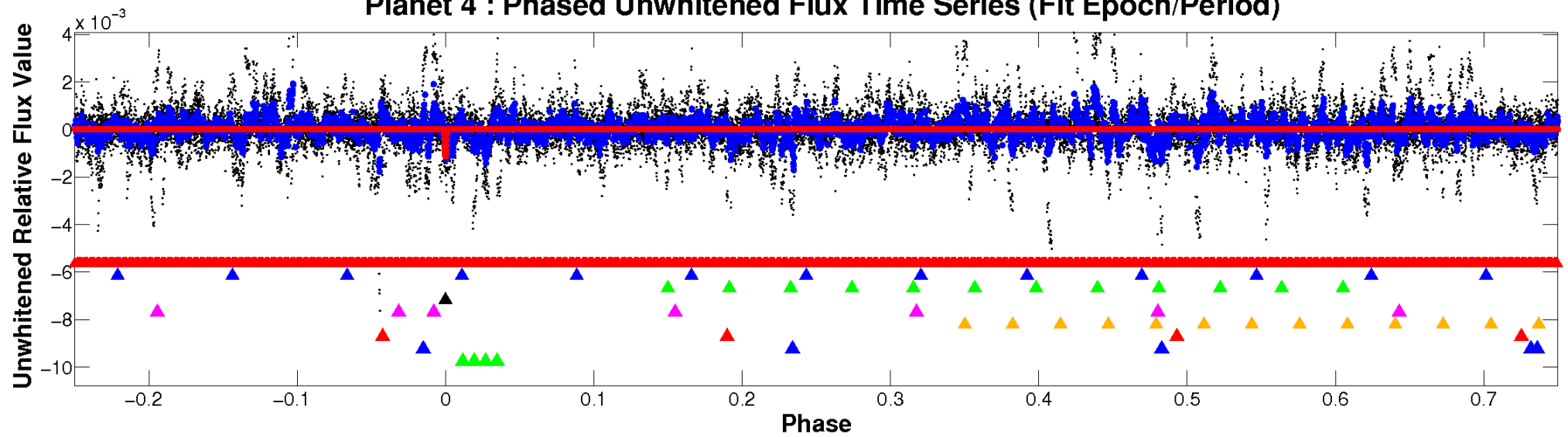
TCE 003647812-04



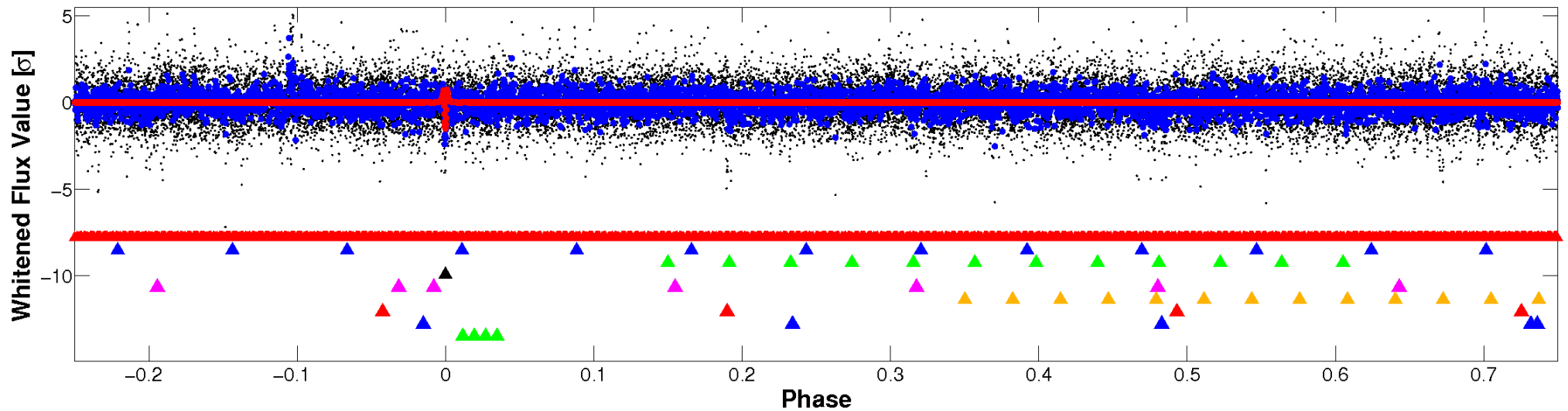


# Non-Whitened Vs. Whitened Light Curve

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

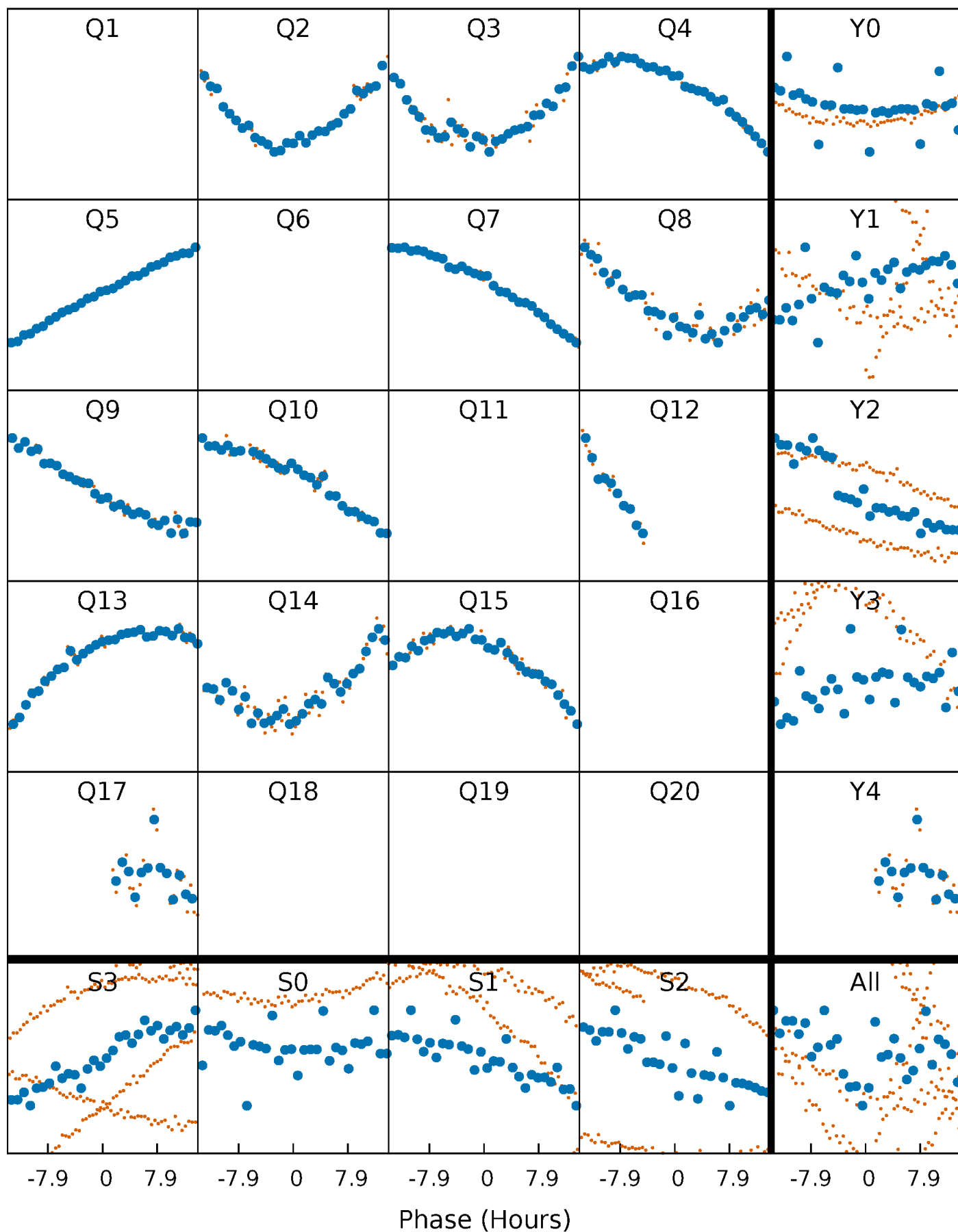


## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



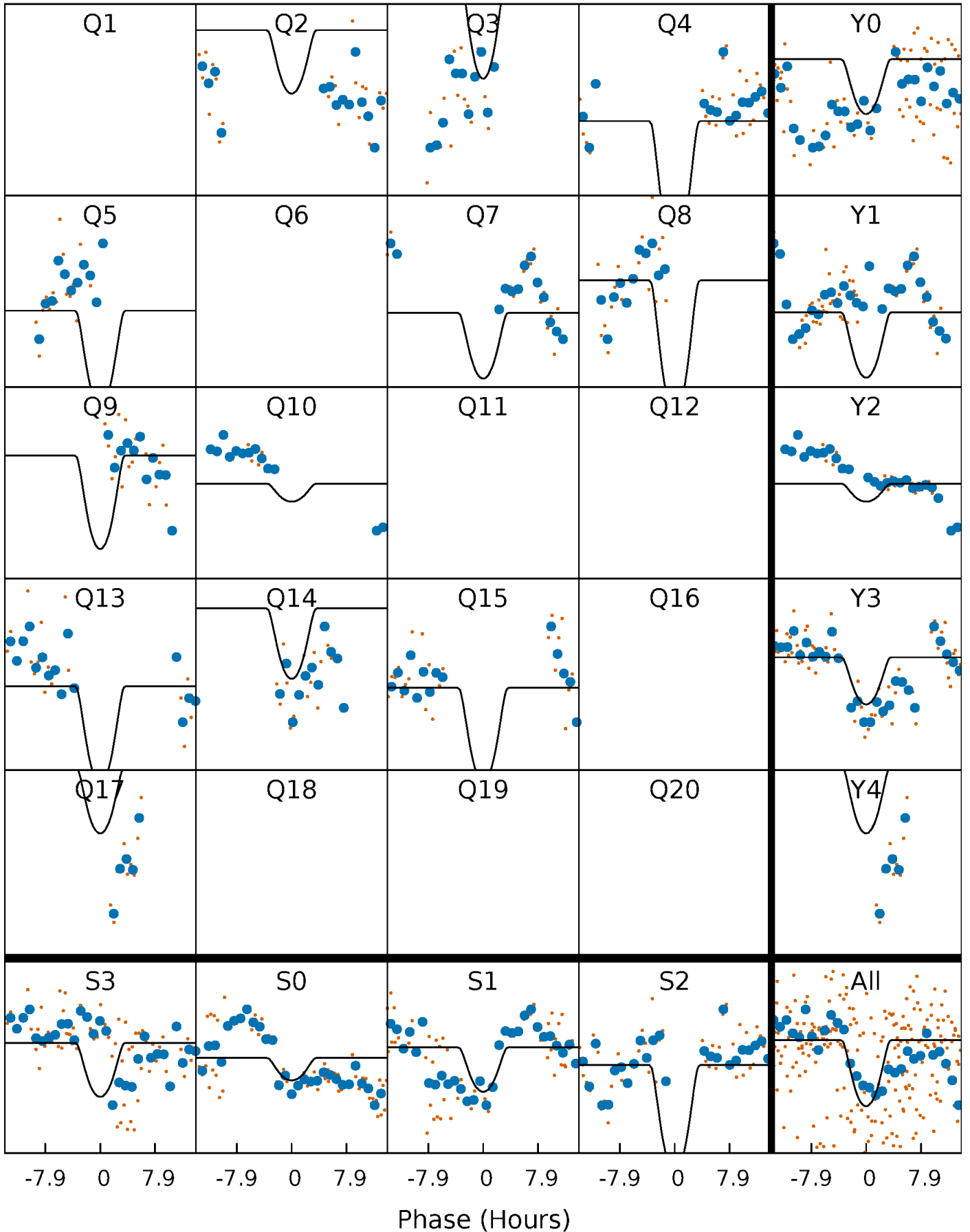
# PDC Quarter-Phased Transit Curves

TCE 003647812-04 P=117.477275 Days  $T_0=177.043792$  (BKJD)



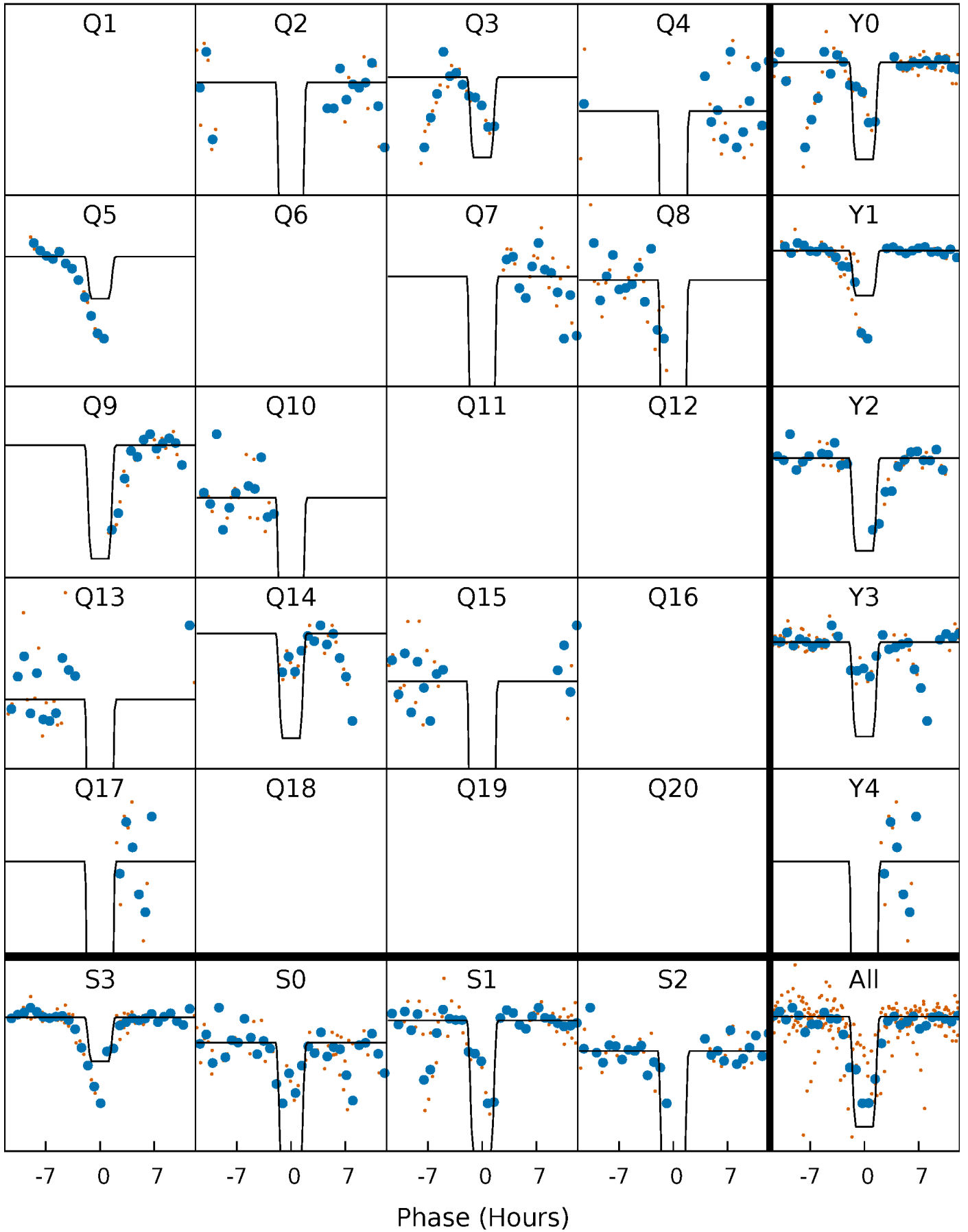
# DV Quarter-Phased Transit Curves

TCE 003647812-04 P=117.477275 Days  $T_0=177.043792$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

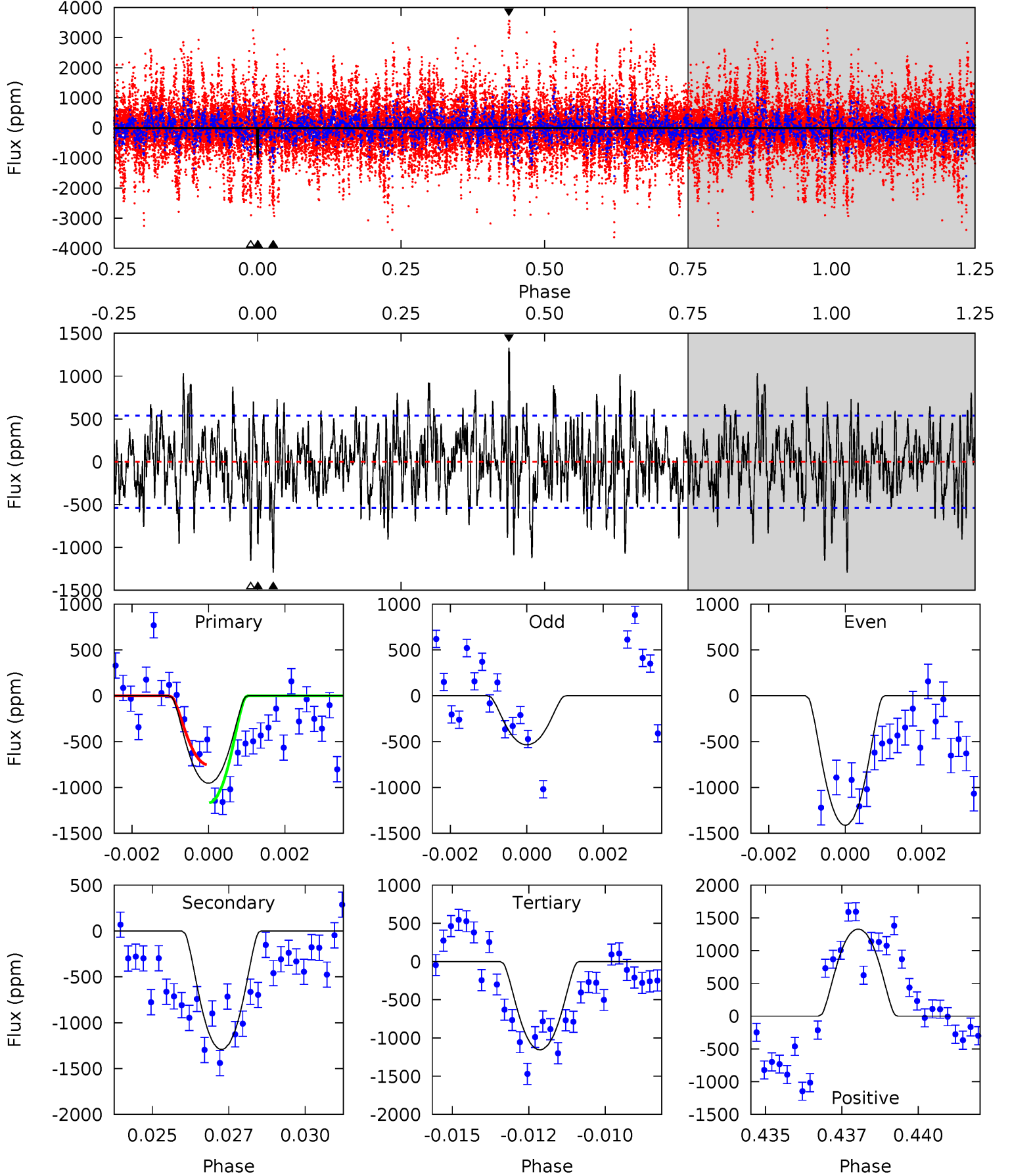
TCE 003647812-04 P=117.475501 Days  $T_0=177.036874$  (BKJD)



# DV Model-Shift Uniqueness Test

003647812-04, P = 117.477275 Days, E = 59.566517 Days

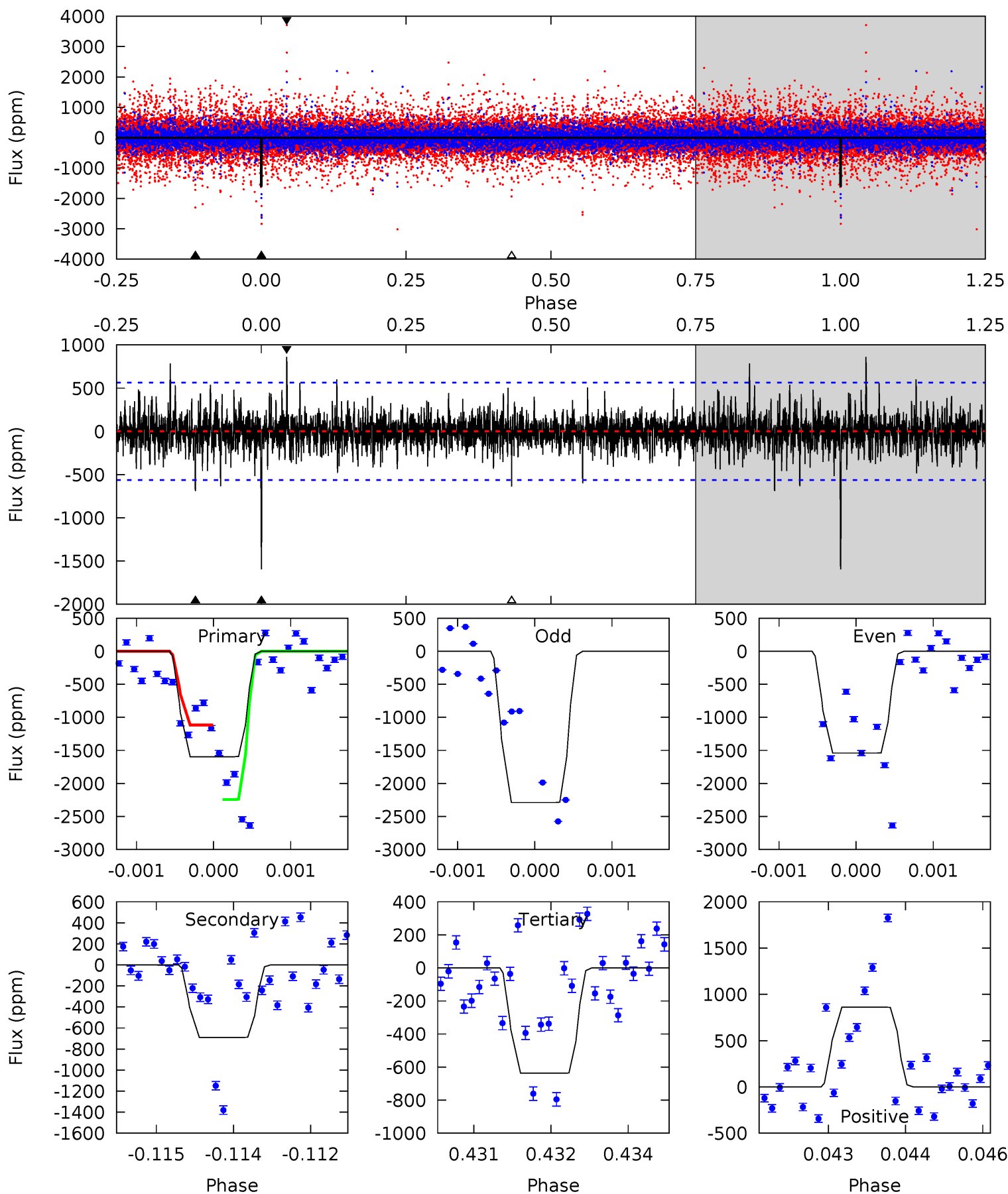
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.35	12.7	11.3	13.0	5.29	3.02	3.32	-1.97	-3.67	1.34	-0.36	4.15	-0.43	0.51	2.07



# Alt Model-Shift Uniqueness Test

003647812-04, P = 117.475501 Days, E = 59.561373 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
15.3	6.62	6.12	8.26	5.41	3.23	1.31	9.21	7.06	0.50	-1.65	3.43	1.59	0.35	5.43



### Stellar Parameters For KIC 003647812

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5534^{+166}_{-166}$	$4.504^{+0.066}_{-0.165}$	$-0.040^{+0.300}_{-0.300}$	$0.877^{+0.207}_{-0.095}$	$0.896^{+0.102}_{-0.083}$	$1.870^{+0.529}_{-0.824}$
	+3%/-3%	+1%/-4%	+750%/-750%	+24%/-11%	+11%/-9%	+28%/-44%
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 003647812-04 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-1292 \pm 102$	$4.51^{+2.58}_{-2.45}$	$481^{+28}_{-23}$	$5004^{+2397}_{-853}$	$7155^{+26504}_{-4277}$
Alt.	$-689 \pm 104$	$6.10^{+2.61}_{-2.54}$	$482^{+29}_{-24}$	$3939^{+907}_{-435}$	$2083^{+3885}_{-1085}$

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



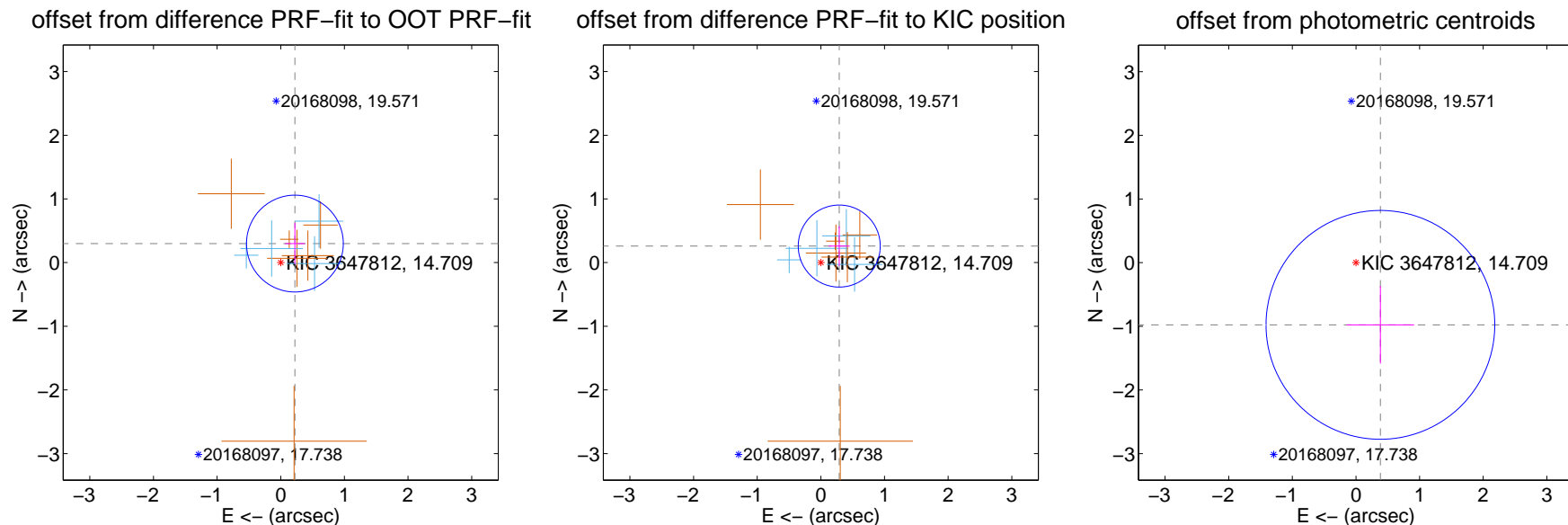
## DV Centroid Data

Supplemental centroid analysis for 003647812-04. Kepler magnitude: 14.71. Transit SNR 7.21

There are 4 quarters with good PRF difference image offsets

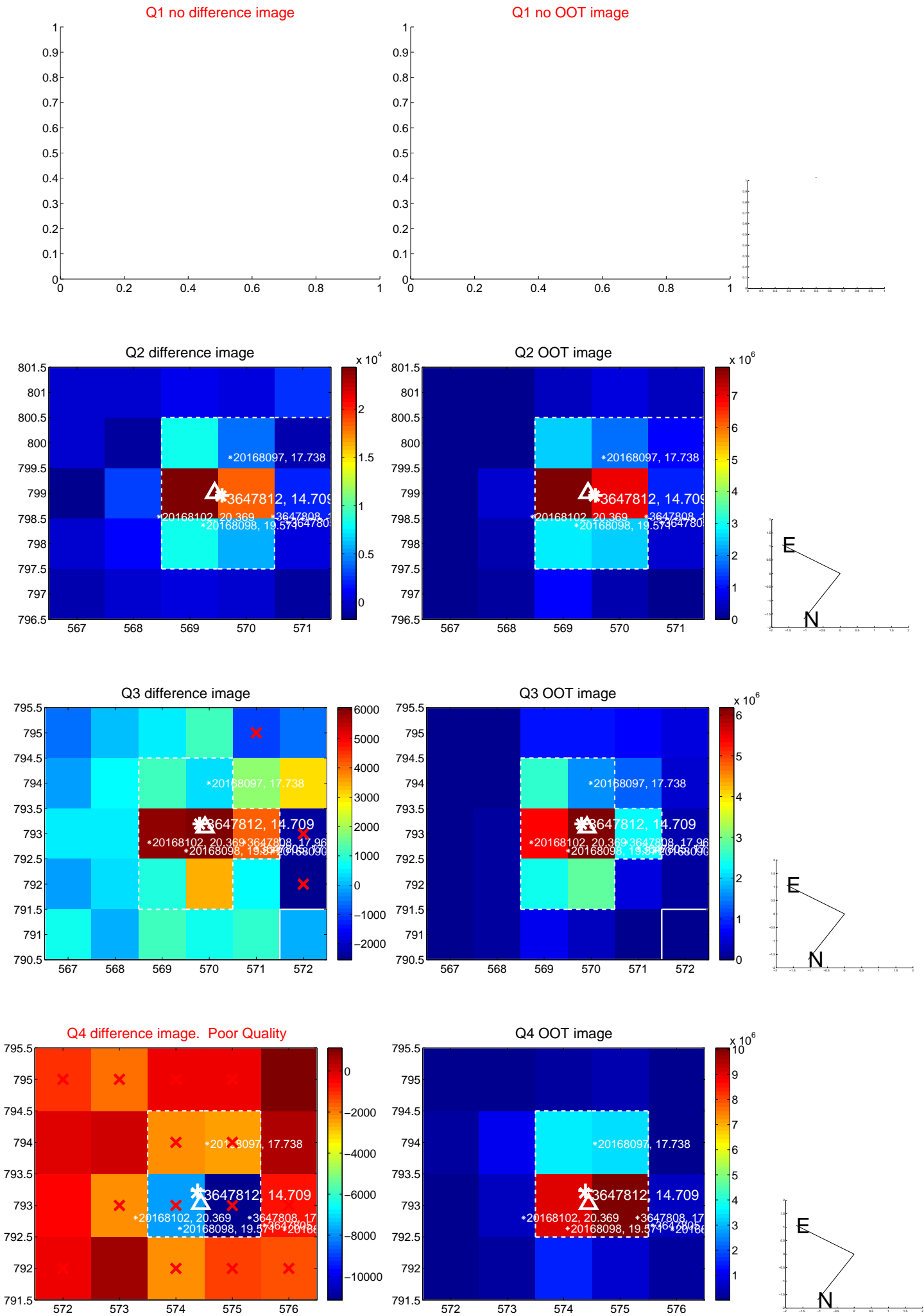
The direct PRF centroid is offset from the target star catalog position by about 0.02 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.372 \pm 0.253$	1.47	$-0.222 \pm 0.156$	$0.299 \pm 0.328$
PRF-fit source offset from KIC position	$0.388 \pm 0.215$	1.81	$-0.289 \pm 0.163$	$0.259 \pm 0.311$
photometric centroid source offset	$1.05 \pm 0.60$	1.75	$-0.38 \pm 0.53$	$-0.98 \pm 0.61$

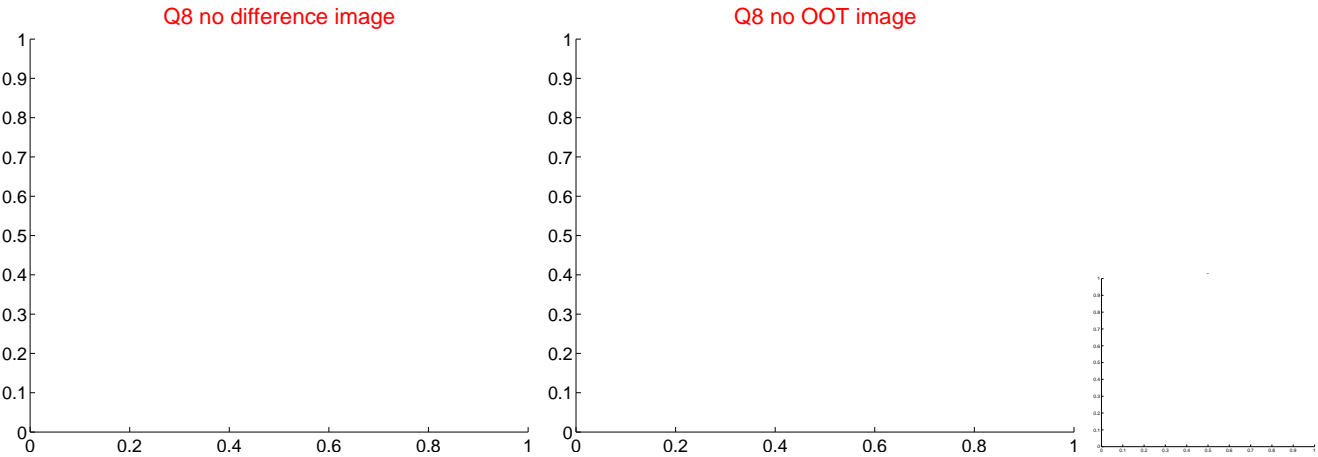
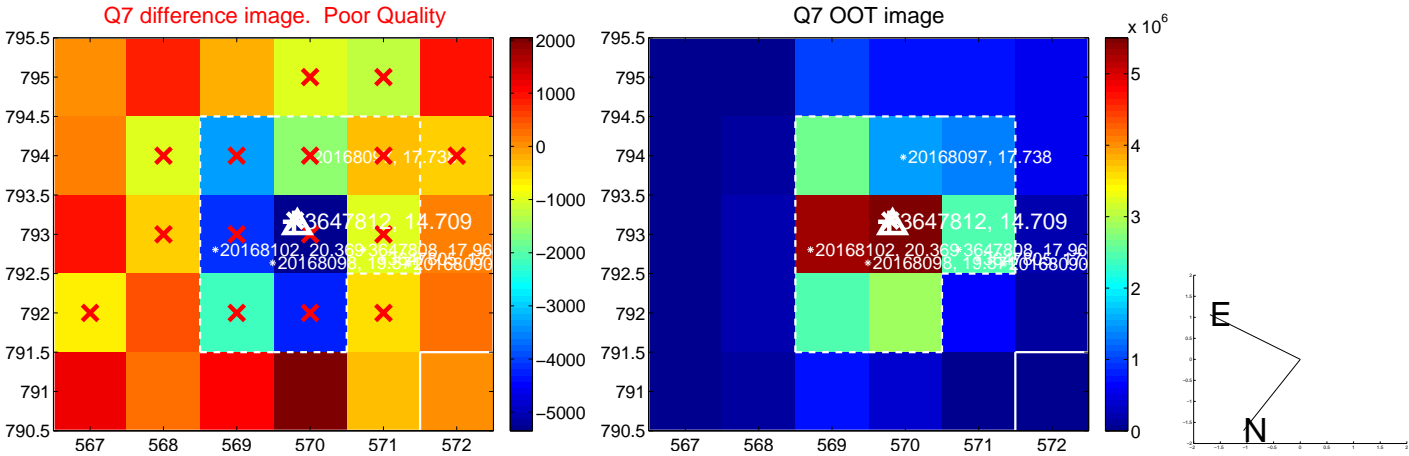
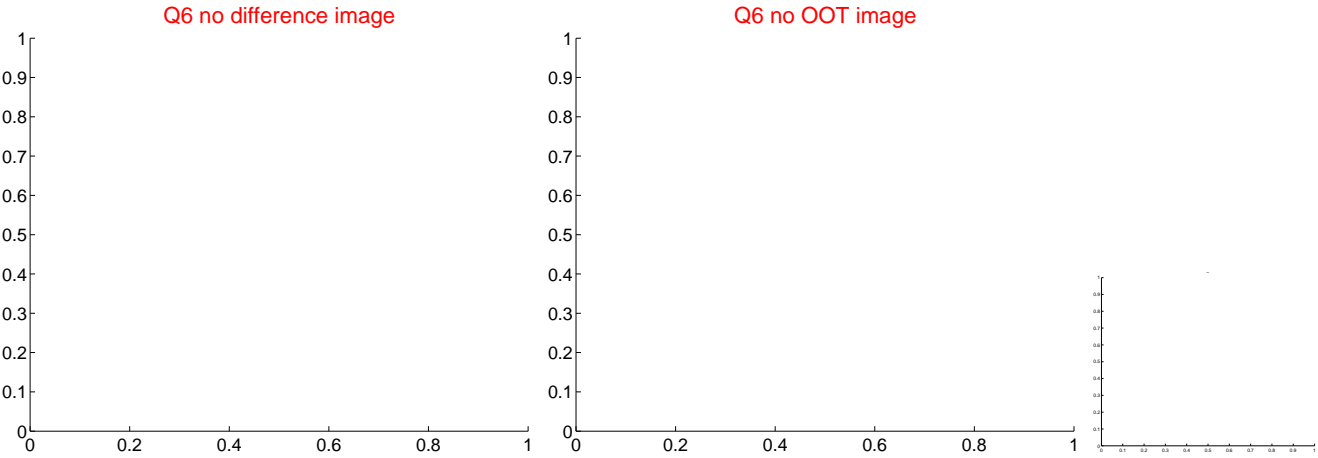
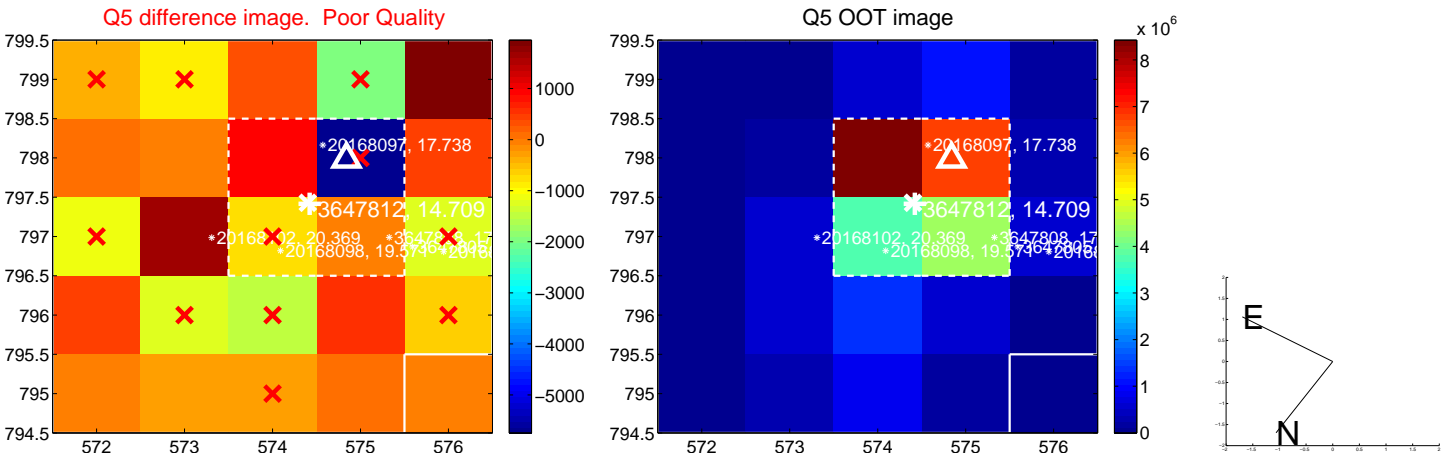


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

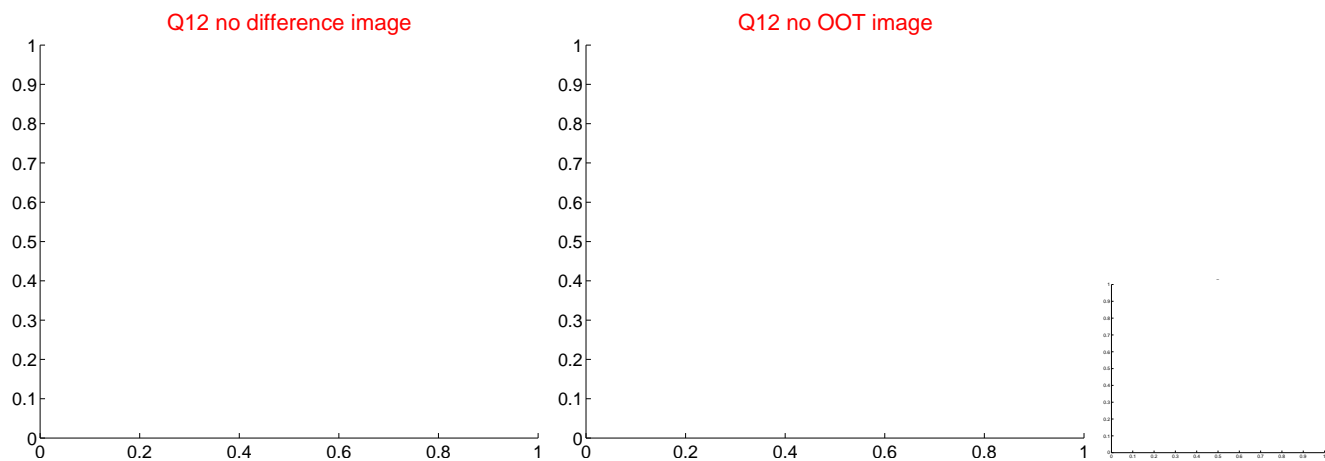
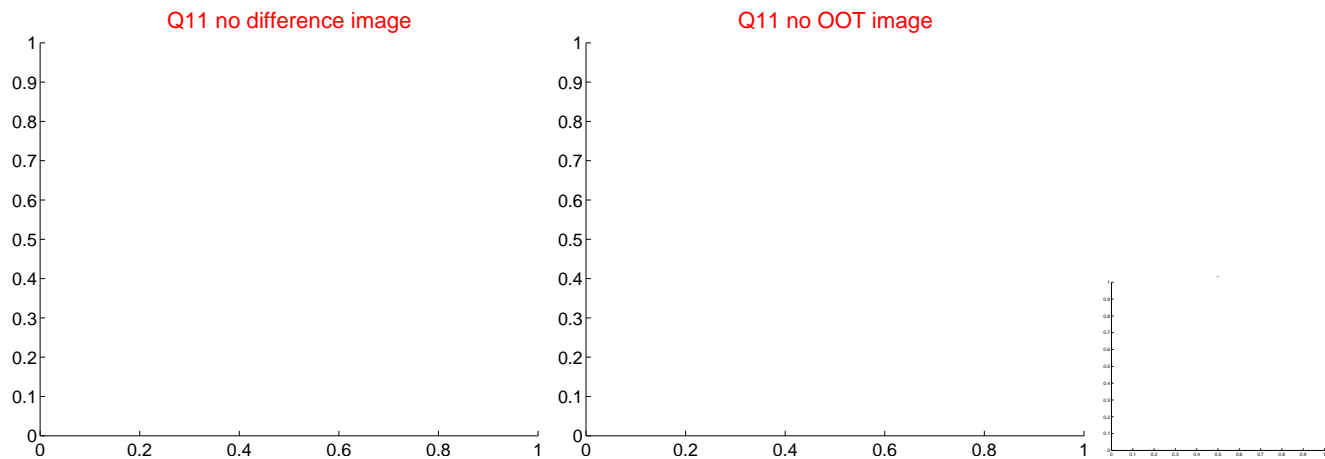
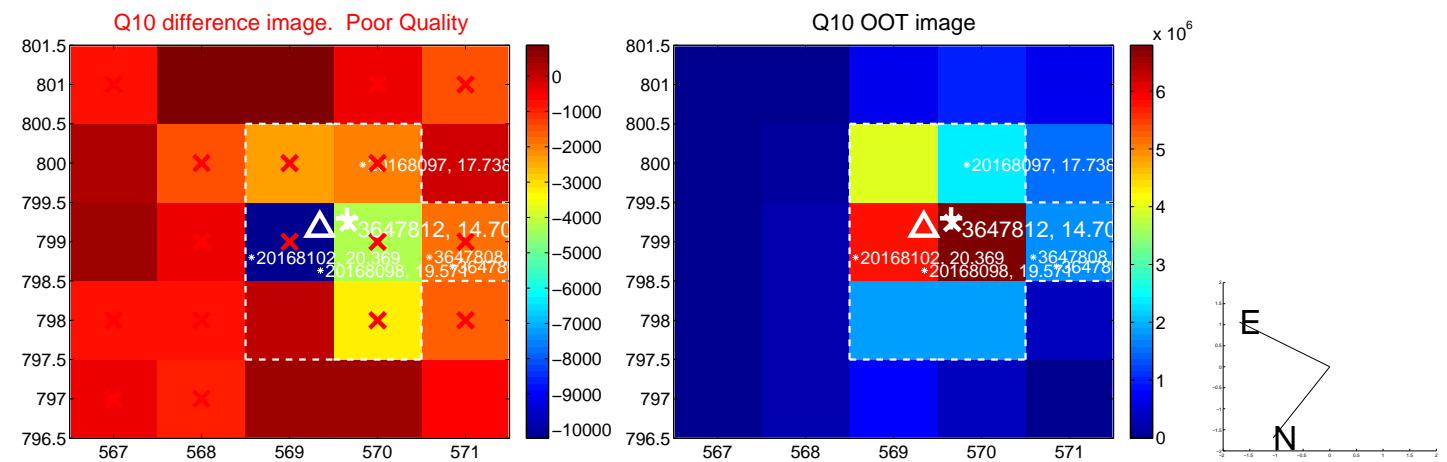
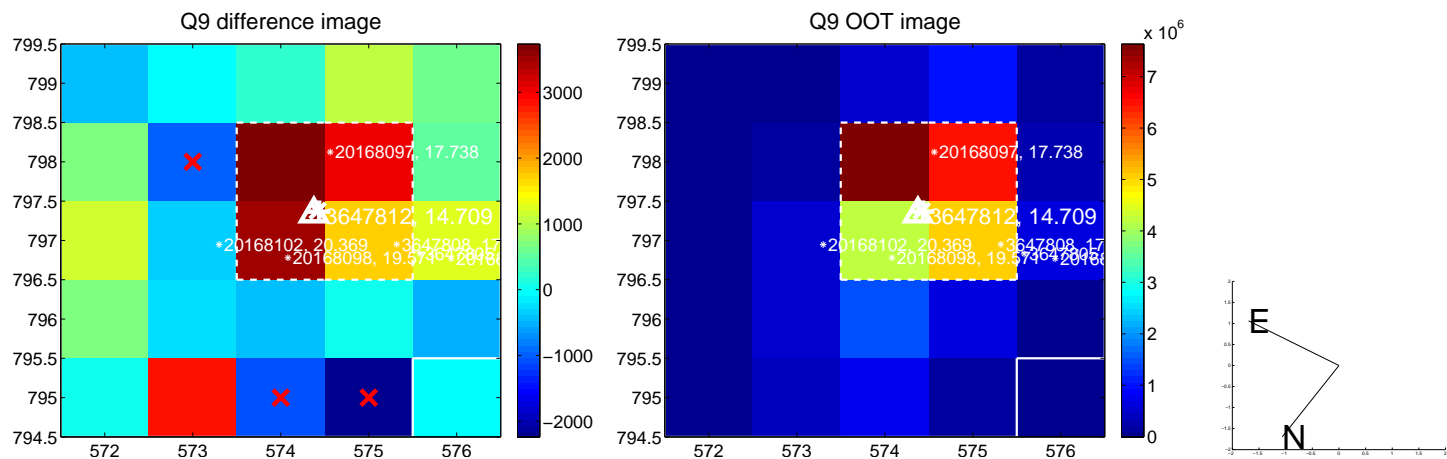
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



