

# KIC 004068539

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004068539-01	OBS	No	329.750808	132.793344	931.3	5.504	17.2	6.7	3.38	4946	10.12	7.69
004068539-02	OBS	No	488.817554	531.587690	1505.9	5.757	16.9	10.2	3.38	4946	13.96	4.55
004068539-03	OBS	No	164.780942	271.640333	641.8	2.066	16.6	6.8	3.38	4946	8.79	19.39
004068539-04	OBS	No	195.135183	156.264736	1317.8	11.313	15.1	8.9	3.38	4946	15.73	15.48
004068539-06	OBS	No	194.178598	185.625789	708.3	5.027	15.4	6.8	3.38	4946	8.86	15.58
004068539-07	OBS	No	660.834953	193.179478	512.9	7.500	14.5	-1.0	3.38	4946	7.43	3.04

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004068539-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
004068539-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
004068539-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_ZUMA_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
004068539-04	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—INCONSISTENT_TRANS
004068539-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—INCONSISTENT_TRANS—CENT_KIC_POS
004068539-07	OBS	FP	0.00	1	0	0	0	LPP_DV—ALL_TRANS_CHASES—CENT_NOFITS

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

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

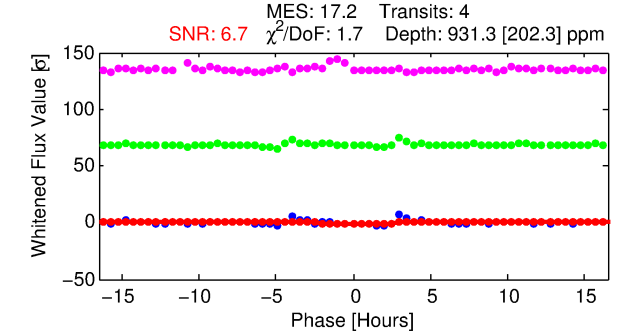
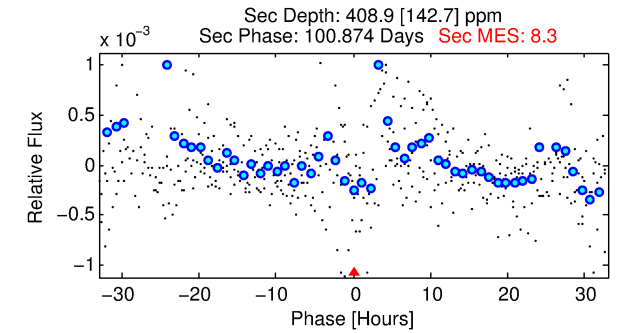
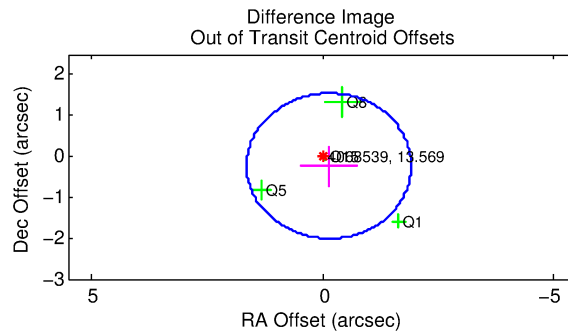
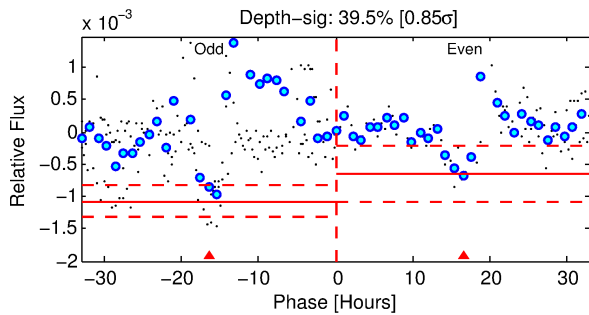
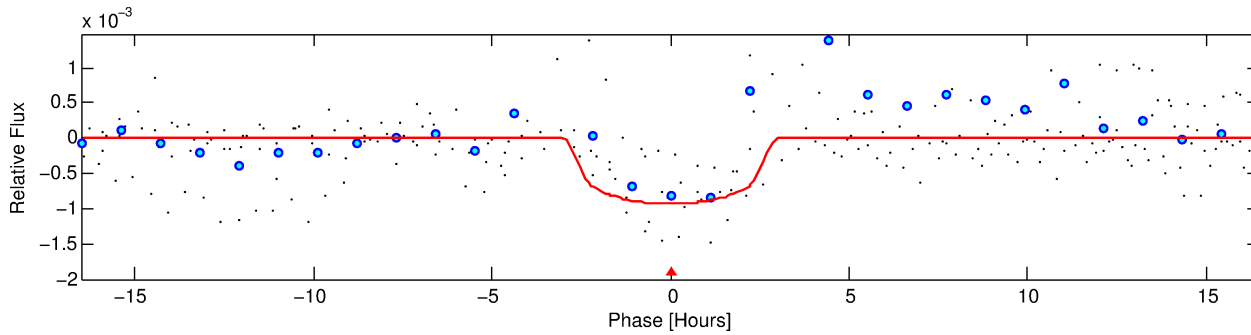
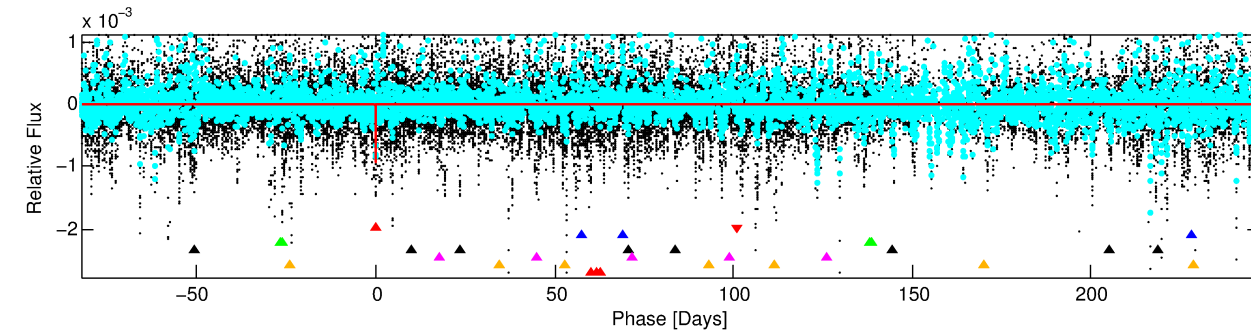
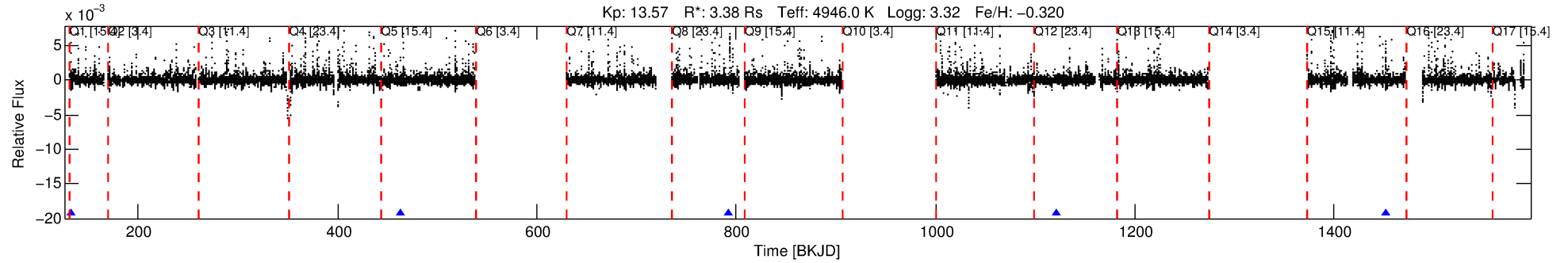
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 004068539-01

No Significant Match Found

# DV One-Page Summary

KIC: 4068539 Candidate: 1 of 7 Period: 329.751 d



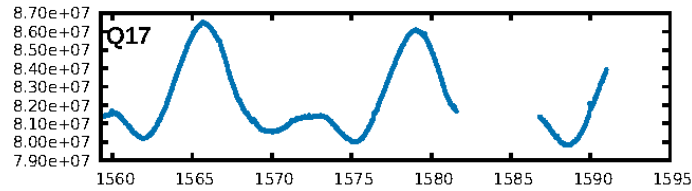
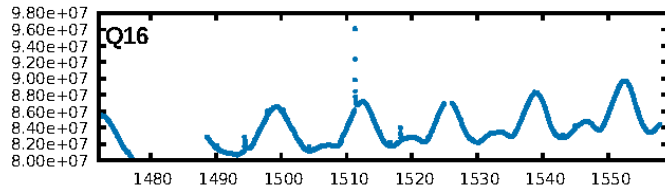
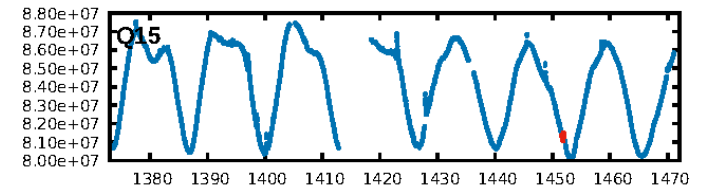
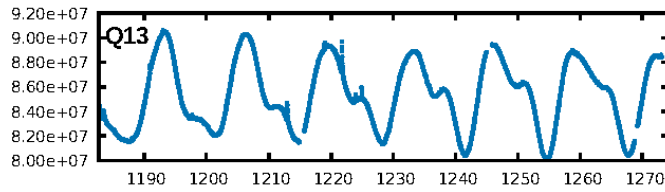
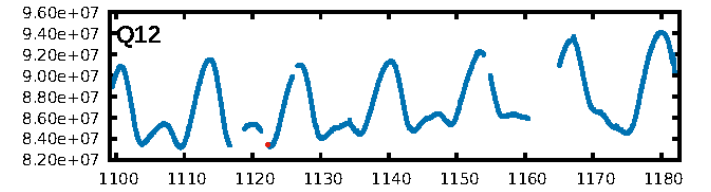
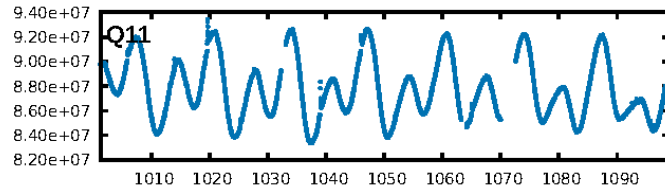
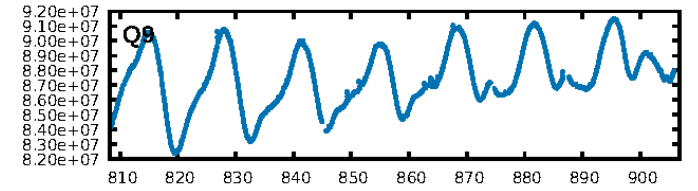
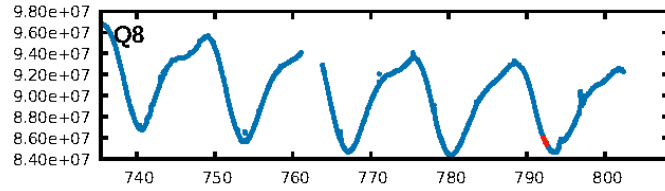
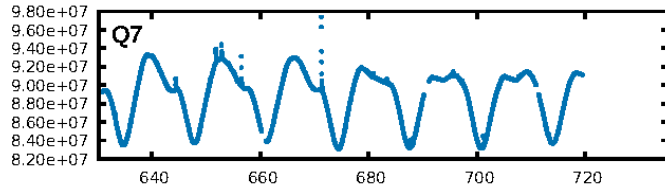
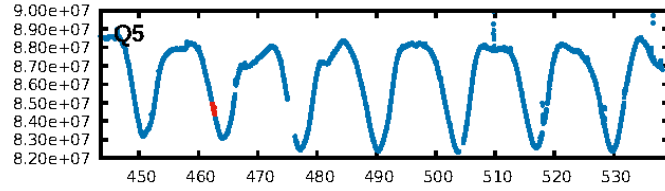
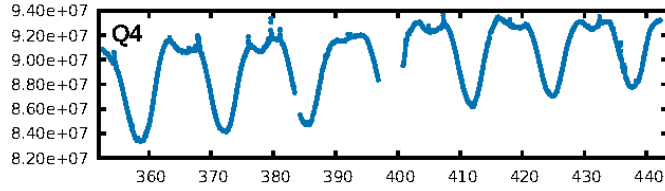
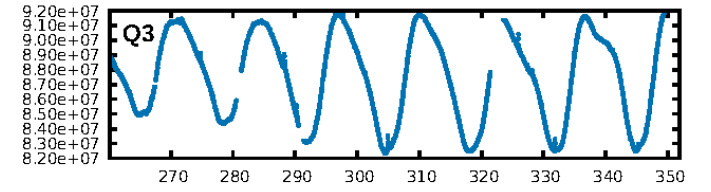
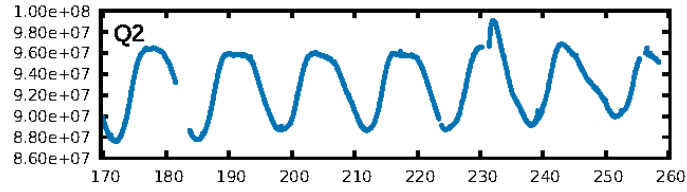
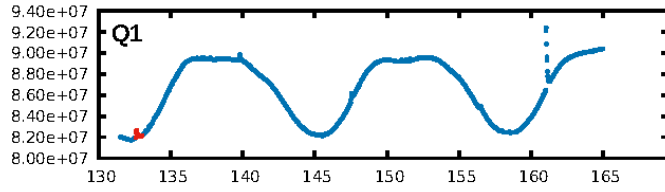
## DV Fit Results:

Period = 329.75081 [0.00350] d  
Epoch = 132.7933 [0.0081] BKJD  
Rp/R\* = 0.0275 [0.0519]  
a/R\* = 450.20 [3025.12]  
b = 0.30 [20.90]  
Seff = 7.69 [14.86]  
Teff = 425 [205] K  
Rp = 10.12 [20.50] Re  
a = 0.8914 [0.9392] AU  
Ag = 1743.72 [7417.93] [0.23 $\sigma$ ]  
Teffp = 4242 [4022] K [0.95 $\sigma$ ]

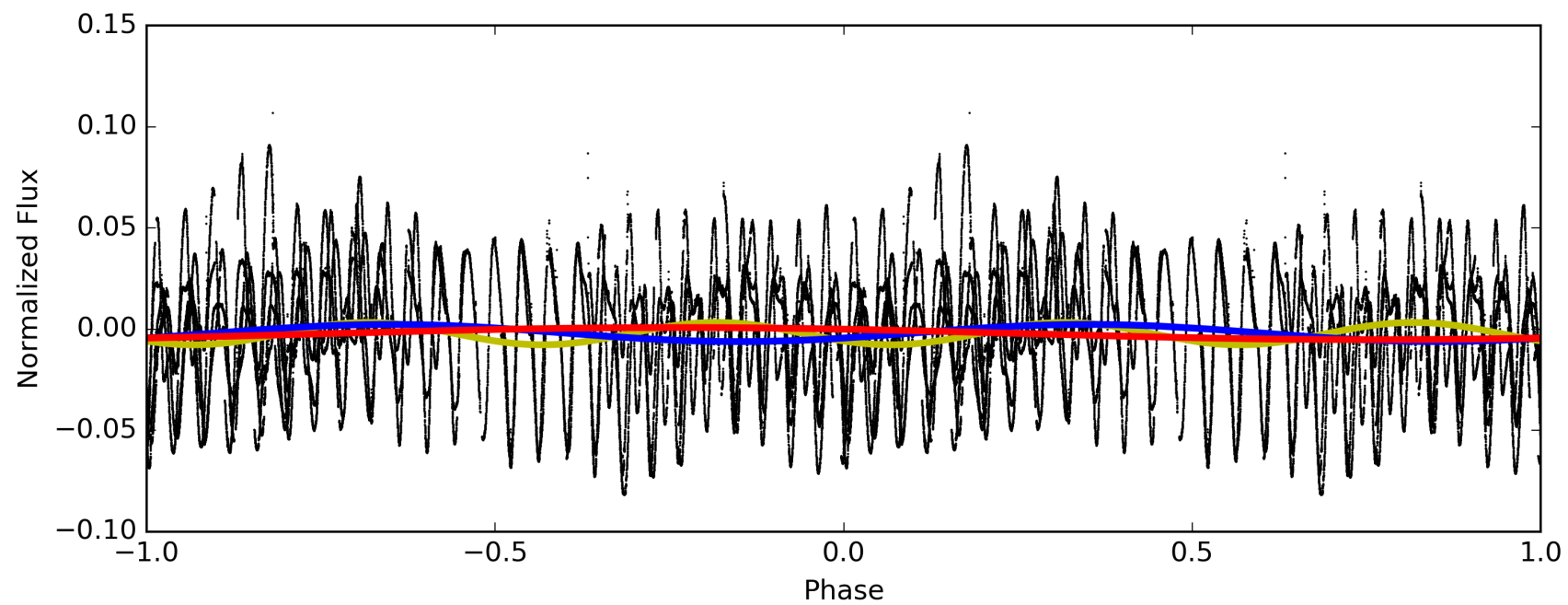
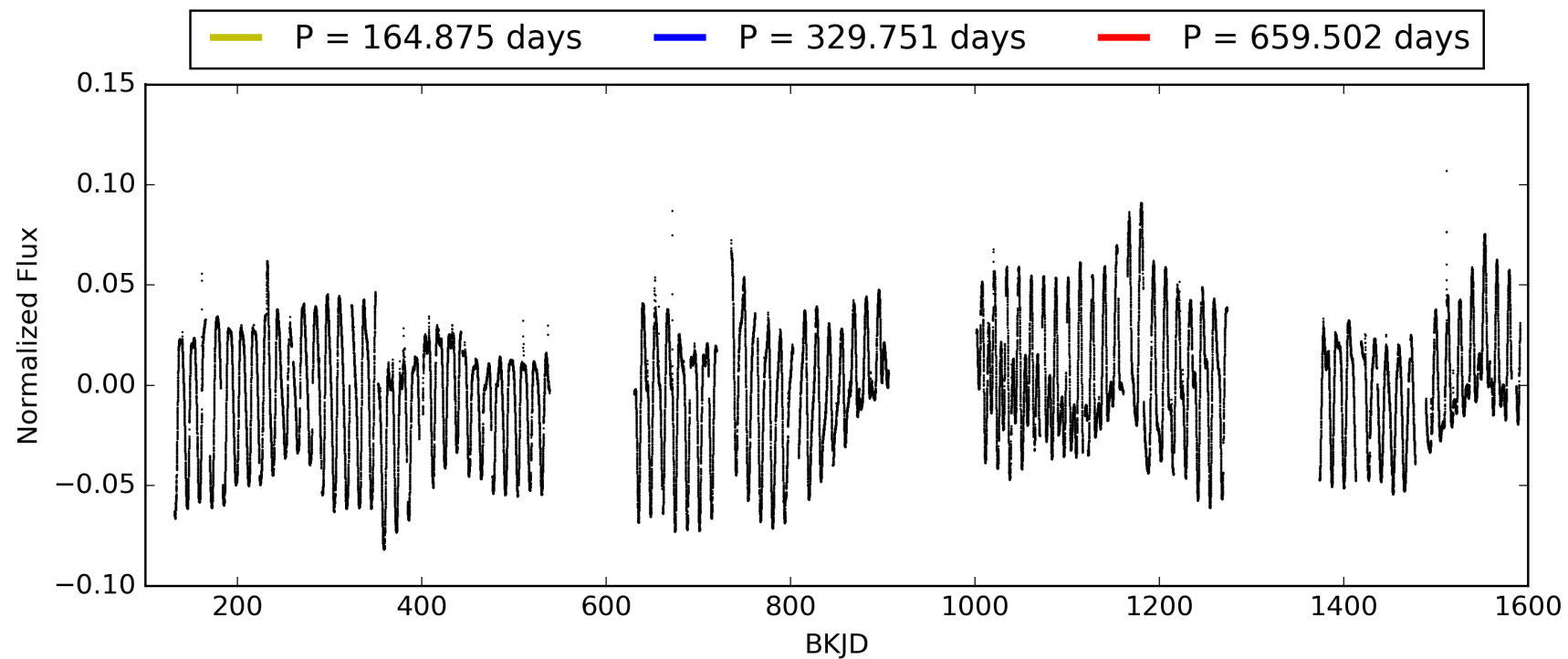
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [80.25 $\sigma$ ]  
LongPeriod-sig: 100.0% [479.31 $\sigma$ ]  
ModelChiSquare2-sig: 0.1%  
ModelChiSquareGof-sig: 6.5%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: -0.6255  
Centroid-sig: 10.4%  
Centroid-so: 0.736 arcsec [0.85 $\sigma$ ]  
OotOffset-rm: 0.271 arcsec [0.46 $\sigma$ ]  
KicOffset-rm: 0.309 arcsec [0.55 $\sigma$ ]  
OotOffset-st: 0/1/1/2 [4]  
KicOffset-st: 0/1/1/2 [4]  
DiffImageQuality-fgm: 0.75 [3/4]  
DiffImageOverlap-fno: 1.00 [4/4]

# TCE 004068539-01, PDC Light Curves



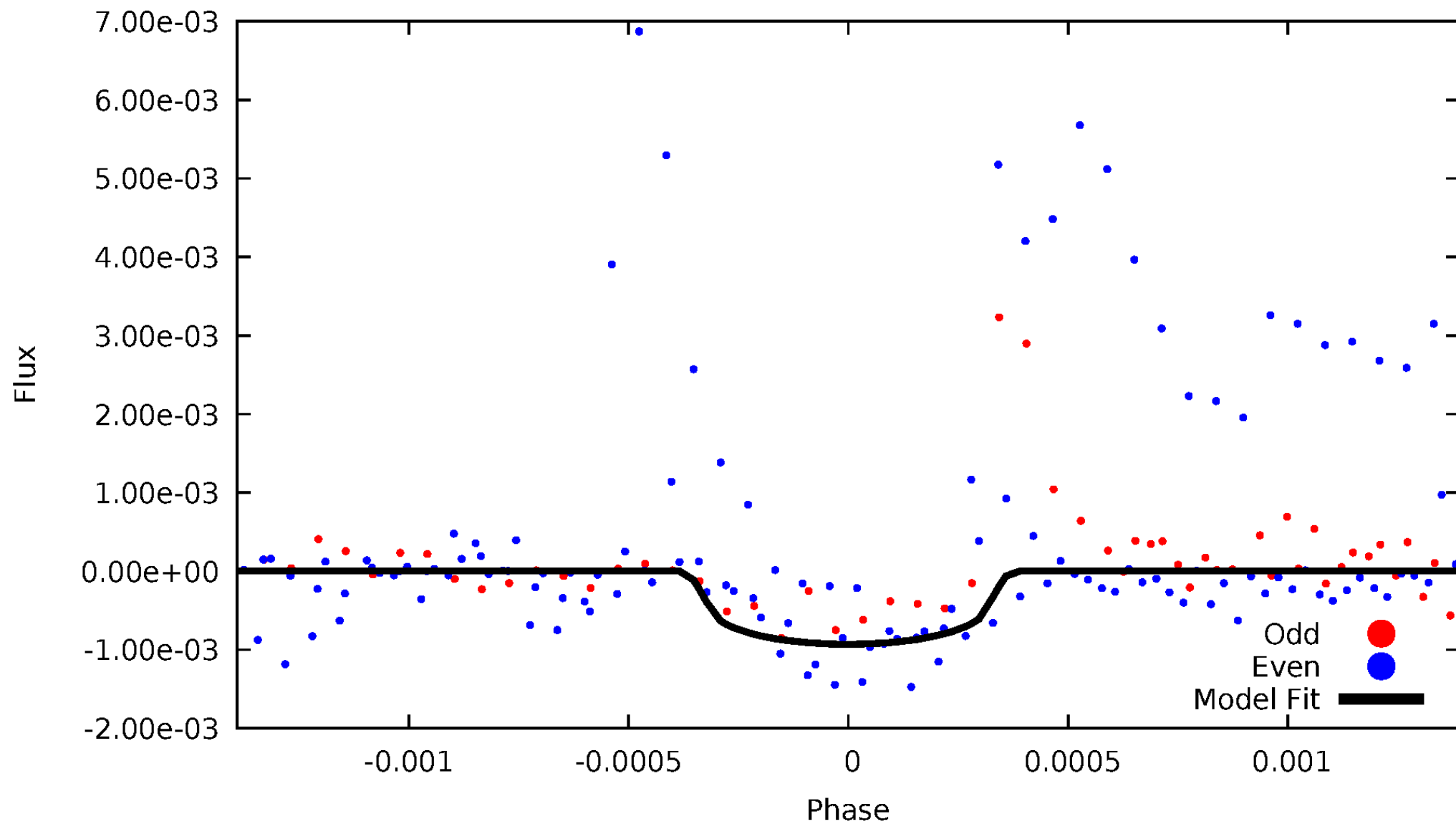
TCE 004068539-01





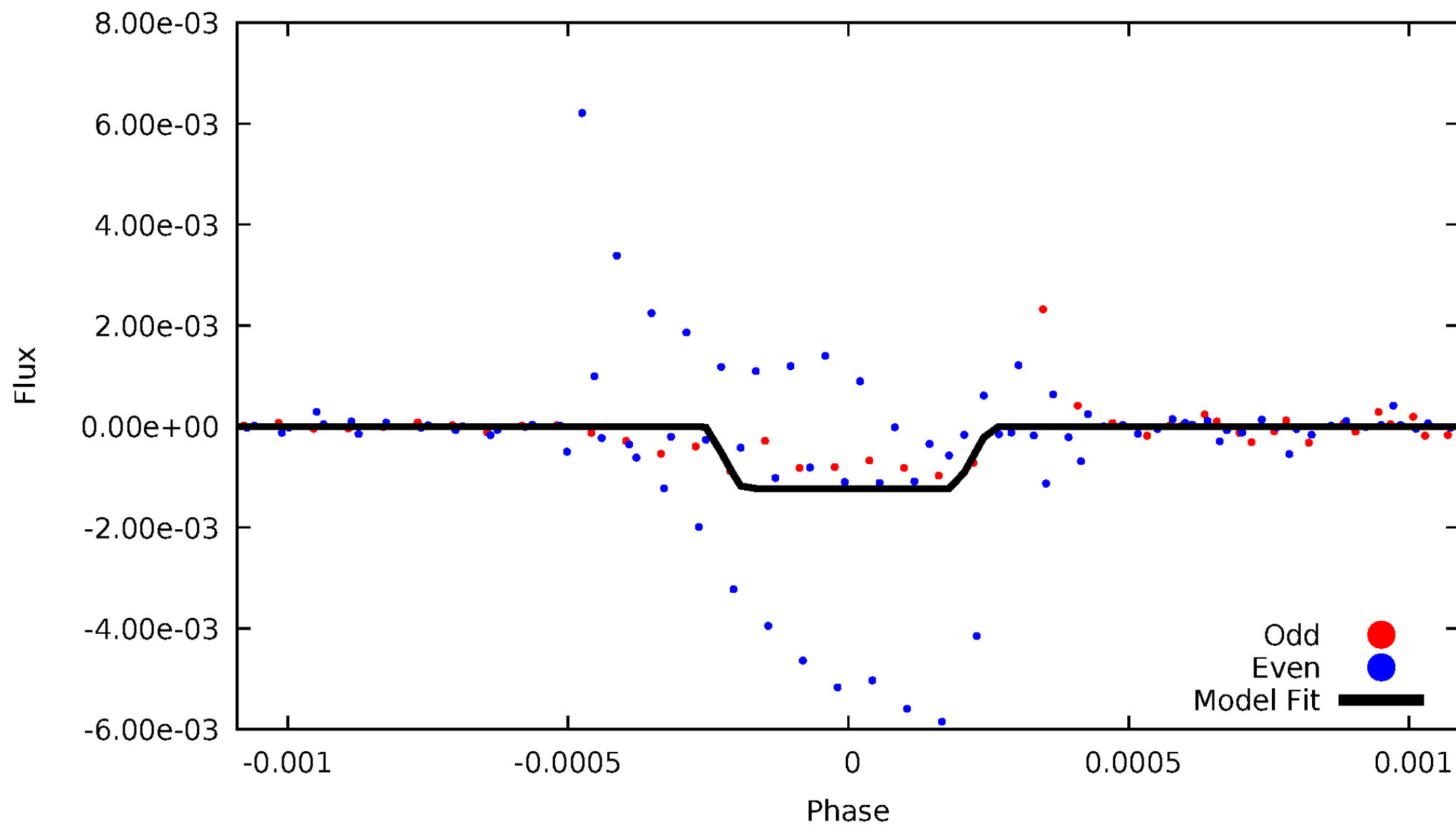
# DV Odd/Even

TCE 004068539-01



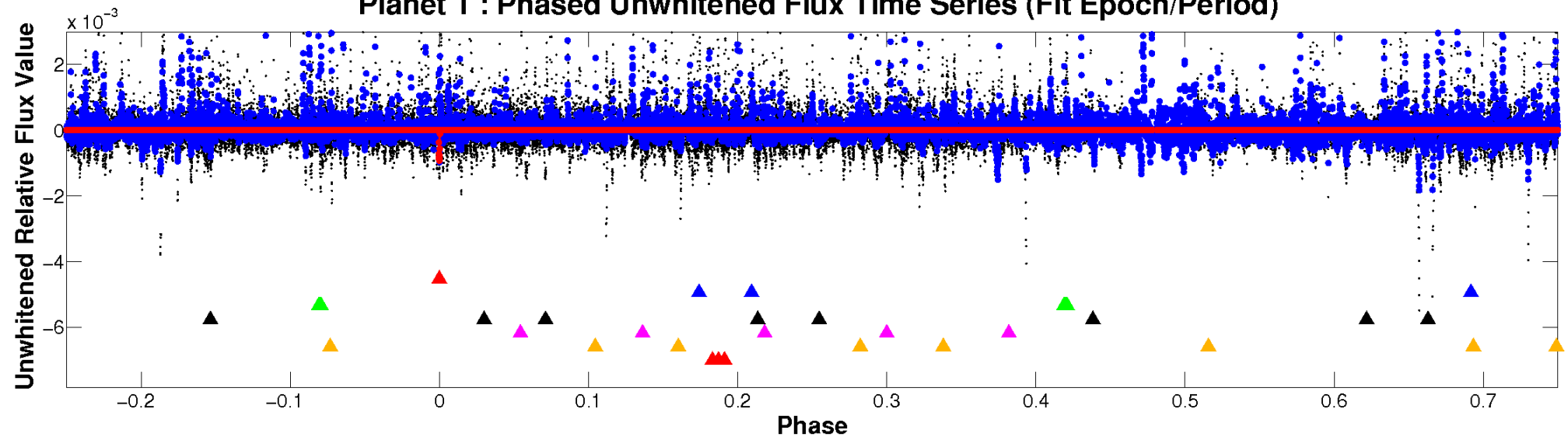
# ALT Odd/Even

TCE 004068539-01

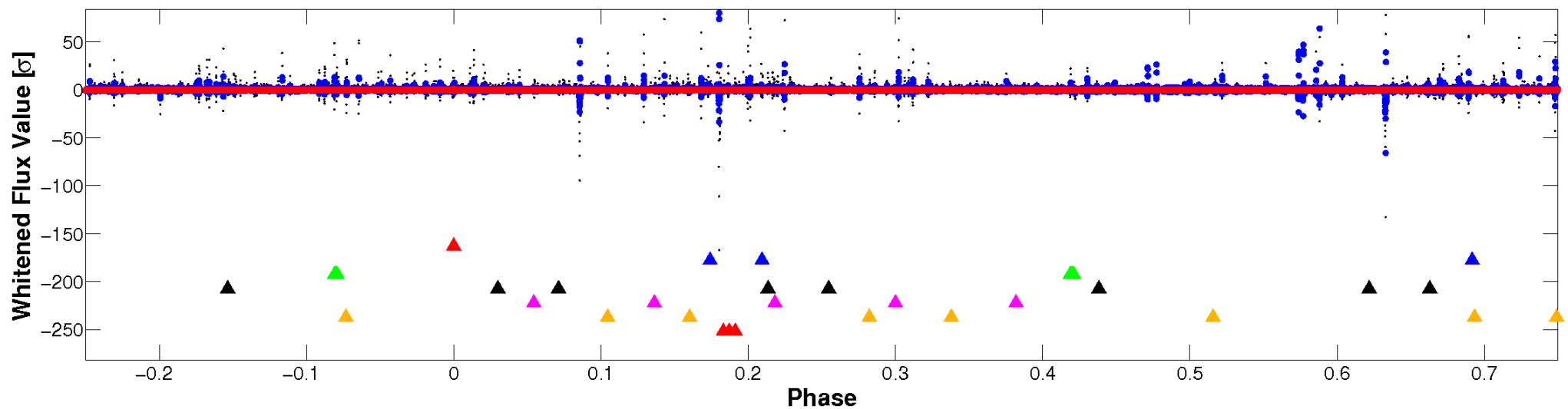


# Non-Whitened Vs. Whitened Light Curve

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

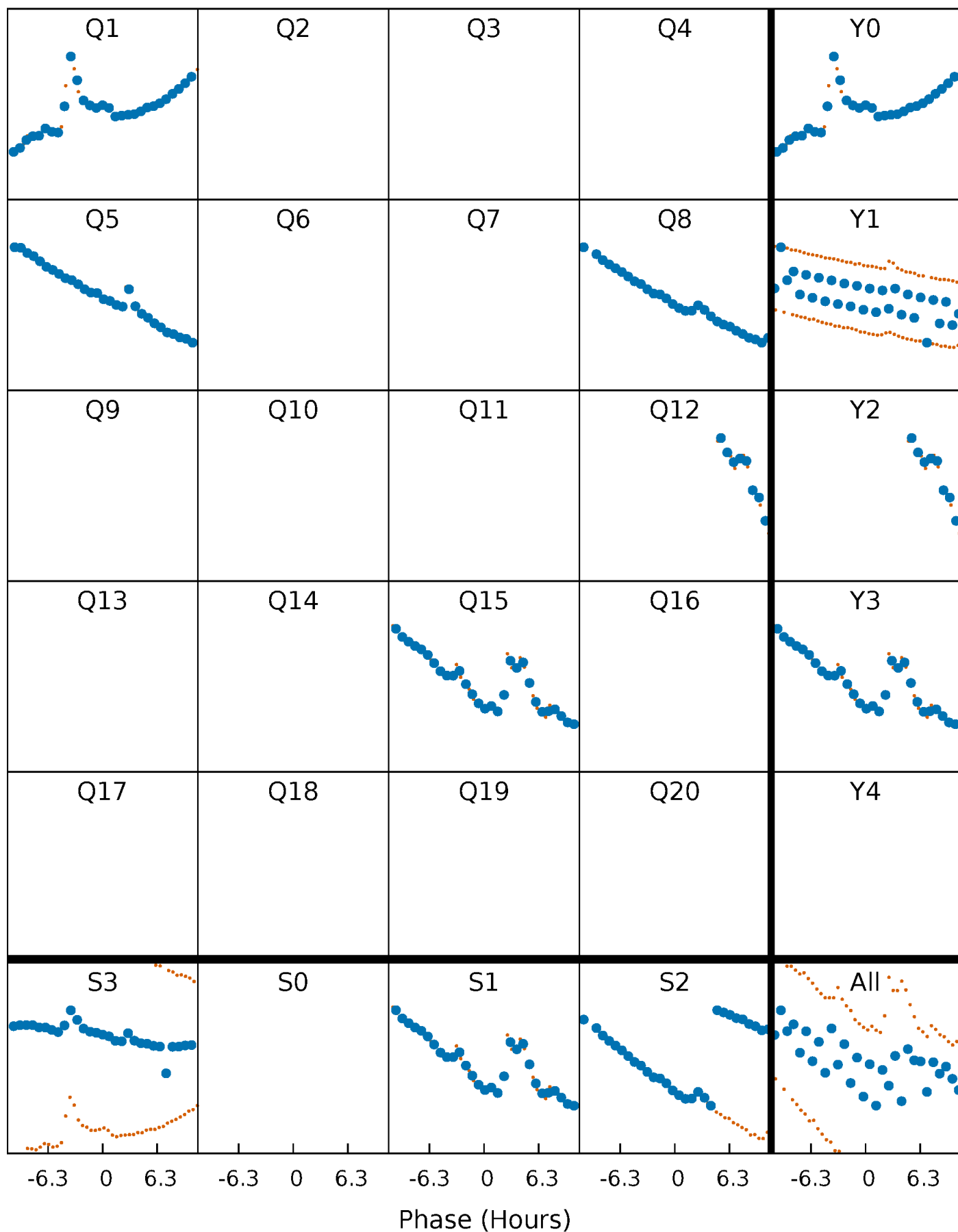


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



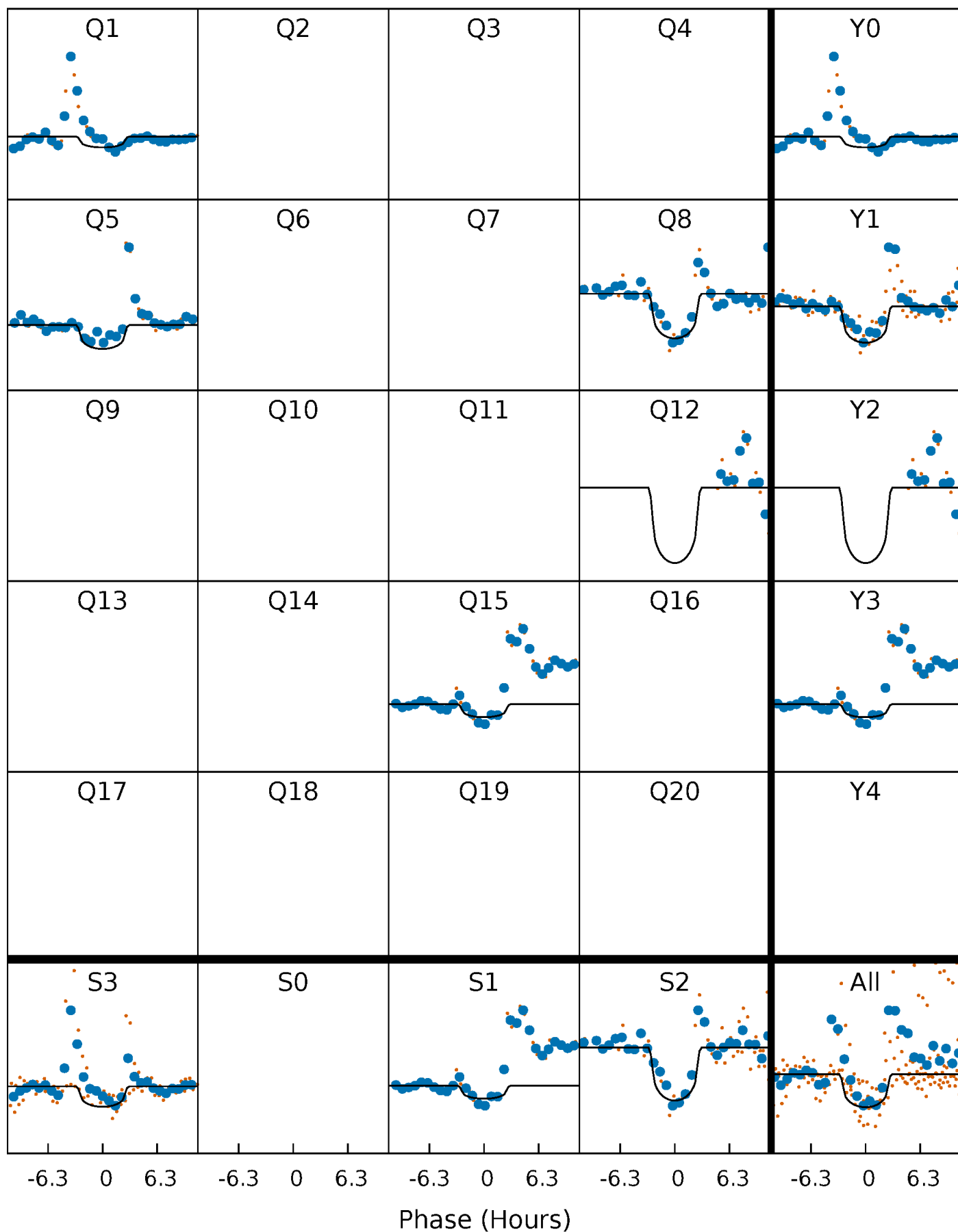
# PDC Quarter-Phased Transit Curves

TCE 004068539-01 P=329.750808 Days  $T_0=132.793344$  (BKJD)



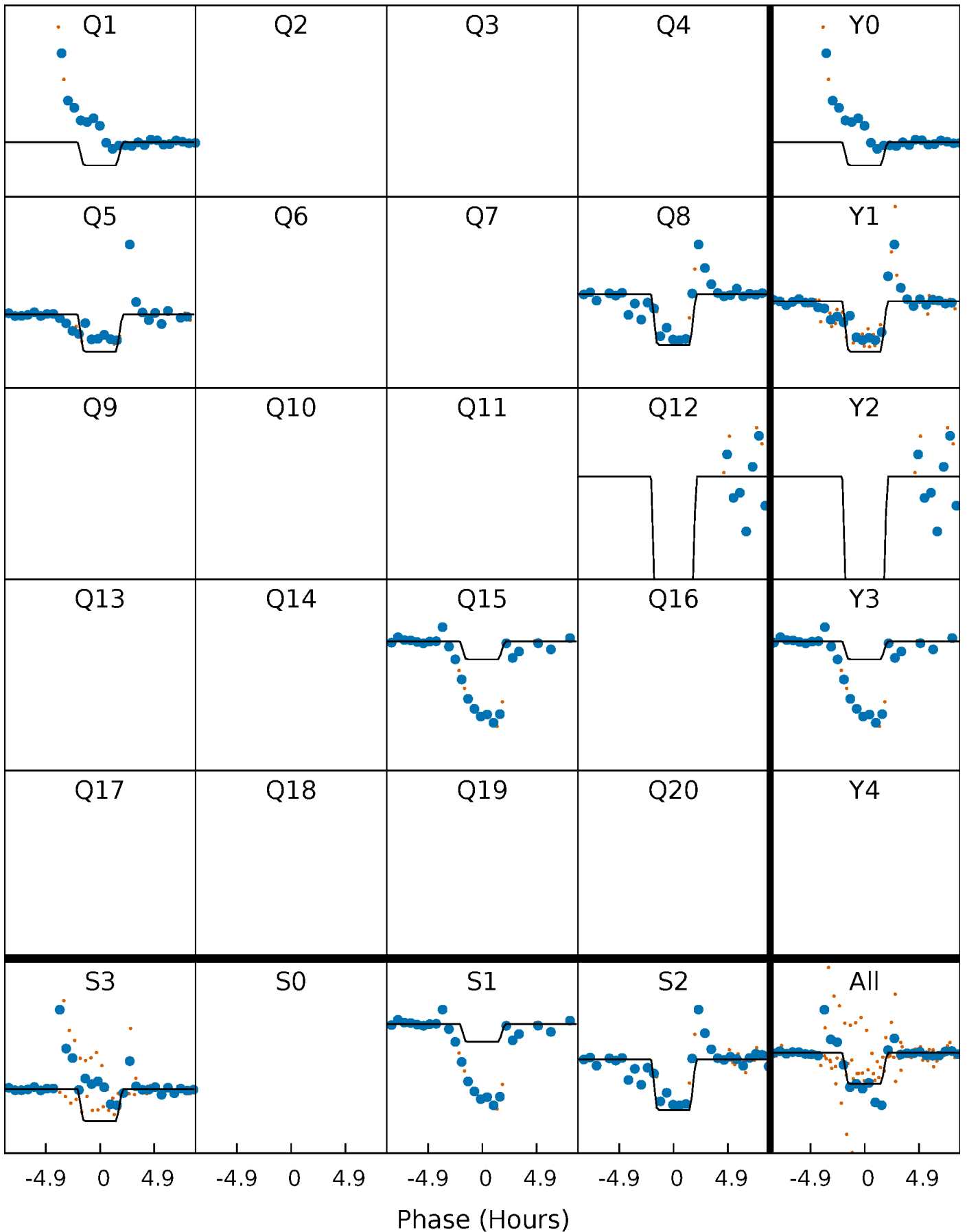
# DV Quarter-Phased Transit Curves

TCE 004068539-01 P=329.750808 Days  $T_0=132.793344$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

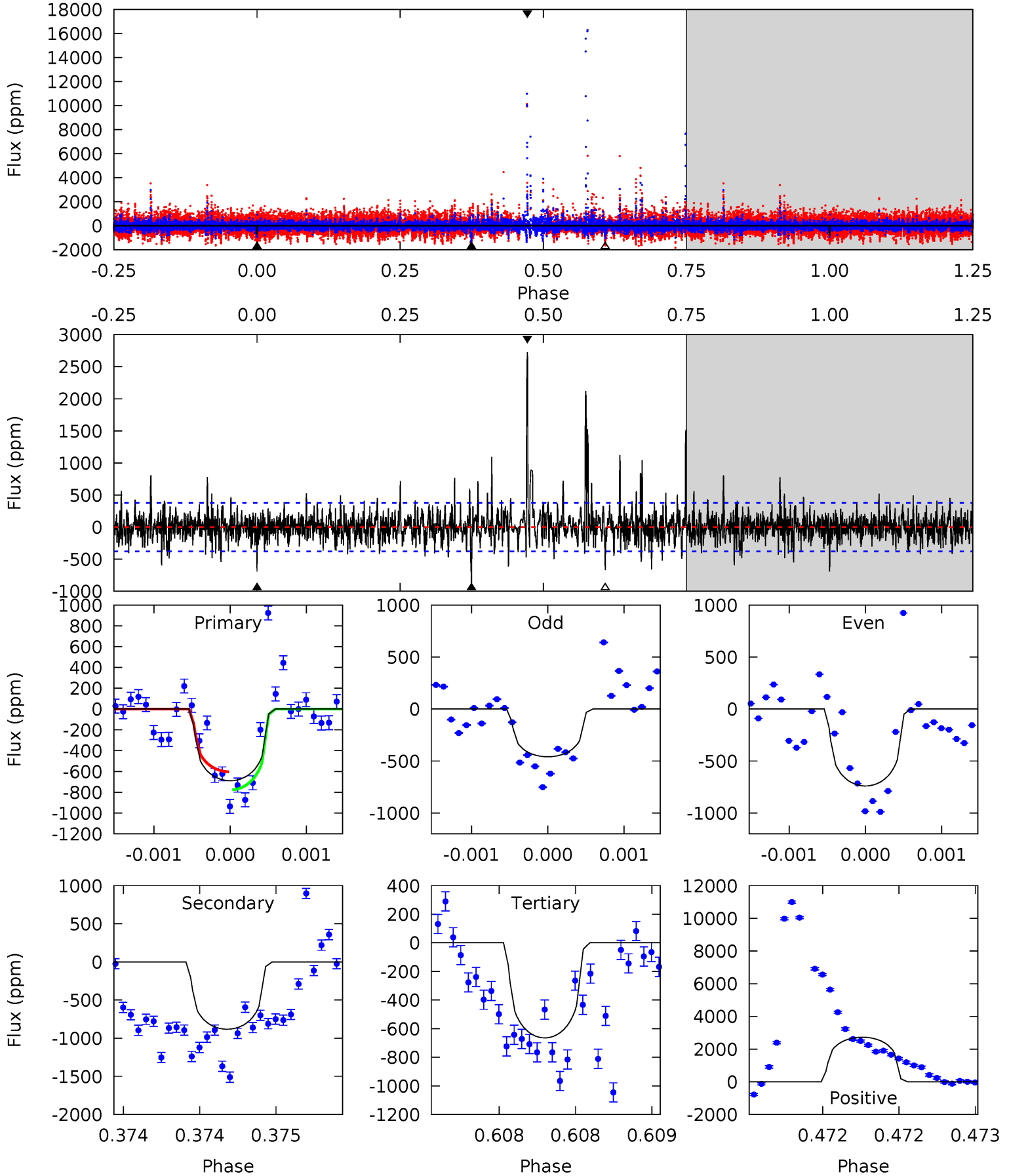
TCE 004068539-01 P=329.749980 Days  $T_0=132.813294$  (BKJD)



# DV Model-Shift Uniqueness Test

004068539-01, P = 329.750808 Days, E = 132.793344 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.0	12.8	9.65	39.6	5.51	3.39	2.85	0.36	-29.6	3.17	-26.8	1.23	0.96	0.76	1.26

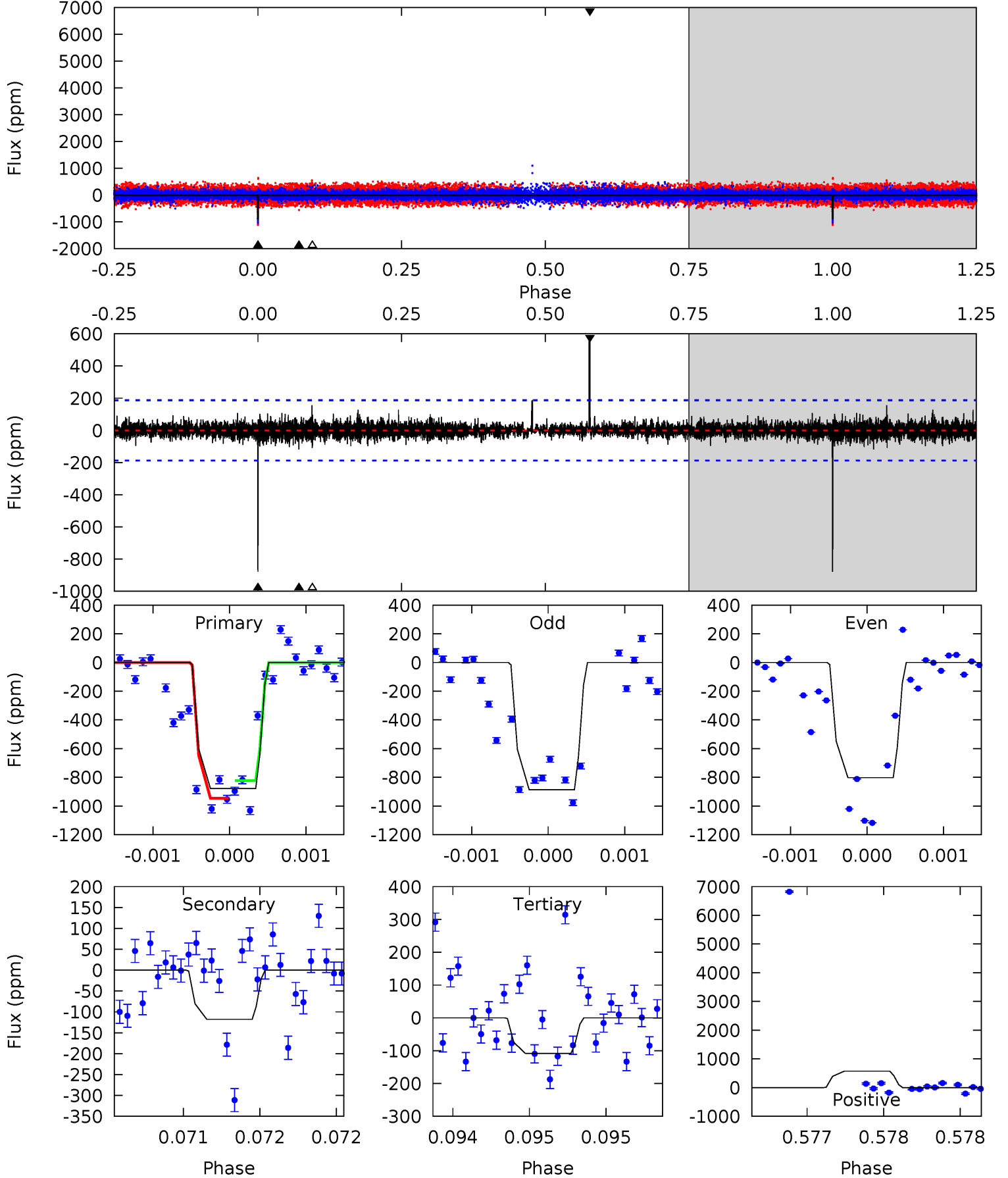




# Alt Model-Shift Uniqueness Test

004068539-01, P = 329.749980 Days, E = 132.813294 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
26.1	3.50	3.23	17.0	5.57	3.47	0.78	22.8	9.07	0.27	-13.5	1.14	1.83	0.39	1.79



### Stellar Parameters For KIC 004068539

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$4946^{+123}_{-123}$	$3.320^{+1.216}_{-0.304}$	$-0.320^{+0.300}_{-0.250}$	$3.376^{+1.800}_{-2.476}$	$0.868^{+0.264}_{-0.216}$	$0.032^{+1.760}_{-0.019}$
	+2%/-2%	+37%/-9%	+94%/-78%	+53%/-73%	+30%/-25%	+5542%/-60%
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 004068539-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-882 \pm 69$	$13.97^{+18.01}_{-9.83}$	$570^{+95}_{-127}$	$4166^{+2514}_{-815}$	$2072^{+20099}_{-1693}$
Alt.	$-118 \pm 34$	$16.03^{+18.36}_{-11.40}$	$576^{+85}_{-125}$	$2909^{+1209}_{-424}$	$196^{+2135}_{-154}$

$T_{max}$  = 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

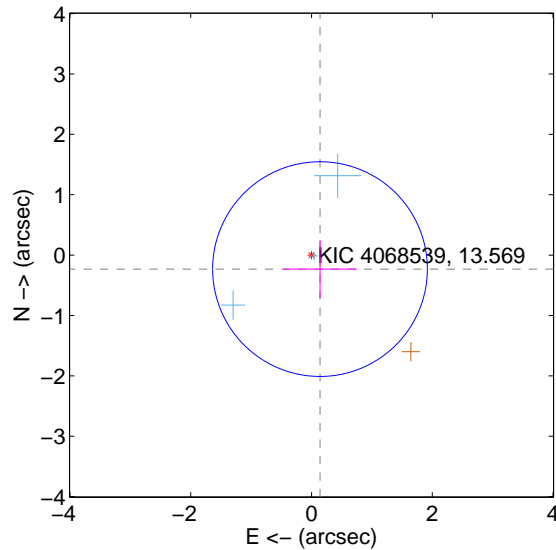
Supplemental centroid analysis for 004068539-01. Kepler magnitude: 13.57. Transit SNR 6.73

There are 3 quarters with good PRF difference image offsets

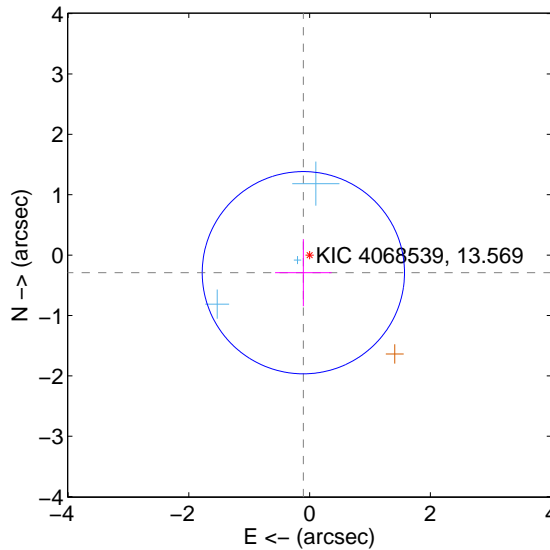
The direct PRF centroid is offset from the target star catalog position by about 0.25 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.271 \pm 0.593$	0.46	$-0.141 \pm 0.613$	$-0.232 \pm 0.484$
PRF-fit source offset from KIC position	$0.309 \pm 0.558$	0.55	$0.103 \pm 0.468$	$-0.292 \pm 0.556$
photometric centroid source offset	$0.74 \pm 0.87$	0.85	$-0.51 \pm 1.07$	$0.53 \pm 0.61$

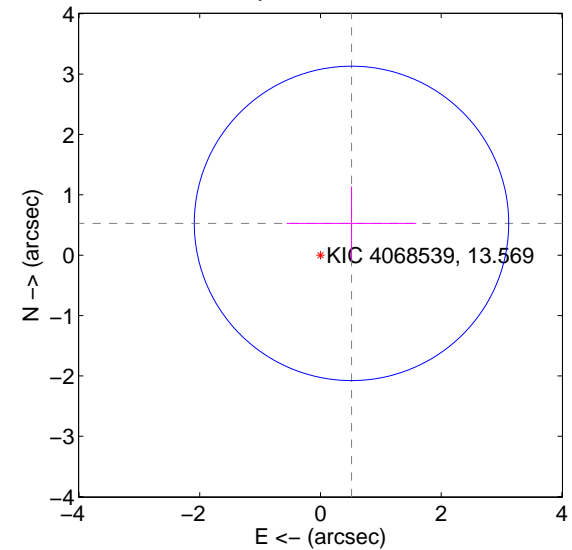
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

