

# KIC 005039684

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005039684-01	OBS	No	593.783060	241.375691	1518.3	8.430	14.9	5.4	0.82	5526	3.43	0.32
005039684-02	OBS	No	233.933802	258.872801	2130.8	6.584	14.5	7.6	0.82	5526	4.71	1.12
005039684-03	OBS	No	605.577962	215.863531	1928.8	9.282	10.3	6.5	0.82	5526	3.55	0.32
005039684-04	OBS	No	375.177216	151.129344	1501.9	3.903	12.7	7.4	0.82	5526	3.15	0.60
005039684-05	OBS	No	457.091926	484.861736	1708.5	3.500	11.6	-1.0	0.82	5526	3.35	0.46

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005039684-01	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_KIC_POS
005039684-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005039684-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005039684-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE_TRACKER—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005039684-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_NOFITS—HALO_GHOST

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

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

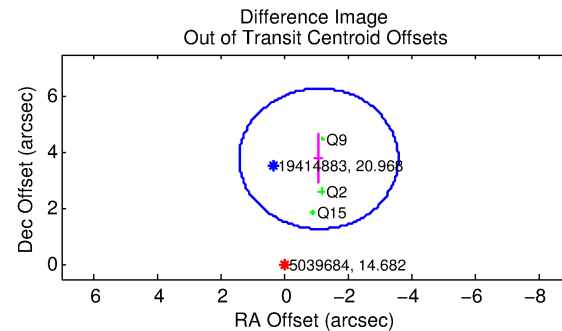
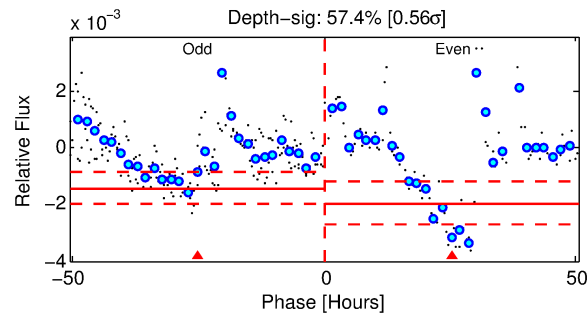
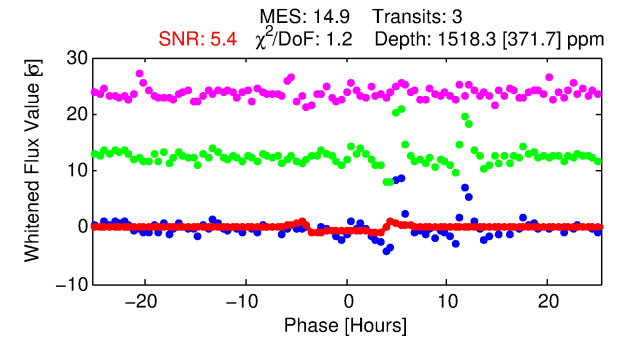
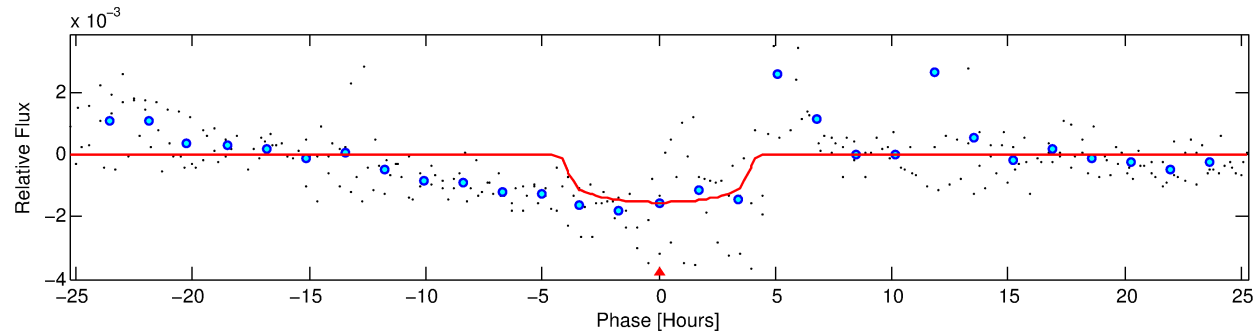
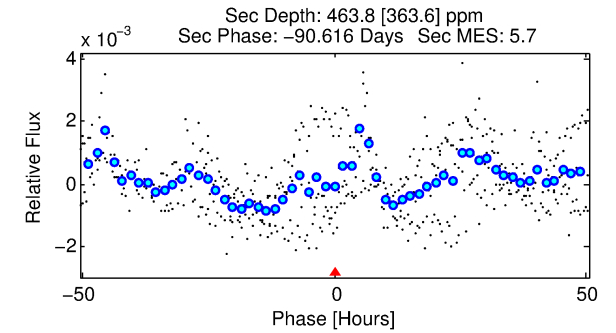
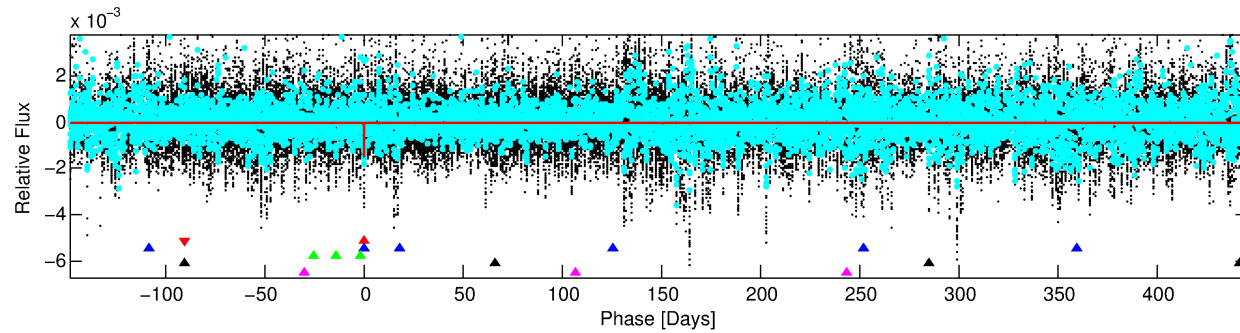
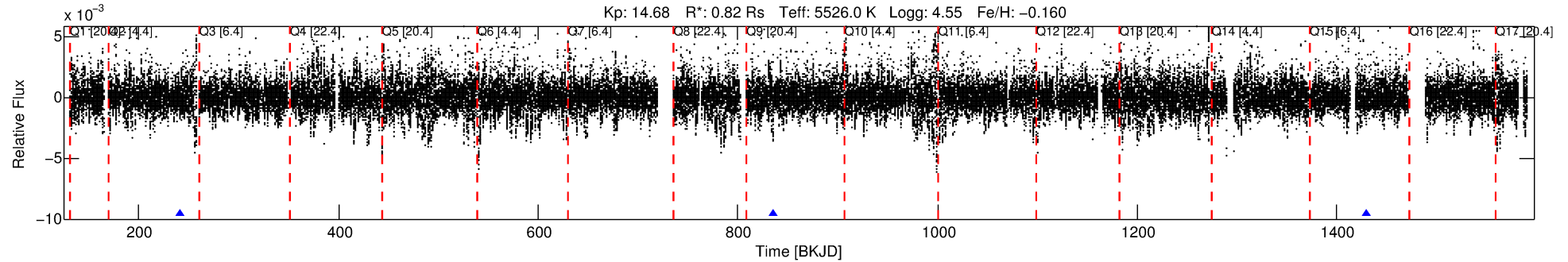
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 005039684-01

No Significant Match Found

# DV One-Page Summary

KIC: 5039684 Candidate: 1 of 5 Period: 593.783 d



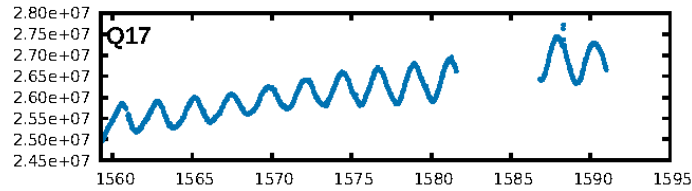
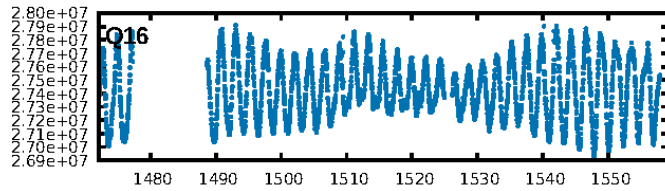
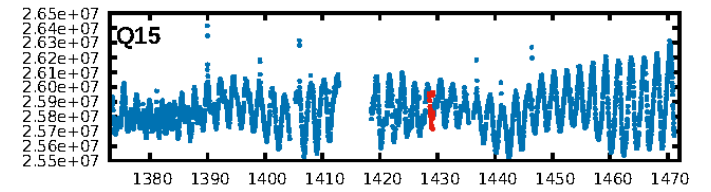
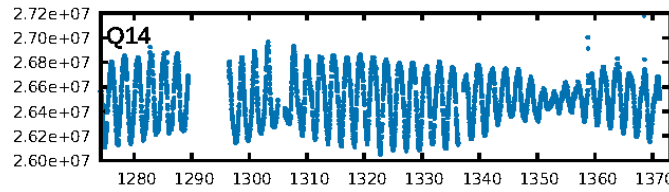
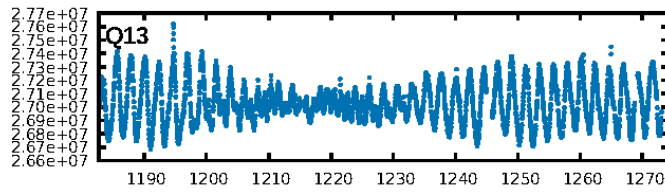
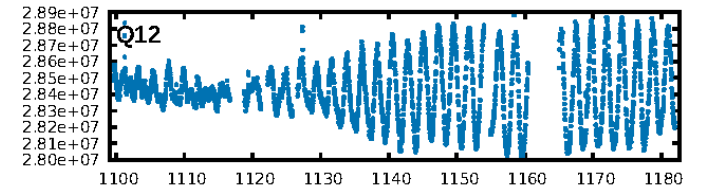
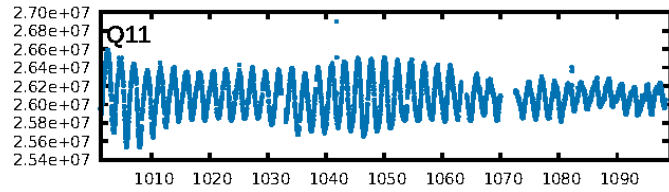
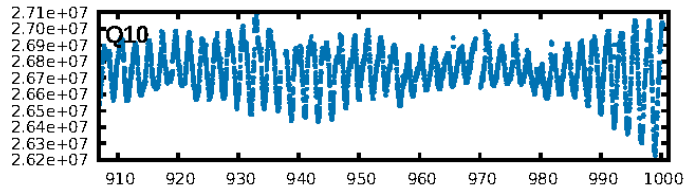
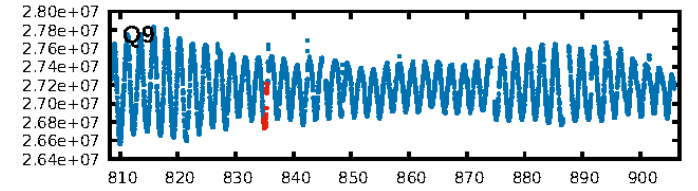
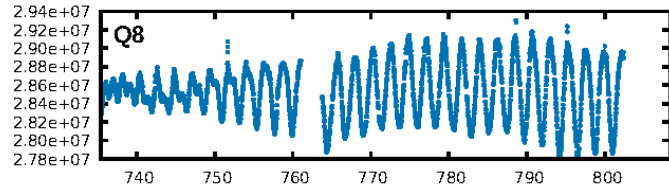
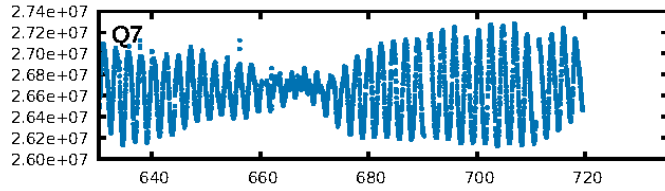
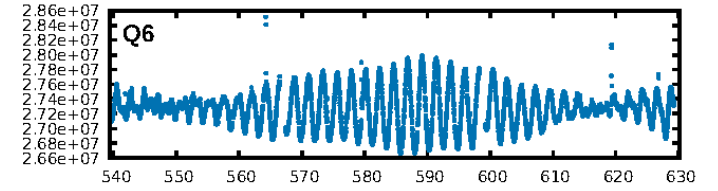
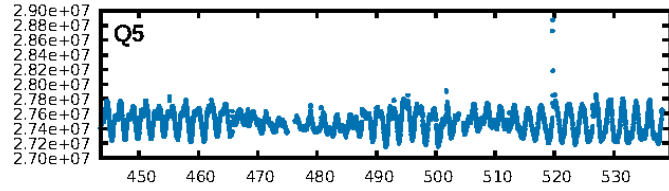
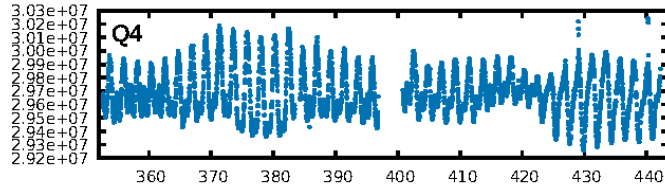
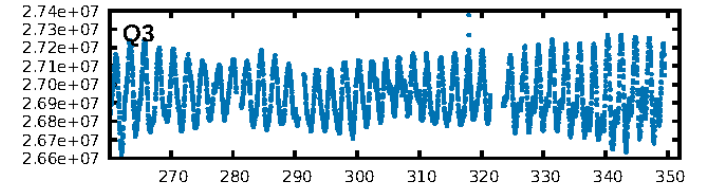
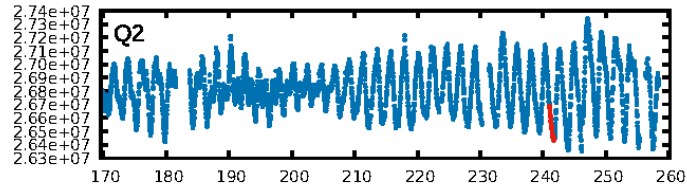
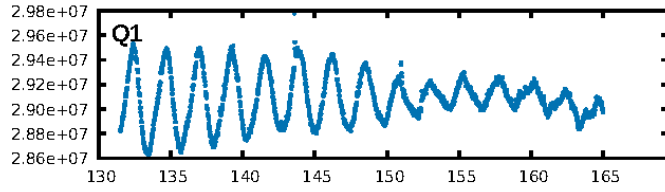
## DV Fit Results:

Period = 593.78306 [0.00817] d  
Epoch = 241.3757 [0.0116] BKJD  
Rp/R\* = 0.0382 [0.0109]  
a/R\* = 407.45 [390.85]  
b = 0.71 [0.68]  
Seff = 0.32 [0.10]  
Teq = 192 [14] K  
Rp = 3.43 [1.25] Re  
a = 1.3203 [0.2516] AU  
Ag = 37907.69 [38232.05] [0.99 $\sigma$ ]  
Teffp = 4147 [1014] K [3.90 $\sigma$ ]

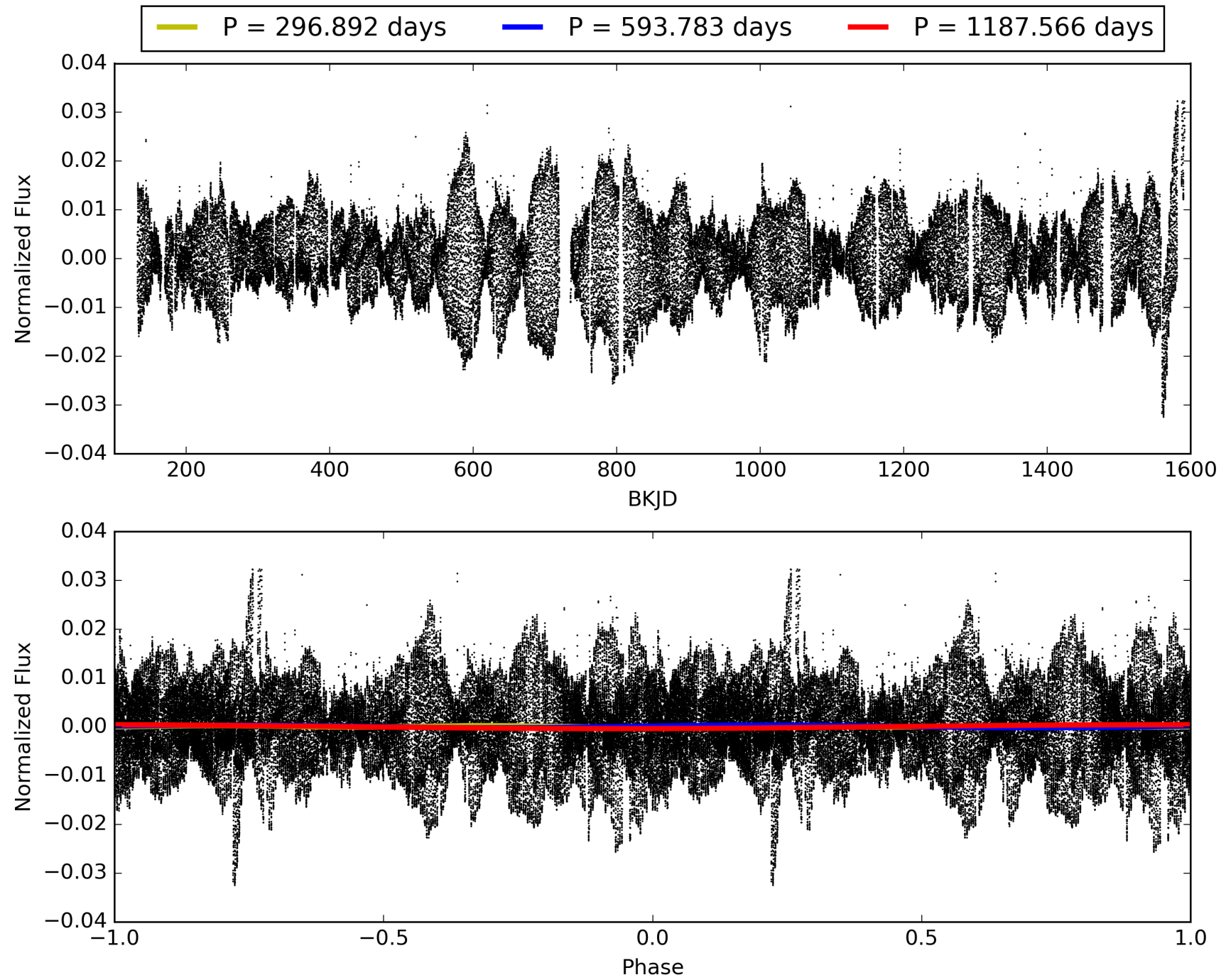
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [359.40 $\sigma$ ]  
LongPeriod-sig: 100.0% [22.58 $\sigma$ ]  
ModelChiSquare2-sig: 46.3%  
ModelChiSquareGof-sig: 84.2%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 2.677  
Centroid-sig: 17.4%  
Centroid-so: 1.376 arcsec [1.29 $\sigma$ ]  
OotOffset-rm: 3.937 arcsec [4.72 $\sigma$ ]  
KicOffset-rm: 0.104 arcsec [1.17 $\sigma$ ]  
OotOffset-st: 1/1/0/1 [3]  
KicOffset-st: 1/1/0/1 [3]  
DiffImageQuality-fgm: 1.00 [3/3]  
DiffImageOverlap-fno: 0.67 [2/3]

# TCE 005039684-01, PDC Light Curves



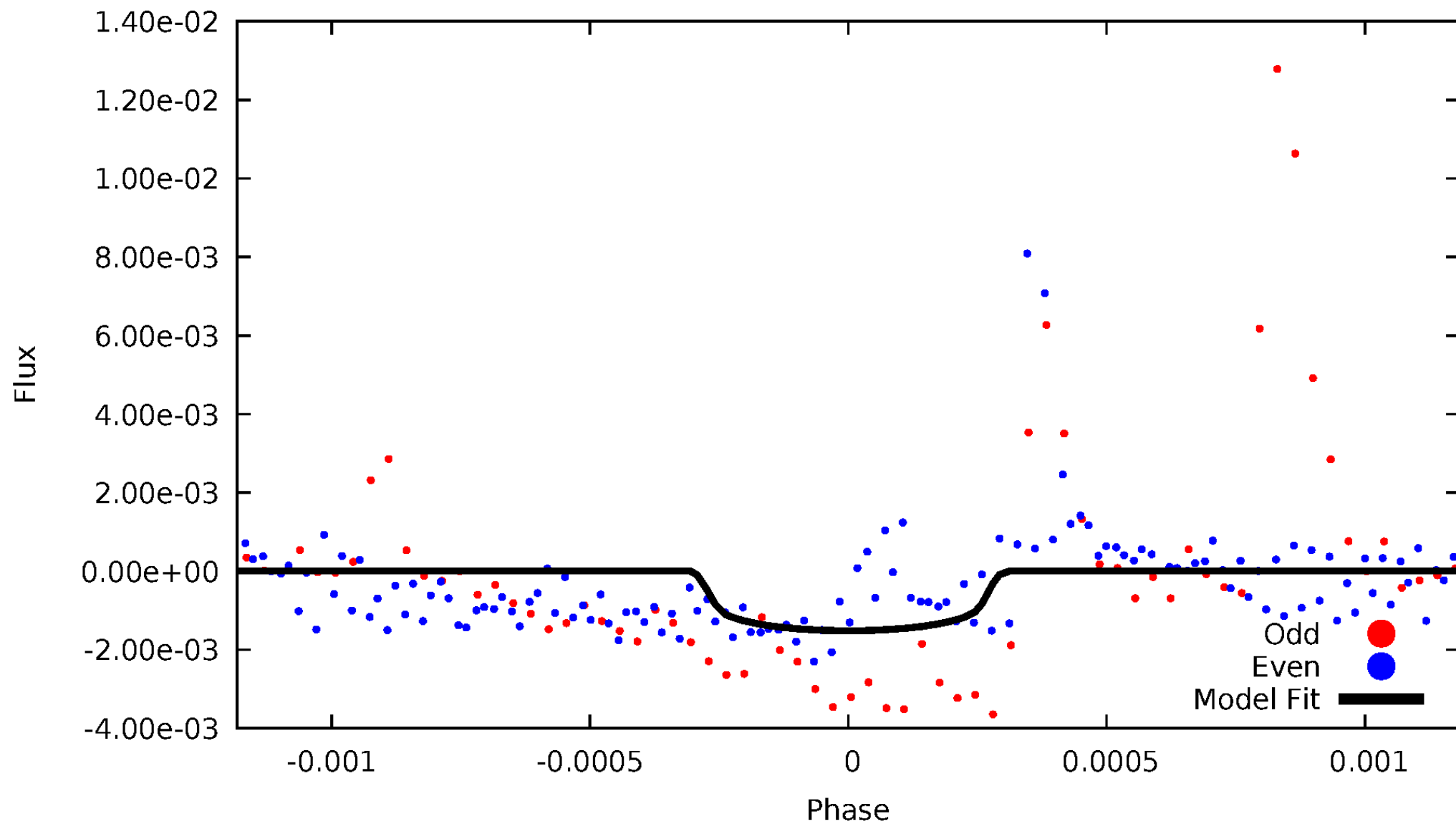
TCE 005039684-01





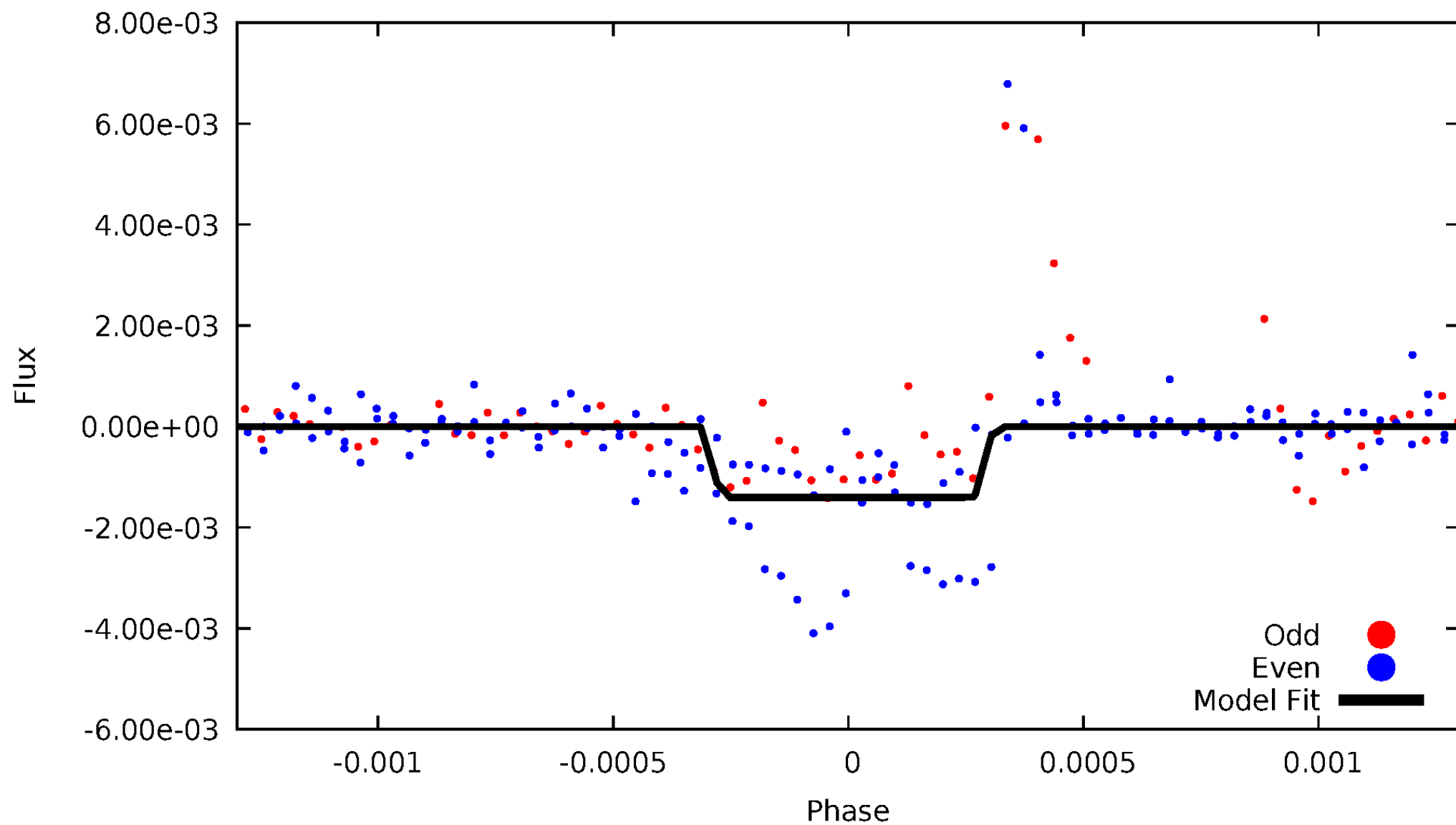
# DV Odd/Even

TCE 005039684-01

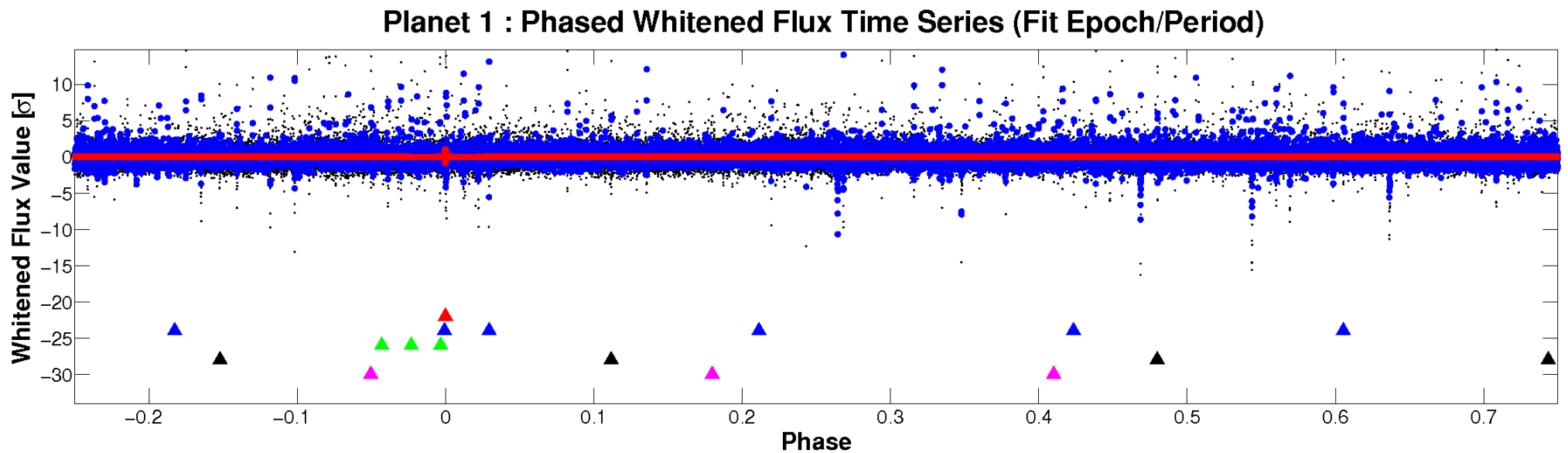
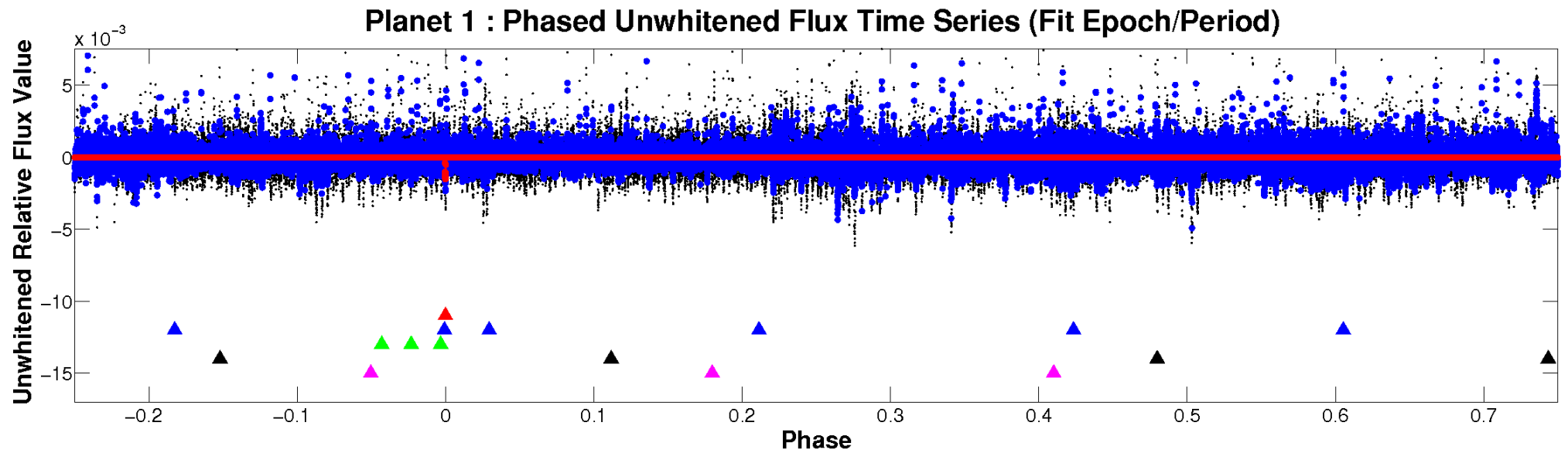


# ALT Odd/Even

TCE 005039684-01

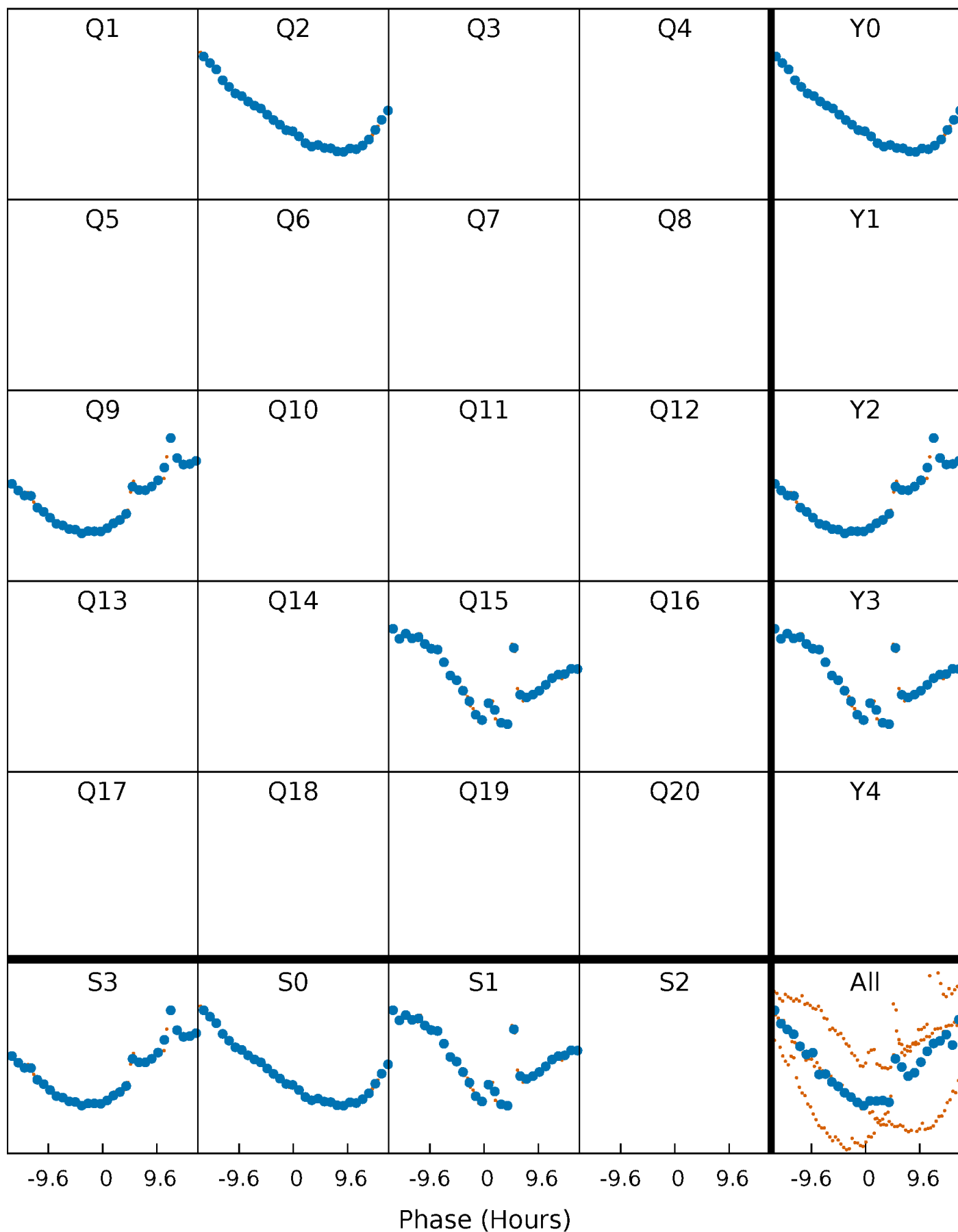


# Non-Whitened Vs. Whitened Light Curve



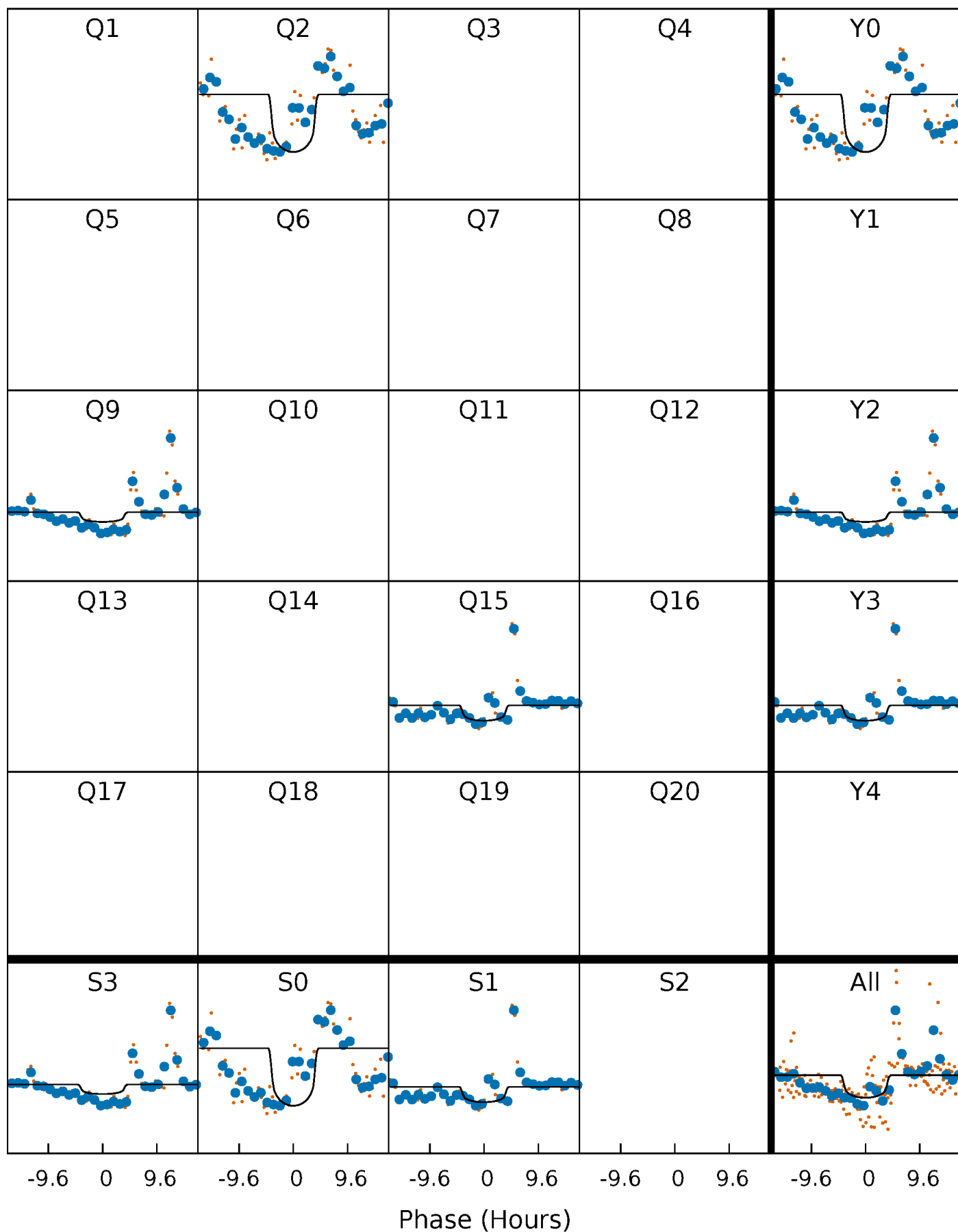
# PDC Quarter-Phased Transit Curves

TCE 005039684-01 P=593.783060 Days  $T_0=241.375691$  (BKJD)



# DV Quarter-Phased Transit Curves

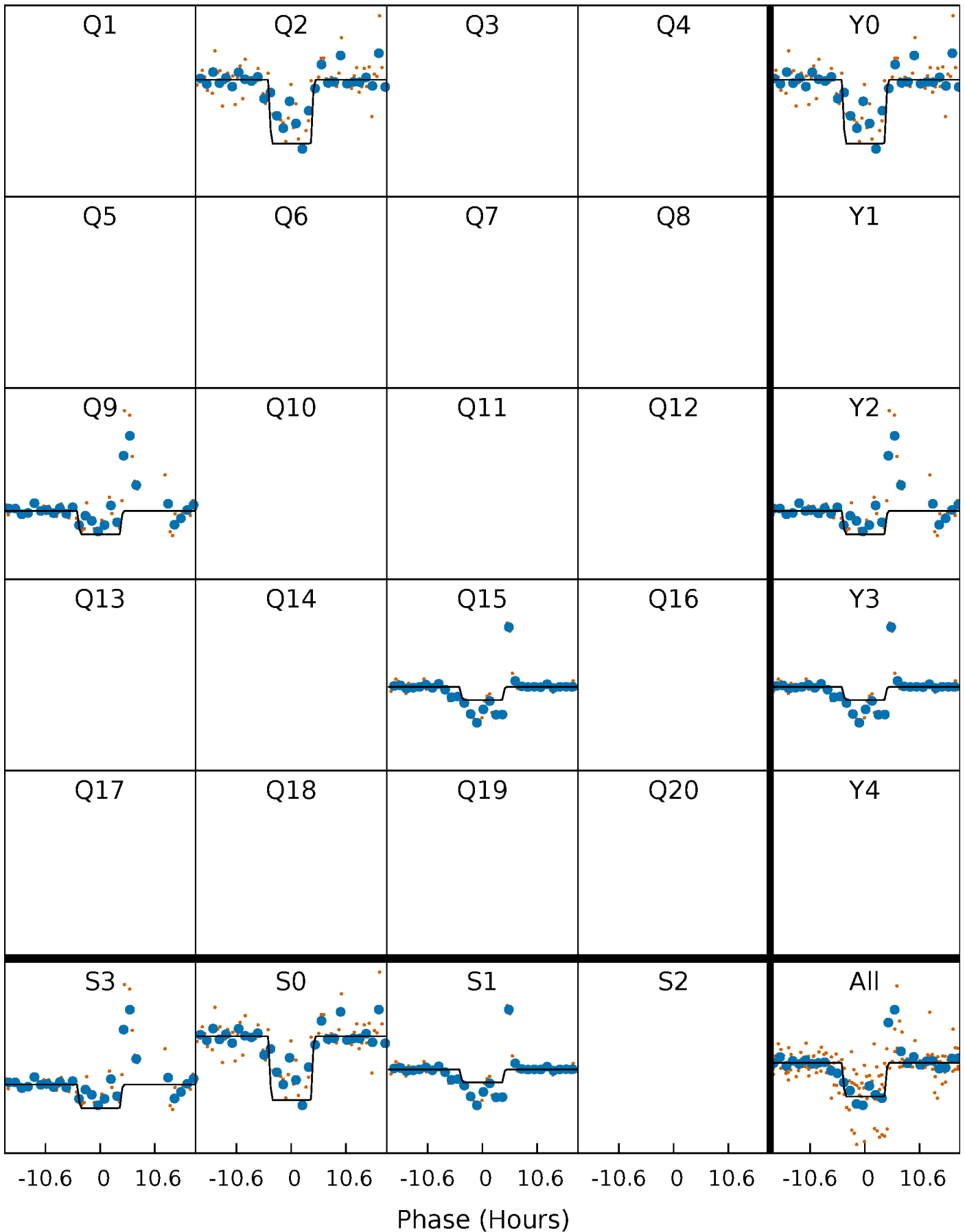
TCE 005039684-01 P=593.783060 Days  $T_0=241.375691$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

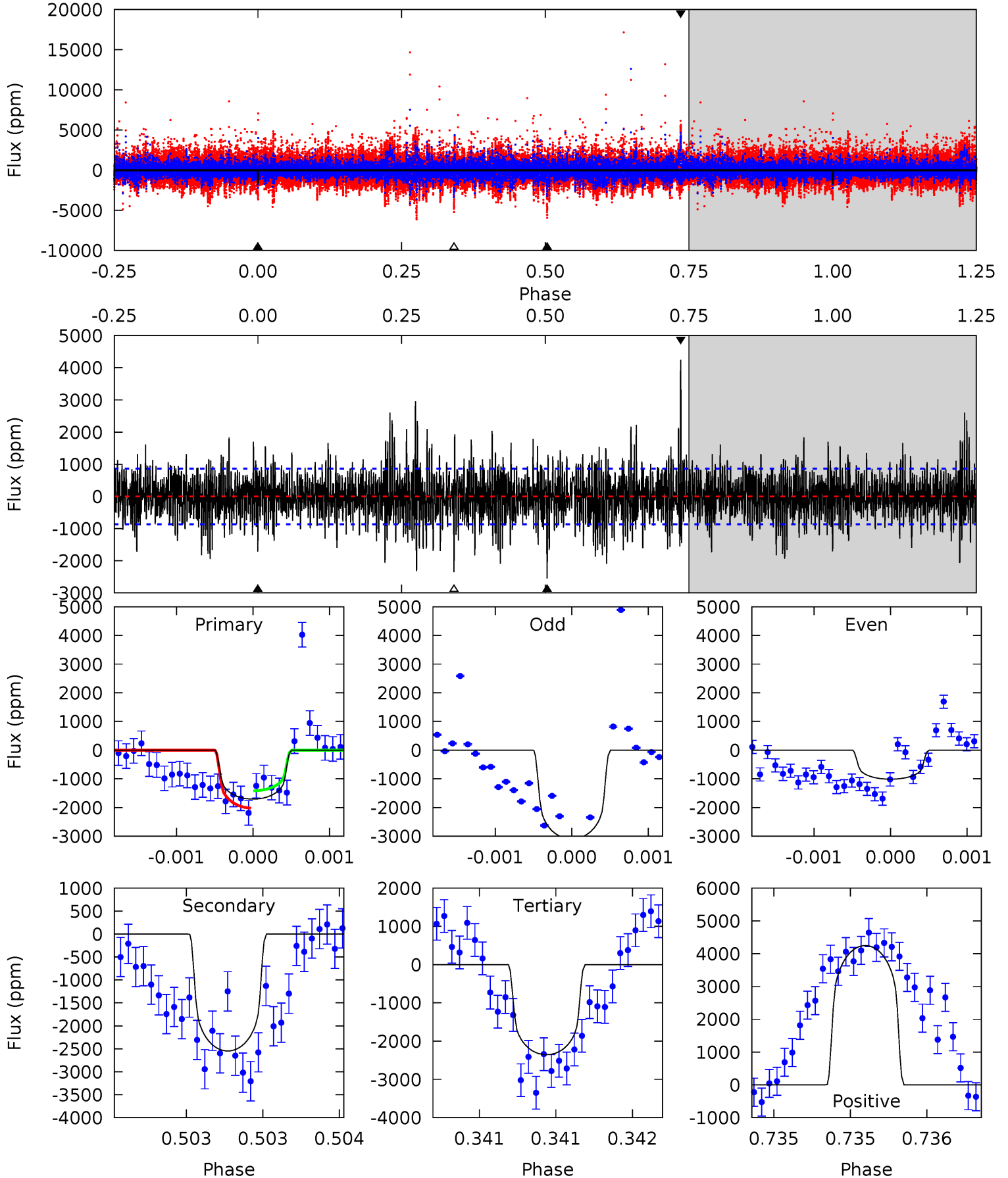
TCE 005039684-01 P=593.778820 Days  $T_0=241.388745$  (BKJD)