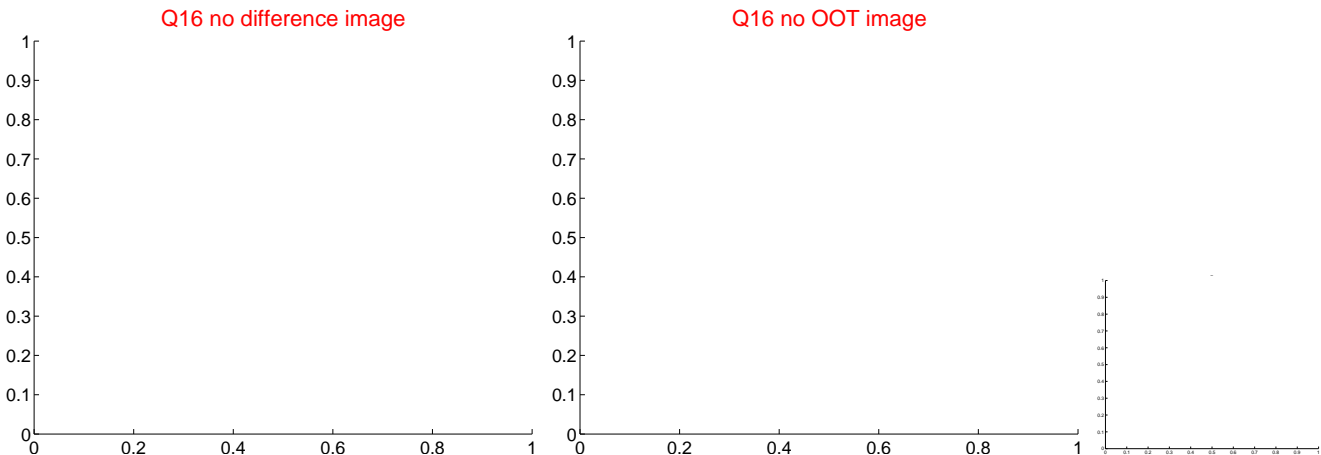
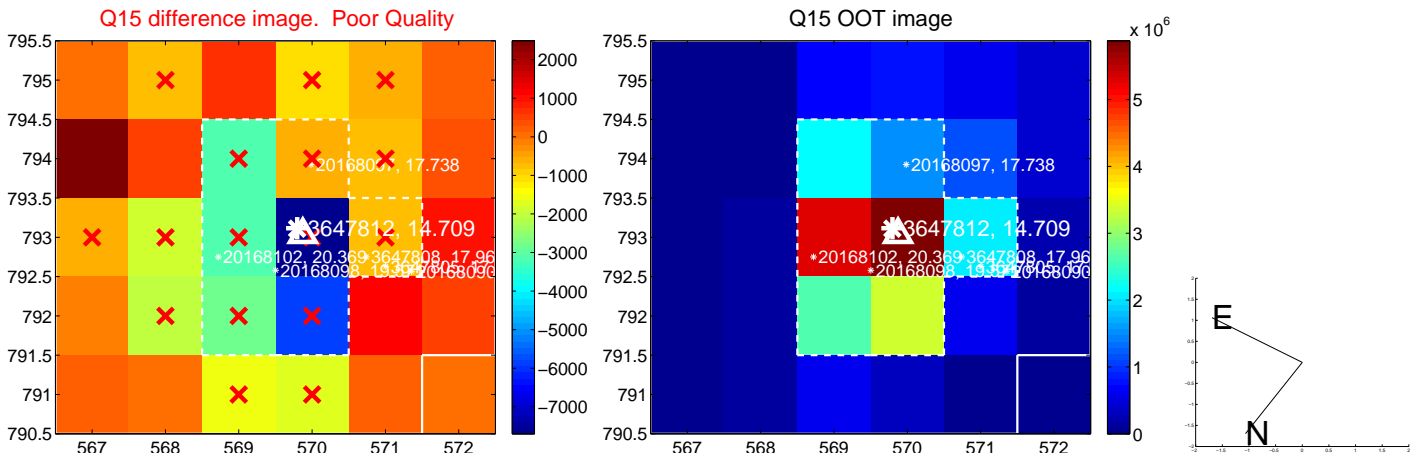
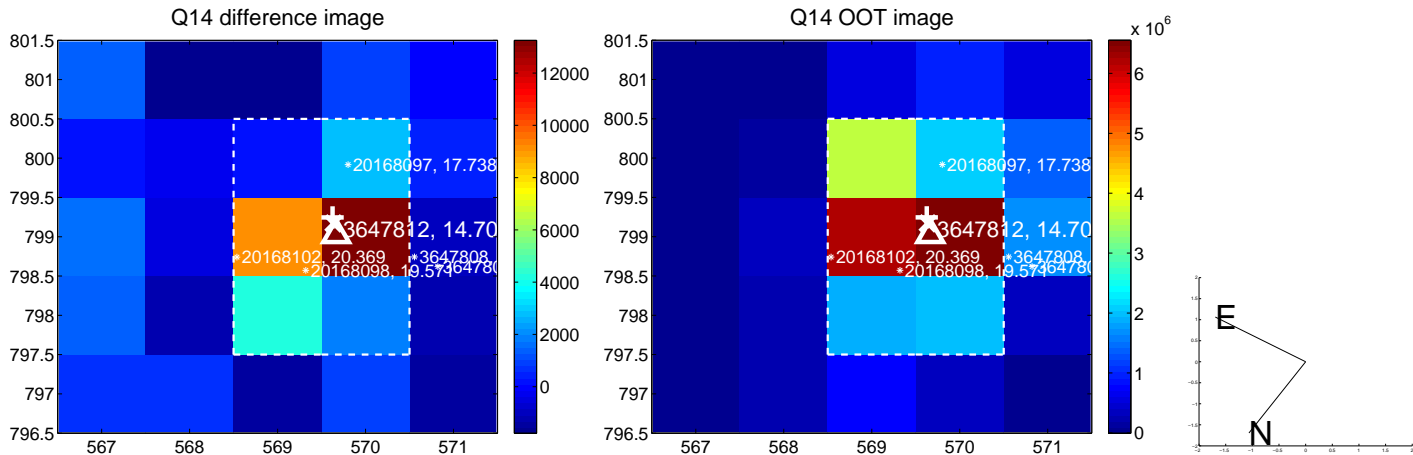
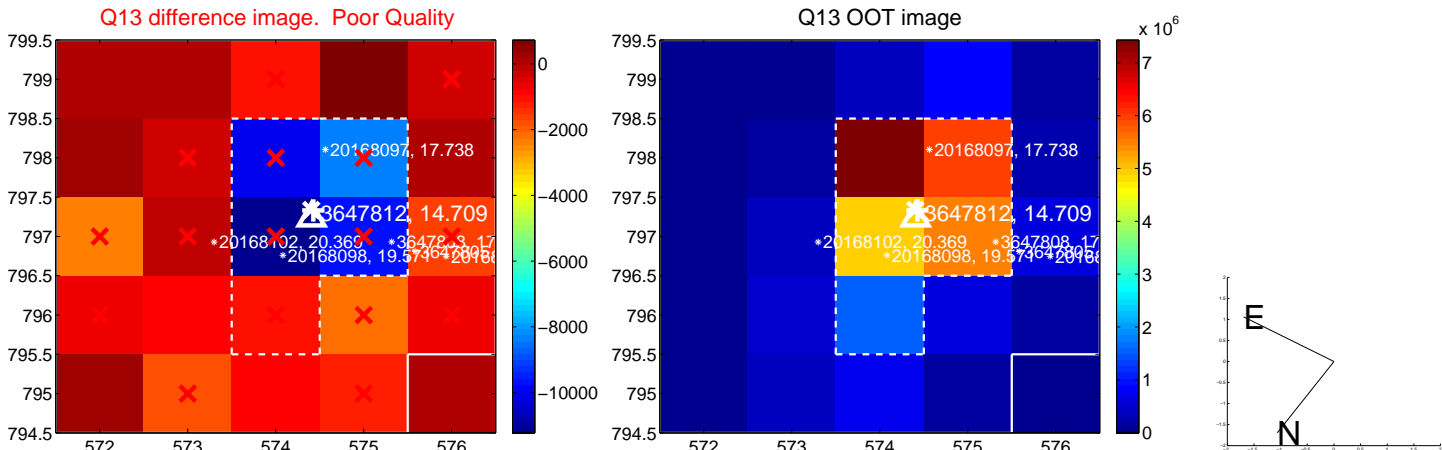
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



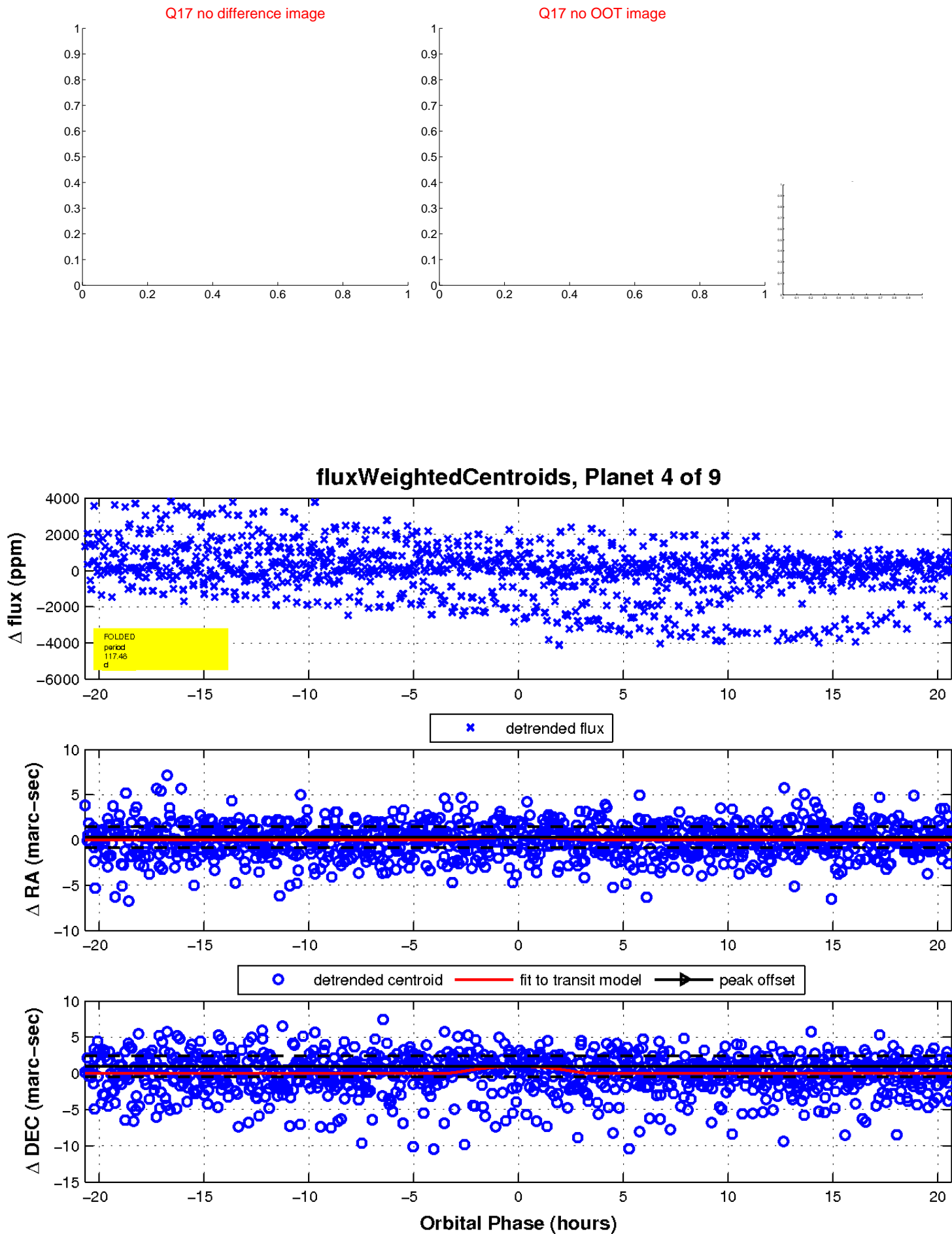
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.



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

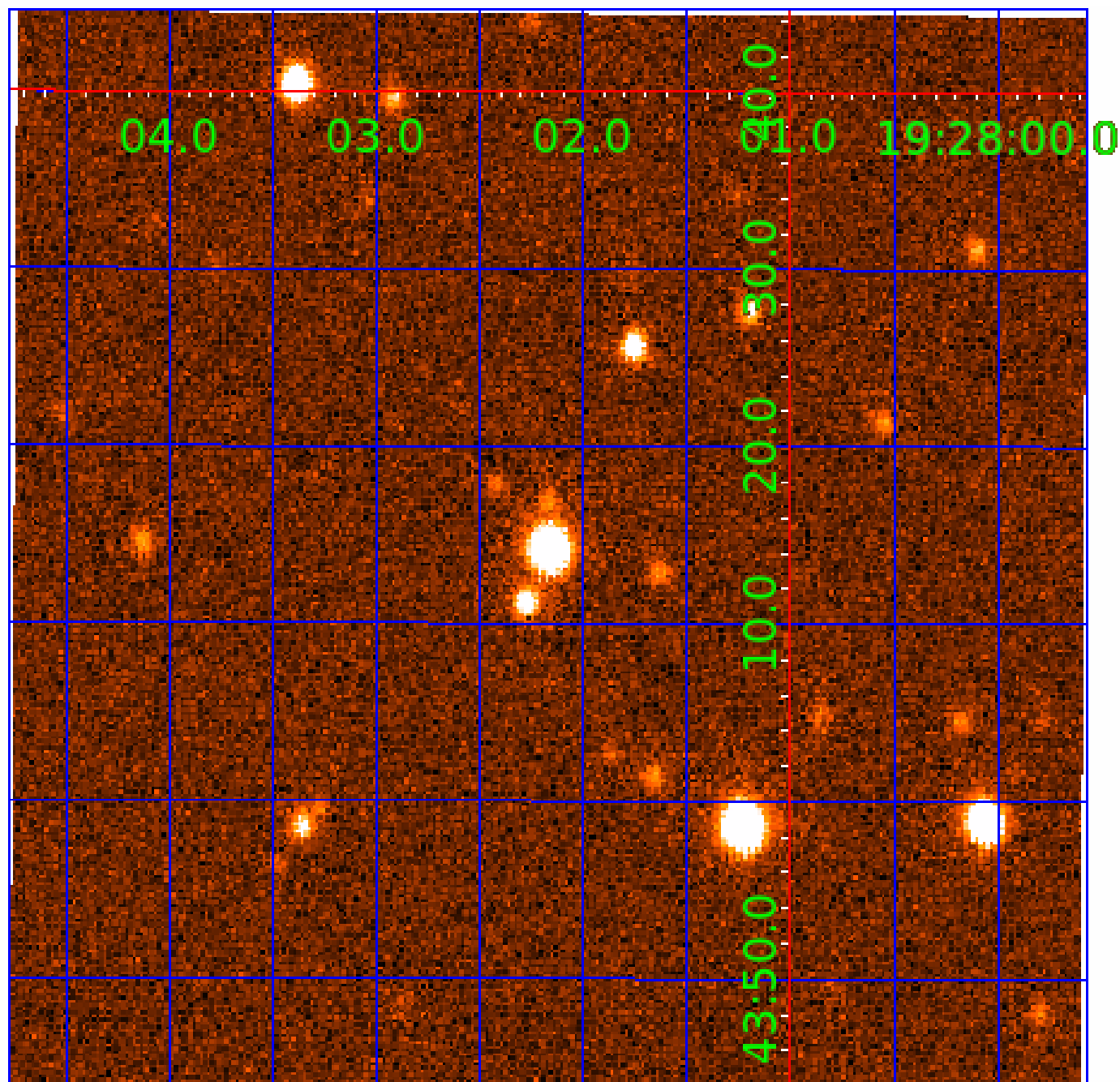


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 003647812

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003647812-01	OBS	No	1.025744	131.805103	48.0	4.726	7.9	8.2	0.88	5534	0.62	1755.22
003647812-02	OBS	No	108.387733	214.706028	405.5	11.124	15.8	2.7	0.88	5534	1.81	3.51
003647812-03	OBS	No	122.338718	194.660074	645.6	1.634	13.3	3.5	0.88	5534	2.46	2.99
003647812-04	OBS	No	117.477275	177.043792	1139.6	6.892	13.3	7.2	0.88	5534	4.16	3.16
003647812-05	OBS	No	215.837817	173.340947	2077.4	38.867	15.1	6.2	0.88	5534	4.50	1.40
003647812-06	OBS	No	113.689287	146.161820	1122.9	12.795	10.8	6.5	0.88	5534	3.74	3.30
003647812-07	OBS	No	325.149215	316.828480	2109.5	7.212	11.6	9.2	0.88	5534	5.07	0.81
003647812-08	OBS	No	323.187877	145.543042	4343.2	27.204	11.6	7.9	0.88	5534	6.94	0.82

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003647812-01	OBS	FP	0.00	1	0	0	0	LPP_DV
003647812-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS
003647812-03	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
003647812-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
003647812-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—INCONSISTENT_TRANS—HALO_GHOST
003647812-06	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—INCONSISTENT_TRANS—HALO_GHOST
003647812-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—ALL_TRANS_CHASES—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—SAME_NTL_PERIOD—CENT_FEW_DIFFS
003647812-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—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.

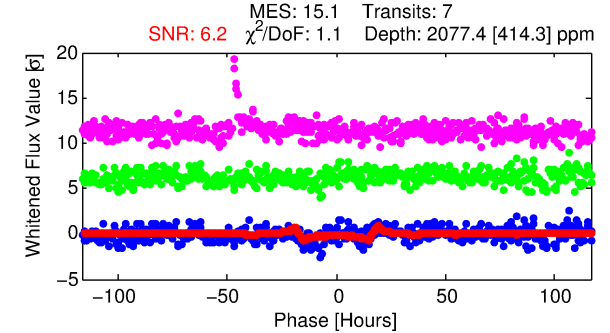
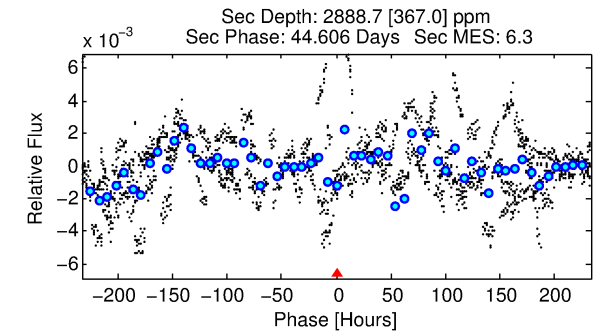
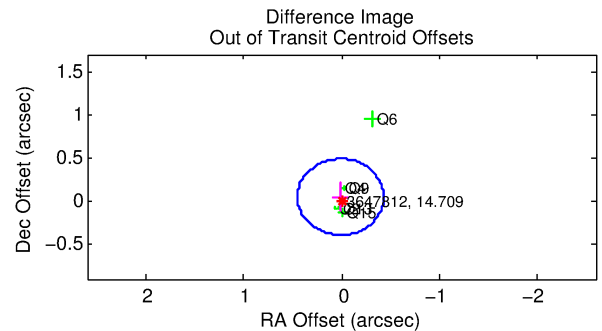
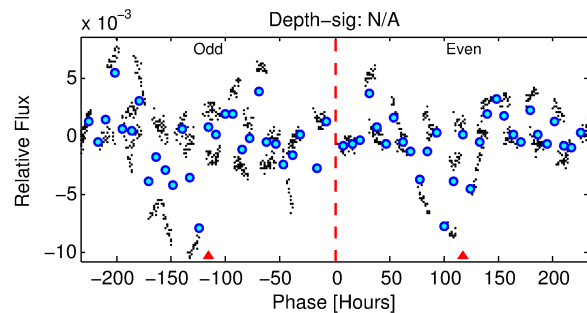
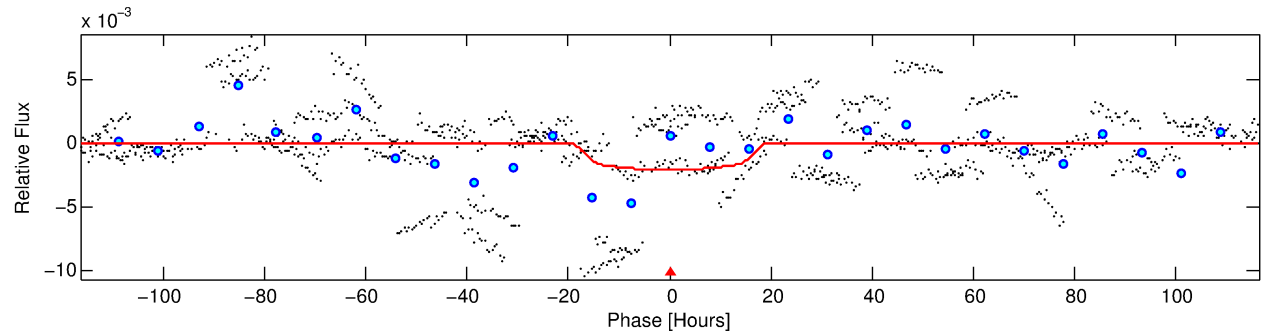
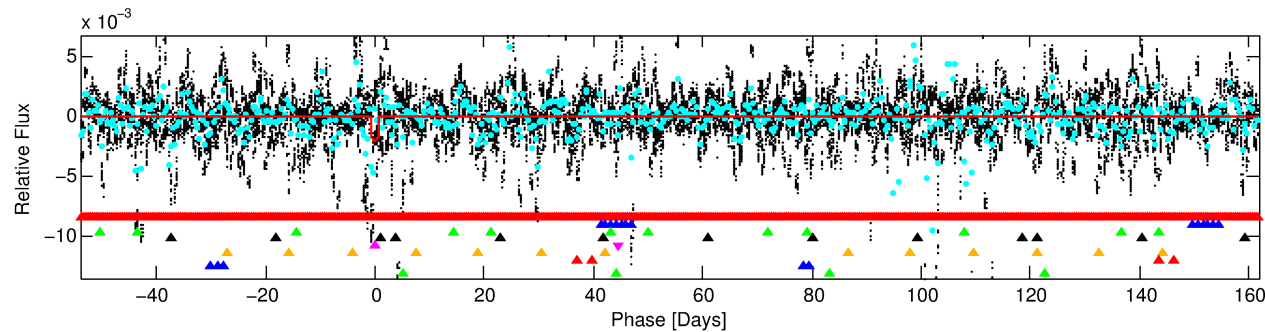
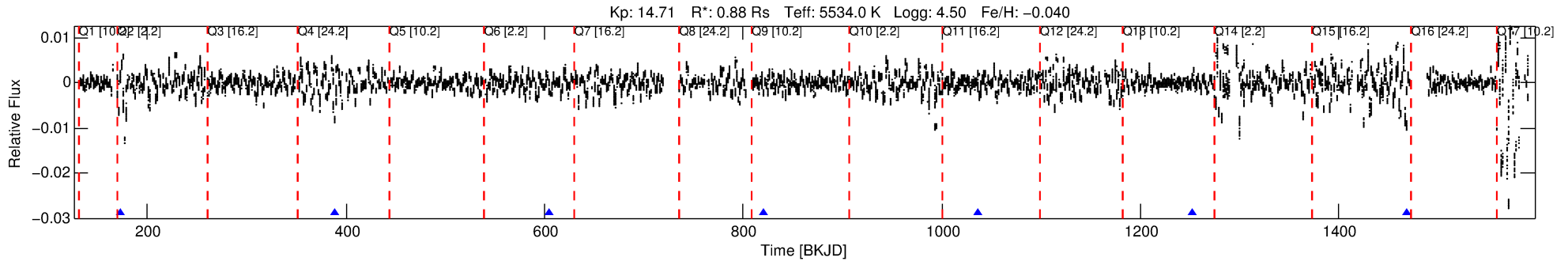
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 003647812-05

No Significant Match Found

# DV One-Page Summary

KIC: 3647812 Candidate: 5 of 9 Period: 215.838 d



## DV Fit Results:

Period = 215.83782 [0.01138] d  
Epoch = 173.3409 [0.0381] BKJD  
Rp/R\* = 0.0470 [0.0051]  
a/R\* = 27.59 [3.44]  
b = 0.82 [0.05]  
Seff = 1.40 [0.45]  
Teq = 277 [22] K  
Rp = 4.50 [1.17] Re  
a = 0.6789 [0.1371] AU  
Ag = 36162.09 [14068.31] [2.57σ]  
Teffp = 5916 [410] K [13.73σ]

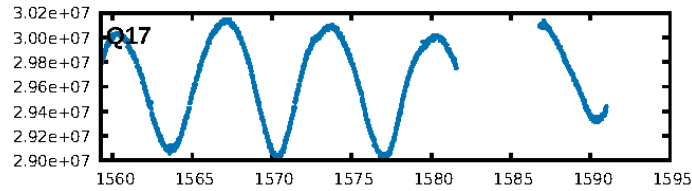
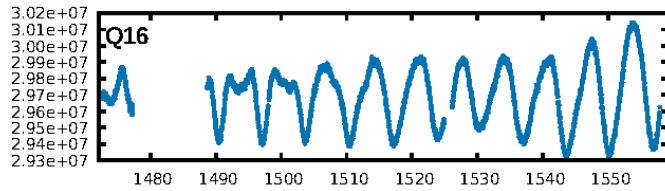
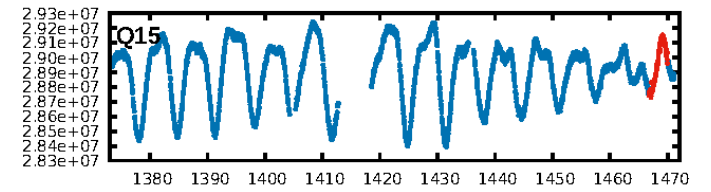
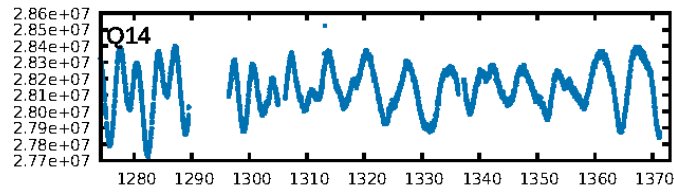
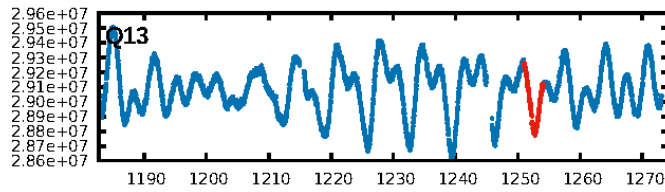
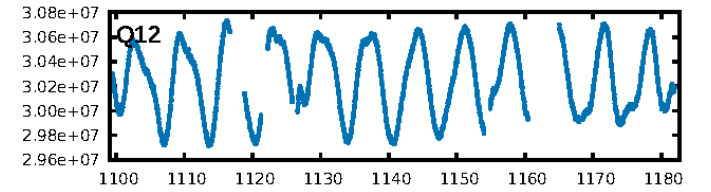
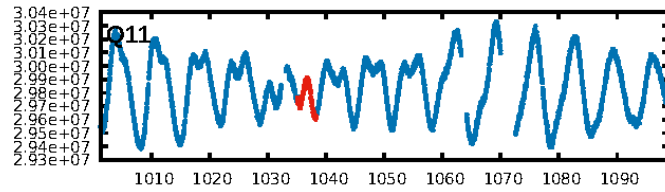
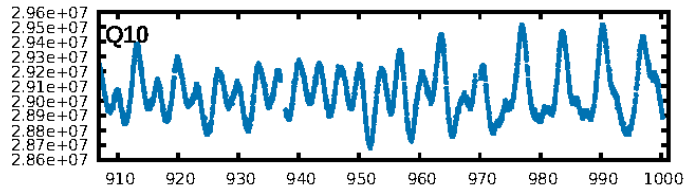
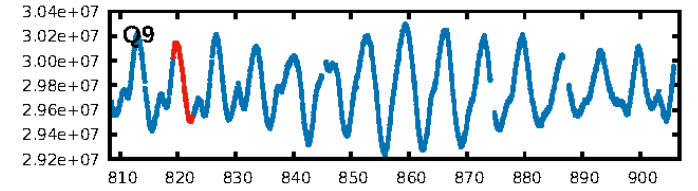
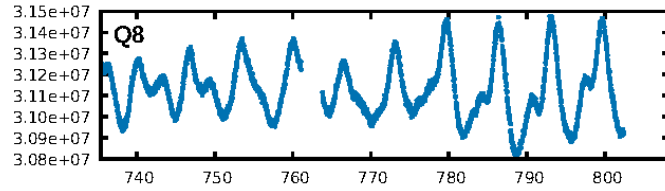
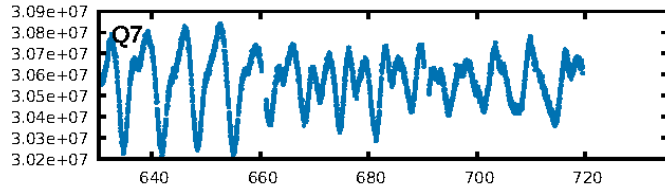
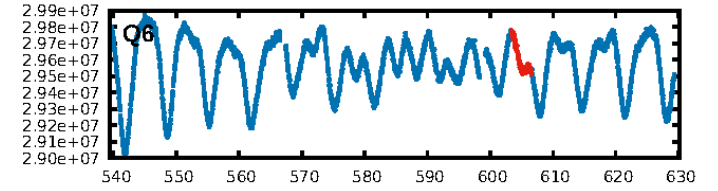
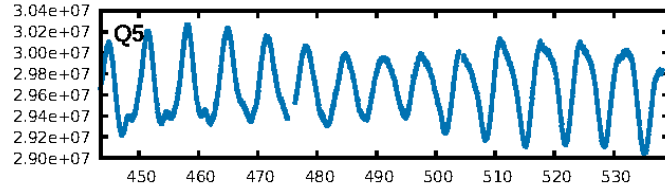
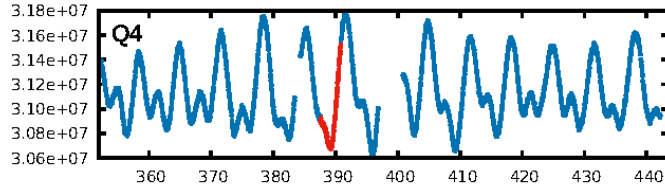
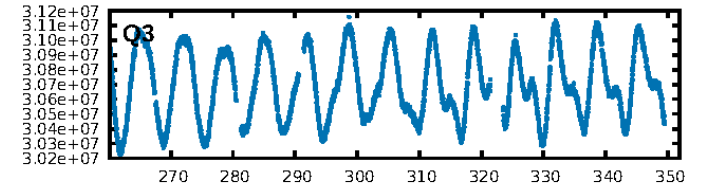
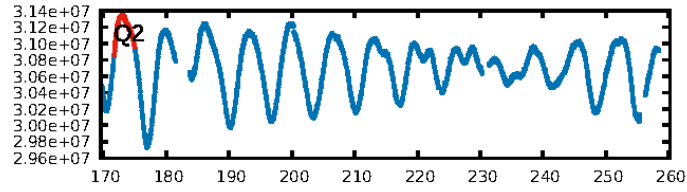
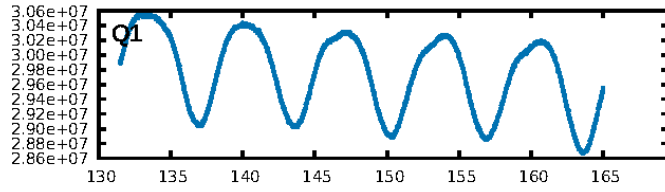
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [57.68σ]  
LongPeriod-sig: 100.0% [54.31σ]  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 1.13e-18  
RollingBand-fgt: 1.00 [7/7]  
GhostDiagnostic-chr: -0.2059  
Centroid-sig: 4.3%  
Centroid-so: 0.555 arcsec [2.06σ]  
OotOffset-rm: 0.051 arcsec [0.35σ]  
KicOffset-rm: 0.029 arcsec [0.26σ]  
OotOffset-st: 2/1/1/2 [6]  
KicOffset-st: 2/1/1/2 [6]  
DiffImageQuality-fgm: 0.50 [3/6]  
DiffImageOverlap-fno: 0.00 [0/6]

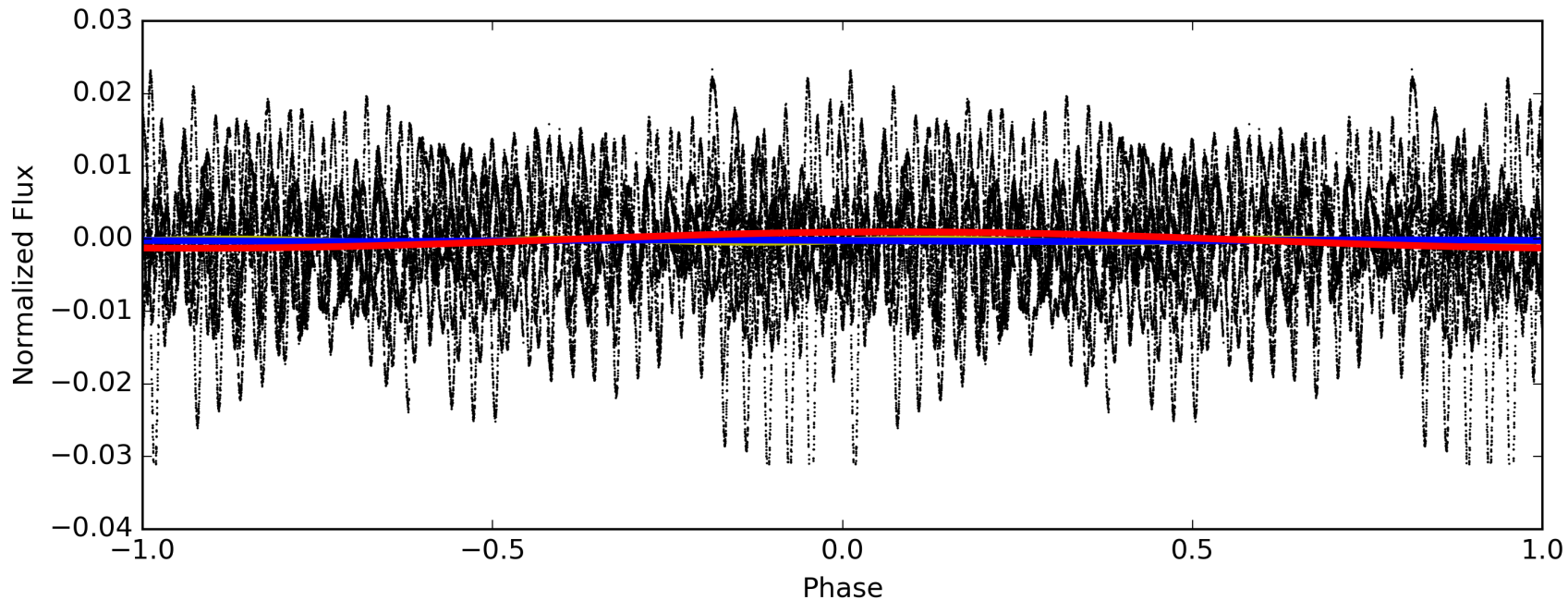
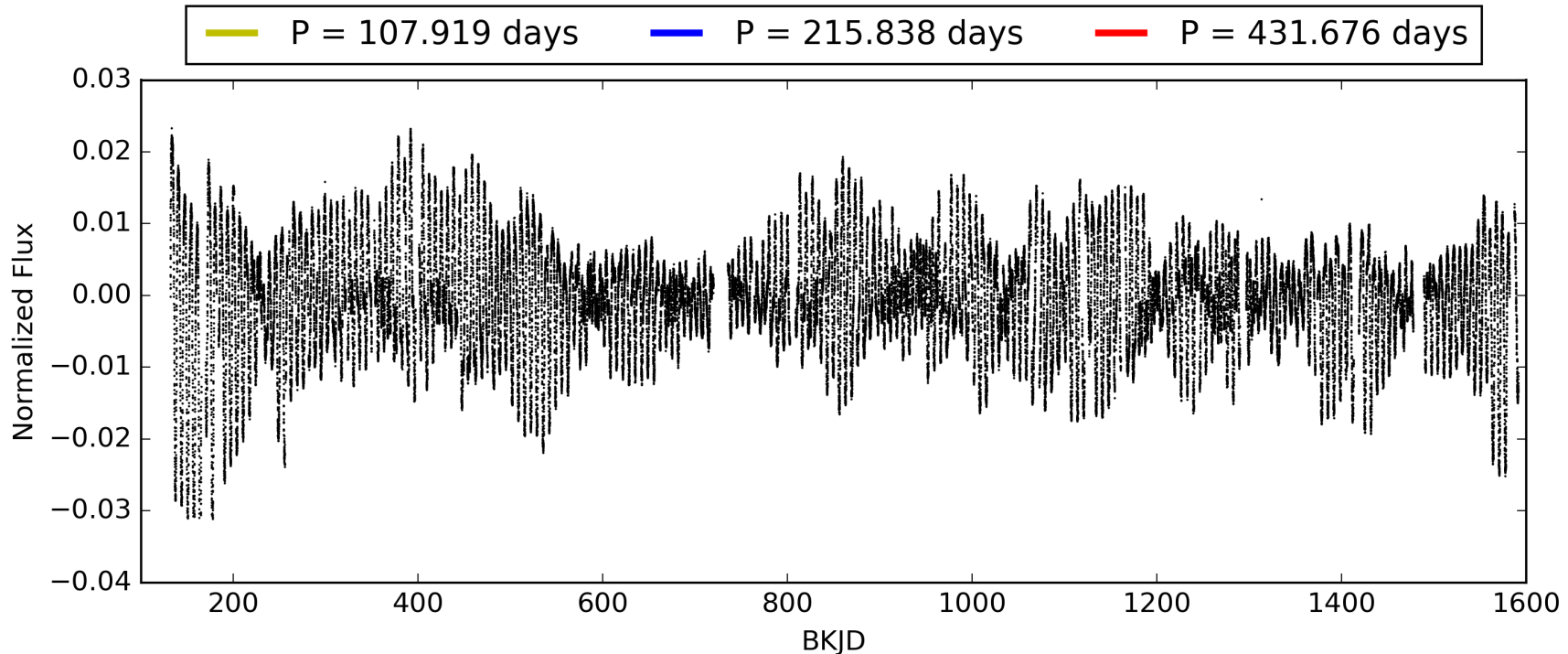
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 04:14:37 Z

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

# TCE 003647812-05, PDC Light Curves

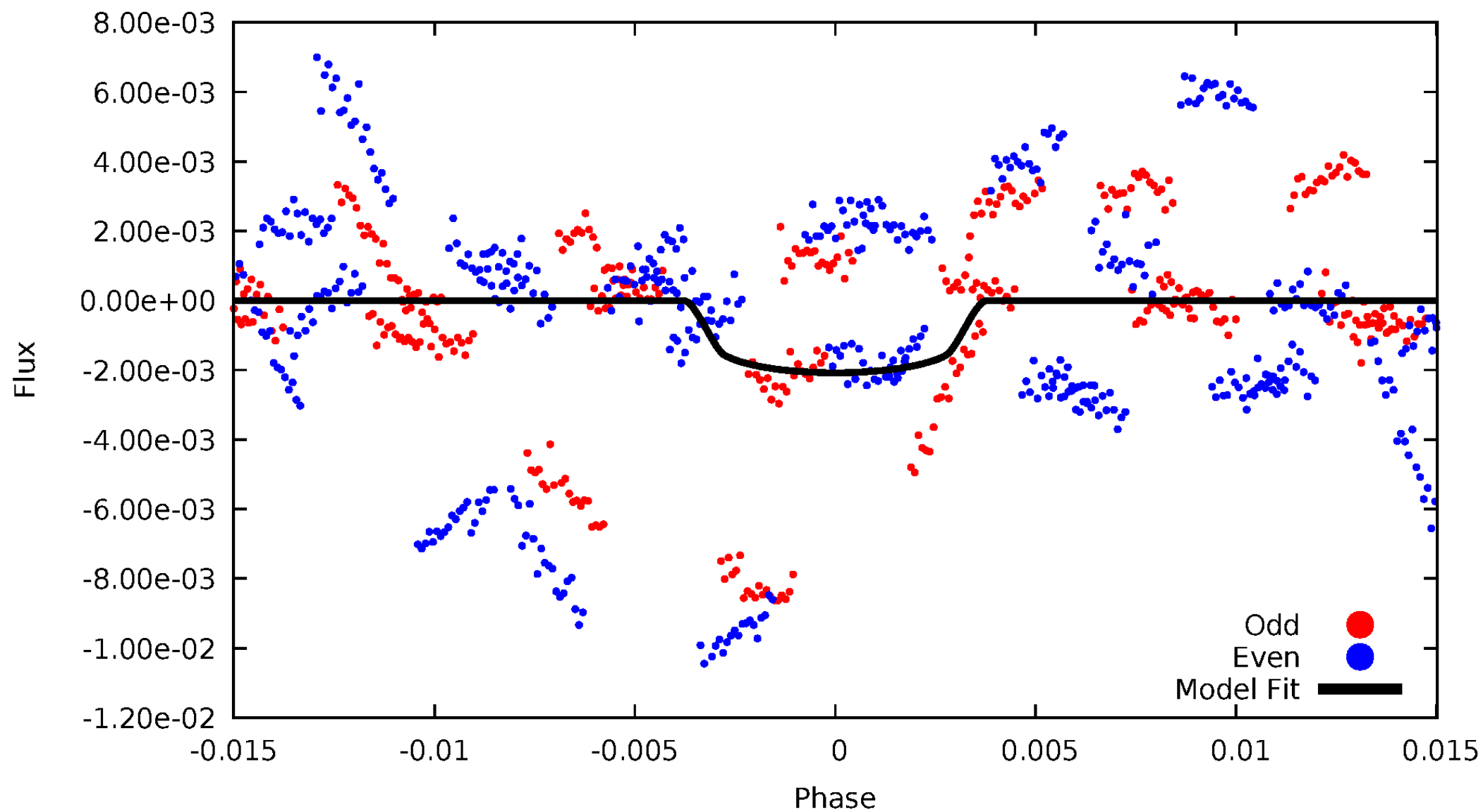


TCE 003647812-05



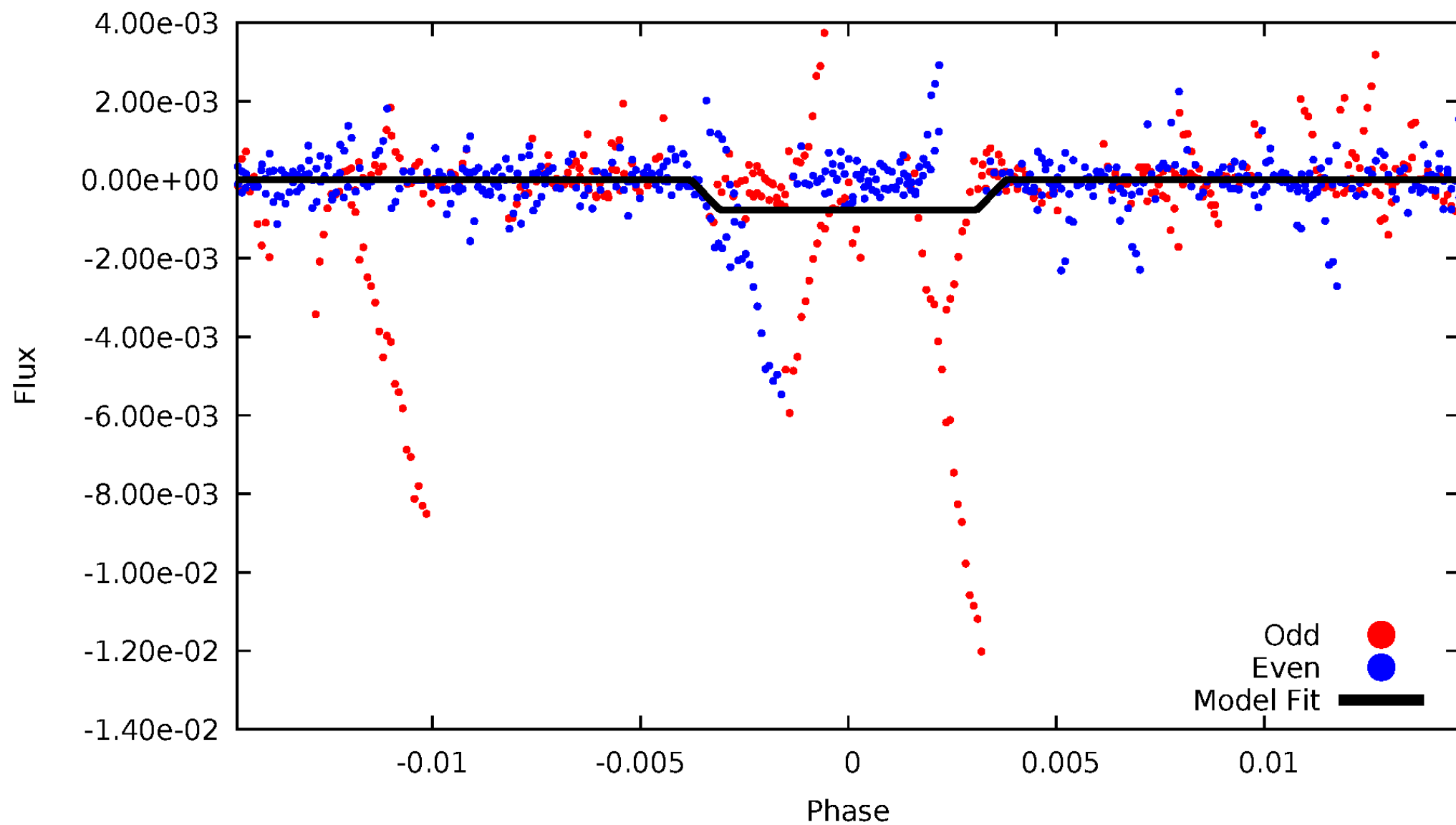
# DV Odd/Even

TCE 003647812-05



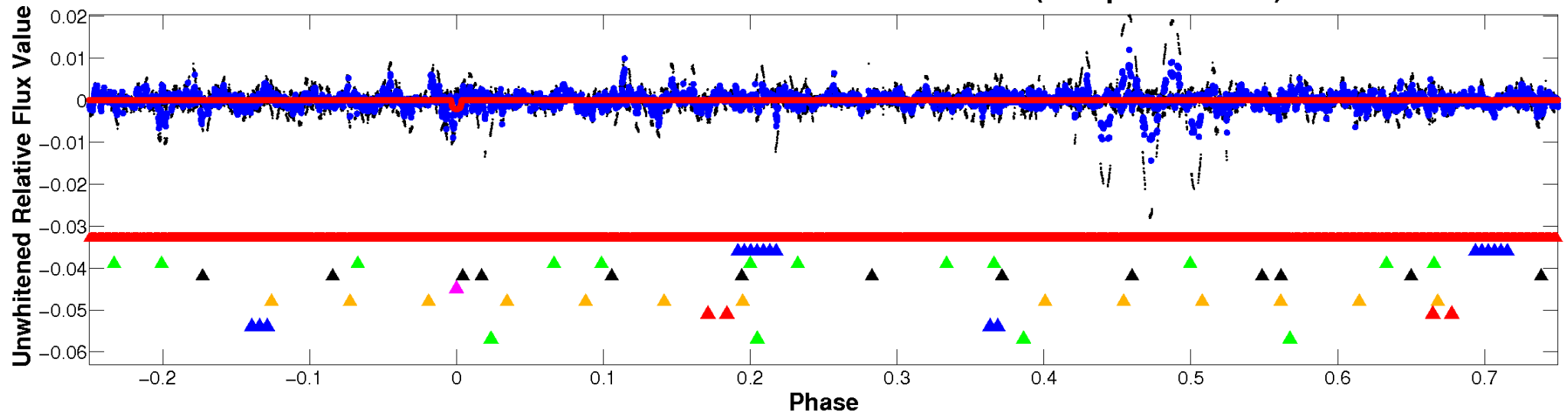
# ALT Odd/Even

TCE 003647812-05

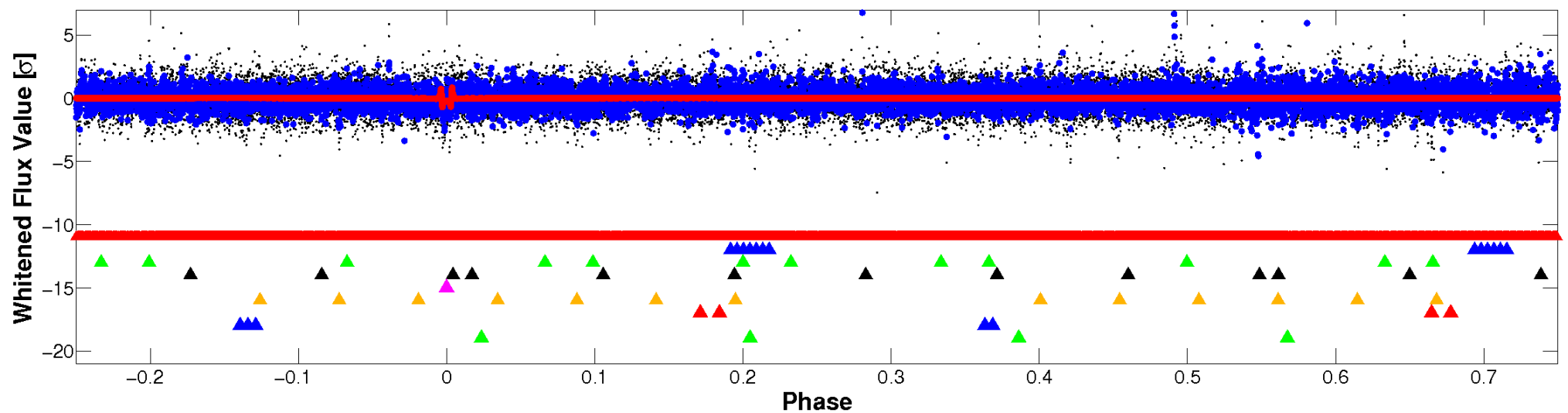


# Non-Whitened Vs. Whitened Light Curve

## Planet 5 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)



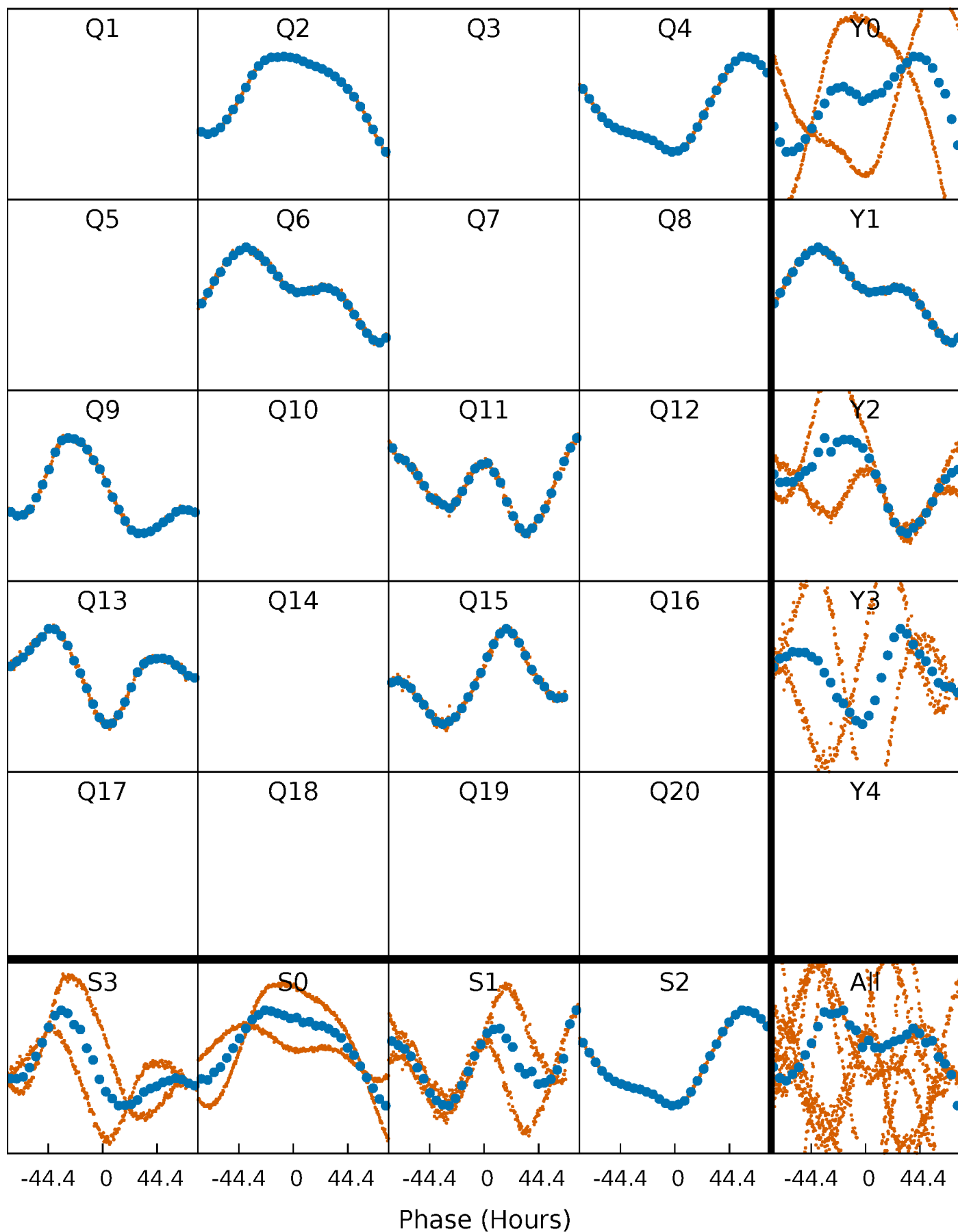
## Planet 5 : Phased Whitened Flux Time Series (Fit Epoch/Period)





