

# KIC 009612084

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009612084-01	OBS	No	1.072278	132.559506	29.2	4.632	8.4	8.2	7.09	5095	4.49	0.00
009612084-02	OBS	No	175.465170	258.536516	601.6	2.271	8.3	9.2	7.09	5095	19.07	49.71
009612084-03	OBS	No	202.221958	170.176293	489.3	4.495	8.7	8.4	7.09	5095	18.78	41.14
009612084-04	OBS	No	81.760399	139.458312	302.5	3.181	8.5	8.8	7.09	5095	13.05	137.62
009612084-05	OBS	No	139.808662	242.670574	358.0	6.969	8.1	7.7	7.09	5095	14.89	67.30
009612084-06	OBS	No	273.160085	376.365574	457.8	4.949	7.7	8.1	7.09	5095	17.53	27.55
009612084-07	OBS	No	29.442997	149.385149	210.3	3.733	8.0	8.4	7.09	5095	11.14	537.14
009612084-08	OBS	No	483.641932	300.213871	109.9	6.000	7.6	-1.0	7.09	5095	7.24	12.86

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009612084-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
009612084-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT
009612084-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES—TRANS_GAPPED—MOD_NONUNIQ_ALT
009612084-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
009612084-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS
009612084-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
009612084-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_ZUMA—TRANS_GAPPED—MOD_NONUNIQ_ALT
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**Notes:** OBS = Observed. INJ = Injected. INV = Inverted. SCR = Scrambled.

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

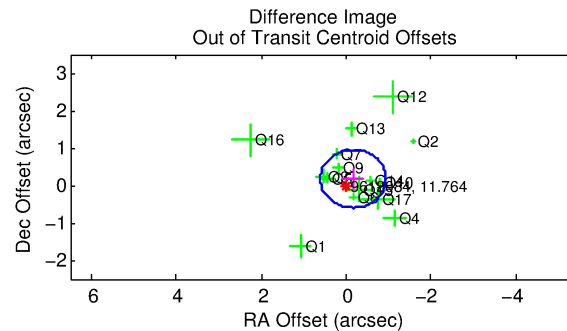
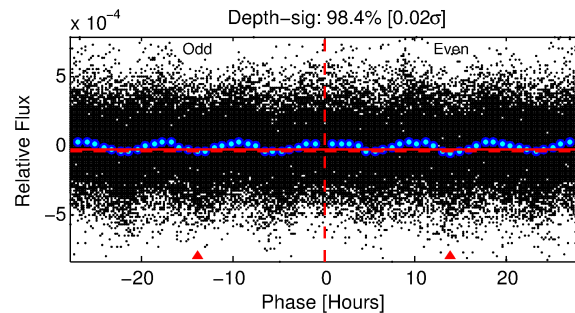
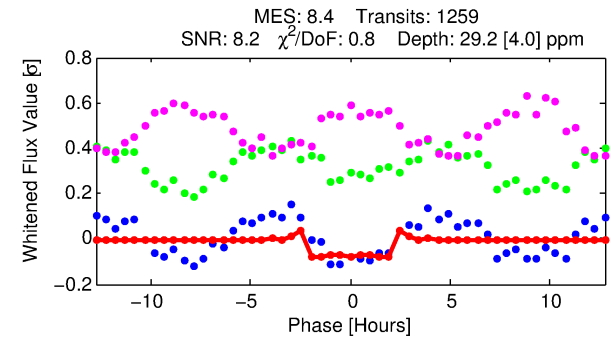
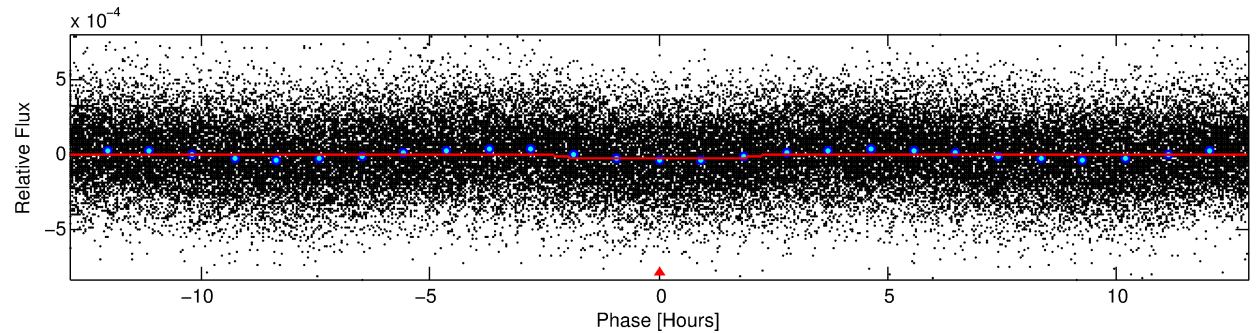
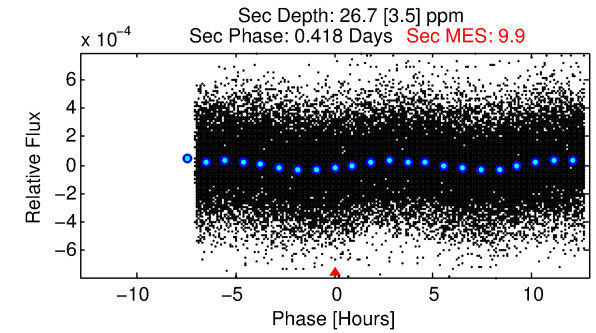
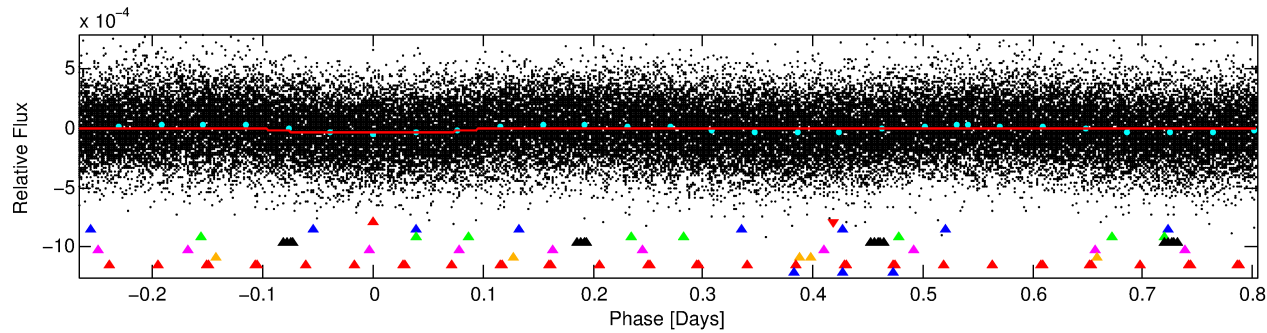
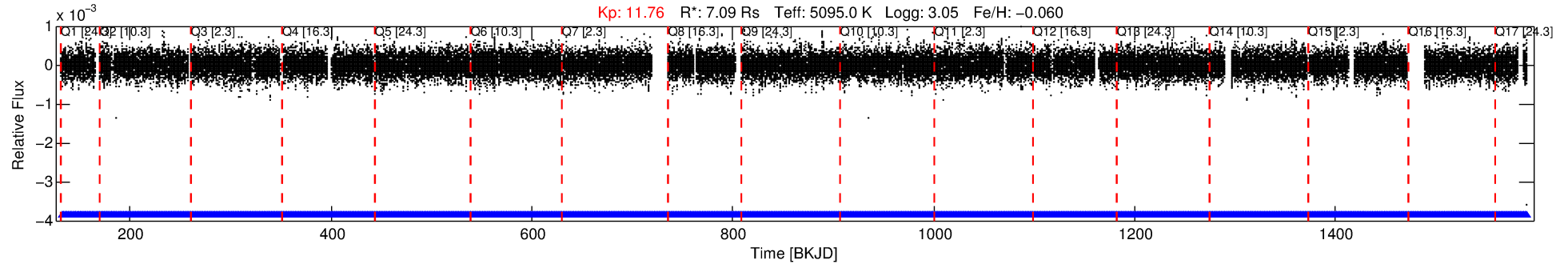
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 009612084-01

No Significant Match Found

# DV One-Page Summary

KIC: 9612084 Candidate: 1 of 8 Period: 1.072 d



## DV Fit Results:

Period = 1.07228 [0.00001] d  
Epoch = 132.5595 [0.0025] BKJD  
Rp/R\* = 0.0058 [0.0017]  
a/R\* = 1.29 [0.63]  
b = 0.87 [0.36]  
Seff = N/A  
Teq = N/A  
Rp = 4.49 [2.15] Re  
a = N/A  
Ag = N/A  
Teffp = N/A

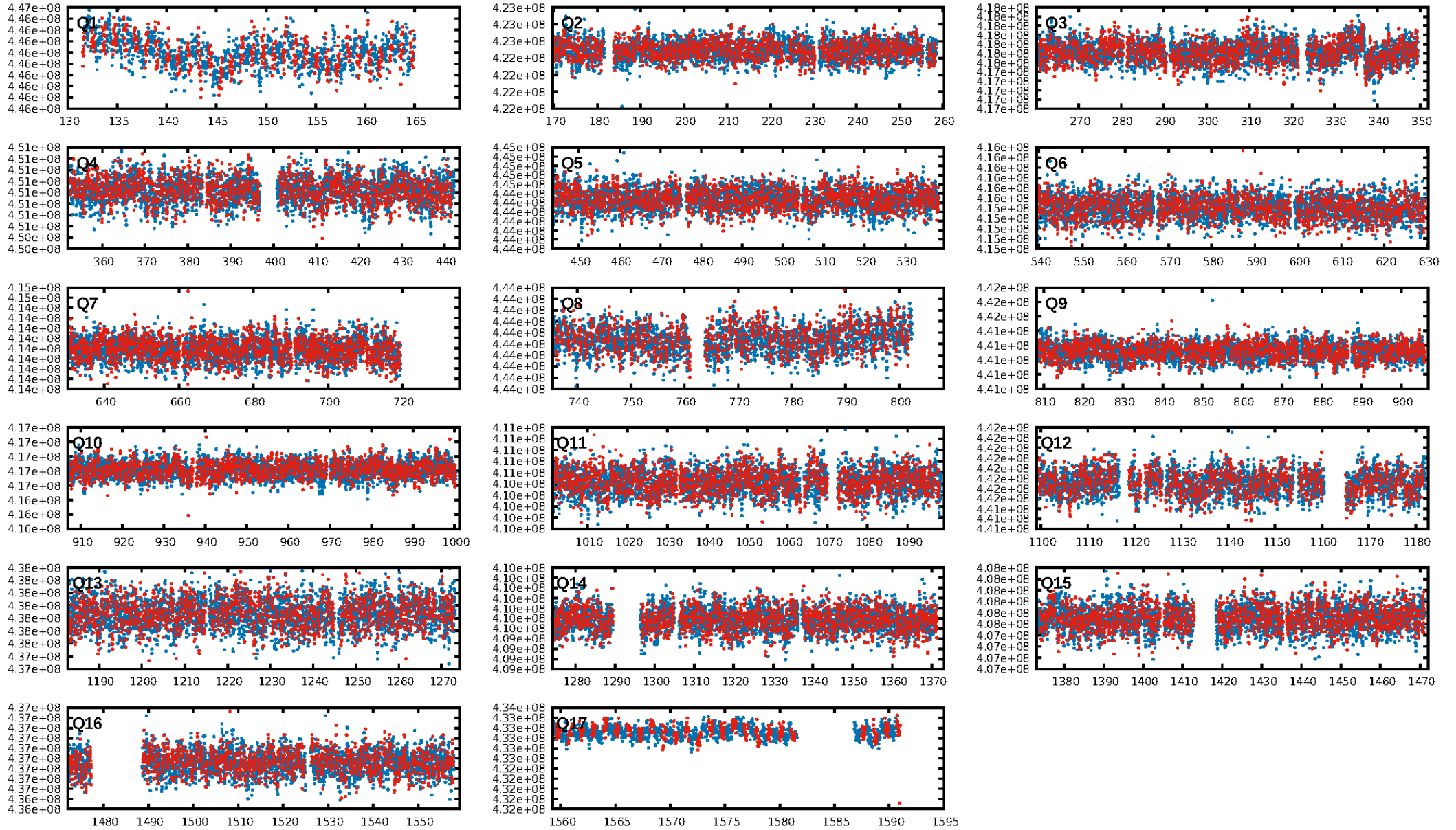
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [114.45σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [1202/1202]  
GhostDiagnostic-chr: 2.056  
Centroid-sig: 0.3%  
Centroid-so: 0.847 arcsec [1.96σ]  
OotOffset-rm: 0.244 arcsec [0.94σ]  
KicOffset-rm: 0.386 arcsec [1.51σ]  
OotOffset-st: 4/3/3/5 [15]  
KicOffset-st: 4/3/3/5 [15]  
DiffImageQuality-fgm: 0.93 [14/15]  
DiffImageOverlap-fno: 1.00 [17/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 13:20:48 Z

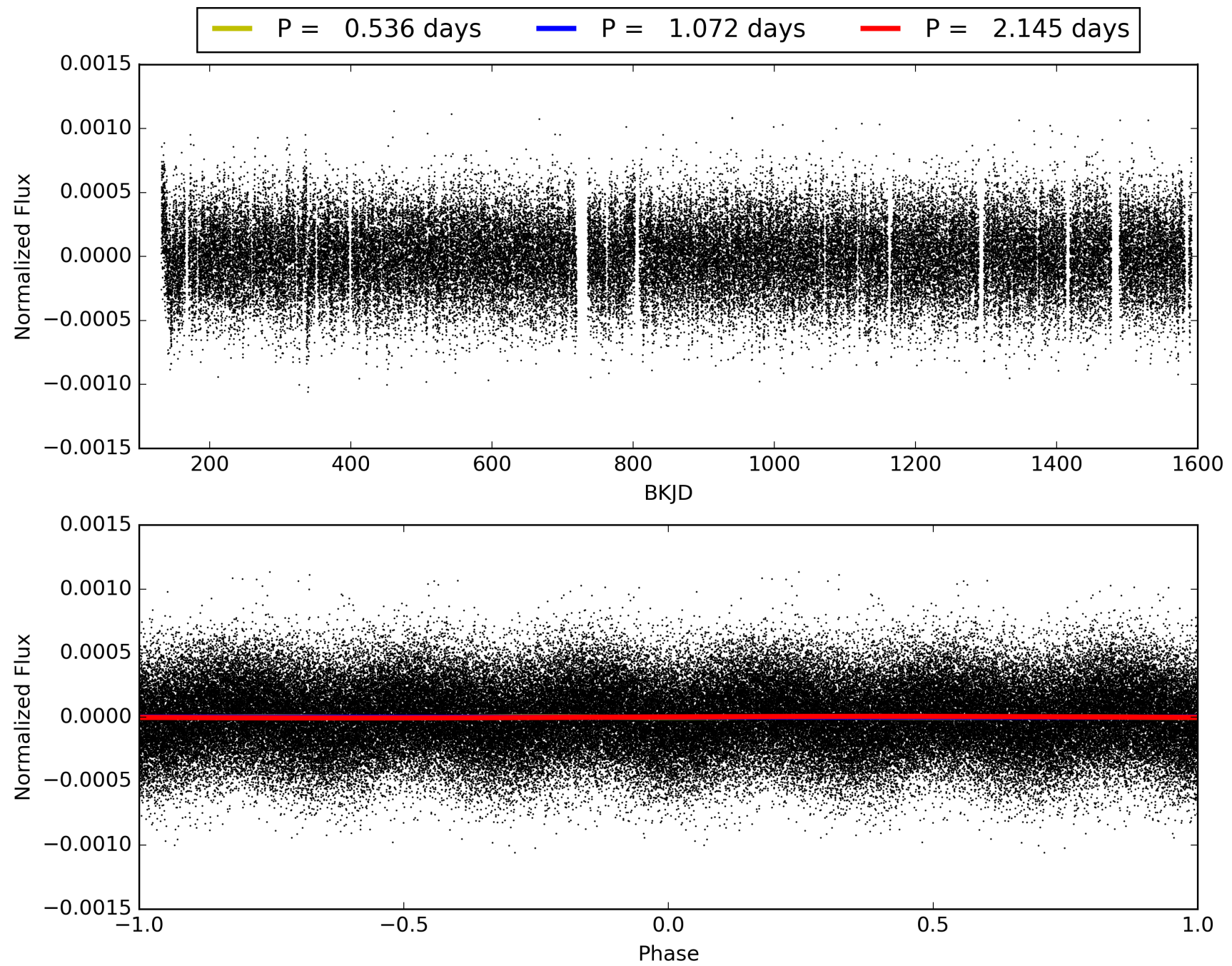
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 009612084-01, PDC Light Curves





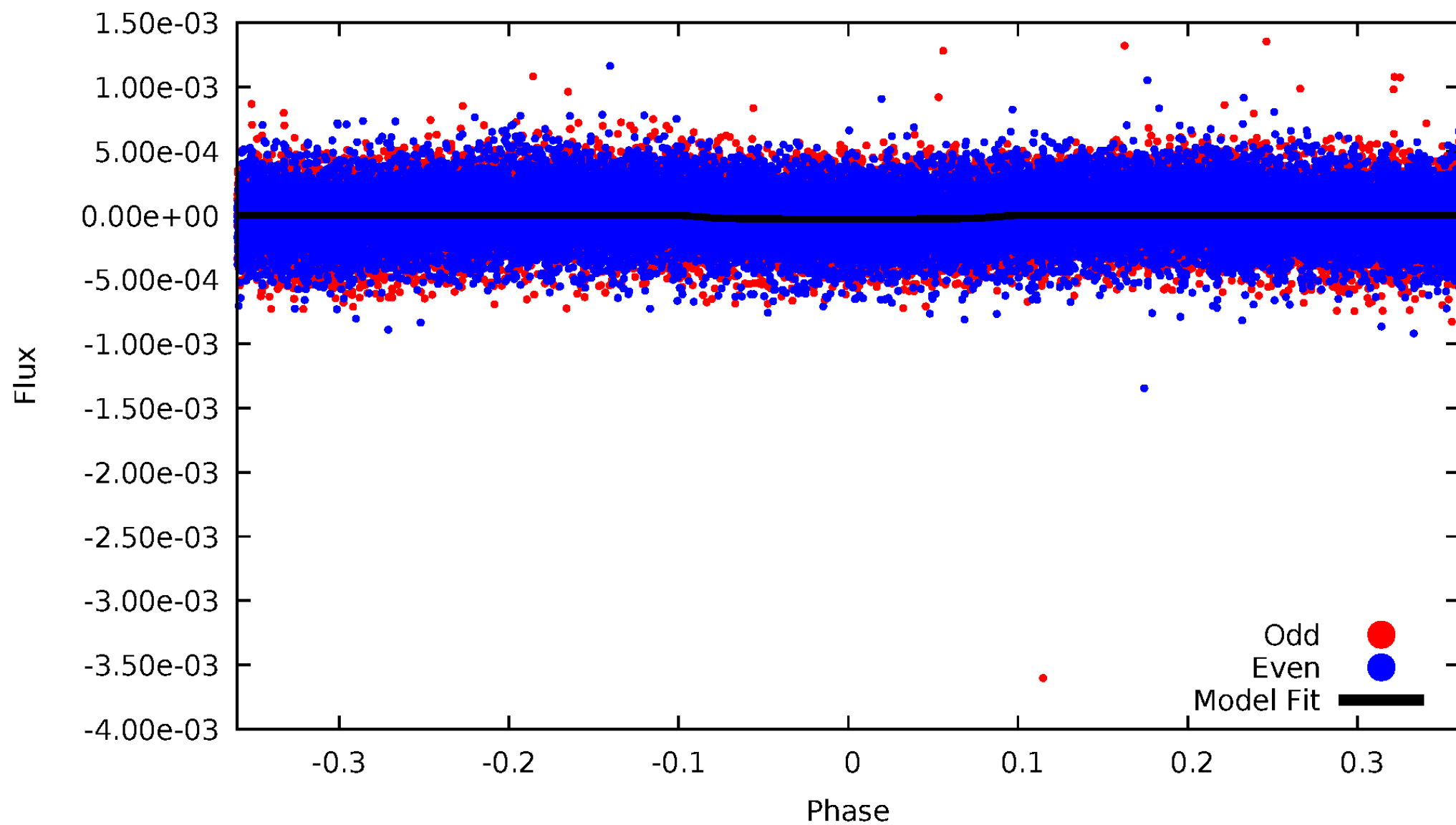
TCE 009612084-01





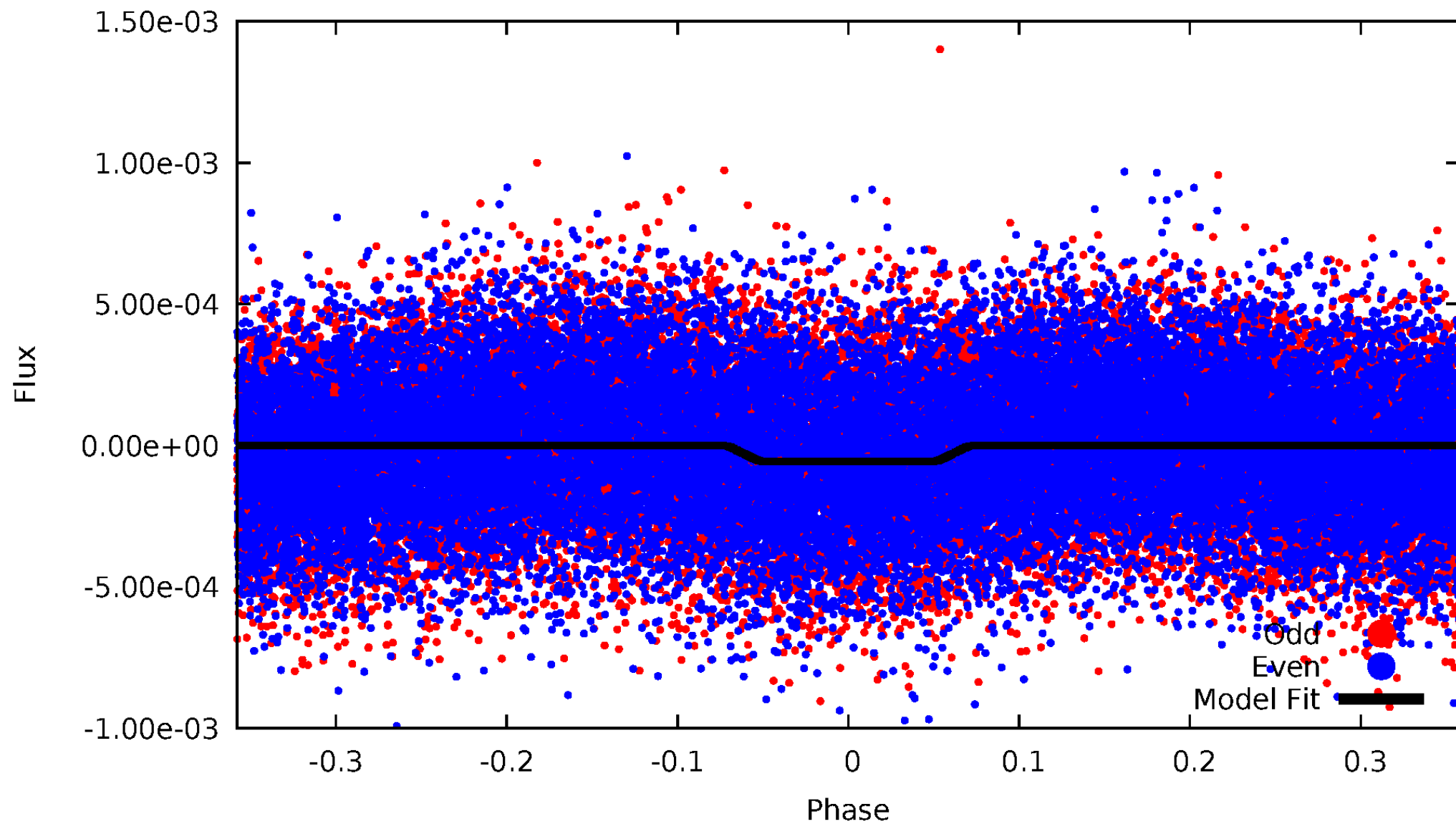
# DV Odd/Even

TCE 009612084-01



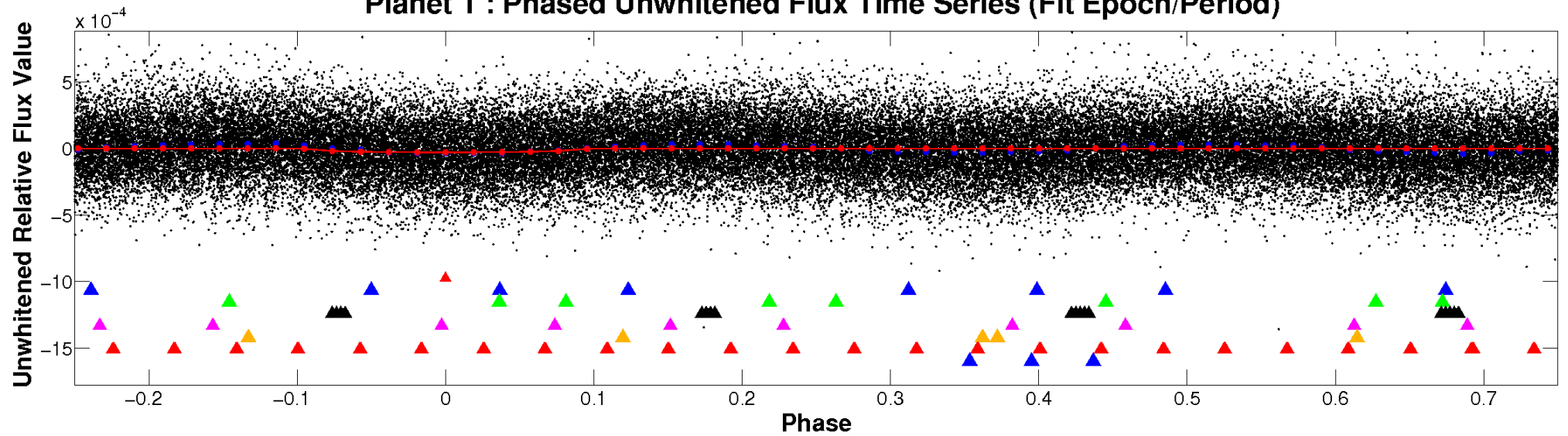
# ALT Odd/Even

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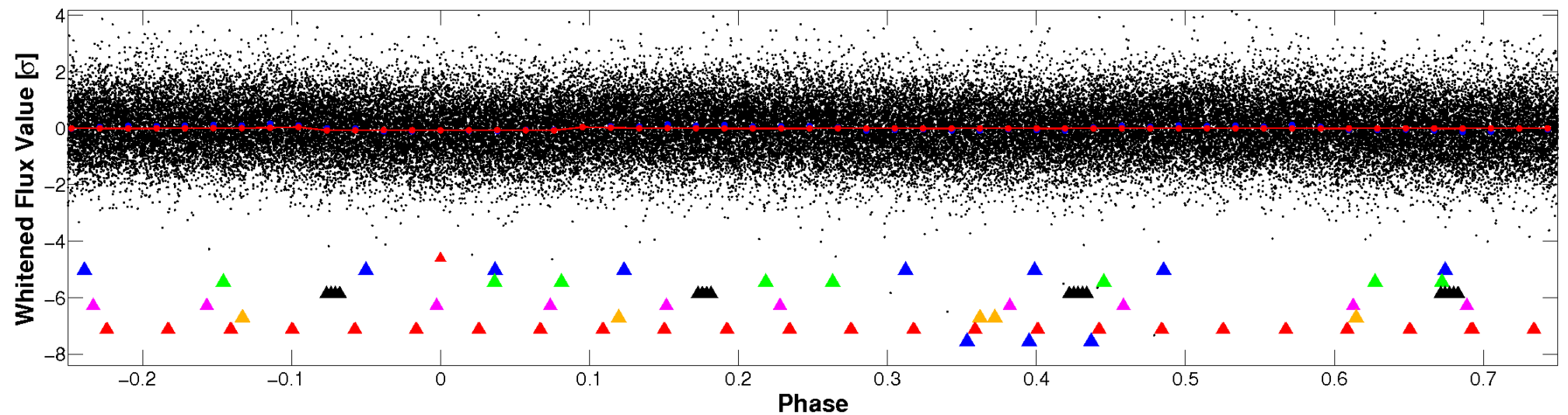


# Non-Whitened Vs. Whitened Light Curve

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



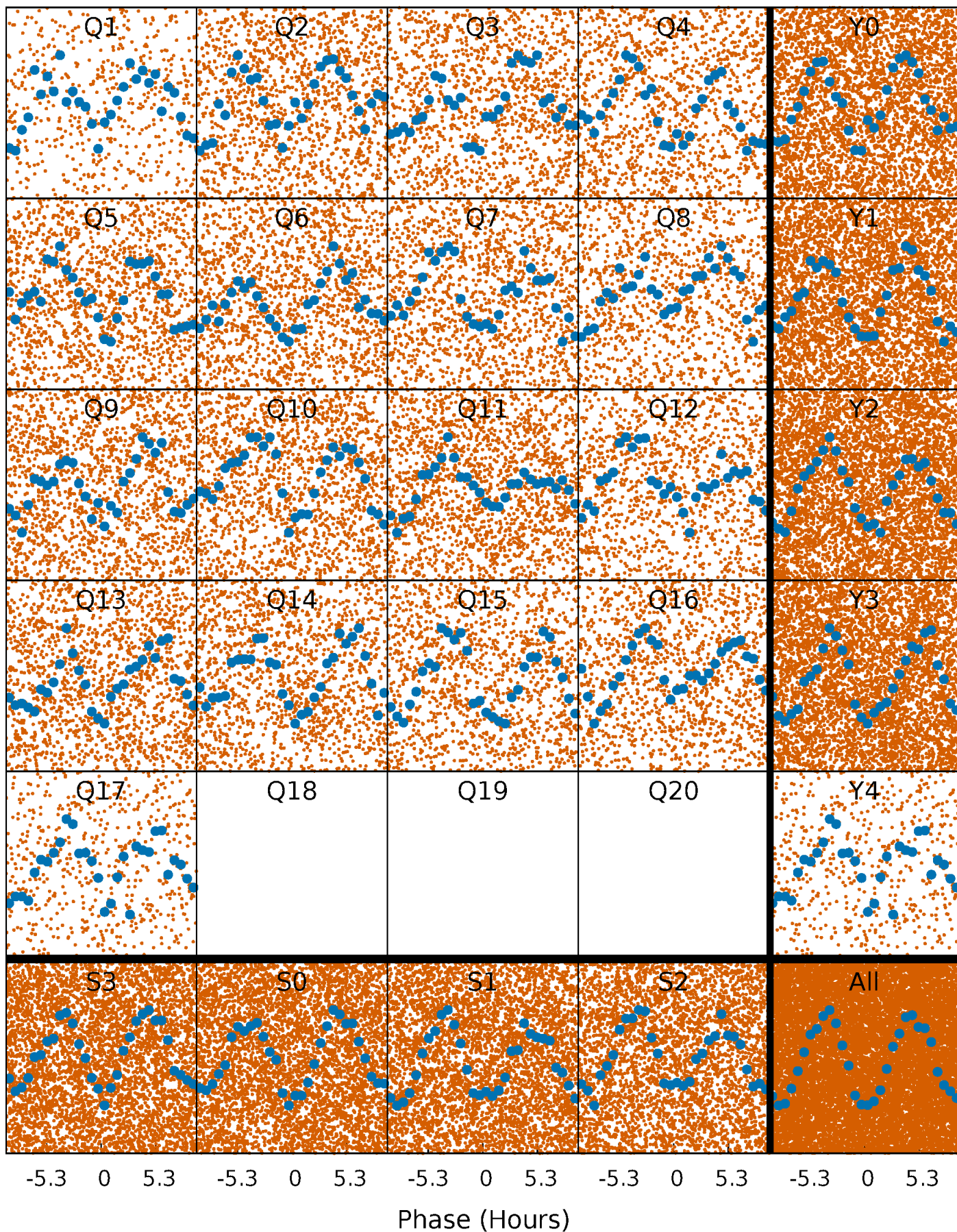
**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**





# PDC Quarter-Phased Transit Curves

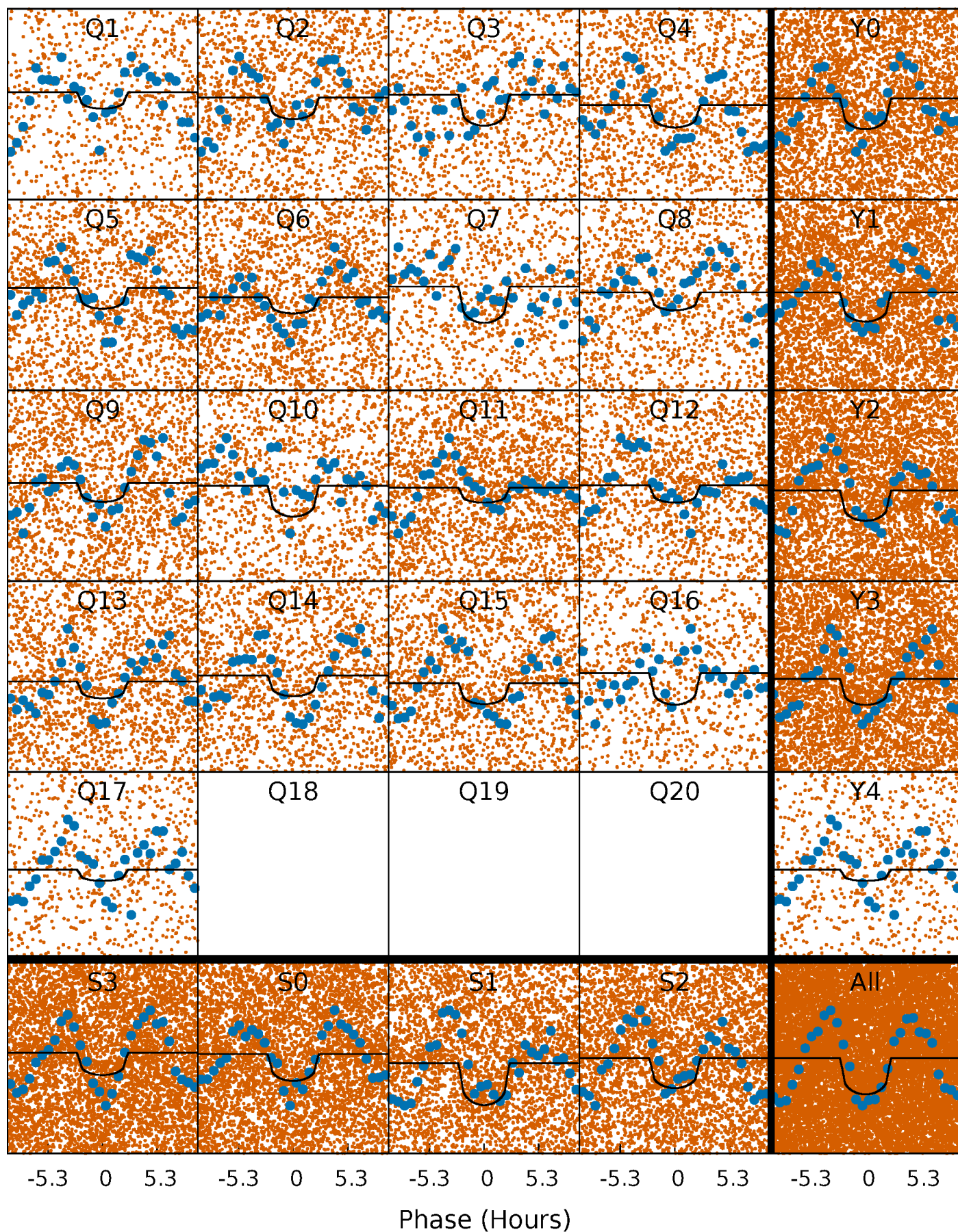
TCE 009612084-01   P= 1.072278 Days    $T_0=132.559506$  (BKJD)





# DV Quarter-Phased Transit Curves

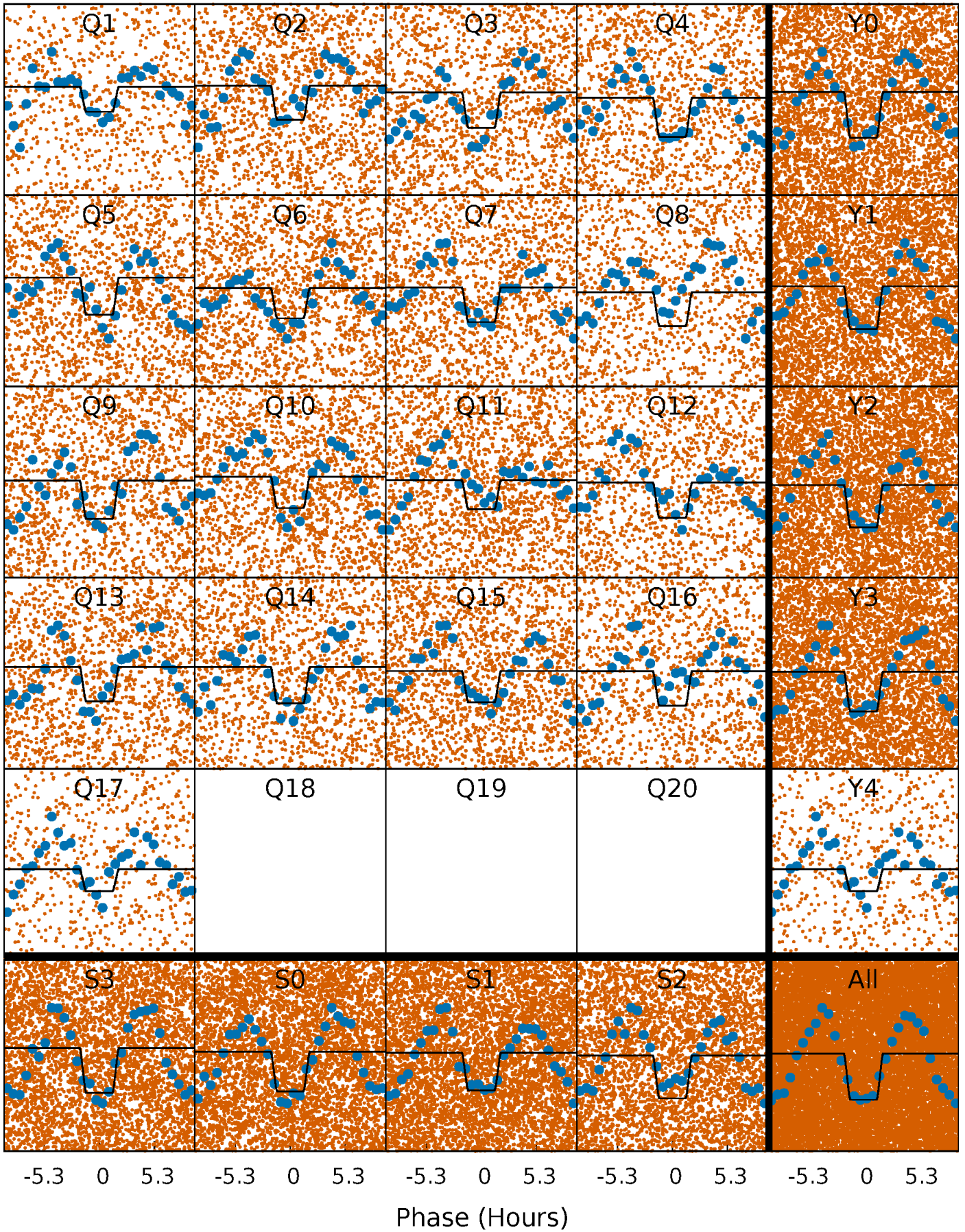
TCE 009612084-01 P= 1.072278 Days  $T_0=132.559506$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

TCE 009612084-01 P= 1.072318 Days  $T_0=132.544633$  (BKJD)

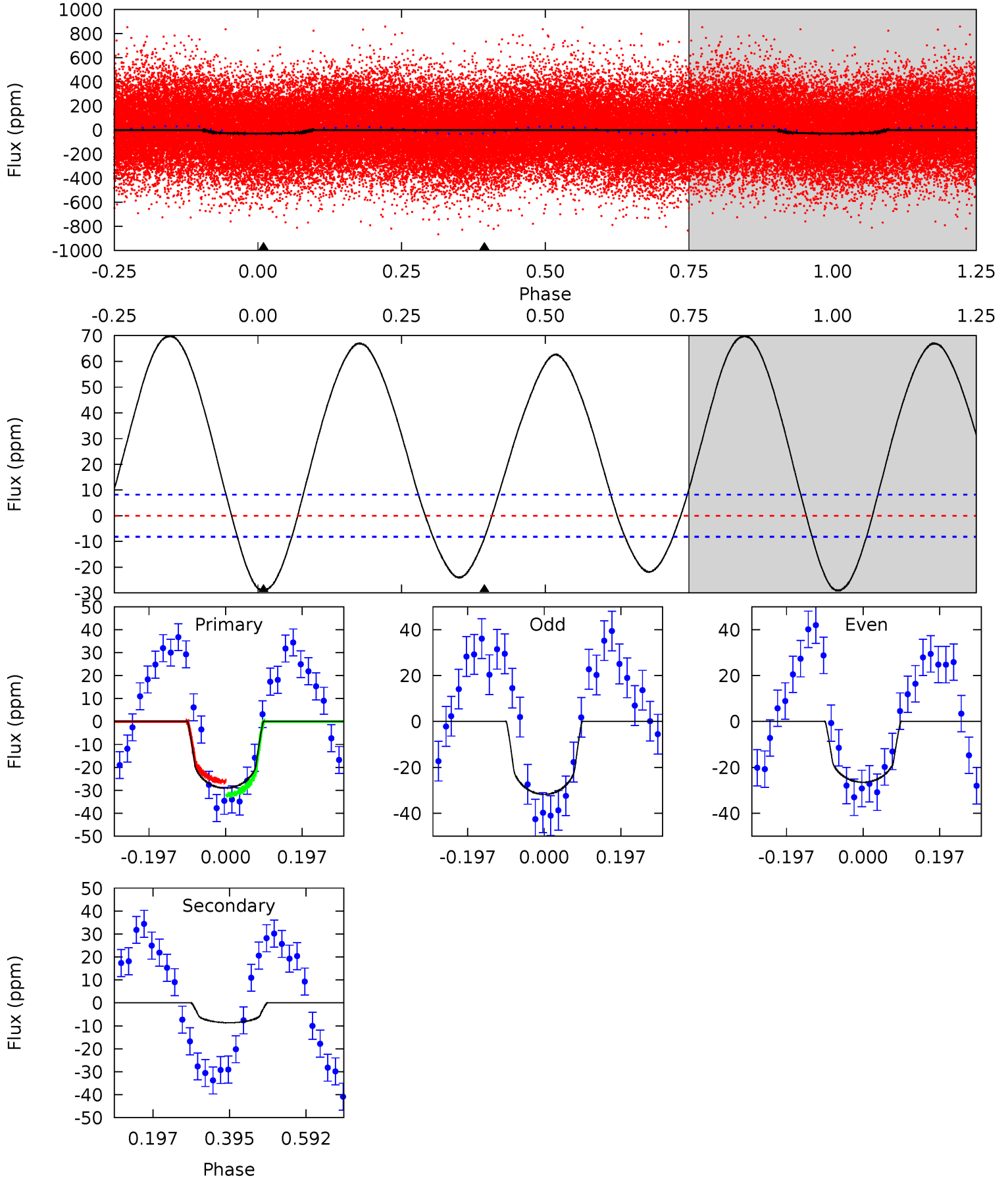




# DV Model-Shift Uniqueness Test

009612084-01, P = 1.072278 Days, E = 131.487228 Days

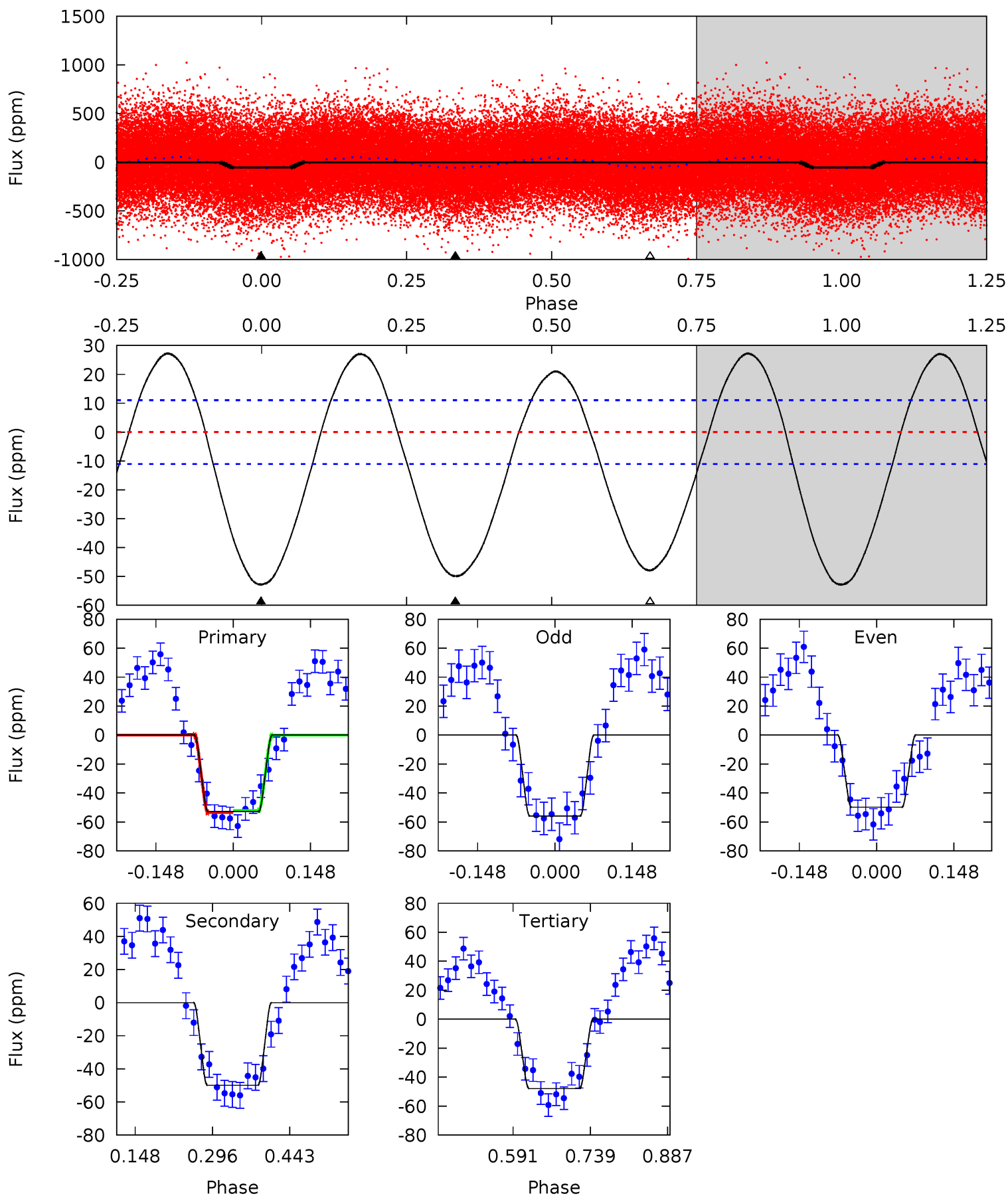
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
15.7	4.68	0	0	4.42	1.29	12.6	15.7	15.7	4.68	4.68	1.44	1.29	0.71	1.66



# Alt Model-Shift Uniqueness Test

009612084-01, P = 1.072318 Days, E = 131.472315 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
21.4	20.2	19.4	0	4.48	1.45	10.9	2.00	21.4	0.82	20.2	1.23	1.07	0.34	0.29



### Stellar Parameters For KIC 009612084

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5095^{+45}_{-121}$	$3.052^{+0.195}_{-0.105}$	$-0.060^{+0.100}_{-0.250}$	$7.094^{+1.066}_{-2.666}$	$2.070^{+0.533}_{-0.799}$	$0.008^{+0.011}_{-0.003}$
	+1%/-2%	+6%/-3%	+167%/-417%	+15%/-38%	+26%/-39%	+136%/-31%
Source	SPE74	SPE74	SPE74	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology  
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

### Secondary Eclipse Parameters for KIC 009612084-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-9 \pm 2$	$4.35^{+1.54}_{-1.58}$	$5117^{+235}_{-367}$	$-3676^{+7201}_{-442}$	$0.177^{+0.229}_{-0.082}$
Alt.	$-50 \pm 2$	$5.69^{+1.69}_{-1.49}$	$5112^{+240}_{-345}$	$4277^{+806}_{-972}$	$0.594^{+0.450}_{-0.240}$

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



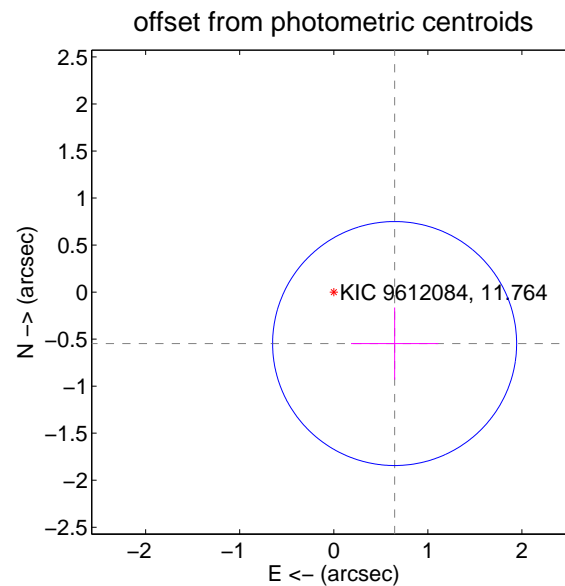
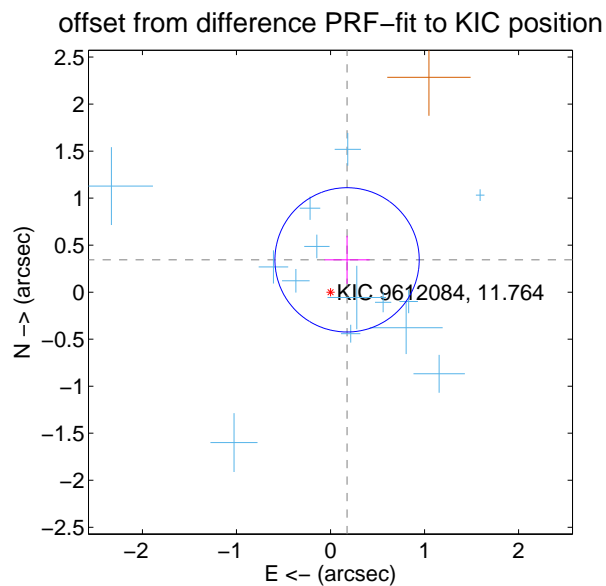
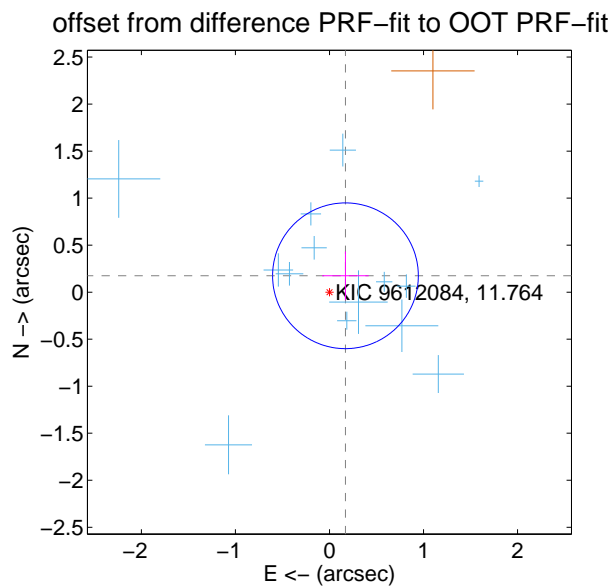
## DV Centroid Data

Supplemental centroid analysis for 009612084-01. **Kepler magnitude: 11.76.** Transit SNR 8.18

There are 14 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.04 arcsec

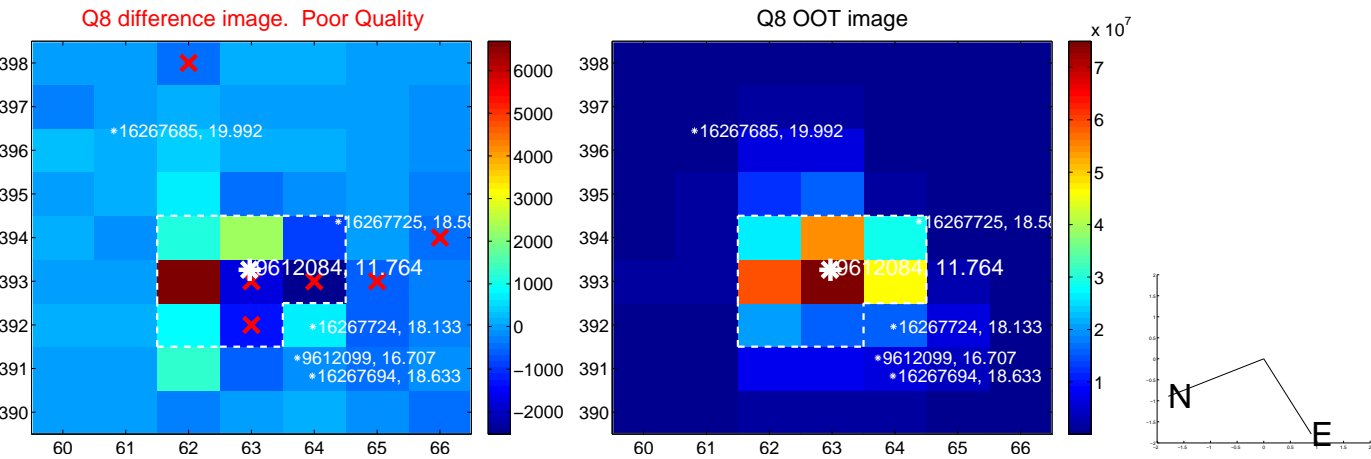
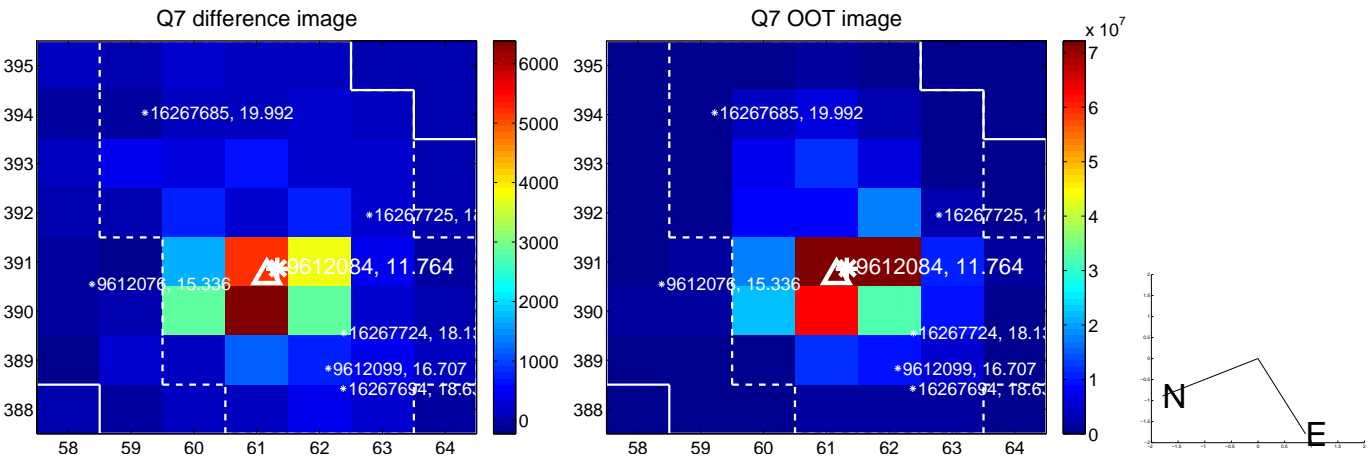
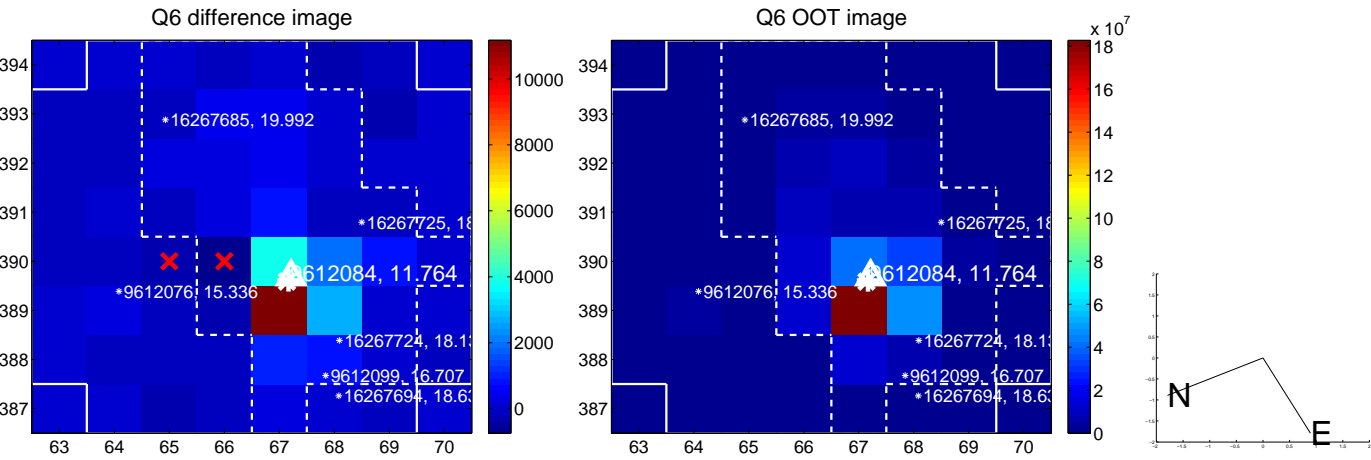
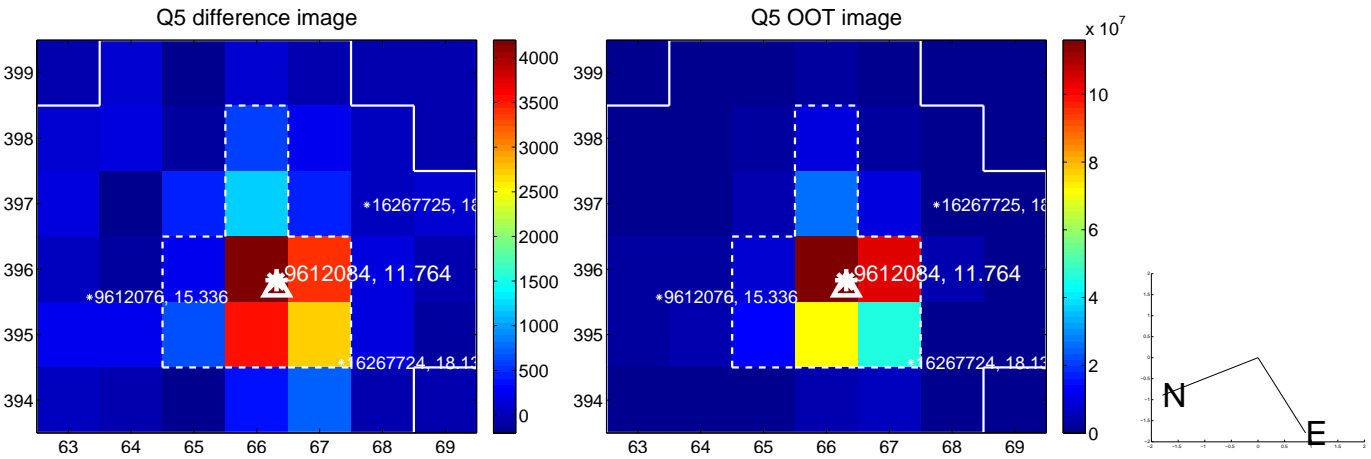
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.244 \pm 0.258$	0.94	$-0.170 \pm 0.247$	$0.174 \pm 0.259$
PRF-fit source offset from KIC position	$0.386 \pm 0.256$	1.51	$-0.176 \pm 0.240$	$0.344 \pm 0.256$
photometric centroid source offset	$0.85 \pm 0.43$	1.96	$-0.65 \pm 0.46$	$-0.55 \pm 0.38$



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.

