

# KIC 011859900

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
011859900-01	OBS	No	439.604995	501.827165	2033.7	3.792	16.8	8.4	0.67	4247	2.98	0.14
011859900-02	OBS	No	583.779998	327.887722	1009.5	12.000	14.8	-1.0	0.67	4247	2.04	0.09
011859900-03	OBS	No	375.779063	258.711135	1758.8	3.561	15.1	7.8	0.67	4247	2.88	0.17
011859900-04	OBS	No	440.597899	185.157716	3438.7	30.528	13.3	7.9	0.67	4247	5.03	0.13
011859900-05	OBS	No	397.217150	270.968371	1380.9	5.642	12.3	7.1	0.67	4247	2.64	0.15
011859900-06	OBS	No	382.032729	344.666605	1876.8	10.133	13.3	7.6	0.67	4247	2.77	0.16
011859900-07	OBS	No	601.243881	347.442639	1036.0	12.000	16.0	-1.0	0.67	4247	2.06	0.09

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
011859900-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011859900-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_NOFITS
011859900-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_POS_DV
011859900-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011859900-05	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—CENT_FEW_DIFFS
011859900-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011859900-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—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.

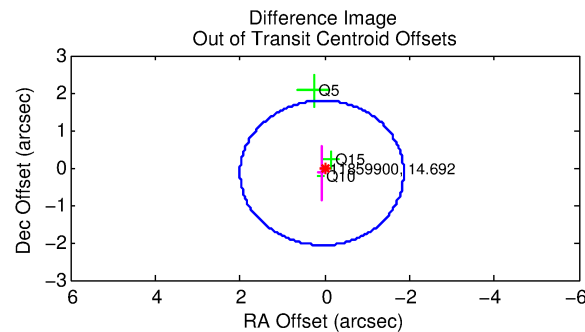
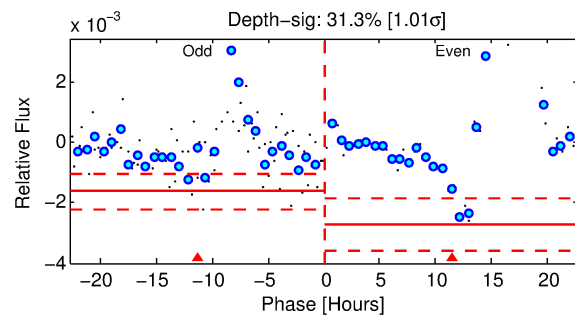
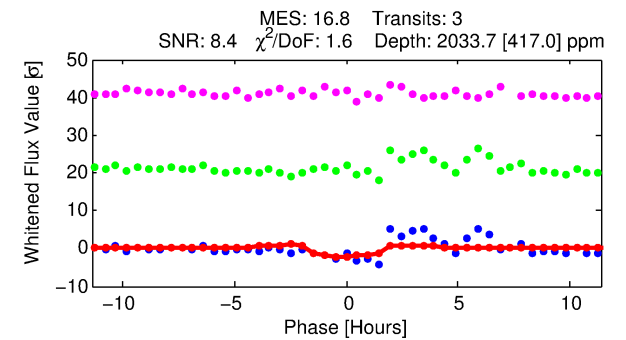
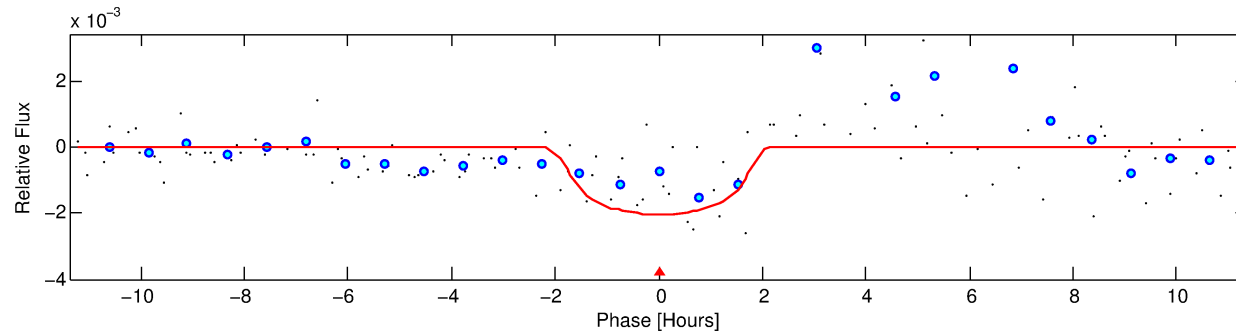
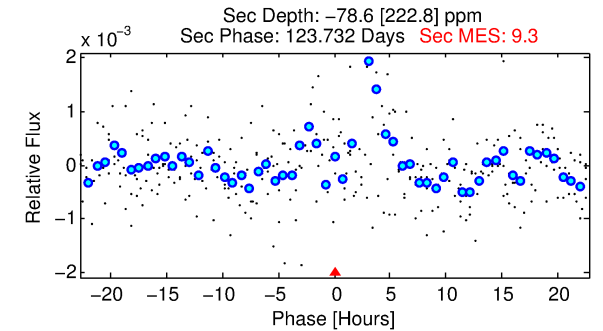
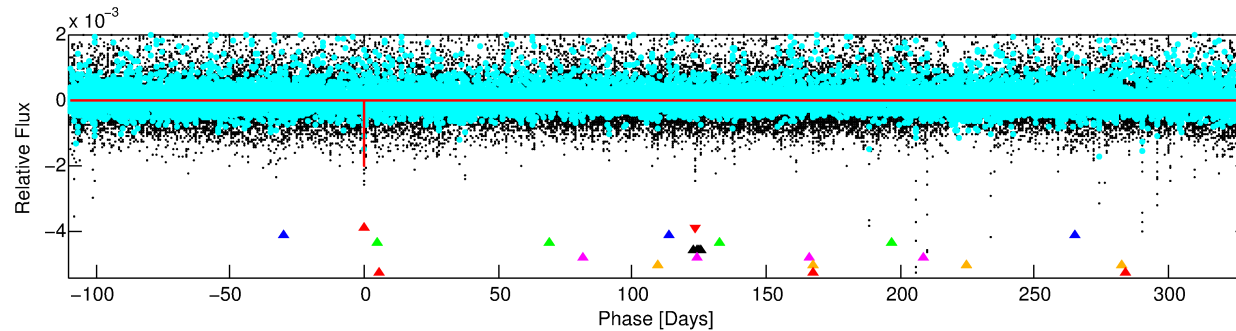
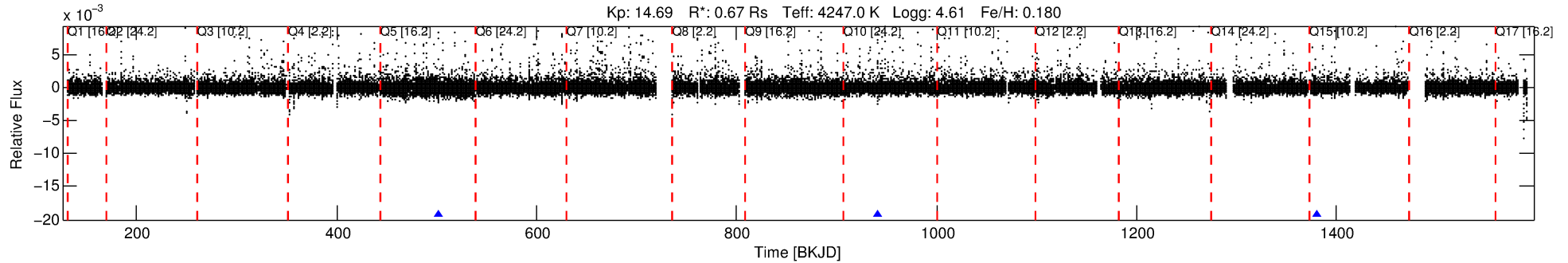
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 011859900-01

No Significant Match Found

# DV One-Page Summary

KIC: 11859900 Candidate: 1 of 7 Period: 439.605 d



## DV Fit Results:

Period = 439.60500 [0.00702] d  
Epoch = 501.8272 [0.0101] BKJD  
Rp/R\* = 0.0406 [0.0751]  
a/R\* = 847.47 [4429.20]  
b = 0.41 [10.96]  
Seff = 0.13 [0.02]  
Teff = 155 [6] K  
Rp = 2.98 [5.52] Re  
a = 0.9895 [0.0717] AU  
Ag = N/A  
Teffp = N/A

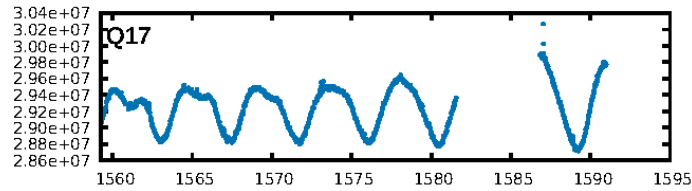
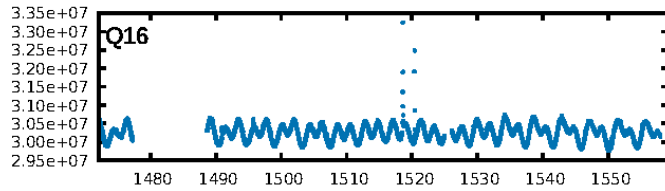
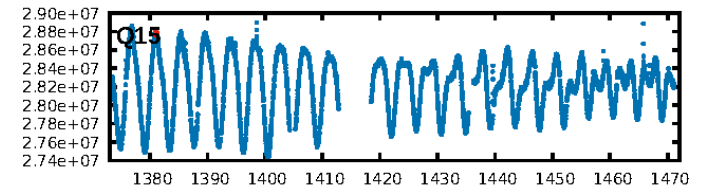
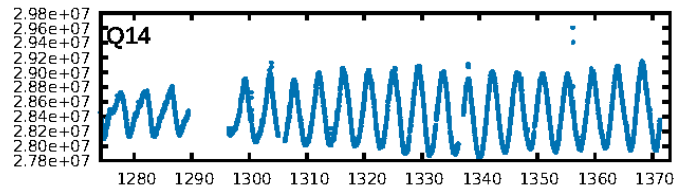
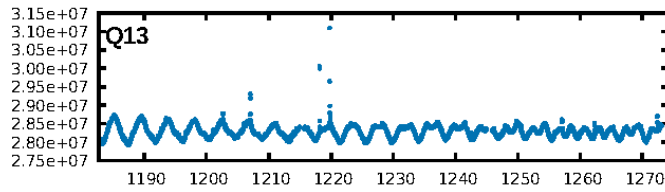
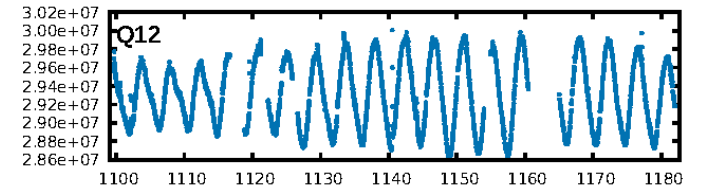
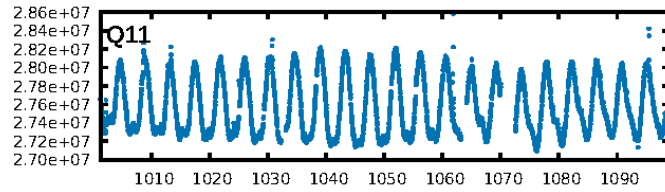
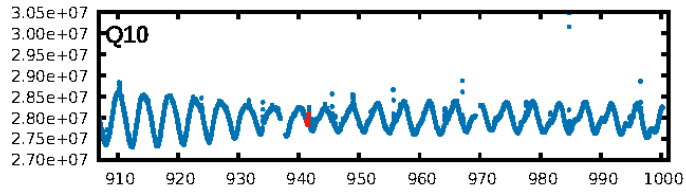
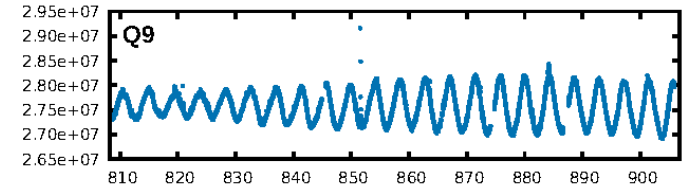
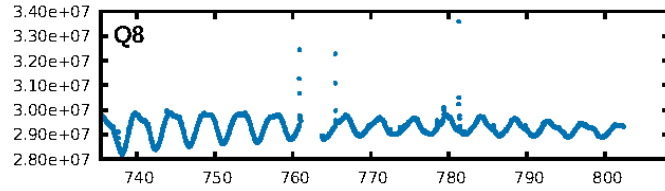
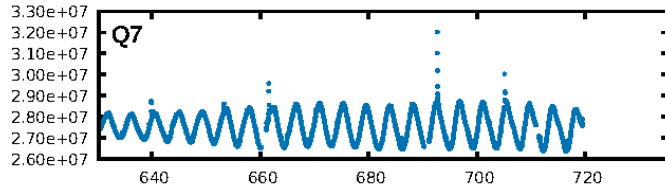
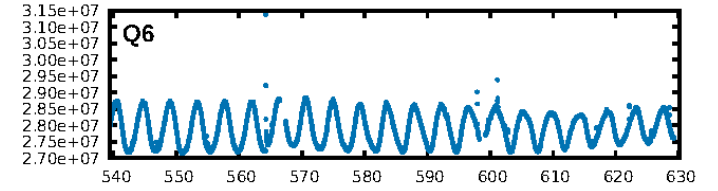
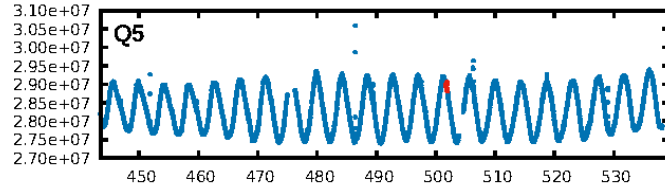
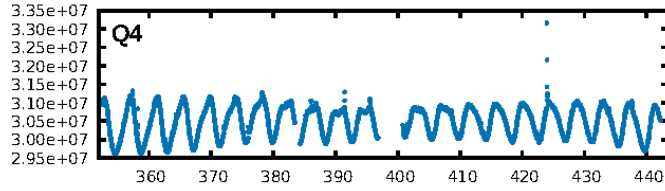
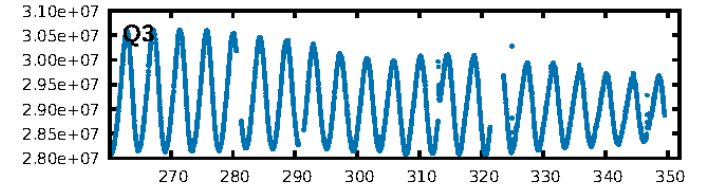
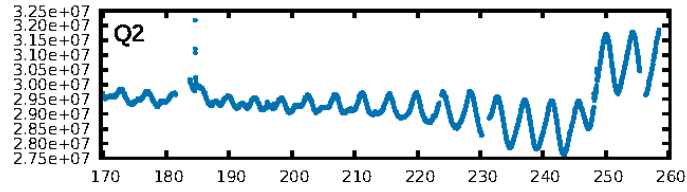
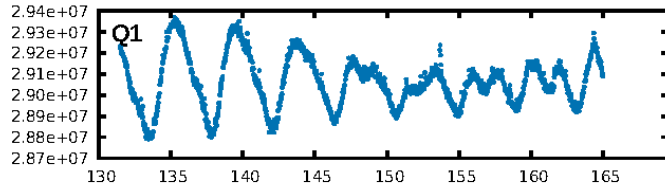
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [149.64 $\sigma$ ]  
LongPeriod-sig: 56.1% [0.77 $\sigma$ ]  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 12.6%  
Bootstrap-pfa: 1.31e-15  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: -4.989  
Centroid-sig: 33.1%  
Centroid-so: 0.410 arcsec [0.62 $\sigma$ ]  
OotOffset-rm: 0.154 arcsec [0.24 $\sigma$ ]  
KicOffset-rm: 0.246 arcsec [1.01 $\sigma$ ]  
OotOffset-st: 1/1/0/1 [3]  
KicOffset-st: 1/1/0/1 [3]  
DiffImageQuality-fgm: 0.67 [2/3]  
DiffImageOverlap-fno: 1.00 [3/3]

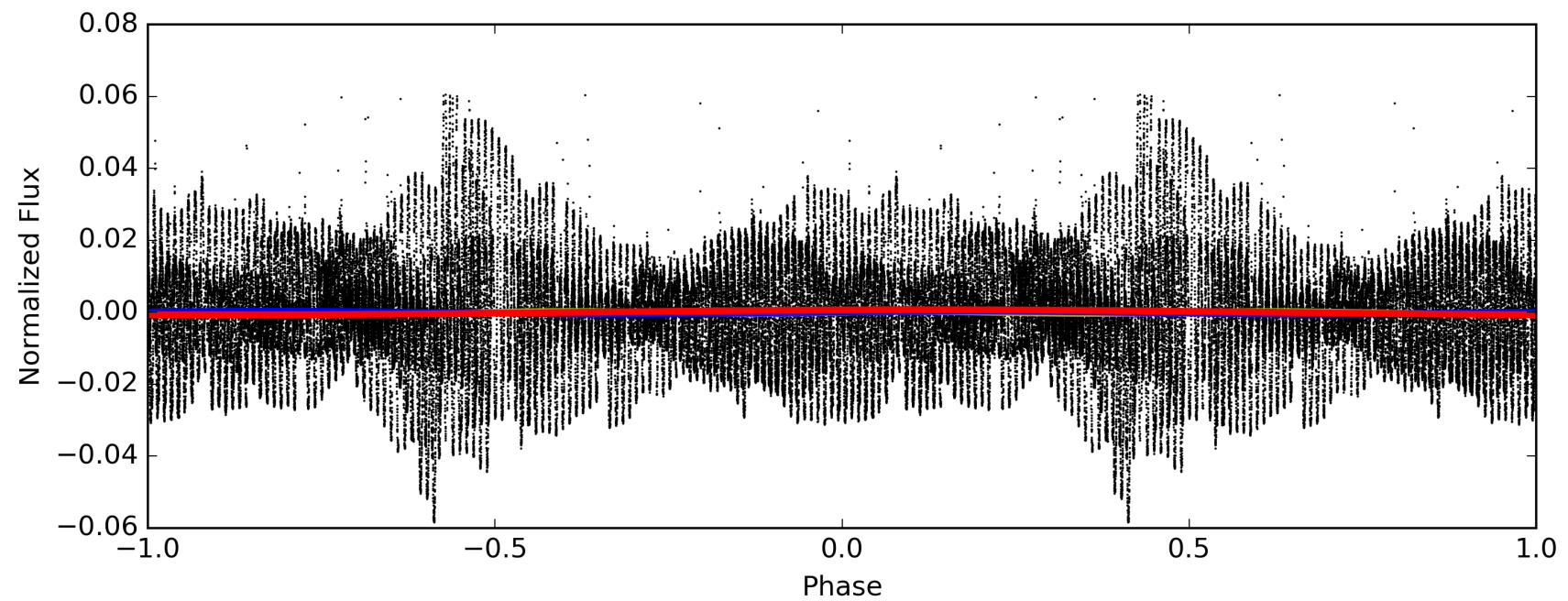
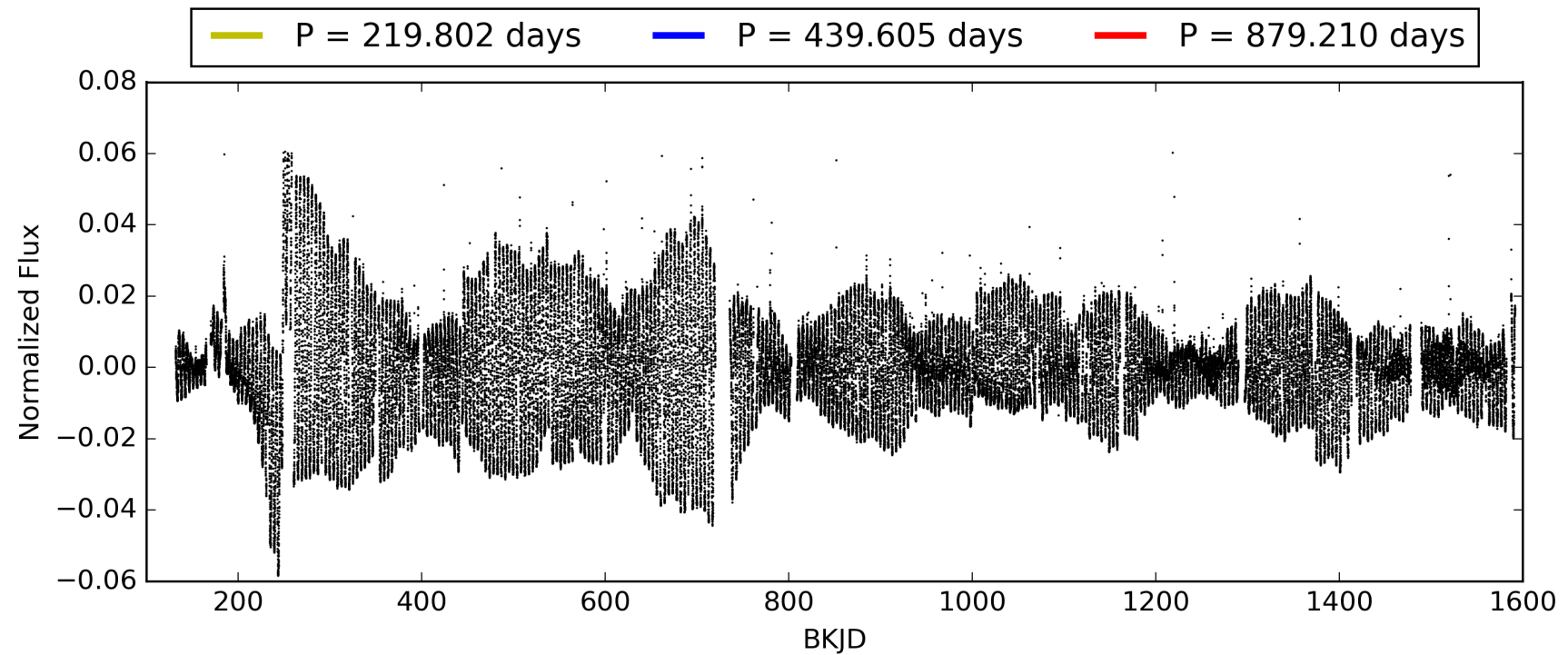
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 05:37:56 Z

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

# TCE 011859900-01, PDC Light Curves



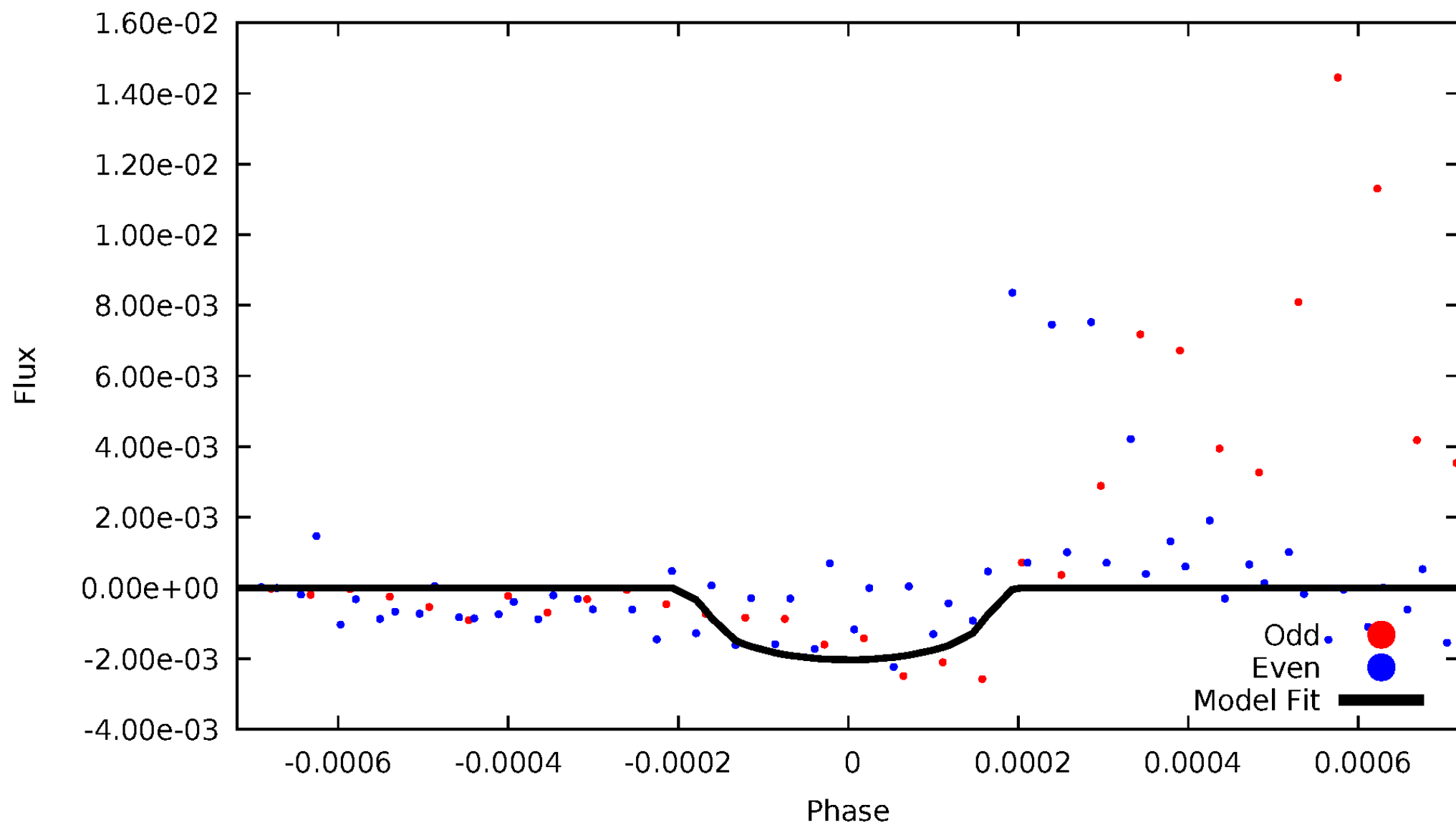
TCE 011859900-01





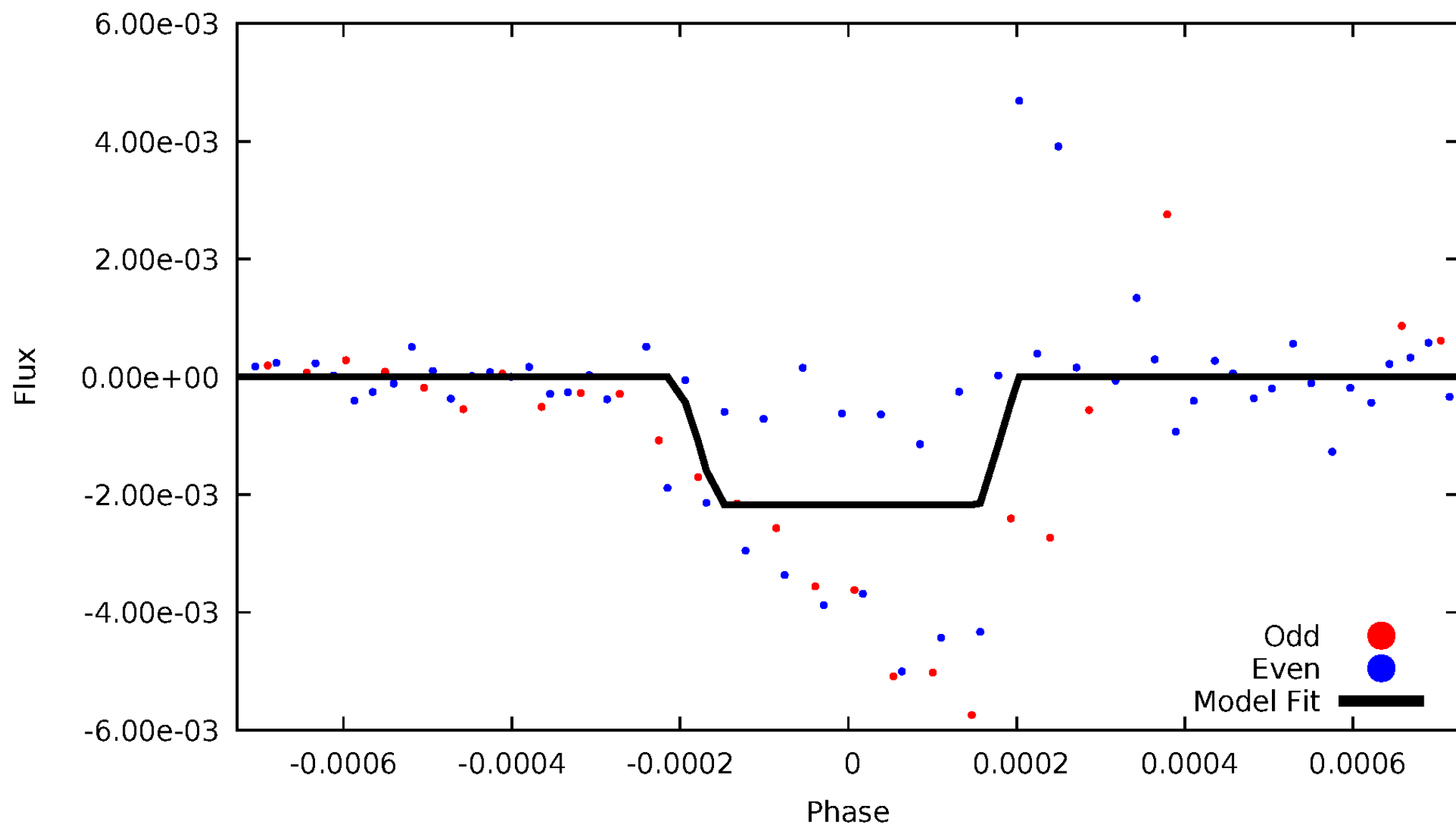
# DV Odd/Even

TCE 011859900-01



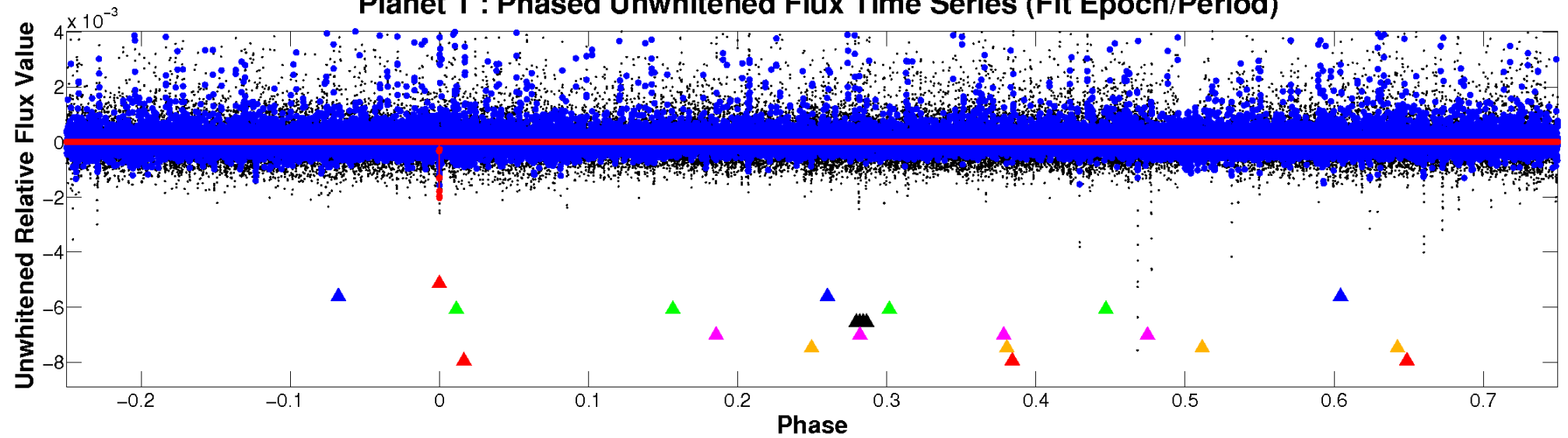
# ALT Odd/Even

TCE 011859900-01

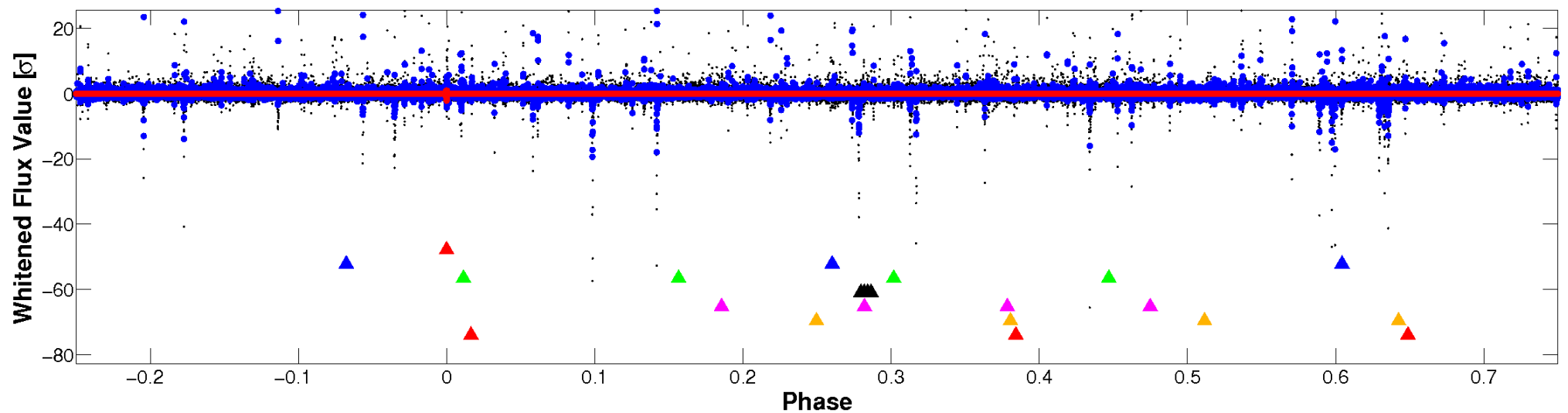


# Non-Whitened Vs. Whitened Light Curve

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

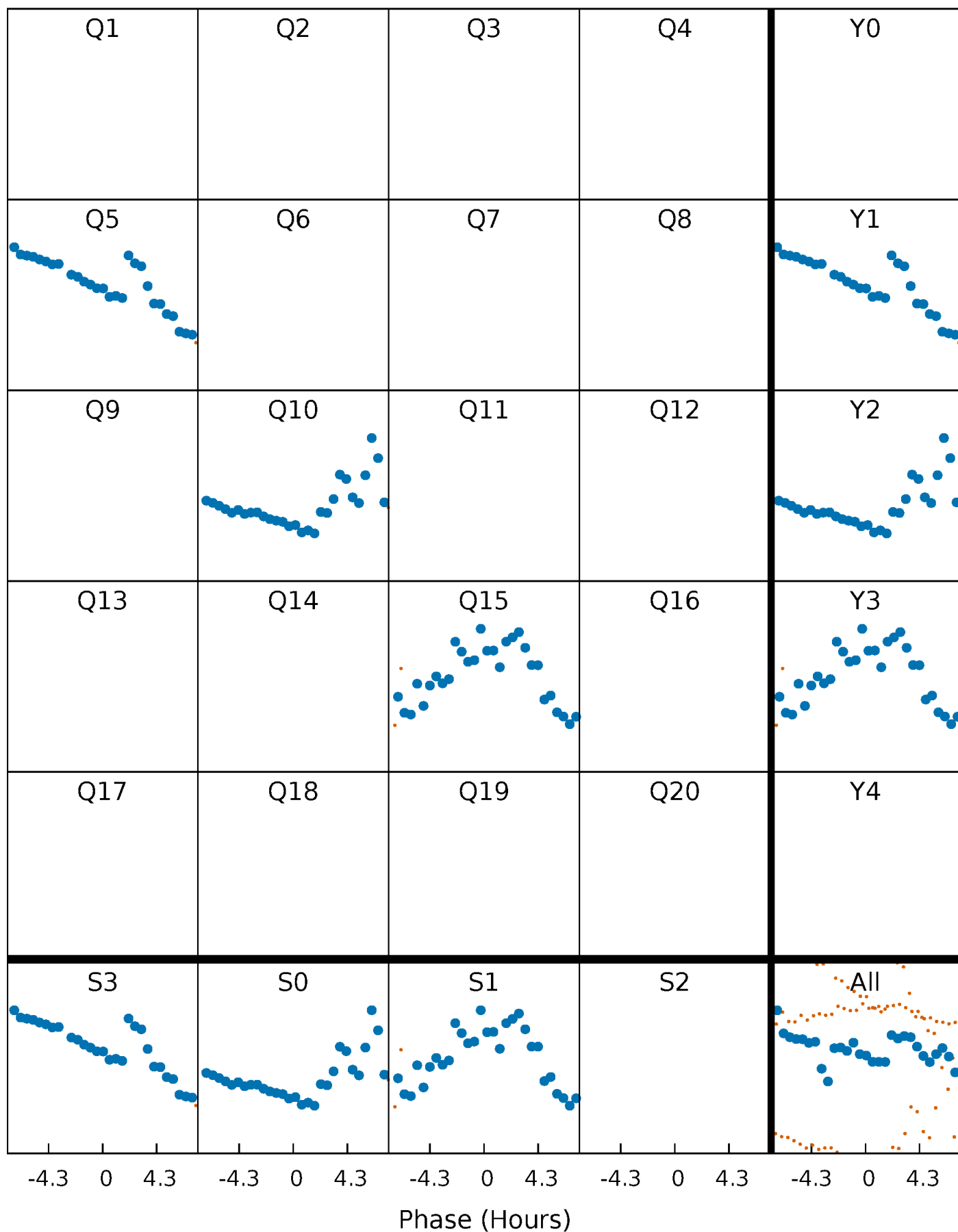


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



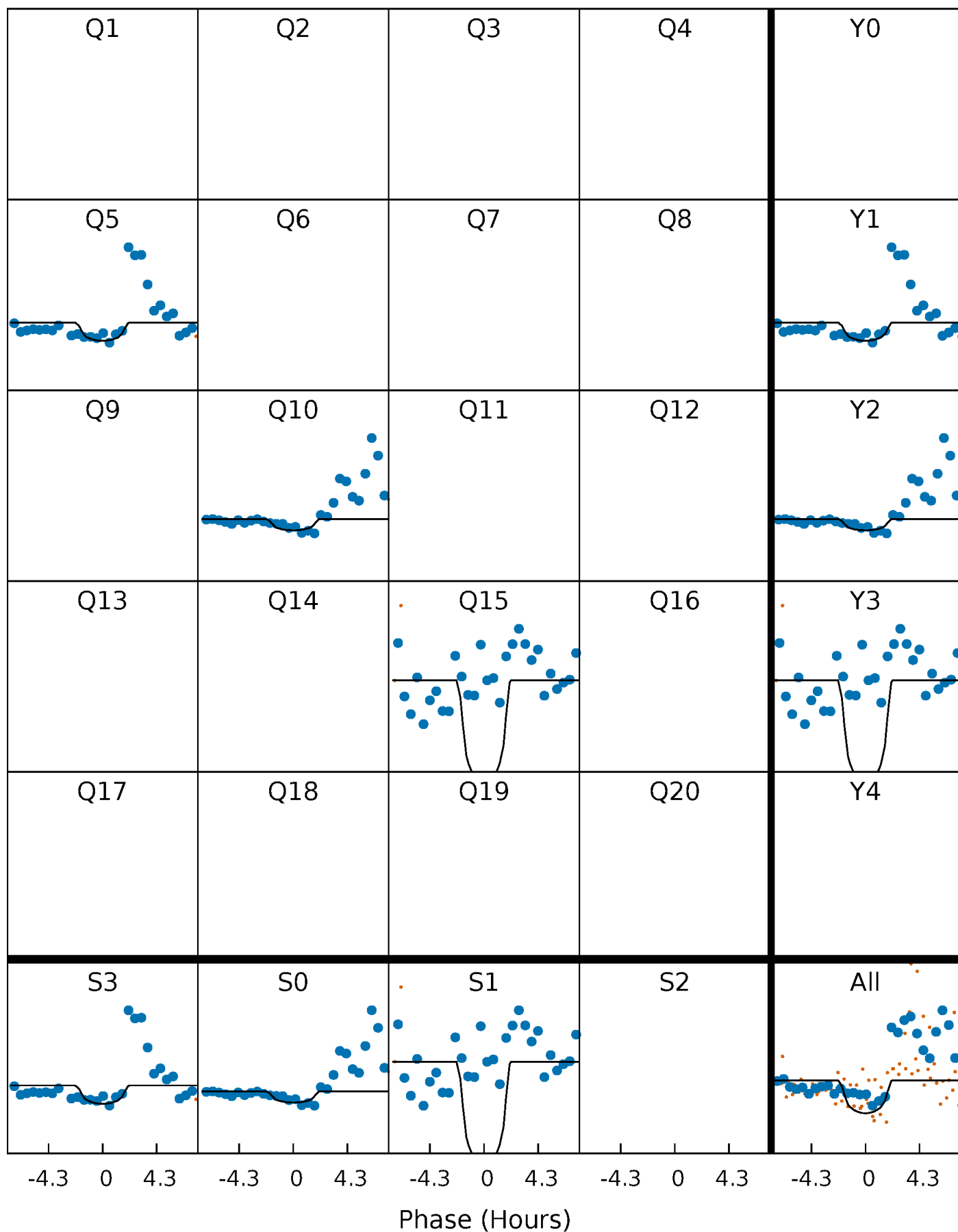
# PDC Quarter-Phased Transit Curves

TCE 011859900-01 P=439.604995 Days  $T_0=501.827165$  (BKJD)



# DV Quarter-Phased Transit Curves

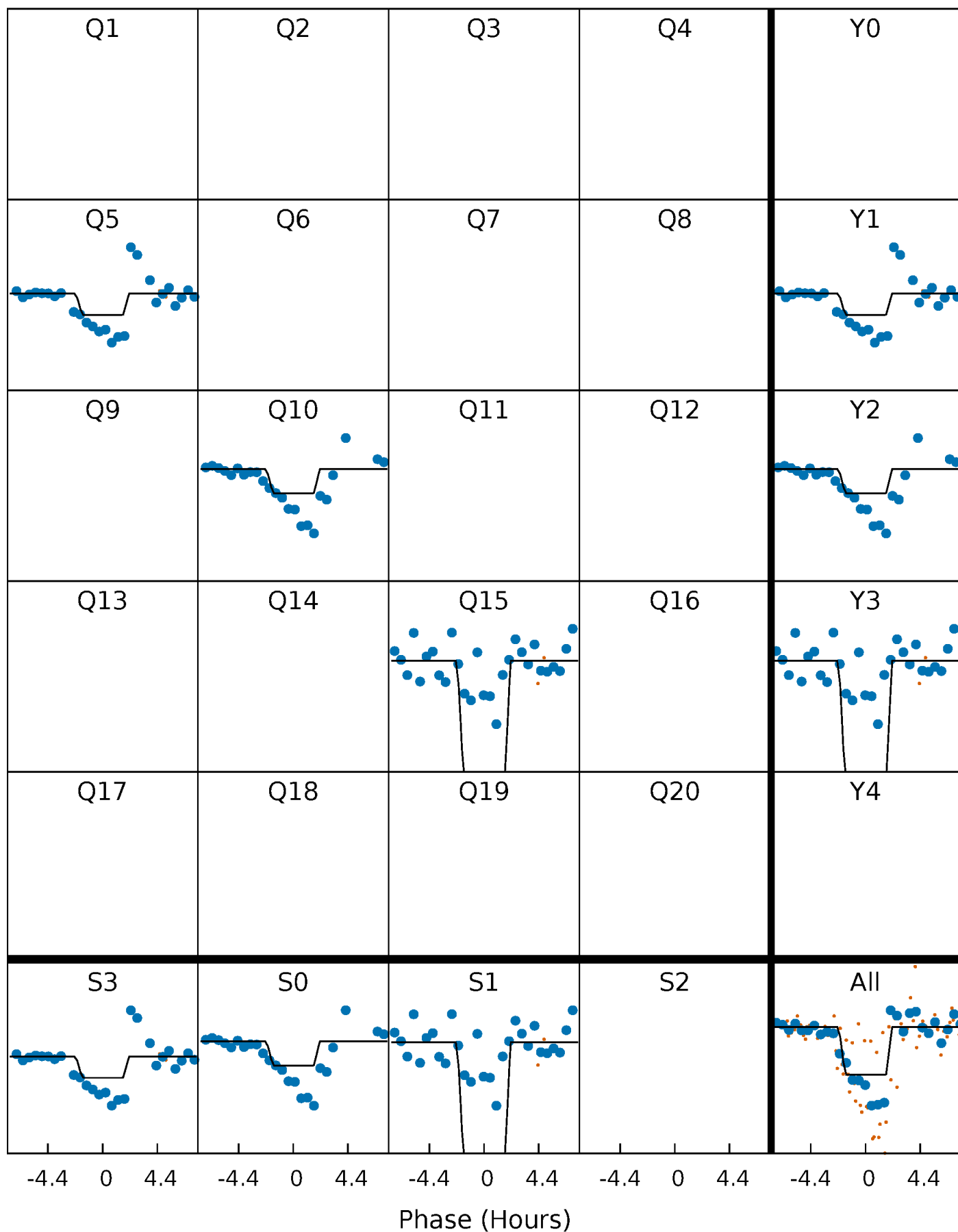
TCE 011859900-01     $P=439.604995$  Days     $T_0=501.827165$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

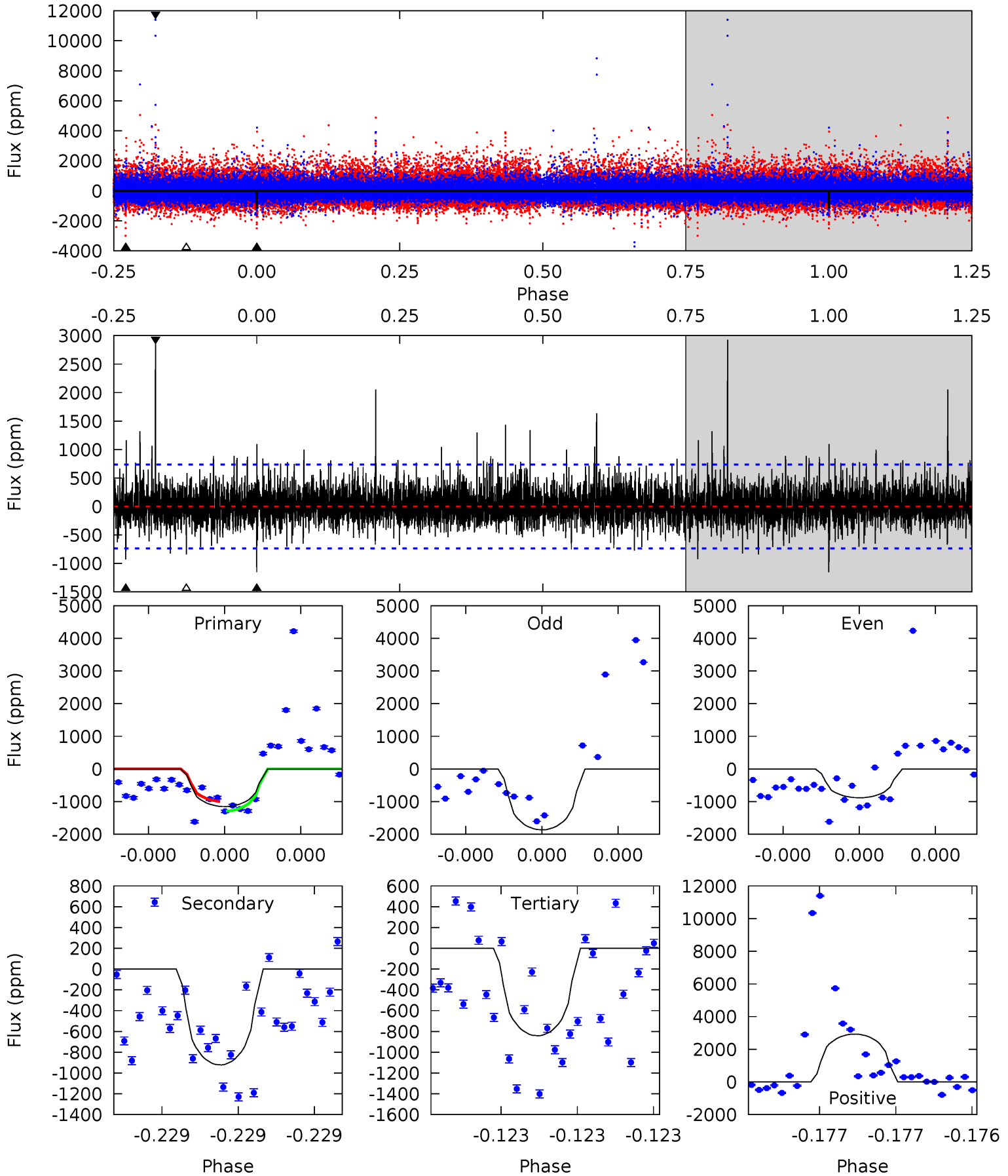
TCE 011859900-01 P=439.614421 Days  $T_0=501.822591$  (BKJD)



# DV Model-Shift Uniqueness Test

011859900-01, P = 439.604995 Days, E = 62.222170 Days

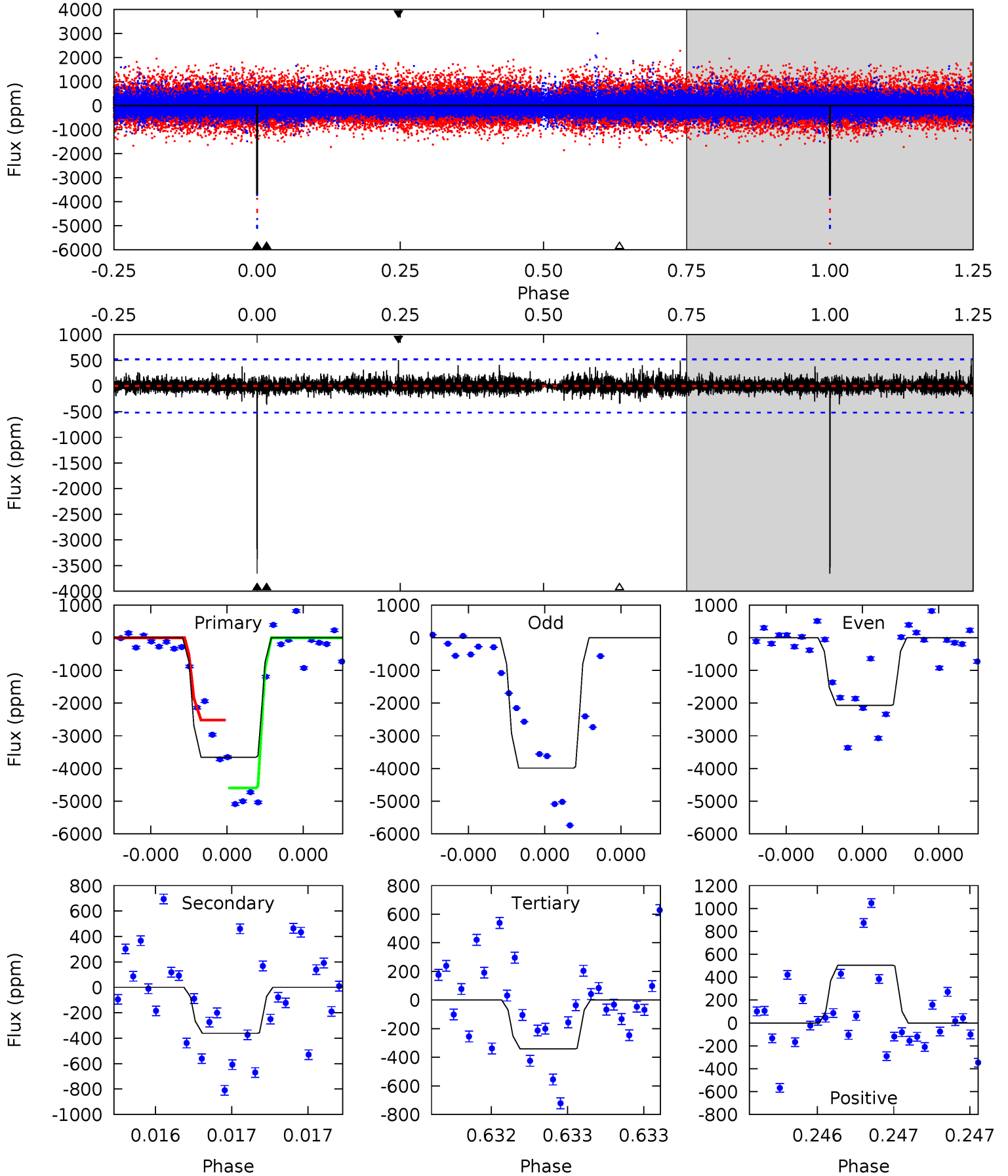
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.82	7.06	6.44	22.4	5.63	3.57	1.84	2.38	-13.6	0.62	-15.3	1.81	0.69	0.72	1.13



# Alt Model-Shift Uniqueness Test

011859900-01, P = 439.614421 Days, E = 62.208170 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
39.6	3.91	3.69	5.45	5.62	3.55	0.81	35.9	34.1	0.22	-1.54	10.7	0.72	0.12	10.8



### Stellar Parameters For KIC 011859900

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4247^{+116}_{-142}$	$4.607^{+0.052}_{-0.017}$	$0.180^{+0.200}_{-0.300}$	$0.673^{+0.024}_{-0.061}$	$0.668^{+0.047}_{-0.052}$	$3.085^{+0.708}_{-0.205}$
	+3%/-3%	+1%/-0%	+111%/-167%	+4%/-9%	+7%/-8%	+23%/-7%
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 011859900-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-922 \pm 131$	$5.04^{+4.83}_{-3.40}$	$214^{+7}_{-8}$	$3231^{+1552}_{-546}$	$19512^{+184569}_{-14306}$
Alt.	$-362 \pm 92$	$5.33^{+4.36}_{-3.33}$	$215^{+6}_{-7}$	$2786^{+963}_{-405}$	$6895^{+41468}_{-4948}$

$T_{\text{max}}$  = 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

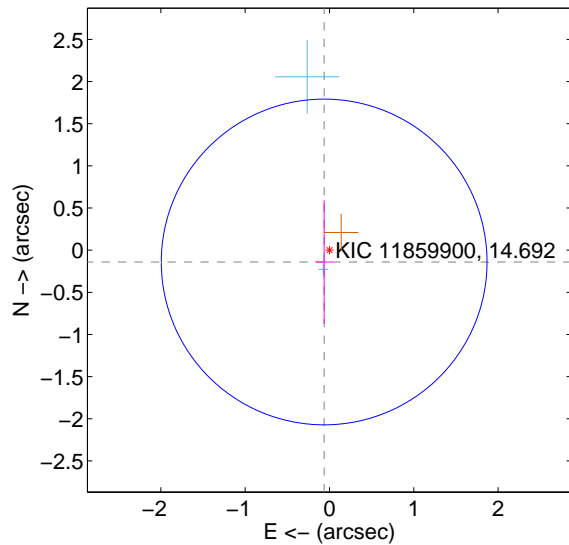
Supplemental centroid analysis for 011859900-01. Kepler magnitude: 14.69. Transit SNR 8.41

There are 2 quarters with good PRF difference image offsets

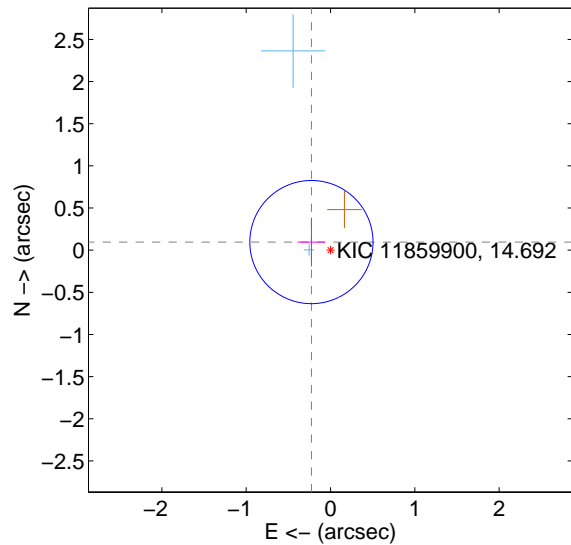
The direct PRF centroid is offset from the target star catalog position by about 0.27 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.154 \pm 0.644$	0.24	$0.063 \pm 0.105$	$-0.140 \pm 0.733$
PRF-fit source offset from KIC position	$0.246 \pm 0.243$	1.01	$0.227 \pm 0.163$	$0.096 \pm 0.290$
photometric centroid source offset	$0.41 \pm 0.66$	0.62	$0.16 \pm 0.59$	$-0.38 \pm 0.67$

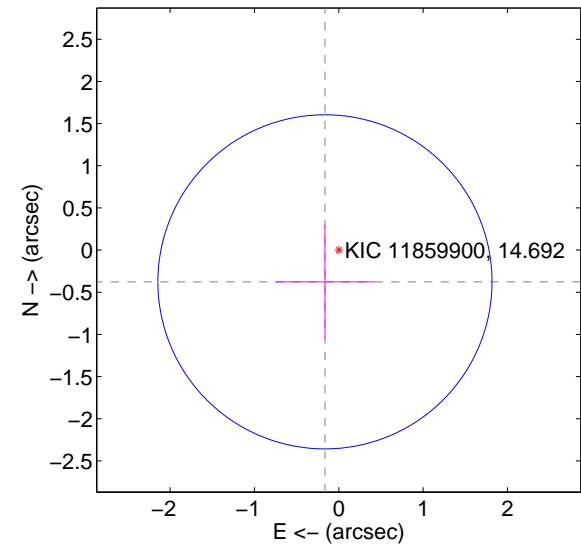
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



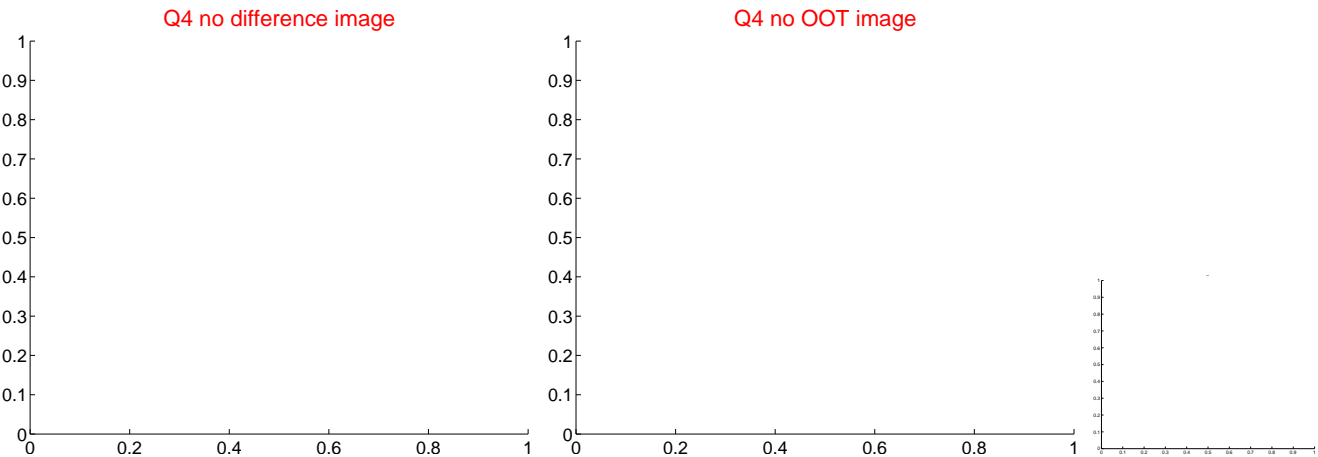
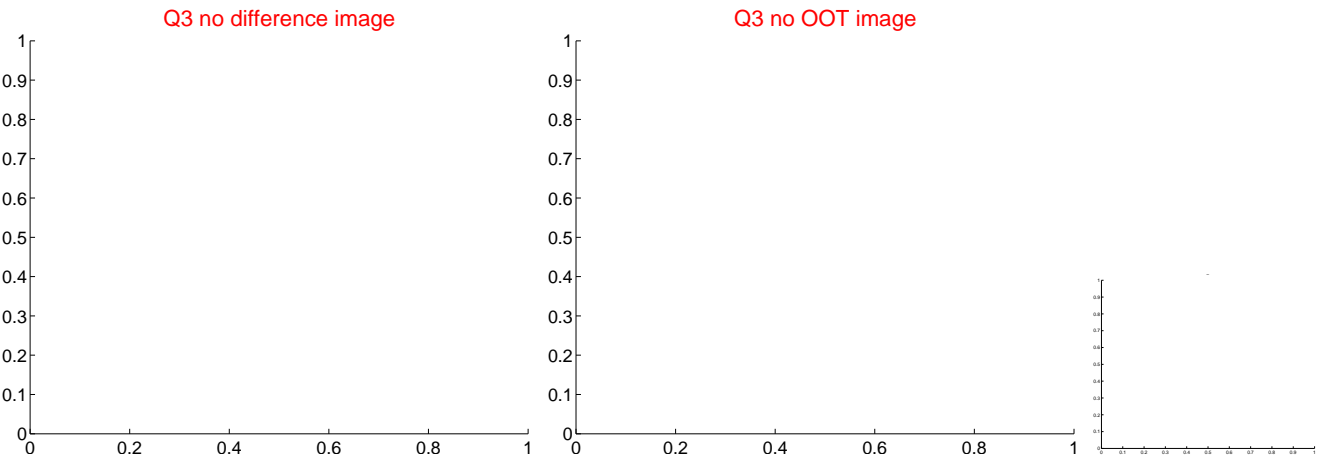
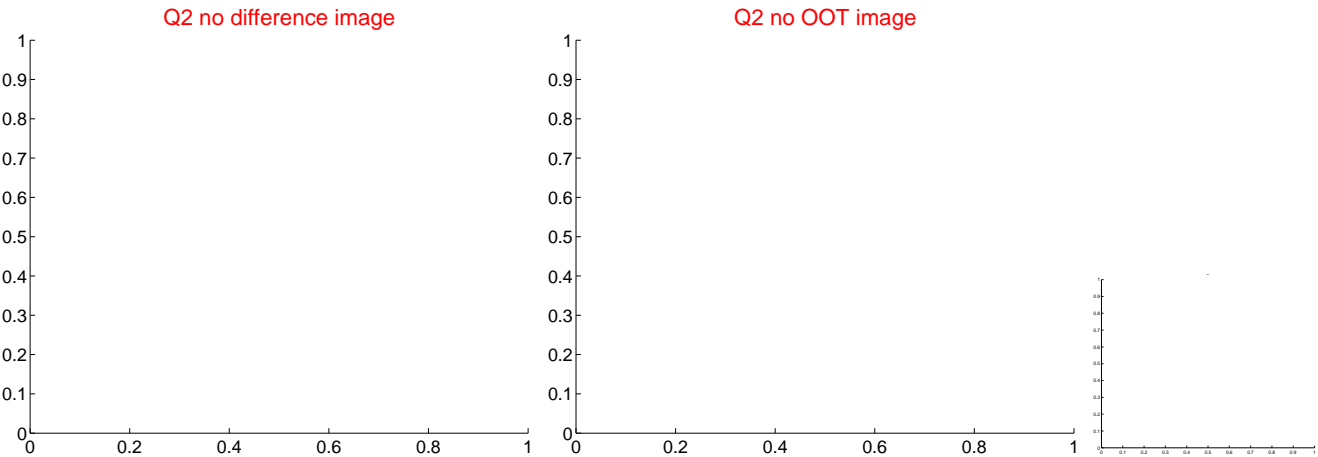
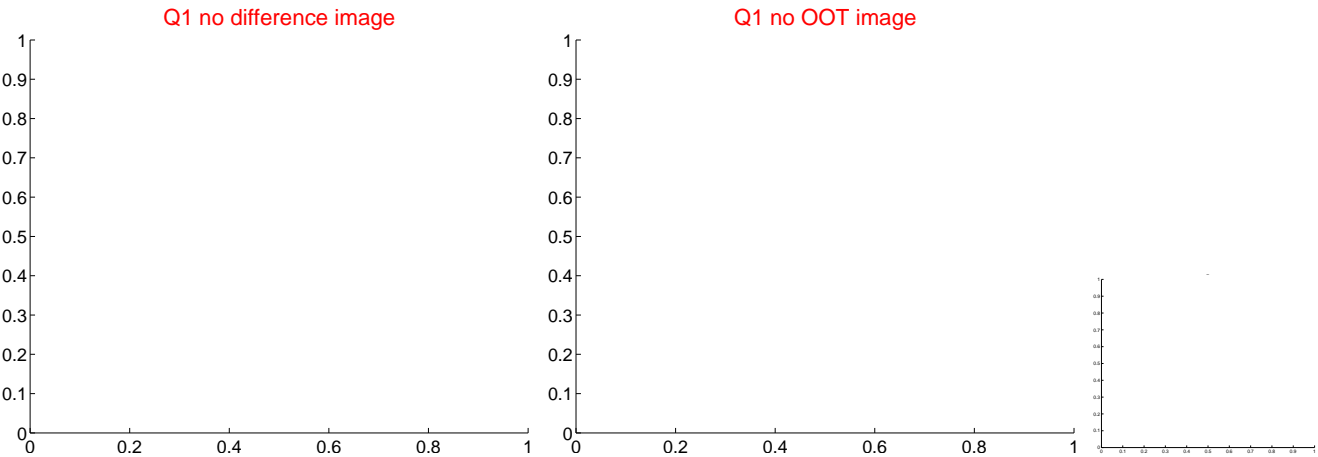
offset from photometric centroids



