

# KIC 010187590

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010187590-01	OBS	No	1.397736	131.711487	72.4	7.994	7.4	7.9	1.03	6108	0.87	2034.61
010187590-02	OBS	No	357.728536	370.052917	9001.2	28.767	15.6	11.8	1.03	6108	16.71	1.25
010187590-03	OBS	No	127.957031	175.181203	13.2	2.604	15.4	0.0	1.03	6108	0.43	4.93
010187590-04	OBS	No	127.988621	175.316389	367.8	3.052	15.2	1.8	1.03	6108	2.17	4.93
010187590-06	OBS	No	93.319103	176.224996	238.0	3.317	12.7	1.4	1.03	6108	1.83	7.51
010187590-07	OBS	No	134.800704	175.639855	1136.5	5.382	13.7	5.2	1.03	6108	6.67	4.60
010187590-08	OBS	No	75.908968	174.229818	670.4	0.657	12.2	2.1	1.03	6108	3.25	9.89

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010187590-01	OBS	FP	0.00	1	0	0	0	LPP_DV
010187590-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS
010187590-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010187590-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—SAME_NTL_PERIOD—CENT_FEW_DIFFS
010187590-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
010187590-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010187590-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_MEAS

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

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

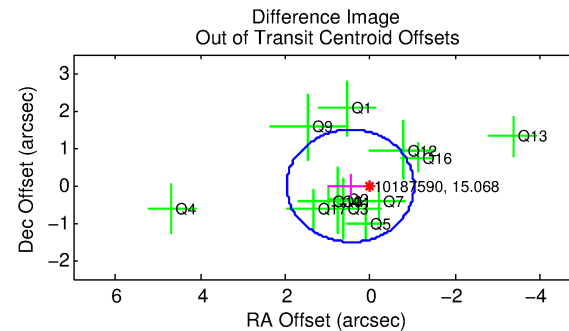
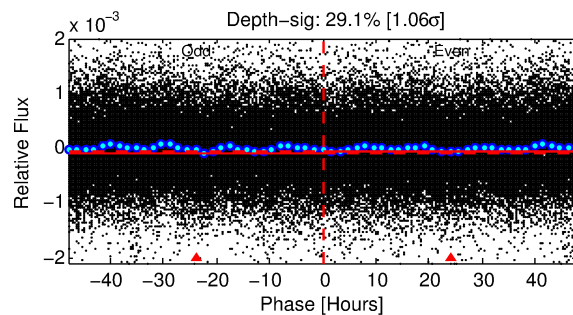
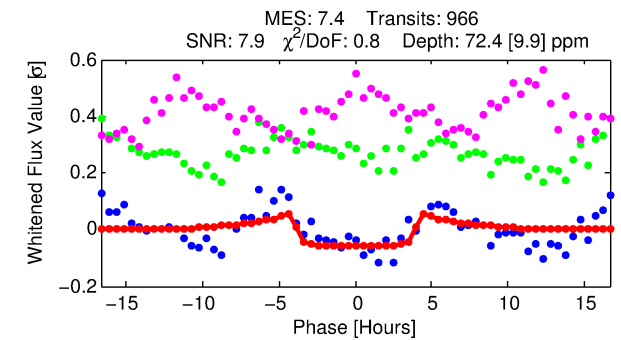
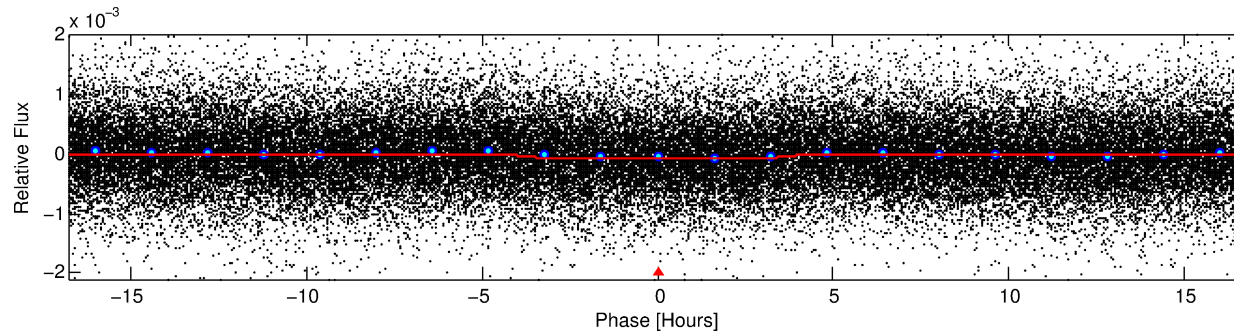
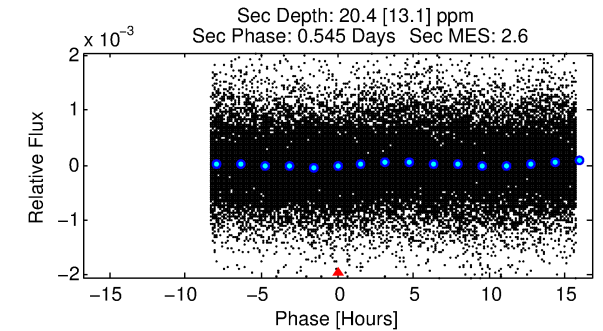
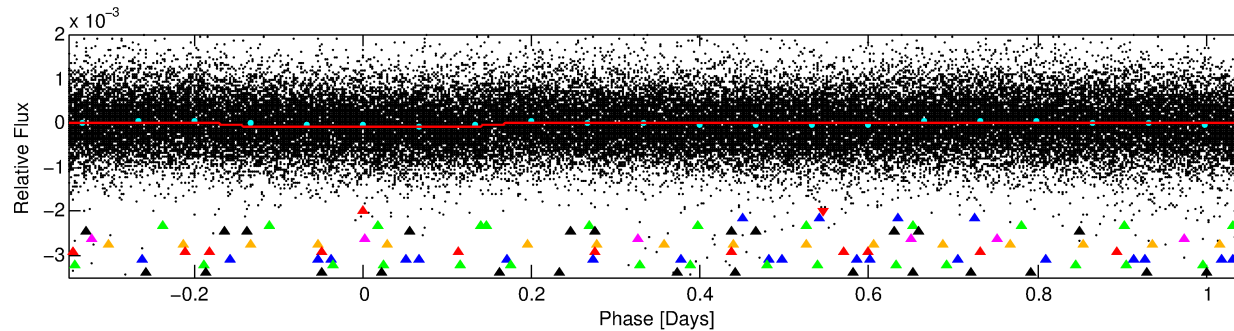
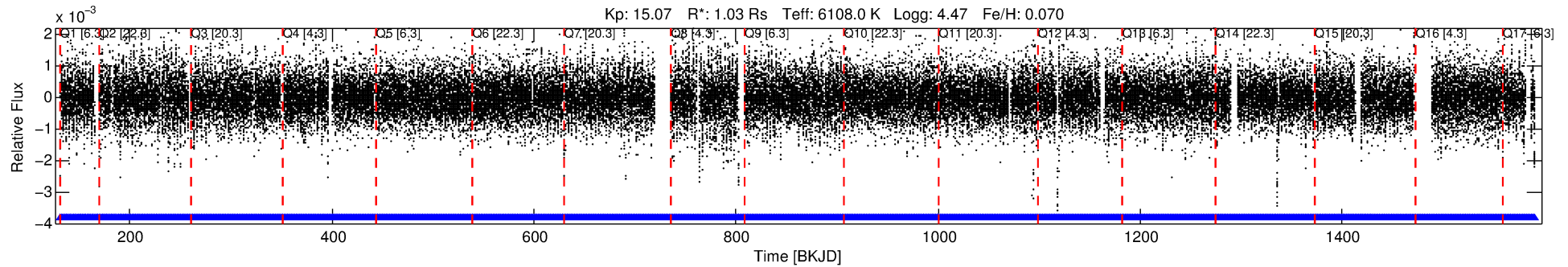
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 010187590-01

No Significant Match Found

# DV One-Page Summary

KIC: 10187590 Candidate: 1 of 10 Period: 1.398 d



## DV Fit Results:

Period = 1.39774 [0.00002] d  
Epoch = 131.7115 [0.0051] BKJD  
Rp/R\* = 0.0078 [0.0100]  
a/R\* = 1.48 [4.94]  
b = 0.01 [785.18]  
Seff = 2034.61 [777.21]  
Teq = 1713 [164] K  
Rp = 0.87 [1.15] Re  
a = 0.0255 [0.0063] AU  
Ag = 9.60 [25.69] [0.33σ]  
Teffp = 4660 [3096] K [0.95σ]

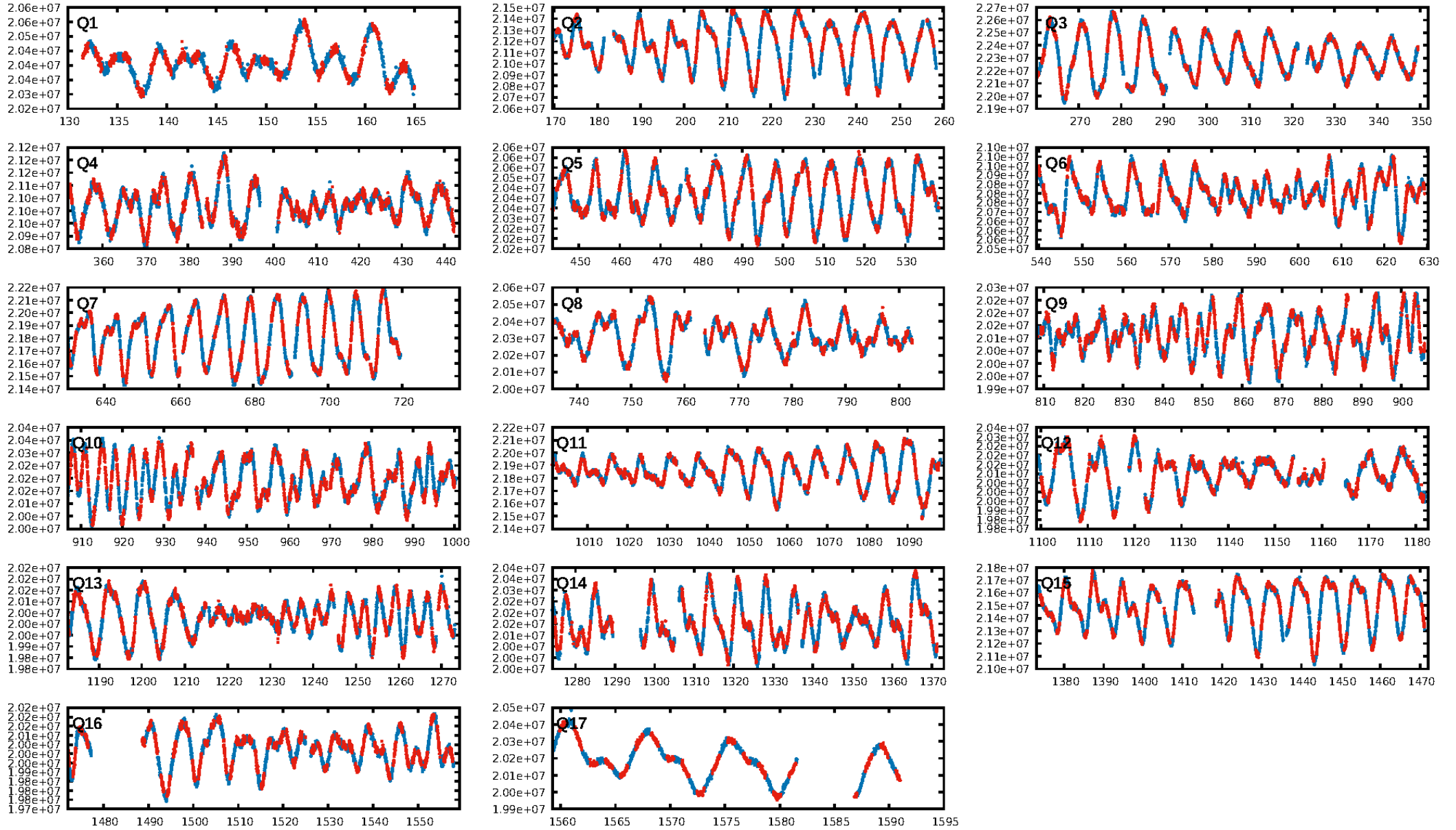
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [222.96σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [922/922]  
**GhostDiagnostic-chr: 0.3407**  
Centroid-sig: 52.8%  
Centroid-so: 1.186 arcsec [1.38σ]  
OotOffset-rm: 0.461 arcsec [0.92σ]  
KicOffset-rm: 0.367 arcsec [0.75σ]  
OotOffset-st: 2/3/3/5 [13]  
KicOffset-st: 2/3/3/5 [13]  
DiffImageQuality-fgm: 0.62 [8/13]  
DiffImageOverlap-fno: 1.00 [17/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 14:43:39 Z

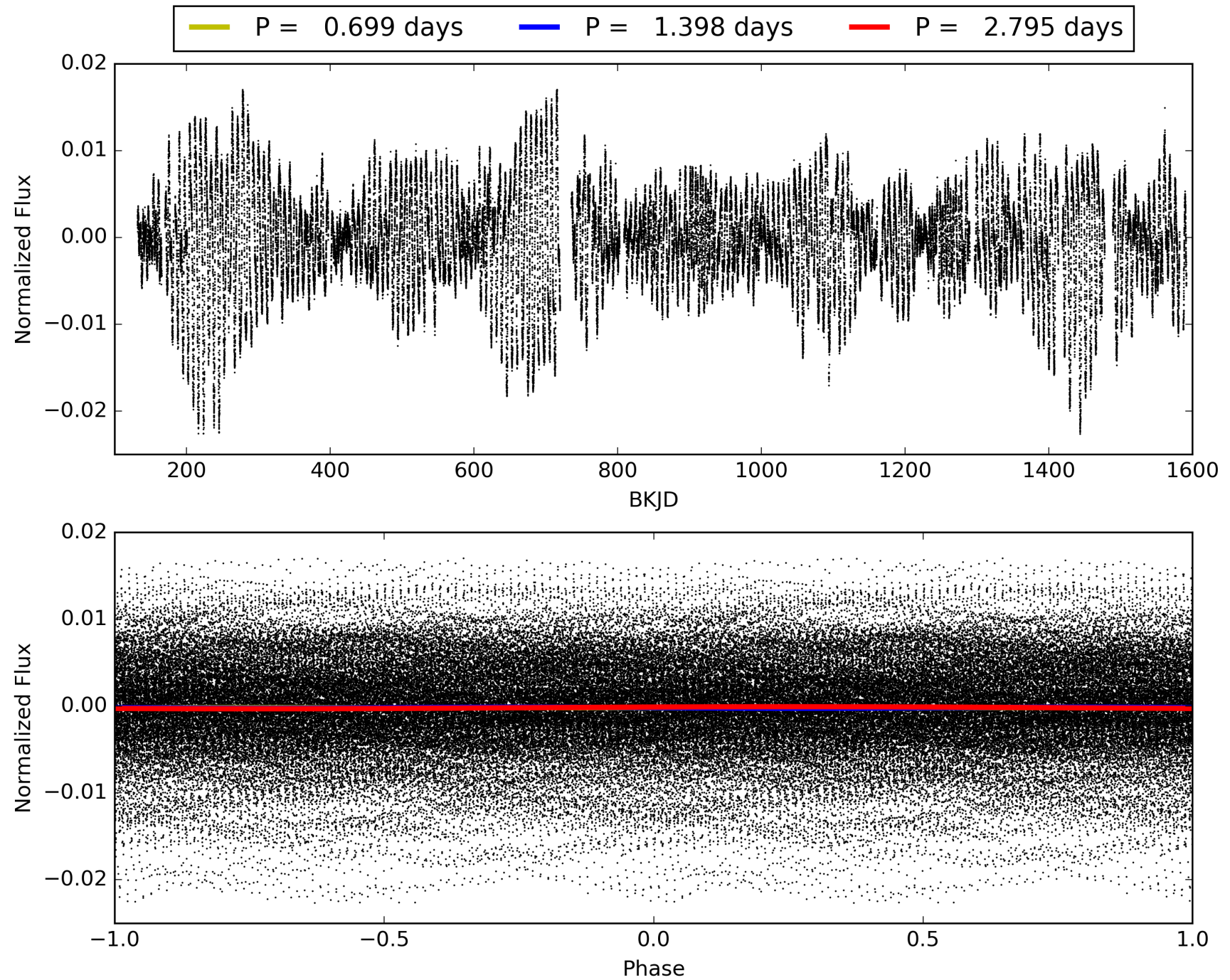
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 010187590-01, PDC Light Curves





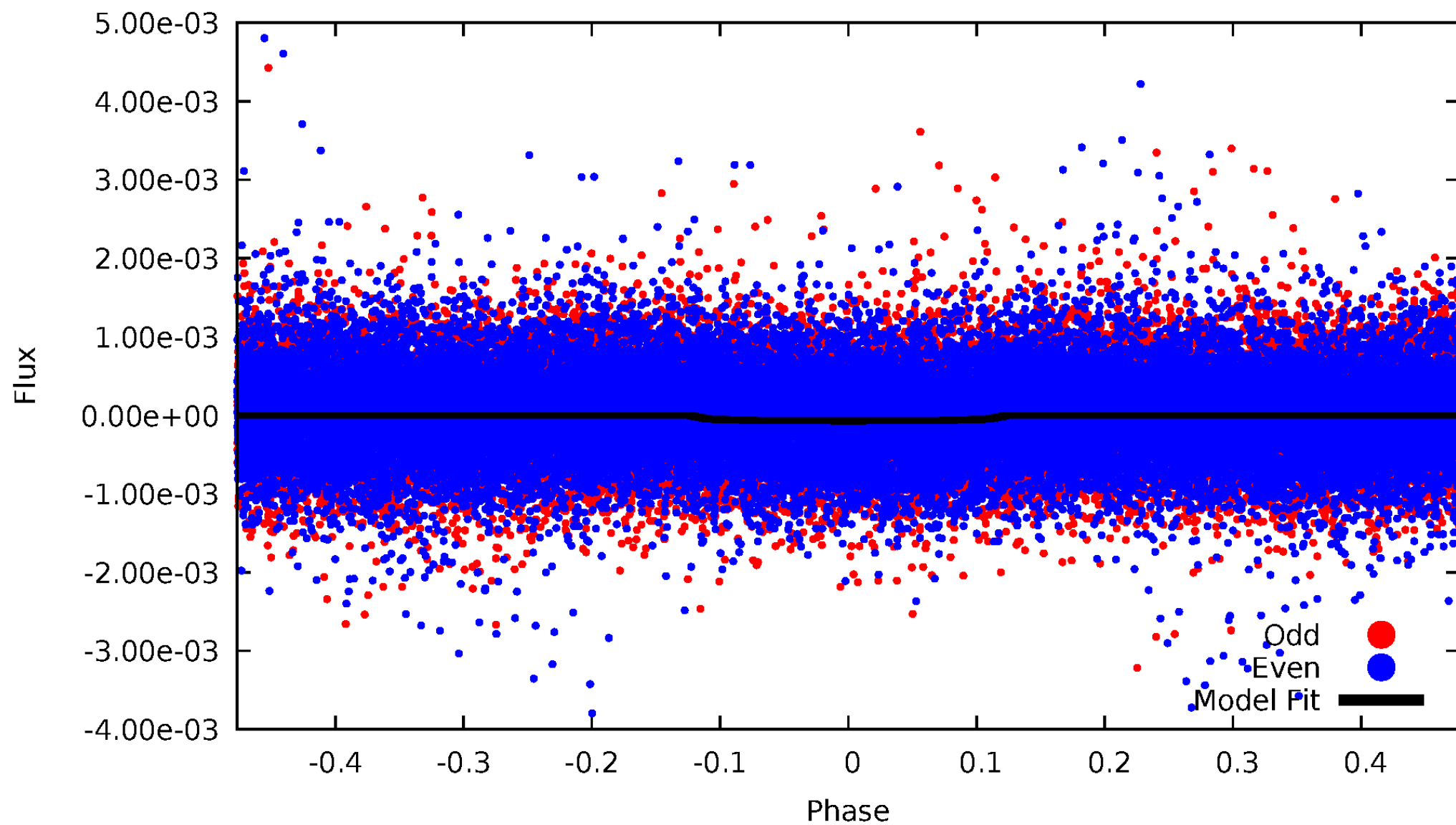
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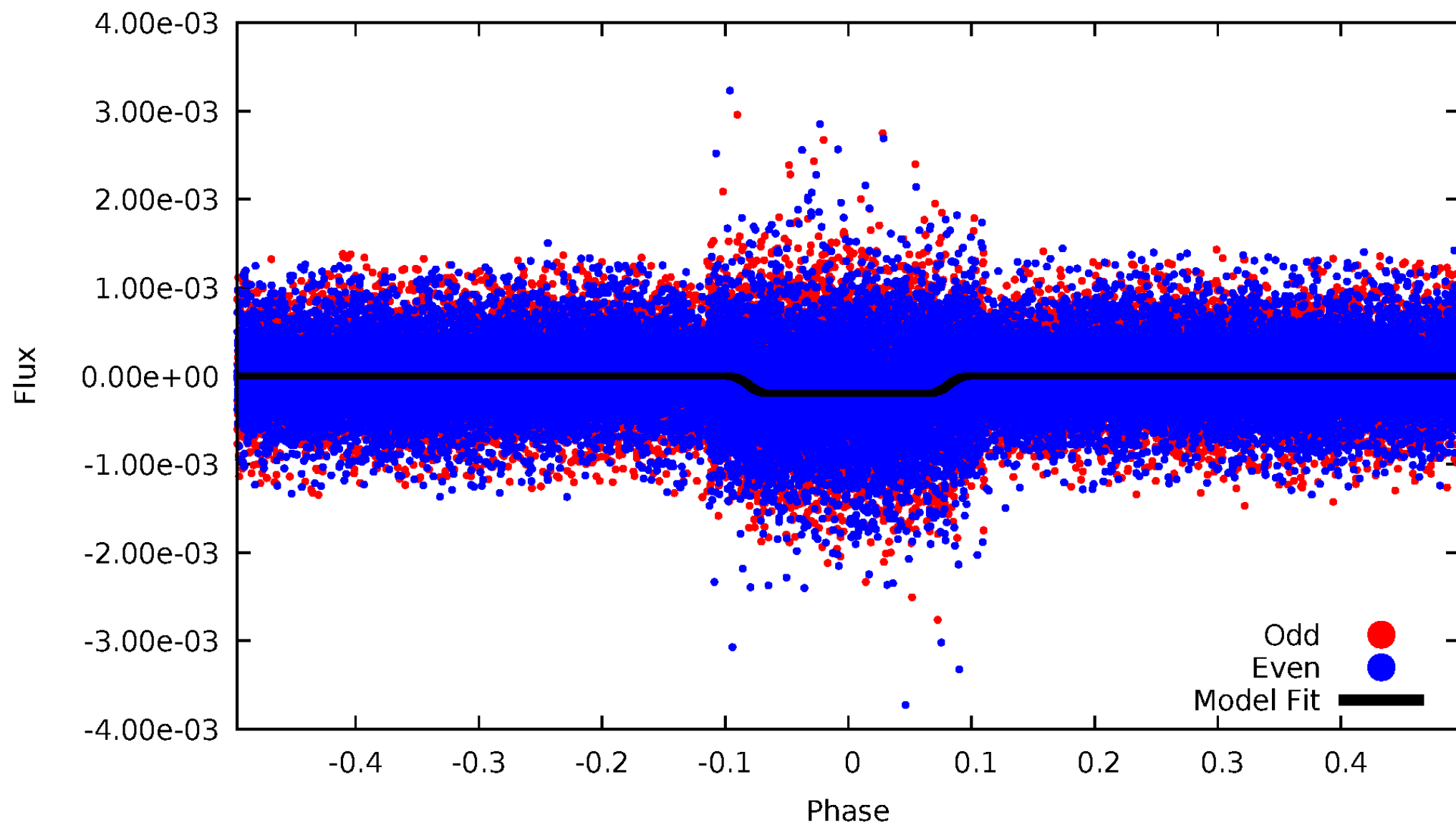
# DV Odd/Even

TCE 010187590-01



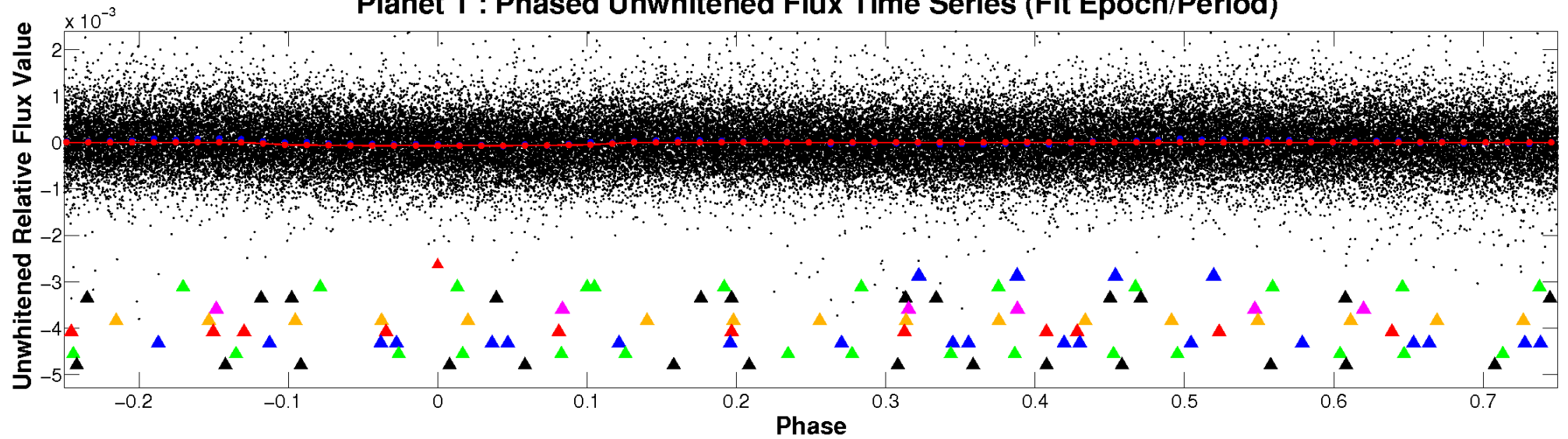
# ALT Odd/Even

TCE 010187590-01

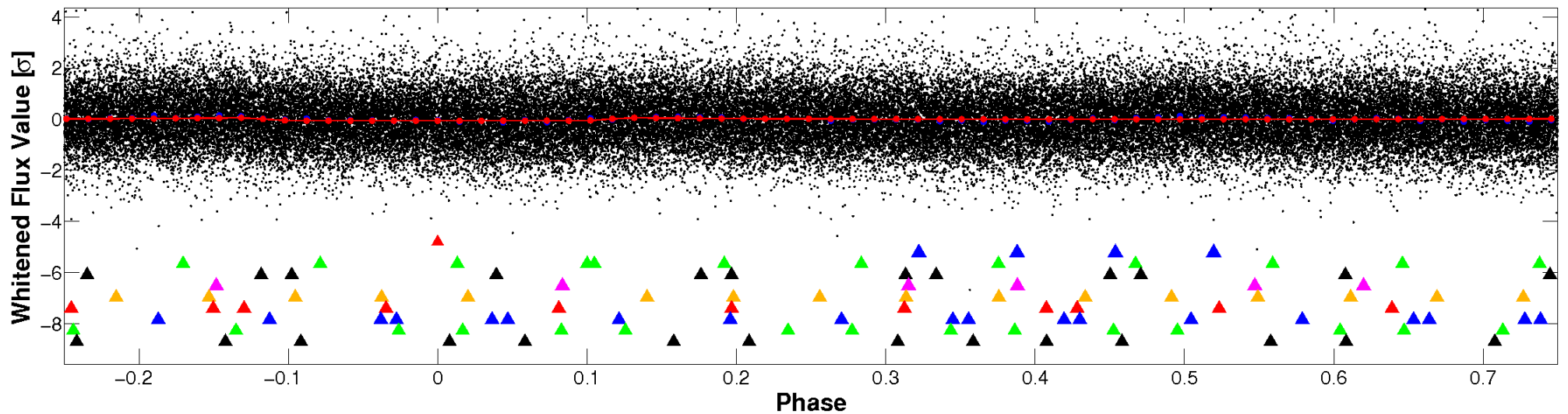


# Non-Whitened Vs. Whitened Light Curve

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



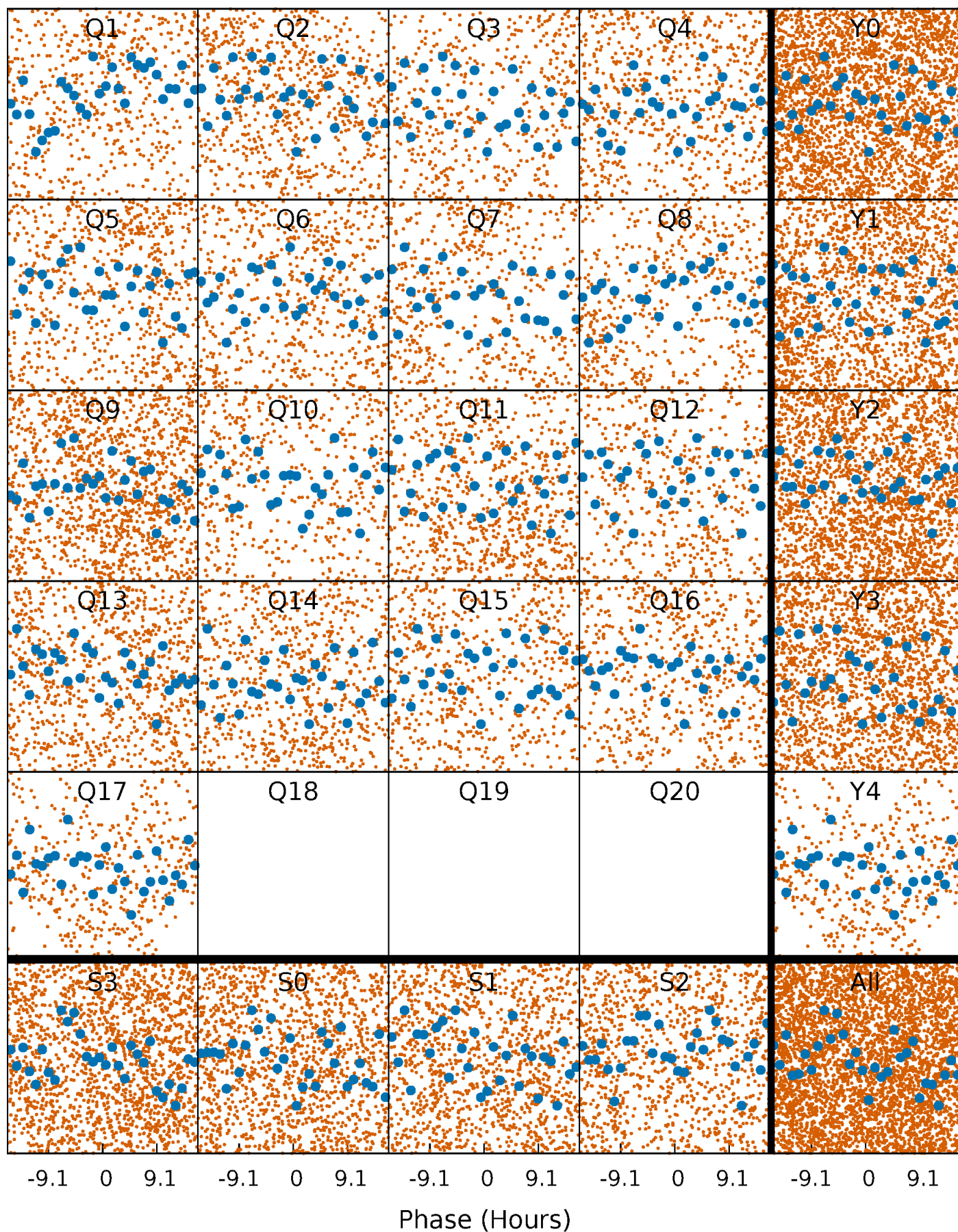
**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**





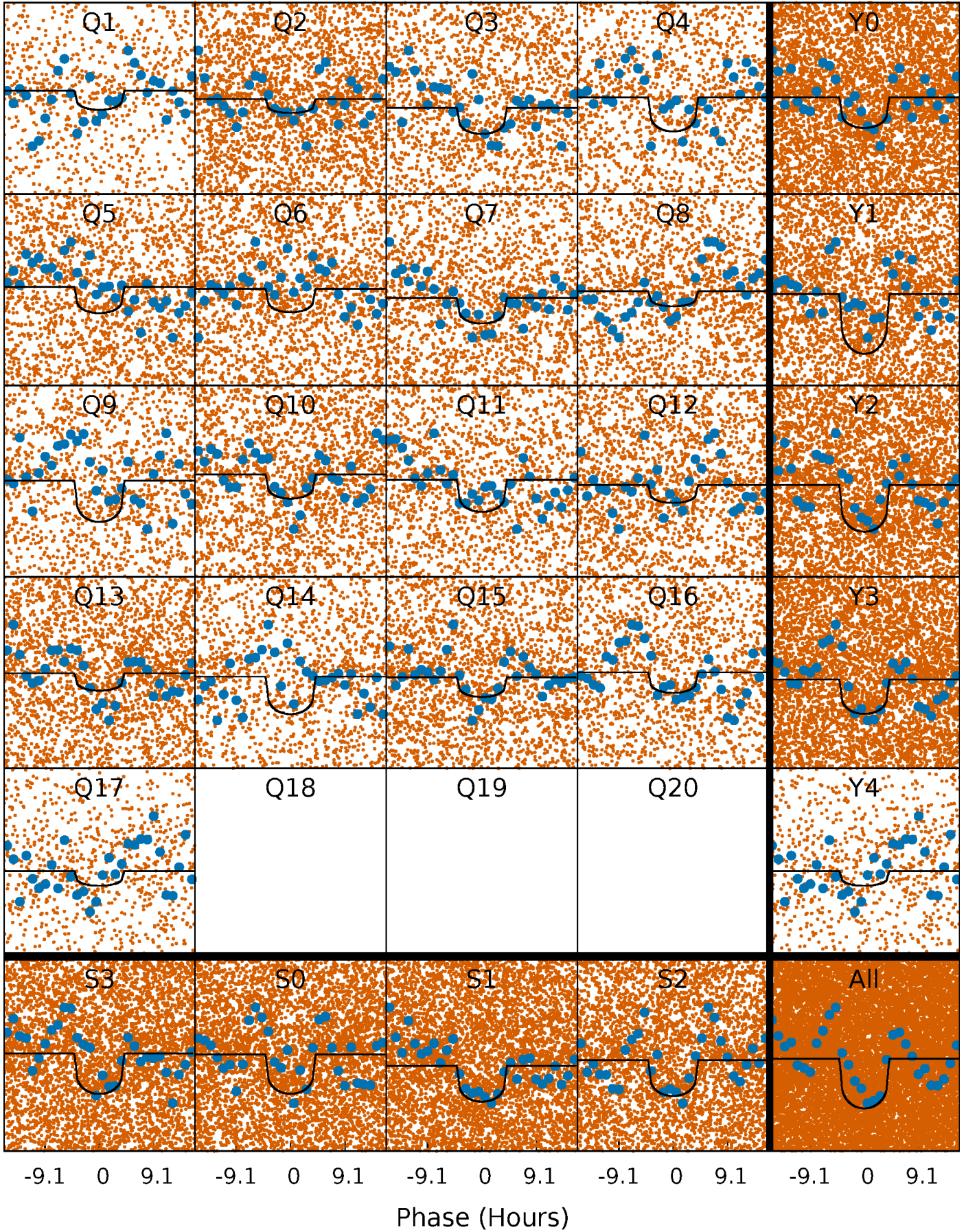
# PDC Quarter-Phased Transit Curves

TCE 010187590-01 P= 1.397736 Days  $T_0=131.711487$  (BKJD)



# DV Quarter-Phased Transit Curves

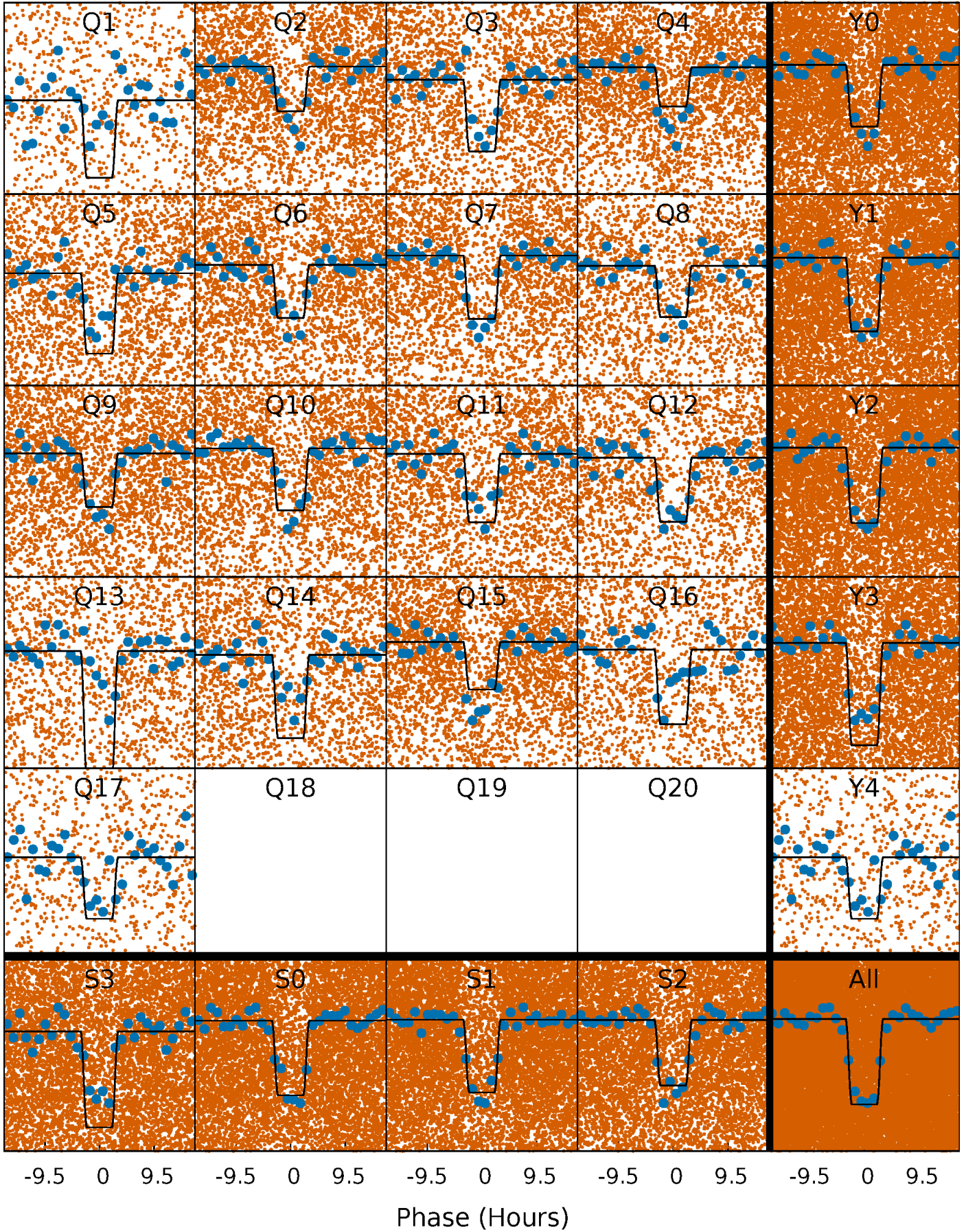
TCE 010187590-01 P= 1.397736 Days  $T_0=131.711487$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

TCE 010187590-01 P= 1.397646 Days  $T_0=131.780871$  (BKJD)

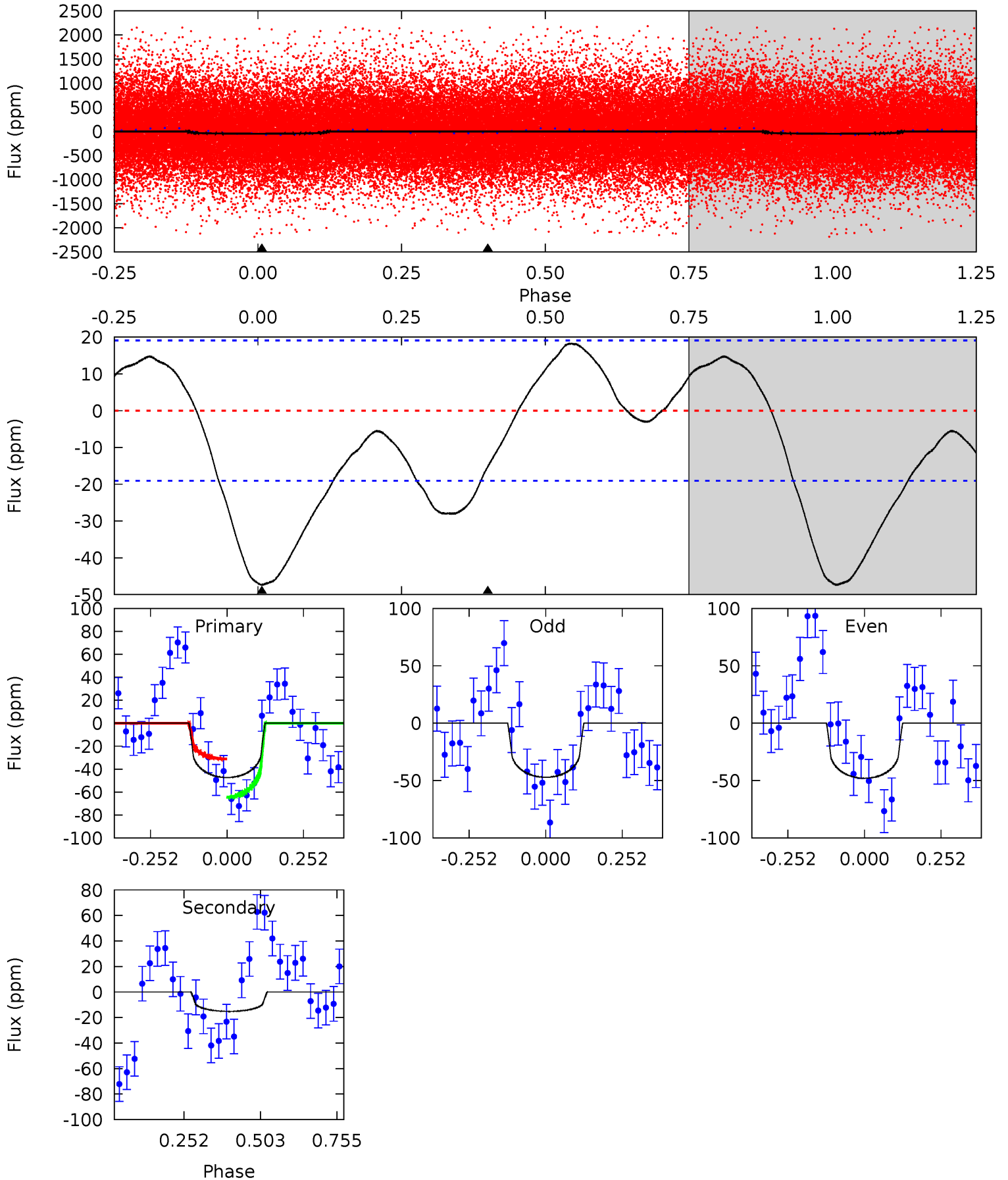




# DV Model-Shift Uniqueness Test

010187590-01, P = 1.397736 Days, E = 130.313751 Days

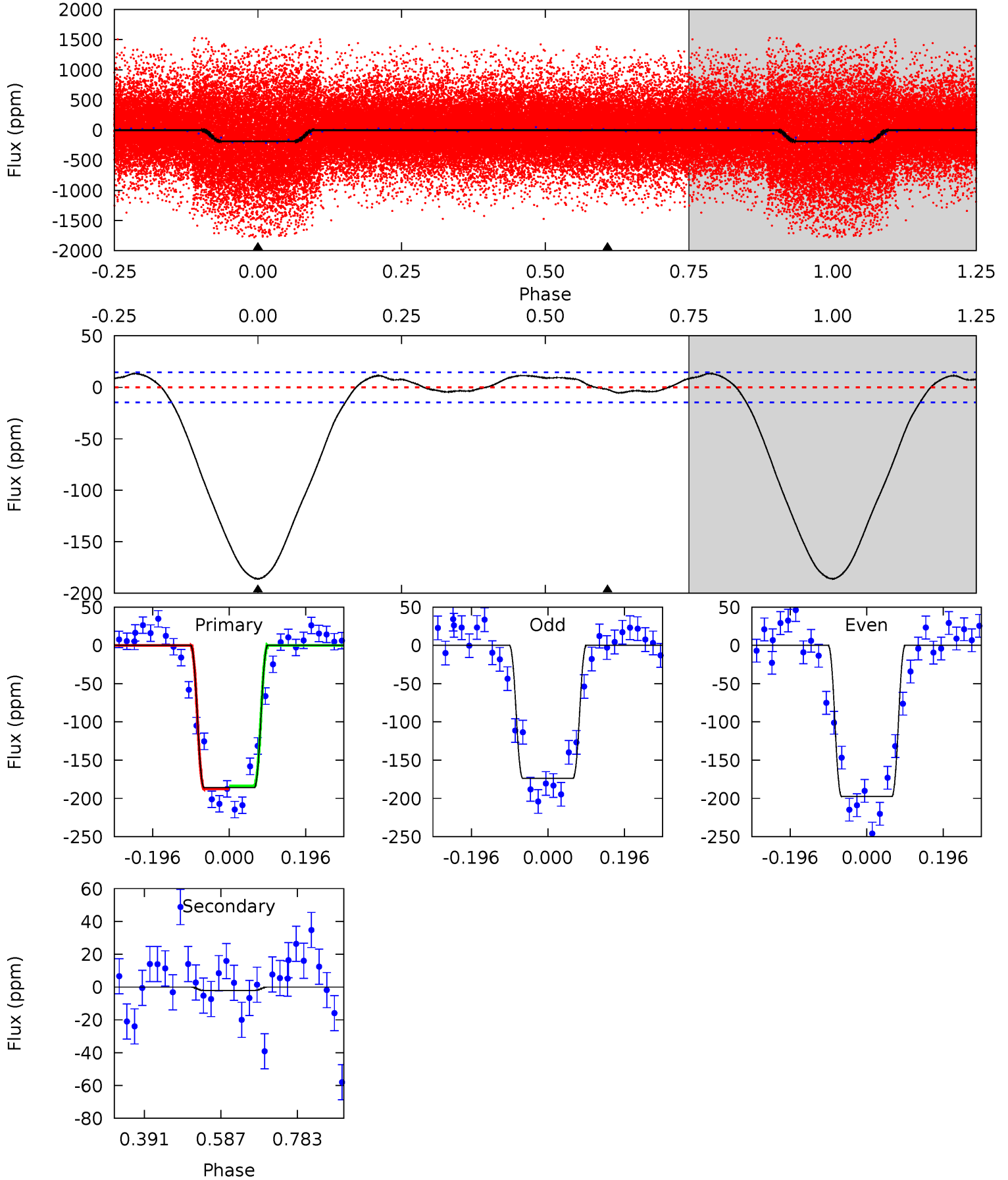
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.8	3.48	0	0	4.37	1.15	0.94	10.8	10.8	3.48	3.48	0.10	0.76	0.28	3.94



# Alt Model-Shift Uniqueness Test

010187590-01, P = 1.397646 Days, E = 130.383225 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
56.3	0.64	0	0	4.42	1.29	1.61	56.3	56.3	0.64	0.64	3.59	1.06	0.07	0.61



### Stellar Parameters For KIC 010187590

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6108^{+172}_{-215}$	$4.466^{+0.048}_{-0.192}$	$0.070^{+0.250}_{-0.300}$	$1.030^{+0.306}_{-0.102}$	$1.132^{+0.130}_{-0.143}$	$1.457^{+0.384}_{-0.739}$
	+3%/-4%	+1%/-4%	+357%/-429%	+30%/-10%	+11%/-13%	+26%/-51%
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 010187590-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-15 \pm 4$	$1.15^{+1.07}_{-0.73}$	$2446^{+150}_{-128}$	$4006^{+2383}_{-902}$	$3.924^{+26.674}_{-2.934}$
Alt.	$-2 \pm 3$	$1.74^{+1.11}_{-0.97}$	$2444^{+174}_{-118}$	$-2486^{+5749}_{-468}$	$0.174^{+1.079}_{-0.332}$

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



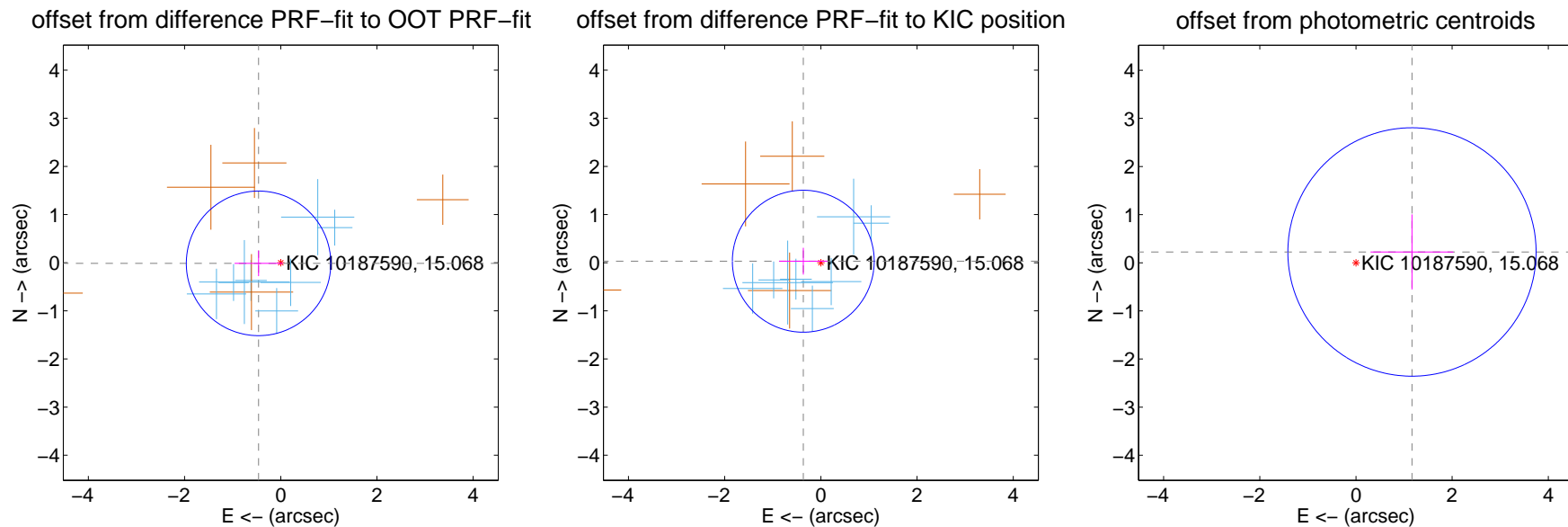
## DV Centroid Data

Supplemental centroid analysis for 010187590-01. Kepler magnitude: 15.07. Transit SNR 7.88

There are 8 quarters with good PRF difference image offsets

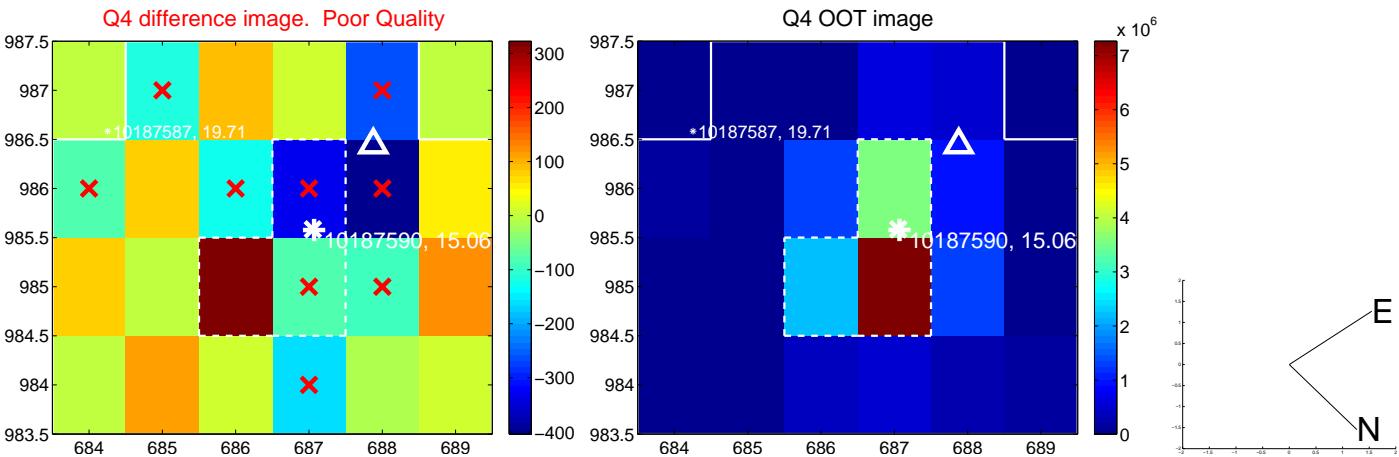
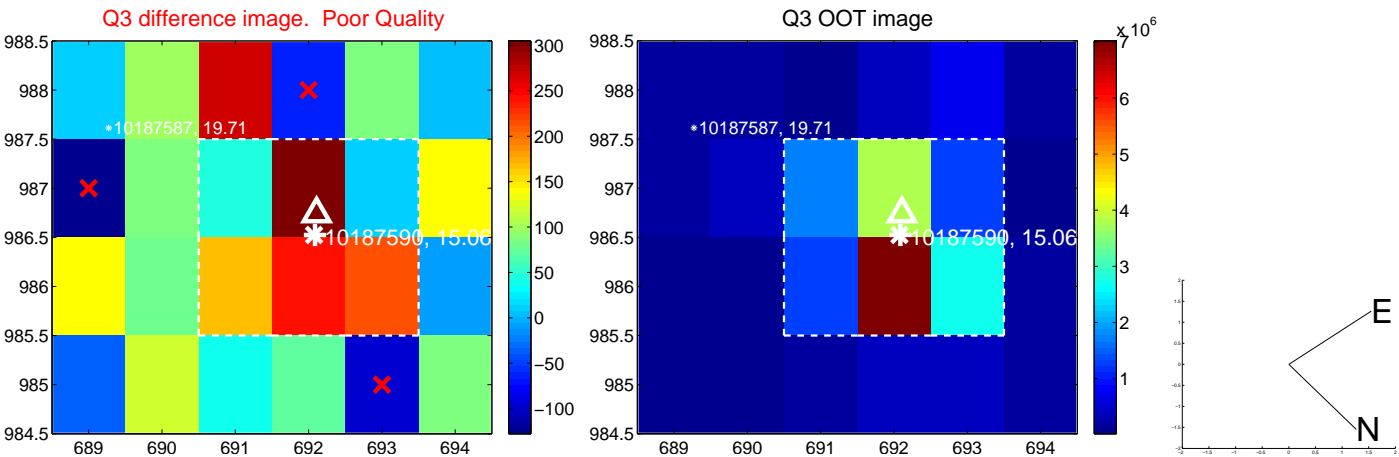
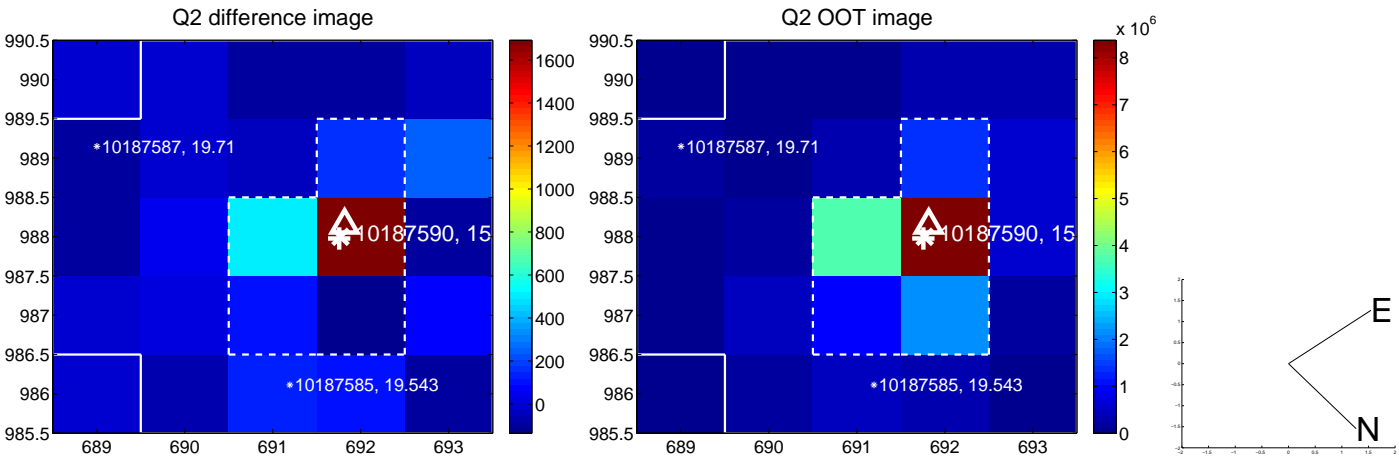
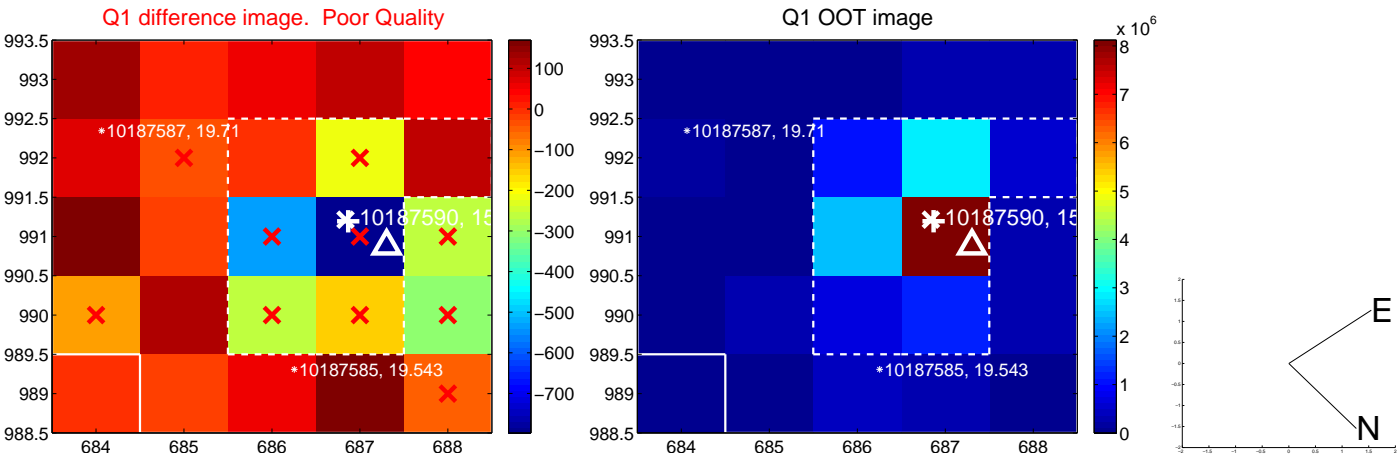
The direct PRF centroid is offset from the target star catalog position by about 0.14 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.461 \pm 0.500$	0.92	$0.461 \pm 0.498$	$-0.014 \pm 0.265$
PRF-fit source offset from KIC position	$0.367 \pm 0.491$	0.75	$0.365 \pm 0.501$	$0.031 \pm 0.278$
photometric centroid source offset	$1.19 \pm 0.86$	1.38	$-1.16 \pm 0.86$	$0.22 \pm 0.78$

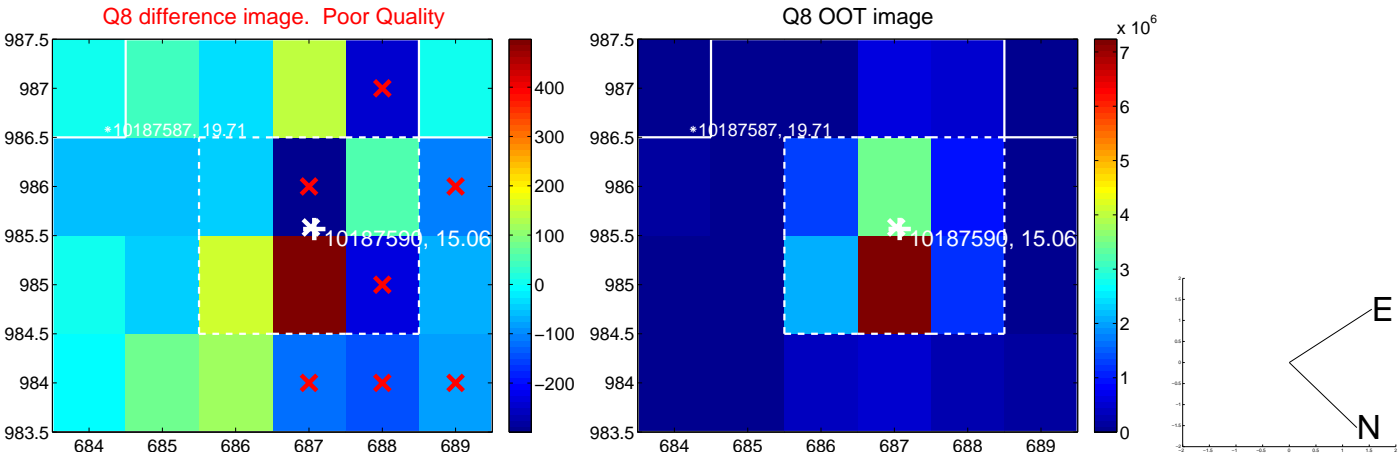
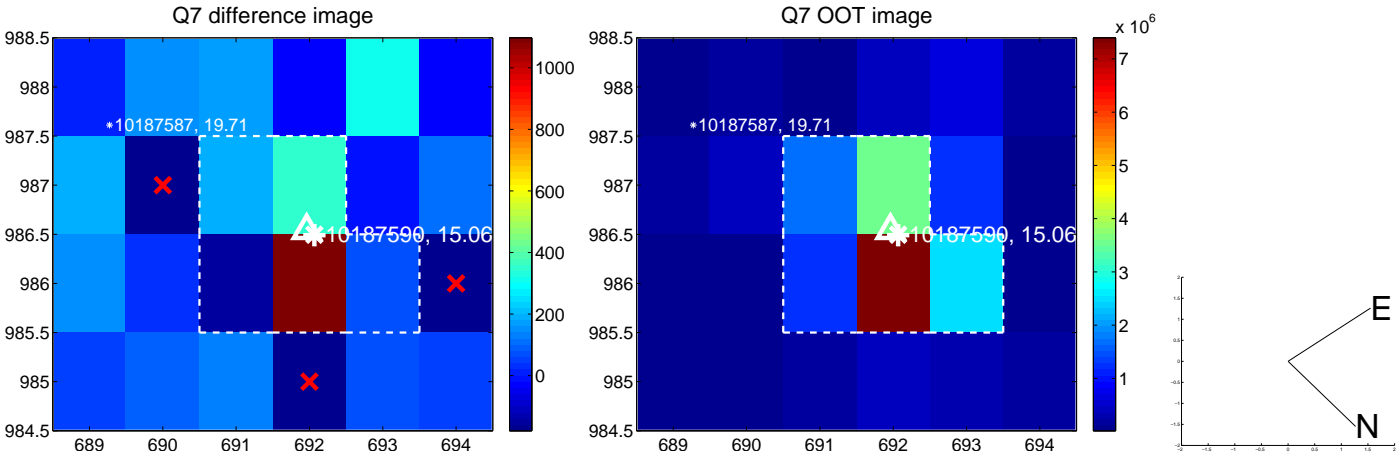
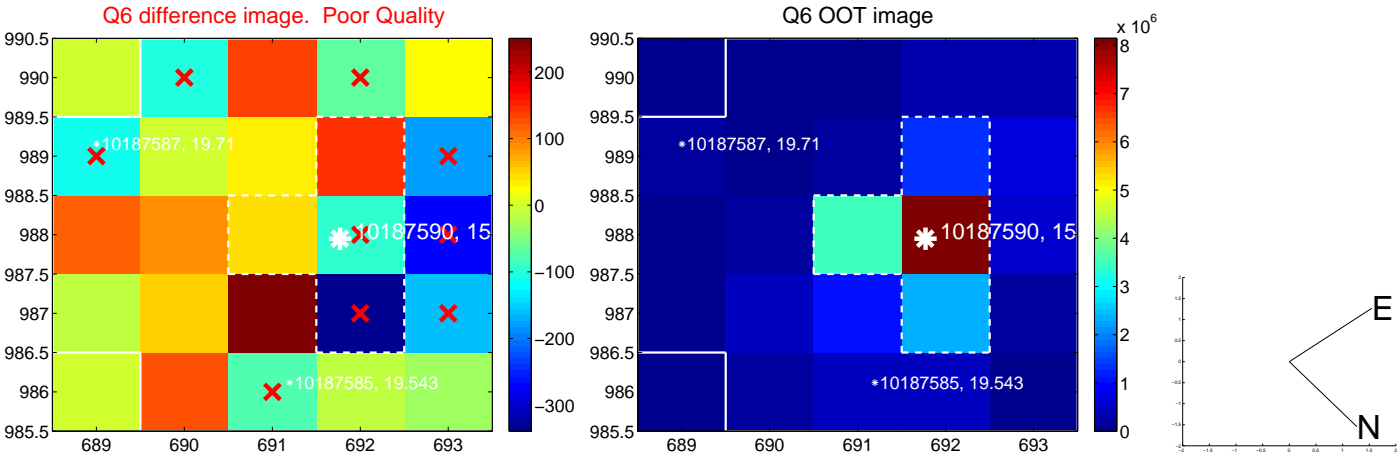
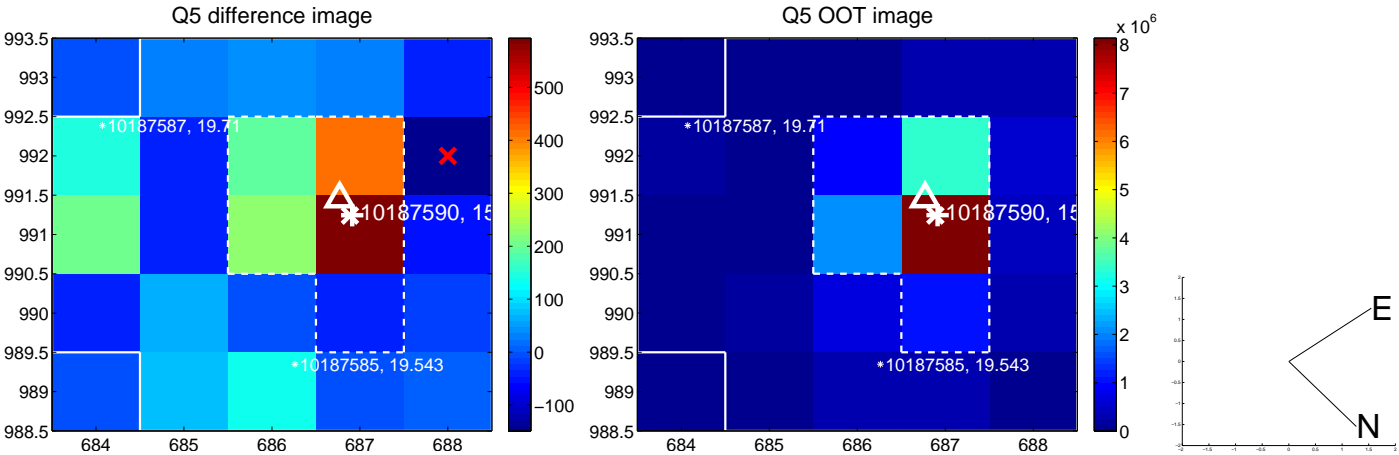


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

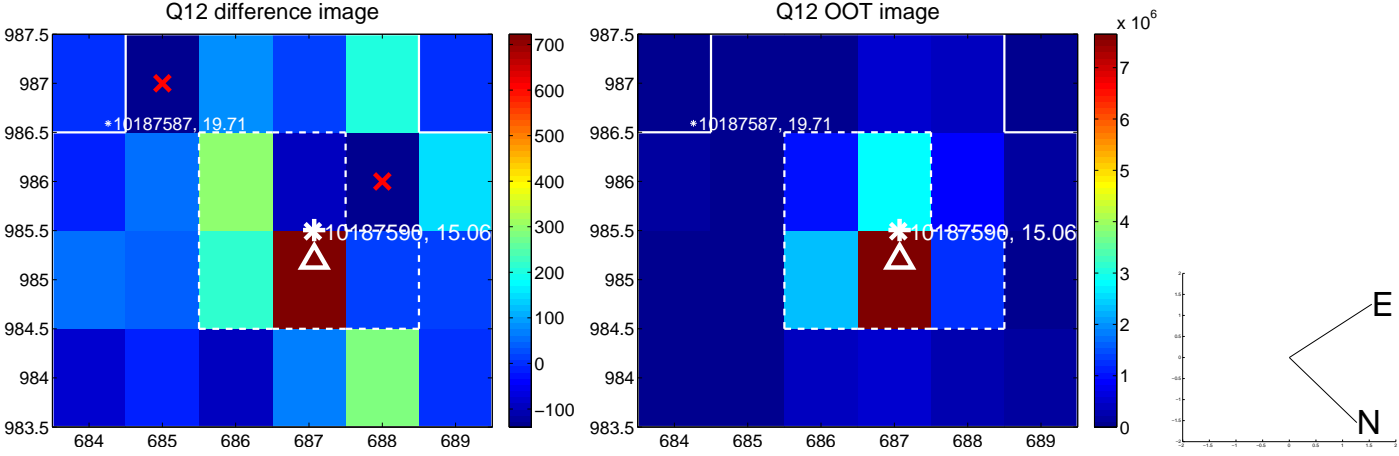
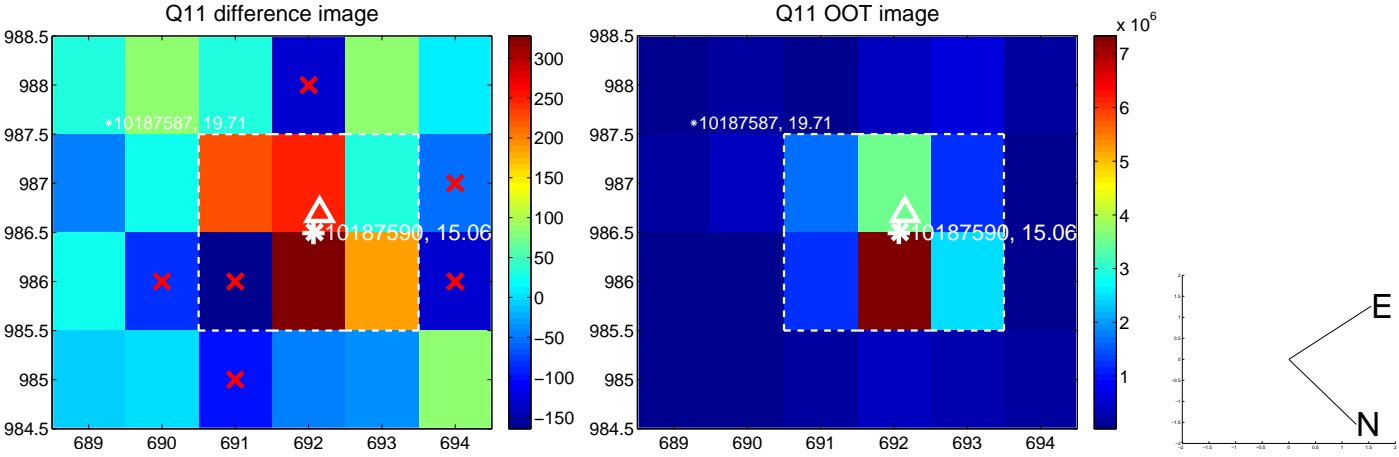
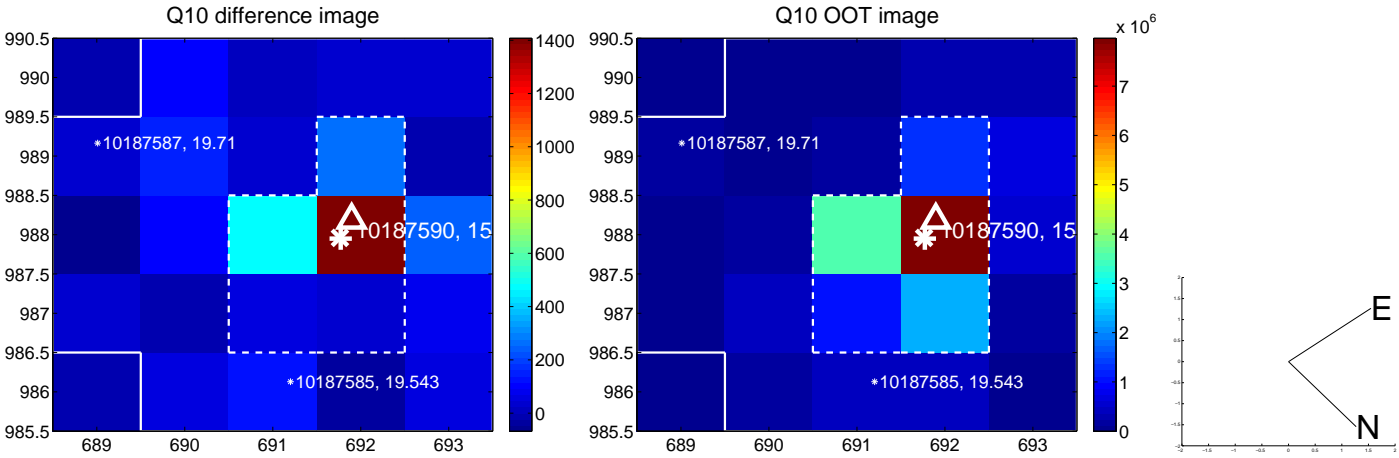
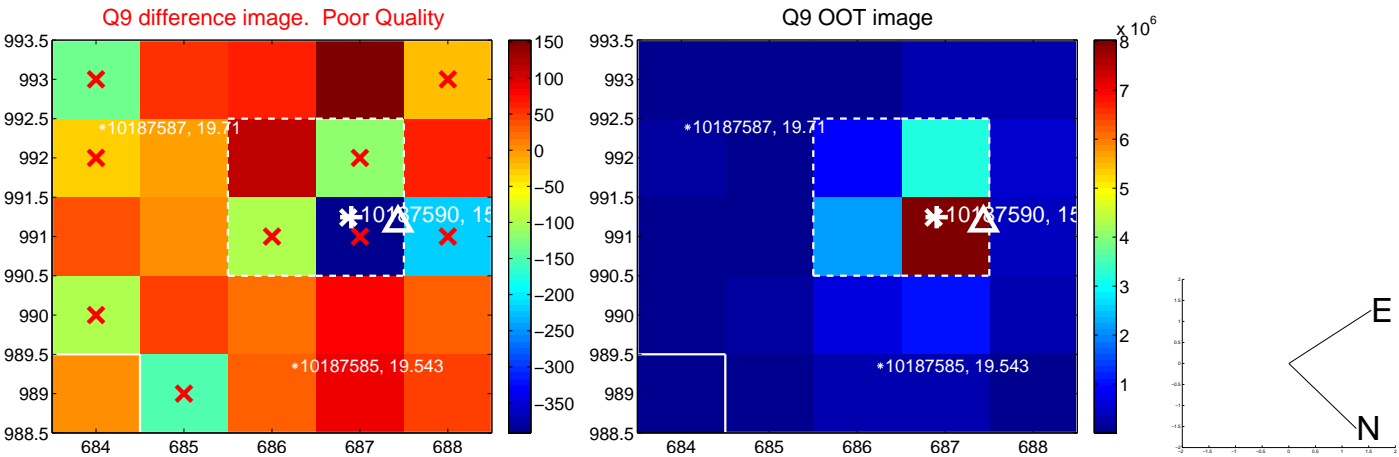