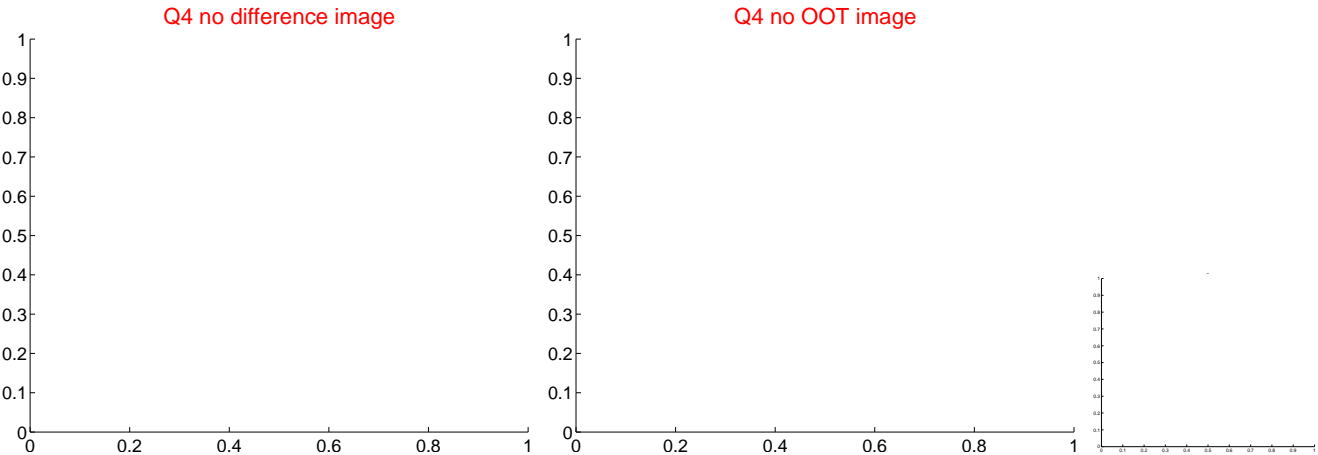
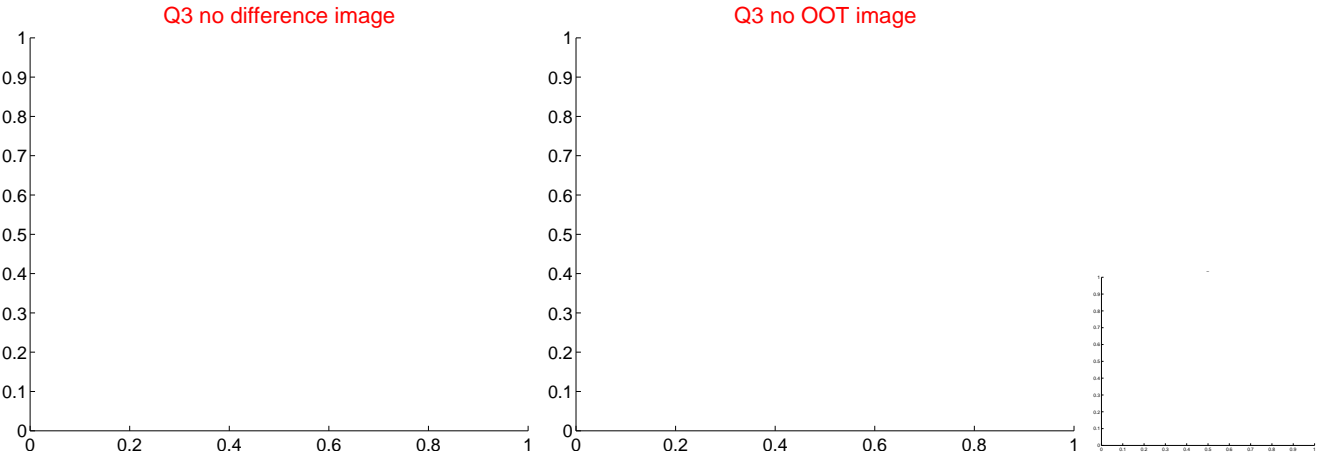
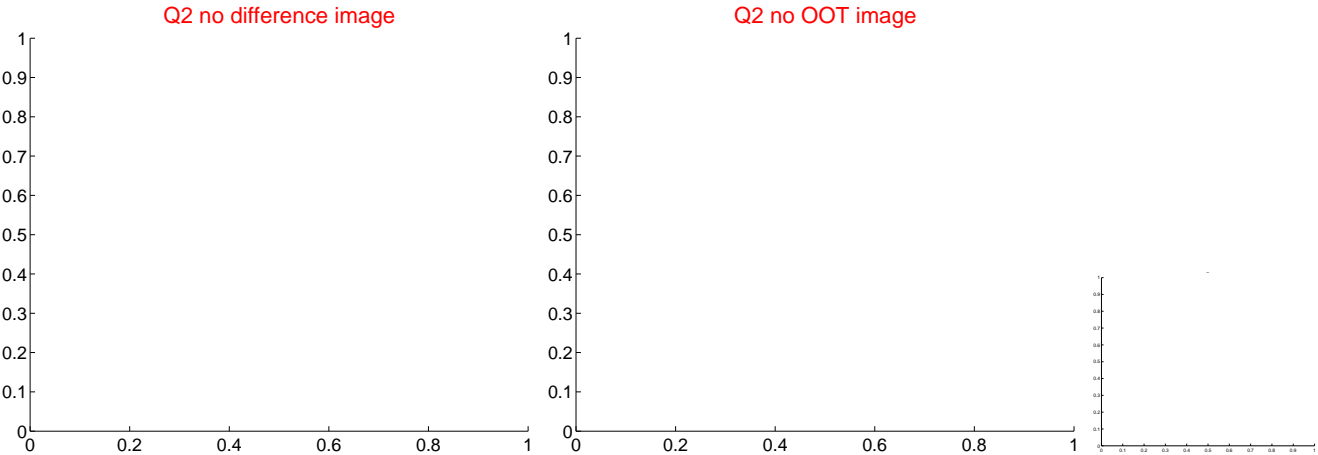
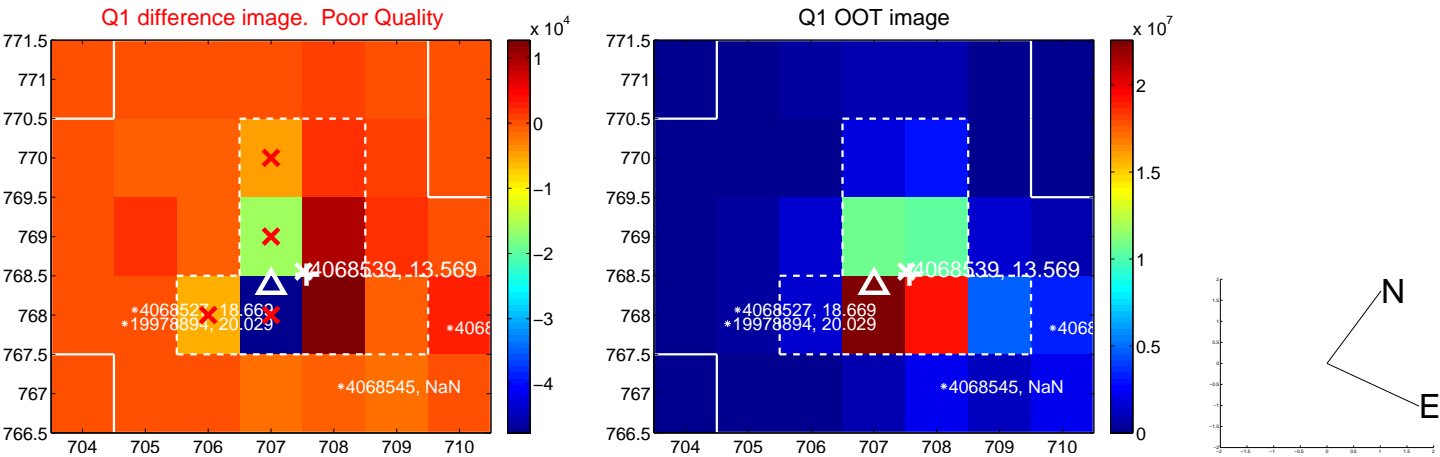


offset from photometric centroids

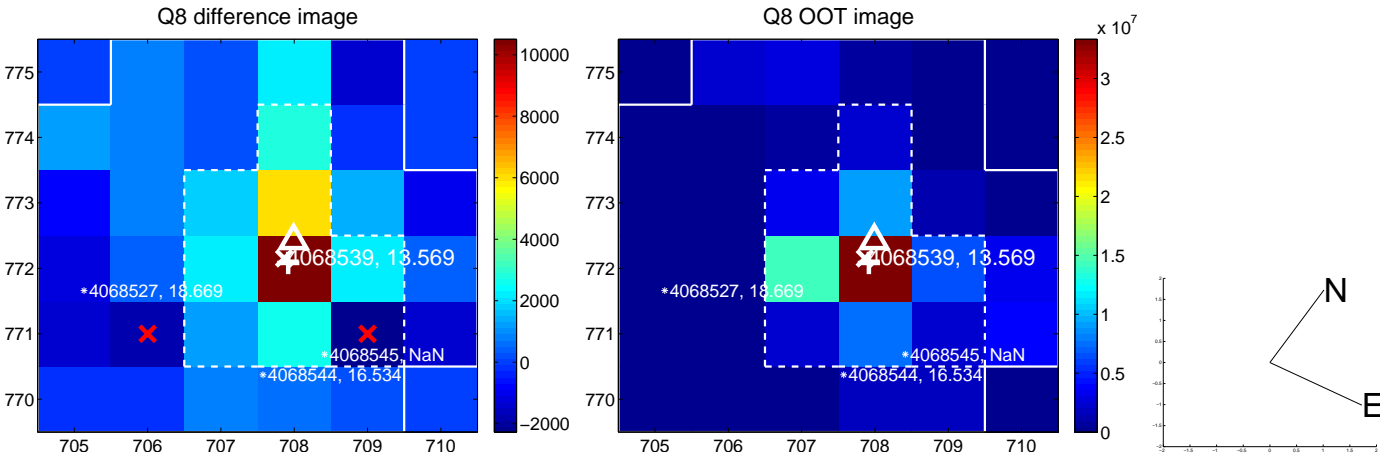
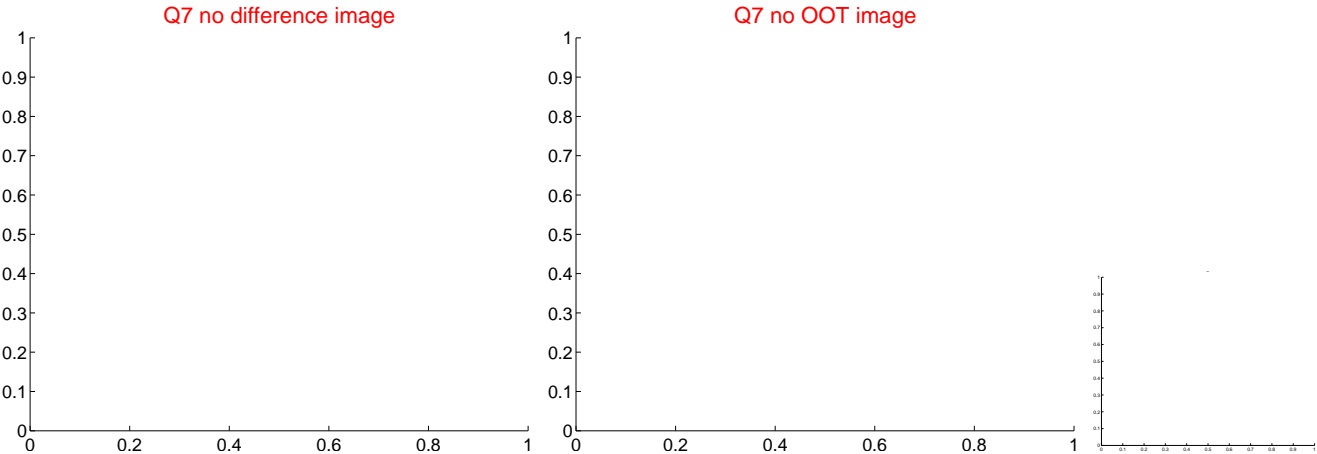
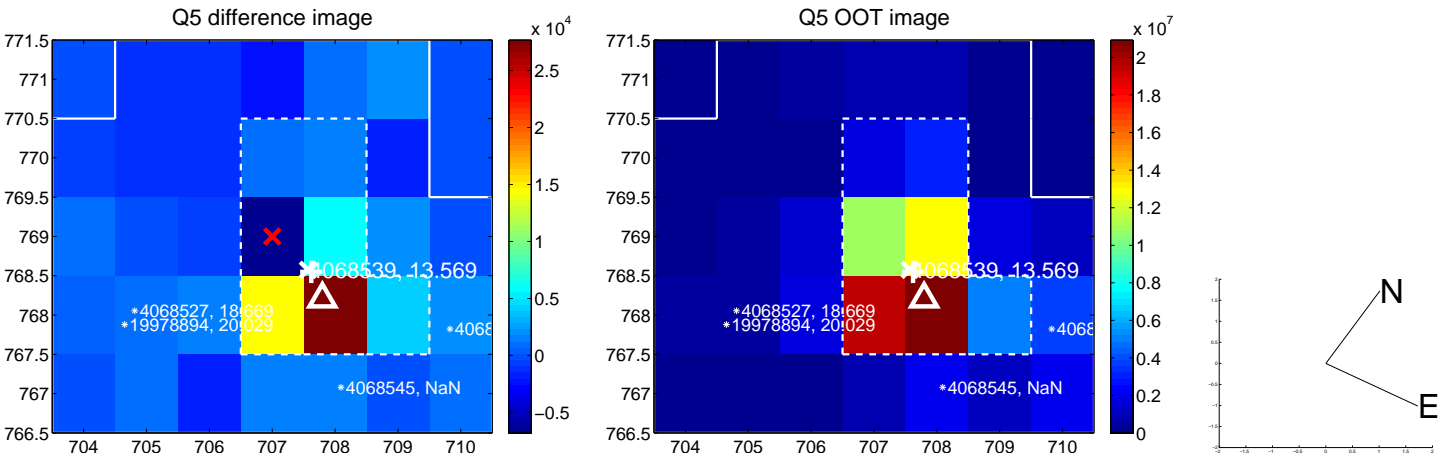


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

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



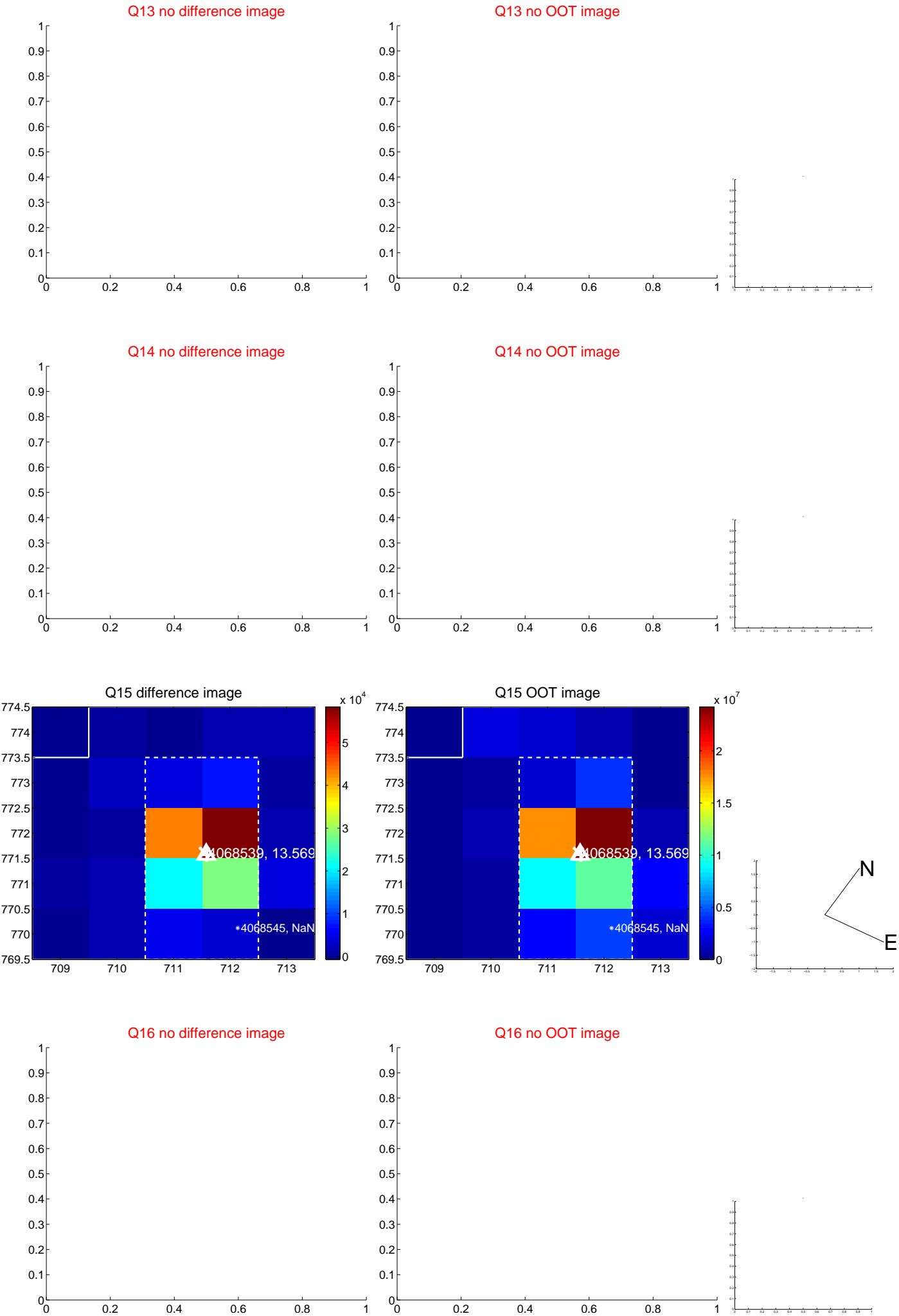
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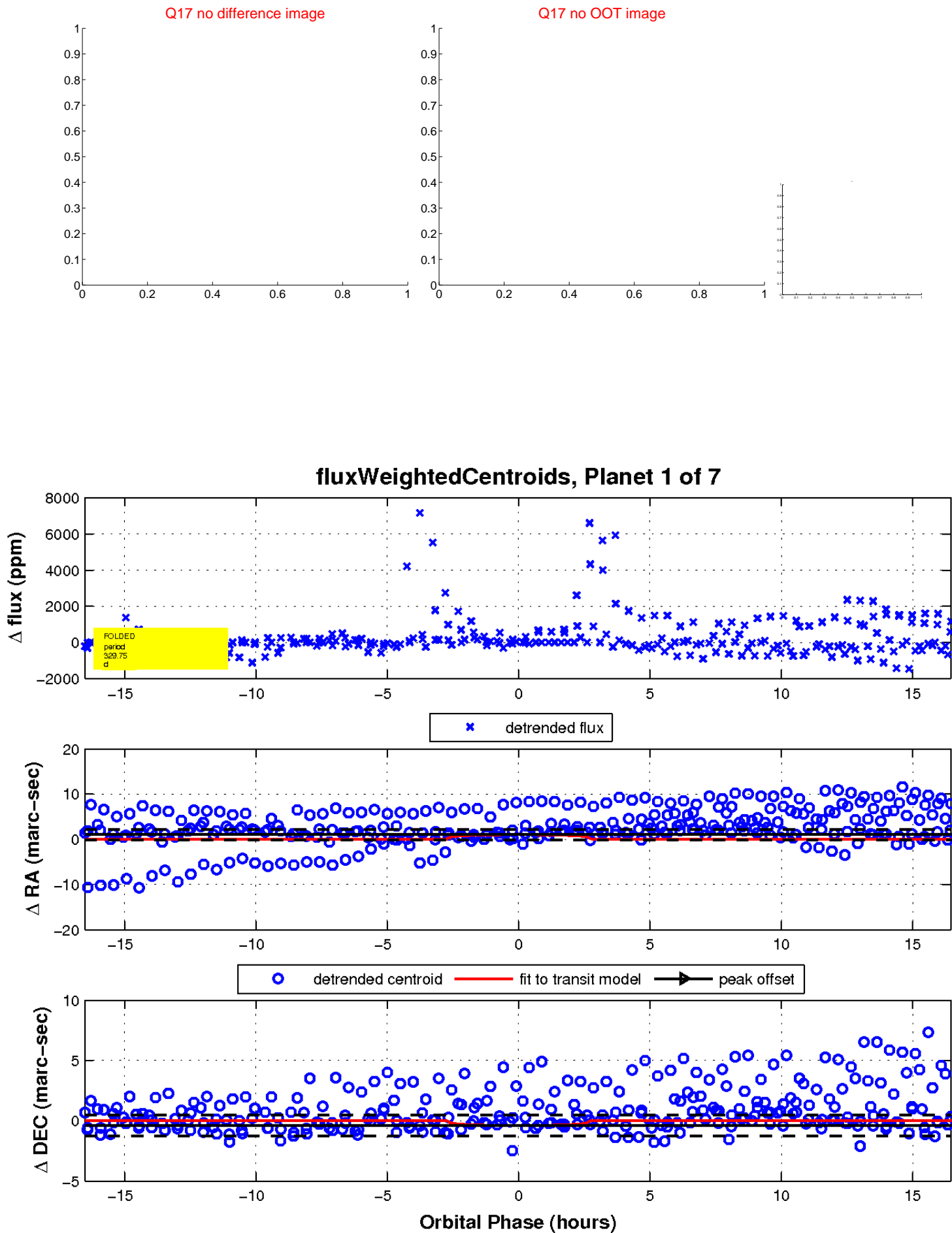


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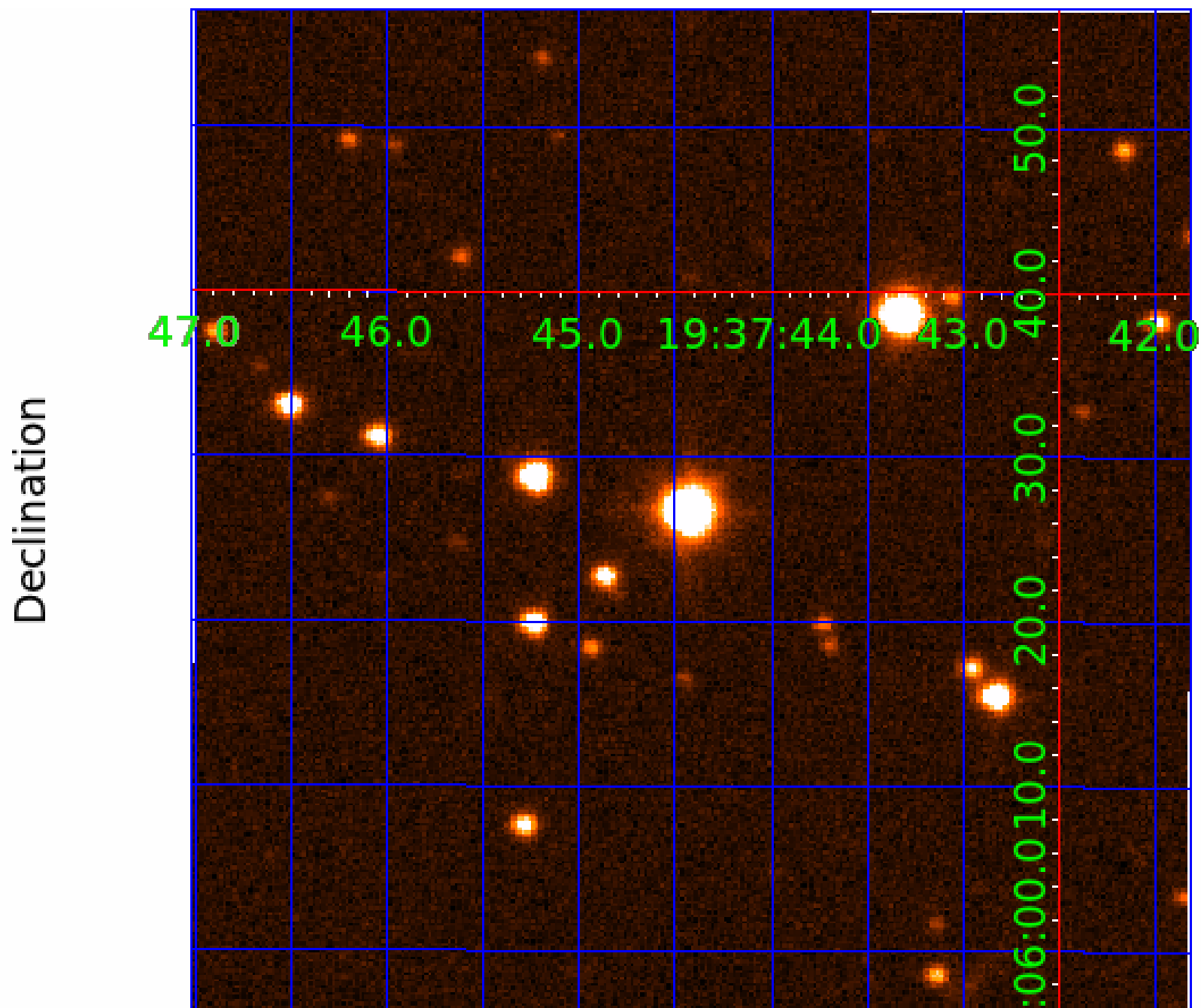




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UKIRT Image



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004068539-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_ZUMA_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
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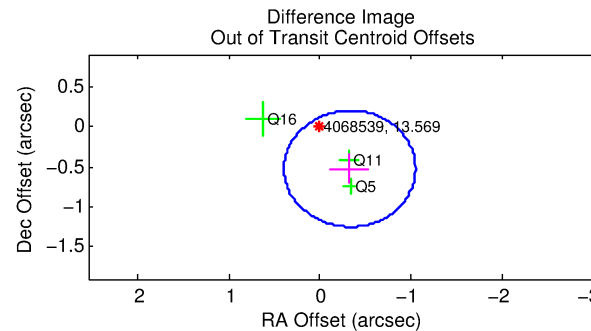
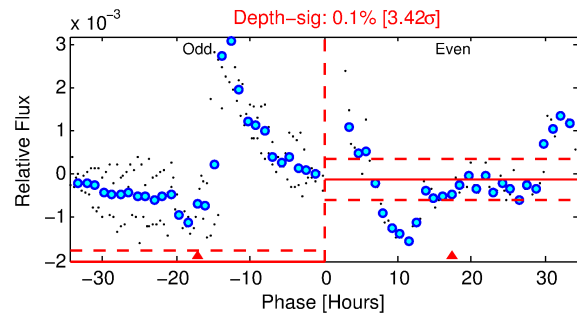
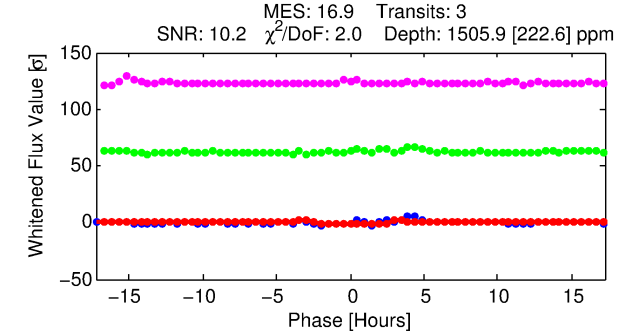
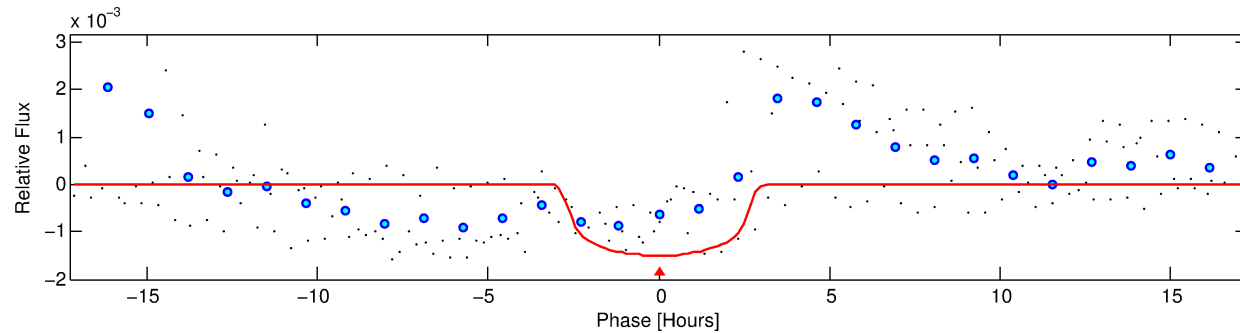
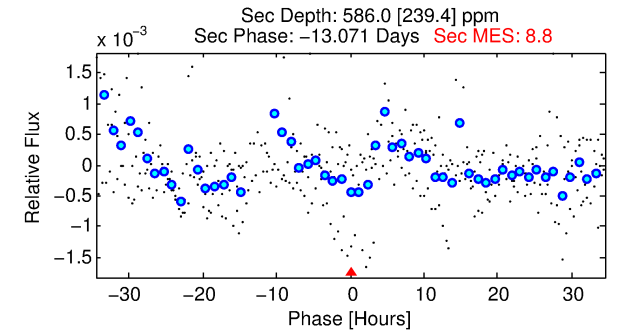
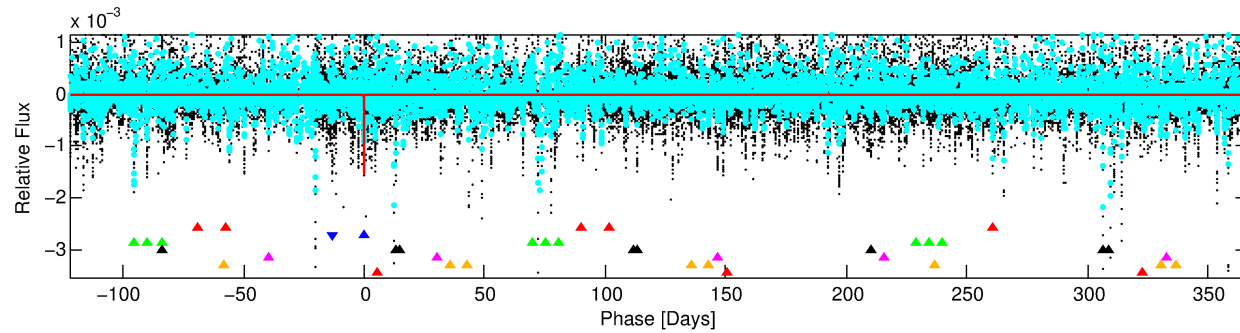
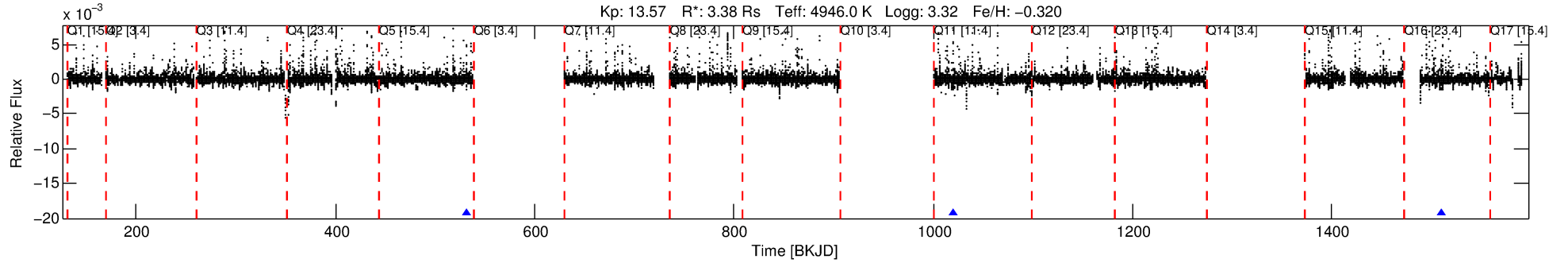
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 004068539-02

No Significant Match Found

# DV One-Page Summary

KIC: 4068539 Candidate: 2 of 7 Period: 488.818 d



## DV Fit Results:

Period = 488.81755 [0.00453] d  
Epoch = 531.5877 [0.0059] BKJD  
Rp/R\* = 0.0379 [0.0121]  
a/R\* = 497.95 [519.91]  
b = 0.70 [0.78]  
Seff = 4.55 [8.79]  
Teq = 372 [180] K  
Rp = 13.96 [11.17] Re  
a = 1.1589 [1.2211] AU  
Ag = 2220.80 [4603.28] [0.48 $\sigma$ ]  
Teffp = 3953 [755] K [4.62 $\sigma$ ]

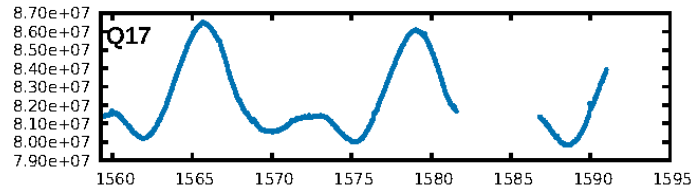
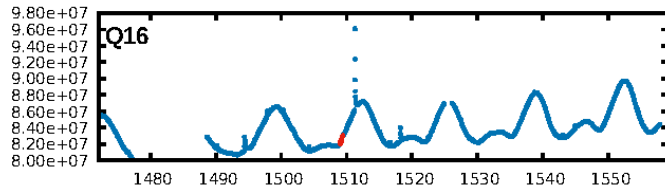
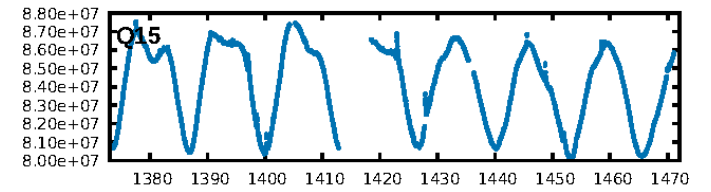
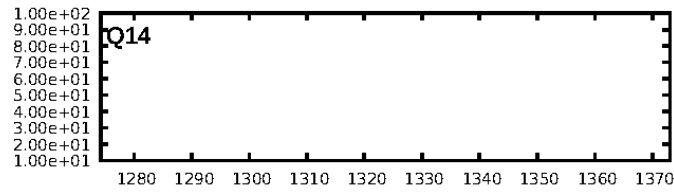
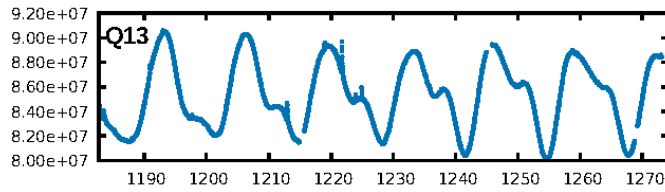
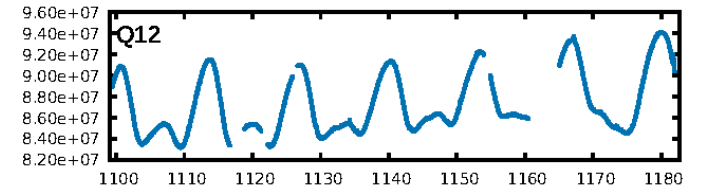
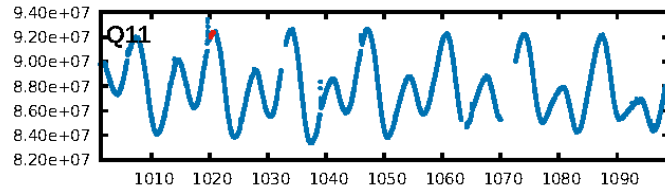
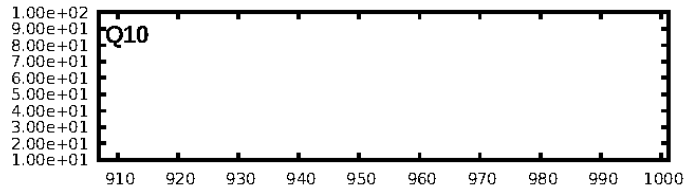
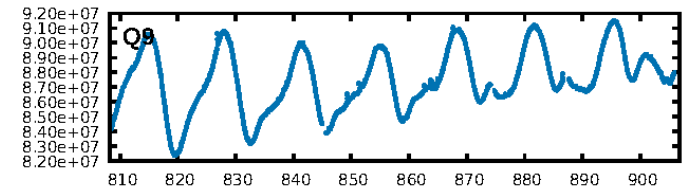
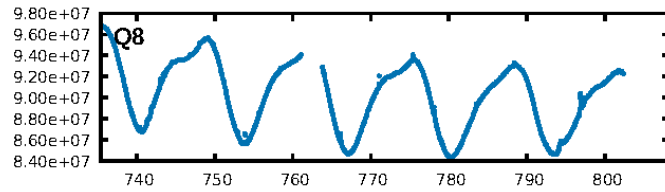
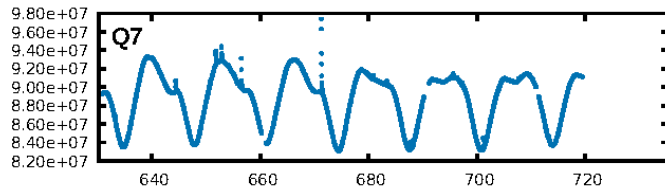
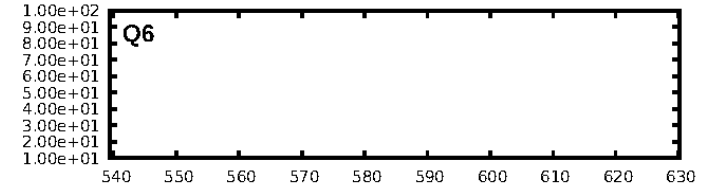
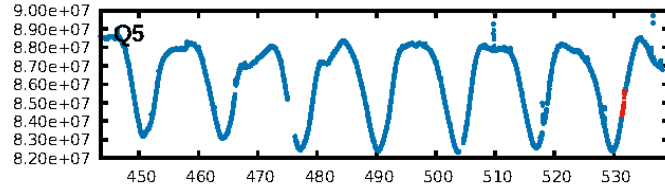
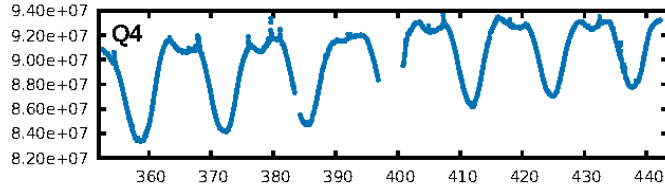
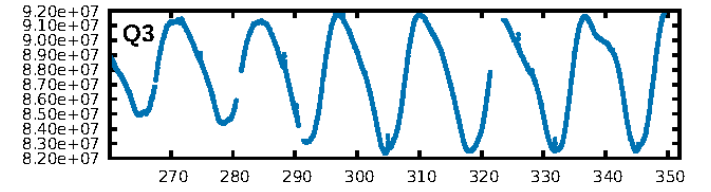
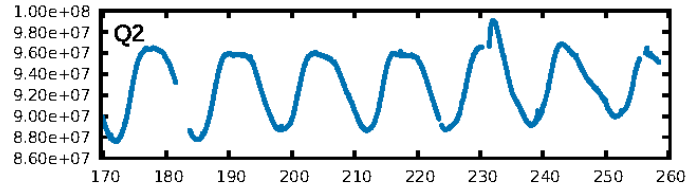
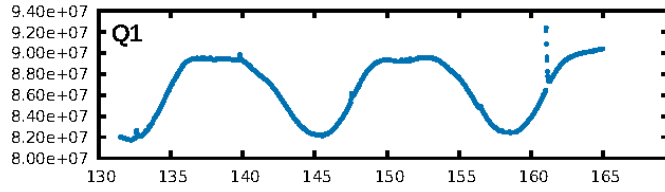
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [479.31 $\sigma$ ]  
LongPeriod-sig: 100.0% [436.64 $\sigma$ ]  
ModelChiSquare2-sig: 0.2%  
ModelChiSquareGof-sig: 15.1%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 0.5202  
Centroid-sig: 38.8%  
Centroid-so: 0.529 arcsec [1.00 $\sigma$ ]  
OotOffset-rm: 0.620 arcsec [2.57 $\sigma$ ]  
KicOffset-rm: 0.660 arcsec [3.15 $\sigma$ ]  
OotOffset-st: 0/1/1/1 [3]  
KicOffset-st: 0/1/1/1 [3]  
DiffImageQuality-fgm: 0.67 [2/3]  
DiffImageOverlap-fno: 1.00 [3/3]

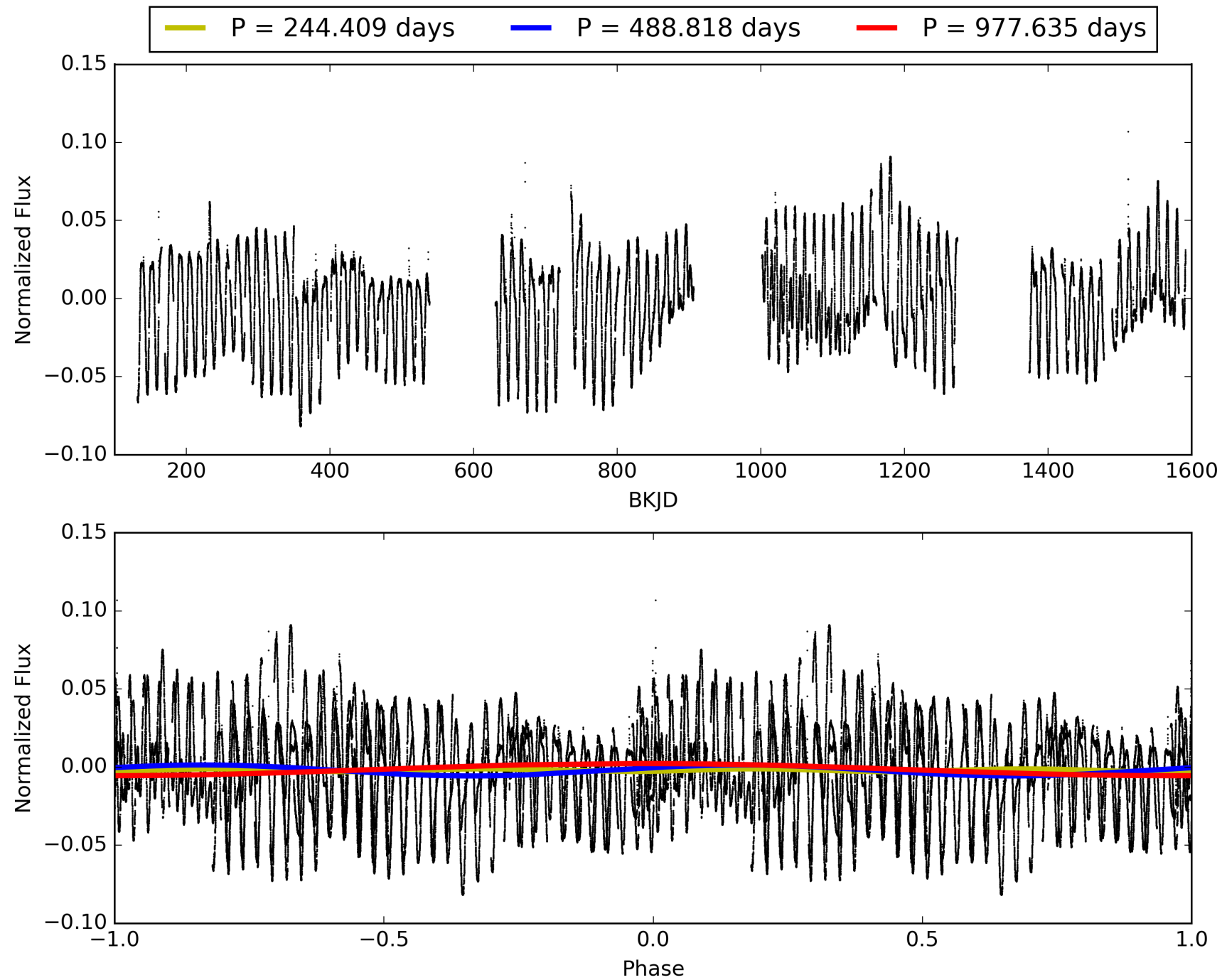
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 21:25:31 Z

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

# TCE 004068539-02, PDC Light Curves

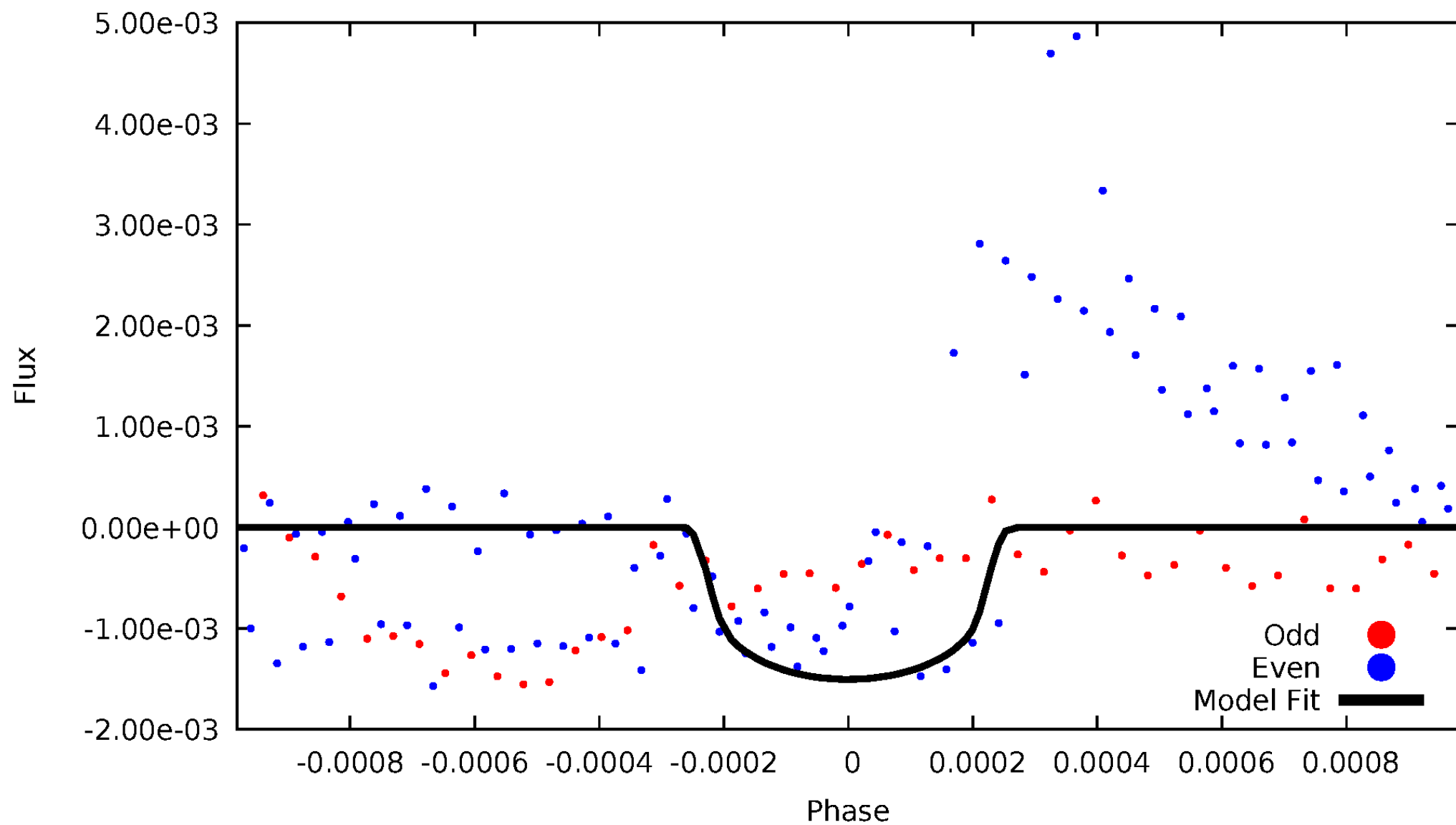


TCE 004068539-02



# DV Odd/Even

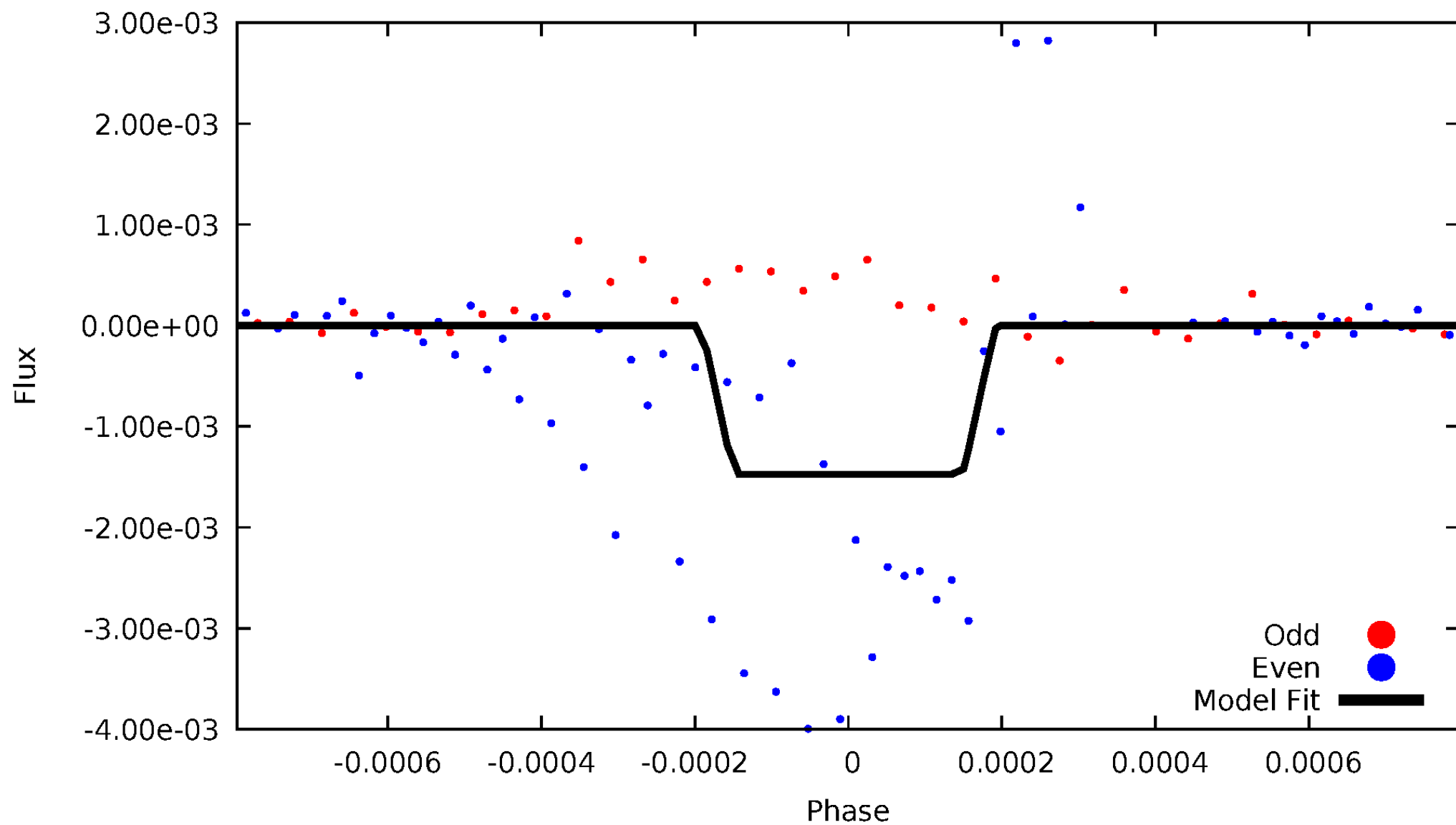
TCE 004068539-02





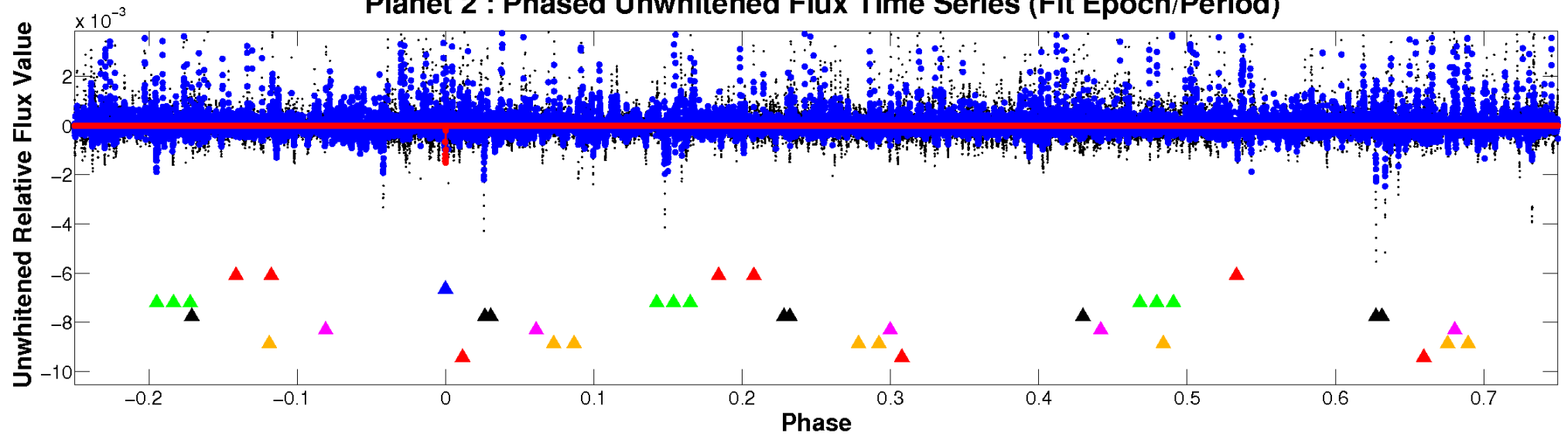
# ALT Odd/Even

TCE 004068539-02

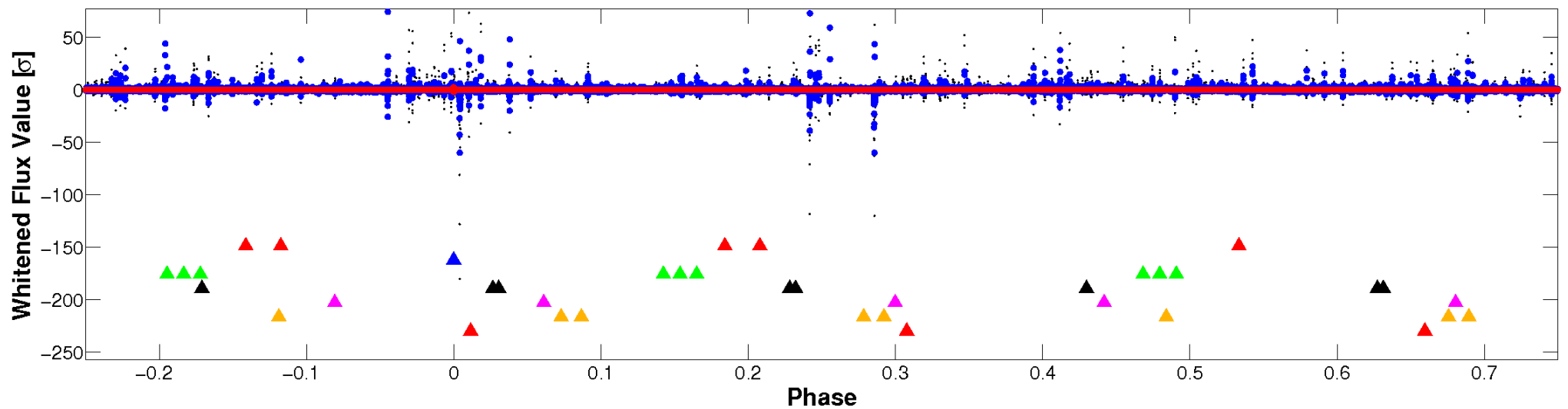


# Non-Whitened Vs. Whitened Light Curve

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

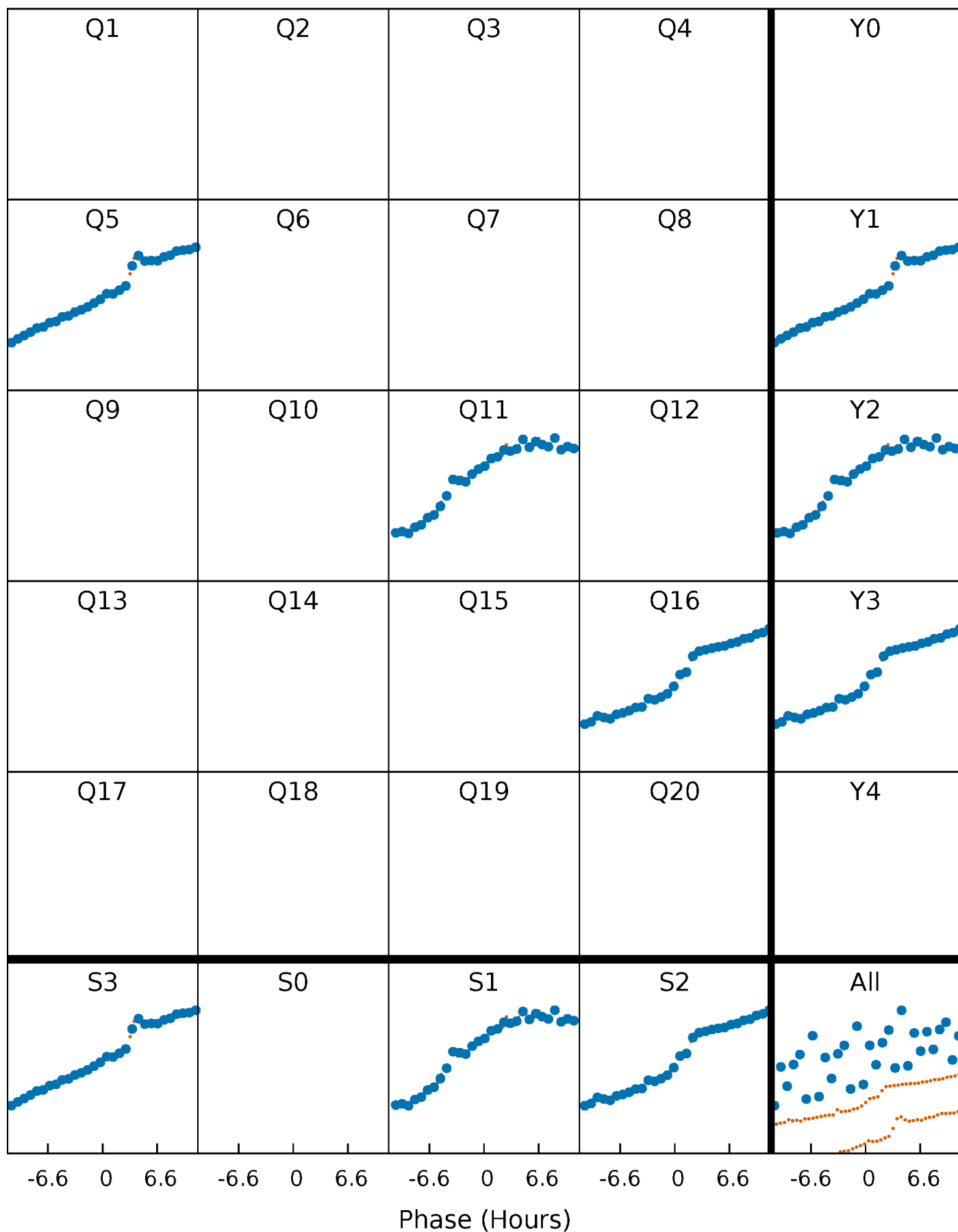


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



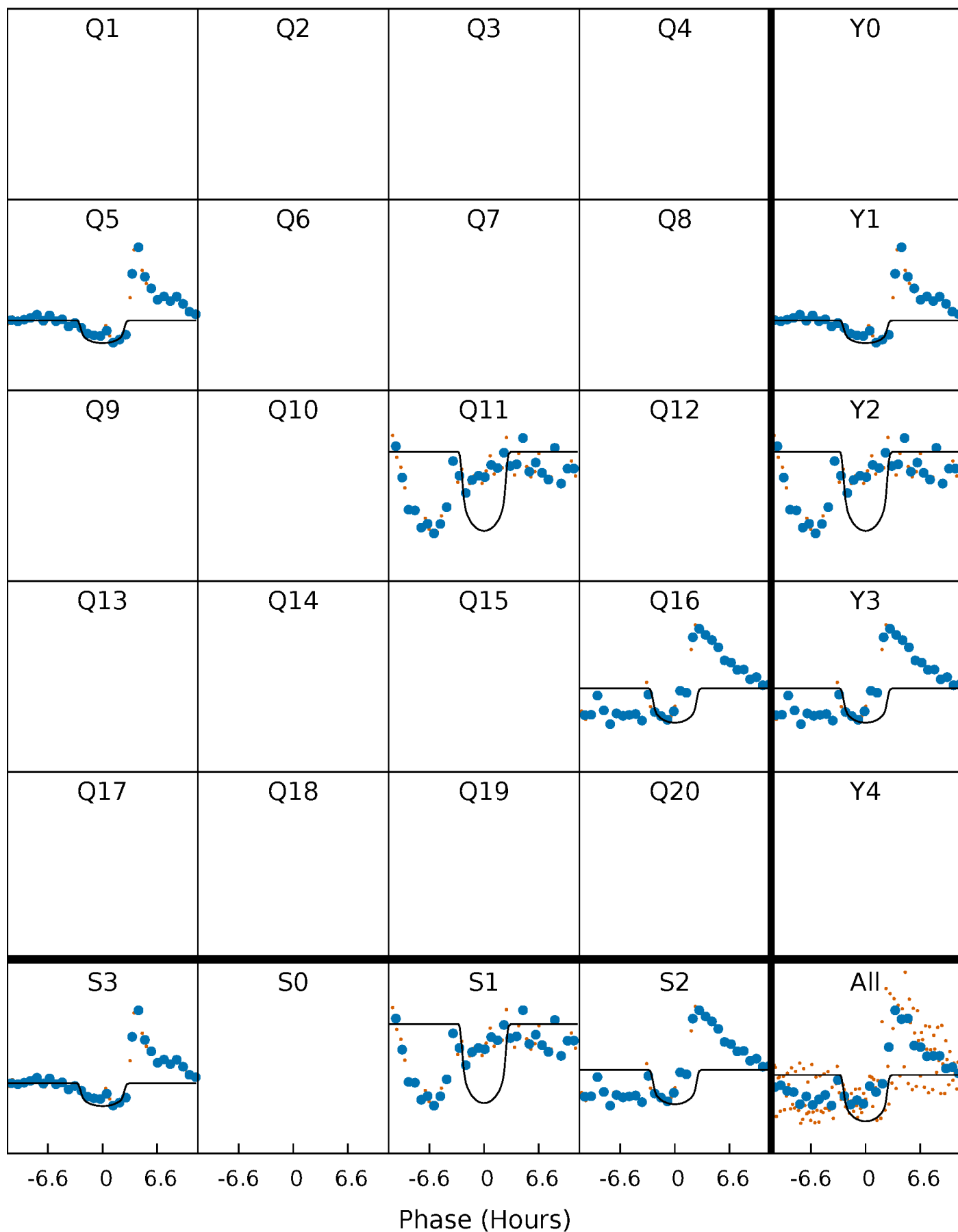
# PDC Quarter-Phased Transit Curves

TCE 004068539-02     $P=488.817554$  Days     $T_0=531.587690$  (BKJD)