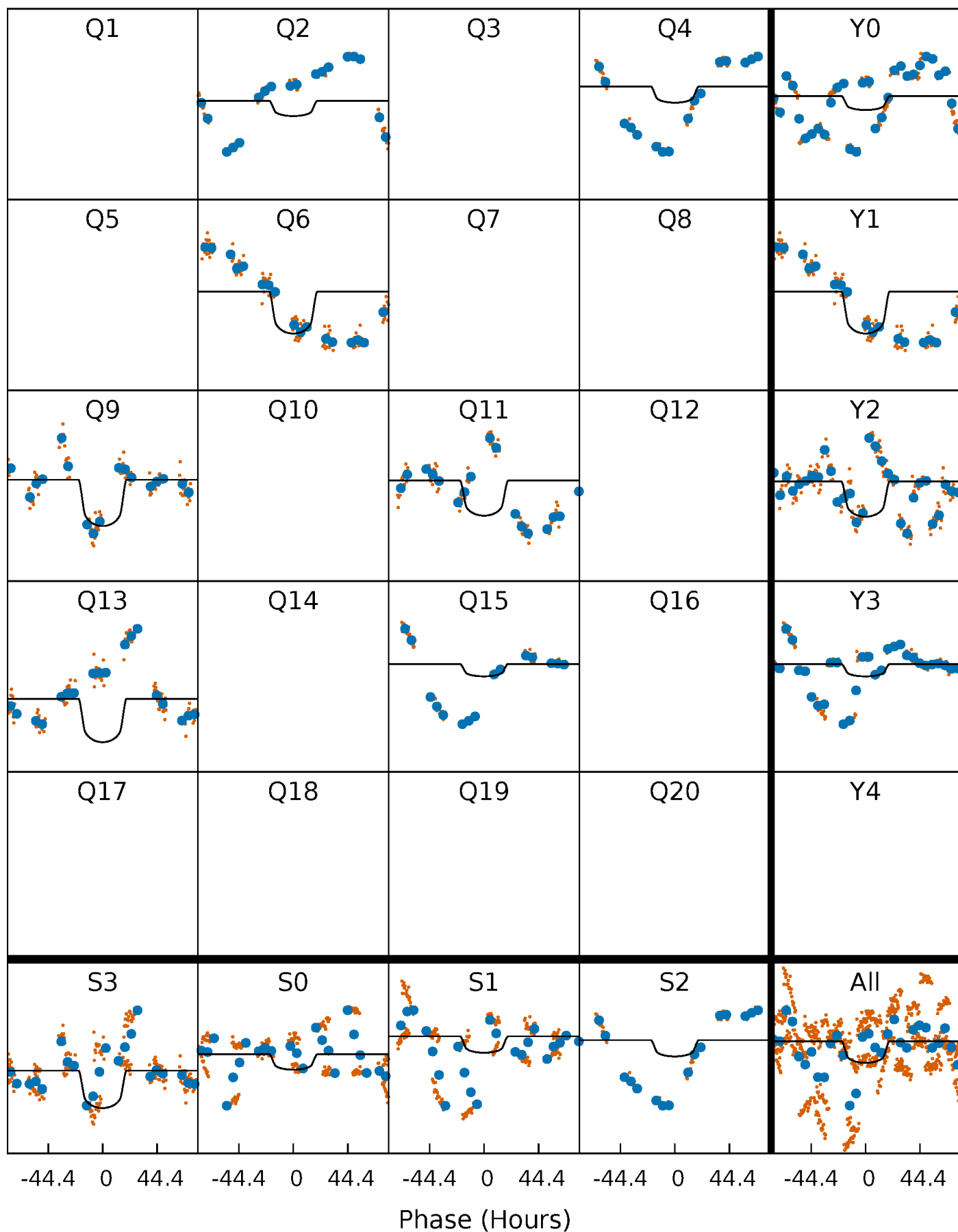
# PDC Quarter-Phased Transit Curves

TCE 003647812-05 P=215.837817 Days  $T_0=173.340947$  (BKJD)



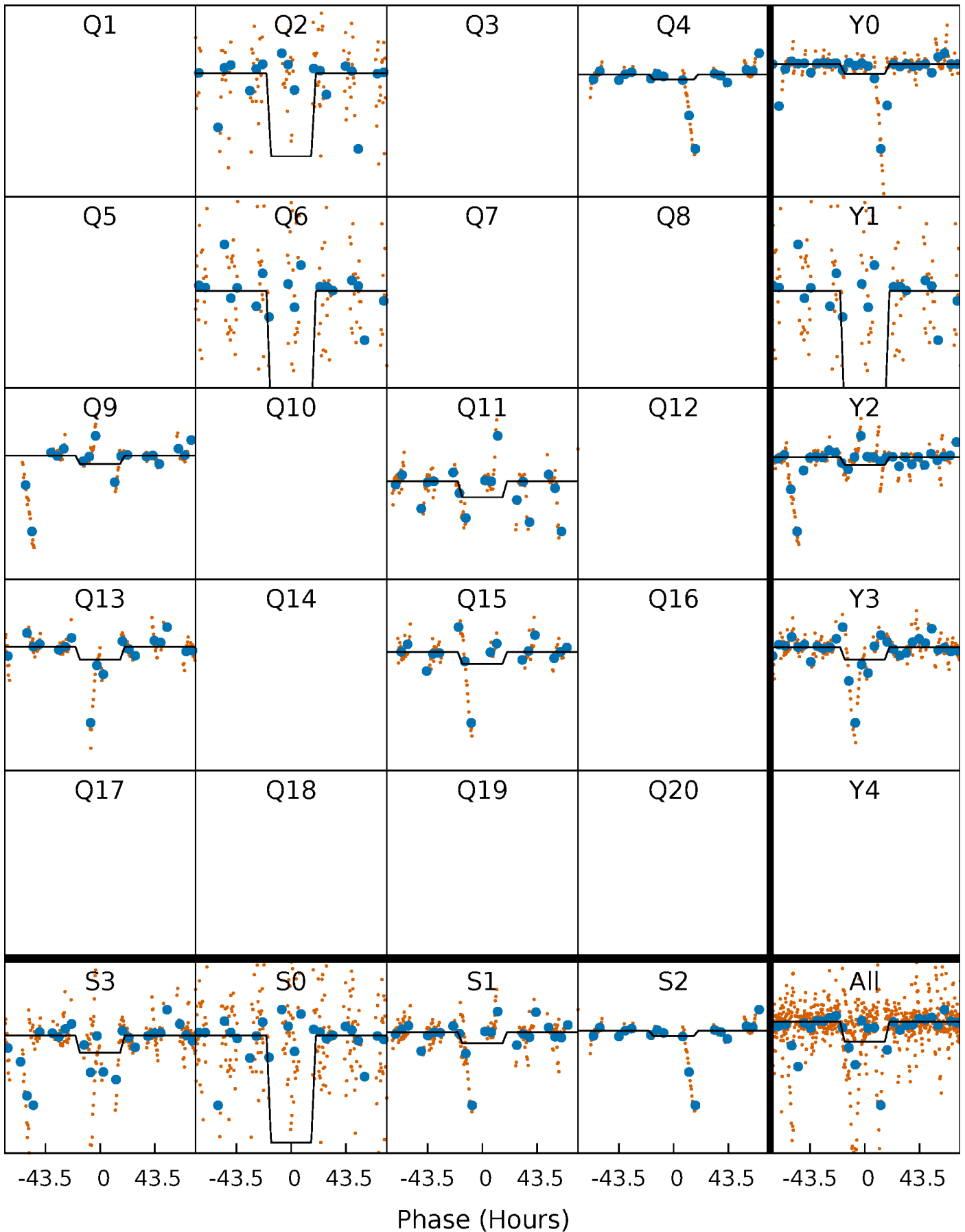
# DV Quarter-Phased Transit Curves

TCE 003647812-05     $P=215.837817$  Days     $T_0=173.340947$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

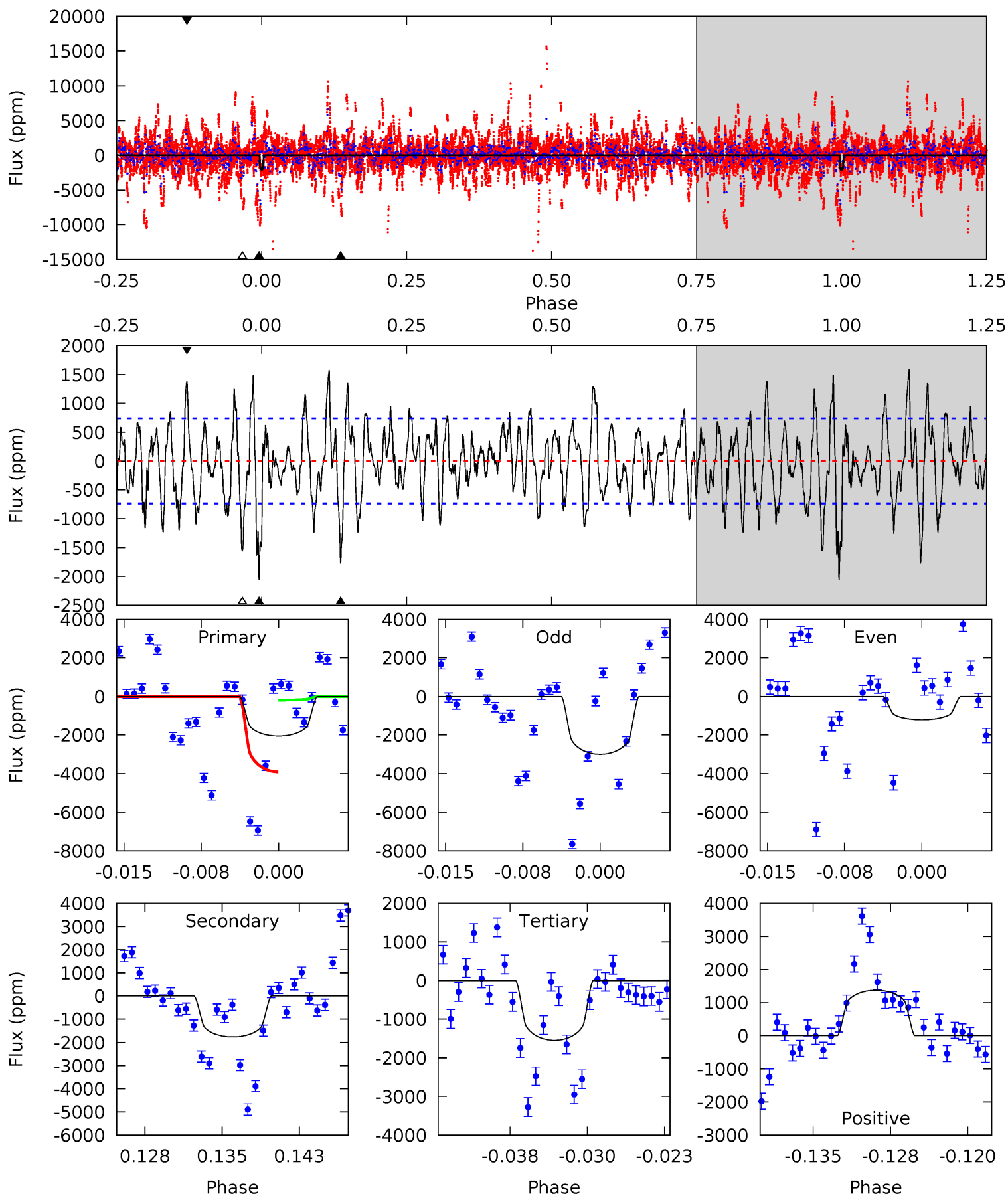
TCE 003647812-05     $P=215.819261$  Days     $T_0=173.463295$  (BKJD)



# DV Model-Shift Uniqueness Test

003647812-05, P = 215.837817 Days, E = 173.340947 Days

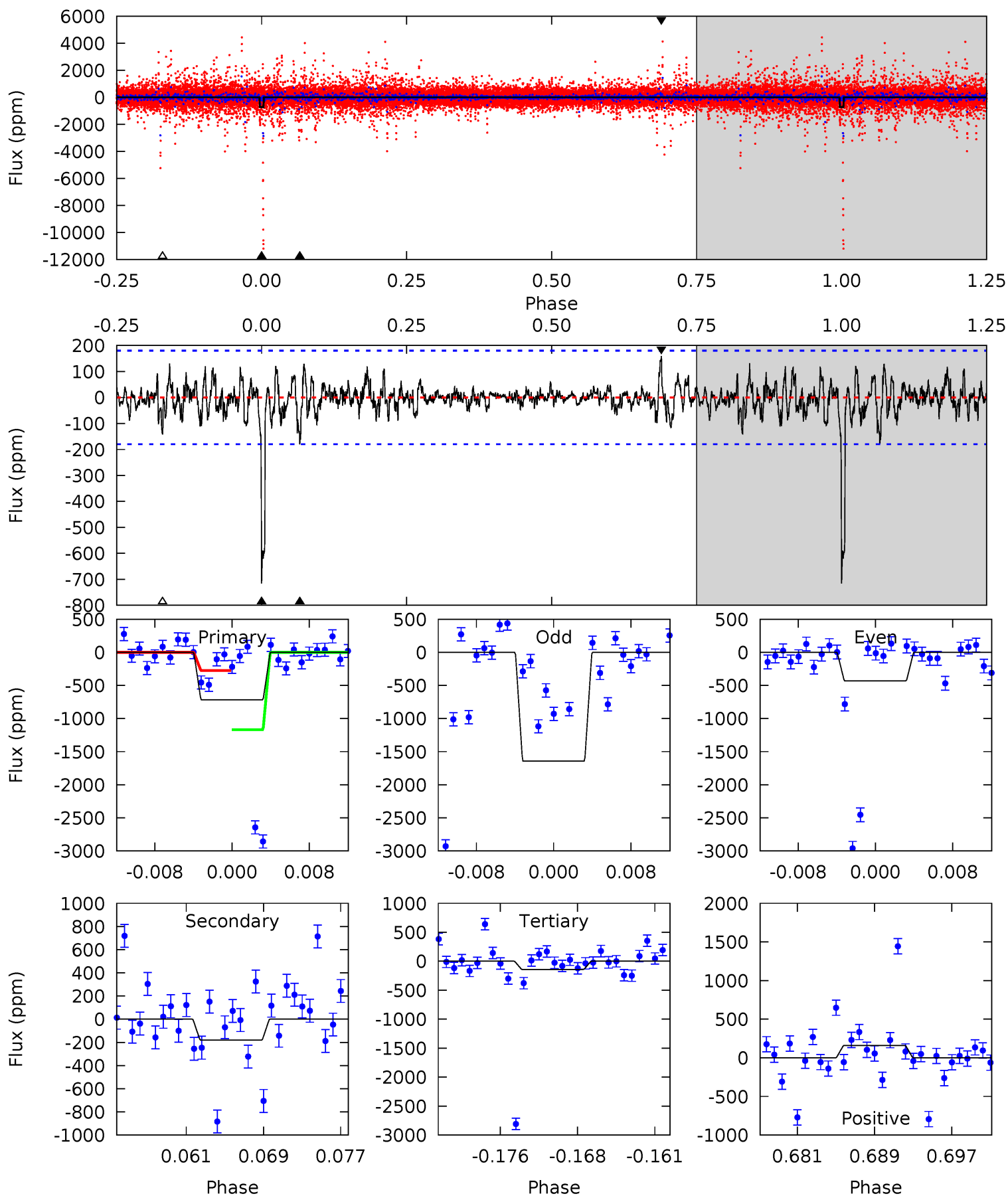
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
14.2	12.2	10.6	9.46	5.08	2.67	3.58	3.50	4.69	1.51	2.69	5.53	1.06	0.43	12.8



# Alt Model-Shift Uniqueness Test

003647812-05, P = 215.819261 Days, E = 173.463295 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
20.2	5.07	3.99	4.48	5.08	2.67	1.07	16.2	15.7	1.09	0.60	14.4	4.28	0.18	12.7



### Stellar Parameters For KIC 003647812

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5534^{+166}_{-166}$	$4.504^{+0.066}_{-0.165}$	$-0.040^{+0.300}_{-0.300}$	$0.877^{+0.207}_{-0.095}$	$0.896^{+0.102}_{-0.083}$	$1.870^{+0.529}_{-0.824}$
	+3%/-3%	+1%/-4%	+750%/-750%	+24%/-11%	+11%/-9%	+28%/-44%
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 003647812-05 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-1765 \pm 145$	$4.64^{+0.69}_{-0.58}$	$393^{+22}_{-18}$	$5252^{+329}_{-297}$	$20500^{+6664}_{-4930}$
Alt.	$-180 \pm 35$	$2.74^{+0.59}_{-0.49}$	$394^{+25}_{-20}$	$4108^{+377}_{-305}$	$5947^{+3505}_{-2271}$

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

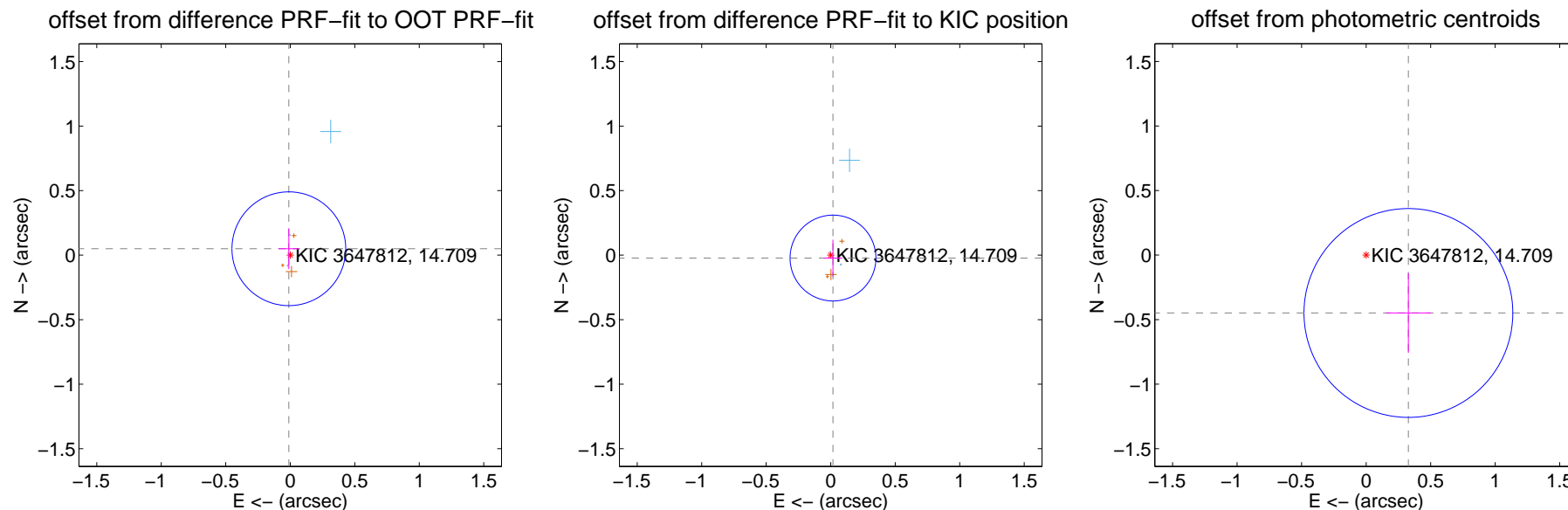
## DV Centroid Data

Supplemental centroid analysis for 003647812-05. Kepler magnitude: 14.71. Transit SNR 6.19

There are 3 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.02 arcsec

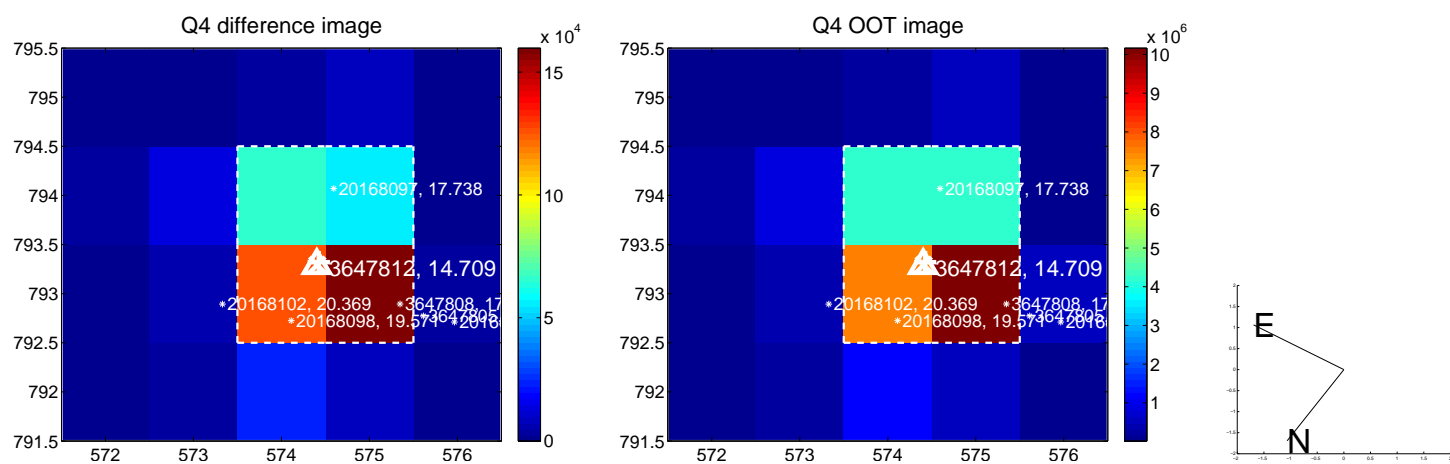
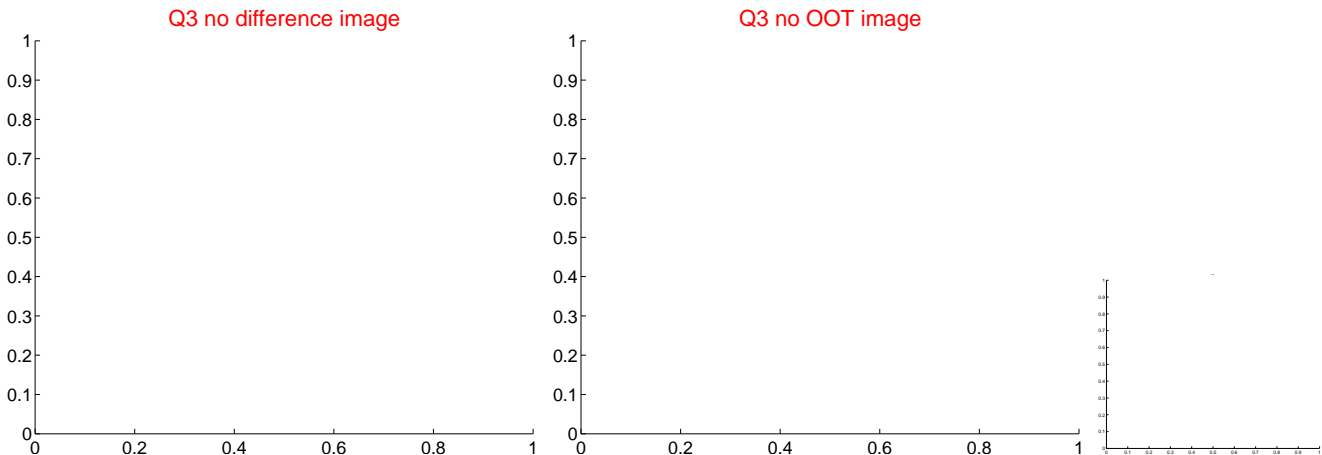
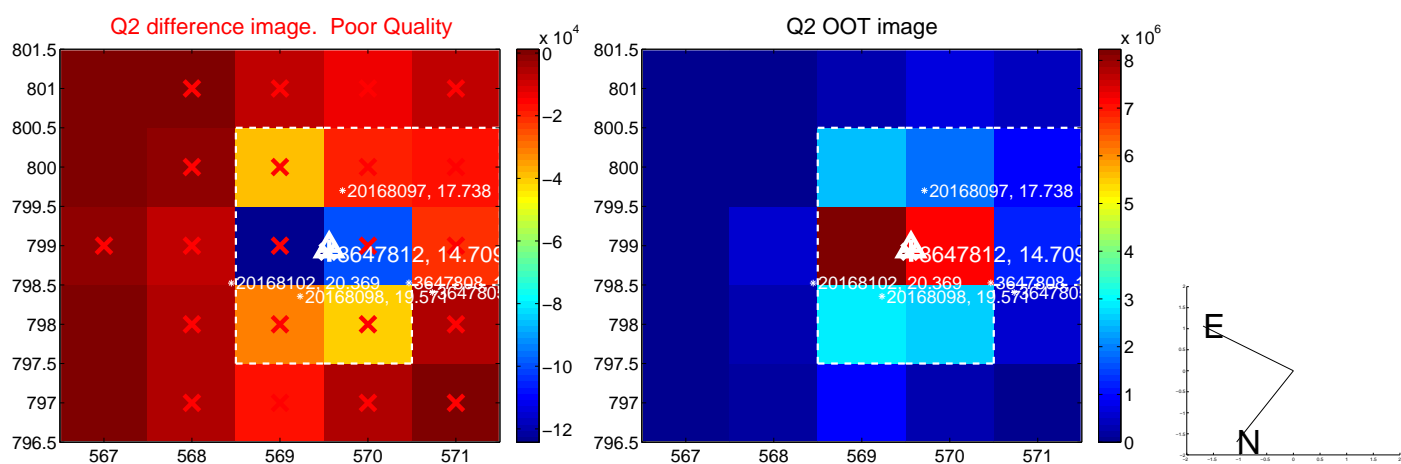
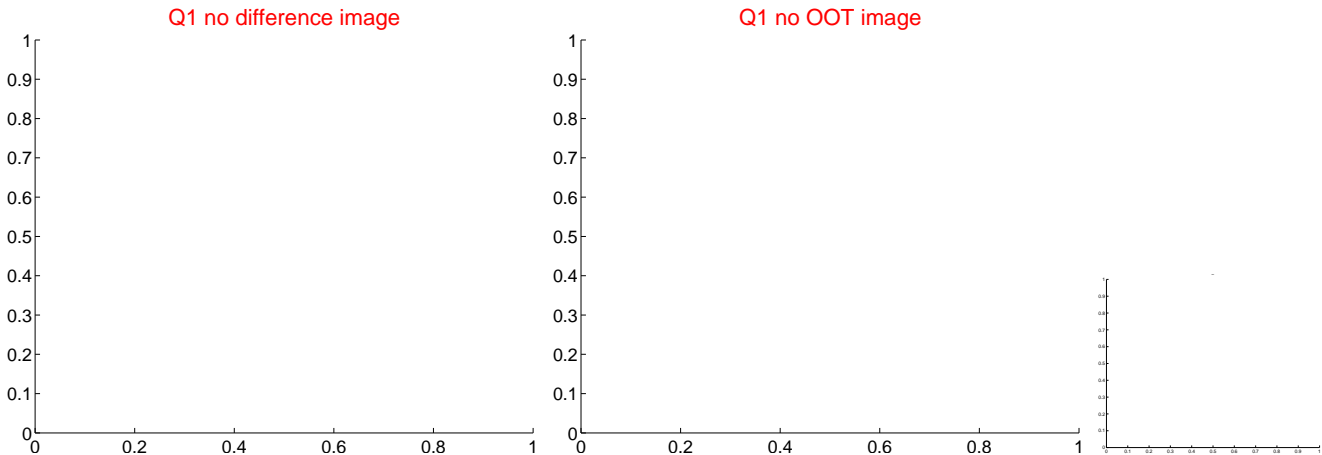
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.051 \pm 0.147$	0.35	$0.011 \pm 0.081$	$0.050 \pm 0.159$
PRF-fit source offset from KIC position	$0.029 \pm 0.111$	0.26	$-0.018 \pm 0.071$	$-0.022 \pm 0.143$
photometric centroid source offset	$0.56 \pm 0.27$	2.06	$-0.33 \pm 0.17$	$-0.45 \pm 0.31$



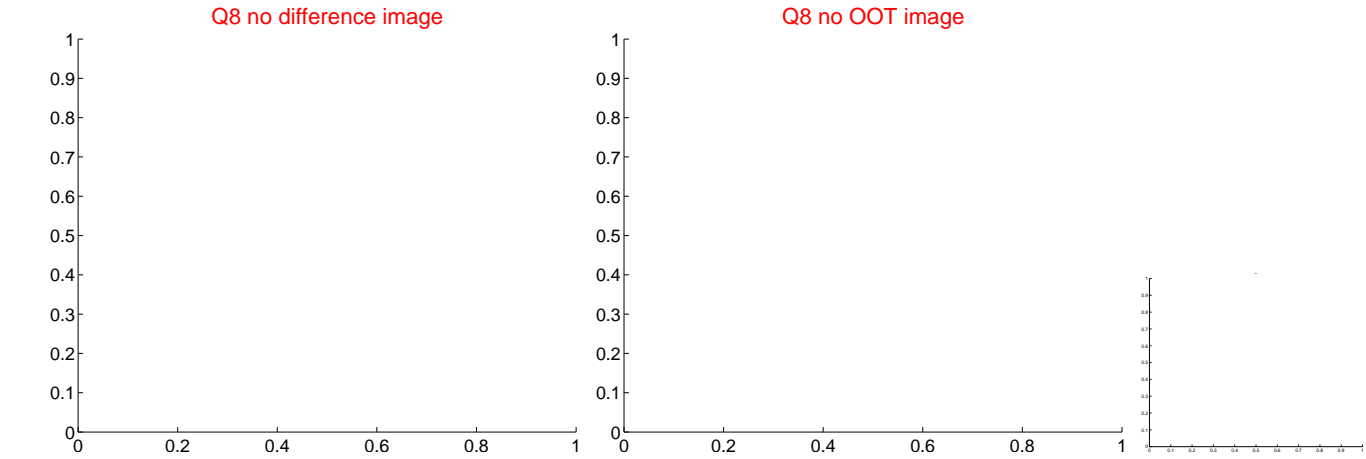
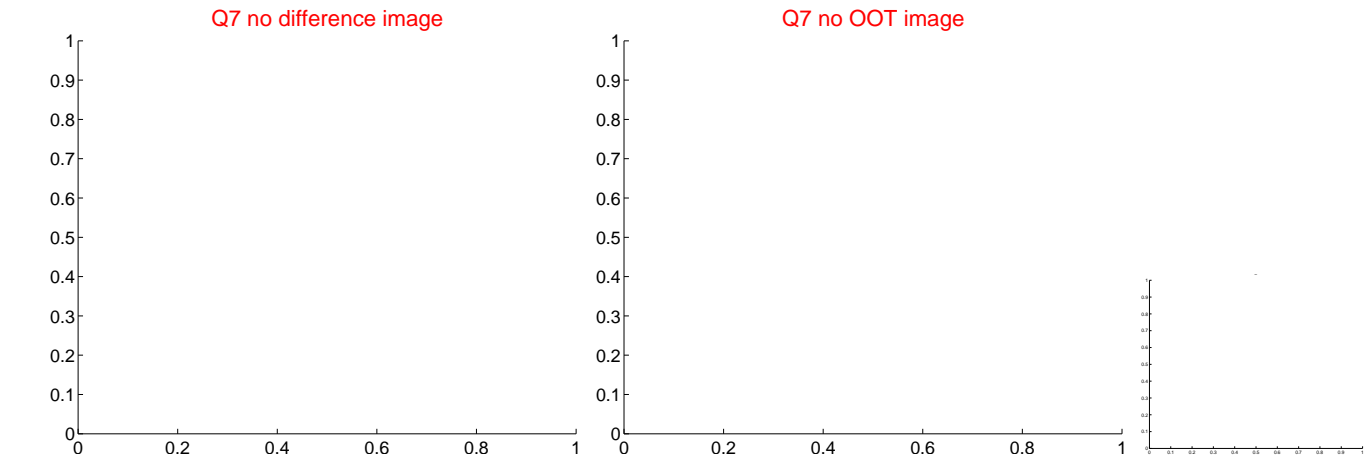
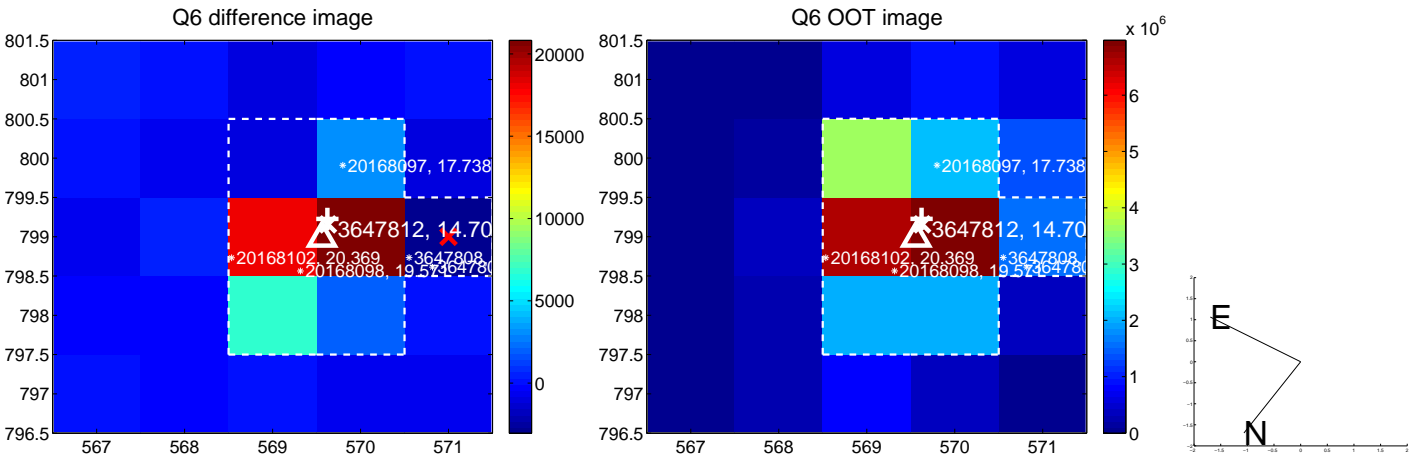
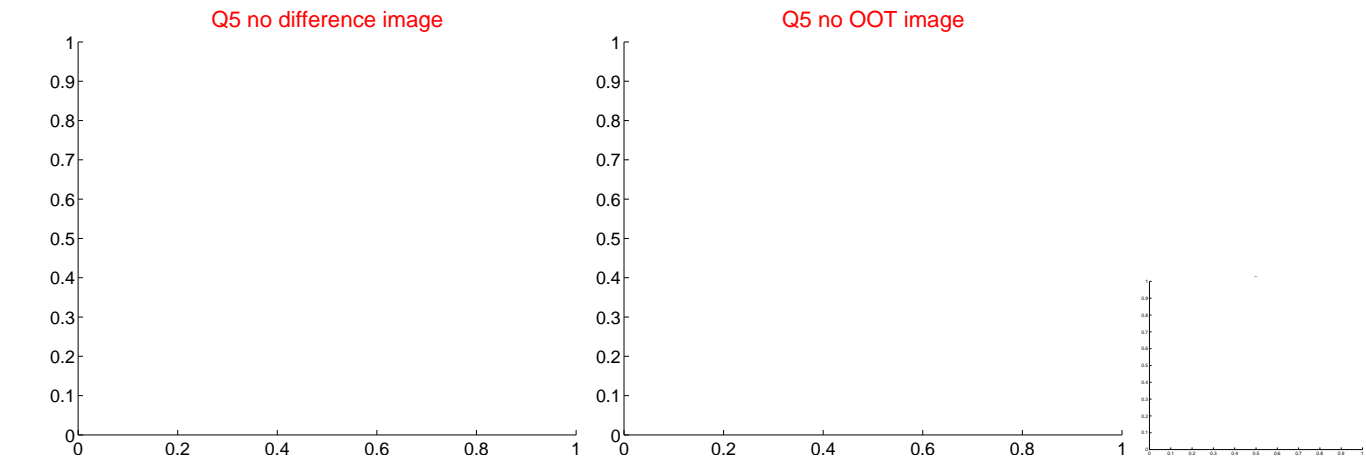
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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



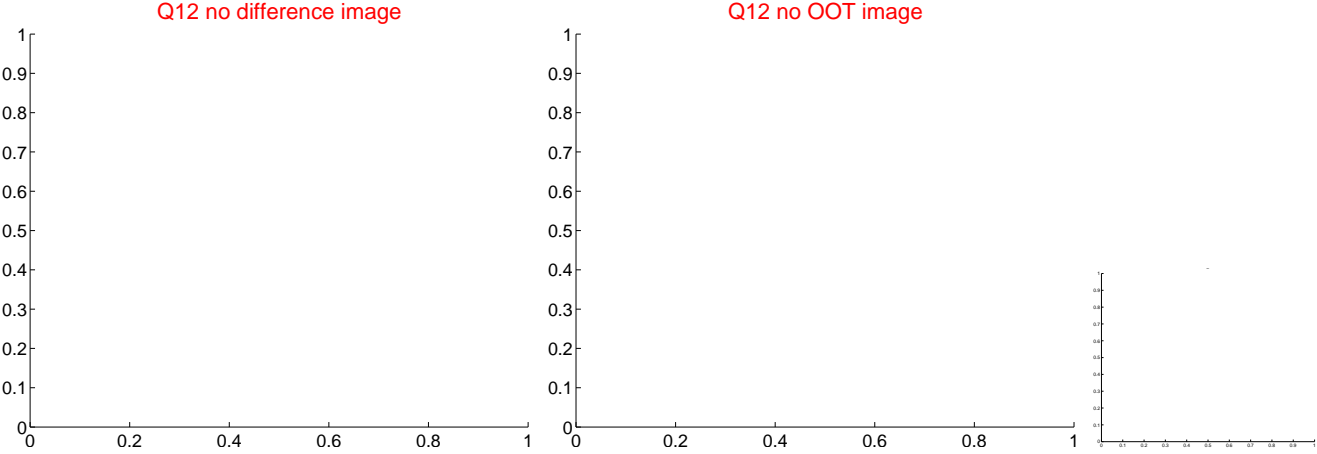
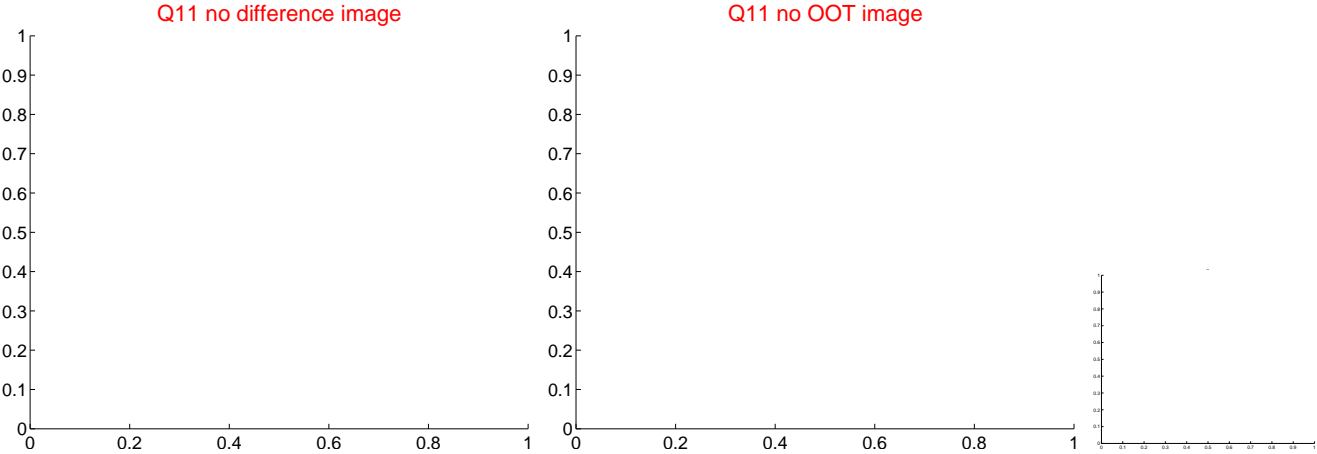
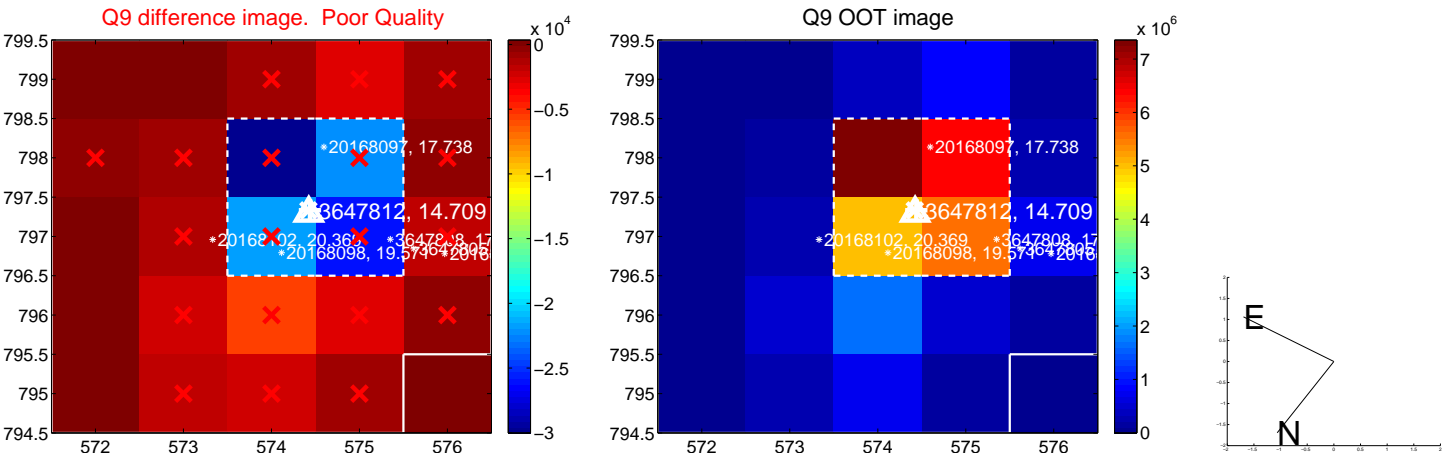
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value



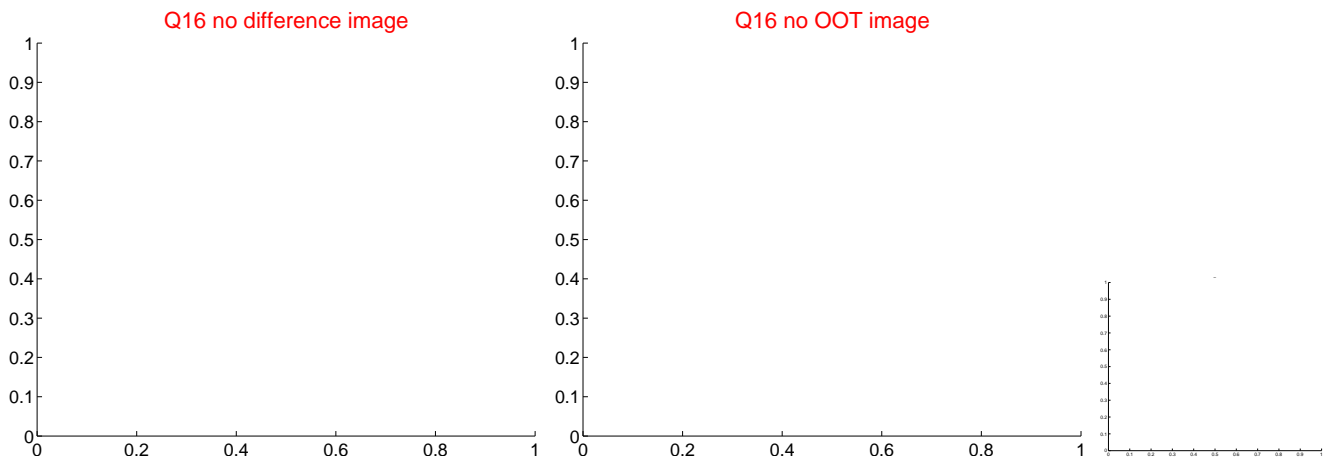
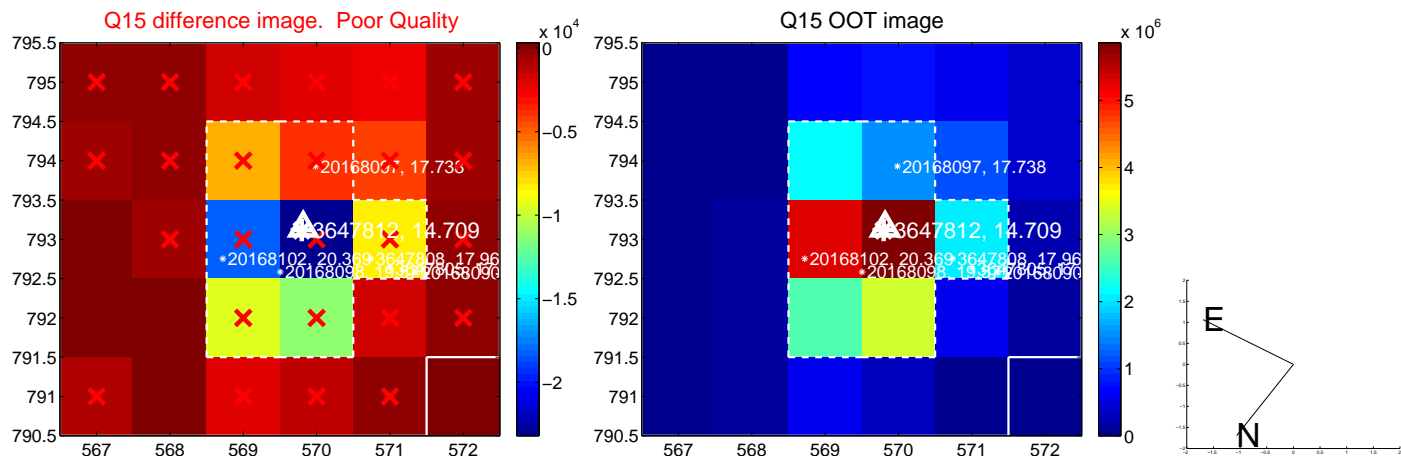
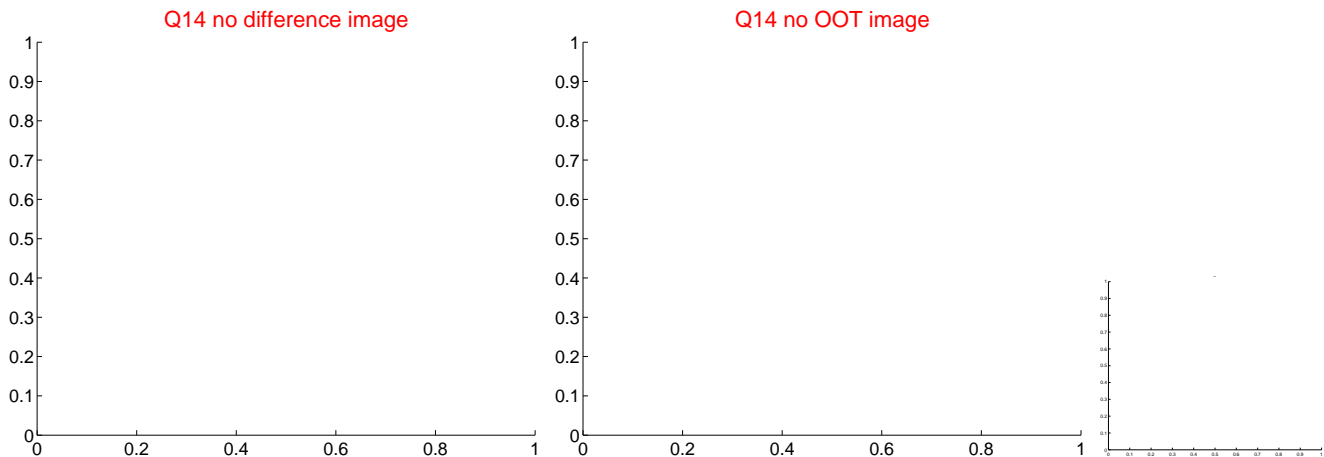
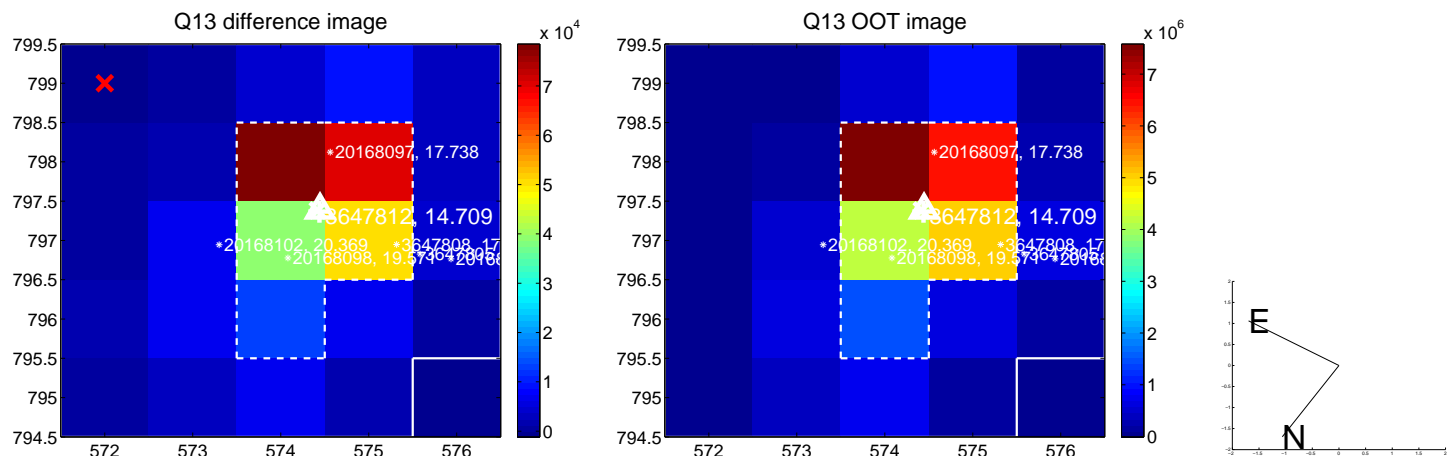
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.