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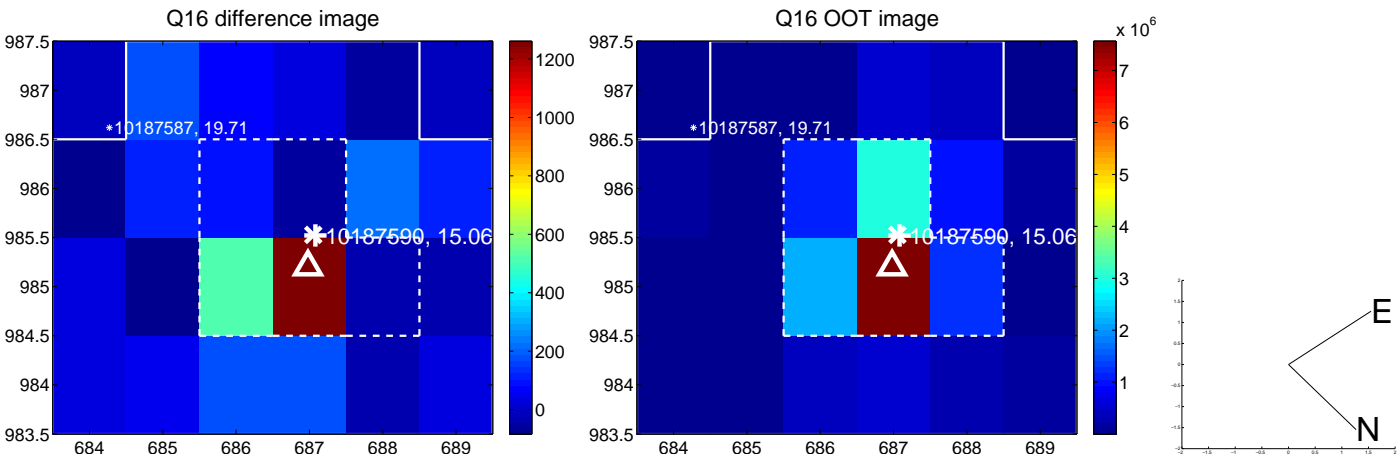
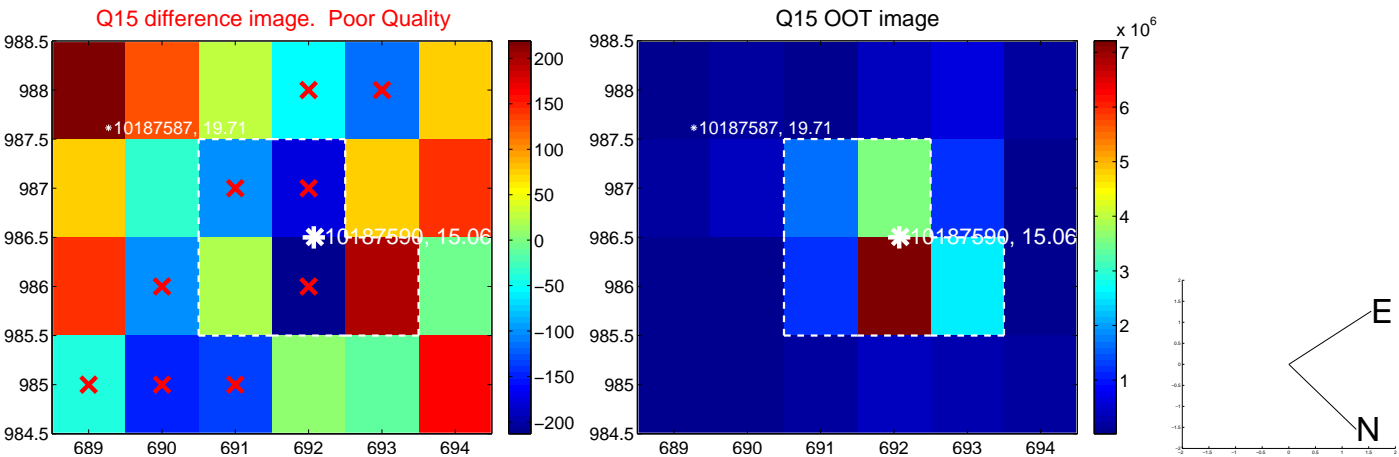
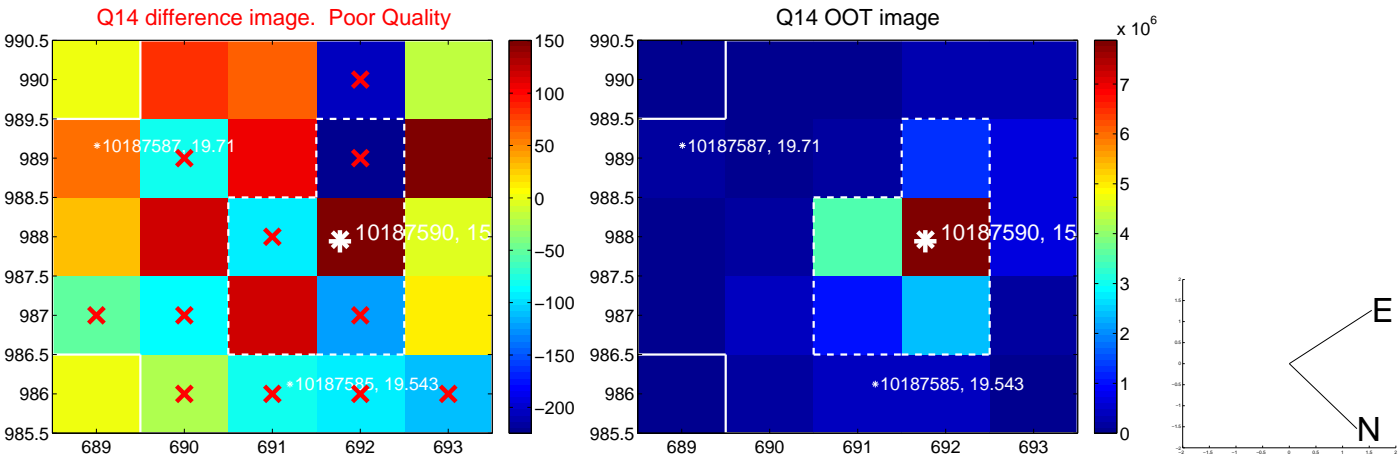
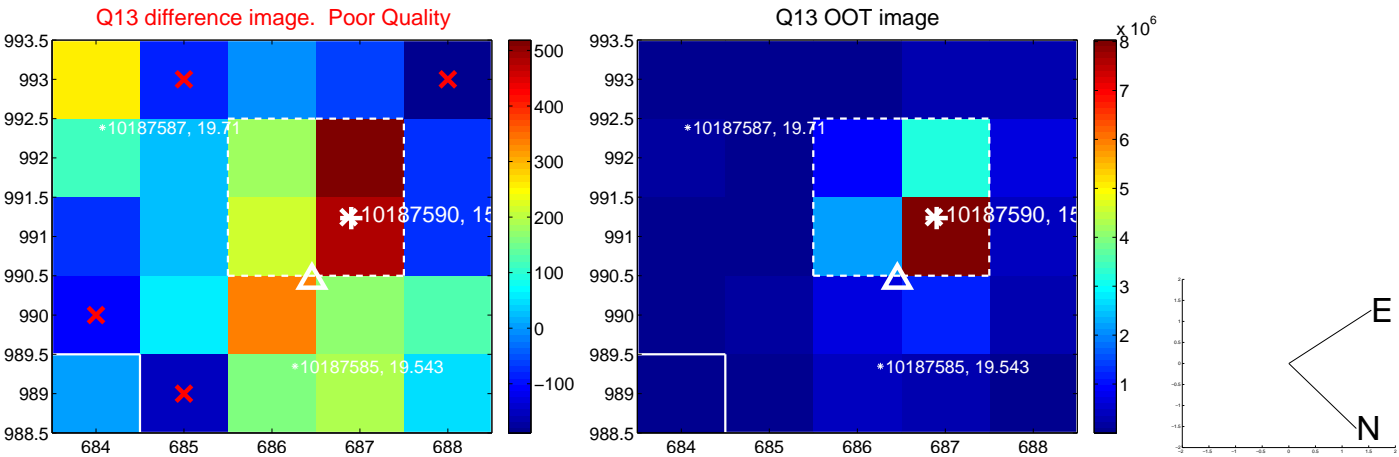




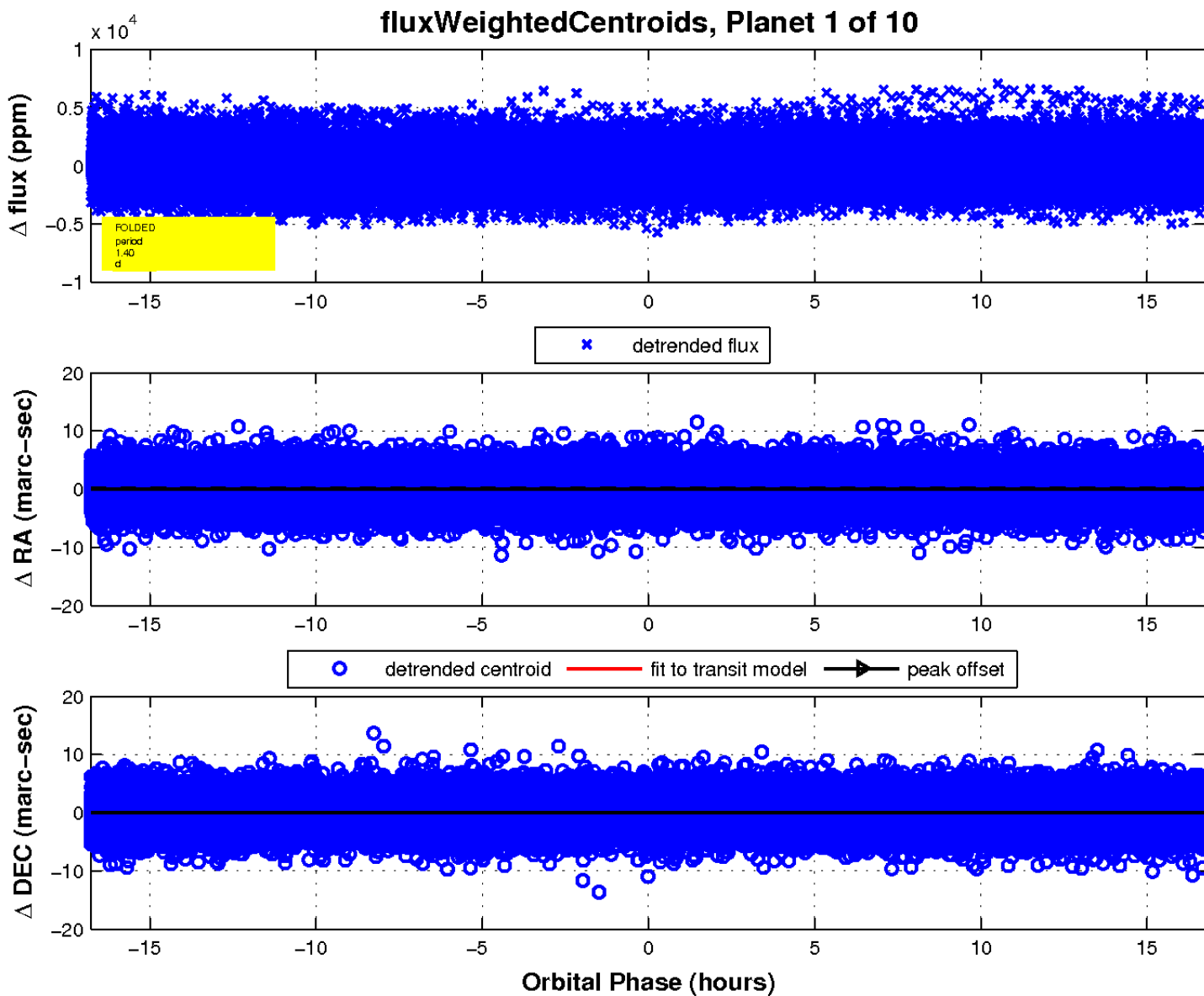
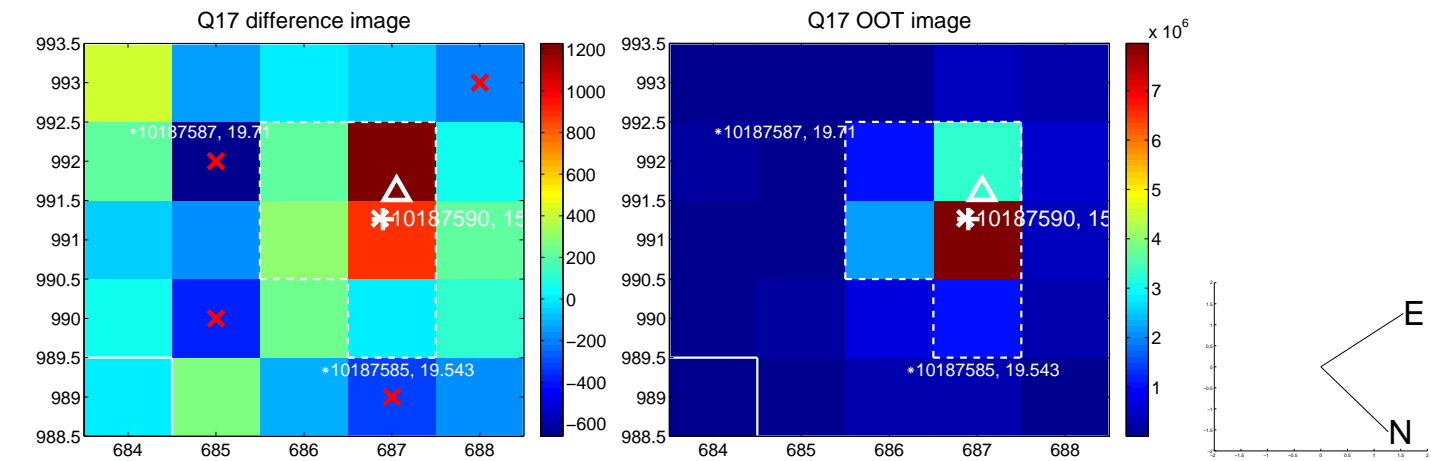
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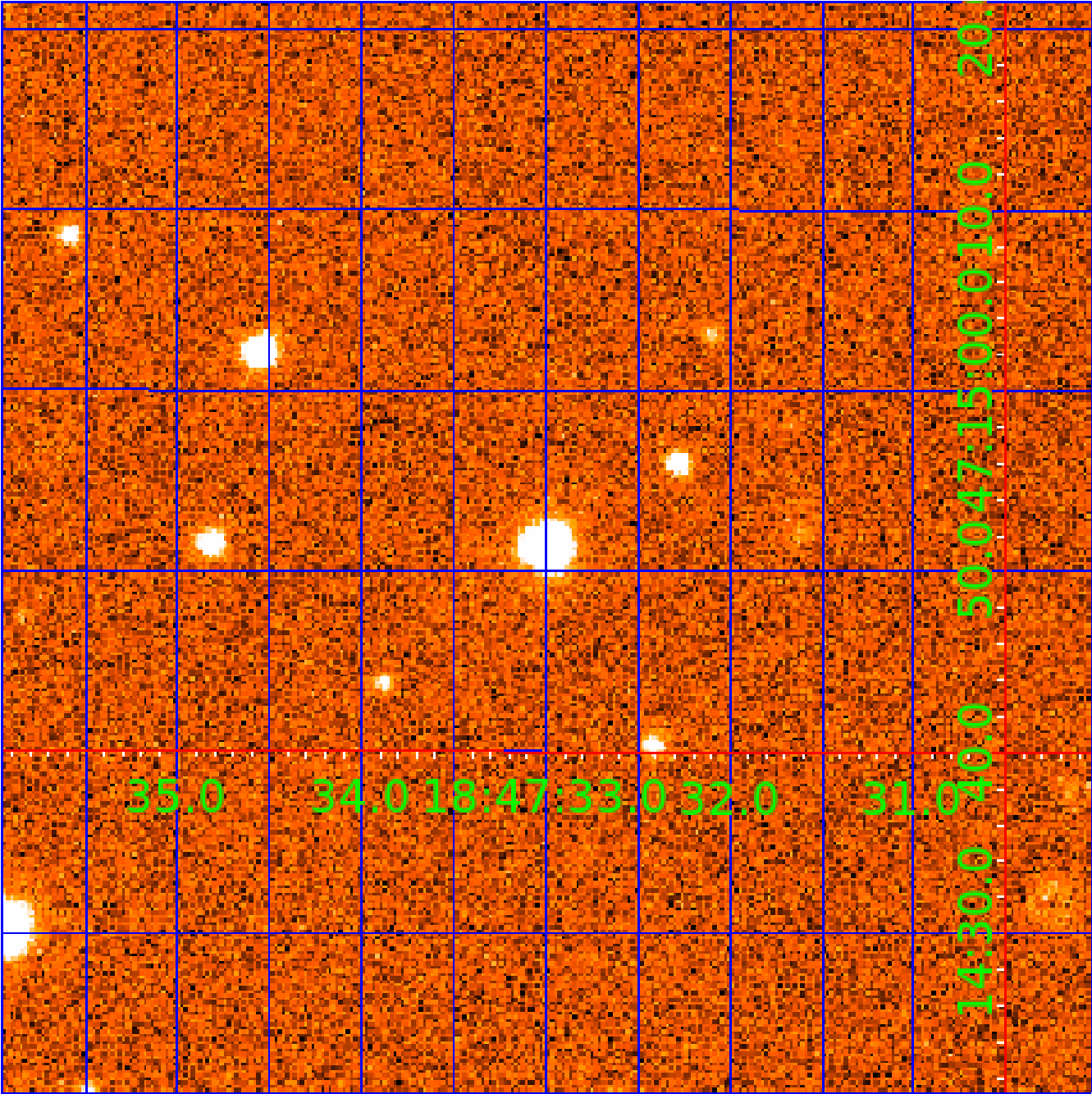


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UKIRT Image

Declination





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

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

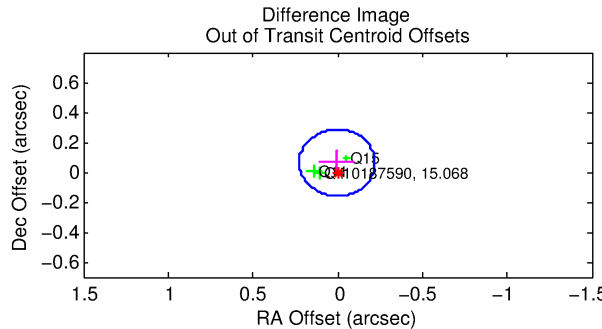
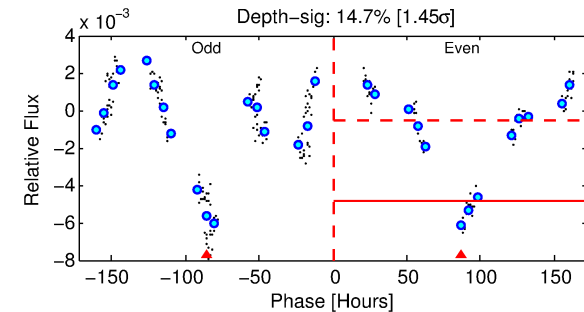
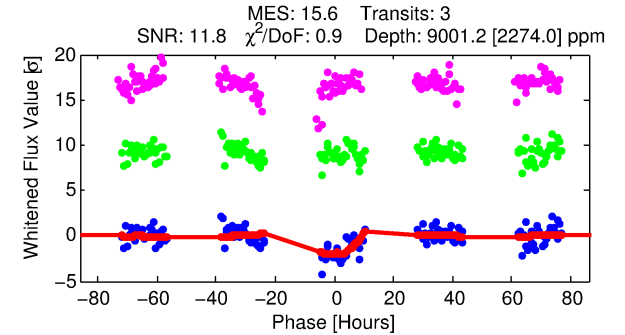
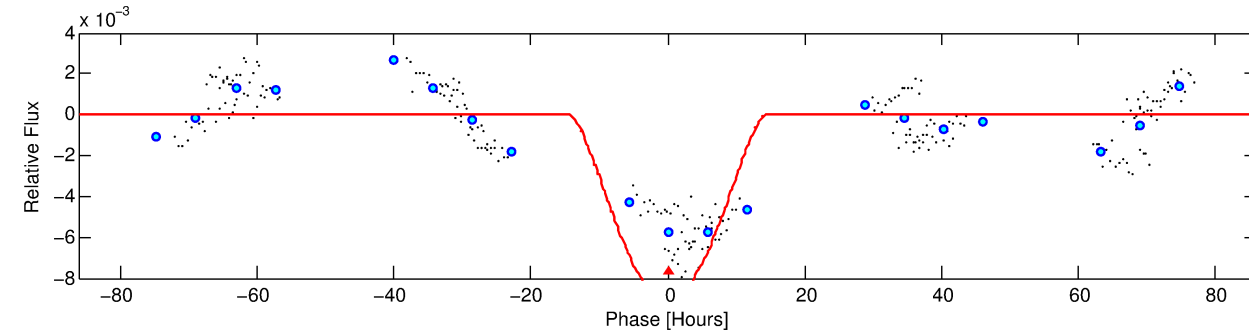
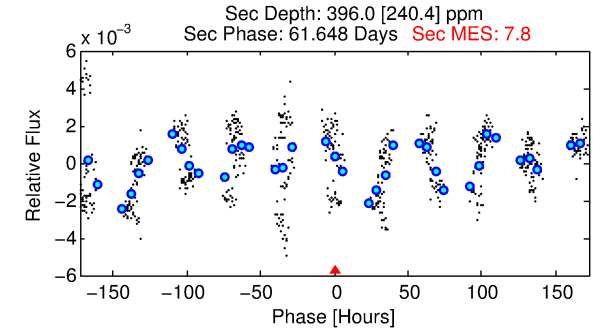
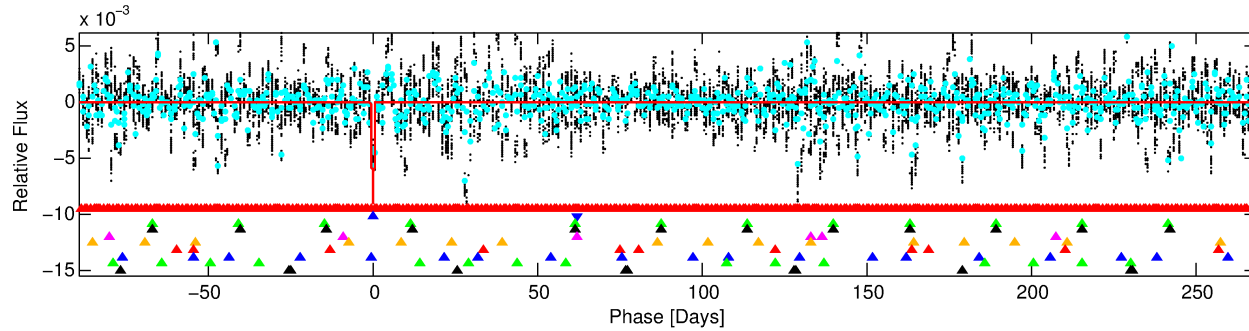
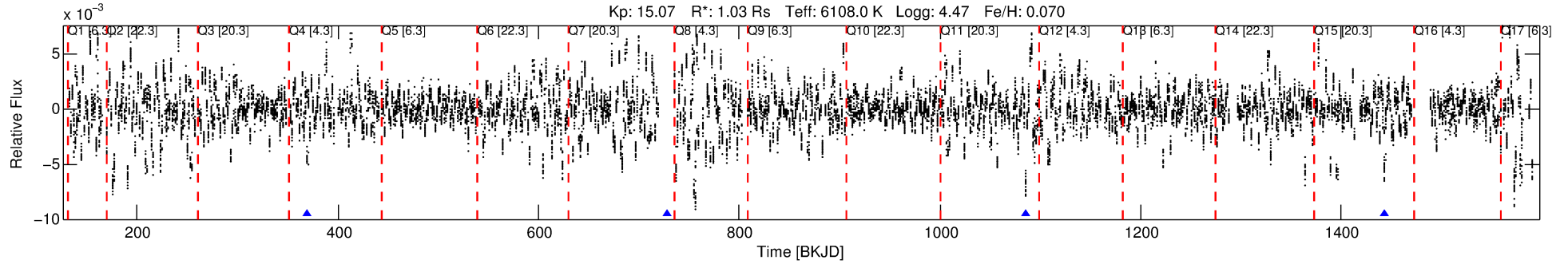
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 010187590-02

No Significant Match Found

# DV One-Page Summary

KIC: 10187590 Candidate: 2 of 10 Period: 357.729 d



## DV Fit Results:

Period = 357.72854 [0.04796] d  
Epoch = 370.0529 [0.1105] BKJD  
Rp/R\* = 0.1487 [0.2354]  
a/R\* = 55.44 [18.11]  
b = 0.99 [0.35]  
Seff = 1.25 [0.48]  
Teff = 270 [26] K  
Rp = 16.71 [26.92] Re  
a = 1.0279 [0.2538] AU  
Ag = 823.95 [2672.43] [0.31σ]  
Teffp = 2234 [1803] K [1.09σ]

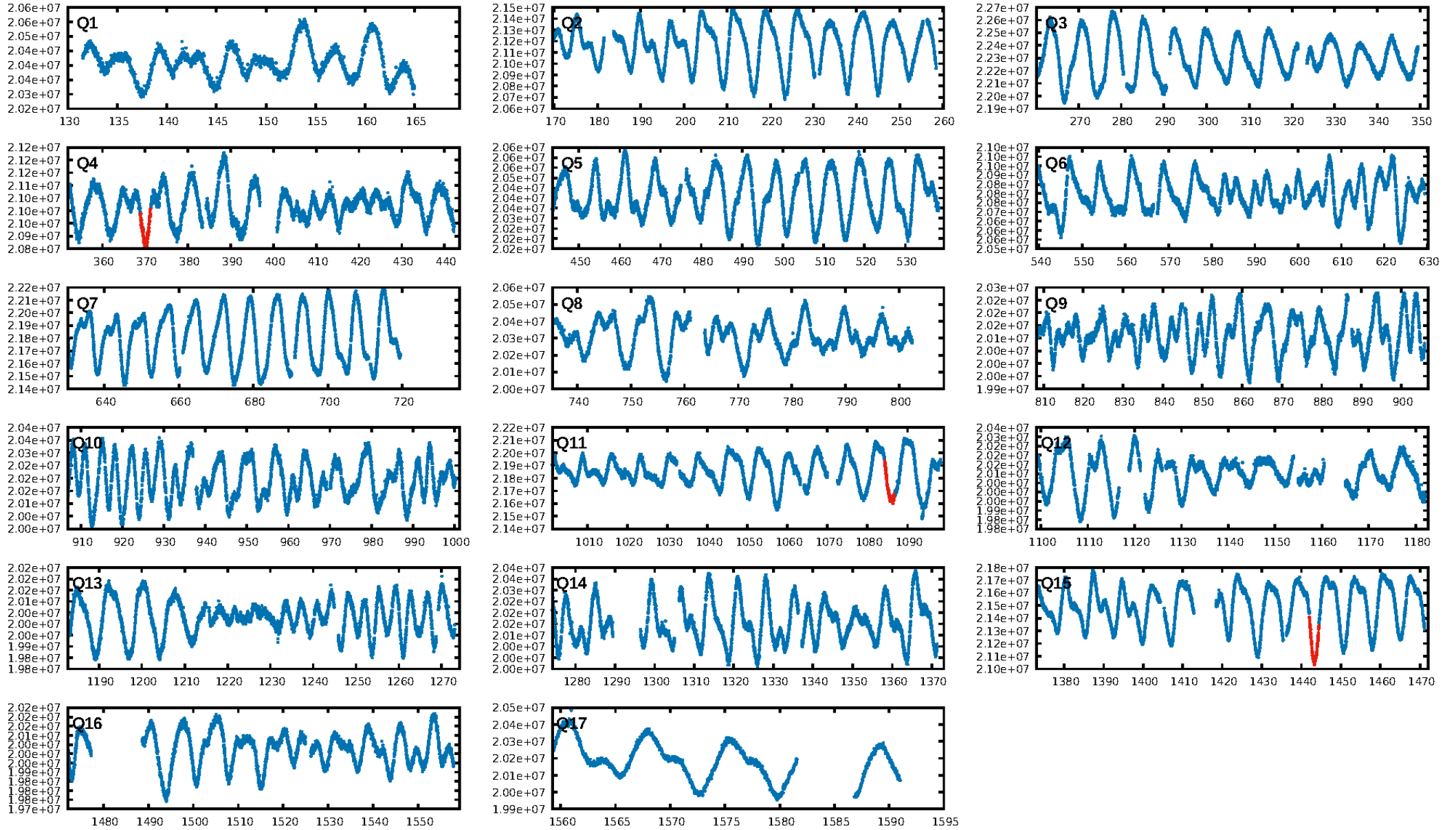
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [57.21σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 27.6%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
**GhostDiagnostic-chr: -0.2814**  
Centroid-sig: 21.7%  
**Centroid-so: 0.522 arcsec [5.75σ]**  
OotOffset-rm: 0.064 arcsec [0.86σ]  
KicOffset-rm: 0.056 arcsec [0.75σ]  
OotOffset-st: 0/2/1/0 [3]  
KicOffset-st: 0/2/1/0 [3]  
DiffImageQuality-fgm: 1.00 [3/3]  
DiffImageOverlap-fno: 0.00 [0/3]

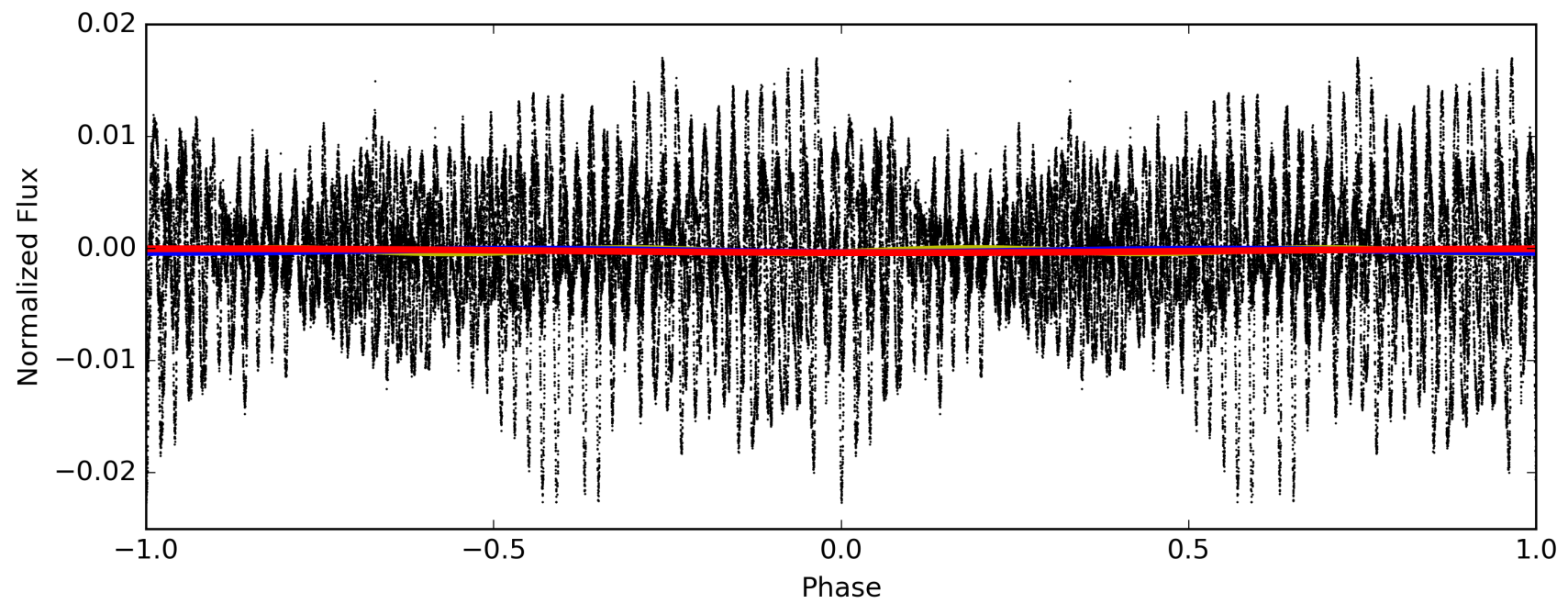
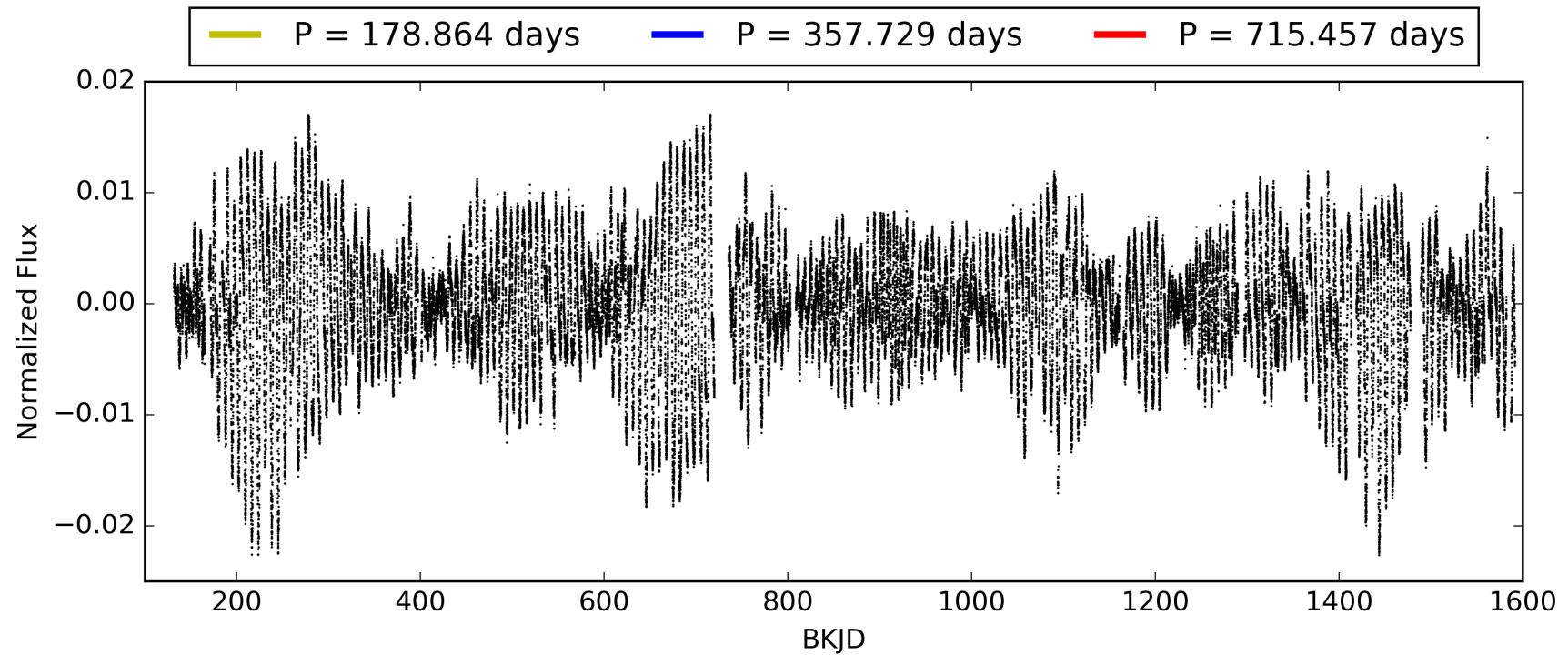
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 14:43:51 Z

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

# TCE 010187590-02, PDC Light Curves



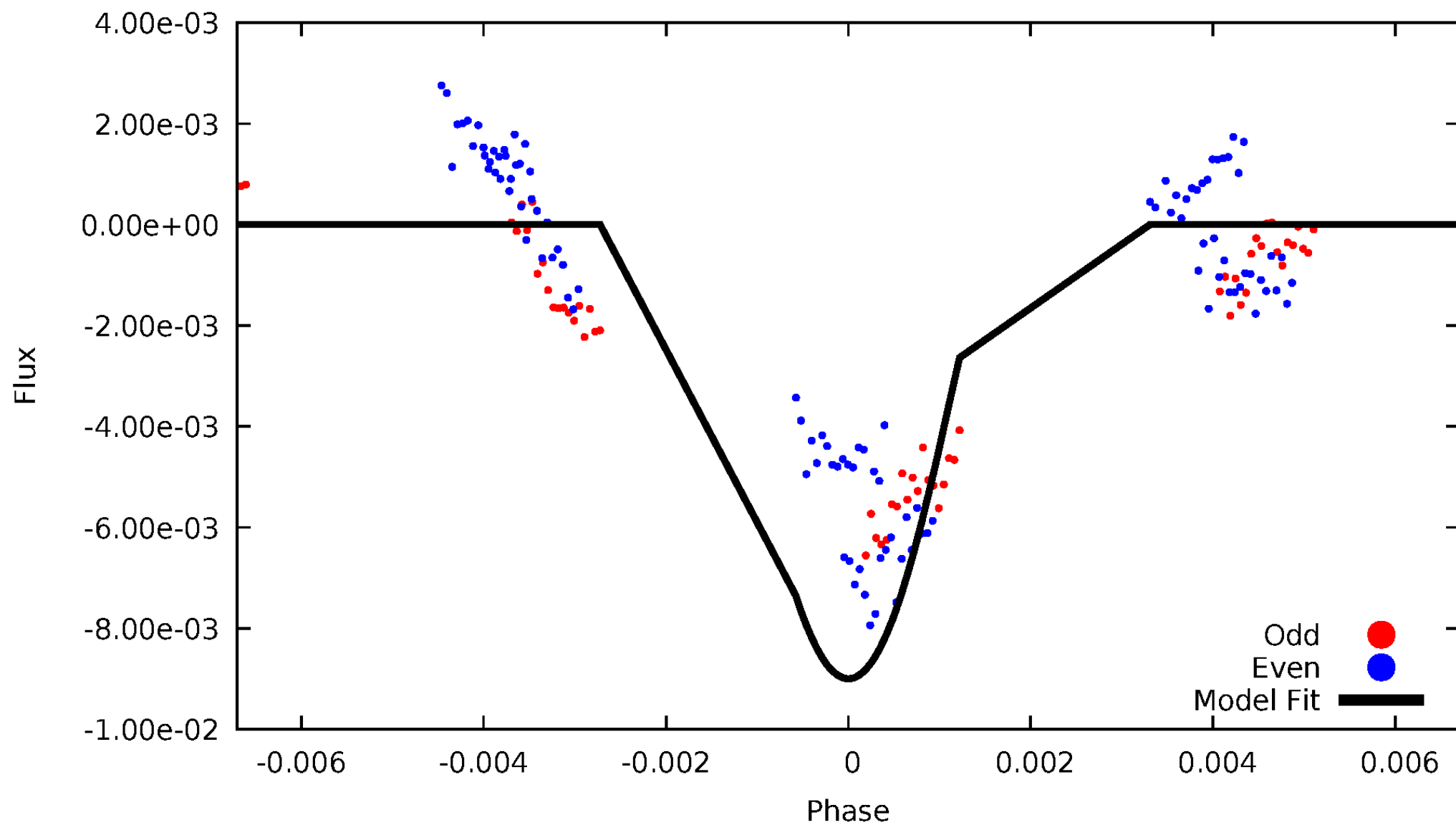
TCE 010187590-02





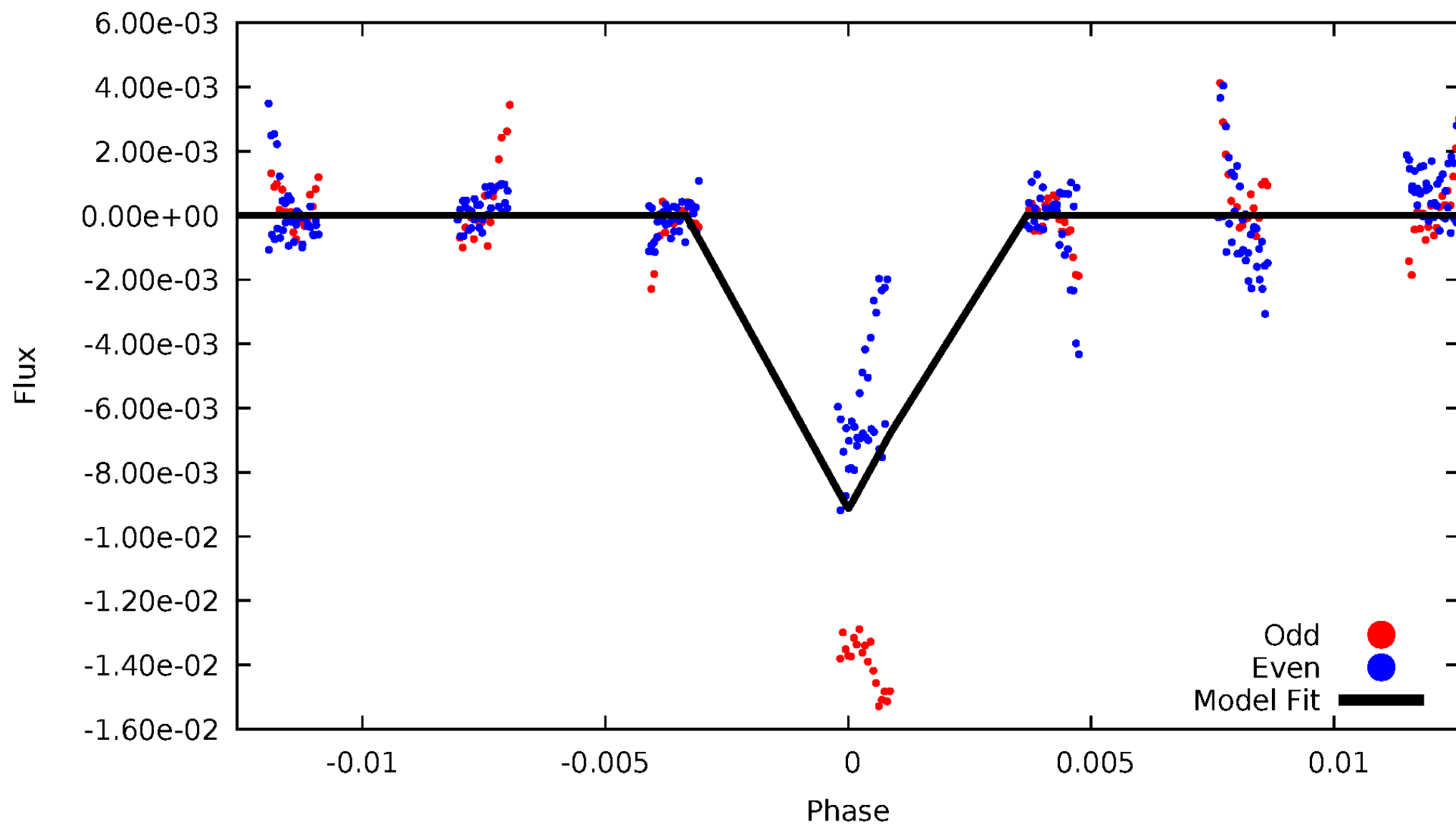
# DV Odd/Even

TCE 010187590-02



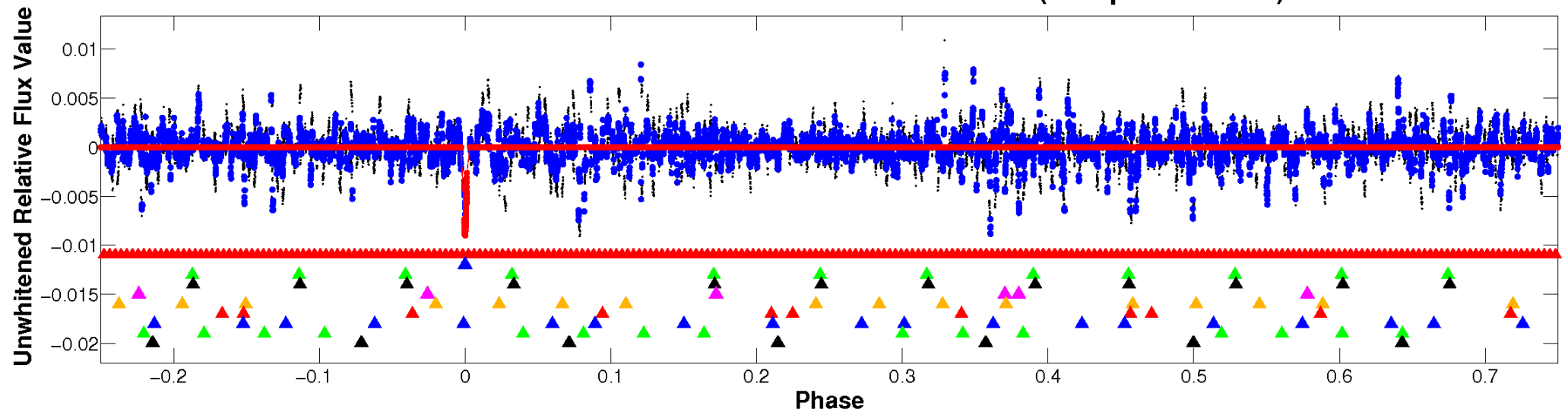
# ALT Odd/Even

TCE 010187590-02

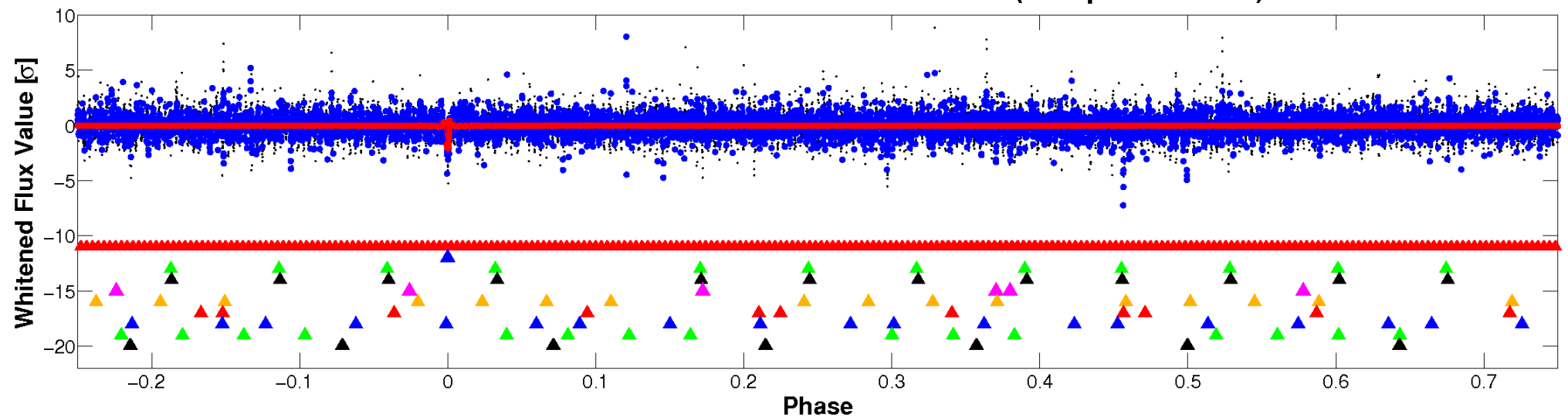


# Non-Whitened Vs. Whitened Light Curve

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

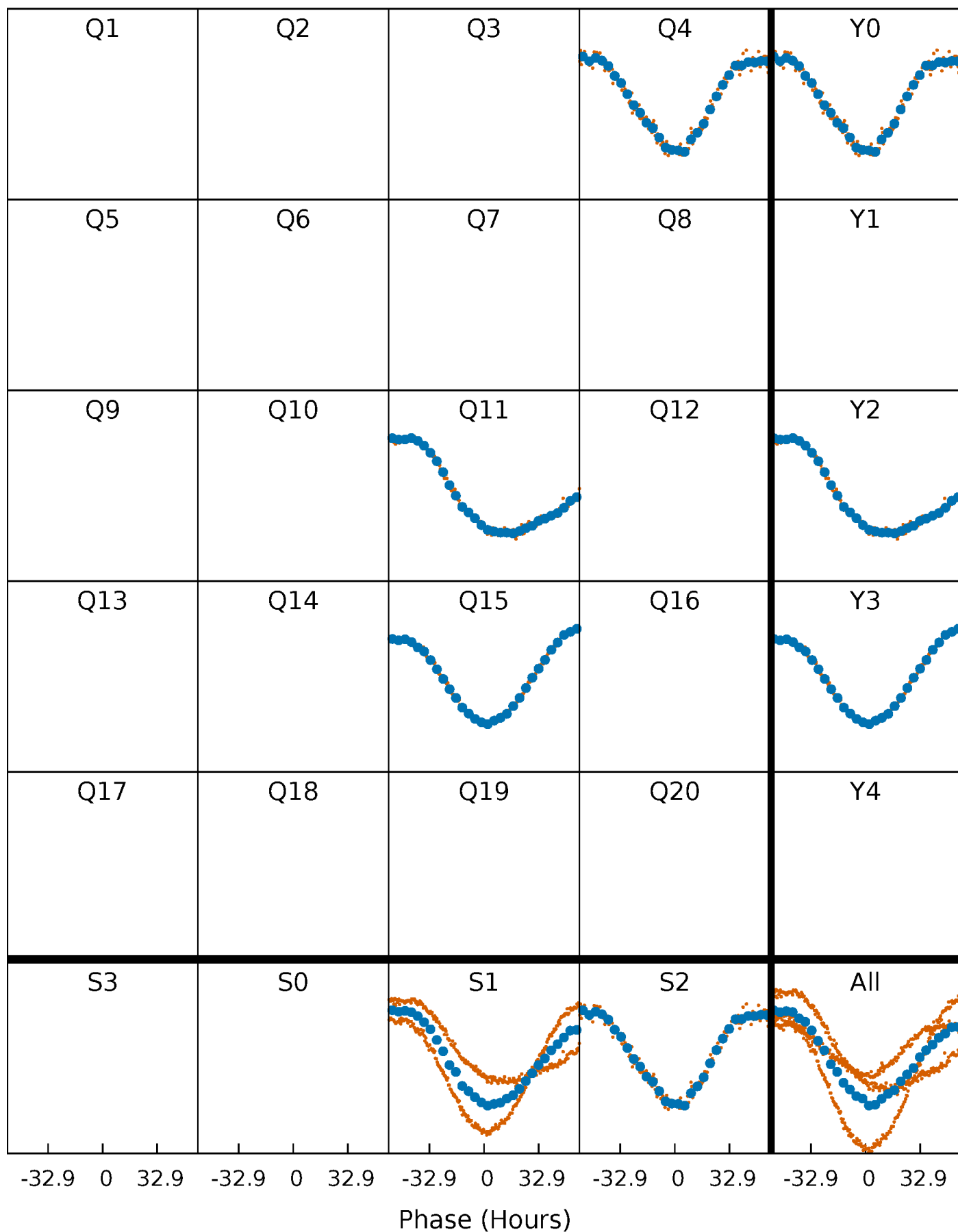


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

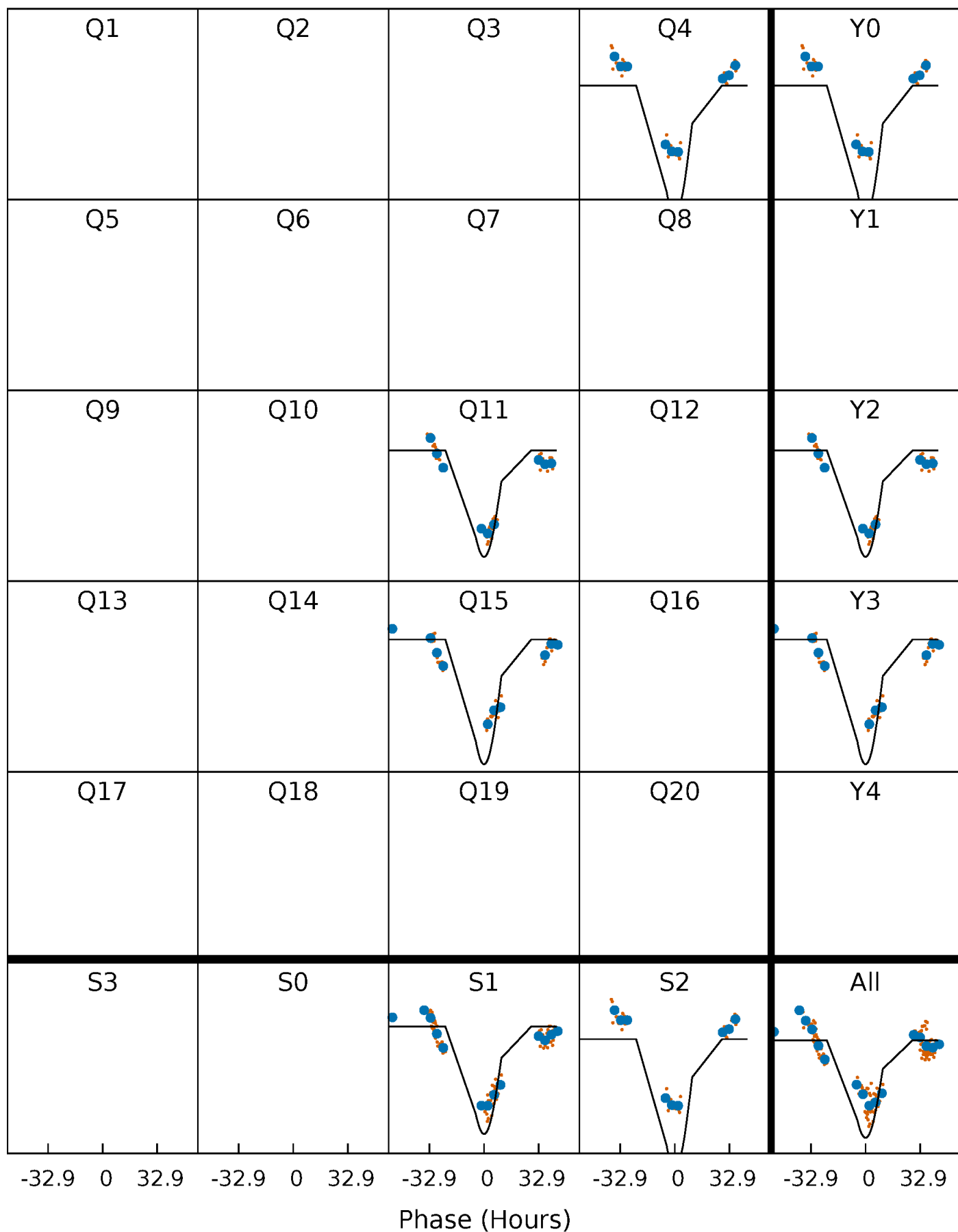
TCE 010187590-02     $P=357.728536$  Days     $T_0=370.052917$  (BKJD)





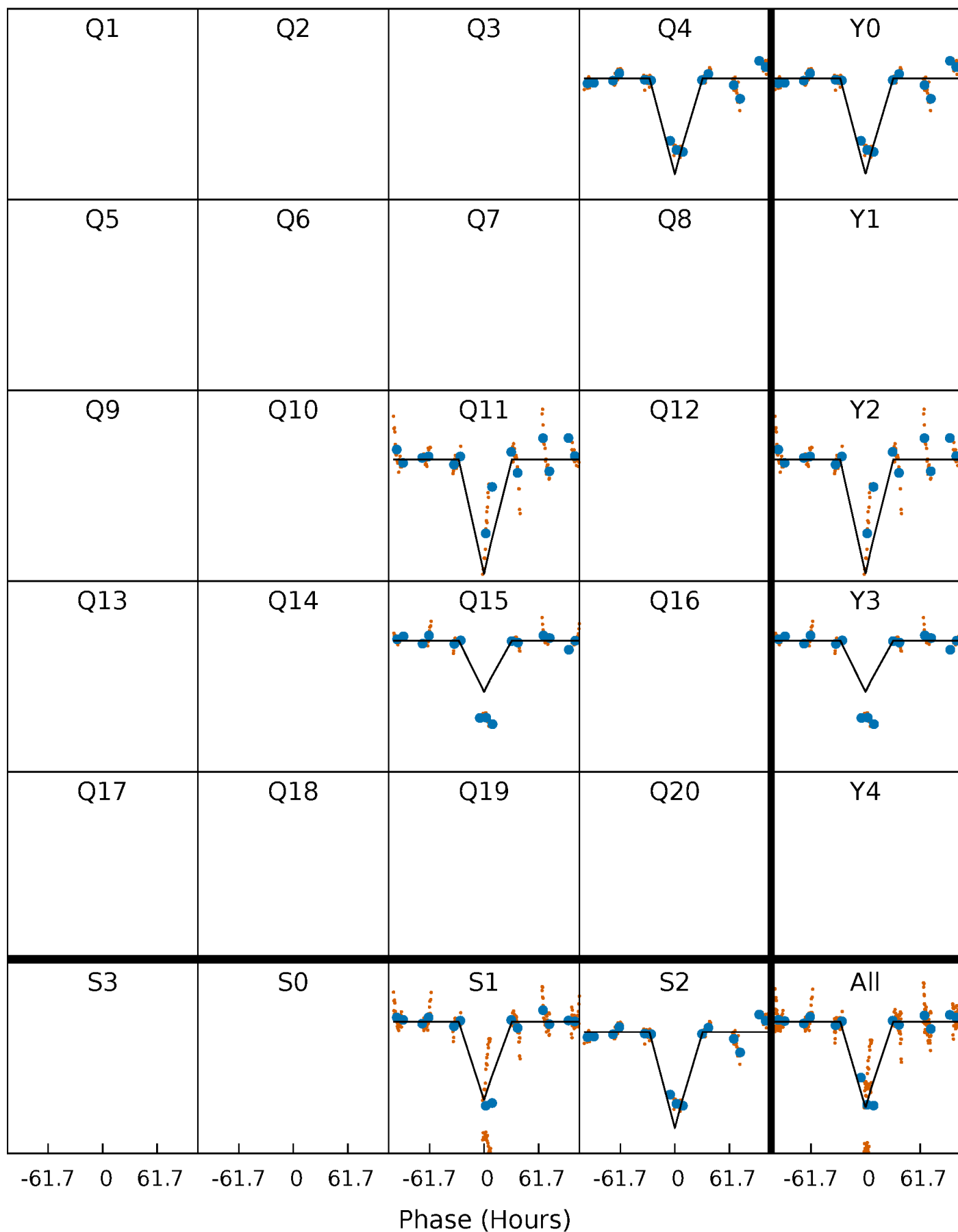
# DV Quarter-Phased Transit Curves

TCE 010187590-02     $P=357.728536$  Days     $T_0=370.052917$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

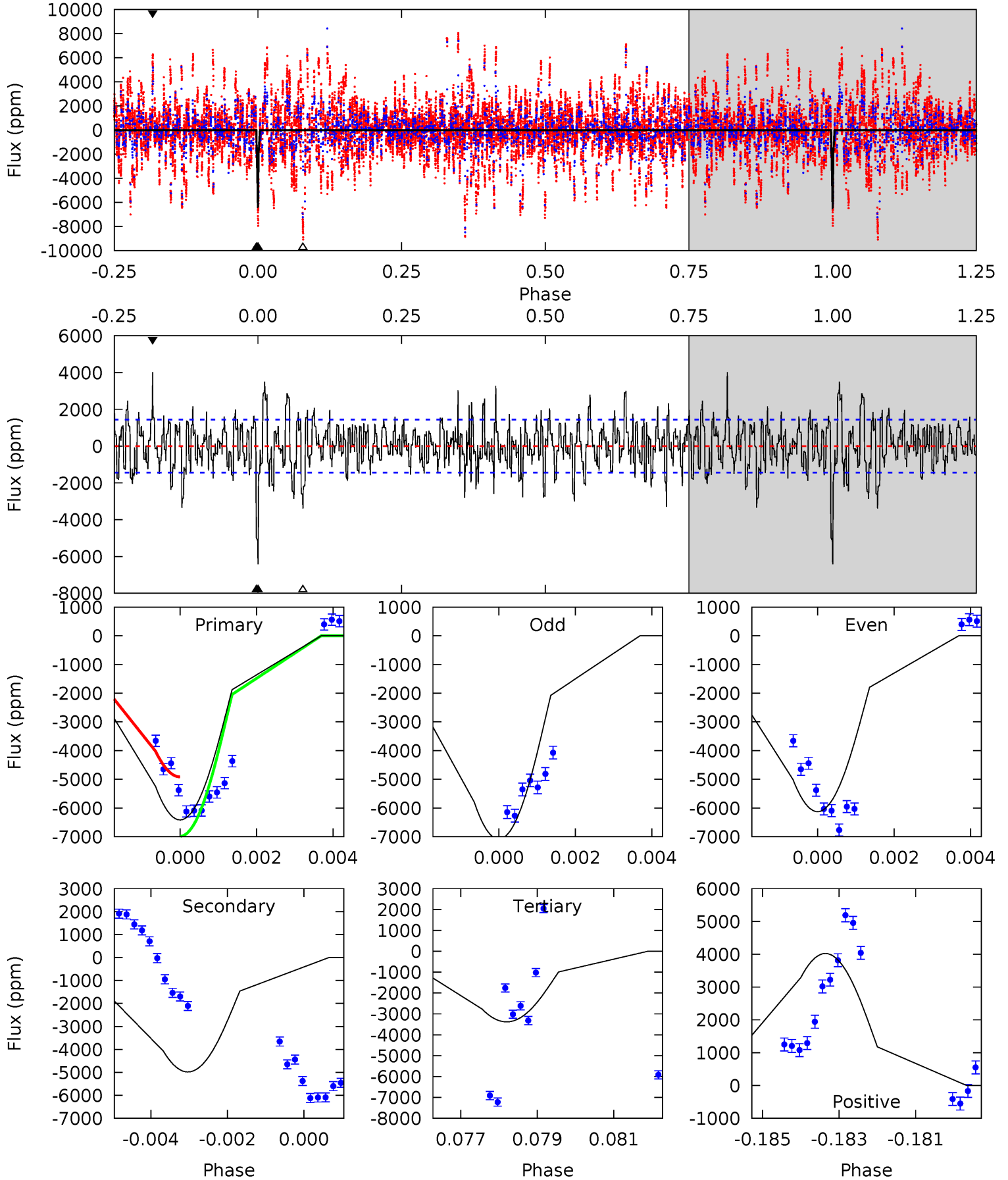
TCE 010187590-02 P=357.814502 Days  $T_0=369.924203$  (BKJD)



# DV Model-Shift Uniqueness Test

010187590-02,  $P = 357.728536$  Days,  $E = 12.324381$  Days

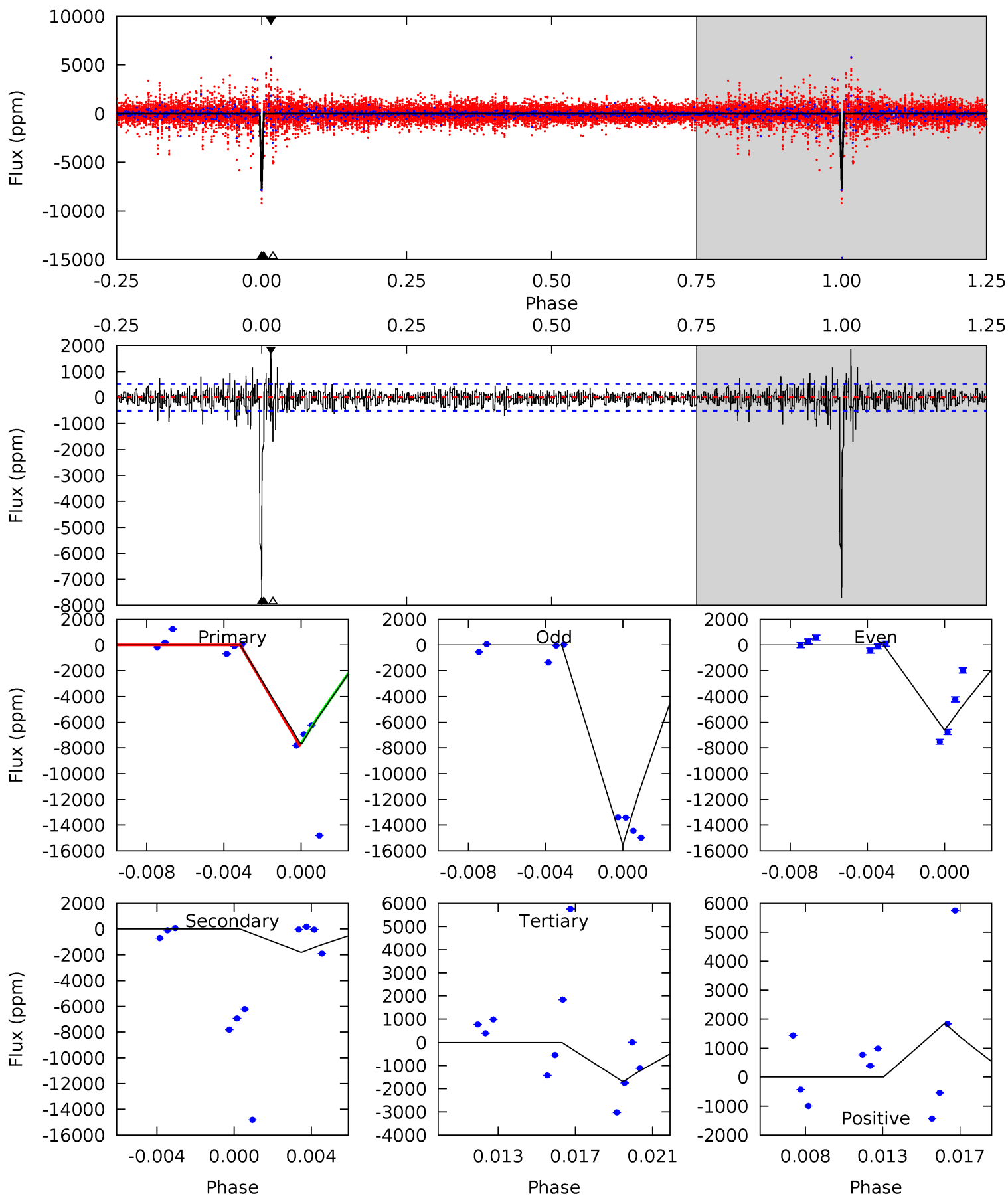
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
23.8	18.5	12.5	14.9	5.35	3.12	3.78	11.2	8.87	5.93	3.56	1.63	0.91	0.39	3.25



# Alt Model-Shift Uniqueness Test

010187590-02, P = 357.814502 Days, E = 12.109701 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
78.2	18.3	17.2	18.7	5.19	2.86	2.10	61.1	59.5	1.12	-0.46	46.6	1.30	0.19	1.26





### Stellar Parameters For KIC 010187590

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6108^{+172}_{-215}$	$4.466^{+0.048}_{-0.192}$	$0.070^{+0.250}_{-0.300}$	$1.030^{+0.306}_{-0.102}$	$1.132^{+0.130}_{-0.143}$	$1.457^{+0.384}_{-0.739}$
	+3%/-4%	+1%/-4%	+357%/-429%	+30%/-10%	+11%/-13%	+26%/-51%
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 010187590-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-4982 \pm 270$	$26.81^{+24.92}_{-17.75}$	$384^{+27}_{-18}$	$3796^{+2102}_{-706}$	$3994^{+31674}_{-2915}$
Alt.	$-1804 \pm 99$	$23.28^{+23.62}_{-16.38}$	$382^{+26}_{-18}$	$3370^{+1796}_{-606}$	$1901^{+19675}_{-1427}$

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

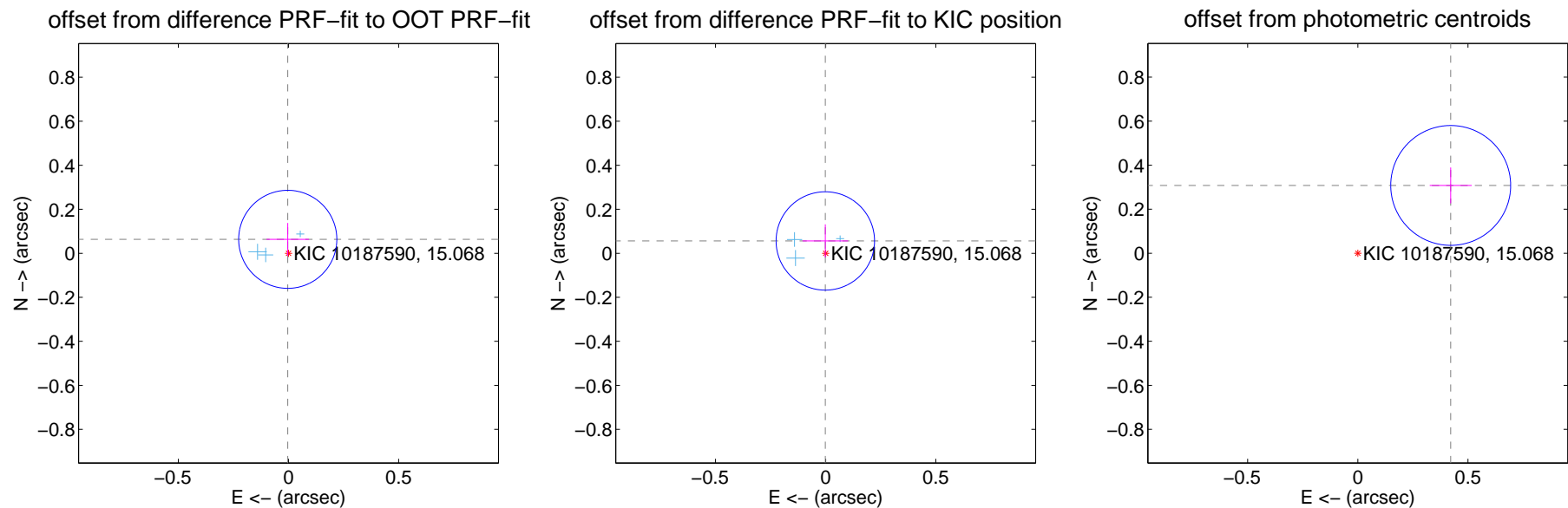
## DV Centroid Data

Supplemental centroid analysis for 010187590-02. Kepler magnitude: 15.07. Transit SNR 11.79

There are 3 quarters with good PRF difference image offsets

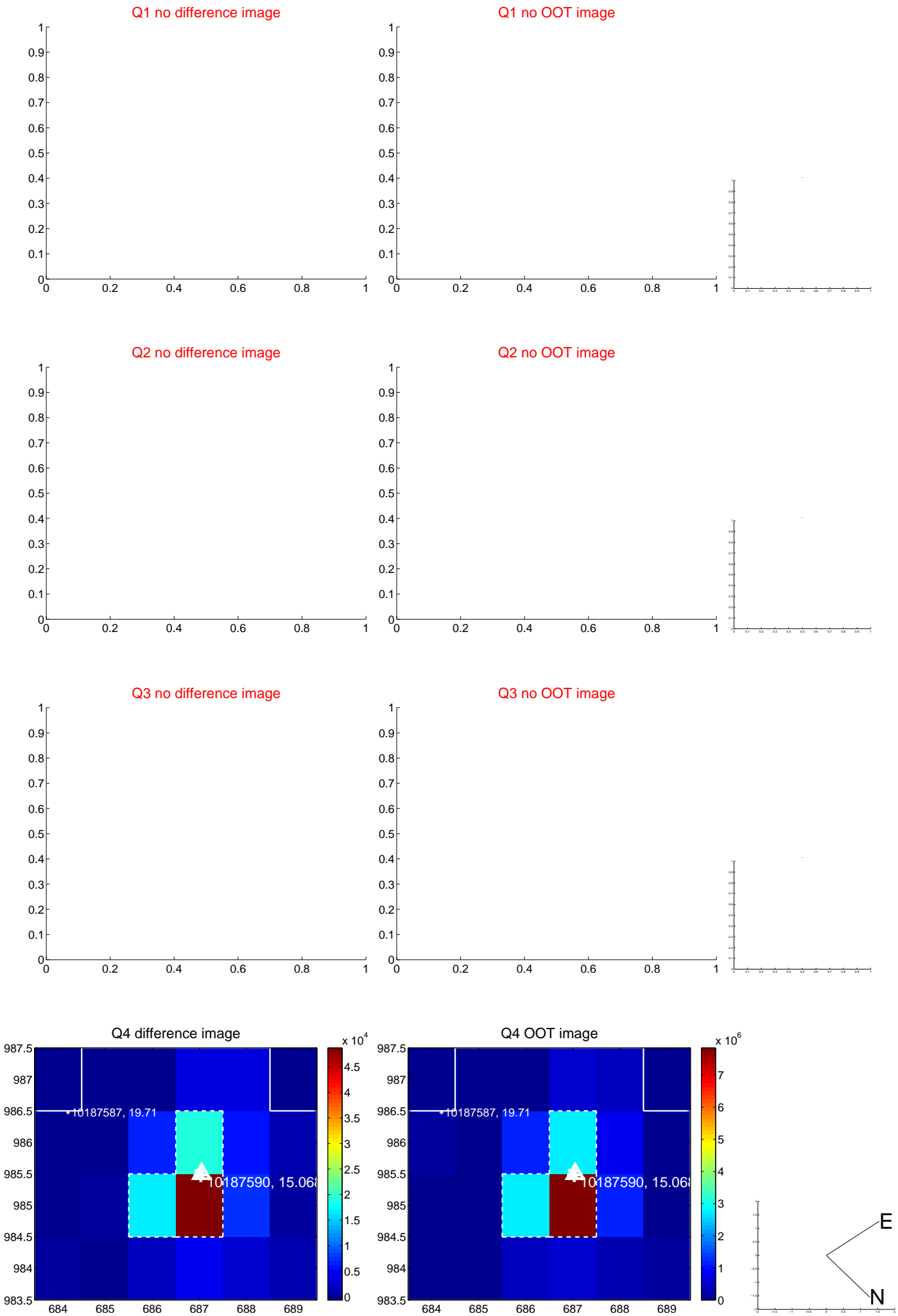
The direct PRF centroid is offset from the target star catalog position by about 0.02 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.064 \pm 0.074$	0.86	$0.003 \pm 0.097$	$0.063 \pm 0.074$
PRF-fit source offset from KIC position	$0.056 \pm 0.074$	0.75	$0.002 \pm 0.103$	$0.056 \pm 0.075$
photometric centroid source offset	$0.52 \pm 0.09$	5.75	$-0.42 \pm 0.10$	$0.31 \pm 0.08$



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.