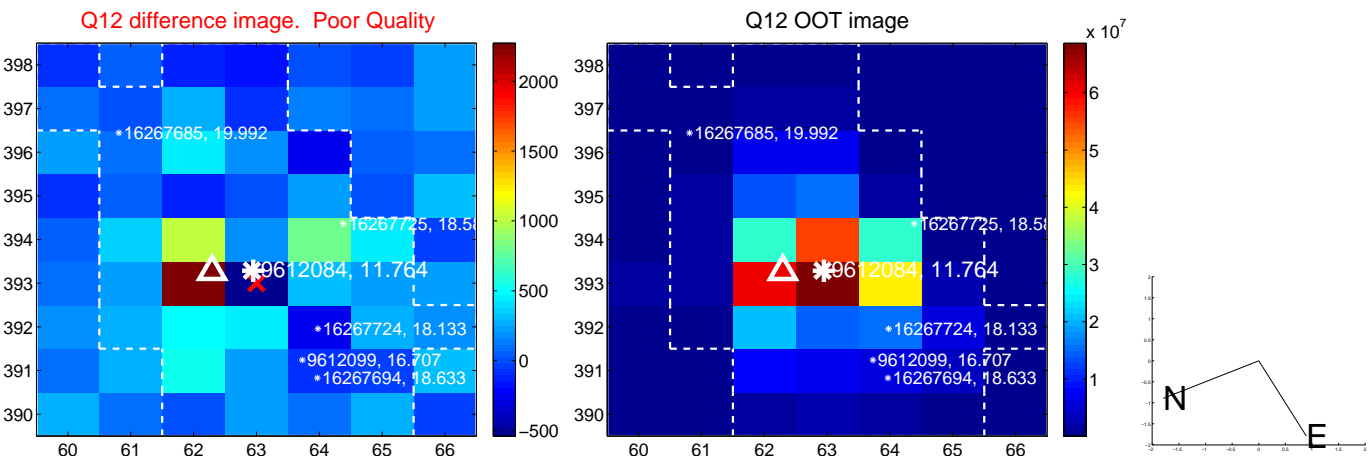
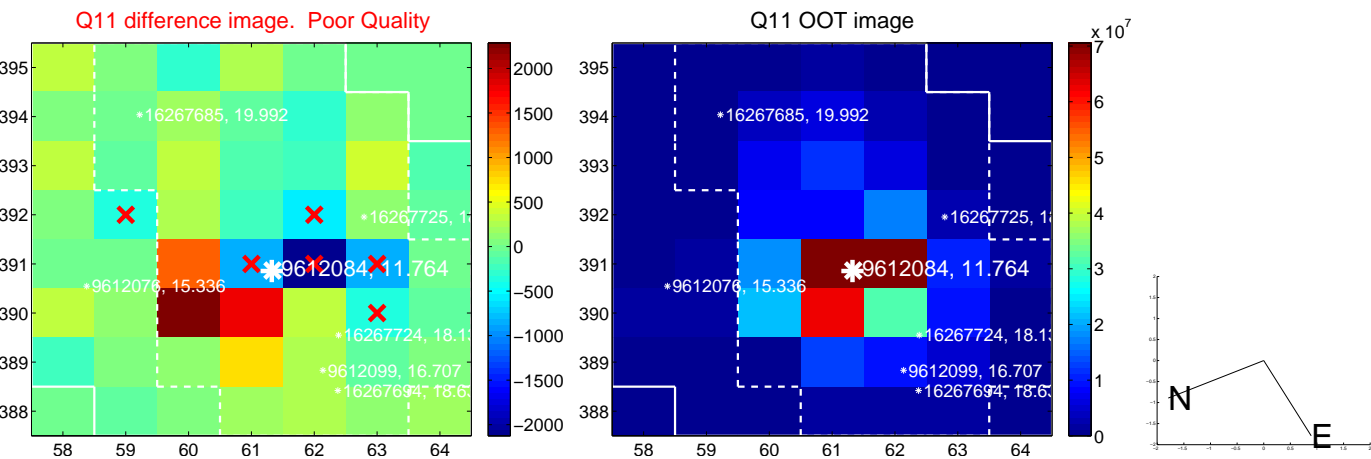
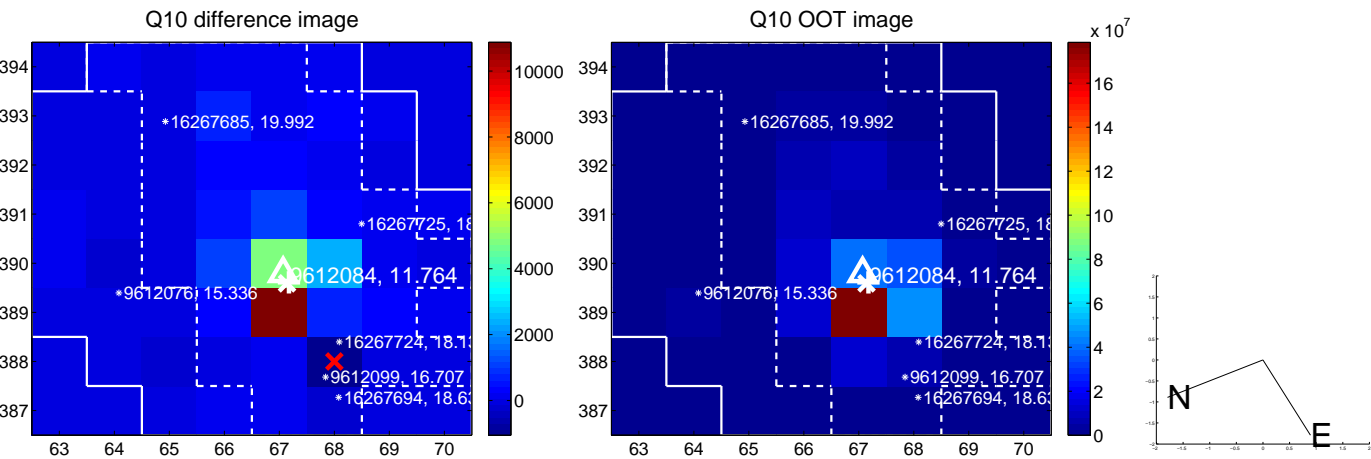
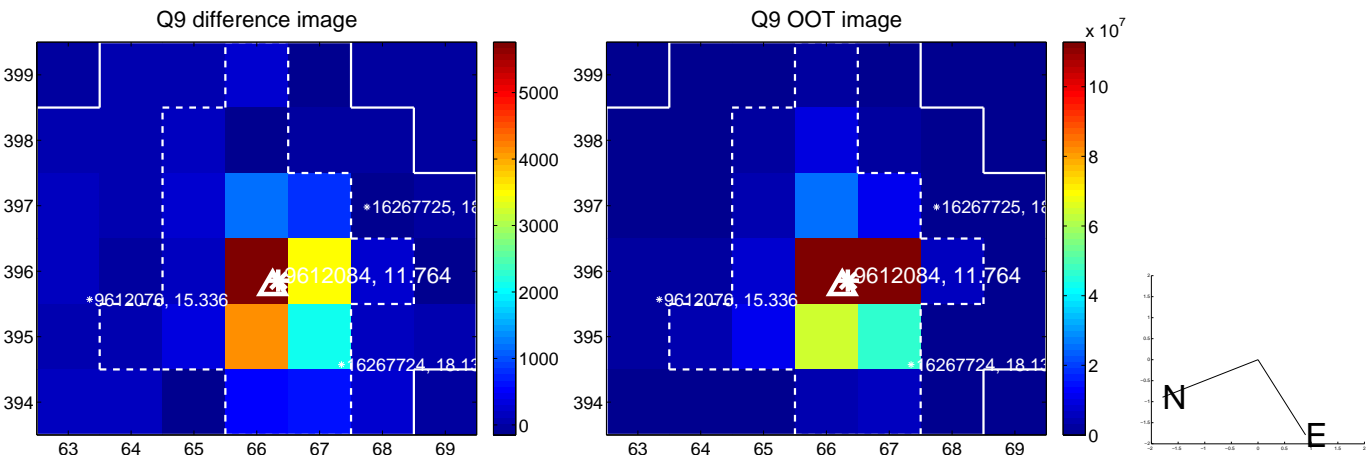


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

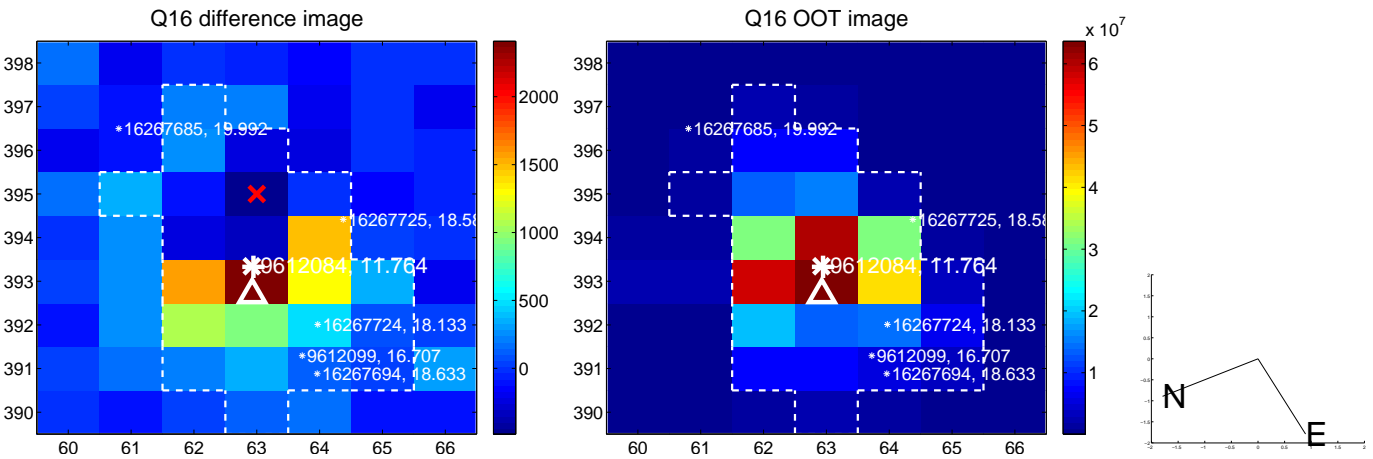
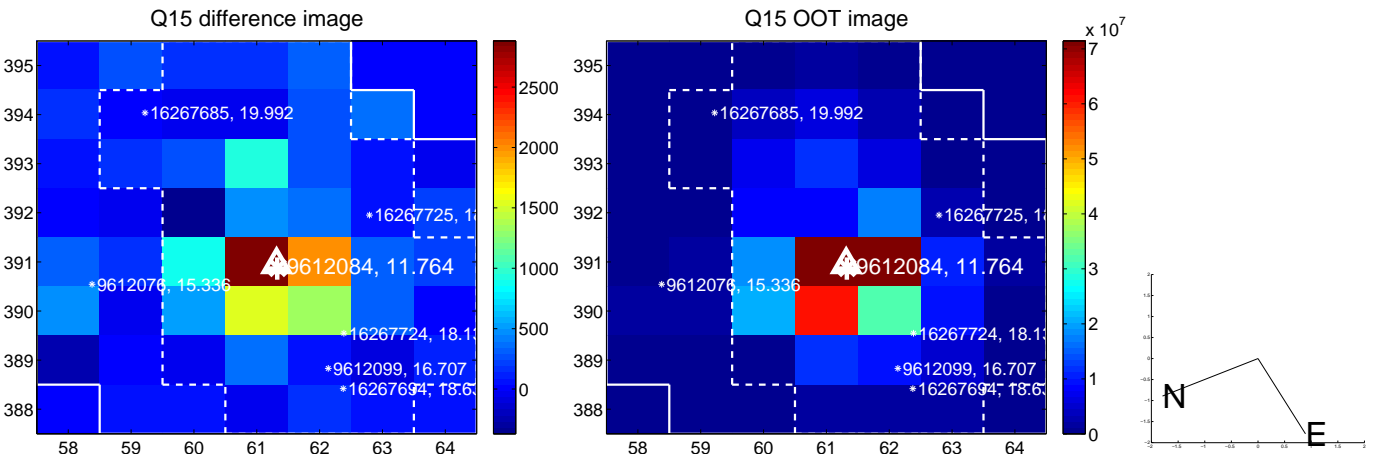
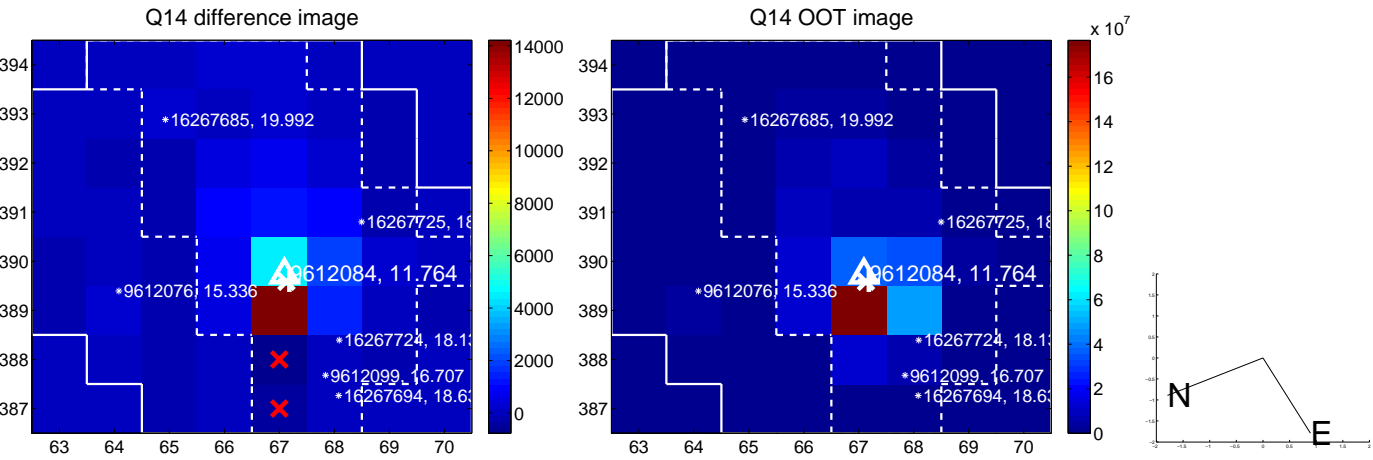
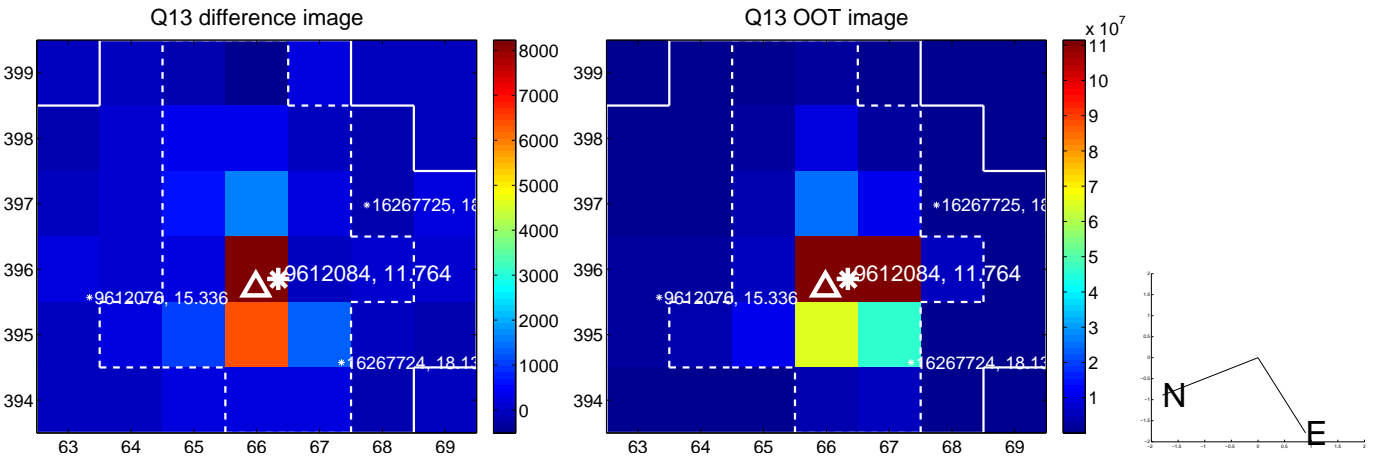




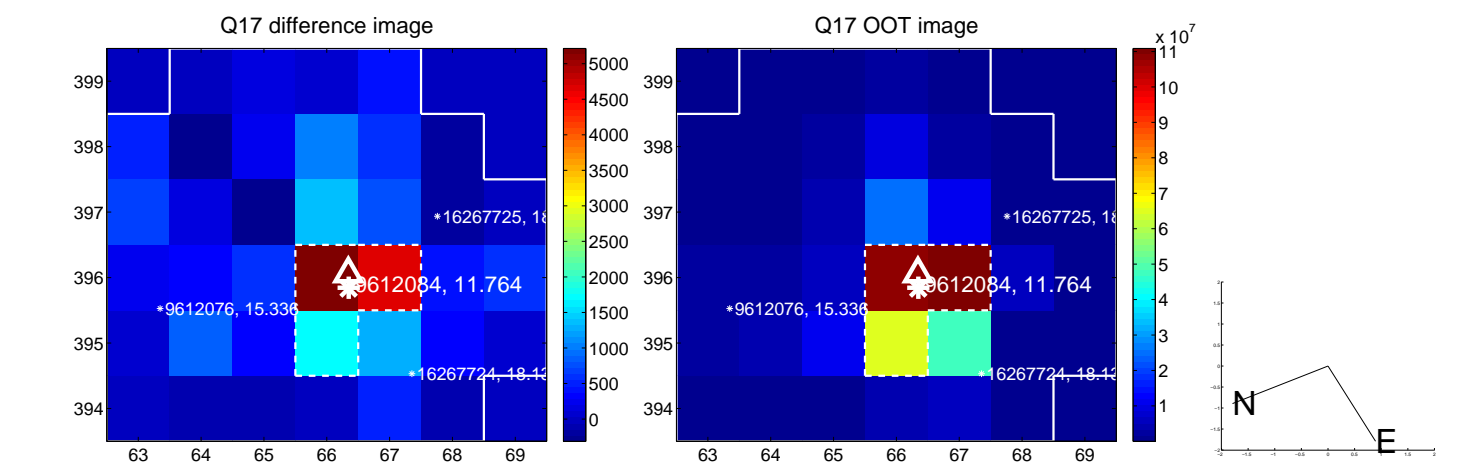
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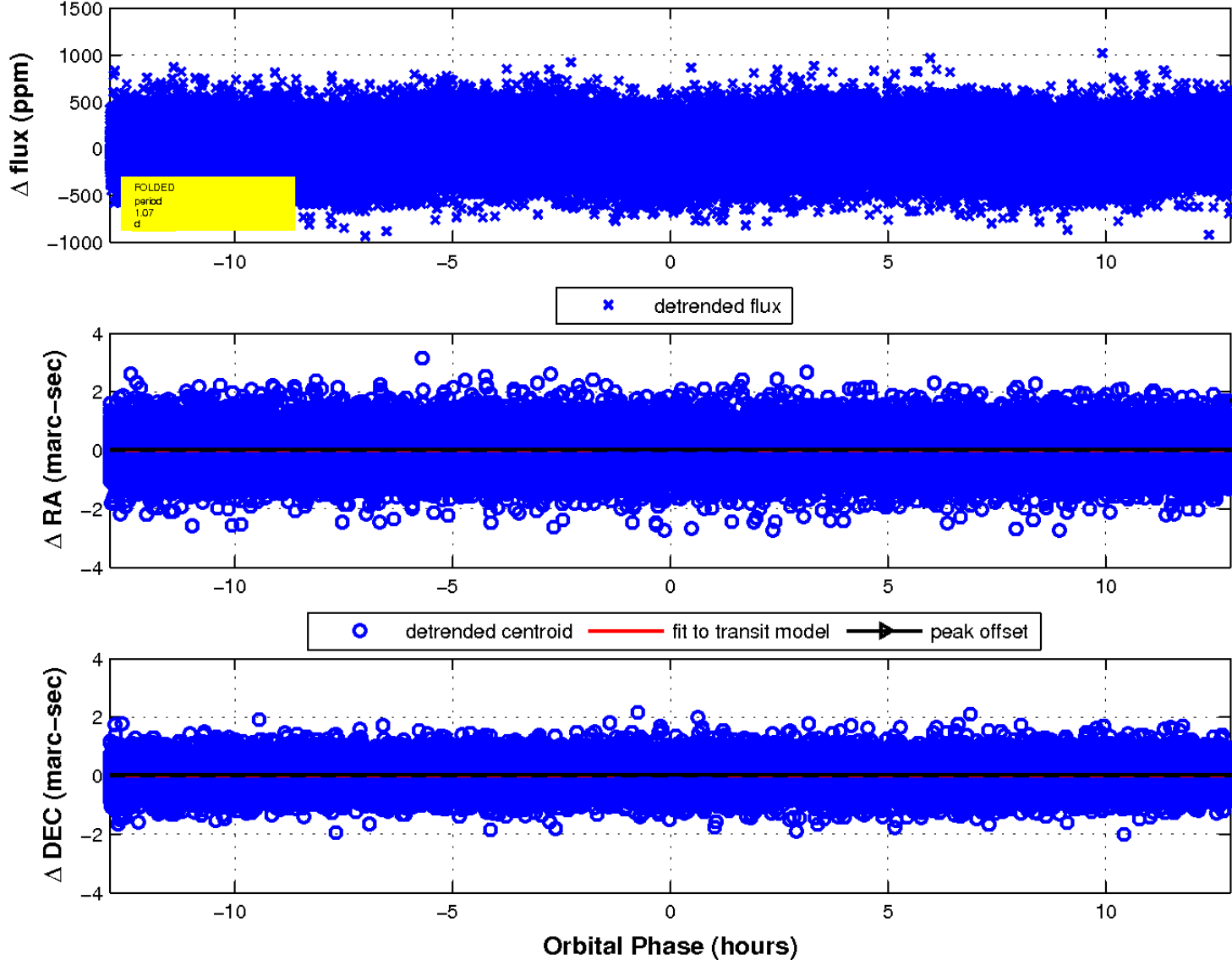
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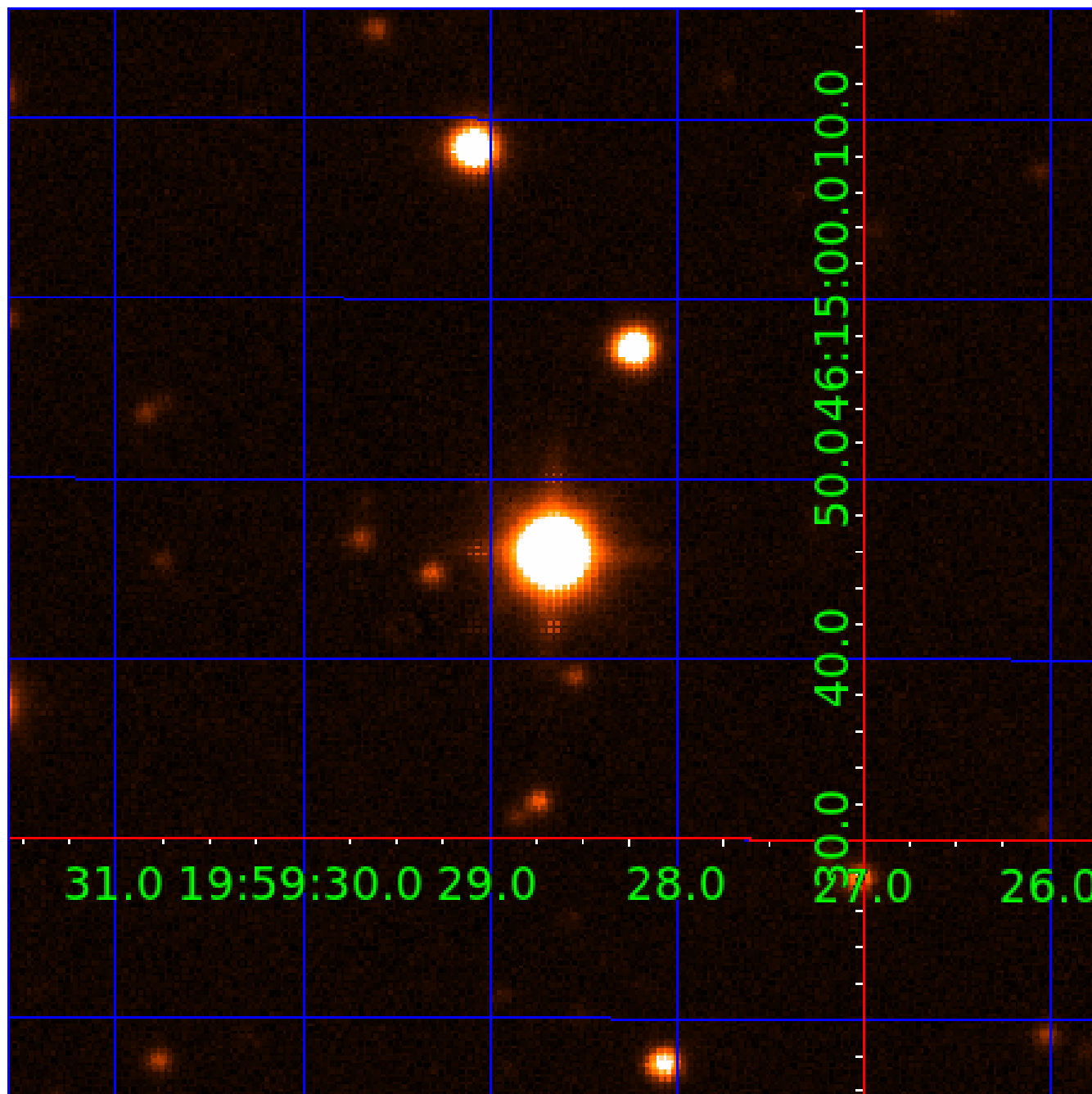


fluxWeightedCentroids, Planet 1 of 8



UKIRT Image

Declination





# KIC 009612084

## Q1-17 DR25 TCE Parameters

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009612084-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
009612084-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS
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N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

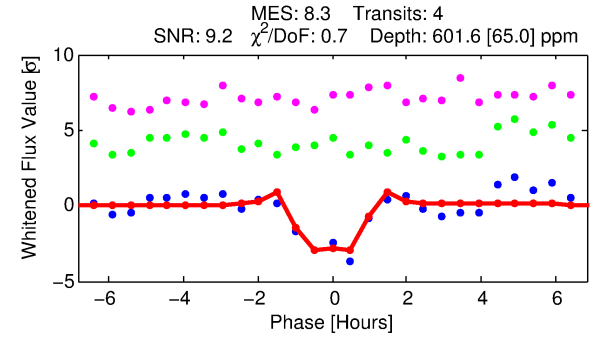
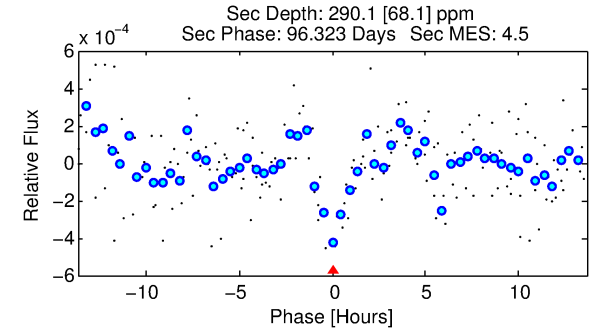
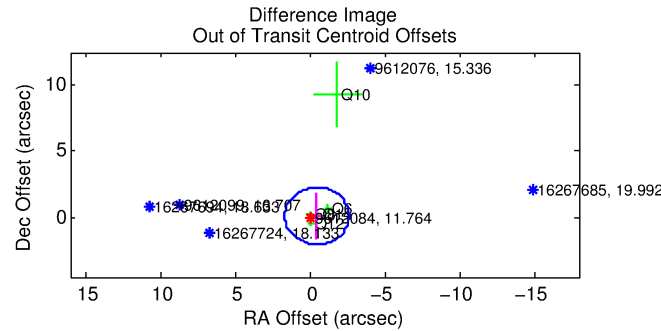
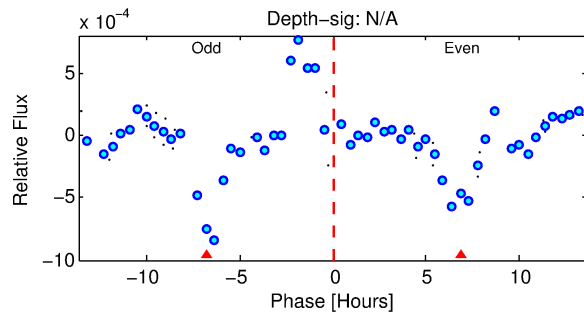
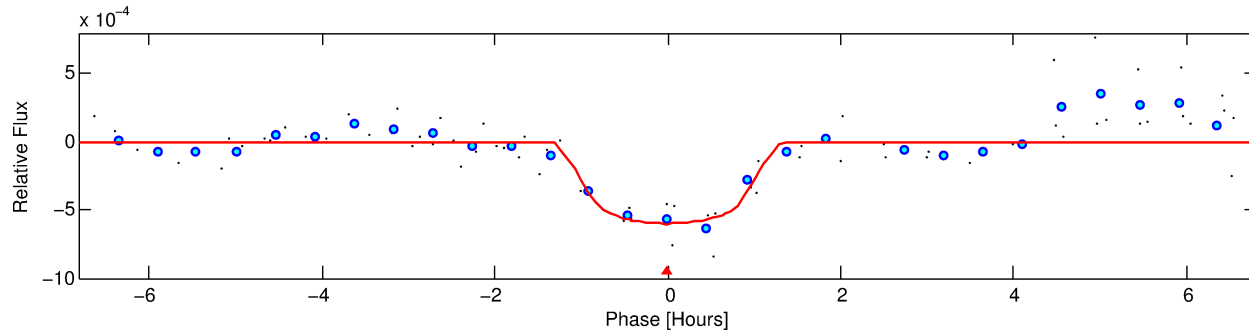
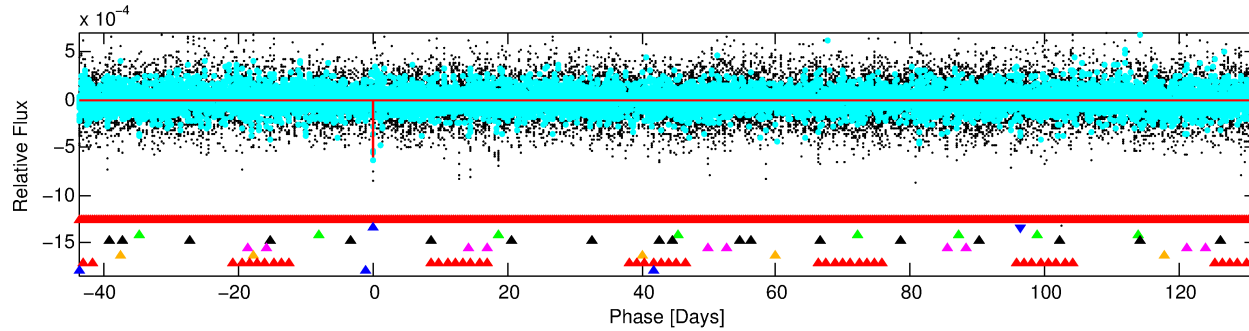
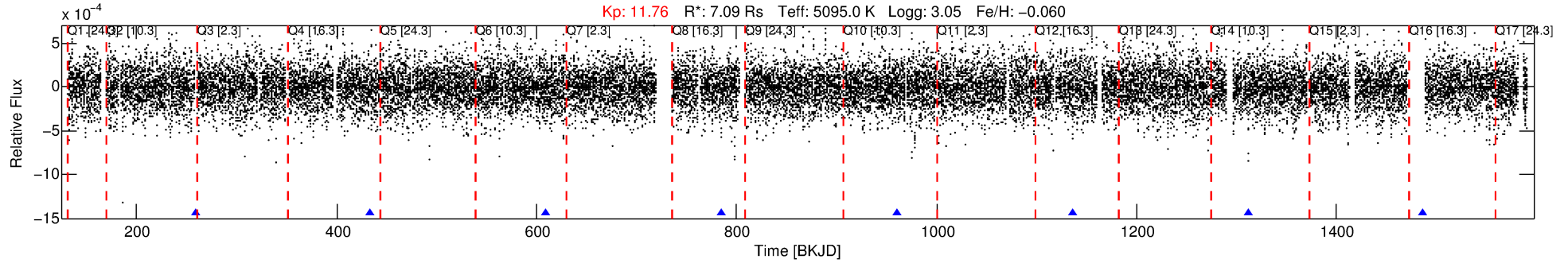
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 009612084-02

No Significant Match Found

# DV One-Page Summary

KIC: 9612084 Candidate: 2 of 8 Period: 175.465 d



## DV Fit Results:

Period = 175.46517 [0.00167] d  
Epoch = 258.5365 [0.0065] BKJD  
Rp/R\* = 0.0246 [0.0364]  
a/R\* = 405.89 [2228.19]  
b = 0.76 [3.14]  
Seff = 49.71 [19.97]  
Teq = 677 [68] K  
Rp = 19.07 [29.11] Re  
a = 0.7818 [0.2282] AU  
Ag = 268.29 [803.38] [0.33σ]  
Teffp = 4237 [3146] K [1.13σ]

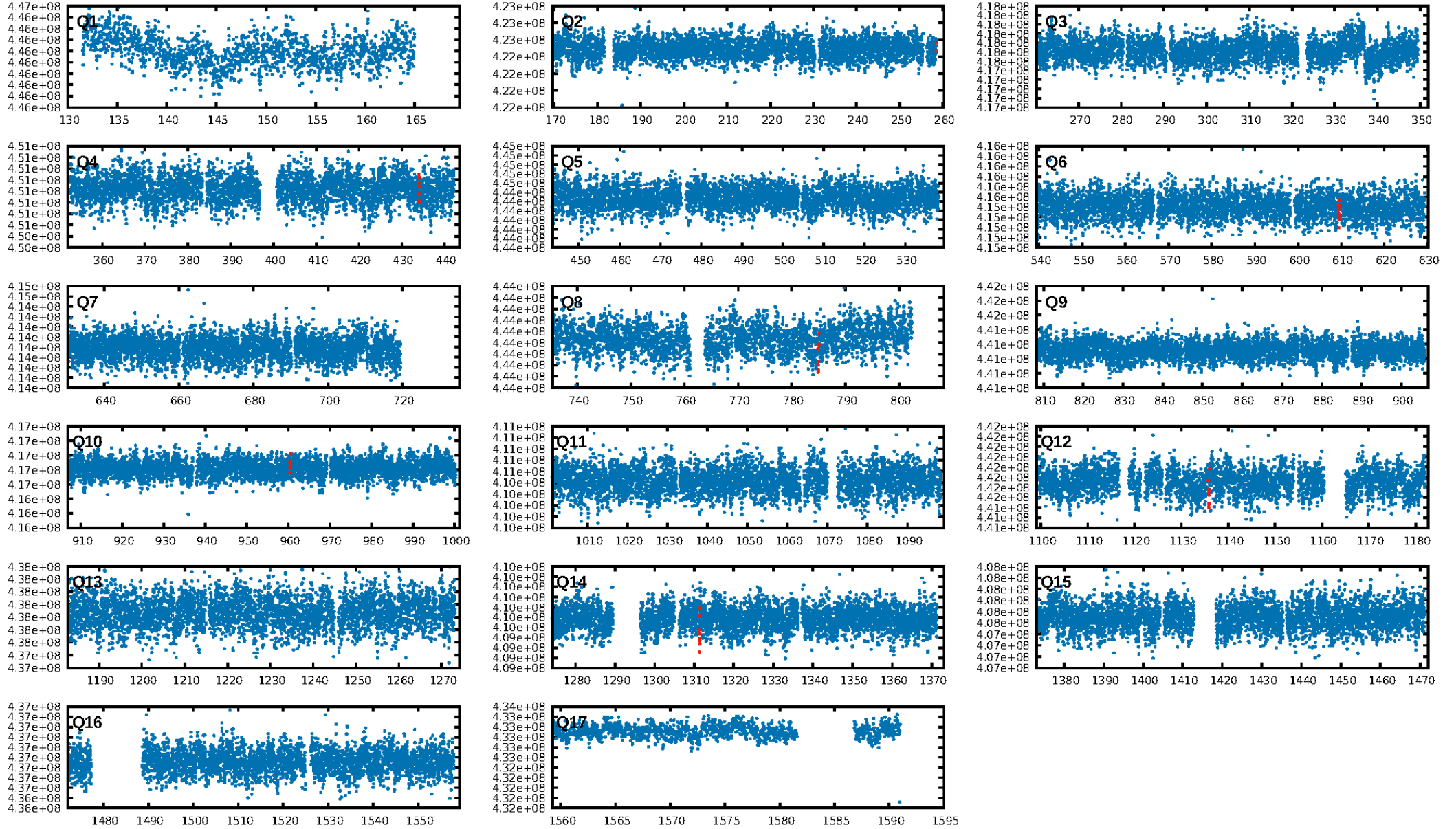
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [116.75σ]  
LongPeriod-sig: 100.0% [127.52σ]  
ModelChiSquare2-sig: 75.7%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: 1.6  
Centroid-sig: 2.4%  
Centroid-so: 0.622 arcsec [1.47σ]  
OotOffset-rm: 0.493 arcsec [0.69σ]  
KicOffset-rm: 0.411 arcsec [1.25σ]  
OotOffset-st: 3/0/2/0 [5]  
KicOffset-st: 3/0/2/0 [5]  
DiffImageQuality-fgm: 0.80 [4/5]  
DiffImageOverlap-fno: 0.17 [1/6]

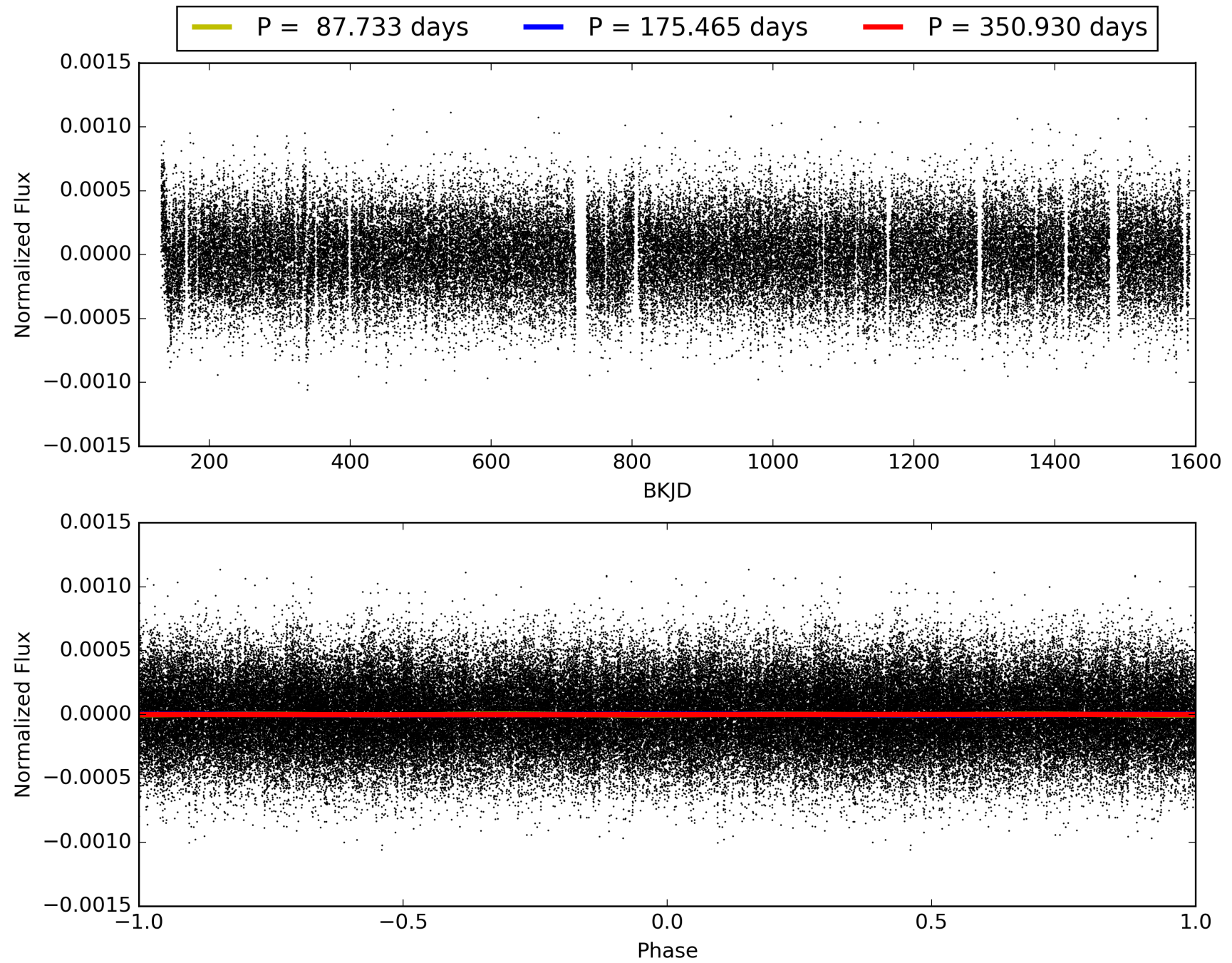
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 13:21:01 Z

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

# TCE 009612084-02, PDC Light Curves



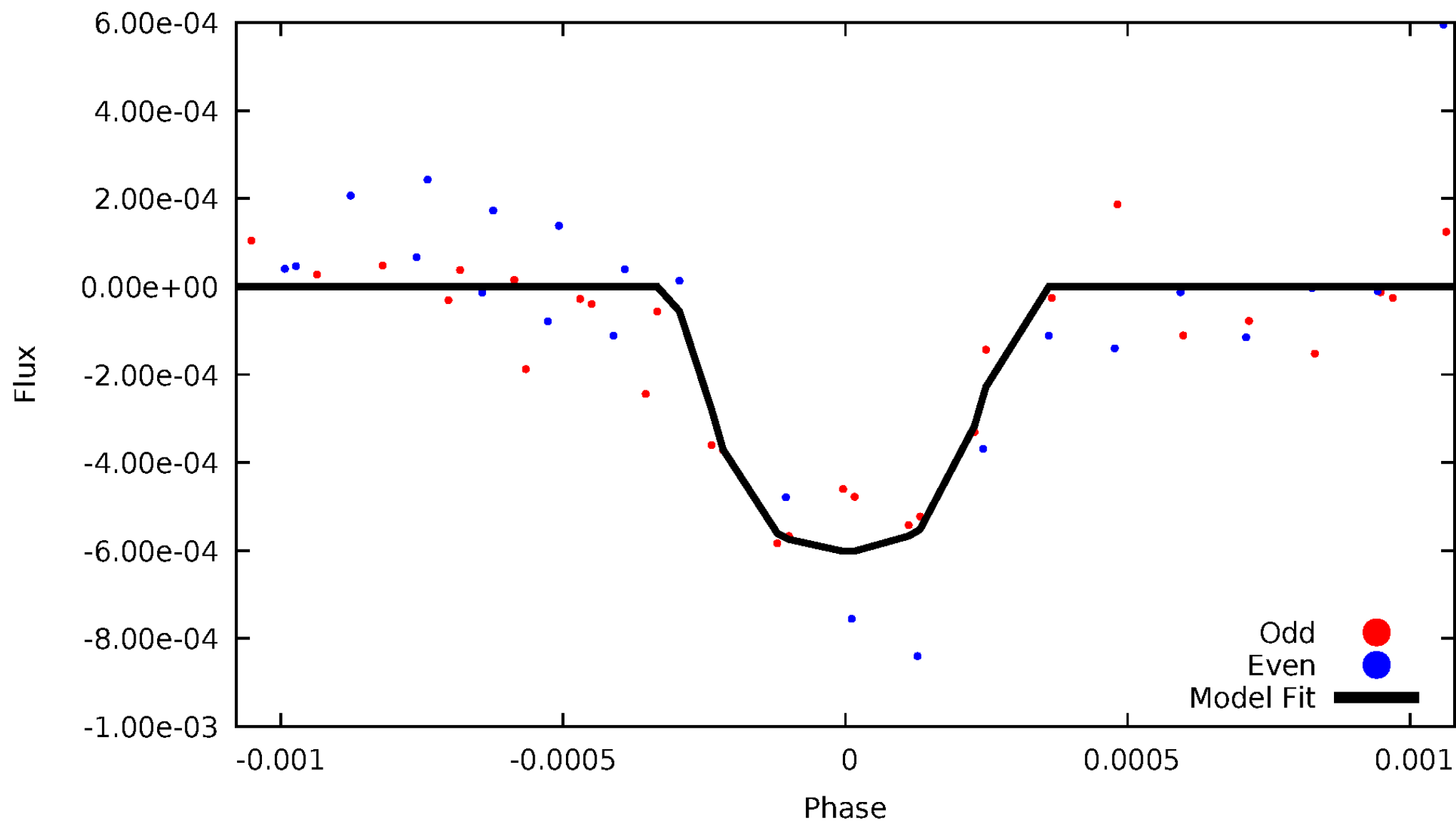
# TCE 009612084-02





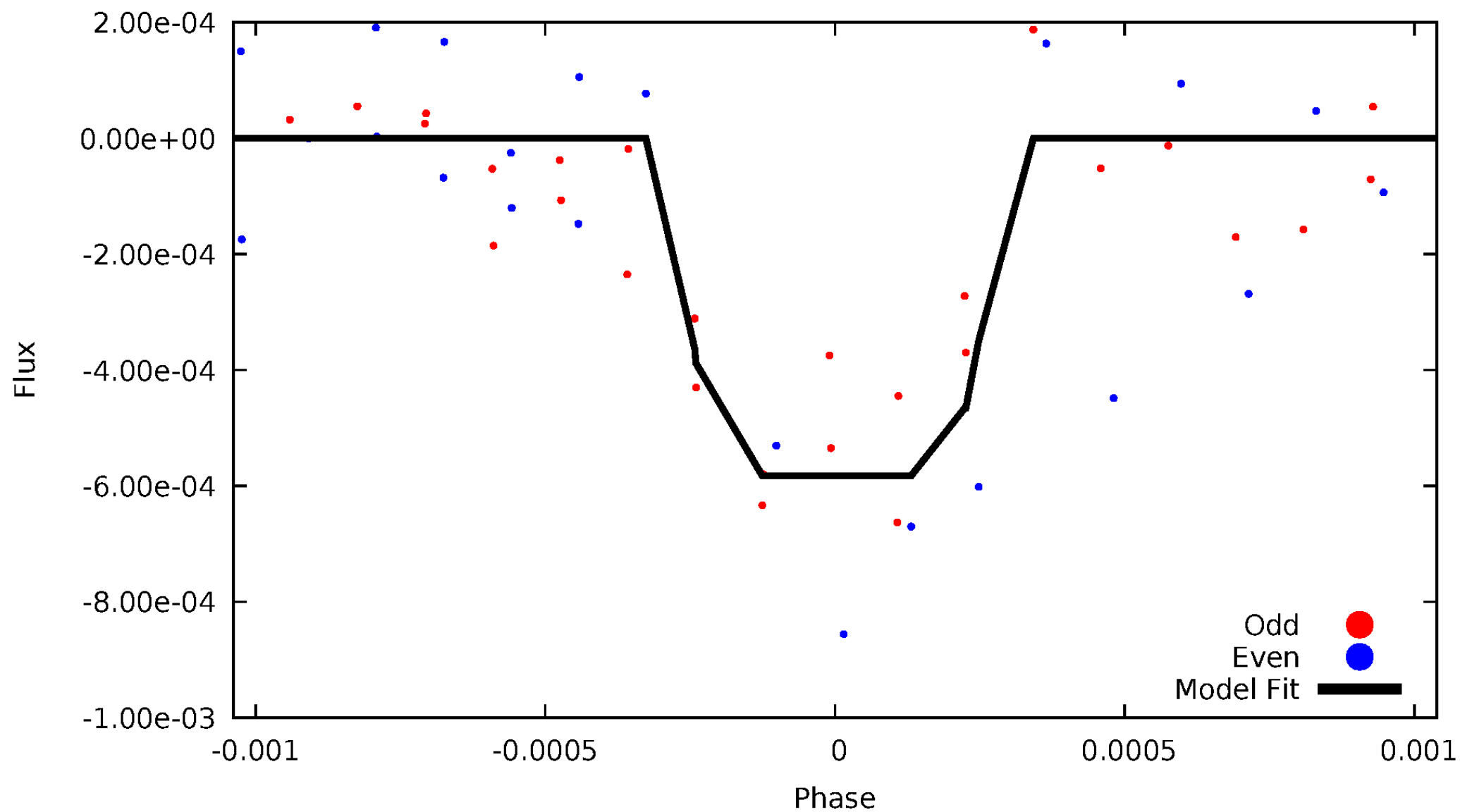
# DV Odd/Even

TCE 009612084-02



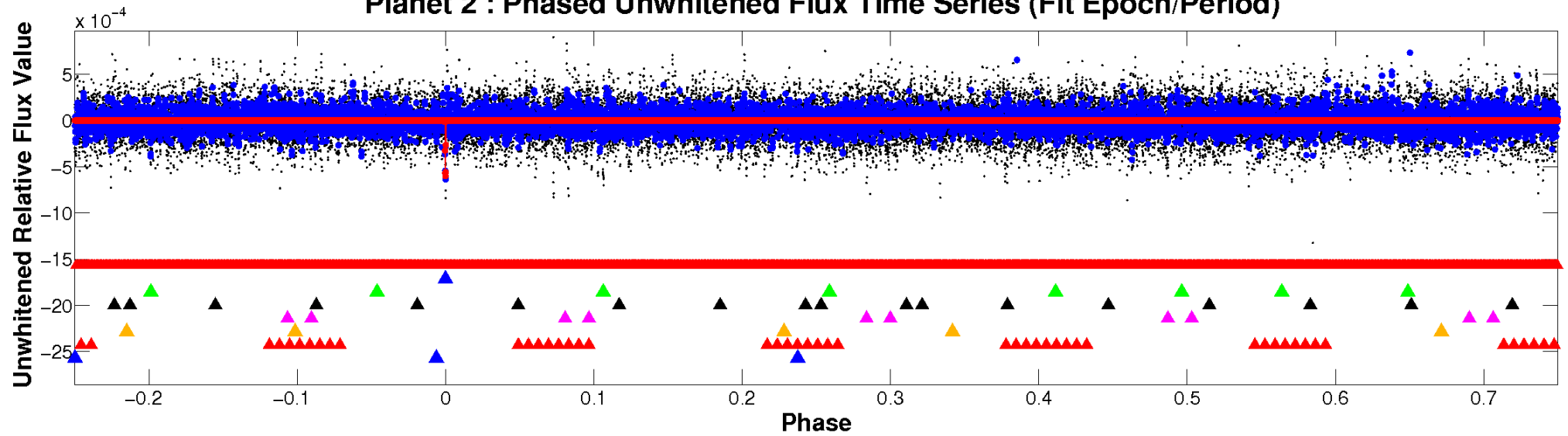
# ALT Odd/Even

TCE 009612084-02

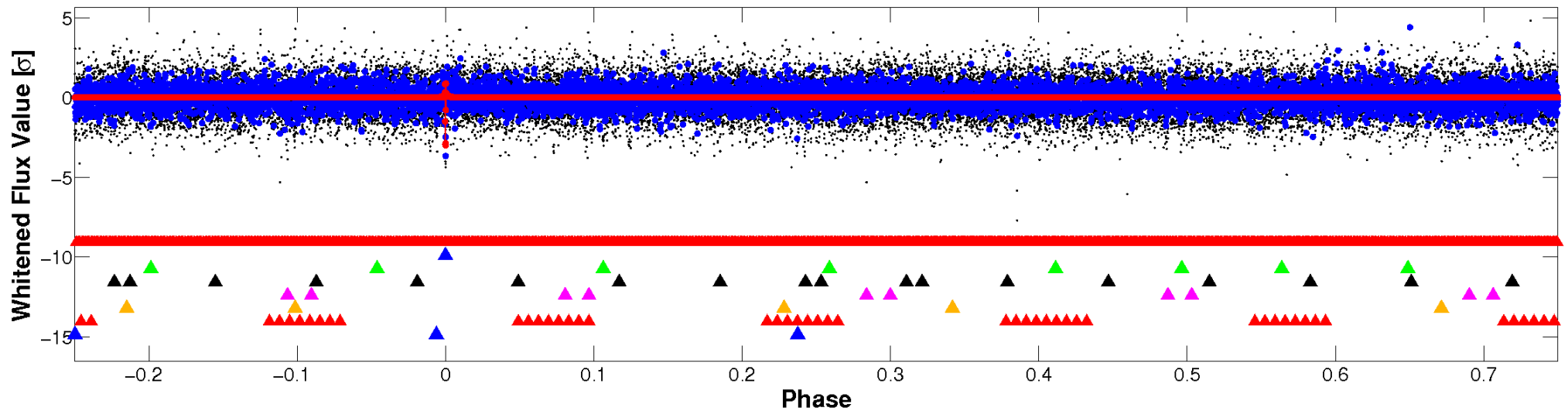


# Non-Whitened Vs. Whitened Light Curve

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

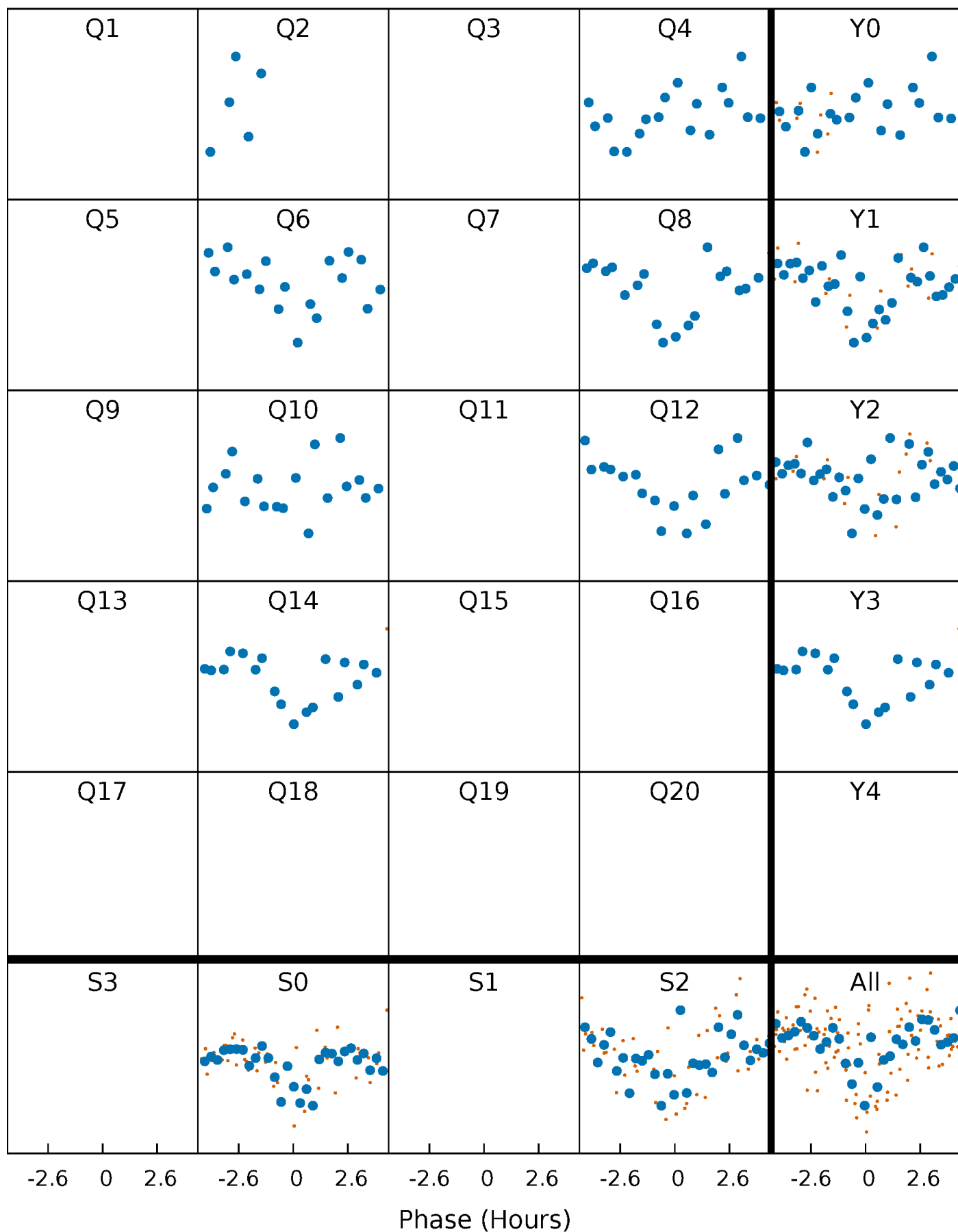


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

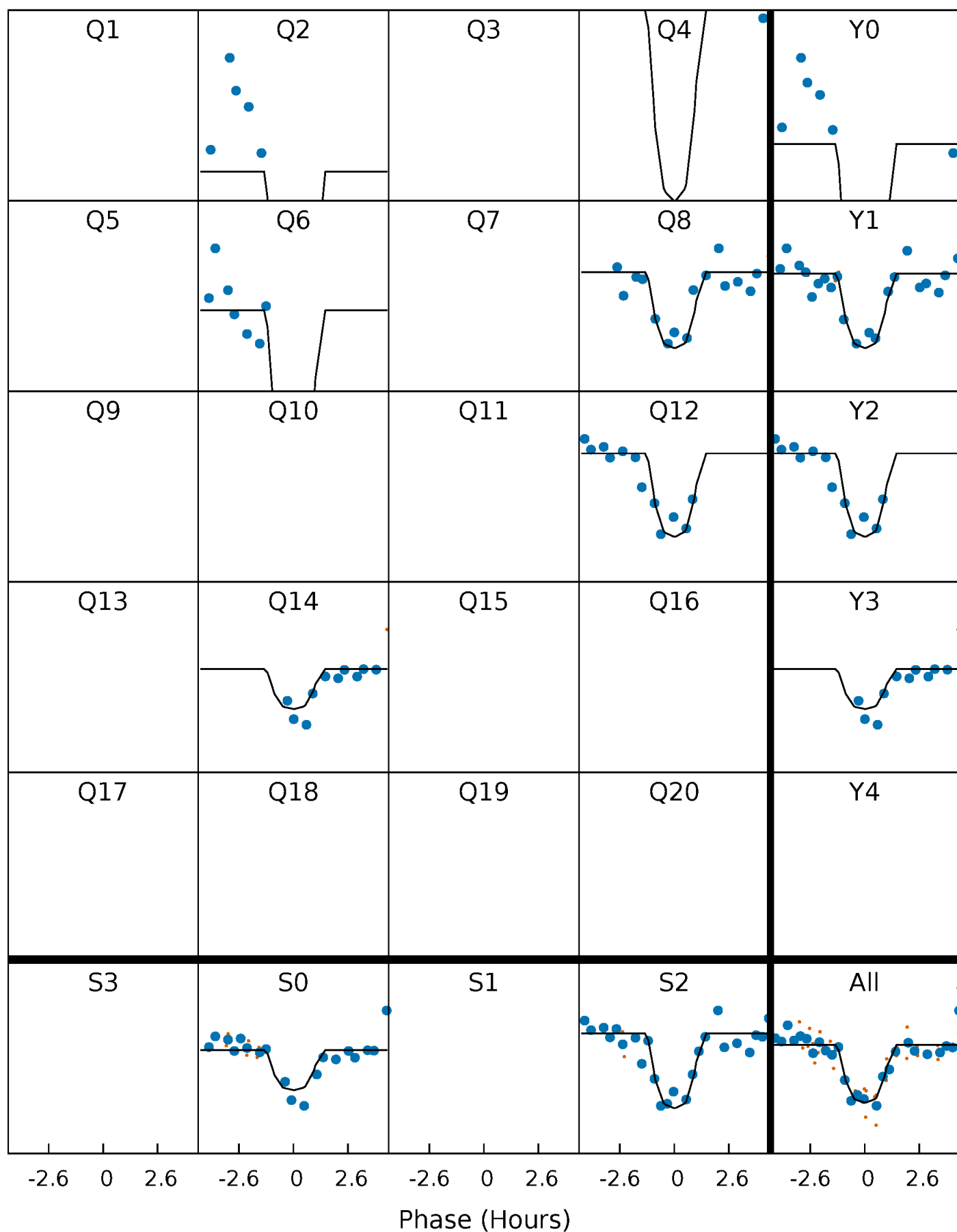
TCE 009612084-02 P=175.465170 Days  $T_0=258.536516$  (BKJD)





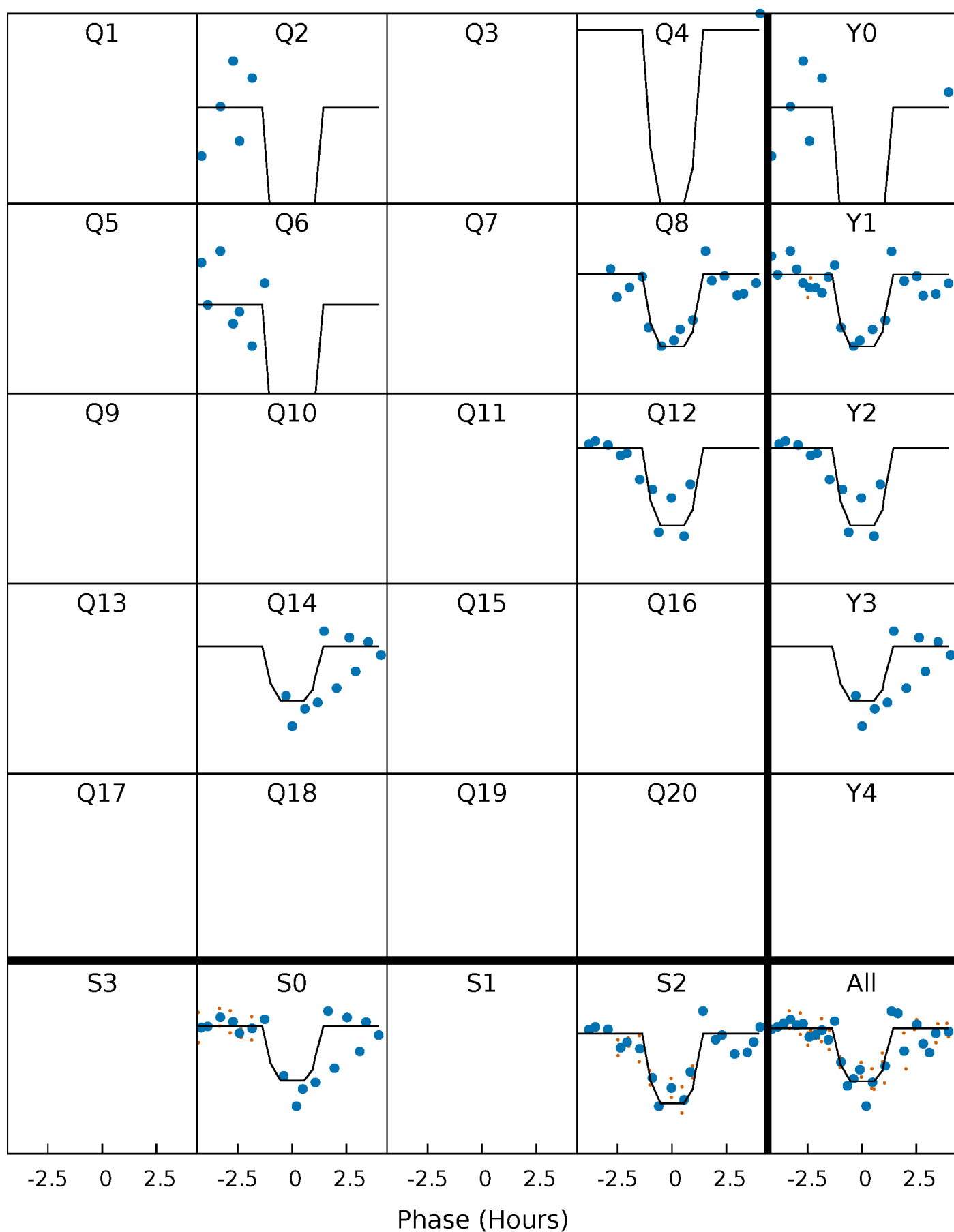
# DV Quarter-Phased Transit Curves

TCE 009612084-02 P=175.465170 Days  $T_0=258.536516$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

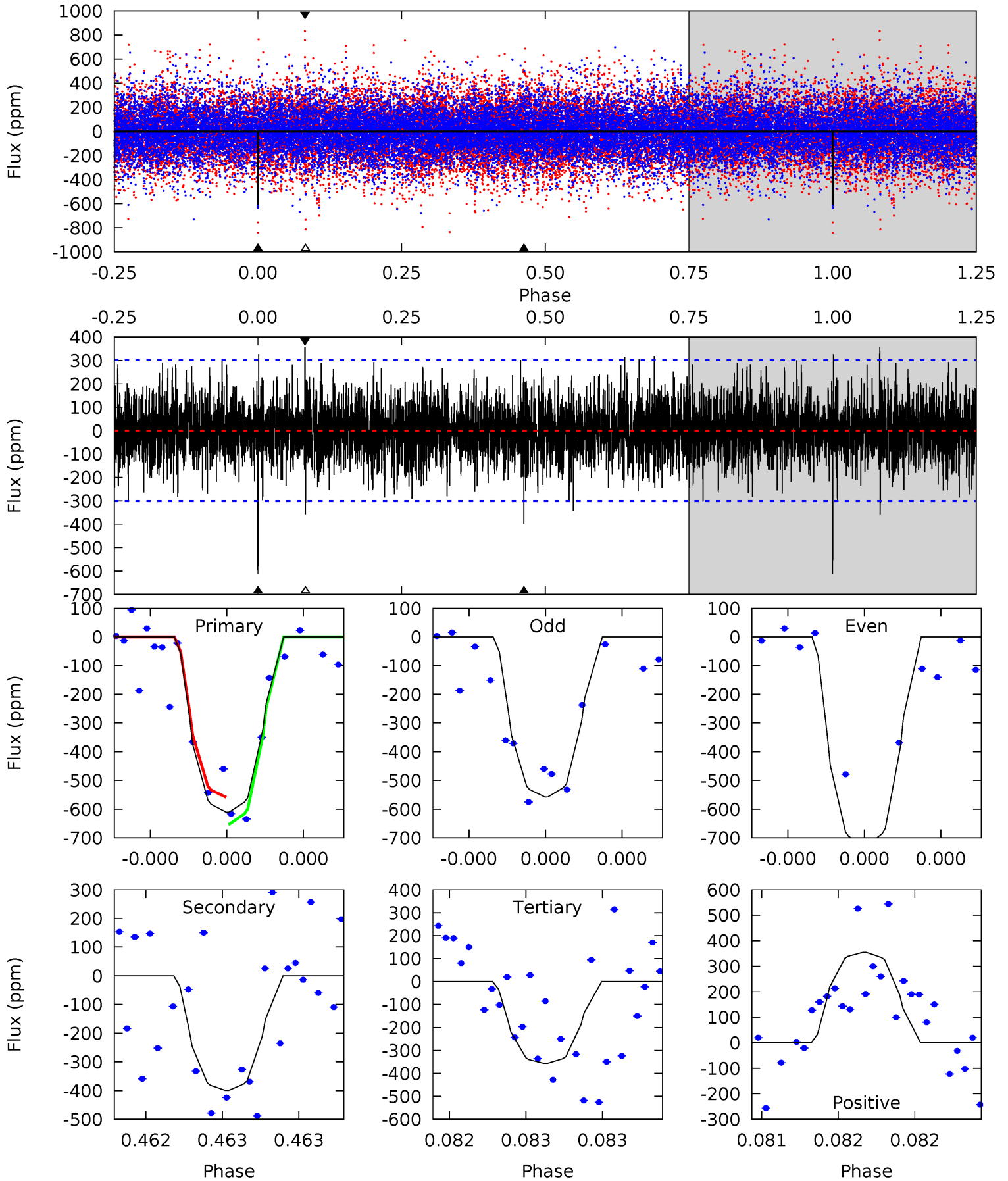
TCE 009612084-02 P=175.463571 Days  $T_0=258.545395$  (BKJD)



# DV Model-Shift Uniqueness Test

009612084-02,  $P = 175.465170$  Days,  $E = 83.071346$  Days

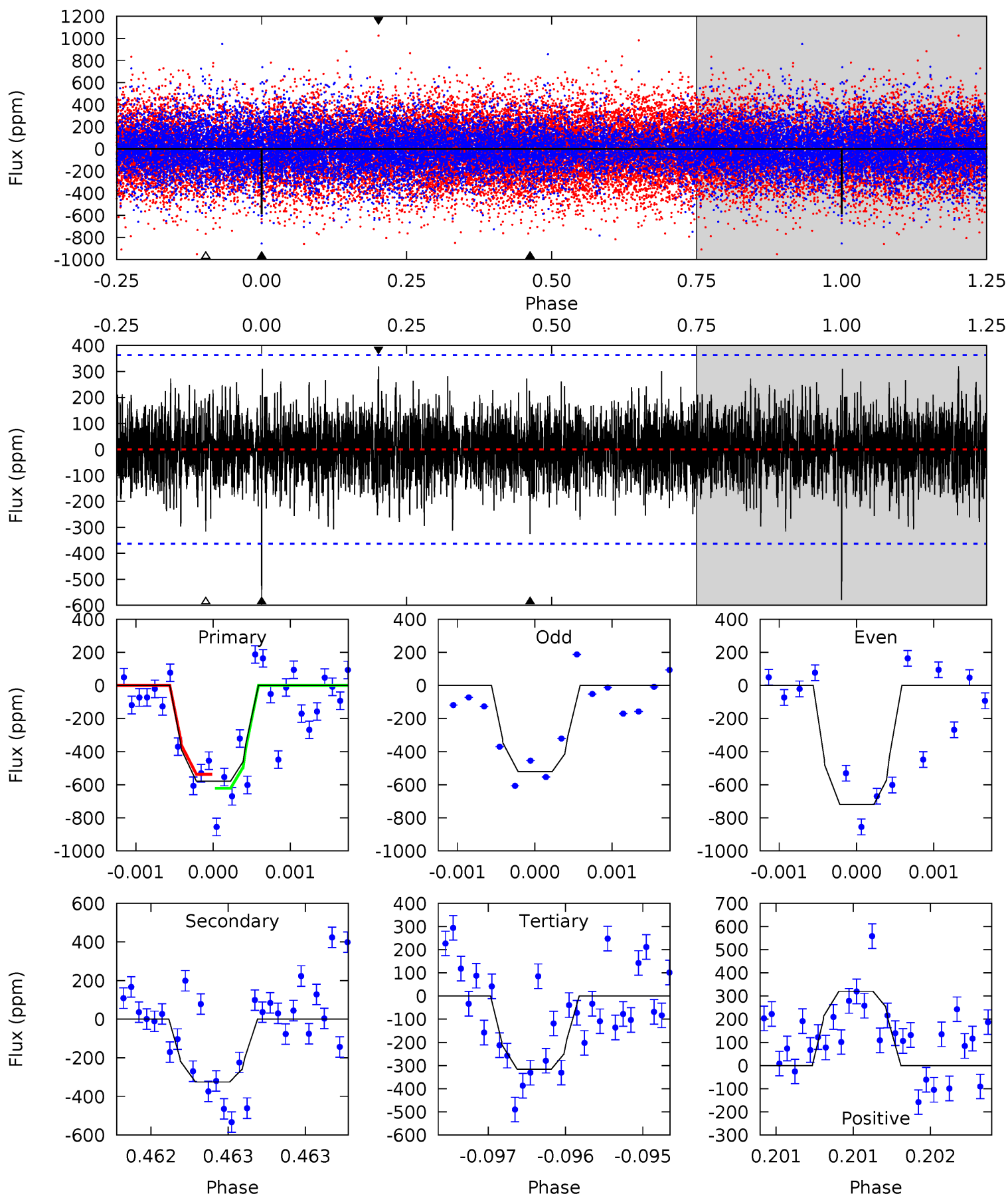
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.3	7.40	6.61	6.57	5.58	3.49	1.69	4.70	4.74	0.79	0.83	1.48	1.08	0.37	0.86