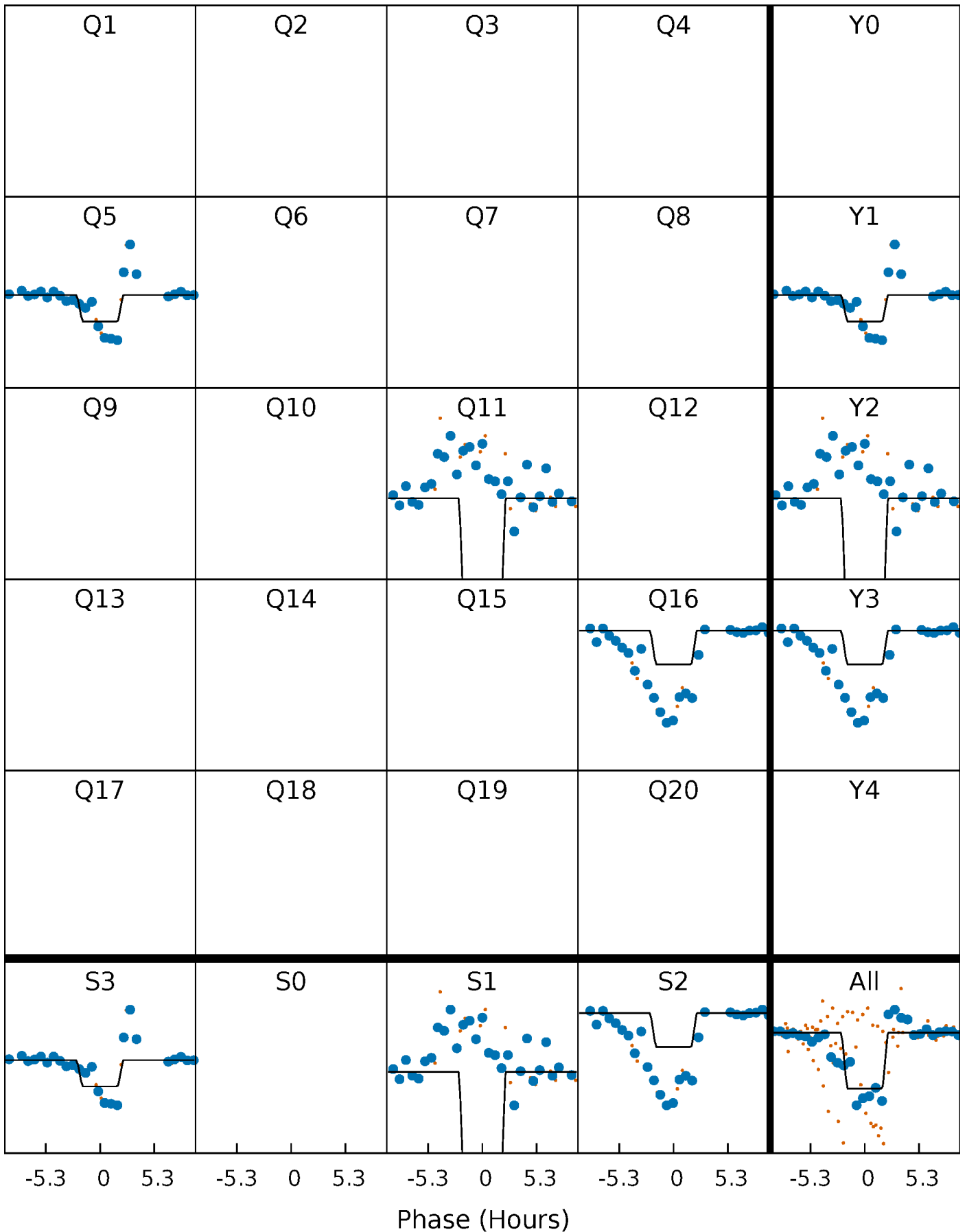
# DV Quarter-Phased Transit Curves

TCE 004068539-02 P=488.817554 Days  $T_0=531.587690$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

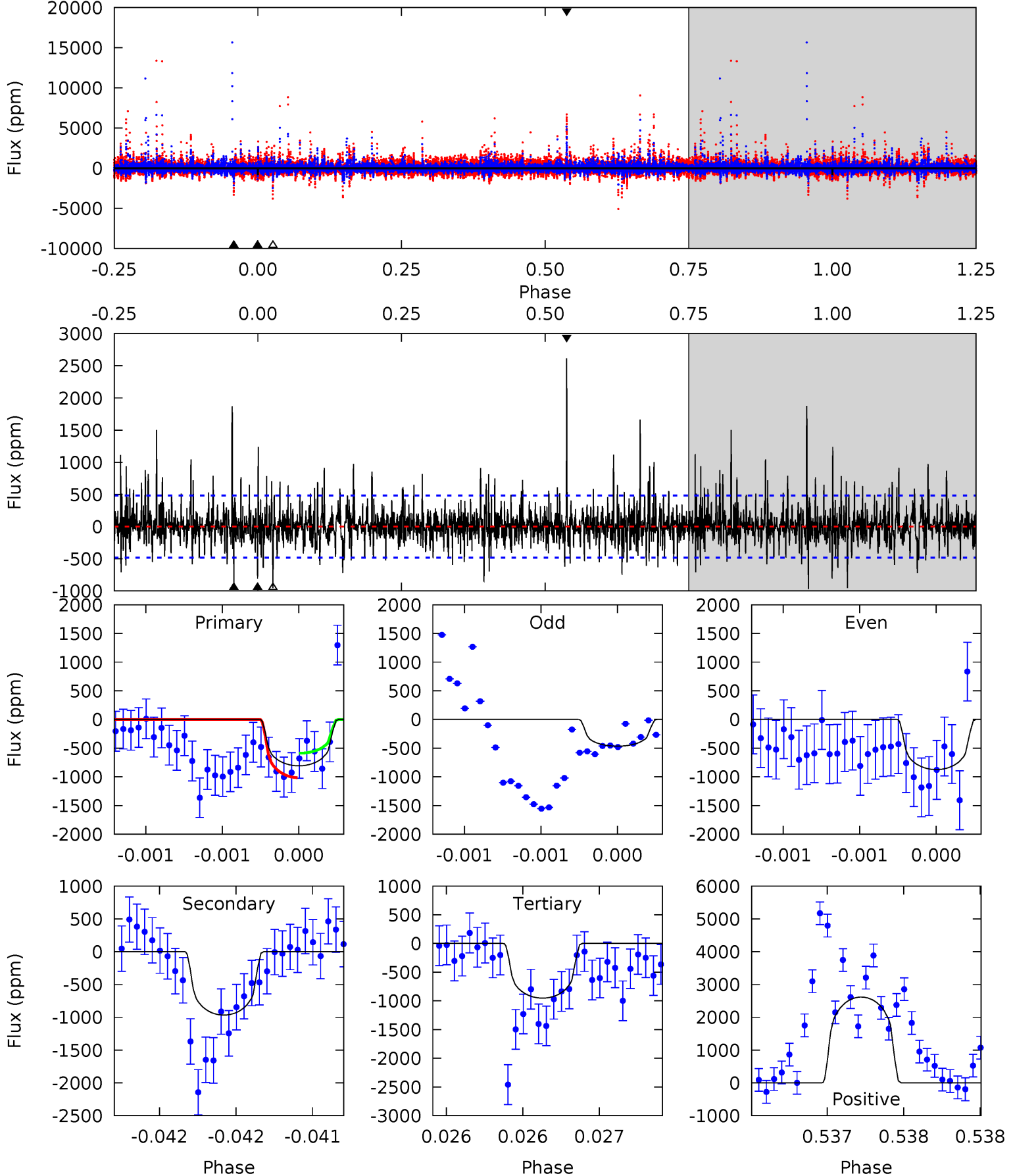
TCE 004068539-02 P=488.784378 Days  $T_0=531.639754$  (BKJD)



# DV Model-Shift Uniqueness Test

004068539-02, P = 488.817554 Days, E = 42.770136 Days

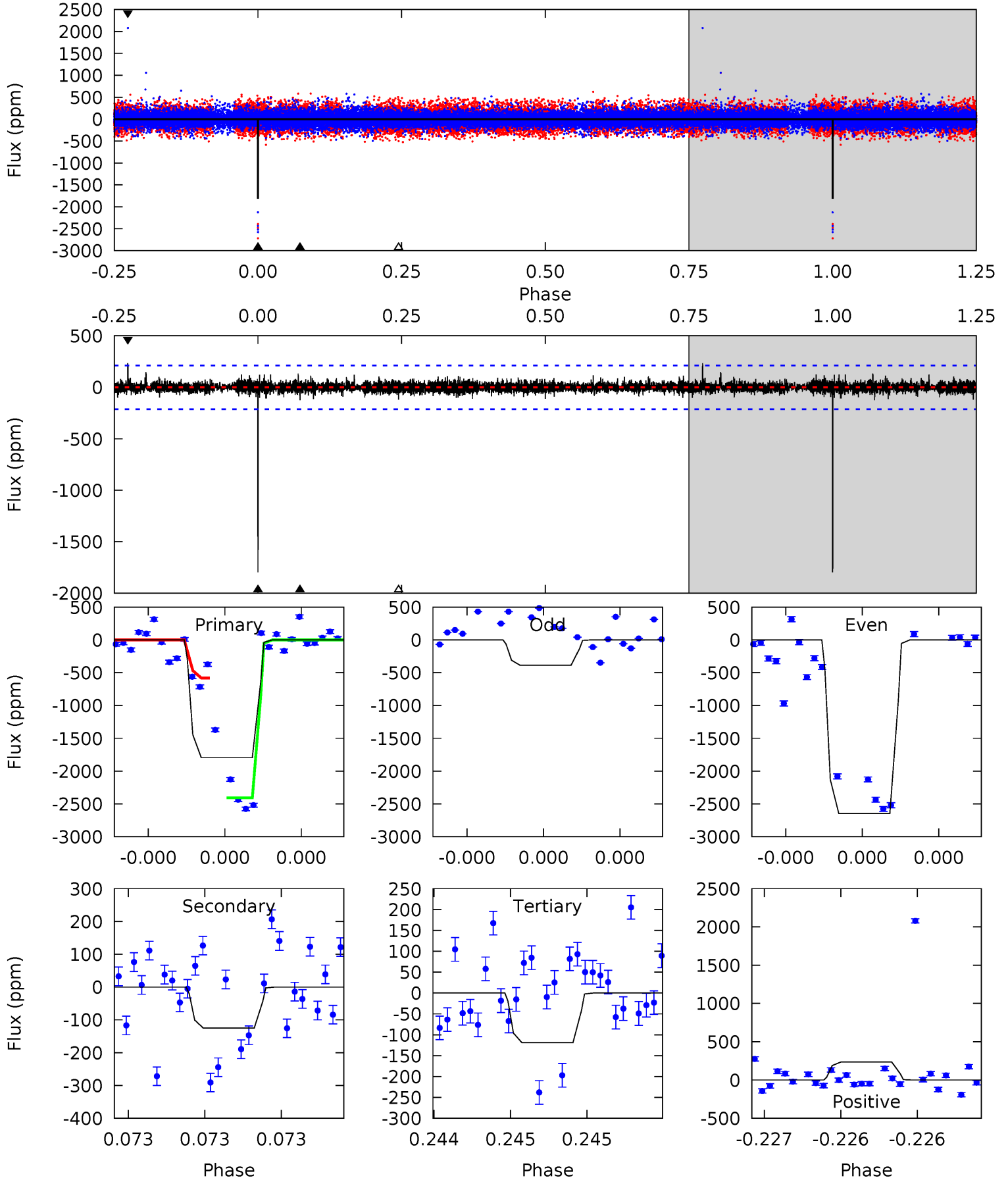
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.31	11.1	11.0	30.2	5.57	3.47	2.48	-1.66	-20.8	0.17	-19.0	1.50	1.42	0.73	2.48



# Alt Model-Shift Uniqueness Test

004068539-02, P = 488.784378 Days, E = 42.855376 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
47.4	3.30	3.15	6.18	5.62	3.56	0.66	44.2	41.2	0.15	-2.88	36.0	0.97	0.12	0





### Stellar Parameters For KIC 004068539

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$4946^{+123}_{-123}$	$3.320^{+1.216}_{-0.304}$	$-0.320^{+0.300}_{-0.250}$	$3.376^{+1.800}_{-2.476}$	$0.868^{+0.264}_{-0.216}$	$0.032^{+1.760}_{-0.019}$
	+2%/-2%	+37%/-9%	+94%/-78%	+53%/-73%	+30%/-25%	+5542%/-60%
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 004068539-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-967 \pm 87$	$12.70^{+7.64}_{-5.94}$	$506^{+84}_{-102}$	$4565^{+854}_{-482}$	$4459^{+11596}_{-2581}$
Alt.	$-125 \pm 38$	$12.88^{+7.12}_{-6.01}$	$501^{+85}_{-105}$	$3181^{+433}_{-278}$	$577^{+1423}_{-365}$

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

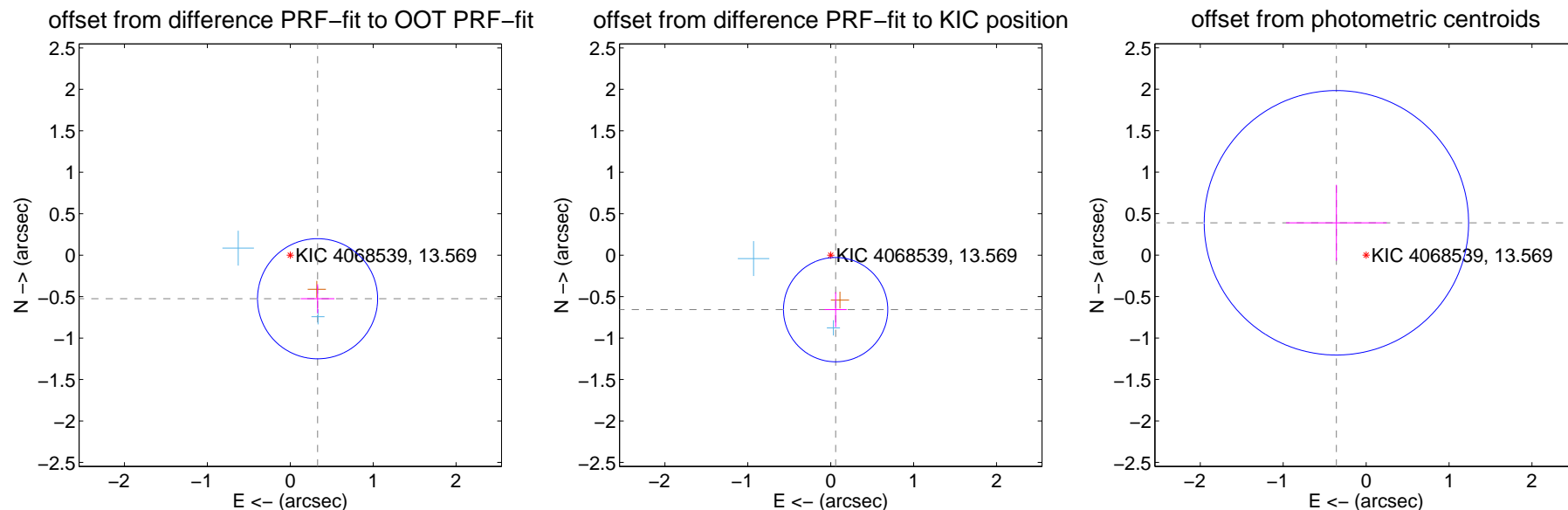
## DV Centroid Data

Supplemental centroid analysis for 004068539-02. Kepler magnitude: 13.57. Transit SNR 10.18

There are 2 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.33 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.620 \pm 0.241$	2.57	$-0.330 \pm 0.203$	$-0.526 \pm 0.174$
PRF-fit source offset from KIC position	$0.660 \pm 0.210$	3.15	$-0.059 \pm 0.133$	$-0.657 \pm 0.210$
photometric centroid source offset	$0.53 \pm 0.53$	1.00	$0.36 \pm 0.61$	$0.39 \pm 0.46$

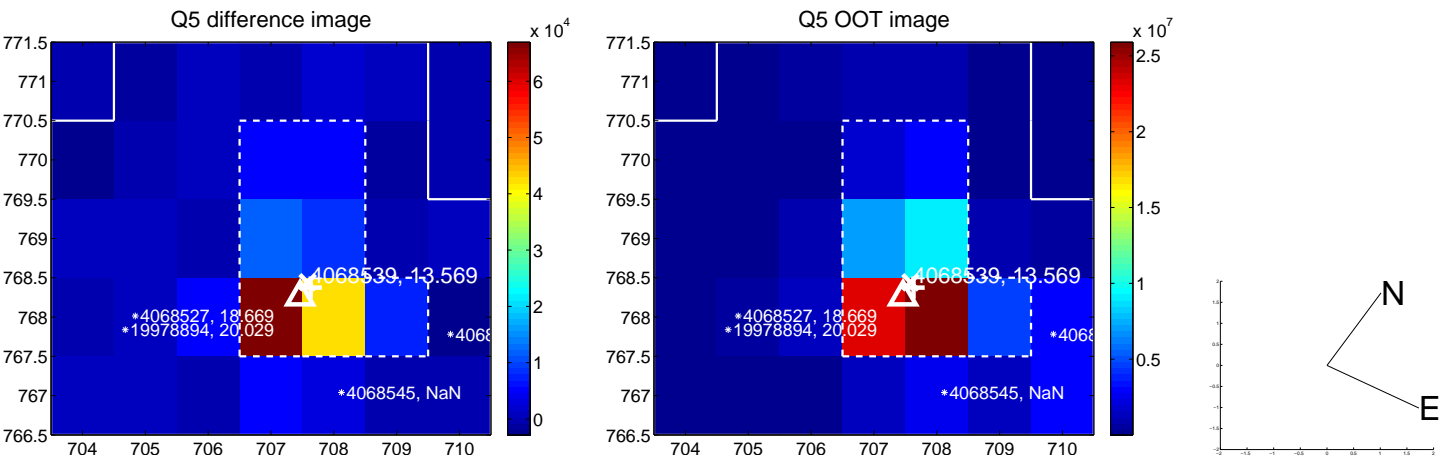


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

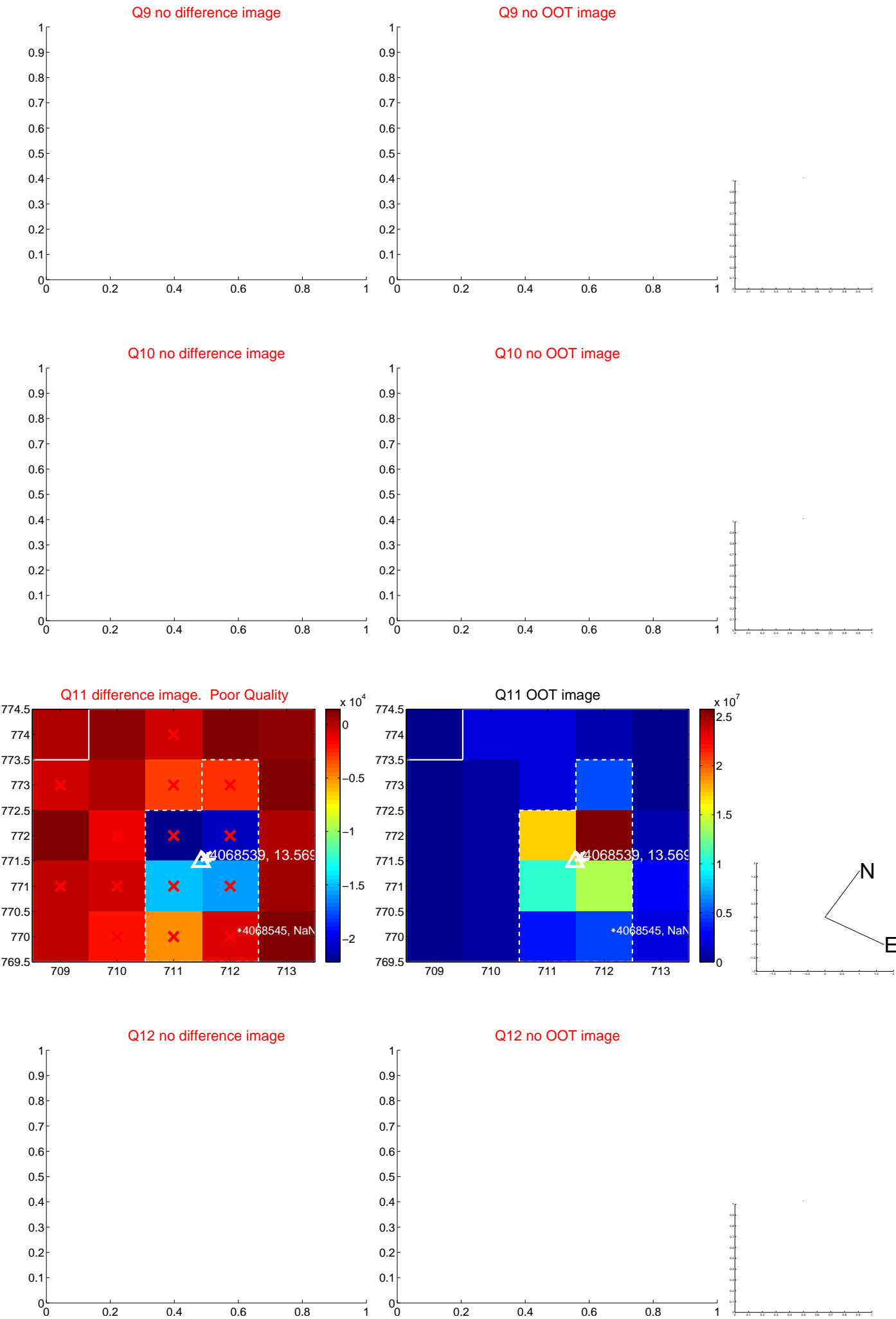
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



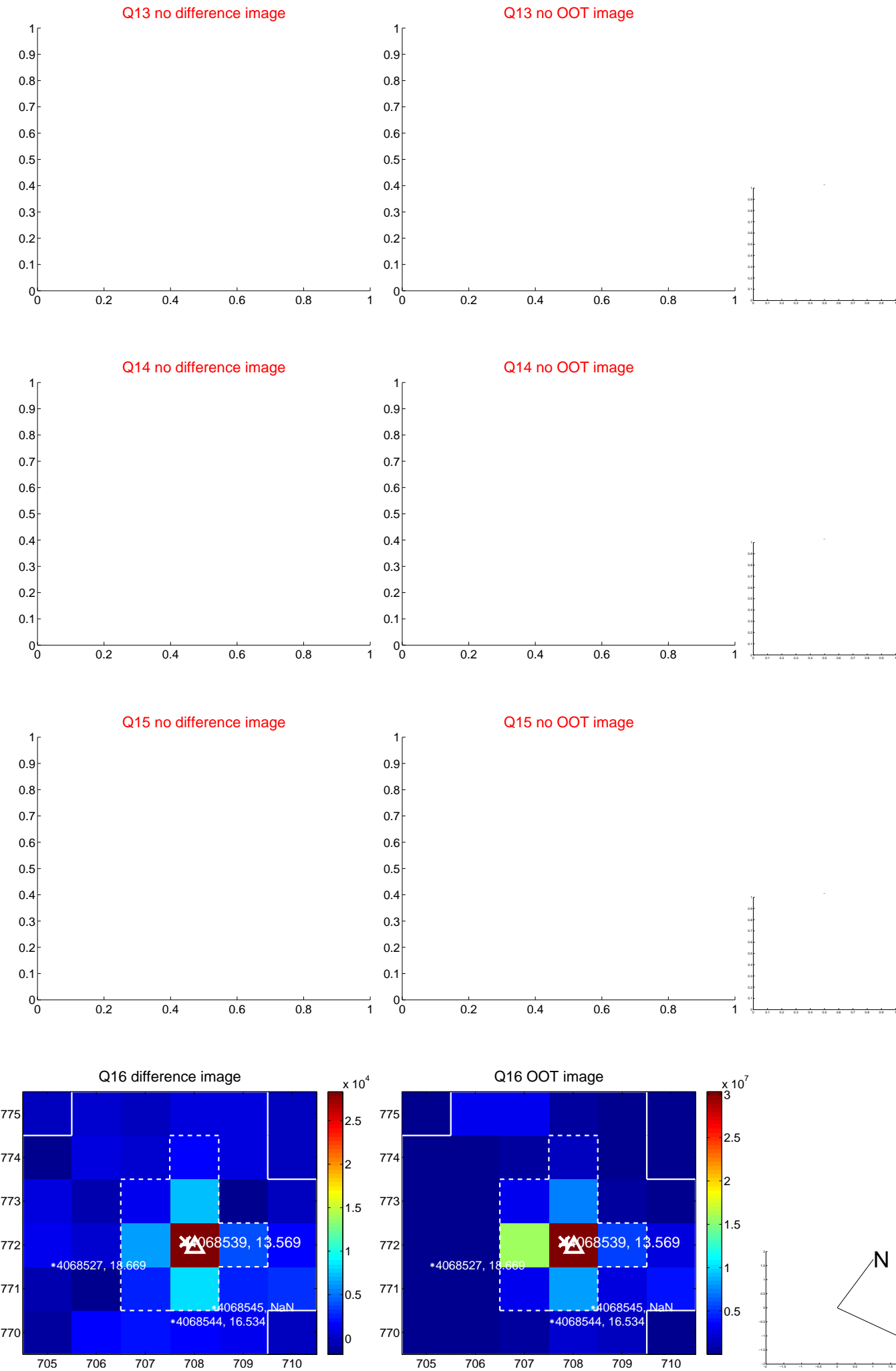
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



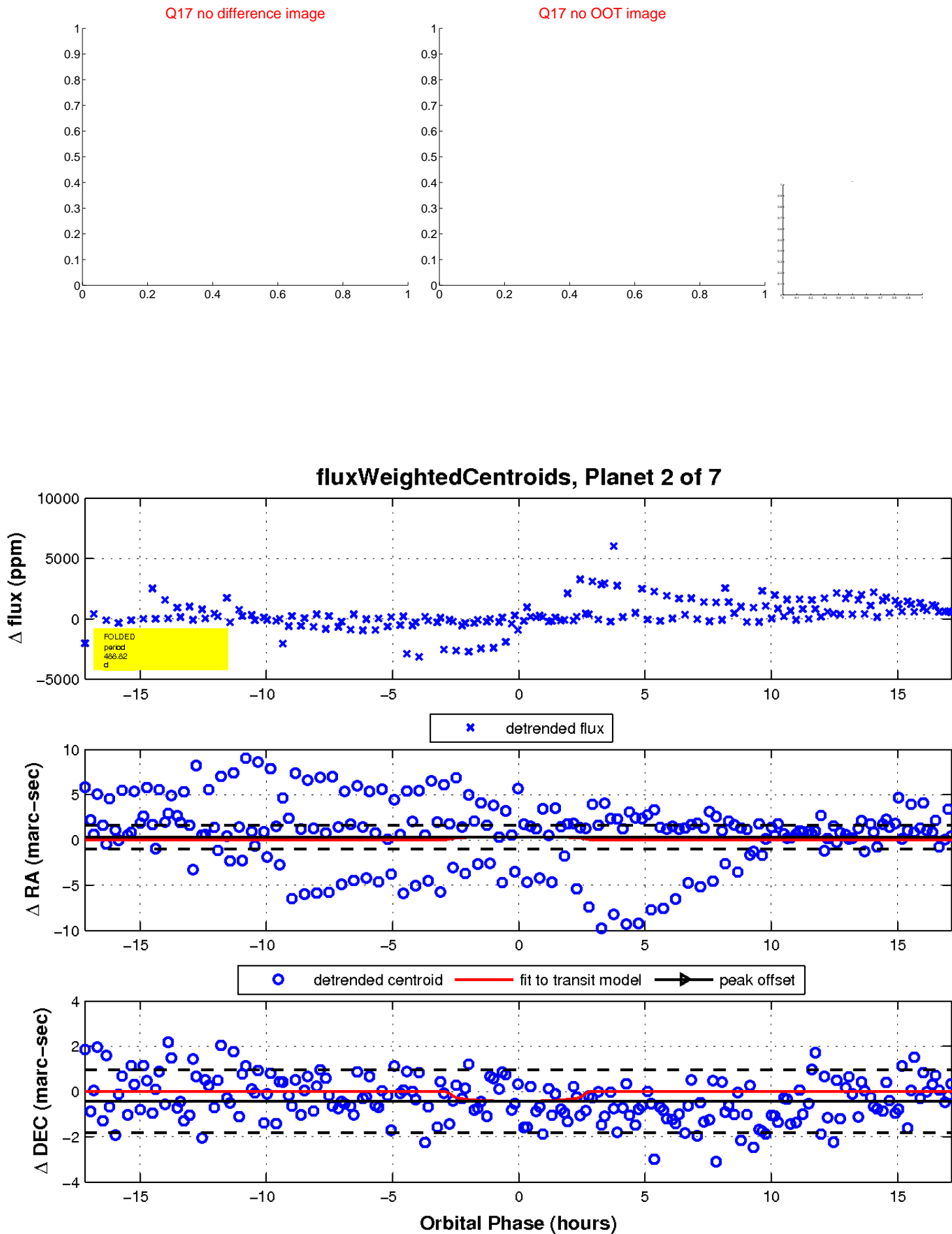
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



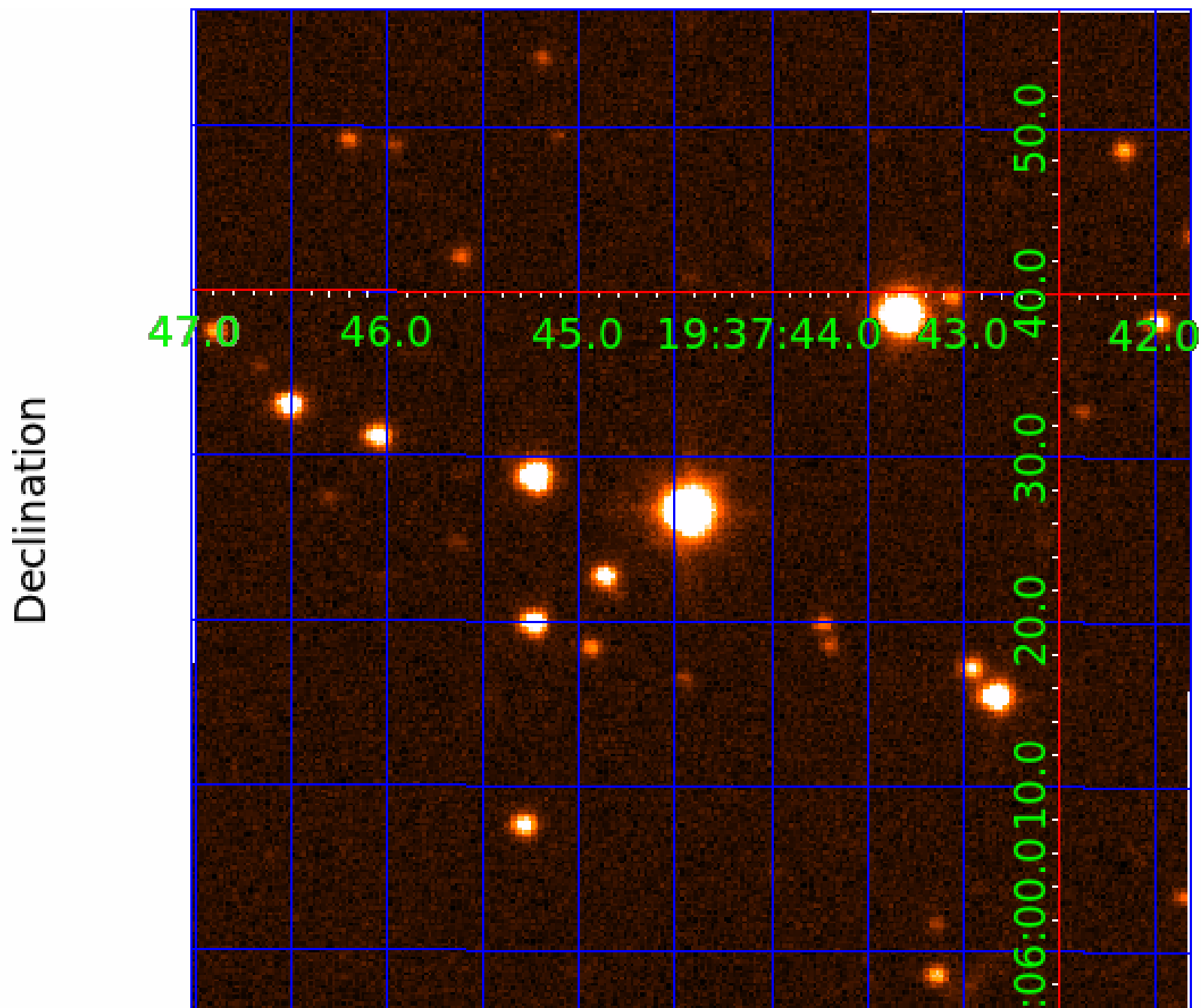
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image





# KIC 004068539

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004068539-01	OBS	No	329.750808	132.793344	931.3	5.504	17.2	6.7	3.38	4946	10.12	7.69
004068539-02	OBS	No	488.817554	531.587690	1505.9	5.757	16.9	10.2	3.38	4946	13.96	4.55
004068539-03	OBS	No	164.780942	271.640333	641.8	2.066	16.6	6.8	3.38	4946	8.79	19.39
004068539-04	OBS	No	195.135183	156.264736	1317.8	11.313	15.1	8.9	3.38	4946	15.73	15.48
004068539-06	OBS	No	194.178598	185.625789	708.3	5.027	15.4	6.8	3.38	4946	8.86	15.58
004068539-07	OBS	No	660.834953	193.179478	512.9	7.500	14.5	-1.0	3.38	4946	7.43	3.04

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004068539-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
004068539-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
004068539-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_ZUMA_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
004068539-04	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—INCONSISTENT_TRANS
004068539-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—INCONSISTENT_TRANS—CENT_KIC_POS
004068539-07	OBS	FP	0.00	1	0	0	0	LPP_DV—ALL_TRANS_CHASES—CENT_NOFITS

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

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

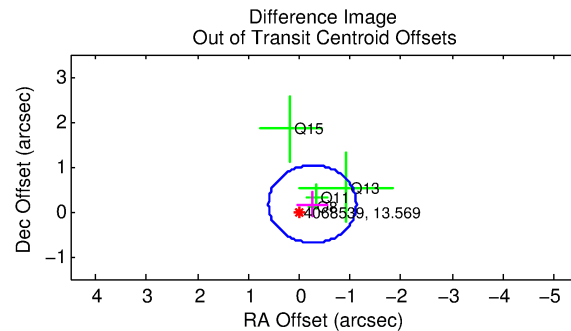
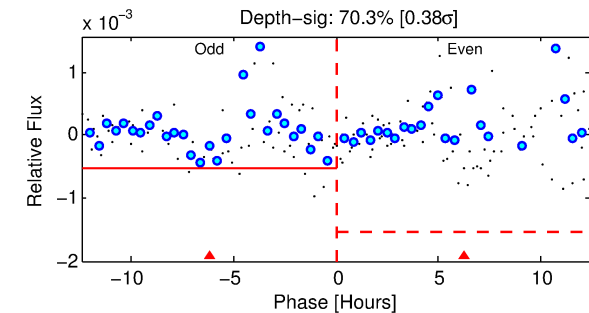
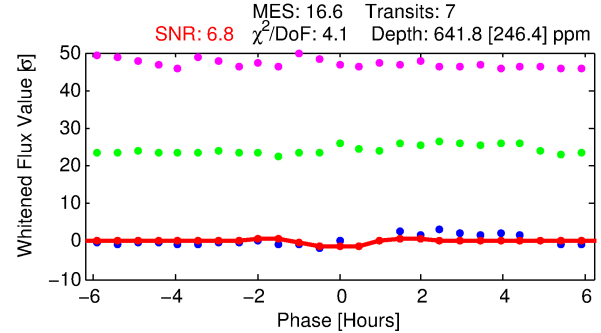
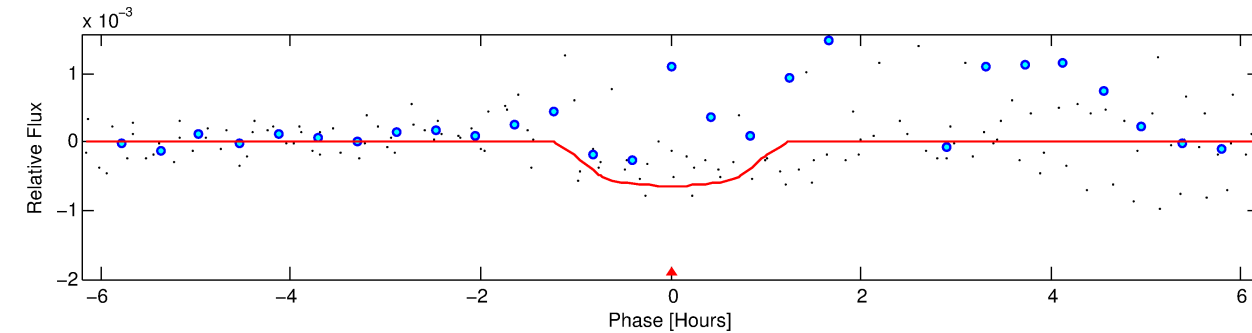
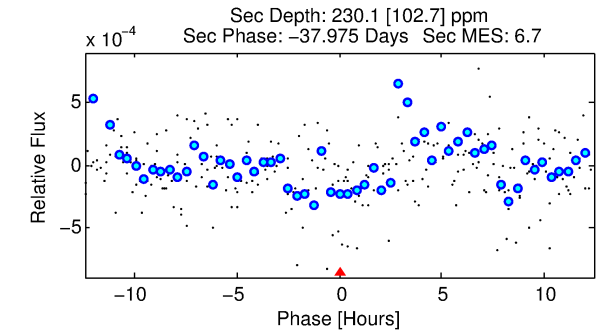
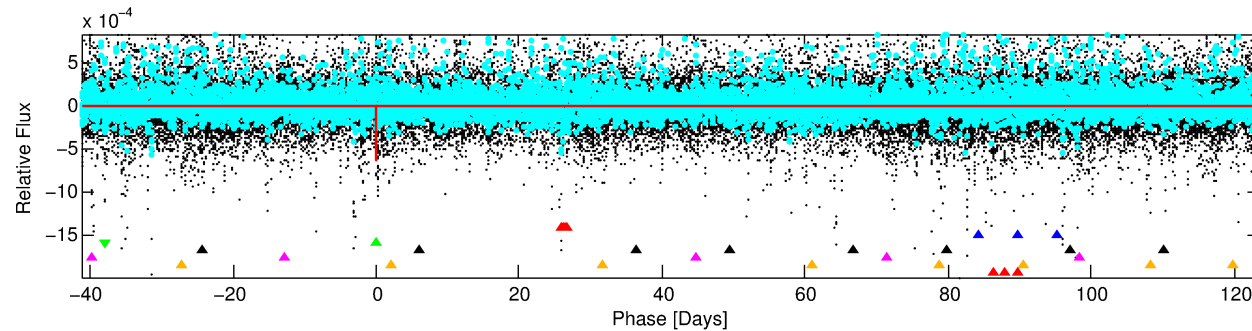
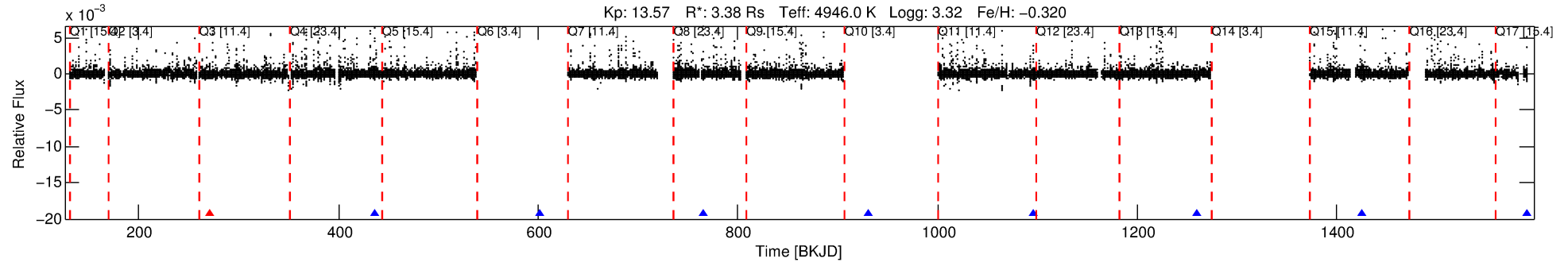
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 004068539-03

No Significant Match Found

# DV One-Page Summary

KIC: 4068539 Candidate: 3 of 7 Period: 164.781 d



## DV Fit Results:

Period = 164.78094 [0.00270] d  
Epoch = 271.6403 [0.0133] BKJD  
Rp/R\* = 0.0239 [0.1403]  
a/R\* = 518.19 [10704.39]  
b = 0.57 [24.95]  
Seff = 19.39 [37.47]  
Teq = 535 [258] K  
Rp = 8.79 [52.08] Re  
a = 0.5614 [0.5915] AU  
Ag = 516.24 [6156.48] [0.08 $\sigma$ ]  
Teffp = 3944 [11603] K [0.29 $\sigma$ ]

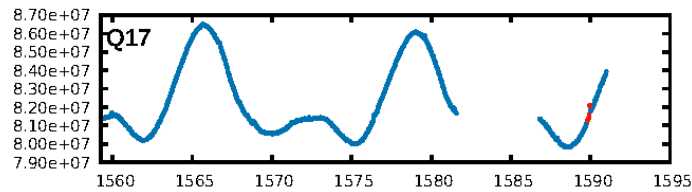
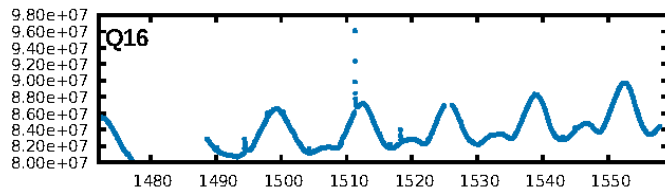
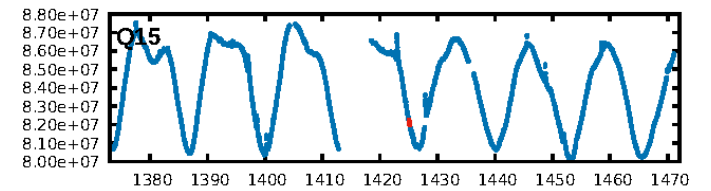
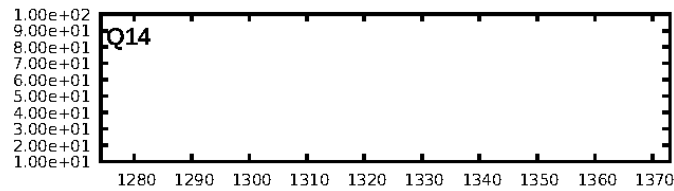
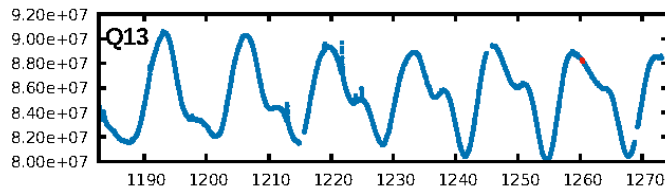
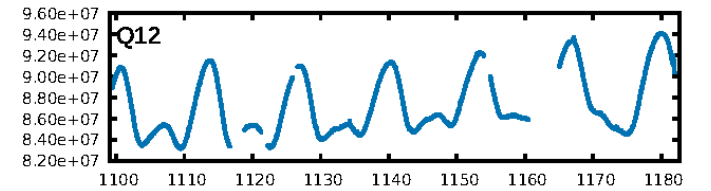
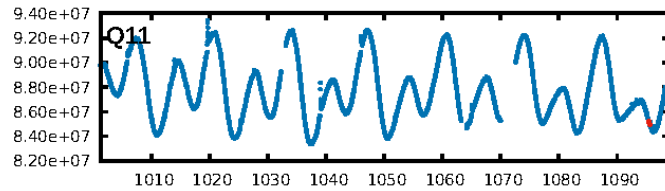
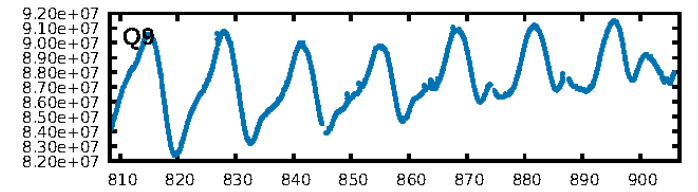
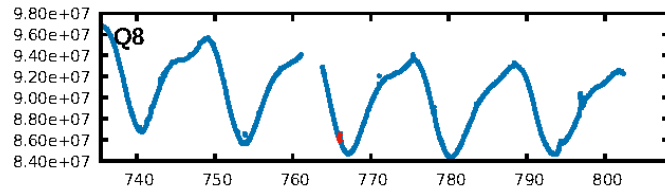
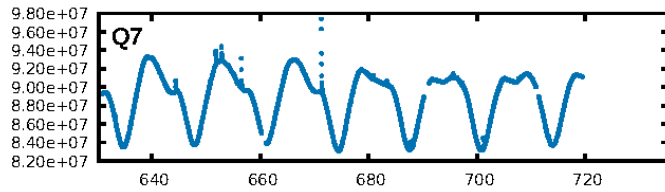
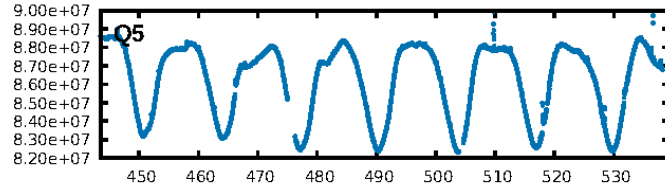
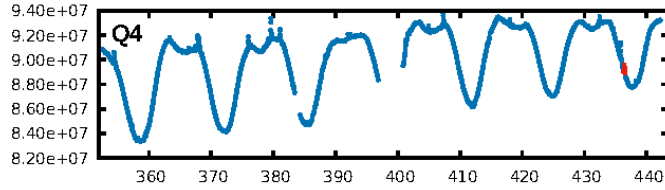
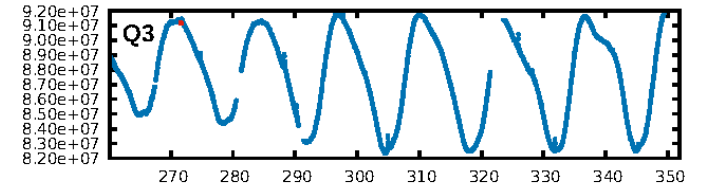
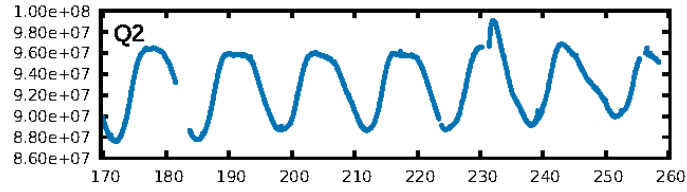
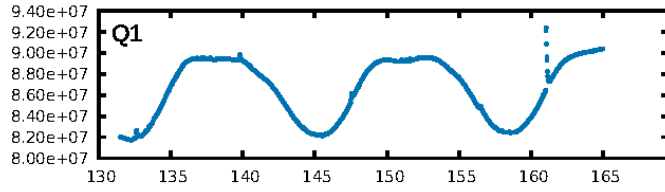
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [129.80 $\sigma$ ]  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 0.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 0.83 [5/6]  
GhostDiagnostic-chr: 0.6634  
Centroid-sig: 3.9%  
Centroid-so: 2.006 arcsec [1.74 $\sigma$ ]  
OotOffset-rm: 0.309 arcsec [1.07 $\sigma$ ]  
OotOffset-st: 0/2/1/1 [4]  
KicOffset-rm: 0.077 arcsec [0.22 $\sigma$ ]  
KicOffset-st: 0/2/1/1 [4]  
DiffImageQuality-fgm: 0.75 [3/4]  
DiffImageOverlap-fno: 1.00 [5/5]

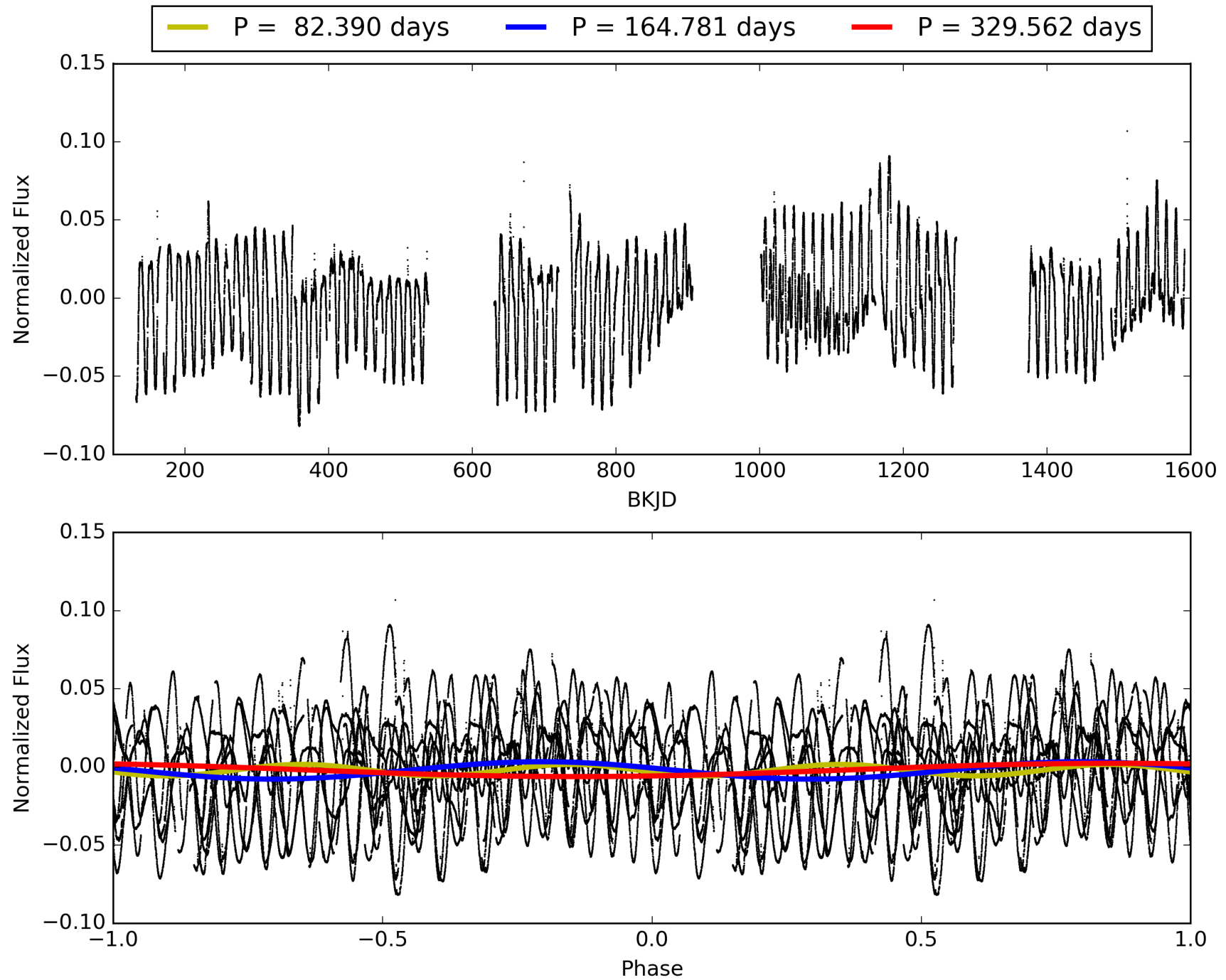
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 21:25:42 Z