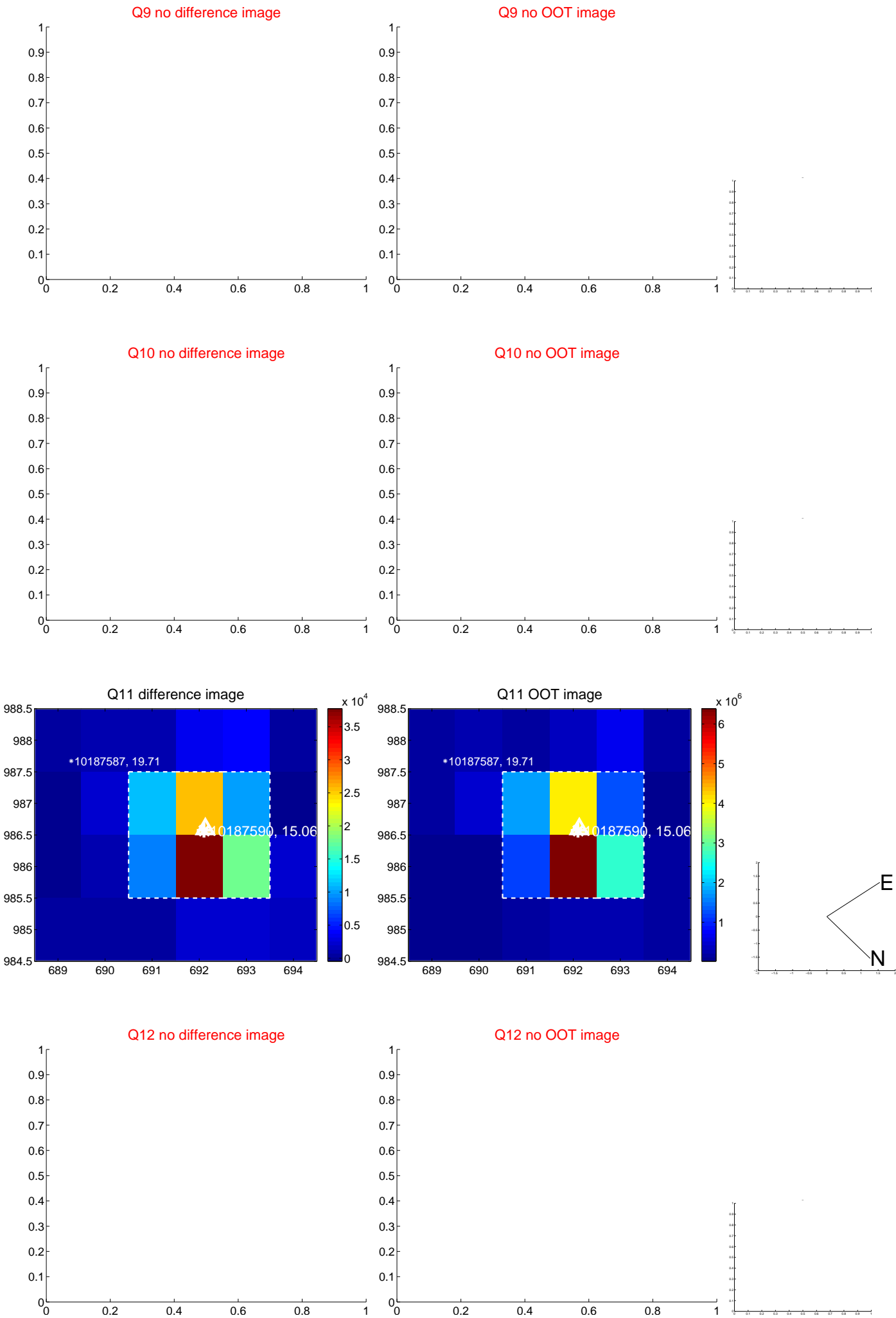
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



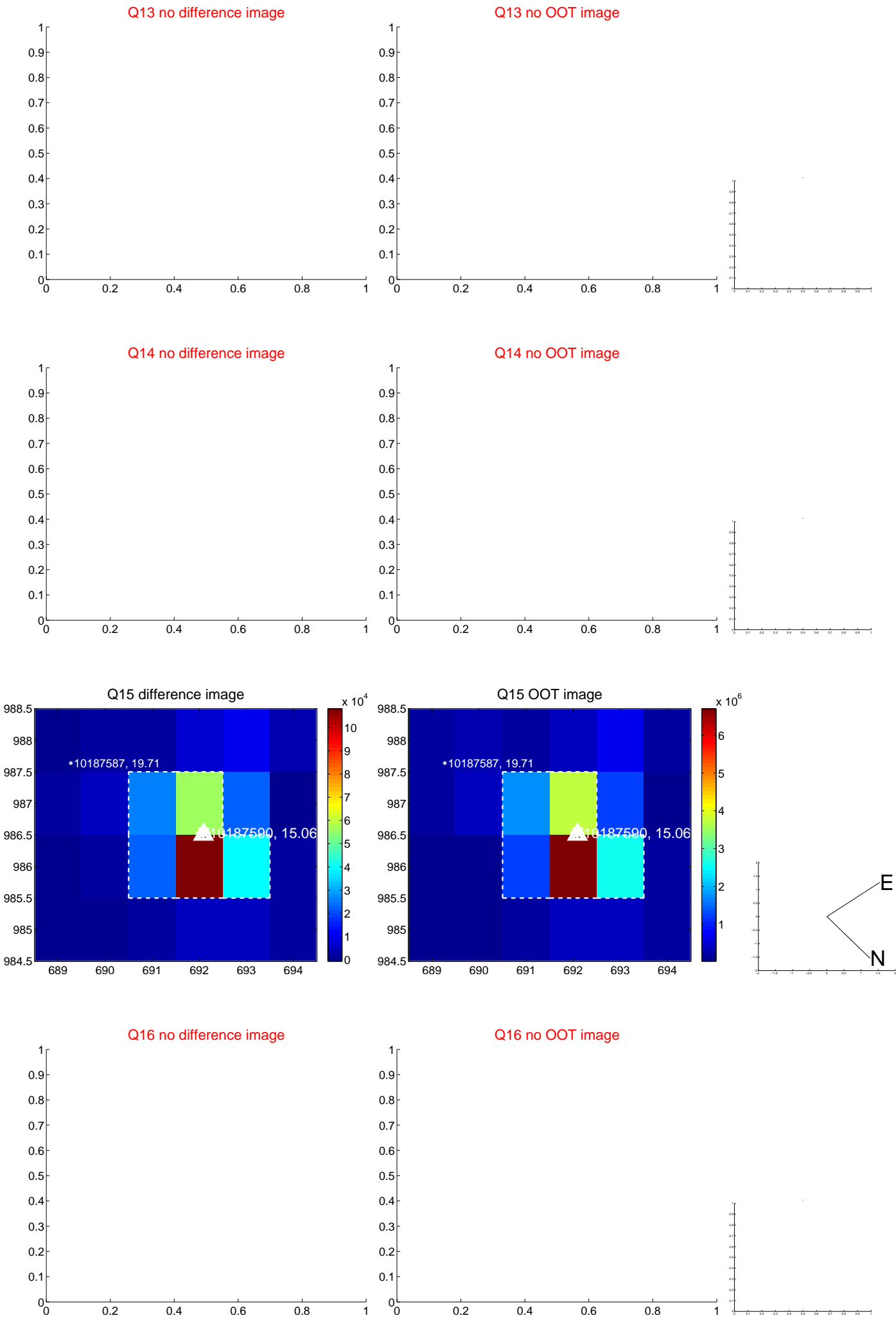
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

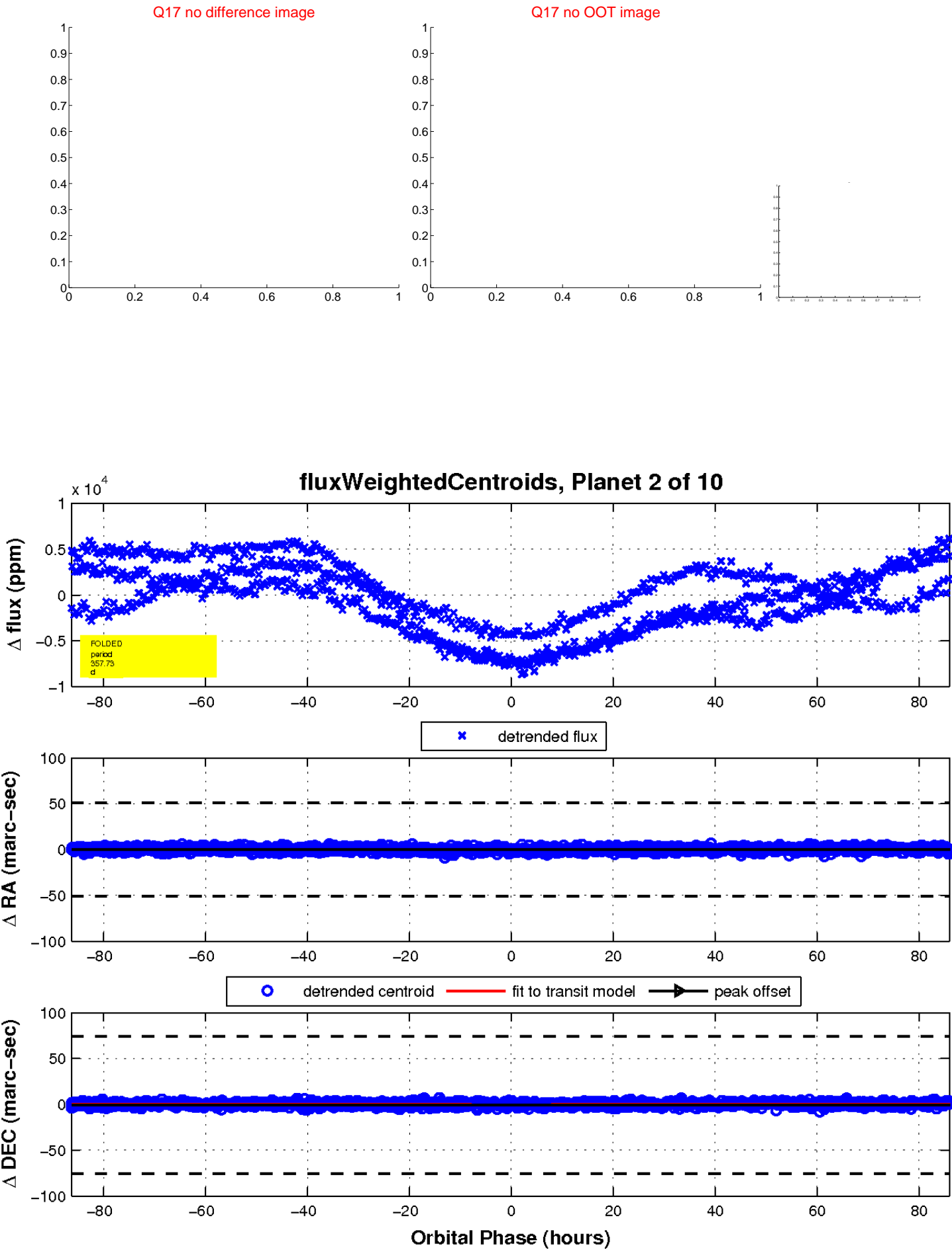


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



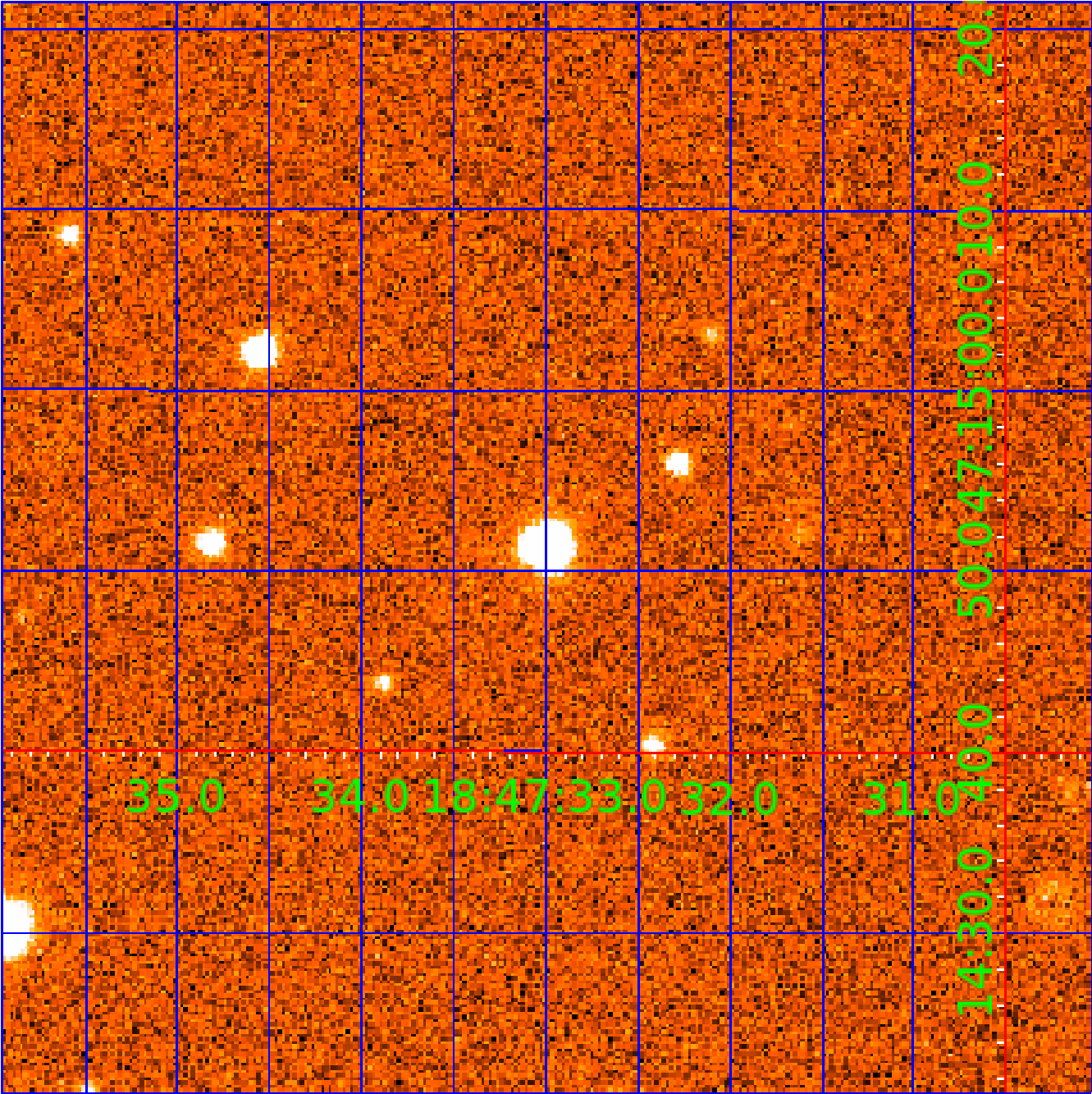


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 010187590

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010187590-01	OBS	No	1.397736	131.711487	72.4	7.994	7.4	7.9	1.03	6108	0.87	2034.61
010187590-02	OBS	No	357.728536	370.052917	9001.2	28.767	15.6	11.8	1.03	6108	16.71	1.25
010187590-03	OBS	No	127.957031	175.181203	13.2	2.604	15.4	0.0	1.03	6108	0.43	4.93
010187590-04	OBS	No	127.988621	175.316389	367.8	3.052	15.2	1.8	1.03	6108	2.17	4.93
010187590-06	OBS	No	93.319103	176.224996	238.0	3.317	12.7	1.4	1.03	6108	1.83	7.51
010187590-07	OBS	No	134.800704	175.639855	1136.5	5.382	13.7	5.2	1.03	6108	6.67	4.60
010187590-08	OBS	No	75.908968	174.229818	670.4	0.657	12.2	2.1	1.03	6108	3.25	9.89

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010187590-01	OBS	FP	0.00	1	0	0	0	LPP_DV
010187590-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS
010187590-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010187590-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—SAME_NTL_PERIOD—CENT_FEW_DIFFS
010187590-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
010187590-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010187590-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_MEAS

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

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

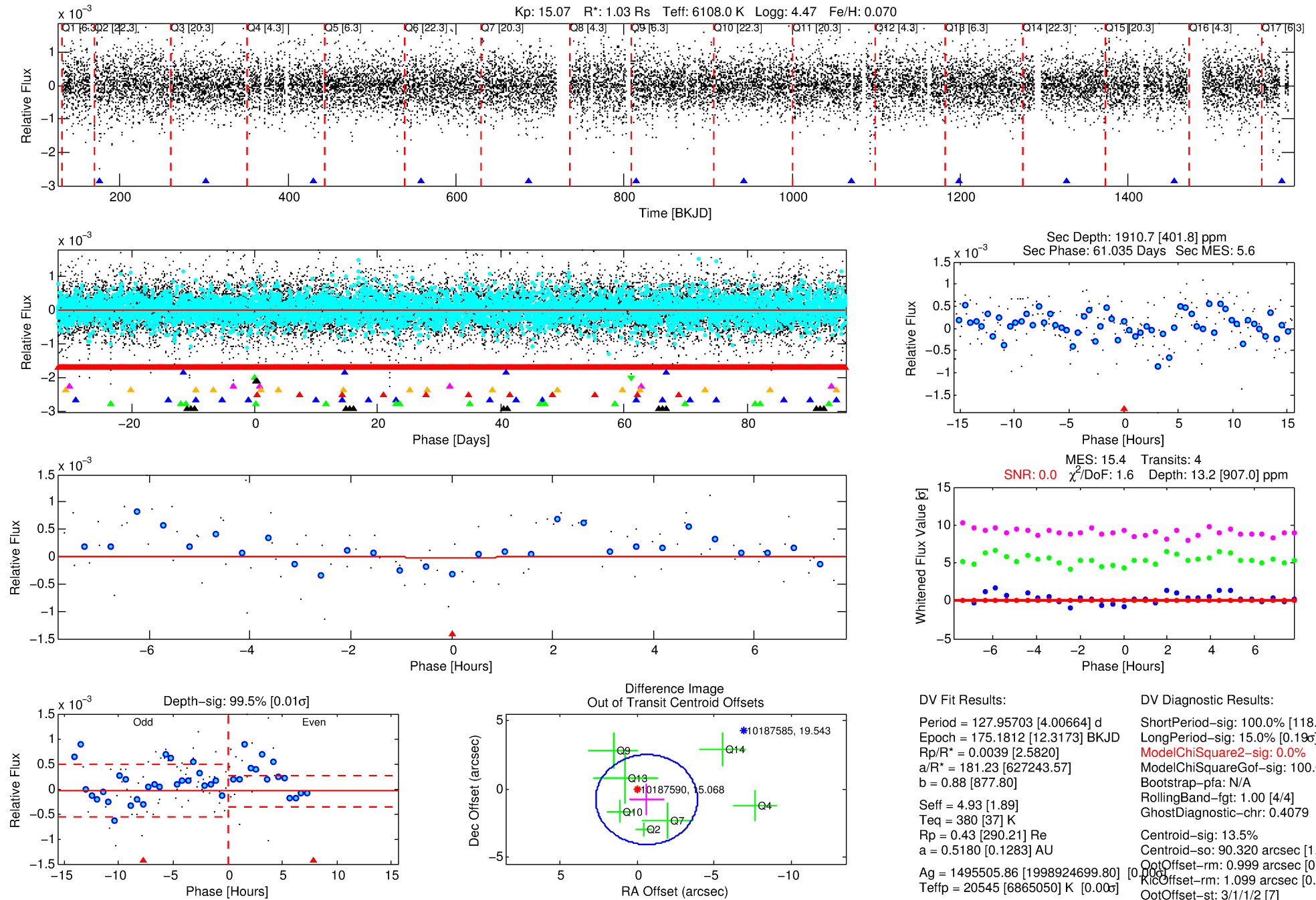
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 010187590-03

No Significant Match Found

# DV One-Page Summary

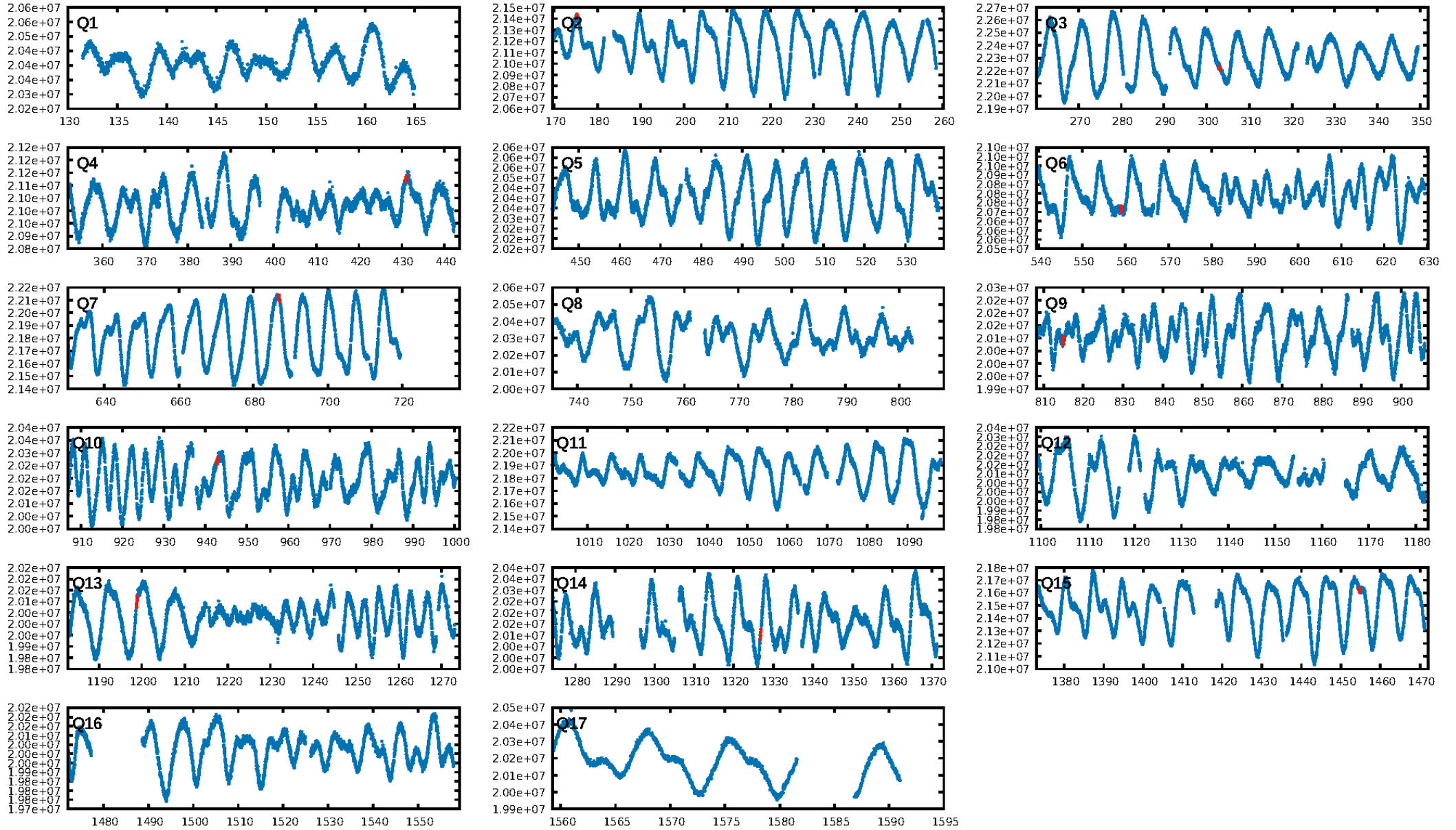
KIC: 10187590 Candidate: 3 of 10 Period: 127.957 d



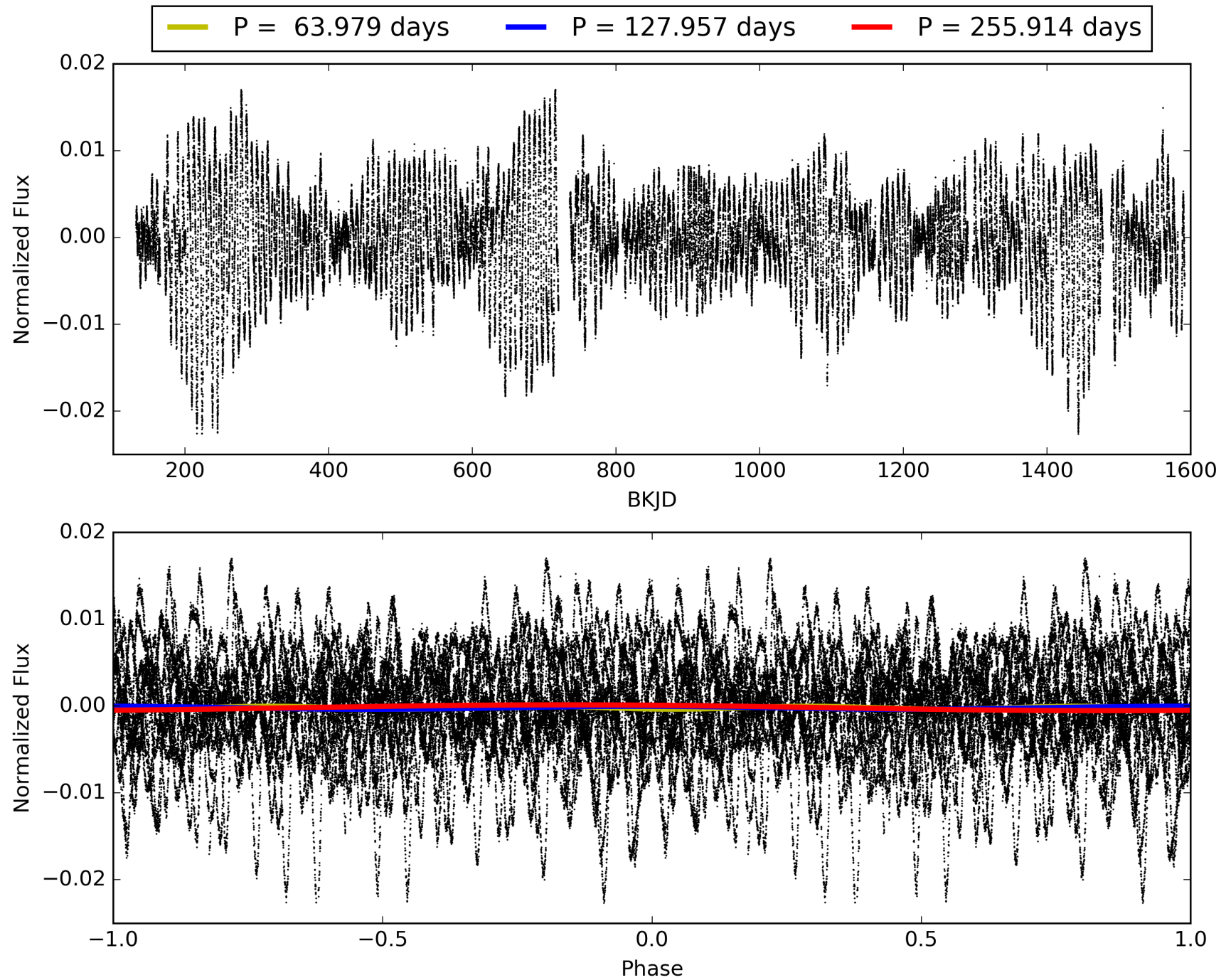
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 14:43:55 Z

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

# TCE 010187590-03, PDC Light Curves



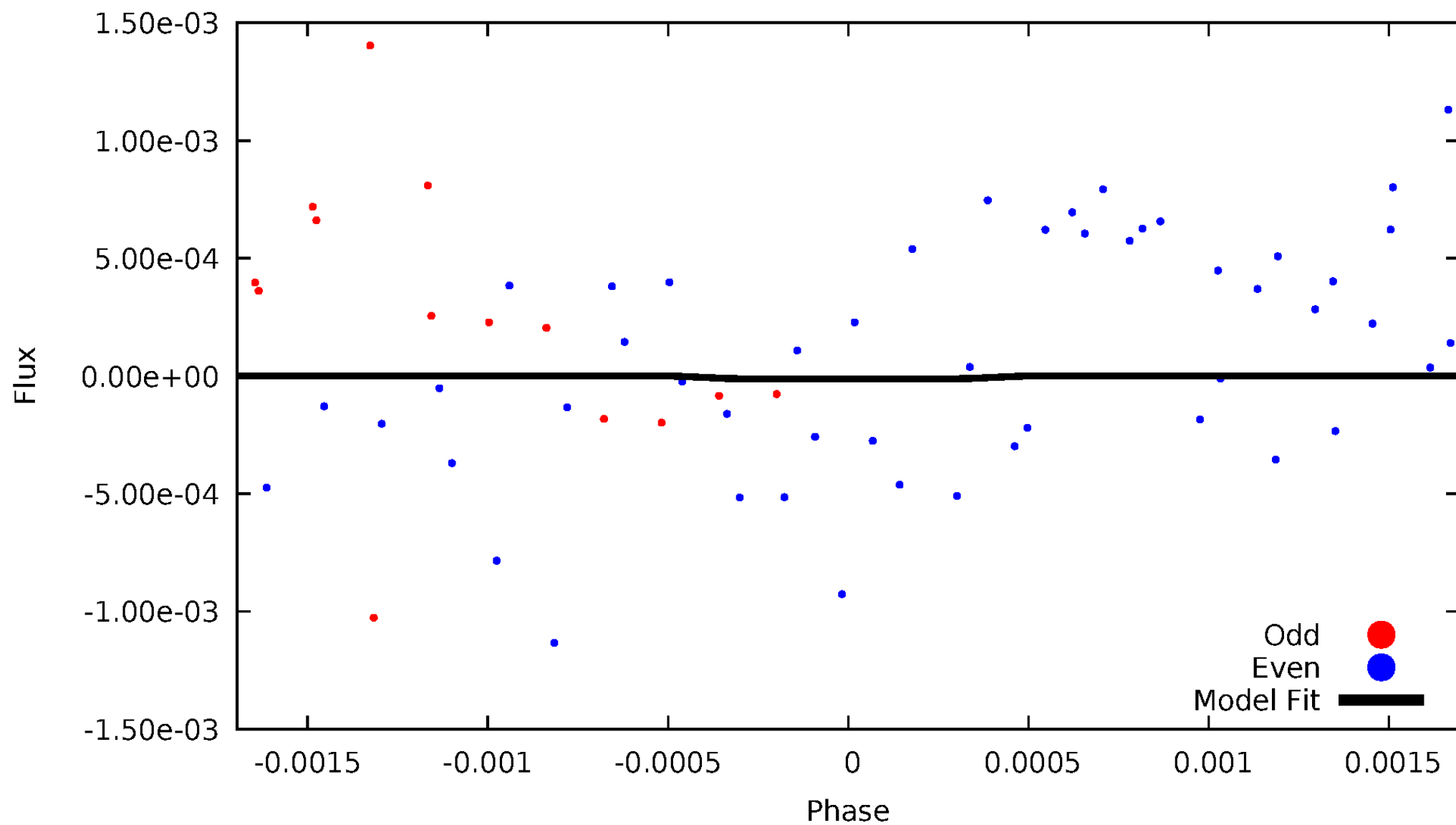
# TCE 010187590-03





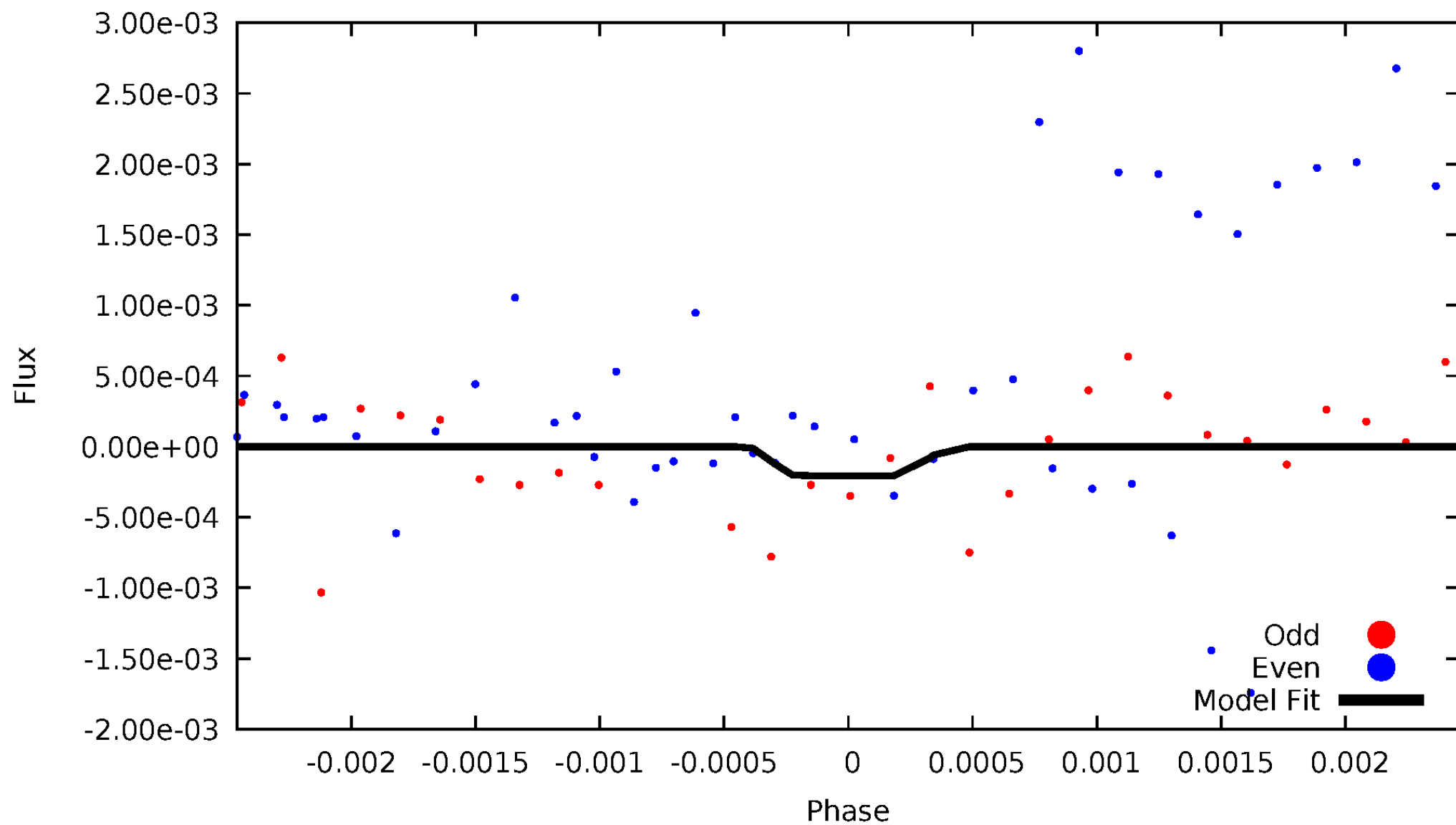
# DV Odd/Even

TCE 010187590-03



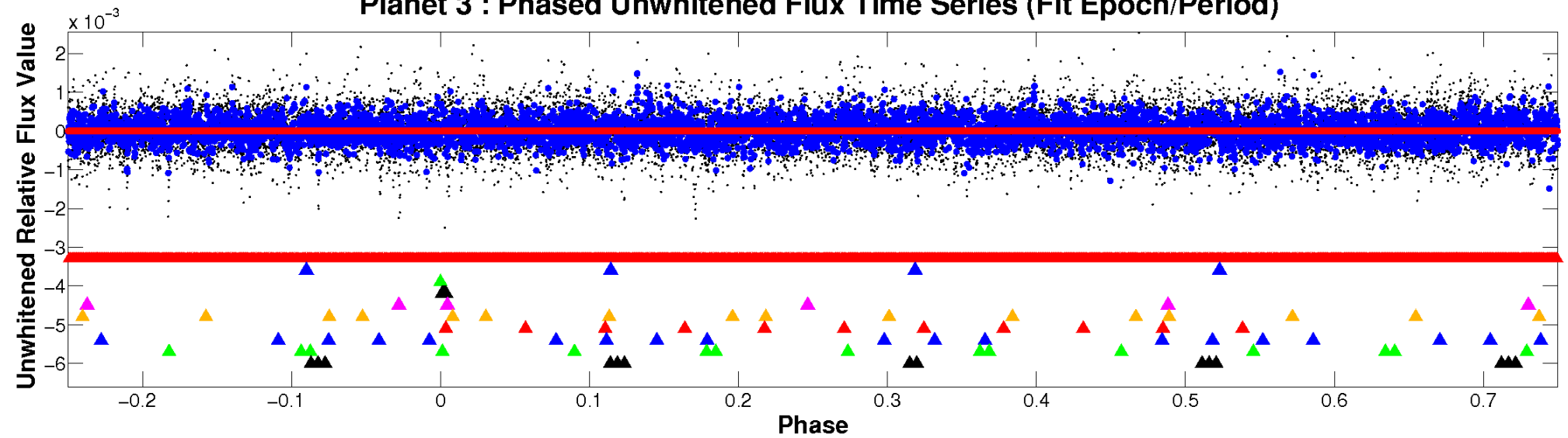
# ALT Odd/Even

TCE 010187590-03

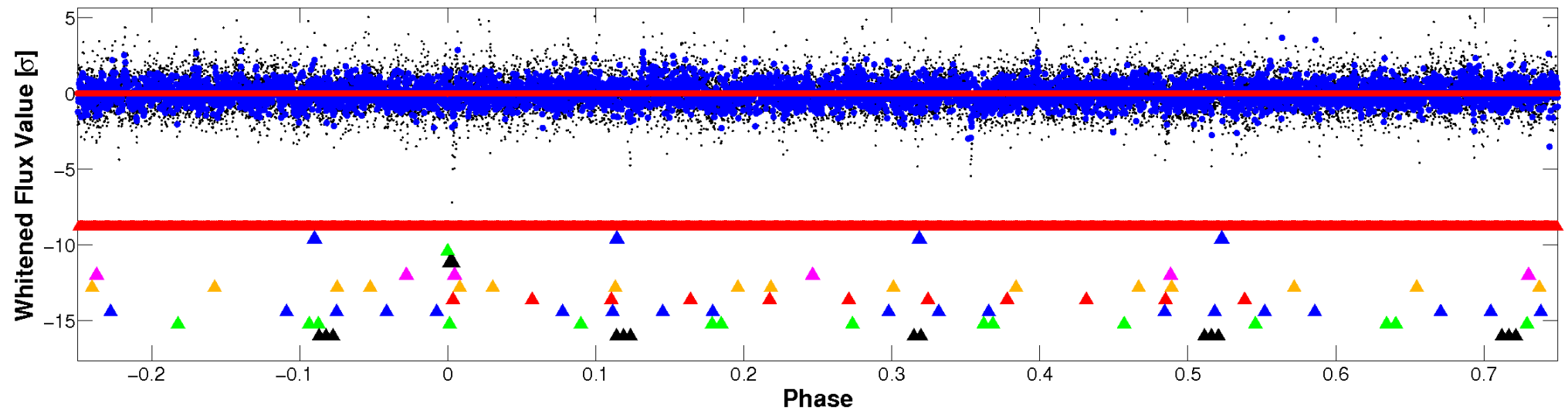


# Non-Whitened Vs. Whitened Light Curve

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

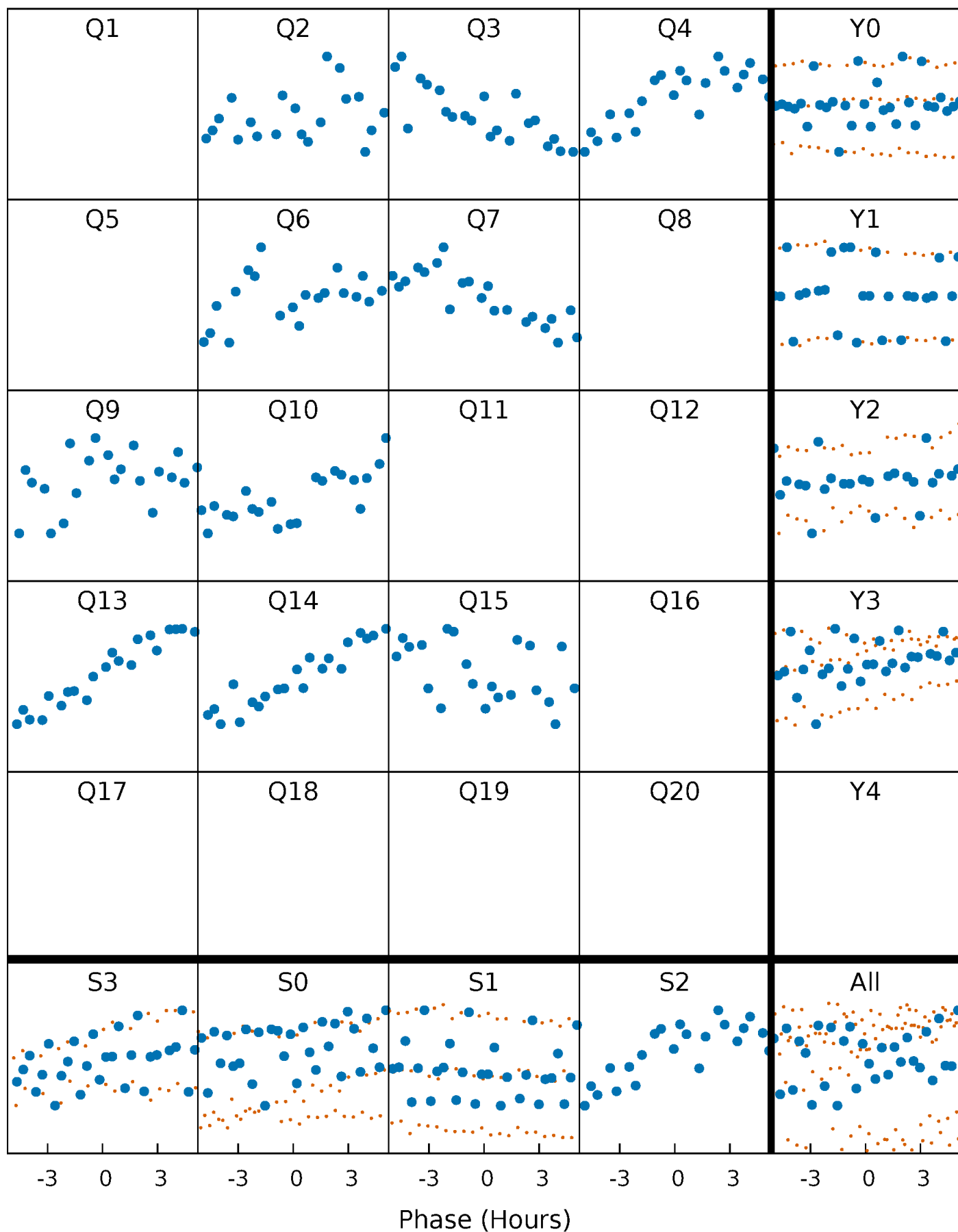


## Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



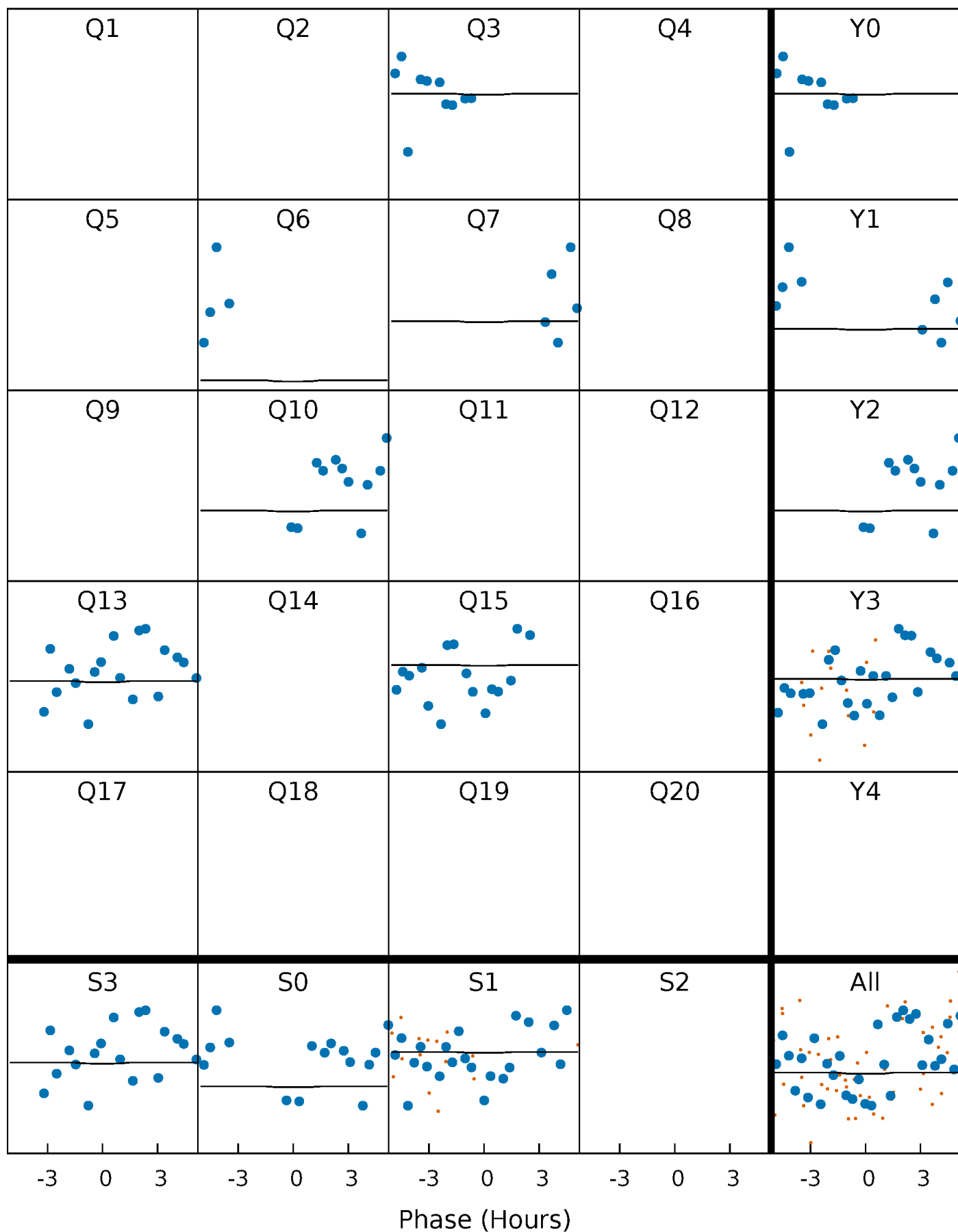
# PDC Quarter-Phased Transit Curves

TCE 010187590-03     $P=127.957031$  Days     $T_0=175.181203$  (BKJD)



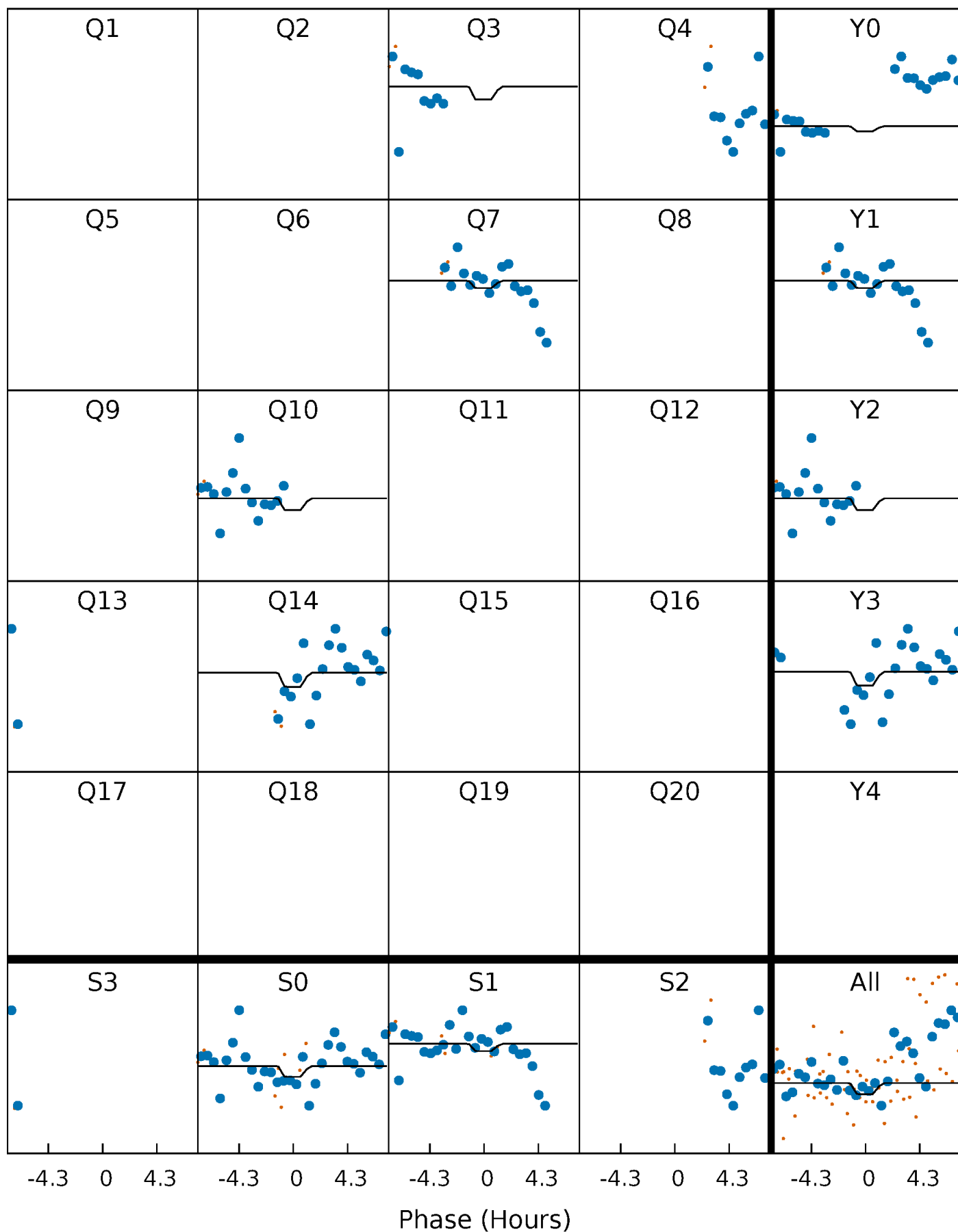
# DV Quarter-Phased Transit Curves

TCE 010187590-03     $P=127.957031$  Days     $T_0=175.181203$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 010187590-03 P=128.013354 Days  $T_0=175.227979$  (BKJD)

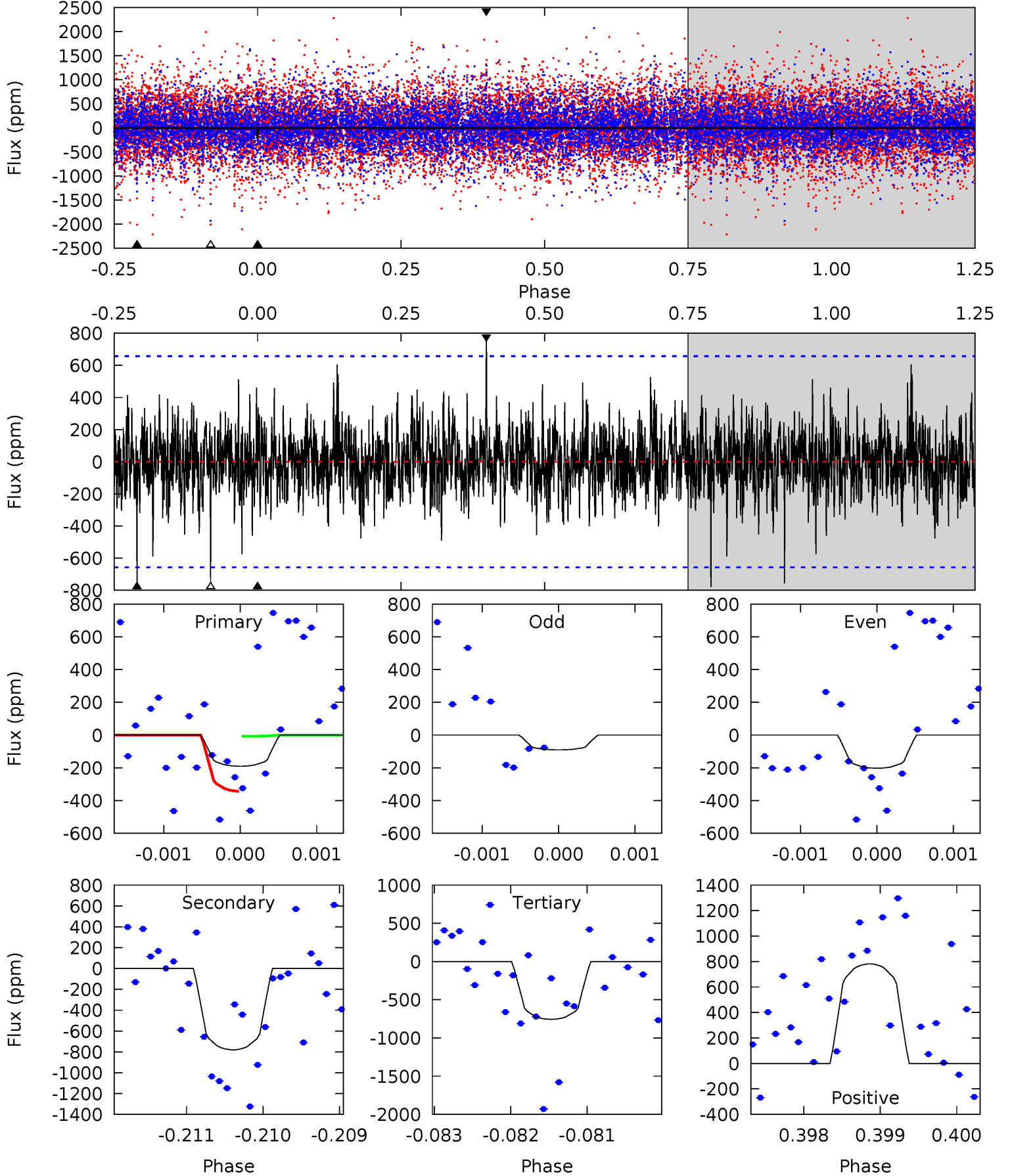




# DV Model-Shift Uniqueness Test

010187590-03, P = 127.957031 Days, E = 47.224172 Days

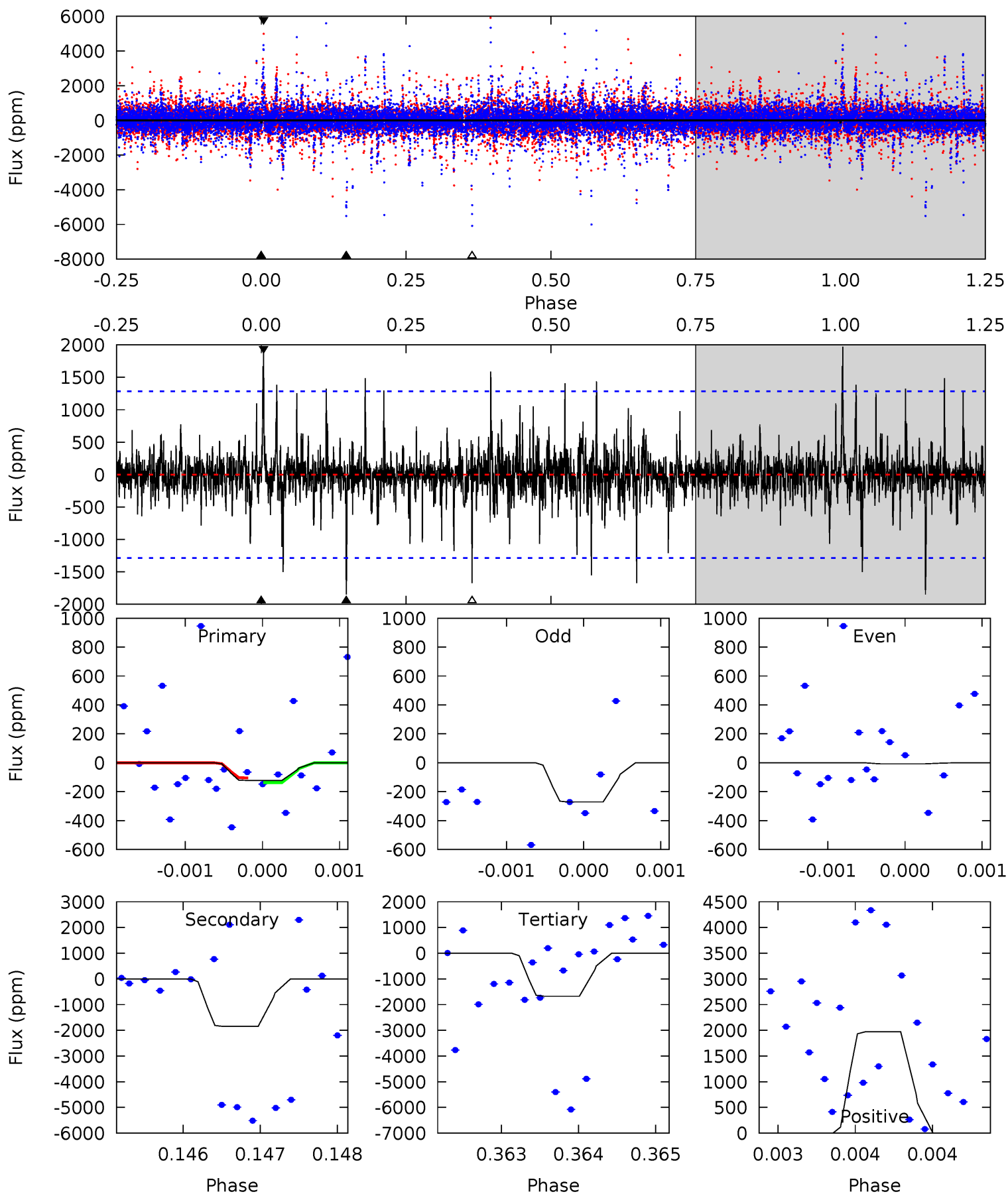
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
1.58	6.49	6.29	6.50	5.46	3.30	1.29	-4.70	-4.91	0.20	-0.01	0.30	2.01	0.50	1.39



# Alt Model-Shift Uniqueness Test

010187590-03, P = 128.013354 Days, E = 47.214625 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0.53	7.92	7.17	8.45	5.51	3.38	1.18	-6.64	-7.92	0.75	-0.53	0.42	0.57	0.52	0.07



### Stellar Parameters For KIC 010187590

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6108^{+172}_{-215}$	$4.466^{+0.048}_{-0.192}$	$0.070^{+0.250}_{-0.300}$	$1.030^{+0.306}_{-0.102}$	$1.132^{+0.130}_{-0.143}$	$1.457^{+0.384}_{-0.739}$
	+3%/-4%	+1%/-4%	+357%/-429%	+30%/-10%	+11%/-13%	+26%/-51%
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 010187590-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-781 \pm 120$	$197.27^{+253.22}_{-139.29}$	$542^{+34}_{-28}$	$1803^{+577}_{-317}$	$2.859^{+31.794}_{-2.286}$
Alt.	$-1848 \pm 233$	$206.56^{+226.41}_{-140.14}$	$541^{+37}_{-26}$	$1953^{+587}_{-282}$	$6.030^{+55.918}_{-4.612}$

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

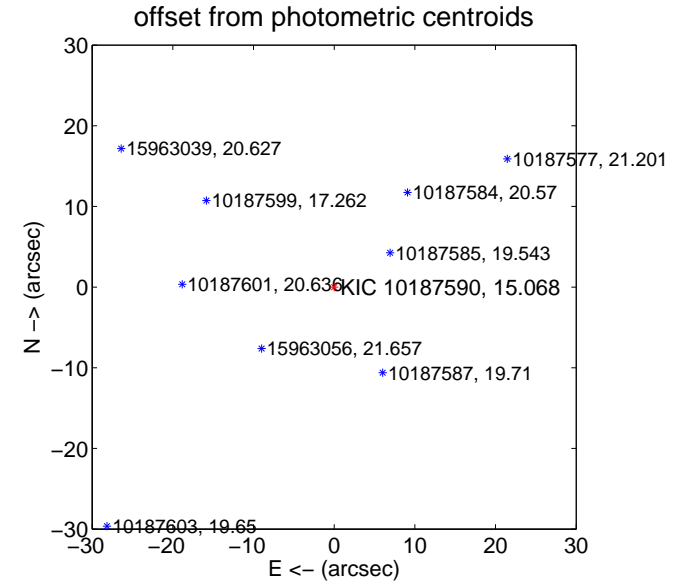
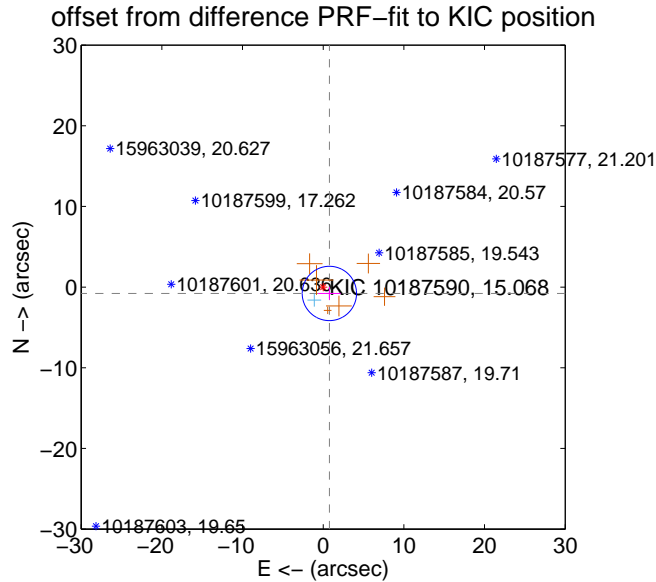
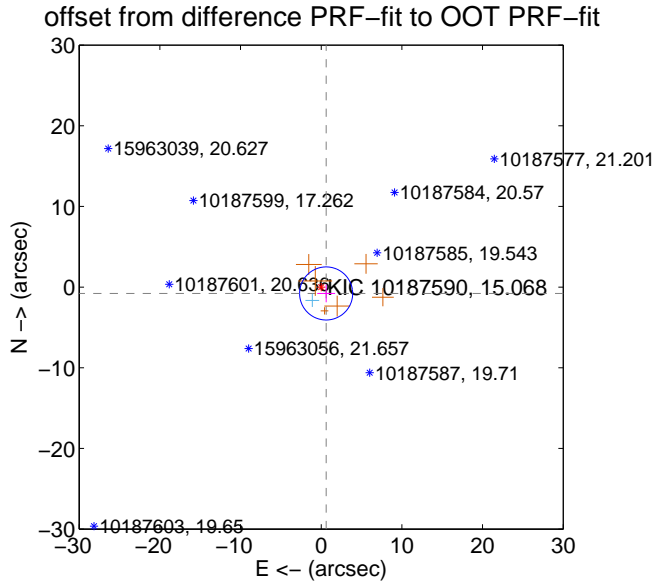
## DV Centroid Data

Supplemental centroid analysis for 010187590-03. Kepler magnitude: 15.07. Transit SNR 0.03

There are 1 quarters with good PRF difference image offsets

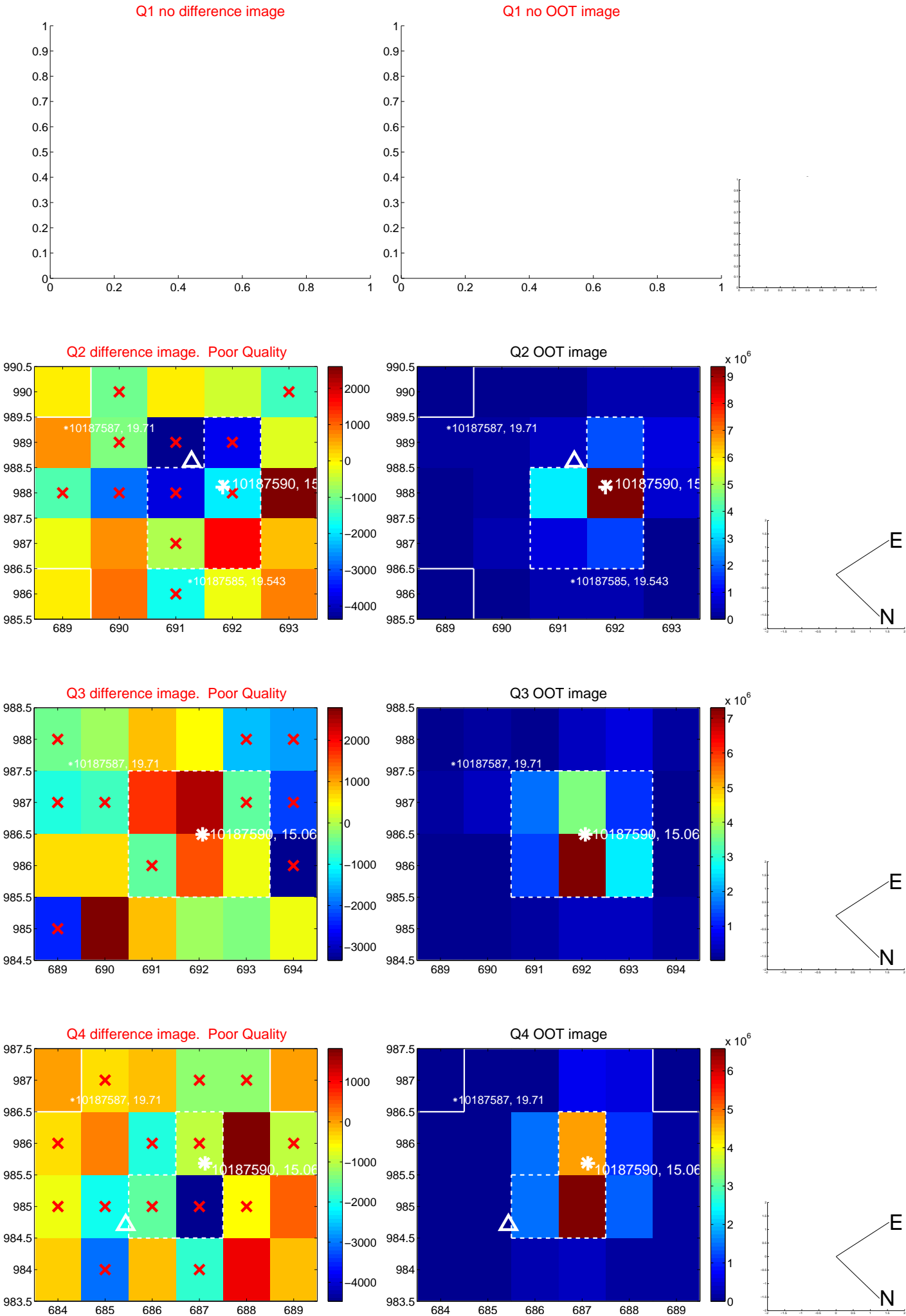
The direct PRF centroid is offset from the target star catalog position by about 0.05 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.999 \pm 1.097$	0.91	$-0.614 \pm 1.104$	$-0.788 \pm 1.092$
PRF-fit source offset from KIC position	$1.099 \pm 1.122$	0.98	$-0.767 \pm 1.404$	$-0.788 \pm 0.829$
photometric centroid source offset	$90.33 \pm 73.26$	1.23	$52.25 \pm 77.46$	$-73.68 \pm 71.06$