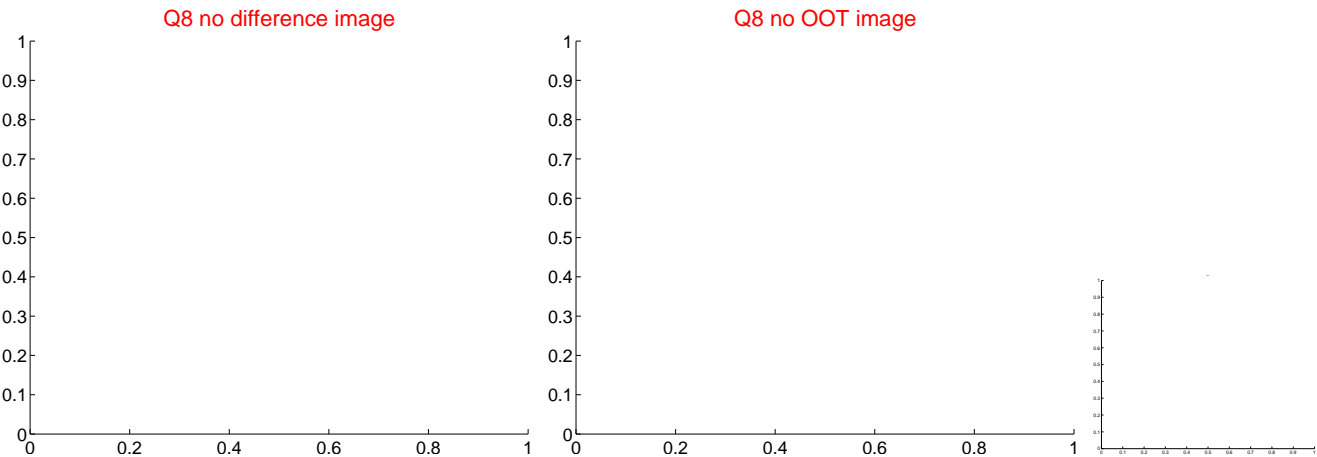
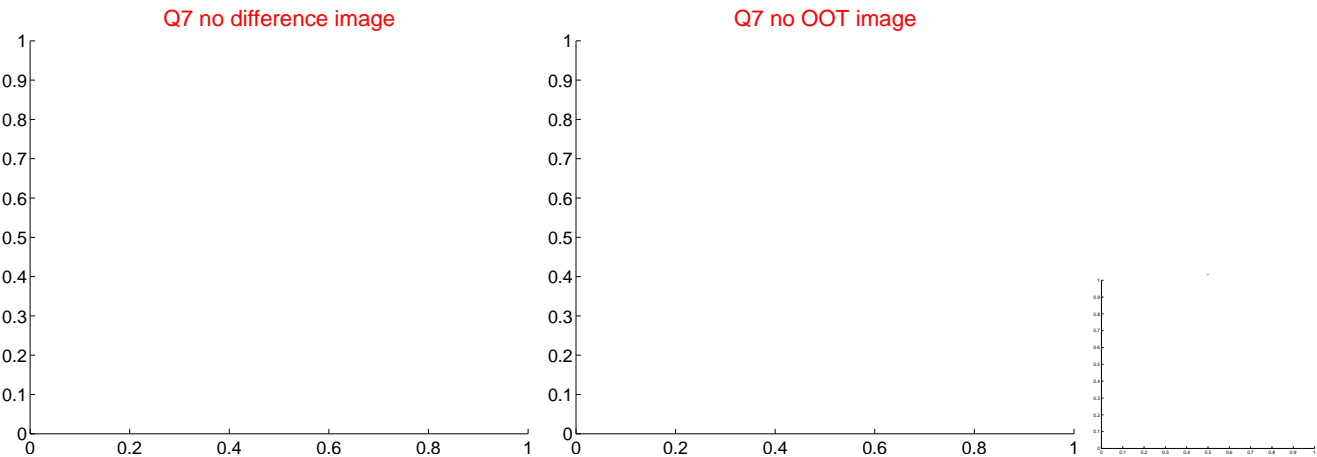
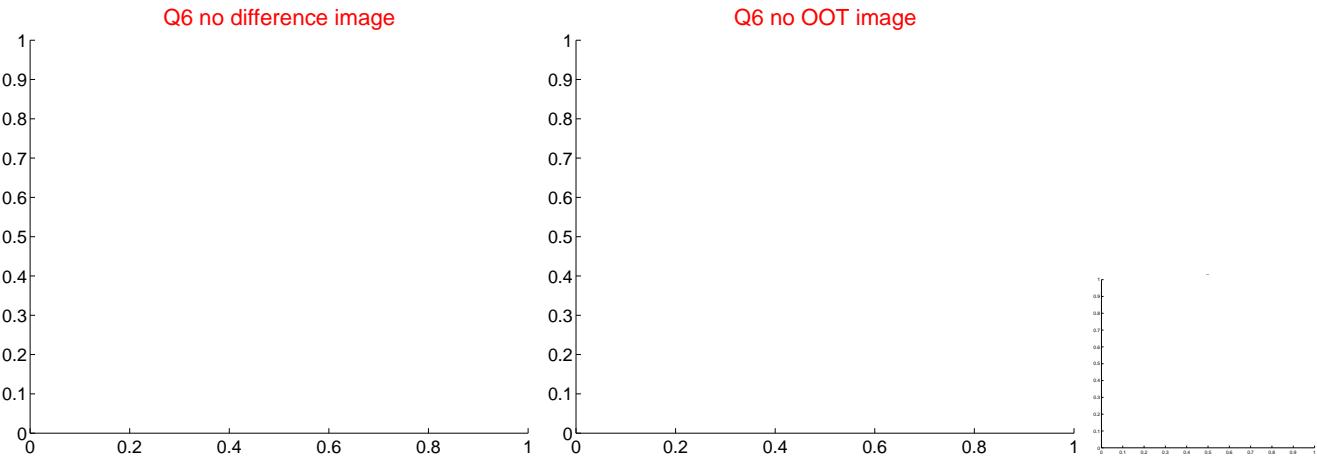
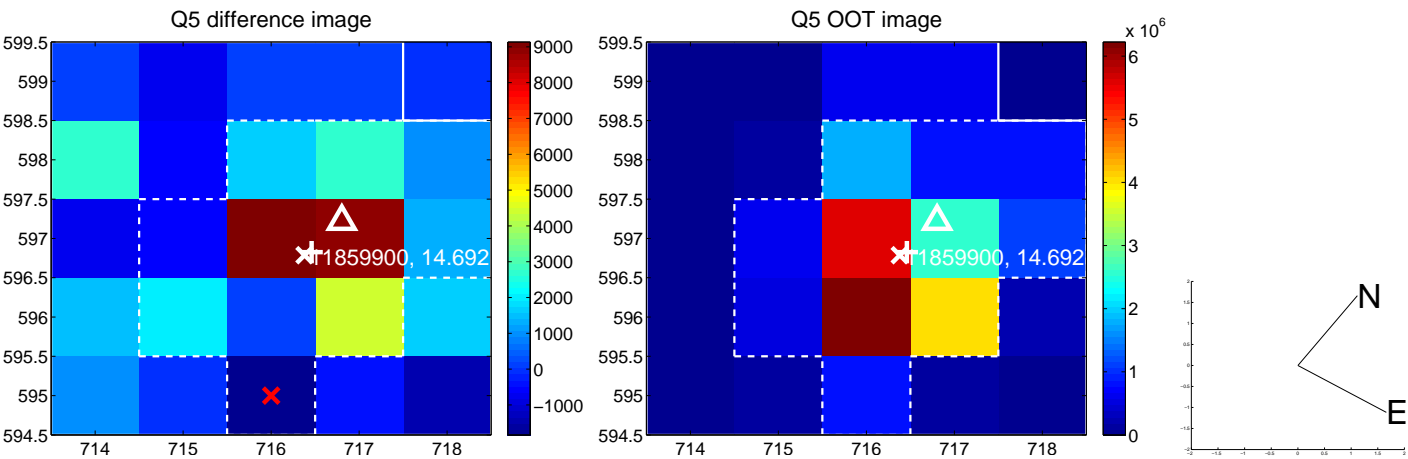
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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



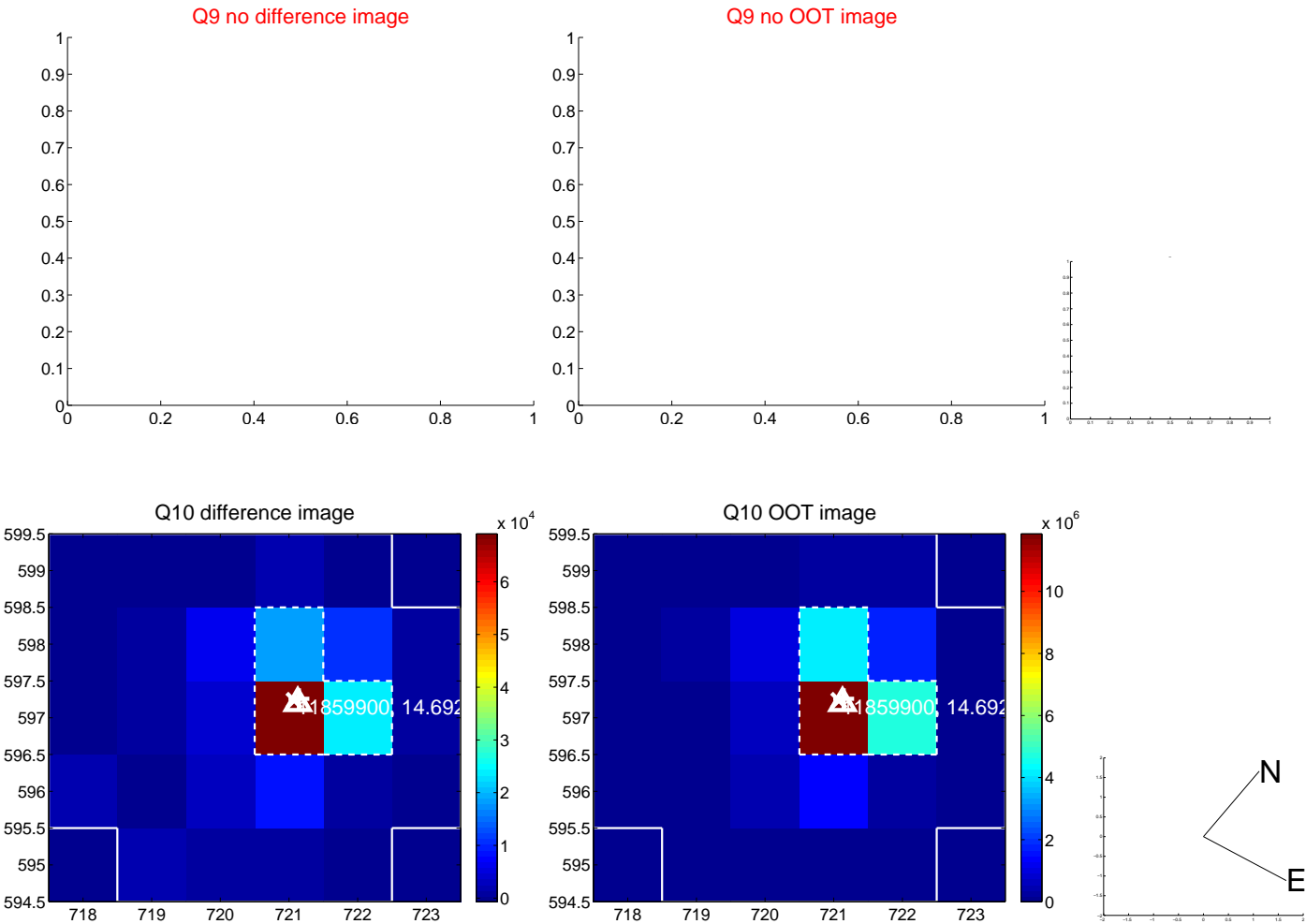
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



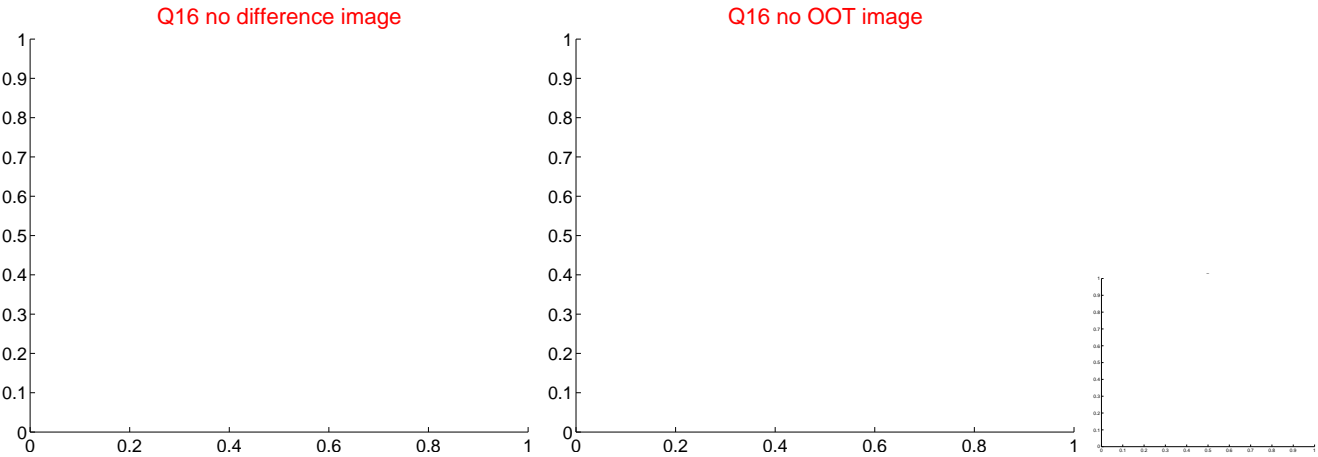
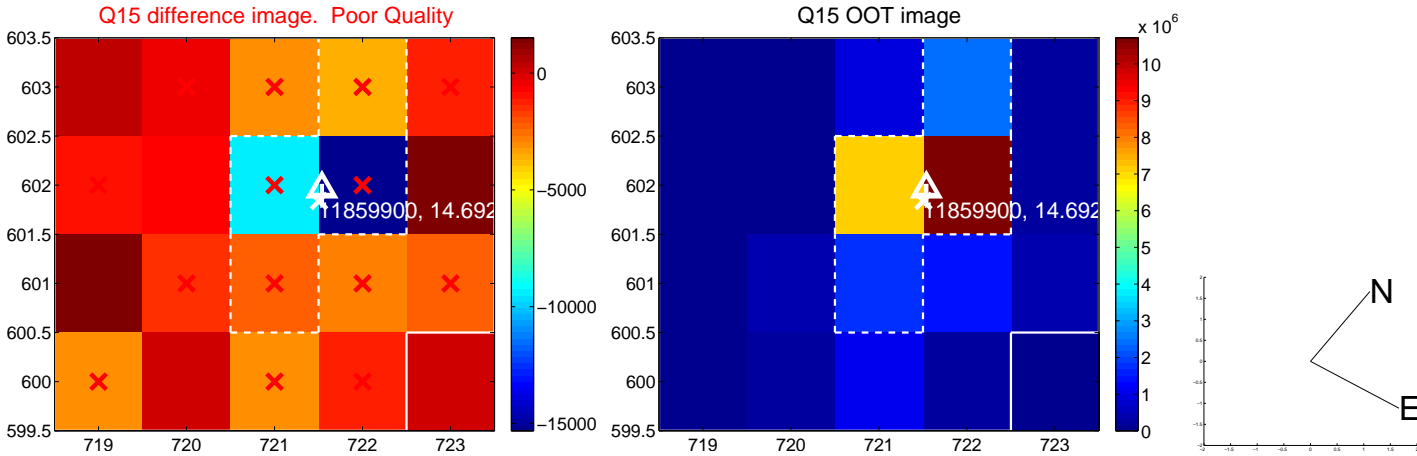
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



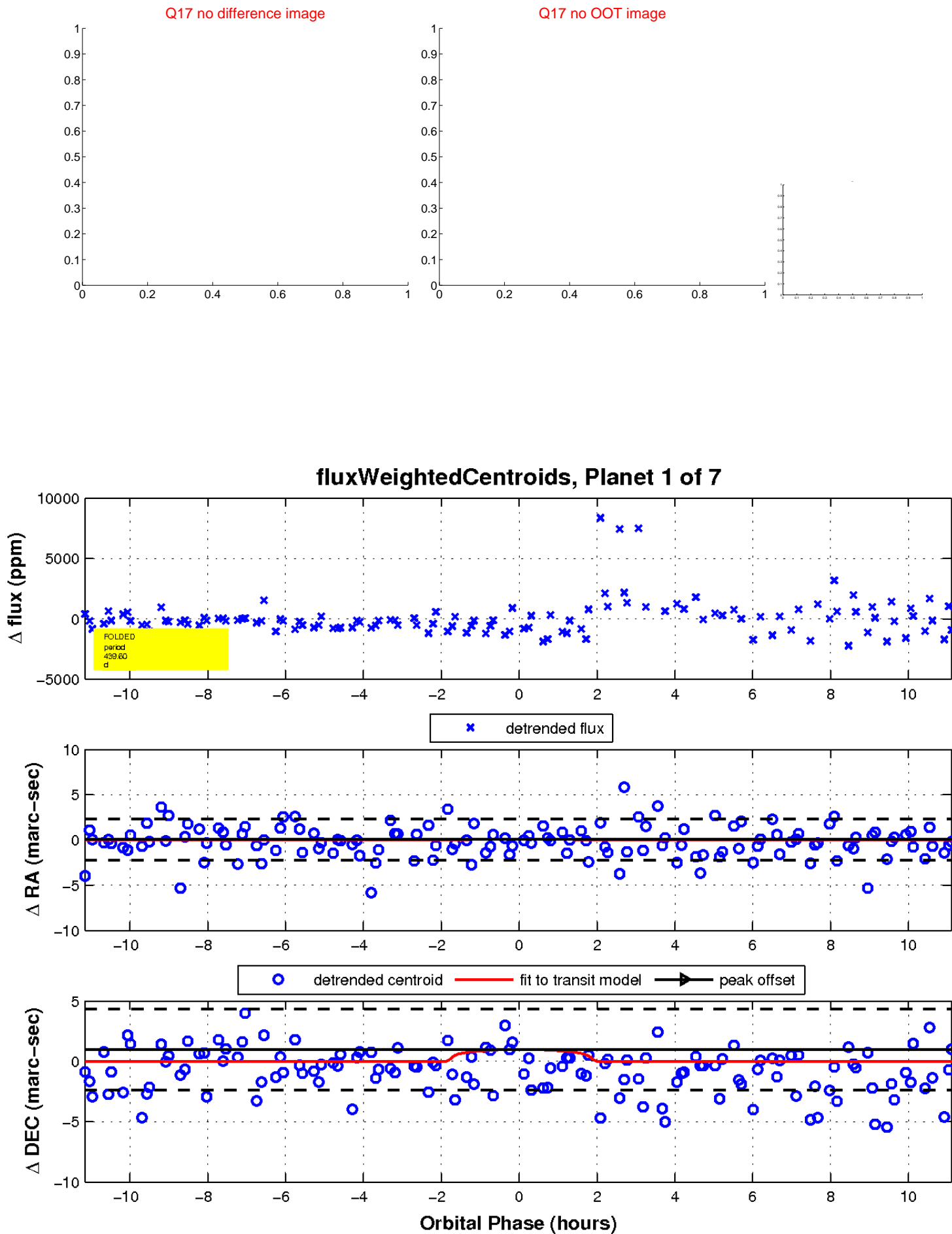
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



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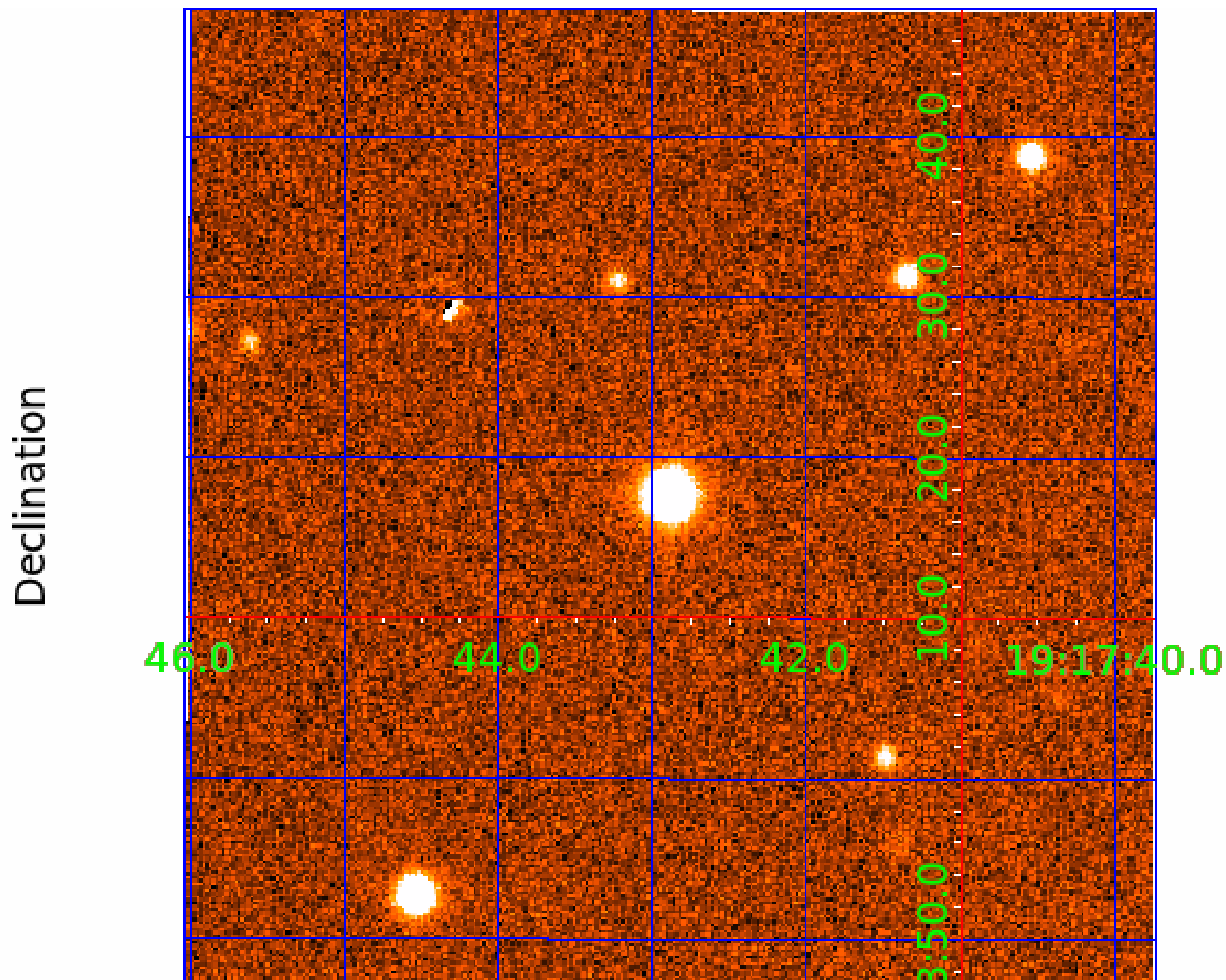


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





UKIRT Image



# KIC 011859900

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
011859900-01	OBS	No	439.604995	501.827165	2033.7	3.792	16.8	8.4	0.67	4247	2.98	0.14
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011859900-03	OBS	No	375.779063	258.711135	1758.8	3.561	15.1	7.8	0.67	4247	2.88	0.17
011859900-04	OBS	No	440.597899	185.157716	3438.7	30.528	13.3	7.9	0.67	4247	5.03	0.13
011859900-05	OBS	No	397.217150	270.968371	1380.9	5.642	12.3	7.1	0.67	4247	2.64	0.15
011859900-06	OBS	No	382.032729	344.666605	1876.8	10.133	13.3	7.6	0.67	4247	2.77	0.16
011859900-07	OBS	No	601.243881	347.442639	1036.0	12.000	16.0	-1.0	0.67	4247	2.06	0.09

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
011859900-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011859900-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_NOFITS
011859900-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_POS_DV
011859900-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011859900-05	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—CENT_FEW_DIFFS
011859900-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011859900-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—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.

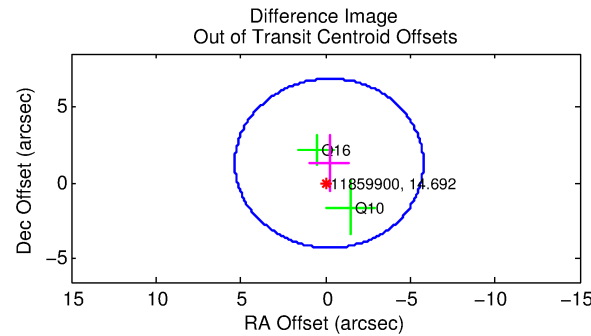
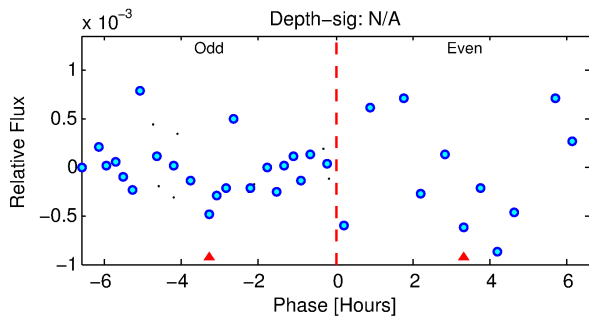
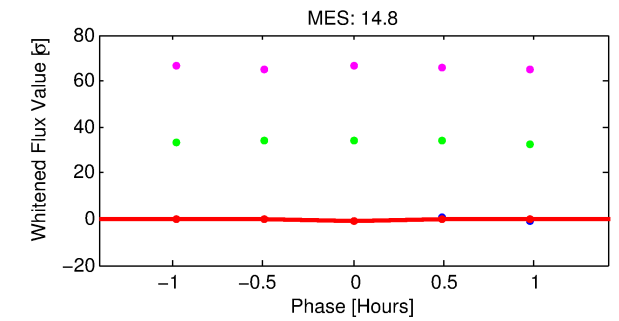
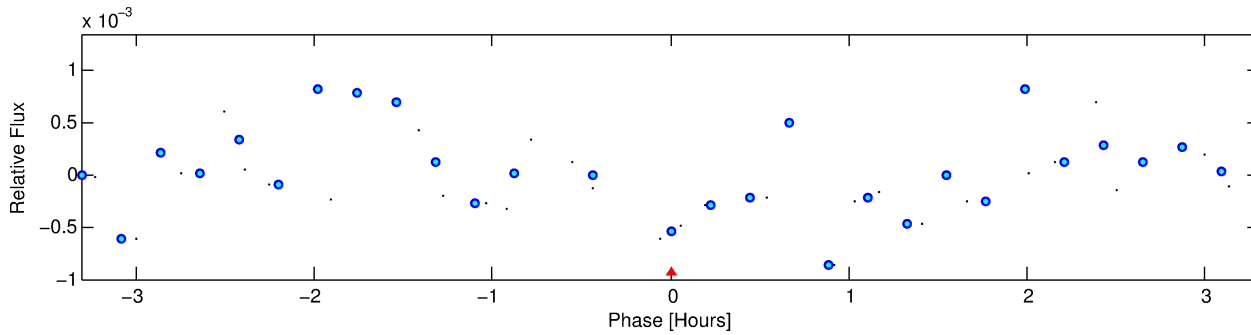
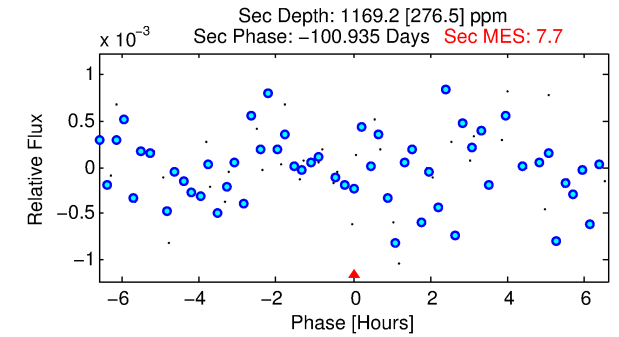
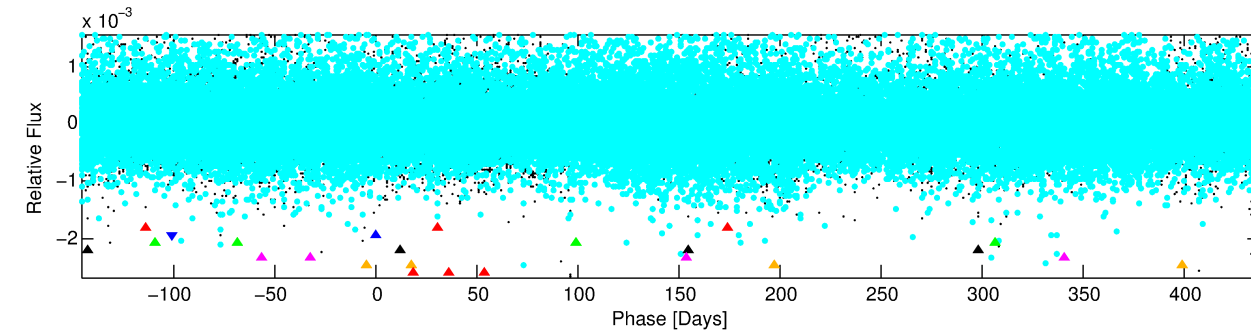
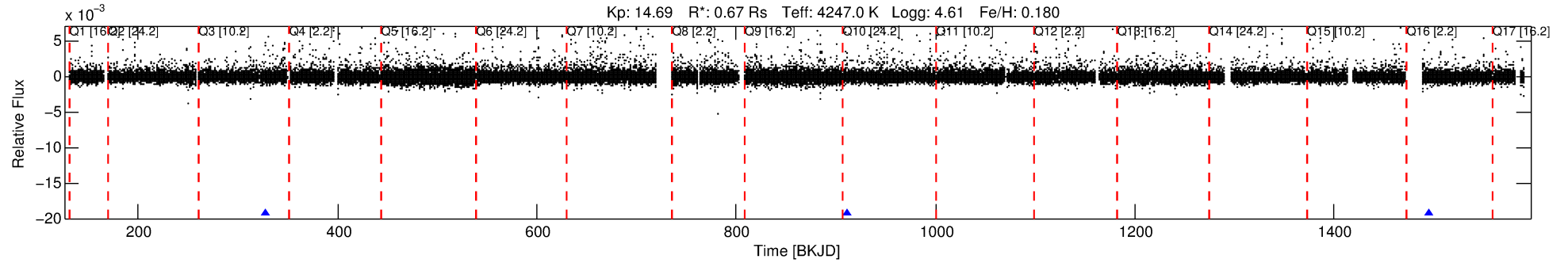
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 011859900-02

No Significant Match Found

# DV One-Page Summary

KIC: 11859900 Candidate: 2 of 7 Period: 583.780 d



## TPS TCE Results:

Period = 583.78000 d  
Epoch = 327.8877 BKJD

DV fit results are unavailable

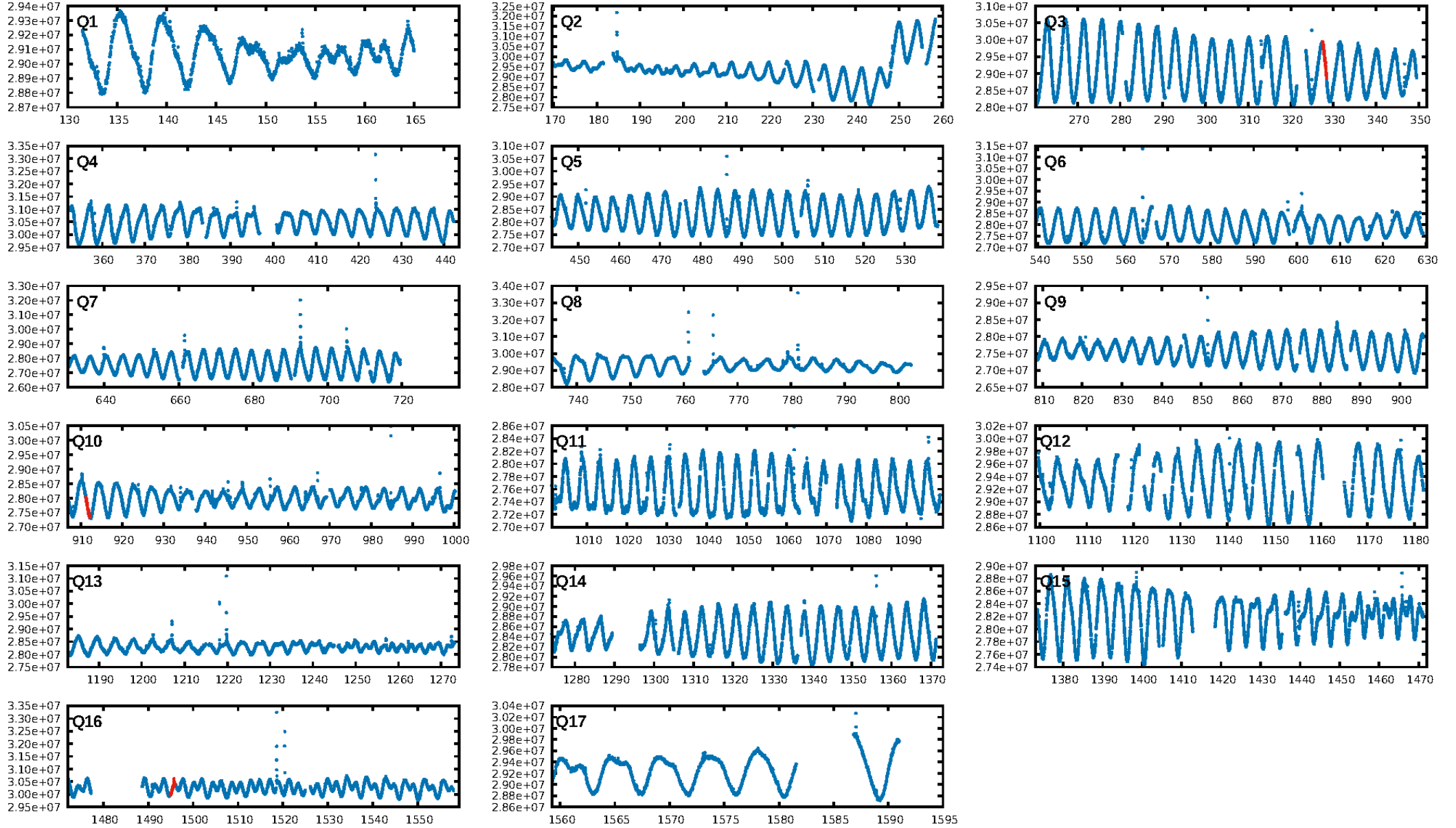
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [104.76σ]  
LongPeriod-sig: 100.0% [24.70σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 7.94e-14  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: -0.4627  
Centroid-sig: 70.7%  
Centroid-so: 5.891 arcsec [0.64σ]  
OotOffset-rm: 1.310 arcsec [0.71σ]  
KicOffset-rm: 1.533 arcsec [0.81σ]  
OotOffset-st: 1/0/1/0 [2]  
KicOffset-st: 1/0/1/0 [2]  
DiffImageQuality-fgm: 0.00 [0/2]  
DiffImageOverlap-fno: 1.00 [2/2]

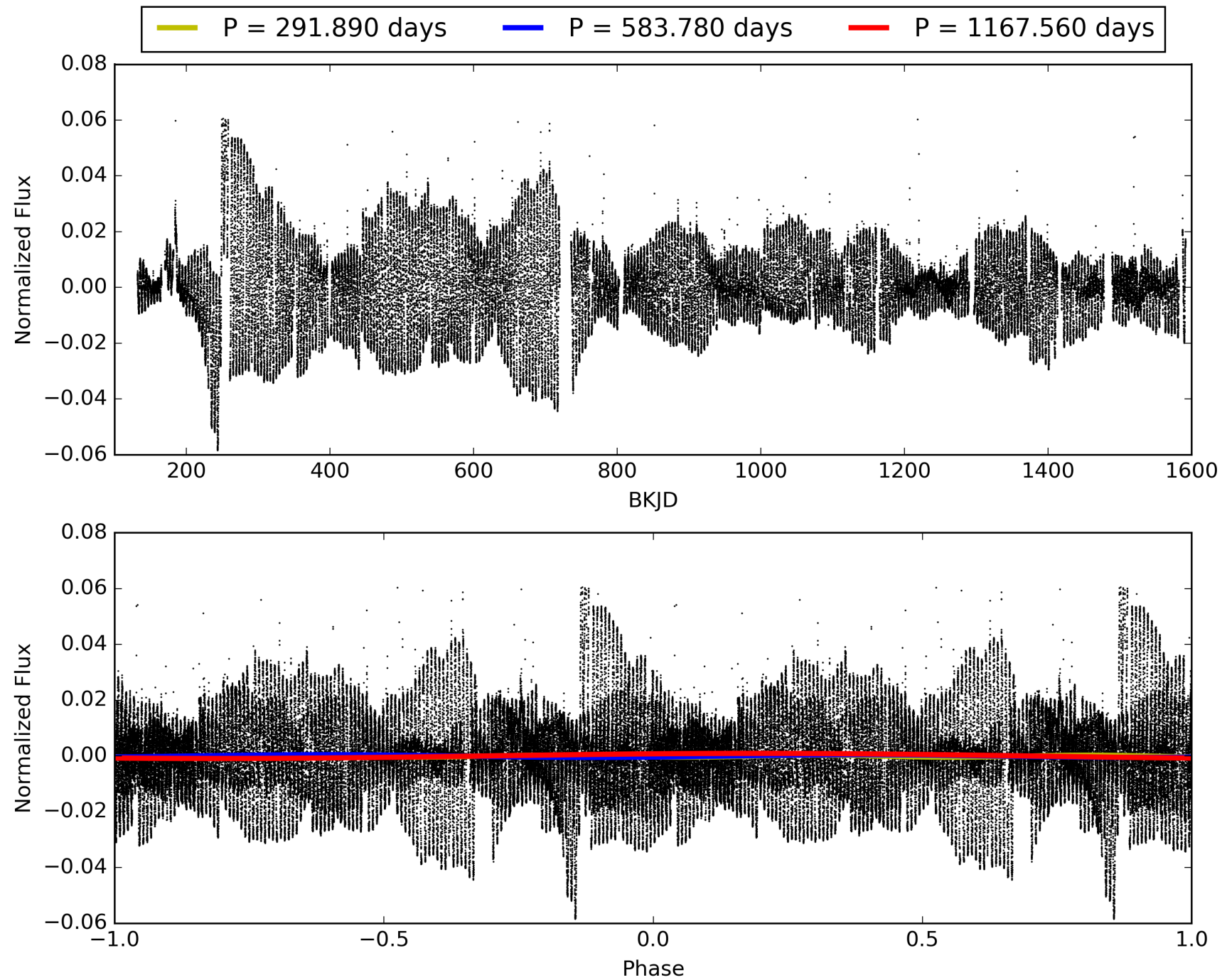
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 05:38:54 Z

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

# TCE 011859900-02, PDC Light Curves



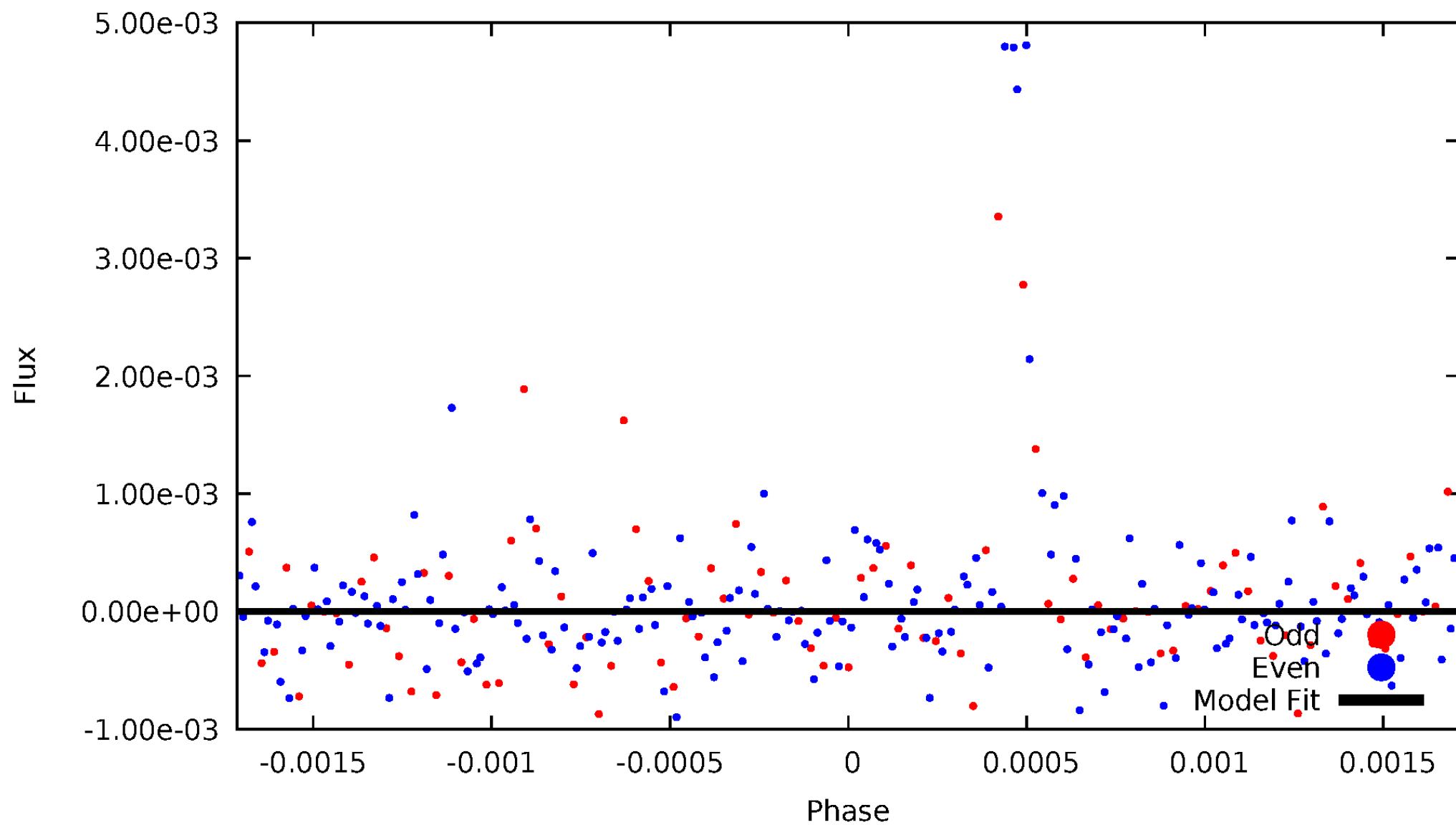
# TCE 011859900-02





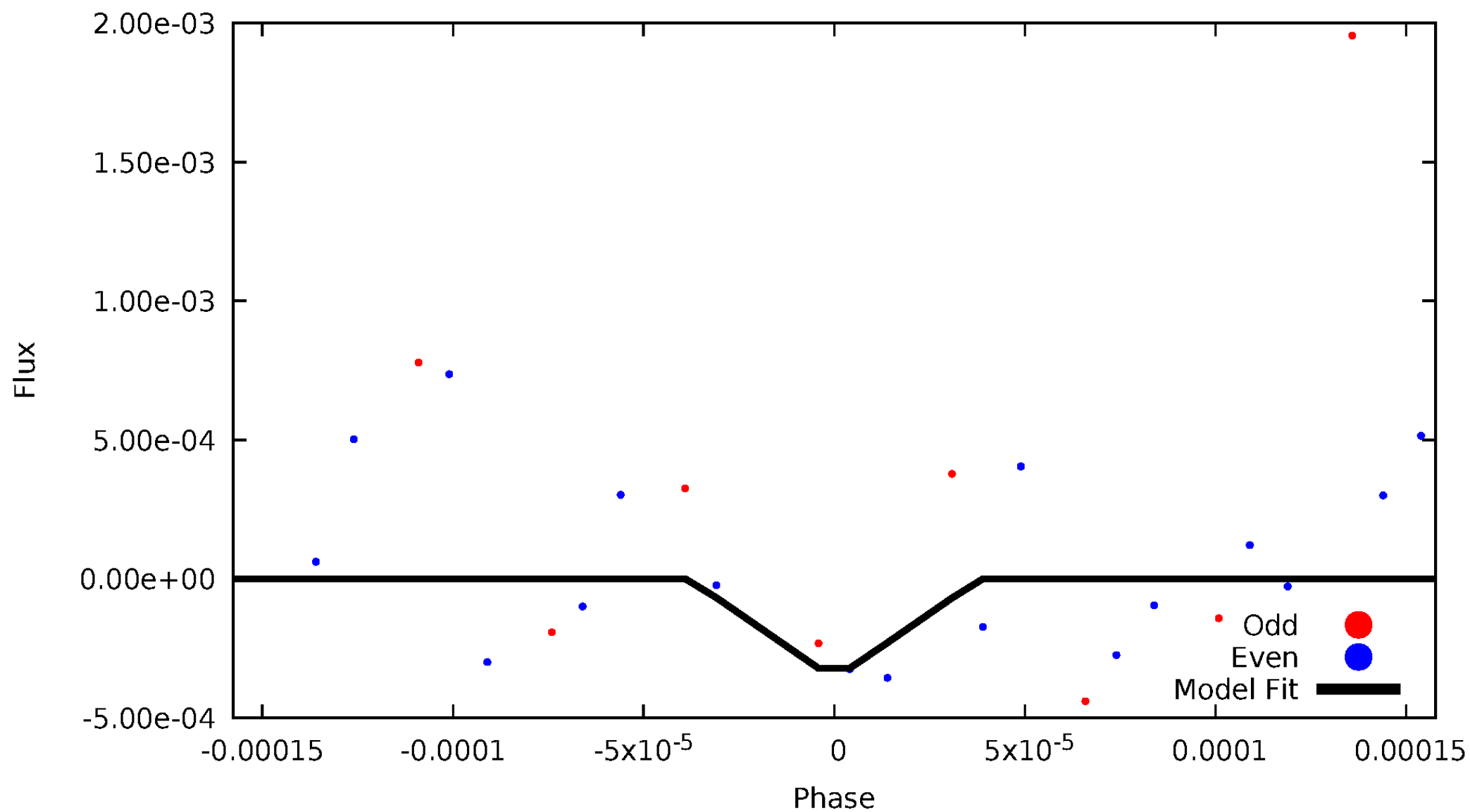
# DV Odd/Even

TCE 011859900-02



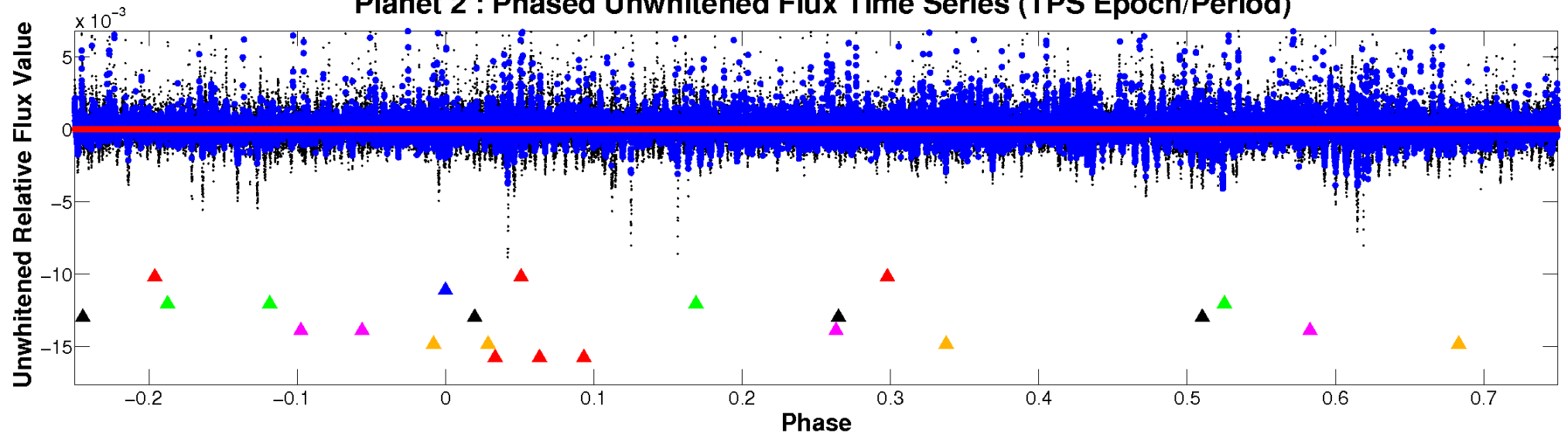
# ALT Odd/Even

TCE 011859900-02

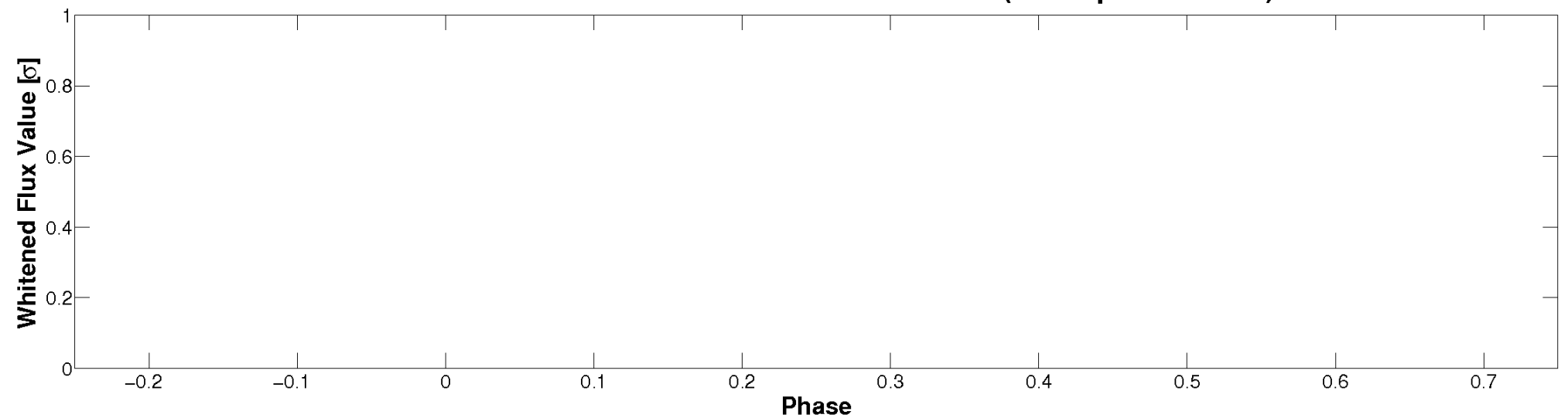


# Non-Whitened Vs. Whitened Light Curve

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

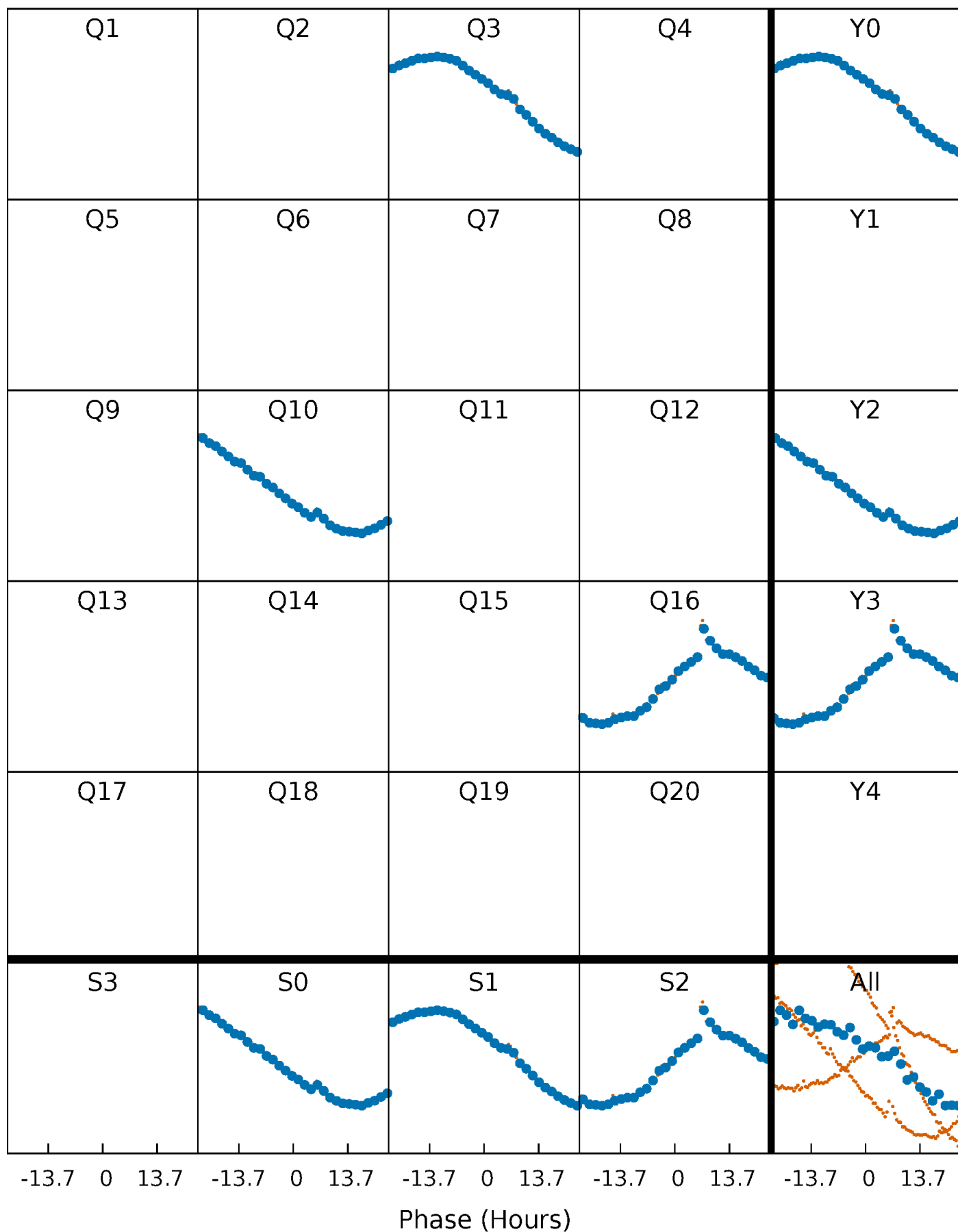


**Planet 2 : Phased Whitened Flux Time Series (TPS Epoch/Period)**



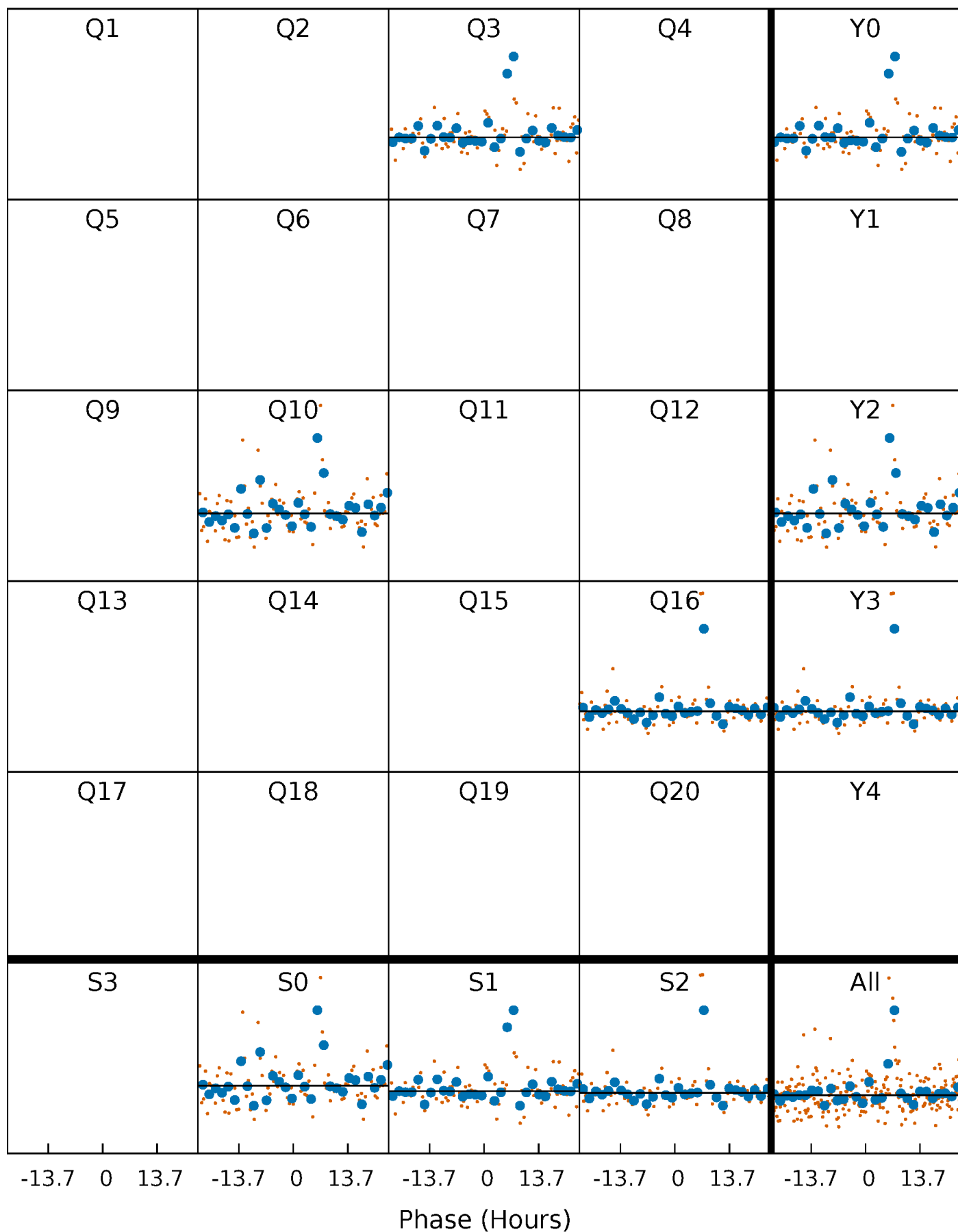
# PDC Quarter-Phased Transit Curves

TCE 011859900-02     $P=583.779998$  Days     $T_0=327.887722$  (BKJD)



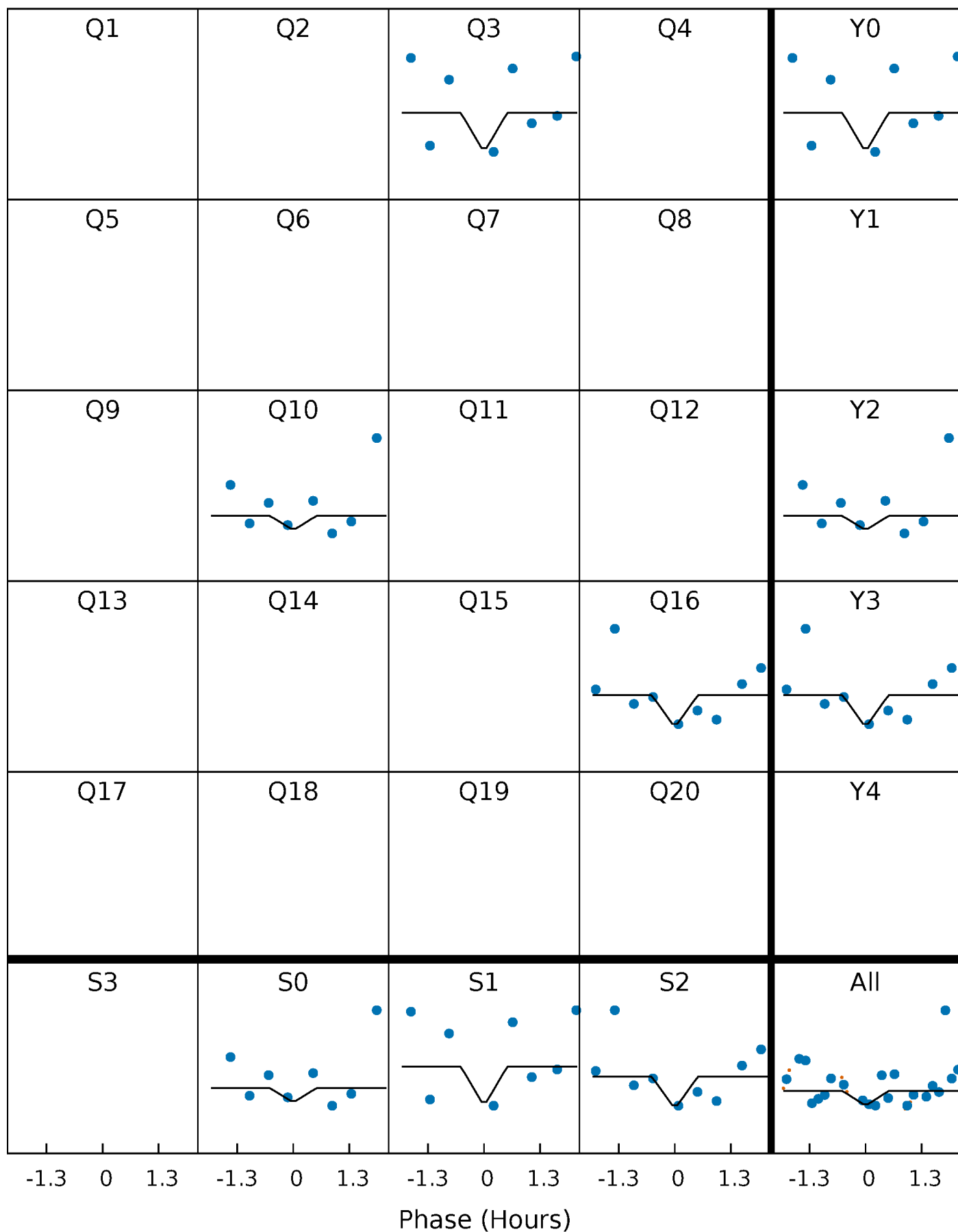
# DV Quarter-Phased Transit Curves

TCE 011859900-02     $P=583.779998$  Days     $T_0=327.887722$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

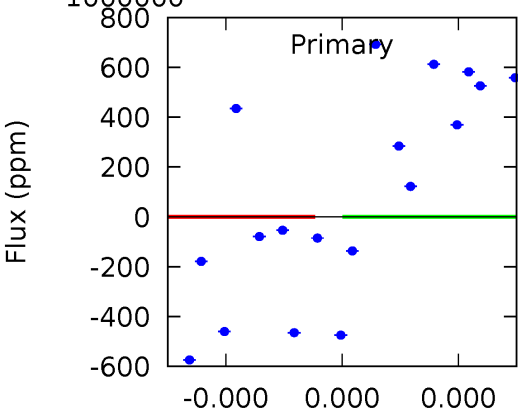
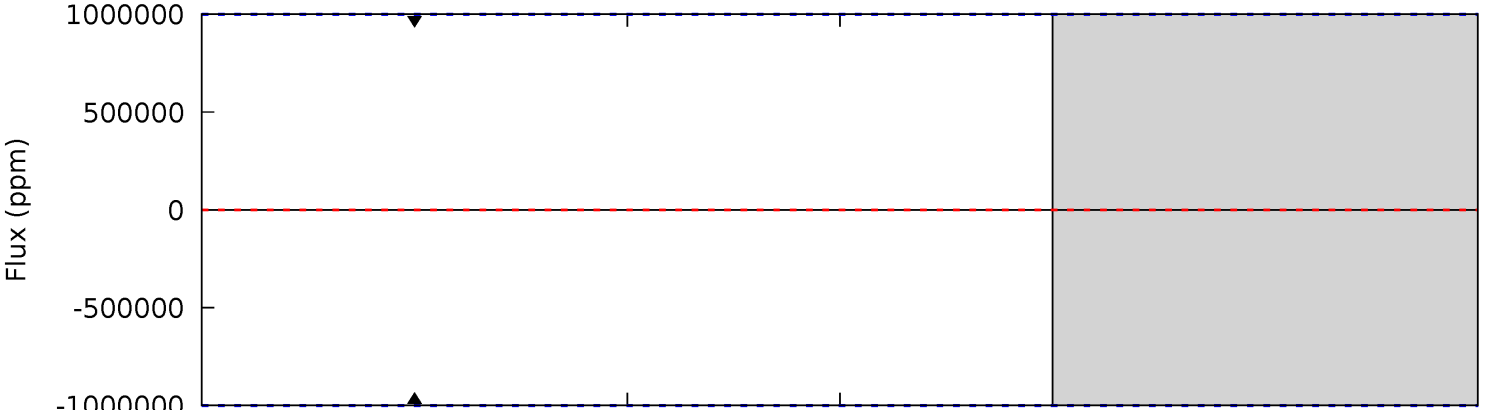
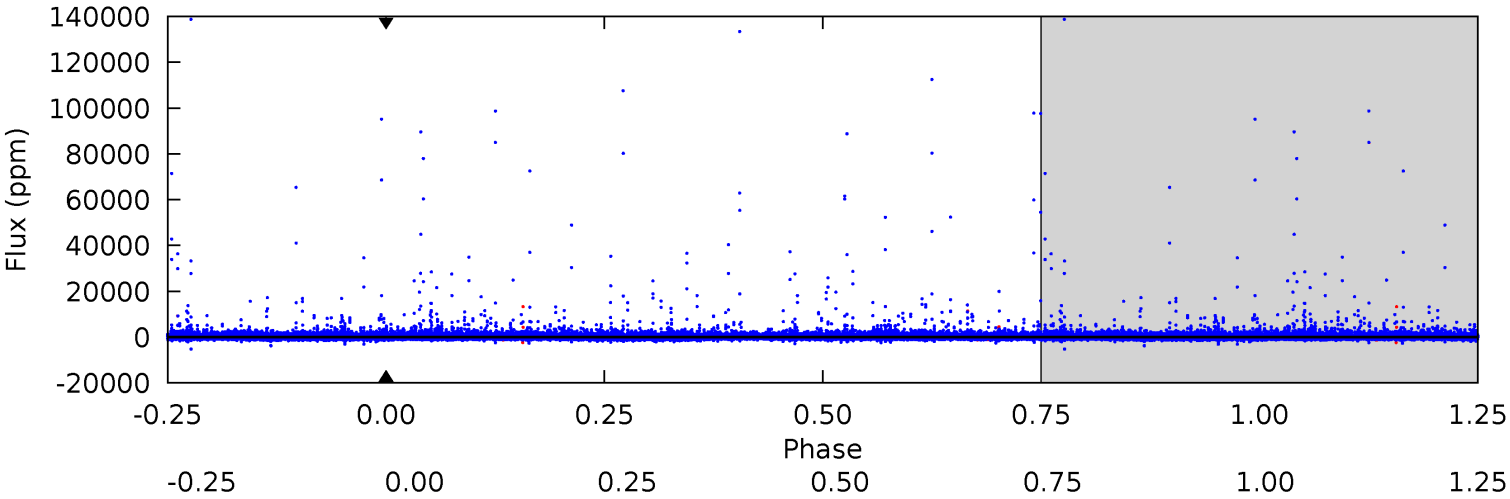
TCE 011859900-02 P=583.779998 Days  $T_0=327.440785$  (BKJD)