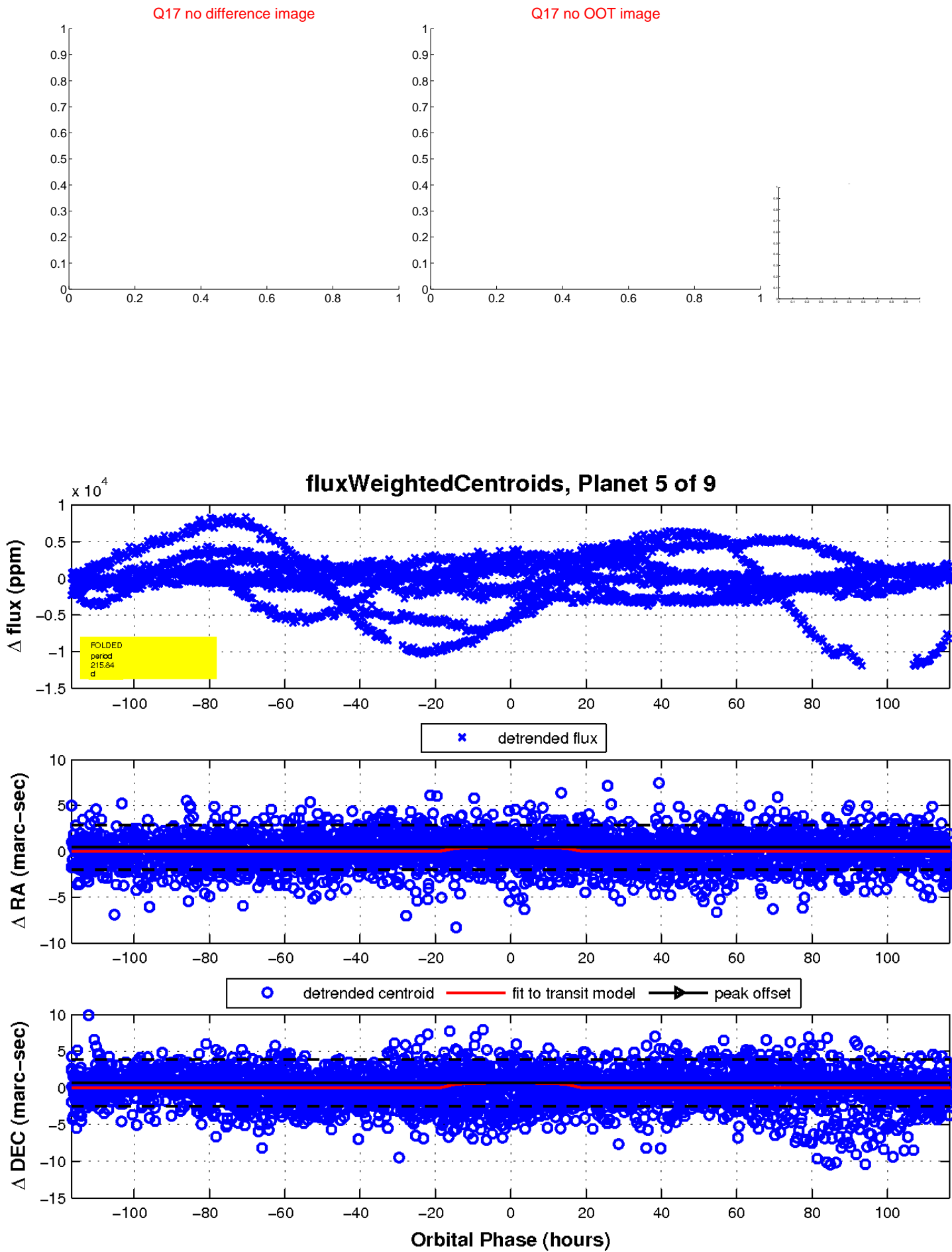
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

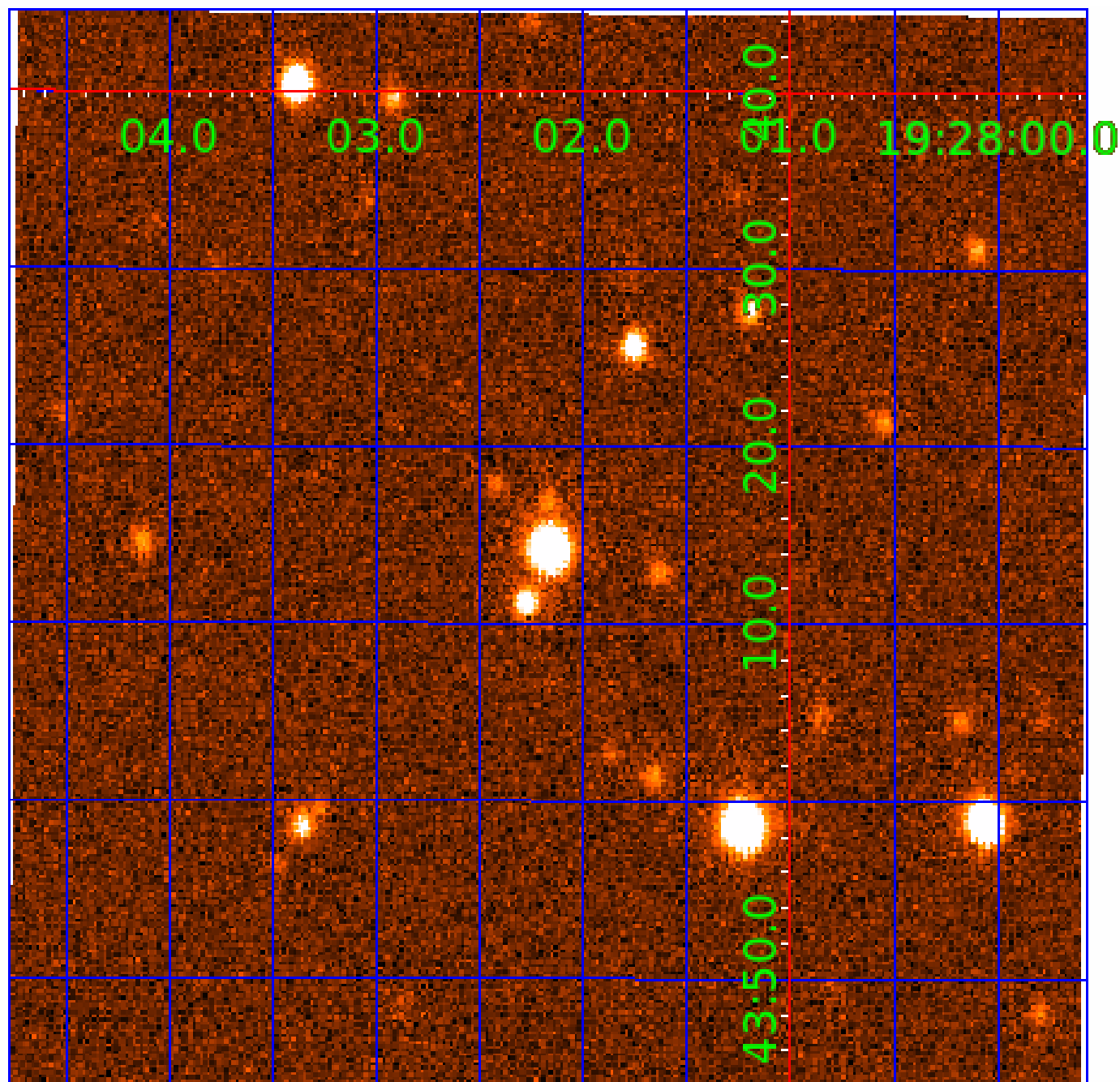


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 003647812

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003647812-01	OBS	No	1.025744	131.805103	48.0	4.726	7.9	8.2	0.88	5534	0.62	1755.22
003647812-02	OBS	No	108.387733	214.706028	405.5	11.124	15.8	2.7	0.88	5534	1.81	3.51
003647812-03	OBS	No	122.338718	194.660074	645.6	1.634	13.3	3.5	0.88	5534	2.46	2.99
003647812-04	OBS	No	117.477275	177.043792	1139.6	6.892	13.3	7.2	0.88	5534	4.16	3.16
003647812-05	OBS	No	215.837817	173.340947	2077.4	38.867	15.1	6.2	0.88	5534	4.50	1.40
003647812-06	OBS	No	113.689287	146.161820	1122.9	12.795	10.8	6.5	0.88	5534	3.74	3.30
003647812-07	OBS	No	325.149215	316.828480	2109.5	7.212	11.6	9.2	0.88	5534	5.07	0.81
003647812-08	OBS	No	323.187877	145.543042	4343.2	27.204	11.6	7.9	0.88	5534	6.94	0.82

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003647812-01	OBS	FP	0.00	1	0	0	0	LPP_DV
003647812-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS
003647812-03	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
003647812-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
003647812-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—INCONSISTENT_TRANS—HALO_GHOST
003647812-06	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—INCONSISTENT_TRANS—HALO_GHOST
003647812-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—ALL_TRANS_CHASES—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—SAME_NTL_PERIOD—CENT_FEW_DIFFS
003647812-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—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.

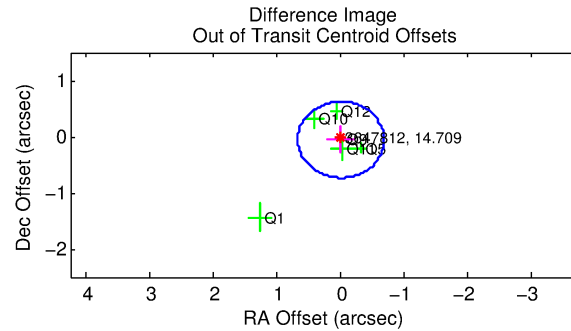
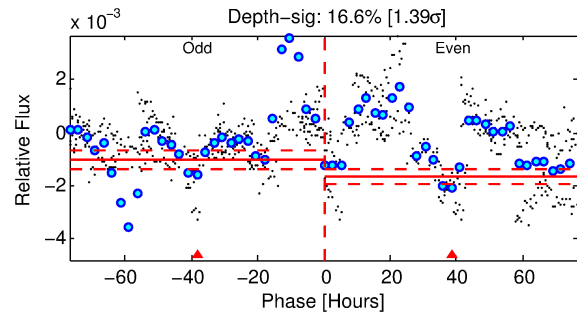
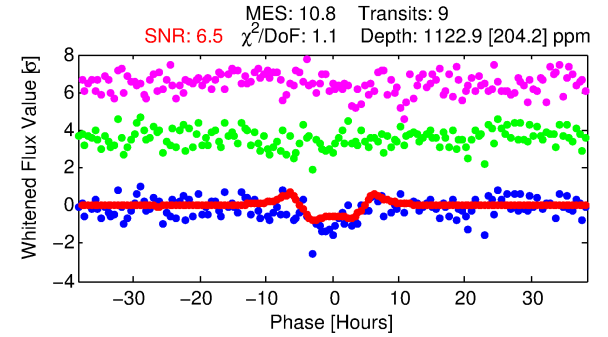
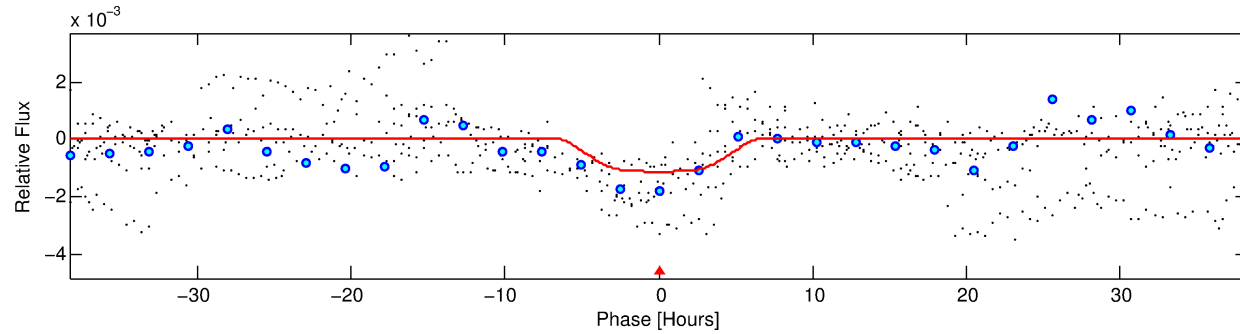
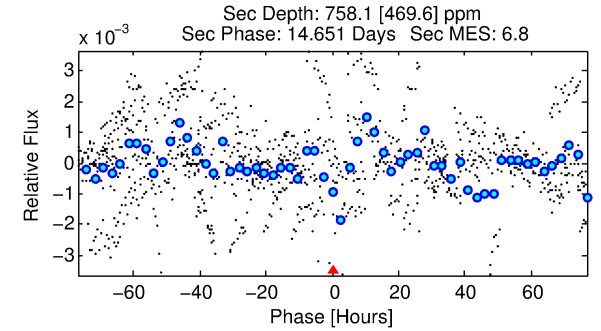
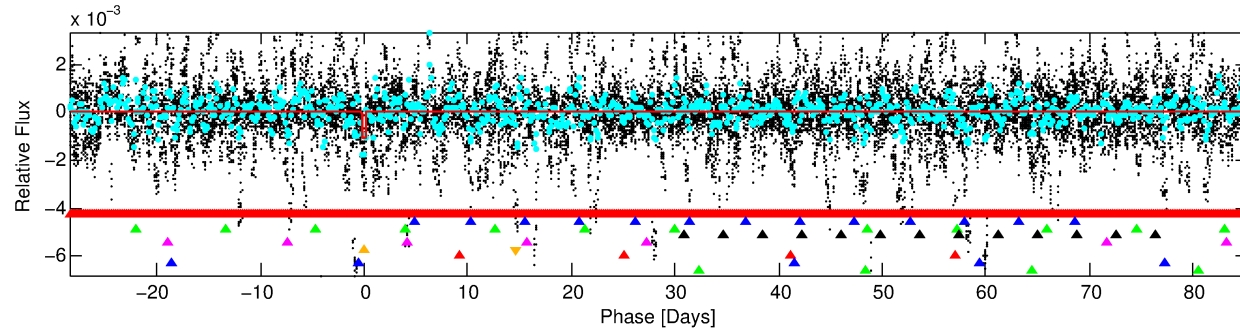
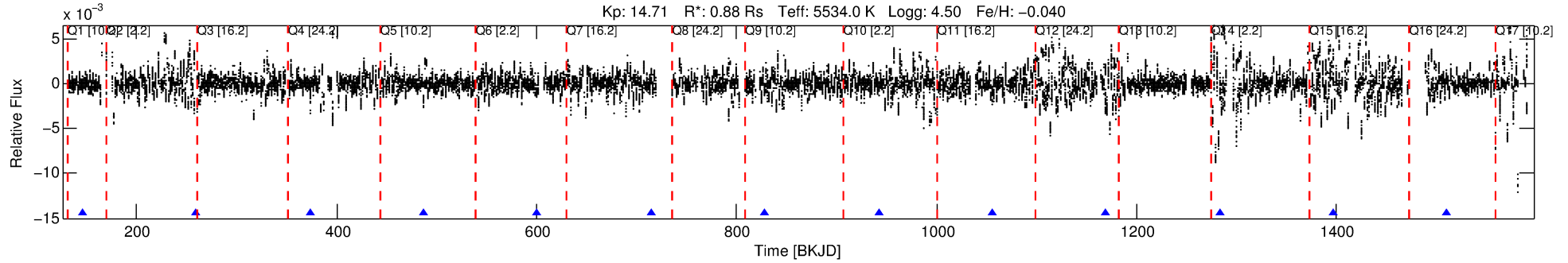
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 003647812-06

No Significant Match Found

# DV One-Page Summary

KIC: 3647812 Candidate: 6 of 9 Period: 113.689 d



## DV Fit Results:

Period = 113.68929 [0.00437] d  
Epoch = 146.1618 [0.0281] BKJD  
Rp/R\* = 0.0391 [0.0040]  
a/R\* = 29.57 [4.41]  
b = 0.94 [0.02]  
Self = 3.30 [1.06]  
Teff = 344 [28] K  
Rp = 3.74 [0.96] Re  
a = 0.4428 [0.0894] AU  
Ag = 5854.09 [4197.62] [1.39σ]  
Teffp = 4647 [770] K [5.58σ]

## DV Diagnostic Results:

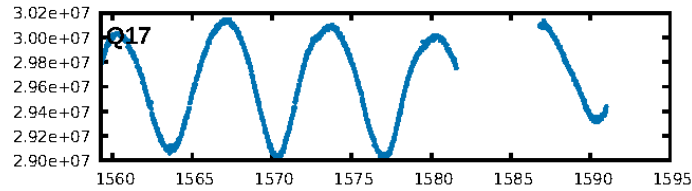
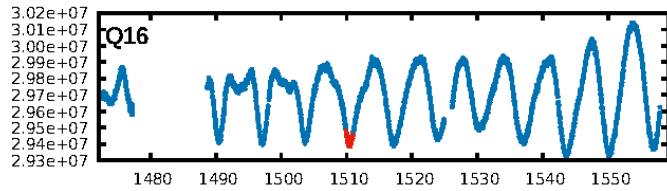
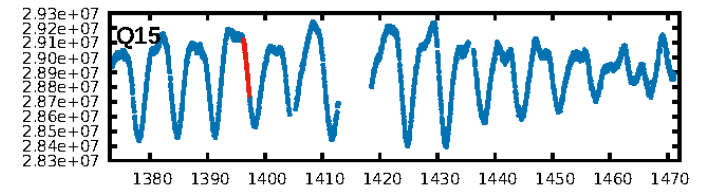
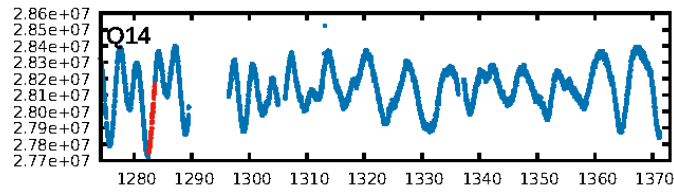
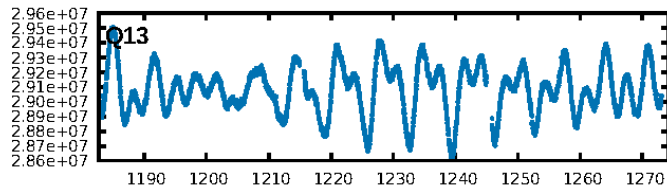
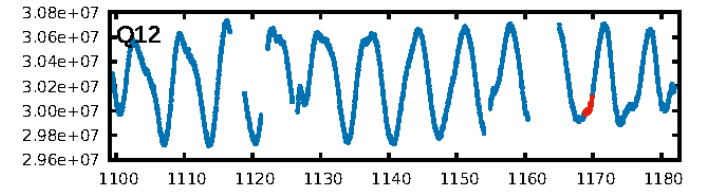
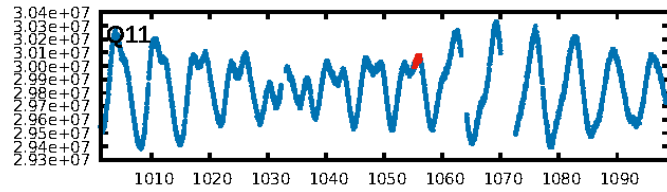
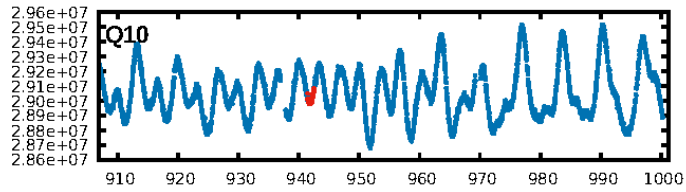
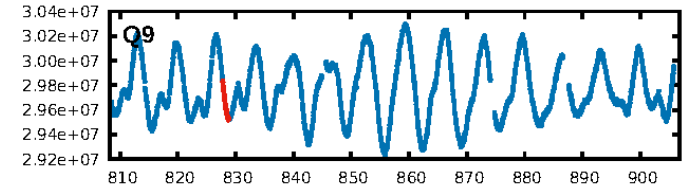
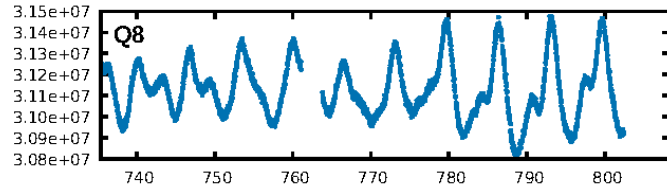
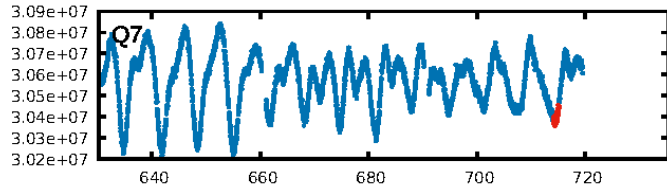
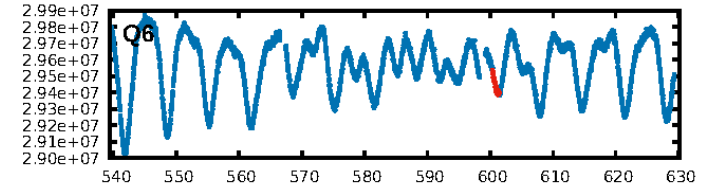
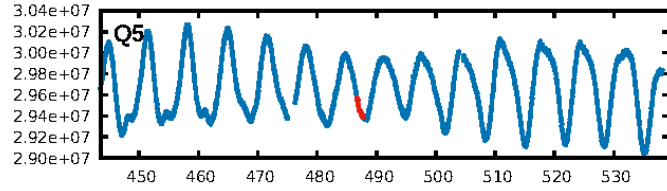
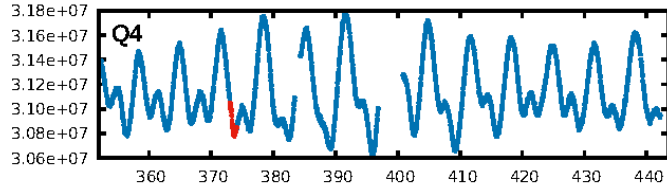
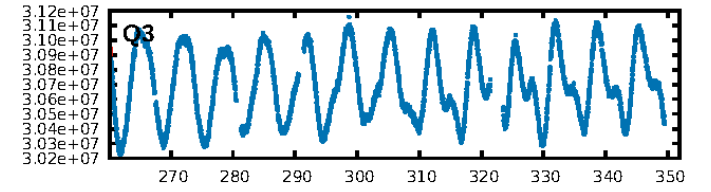
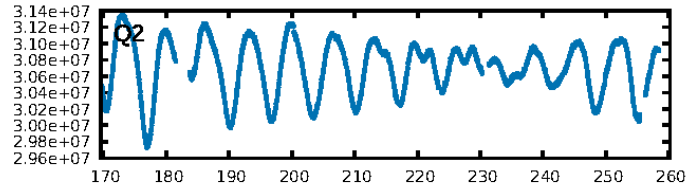
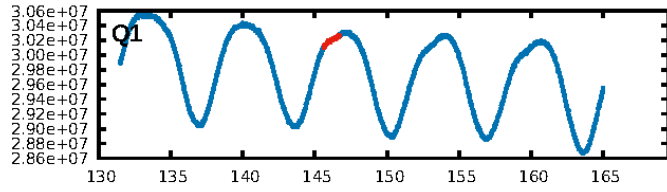
ShortPeriod-sig: 100.0% [7.50σ]  
LongPeriod-sig: 100.0% [6.26σ]  
ModelChiSquare2-sig: 1.5%  
ModelChiSquareGof-sig: 100.0%  
**Bootstrap-pfa: 2.40e-12**  
RollingBand-fgt: 1.00 [9/9]  
**GhostDiagnostic-chr: -0.003299**  
Centroid-sig: 4.7%  
Centroid-so: 0.740 arcsec [2.08σ]  
OotOffset-rm: 0.058 arcsec [0.25σ]  
KicOffset-rm: 0.120 arcsec [0.69σ]  
OotOffset-st: 1/1/1/3 [6]  
KicOffset-st: 1/1/1/3 [6]  
DiffImageQuality-fgm: 0.67 [4/6]  
DiffImageOverlap-fno: 0.00 [0/6]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 04:14:41 Z

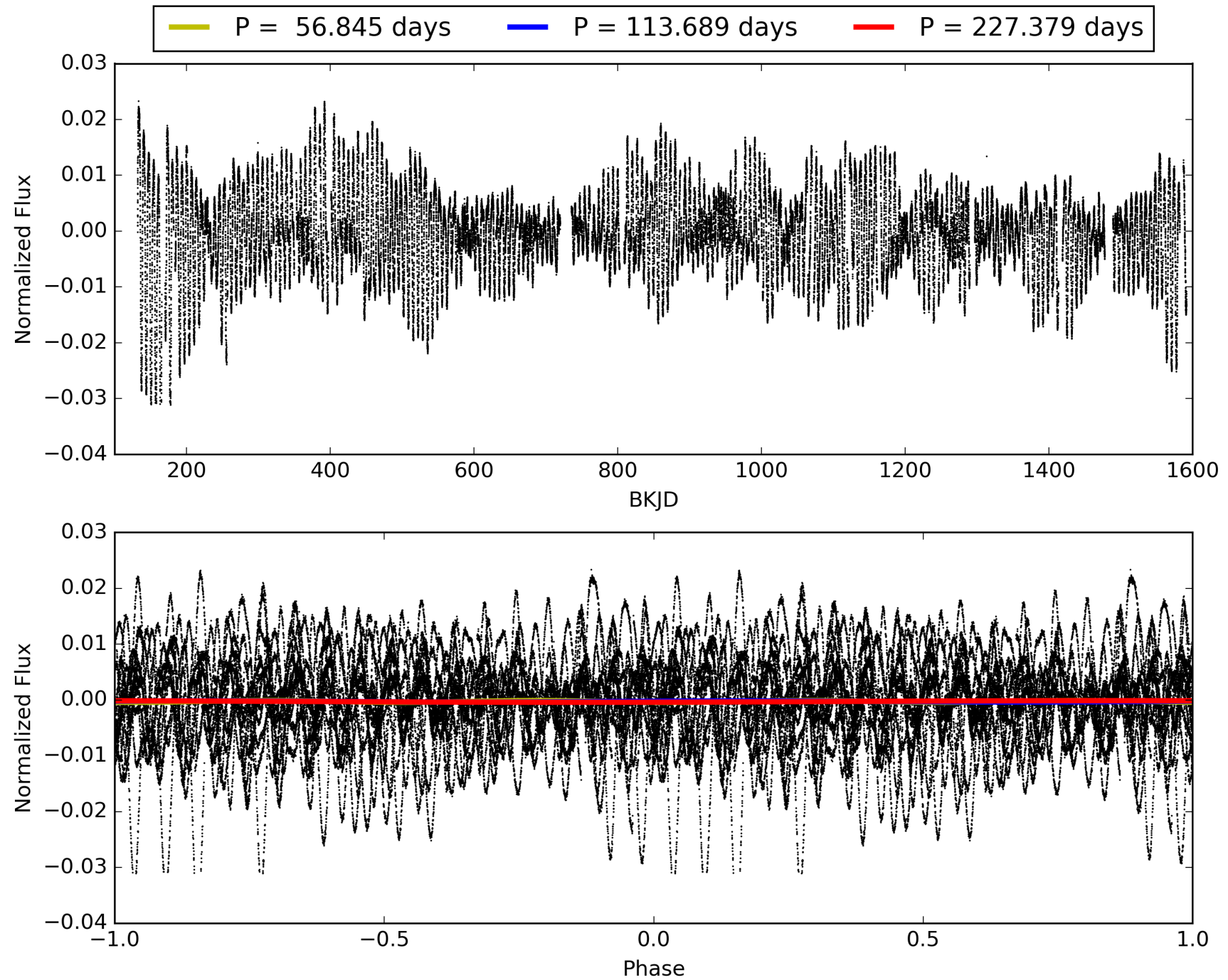
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 003647812-06, PDC Light Curves

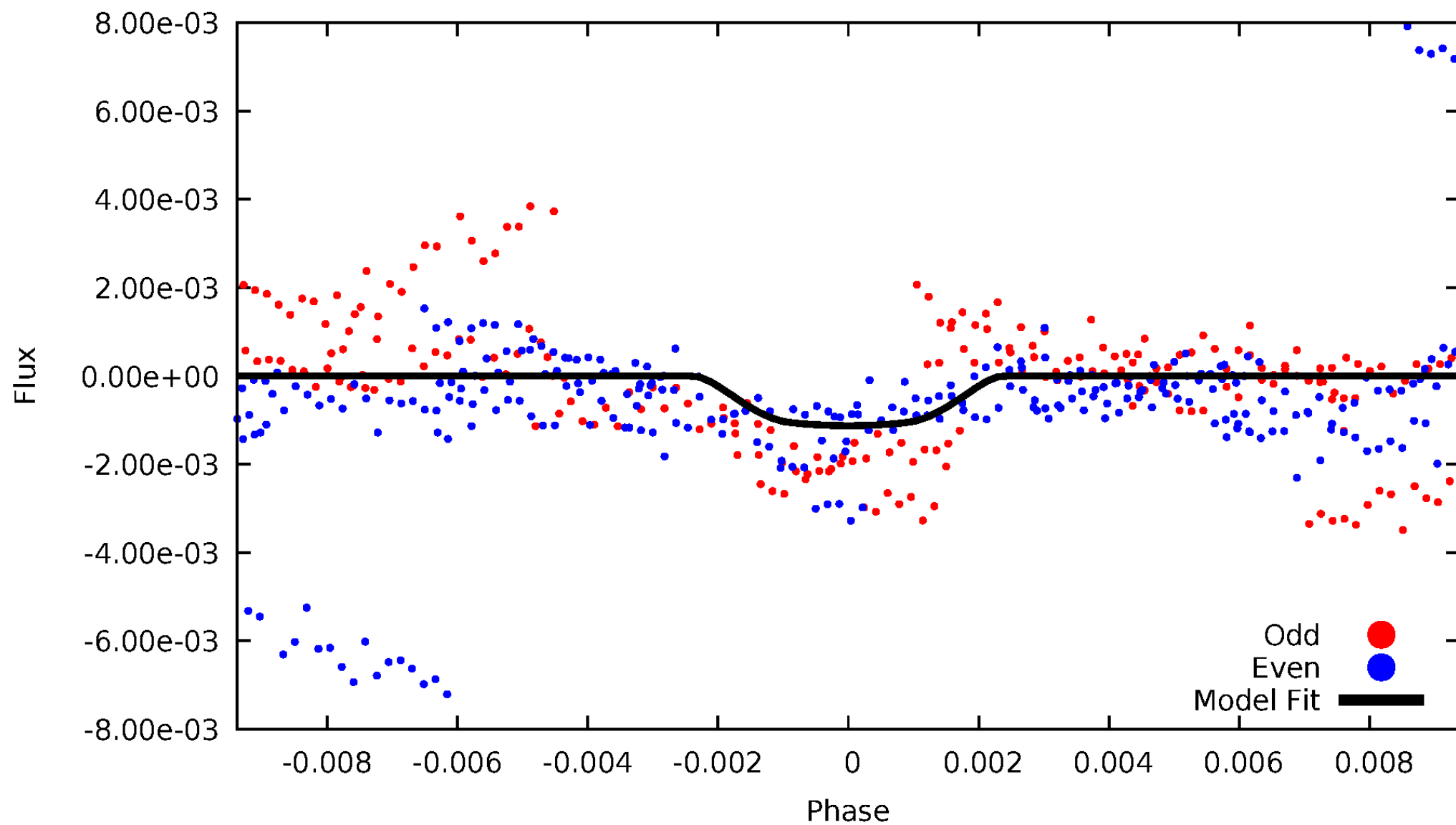


TCE 003647812-06



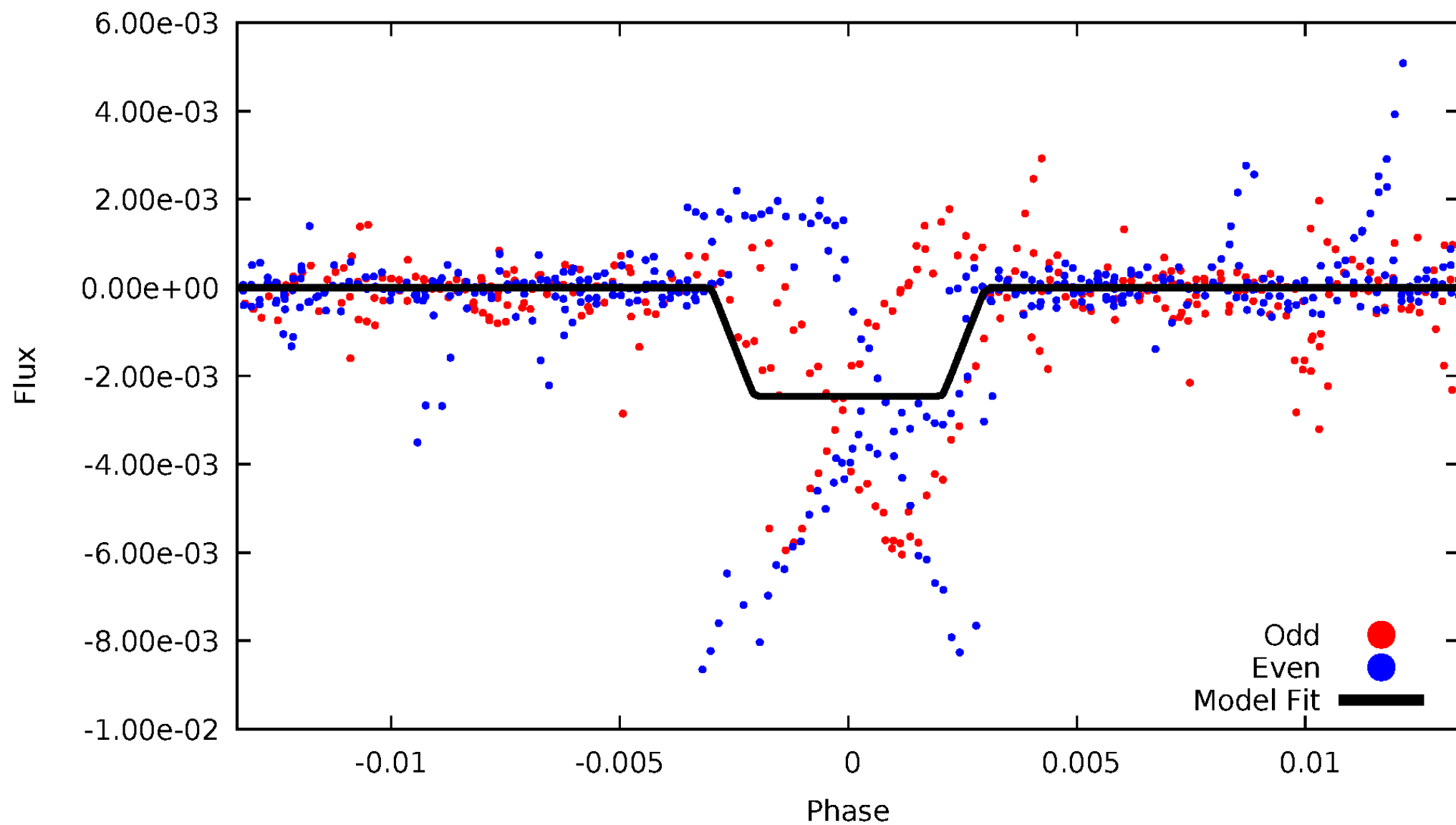
# DV Odd/Even

TCE 003647812-06



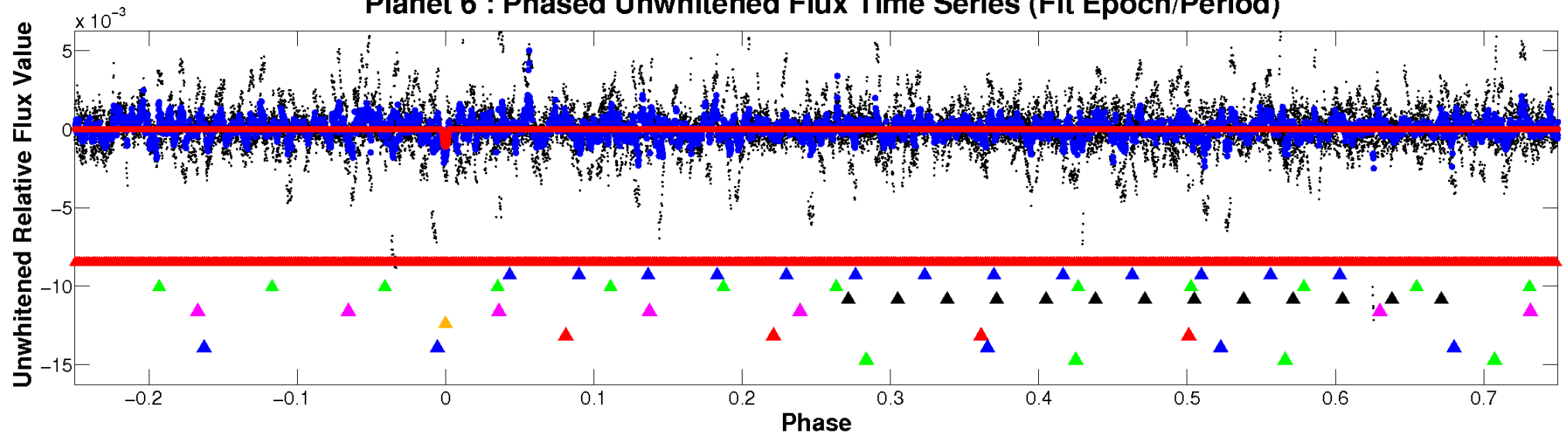
# ALT Odd/Even

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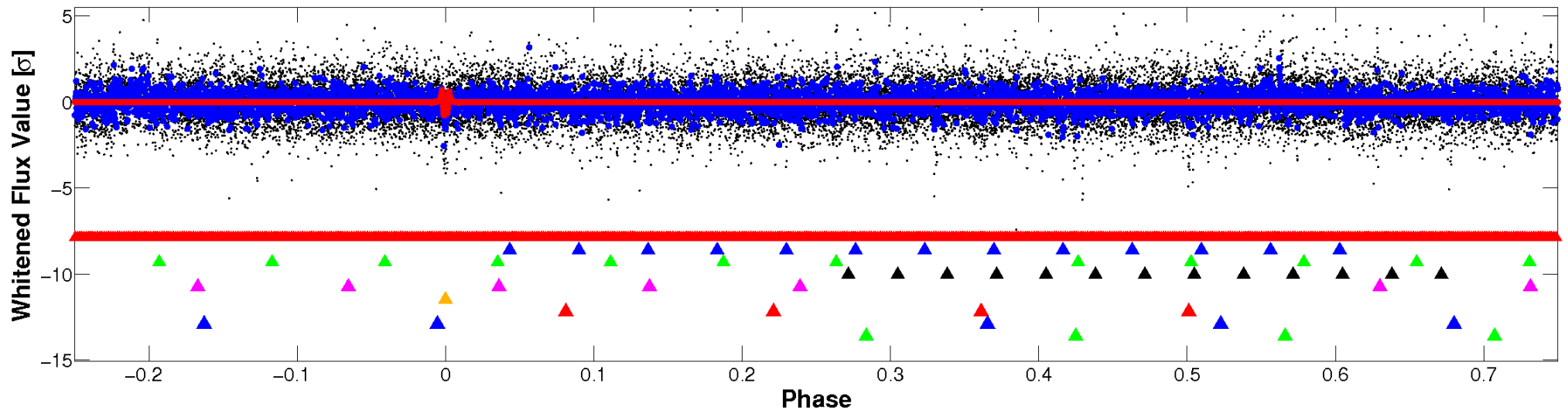


# Non-Whitened Vs. Whitened Light Curve

Planet 6 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

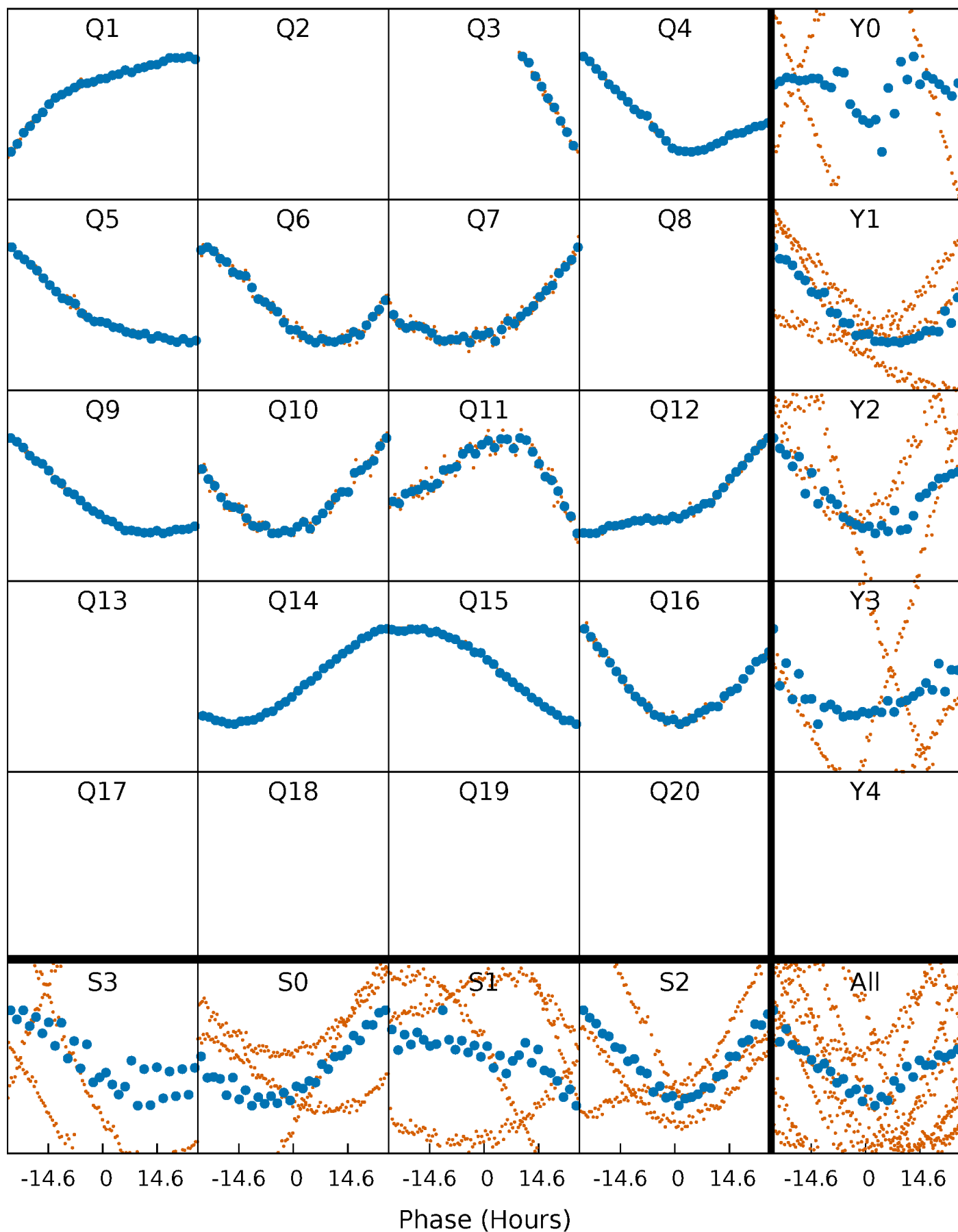


Planet 6 : Phased Whitened Flux Time Series (Fit Epoch/Period)



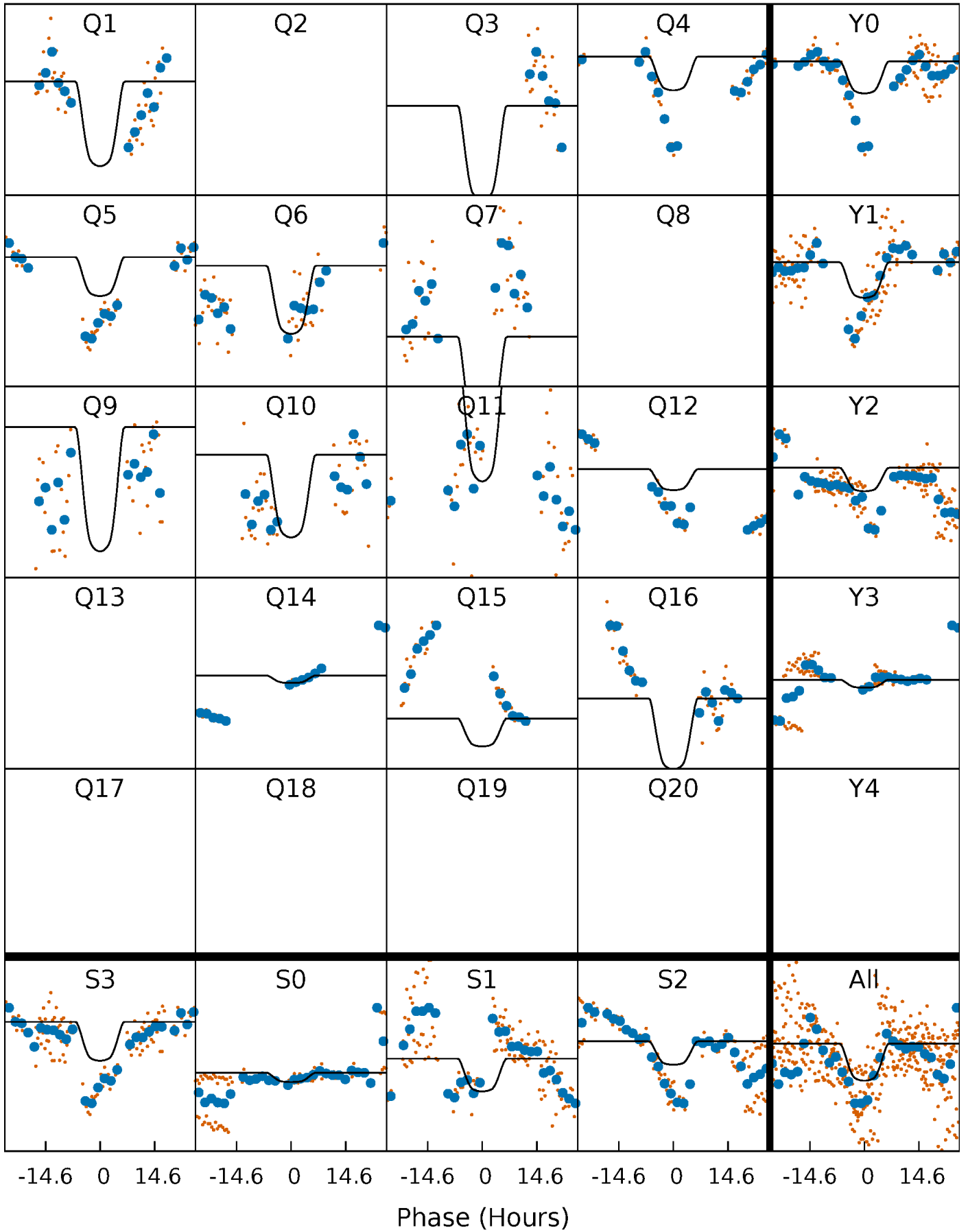
# PDC Quarter-Phased Transit Curves

TCE 003647812-06 P=113.689288 Days  $T_0=146.161820$  (BKJD)



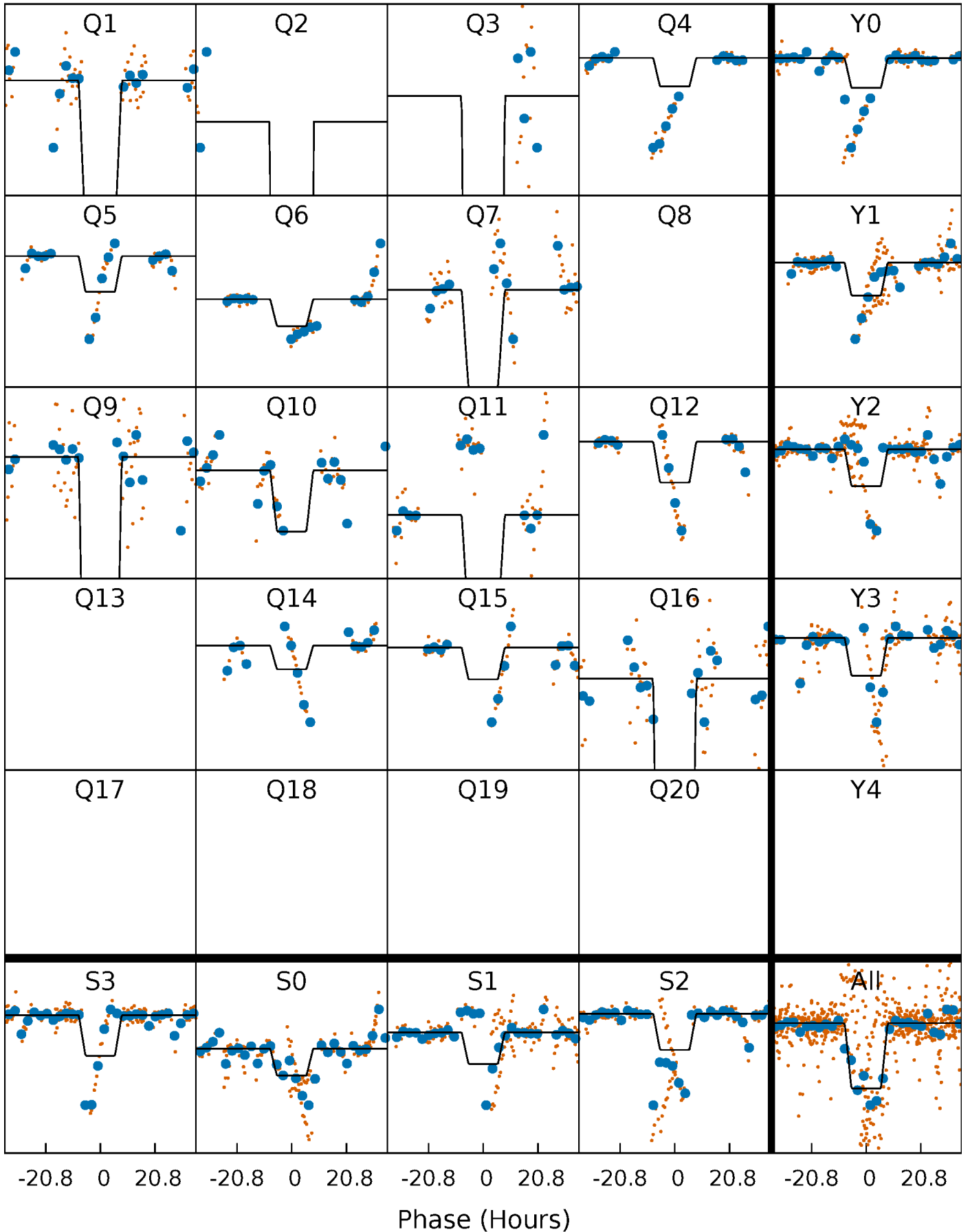
# DV Quarter-Phased Transit Curves

TCE 003647812-06     $P=113.689288$  Days     $T_0=146.161820$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 003647812-06 P=113.692328 Days  $T_0=146.155692$  (BKJD)