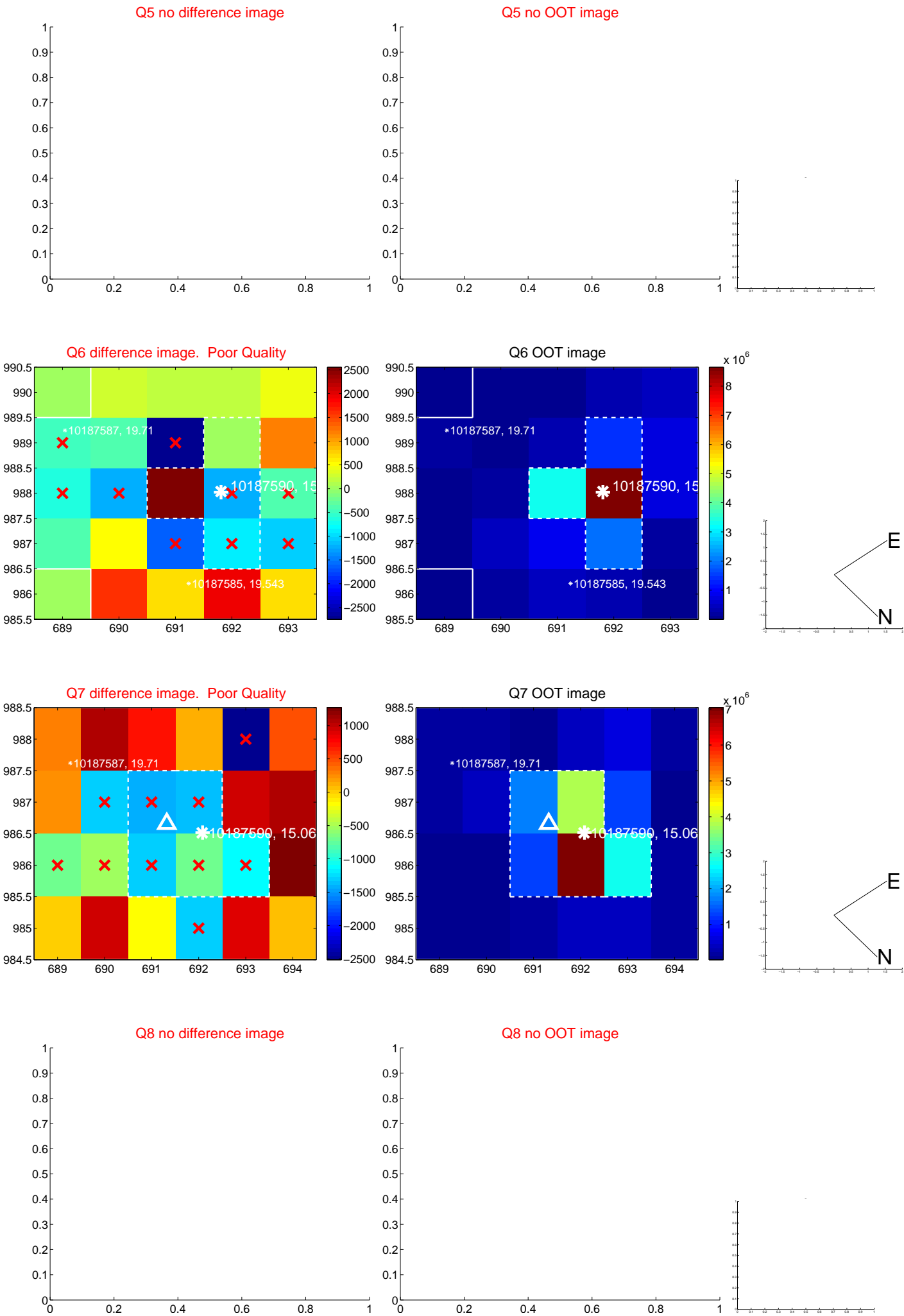


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

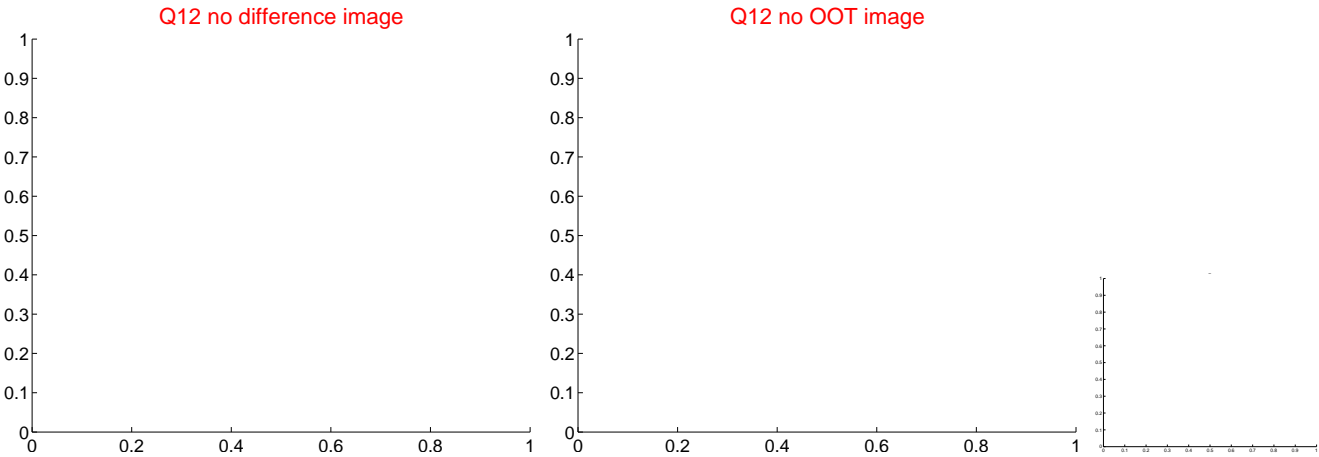
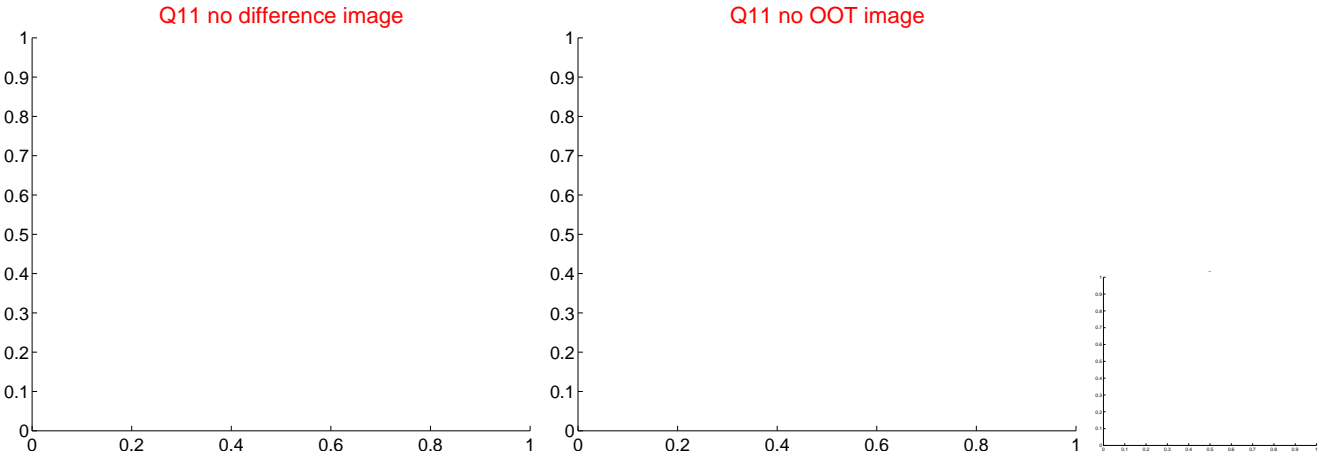
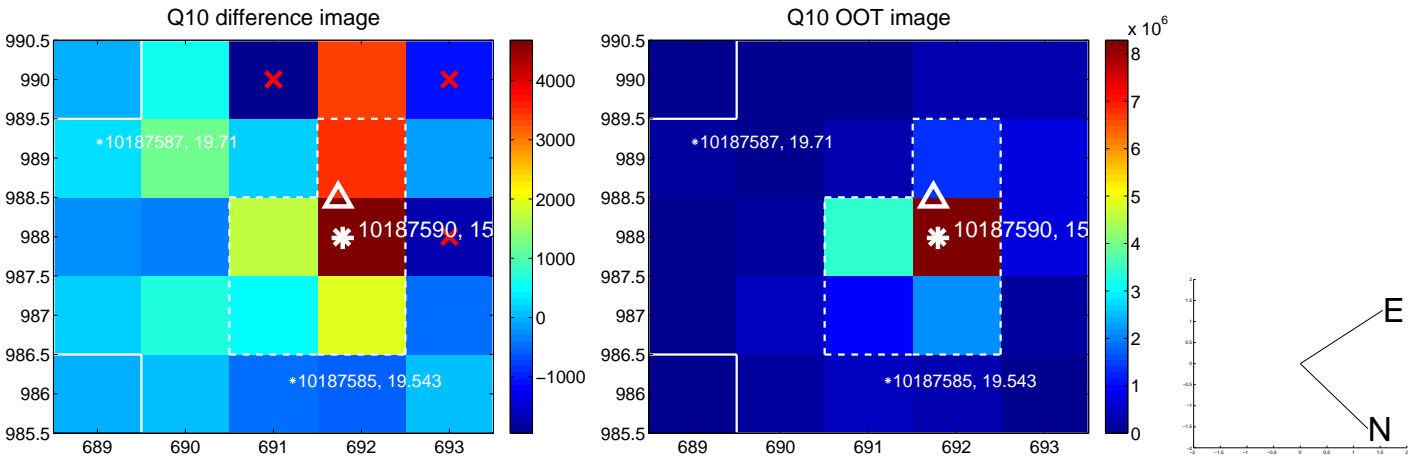
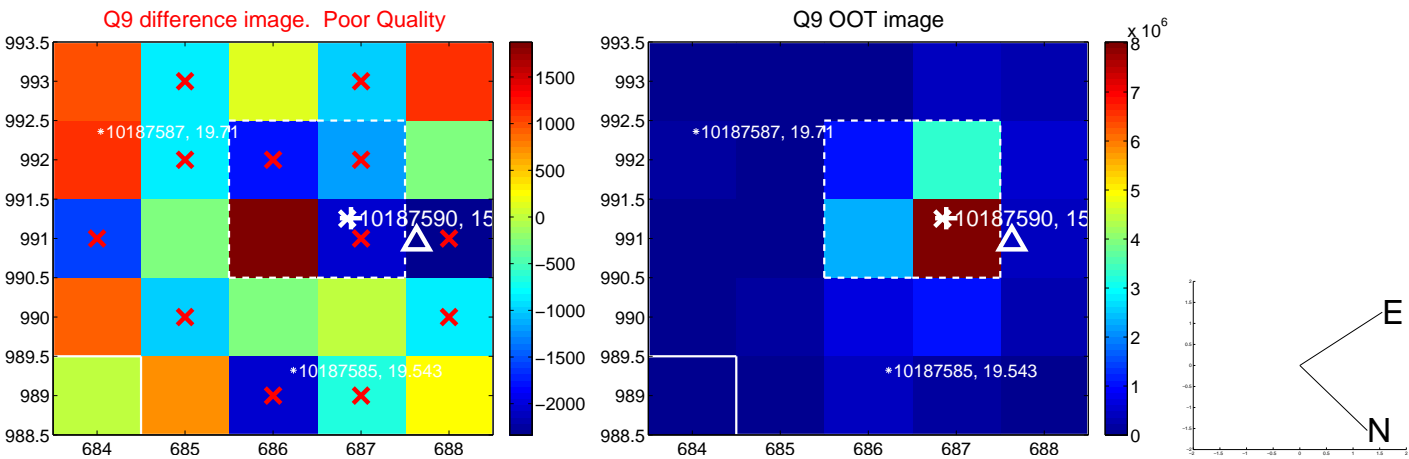


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

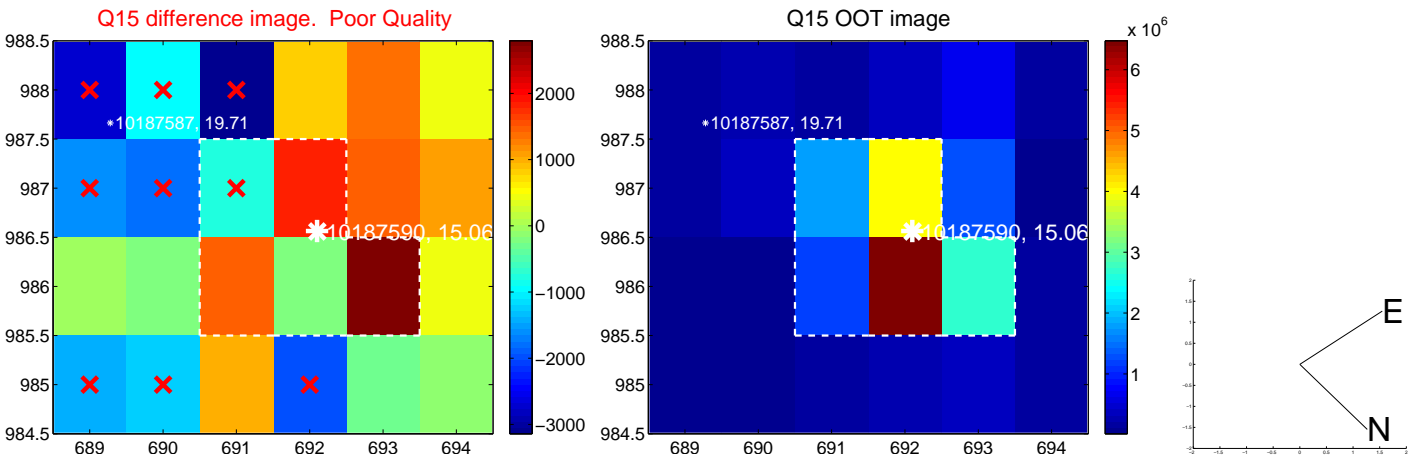
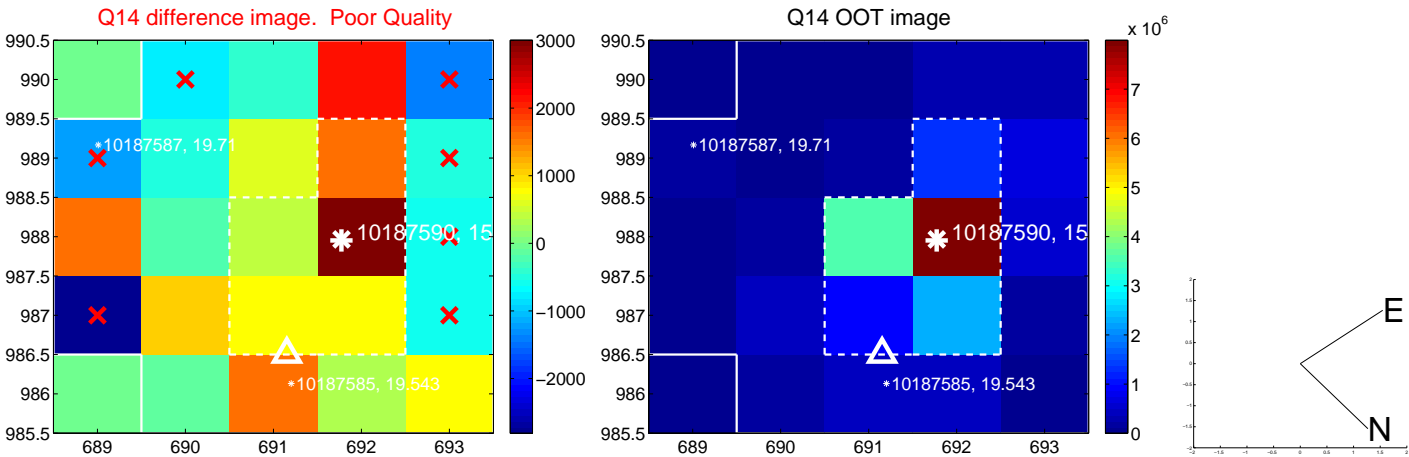
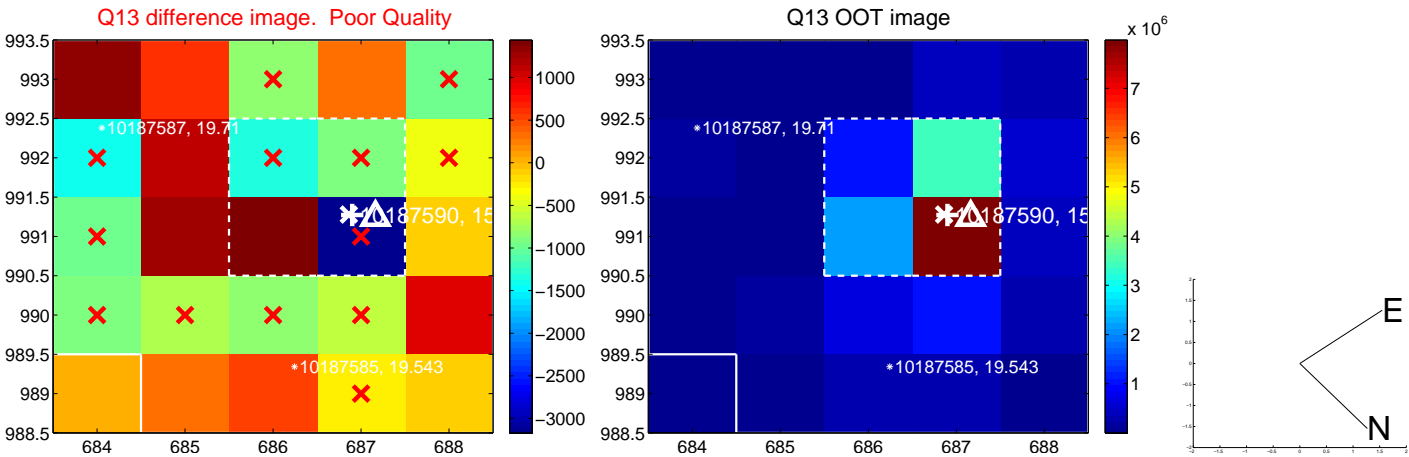




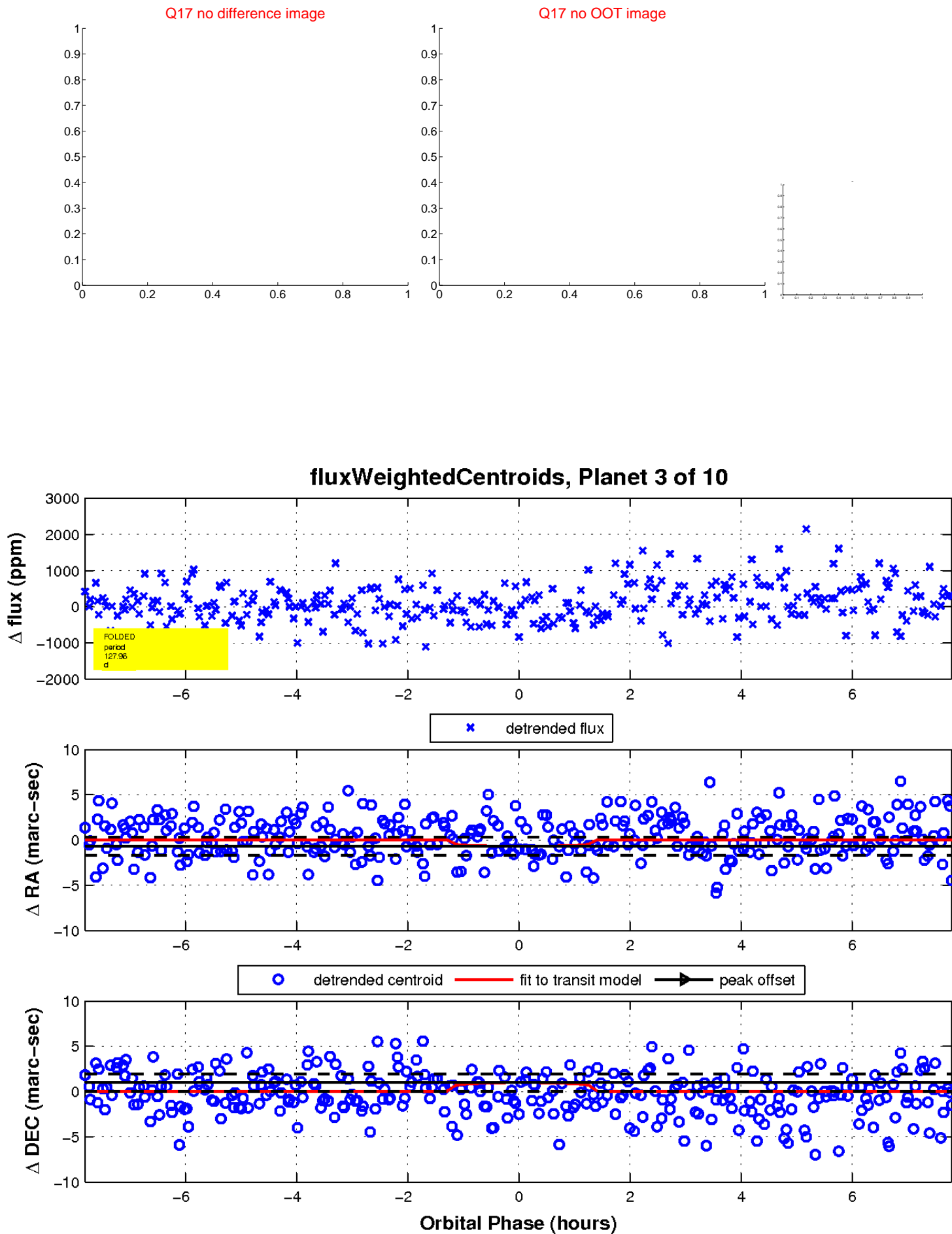
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

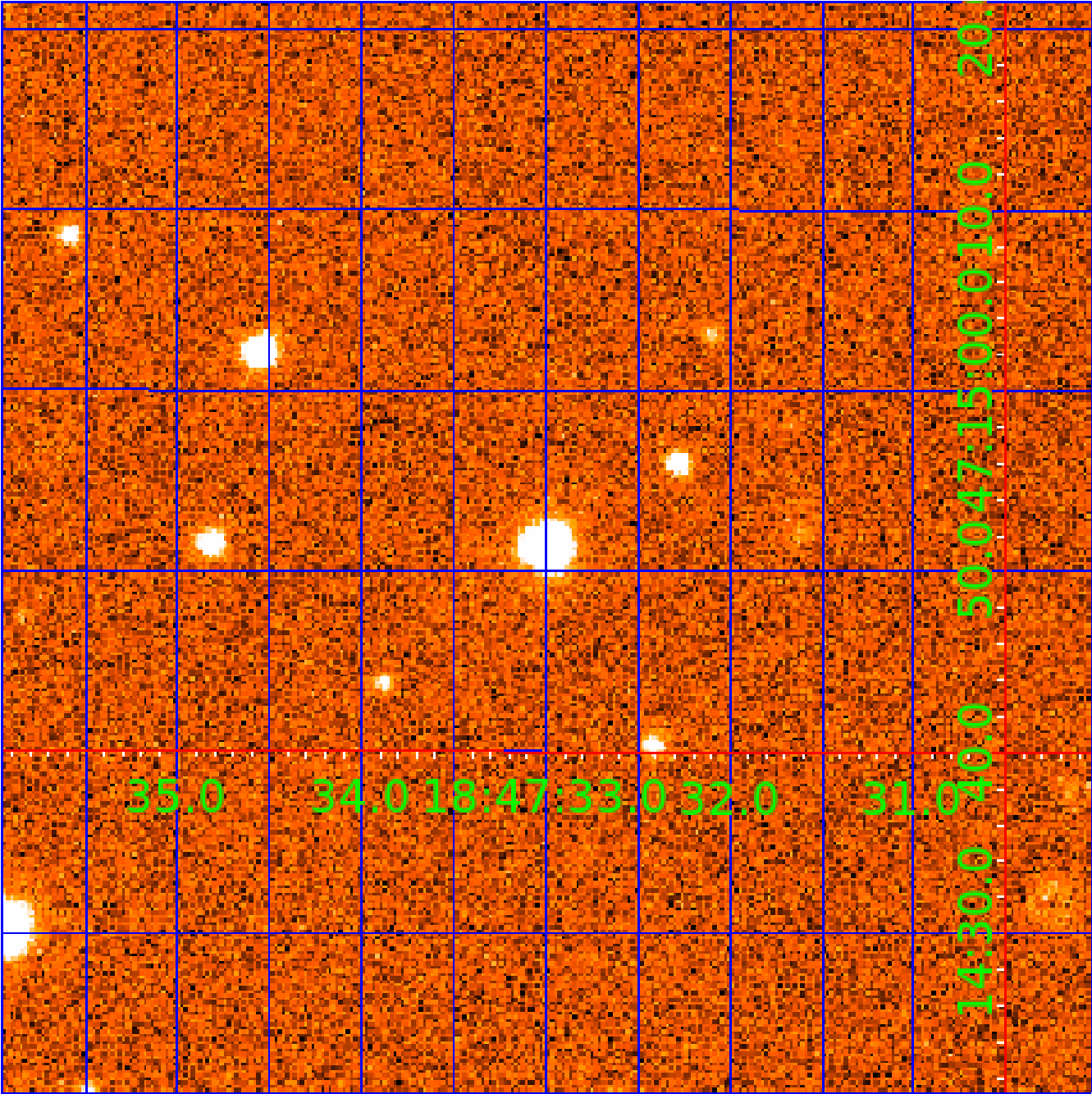


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 010187590

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010187590-01	OBS	No	1.397736	131.711487	72.4	7.994	7.4	7.9	1.03	6108	0.87	2034.61
010187590-02	OBS	No	357.728536	370.052917	9001.2	28.767	15.6	11.8	1.03	6108	16.71	1.25
010187590-03	OBS	No	127.957031	175.181203	13.2	2.604	15.4	0.0	1.03	6108	0.43	4.93
010187590-04	OBS	No	127.988621	175.316389	367.8	3.052	15.2	1.8	1.03	6108	2.17	4.93
010187590-06	OBS	No	93.319103	176.224996	238.0	3.317	12.7	1.4	1.03	6108	1.83	7.51
010187590-07	OBS	No	134.800704	175.639855	1136.5	5.382	13.7	5.2	1.03	6108	6.67	4.60
010187590-08	OBS	No	75.908968	174.229818	670.4	0.657	12.2	2.1	1.03	6108	3.25	9.89

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010187590-01	OBS	FP	0.00	1	0	0	0	LPP_DV
010187590-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS
010187590-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010187590-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—SAME_NTL_PERIOD—CENT_FEW_DIFFS
010187590-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
010187590-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010187590-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_MEAS

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

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

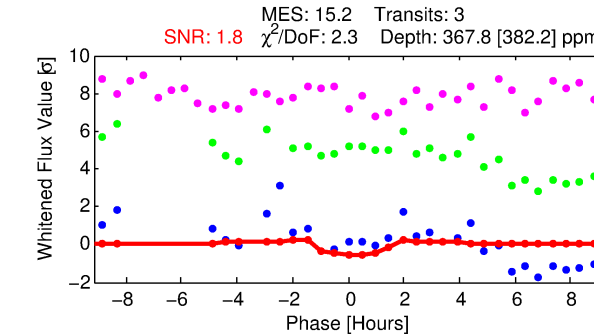
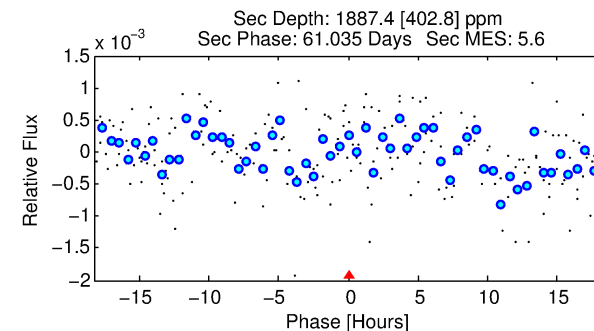
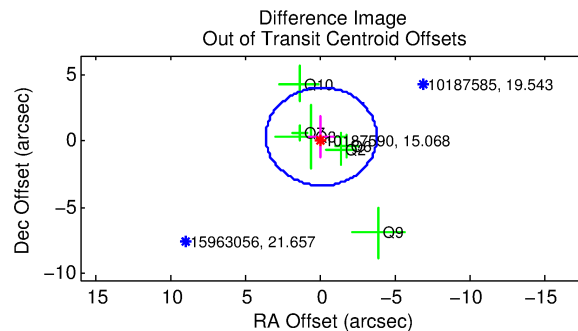
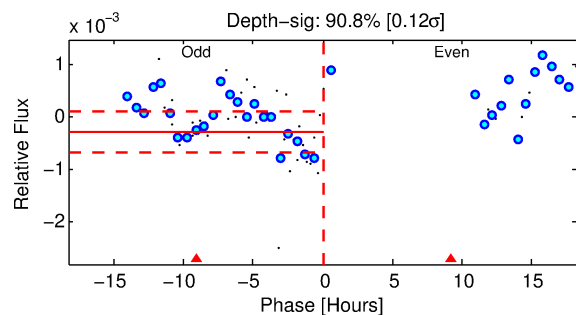
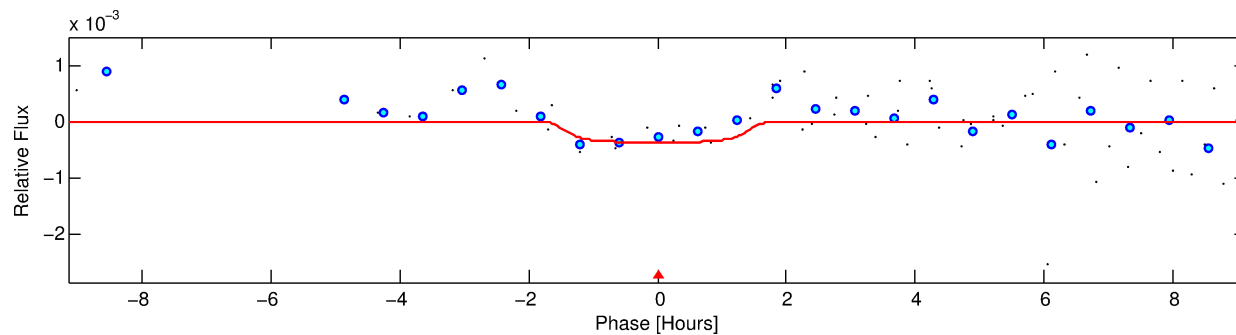
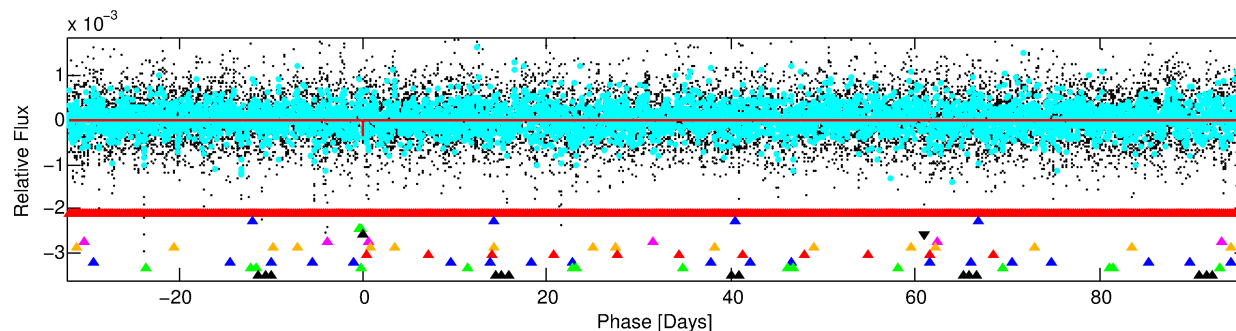
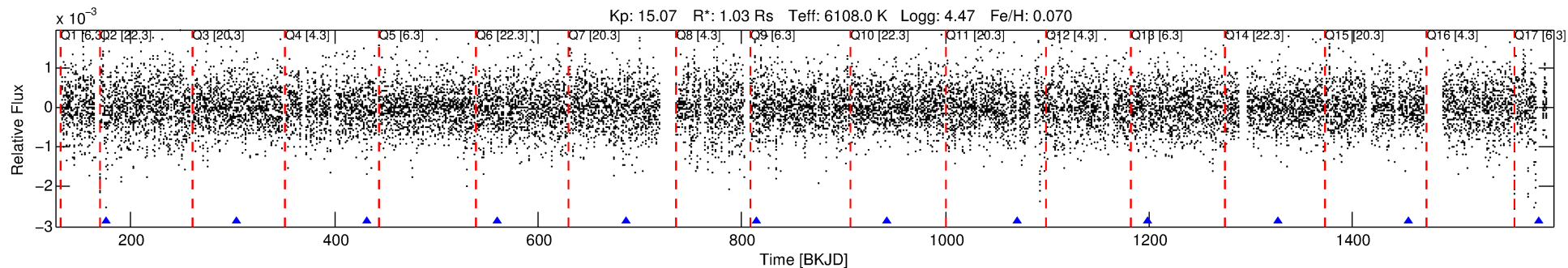
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 010187590-04

No Significant Match Found

# DV One-Page Summary

KIC: 10187590 Candidate: 4 of 10 Period: 127.989 d



## DV Fit Results:

Period = 127.98862 [0.01587] d  
Epoch = 175.3164 [0.0674] BKJD  
Rp/R\* = 0.0193 [0.0990]  
a/R\* = 208.40 [5091.80]  
b = 0.78 [12.04]  
Seff = 4.93 [1.88]  
Teq = 380 [36] K  
Rp = 2.17 [11.14] Re  
a = 0.5180 [0.1279] AU  
Ag = 58920.60 [603383.01] [0.10 $\sigma$ ]  
Teffp = 9152 [23420] K [0.37 $\sigma$ ]

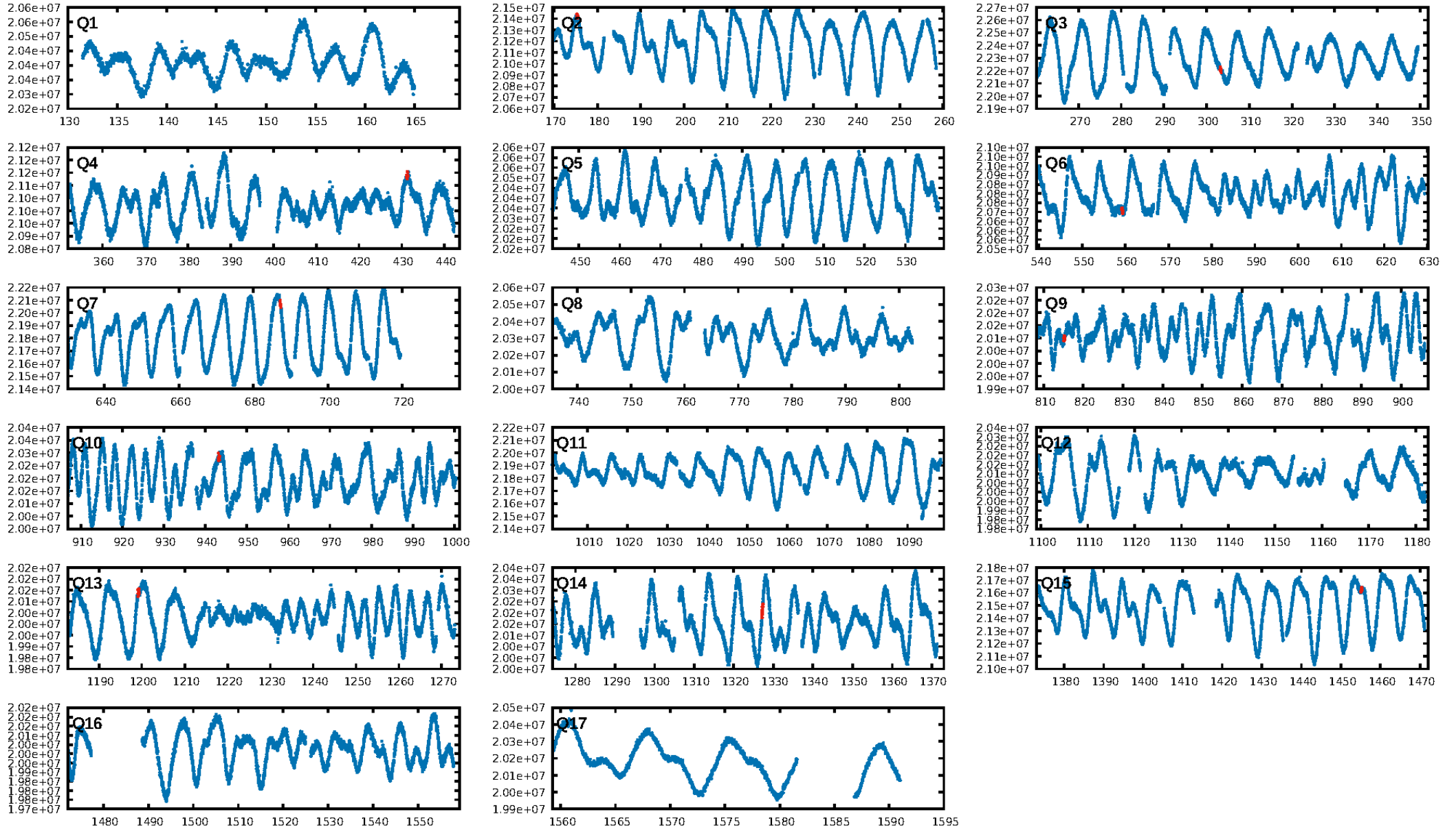
## DV Diagnostic Results:

ShortPeriod-sig: 15.0% [0.19 $\sigma$ ]  
LongPeriod-sig: 100.0% [26.42 $\sigma$ ]  
ModelChiSquare2-sig: 85.0%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: -1.937  
Centroid-sig: 0.0%  
Centroid-so: 7.809 arcsec [3.30 $\sigma$ ]  
OotOffset-rm: 0.370 arcsec [0.30 $\sigma$ ]  
KicOffset-rm: 0.391 arcsec [0.37 $\sigma$ ]  
OotOffset-st: 3/2/0/1 [6]  
KicOffset-st: 3/2/0/1 [6]  
DiffImageQuality-fgm: 0.00 [0/6]  
DiffImageOverlap-fno: 0.00 [0/10]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 14:44:00 Z

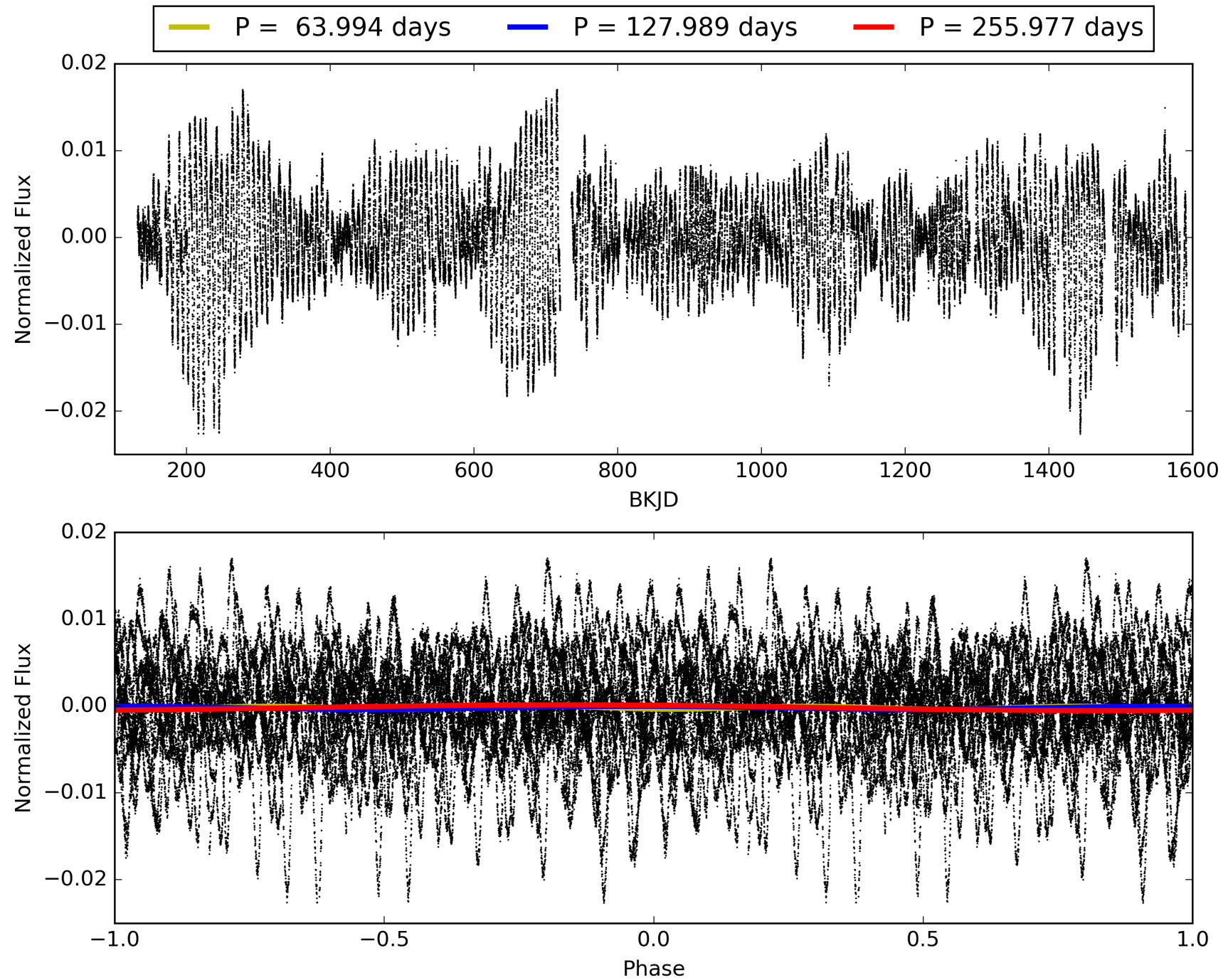
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 010187590-04, PDC Light Curves



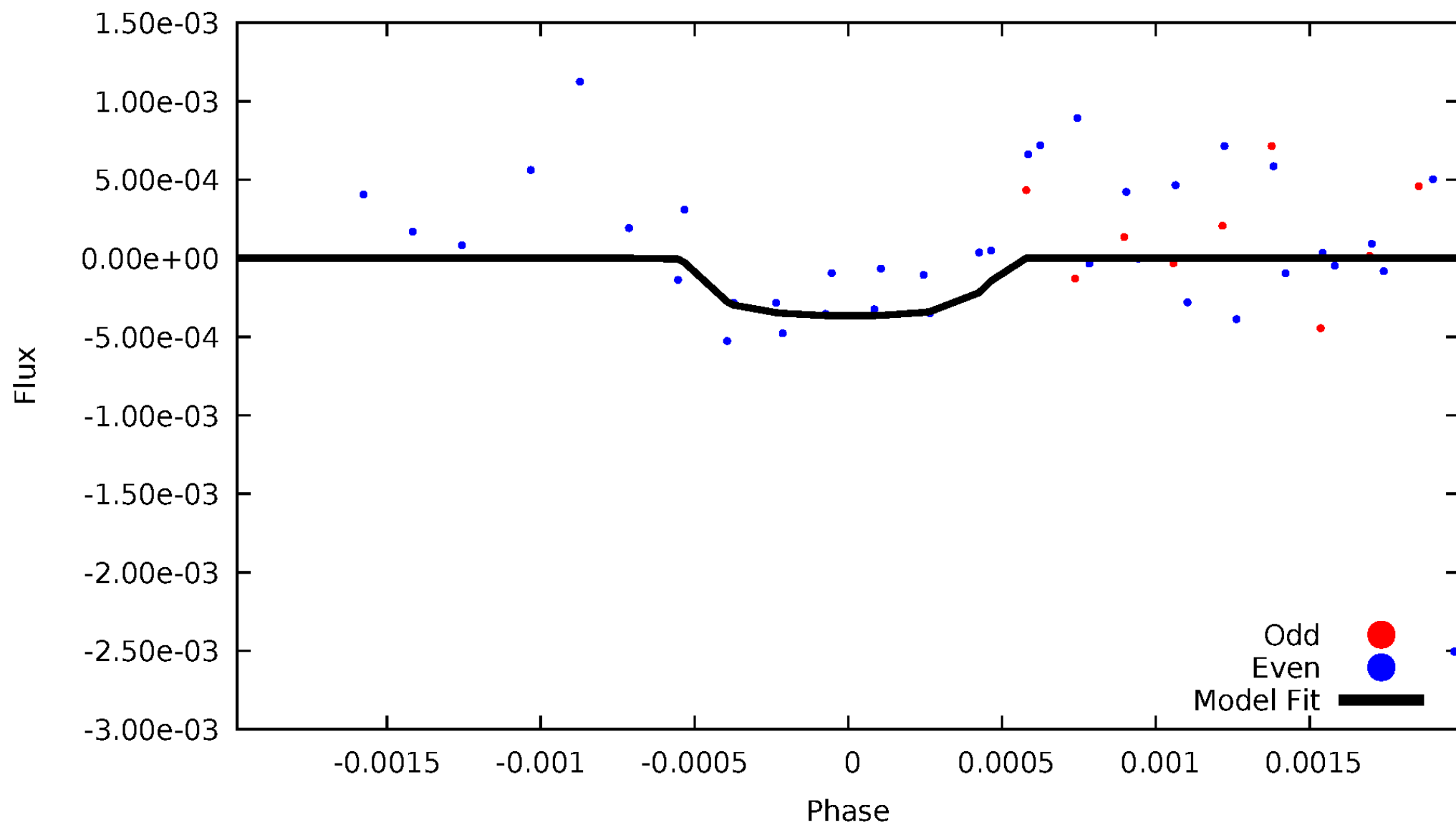


# TCE 010187590-04



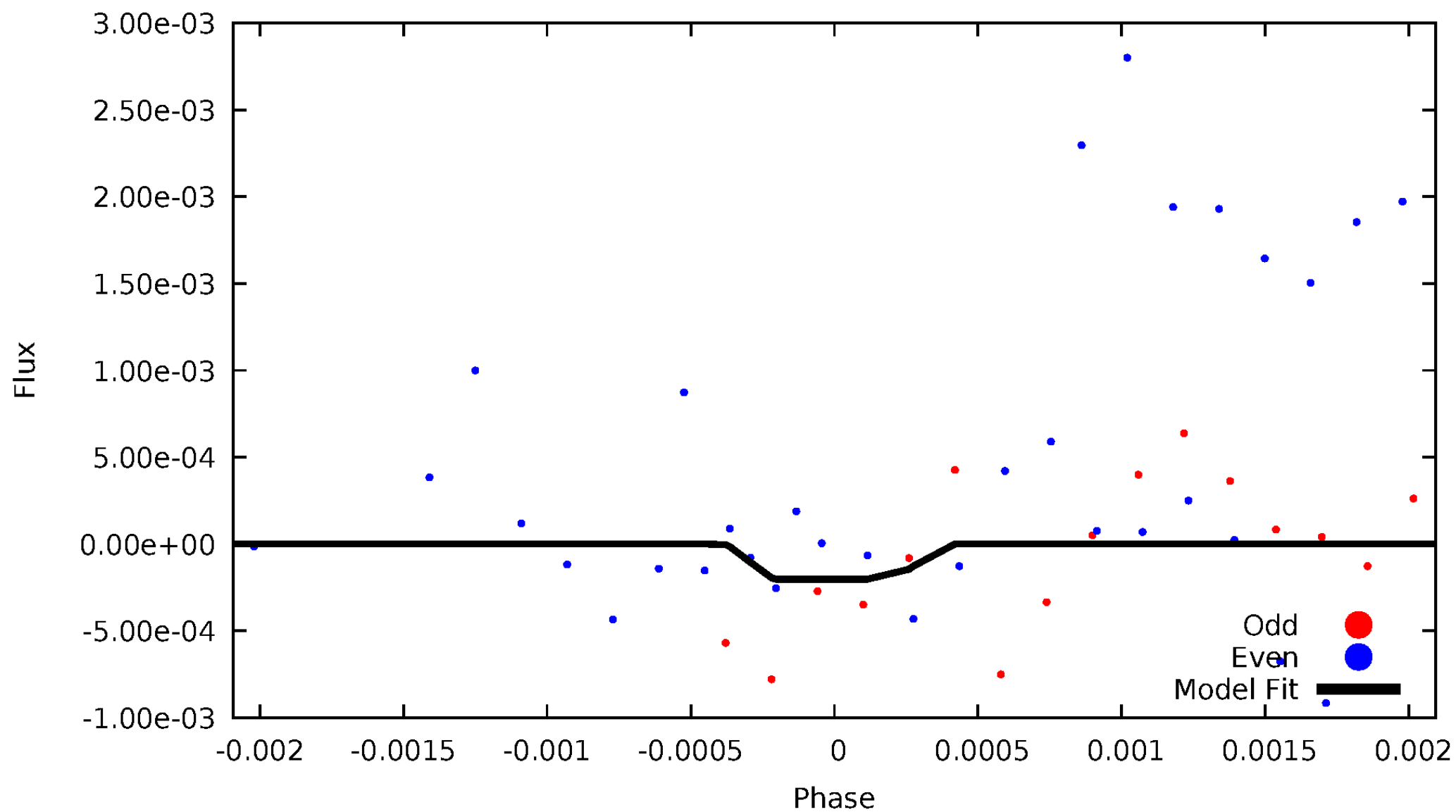
# DV Odd/Even

TCE 010187590-04



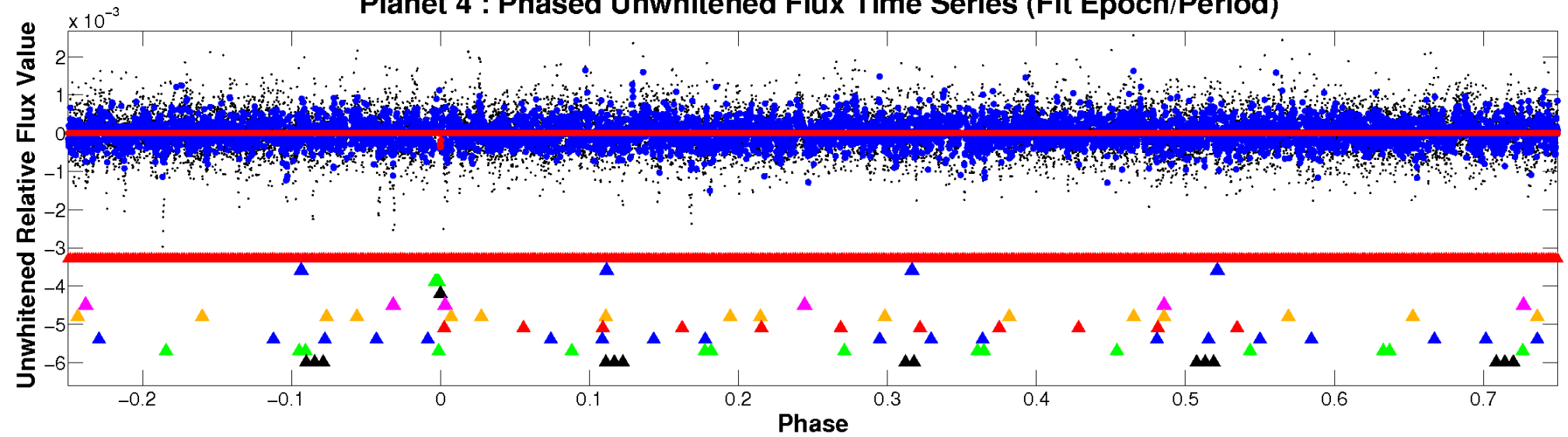
# ALT Odd/Even

TCE 010187590-04

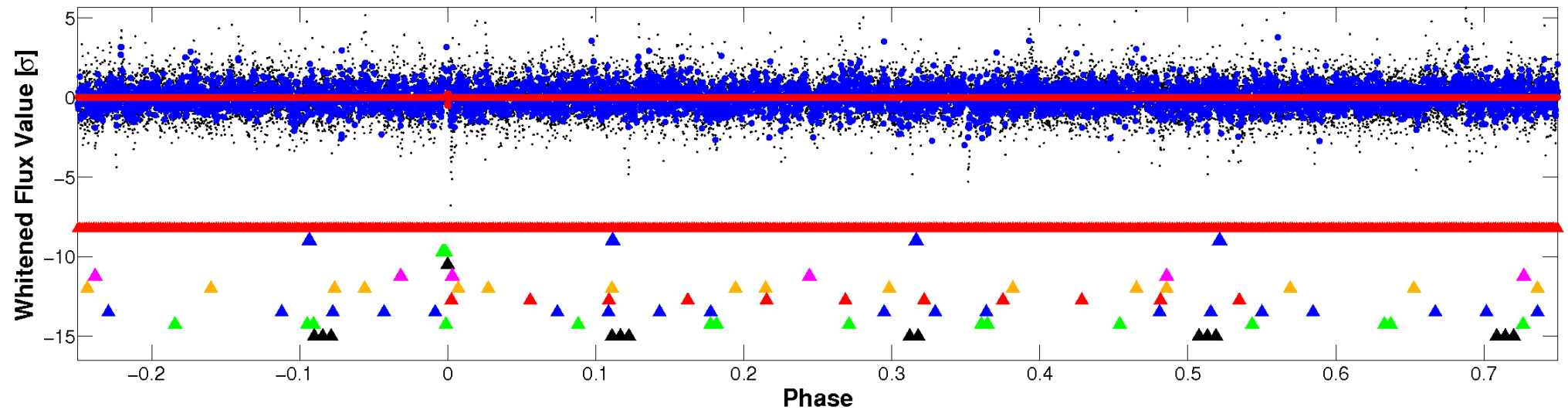


# Non-Whitened Vs. Whitened Light Curve

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

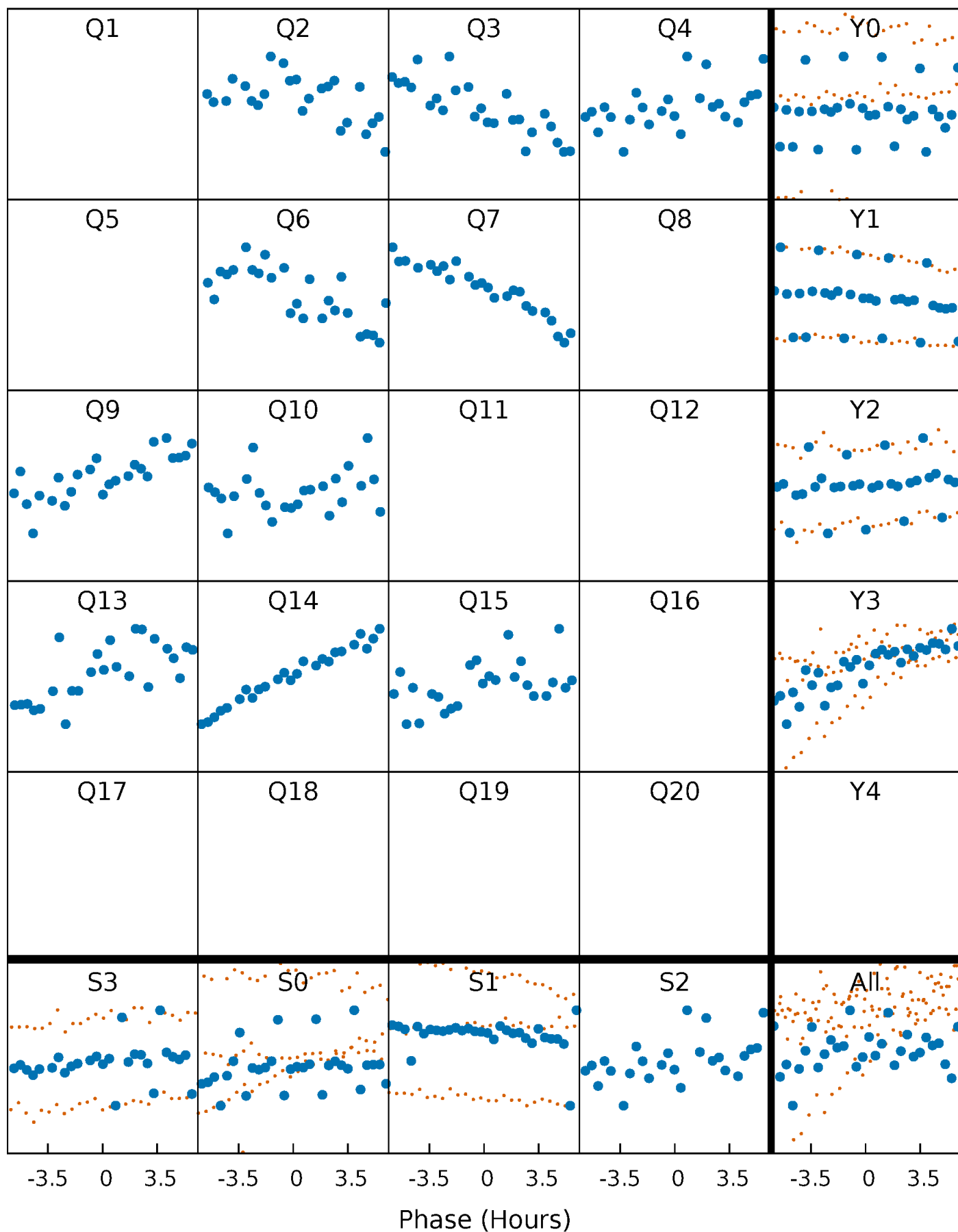


## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



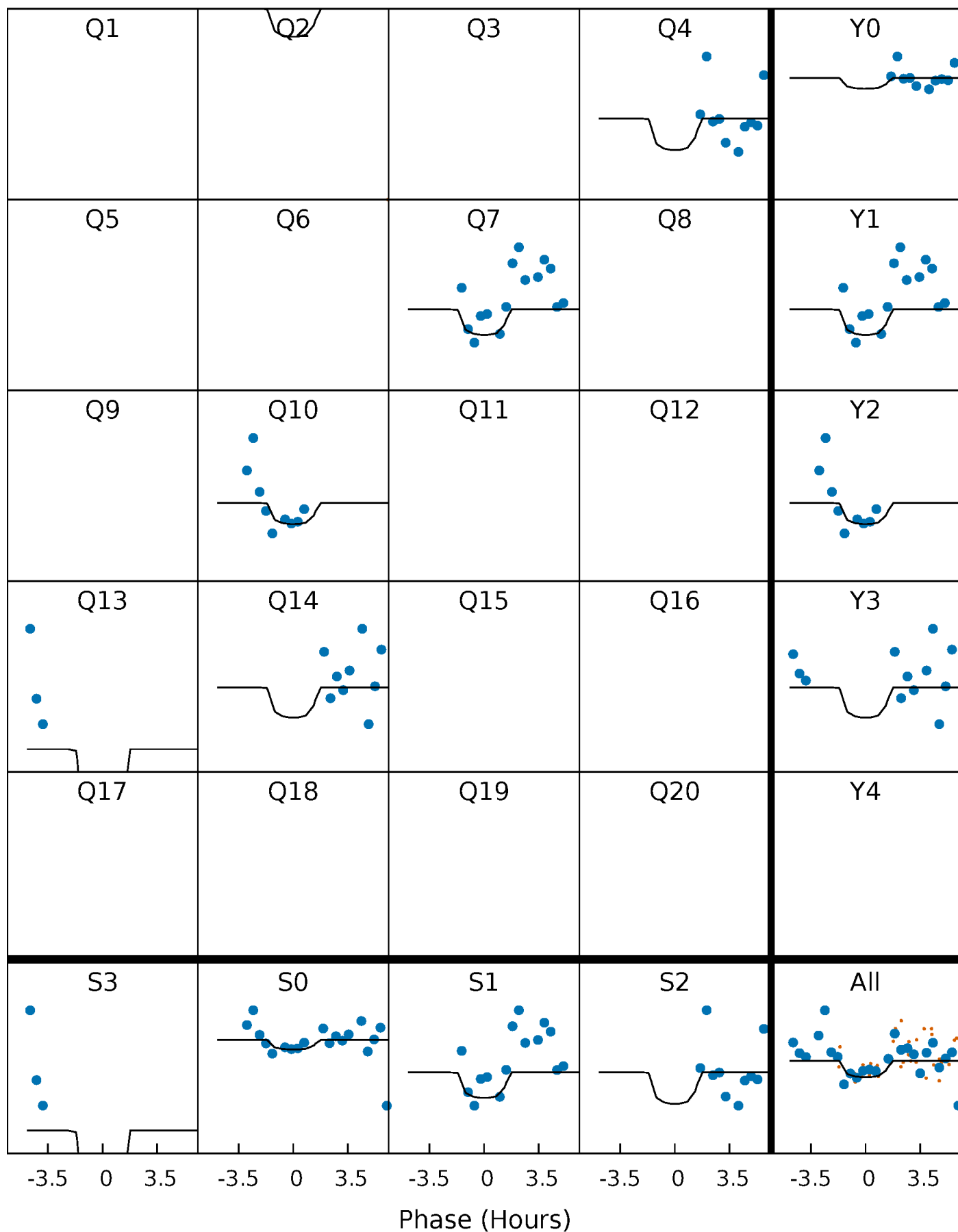
# PDC Quarter-Phased Transit Curves

TCE 010187590-04 P=127.988621 Days  $T_0=175.316389$  (BKJD)



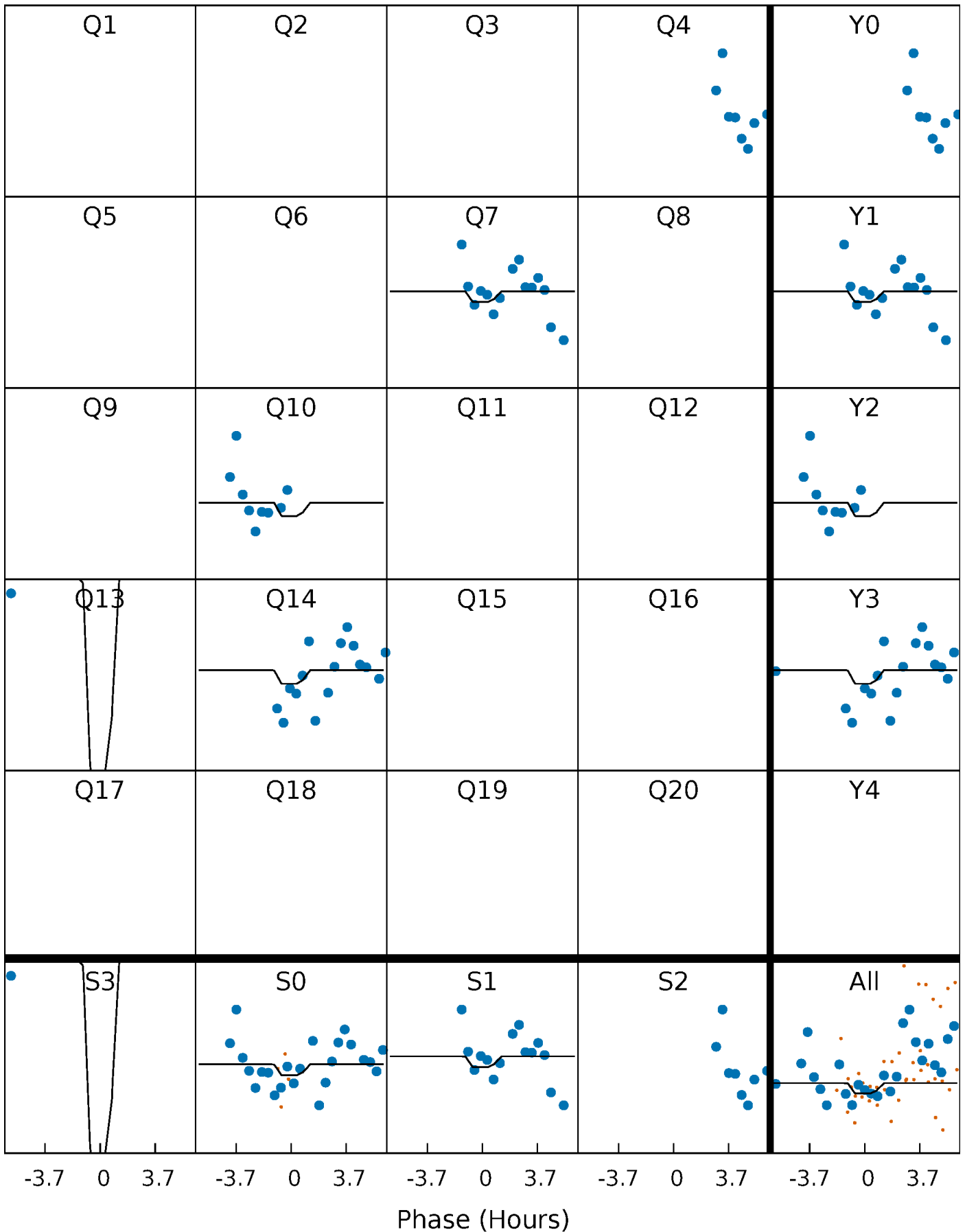
# DV Quarter-Phased Transit Curves

TCE 010187590-04 P=127.988621 Days  $T_0=175.316389$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 010187590-04 P=128.013354 Days  $T_0=175.216243$  (BKJD)

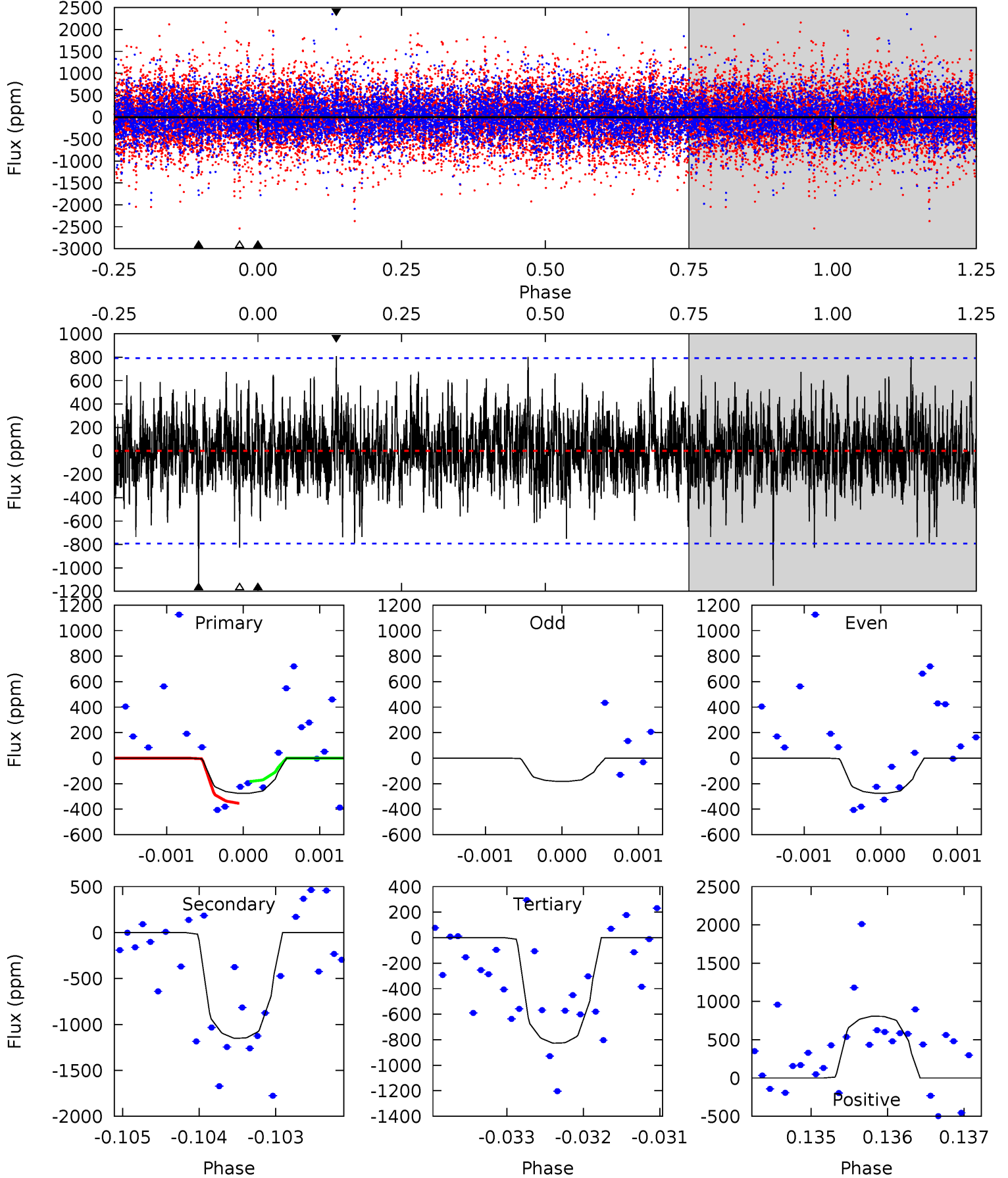




# DV Model-Shift Uniqueness Test

010187590-04, P = 127.988621 Days, E = 47.327768 Days

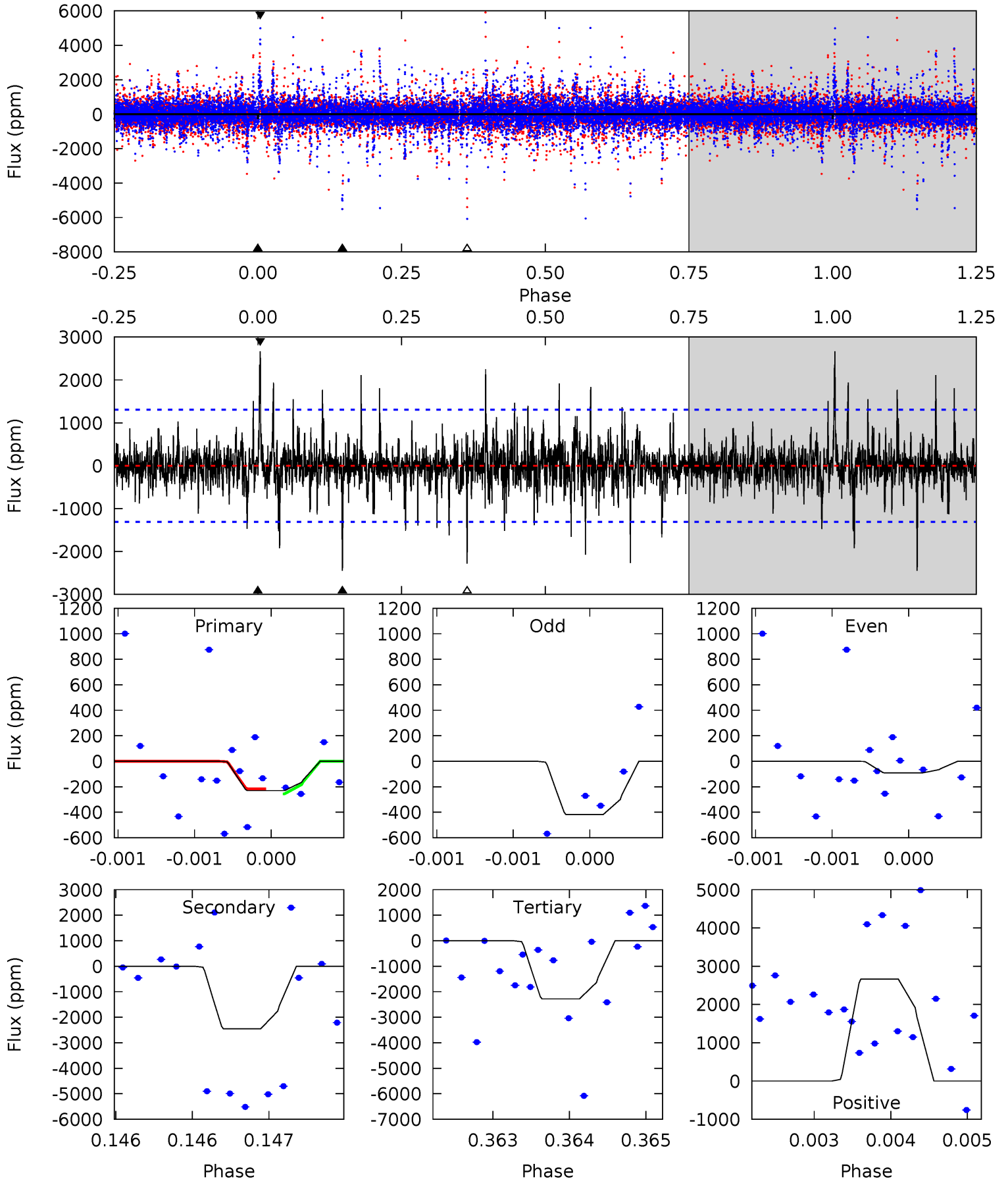
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
1.90	7.92	5.69	5.56	5.45	3.29	1.46	-3.79	-3.66	2.23	2.37	0.35	1.00	0.41	0.58



# Alt Model-Shift Uniqueness Test

010187590-04, P = 128.013354 Days, E = 47.202889 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0.97	10.3	9.64	11.3	5.53	3.41	1.64	-8.66	-10.3	0.71	-0.91	0.49	0.92	0.52	0.07



### Stellar Parameters For KIC 010187590

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6108^{+172}_{-215}$	$4.466^{+0.048}_{-0.192}$	$0.070^{+0.250}_{-0.300}$	$1.030^{+0.306}_{-0.102}$	$1.132^{+0.130}_{-0.143}$	$1.457^{+0.384}_{-0.739}$
	+3%/-4%	+1%/-4%	+357%/-429%	+30%/-10%	+11%/-13%	+26%/-51%
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 010187590-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-1152 \pm 145$	$8.25^{+9.46}_{-5.79}$	$542^{+35}_{-26}$	$4436^{+3539}_{-1033}$	$2480^{+25449}_{-1966}$
Alt.	$-2449 \pm 237$	$8.76^{+9.56}_{-6.09}$	$540^{+38}_{-24}$	$5036^{+4717}_{-1186}$	$4654^{+46222}_{-3585}$

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

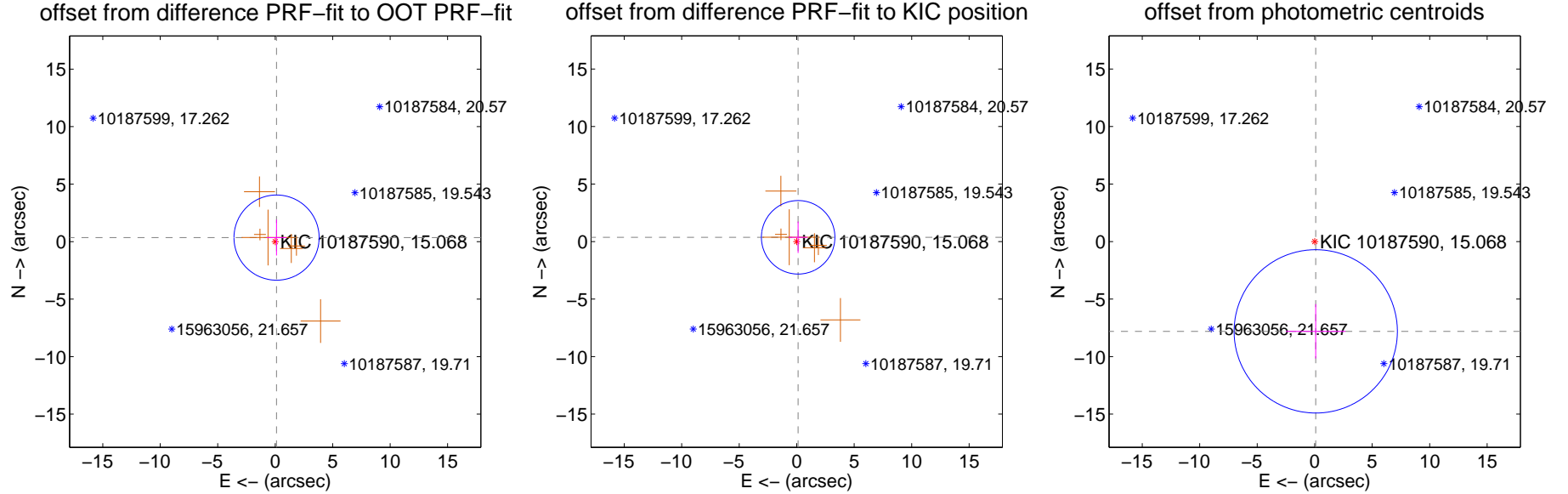
## DV Centroid Data

Supplemental centroid analysis for 010187590-04. Kepler magnitude: 15.07. Transit SNR 1.79