# DV Model-Shift Uniqueness Test

011859900-02, P = 583.779998 Days, E = 327.887722 Days

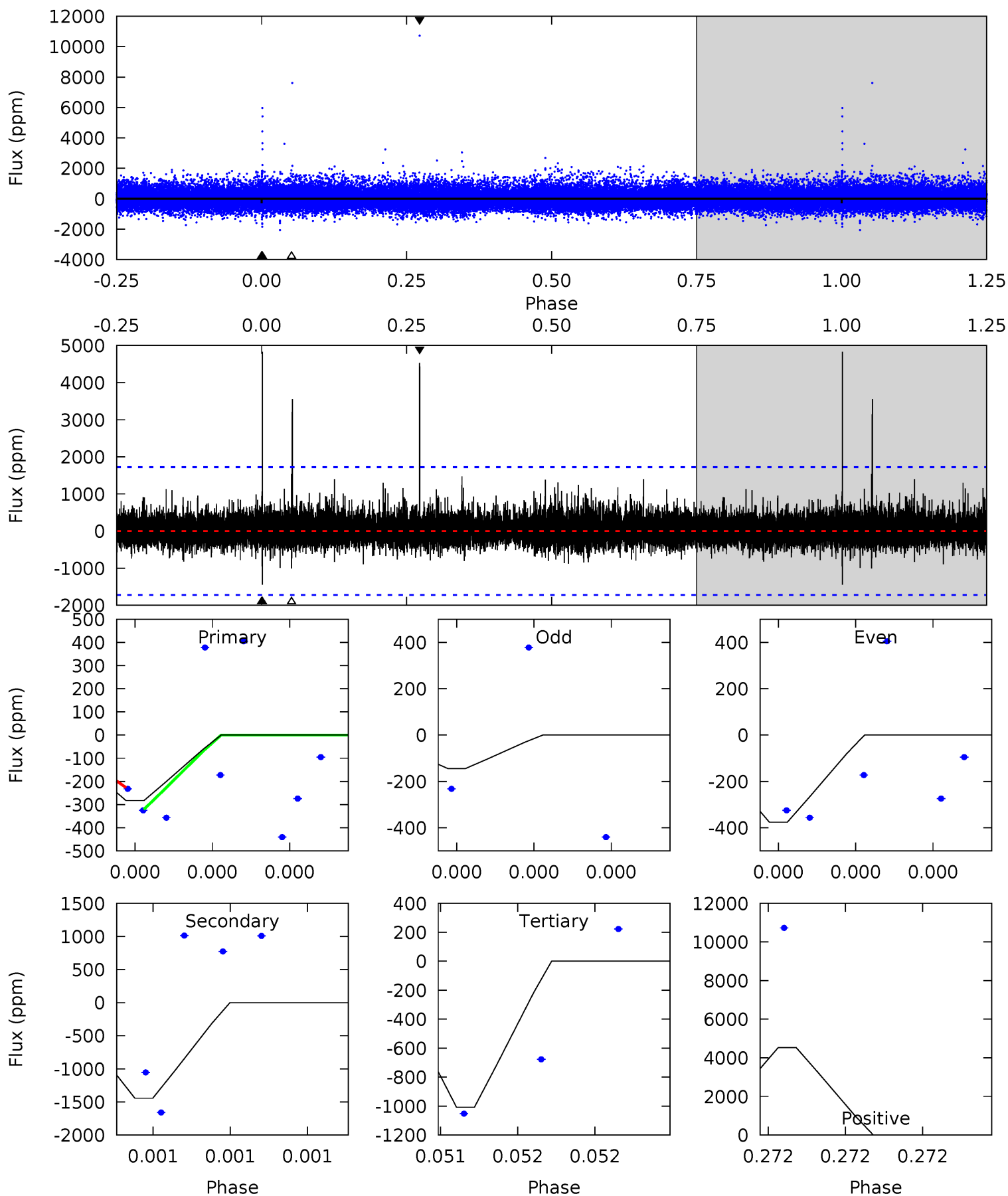
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



# Alt Model-Shift Uniqueness Test

011859900-02, P = 583.779998 Days, E = 327.440785 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
0.99	5.04	3.52	15.8	6.02	4.14	0.78	-2.53	-14.8	1.52	-10.8	0.54	1.00	0.77	0.00





### Stellar Parameters For KIC 011859900

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4247^{+116}_{-142}$	$4.607^{+0.052}_{-0.017}$	$0.180^{+0.200}_{-0.300}$	$0.673^{+0.024}_{-0.061}$	$0.668^{+0.047}_{-0.052}$	$3.085^{+0.708}_{-0.205}$
	+3%/-3%	+1%/-0%	+111%/-167%	+4%/-9%	+7%/-8%	+23%/-7%
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 011859900-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$0 \pm 1000000$	$5.90^{+5.93}_{-4.08}$	$195^{+6}_{-7}$	$-2950^{+12981}_{-6544}$	$-17106.310^{+3944375.229}_{-3492717.622}$
Alt.	$-1443 \pm 286$	$5.39^{+5.62}_{-3.88}$	$195^{+7}_{-7}$	$3375^{+2069}_{-646}$	$38956^{+462687}_{-29837}$

$T_{\text{max}}$  = 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

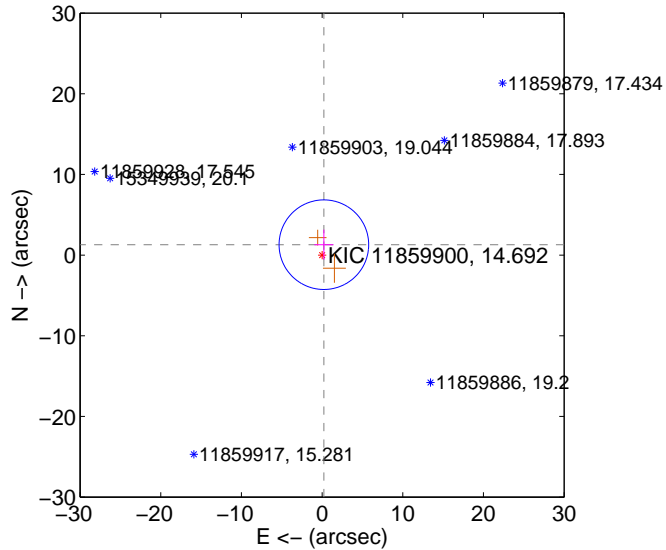
Supplemental centroid analysis for 011859900-02. Kepler magnitude: 14.69. Transit SNR -1.00

There are 0 quarters with good PRF difference image offsets

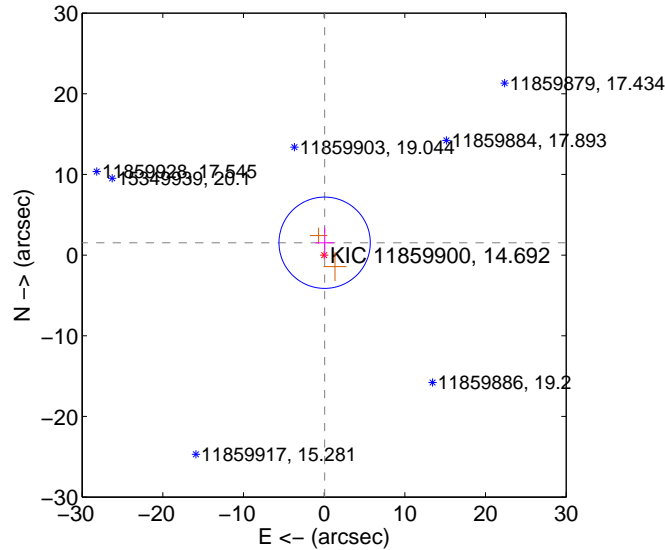
The direct PRF centroid is offset from the target star catalog position by about 0.29 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.310 \pm 1.851$	0.71	$-0.221 \pm 1.172$	$1.291 \pm 1.867$
PRF-fit source offset from KIC position	$1.533 \pm 1.886$	0.81	$-0.060 \pm 1.151$	$1.532 \pm 1.887$
photometric centroid source offset	$5.89 \pm 9.15$	0.64	$-2.24 \pm 8.53$	$5.45 \pm 9.26$

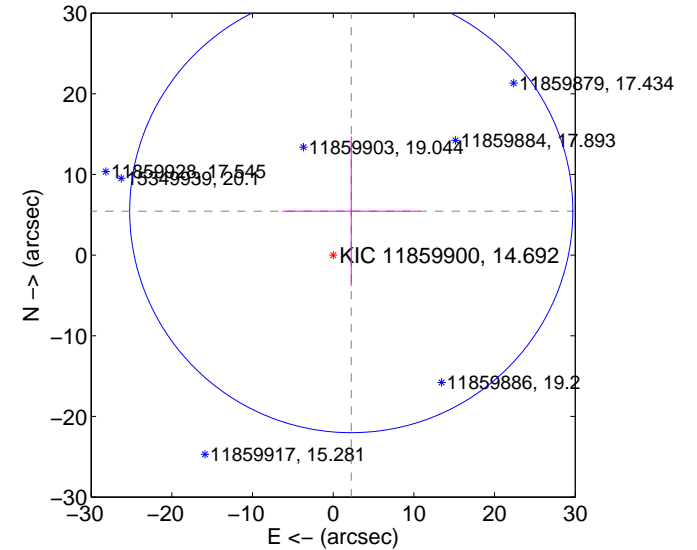
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



offset from photometric centroids

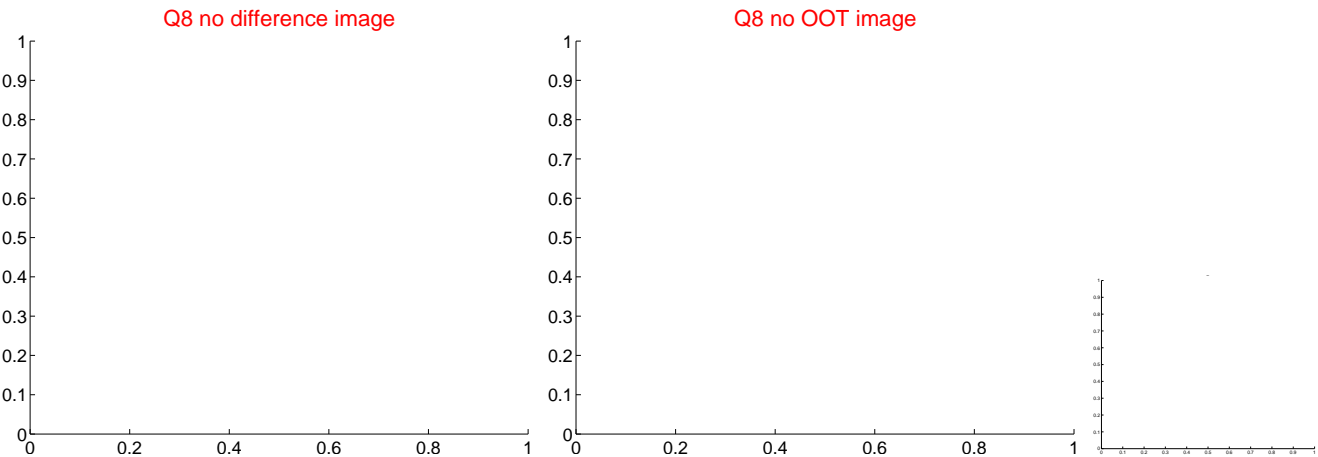
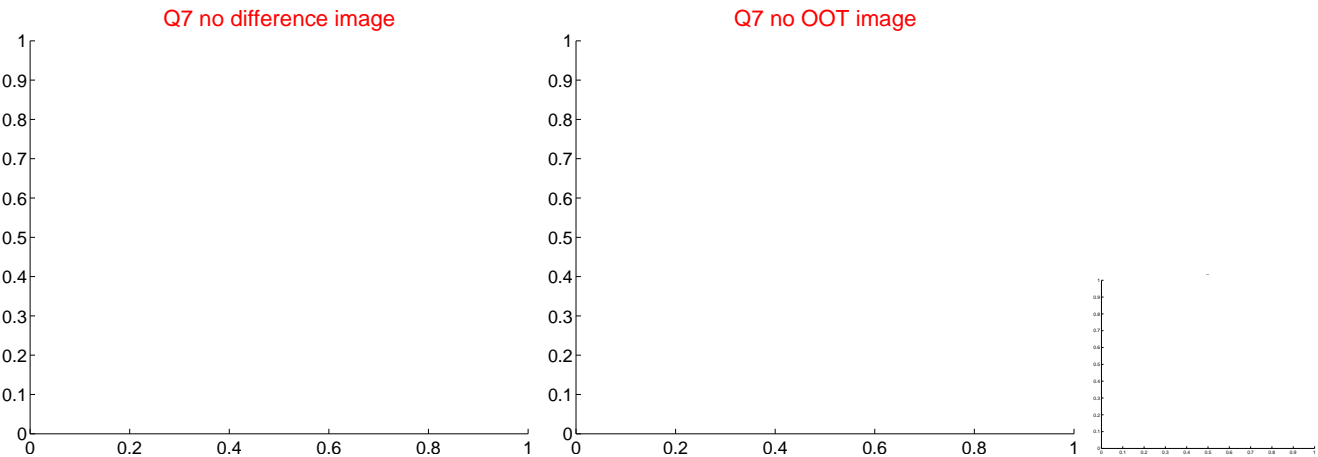
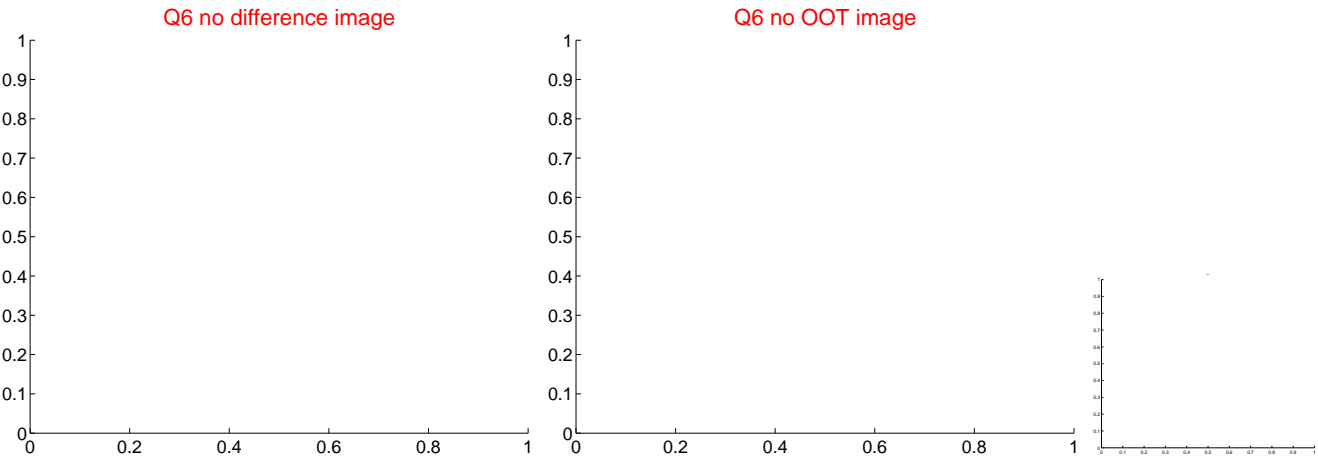
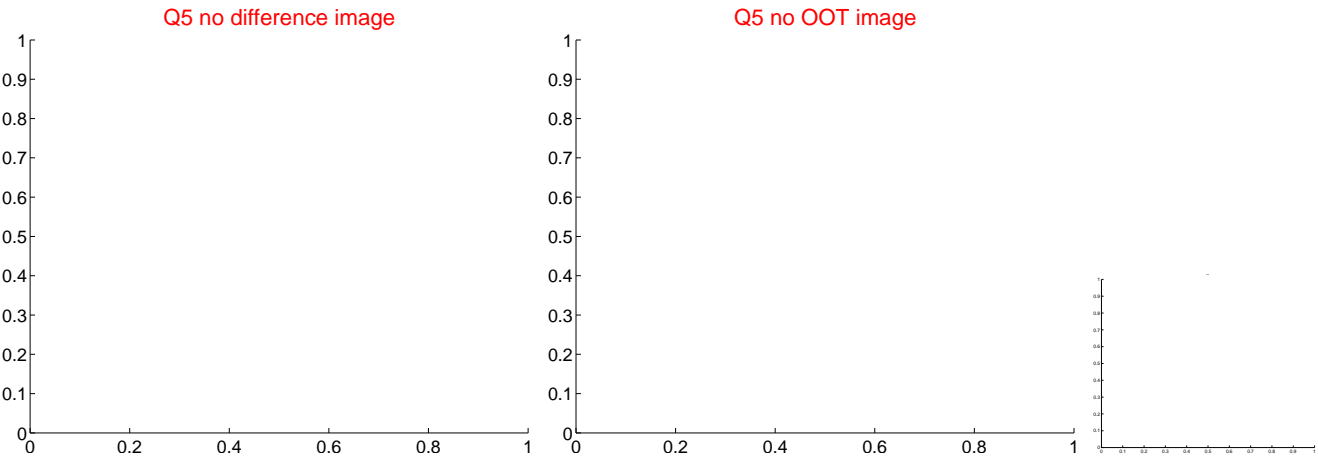


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

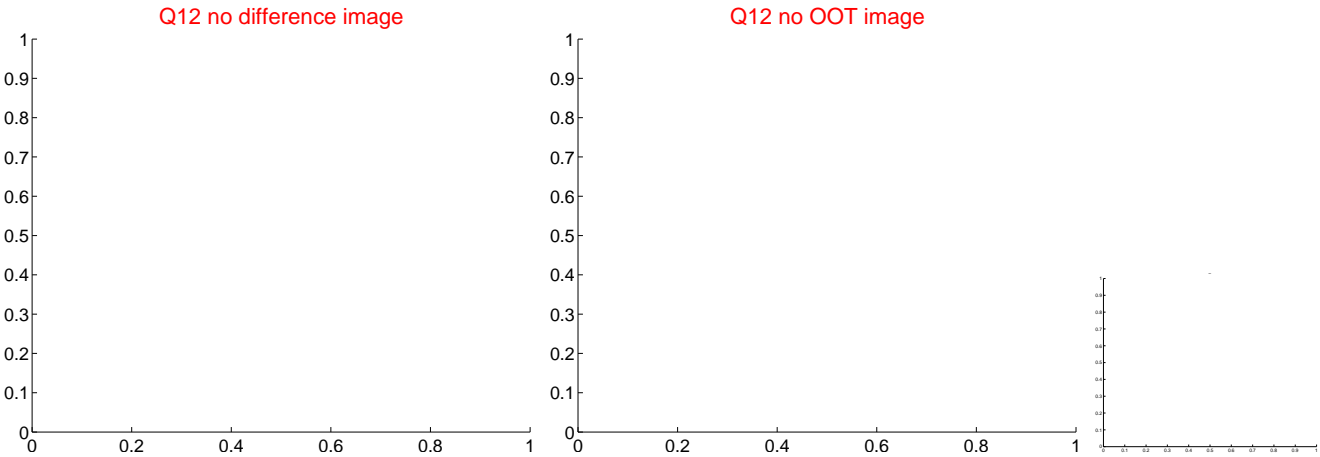
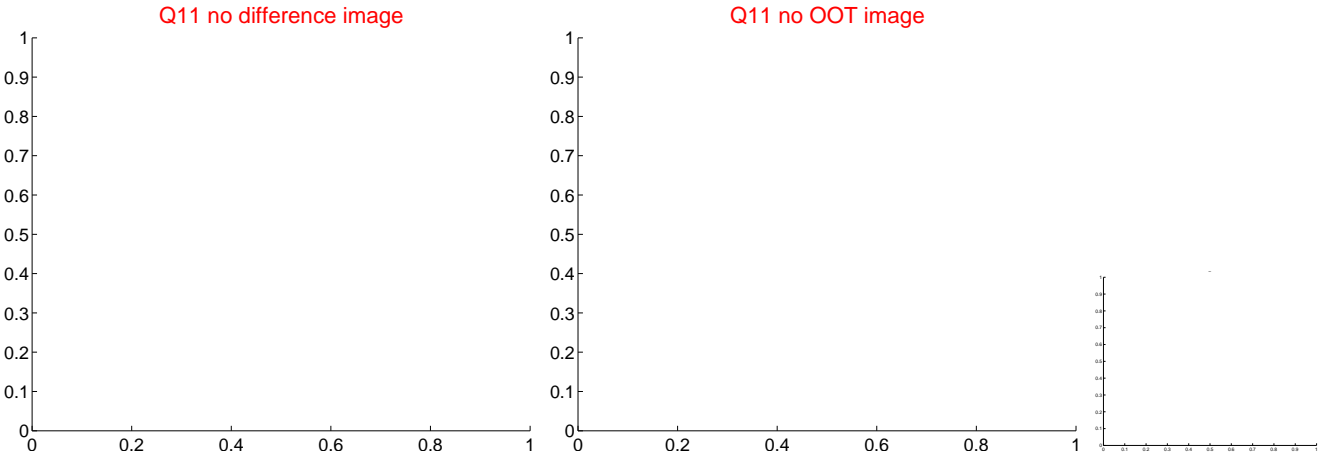
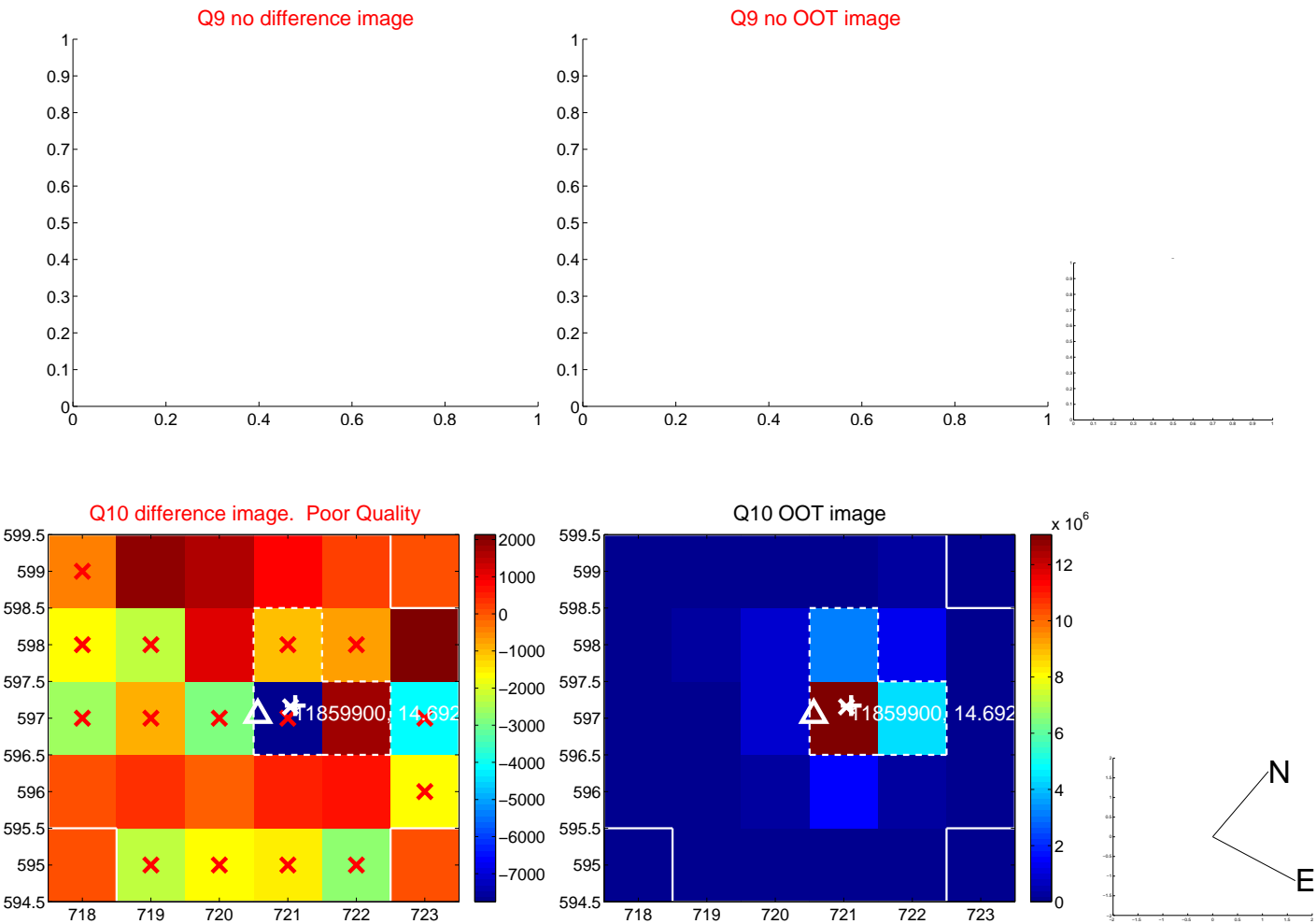
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



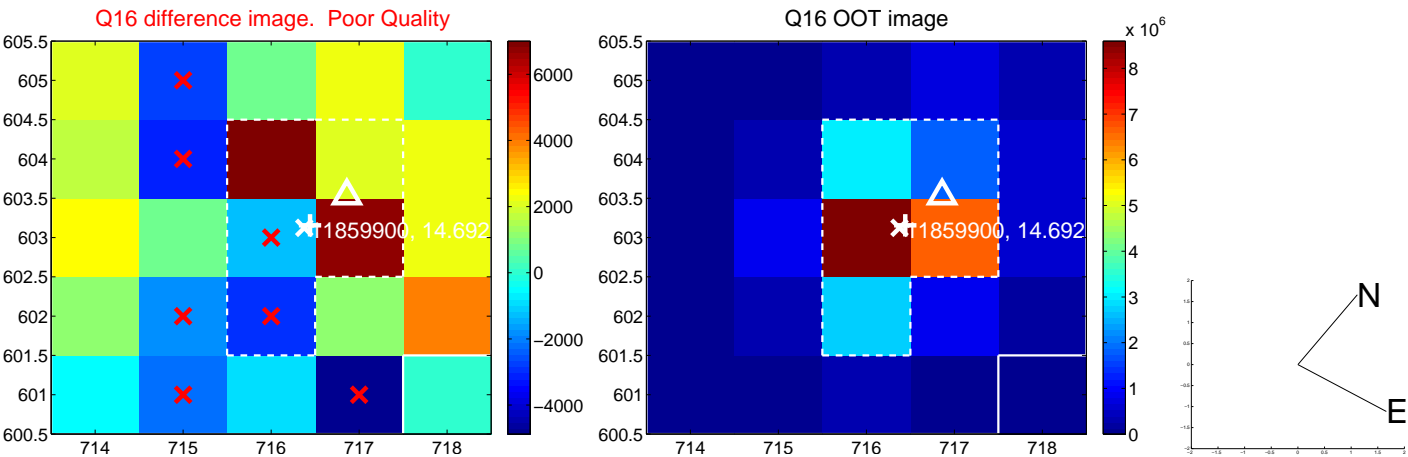
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



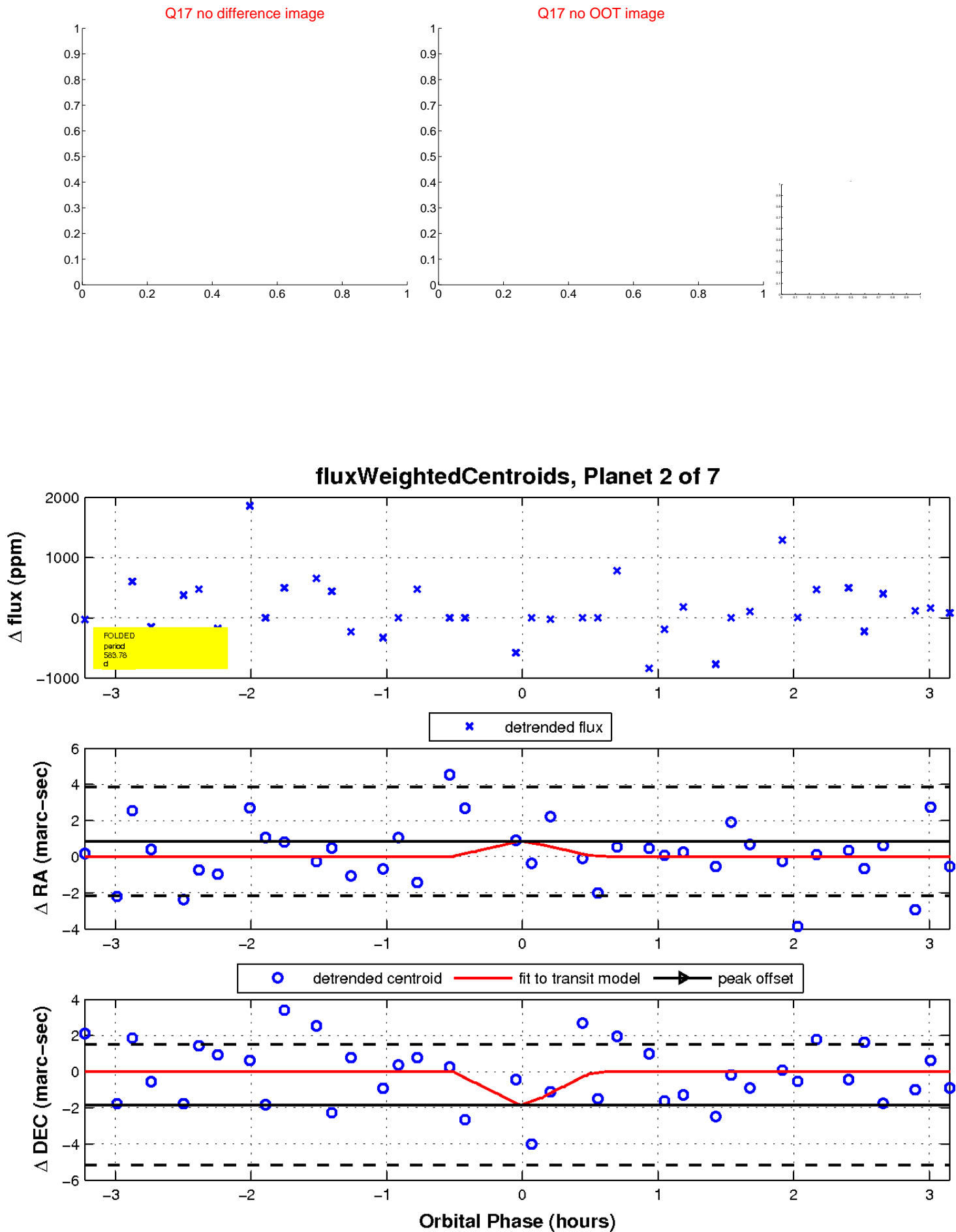
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



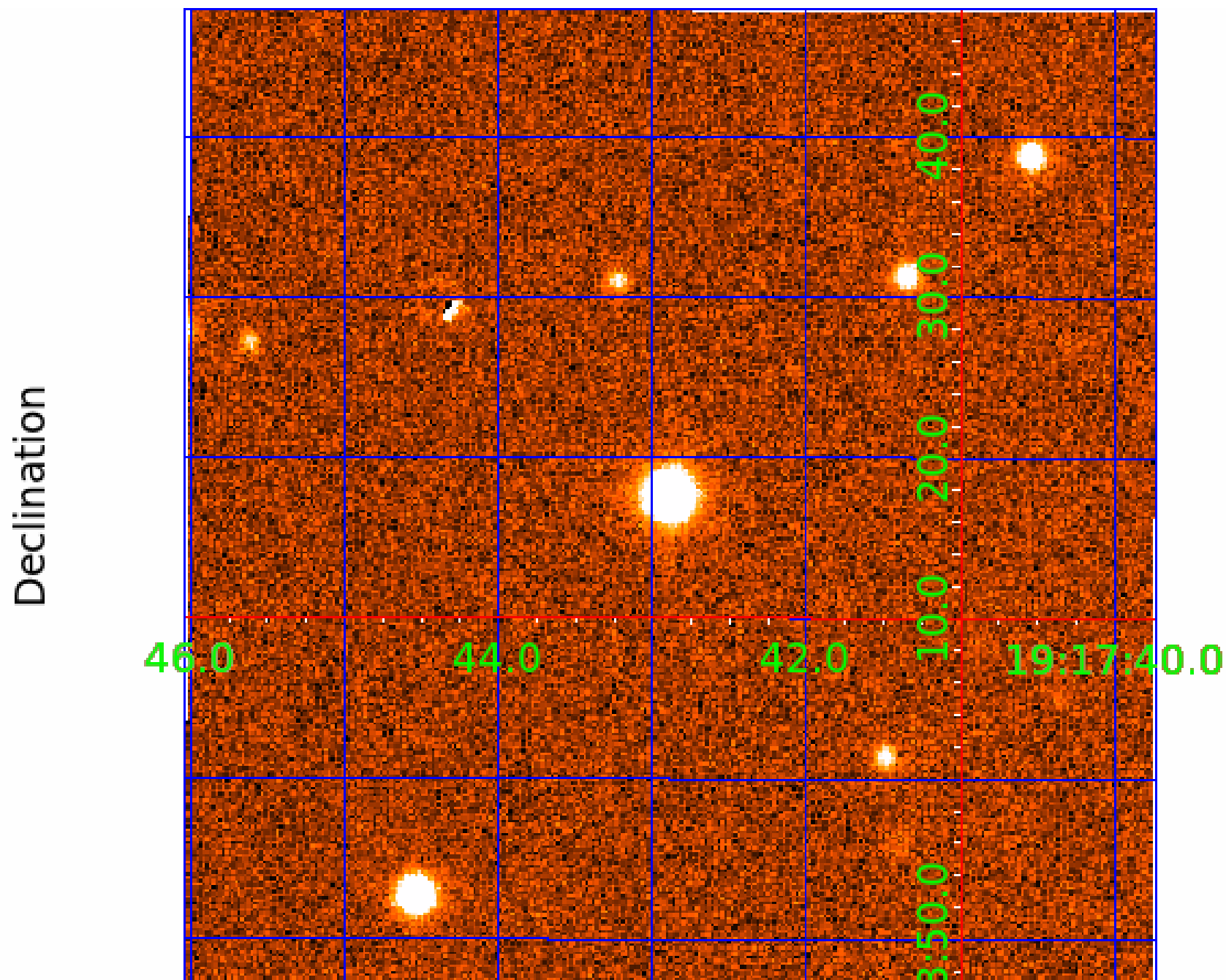
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



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



UKIRT Image





# KIC 011859900

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
011859900-01	OBS	No	439.604995	501.827165	2033.7	3.792	16.8	8.4	0.67	4247	2.98	0.14
011859900-02	OBS	No	583.779998	327.887722	1009.5	12.000	14.8	-1.0	0.67	4247	2.04	0.09
011859900-03	OBS	No	375.779063	258.711135	1758.8	3.561	15.1	7.8	0.67	4247	2.88	0.17
011859900-04	OBS	No	440.597899	185.157716	3438.7	30.528	13.3	7.9	0.67	4247	5.03	0.13
011859900-05	OBS	No	397.217150	270.968371	1380.9	5.642	12.3	7.1	0.67	4247	2.64	0.15
011859900-06	OBS	No	382.032729	344.666605	1876.8	10.133	13.3	7.6	0.67	4247	2.77	0.16
011859900-07	OBS	No	601.243881	347.442639	1036.0	12.000	16.0	-1.0	0.67	4247	2.06	0.09

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
011859900-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011859900-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_NOFITS
011859900-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_POS_DV
011859900-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011859900-05	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—CENT_FEW_DIFFS
011859900-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011859900-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—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.

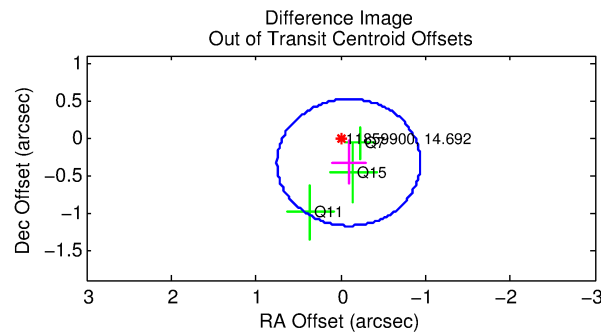
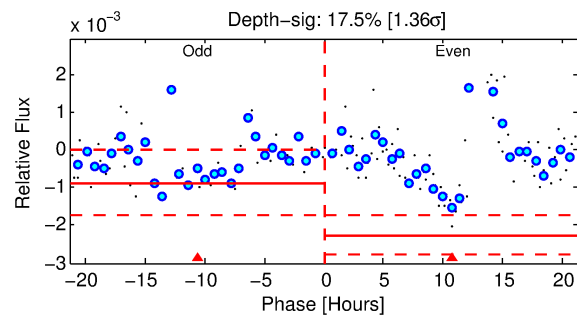
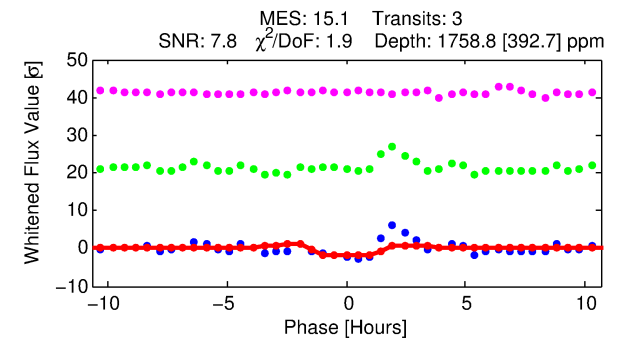
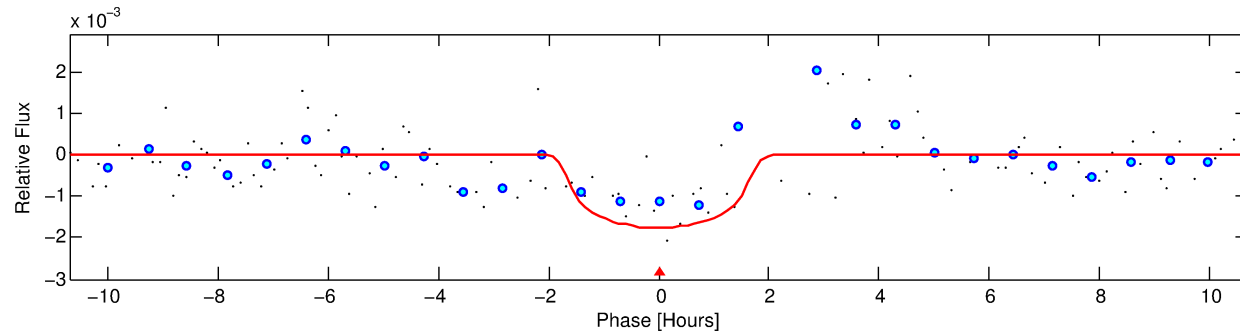
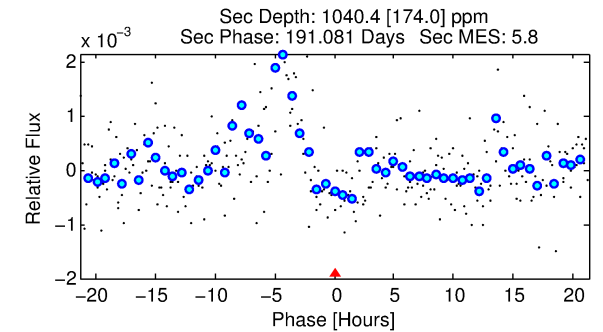
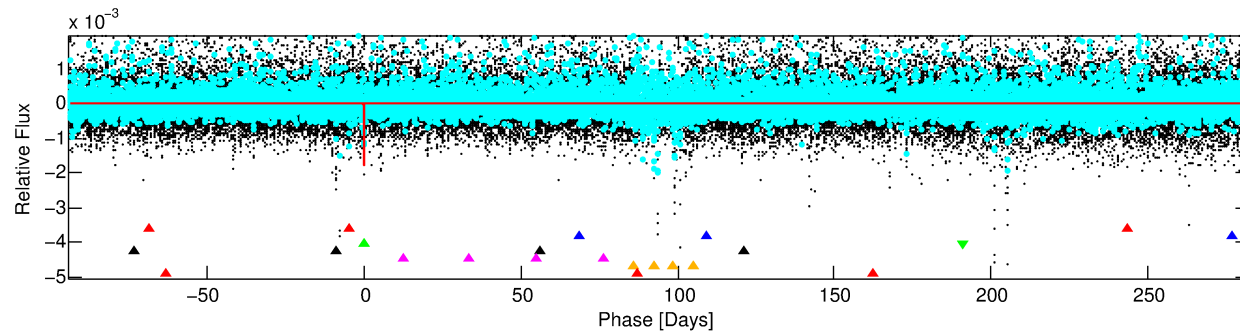
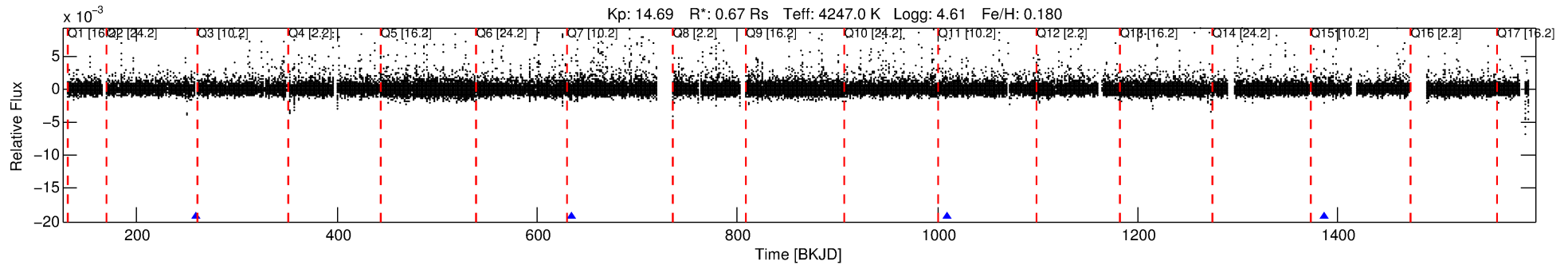
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 011859900-03

No Significant Match Found

# DV One-Page Summary

KIC: 11859900 Candidate: 3 of 7 Period: 375.779 d



## DV Fit Results:

Period = 375.77906 [0.00634] d  
Epoch = 258.7111 [0.0146] BKJD  
Rp/R\* = 0.0392 [0.0648]  
a/R\* = 698.41 [3363.07]  
b = 0.57 [5.80]  
Seff = 0.17 [0.03]  
Teq = 163 [7] K  
Rp = 2.88 [4.77] Re  
a = 0.8912 [0.0645] AU  
Ag = 54815.44 [181483.47] [0.30 $\sigma$ ]  
Teffp = 3852 [3189] K [1.16 $\sigma$ ]

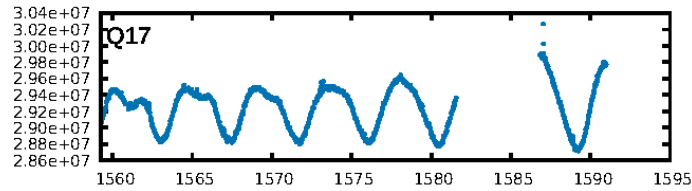
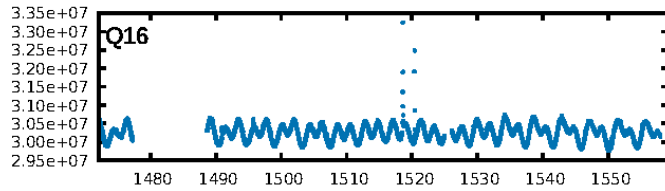
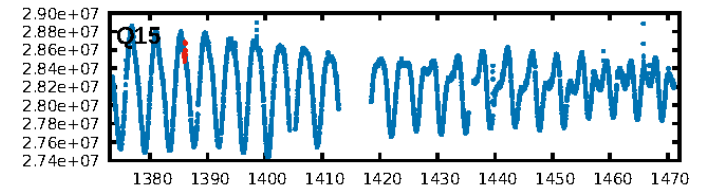
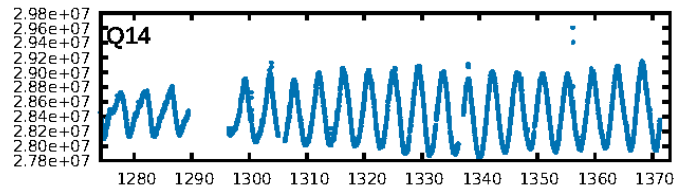
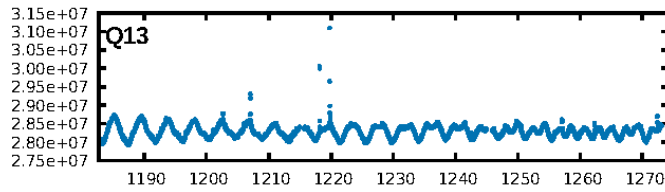
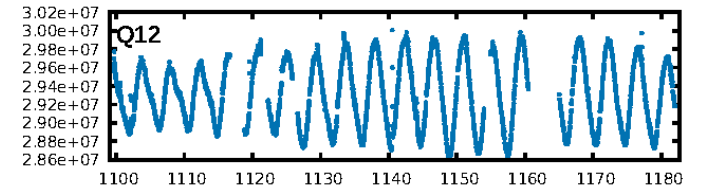
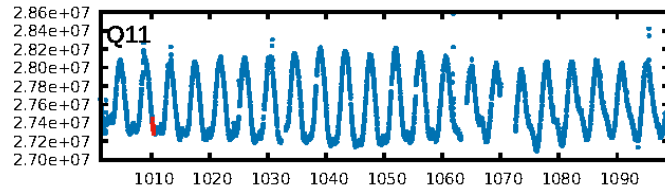
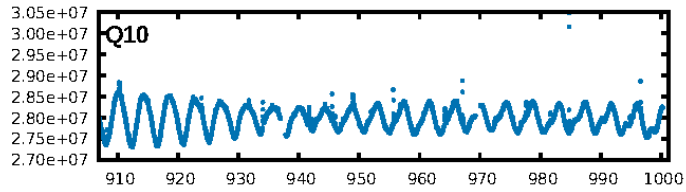
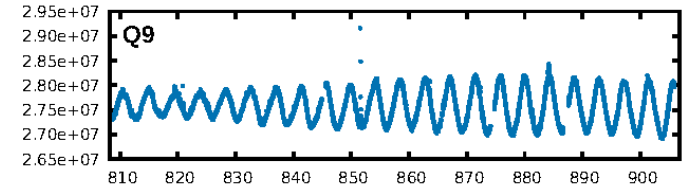
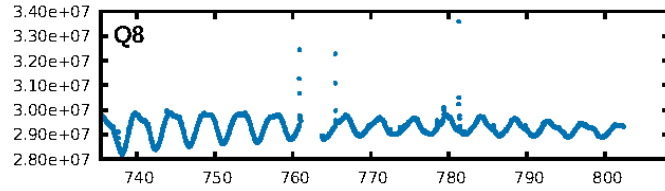
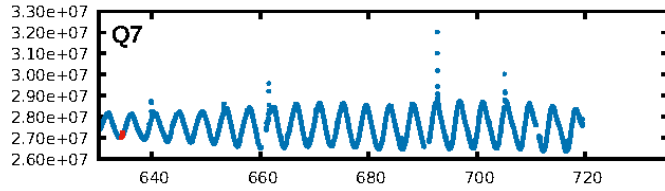
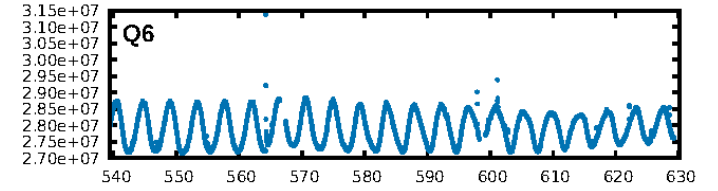
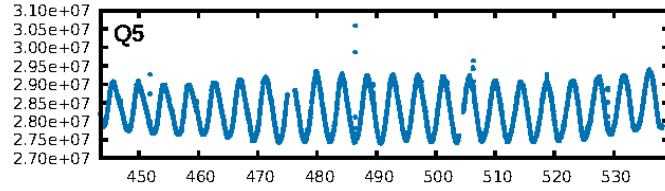
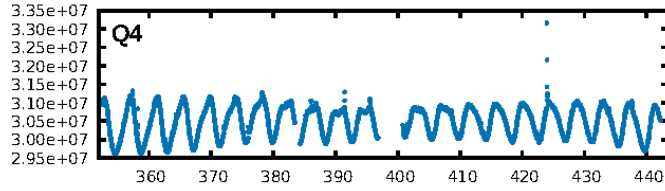
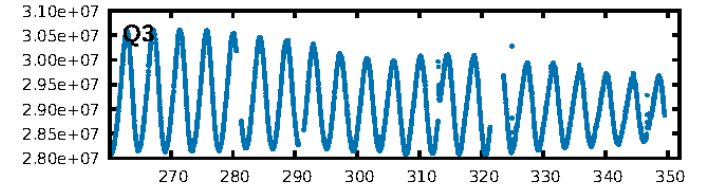
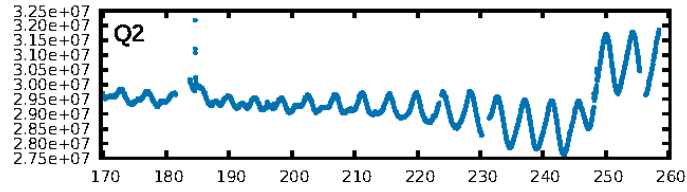
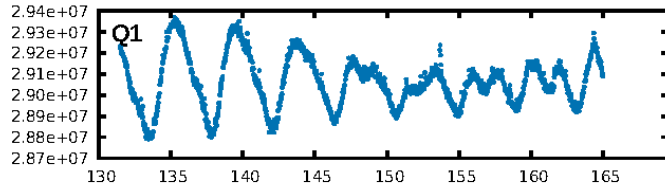
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [13.97 $\sigma$ ]  
**ModelChiSquare2-sig: 0.1%**  
ModelChiSquareGof-sig: 37.9%  
Bootstrap-pfa: 5.38e-14  
RollingBand-fgt: 1.00 [3/3]  
**GhostDiagnostic-chr: 0.4878**  
Centroid-sig: 75.5%  
Centroid-so: 0.377 arcsec [0.49 $\sigma$ ]  
OotOffset-rm: 0.344 arcsec [1.22 $\sigma$ ]  
OotOffset-st: 0/3/0/0 [3]  
KicOffset-rm: 0.143 arcsec [0.59 $\sigma$ ]  
KicOffset-st: 0/3/0/0 [3]  
DiffImageQuality-fgm: 1.00 [3/3]  
DiffImageOverlap-fno: 1.00 [3/3]

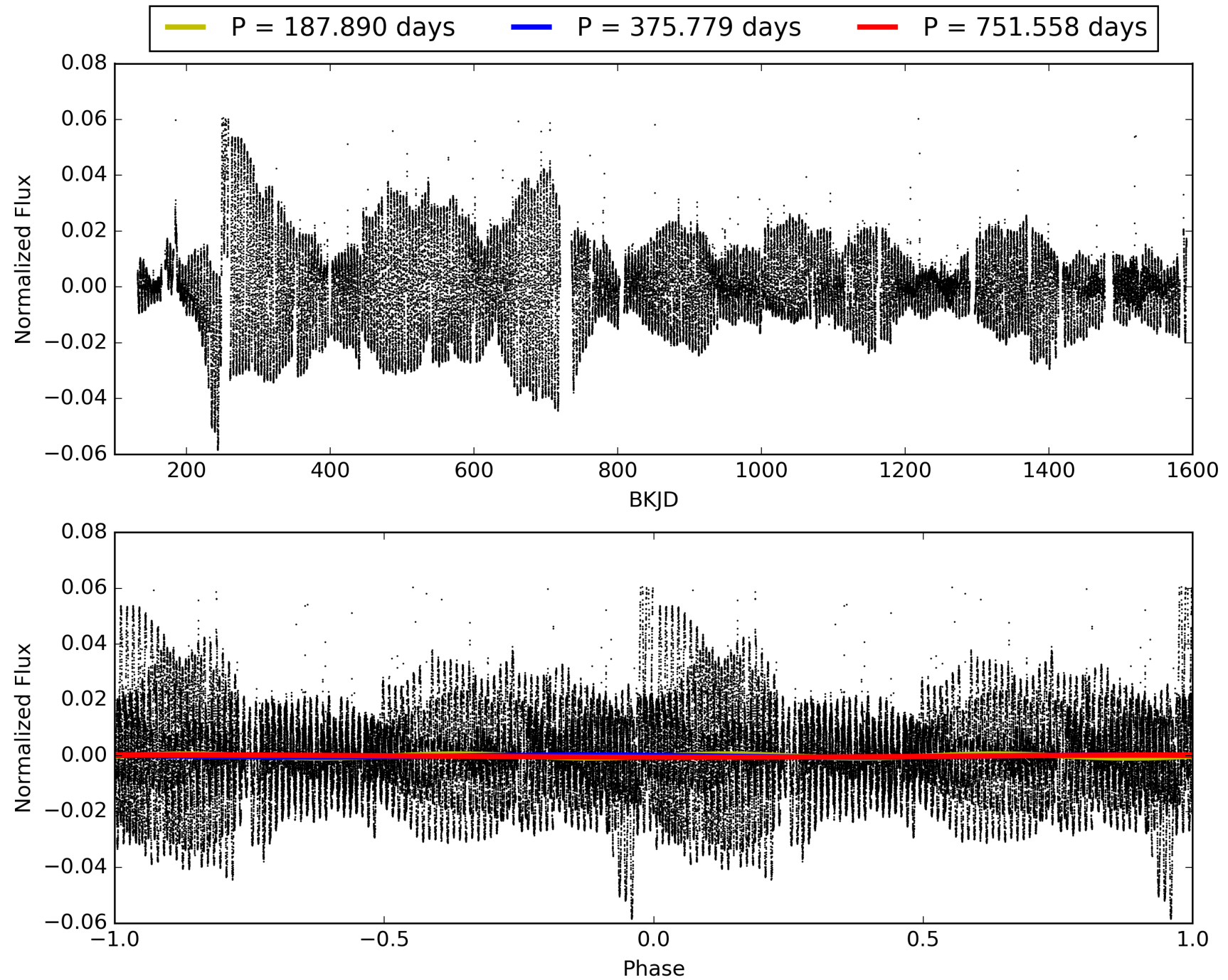
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 05:39:11 Z

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

# TCE 011859900-03, PDC Light Curves

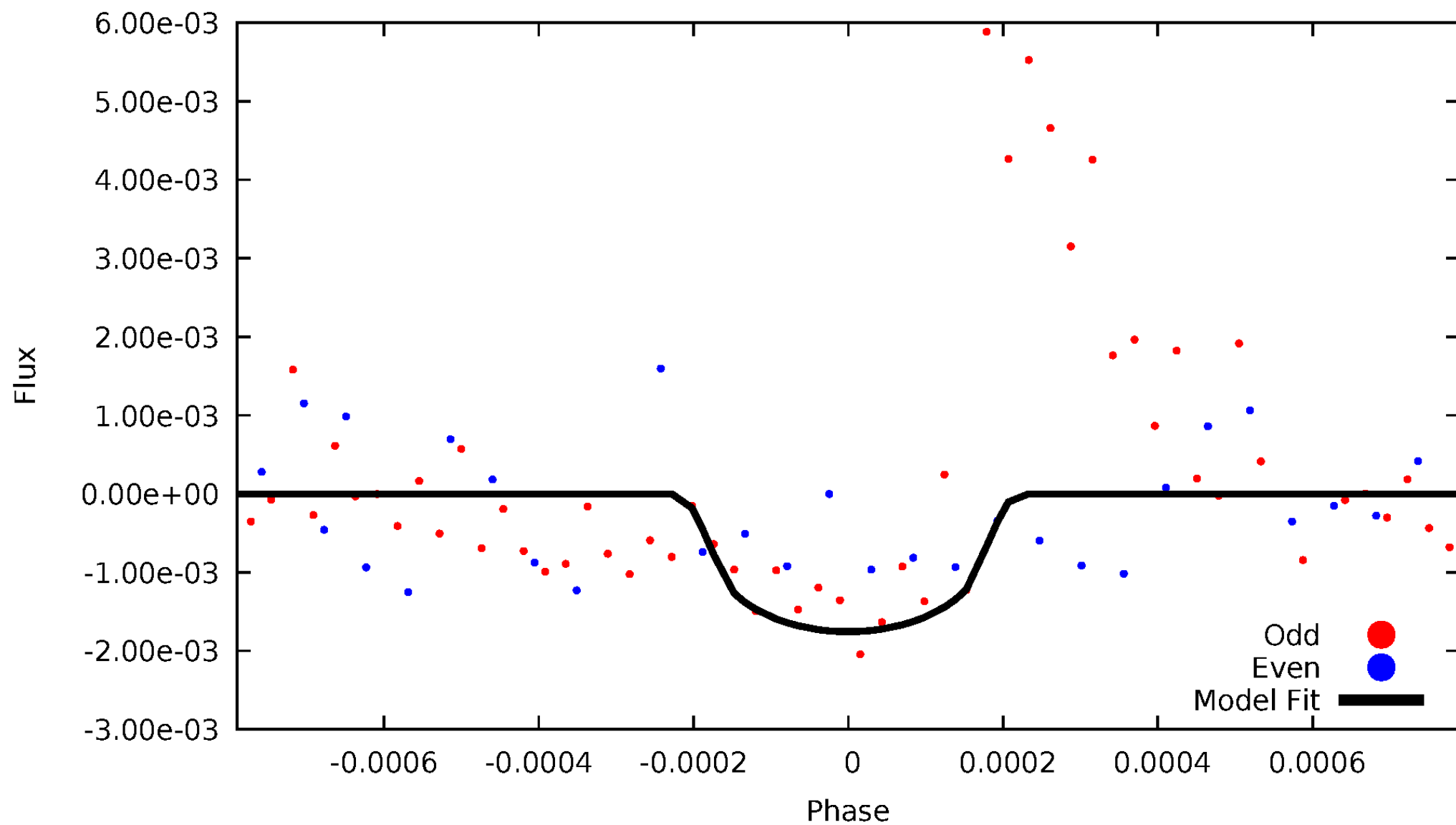


# TCE 011859900-03



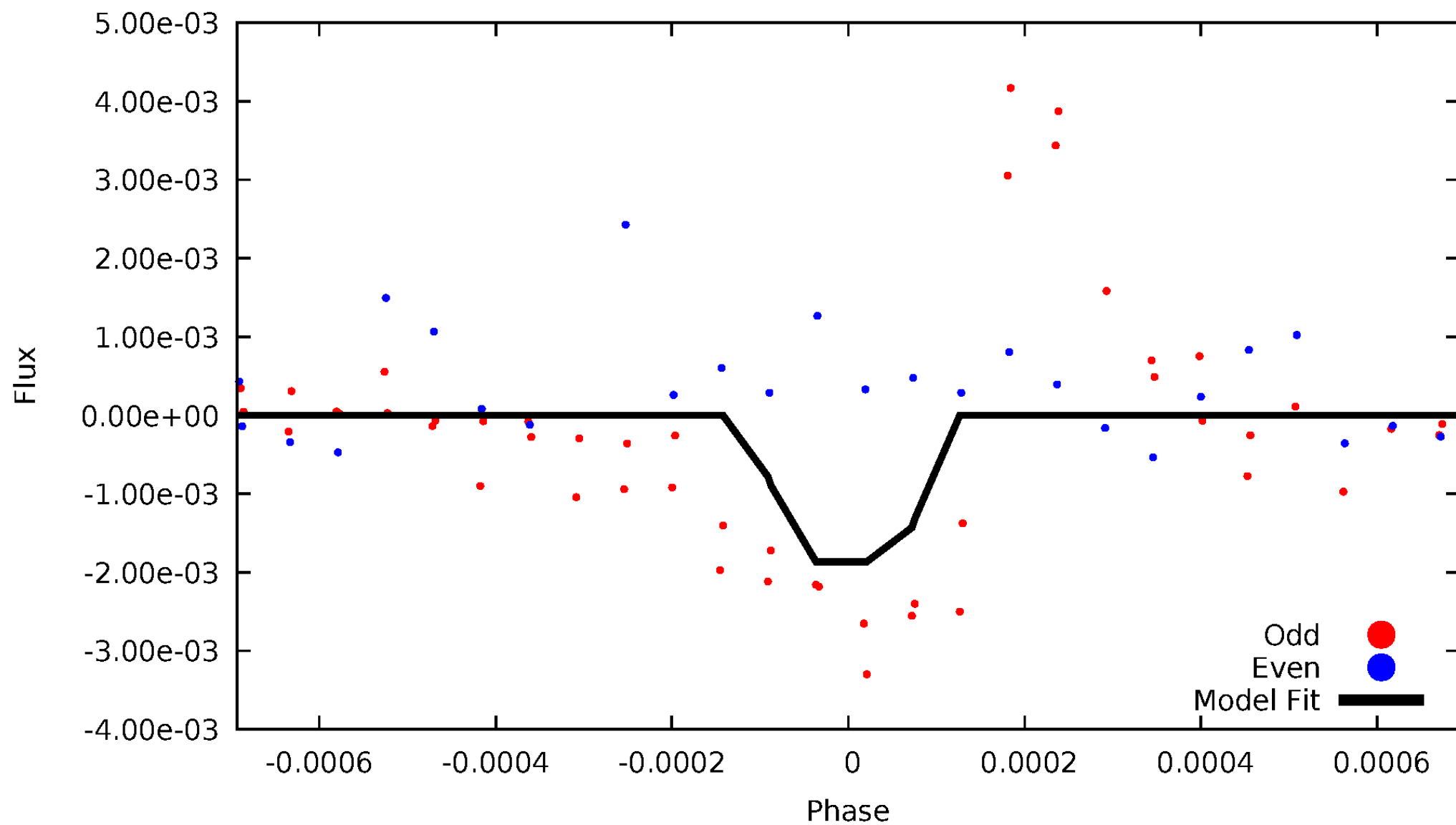
# DV Odd/Even

TCE 011859900-03



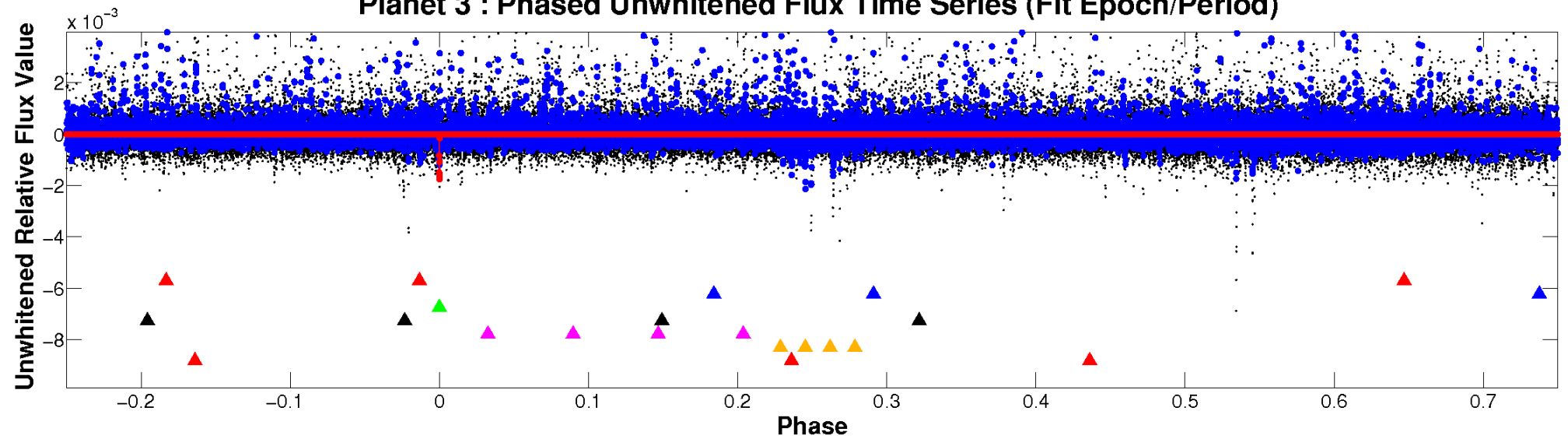
# ALT Odd/Even

TCE 011859900-03

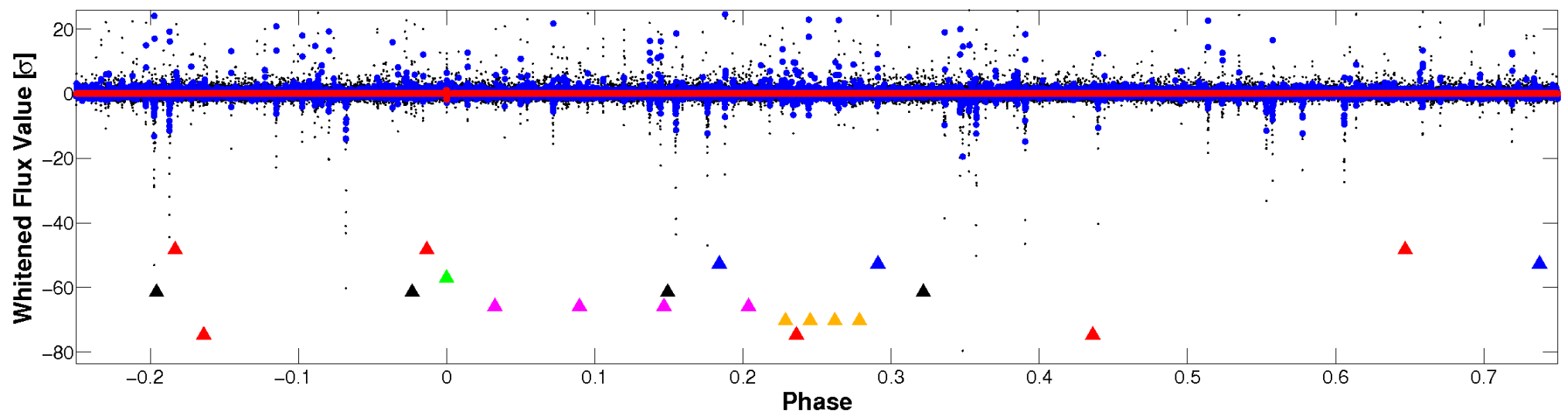


# Non-Whitened Vs. Whitened Light Curve

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

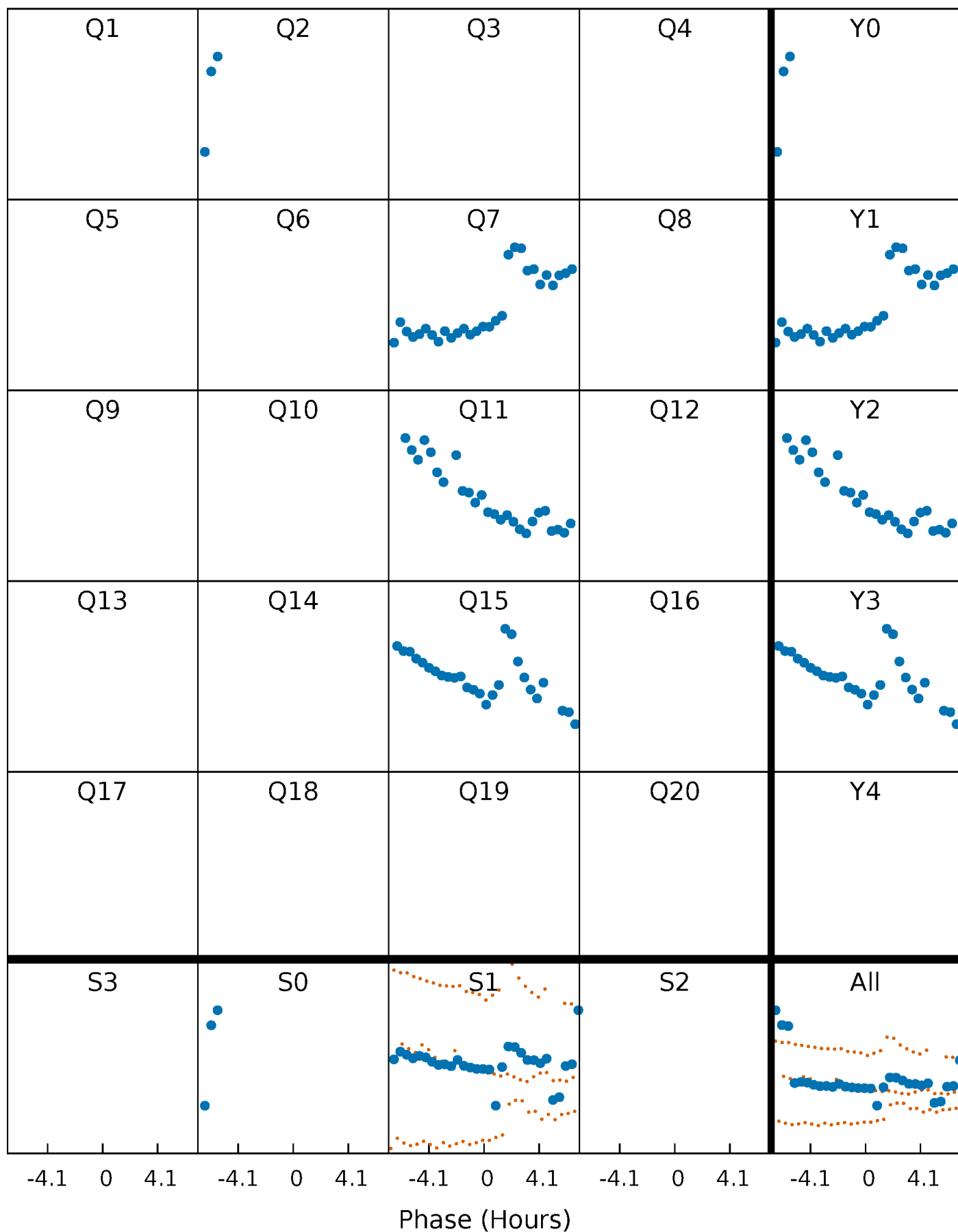


## Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

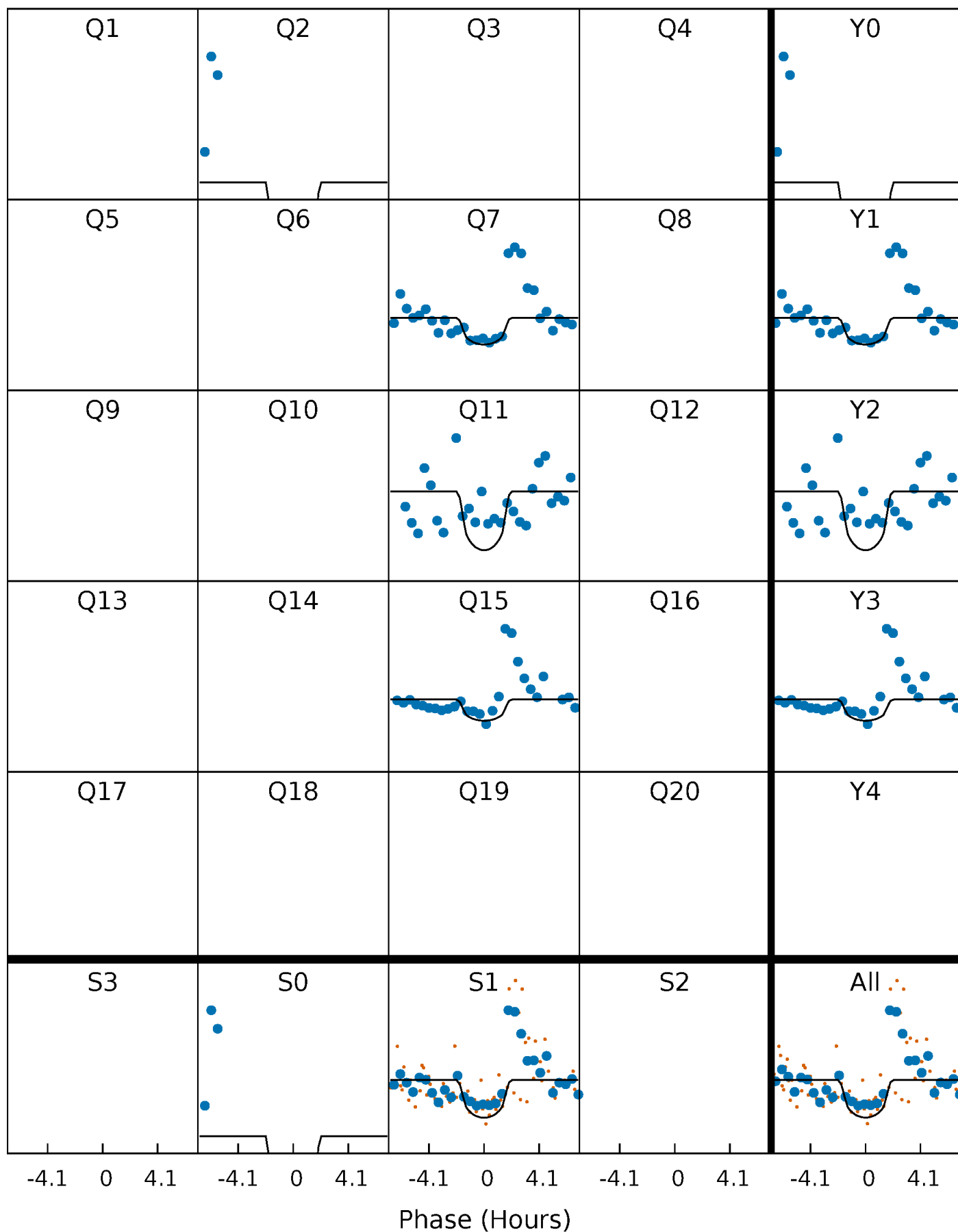
TCE 011859900-03     $P=375.779063$  Days     $T_0=258.711135$  (BKJD)





