

# KIC 002860579

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
002860579-01	OBS	No	348.372609	377.647764	1407.7	7.003	17.5	8.3	0.76	5345	2.85	0.56
002860579-02	OBS	No	437.580170	392.514028	824.6	5.252	16.2	5.1	0.76	5345	2.24	0.41
002860579-03	OBS	No	336.155467	371.710079	848.3	7.410	13.9	5.8	0.76	5345	2.43	0.59
002860579-04	OBS	No	505.753509	555.376823	1396.4	6.438	13.0	9.3	0.76	5345	2.94	0.34
002860579-06	OBS	No	495.661329	558.308458	943.7	4.518	14.4	6.7	0.76	5345	2.45	0.35
002860579-07	OBS	No	711.217301	149.175806	1045.3	6.000	11.8	-1.0	0.76	5345	2.42	0.22

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002860579-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_MEAS
002860579-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
002860579-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
002860579-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—CENT_FEW_DIFFS
002860579-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
002860579-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_NOFITS

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

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

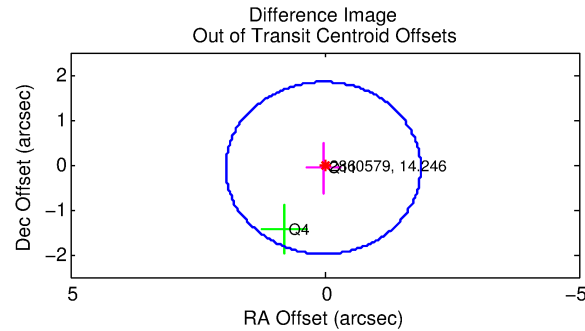
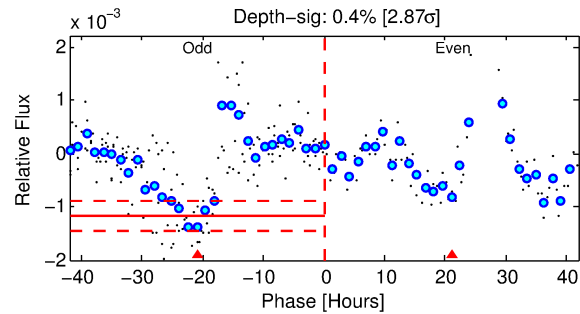
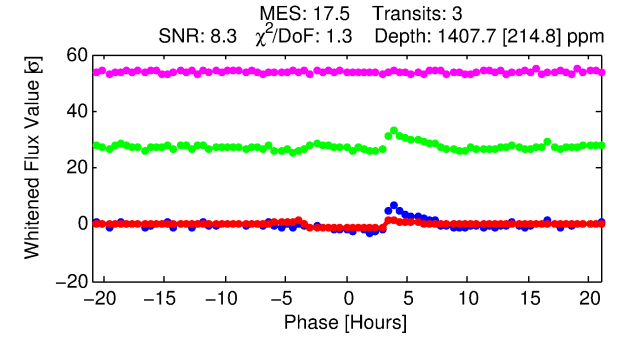
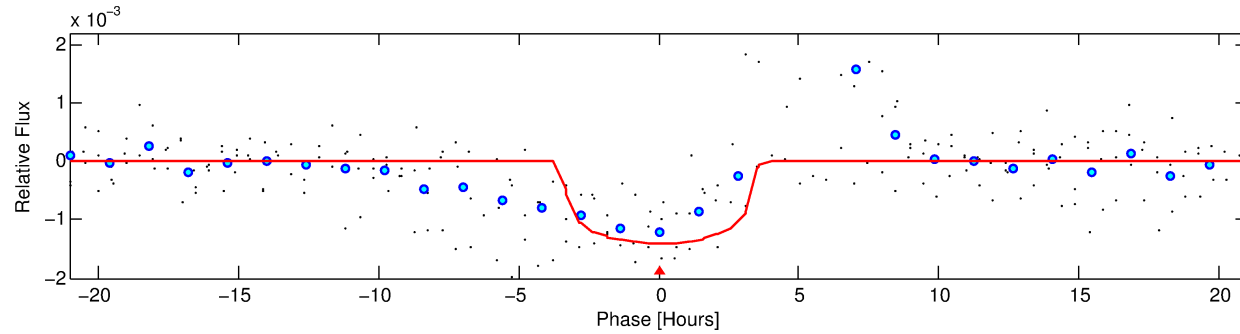
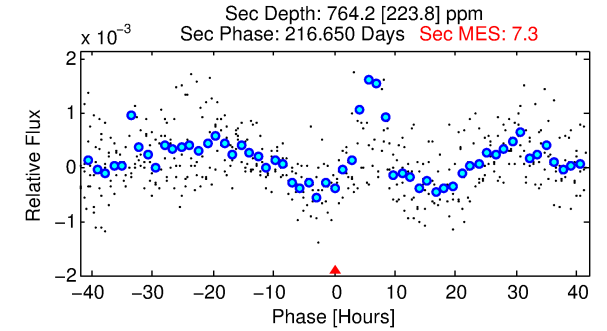
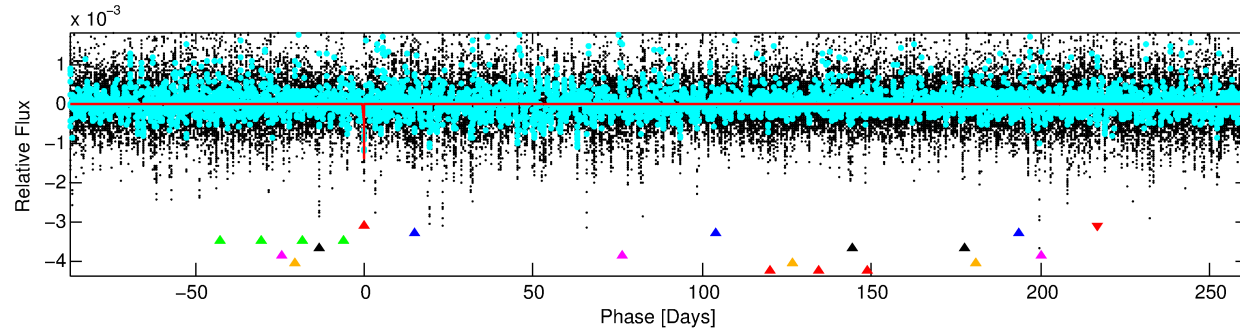
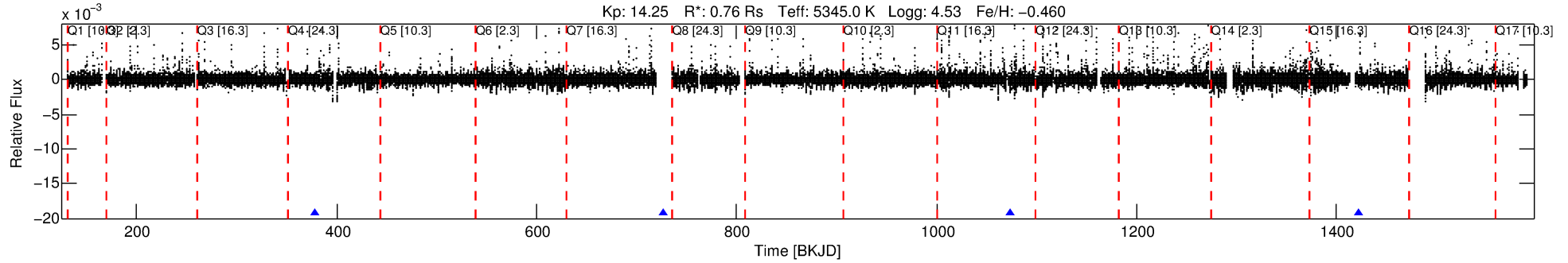
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 002860579-01

No Significant Match Found

# DV One-Page Summary

KIC: 2860579 Candidate: 1 of 7 Period: 348.373 d



## DV Fit Results:

Period = 348.37261 [0.00384] d  
Epoch = 377.6478 [0.0079] BKJD  
Rp/R\* = 0.0343 [0.0277]  
a/R\* = 372.60 [1206.51]  
b = 0.33 [8.87]  
Seff = 0.56 [0.11]  
Teq = 221 [11] K  
Rp = 2.85 [2.33] Re  
a = 0.8689 [0.0953] AU  
Ag = 39144.82 [64698.26] [0.61 $\sigma$ ]  
Teffp = 4799 [1978] K [2.31 $\sigma$ ]

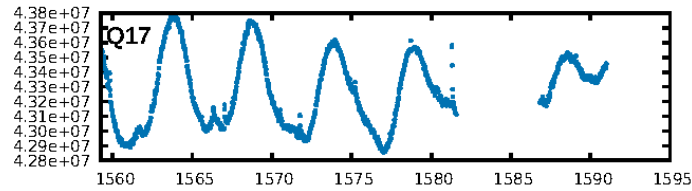
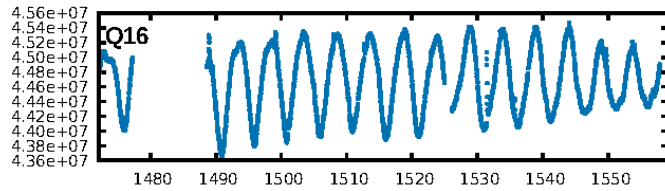
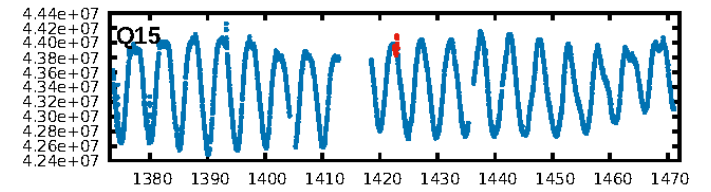
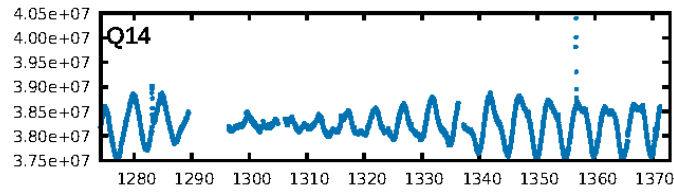
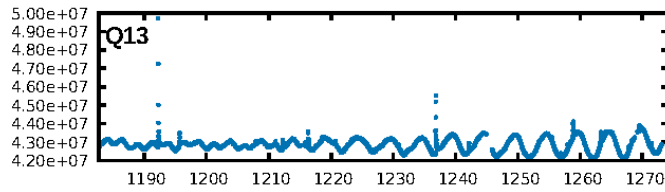
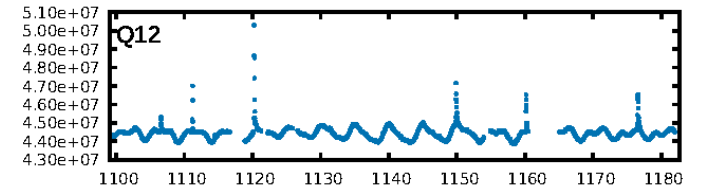
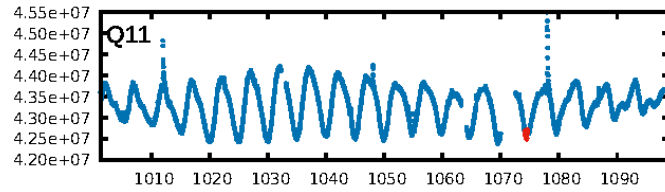
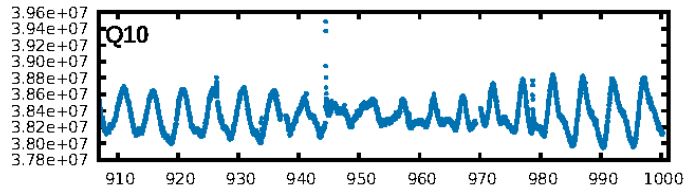
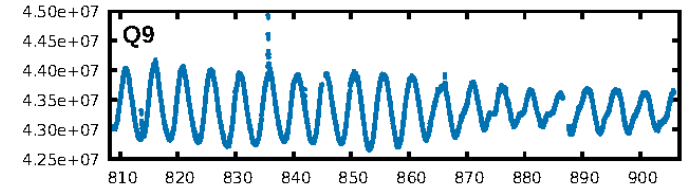
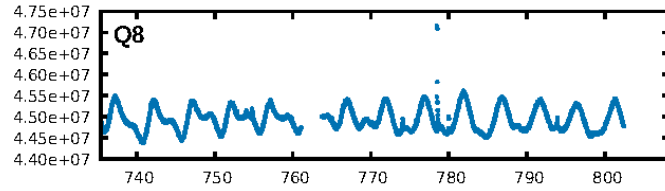
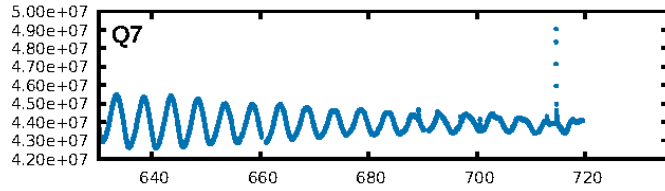
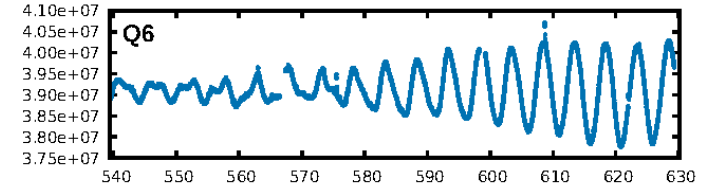
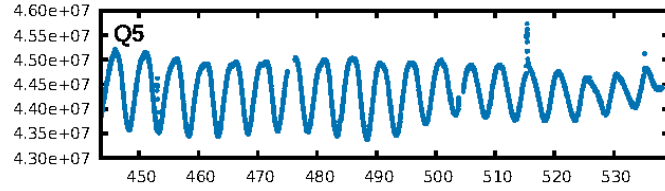
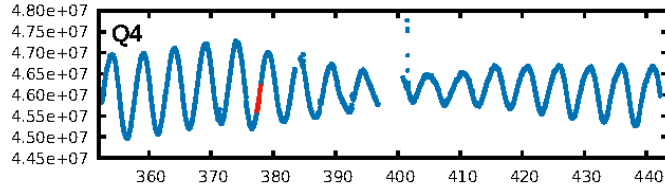
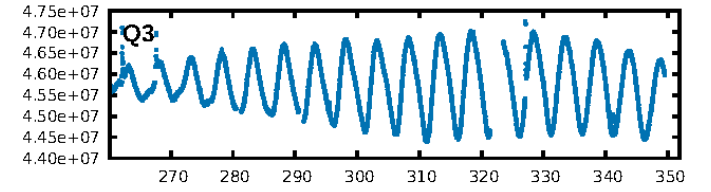
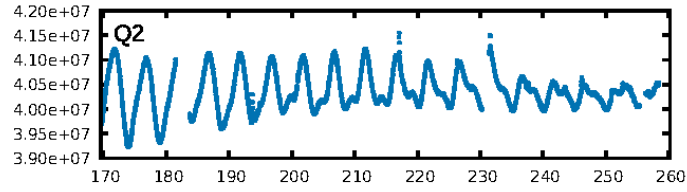
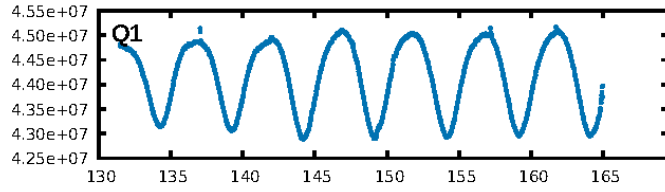
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [28.76 $\sigma$ ]  
LongPeriod-sig: 100.0% [244.56 $\sigma$ ]  
ModelChiSquare2-sig: 0.8%  
ModelChiSquareGof-sig: 60.7%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 2.1  
Centroid-sig: 71.6%  
Centroid-so: 0.739 arcsec [1.07 $\sigma$ ]  
OotOffset-rm: 0.079 arcsec [0.12 $\sigma$ ]  
OotOffset-st: 0/1/1/0 [2]  
KicOffset-rm: 0.129 arcsec [0.40 $\sigma$ ]  
KicOffset-st: 0/1/1/0 [2]  
DiffImageQuality-fgm: 1.00 [2/2]  
DiffImageOverlap-fno: 1.00 [3/3]

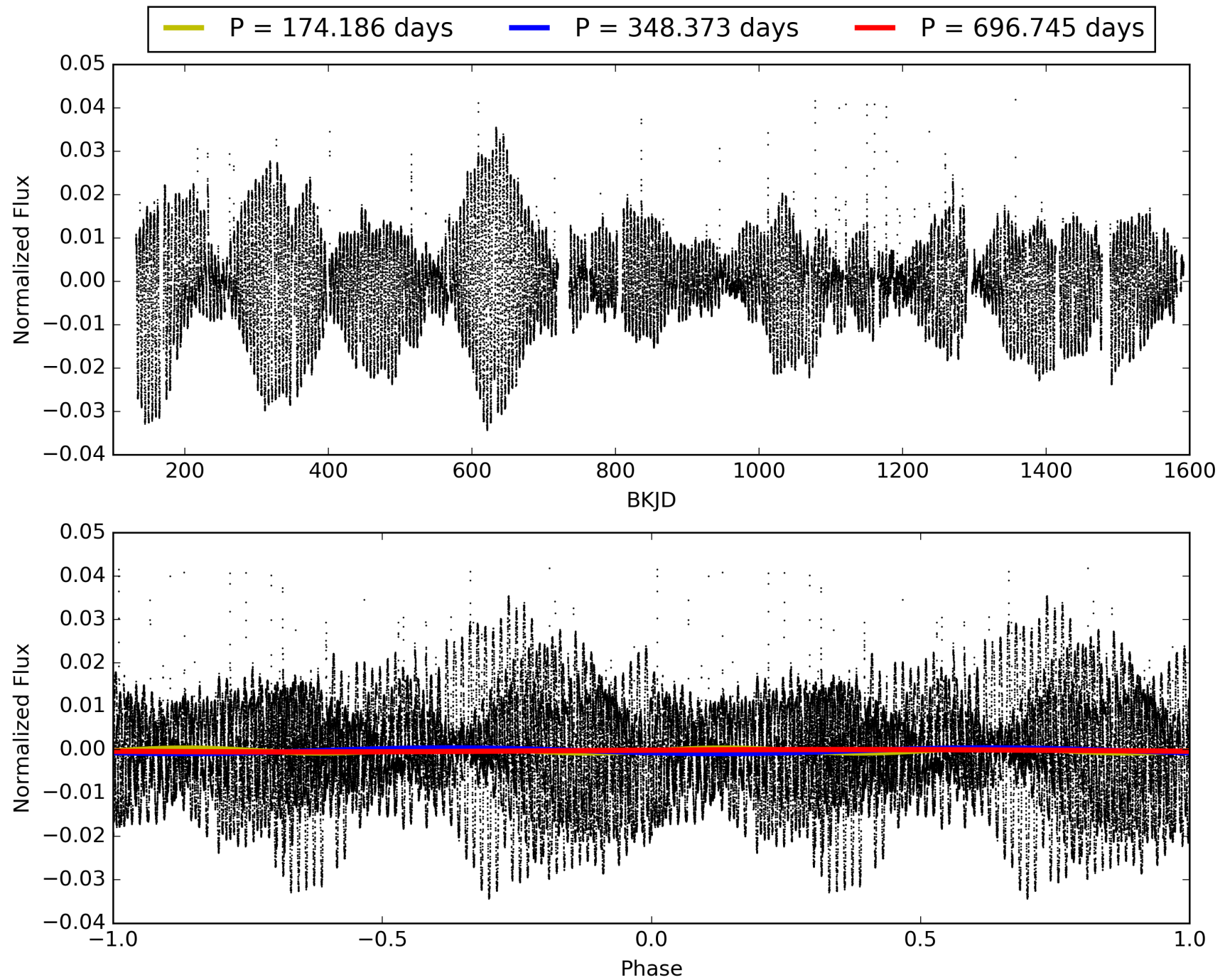
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 002860579-01, PDC Light Curves



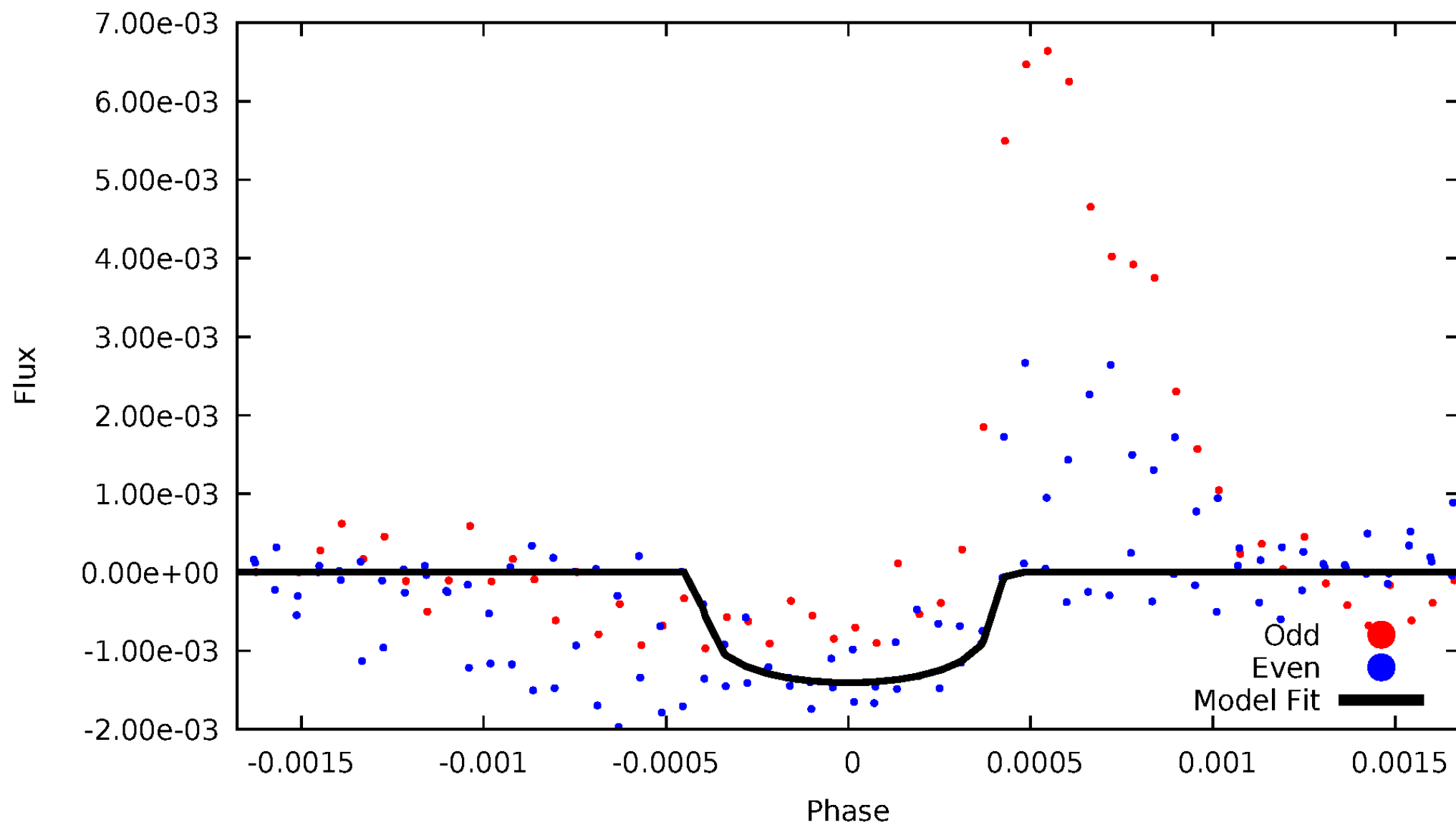
TCE 002860579-01





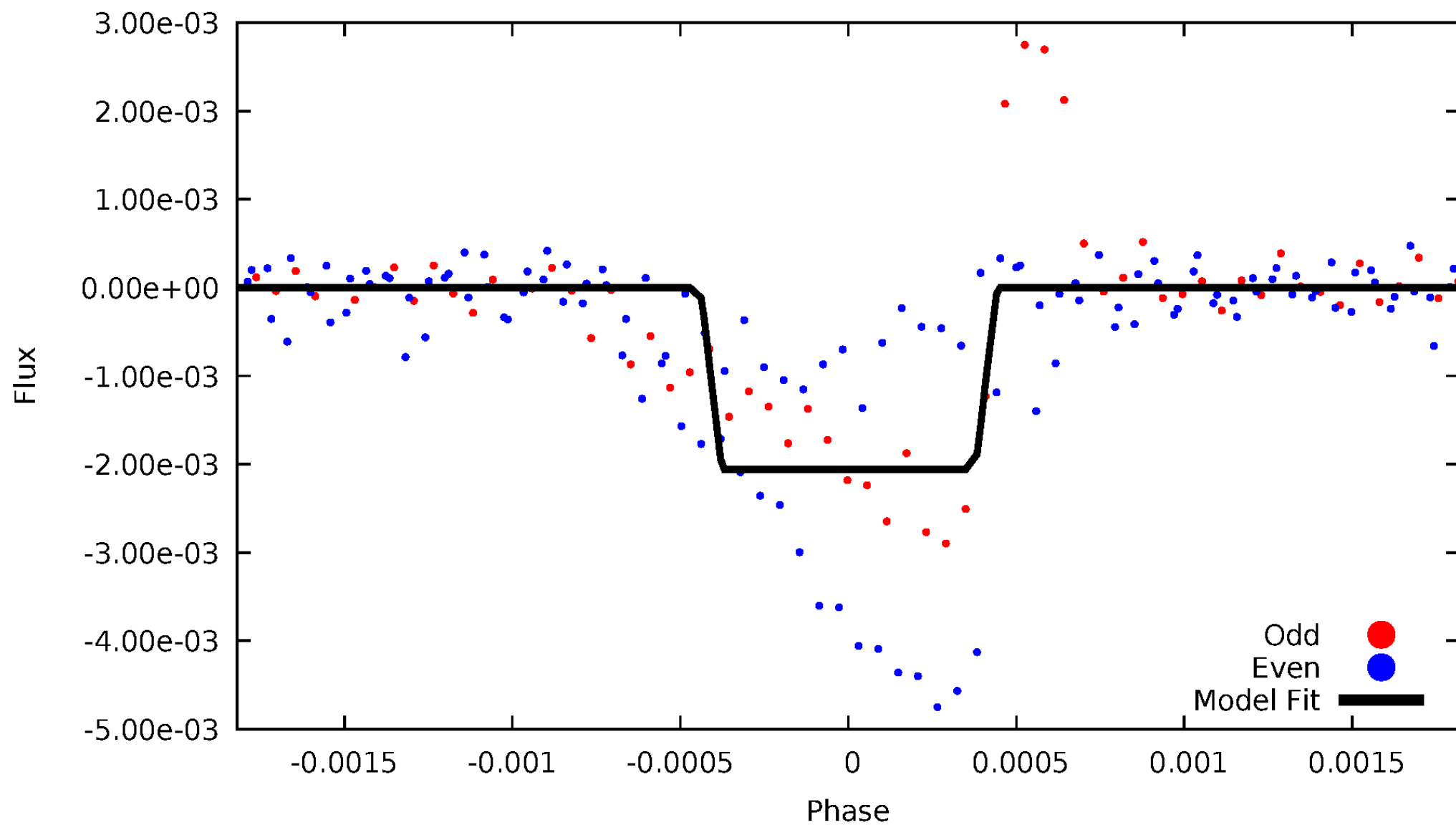
# DV Odd/Even

TCE 002860579-01



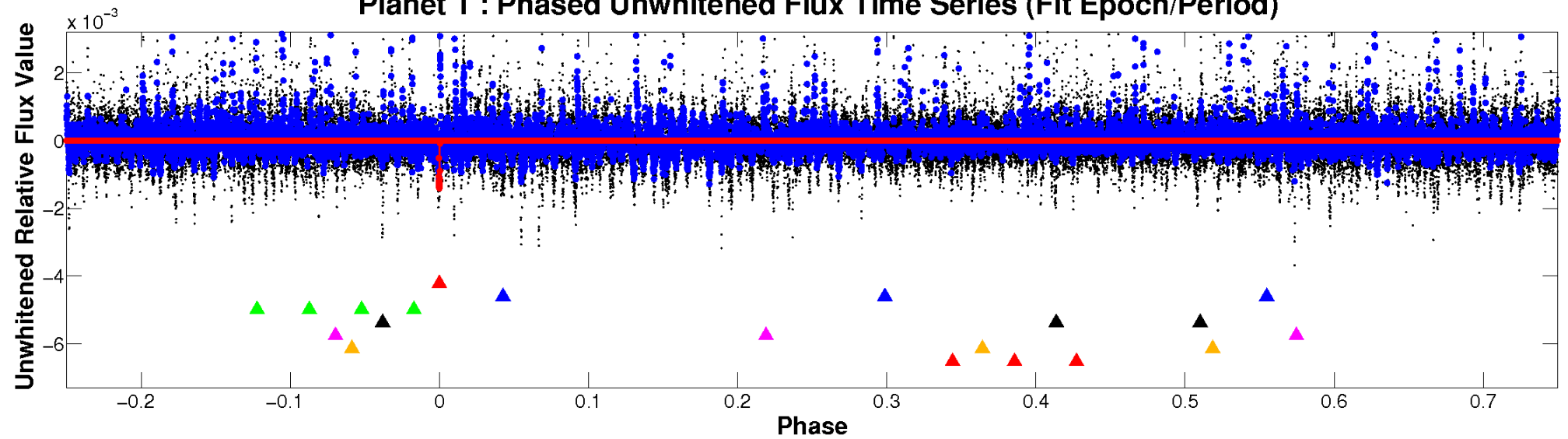
# ALT Odd/Even

TCE 002860579-01

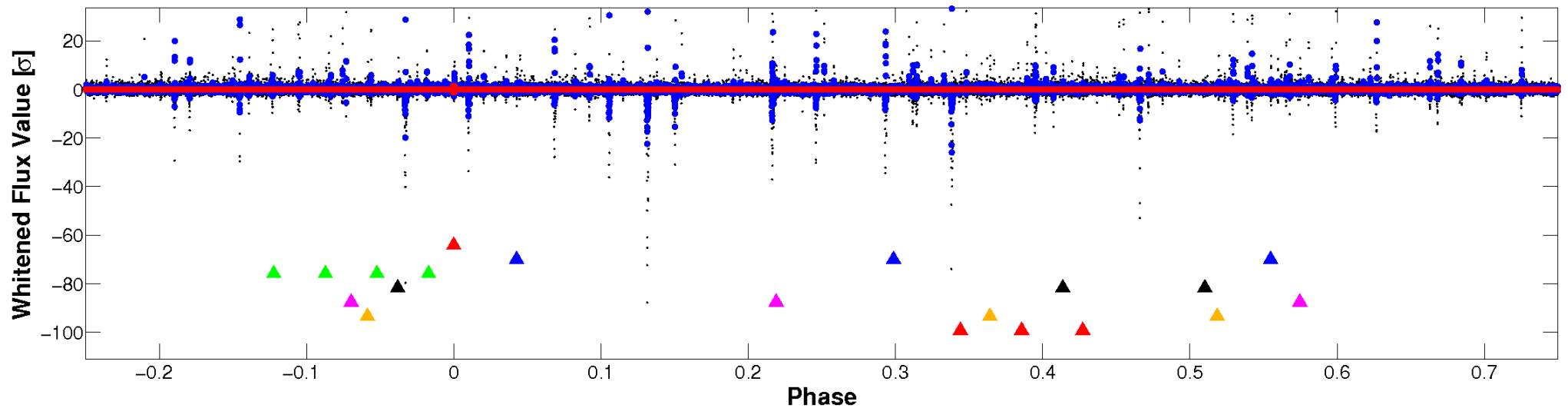


# Non-Whitened Vs. Whitened Light Curve

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

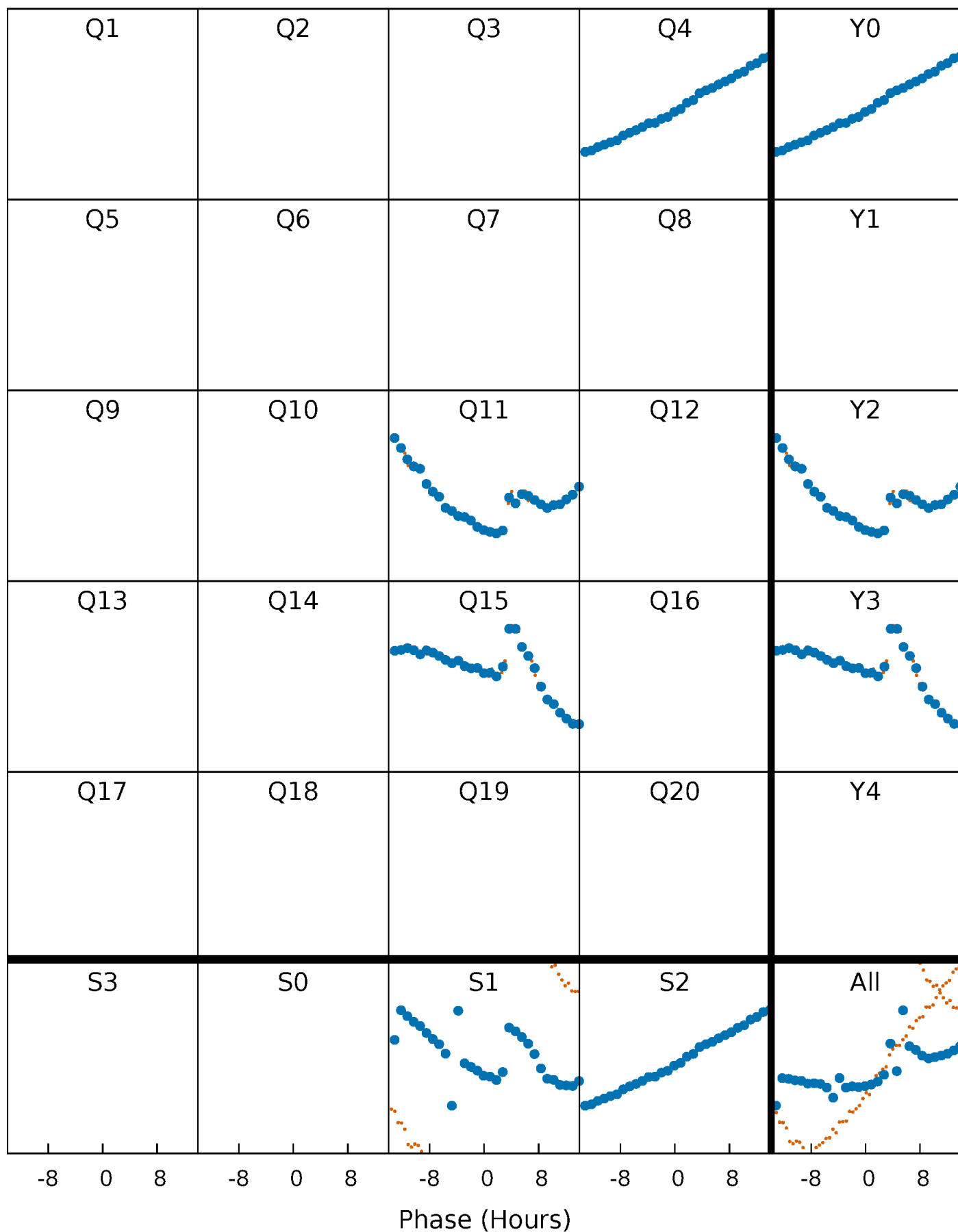


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



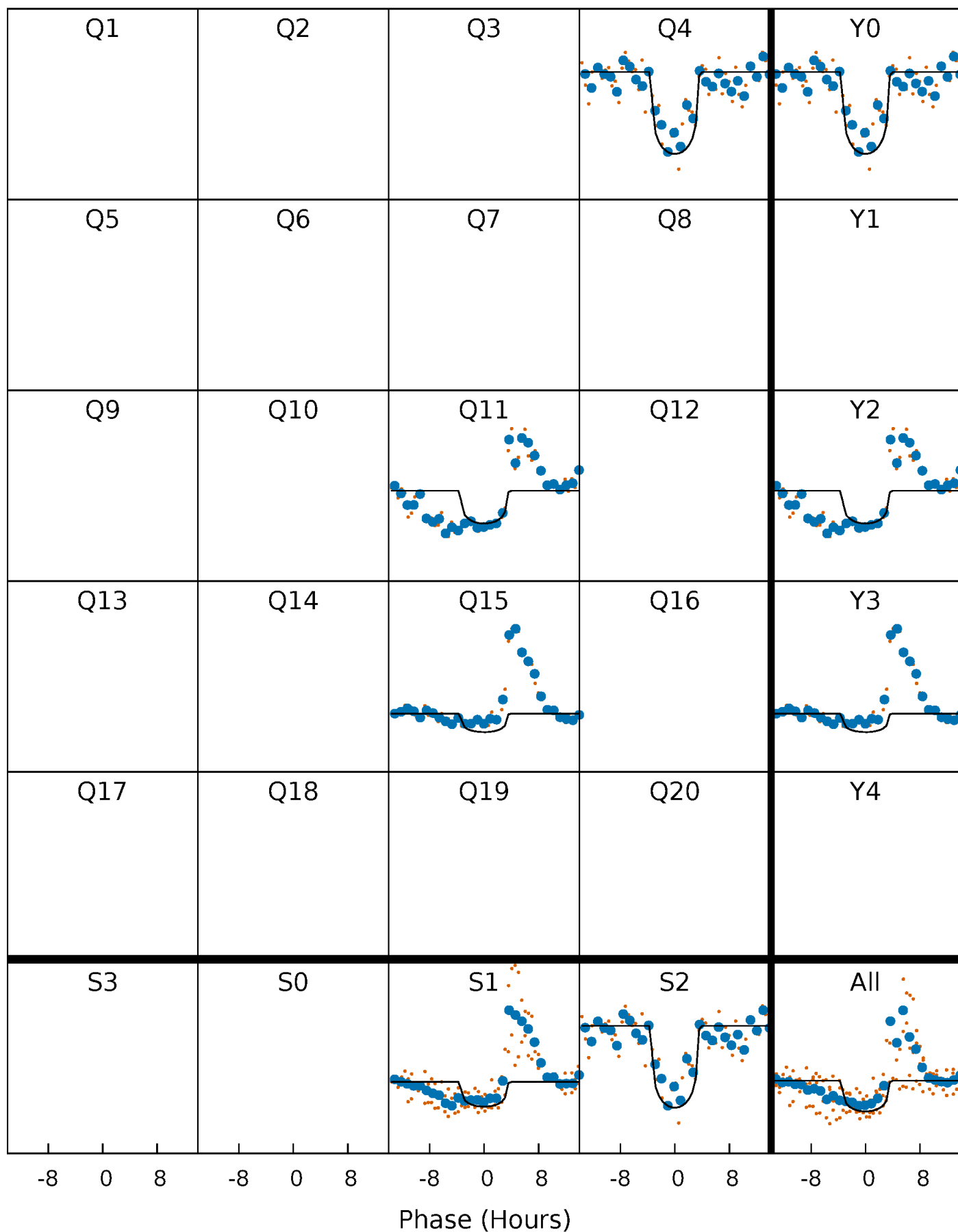
# PDC Quarter-Phased Transit Curves

TCE 002860579-01 P=348.372609 Days  $T_0=377.647764$  (BKJD)



# DV Quarter-Phased Transit Curves

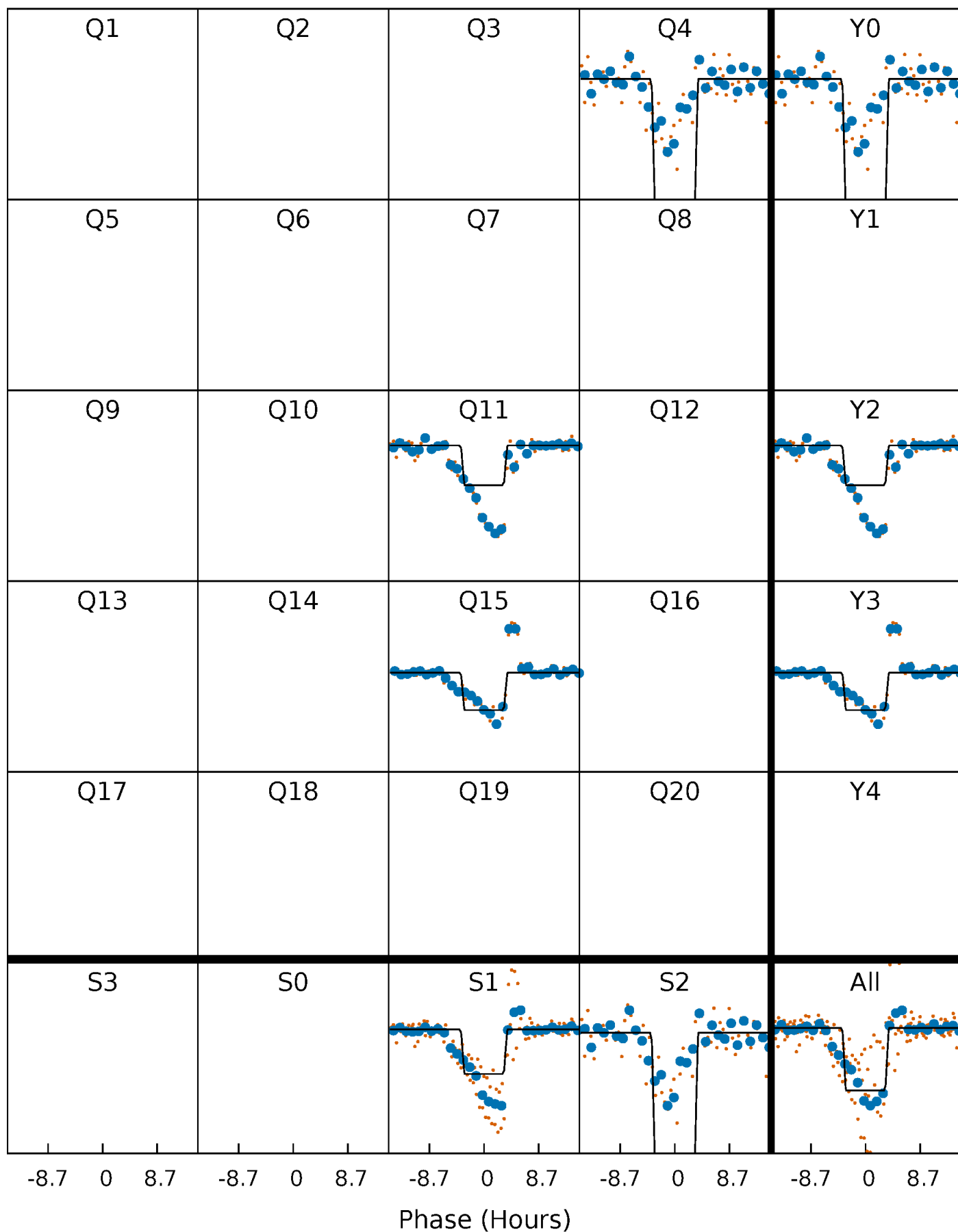
TCE 002860579-01 P=348.372609 Days  $T_0=377.647764$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

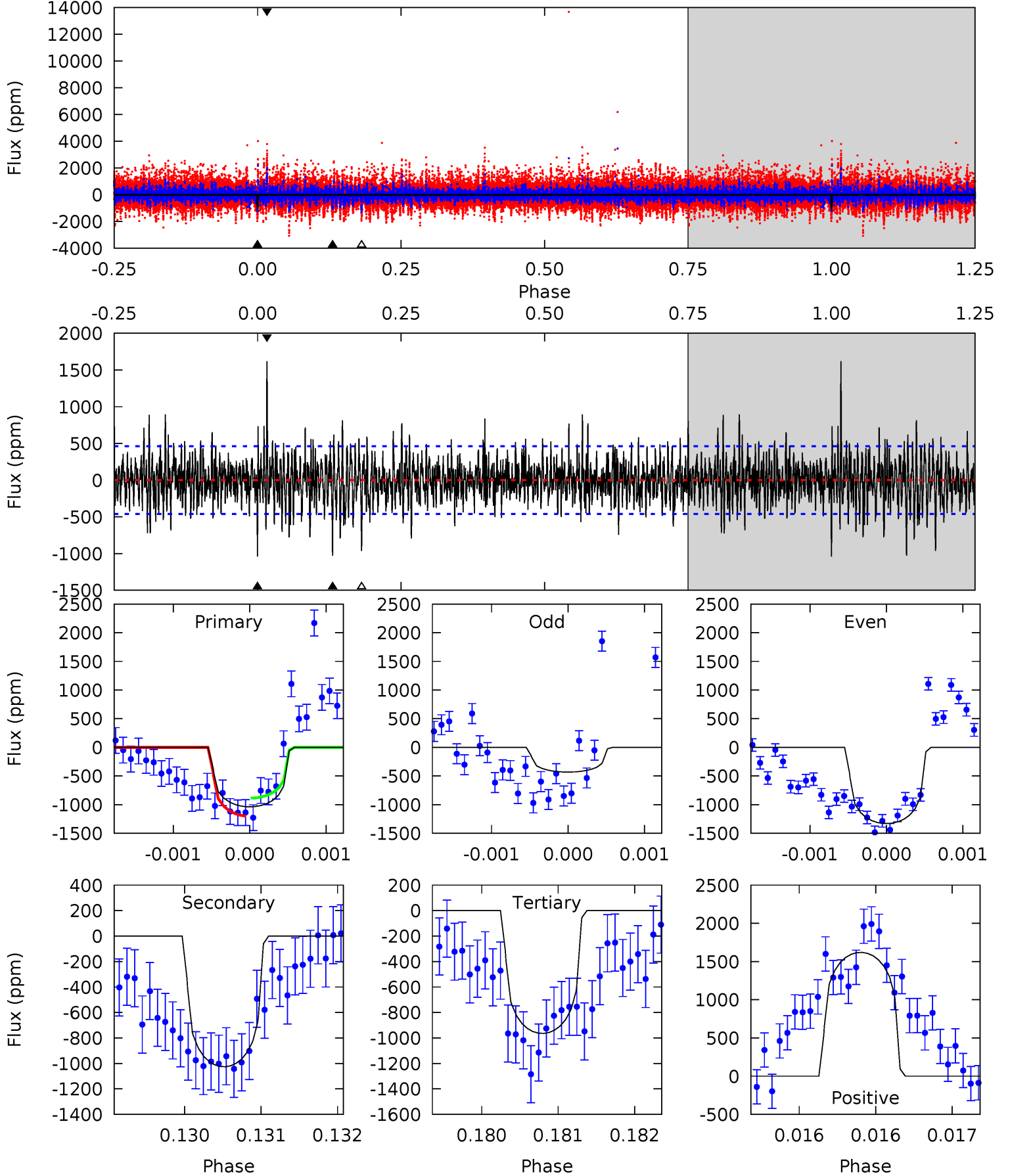
TCE 002860579-01 P=348.364953 Days  $T_0=377.657806$  (BKJD)



# DV Model-Shift Uniqueness Test

002860579-01,  $P = 348.372609$  Days,  $E = 29.275155$  Days

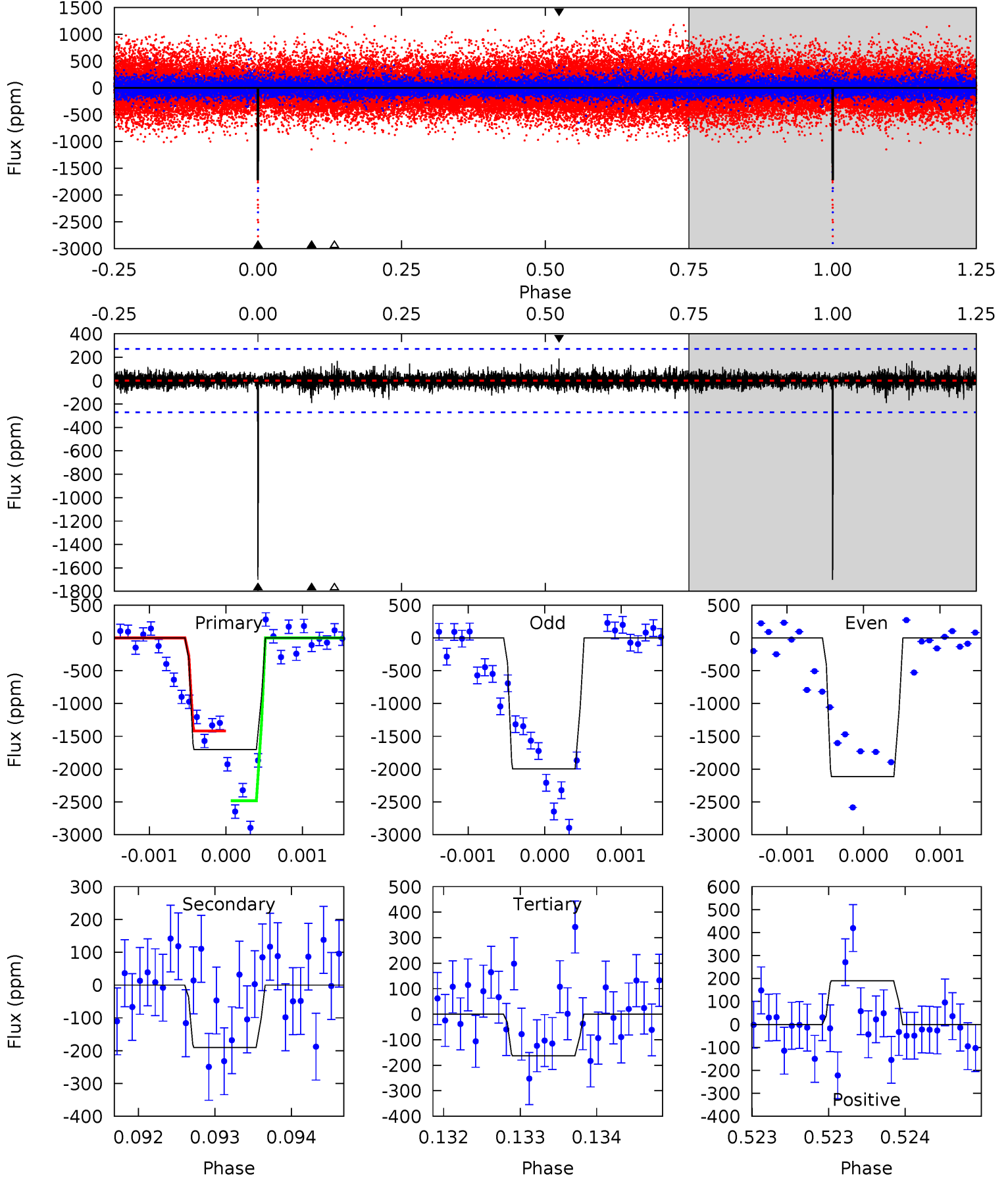
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.3	12.2	11.5	19.2	5.49	3.34	2.75	0.87	-6.91	0.73	-7.06	3.53	0.94	0.61	1.86



# Alt Model-Shift Uniqueness Test

002860579-01, P = 348.364953 Days, E = 29.292853 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
34.3	3.83	3.29	3.83	5.47	3.33	0.64	31.0	30.5	0.54	0.01	1.45	1.05	0.10	9.95



### Stellar Parameters For KIC 002860579

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5345^{+160}_{-144}$	$4.533^{+0.093}_{-0.076}$	$-0.460^{+0.300}_{-0.300}$	$0.761^{+0.095}_{-0.095}$	$0.720^{+0.103}_{-0.041}$	$2.305^{+0.908}_{-0.603}$
	+3%/-3%	+2%/-2%	+65%/-65%	+12%/-12%	+14%/-6%	+39%/-26%
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 002860579-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-1026 \pm 84$	$3.26^{+2.06}_{-2.05}$	$308^{+13}_{-13}$	$4906^{+3245}_{-825}$	$40564^{+263477}_{-24905}$
Alt.	$-190 \pm 50$	$4.00^{+2.39}_{-2.02}$	$308^{+13}_{-13}$	$3364^{+954}_{-446}$	$4882^{+16361}_{-3029}$

$T_{max}$  = 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

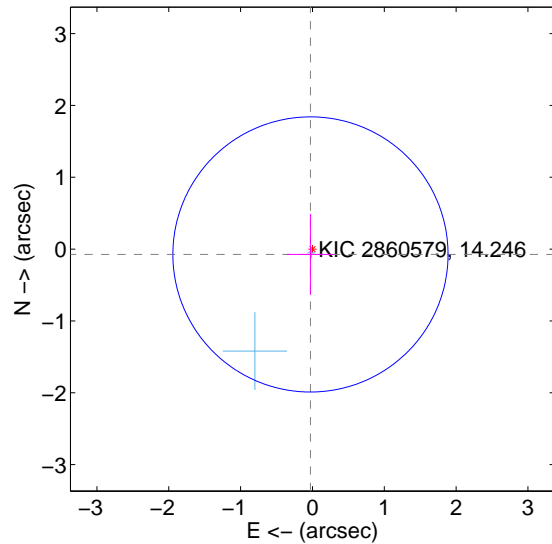
Supplemental centroid analysis for 002860579-01. Kepler magnitude: 14.25. Transit SNR 8.34

There are 2 quarters with good PRF difference image offsets

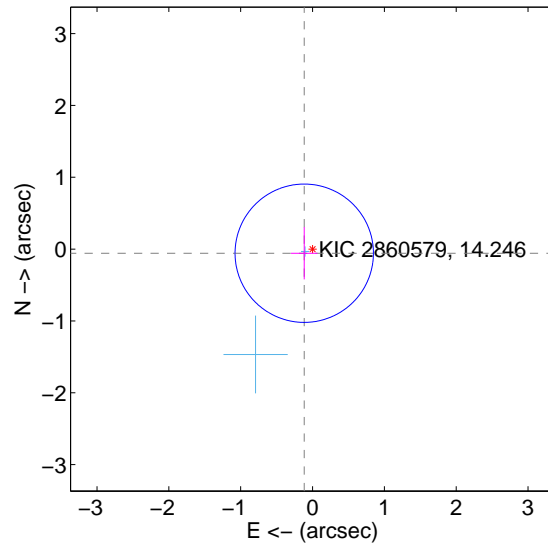
The direct PRF centroid is offset from the target star catalog position by about 0.09 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.079 \pm 0.638$	0.12	$0.027 \pm 0.328$	$-0.074 \pm 0.562$
PRF-fit source offset from KIC position	$0.129 \pm 0.321$	0.40	$0.115 \pm 0.185$	$-0.058 \pm 0.365$
photometric centroid source offset	$0.74 \pm 0.69$	1.07	$0.52 \pm 0.68$	$-0.53 \pm 0.70$