There are 0 quarters with good PRF difference image offsets

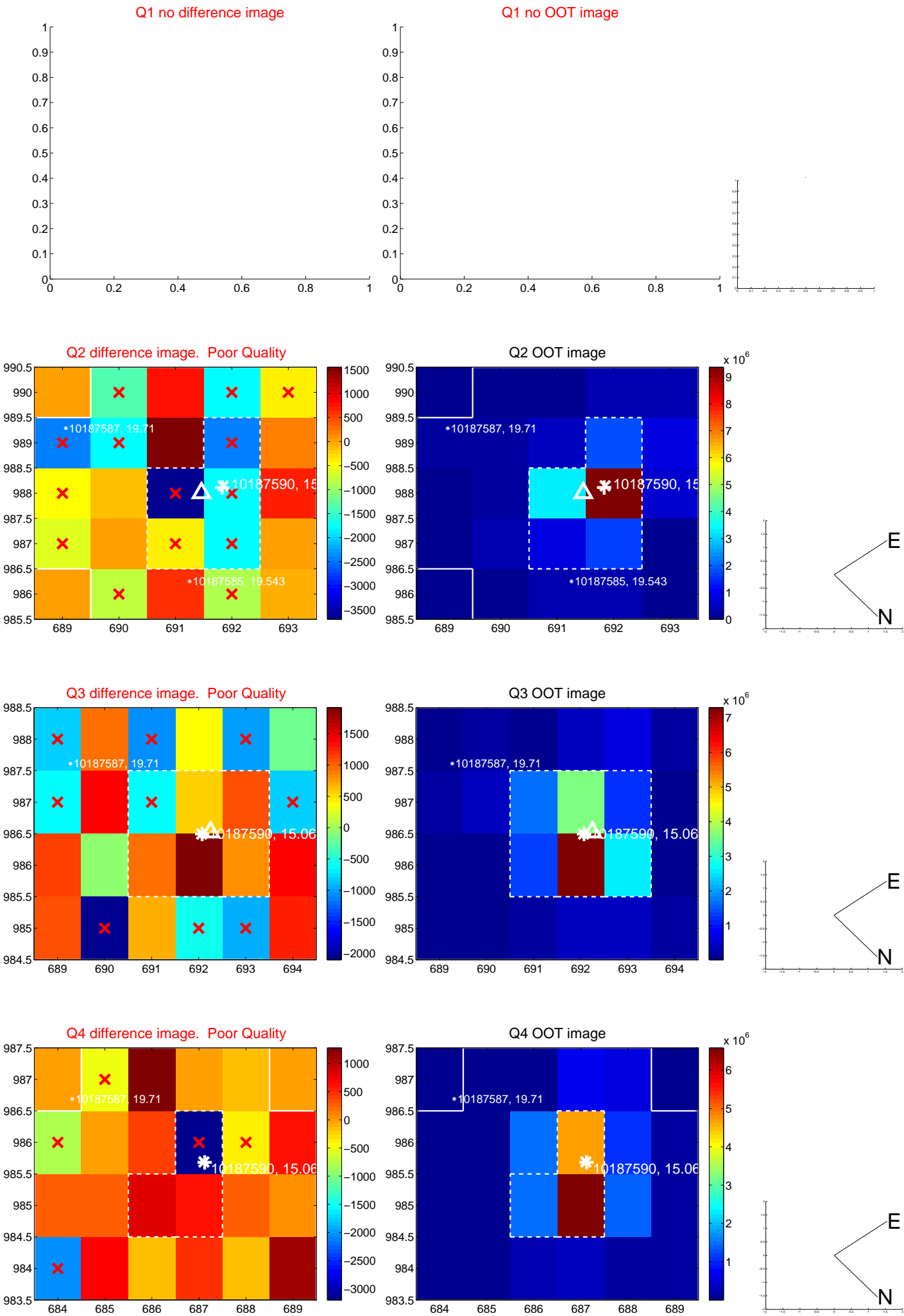
The direct PRF centroid is offset from the target star catalog position by about 0.05 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.370 \pm 1.235$	0.30	$-0.118 \pm 0.865$	$0.350 \pm 1.556$
PRF-fit source offset from KIC position	$0.391 \pm 1.065$	0.37	$-0.127 \pm 0.820$	$0.370 \pm 1.366$
photometric centroid source offset	$7.81 \pm 2.37$	3.30	$-0.09 \pm 2.59$	$-7.81 \pm 2.37$

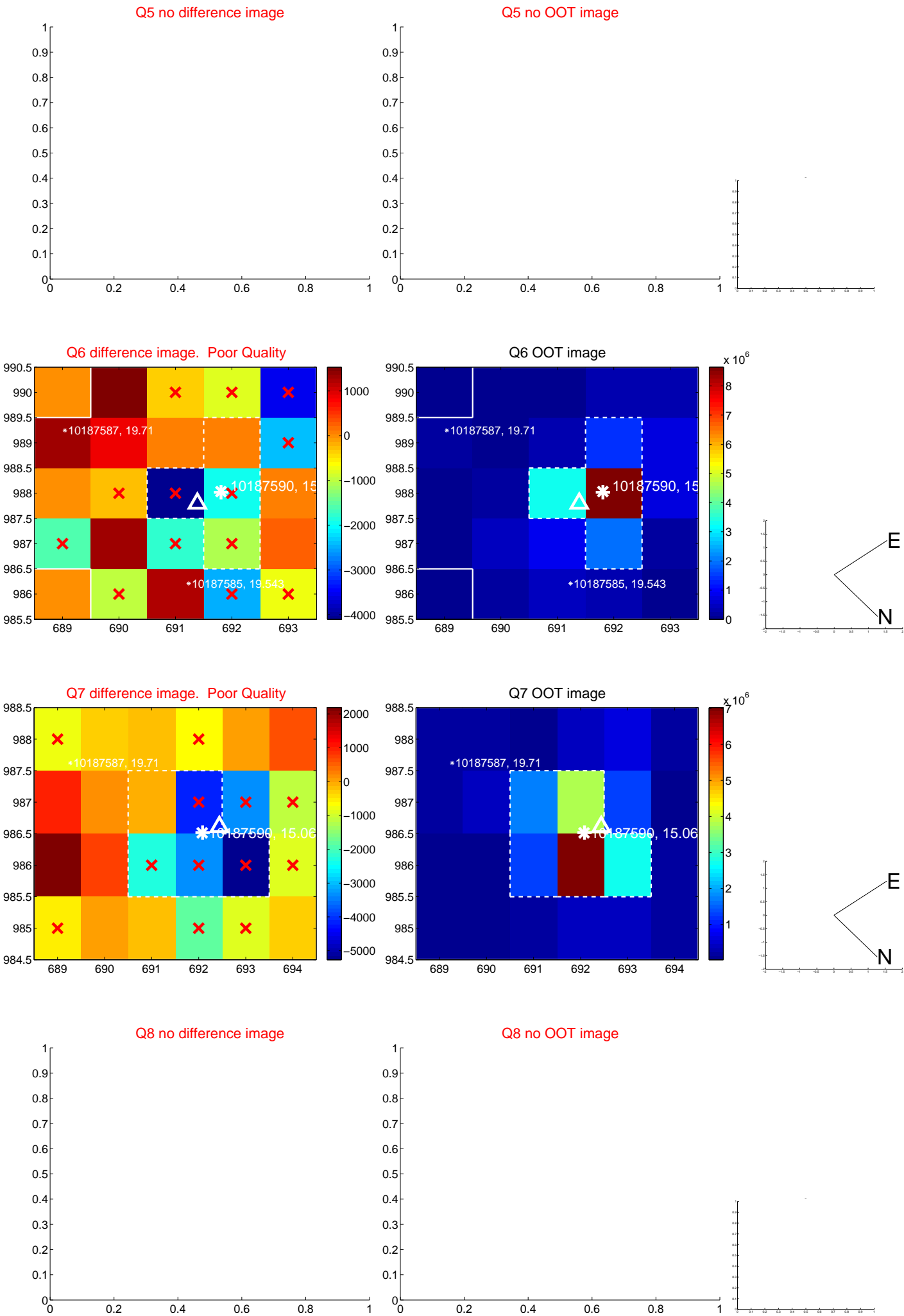


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

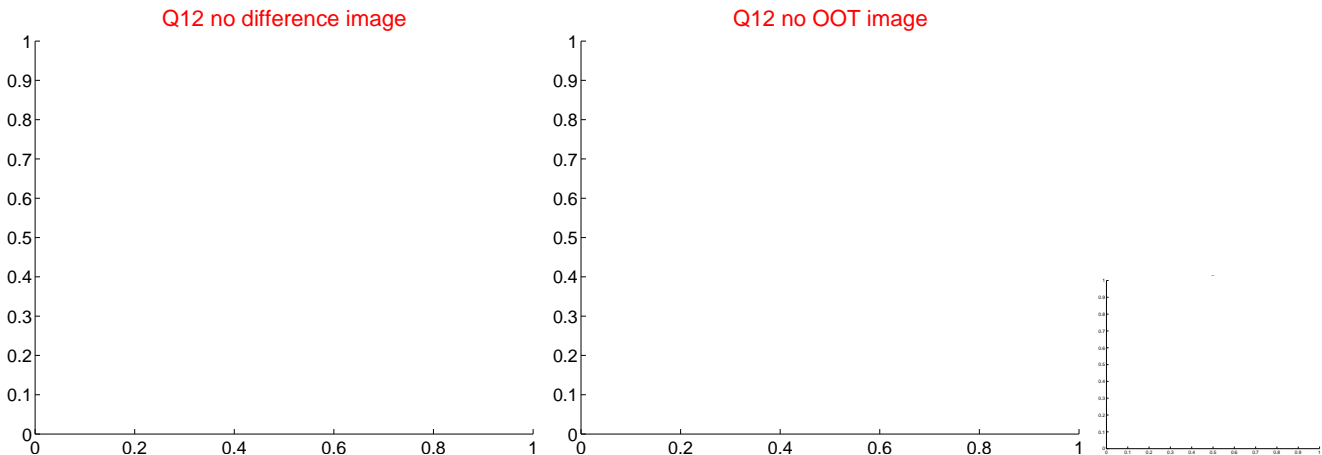
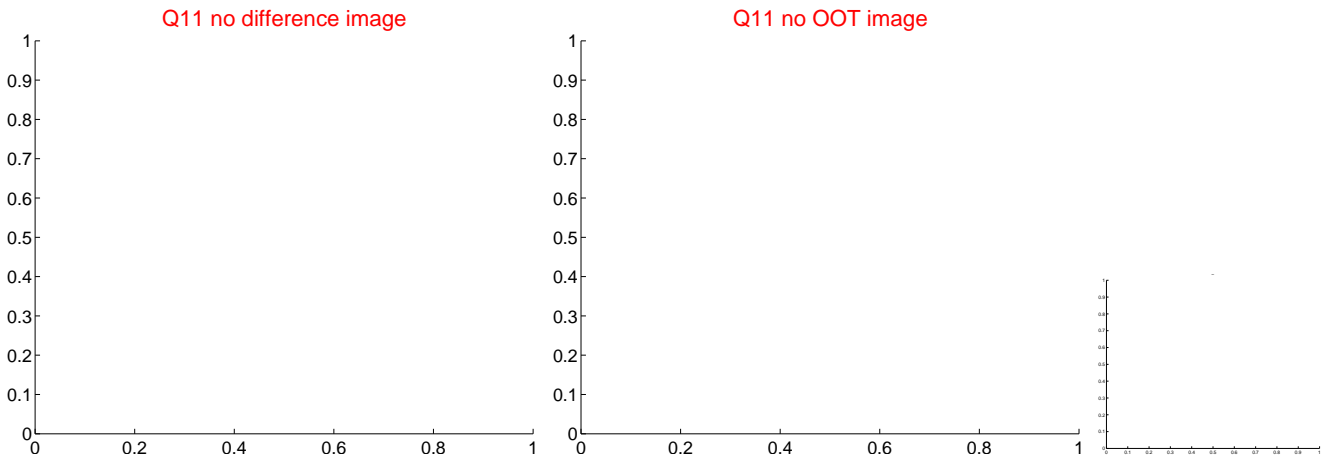
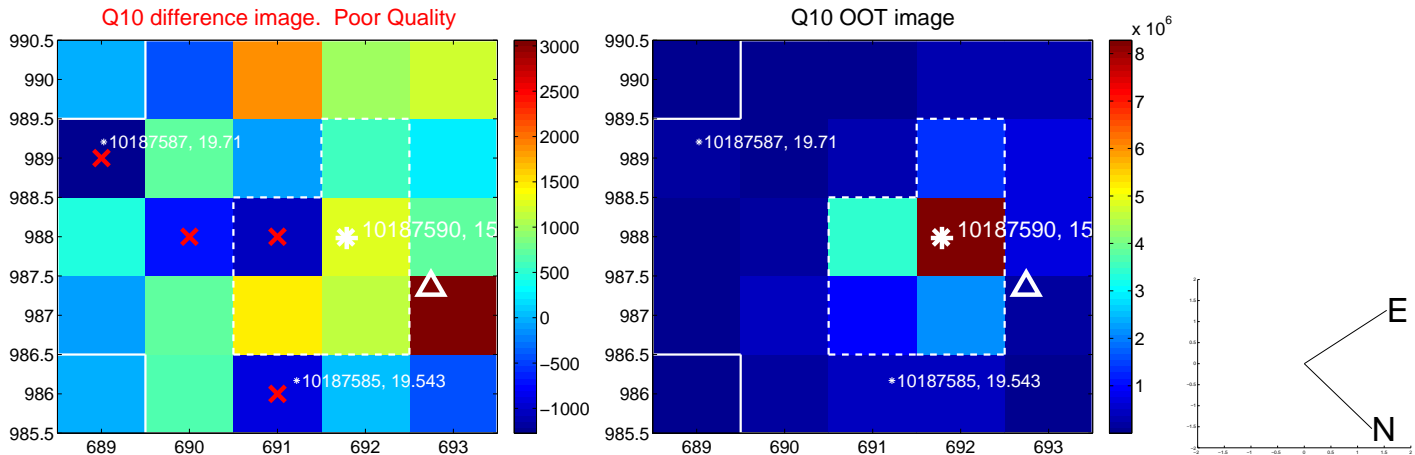
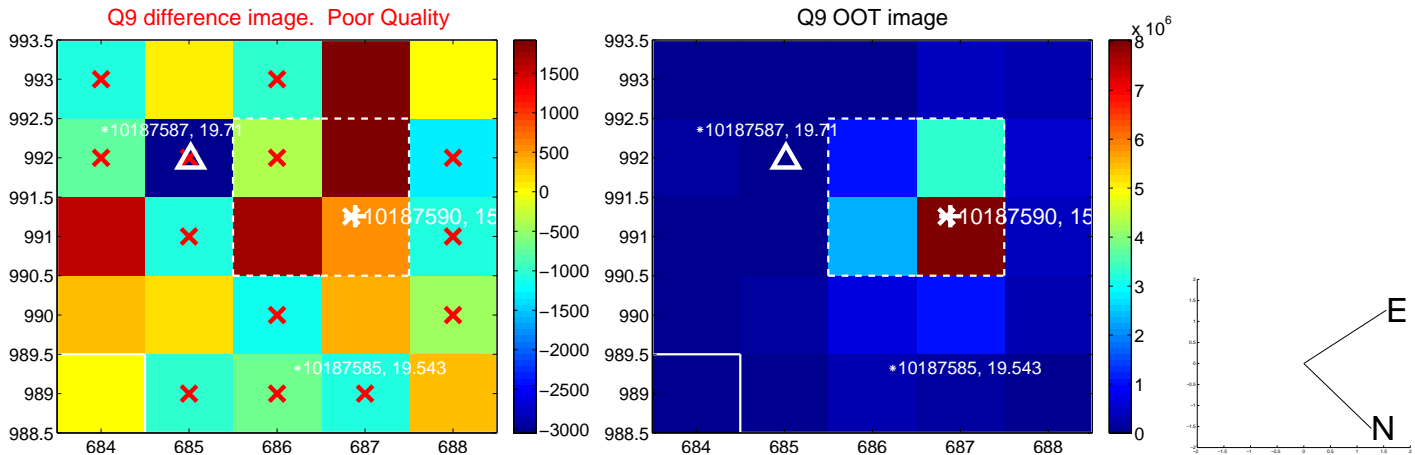
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

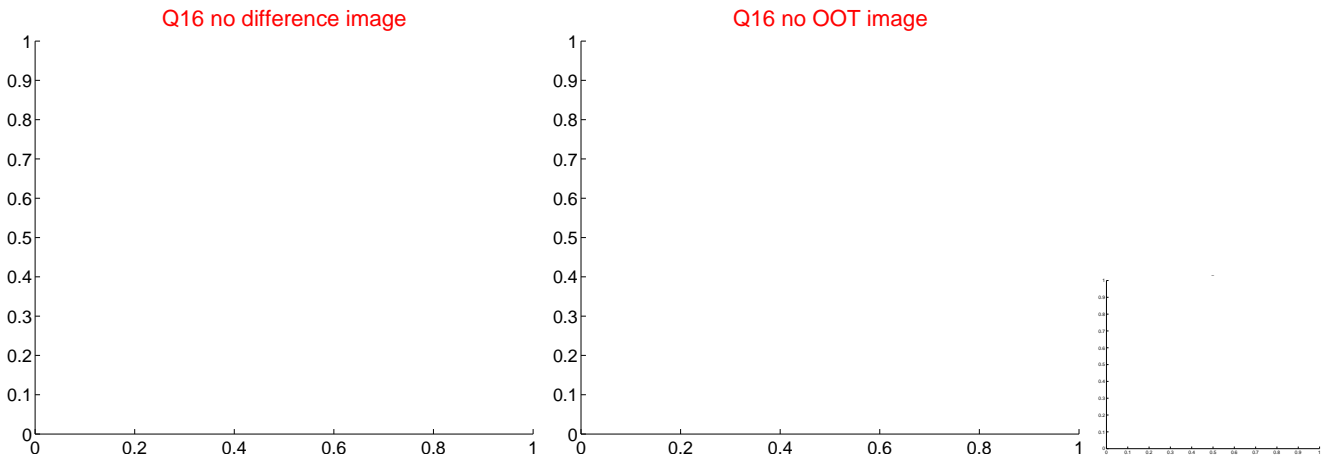
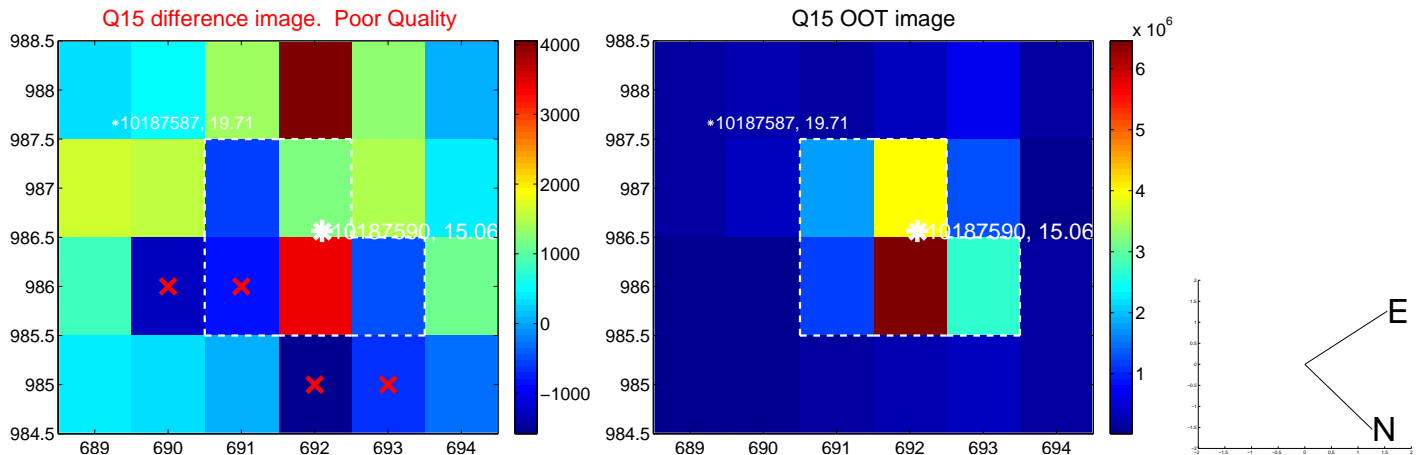
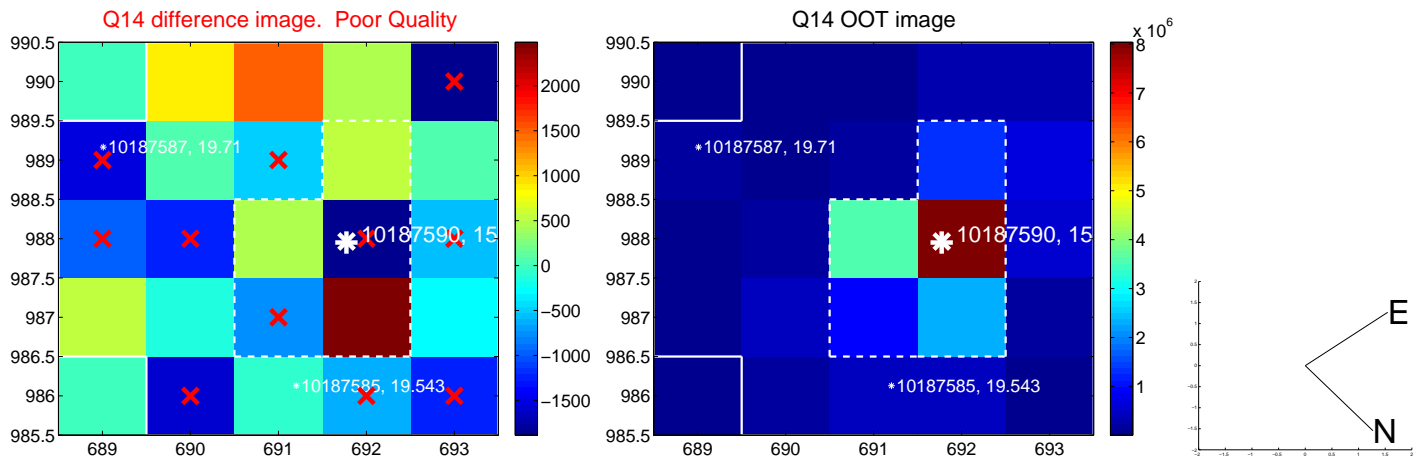
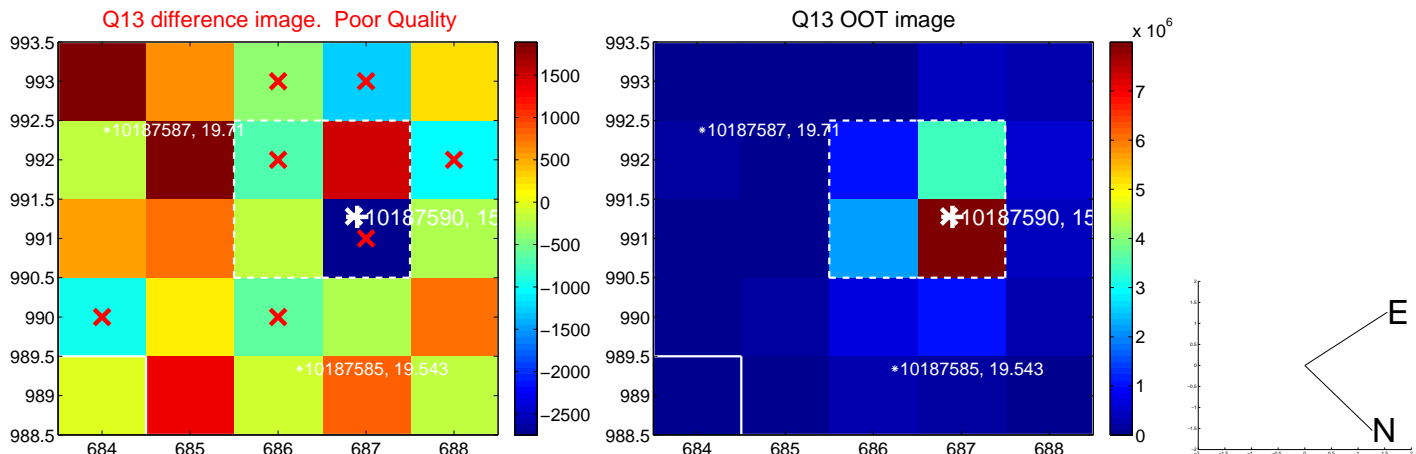


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

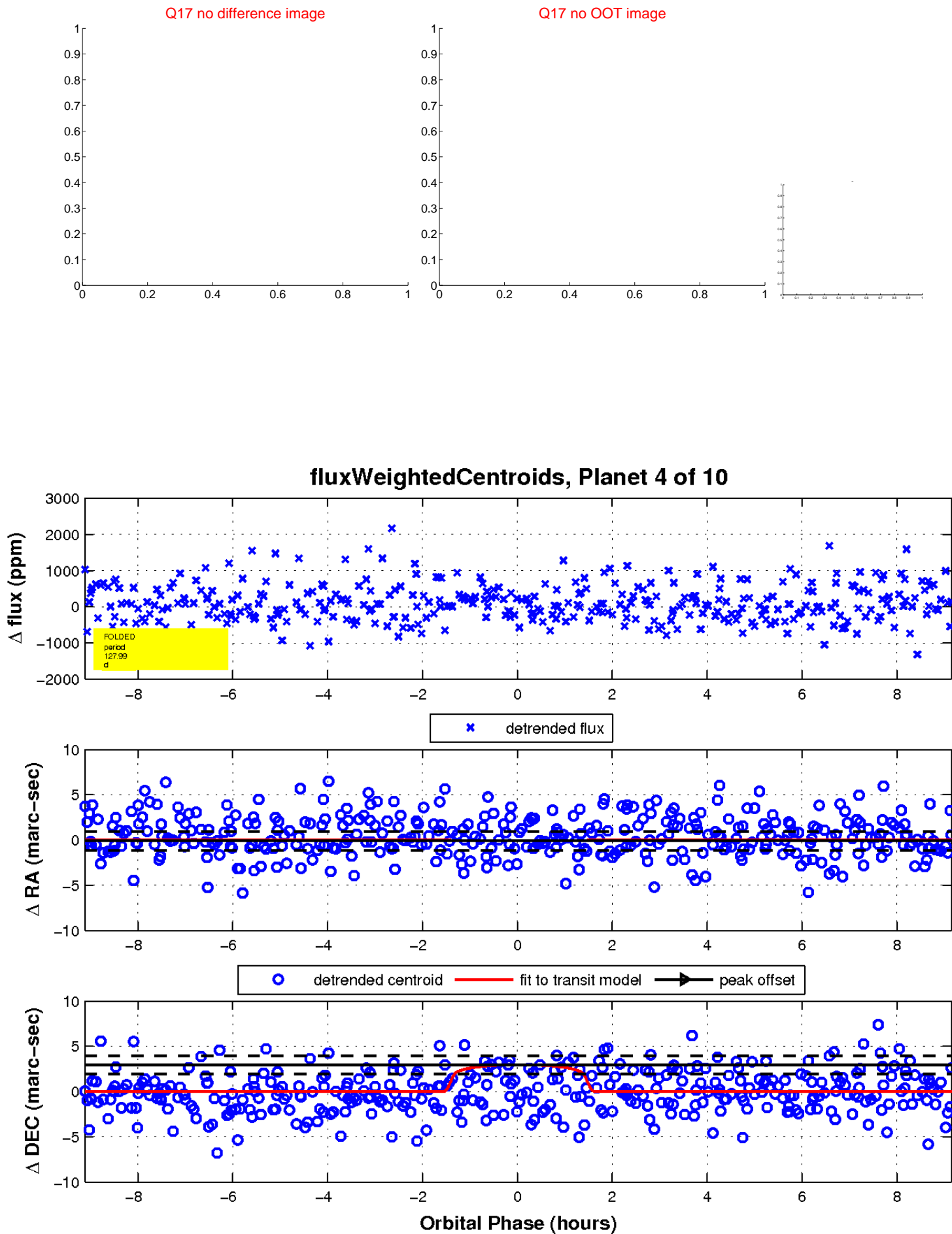




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

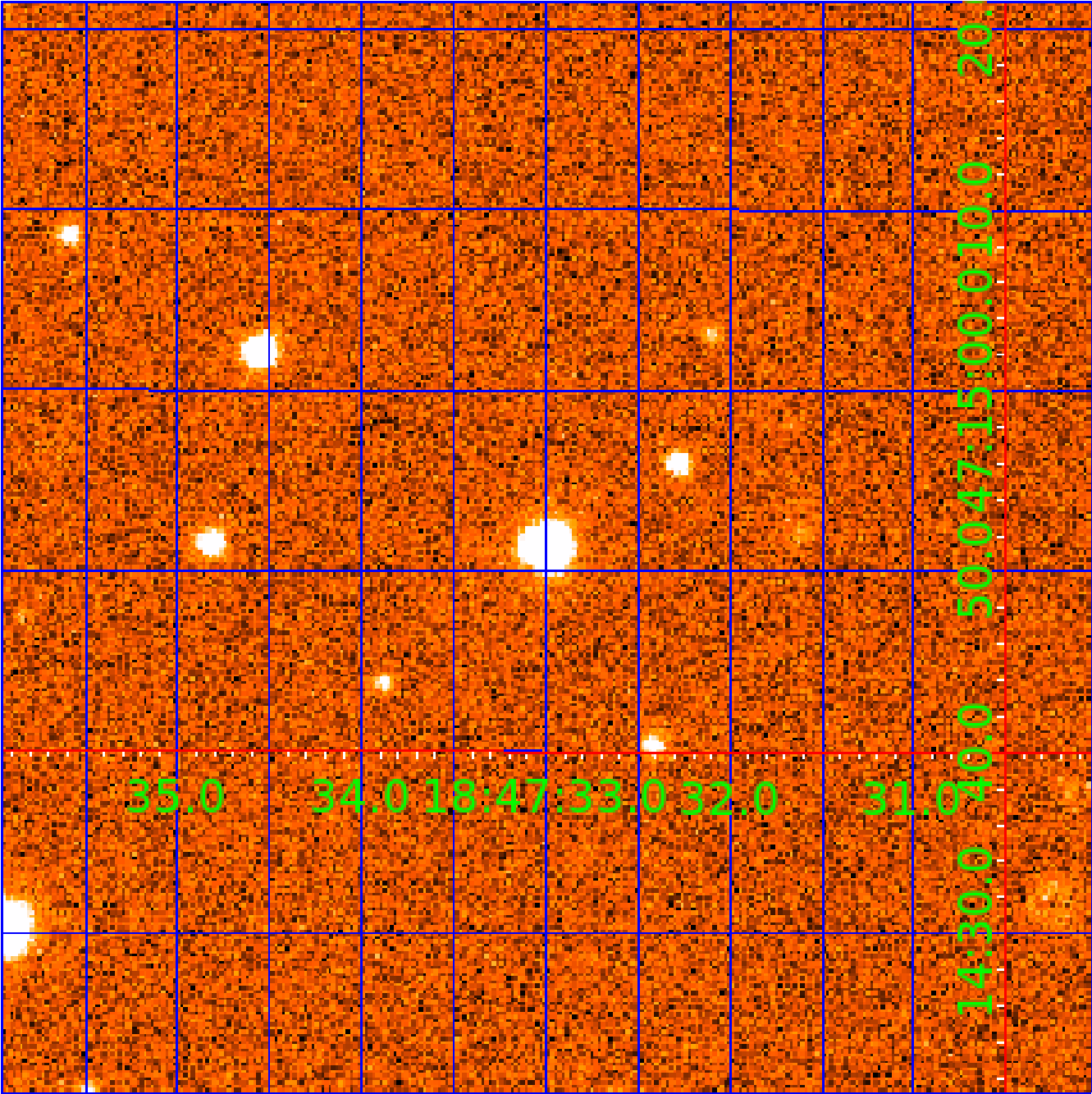


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 010187590

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010187590-01	OBS	No	1.397736	131.711487	72.4	7.994	7.4	7.9	1.03	6108	0.87	2034.61
010187590-02	OBS	No	357.728536	370.052917	9001.2	28.767	15.6	11.8	1.03	6108	16.71	1.25
010187590-03	OBS	No	127.957031	175.181203	13.2	2.604	15.4	0.0	1.03	6108	0.43	4.93
010187590-04	OBS	No	127.988621	175.316389	367.8	3.052	15.2	1.8	1.03	6108	2.17	4.93
010187590-06	OBS	No	93.319103	176.224996	238.0	3.317	12.7	1.4	1.03	6108	1.83	7.51
010187590-07	OBS	No	134.800704	175.639855	1136.5	5.382	13.7	5.2	1.03	6108	6.67	4.60
010187590-08	OBS	No	75.908968	174.229818	670.4	0.657	12.2	2.1	1.03	6108	3.25	9.89

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010187590-01	OBS	FP	0.00	1	0	0	0	LPP_DV
010187590-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS
010187590-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010187590-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—SAME_NTL_PERIOD—CENT_FEW_DIFFS
010187590-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
010187590-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010187590-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_MEAS

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

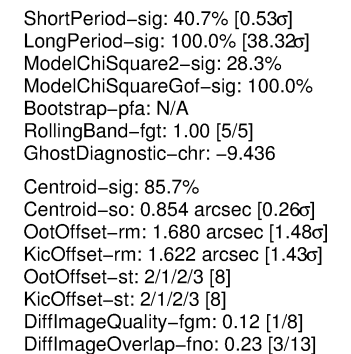
N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

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.

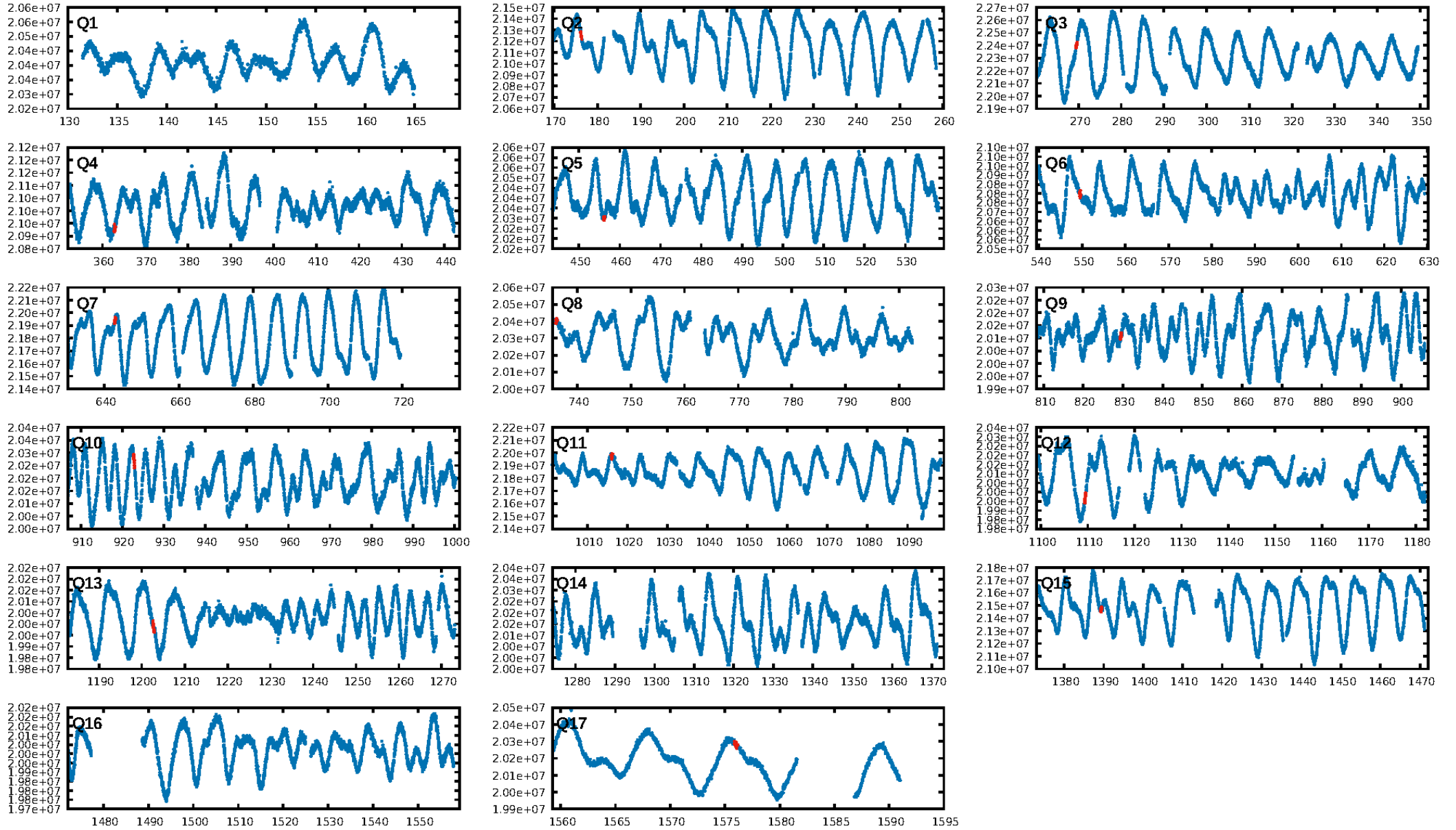
Ephemeris Match Information For 010187590-06

No Significant Match Found

KIC: 10187590    Candidate: 6 of 10    Period: 93.319 d

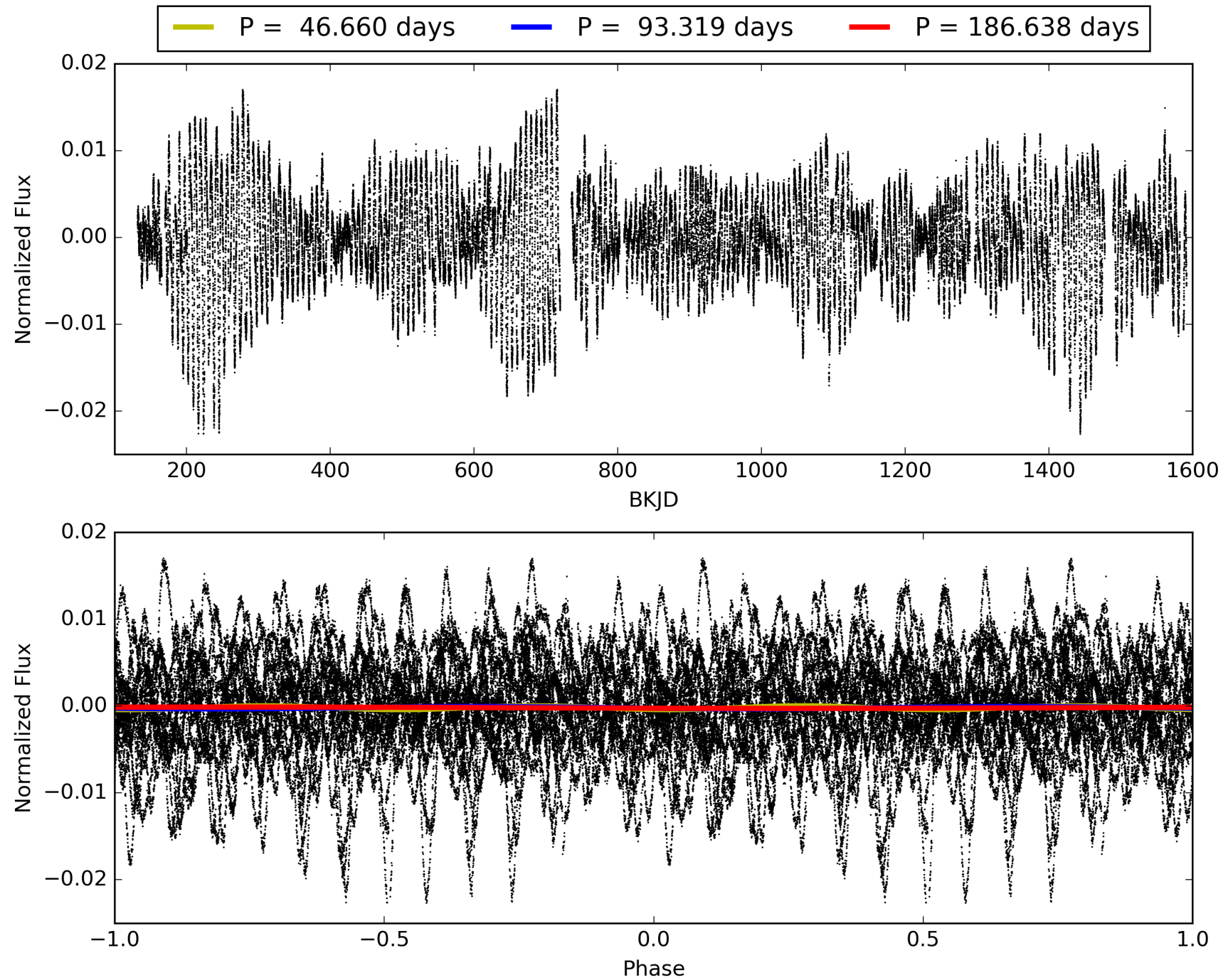


# TCE 010187590-06, PDC Light Curves



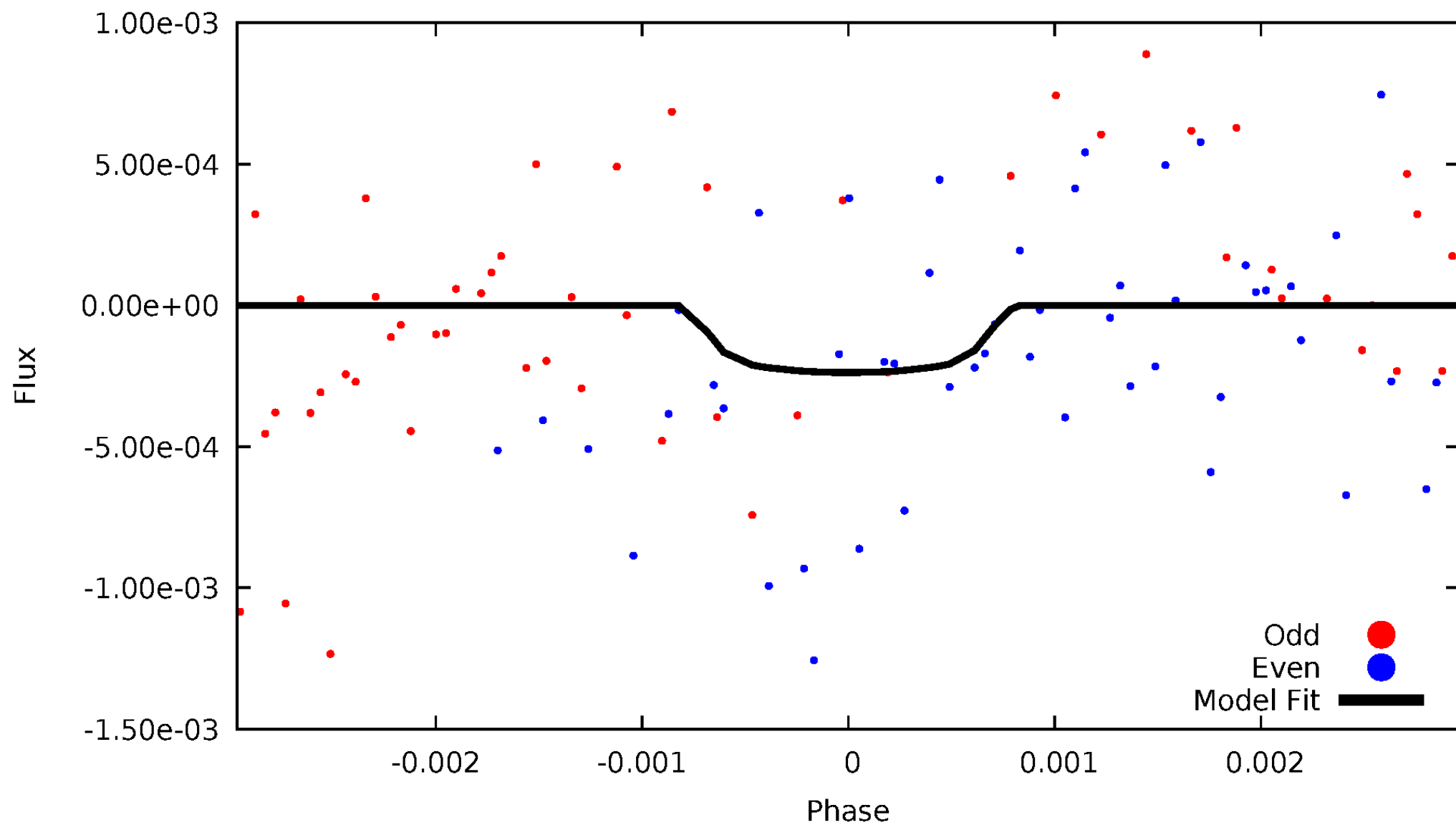


# TCE 010187590-06



# DV Odd/Even

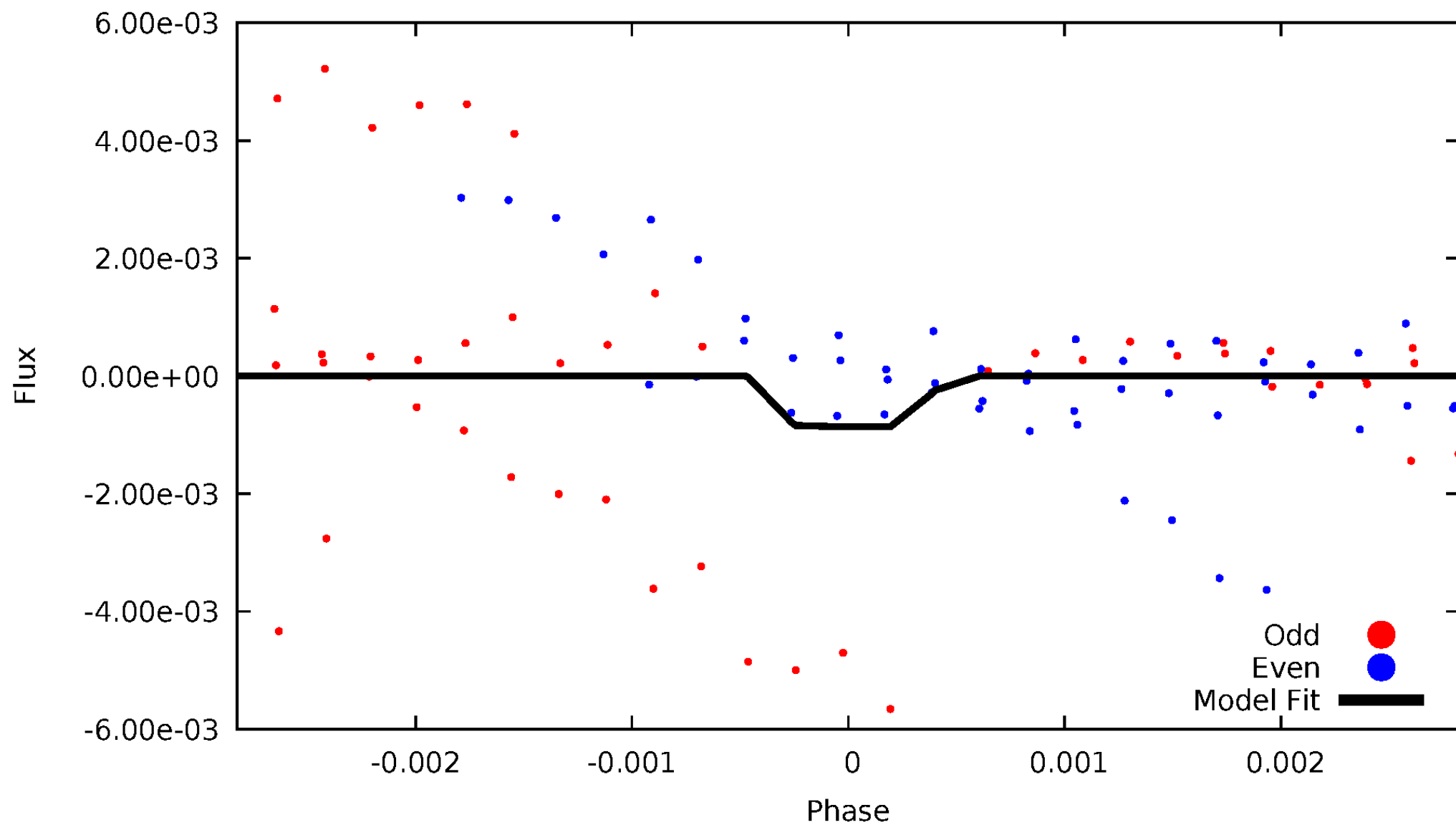
TCE 010187590-06





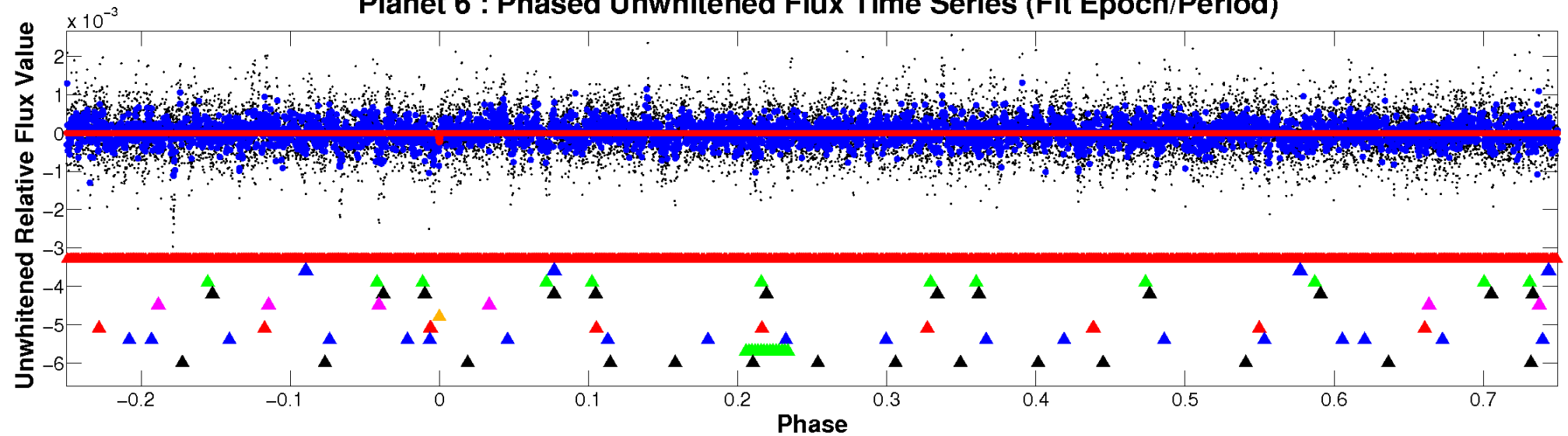
# ALT Odd/Even

TCE 010187590-06

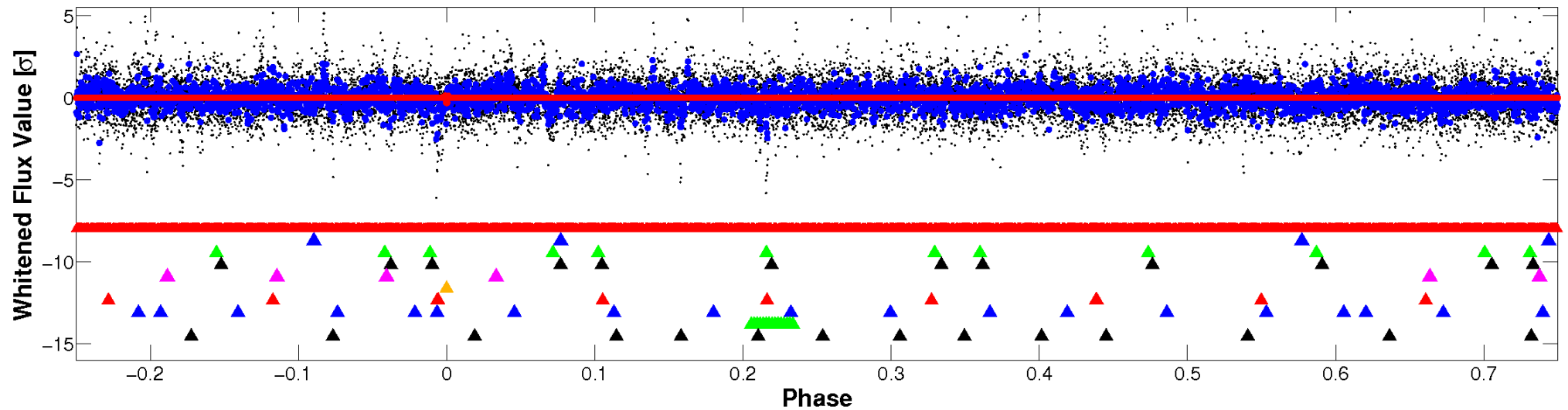


# Non-Whitened Vs. Whitened Light Curve

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

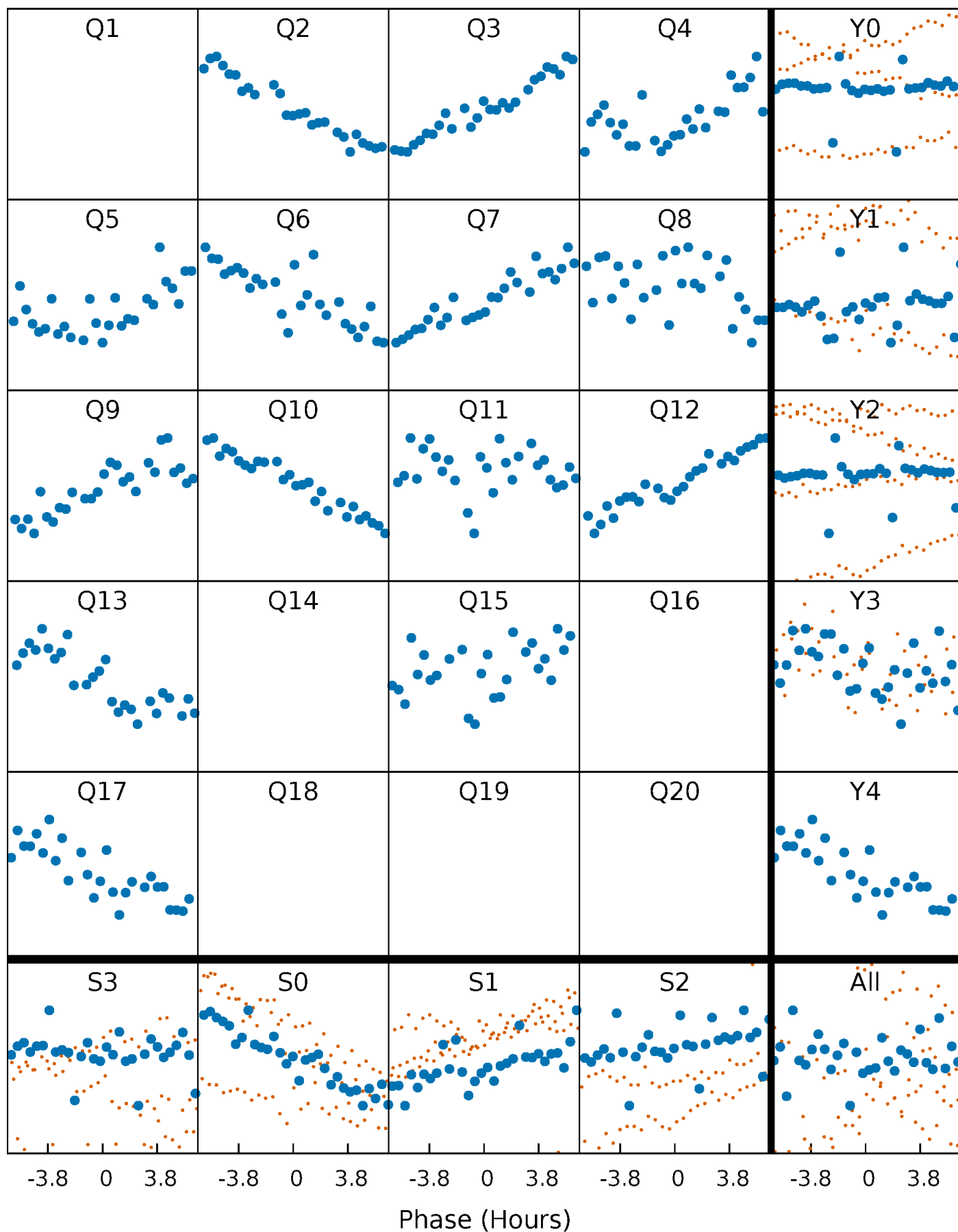


## Planet 6 : Phased Whitened Flux Time Series (Fit Epoch/Period)



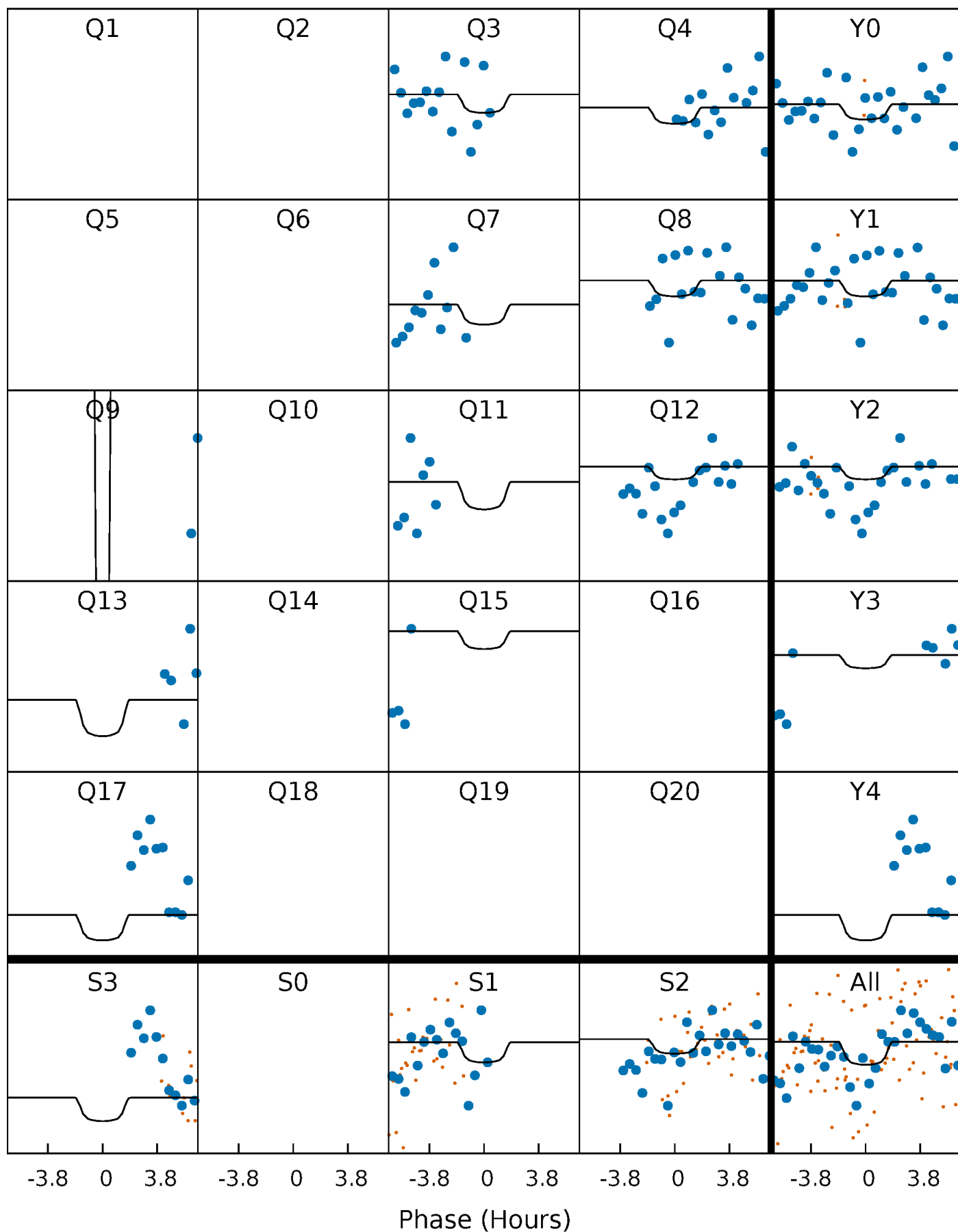
# PDC Quarter-Phased Transit Curves

TCE 010187590-06 P= 93.319103 Days  $T_0=176.224996$  (BKJD)



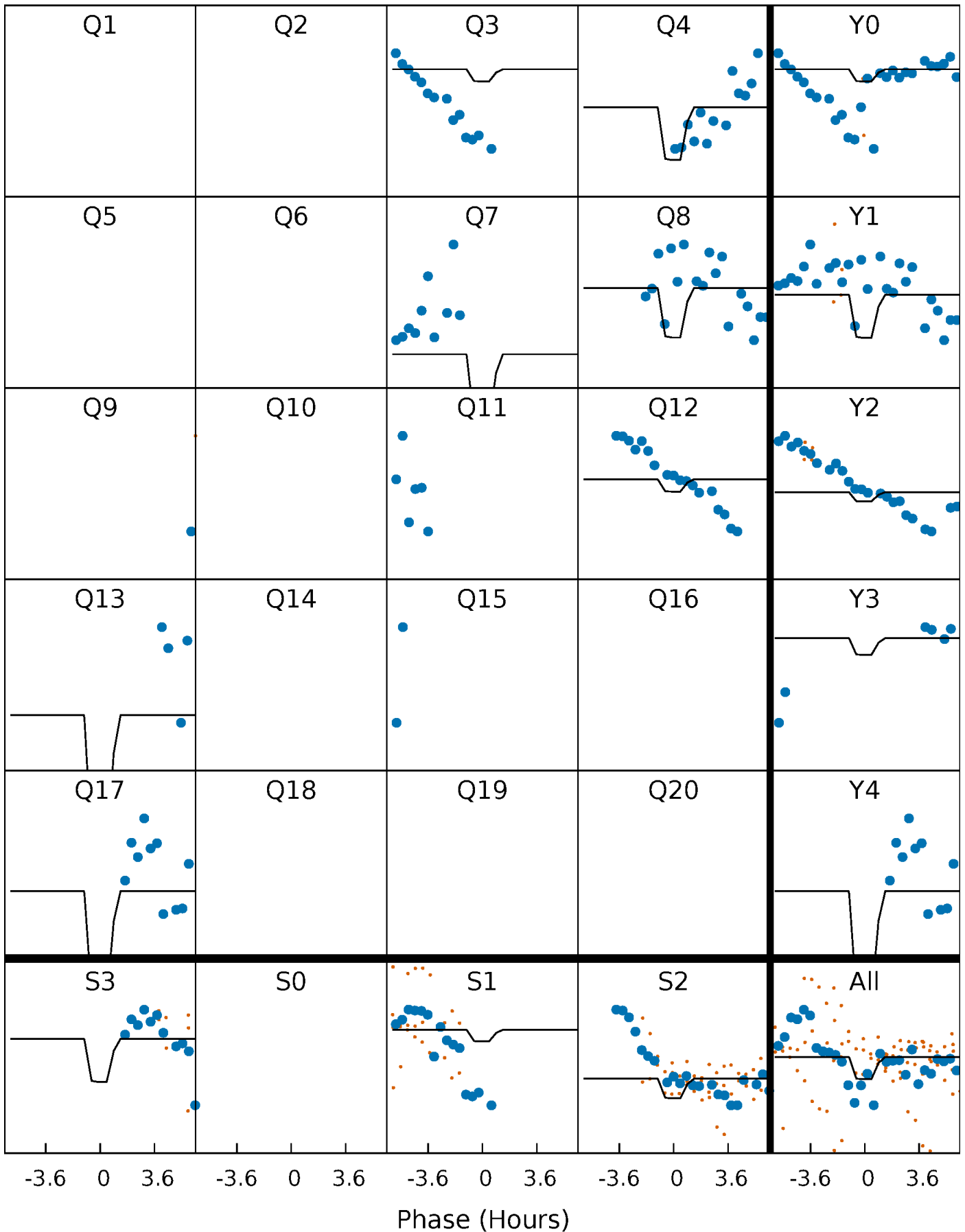
# DV Quarter-Phased Transit Curves

TCE 010187590-06 P= 93.319103 Days  $T_0=176.224996$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

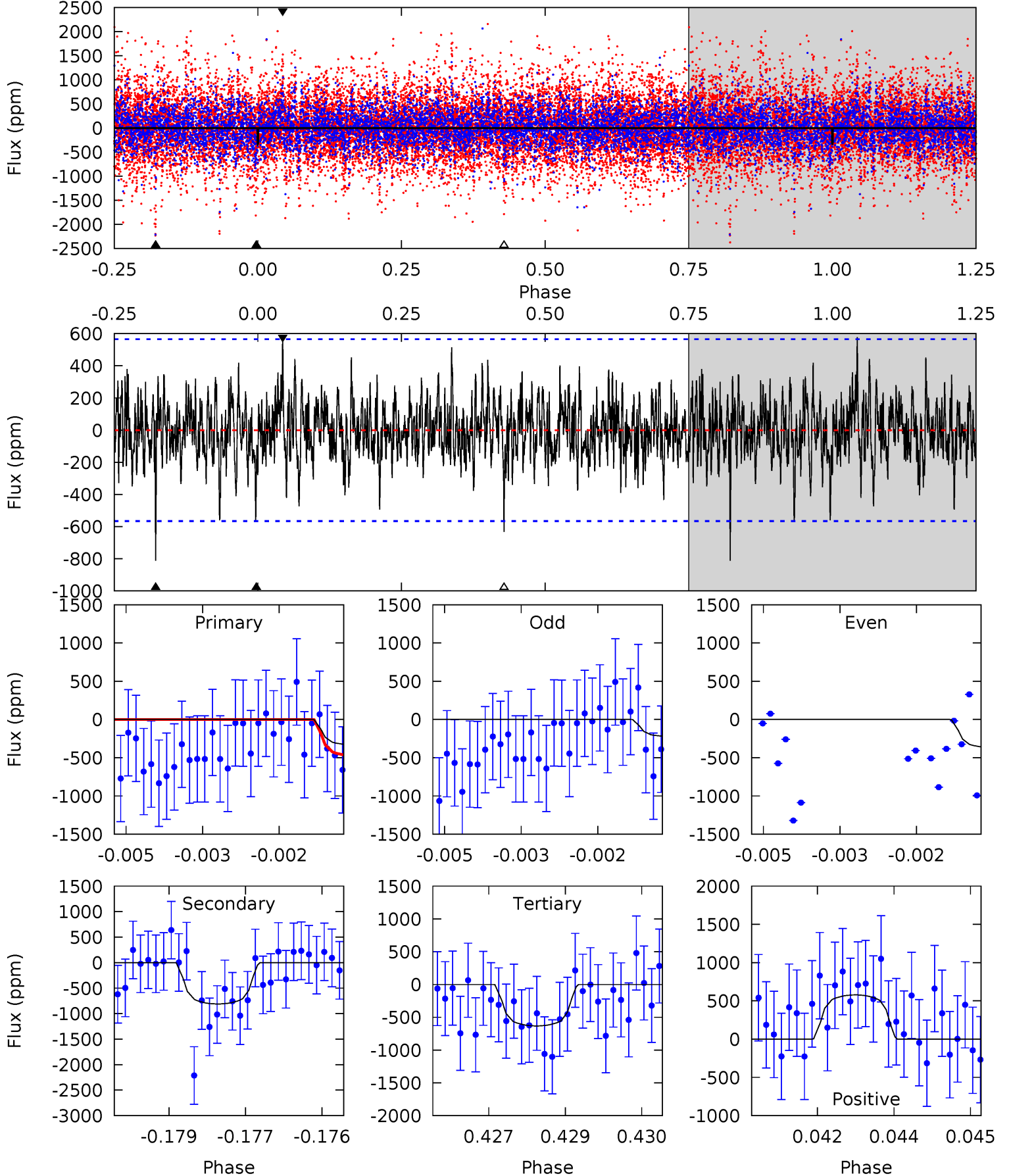
TCE 010187590-06     $P = 93.320069$  Days     $T_0 = 176.223736$  (BKJD)



# DV Model-Shift Uniqueness Test

010187590-06, P = 93.319103 Days, E = 82.905893 Days

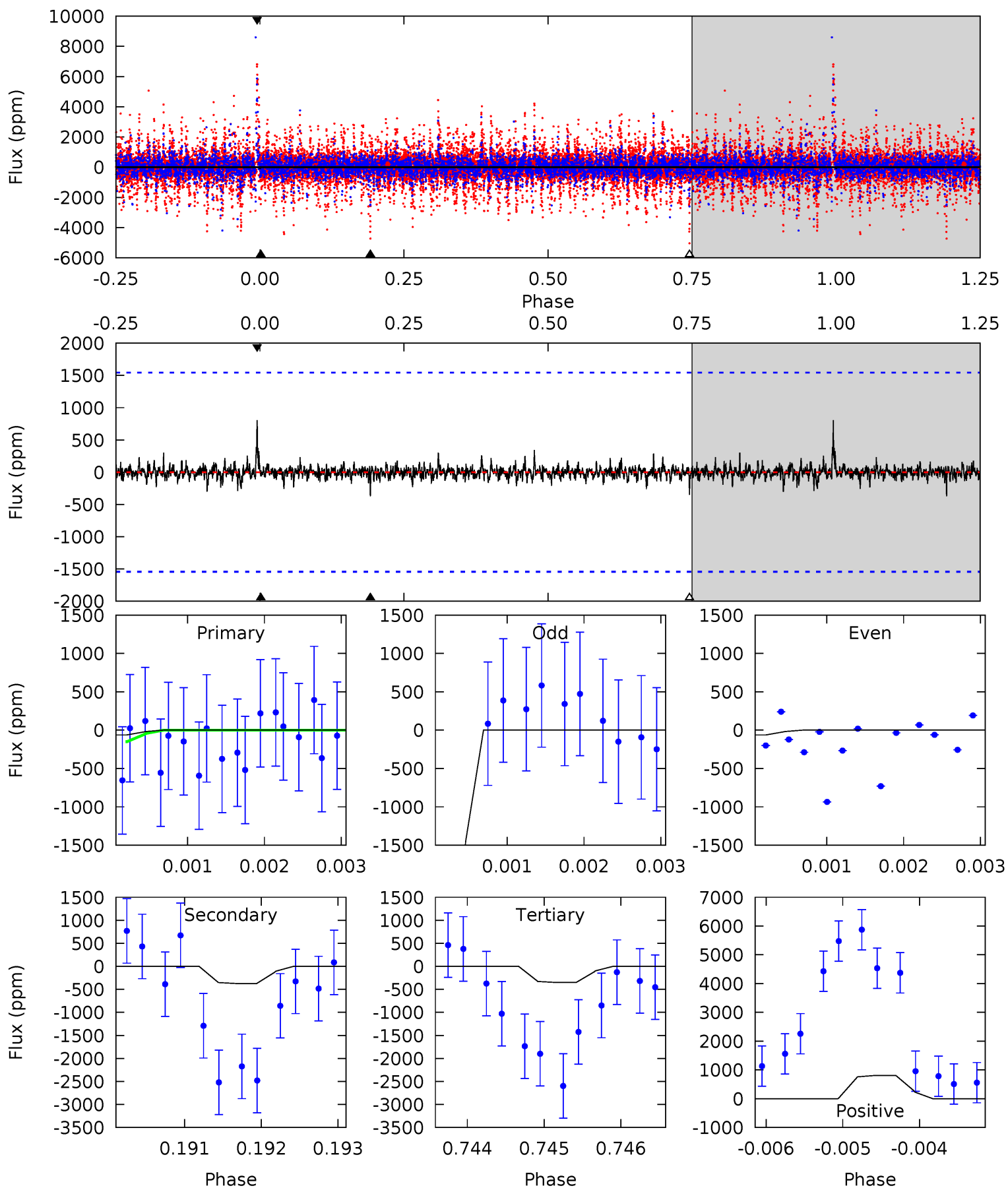
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
3.16	7.71	6.01	5.50	5.38	3.17	1.46	-2.85	-2.34	1.70	2.22	0.59	1.90	0.42	1.31



# Alt Model-Shift Uniqueness Test

010187590-06, P = 93.320069 Days, E = 82.903667 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0.22	1.33	1.24	2.86	5.47	3.33	0.25	-1.02	-2.65	0.09	-1.54	6.99	5.36	0.68	0