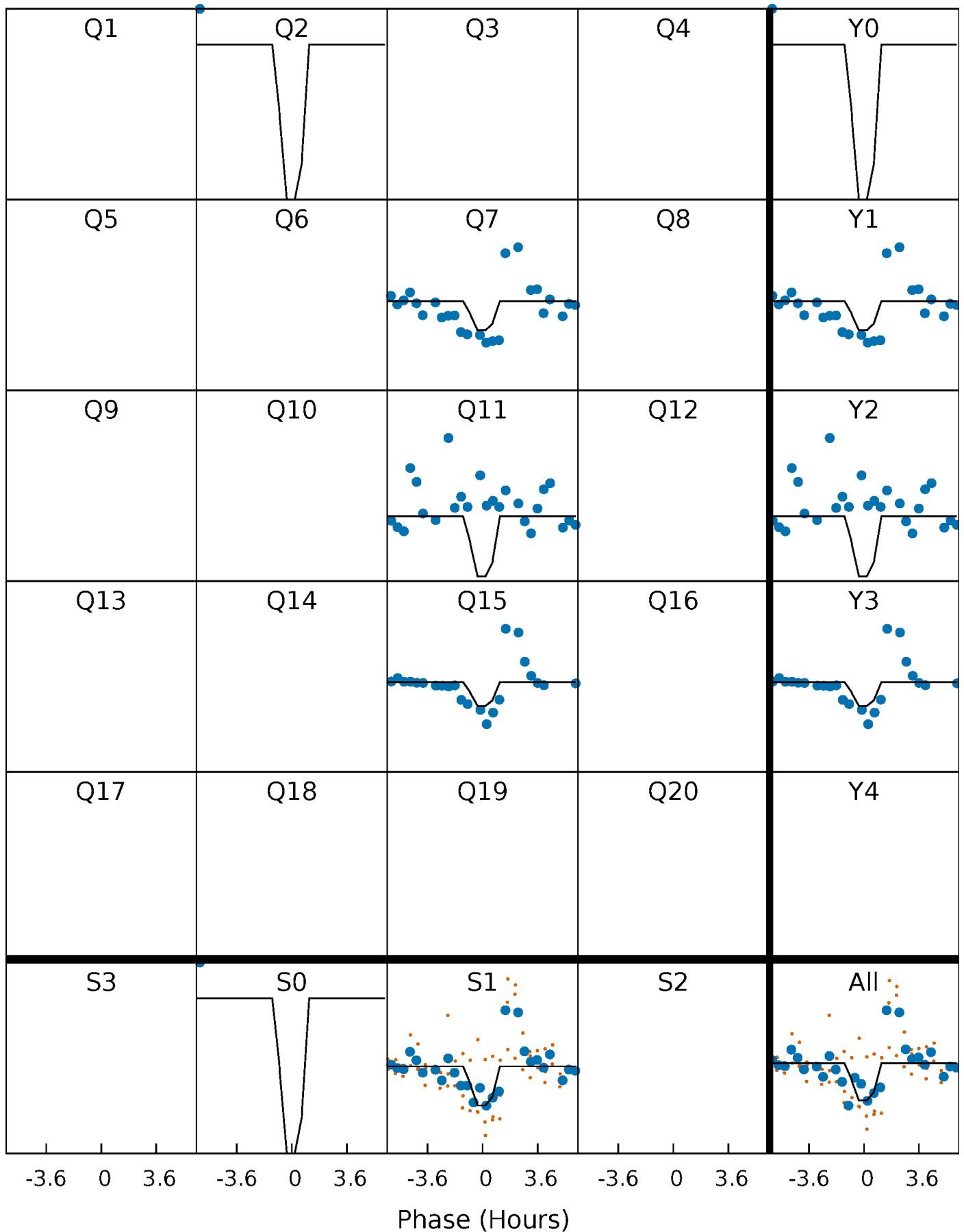
# DV Quarter-Phased Transit Curves

TCE 011859900-03     $P=375.779063$  Days     $T_0=258.711135$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

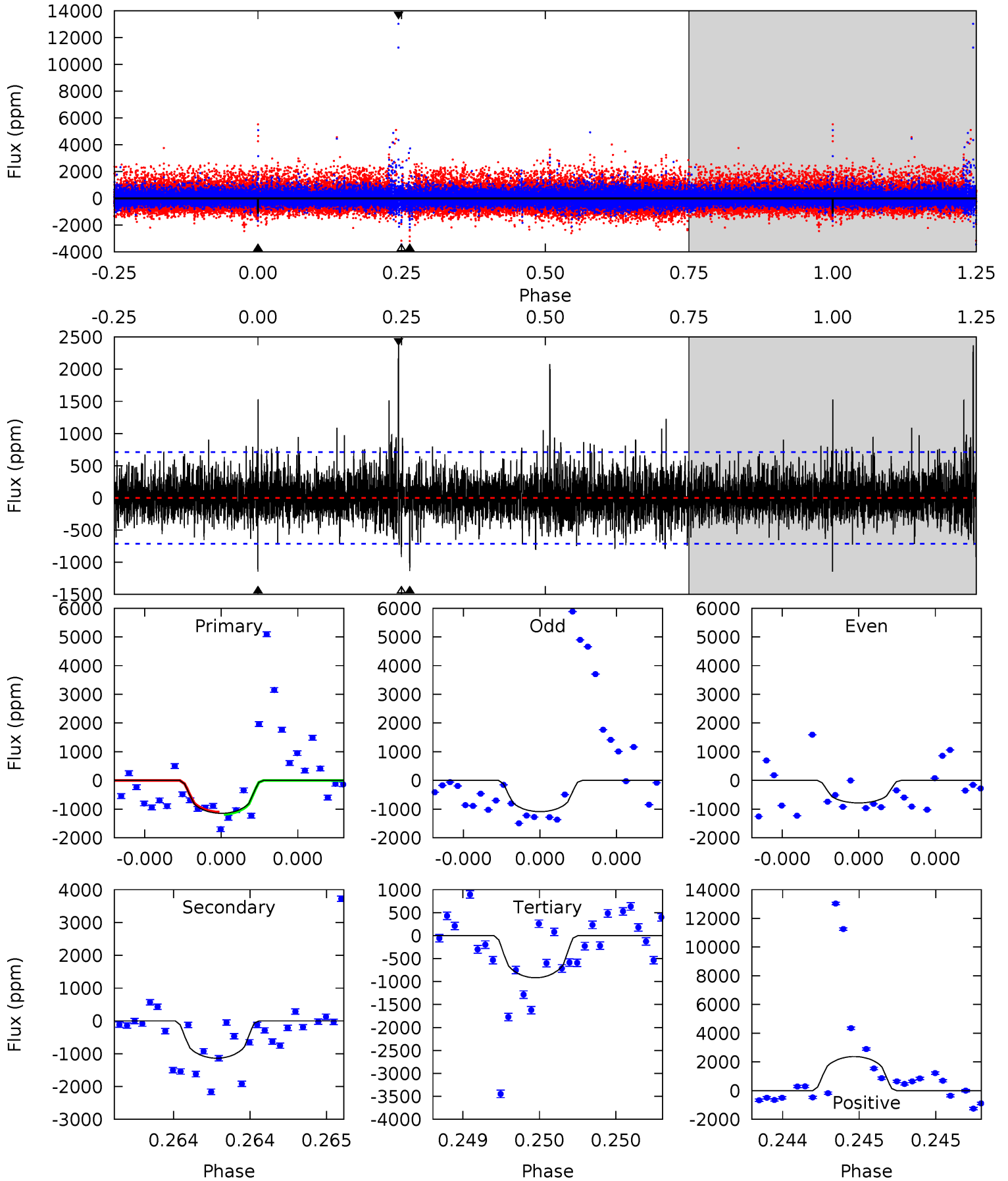
TCE 011859900-03 P=375.773168 Days  $T_0=258.726762$  (BKJD)



# DV Model-Shift Uniqueness Test

011859900-03, P = 375.779063 Days, E = 258.711135 Days

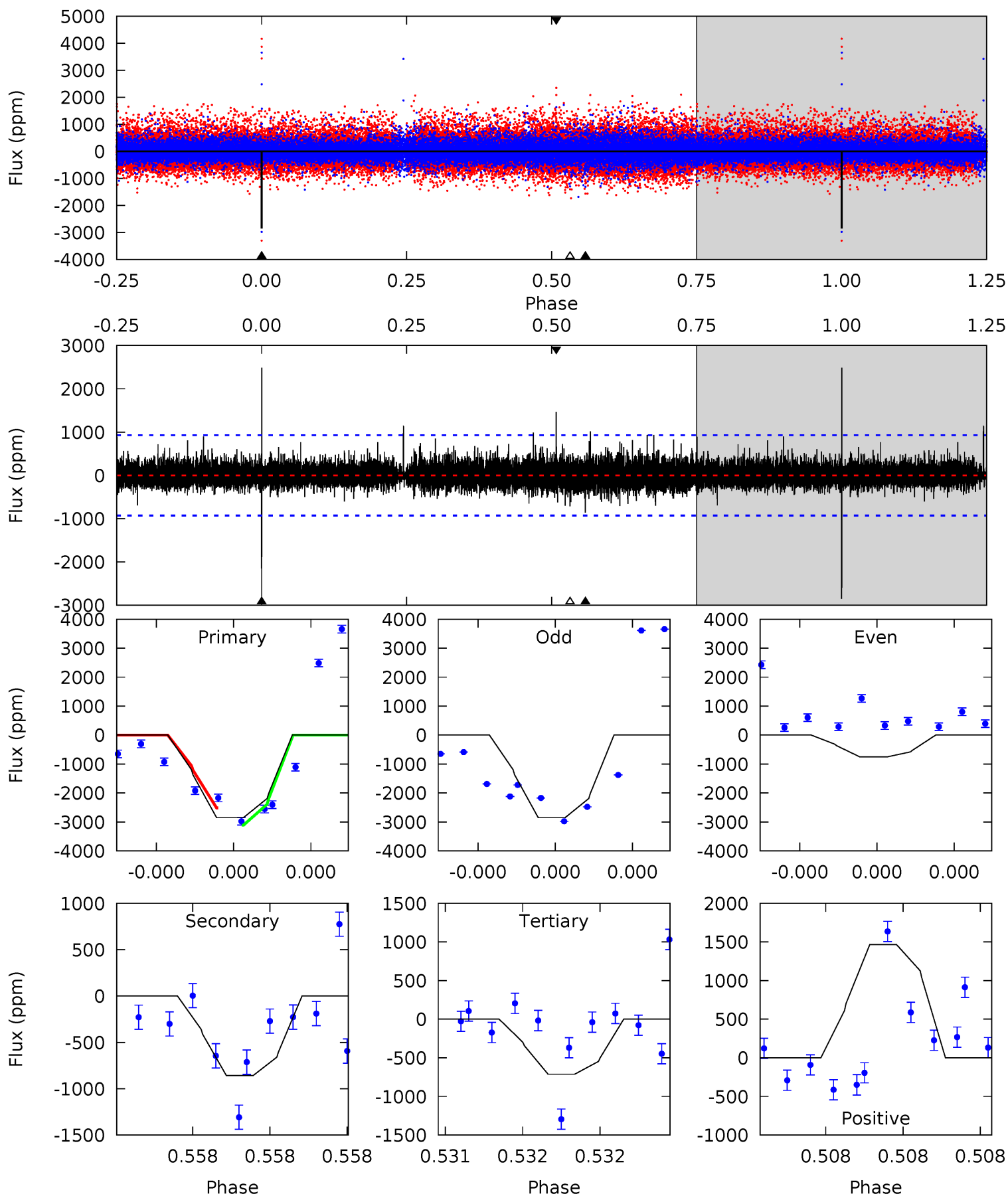
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.02	8.94	7.21	18.6	5.60	3.53	1.86	1.81	-9.63	1.73	-9.71	0.92	1.25	0.67	0.29



# Alt Model-Shift Uniqueness Test

011859900-03, P = 375.773168 Days, E = 258.726762 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	5.34	4.42	9.10	5.76	3.77	1.04	13.3	8.62	0.91	-3.77	8.18	0.60	0.47	1.86



### Stellar Parameters For KIC 011859900

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4247^{+116}_{-142}$	$4.607^{+0.052}_{-0.017}$	$0.180^{+0.200}_{-0.300}$	$0.673^{+0.024}_{-0.061}$	$0.668^{+0.047}_{-0.052}$	$3.085^{+0.708}_{-0.205}$
	+3%/-3%	+1%/-0%	+111%/-167%	+4%/-9%	+7%/-8%	+23%/-7%
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 011859900-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-1137 \pm 127$	$4.53^{+4.20}_{-3.12}$	$226^{+7}_{-8}$	$3448^{+1891}_{-614}$	$24498^{+233164}_{-17805}$
Alt.	$-859 \pm 161$	$4.35^{+4.60}_{-2.67}$	$226^{+7}_{-8}$	$3299^{+1421}_{-587}$	$19058^{+122724}_{-14498}$

$T_{\text{max}}$  = 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

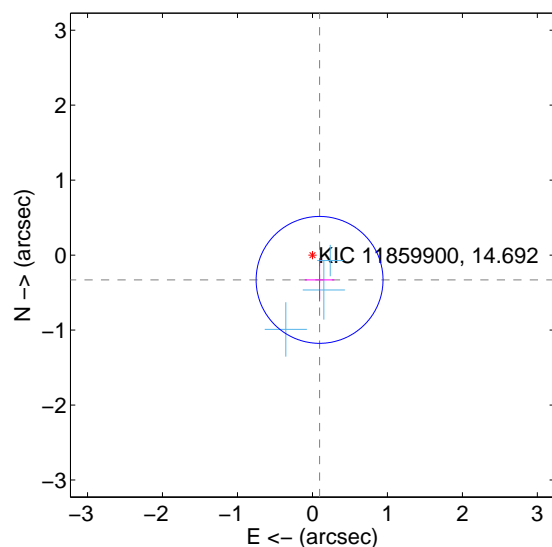
Supplemental centroid analysis for 011859900-03. Kepler magnitude: 14.69. Transit SNR 7.84

There are 3 quarters with good PRF difference image offsets

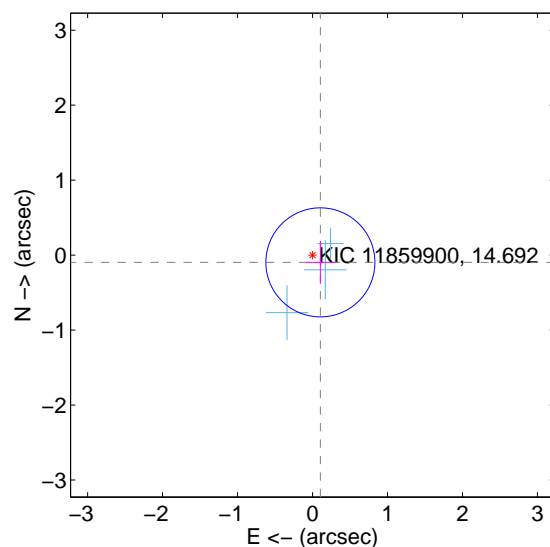
The direct PRF centroid is offset from the target star catalog position by about 0.27 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.344 \pm 0.282$	1.22	$-0.095 \pm 0.198$	$-0.331 \pm 0.288$
PRF-fit source offset from KIC position	$0.143 \pm 0.242$	0.59	$-0.105 \pm 0.196$	$-0.097 \pm 0.287$
photometric centroid source offset	$0.38 \pm 0.77$	0.49	$-0.03 \pm 0.60$	$0.38 \pm 0.77$

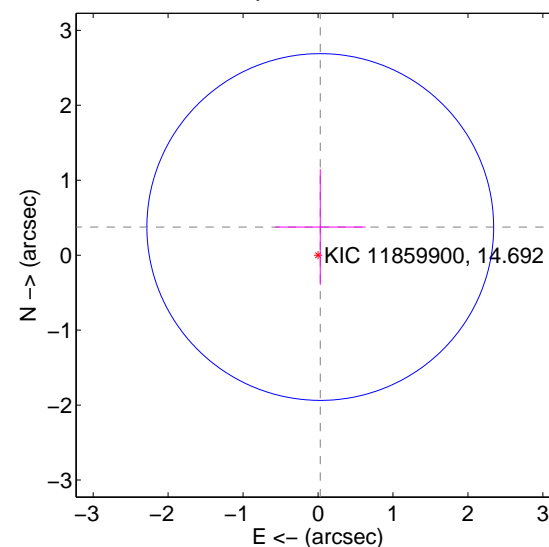
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



offset from photometric centroids

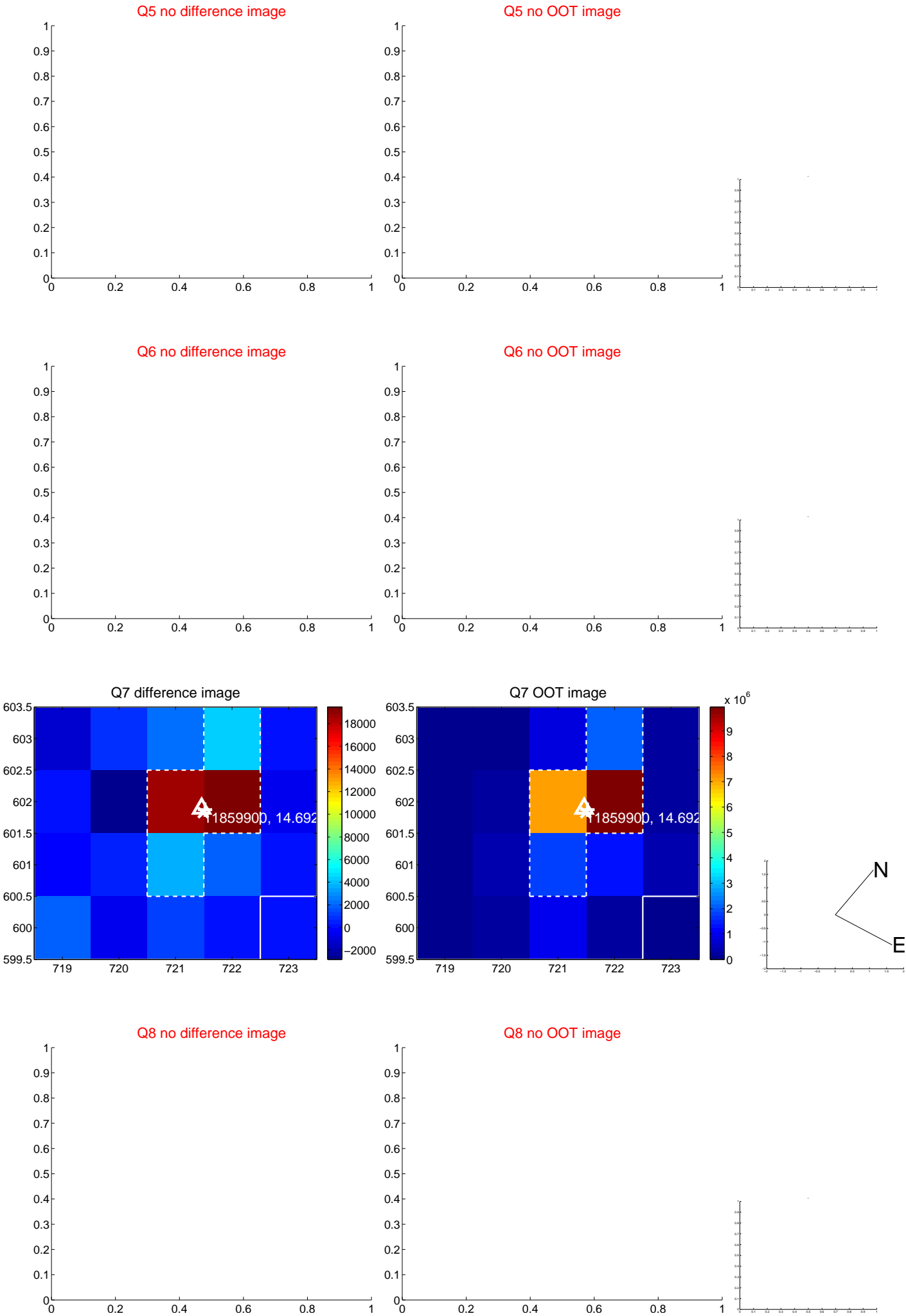


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

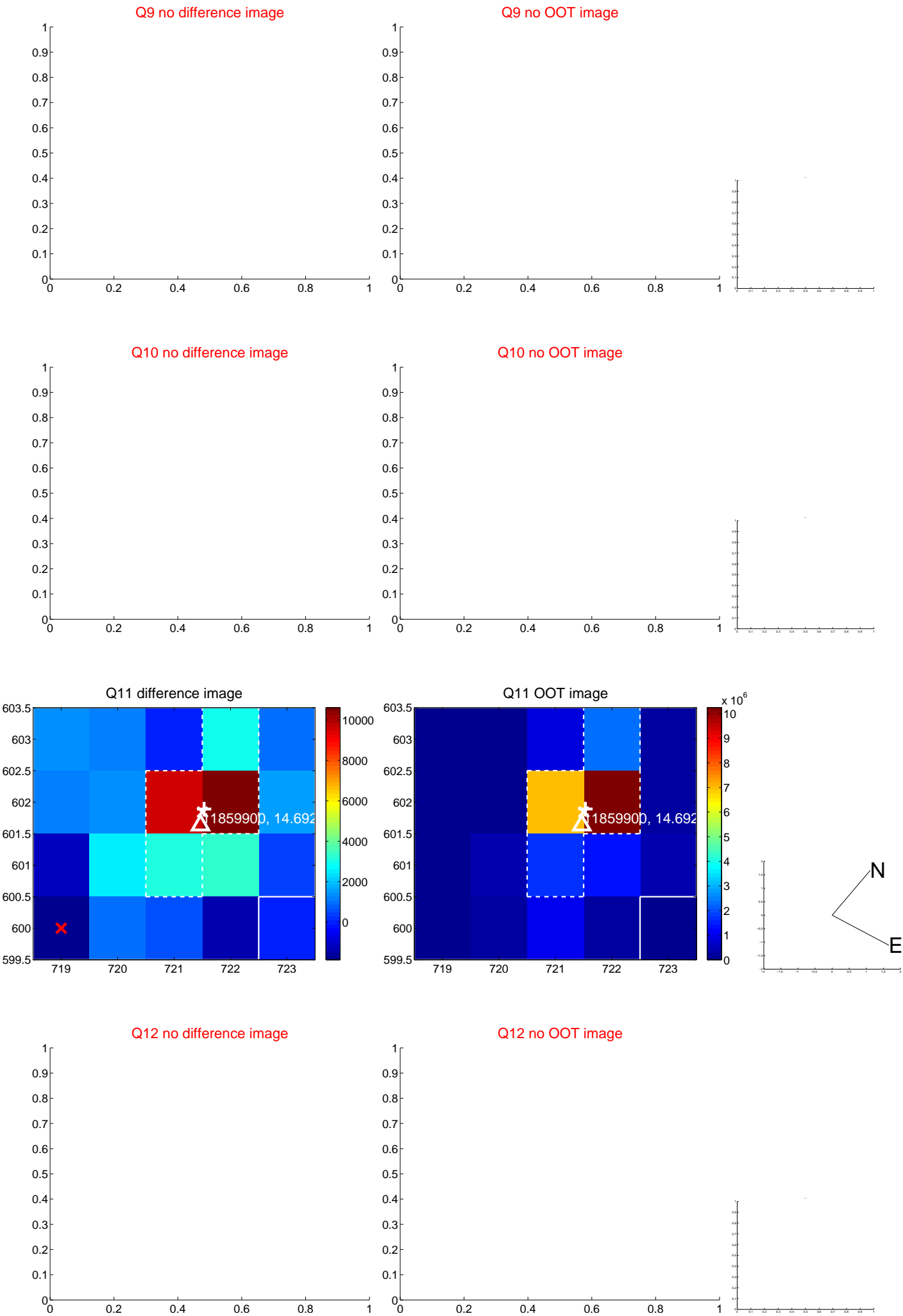


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

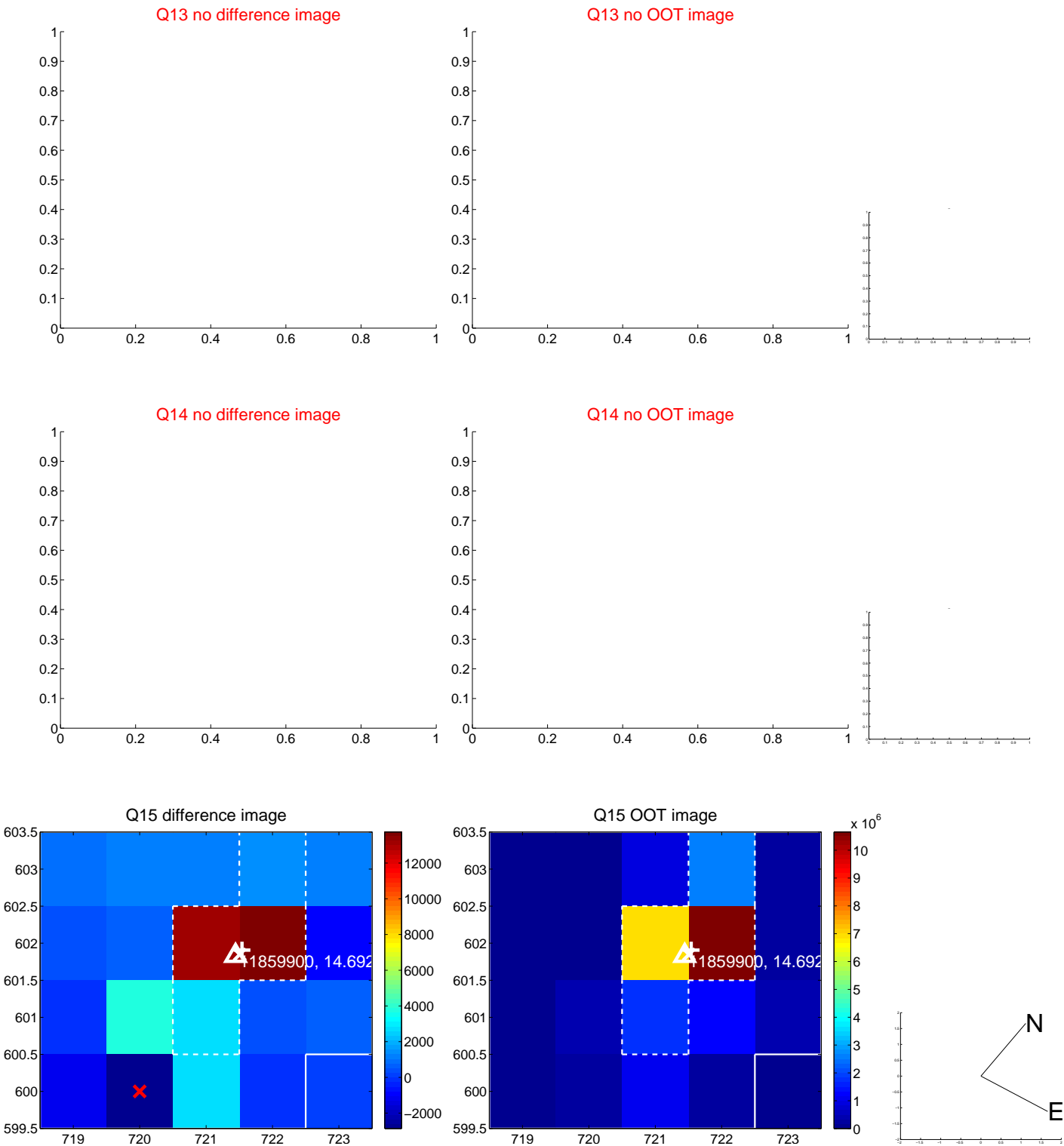




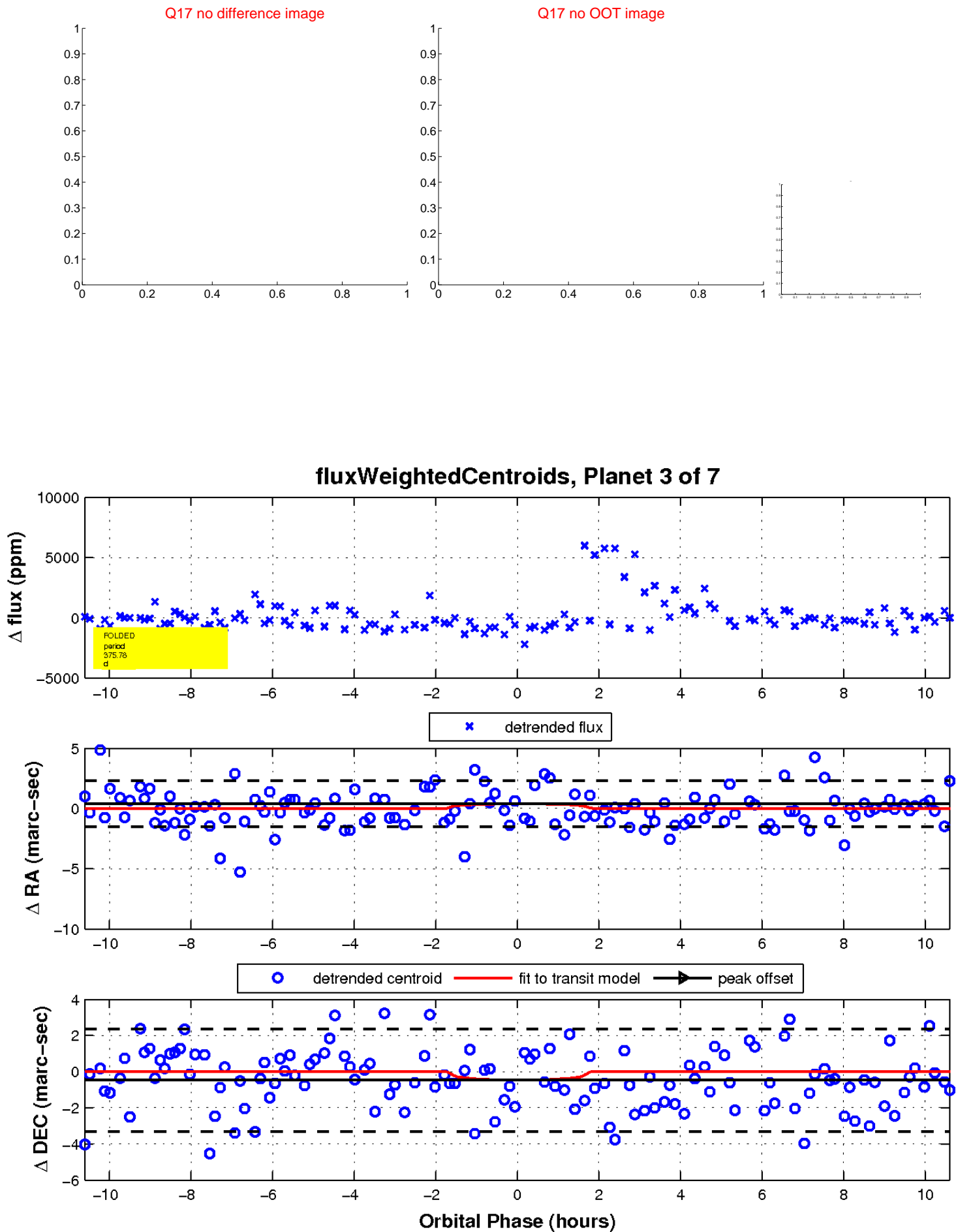
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



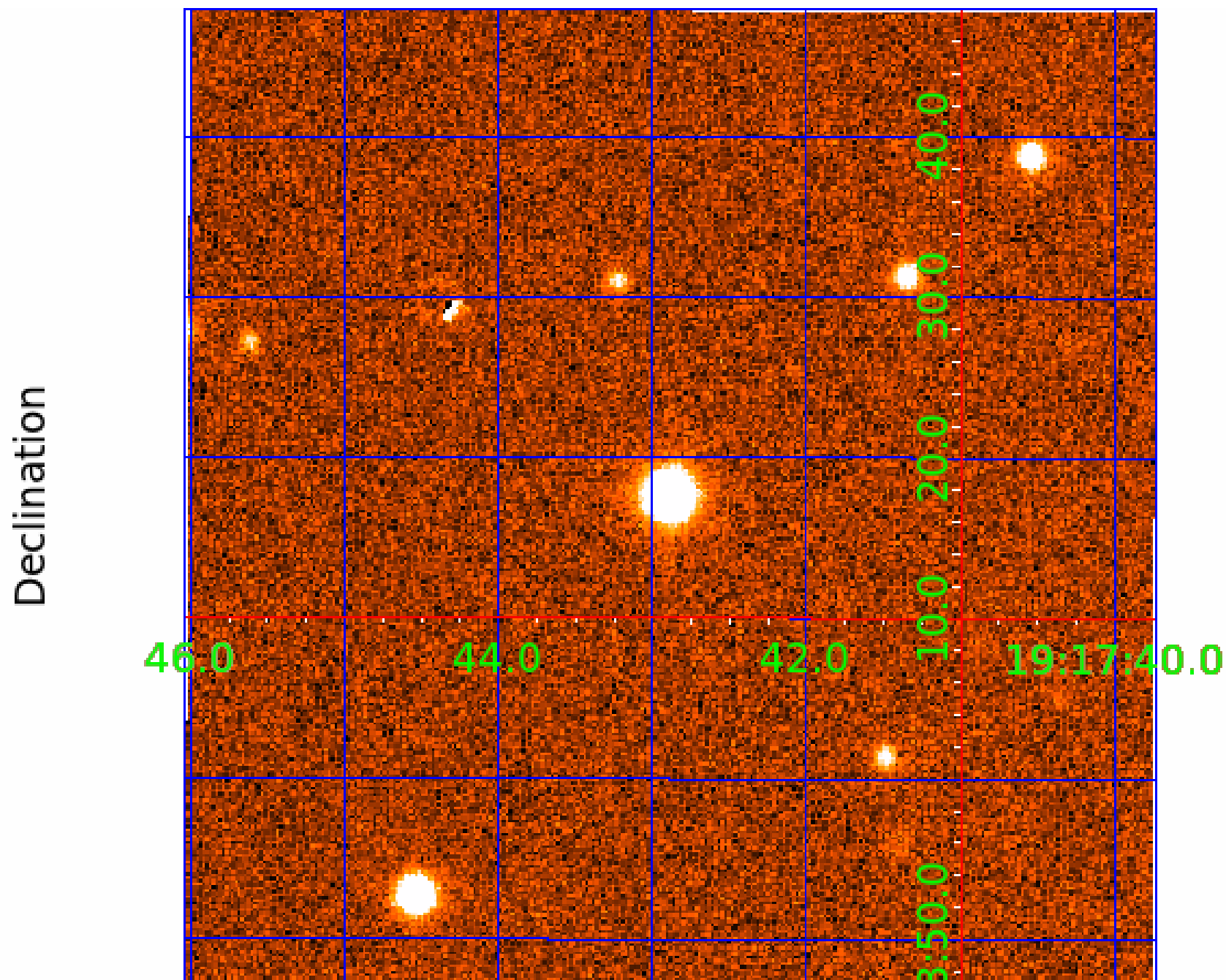
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image



# KIC 011859900

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
011859900-01	OBS	No	439.604995	501.827165	2033.7	3.792	16.8	8.4	0.67	4247	2.98	0.14
011859900-02	OBS	No	583.779998	327.887722	1009.5	12.000	14.8	-1.0	0.67	4247	2.04	0.09
011859900-03	OBS	No	375.779063	258.711135	1758.8	3.561	15.1	7.8	0.67	4247	2.88	0.17
011859900-04	OBS	No	440.597899	185.157716	3438.7	30.528	13.3	7.9	0.67	4247	5.03	0.13
011859900-05	OBS	No	397.217150	270.968371	1380.9	5.642	12.3	7.1	0.67	4247	2.64	0.15
011859900-06	OBS	No	382.032729	344.666605	1876.8	10.133	13.3	7.6	0.67	4247	2.77	0.16
011859900-07	OBS	No	601.243881	347.442639	1036.0	12.000	16.0	-1.0	0.67	4247	2.06	0.09

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
011859900-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011859900-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_NOFITS
011859900-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_POS_DV
011859900-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011859900-05	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—CENT_FEW_DIFFS
011859900-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011859900-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—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.

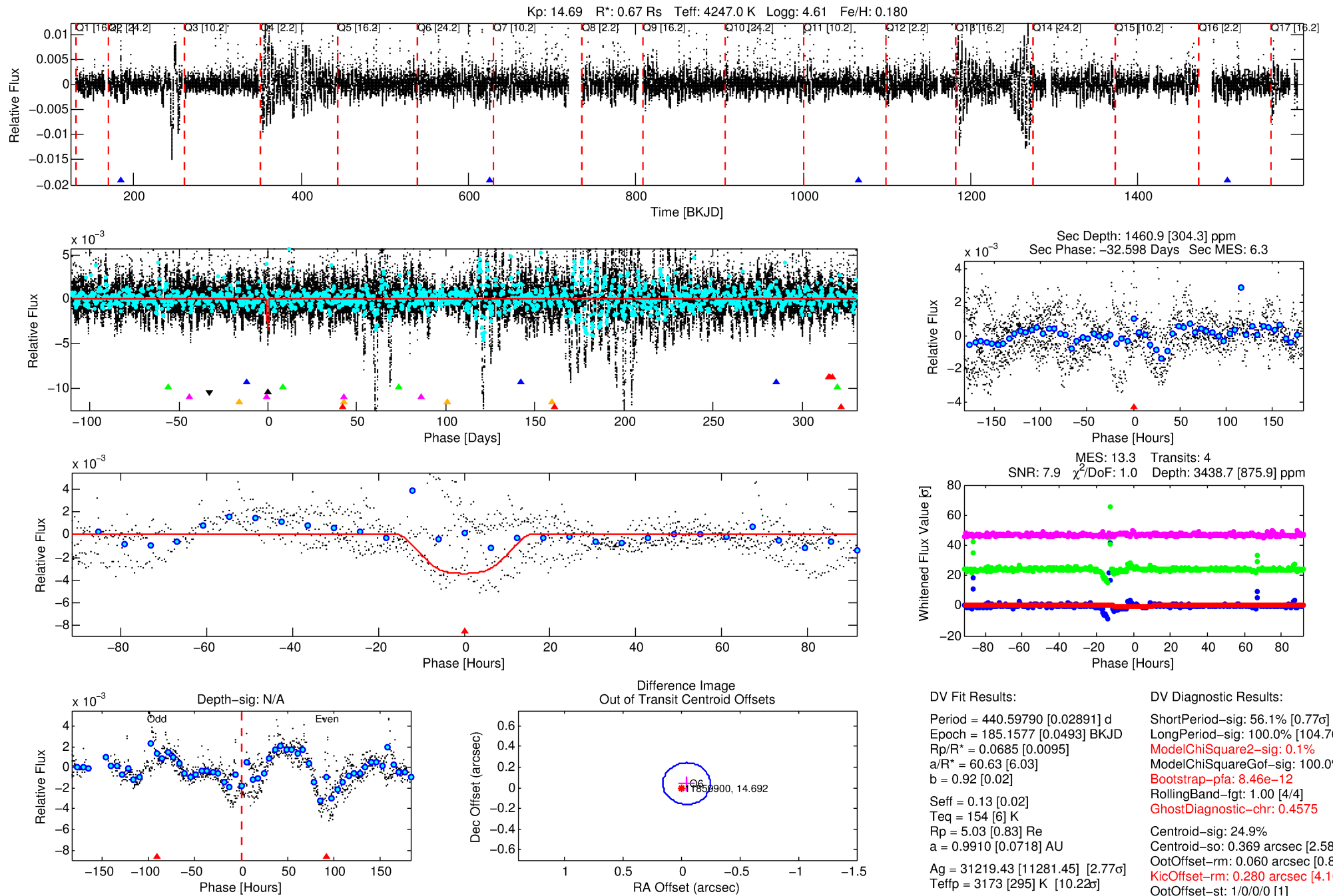
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 011859900-04

No Significant Match Found

# DV One-Page Summary

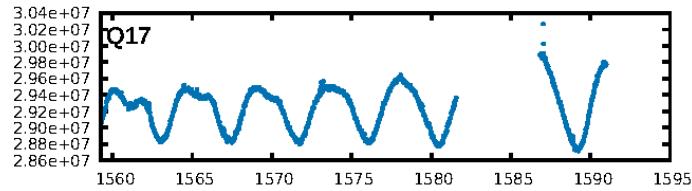
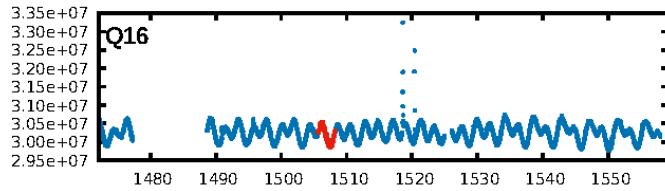
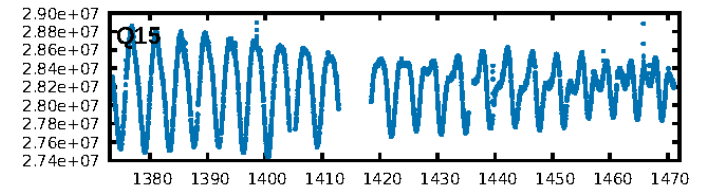
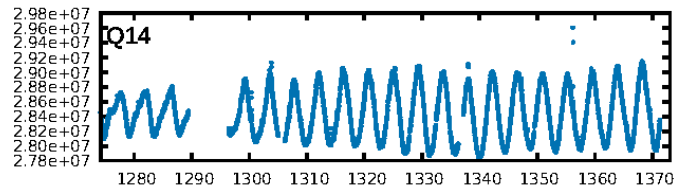
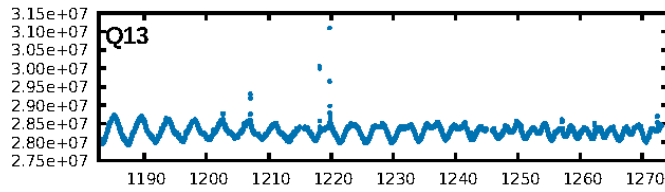
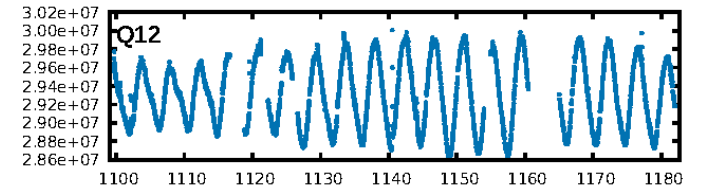
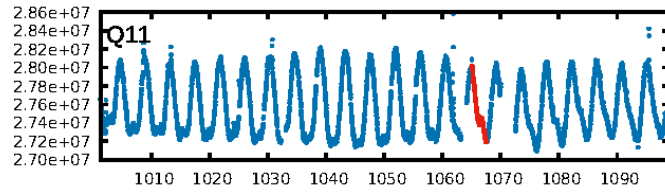
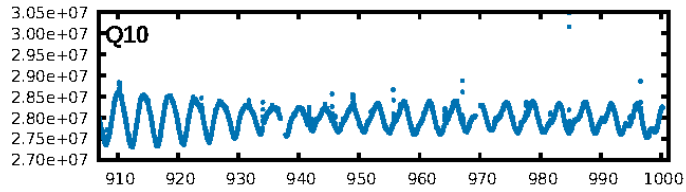
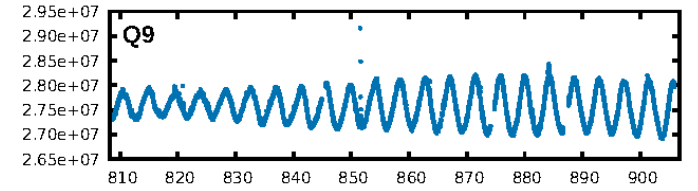
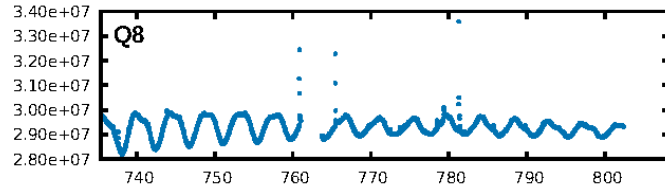
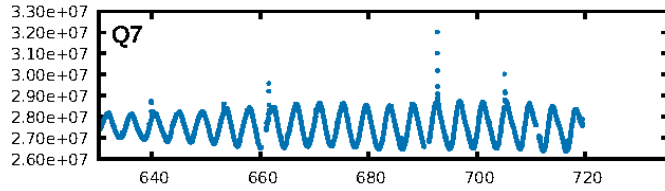
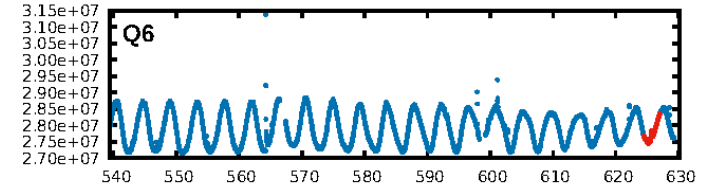
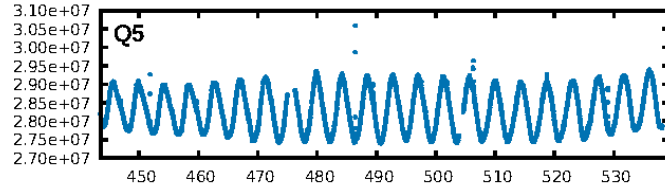
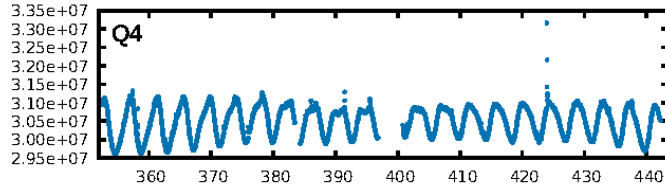
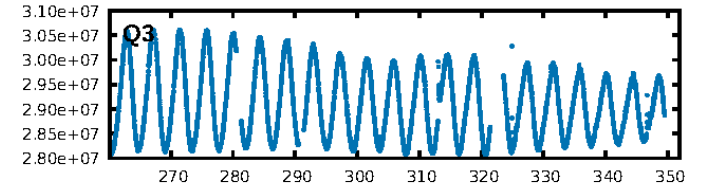
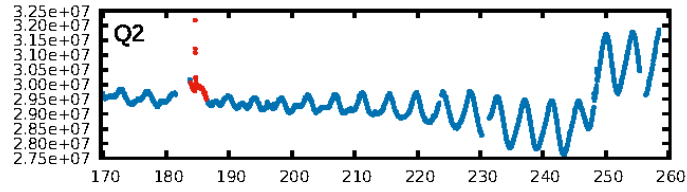
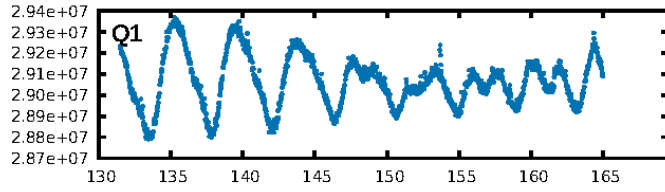
KIC: 11859900 Candidate: 4 of 7 Period: 440.598 d



Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 05:39:19 Z

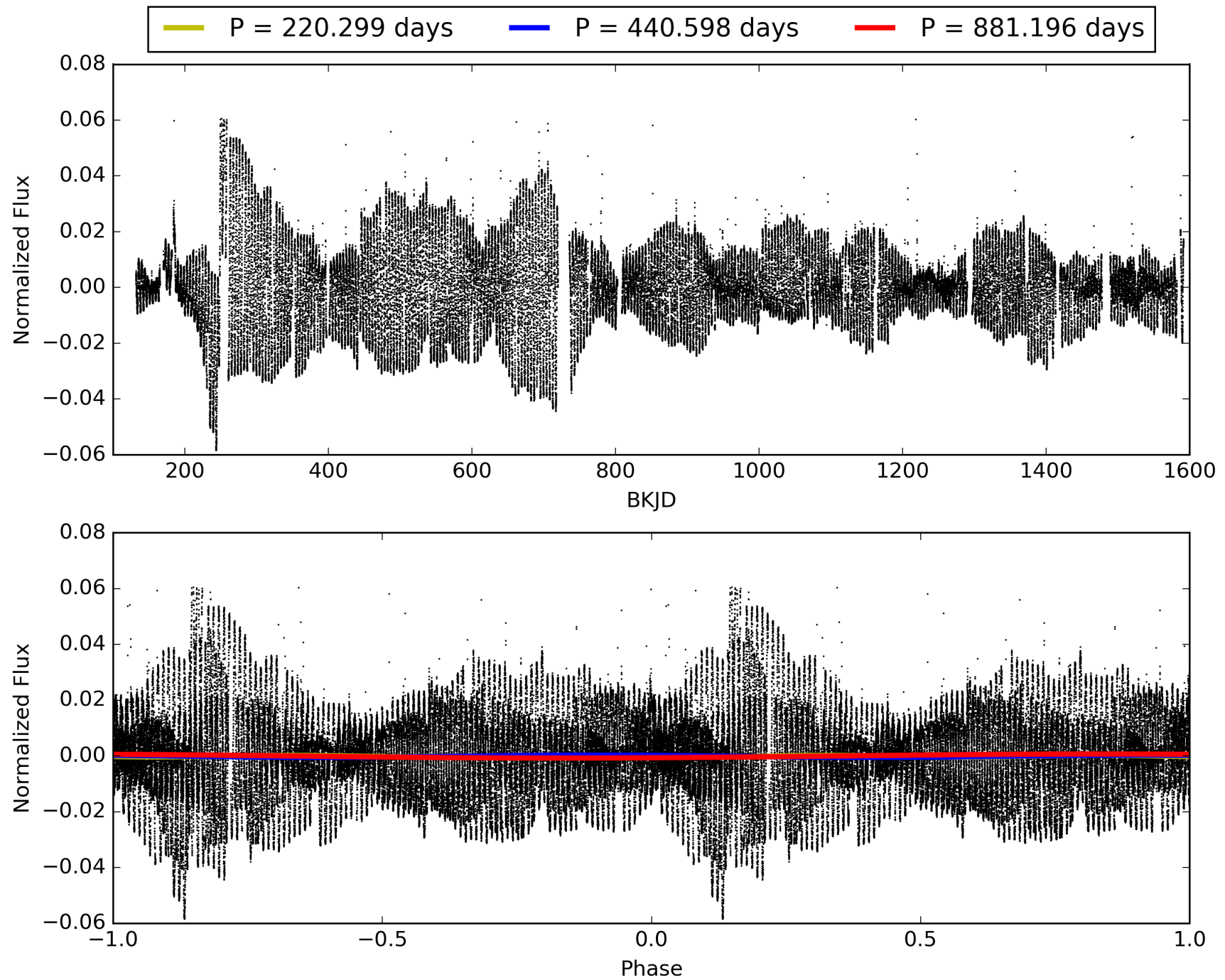
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 011859900-04, PDC Light Curves





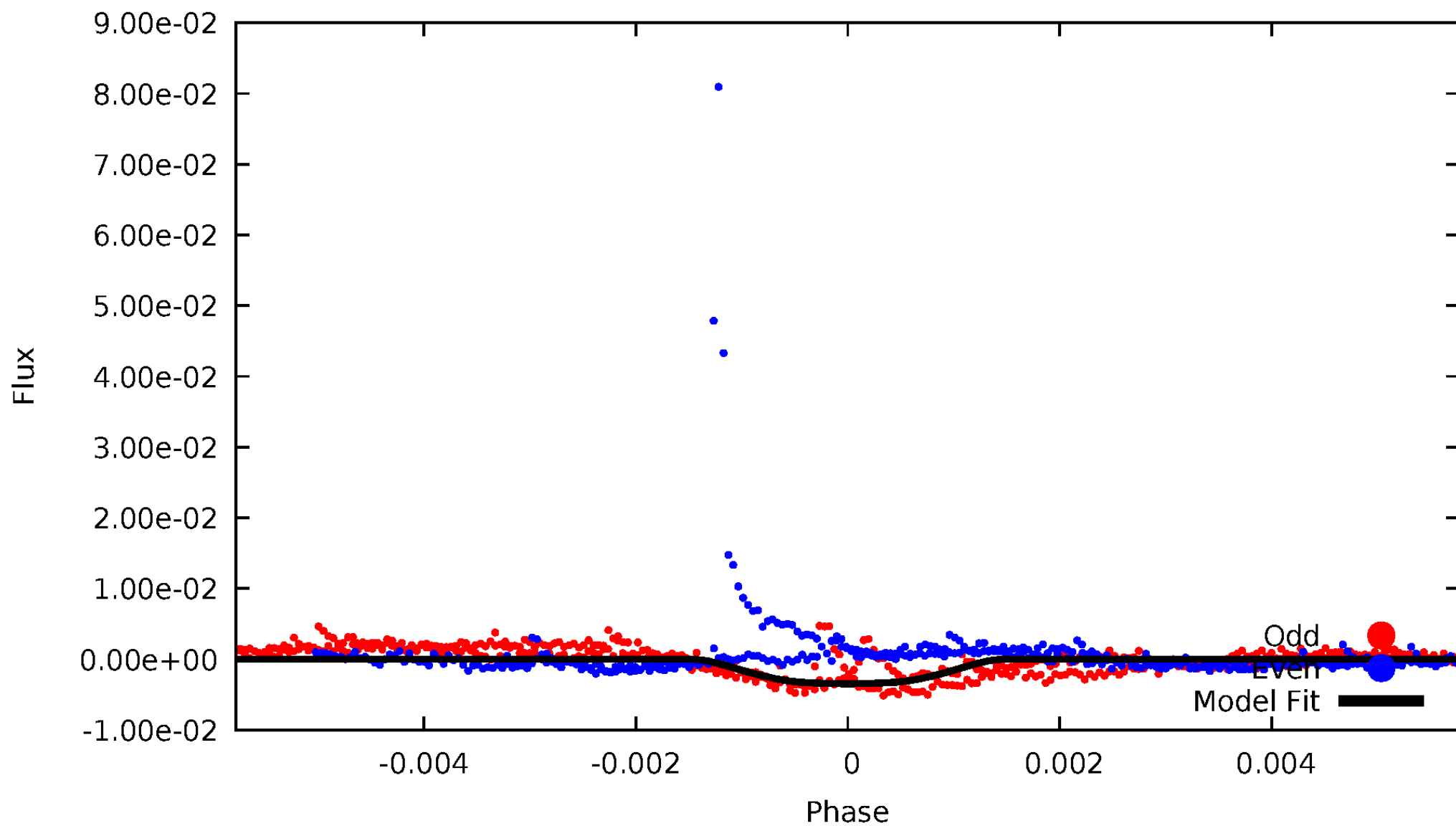
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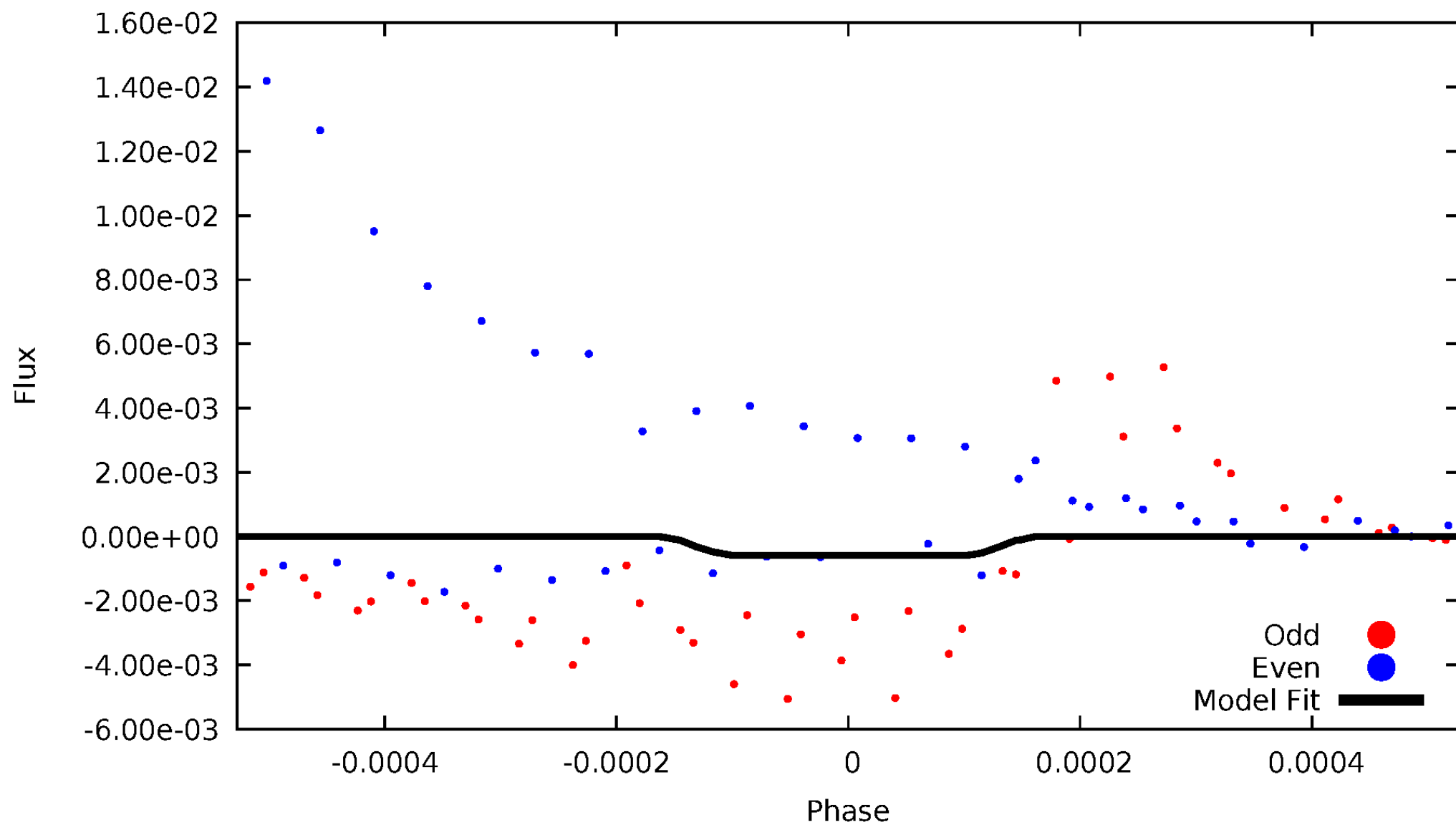
# DV Odd/Even

TCE 011859900-04



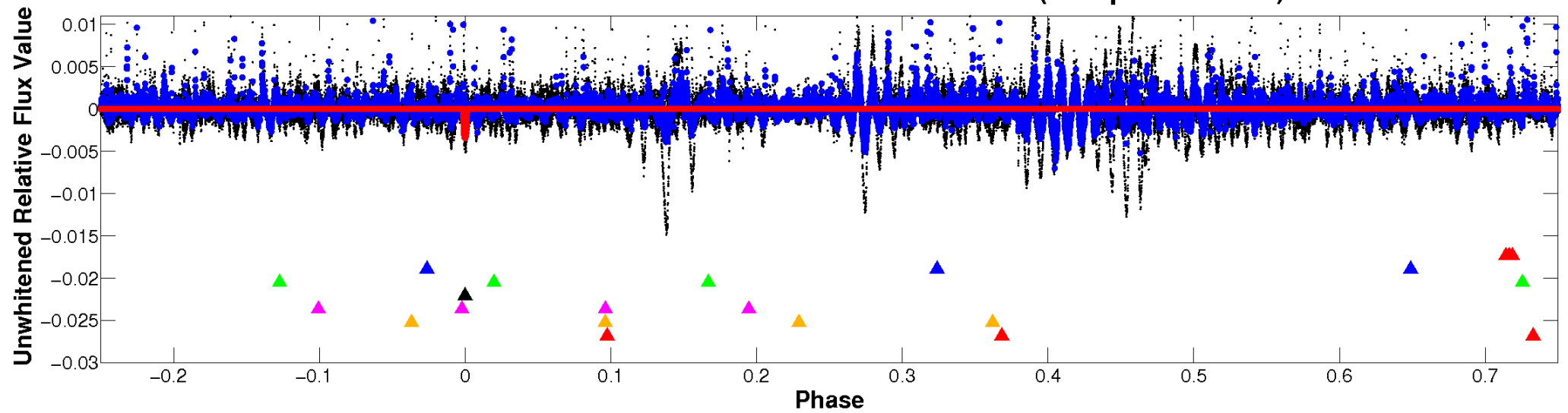
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TCE 011859900-04