# DV Model-Shift Uniqueness Test

005039684-01, P = 593.783060 Days, E = 241.375691 Days

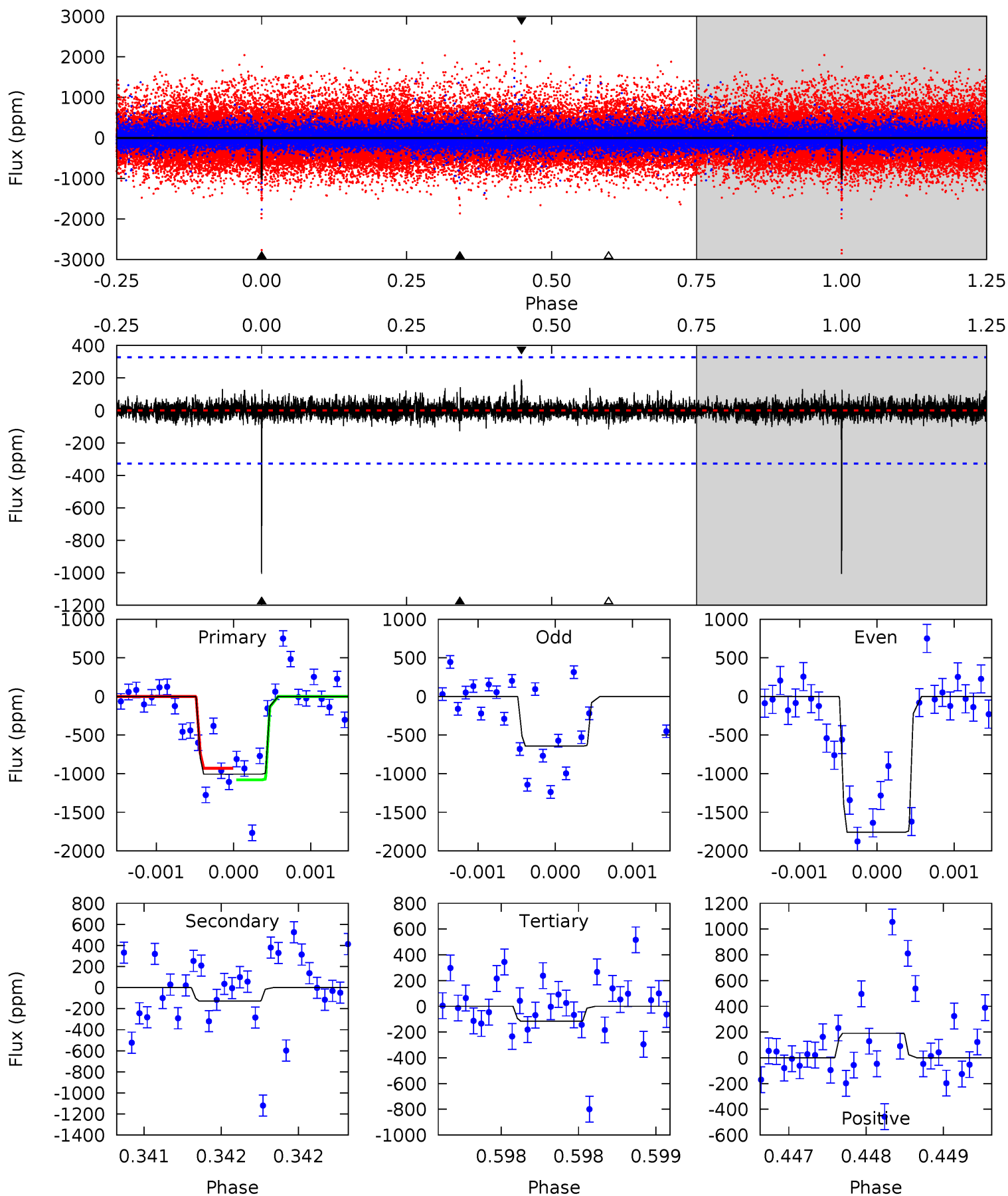
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.0	16.3	15.1	27.3	5.54	3.42	4.03	-4.16	-16.3	1.23	-10.9	5.57	1.65	0.63	1.95



# Alt Model-Shift Uniqueness Test

005039684-01, P = 593.778820 Days, E = 241.388745 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
17.0	2.16	1.96	3.21	5.53	3.41	0.50	15.0	13.8	0.20	-1.04	9.65	1.57	0.16	1.29



### Stellar Parameters For KIC 005039684

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5526^{+166}_{-149}$	$4.549^{+0.050}_{-0.150}$	$-0.160^{+0.300}_{-0.300}$	$0.821^{+0.187}_{-0.080}$	$0.870^{+0.092}_{-0.092}$	$2.214^{+0.541}_{-0.929}$
	+3%/-3%	+1%/-3%	+188%/-188%	+23%/-10%	+11%/-11%	+24%/-42%
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 005039684-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-2547 \pm 156$	$3.54^{+1.07}_{-1.03}$	$272^{+15}_{-11}$	$6294^{+1325}_{-721}$	$191312^{+197936}_{-77657}$
Alt.	$-128 \pm 59$	$3.56^{+0.99}_{-1.11}$	$273^{+14}_{-12}$	$3471^{+506}_{-424}$	$9416^{+12354}_{-5591}$

$T_{\text{max}}$  = 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

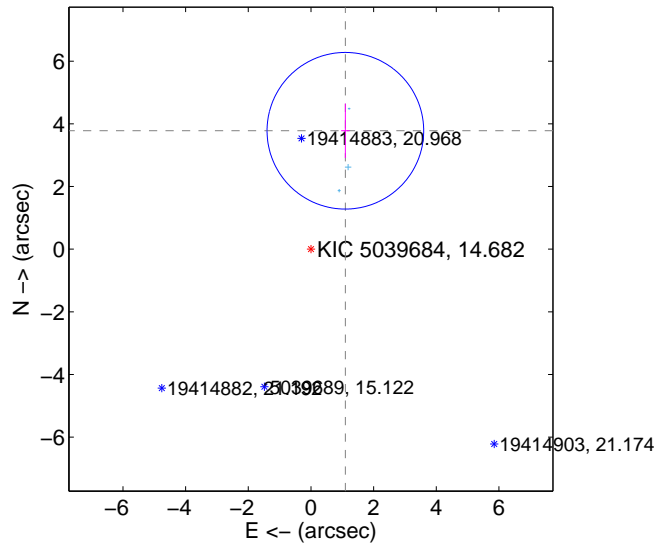
Supplemental centroid analysis for 005039684-01. Kepler magnitude: 14.68. Transit SNR 5.38

There are 3 quarters with good PRF difference image offsets

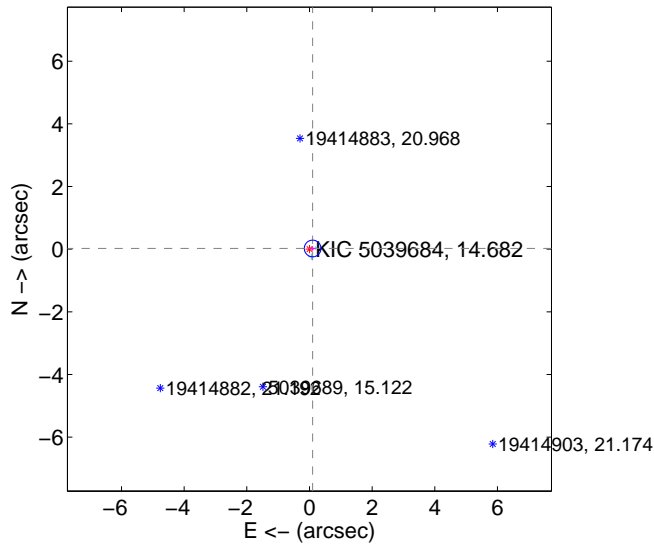
The direct PRF centroid is offset from the target star catalog position by about 1.97 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$3.937 \pm 0.833$	4.72	$-1.099 \pm 0.135$	$3.781 \pm 0.867$
PRF-fit source offset from KIC position	$0.104 \pm 0.089$	1.17	$-0.101 \pm 0.089$	$0.022 \pm 0.071$
photometric centroid source offset	$1.38 \pm 1.06$	1.29	$0.20 \pm 0.56$	$-1.36 \pm 1.07$

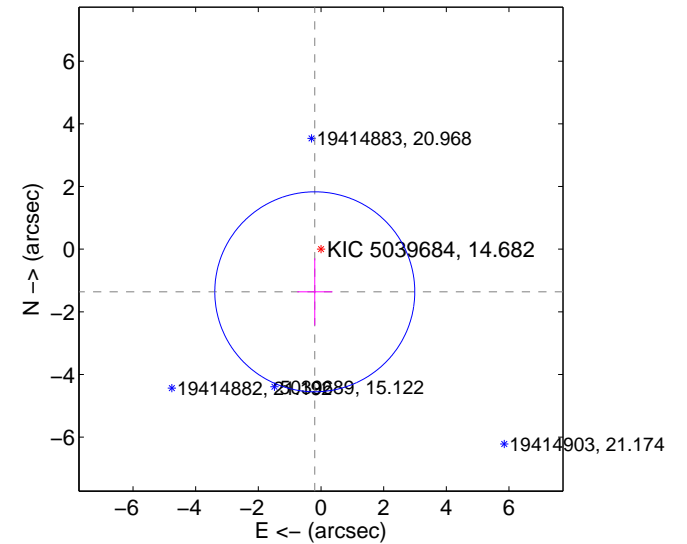
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



offset from photometric centroids



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

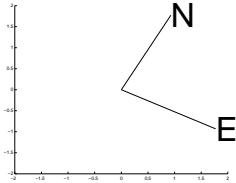
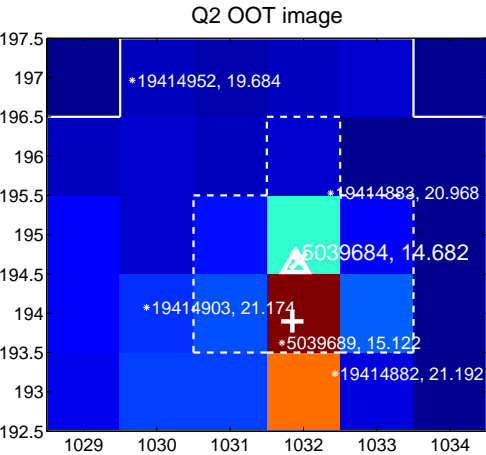
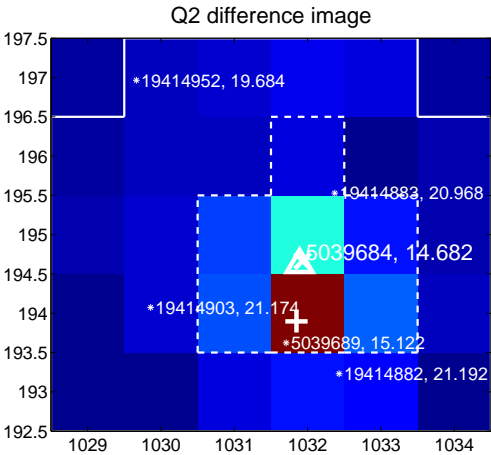


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

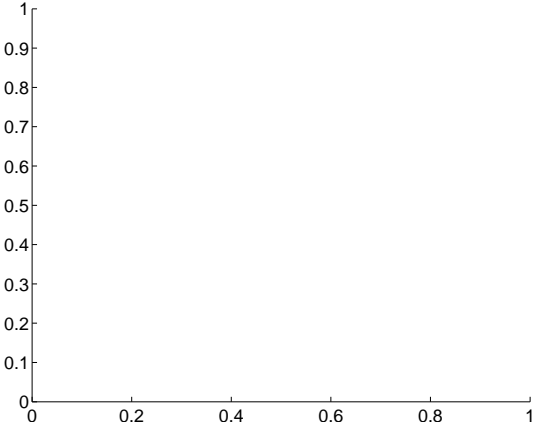
Q1 no difference image



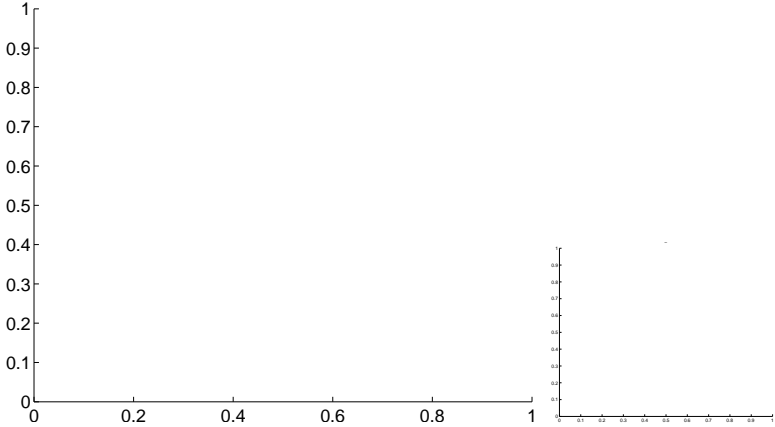
Q1 no OOT image



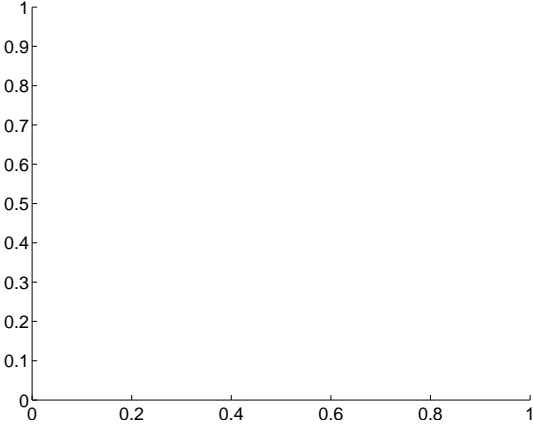
Q3 no difference image



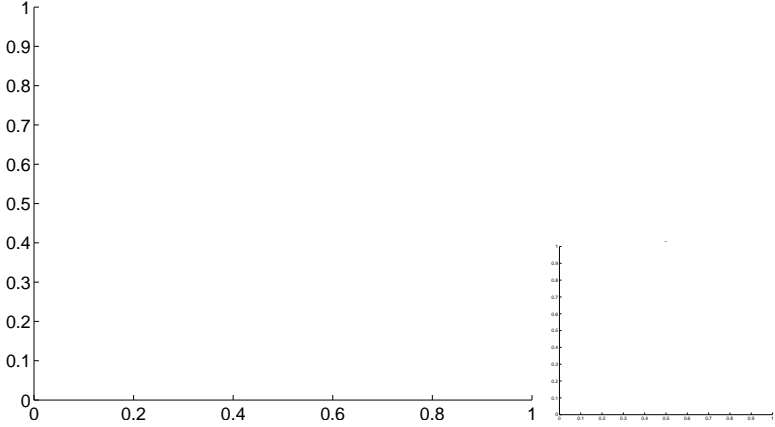
Q3 no OOT image



Q4 no difference image



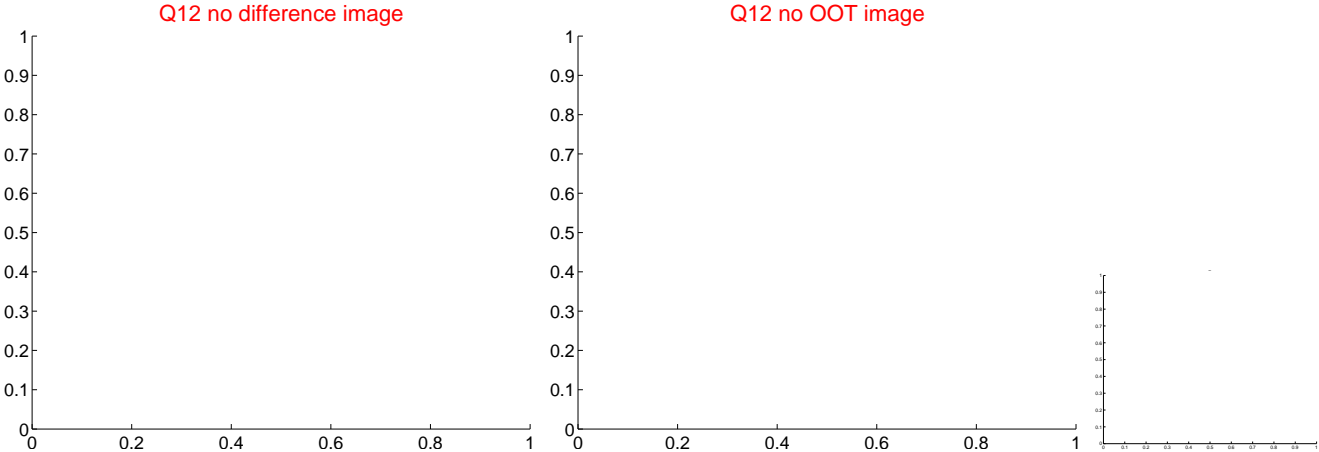
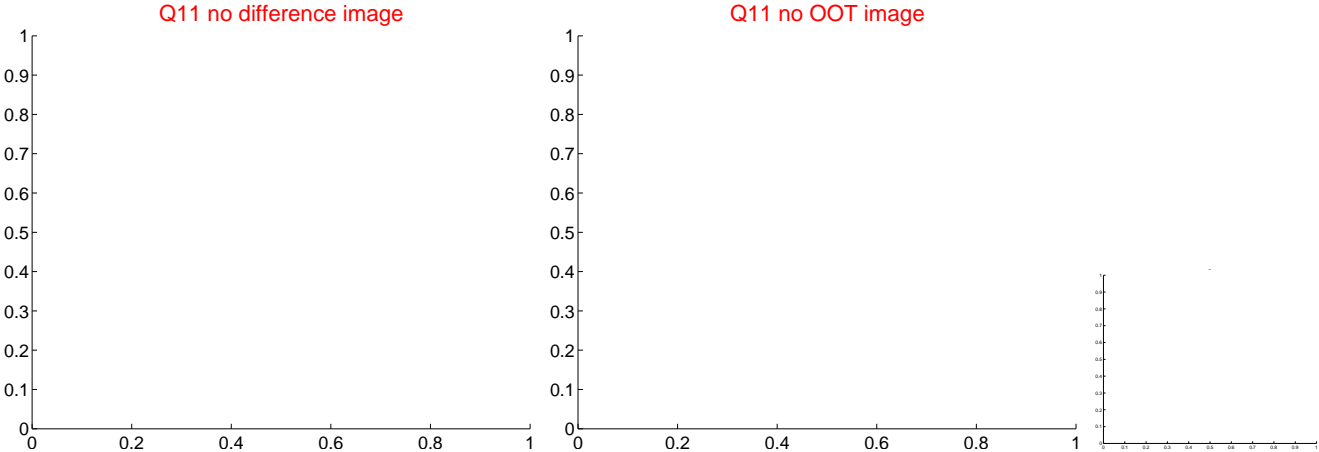
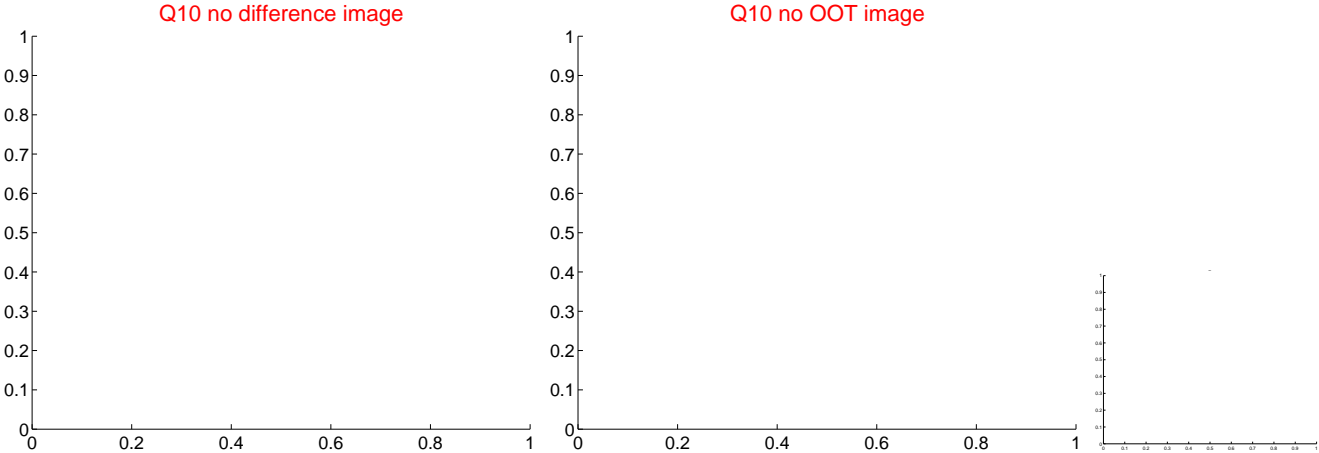
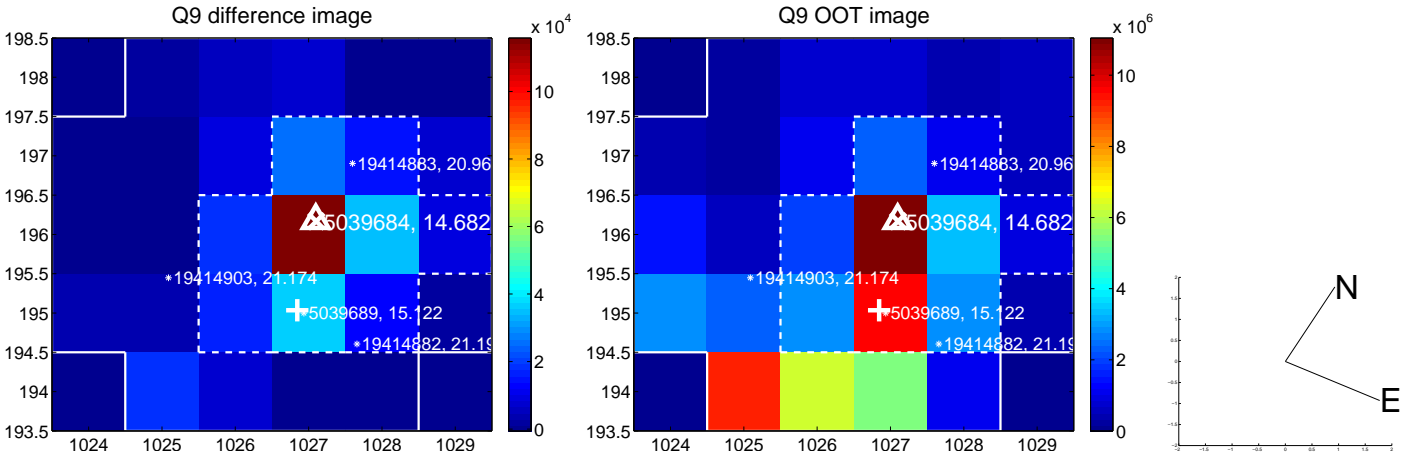
Q4 no OOT image



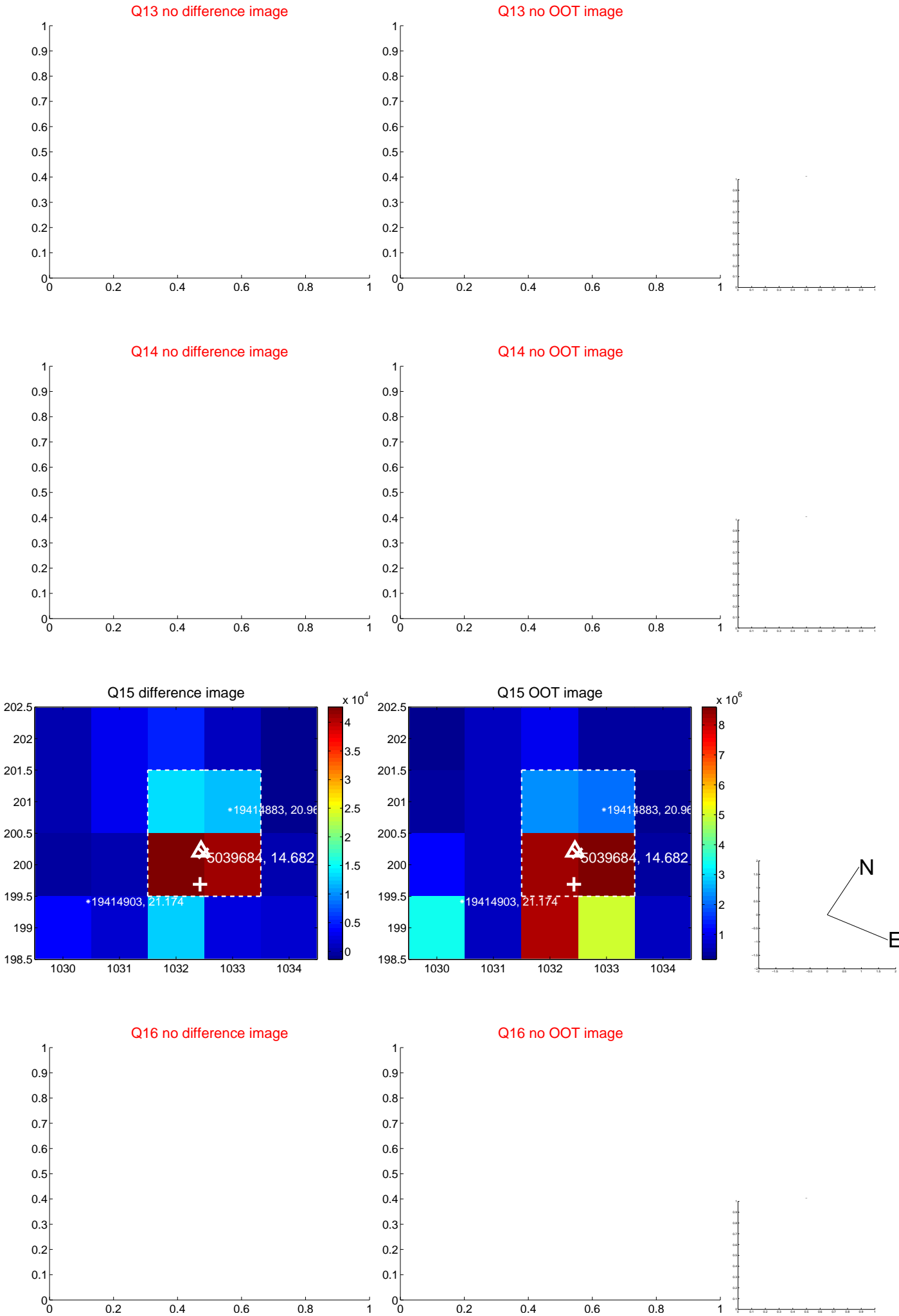
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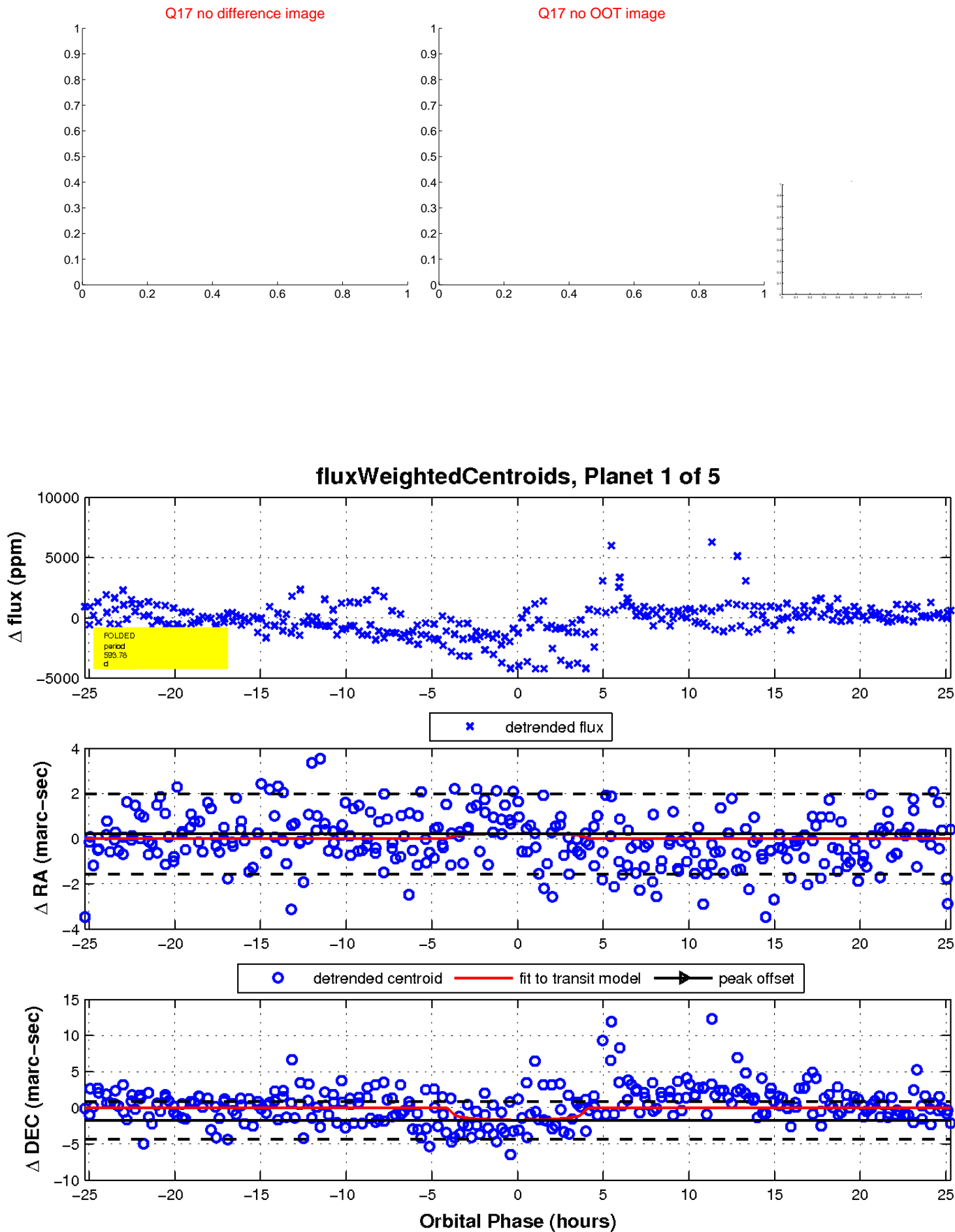
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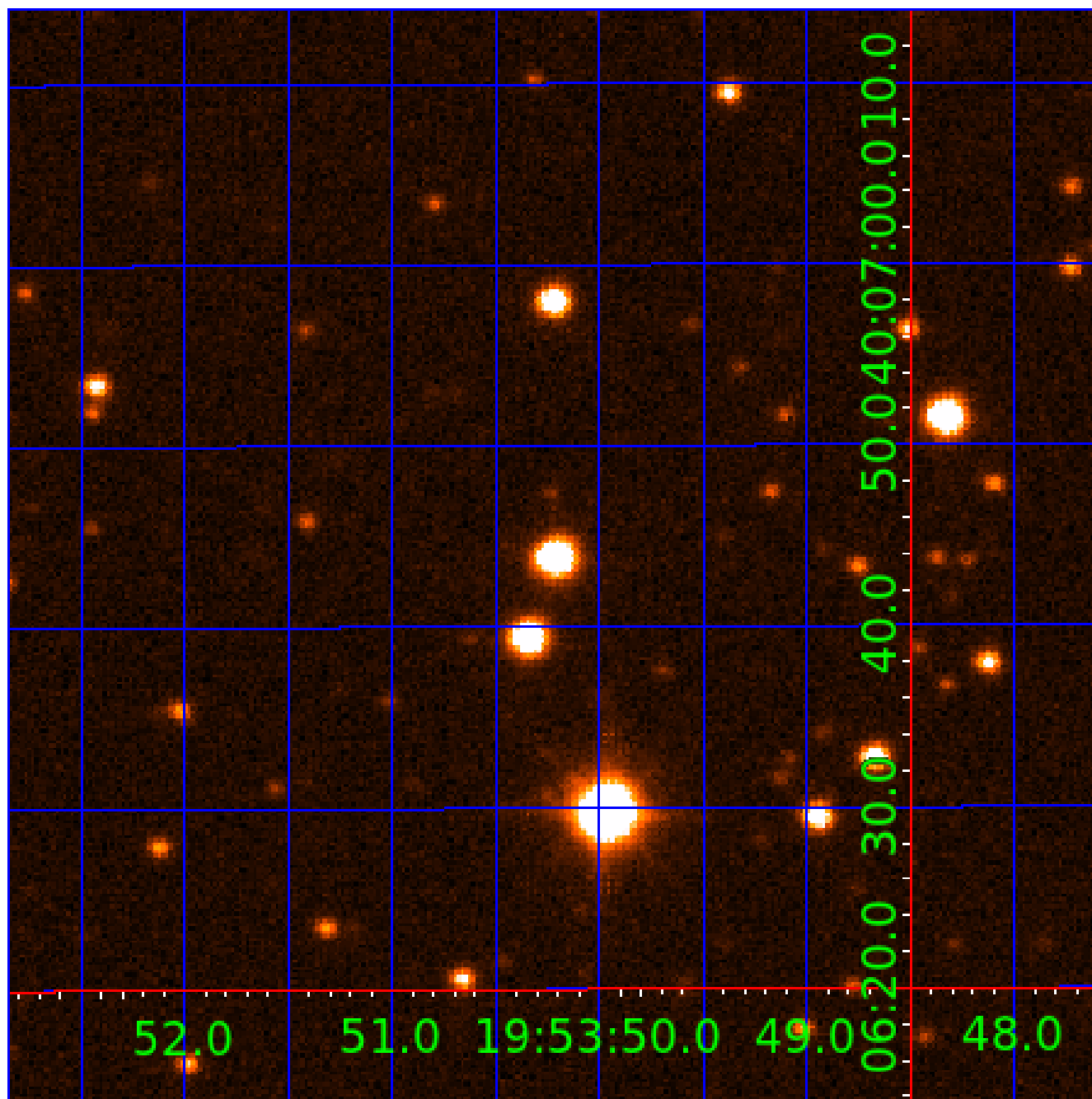
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





UKIRT Image

Declination



# KIC 005039684

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005039684-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005039684-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005039684-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE_TRACKER—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005039684-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_NOFITS—HALO_GHOST

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

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

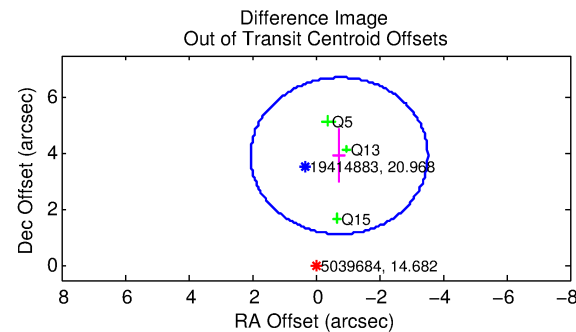
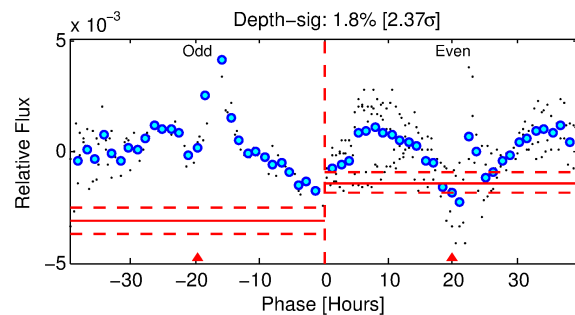
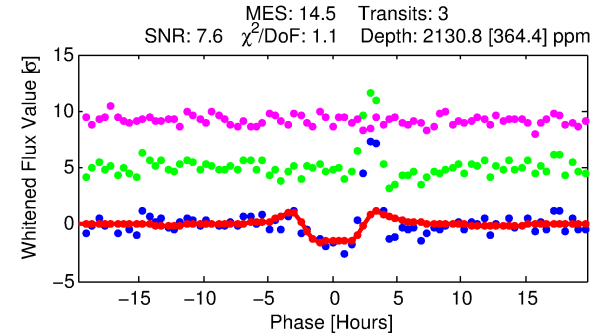
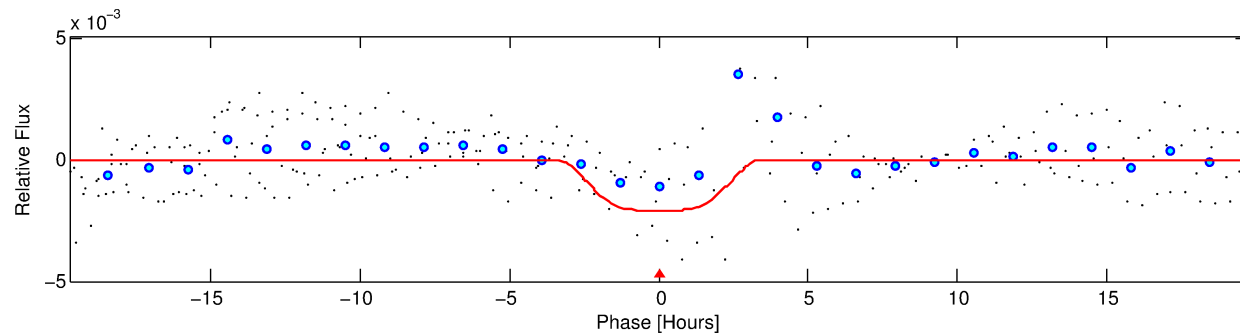
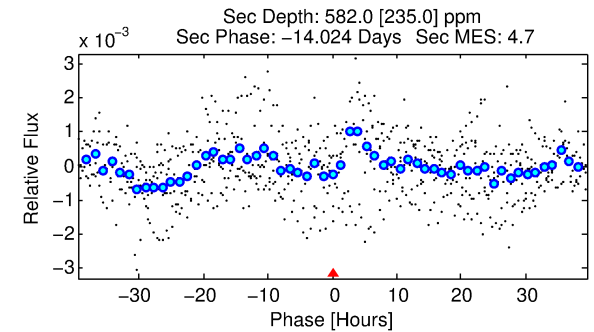
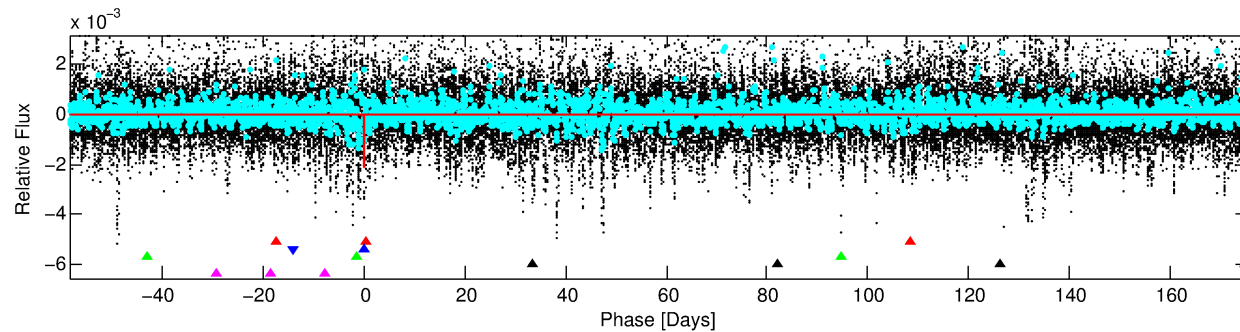
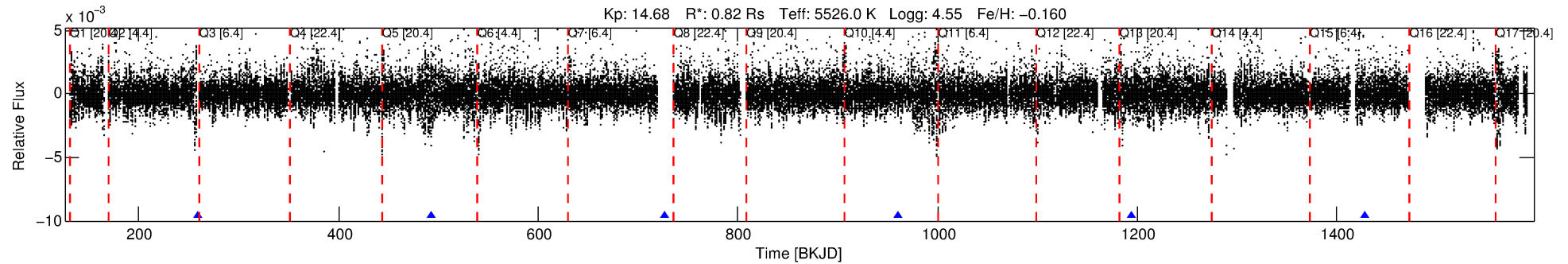
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 005039684-02

No Significant Match Found

# DV One-Page Summary

KIC: 5039684 Candidate: 2 of 5 Period: 233.934 d



## DV Fit Results:

Period = 233.93380 [0.00572] d  
Epoch = 258.8728 [0.0180] BKJD  
Rp/R\* = 0.0525 [0.0055]  
a/R\* = 134.78 [22.42]  
b = 0.93 [0.03]  
Seff = 1.12 [0.34]  
Teq = 262 [20] K  
Rp = 4.70 [1.18] Re  
a = 0.7096 [0.1352] AU  
Ag = 7282.39 [3876.02] [1.88σ]  
Teffp = 3745 [441] K [7.89σ]

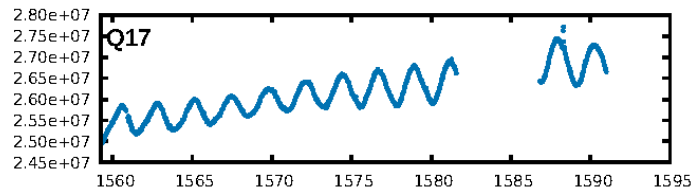
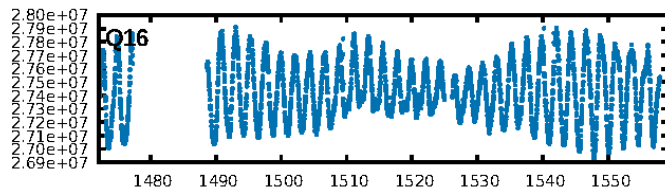
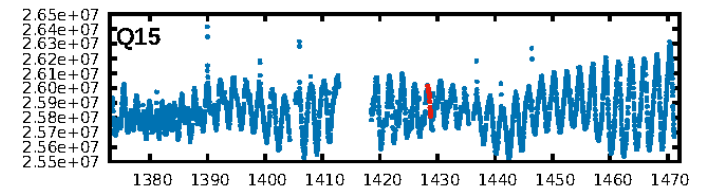
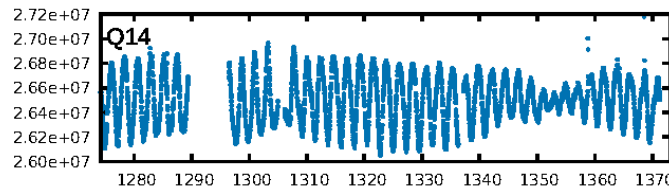
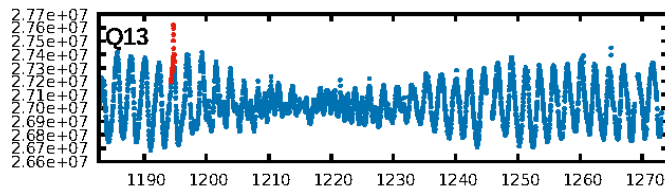
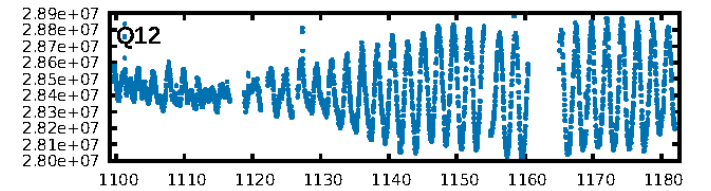
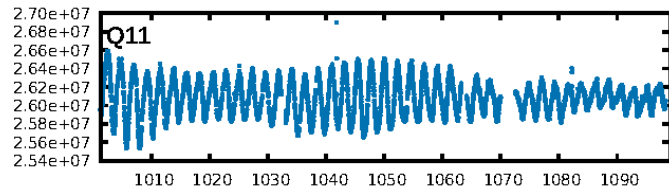
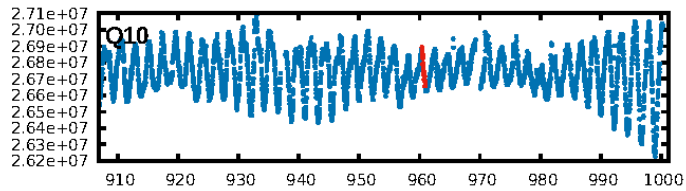
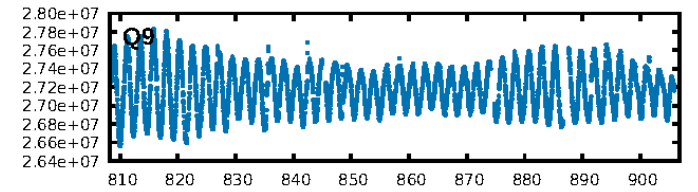
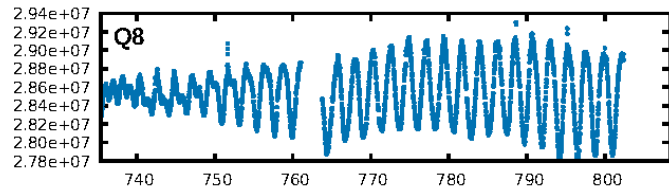
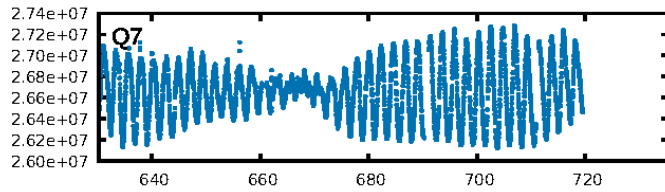
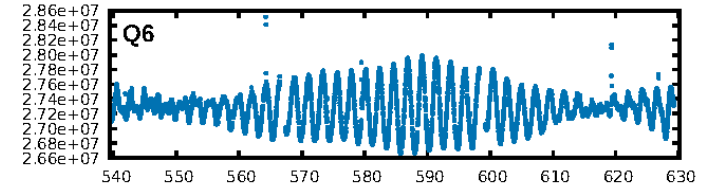
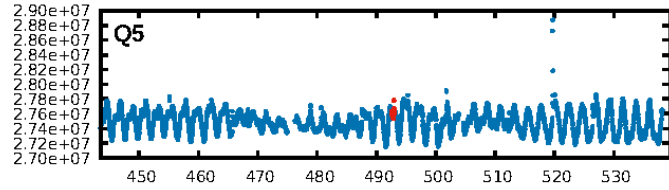
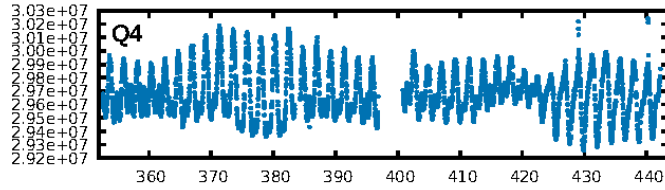
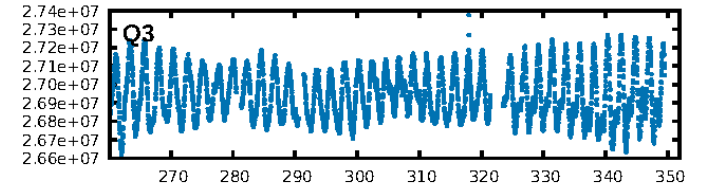
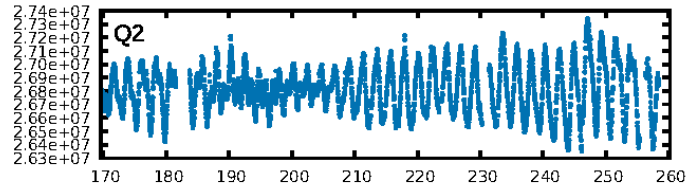
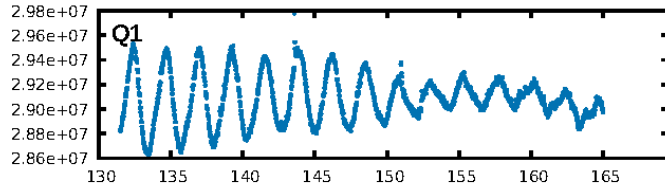
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [442.89σ]  
ModelChiSquare2-sig: 0.2%  
ModelChiSquareGof-sig: 80.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: -0.9841  
Centroid-sig: 27.4%  
Centroid-so: 2.192 arcsec [3.17σ]  
OotOffset-rm: 3.990 arcsec [4.29σ]  
KicOffset-rm: 0.226 arcsec [1.05σ]  
OotOffset-st: 0/1/0/2 [3]  
KicOffset-st: 0/1/0/2 [3]  
DiffImageQuality-fgm: 0.33 [1/3]  
DiffImageOverlap-fno: 0.75 [3/4]