### Stellar Parameters For KIC 010187590

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6108^{+172}_{-215}$	$4.466^{+0.048}_{-0.192}$	$0.070^{+0.250}_{-0.300}$	$1.030^{+0.306}_{-0.102}$	$1.132^{+0.130}_{-0.143}$	$1.457^{+0.384}_{-0.739}$
	+3%/-4%	+1%/-4%	+357%/-429%	+30%/-10%	+11%/-13%	+26%/-51%
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 010187590-06 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-811 \pm 105$	$6.36^{+7.17}_{-4.44}$	$601^{+43}_{-30}$	$4595^{+3924}_{-1096}$	$1913^{+19687}_{-1507}$
Alt.	$-374 \pm 282$	$7.06^{+7.11}_{-4.94}$	$600^{+46}_{-28}$	$3712^{+2128}_{-1001}$	$592^{+5380}_{-526}$

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



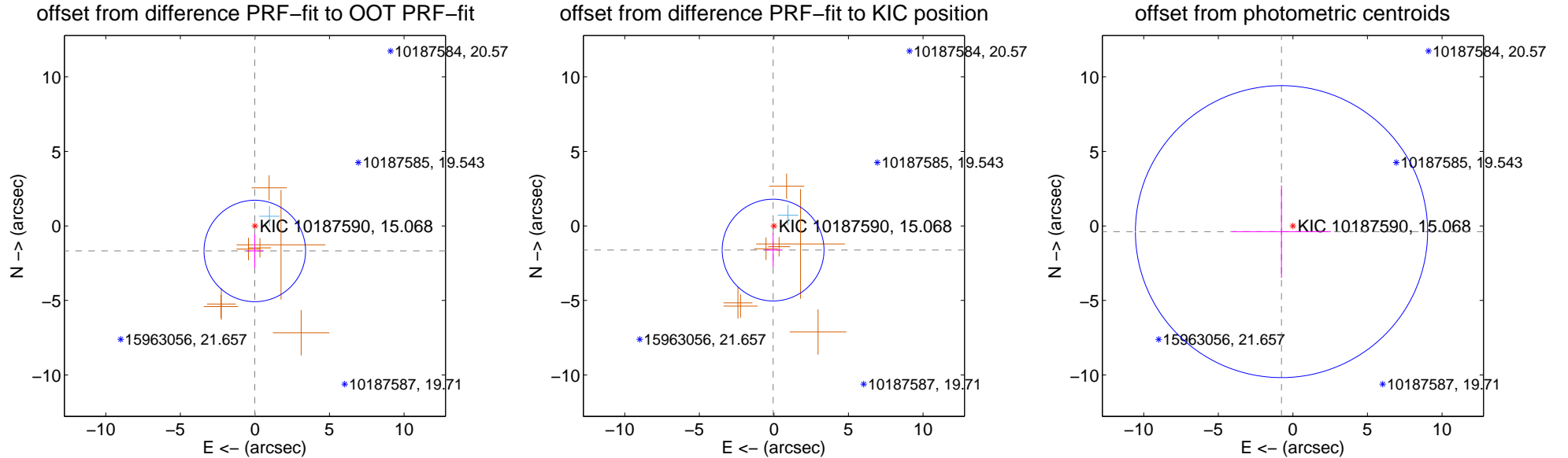
## DV Centroid Data

Supplemental centroid analysis for 010187590-06. Kepler magnitude: 15.07. Transit SNR 1.37

There are 1 quarters with good PRF difference image offsets

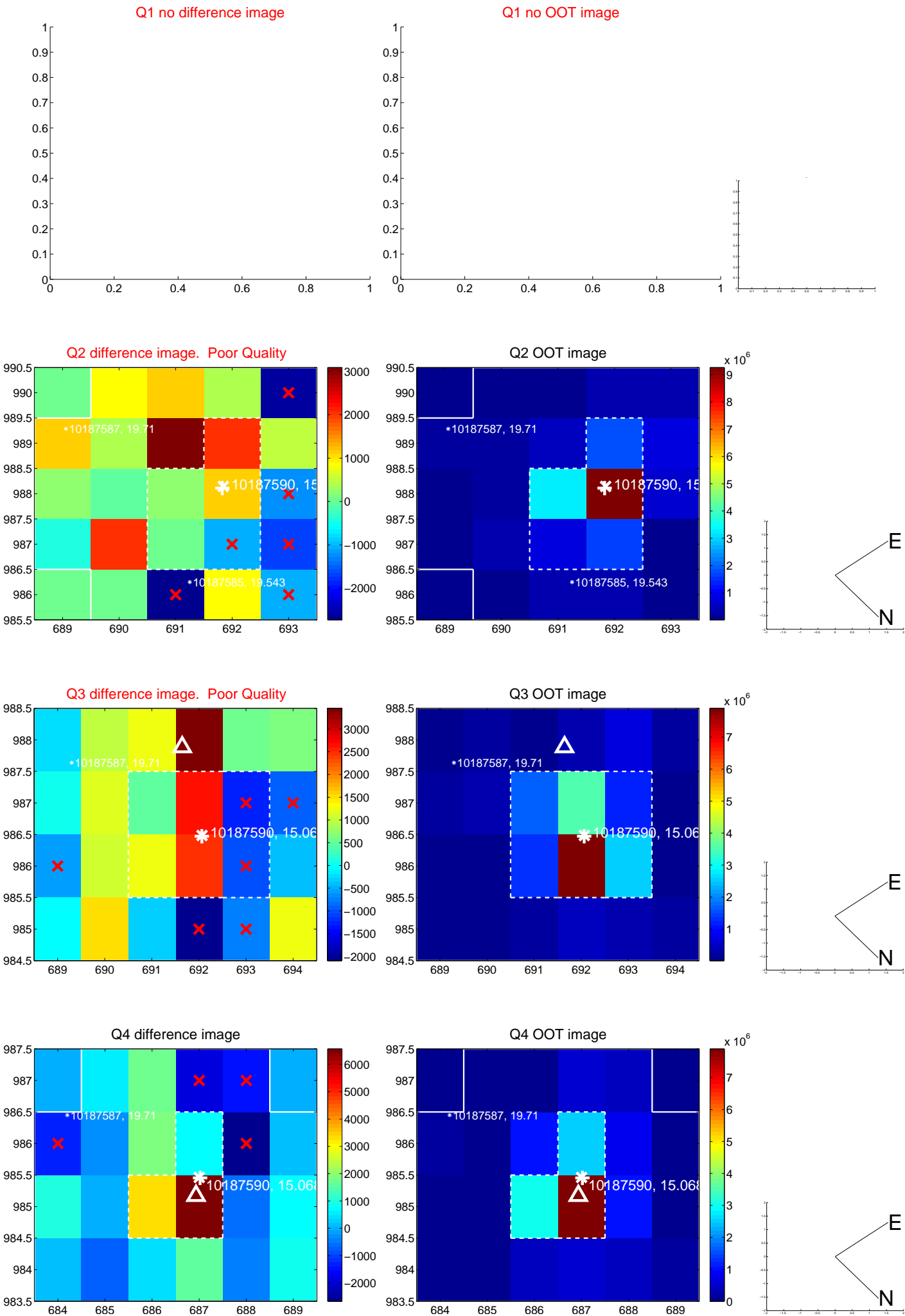
The direct PRF centroid is offset from the target star catalog position by about 0.15 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.680 \pm 1.135$	1.48	$0.009 \pm 0.555$	$-1.680 \pm 1.134$
PRF-fit source offset from KIC position	$1.622 \pm 1.138$	1.43	$0.054 \pm 0.578$	$-1.621 \pm 1.138$
photometric centroid source offset	$0.85 \pm 3.26$	0.26	$0.76 \pm 3.30$	$-0.38 \pm 3.10$

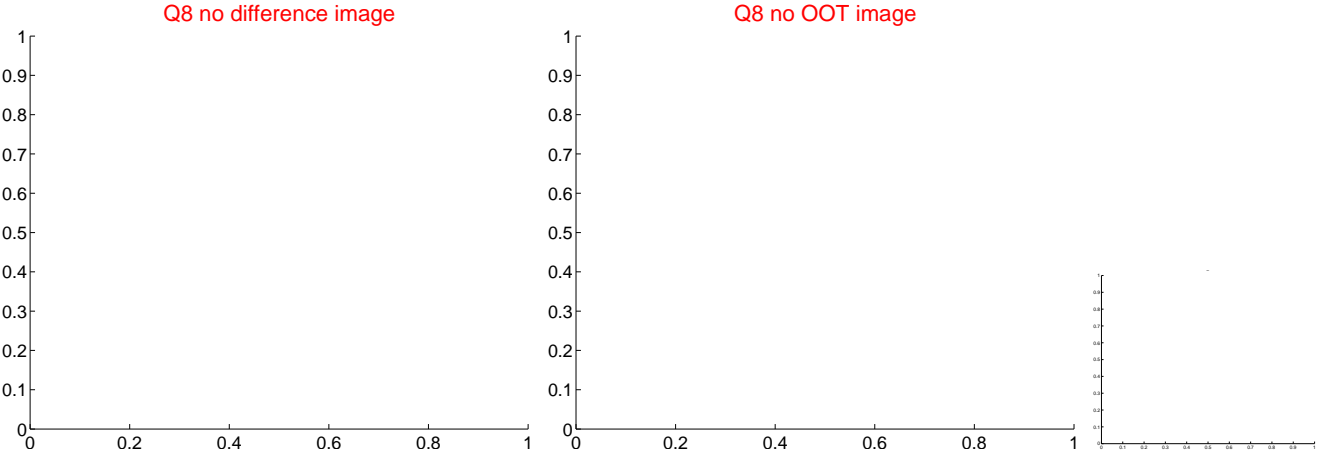
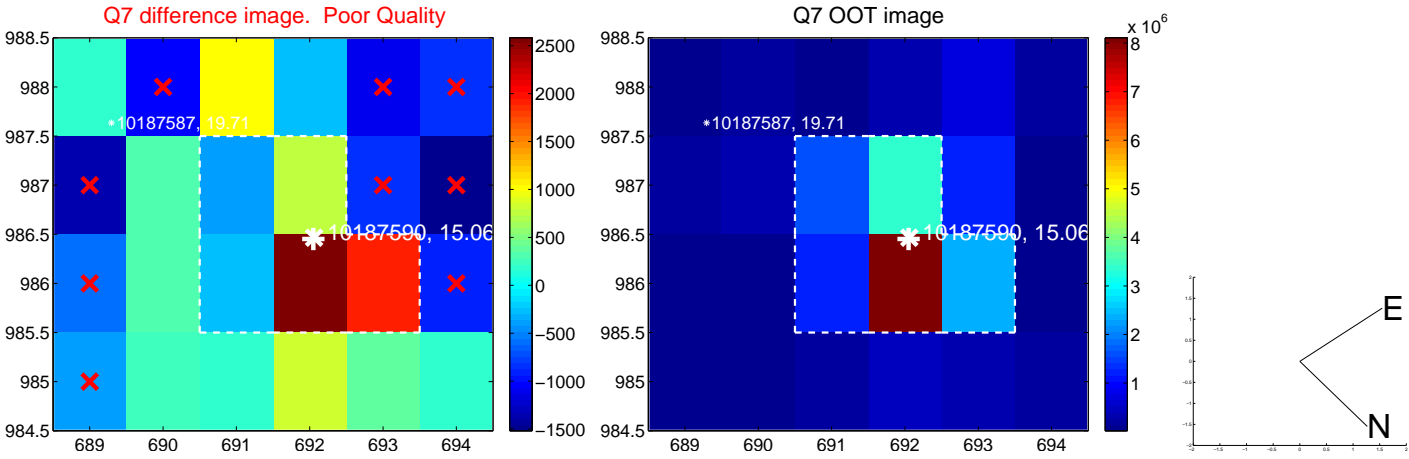
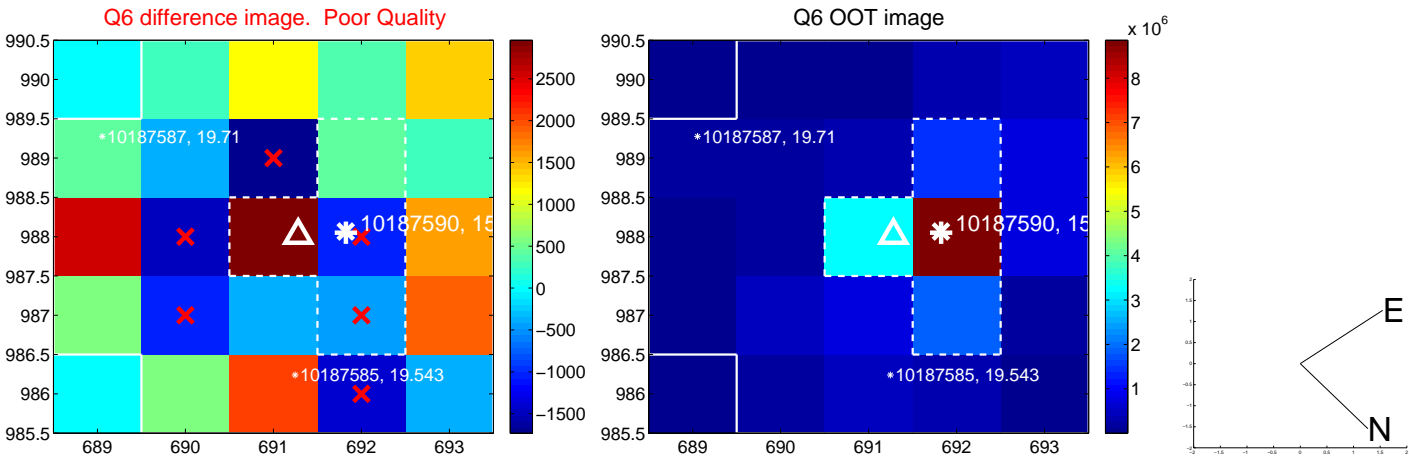
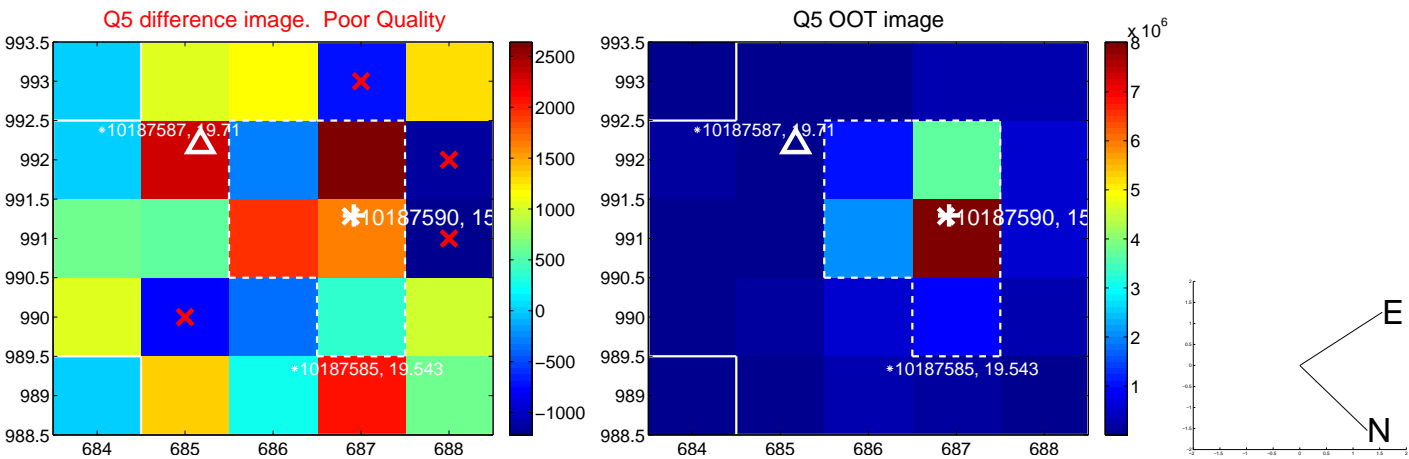


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

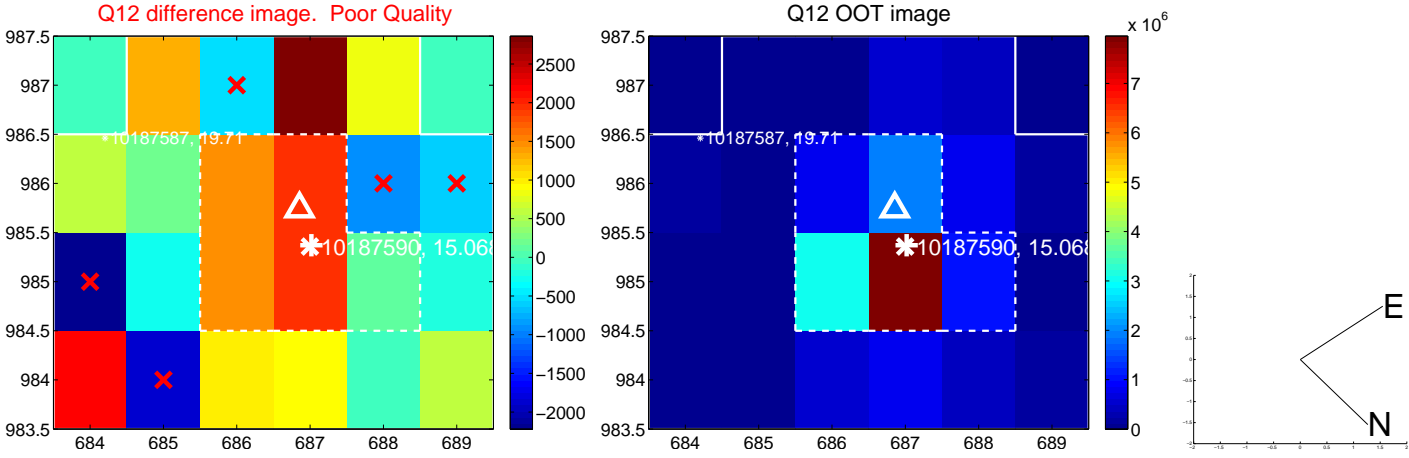
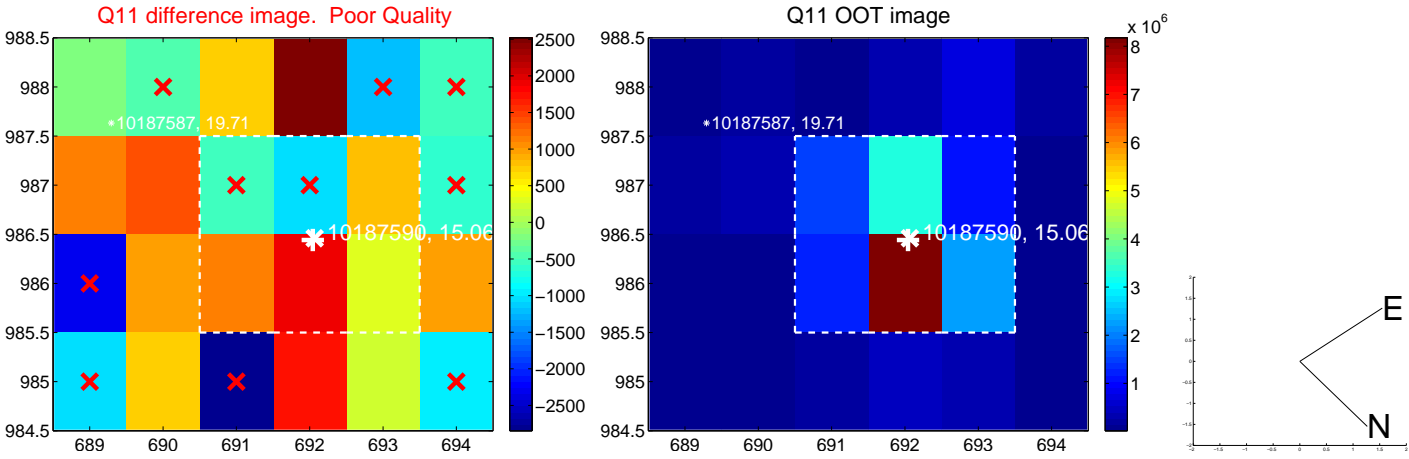
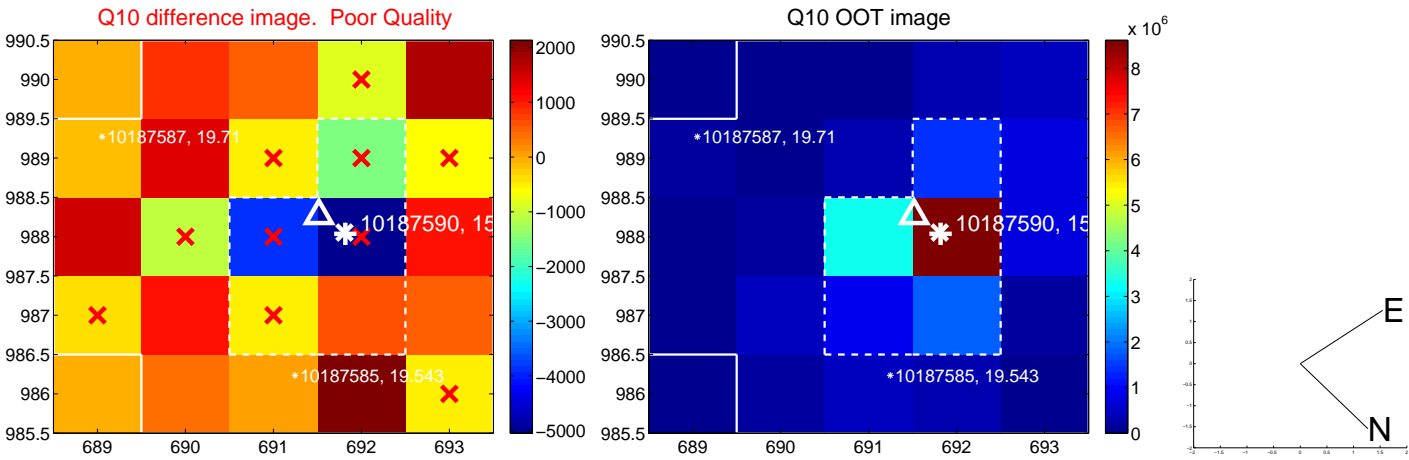
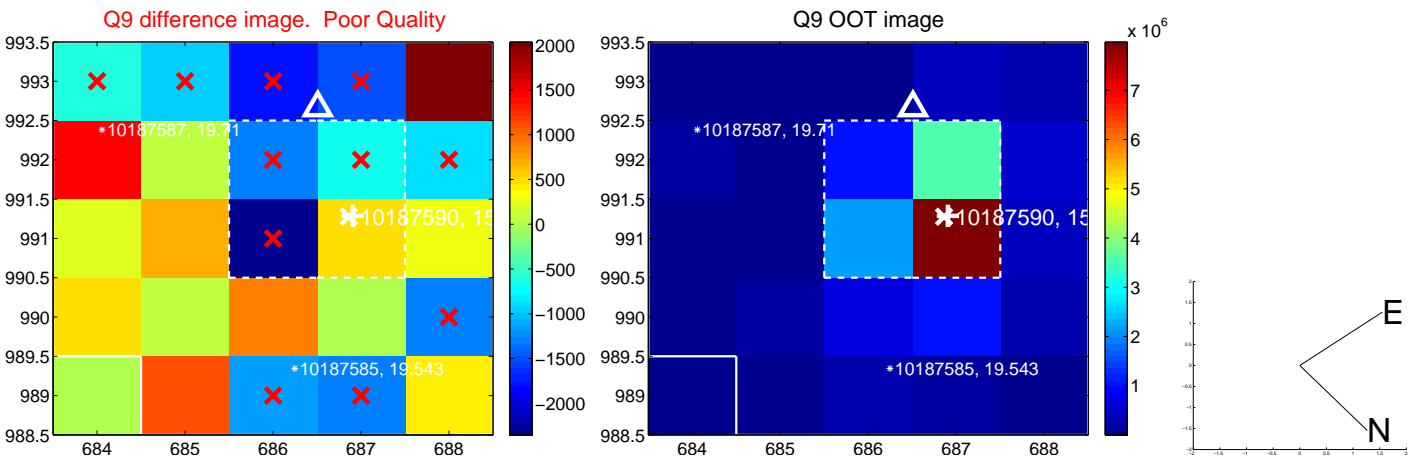
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



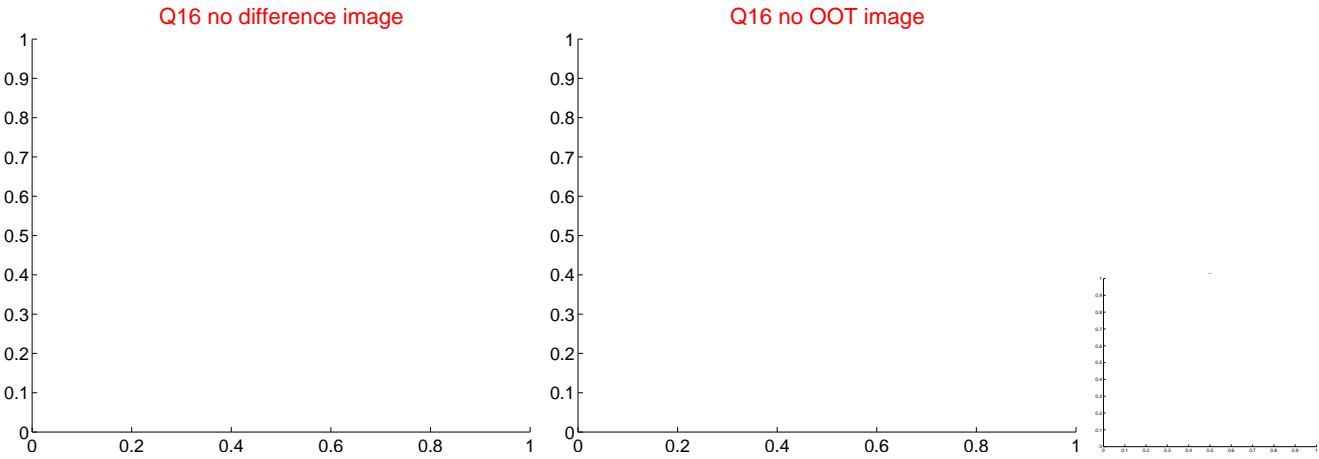
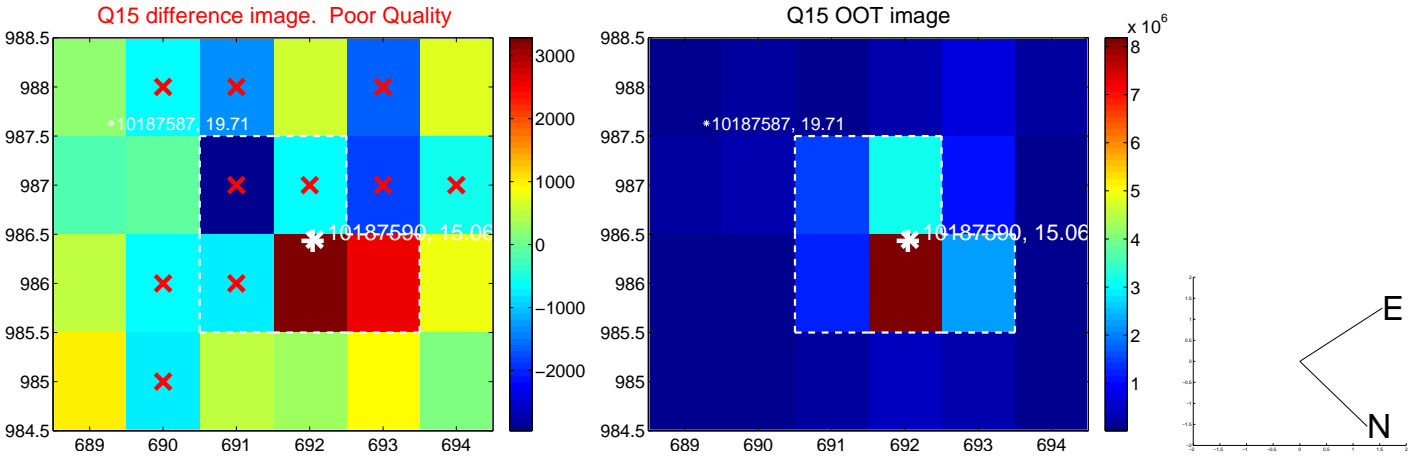
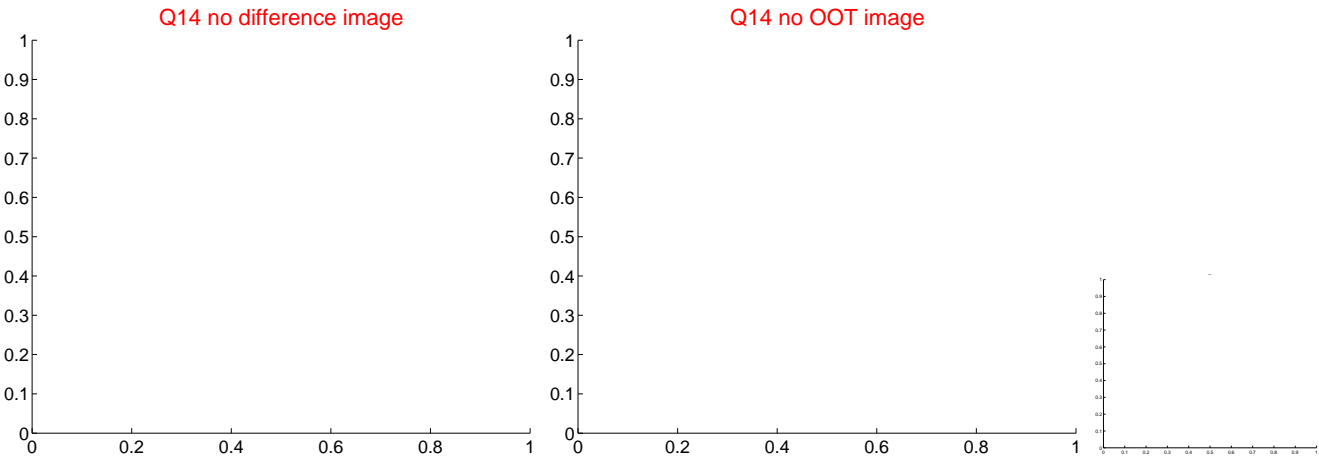
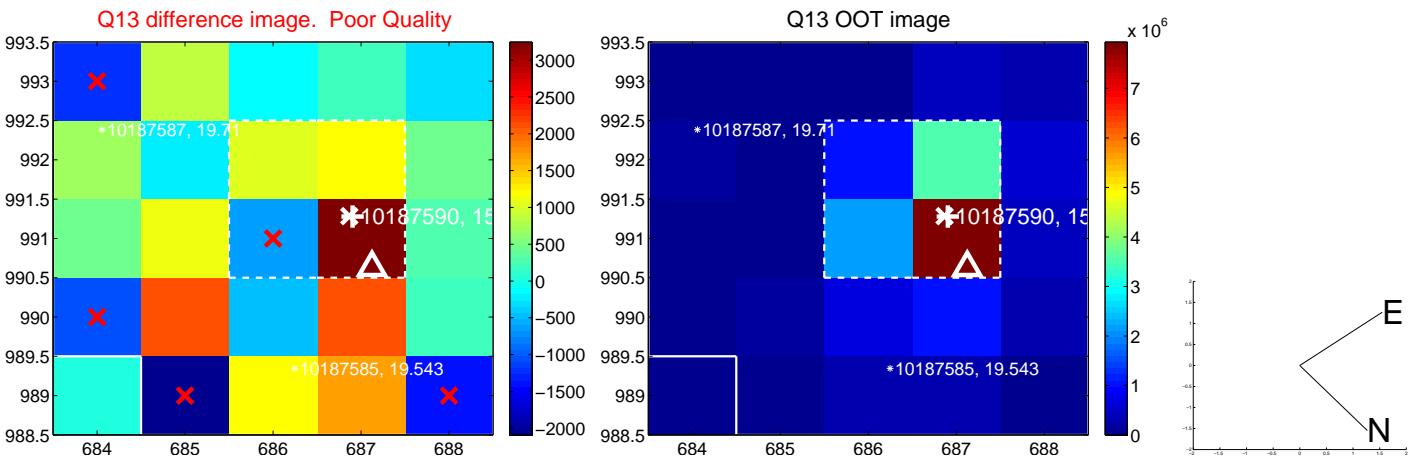
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



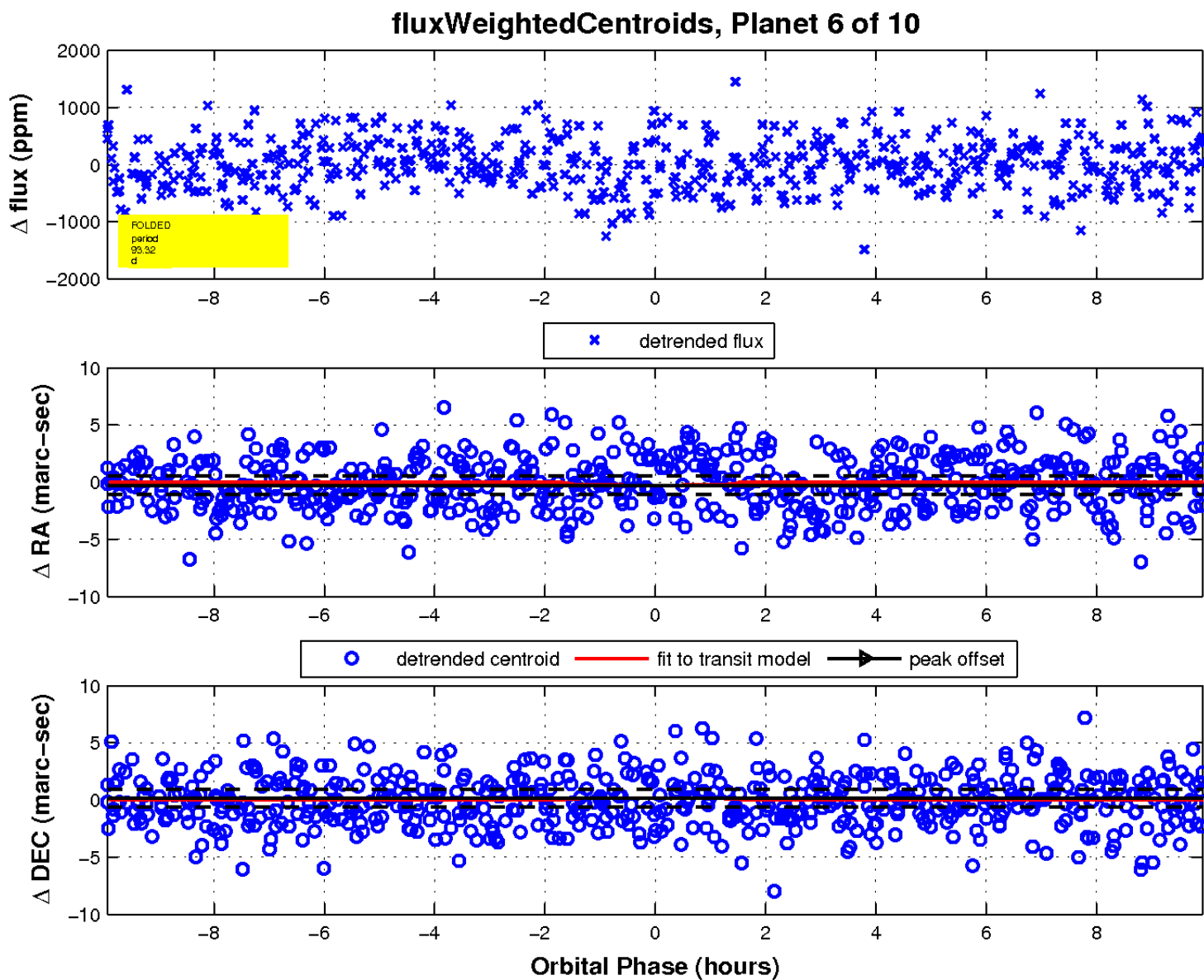
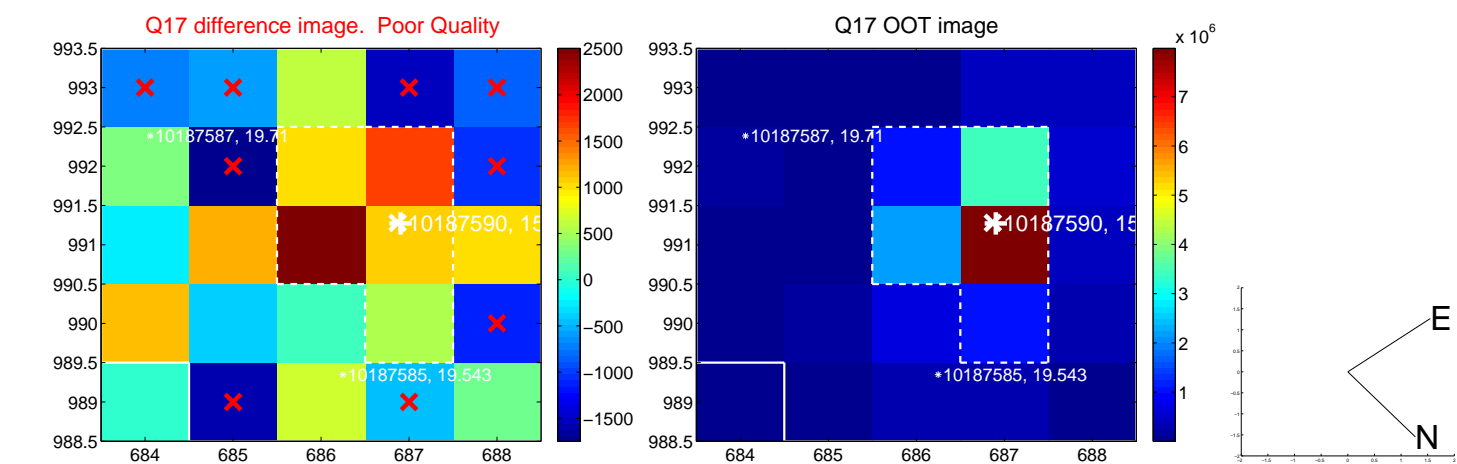
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

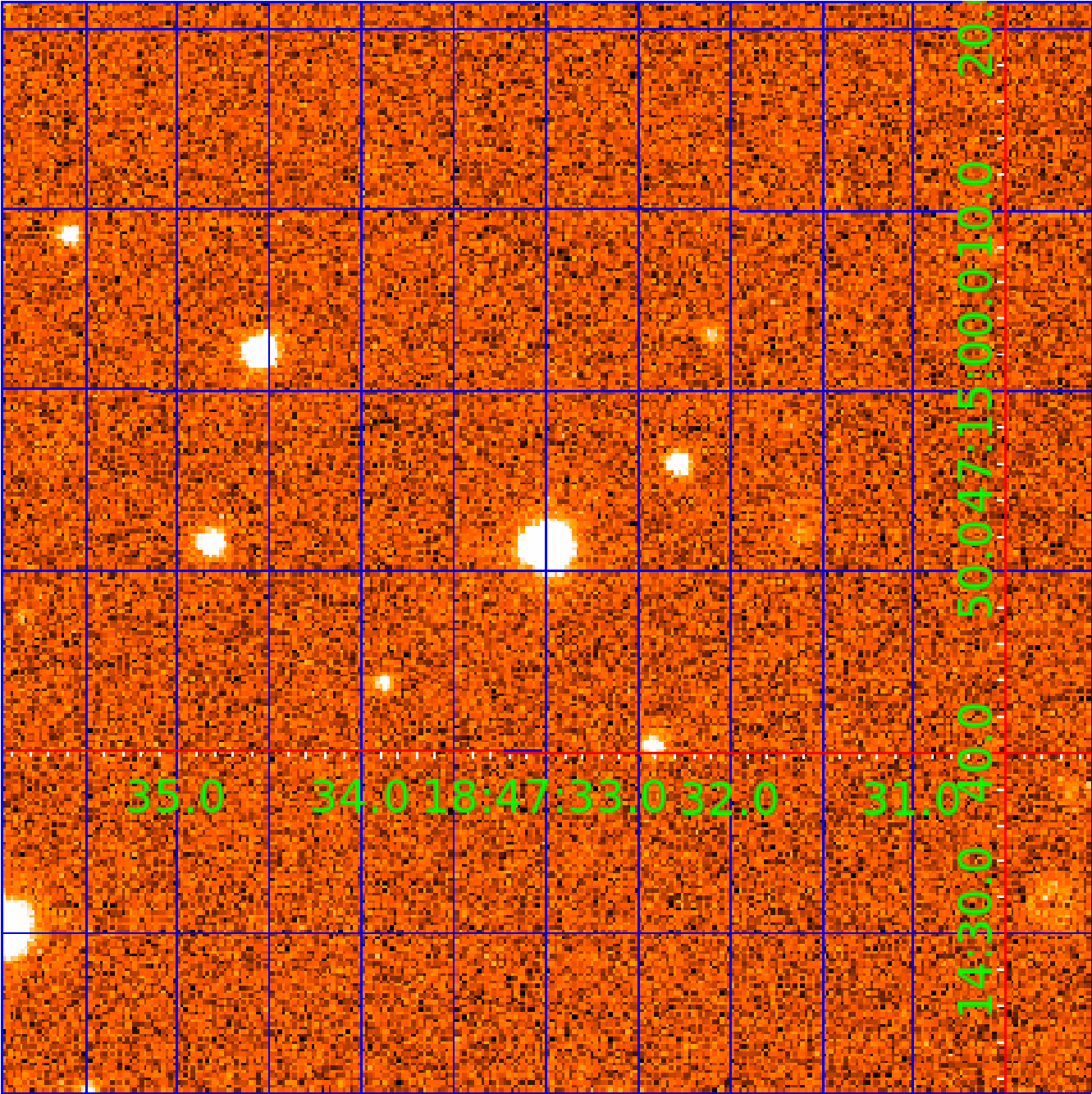


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 010187590

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010187590-01	OBS	No	1.397736	131.711487	72.4	7.994	7.4	7.9	1.03	6108	0.87	2034.61
010187590-02	OBS	No	357.728536	370.052917	9001.2	28.767	15.6	11.8	1.03	6108	16.71	1.25
010187590-03	OBS	No	127.957031	175.181203	13.2	2.604	15.4	0.0	1.03	6108	0.43	4.93
010187590-04	OBS	No	127.988621	175.316389	367.8	3.052	15.2	1.8	1.03	6108	2.17	4.93
010187590-06	OBS	No	93.319103	176.224996	238.0	3.317	12.7	1.4	1.03	6108	1.83	7.51
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010187590-08	OBS	No	75.908968	174.229818	670.4	0.657	12.2	2.1	1.03	6108	3.25	9.89

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010187590-01	OBS	FP	0.00	1	0	0	0	LPP_DV
010187590-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS
010187590-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010187590-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—SAME_NTL_PERIOD—CENT_FEW_DIFFS
010187590-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
010187590-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010187590-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_MEAS

**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.

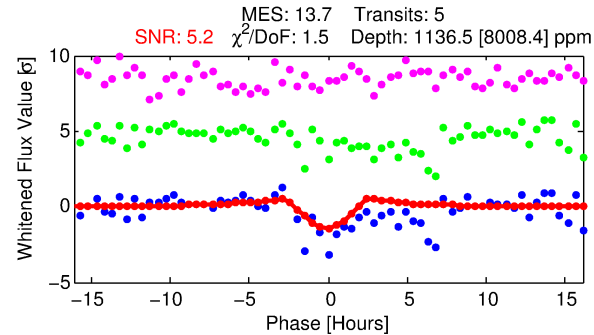
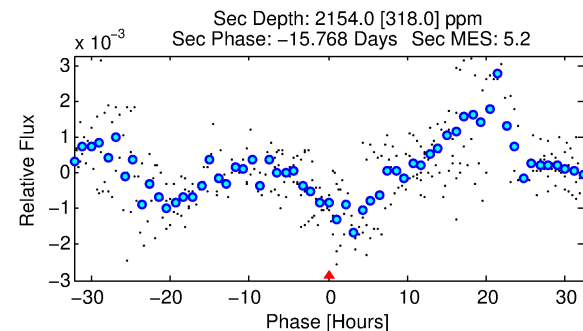
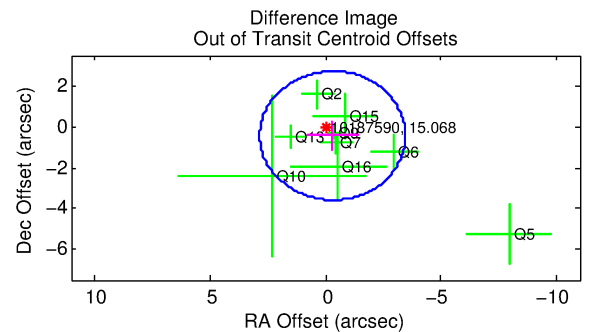
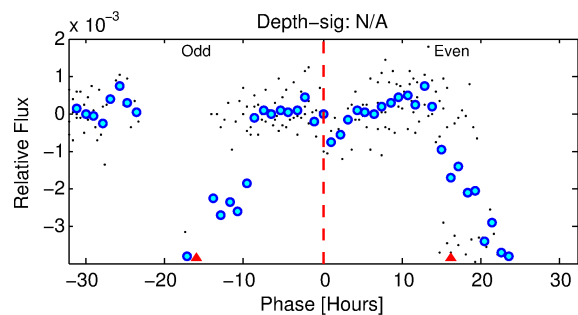
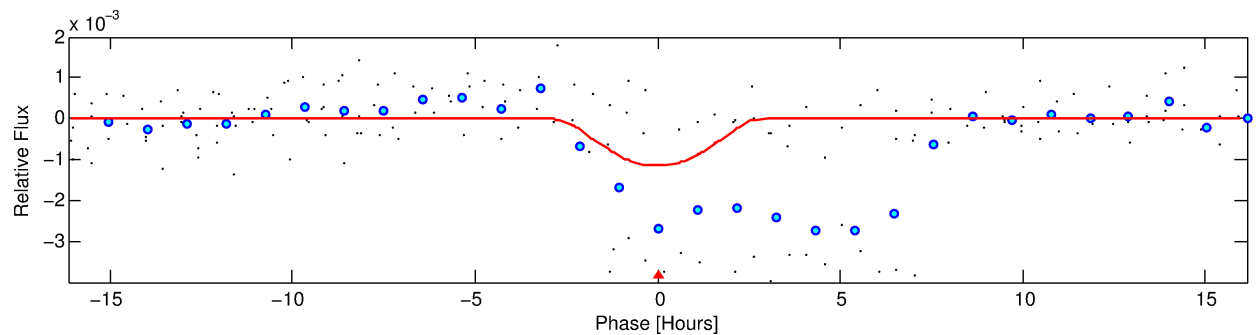
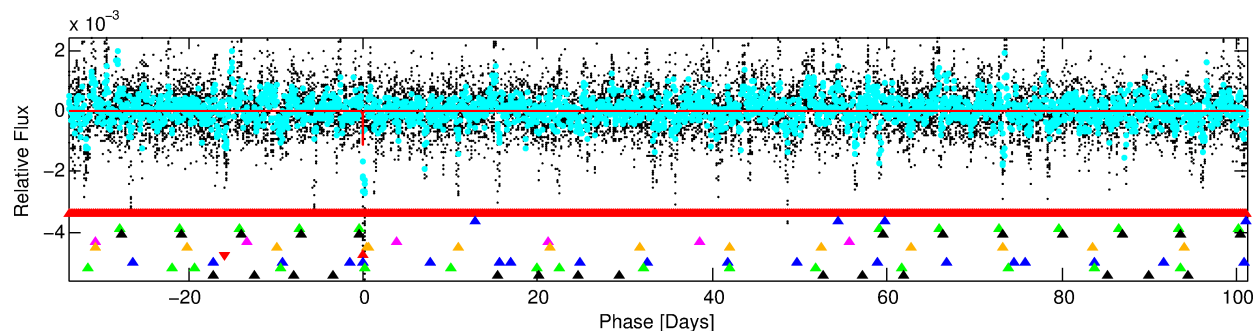
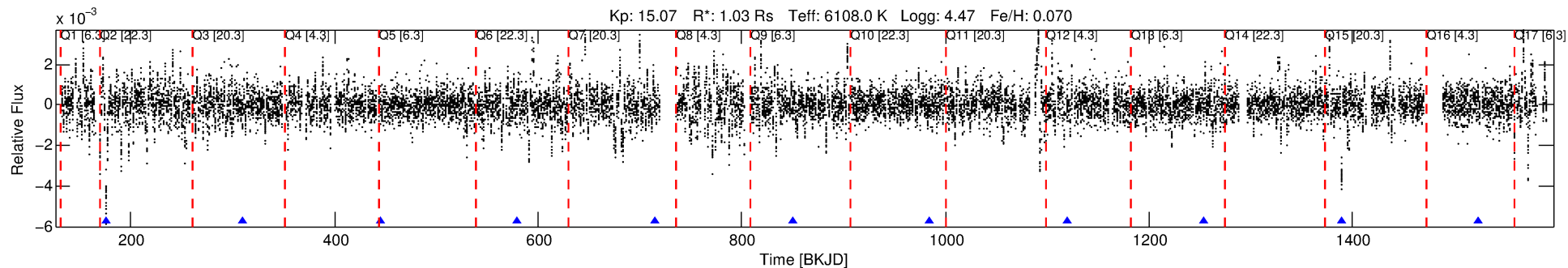
Ephemeris Match Information For 010187590-07

No Significant Match Found



# DV One-Page Summary

KIC: 10187590 Candidate: 7 of 10 Period: 134.801 d



## DV Fit Results:

Period = 134.80070 [0.00341] d  
Epoch = 175.6399 [0.0220] BKJD  
Rp/R\* = 0.0594 [0.4014]  
a/R\* = 66.93 [107.20]  
b = 1.00 [0.29]  
Seff = 4.60 [1.76]  
Teq = 373 [36] K  
Rp = 6.67 [45.16] Re  
a = 0.5363 [0.1324] AU  
Ag = 7649.97 [103455.50] [0.07σ]  
Teff = 5400 [18251] K [0.2σ]

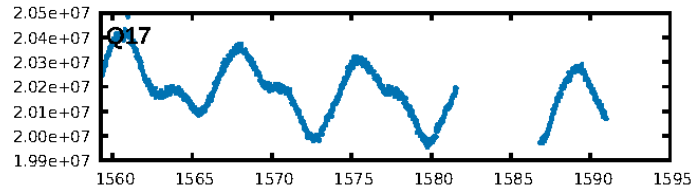
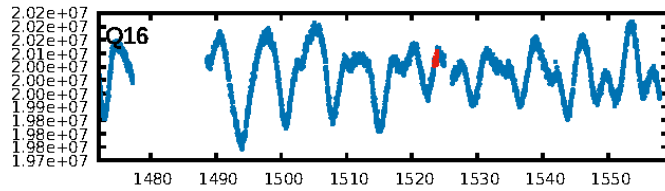
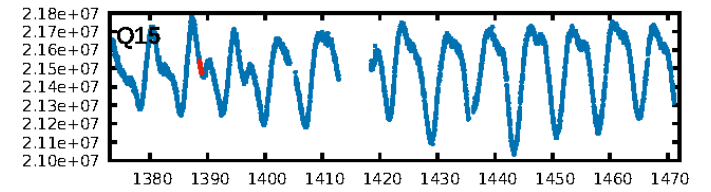
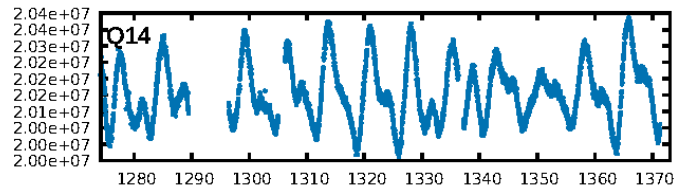
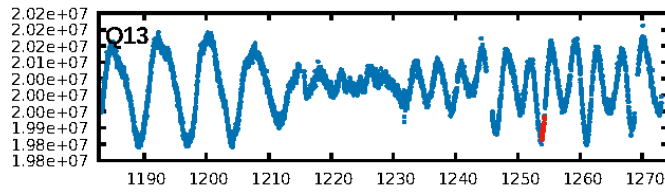
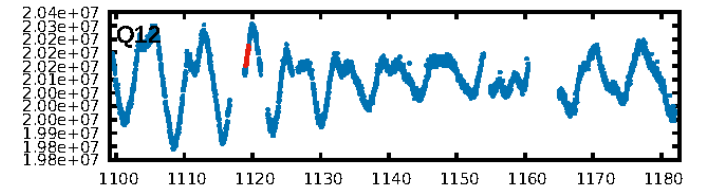
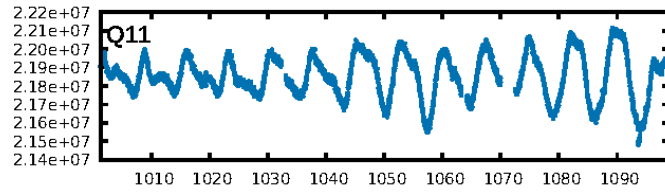
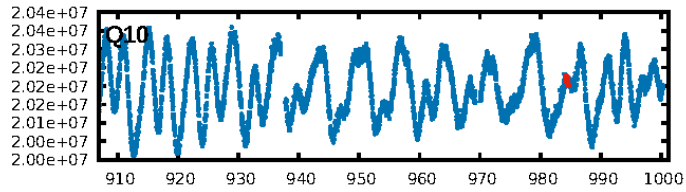
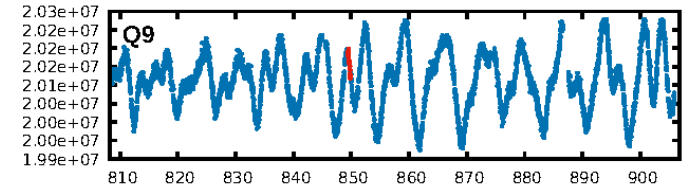
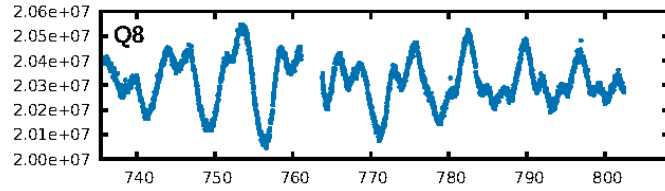
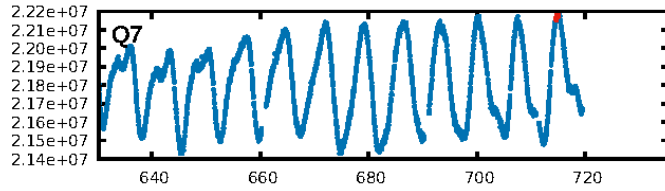
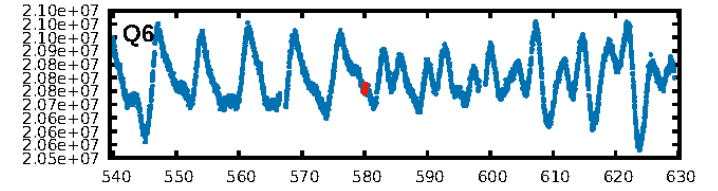
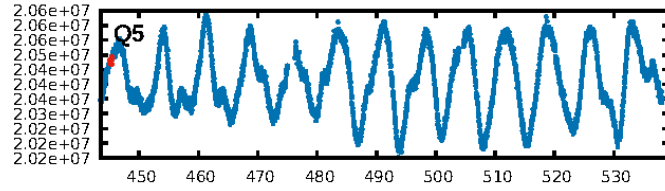
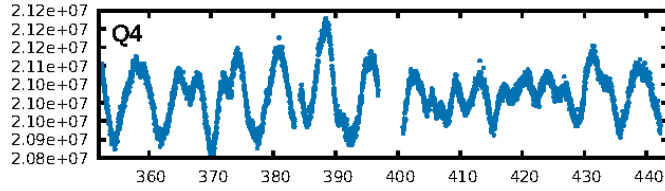
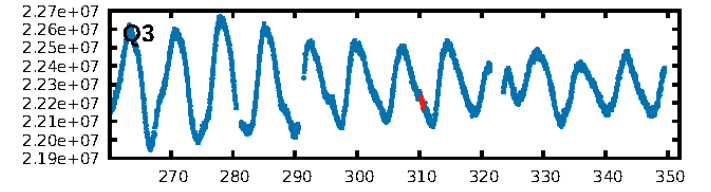
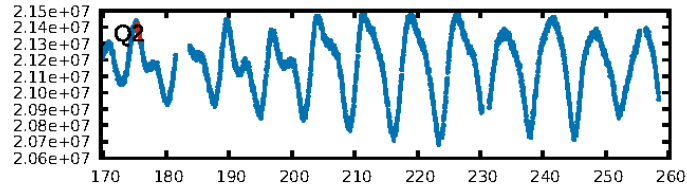
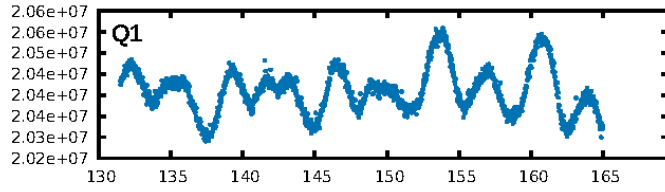
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [26.42σ]  
LongPeriod-sig: 100.0% [395.34σ]  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 91.6%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [5/5]  
GhostDiagnostic-chr: 0.594  
Centroid-sig: 9.5%  
Centroid-so: 0.782 arcsec [0.98σ]  
OotOffset-rm: 0.528 arcsec [0.50σ]  
OotOffset-st: 3/2/1/3 [9]  
KicOffset-rm: 0.417 arcsec [0.50σ]  
KicOffset-st: 3/2/1/3 [9]  
DiffImageQuality-fgm: 0.11 [1/9]  
DiffImageOverlap-fno: 0.09 [1/11]

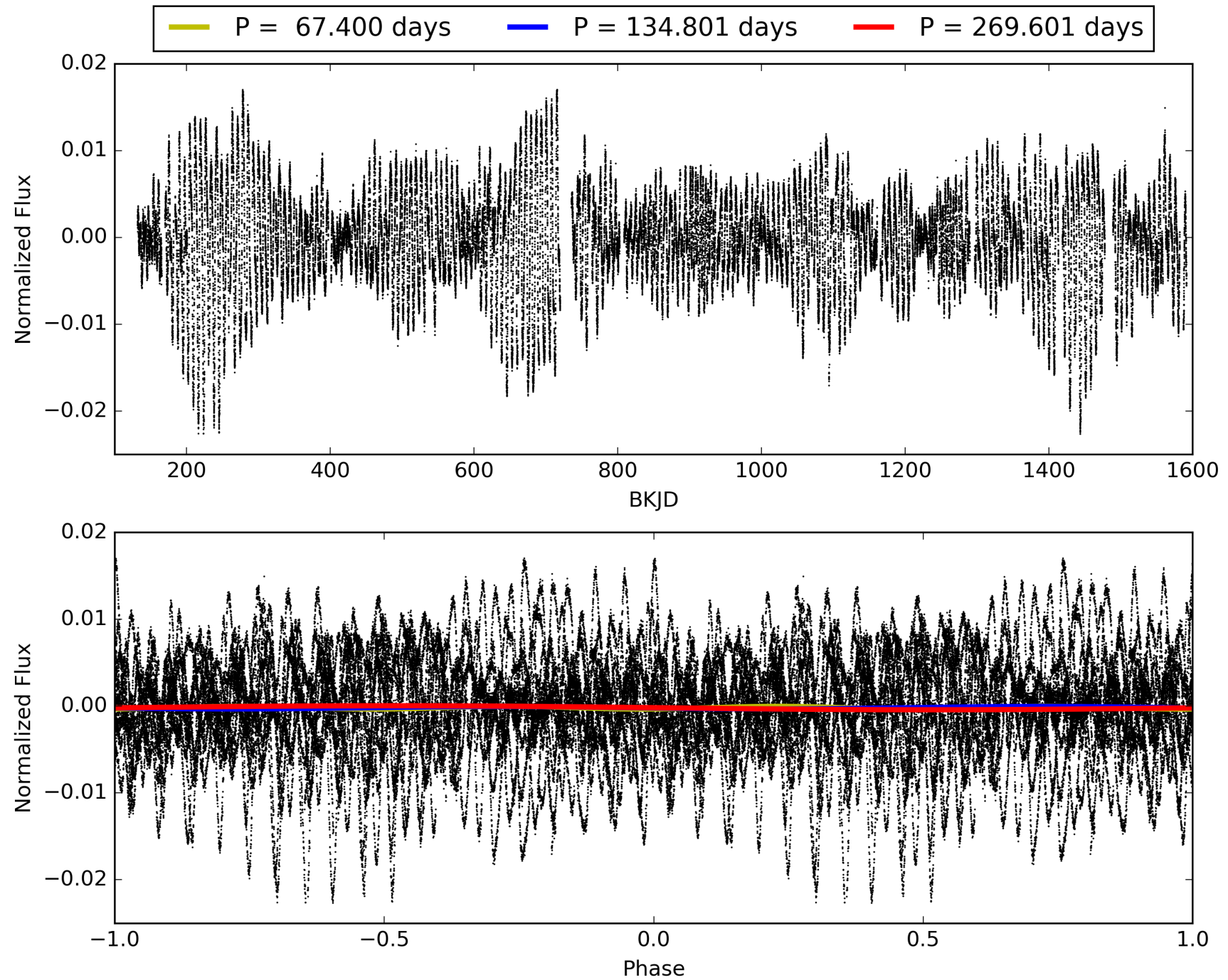
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 14:44:14 Z

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

# TCE 010187590-07, PDC Light Curves

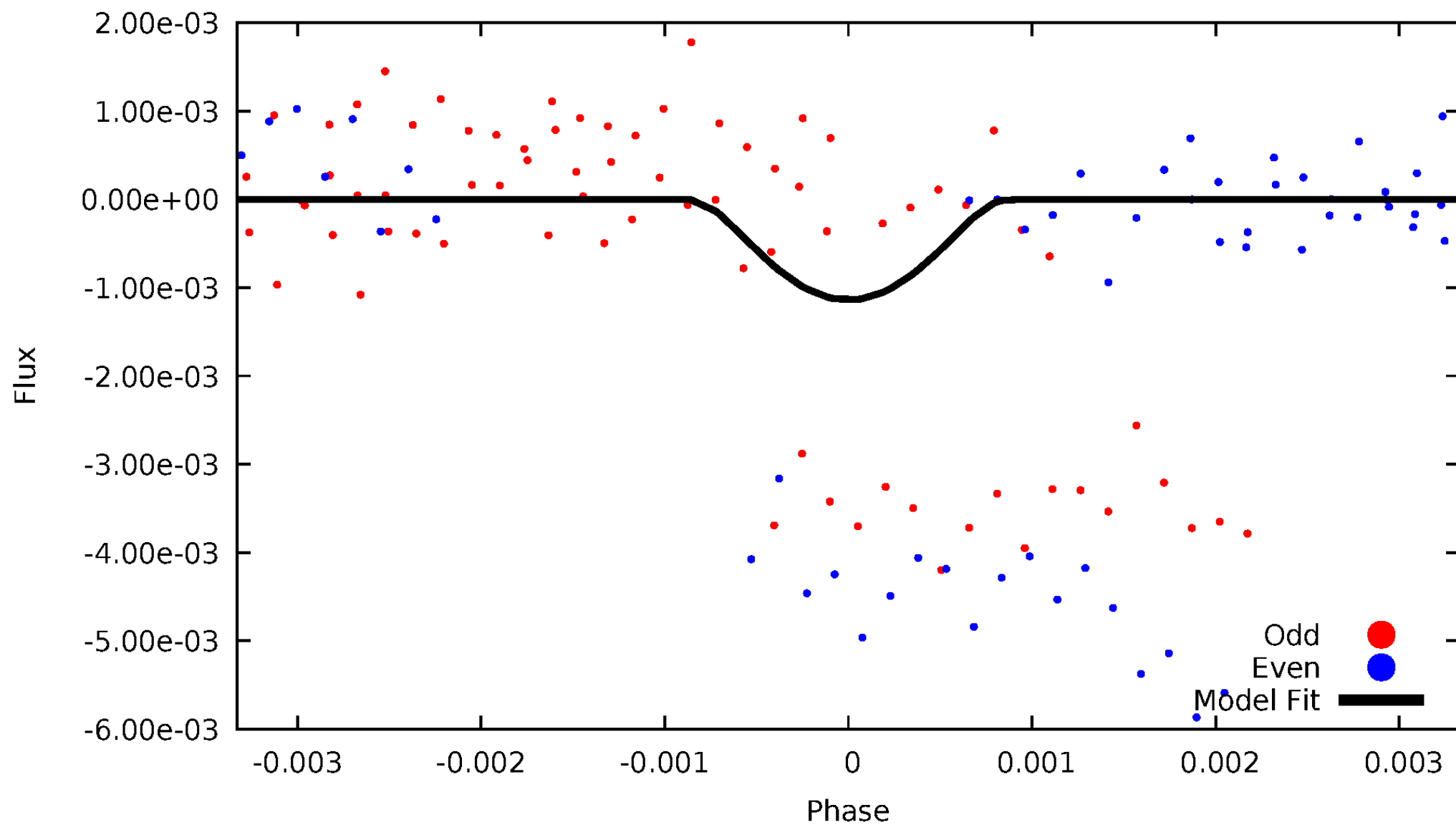


TCE 010187590-07



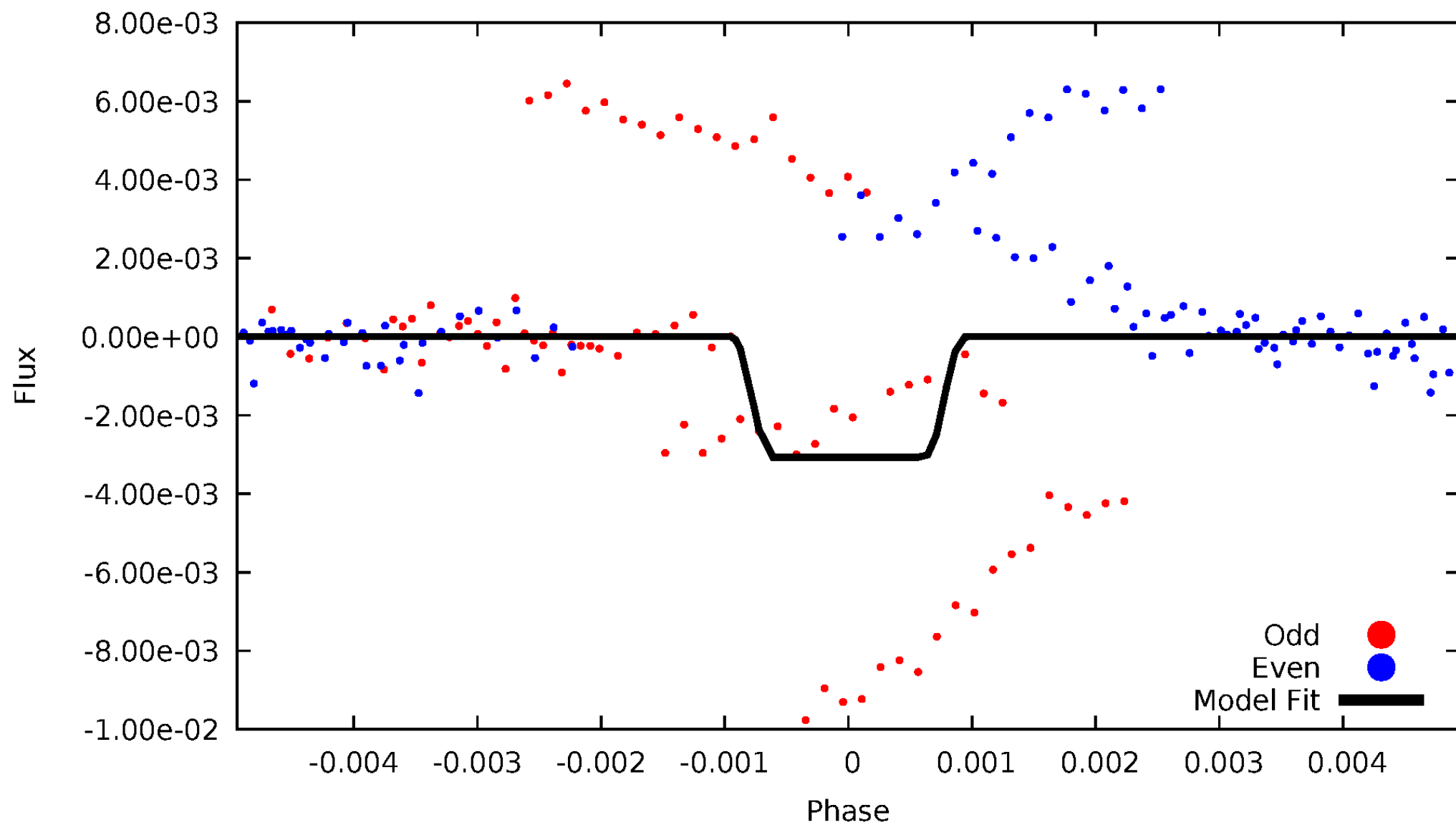
# DV Odd/Even

TCE 010187590-07



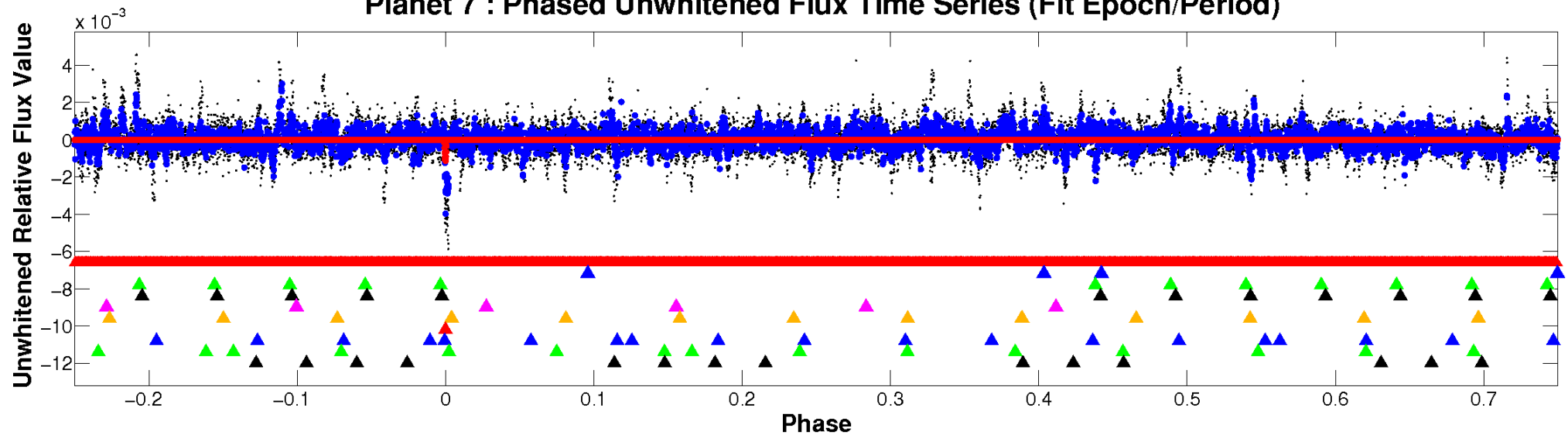
# ALT Odd/Even

TCE 010187590-07

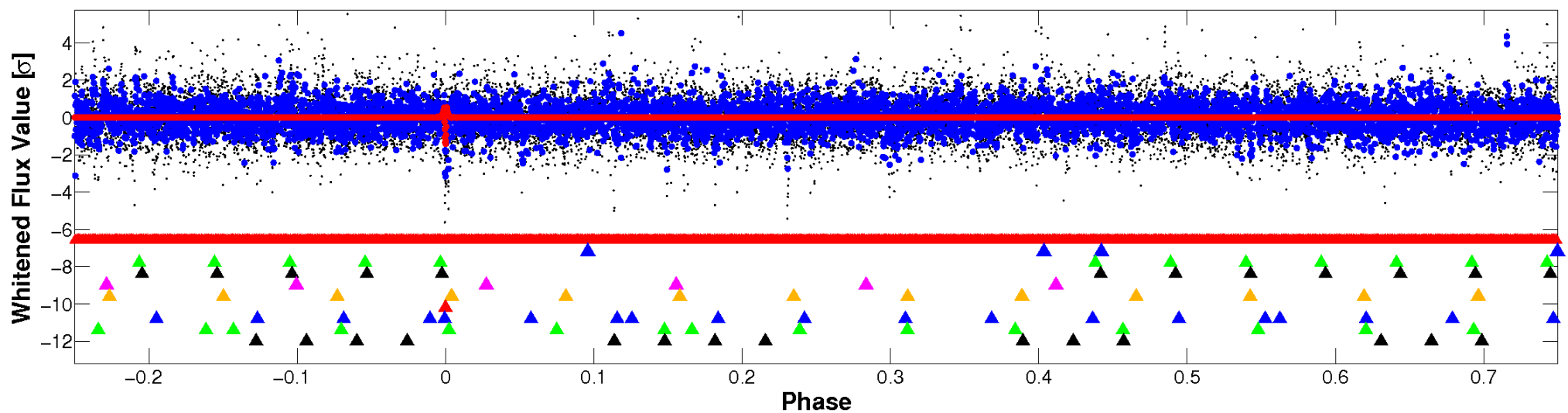


# Non-Whitened Vs. Whitened Light Curve

Planet 7 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

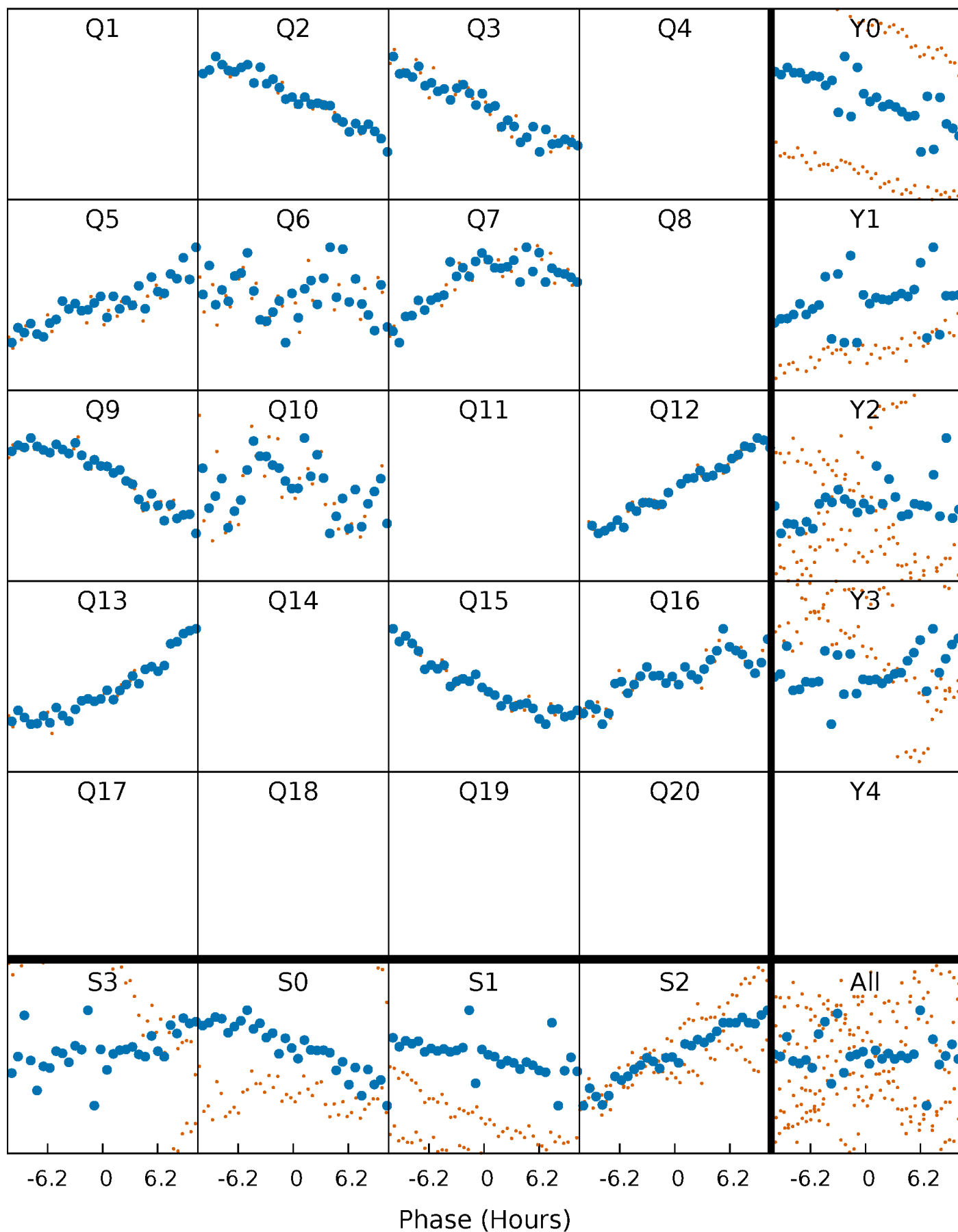


Planet 7 : Phased Whitened Flux Time Series (Fit Epoch/Period)