# Alt Model-Shift Uniqueness Test

009612084-02,  $P = 175.463571$  Days,  $E = 83.081824$  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
8.84	4.96	4.82	4.89	5.55	3.44	1.31	4.01	3.95	0.14	0.07	1.43	1.12	0.36	0.64





### Stellar Parameters For KIC 009612084

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5095^{+45}_{-121}$	$3.052^{+0.195}_{-0.105}$	$-0.060^{+0.100}_{-0.250}$	$7.094^{+1.066}_{-2.666}$	$2.070^{+0.533}_{-0.799}$	$0.008^{+0.011}_{-0.003}$
	+1%/-2%	+6%/-3%	+167%/-417%	+15%/-38%	+26%/-39%	+136%/-31%
Source	SPE74	SPE74	SPE74	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology  
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

### Secondary Eclipse Parameters for KIC 009612084-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-400 \pm 54$	$26.85^{+23.01}_{-17.88}$	$935^{+45}_{-57}$	$4042^{+2370}_{-707}$	$187^{+1524}_{-131}$
Alt.	$-325 \pm 65$	$27.21^{+24.03}_{-17.93}$	$936^{+44}_{-63}$	$3861^{+2212}_{-710}$	$148^{+1187}_{-109}$

$T_{\text{max}}$  = 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

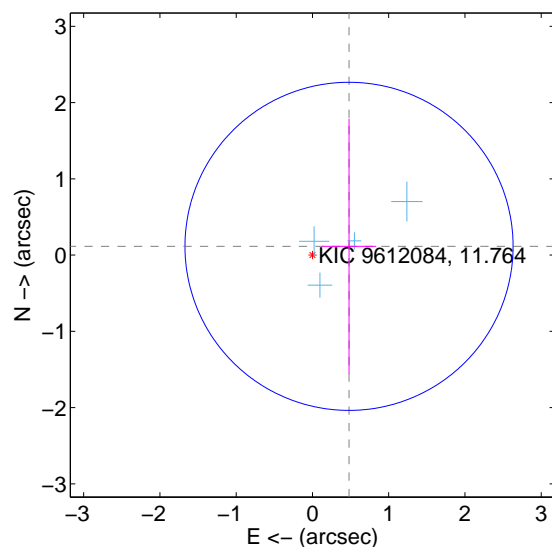
Supplemental centroid analysis for 009612084-02. **Kepler magnitude: 11.76.** Transit SNR 9.21

There are 4 quarters with good PRF difference image offsets

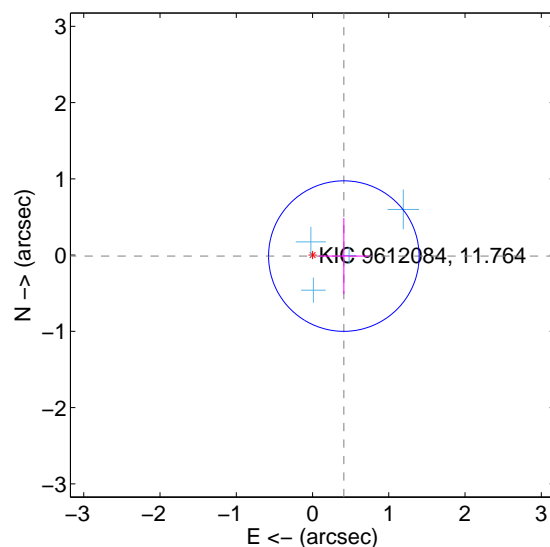
The direct PRF centroid is offset from the target star catalog position by about 0.21 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.493 \pm 0.717$	0.69	$-0.480 \pm 0.356$	$0.115 \pm 1.673$
PRF-fit source offset from KIC position	$0.411 \pm 0.329$	1.25	$-0.411 \pm 0.329$	$-0.013 \pm 0.499$
photometric centroid source offset	$0.62 \pm 0.42$	1.47	$-0.38 \pm 0.52$	$0.49 \pm 0.35$

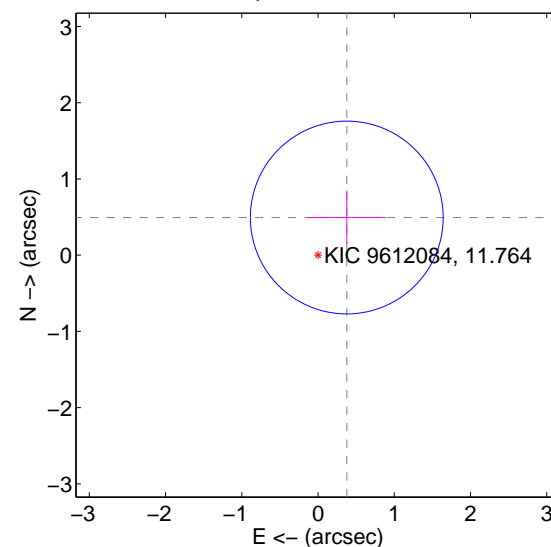
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

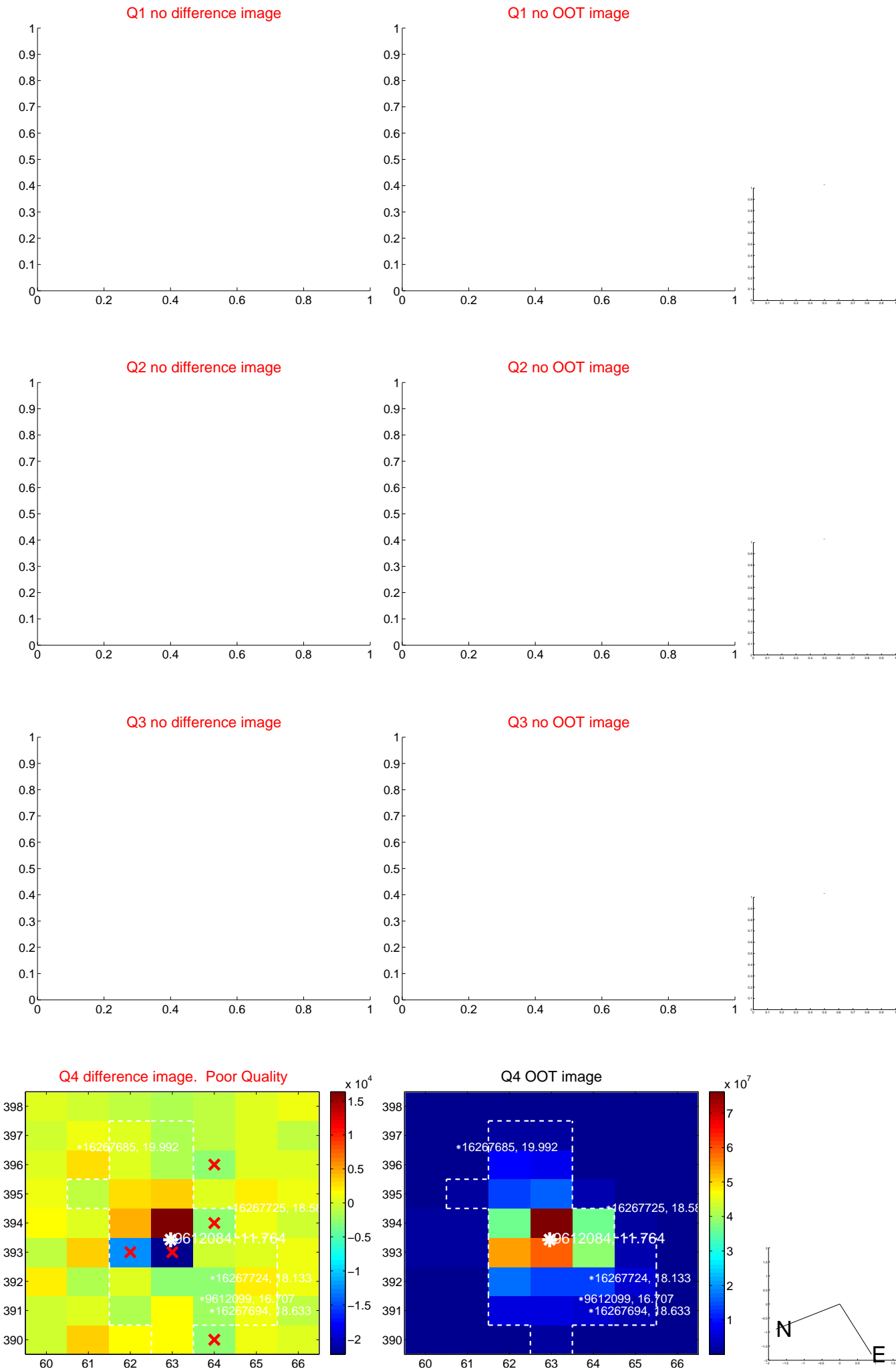


offset from photometric centroids

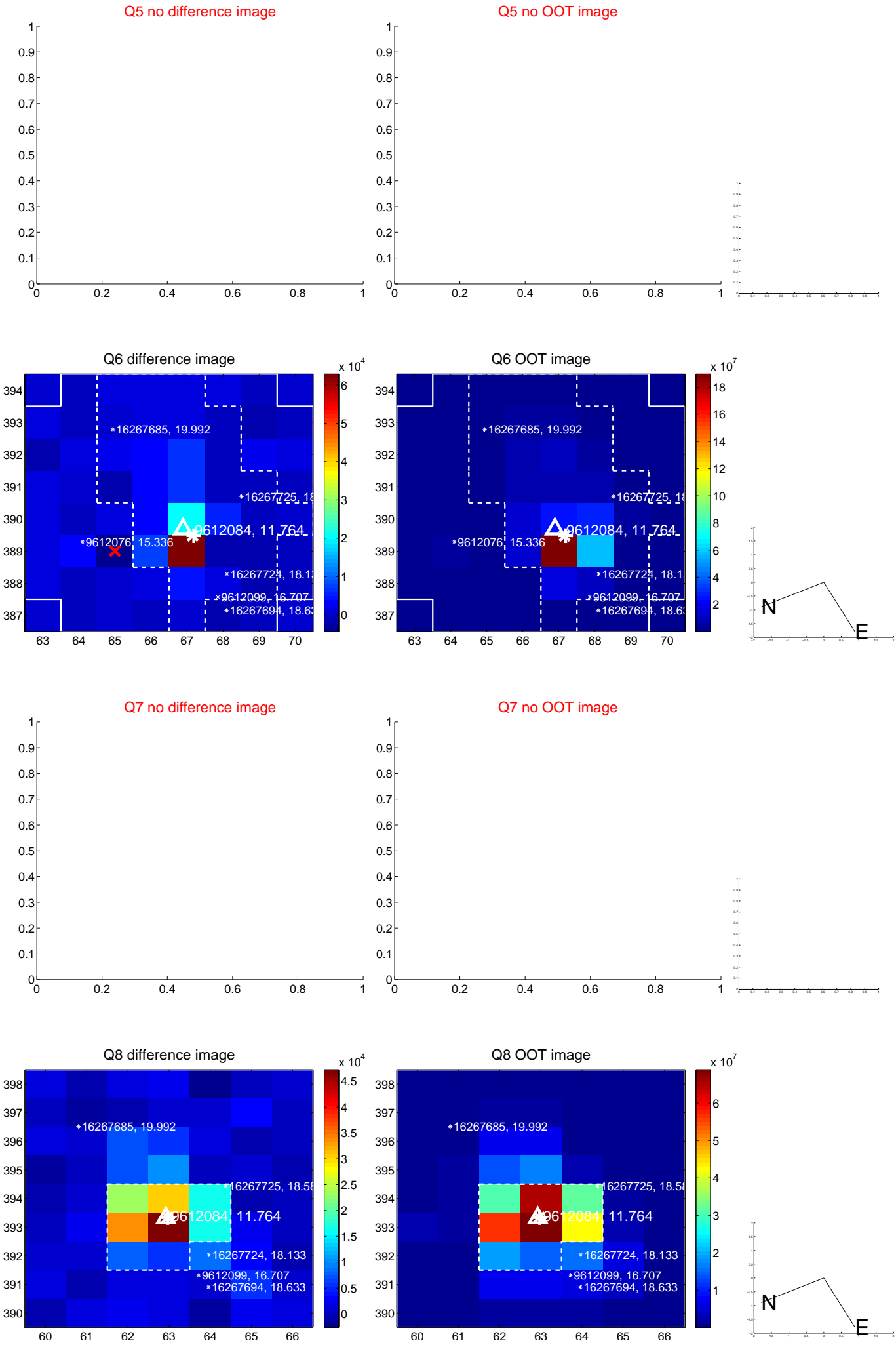


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

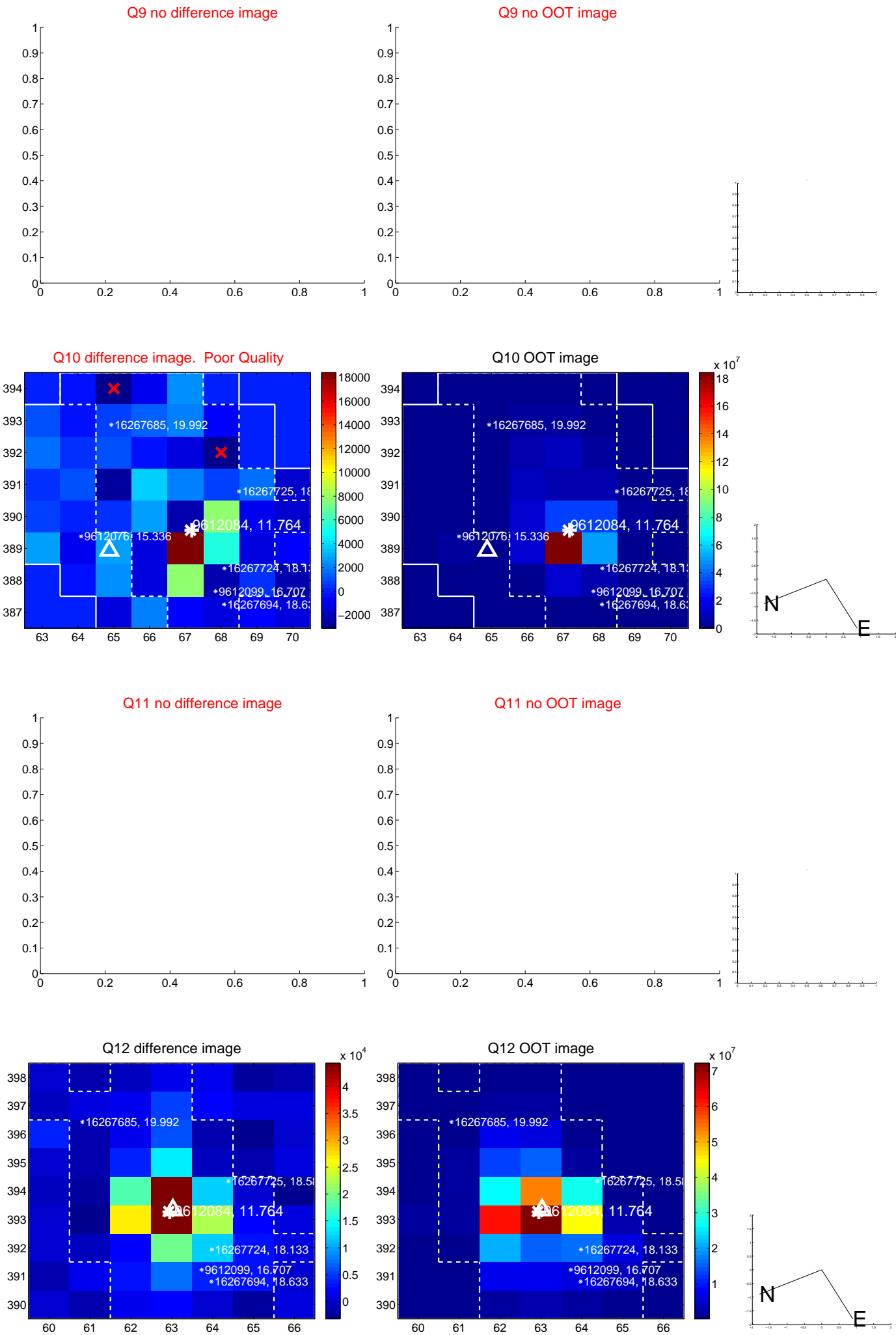
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

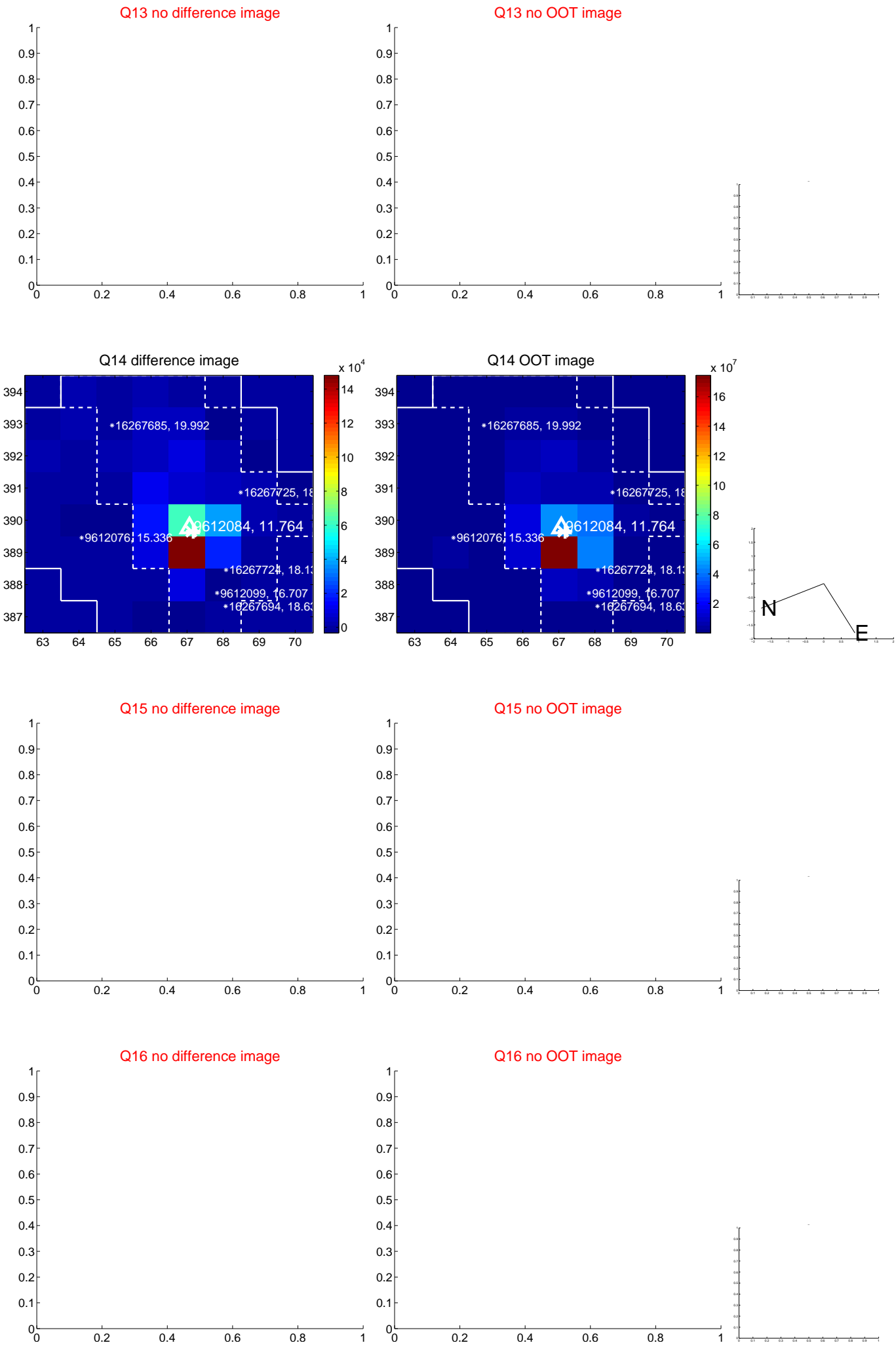


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

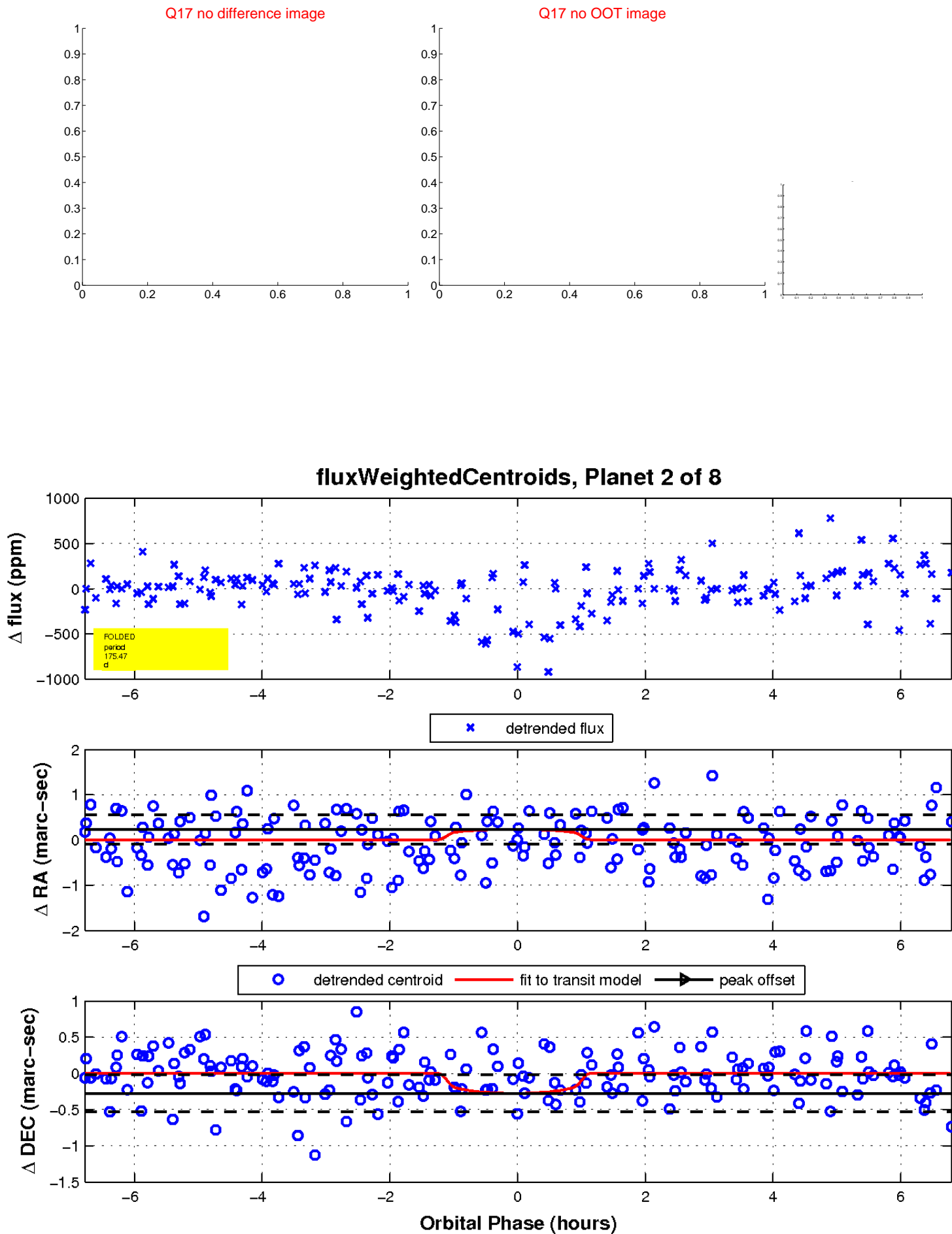




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

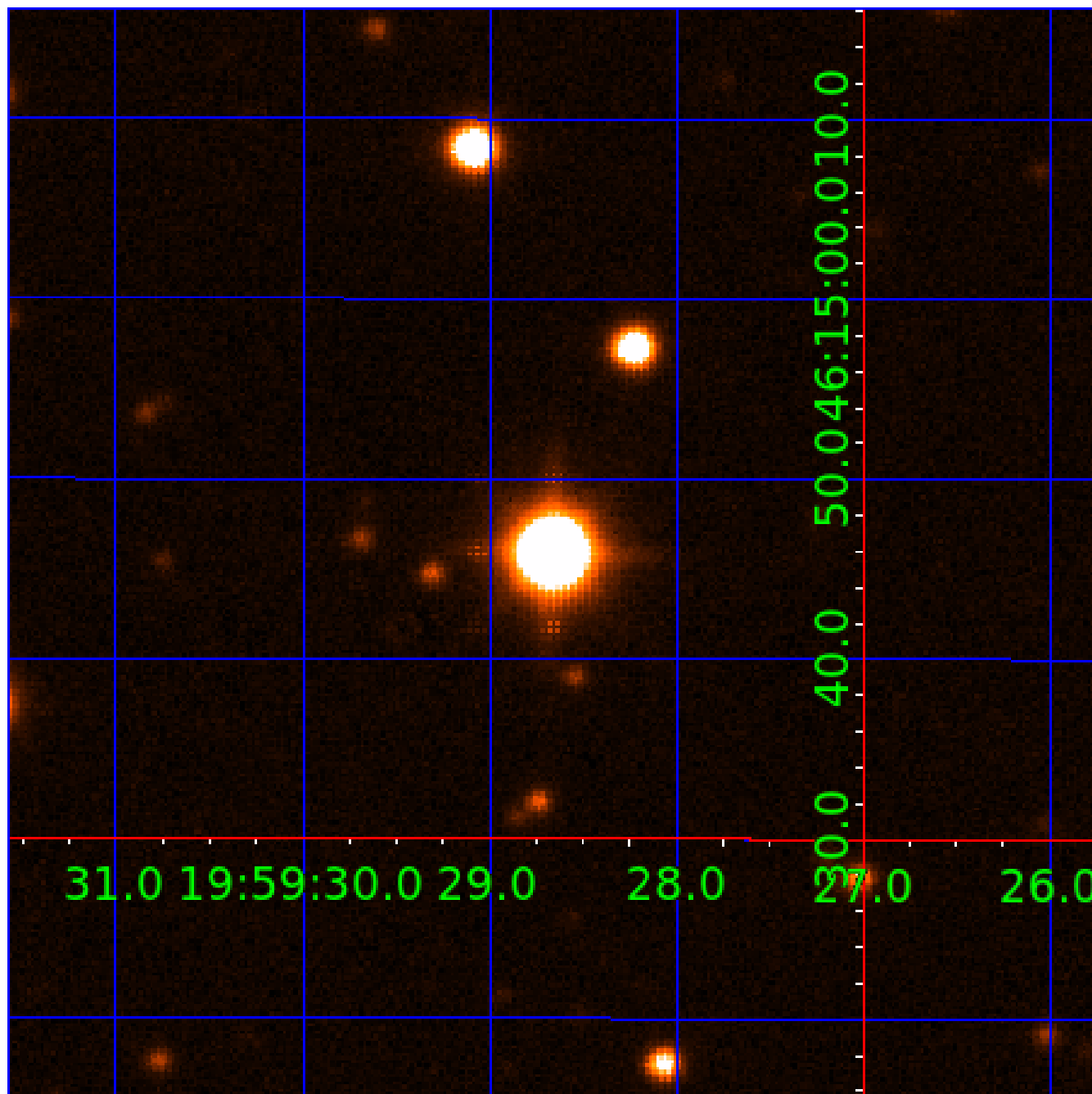


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 009612084

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009612084-01	OBS	No	1.072278	132.559506	29.2	4.632	8.4	8.2	7.09	5095	4.49	0.00
009612084-02	OBS	No	175.465170	258.536516	601.6	2.271	8.3	9.2	7.09	5095	19.07	49.71
009612084-03	OBS	No	202.221958	170.176293	489.3	4.495	8.7	8.4	7.09	5095	18.78	41.14
009612084-04	OBS	No	81.760399	139.458312	302.5	3.181	8.5	8.8	7.09	5095	13.05	137.62
009612084-05	OBS	No	139.808662	242.670574	358.0	6.969	8.1	7.7	7.09	5095	14.89	67.30
009612084-06	OBS	No	273.160085	376.365574	457.8	4.949	7.7	8.1	7.09	5095	17.53	27.55
009612084-07	OBS	No	29.442997	149.385149	210.3	3.733	8.0	8.4	7.09	5095	11.14	537.14
009612084-08	OBS	No	483.641932	300.213871	109.9	6.000	7.6	-1.0	7.09	5095	7.24	12.86

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009612084-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
009612084-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT
009612084-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES—TRANS_GAPPED—MOD_NONUNIQ_ALT
009612084-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
009612084-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS
009612084-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
009612084-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_ZUMA—TRANS_GAPPED—MOD_NONUNIQ_ALT
009612084-08	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—CENT_NOFITS—HALO_GHOST

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

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

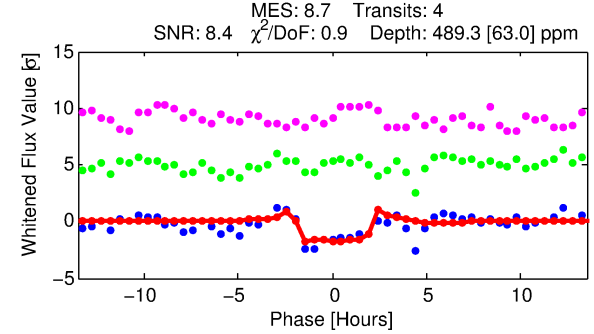
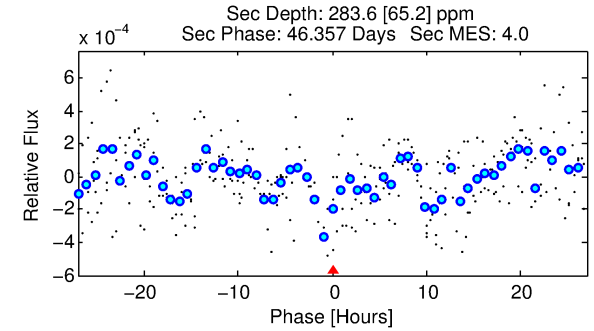
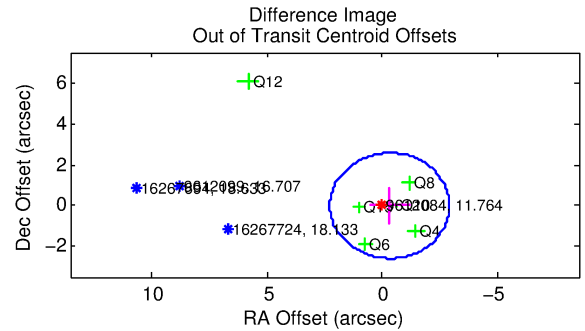
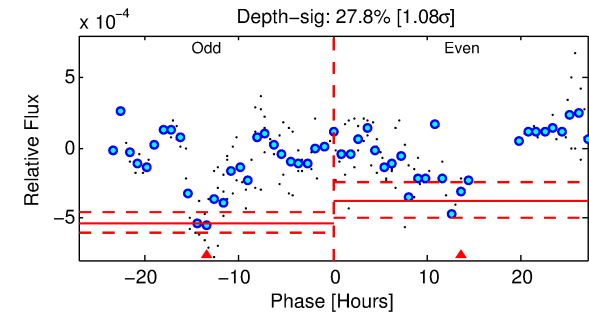
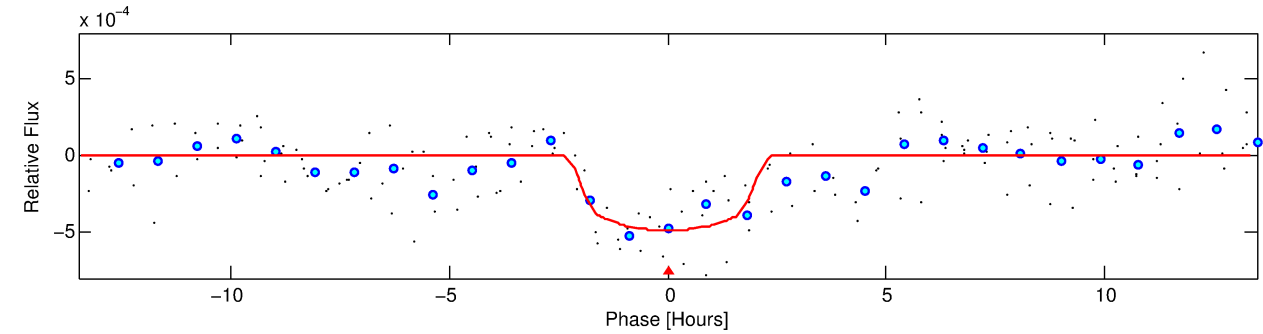
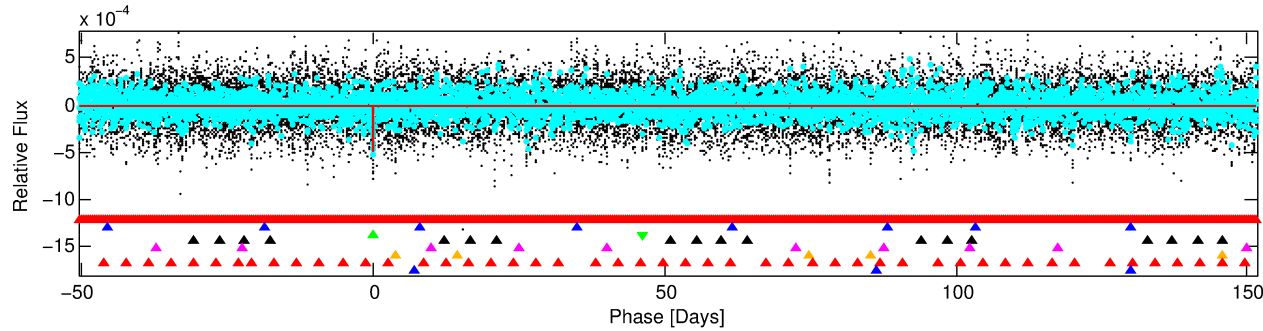
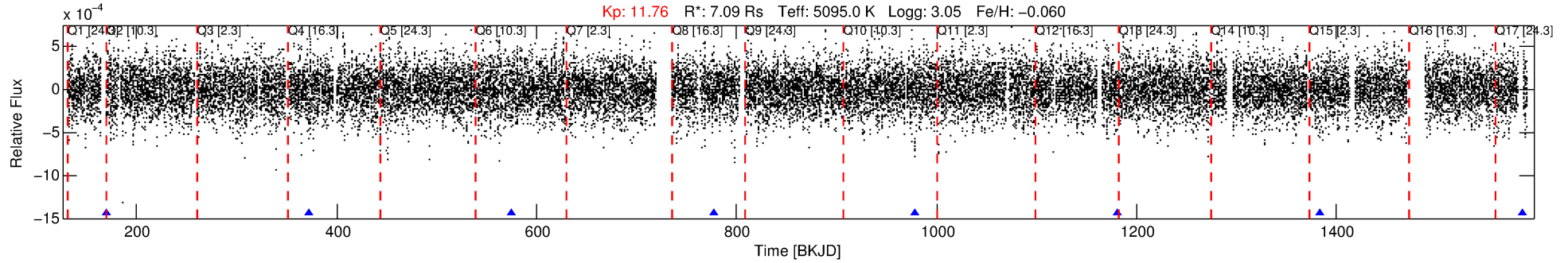
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 009612084-03

No Significant Match Found

# DV One-Page Summary

KIC: 9612084 Candidate: 3 of 8 Period: 202.222 d



## DV Fit Results:

Period = 202.22196 [0.00211] d  
Epoch = 170.1763 [0.0088] BKJD  
Rp/R\* = 0.0243 [0.0050]  
a/R\* = 174.76 [130.03]  
b = 0.89 [0.18]  
Seff = 41.14 [16.53]  
Teq = 646 [65] K  
Rp = 18.78 [8.03] Re  
a = 0.8594 [0.2508] AU  
Ag = 326.68 [199.29] [1.63 $\sigma$ ]  
Teffp = 4245 [508] K [7.03 $\sigma$ ]

## DV Diagnostic Results:

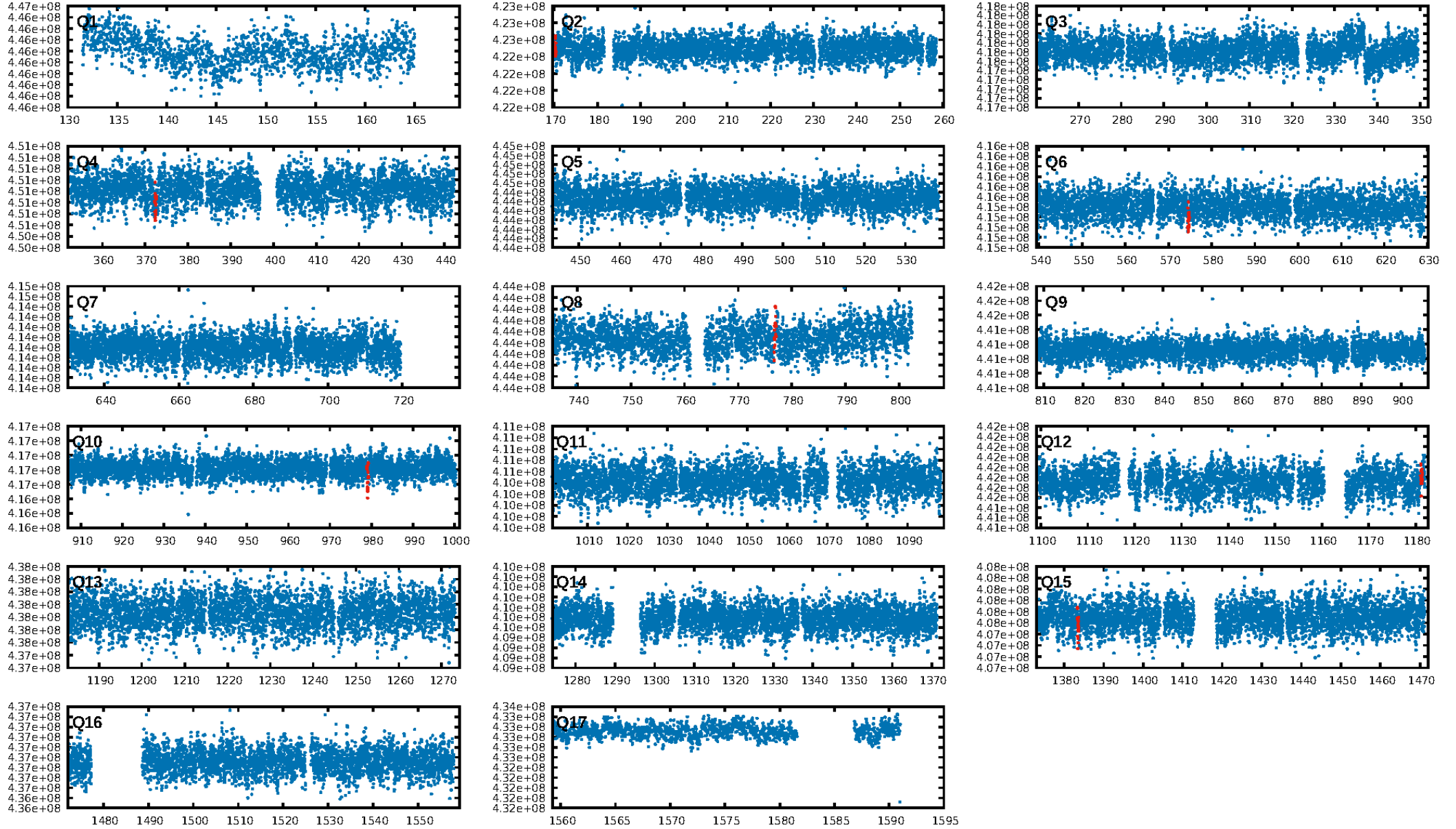
ShortPeriod-sig: 100.0% [127.52 $\sigma$ ]  
LongPeriod-sig: 100.0% [254.65 $\sigma$ ]  
ModelChiSquare2-sig: 10.5%  
ModelChiSquareGof-sig: 99.8%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: -2.565  
Centroid-sig: 50.9%  
Centroid-so: 0.193 arcsec [0.48 $\sigma$ ]  
OotOffset-rm: 0.306 arcsec [0.36 $\sigma$ ]  
KicOffset-rm: 0.266 arcsec [0.17 $\sigma$ ]  
OotOffset-st: 2/1/3/0 [6]  
KicOffset-st: 2/1/3/0 [6]  
DiffImageQuality-fgm: 0.67 [4/6]  
DiffImageOverlap-fno: 0.00 [0/6]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 13:21:08 Z

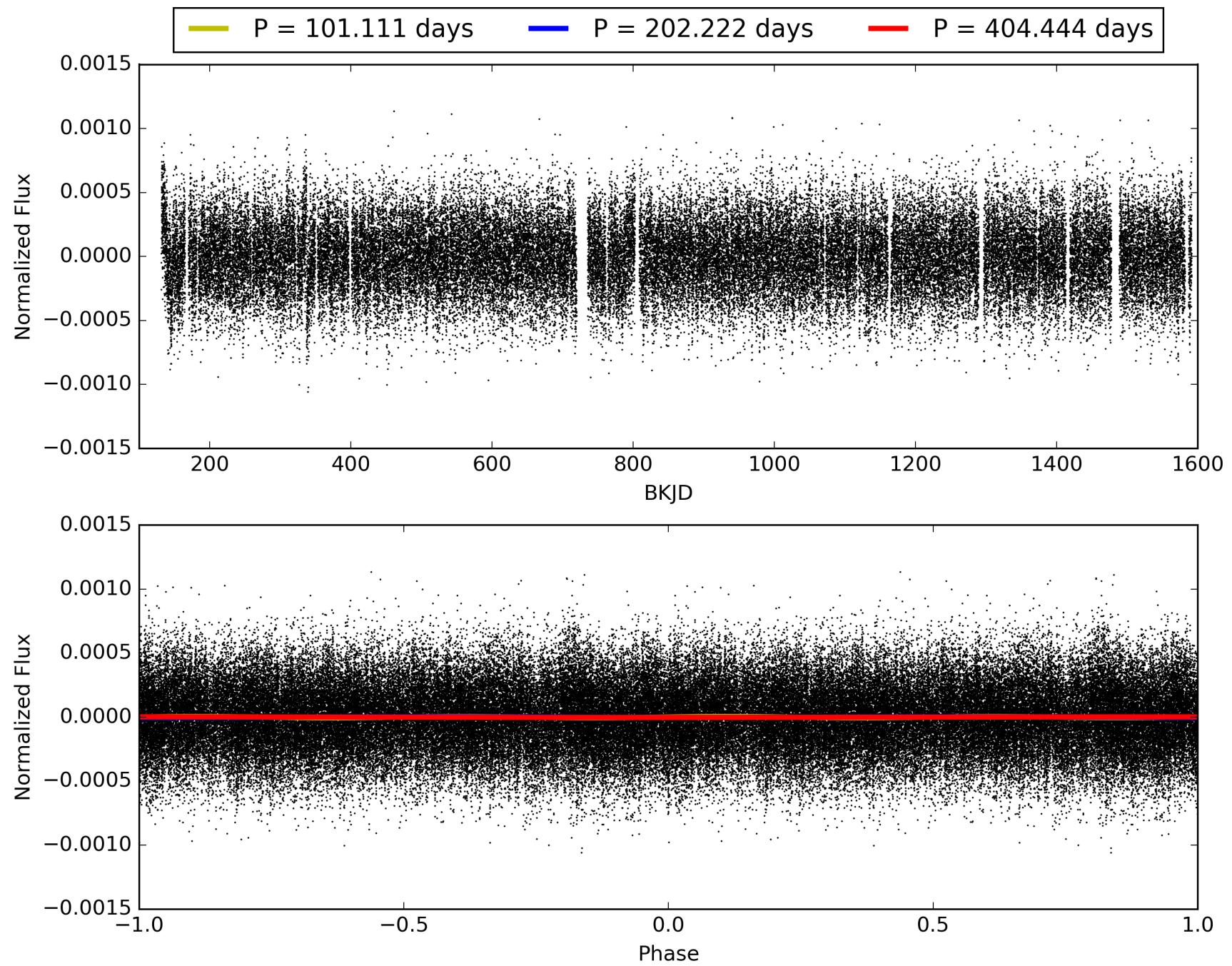
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 009612084-03, PDC Light Curves

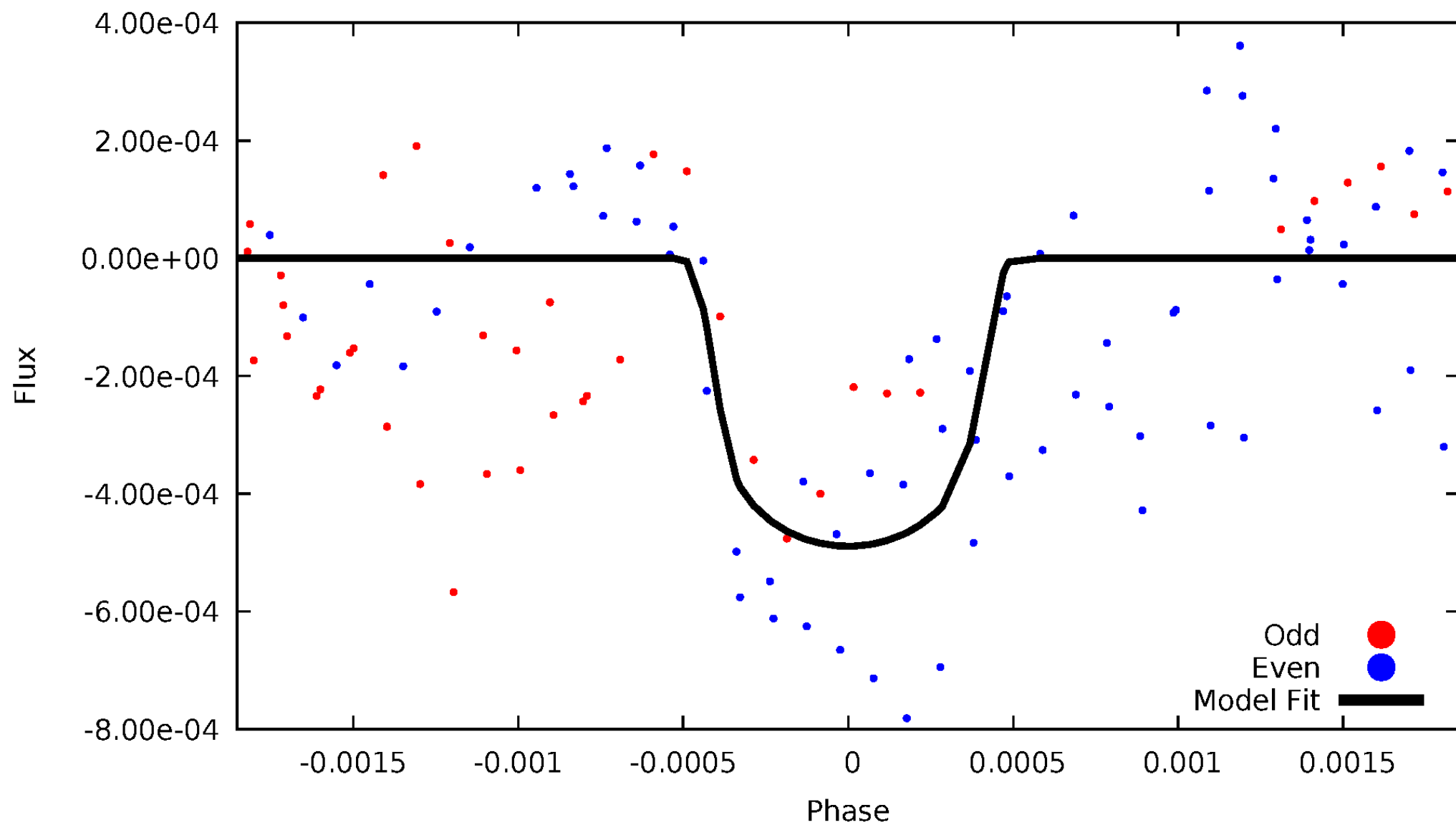


# TCE 009612084-03



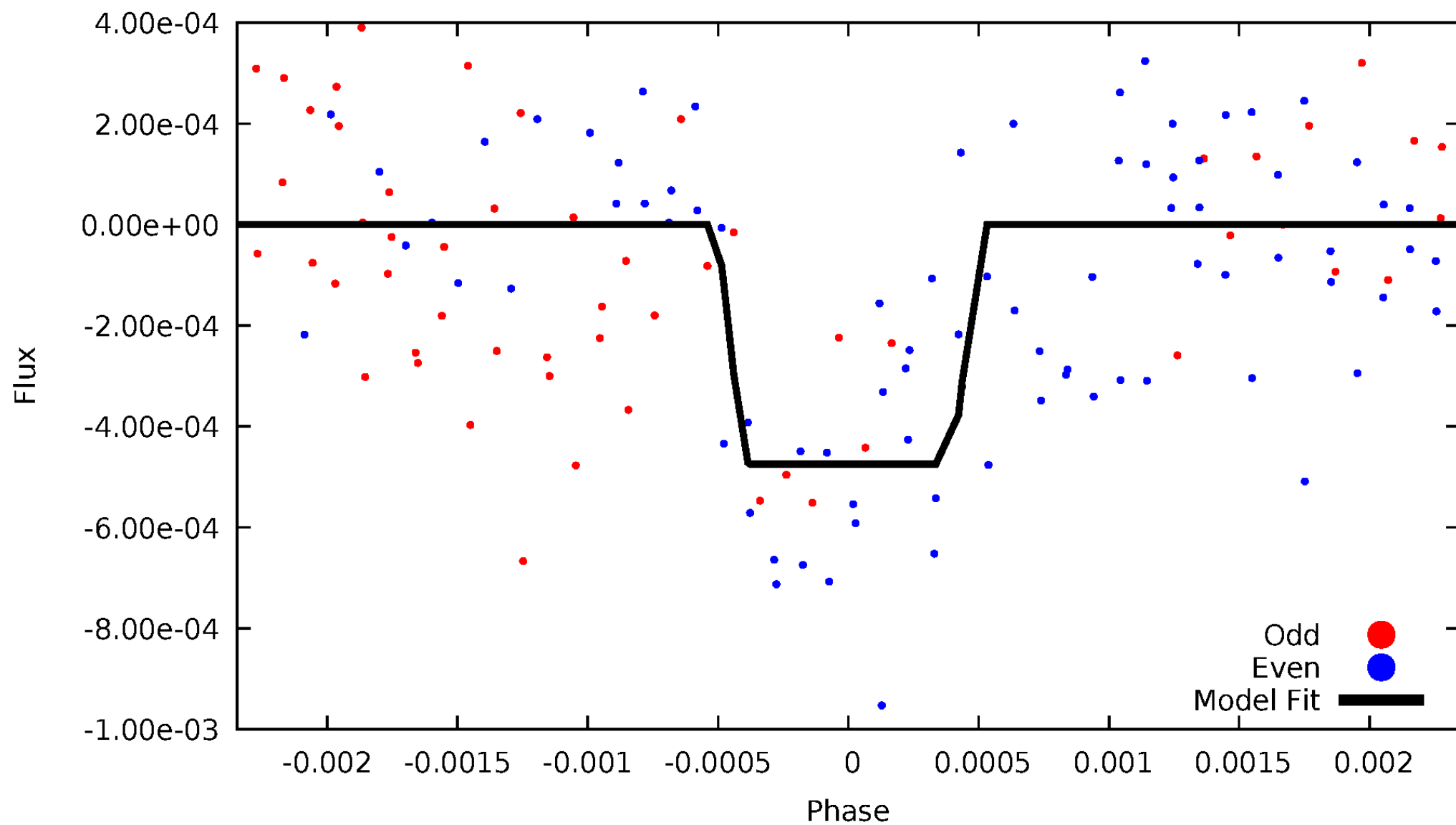
# DV Odd/Even

TCE 009612084-03



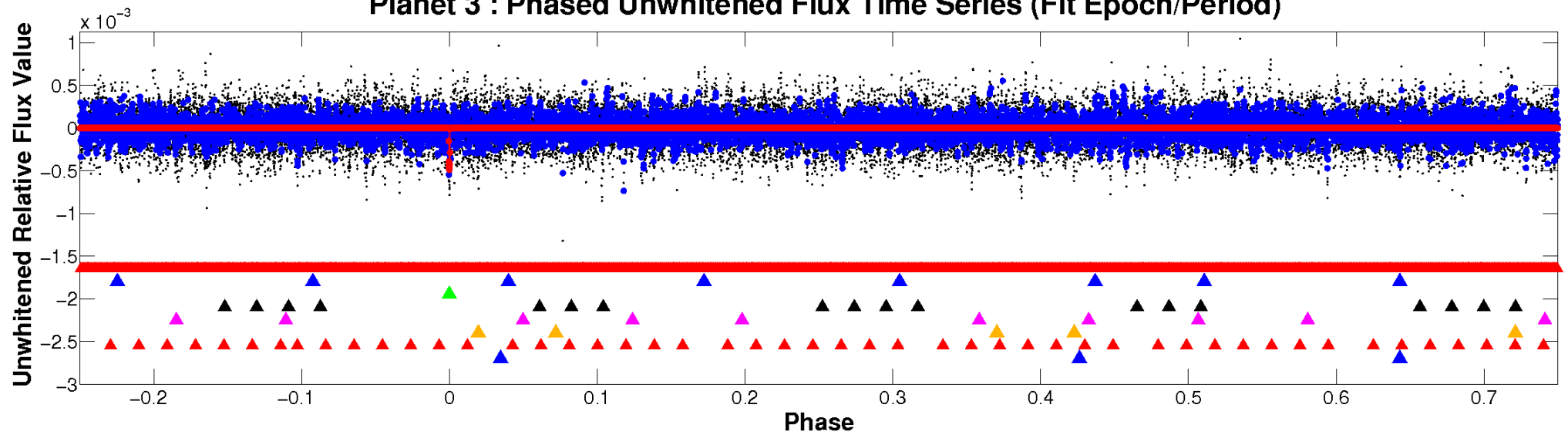
# ALT Odd/Even

TCE 009612084-03

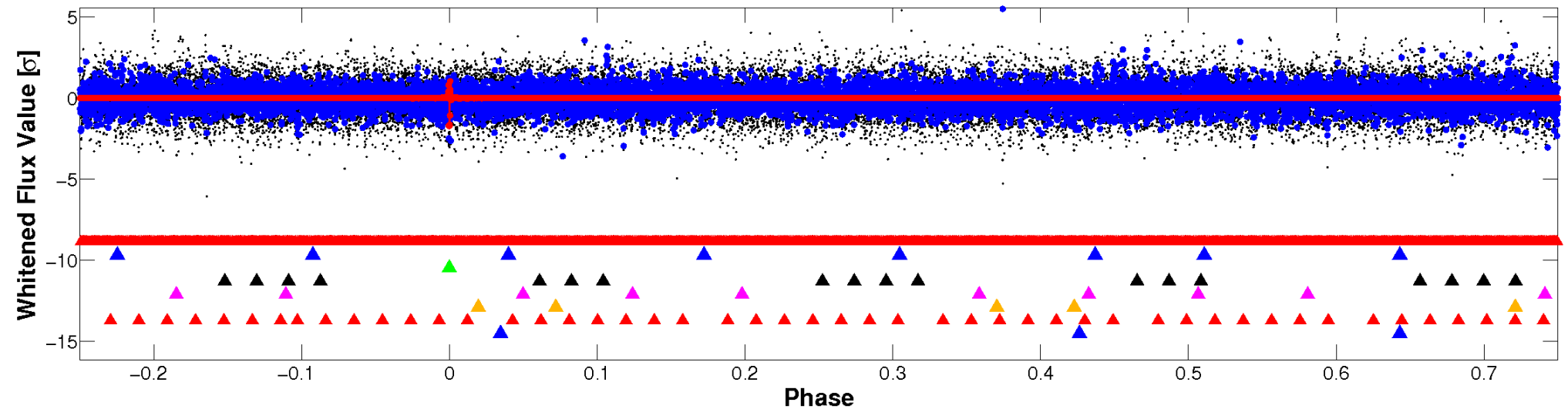


# Non-Whitened Vs. Whitened Light Curve

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



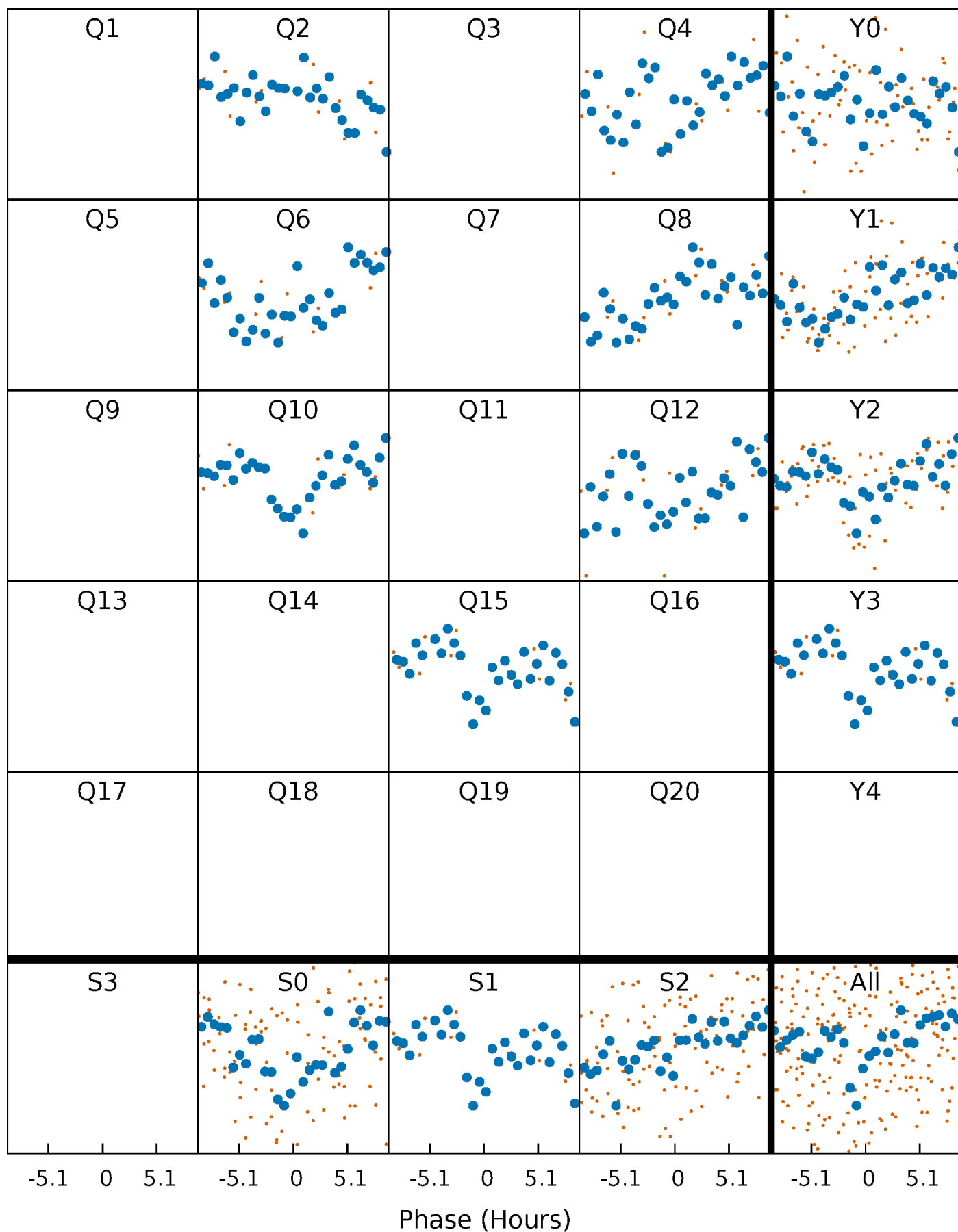
## Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)





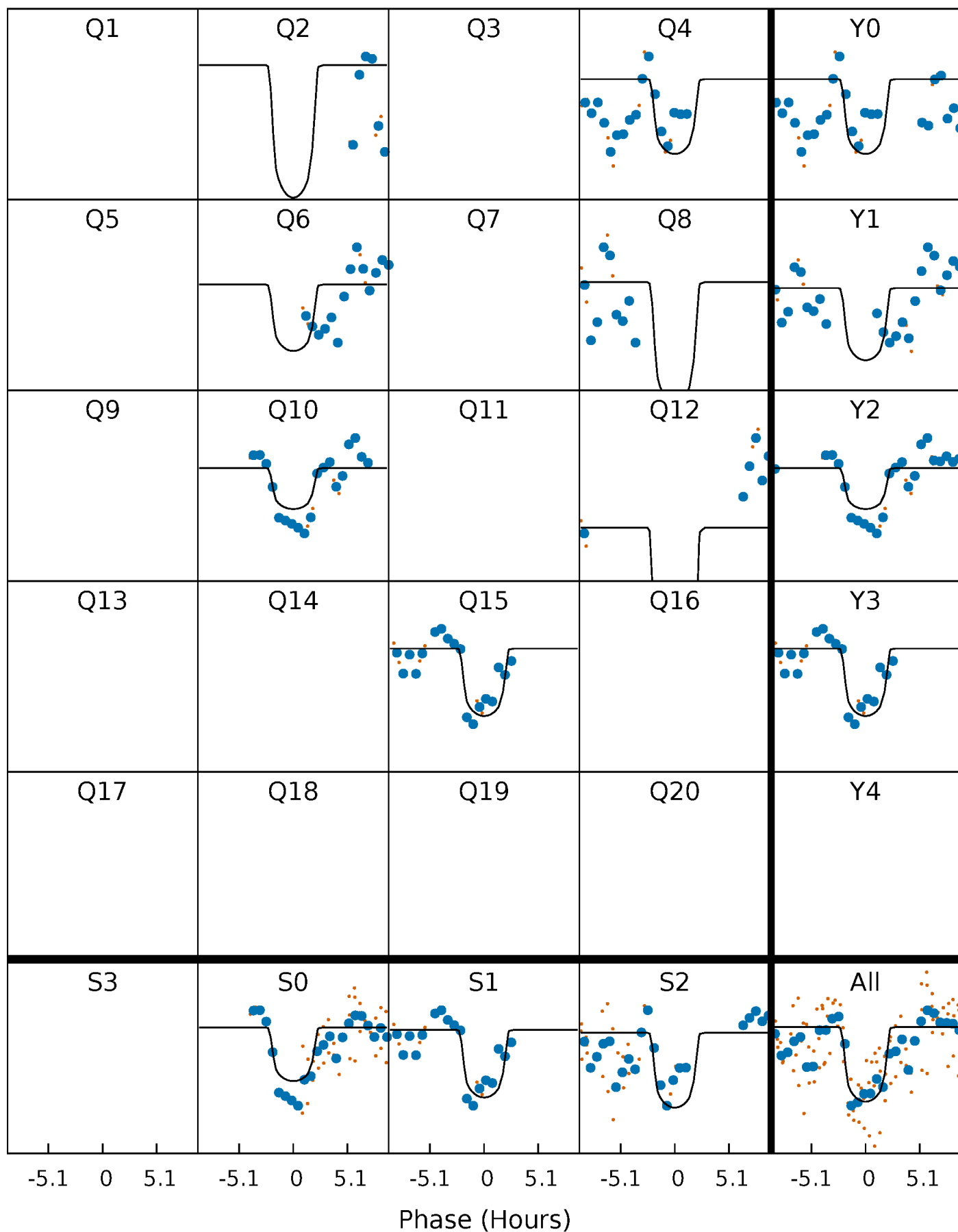
# PDC Quarter-Phased Transit Curves

TCE 009612084-03 P=202.221958 Days  $T_0=170.176293$  (BKJD)