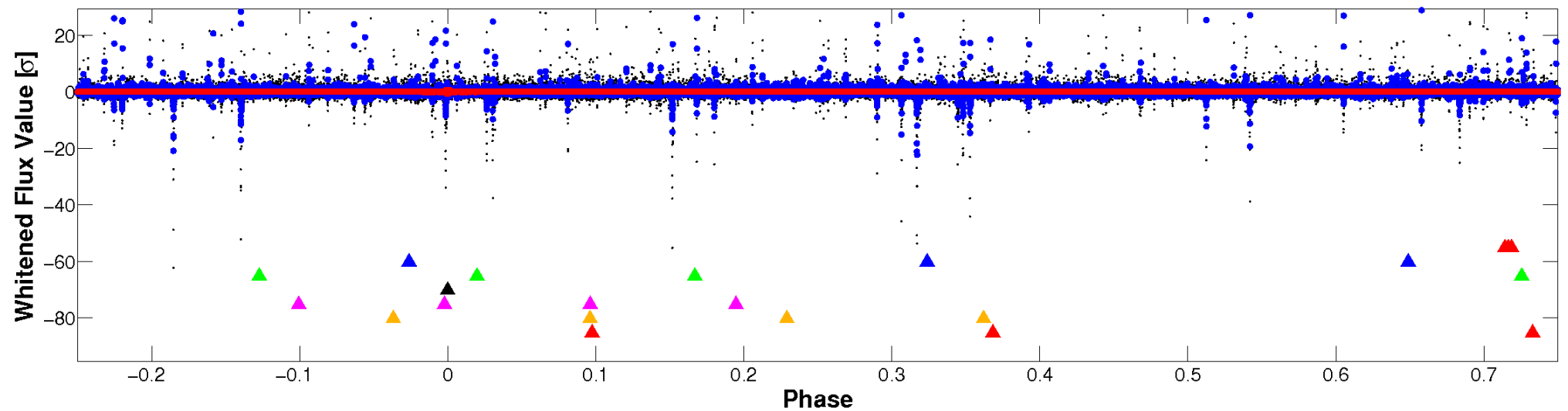


# Non-Whitened Vs. Whitened Light Curve

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

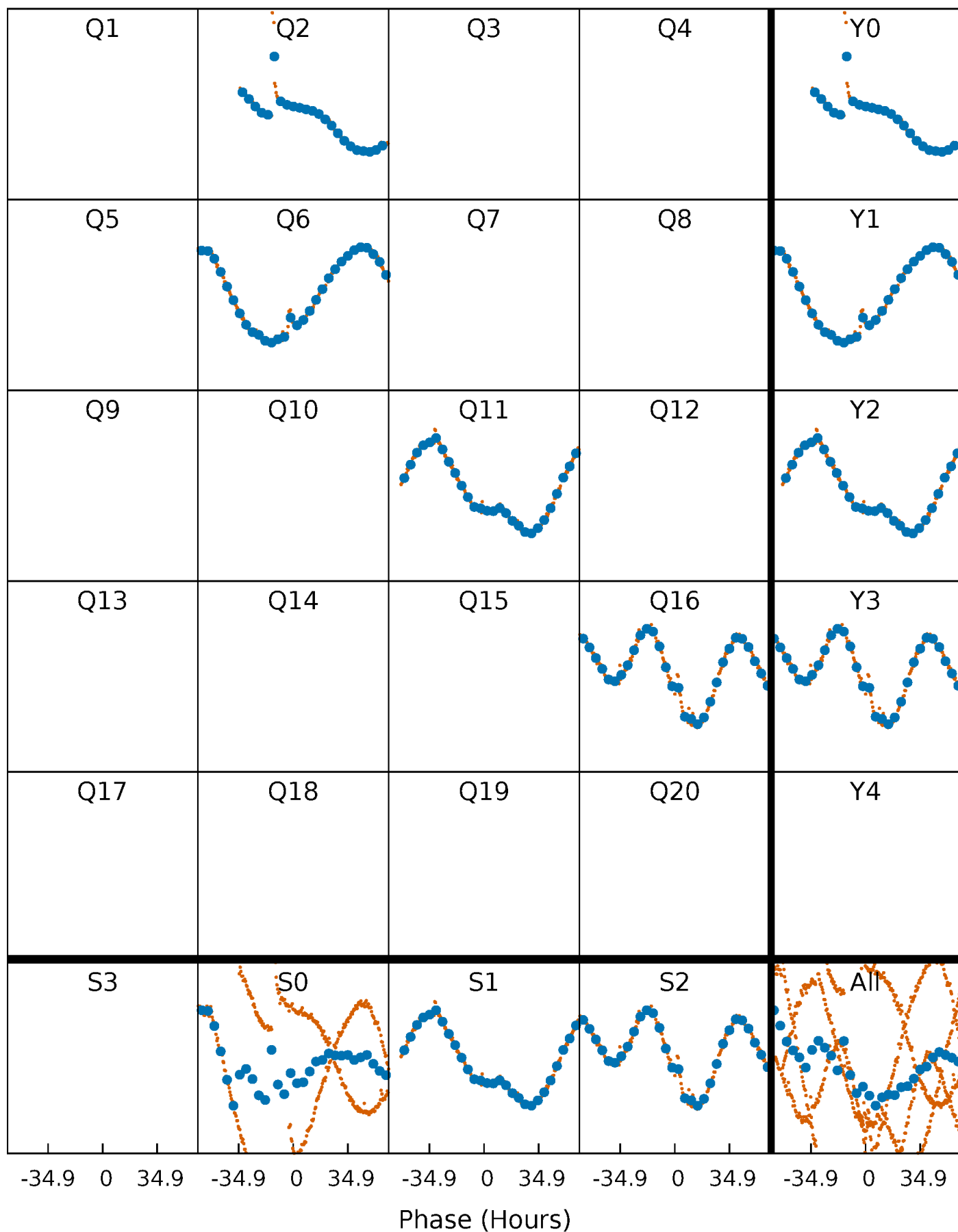


## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



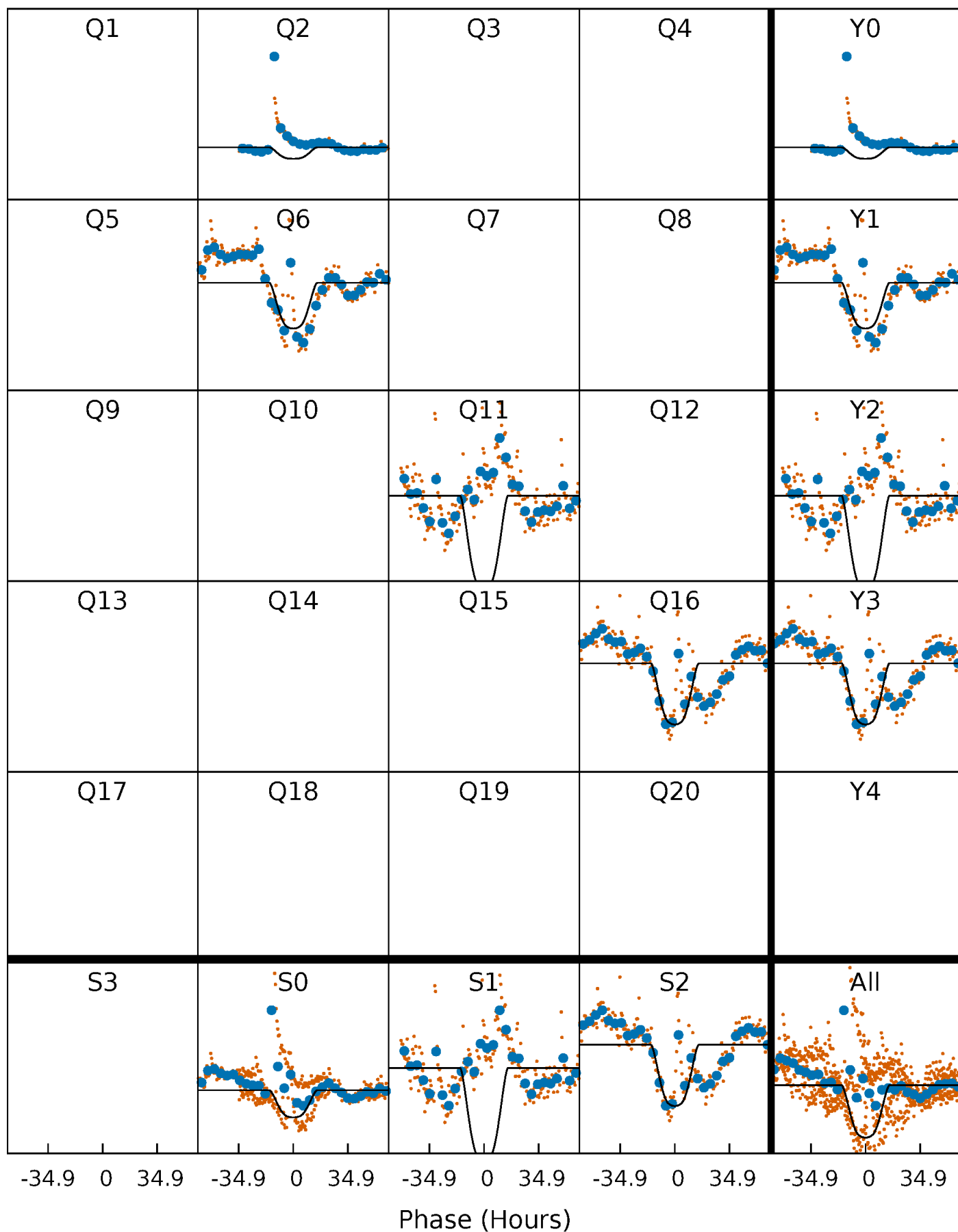
# PDC Quarter-Phased Transit Curves

TCE 011859900-04     $P=440.597899$  Days     $T_0=185.157716$  (BKJD)



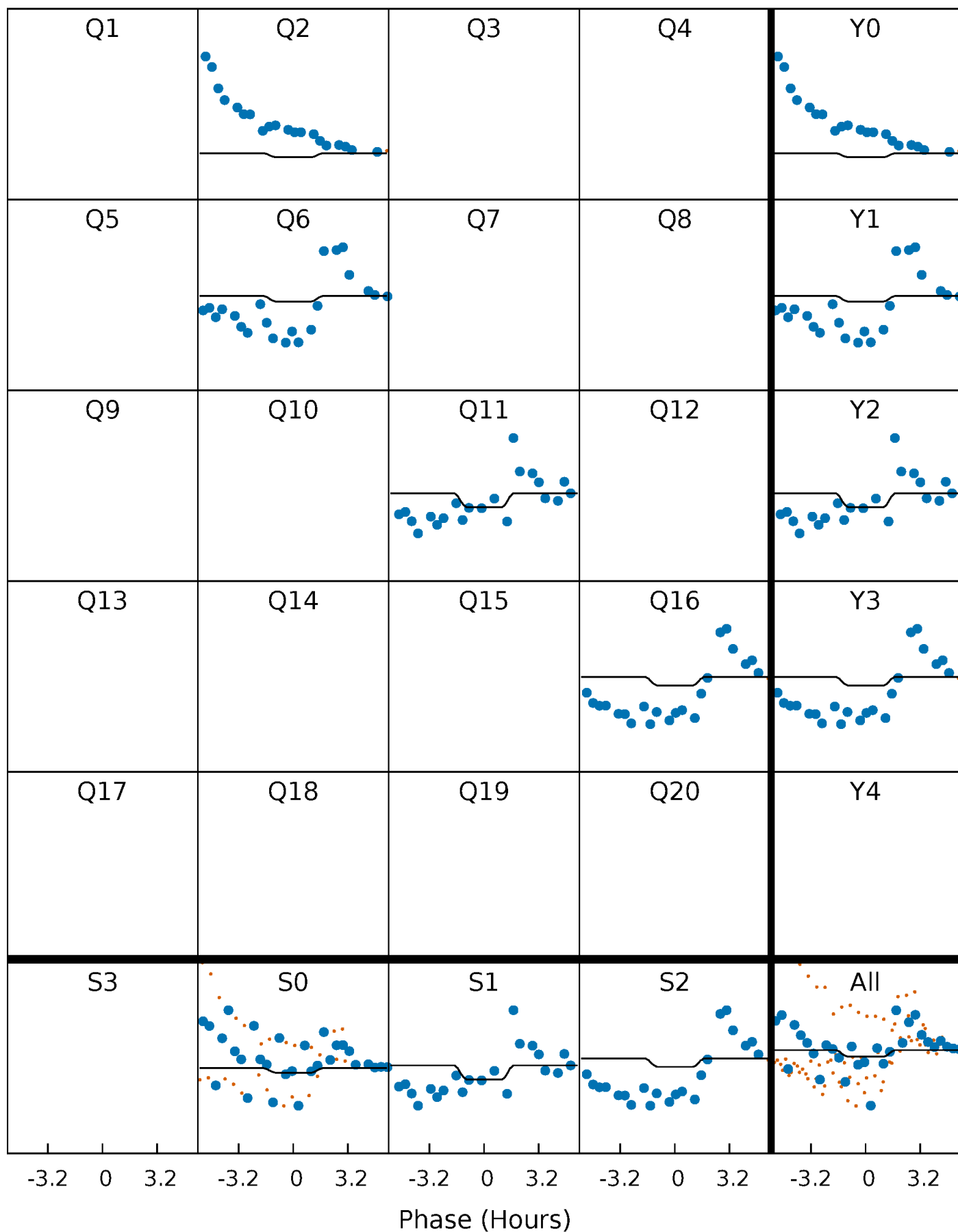
# DV Quarter-Phased Transit Curves

TCE 011859900-04 P=440.597899 Days  $T_0=185.157716$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

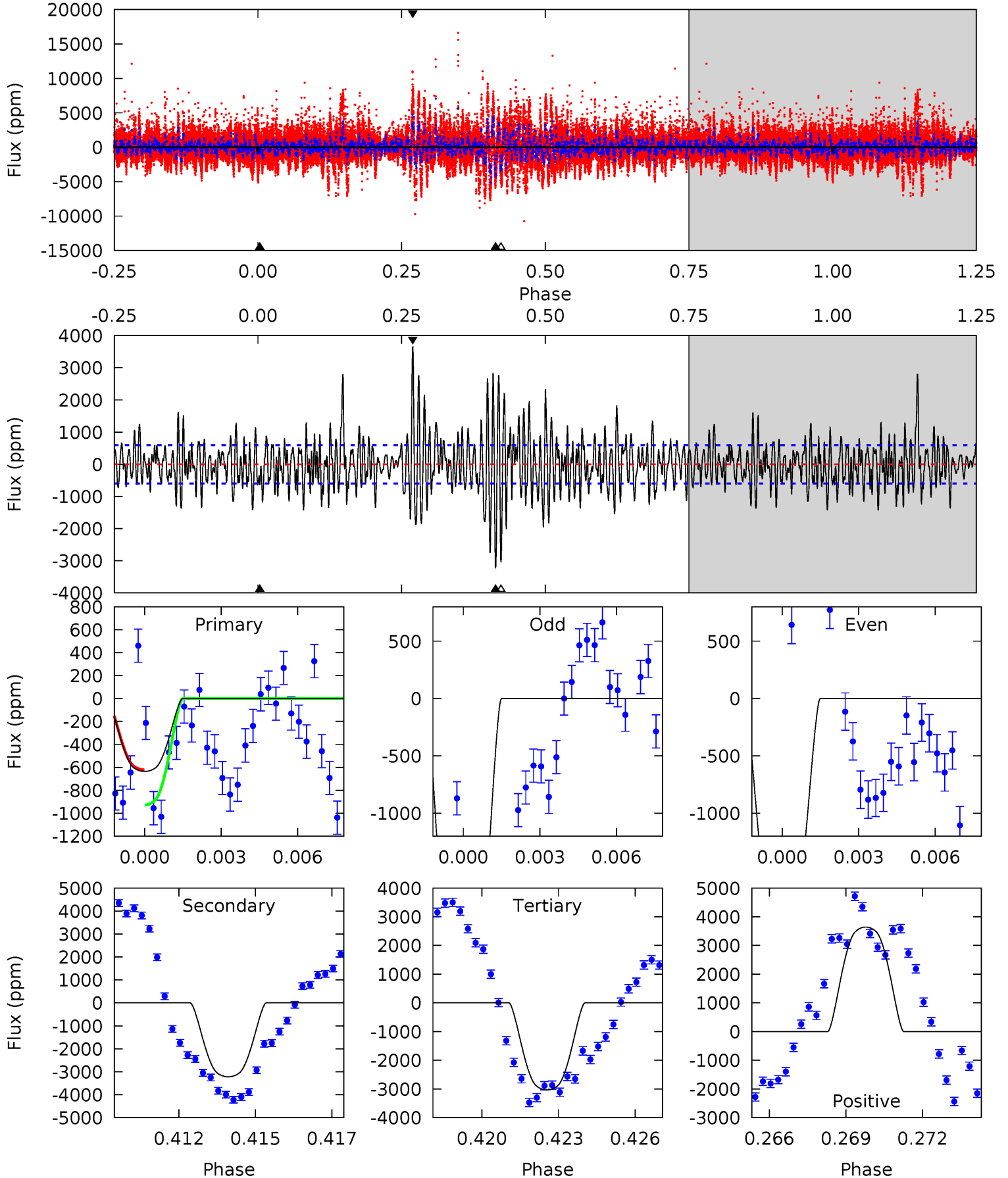
TCE 011859900-04 P=440.676966 Days  $T_0=184.882510$  (BKJD)



# DV Model-Shift Uniqueness Test

011859900-04, P = 440.597899 Days, E = 185.157716 Days

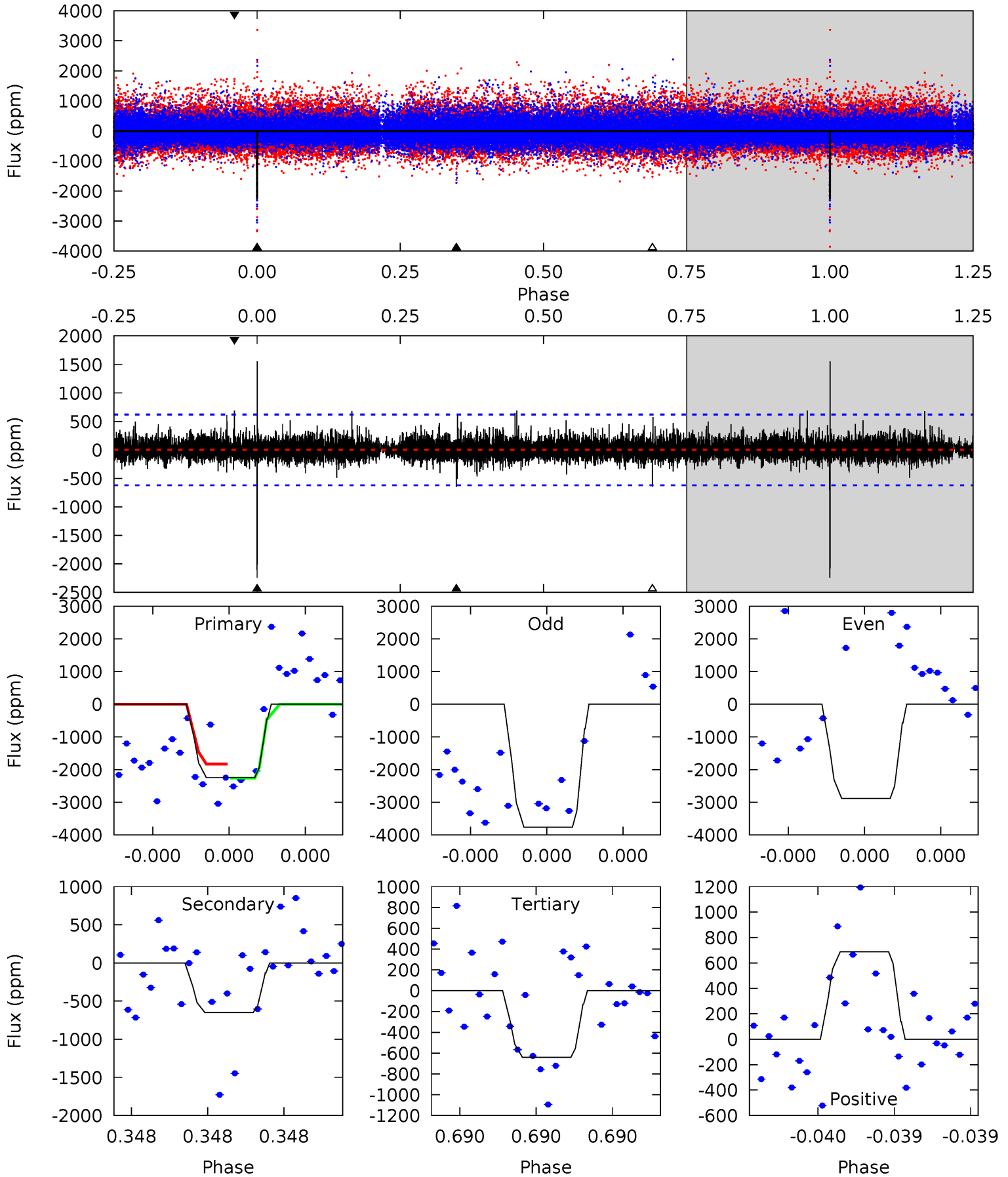
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.61	28.4	26.8	32.2	5.26	2.98	6.55	-21.2	-26.6	1.65	-3.74	2.68	0.18	0.53	1.36



# Alt Model-Shift Uniqueness Test

011859900-04, P = 440.676966 Days, E = 184.882510 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
20.5	5.93	5.87	6.29	5.67	3.62	1.03	14.6	14.2	0.07	-0.36	4.67	0.62	0.41	1.80





### Stellar Parameters For KIC 011859900

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4247^{+116}_{-142}$	$4.607^{+0.052}_{-0.017}$	$0.180^{+0.200}_{-0.300}$	$0.673^{+0.024}_{-0.061}$	$0.668^{+0.047}_{-0.052}$	$3.085^{+0.708}_{-0.205}$
	+3%/-3%	+1%/-0%	+111%/-167%	+4%/-9%	+7%/-8%	+23%/-7%
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 011859900-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-3220 \pm 113$	$5.00^{+0.71}_{-0.76}$	$214^{+7}_{-8}$	$3968^{+228}_{-212}$	$70123^{+25941}_{-16403}$
Alt.	$-649 \pm 109$	$1.80^{+0.65}_{-0.71}$	$214^{+7}_{-8}$	$4284^{+922}_{-491}$	$112538^{+179131}_{-53449}$

$T_{\text{max}}$  = 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

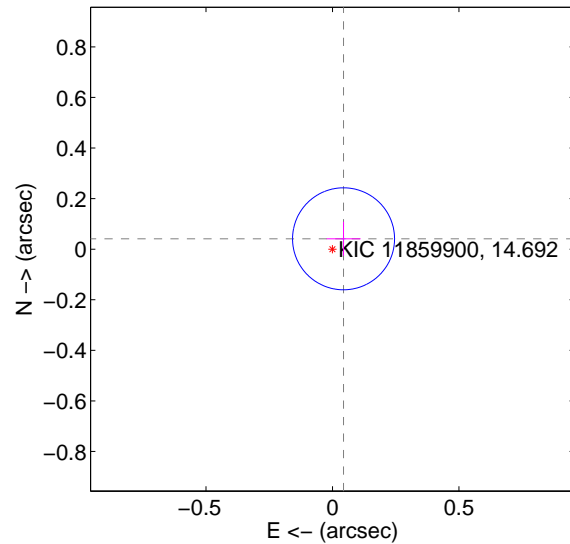
Supplemental centroid analysis for 011859900-04. Kepler magnitude: 14.69. Transit SNR 7.91

There are 1 quarters with good PRF difference image offsets

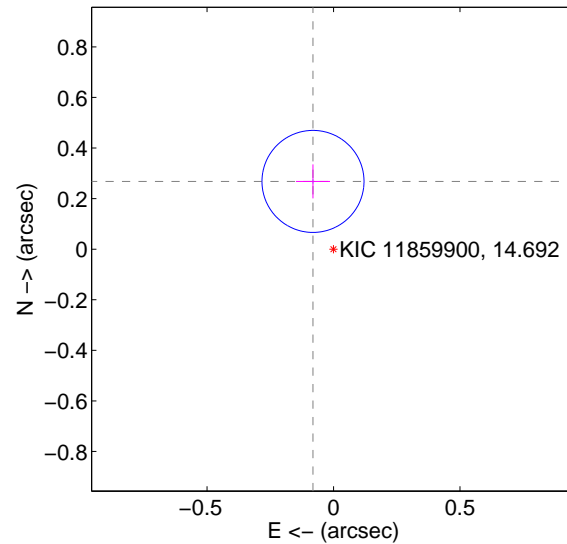
The direct PRF centroid is offset from the target star catalog position by about 0.26 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.060 \pm 0.067$	0.89	$-0.044 \pm 0.067$	$0.041 \pm 0.067$
PRF-fit source offset from KIC position	<b><math>0.280 \pm 0.067</math></b>	<b>4.16</b>	$0.081 \pm 0.067$	$0.268 \pm 0.067$
photometric centroid source offset	$0.37 \pm 0.14$	2.58	$0.37 \pm 0.14$	$0.04 \pm 0.17$

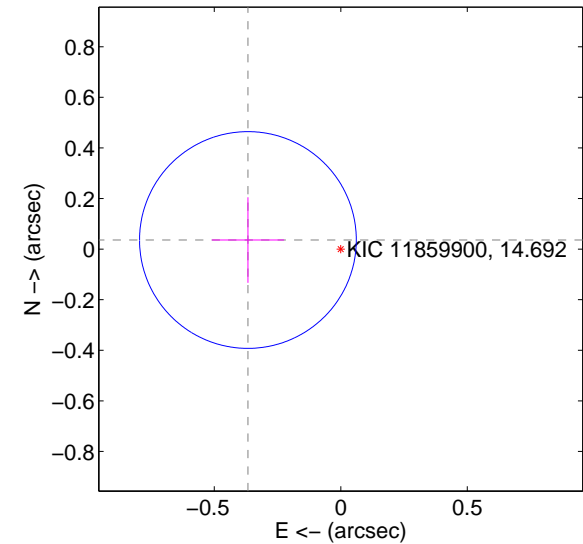
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



offset from photometric centroids

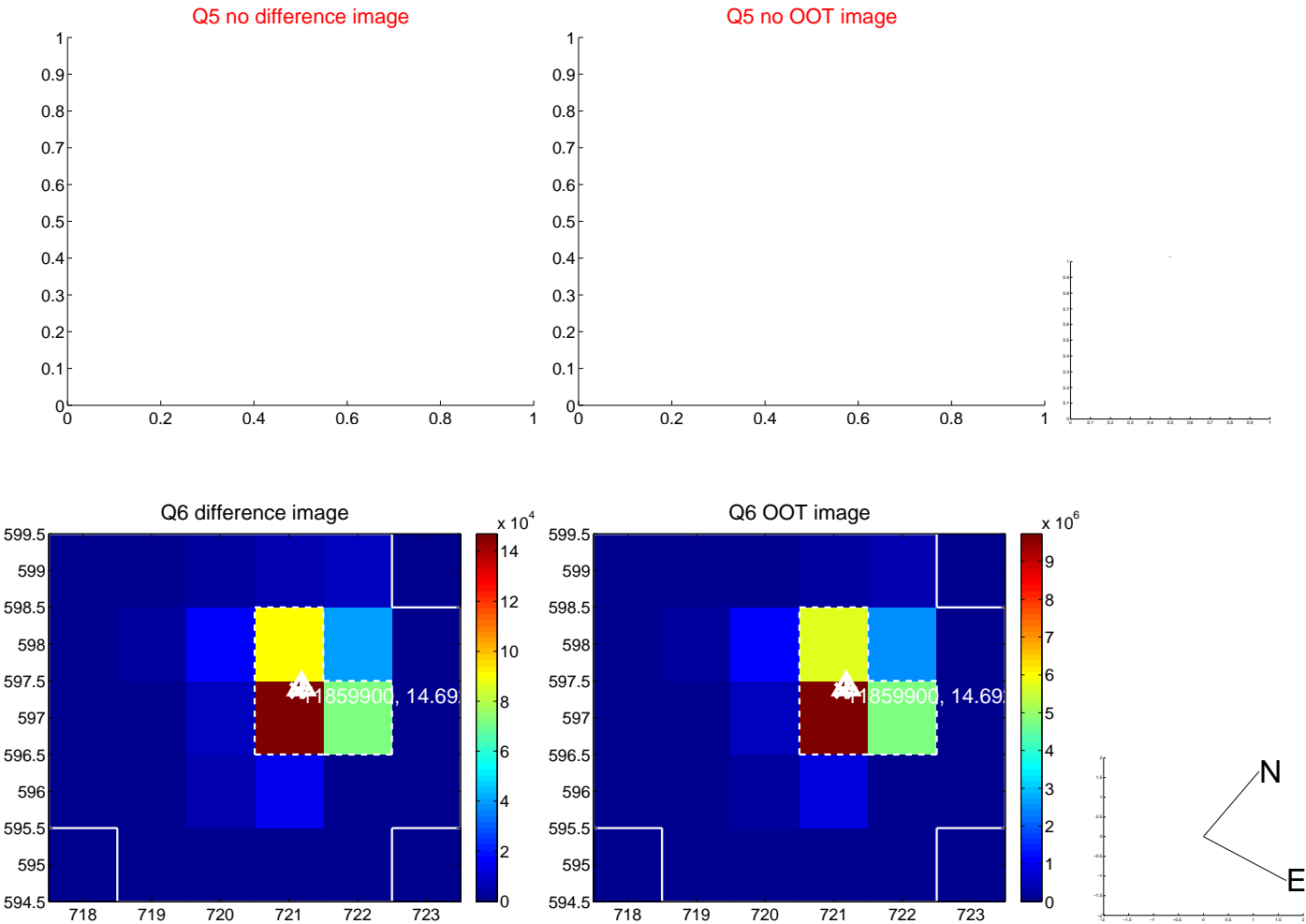


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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



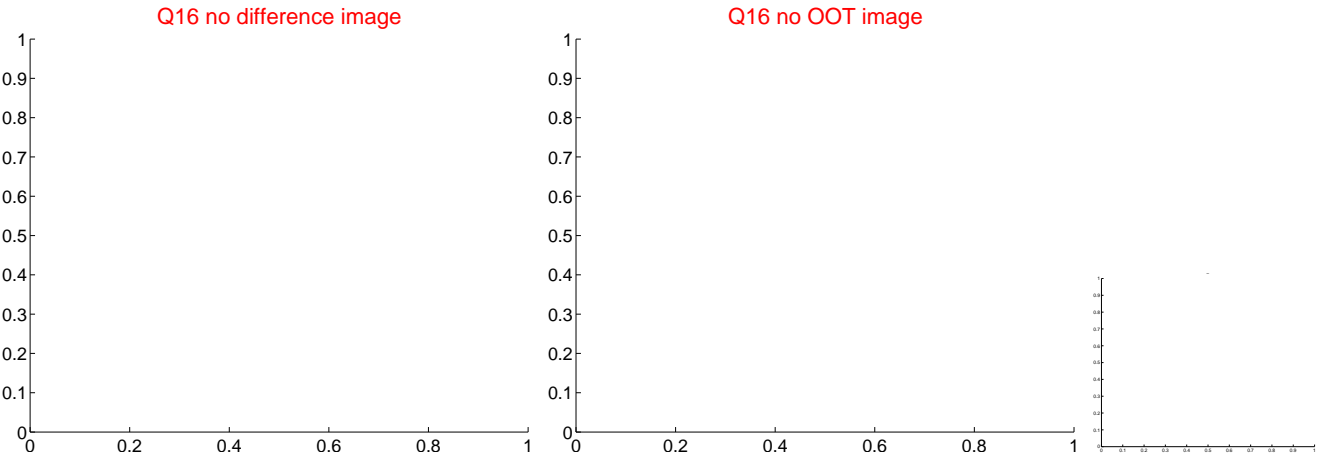
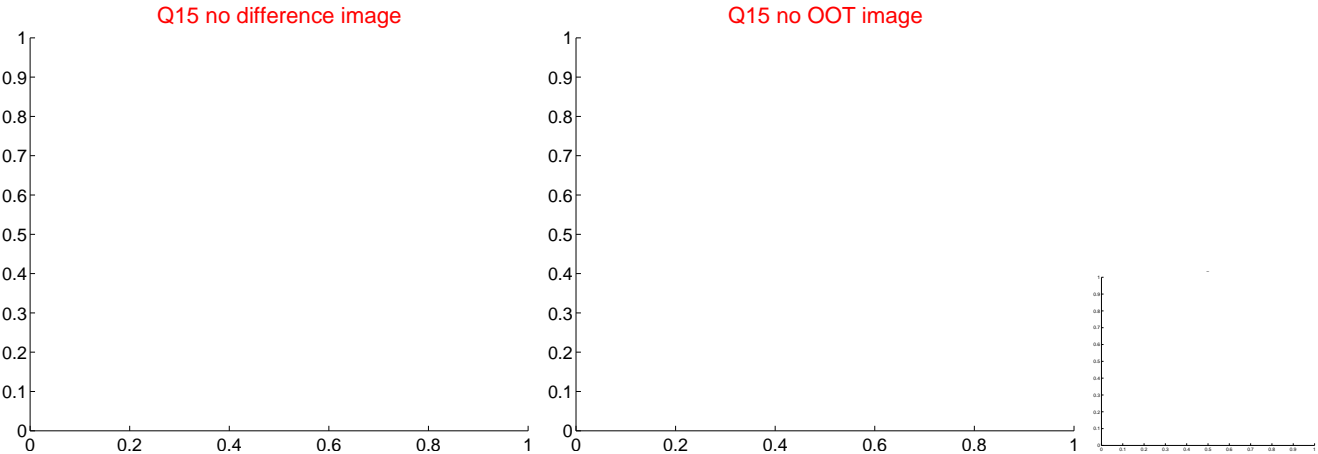
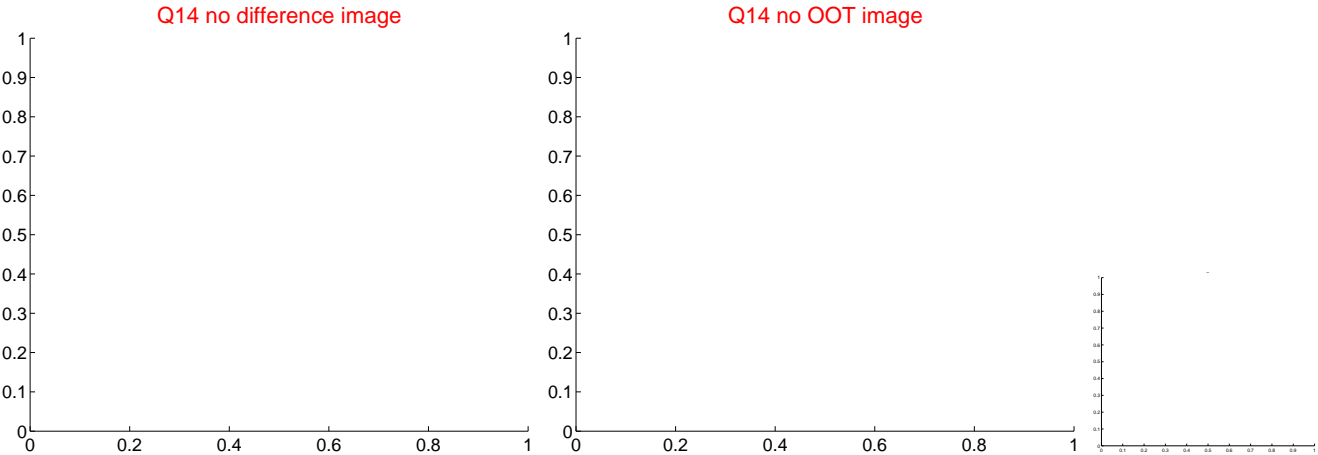
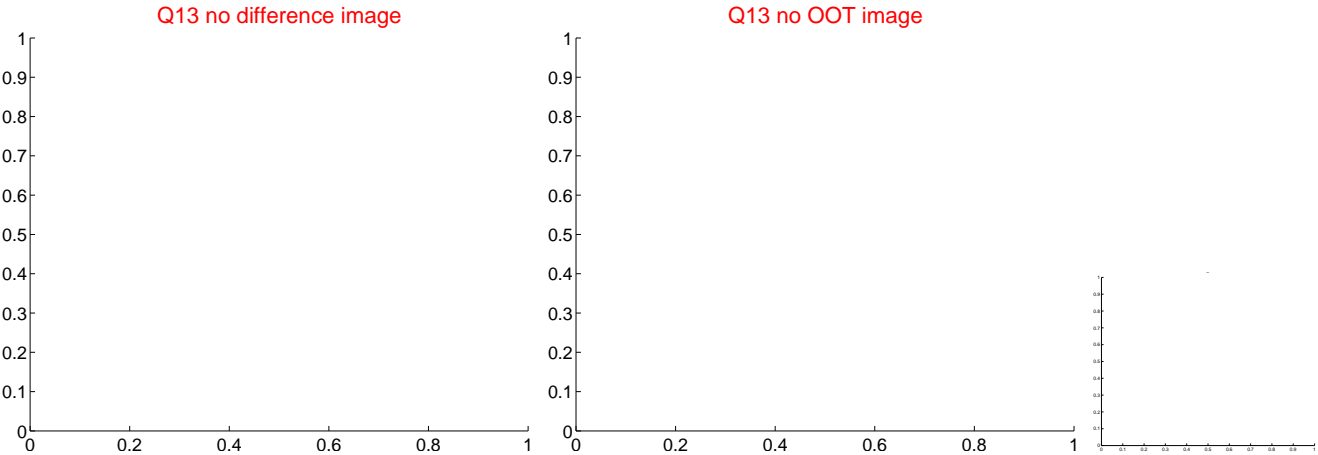
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



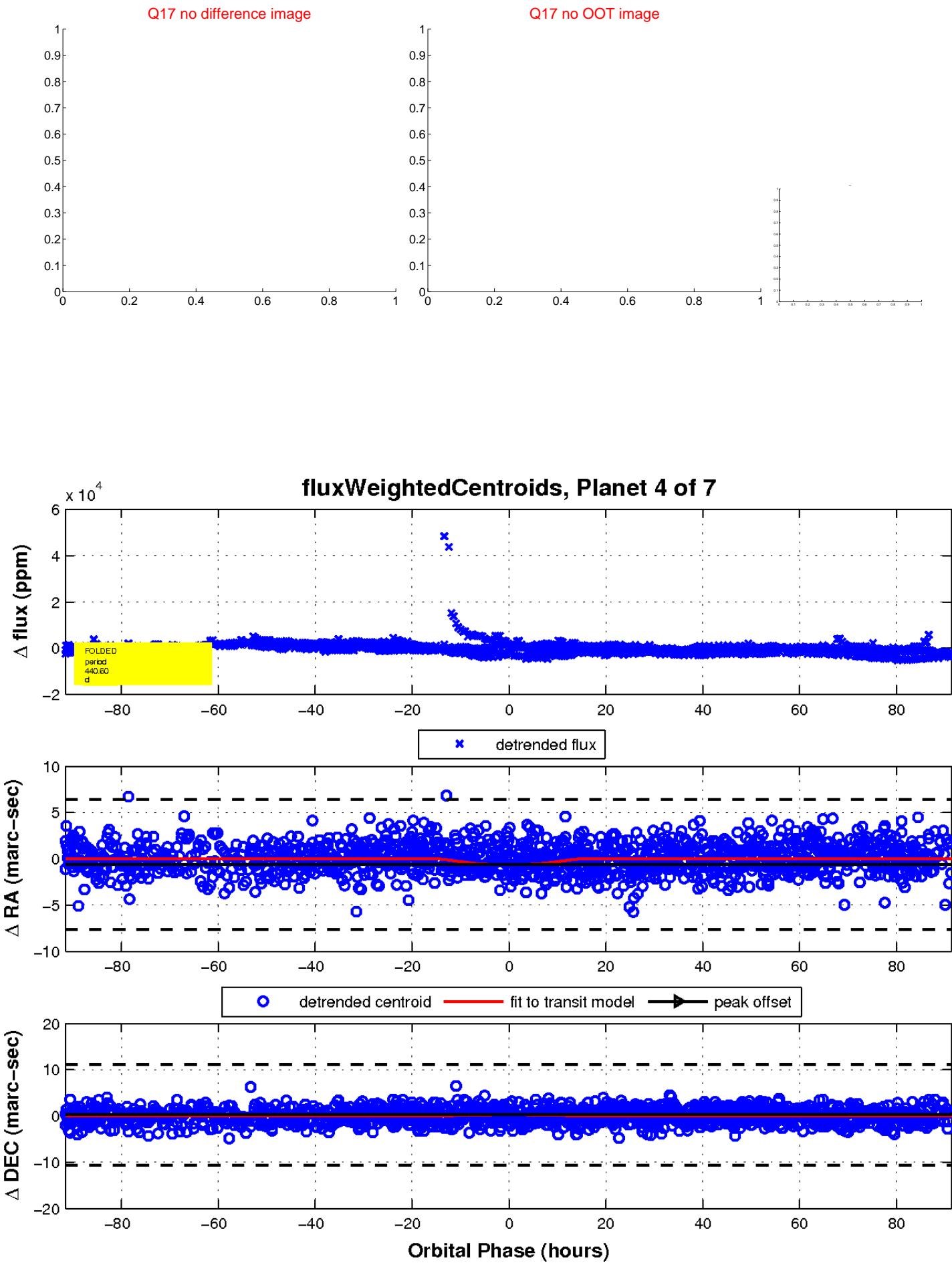
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



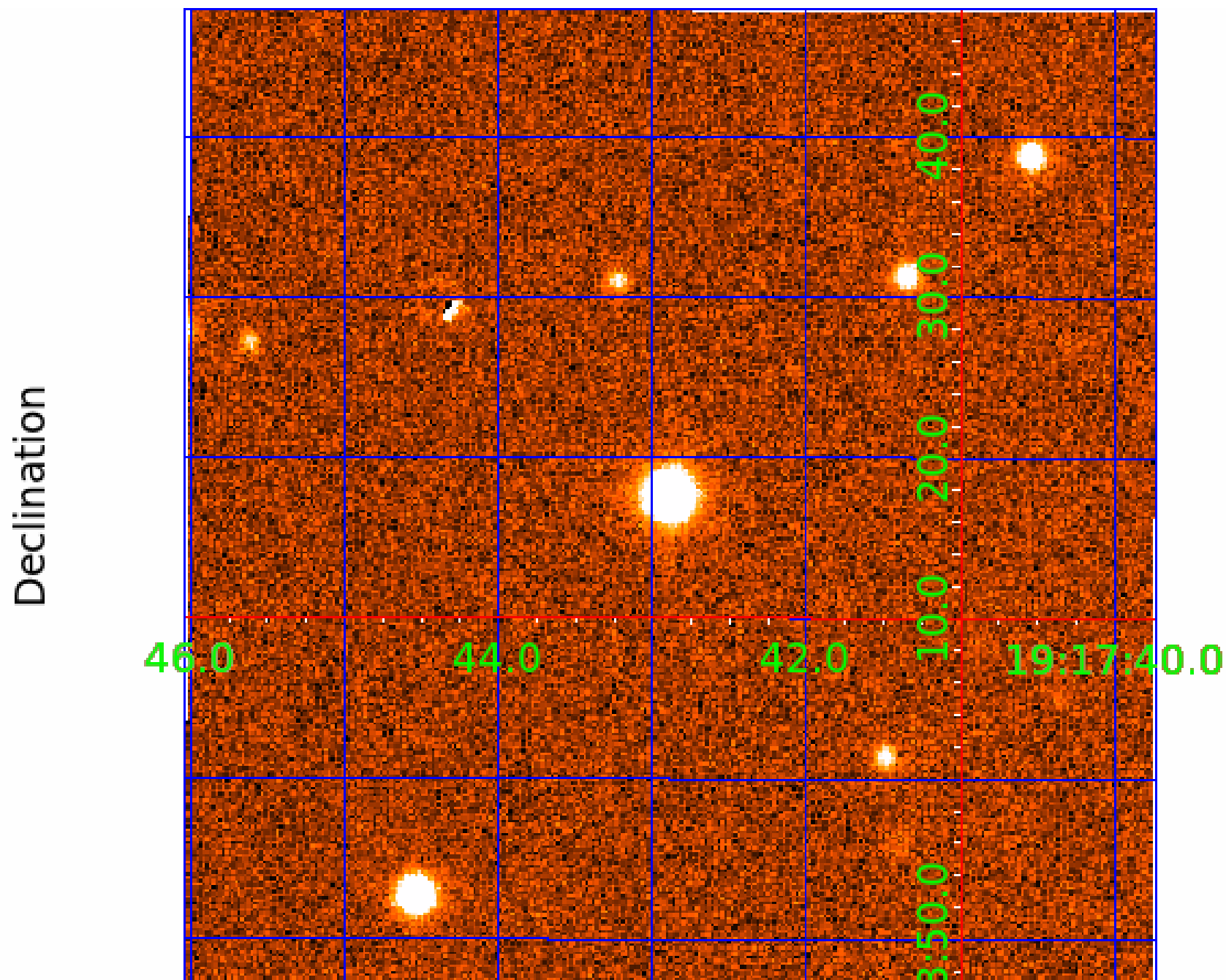
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image





# KIC 011859900

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
011859900-01	OBS	No	439.604995	501.827165	2033.7	3.792	16.8	8.4	0.67	4247	2.98	0.14
011859900-02	OBS	No	583.779998	327.887722	1009.5	12.000	14.8	-1.0	0.67	4247	2.04	0.09
011859900-03	OBS	No	375.779063	258.711135	1758.8	3.561	15.1	7.8	0.67	4247	2.88	0.17
011859900-04	OBS	No	440.597899	185.157716	3438.7	30.528	13.3	7.9	0.67	4247	5.03	0.13
011859900-05	OBS	No	397.217150	270.968371	1380.9	5.642	12.3	7.1	0.67	4247	2.64	0.15
011859900-06	OBS	No	382.032729	344.666605	1876.8	10.133	13.3	7.6	0.67	4247	2.77	0.16
011859900-07	OBS	No	601.243881	347.442639	1036.0	12.000	16.0	-1.0	0.67	4247	2.06	0.09

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
011859900-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011859900-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_NOFITS
011859900-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_POS_DV
011859900-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011859900-05	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—CENT_FEW_DIFFS
011859900-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011859900-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—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.

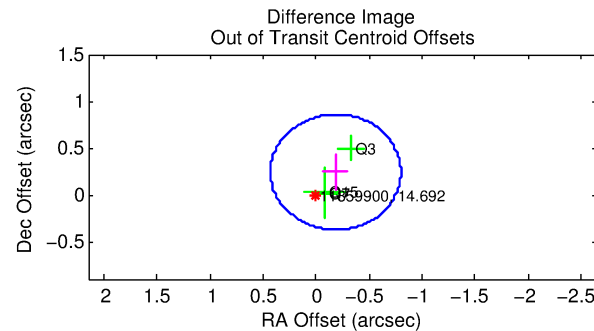
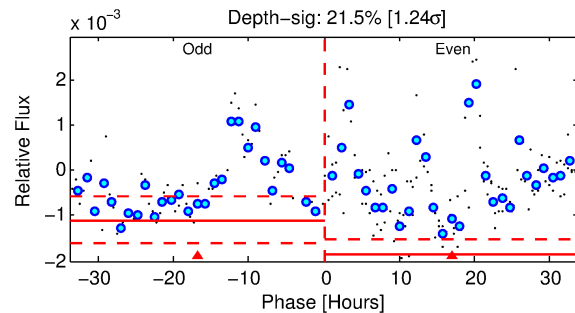
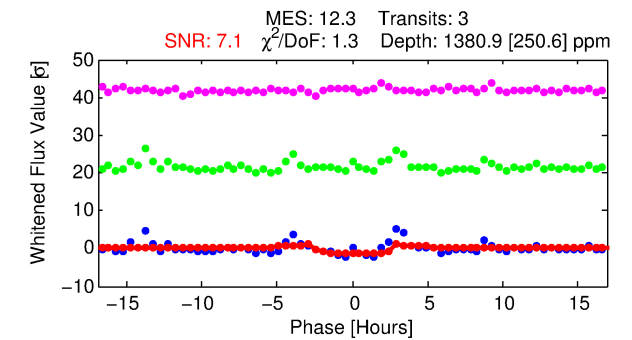
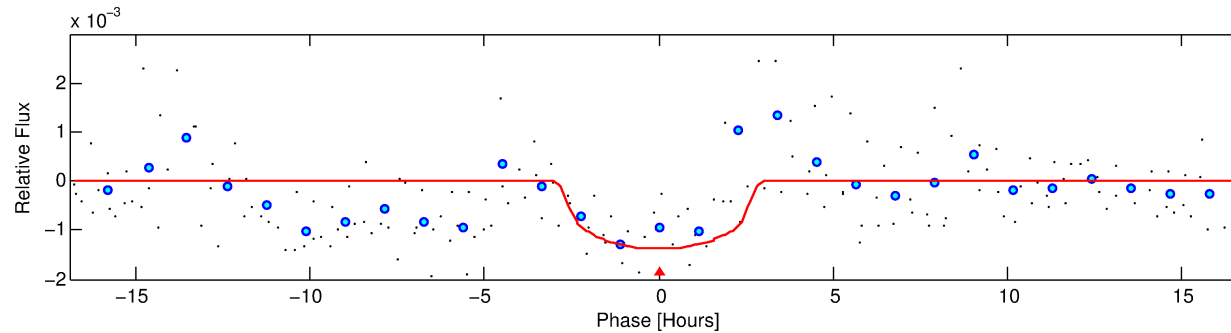
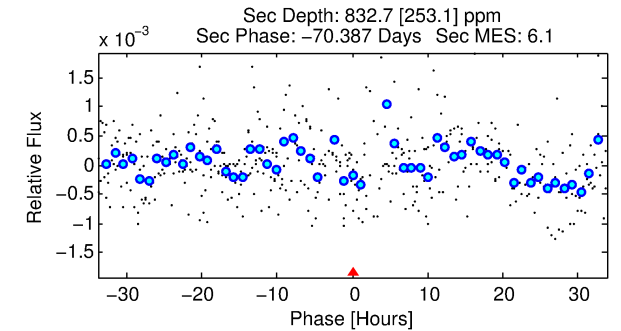
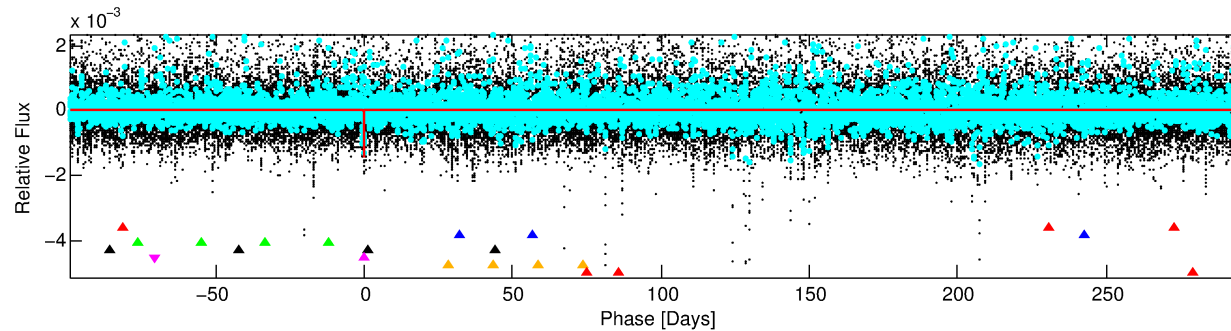
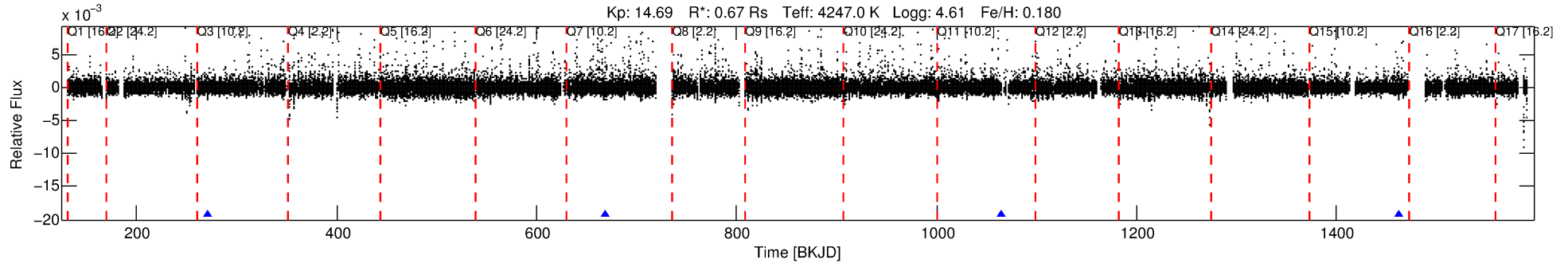
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 011859900-05

No Significant Match Found

# DV One-Page Summary

KIC: 11859900 Candidate: 5 of 7 Period: 397.217 d



## DV Fit Results:

Period = 397.21715 [0.00500] d  
Epoch = 270.9684 [0.0099] BKJD  
Rp/R\* = 0.0360 [0.0243]  
a/R\* = 422.81 [838.30]  
b = 0.67 [1.64]  
Seff = 0.15 [0.03]  
Teq = 160 [7] K  
Rp = 2.64 [1.80] Re  
a = 0.9248 [0.0670] AU  
Ag = 56185.77 [77910.23] [0.72 $\sigma$ ]  
Teffp = 3805 [1322] K [2.76 $\sigma$ ]

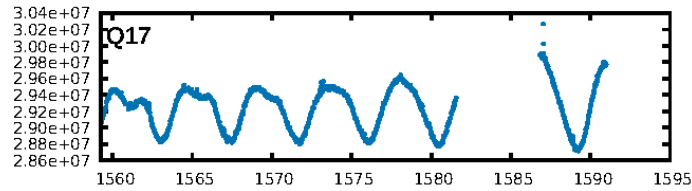
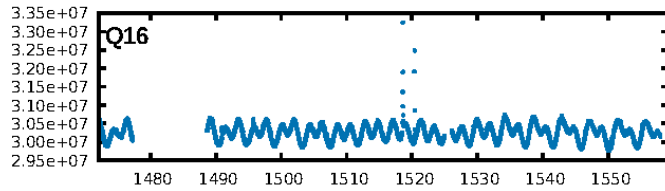
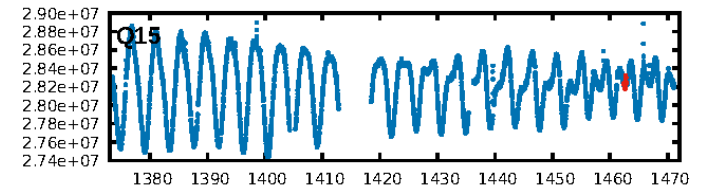
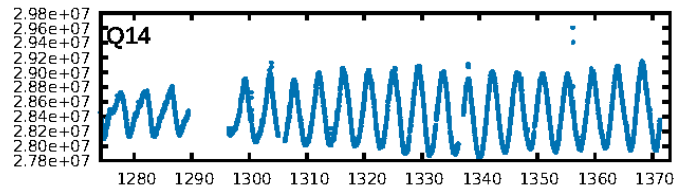
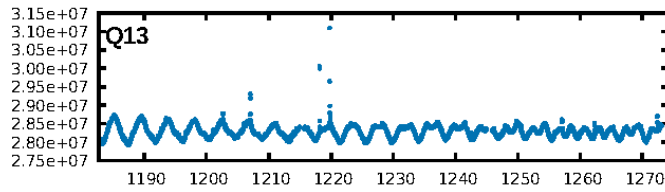
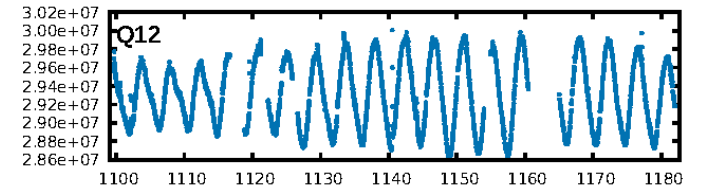
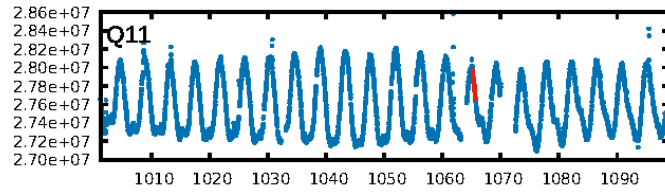
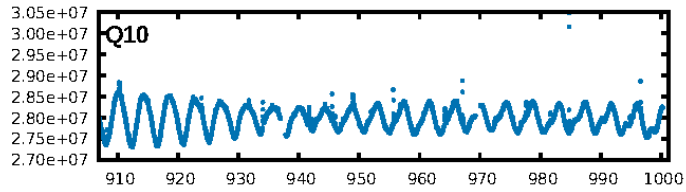
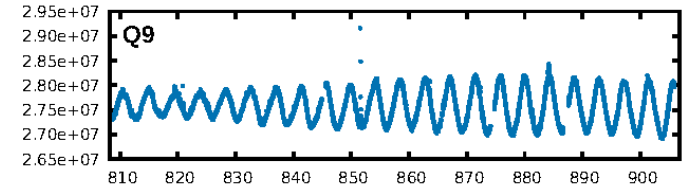
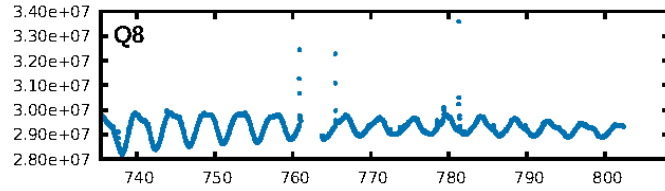
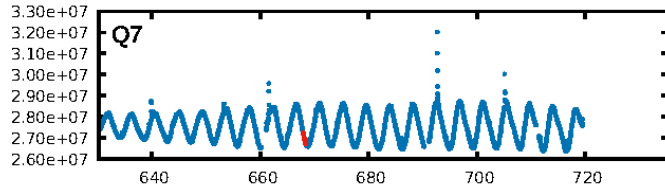
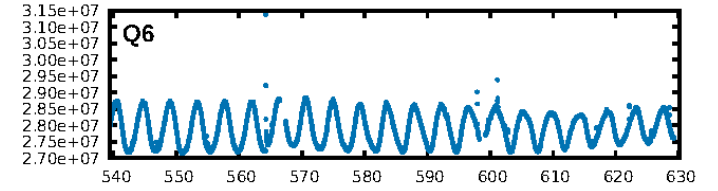
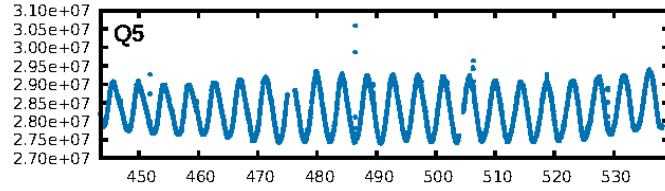
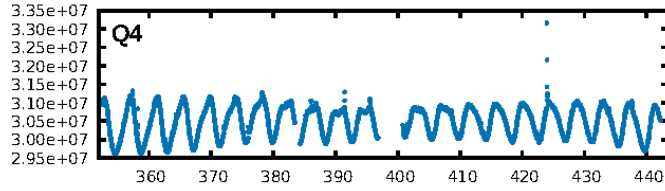
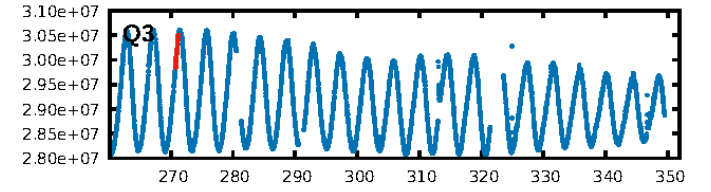
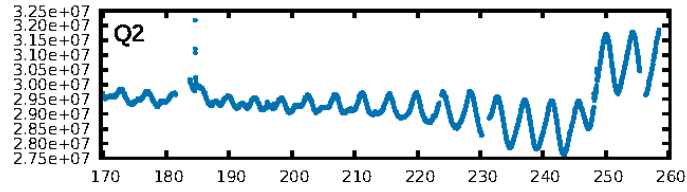
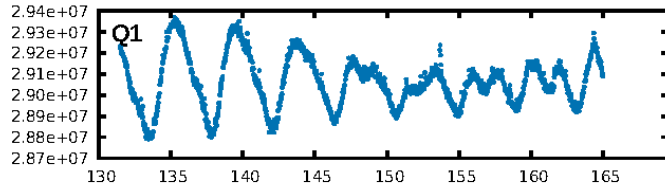
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [31.42 $\sigma$ ]  
LongPeriod-sig: 100.0% [149.64 $\sigma$ ]  
ModelChiSquare2-sig: 1.1%  
ModelChiSquareGof-sig: 84.3%  
**Bootstrap-pfa: 2.33e-10**  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: -3.145  
Centroid-sig: 68.2%  
Centroid-so: 0.469 arcsec [0.72 $\sigma$ ]  
OotOffset-rm: 0.303 arcsec [1.48 $\sigma$ ]  
OotOffset-st: 0/3/0/0 [3]  
KicOffset-rm: 0.439 arcsec [2.08 $\sigma$ ]  
KicOffset-st: 0/3/0/0 [3]  
DiffImageQuality-fgm: 0.67 [2/3]  
DiffImageOverlap-fno: 1.00 [3/3]

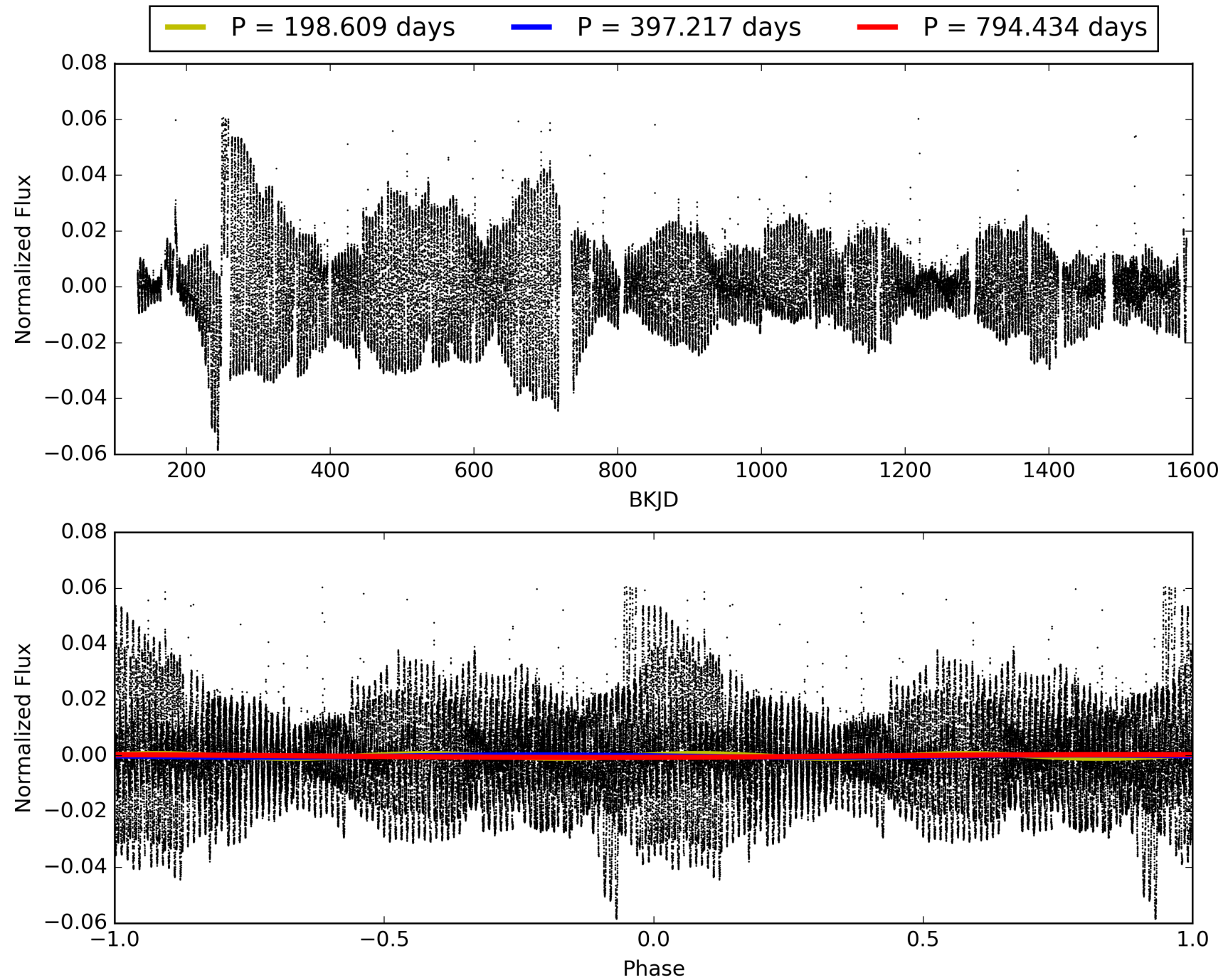
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 011859900-05, PDC Light Curves