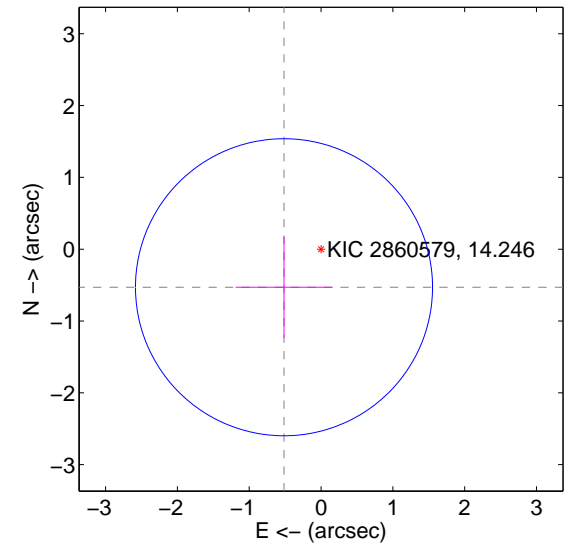
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



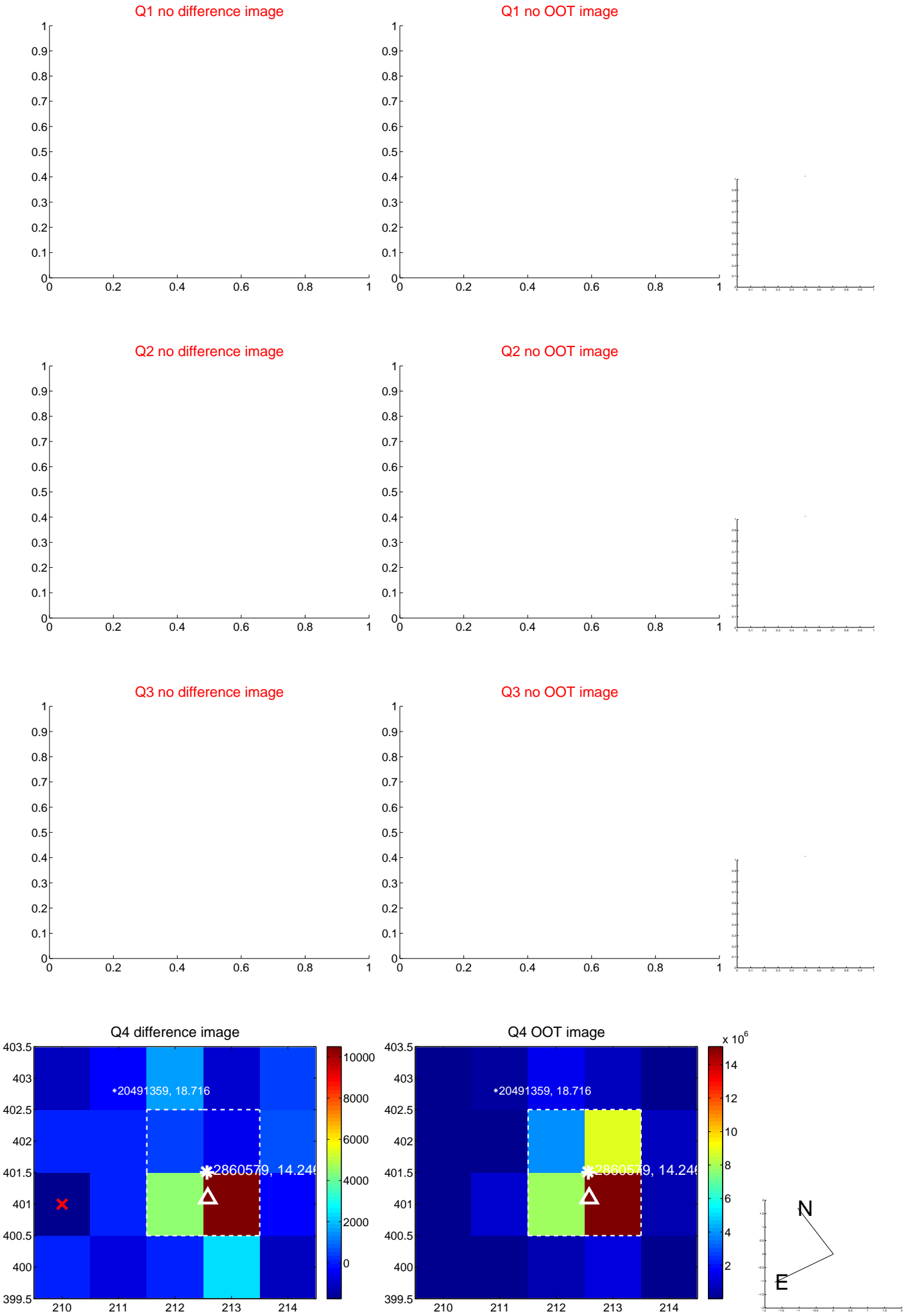
offset from photometric centroids



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



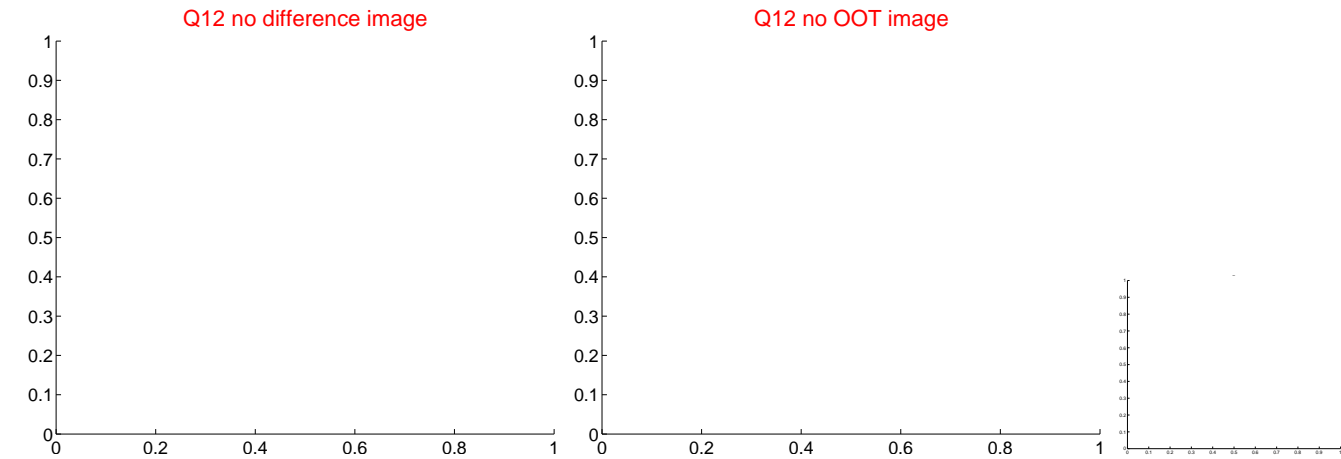
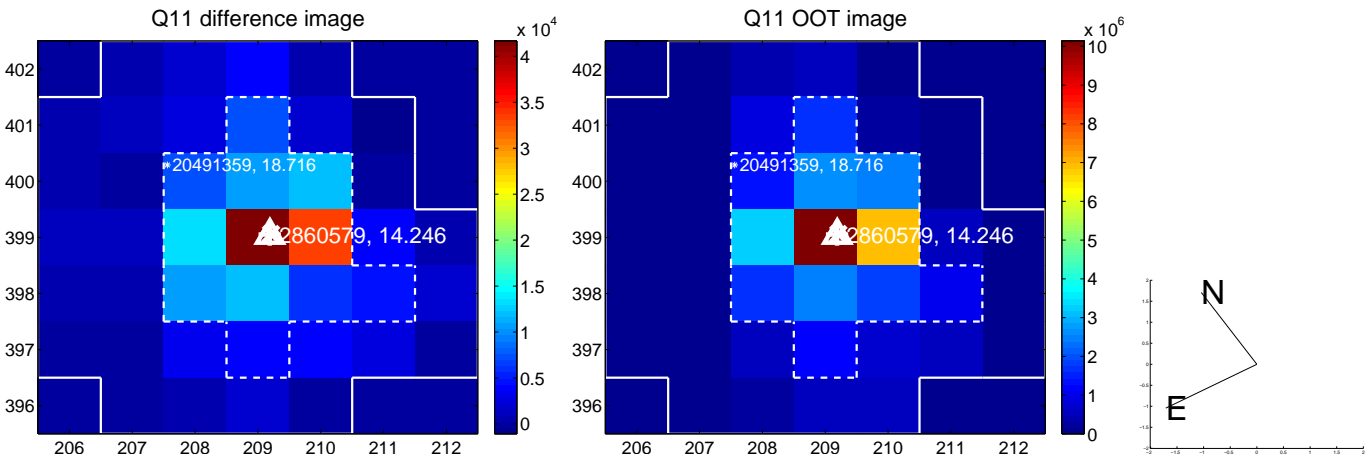
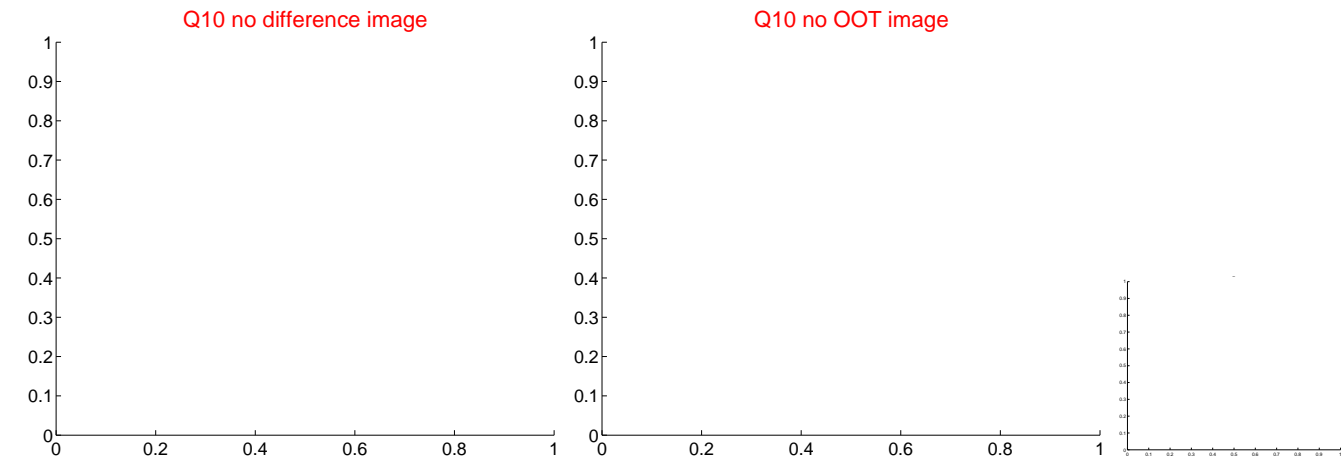
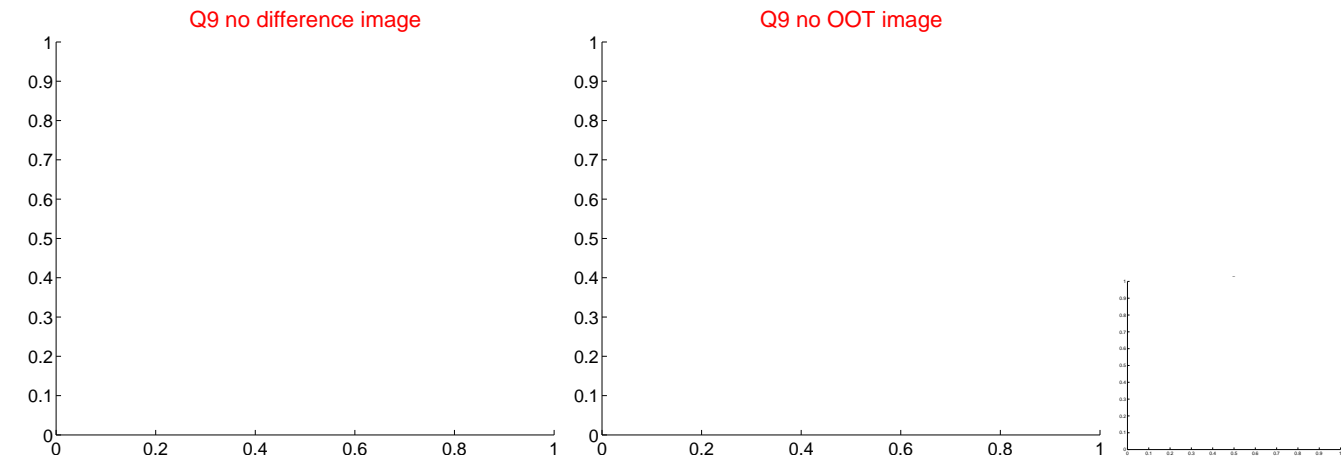
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



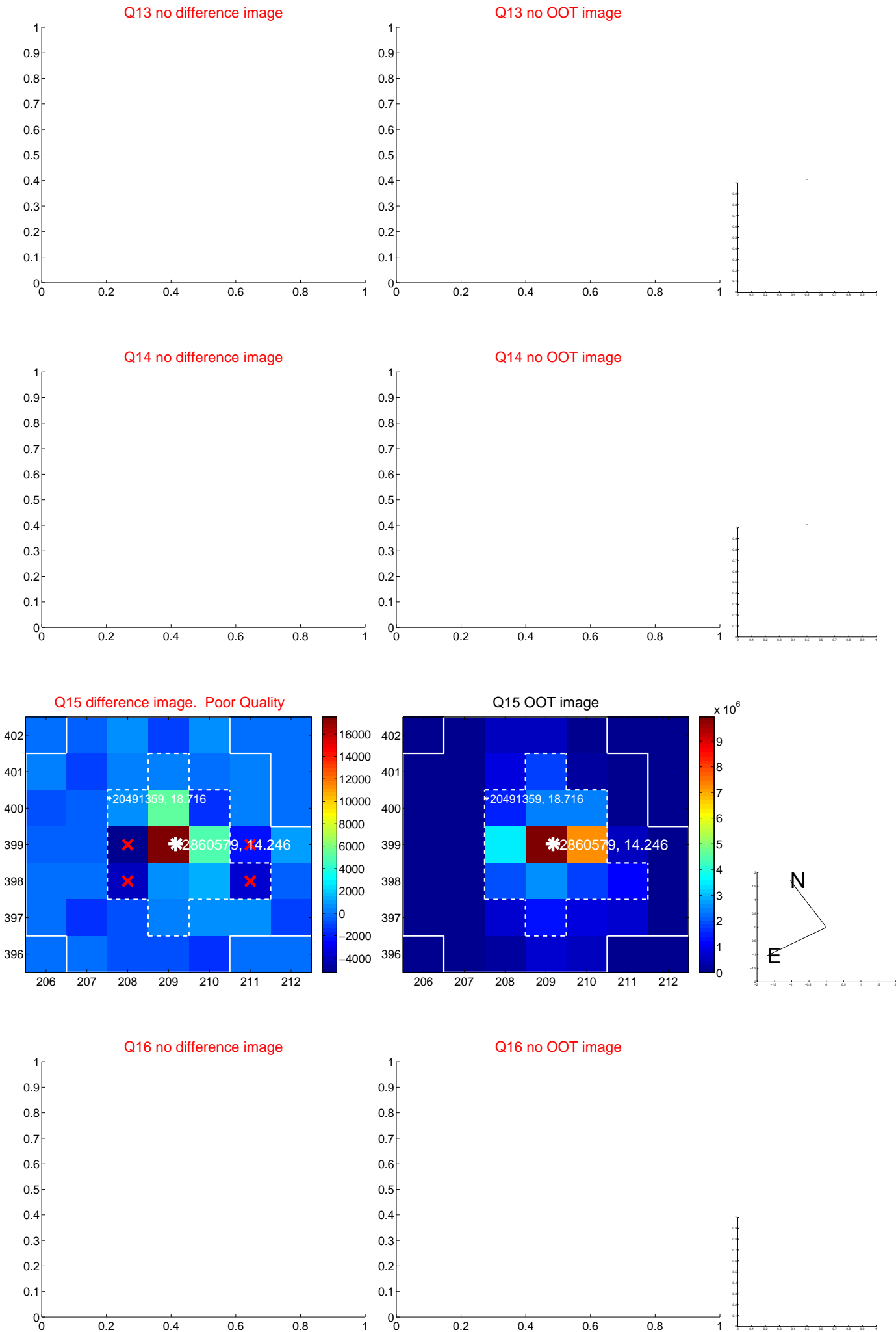
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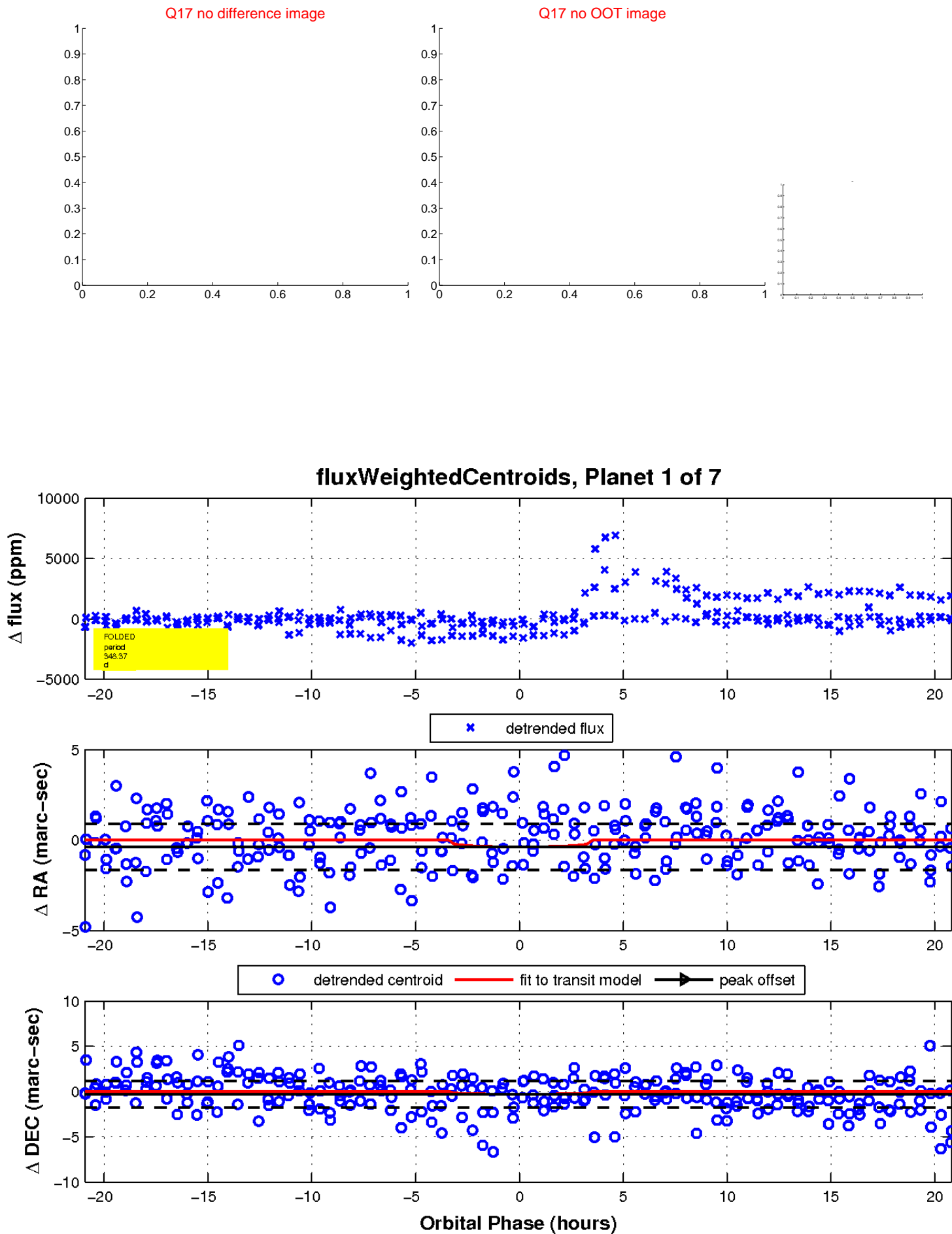
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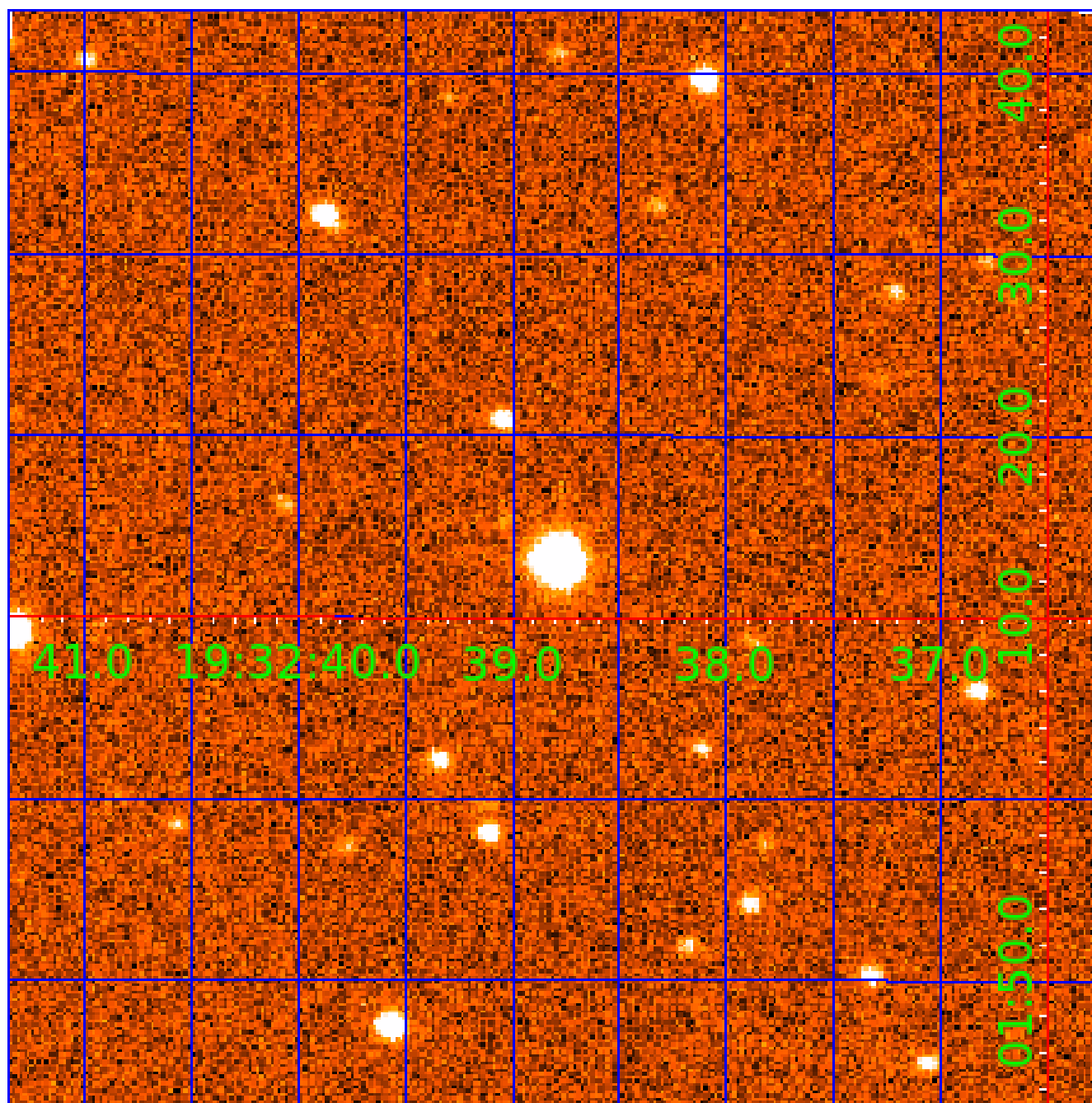
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# UKIRT Image

Declination



# KIC 002860579

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

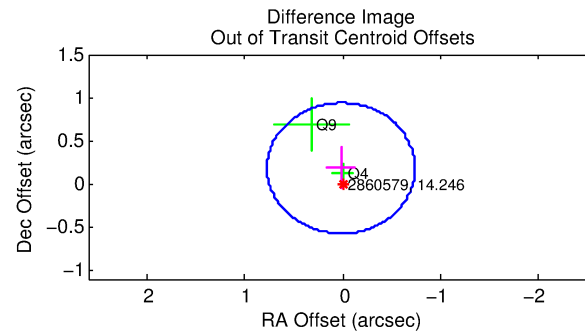
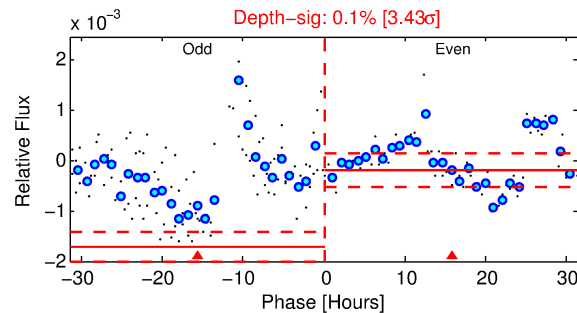
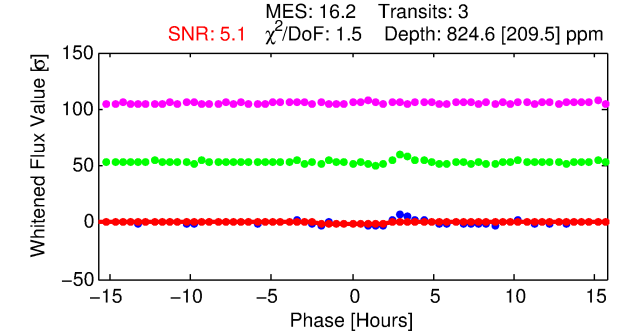
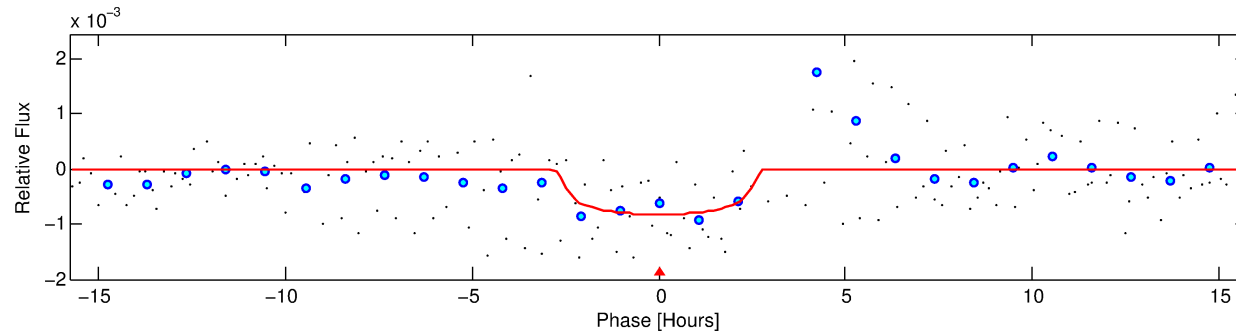
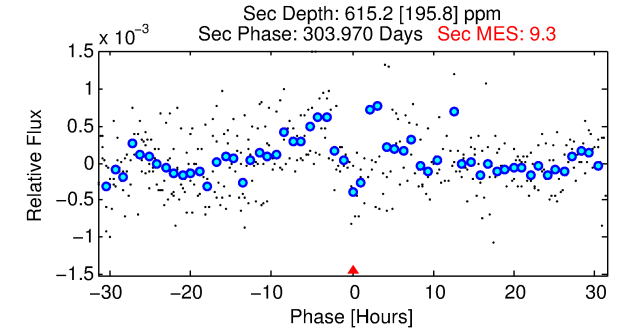
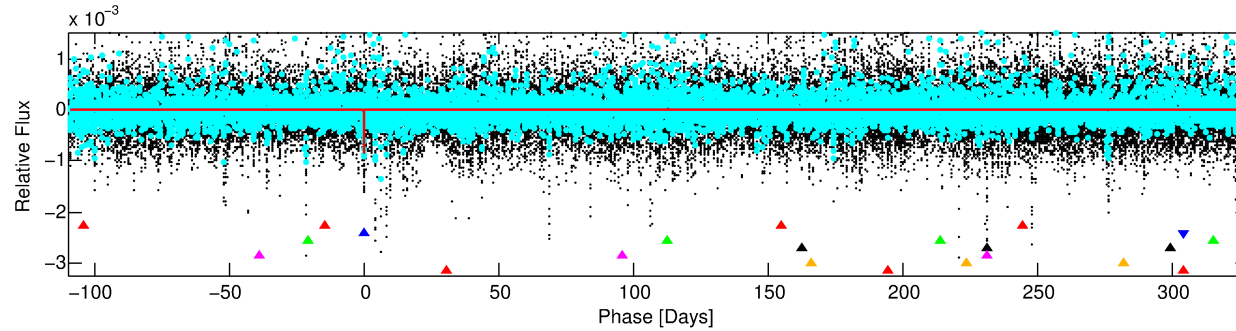
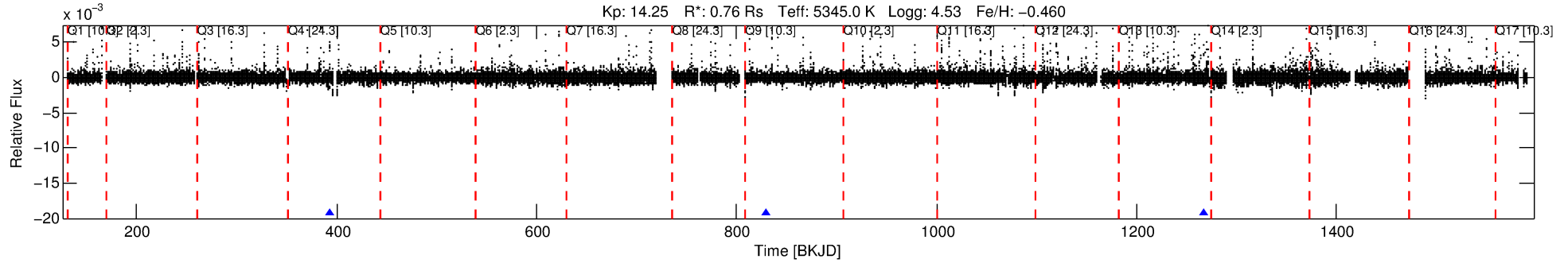
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 002860579-02

No Significant Match Found

# DV One-Page Summary

KIC: 2860579 Candidate: 2 of 7 Period: 437.580 d



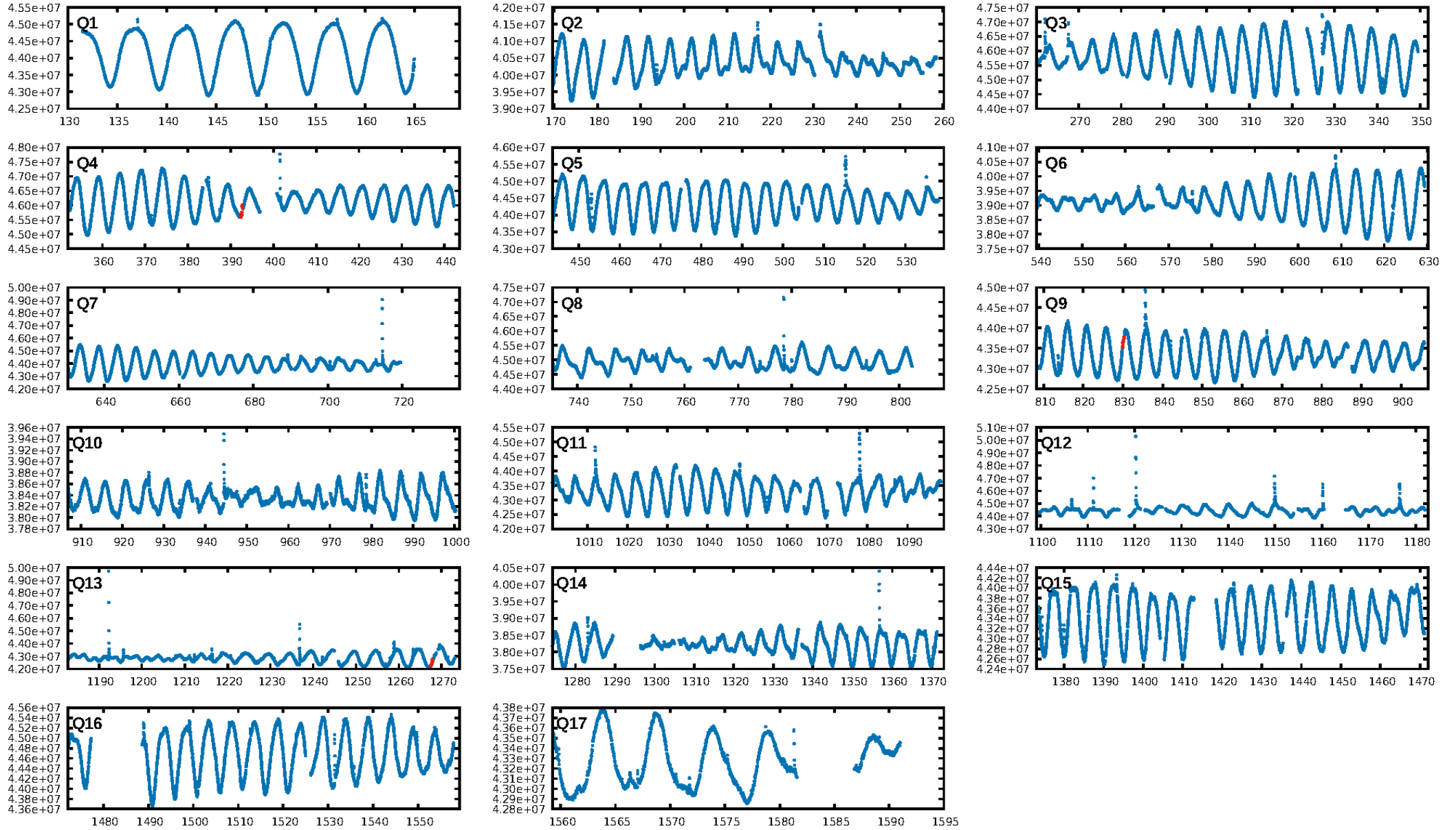
## DV Fit Results:

Period = 437.58017 [0.01205] d  
Epoch = 392.5140 [0.0143] BKJD  
Rp/R\* = 0.0270 [0.0514]  
a/R\* = 556.73 [4315.77]  
b = 0.54 [10.34]  
Seff = 0.41 [0.08]  
Teq = 205 [10] K  
Rp = 2.24 [4.28] Re  
a = 1.0116 [0.1109] AU  
Ag = 69023.90 [264135.83] [0.26 $\sigma$ ]  
Teffp = 5125 [4901] K [1.00 $\sigma$ ]

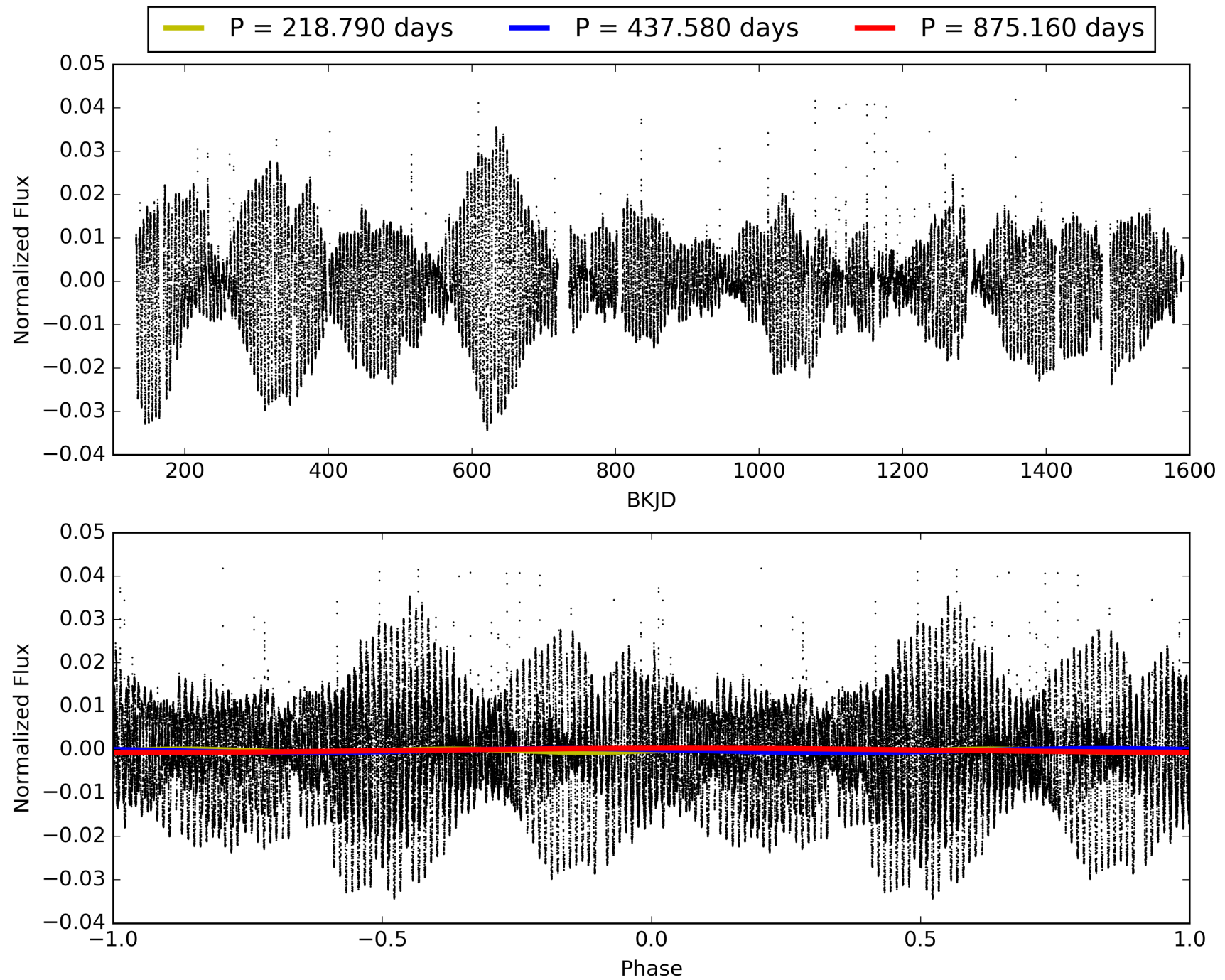
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [244.56 $\sigma$ ]  
LongPeriod-sig: 100.0% [201.19 $\sigma$ ]  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 43.4%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: -0.8184  
Centroid-sig: 0.0%  
Centroid-so: 1.655 arcsec [1.83 $\sigma$ ]  
OotOffset-rm: 0.183 arcsec [0.73 $\sigma$ ]  
OotOffset-st: 0/0/1/1 [2]  
KicOffset-rm: 0.145 arcsec [0.64 $\sigma$ ]  
KicOffset-st: 0/0/1/1 [2]  
DiffImageQuality-fgm: 0.50 [1/2]  
DiffImageOverlap-fno: 1.00 [2/2]

# TCE 002860579-02, PDC Light Curves



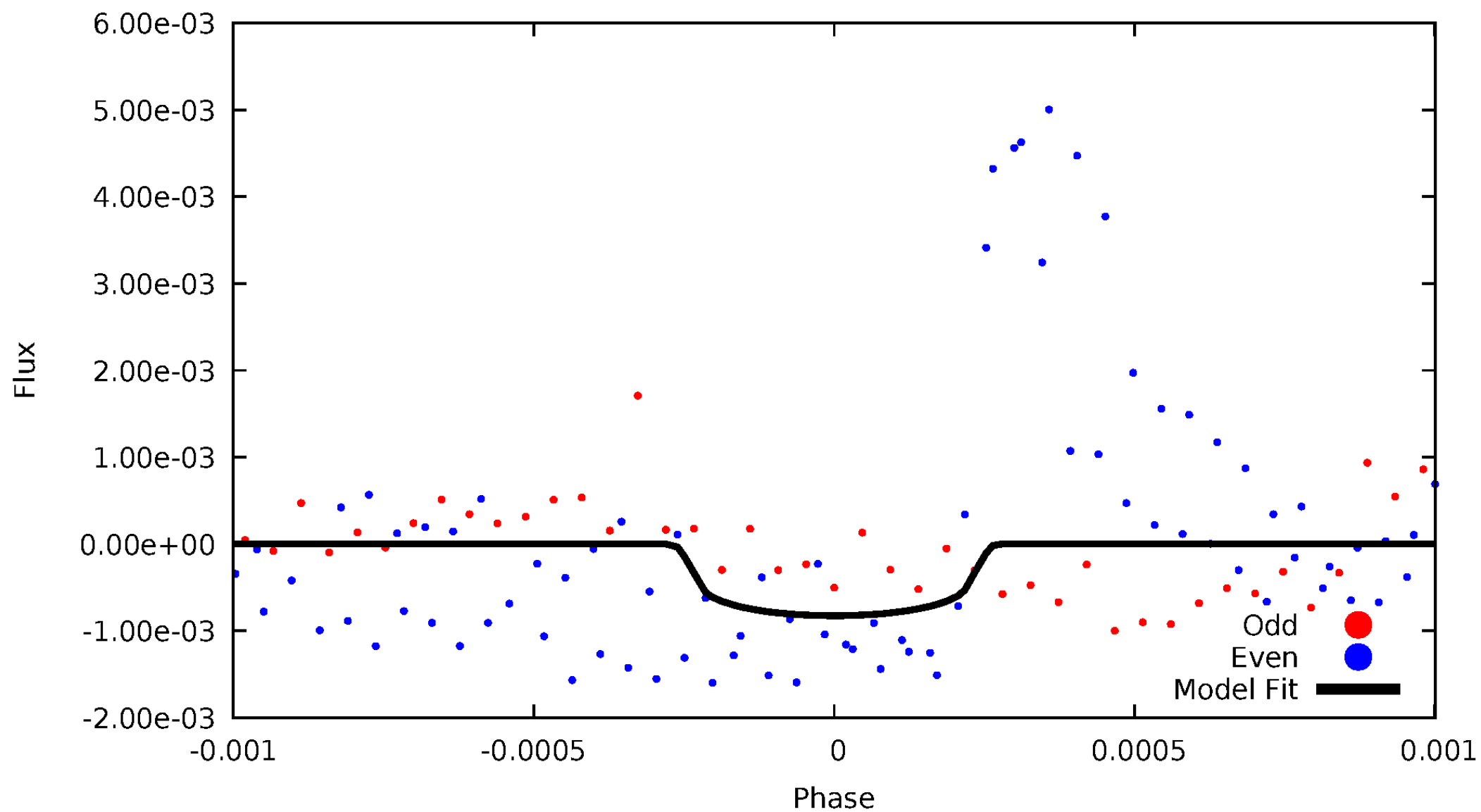
TCE 002860579-02





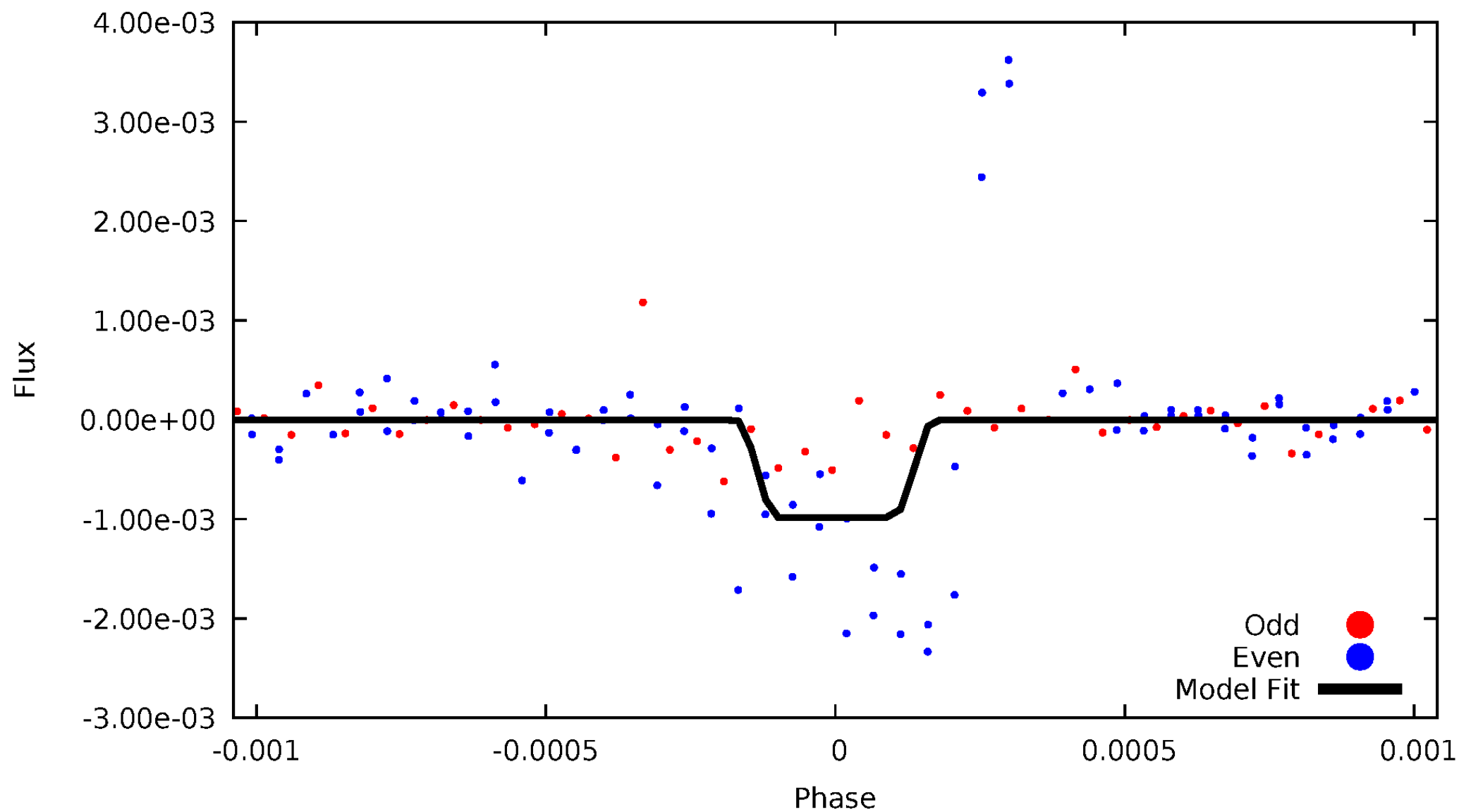
# DV Odd/Even

TCE 002860579-02



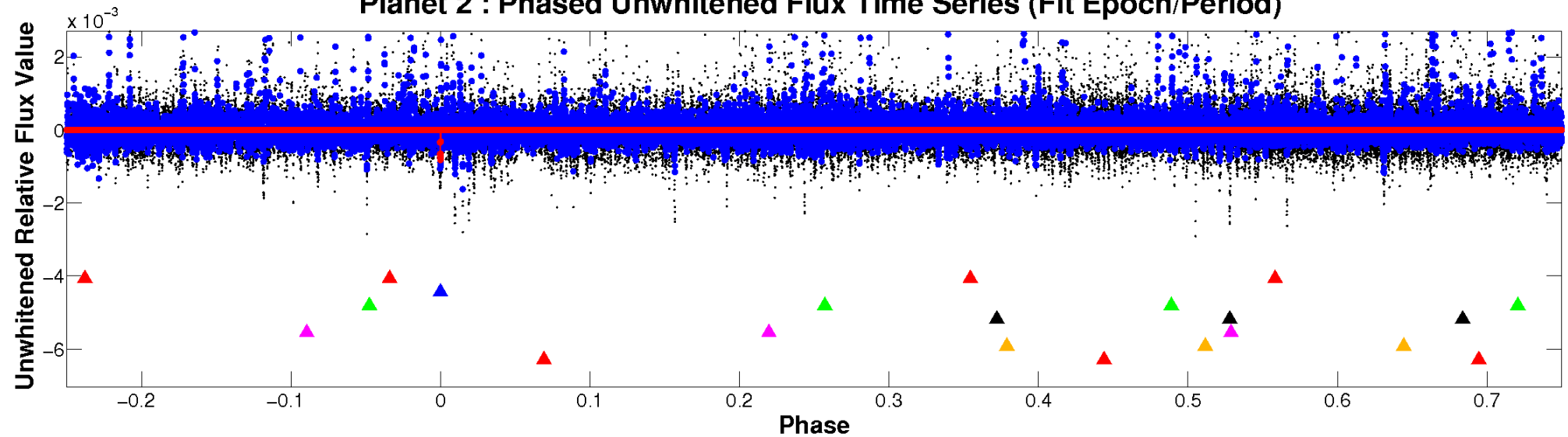
# ALT Odd/Even

TCE 002860579-02

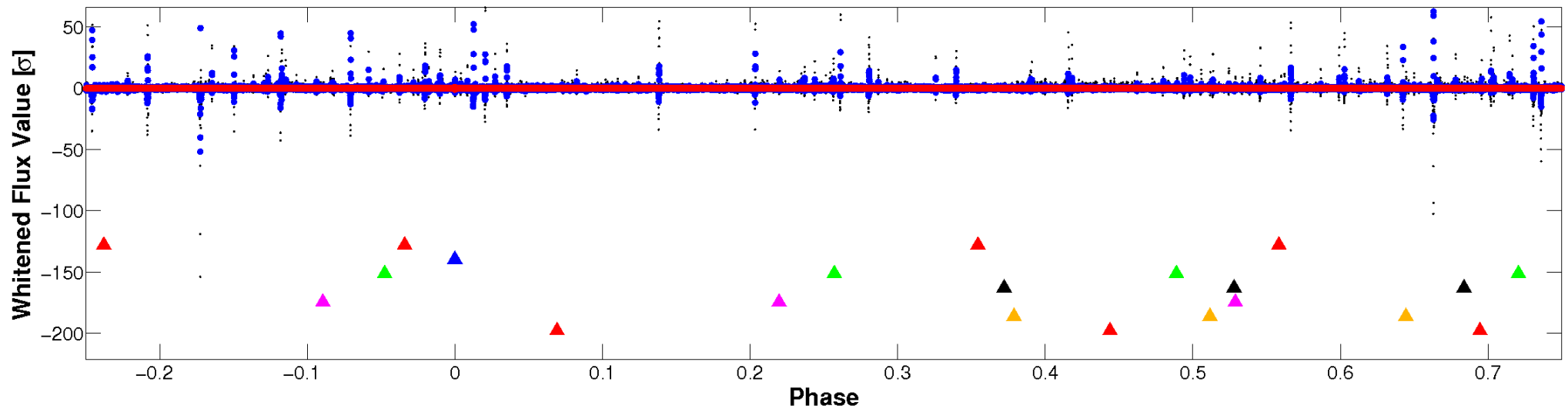


# Non-Whitened Vs. Whitened Light Curve

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

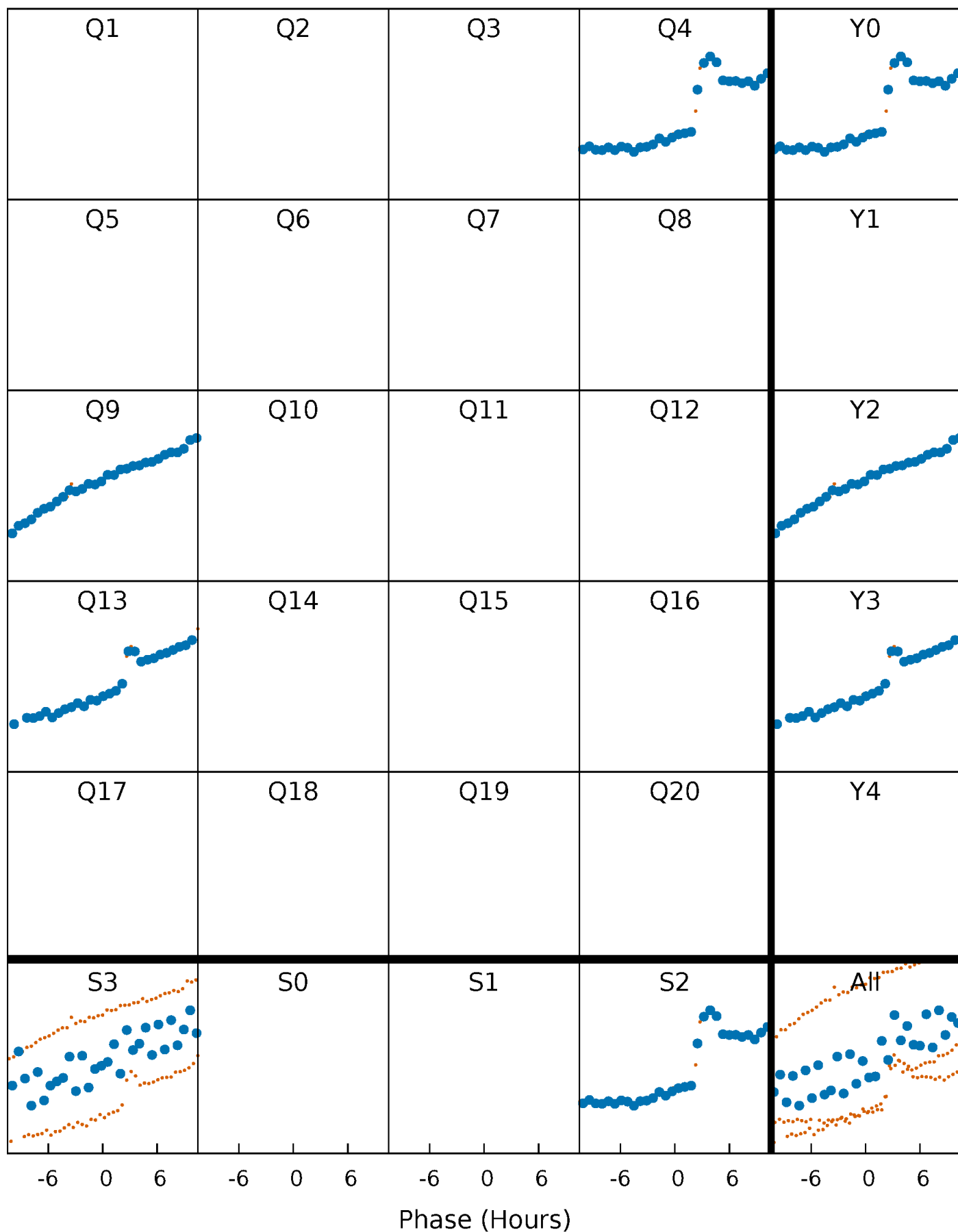


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



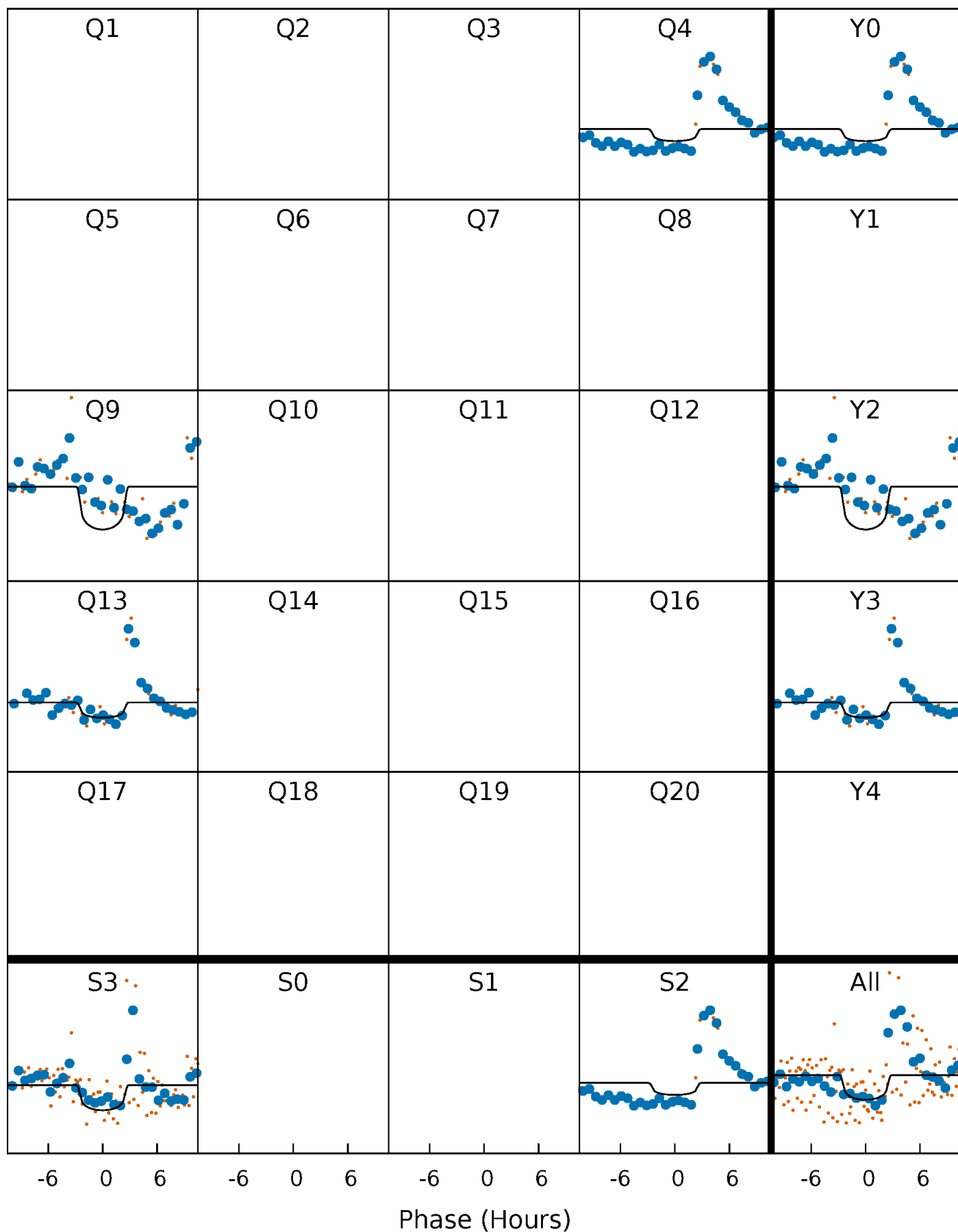
# PDC Quarter-Phased Transit Curves

TCE 002860579-02 P=437.580170 Days  $T_0=392.514028$  (BKJD)