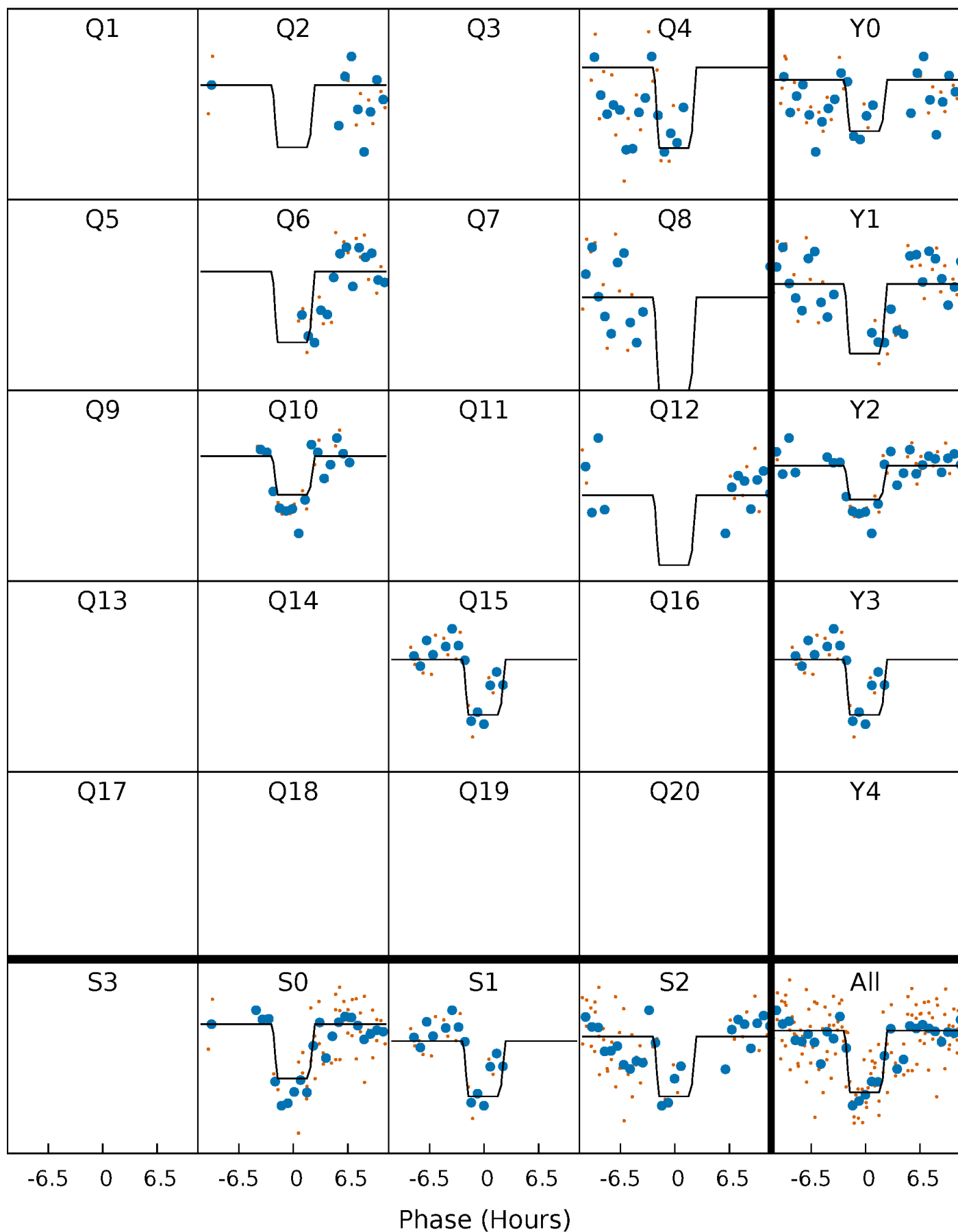
# DV Quarter-Phased Transit Curves

TCE 009612084-03 P=202.221958 Days  $T_0=170.176293$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

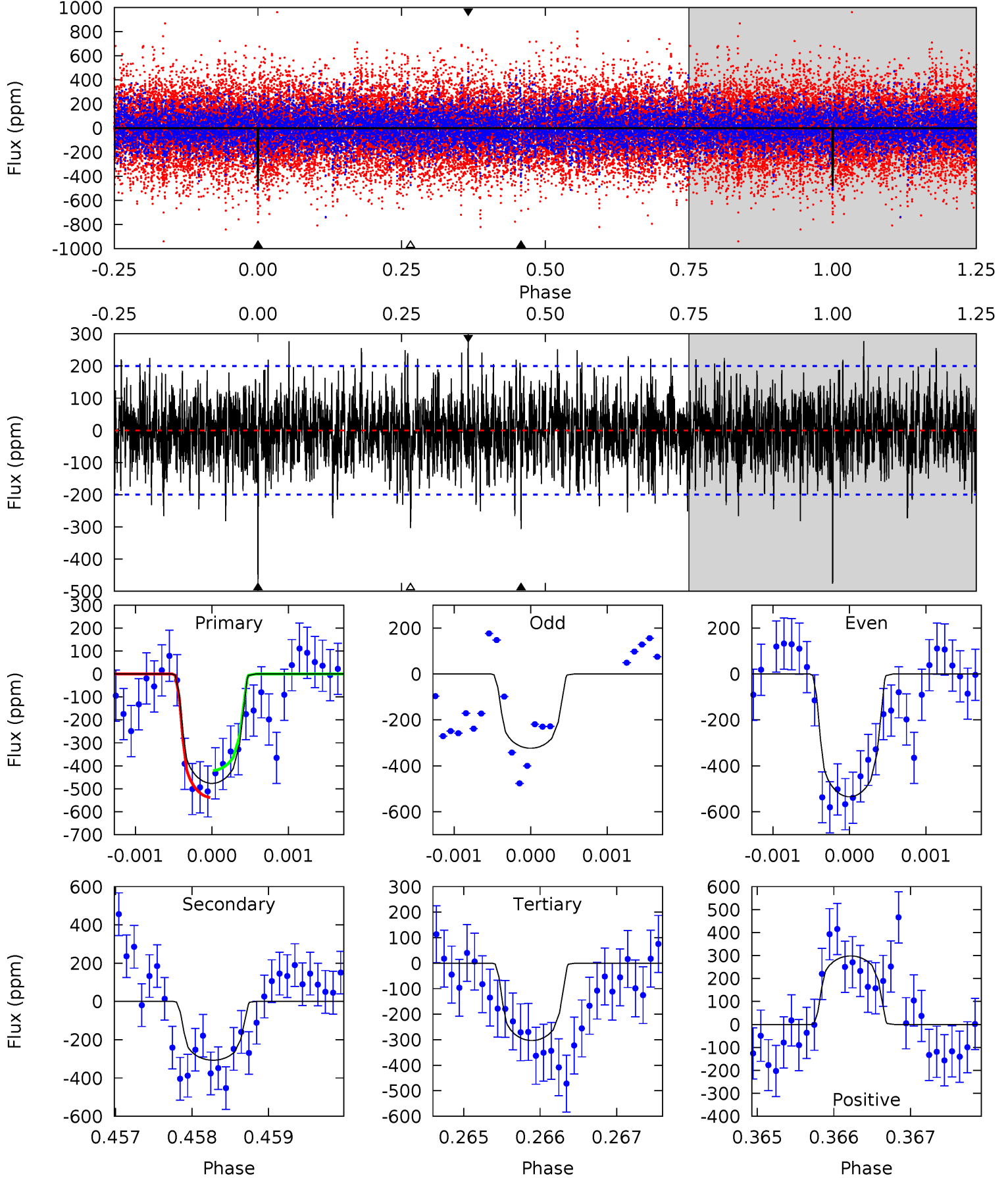
TCE 009612084-03 P=202.221748 Days  $T_0=170.187012$  (BKJD)



# DV Model-Shift Uniqueness Test

009612084-03, P = 202.221958 Days, E = 170.176293 Days

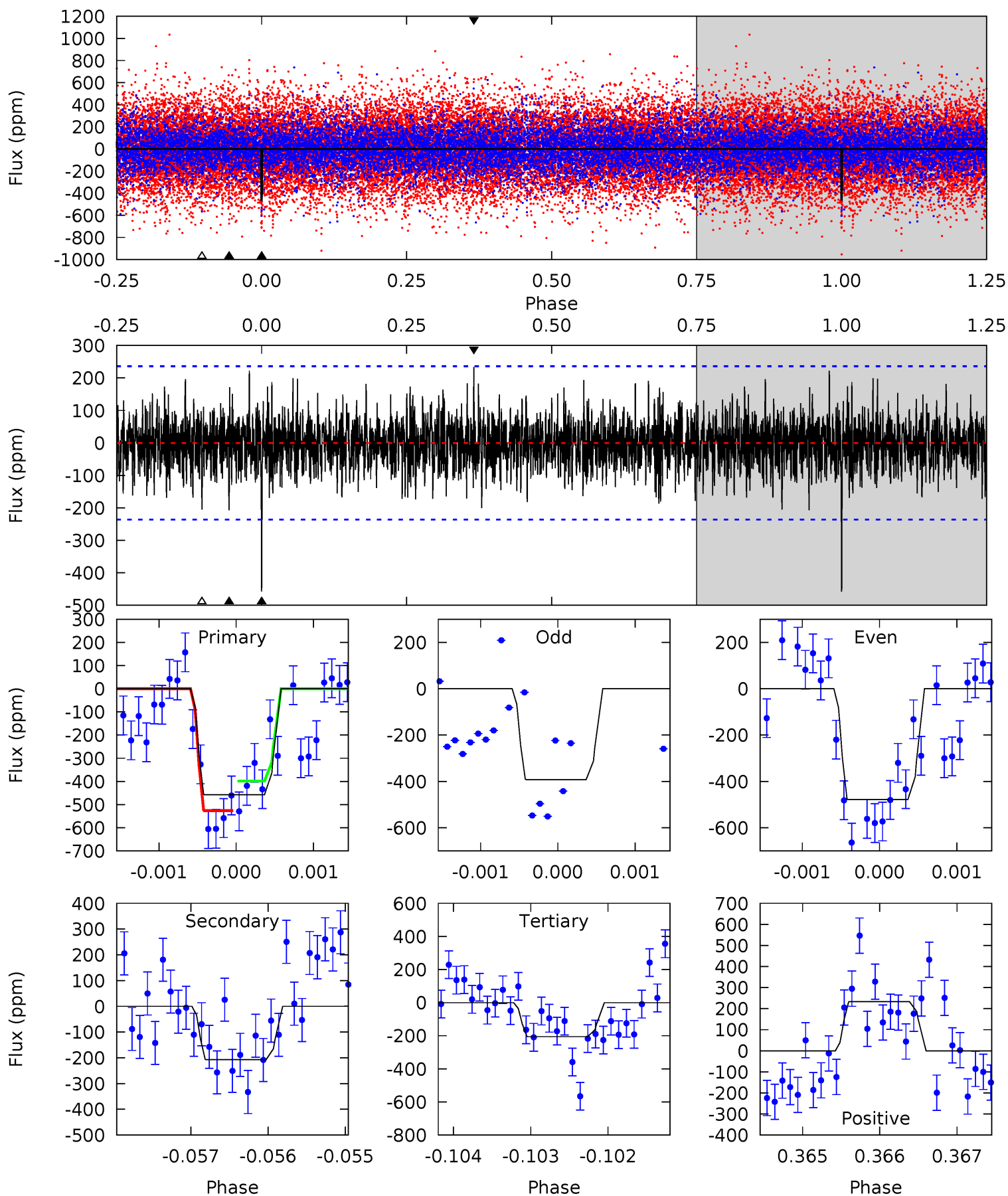
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.0	8.37	8.26	8.13	5.45	3.28	2.18	4.73	4.86	0.11	0.24	2.43	1.19	0.38	1.59



# Alt Model-Shift Uniqueness Test

009612084-03, P = 202.221748 Days, E = 170.187012 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
10.6	4.80	4.76	5.41	5.47	3.32	1.39	5.85	5.20	0.05	-0.60	0.86	1.14	0.34	1.47





### Stellar Parameters For KIC 009612084

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5095^{+45}_{-121}$	$3.052^{+0.195}_{-0.105}$	$-0.060^{+0.100}_{-0.250}$	$7.094^{+1.066}_{-2.666}$	$2.070^{+0.533}_{-0.799}$	$0.008^{+0.011}_{-0.003}$
	+1%/-2%	+6%/-3%	+167%/-417%	+15%/-38%	+26%/-39%	+136%/-31%
Source	SPE74	SPE74	SPE74	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology  
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

### Secondary Eclipse Parameters for KIC 009612084-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-307 \pm 37$	$18.56^{+4.55}_{-4.82}$	$889^{+45}_{-59}$	$4421^{+442}_{-319}$	$376^{+252}_{-140}$
Alt.	$-207 \pm 43$	$16.83^{+5.01}_{-4.68}$	$894^{+43}_{-53}$	$4278^{+518}_{-353}$	$300^{+270}_{-122}$

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

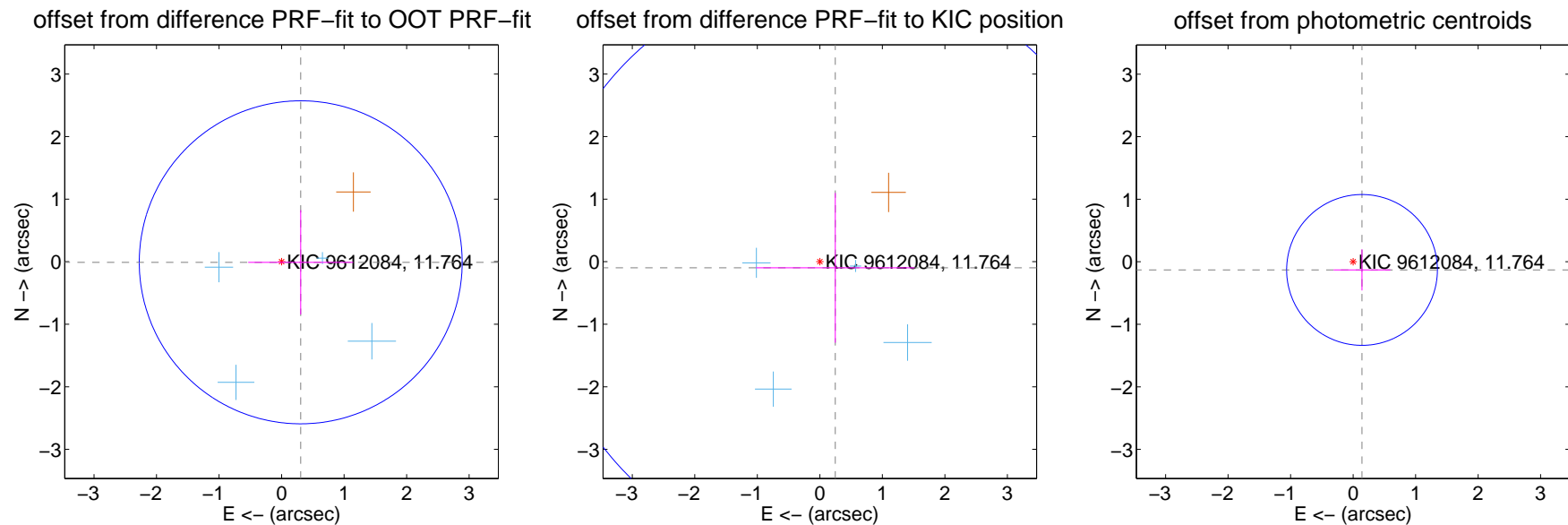
## DV Centroid Data

Supplemental centroid analysis for 009612084-03. **Kepler magnitude: 11.76.** Transit SNR 8.37

There are 4 quarters with good PRF difference image offsets

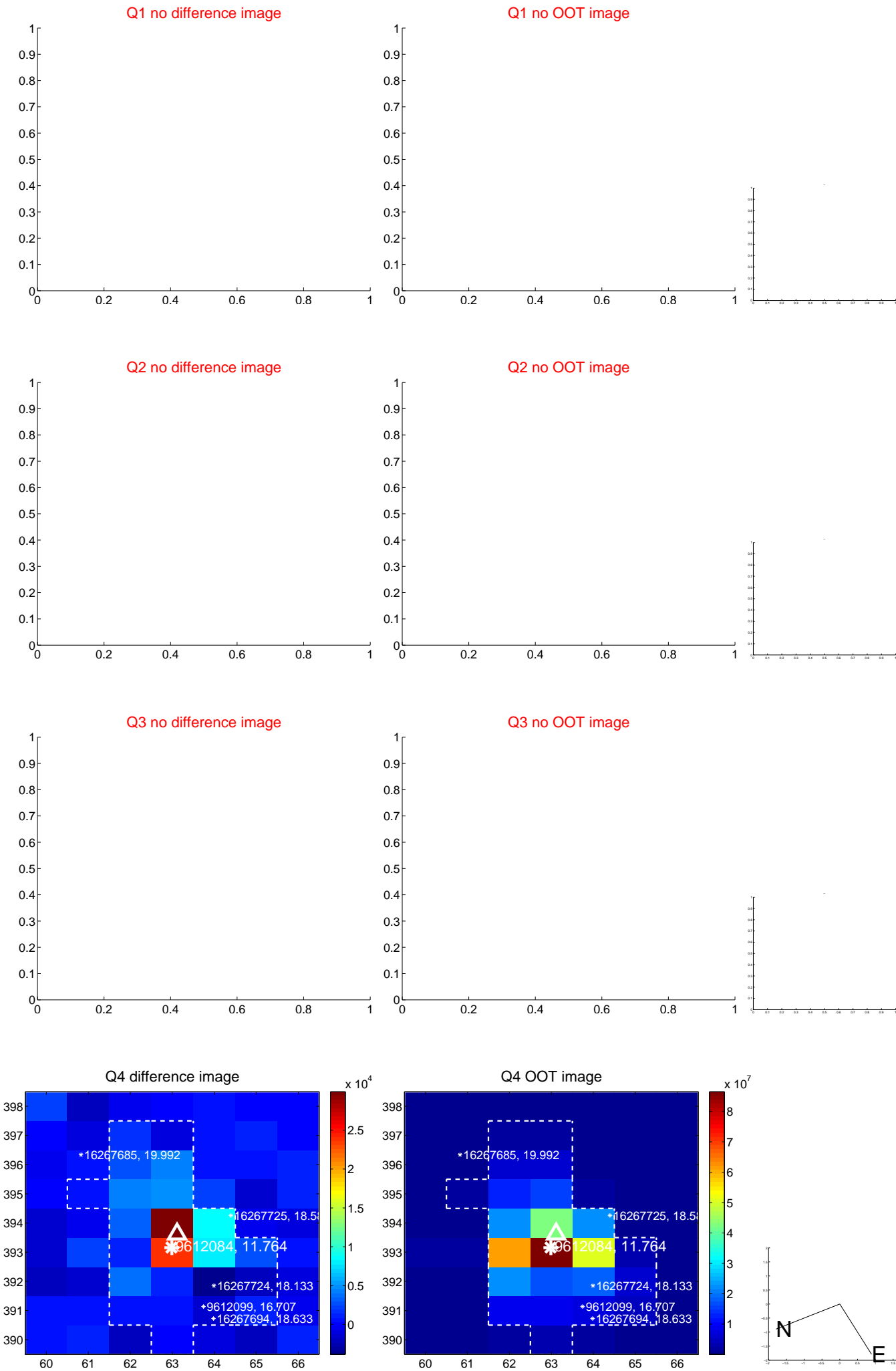
The direct PRF centroid is offset from the target star catalog position by about 0.07 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.306 \pm 0.861$	0.36	$-0.306 \pm 0.840$	$-0.010 \pm 0.833$
PRF-fit source offset from KIC position	$0.266 \pm 1.563$	0.17	$-0.247 \pm 1.267$	$-0.098 \pm 1.197$
photometric centroid source offset	$0.19 \pm 0.40$	0.48	$-0.14 \pm 0.45$	$-0.13 \pm 0.33$

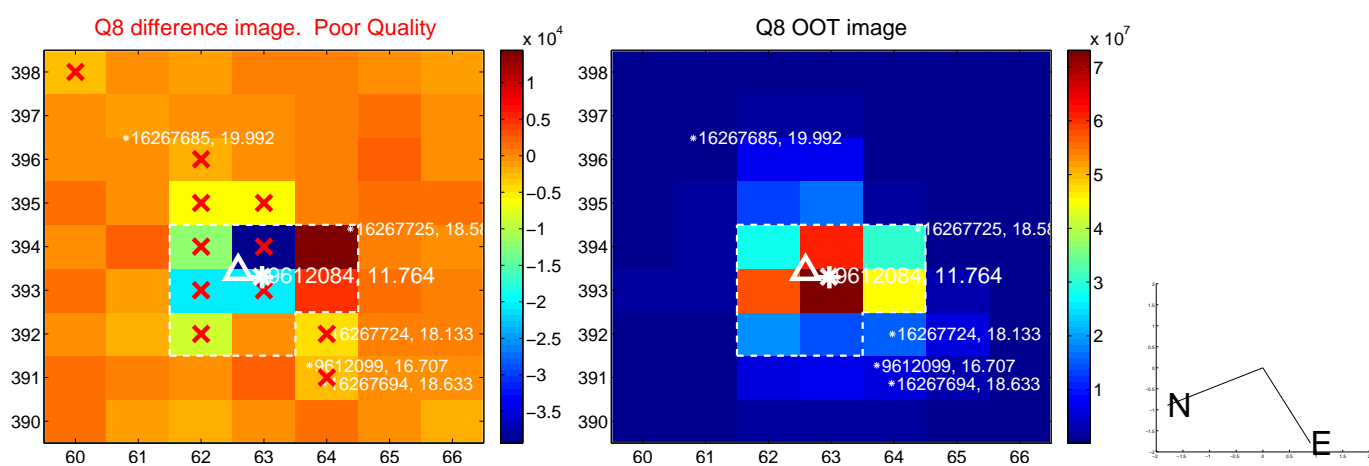
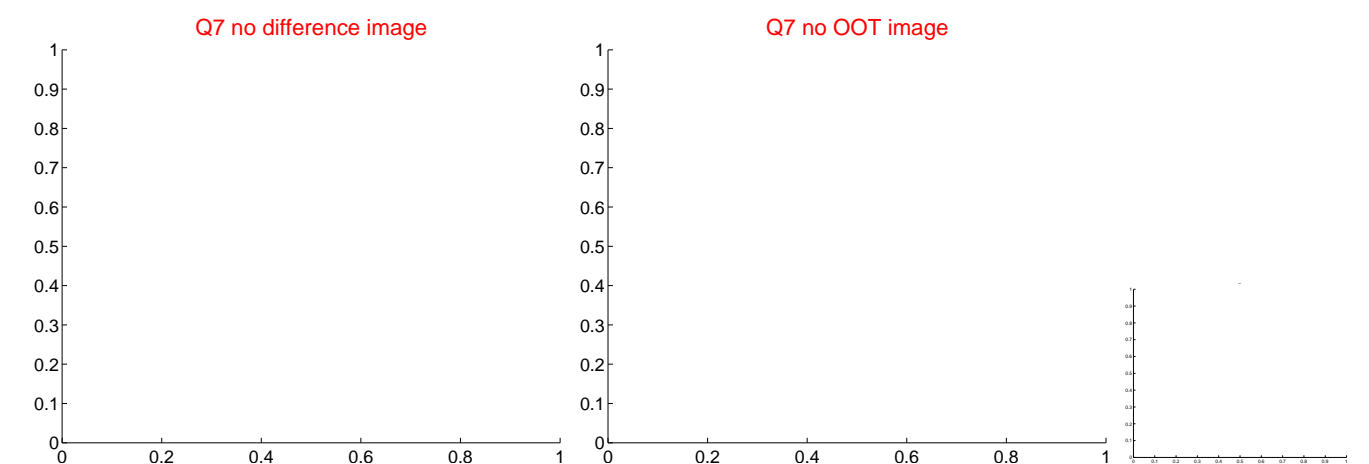
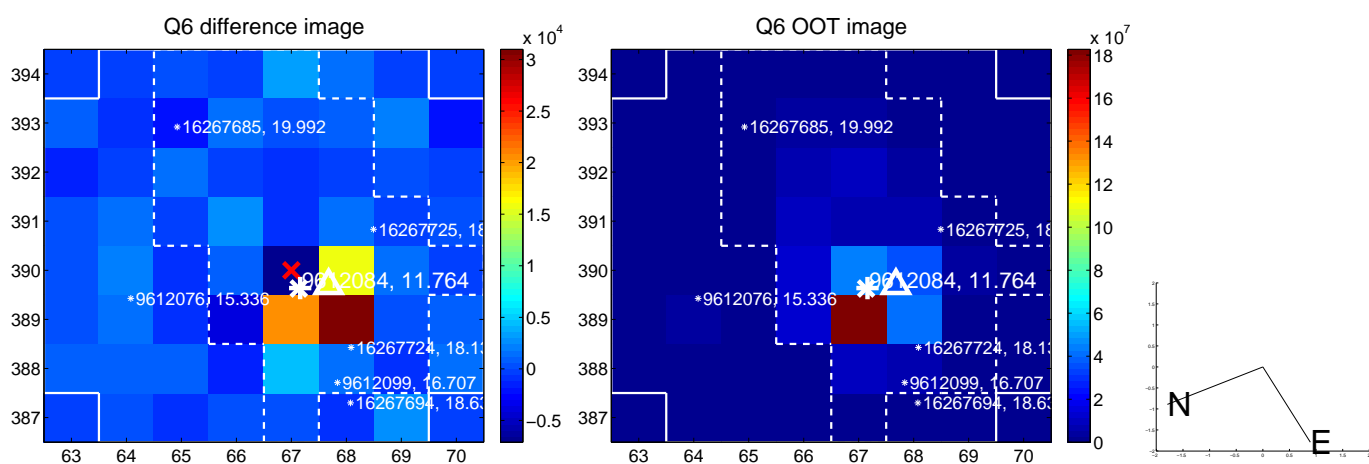
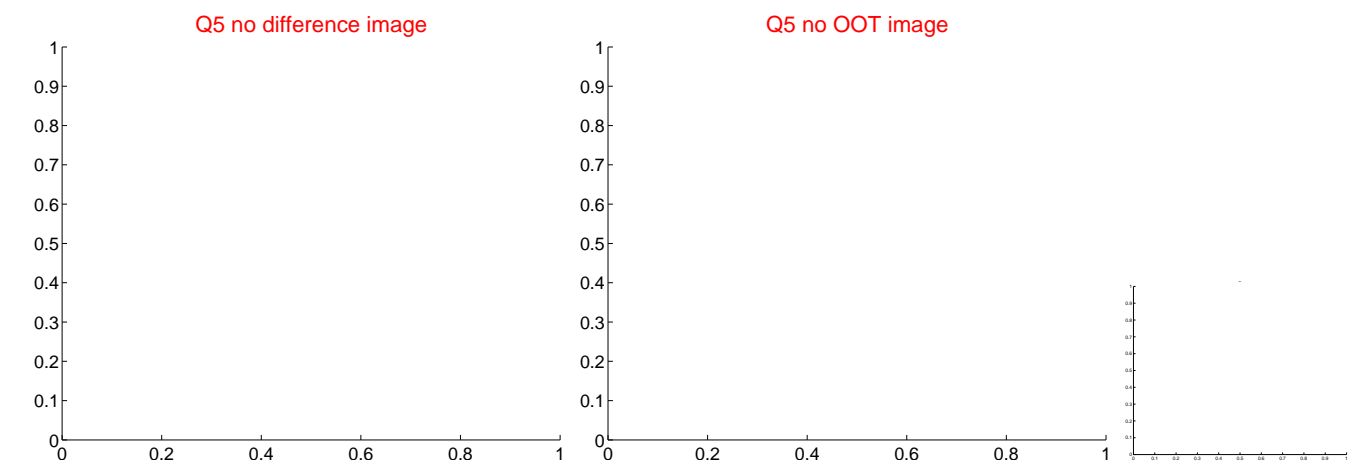


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

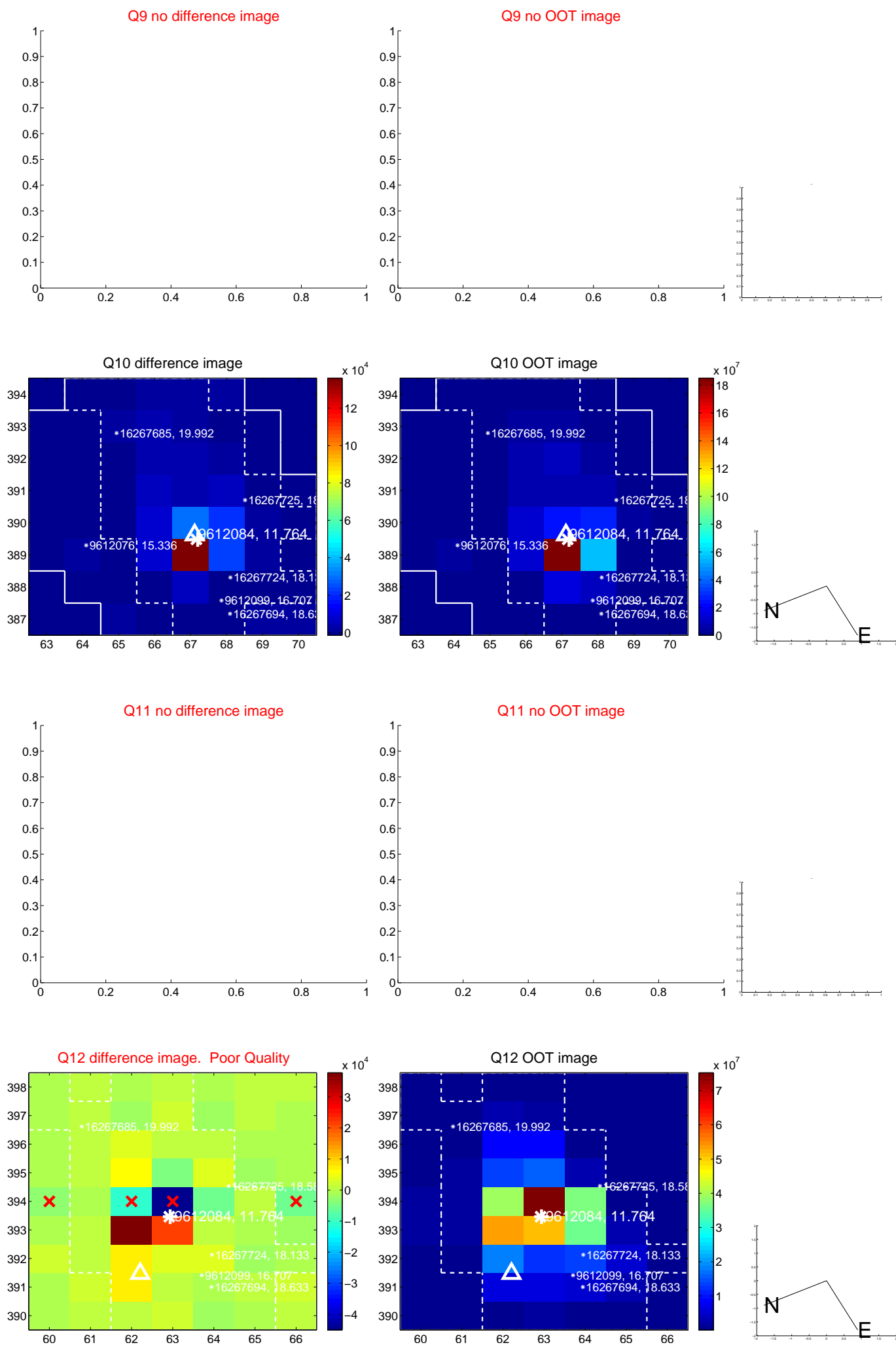
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



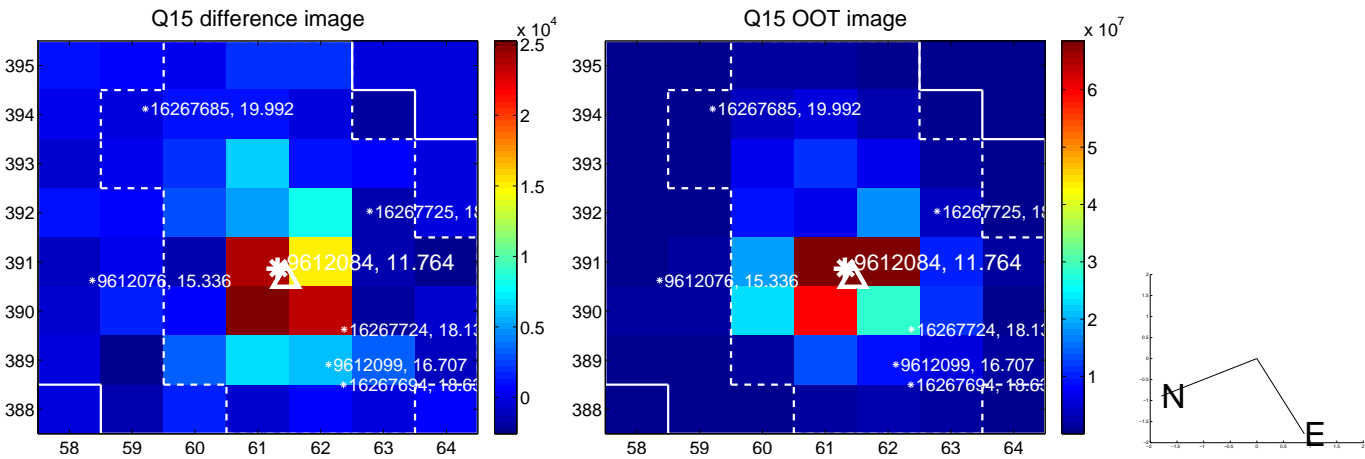
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value



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

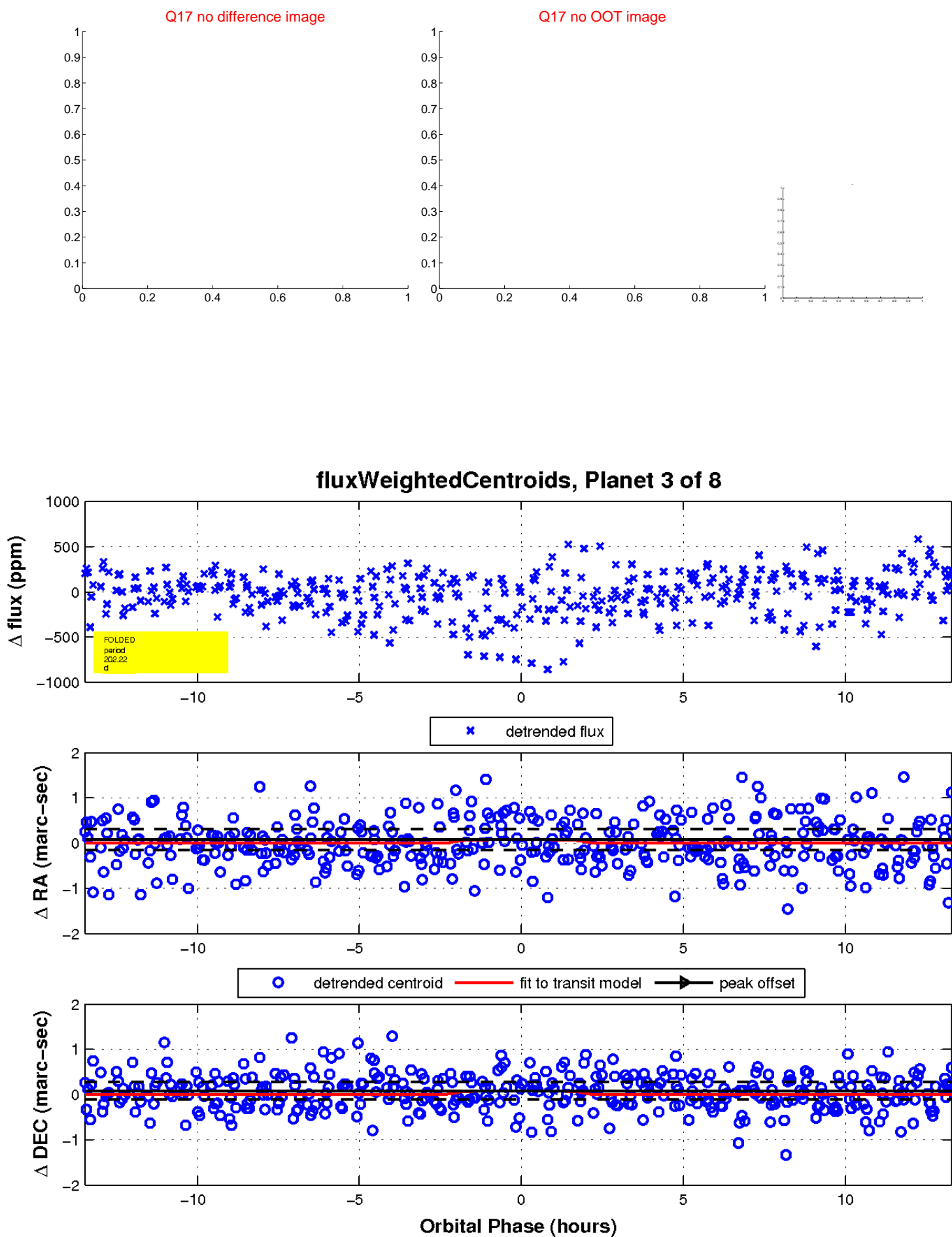


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



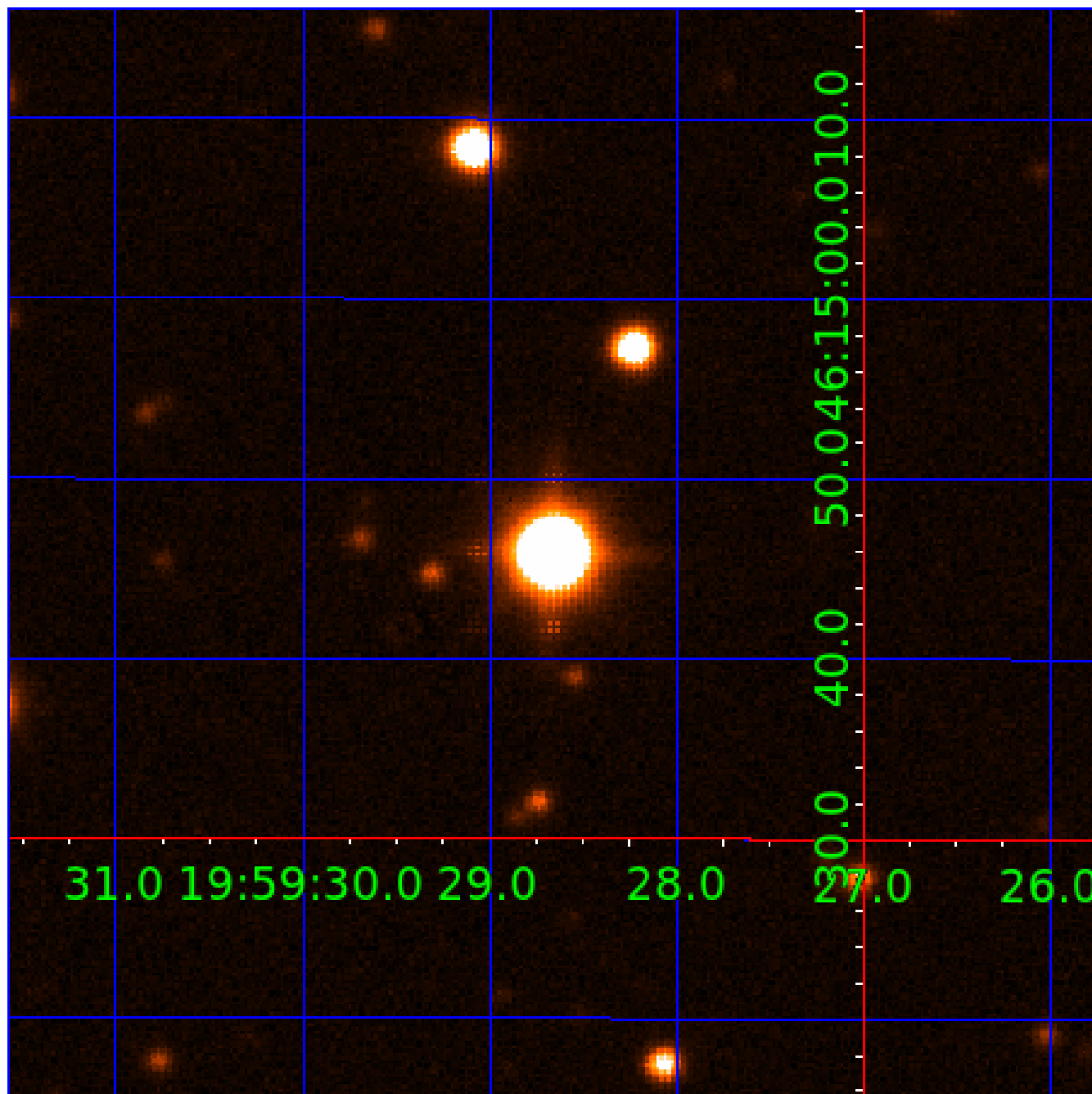


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 009612084

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009612084-01	OBS	No	1.072278	132.559506	29.2	4.632	8.4	8.2	7.09	5095	4.49	0.00
009612084-02	OBS	No	175.465170	258.536516	601.6	2.271	8.3	9.2	7.09	5095	19.07	49.71
009612084-03	OBS	No	202.221958	170.176293	489.3	4.495	8.7	8.4	7.09	5095	18.78	41.14
009612084-04	OBS	No	81.760399	139.458312	302.5	3.181	8.5	8.8	7.09	5095	13.05	137.62
009612084-05	OBS	No	139.808662	242.670574	358.0	6.969	8.1	7.7	7.09	5095	14.89	67.30
009612084-06	OBS	No	273.160085	376.365574	457.8	4.949	7.7	8.1	7.09	5095	17.53	27.55
009612084-07	OBS	No	29.442997	149.385149	210.3	3.733	8.0	8.4	7.09	5095	11.14	537.14
009612084-08	OBS	No	483.641932	300.213871	109.9	6.000	7.6	-1.0	7.09	5095	7.24	12.86

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009612084-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
009612084-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT
009612084-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES—TRANS_GAPPED—MOD_NONUNIQ_ALT
009612084-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
009612084-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS
009612084-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
009612084-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_ZUMA—TRANS_GAPPED—MOD_NONUNIQ_ALT
009612084-08	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—CENT_NOFITS—HALO_GHOST

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

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

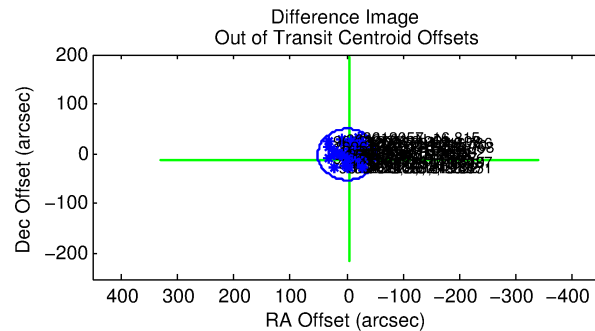
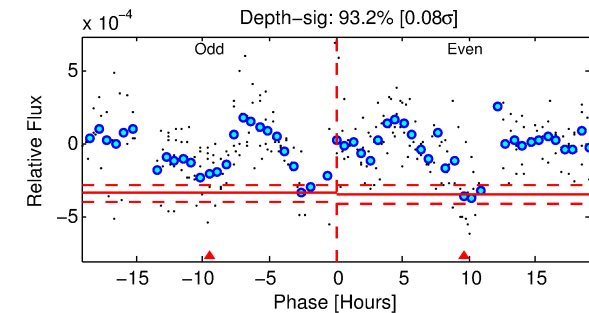
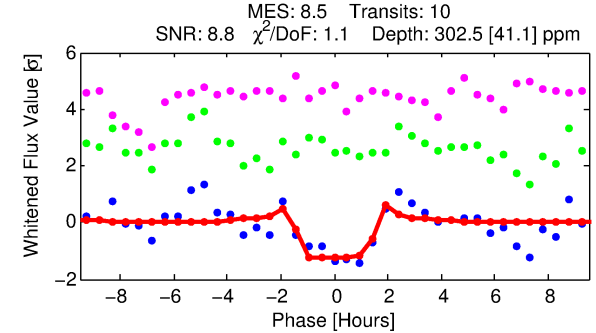
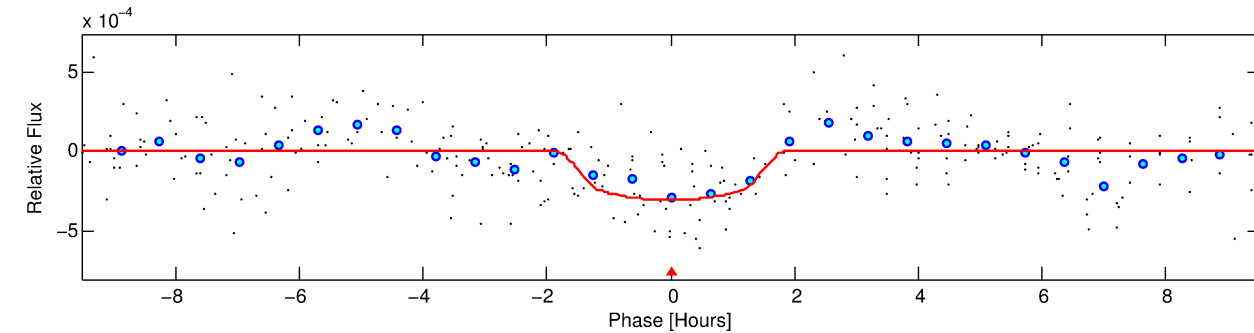
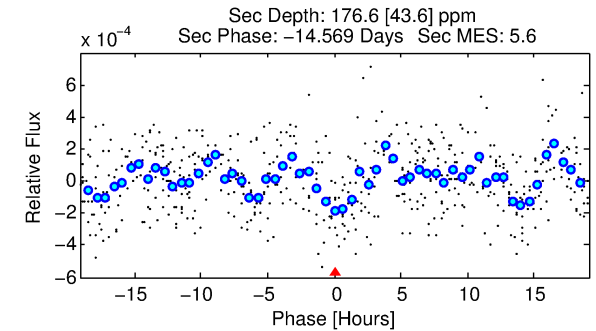
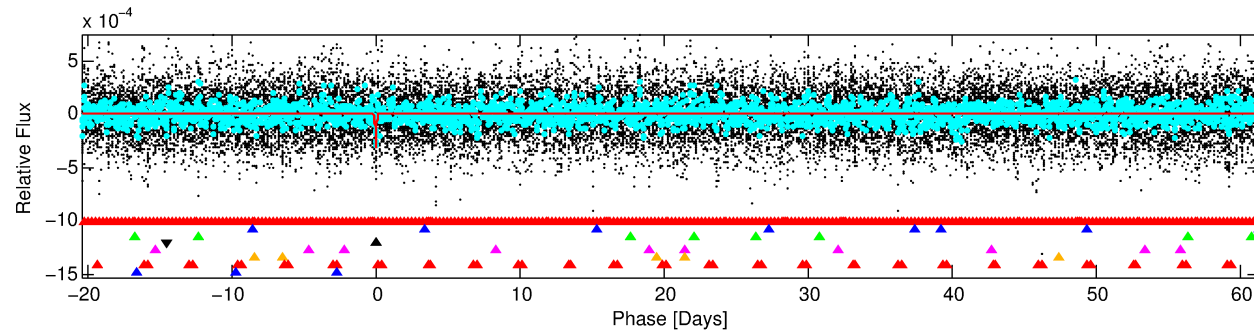
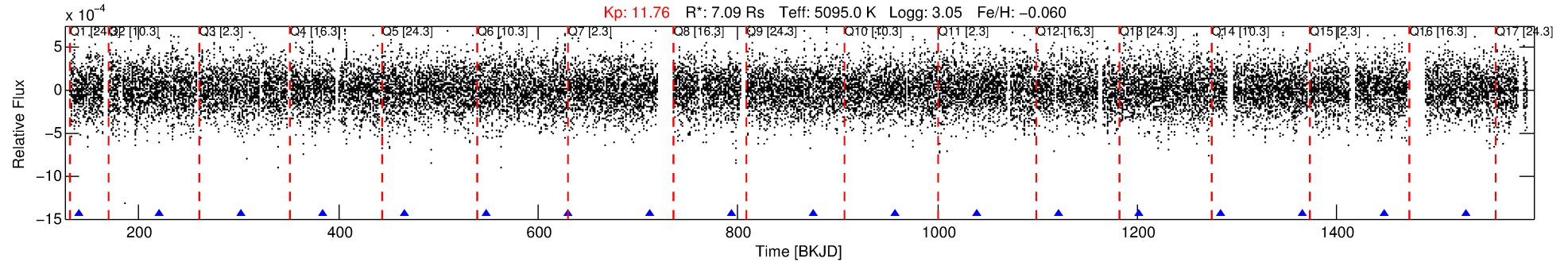
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 009612084-04

No Significant Match Found

# DV One-Page Summary

KIC: 9612084 Candidate: 4 of 8 Period: 81.760 d



## DV Fit Results:

Period = 81.76040 [0.00053] d  
Epoch = 139.4583 [0.0055] BKJD  
Rp/R\* = 0.0169 [0.0198]  
a/R\* = 149.31 [644.72]  
b = 0.68 [3.54]  
Seff = 137.62 [55.29]  
Teq = 873 [88] K  
Rp = 13.05 [16.09] Re  
a = 0.4699 [0.1371] AU  
Ag = 125.93 [301.38] [0.41σ]  
Teffp = 4523 [2672] K [1.37σ]

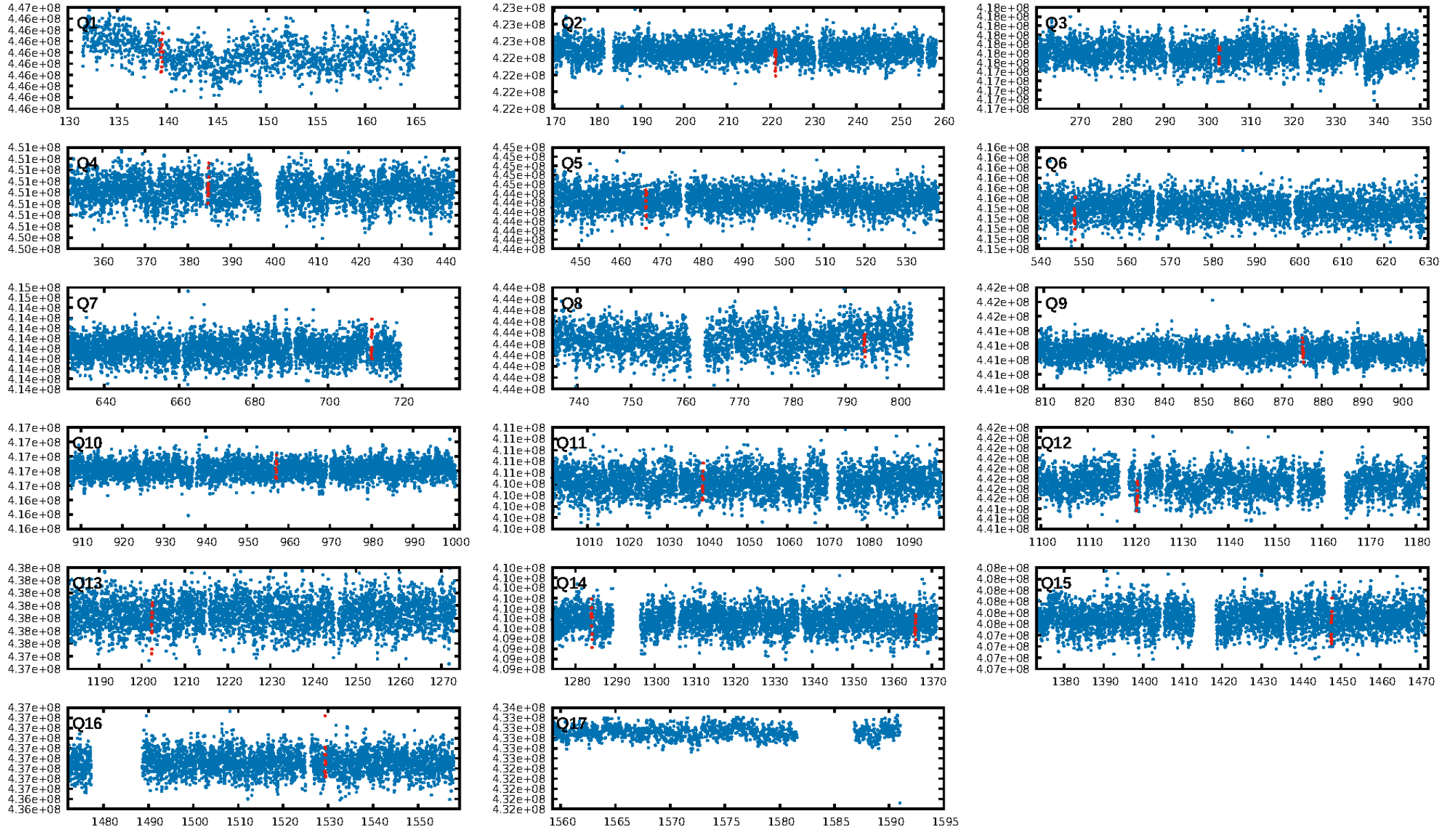
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [256.02σ]  
LongPeriod-sig: 100.0% [181.86σ]  
ModelChiSquare2-sig: 33.1%  
ModelChiSquareGoF-sig: 99.5%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [9/9]  
GhostDiagnostic-chr: 3.352  
Centroid-sig: 28.4%  
Centroid-so: 0.347 arcsec [0.79σ]  
OotOffset-rm: 0.644 arcsec [0.04σ]  
KicOffset-rm: 0.715 arcsec [0.04σ]  
OotOffset-st: 4/3/2/3 [12]  
KicOffset-st: 4/3/2/3 [12]  
DiffImageQuality-fgm: 0.58 [7/12]  
DiffImageOverlap-fno: 0.36 [5/14]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 13:21:14 Z

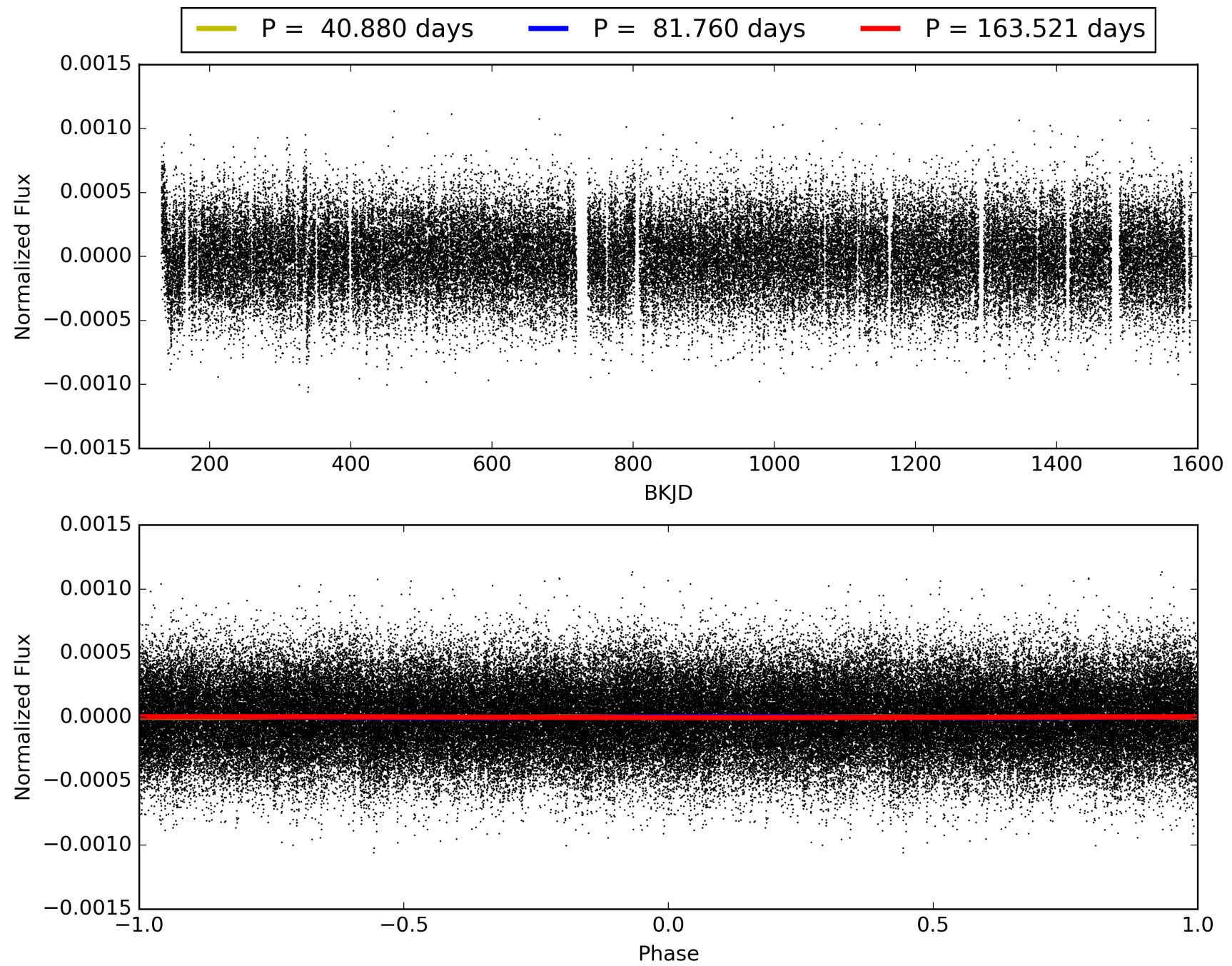
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 009612084-04, PDC Light Curves





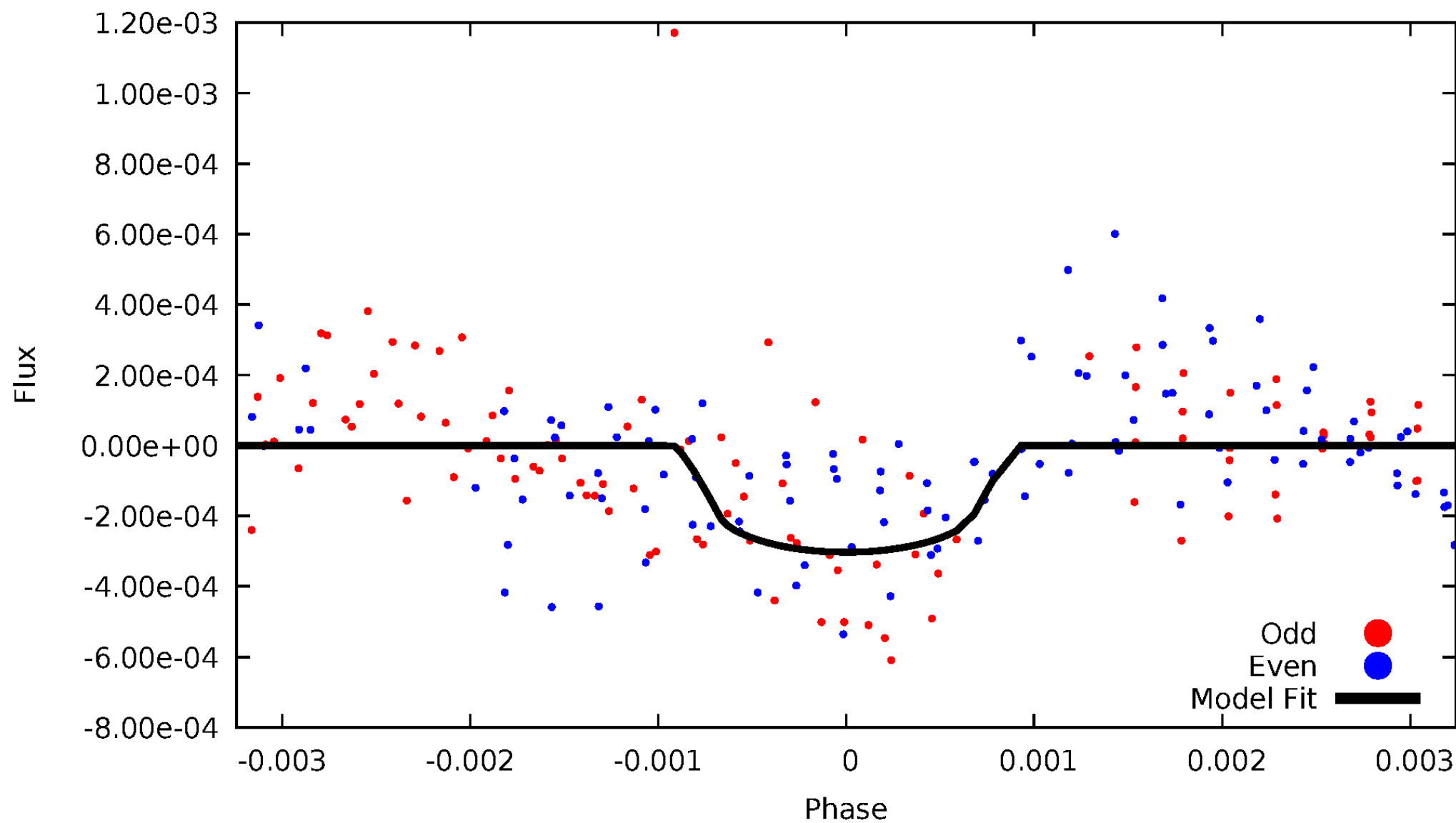
TCE 009612084-04





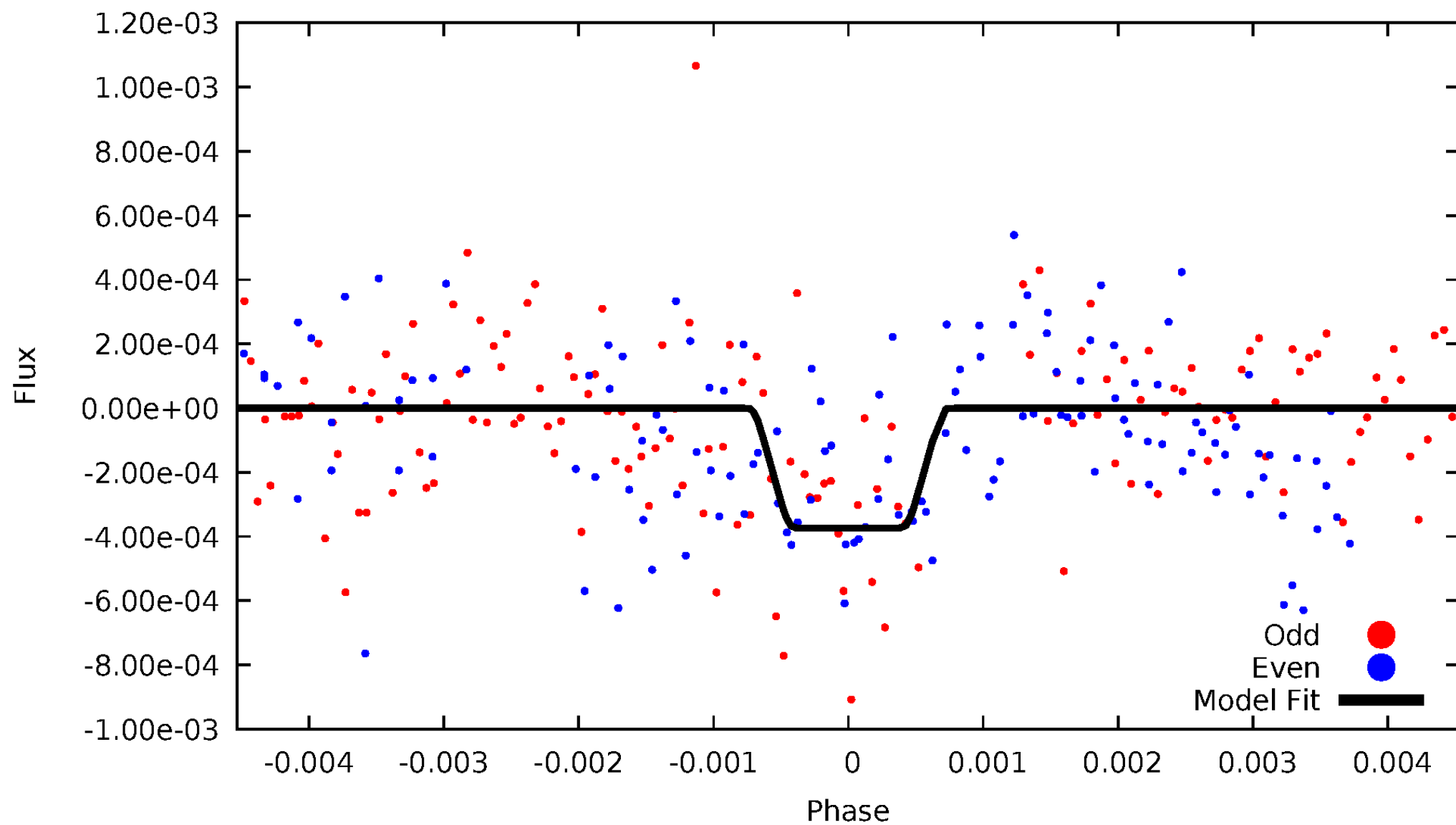
# DV Odd/Even

TCE 009612084-04



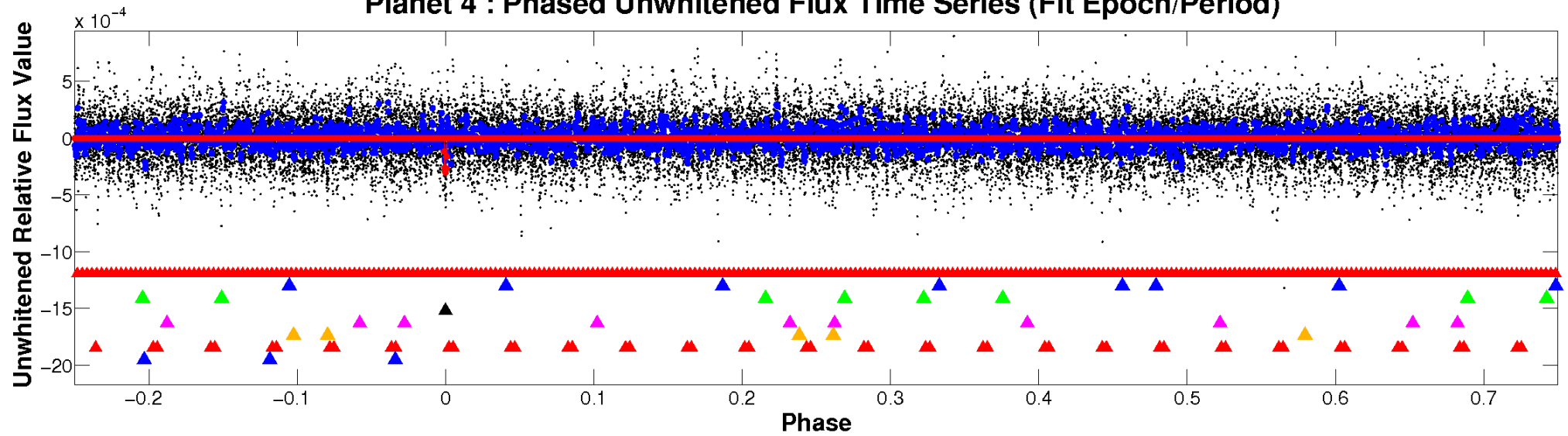
# ALT Odd/Even

TCE 009612084-04

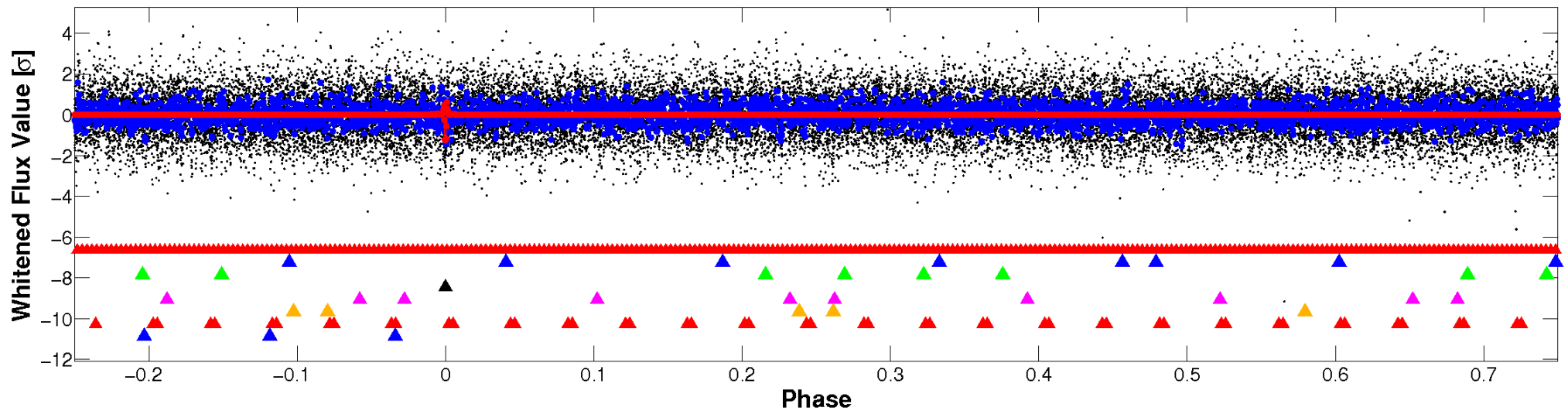


# Non-Whitened Vs. Whitened Light Curve

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

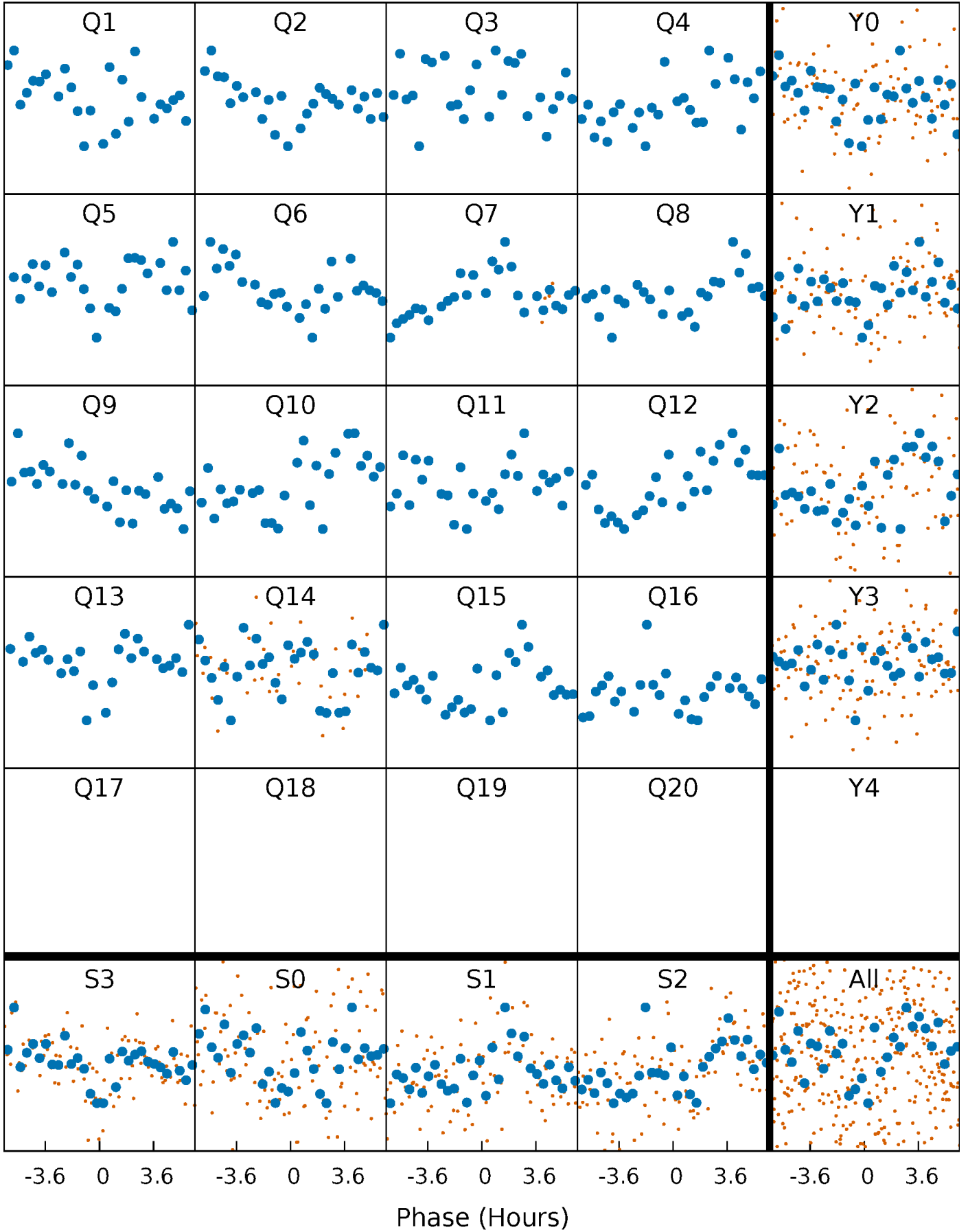


## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



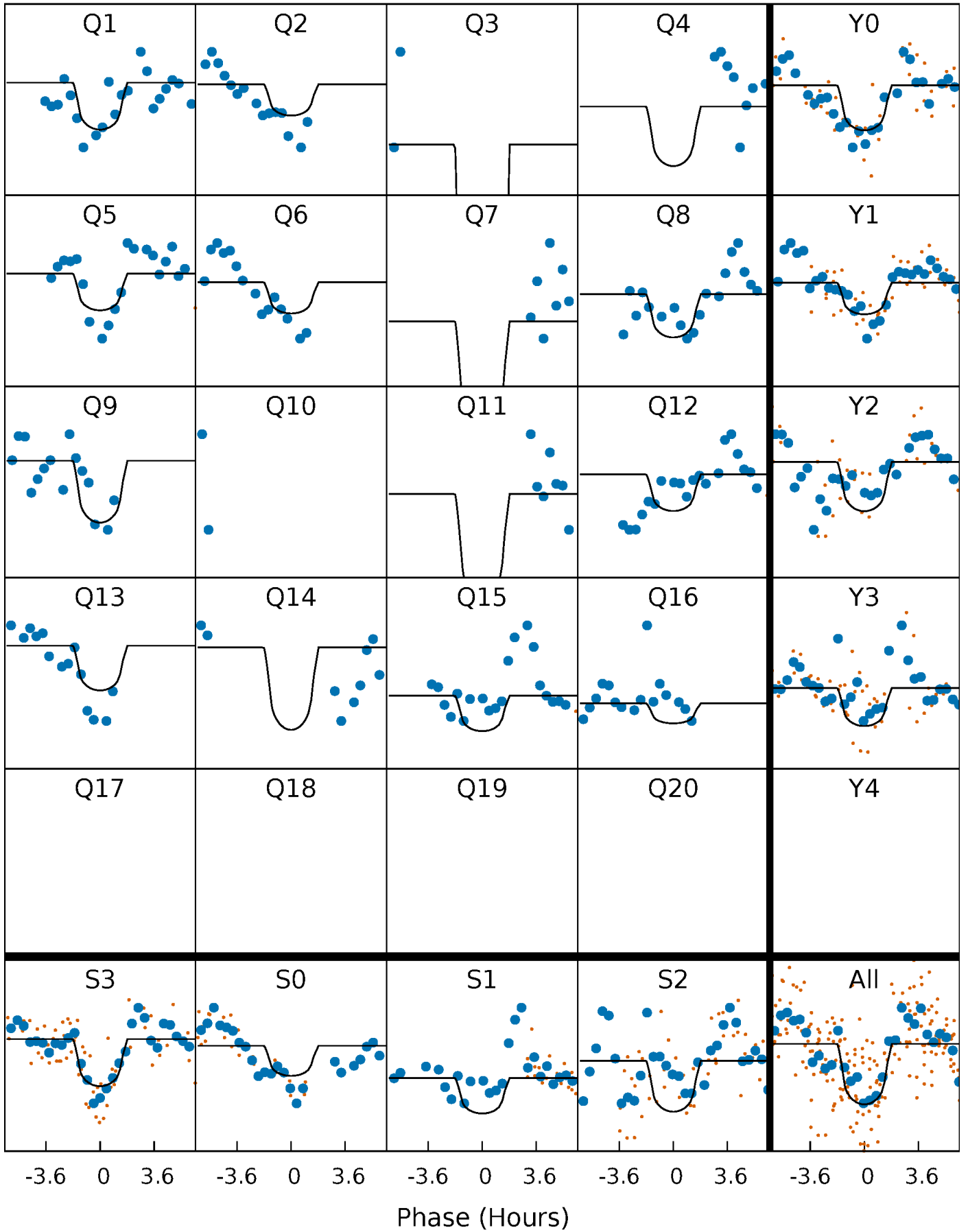
# PDC Quarter-Phased Transit Curves

TCE 009612084-04   P= 81.760399 Days    $T_0=139.458312$  (BKJD)