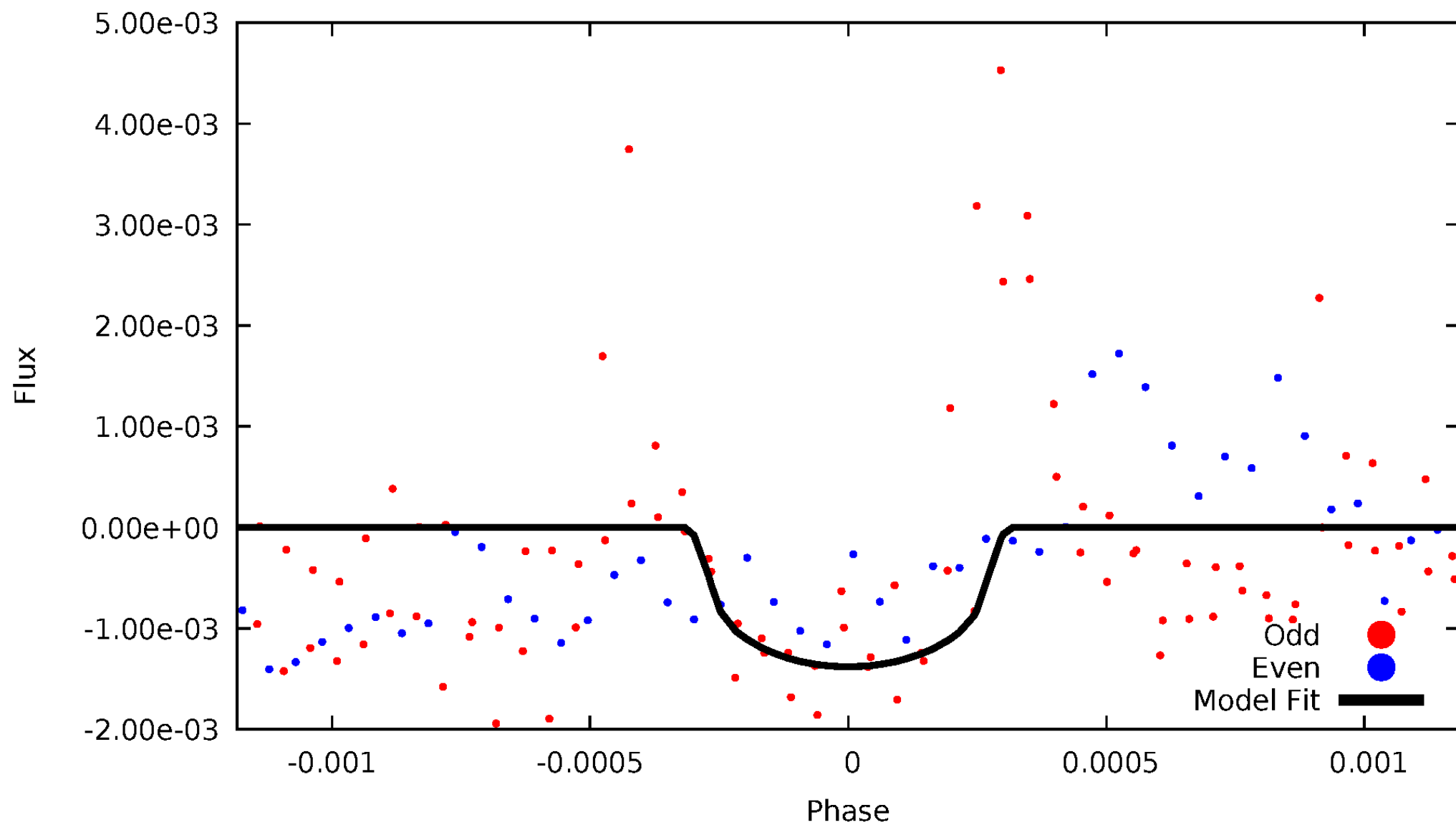


TCE 011859900-05



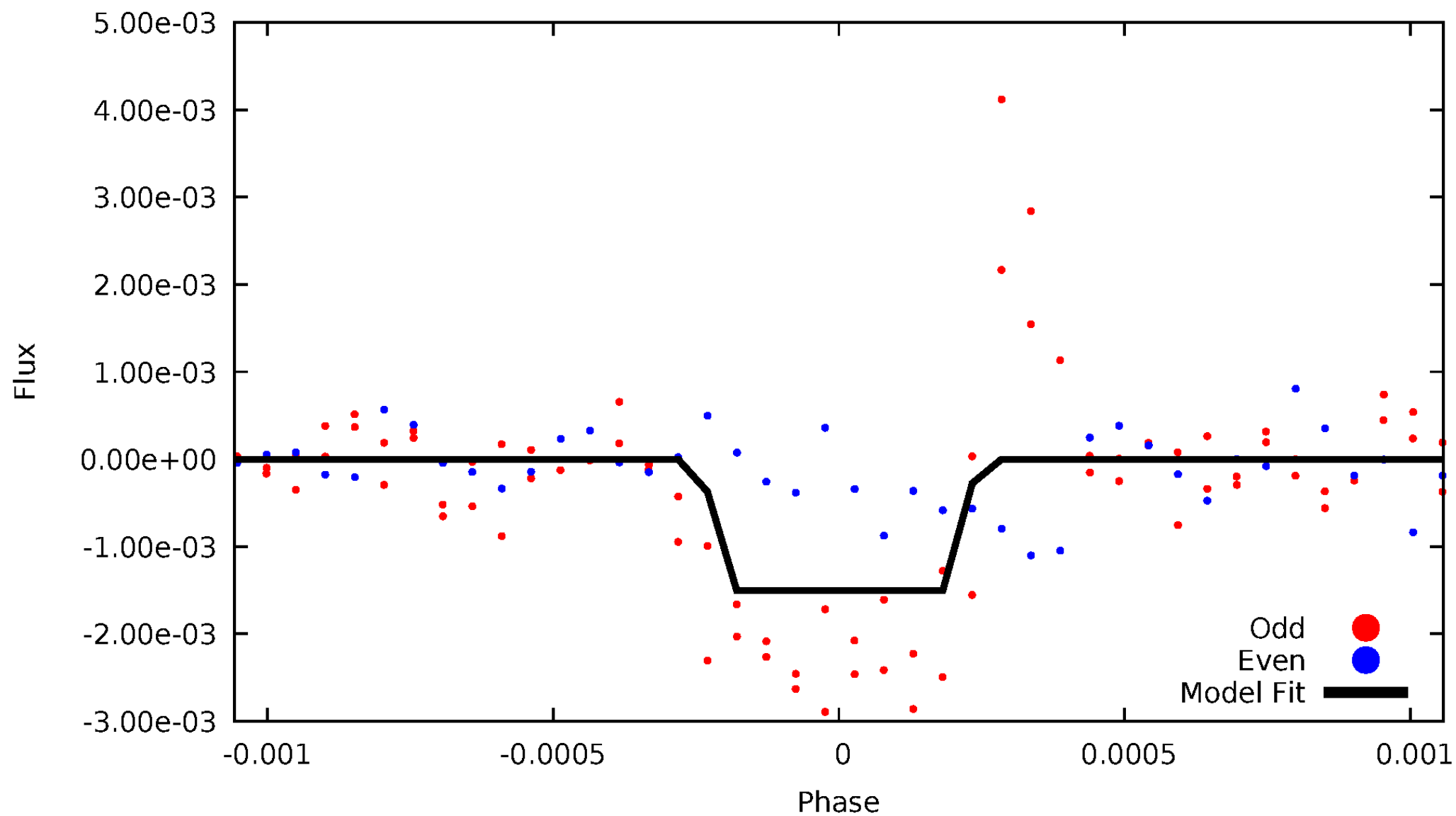
# DV Odd/Even

TCE 011859900-05



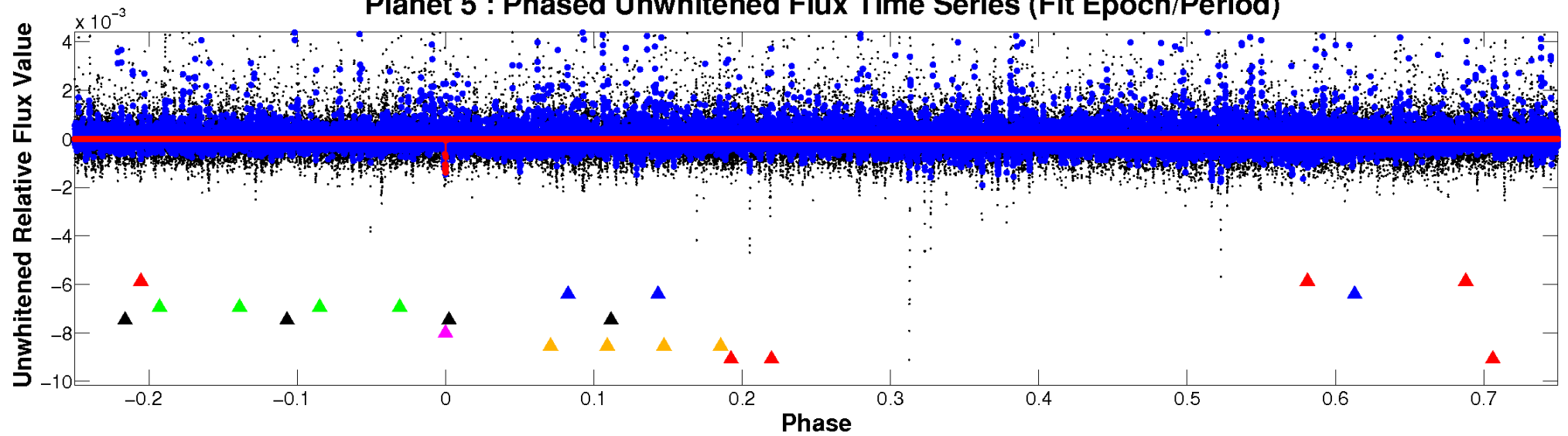
# ALT Odd/Even

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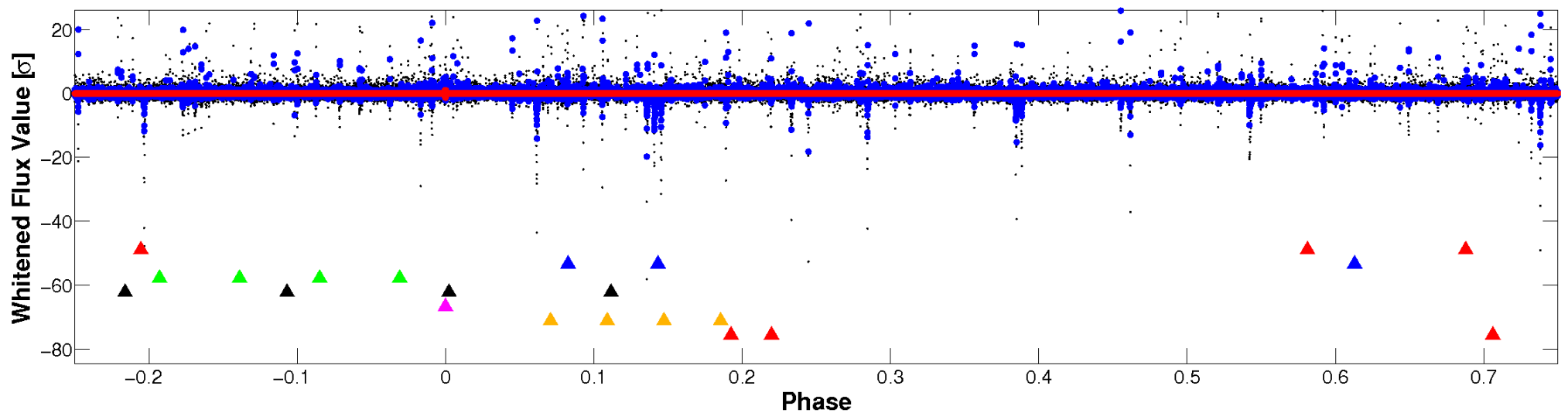


# Non-Whitened Vs. Whitened Light Curve

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

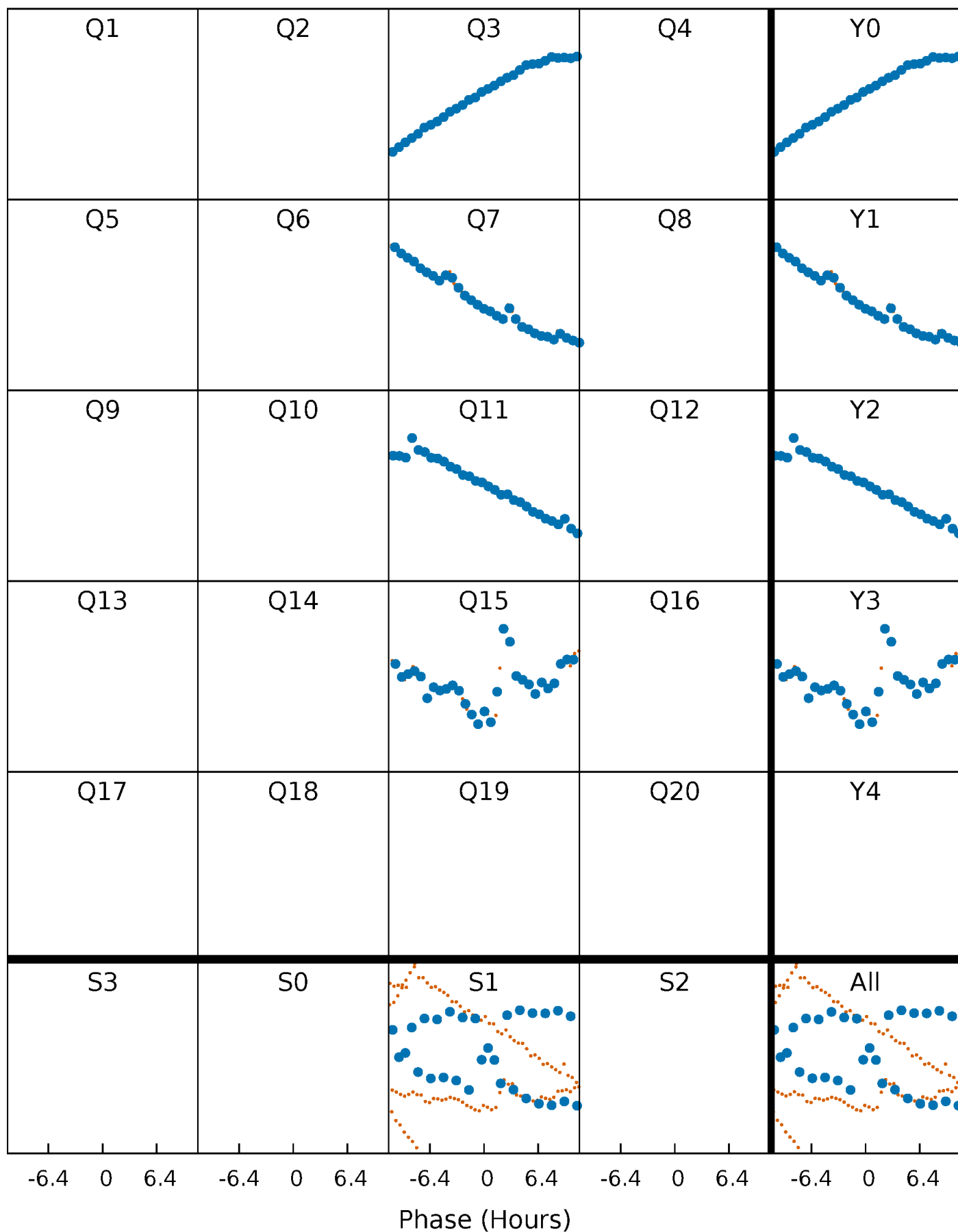


Planet 5 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

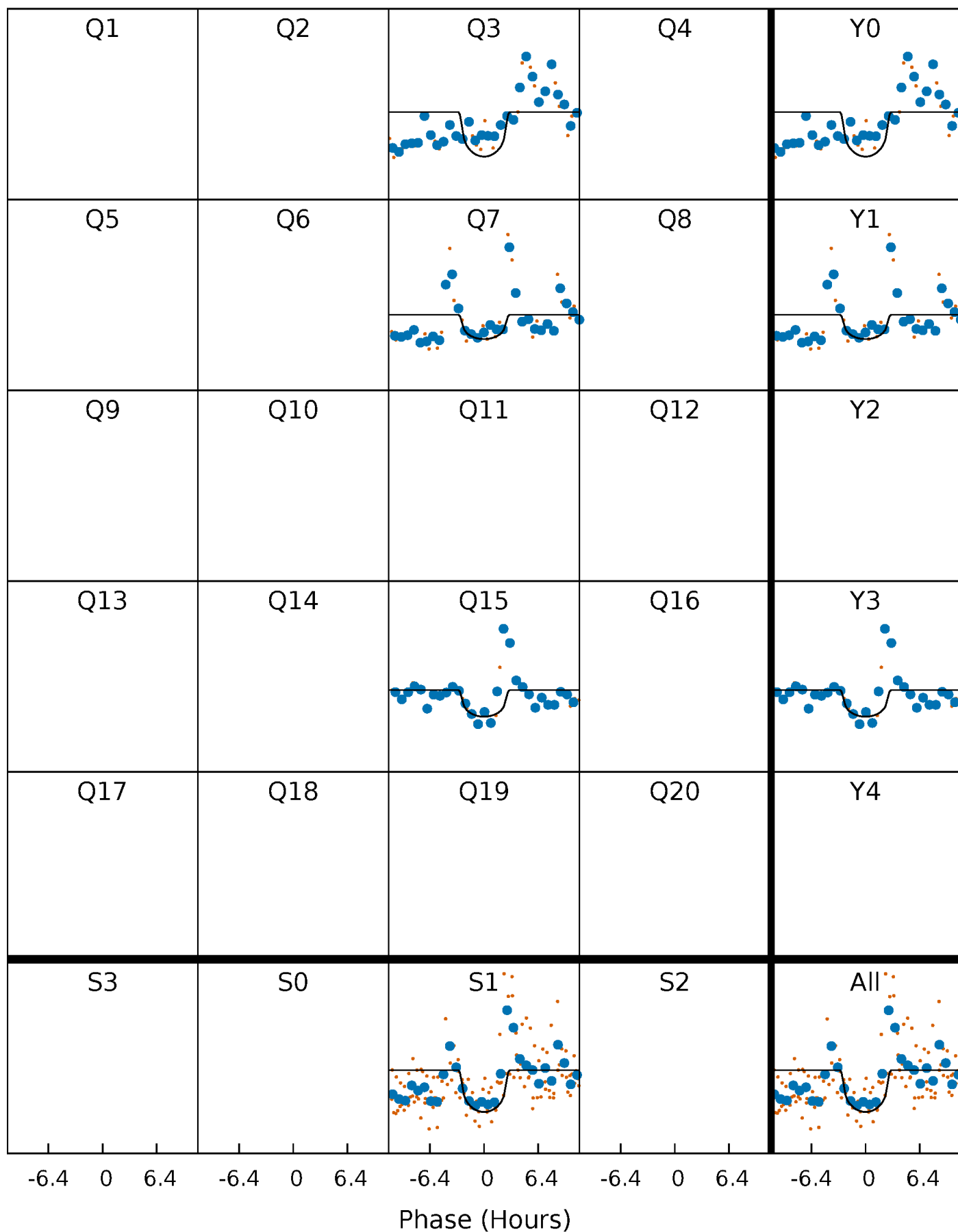
TCE 011859900-05     $P=397.217150$  Days     $T_0=270.968371$  (BKJD)





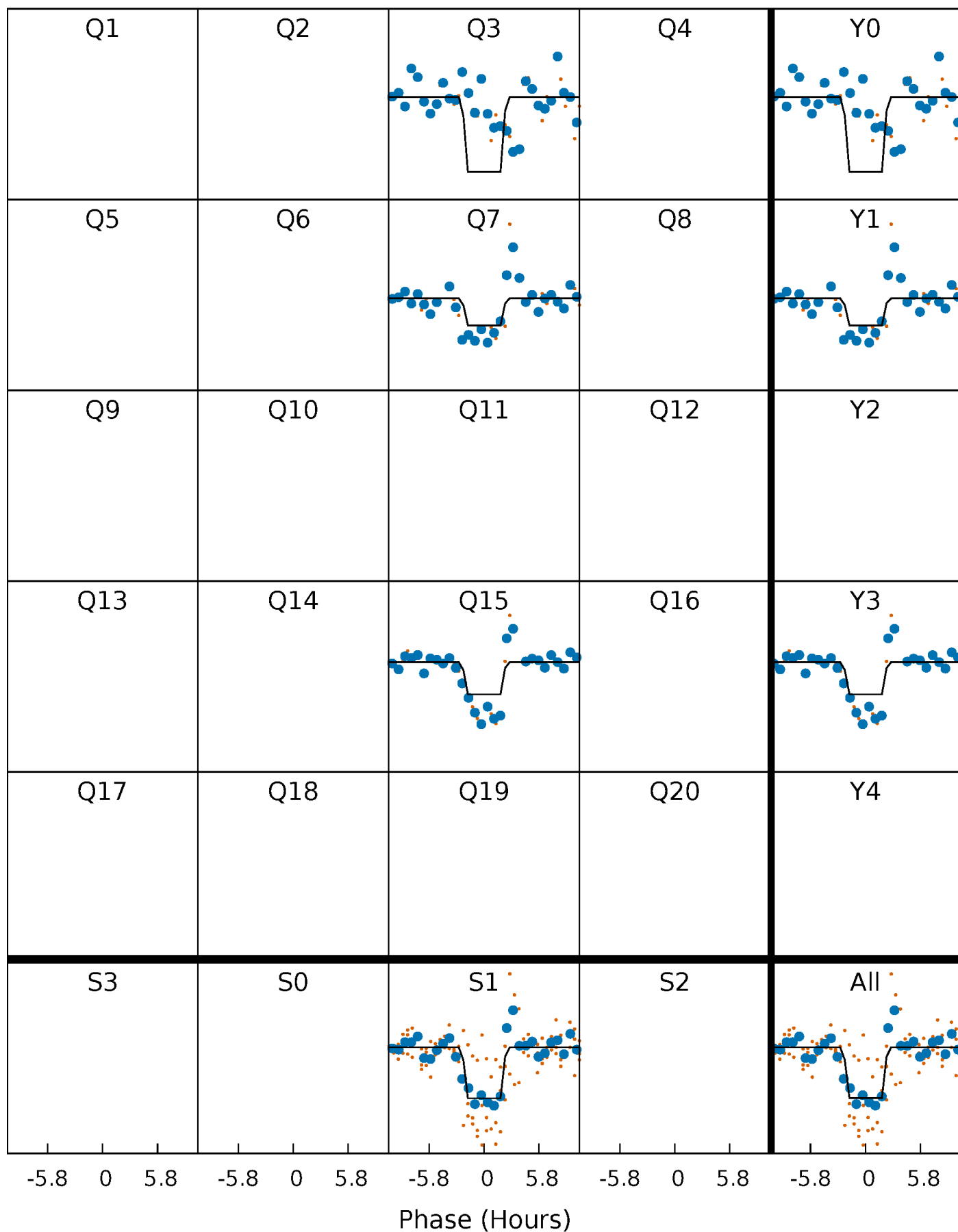
# DV Quarter-Phased Transit Curves

TCE 011859900-05     $P=397.217150$  Days     $T_0=270.968371$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

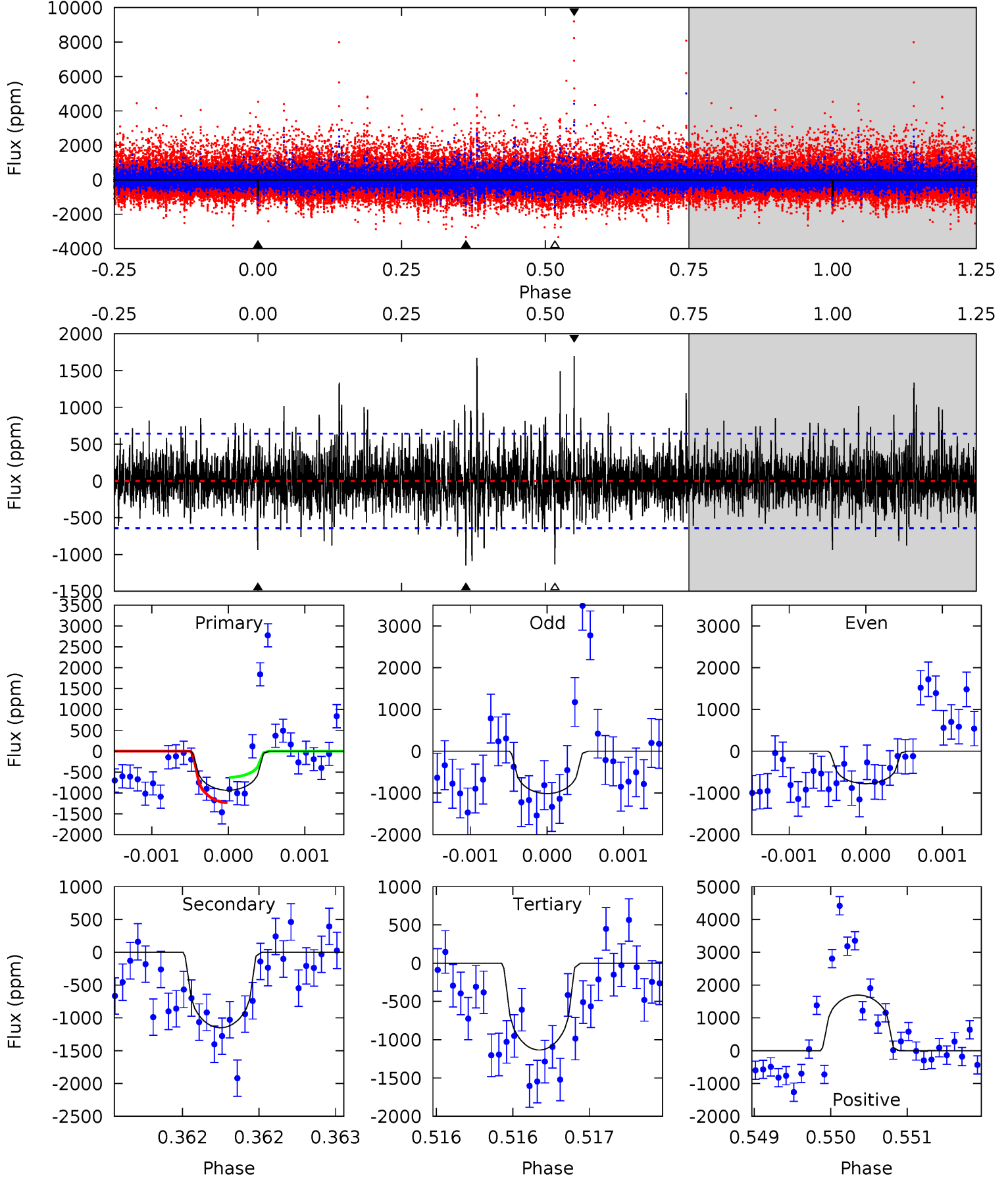
TCE 011859900-05     $P=397.207973$  Days     $T_0=270.981745$  (BKJD)



# DV Model-Shift Uniqueness Test

011859900-05, P = 397.217150 Days, E = 270.968371 Days

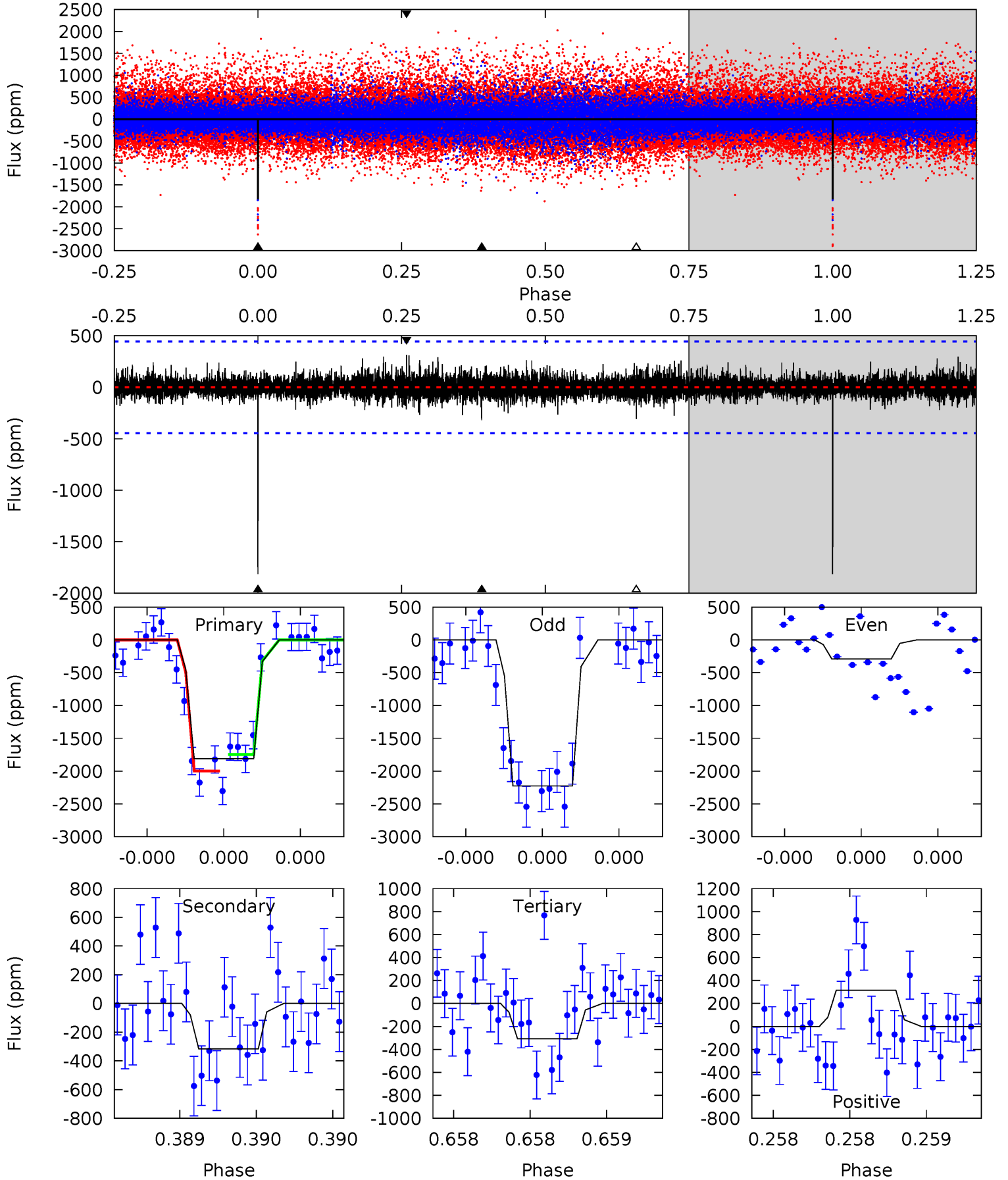
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.06	9.89	9.75	14.6	5.53	3.41	2.23	-1.70	-6.52	0.14	-4.68	0.70	1.00	0.60	2.63



# Alt Model-Shift Uniqueness Test

011859900-05, P = 397.207973 Days, E = 270.981745 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
22.7	3.97	3.84	3.96	5.59	3.50	0.76	18.9	18.7	0.13	0.02	11.9	0.76	0.15	0



### Stellar Parameters For KIC 011859900

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4247^{+116}_{-142}$	$4.607^{+0.052}_{-0.017}$	$0.180^{+0.200}_{-0.300}$	$0.673^{+0.024}_{-0.061}$	$0.668^{+0.047}_{-0.052}$	$3.085^{+0.708}_{-0.205}$
	+3%/-3%	+1%/-0%	+111%/-167%	+4%/-9%	+7%/-8%	+23%/-7%
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 011859900-05 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-1150 \pm 116$	$2.72^{+1.66}_{-1.55}$	$221^{+7}_{-8}$	$4105^{+1652}_{-649}$	$75967^{+319079}_{-47213}$
Alt.	$-317 \pm 80$	$3.01^{+1.72}_{-1.70}$	$222^{+7}_{-8}$	$3205^{+950}_{-418}$	$16542^{+62845}_{-10135}$

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

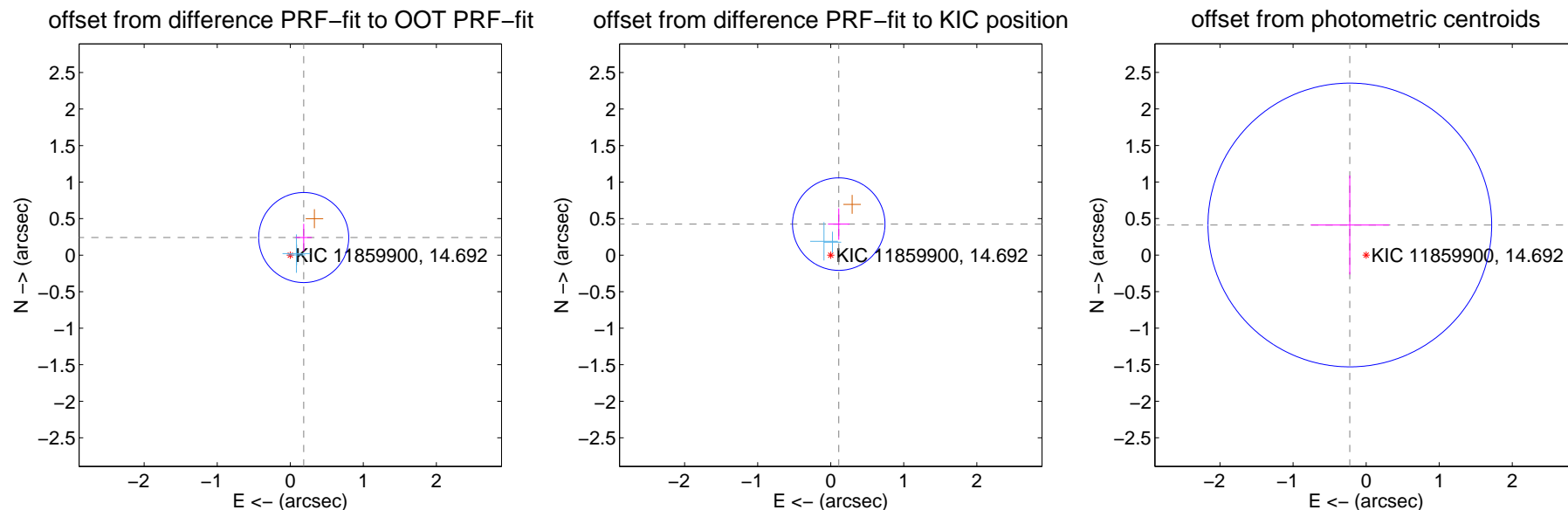
## DV Centroid Data

Supplemental centroid analysis for 011859900-05. Kepler magnitude: 14.69. Transit SNR 7.07

There are 2 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.24 arcsec

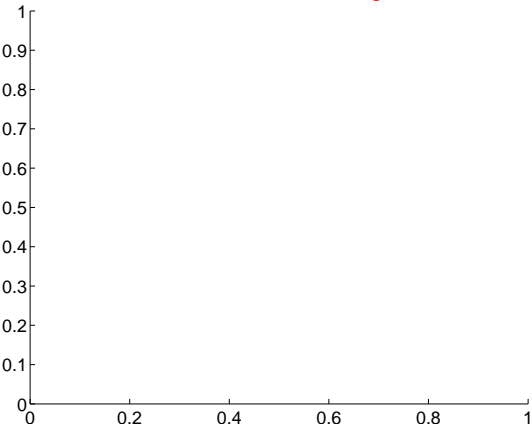
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.303 \pm 0.205$	1.48	$-0.184 \pm 0.112$	$0.241 \pm 0.188$
PRF-fit source offset from KIC position	$0.439 \pm 0.211$	2.08	$-0.110 \pm 0.148$	$0.425 \pm 0.215$
photometric centroid source offset	$0.47 \pm 0.65$	0.72	$0.22 \pm 0.54$	$0.41 \pm 0.68$



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.

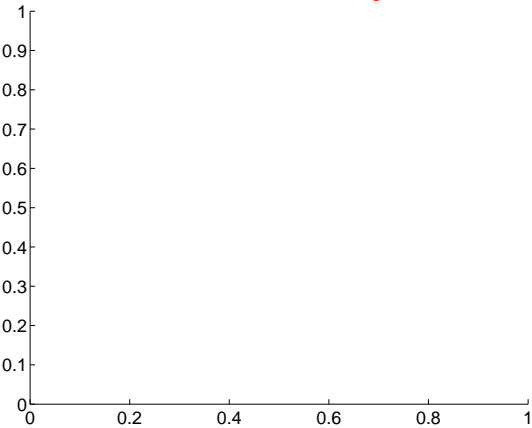
Q1 no difference image



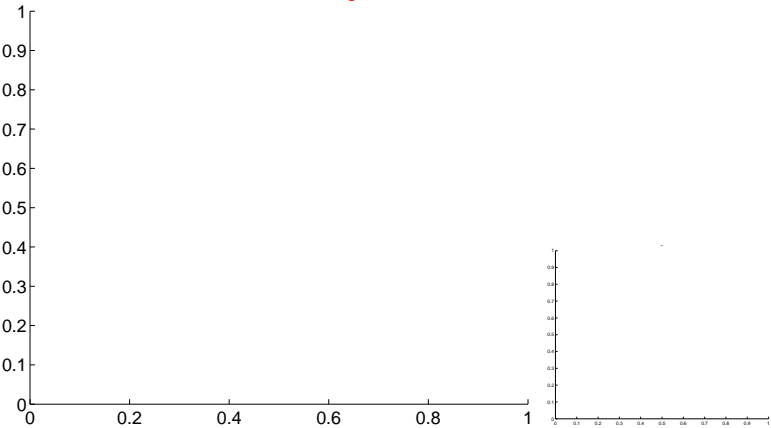
Q1 no OOT image



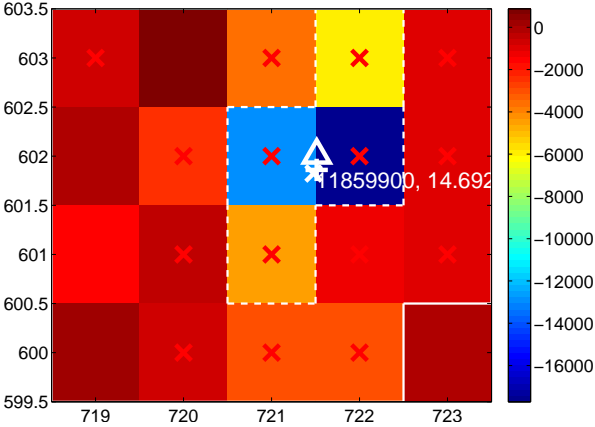
Q2 no difference image



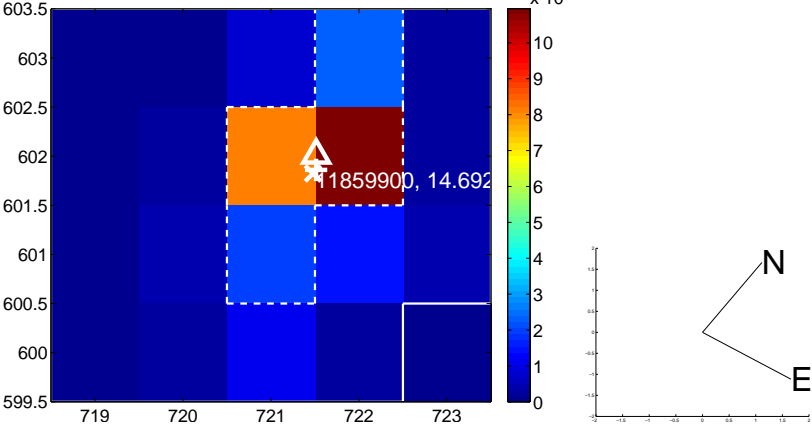
Q2 no OOT image



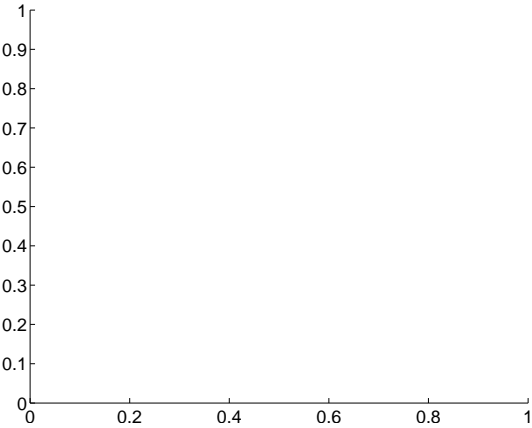
Q3 difference image. Poor Quality



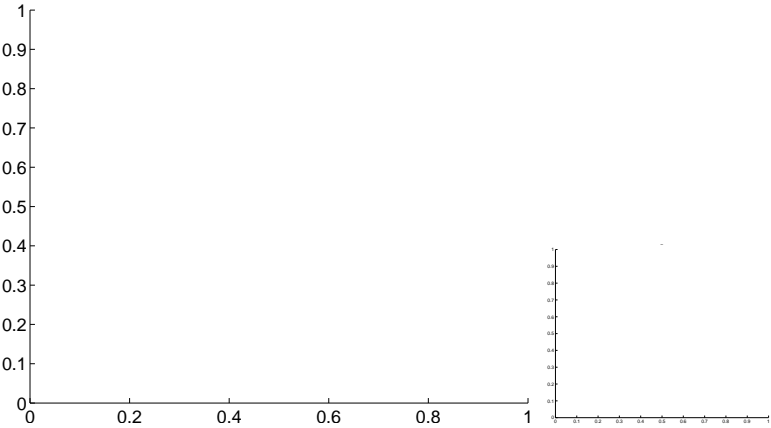
Q3 OOT image



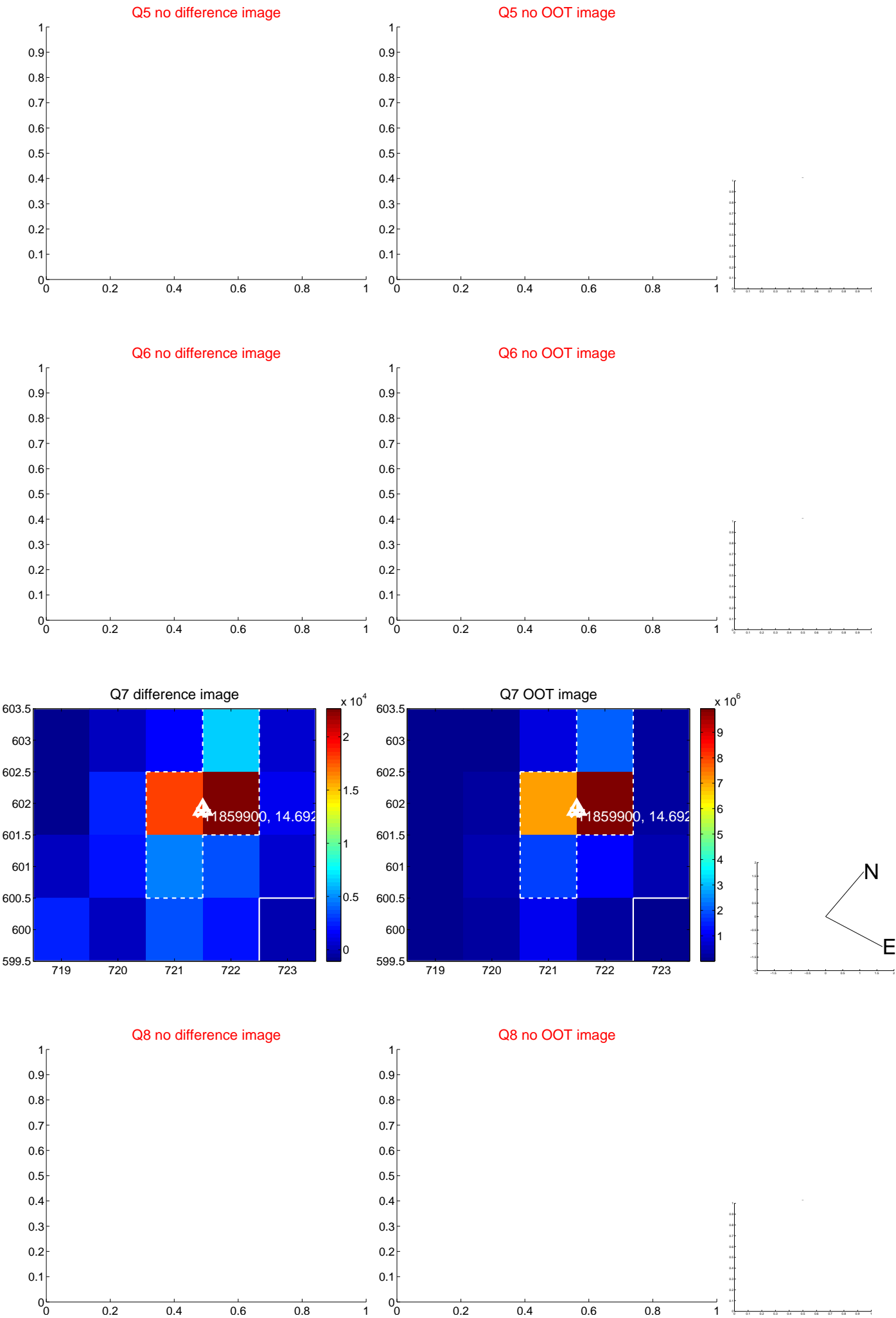
Q4 no difference image



Q4 no OOT image



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

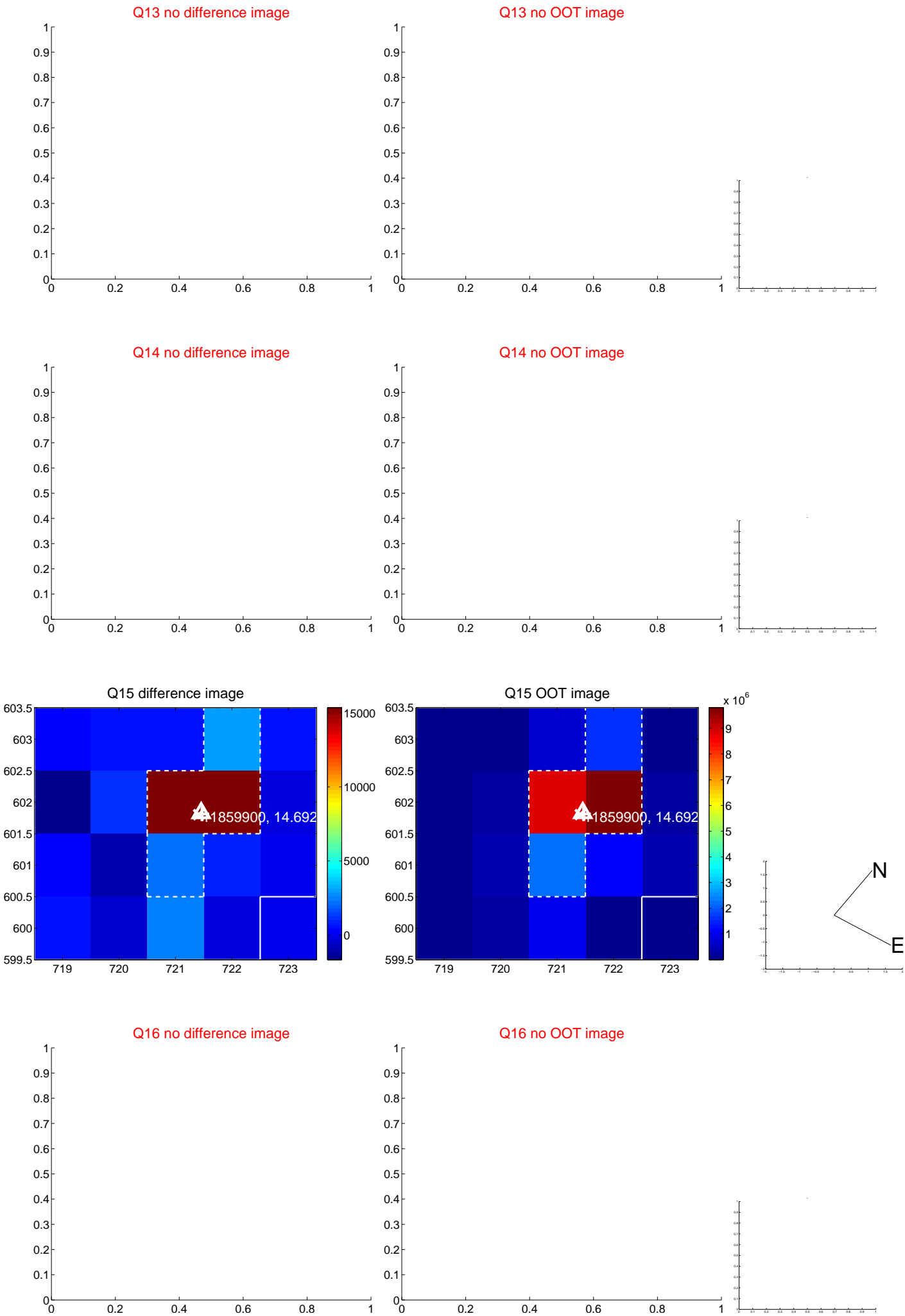




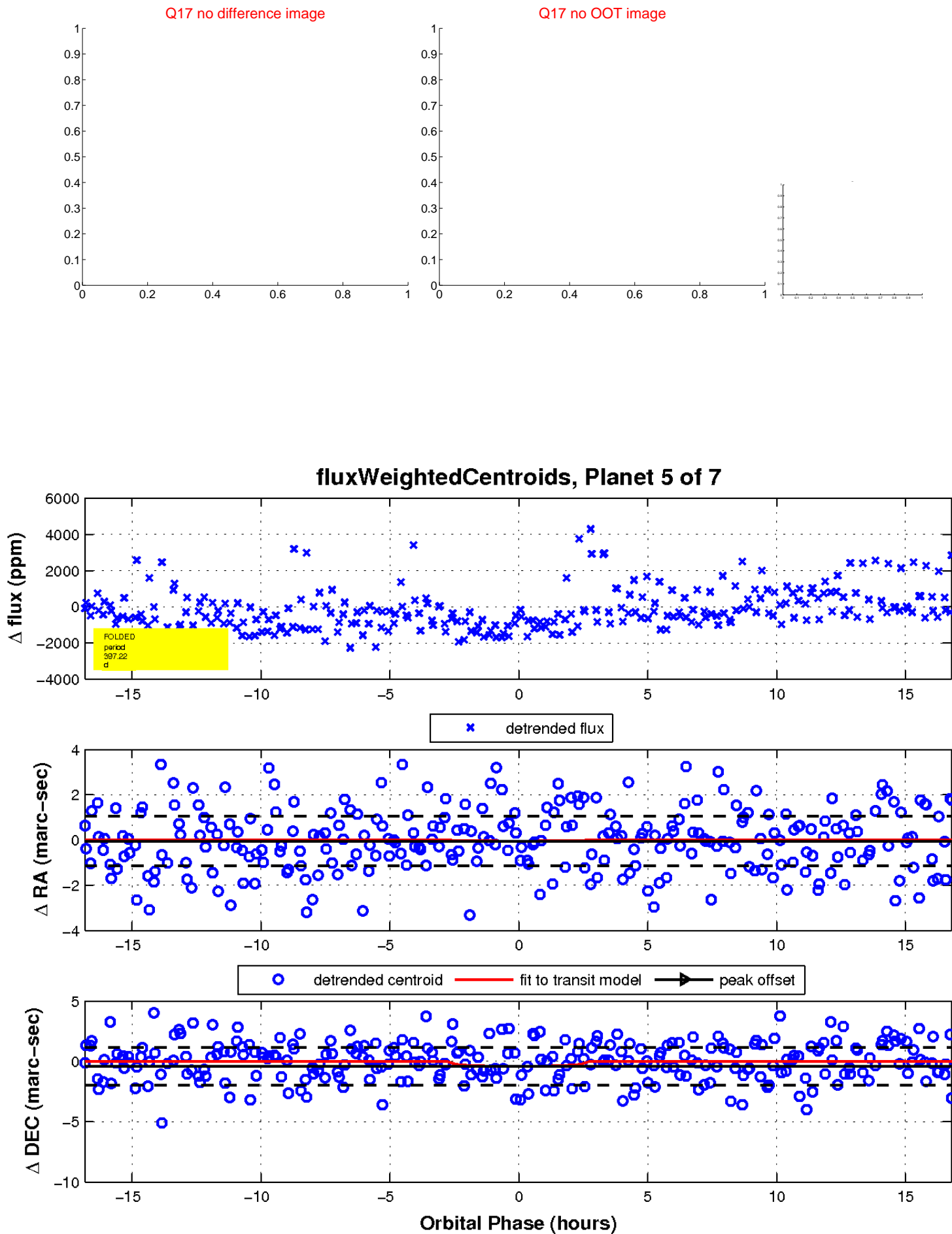
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



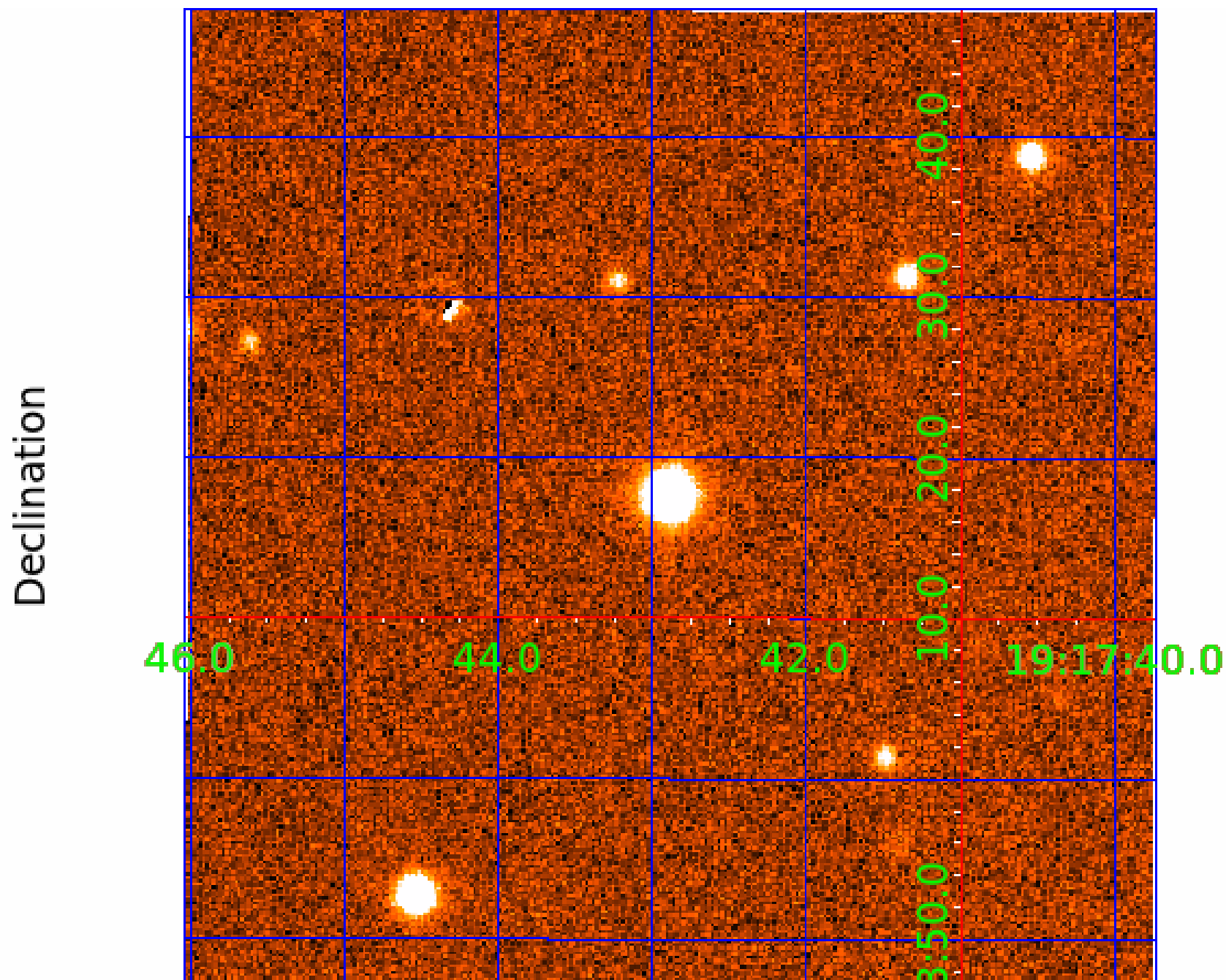
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image



# KIC 011859900

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
011859900-01	OBS	No	439.604995	501.827165	2033.7	3.792	16.8	8.4	0.67	4247	2.98	0.14
011859900-02	OBS	No	583.779998	327.887722	1009.5	12.000	14.8	-1.0	0.67	4247	2.04	0.09
011859900-03	OBS	No	375.779063	258.711135	1758.8	3.561	15.1	7.8	0.67	4247	2.88	0.17
011859900-04	OBS	No	440.597899	185.157716	3438.7	30.528	13.3	7.9	0.67	4247	5.03	0.13
011859900-05	OBS	No	397.217150	270.968371	1380.9	5.642	12.3	7.1	0.67	4247	2.64	0.15
011859900-06	OBS	No	382.032729	344.666605	1876.8	10.133	13.3	7.6	0.67	4247	2.77	0.16
011859900-07	OBS	No	601.243881	347.442639	1036.0	12.000	16.0	-1.0	0.67	4247	2.06	0.09

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
011859900-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011859900-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_NOFITS
011859900-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_POS_DV
011859900-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011859900-05	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—CENT_FEW_DIFFS
011859900-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011859900-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—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.

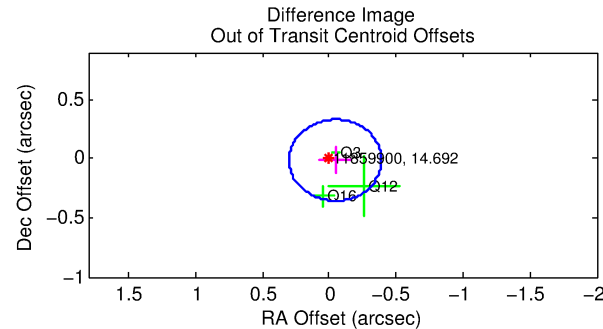
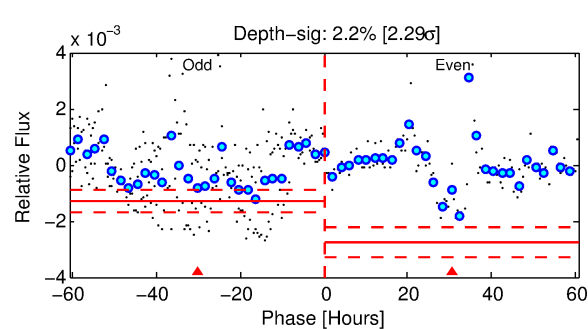
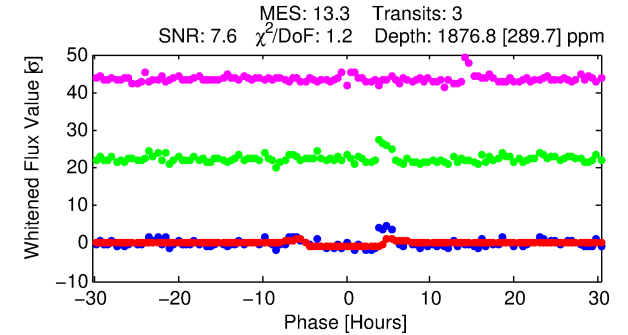
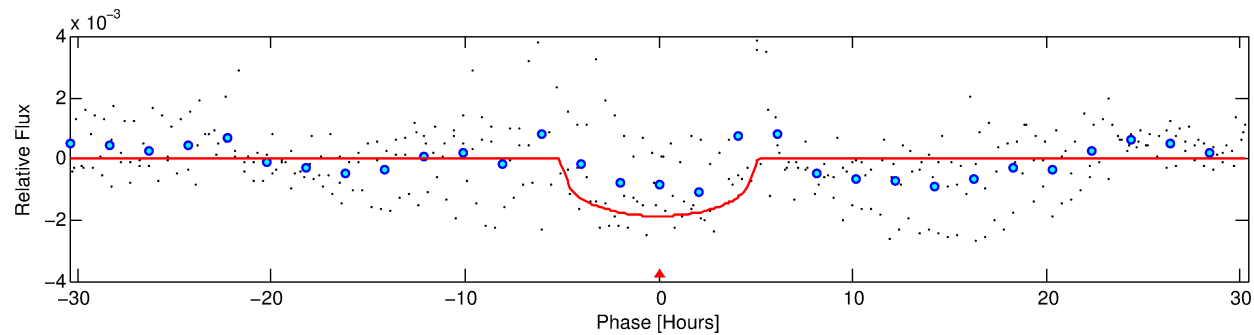
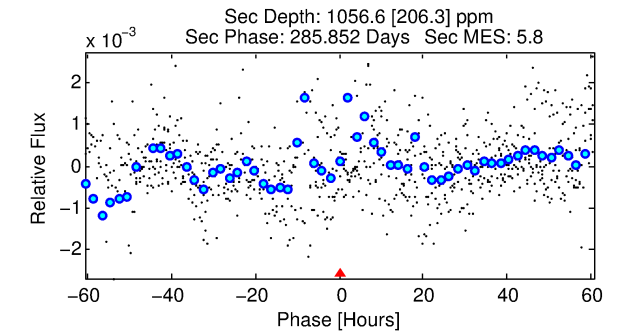
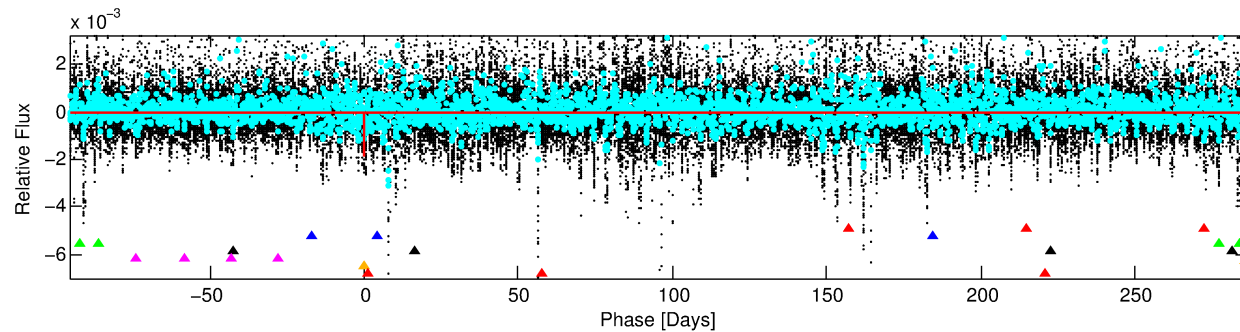
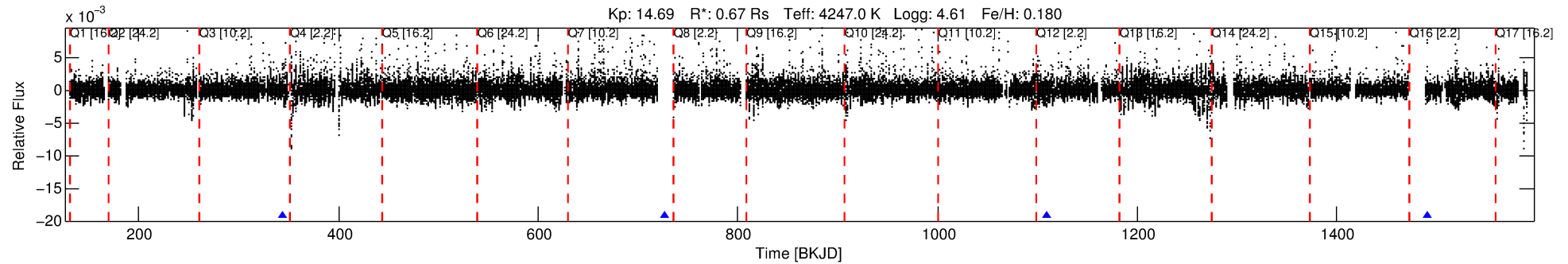
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 011859900-06

No Significant Match Found

# DV One-Page Summary

KIC: 11859900 Candidate: 6 of 7 Period: 382.033 d



## DV Fit Results:

Period = 382.03273 [0.00488] d  
Epoch = 344.6666 [0.0099] BKJD  
Rp/R\* = 0.0377 [0.0219]  
a/R\* = 298.90 [483.65]  
b = 0.00 [1873.79]  
Seff = 0.16 [0.03]  
Teq = 162 [7] K  
Rp = 2.77 [1.63] Re  
a = 0.9011 [0.0653] AU  
Ag = 61491.64 [72794.45] [0.84%]  
Teffp = 3942 [1170] K [3.23%]

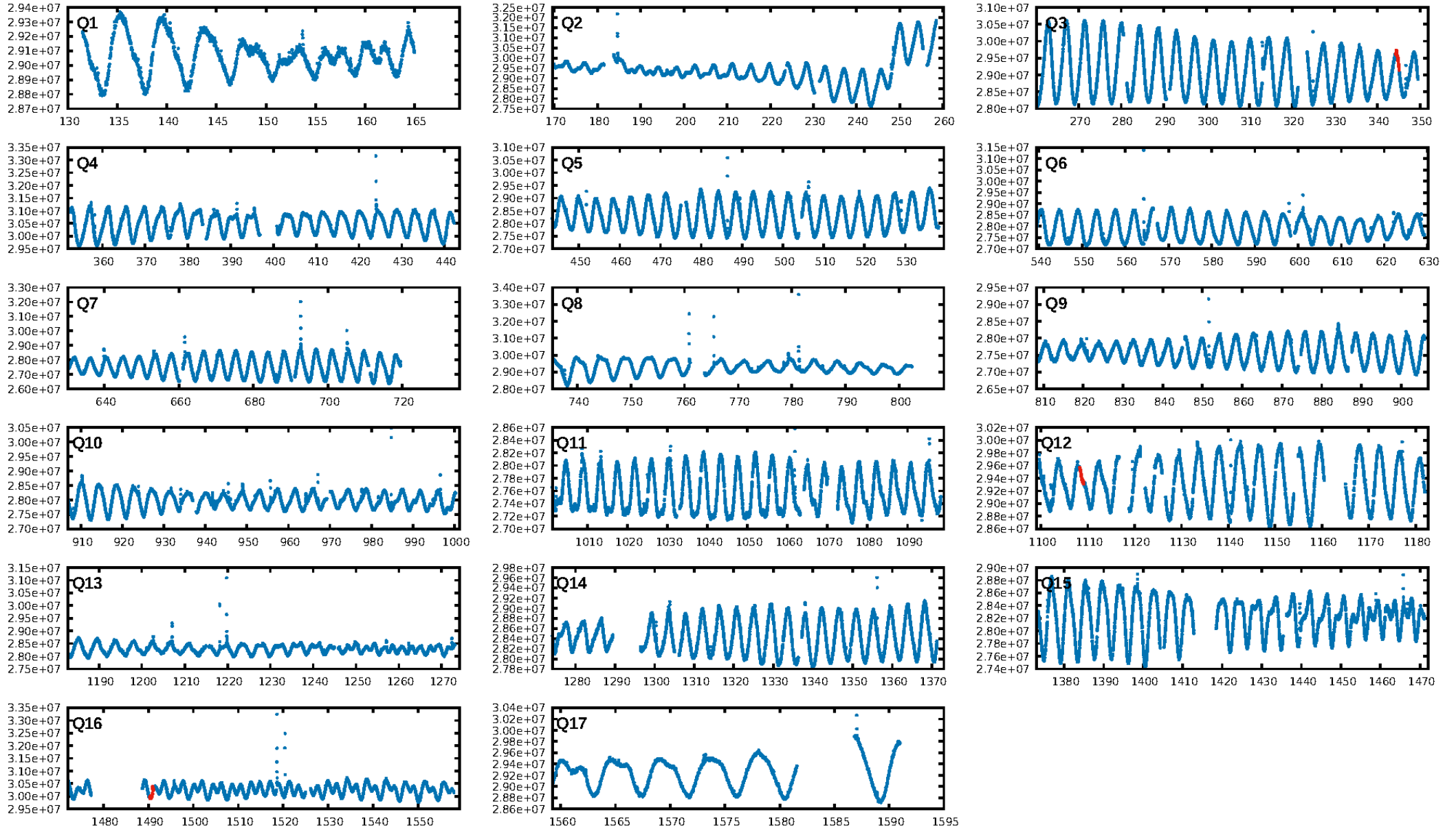
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [13.97%]  
LongPeriod-sig: 100.0% [31.42%]  
ModelChiSquare2-sig: 3.3%  
ModelChiSquareGof-sig: 74.4%  
**Bootstrap-pfa: 3.16e-12**  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: -7.428  
Centroid-sig: 73.0%  
Centroid-so: 0.468 arcsec [1.12%]  
OotOffset-rm: 0.046 arcsec [0.40%]  
OotOffset-st: 0/1/2/0 [3]  
KicOffset-rm: 0.173 arcsec [1.52%]  
KicOffset-st: 0/1/2/0 [3]  
DiffImageQuality-fgm: 0.67 [2/3]  
DiffImageOverlap-fno: 0.67 [2/3]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 05:39:41 Z