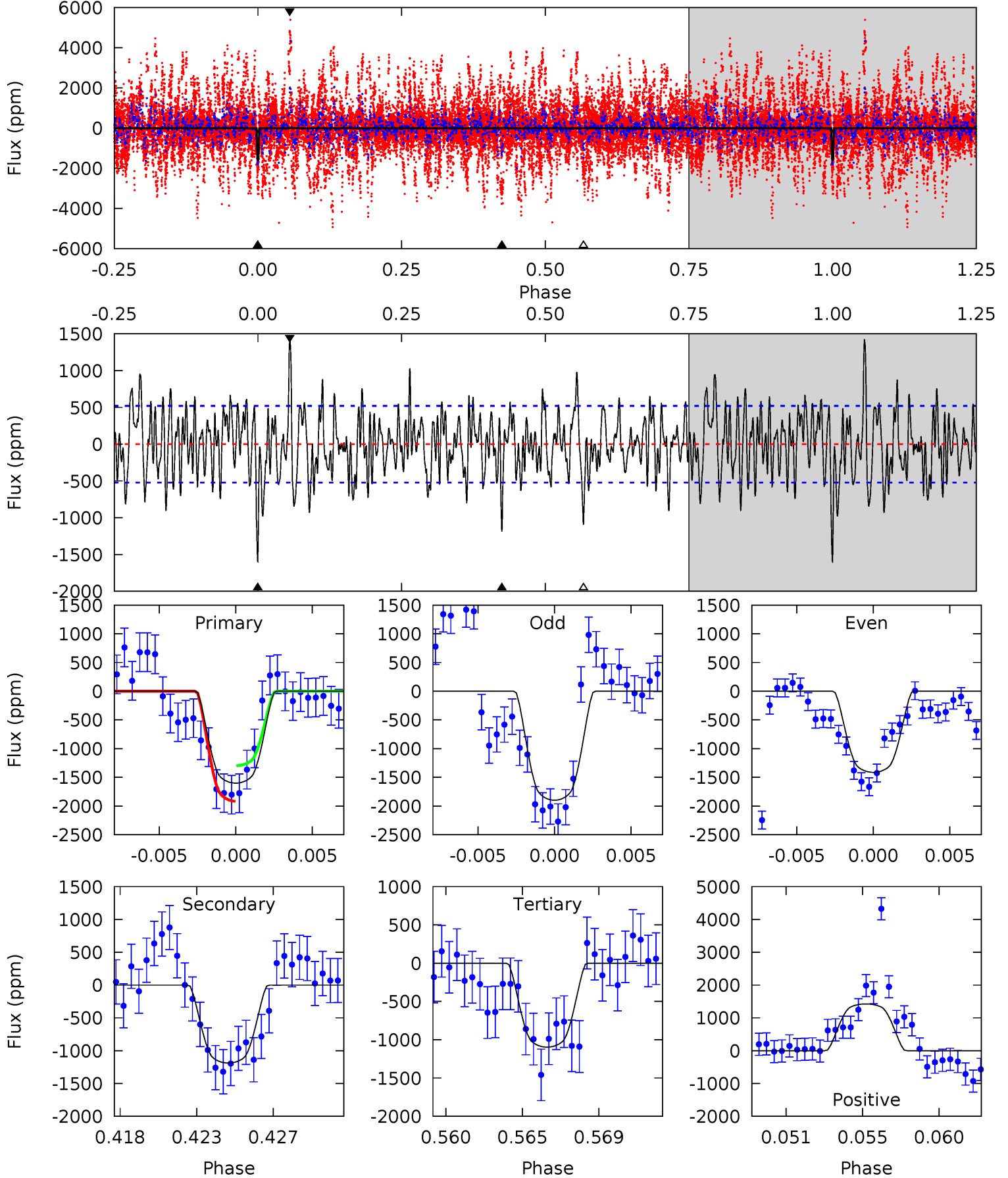




# DV Model-Shift Uniqueness Test

003647812-06, P = 113.689288 Days, E = 32.472532 Days

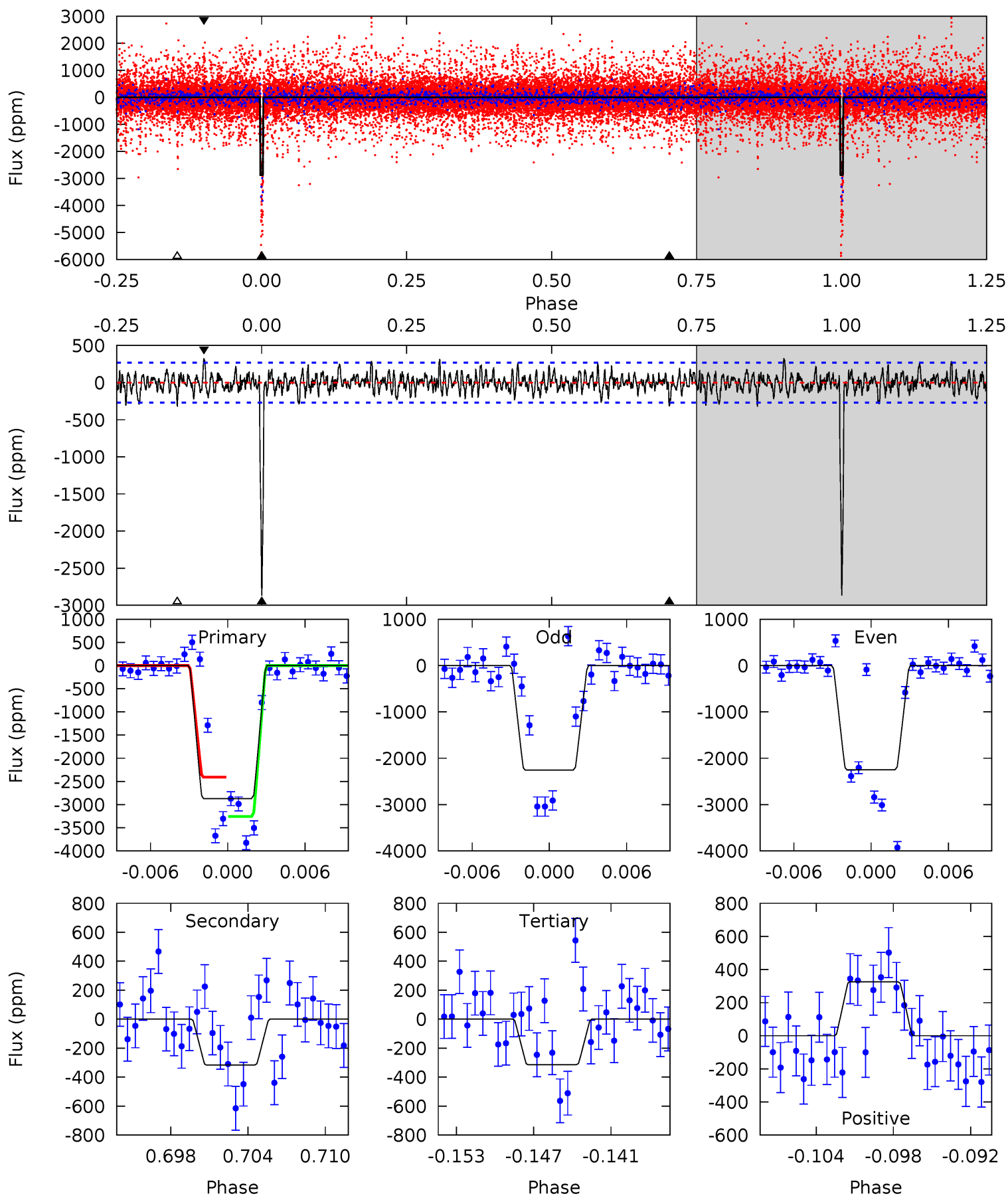
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
15.9	11.8	10.9	14.2	5.17	2.83	3.58	5.02	1.76	0.91	-2.35	2.20	0.90	0.47	3.12



# Alt Model-Shift Uniqueness Test

003647812-06, P = 113.692328 Days, E = 32.463364 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
54.7	6.04	6.00	6.22	5.12	2.74	1.77	48.7	48.5	0.04	-0.18	0.05	0.84	0.10	0



### Stellar Parameters For KIC 003647812

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5534^{+166}_{-166}$	$4.504^{+0.066}_{-0.165}$	$-0.040^{+0.300}_{-0.300}$	$0.877^{+0.207}_{-0.095}$	$0.896^{+0.102}_{-0.083}$	$1.870^{+0.529}_{-0.824}$
	+3%/-3%	+1%/-4%	+750%/-750%	+24%/-11%	+11%/-9%	+28%/-44%
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 003647812-06 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-1188 \pm 101$	$3.80^{+0.60}_{-0.48}$	$486^{+31}_{-22}$	$5243^{+333}_{-286}$	$8805^{+2800}_{-2160}$
Alt.	$-317 \pm 52$	$4.84^{+0.64}_{-0.54}$	$484^{+30}_{-23}$	$3714^{+156}_{-177}$	$1437^{+436}_{-380}$

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

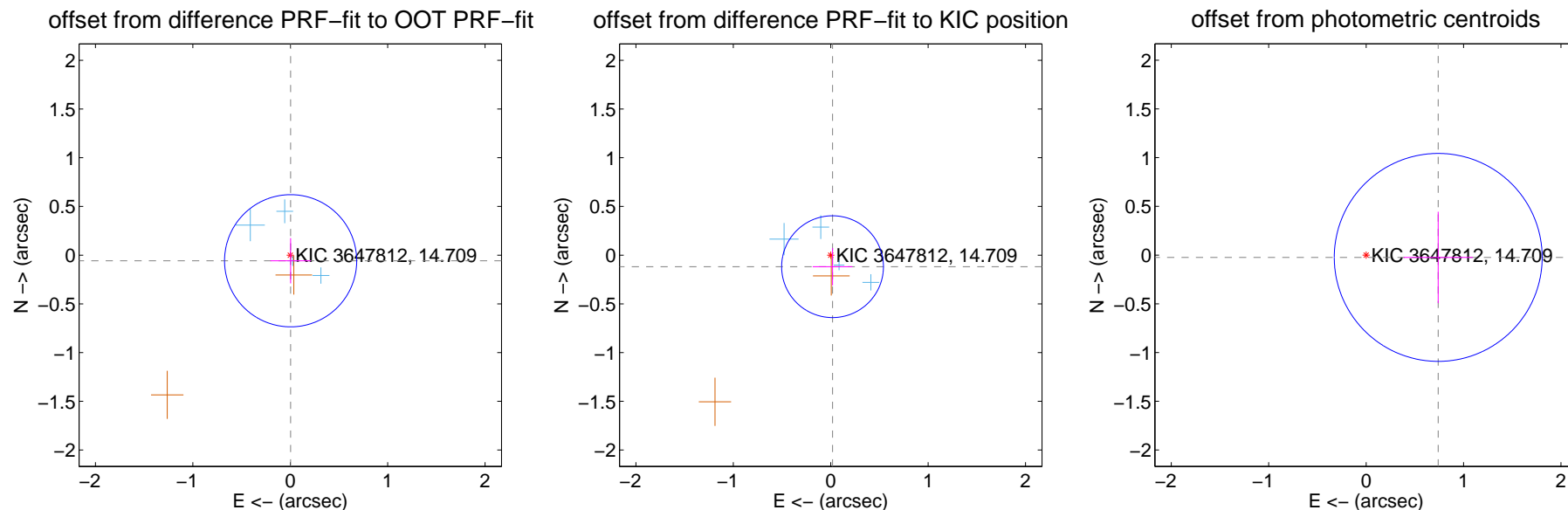
## DV Centroid Data

Supplemental centroid analysis for 003647812-06. Kepler magnitude: 14.71. Transit SNR 6.51

There are 4 quarters with good PRF difference image offsets

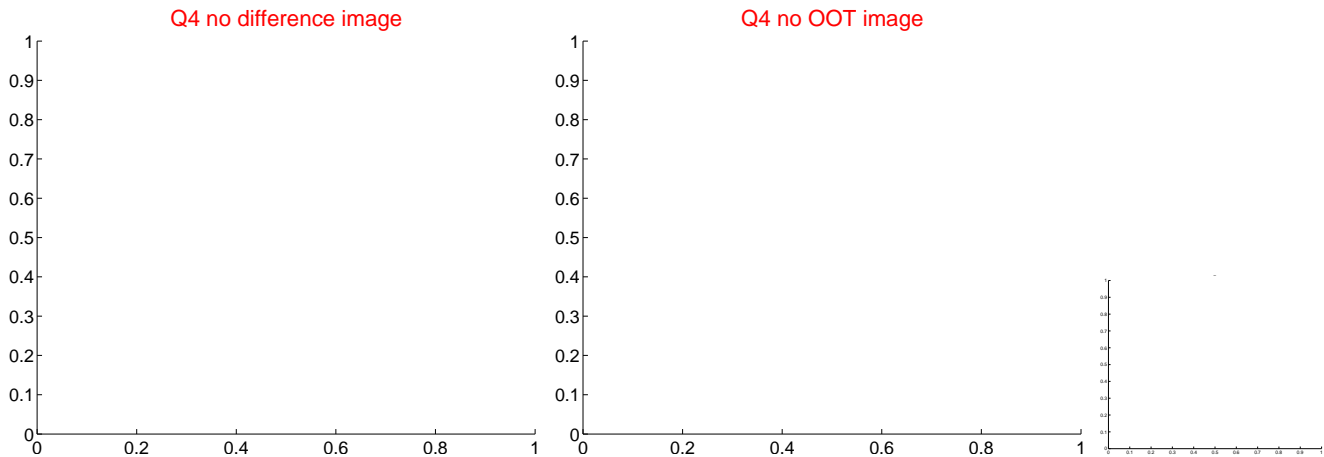
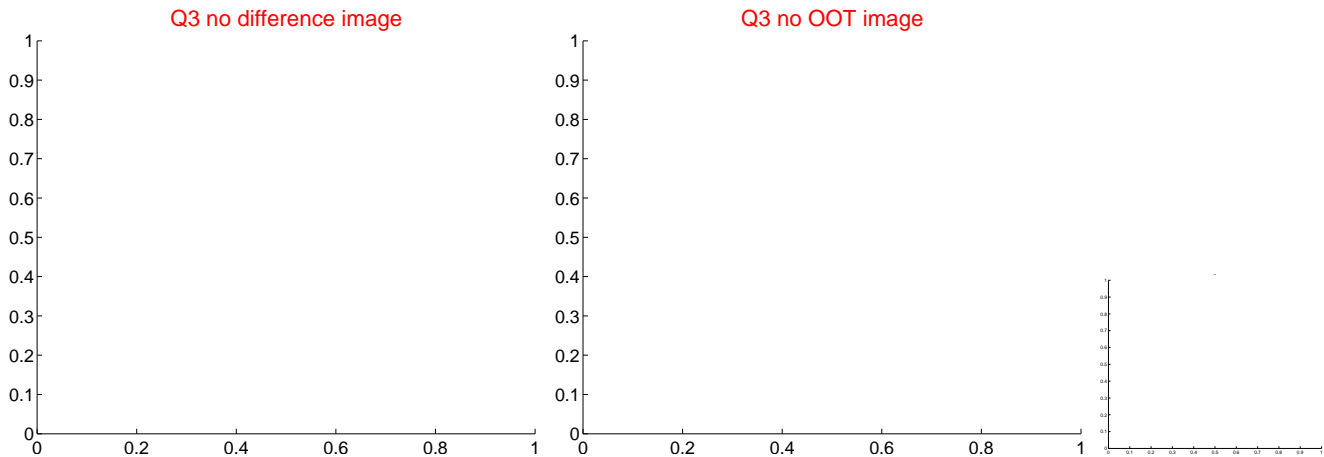
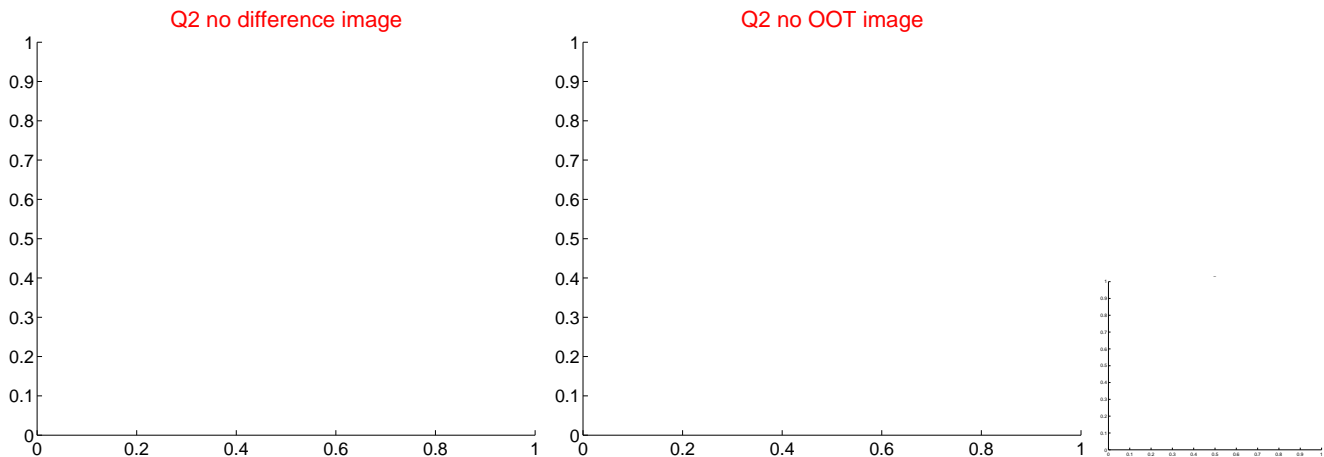
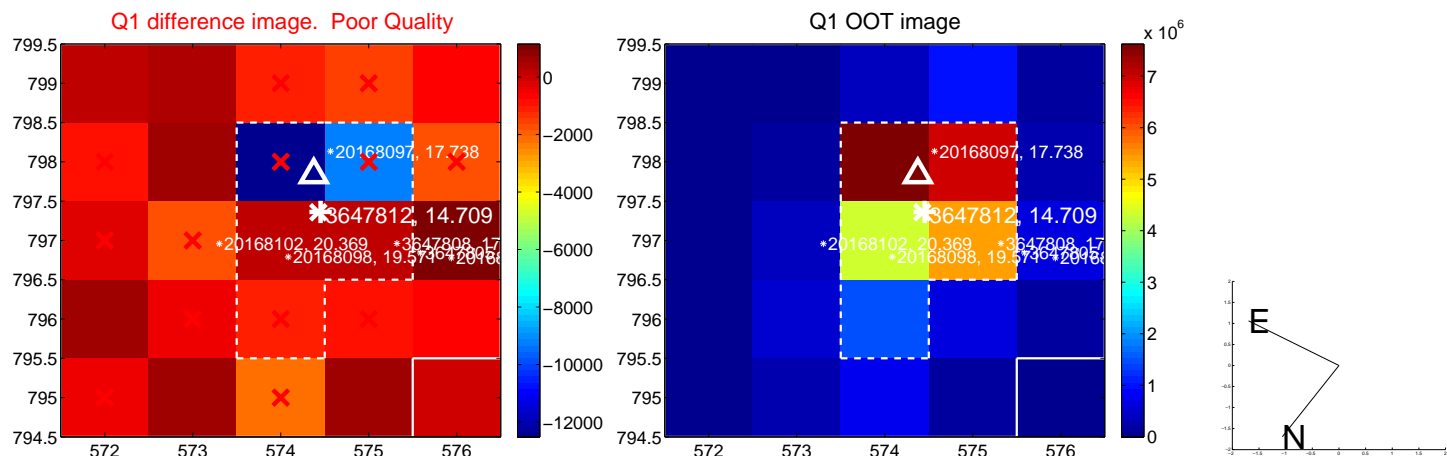
The direct PRF centroid is offset from the target star catalog position by about 0.17 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.058 \pm 0.226$	0.25	$-0.004 \pm 0.207$	$-0.057 \pm 0.232$
PRF-fit source offset from KIC position	$0.120 \pm 0.174$	0.69	$-0.019 \pm 0.204$	$-0.118 \pm 0.192$
photometric centroid source offset	$0.74 \pm 0.36$	2.08	$-0.74 \pm 0.36$	$-0.02 \pm 0.47$

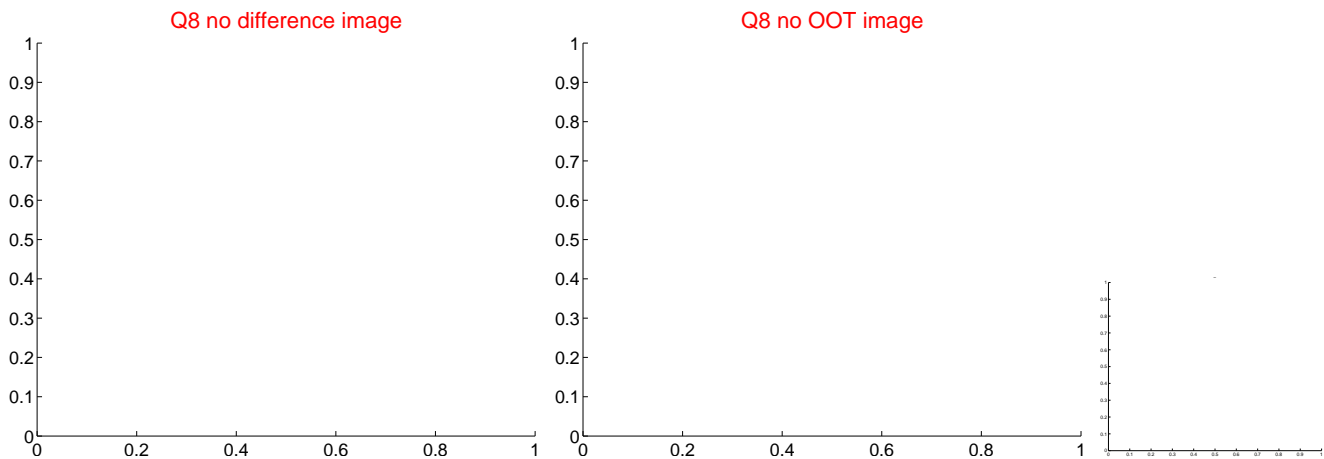
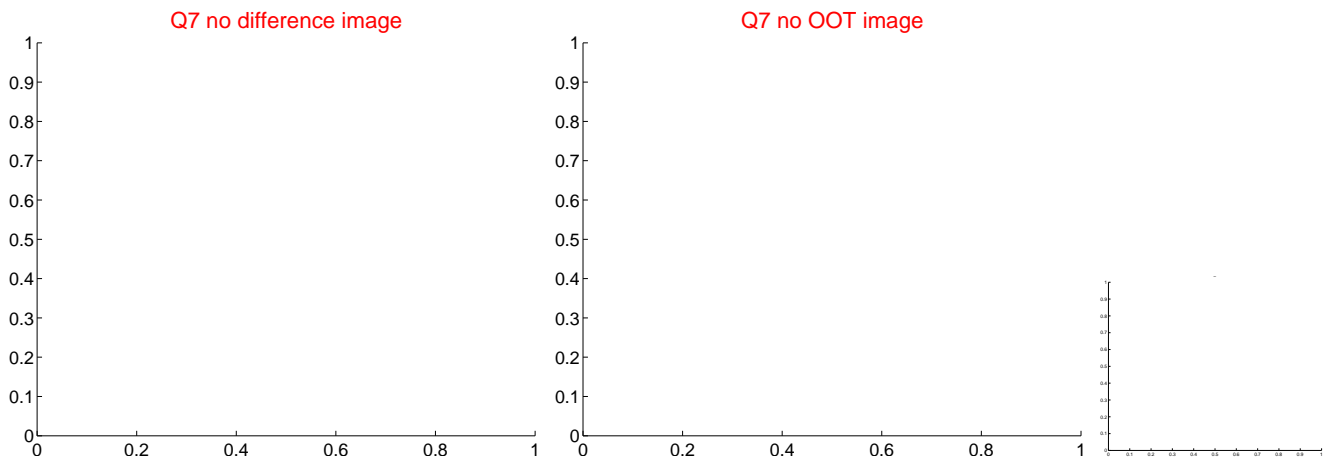
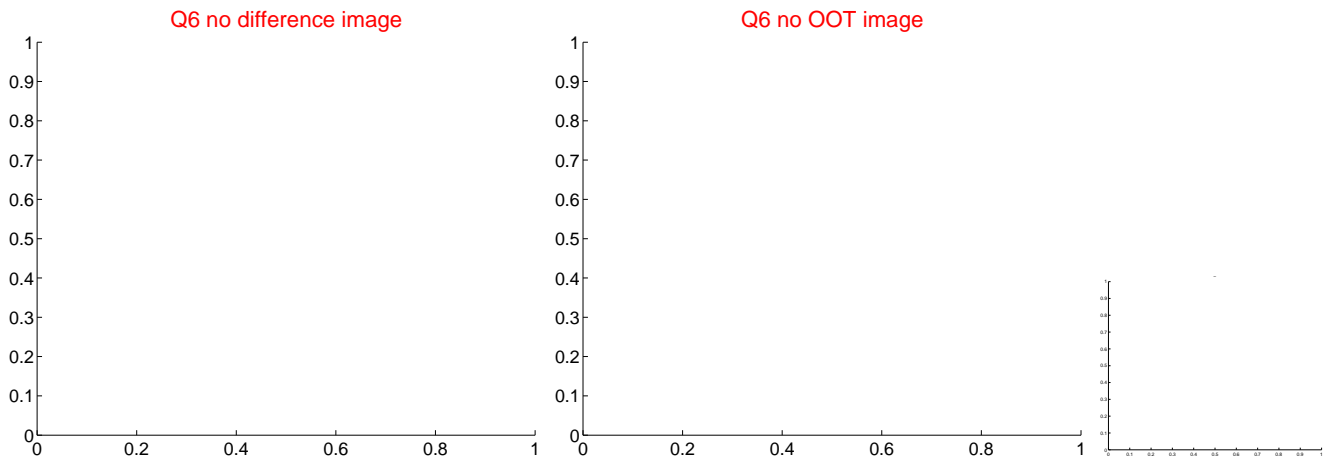
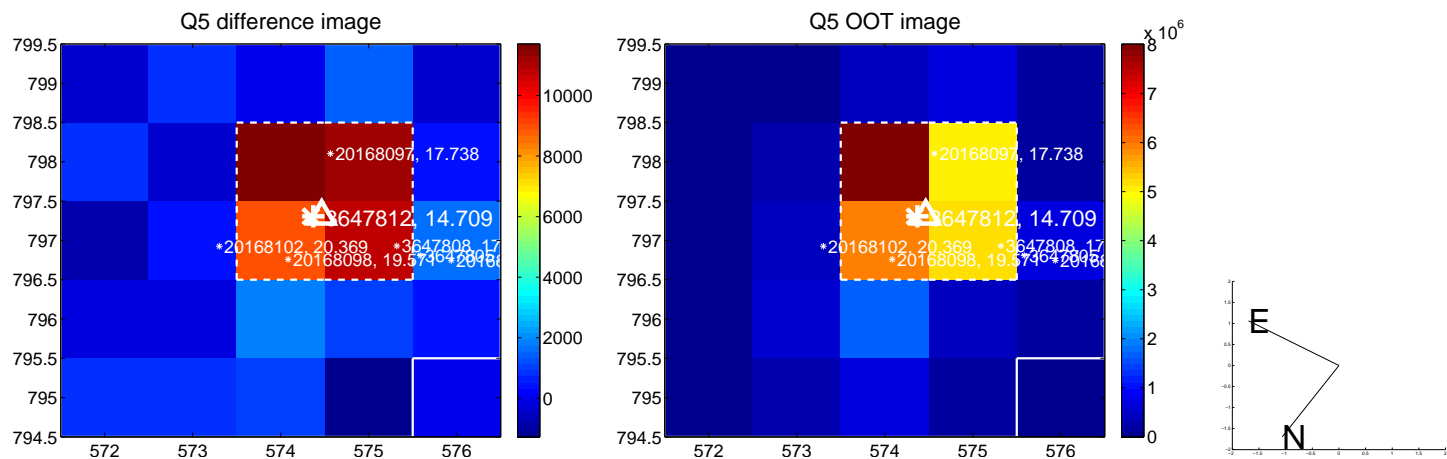


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

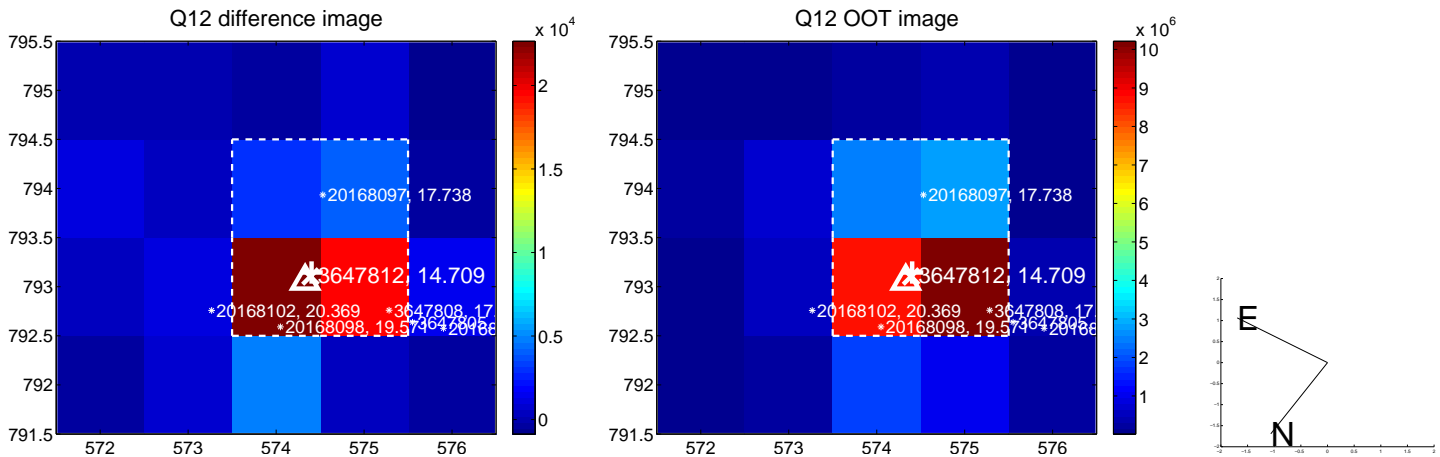
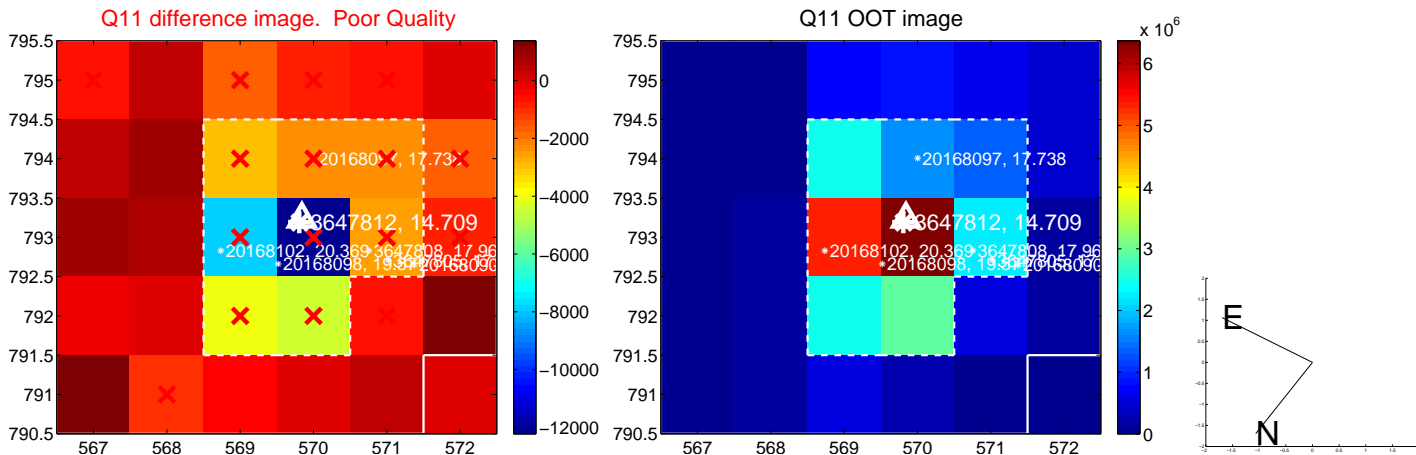
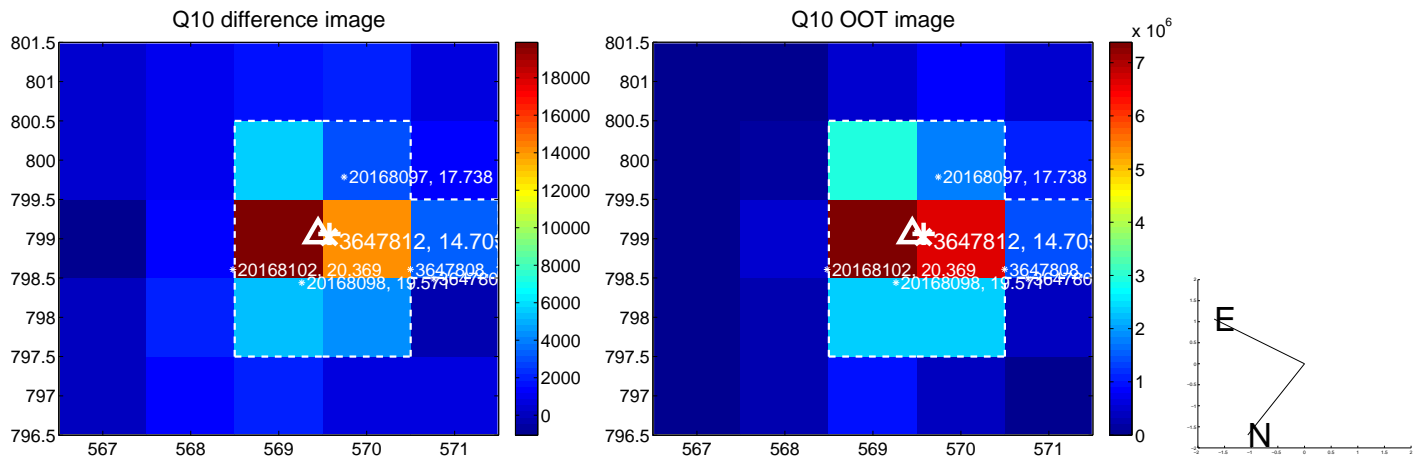
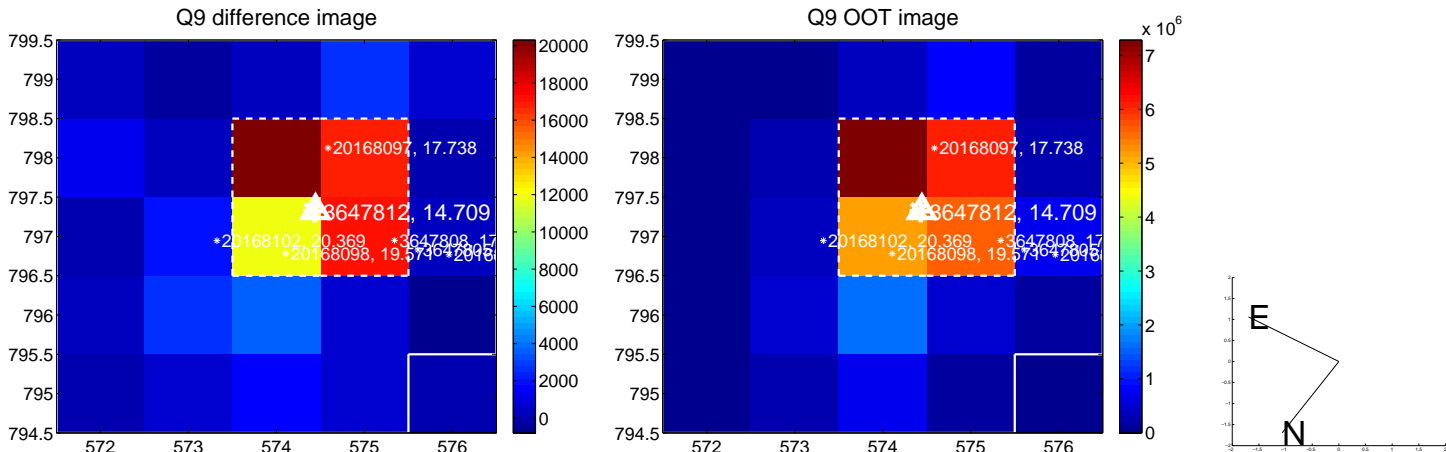
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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.

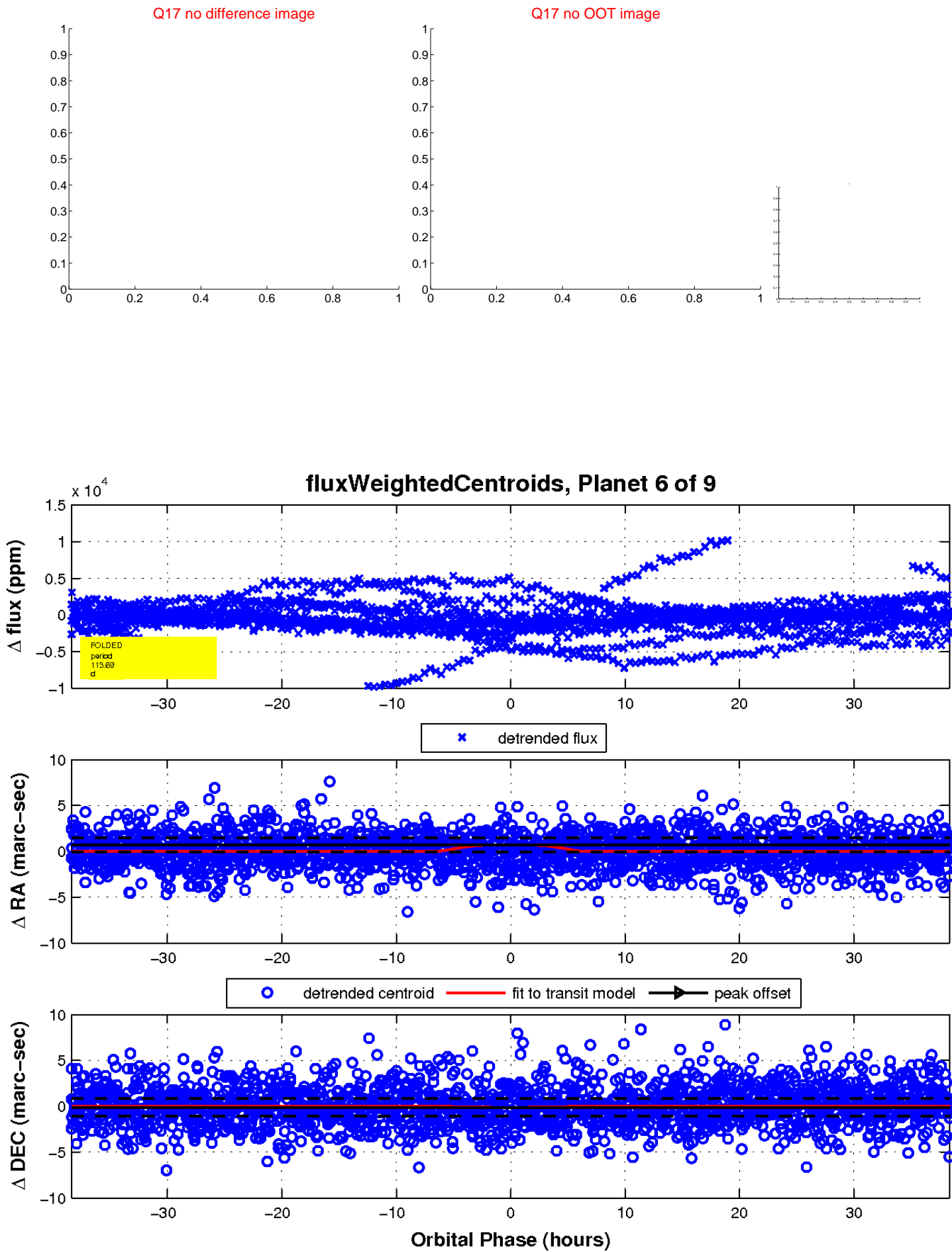


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



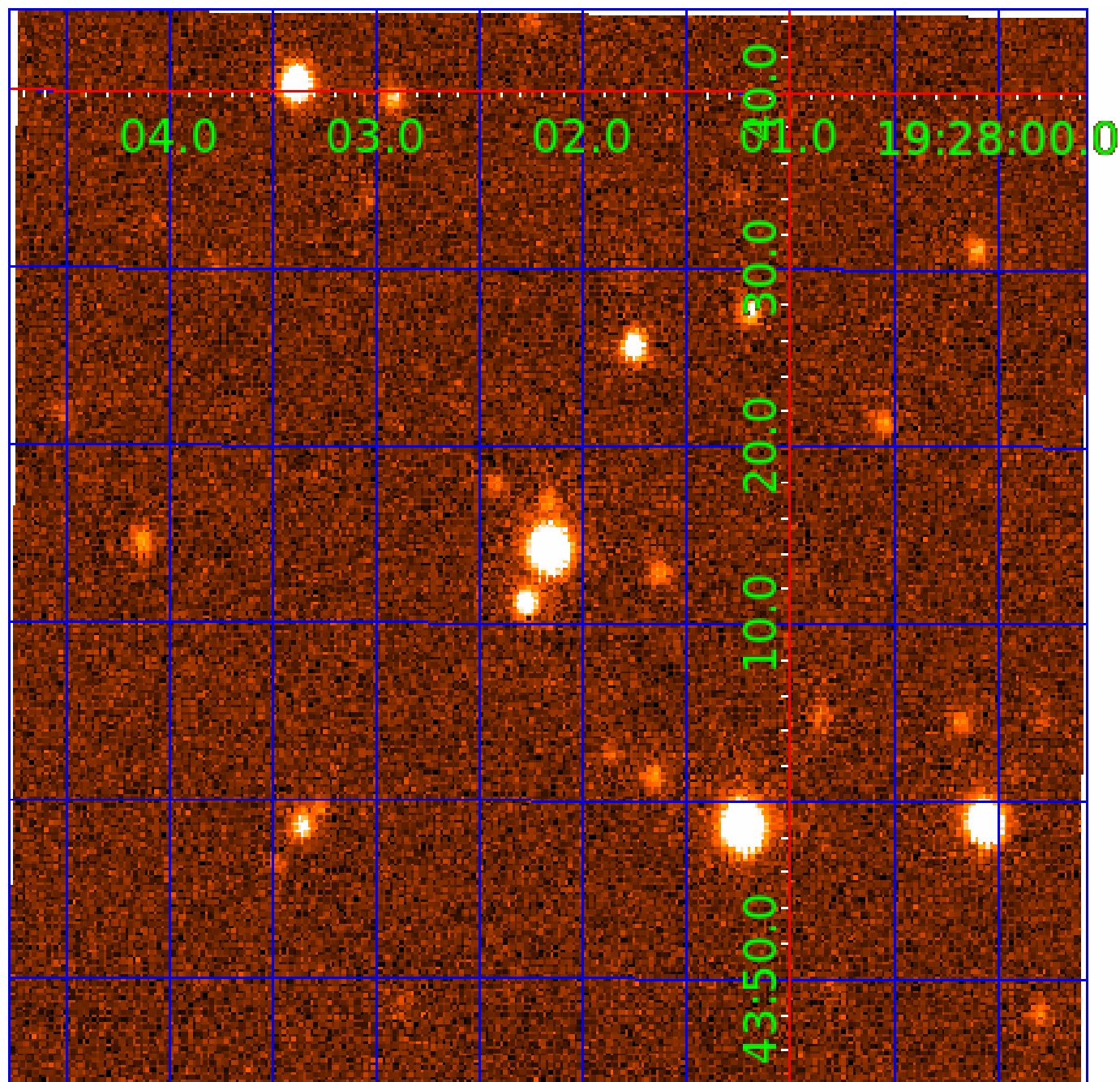


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 003647812

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003647812-01	OBS	No	1.025744	131.805103	48.0	4.726	7.9	8.2	0.88	5534	0.62	1755.22
003647812-02	OBS	No	108.387733	214.706028	405.5	11.124	15.8	2.7	0.88	5534	1.81	3.51
003647812-03	OBS	No	122.338718	194.660074	645.6	1.634	13.3	3.5	0.88	5534	2.46	2.99
003647812-04	OBS	No	117.477275	177.043792	1139.6	6.892	13.3	7.2	0.88	5534	4.16	3.16
003647812-05	OBS	No	215.837817	173.340947	2077.4	38.867	15.1	6.2	0.88	5534	4.50	1.40
003647812-06	OBS	No	113.689287	146.161820	1122.9	12.795	10.8	6.5	0.88	5534	3.74	3.30
003647812-07	OBS	No	325.149215	316.828480	2109.5	7.212	11.6	9.2	0.88	5534	5.07	0.81
003647812-08	OBS	No	323.187877	145.543042	4343.2	27.204	11.6	7.9	0.88	5534	6.94	0.82

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003647812-01	OBS	FP	0.00	1	0	0	0	LPP_DV
003647812-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS
003647812-03	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
003647812-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
003647812-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—INCONSISTENT_TRANS—HALO_GHOST
003647812-06	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—INCONSISTENT_TRANS—HALO_GHOST
003647812-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—ALL_TRANS_CHASES—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—SAME_NTL_PERIOD—CENT_FEW_DIFFS
003647812-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—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.