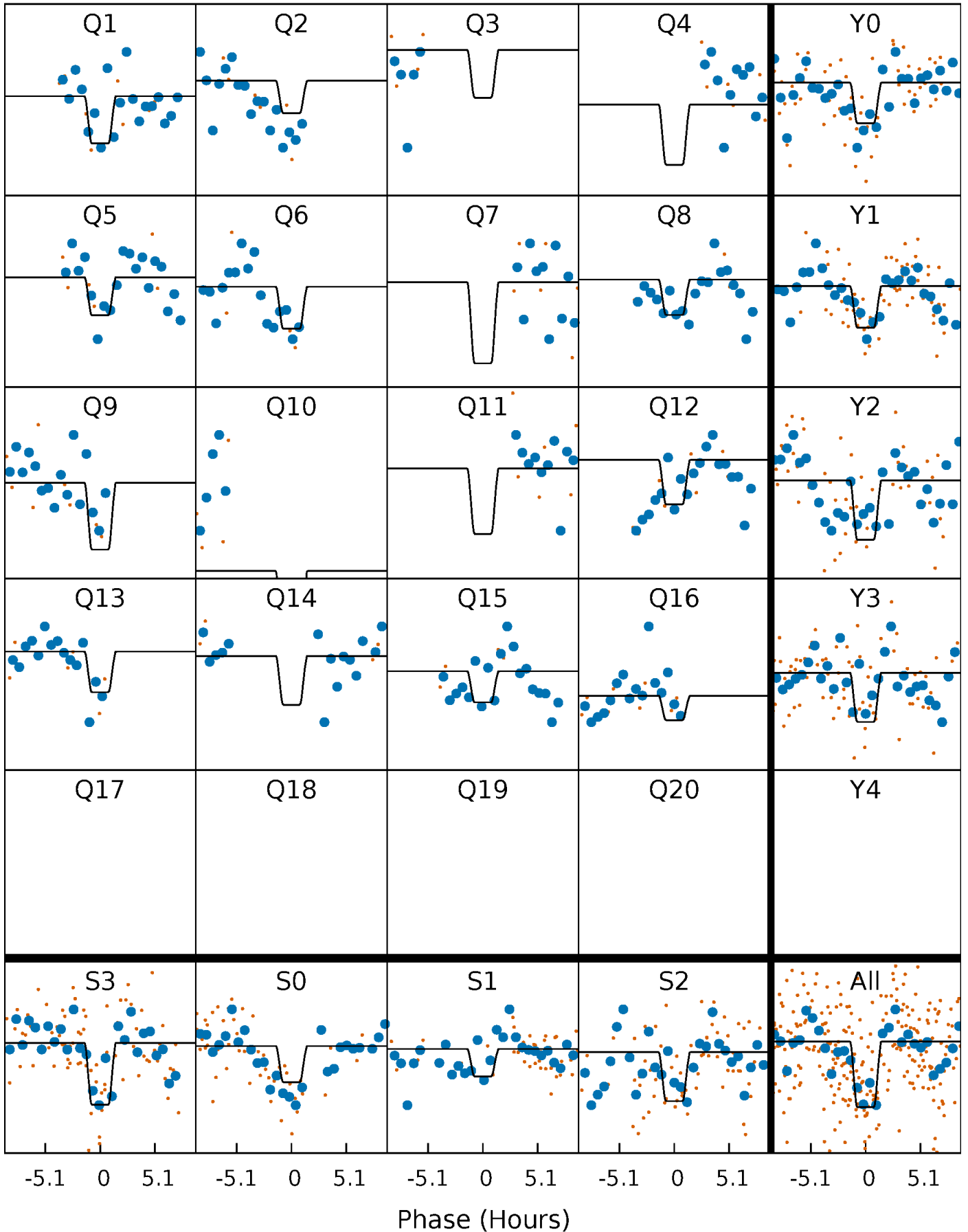
# DV Quarter-Phased Transit Curves

TCE 009612084-04 P= 81.760399 Days  $T_0=139.458312$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

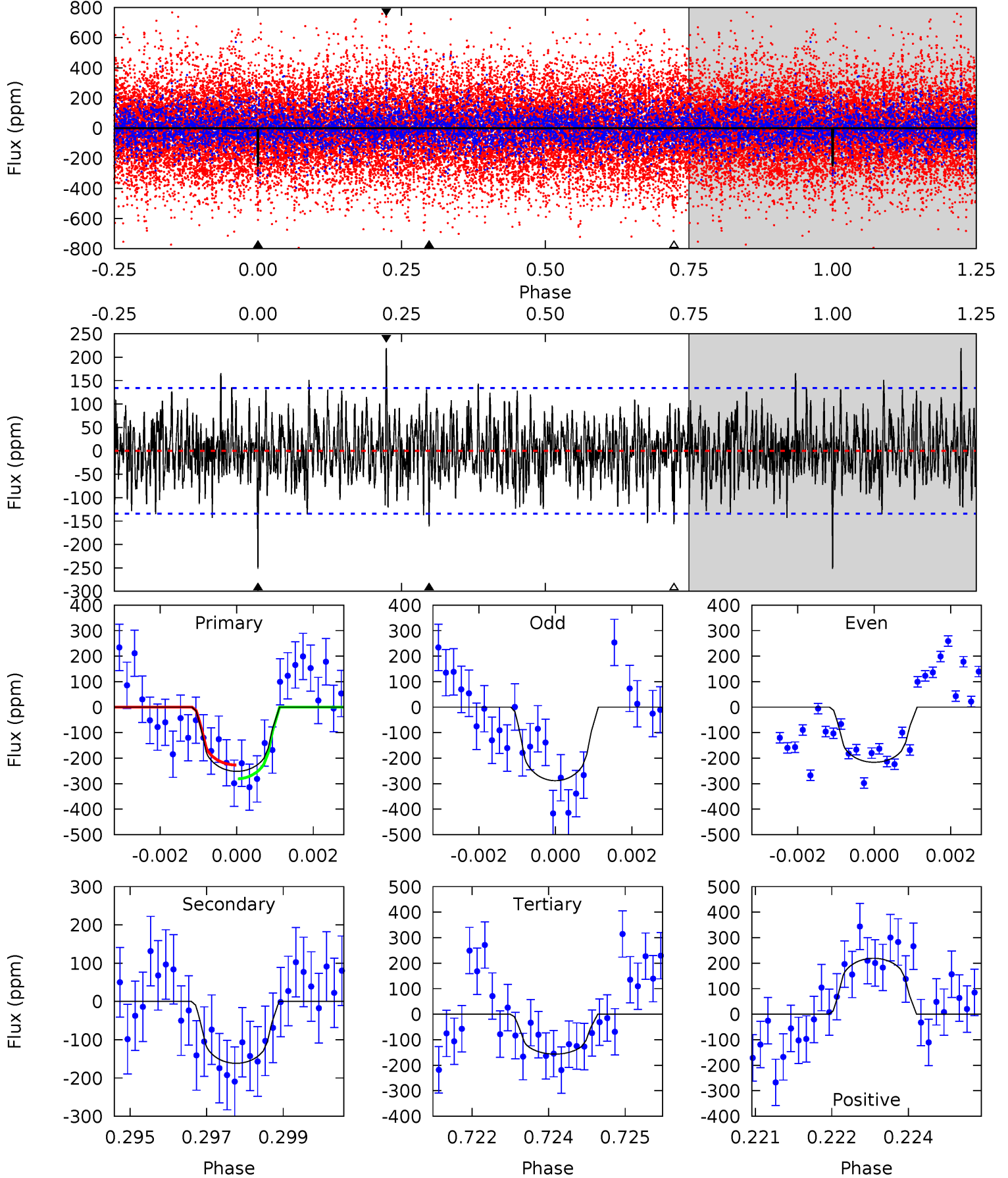
TCE 009612084-04     $P = 81.761673$  Days     $T_0 = 139.454326$  (BKJD)



# DV Model-Shift Uniqueness Test

009612084-04, P = 81.760399 Days, E = 57.697913 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
10.1	6.46	6.25	8.76	5.36	3.15	2.00	3.81	1.30	0.21	-2.30	1.44	1.03	0.47	1.07

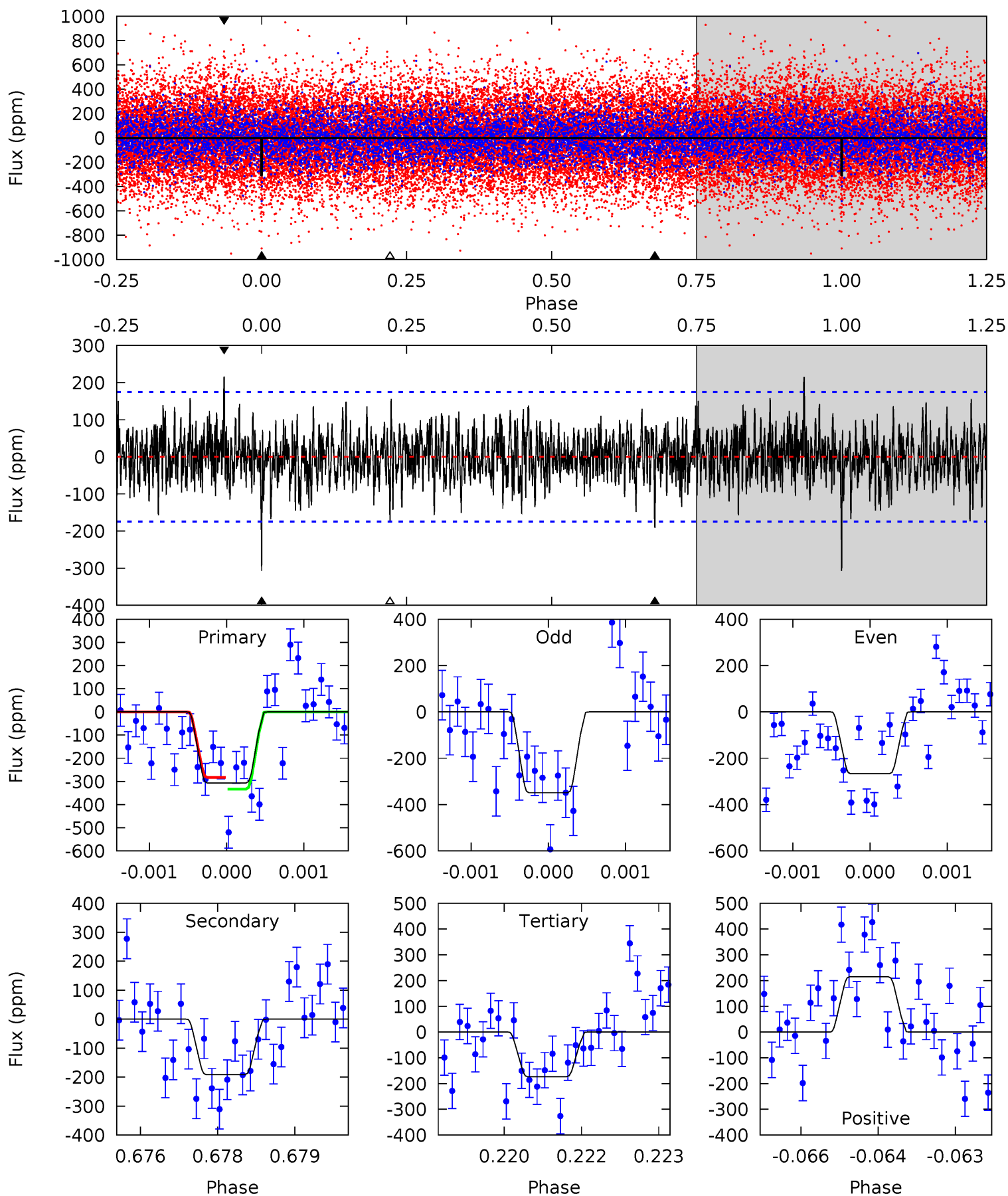




# Alt Model-Shift Uniqueness Test

009612084-04, P = 81.761673 Days, E = 57.692653 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
9.46	5.89	5.35	6.61	5.38	3.17	1.65	4.12	2.85	0.55	-0.72	1.28	1.06	0.41	0.78



### Stellar Parameters For KIC 009612084

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5095^{+45}_{-121}$	$3.052^{+0.195}_{-0.105}$	$-0.060^{+0.100}_{-0.250}$	$7.094^{+1.066}_{-2.666}$	$2.070^{+0.533}_{-0.799}$	$0.008^{+0.011}_{-0.003}$
	+1%/-2%	+6%/-3%	+167%/-417%	+15%/-38%	+26%/-39%	+136%/-31%
Source	SPE74	SPE74	SPE74	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology  
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

### Secondary Eclipse Parameters for KIC 009612084-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-162 \pm 25$	$16.47^{+14.51}_{-9.93}$	$1208^{+56}_{-84}$	$4055^{+1929}_{-690}$	$70^{+398}_{-49}$
Alt.	$-191 \pm 32$	$18.25^{+14.55}_{-11.23}$	$1209^{+53}_{-77}$	$4069^{+1958}_{-693}$	$68^{+395}_{-46}$

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

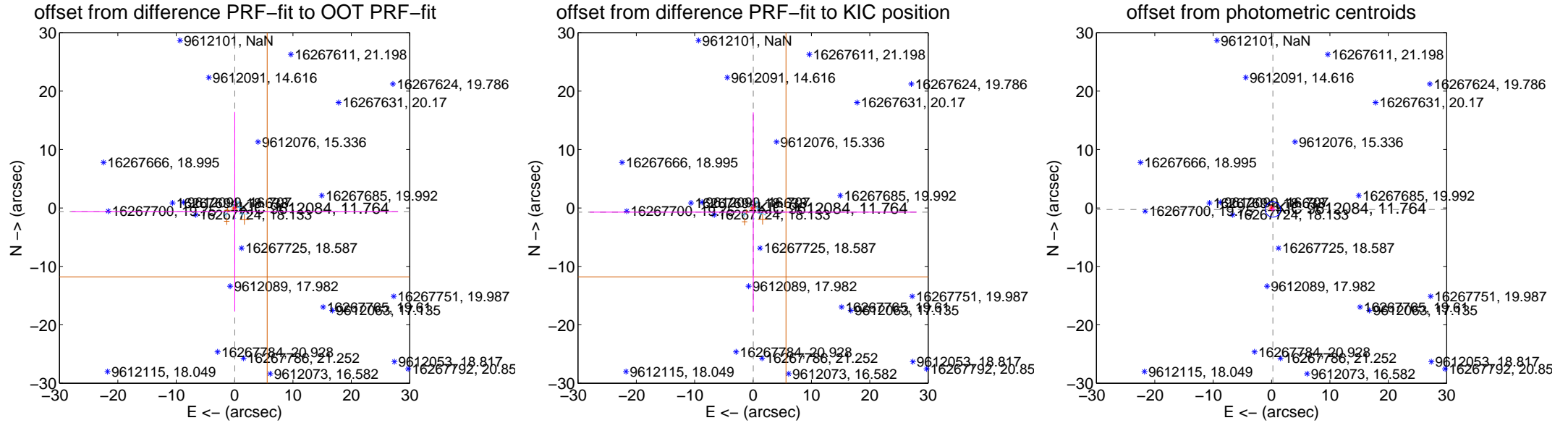
# DV Centroid Data

Supplemental centroid analysis for 009612084-04. **Kepler magnitude: 11.76.** Transit SNR 8.80

There are 7 quarters with good PRF difference image offsets

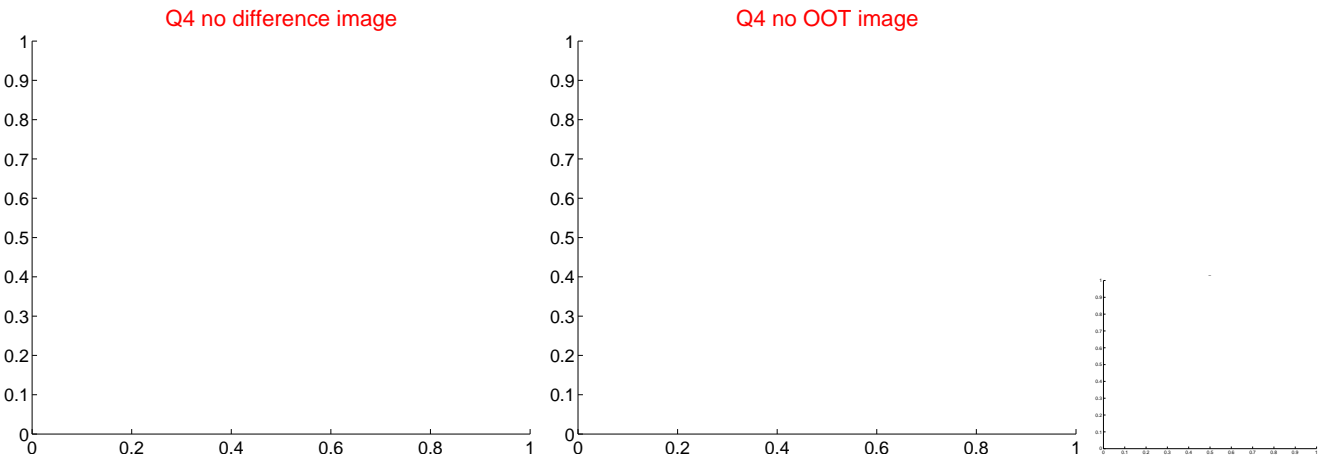
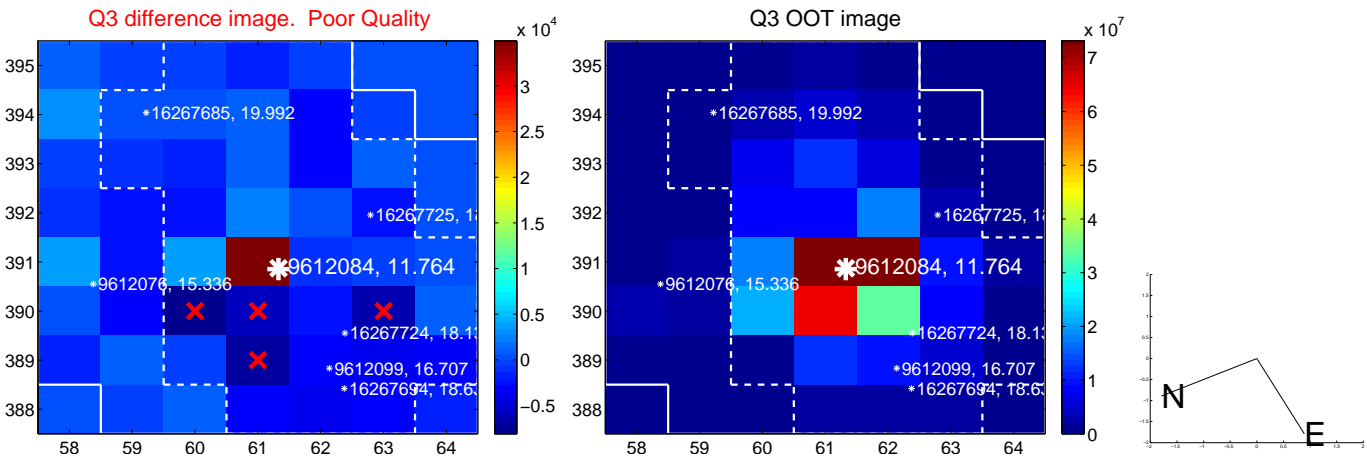
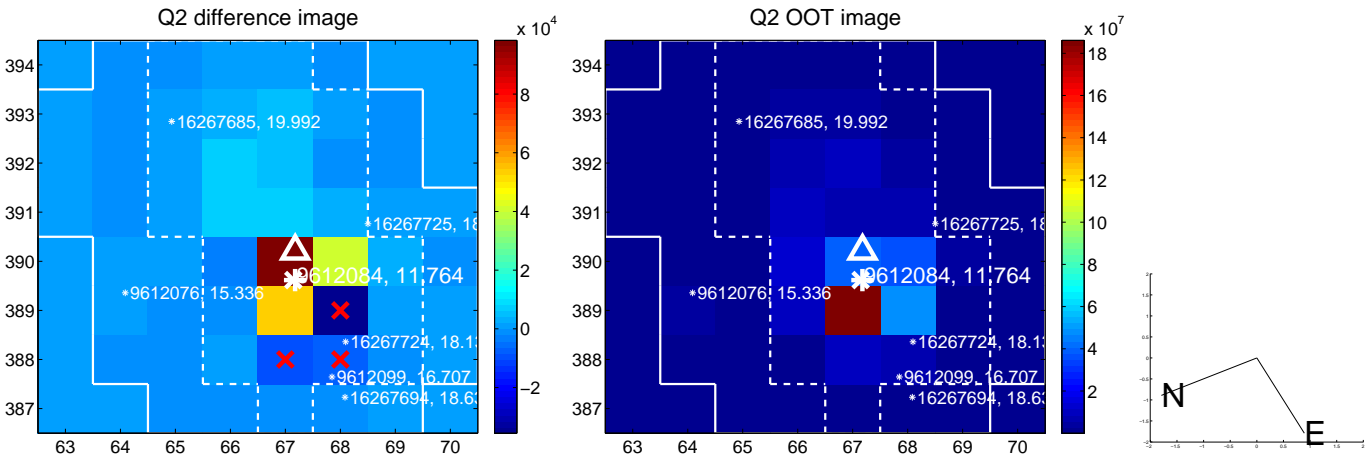
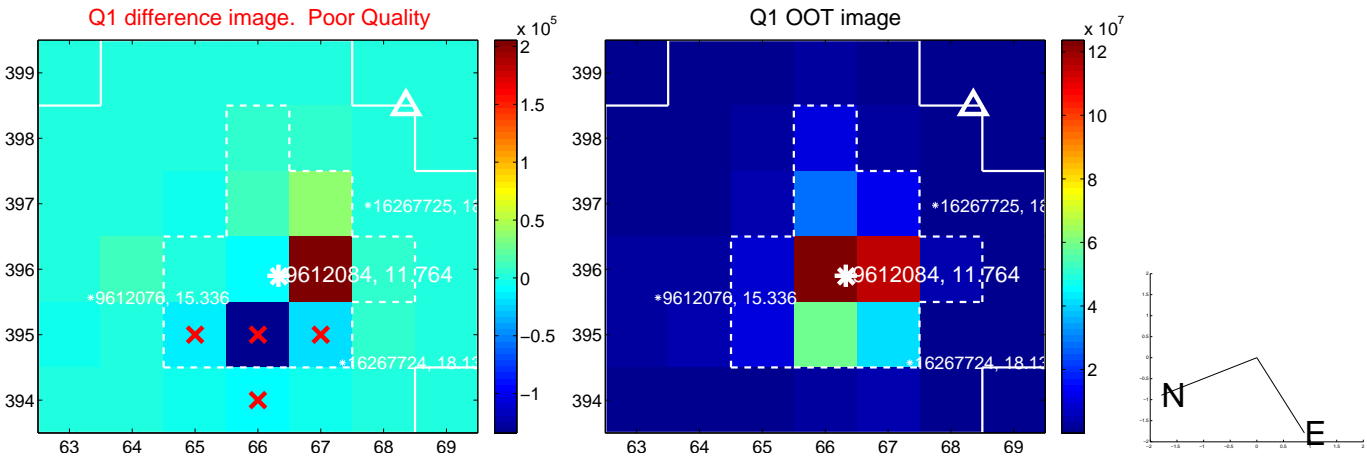
The direct PRF centroid is offset from the target star catalog position by about 0.13 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.644 \pm 17.121$	0.04	$-0.039 \pm 27.984$	$-0.643 \pm 17.068$
PRF-fit source offset from KIC position	$0.715 \pm 17.091$	0.04	$-0.029 \pm 27.984$	$-0.715 \pm 17.068$
photometric centroid source offset	$0.35 \pm 0.44$	0.79	$-0.23 \pm 0.50$	$-0.26 \pm 0.38$

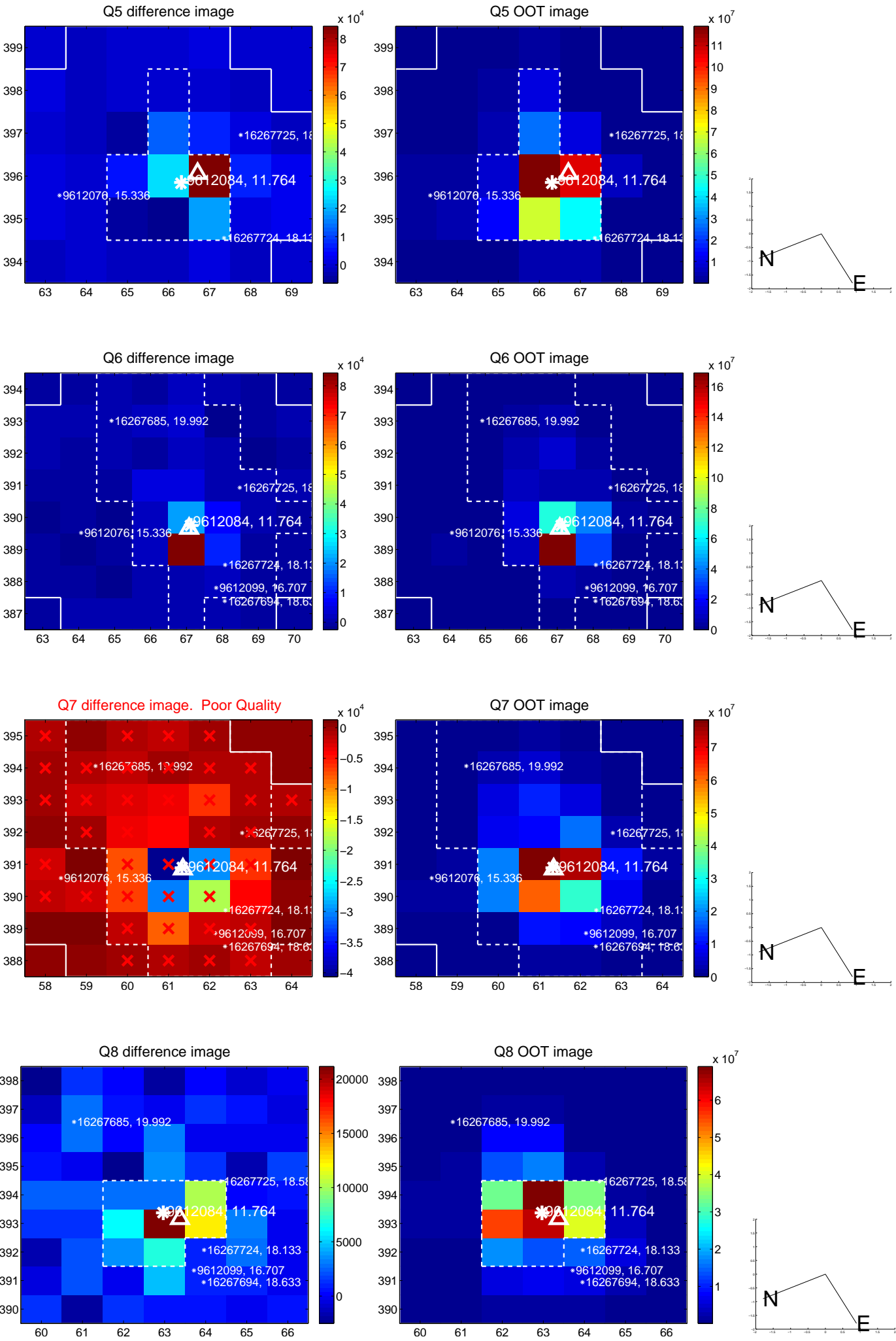


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

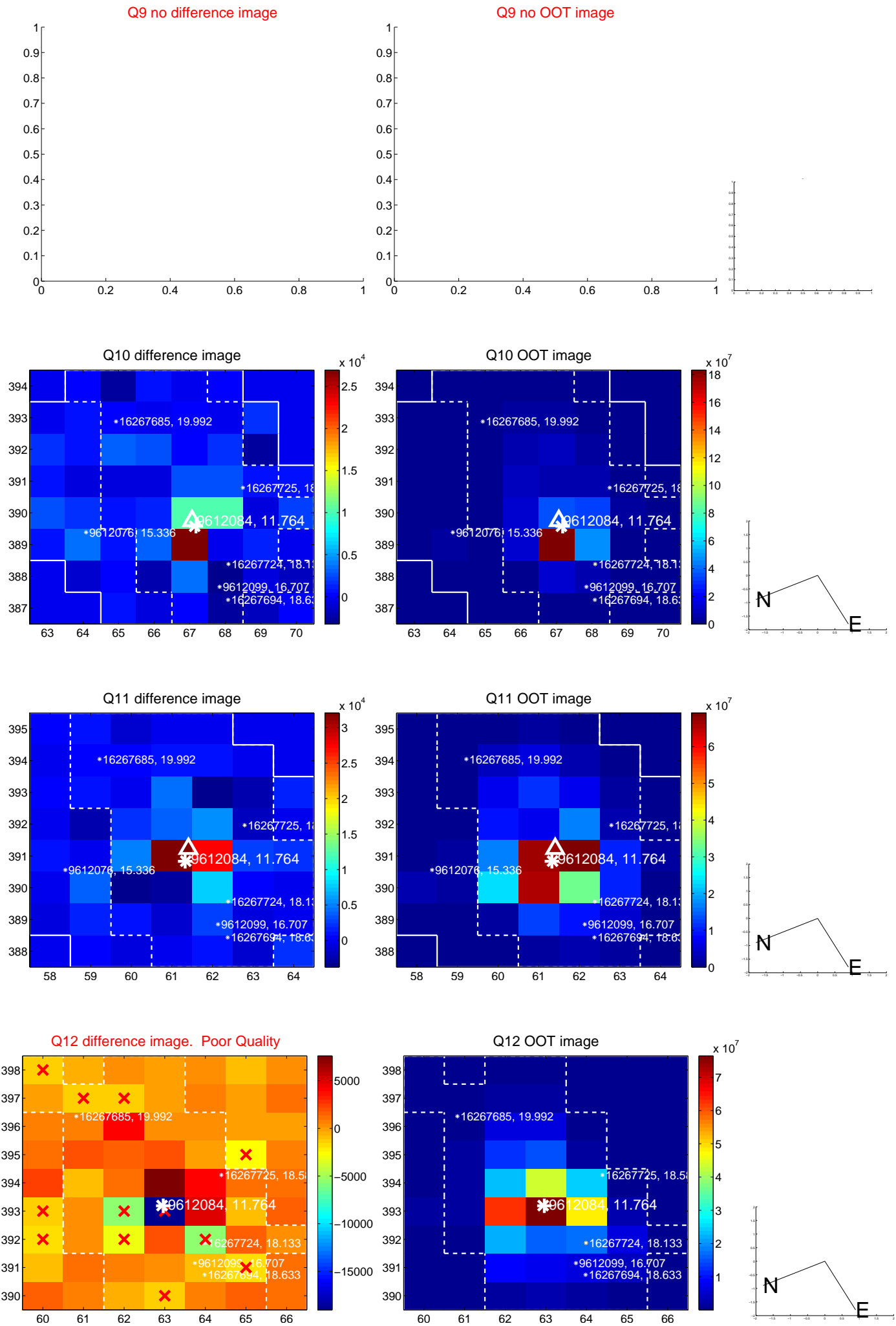
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



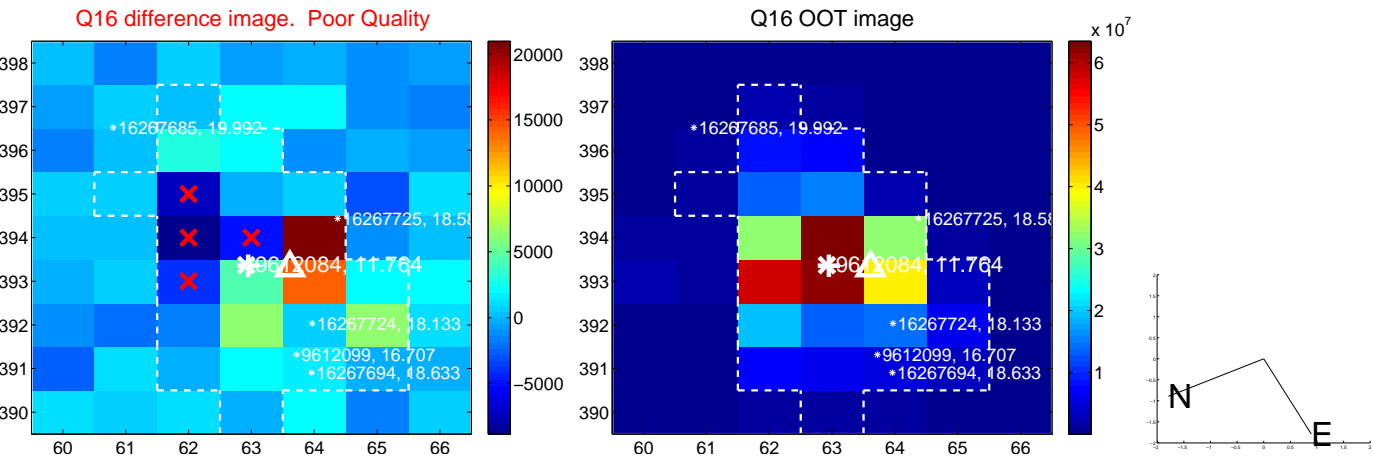
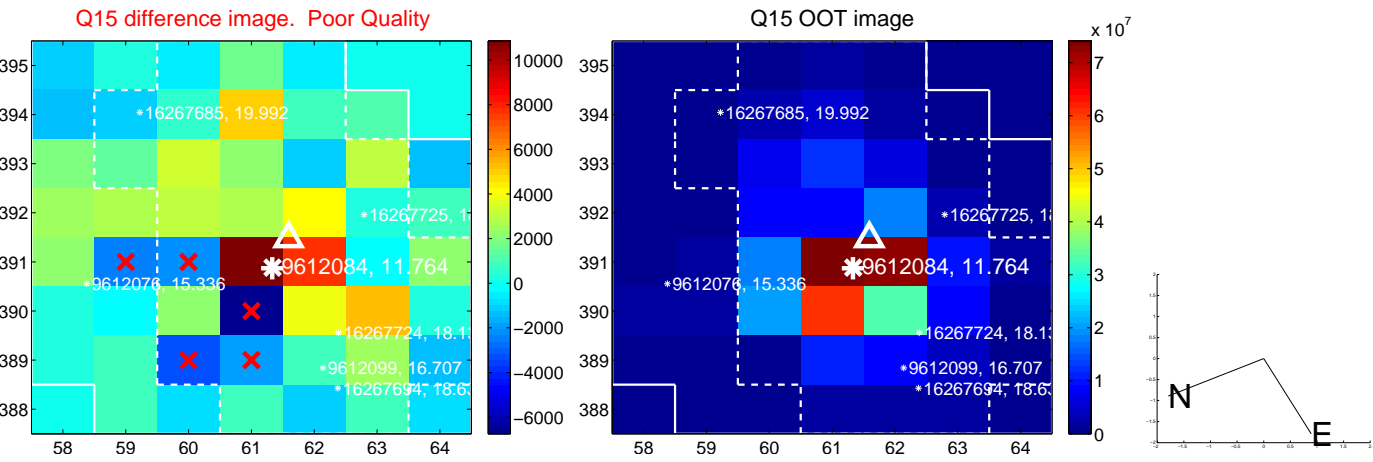
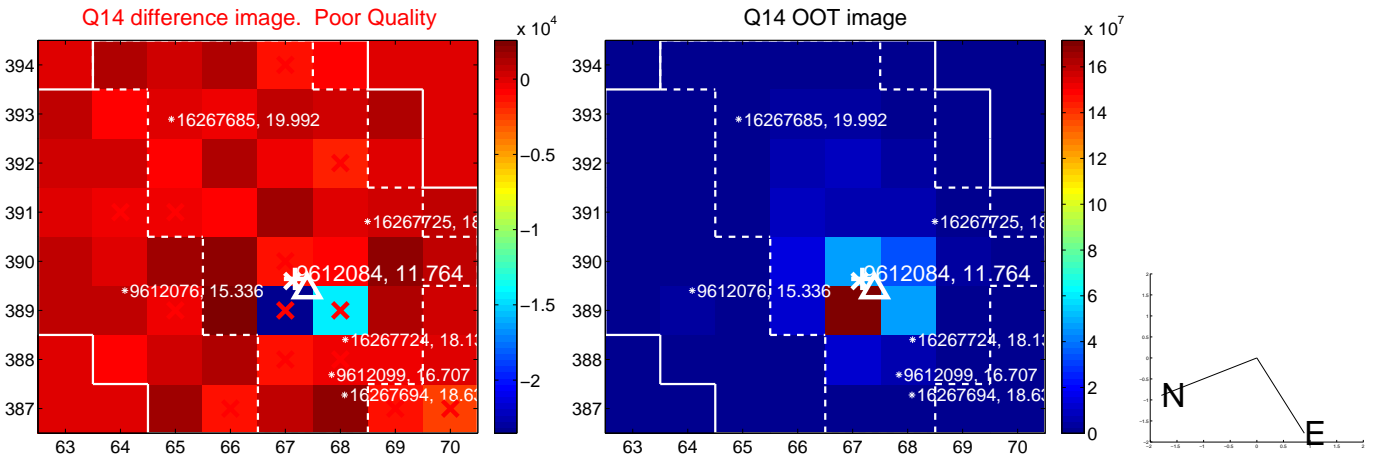
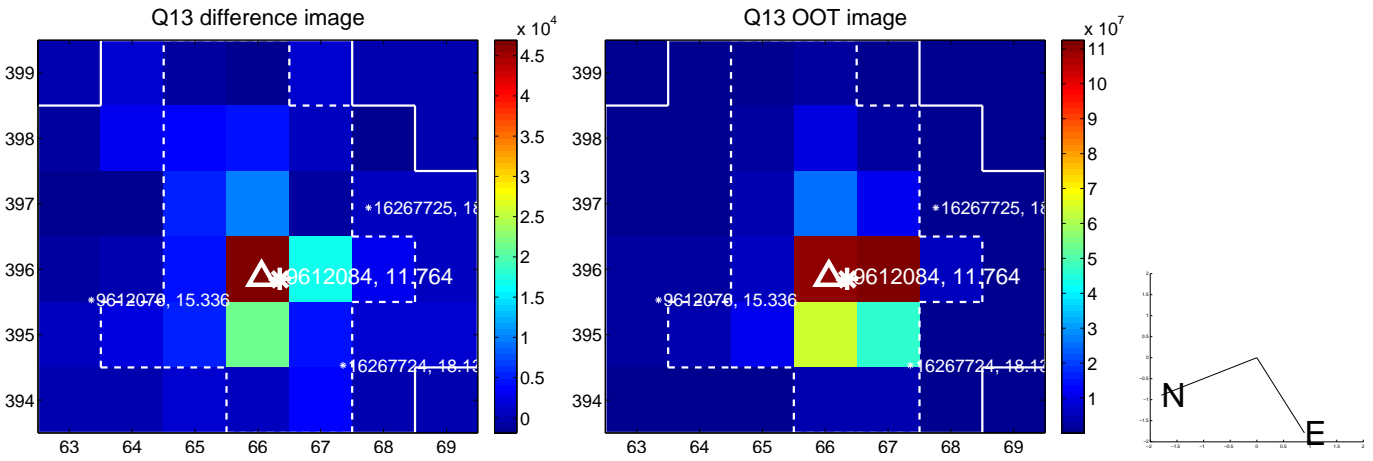
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

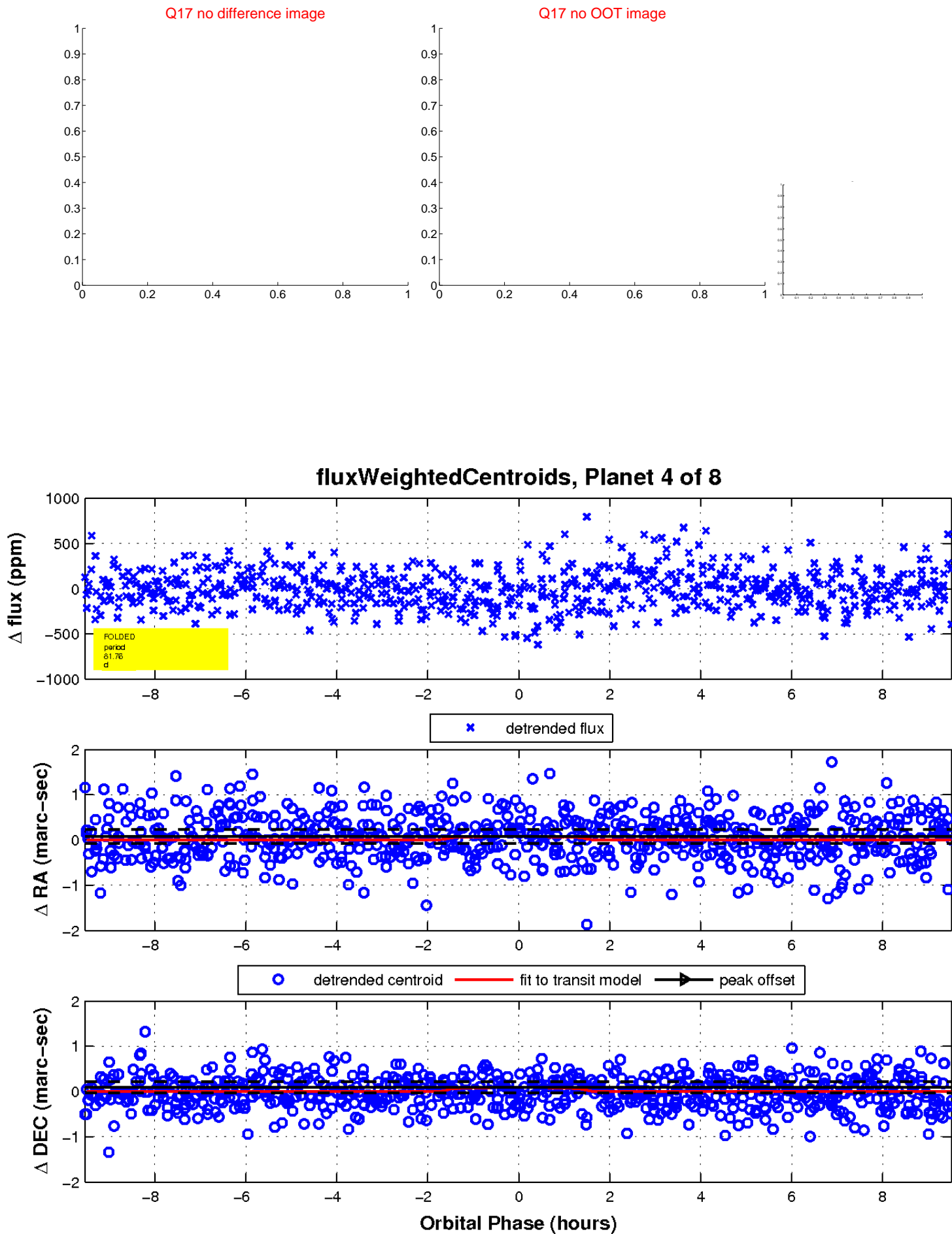


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



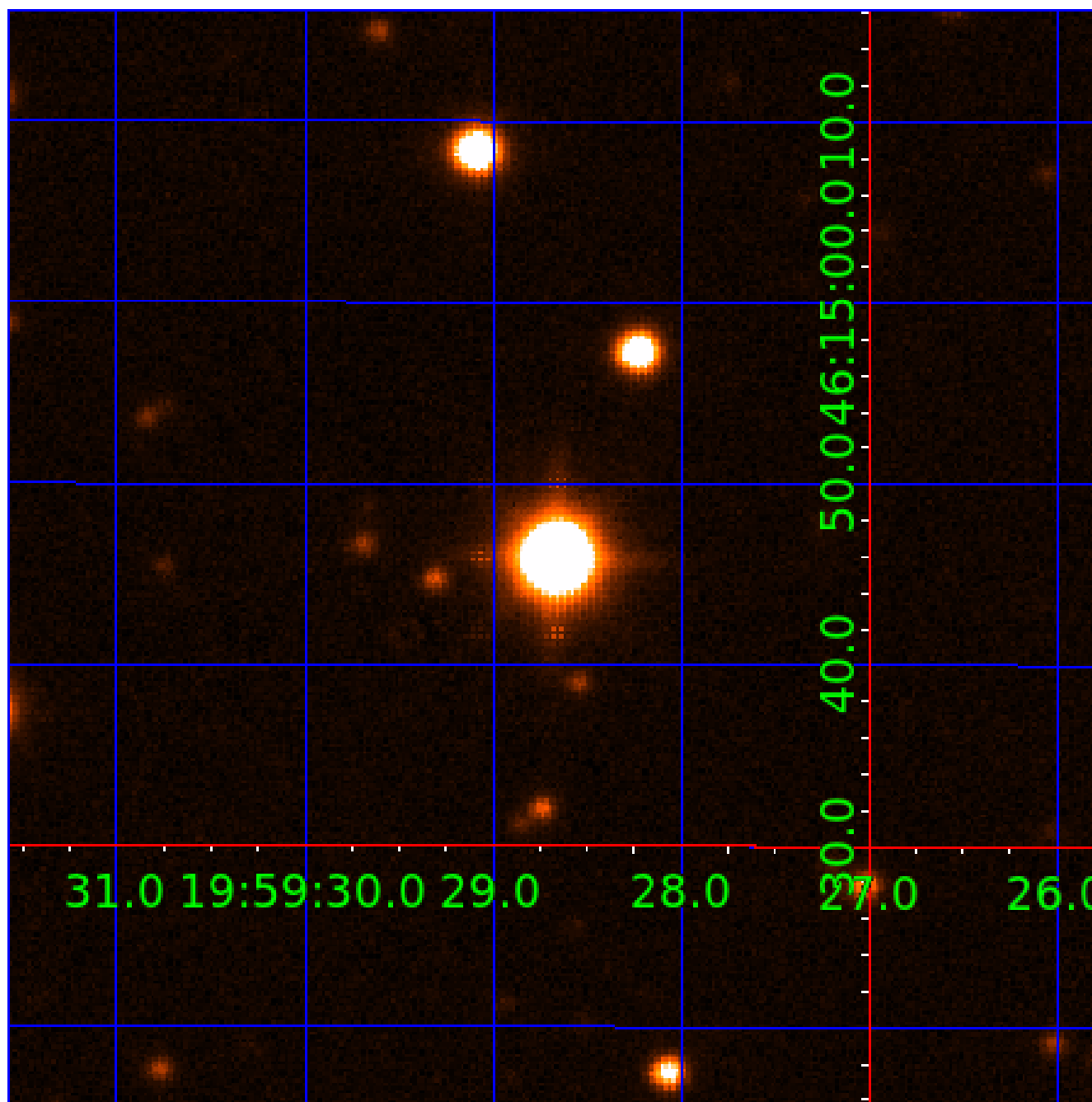


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 009612084

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009612084-01	OBS	No	1.072278	132.559506	29.2	4.632	8.4	8.2	7.09	5095	4.49	0.00
009612084-02	OBS	No	175.465170	258.536516	601.6	2.271	8.3	9.2	7.09	5095	19.07	49.71
009612084-03	OBS	No	202.221958	170.176293	489.3	4.495	8.7	8.4	7.09	5095	18.78	41.14
009612084-04	OBS	No	81.760399	139.458312	302.5	3.181	8.5	8.8	7.09	5095	13.05	137.62
009612084-05	OBS	No	139.808662	242.670574	358.0	6.969	8.1	7.7	7.09	5095	14.89	67.30
009612084-06	OBS	No	273.160085	376.365574	457.8	4.949	7.7	8.1	7.09	5095	17.53	27.55
009612084-07	OBS	No	29.442997	149.385149	210.3	3.733	8.0	8.4	7.09	5095	11.14	537.14
009612084-08	OBS	No	483.641932	300.213871	109.9	6.000	7.6	-1.0	7.09	5095	7.24	12.86

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009612084-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
009612084-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT
009612084-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES—TRANS_GAPPED—MOD_NONUNIQ_ALT
009612084-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
009612084-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS
009612084-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
009612084-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_ZUMA—TRANS_GAPPED—MOD_NONUNIQ_ALT
009612084-08	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—CENT_NOFITS—HALO_GHOST

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

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

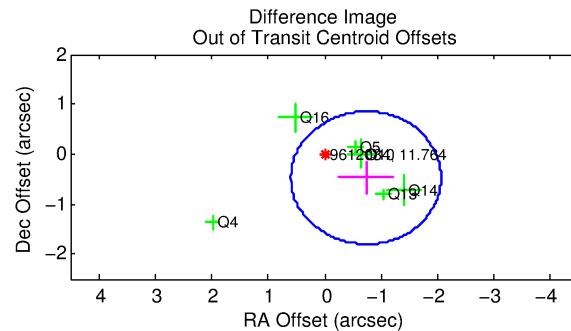
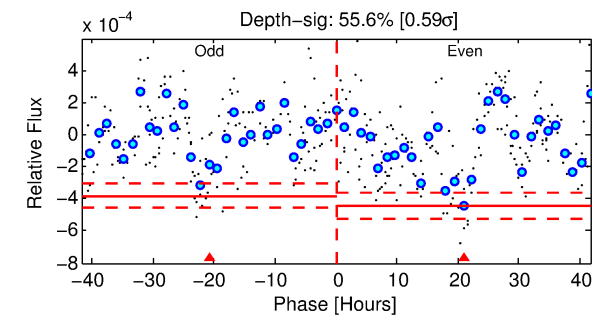
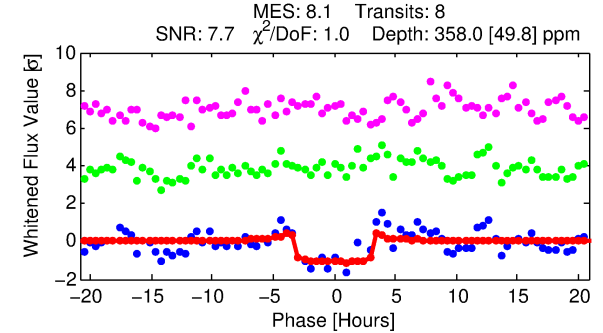
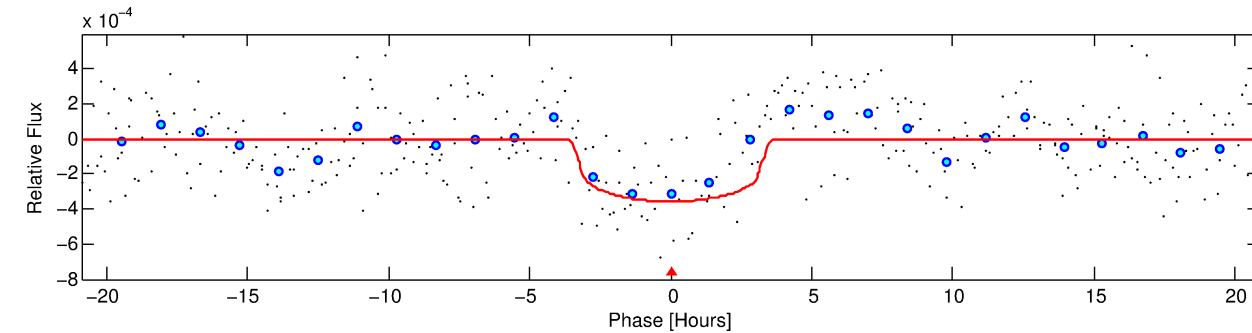
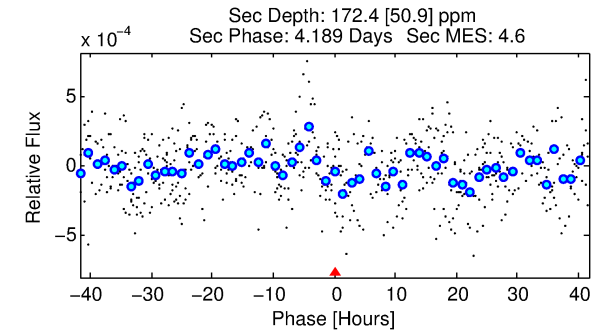
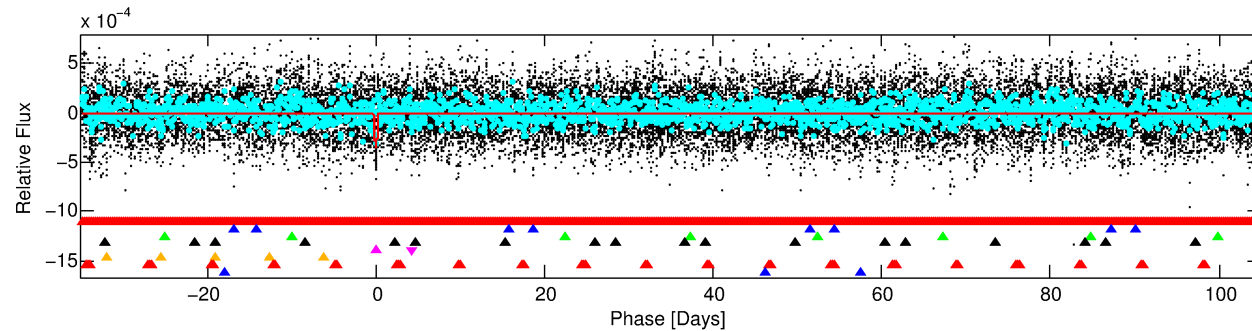
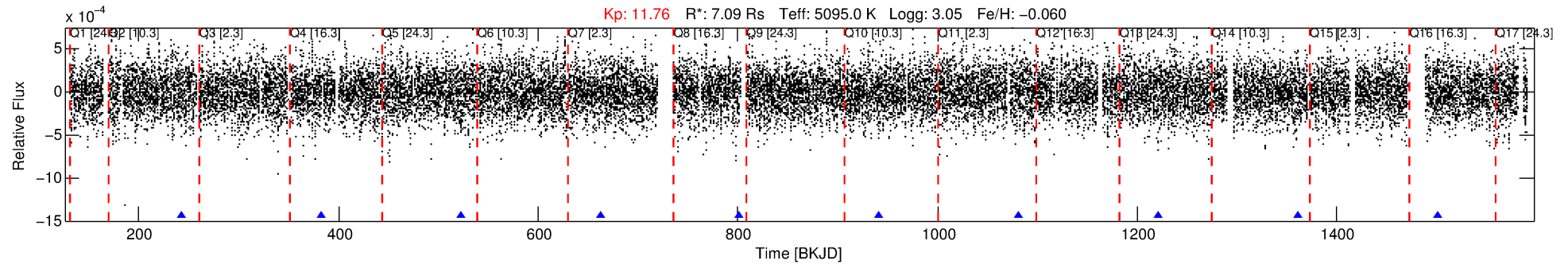
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 009612084-05

No Significant Match Found

# DV One-Page Summary

KIC: 9612084 Candidate: 5 of 8 Period: 139.809 d



## DV Fit Results:

Period = 139.80866 [0.00180] d  
Epoch = 242.6706 [0.0099] BKJD  
 $R_p/R^*$  = 0.0192 [0.0070]  
 $a/R^*$  = 99.09 [133.21]  
 $b$  = 0.79 [0.66]  
 $S_{\text{eff}}$  = 67.30 [27.04]  
 $T_{\text{eq}}$  = 730 [73] K  
 $R_p$  = 14.89 [7.77]  $R_e$   
 $a$  = 0.6719 [0.1961] AU  
 $A_g$  = 193.18 [168.73] [1.14σ]  
 $T_{\text{effp}}$  = 4210 [828] K [4.18σ]