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

# TCE 004068539-03, PDC Light Curves

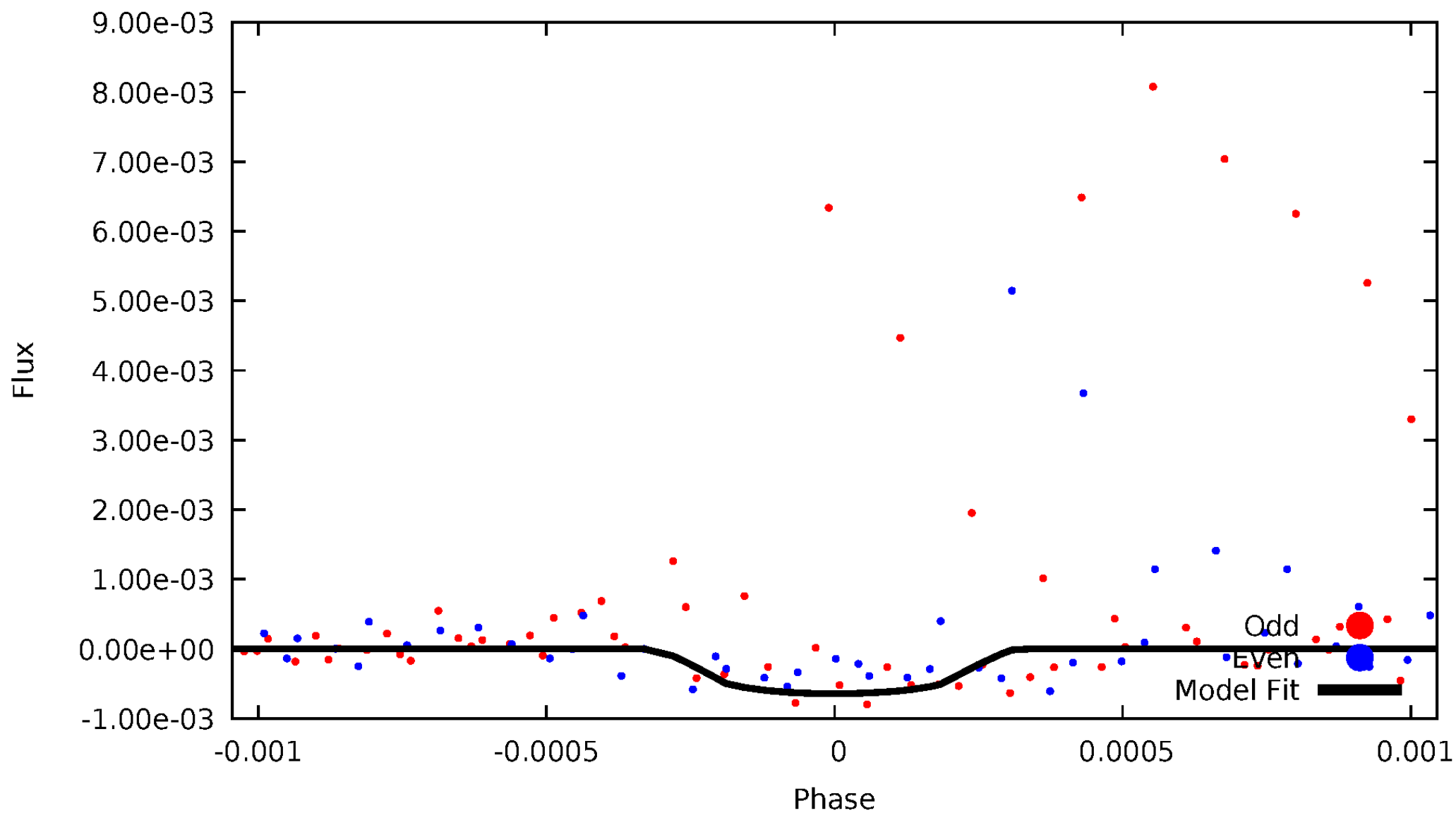


TCE 004068539-03



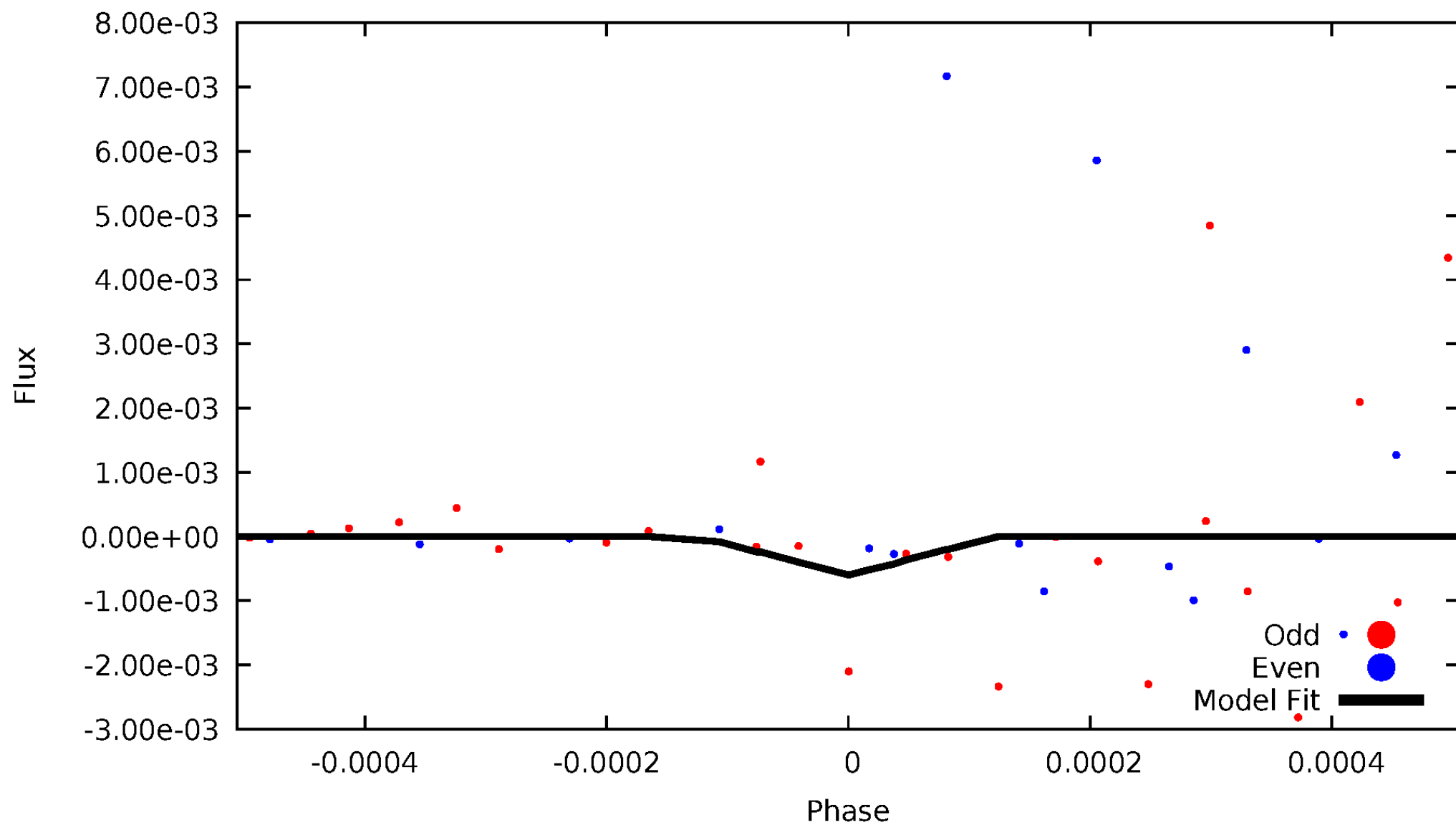
# DV Odd/Even

TCE 004068539-03



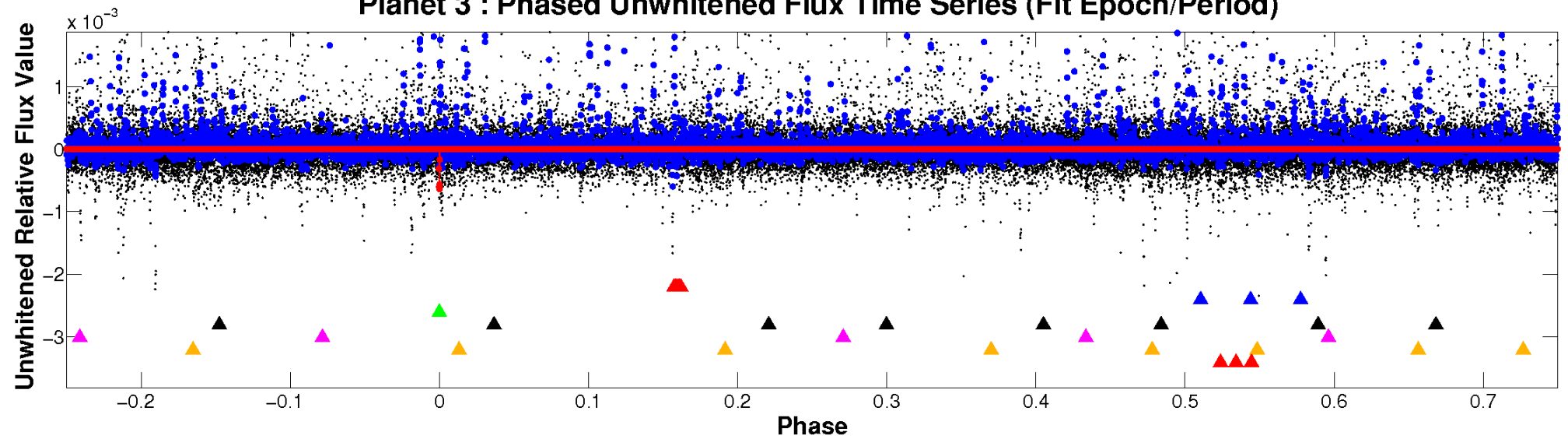
# ALT Odd/Even

TCE 004068539-03

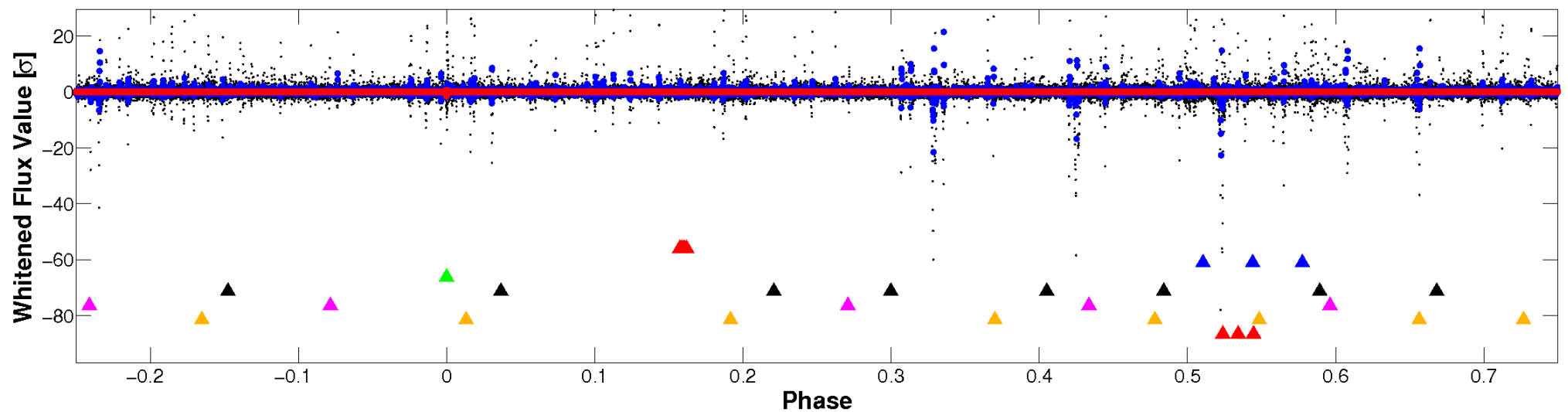


# Non-Whitened Vs. Whitened Light Curve

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

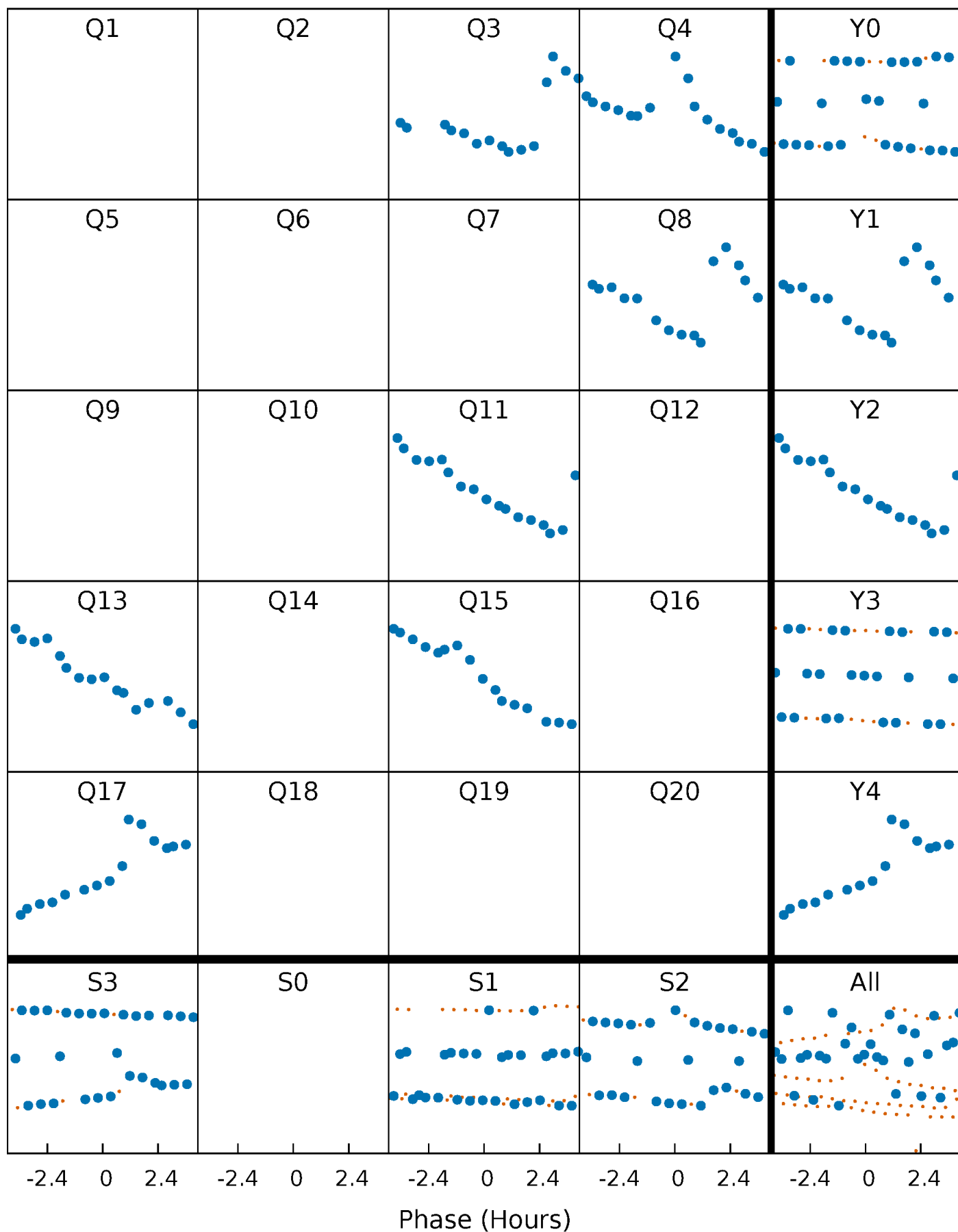


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

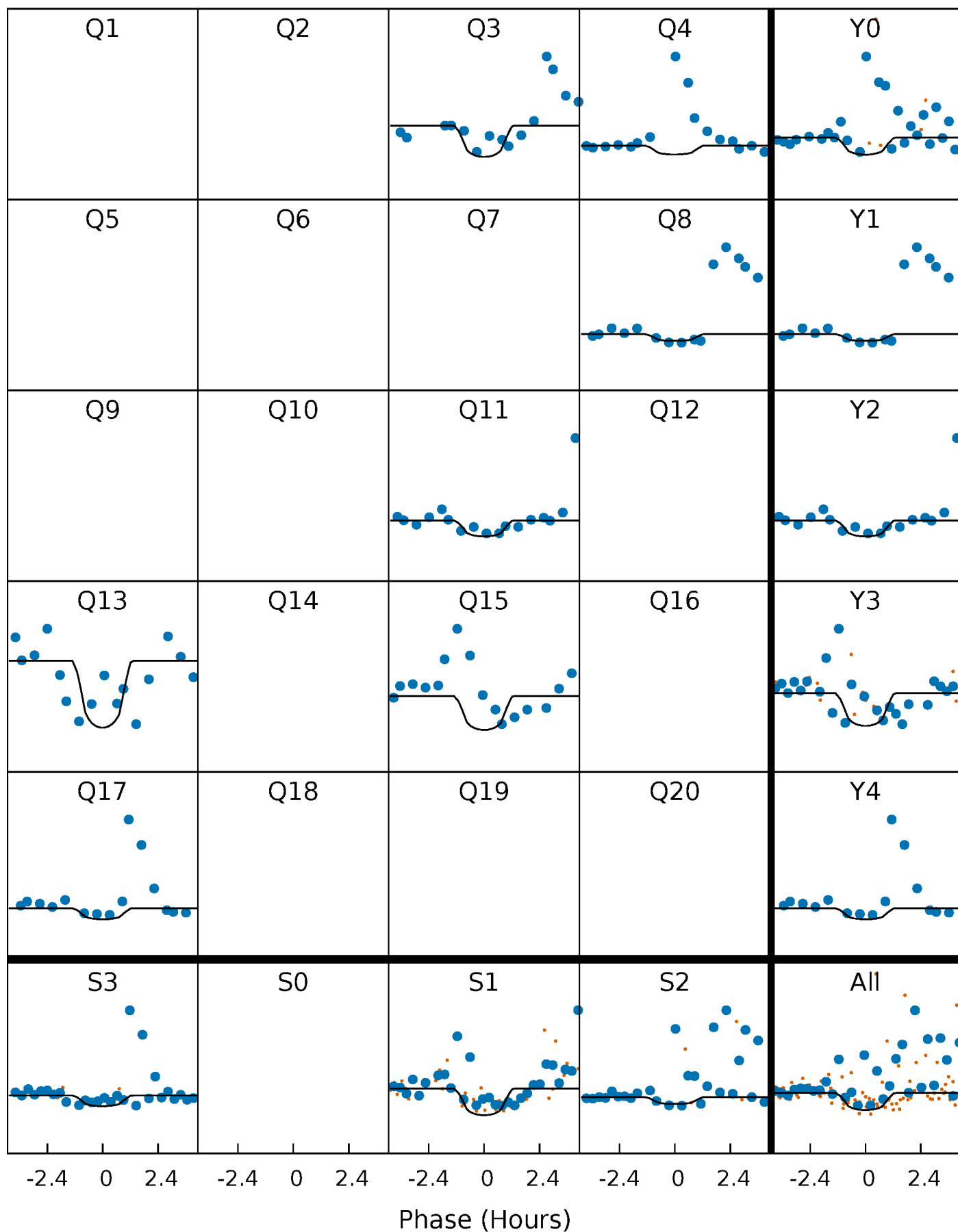
TCE 004068539-03 P=164.780942 Days  $T_0=271.640333$  (BKJD)





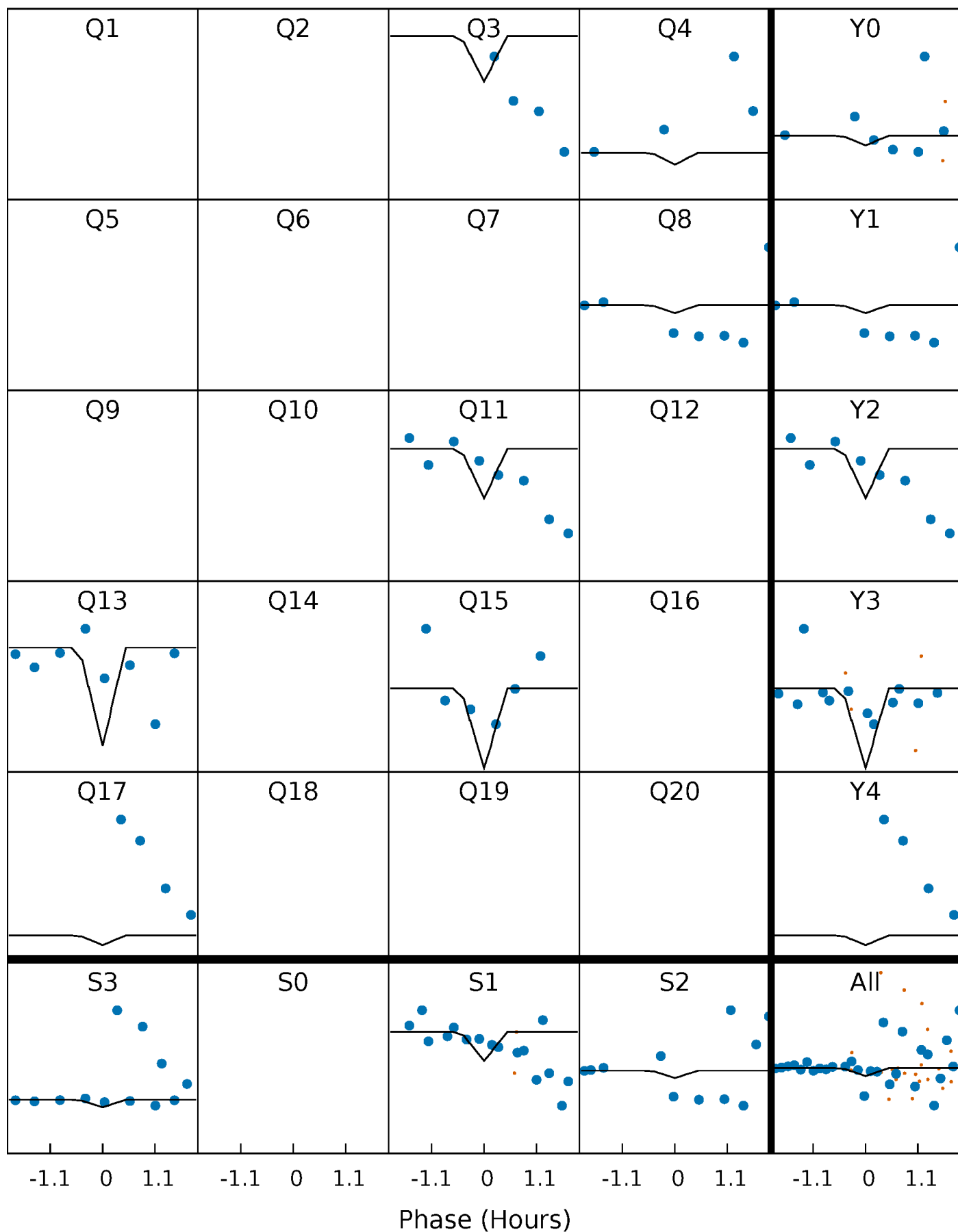
# DV Quarter-Phased Transit Curves

TCE 004068539-03     $P=164.780942$  Days     $T_0=271.640333$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

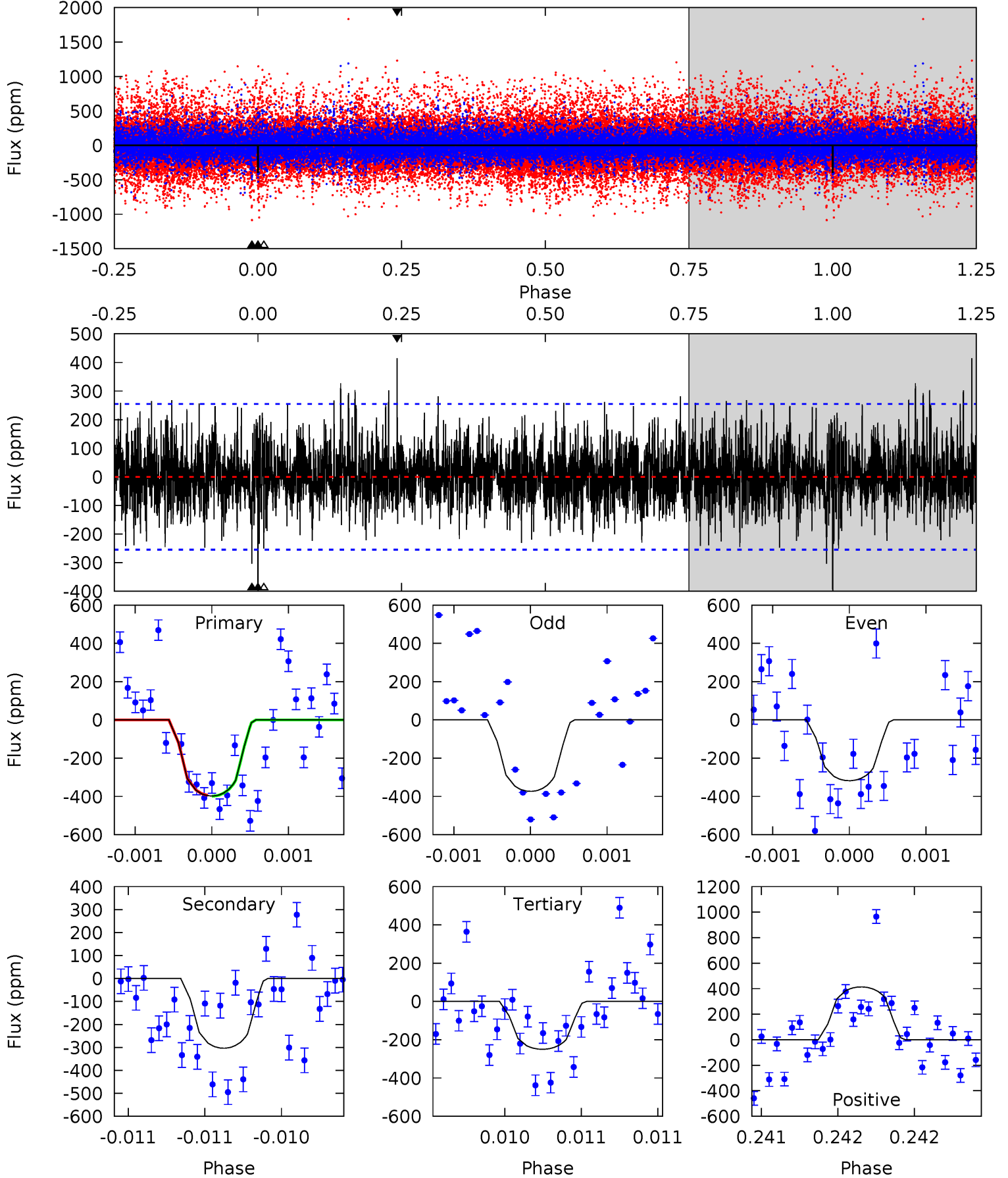
TCE 004068539-03 P=164.790639 Days  $T_0=271.600080$  (BKJD)



# DV Model-Shift Uniqueness Test

004068539-03, P = 164.780942 Days, E = 106.859391 Days

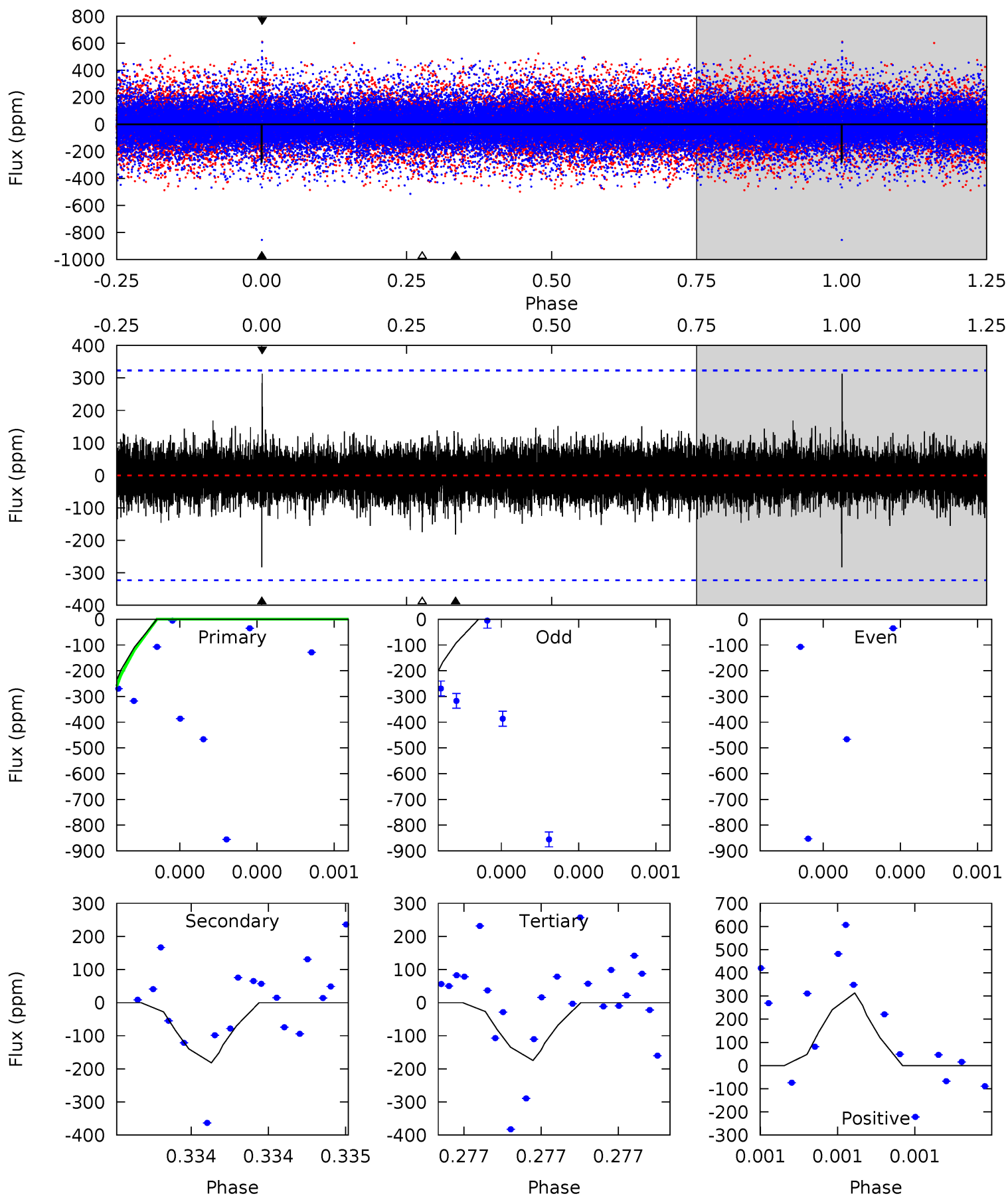
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.67	6.61	5.45	9.02	5.54	3.44	1.67	3.22	-0.36	1.17	-2.41	0.47	-1.34	0.51	0



# Alt Model-Shift Uniqueness Test

004068539-03, P = 164.790639 Days, E = 106.809441 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
5.01	3.23	3.10	5.56	5.73	3.72	0.72	1.91	-0.55	0.13	-2.33	0	0.90	0.53	0



### Stellar Parameters For KIC 004068539

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$4946^{+123}_{-123}$	$3.320^{+1.216}_{-0.304}$	$-0.320^{+0.300}_{-0.250}$	$3.376^{+1.800}_{-2.476}$	$0.868^{+0.264}_{-0.216}$	$0.032^{+1.760}_{-0.019}$
	+2%/-2%	+37%/-9%	+94%/-78%	+53%/-73%	+30%/-25%	+5542%/-60%
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 004068539-03 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-304 \pm 46$	$33.09^{+40.68}_{-23.29}$	$721^{+117}_{-160}$	$2749^{+1134}_{-450}$	$50^{+490}_{-39}$
Alt.	$-182 \pm 56$	$34.63^{+44.48}_{-24.61}$	$734^{+104}_{-163}$	$2503^{+1045}_{-370}$	$25^{+315}_{-20}$

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

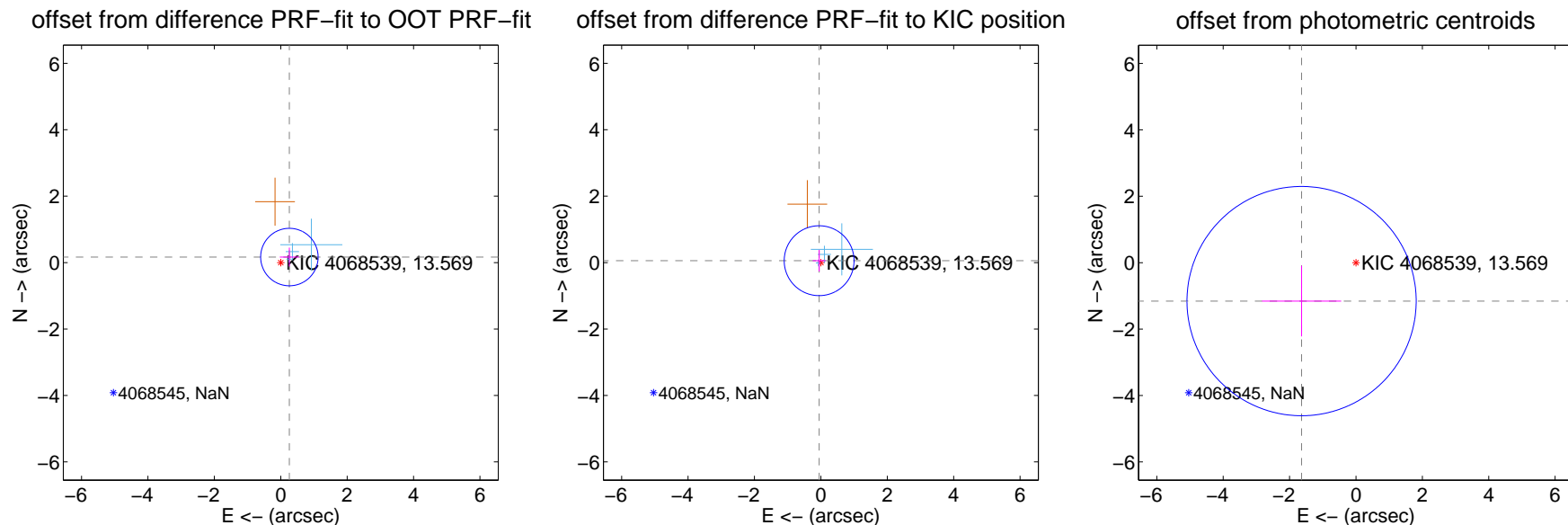
## DV Centroid Data

Supplemental centroid analysis for 004068539-03. Kepler magnitude: 13.57. Transit SNR 6.81

There are 3 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.25 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.309 \pm 0.288$	1.07	$-0.260 \pm 0.290$	$0.167 \pm 0.284$
PRF-fit source offset from KIC position	$0.077 \pm 0.351$	0.22	$0.052 \pm 0.196$	$0.057 \pm 0.326$
photometric centroid source offset	$2.01 \pm 1.15$	1.74	$1.64 \pm 1.19$	$-1.16 \pm 1.06$

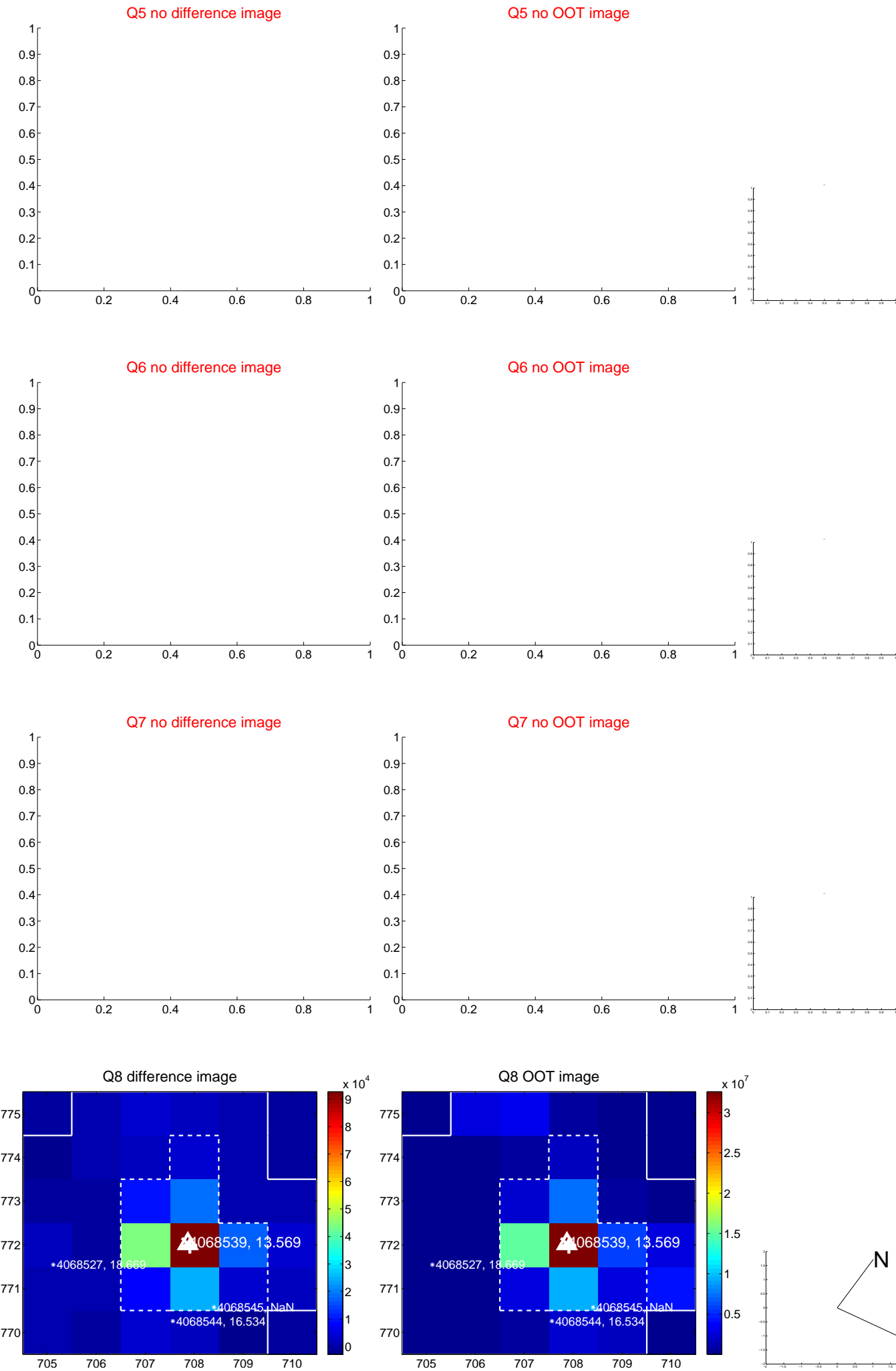


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

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

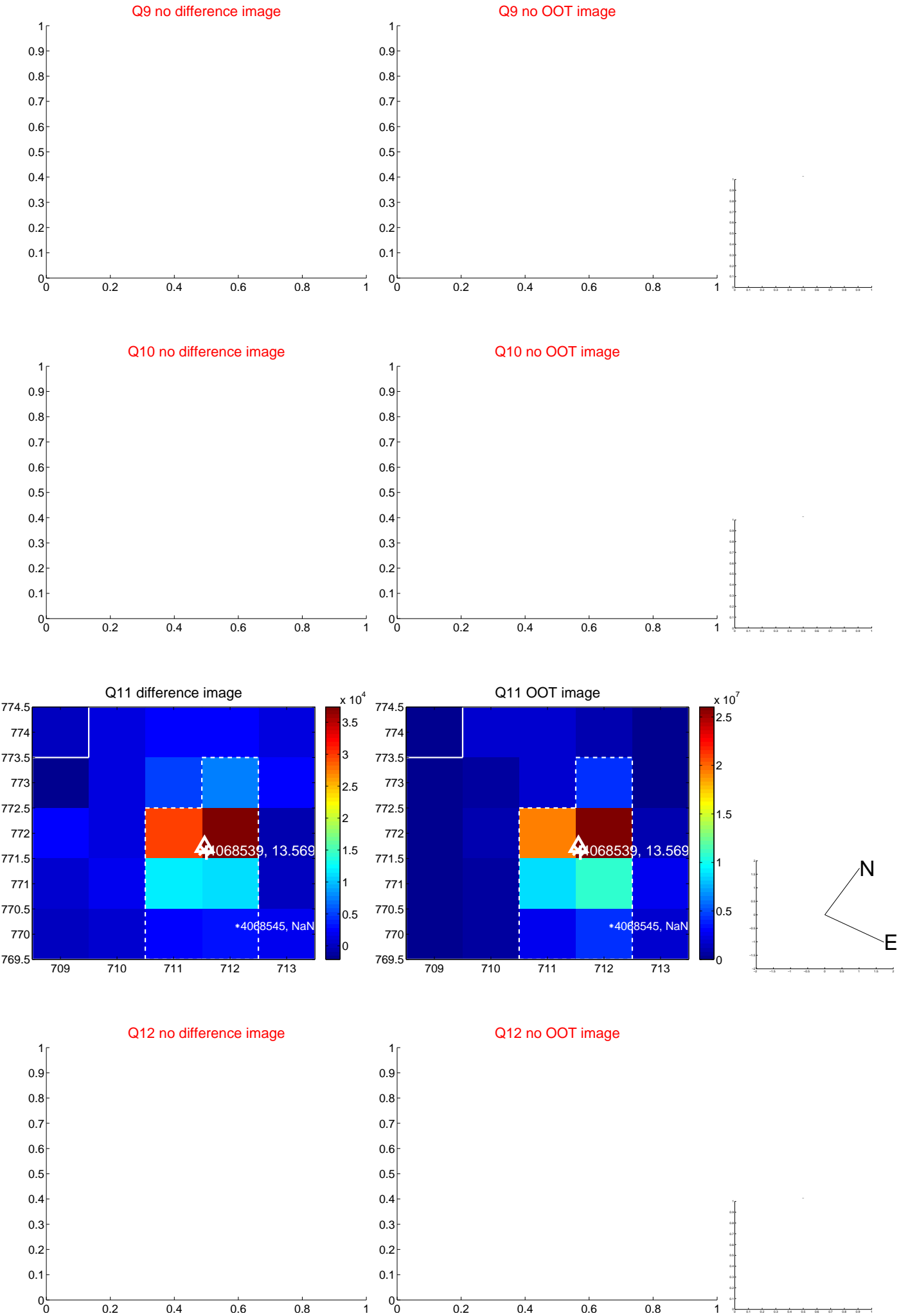


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

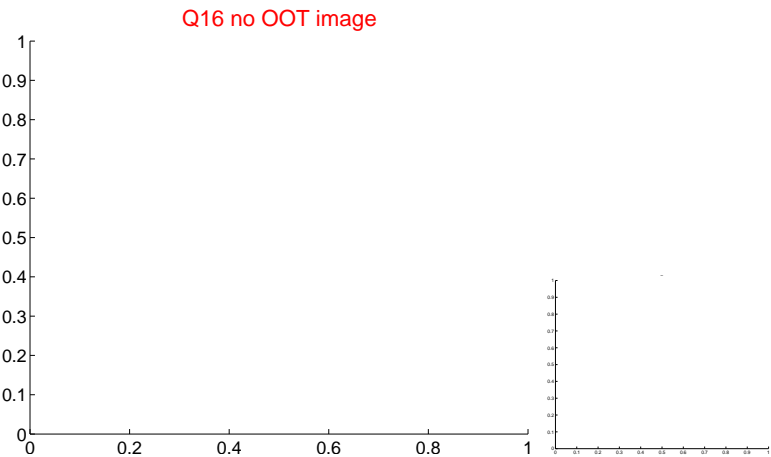
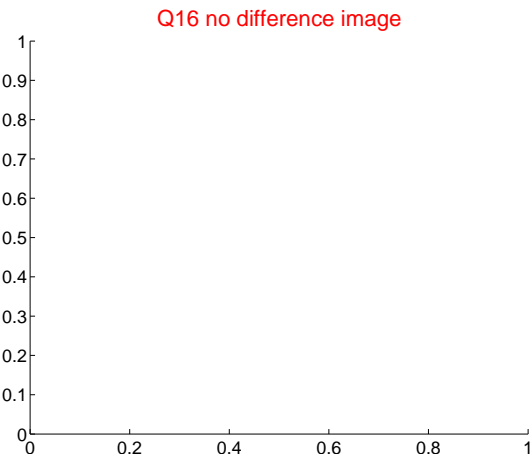
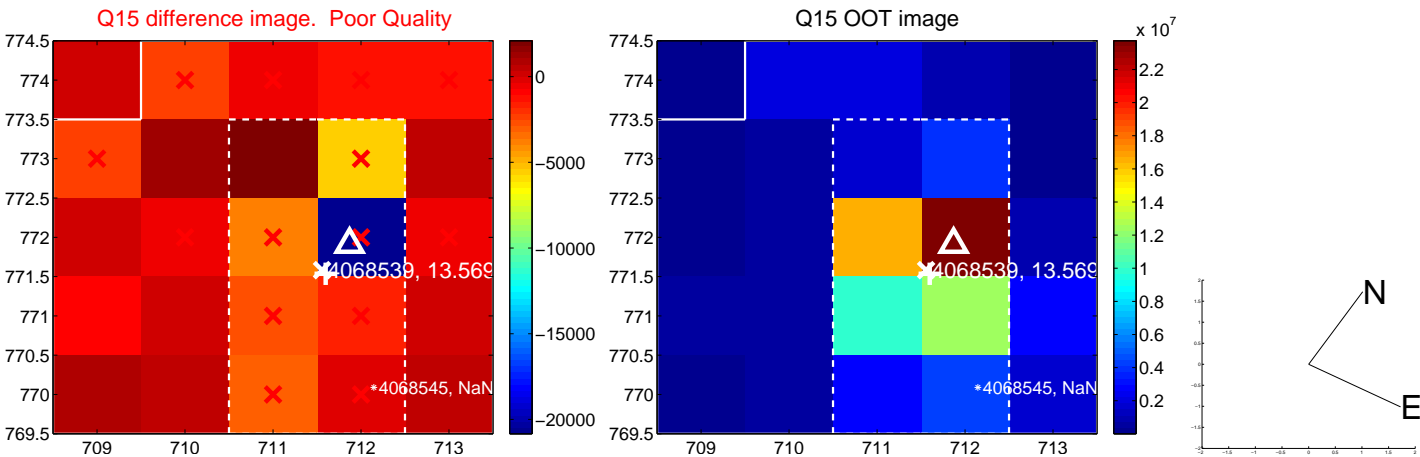
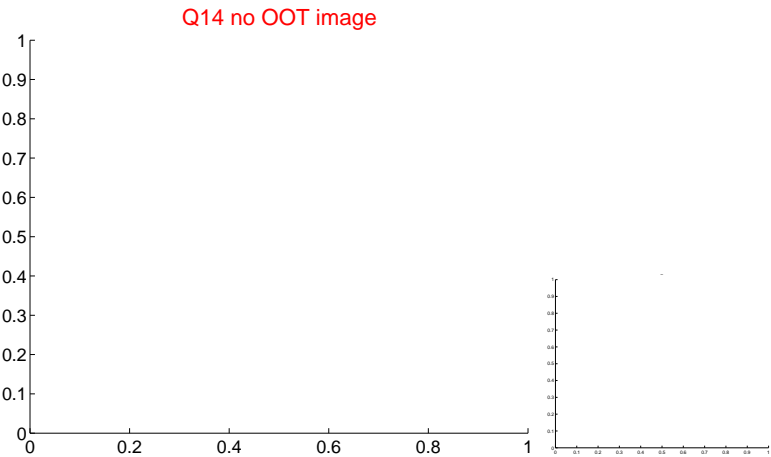
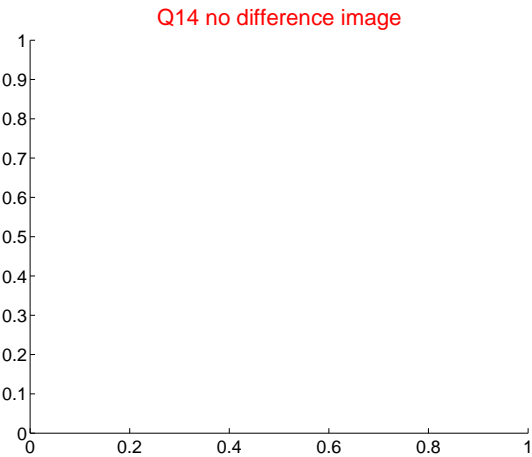
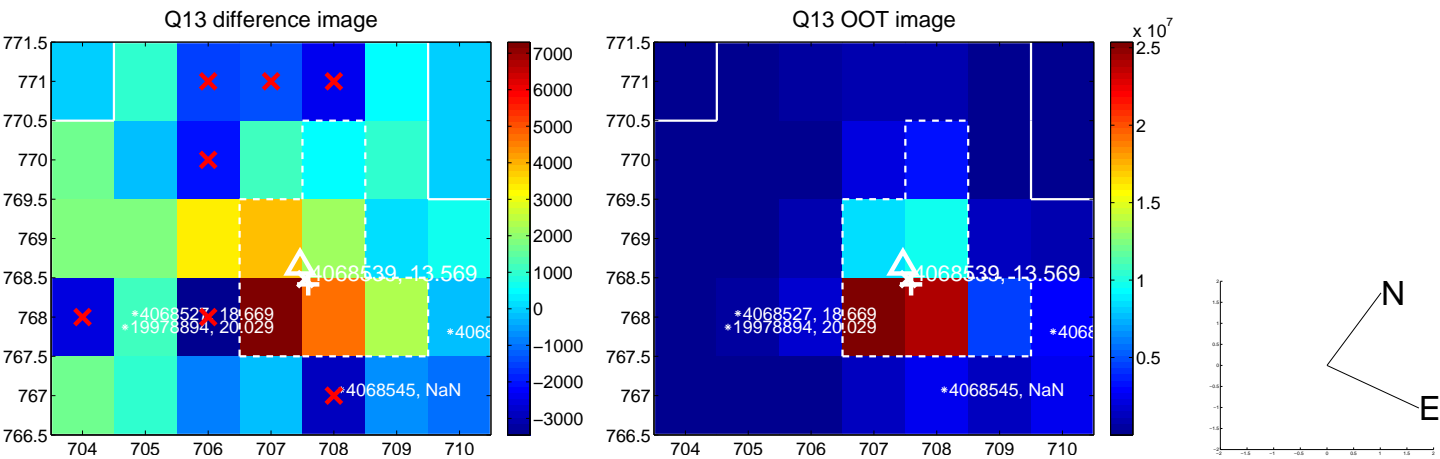




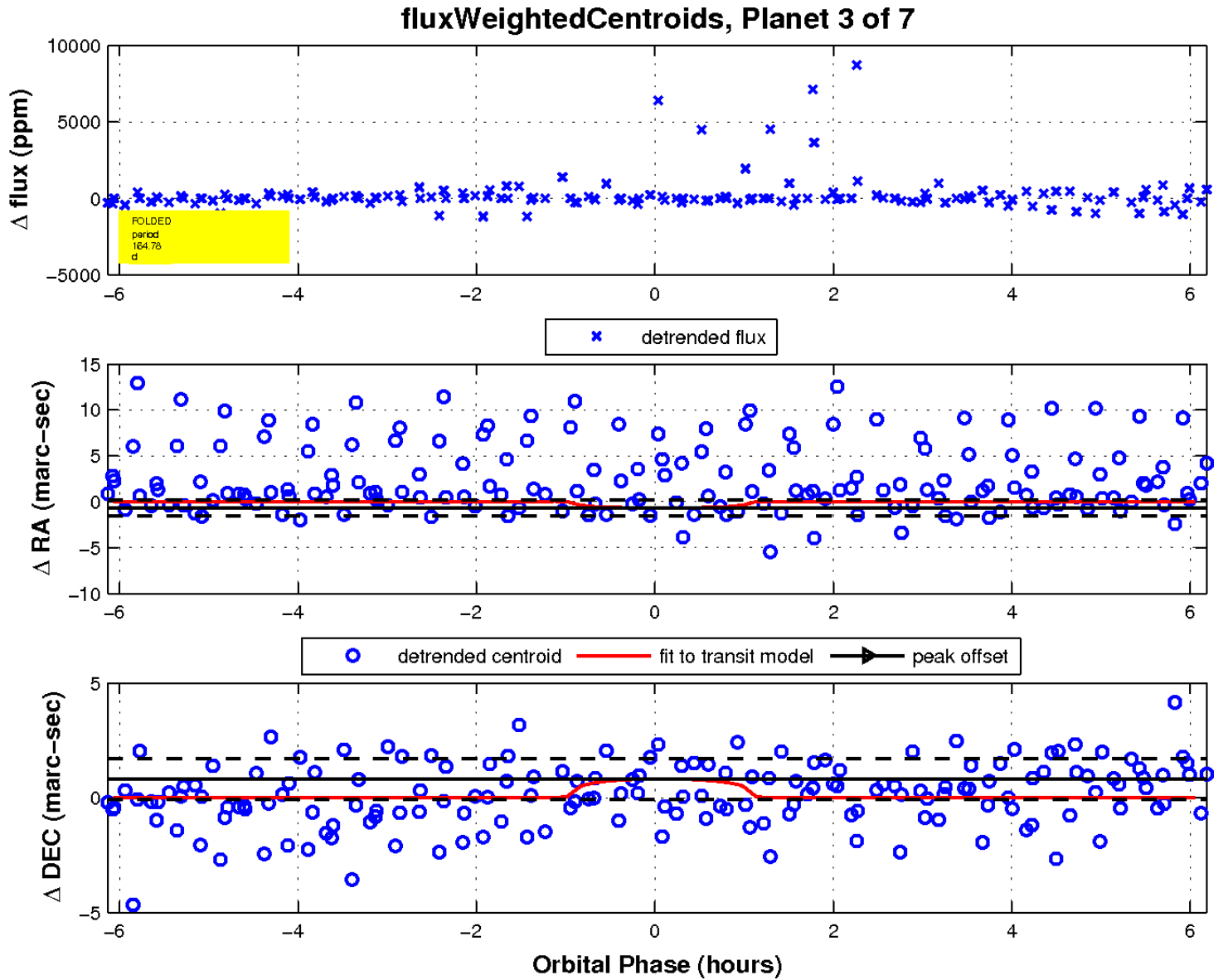
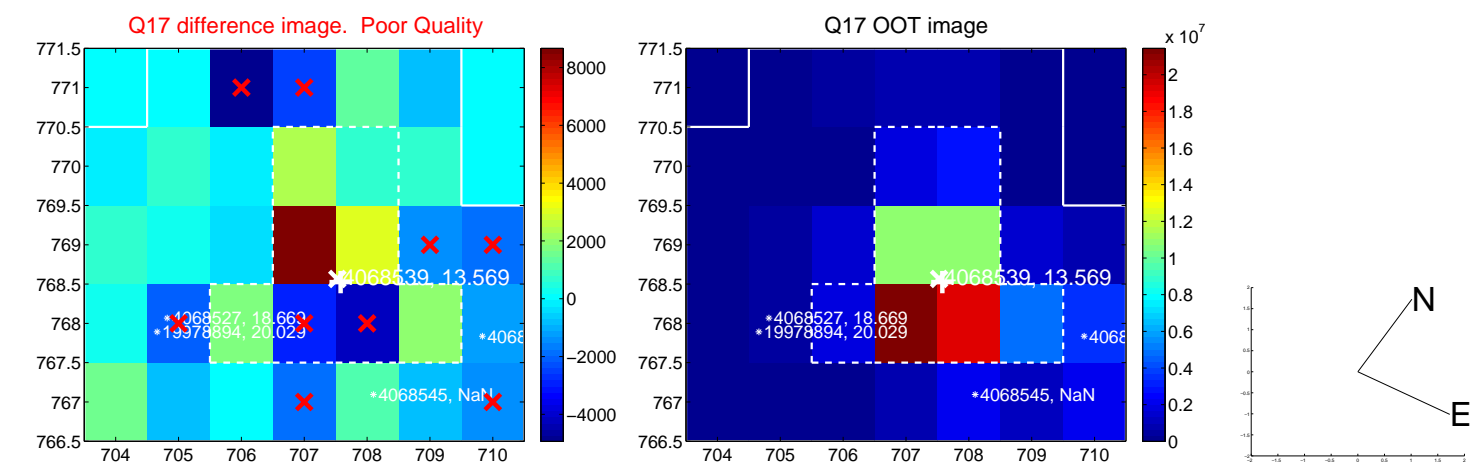
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



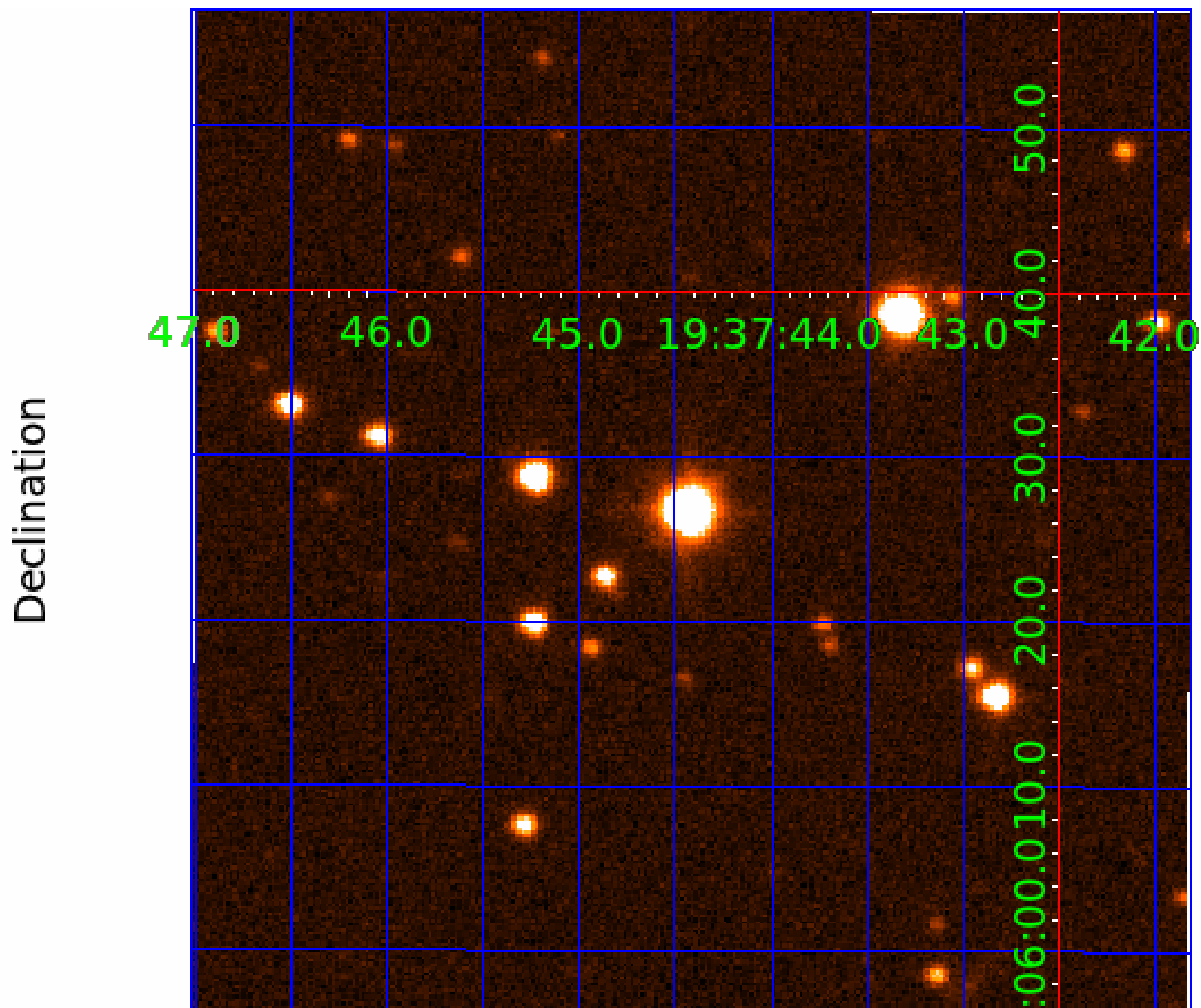
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.