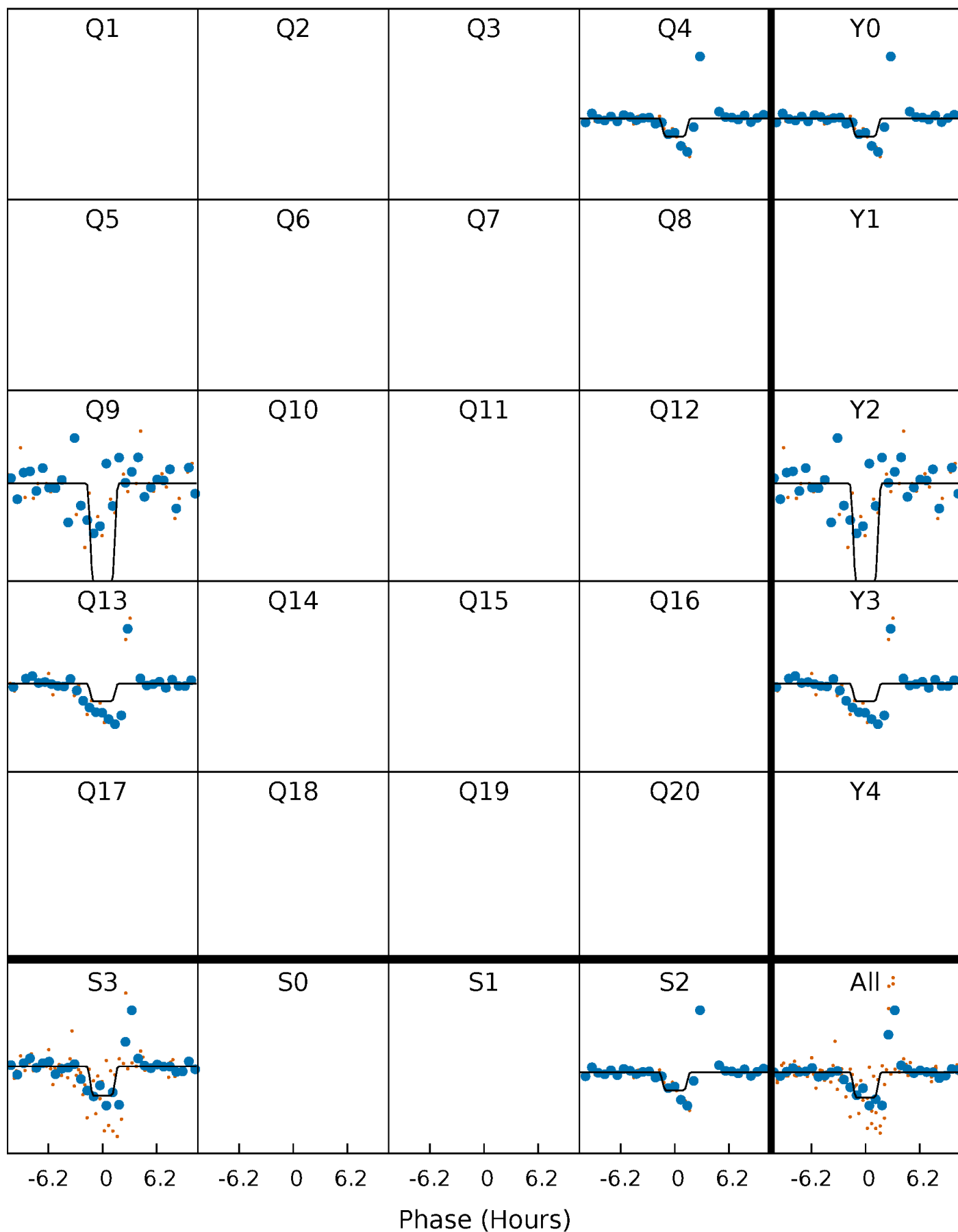
# DV Quarter-Phased Transit Curves

TCE 002860579-02     $P=437.580170$  Days     $T_0=392.514028$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

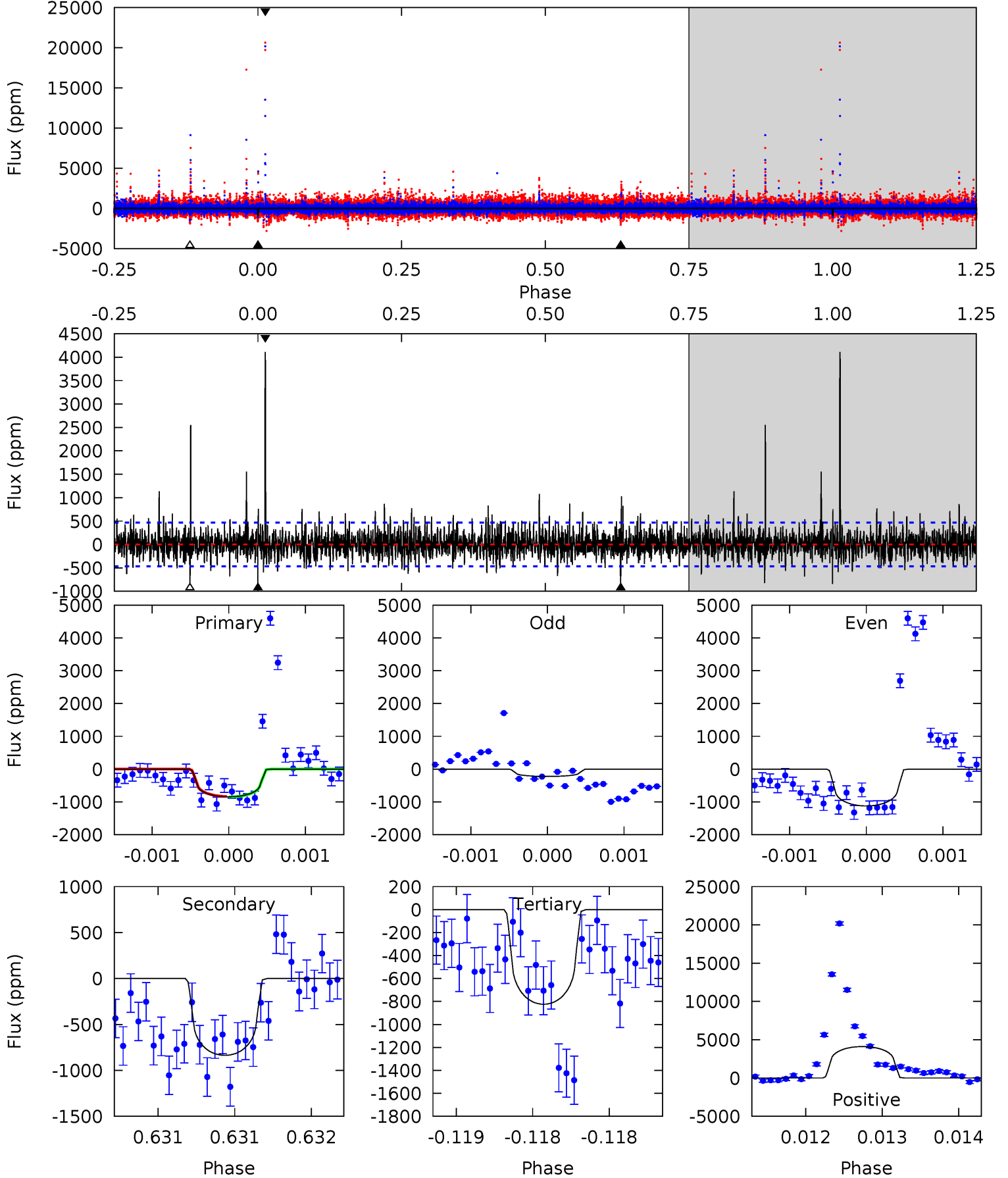
TCE 002860579-02     $P=437.577876$  Days     $T_0=392.518721$  (BKJD)



# DV Model-Shift Uniqueness Test

002860579-02, P = 437.580170 Days, E = 392.514028 Days

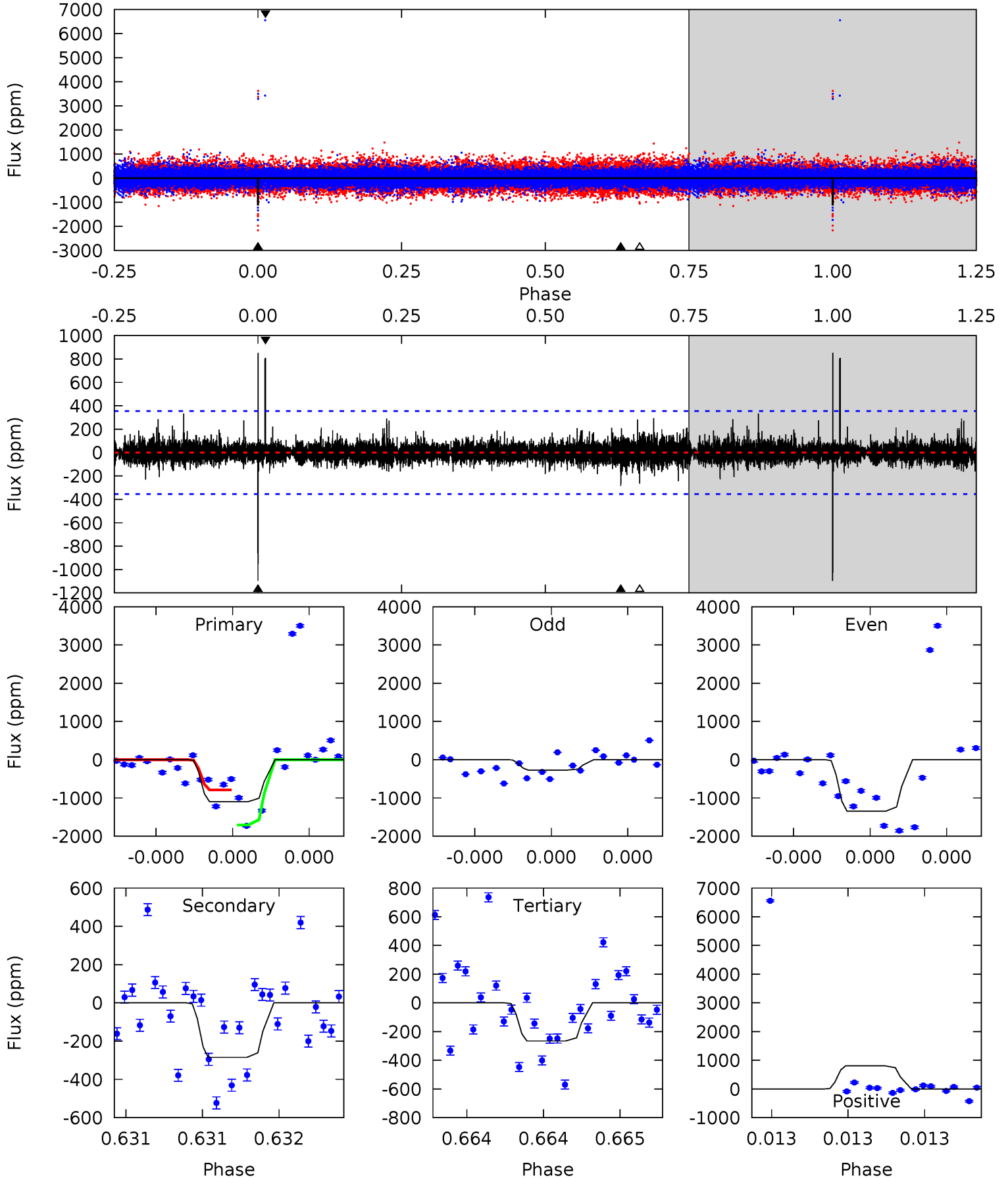
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.0	9.94	9.80	48.8	5.56	3.46	2.59	0.24	-38.8	0.15	-38.9	3.87	0.93	0.83	0.09



# Alt Model-Shift Uniqueness Test

002860579-02, P = 437.577876 Days, E = 392.518721 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
17.5	4.54	4.23	12.9	5.65	3.59	0.80	13.3	4.59	0.31	-8.36	8.73	0.97	0.44	7.56





### Stellar Parameters For KIC 002860579

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5345^{+160}_{-144}$	$4.533^{+0.093}_{-0.076}$	$-0.460^{+0.300}_{-0.300}$	$0.761^{+0.095}_{-0.095}$	$0.720^{+0.103}_{-0.041}$	$2.305^{+0.908}_{-0.603}$
	+3%/-3%	+2%/-2%	+65%/-65%	+12%/-12%	+14%/-6%	+39%/-26%
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 002860579-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-837 \pm 84$	$3.95^{+3.70}_{-2.77}$	$286^{+12}_{-12}$	$4361^{+3407}_{-888}$	$30169^{+318124}_{-21987}$
Alt.	$-285 \pm 63$	$4.22^{+3.36}_{-2.86}$	$285^{+12}_{-12}$	$3550^{+1852}_{-606}$	$9252^{+77271}_{-6576}$

$T_{\text{max}}$  = Theoretical Maximum Planetary Temperature

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

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

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

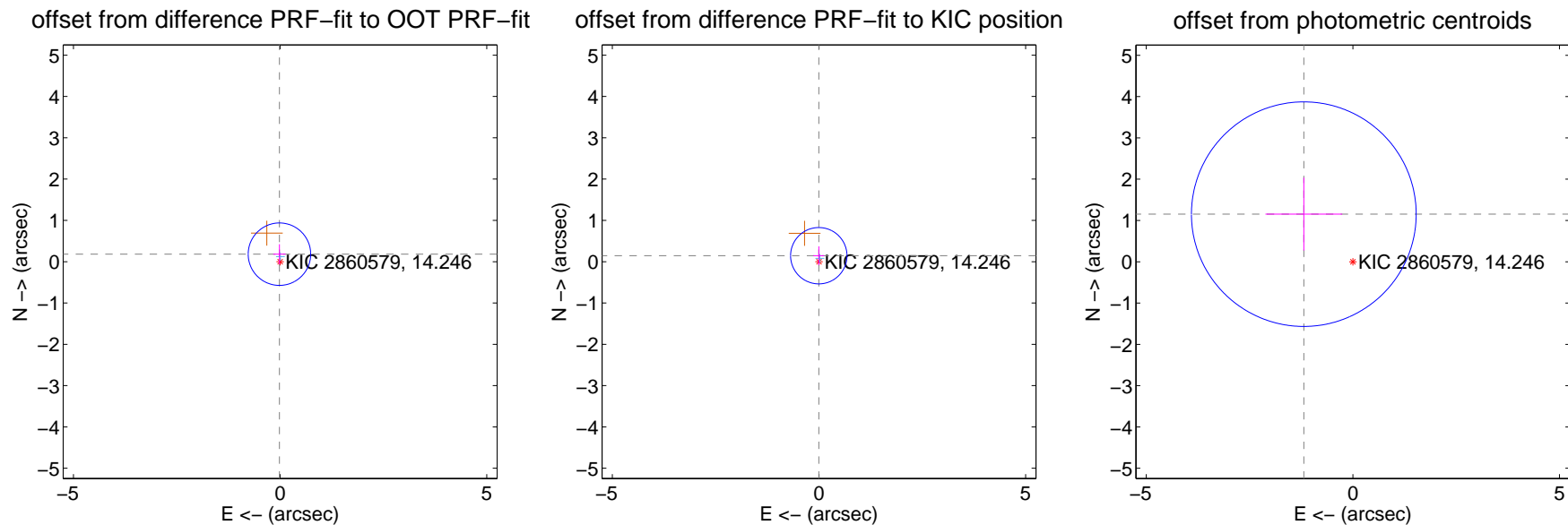
## DV Centroid Data

Supplemental centroid analysis for 002860579-02. Kepler magnitude: 14.25. Transit SNR 5.13

There are 1 quarters with good PRF difference image offsets

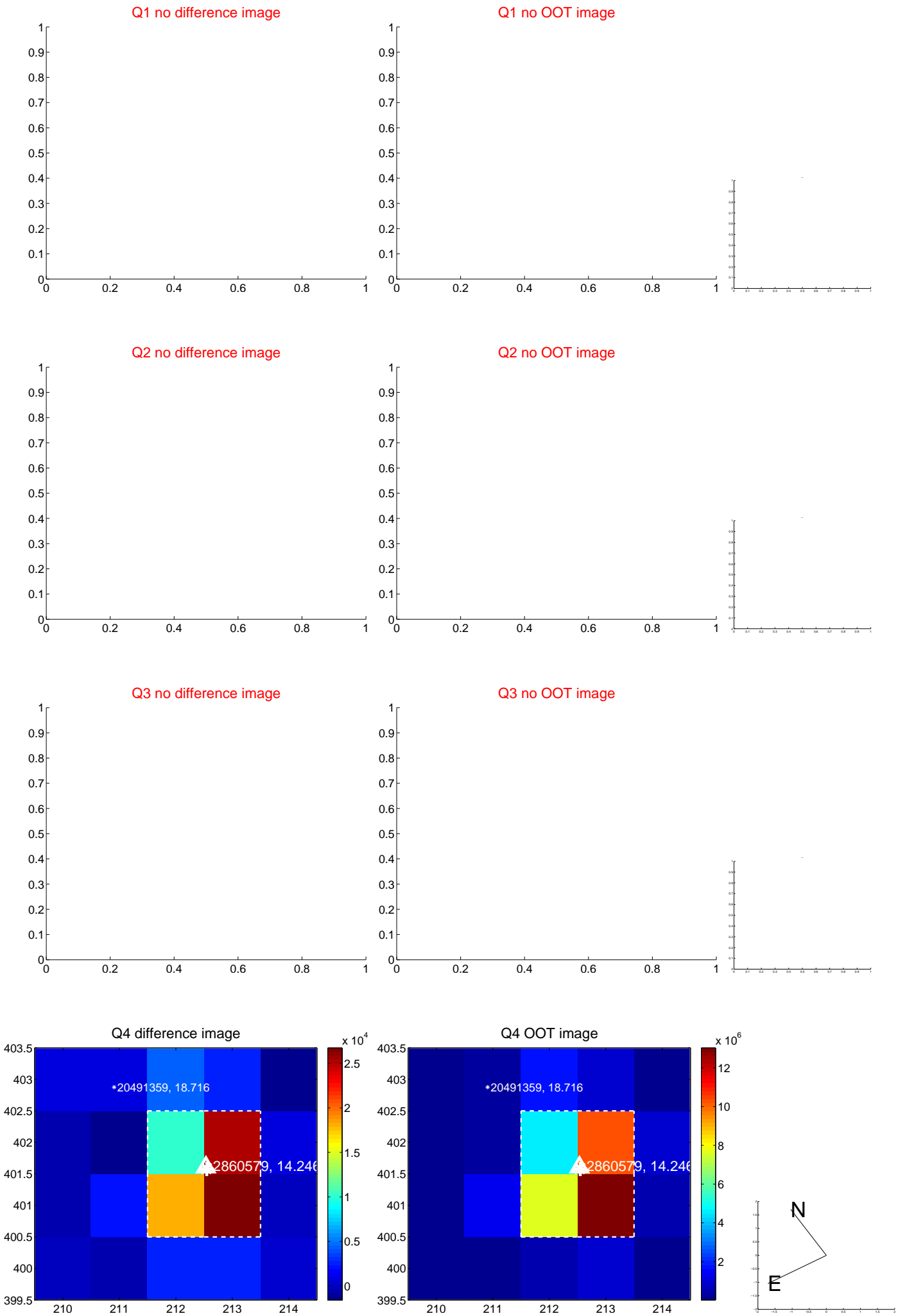
The direct PRF centroid is offset from the target star catalog position by about 0.03 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.183 \pm 0.252$	0.73	$0.016 \pm 0.150$	$0.182 \pm 0.242$
PRF-fit source offset from KIC position	$0.145 \pm 0.227$	0.64	$0.005 \pm 0.129$	$0.145 \pm 0.227$
photometric centroid source offset	$1.66 \pm 0.91$	1.83	$1.19 \pm 0.93$	$1.15 \pm 0.88$



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.

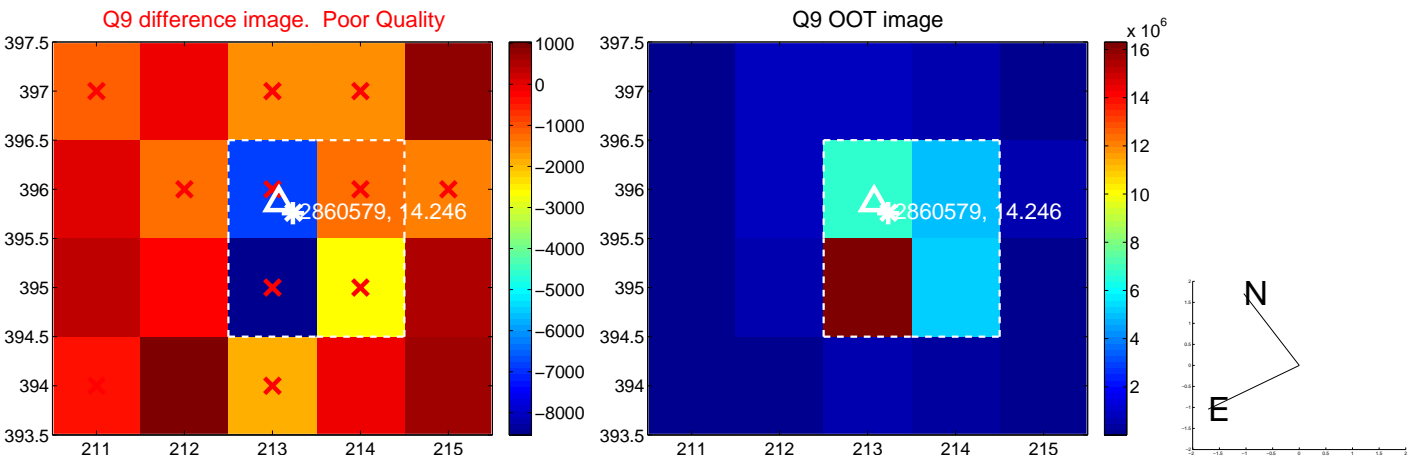
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



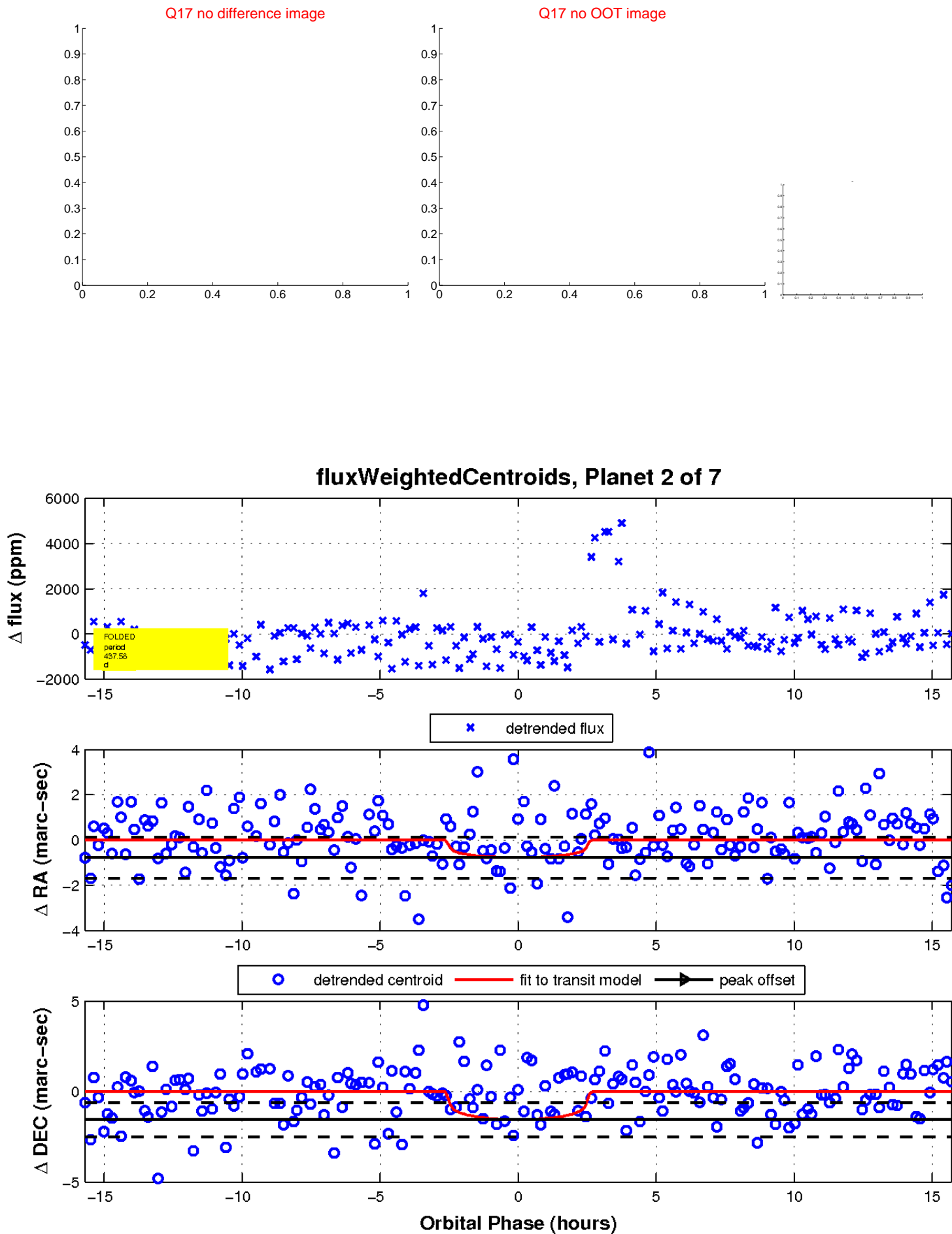
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

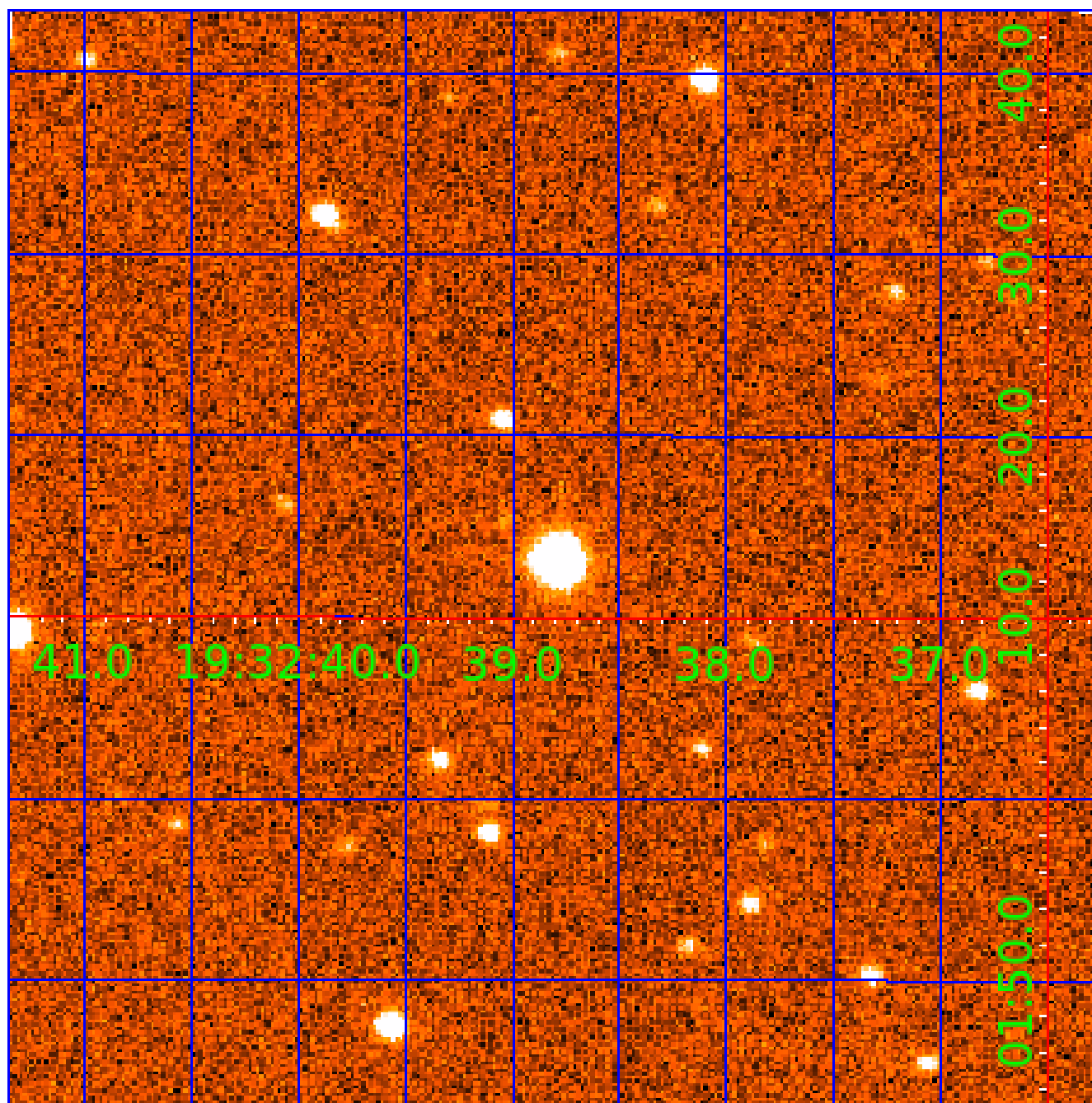


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



# UKIRT Image

Declination





# KIC 002860579

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
002860579-01	OBS	No	348.372609	377.647764	1407.7	7.003	17.5	8.3	0.76	5345	2.85	0.56
002860579-02	OBS	No	437.580170	392.514028	824.6	5.252	16.2	5.1	0.76	5345	2.24	0.41
002860579-03	OBS	No	336.155467	371.710079	848.3	7.410	13.9	5.8	0.76	5345	2.43	0.59
002860579-04	OBS	No	505.753509	555.376823	1396.4	6.438	13.0	9.3	0.76	5345	2.94	0.34
002860579-06	OBS	No	495.661329	558.308458	943.7	4.518	14.4	6.7	0.76	5345	2.45	0.35
002860579-07	OBS	No	711.217301	149.175806	1045.3	6.000	11.8	-1.0	0.76	5345	2.42	0.22

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002860579-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_MEAS
002860579-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
002860579-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
002860579-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—CENT_FEW_DIFFS
002860579-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
002860579-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_NOFITS

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

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

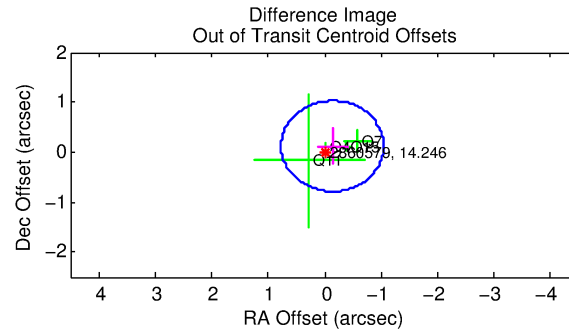
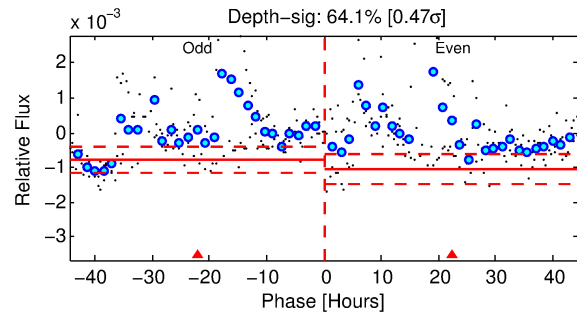
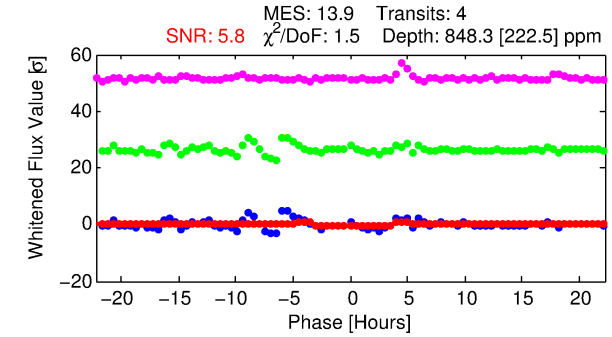
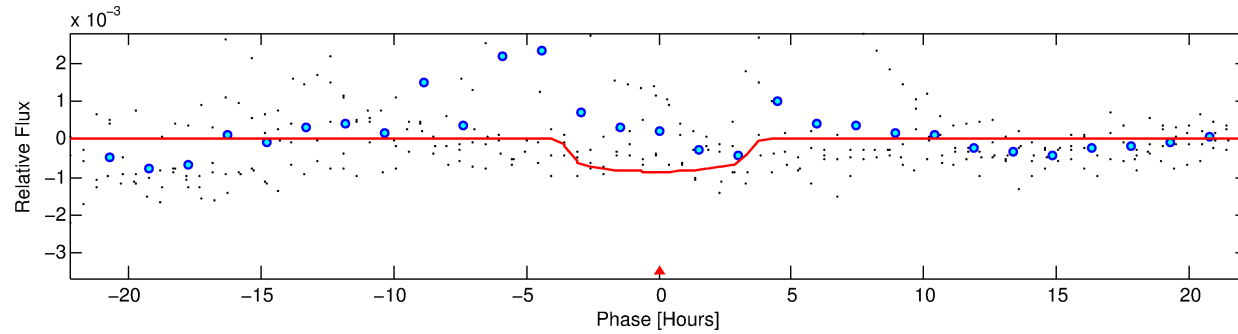
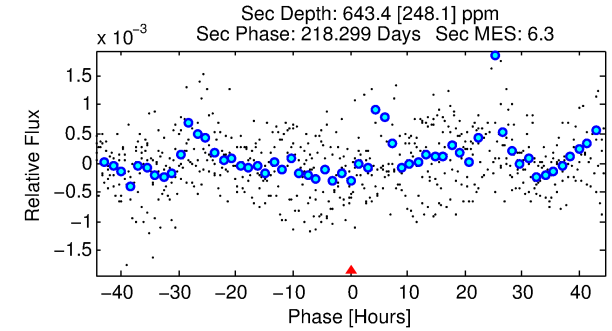
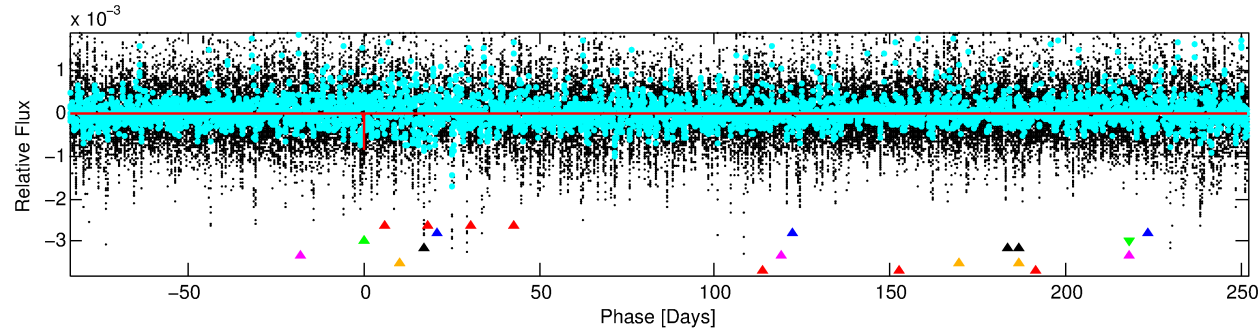
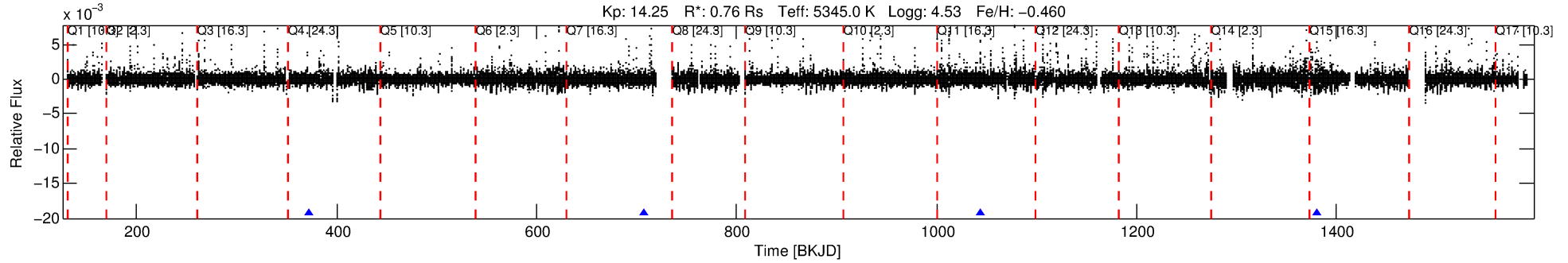
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 002860579-03

No Significant Match Found

# DV One-Page Summary

KIC: 2860579 Candidate: 3 of 7 Period: 336.155 d



## DV Fit Results:

Period = 336.15547 [0.00838] d  
Epoch = 371.7101 [0.0138] BKJD  
Rp/R\* = 0.0292 [0.0124]  
a/R\* = 237.84 [367.43]  
b = 0.77 [0.84]  
Seff = 0.59 [0.12]  
Teq = 223 [11] K  
Rp = 2.43 [1.07] Re  
a = 0.8485 [0.0930] AU  
Ag = 43298.61 [40904.94] [1.06 $\sigma$ ]  
Teffp = 4981 [1168] K [4.07 $\sigma$ ]

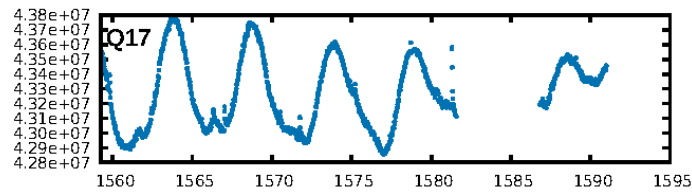
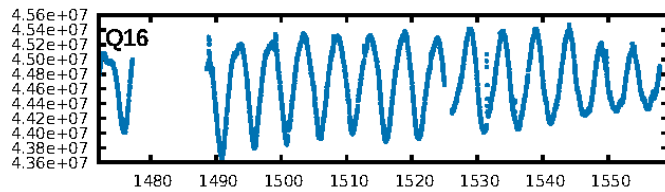
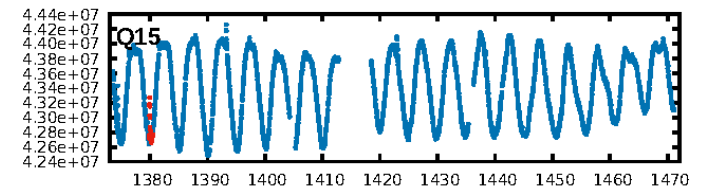
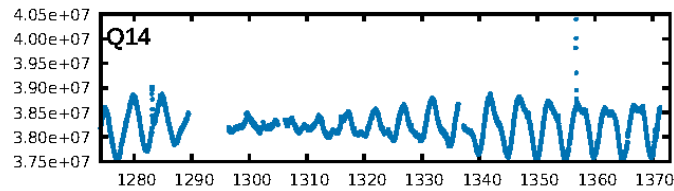
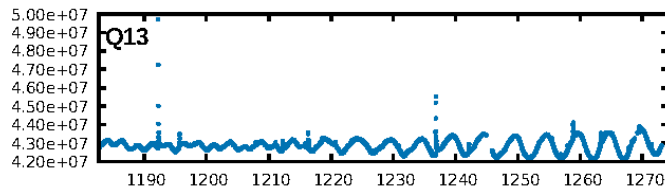
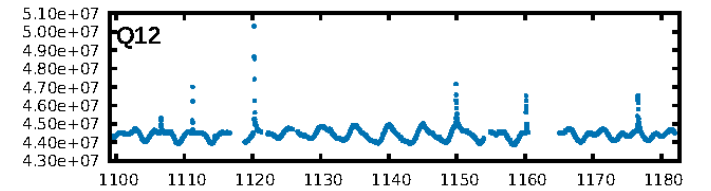
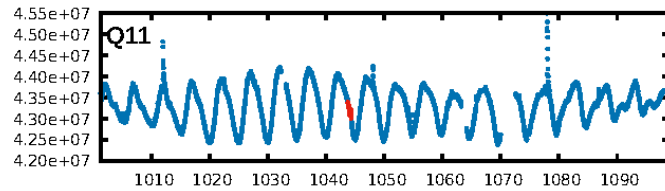
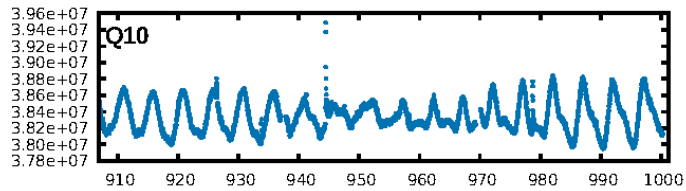
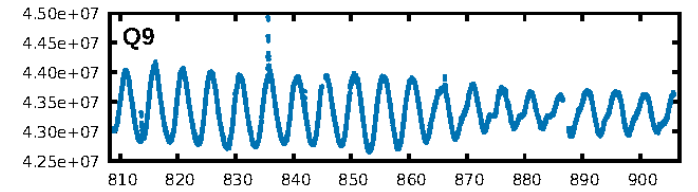
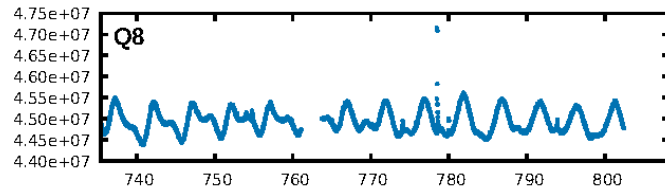
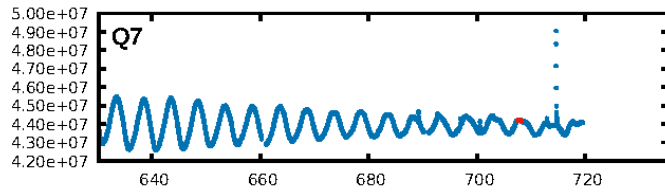
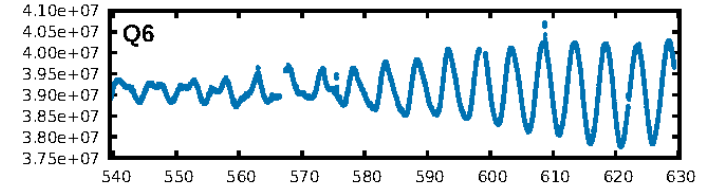
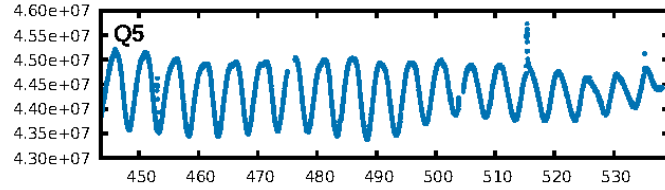
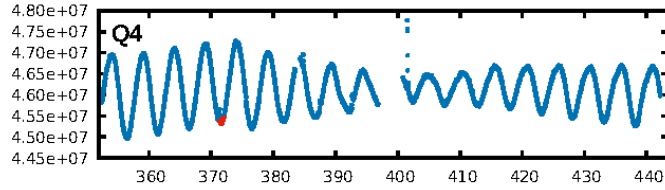
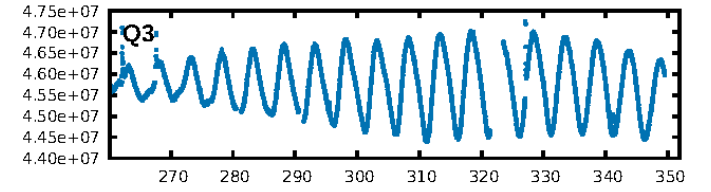
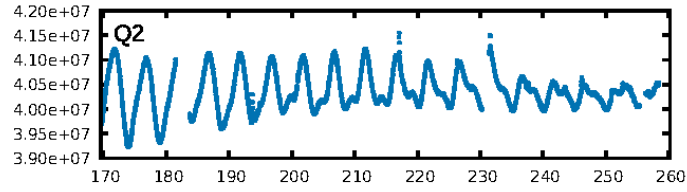
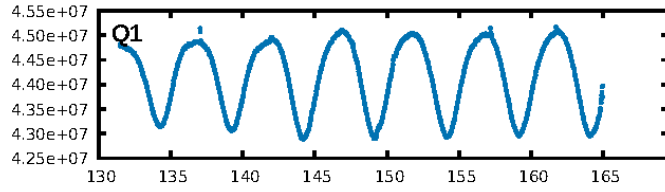
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [28.76 $\sigma$ ]  
ModelChiSquare2-sig: 8.2%  
ModelChiSquareGof-sig: 72.1%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: 1.041  
Centroid-sig: 3.6%  
Centroid-so: 1.030 arcsec [1.02 $\sigma$ ]  
OotOffset-rm: 0.182 arcsec [0.60 $\sigma$ ]  
OotOffset-st: 0/3/1/0 [4]  
KicOffset-rm: 0.158 arcsec [0.50 $\sigma$ ]  
KicOffset-st: 0/3/1/0 [4]  
DiffImageQuality-fgm: 0.50 [2/4]  
DiffImageOverlap-fno: 1.00 [4/4]

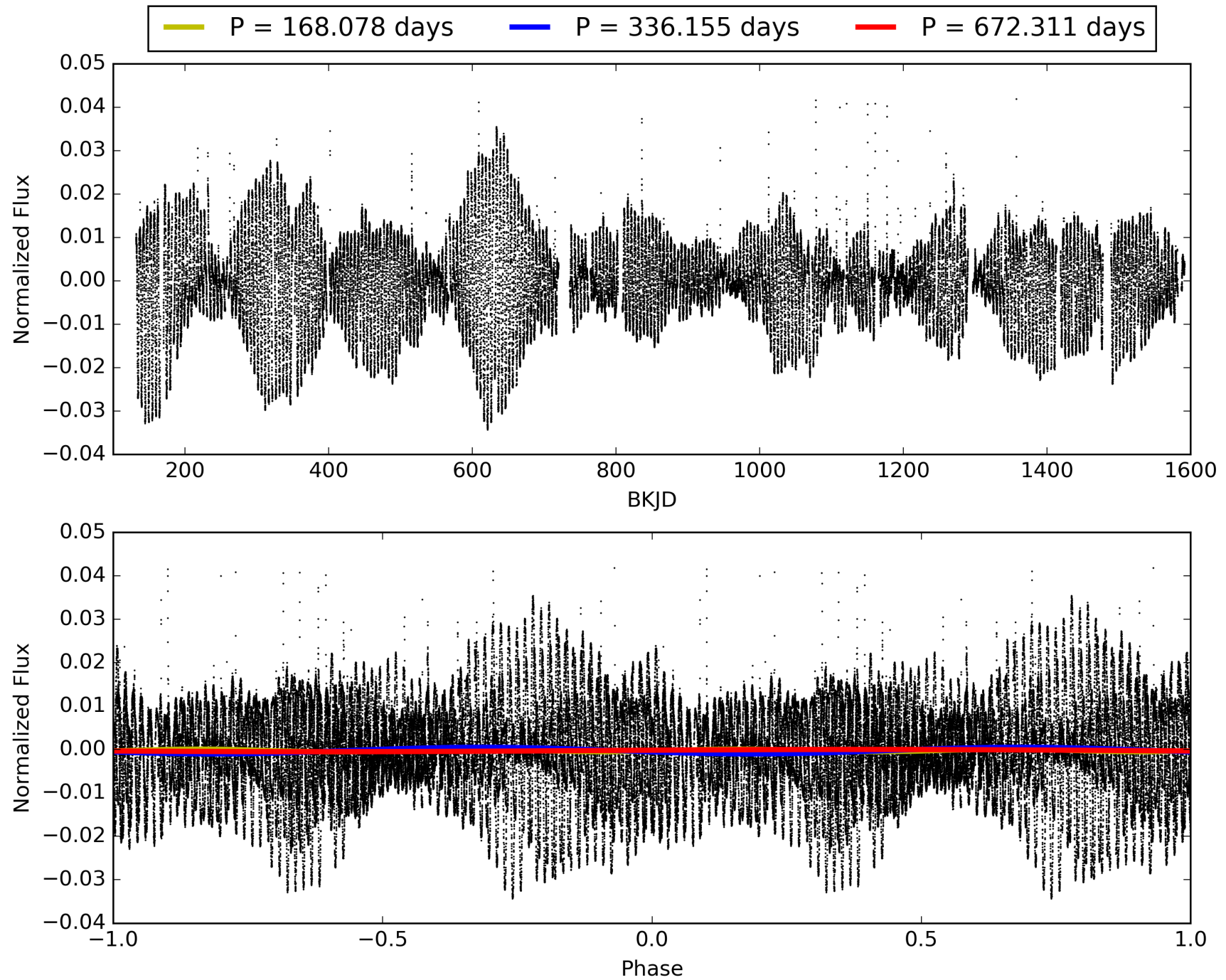
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 05:58:01 Z