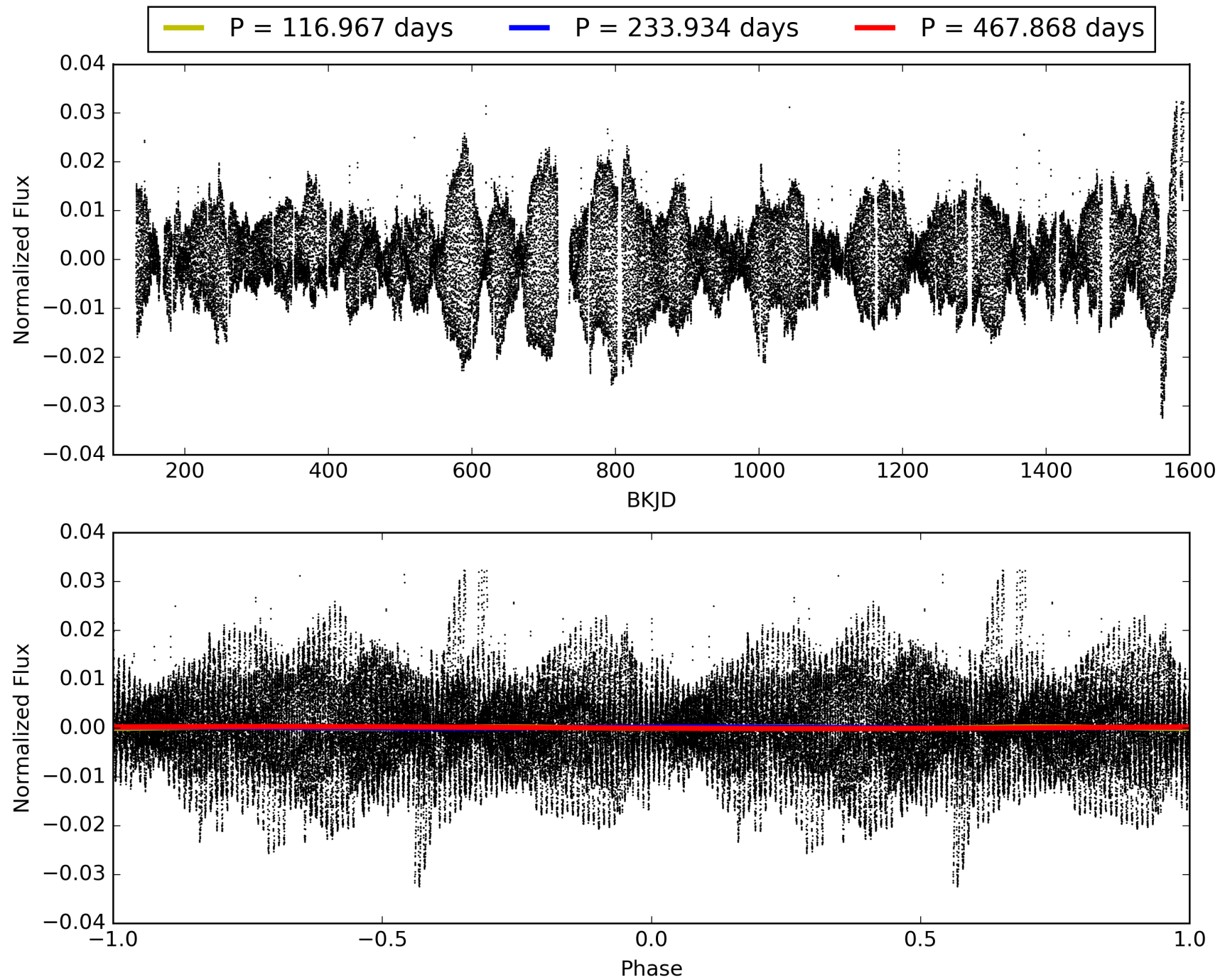
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 16:07:06 Z

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

# TCE 005039684-02, PDC Light Curves



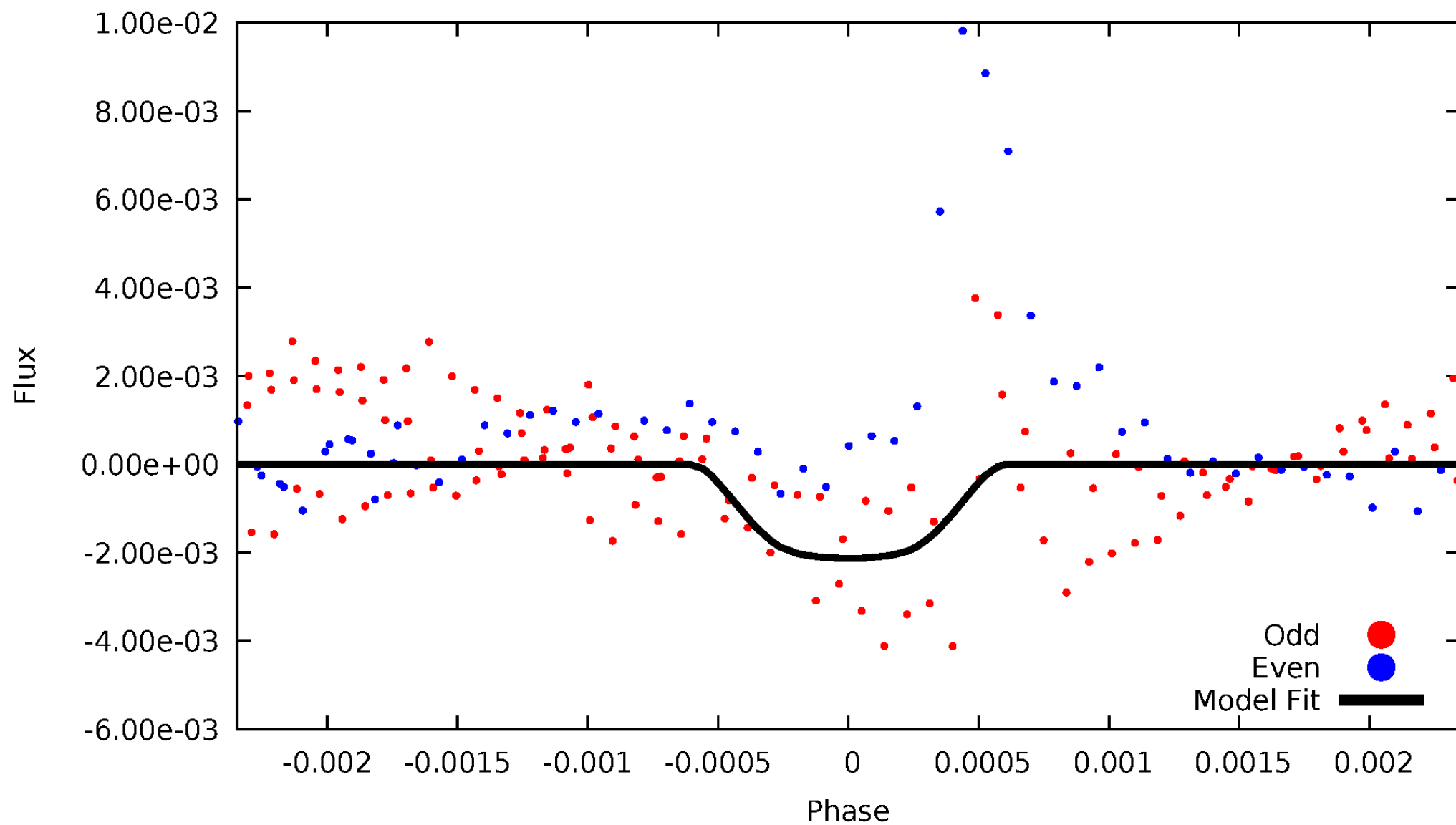
TCE 005039684-02





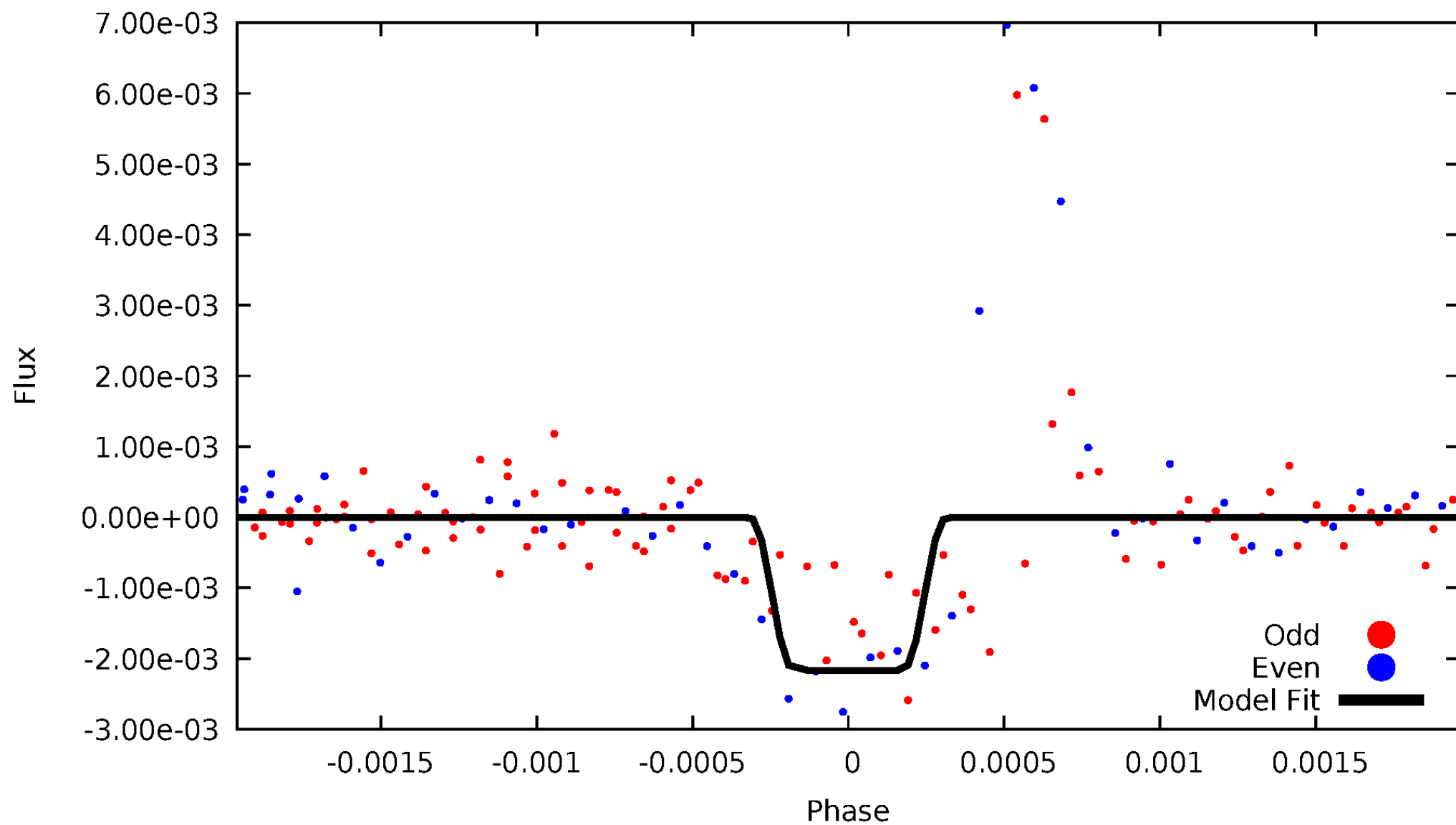
# DV Odd/Even

TCE 005039684-02



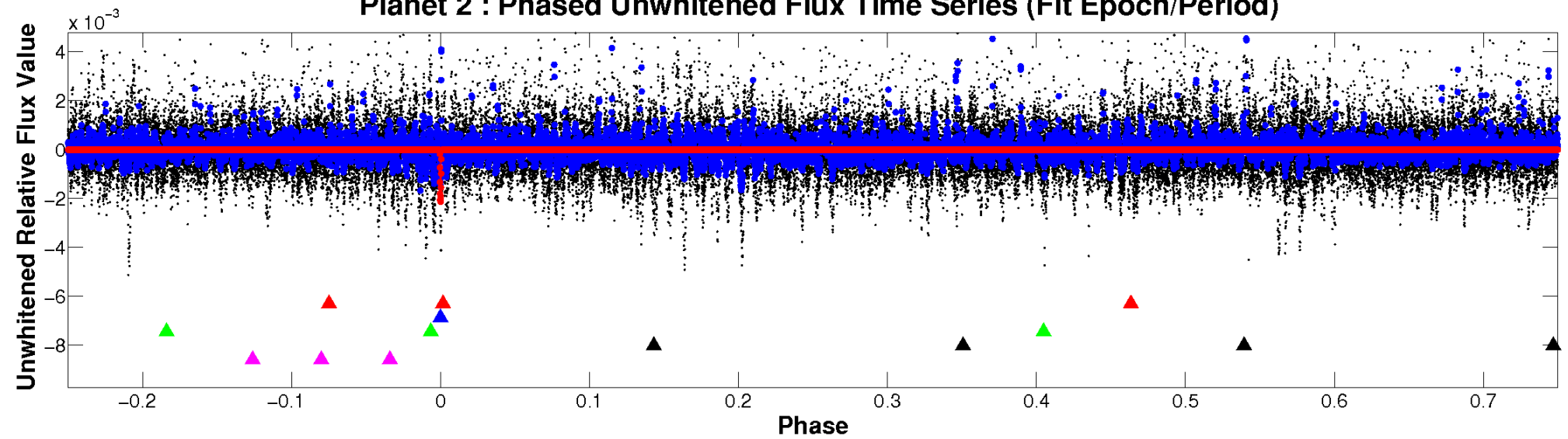
# ALT Odd/Even

TCE 005039684-02

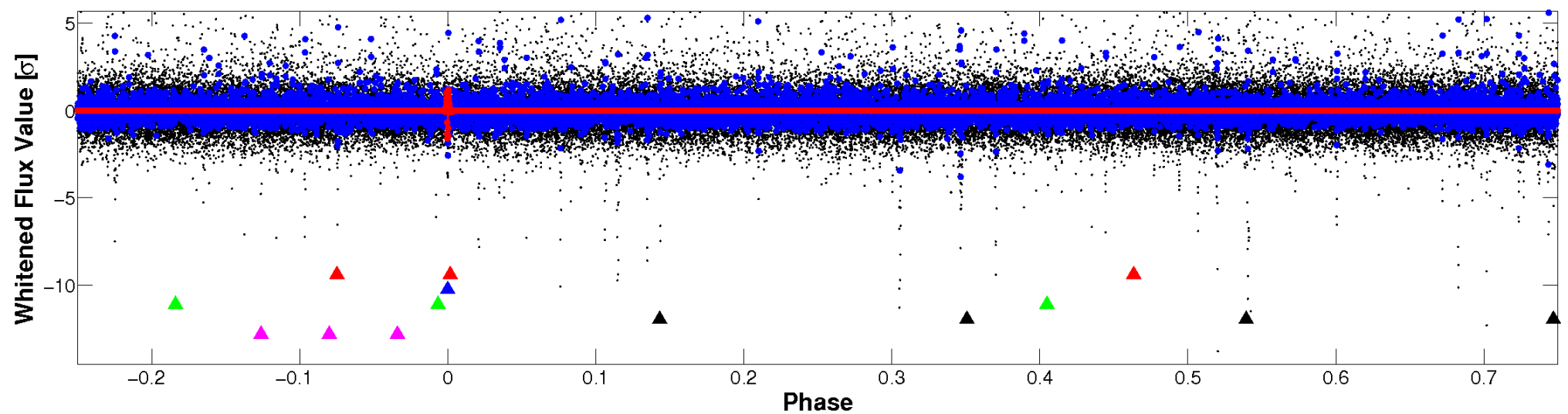


# Non-Whitened Vs. Whitened Light Curve

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

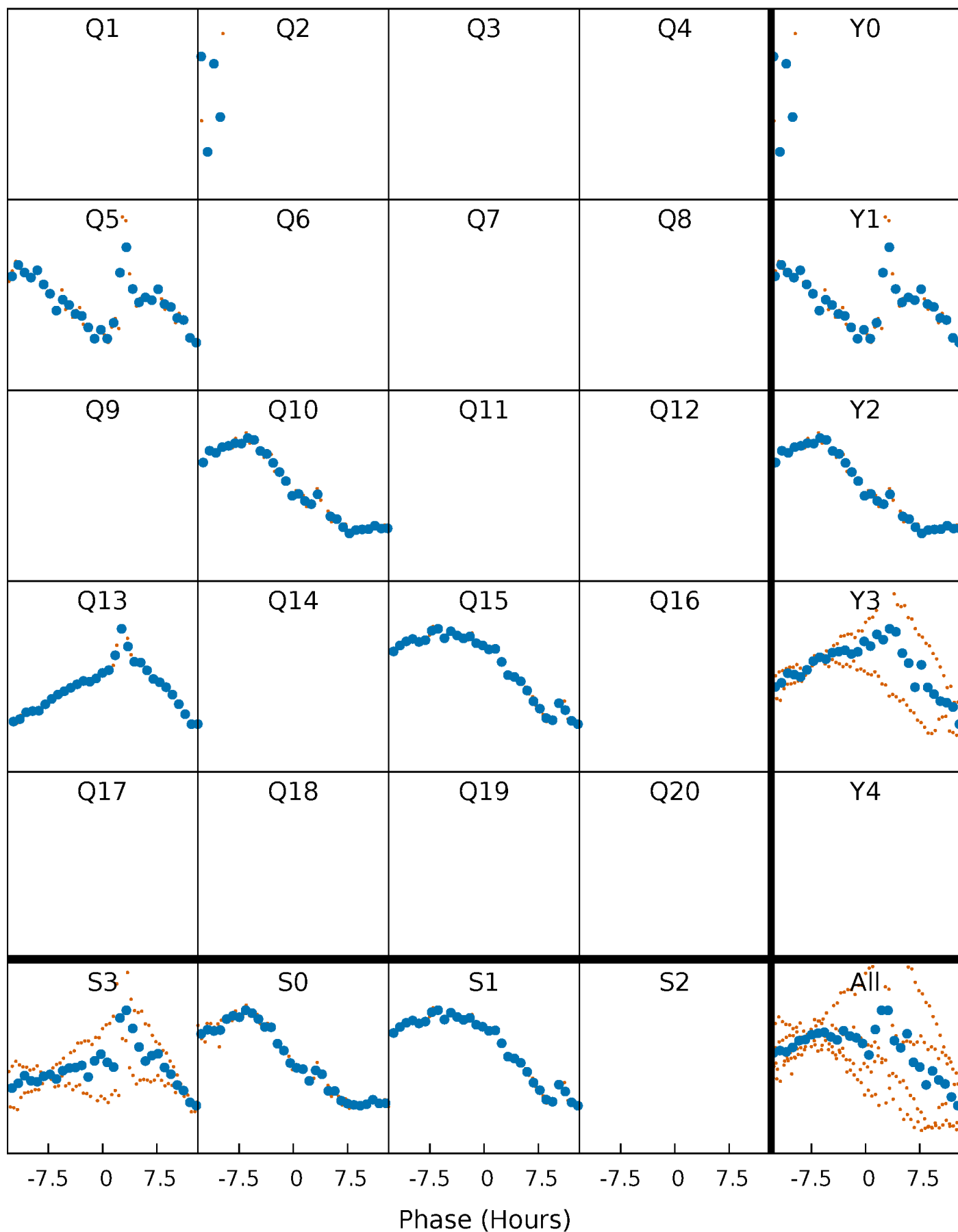


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



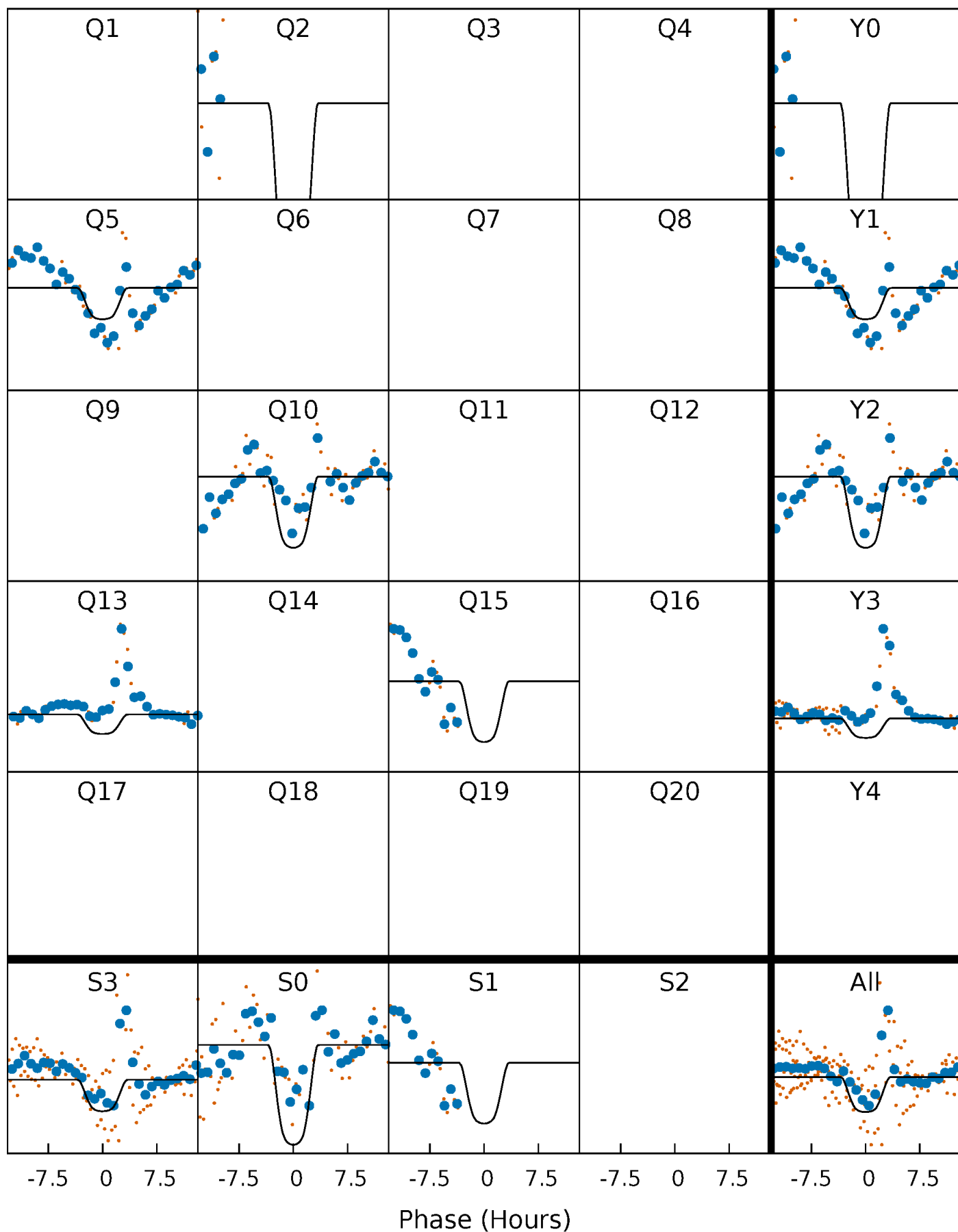
# PDC Quarter-Phased Transit Curves

TCE 005039684-02 P=233.933802 Days  $T_0=258.872801$  (BKJD)



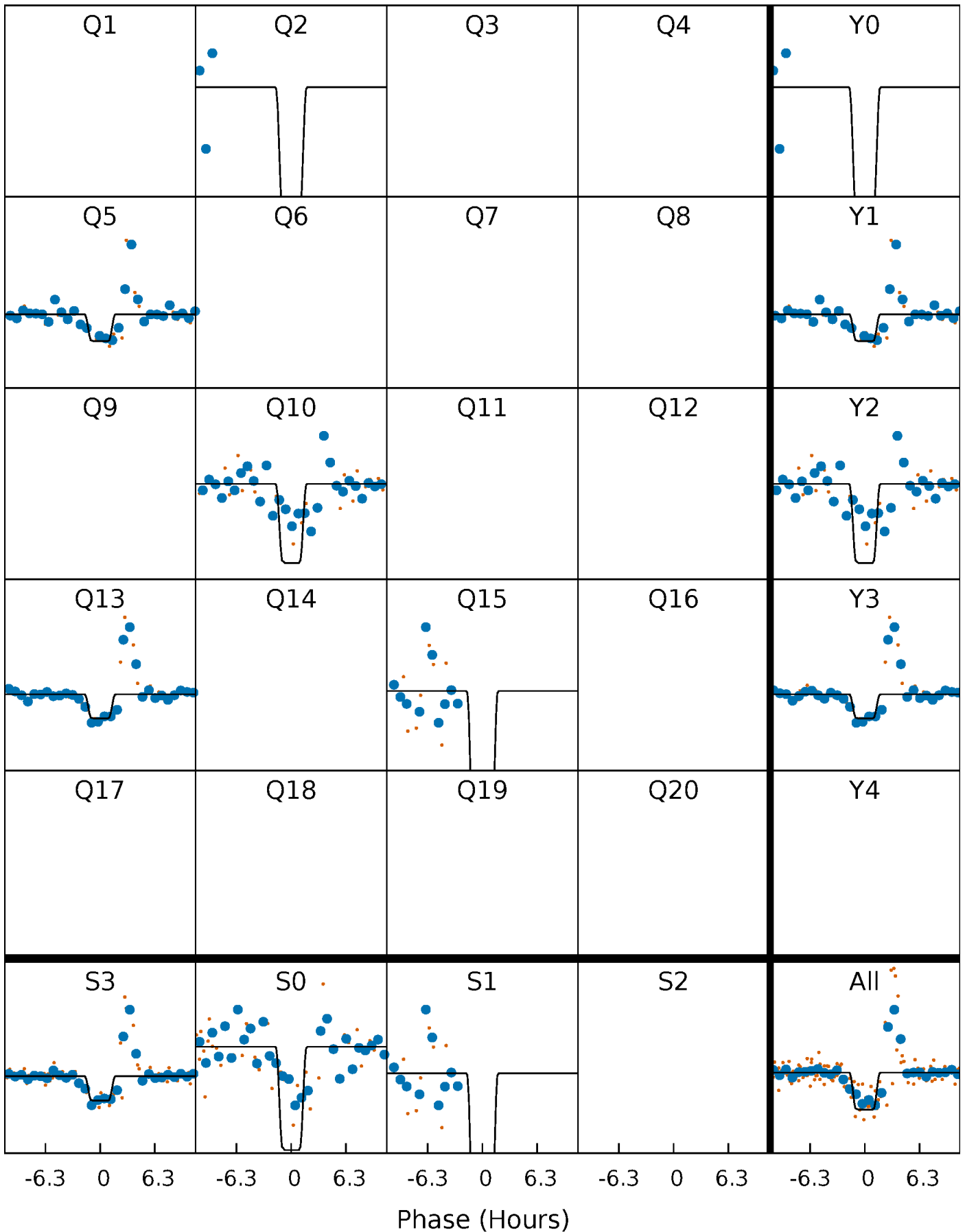
# DV Quarter-Phased Transit Curves

TCE 005039684-02 P=233.933802 Days  $T_0=258.872801$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

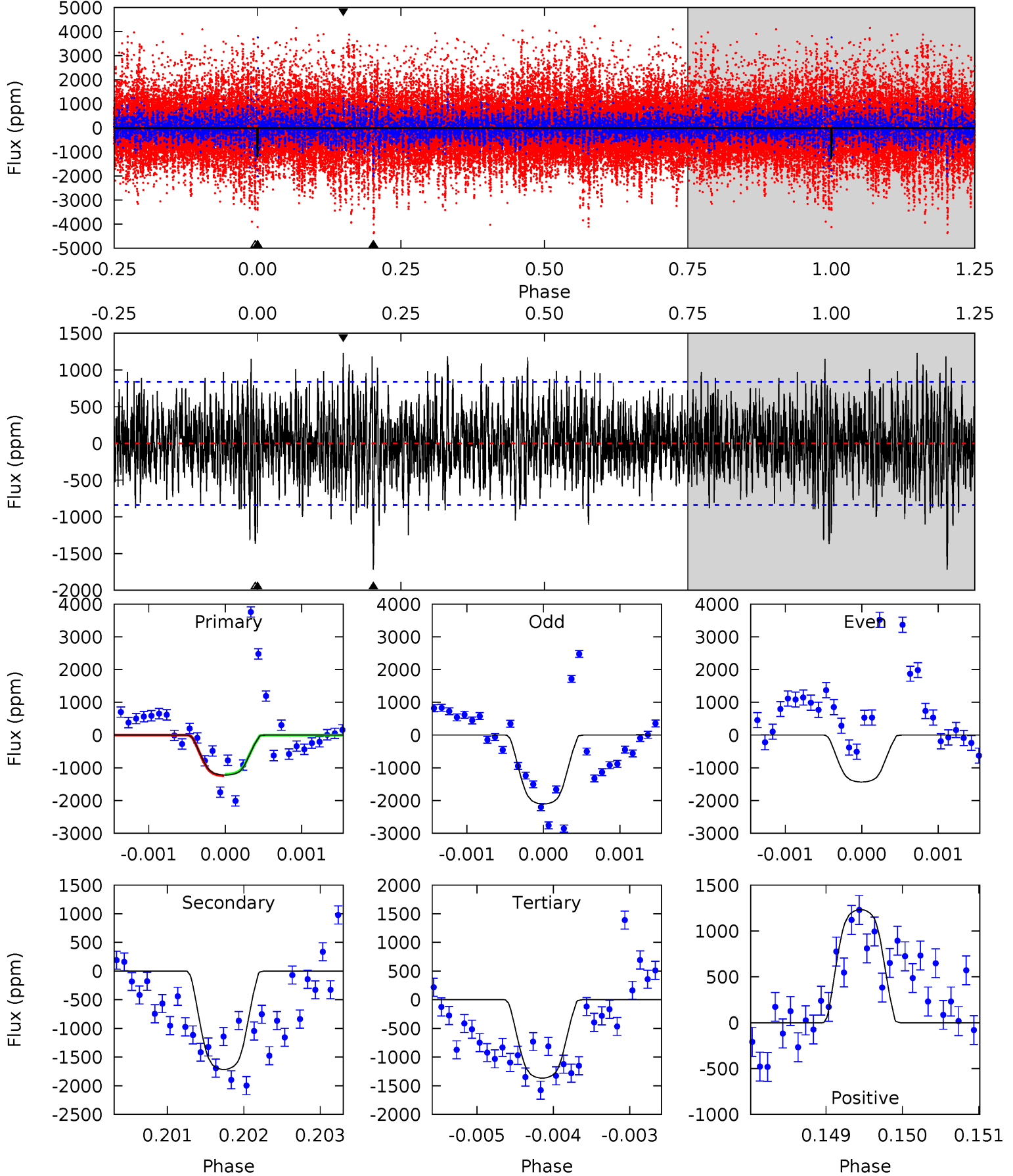
TCE 005039684-02     $P=233.932649$  Days     $T_0=258.861354$  (BKJD)



# DV Model-Shift Uniqueness Test

005039684-02, P = 233.933802 Days, E = 24.938999 Days

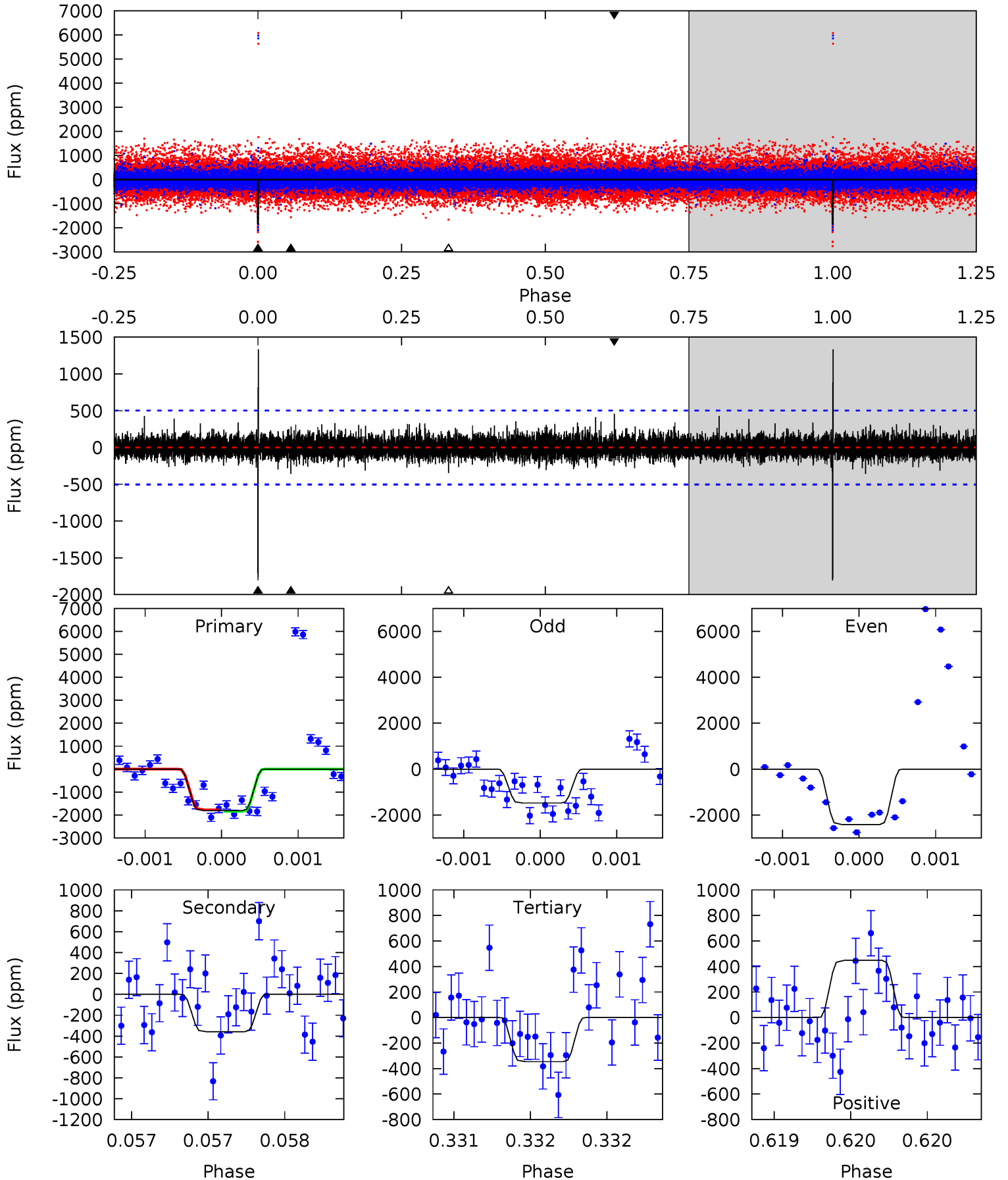
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.89	11.1	8.83	7.96	5.41	3.22	2.33	-0.94	-0.08	2.26	3.13	2.23	0.99	0.42	0.13



# Alt Model-Shift Uniqueness Test

005039684-02, P = 233.932649 Days, E = 24.928705 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
20.0	3.95	3.82	4.94	5.55	3.44	0.96	16.1	15.0	0.14	-0.99	5.15	0.87	0.42	0.34





### Stellar Parameters For KIC 005039684

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5526^{+166}_{-149}$	$4.549^{+0.050}_{-0.150}$	$-0.160^{+0.300}_{-0.300}$	$0.821^{+0.187}_{-0.080}$	$0.870^{+0.092}_{-0.092}$	$2.214^{+0.541}_{-0.929}$
	+3%/-3%	+1%/-3%	+188%/-188%	+23%/-10%	+11%/-11%	+24%/-42%
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 005039684-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-1718 \pm 155$	$4.81^{+0.80}_{-0.64}$	$374^{+21}_{-16}$	$5010^{+290}_{-253}$	$20294^{+6679}_{-5514}$
Alt.	$-358 \pm 91$	$4.28^{+0.70}_{-0.59}$	$372^{+22}_{-15}$	$3861^{+259}_{-225}$	$5200^{+2515}_{-1719}$

$T_{max}$  = Theoretical Maximum Planetary Temperature  
 $T_{obs}$  = Observed Planetary Temperature (Assuming A=0.3)  
 $A_{obs}$  = Observed Albedo (Assuming T=0)

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

## DV Centroid Data

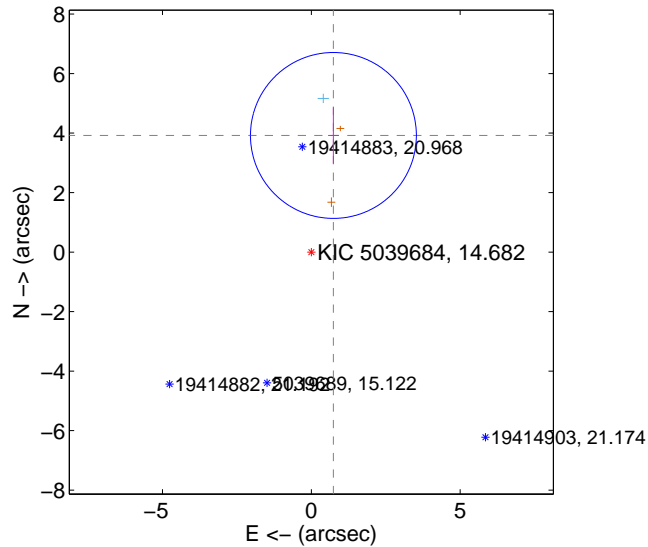
Supplemental centroid analysis for 005039684-02. Kepler magnitude: 14.68. Transit SNR 7.61

There are 1 quarters with good PRF difference image offsets

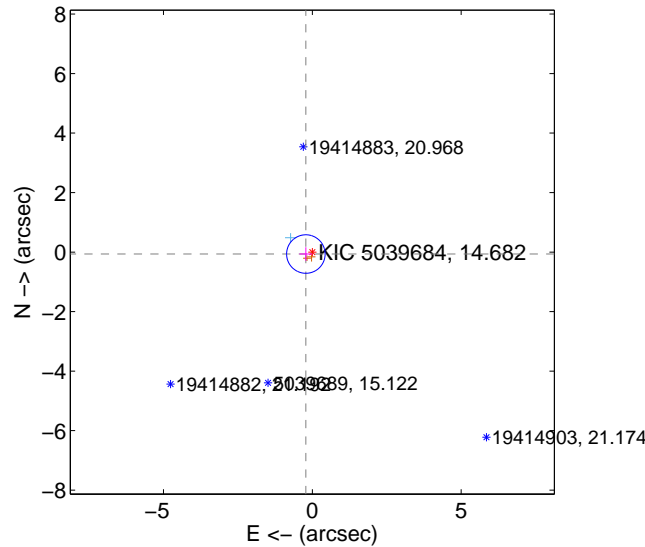
The direct PRF centroid is offset from the target star catalog position by about 1.97 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$3.990 \pm 0.929$	4.29	$-0.743 \pm 0.181$	$3.920 \pm 0.945$
PRF-fit source offset from KIC position	$0.226 \pm 0.216$	1.05	$0.217 \pm 0.215$	$-0.065 \pm 0.227$
photometric centroid source offset	$2.19 \pm 0.69$	3.17	$0.64 \pm 0.39$	$-2.10 \pm 0.71$

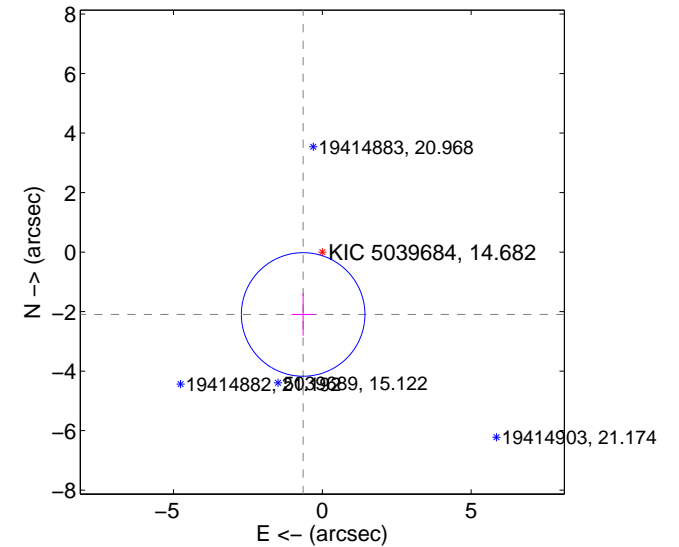
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



offset from photometric centroids

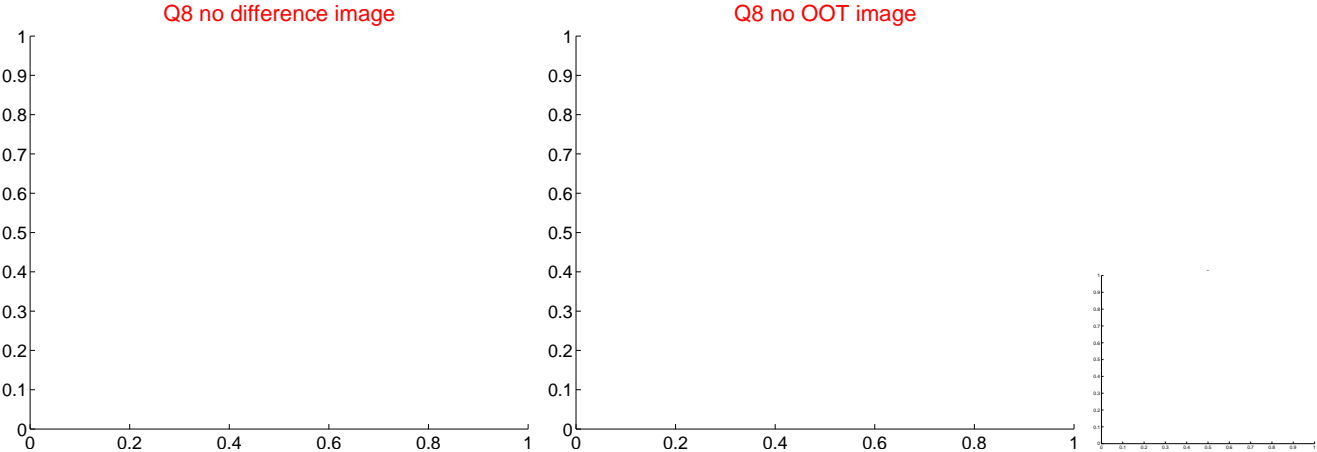
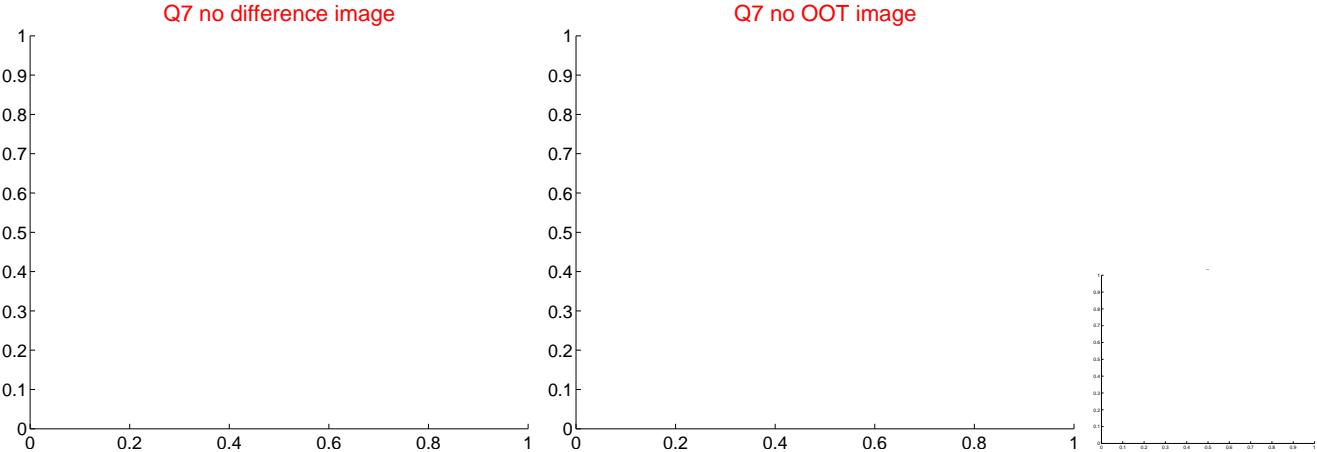
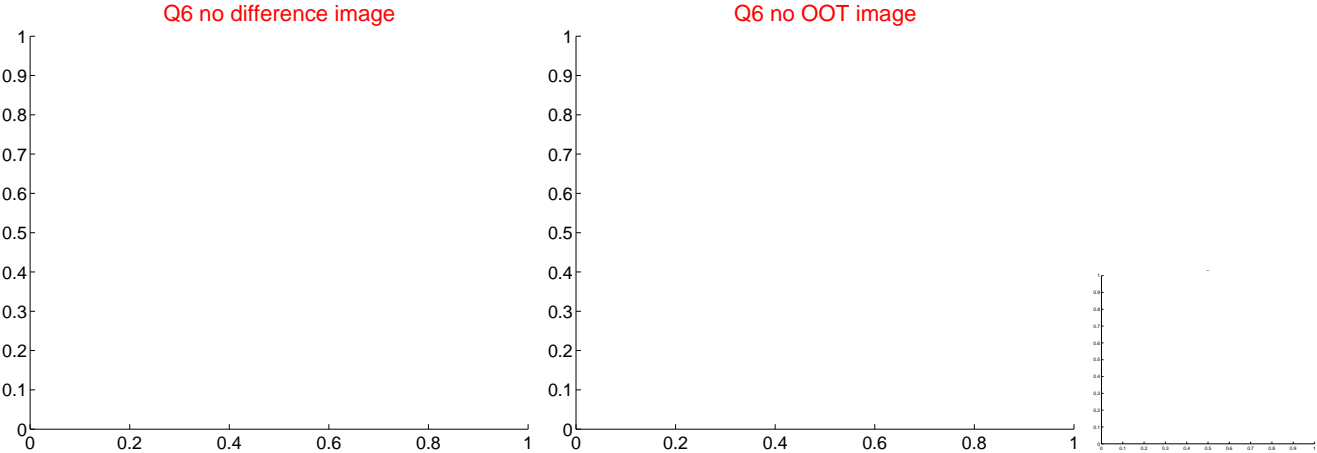
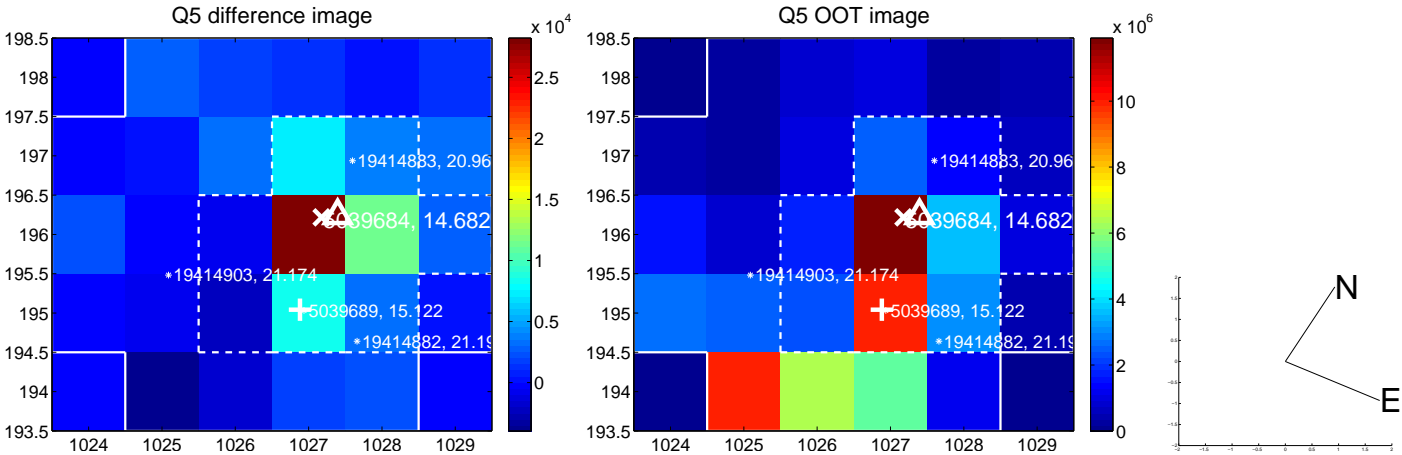