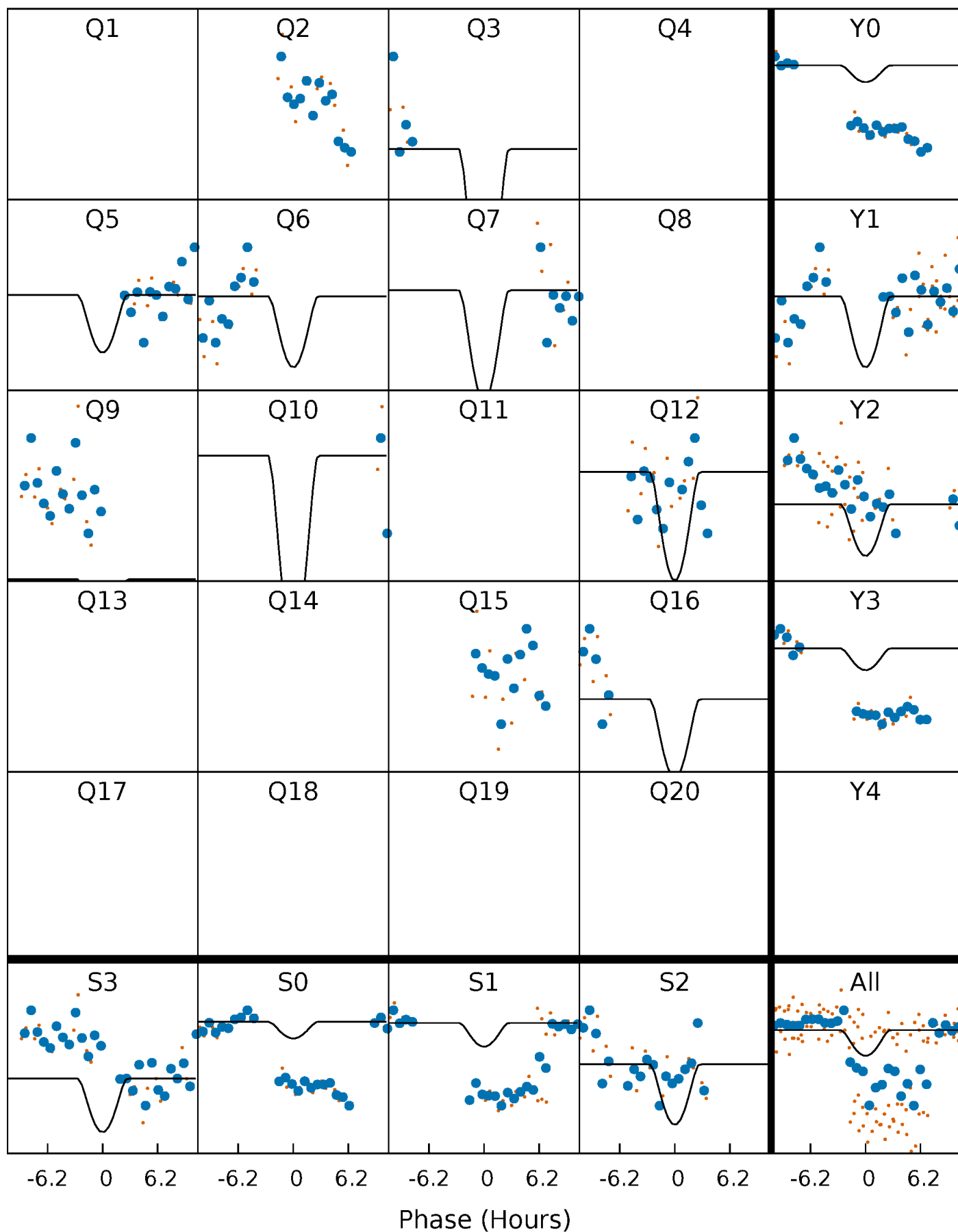
# PDC Quarter-Phased Transit Curves

TCE 010187590-07 P=134.800704 Days  $T_0=175.639855$  (BKJD)



# DV Quarter-Phased Transit Curves

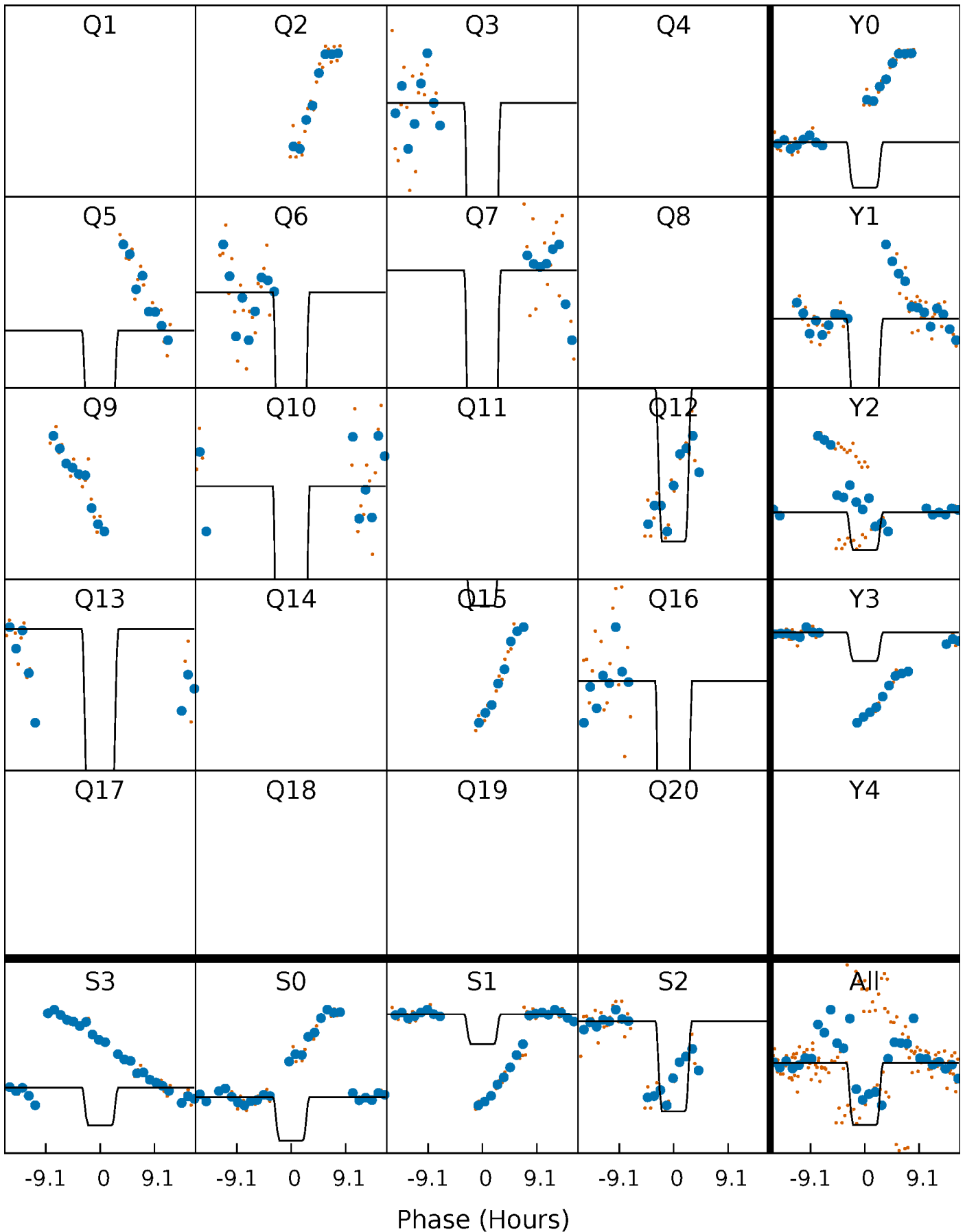
TCE 010187590-07     $P=134.800704$  Days     $T_0=175.639855$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

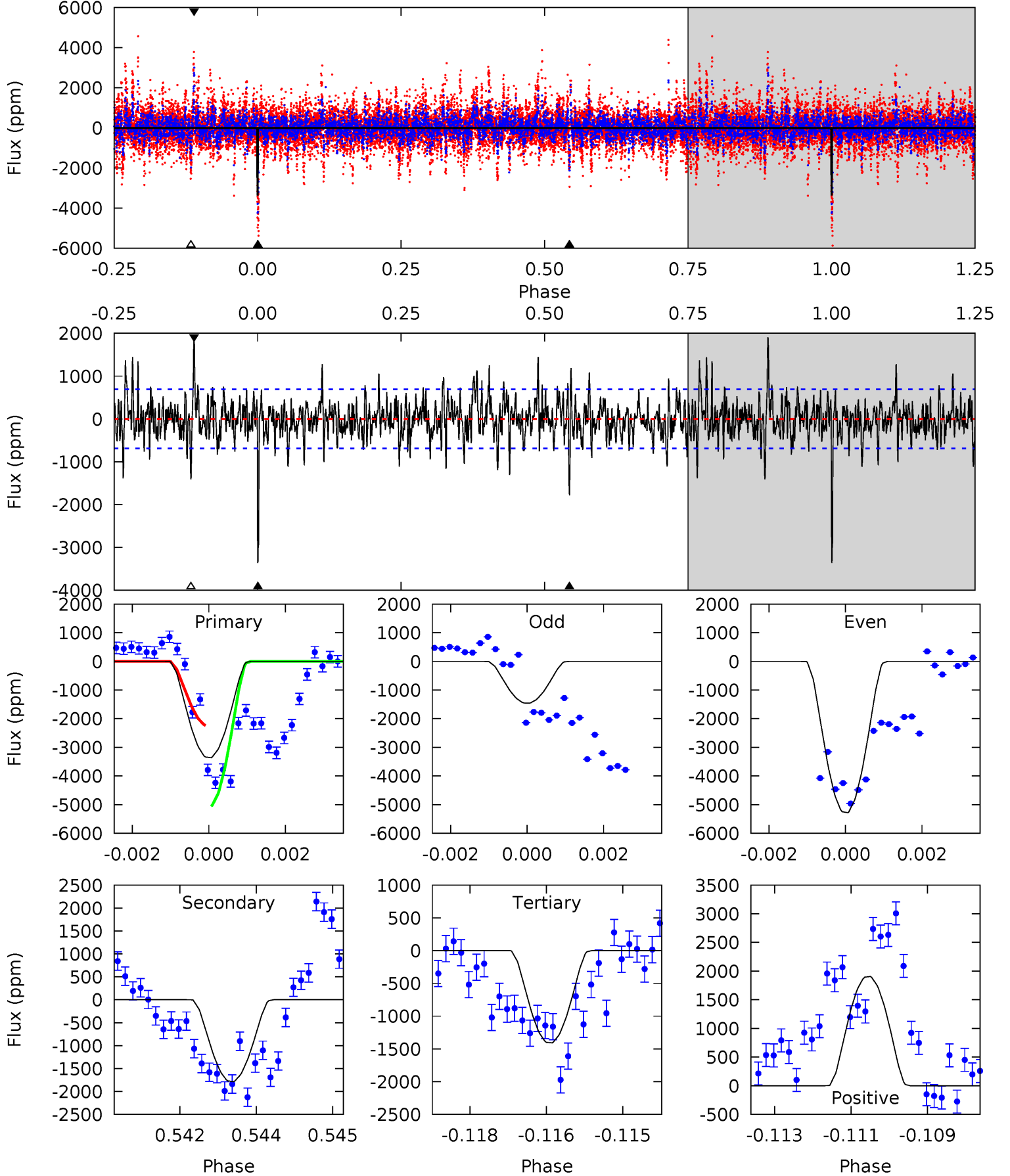
TCE 010187590-07     $P=134.807006$  Days     $T_0=175.575253$  (BKJD)



# DV Model-Shift Uniqueness Test

010187590-07,  $P = 134.800704$  Days,  $E = 40.839151$  Days

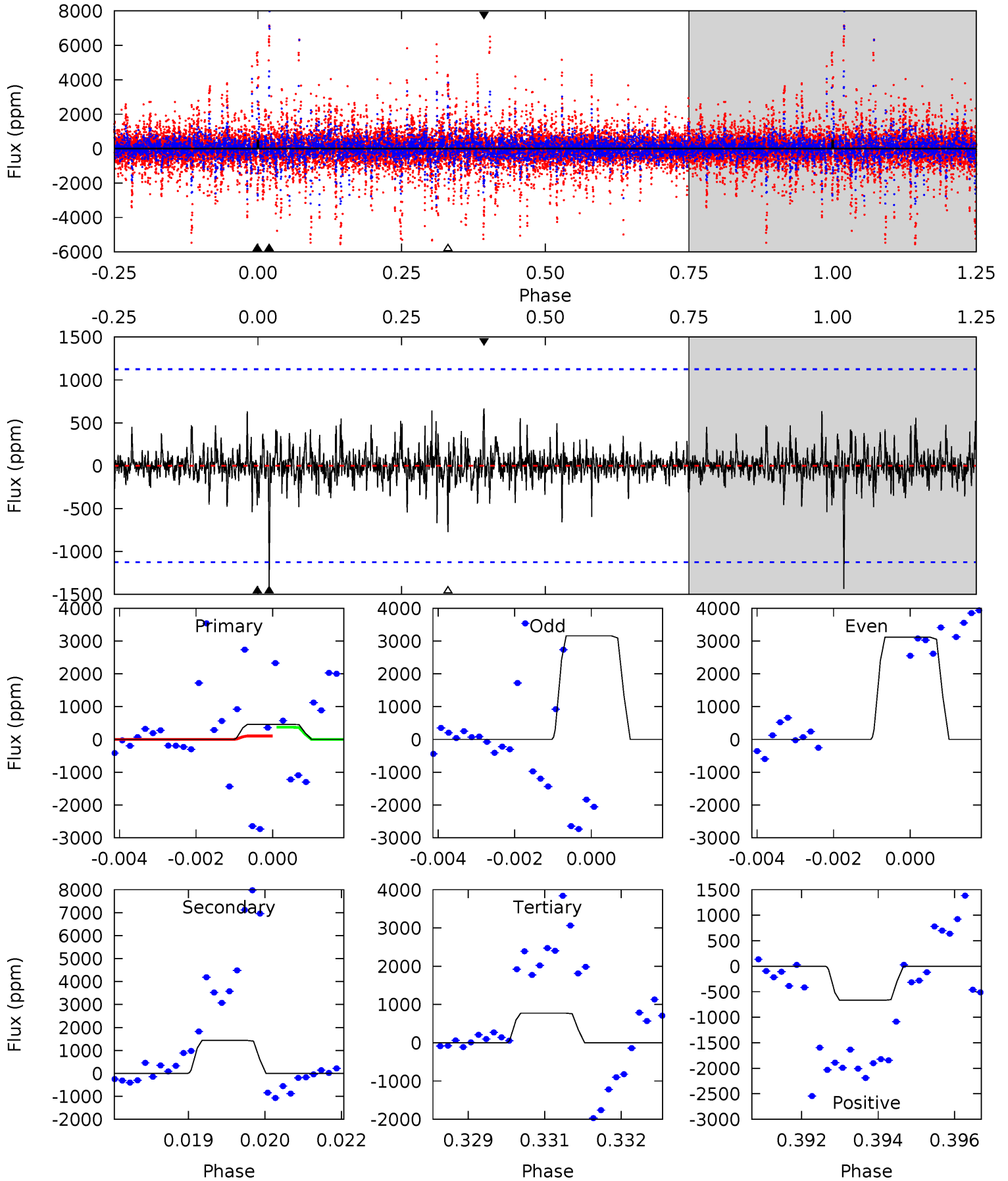
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
26.1	13.9	11.0	14.8	5.36	3.14	2.94	15.2	11.3	2.91	-0.96	14.2	6.31	0.36	10.9



# Alt Model-Shift Uniqueness Test

010187590-07, P = 134.807006 Days, E = 40.768247 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2.18	6.82	3.67	3.17	5.34	3.11	0.64	-1.49	-0.99	3.15	3.65	0.10	-1.71	0.32	0.55



### Stellar Parameters For KIC 010187590

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6108^{+172}_{-215}$	$4.466^{+0.048}_{-0.192}$	$0.070^{+0.250}_{-0.300}$	$1.030^{+0.306}_{-0.102}$	$1.132^{+0.130}_{-0.143}$	$1.457^{+0.384}_{-0.739}$
	+3%/-4%	+1%/-4%	+357%/-429%	+30%/-10%	+11%/-13%	+26%/-51%
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 010187590-07 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-1783 \pm 129$	$35.71^{+37.15}_{-25.07}$	$532^{+38}_{-28}$	$2972^{+1401}_{-506}$	$217^{+2519}_{-167}$
Alt.	$-1436 \pm 210$	$34.94^{+37.34}_{-25.14}$	$531^{+38}_{-26}$	$2899^{+1473}_{-503}$	$187^{+2118}_{-144}$

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

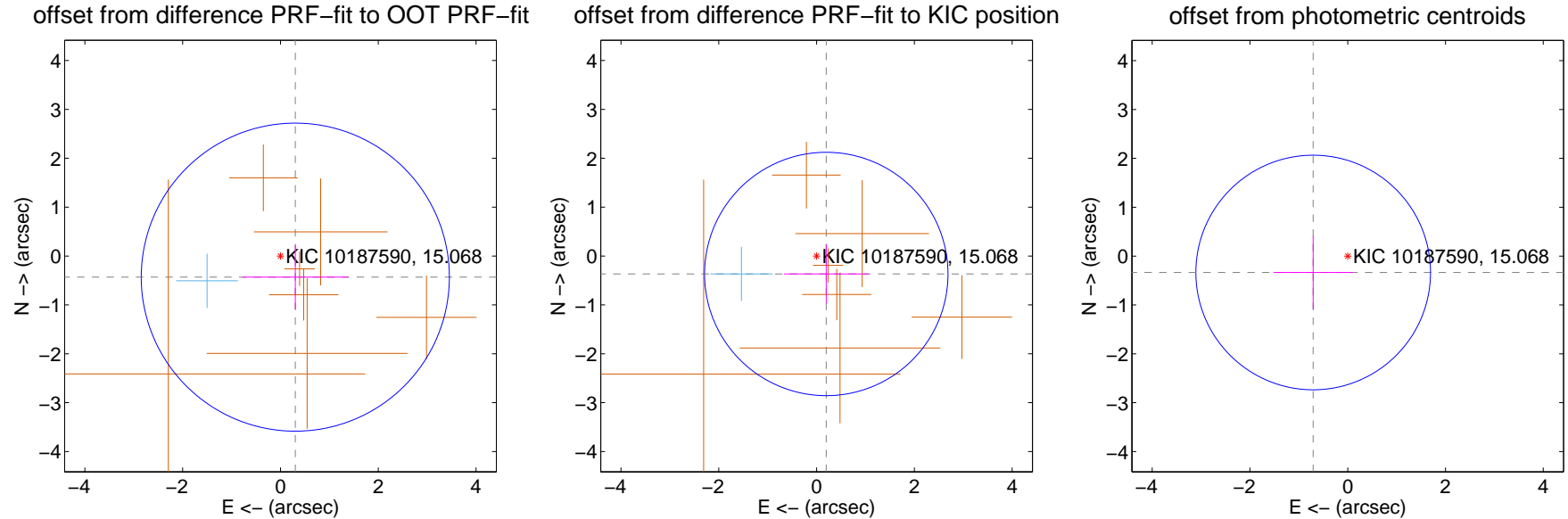
## DV Centroid Data

Supplemental centroid analysis for 010187590-07. Kepler magnitude: 15.07. Transit SNR 5.23

There are 1 quarters with good PRF difference image offsets

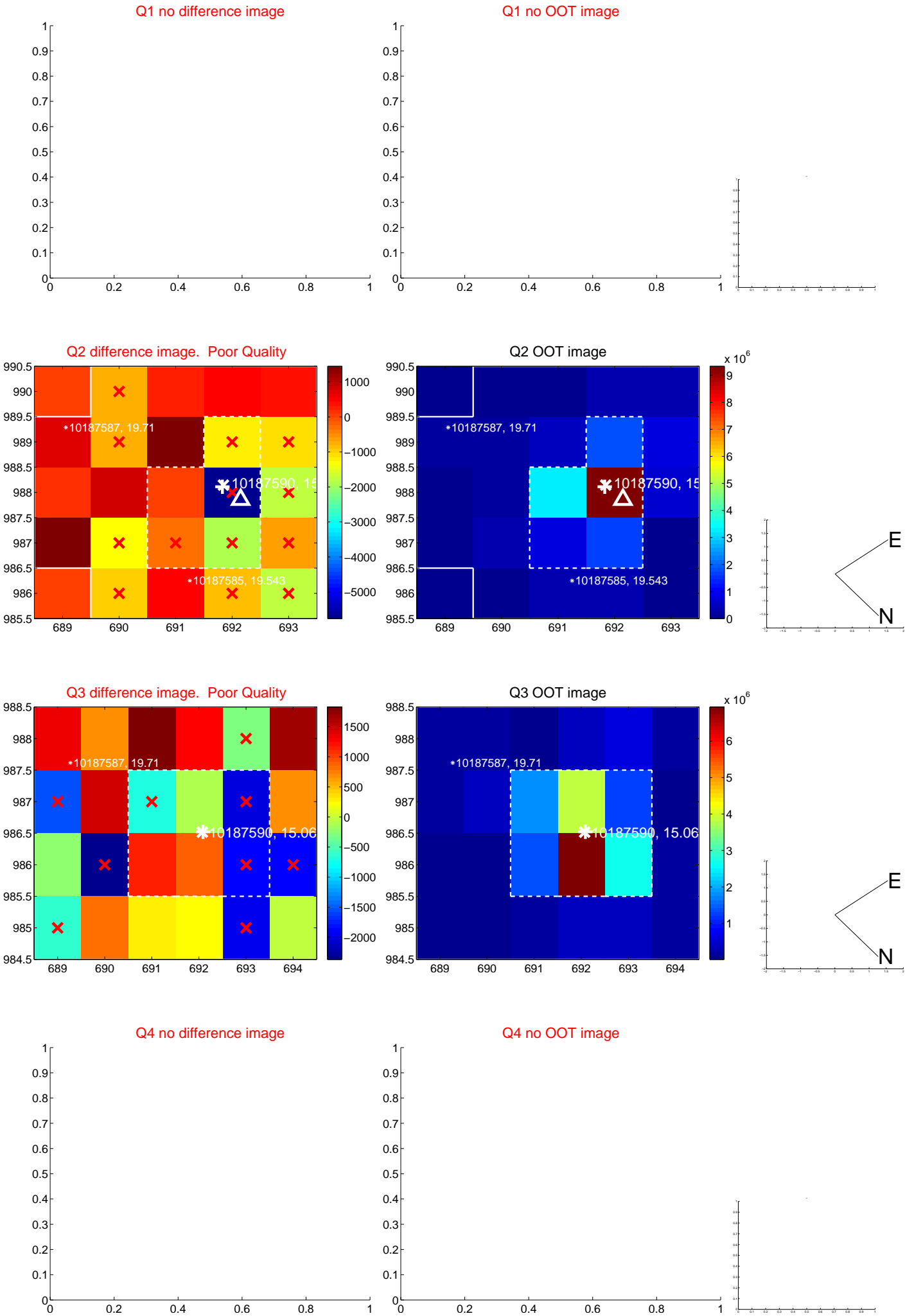
The direct PRF centroid is offset from the target star catalog position by about 0.13 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.528 \pm 1.050$	0.50	$-0.304 \pm 1.082$	$-0.432 \pm 0.658$
PRF-fit source offset from KIC position	$0.417 \pm 0.830$	0.50	$-0.198 \pm 0.866$	$-0.367 \pm 0.604$
photometric centroid source offset	$0.78 \pm 0.80$	0.98	$0.71 \pm 0.81$	$-0.34 \pm 0.75$

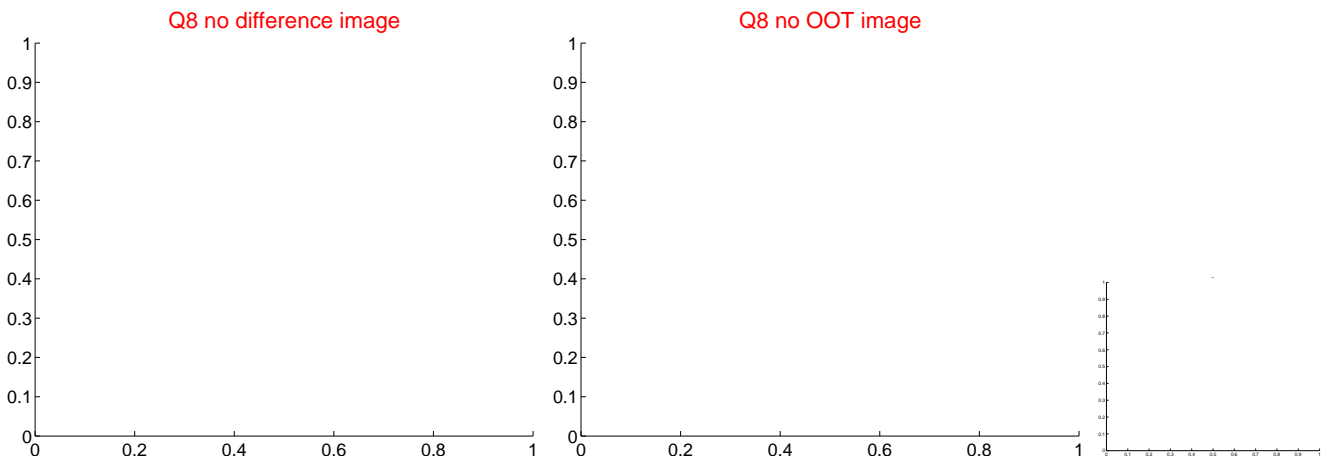
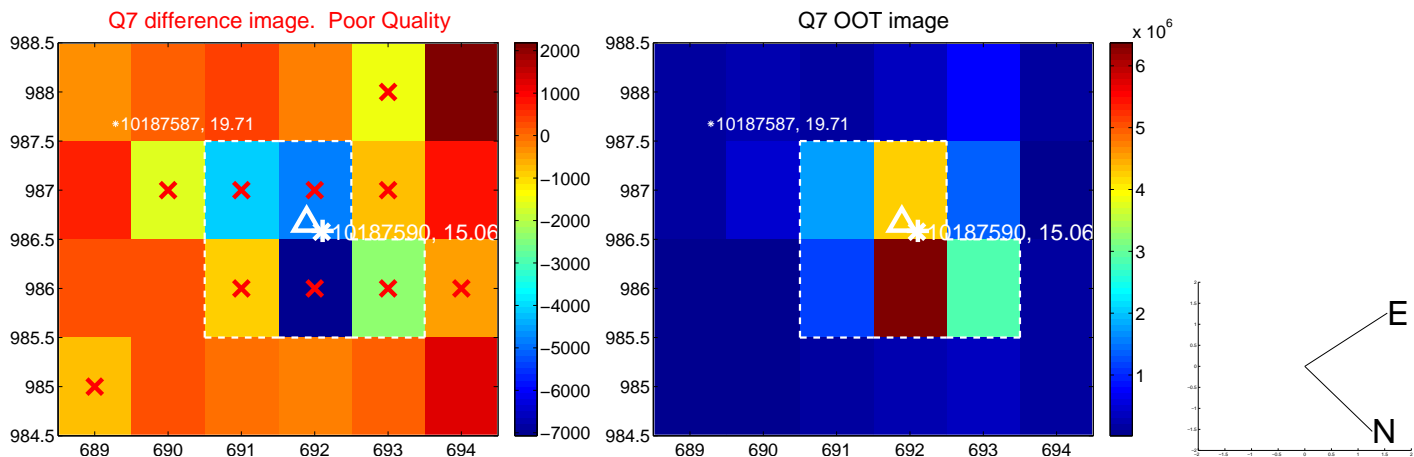
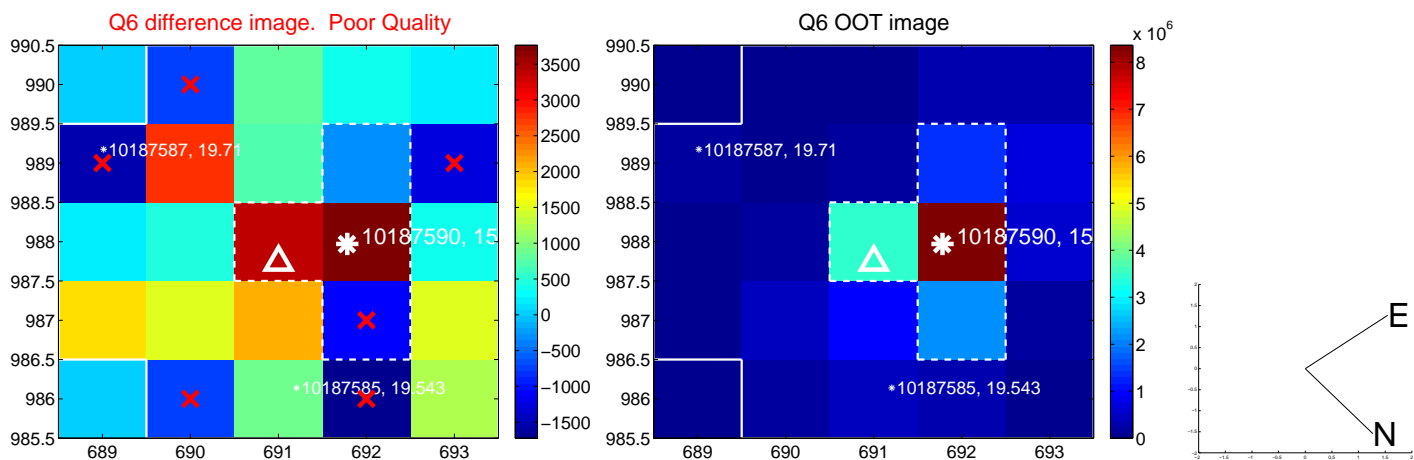
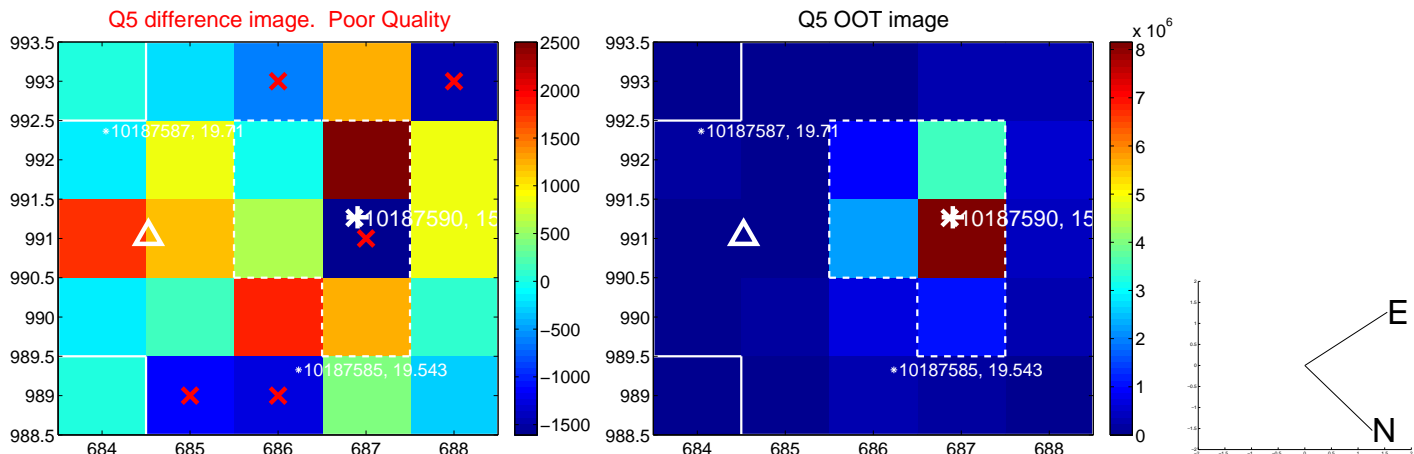


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

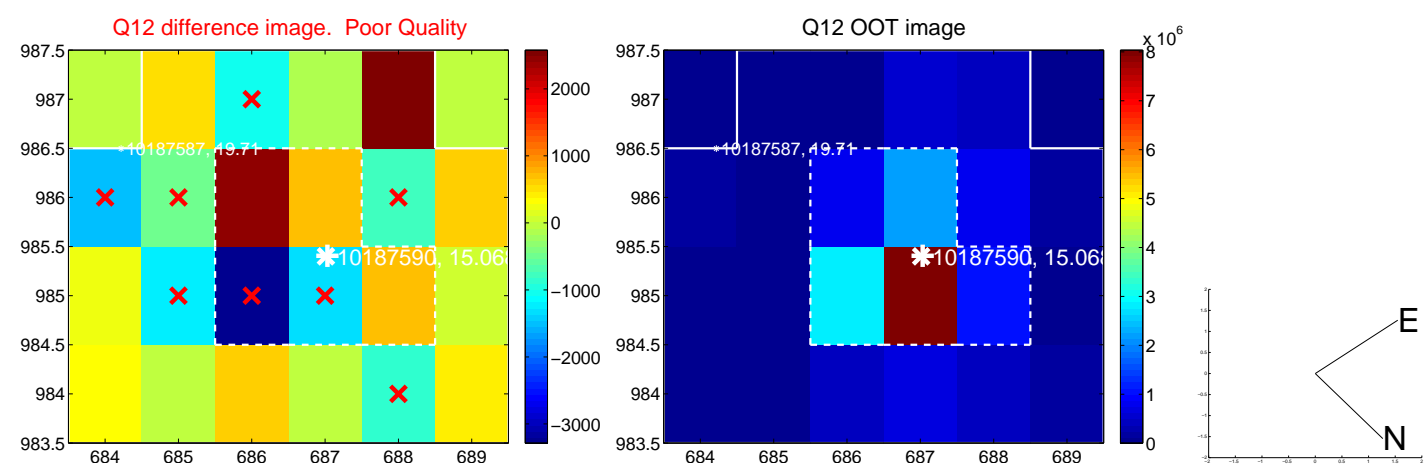
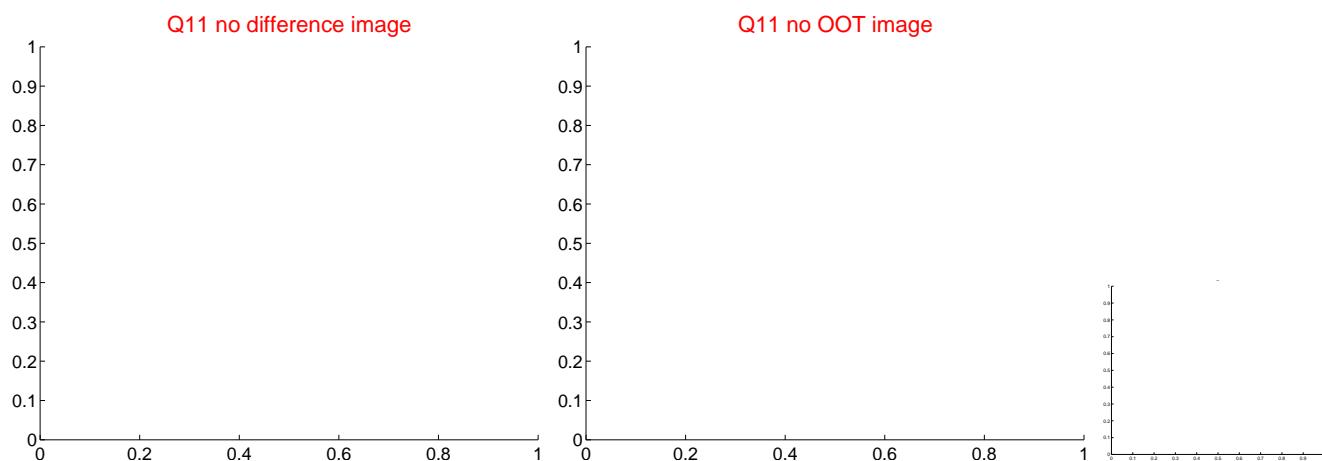
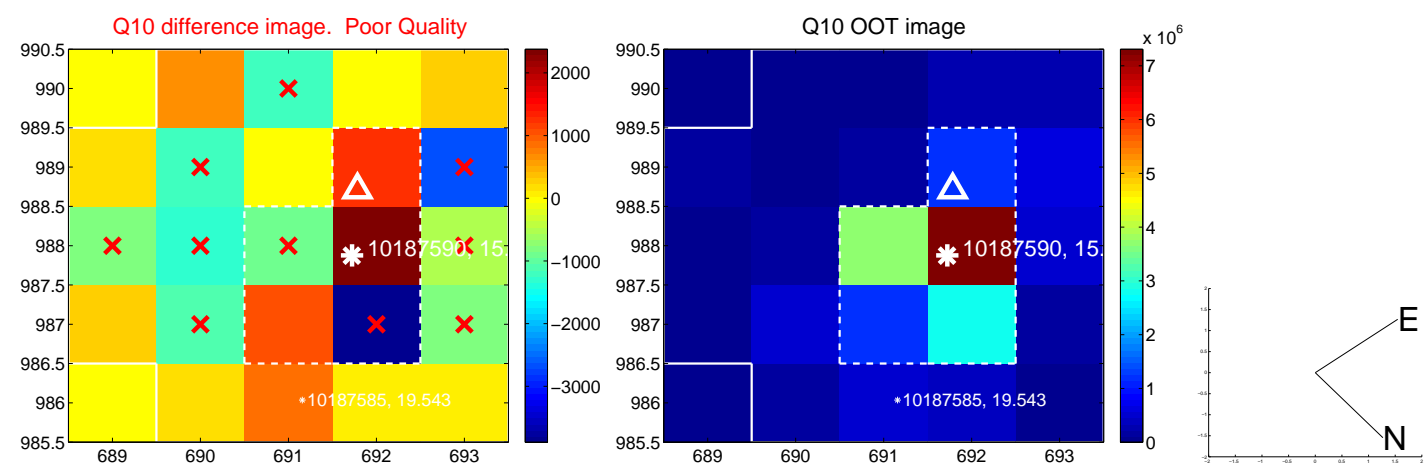
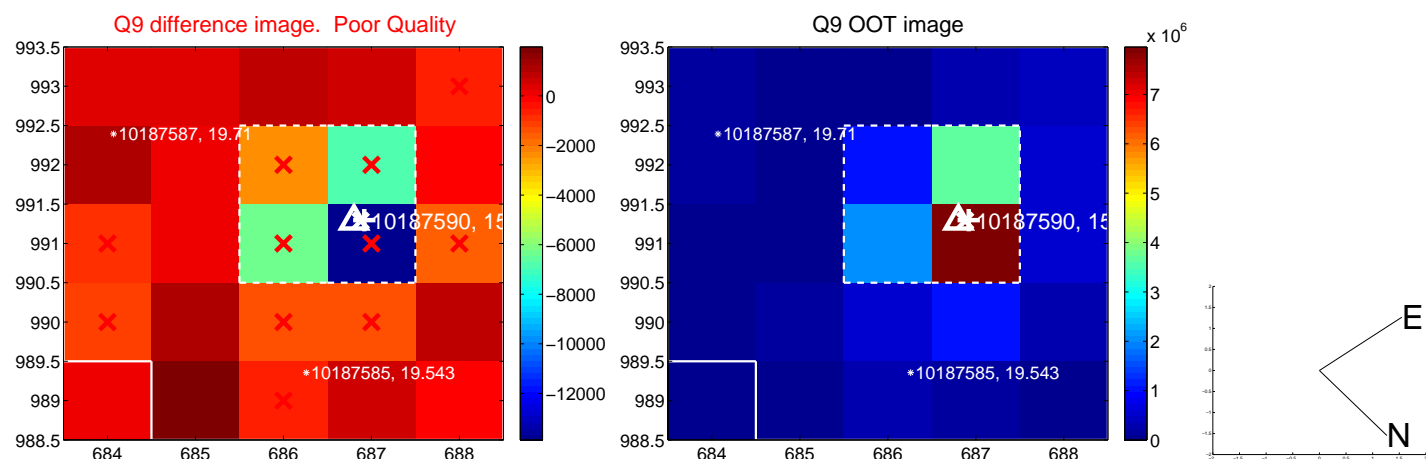
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

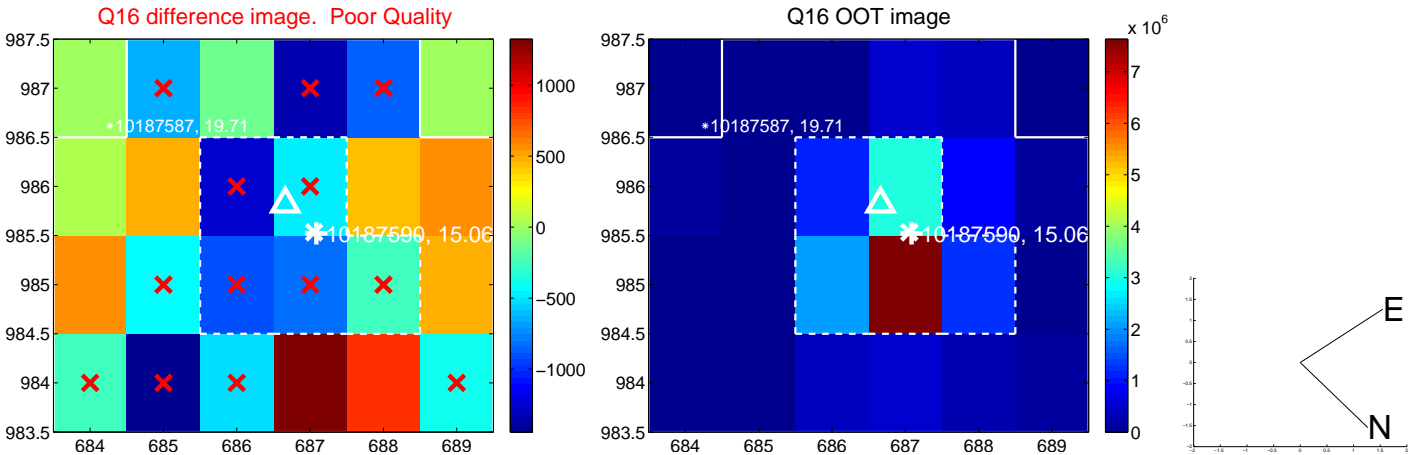
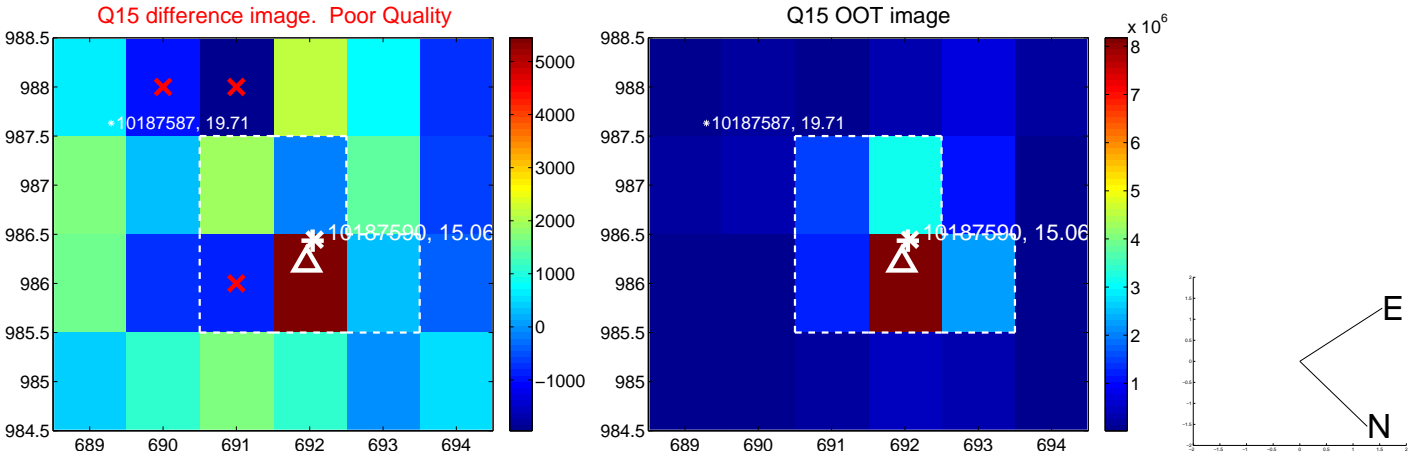
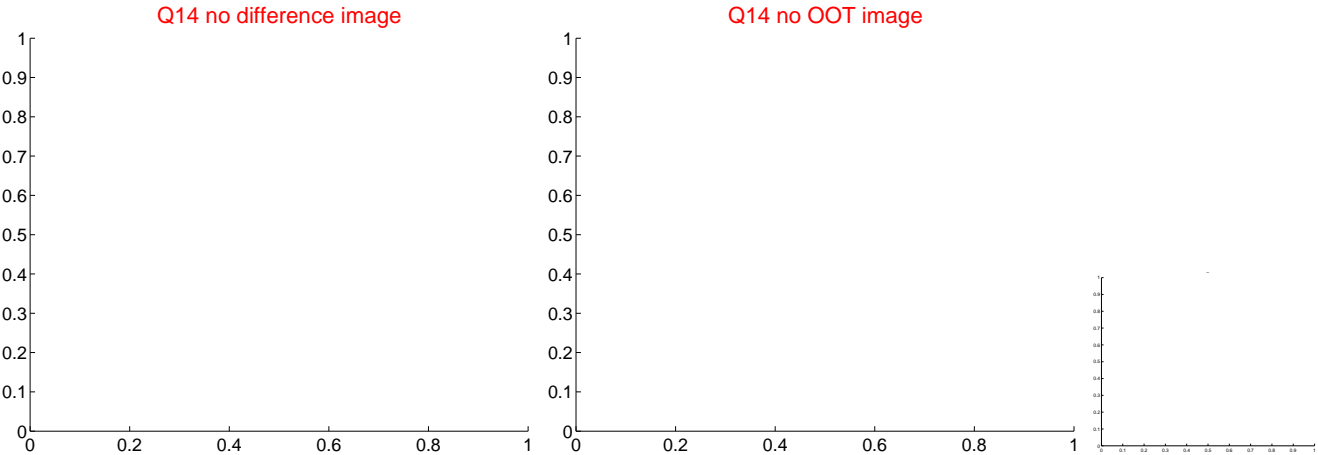
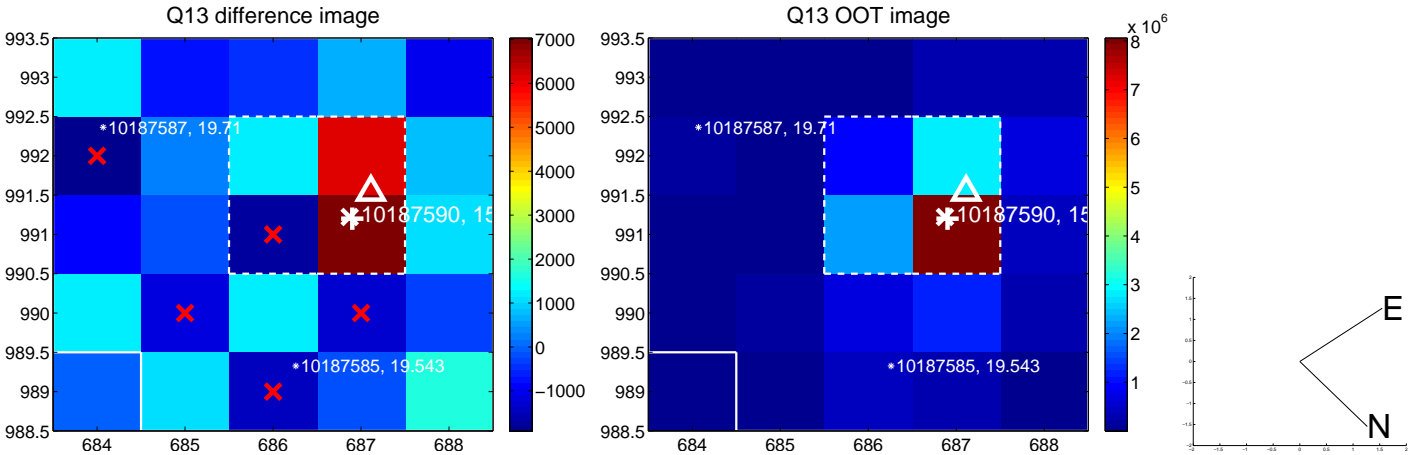


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

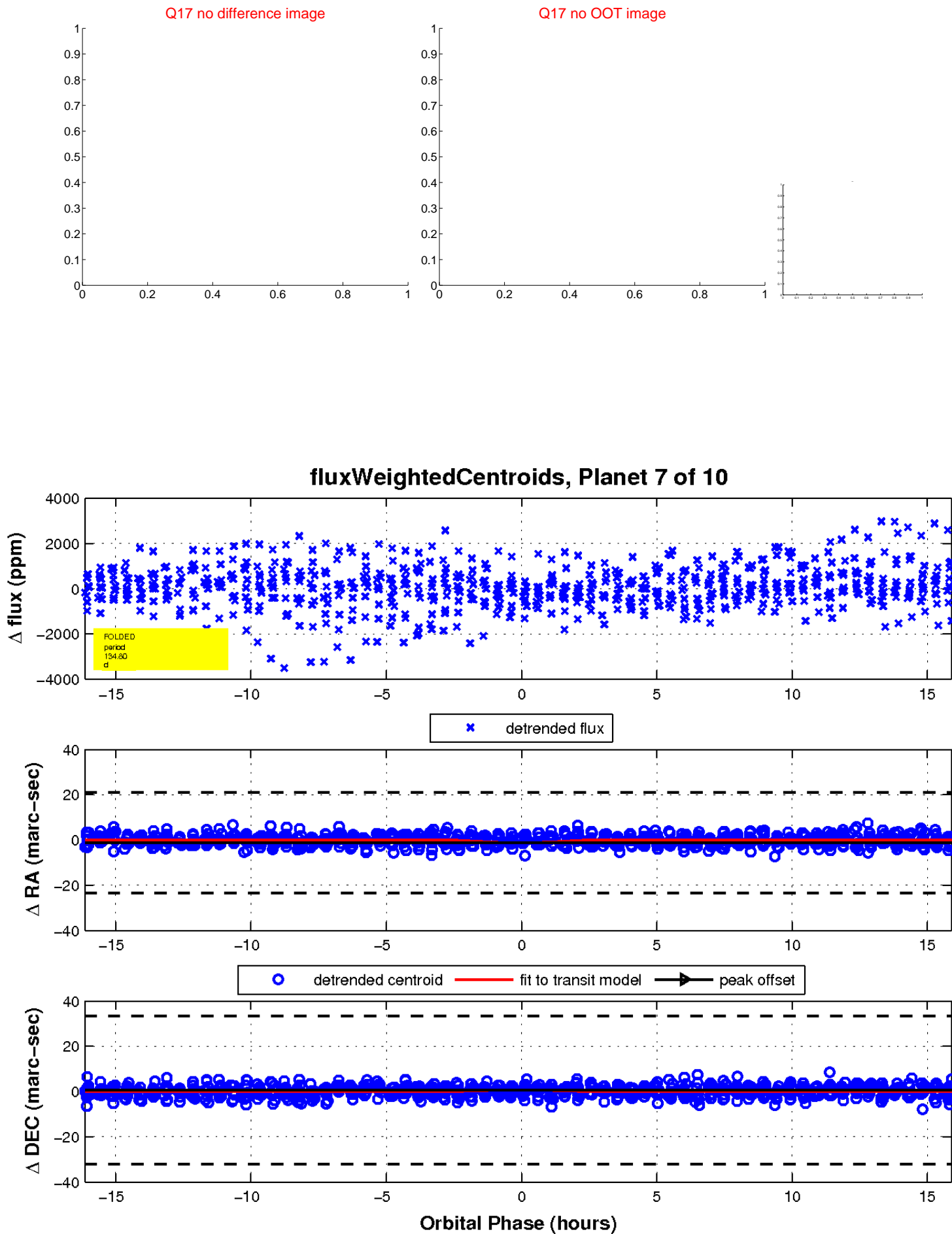




white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

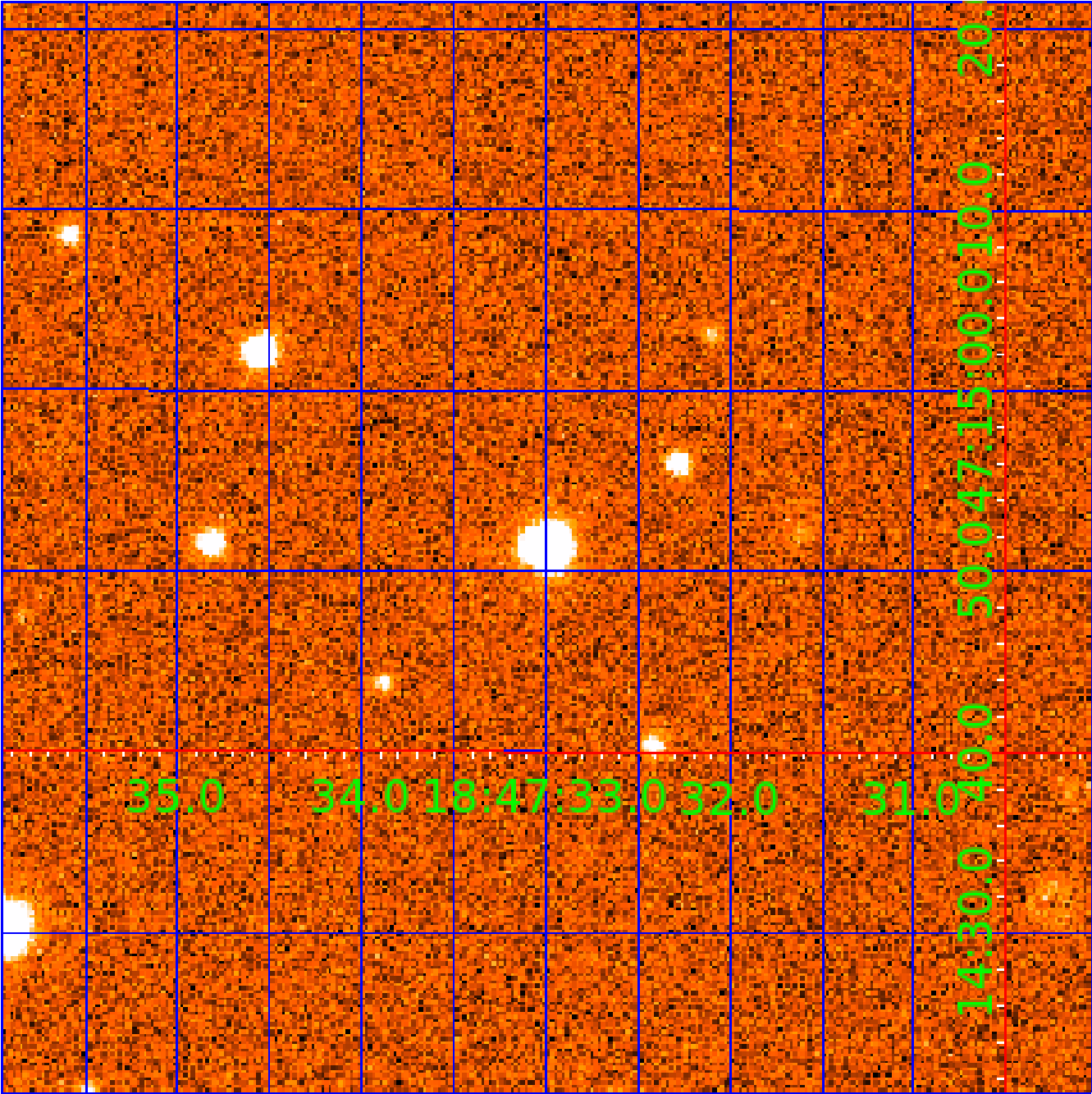


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 010187590

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010187590-01	OBS	No	1.397736	131.711487	72.4	7.994	7.4	7.9	1.03	6108	0.87	2034.61
010187590-02	OBS	No	357.728536	370.052917	9001.2	28.767	15.6	11.8	1.03	6108	16.71	1.25
010187590-03	OBS	No	127.957031	175.181203	13.2	2.604	15.4	0.0	1.03	6108	0.43	4.93
010187590-04	OBS	No	127.988621	175.316389	367.8	3.052	15.2	1.8	1.03	6108	2.17	4.93
010187590-06	OBS	No	93.319103	176.224996	238.0	3.317	12.7	1.4	1.03	6108	1.83	7.51
010187590-07	OBS	No	134.800704	175.639855	1136.5	5.382	13.7	5.2	1.03	6108	6.67	4.60
010187590-08	OBS	No	75.908968	174.229818	670.4	0.657	12.2	2.1	1.03	6108	3.25	9.89

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010187590-01	OBS	FP	0.00	1	0	0	0	LPP_DV
010187590-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS
010187590-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010187590-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—SAME_NTL_PERIOD—CENT_FEW_DIFFS
010187590-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
010187590-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
010187590-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_MEAS

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

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

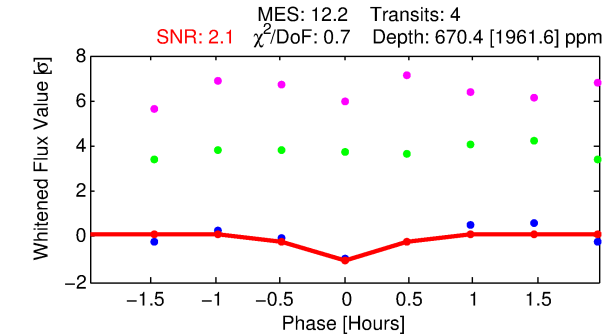
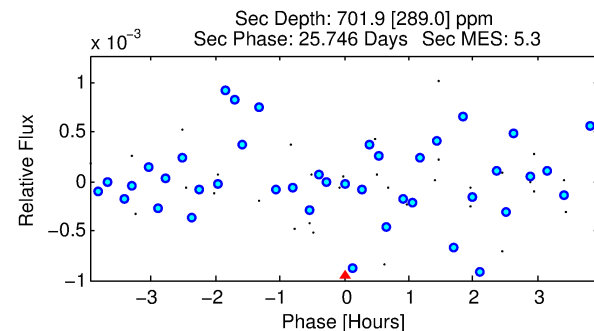
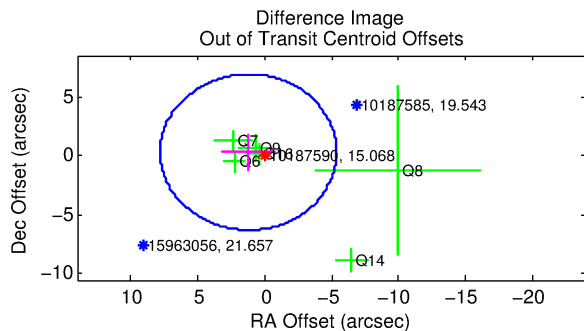
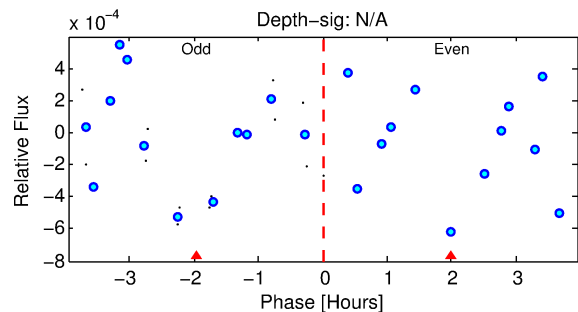
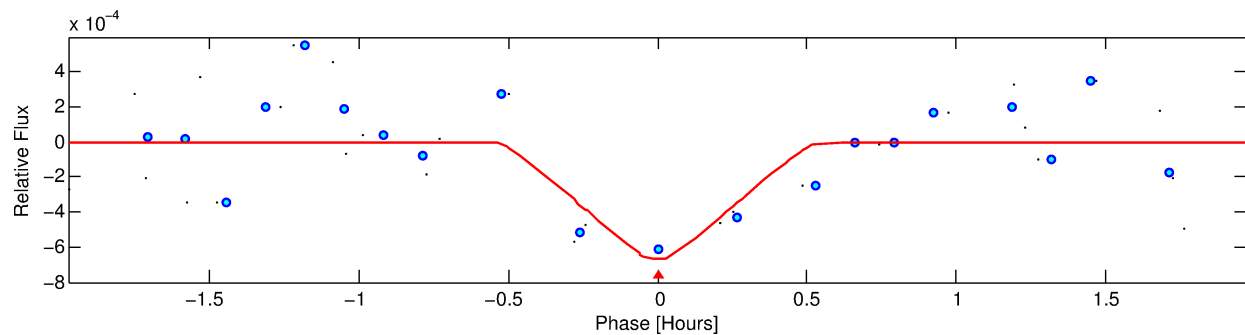
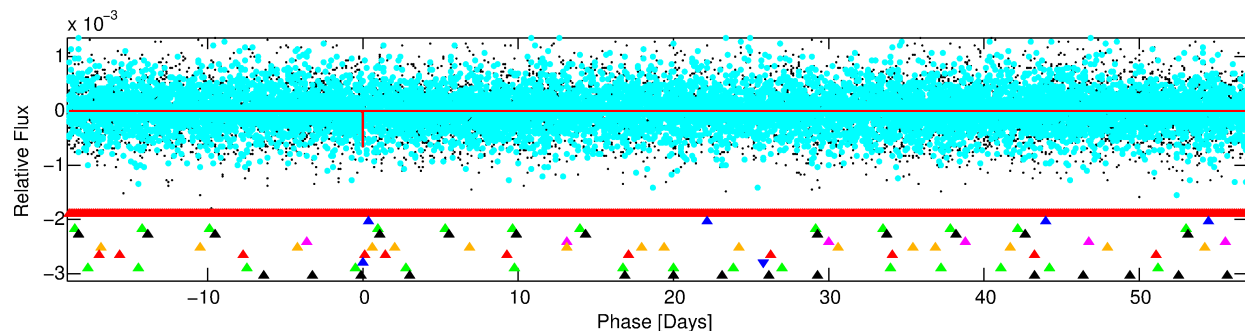
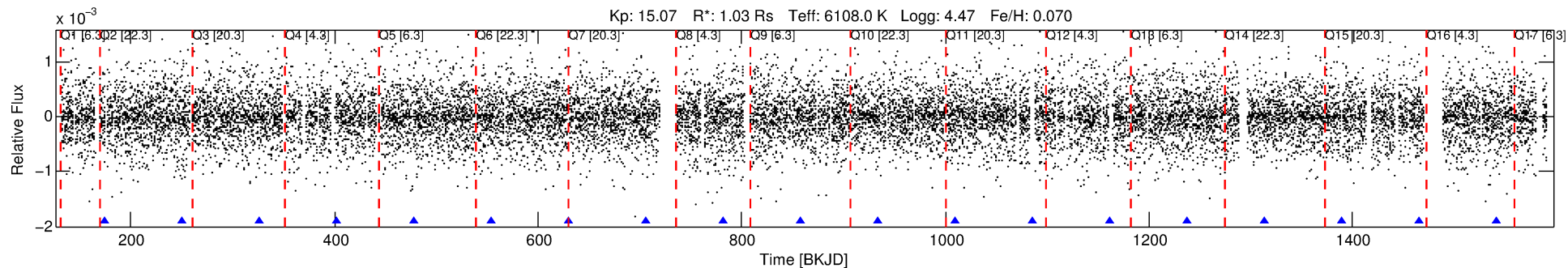
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 010187590-08

No Significant Match Found

# DV One-Page Summary

KIC: 10187590 Candidate: 8 of 10 Period: 75.909 d



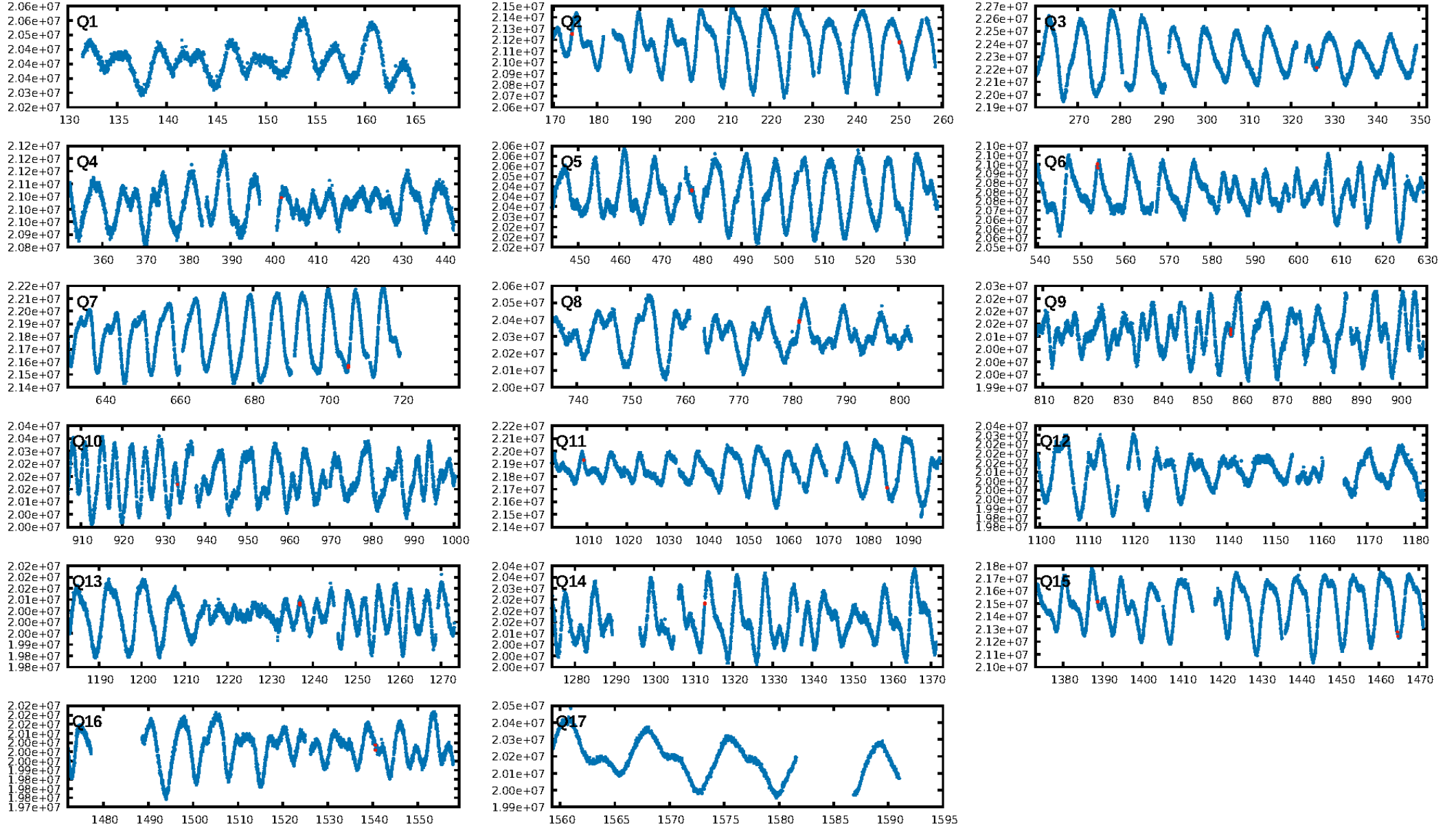
## DV Fit Results:

Period = 75.90897 [0.00115] d  
Epoch = 174.2298 [0.0231] BKJD  
Rp/R\* = 0.0289 [0.3389]  
a/R\* = 438.65 [23809.60]  
b = 0.90 [11.97]  
Seff = 9.89 [3.78]  
Teq = 452 [43] K  
Rp = 3.24 [38.11] Re  
a = 0.3657 [0.0903] AU  
Ag = 4904.55 [115199.33] [0.04σ]  
Teffp = 5851 [34355] K [0.1σ]

## DV Diagnostic Results:

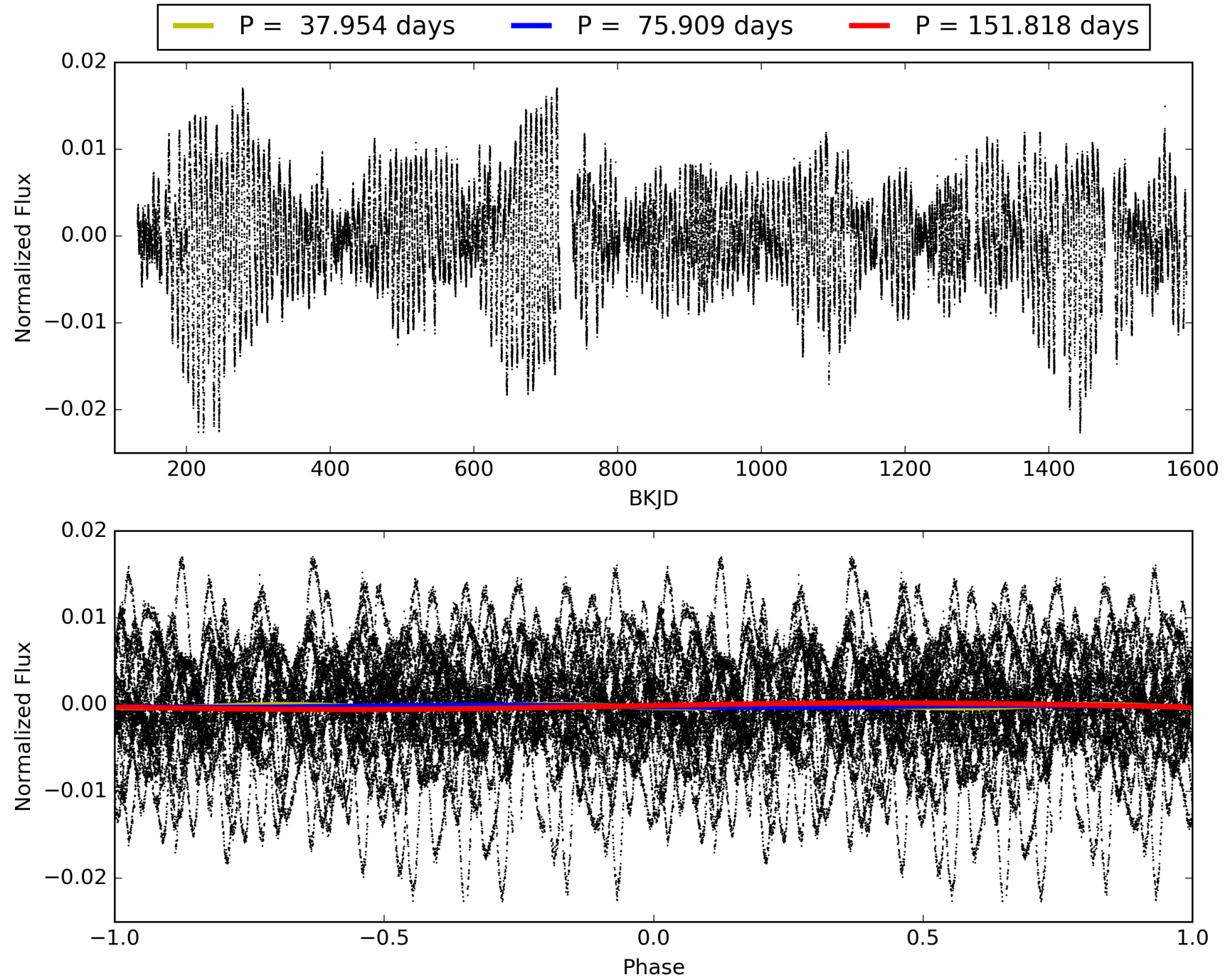
ShortPeriod-sig: 100.0% [222.96σ]  
LongPeriod-sig: 100.0% [53.30σ]  
ModelChiSquare2-sig: 90.0%  
ModelChiSquareGof-sig: 99.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [4/4]  
**GhostDiagnostic-chr: 1.005**  
Centroid-sig: 70.6%  
Centroid-so: 1.394 arcsec [0.53σ]  
OotOffset-rm: 1.251 arcsec [0.57σ]  
OotOffset-st: 2/1/2/1 [6]  
KicOffset-rm: 1.431 arcsec [0.70σ]  
KicOffset-st: 2/1/2/1 [6]  
DiffImageQuality-fgm: 0.33 [2/6]  
DiffImageOverlap-fno: 0.33 [3/9]