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

# TCE 002860579-03, PDC Light Curves

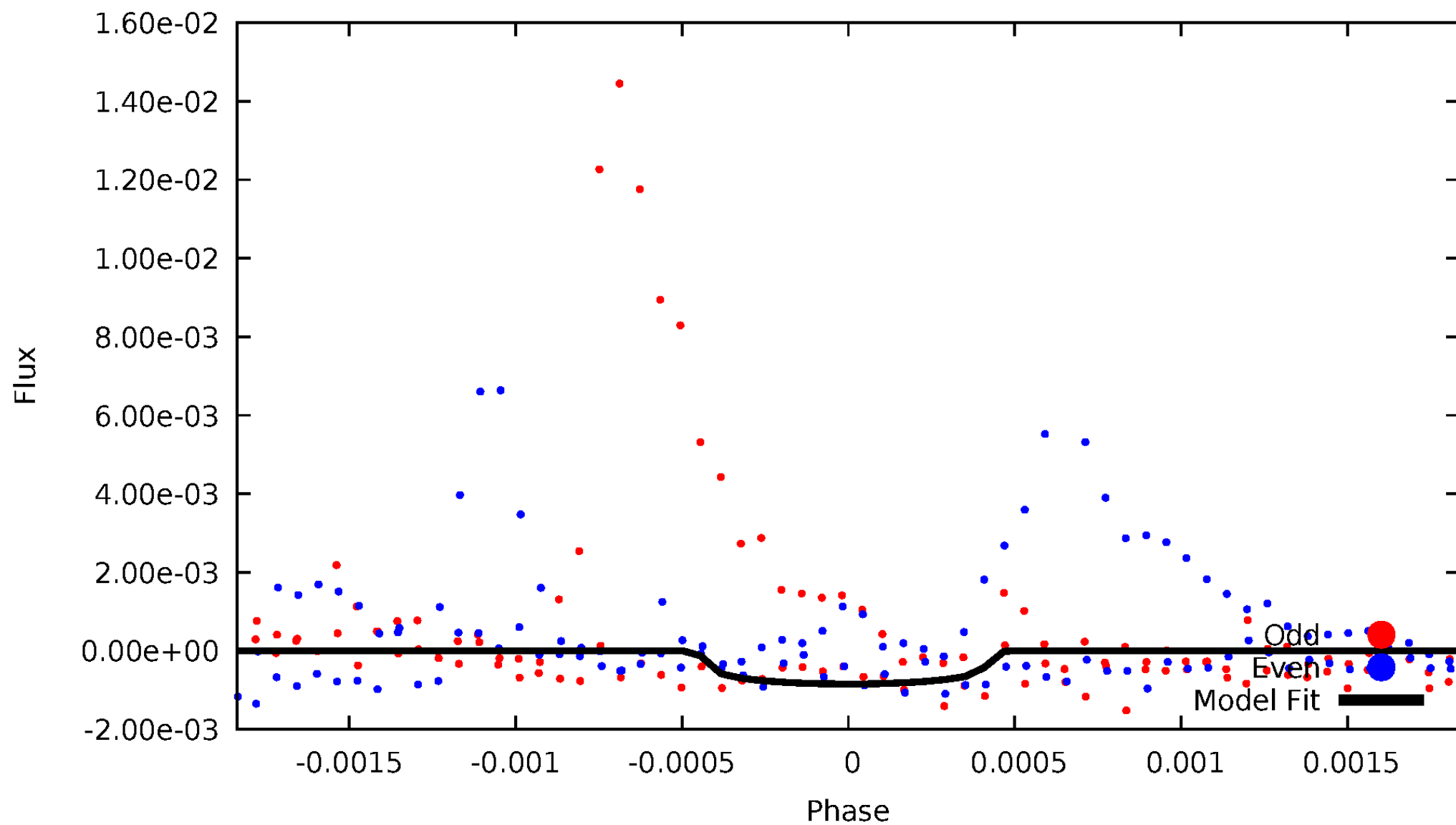


TCE 002860579-03



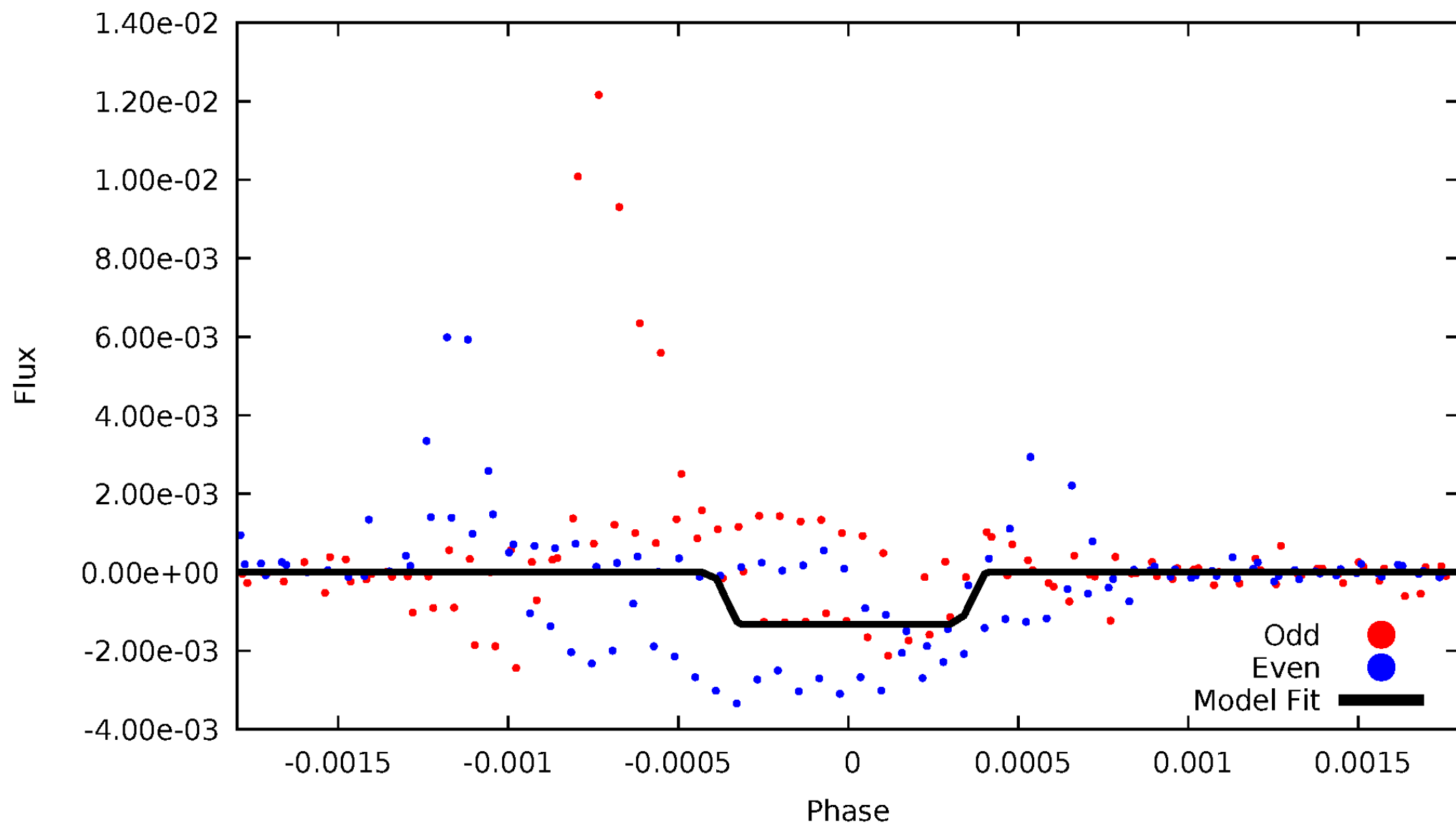
# DV Odd/Even

TCE 002860579-03



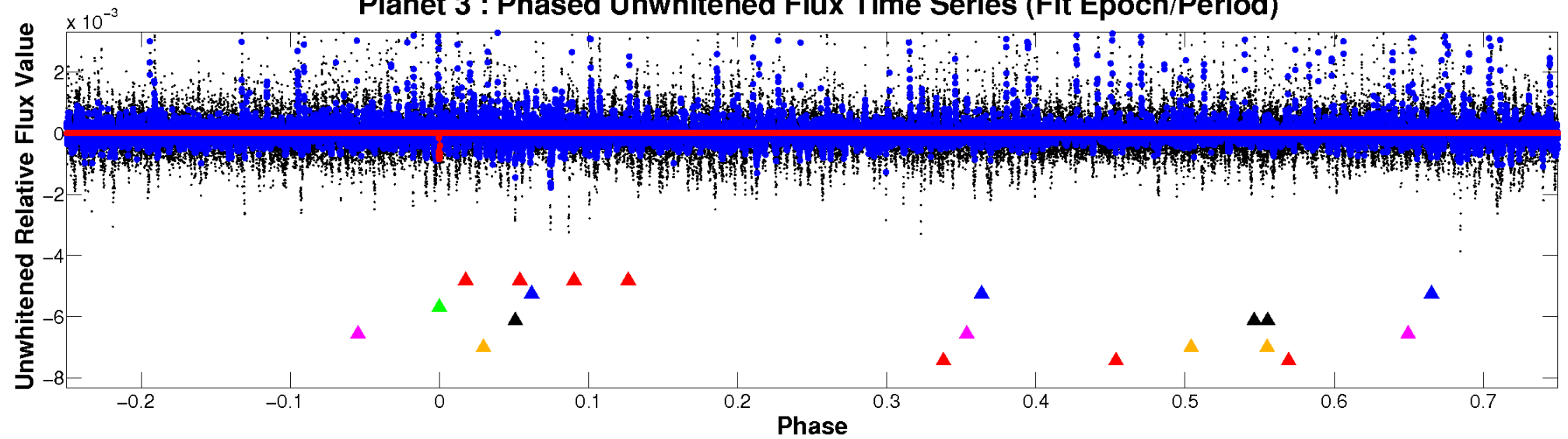
# ALT Odd/Even

TCE 002860579-03

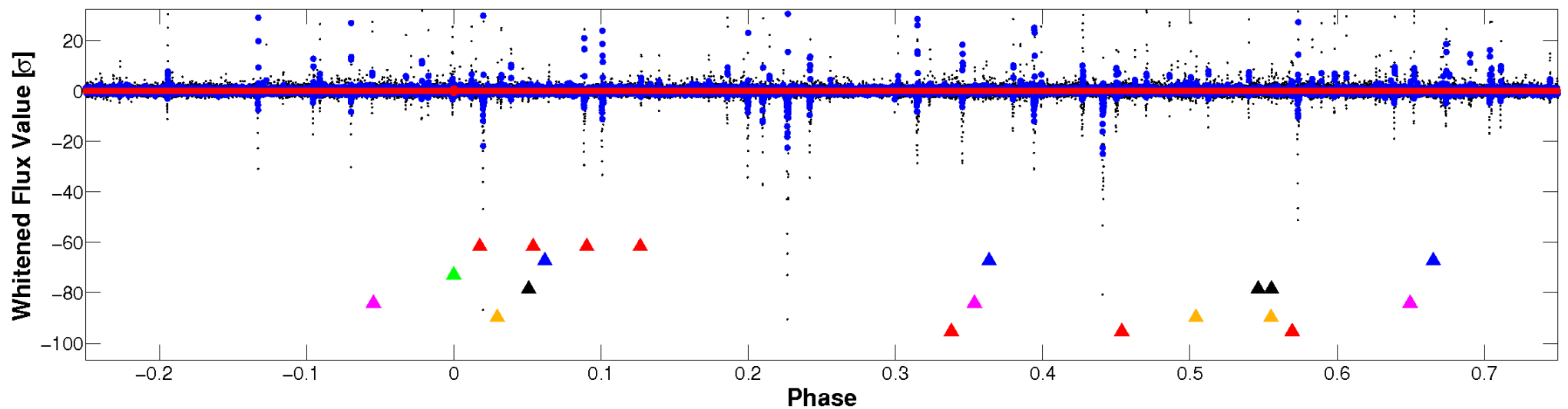


# Non-Whitened Vs. Whitened Light Curve

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

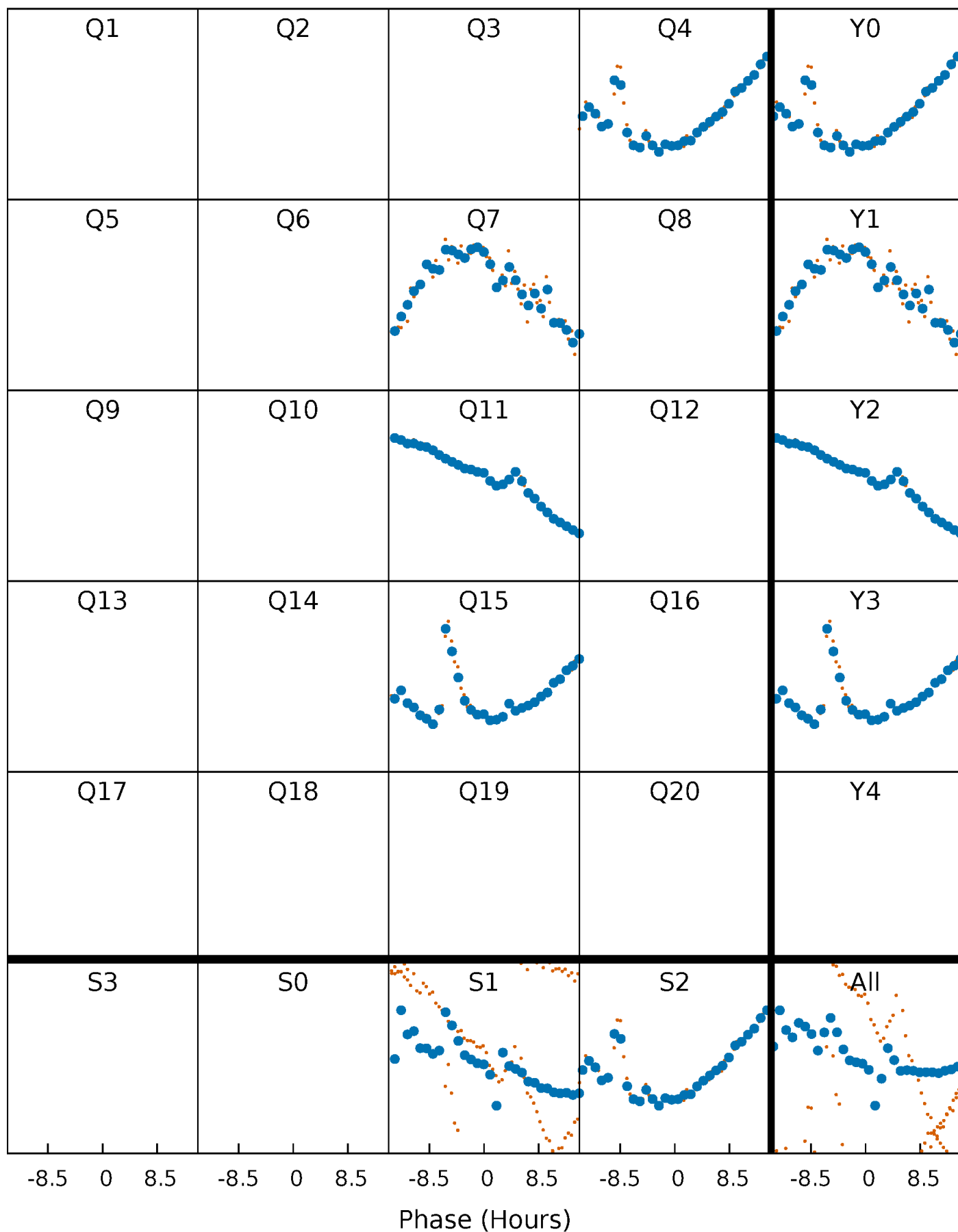


## Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

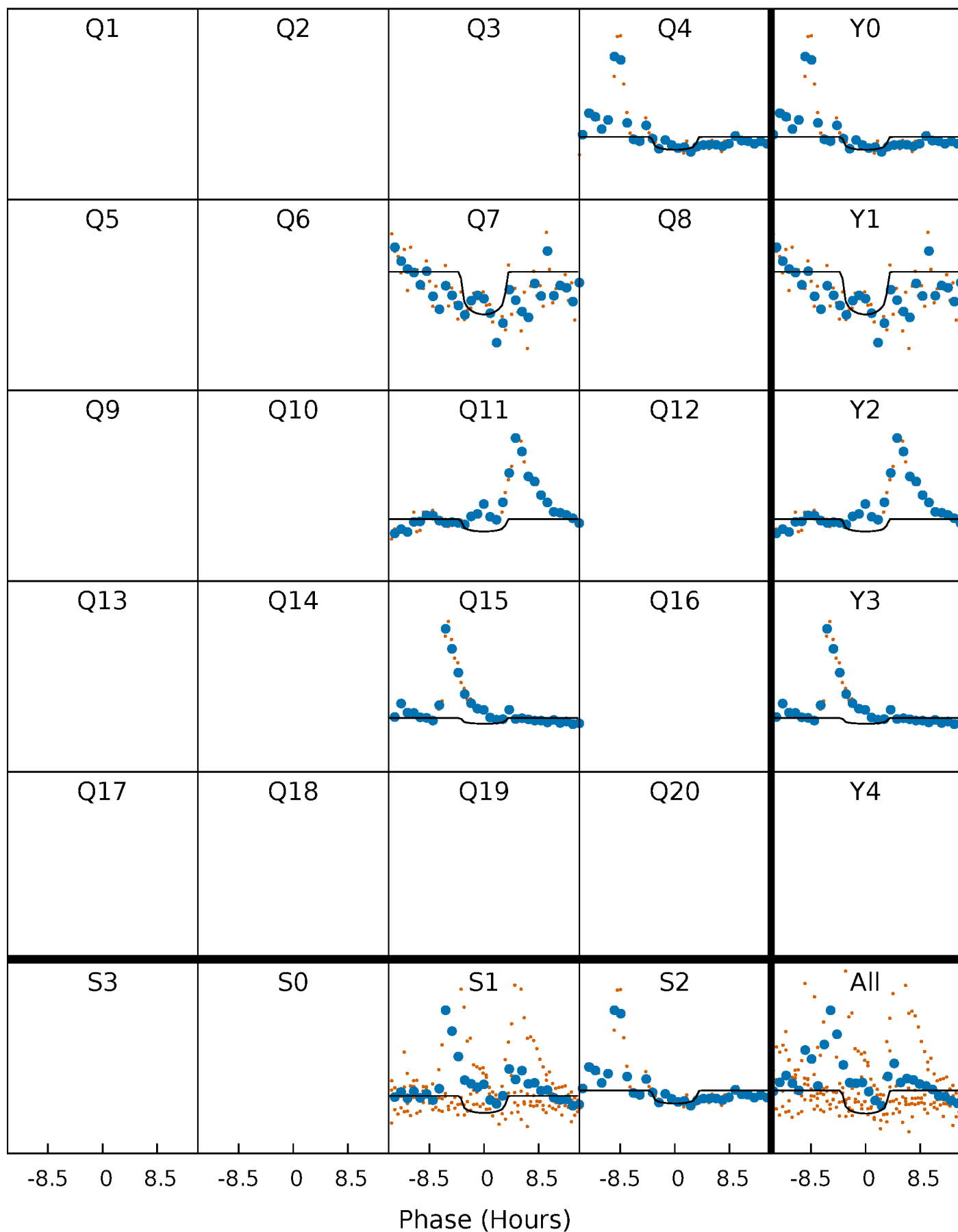
TCE 002860579-03     $P=336.155467$  Days     $T_0=371.710079$  (BKJD)





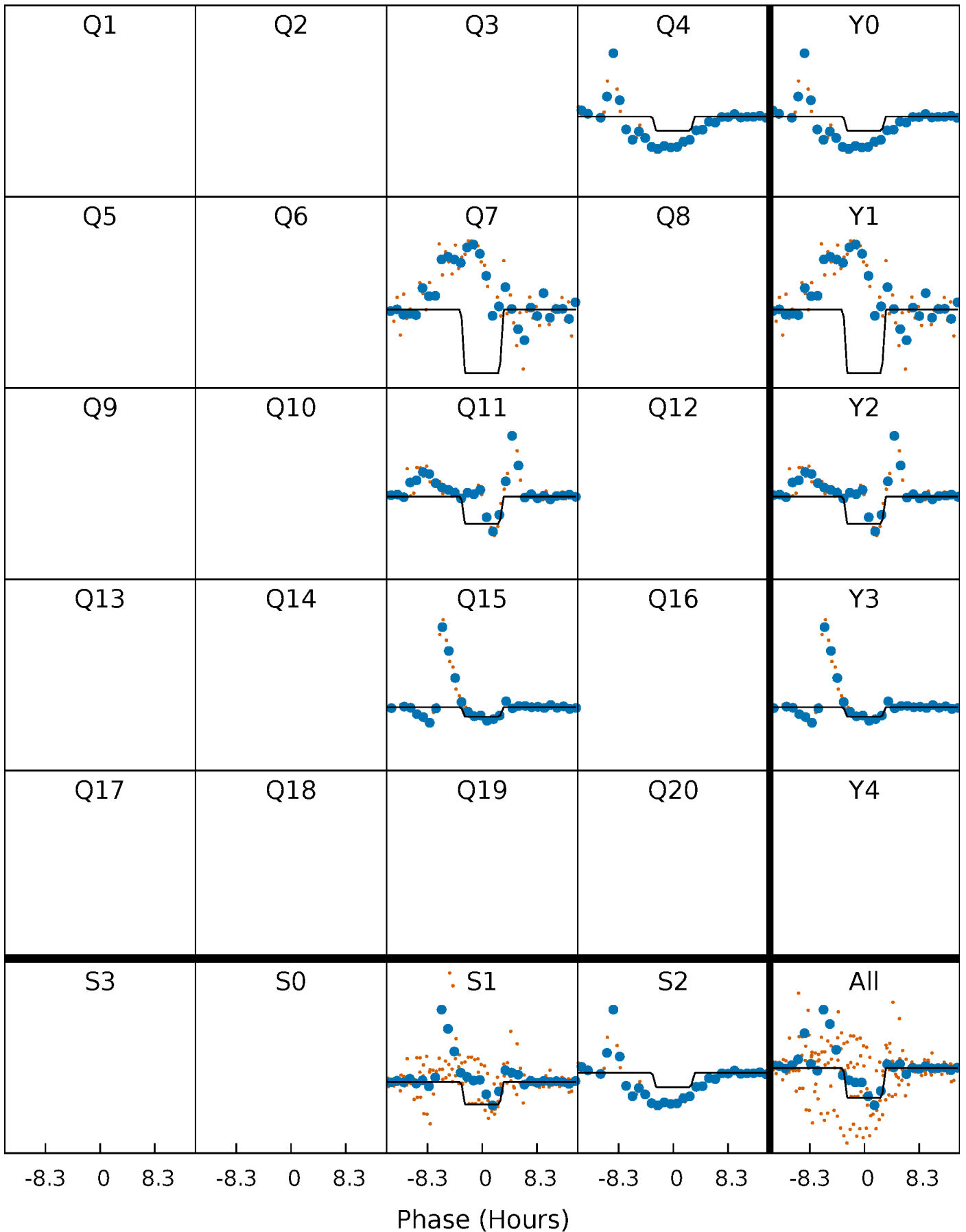
# DV Quarter-Phased Transit Curves

TCE 002860579-03     $P=336.155467$  Days     $T_0=371.710079$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

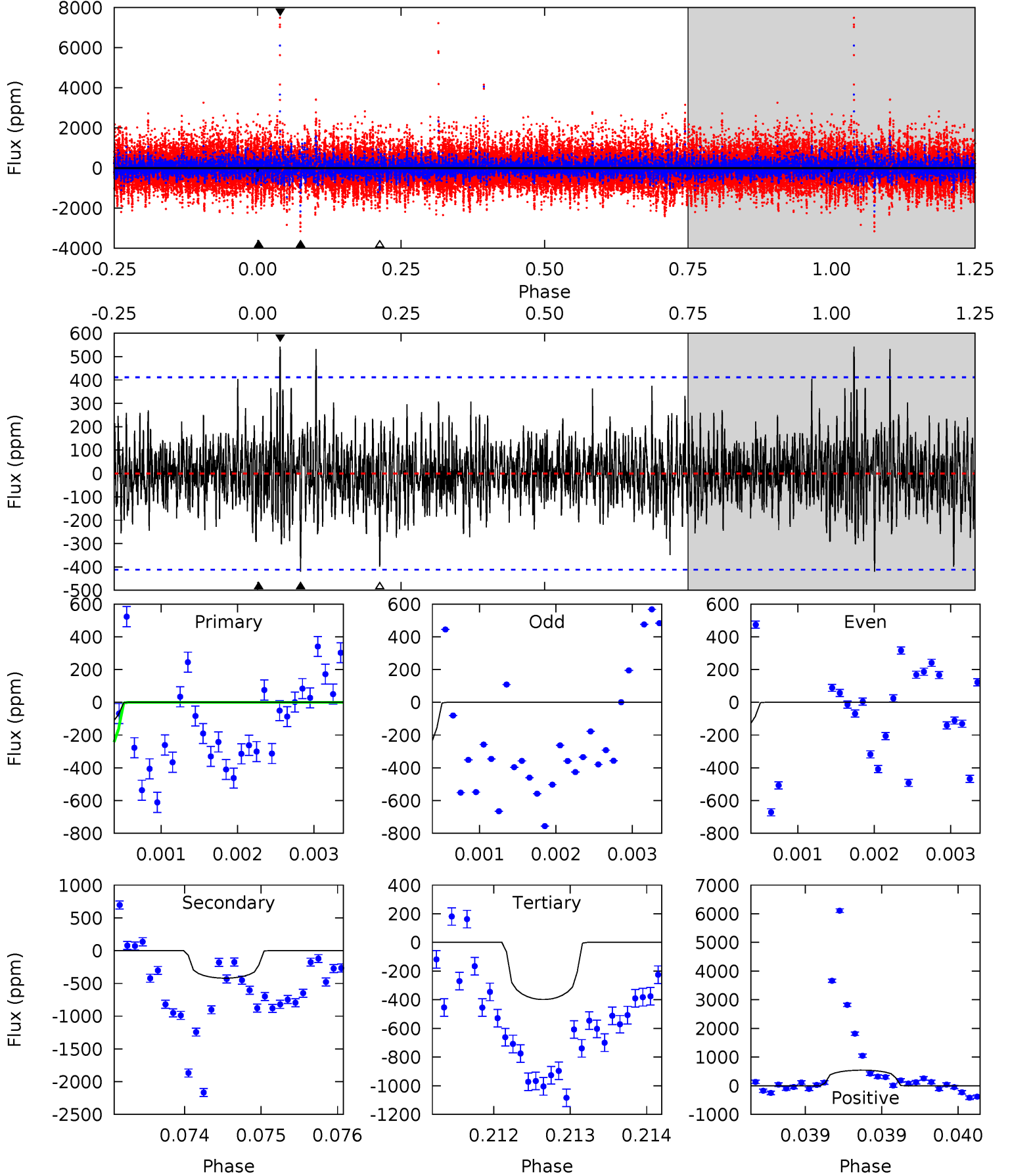
TCE 002860579-03     $P=336.152495$  Days     $T_0=371.734649$  (BKJD)



# DV Model-Shift Uniqueness Test

002860579-03, P = 336.155467 Days, E = 35.554612 Days

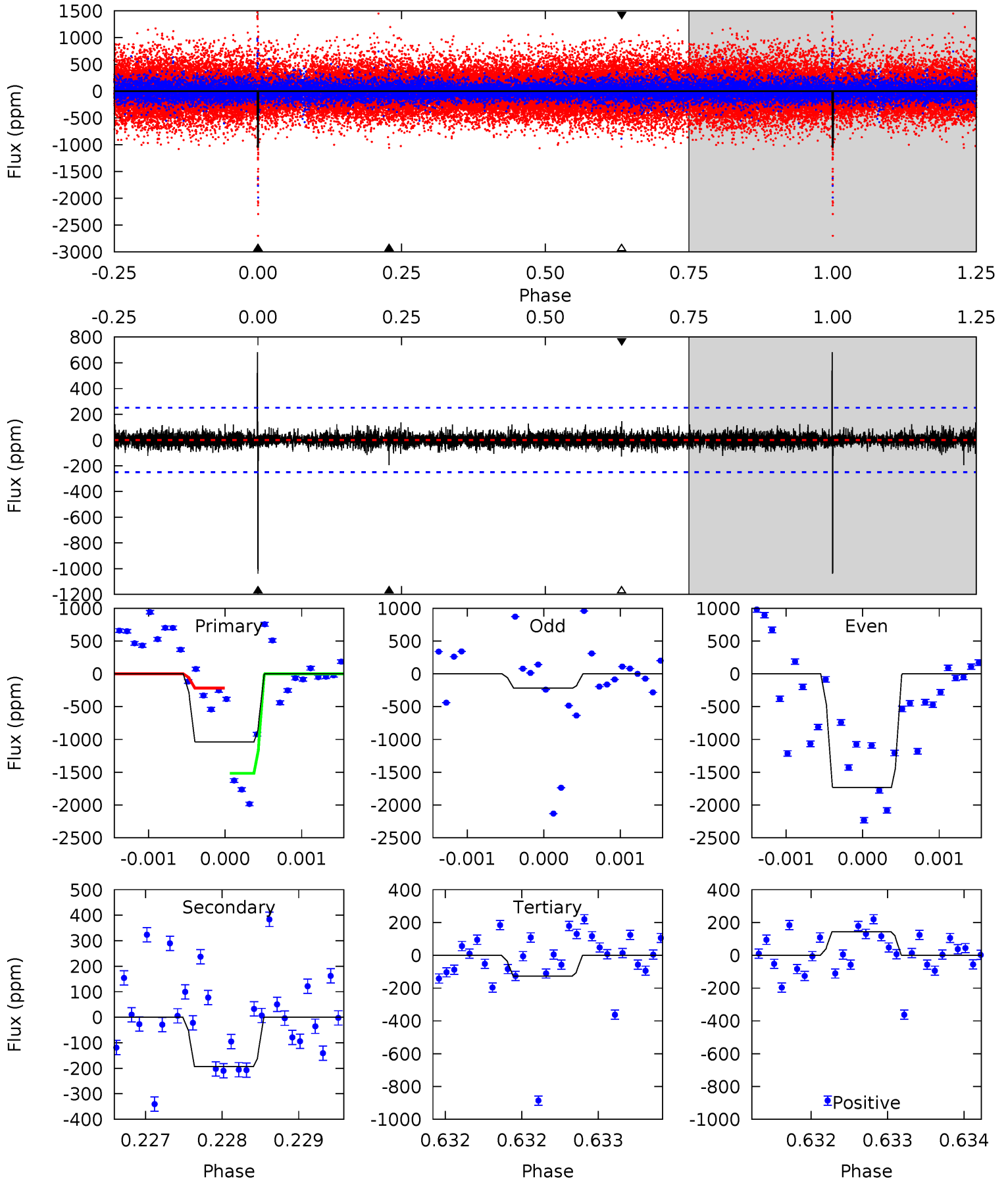
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
1.90	5.58	5.29	7.20	5.47	3.31	1.38	-3.39	-5.30	0.29	-1.62	0.68	-0.31	0.56	1.97



# Alt Model-Shift Uniqueness Test

002860579-03, P = 336.152495 Days, E = 35.582154 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
22.8	4.25	2.79	3.16	5.49	3.35	0.68	20.0	19.6	1.46	1.09	19.8	1.02	0.40	14.0



### Stellar Parameters For KIC 002860579

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5345^{+160}_{-144}$	$4.533^{+0.093}_{-0.076}$	$-0.460^{+0.300}_{-0.300}$	$0.761^{+0.095}_{-0.095}$	$0.720^{+0.103}_{-0.041}$	$2.305^{+0.908}_{-0.603}$
	+3%/-3%	+2%/-2%	+65%/-65%	+12%/-12%	+14%/-6%	+39%/-26%
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 002860579-03 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-421 \pm 75$	$2.41^{+1.04}_{-0.99}$	$311^{+14}_{-13}$	$4606^{+1224}_{-600}$	$28925^{+58426}_{-15153}$
Alt.	$-194 \pm 46$	$3.08^{+1.03}_{-1.06}$	$313^{+13}_{-13}$	$3684^{+624}_{-347}$	$8132^{+11477}_{-3676}$

$T_{max}$  = 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

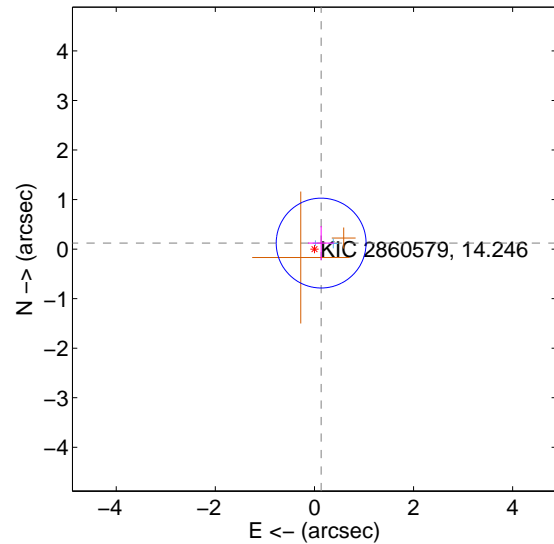
Supplemental centroid analysis for 002860579-03. Kepler magnitude: 14.25. Transit SNR 5.77

There are 2 quarters with good PRF difference image offsets

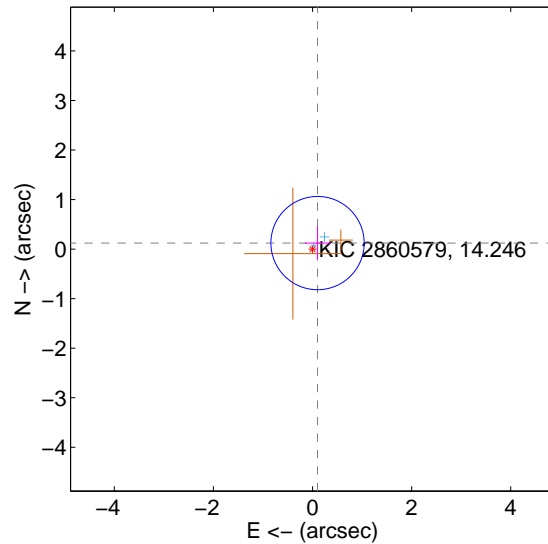
The direct PRF centroid is offset from the target star catalog position by about 0.19 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.182 \pm 0.302$	0.60	$-0.135 \pm 0.263$	$0.122 \pm 0.345$
PRF-fit source offset from KIC position	$0.158 \pm 0.314$	0.50	$-0.101 \pm 0.263$	$0.121 \pm 0.345$
photometric centroid source offset	$1.03 \pm 1.01$	1.02	$0.82 \pm 0.98$	$0.63 \pm 1.07$

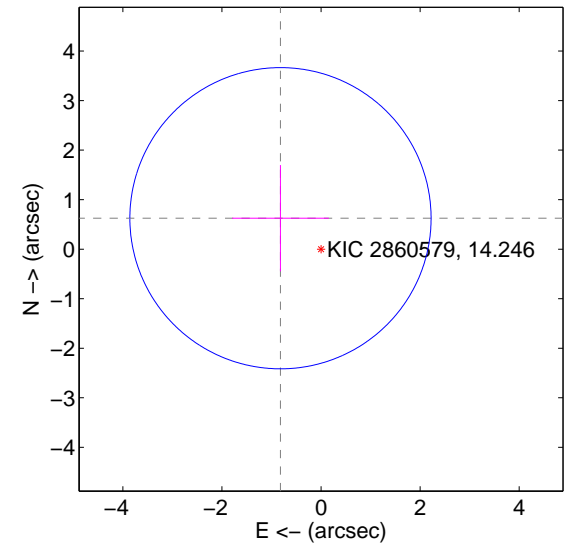
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

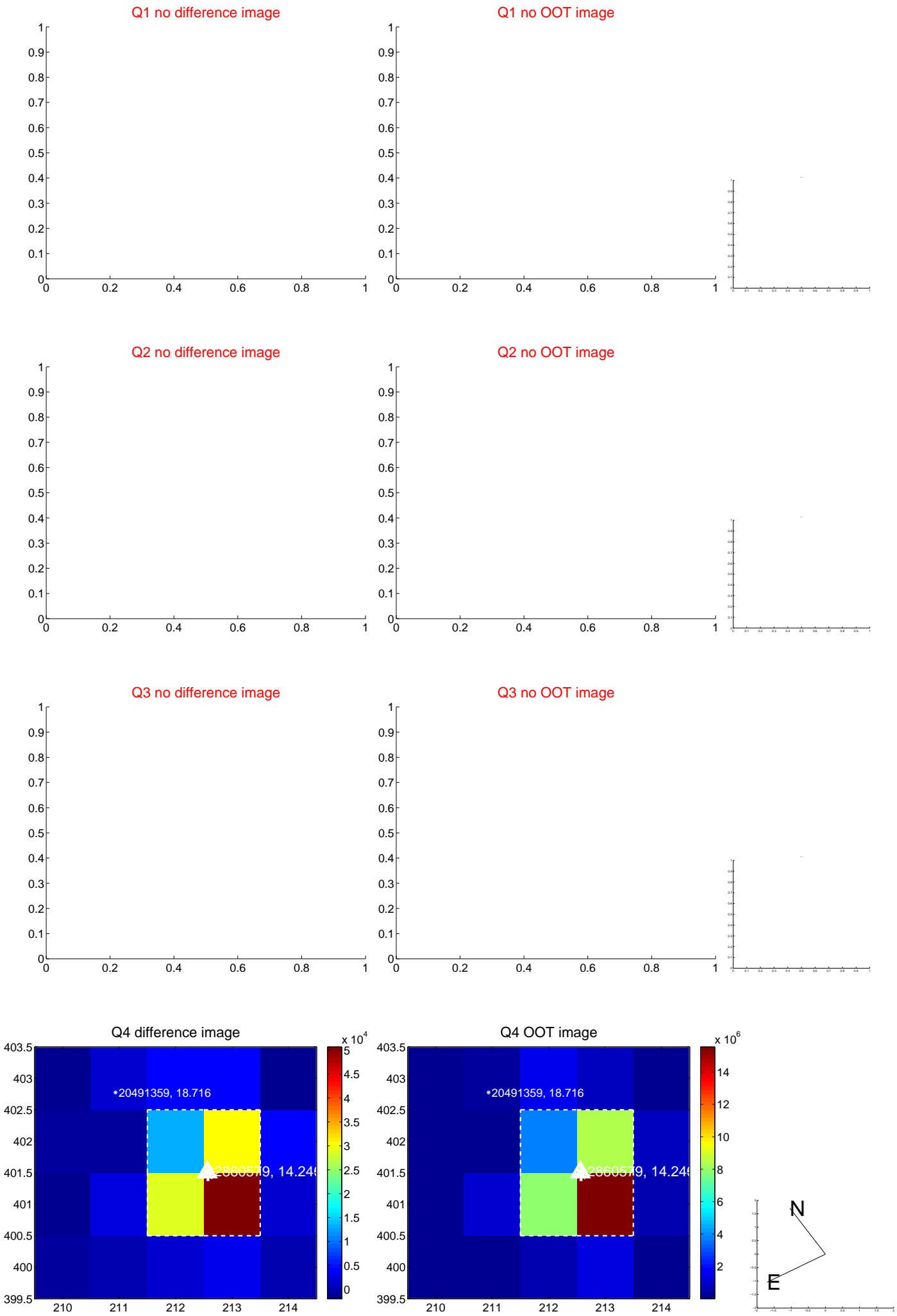


offset from photometric centroids

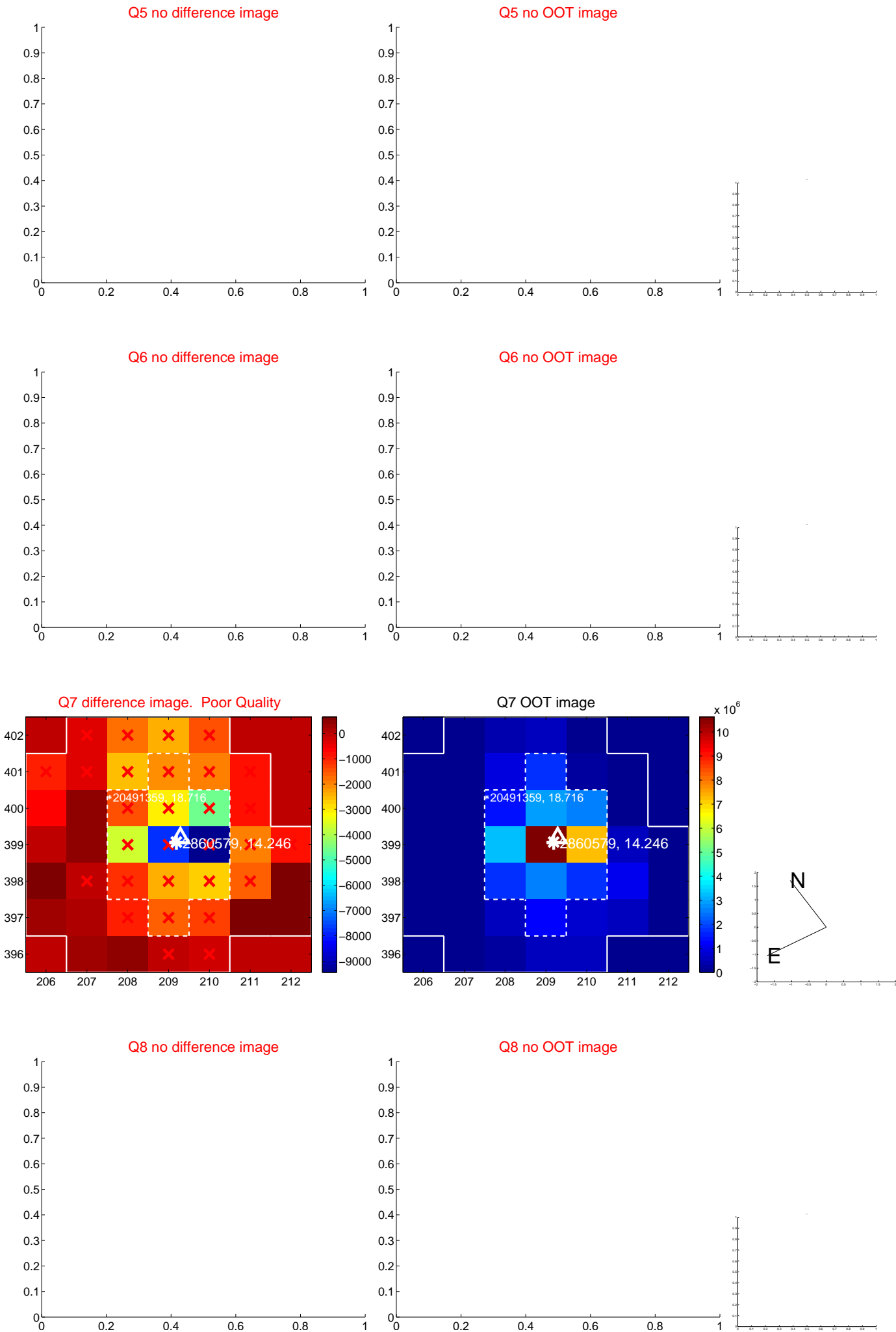


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

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

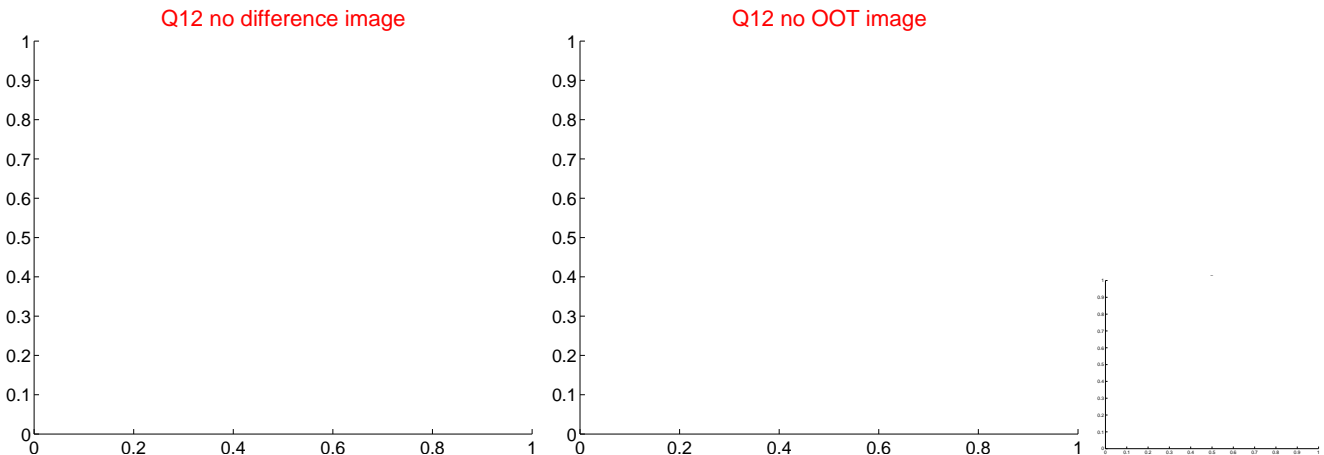
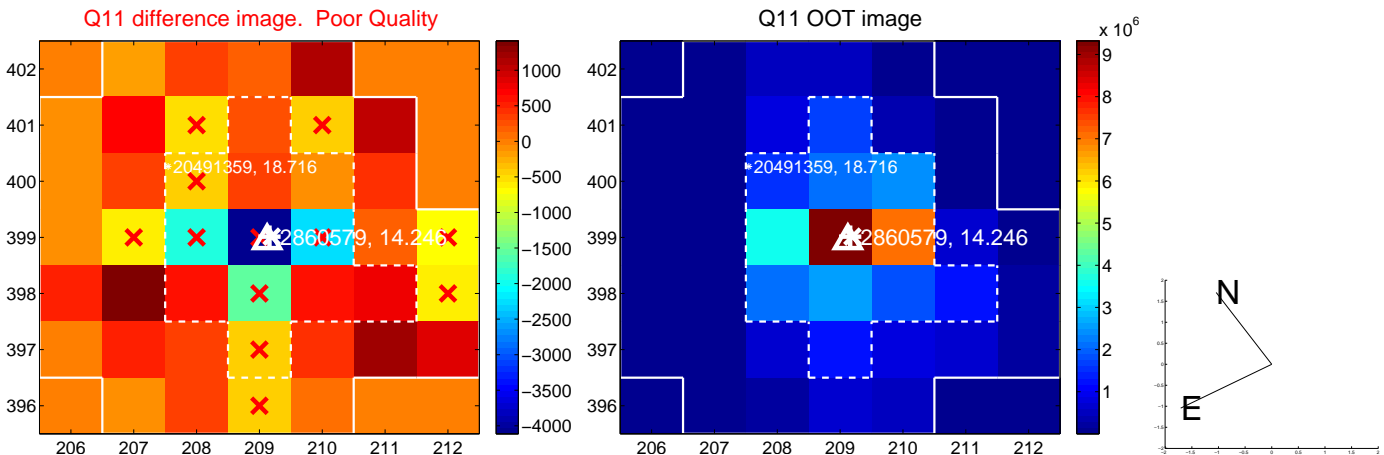
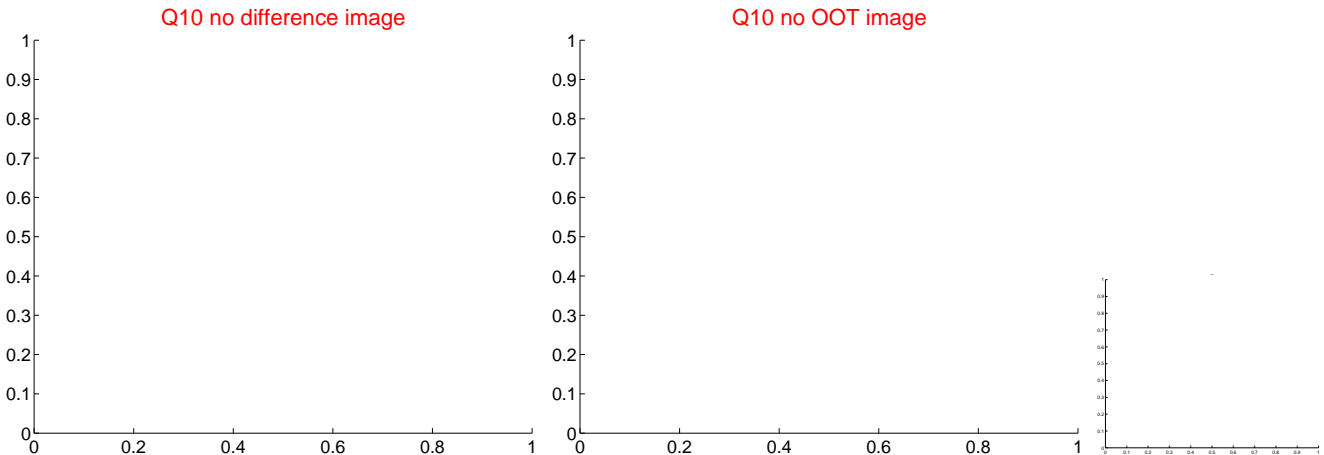
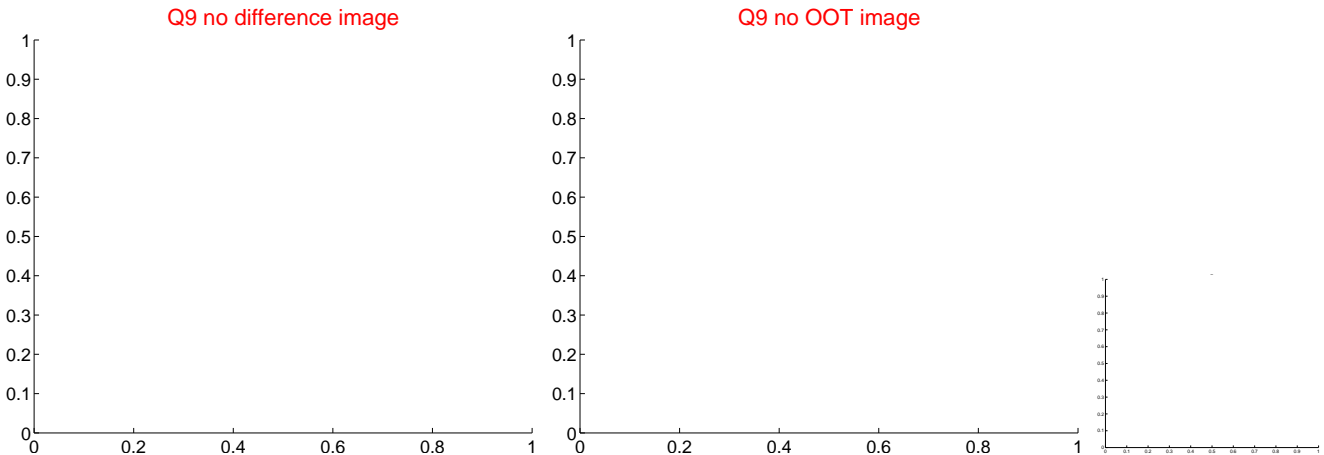


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

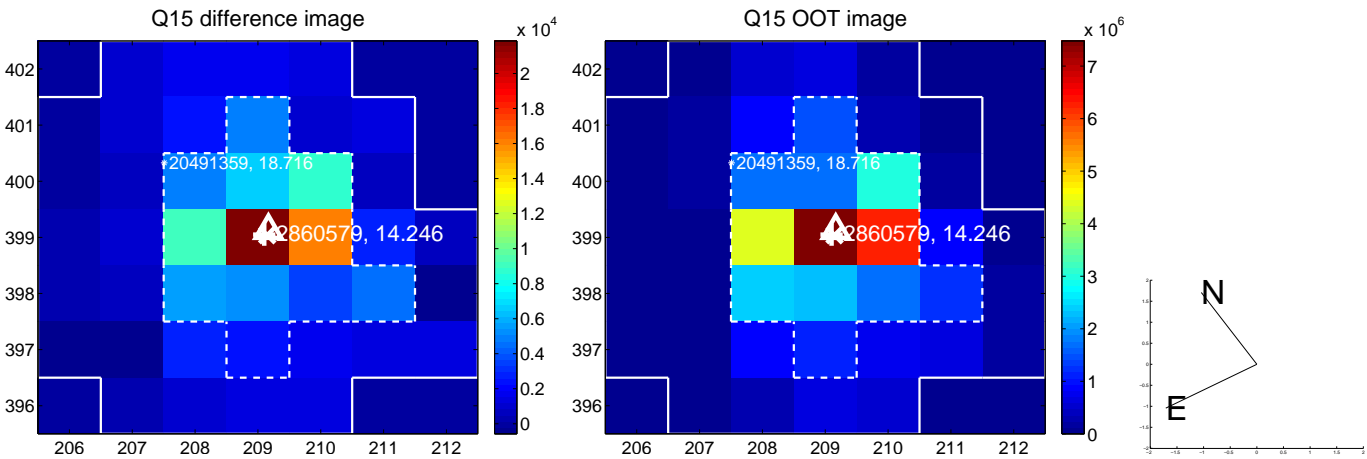




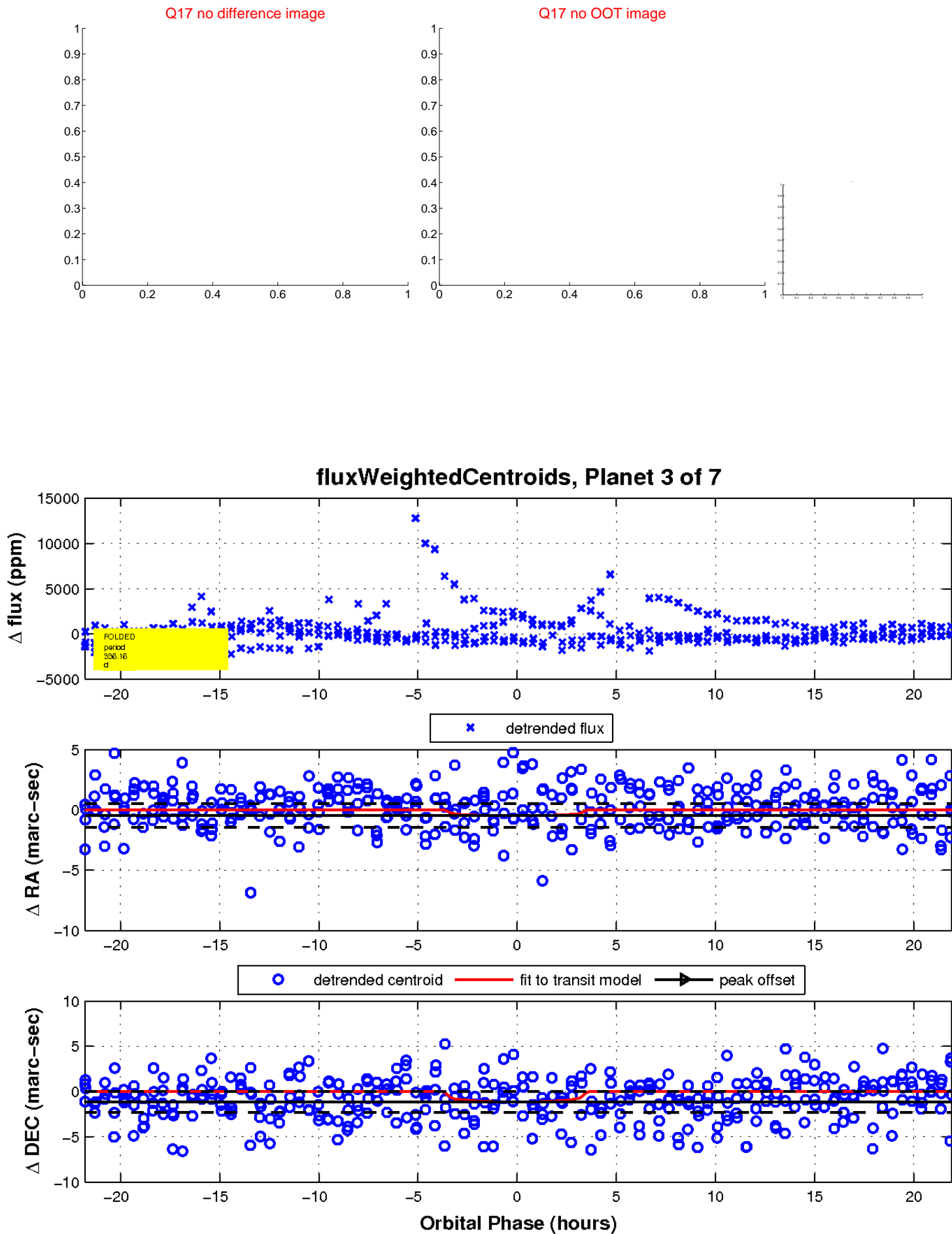
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value