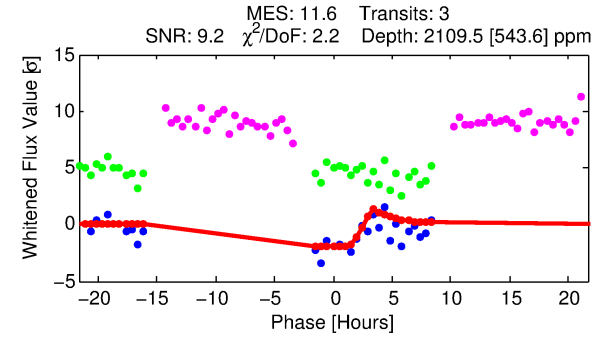
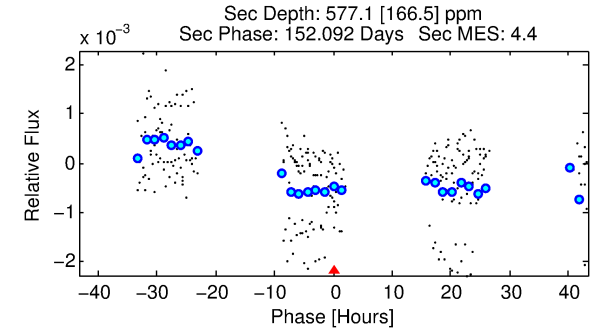
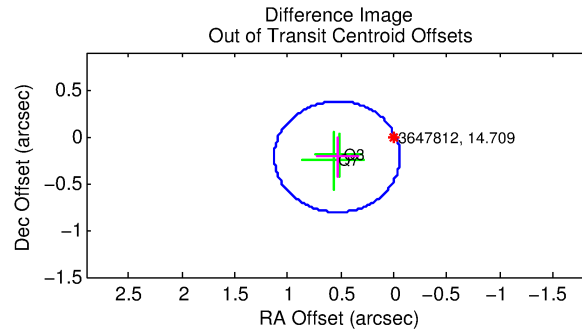
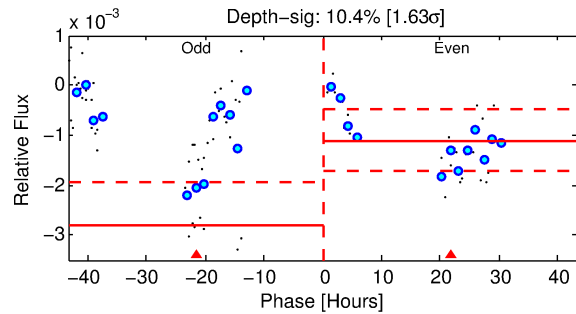
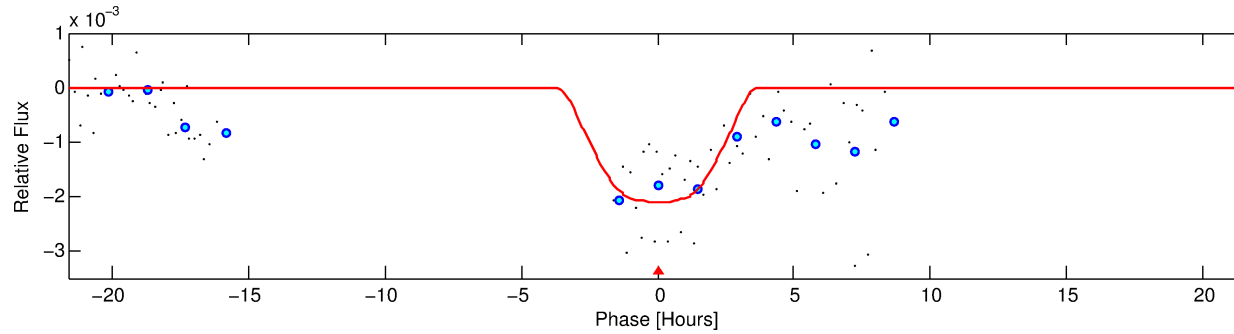
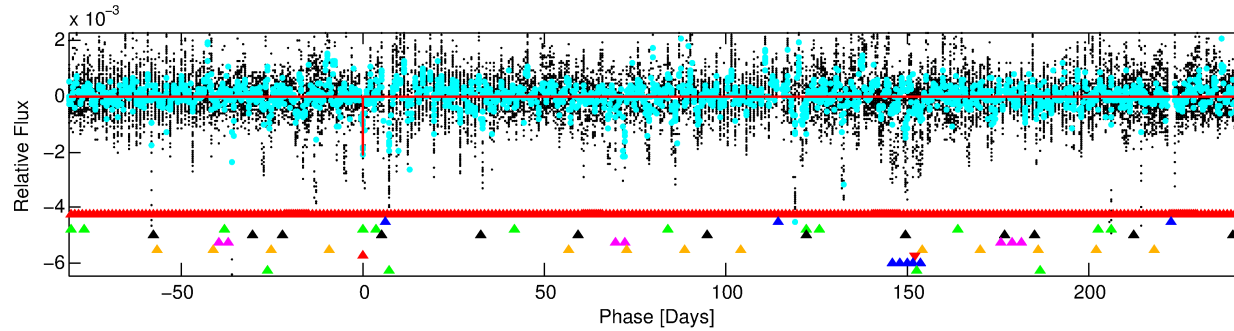
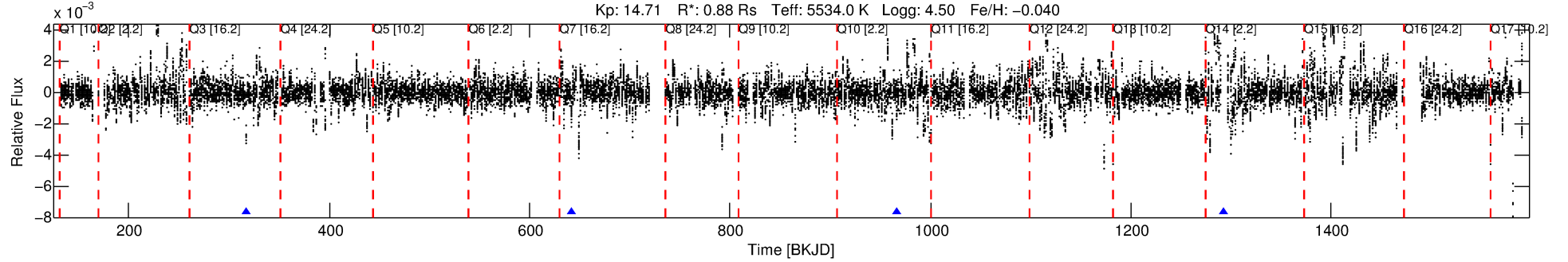
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 003647812-07

No Significant Match Found

# DV One-Page Summary

KIC: 3647812 Candidate: 7 of 9 Period: 325.149 d



## DV Fit Results:

Period = 325.14922 [0.02631] d  
Epoch = 316.8285 [0.0370] BKJD  
Rp/R\* = 0.0530 [0.0079]  
a/R\* = 166.67 [61.54]  
b = 0.94 [0.04]  
Seff = 0.81 [0.26]  
Teq = 242 [19] K  
Rp = 5.07 [1.42] Re  
a = 0.8921 [0.1802] AU  
Ag = 9837.11 [5027.02] [1.96σ]  
Teffp = 3727 [403] K [8.65σ]

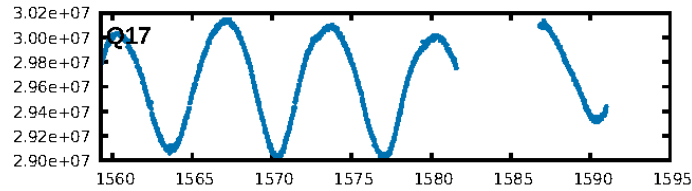
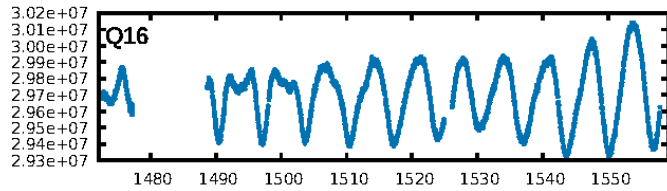
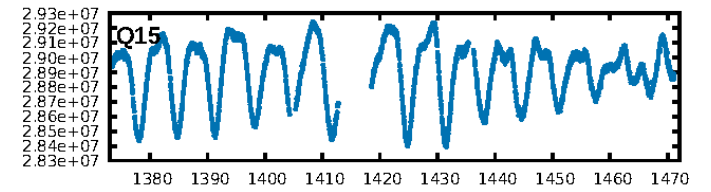
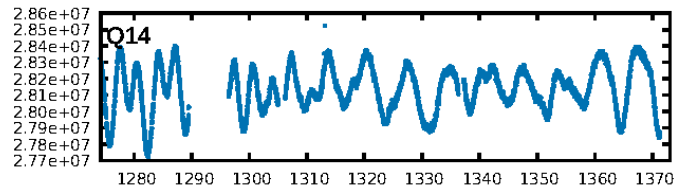
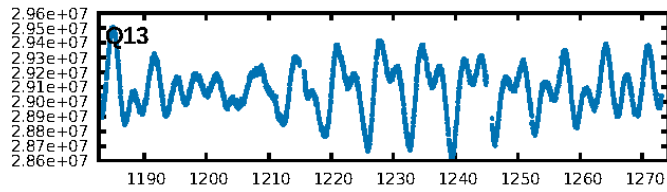
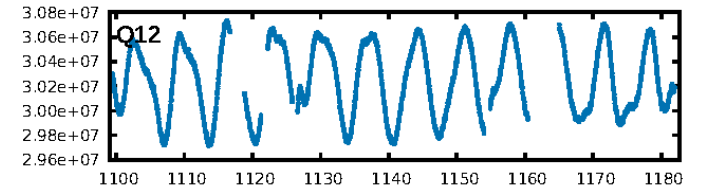
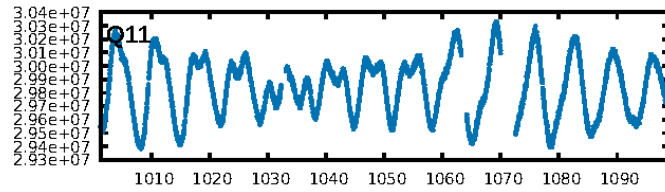
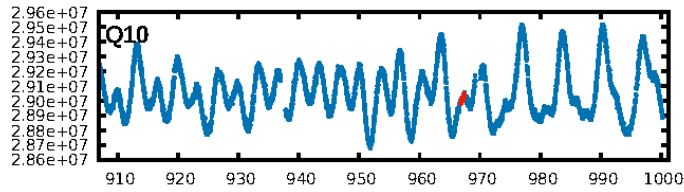
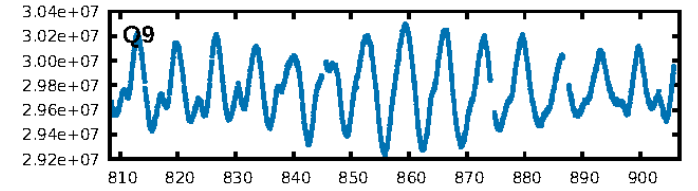
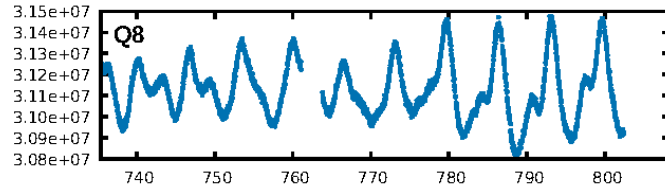
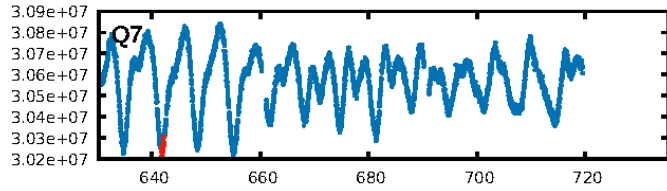
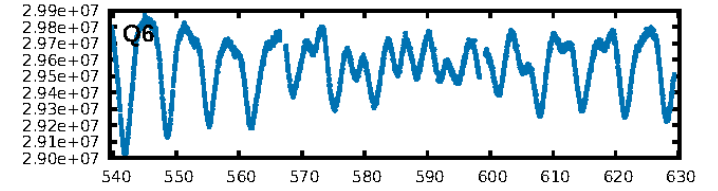
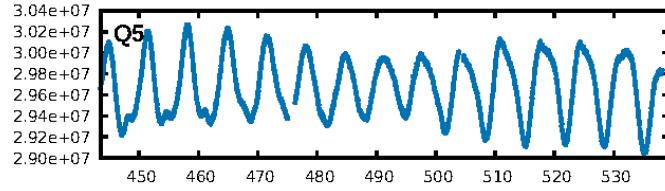
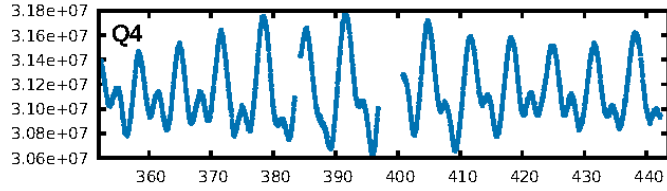
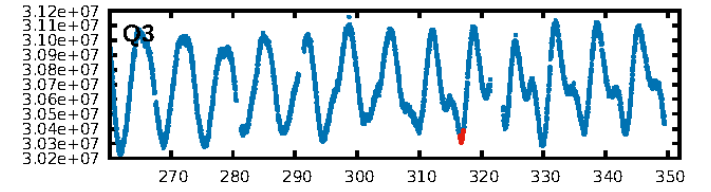
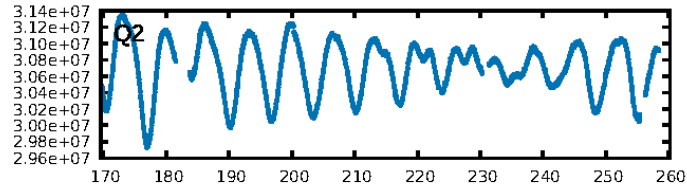
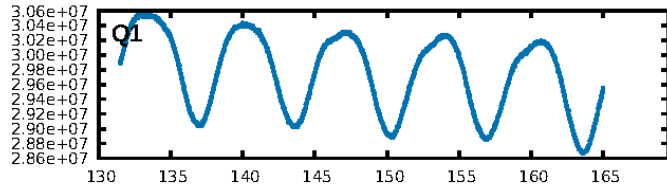
## DV Diagnostic Results:

ShortPeriod-sig: 90.6% [1.67σ]  
LongPeriod-sig: 100.0% [175.35σ]  
**ModelChiSquare2-sig: 0.0%**  
ModelChiSquareGof-sig: 96.5%  
Bootstrap-pfa: 3.51e-13  
RollingBand-fgt: 1.00 [3/3]  
**GhostDiagnostic-chr: 1.018**  
Centroid-sig: 80.8%  
Centroid-so: 0.079 arcsec [0.11σ]  
OotOffset-rm: 0.575 arcsec [2.91σ]  
KicOffset-rm: 0.583 arcsec [2.95σ]  
OotOffset-st: 0/2/0/0 [2]  
KicOffset-st: 0/2/0/0 [2]  
DiffImageQuality-fgm: 1.00 [2/2]  
DiffImageOverlap-fno: 0.00 [0/2]

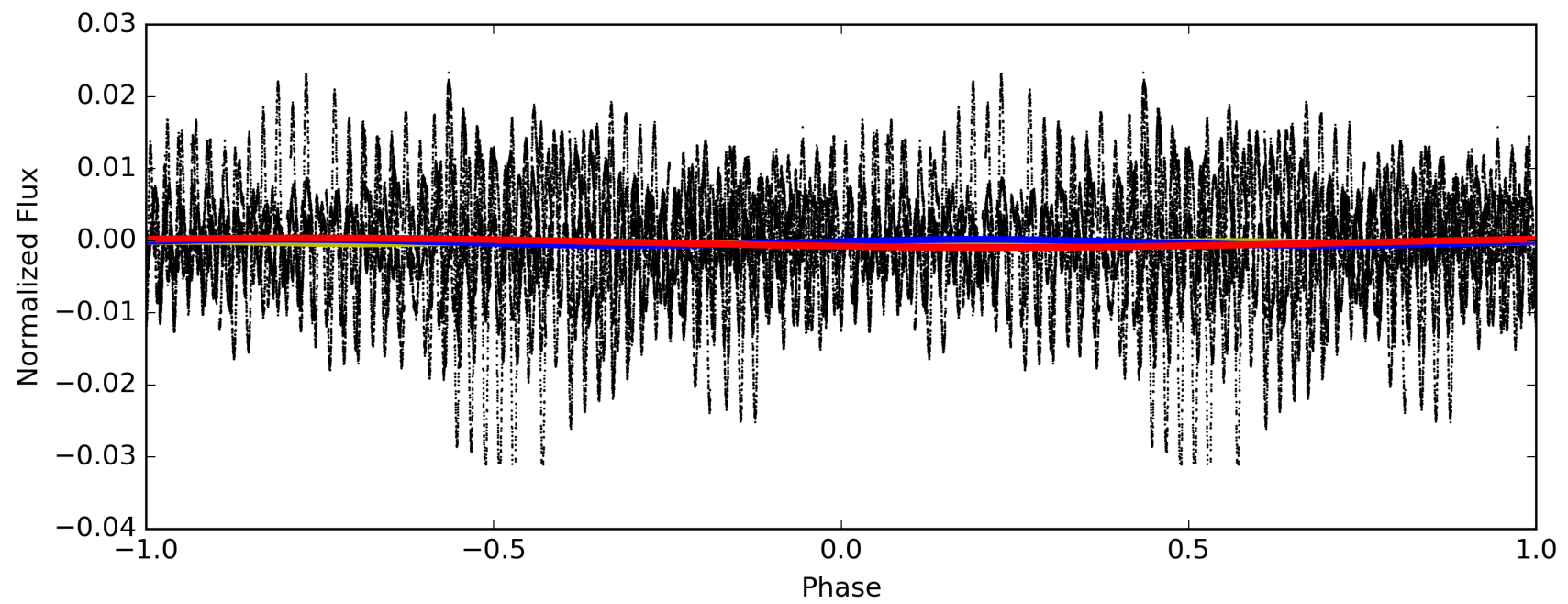
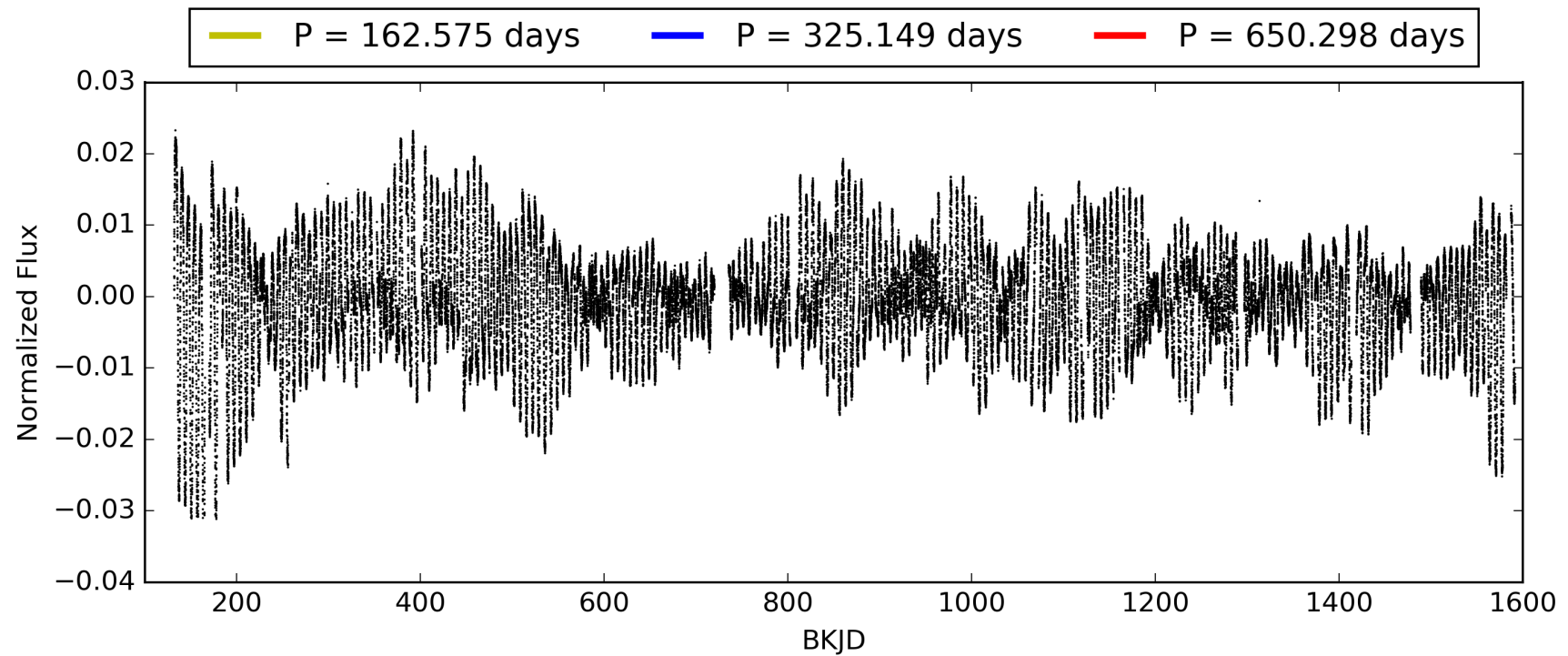
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 04:14:47 Z

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

# TCE 003647812-07, PDC Light Curves

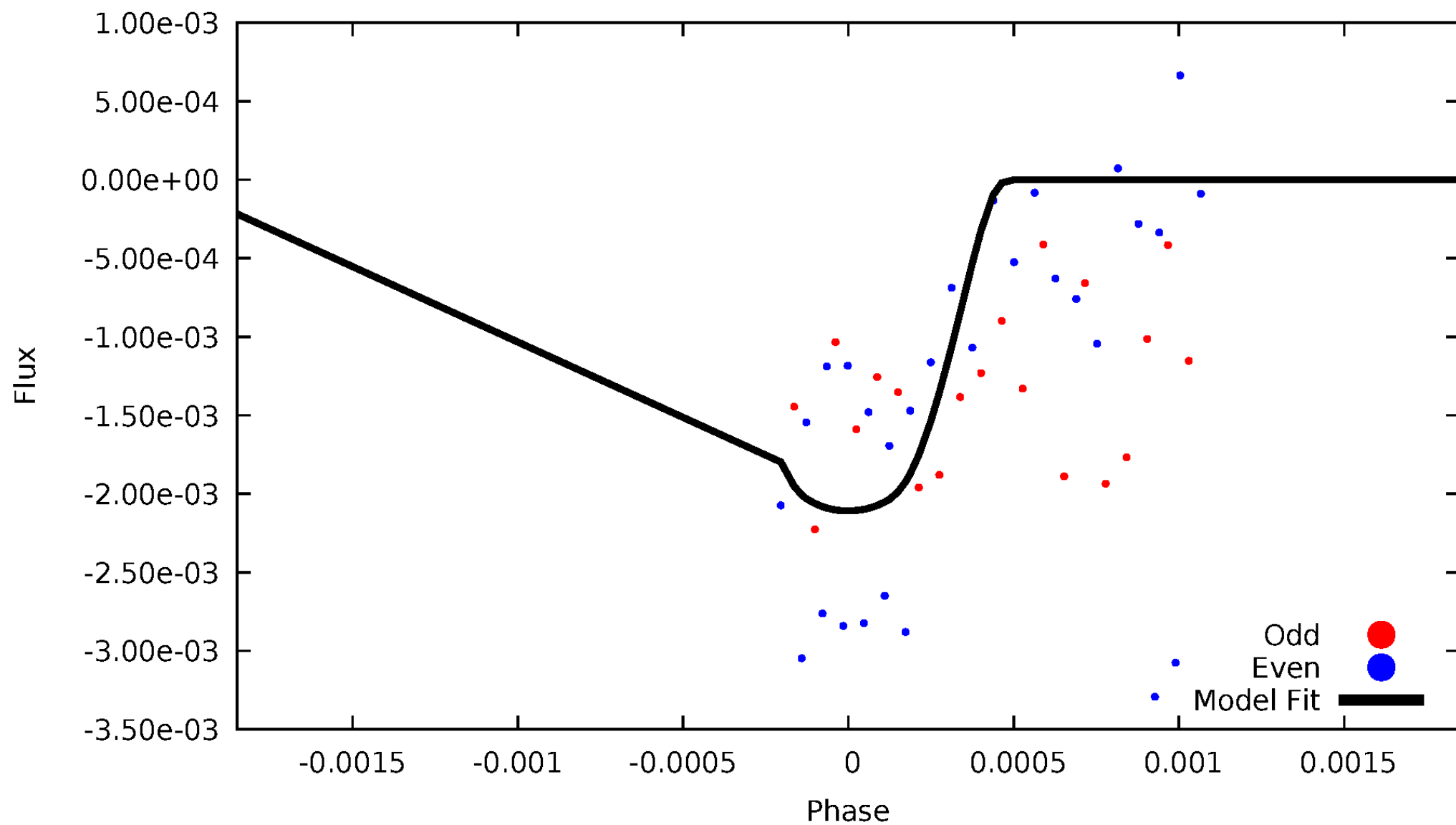


TCE 003647812-07



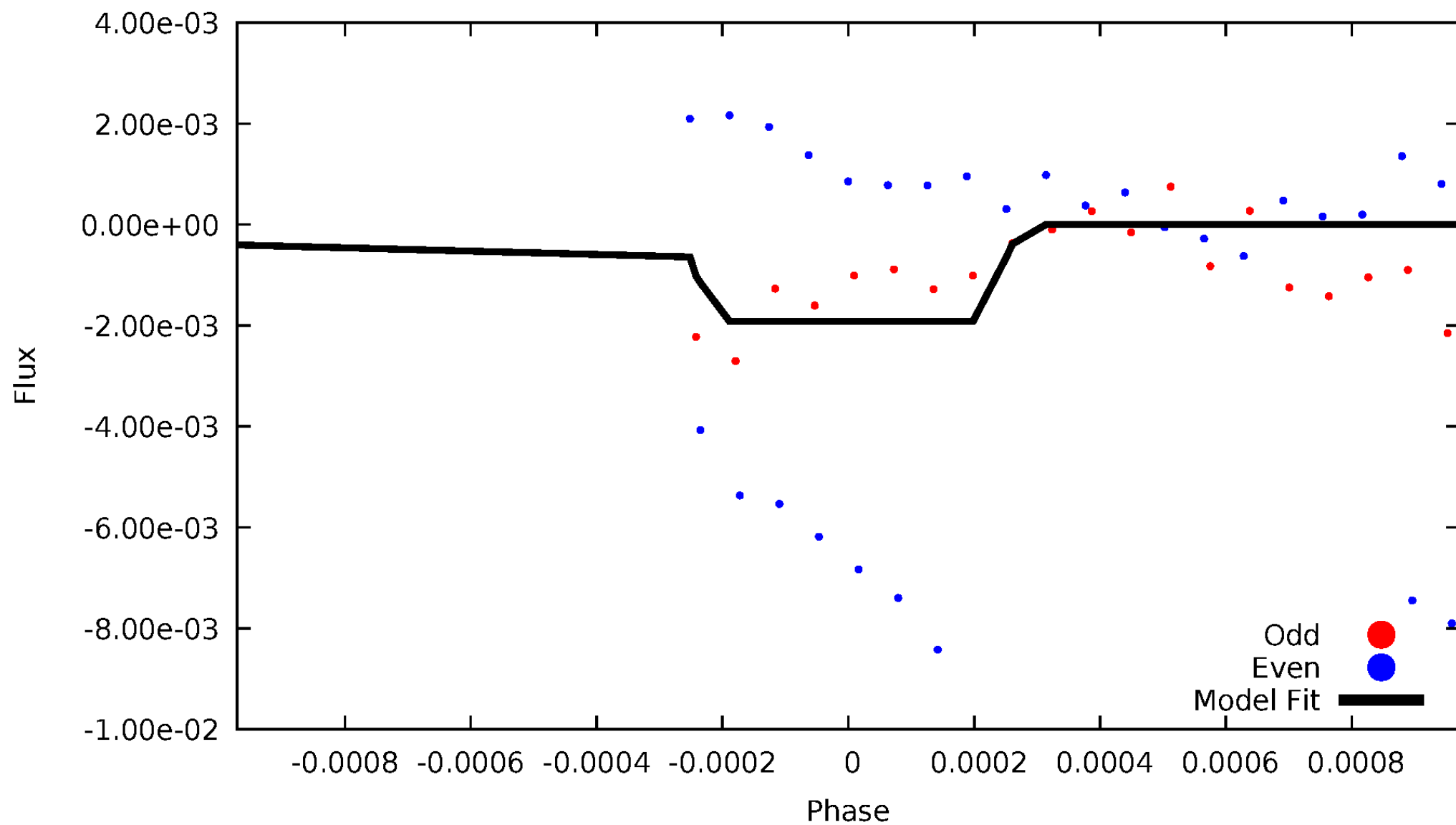
DV Odd/Even

TCE 003647812-07



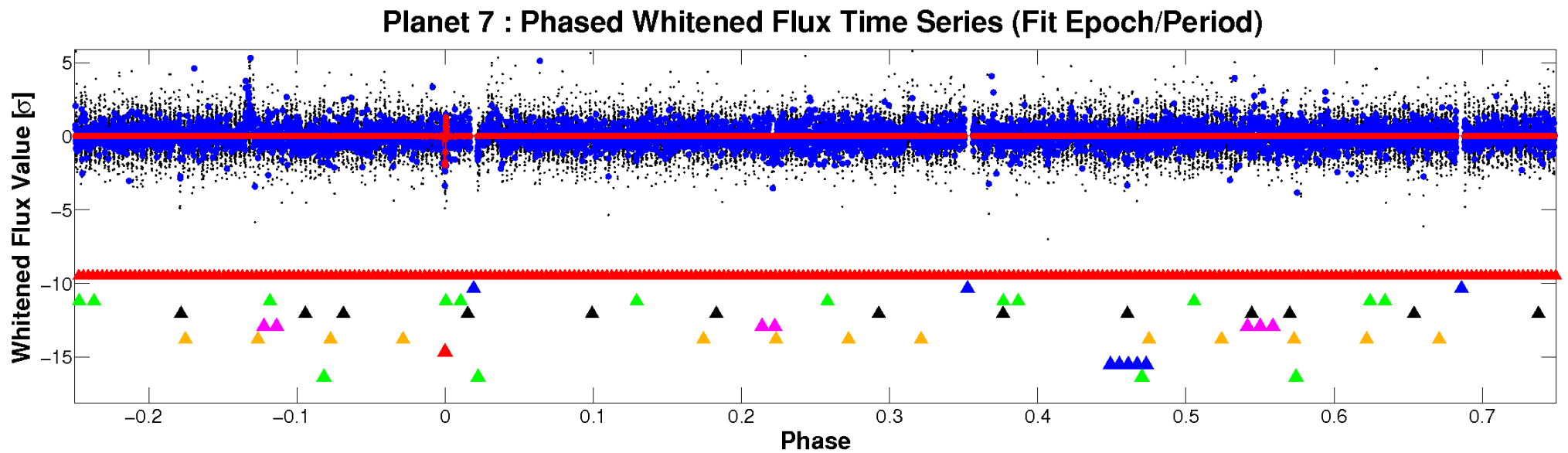
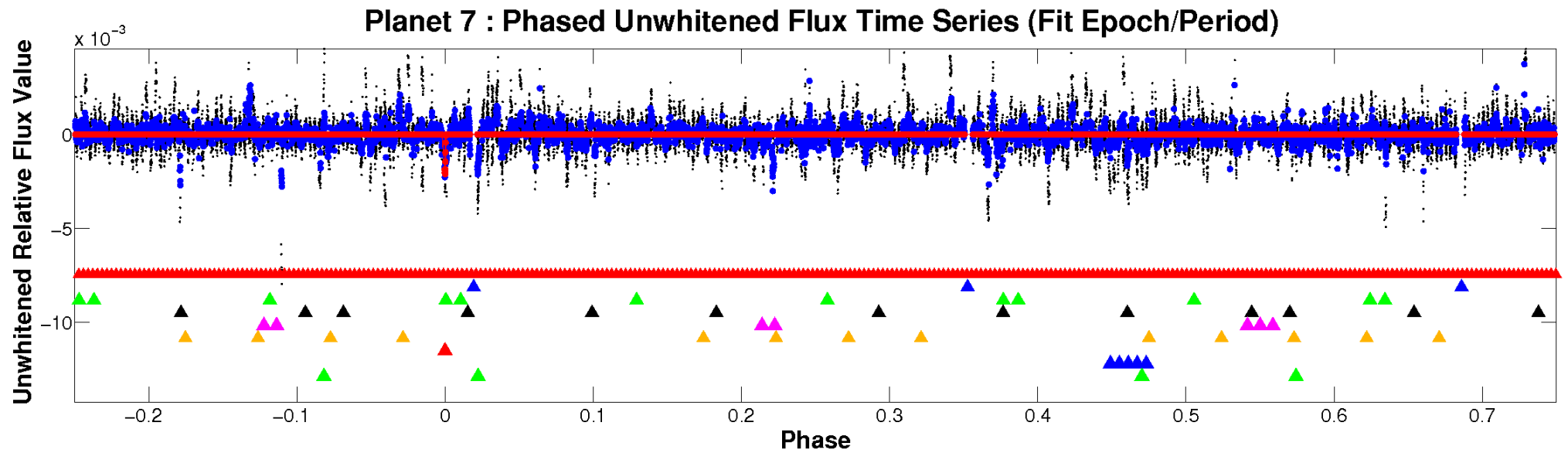
# ALT Odd/Even

TCE 003647812-07



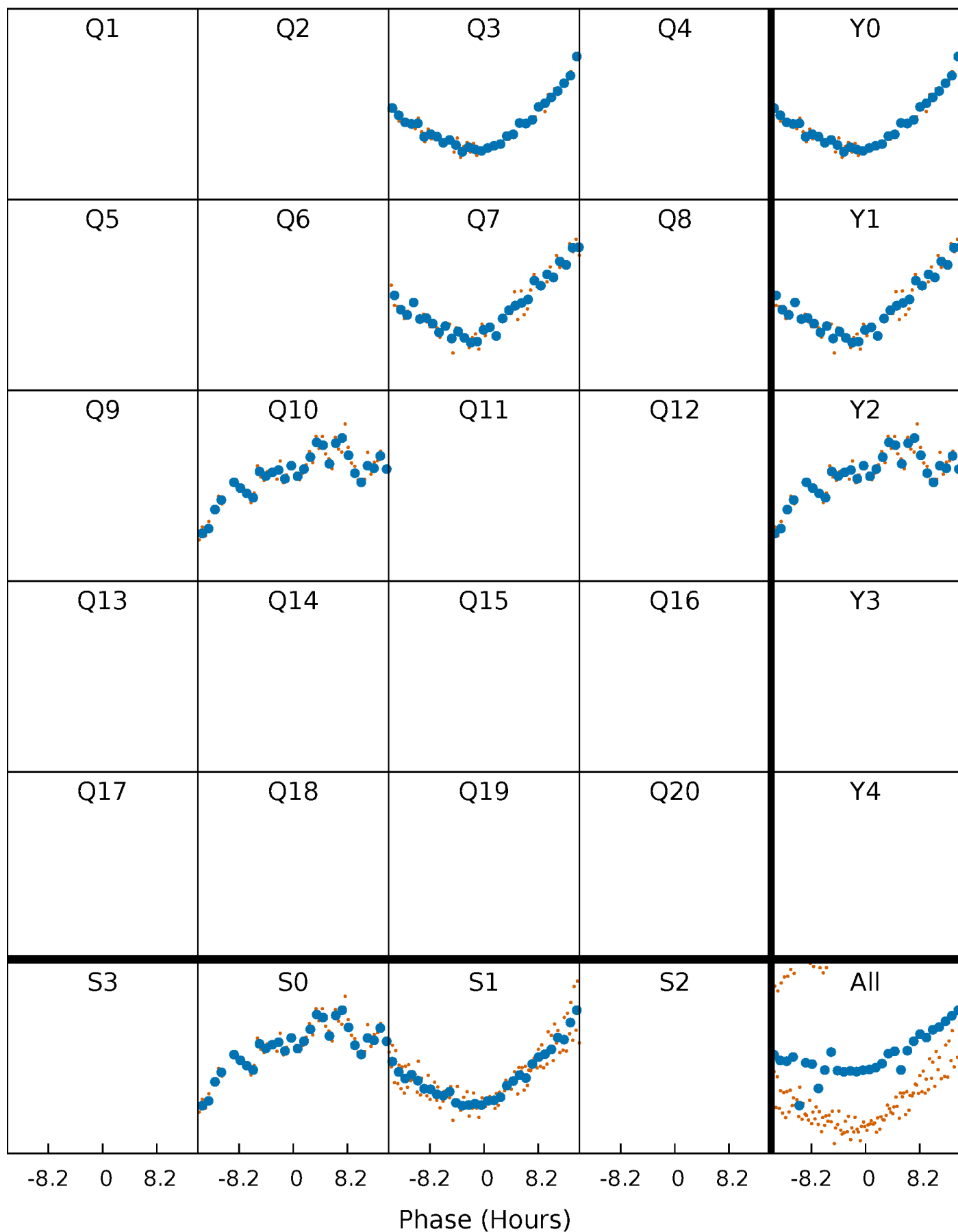


# Non-Whitened Vs. Whitened Light Curve



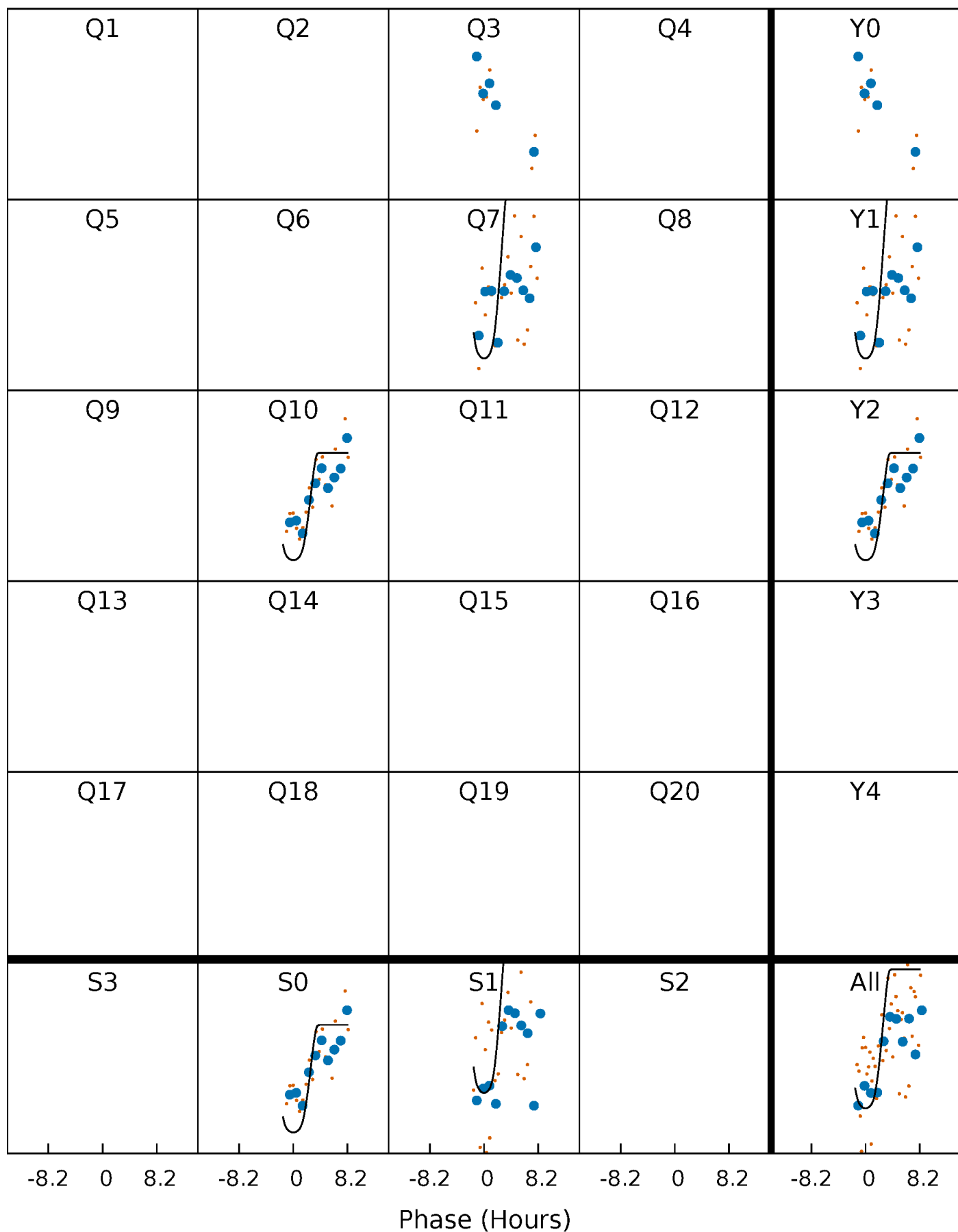
# PDC Quarter-Phased Transit Curves

TCE 003647812-07     $P=325.149215$  Days     $T_0=316.828480$  (BKJD)



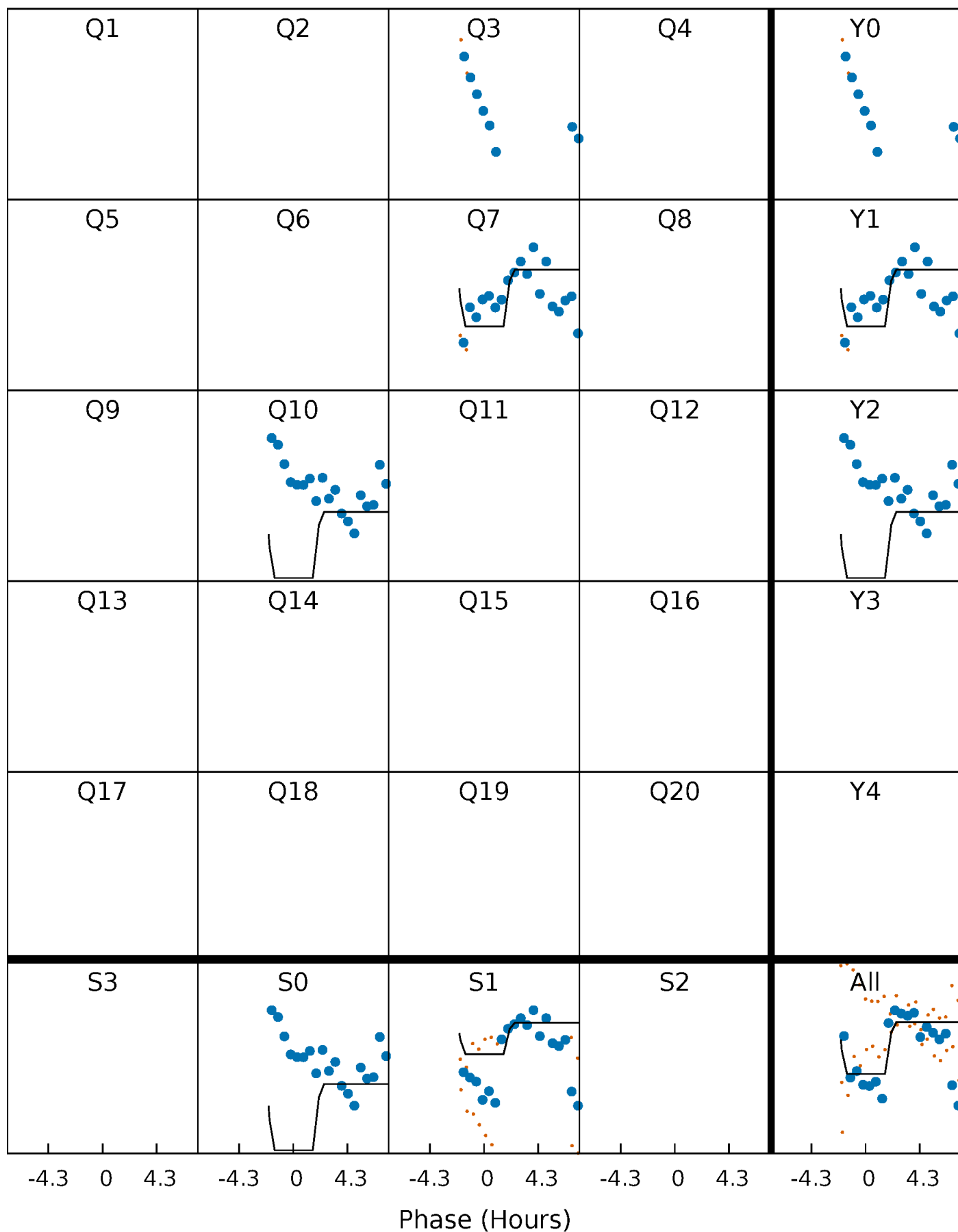
# DV Quarter-Phased Transit Curves

TCE 003647812-07     $P=325.149215$  Days     $T_0=316.828480$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

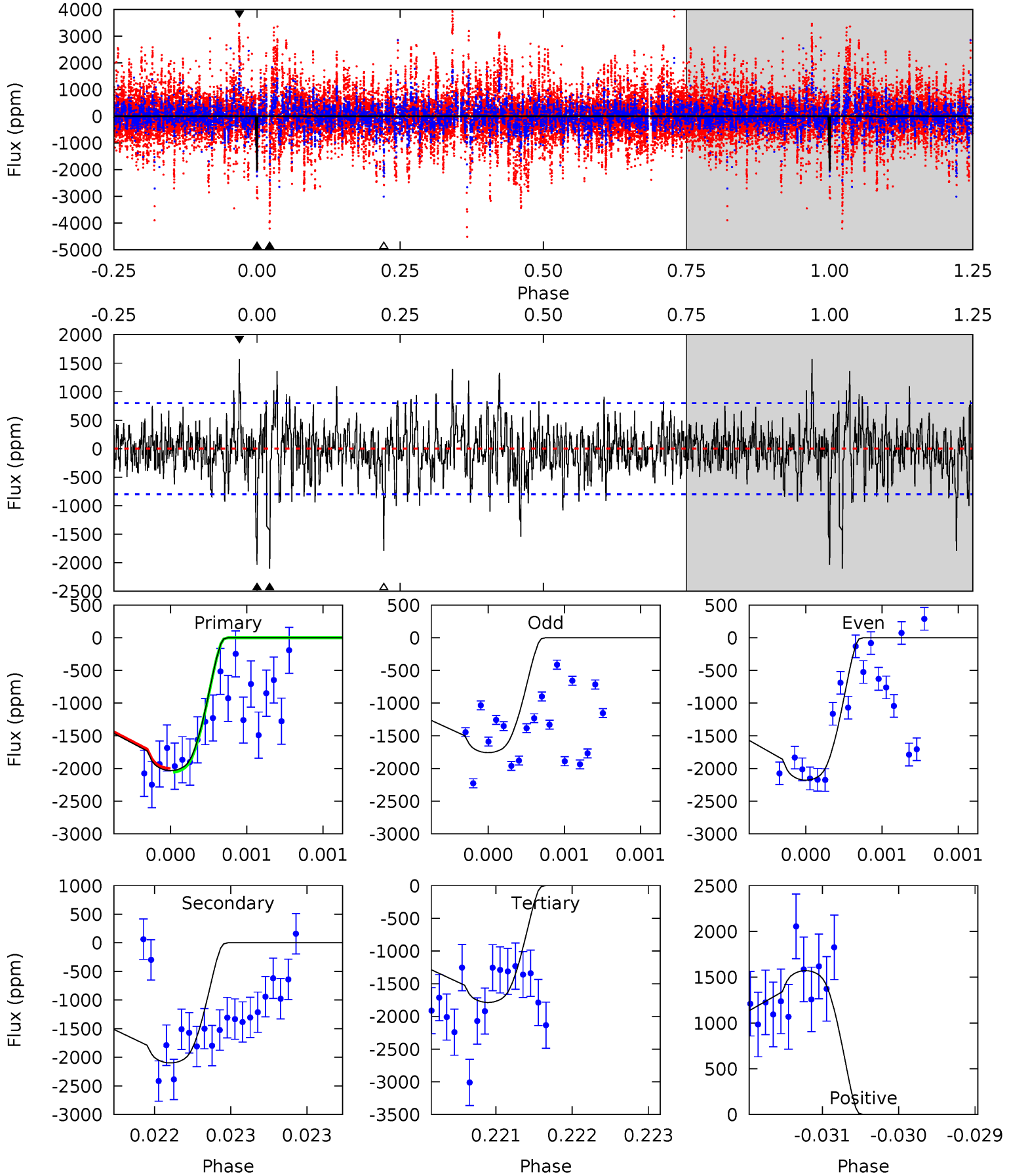
TCE 003647812-07     $P=325.164311$  Days     $T_0=316.838629$  (BKJD)



# DV Model-Shift Uniqueness Test

003647812-07, P = 325.149215 Days, E = 316.828480 Days

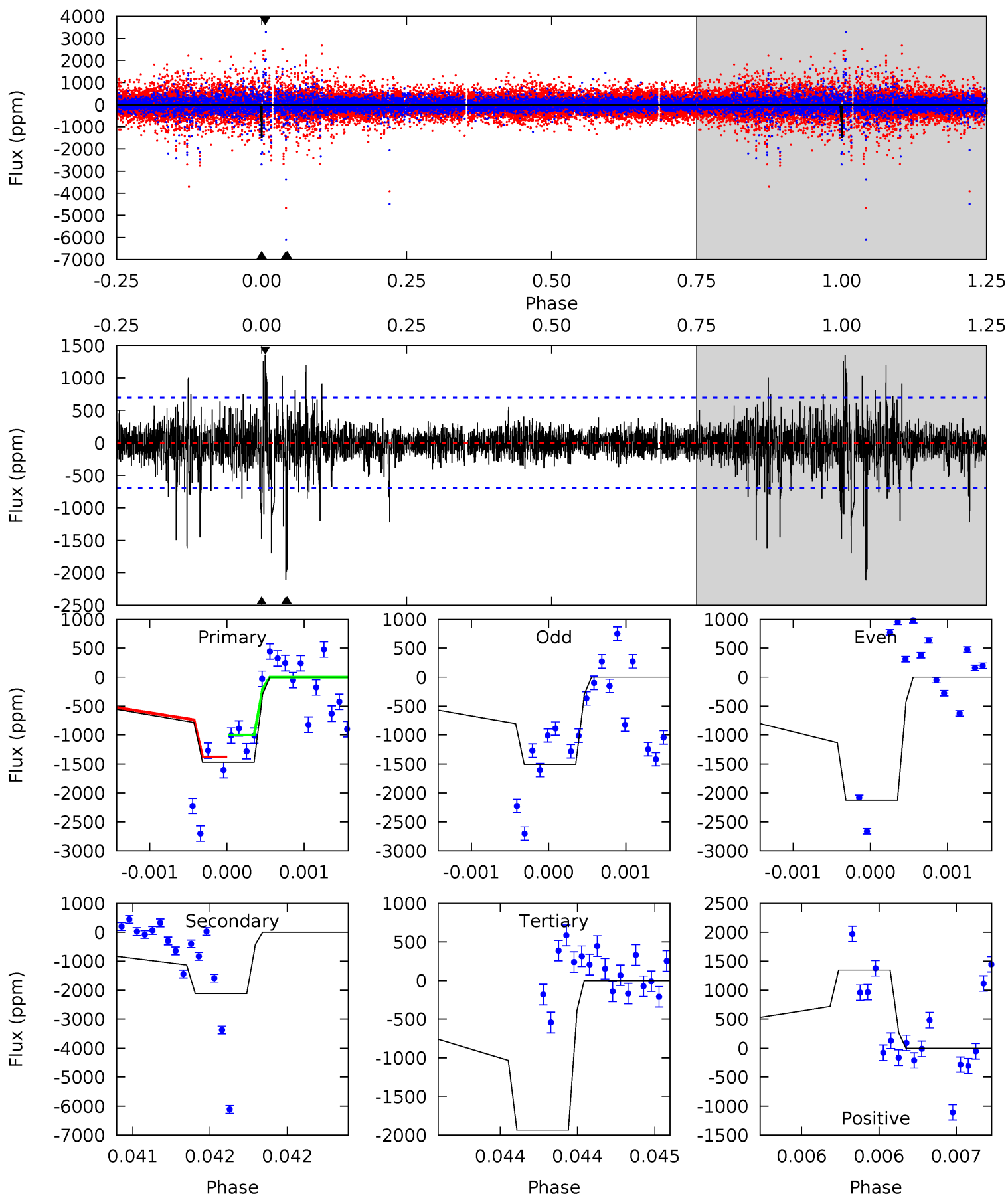
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
14.0	14.5	12.3	10.9	5.52	3.40	2.53	1.69	3.18	2.15	3.64	1.29	1.16	0.43	0.20



# Alt Model-Shift Uniqueness Test

003647812-07, P = 325.164311 Days, E = 316.838629 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.7	16.9	15.5	10.8	5.55	3.45	1.33	-3.73	0.95	1.43	6.12	3.19	1.51	0.39	1.59



### Stellar Parameters For KIC 003647812

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5534^{+166}_{-166}$	$4.504^{+0.066}_{-0.165}$	$-0.040^{+0.300}_{-0.300}$	$0.877^{+0.207}_{-0.095}$	$0.896^{+0.102}_{-0.083}$	$1.870^{+0.529}_{-0.824}$
	+3%/-3%	+1%/-4%	+750%/-750%	+24%/-11%	+11%/-9%	+28%/-44%
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 003647812-07 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	-2099 $\pm$ 145	$5.31^{+1.09}_{-0.88}$	$344^{+22}_{-17}$	$5170^{+401}_{-324}$	$32499^{+14988}_{-10006}$
Alt.	-2115 $\pm$ 125	$4.36^{+0.96}_{-0.86}$	$343^{+21}_{-16}$	$5655^{+621}_{-458}$	$49331^{+26574}_{-16353}$

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

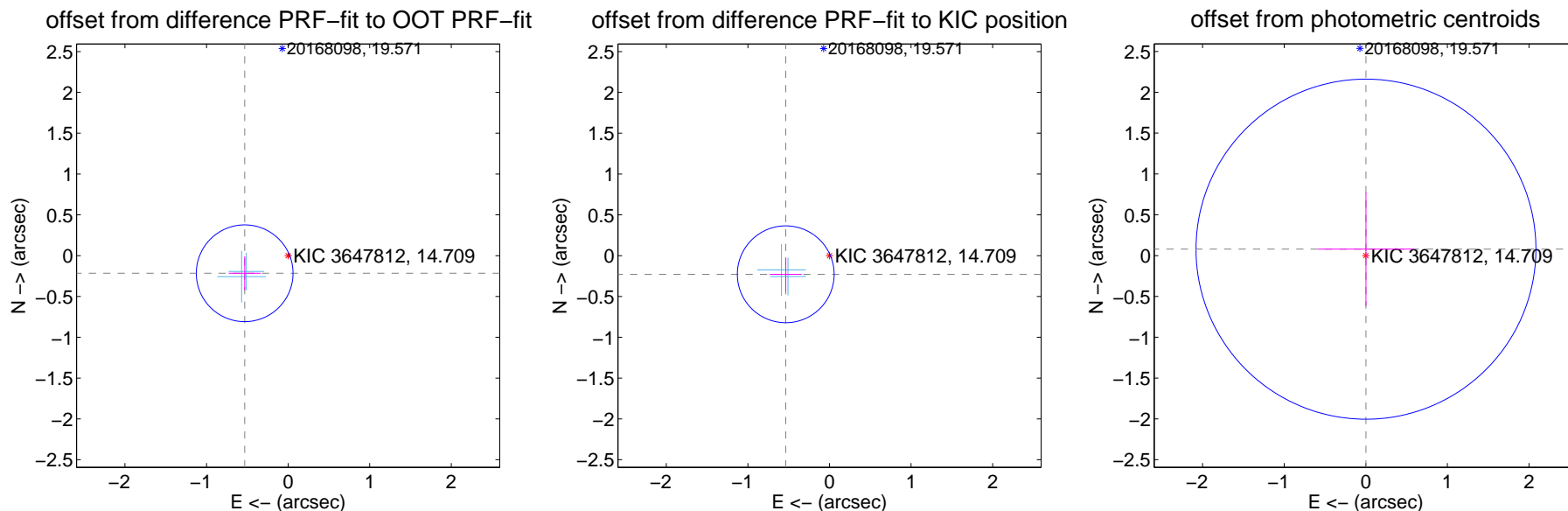
## DV Centroid Data

Supplemental centroid analysis for 003647812-07. Kepler magnitude: 14.71. Transit SNR 9.16