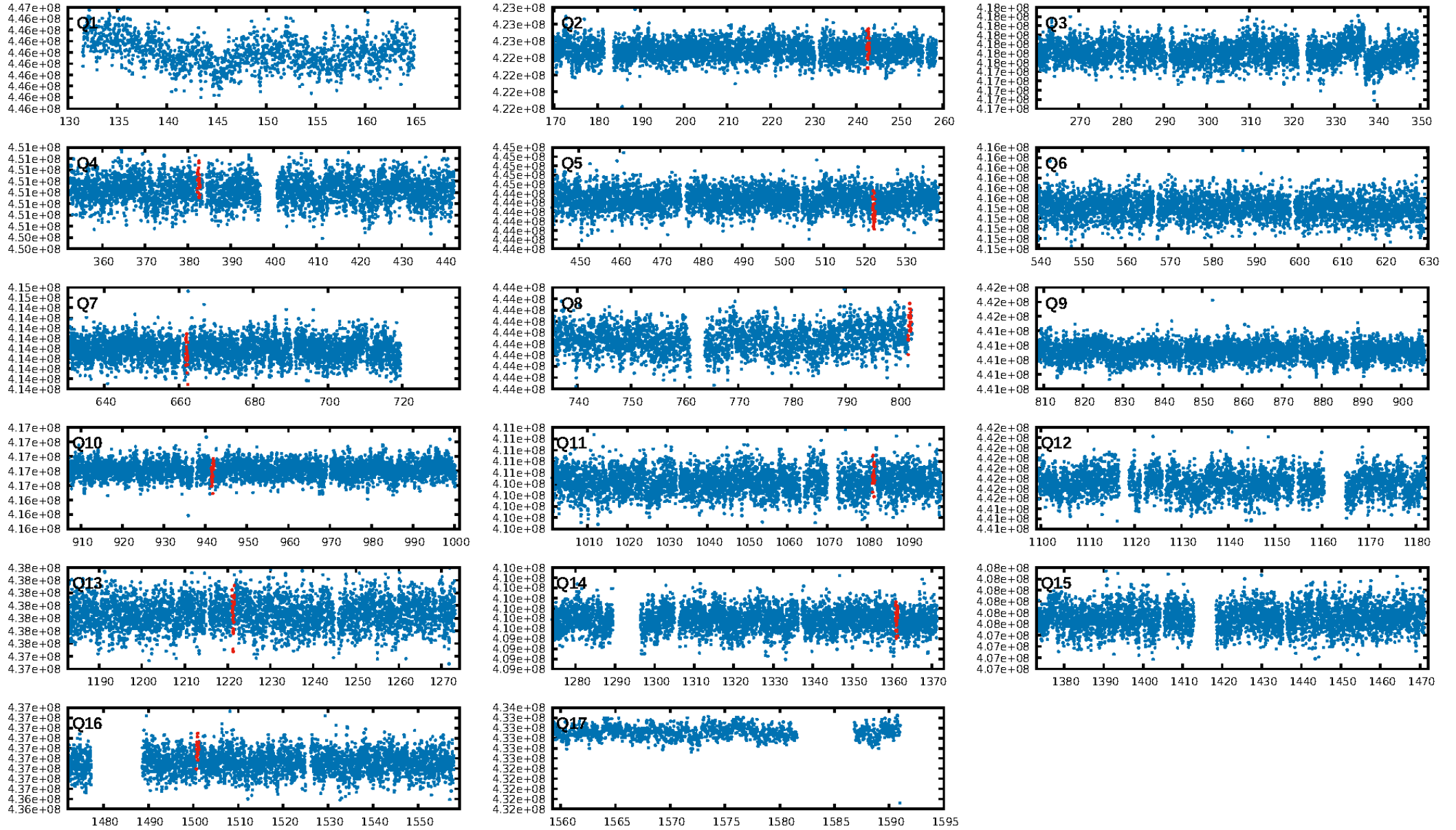
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [181.86σ]  
LongPeriod-sig: 100.0% [116.75σ]  
ModelChiSquare2-sig: 55.8%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [8/8]  
GhostDiagnostic-chr: 0.7135  
Centroid-sig: 5.8%  
Centroid-so: 0.443 arcsec [1.33σ]  
OotOffset-rm: 0.872 arcsec [1.97σ]  
OotOffset-st: 2/0/2/2 [6]  
KicOffset-rm: 0.916 arcsec [2.38σ]  
KicOffset-st: 2/0/2/2 [6]  
DiffImageQuality-fgm: 0.67 [4/6]  
DiffImageOverlap-fno: 0.00 [0/8]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 13:21:19 Z

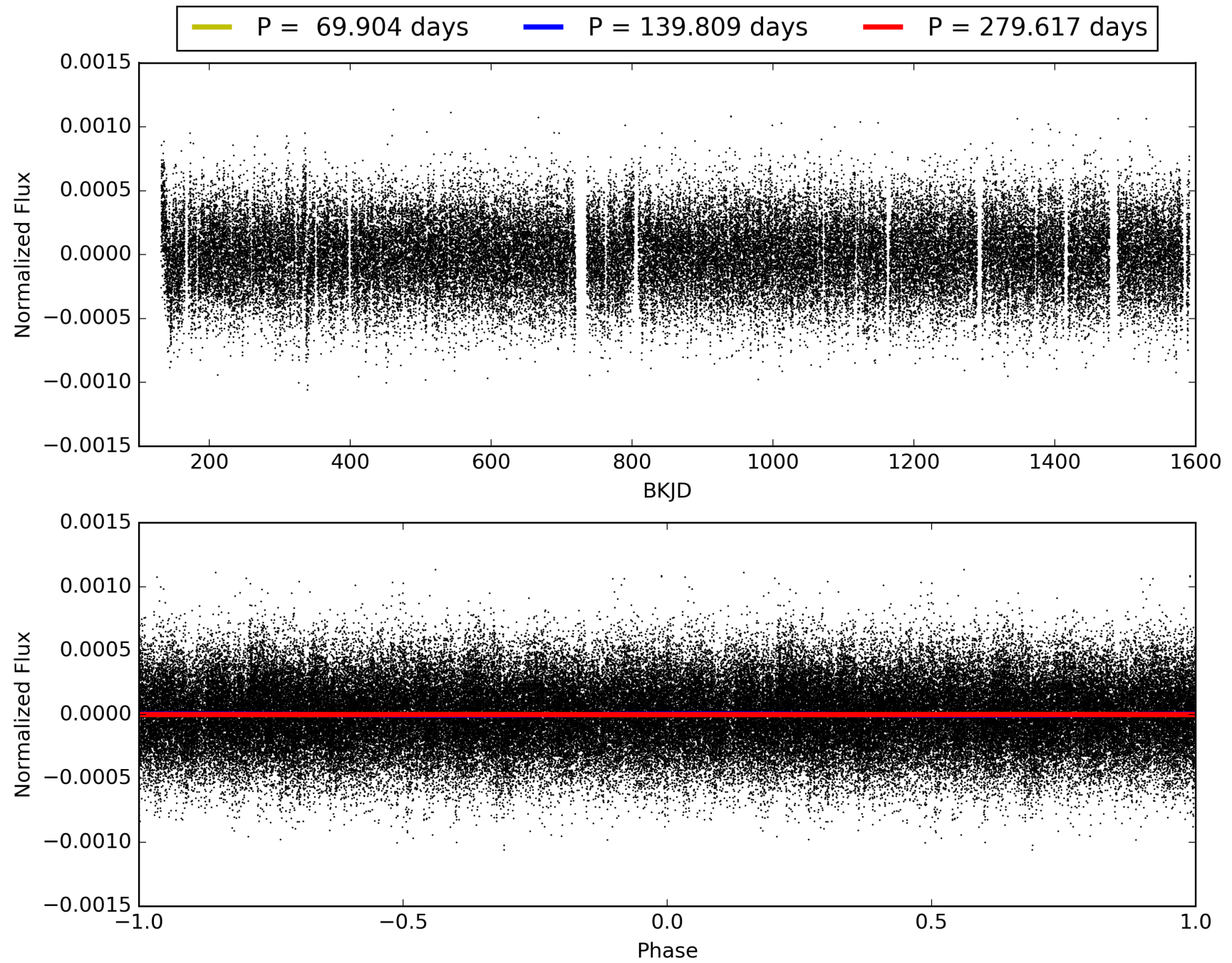
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 009612084-05, PDC Light Curves



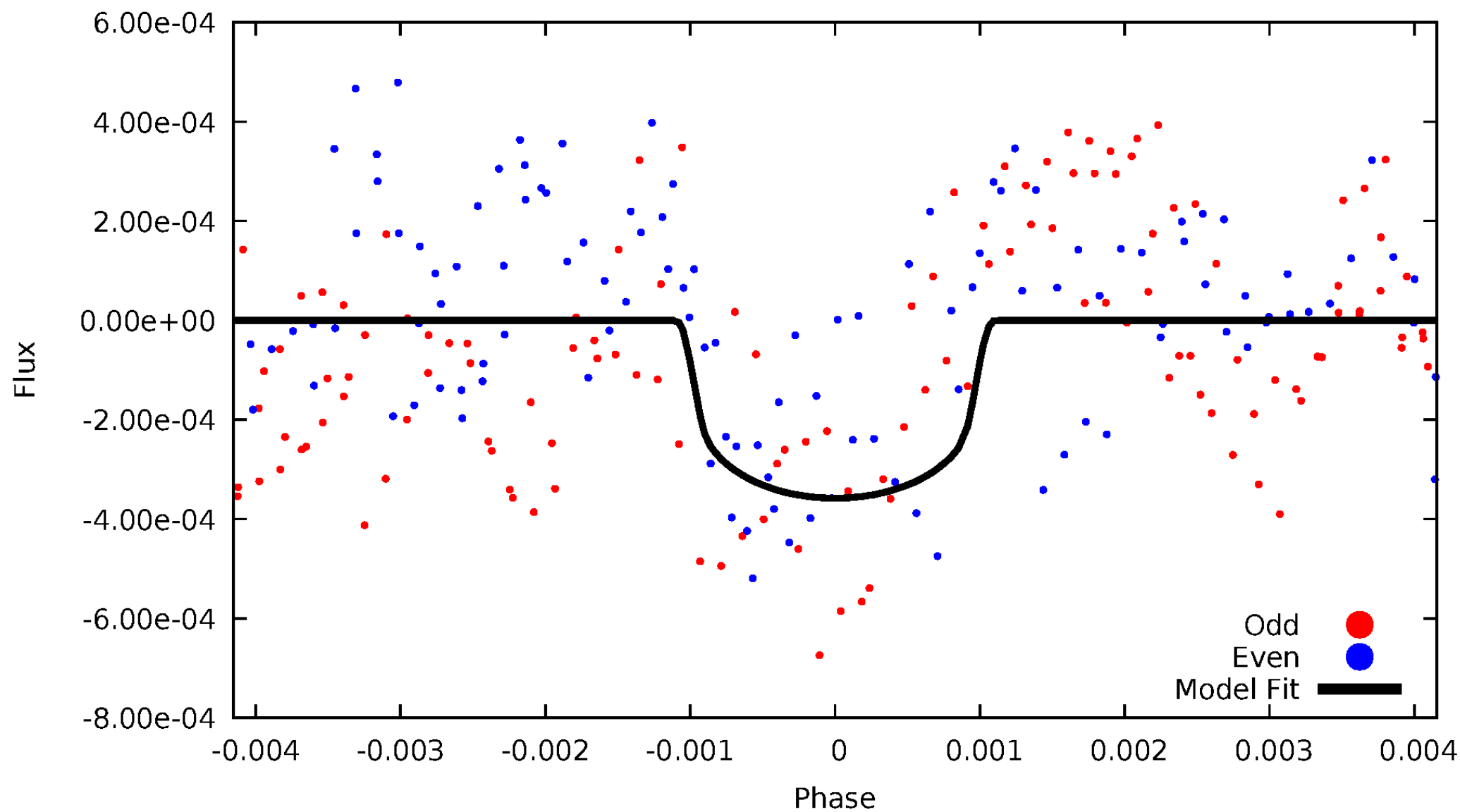


TCE 009612084-05



# DV Odd/Even

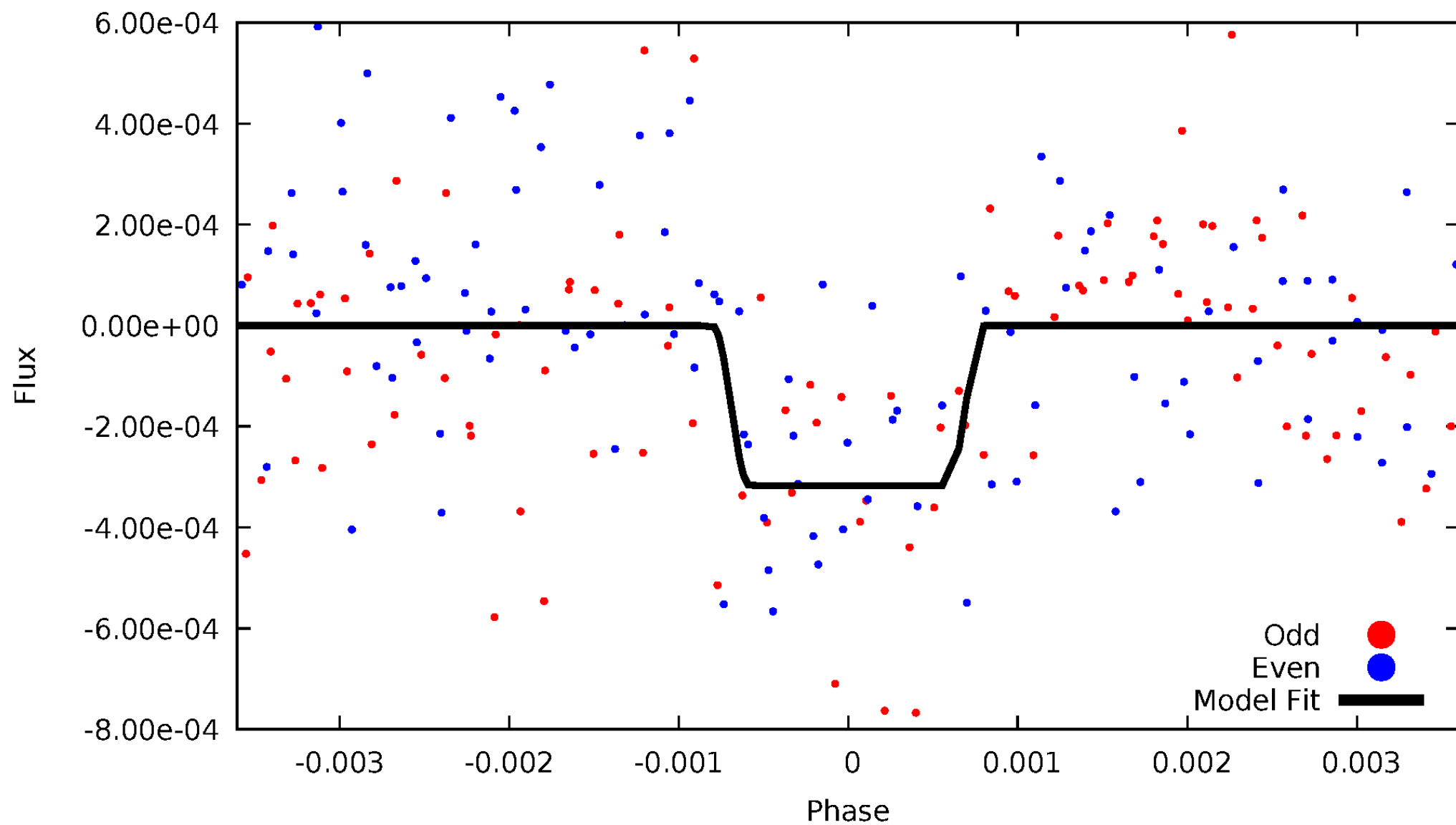
TCE 009612084-05





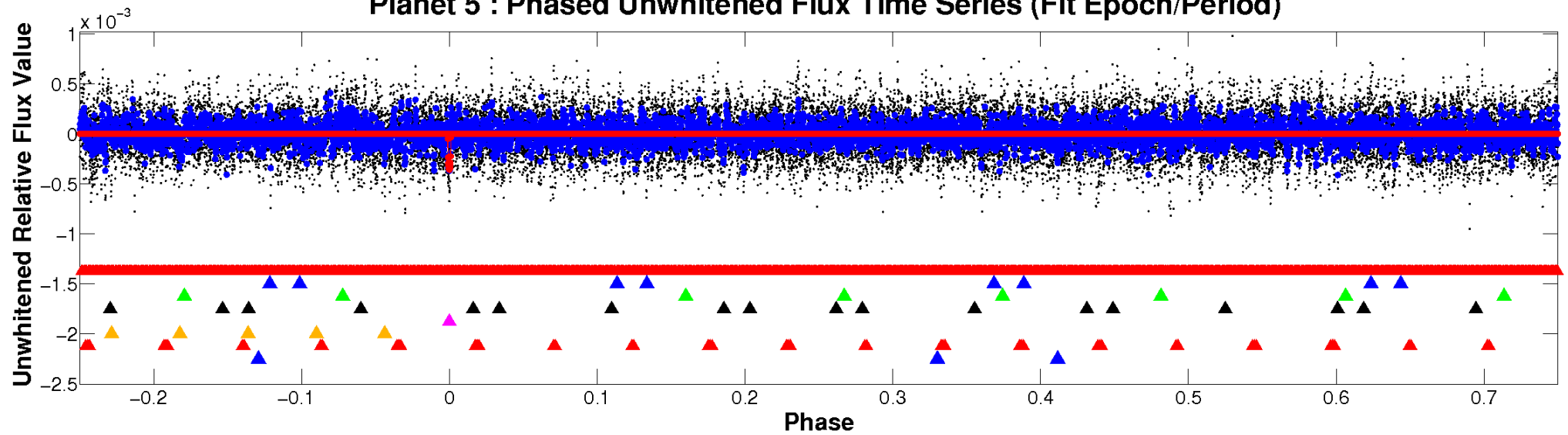
# ALT Odd/Even

TCE 009612084-05

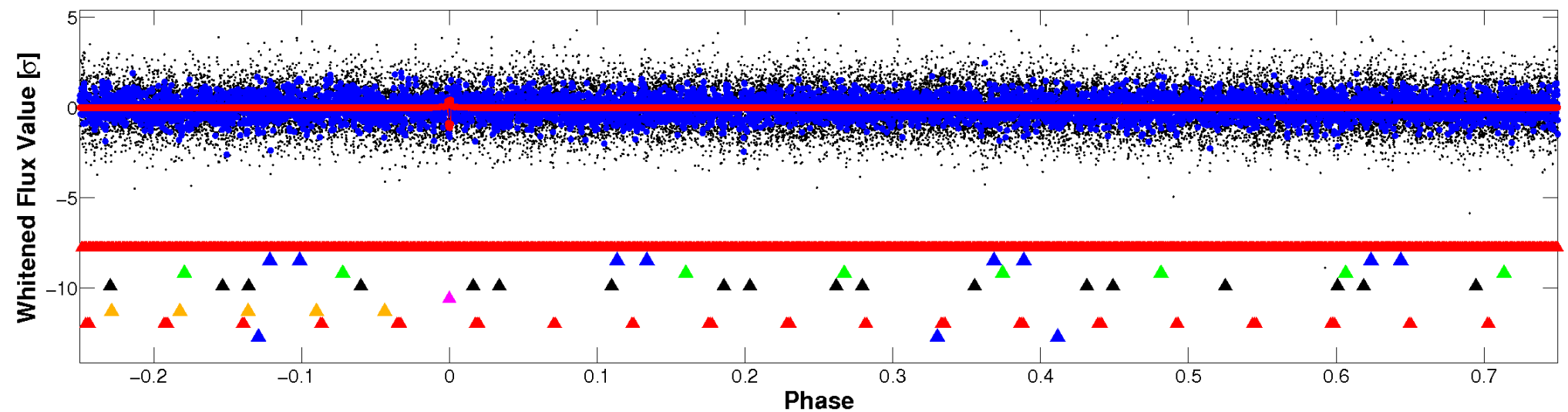


# Non-Whitened Vs. Whitened Light Curve

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

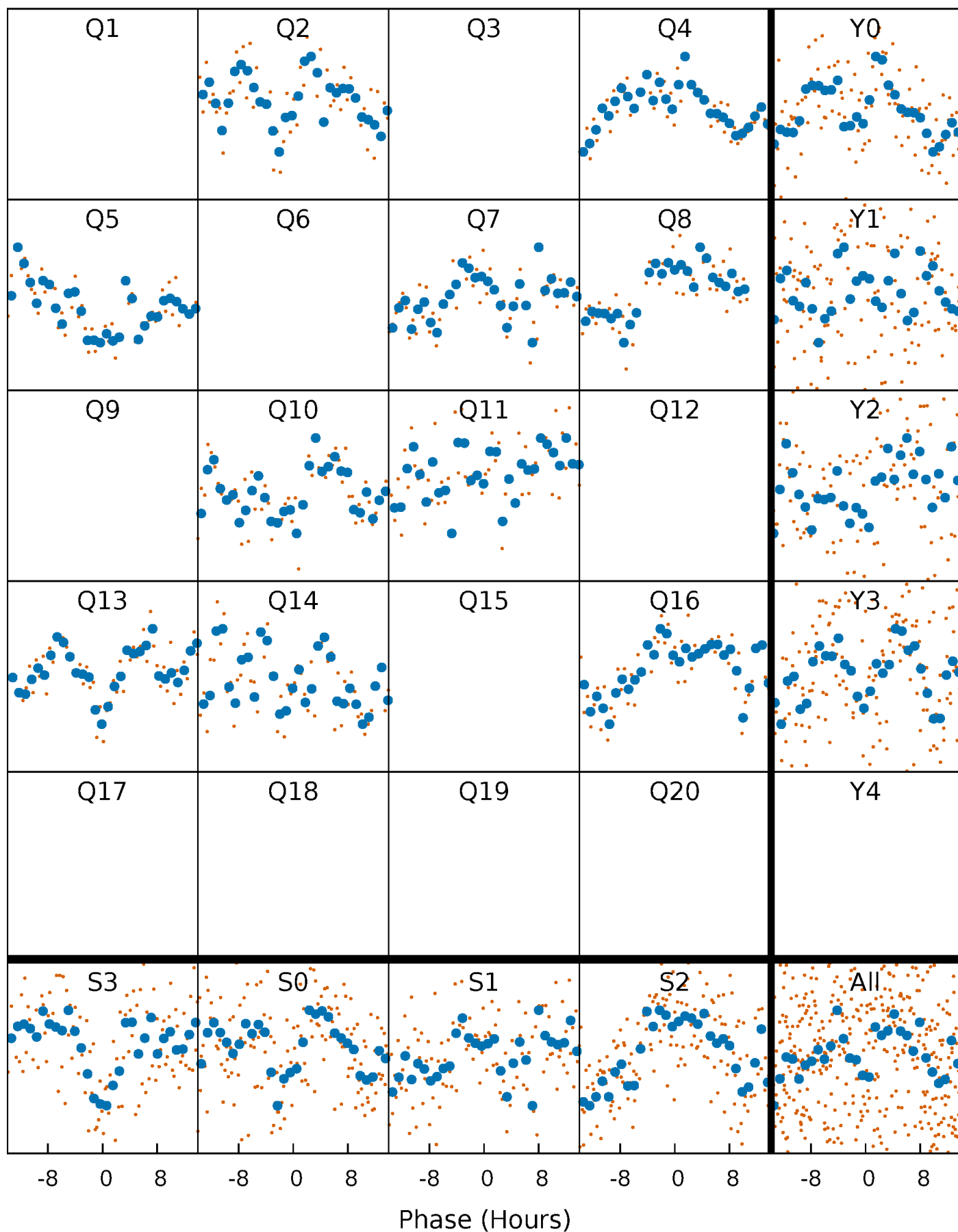


Planet 5 : Phased Whitened Flux Time Series (Fit Epoch/Period)



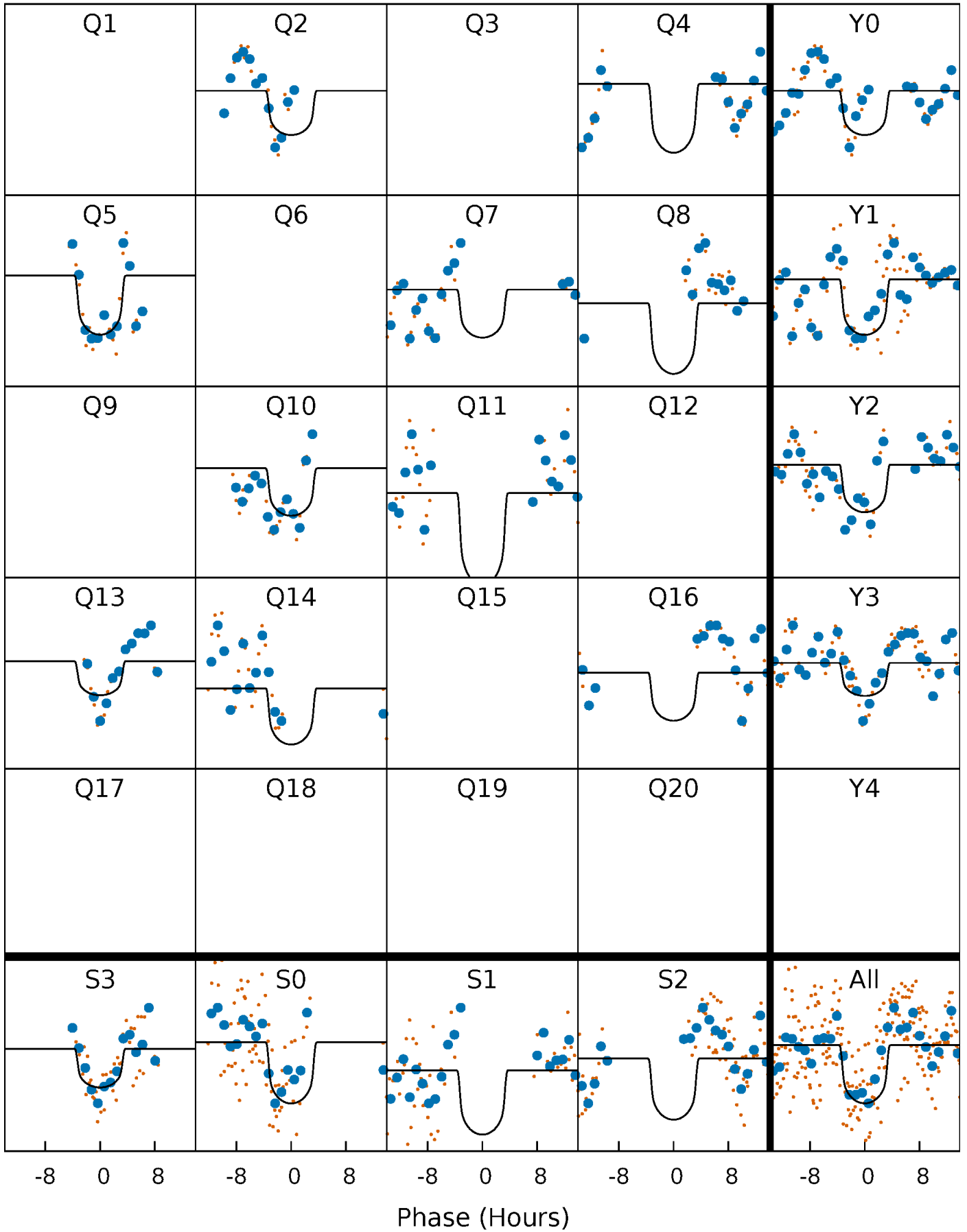
# PDC Quarter-Phased Transit Curves

TCE 009612084-05     $P=139.808662$  Days     $T_0=242.670574$  (BKJD)



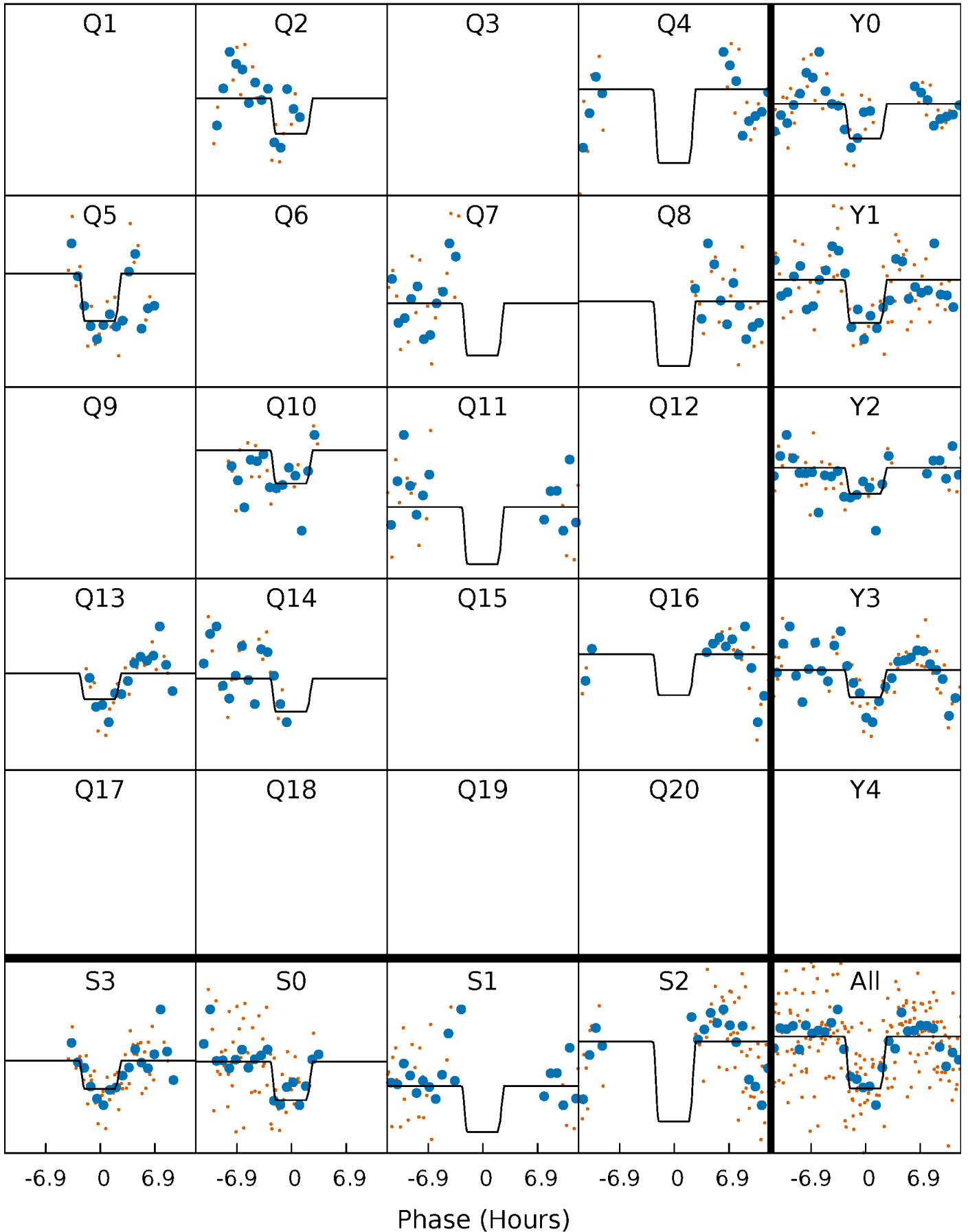
# DV Quarter-Phased Transit Curves

TCE 009612084-05     $P=139.808662$  Days     $T_0=242.670574$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

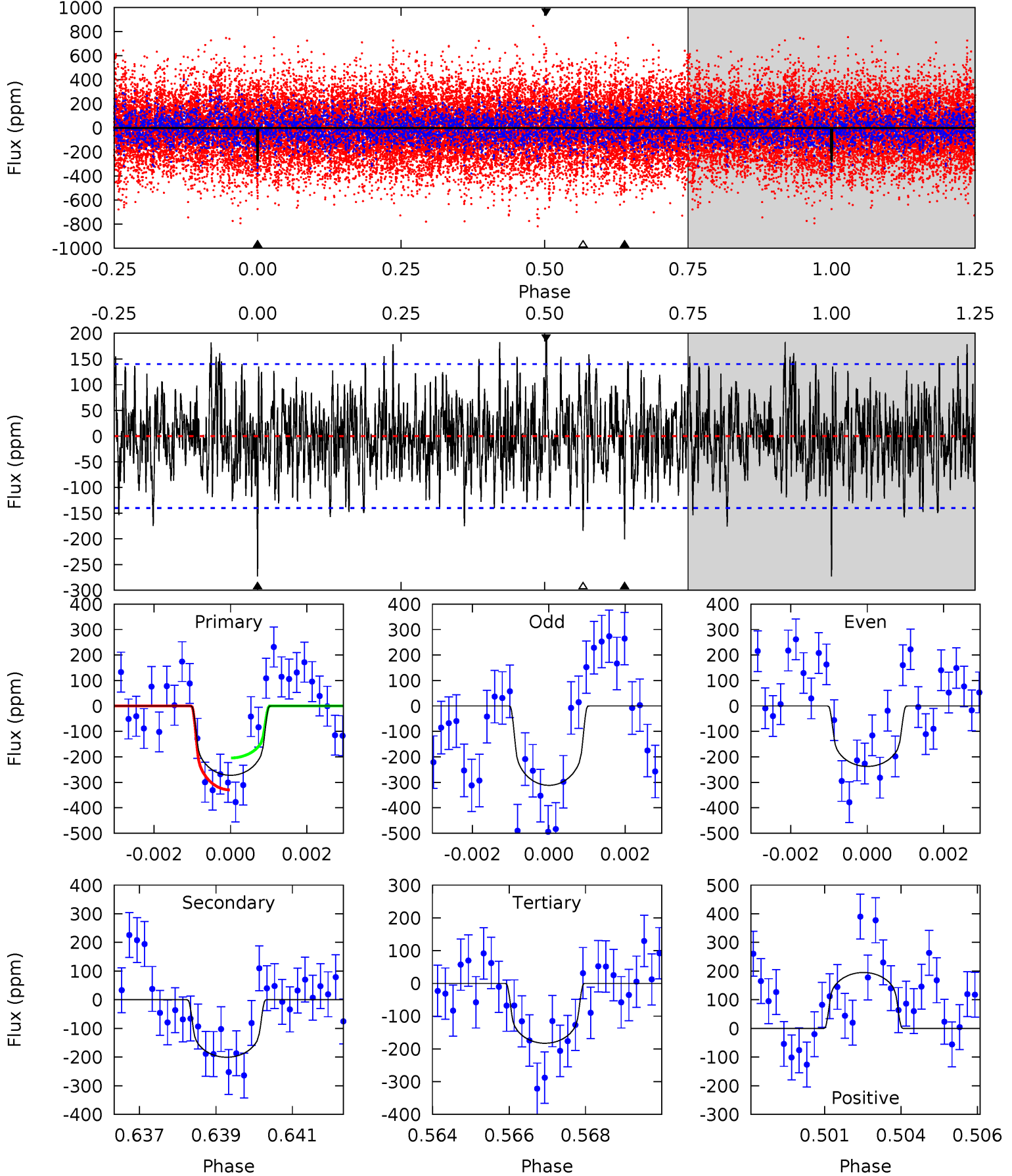
TCE 009612084-05     $P=139.807630$  Days     $T_0=242.653281$  (BKJD)



# DV Model-Shift Uniqueness Test

009612084-05, P = 139.808662 Days, E = 102.861912 Days

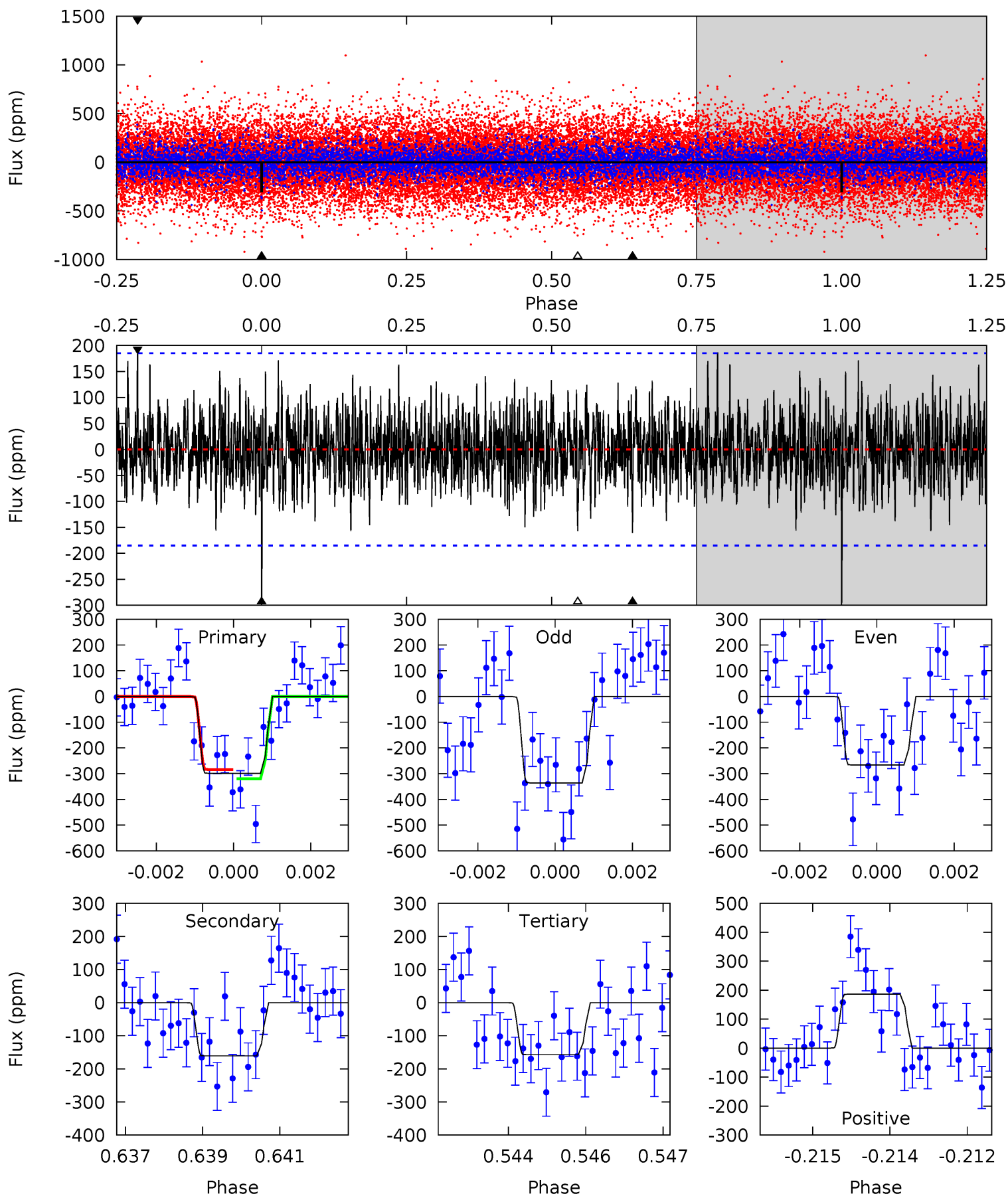
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.3	7.62	6.94	7.41	5.31	3.07	2.24	3.40	2.94	0.67	0.21	1.41	0.81	0.42	2.39



# Alt Model-Shift Uniqueness Test

009612084-05, P = 139.807630 Days, E = 102.845651 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
8.66	4.67	4.55	5.40	5.37	3.16	1.47	4.10	3.25	0.11	-0.74	1.01	0.90	0.38	0.51





### Stellar Parameters For KIC 009612084

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5095^{+45}_{-121}$	$3.052^{+0.195}_{-0.105}$	$-0.060^{+0.100}_{-0.250}$	$7.094^{+1.066}_{-2.666}$	$2.070^{+0.533}_{-0.799}$	$0.008^{+0.011}_{-0.003}$
	+1%/-2%	+6%/-3%	+167%/-417%	+15%/-38%	+26%/-39%	+136%/-31%
Source	SPE74	SPE74	SPE74	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology  
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

### Secondary Eclipse Parameters for KIC 009612084-05 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-201 \pm 26$	$14.38^{+6.08}_{-5.63}$	$1007^{+46}_{-66}$	$4472^{+951}_{-521}$	$237^{+379}_{-115}$
Alt.	$-161 \pm 34$	$13.61^{+6.18}_{-5.39}$	$1011^{+48}_{-65}$	$4396^{+1009}_{-536}$	$216^{+382}_{-113}$

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

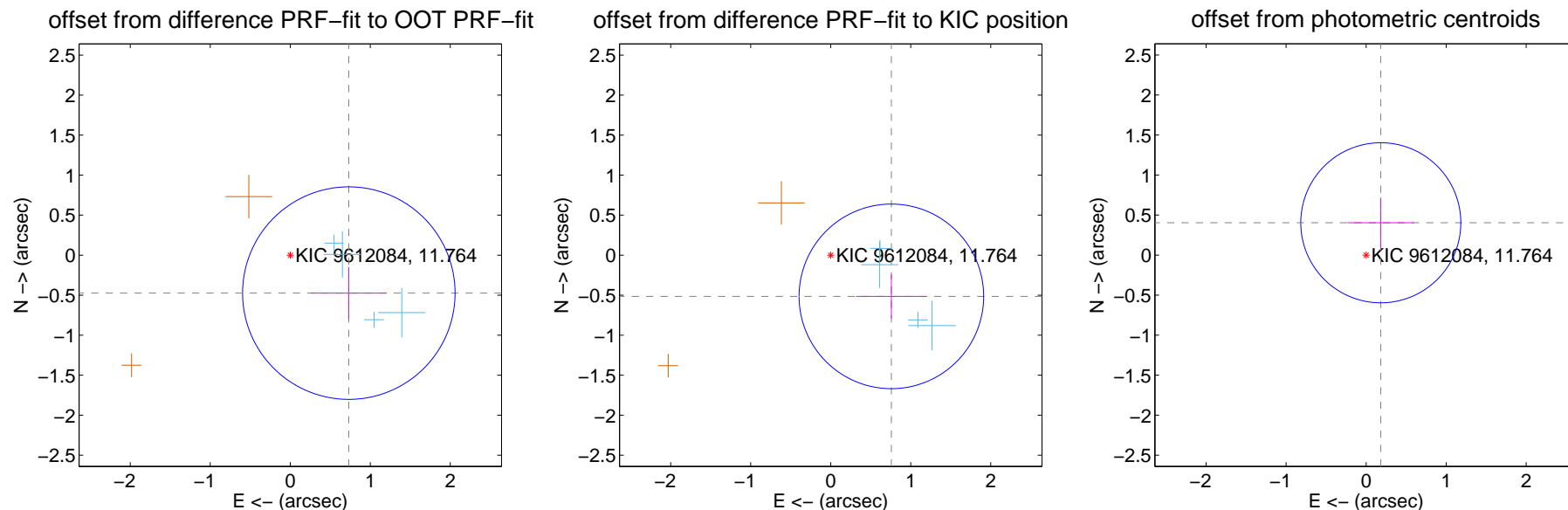
## DV Centroid Data

Supplemental centroid analysis for 009612084-05. **Kepler magnitude: 11.76.** Transit SNR 7.65

There are 4 quarters with good PRF difference image offsets

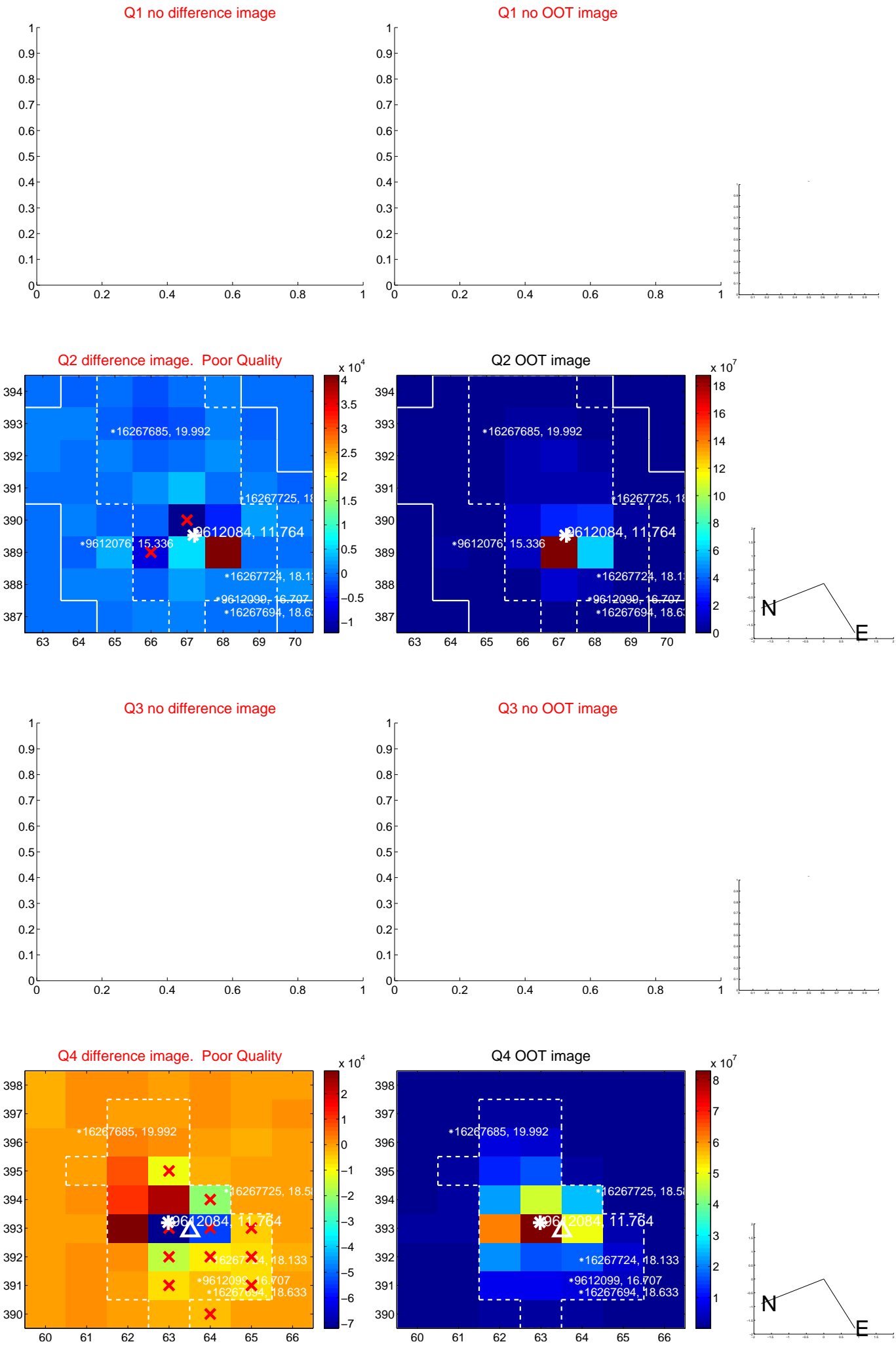
The direct PRF centroid is offset from the target star catalog position by about 0.13 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.872 \pm 0.443$	1.97	$-0.732 \pm 0.473$	$-0.474 \pm 0.327$
PRF-fit source offset from KIC position	$0.916 \pm 0.384$	2.38	$-0.758 \pm 0.443$	$-0.515 \pm 0.275$
photometric centroid source offset	$0.44 \pm 0.33$	1.33	$-0.18 \pm 0.42$	$0.40 \pm 0.31$

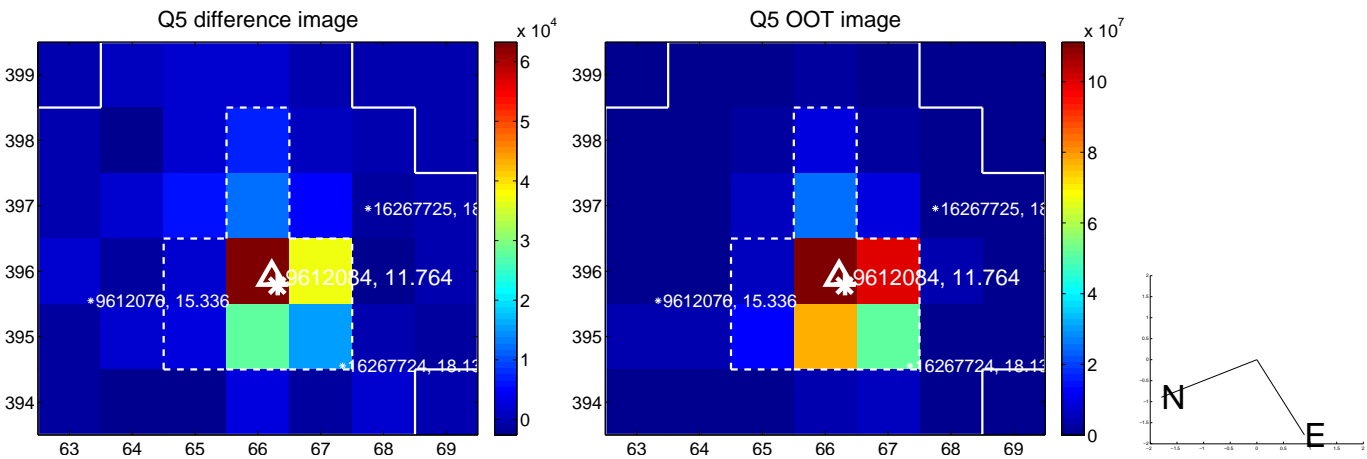


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

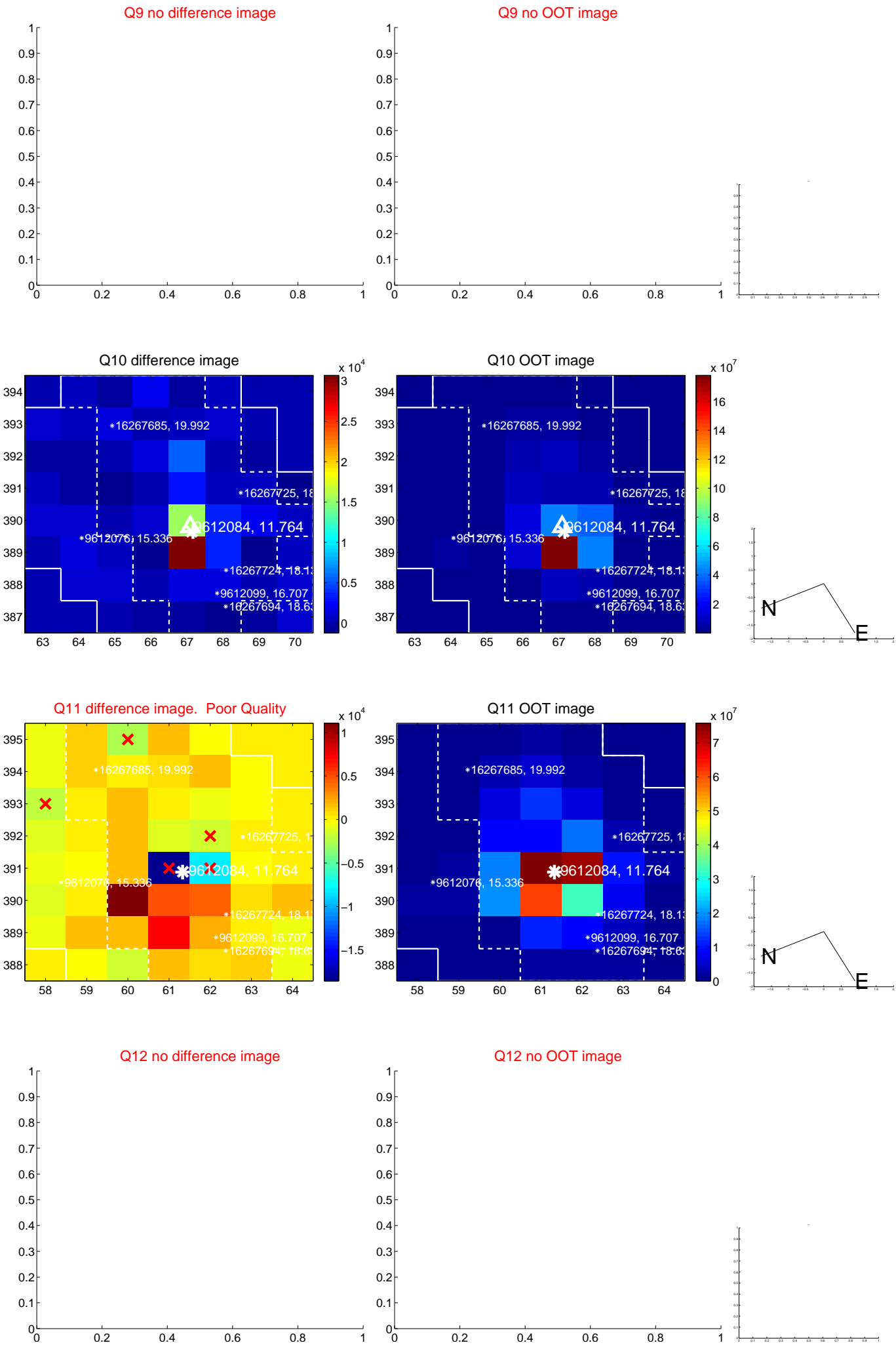
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



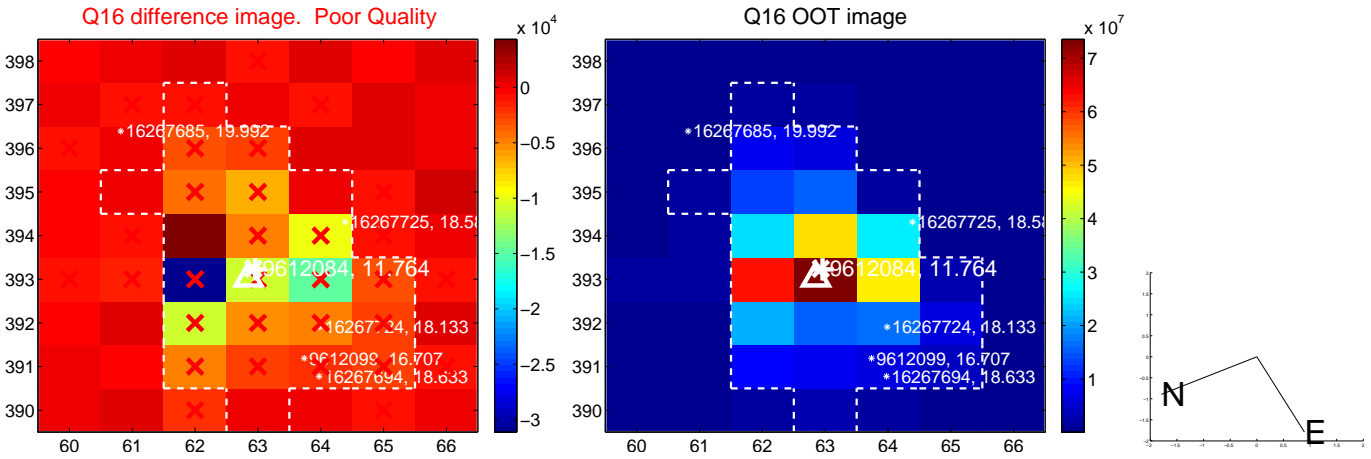
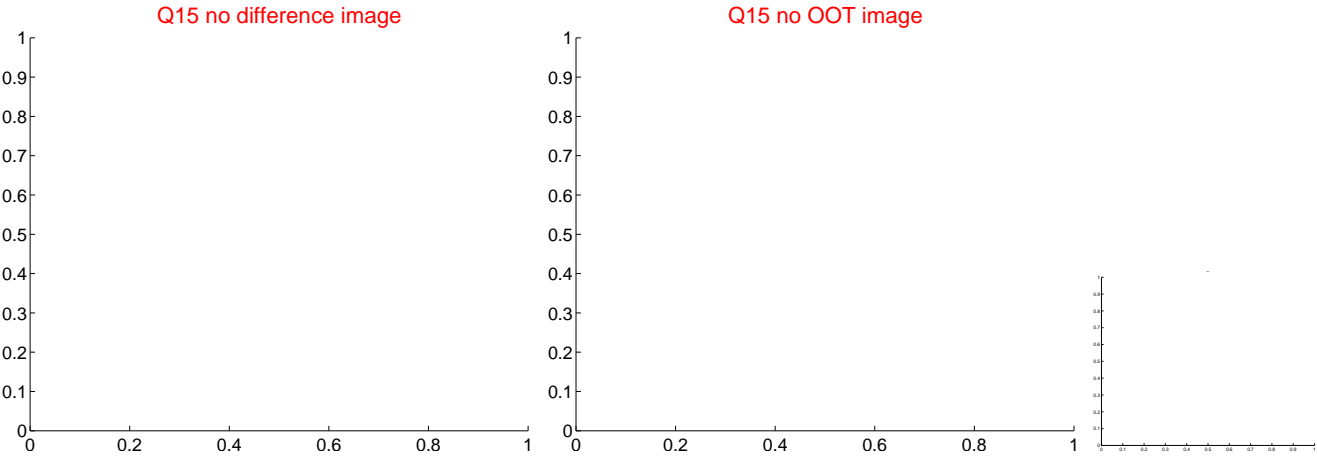
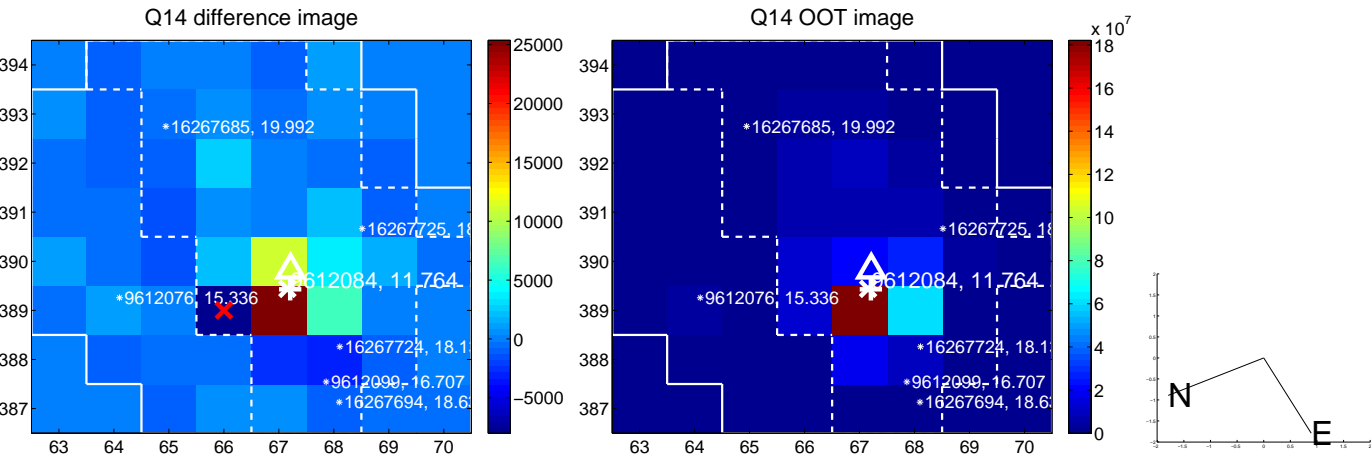
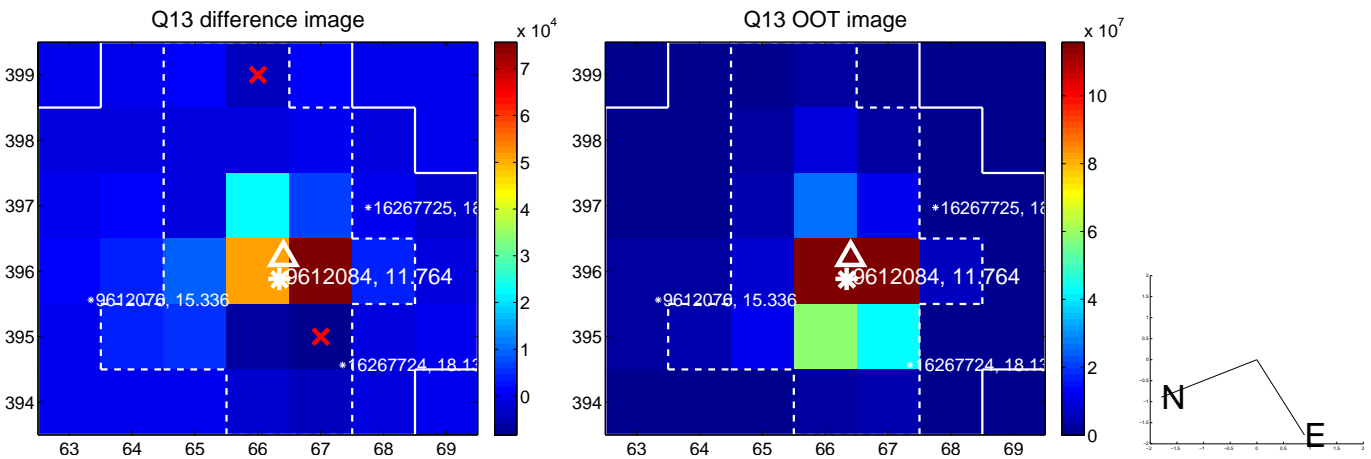
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



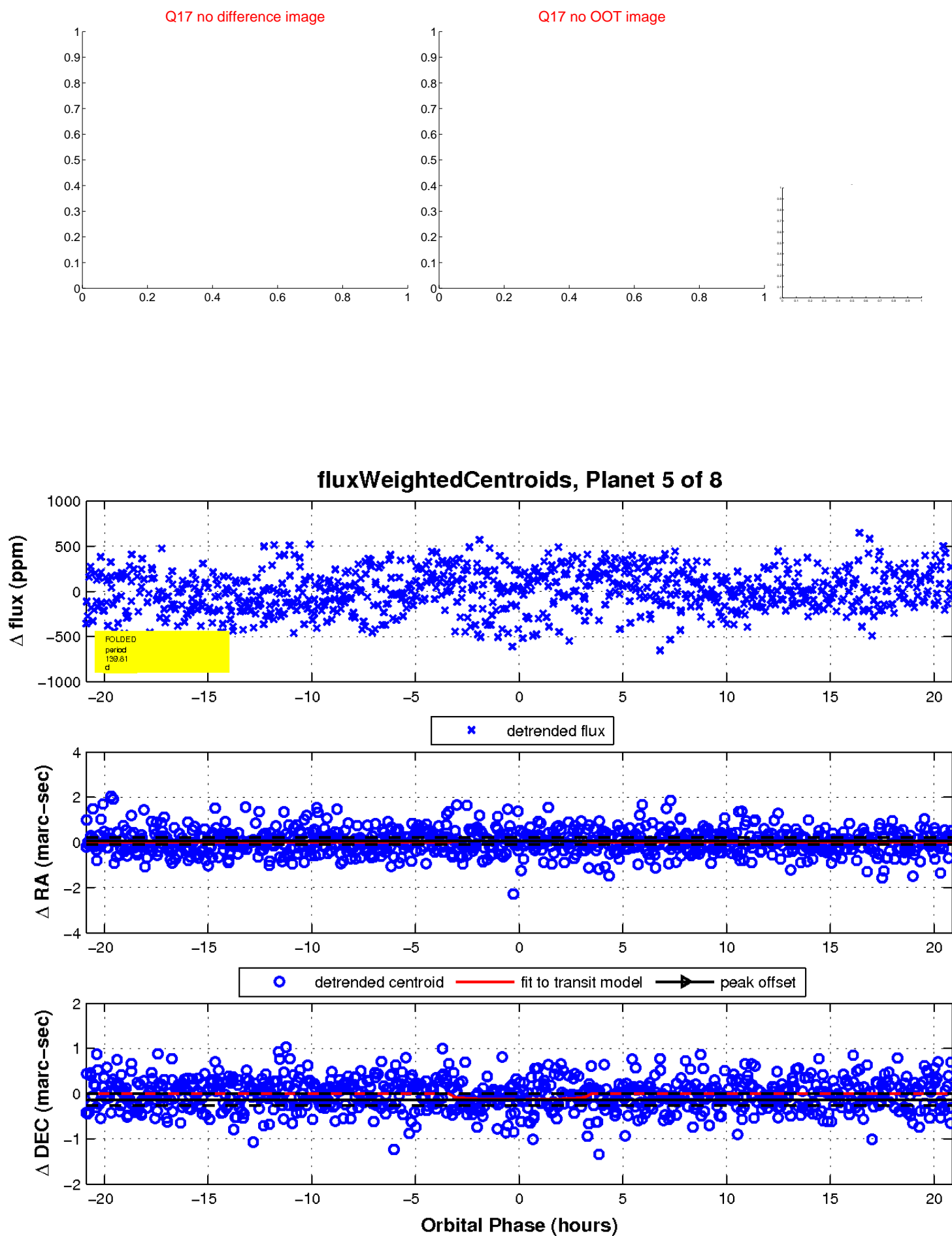
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



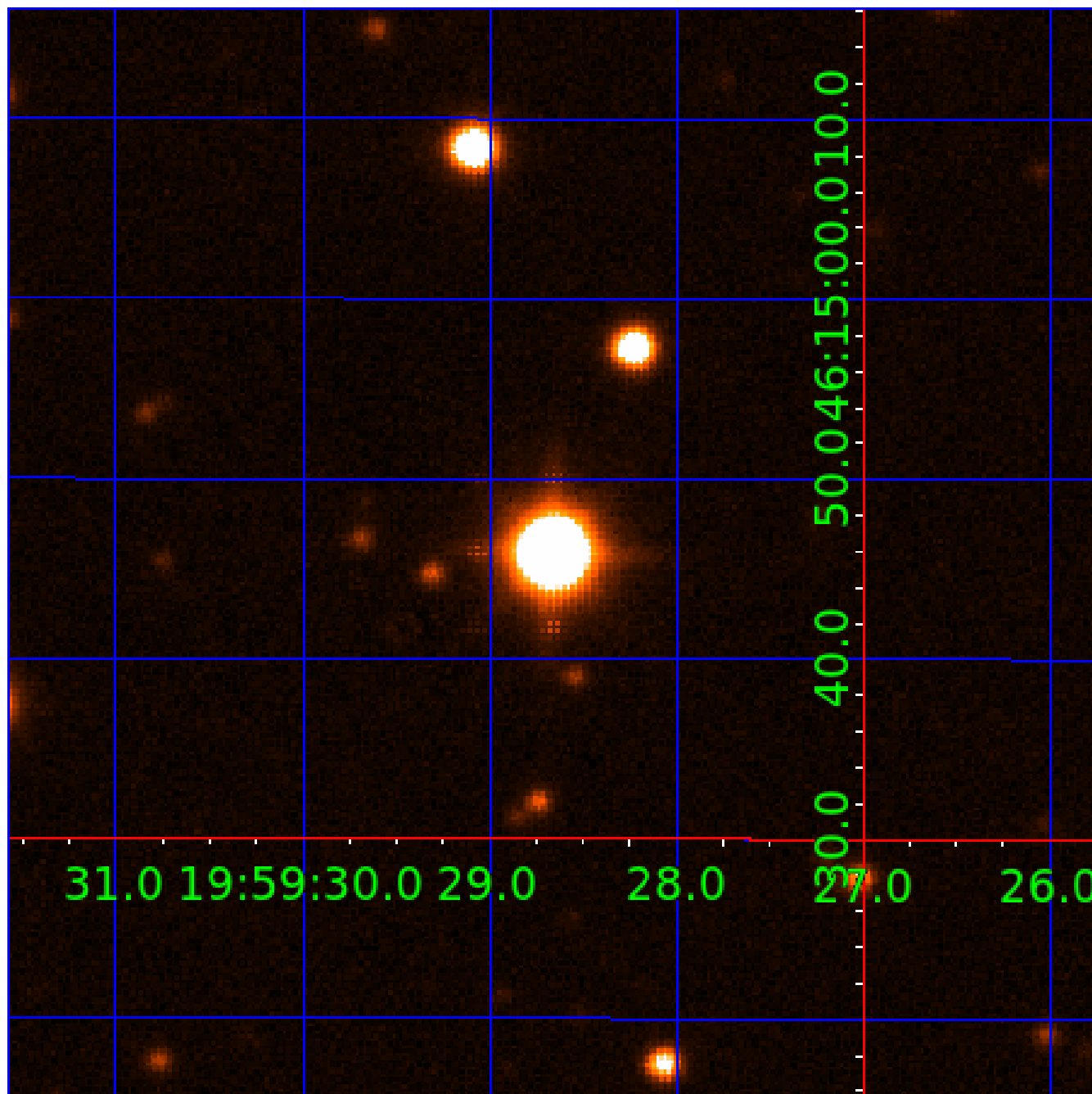
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