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



UKIRT Image



# KIC 004068539

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004068539-01	OBS	No	329.750808	132.793344	931.3	5.504	17.2	6.7	3.38	4946	10.12	7.69
004068539-02	OBS	No	488.817554	531.587690	1505.9	5.757	16.9	10.2	3.38	4946	13.96	4.55
004068539-03	OBS	No	164.780942	271.640333	641.8	2.066	16.6	6.8	3.38	4946	8.79	19.39
004068539-04	OBS	No	195.135183	156.264736	1317.8	11.313	15.1	8.9	3.38	4946	15.73	15.48
004068539-06	OBS	No	194.178598	185.625789	708.3	5.027	15.4	6.8	3.38	4946	8.86	15.58
004068539-07	OBS	No	660.834953	193.179478	512.9	7.500	14.5	-1.0	3.38	4946	7.43	3.04

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004068539-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
004068539-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
004068539-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_ZUMA_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
004068539-04	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—INCONSISTENT_TRANS
004068539-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—INCONSISTENT_TRANS—CENT_KIC_POS
004068539-07	OBS	FP	0.00	1	0	0	0	LPP_DV—ALL_TRANS_CHASES—CENT_NOFITS

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

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

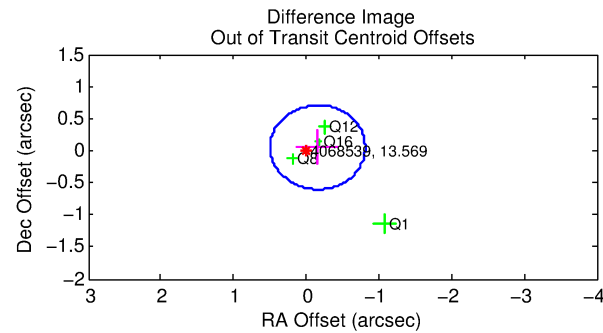
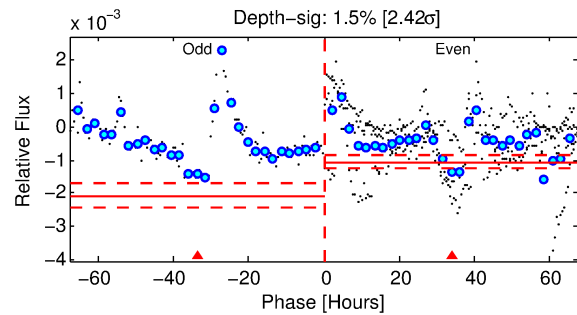
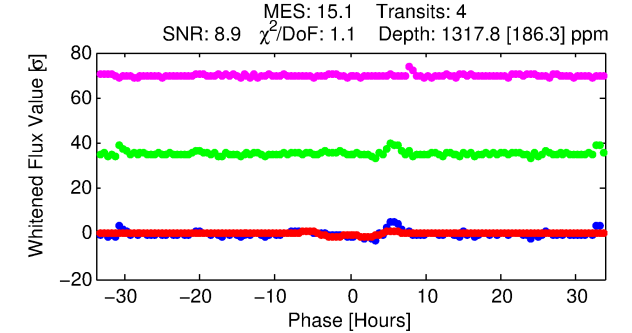
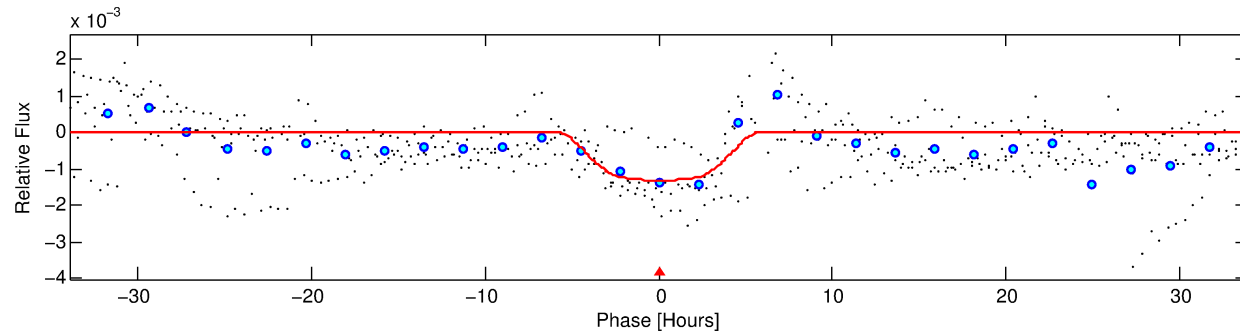
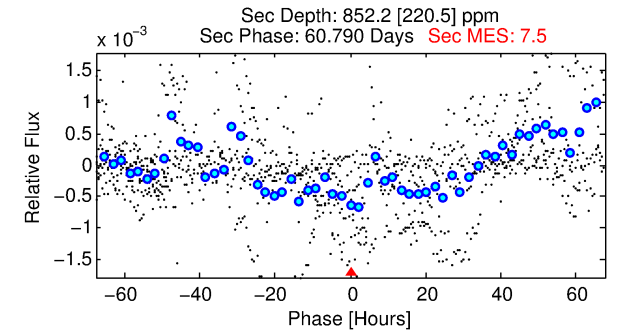
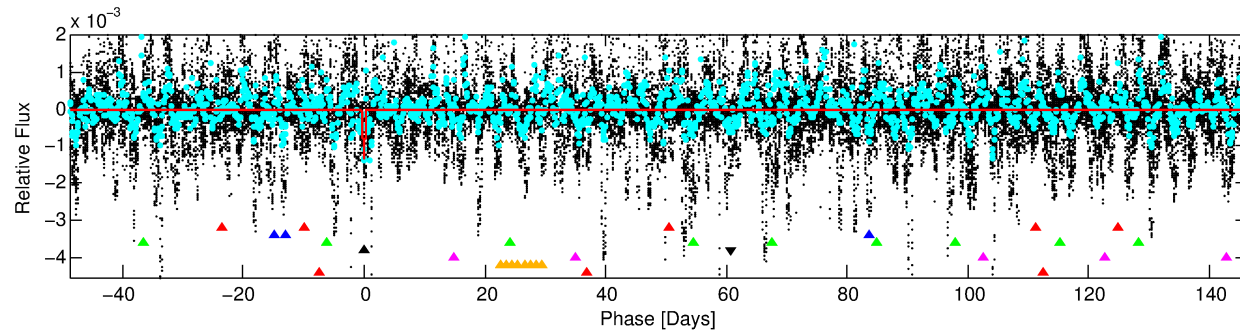
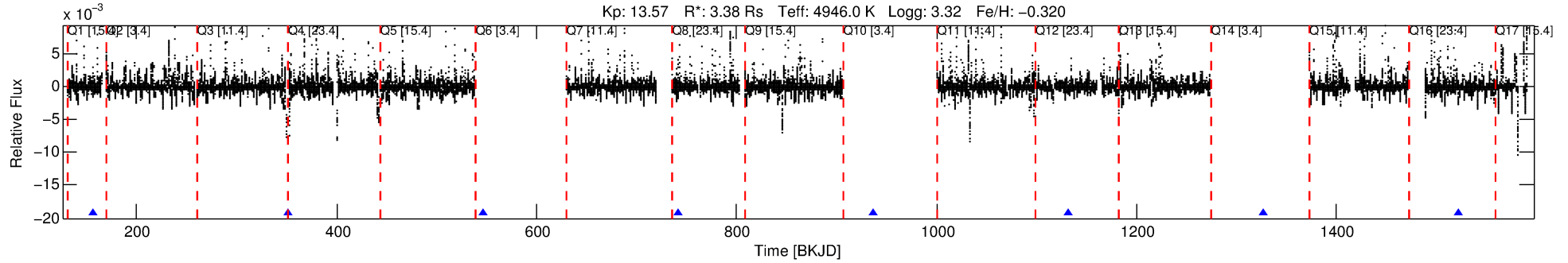
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 004068539-04

No Significant Match Found

# DV One-Page Summary

KIC: 4068539 Candidate: 4 of 7 Period: 195.135 d



## DV Fit Results:

Period = 195.13518 [0.00291] d  
Epoch = 156.2647 [0.0138] BKJD  
Rp/R\* = 0.0427 [0.0034]  
a/R\* = 60.18 [5.79]  
b = 0.94 [0.01]  
Seff = 15.48 [29.91]  
Teq = 506 [244] K  
Rp = 15.73 [11.61] Re  
a = 0.6283 [0.6620] AU  
Ag = 747.75 [1460.65] [0.51 $\sigma$ ]  
Teffp = 4089 [327] K [8.78 $\sigma$ ]

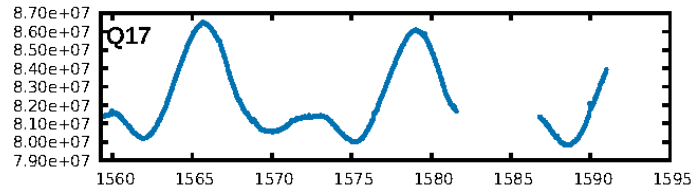
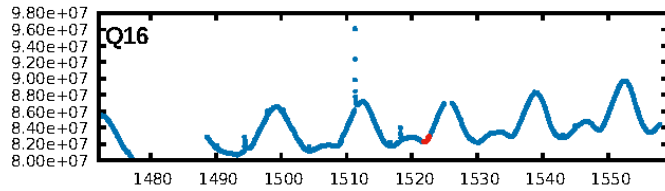
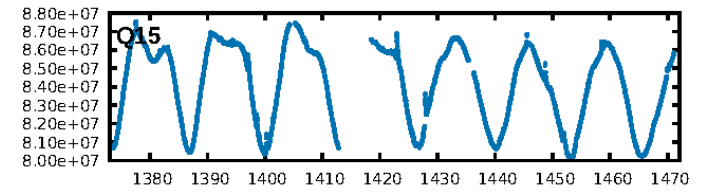
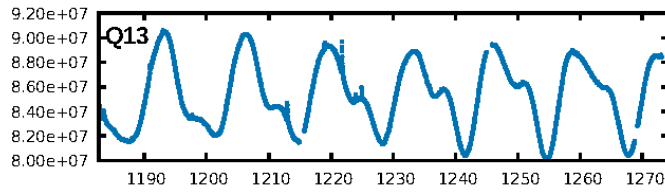
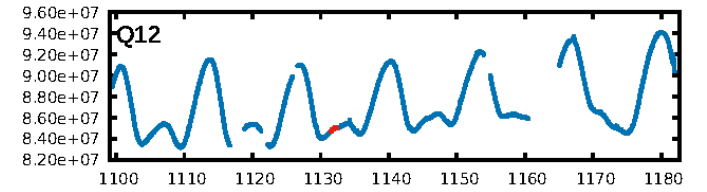
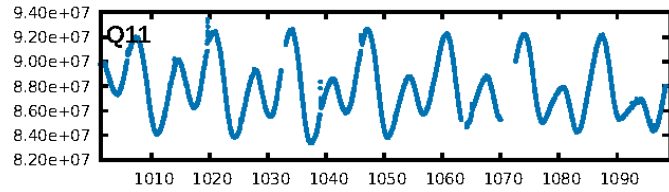
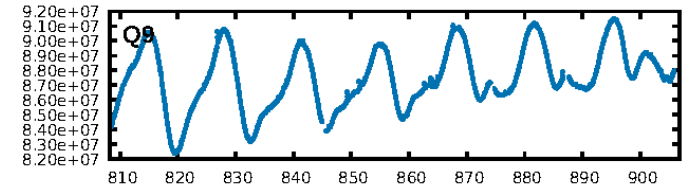
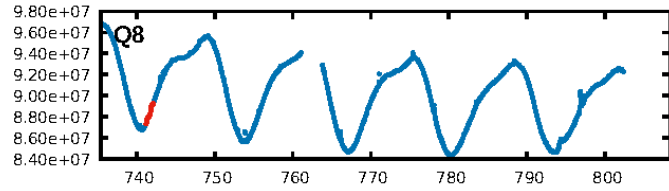
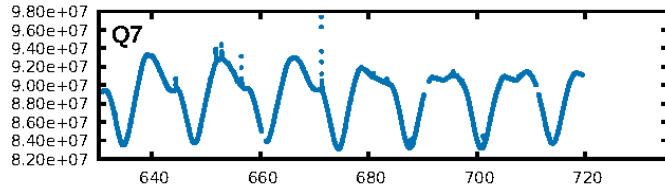
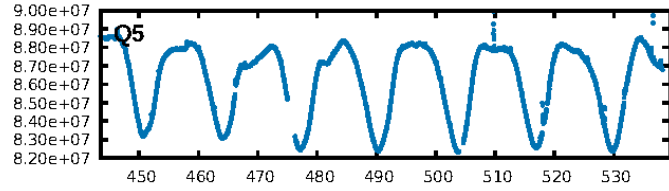
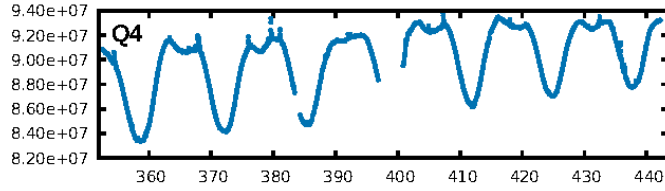
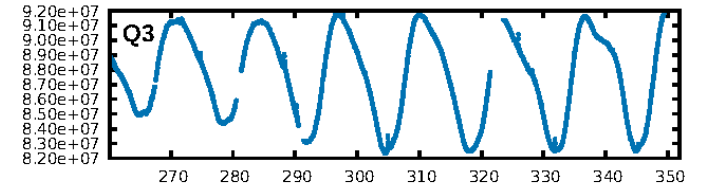
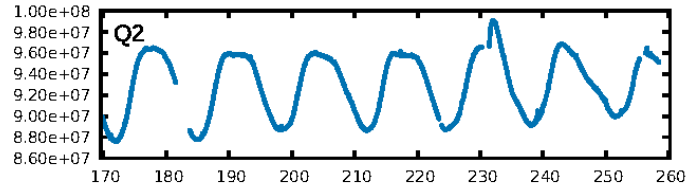
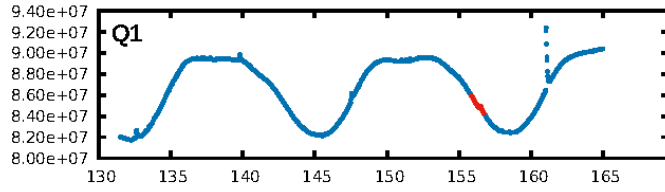
## DV Diagnostic Results:

ShortPeriod-sig: 93.6% [1.85 $\sigma$ ]  
LongPeriod-sig: 100.0% [202.37 $\sigma$ ]  
ModelChiSquare2-sig: 4.7%  
ModelChiSquareGof-sig: 99.7%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: -26.8  
Centroid-sig: 25.7%  
Centroid-so: 0.361 arcsec [0.37 $\sigma$ ]  
OotOffset-rm: 0.165 arcsec [0.75 $\sigma$ ]  
OotOffset-st: 0/0/3/1 [4]  
KicOffset-rm: 0.155 arcsec [0.96 $\sigma$ ]  
KicOffset-st: 0/0/3/1 [4]  
DiffImageQuality-fgm: 0.75 [3/4]  
DiffImageOverlap-fno: 1.00 [4/4]

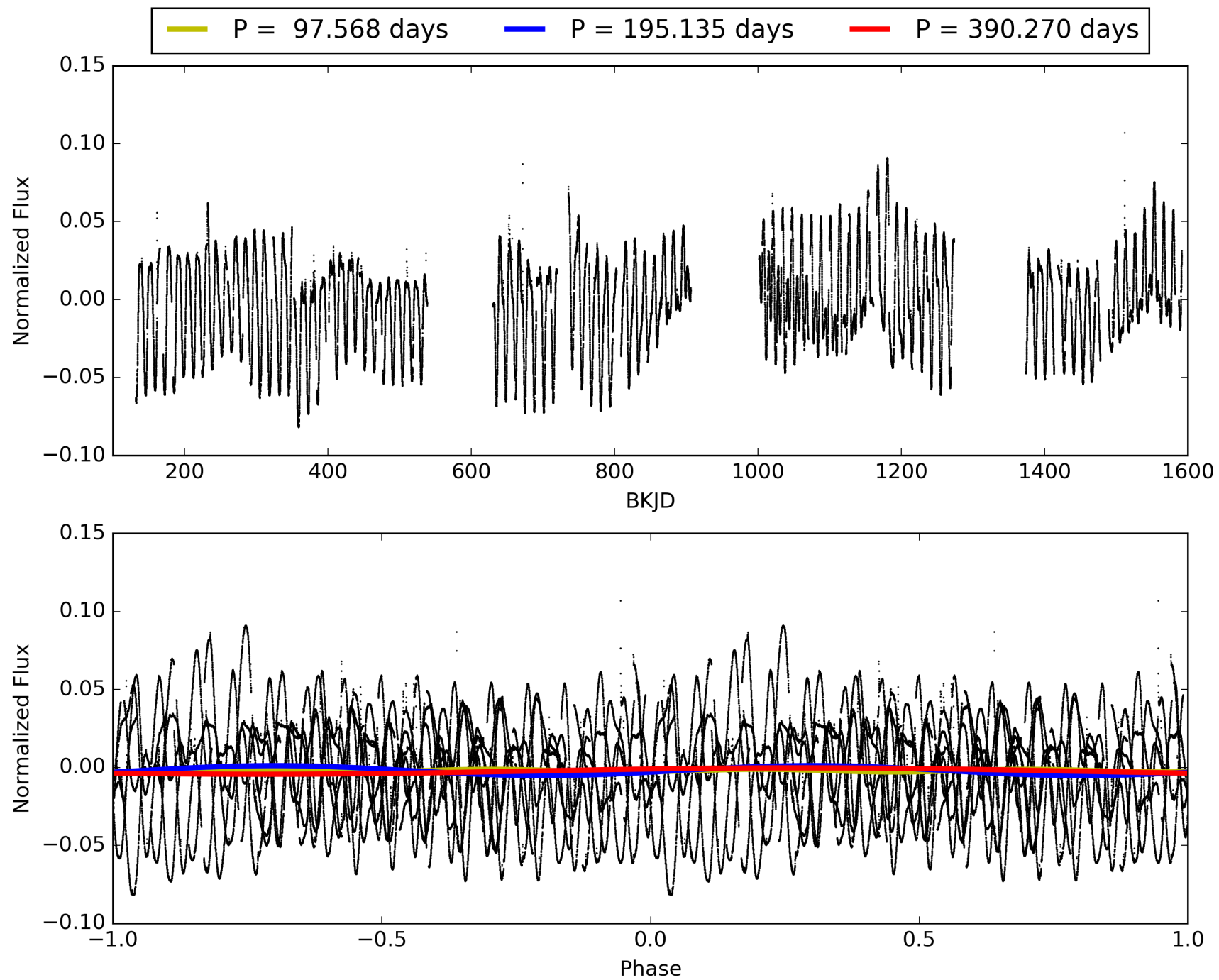
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 21:25:49 Z

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

# TCE 004068539-04, PDC Light Curves



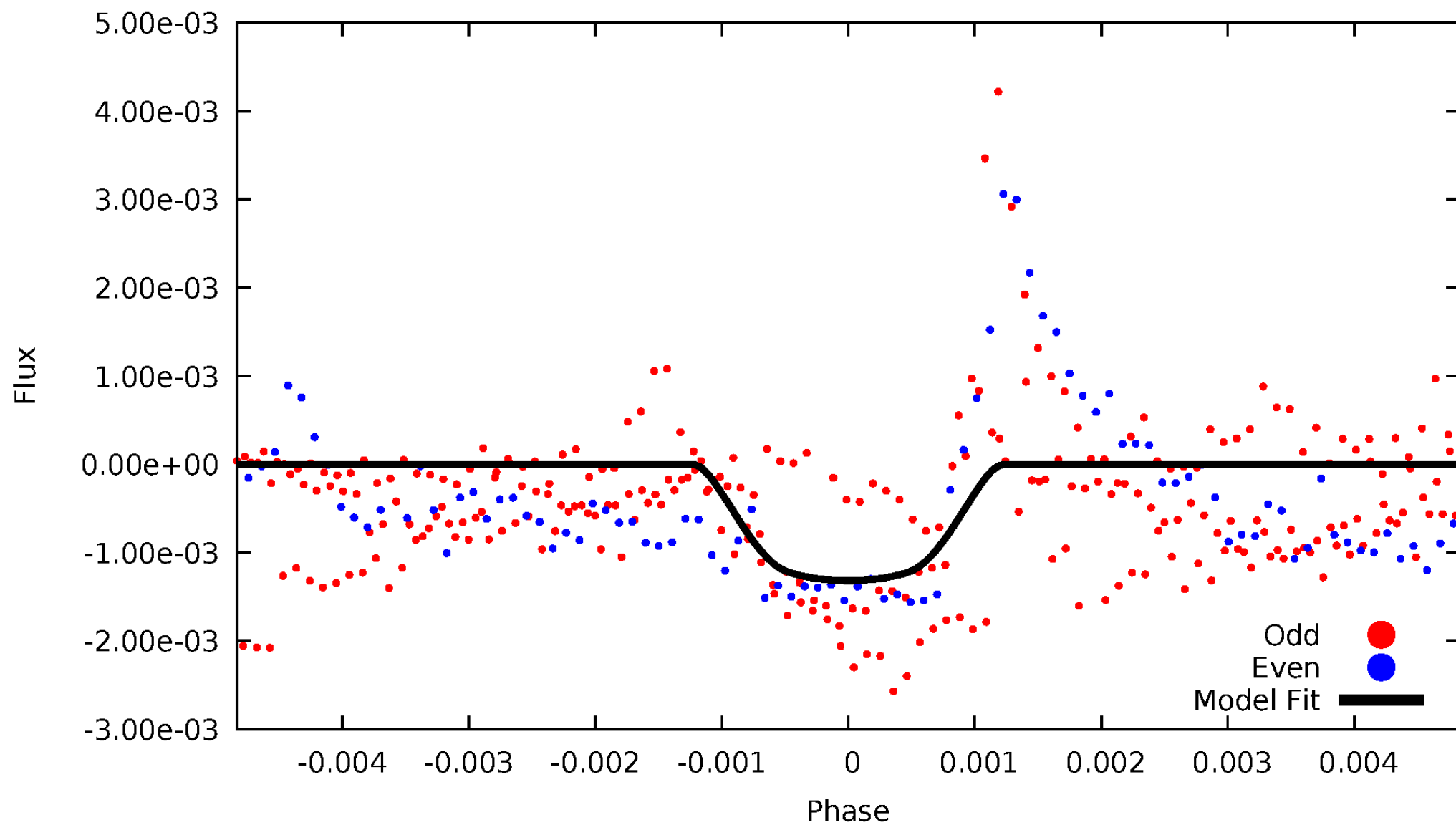
TCE 004068539-04





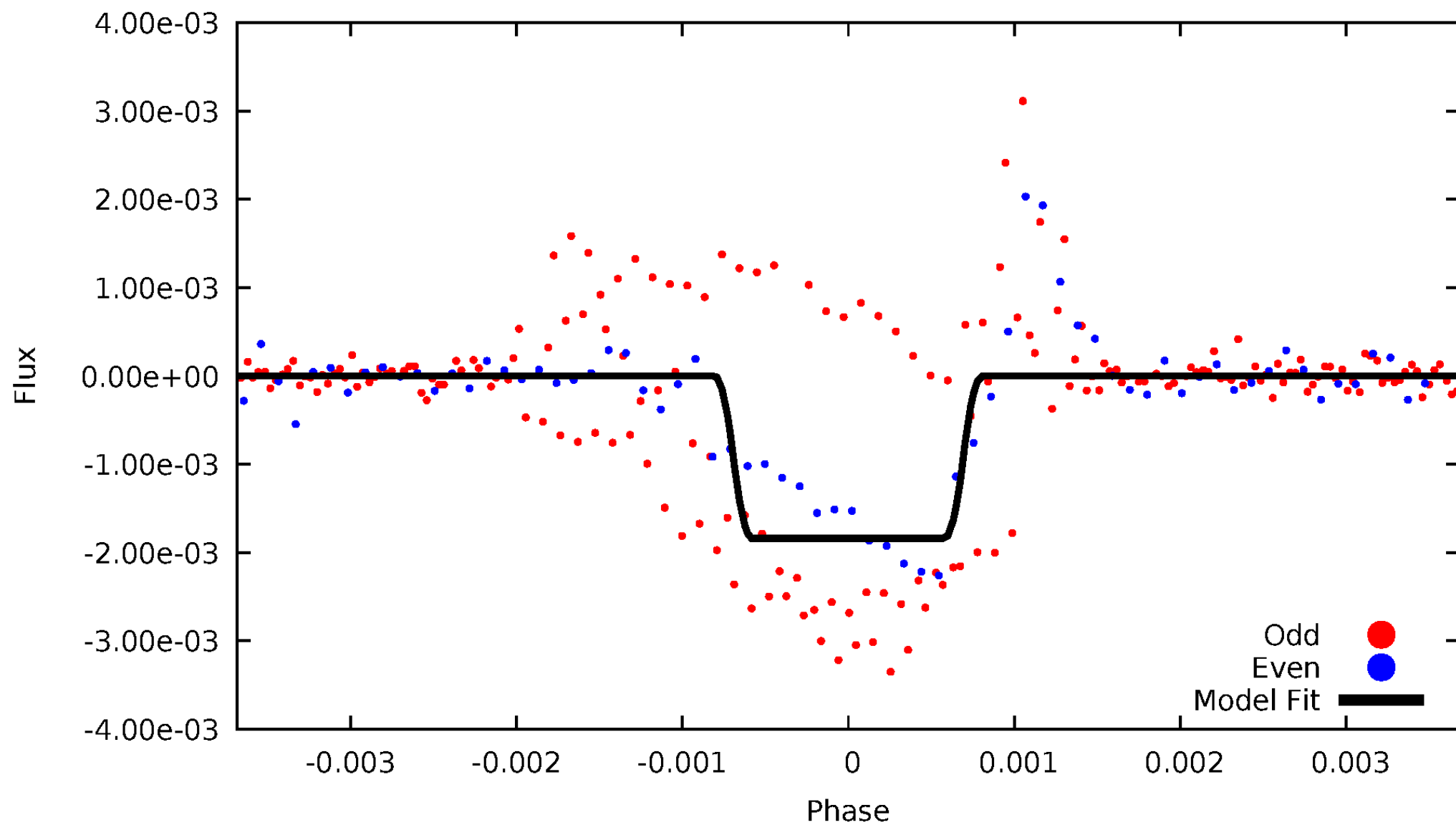
# DV Odd/Even

TCE 004068539-04



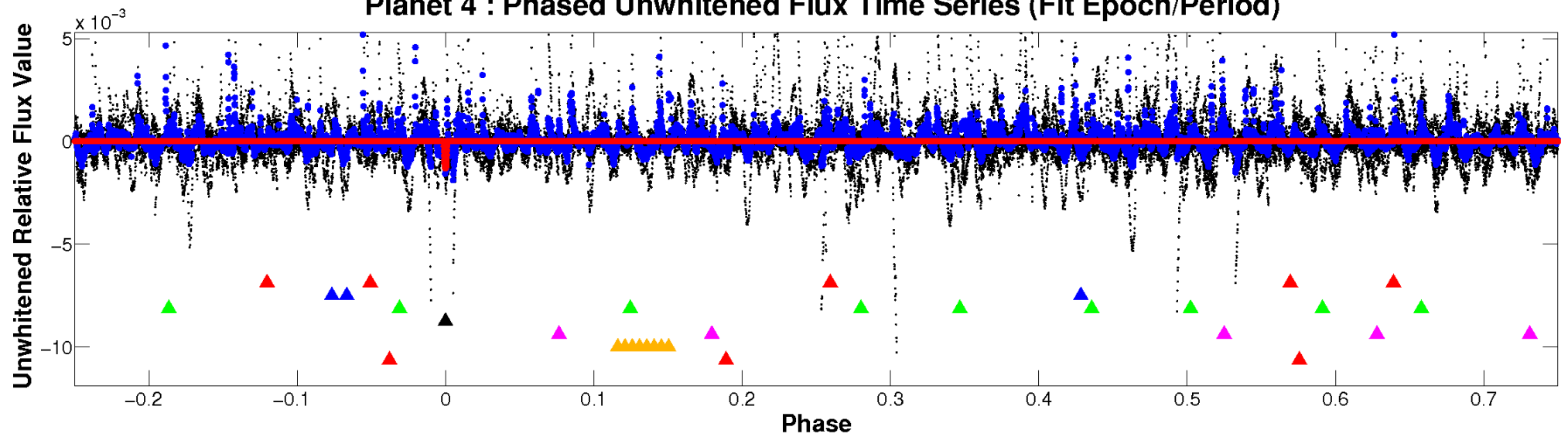
# ALT Odd/Even

TCE 004068539-04

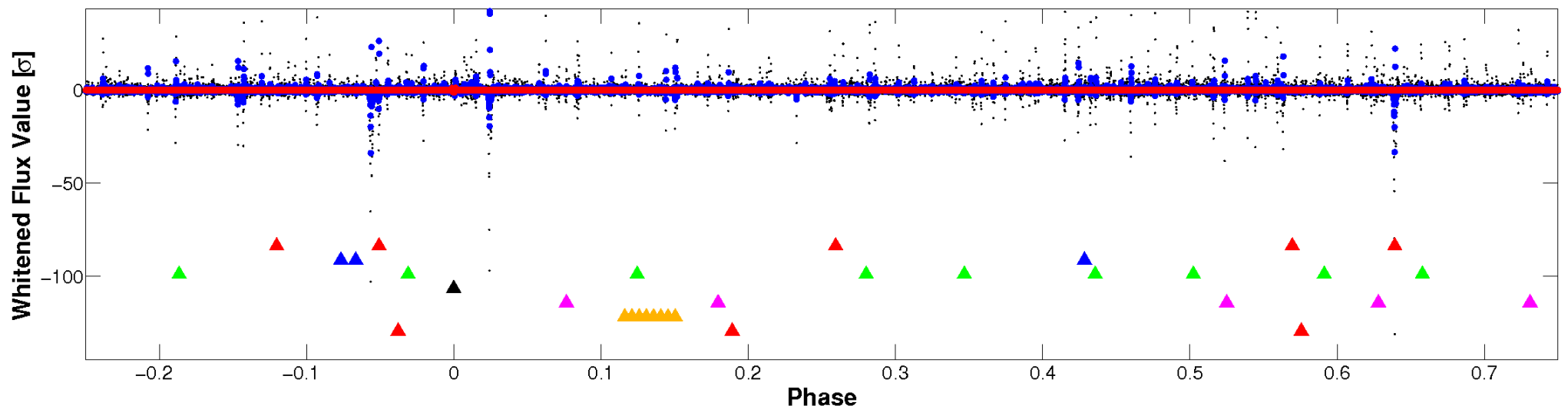


# Non-Whitened Vs. Whitened Light Curve

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



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



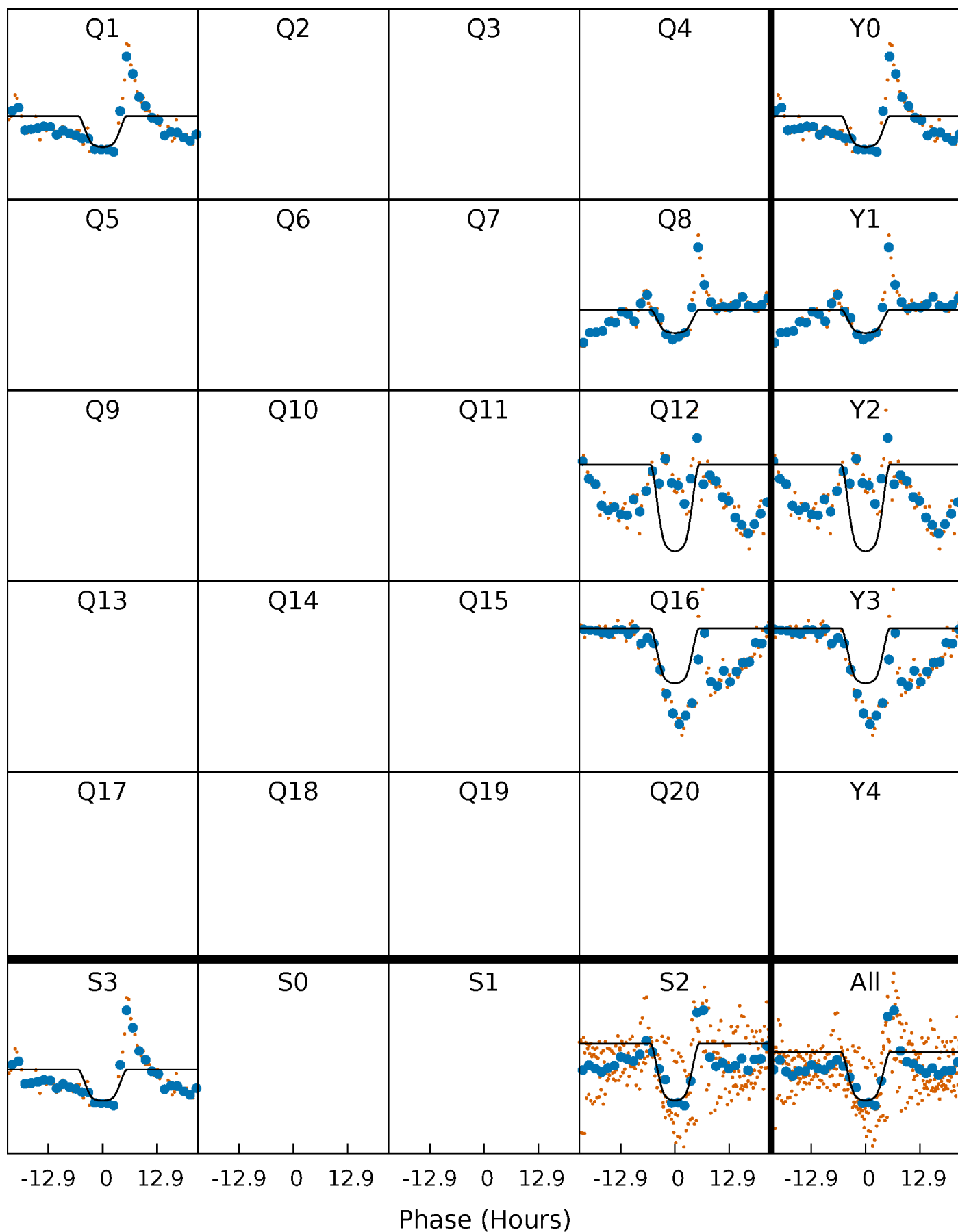
# PDC Quarter-Phased Transit Curves

TCE 004068539-04 P=195.135183 Days  $T_0=156.264736$  (BKJD)



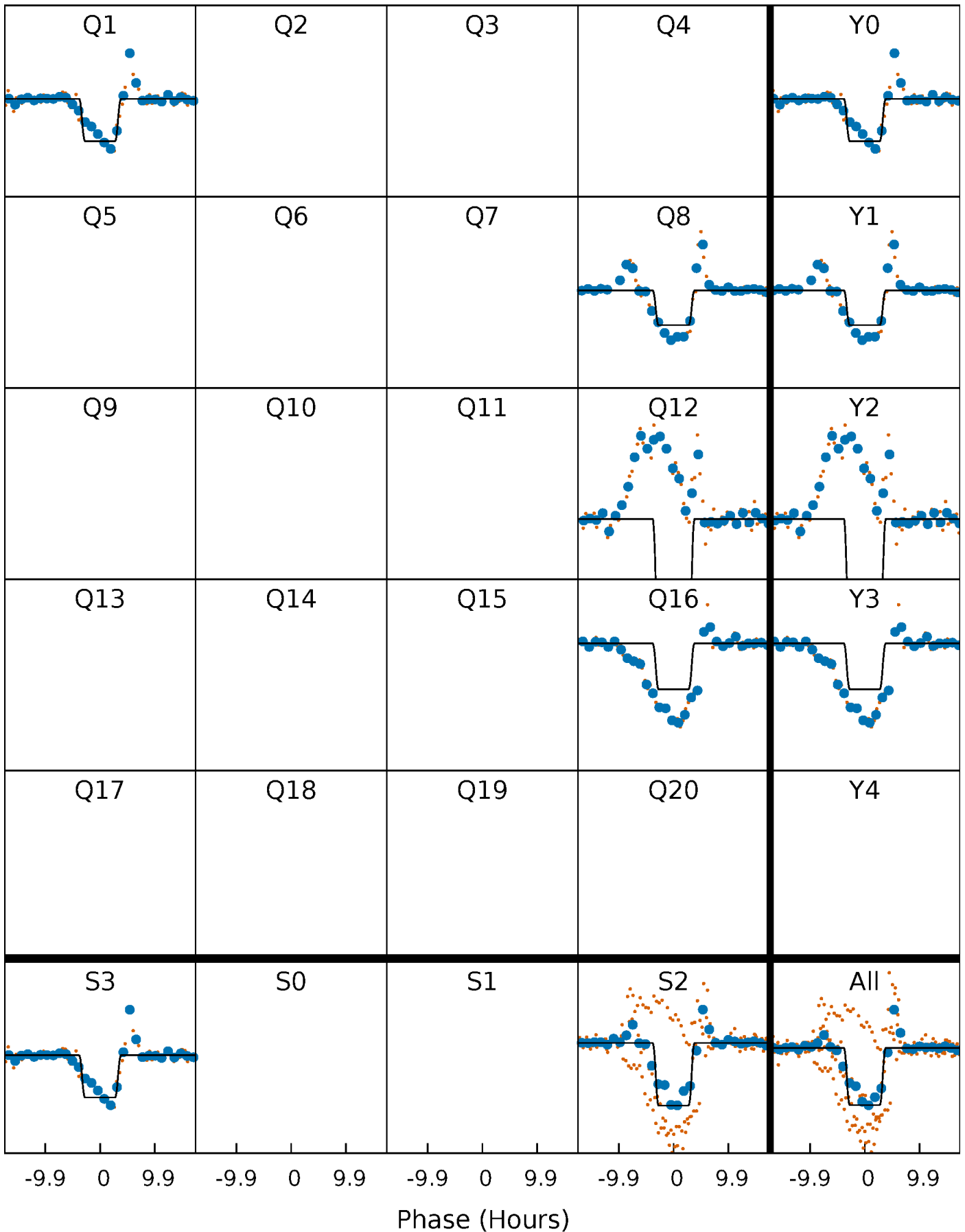
# DV Quarter-Phased Transit Curves

TCE 004068539-04     $P=195.135183$  Days     $T_0=156.264736$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

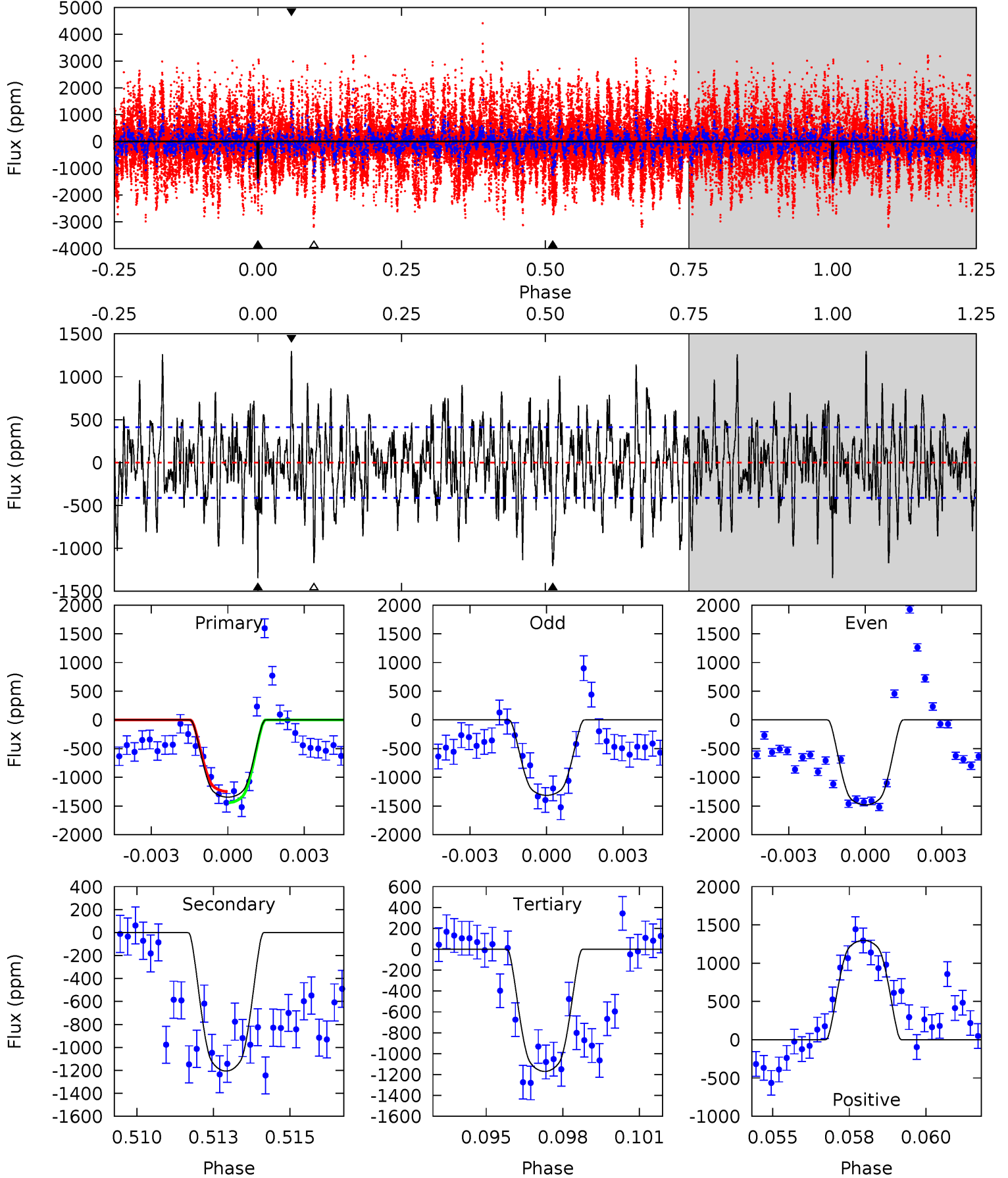
TCE 004068539-04 P=195.133687 Days  $T_0=156.295345$  (BKJD)



# DV Model-Shift Uniqueness Test

004068539-04, P = 195.135183 Days, E = 156.264736 Days

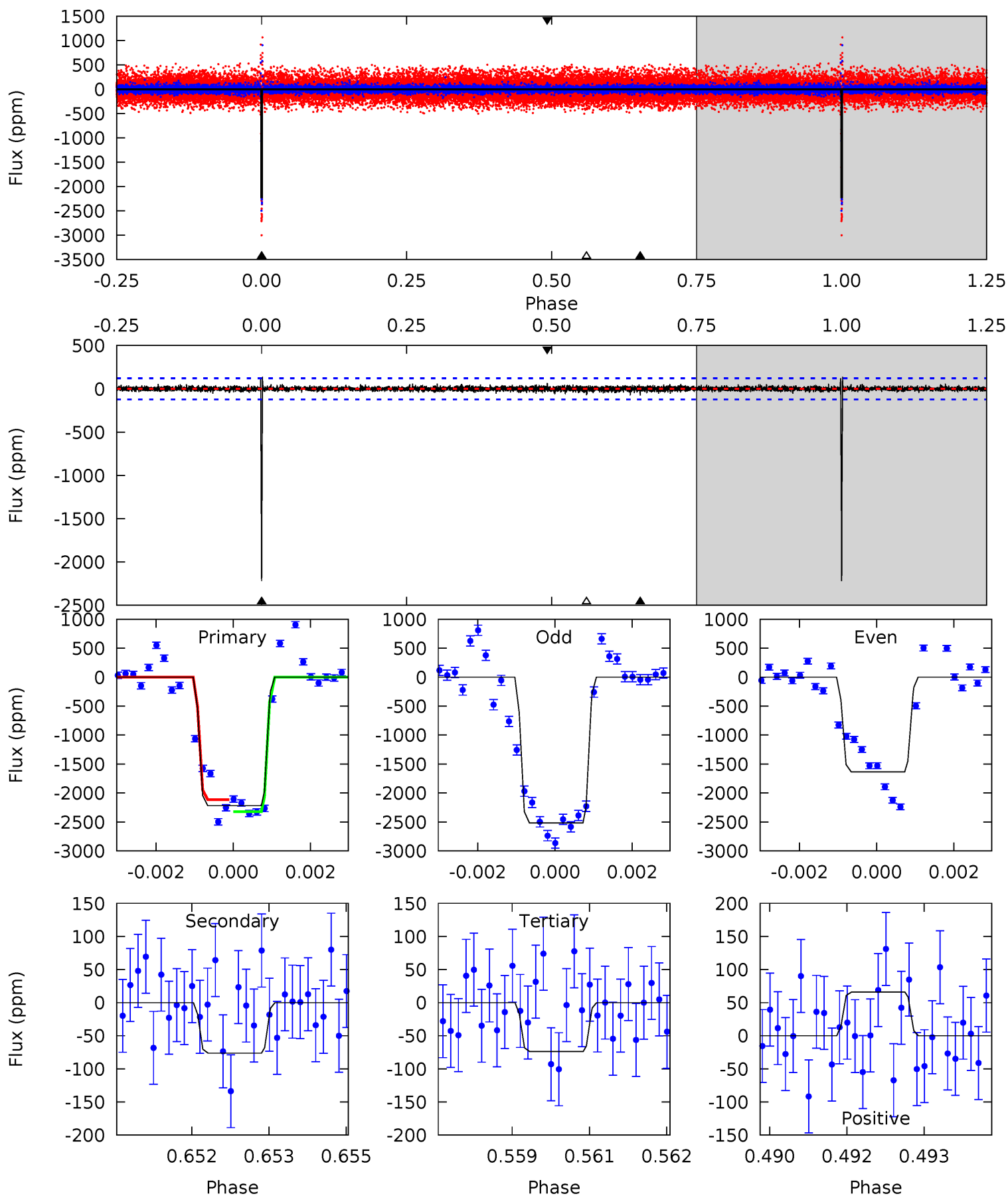
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
17.3	15.5	15.0	16.7	5.29	3.02	4.77	2.26	0.63	0.46	-1.17	0.68	0.92	0.49	1.26



# Alt Model-Shift Uniqueness Test

004068539-04, P = 195.133687 Days, E = 156.295345 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
97.6	3.36	3.25	2.90	5.37	3.16	0.65	94.4	94.7	0.10	0.46	20.6	0.77	0.06	0





### Stellar Parameters For KIC 004068539

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$4946^{+123}_{-123}$	$3.320^{+1.216}_{-0.304}$	$-0.320^{+0.300}_{-0.250}$	$3.376^{+1.800}_{-2.476}$	$0.868^{+0.264}_{-0.216}$	$0.032^{+1.760}_{-0.019}$
	+2%/-2%	+37%/-9%	+94%/-78%	+53%/-73%	+30%/-25%	+5542%/-60%
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 004068539-04 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-1206 \pm 78$	$14.34^{+6.04}_{-5.79}$	$679^{+111}_{-155}$	$4548^{+195}_{-175}$	$1273^{+2200}_{-597}$
Alt.	$-76 \pm 23$	$14.84^{+5.51}_{-6.23}$	$682^{+113}_{-163}$	$2895^{+144}_{-153}$	$79^{+140}_{-42}$

$T_{\text{max}}$  = 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

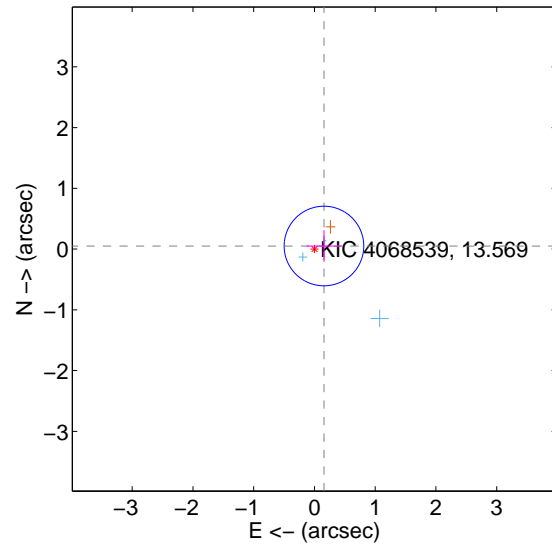
Supplemental centroid analysis for 004068539-04. Kepler magnitude: 13.57. Transit SNR 8.89

There are 3 quarters with good PRF difference image offsets

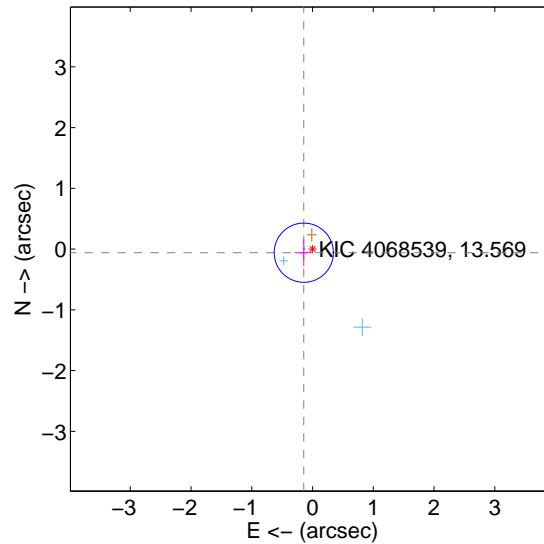
The direct PRF centroid is offset from the target star catalog position by about 0.33 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.165 \pm 0.218$	0.75	$-0.157 \pm 0.290$	$0.051 \pm 0.259$
PRF-fit source offset from KIC position	$0.155 \pm 0.162$	0.96	$0.143 \pm 0.151$	$-0.059 \pm 0.217$
photometric centroid source offset	$0.36 \pm 0.99$	0.37	$-0.31 \pm 1.10$	$-0.18 \pm 0.49$

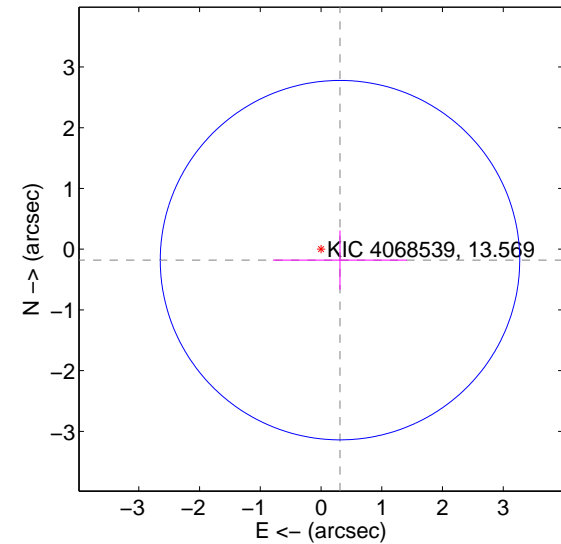
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