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

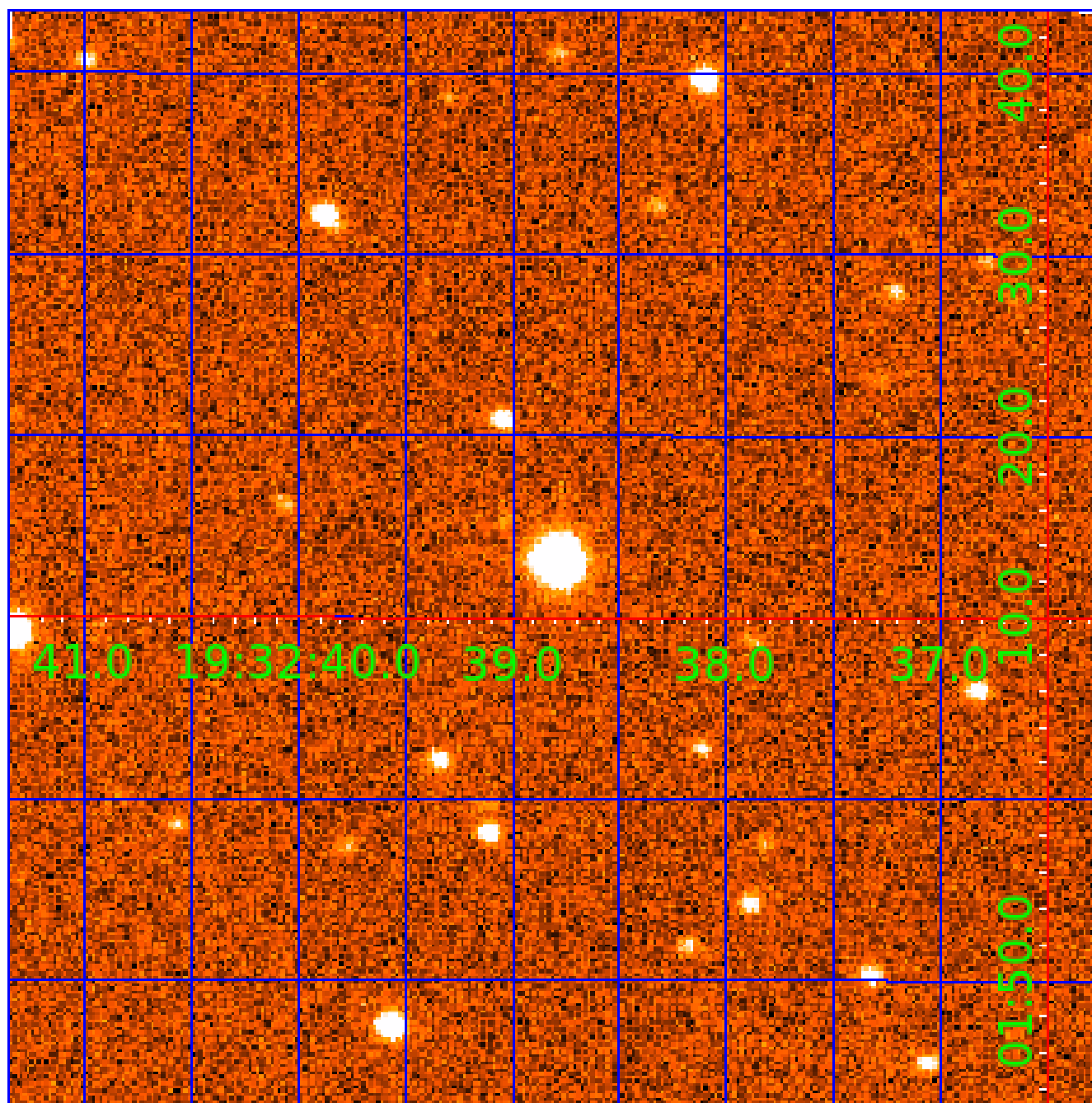


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



# UKIRT Image

Declination



# KIC 002860579

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
002860579-01	OBS	No	348.372609	377.647764	1407.7	7.003	17.5	8.3	0.76	5345	2.85	0.56
002860579-02	OBS	No	437.580170	392.514028	824.6	5.252	16.2	5.1	0.76	5345	2.24	0.41
002860579-03	OBS	No	336.155467	371.710079	848.3	7.410	13.9	5.8	0.76	5345	2.43	0.59
002860579-04	OBS	No	505.753509	555.376823	1396.4	6.438	13.0	9.3	0.76	5345	2.94	0.34
002860579-06	OBS	No	495.661329	558.308458	943.7	4.518	14.4	6.7	0.76	5345	2.45	0.35
002860579-07	OBS	No	711.217301	149.175806	1045.3	6.000	11.8	-1.0	0.76	5345	2.42	0.22

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002860579-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_MEAS
002860579-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
002860579-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
002860579-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—CENT_FEW_DIFFS
002860579-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
002860579-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_NOFITS

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

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

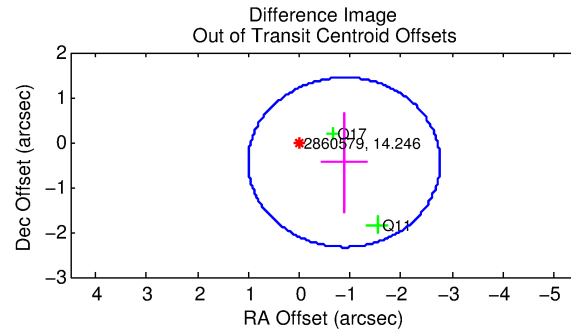
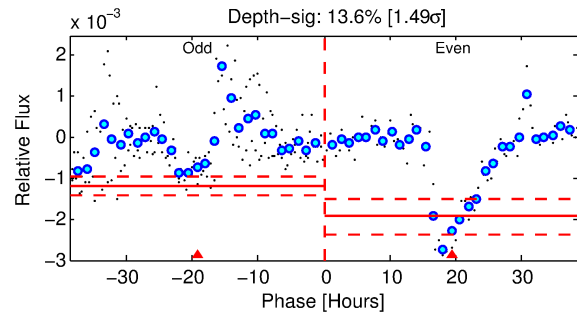
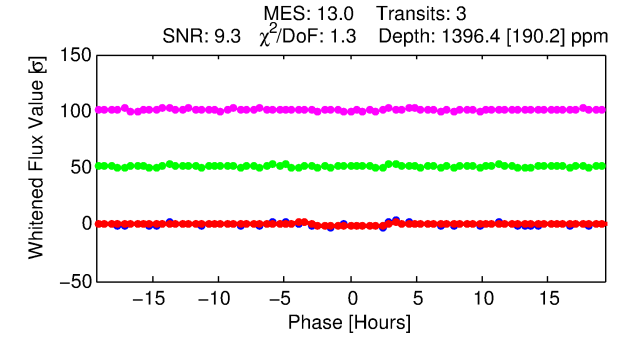
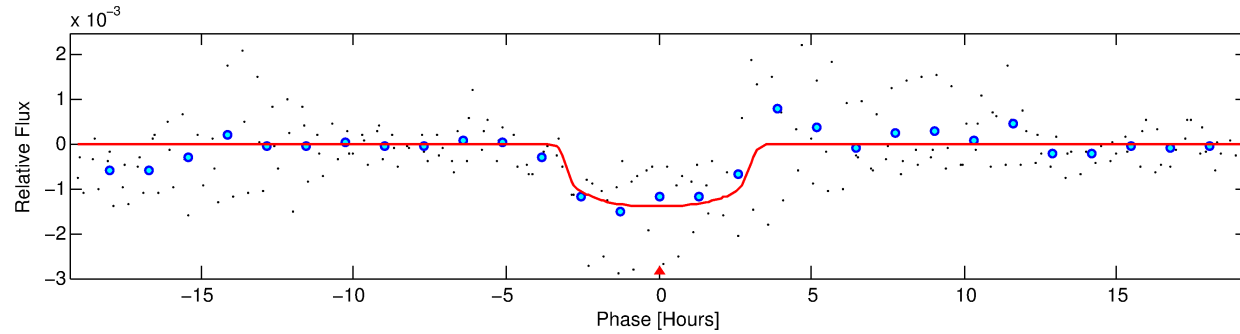
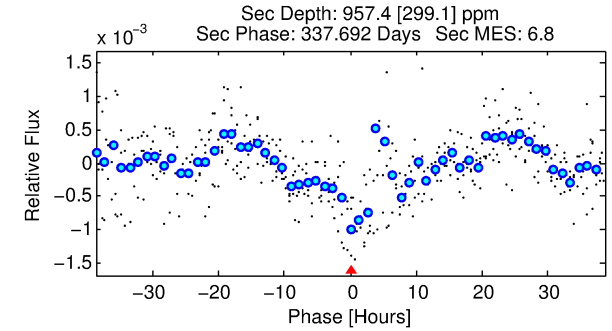
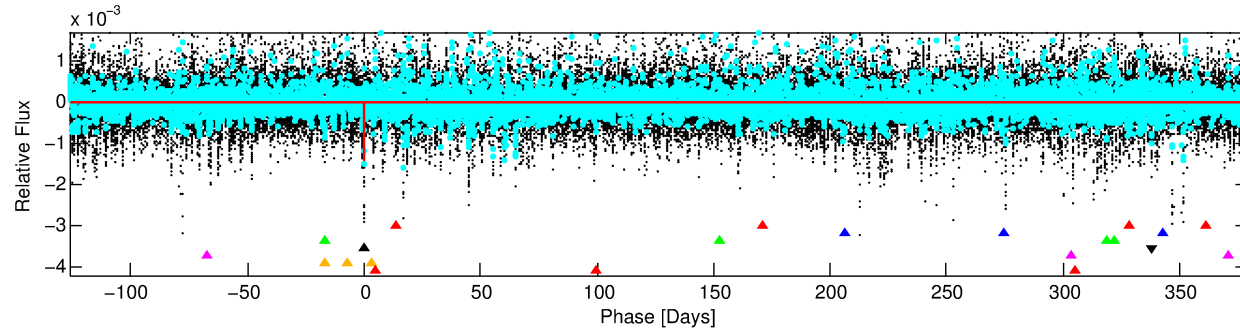
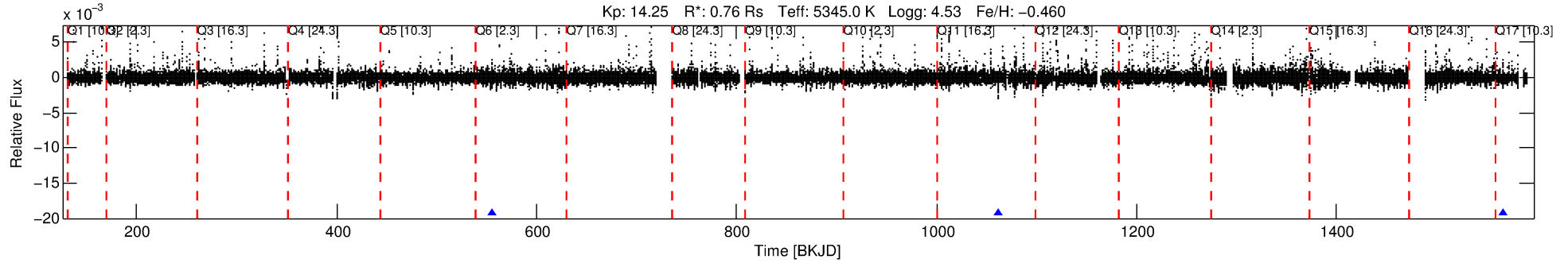
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 002860579-04

No Significant Match Found

# DV One-Page Summary

KIC: 2860579 Candidate: 4 of 7 Period: 505.754 d



## DV Fit Results:

Period = 505.75351 [0.00558] d  
Epoch = 555.3768 [0.0085] BKJD  
Rp/R\* = 0.0353 [0.0153]  
a/R\* = 517.67 [875.07]  
b = 0.57 [2.00]  
Seff = 0.34 [0.07]  
Teq = 195 [10] K  
Rp = 2.93 [1.32] Re  
a = 1.1141 [0.1221] AU  
Ag = 75900.86 [70802.89] [1.07 $\sigma$ ]  
Teffp = 5001 [1158] K [4.15 $\sigma$ ]

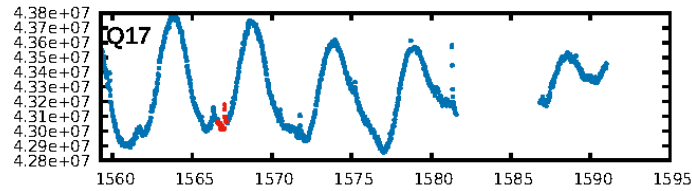
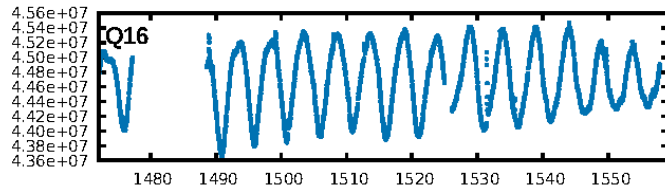
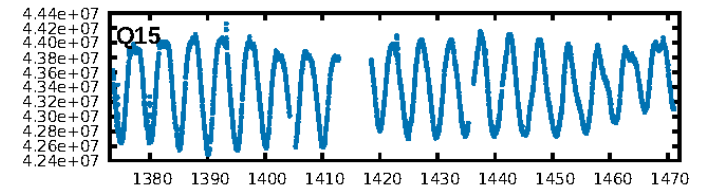
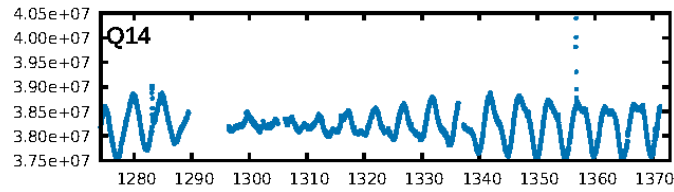
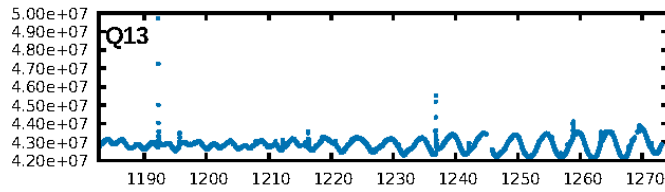
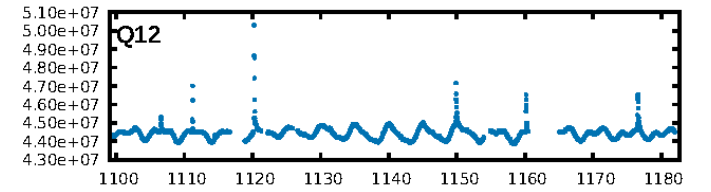
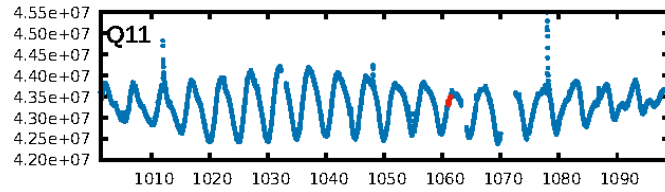
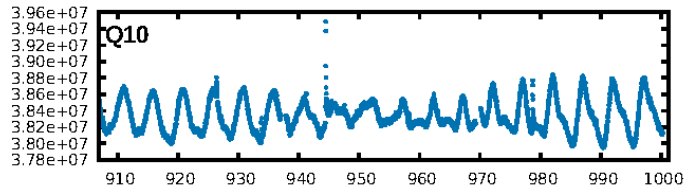
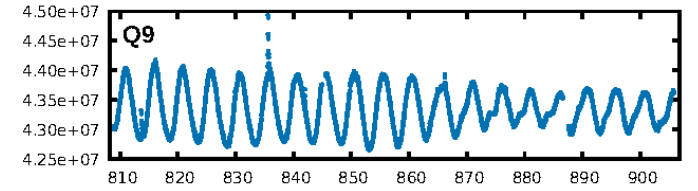
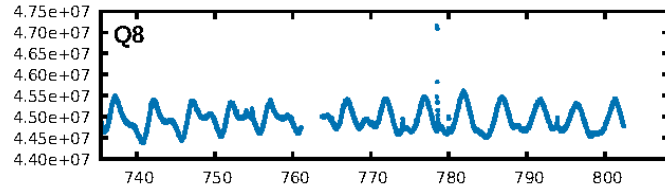
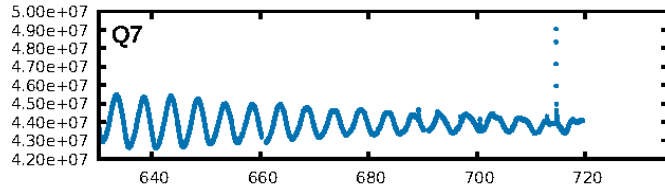
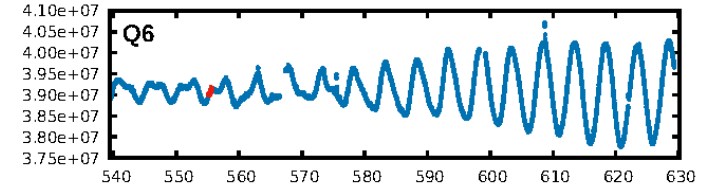
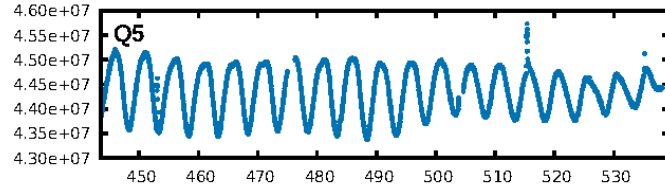
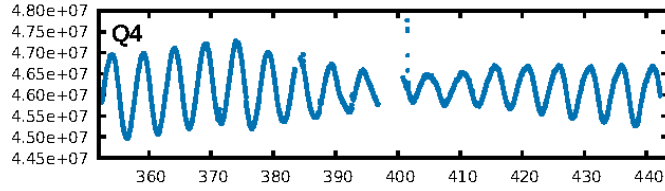
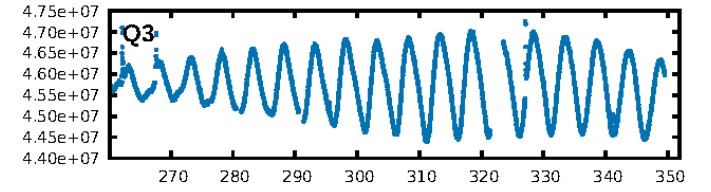
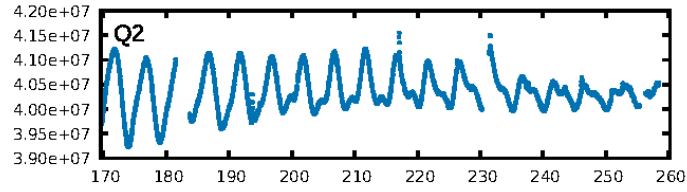
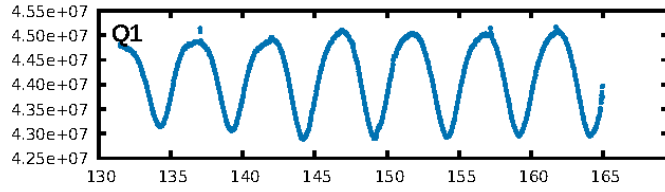
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [30.80 $\sigma$ ]  
LongPeriod-sig: 100.0% [198.83 $\sigma$ ]  
ModelChiSquare2-sig: 7.1%  
ModelChiSquareGof-sig: 40.5%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [2/2]  
GhostDiagnostic-chr: 2.526  
Centroid-sig: 95.2%  
Centroid-so: 0.716 arcsec [1.34 $\sigma$ ]  
OotOffset-rm: 0.989 arcsec [1.57 $\sigma$ ]  
OotOffset-st: 0/1/0/1 [2]  
KicOffset-rm: 0.921 arcsec [1.46 $\sigma$ ]  
KicOffset-st: 0/1/0/1 [2]  
DiffImageQuality-fgm: 1.00 [2/2]  
DiffImageOverlap-fno: 1.00 [3/3]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 05:58:14 Z

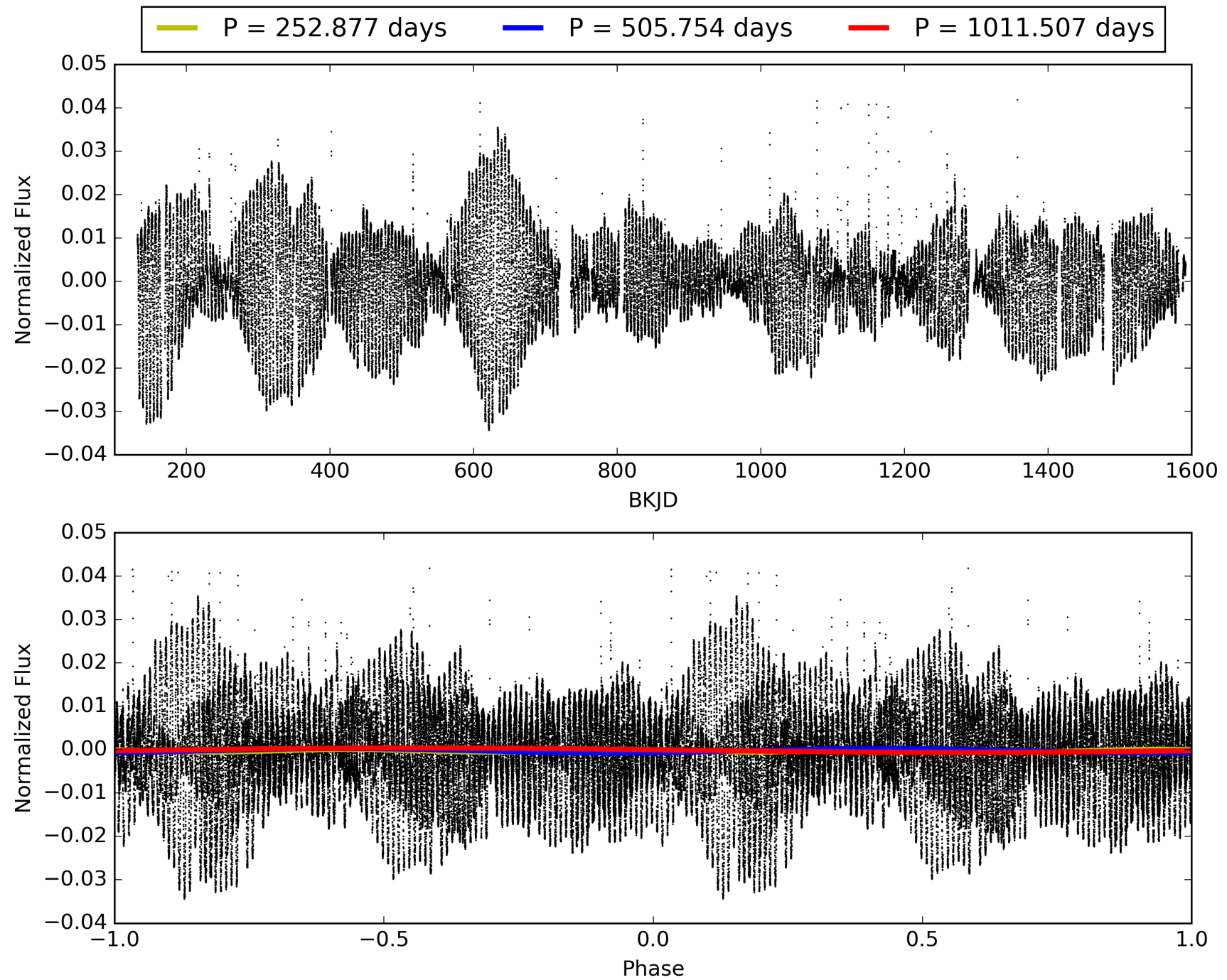
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 002860579-04, PDC Light Curves





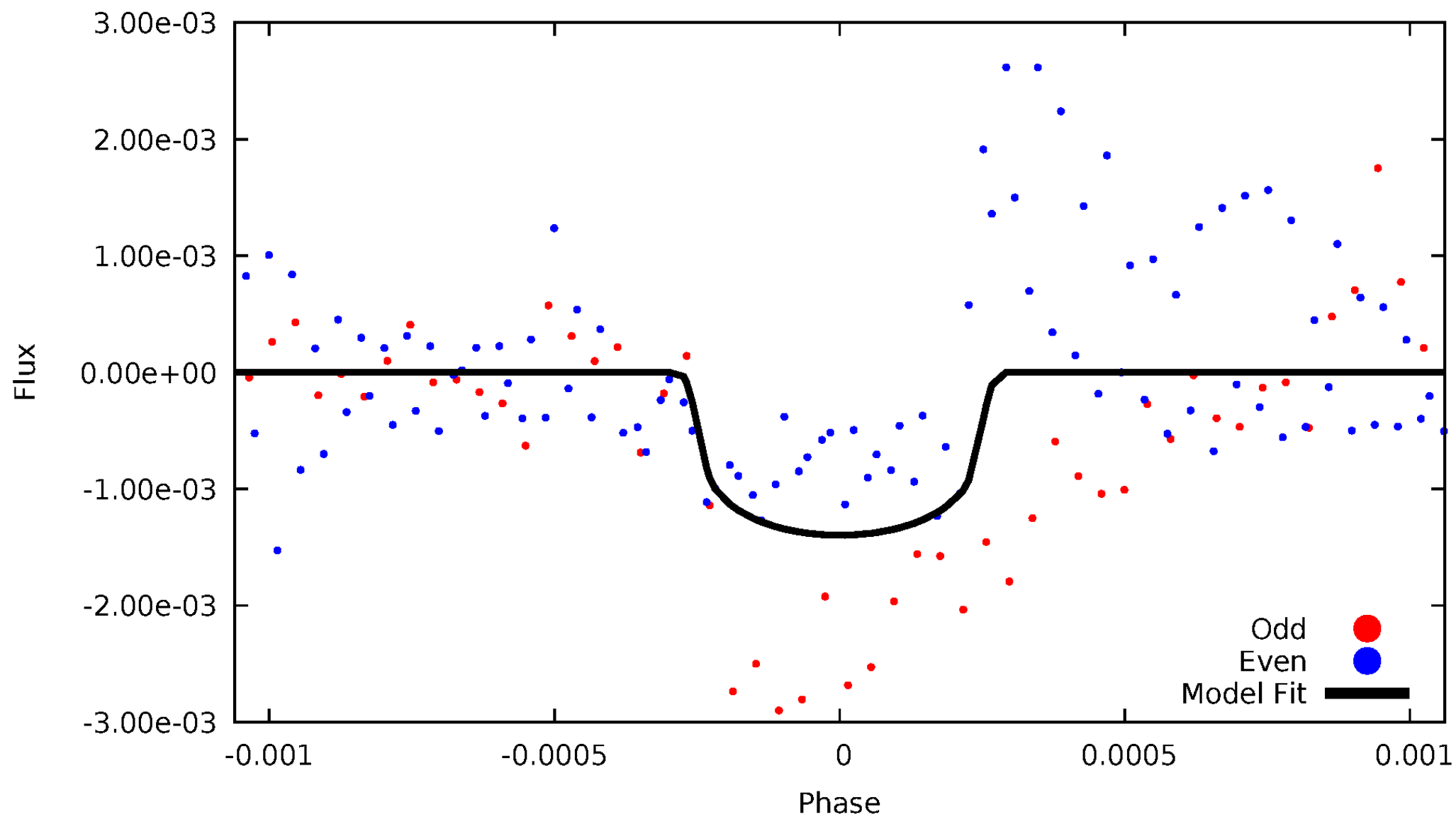
# TCE 002860579-04





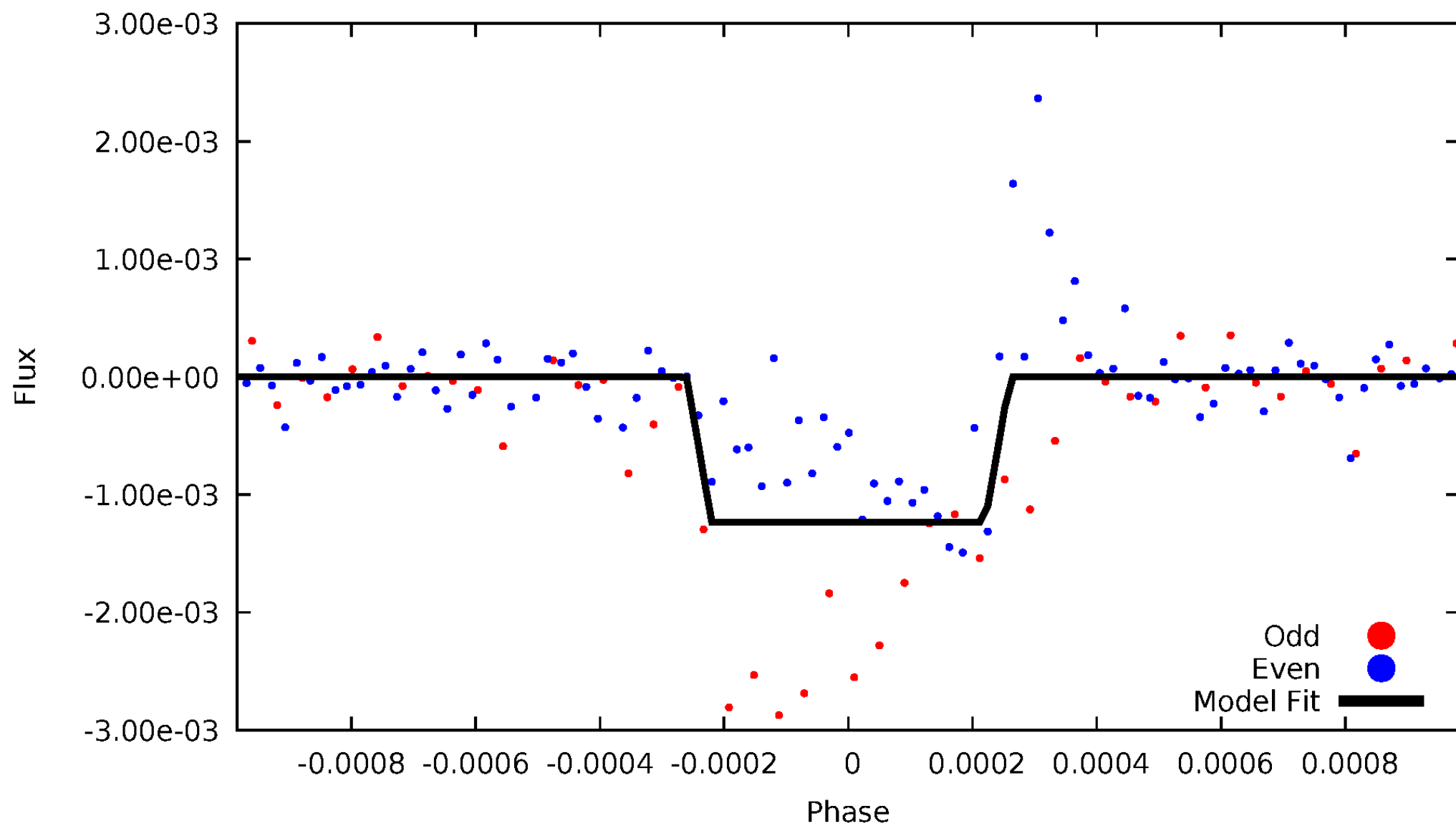
# DV Odd/Even

TCE 002860579-04



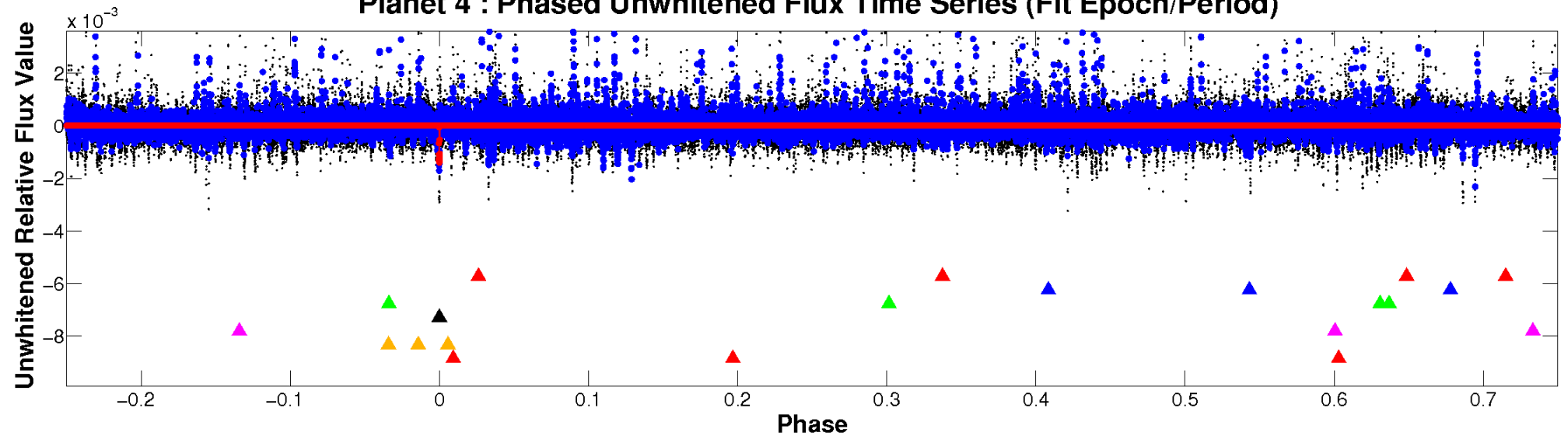
# ALT Odd/Even

TCE 002860579-04

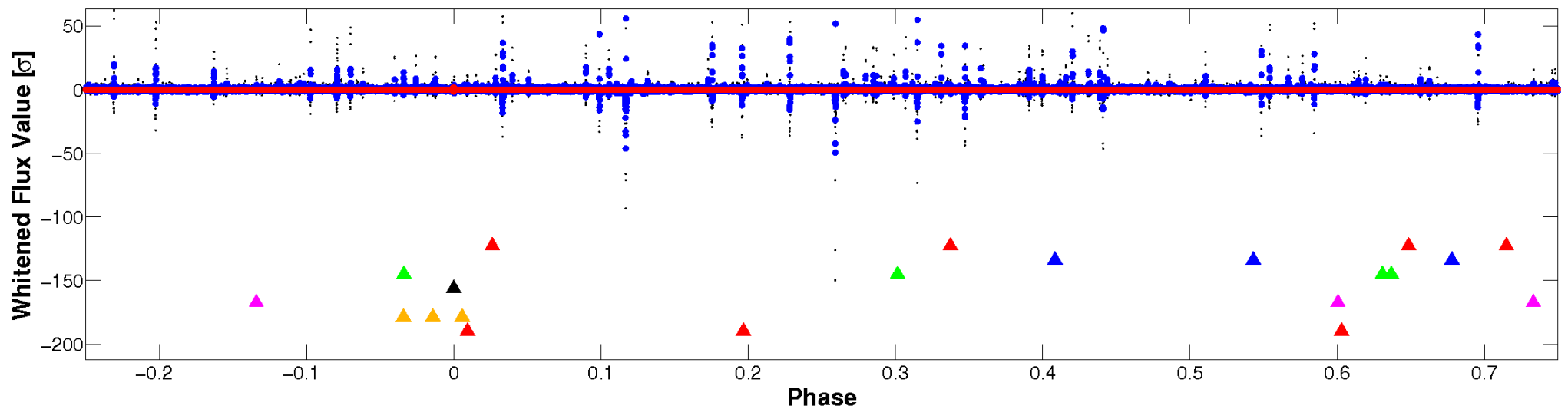


# Non-Whitened Vs. Whitened Light Curve

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

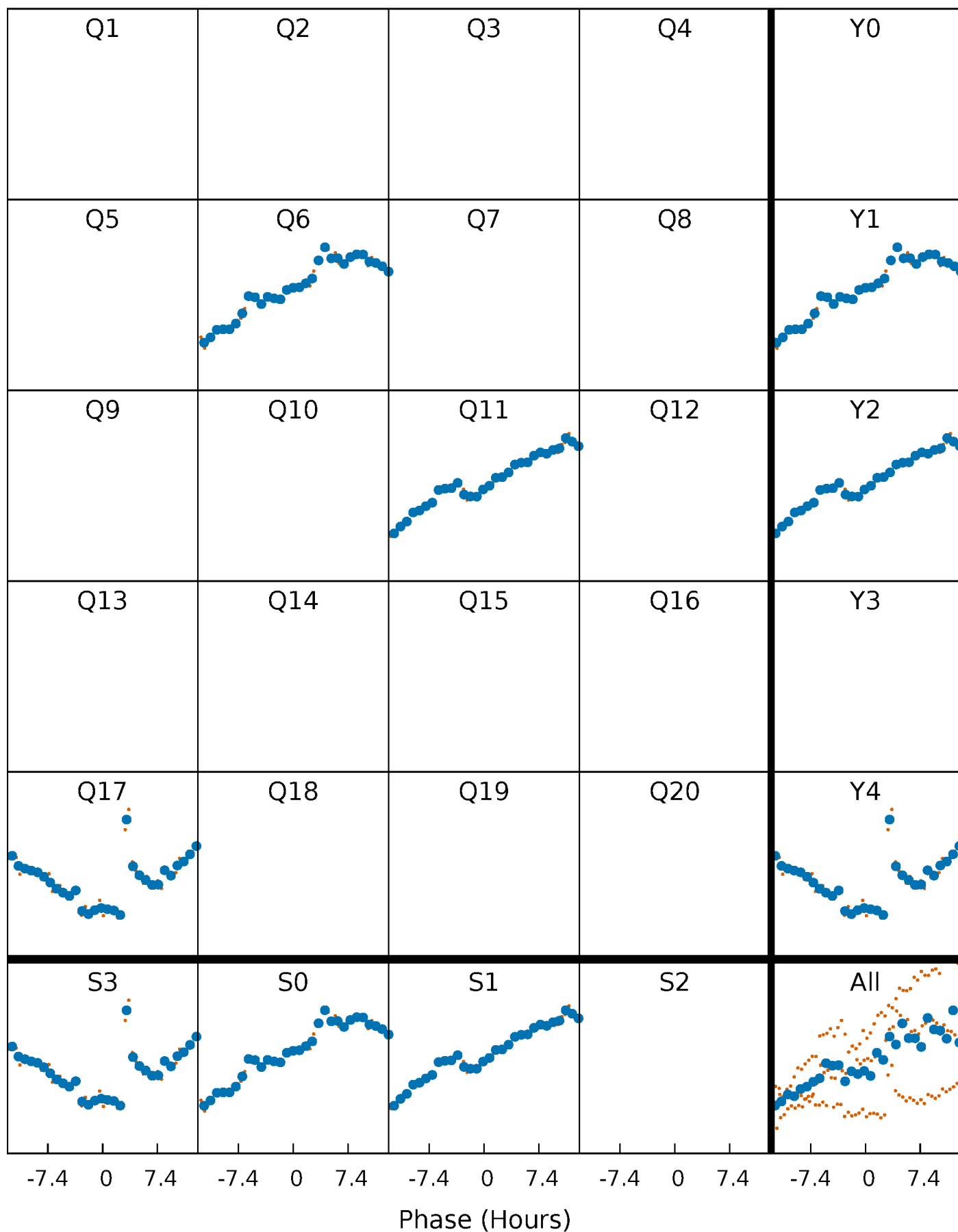


## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



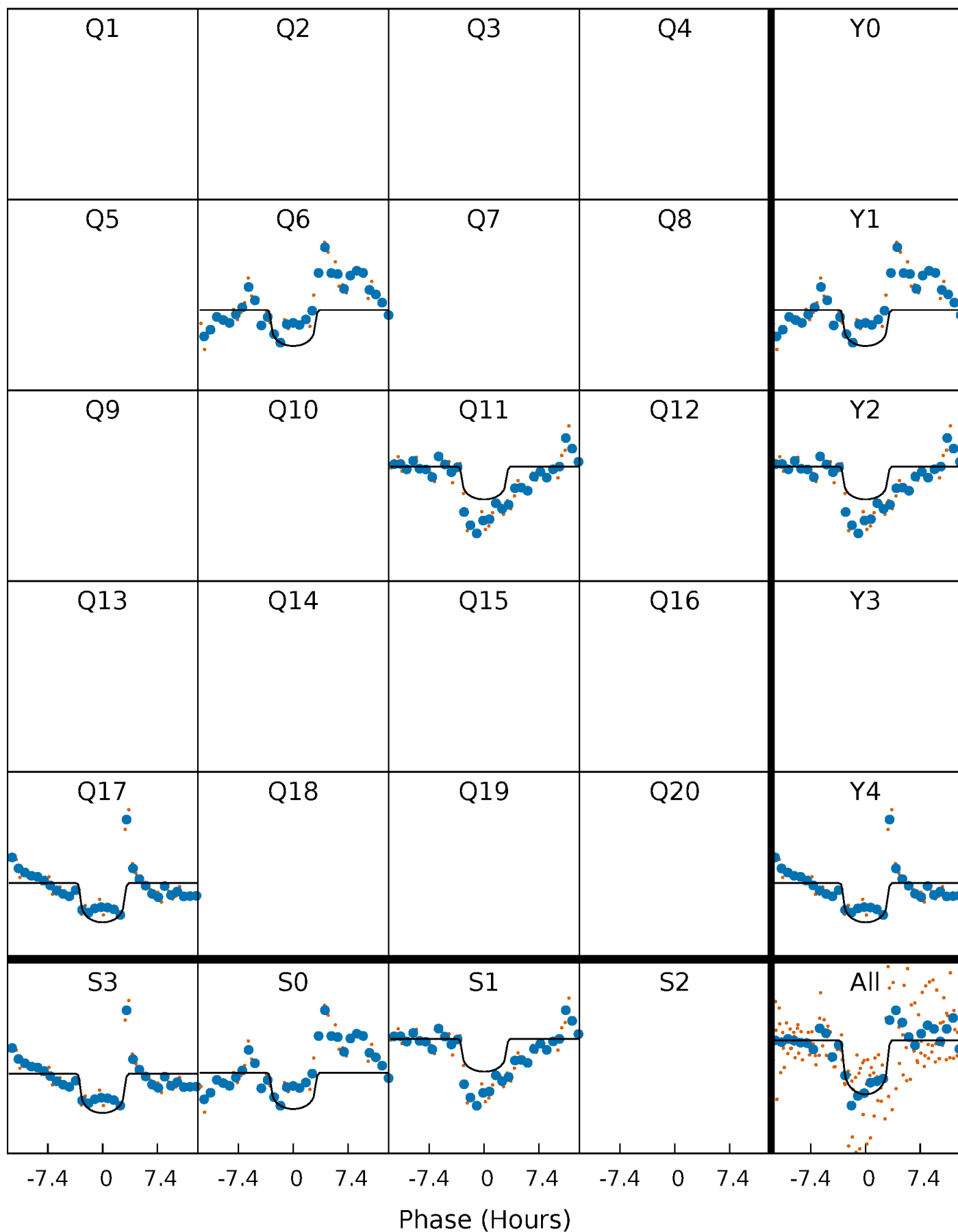
# PDC Quarter-Phased Transit Curves

TCE 002860579-04 P=505.753509 Days  $T_0=555.376823$  (BKJD)



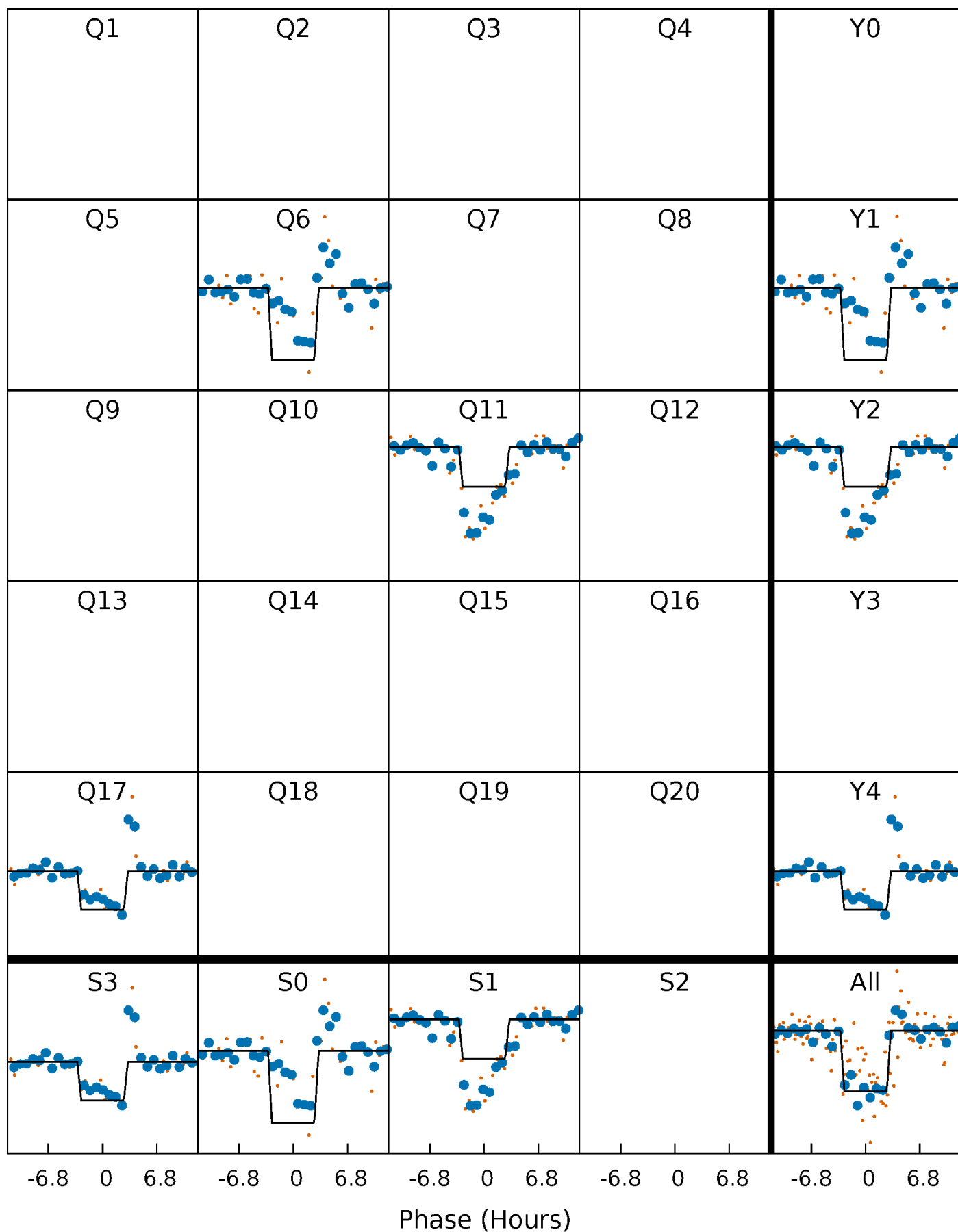
# DV Quarter-Phased Transit Curves

TCE 002860579-04     $P=505.753509$  Days     $T_0=555.376823$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

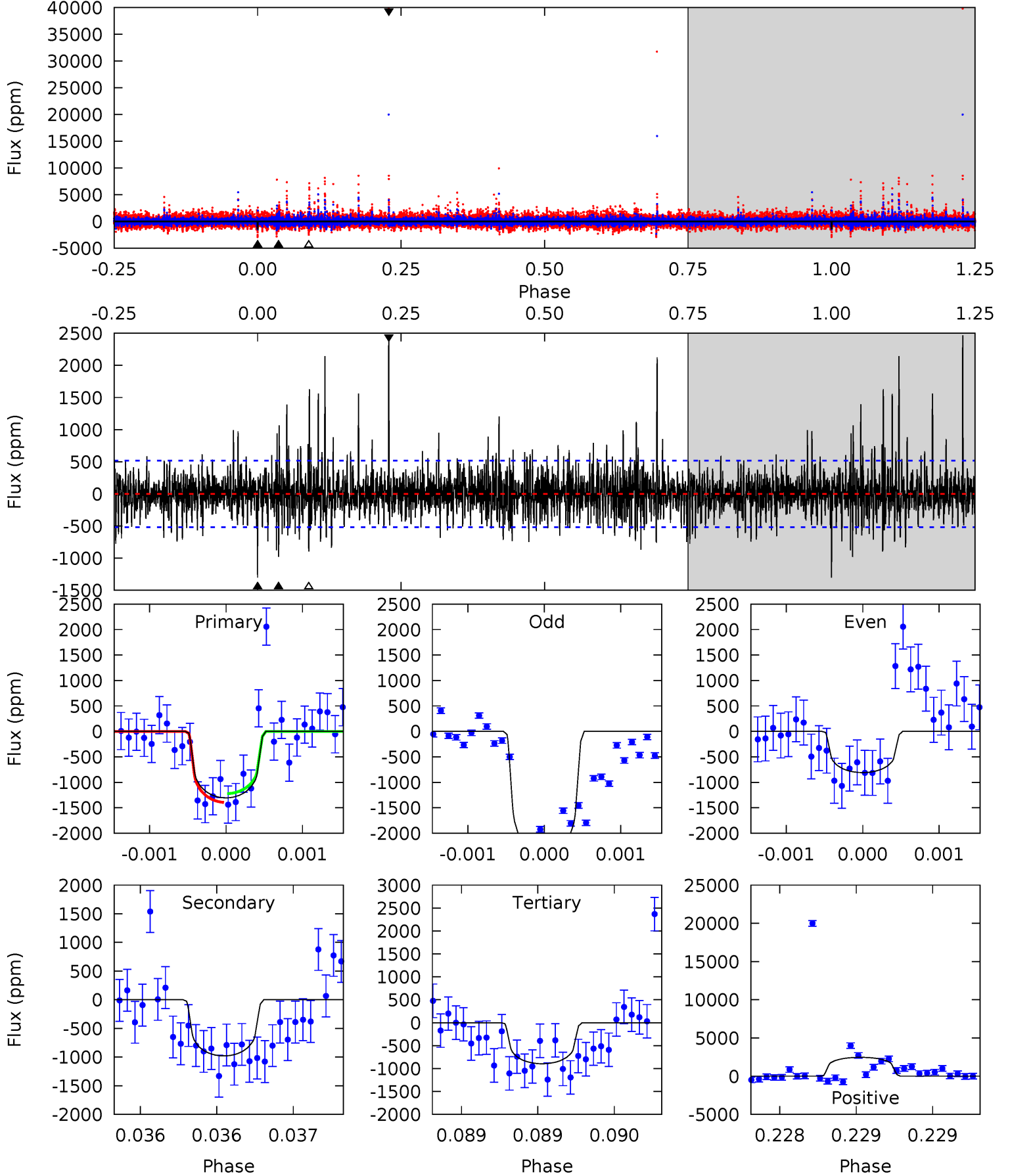
TCE 002860579-04 P=505.744232 Days  $T_0=555.388677$  (BKJD)



# DV Model-Shift Uniqueness Test

002860579-04, P = 505.753509 Days, E = 49.623314 Days

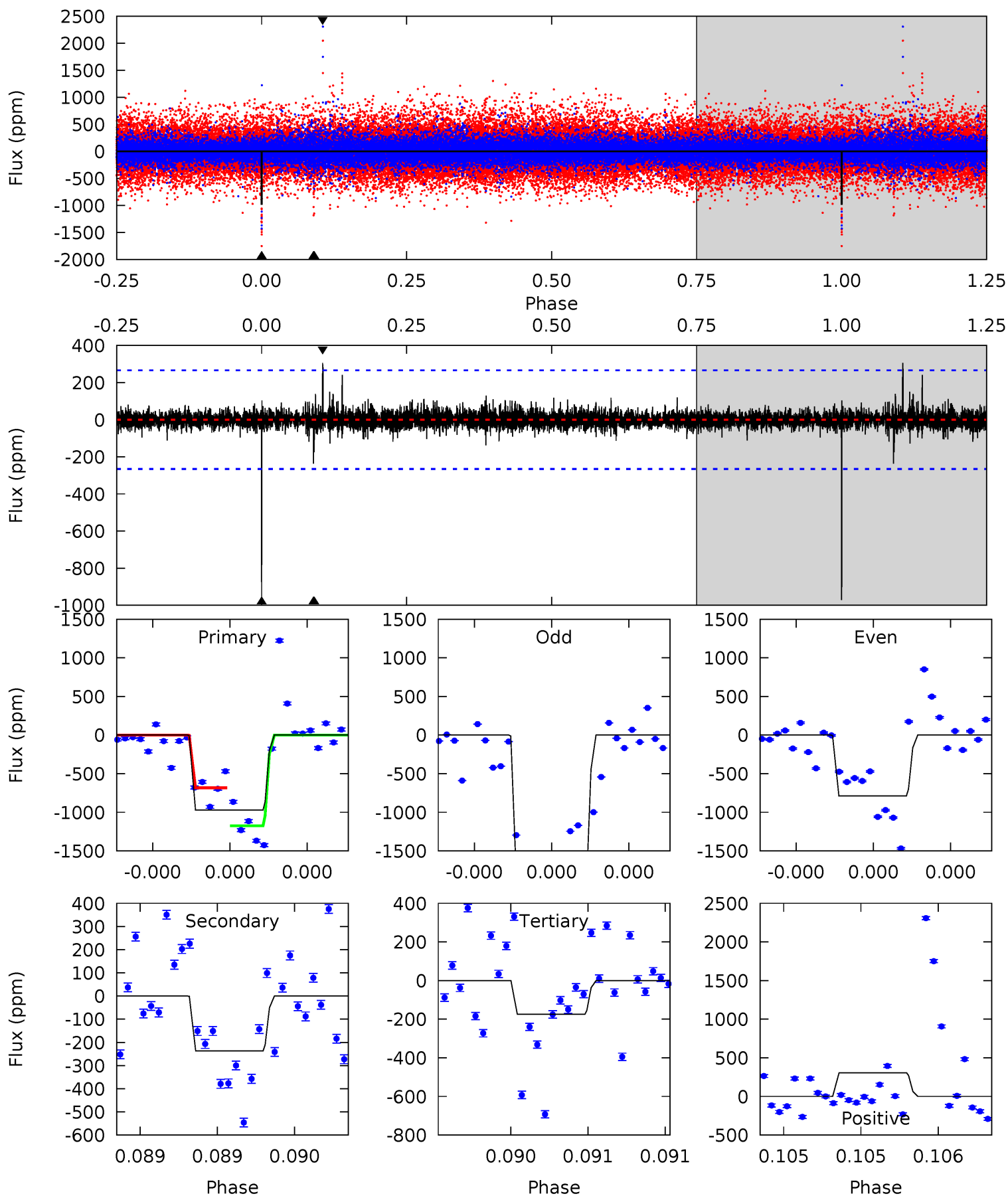
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
14.0	10.5	9.62	26.5	5.55	3.45	2.79	4.39	-12.5	0.90	-16.0	3.22	1.40	0.65	0.92



# Alt Model-Shift Uniqueness Test

002860579-04, P = 505.744232 Days, E = 49.644445 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
20.4	4.96	3.67	6.41	5.58	3.48	0.56	16.7	14.0	1.29	-1.45	13.9	1.22	0.24	5.15