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

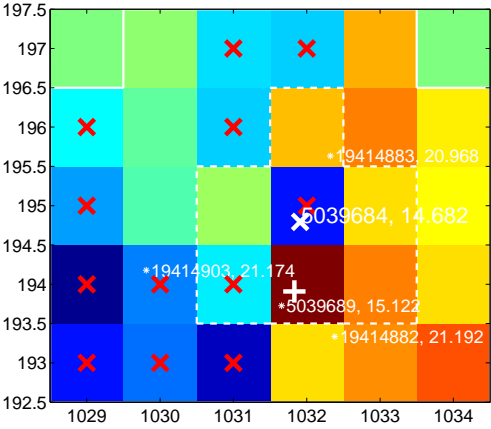
Q9 no difference image



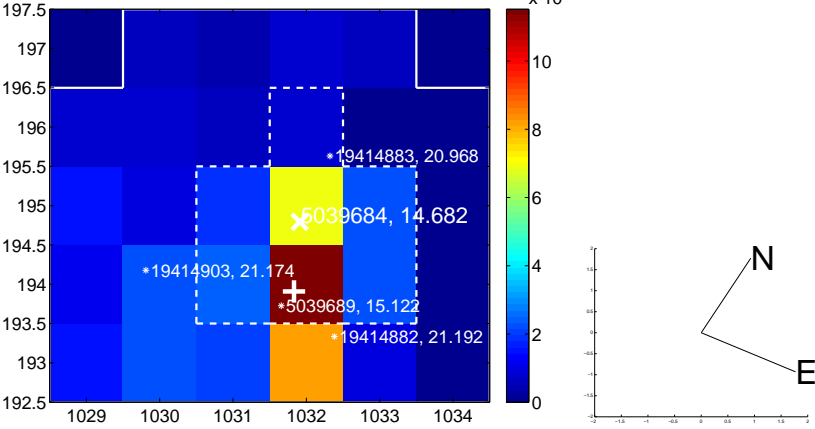
Q9 no OOT image



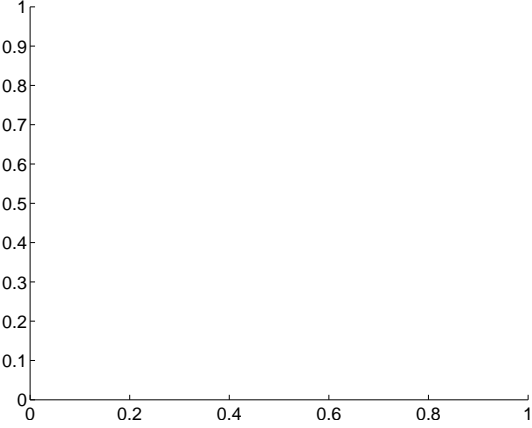
Q10 difference image. Poor Quality



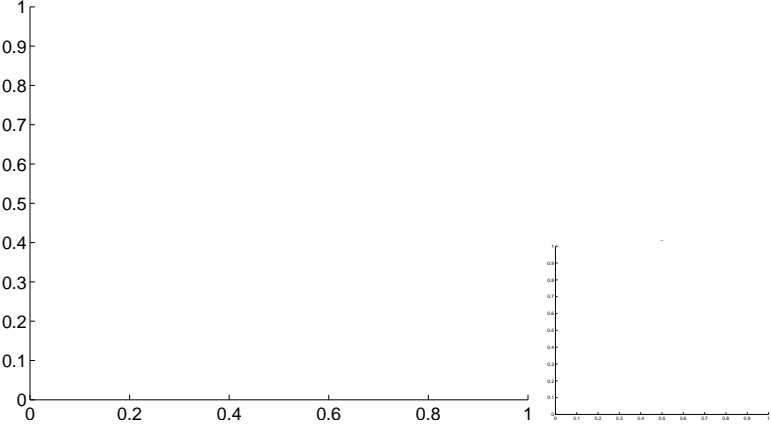
Q10 OOT image



Q11 no difference image



Q11 no OOT image



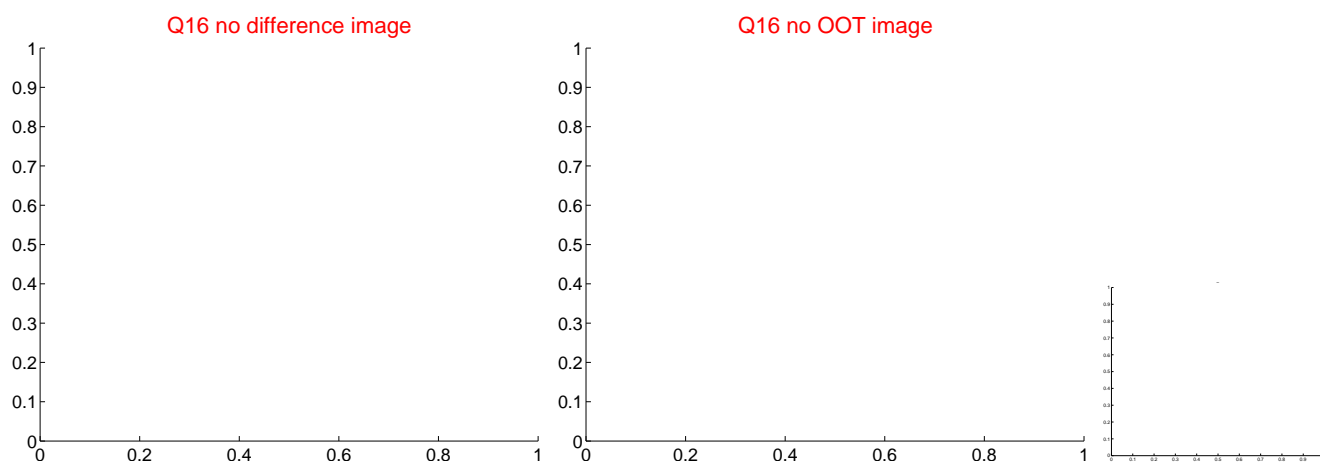
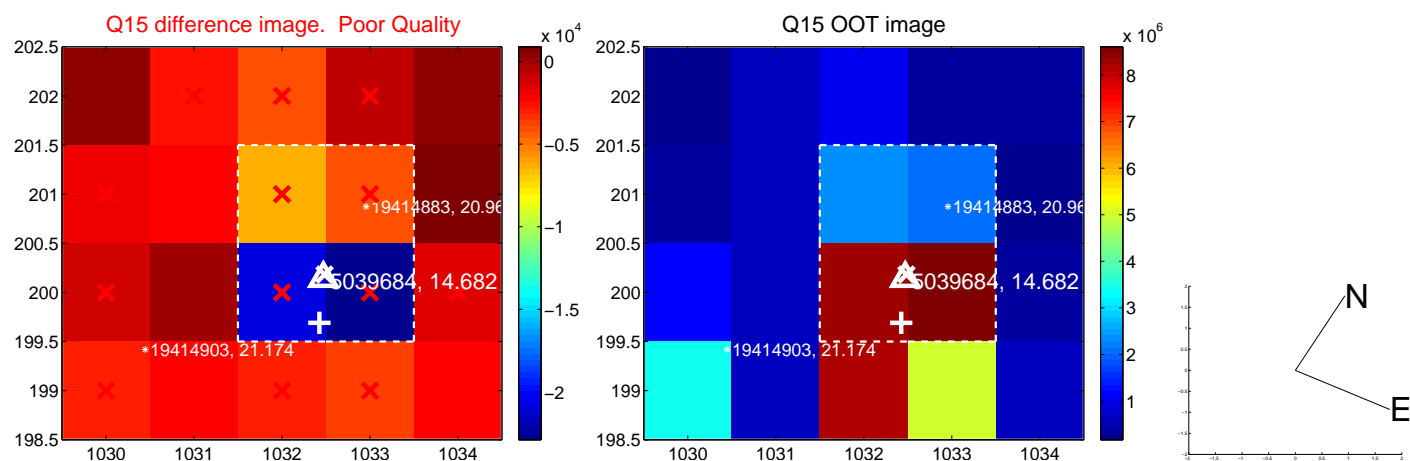
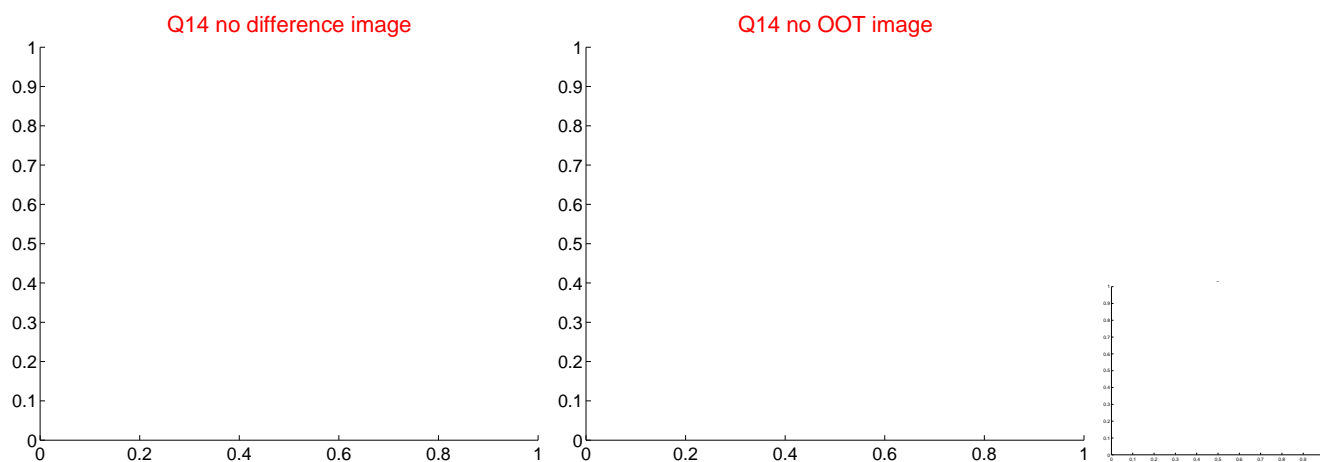
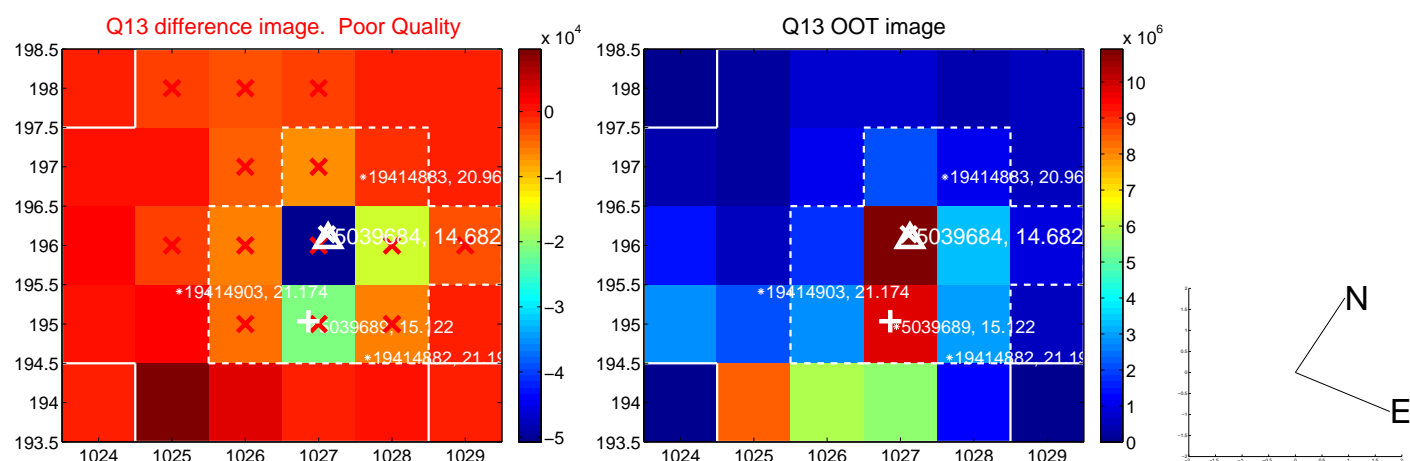
Q12 no difference image



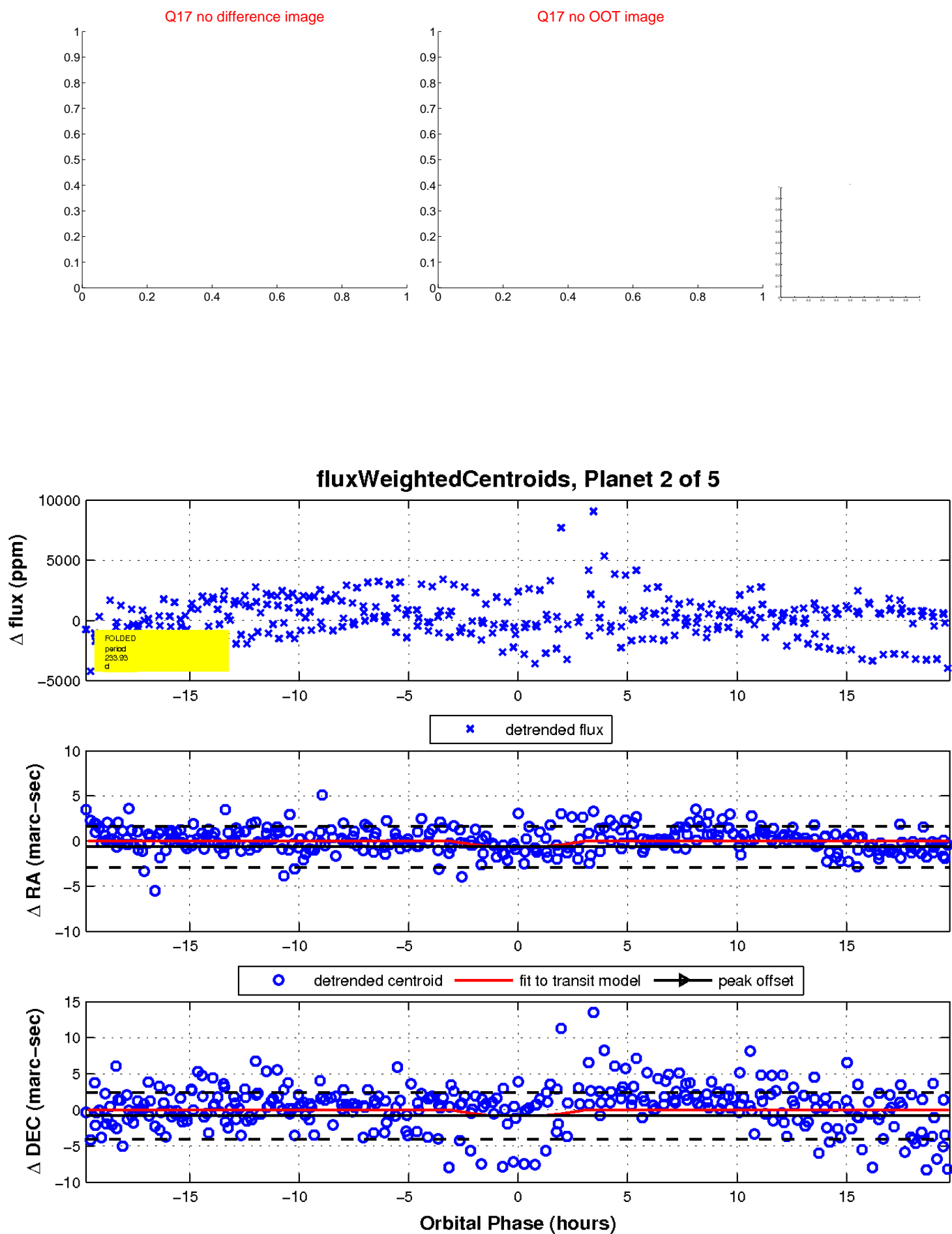
Q12 no OOT image



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

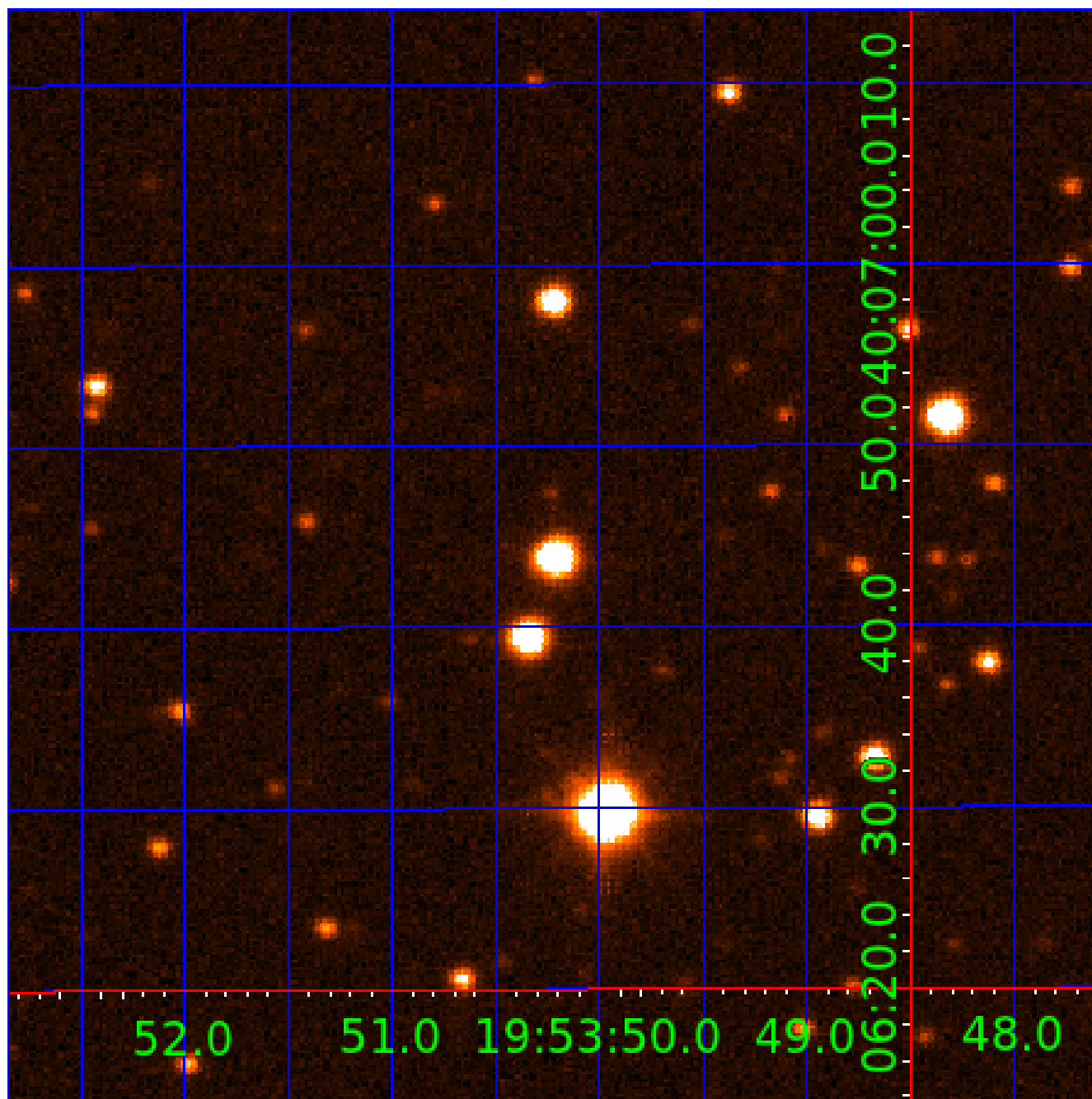


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 005039684

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005039684-01	OBS	No	593.783060	241.375691	1518.3	8.430	14.9	5.4	0.82	5526	3.43	0.32
005039684-02	OBS	No	233.933802	258.872801	2130.8	6.584	14.5	7.6	0.82	5526	4.71	1.12
005039684-03	OBS	No	605.577962	215.863531	1928.8	9.282	10.3	6.5	0.82	5526	3.55	0.32
005039684-04	OBS	No	375.177216	151.129344	1501.9	3.903	12.7	7.4	0.82	5526	3.15	0.60
005039684-05	OBS	No	457.091926	484.861736	1708.5	3.500	11.6	-1.0	0.82	5526	3.35	0.46

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005039684-01	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_KIC_POS
005039684-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005039684-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005039684-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE_TRACKER—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005039684-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_NOFITS—HALO_GHOST

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

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

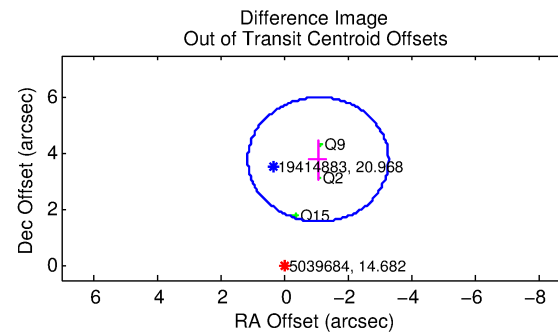
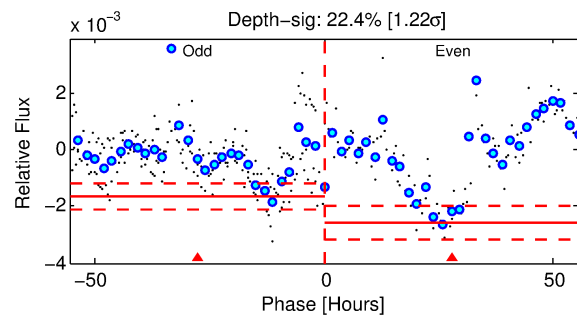
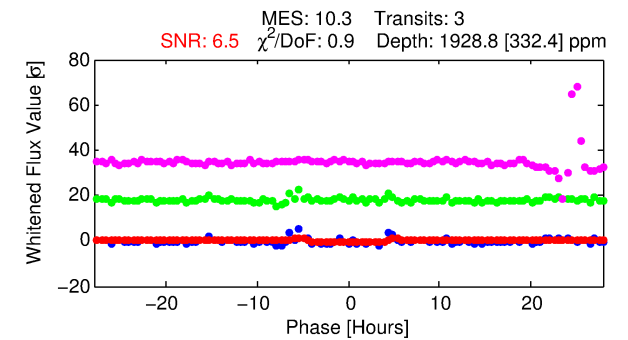
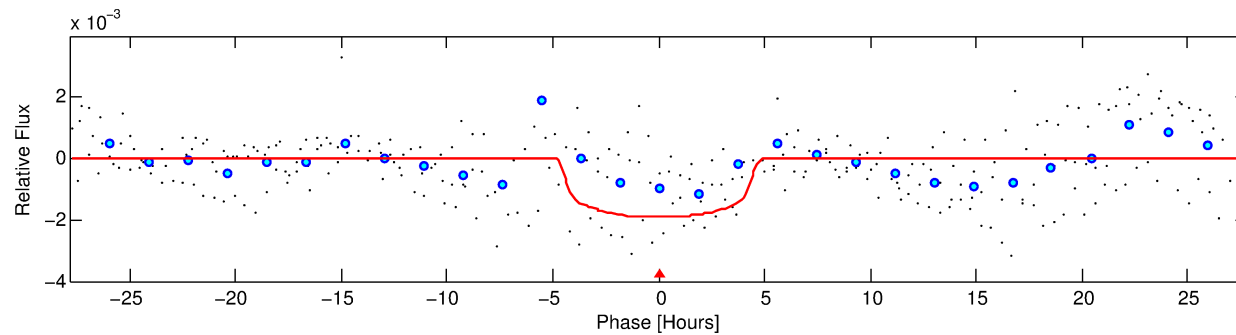
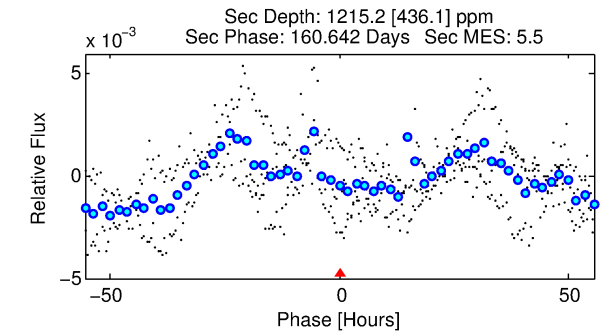
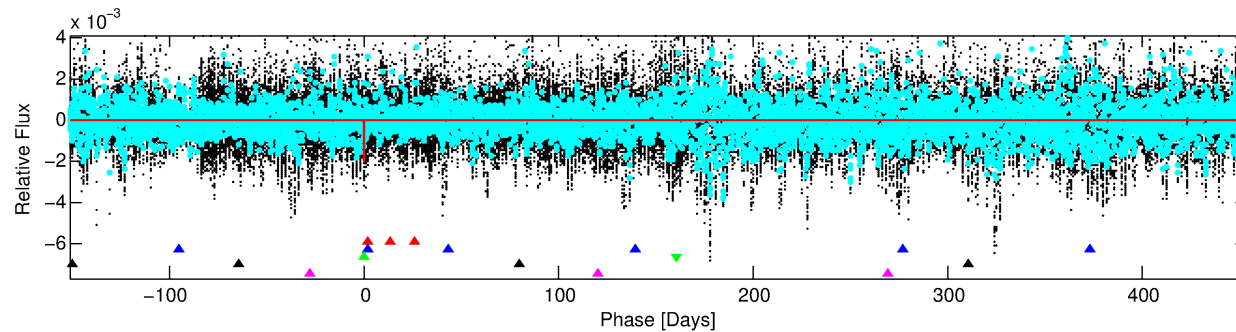
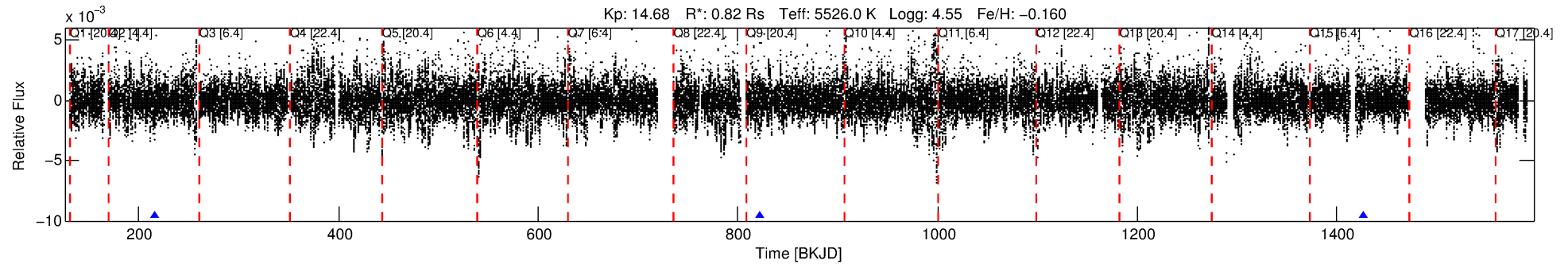
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 005039684-03

No Significant Match Found

# DV One-Page Summary

KIC: 5039684 Candidate: 3 of 5 Period: 605.578 d



## DV Fit Results:

Period = 605.57796 [0.00524] d  
Epoch = 215.8635 [0.0066] BKJD  
Rp/R\* = 0.0396 [0.0262]  
a/R\* = 518.01 [1375.59]  
b = 0.02 [108.45]  
Seff = 0.31 [0.09]  
Teq = 191 [14] K  
Rp = 3.55 [2.48] Re  
a = 1.3377 [0.2549] AU  
Ag = 94957.18 [132738.62] [0.72 $\sigma$ ]  
Teffp = 5183 [1783] K [2.80 $\sigma$ ]

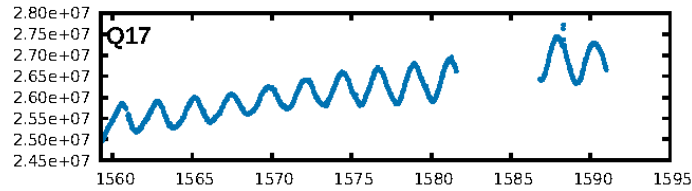
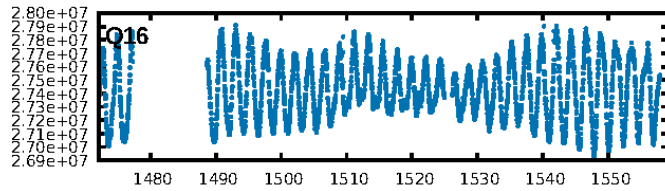
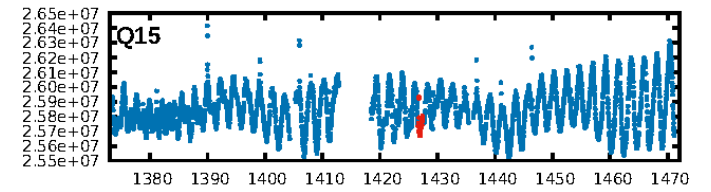
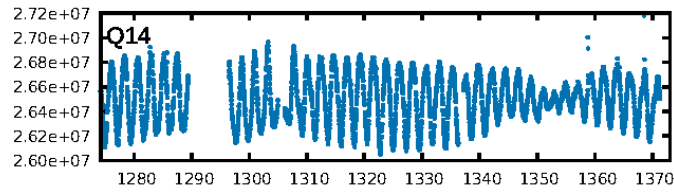
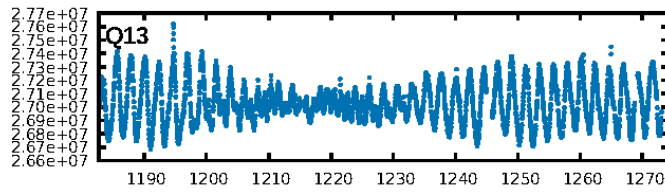
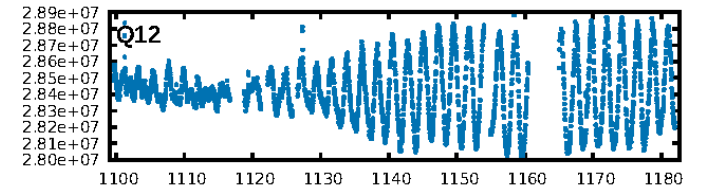
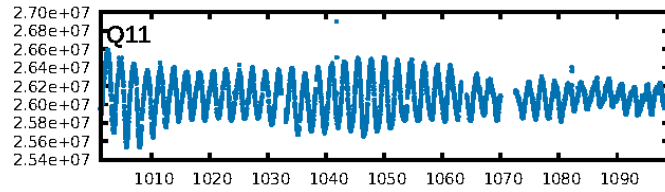
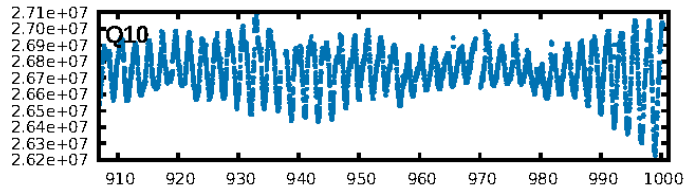
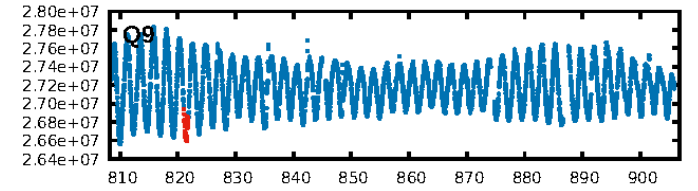
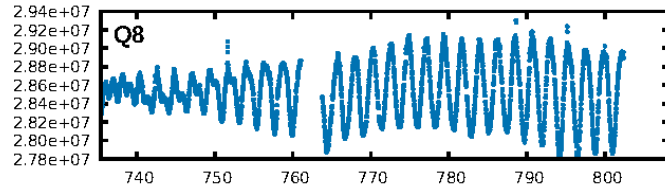
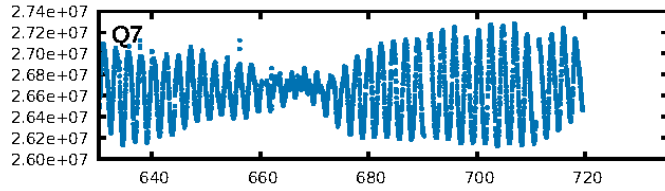
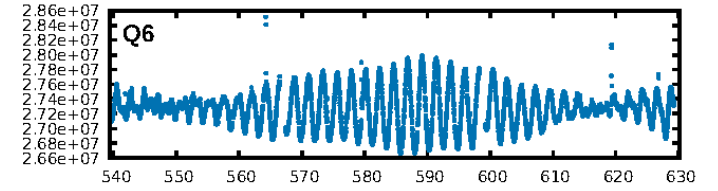
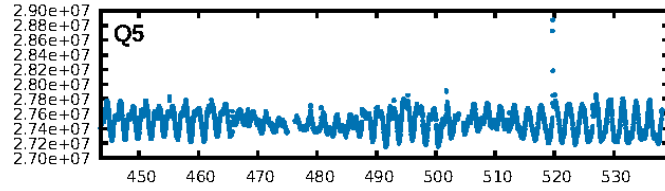
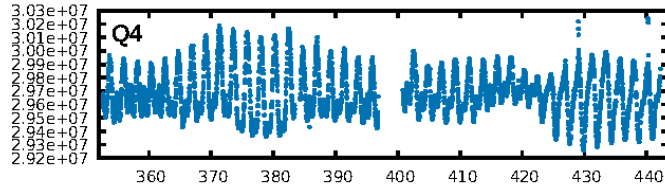
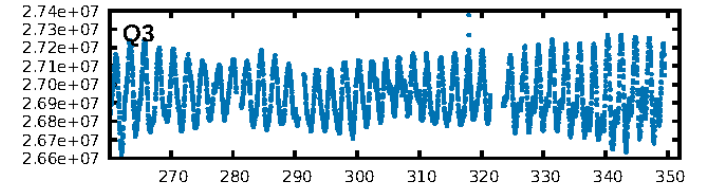
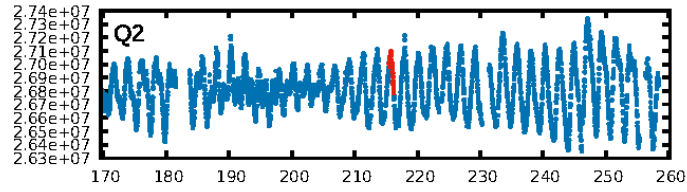
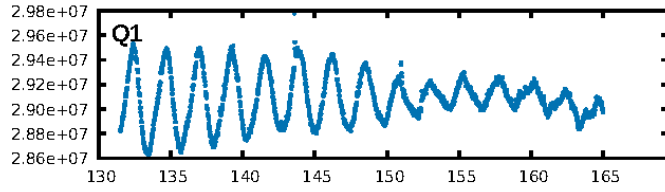
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [22.58 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 7.5%  
ModelChiSquareGof-sig: 99.4%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 1.32  
Centroid-sig: 11.9%  
Centroid-so: 2.912 arcsec [3.24 $\sigma$ ]  
OotOffset-rm: 3.940 arcsec [5.34 $\sigma$ ]  
KicOffset-rm: 0.157 arcsec [1.57 $\sigma$ ]  
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]

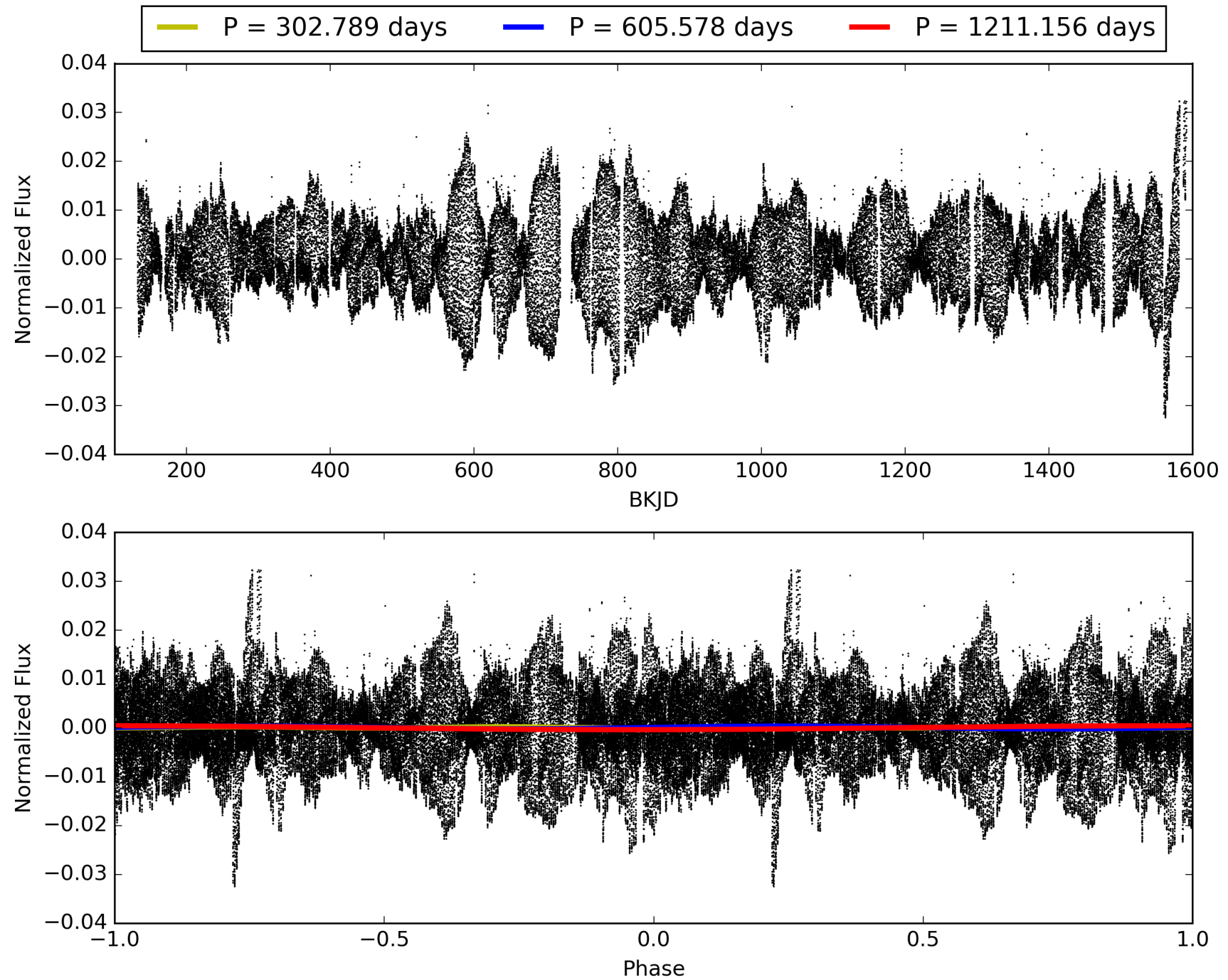
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 16:07:18 Z

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

# TCE 005039684-03, PDC Light Curves

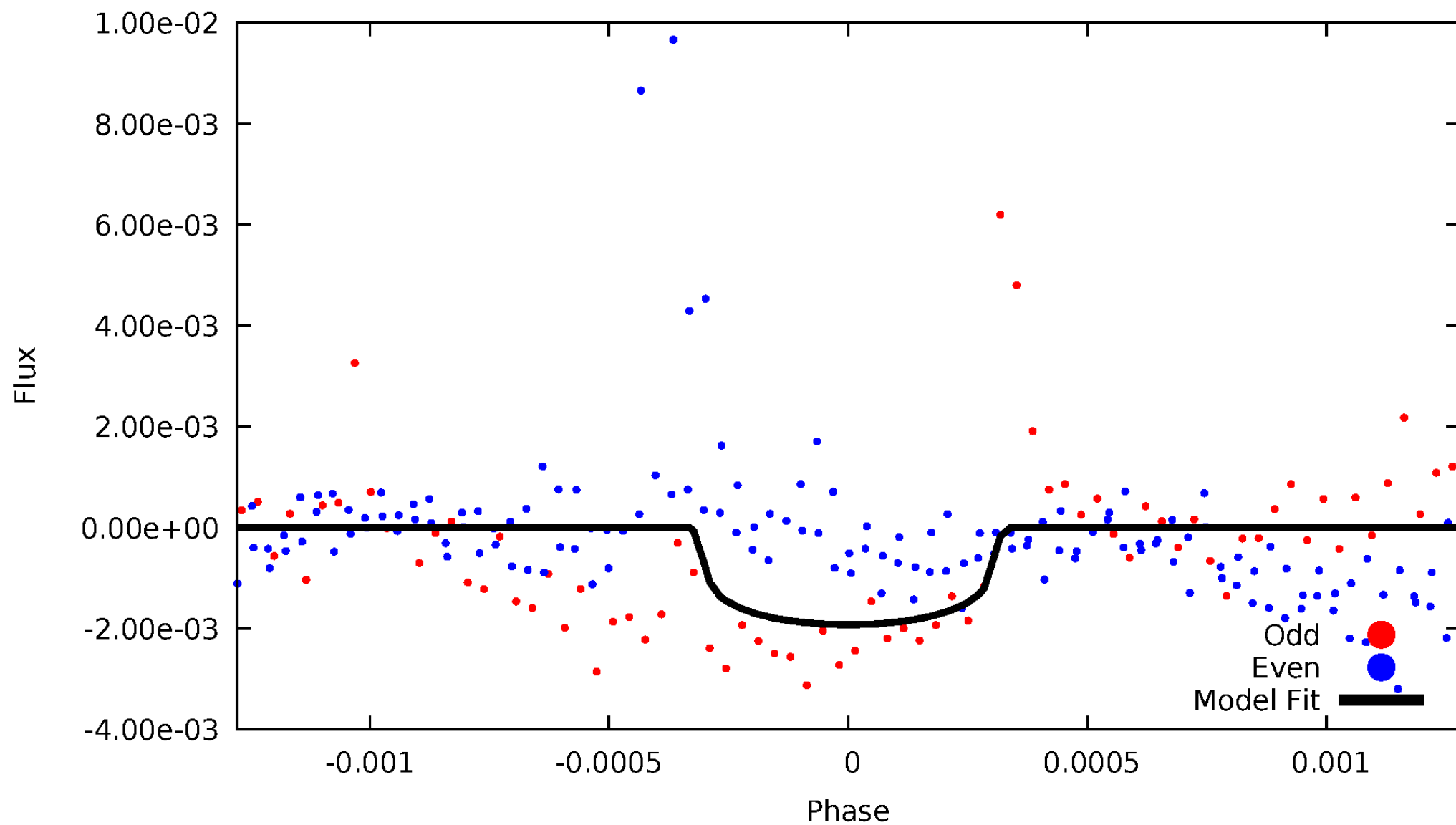


TCE 005039684-03



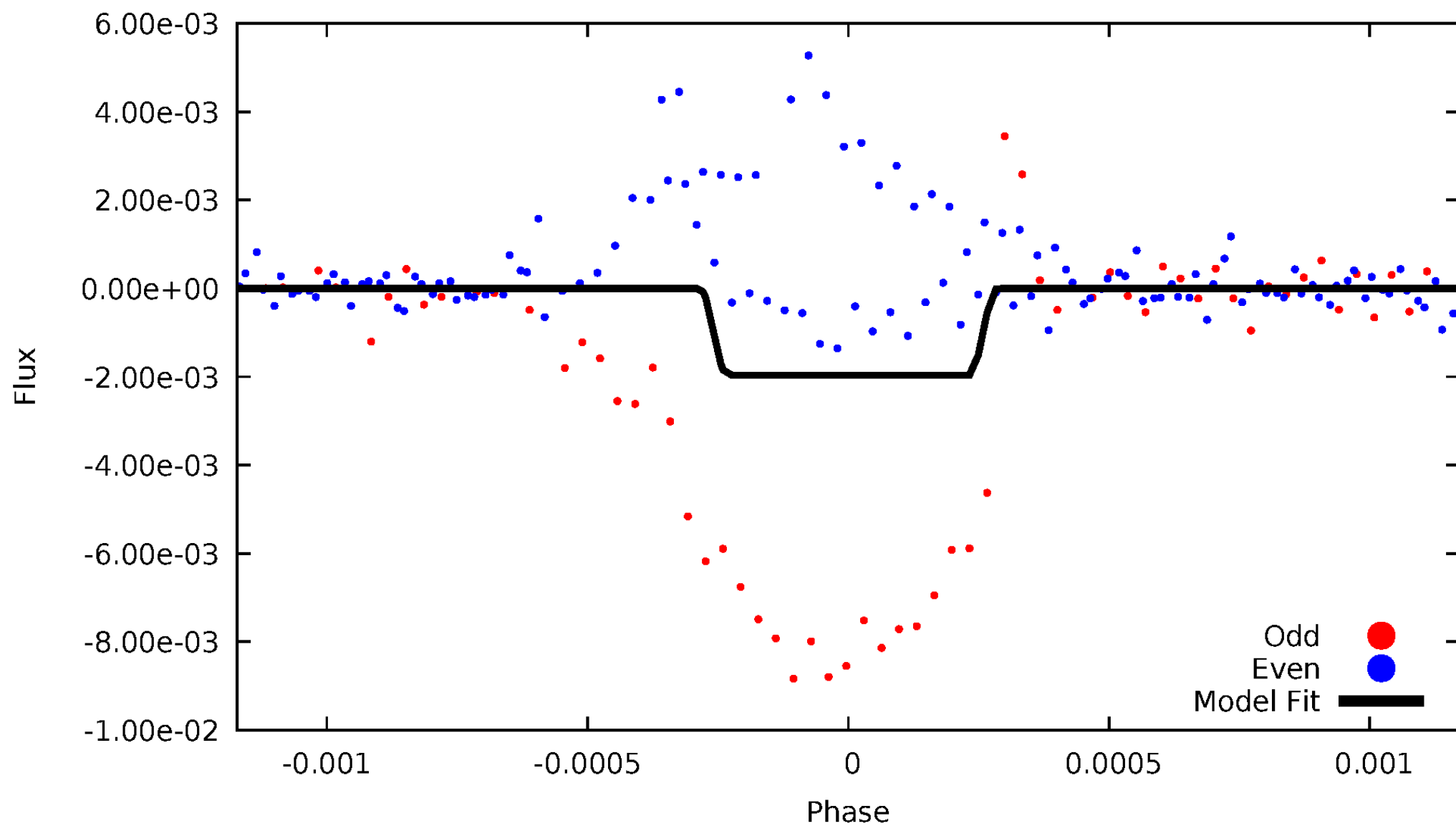
# DV Odd/Even

TCE 005039684-03



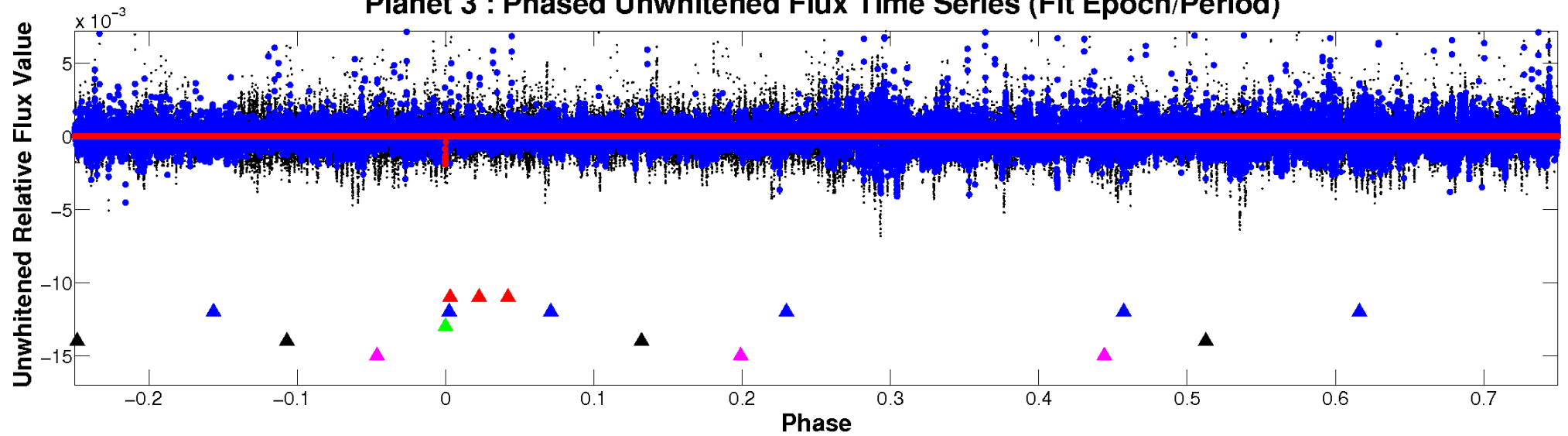
# ALT Odd/Even

TCE 005039684-03

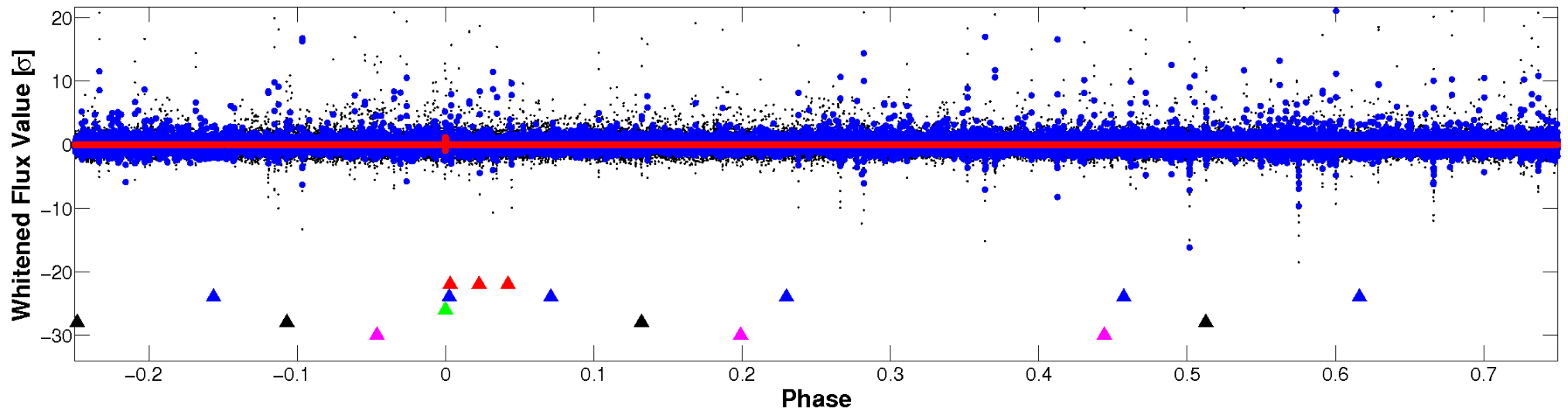


# Non-Whitened Vs. Whitened Light Curve

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

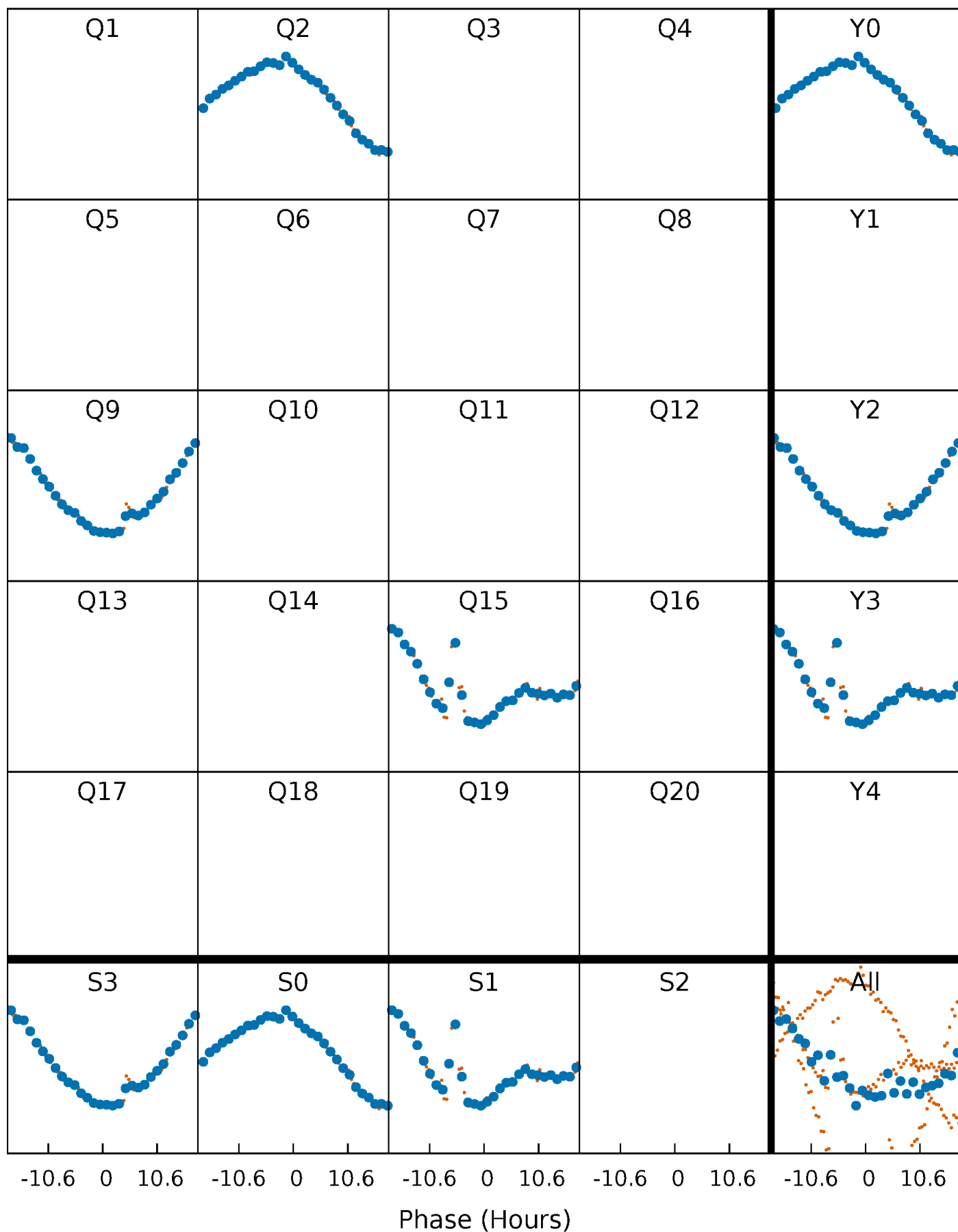


**Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

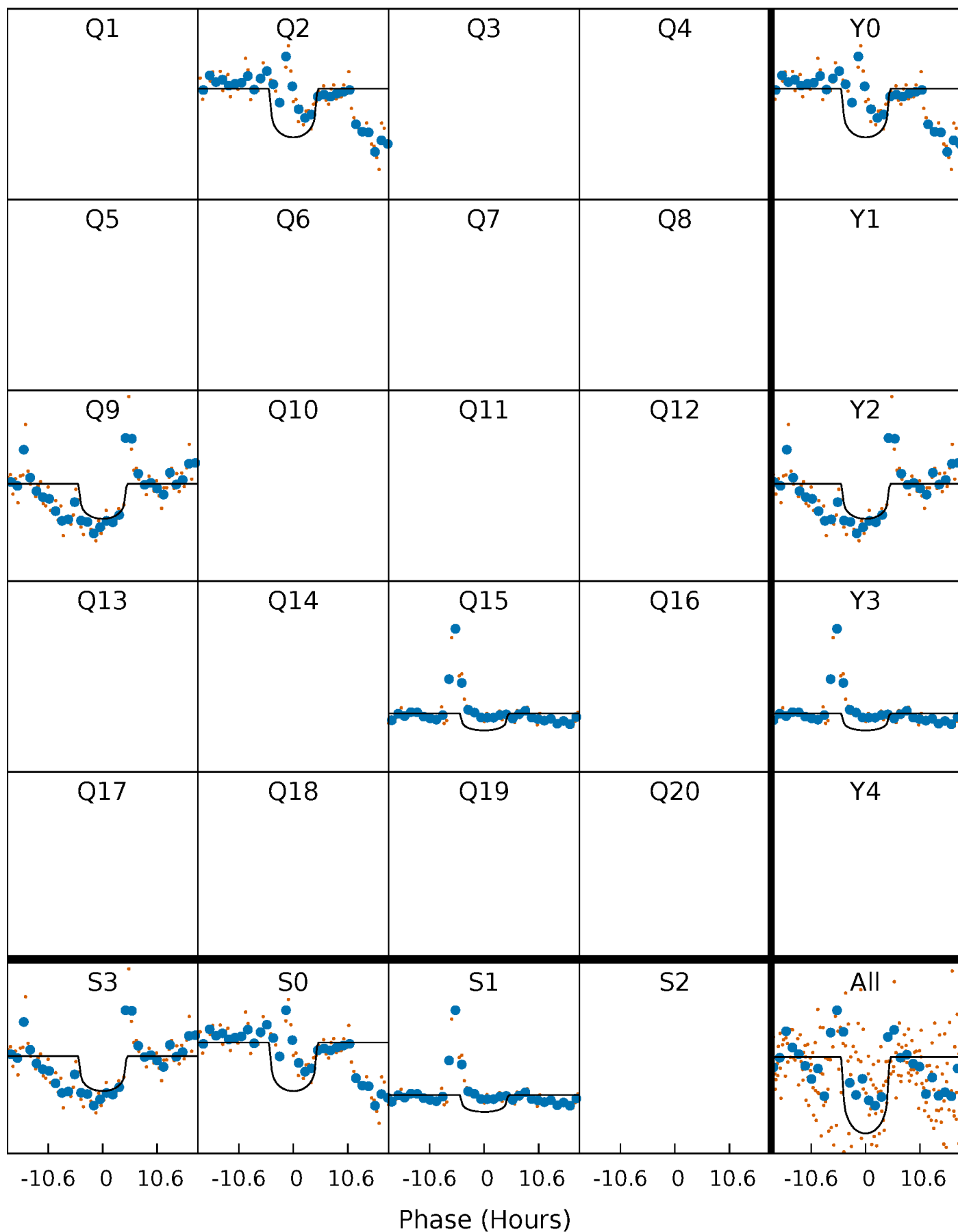
TCE 005039684-03 P=605.577962 Days  $T_0=215.863531$  (BKJD)