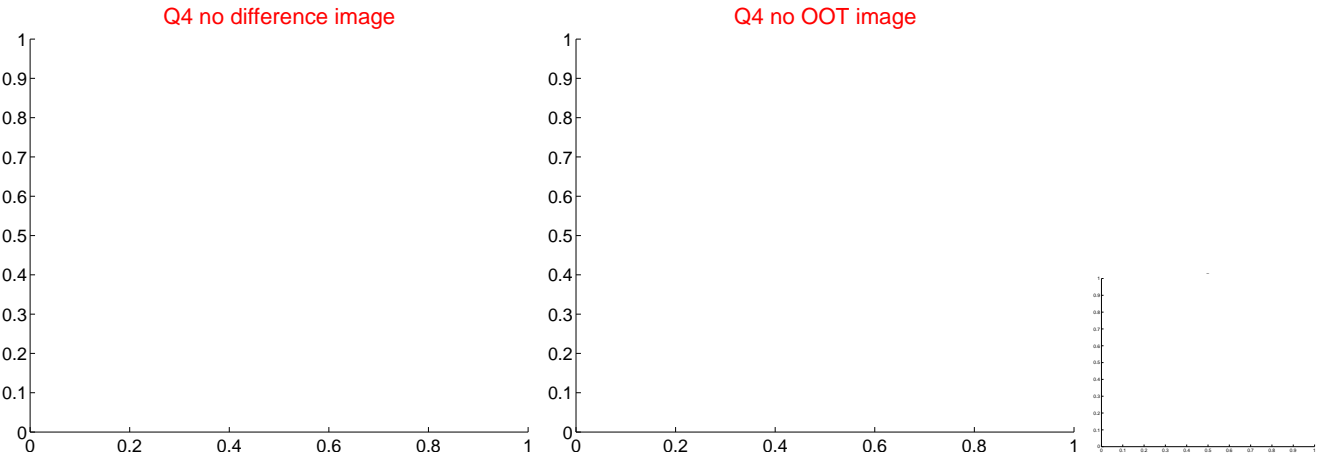
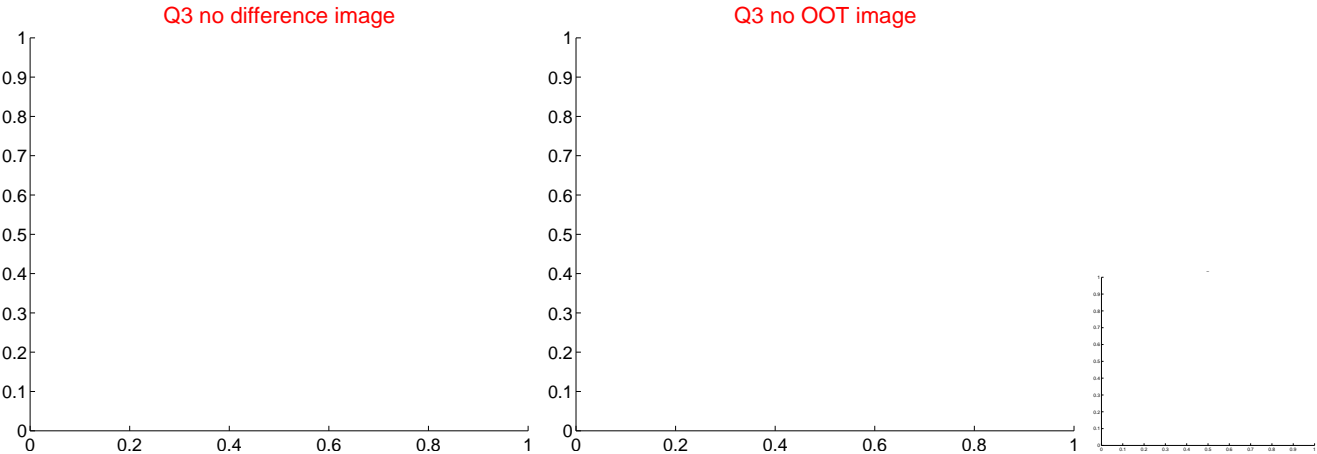
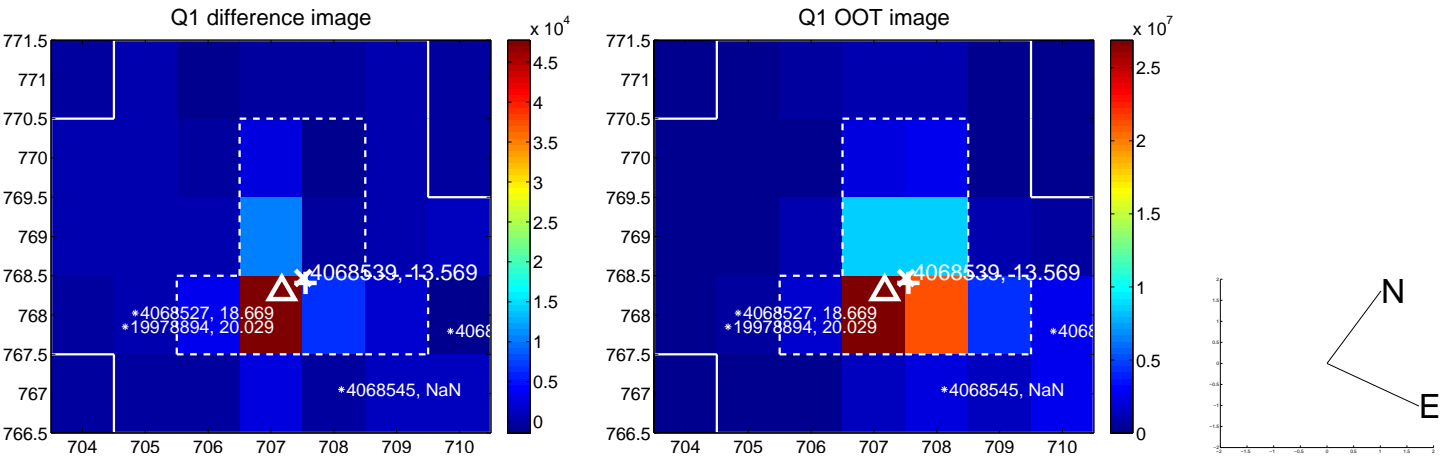


offset from photometric centroids

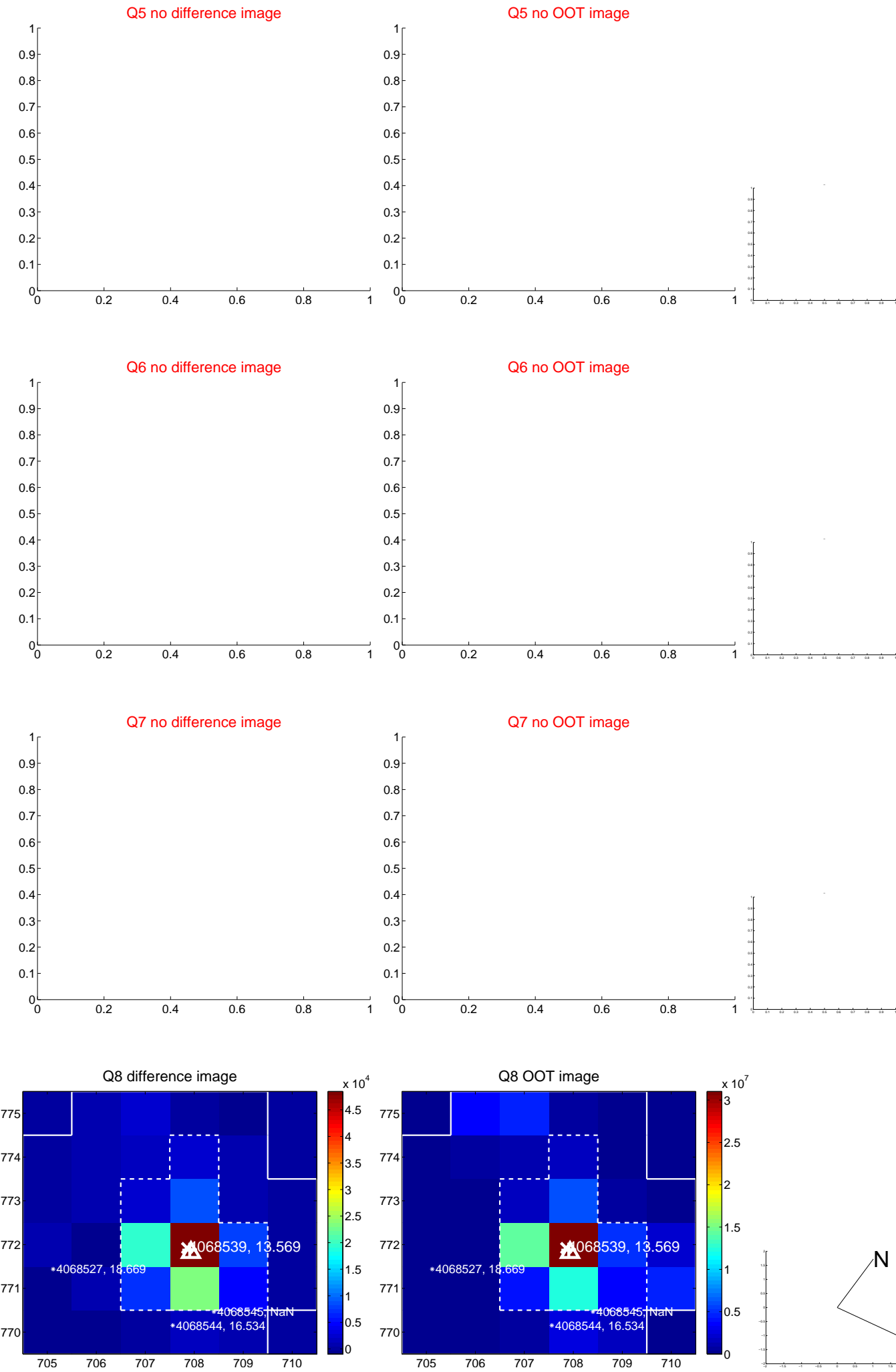


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

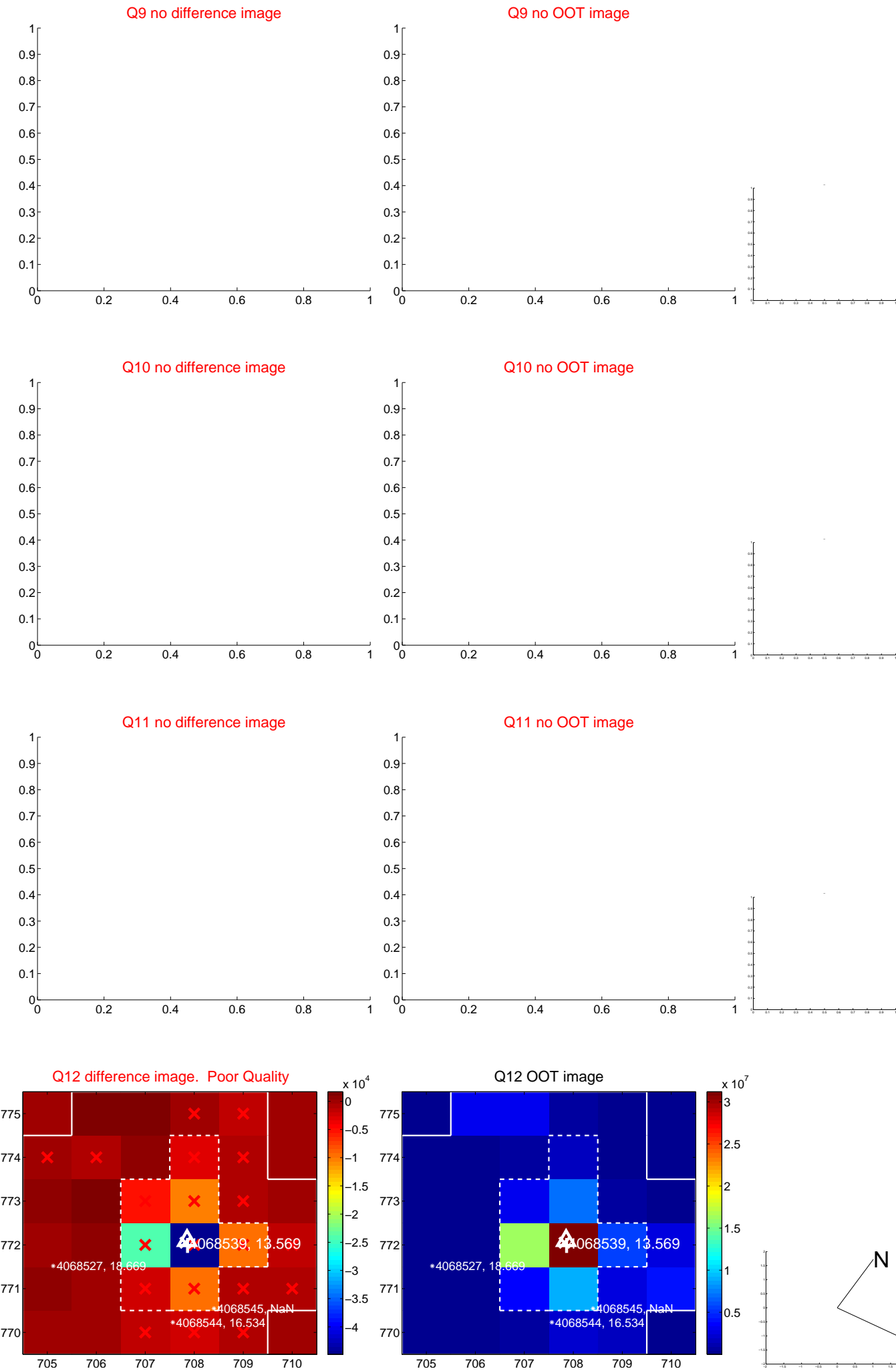
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



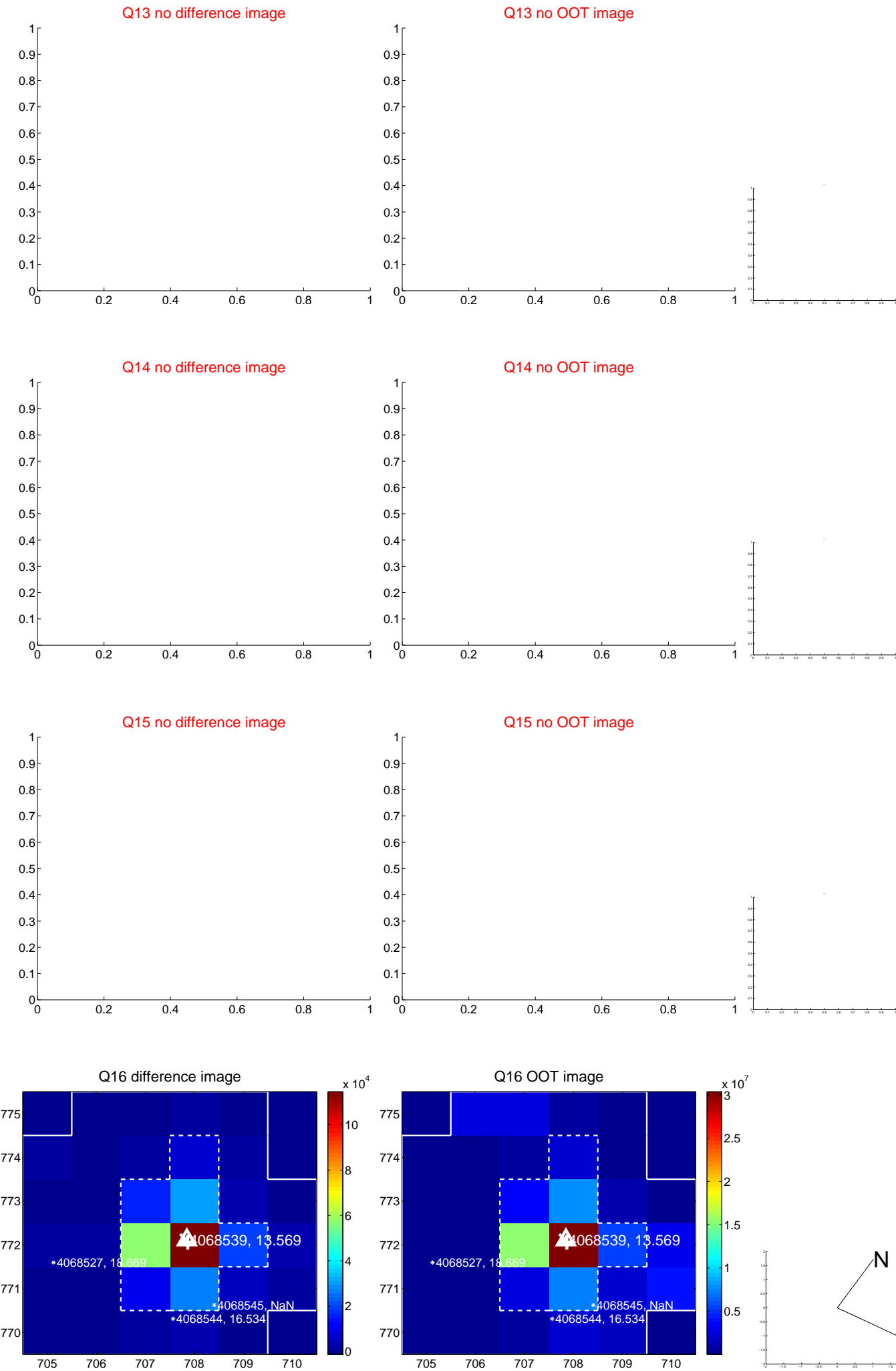
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



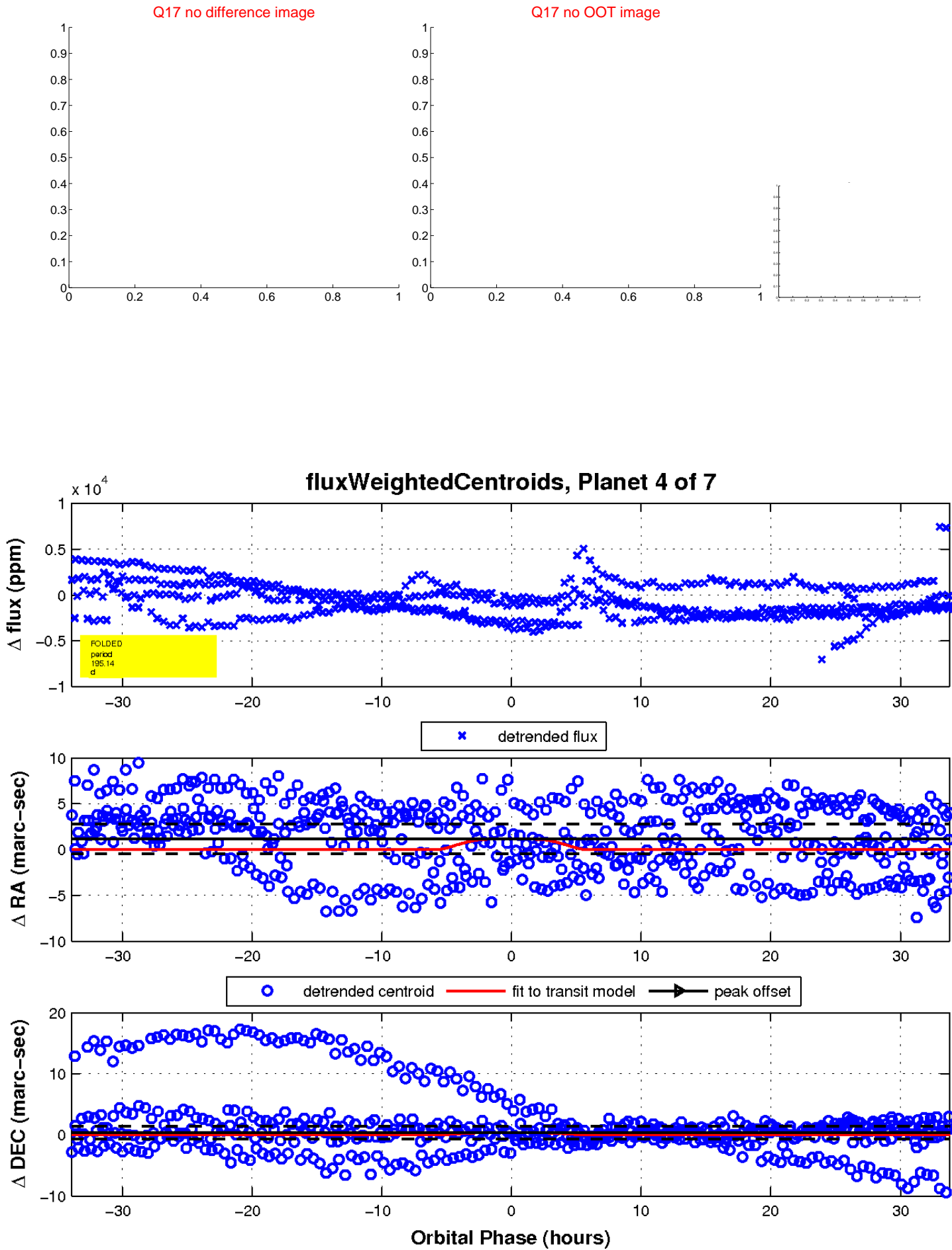
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



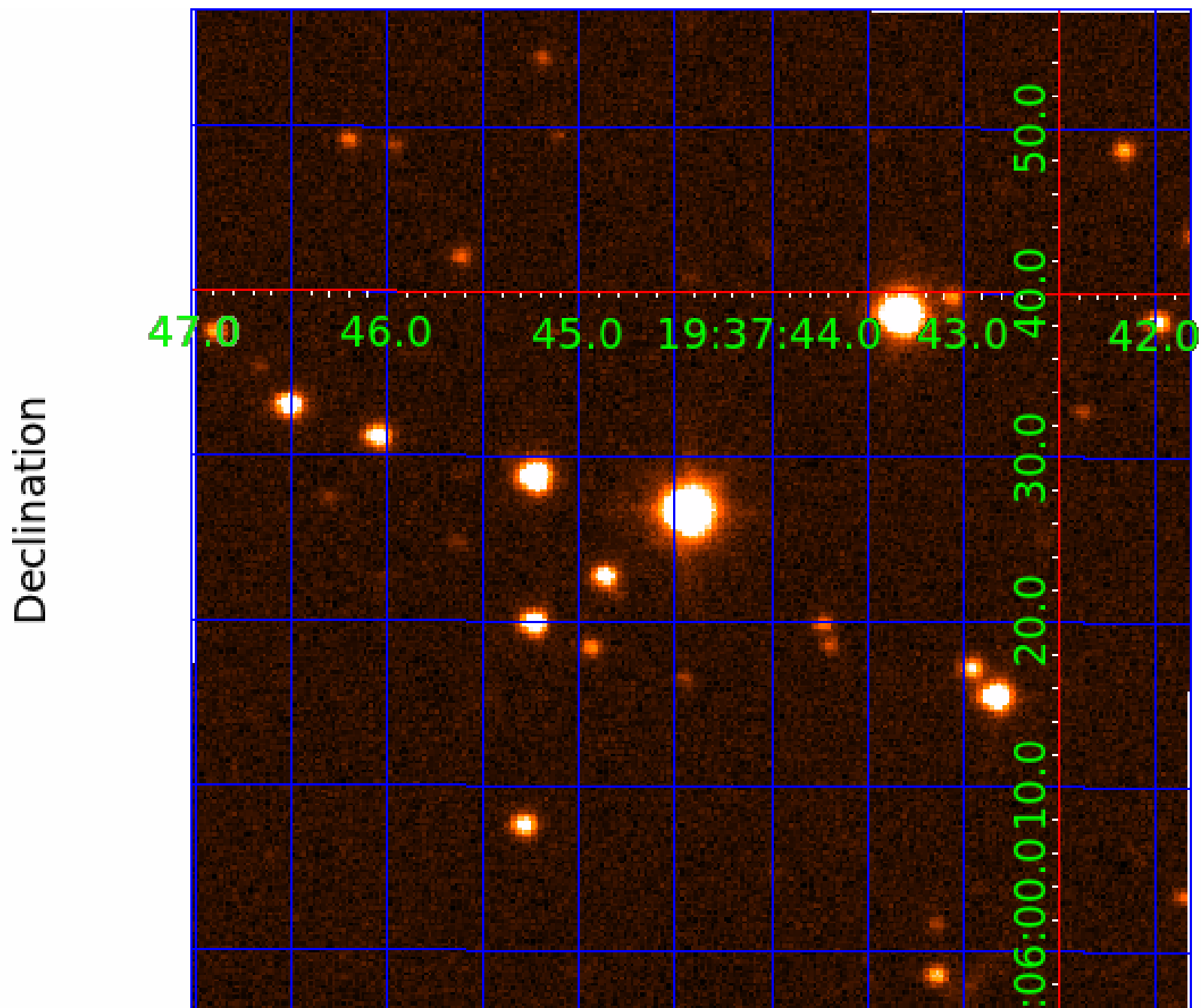
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image





# KIC 004068539

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004068539-01	OBS	No	329.750808	132.793344	931.3	5.504	17.2	6.7	3.38	4946	10.12	7.69
004068539-02	OBS	No	488.817554	531.587690	1505.9	5.757	16.9	10.2	3.38	4946	13.96	4.55
004068539-03	OBS	No	164.780942	271.640333	641.8	2.066	16.6	6.8	3.38	4946	8.79	19.39
004068539-04	OBS	No	195.135183	156.264736	1317.8	11.313	15.1	8.9	3.38	4946	15.73	15.48
004068539-06	OBS	No	194.178598	185.625789	708.3	5.027	15.4	6.8	3.38	4946	8.86	15.58
004068539-07	OBS	No	660.834953	193.179478	512.9	7.500	14.5	-1.0	3.38	4946	7.43	3.04

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004068539-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
004068539-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
004068539-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_ZUMA_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
004068539-04	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—INCONSISTENT_TRANS
004068539-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—INCONSISTENT_TRANS—CENT_KIC_POS
004068539-07	OBS	FP	0.00	1	0	0	0	LPP_DV—ALL_TRANS_CHASES—CENT_NOFITS

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

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

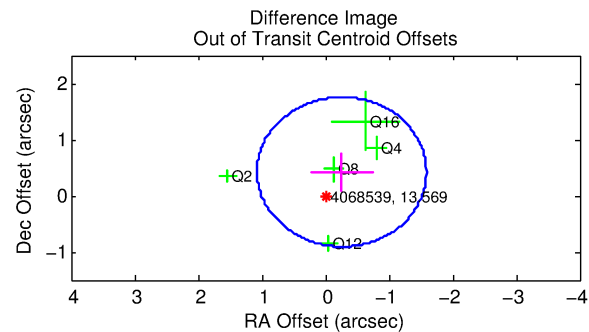
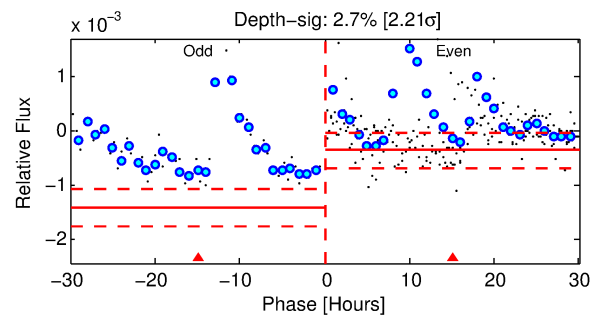
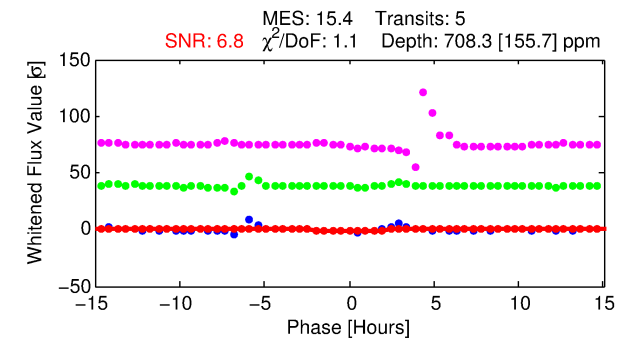
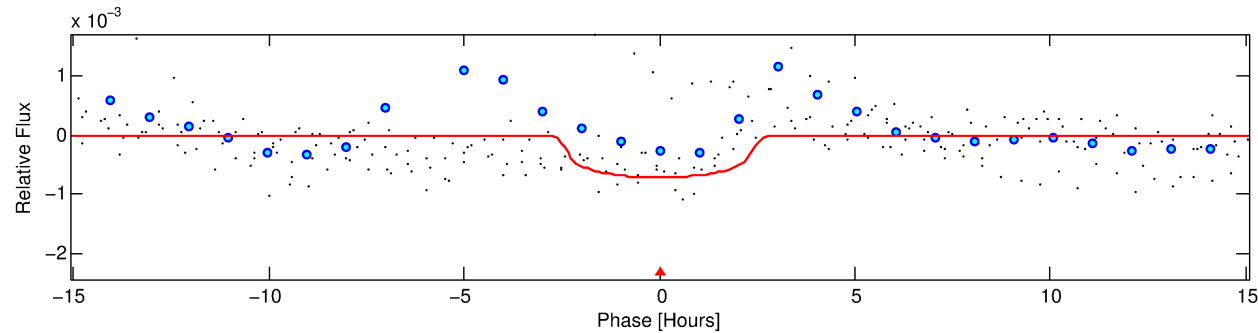
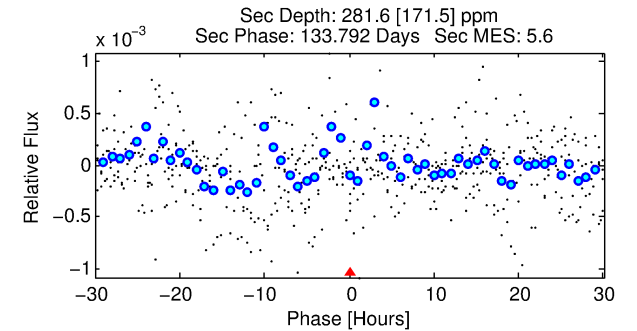
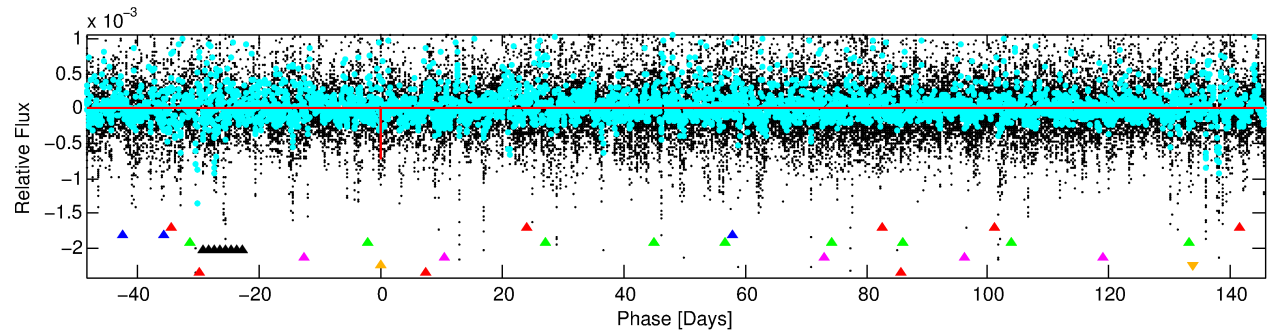
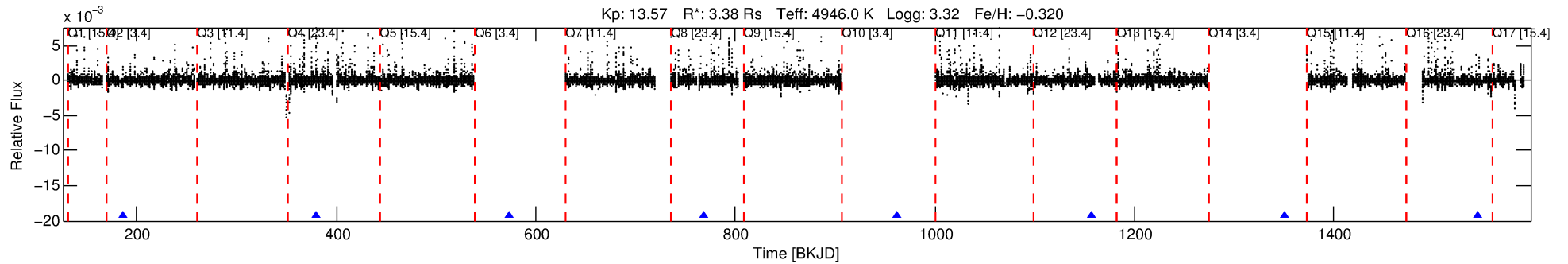
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 004068539-06

No Significant Match Found

# DV One-Page Summary

KIC: 4068539 Candidate: 6 of 7 Period: 194.179 d



## DV Fit Results:

Period = 194.17860 [0.00233] d  
Epoch = 185.6258 [0.0109] BKJD  
Rp/R\* = 0.0241 [0.0425]  
a/R\* = 285.62 [1791.42]  
b = 0.33 [16.88]  
Seff = 15.58 [30.10]  
Teff = 507 [245] K  
Rp = 8.86 [16.94] Re  
a = 0.6263 [0.6599] AU  
Ag = 773.60 [3147.30] [0.25σ]  
Teffp = 4131 [3700] K [0.98σ]

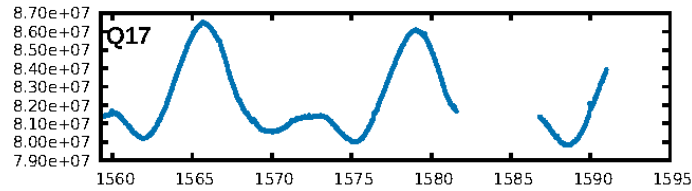
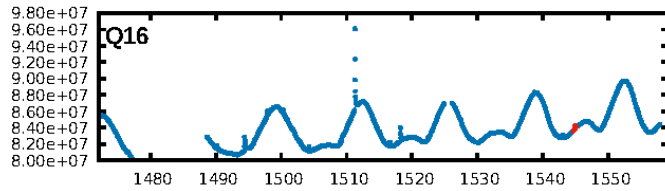
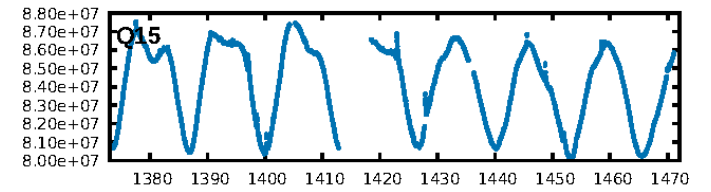
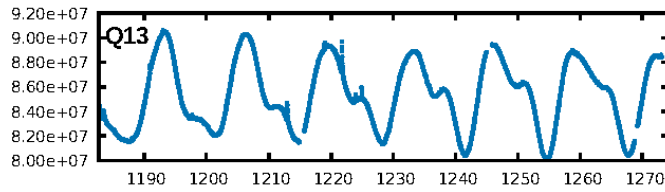
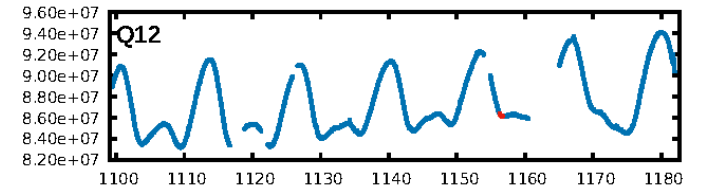
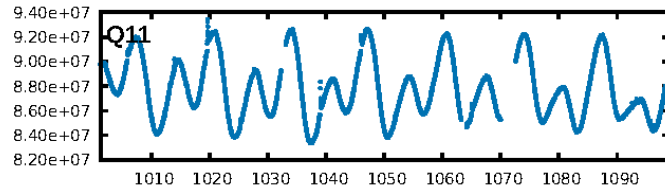
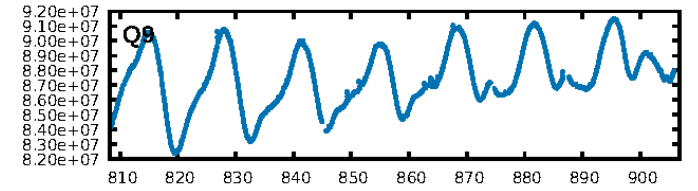
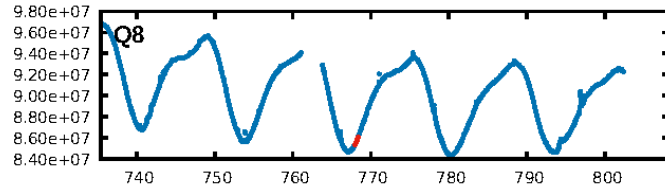
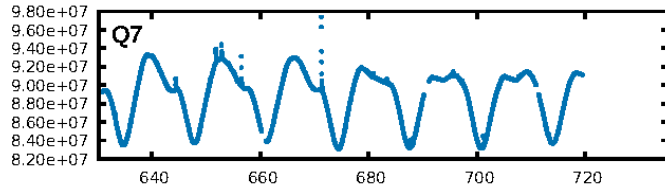
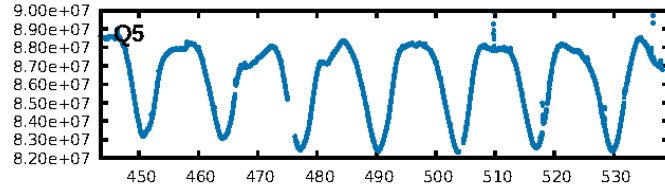
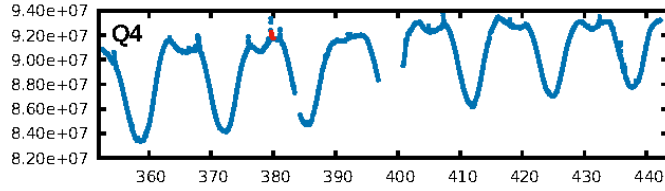
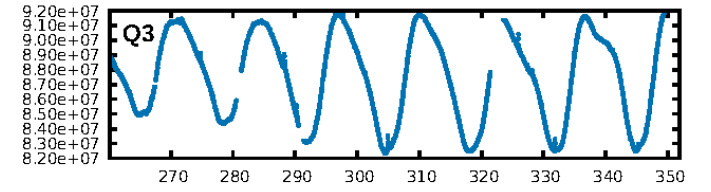
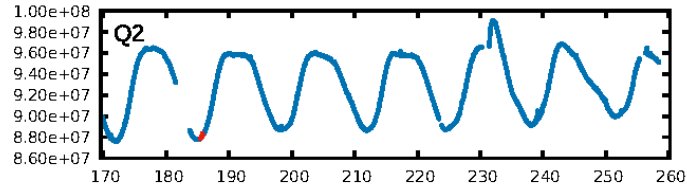
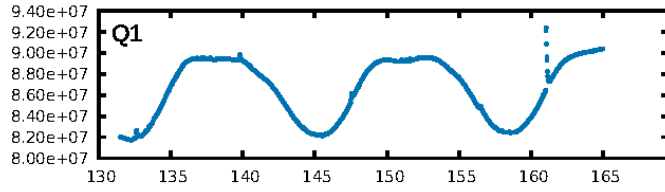
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [129.80σ]  
LongPeriod-sig: 93.6% [1.85σ]  
ModelChiSquare2-sig: 2.2%  
ModelChiSquareGof-sig: 97.8%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [5/5]  
GhostDiagnostic-chr: 0.8382  
Centroid-sig: 3.2%  
Centroid-so: 1.582 arcsec [1.24σ]  
OotOffset-rm: 0.496 arcsec [1.12σ]  
KicOffset-rm: 0.373 arcsec [1.19σ]  
OotOffset-st: 1/0/4/0 [5]  
KicOffset-st: 1/0/4/0 [5]  
DiffImageQuality-fgm: 1.00 [5/5]  
DiffImageOverlap-fno: 1.00 [5/5]

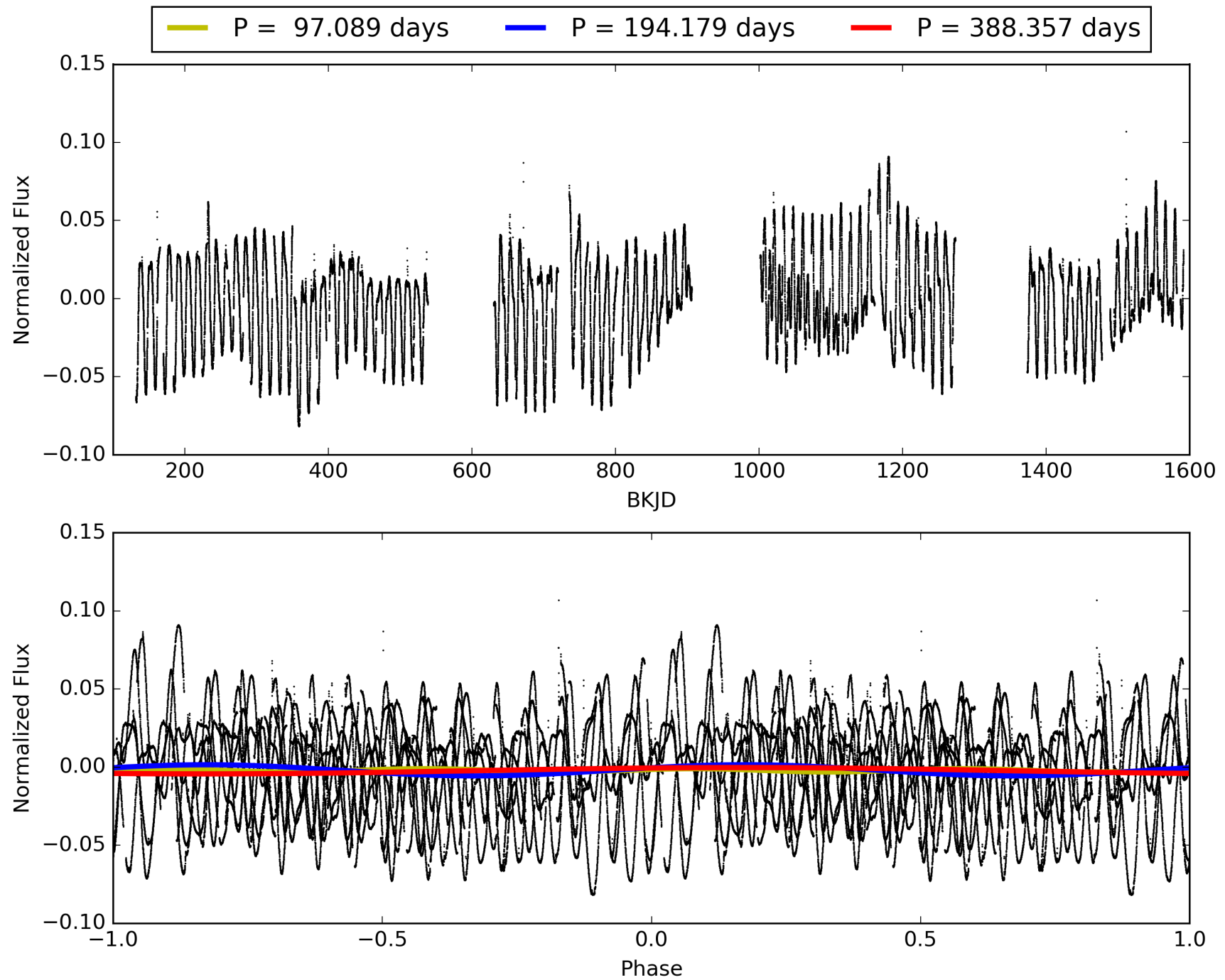
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 21:26:05 Z

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

# TCE 004068539-06, PDC Light Curves

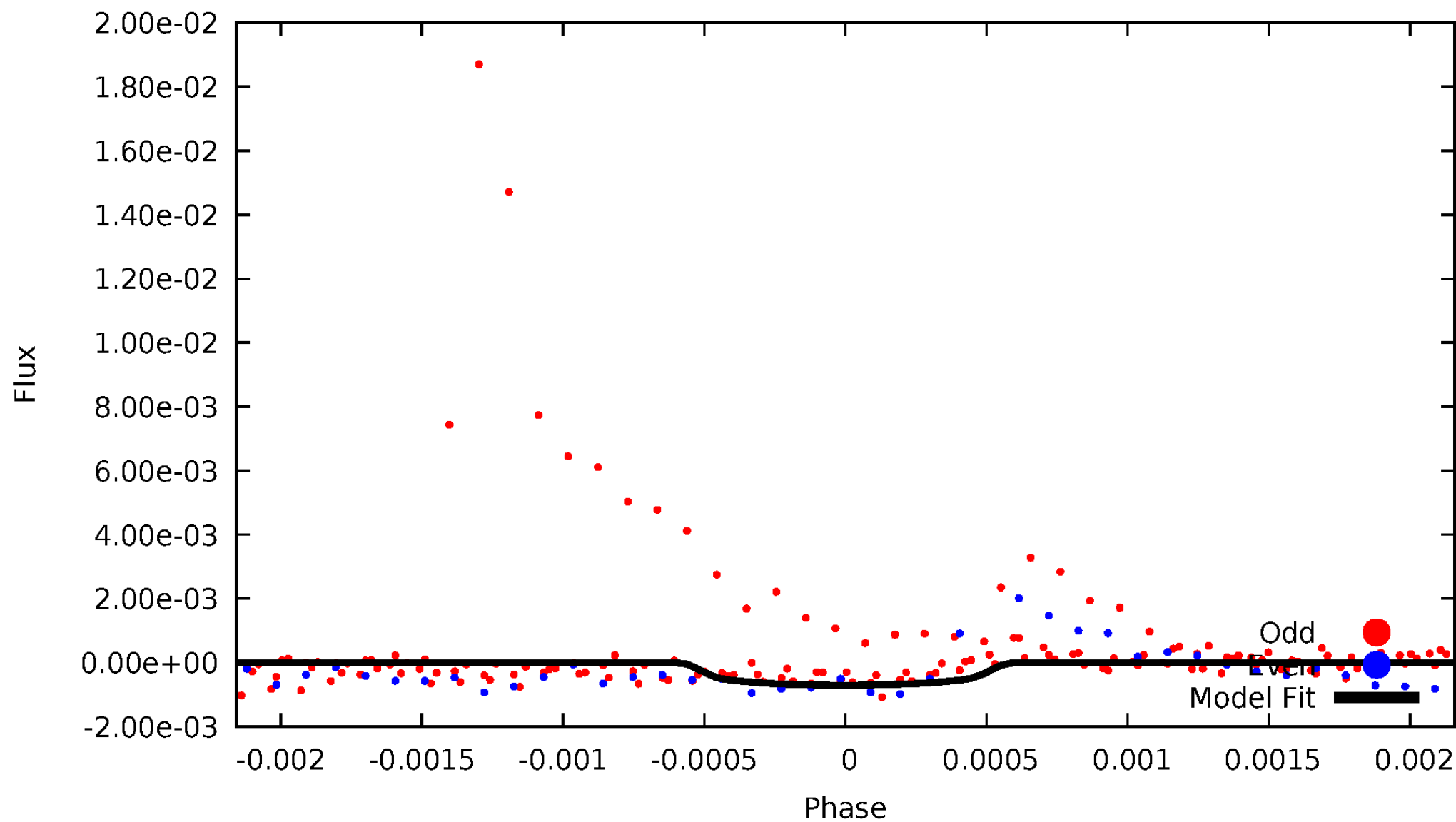


TCE 004068539-06



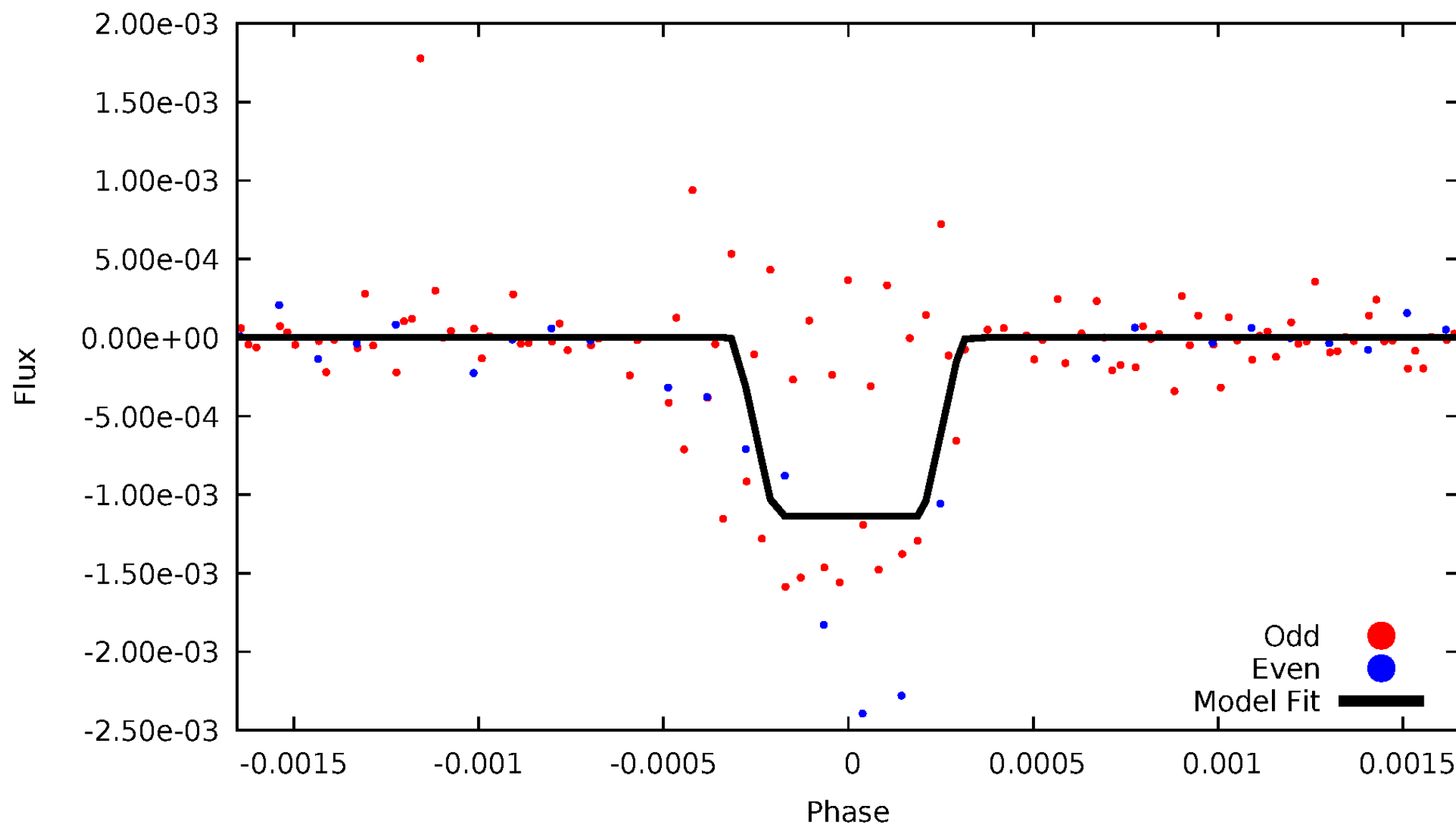
# DV Odd/Even

TCE 004068539-06



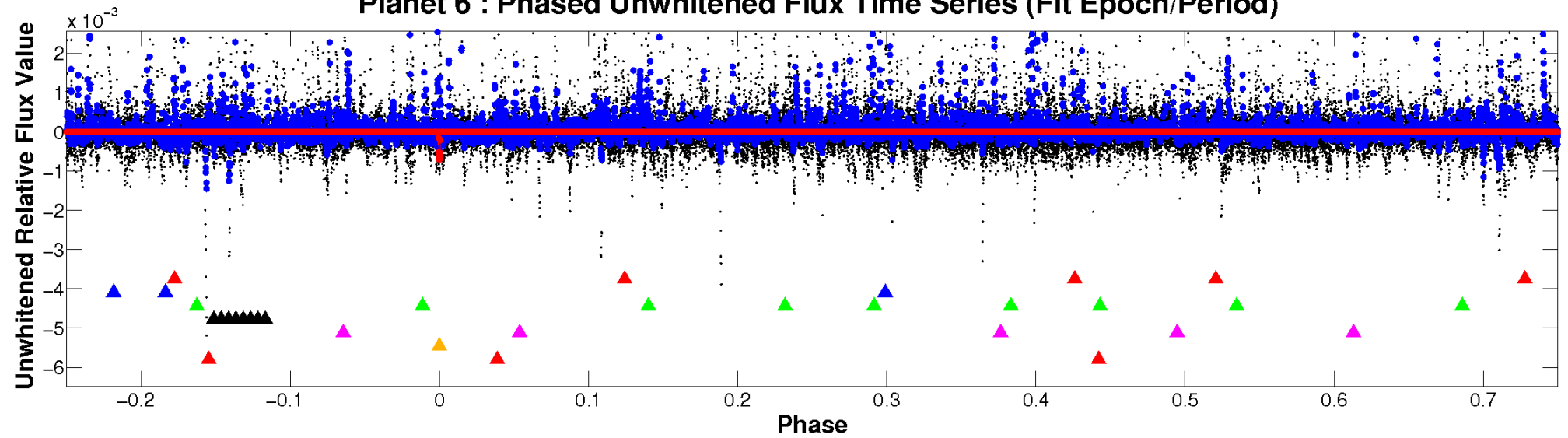
# ALT Odd/Even

TCE 004068539-06

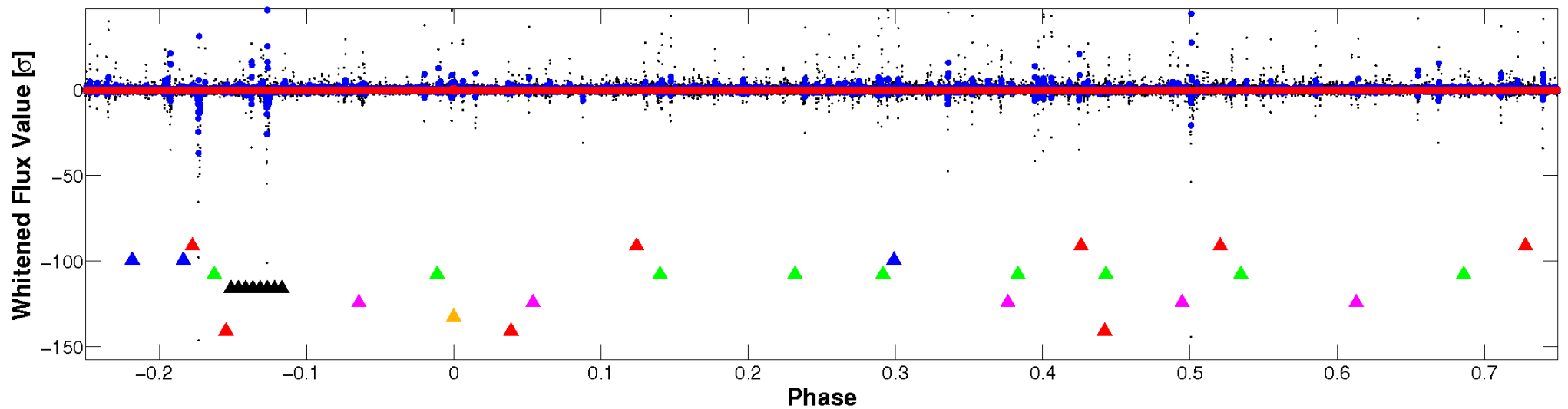


# Non-Whitened Vs. Whitened Light Curve

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

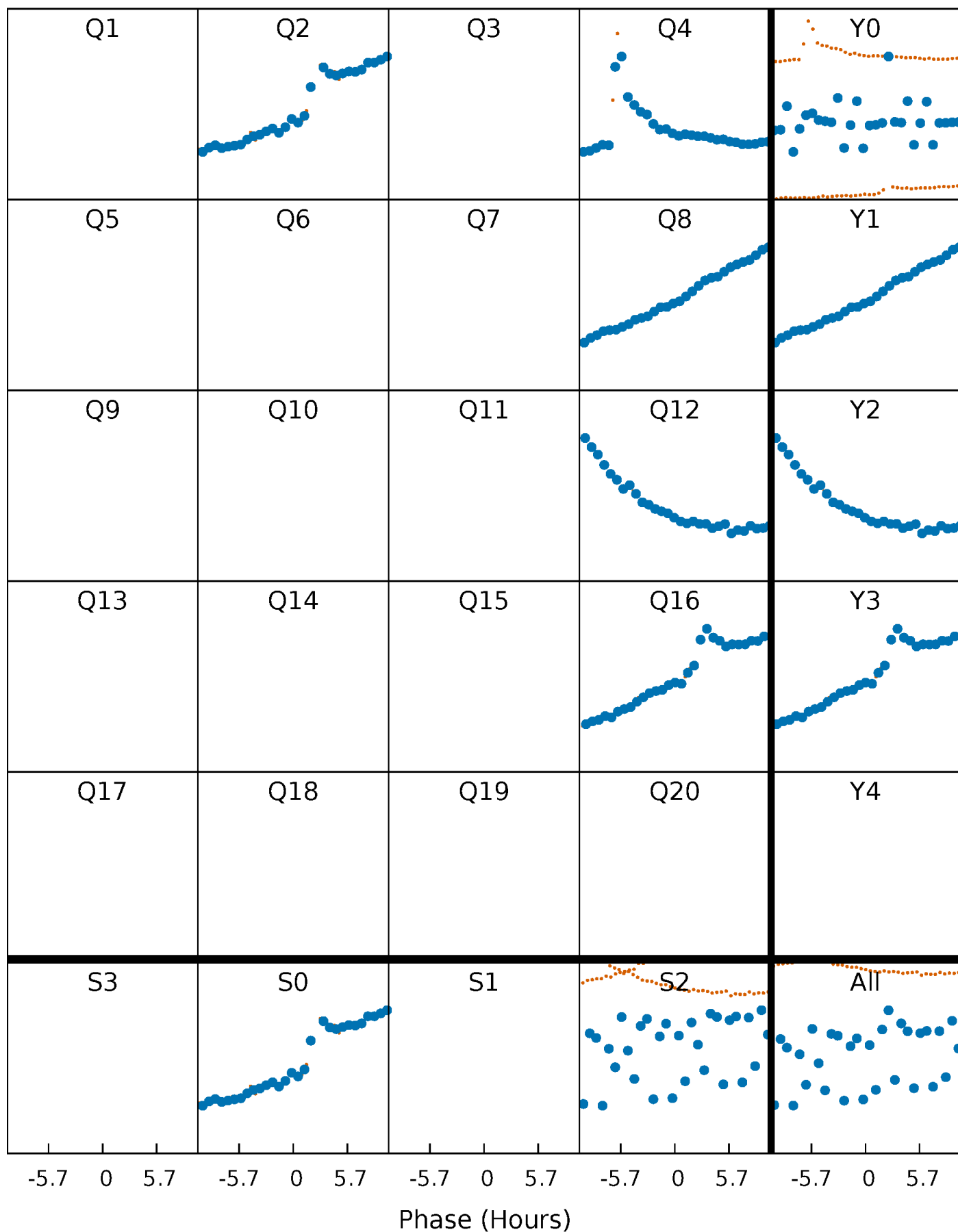


## Planet 6 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

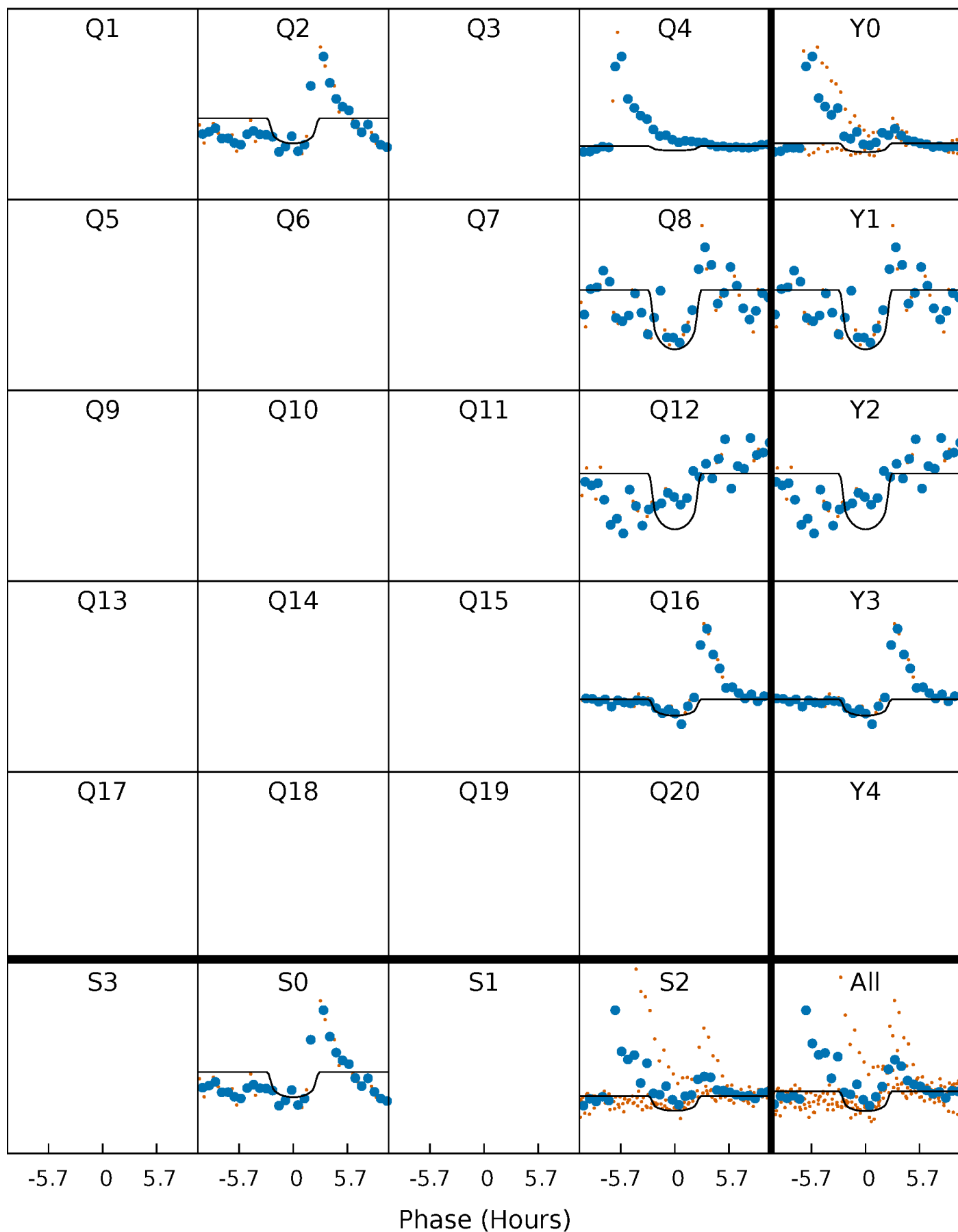
TCE 004068539-06 P=194.178598 Days  $T_0=185.625789$  (BKJD)