There are 2 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.08 arcsec

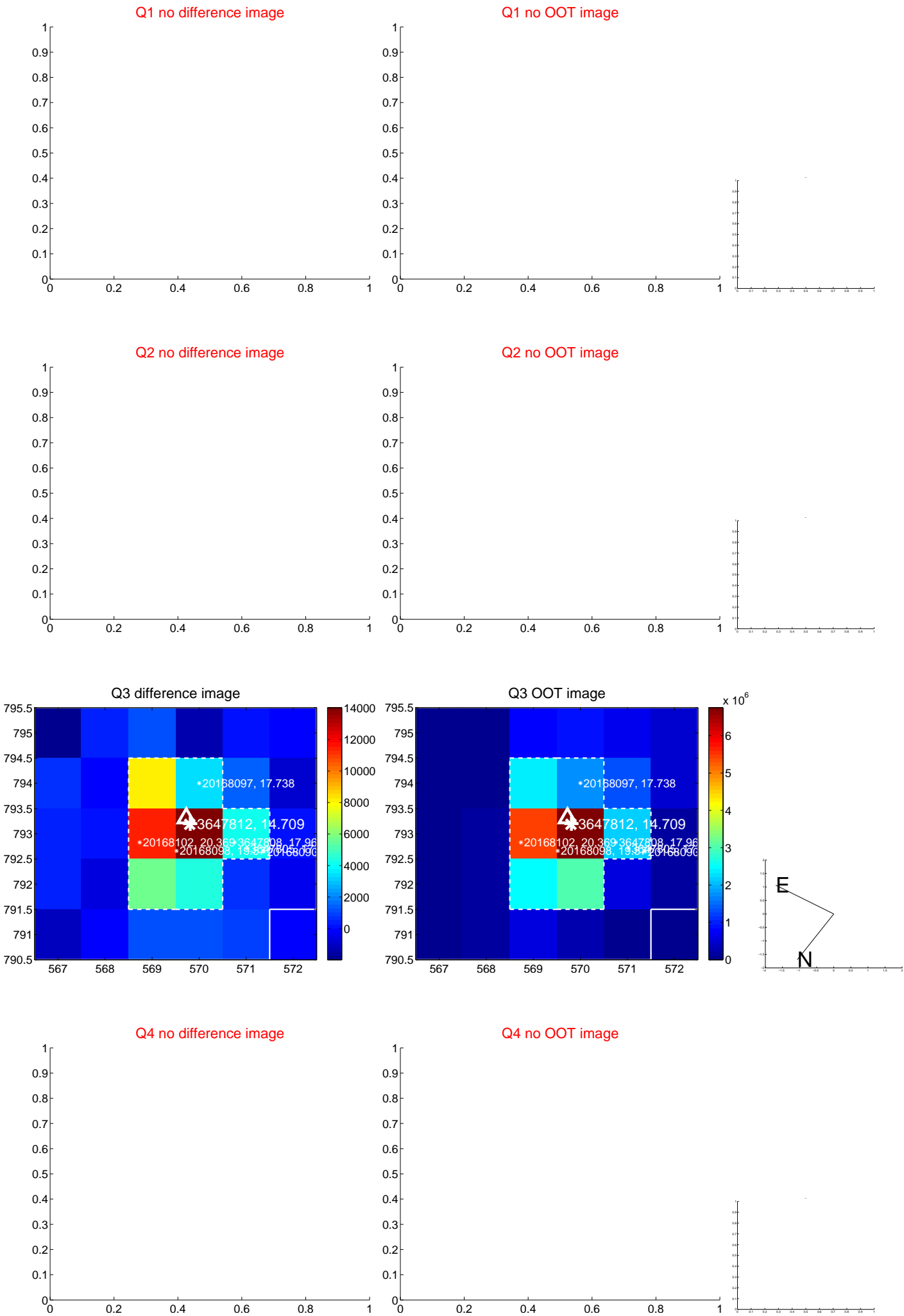
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.575 \pm 0.198$	2.91	$0.533 \pm 0.196$	$-0.216 \pm 0.207$
PRF-fit source offset from KIC position	$0.583 \pm 0.198$	2.95	$0.536 \pm 0.196$	$-0.228 \pm 0.207$
photometric centroid source offset	$0.08 \pm 0.69$	0.11	$-0.00 \pm 0.59$	$0.08 \pm 0.69$



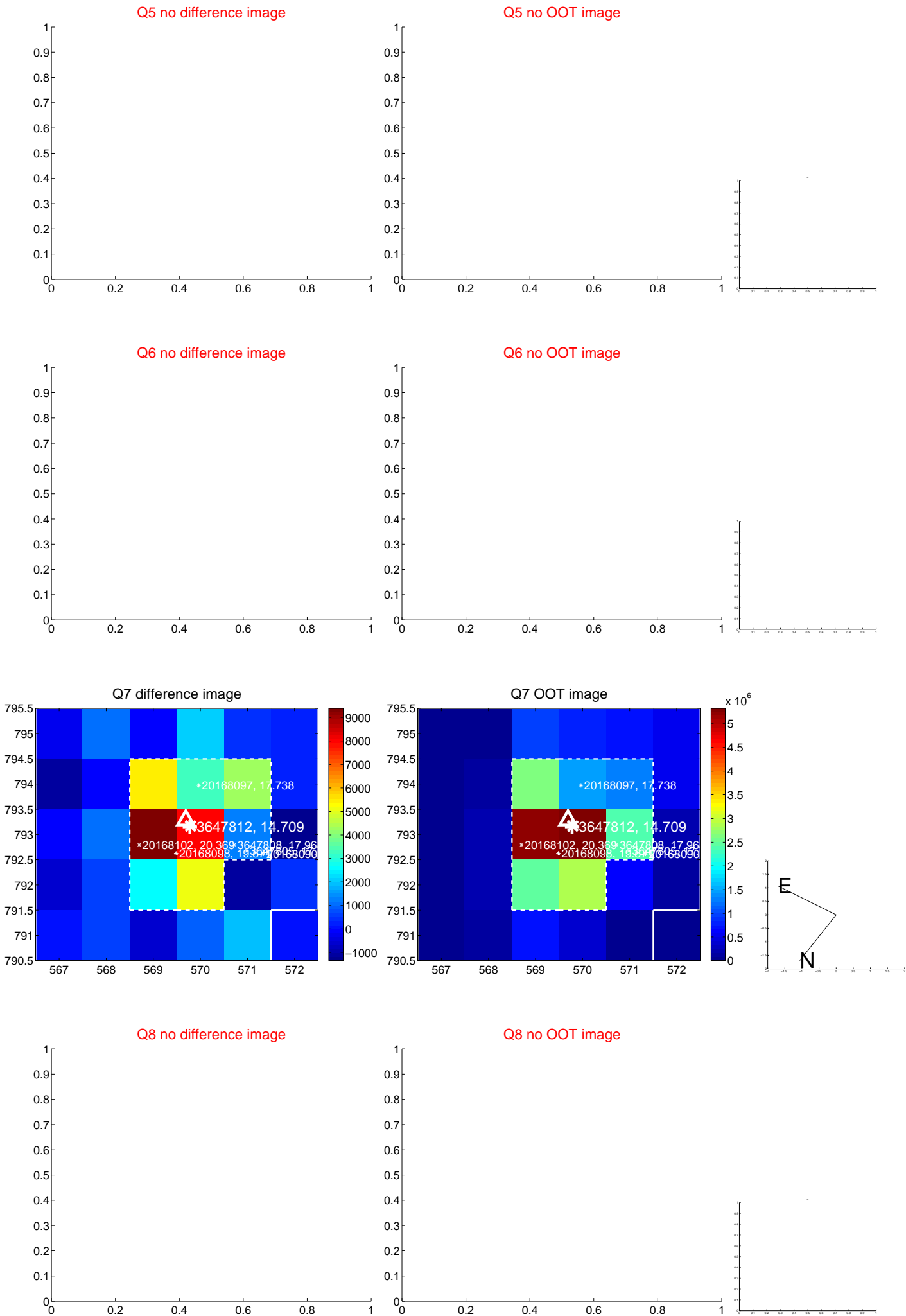
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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



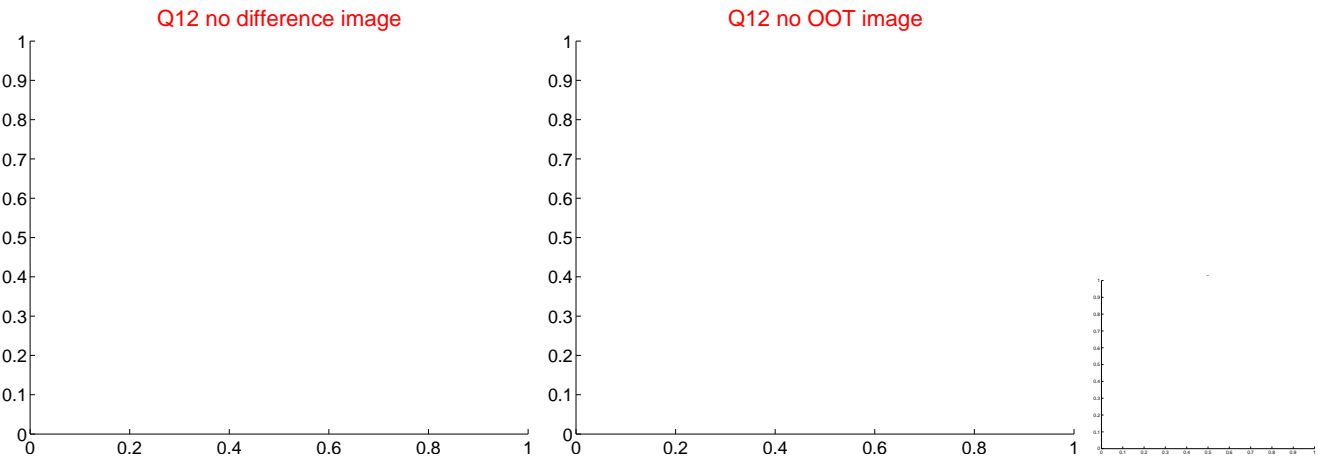
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



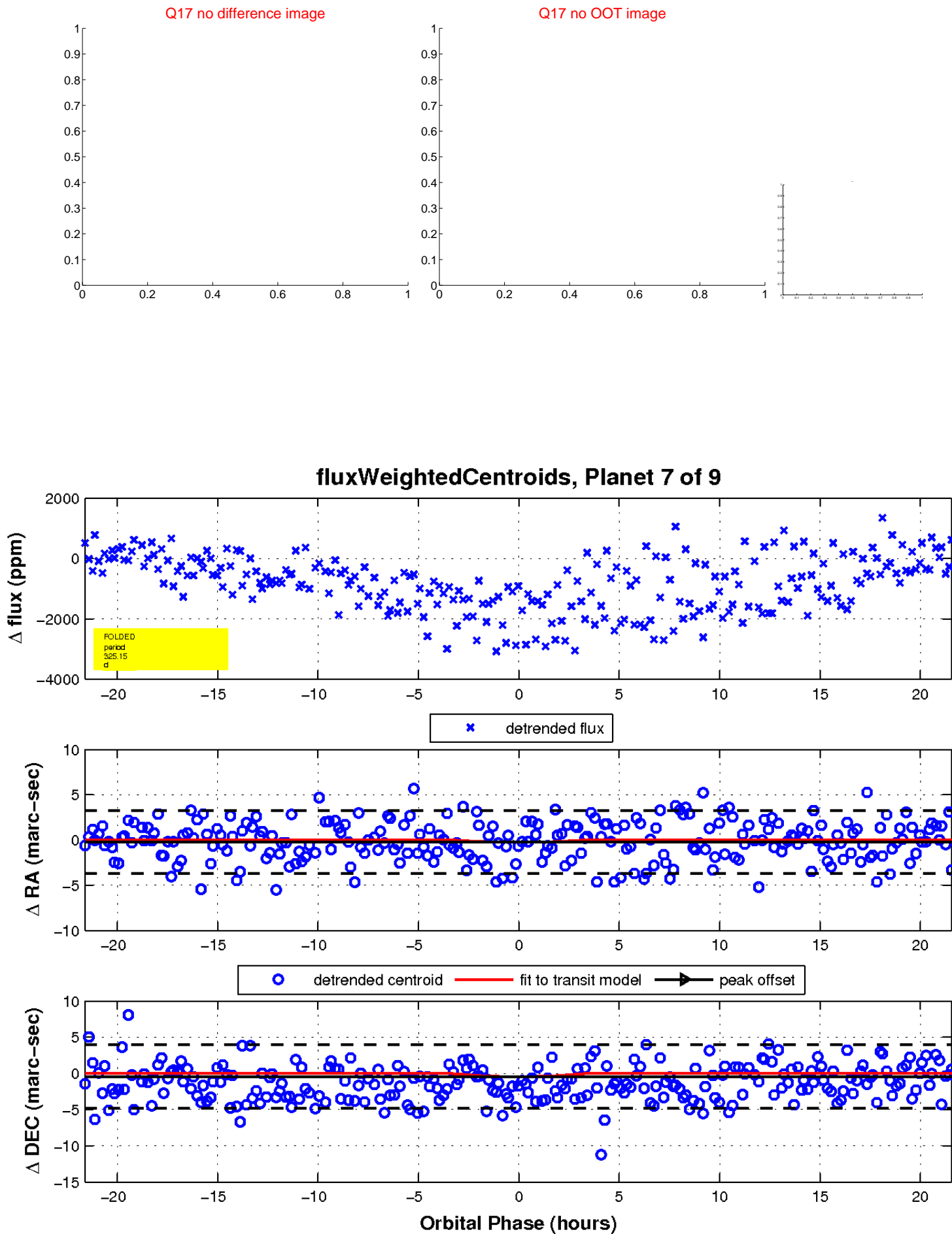
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

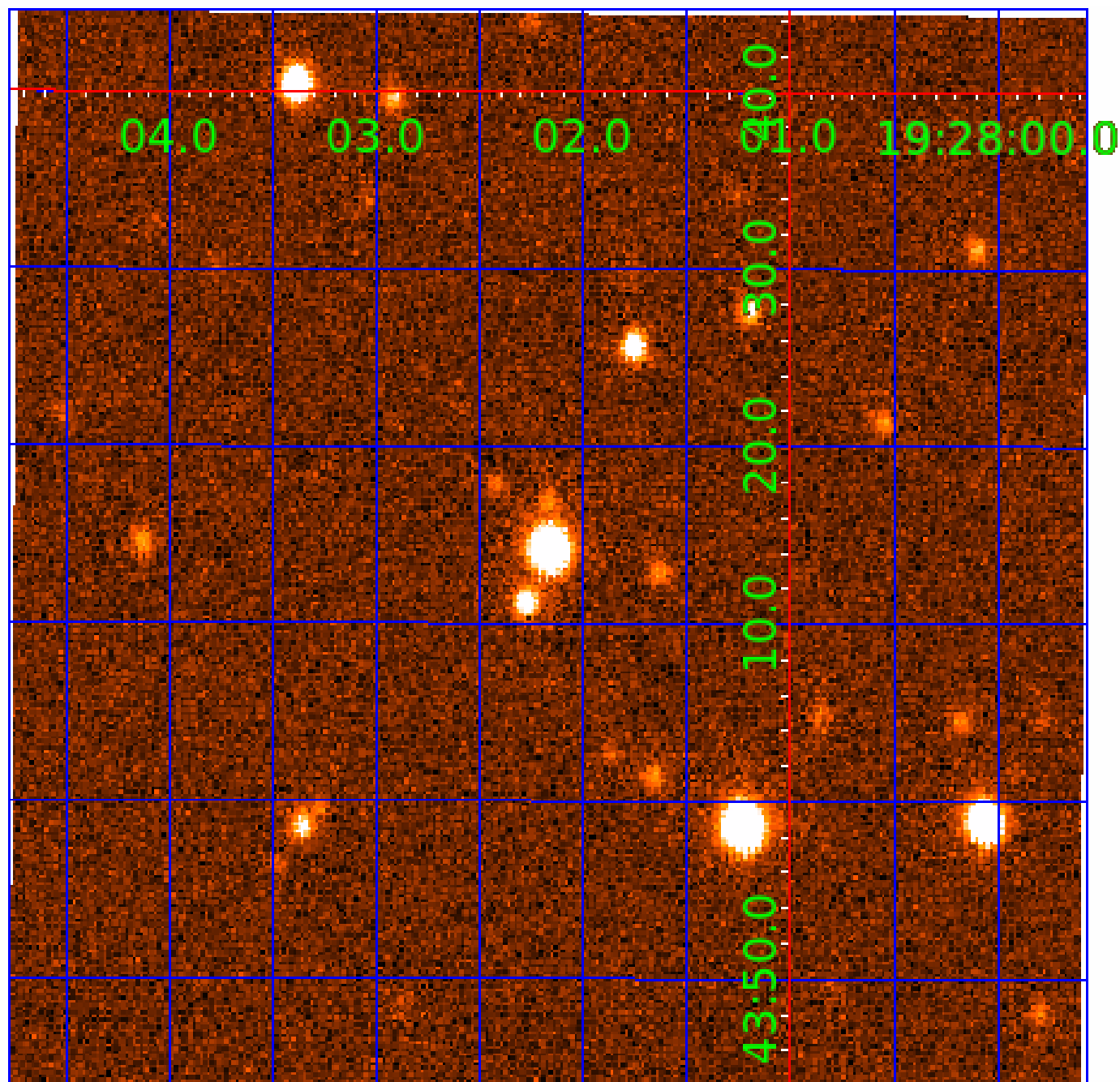


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 003647812

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003647812-01	OBS	No	1.025744	131.805103	48.0	4.726	7.9	8.2	0.88	5534	0.62	1755.22
003647812-02	OBS	No	108.387733	214.706028	405.5	11.124	15.8	2.7	0.88	5534	1.81	3.51
003647812-03	OBS	No	122.338718	194.660074	645.6	1.634	13.3	3.5	0.88	5534	2.46	2.99
003647812-04	OBS	No	117.477275	177.043792	1139.6	6.892	13.3	7.2	0.88	5534	4.16	3.16
003647812-05	OBS	No	215.837817	173.340947	2077.4	38.867	15.1	6.2	0.88	5534	4.50	1.40
003647812-06	OBS	No	113.689287	146.161820	1122.9	12.795	10.8	6.5	0.88	5534	3.74	3.30
003647812-07	OBS	No	325.149215	316.828480	2109.5	7.212	11.6	9.2	0.88	5534	5.07	0.81
003647812-08	OBS	No	323.187877	145.543042	4343.2	27.204	11.6	7.9	0.88	5534	6.94	0.82

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003647812-01	OBS	FP	0.00	1	0	0	0	LPP_DV
003647812-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS
003647812-03	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
003647812-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
003647812-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—INCONSISTENT_TRANS—HALO_GHOST
003647812-06	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—INCONSISTENT_TRANS—HALO_GHOST
003647812-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—ALL_TRANS_CHASES—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—SAME_NTL_PERIOD—CENT_FEW_DIFFS
003647812-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—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.

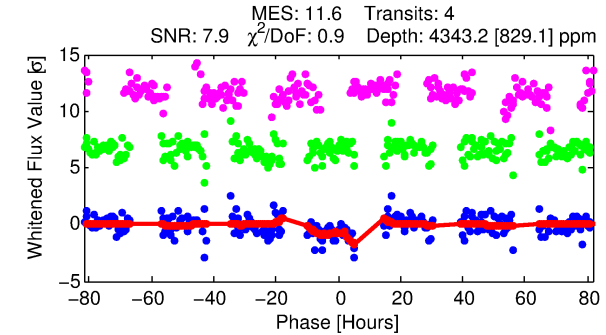
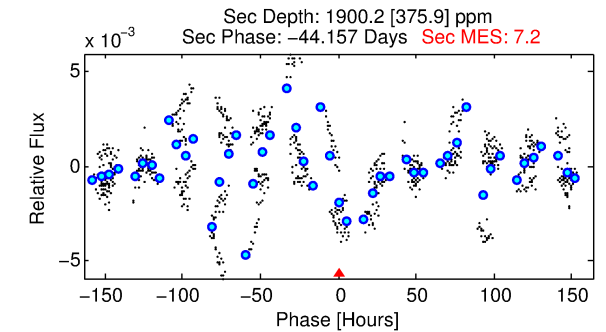
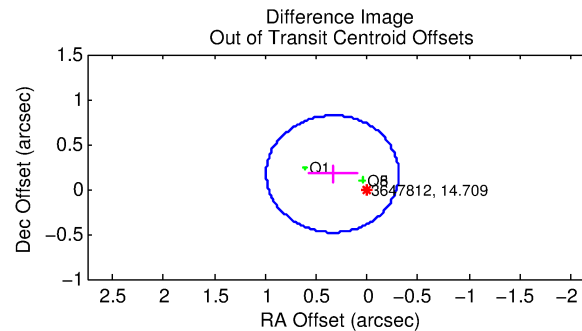
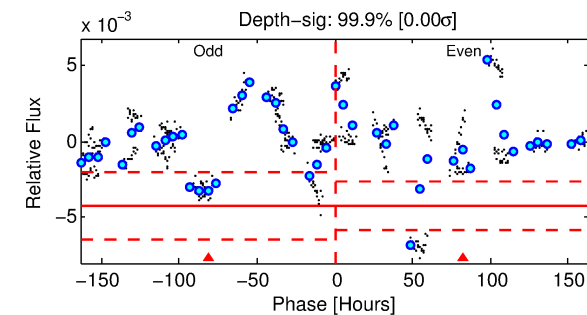
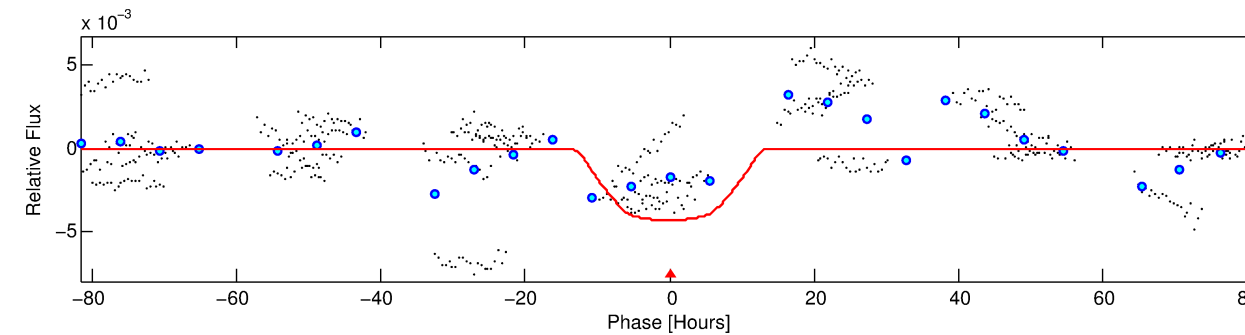
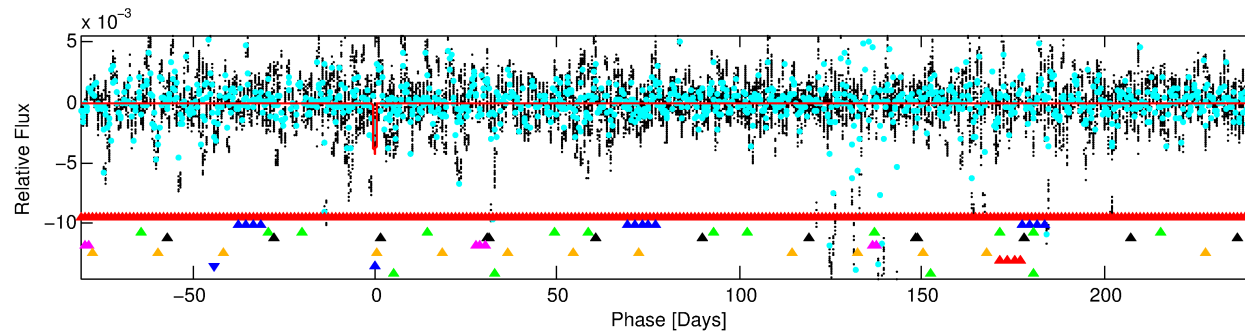
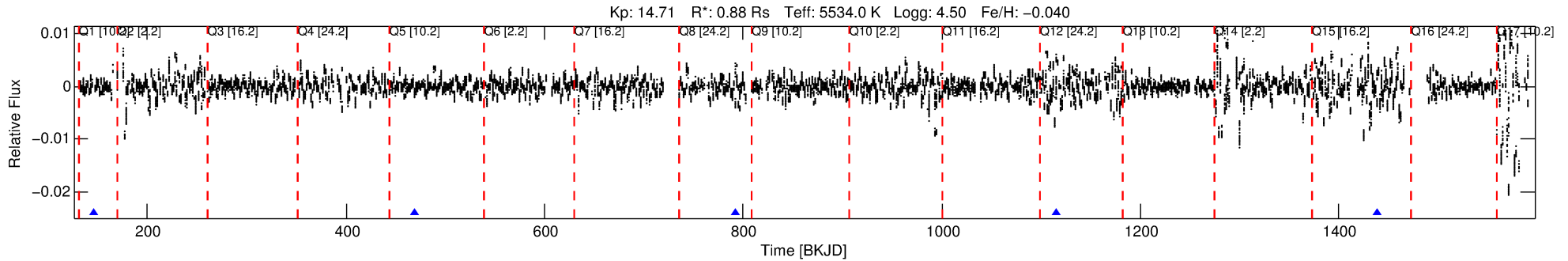
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 003647812-08

No Significant Match Found

# DV One-Page Summary

KIC: 3647812 Candidate: 8 of 9 Period: 323.188 d



## DV Fit Results:

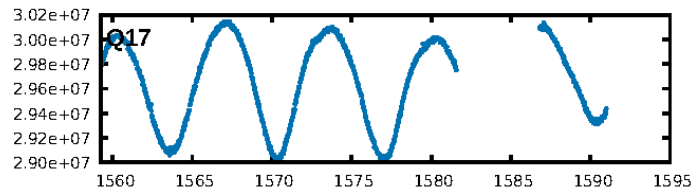
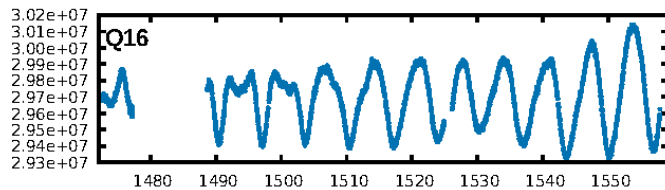
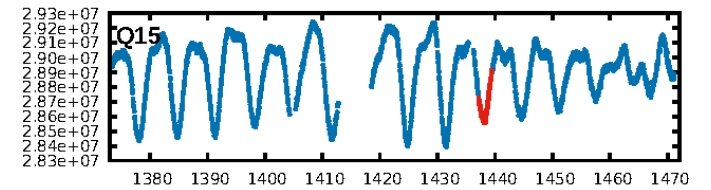
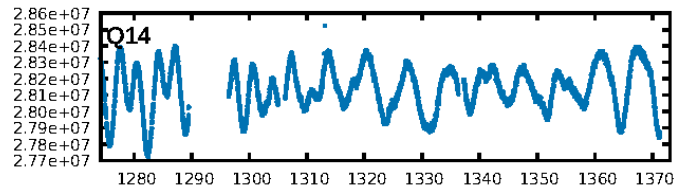
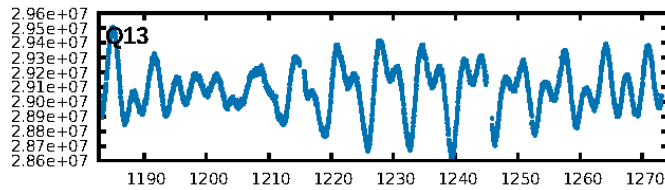
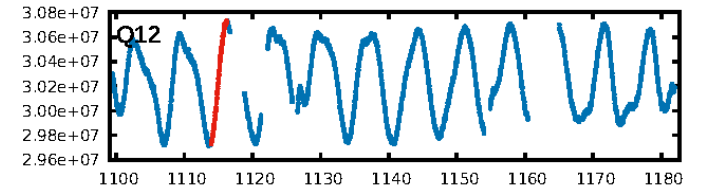
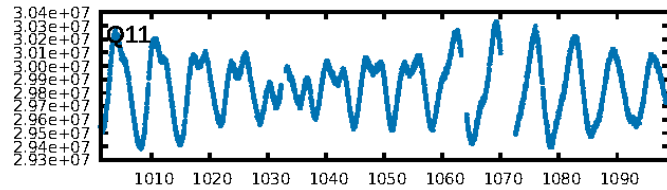
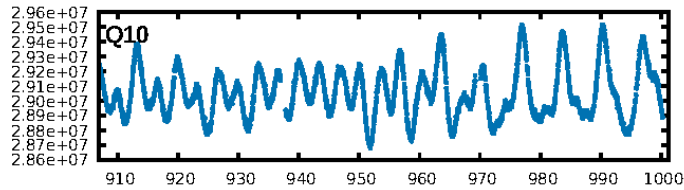
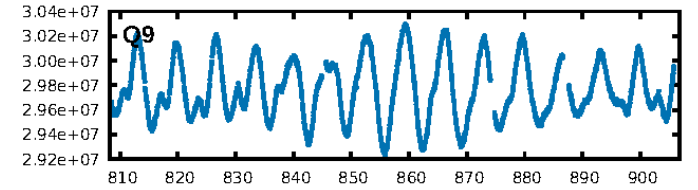
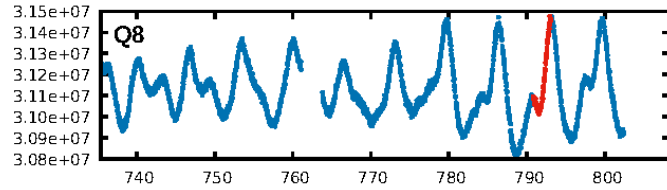
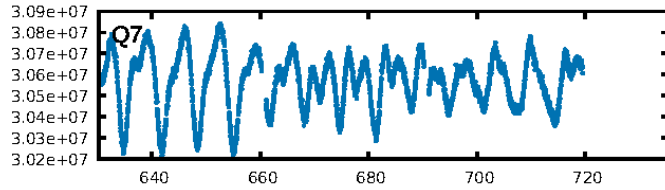
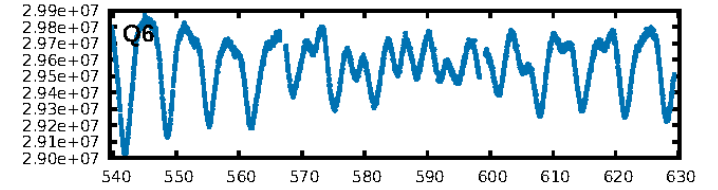
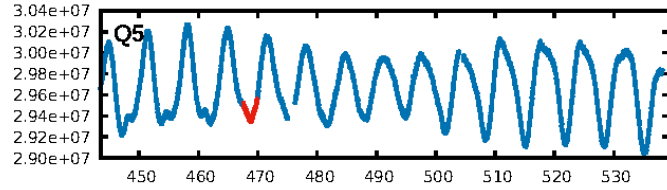
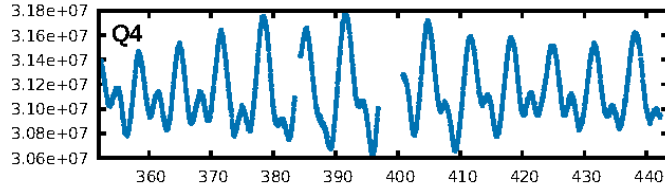
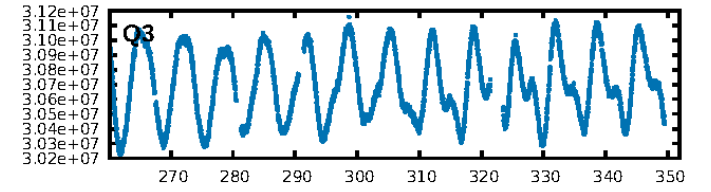
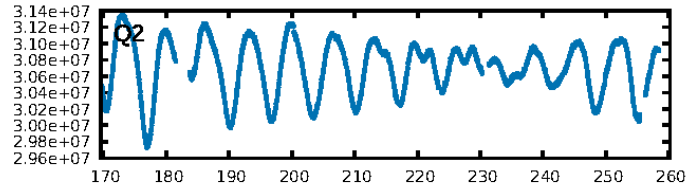
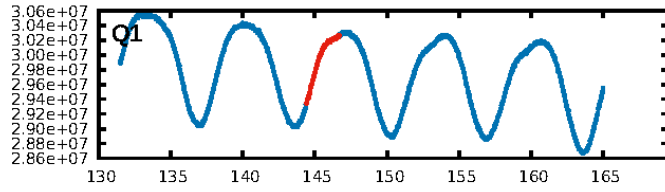
Period = 323.18788 [0.02689] d  
Epoch = 145.5430 [0.0807] BKJD  
Rp/R\* = 0.0725 [0.0069]  
a/R\* = 53.17 [9.30]  
b = 0.90 [0.03]  
Seff = 0.82 [0.26]  
Teq = 243 [19] K  
Rp = 6.94 [1.77] Re  
a = 0.8885 [0.1795] AU  
Ag = 17129.37 [6945.12] [2.47σ]  
Teffp = 4290 [322] K [12.57σ]

## DV Diagnostic Results:

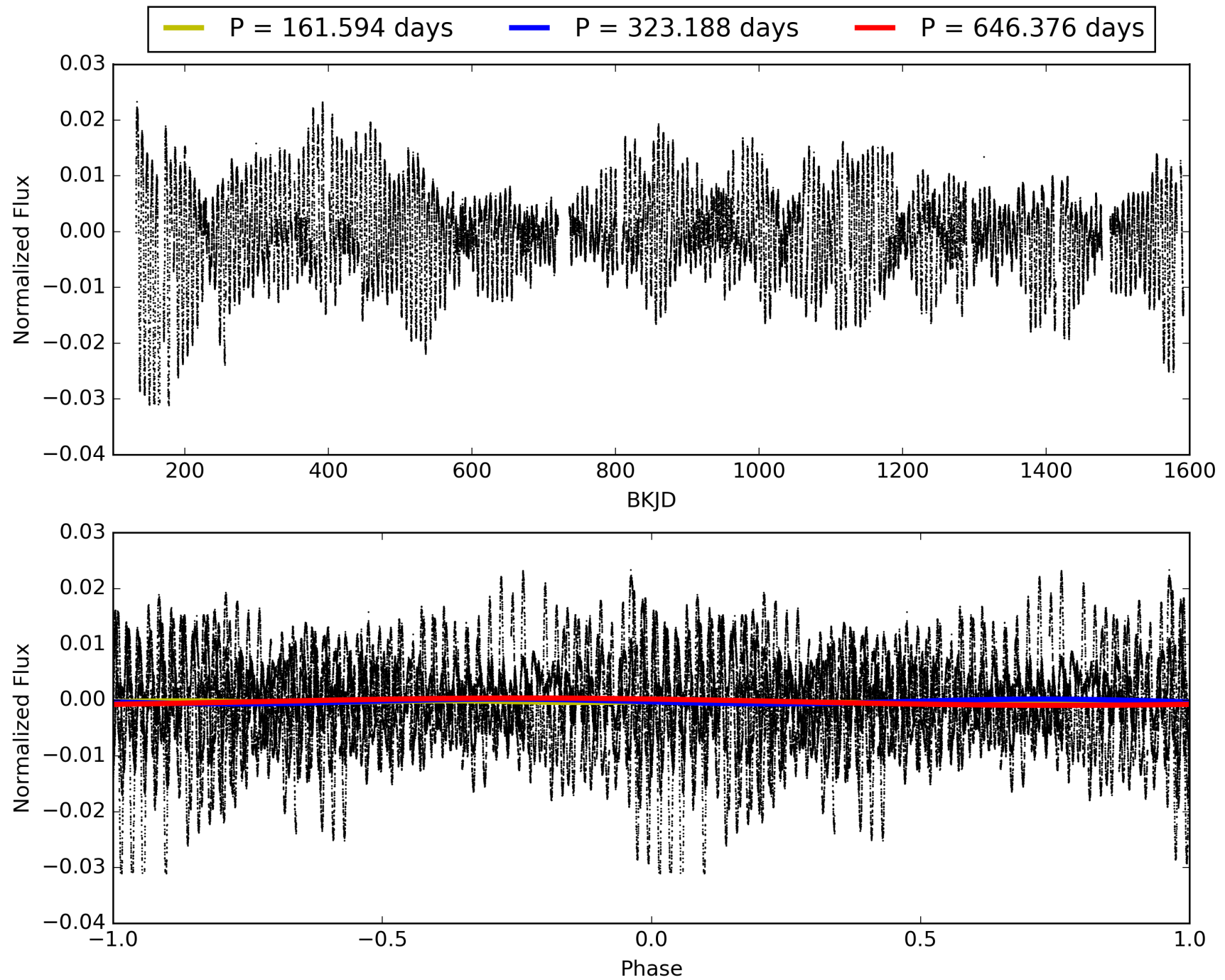
ShortPeriod-sig: 100.0% [54.31σ]  
LongPeriod-sig: 90.6% [1.67σ]  
ModelChiSquare2-sig: 20.1%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 6.62e-12  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: 8.064  
Centroid-sig: 0.2%  
Centroid-so: 0.487 arcsec [2.89σ]  
OotOffset-rm: 0.379 arcsec [1.75σ]  
OotOffset-st: 0/0/1/2 [3]  
KicOffset-rm: 0.285 arcsec [1.30σ]  
KicOffset-st: 0/0/1/2 [3]  
DiffImageQuality-fgm: 0.67 [2/3]  
DiffImageOverlap-fno: 0.00 [0/3]



# TCE 003647812-08, PDC Light Curves

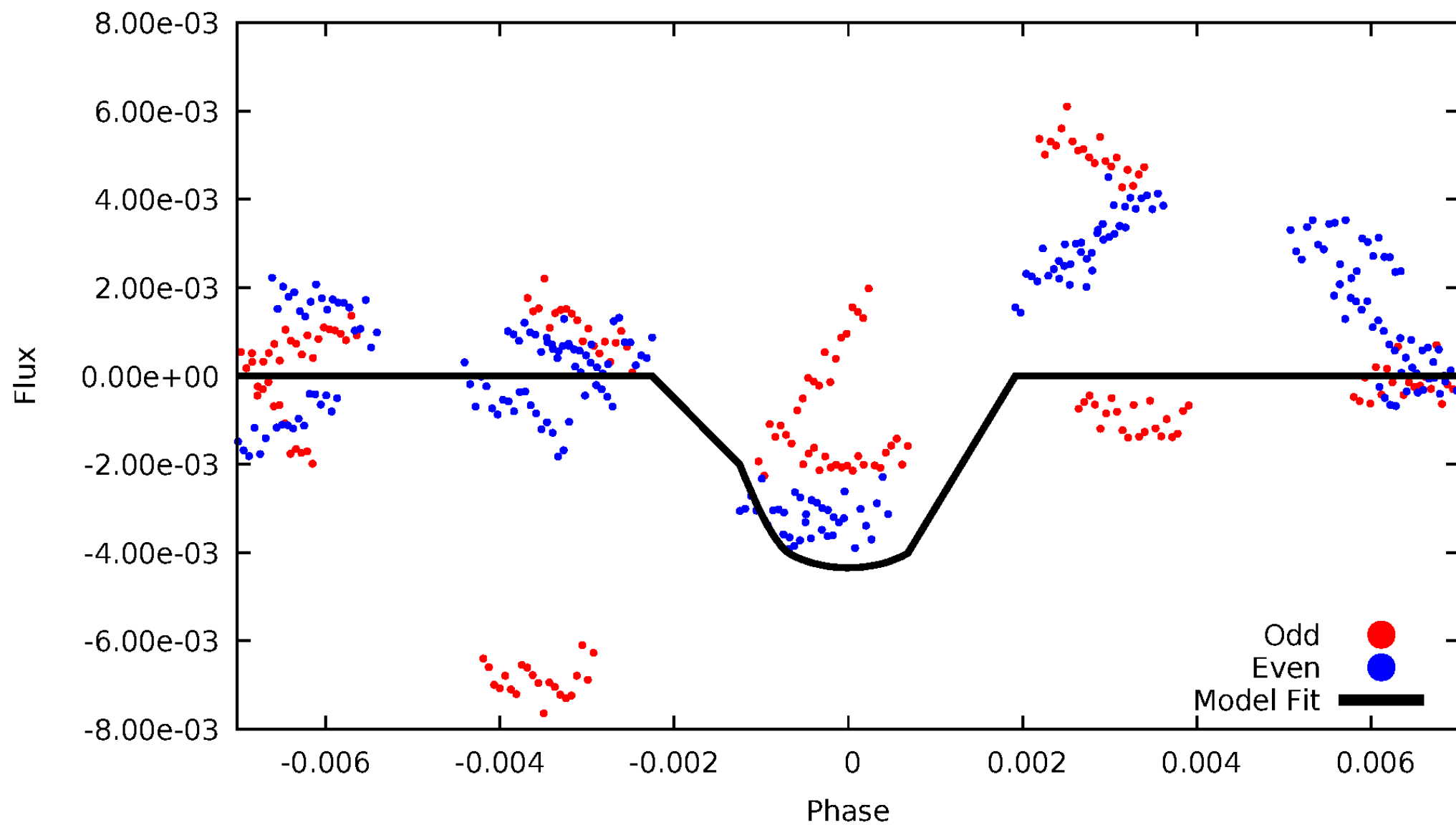


TCE 003647812-08



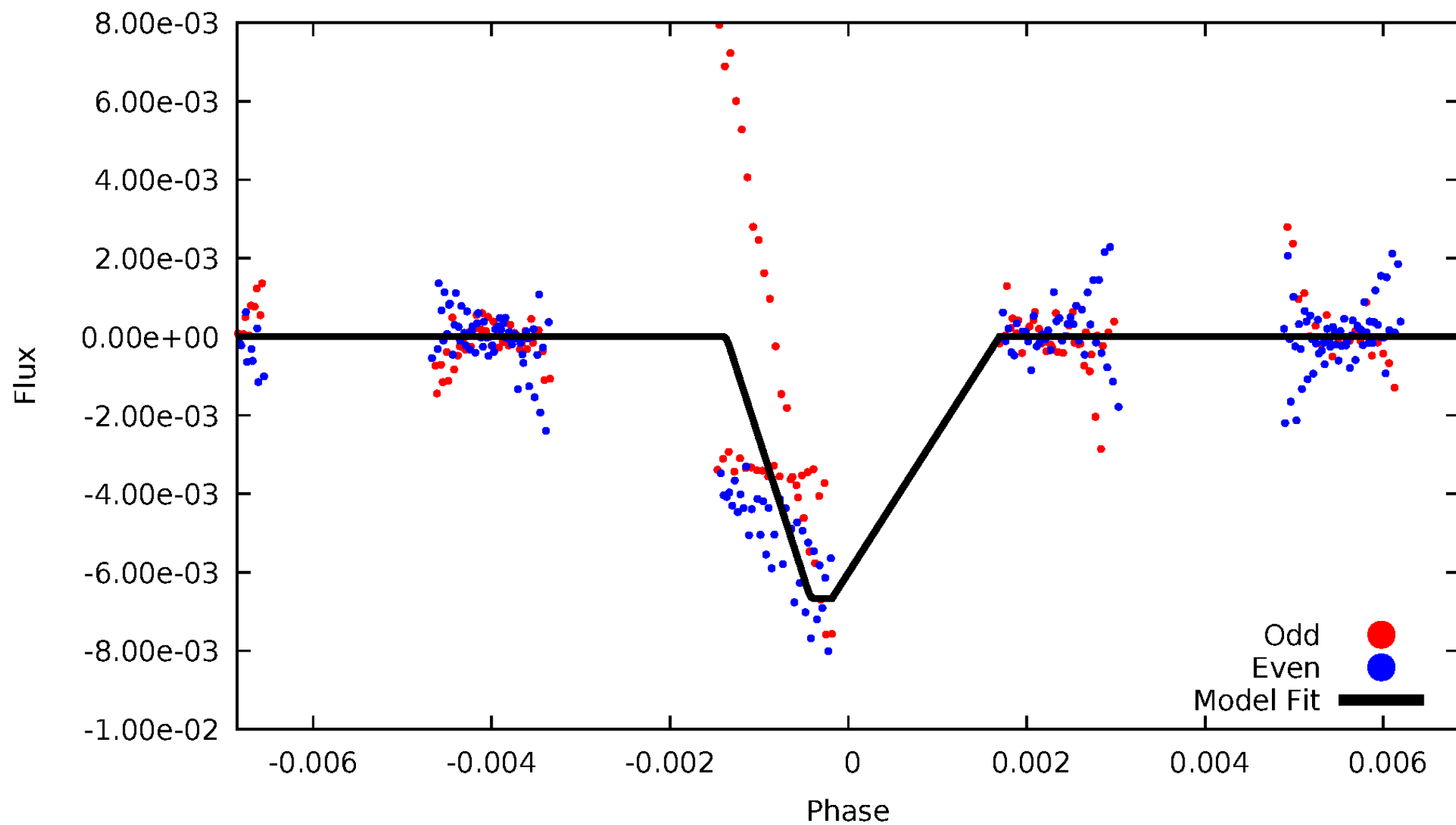
# DV Odd/Even

TCE 003647812-08



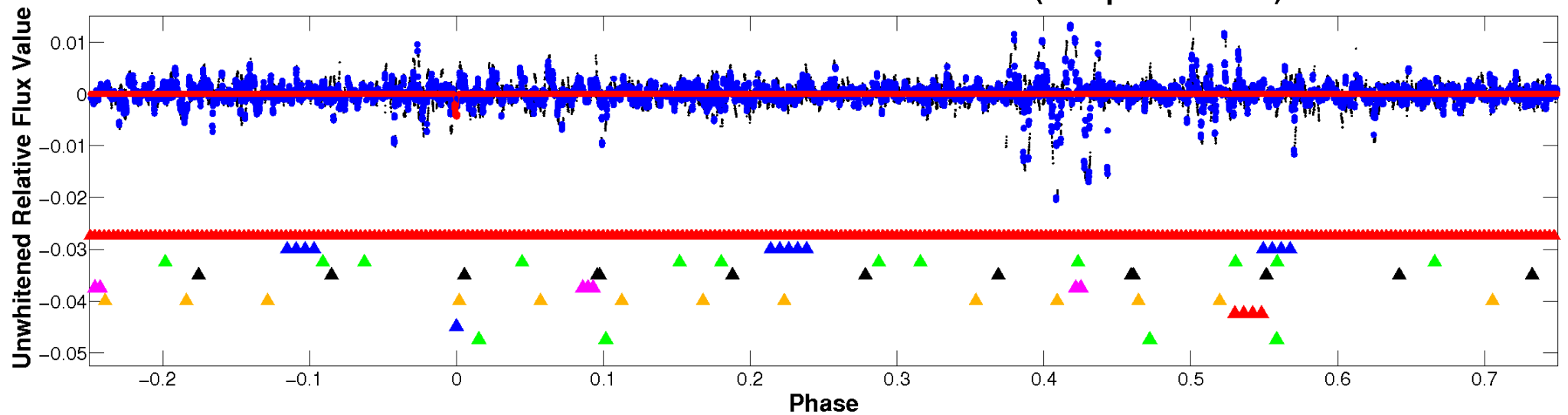
# ALT Odd/Even

TCE 003647812-08

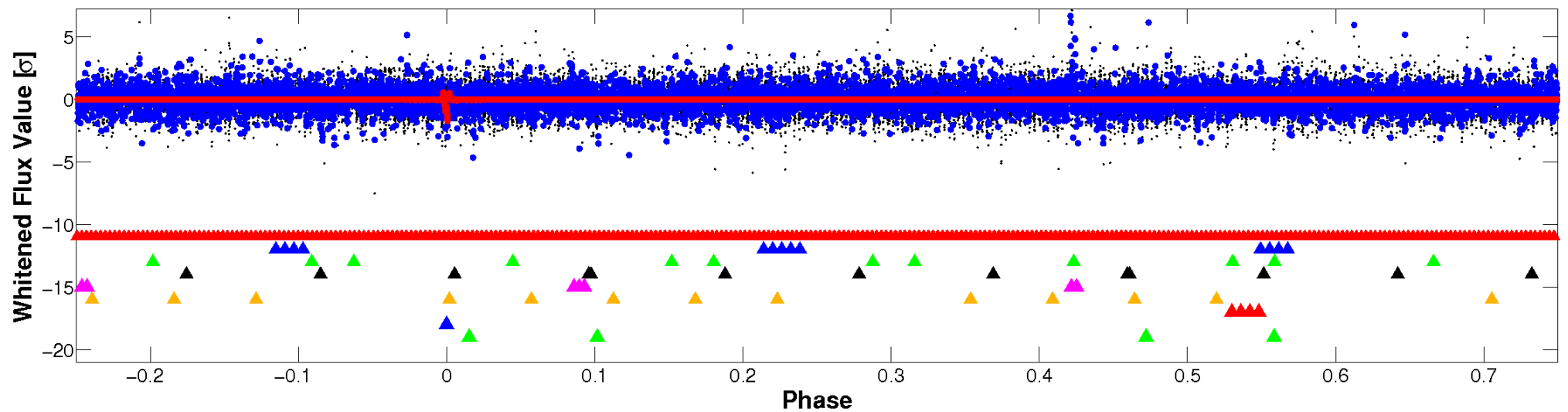


# Non-Whitened Vs. Whitened Light Curve

## Planet 8 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

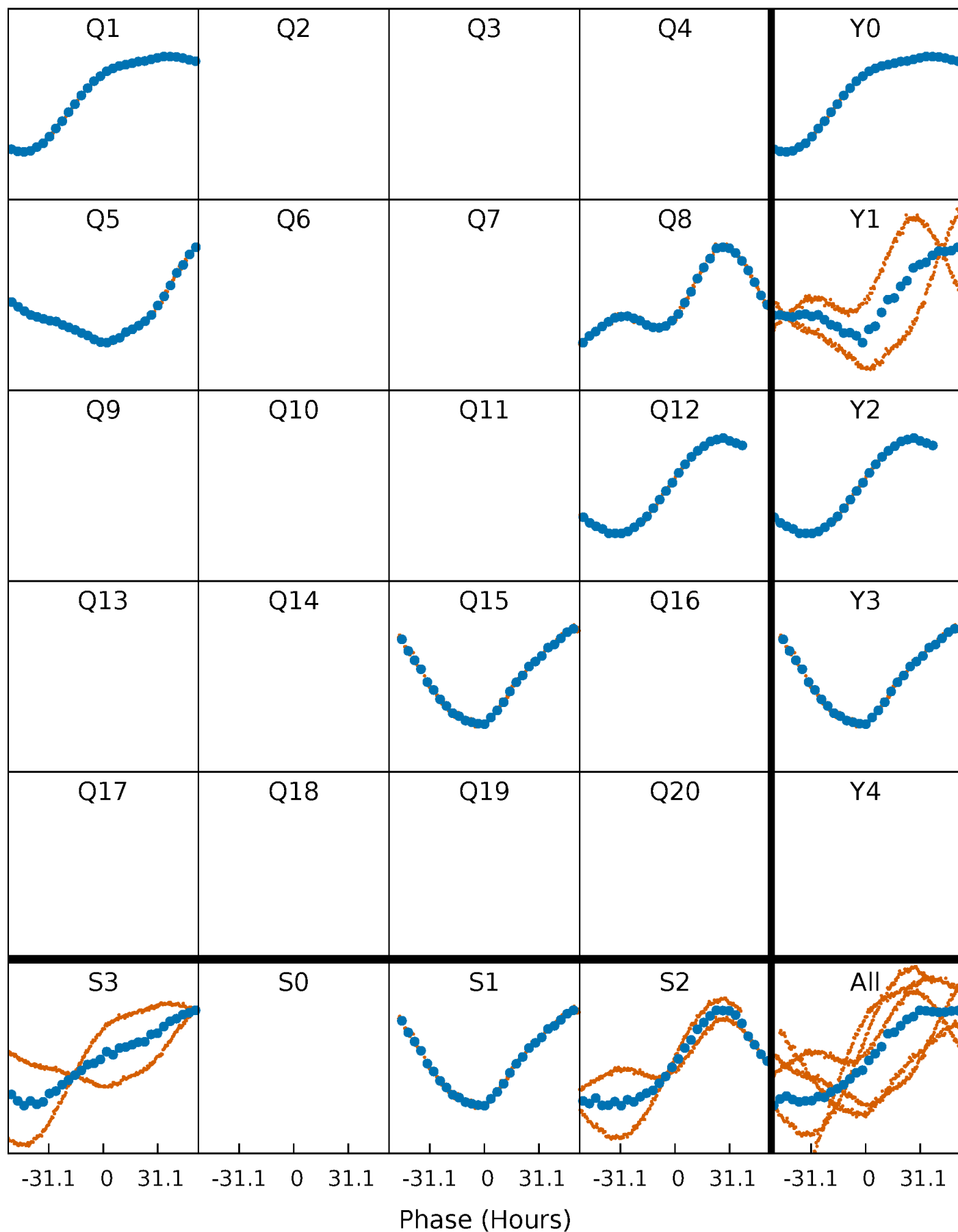


## Planet 8 : Phased Whitened Flux Time Series (Fit Epoch/Period)



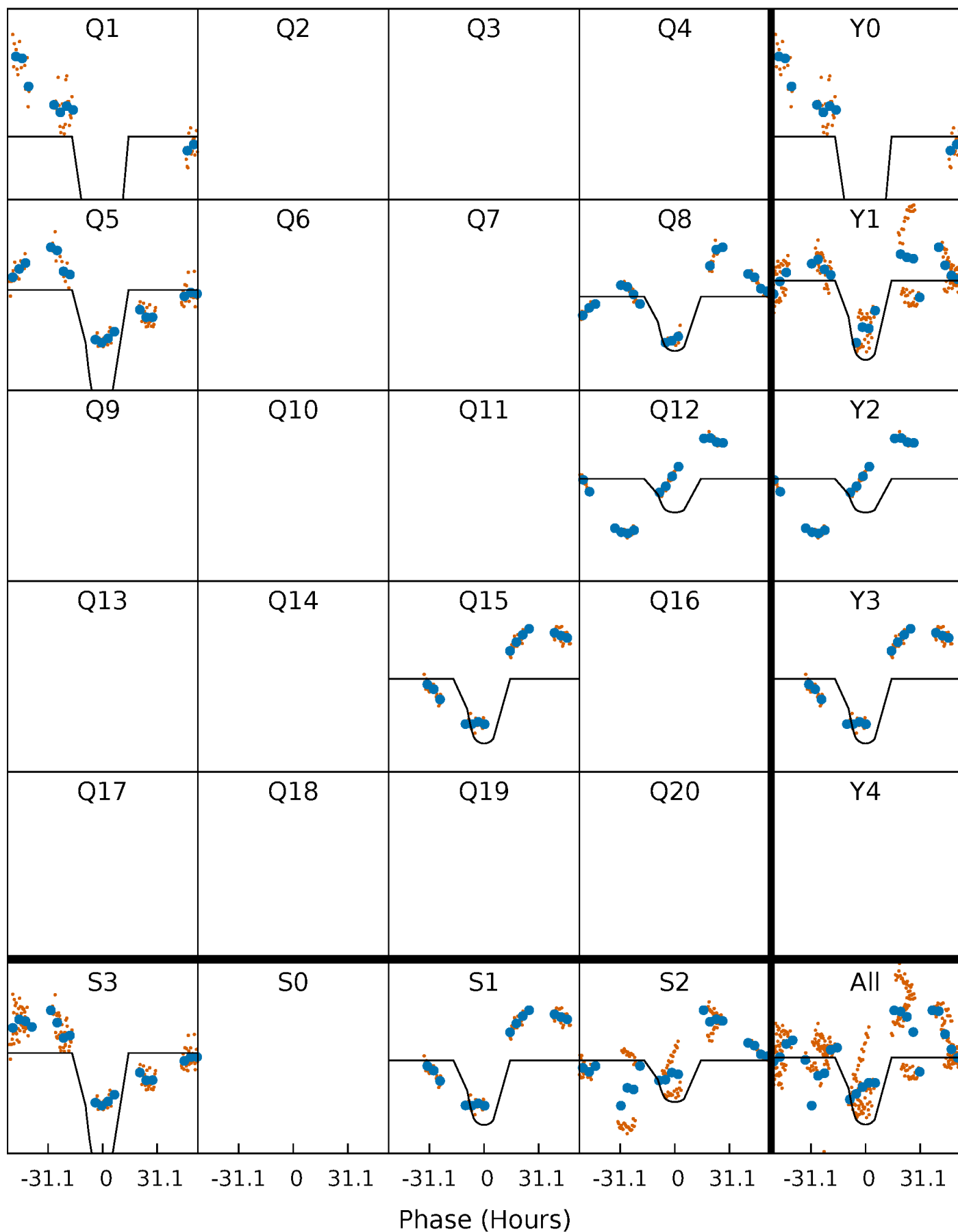
# PDC Quarter-Phased Transit Curves

TCE 003647812-08     $P=323.187877$  Days     $T_0=145.543042$  (BKJD)