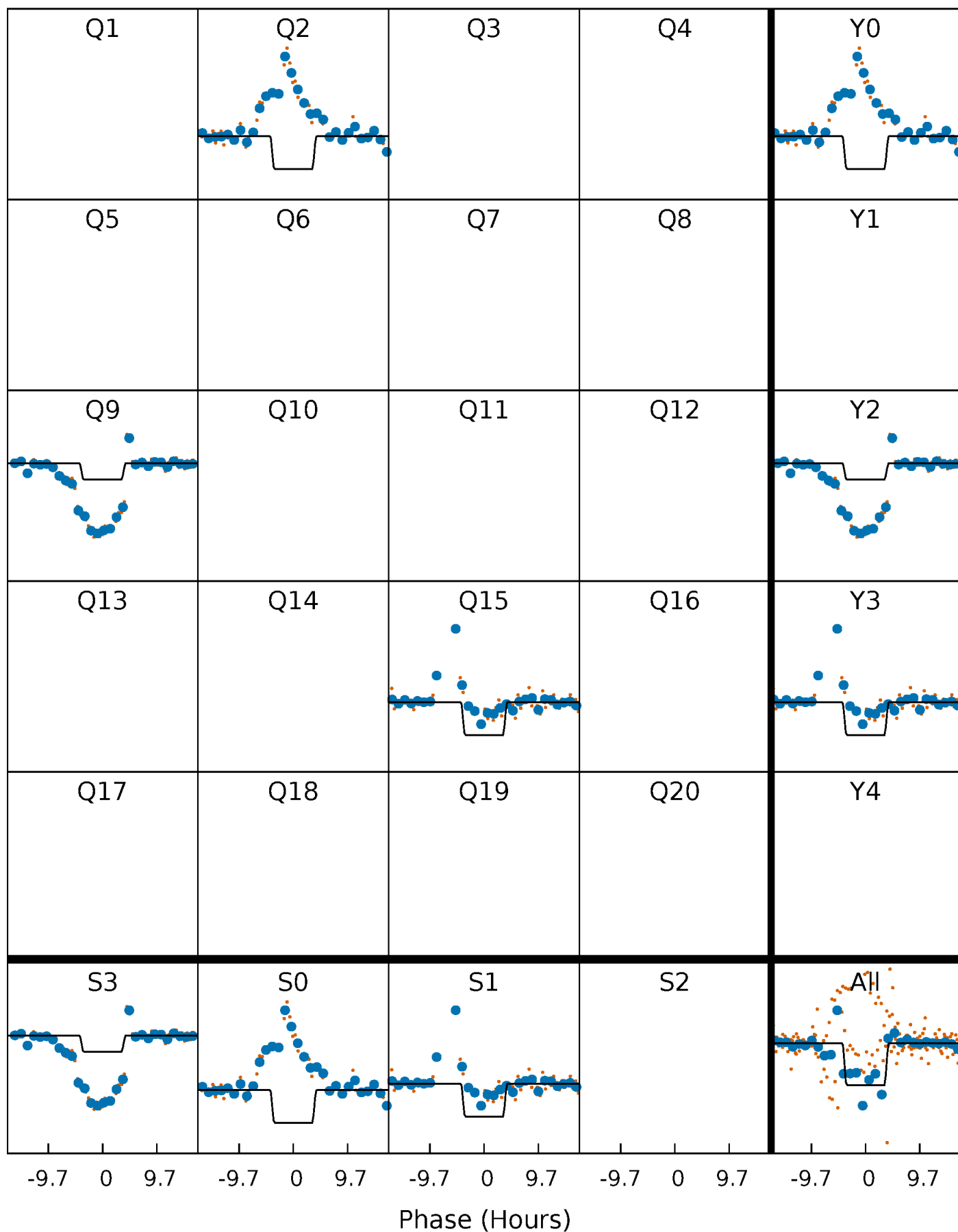
# DV Quarter-Phased Transit Curves

TCE 005039684-03     $P=605.577962$  Days     $T_0=215.863531$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

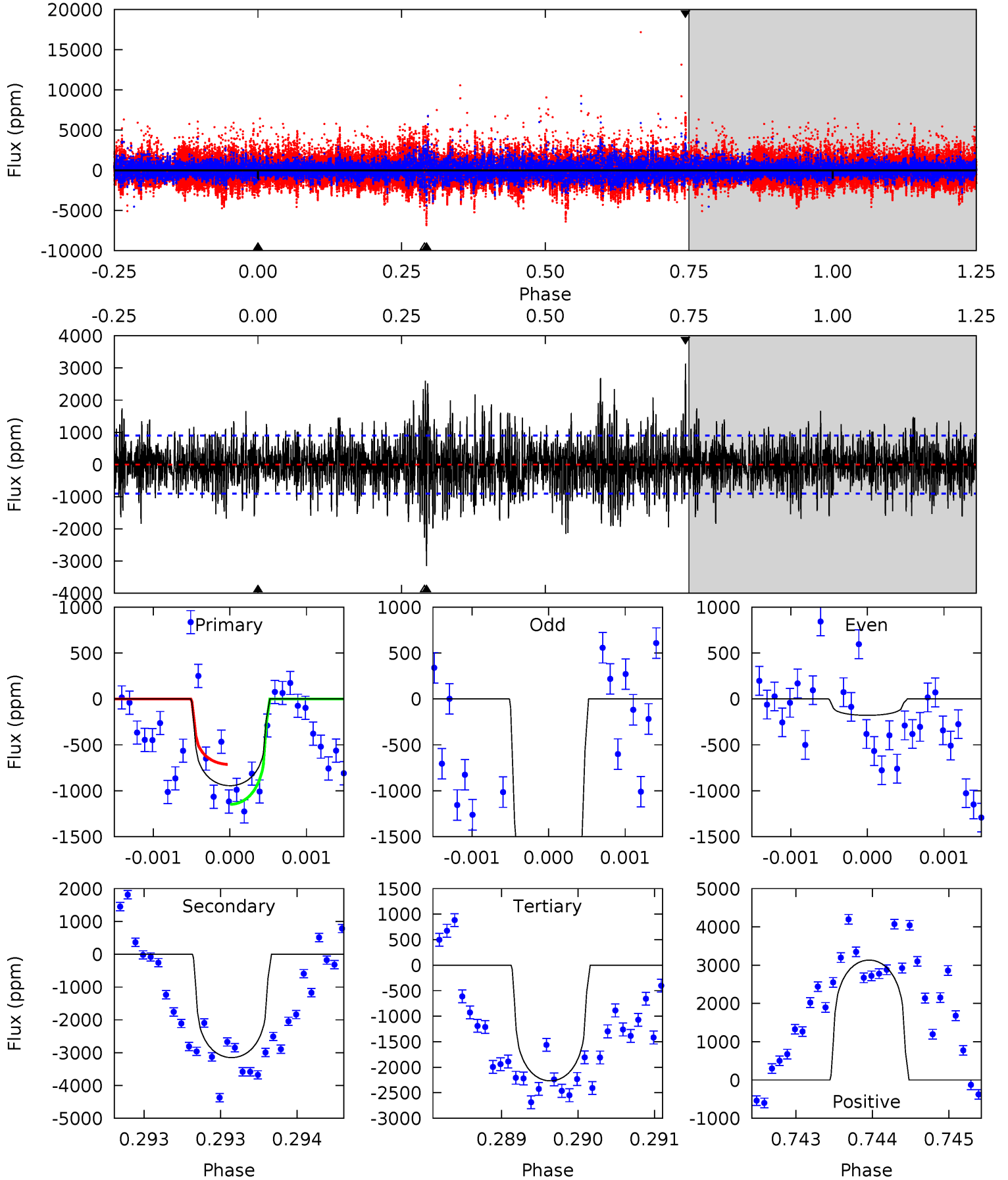
TCE 005039684-03 P=605.582606 Days  $T_0=215.869904$  (BKJD)



# DV Model-Shift Uniqueness Test

005039684-03, P = 605.577962 Days, E = 215.863531 Days

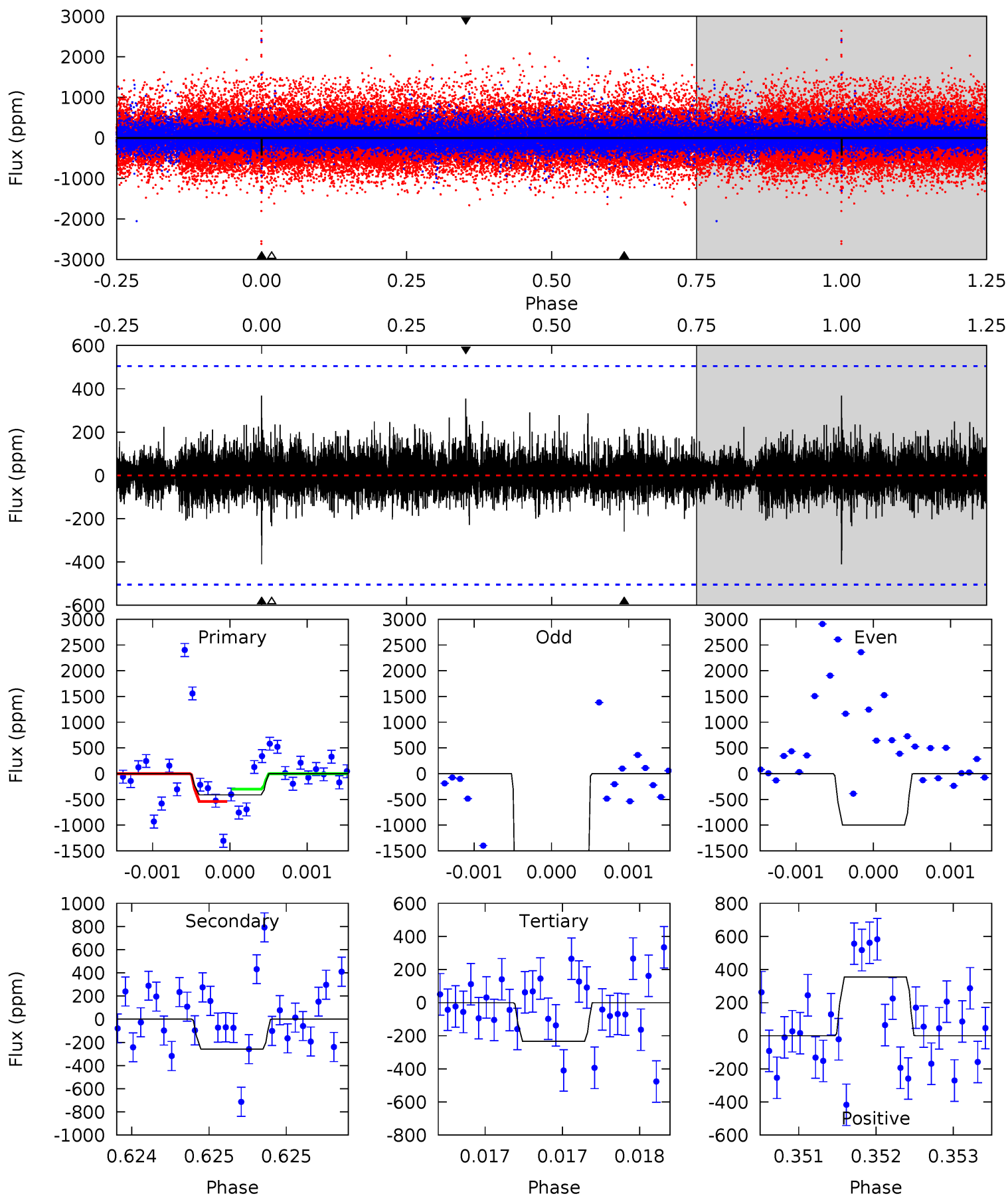
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.80	19.3	13.9	19.2	5.53	3.41	3.97	-8.11	-13.4	5.42	0.11	5.73	2.37	0.50	1.34



# Alt Model-Shift Uniqueness Test

005039684-03, P = 605.582606 Days, E = 215.869904 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
4.52	2.85	2.57	3.90	5.55	3.45	0.61	1.95	0.62	0.28	-1.05	53.5	3.19	0.47	0



### Stellar Parameters For KIC 005039684

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5526^{+166}_{-149}$	$4.549^{+0.050}_{-0.150}$	$-0.160^{+0.300}_{-0.300}$	$0.821^{+0.187}_{-0.080}$	$0.870^{+0.092}_{-0.092}$	$2.214^{+0.541}_{-0.929}$
	+3%/-3%	+1%/-3%	+188%/-188%	+23%/-10%	+11%/-11%	+24%/-42%
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 005039684-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-3150 \pm 163$	$3.92^{+2.28}_{-2.12}$	$271^{+15}_{-11}$	$6318^{+3997}_{-1207}$	$198099^{+788090}_{-118542}$
Alt.	$-259 \pm 91$	$4.26^{+2.43}_{-2.30}$	$272^{+15}_{-12}$	$3654^{+1253}_{-513}$	$13376^{+48901}_{-8447}$

$T_{max}$  = Theoretical Maximum Planetary Temperature

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

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

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

## DV Centroid Data

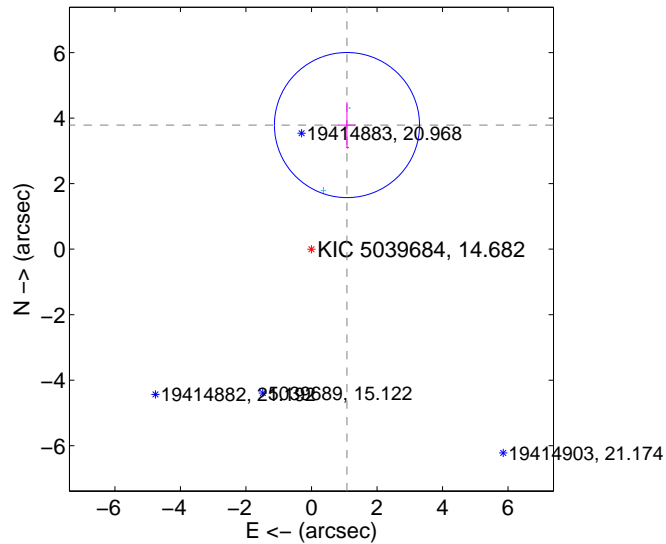
Supplemental centroid analysis for 005039684-03. Kepler magnitude: 14.68. Transit SNR 6.49

There are 2 quarters with good PRF difference image offsets

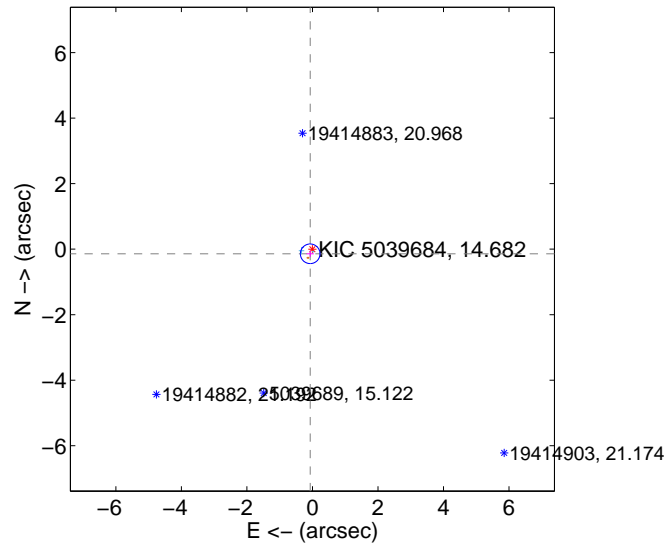
The direct PRF centroid is offset from the target star catalog position by about 1.96 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$3.940 \pm 0.738$	5.34	$-1.083 \pm 0.266$	$3.788 \pm 0.702$
PRF-fit source offset from KIC position	$0.157 \pm 0.100$	1.57	$0.069 \pm 0.110$	$-0.141 \pm 0.097$
photometric centroid source offset	$2.91 \pm 0.90$	3.24	$-0.24 \pm 0.45$	$-2.90 \pm 0.90$

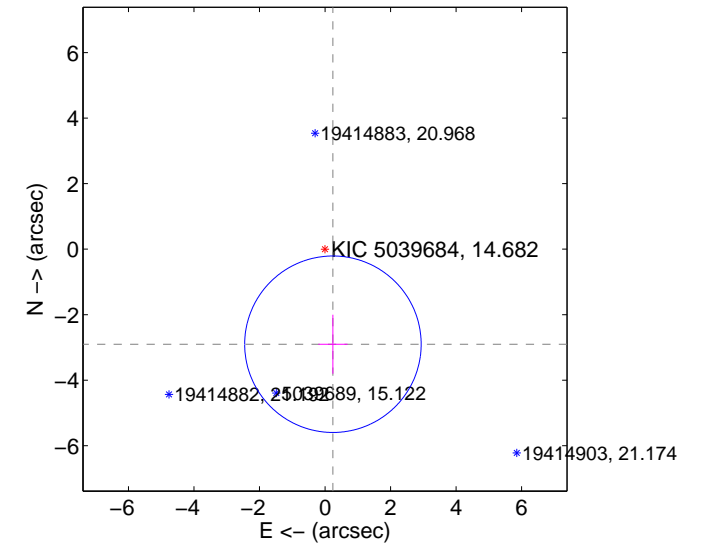
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

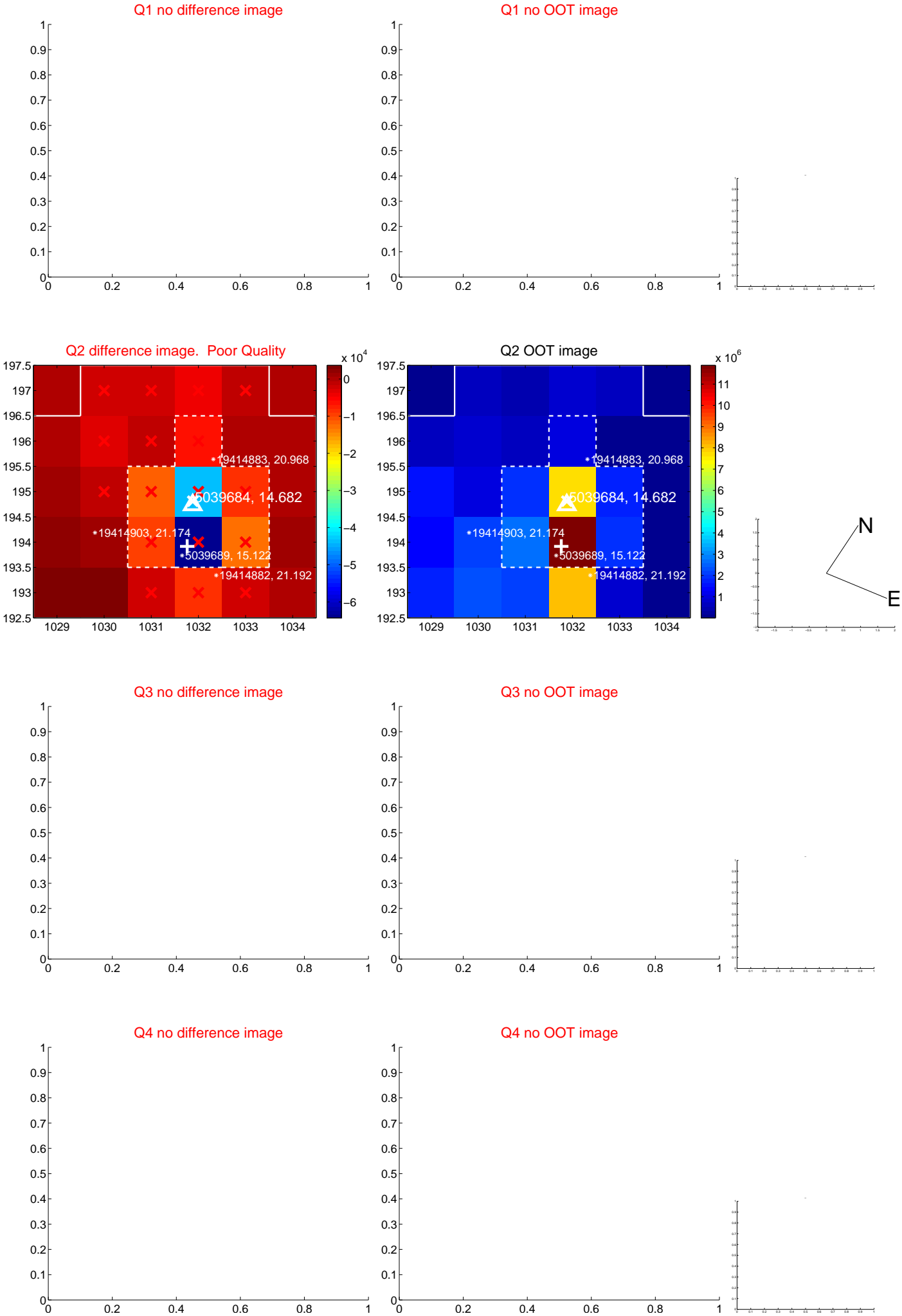


offset from photometric centroids



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.

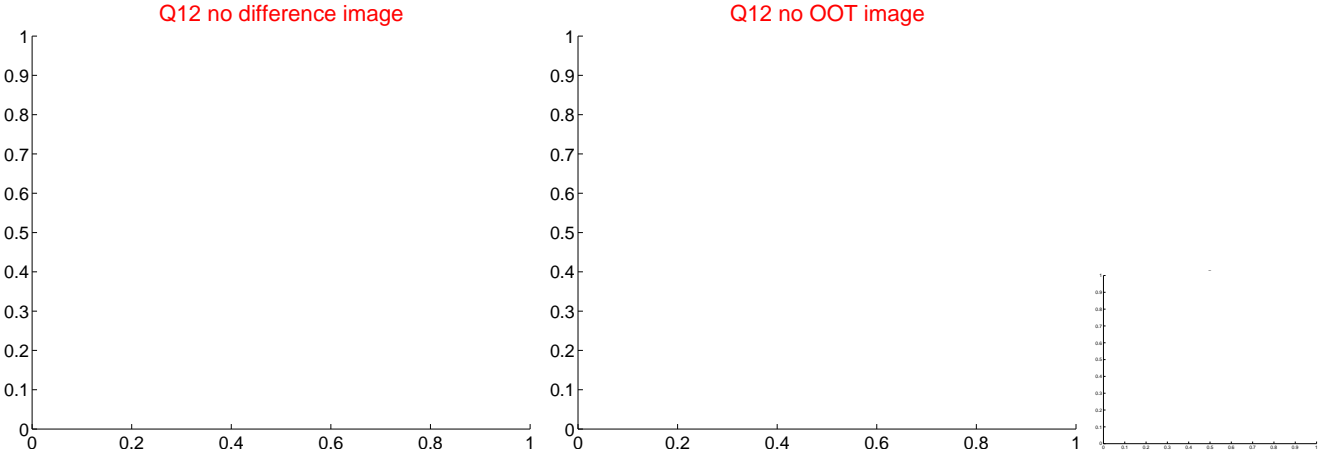
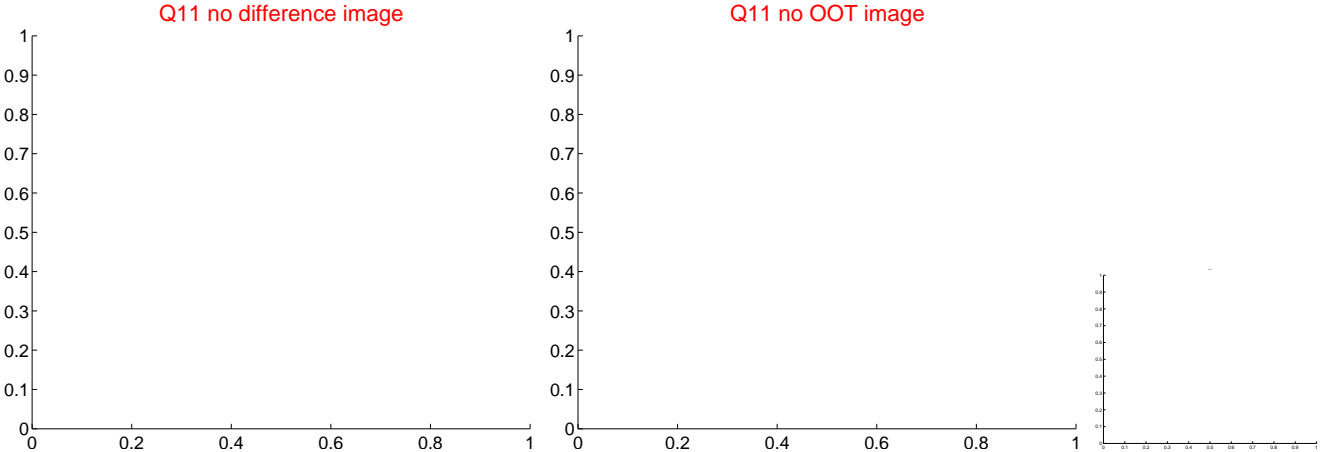
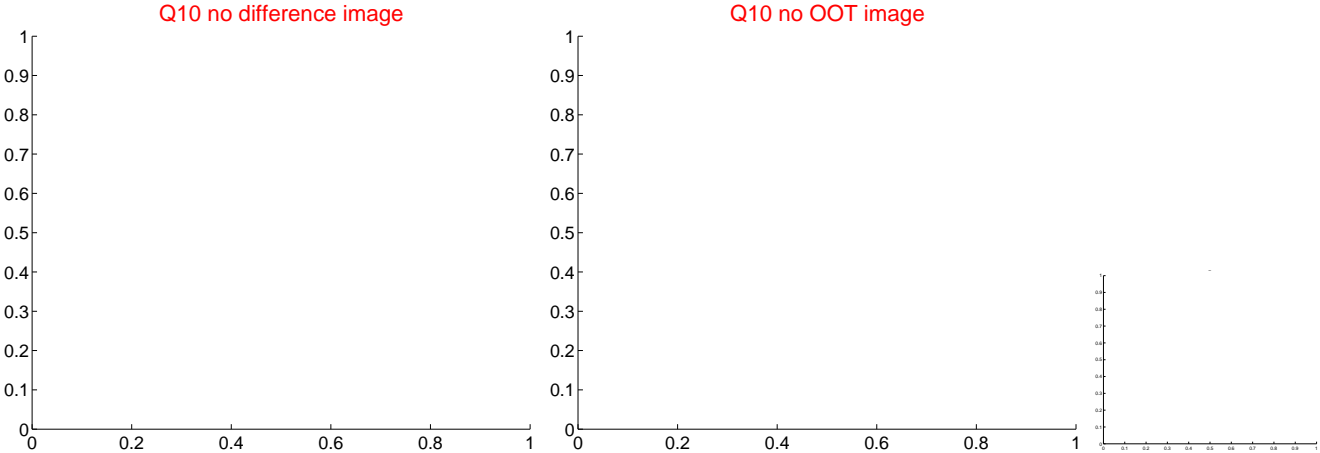
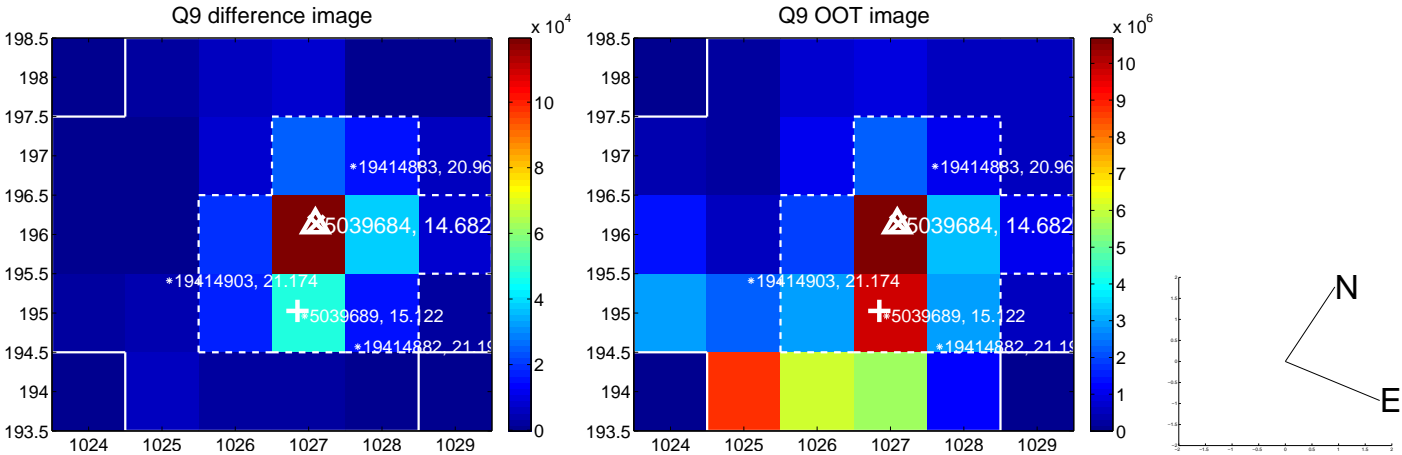


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

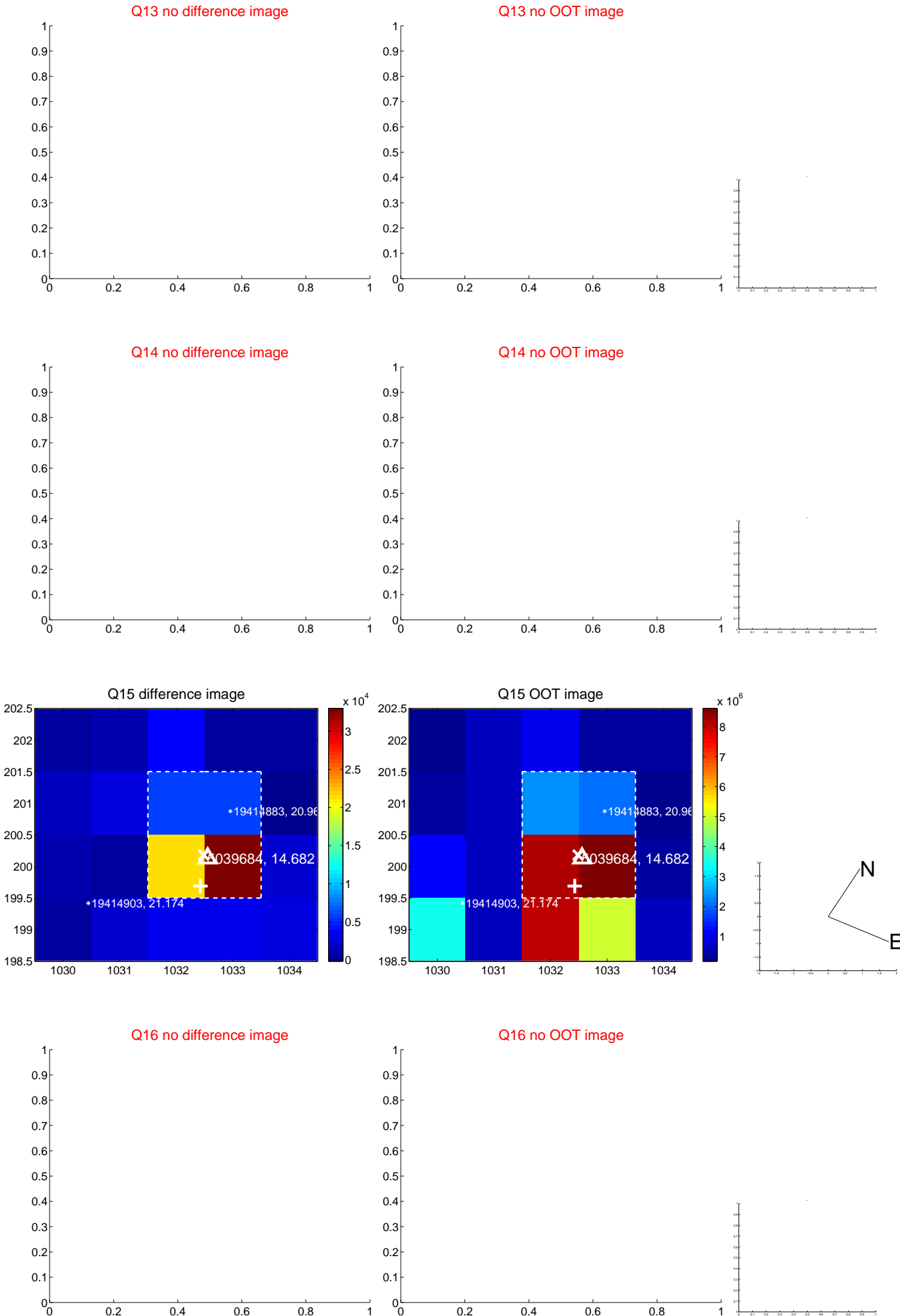




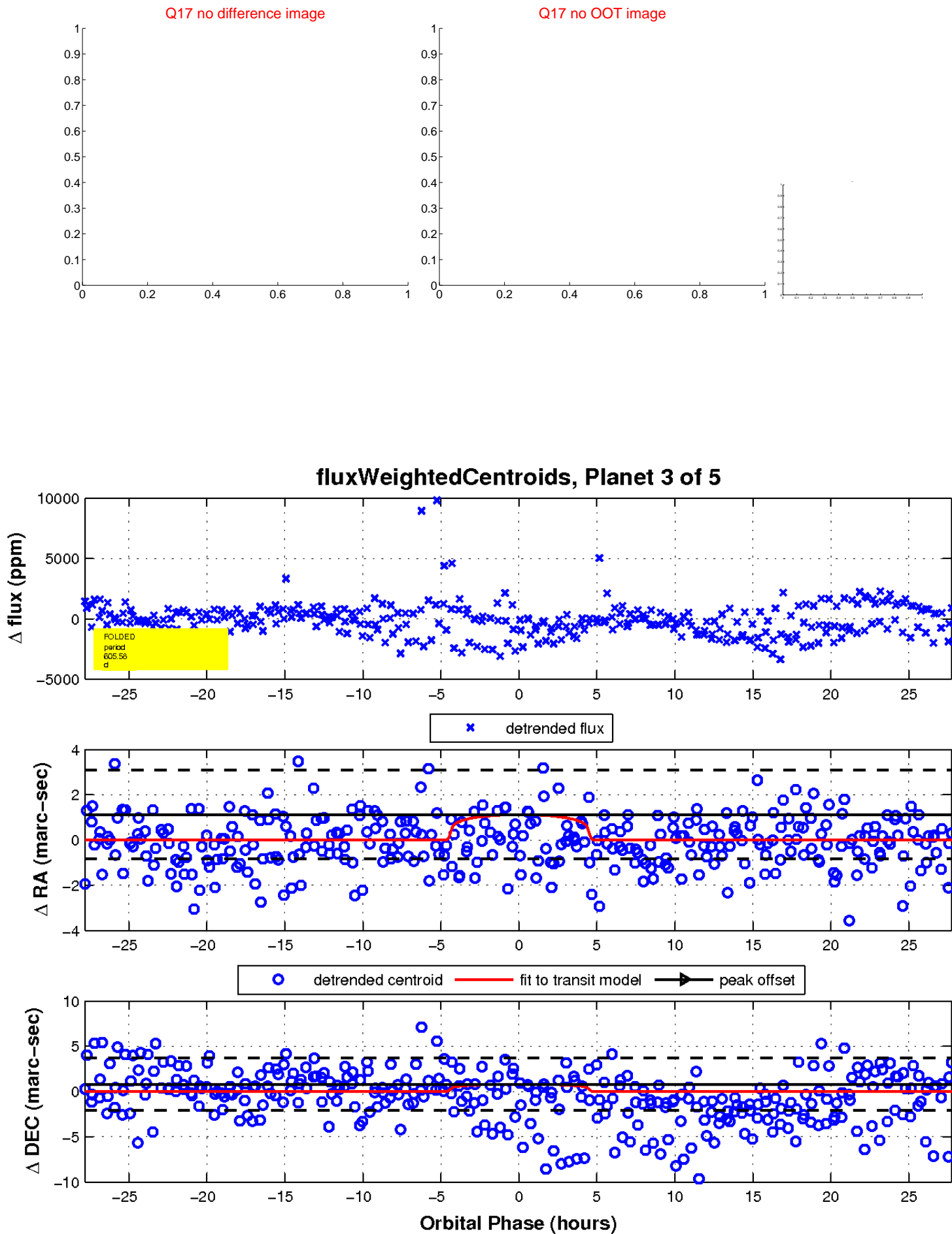
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

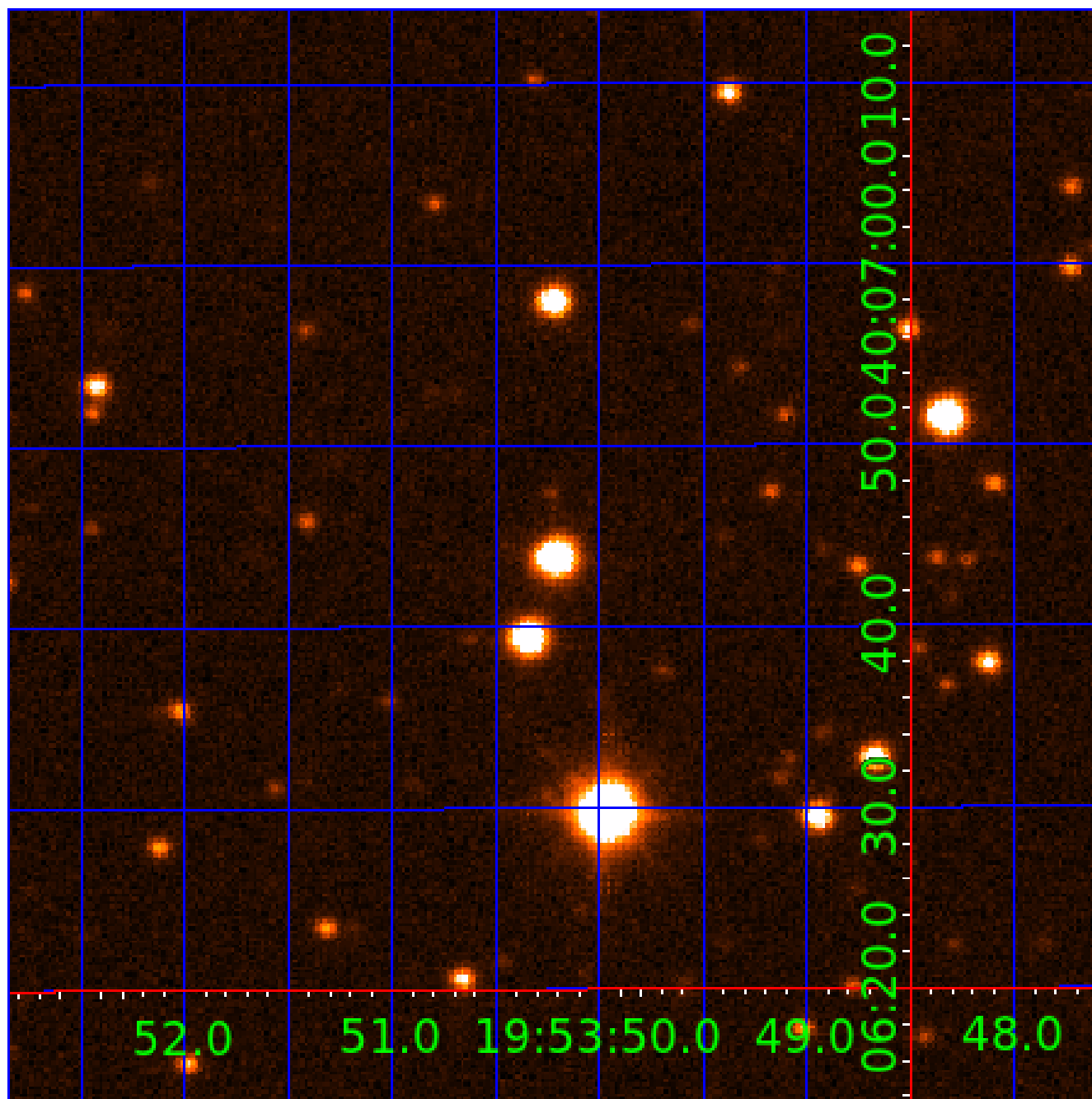


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 005039684

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005039684-01	OBS	No	593.783060	241.375691	1518.3	8.430	14.9	5.4	0.82	5526	3.43	0.32
005039684-02	OBS	No	233.933802	258.872801	2130.8	6.584	14.5	7.6	0.82	5526	4.71	1.12
005039684-03	OBS	No	605.577962	215.863531	1928.8	9.282	10.3	6.5	0.82	5526	3.55	0.32
005039684-04	OBS	No	375.177216	151.129344	1501.9	3.903	12.7	7.4	0.82	5526	3.15	0.60
005039684-05	OBS	No	457.091926	484.861736	1708.5	3.500	11.6	-1.0	0.82	5526	3.35	0.46

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005039684-01	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_KIC_POS
005039684-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005039684-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005039684-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE_TRACKER—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005039684-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_NOFITS—HALO_GHOST