UKIRT Image

Declination



# KIC 009612084

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009612084-01	OBS	No	1.072278	132.559506	29.2	4.632	8.4	8.2	7.09	5095	4.49	0.00
009612084-02	OBS	No	175.465170	258.536516	601.6	2.271	8.3	9.2	7.09	5095	19.07	49.71
009612084-03	OBS	No	202.221958	170.176293	489.3	4.495	8.7	8.4	7.09	5095	18.78	41.14
009612084-04	OBS	No	81.760399	139.458312	302.5	3.181	8.5	8.8	7.09	5095	13.05	137.62
009612084-05	OBS	No	139.808662	242.670574	358.0	6.969	8.1	7.7	7.09	5095	14.89	67.30
009612084-06	OBS	No	273.160085	376.365574	457.8	4.949	7.7	8.1	7.09	5095	17.53	27.55
009612084-07	OBS	No	29.442997	149.385149	210.3	3.733	8.0	8.4	7.09	5095	11.14	537.14
009612084-08	OBS	No	483.641932	300.213871	109.9	6.000	7.6	-1.0	7.09	5095	7.24	12.86

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009612084-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
009612084-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT
009612084-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES—TRANS_GAPPED—MOD_NONUNIQ_ALT
009612084-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
009612084-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS
009612084-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
009612084-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_ZUMA—TRANS_GAPPED—MOD_NONUNIQ_ALT
009612084-08	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—CENT_NOFITS—HALO_GHOST

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

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

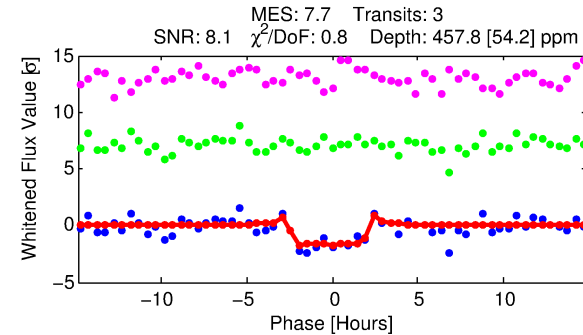
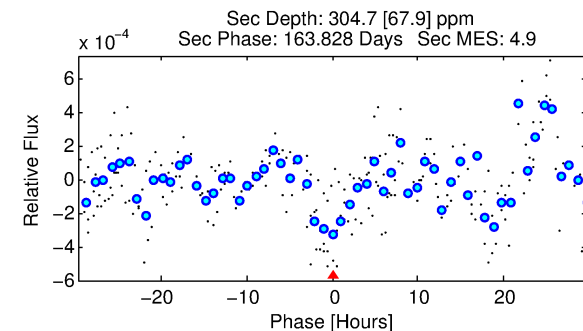
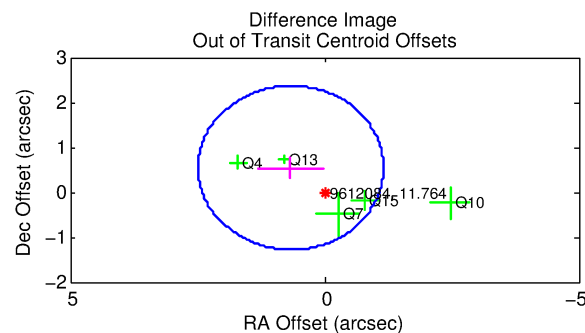
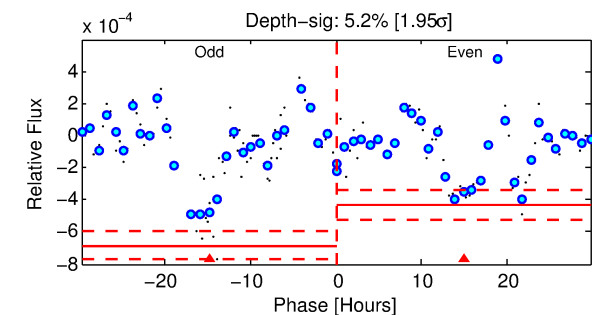
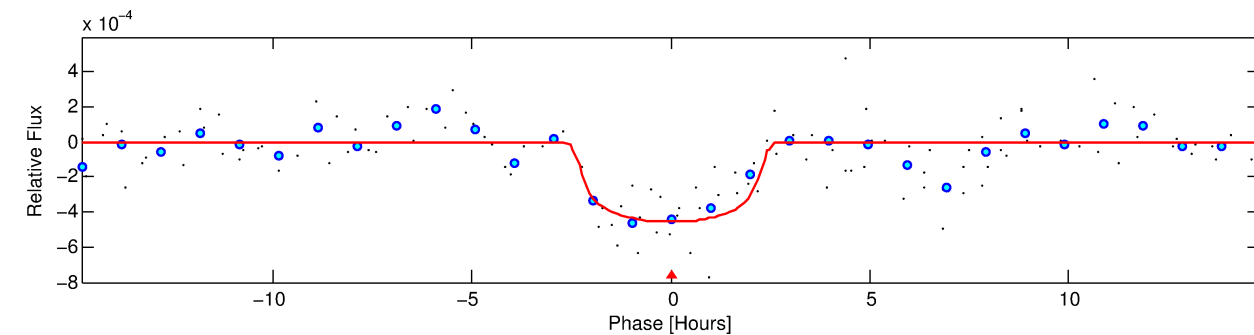
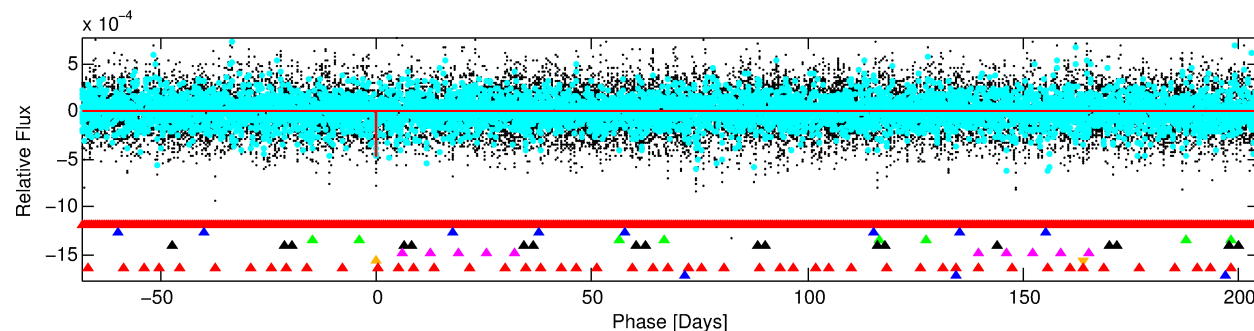
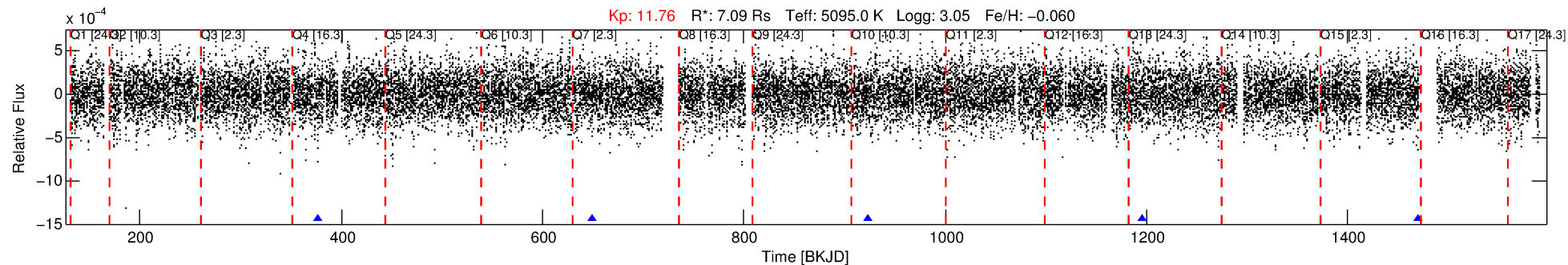
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 009612084-06

No Significant Match Found

# DV One-Page Summary

KIC: 9612084 Candidate: 6 of 8 Period: 273.160 d



## DV Fit Results:

Period = 273.16009 [0.00368] d  
Epoch = 376.3656 [0.0113] BKJD  
Rp/R\* = 0.0226 [0.0089]  
a/R\* = 239.98 [368.66]  
b = 0.85 [0.51]  
Seff = 27.55 [11.07]  
Teq = 584 [59] K  
Rp = 17.53 [9.54] Re  
a = 1.0501 [0.3065] AU  
Ag = 601.46 [545.14] [1.10 $\sigma$ ]  
Teffp = 4473 [921] K [4.21 $\sigma$ ]

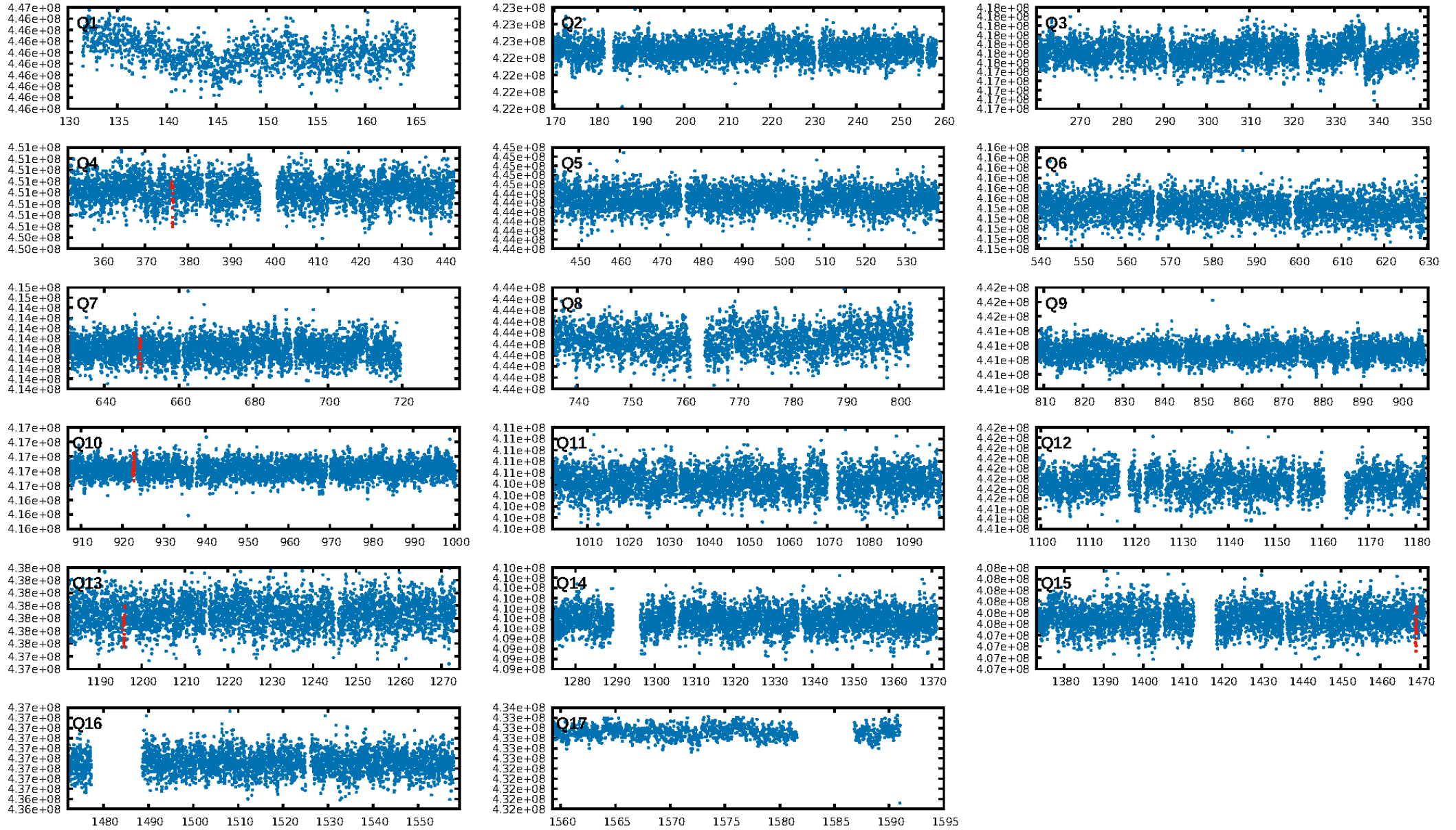
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [254.65 $\sigma$ ]  
LongPeriod-sig: 100.0% [649.47 $\sigma$ ]  
ModelChiSquare2-sig: 89.1%  
ModelChiSquareGof-sig: 98.6%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: -2.287  
Centroid-sig: 6.4%  
Centroid-so: 0.741 arcsec [1.43 $\sigma$ ]  
OotOffset-rm: 0.858 arcsec [1.41 $\sigma$ ]  
OotOffset-st: 1/2/1/1 [5]  
KicOffset-rm: 0.851 arcsec [1.31 $\sigma$ ]  
KicOffset-st: 1/2/1/1 [5]  
DiffImageQuality-fgm: 0.40 [2/5]  
DiffImageOverlap-fno: 0.00 [0/5]

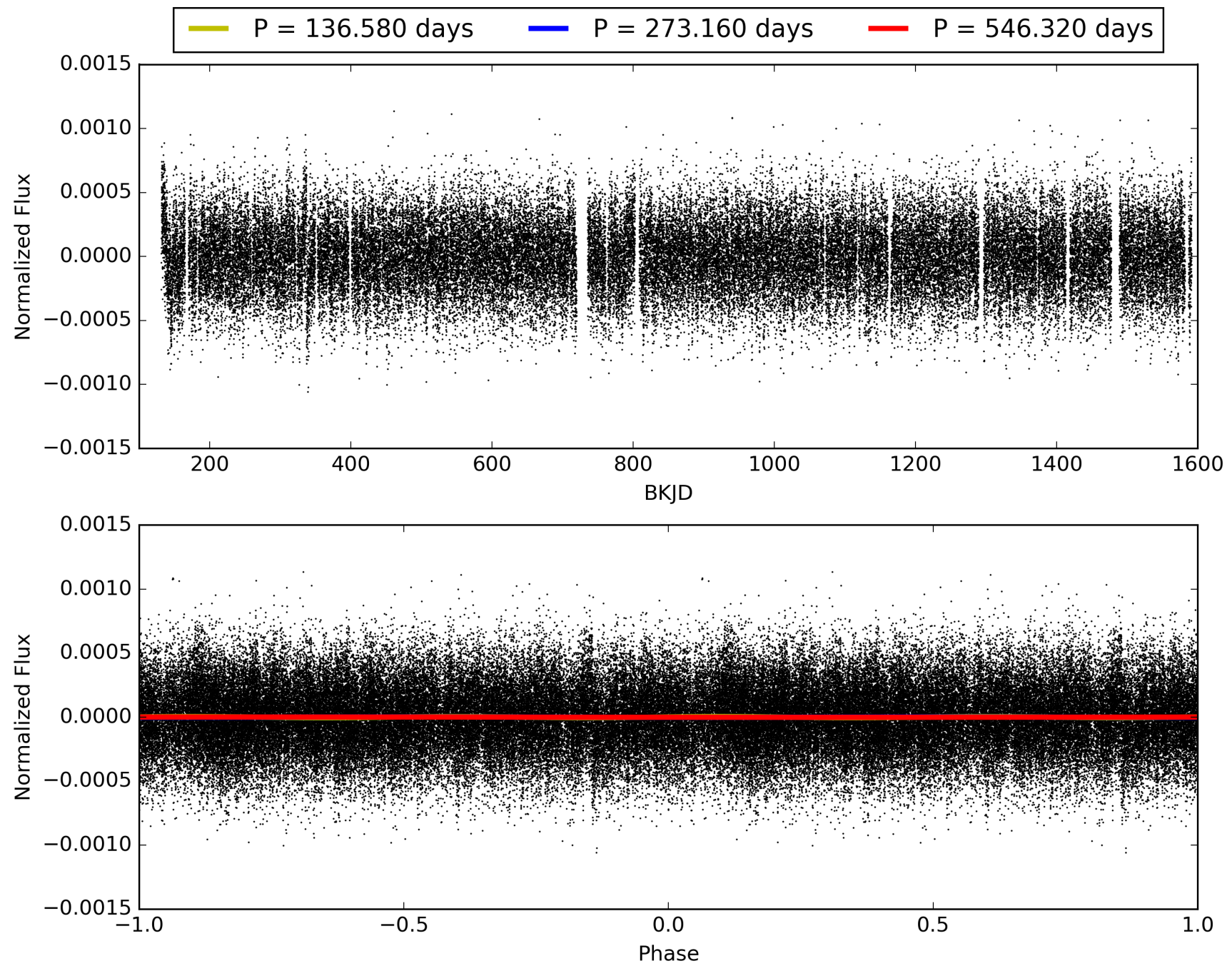
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 13:21:26 Z

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

# TCE 009612084-06, PDC Light Curves

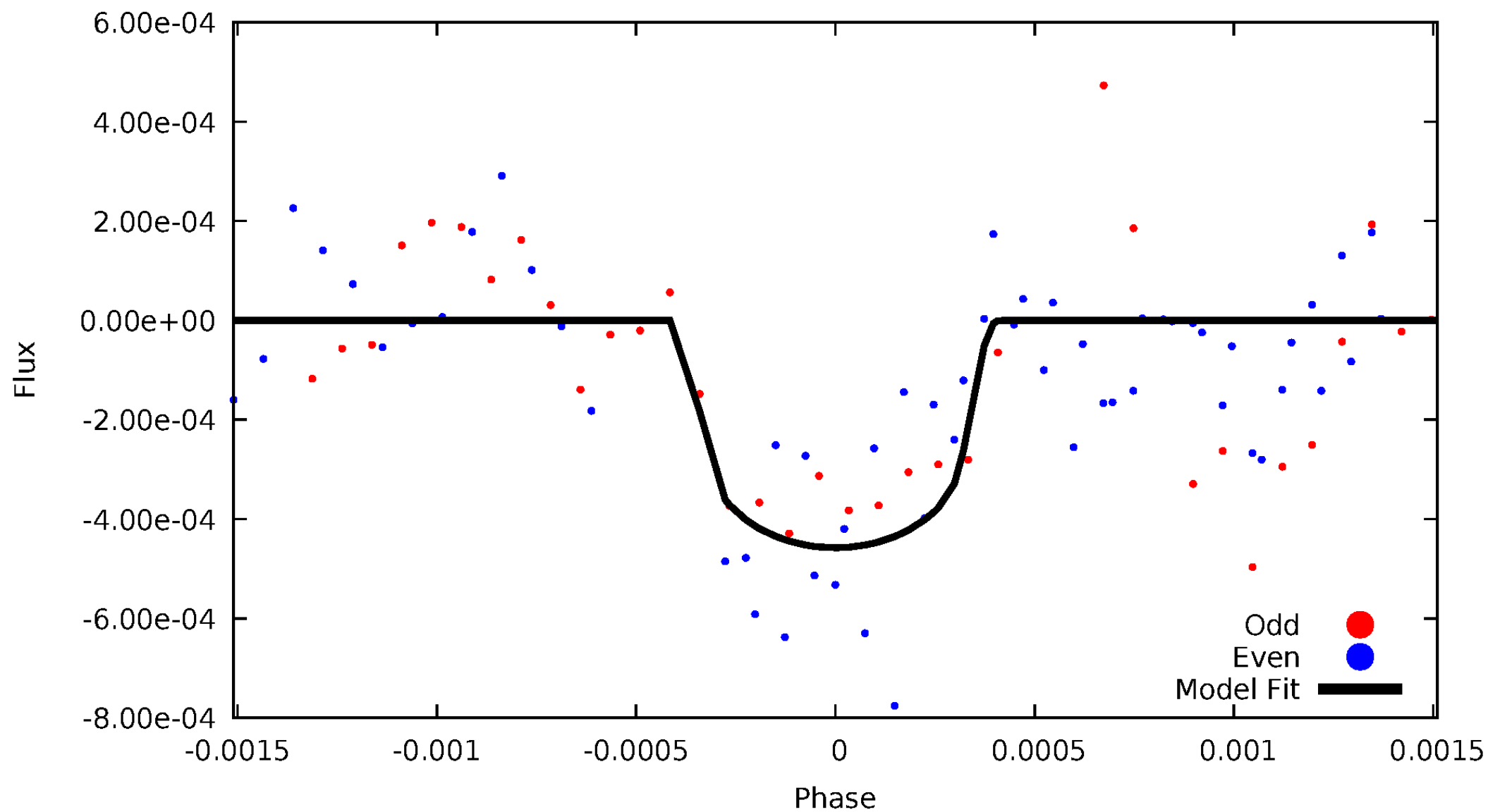


TCE 009612084-06



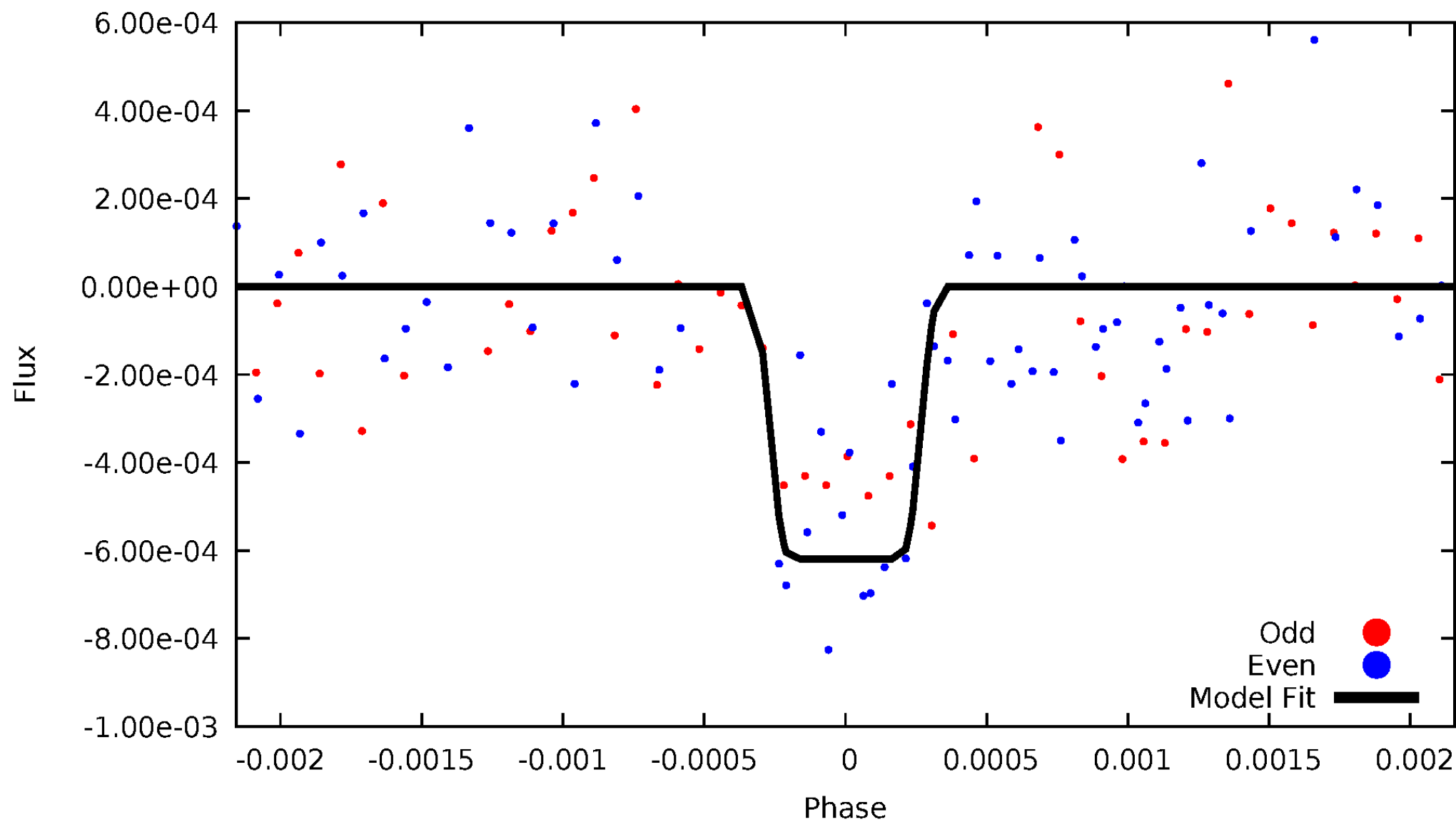
# DV Odd/Even

TCE 009612084-06



# ALT Odd/Even

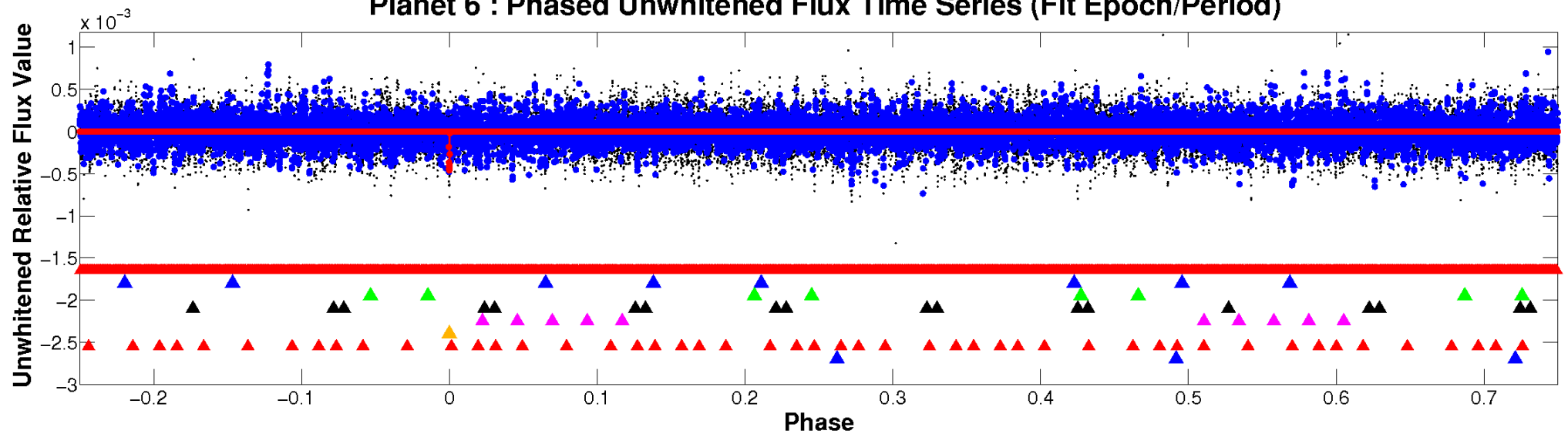
TCE 009612084-06



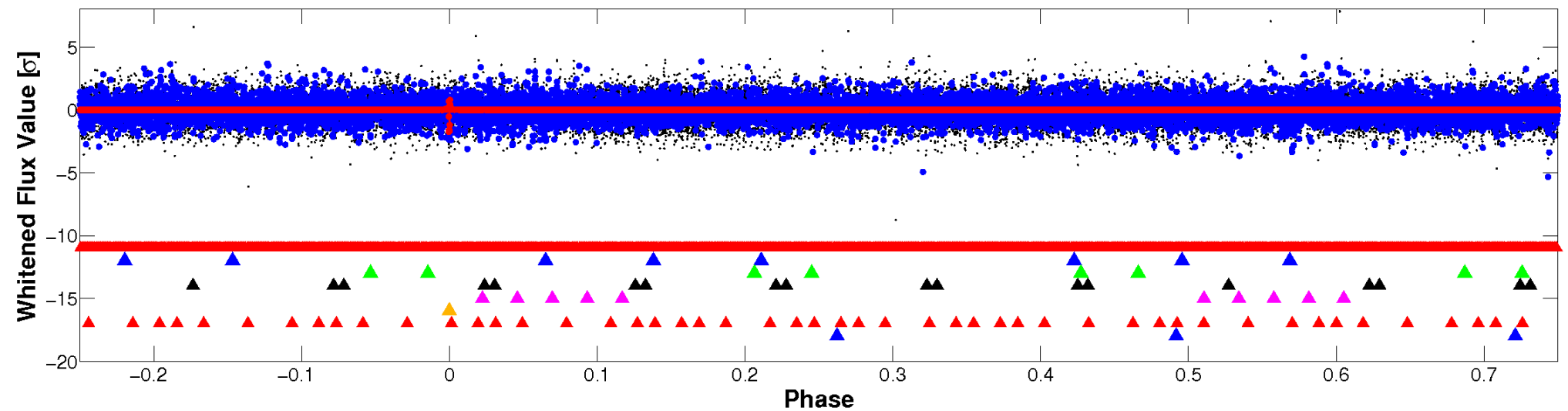


# Non-Whitened Vs. Whitened Light Curve

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

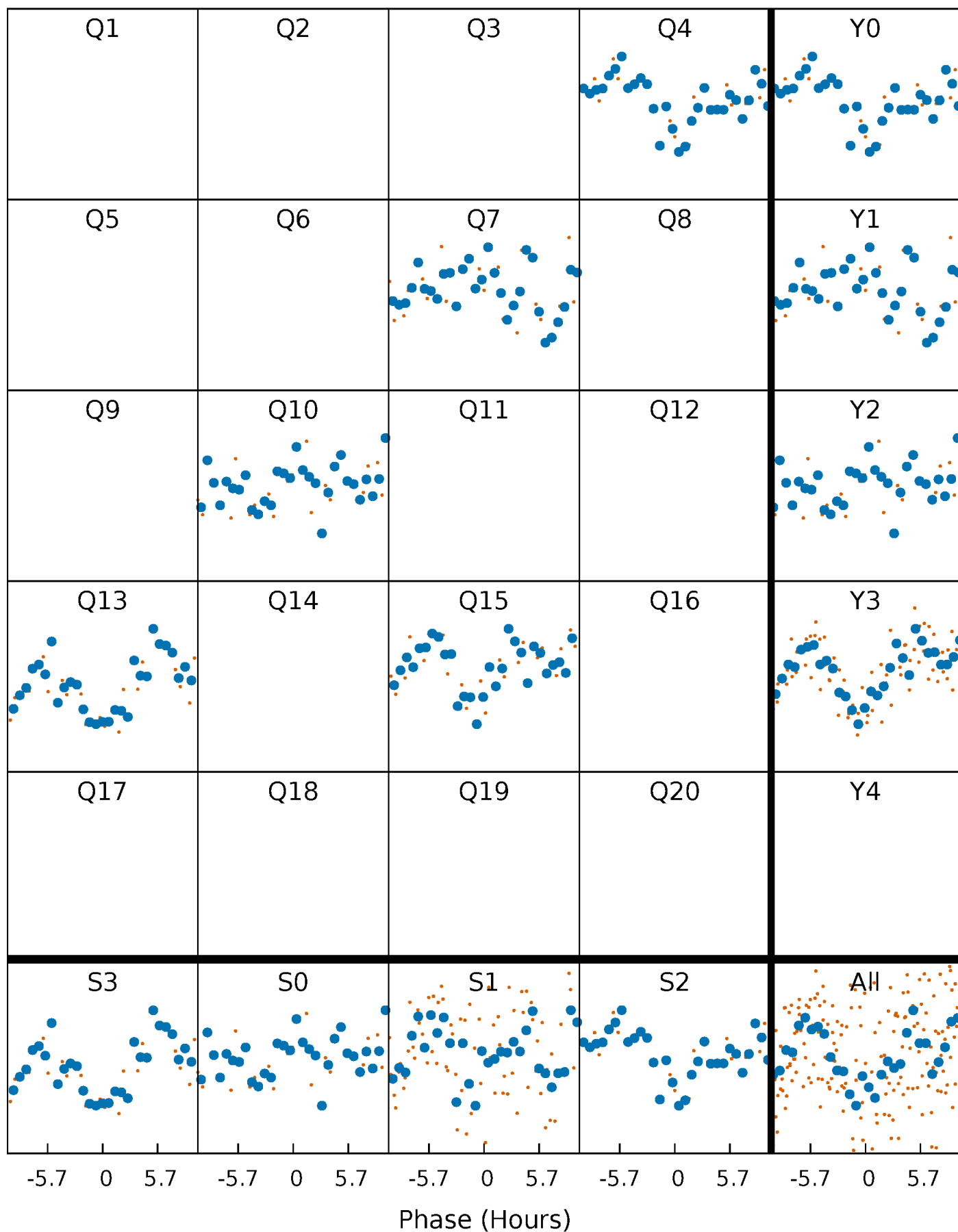


## Planet 6 : Phased Whitened Flux Time Series (Fit Epoch/Period)



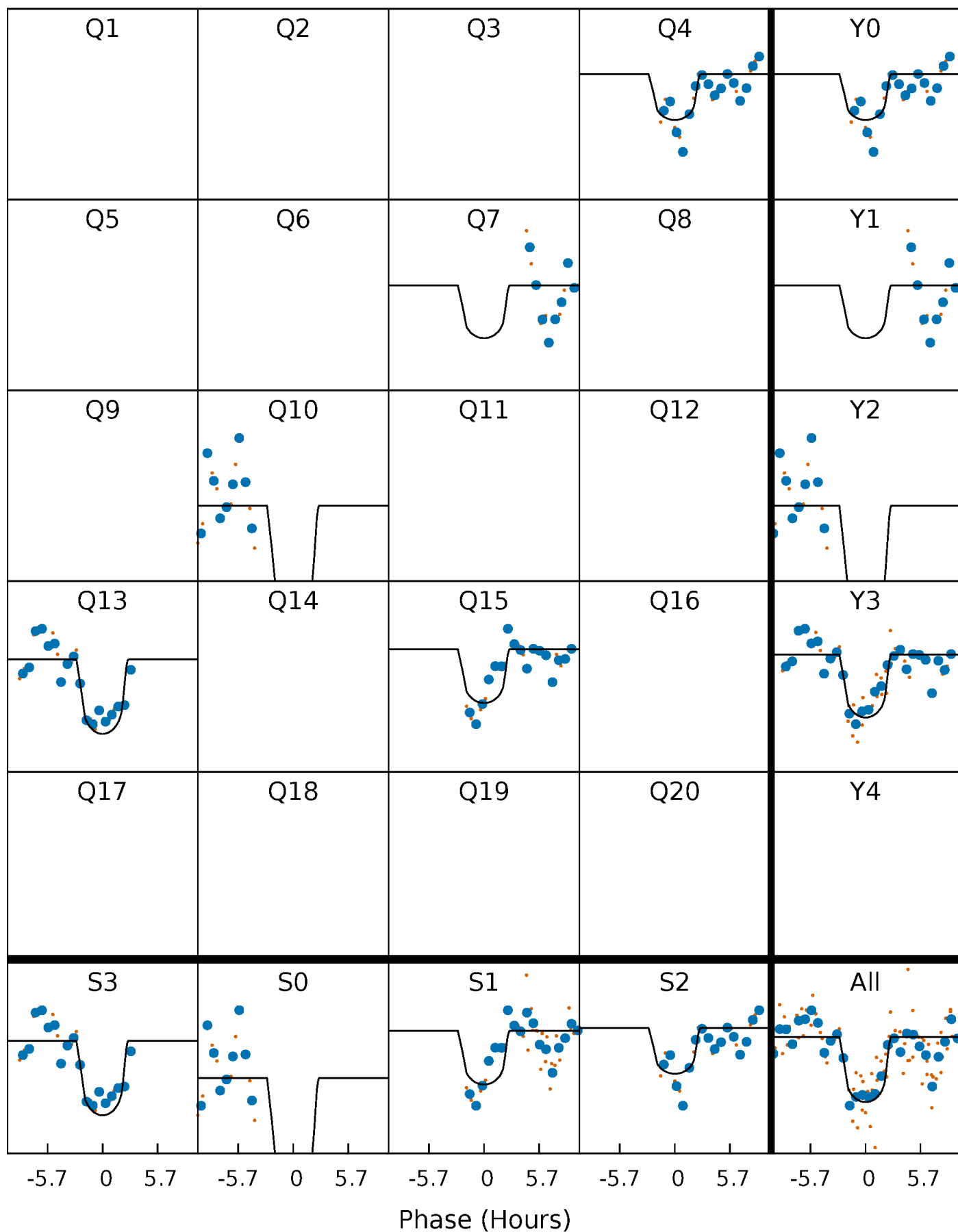
# PDC Quarter-Phased Transit Curves

TCE 009612084-06     $P=273.160085$  Days     $T_0=376.365574$  (BKJD)



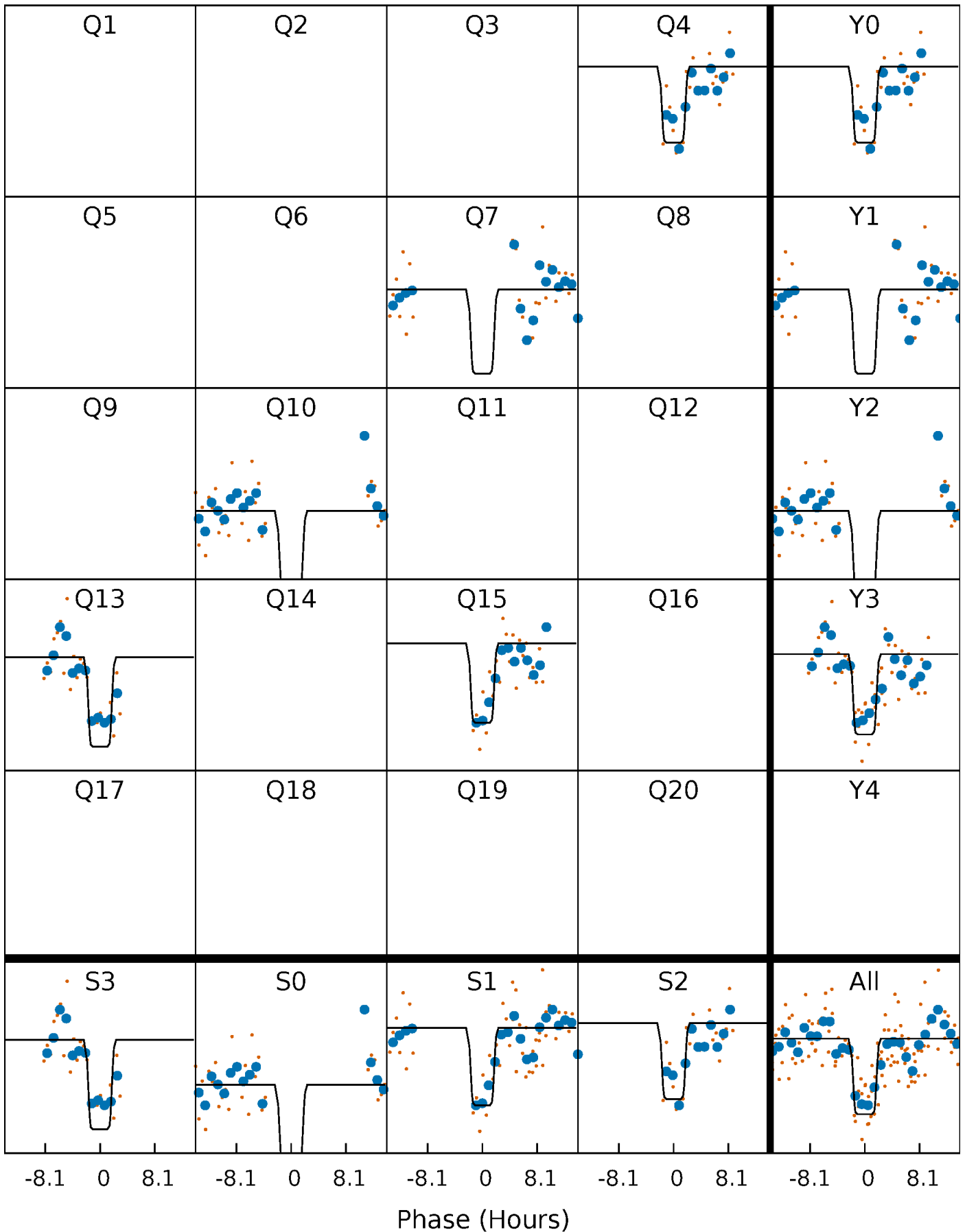
# DV Quarter-Phased Transit Curves

TCE 009612084-06     $P=273.160085$  Days     $T_0=376.365574$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

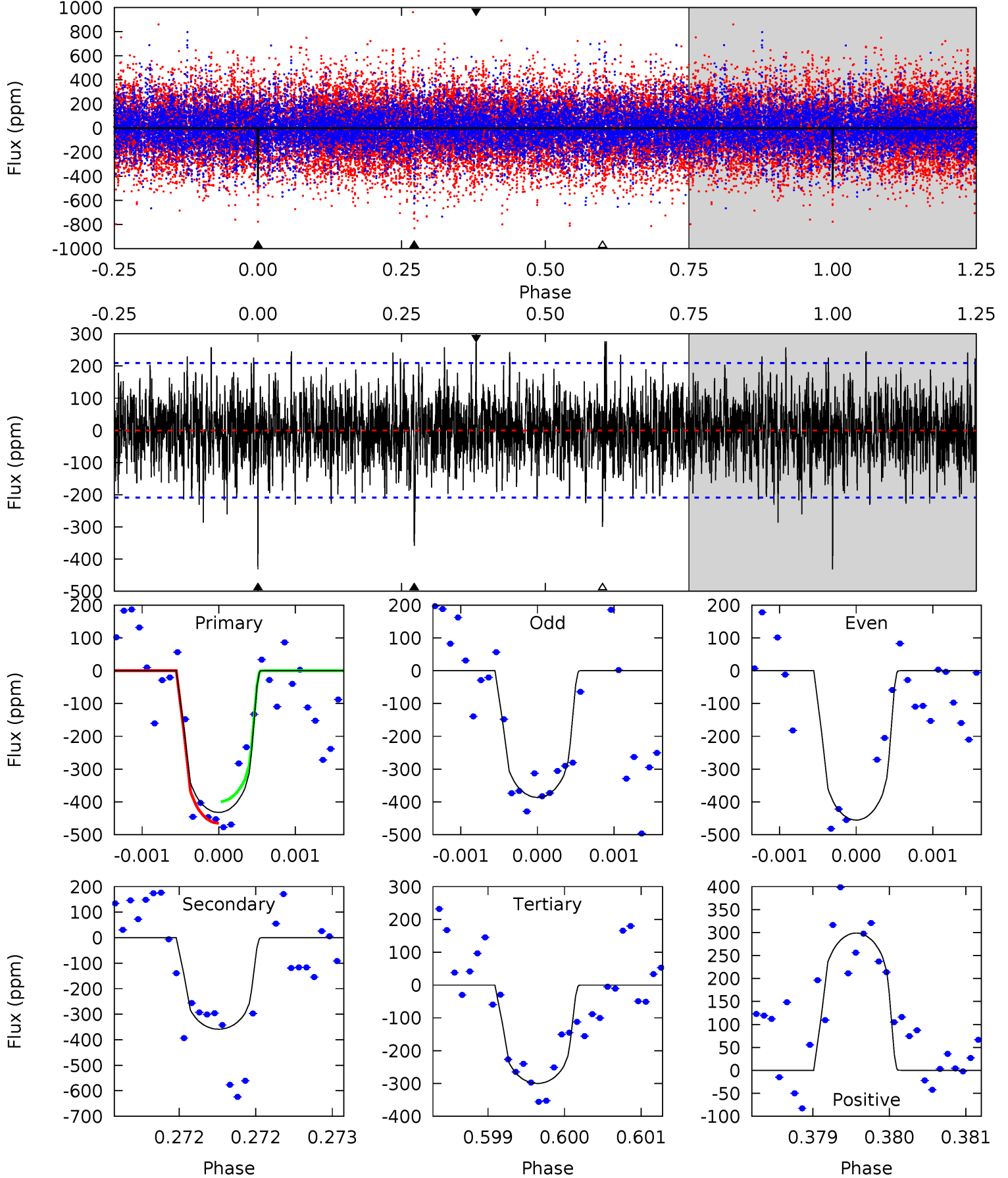
TCE 009612084-06 P=273.154801 Days  $T_0=376.368496$  (BKJD)



# DV Model-Shift Uniqueness Test

009612084-06, P = 273.160085 Days, E = 103.205489 Days

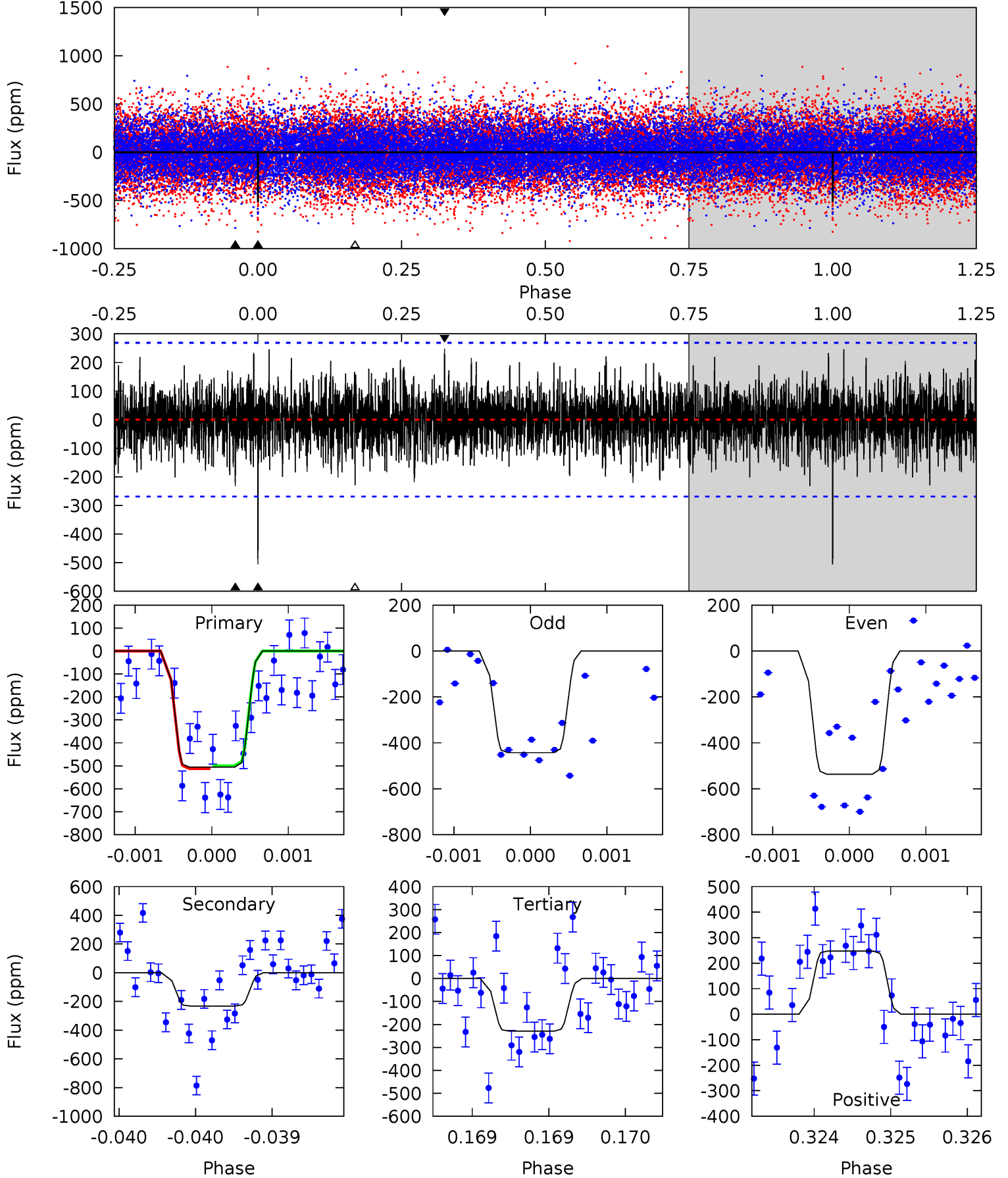
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.4	9.45	7.90	7.87	5.50	3.37	2.03	3.48	3.51	1.55	1.58	0.84	1.02	0.41	0.86



# Alt Model-Shift Uniqueness Test

009612084-06, P = 273.154801 Days, E = 103.213695 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
10.4	4.79	4.73	5.12	5.56	3.46	1.37	5.71	5.33	0.05	-0.33	0.93	0.98	0.33	0.13



### Stellar Parameters For KIC 009612084

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5095^{+45}_{-121}$	$3.052^{+0.195}_{-0.105}$	$-0.060^{+0.100}_{-0.250}$	$7.094^{+1.066}_{-2.666}$	$2.070^{+0.533}_{-0.799}$	$0.008^{+0.011}_{-0.003}$
	+1%/-2%	+6%/-3%	+167%/-417%	+15%/-38%	+26%/-39%	+136%/-31%
Source	SPE74	SPE74	SPE74	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology  
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

### Secondary Eclipse Parameters for KIC 009612084-06 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-359 \pm 38$	$17.04^{+7.59}_{-7.04}$	$809^{+38}_{-51}$	$4718^{+1158}_{-562}$	$768^{+1300}_{-395}$
Alt.	$-232 \pm 48$	$18.95^{+8.23}_{-7.31}$	$809^{+41}_{-52}$	$4146^{+798}_{-442}$	$384^{+629}_{-194}$

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



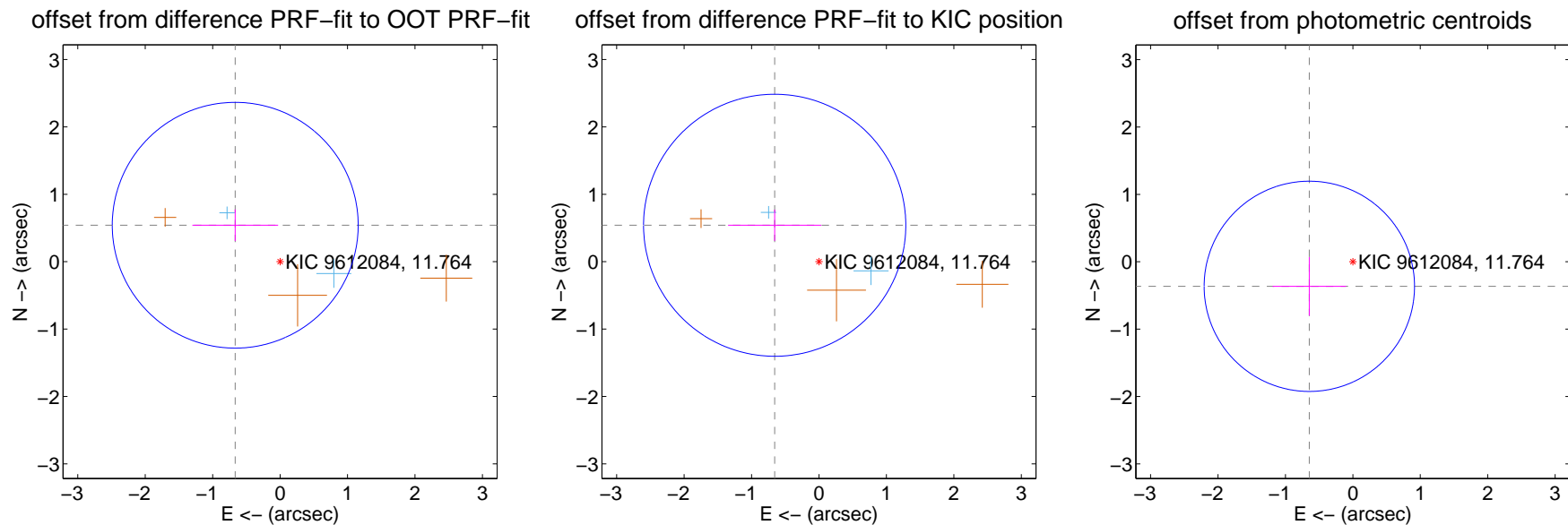
## DV Centroid Data

Supplemental centroid analysis for 009612084-06. **Kepler magnitude: 11.76.** Transit SNR 8.14

**There are 2 quarters with good PRF difference image offsets**

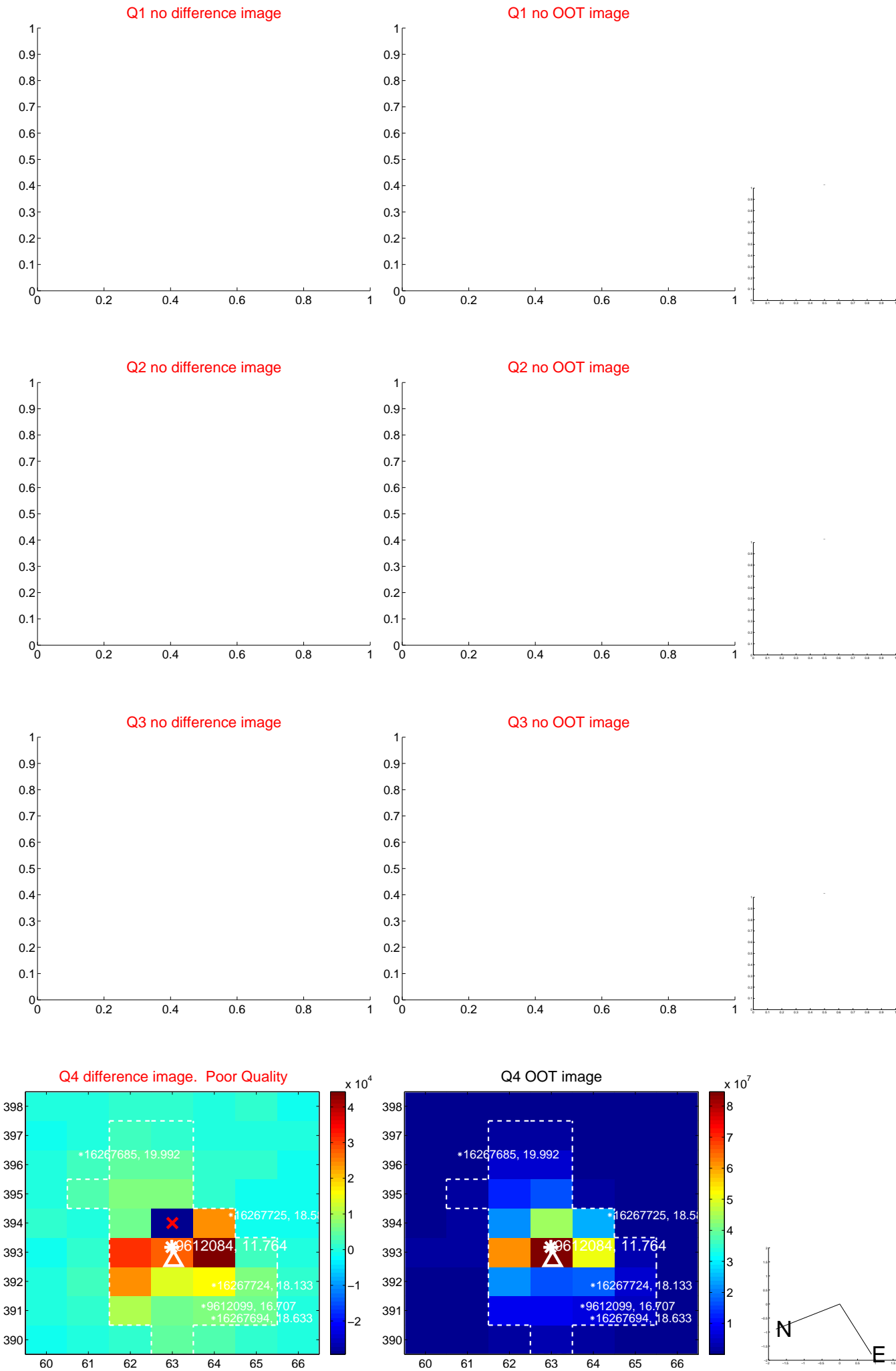
The direct PRF centroid is offset from the target star catalog position by about 0.05 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.858 \pm 0.608$	1.41	$0.666 \pm 0.636$	$0.541 \pm 0.234$
PRF-fit source offset from KIC position	$0.851 \pm 0.648$	1.31	$0.657 \pm 0.691$	$0.541 \pm 0.232$
photometric centroid source offset	$0.74 \pm 0.52$	1.43	$0.65 \pm 0.54$	$-0.36 \pm 0.43$

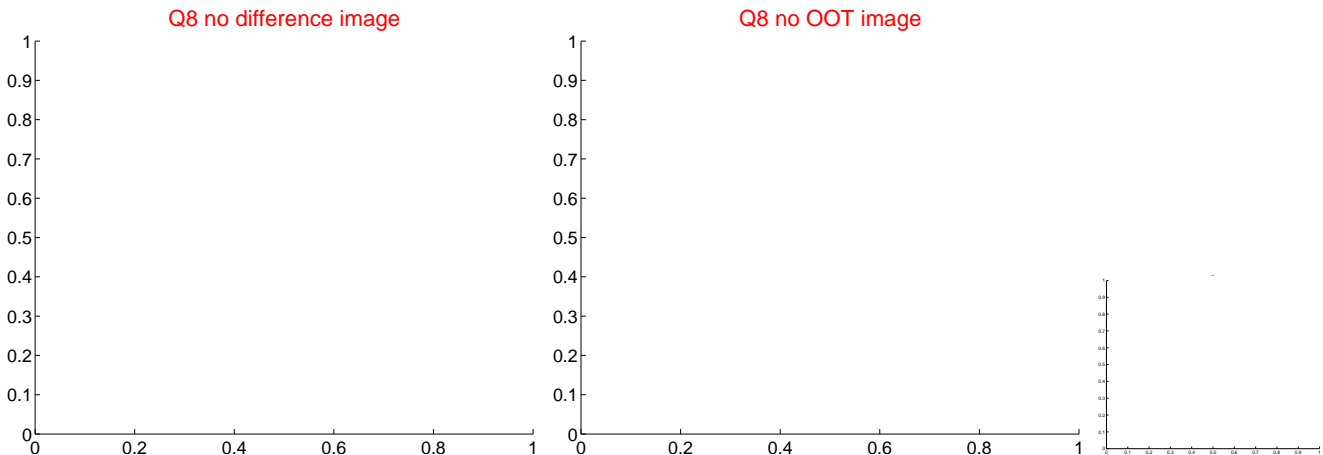
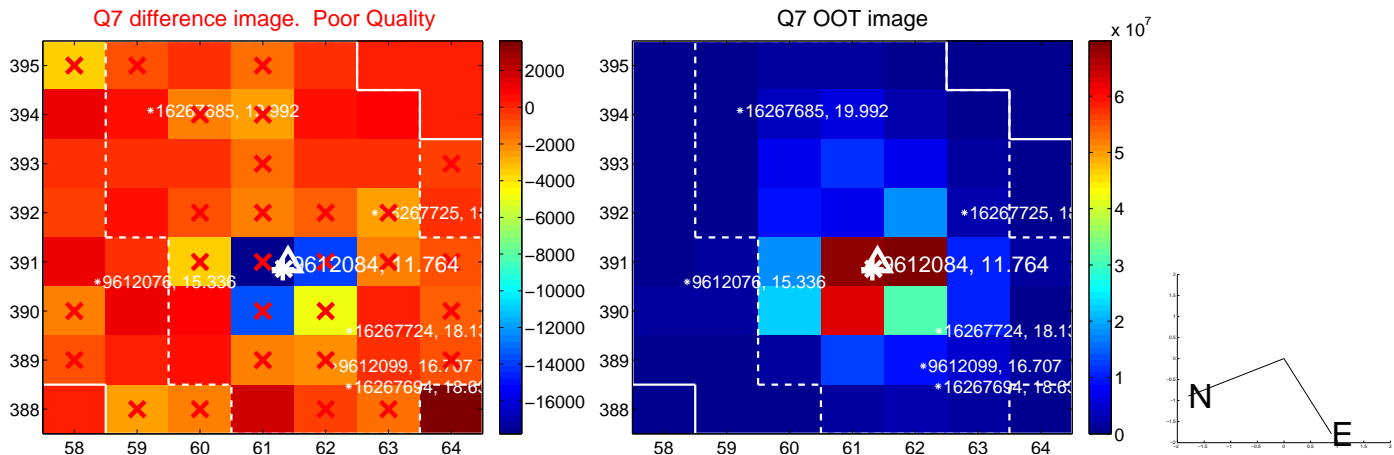
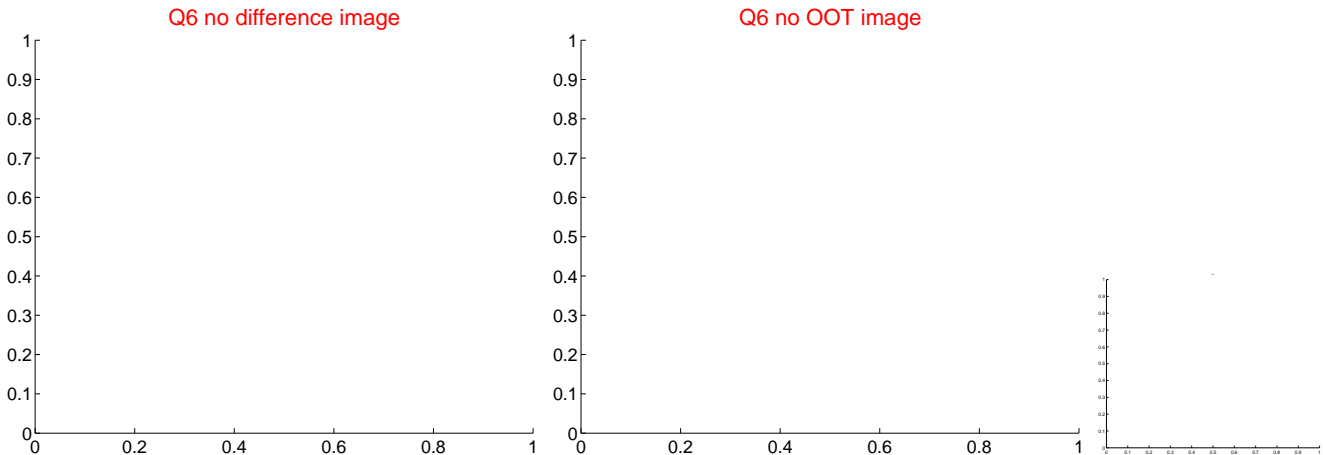
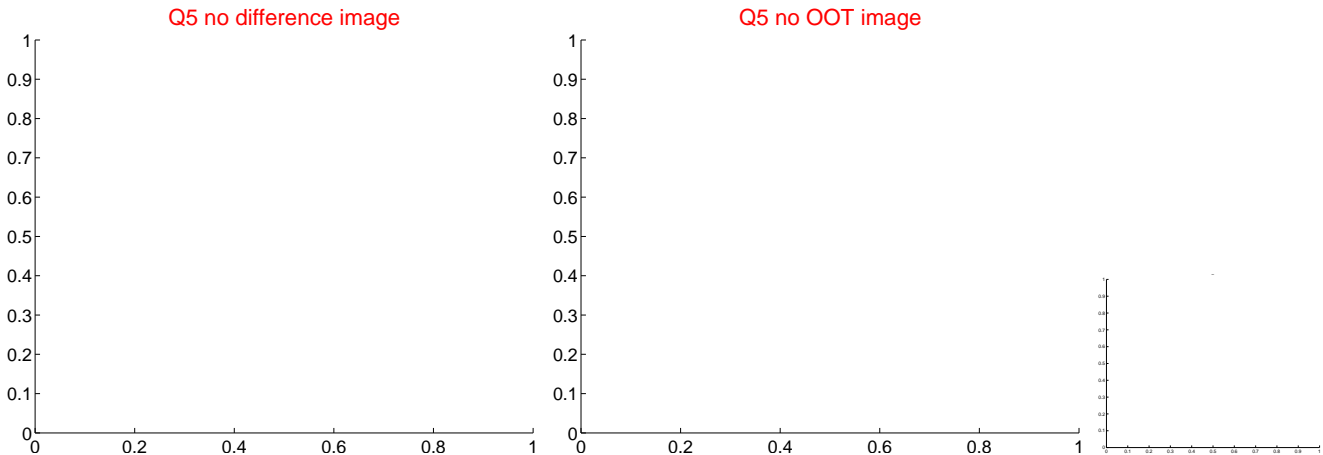