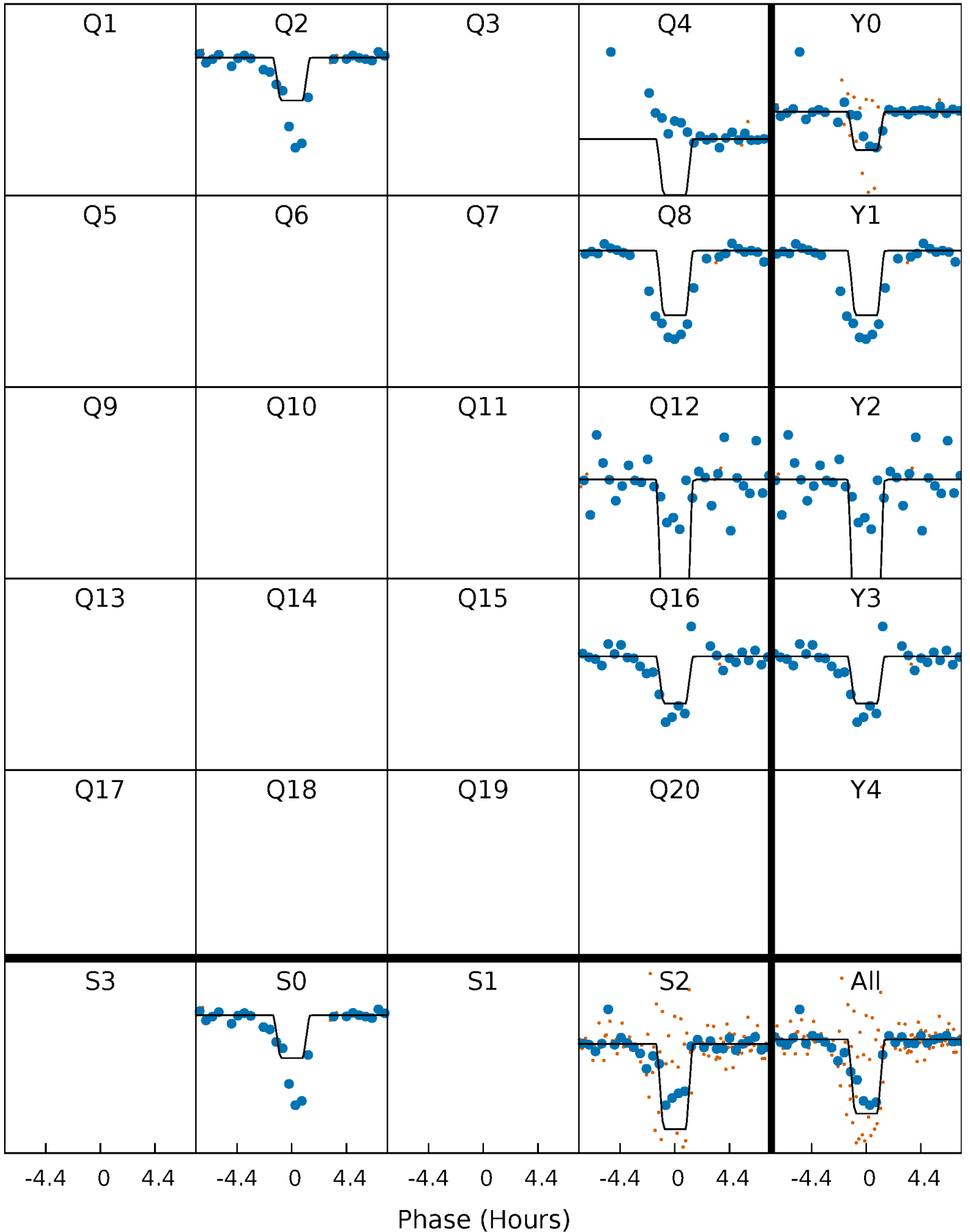
# DV Quarter-Phased Transit Curves

TCE 004068539-06 P=194.178598 Days  $T_0=185.625789$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

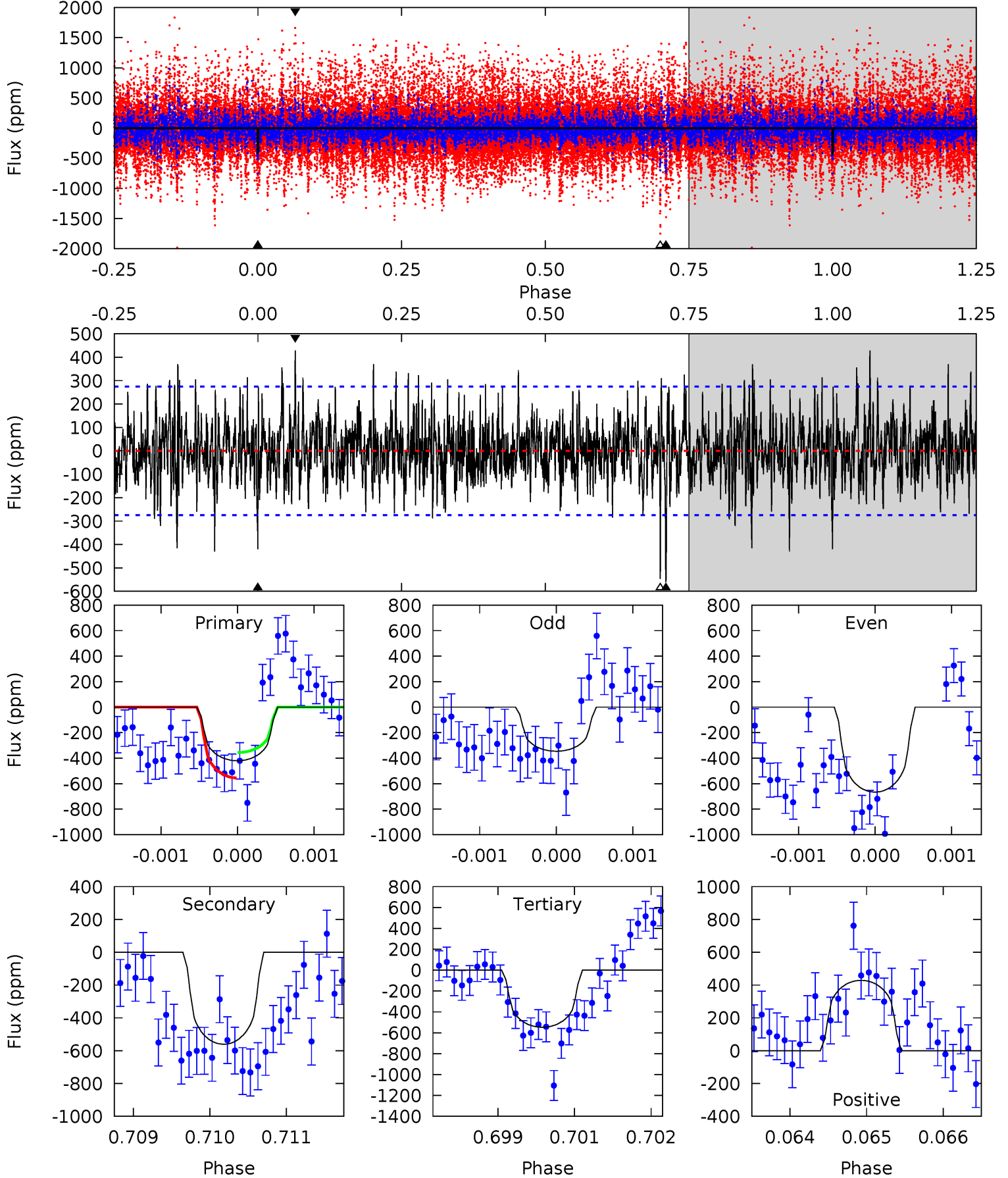
TCE 004068539-06 P=194.182615 Days  $T_0=185.655960$  (BKJD)



# DV Model-Shift Uniqueness Test

004068539-06, P = 194.178598 Days, E = 185.625789 Days

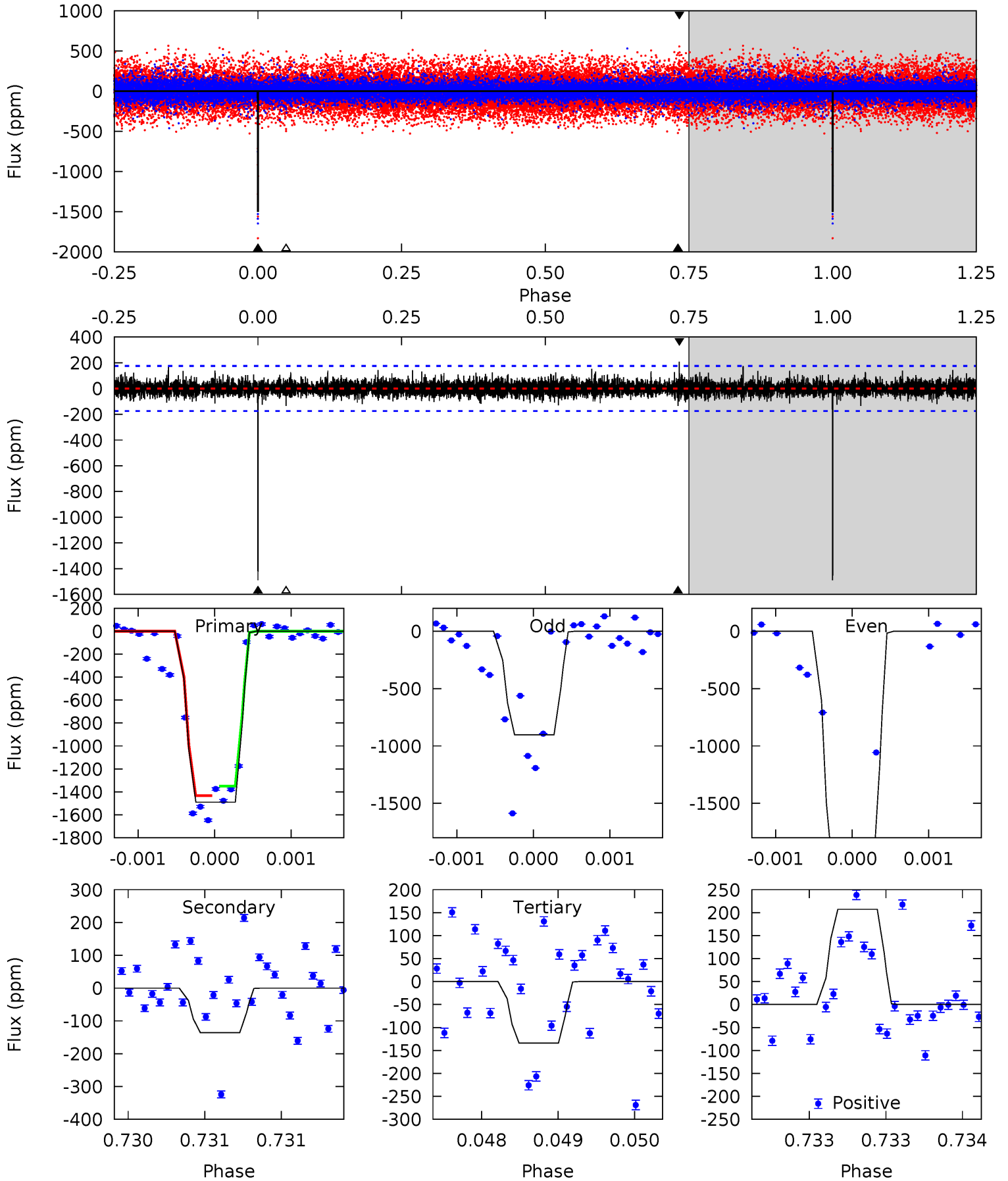
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.31	11.1	10.8	8.48	5.43	3.25	2.01	-2.51	-0.17	0.27	2.61	1.28	0.20	0.43	1.98



# Alt Model-Shift Uniqueness Test

004068539-06, P = 194.182615 Days, E = 185.655960 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
46.8	4.26	4.21	6.51	5.52	3.39	1.03	42.6	40.3	0.06	-2.25	11.9	0.72	0.12	0



### Stellar Parameters For KIC 004068539

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$4946^{+123}_{-123}$	$3.320^{+1.216}_{-0.304}$	$-0.320^{+0.300}_{-0.250}$	$3.376^{+1.800}_{-2.476}$	$0.868^{+0.264}_{-0.216}$	$0.032^{+1.760}_{-0.019}$
	+2%/-2%	+37%/-9%	+94%/-78%	+53%/-73%	+30%/-25%	+5542%/-60%
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 004068539-06 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-561 \pm 51$	$12.22^{+14.28}_{-9.06}$	$679^{+122}_{-157}$	$4080^{+2601}_{-845}$	$823^{+11148}_{-650}$
Alt.	$-136 \pm 32$	$14.85^{+15.99}_{-10.38}$	$690^{+105}_{-150}$	$3045^{+1247}_{-463}$	$128^{+1289}_{-99}$

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

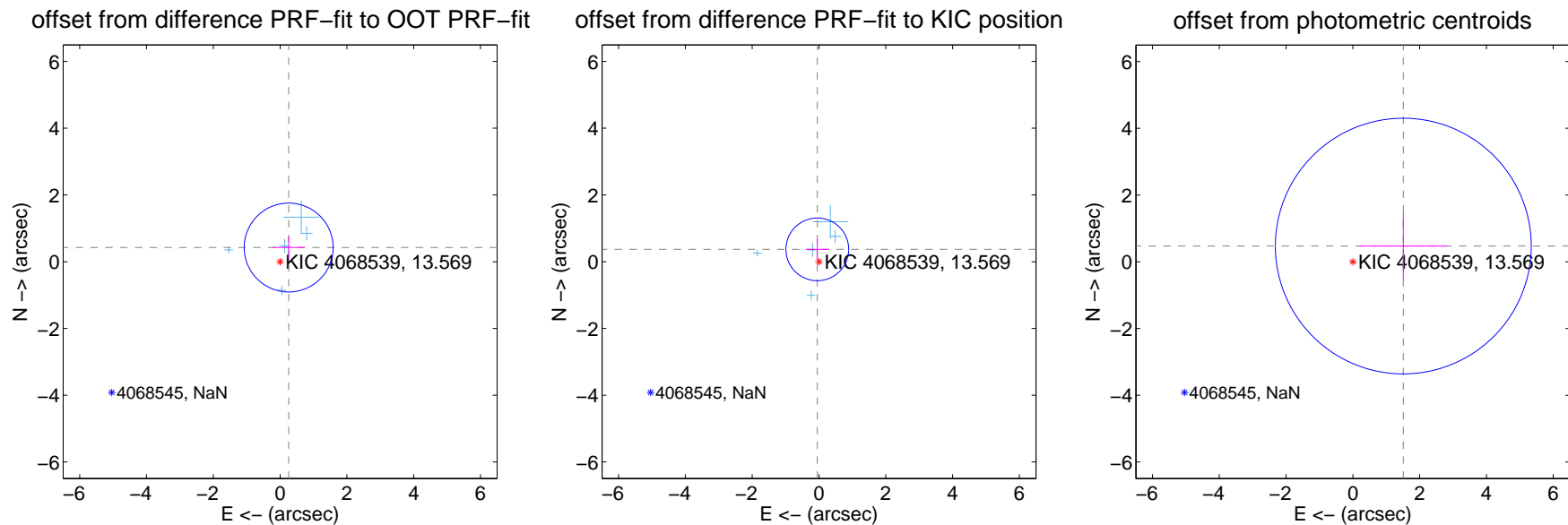
## DV Centroid Data

Supplemental centroid analysis for 004068539-06. Kepler magnitude: 13.57. Transit SNR 6.83

There are 5 quarters with good PRF difference image offsets

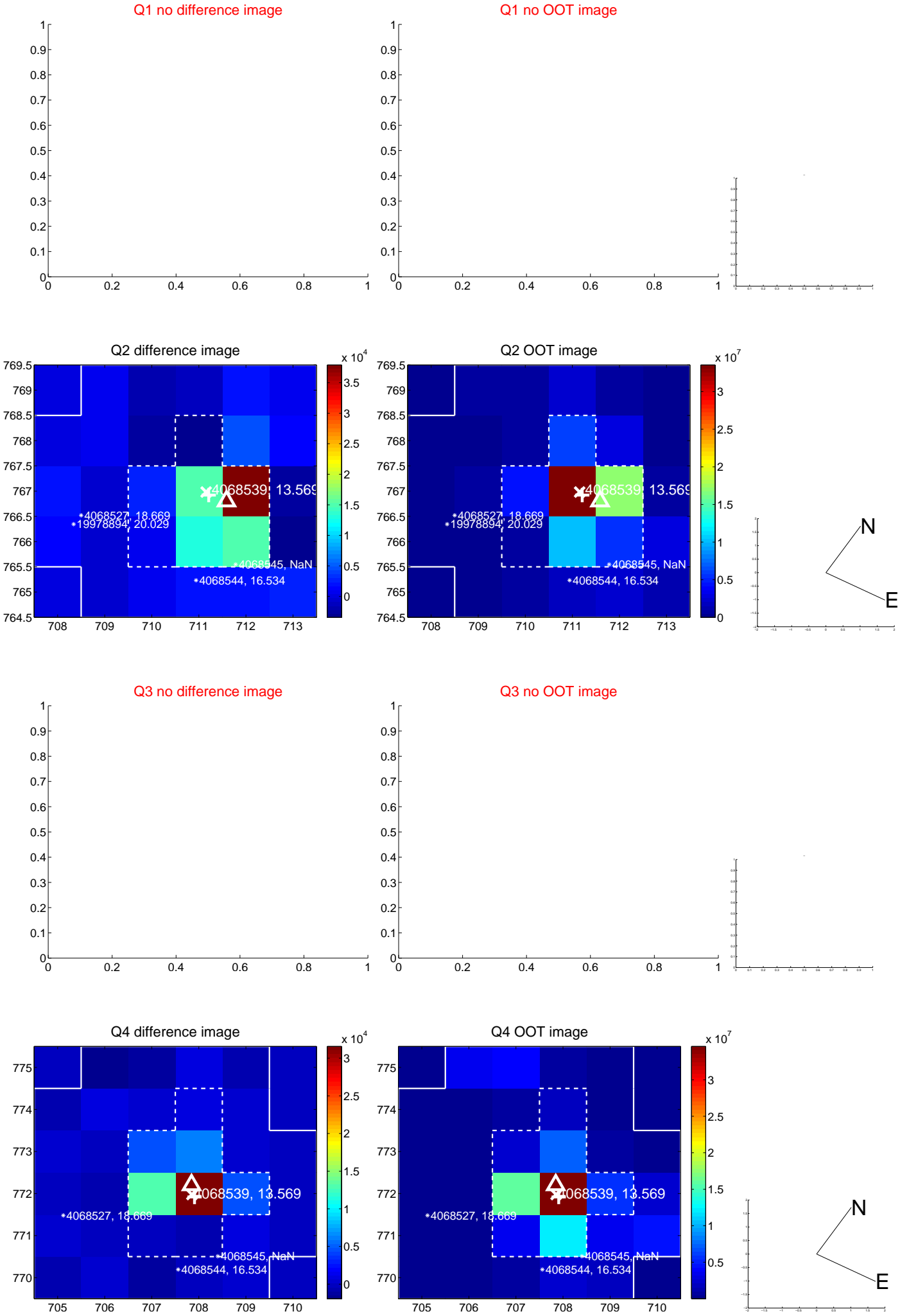
The direct PRF centroid is offset from the target star catalog position by about 0.32 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.496 \pm 0.444$	1.12	$-0.257 \pm 0.484$	$0.424 \pm 0.325$
PRF-fit source offset from KIC position	$0.373 \pm 0.313$	1.19	$0.050 \pm 0.348$	$0.370 \pm 0.317$
photometric centroid source offset	$1.58 \pm 1.28$	1.24	$-1.51 \pm 1.30$	$0.47 \pm 1.00$

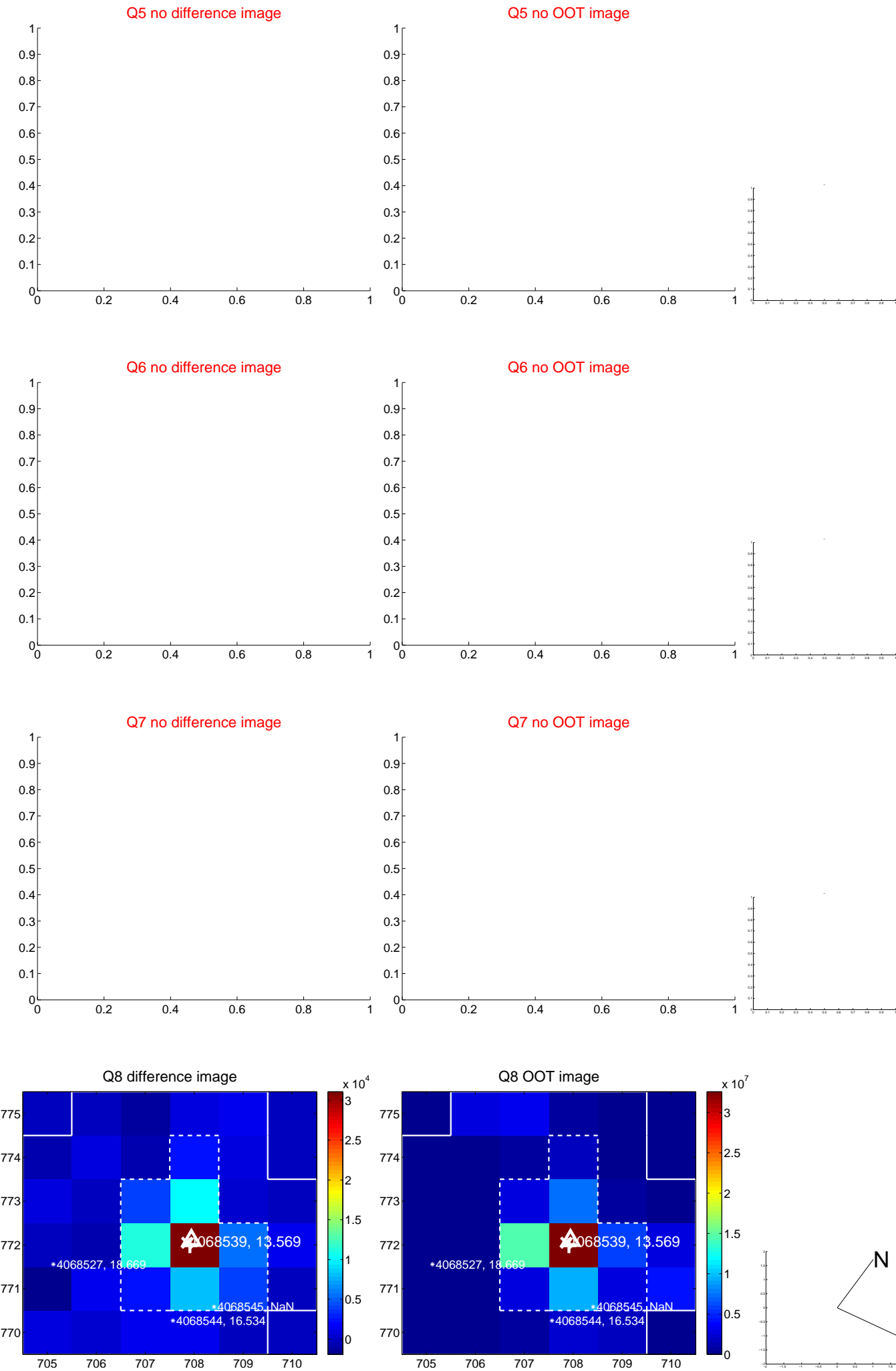


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

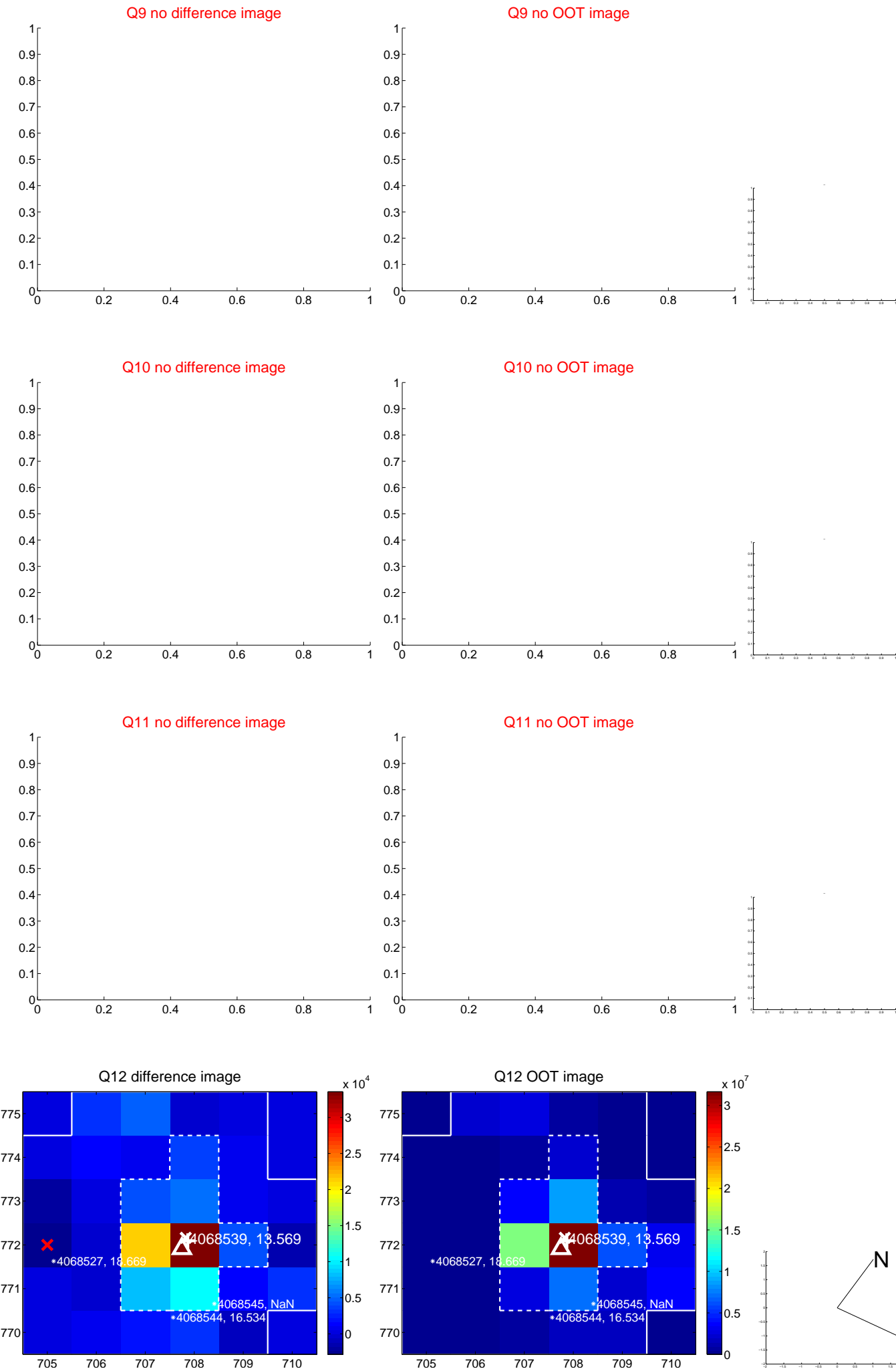


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

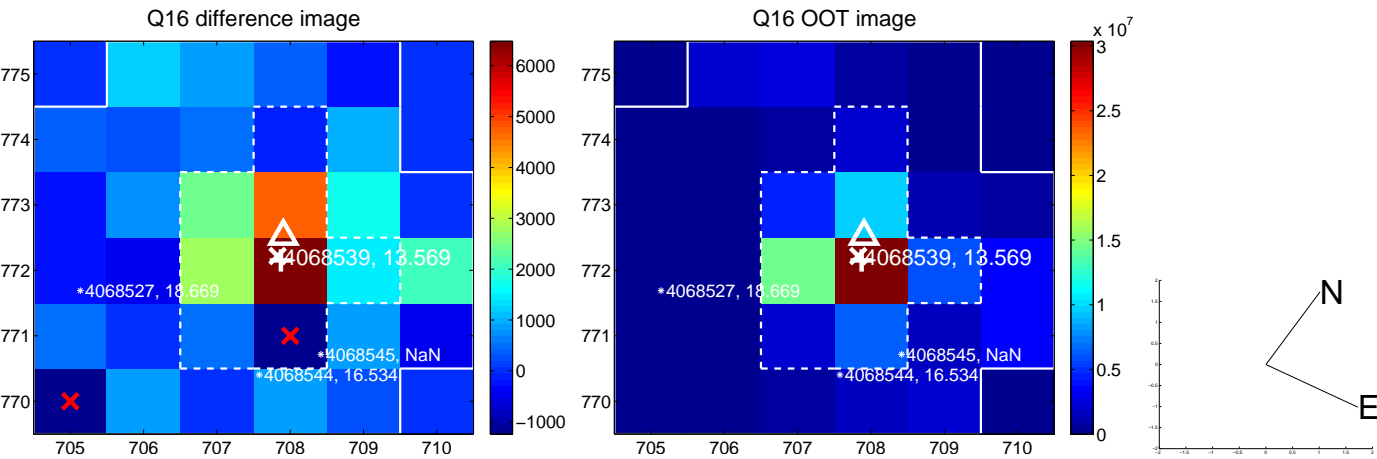




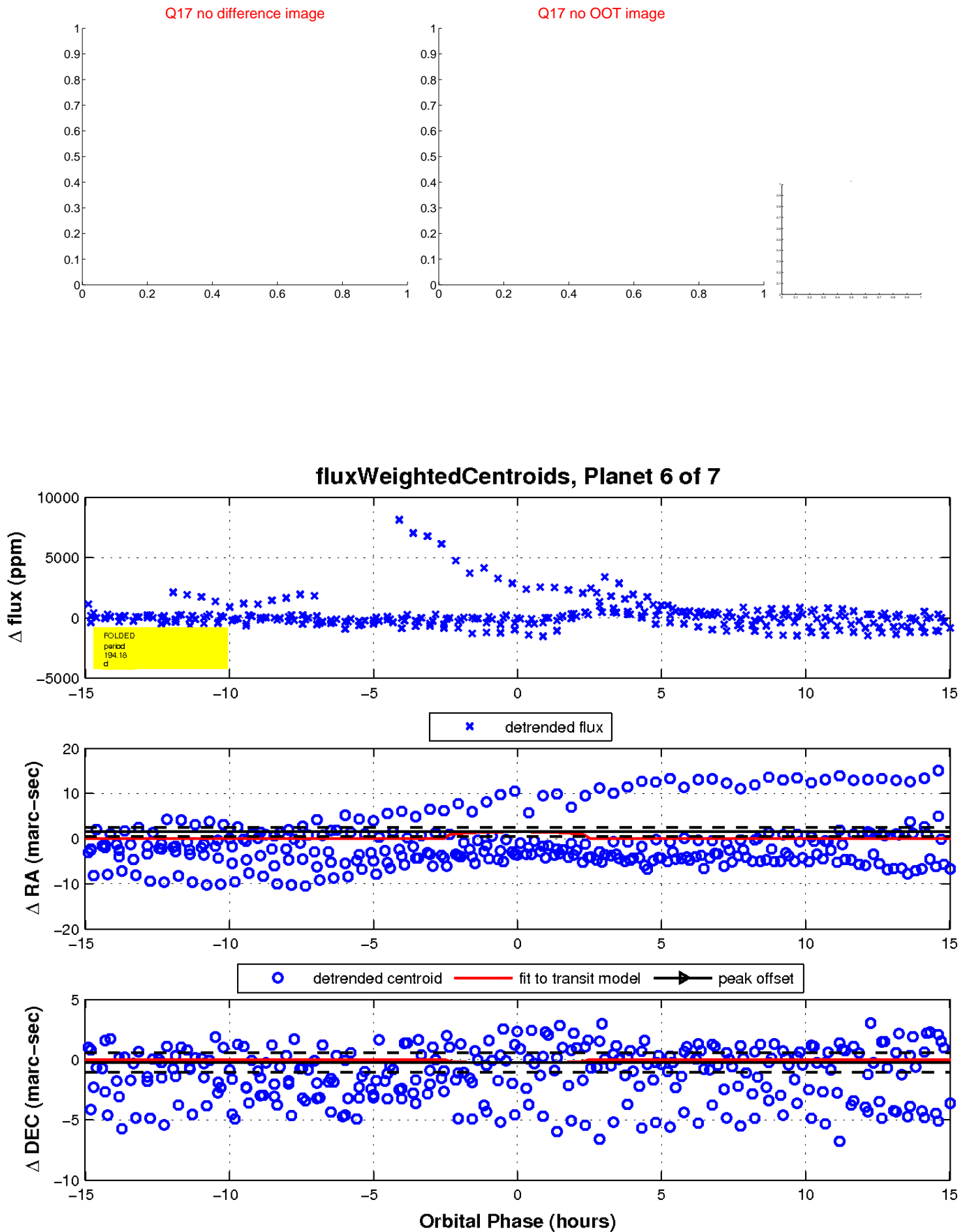
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



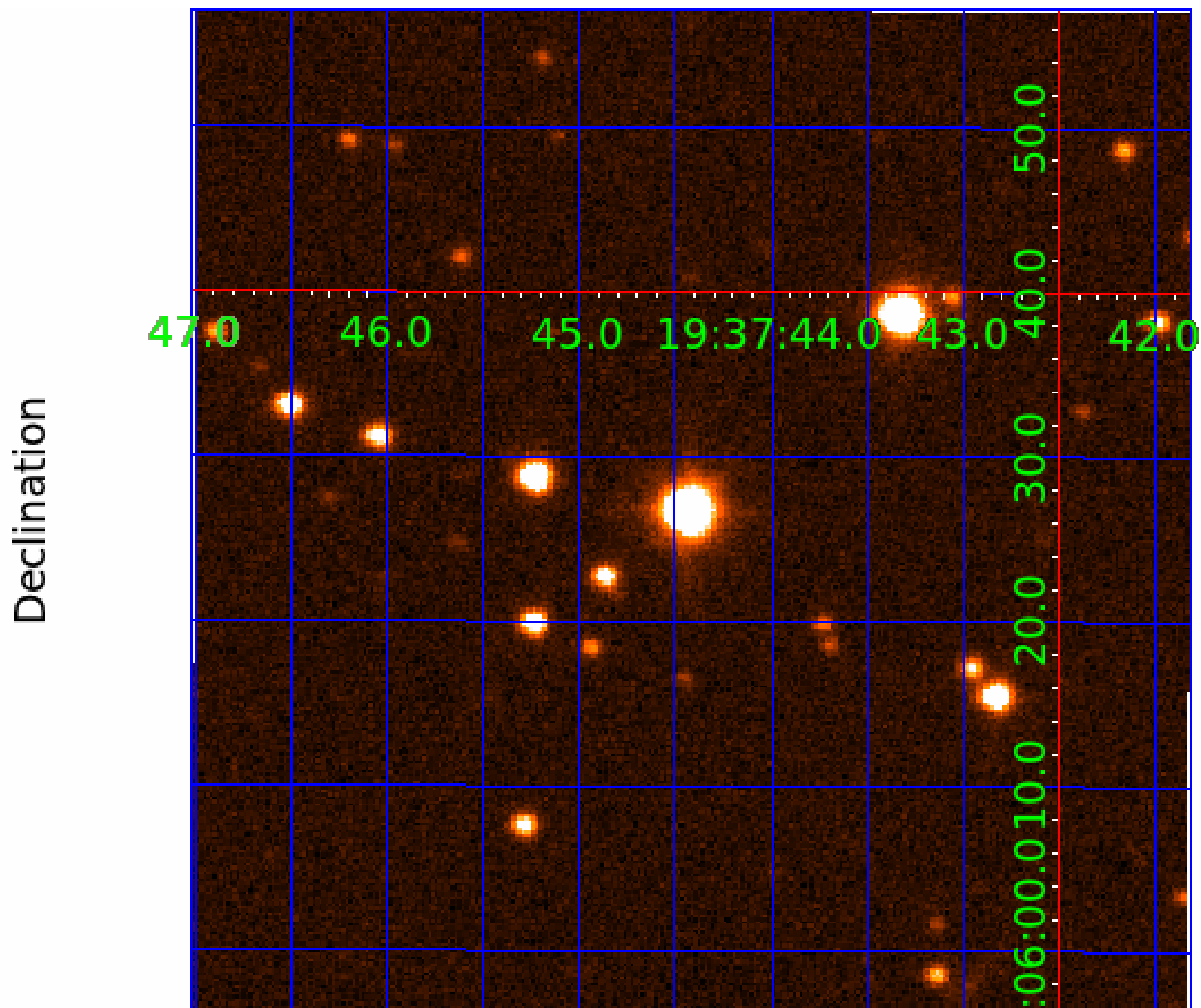
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image



# KIC 004068539

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004068539-01	OBS	No	329.750808	132.793344	931.3	5.504	17.2	6.7	3.38	4946	10.12	7.69
004068539-02	OBS	No	488.817554	531.587690	1505.9	5.757	16.9	10.2	3.38	4946	13.96	4.55
004068539-03	OBS	No	164.780942	271.640333	641.8	2.066	16.6	6.8	3.38	4946	8.79	19.39
004068539-04	OBS	No	195.135183	156.264736	1317.8	11.313	15.1	8.9	3.38	4946	15.73	15.48
004068539-06	OBS	No	194.178598	185.625789	708.3	5.027	15.4	6.8	3.38	4946	8.86	15.58
004068539-07	OBS	No	660.834953	193.179478	512.9	7.500	14.5	-1.0	3.38	4946	7.43	3.04

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004068539-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
004068539-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
004068539-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_ZUMA_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
004068539-04	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—INCONSISTENT_TRANS
004068539-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—INCONSISTENT_TRANS—CENT_KIC_POS
004068539-07	OBS	FP	0.00	1	0	0	0	LPP_DV—ALL_TRANS_CHASES—CENT_NOFITS

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

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

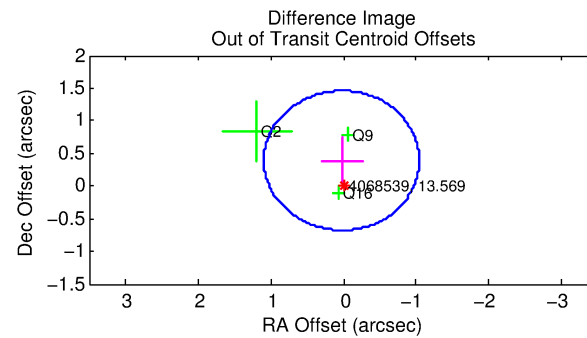
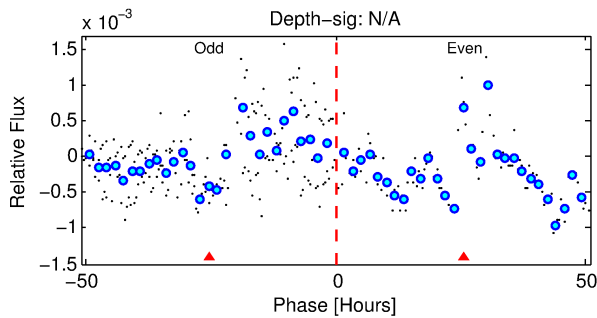
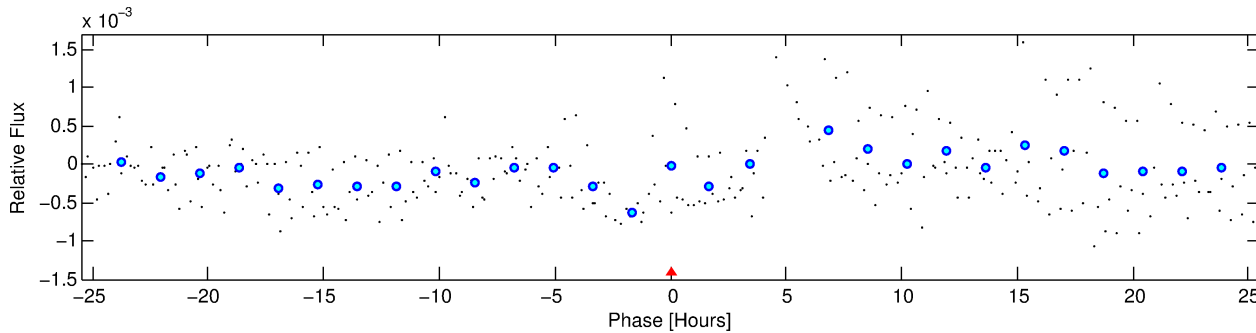
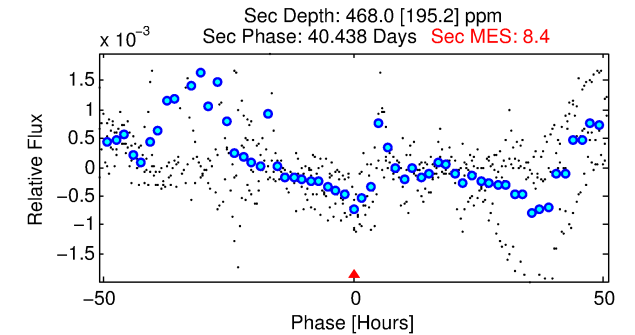
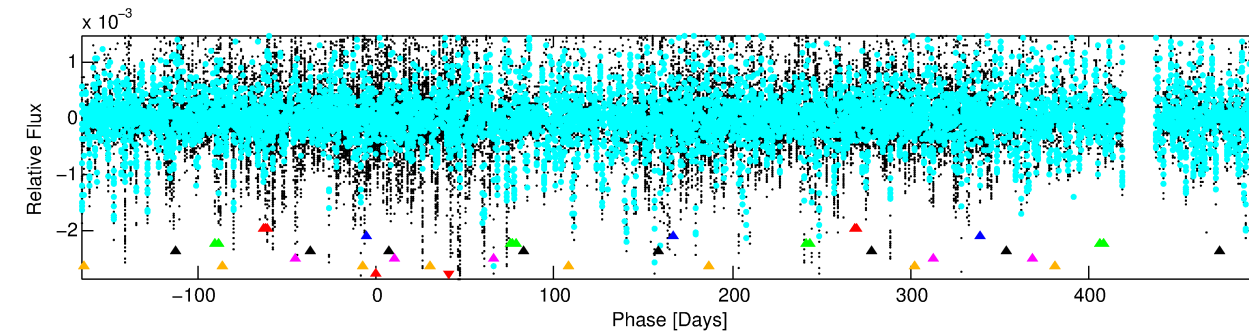
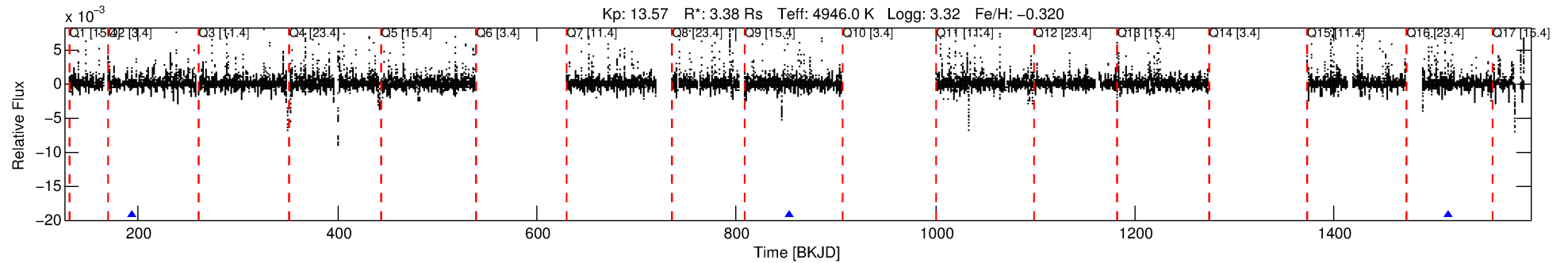
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 004068539-07

No Significant Match Found

# DV One-Page Summary

KIC: 4068539 Candidate: 7 of 7 Period: 660.835 d



## TPS TCE Results:

Period = 660.83495 d  
Epoch = 193.1795 BKJD

DV fit results are unavailable

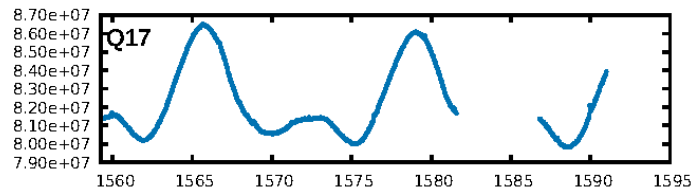
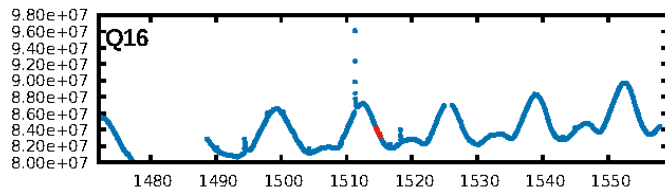
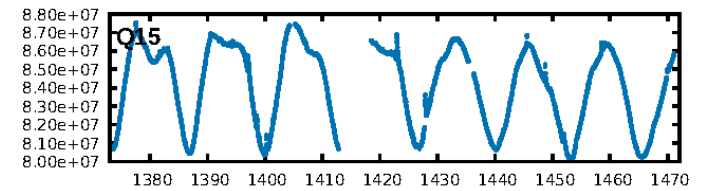
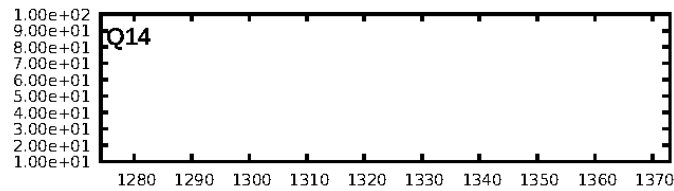
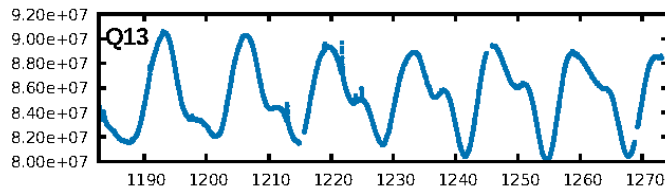
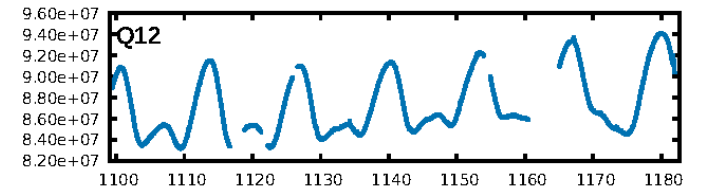
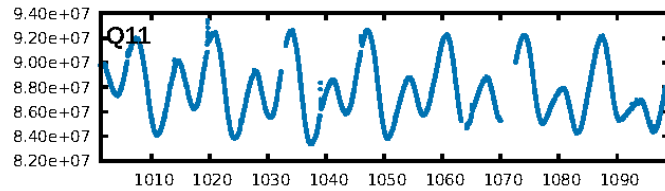
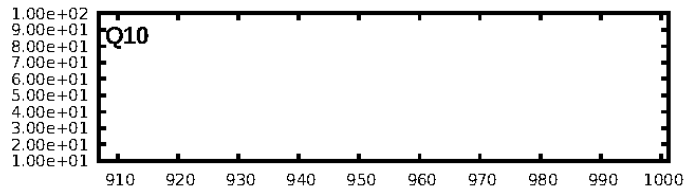
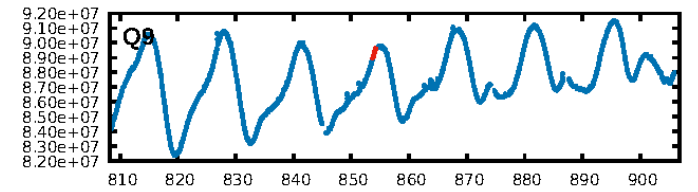
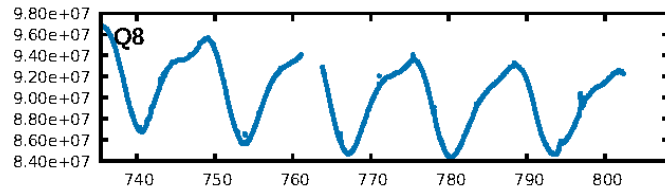
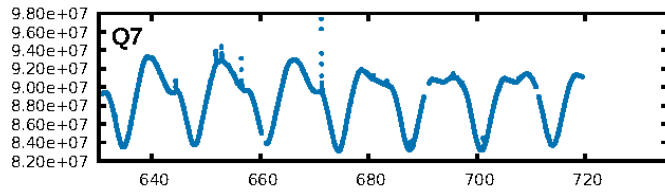
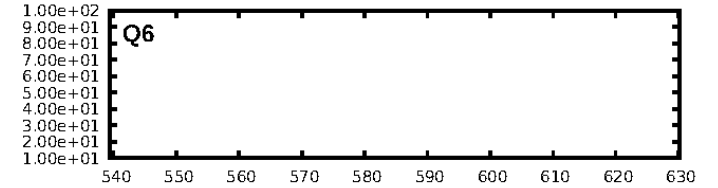
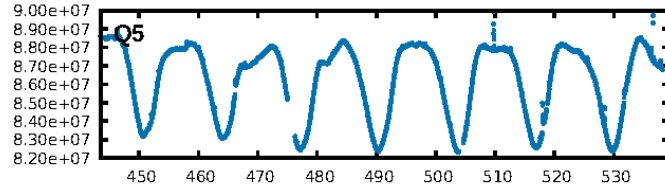
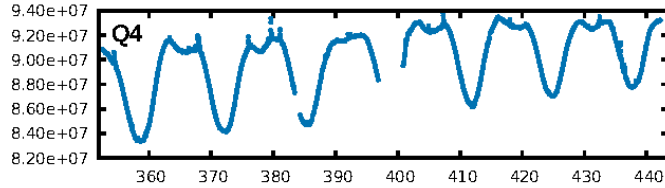
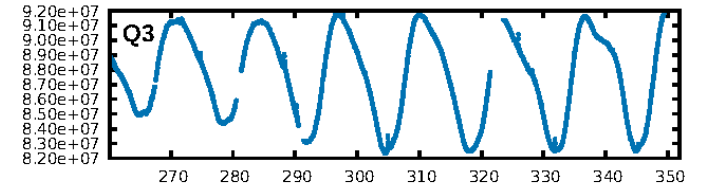
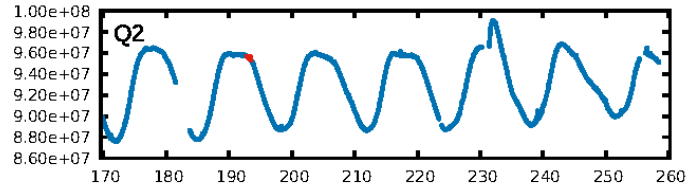
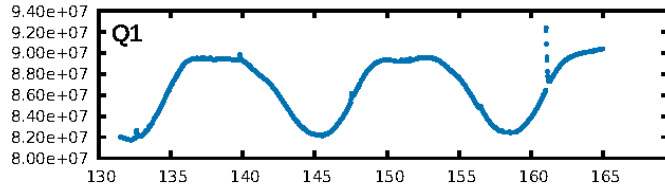
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [436.64σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 0.3657  
Centroid-sig: 8.7%  
Centroid-so: 1.682 arcsec [0.92σ]  
OotOffset-rm: 0.393 arcsec [1.10σ]  
KicOffset-rm: 0.446 arcsec [1.03σ]  
OotOffset-st: 1/0/1/1 [3]  
KicOffset-st: 1/0/1/1 [3]  
DiffImageQuality-fgm: 0.33 [1/3]  
DiffImageOverlap-fno: 1.00 [3/3]

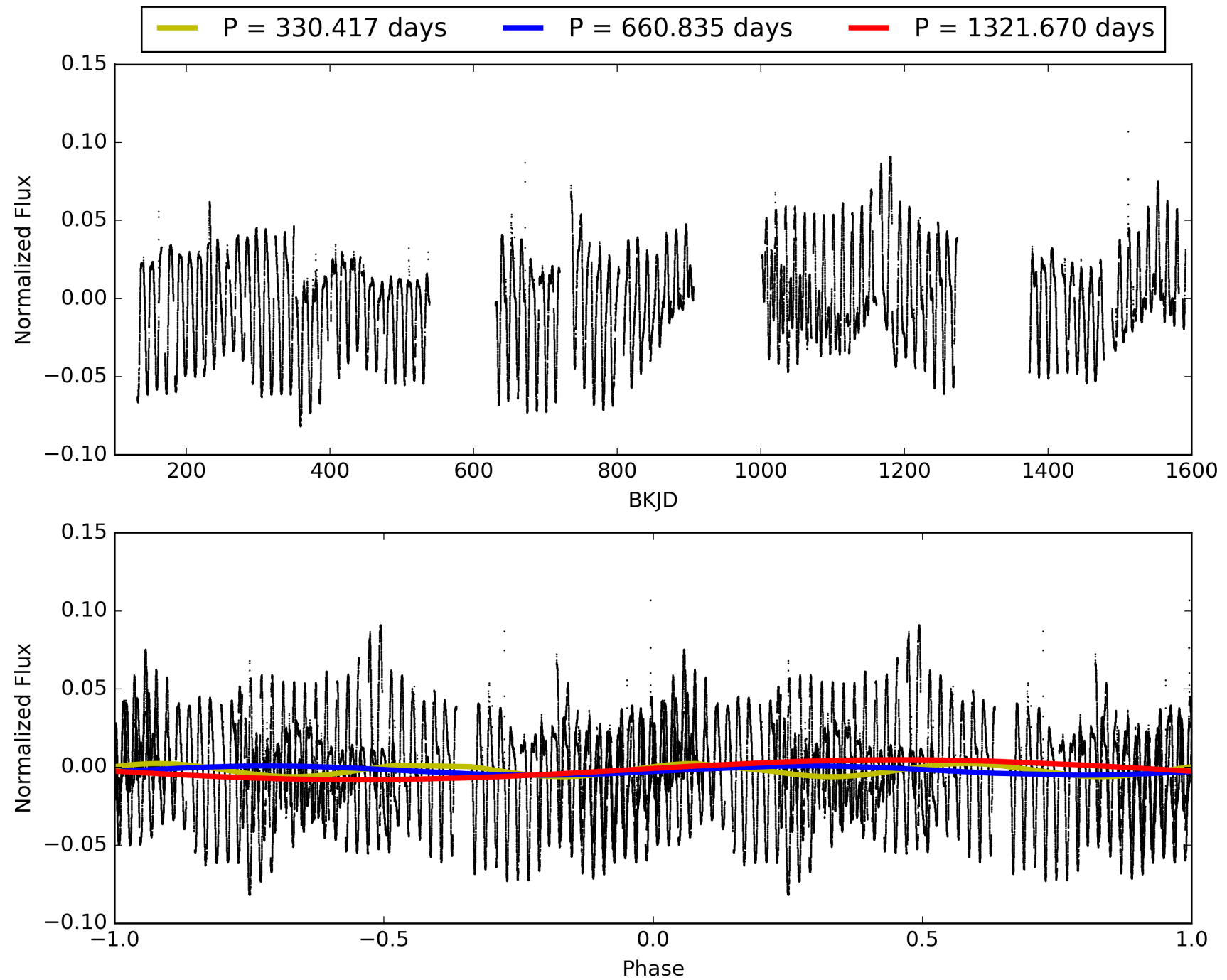
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 21:26:16 Z