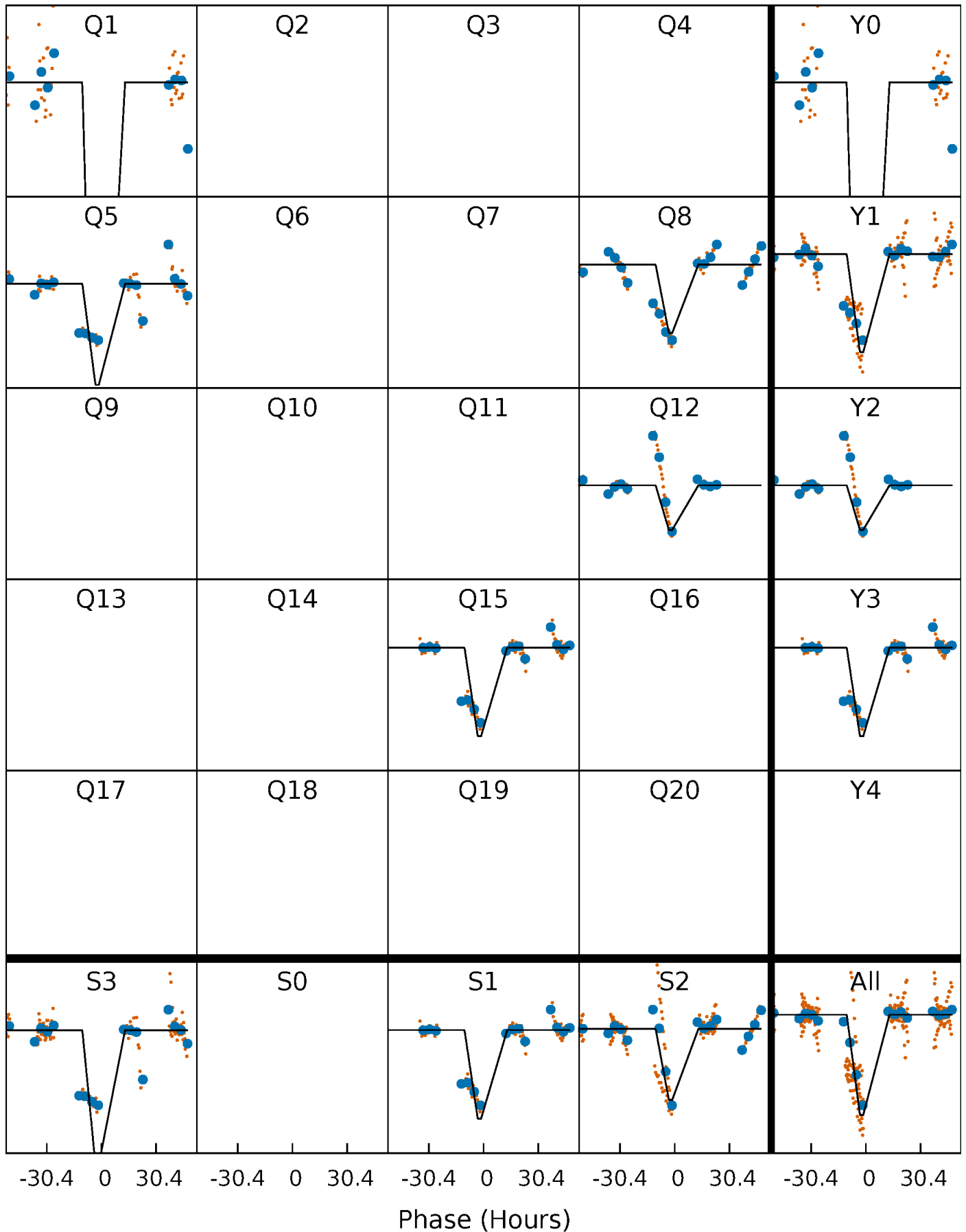
# DV Quarter-Phased Transit Curves

TCE 003647812-08     $P=323.187877$  Days     $T_0=145.543042$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 003647812-08     $P=323.102262$  Days     $T_0=145.934886$  (BKJD)

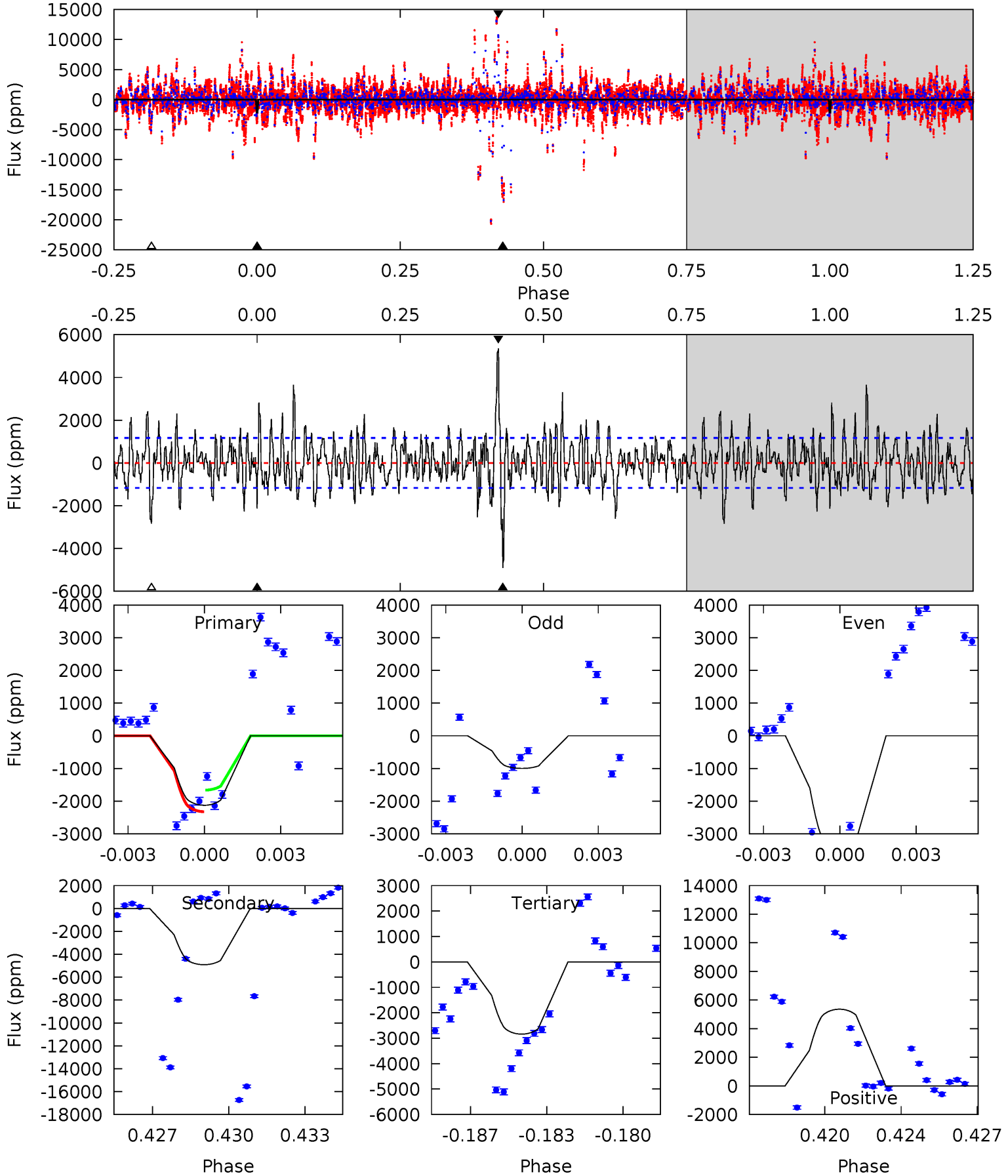




# DV Model-Shift Uniqueness Test

003647812-08, P = 323.187877 Days, E = 145.543042 Days

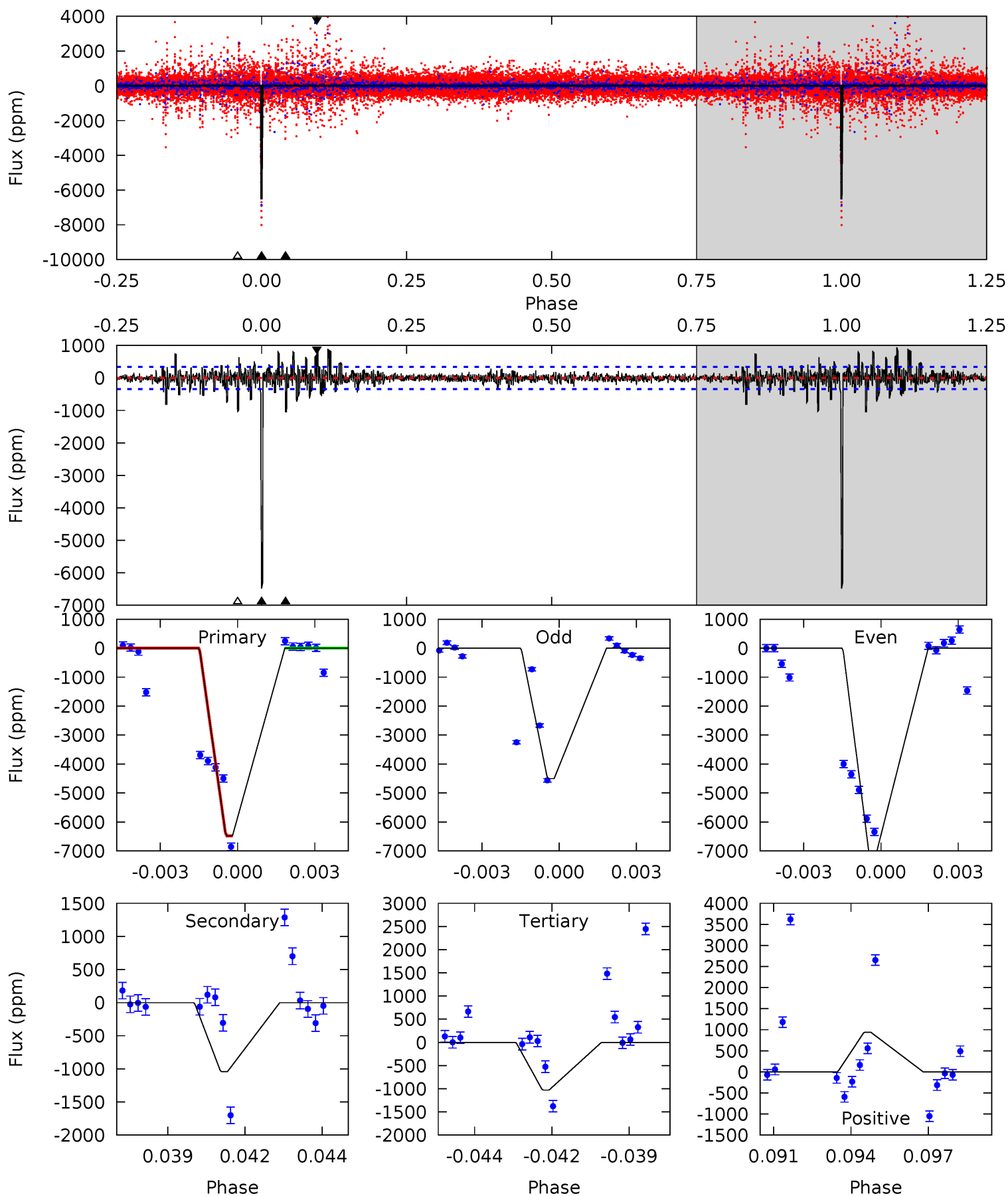
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.55	22.1	12.8	24.1	5.24	2.95	4.06	-3.21	-14.5	9.30	-2.02	5.15	0.84	0.52	1.33



# Alt Model-Shift Uniqueness Test

003647812-08, P = 323.102262 Days, E = 145.934886 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
99.7	16.1	15.8	14.5	5.27	2.99	1.82	83.9	85.2	0.22	1.56	20.0	0	0.13	0



### Stellar Parameters For KIC 003647812

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5534^{+166}_{-166}$	$4.504^{+0.066}_{-0.165}$	$-0.040^{+0.300}_{-0.300}$	$0.877^{+0.207}_{-0.095}$	$0.896^{+0.102}_{-0.083}$	$1.870^{+0.529}_{-0.824}$
	+3%/-3%	+1%/-4%	+750%/-750%	+24%/-11%	+11%/-9%	+28%/-44%
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 003647812-08 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-4911 \pm 223$	$7.11^{+1.13}_{-0.90}$	$343^{+20}_{-16}$	$5464^{+296}_{-278}$	$42270^{+12298}_{-10520}$
Alt.	$-1044 \pm 65$	$8.00^{+1.15}_{-0.91}$	$344^{+21}_{-15}$	$3846^{+140}_{-144}$	$7002^{+1968}_{-1569}$

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

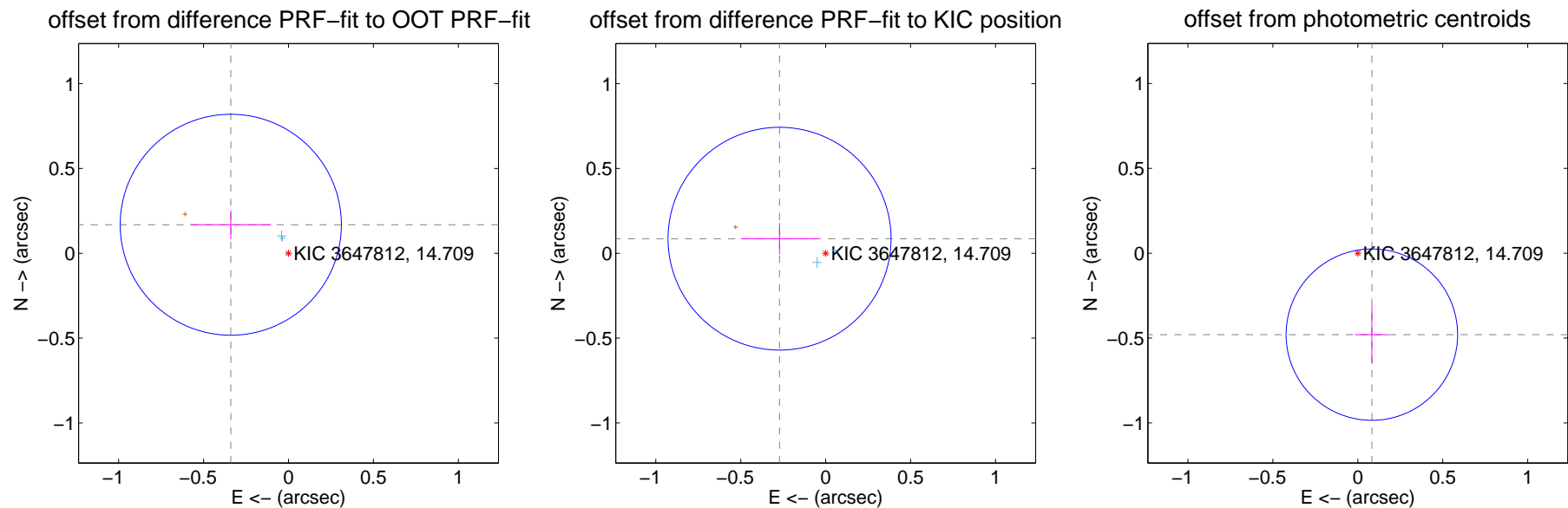
## DV Centroid Data

Supplemental centroid analysis for 003647812-08. Kepler magnitude: 14.71. Transit SNR 7.94

There are 2 quarters with good PRF difference image offsets

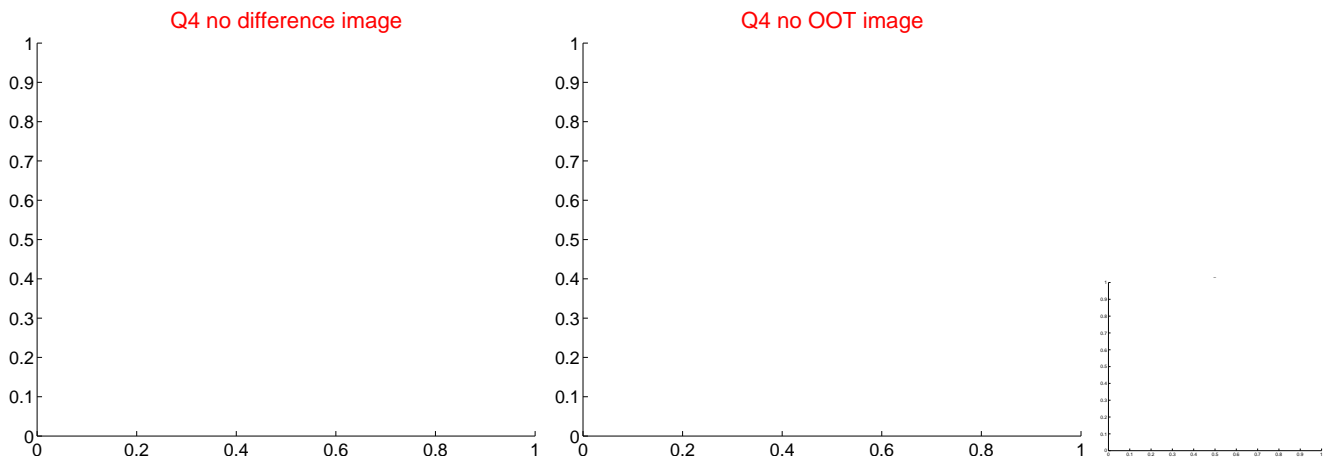
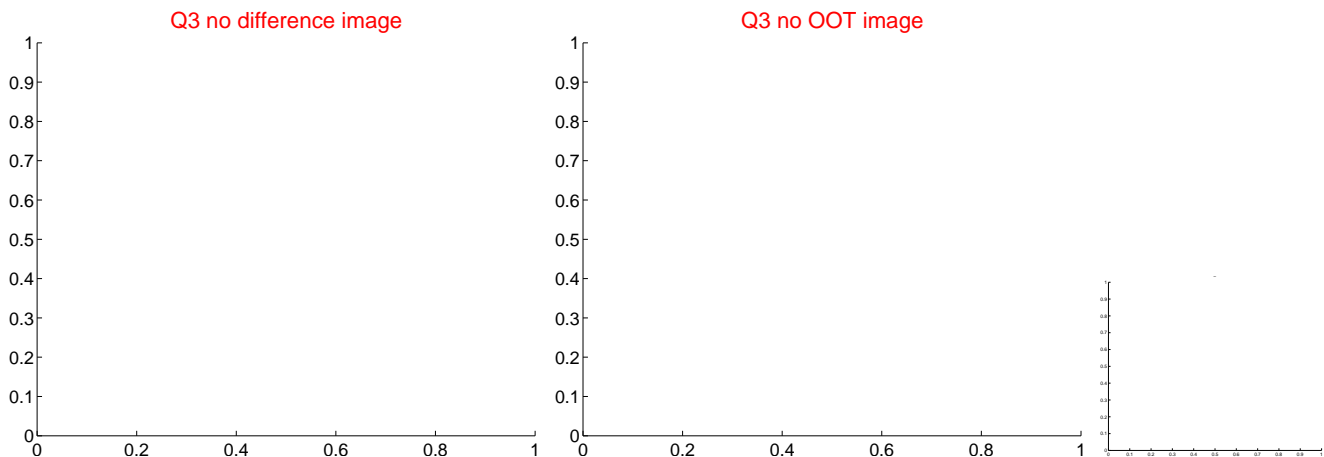
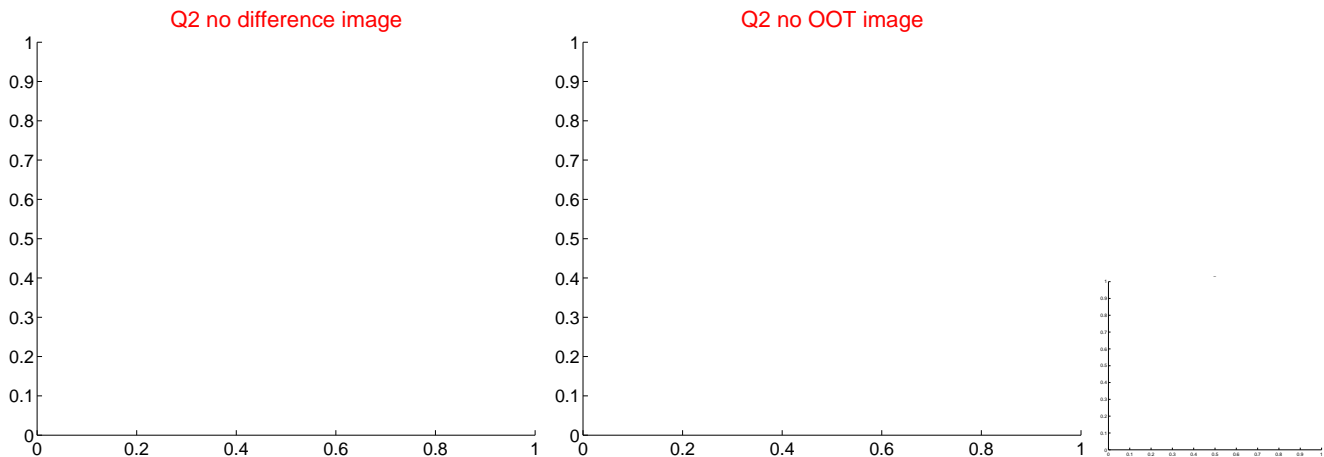
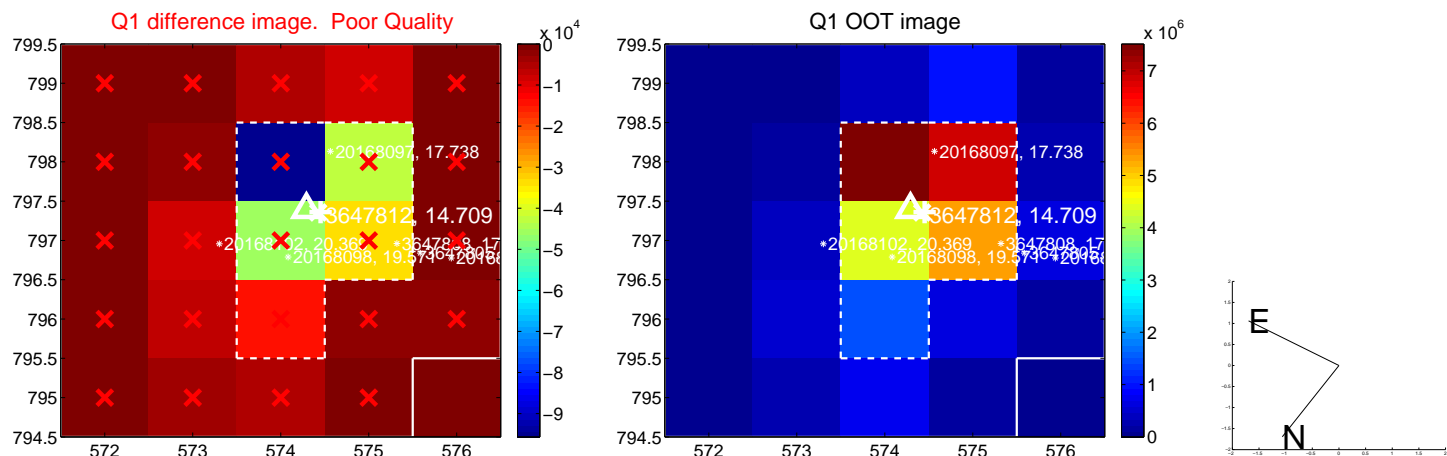
The direct PRF centroid is offset from the target star catalog position by about 0.16 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.379 \pm 0.217$	1.75	$0.340 \pm 0.238$	$0.168 \pm 0.086$
PRF-fit source offset from KIC position	$0.285 \pm 0.219$	1.30	$0.271 \pm 0.228$	$0.086 \pm 0.093$
photometric centroid source offset	$0.49 \pm 0.17$	2.89	$-0.08 \pm 0.10$	$-0.48 \pm 0.17$

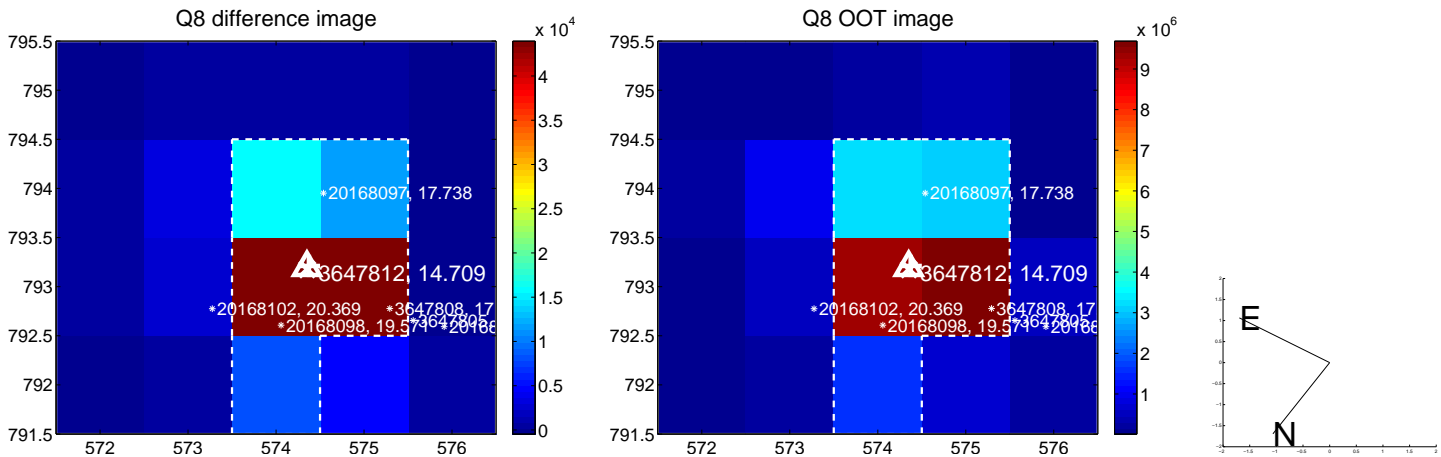
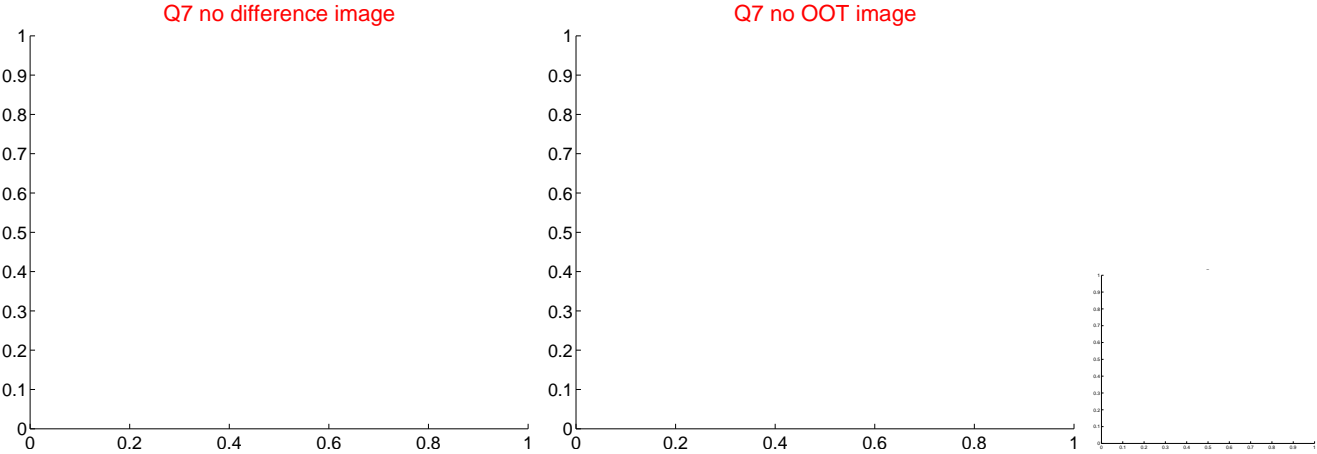
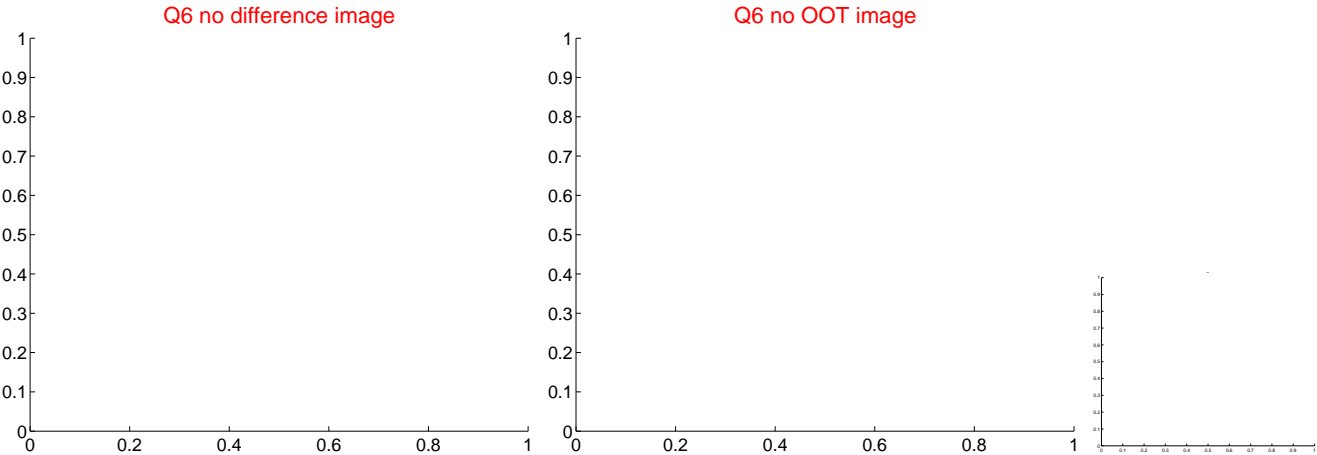
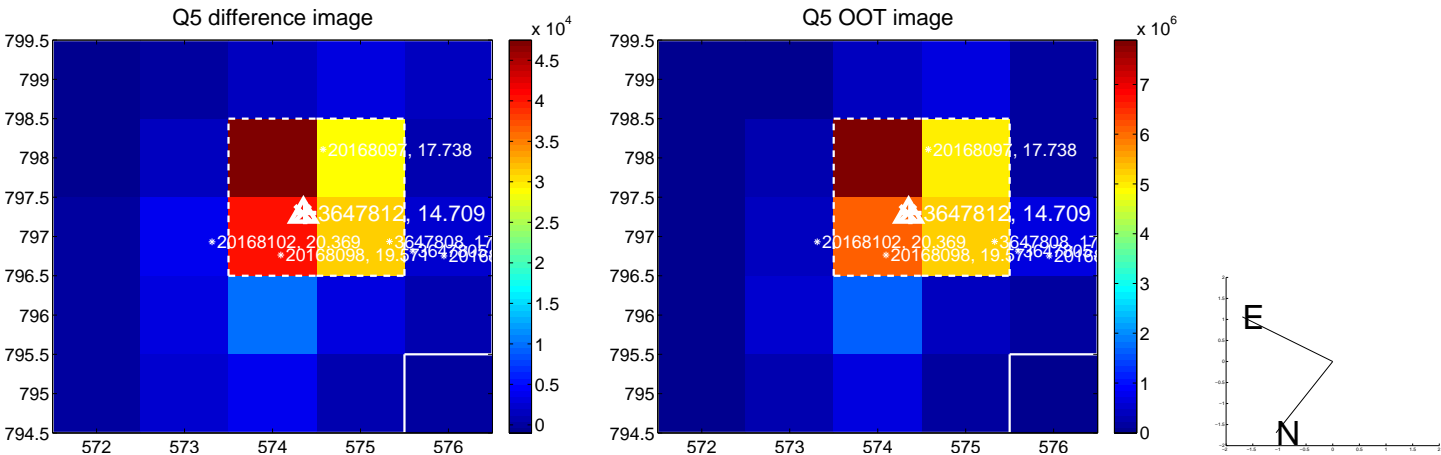


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

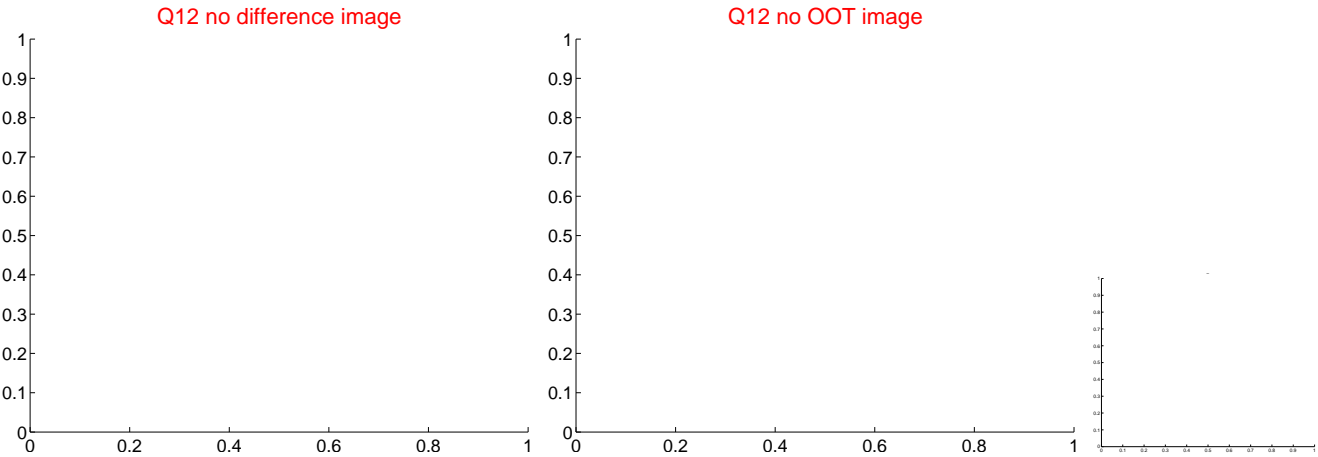
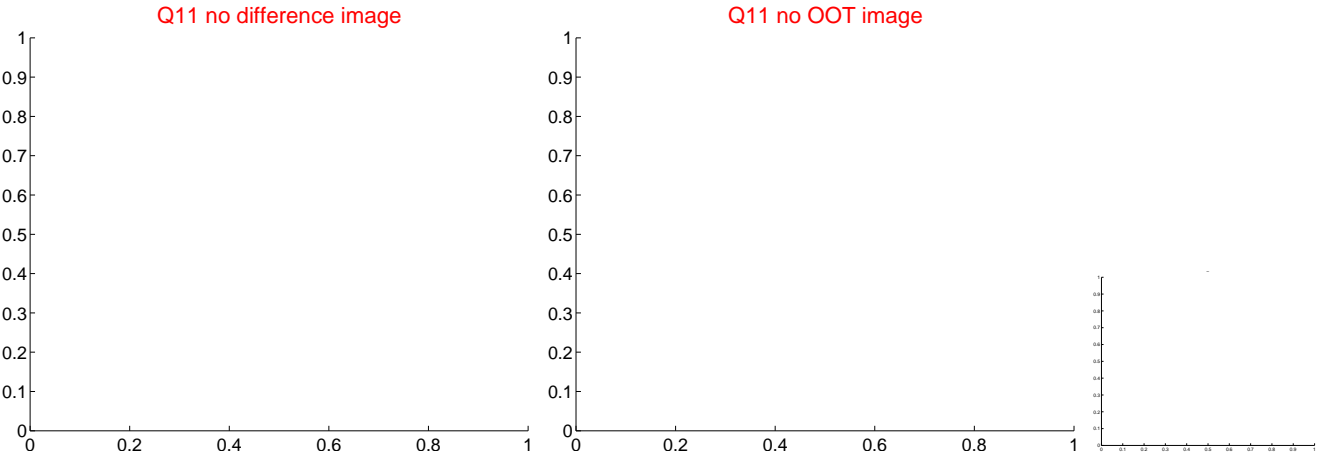
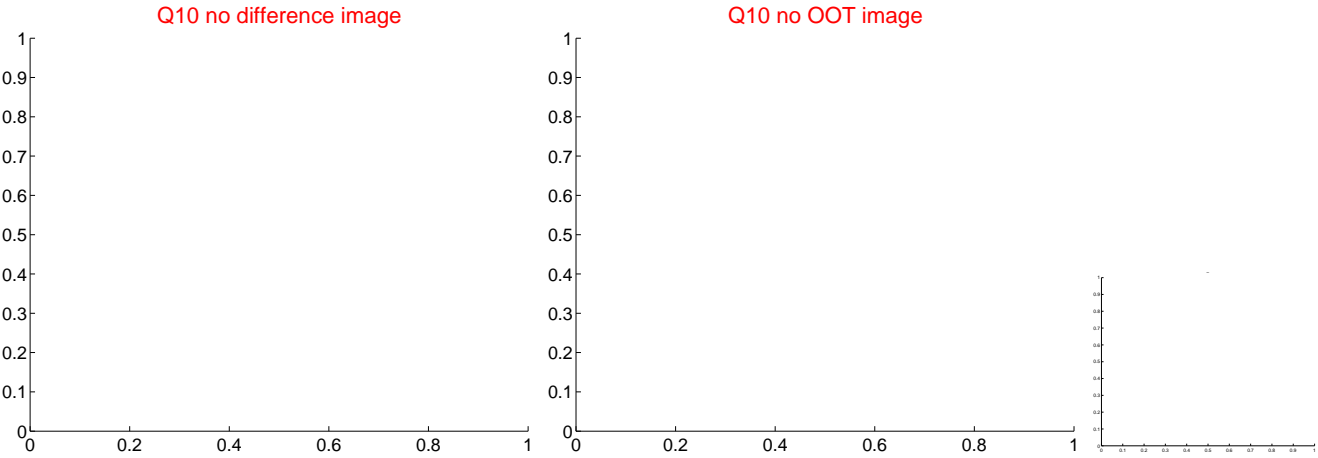
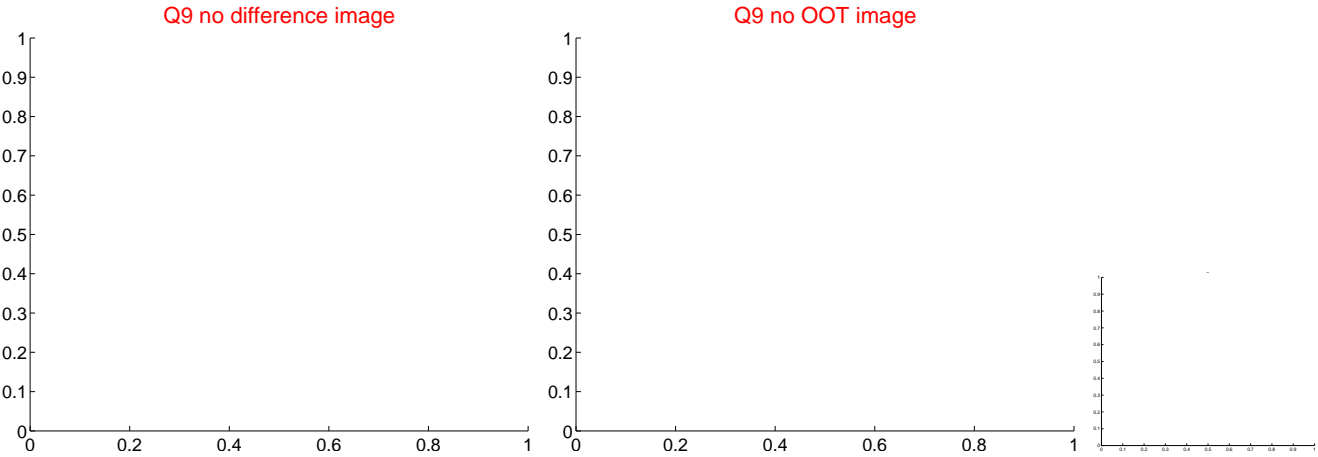
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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.

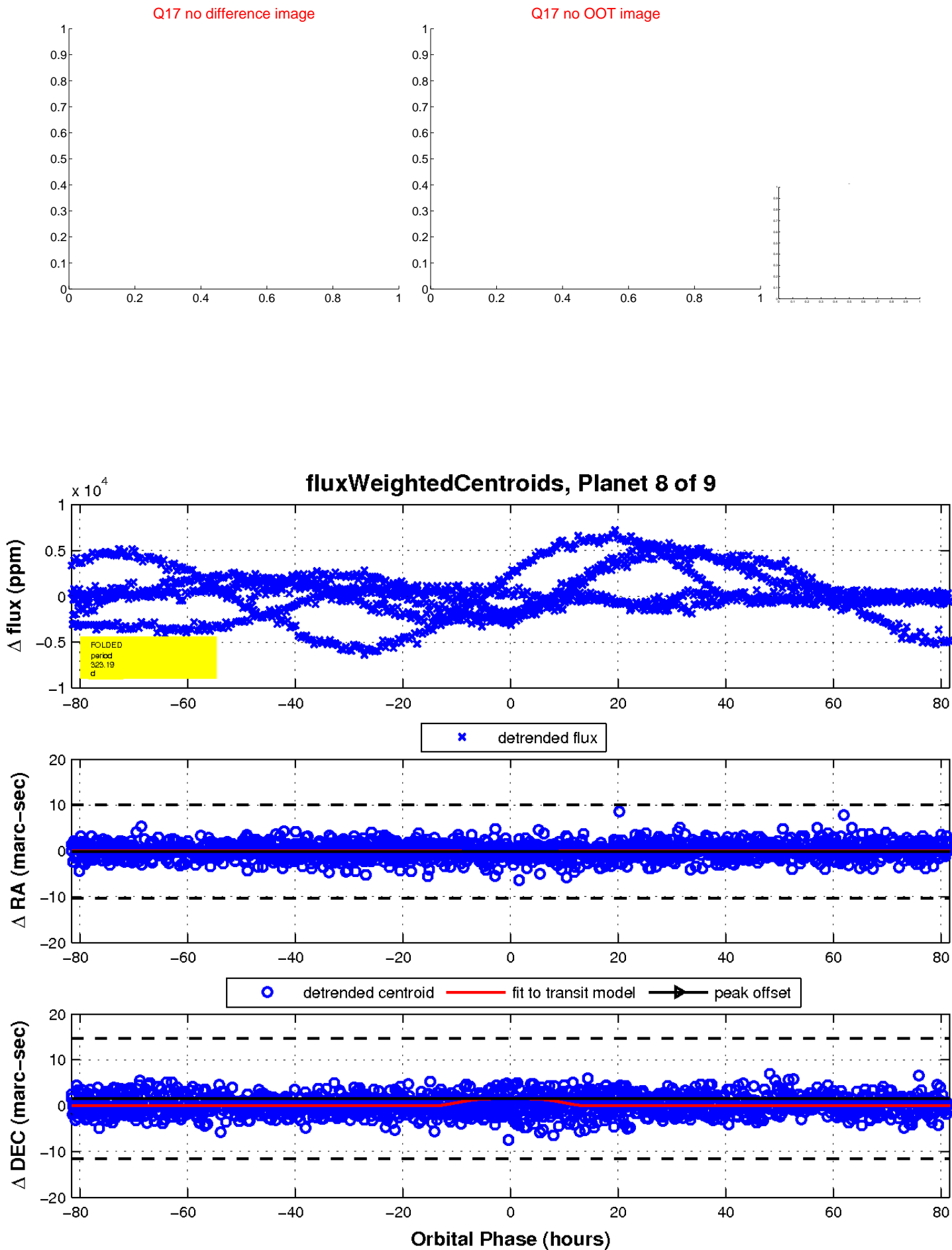


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





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



UKIRT Image

Declination