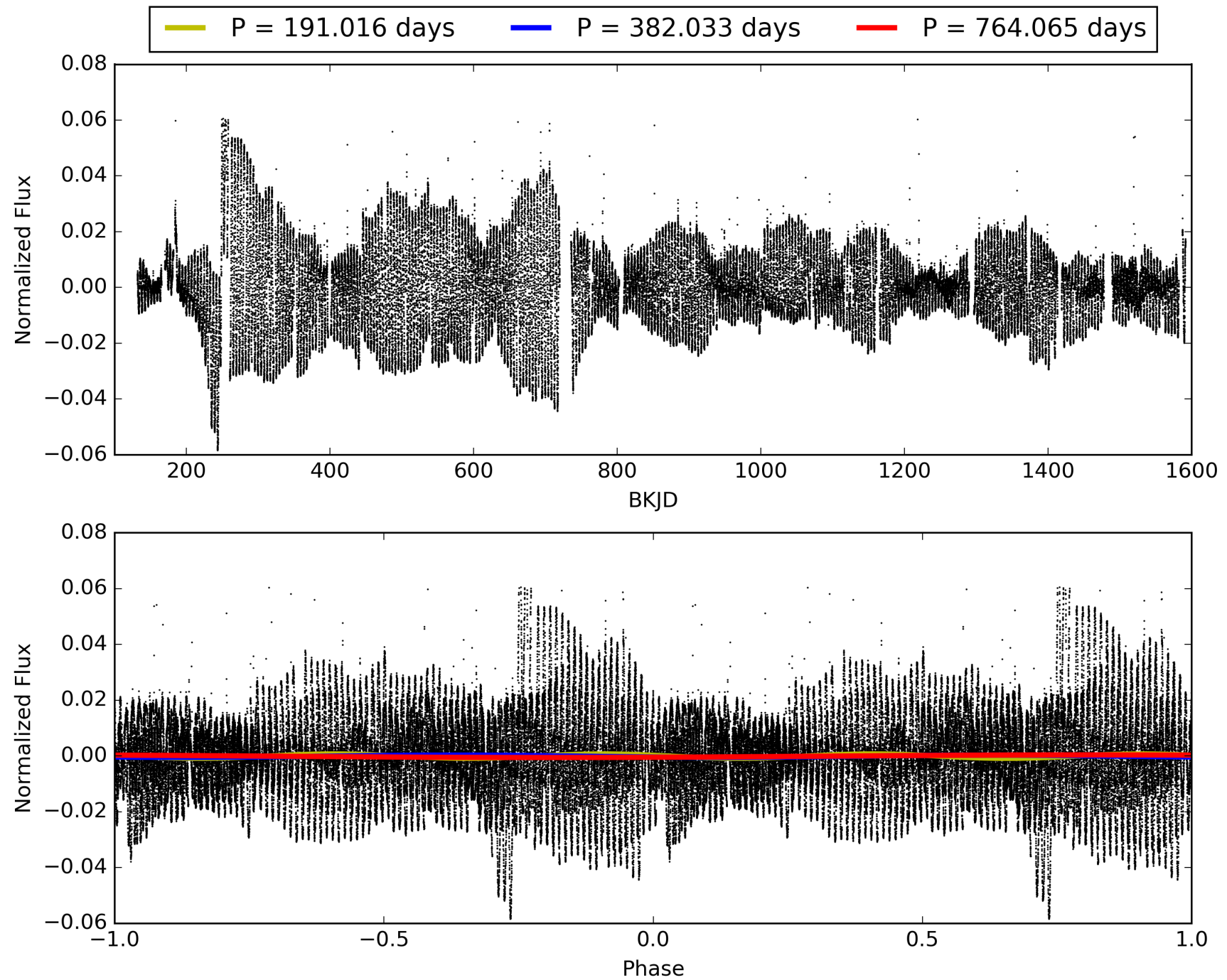
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 011859900-06, PDC Light Curves





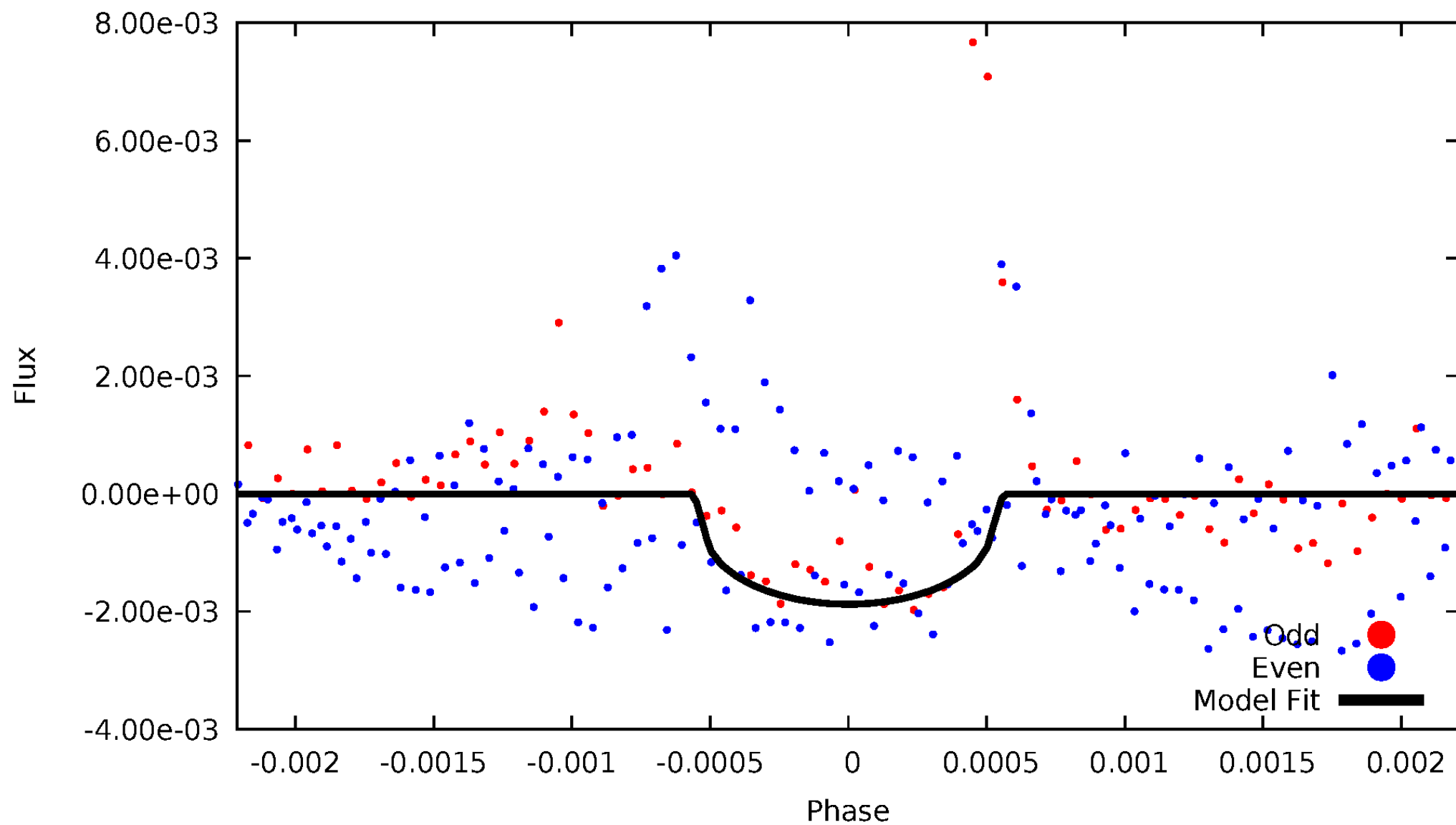
# TCE 011859900-06





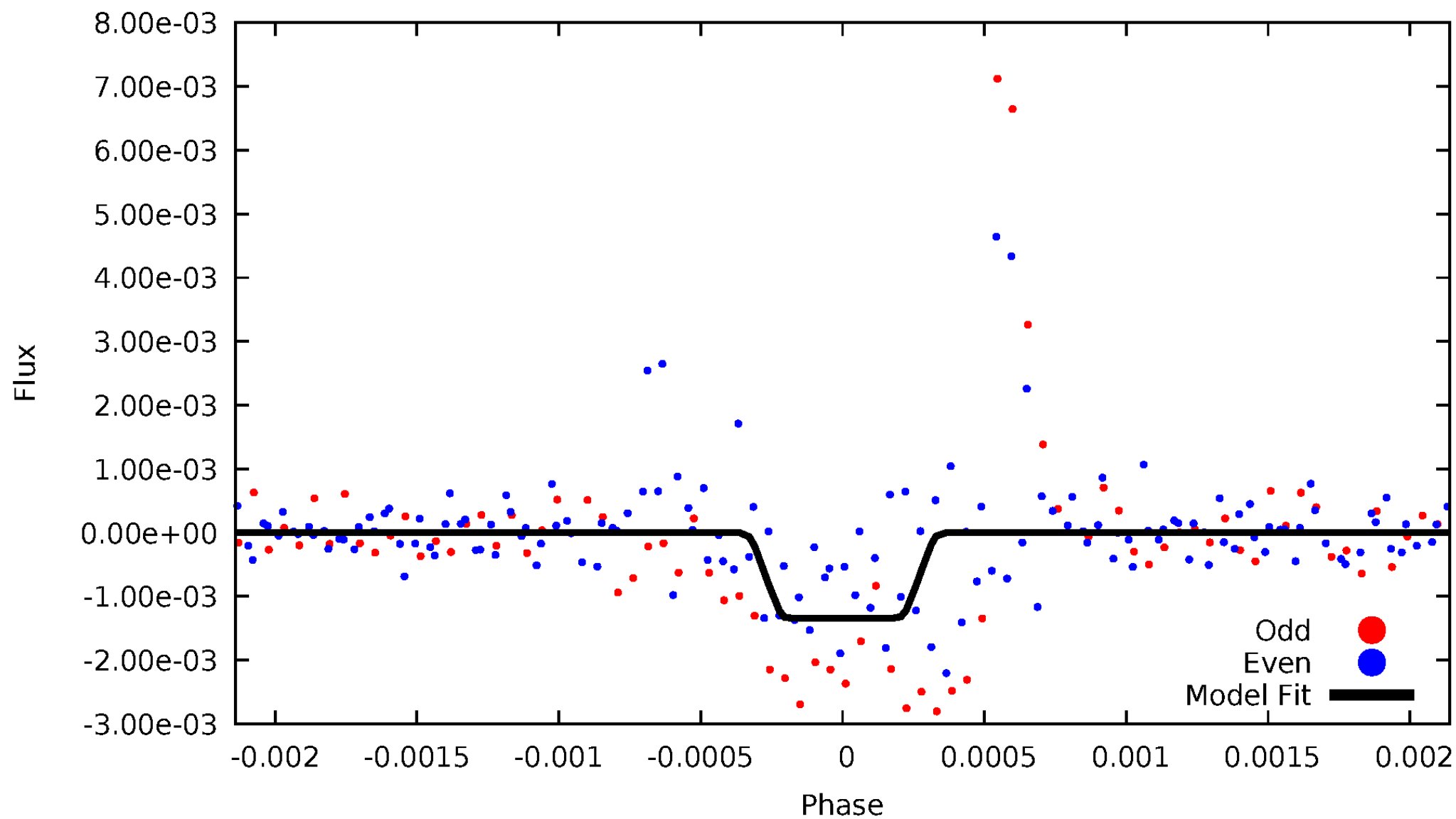
# DV Odd/Even

TCE 011859900-06



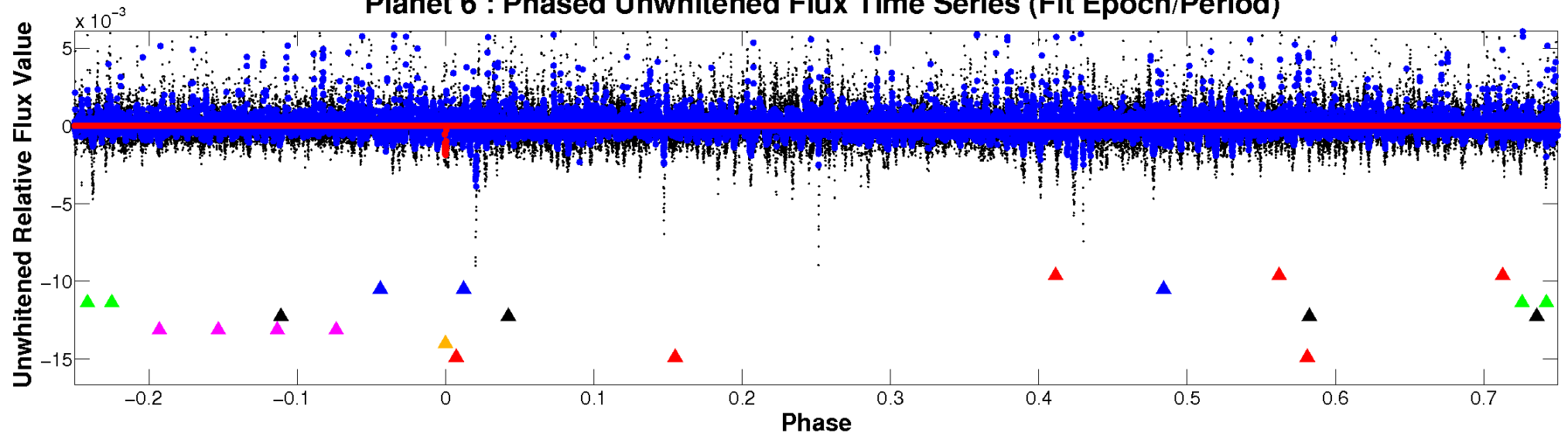
# ALT Odd/Even

TCE 011859900-06

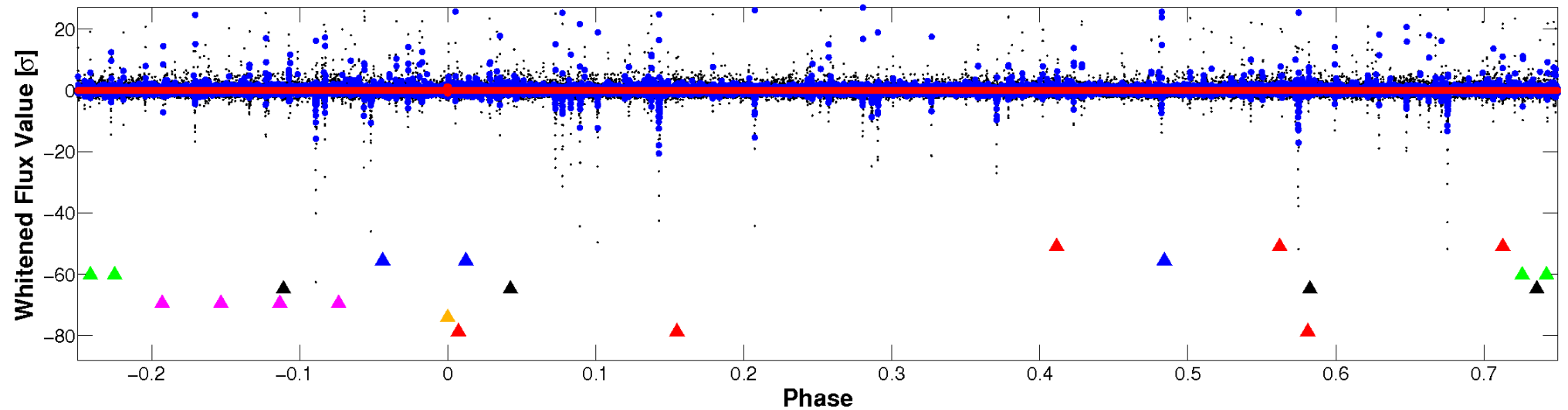


# Non-Whitened Vs. Whitened Light Curve

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

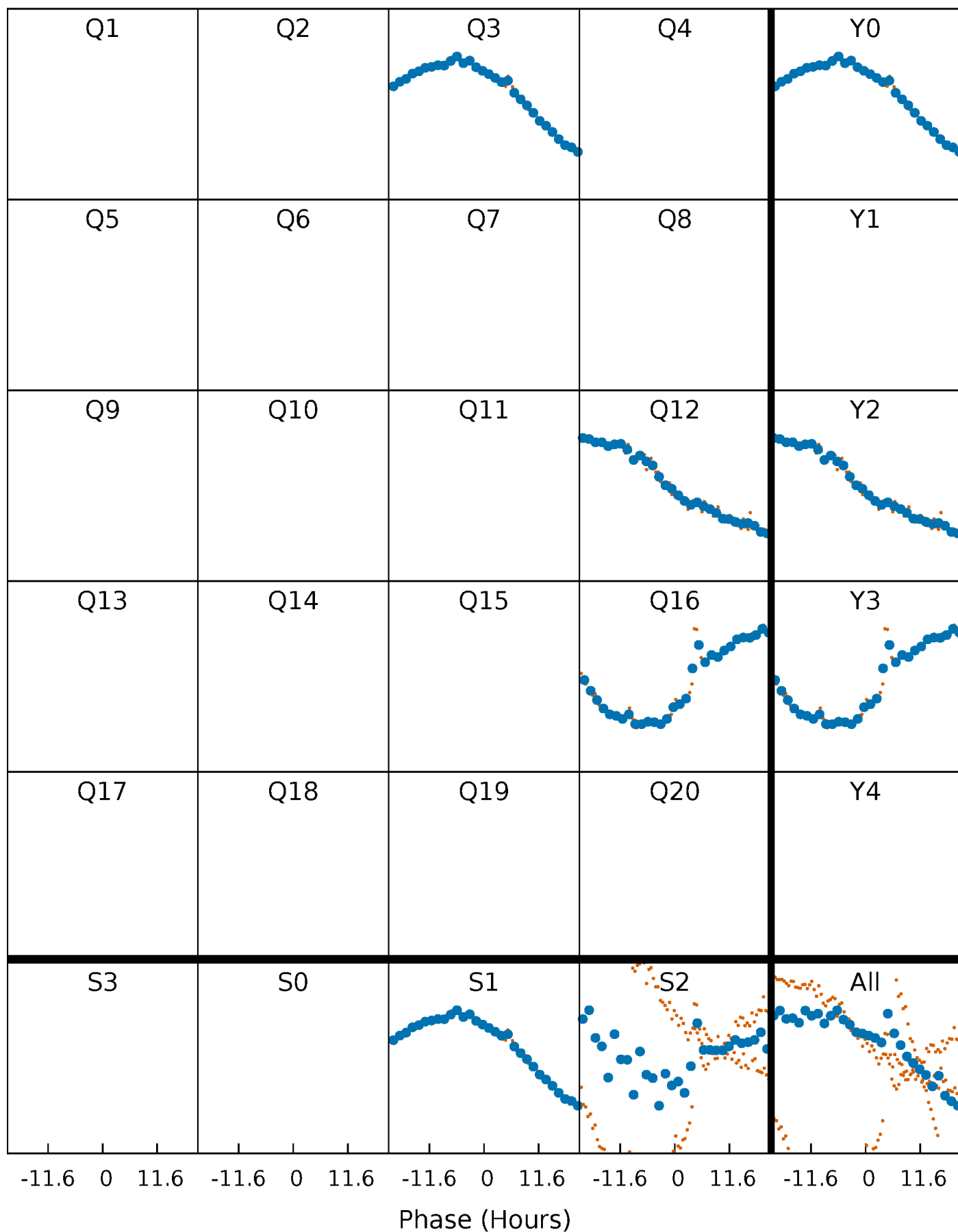


## Planet 6 : Phased Whitened Flux Time Series (Fit Epoch/Period)



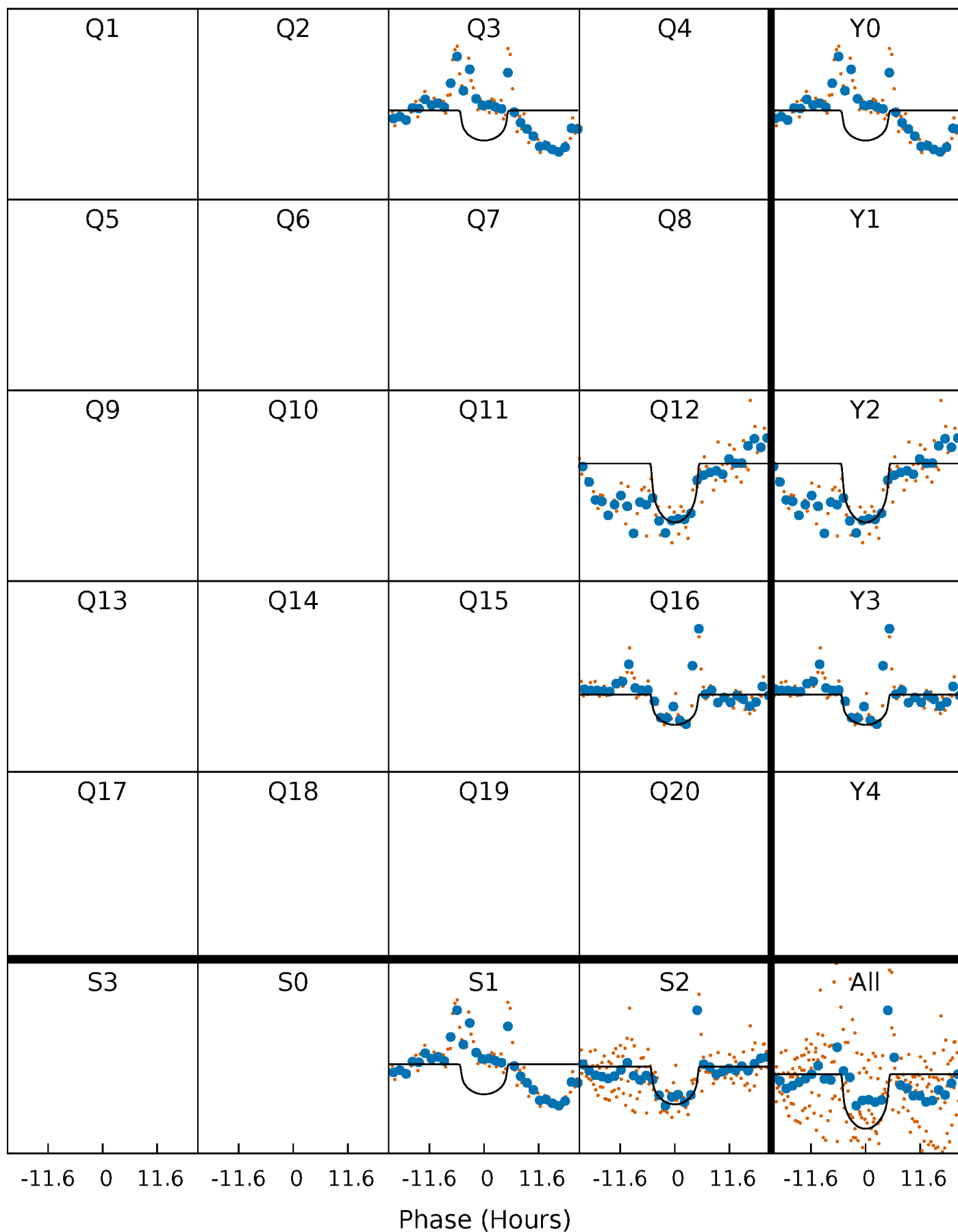
# PDC Quarter-Phased Transit Curves

TCE 011859900-06     $P=382.032729$  Days     $T_0=344.666605$  (BKJD)



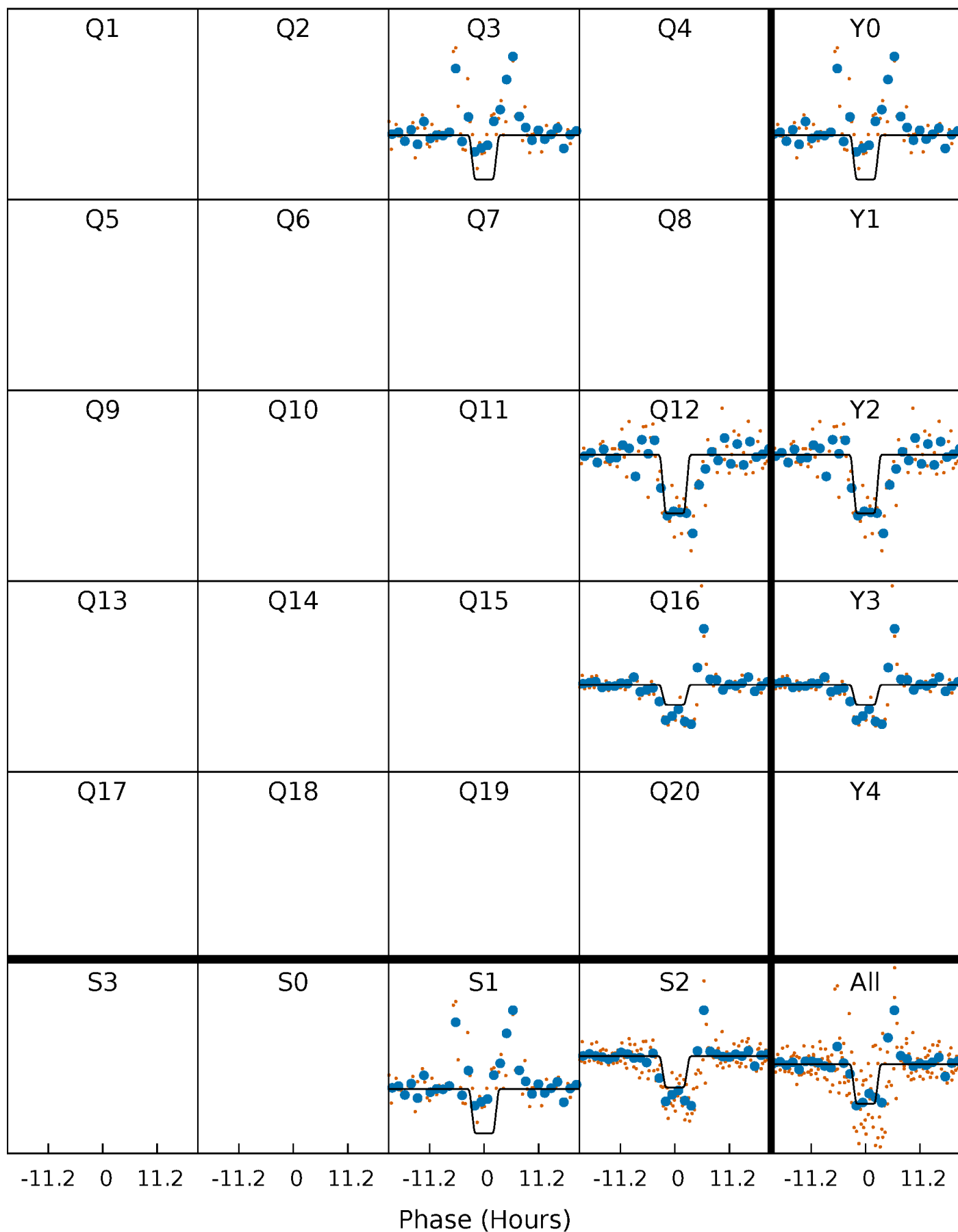
# DV Quarter-Phased Transit Curves

TCE 011859900-06     $P=382.032729$  Days     $T_0=344.666605$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

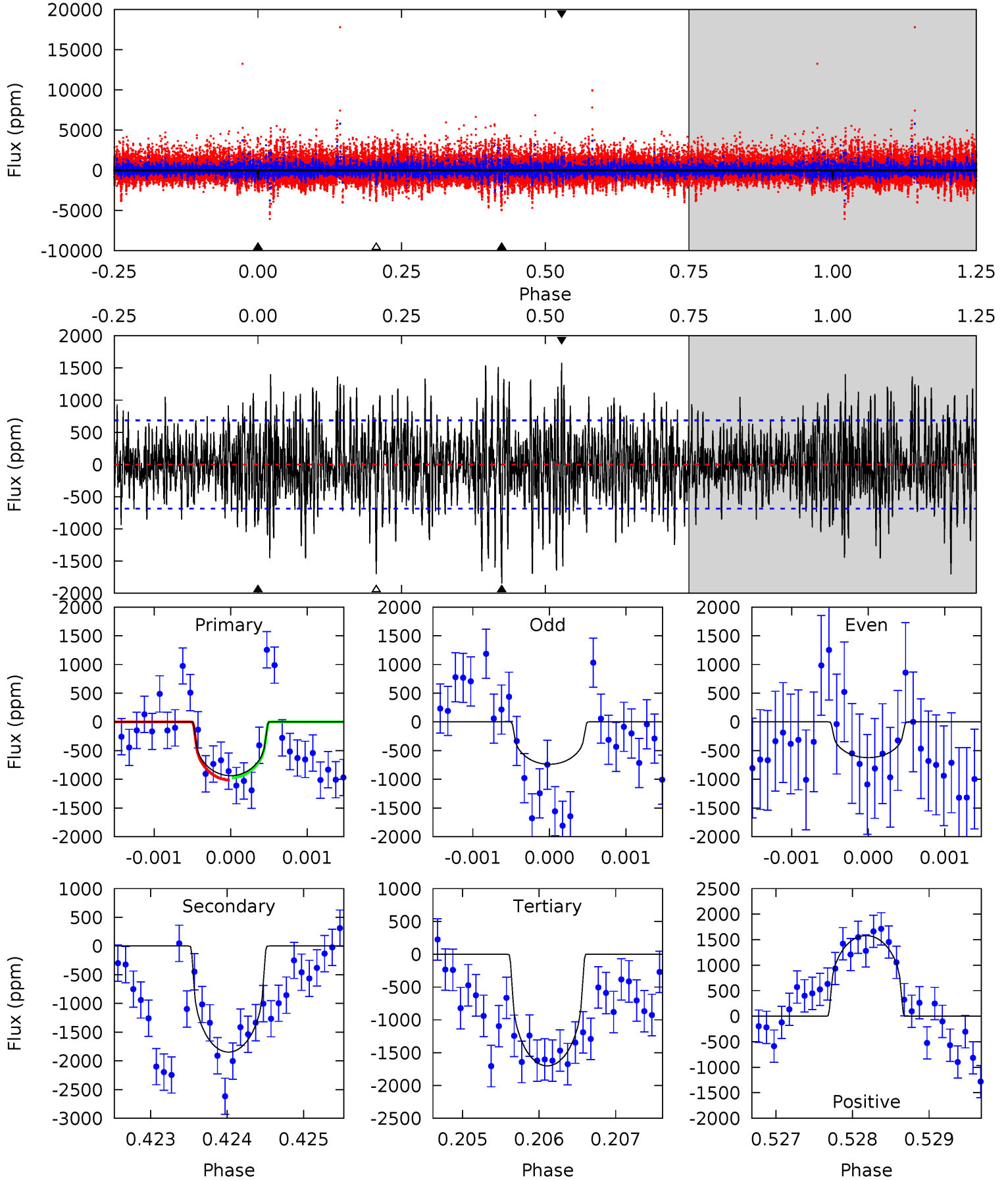
TCE 011859900-06 P=382.019027 Days  $T_0=344.671273$  (BKJD)



# DV Model-Shift Uniqueness Test

011859900-06,  $P = 382.032729$  Days,  $E = 344.666605$  Days

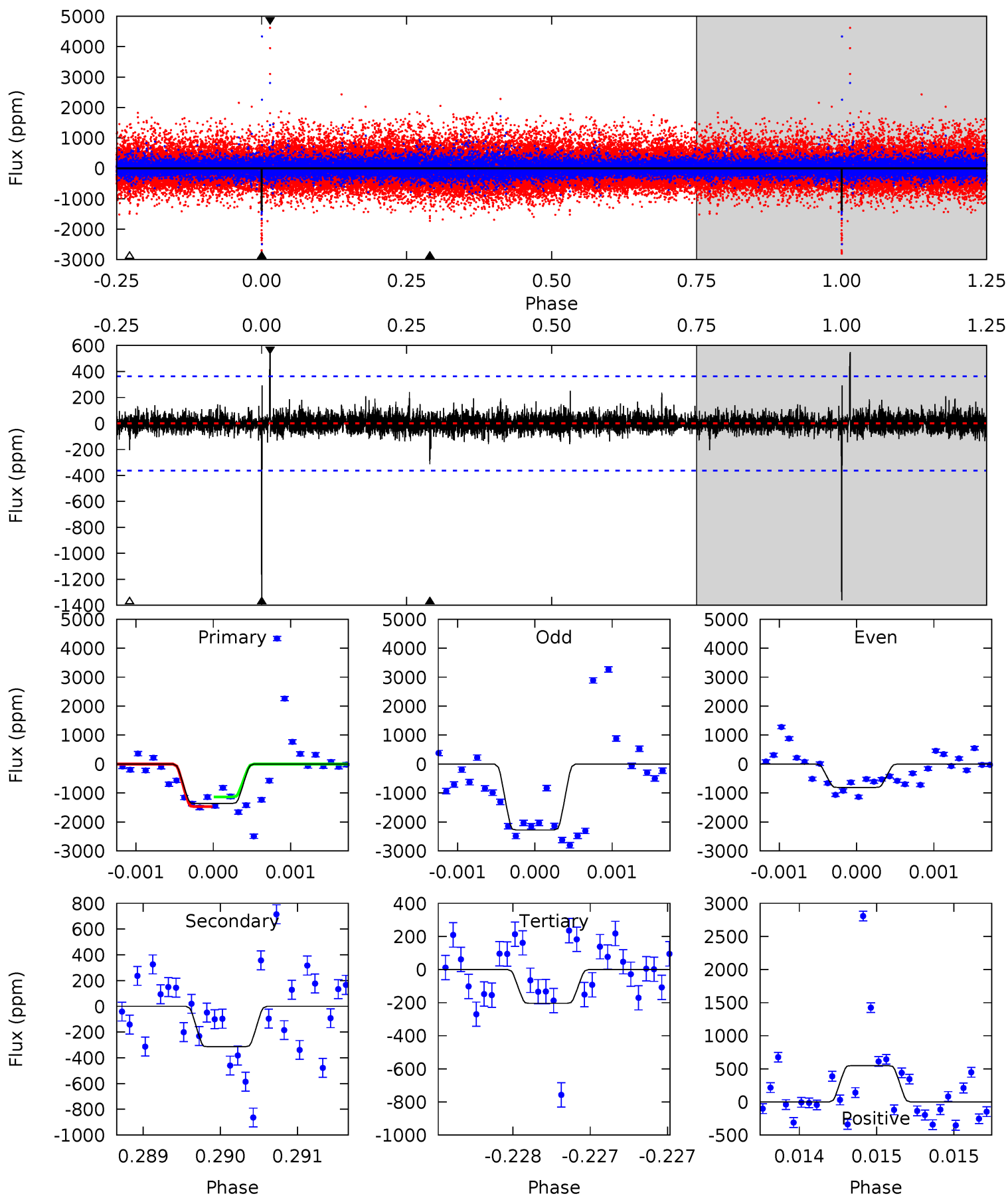
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.43	14.7	13.5	12.5	5.43	3.25	3.67	-6.06	-5.10	1.16	2.13	0.38	0.89	0.46	0.16



# Alt Model-Shift Uniqueness Test

011859900-06, P = 382.019027 Days, E = 344.671273 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
20.7	4.77	3.10	8.33	5.52	3.39	0.67	17.6	12.4	1.67	-3.56	10.7	0.92	0.29	2.57





### Stellar Parameters For KIC 011859900

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4247^{+116}_{-142}$	$4.607^{+0.052}_{-0.017}$	$0.180^{+0.200}_{-0.300}$	$0.673^{+0.024}_{-0.061}$	$0.668^{+0.047}_{-0.052}$	$3.085^{+0.708}_{-0.205}$
	+3%/-3%	+1%/-0%	+111%/-167%	+4%/-9%	+7%/-8%	+23%/-7%
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 011859900-06 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-1847 \pm 126$	$2.77^{+1.56}_{-1.43}$	$225^{+8}_{-8}$	$4402^{+1730}_{-625}$	$107758^{+344055}_{-63105}$
Alt.	$-314 \pm 66$	$2.78^{+1.52}_{-1.56}$	$225^{+7}_{-8}$	$3285^{+1034}_{-418}$	$18380^{+70911}_{-11249}$

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

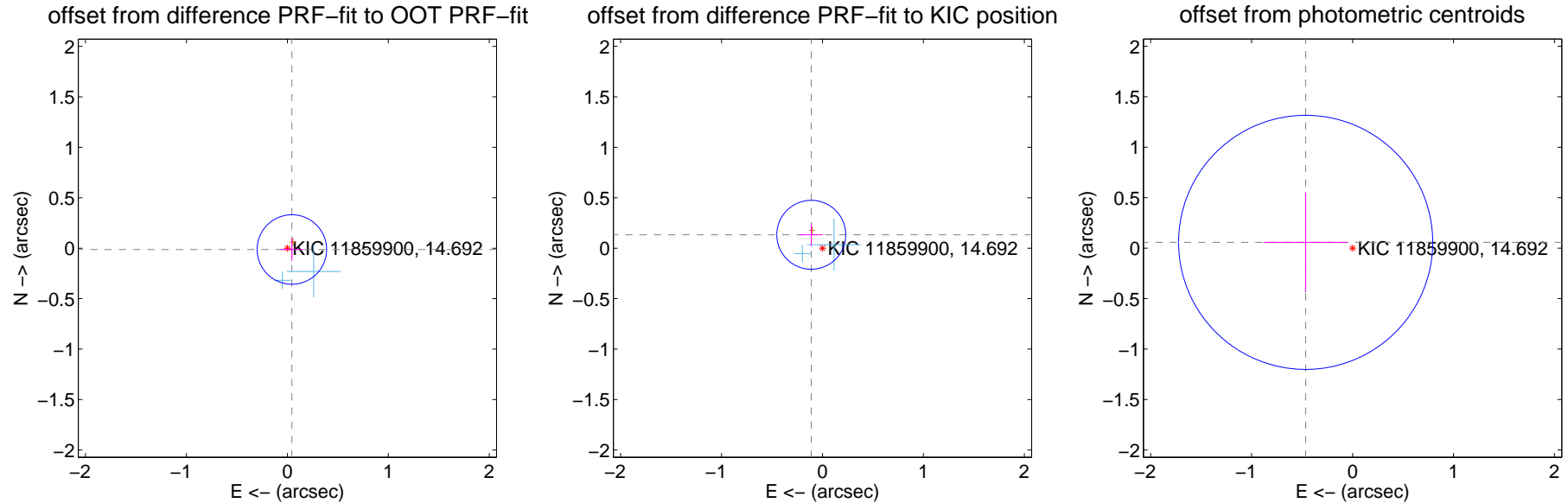
## DV Centroid Data

Supplemental centroid analysis for 011859900-06. Kepler magnitude: 14.69. Transit SNR 7.60

There are 2 quarters with good PRF difference image offsets

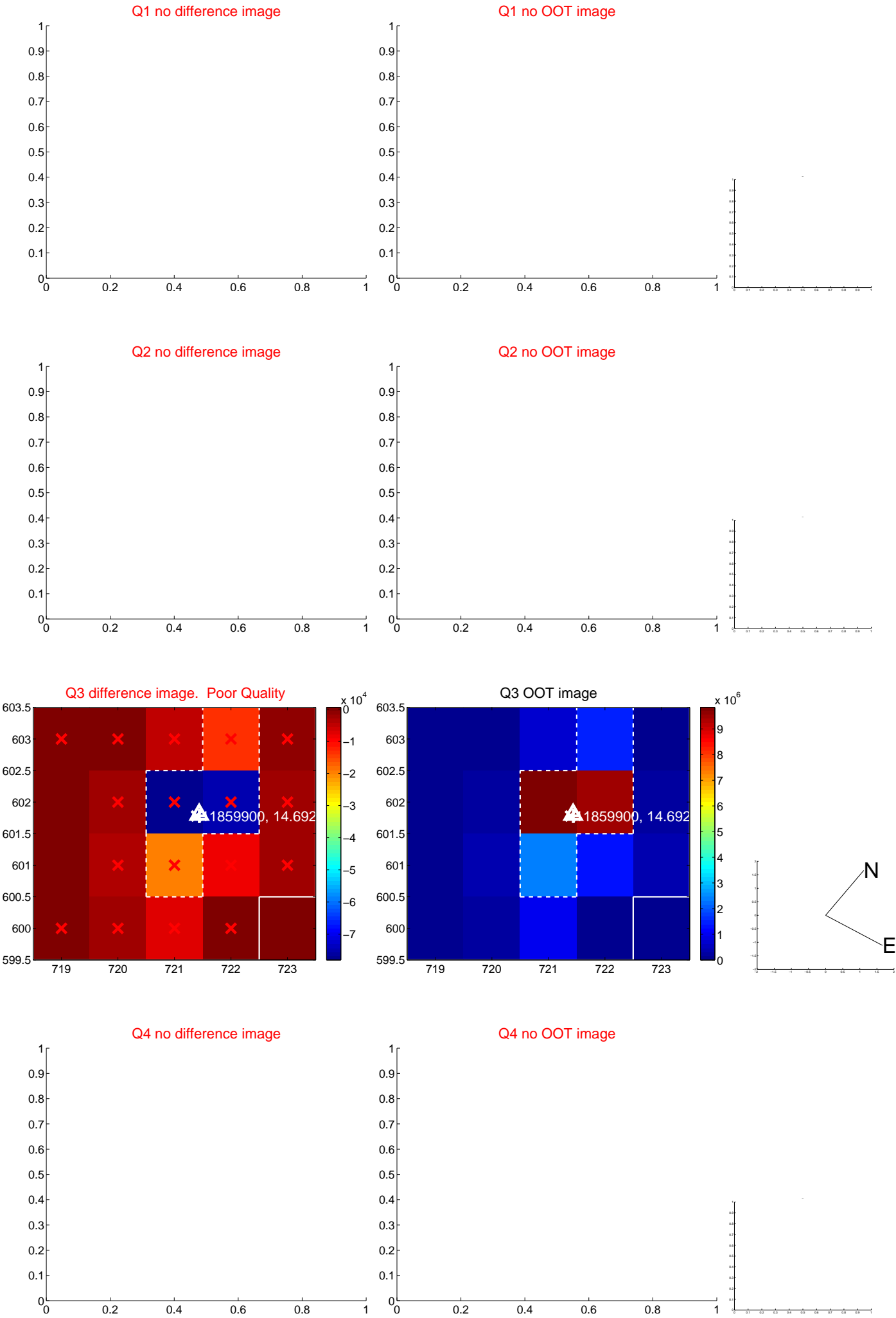
The direct PRF centroid is offset from the target star catalog position by about 0.30 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.046 \pm 0.115$	0.40	$-0.045 \pm 0.115$	$-0.013 \pm 0.113$
PRF-fit source offset from KIC position	$0.173 \pm 0.114$	1.52	$0.111 \pm 0.115$	$0.133 \pm 0.113$
photometric centroid source offset	$0.47 \pm 0.42$	1.12	$0.46 \pm 0.42$	$0.06 \pm 0.49$

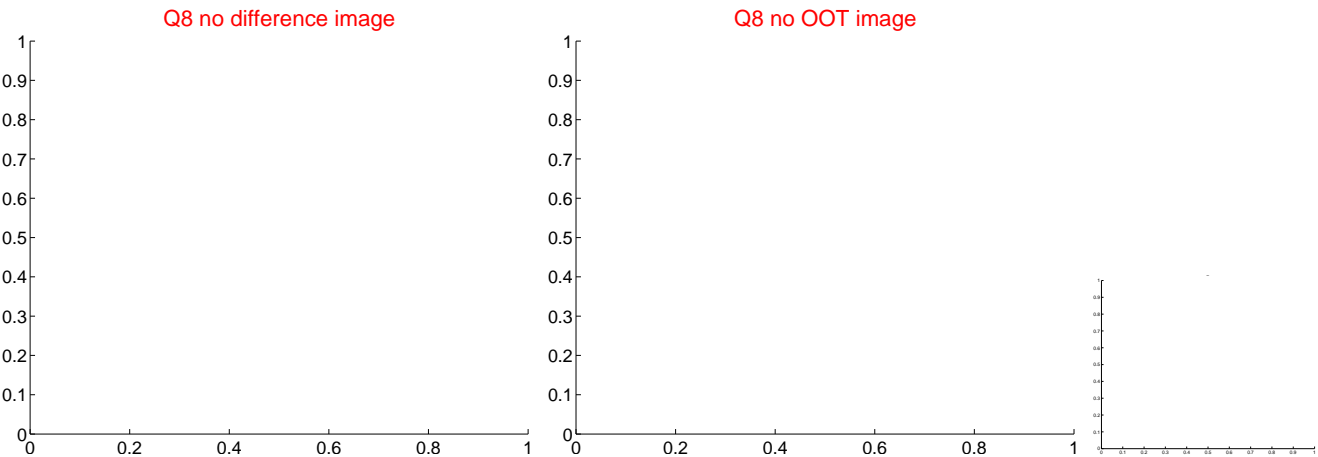
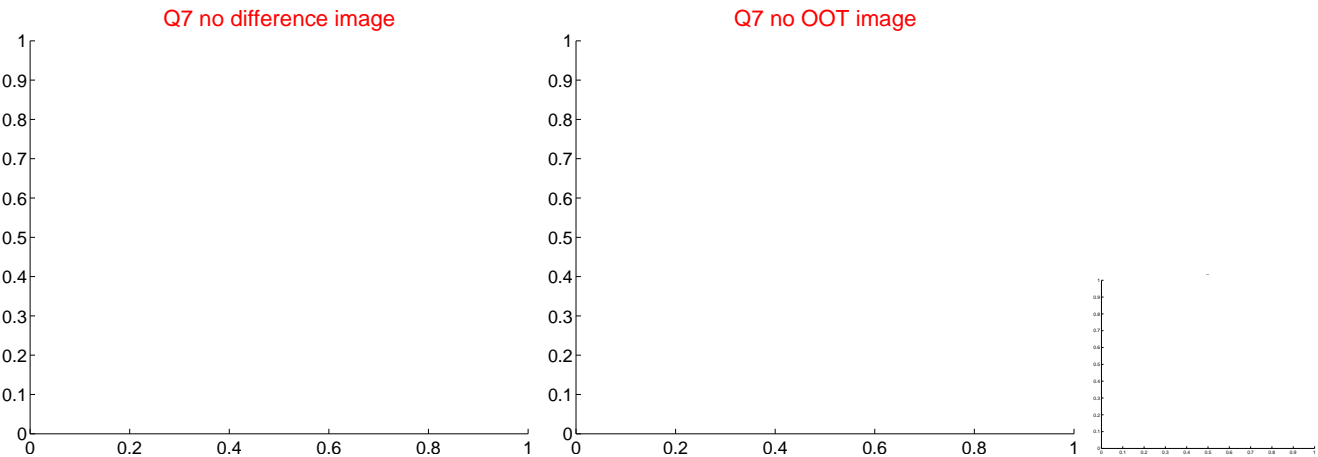
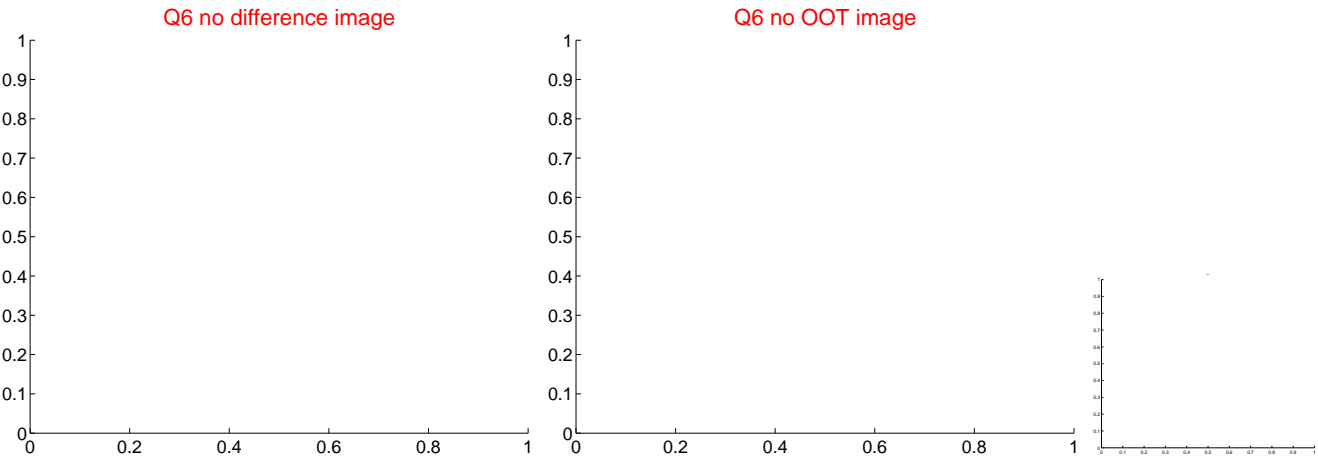
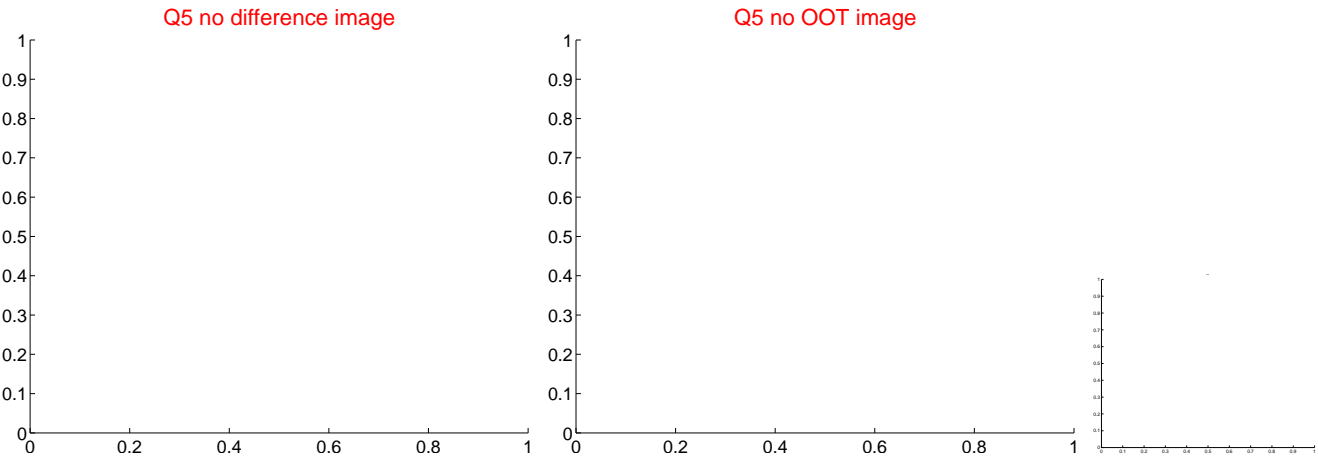


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

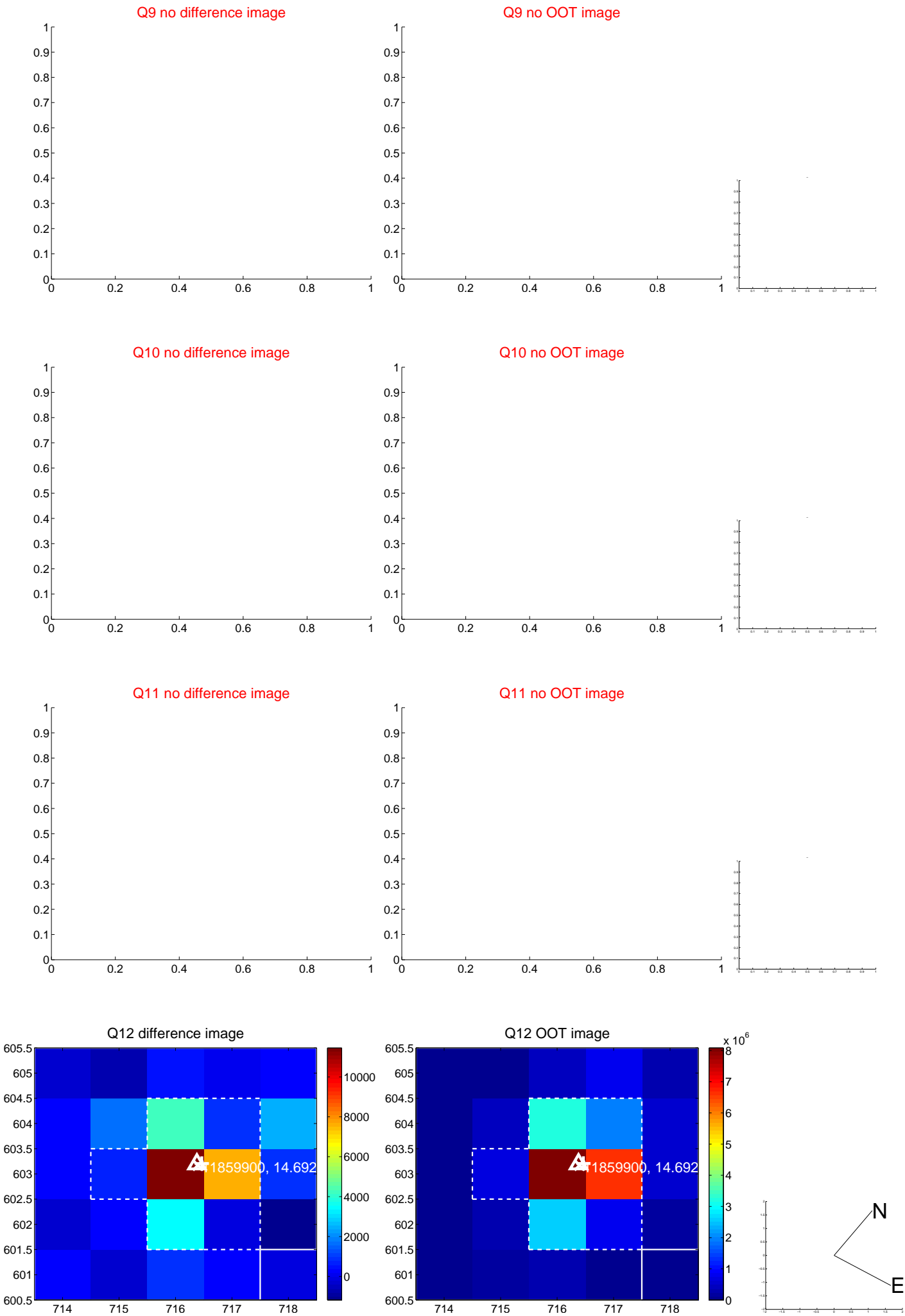
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



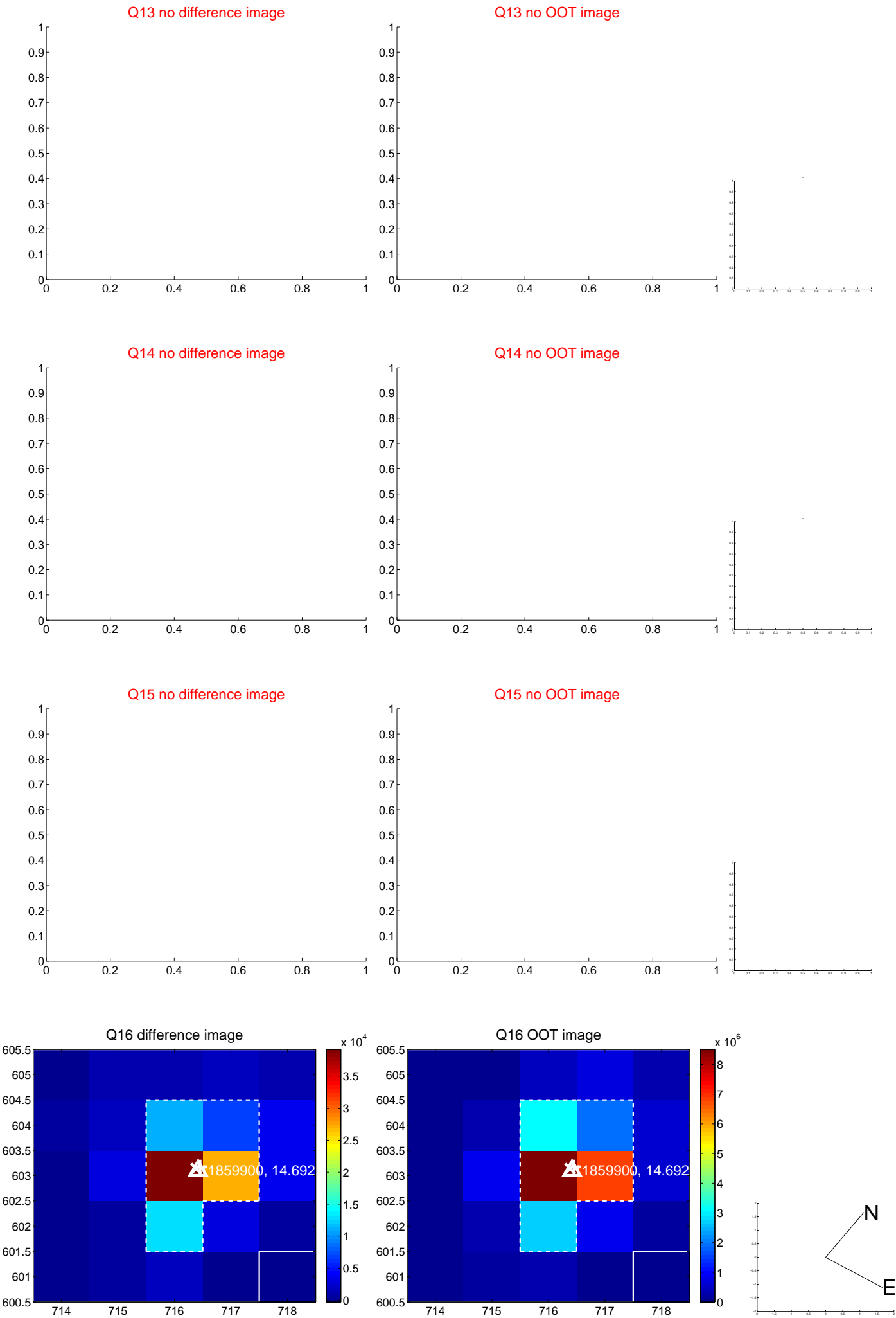
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



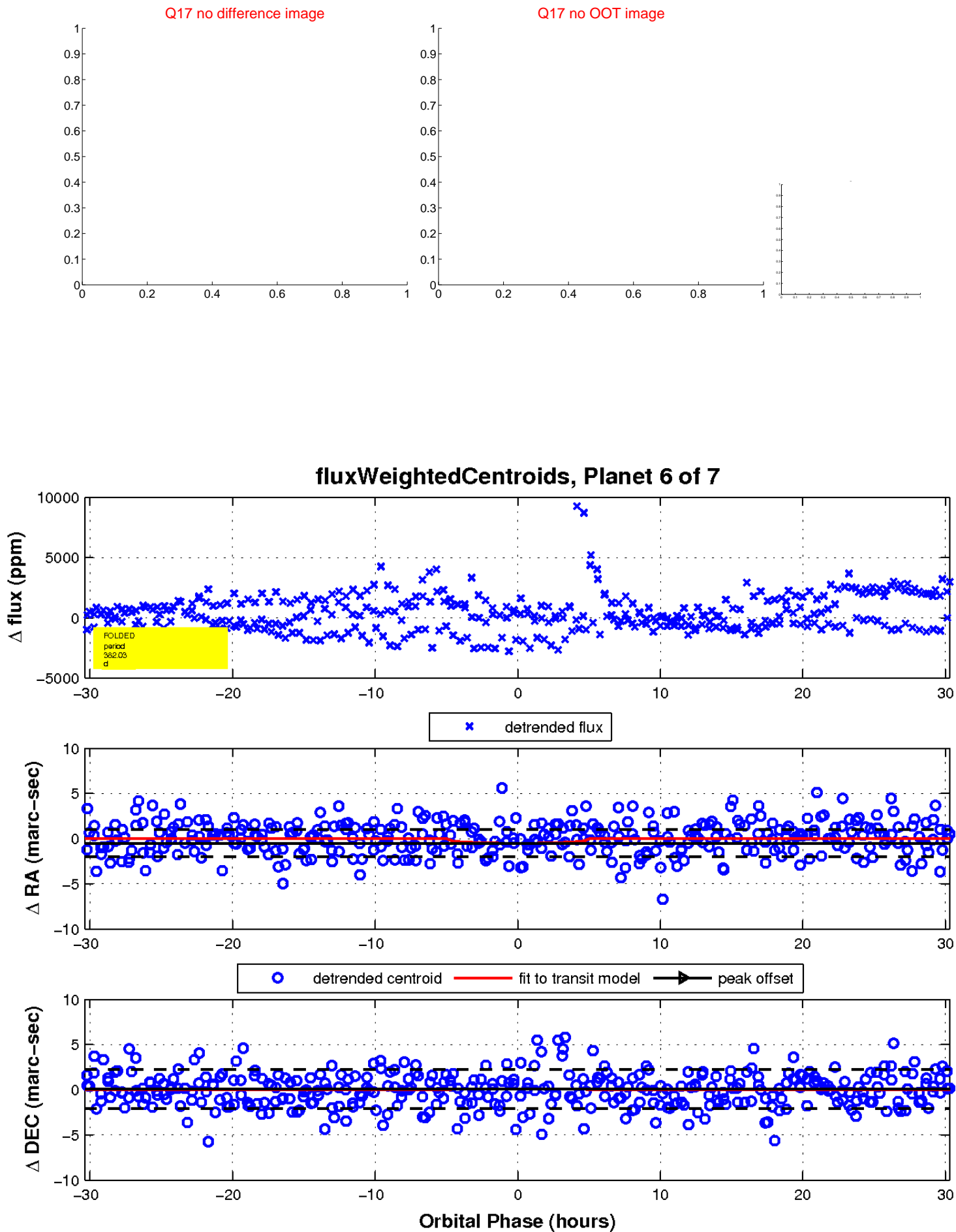
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



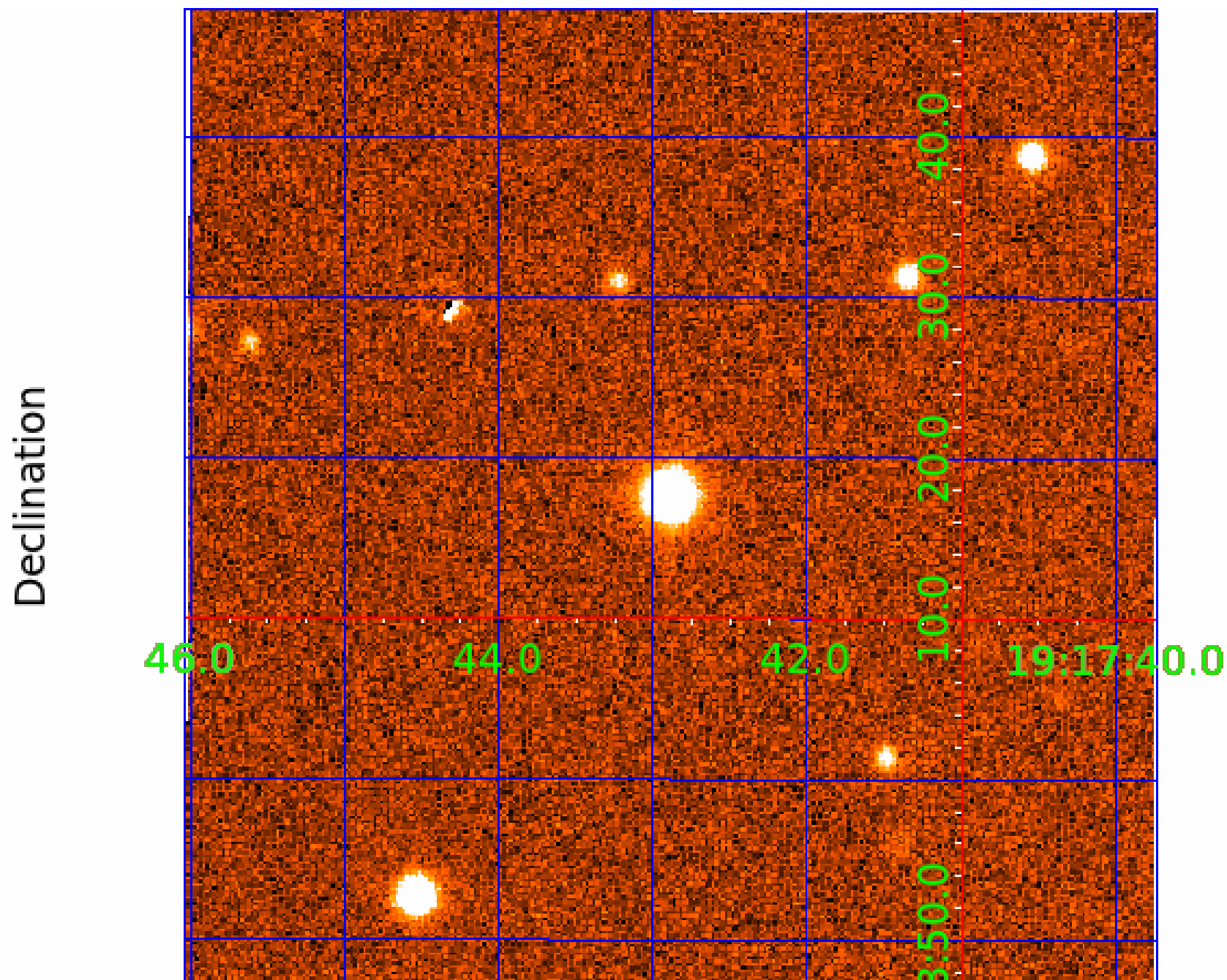
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image





# KIC 011859900

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
011859900-01	OBS	No	439.604995	501.827165	2033.7	3.792	16.8	8.4	0.67	4247	2.98	0.14
011859900-02	OBS	No	583.779998	327.887722	1009.5	12.000	14.8	-1.0	0.67	4247	2.04	0.09
011859900-03	OBS	No	375.779063	258.711135	1758.8	3.561	15.1	7.8	0.67	4247	2.88	0.17
011859900-04	OBS	No	440.597899	185.157716	3438.7	30.528	13.3	7.9	0.67	4247	5.03	0.13
011859900-05	OBS	No	397.217150	270.968371	1380.9	5.642	12.3	7.1	0.67	4247	2.64	0.15
011859900-06	OBS	No	382.032729	344.666605	1876.8	10.133	13.3	7.6	0.67	4247	2.77	0.16
011859900-07	OBS	No	601.243881	347.442639	1036.0	12.000	16.0	-1.0	0.67	4247	2.06	0.09

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
011859900-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011859900-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_NOFITS
011859900-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_POS_DV
011859900-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011859900-05	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—CENT_FEW_DIFFS
011859900-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
011859900-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—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.