### Stellar Parameters For KIC 002860579

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5345^{+160}_{-144}$	$4.533^{+0.093}_{-0.076}$	$-0.460^{+0.300}_{-0.300}$	$0.761^{+0.095}_{-0.095}$	$0.720^{+0.103}_{-0.041}$	$2.305^{+0.908}_{-0.603}$
	+3%/-3%	+2%/-2%	+65%/-65%	+12%/-12%	+14%/-6%	+39%/-26%
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 002860579-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-979 \pm 93$	$3.01^{+1.37}_{-1.32}$	$273^{+11}_{-12}$	$5028^{+1645}_{-690}$	$75925^{+154217}_{-40860}$
Alt.	$-237 \pm 48$	$2.95^{+1.28}_{-1.27}$	$272^{+12}_{-12}$	$3908^{+901}_{-498}$	$19204^{+40222}_{-10218}$

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

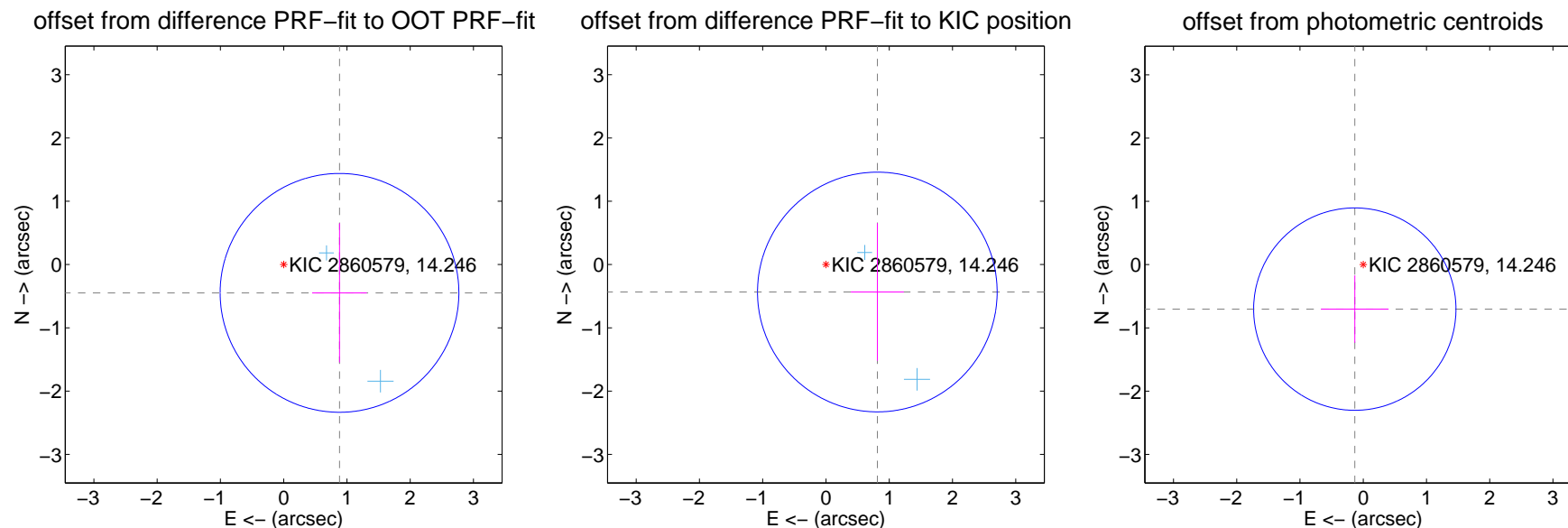
## DV Centroid Data

Supplemental centroid analysis for 002860579-04. Kepler magnitude: 14.25. Transit SNR 9.31

There are 2 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.06 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.989 \pm 0.629$	1.57	$-0.882 \pm 0.432$	$-0.448 \pm 1.099$
PRF-fit source offset from KIC position	$0.921 \pm 0.631$	1.46	$-0.812 \pm 0.418$	$-0.434 \pm 1.086$
photometric centroid source offset	$0.72 \pm 0.53$	1.34	$0.13 \pm 0.53$	$-0.70 \pm 0.53$

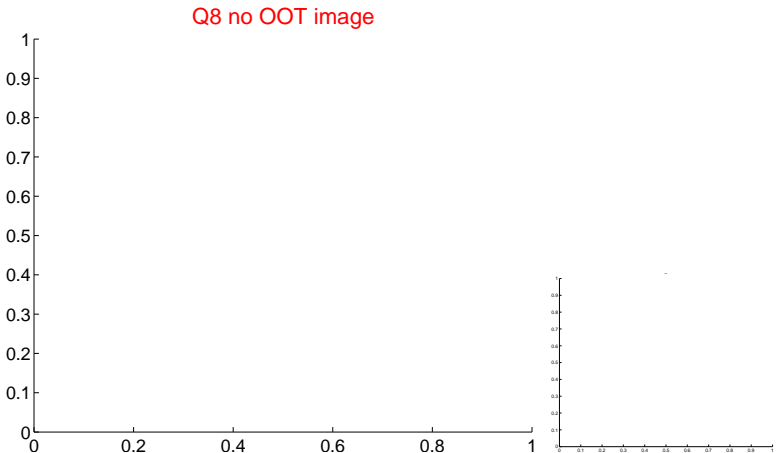
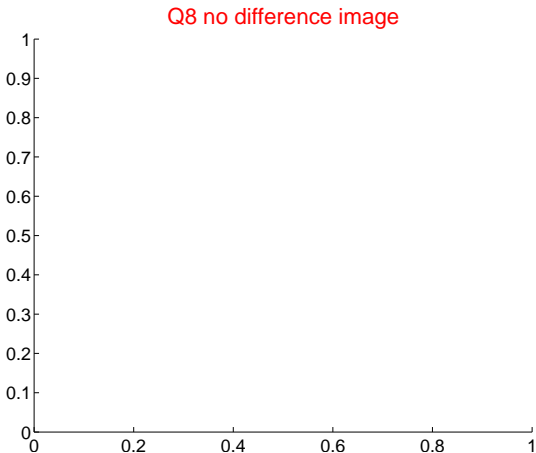
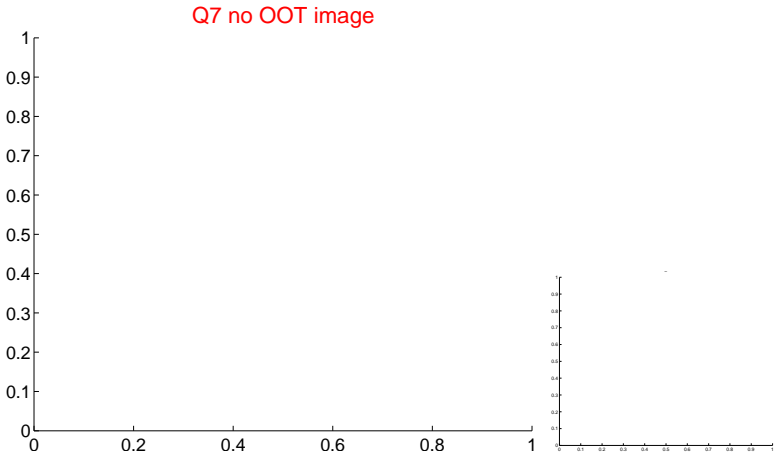
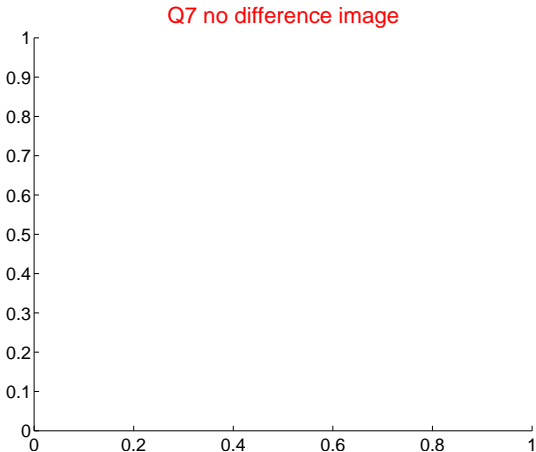
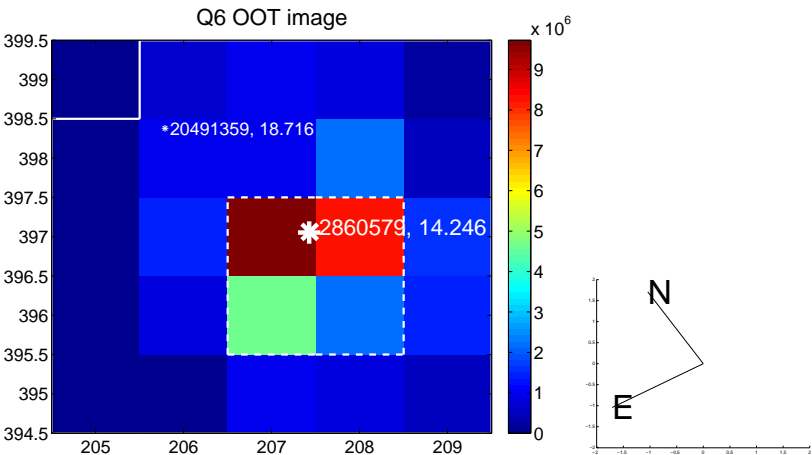
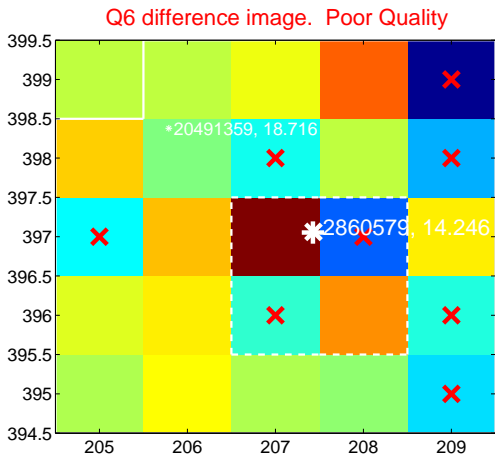
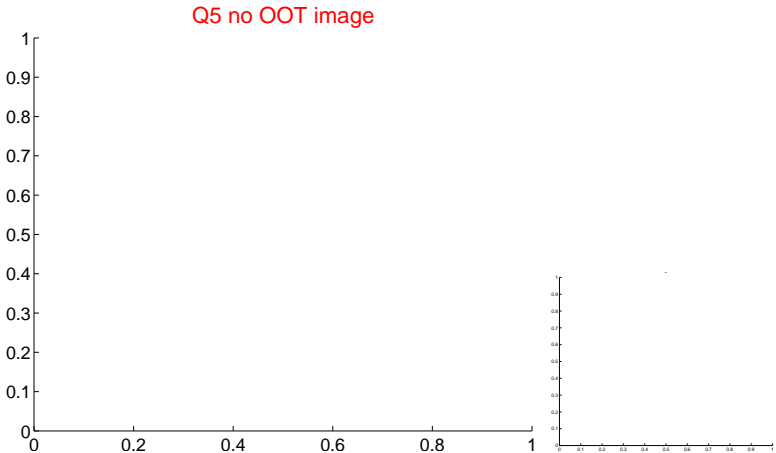
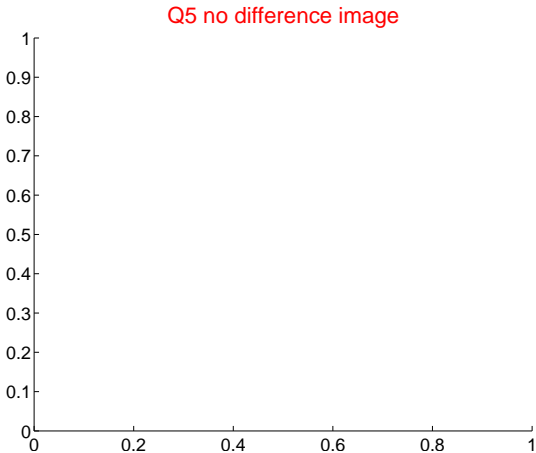


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

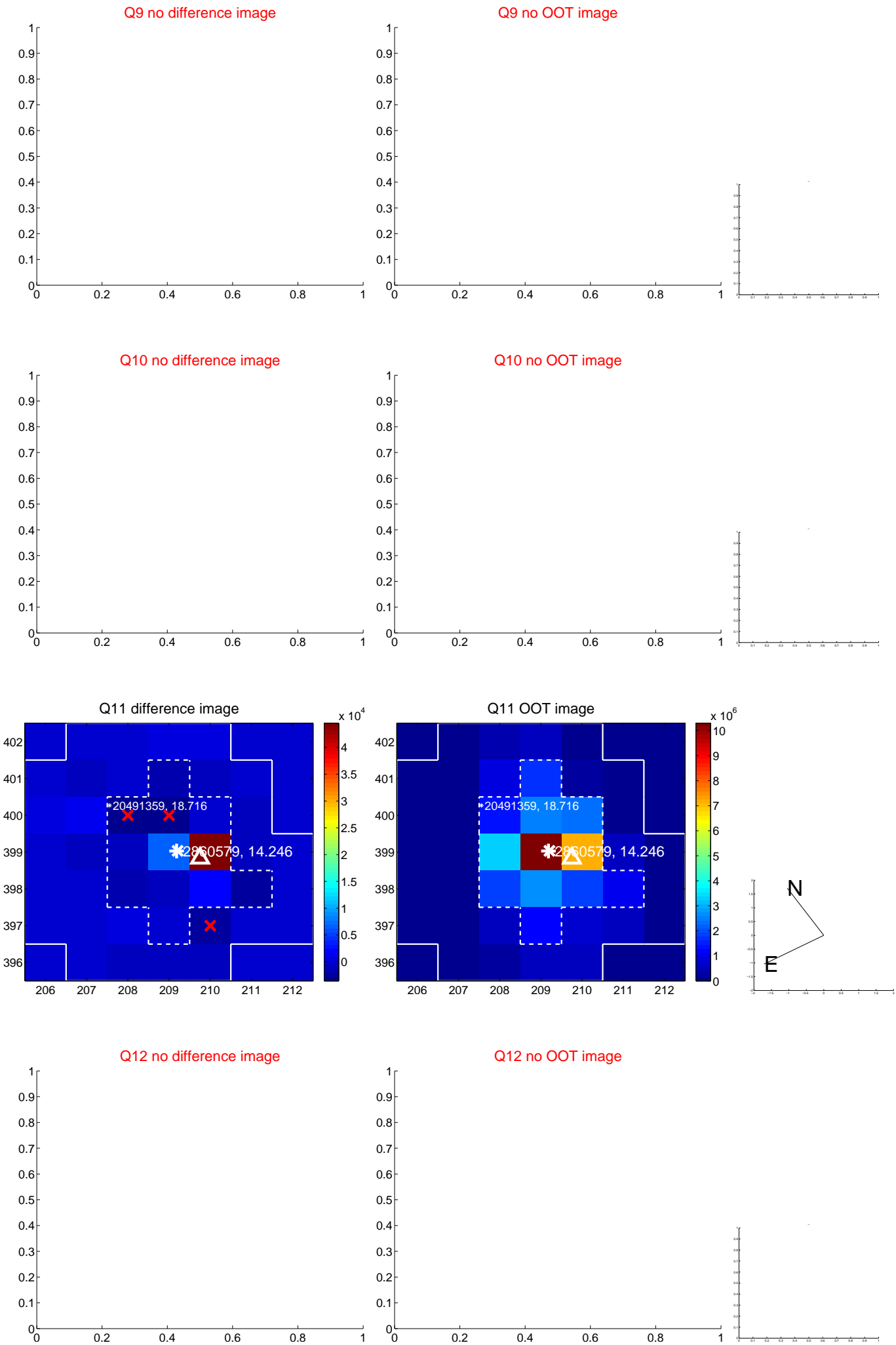
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



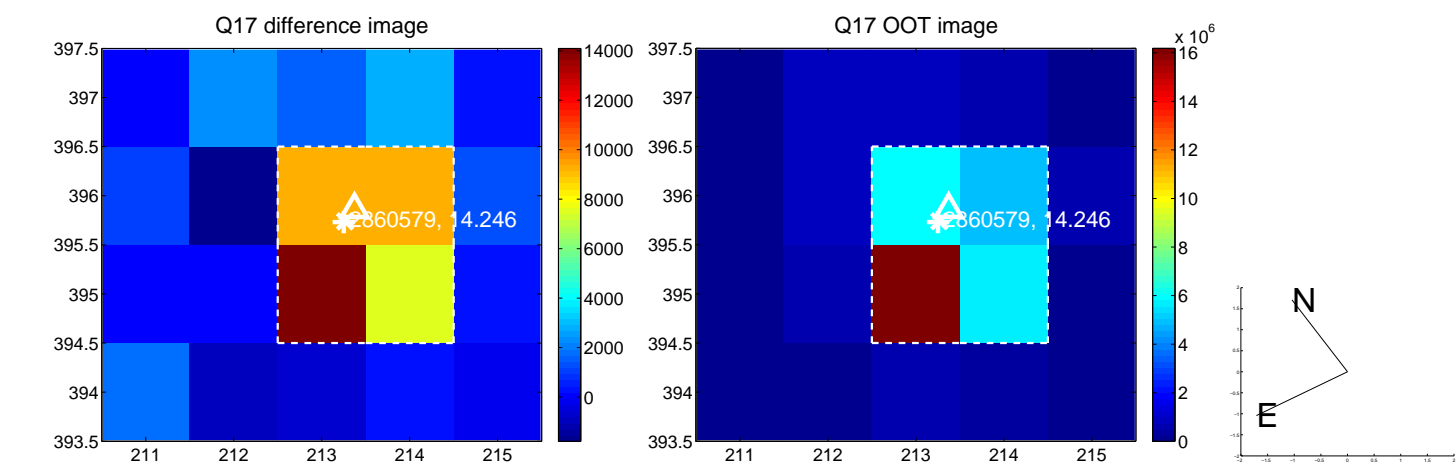
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



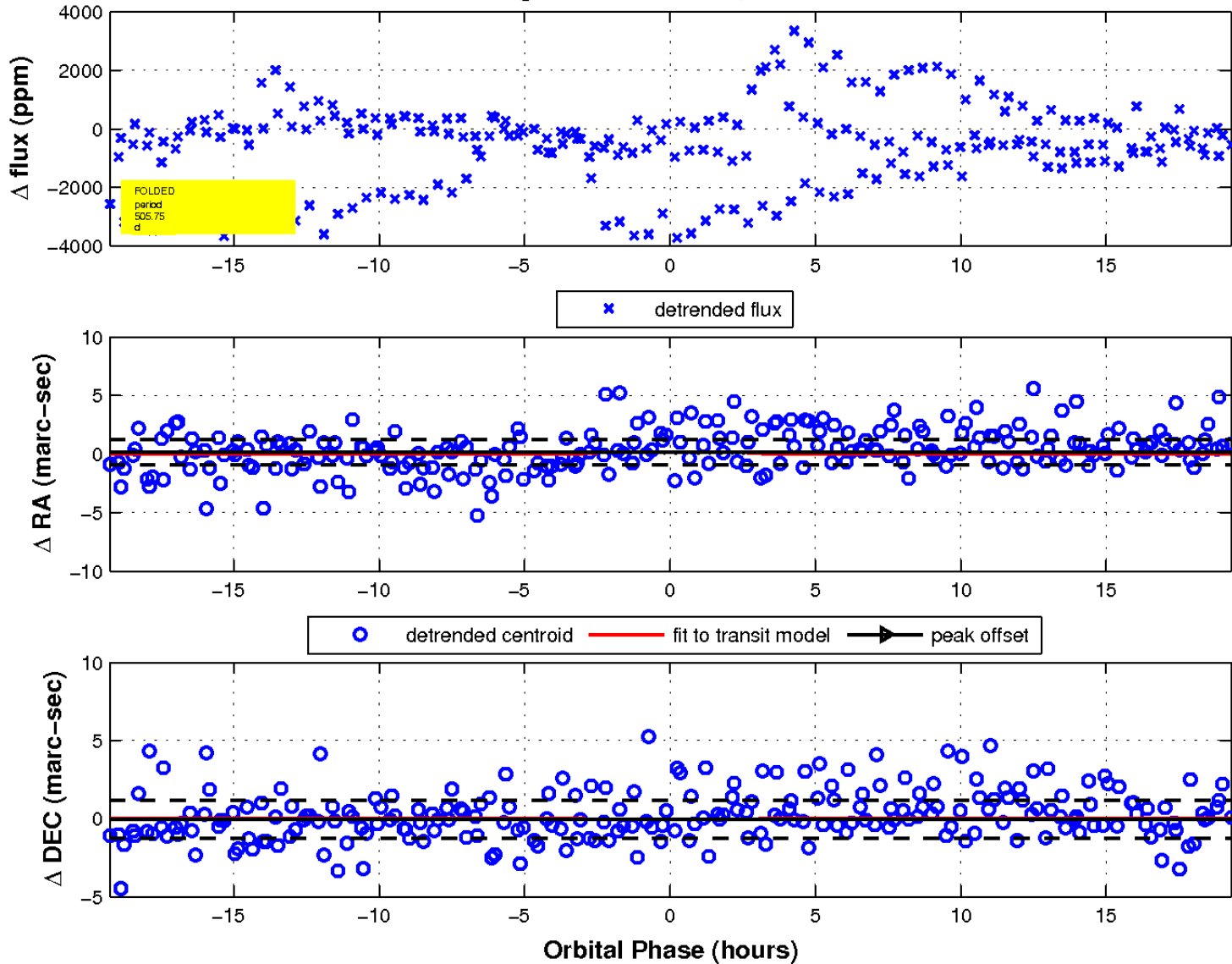
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

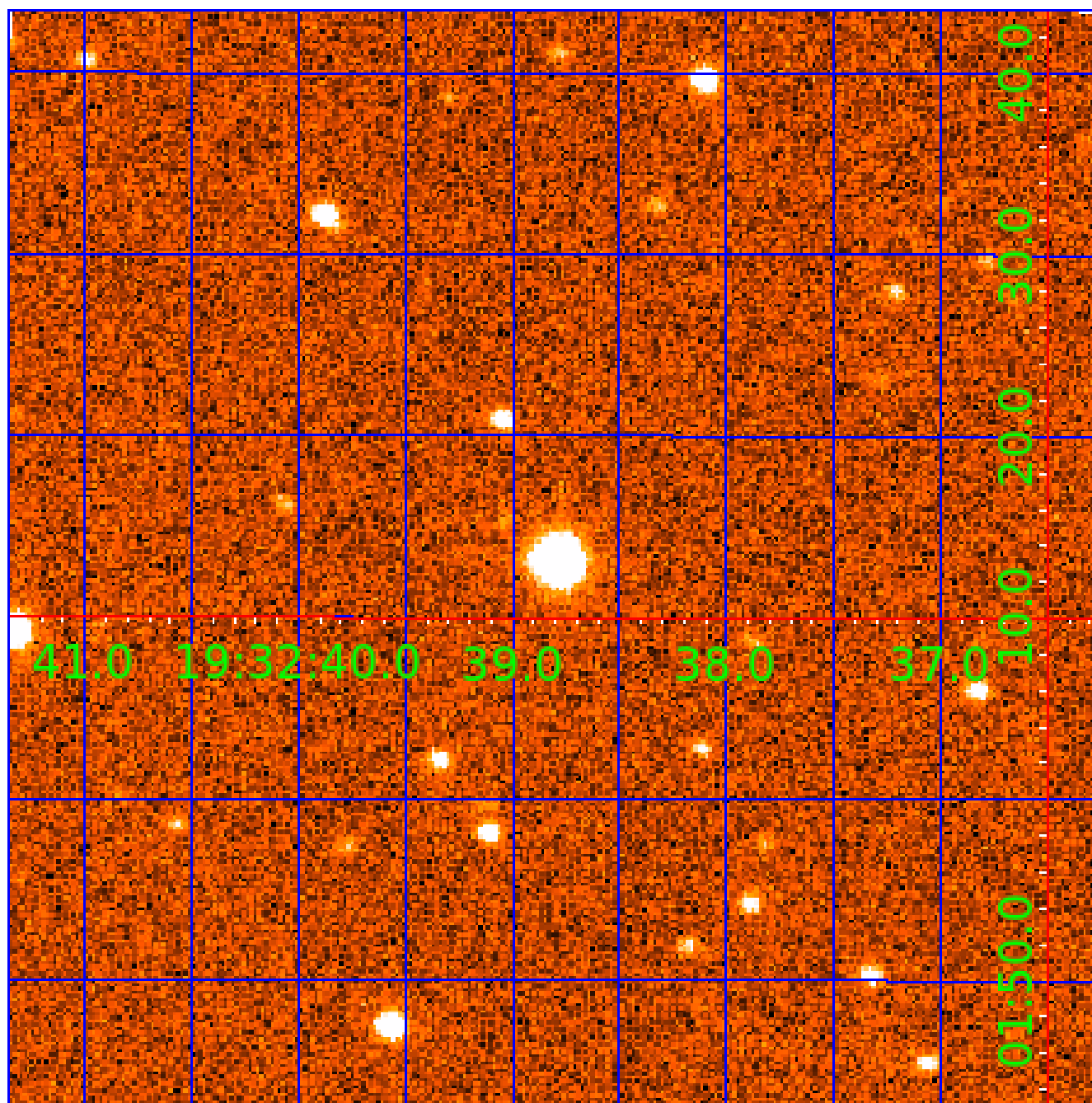


fluxWeightedCentroids, Planet 4 of 7



# UKIRT Image

Declination





# KIC 002860579

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
002860579-01	OBS	No	348.372609	377.647764	1407.7	7.003	17.5	8.3	0.76	5345	2.85	0.56
002860579-02	OBS	No	437.580170	392.514028	824.6	5.252	16.2	5.1	0.76	5345	2.24	0.41
002860579-03	OBS	No	336.155467	371.710079	848.3	7.410	13.9	5.8	0.76	5345	2.43	0.59
002860579-04	OBS	No	505.753509	555.376823	1396.4	6.438	13.0	9.3	0.76	5345	2.94	0.34
002860579-06	OBS	No	495.661329	558.308458	943.7	4.518	14.4	6.7	0.76	5345	2.45	0.35
002860579-07	OBS	No	711.217301	149.175806	1045.3	6.000	11.8	-1.0	0.76	5345	2.42	0.22

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002860579-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_MEAS
002860579-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
002860579-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
002860579-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—CENT_FEW_DIFFS
002860579-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
002860579-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_NOFITS

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

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

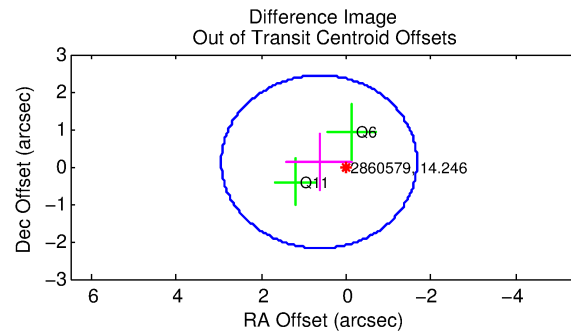
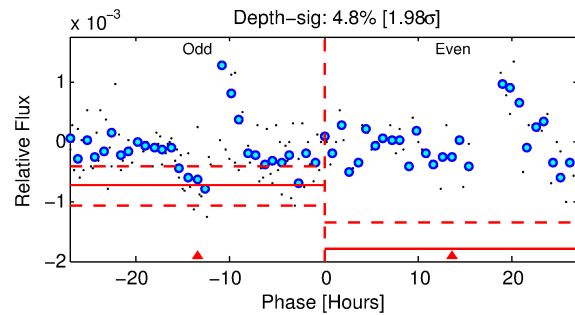
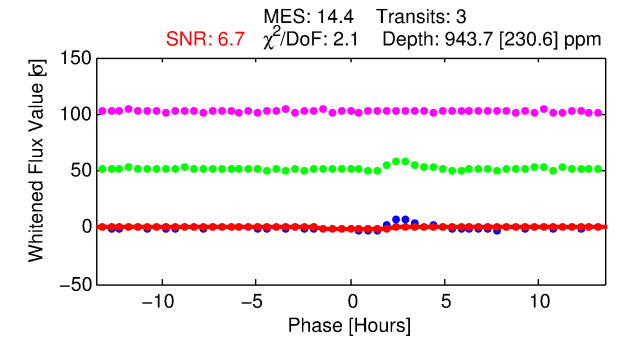
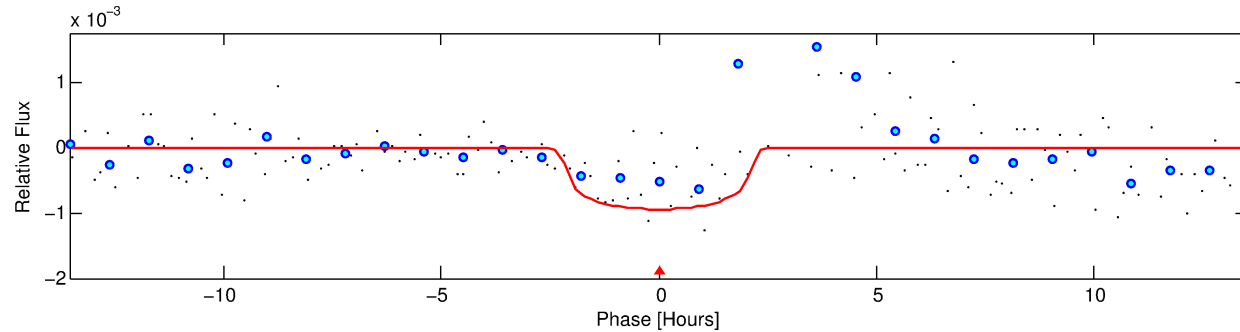
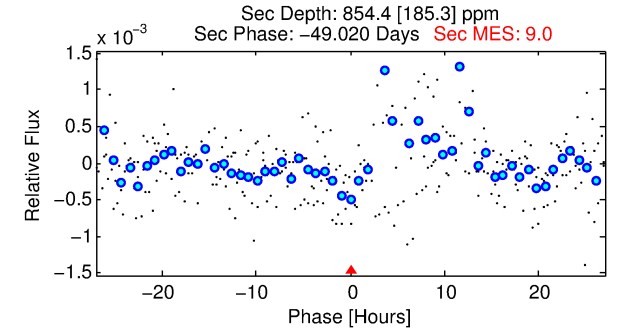
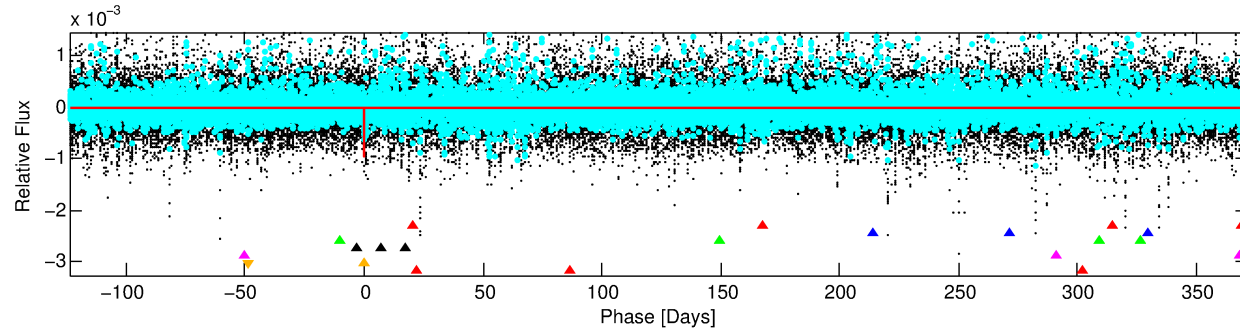
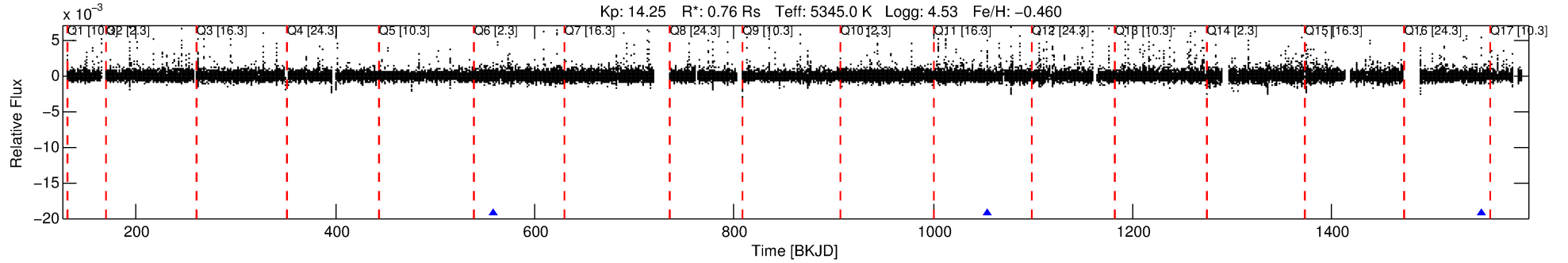
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 002860579-06

No Significant Match Found

# DV One-Page Summary

KIC: 2860579 Candidate: 6 of 7 Period: 495.661 d



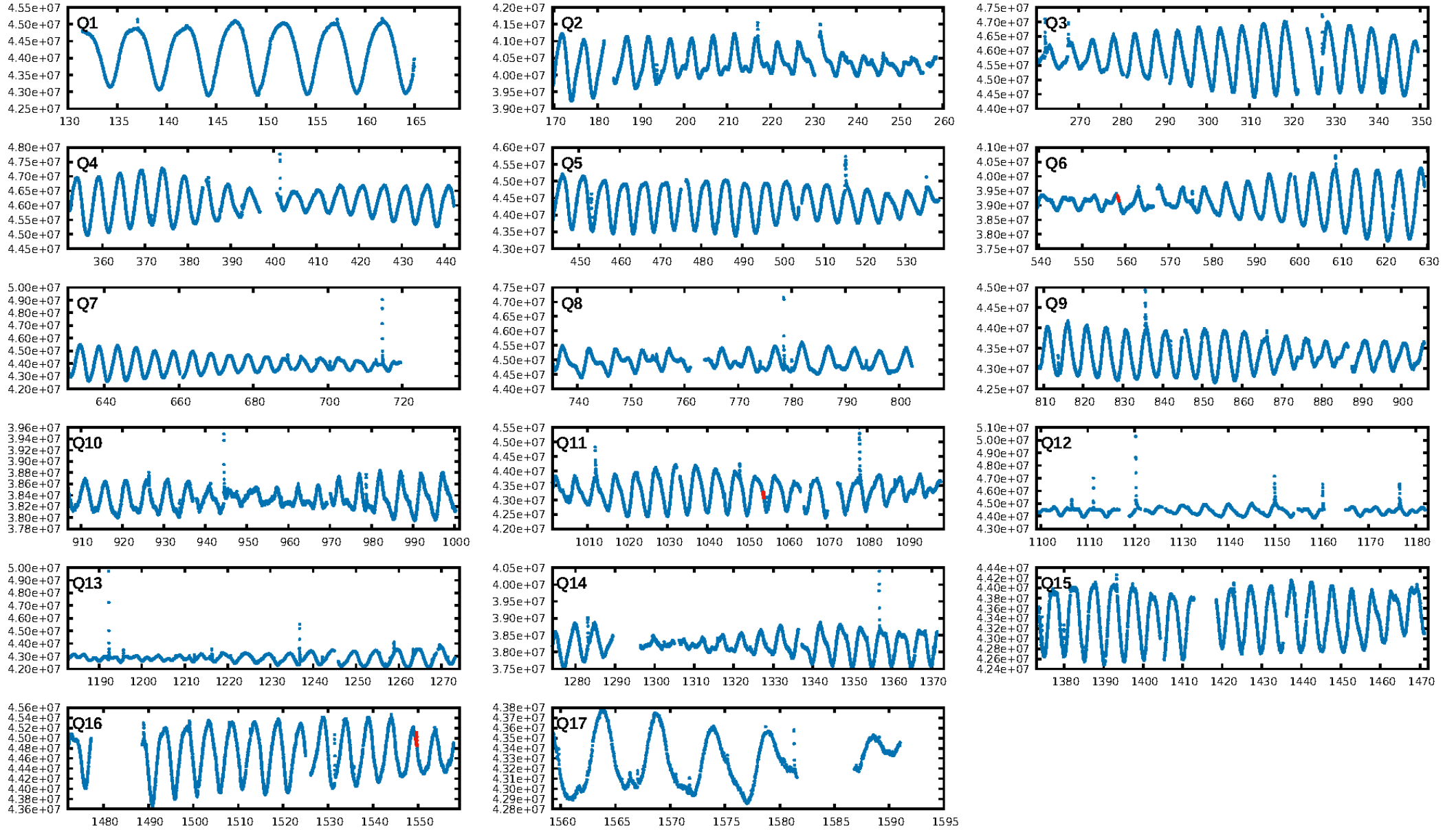
## DV Fit Results:

Period = 495.66133 [0.00907] d  
Epoch = 558.3085 [0.0127] BKJD  
Rp/R\* = 0.0295 [0.0439]  
a/R\* = 678.37 [4085.89]  
b = 0.64 [5.71]  
Seff = 0.35 [0.07]  
Teq = 196 [10] K  
Rp = 2.45 [3.66] Re  
a = 1.0992 [0.1205] AU  
Ag = 94717.33 [283374.73] [0.33 $\sigma$ ]  
Teffp = 5322 [3977] K [1.29 $\sigma$ ]

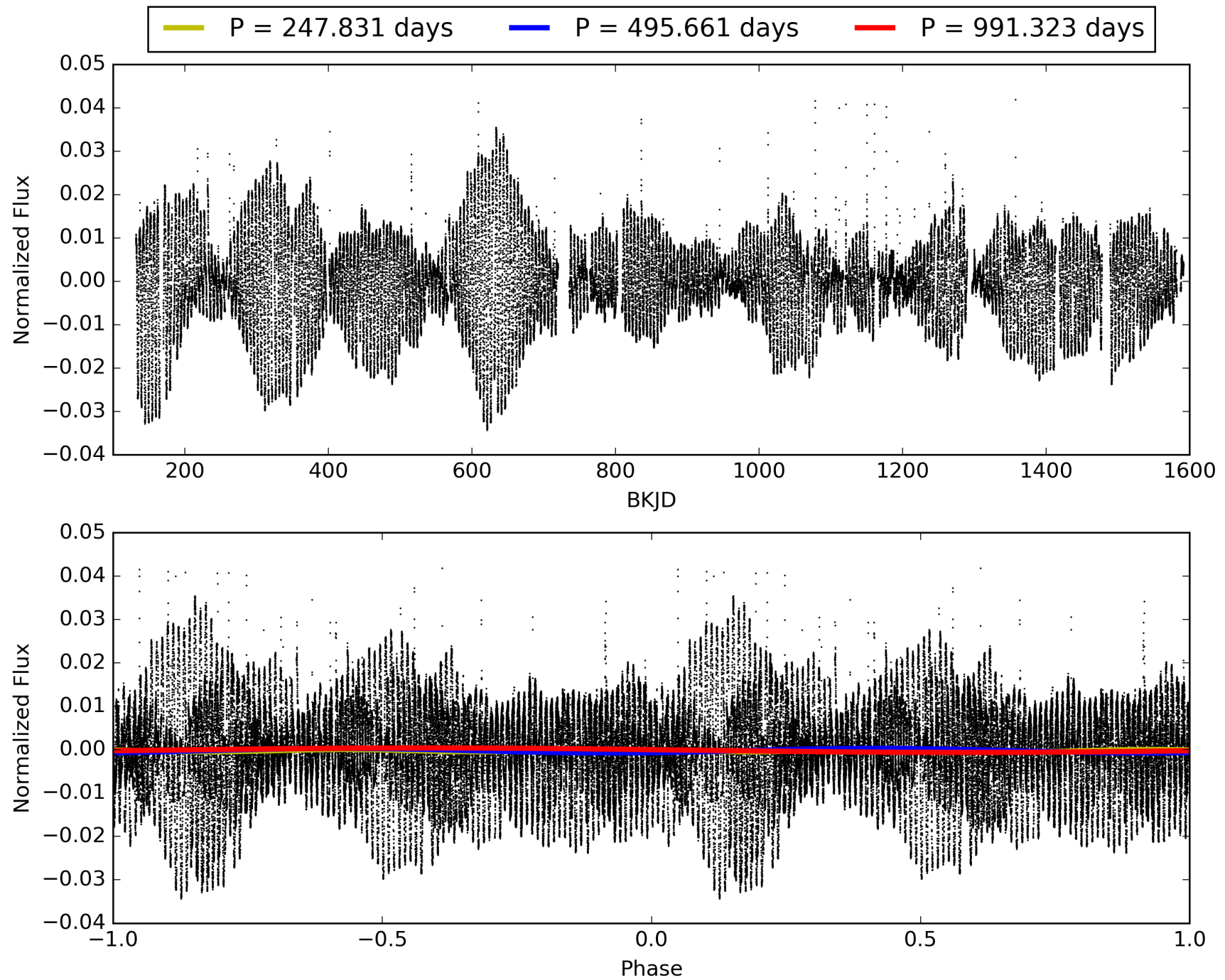
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [201.19 $\sigma$ ]  
LongPeriod-sig: 100.0% [30.80 $\sigma$ ]  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 3.9%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: -0.4161  
Centroid-sig: 60.6%  
Centroid-so: 1.291 arcsec [1.21 $\sigma$ ]  
OotOffset-rm: 0.641 arcsec [0.83 $\sigma$ ]  
OotOffset-st: 1/1/0/0 [2]  
KicOffset-rm: 0.716 arcsec [0.89 $\sigma$ ]  
KicOffset-st: 1/1/0/0 [2]  
DiffImageQuality-fgm: 0.50 [1/2]  
DiffImageOverlap-fno: 1.00 [2/2]

# TCE 002860579-06, PDC Light Curves

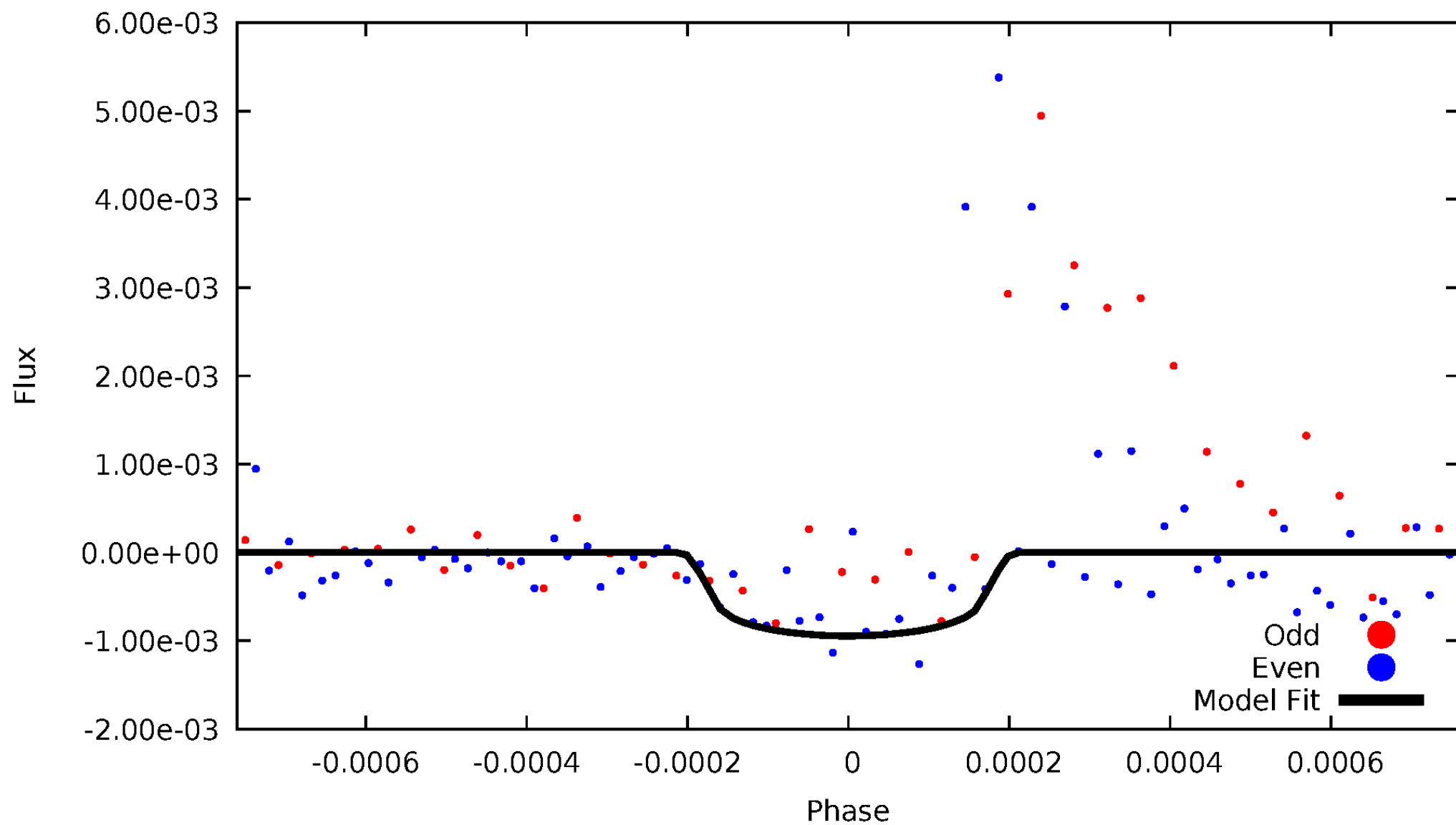


TCE 002860579-06



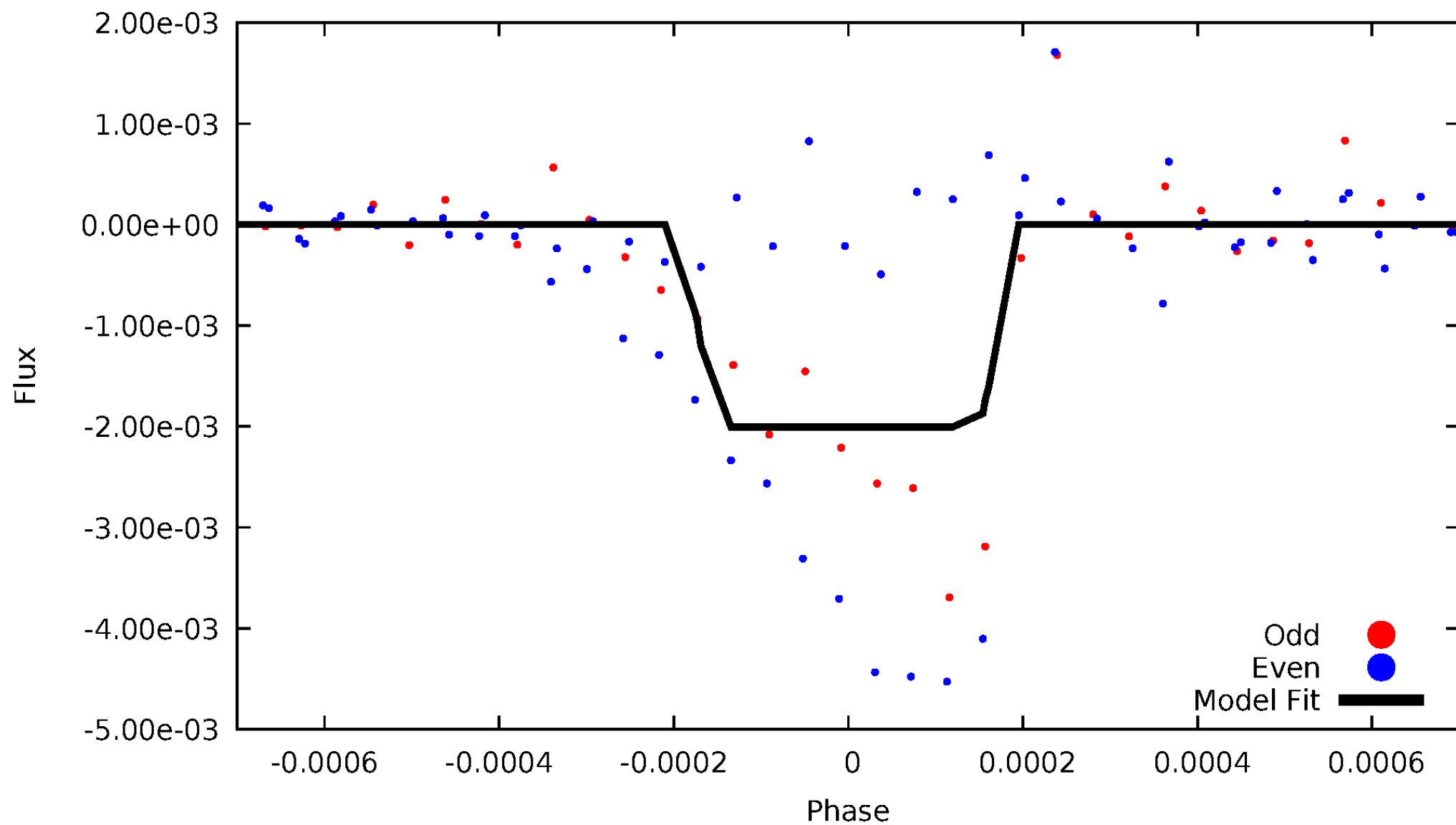
# DV Odd/Even

TCE 002860579-06



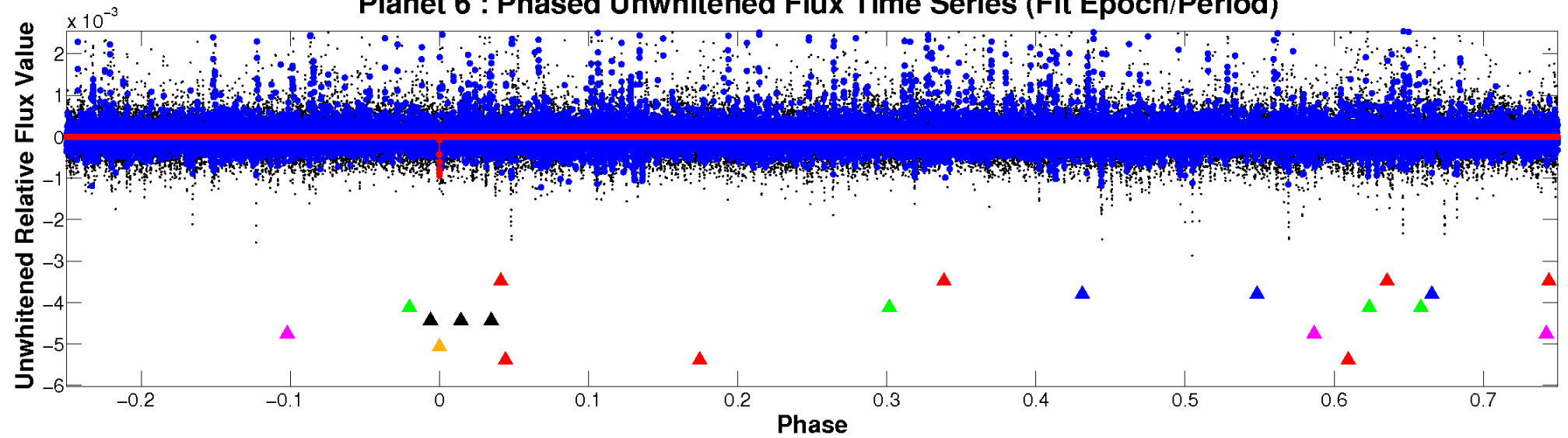
# ALT Odd/Even

TCE 002860579-06

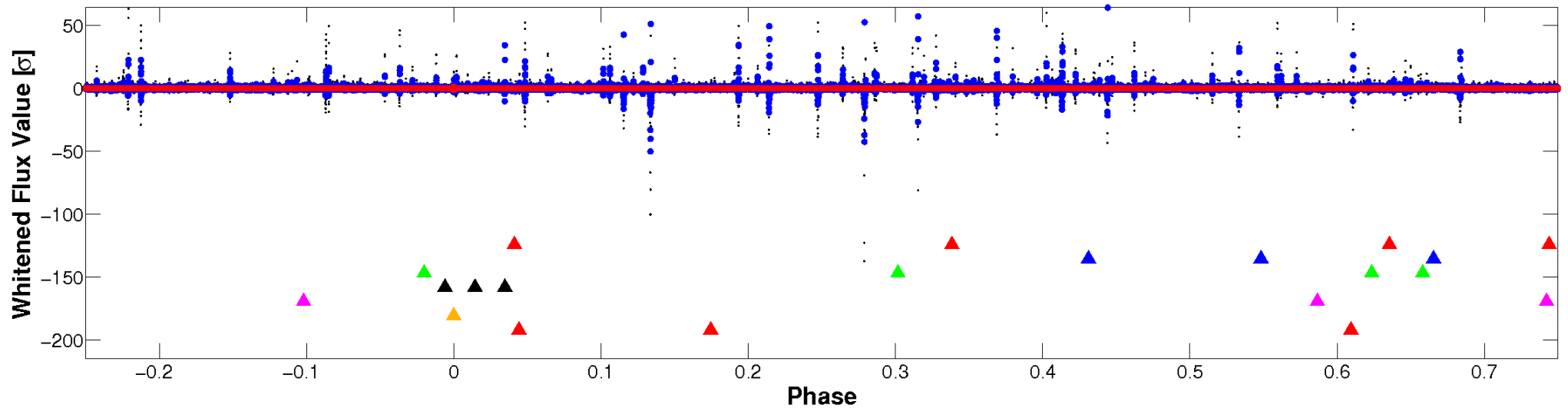


# Non-Whitened Vs. Whitened Light Curve

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

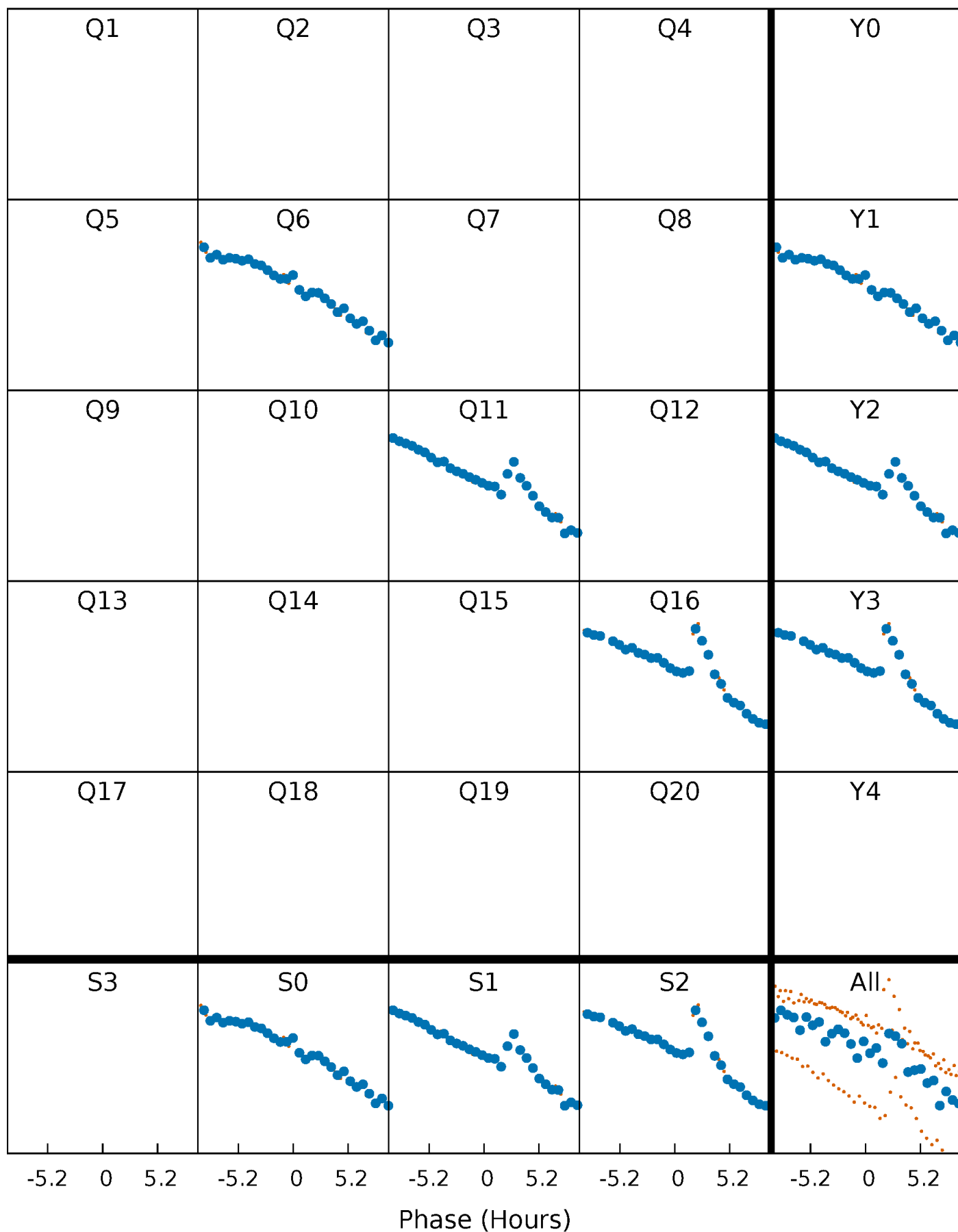


## Planet 6 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

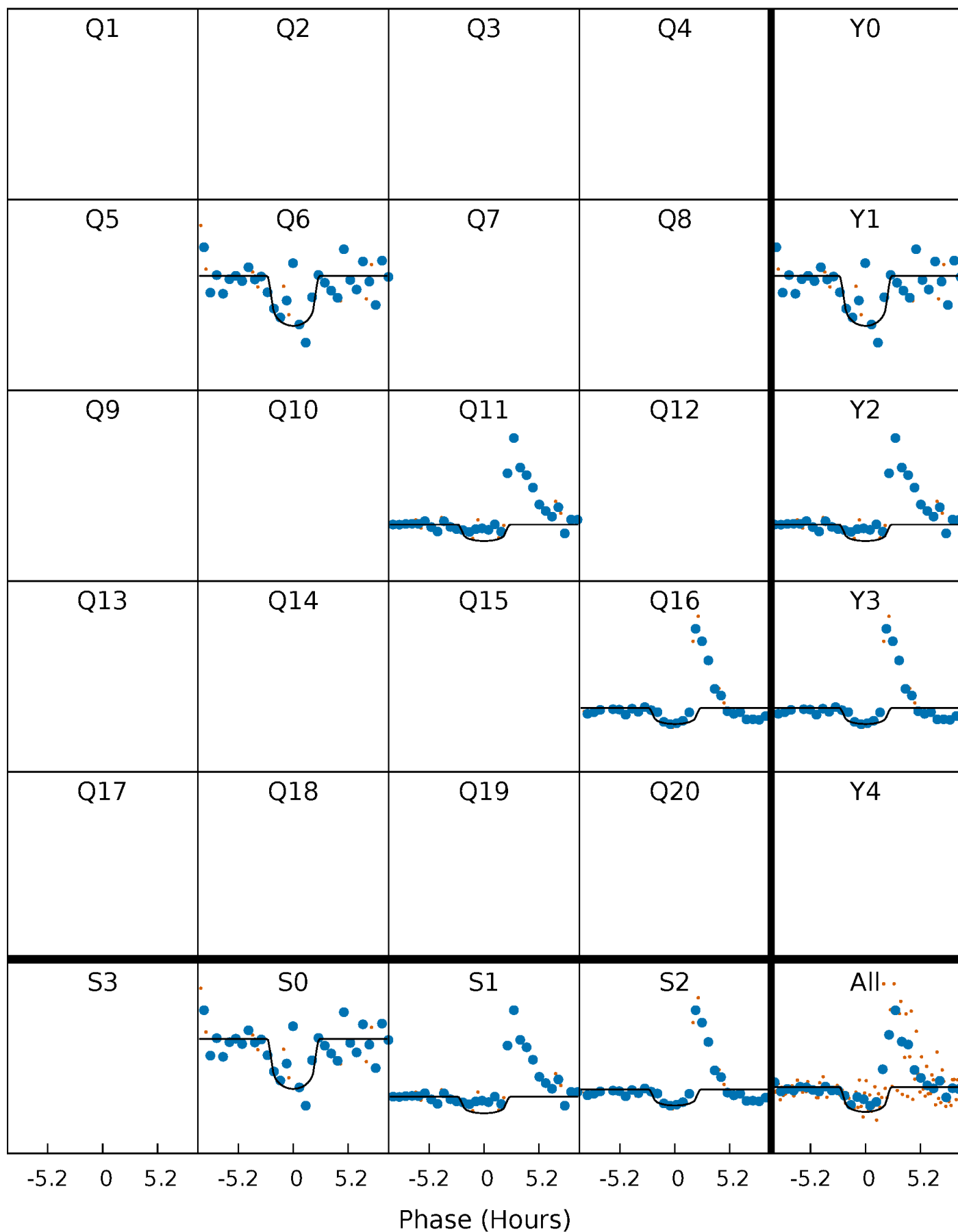
TCE 002860579-06 P=495.661329 Days  $T_0=558.308459$  (BKJD)