# TCE 010187590-08, PDC Light Curves



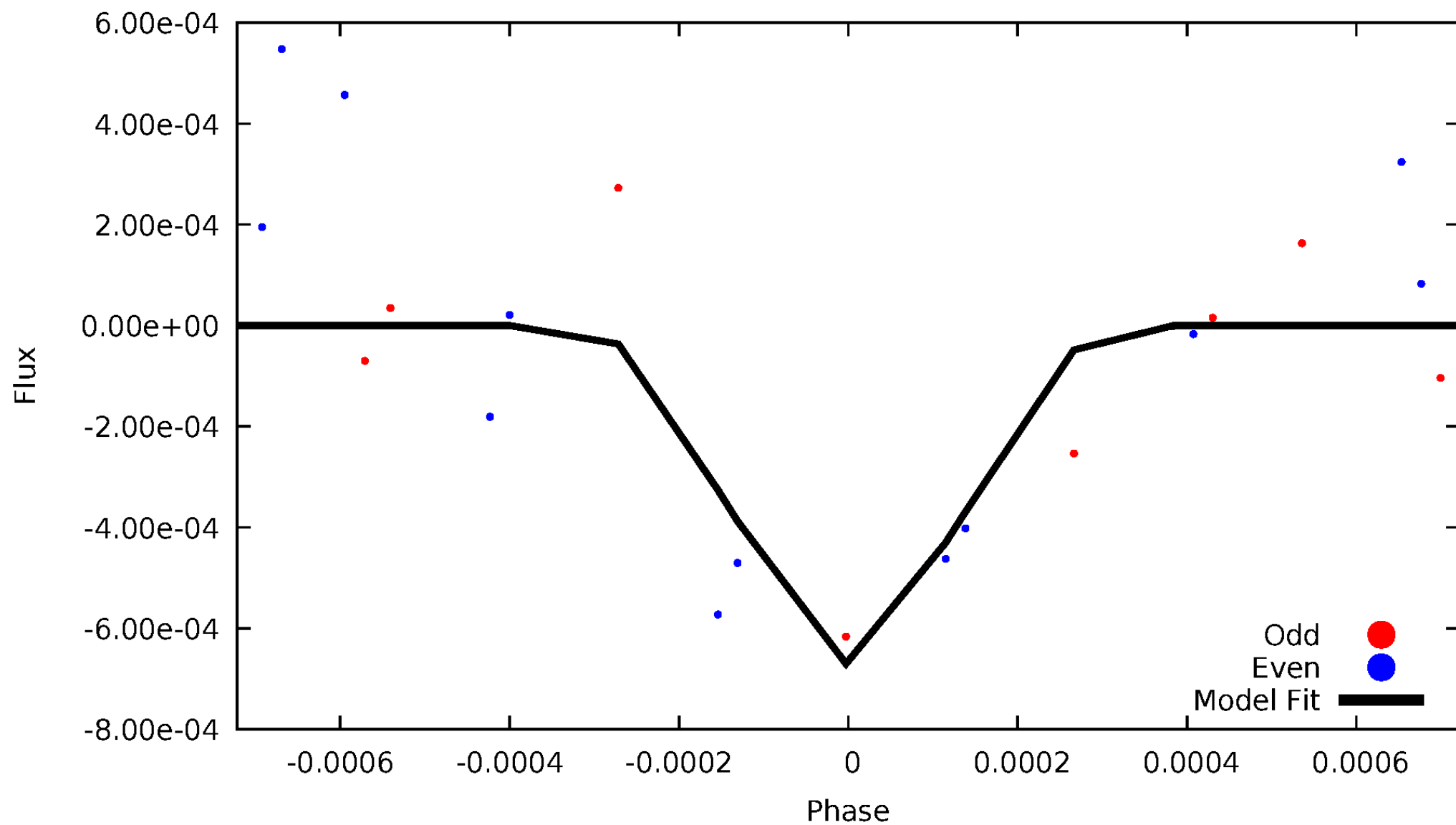


# TCE 010187590-08



# DV Odd/Even

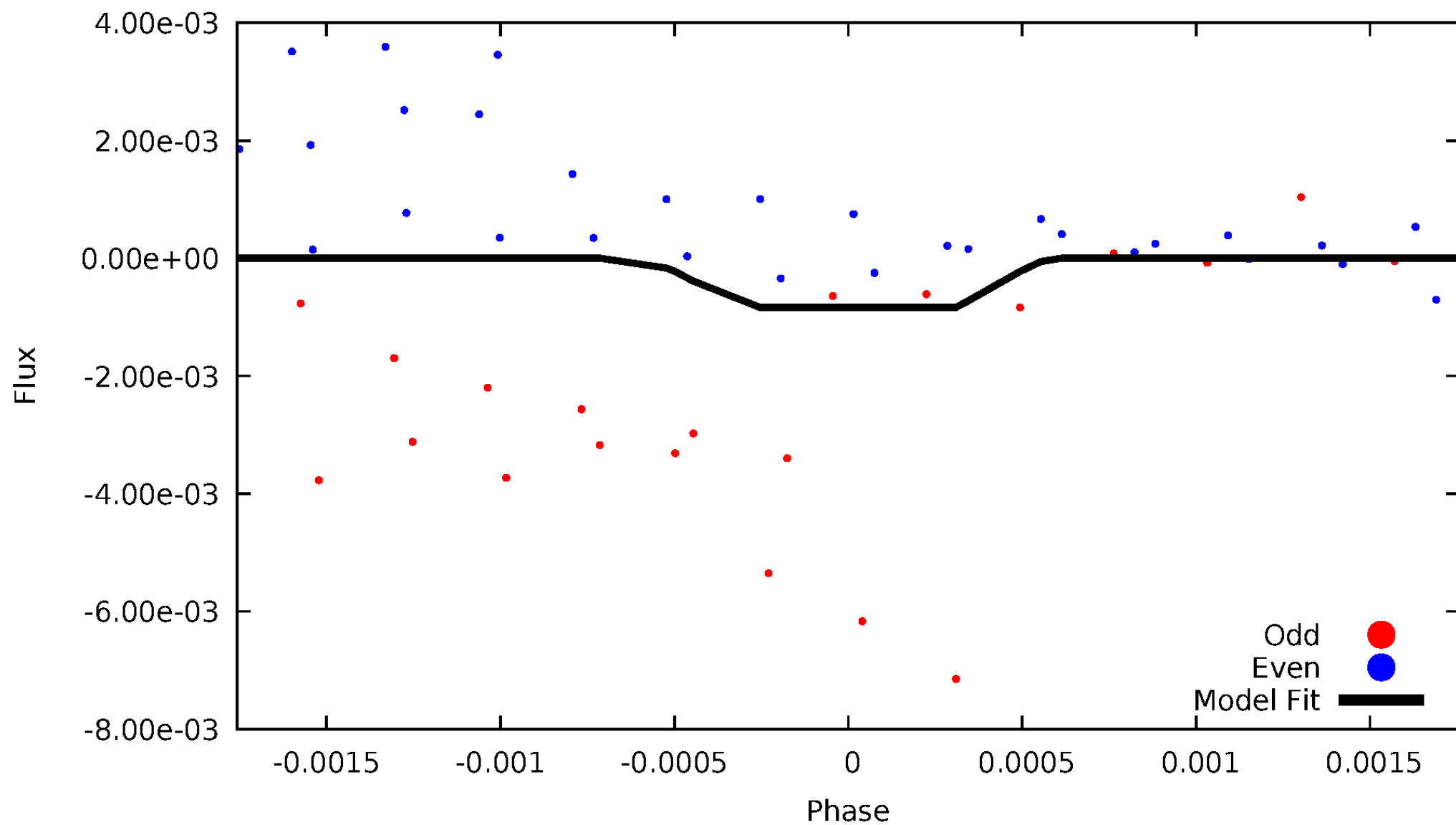
TCE 010187590-08





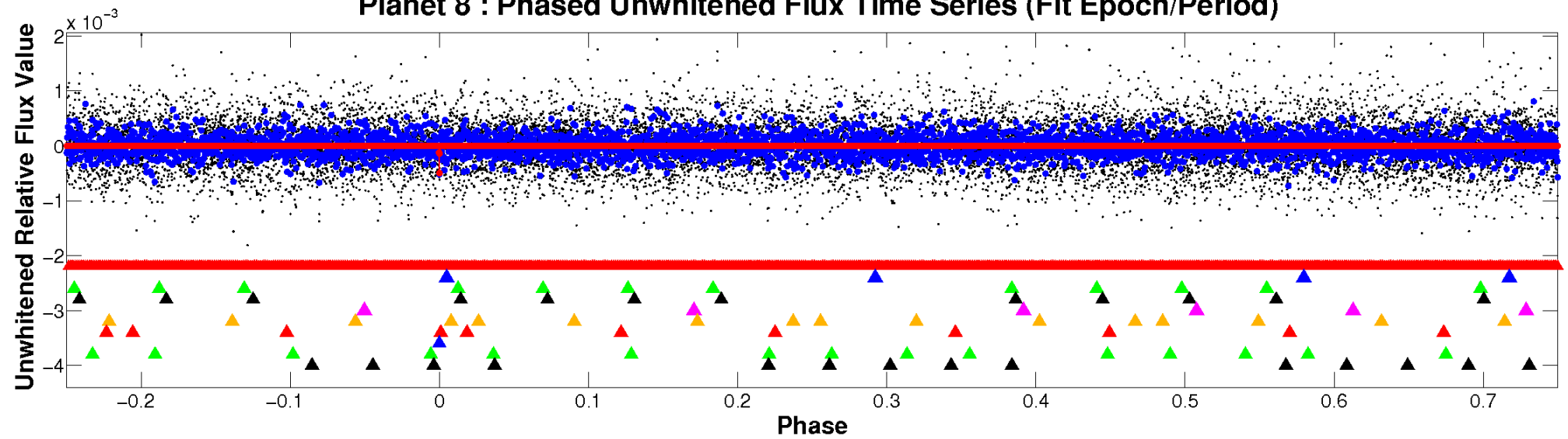
# ALT Odd/Even

TCE 010187590-08

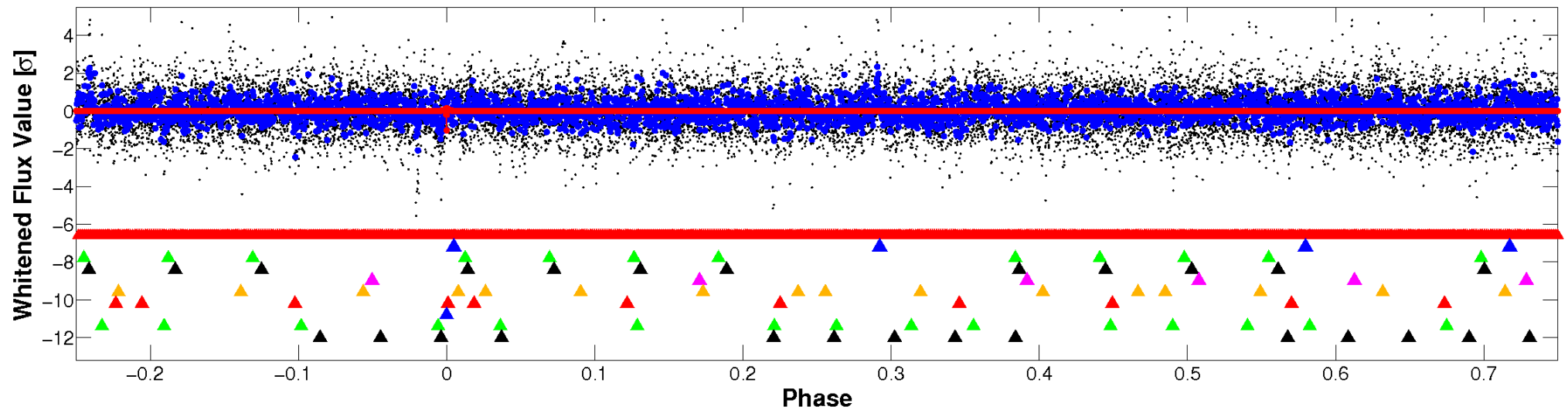


# Non-Whitened Vs. Whitened Light Curve

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

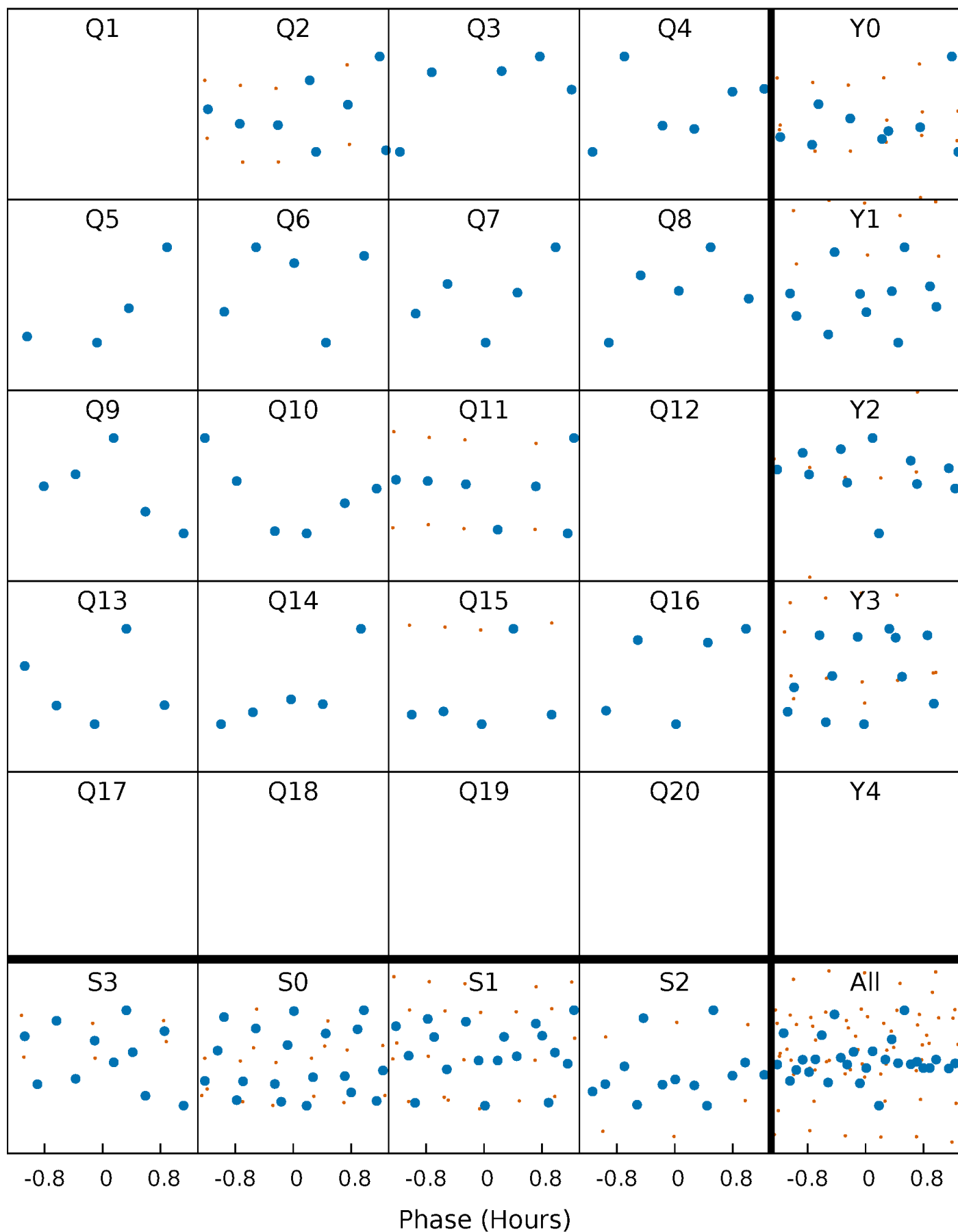


## Planet 8 : Phased Whitened Flux Time Series (Fit Epoch/Period)



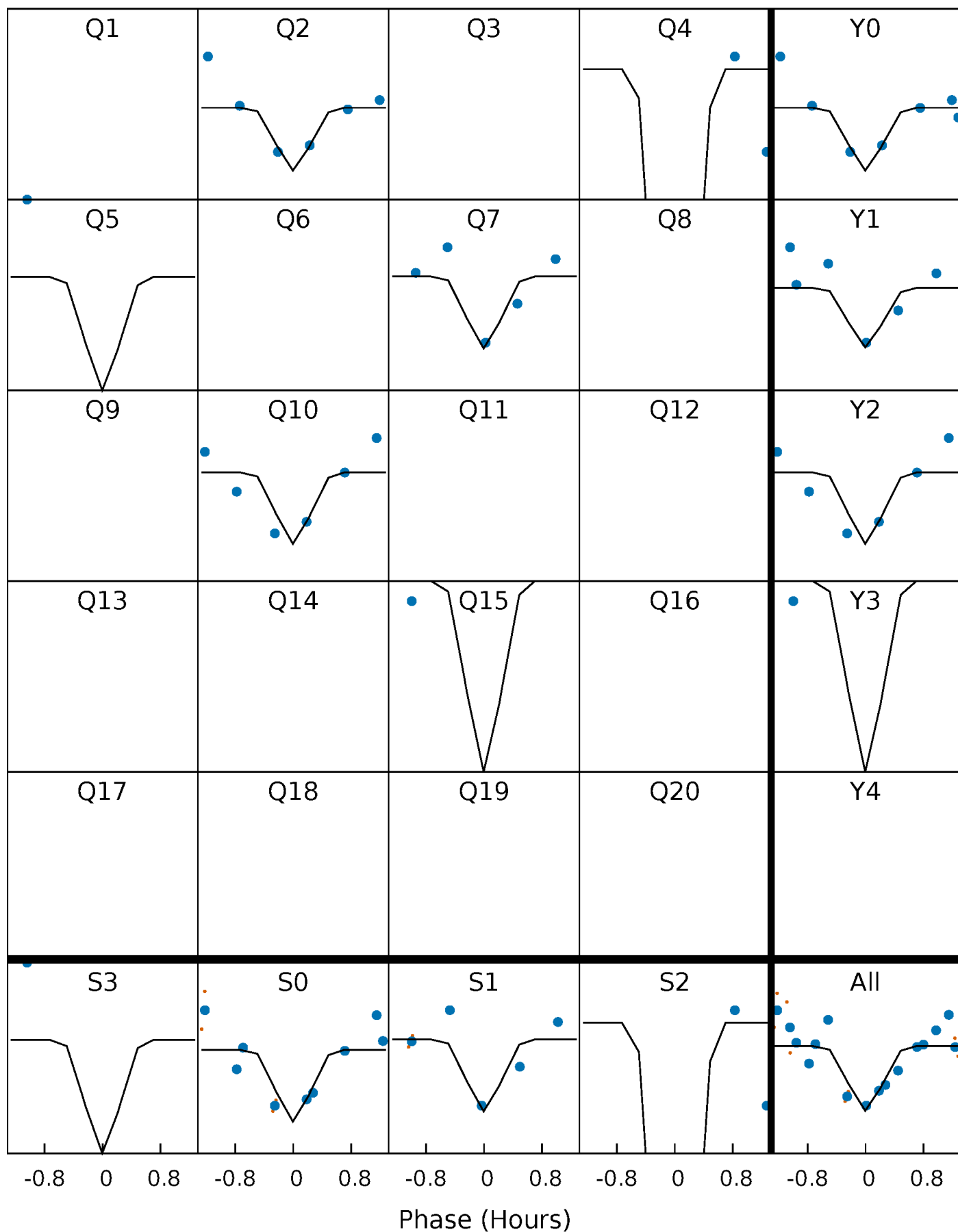
# PDC Quarter-Phased Transit Curves

TCE 010187590-08     $P = 75.908968$  Days     $T_0 = 174.229818$  (BKJD)



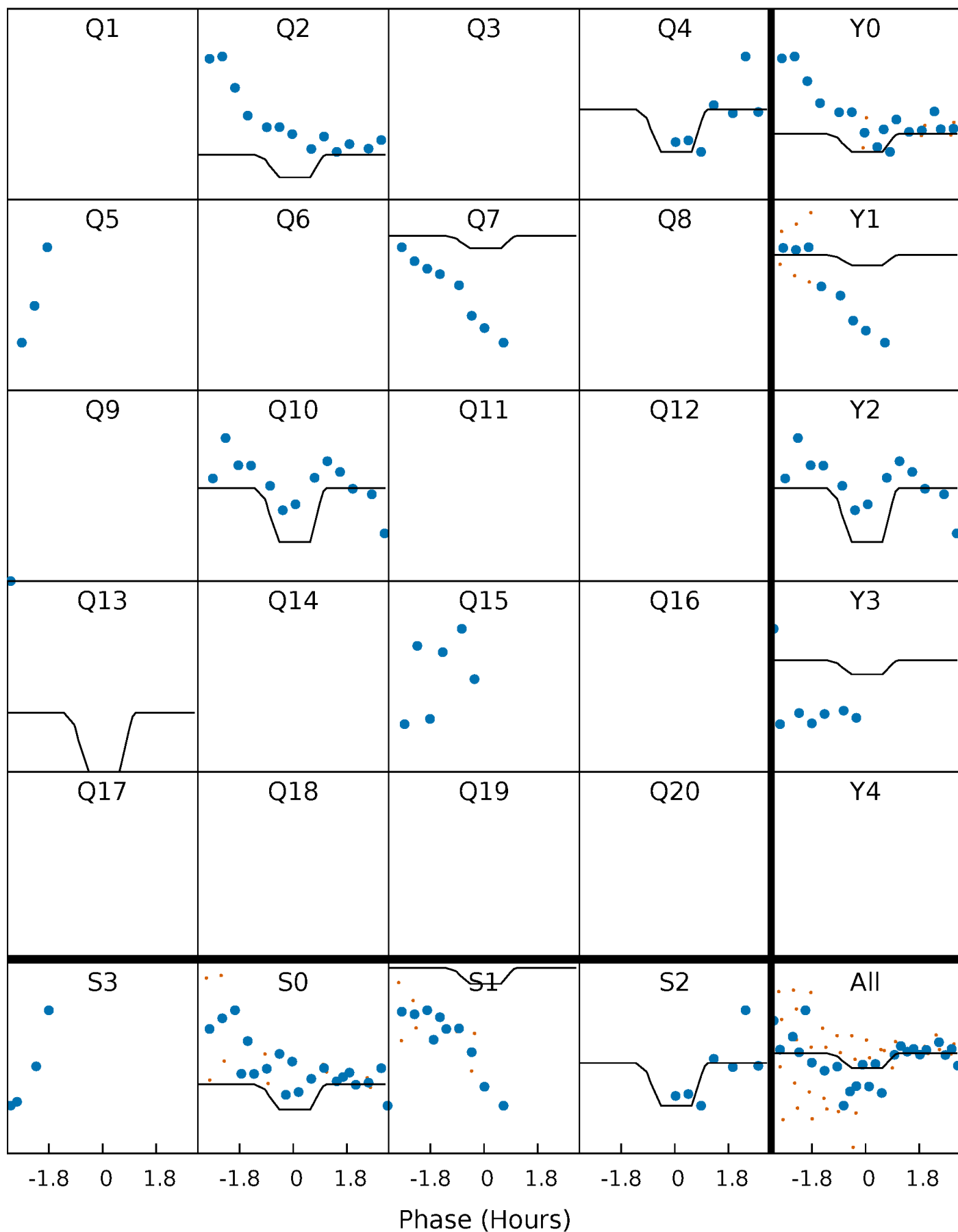
# DV Quarter-Phased Transit Curves

TCE 010187590-08     $P = 75.908968$  Days     $T_0 = 174.229818$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

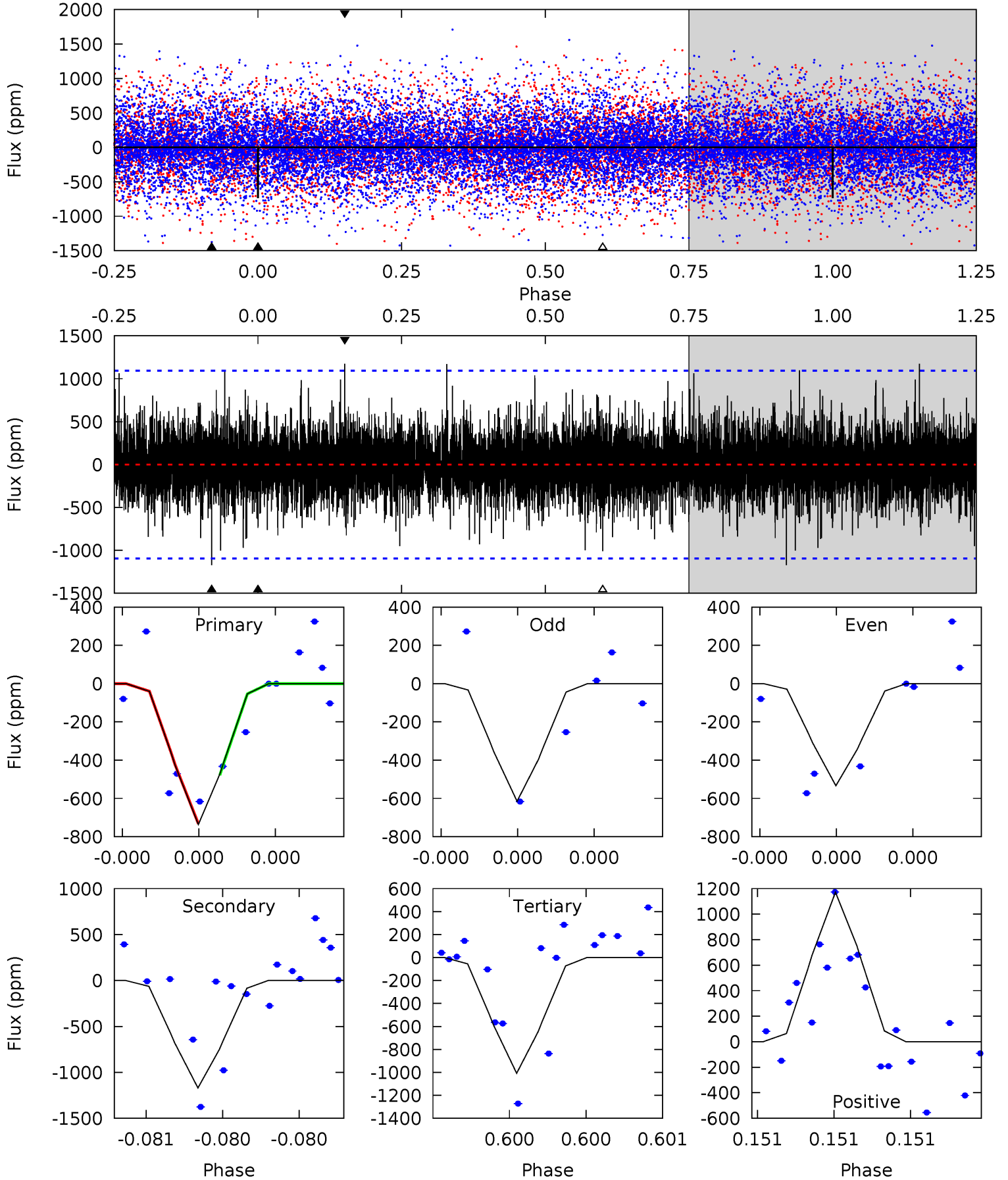
TCE 010187590-08 P= 75.904251 Days  $T_0=174.280023$  (BKJD)



# DV Model-Shift Uniqueness Test

010187590-08, P = 75.908968 Days, E = 98.320850 Days

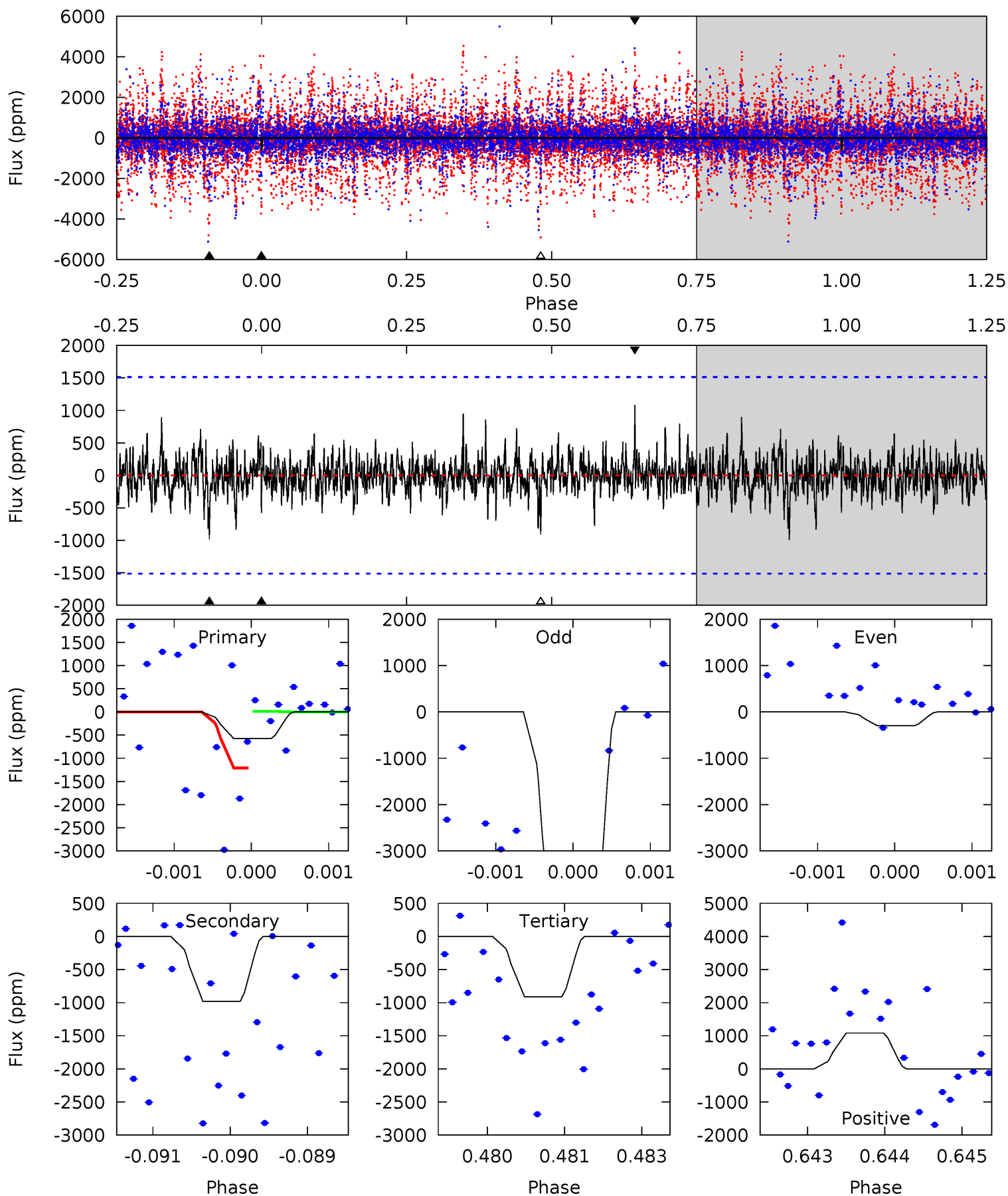
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
3.77	5.99	5.16	6.00	5.60	3.53	1.32	-1.39	-2.23	0.83	-0.02	0.18	0.98	0.50	0.65



# Alt Model-Shift Uniqueness Test

010187590-08, P = 75.904251 Days, E = 98.375772 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2.07	3.52	3.27	3.88	5.43	3.26	0.77	-1.20	-1.81	0.25	-0.36	7.96	2.93	0.52	2.19



### Stellar Parameters For KIC 010187590

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6108^{+172}_{-215}$	$4.466^{+0.048}_{-0.192}$	$0.070^{+0.250}_{-0.300}$	$1.030^{+0.306}_{-0.102}$	$1.132^{+0.130}_{-0.143}$	$1.457^{+0.384}_{-0.739}$
	+3%/-4%	+1%/-4%	+357%/-429%	+30%/-10%	+11%/-13%	+26%/-51%
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 010187590-08 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-1169 \pm 195$	$28.61^{+30.00}_{-19.89}$	$642^{+44}_{-30}$	$2978^{+1375}_{-519}$	$104^{+1013}_{-80}$
Alt.	$-982 \pm 279$	$29.23^{+30.80}_{-20.59}$	$646^{+44}_{-32}$	$2870^{+1367}_{-486}$	$86^{+838}_{-67}$

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



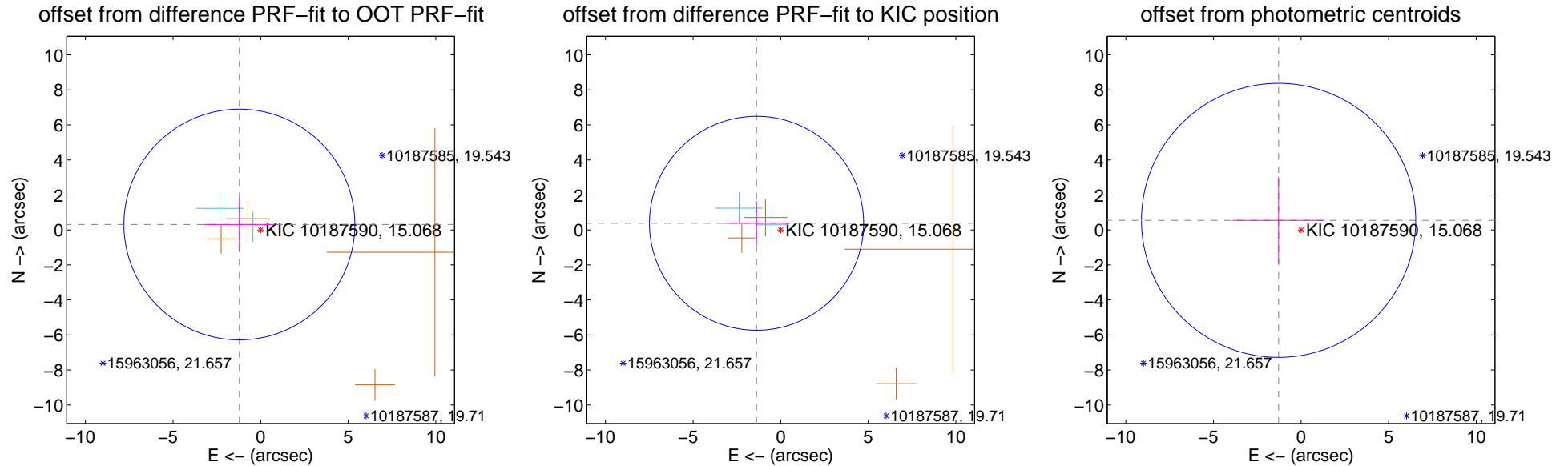
## DV Centroid Data

Supplemental centroid analysis for 010187590-08. Kepler magnitude: 15.07. Transit SNR 2.15

There are 2 quarters with good PRF difference image offsets

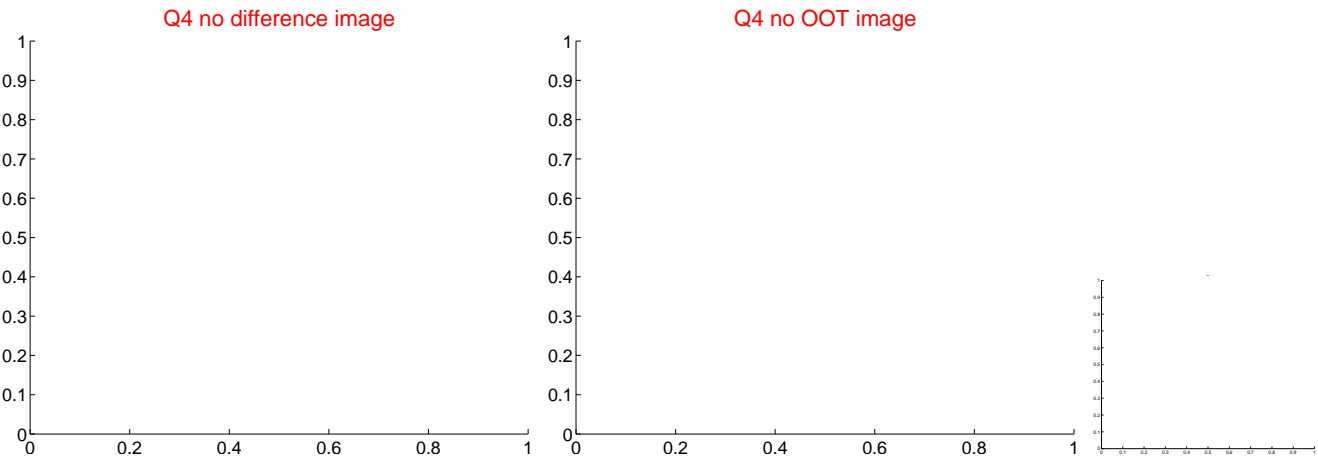
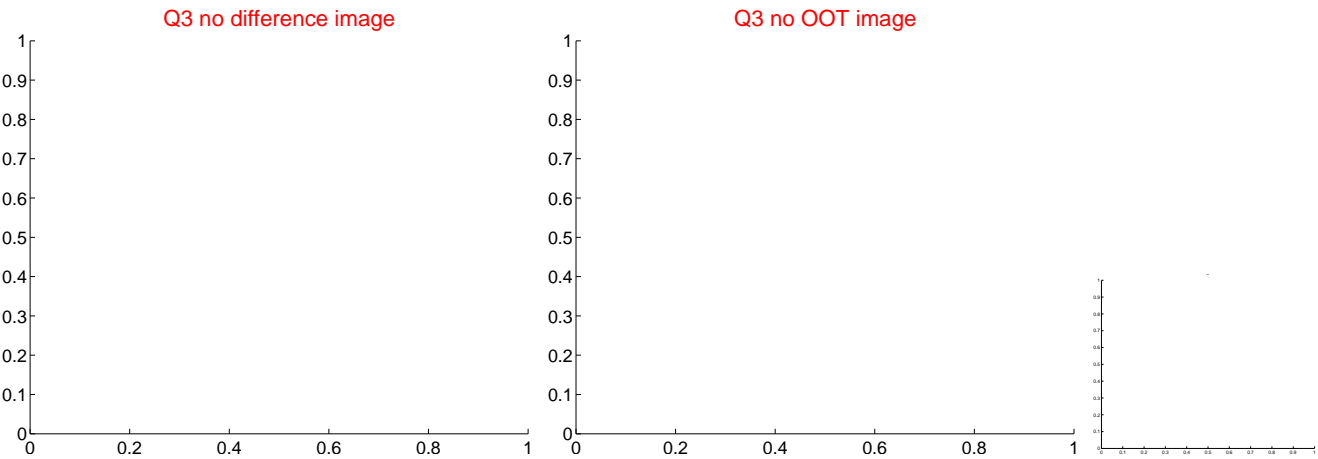
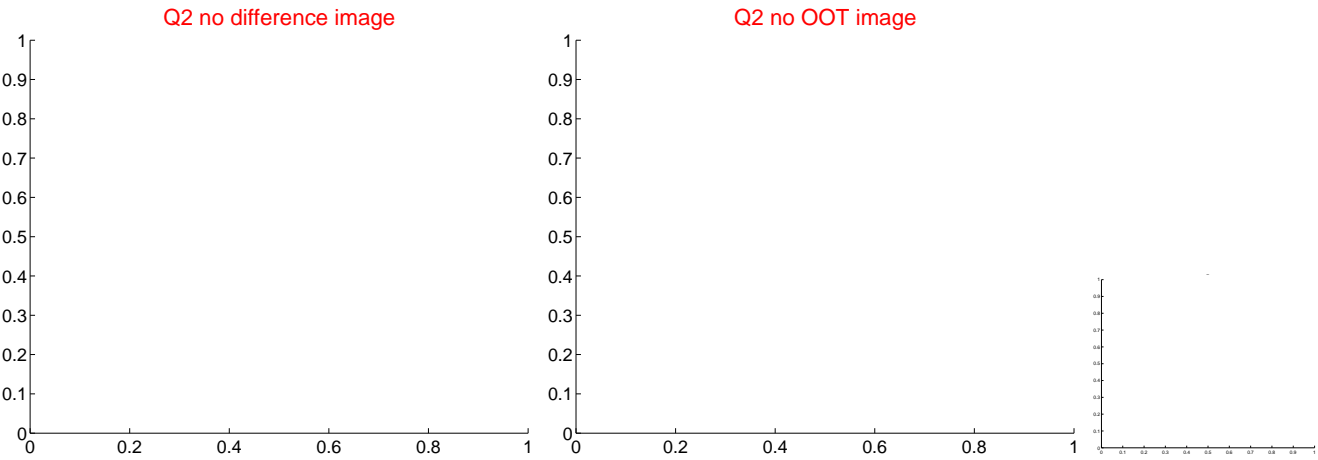
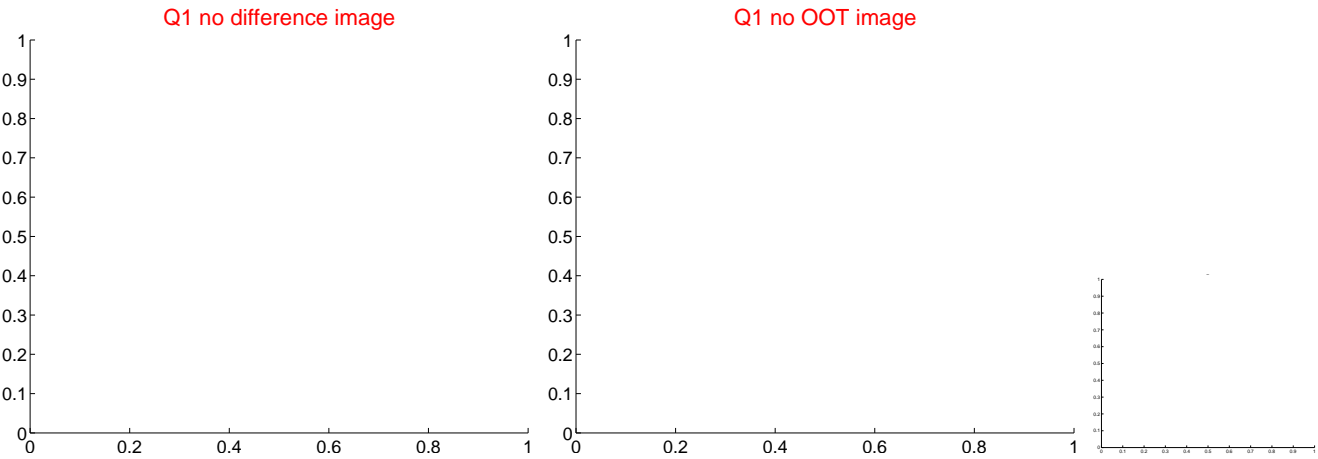
The direct PRF centroid is offset from the target star catalog position by about 0.13 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.251 \pm 2.196$	0.57	$1.212 \pm 2.004$	$0.310 \pm 1.494$
PRF-fit source offset from KIC position	$1.431 \pm 2.037$	0.70	$1.379 \pm 1.880$	$0.381 \pm 1.267$
photometric centroid source offset	$1.39 \pm 2.61$	0.53	$1.28 \pm 2.63$	$0.55 \pm 2.49$

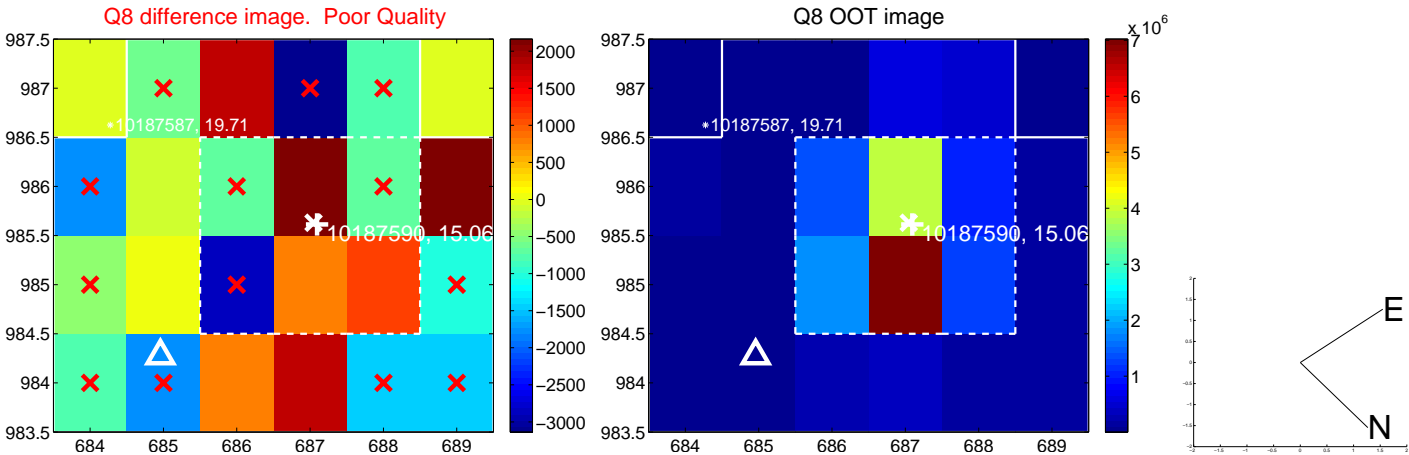
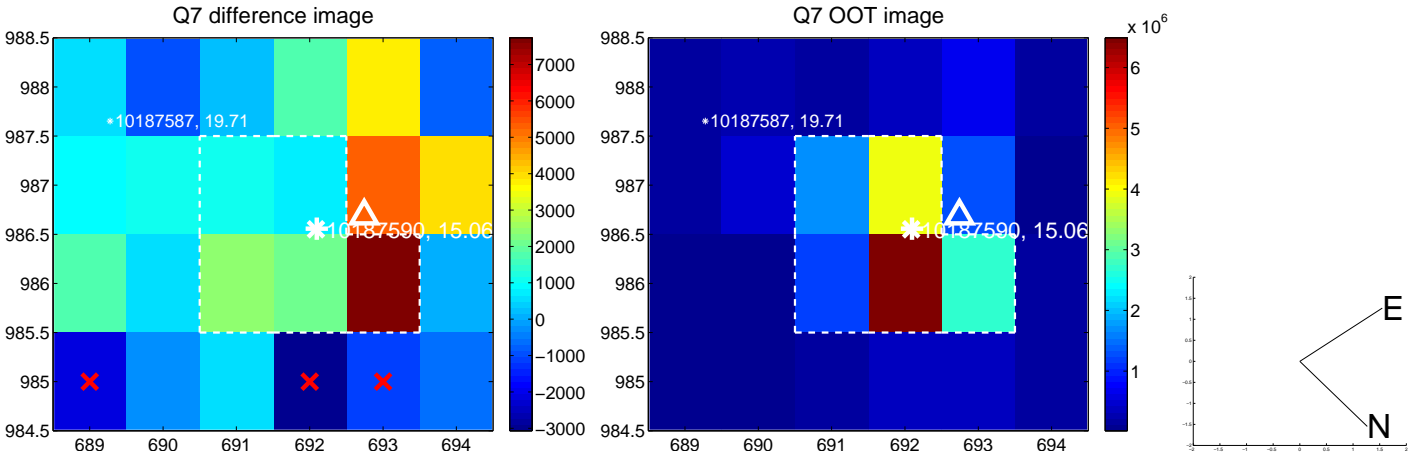
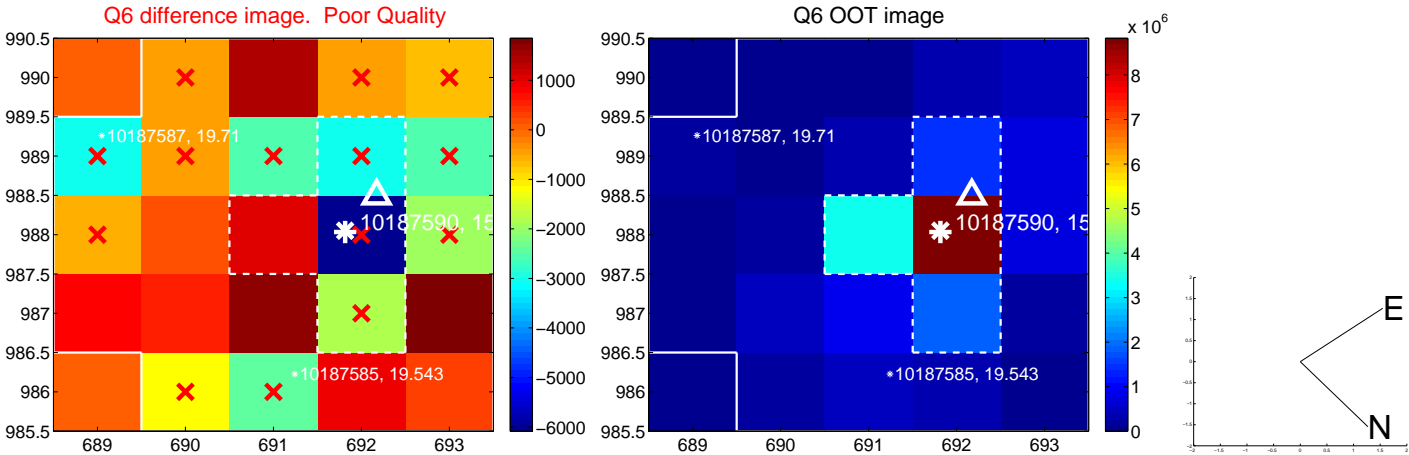
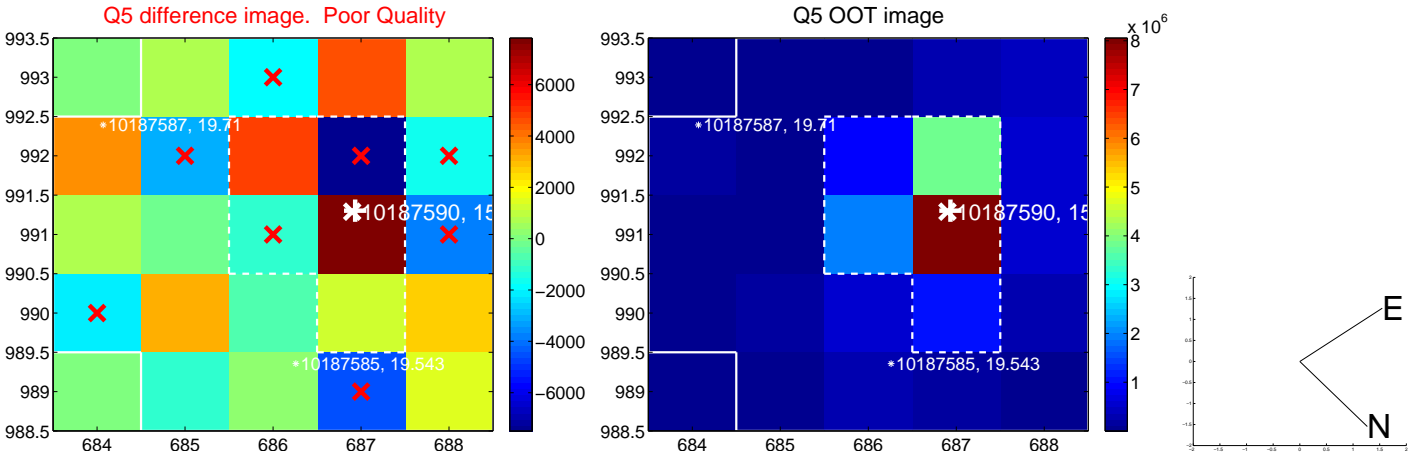


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

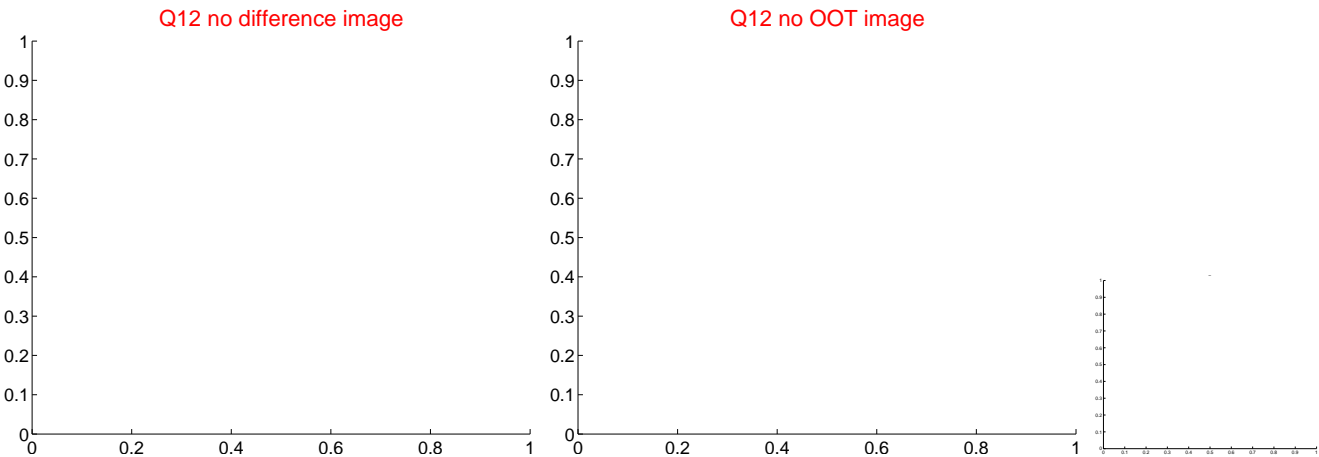
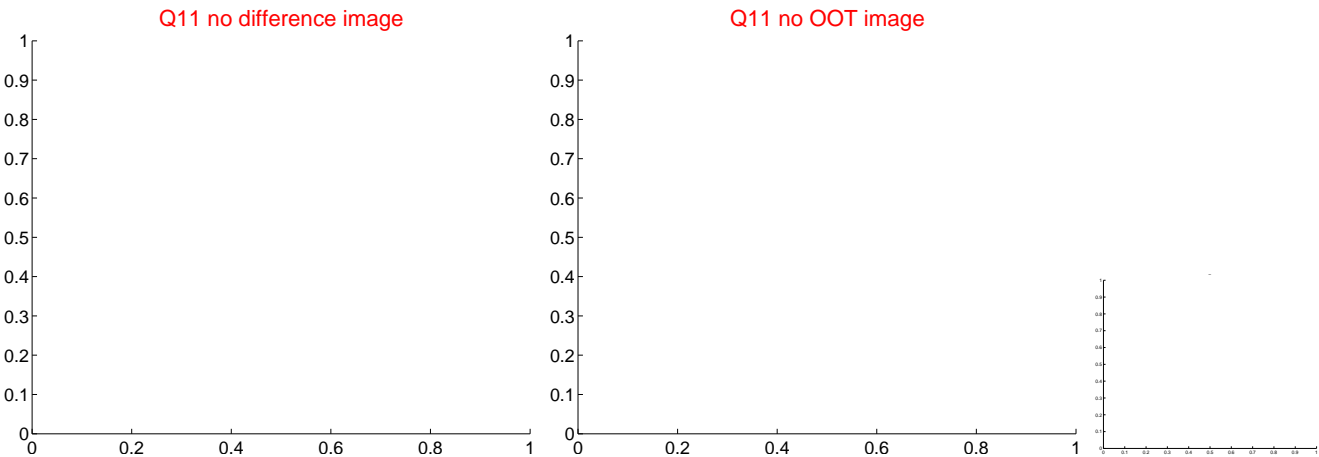
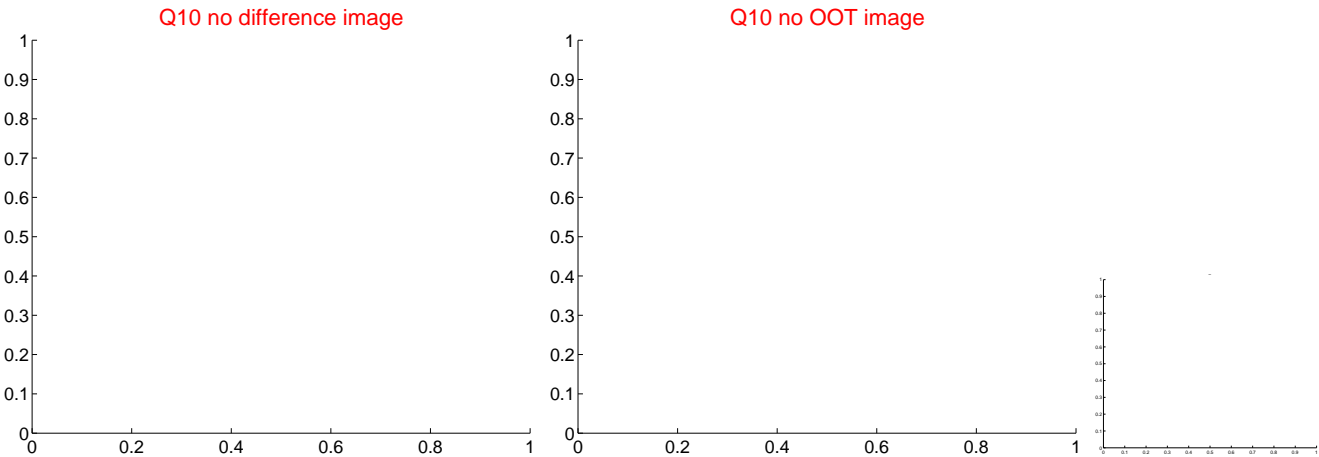
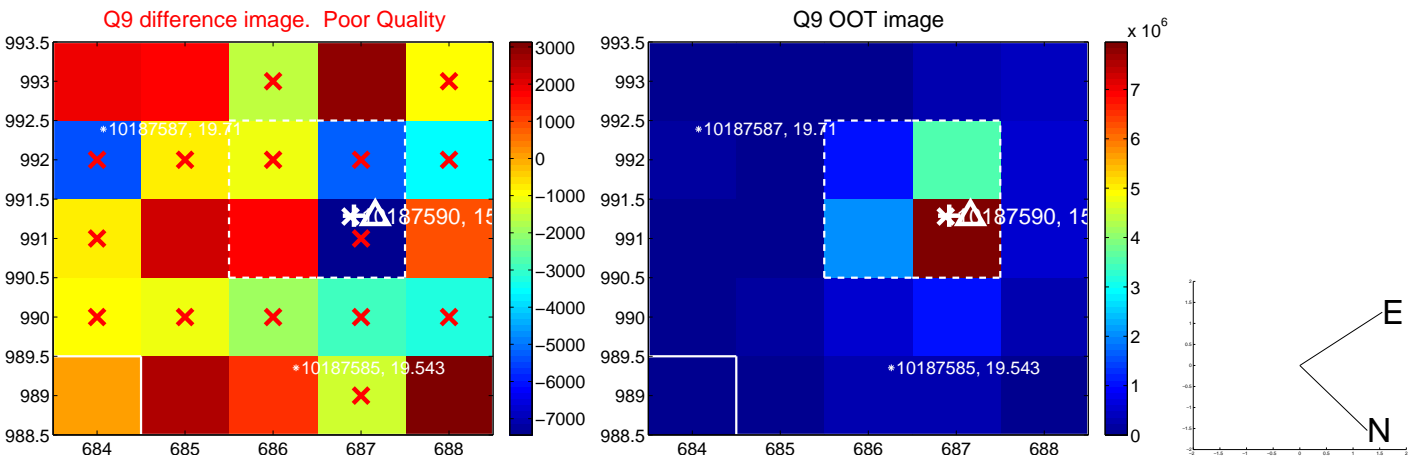
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



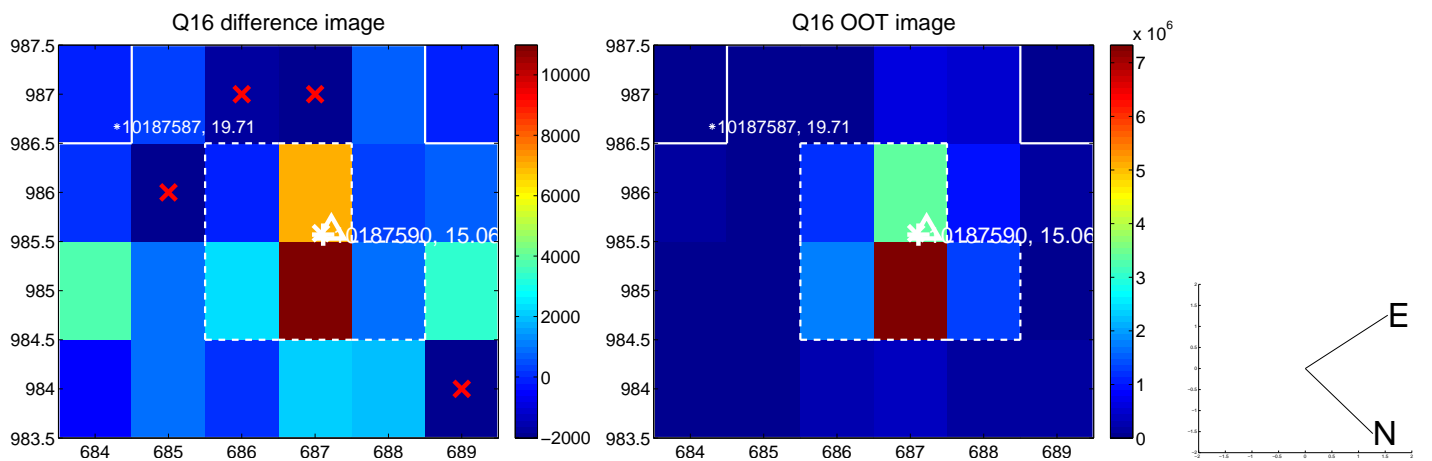
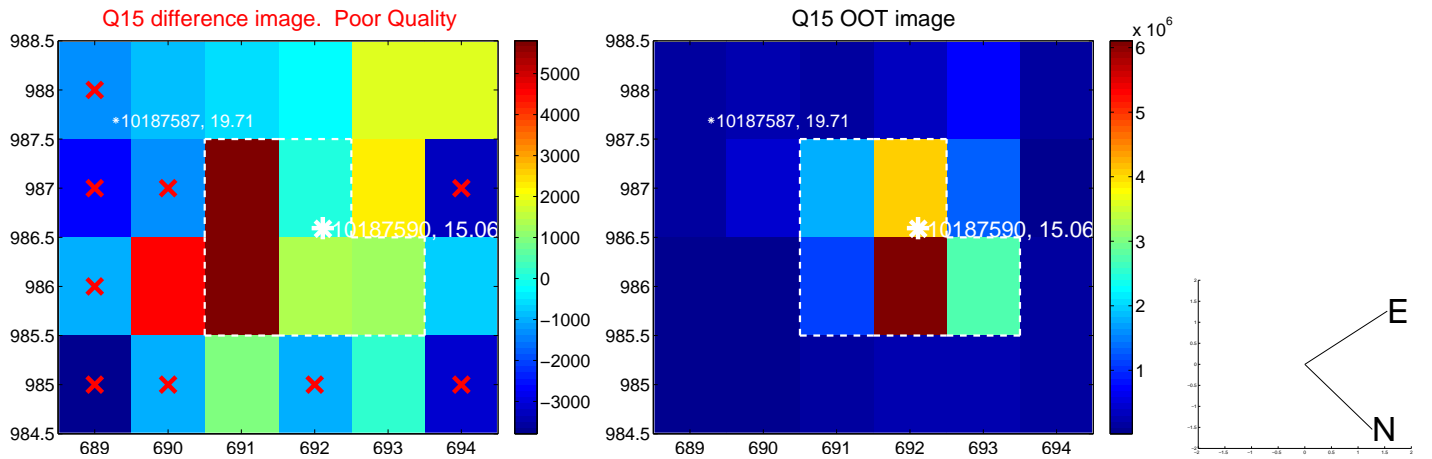
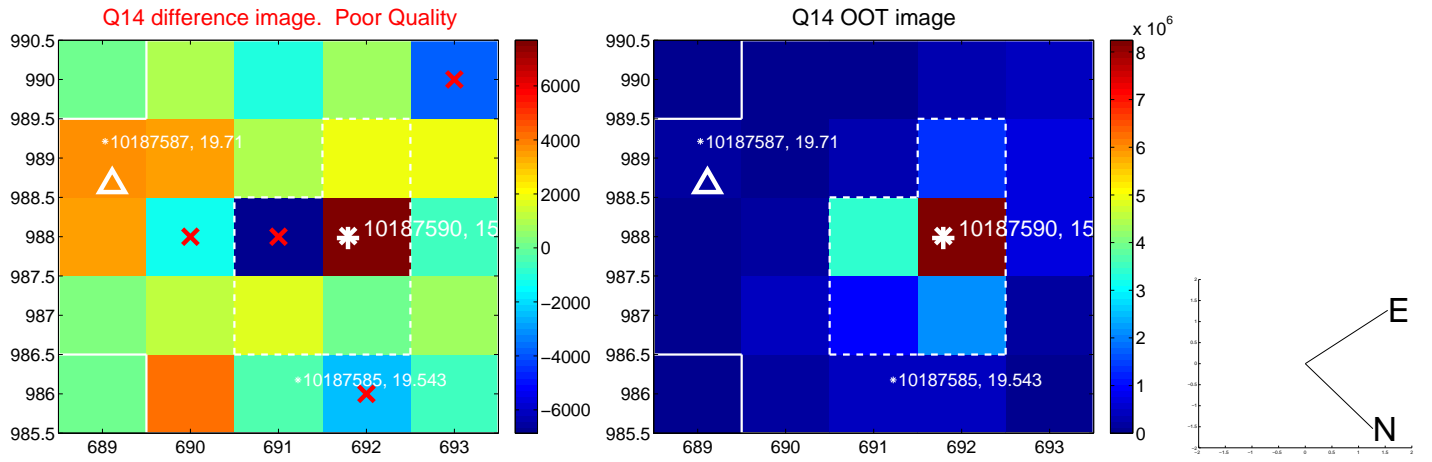
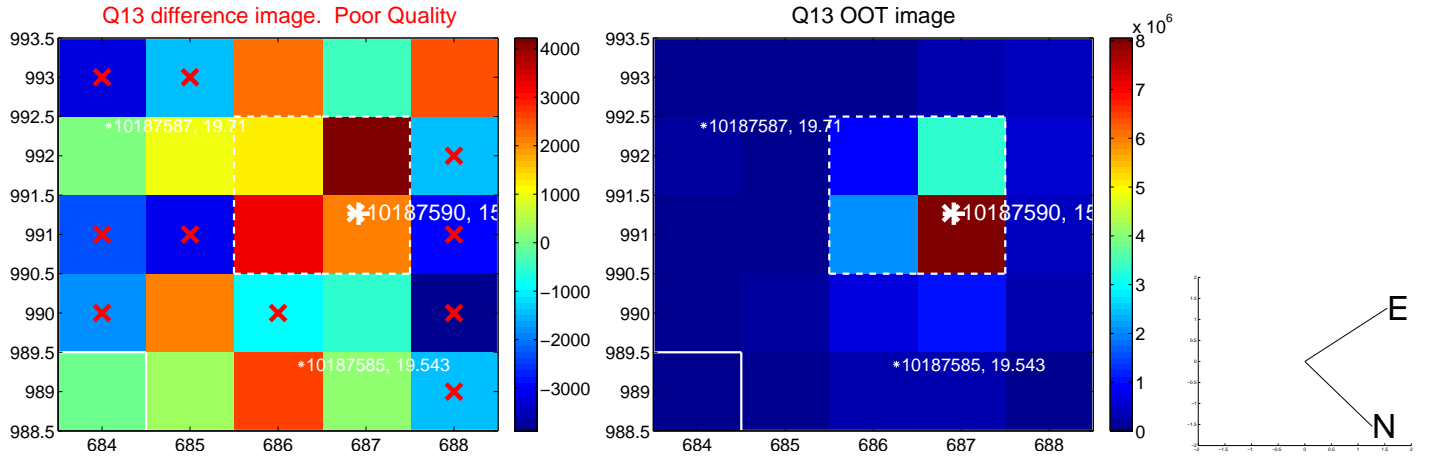
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



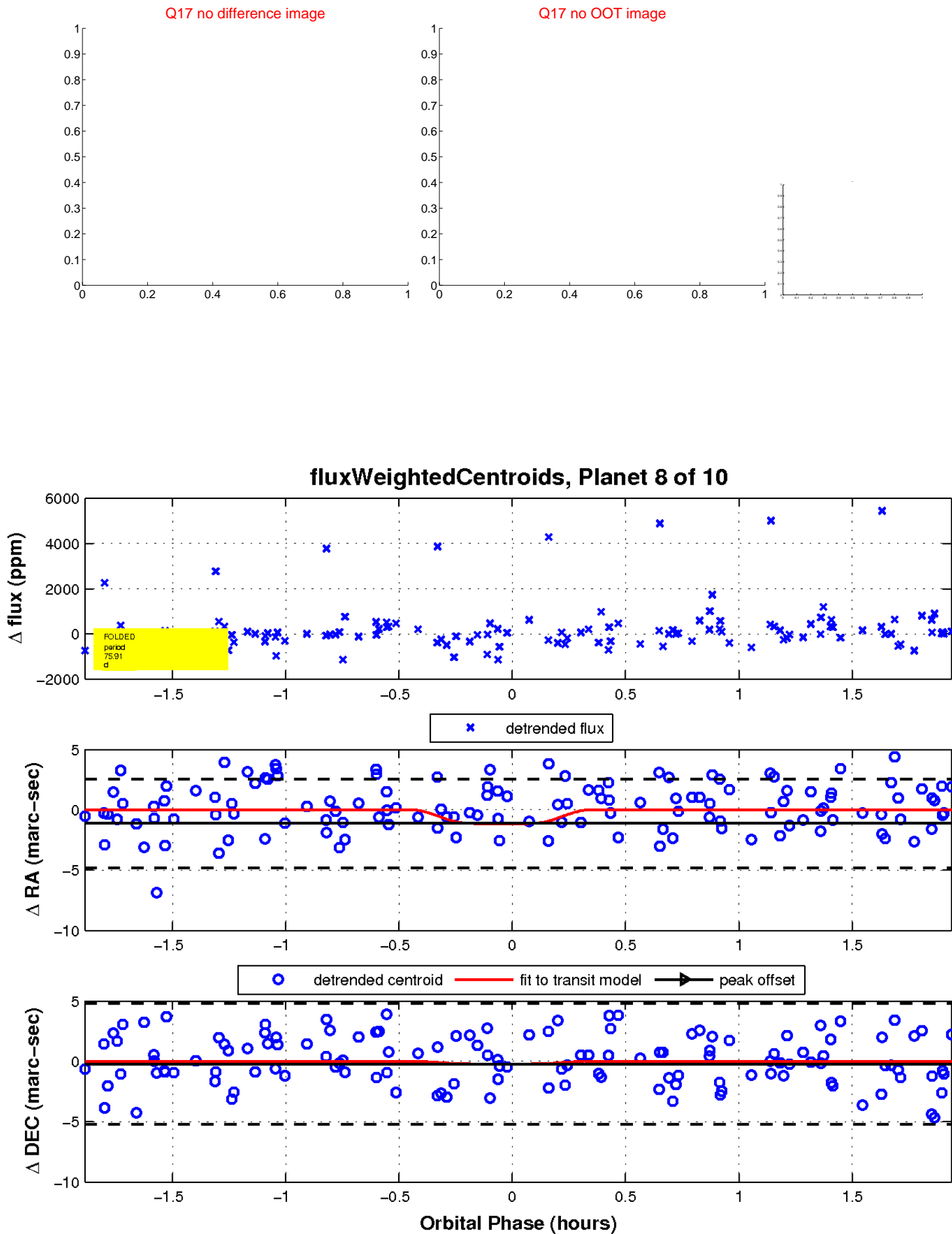
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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UKIRT Image

Declination