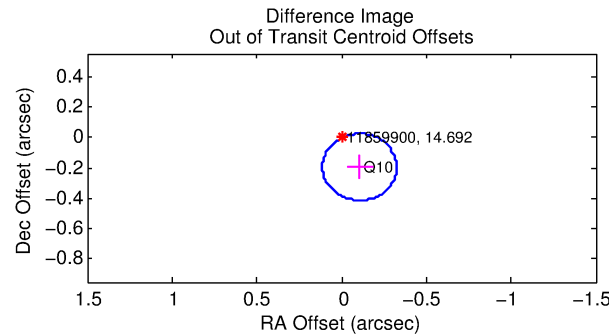
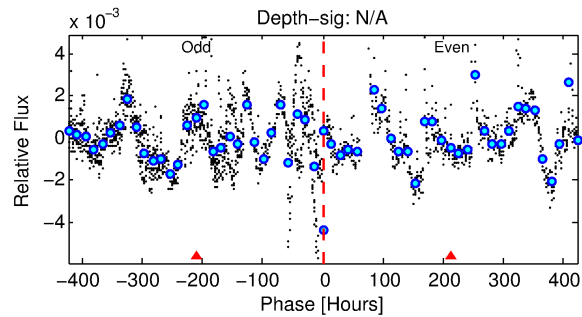
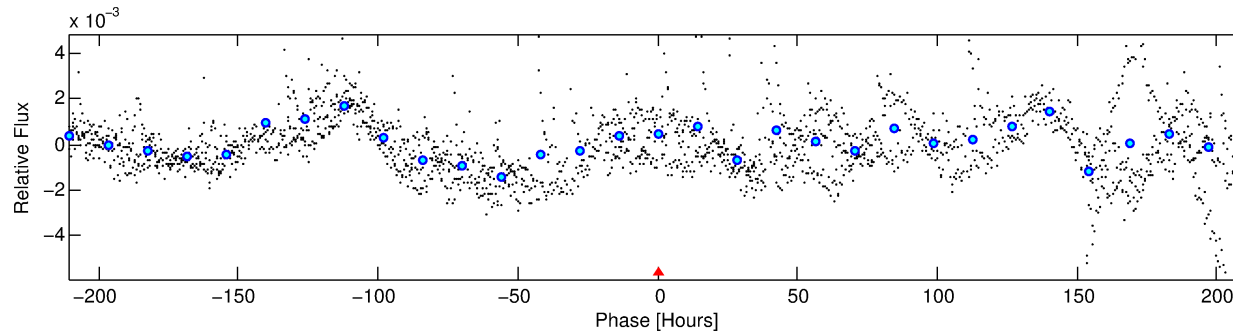
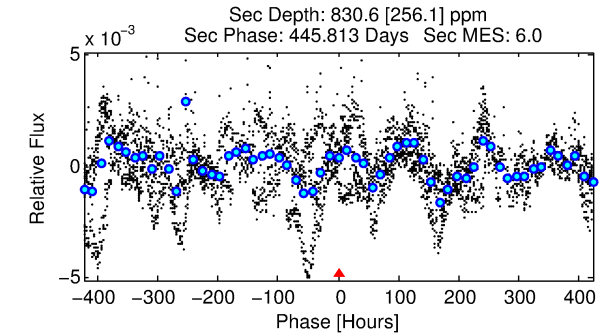
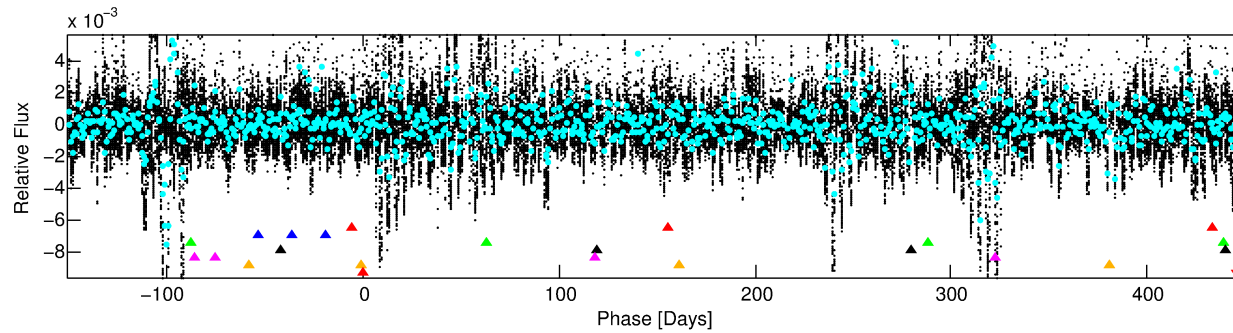
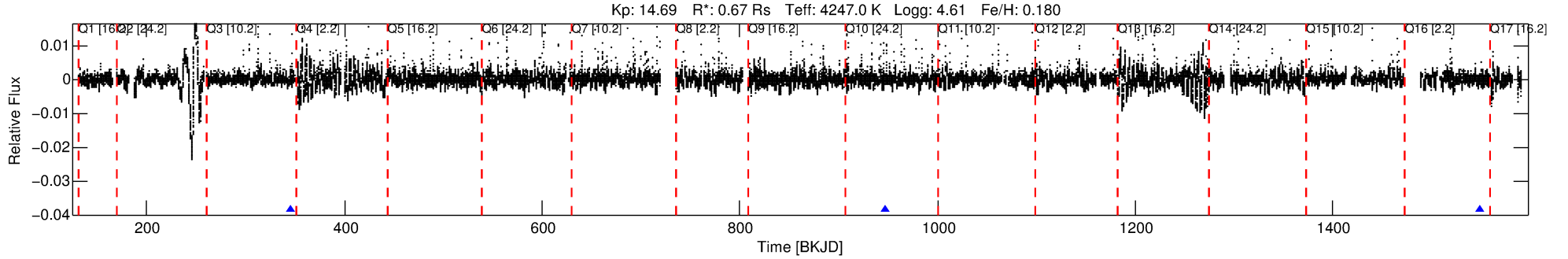
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 011859900-07

No Significant Match Found

# DV One-Page Summary

KIC: 11859900 Candidate: 7 of 7 Period: 601.244 d



## TPS TCE Results:

Period = 601.24388 d  
Epoch = 347.4426 BKJD

DV fit results are unavailable

## DV Diagnostic Results:

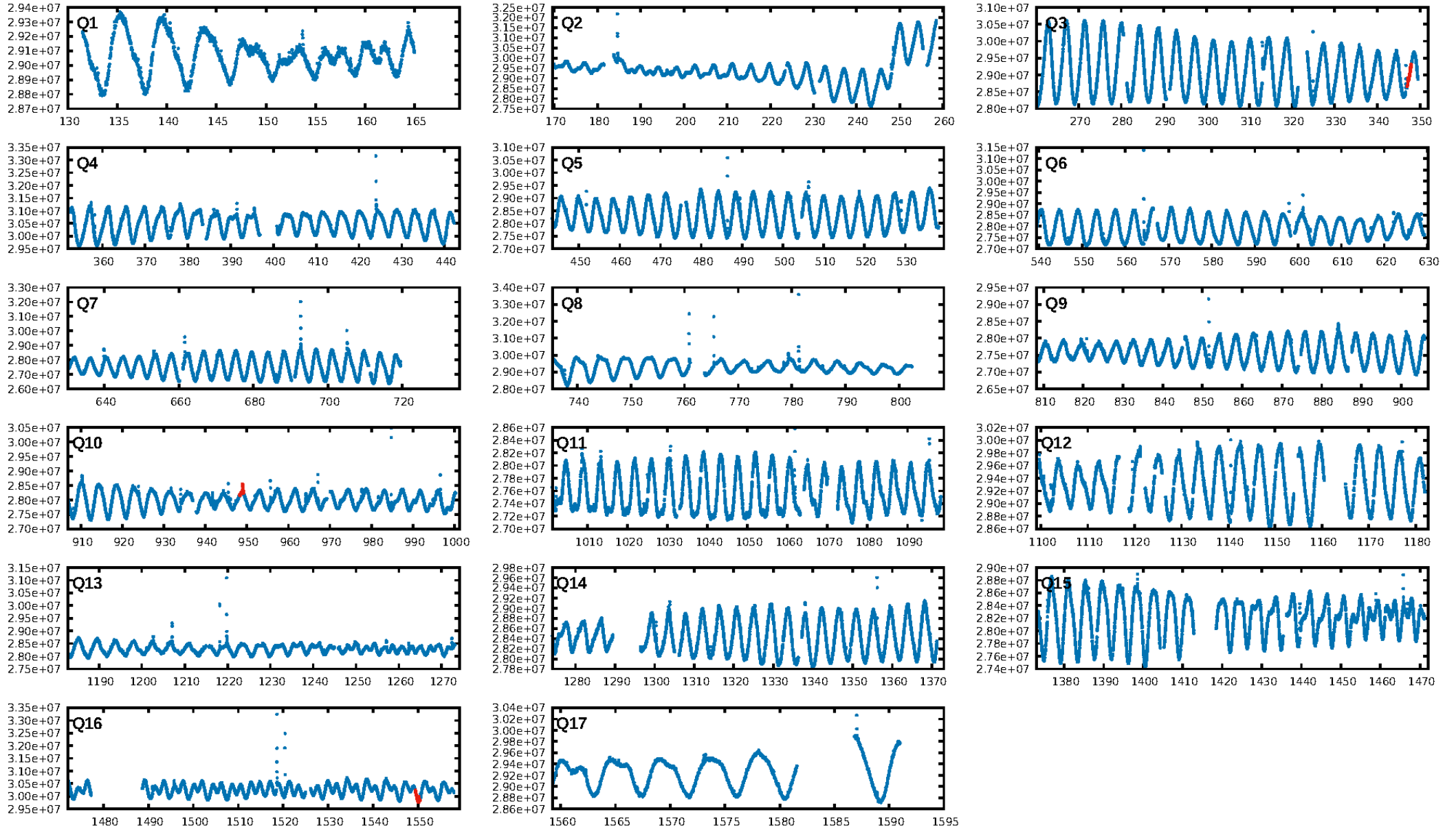
ShortPeriod-sig: 100.0% [24.70σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 6.92e-15  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: -0.4358

Centroid-sig: 99.1%  
Centroid-so: 0.262 arcsec [0.58σ]  
OotOffset-rm: 0.222 arcsec [3.04σ]  
KicOffset-rm: 0.078 arcsec [1.08σ]  
OotOffset-st: 1/0/0/0 [1]  
KicOffset-st: 1/0/0/0 [1]  
DiffImageQuality-fgm: 1.00 [1/1]  
DiffImageOverlap-fno: 1.00 [1/1]

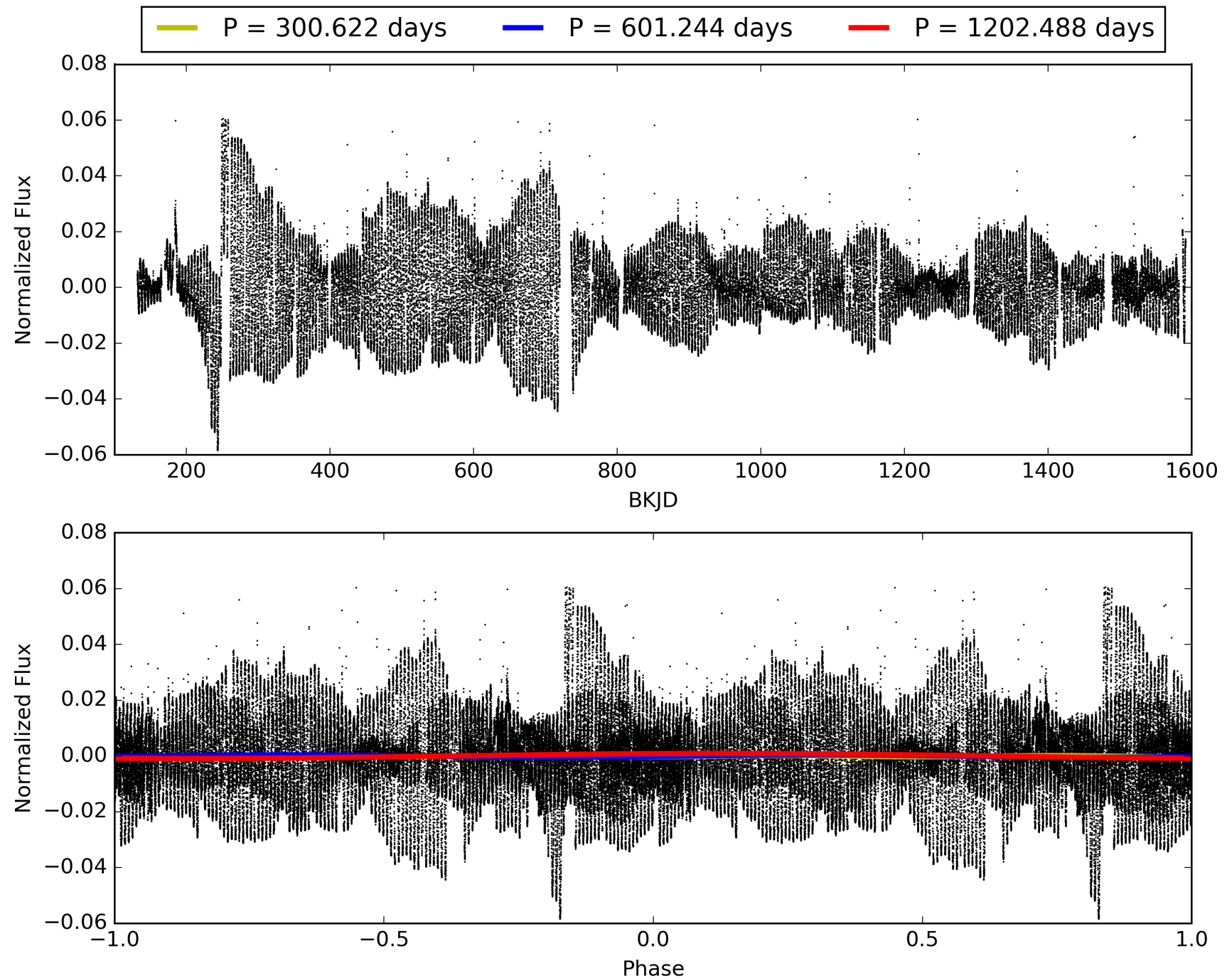
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 05:39:50 Z

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

# TCE 011859900-07, PDC Light Curves

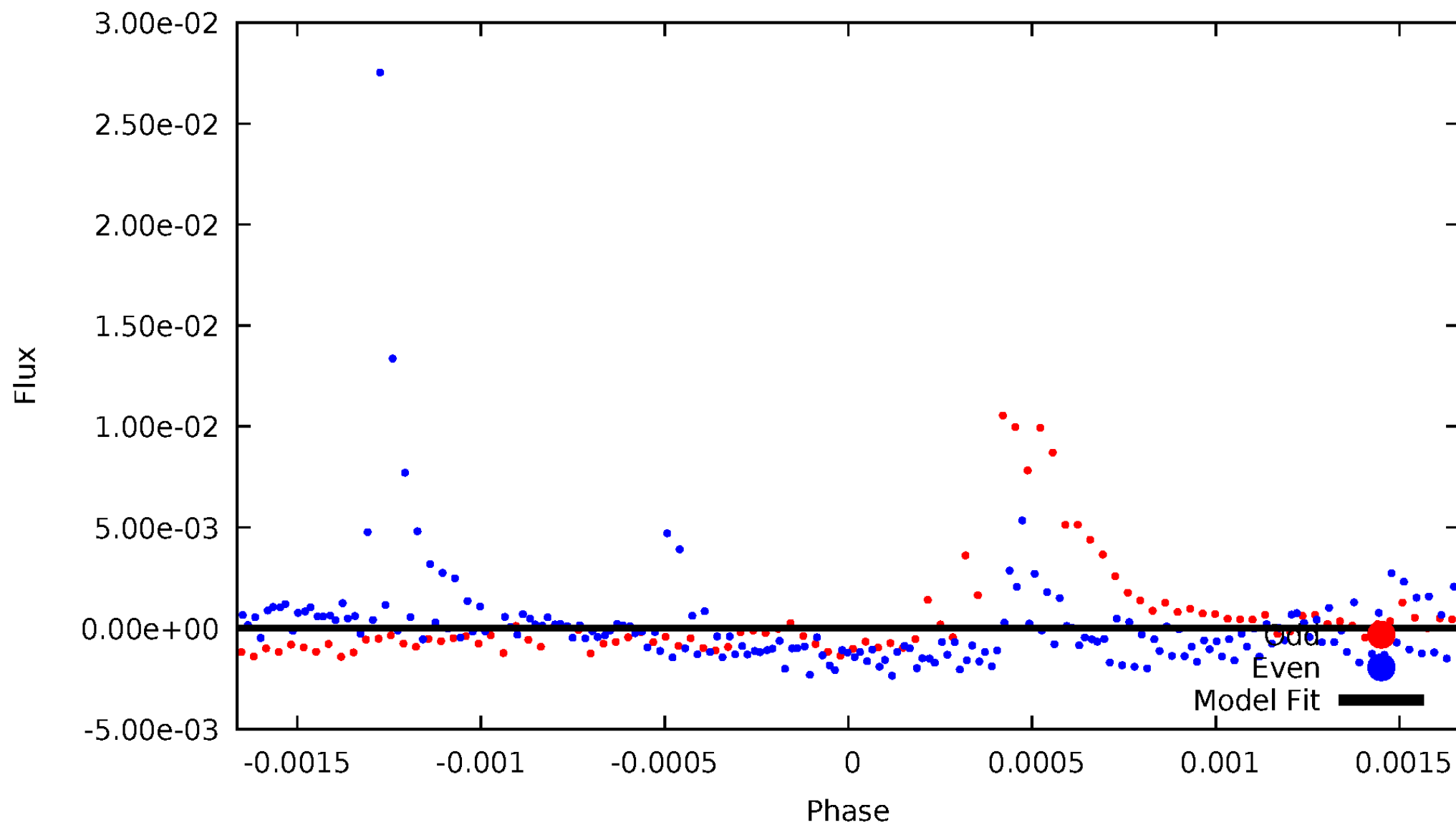


# TCE 011859900-07



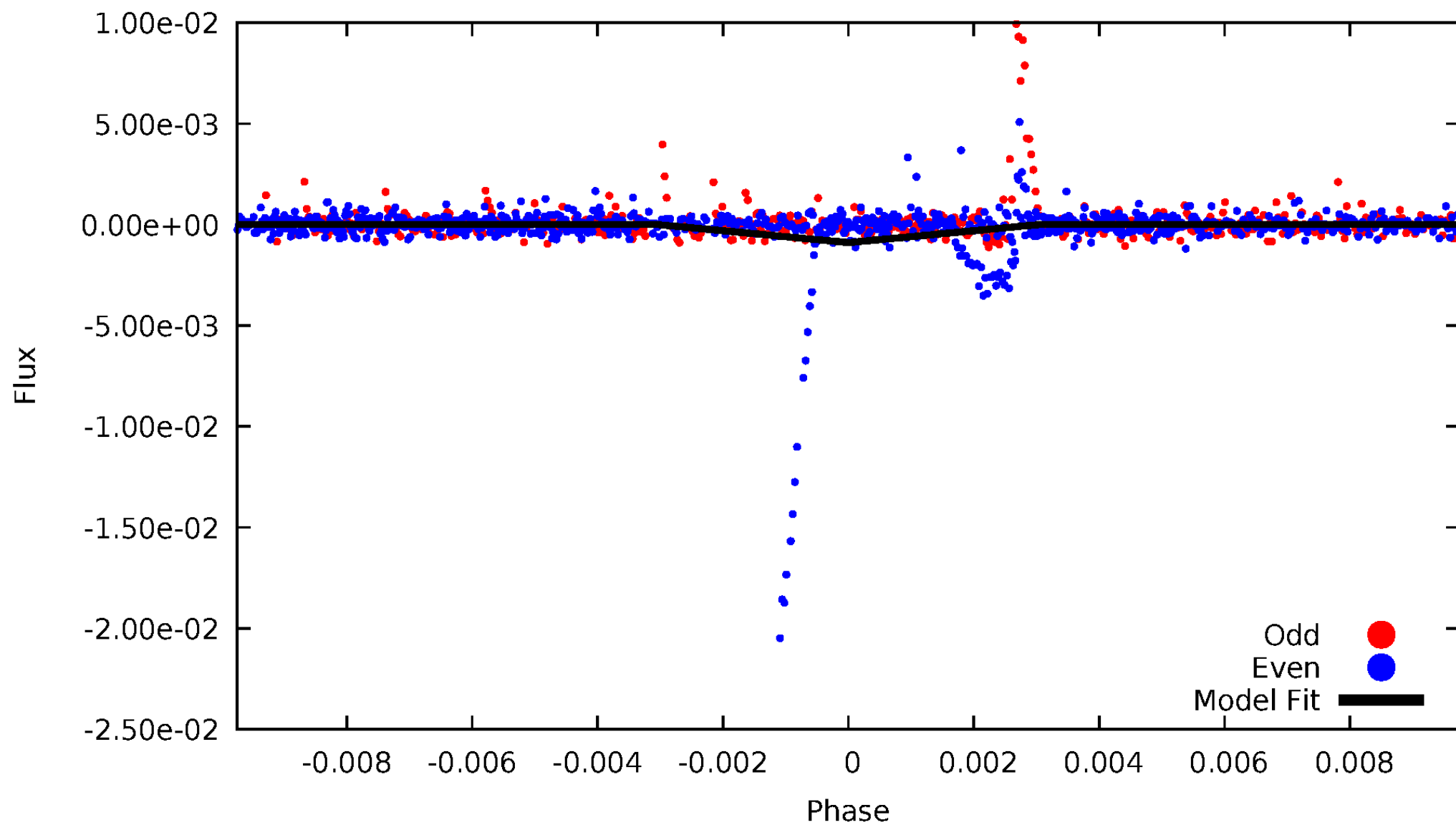
# DV Odd/Even

TCE 011859900-07

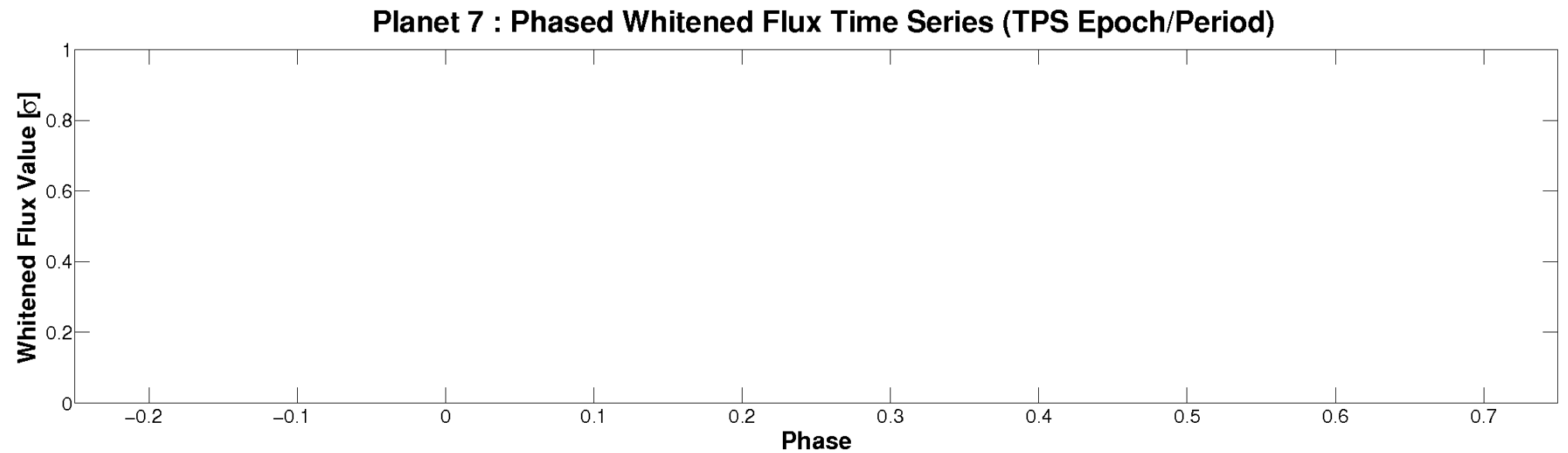
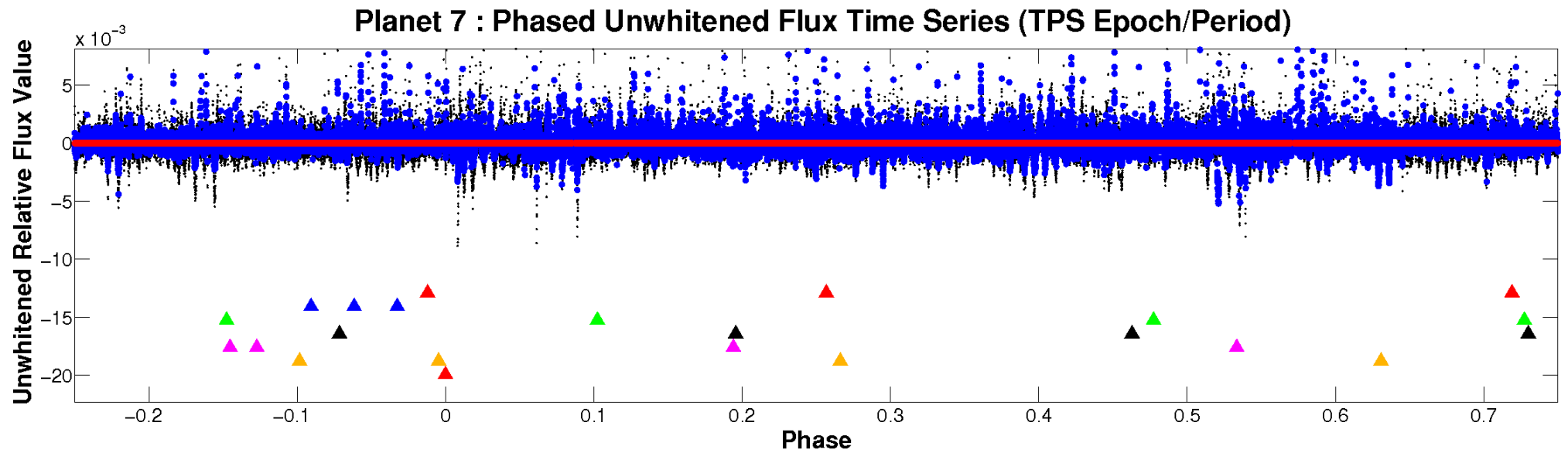


# ALT Odd/Even

TCE 011859900-07

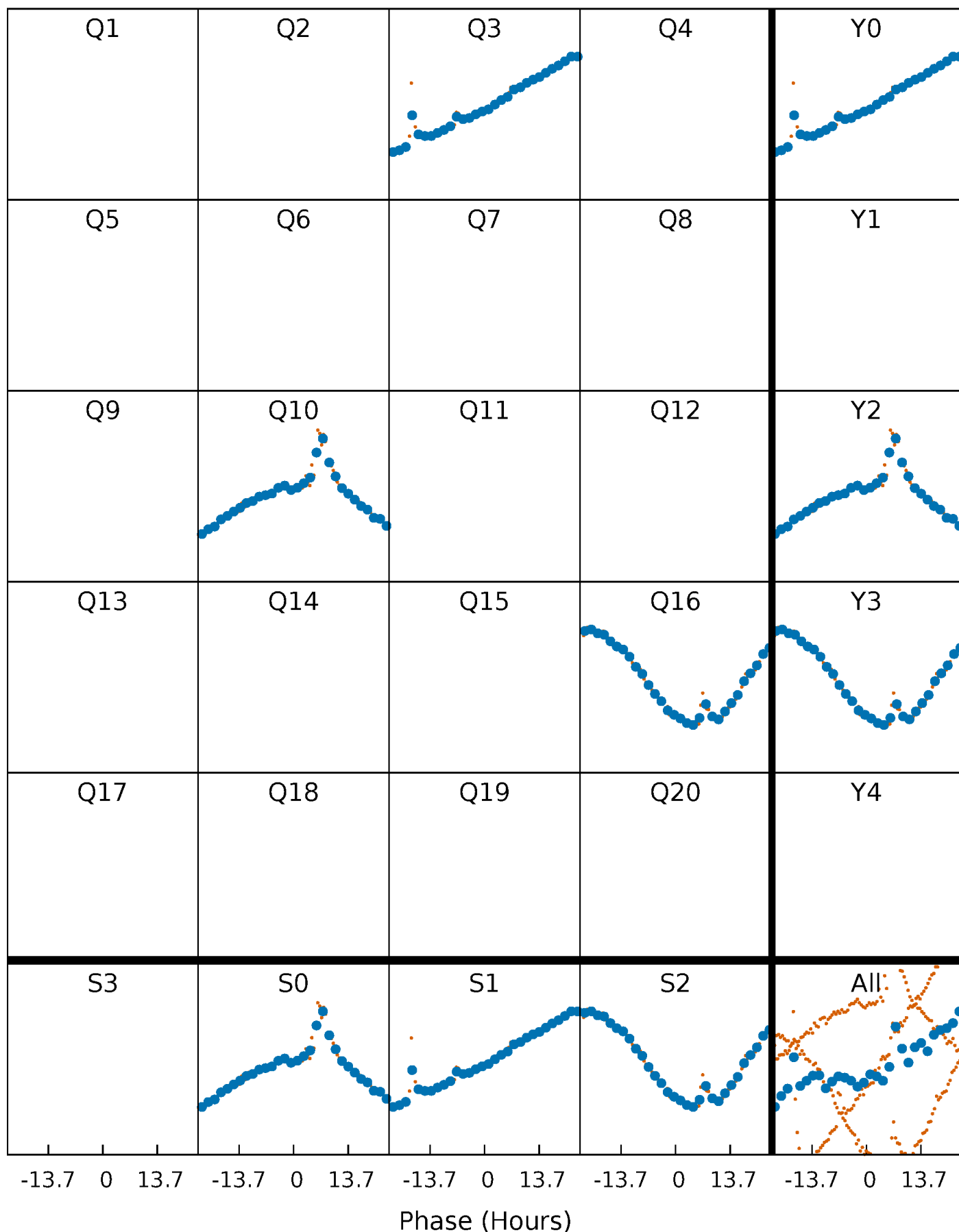


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

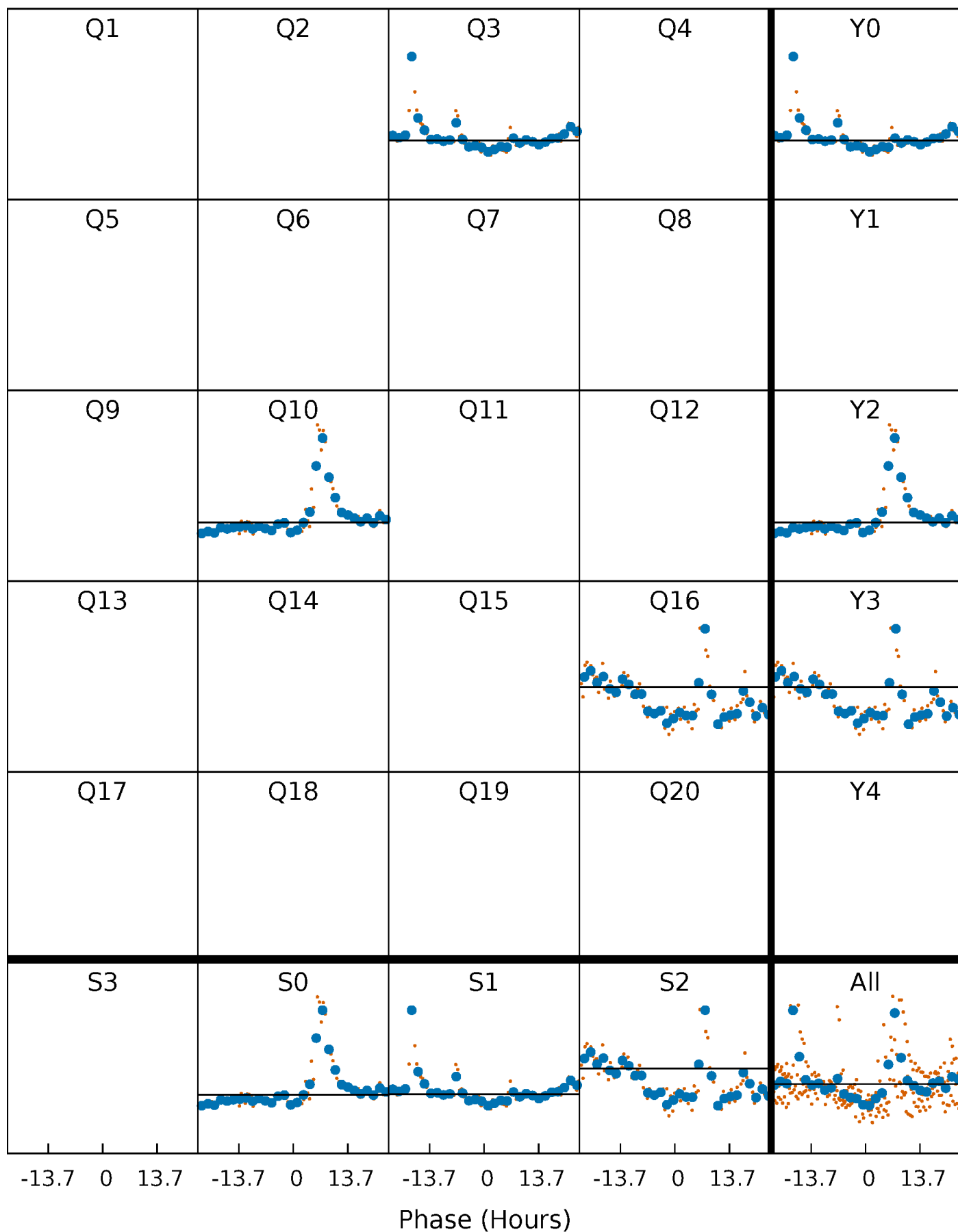
TCE 011859900-07 P=601.243881 Days  $T_0=347.442639$  (BKJD)





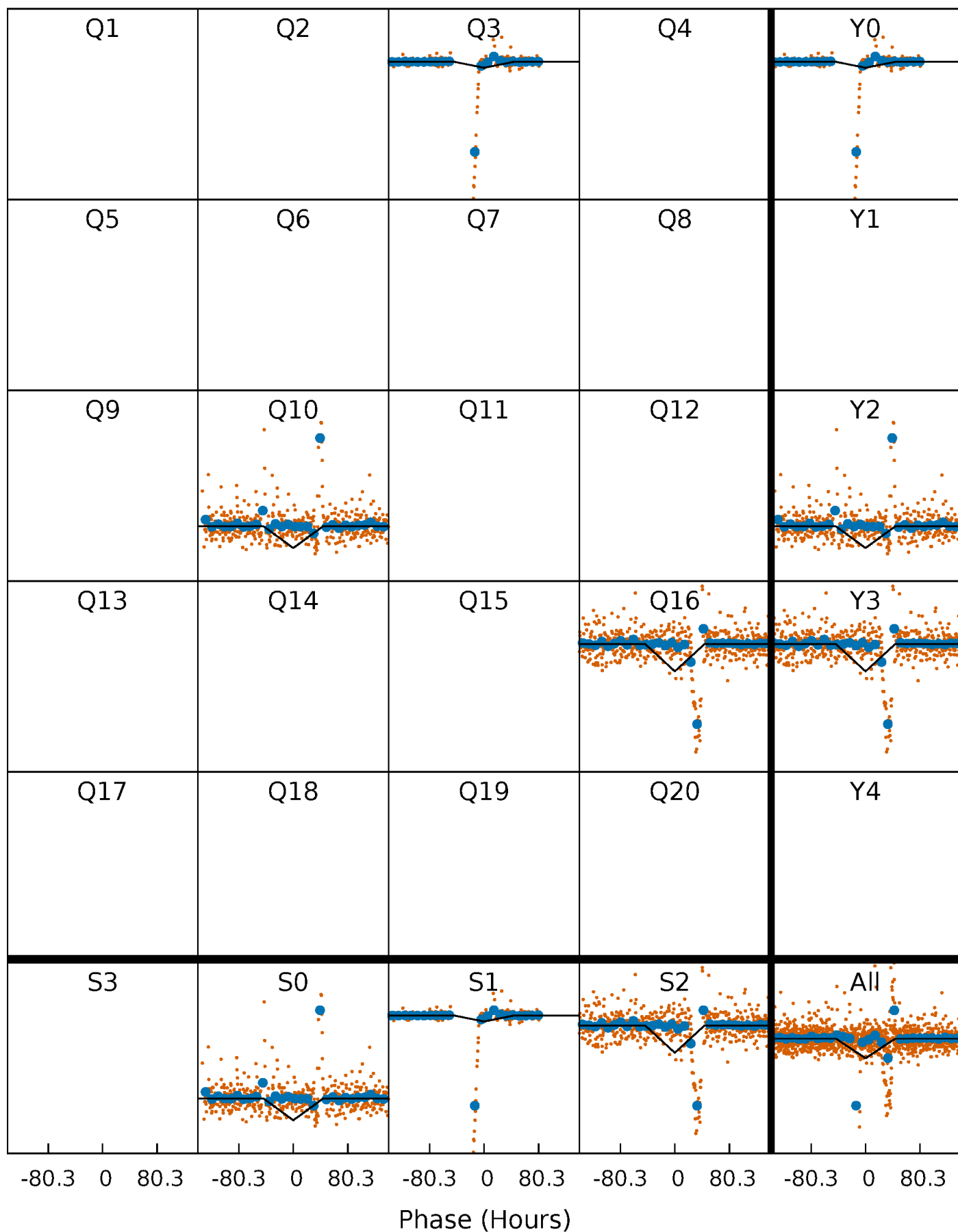
# DV Quarter-Phased Transit Curves

TCE 011859900-07     $P=601.243881$  Days     $T_0=347.442639$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

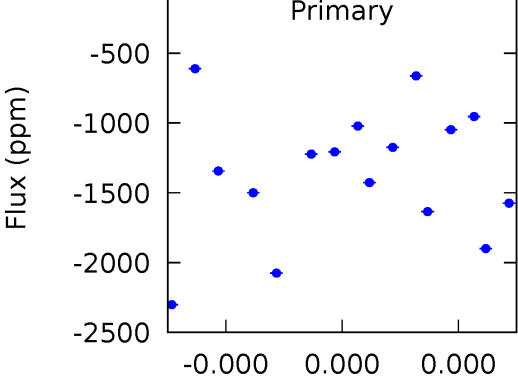
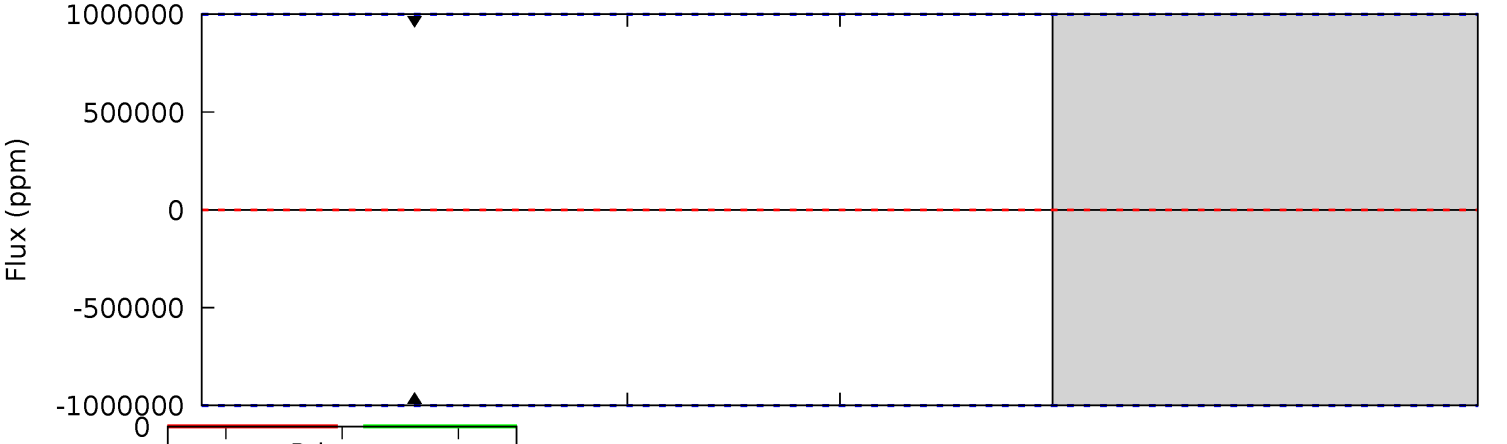
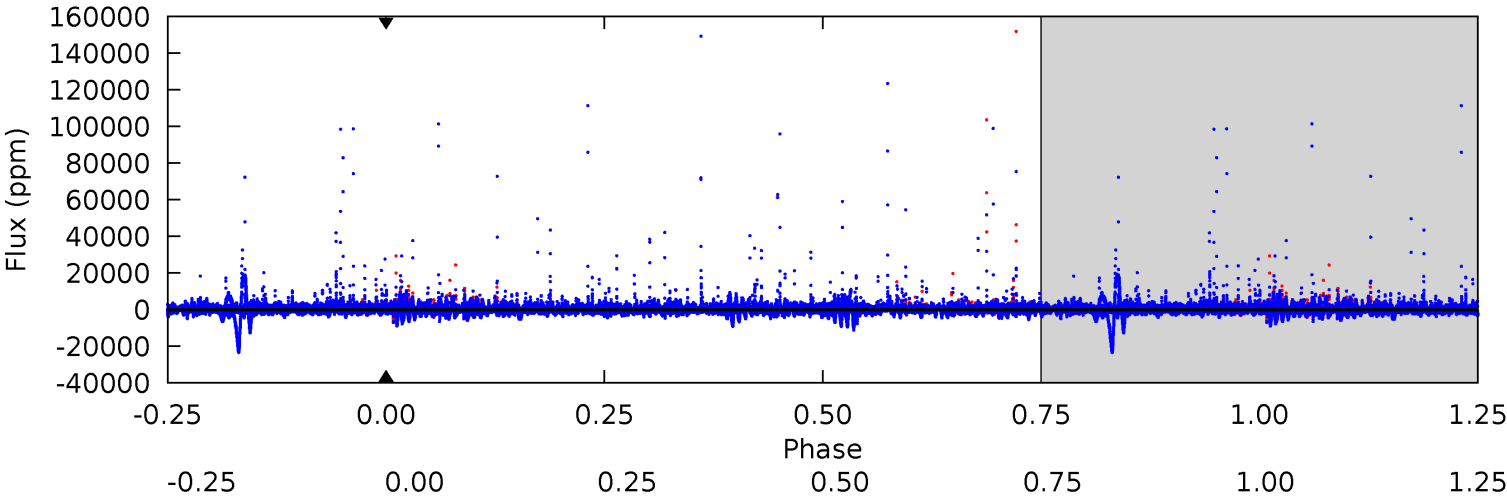
TCE 011859900-07     $P=601.243881$  Days     $T_0=346.085246$  (BKJD)



# DV Model-Shift Uniqueness Test

011859900-07, P = 601.243881 Days, E = 347.442639 Days

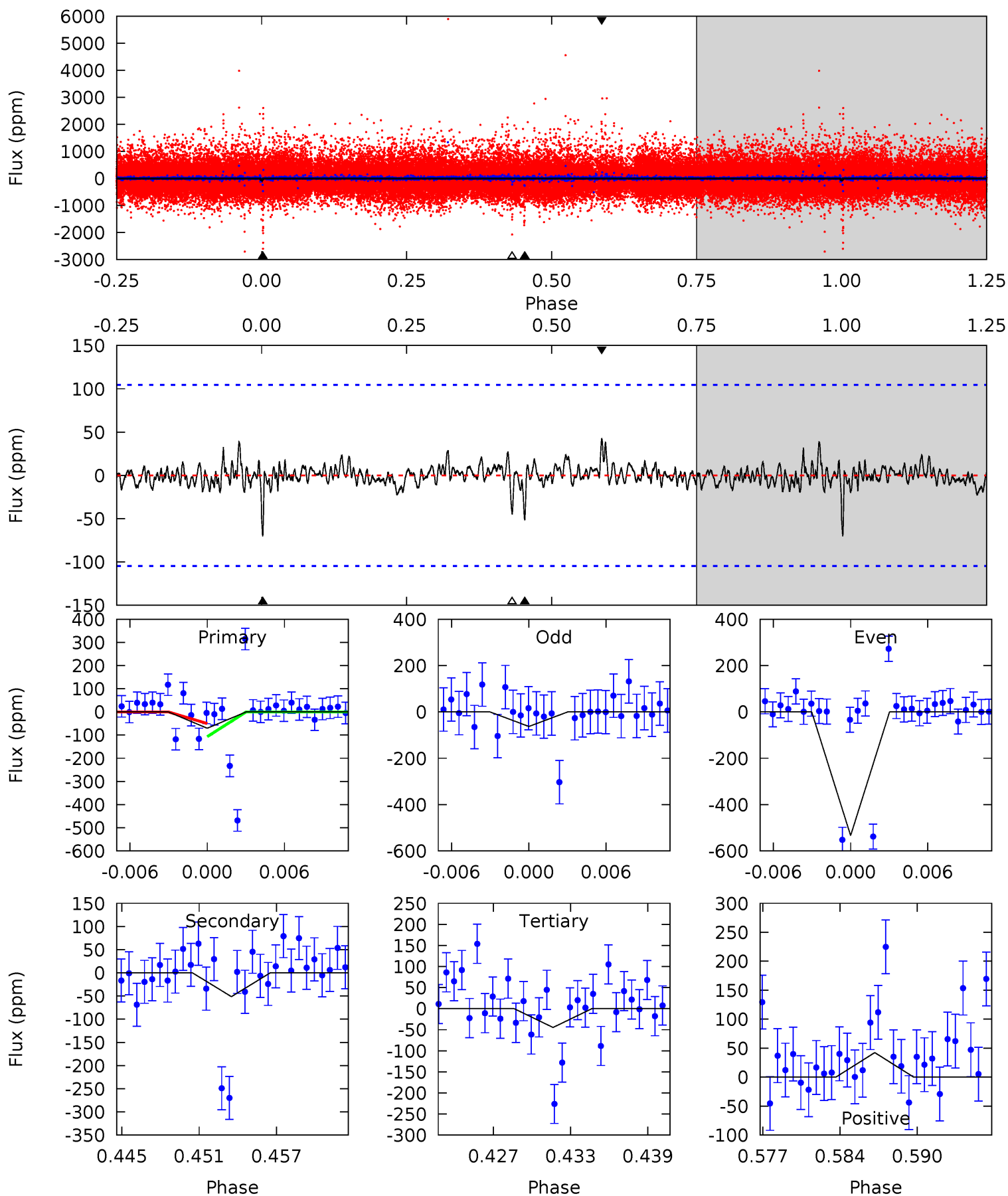
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



# Alt Model-Shift Uniqueness Test

011859900-07, P = 601.243881 Days, E = 346.085246 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
3.45	2.51	2.18	2.07	5.12	2.75	0.45	1.26	1.38	0.33	0.44	10.3	3.06	0.38	1.38



### Stellar Parameters For KIC 011859900

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4247^{+116}_{-142}$	$4.607^{+0.052}_{-0.017}$	$0.180^{+0.200}_{-0.300}$	$0.673^{+0.024}_{-0.061}$	$0.668^{+0.047}_{-0.052}$	$3.085^{+0.708}_{-0.205}$
	+3%/-3%	+1%/-0%	+111%/-167%	+4%/-9%	+7%/-8%	+23%/-7%
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 011859900-07 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$0 \pm 1000000$	$5.72^{+5.74}_{-3.97}$	$193^{+6}_{-7}$	$-3811^{+14345}_{-6083}$	$-84015.069^{+5212513.528}_{-4157298.381}$
Alt.	$-51 \pm 20$	$5.71^{+6.33}_{-3.96}$	$193^{+6}_{-7}$	$2149^{+695}_{-313}$	$1255^{+11305}_{-1004}$

$T_{\text{max}}$  = 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

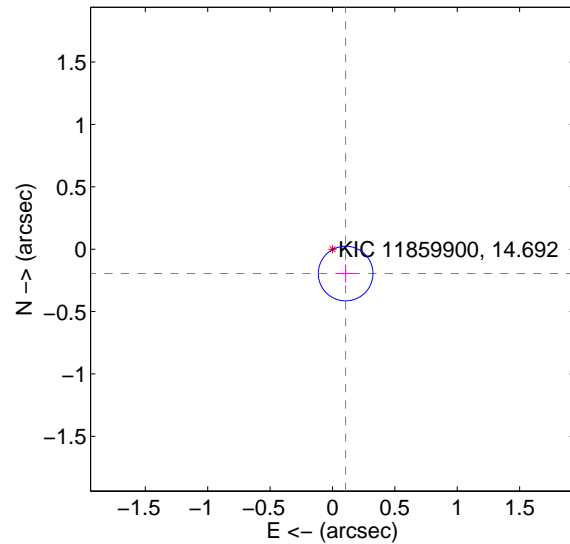
Supplemental centroid analysis for 011859900-07. Kepler magnitude: 14.69. Transit SNR -1.00

There are 1 quarters with good PRF difference image offsets

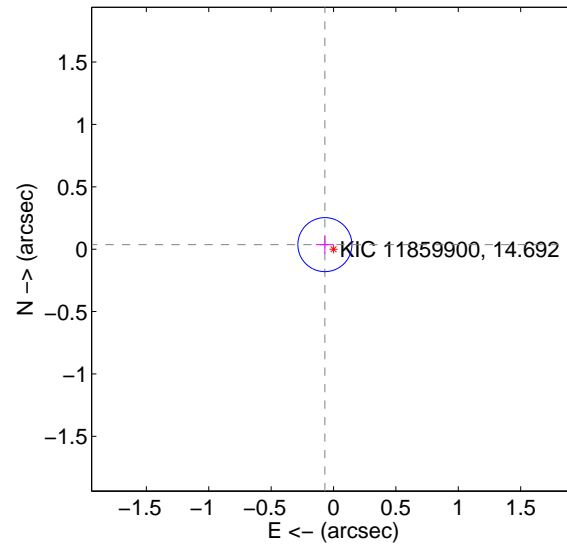
The direct PRF centroid is offset from the target star catalog position by about 0.29 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b>0.222 <math>\pm</math> 0.073</b>	<b>3.04</b>	-0.106 $\pm$ 0.072	-0.195 $\pm$ 0.073
PRF-fit source offset from KIC position	0.078 $\pm$ 0.072	1.08	0.069 $\pm$ 0.072	0.036 $\pm$ 0.073
photometric centroid source offset	0.26 $\pm$ 0.45	0.58	0.24 $\pm$ 0.44	0.11 $\pm$ 0.49

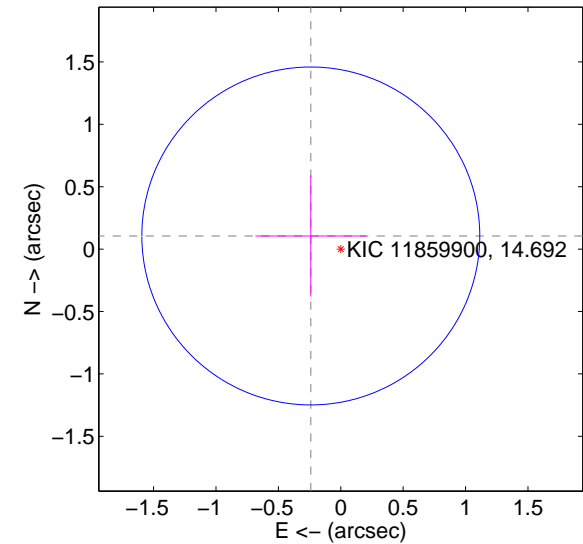
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



offset from photometric centroids

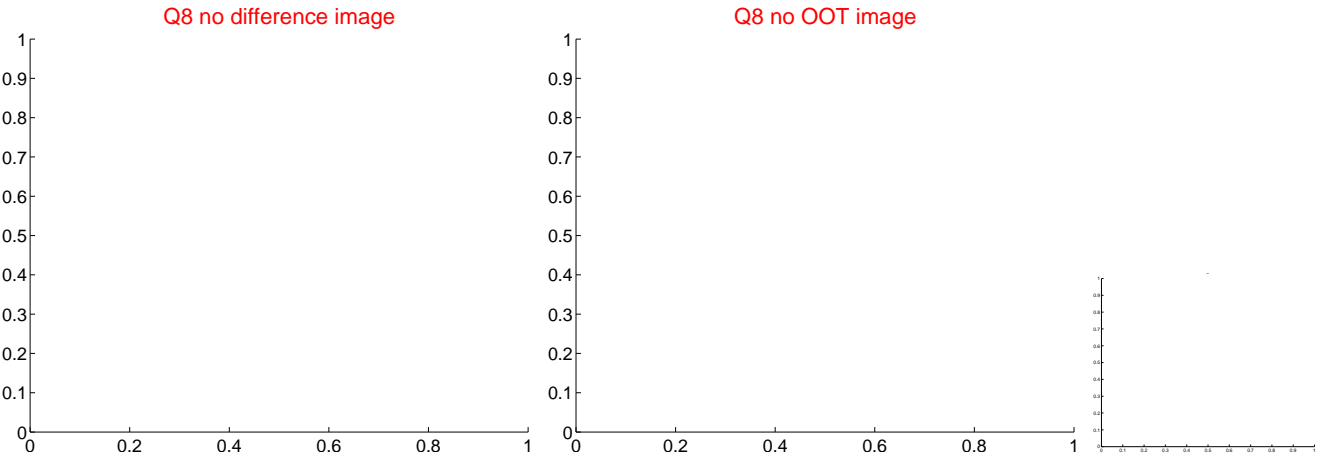
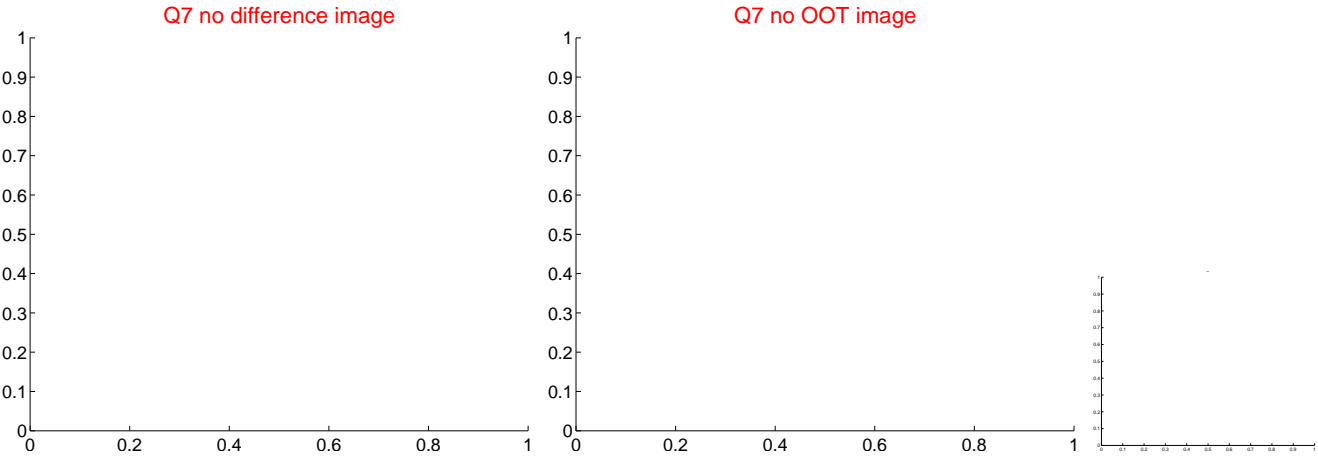
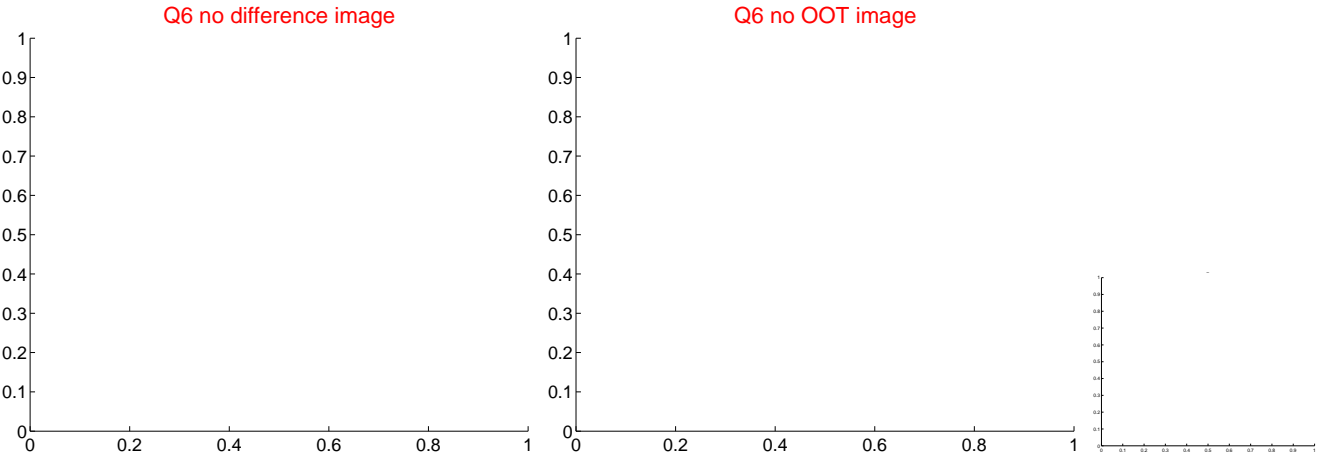
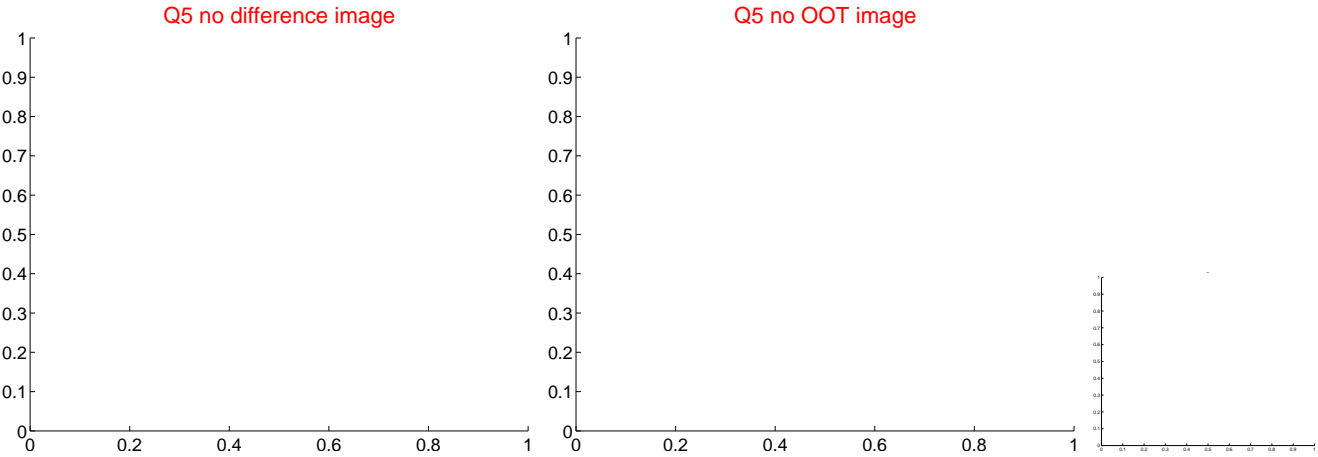


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

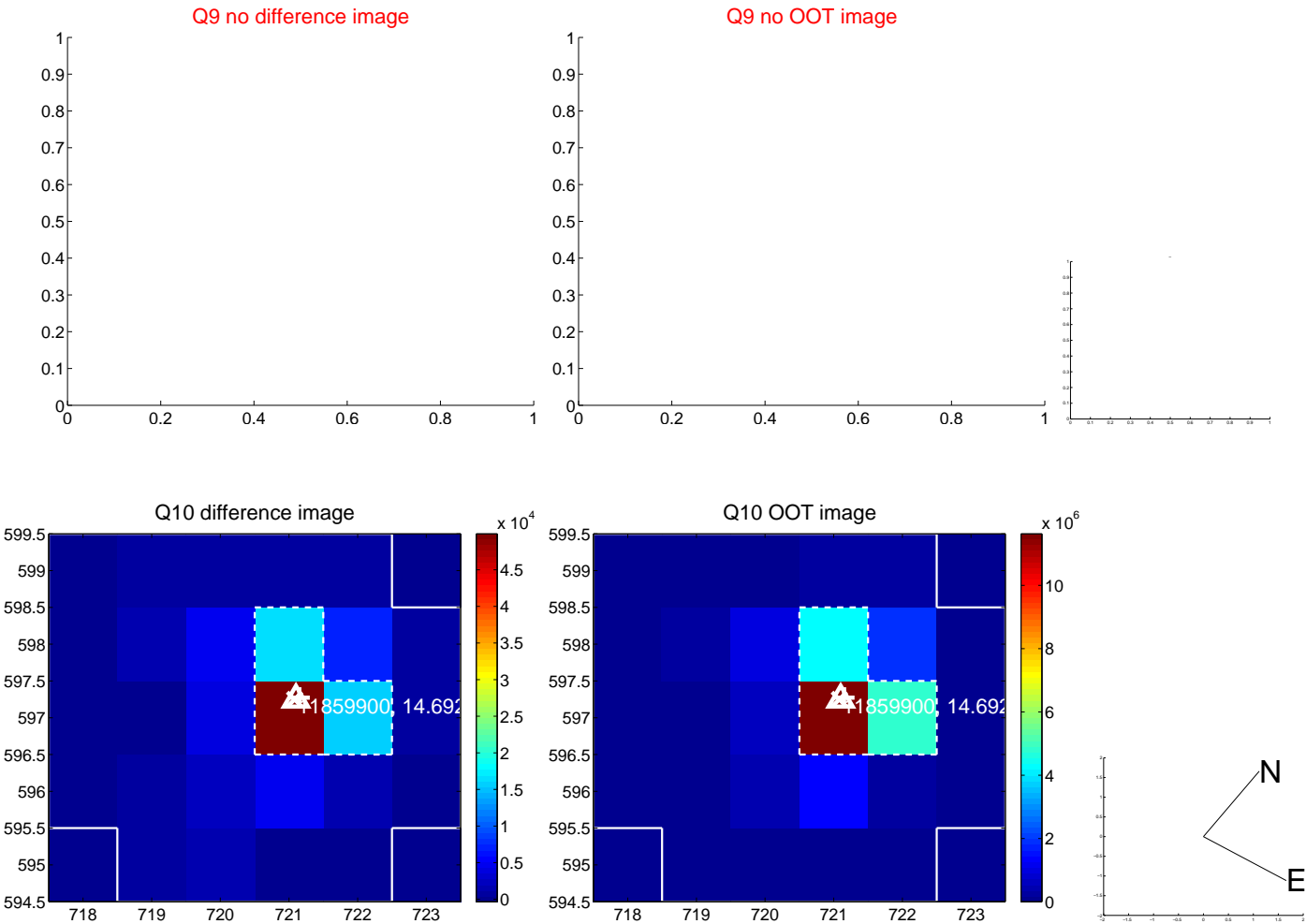


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





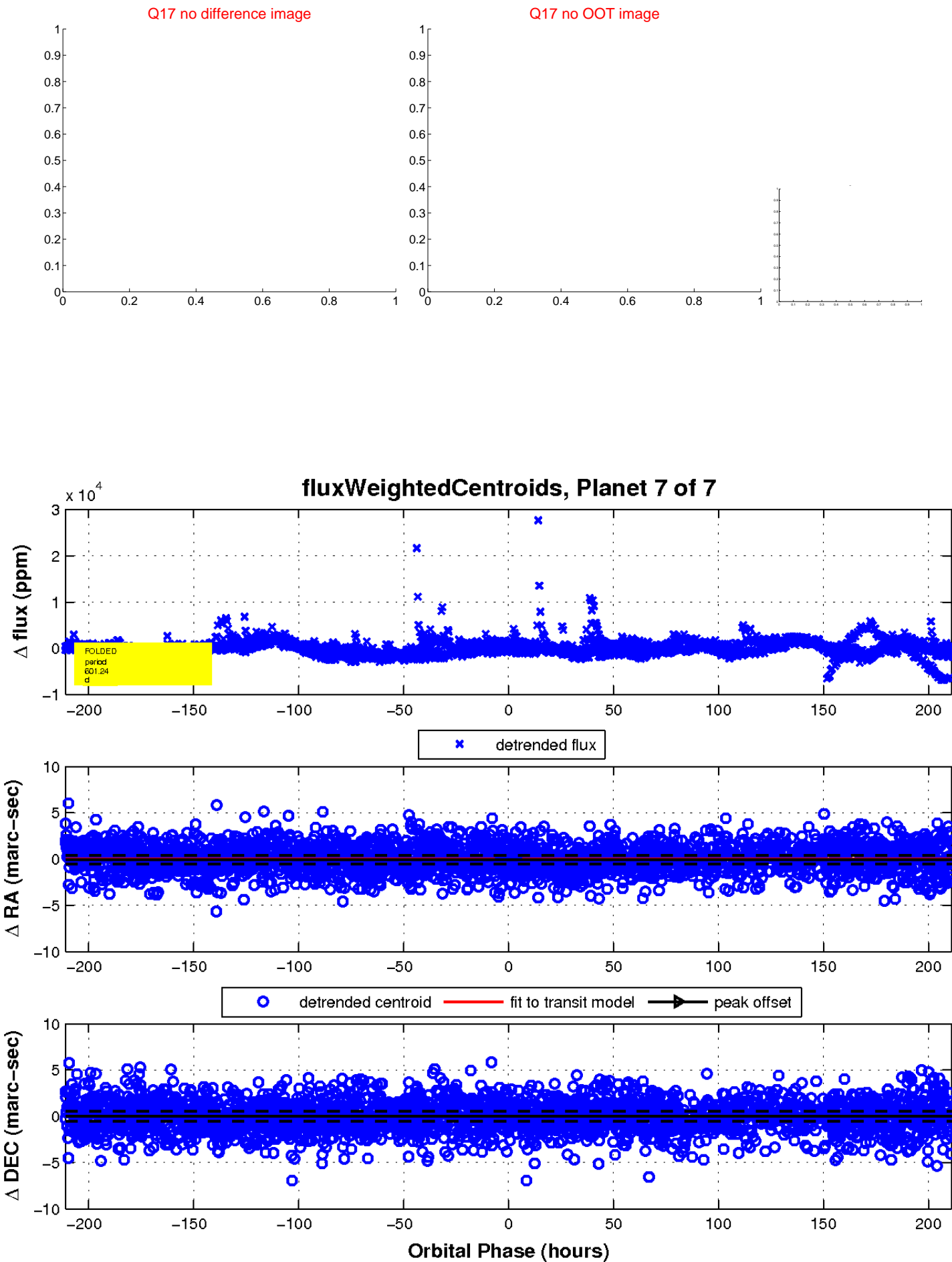
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



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.



UKIRT Image