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

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

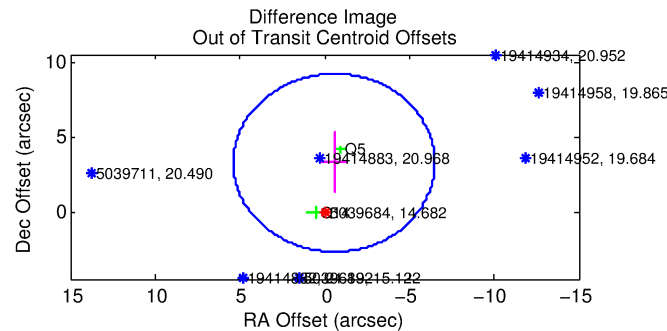
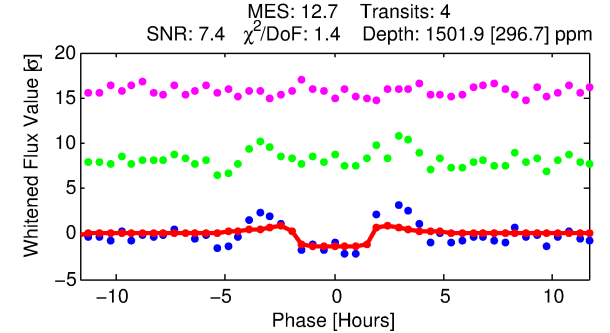
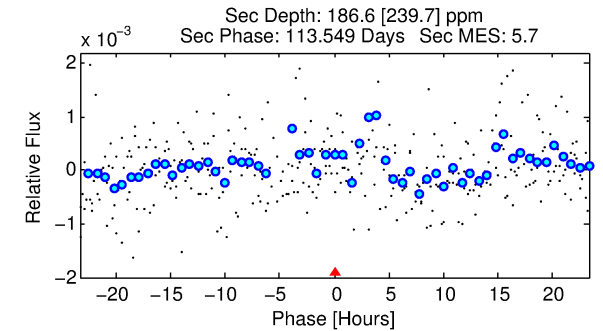
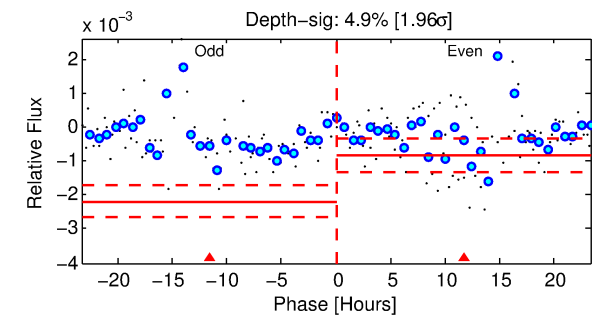
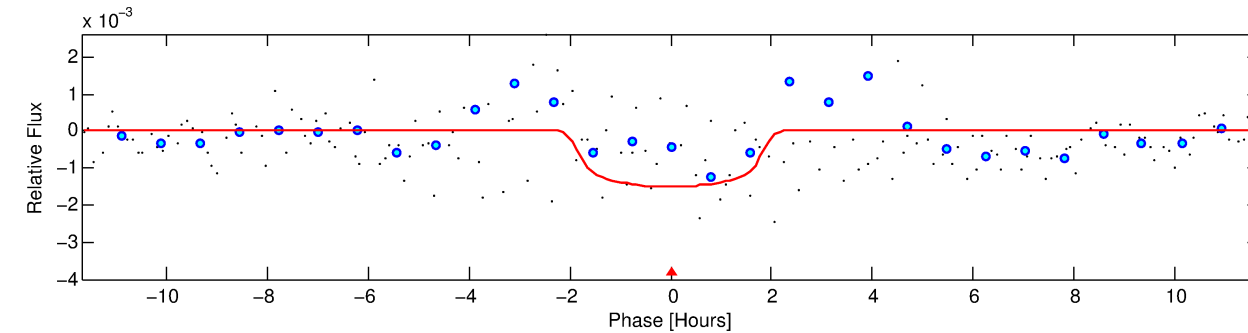
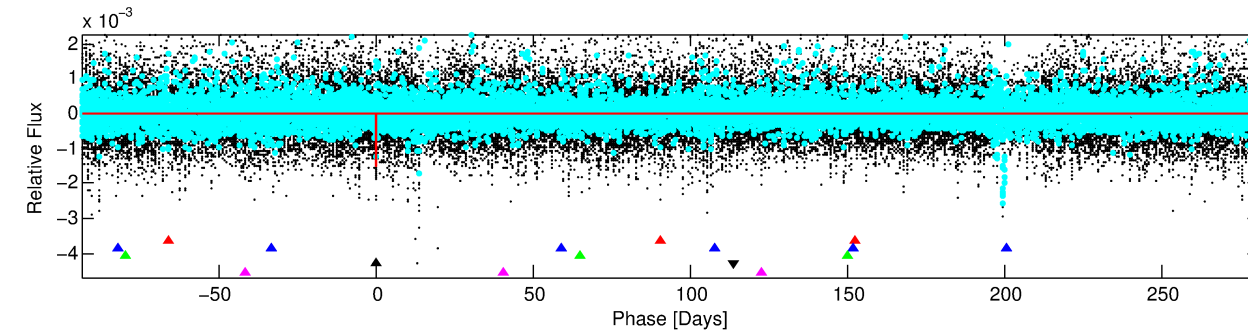
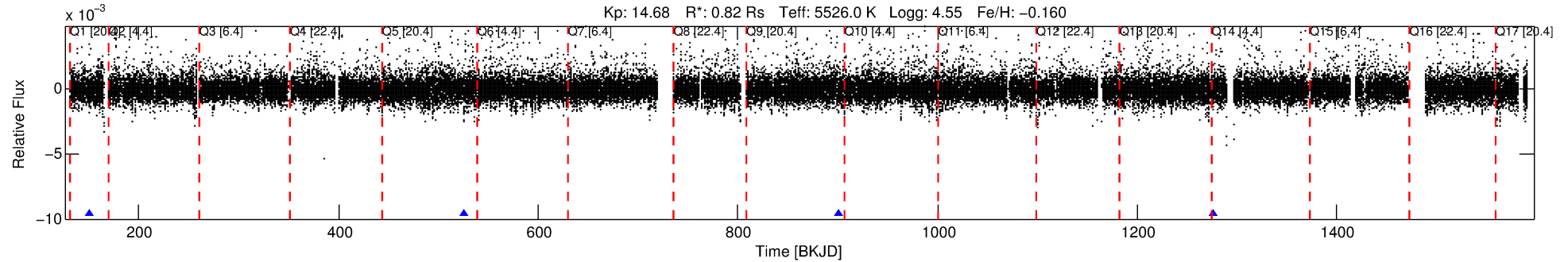
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 005039684-04

No Significant Match Found

# DV One-Page Summary

KIC: 5039684 Candidate: 4 of 5 Period: 375.177 d



## DV Fit Results:

Period = 375.17722 [0.00469] d  
Epoch = 151.1293 [0.0088] BKJD  
Rp/R\* = 0.0352 [0.0861]  
a/R\* = 744.46 [7510.41]  
b = 0.21 [46.36]  
Seff = 0.60 [0.18]  
Teq = 224 [17] K  
Rp = 3.15 [7.75] Re  
a = 0.9722 [0.1853] AU  
Ag = 9778.52 [49572.94] [0.20 $\sigma$ ]  
Teffp = 3444 [4360] K [0.74 $\sigma$ ]

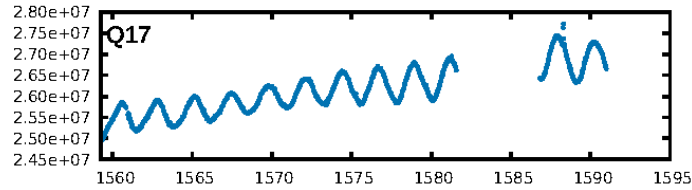
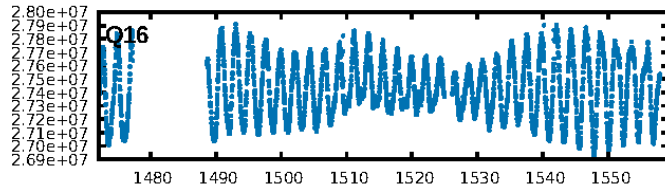
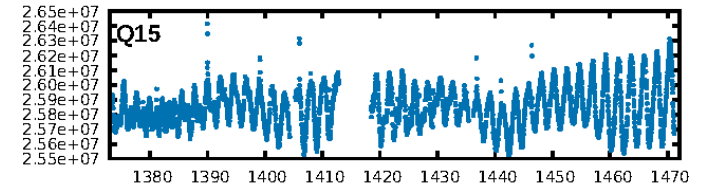
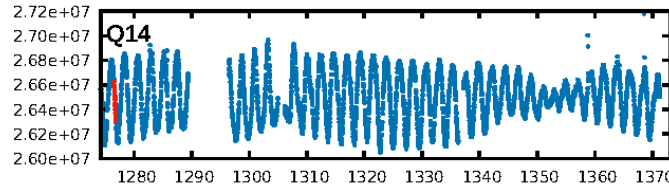
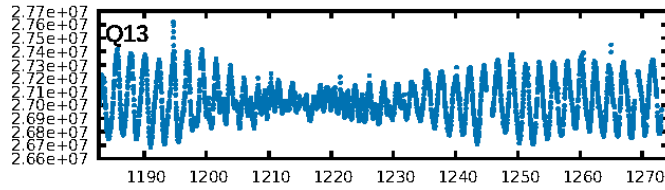
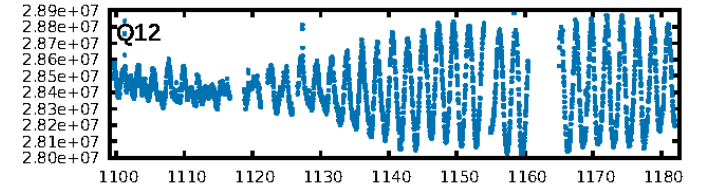
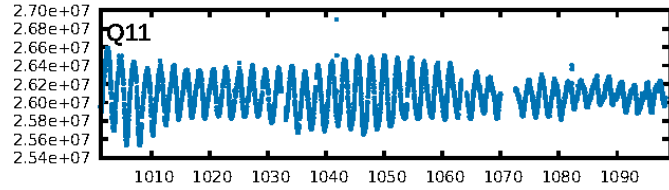
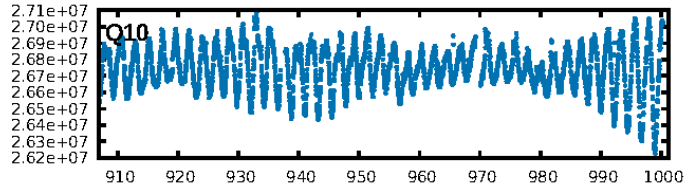
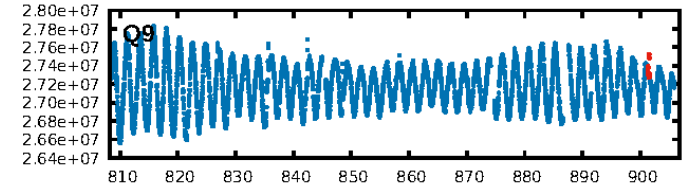
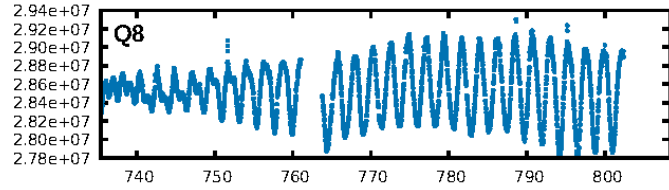
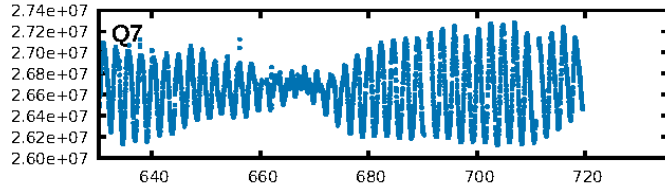
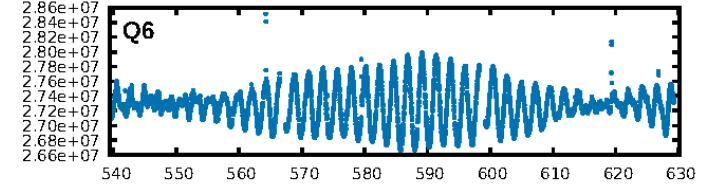
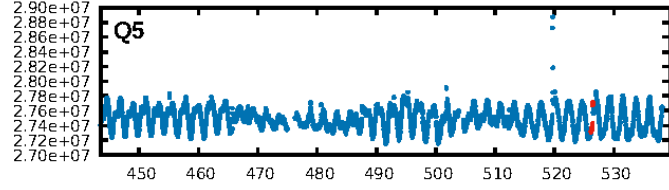
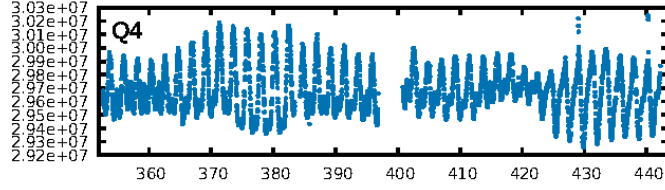
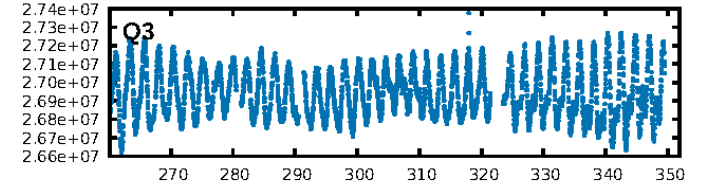
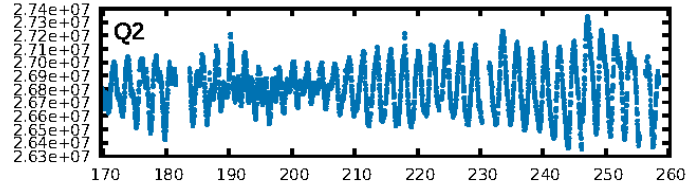
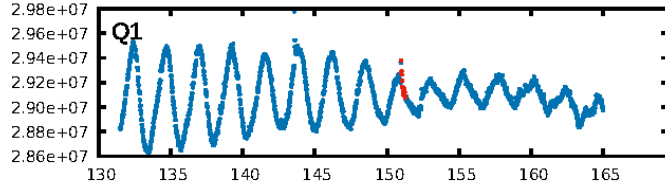
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [442.89 $\sigma$ ]  
LongPeriod-sig: 100.0% [375.02 $\sigma$ ]  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 37.9%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 2.107  
Centroid-sig: 6.0%  
Centroid-so: 1.237 arcsec [1.22 $\sigma$ ]  
OotOffset-rm: 3.308 arcsec [1.67 $\sigma$ ]  
OotOffset-st: 1/0/0/1 [2]  
KicOffset-rm: 0.457 arcsec [1.16 $\sigma$ ]  
KicOffset-st: 1/0/0/1 [2]  
DiffImageQuality-fgm: 0.50 [1/2]  
DiffImageOverlap-fno: 1.00 [4/4]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 16:07:36 Z

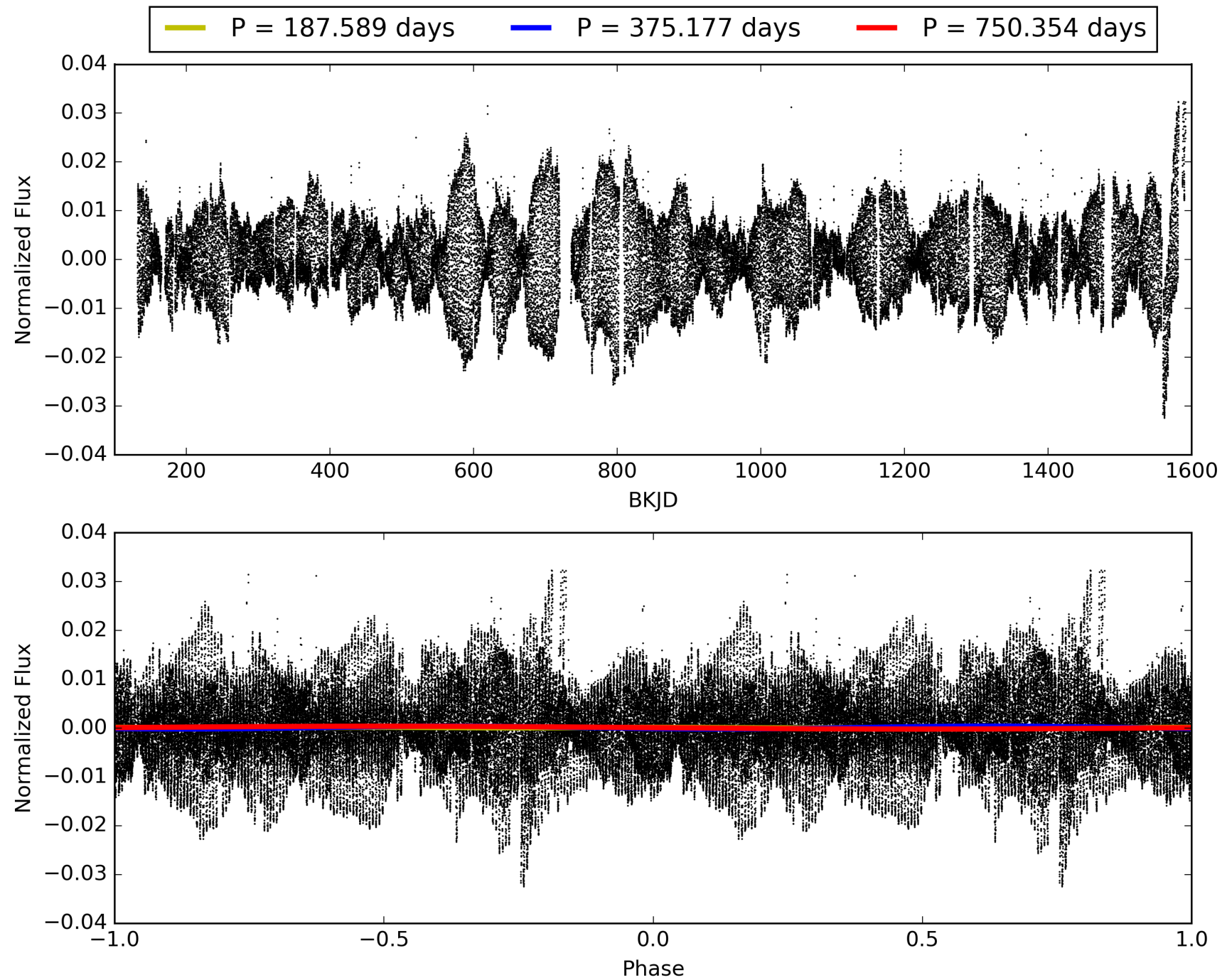
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 005039684-04, PDC Light Curves





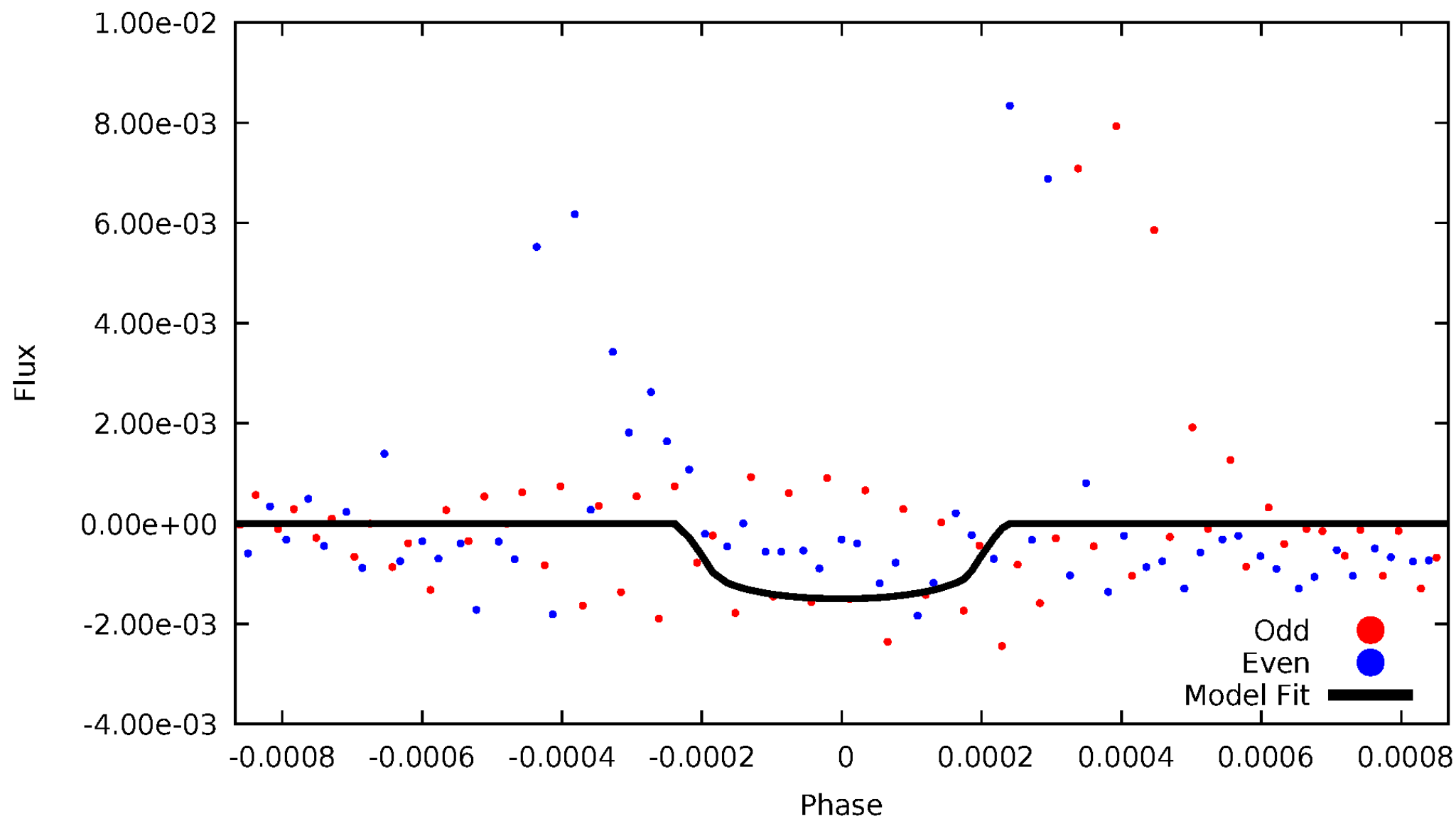
TCE 005039684-04





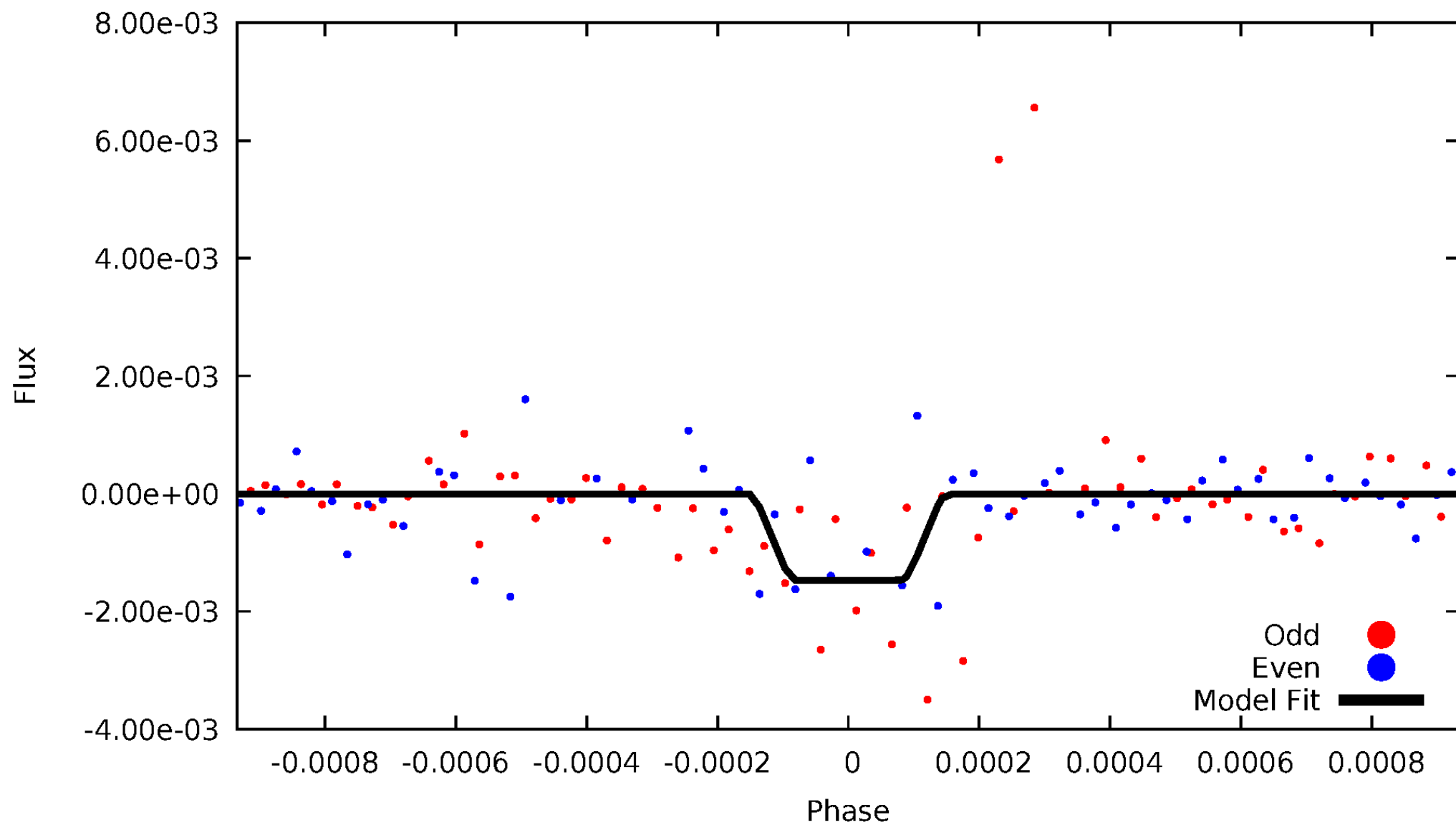
# DV Odd/Even

TCE 005039684-04



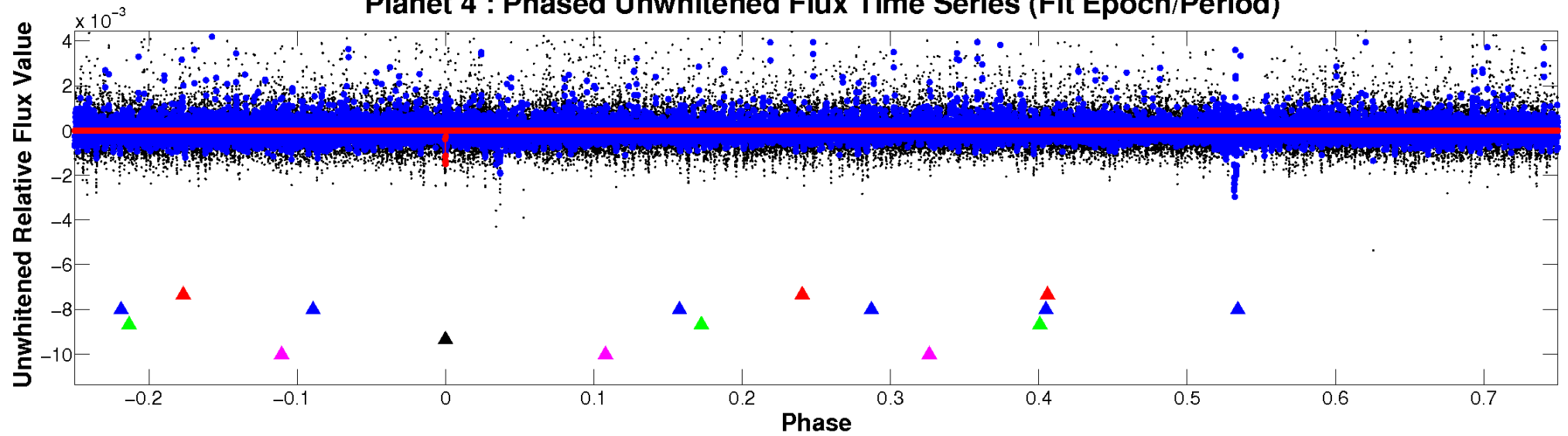
# ALT Odd/Even

TCE 005039684-04

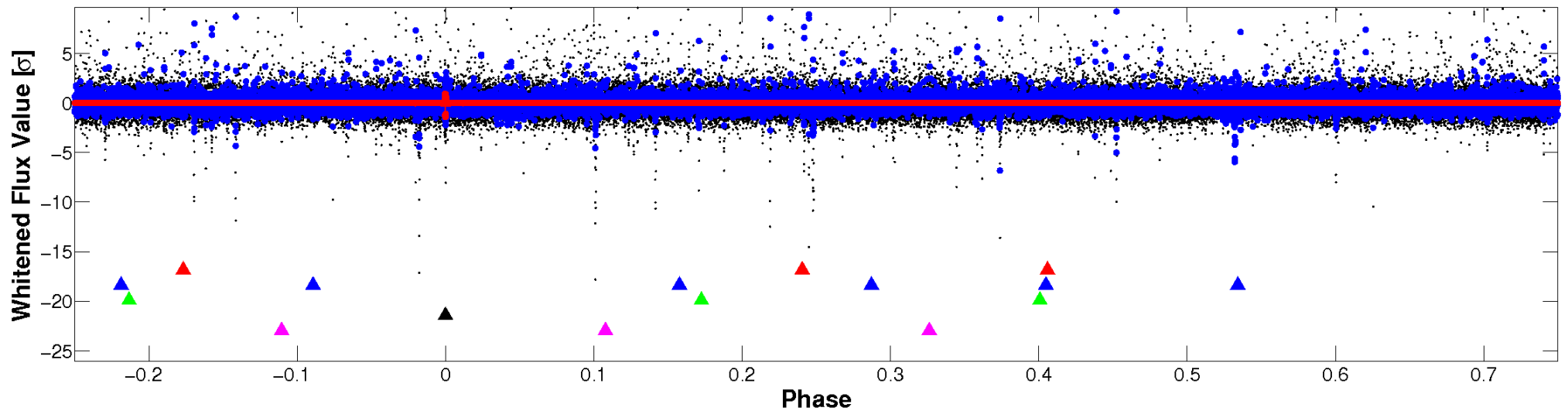


# Non-Whitened Vs. Whitened Light Curve

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

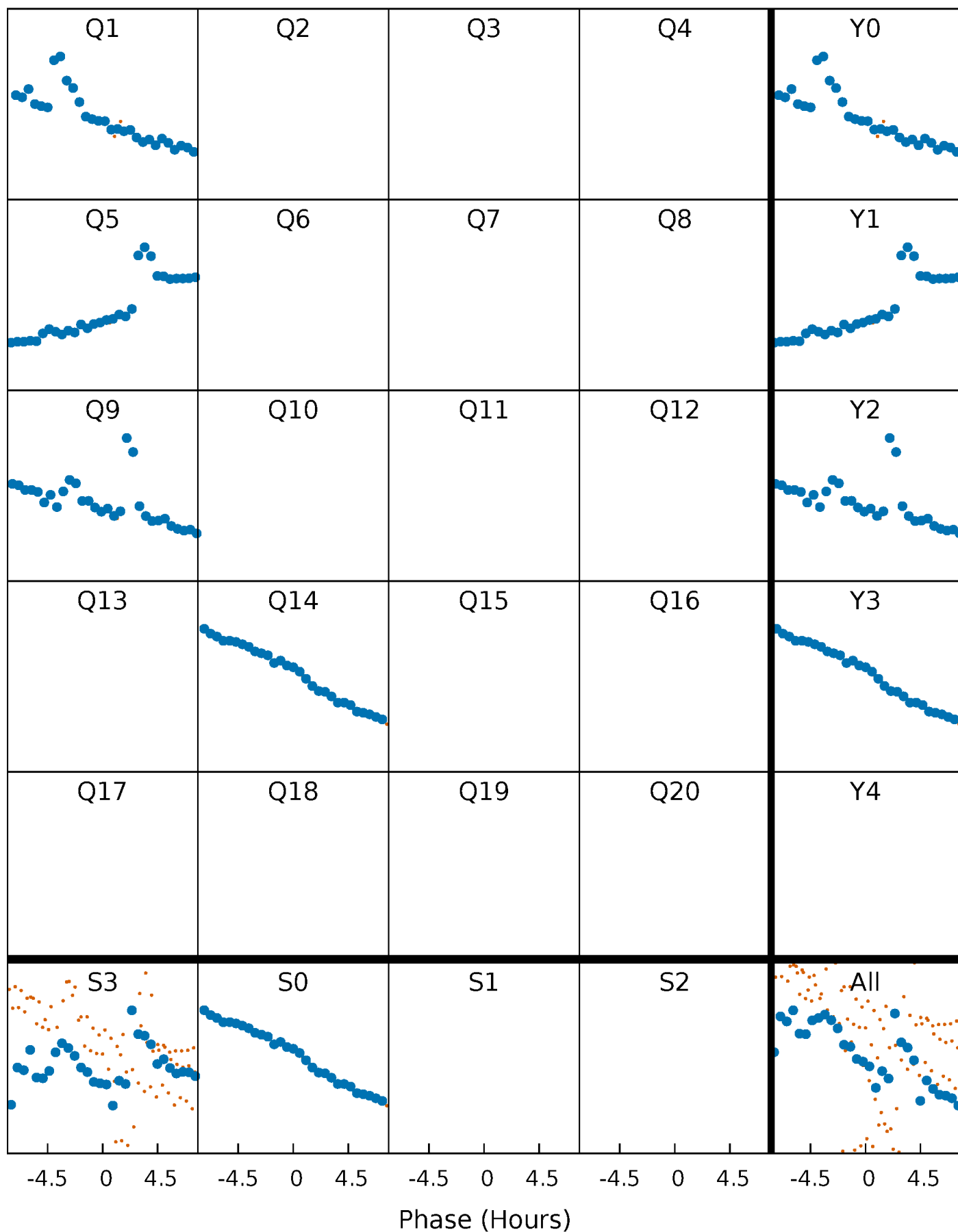


## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



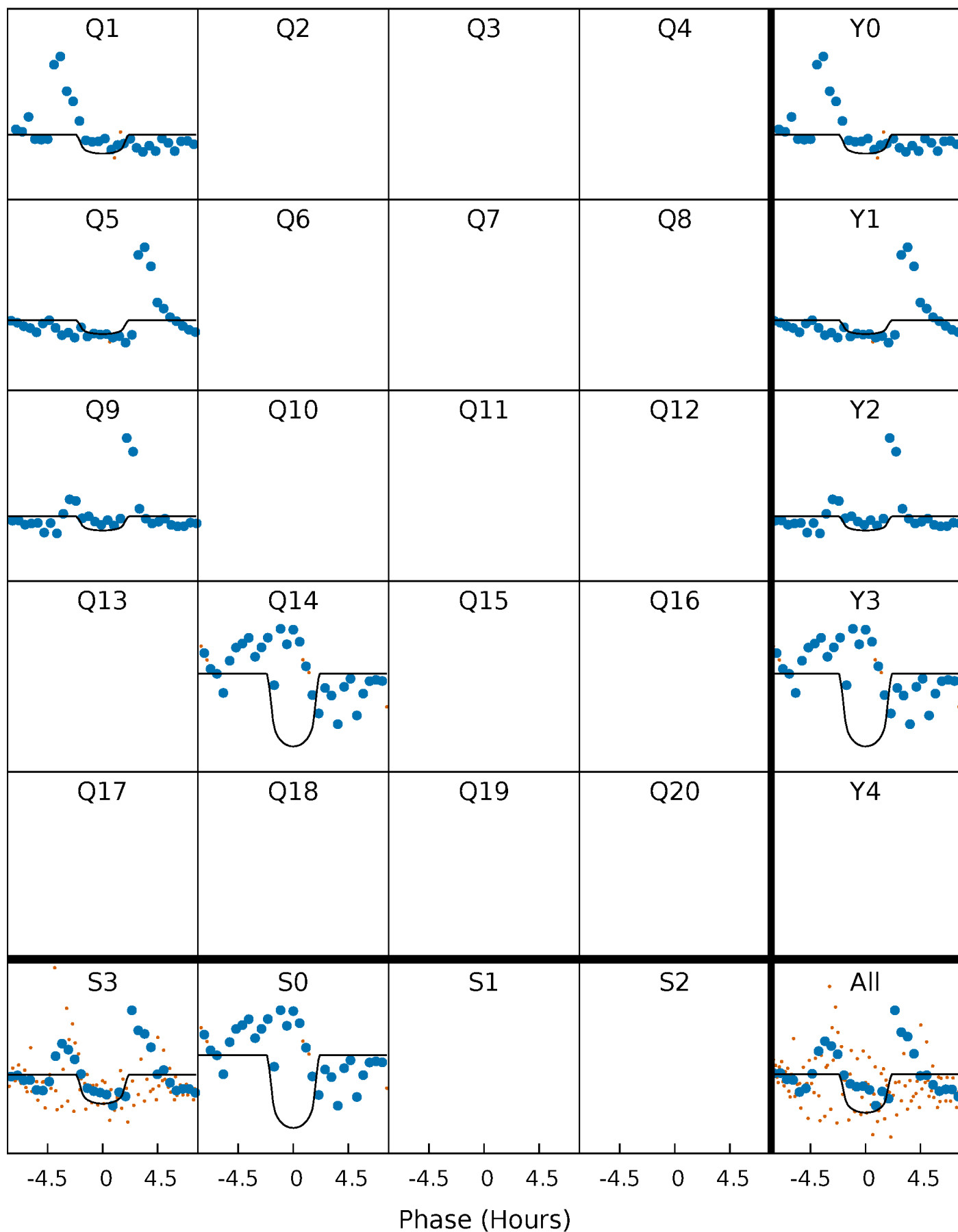
# PDC Quarter-Phased Transit Curves

TCE 005039684-04     $P=375.177216$  Days     $T_0=151.129344$  (BKJD)



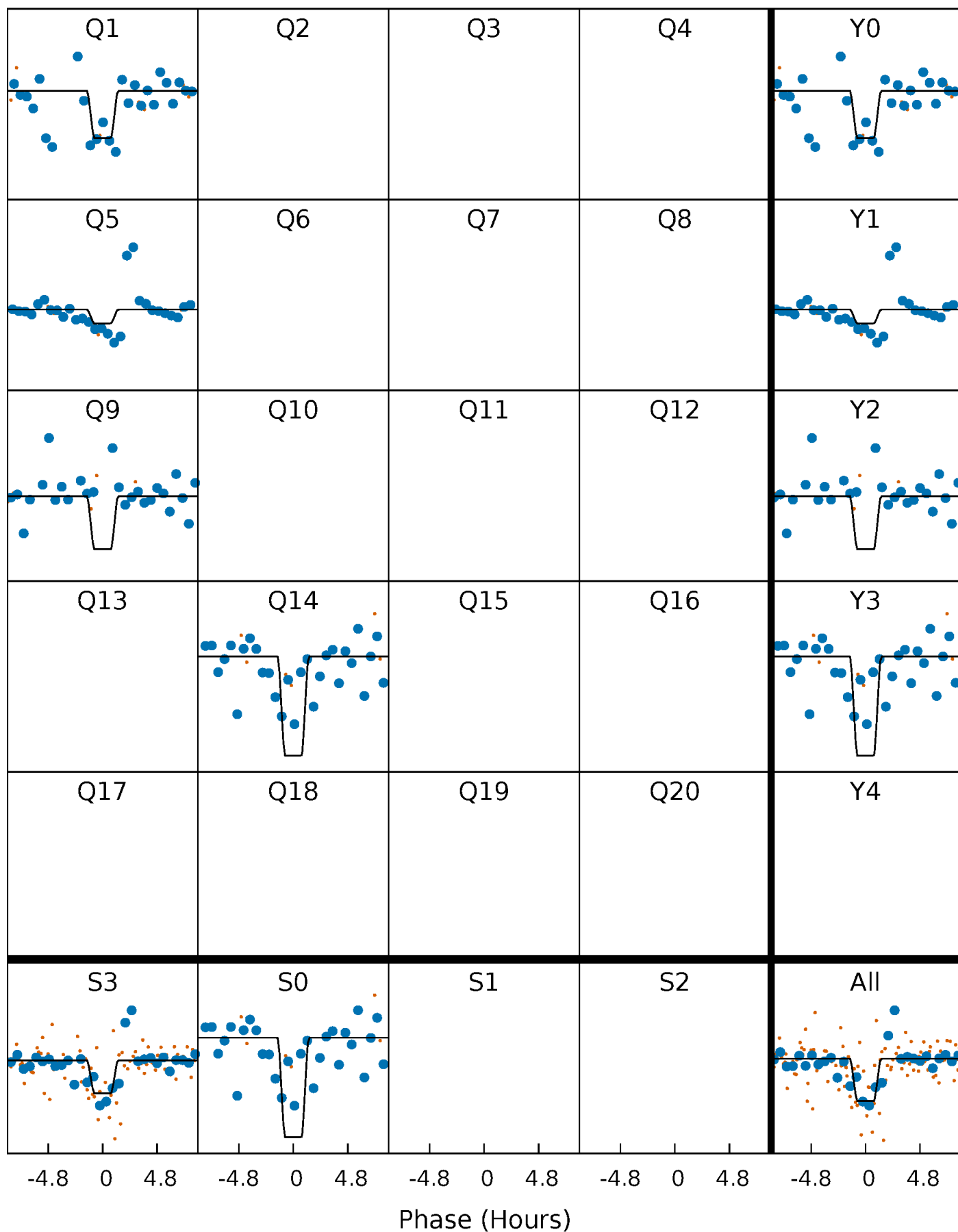
# DV Quarter-Phased Transit Curves

TCE 005039684-04     $P=375.177216$  Days     $T_0=151.129344$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

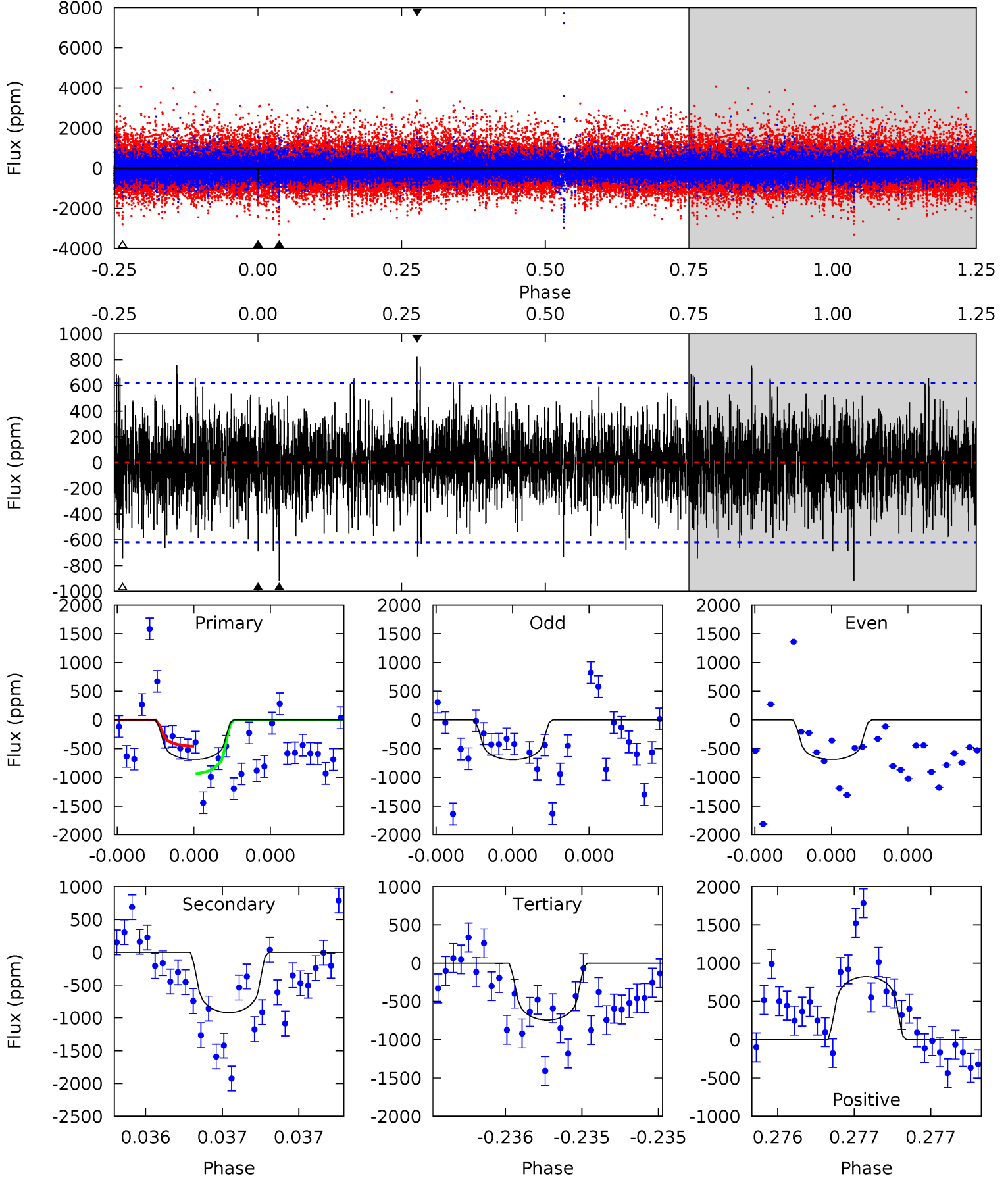
TCE 005039684-04     $P=375.228274$  Days     $T_0=151.118761$  (BKJD)



# DV Model-Shift Uniqueness Test

005039684-04, P = 375.177216 Days, E = 151.129344 Days

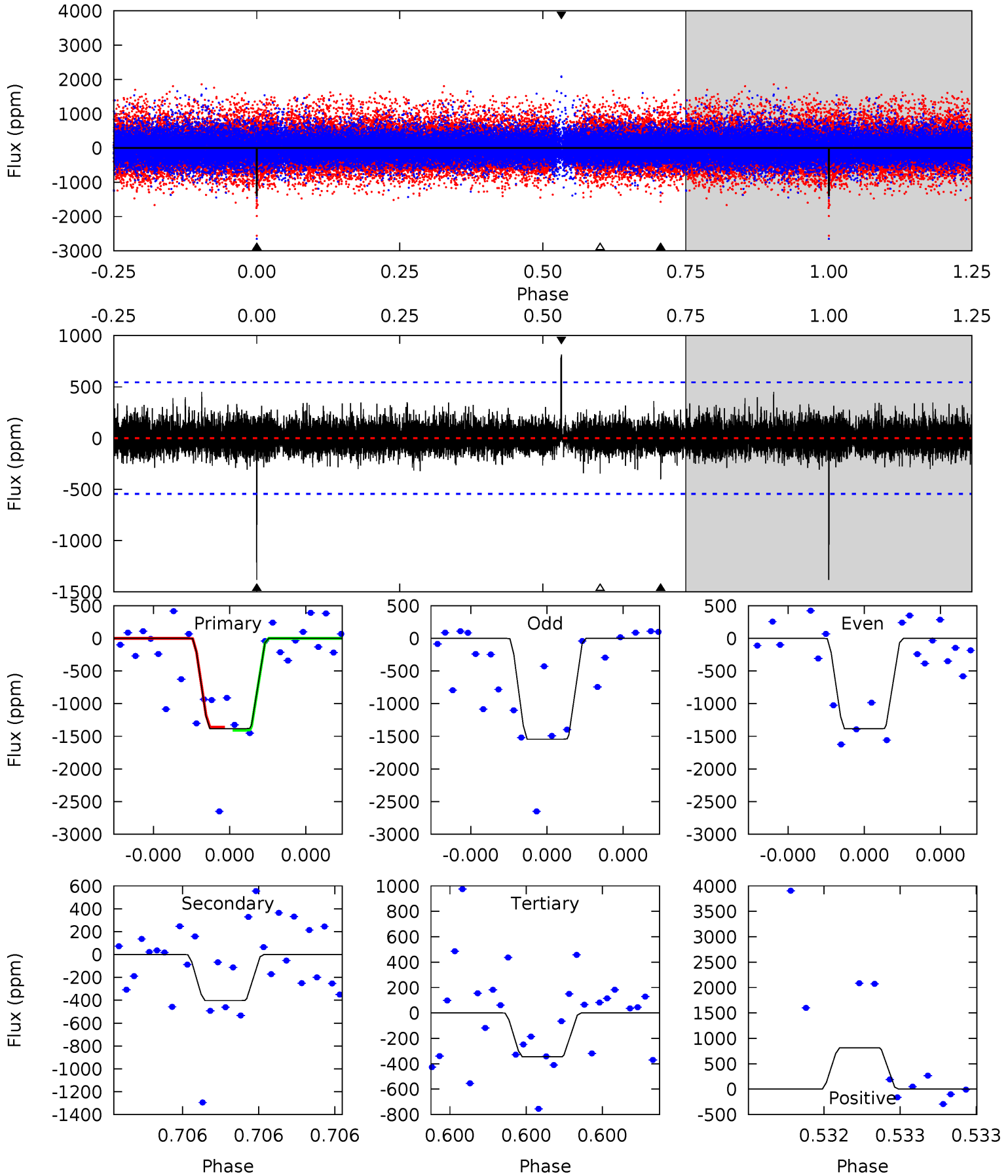
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.23	8.29	6.70	7.44	5.58	3.49	1.78	-0.47	-1.20	1.59	0.86	0.01	1.00	0.47	2.17



# Alt Model-Shift Uniqueness Test

005039684-04, P = 375.228274 Days, E = 151.118761 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
14.4	4.19	3.59	8.48	5.66	3.61	0.88	10.8	5.90	0.61	-4.29	0.82	0.95	0.37	0.25