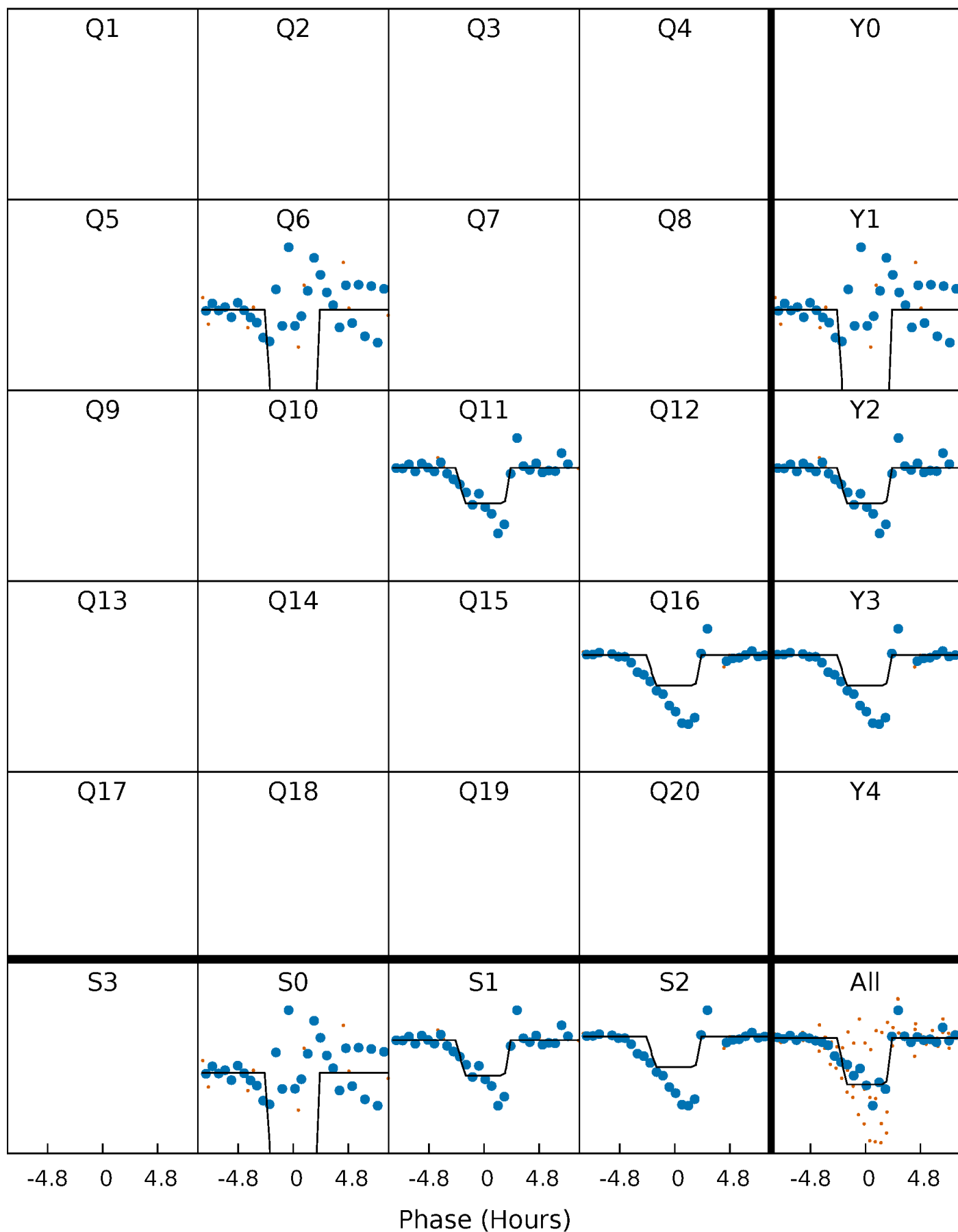
# DV Quarter-Phased Transit Curves

TCE 002860579-06 P=495.661329 Days  $T_0=558.308459$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

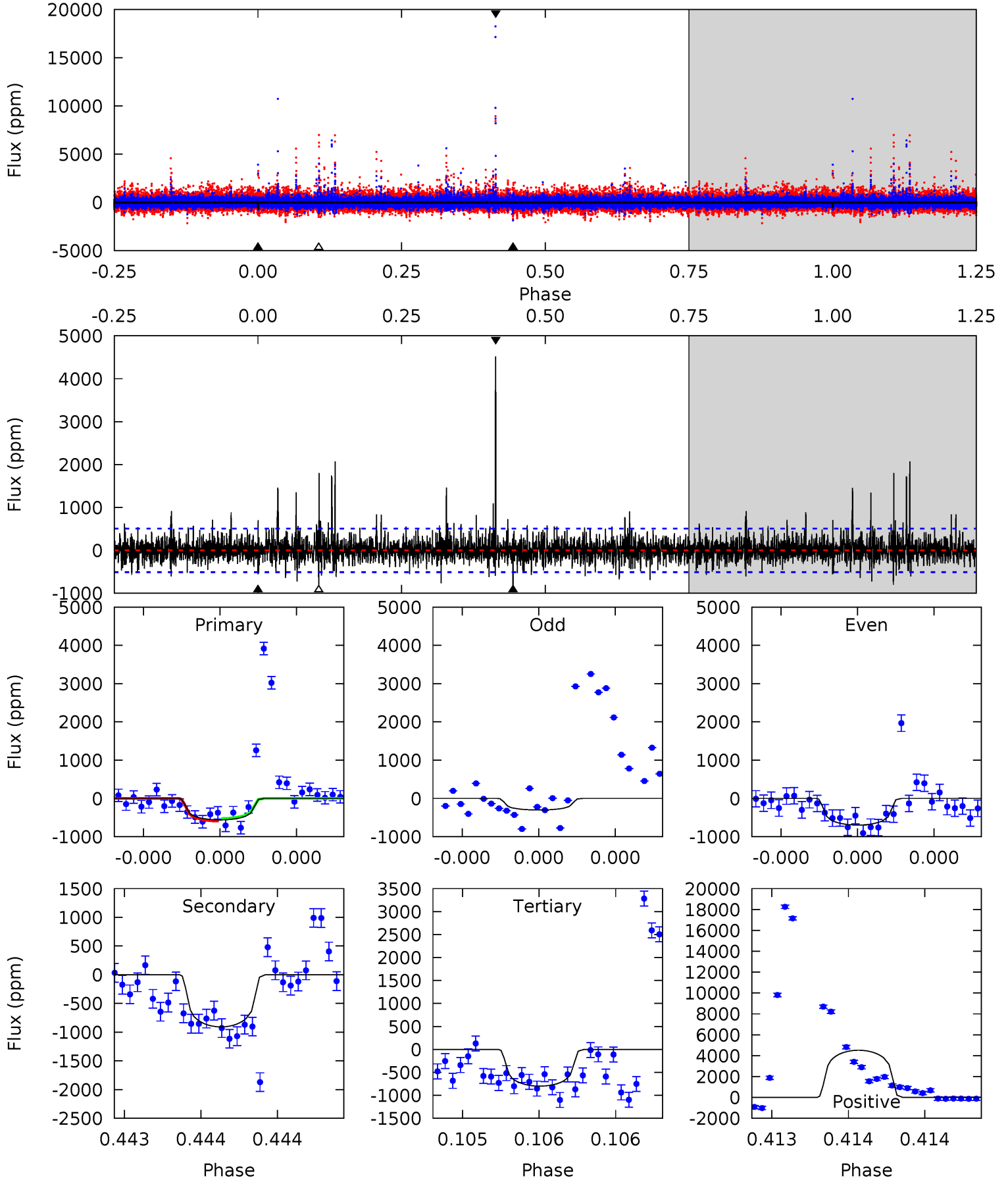
TCE 002860579-06 P=495.636431 Days  $T_0=558.333552$  (BKJD)



# DV Model-Shift Uniqueness Test

002860579-06, P = 495.661329 Days, E = 62.647130 Days

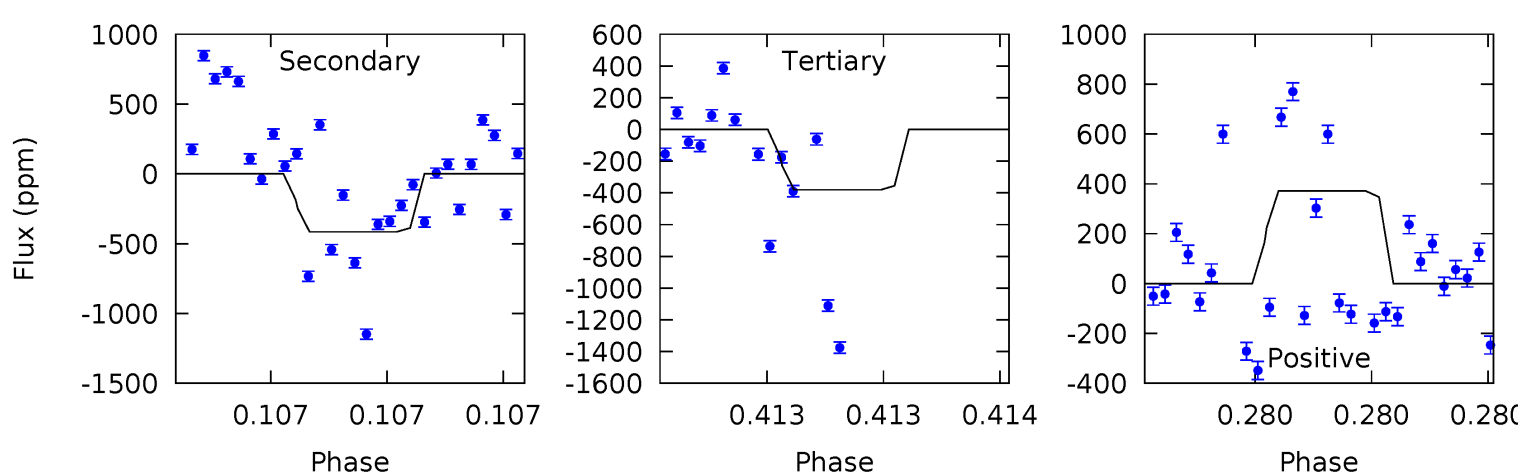
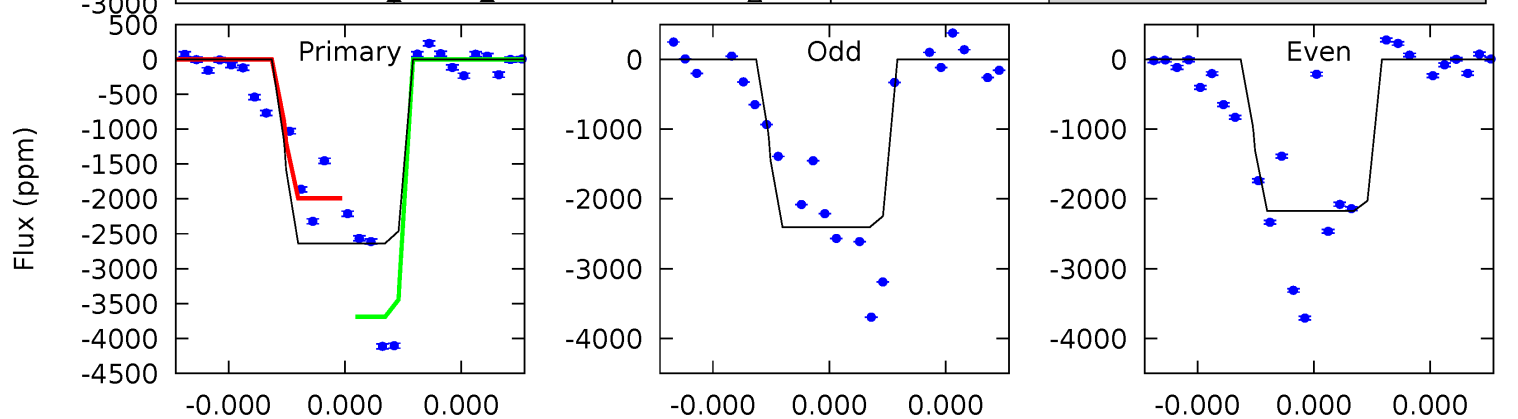
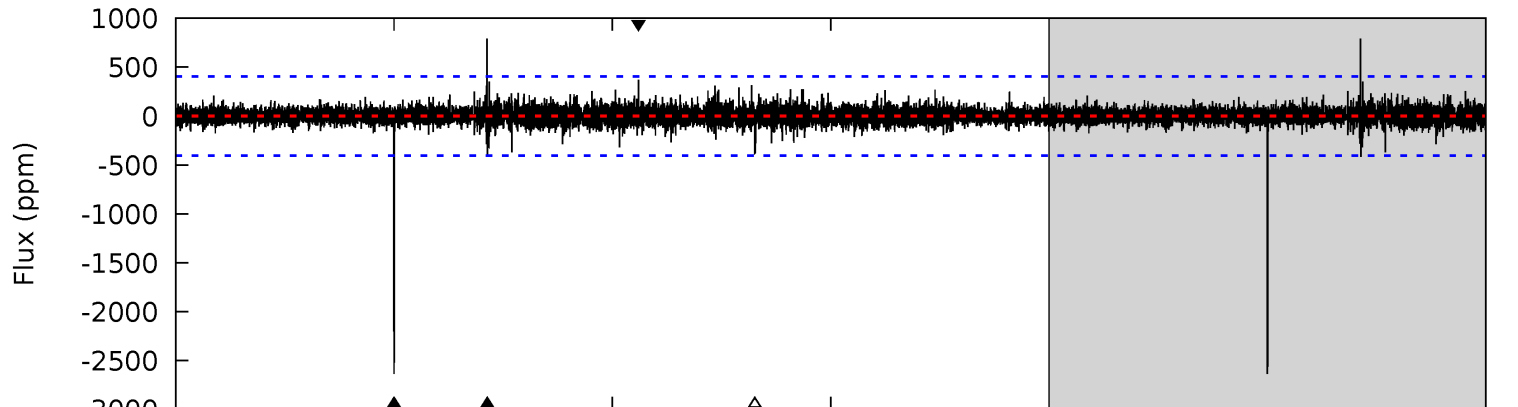
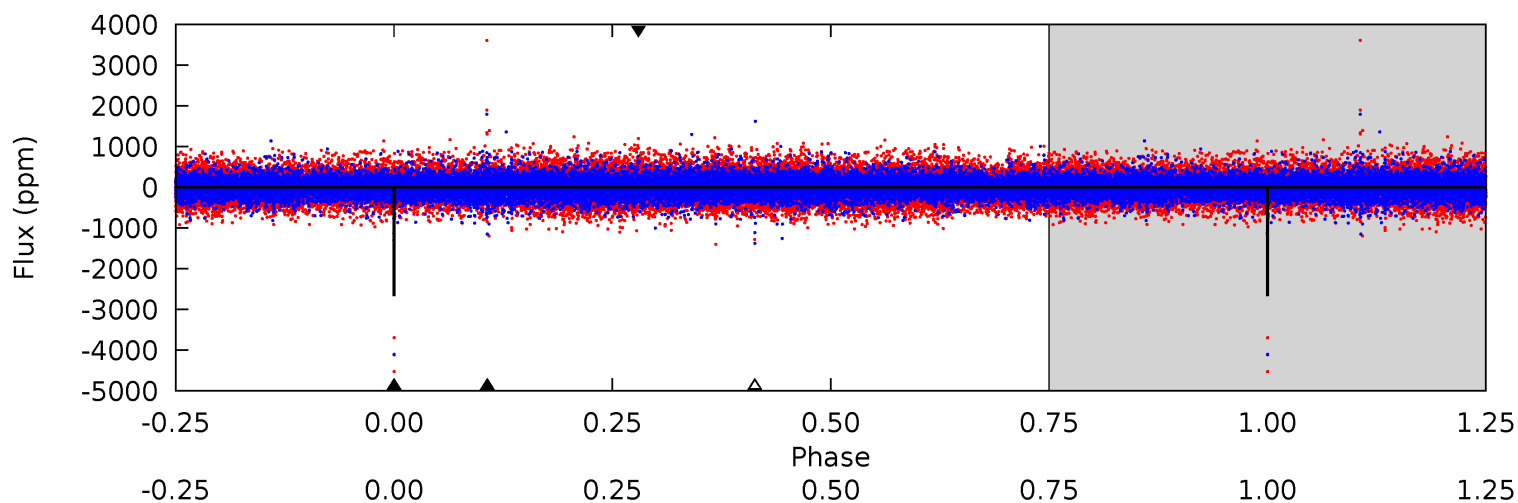
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.22	10.1	8.87	50.1	5.61	3.54	2.29	-2.65	-43.9	1.21	-40.1	0.72	1.13	0.83	0.37



# Alt Model-Shift Uniqueness Test

002860579-06, P = 495.636431 Days, E = 62.697121 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
36.9	5.81	5.32	5.19	5.64	3.59	0.77	31.6	31.7	0.49	0.61	1.96	0.83	0.23	0



### Stellar Parameters For KIC 002860579

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5345^{+160}_{-144}$	$4.533^{+0.093}_{-0.076}$	$-0.460^{+0.300}_{-0.300}$	$0.761^{+0.095}_{-0.095}$	$0.720^{+0.103}_{-0.041}$	$2.305^{+0.908}_{-0.603}$
	+3%/-3%	+2%/-2%	+65%/-65%	+12%/-12%	+14%/-6%	+39%/-26%
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 002860579-06 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-908 \pm 90$	$3.67^{+3.17}_{-2.47}$	$273^{+12}_{-12}$	$4597^{+3270}_{-955}$	$47194^{+379656}_{-34103}$
Alt.	$-415 \pm 72$	$4.48^{+3.20}_{-2.76}$	$273^{+13}_{-10}$	$3711^{+1625}_{-589}$	$14202^{+86222}_{-9265}$

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

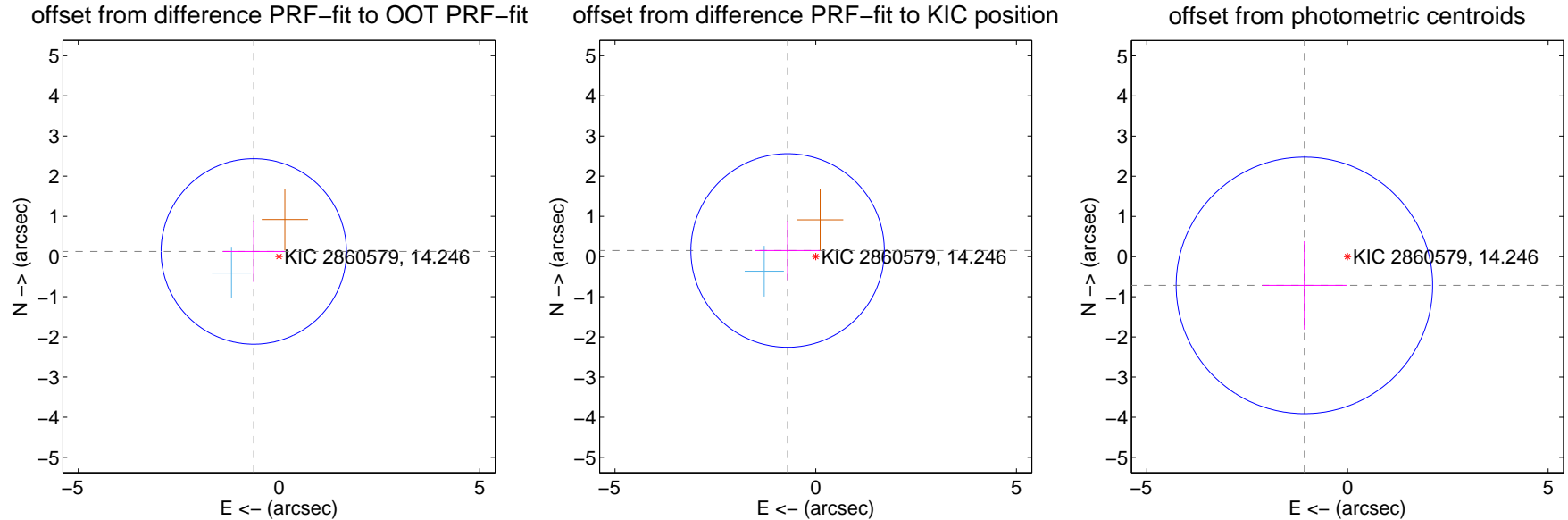
## DV Centroid Data

Supplemental centroid analysis for 002860579-06. Kepler magnitude: 14.25. Transit SNR 6.69

There are 1 quarters with good PRF difference image offsets

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

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.641 \pm 0.769$	0.83	$0.628 \pm 0.770$	$0.127 \pm 0.766$
PRF-fit source offset from KIC position	$0.716 \pm 0.803$	0.89	$0.700 \pm 0.806$	$0.150 \pm 0.736$
photometric centroid source offset	$1.29 \pm 1.06$	1.21	$1.07 \pm 1.05$	$-0.72 \pm 1.10$

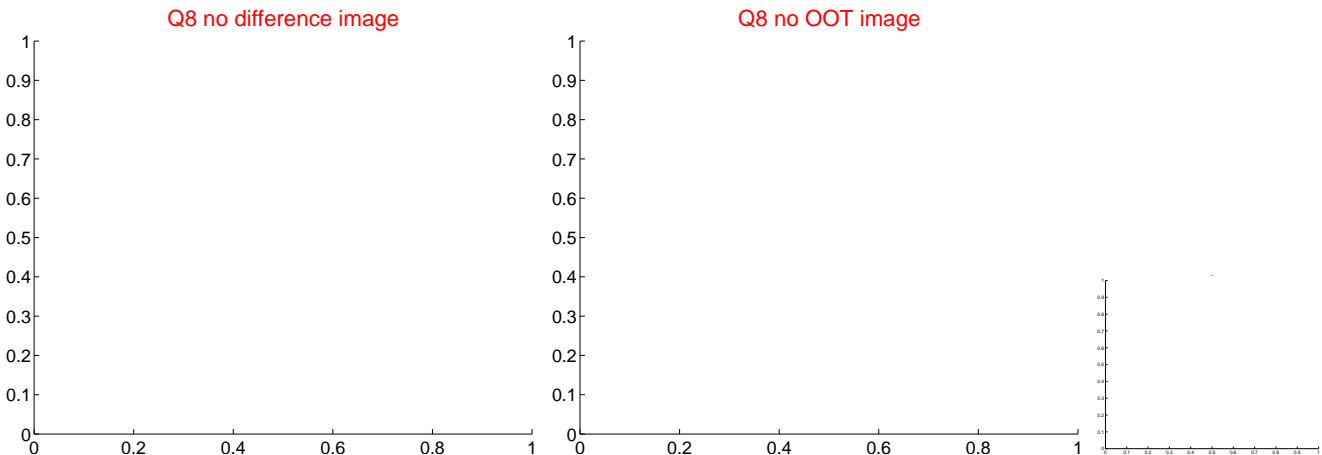
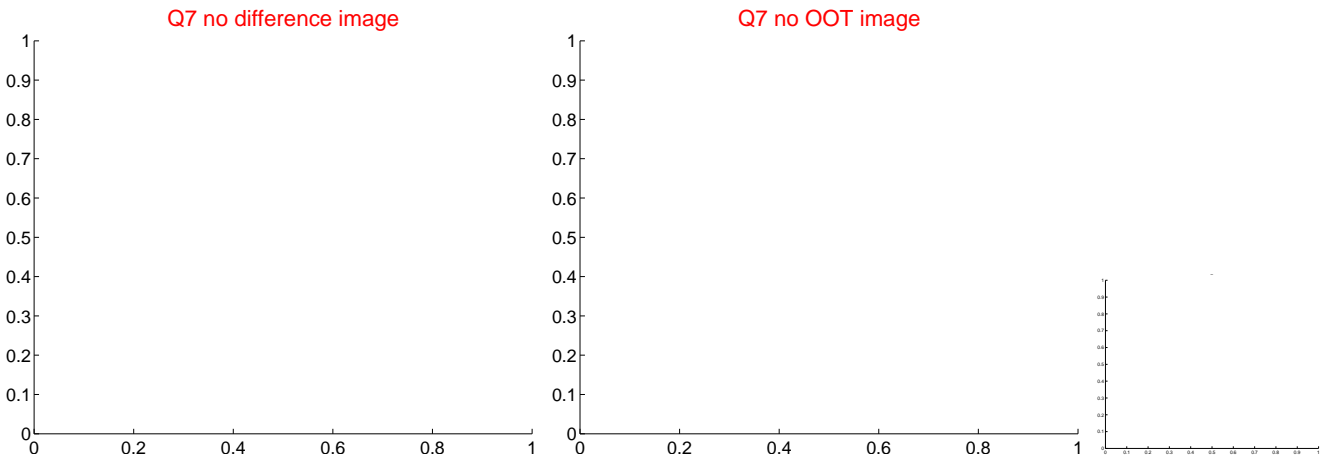
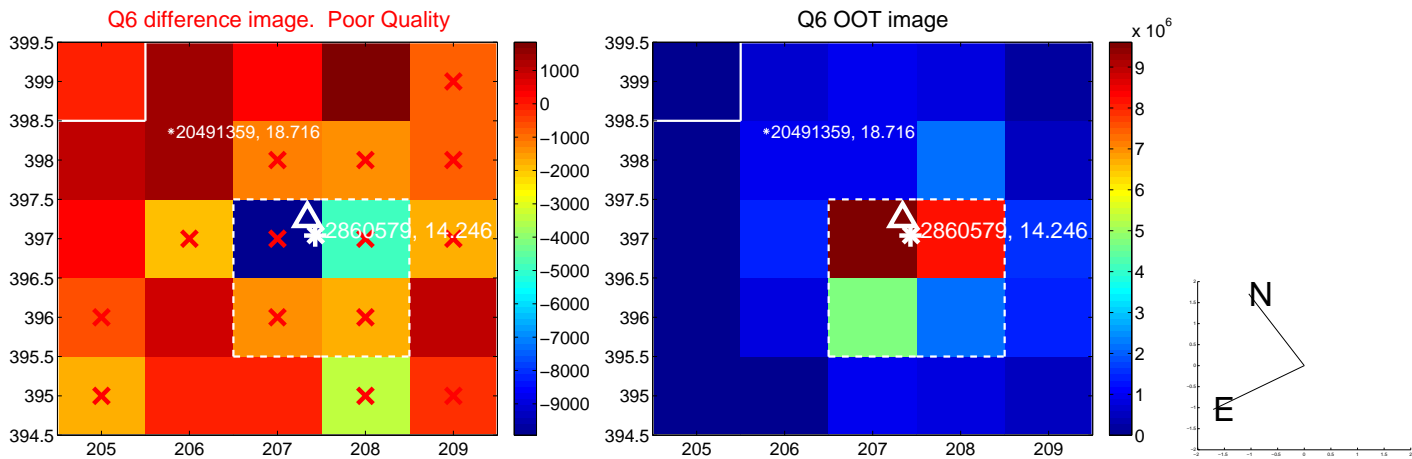
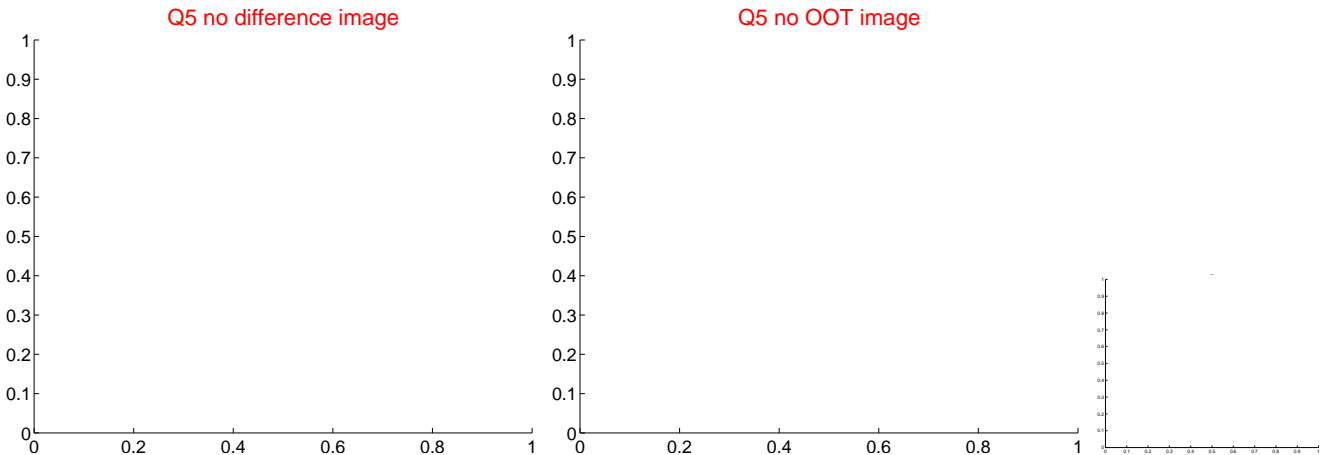


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

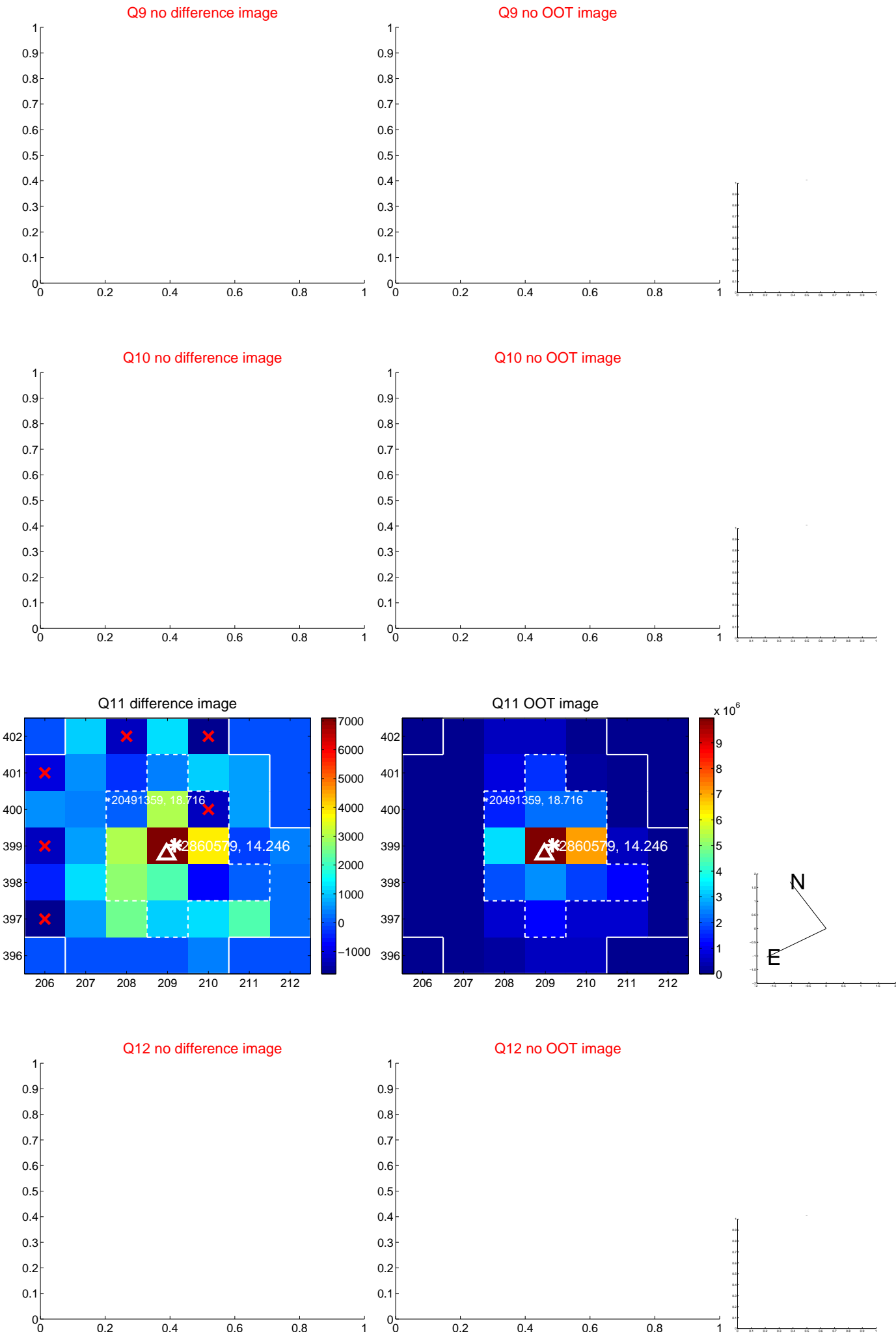


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value





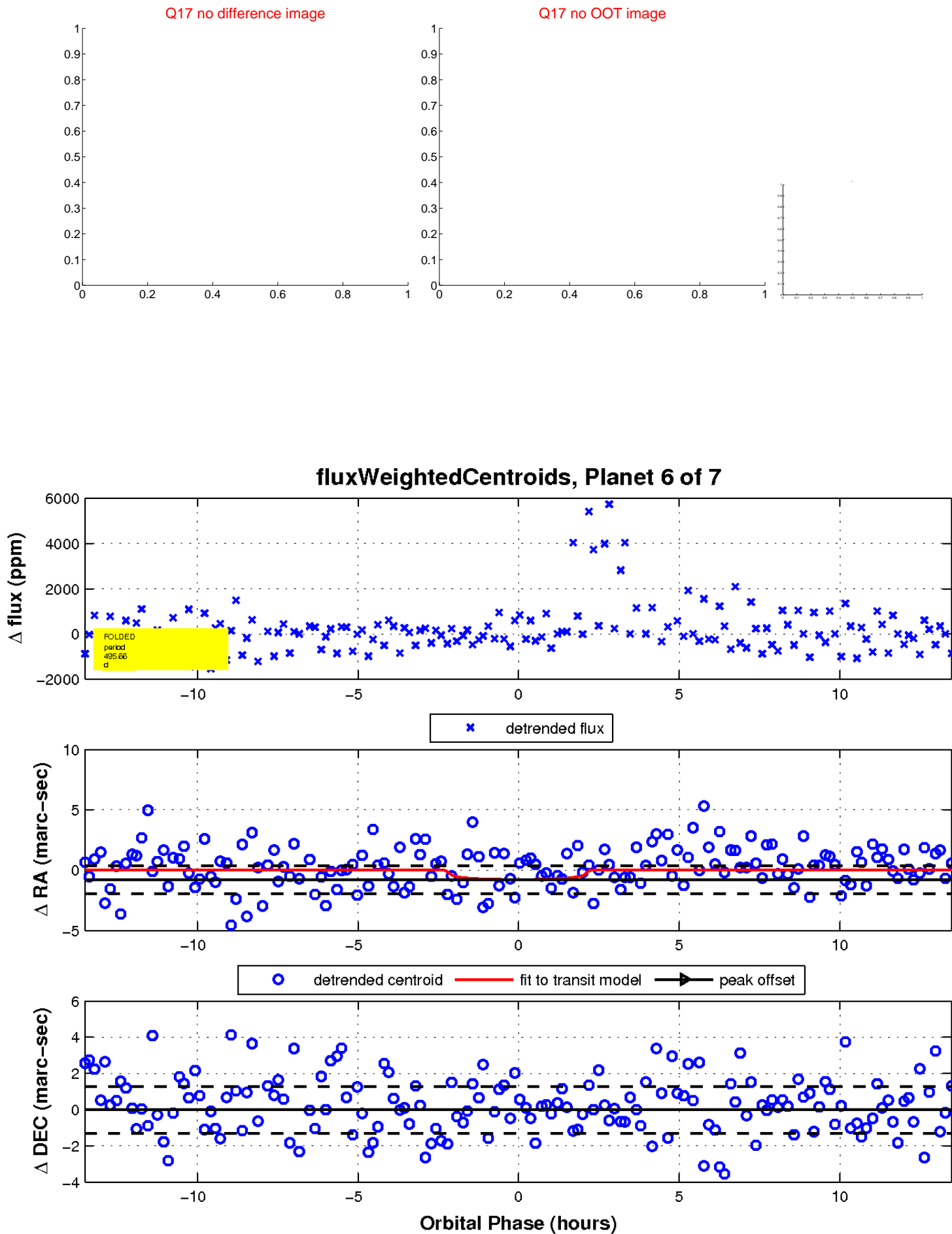
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

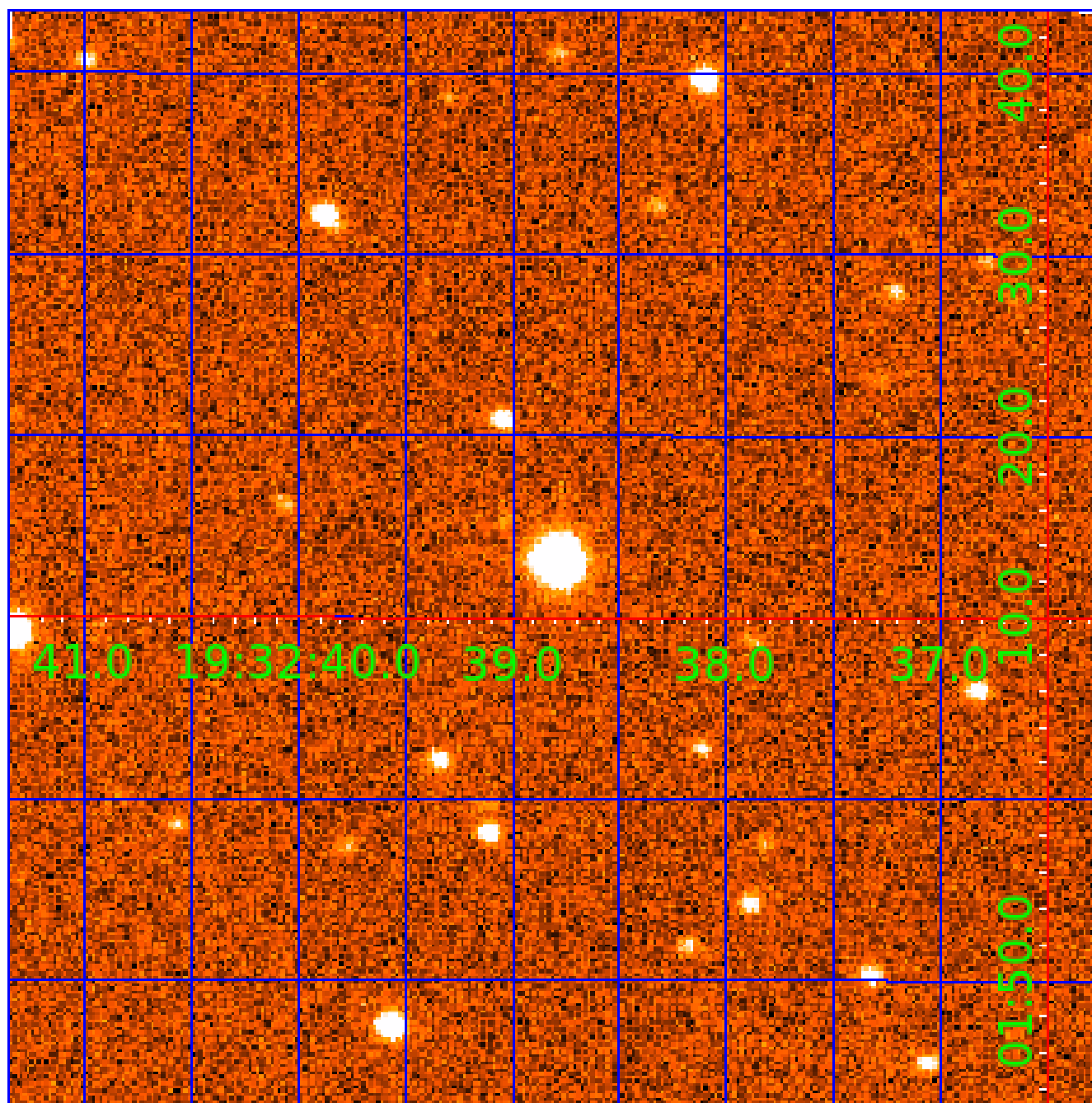


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



# UKIRT Image

Declination



# KIC 002860579

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
002860579-01	OBS	No	348.372609	377.647764	1407.7	7.003	17.5	8.3	0.76	5345	2.85	0.56
002860579-02	OBS	No	437.580170	392.514028	824.6	5.252	16.2	5.1	0.76	5345	2.24	0.41
002860579-03	OBS	No	336.155467	371.710079	848.3	7.410	13.9	5.8	0.76	5345	2.43	0.59
002860579-04	OBS	No	505.753509	555.376823	1396.4	6.438	13.0	9.3	0.76	5345	2.94	0.34
002860579-06	OBS	No	495.661329	558.308458	943.7	4.518	14.4	6.7	0.76	5345	2.45	0.35
002860579-07	OBS	No	711.217301	149.175806	1045.3	6.000	11.8	-1.0	0.76	5345	2.42	0.22

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002860579-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_MEAS
002860579-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
002860579-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
002860579-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—CENT_FEW_DIFFS
002860579-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
002860579-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_NOFITS

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

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

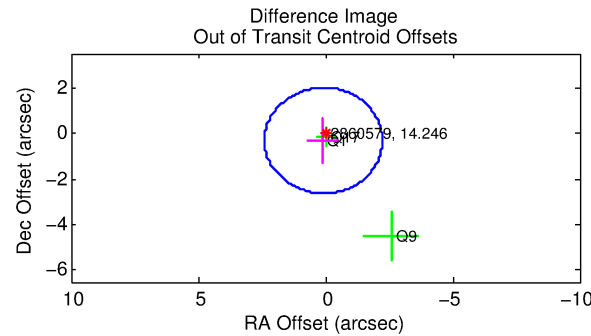
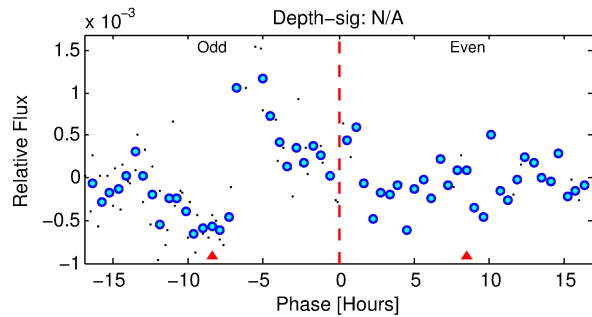
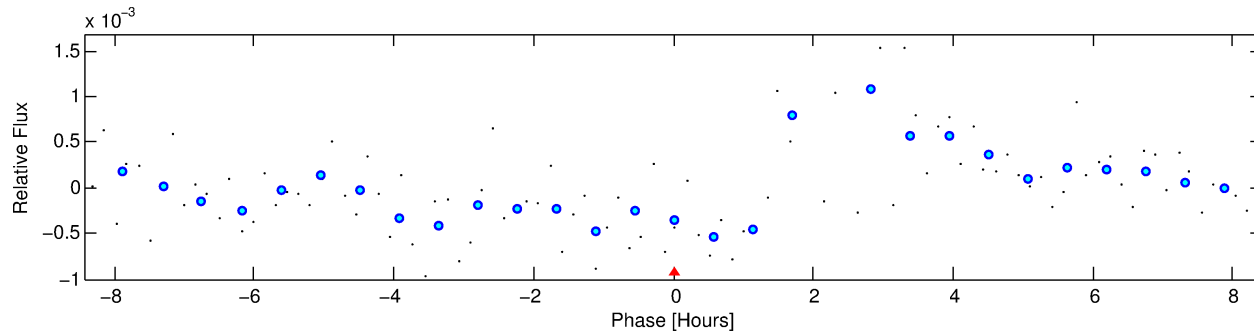
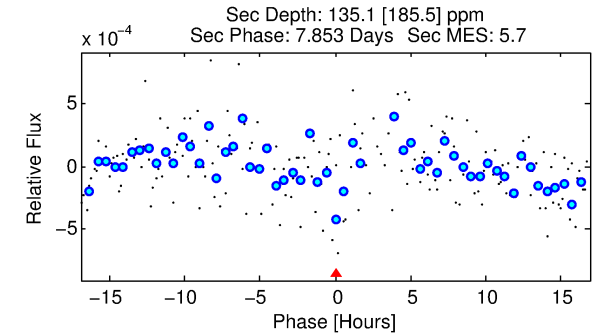
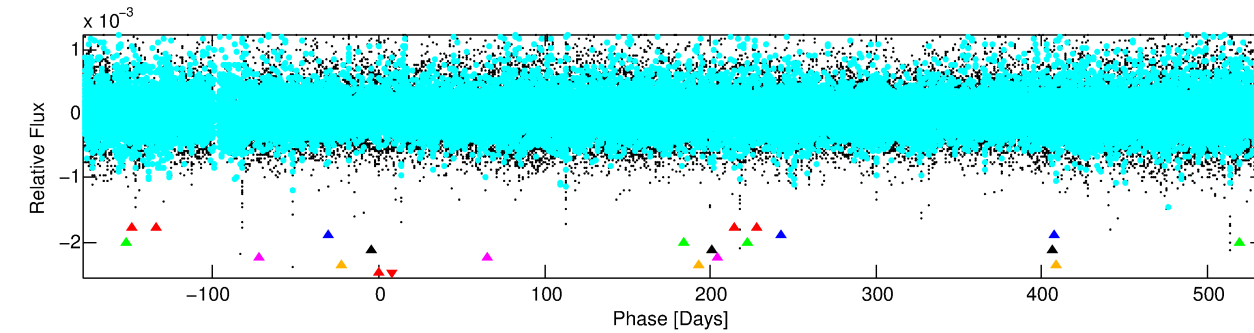
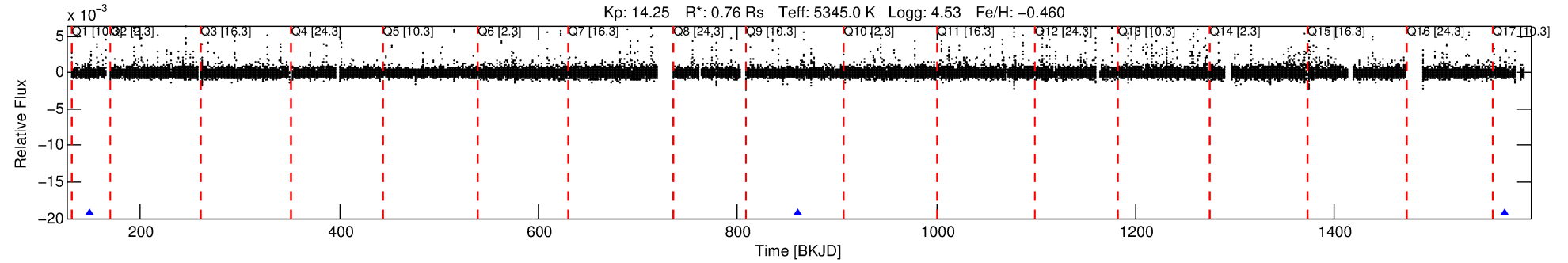
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 002860579-07