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

# TCE 004068539-07, PDC Light Curves



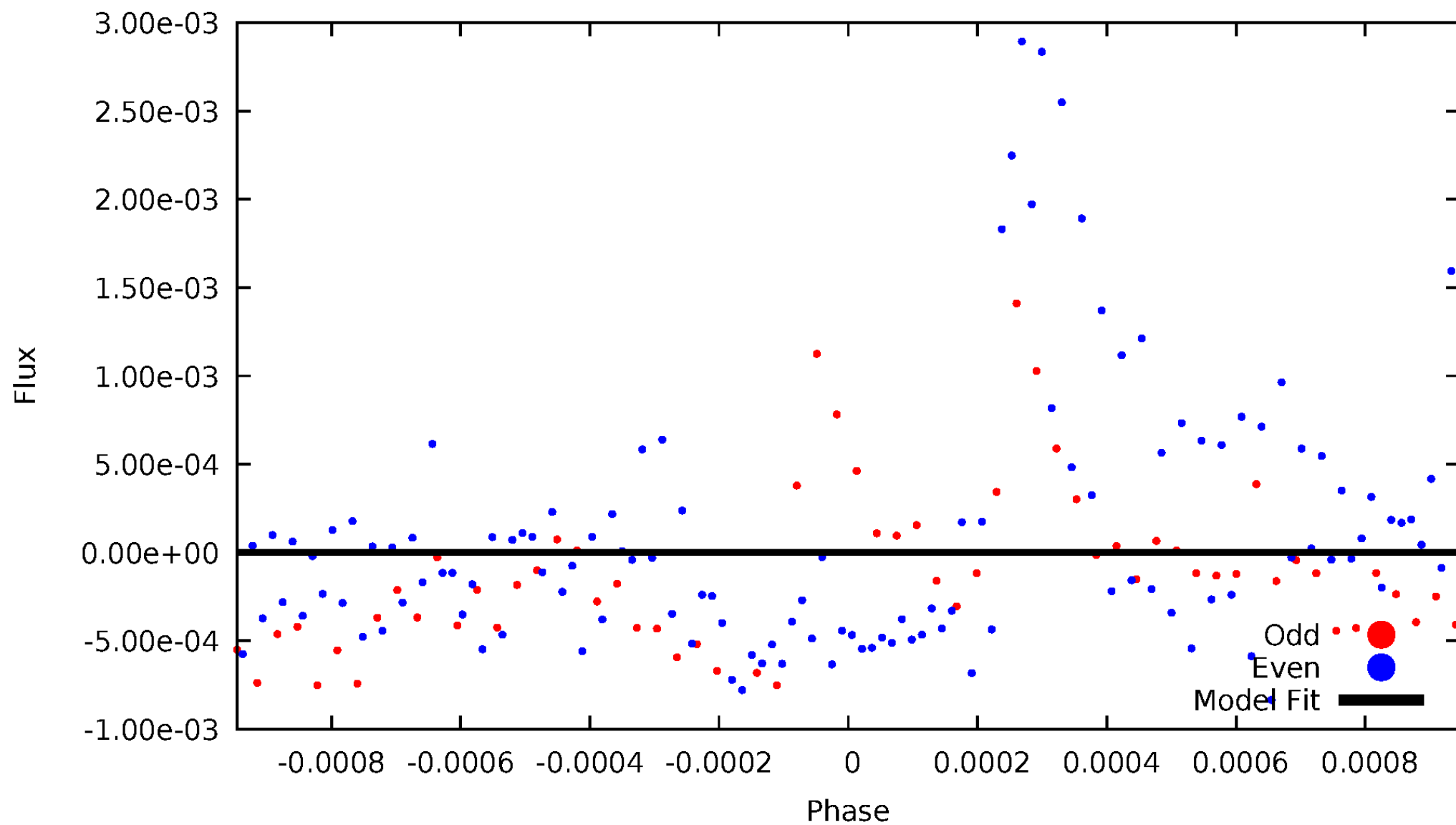
TCE 004068539-07





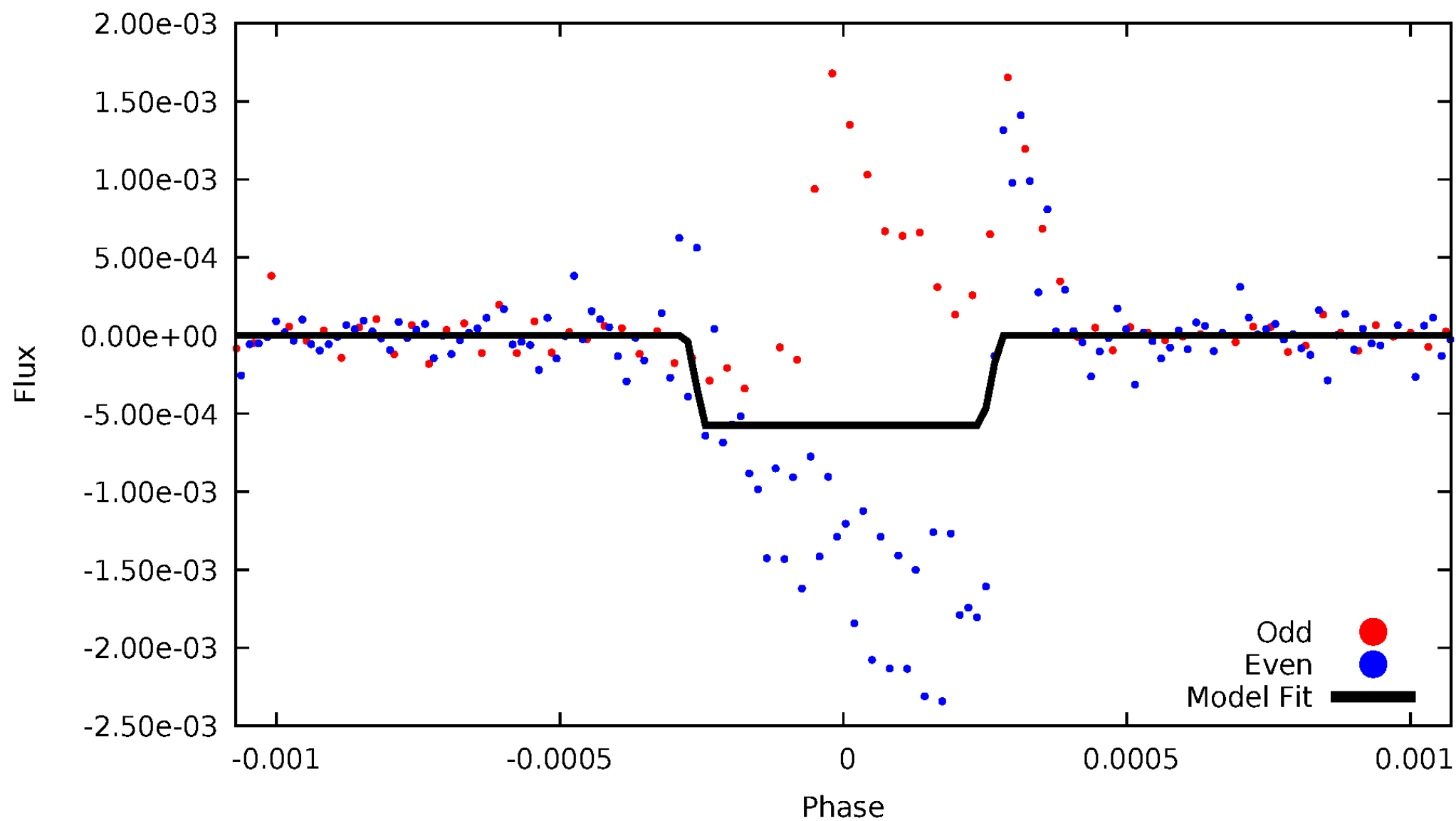
# DV Odd/Even

TCE 004068539-07

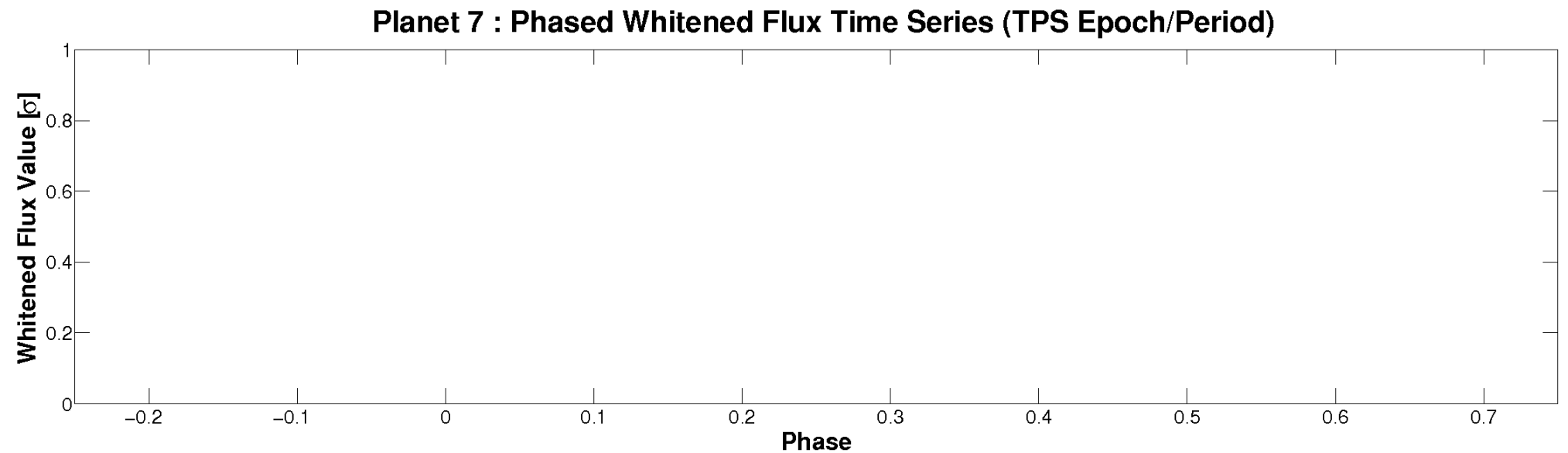
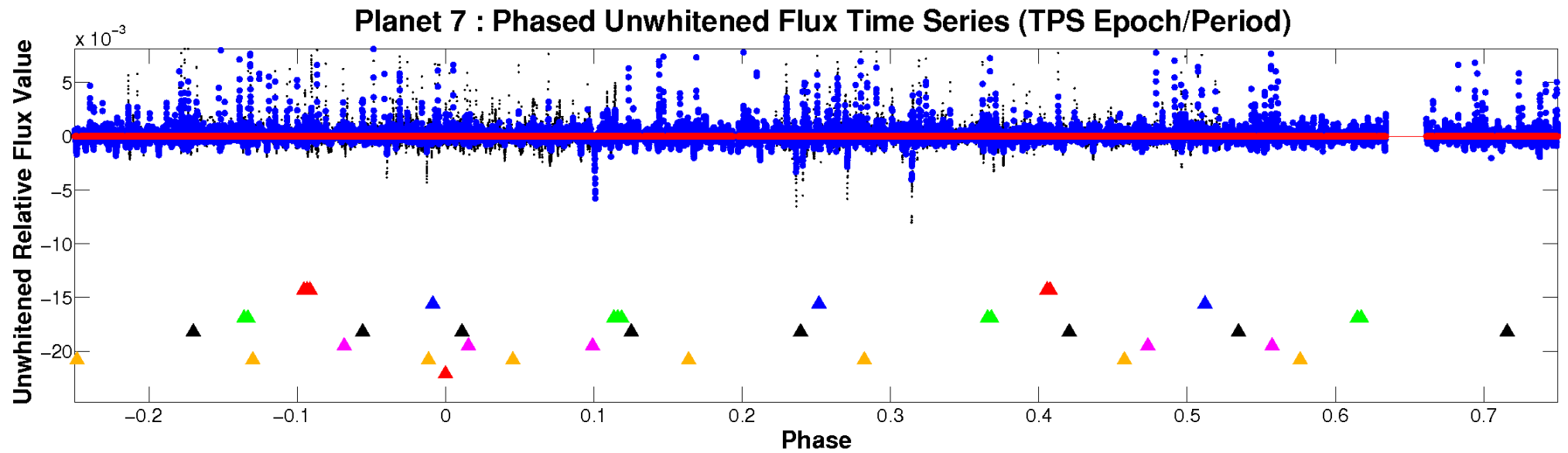


# ALT Odd/Even

TCE 004068539-07

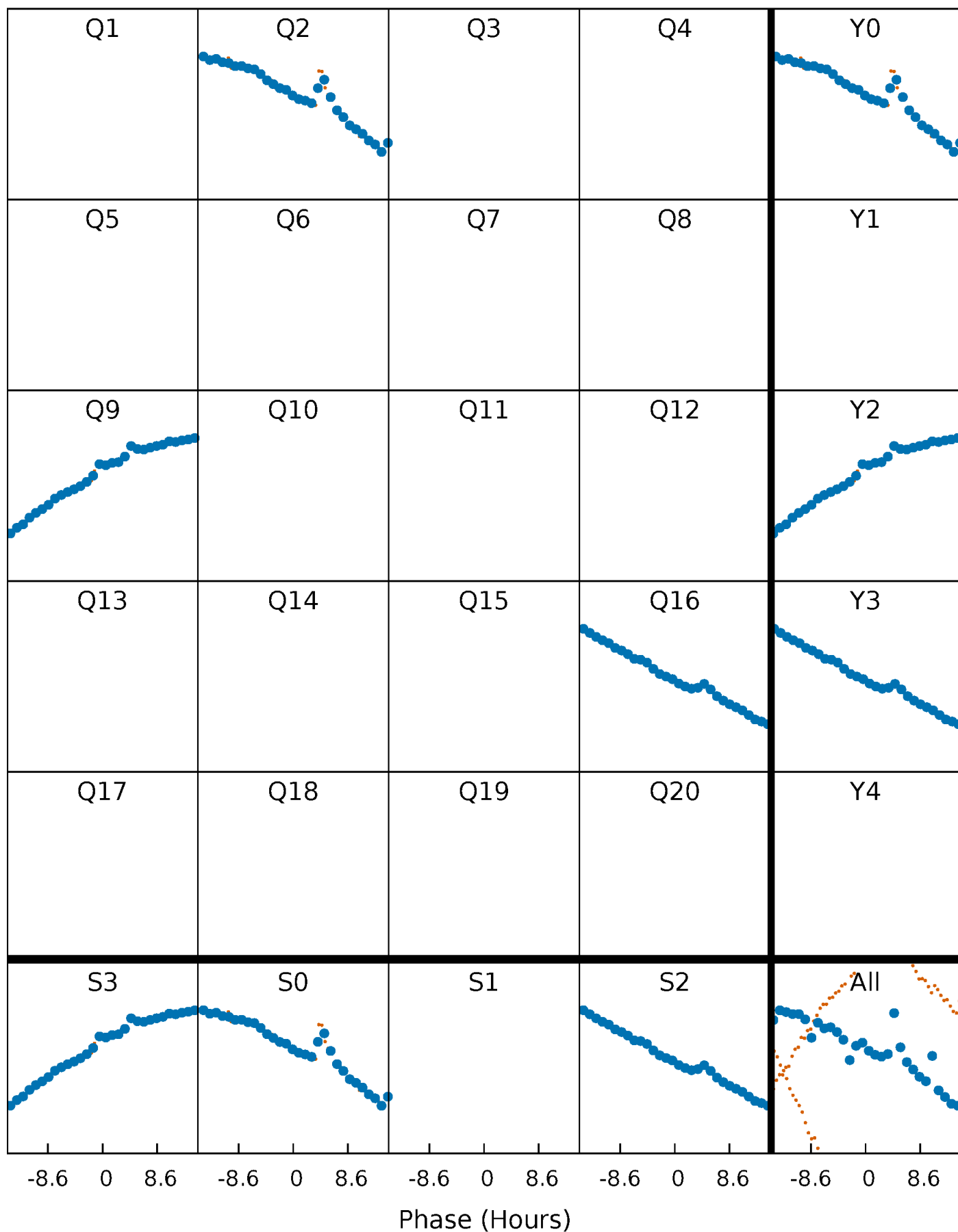


# Non-Whitened Vs. Whitened Light Curve



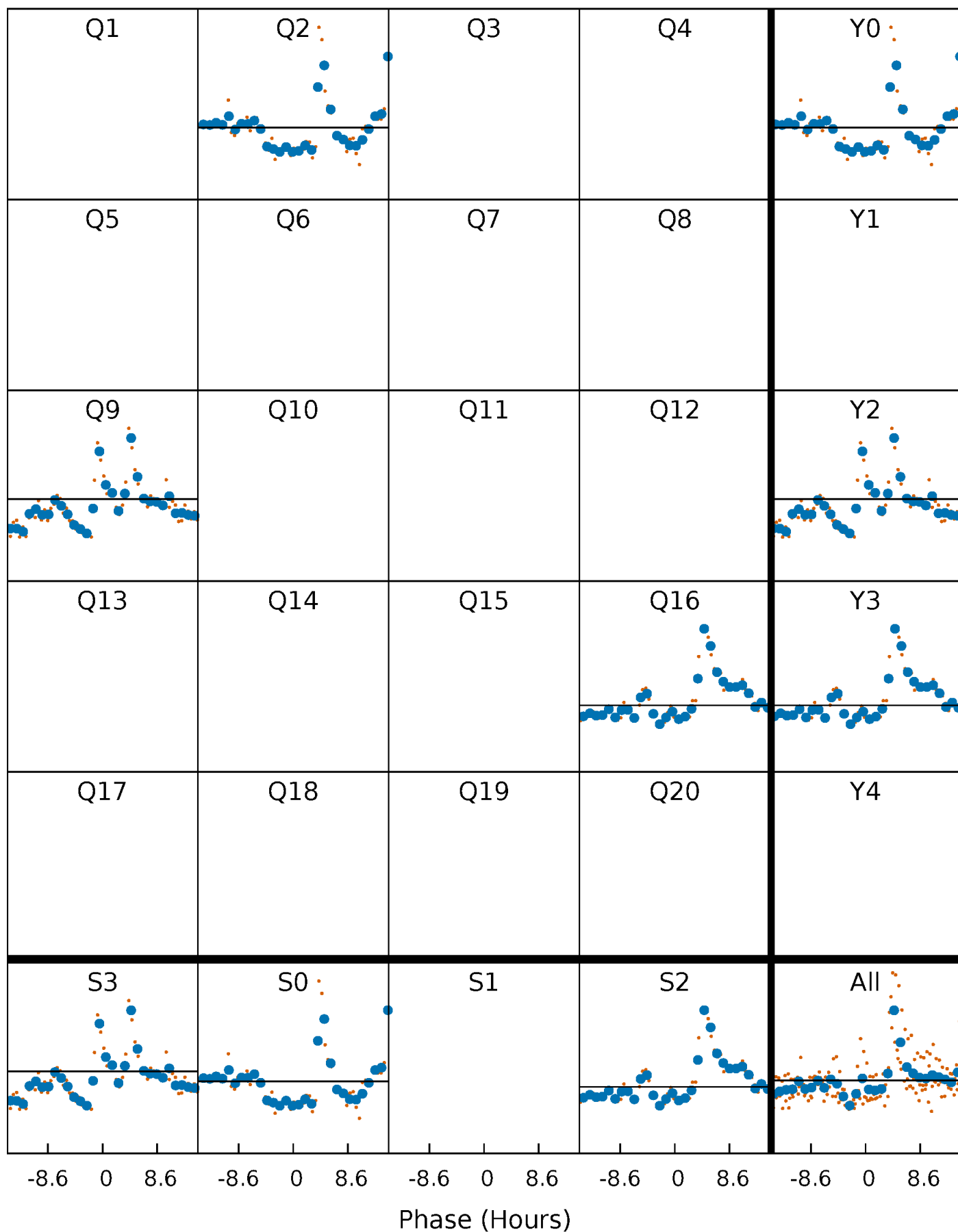
# PDC Quarter-Phased Transit Curves

TCE 004068539-07 P=660.834953 Days  $T_0=193.179478$  (BKJD)



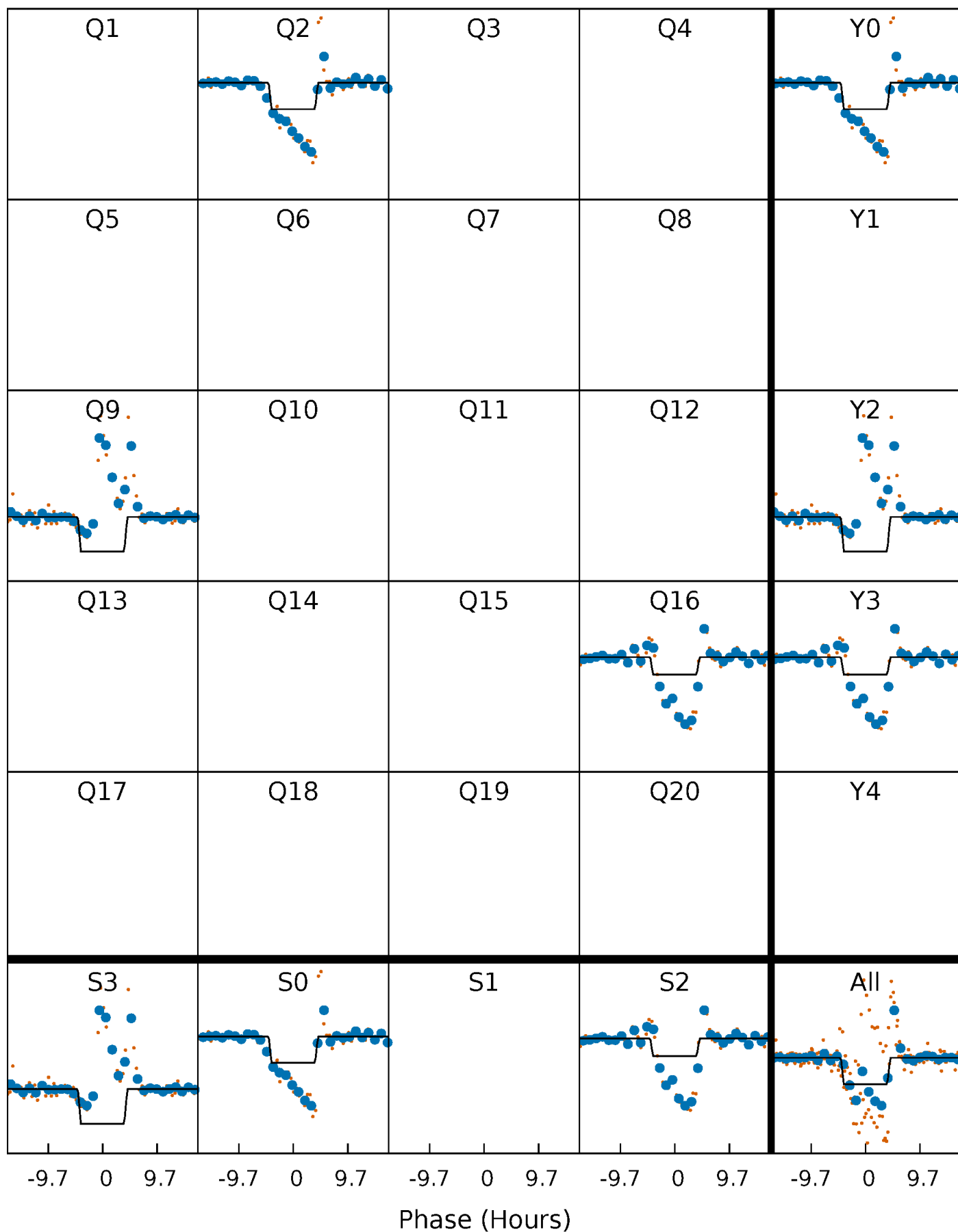
# DV Quarter-Phased Transit Curves

TCE 004068539-07     $P=660.834953$  Days     $T_0=193.179478$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

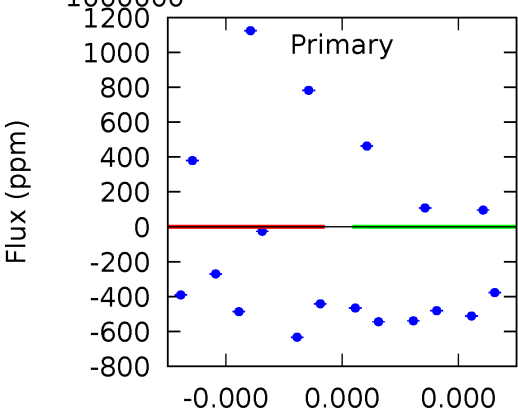
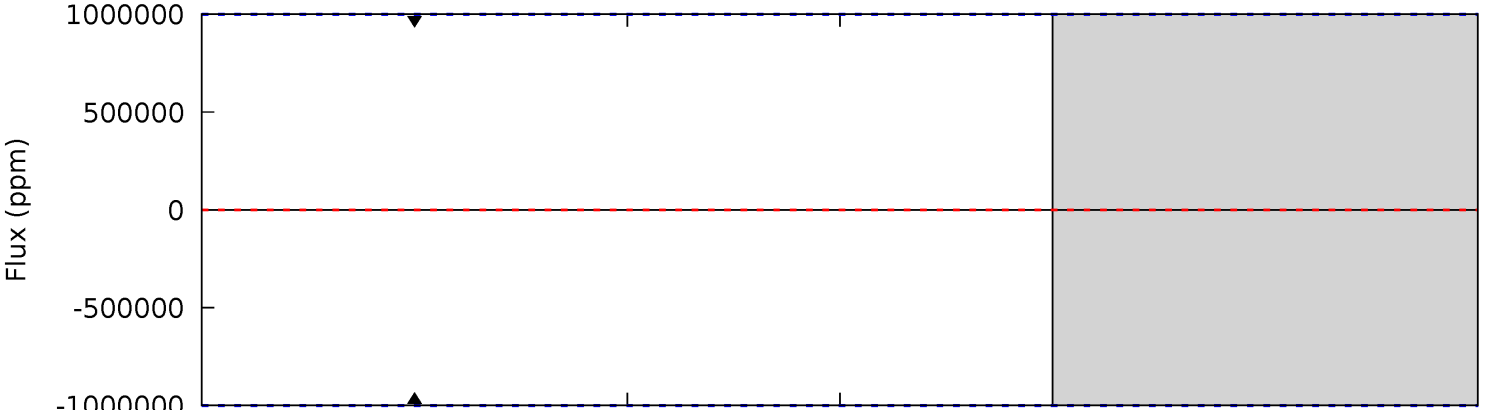
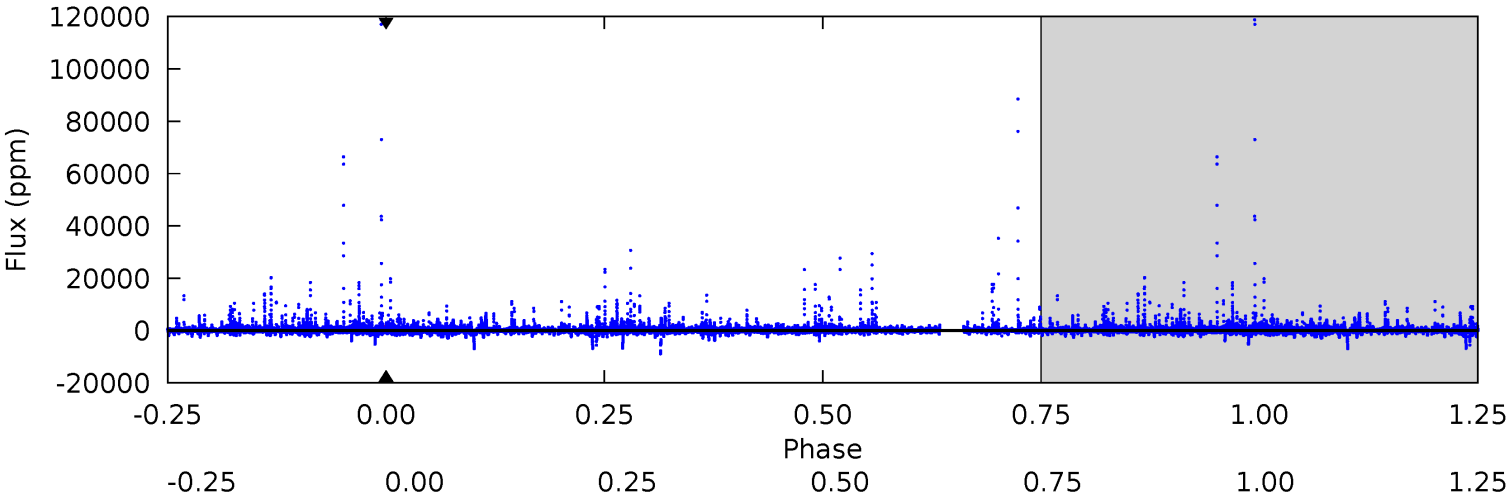
TCE 004068539-07 P=660.834953 Days  $T_0=193.160064$  (BKJD)



# DV Model-Shift Uniqueness Test

004068539-07, P = 660.834953 Days, E = 193.179478 Days

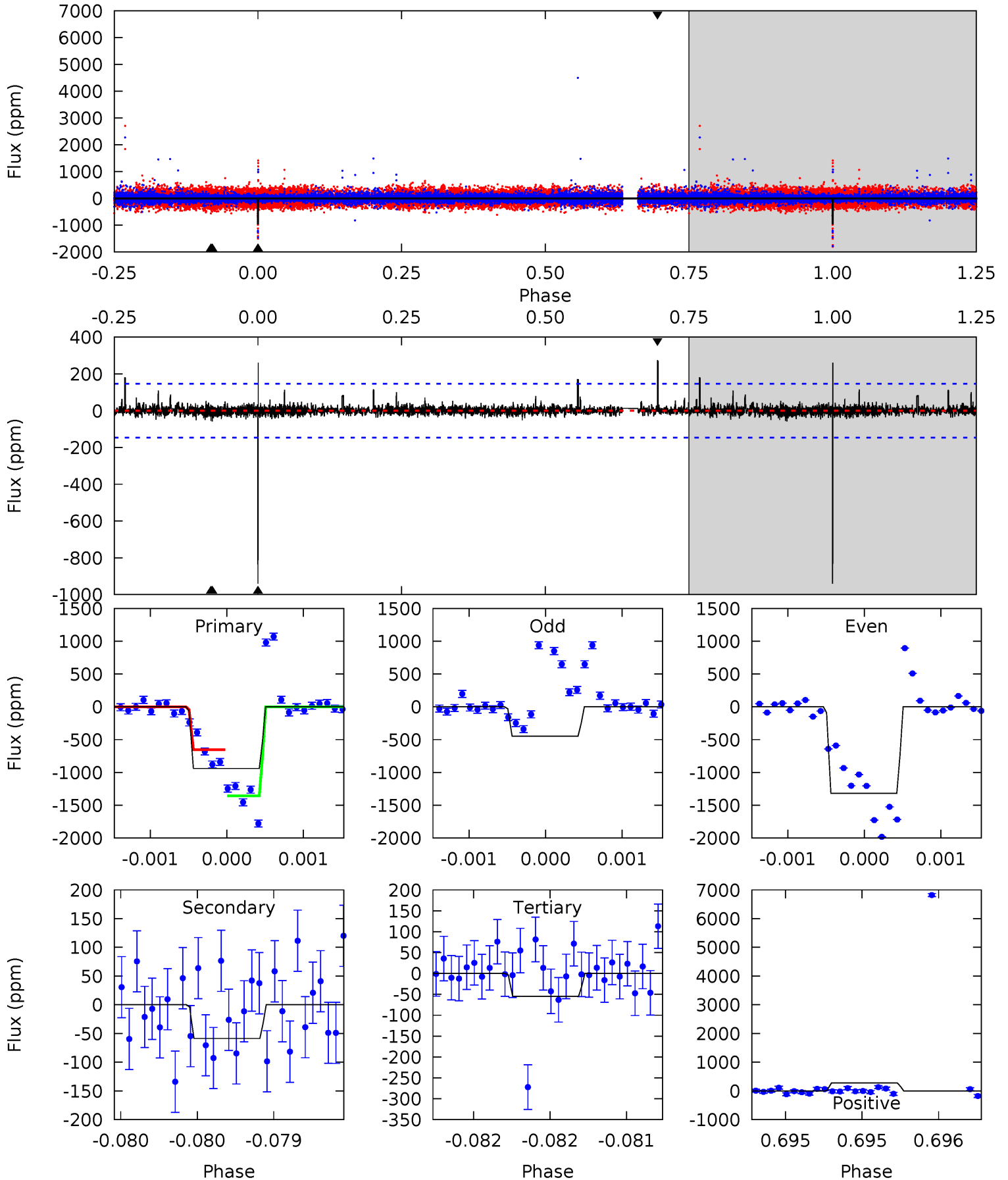
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



# Alt Model-Shift Uniqueness Test

004068539-07, P = 660.834953 Days, E = 193.160064 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
35.7	2.22	2.07	10.4	5.55	3.45	0.61	33.6	25.3	0.15	-8.18	20.3	0.65	0.23	13.3





### Stellar Parameters For KIC 004068539

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$4946^{+123}_{-123}$	$3.320^{+1.216}_{-0.304}$	$-0.320^{+0.300}_{-0.250}$	$3.376^{+1.800}_{-2.476}$	$0.868^{+0.264}_{-0.216}$	$0.032^{+1.760}_{-0.019}$
	+2%/-2%	+37%/-9%	+94%/-78%	+53%/-73%	+30%/-25%	+5542%/-60%
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 004068539-07 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$0 \pm 1000000$	$22.94^{+32.83}_{-16.80}$	$454^{+72}_{-103}$	$3182^{+12852}_{-16643}$	$768^{+583913}_{-359207}$
Alt.	$-59 \pm 26$	$24.35^{+32.72}_{-17.11}$	$461^{+68}_{-97}$	$2404^{+820}_{-395}$	$101^{+1119}_{-83}$

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

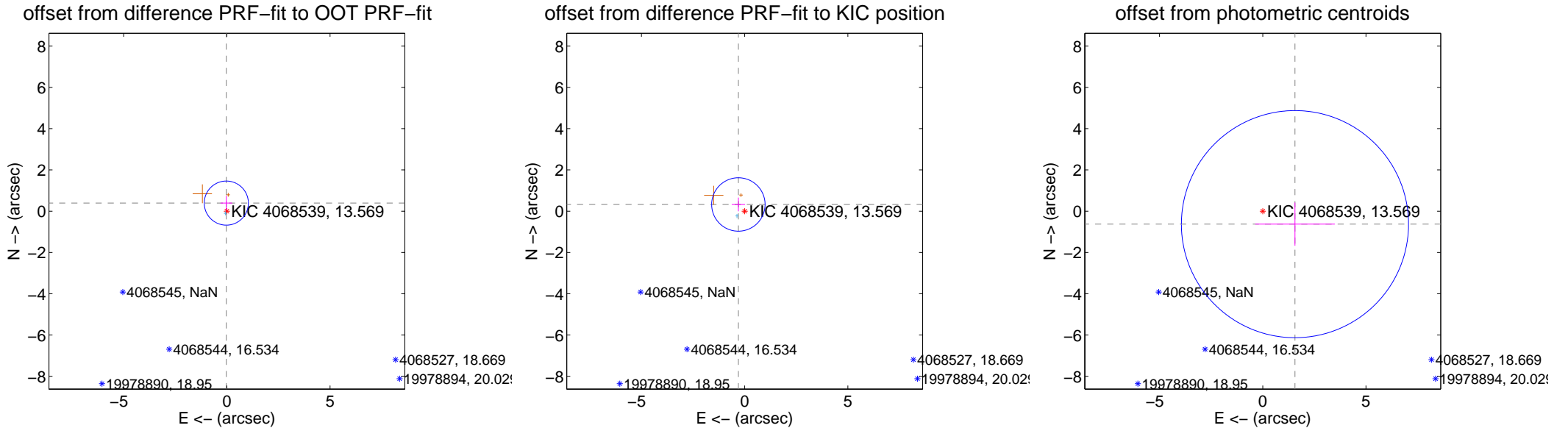
## DV Centroid Data

Supplemental centroid analysis for 004068539-07. Kepler magnitude: 13.57. Transit SNR -1.00

There are 1 quarters with good PRF difference image offsets

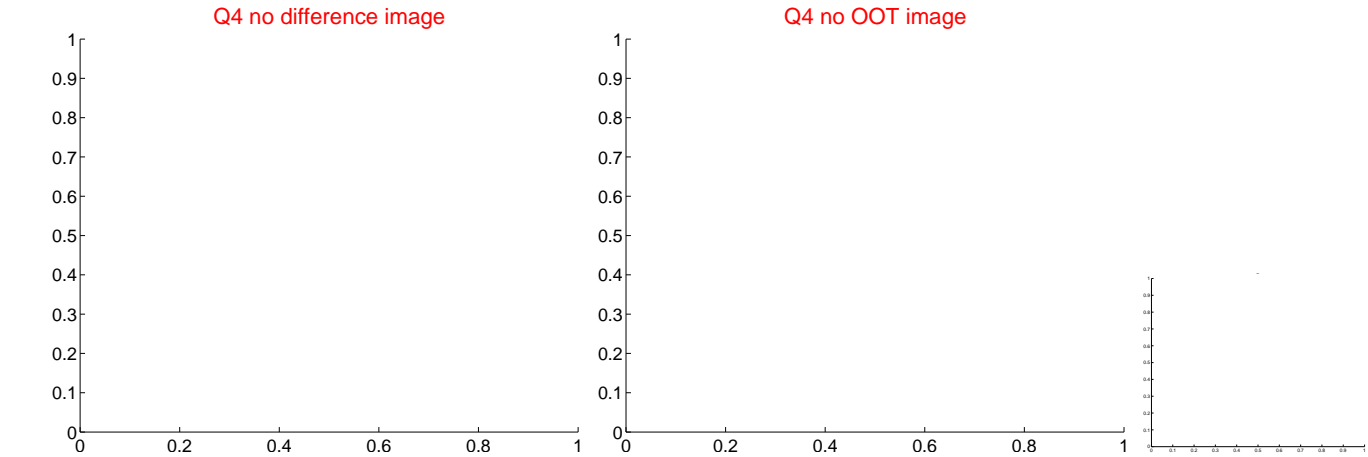
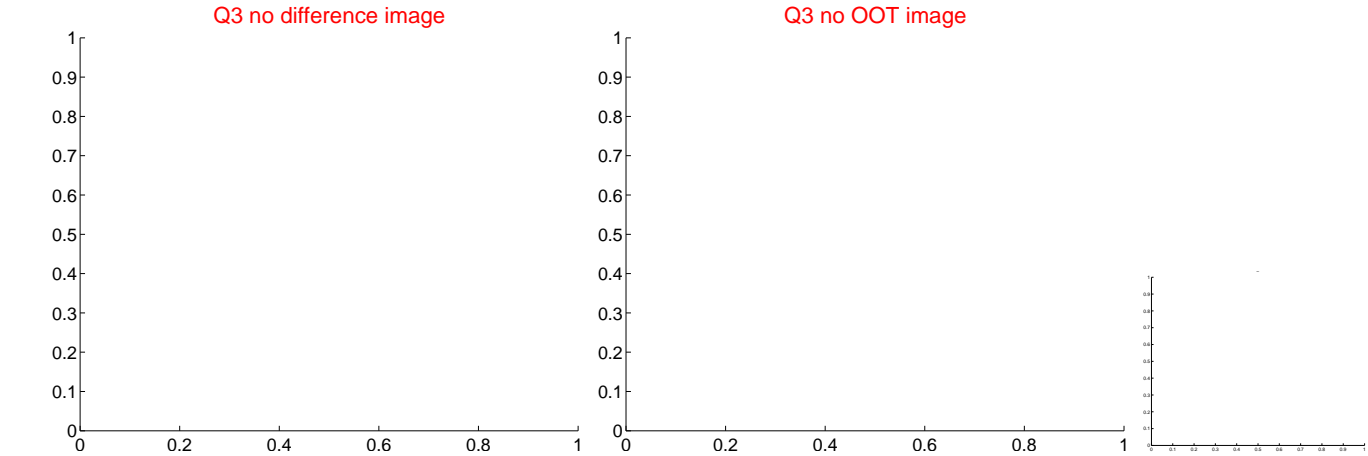
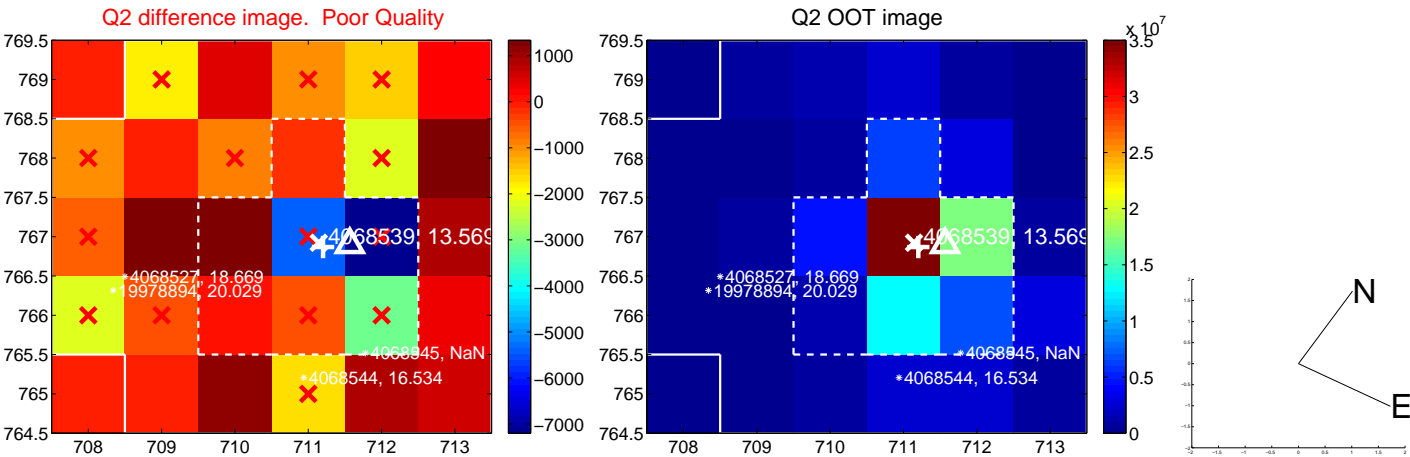
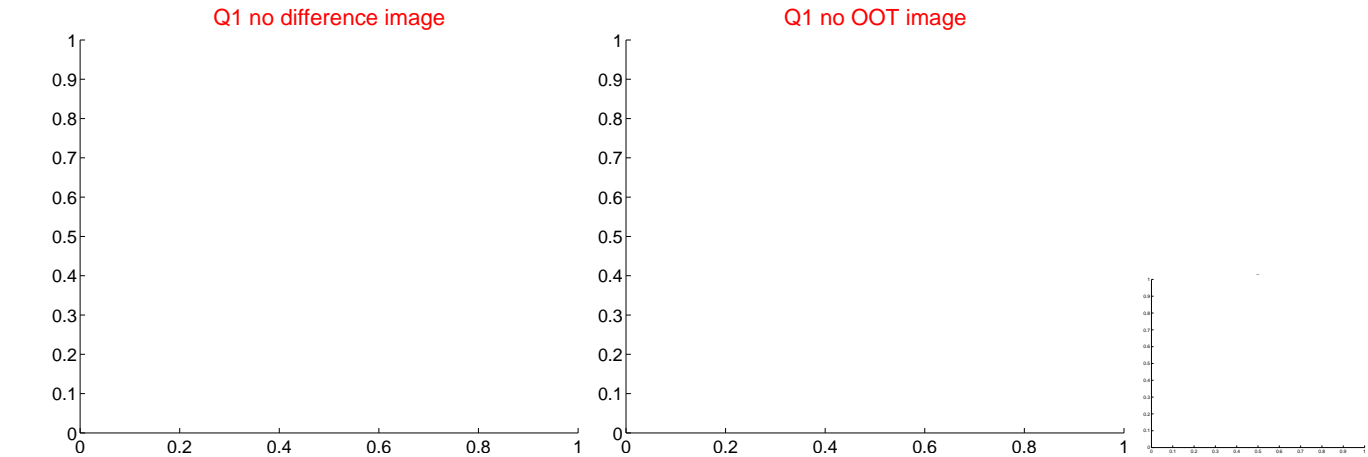
The direct PRF centroid is offset from the target star catalog position by about 0.33 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.393 \pm 0.356$	1.10	$0.026 \pm 0.283$	$0.392 \pm 0.348$
PRF-fit source offset from KIC position	$0.446 \pm 0.431$	1.03	$0.305 \pm 0.322$	$0.325 \pm 0.332$
photometric centroid source offset	$1.68 \pm 1.83$	0.92	$-1.56 \pm 1.93$	$-0.63 \pm 1.05$



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.

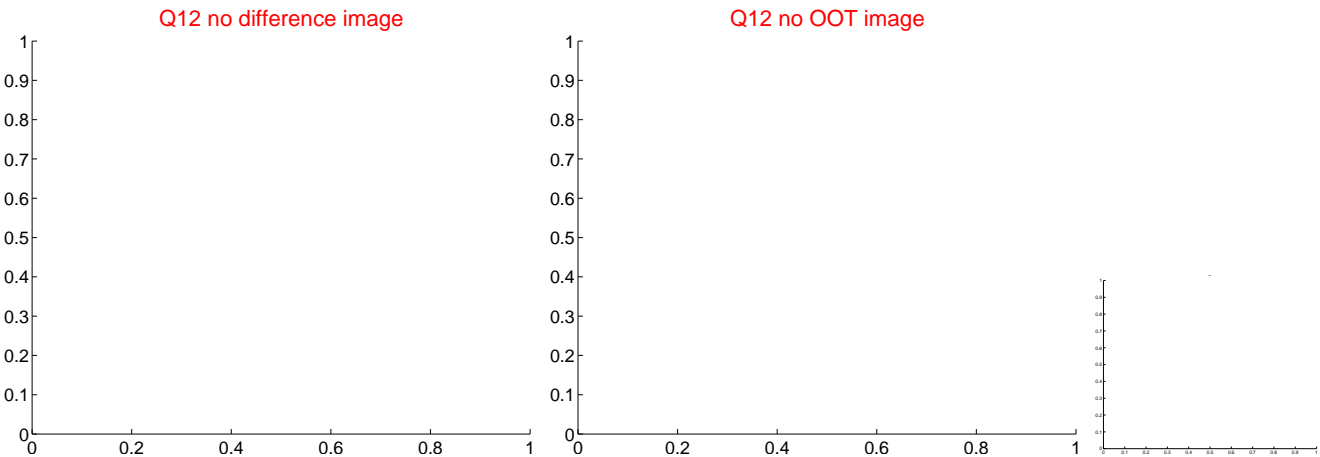
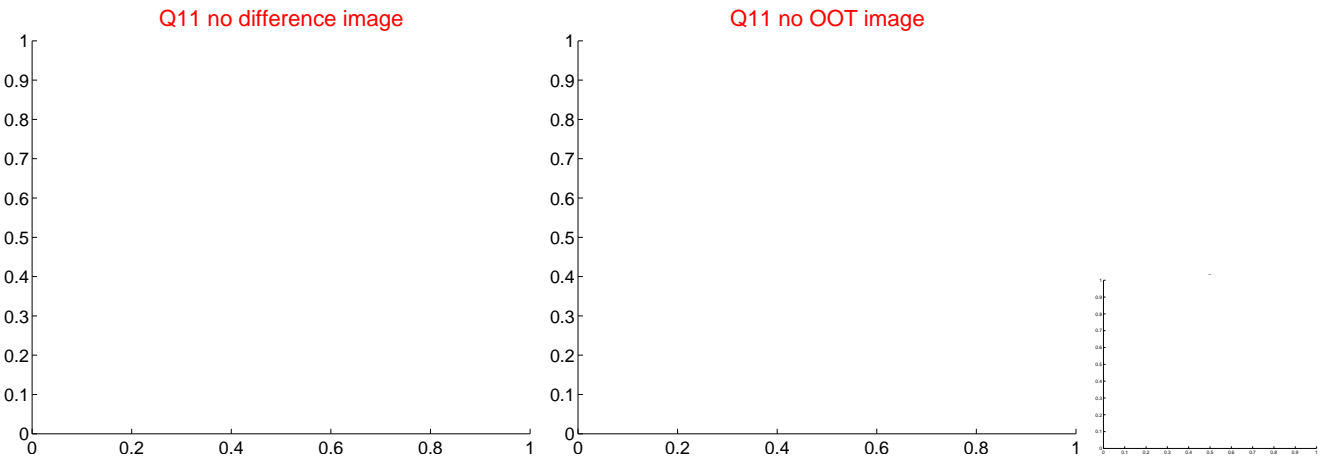
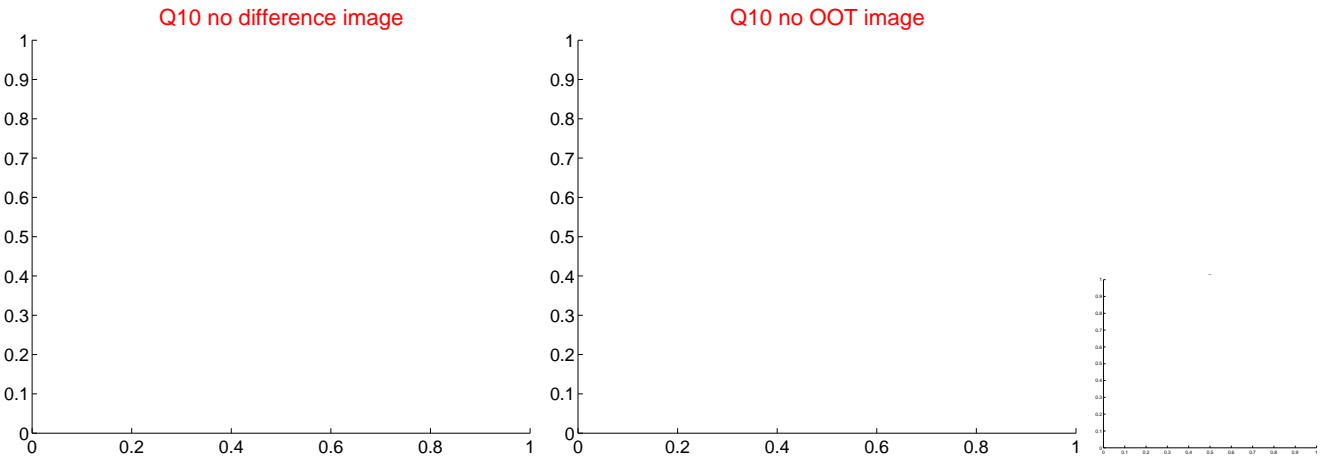
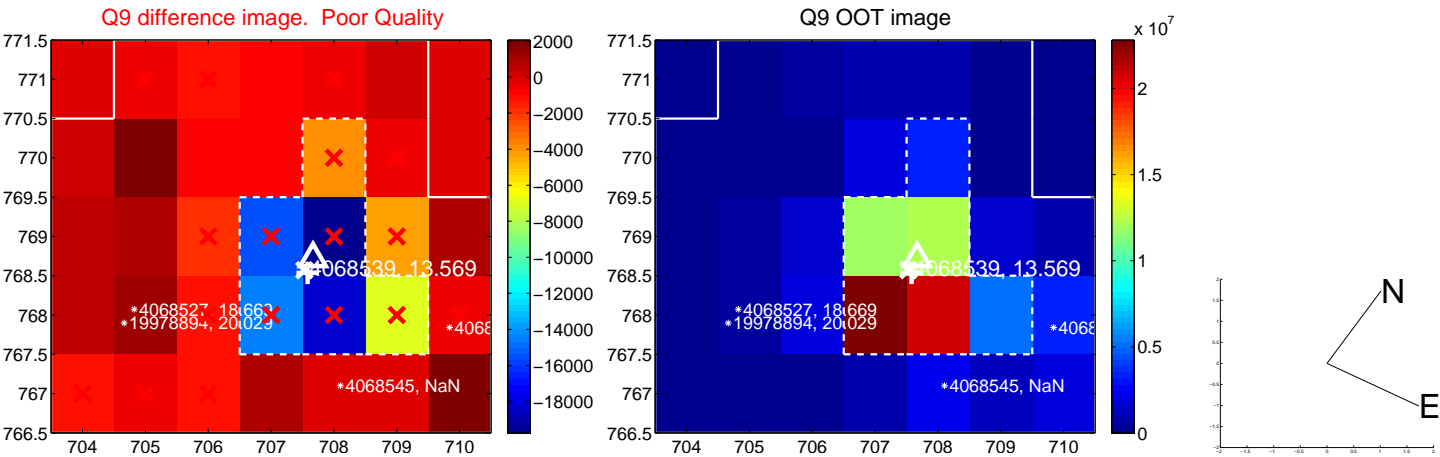
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



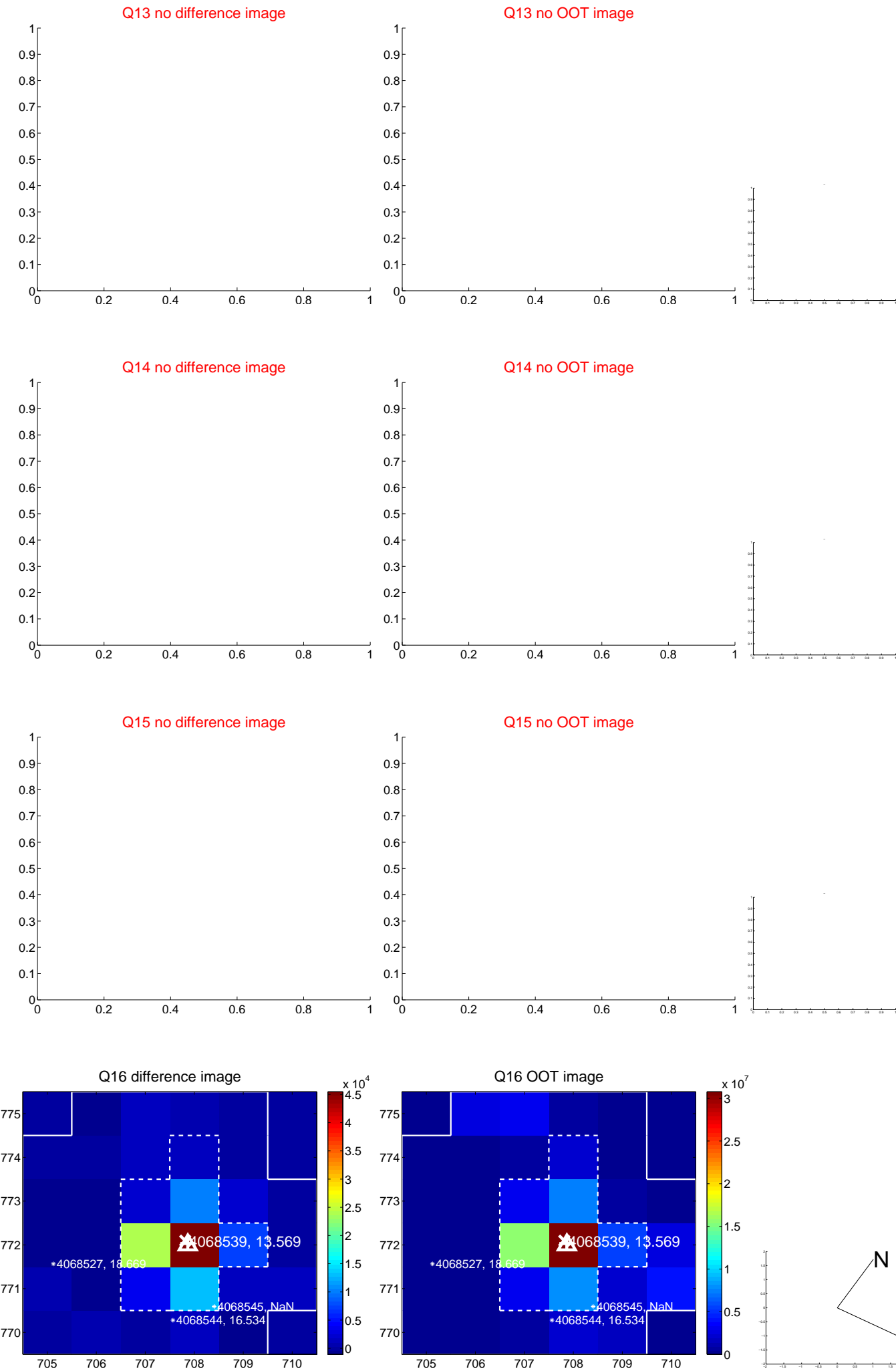
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



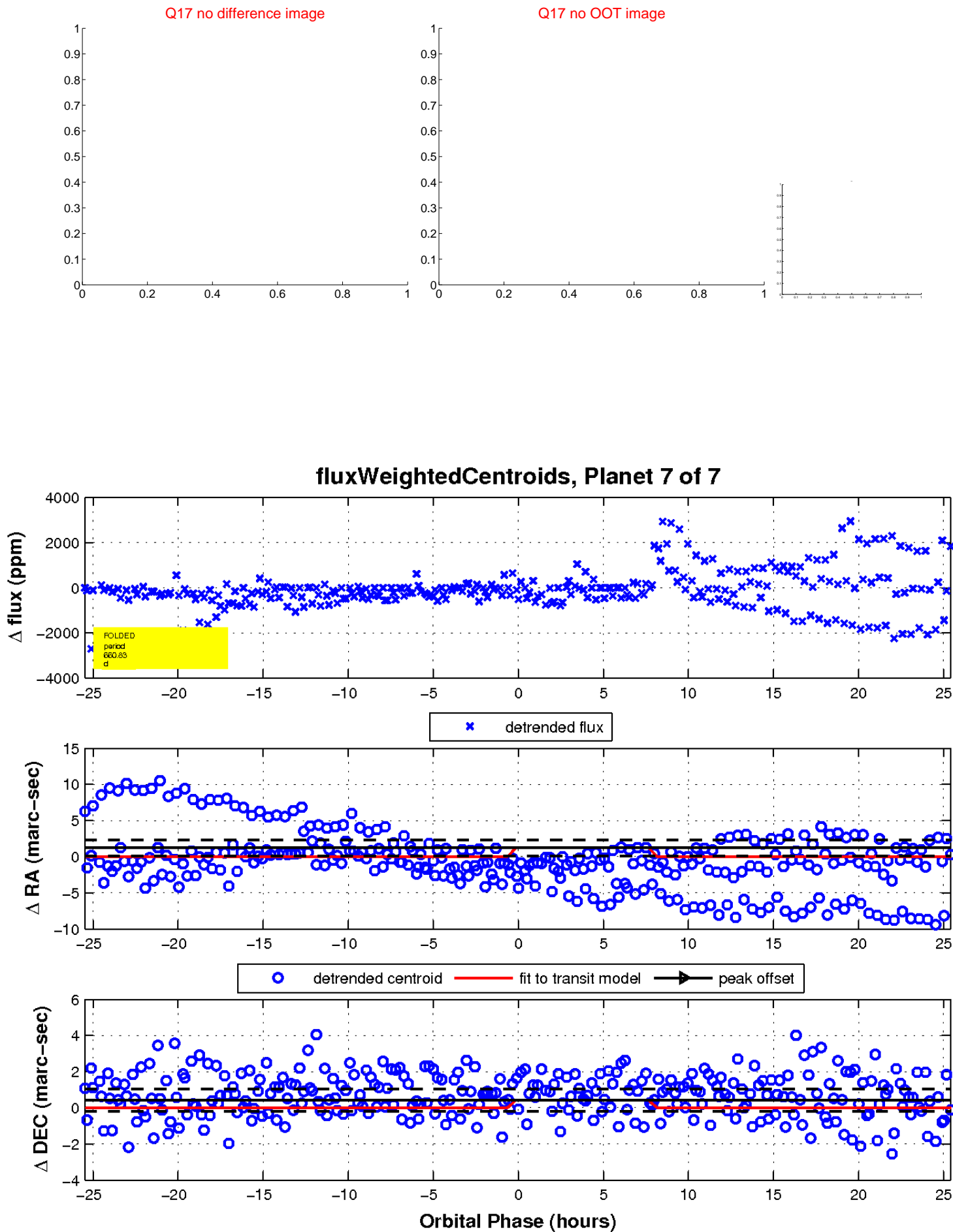
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