### Stellar Parameters For KIC 005039684

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5526^{+166}_{-149}$	$4.549^{+0.050}_{-0.150}$	$-0.160^{+0.300}_{-0.300}$	$0.821^{+0.187}_{-0.080}$	$0.870^{+0.092}_{-0.092}$	$2.214^{+0.541}_{-0.929}$
	+3%/-3%	+1%/-3%	+188%/-188%	+23%/-10%	+11%/-11%	+24%/-42%
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 005039684-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-920 \pm 111$	$7.02^{+6.51}_{-4.86}$	$318^{+16}_{-13}$	$3861^{+2359}_{-751}$	$9640^{+79547}_{-7106}$
Alt.	$-403 \pm 96$	$7.06^{+7.08}_{-4.90}$	$319^{+18}_{-14}$	$3352^{+1803}_{-590}$	$4157^{+38150}_{-3149}$

$T_{max}$  = Theoretical Maximum Planetary Temperature

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

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

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

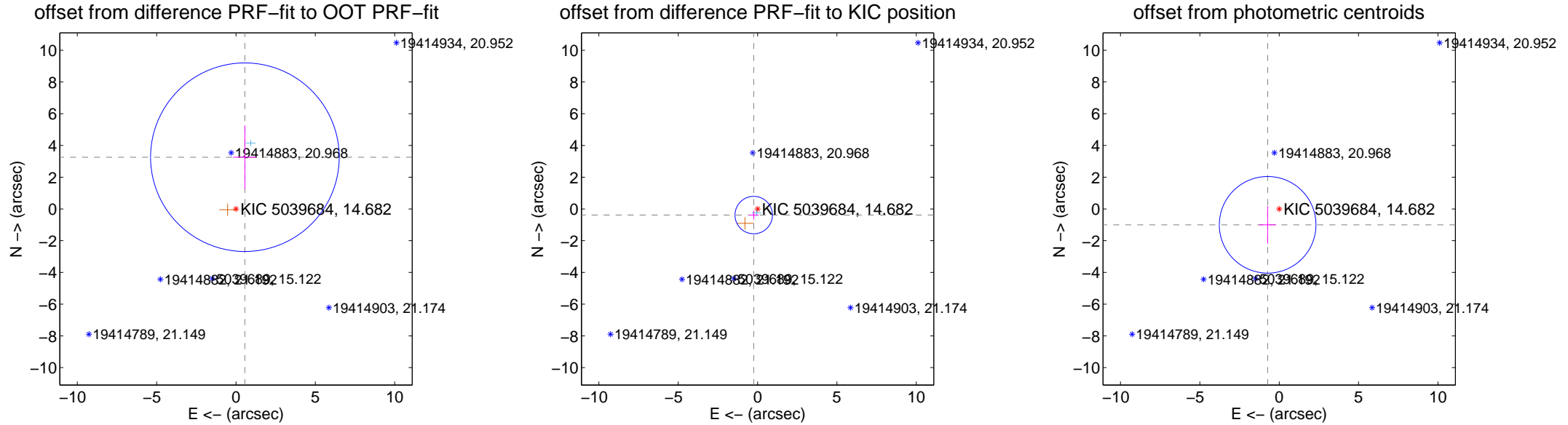
## DV Centroid Data

Supplemental centroid analysis for 005039684-04. Kepler magnitude: 14.68. Transit SNR 7.38

There are 1 quarters with good PRF difference image offsets

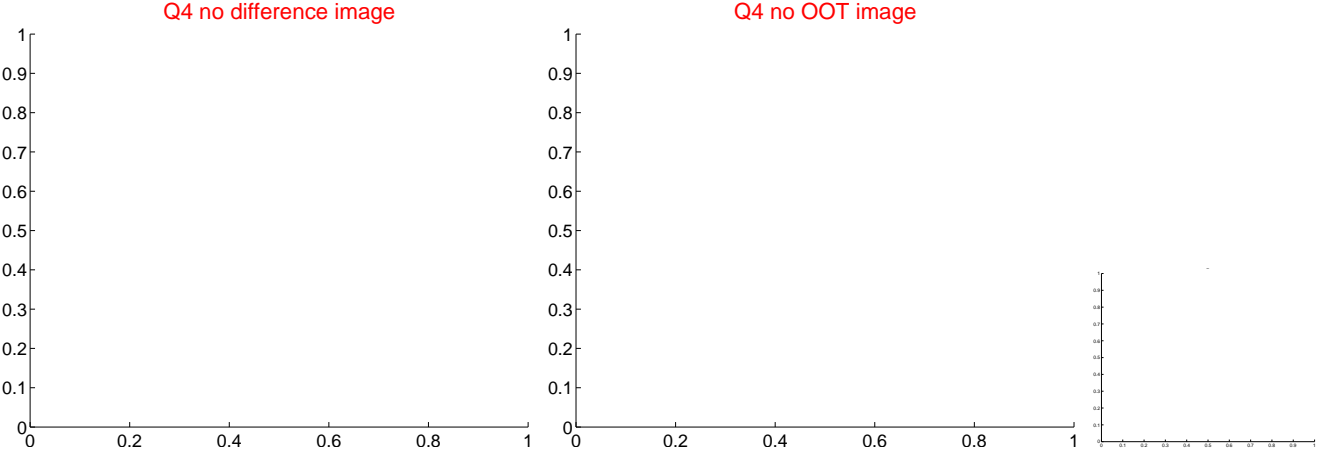
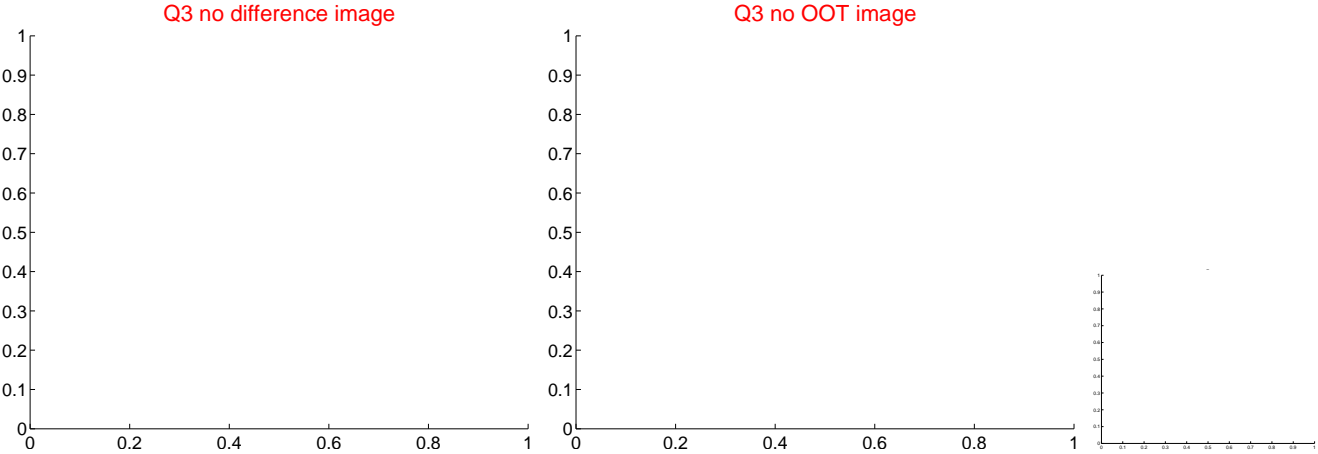
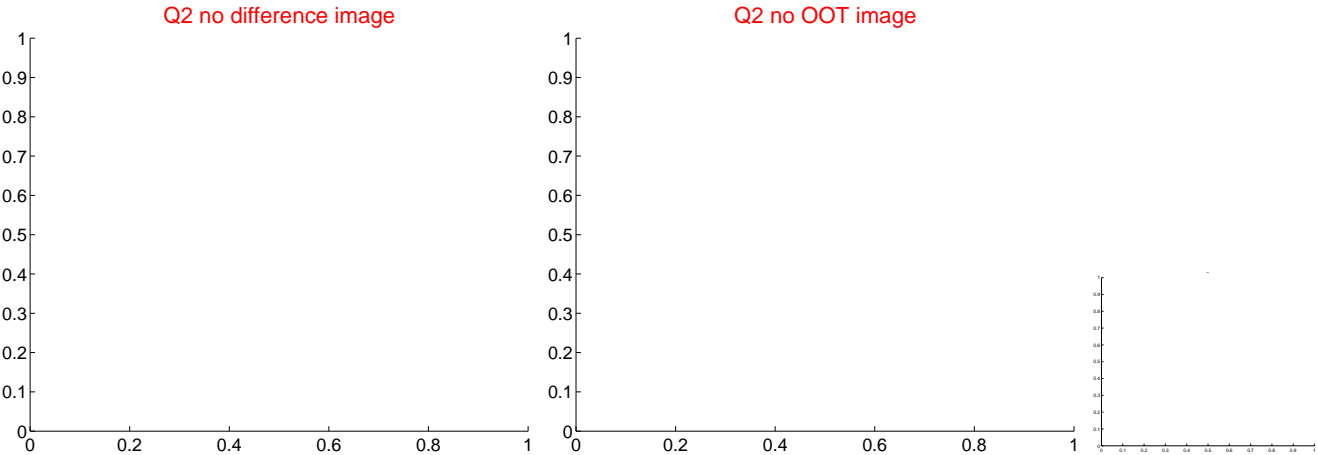
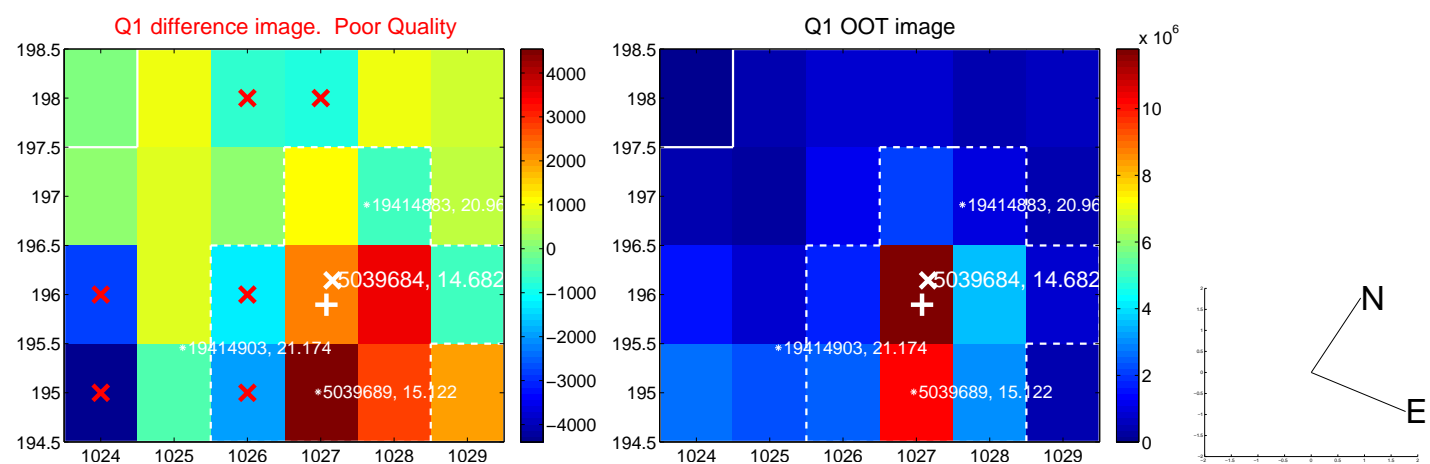
The direct PRF centroid is offset from the target star catalog position by about 0.90 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$3.308 \pm 1.980$	1.67	$-0.561 \pm 0.741$	$3.260 \pm 2.005$
PRF-fit source offset from KIC position	$0.457 \pm 0.393$	1.16	$0.244 \pm 0.307$	$-0.387 \pm 0.277$
photometric centroid source offset	$1.24 \pm 1.01$	1.22	$0.73 \pm 0.54$	$-1.00 \pm 1.19$

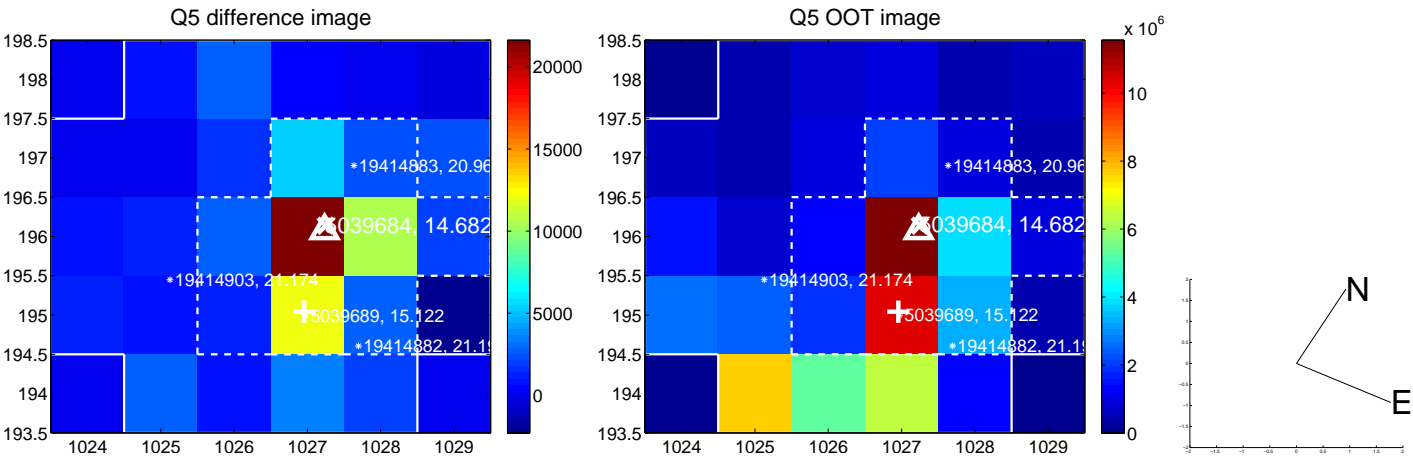


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

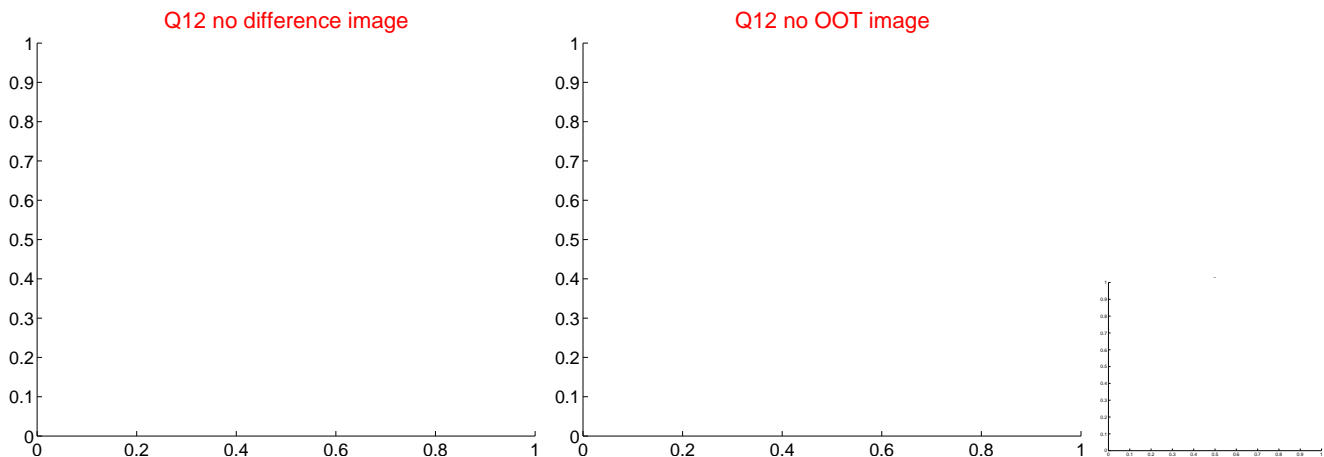
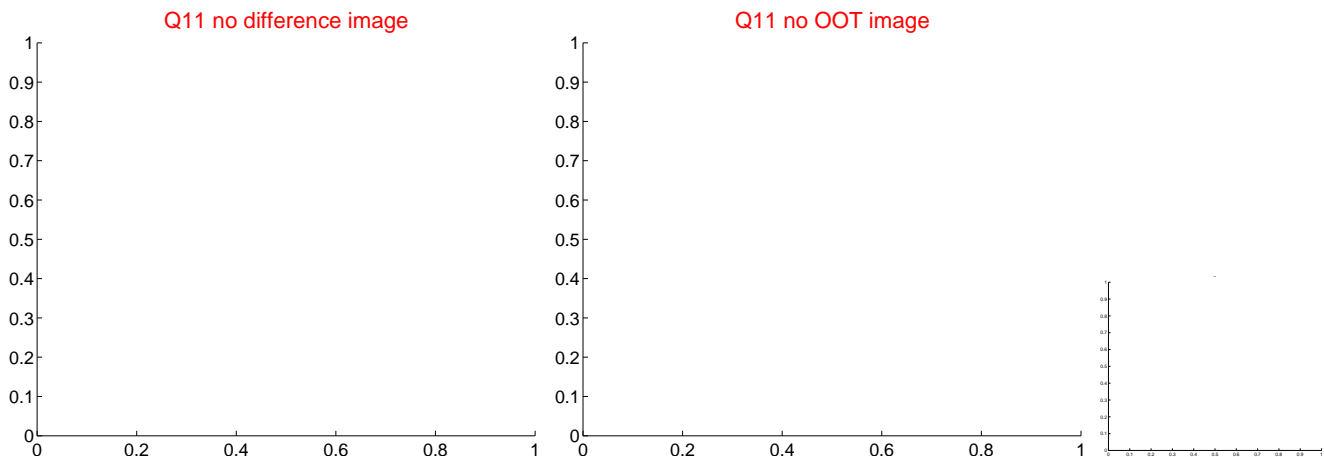
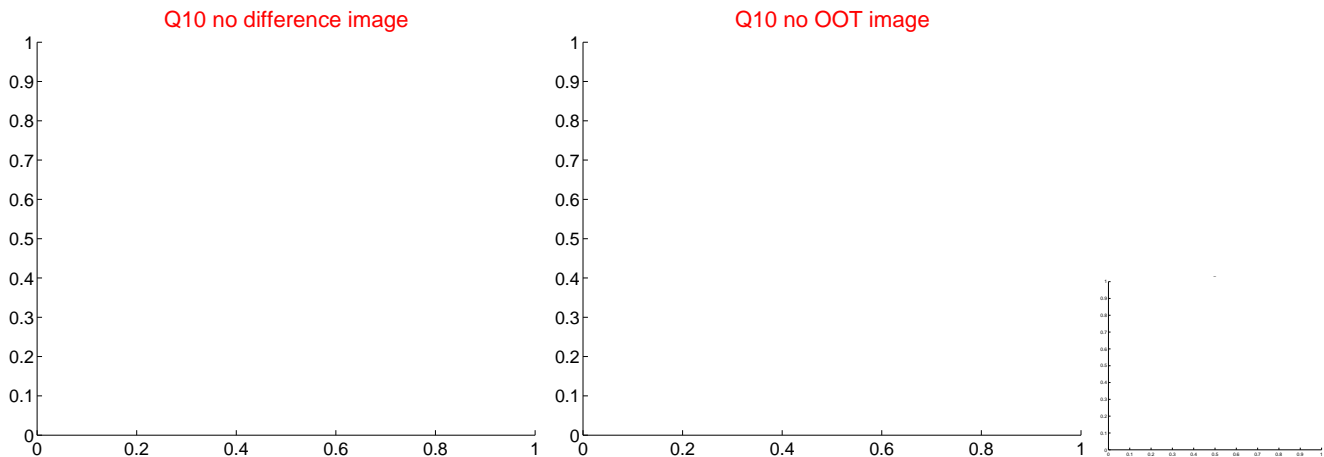
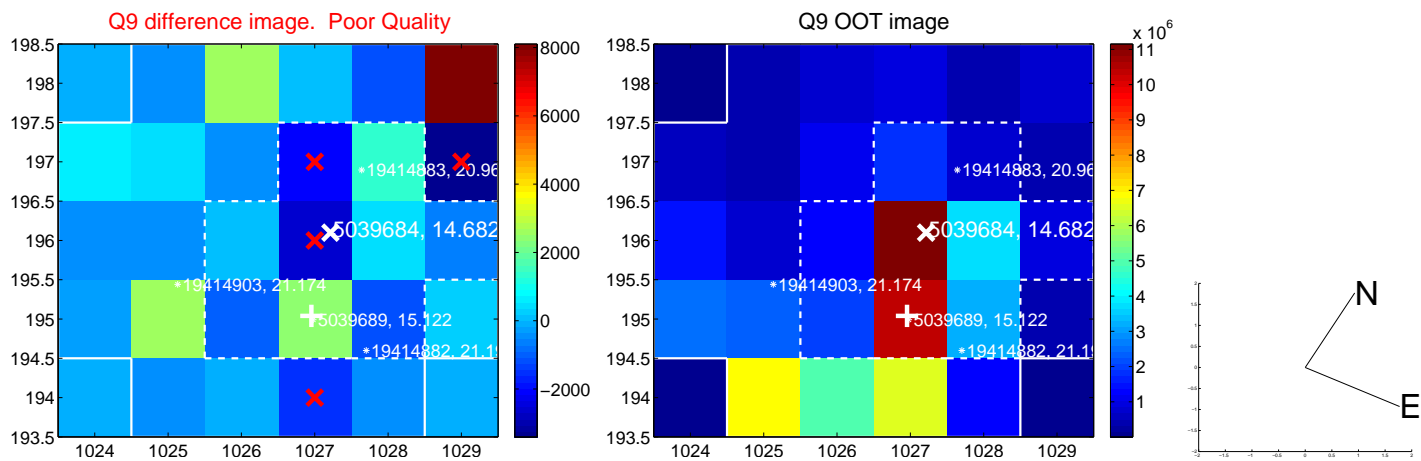
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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.

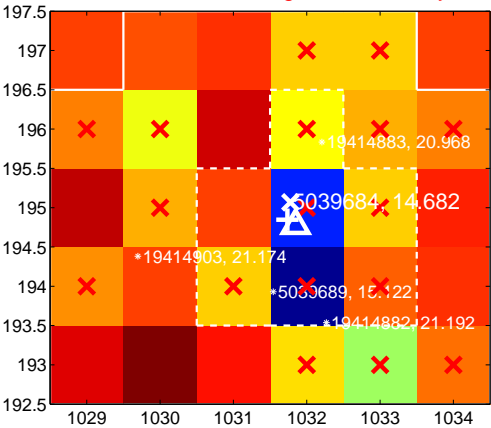
Q13 no difference image



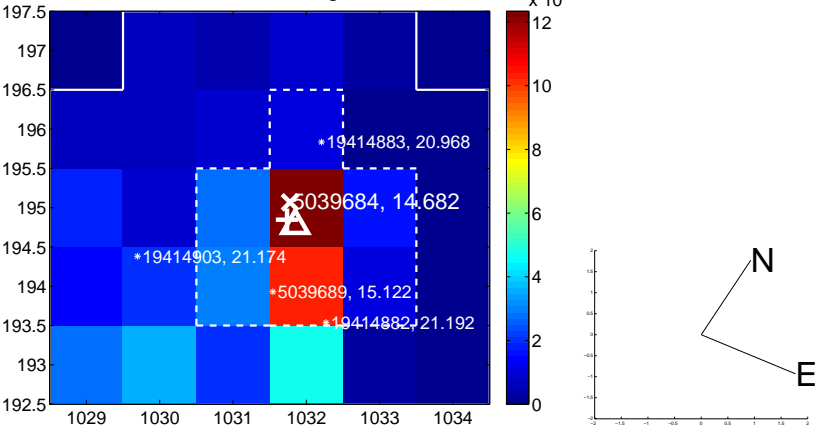
Q13 no OOT image



Q14 difference image. Poor Quality



Q14 OOT image



Q15 no difference image



Q15 no OOT image



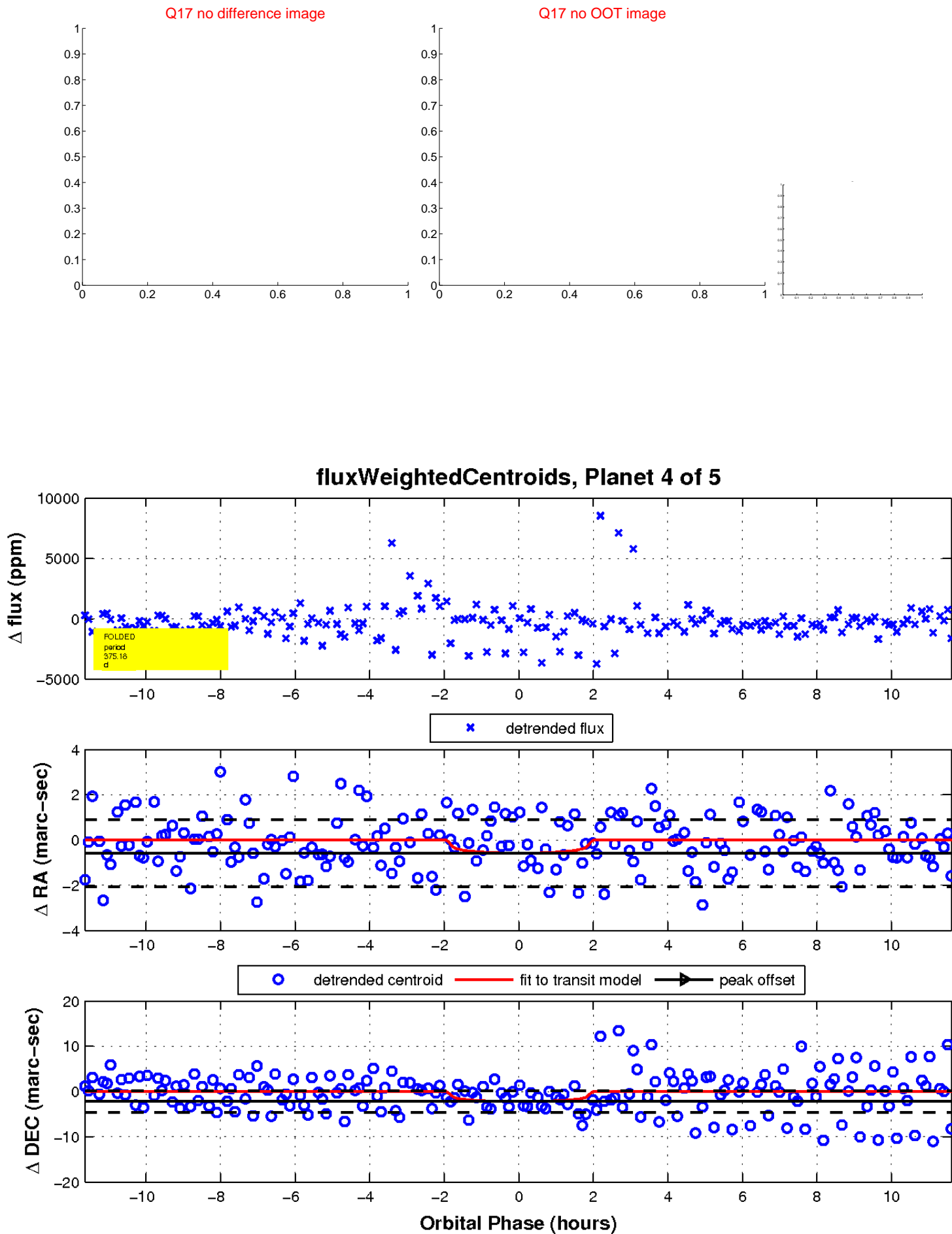
Q16 no difference image



Q16 no OOT image

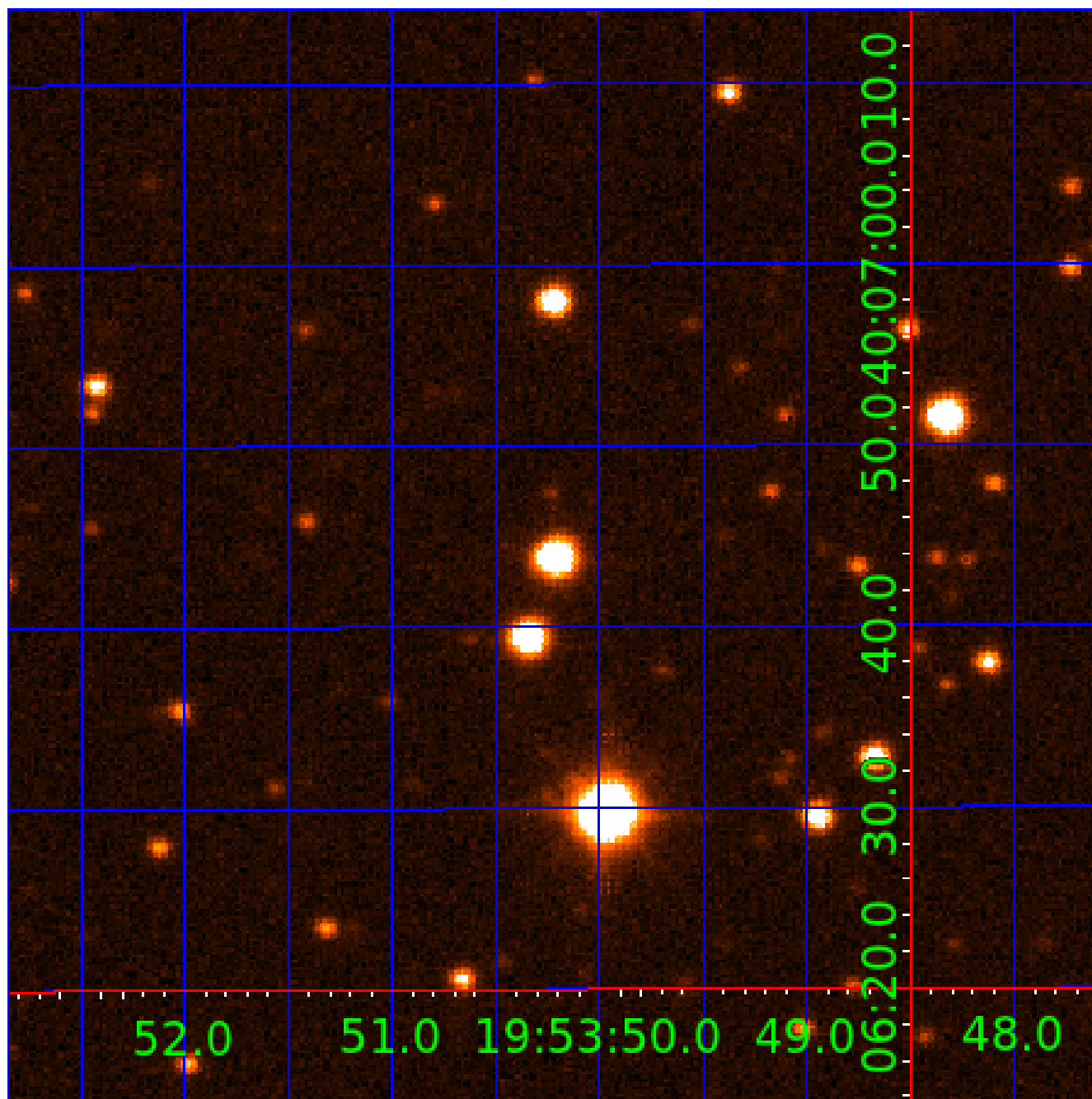


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 005039684

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005039684-01	OBS	No	593.783060	241.375691	1518.3	8.430	14.9	5.4	0.82	5526	3.43	0.32
005039684-02	OBS	No	233.933802	258.872801	2130.8	6.584	14.5	7.6	0.82	5526	4.71	1.12
005039684-03	OBS	No	605.577962	215.863531	1928.8	9.282	10.3	6.5	0.82	5526	3.55	0.32
005039684-04	OBS	No	375.177216	151.129344	1501.9	3.903	12.7	7.4	0.82	5526	3.15	0.60
005039684-05	OBS	No	457.091926	484.861736	1708.5	3.500	11.6	-1.0	0.82	5526	3.35	0.46

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005039684-01	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_KIC_POS
005039684-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005039684-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005039684-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE_TRACKER—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005039684-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_NOFITS—HALO_GHOST

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

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

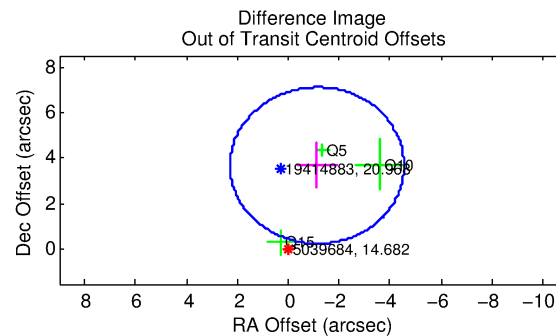
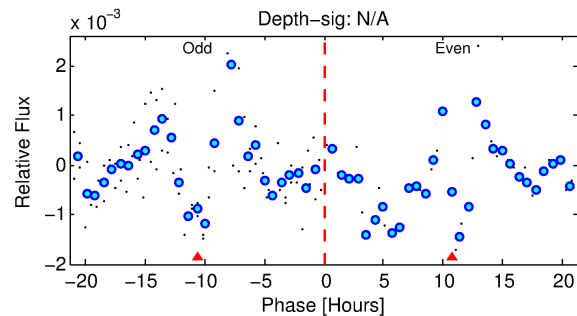
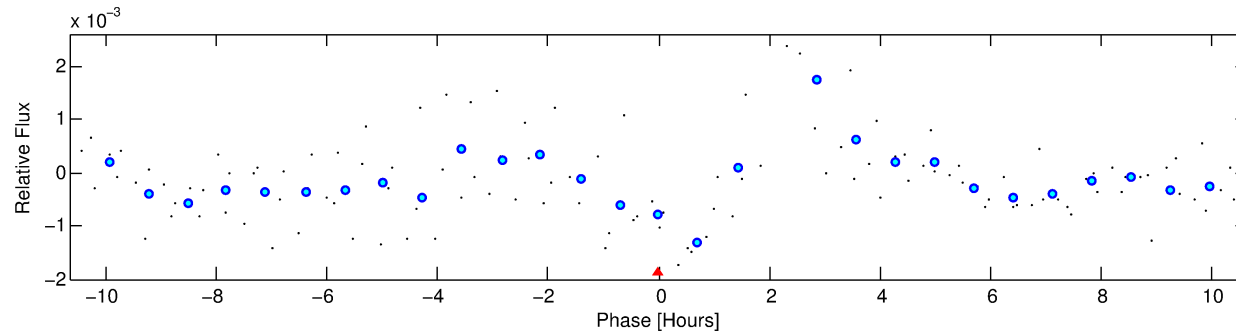
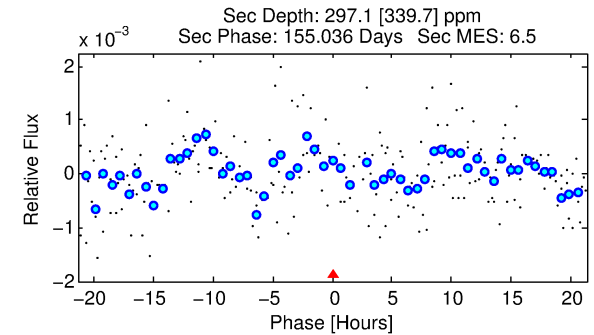
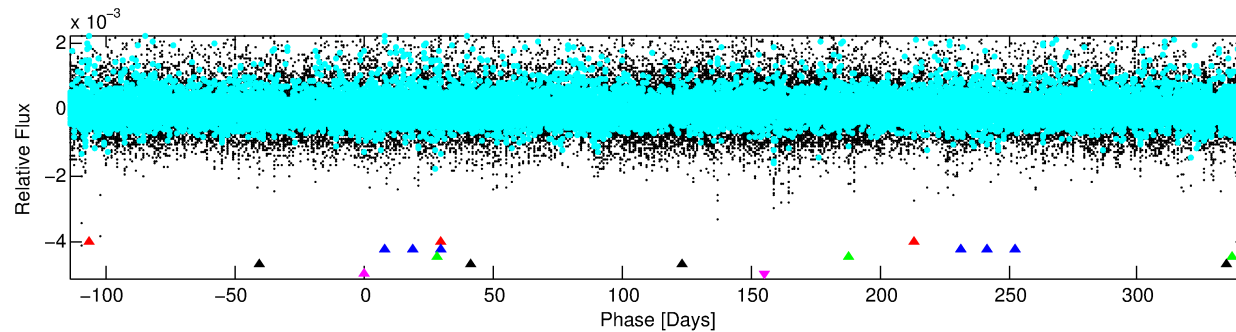
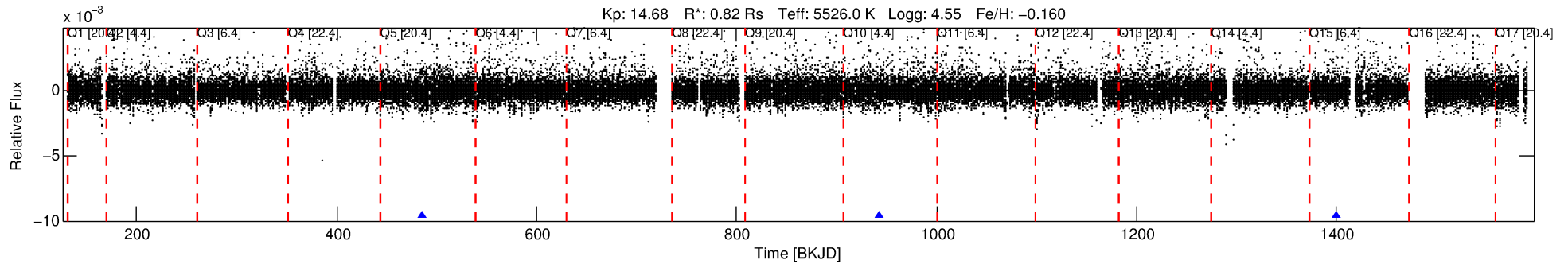
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 005039684-05

No Significant Match Found

# DV One-Page Summary

KIC: 5039684 Candidate: 5 of 5 Period: 457.092 d



## TPS TCE Results:

Period = 457.09193 d  
Epoch = 484.8617 BKJD

DV fit results are unavailable

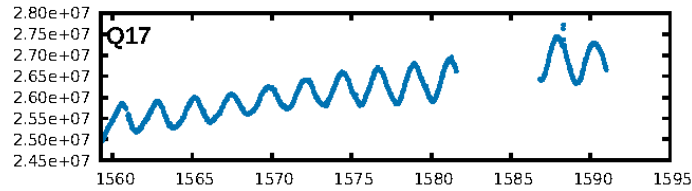
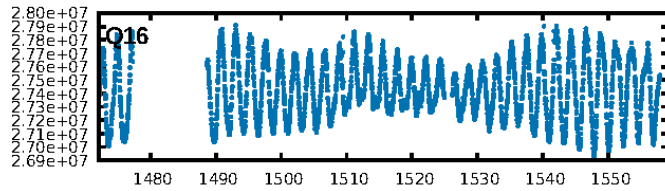
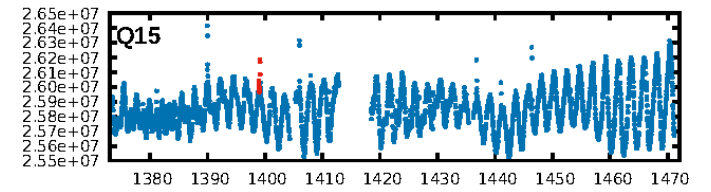
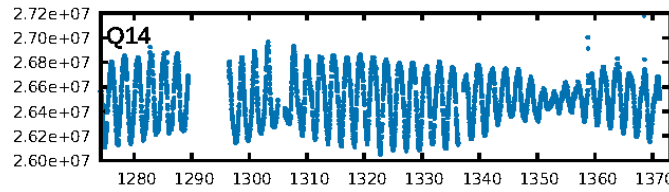
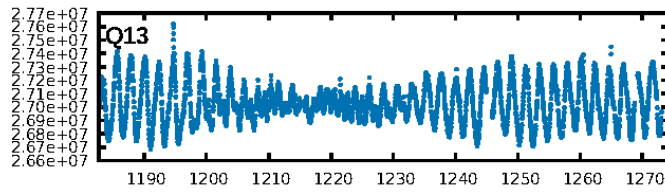
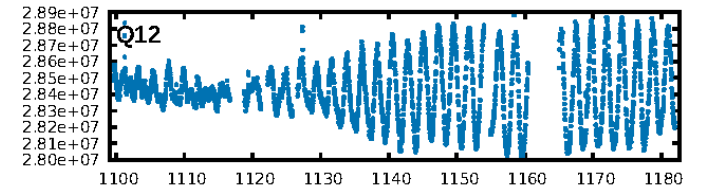
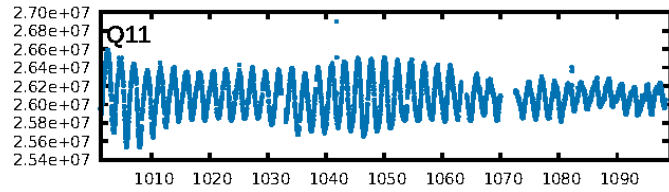
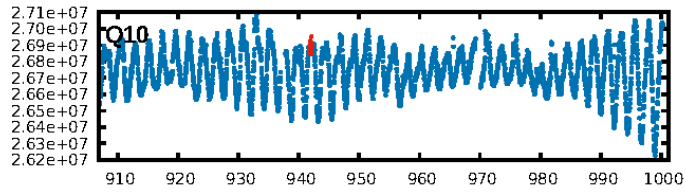
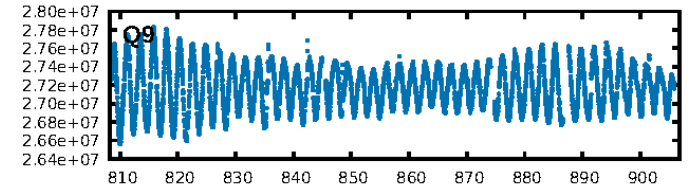
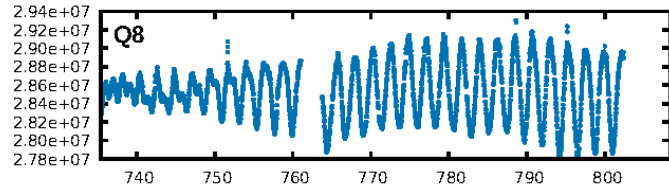
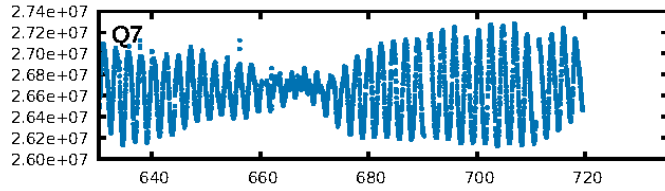
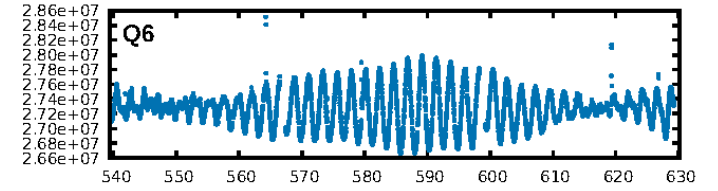
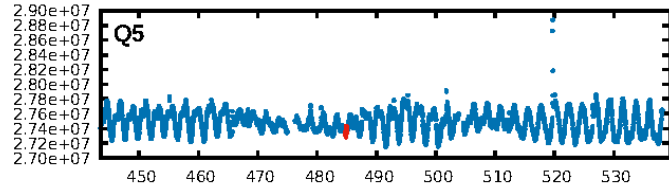
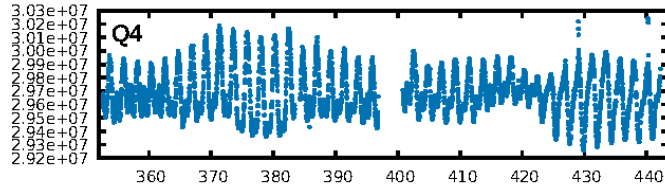
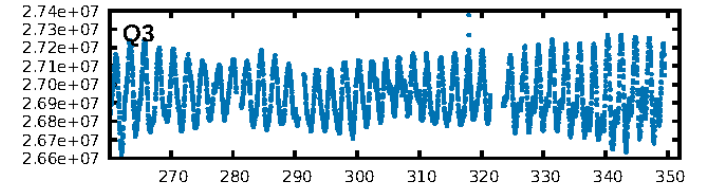
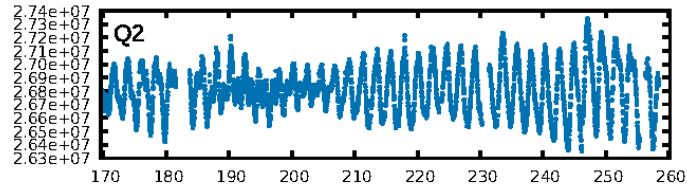
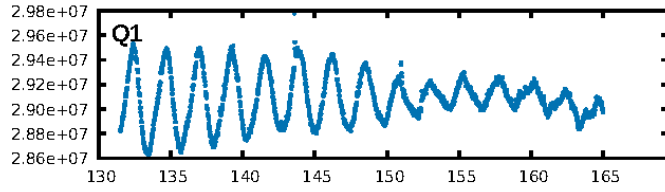
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [375.02σ]  
LongPeriod-sig: 100.0% [359.40σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 0.1432  
Centroid-sig: 13.0%  
Centroid-so: 1.709 arcsec [2.37σ]  
OotOffset-rm: 3.858 arcsec [3.38σ]  
KicOffset-rm: 0.539 arcsec [1.30σ]  
OotOffset-st: 1/1/0/1 [3]  
KicOffset-st: 1/1/0/1 [3]  
DiffImageQuality-fgm: 0.33 [1/3]  
DiffImageOverlap-fno: 1.00 [3/3]

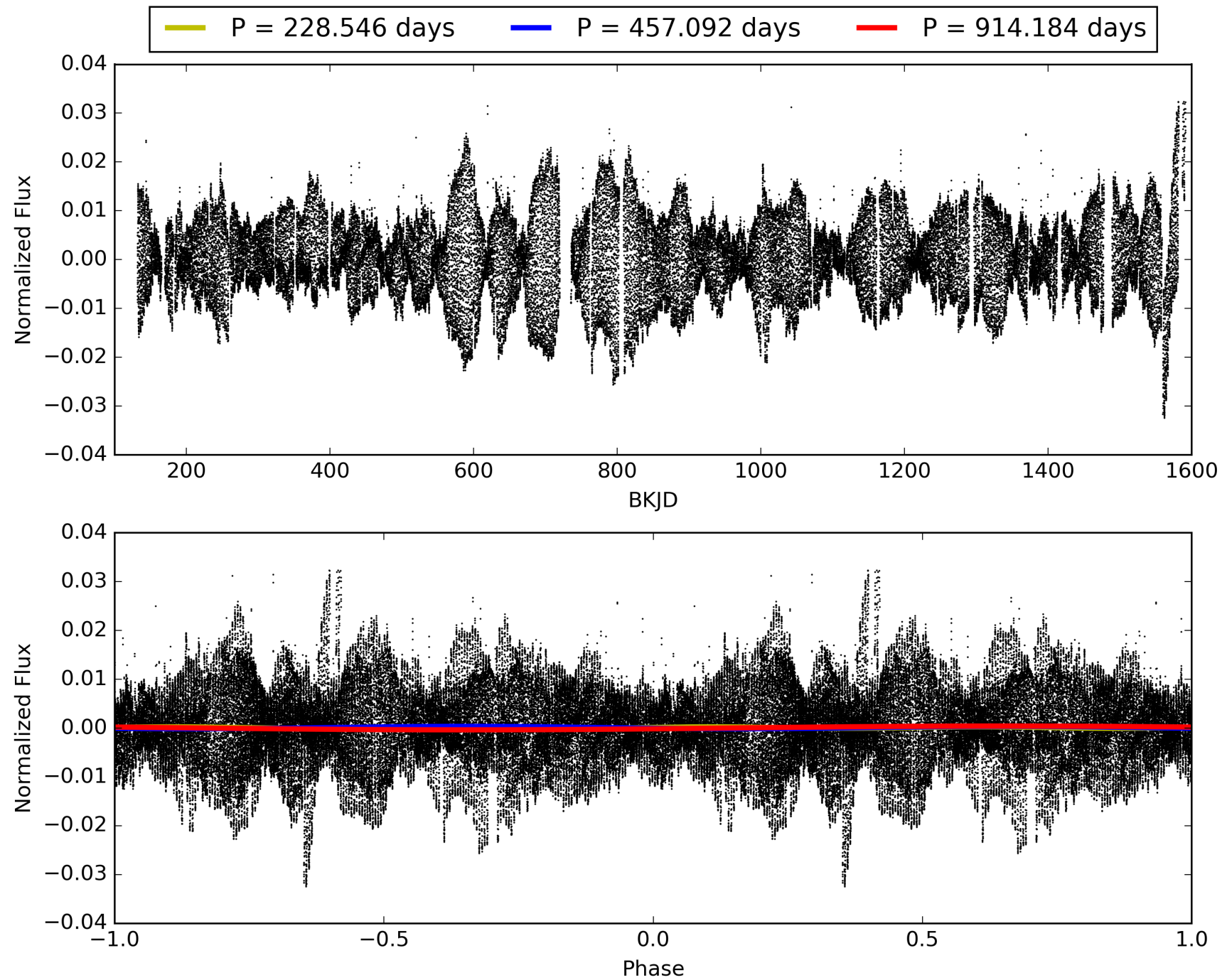
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 16:07:55 Z