No Significant Match Found

# DV One-Page Summary

KIC: 2860579 Candidate: 7 of 7 Period: 711.217 d



## TPS TCE Results:

Period = 711.21730 d  
Epoch = 149.1758 BKJD

DV fit results are unavailable

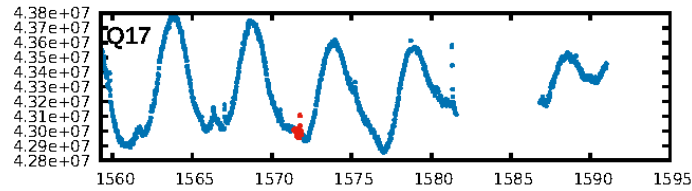
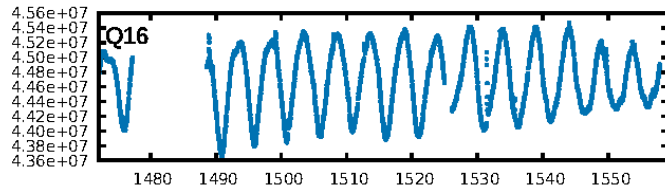
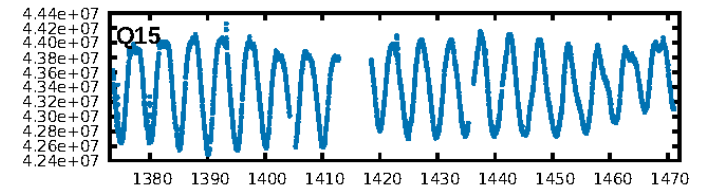
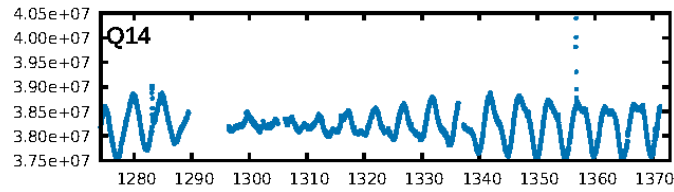
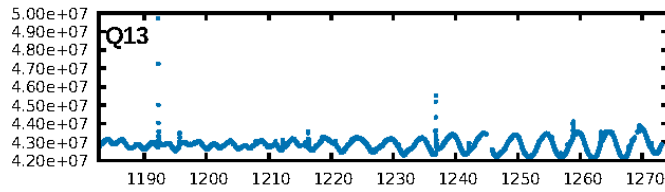
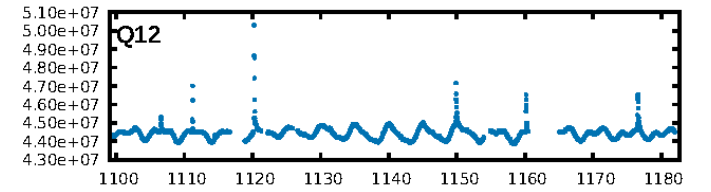
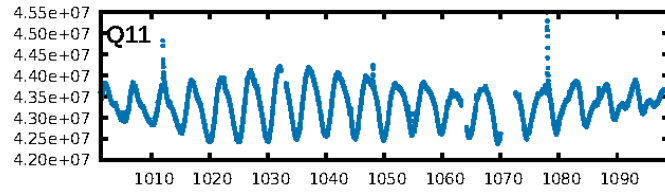
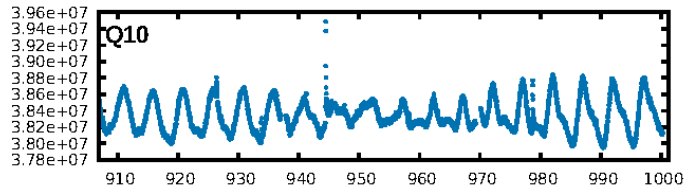
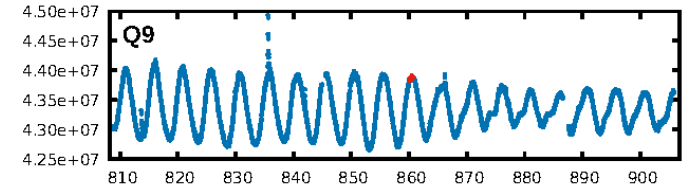
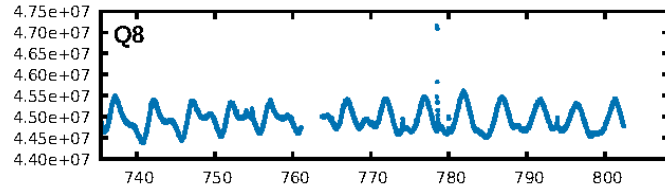
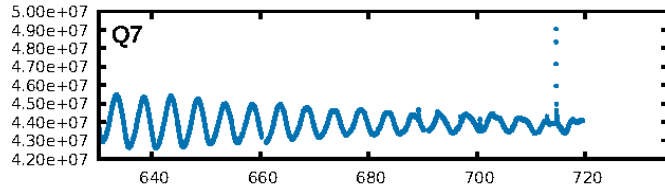
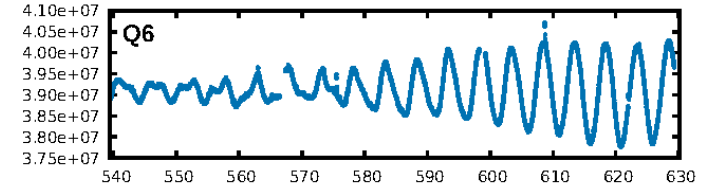
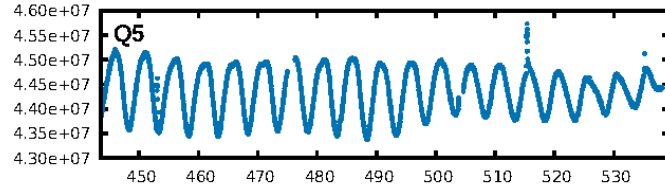
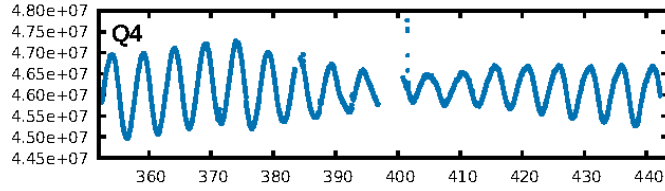
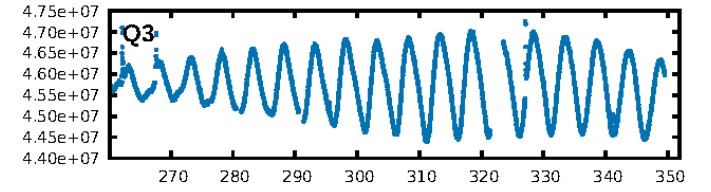
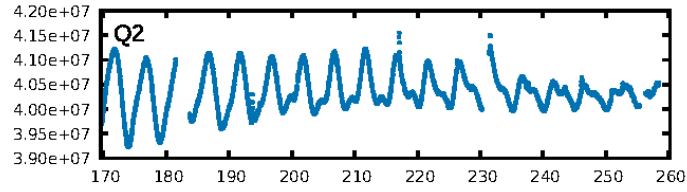
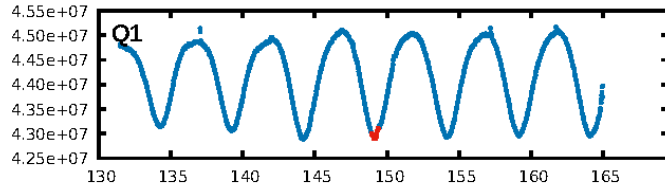
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [428.24 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [1/1]  
GhostDiagnostic-chr: -1.524  
Centroid-sig: 21.3%  
Centroid-so: 2.159 arcsec [1.70 $\sigma$ ]  
OotOffset-rm: 0.319 arcsec [0.41 $\sigma$ ]  
KicOffset-rm: 0.355 arcsec [0.46 $\sigma$ ]  
OotOffset-st: 0/0/0/3 [3]  
KicOffset-st: 0/0/0/3 [3]  
DiffImageQuality-fgm: 0.67 [2/3]  
DiffImageOverlap-fno: 1.00 [3/3]

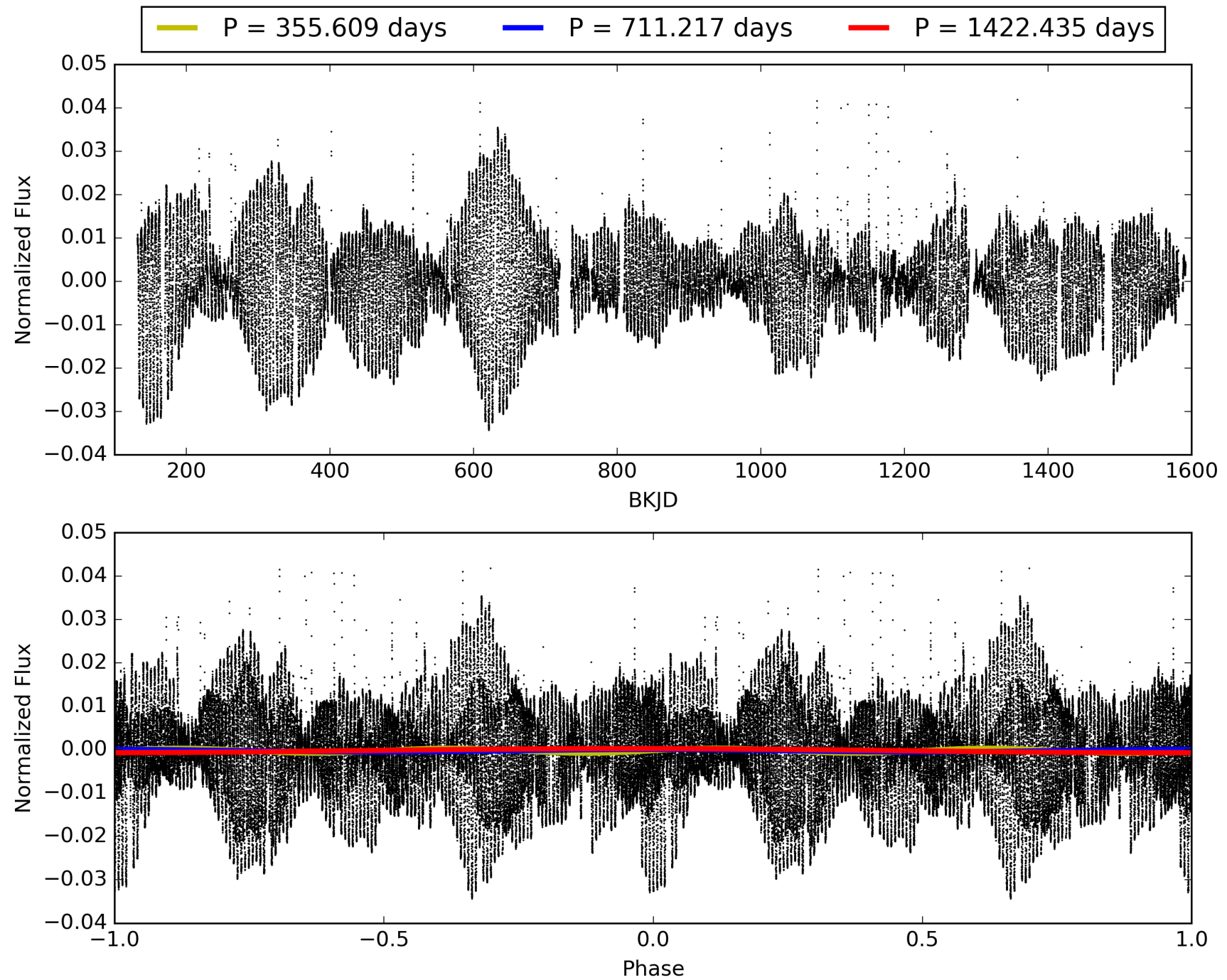
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 05:59:18 Z

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

# TCE 002860579-07, PDC Light Curves



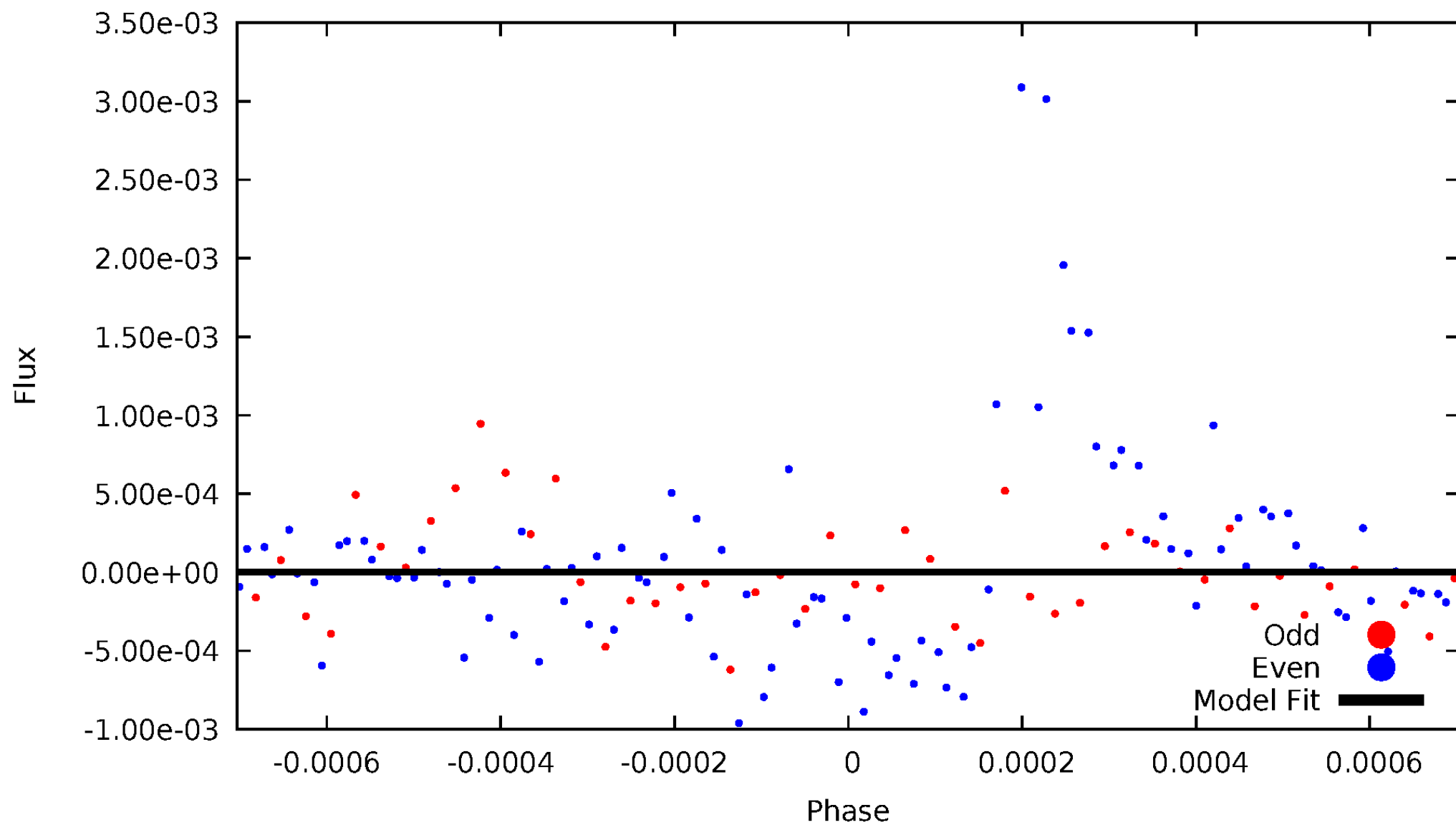
TCE 002860579-07





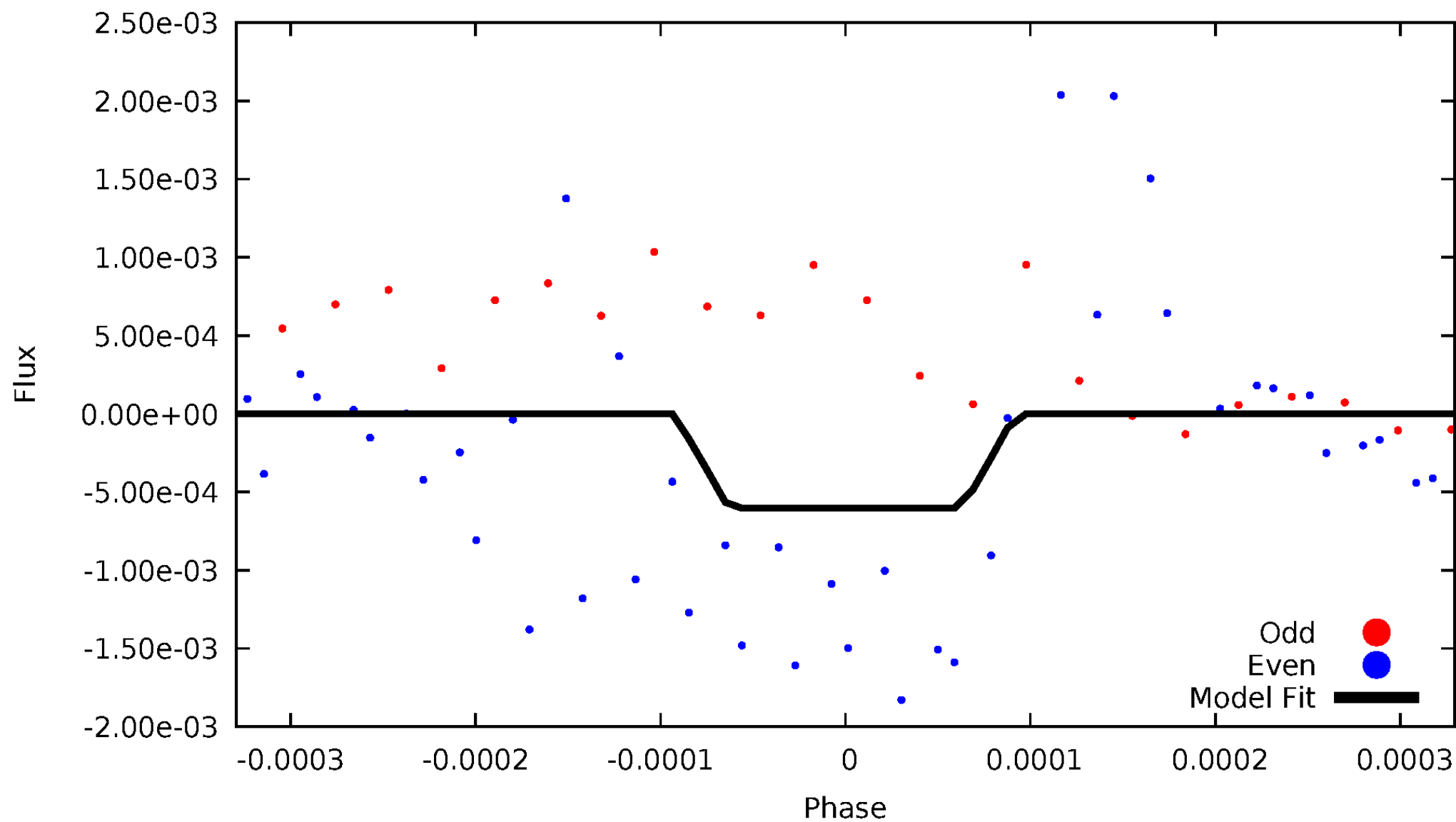
# DV Odd/Even

TCE 002860579-07

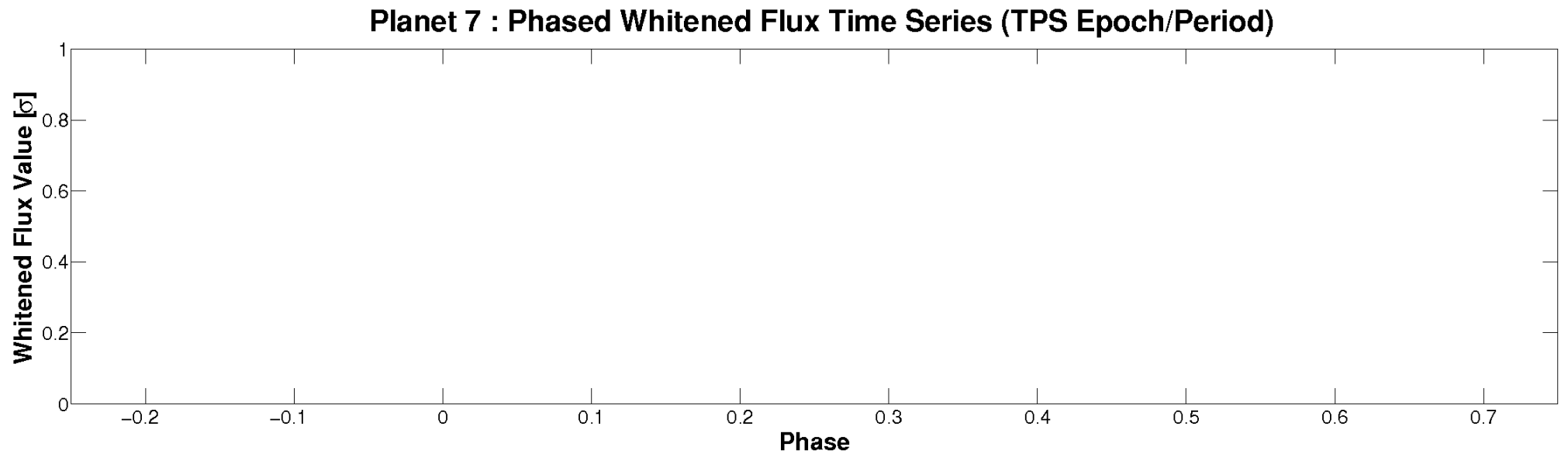
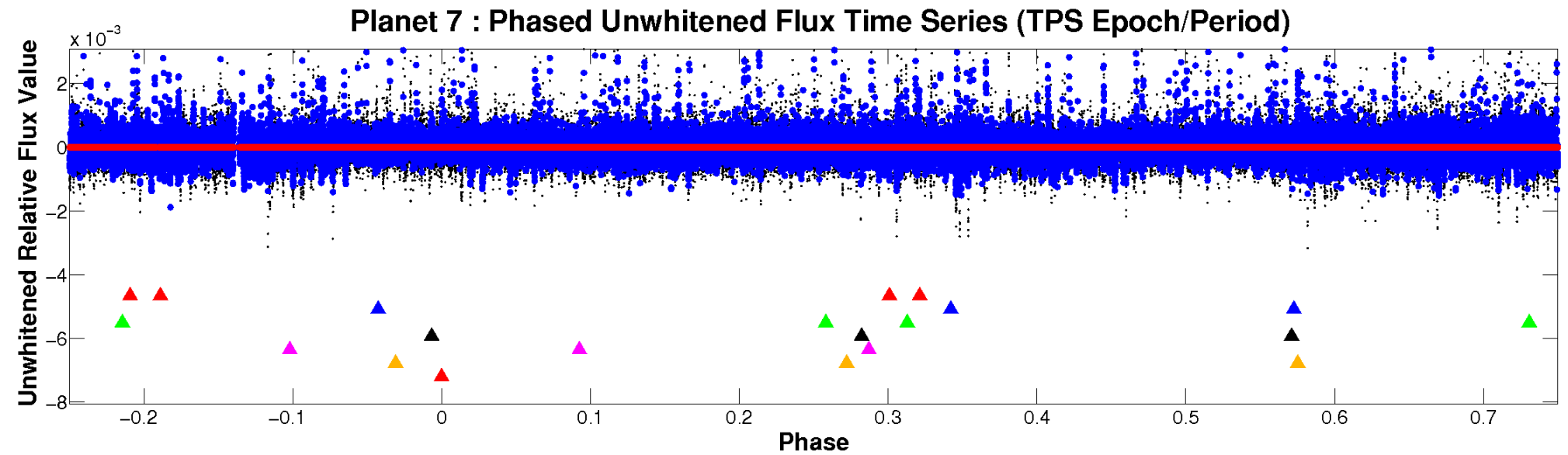


# ALT Odd/Even

TCE 002860579-07

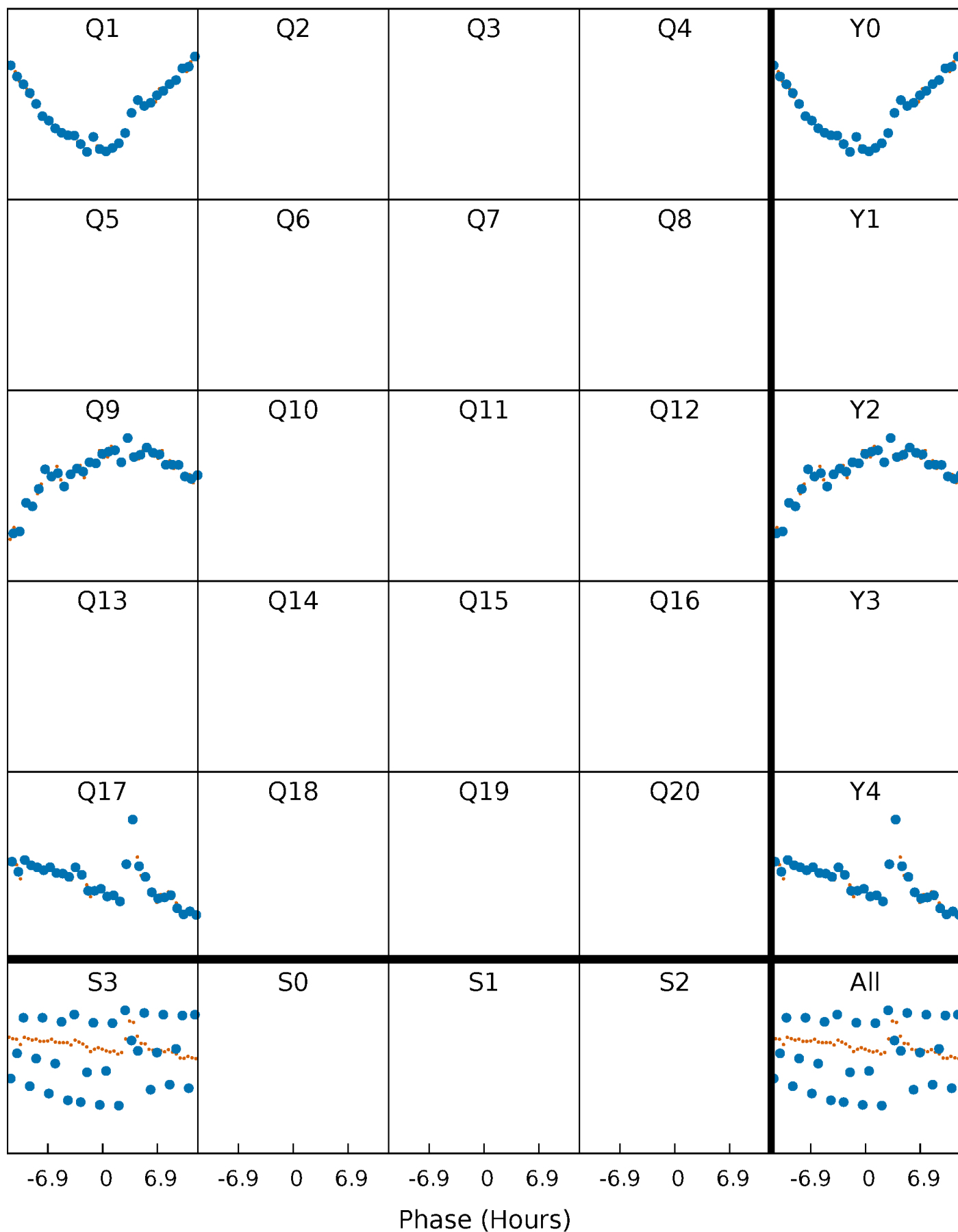


# Non-Whitened Vs. Whitened Light Curve



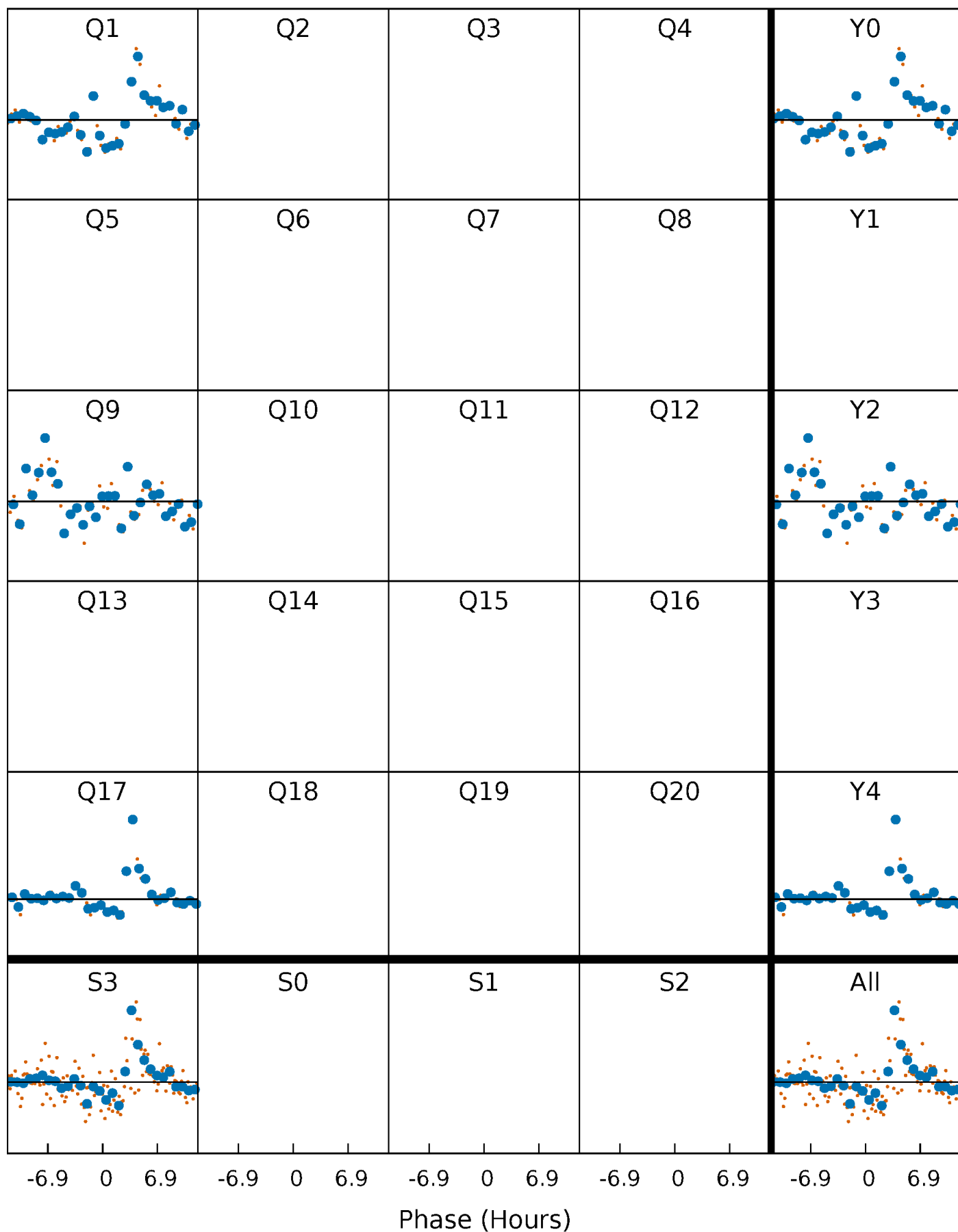
# PDC Quarter-Phased Transit Curves

TCE 002860579-07     $P=711.217300$  Days     $T_0=149.175806$  (BKJD)



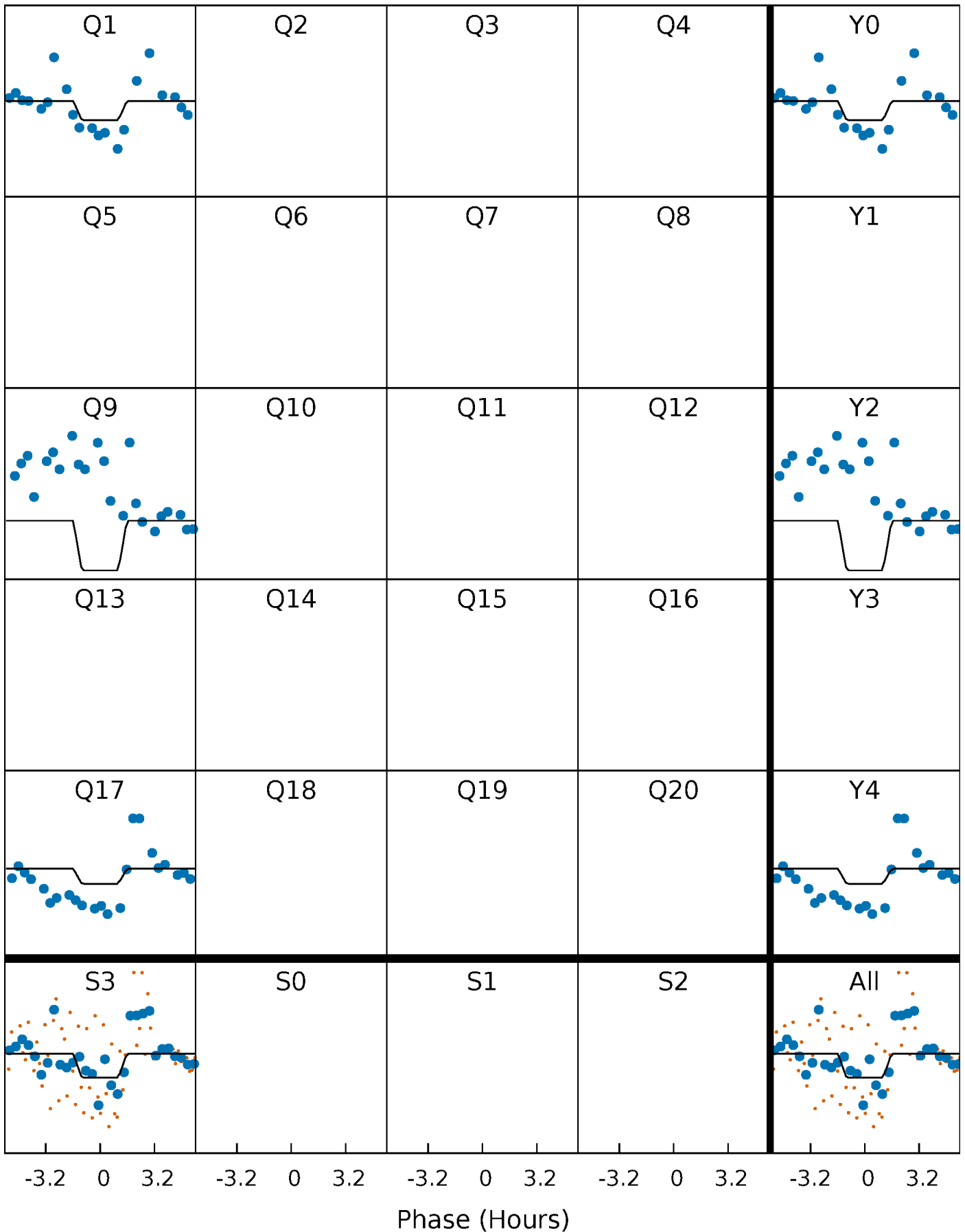
# DV Quarter-Phased Transit Curves

TCE 002860579-07     $P=711.217300$  Days     $T_0=149.175806$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

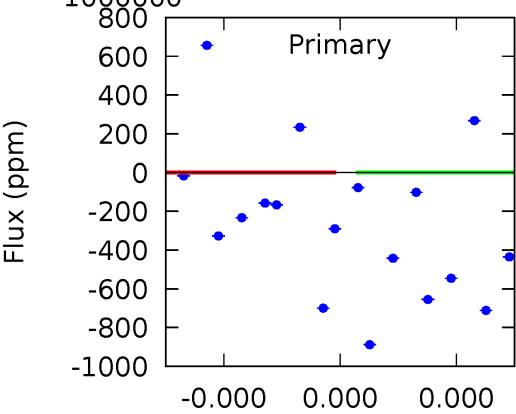
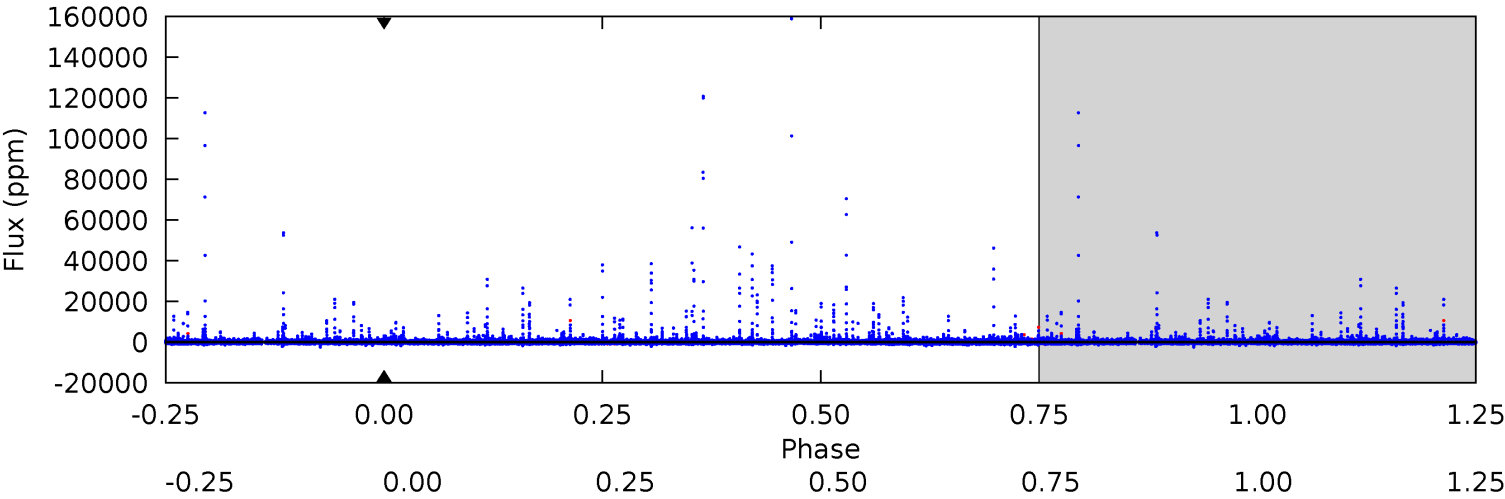
TCE 002860579-07     $P=711.217300$  Days     $T_0=149.234541$  (BKJD)



# DV Model-Shift Uniqueness Test

002860579-07, P = 711.217300 Days, E = 149.175806 Days

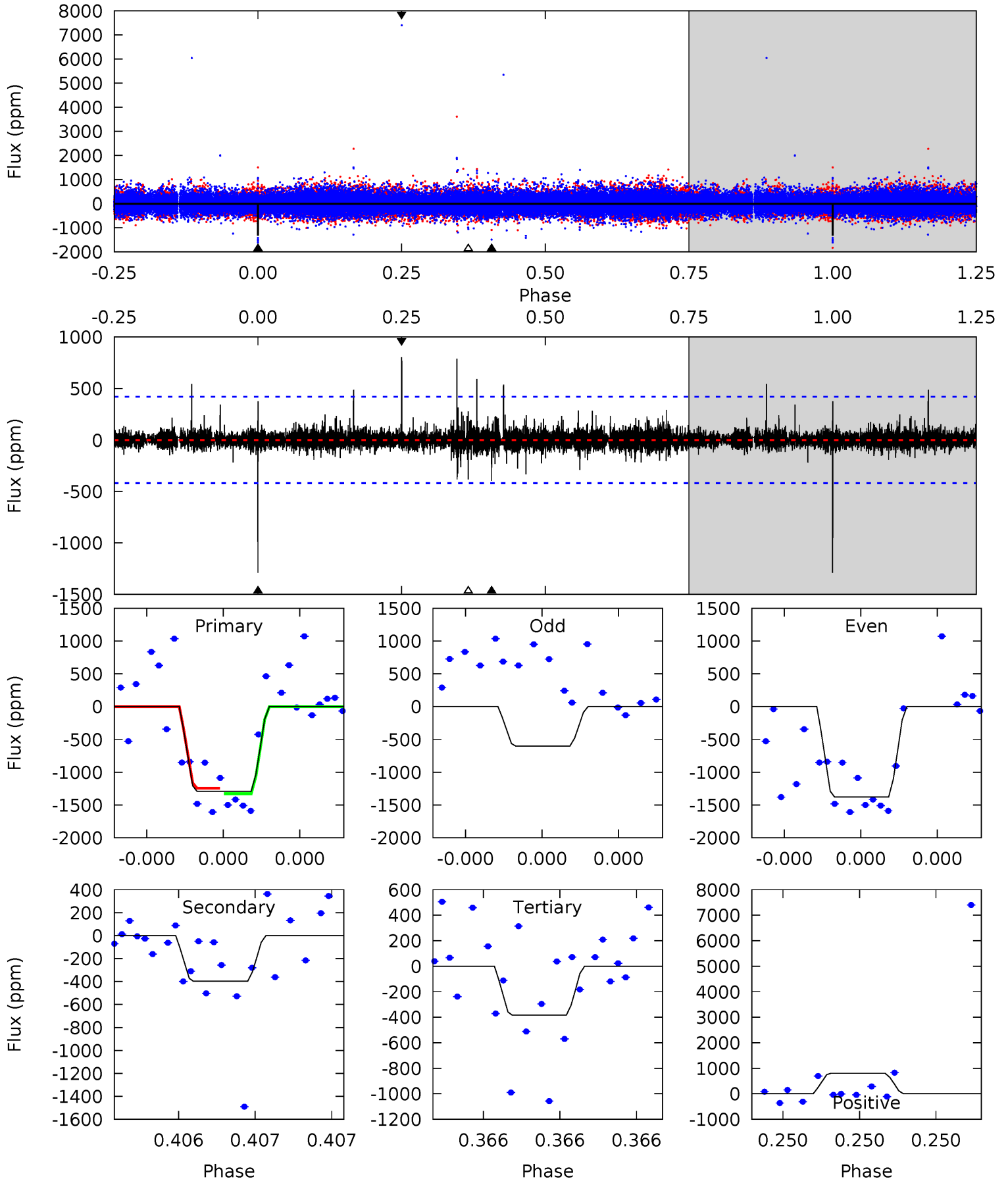
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



# Alt Model-Shift Uniqueness Test

002860579-07, P = 711.217300 Days, E = 149.234541 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
17.7	5.46	5.27	11.1	5.77	3.77	0.70	12.5	6.67	0.19	-5.60	3.48	0.64	0.38	0.57





### Stellar Parameters For KIC 002860579

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5345^{+160}_{-144}$	$4.533^{+0.093}_{-0.076}$	$-0.460^{+0.300}_{-0.300}$	$0.761^{+0.095}_{-0.095}$	$0.720^{+0.103}_{-0.041}$	$2.305^{+0.908}_{-0.603}$
	+3%/-3%	+2%/-2%	+65%/-65%	+12%/-12%	+14%/-6%	+39%/-26%
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 002860579-07 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$0 \pm 1000000$	$6.76^{+7.19}_{-4.58}$	$243^{+11}_{-11}$	$-3933^{+18329}_{-12268}$	$-28274.292^{+3703456.494}_{-4566833.658}$
Alt.	$-397 \pm 73$	$6.80^{+6.47}_{-4.81}$	$243^{+11}_{-10}$	$3220^{+1825}_{-551}$	$9347^{+108226}_{-6916}$

$T_{max}$  = 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

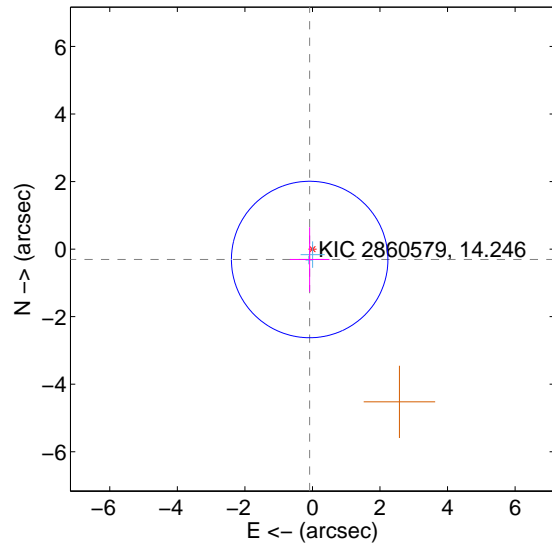
Supplemental centroid analysis for 002860579-07. Kepler magnitude: 14.25. Transit SNR -1.00

There are 2 quarters with good PRF difference image offsets

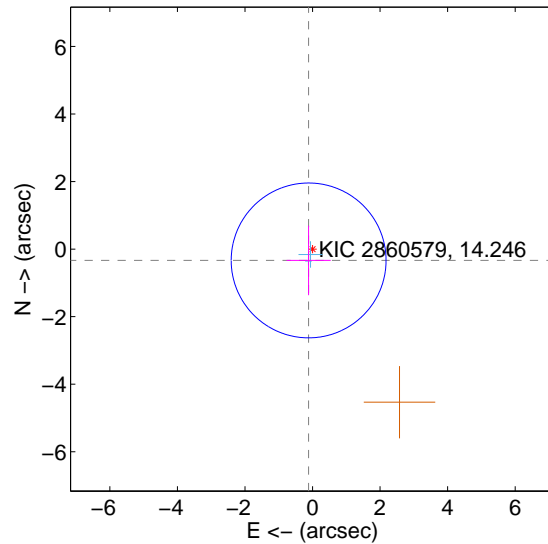
The direct PRF centroid is offset from the target star catalog position by about 0.07 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.319 \pm 0.772$	0.41	$0.082 \pm 0.587$	$-0.308 \pm 0.954$
PRF-fit source offset from KIC position	$0.355 \pm 0.764$	0.46	$0.115 \pm 0.652$	$-0.335 \pm 1.029$
photometric centroid source offset	$2.16 \pm 1.27$	1.70	$1.63 \pm 1.26$	$-1.42 \pm 1.28$

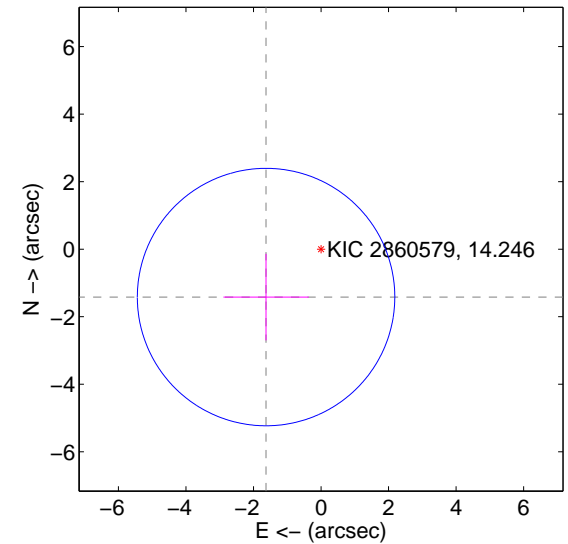
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

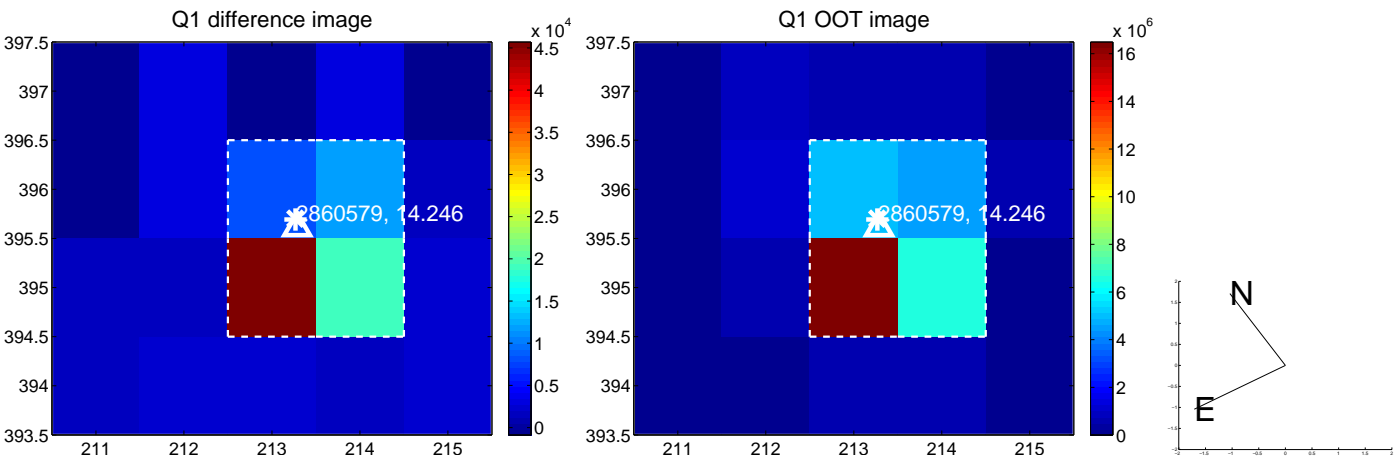


offset from photometric centroids



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

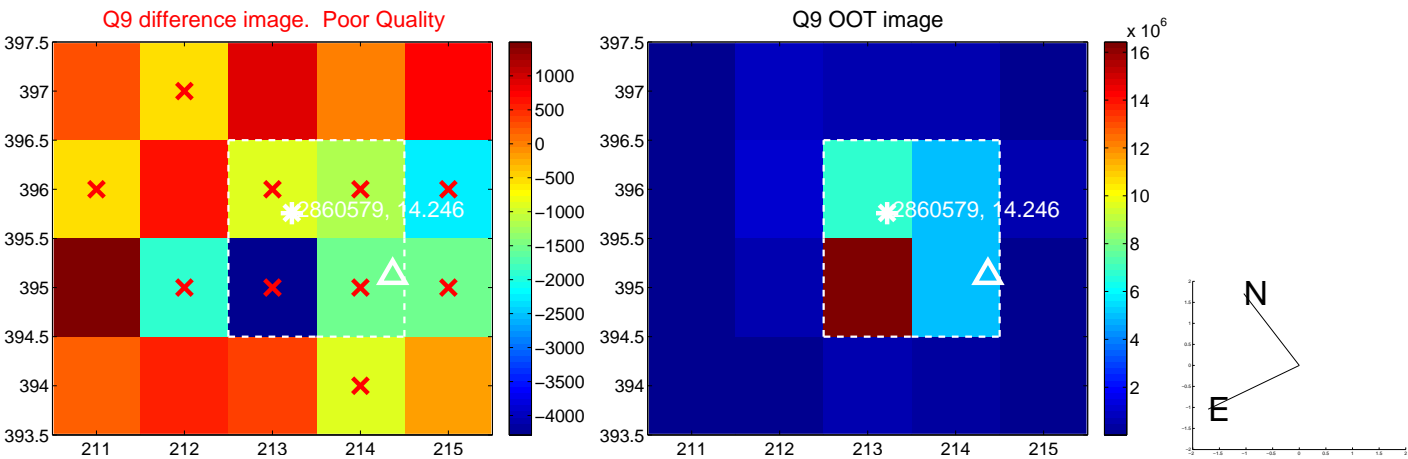
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



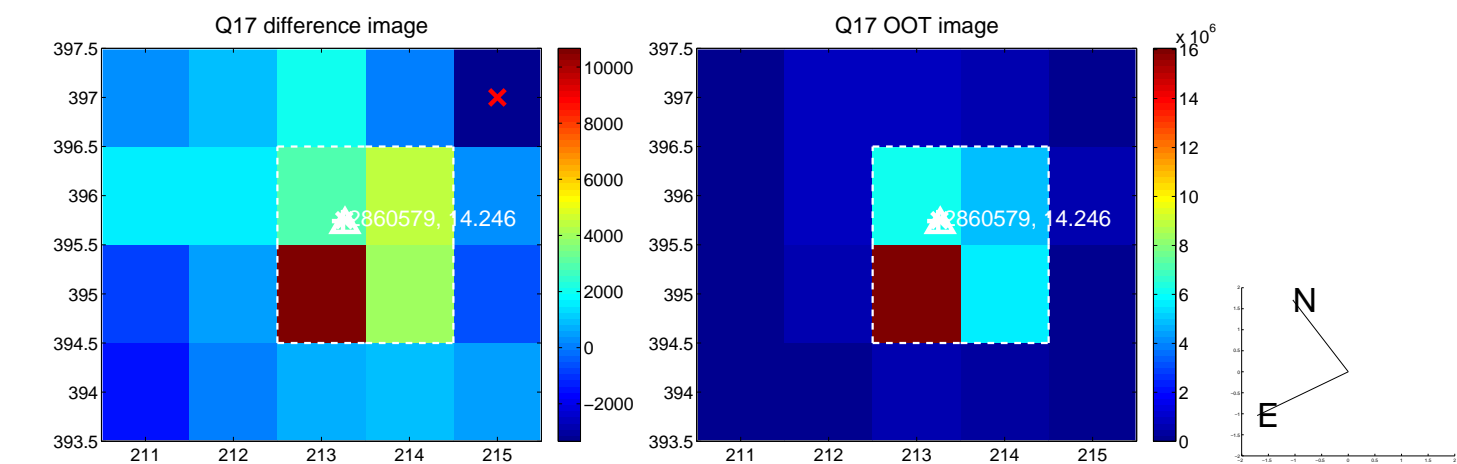
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.



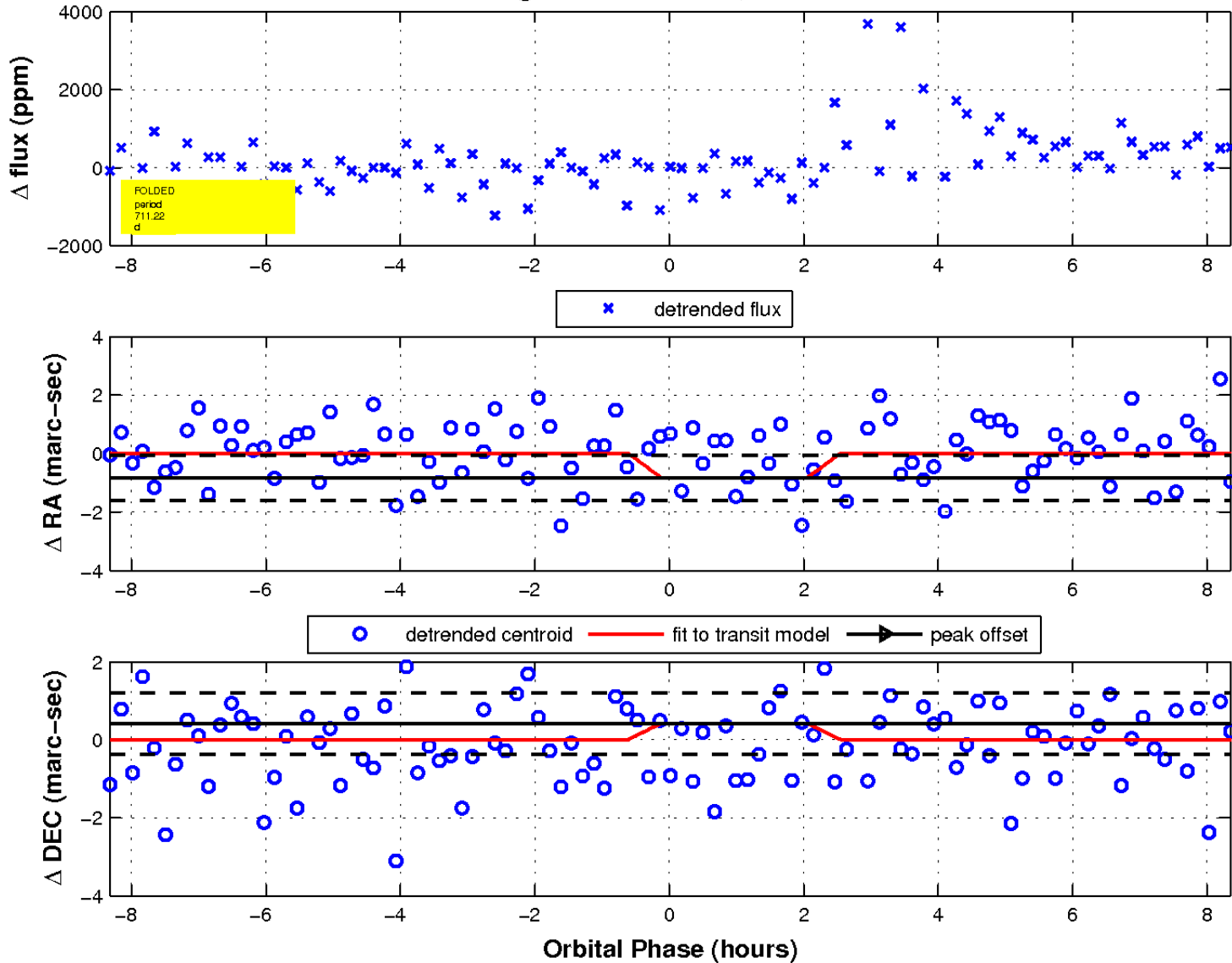
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 7 of 7



# UKIRT Image

Declination