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

# TCE 005039684-05, PDC Light Curves

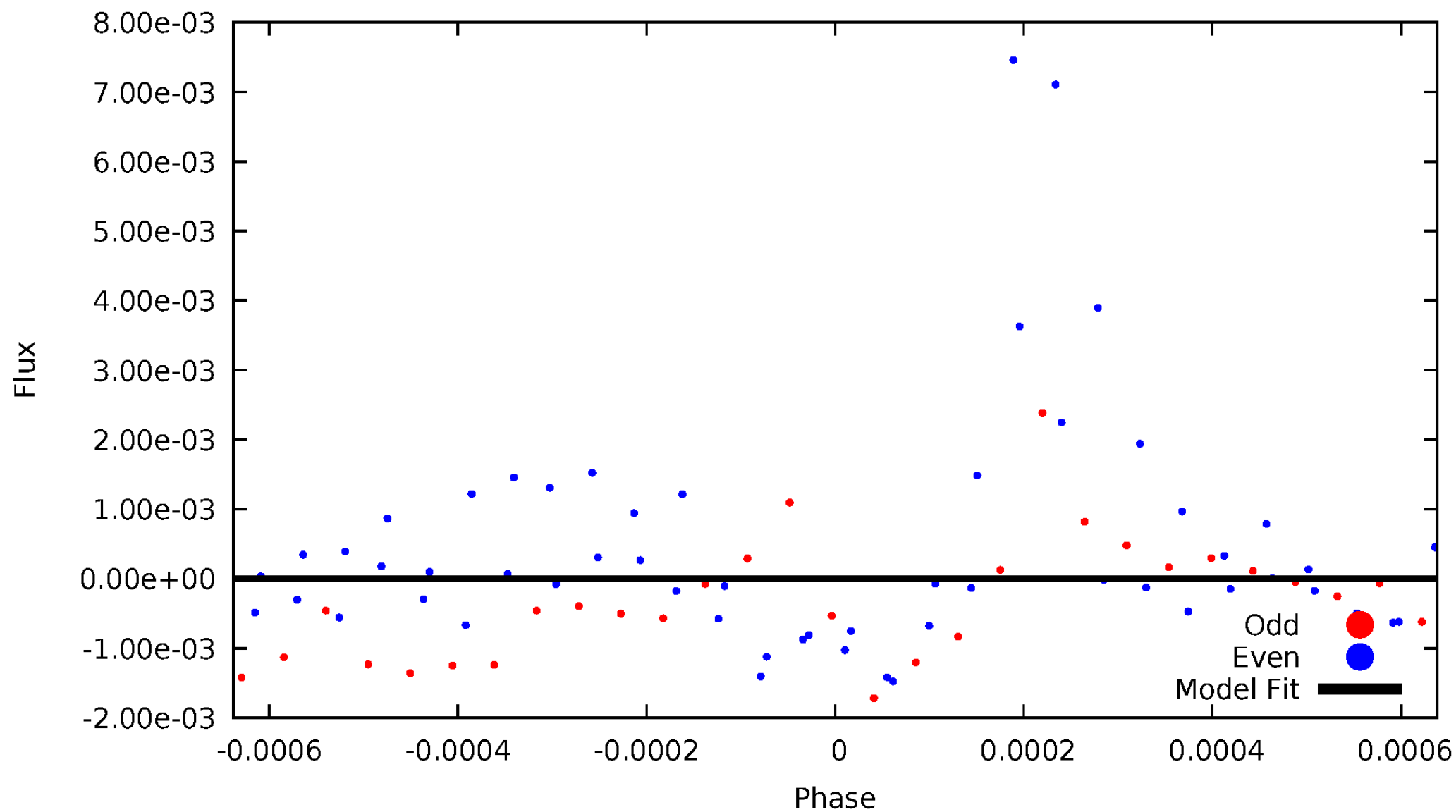


TCE 005039684-05



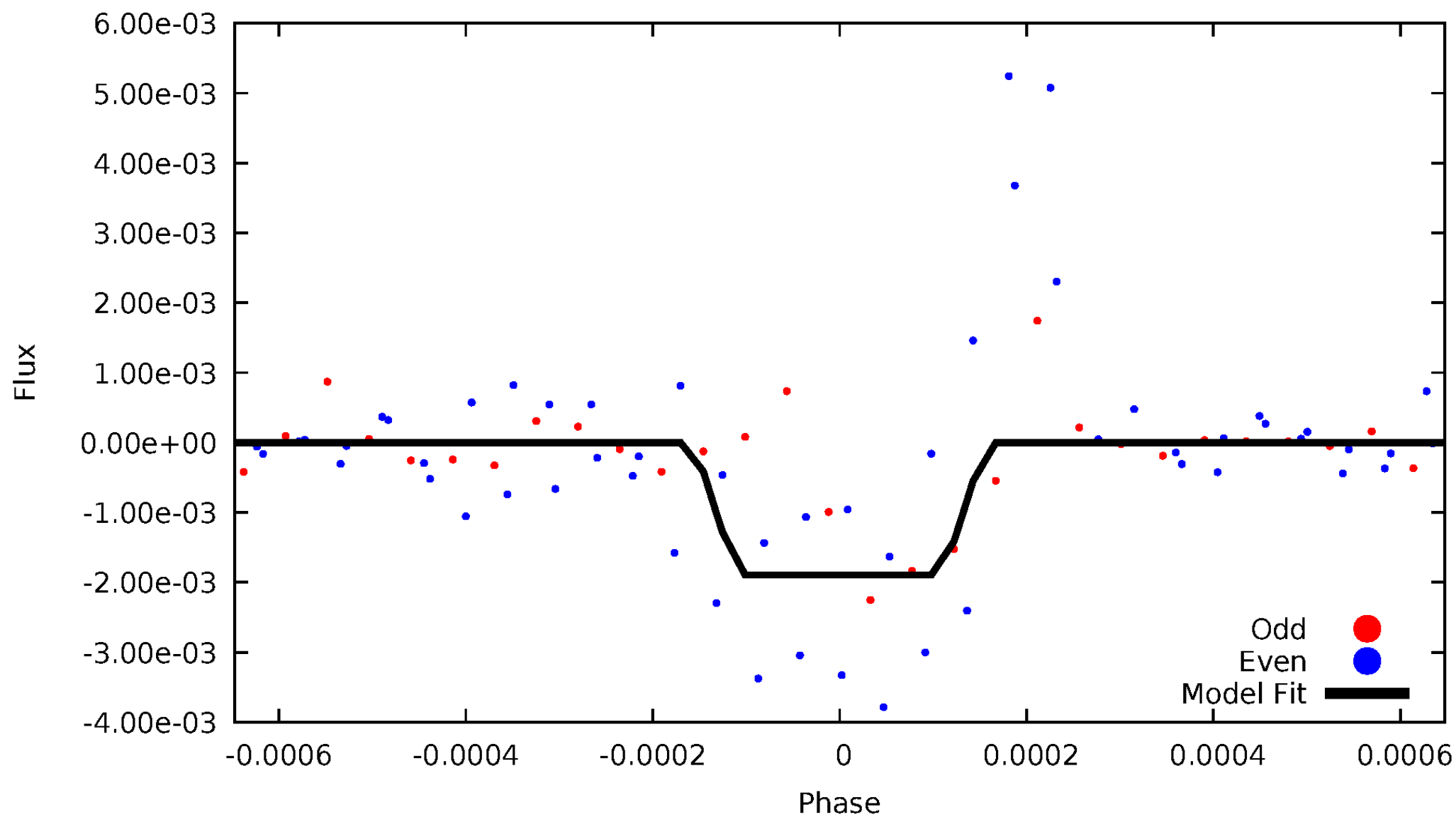
# DV Odd/Even

TCE 005039684-05

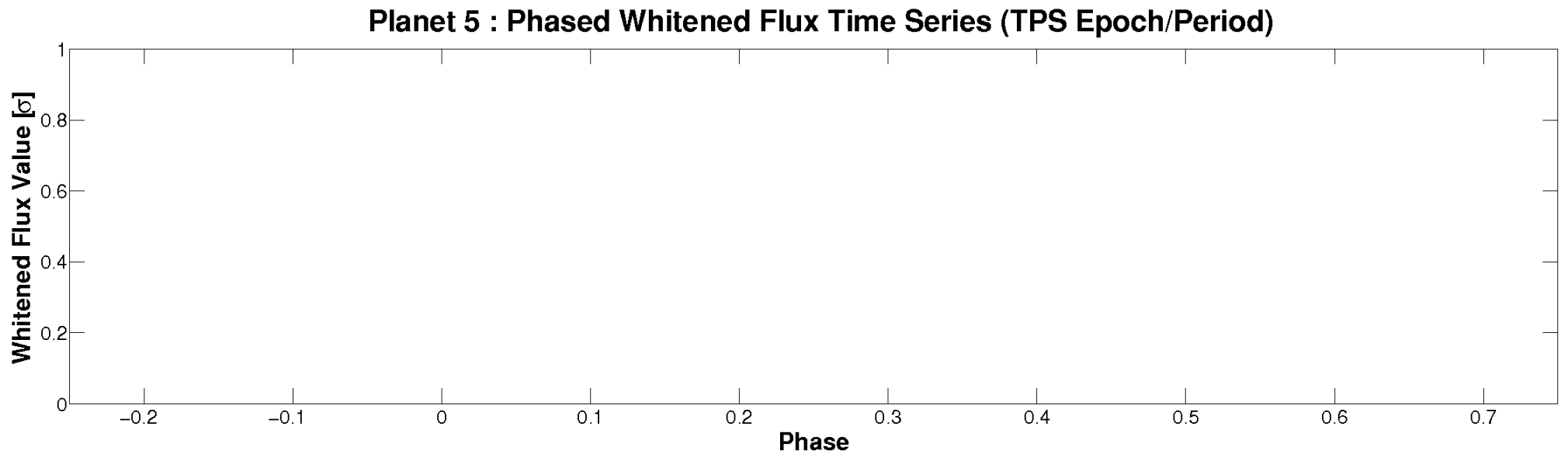
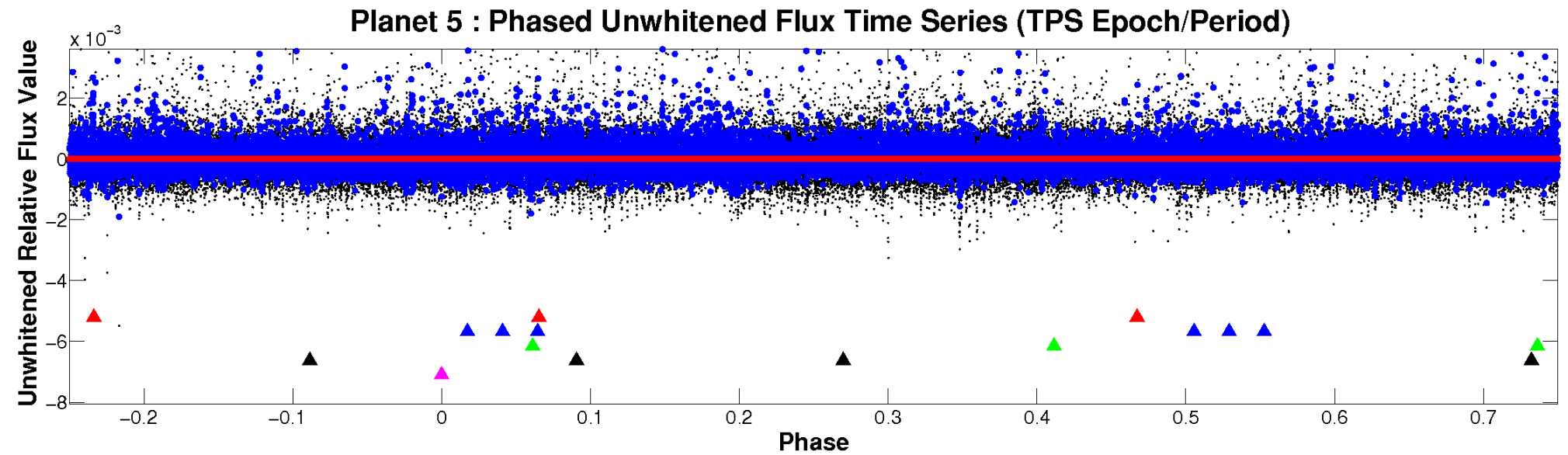


# ALT Odd/Even

TCE 005039684-05

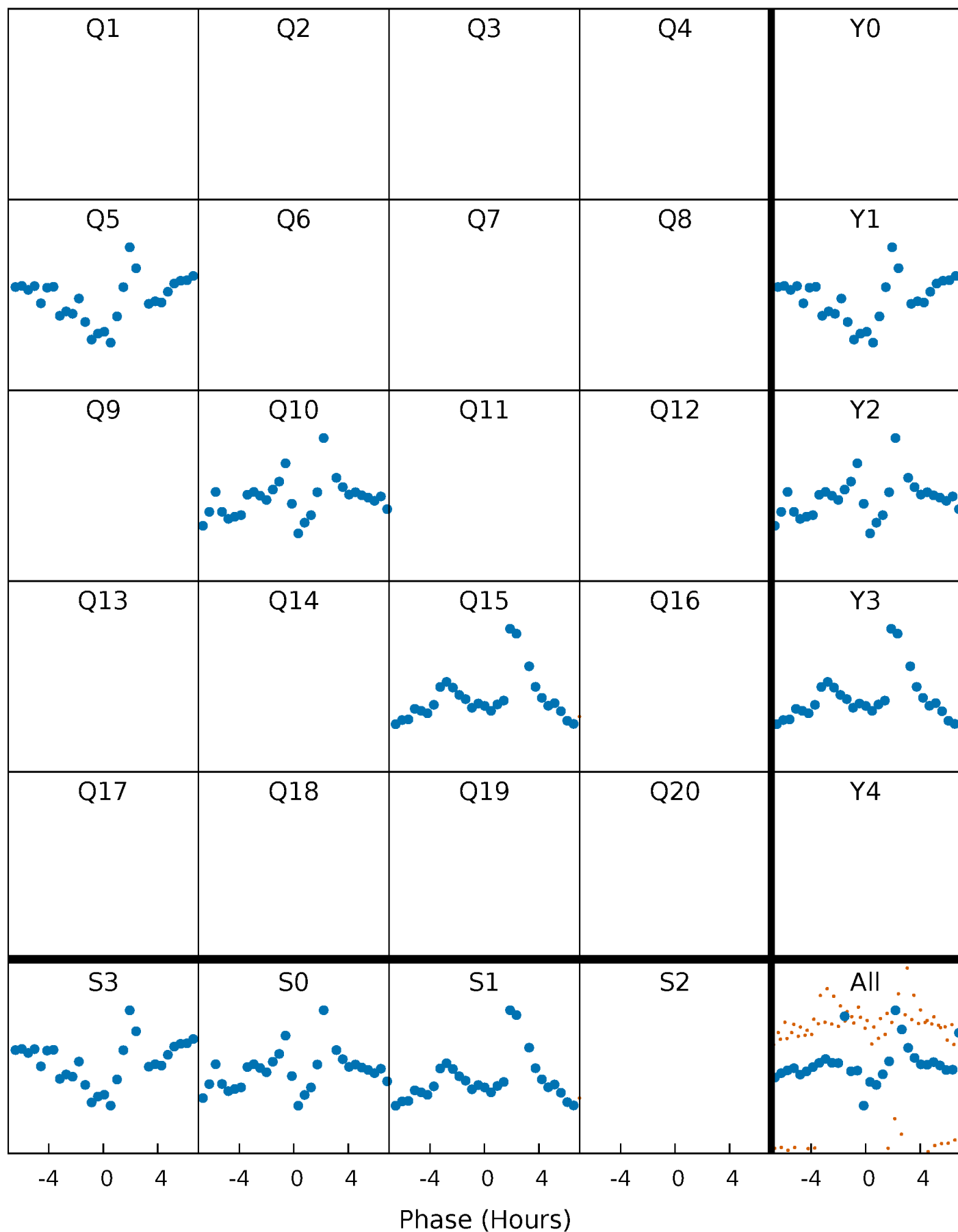


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

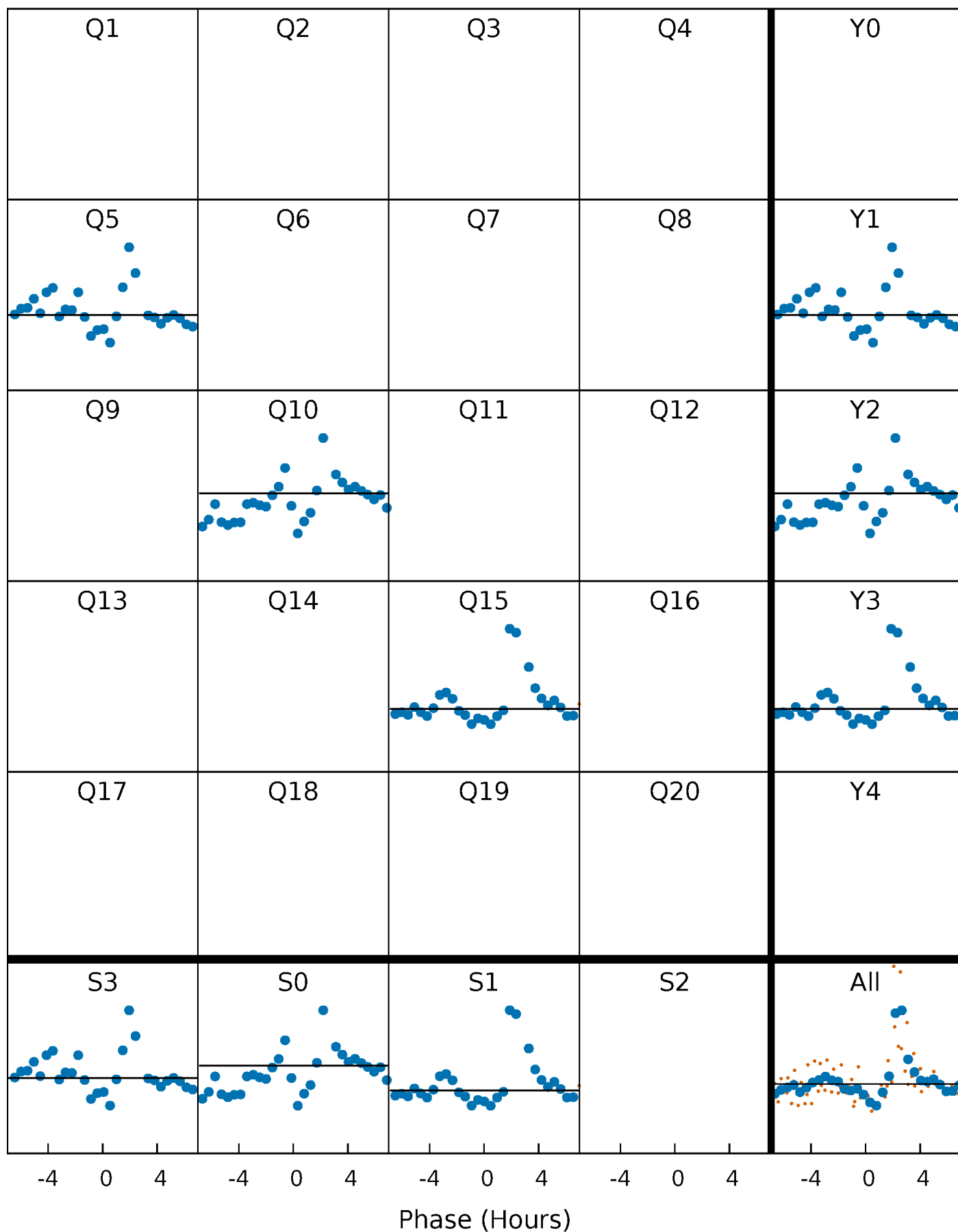
TCE 005039684-05     $P=457.091926$  Days     $T_0=484.861736$  (BKJD)





# DV Quarter-Phased Transit Curves

TCE 005039684-05     $P=457.091926$  Days     $T_0=484.861736$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

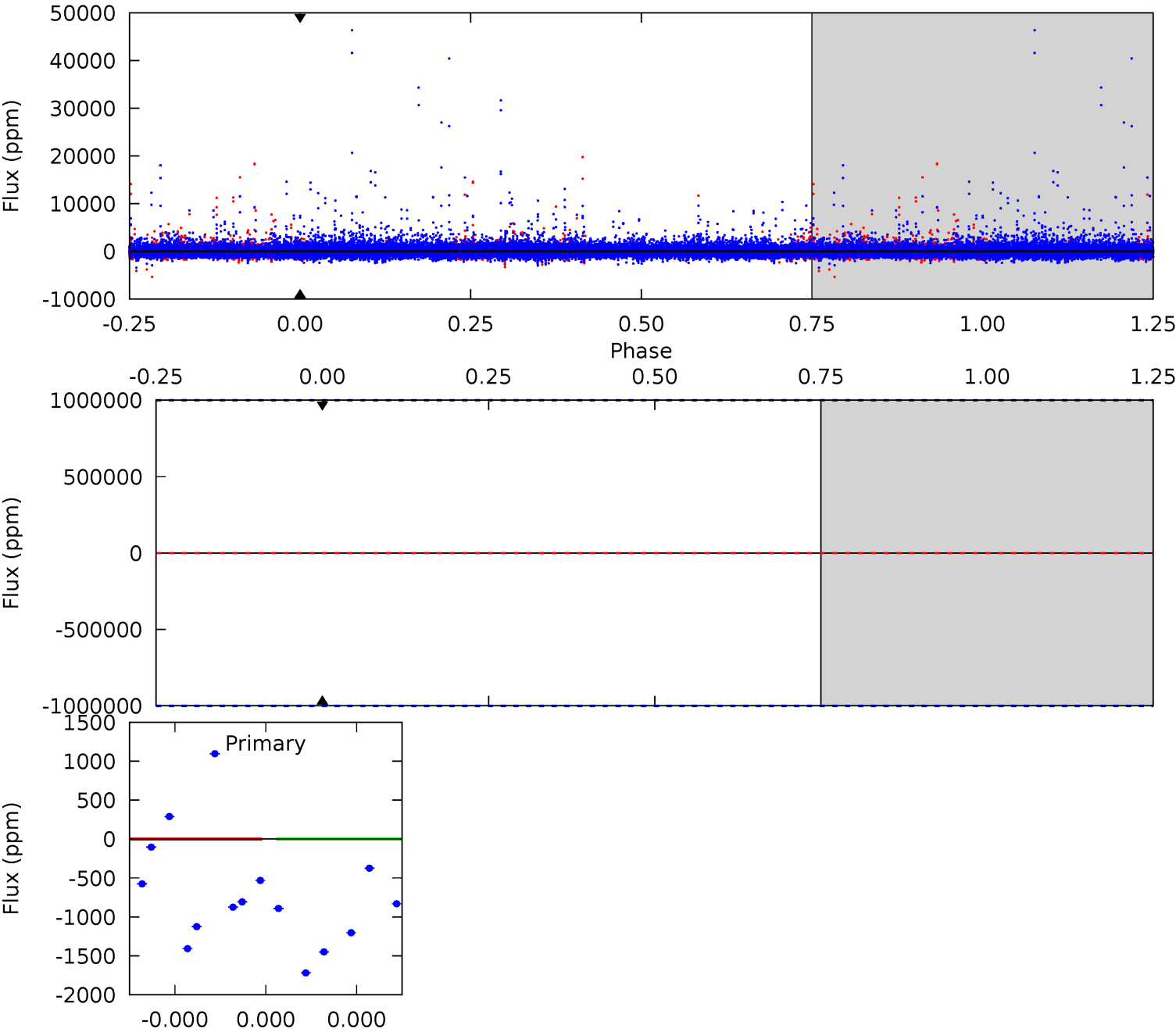
TCE 005039684-05     $P=457.091926$  Days     $T_0=484.865454$  (BKJD)



# DV Model-Shift Uniqueness Test

005039684-05, P = 457.091926 Days, E = 27.769810 Days

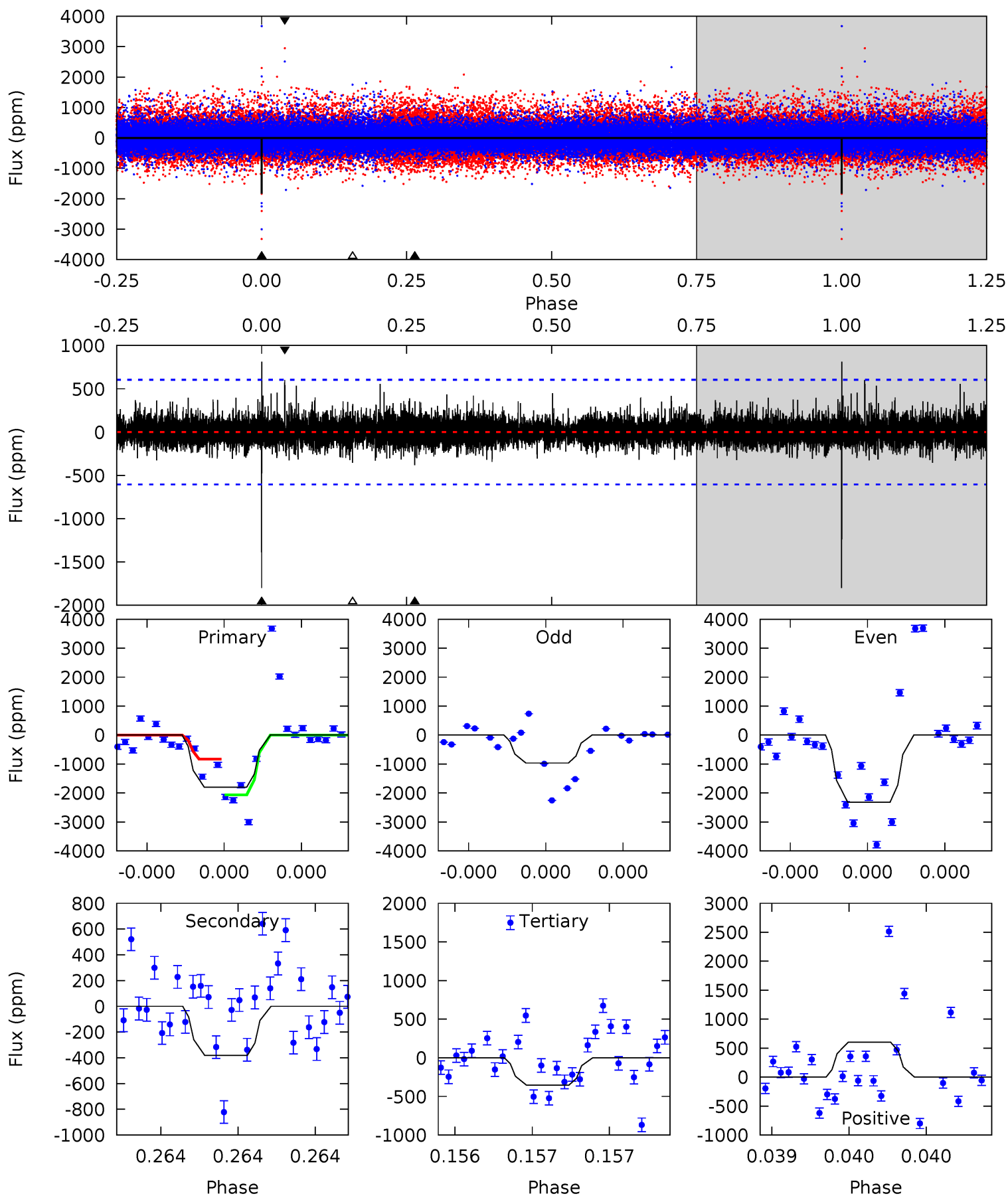
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



# Alt Model-Shift Uniqueness Test

005039684-05, P = 457.091926 Days, E = 27.773528 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
16.9	3.58	3.31	5.63	5.65	3.60	0.86	13.5	11.2	0.27	-2.05	6.98	1.84	0.31	5.66



### Stellar Parameters For KIC 005039684

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5526^{+166}_{-149}$	$4.549^{+0.050}_{-0.150}$	$-0.160^{+0.300}_{-0.300}$	$0.821^{+0.187}_{-0.080}$	$0.870^{+0.092}_{-0.092}$	$2.214^{+0.541}_{-0.929}$
	+3%/-3%	+1%/-3%	+188%/-188%	+23%/-10%	+11%/-11%	+24%/-42%
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 005039684-05 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$0 \pm 1000000$	$7.60^{+8.08}_{-5.16}$	$298^{+16}_{-13}$	$-4390^{+20507}_{-10754}$	$-27851.547^{+1933654.368}_{-1549029.692}$
Alt.	$-382 \pm 107$	$8.12^{+7.81}_{-5.17}$	$298^{+19}_{-12}$	$3177^{+1274}_{-540}$	$3739^{+23865}_{-2805}$

$T_{max}$  = Theoretical Maximum Planetary Temperature

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

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

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

## DV Centroid Data

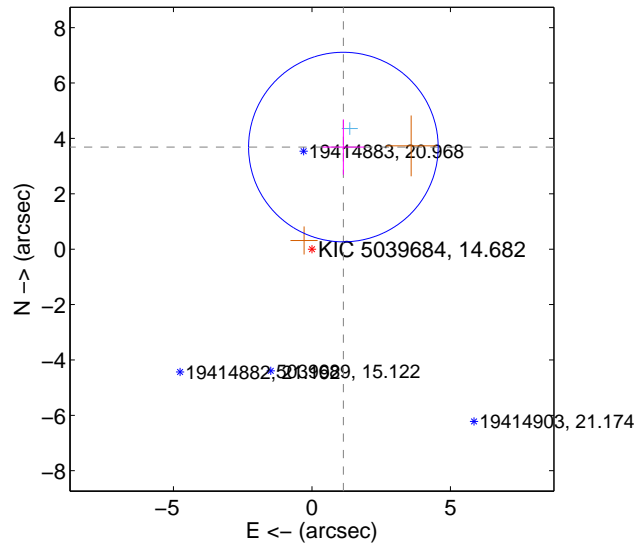
Supplemental centroid analysis for 005039684-05. Kepler magnitude: 14.68. Transit SNR -1.00

There are 1 quarters with good PRF difference image offsets

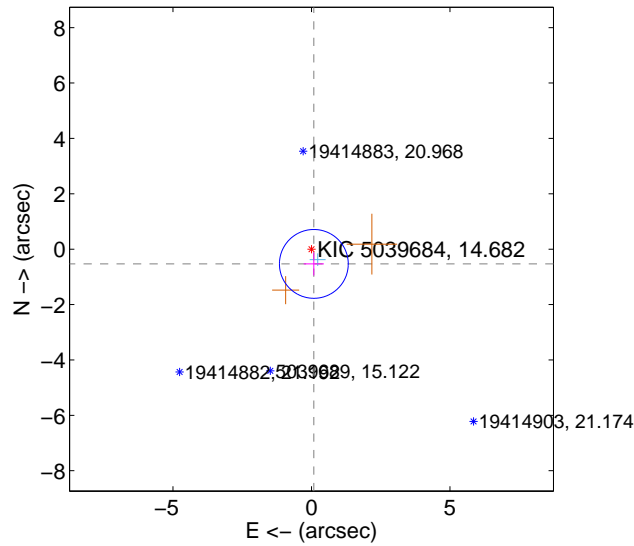
The direct PRF centroid is offset from the target star catalog position by about 1.91 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$3.858 \pm 1.141$	3.38	$-1.135 \pm 0.761$	$3.688 \pm 0.999$
PRF-fit source offset from KIC position	$0.539 \pm 0.414$	1.30	$-0.086 \pm 0.364$	$-0.532 \pm 0.415$
photometric centroid source offset	$1.71 \pm 0.72$	2.37	$0.05 \pm 0.51$	$-1.71 \pm 0.72$

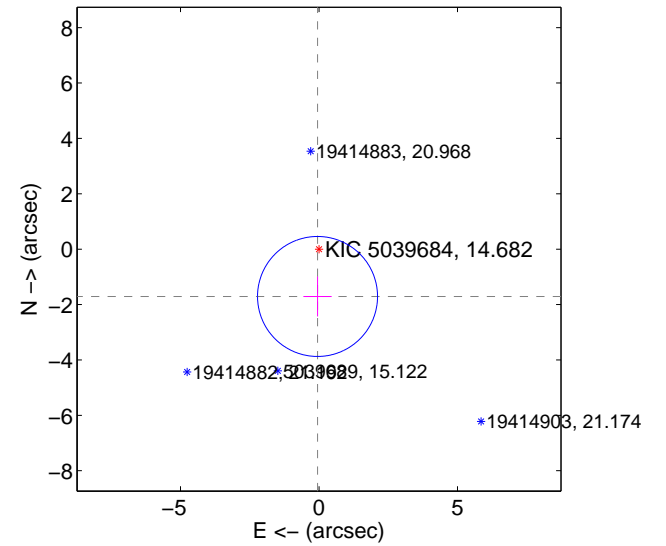
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



offset from photometric centroids

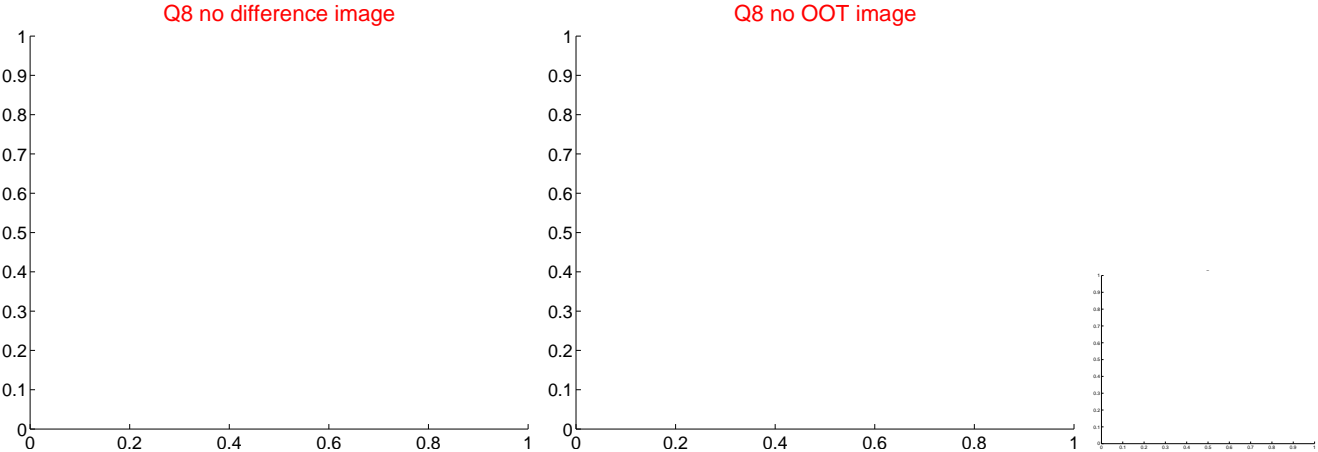
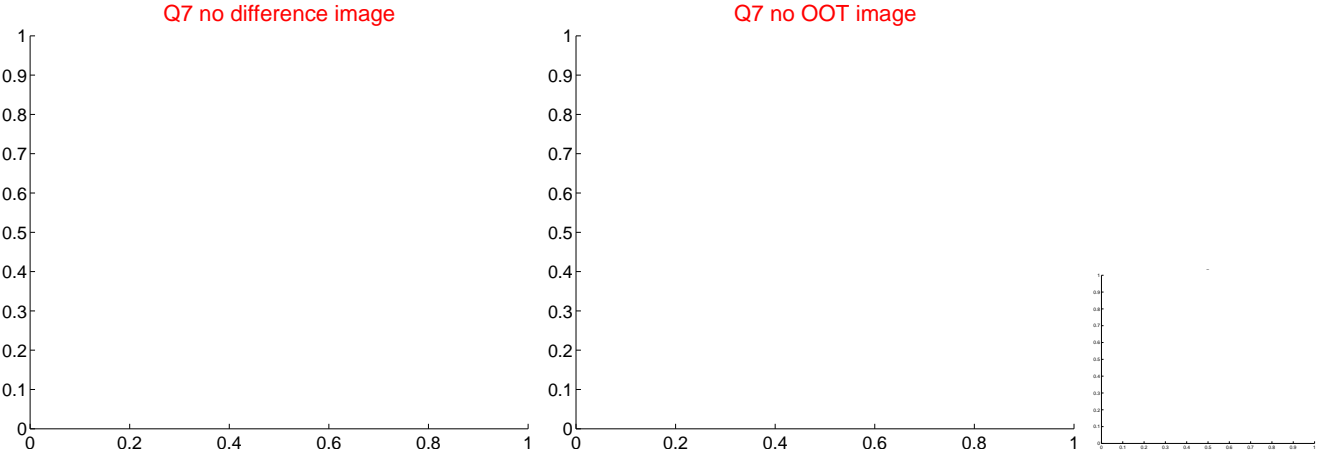
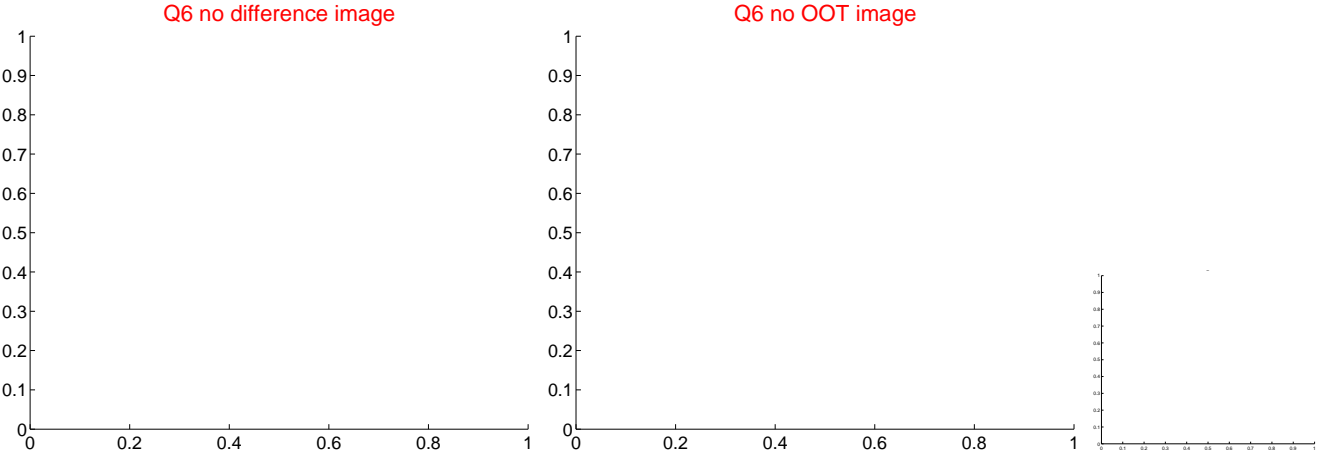
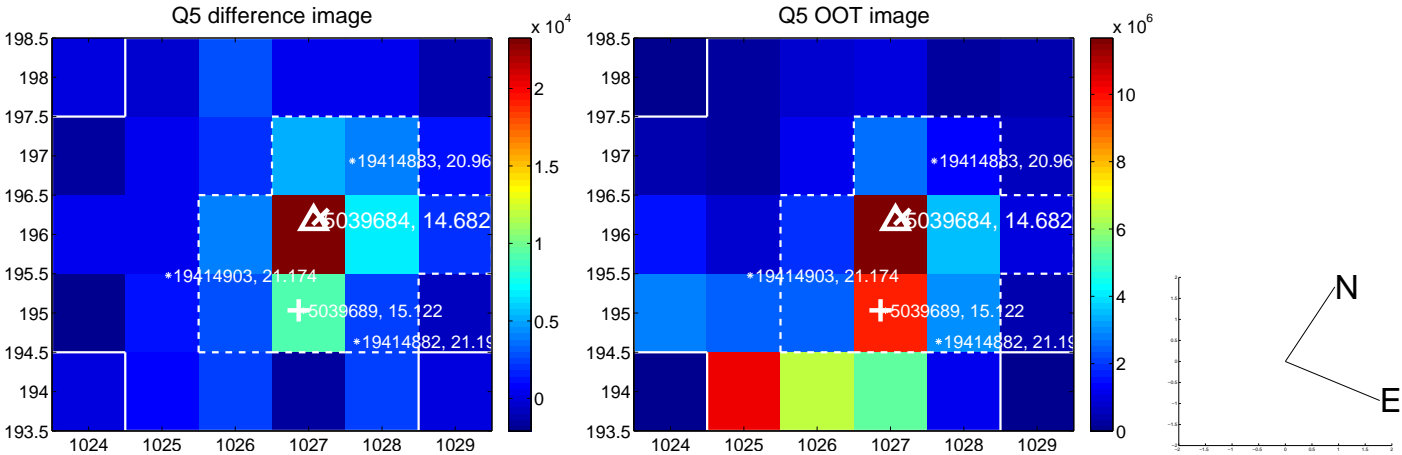


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

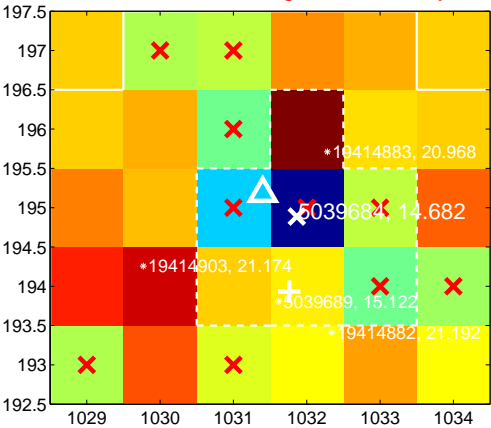
Q9 no difference image



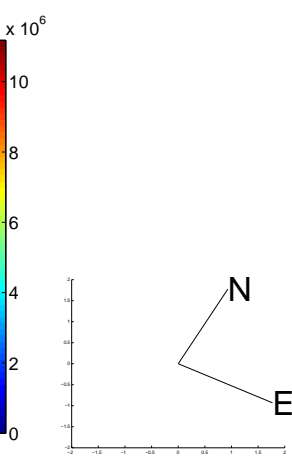
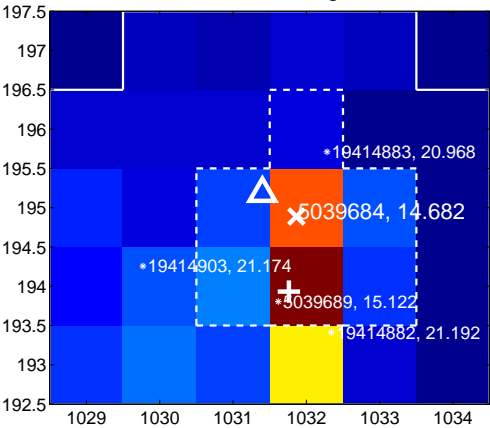
Q9 no OOT image



Q10 difference image. Poor Quality



Q10 OOT image



Q11 no difference image



Q11 no OOT image



Q12 no difference image



Q12 no OOT image



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

Q13 no difference image



Q13 no OOT image



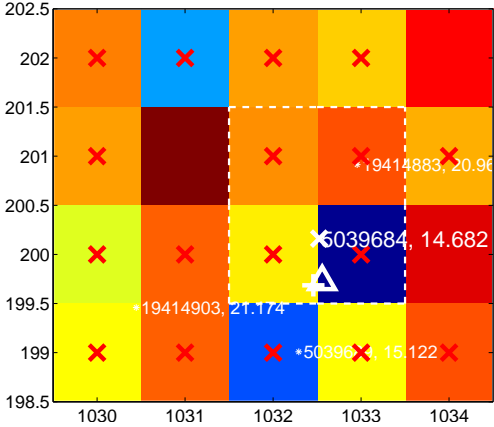
Q14 no difference image



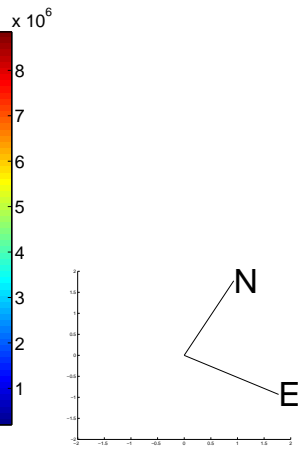
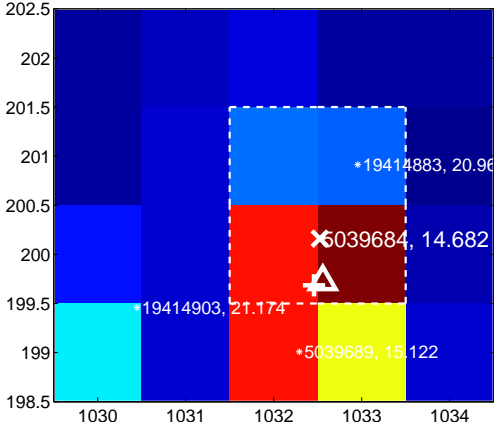
Q14 no OOT image



Q15 difference image. Poor Quality



Q15 OOT image



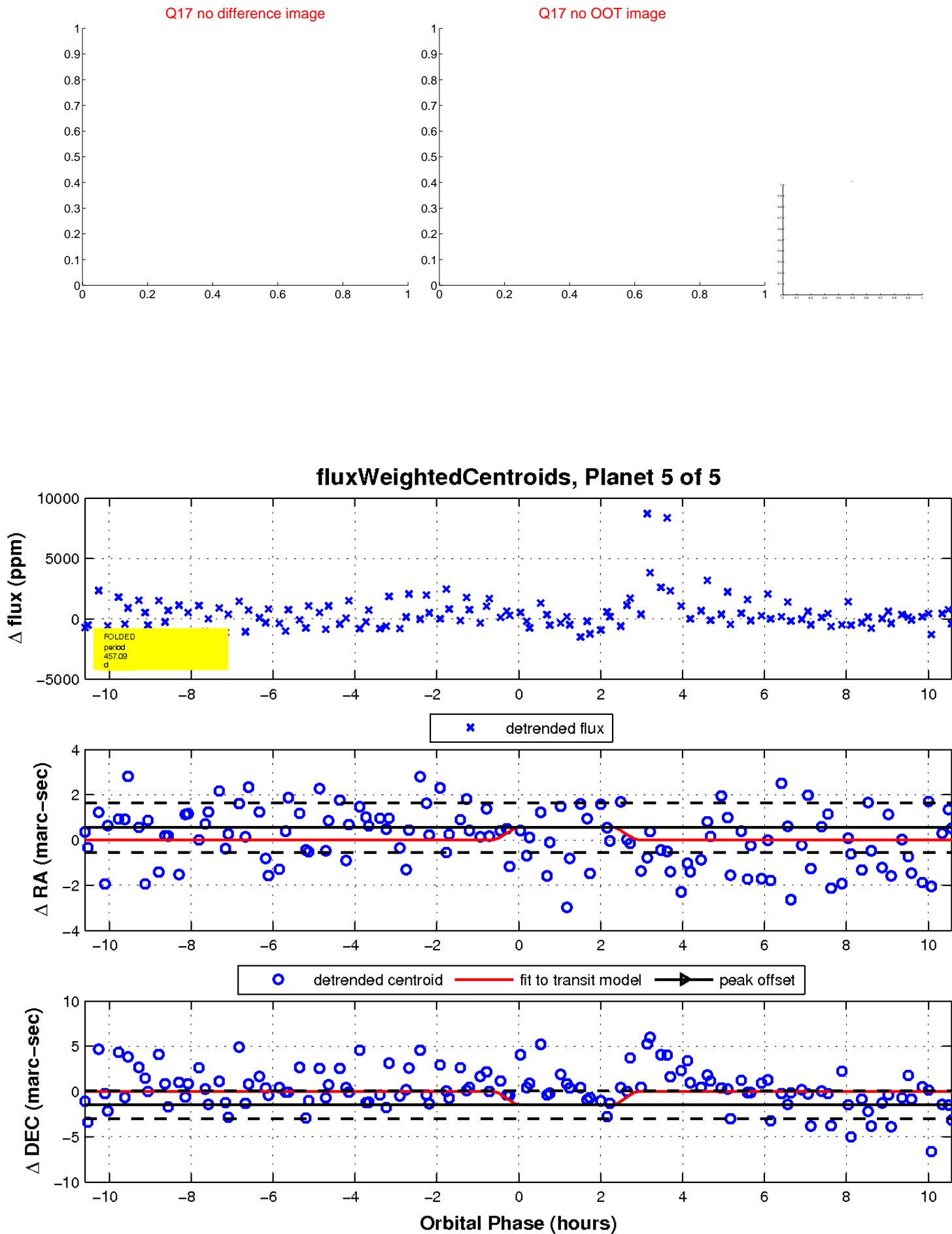
Q16 no difference image



Q16 no OOT image



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



UKIRT Image

Declination