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

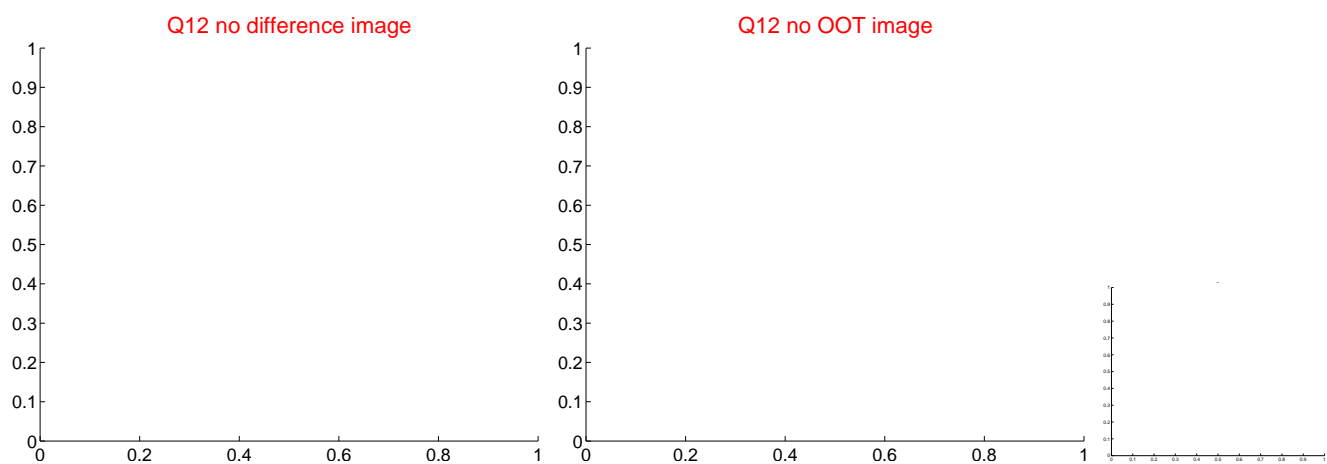
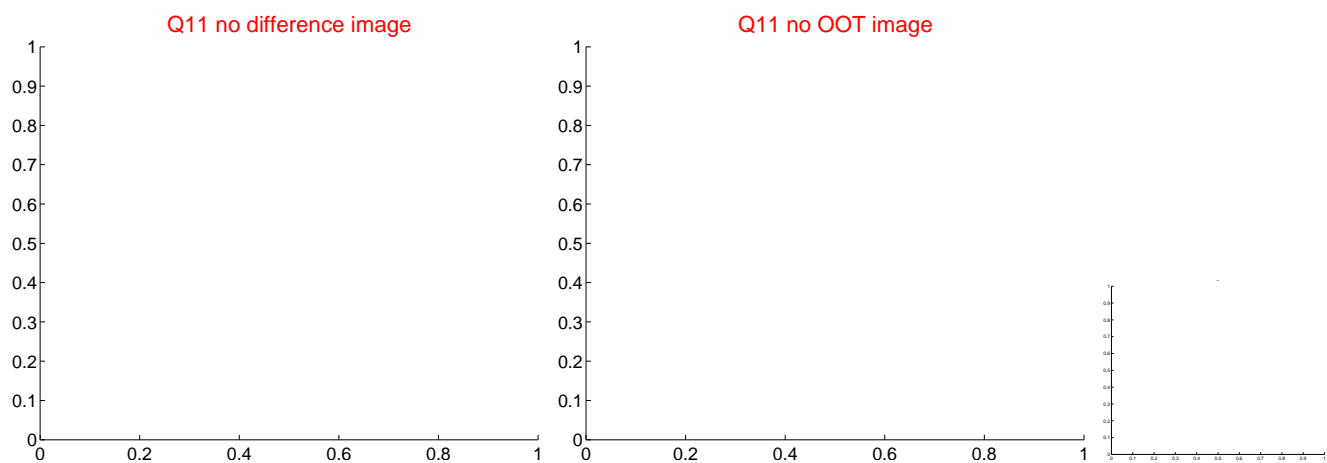
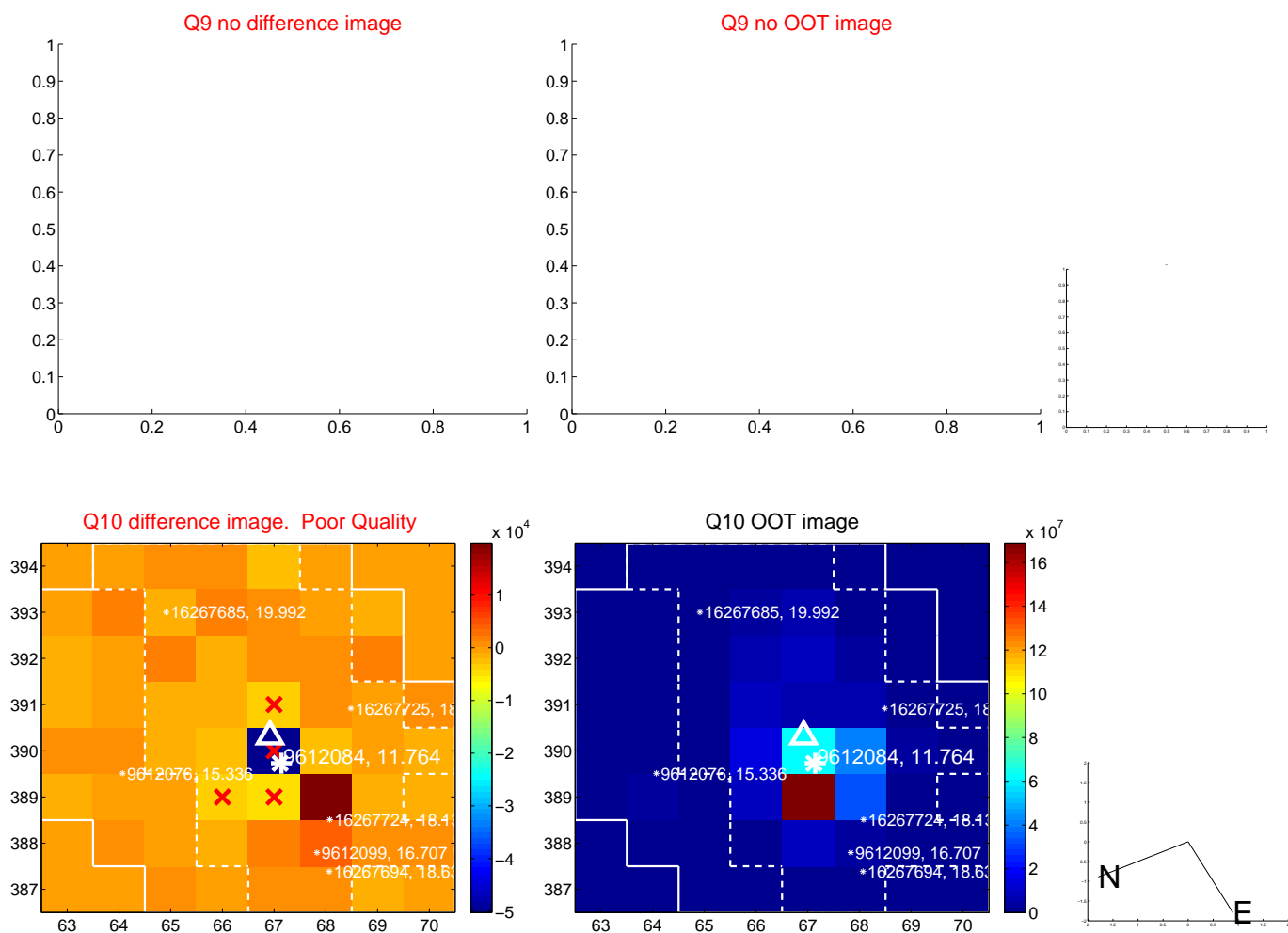
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



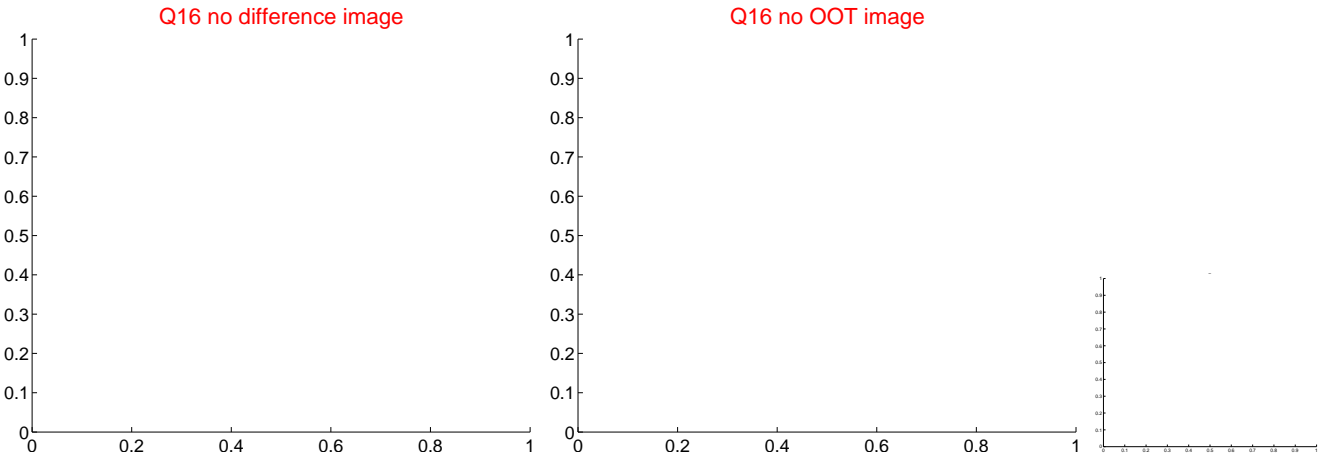
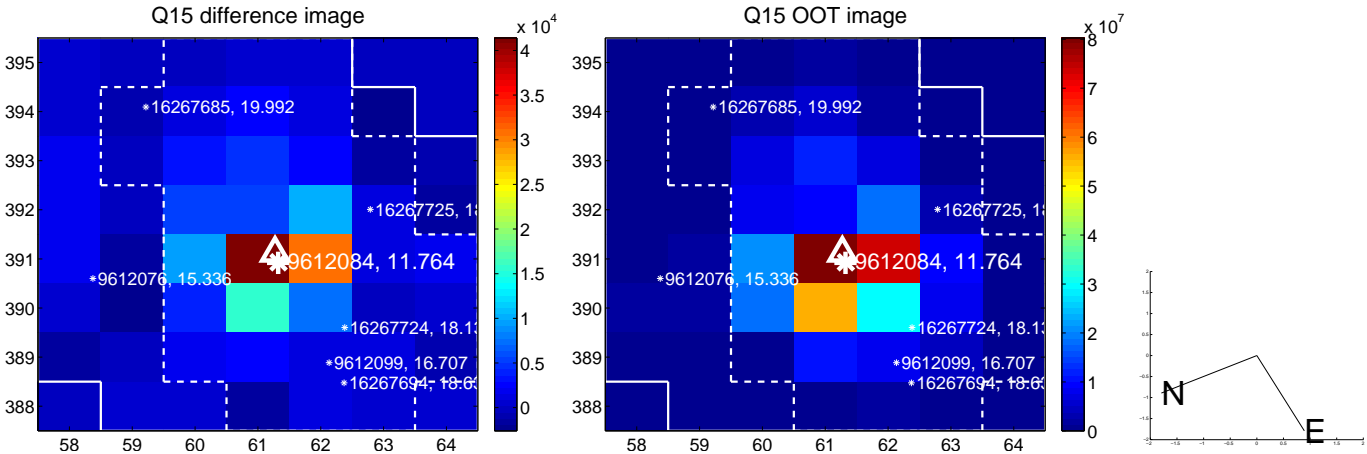
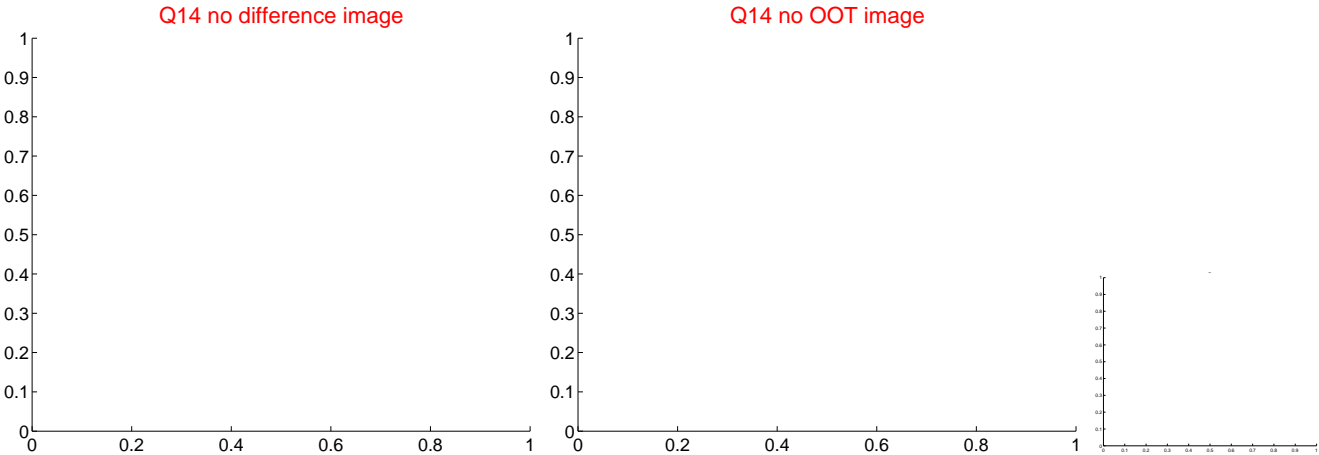
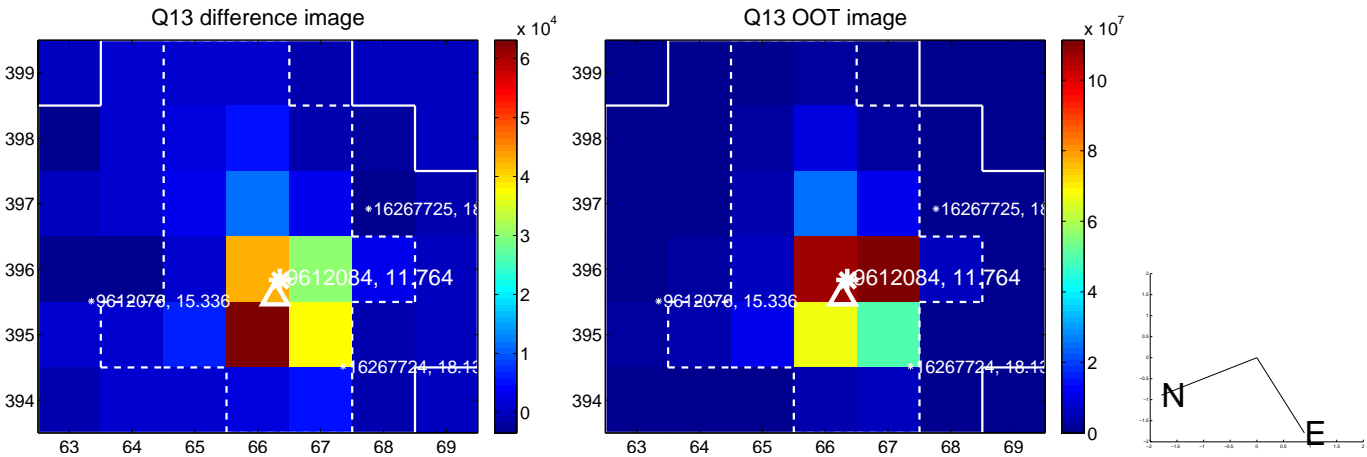
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value



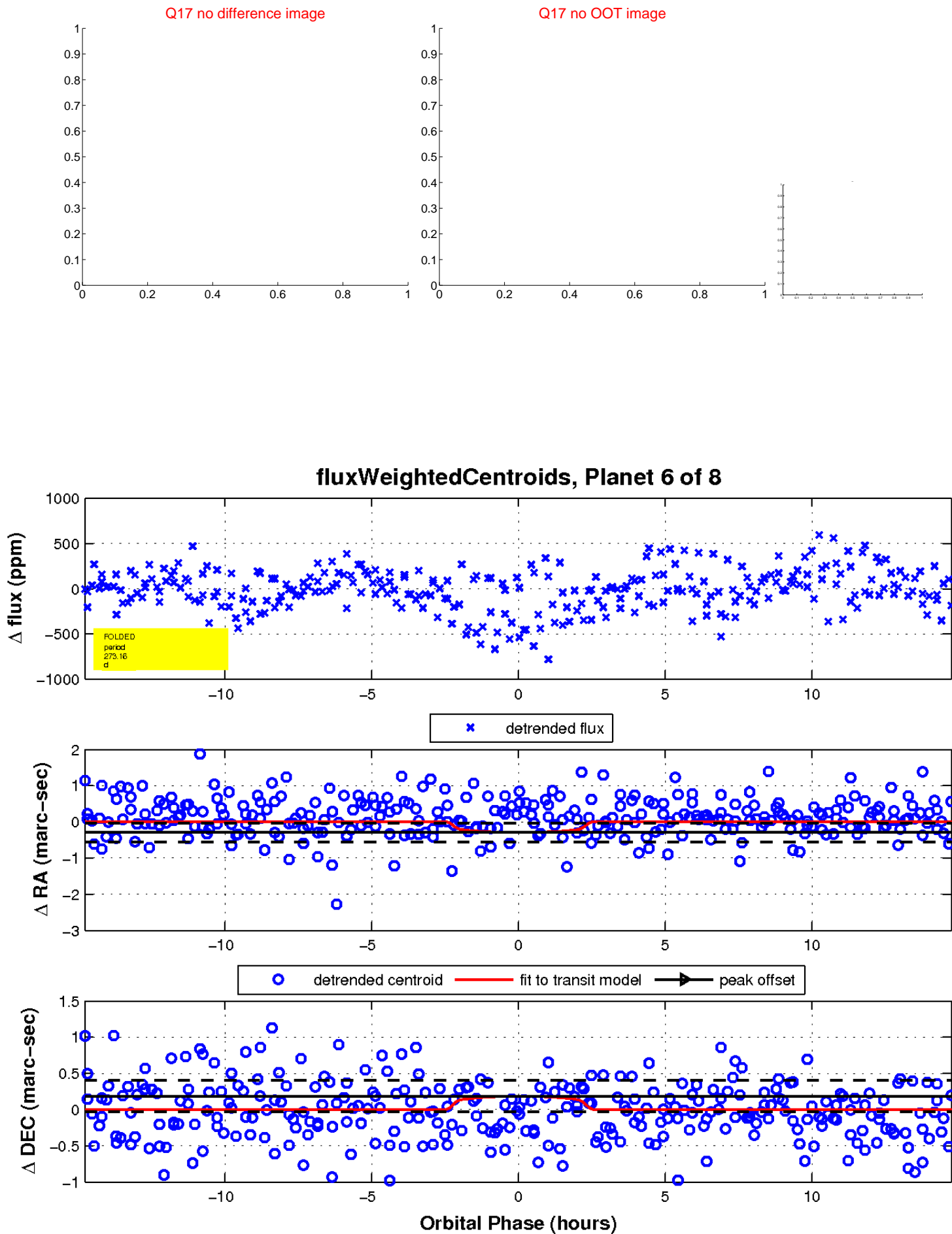
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value



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

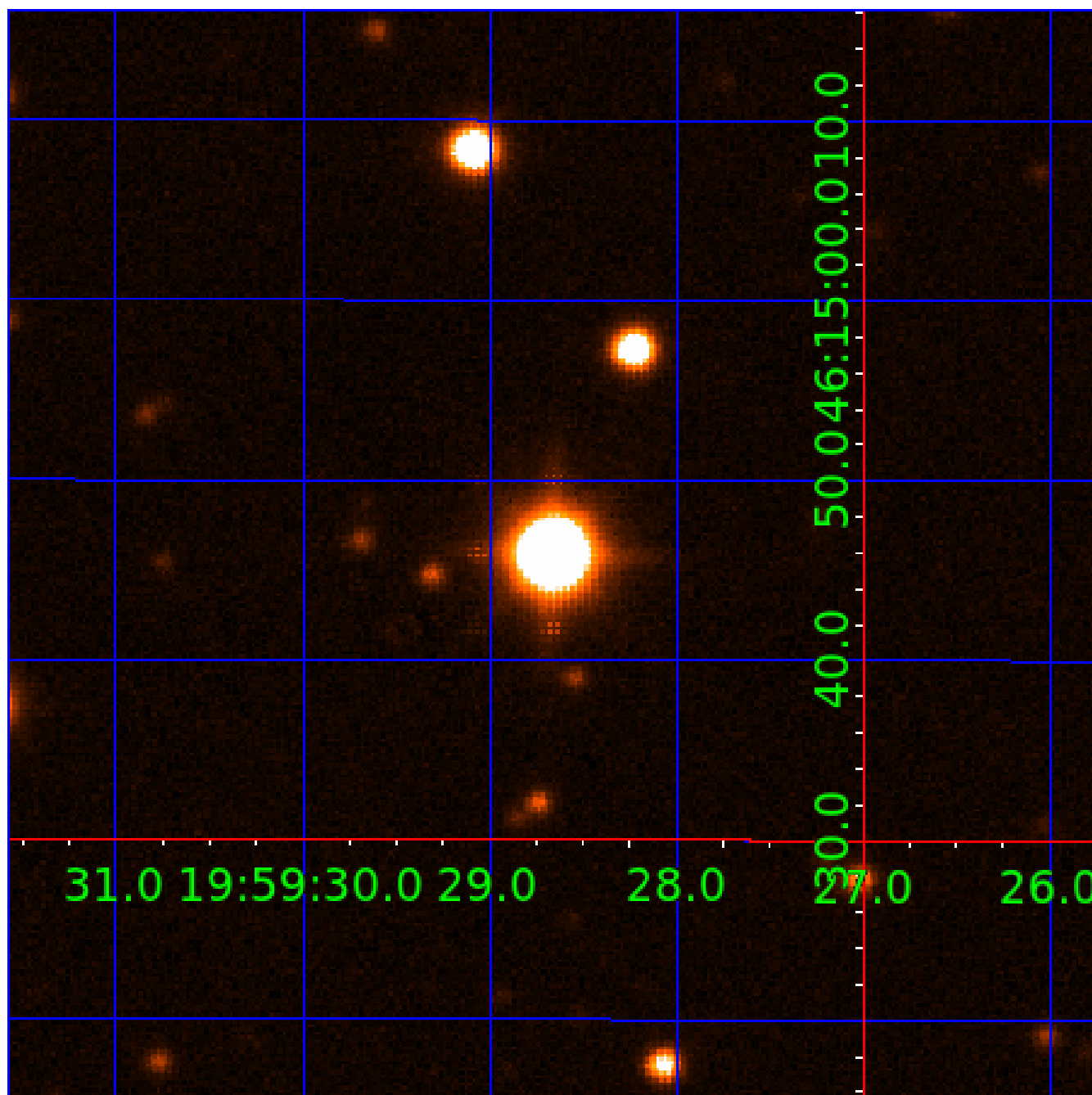


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 009612084

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009612084-01	OBS	No	1.072278	132.559506	29.2	4.632	8.4	8.2	7.09	5095	4.49	0.00
009612084-02	OBS	No	175.465170	258.536516	601.6	2.271	8.3	9.2	7.09	5095	19.07	49.71
009612084-03	OBS	No	202.221958	170.176293	489.3	4.495	8.7	8.4	7.09	5095	18.78	41.14
009612084-04	OBS	No	81.760399	139.458312	302.5	3.181	8.5	8.8	7.09	5095	13.05	137.62
009612084-05	OBS	No	139.808662	242.670574	358.0	6.969	8.1	7.7	7.09	5095	14.89	67.30
009612084-06	OBS	No	273.160085	376.365574	457.8	4.949	7.7	8.1	7.09	5095	17.53	27.55
009612084-07	OBS	No	29.442997	149.385149	210.3	3.733	8.0	8.4	7.09	5095	11.14	537.14
009612084-08	OBS	No	483.641932	300.213871	109.9	6.000	7.6	-1.0	7.09	5095	7.24	12.86

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009612084-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
009612084-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT
009612084-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES—TRANS_GAPPED—MOD_NONUNIQ_ALT
009612084-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
009612084-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS
009612084-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
009612084-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_ZUMA—TRANS_GAPPED—MOD_NONUNIQ_ALT
009612084-08	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—CENT_NOFITS—HALO_GHOST

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

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

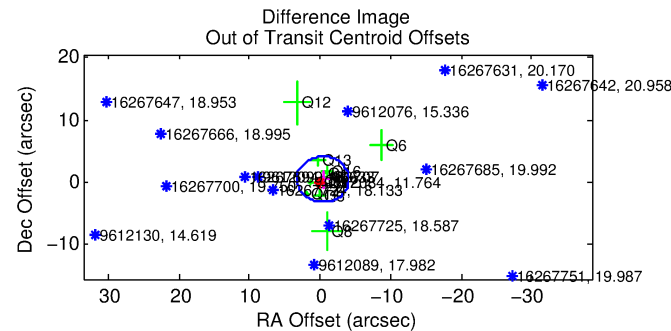
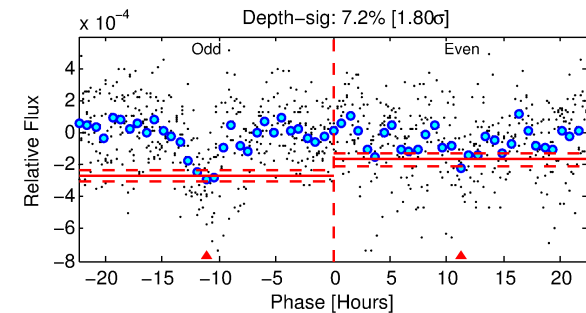
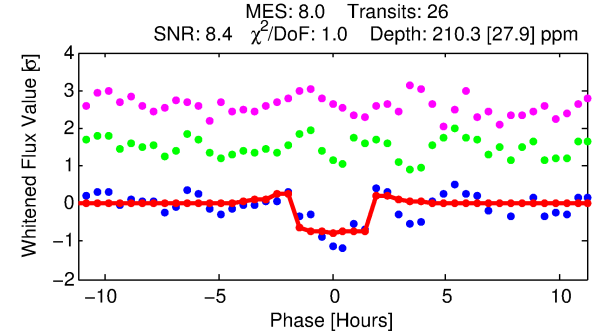
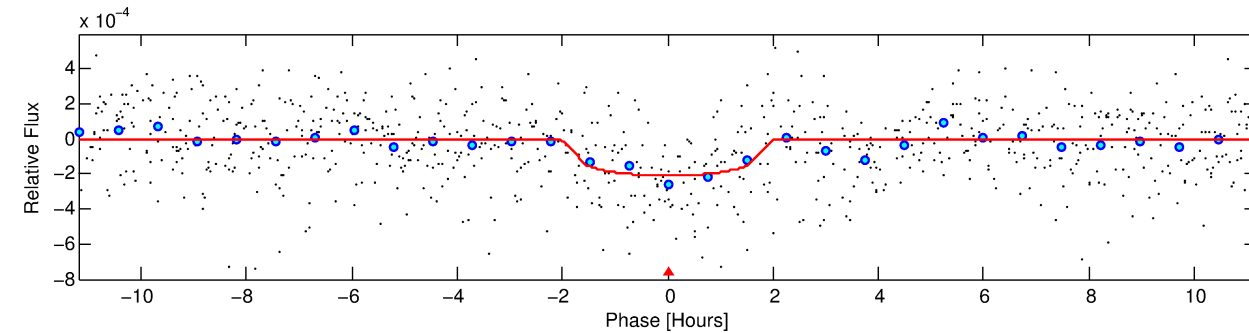
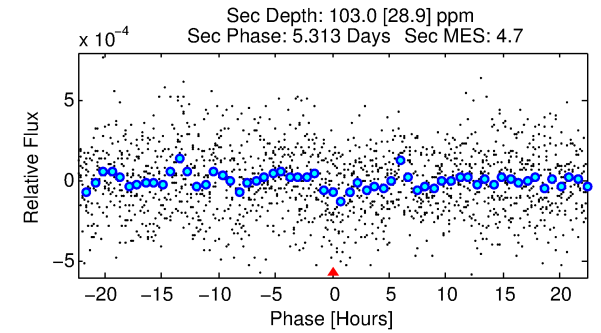
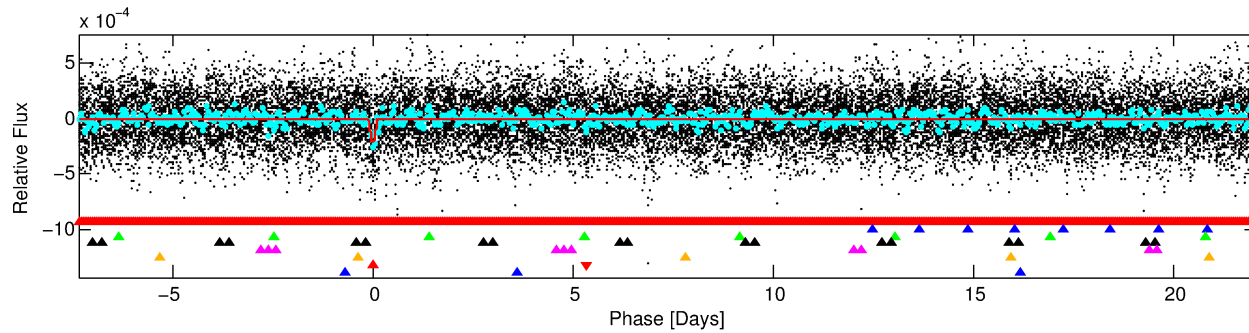
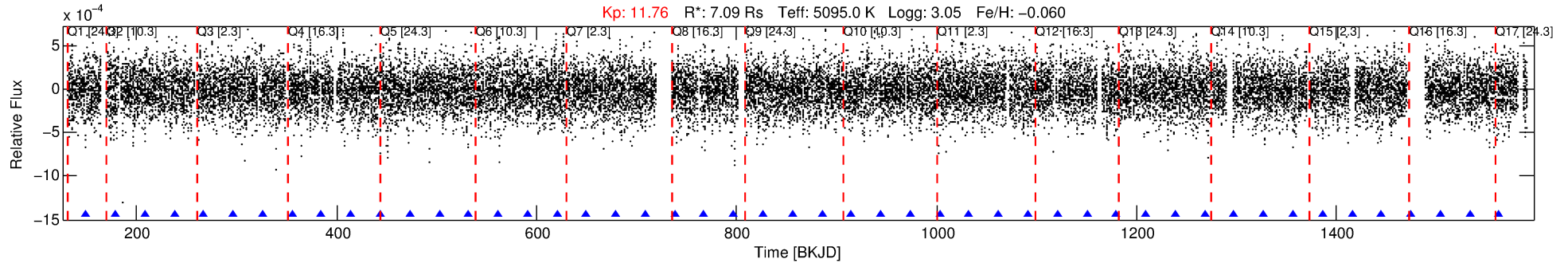
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 009612084-07

No Significant Match Found

# DV One-Page Summary

KIC: 9612084 Candidate: 7 of 8 Period: 29.443 d



## DV Fit Results:

Period = 29.44300 [0.00023] d  
Epoch = 149.3851 [0.0059] BKJD  
Rp/R\* = 0.0144 [0.0109]  
a/R\* = 42.00 [119.59]  
b = 0.74 [1.80]  
Seff = 537.14 [215.79]  
Teq = 1228 [123] K  
Rp = 11.14 [9.40] Re  
a = 0.2378 [0.0694] AU  
Ag = 25.82 [40.95] [0.61σ]  
Teffp = 4278 [1647] K [1.85σ]

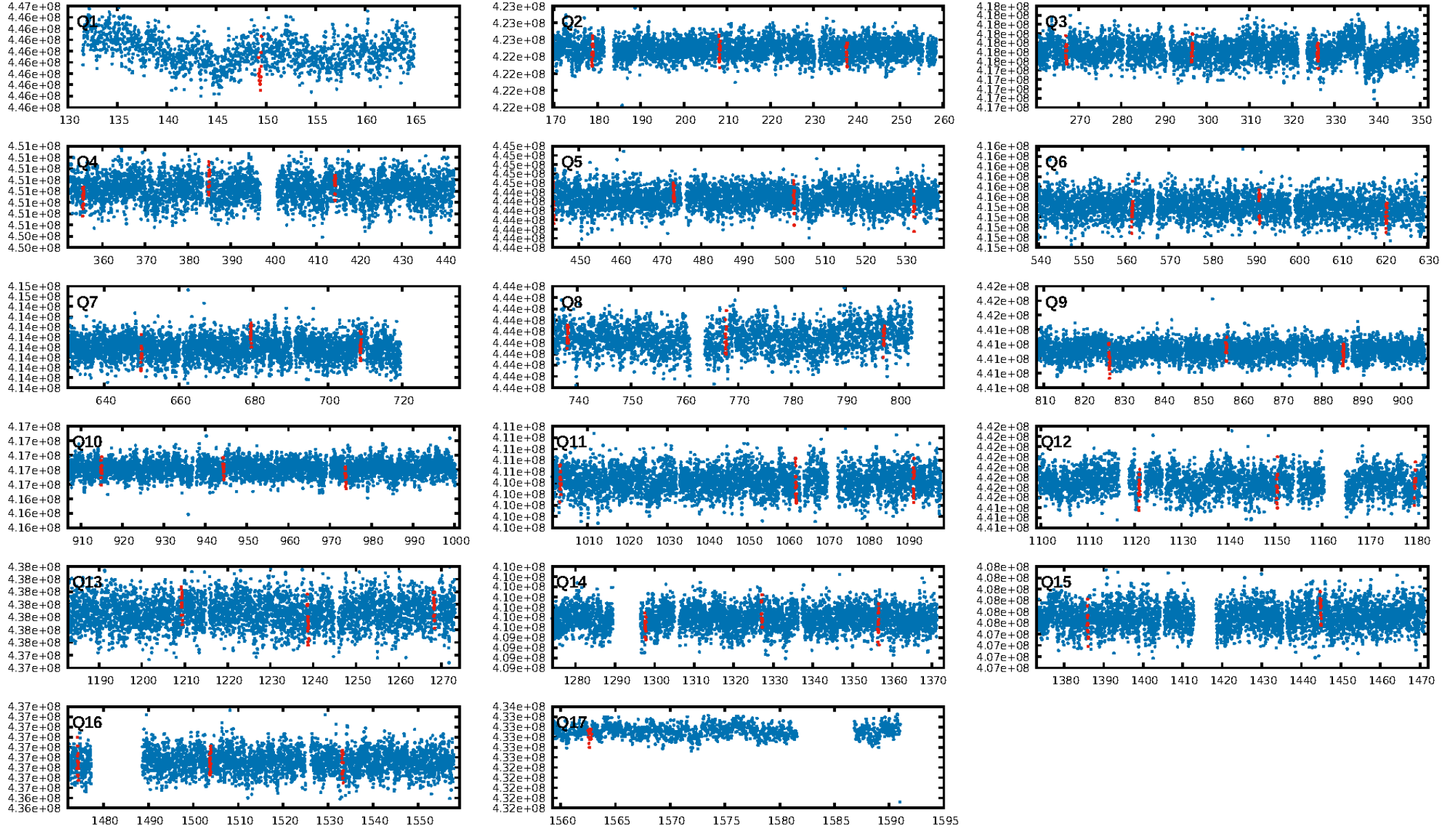
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [114.45σ]  
LongPeriod-sig: 100.0% [256.02σ]  
ModelChiSquare2-sig: 30.2%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [24/24]  
GhostDiagnostic-chr: 0.8347  
Centroid-sig: 6.1%  
Centroid-so: 0.423 arcsec [1.24σ]  
OotOffset-rm: 0.622 arcsec [0.51σ]  
KicOffset-rm: 0.606 arcsec [0.54σ]  
OotOffset-st: 4/1/3/4 [12]  
KicOffset-st: 4/1/3/4 [12]  
DiffImageQuality-fgm: 0.58 [7/12]  
DiffImageOverlap-fno: 0.18 [3/17]

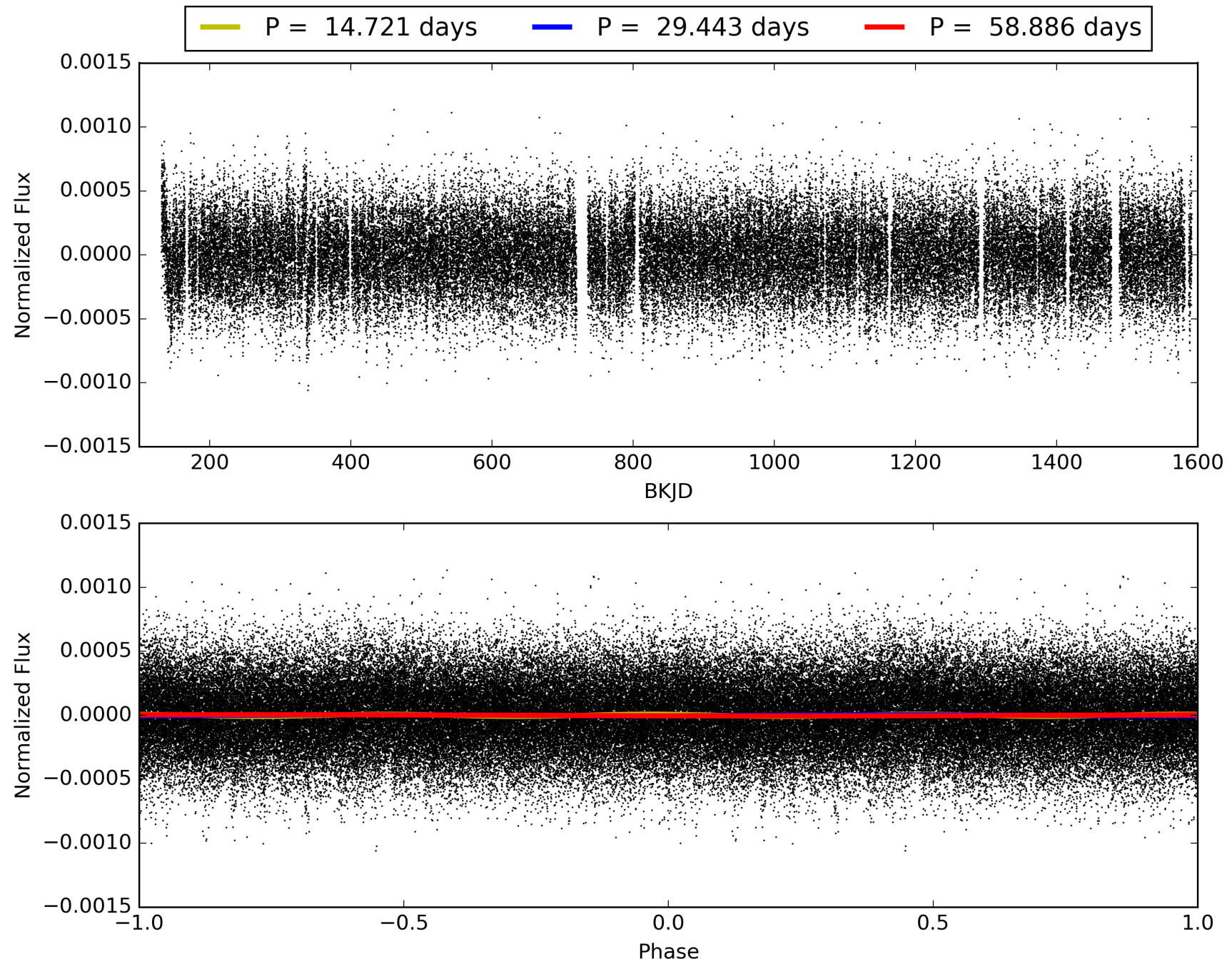
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 13:21:31 Z

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

# TCE 009612084-07, PDC Light Curves

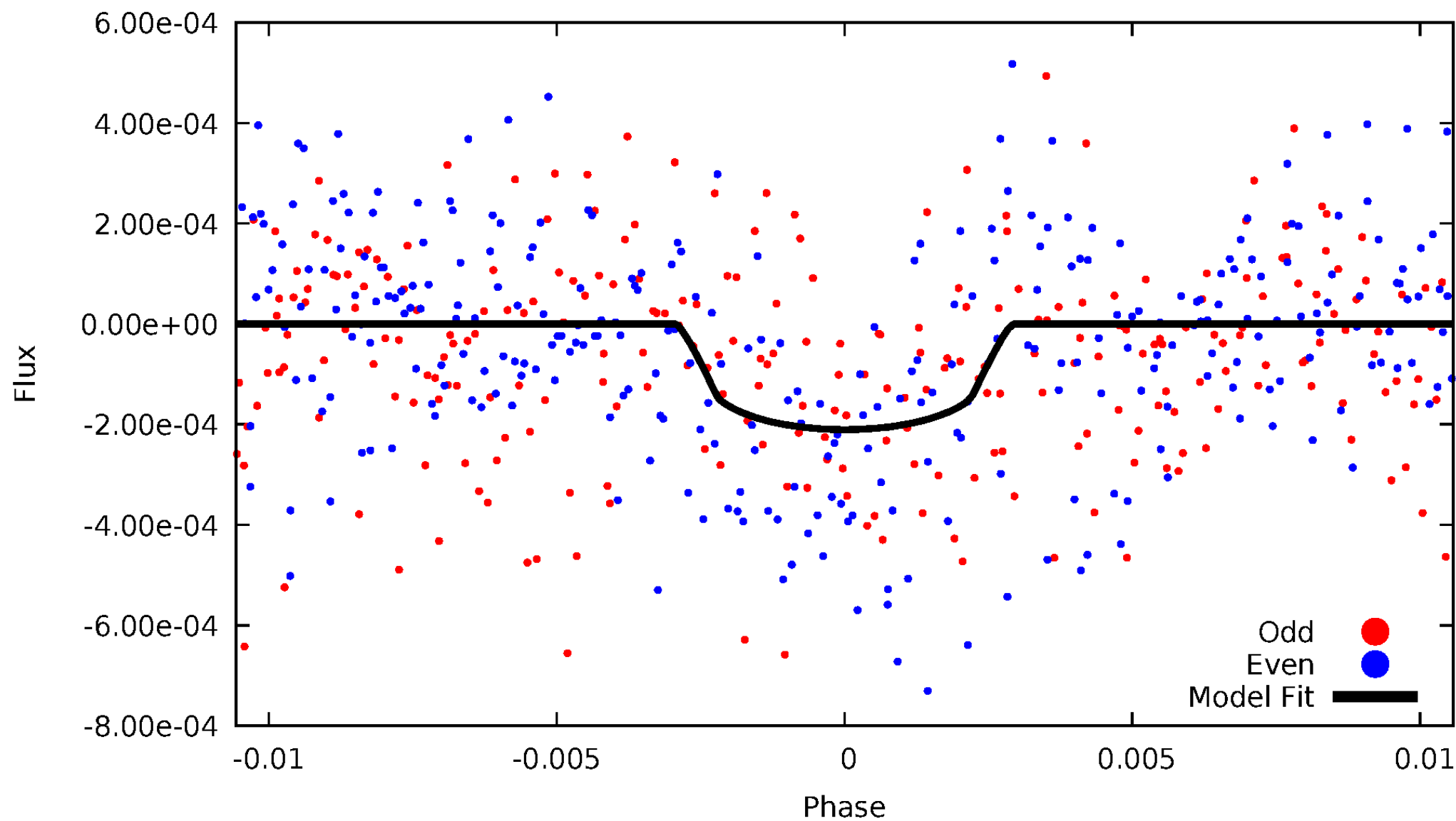


TCE 009612084-07



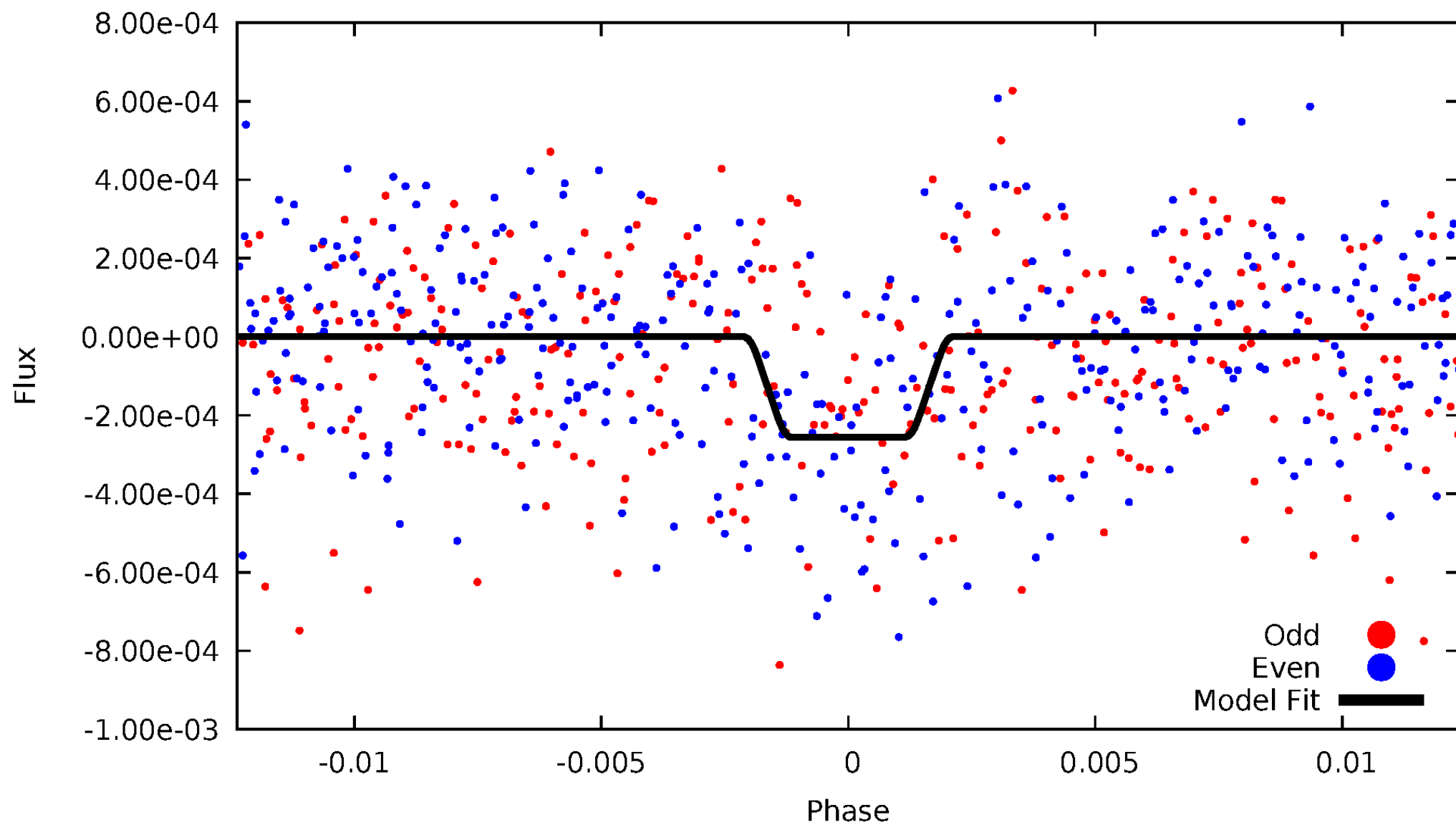
# DV Odd/Even

TCE 009612084-07



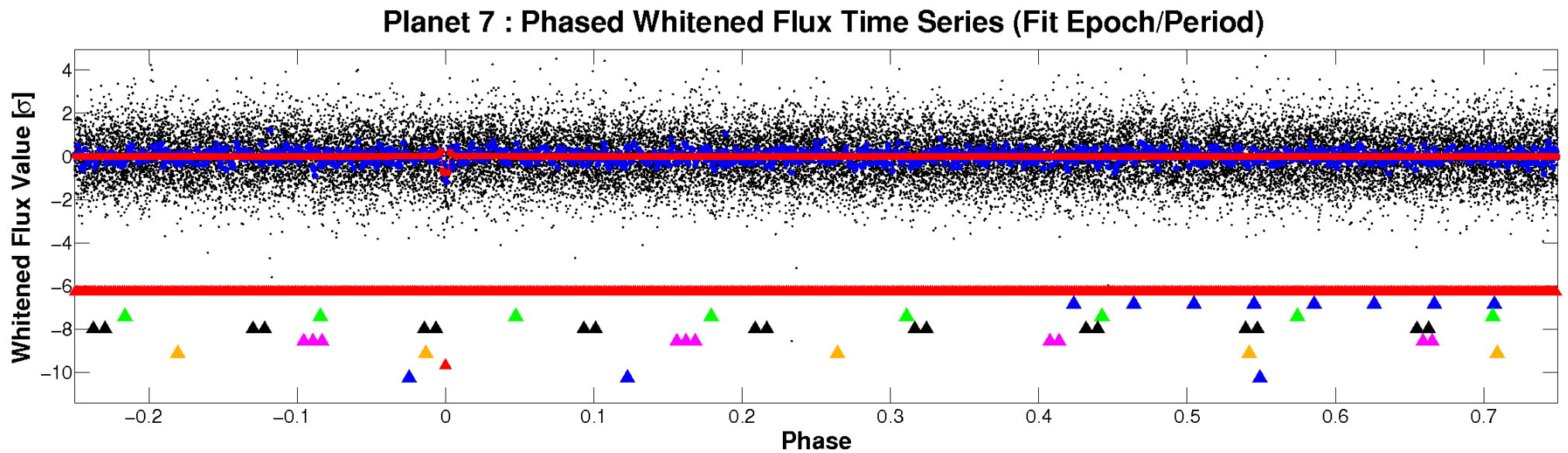
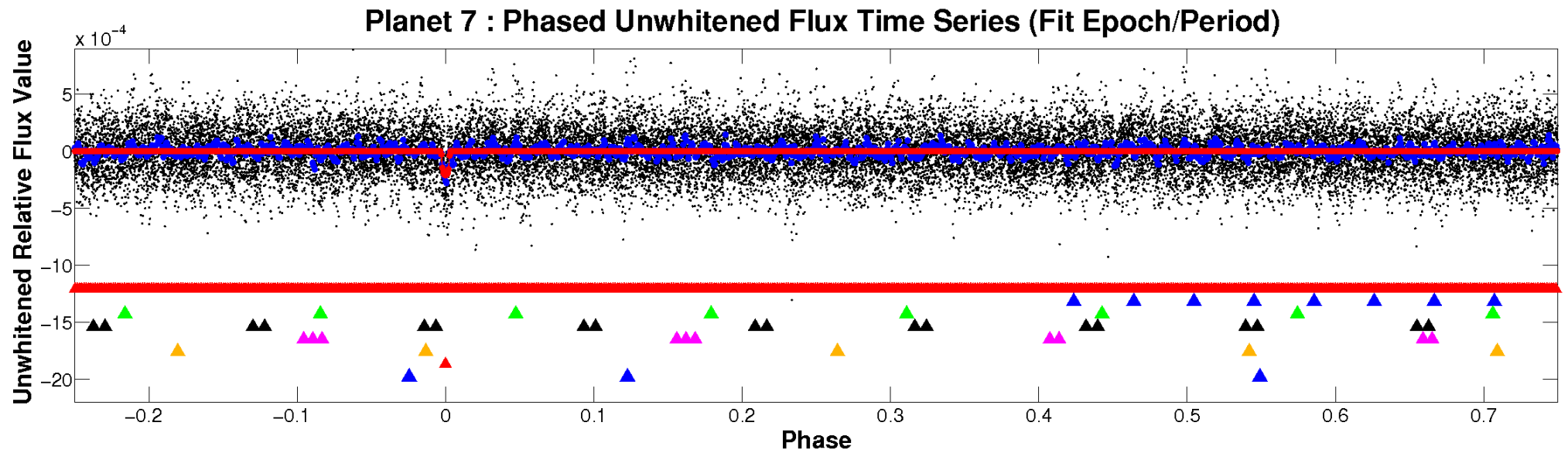
# ALT Odd/Even

TCE 009612084-07



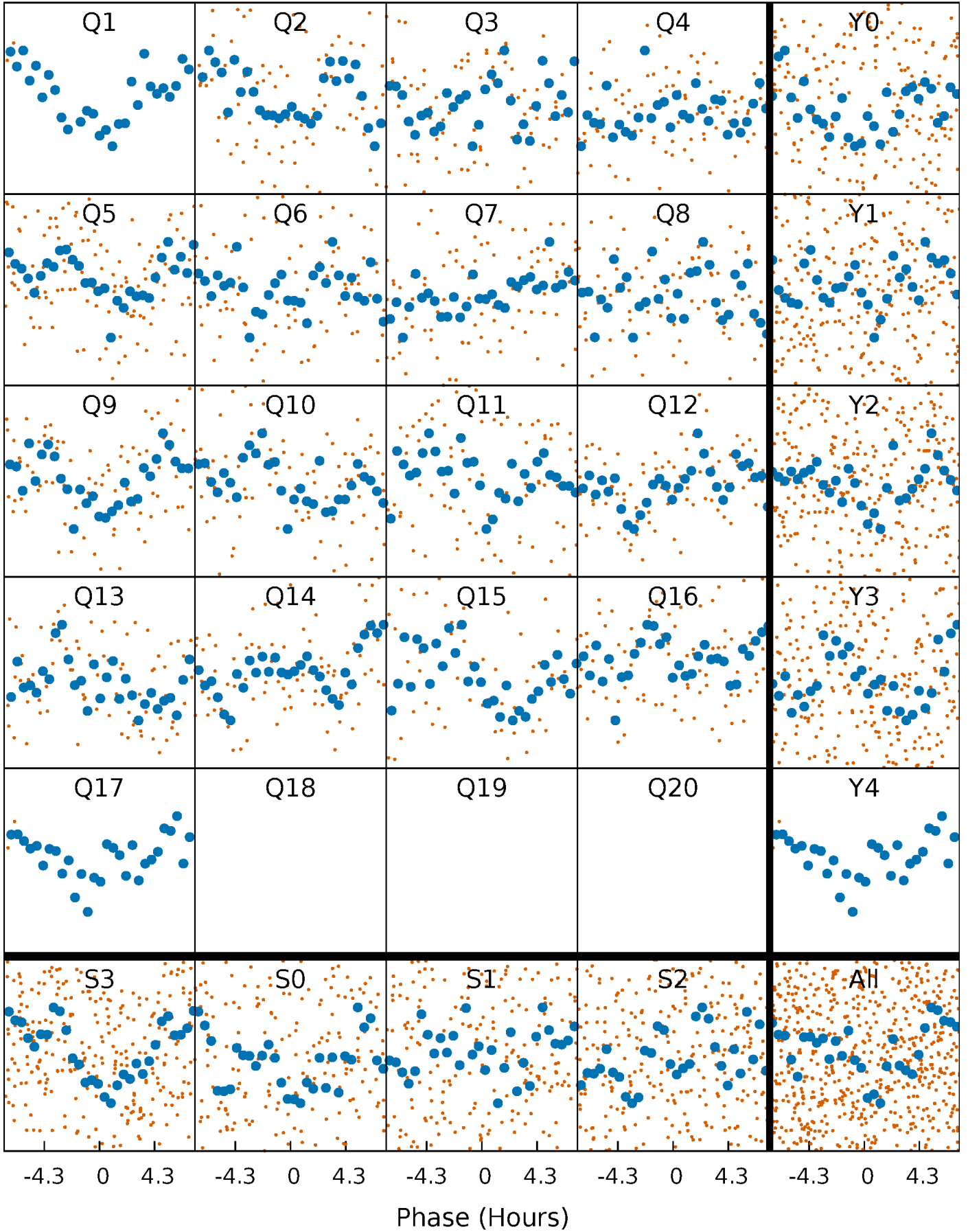


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

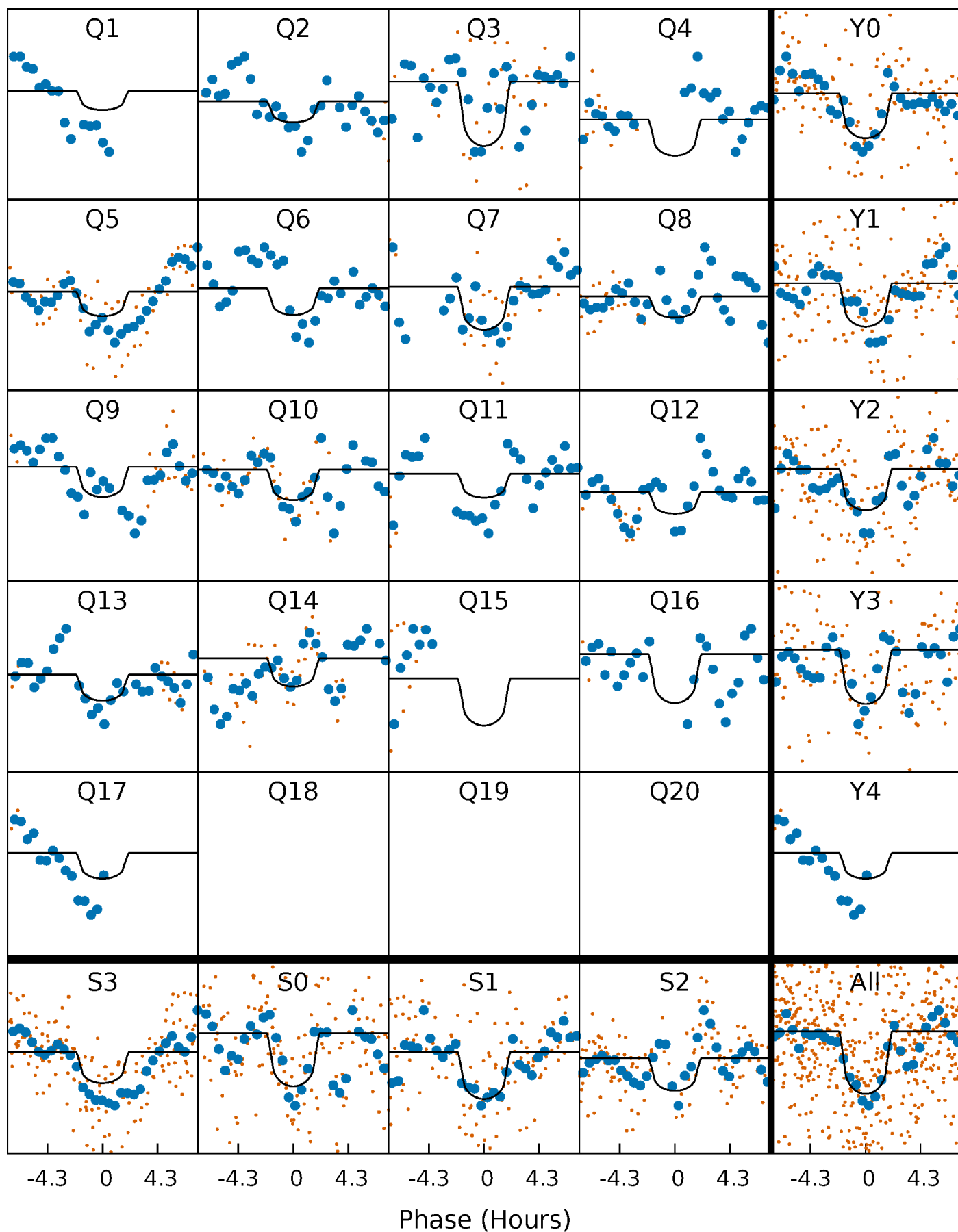
TCE 009612084-07   P= 29.442997 Days    $T_0=149.385149$  (BKJD)





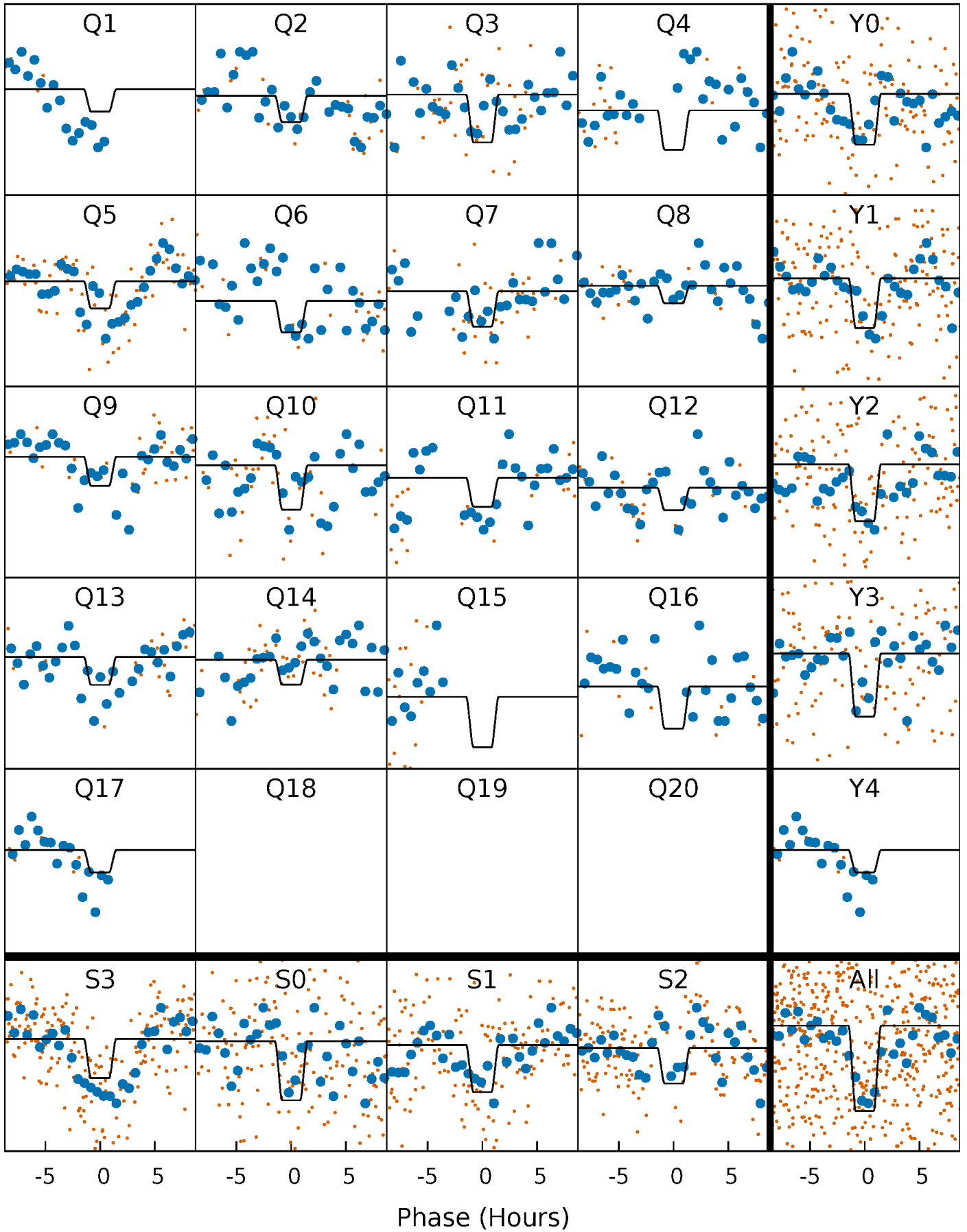
# DV Quarter-Phased Transit Curves

TCE 009612084-07   P= 29.442997 Days    $T_0=149.385149$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

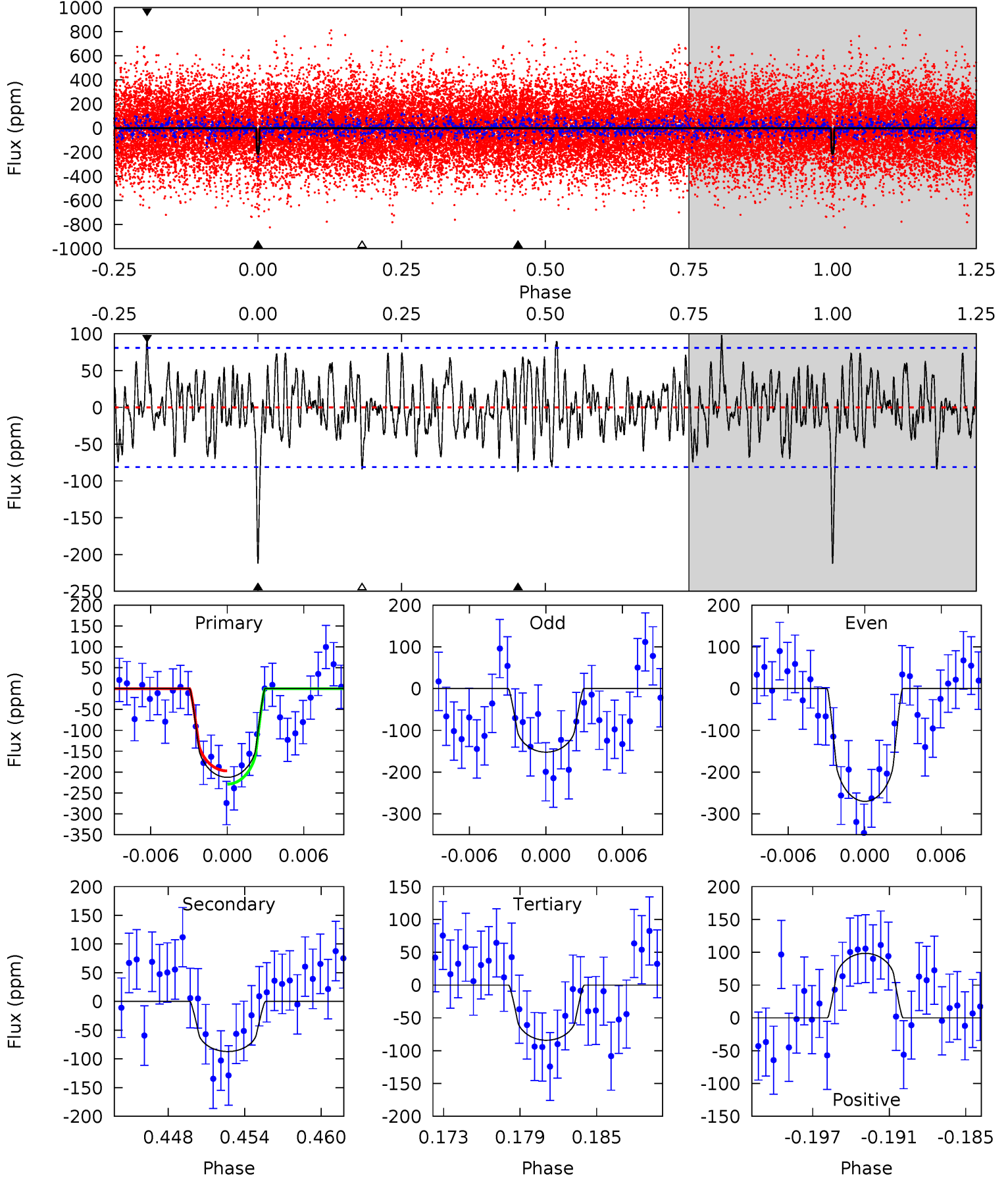
TCE 009612084-07     $P = 29.442339$  Days     $T_0 = 149.404119$  (BKJD)



# DV Model-Shift Uniqueness Test

009612084-07, P = 29.442997 Days, E = 119.942152 Days

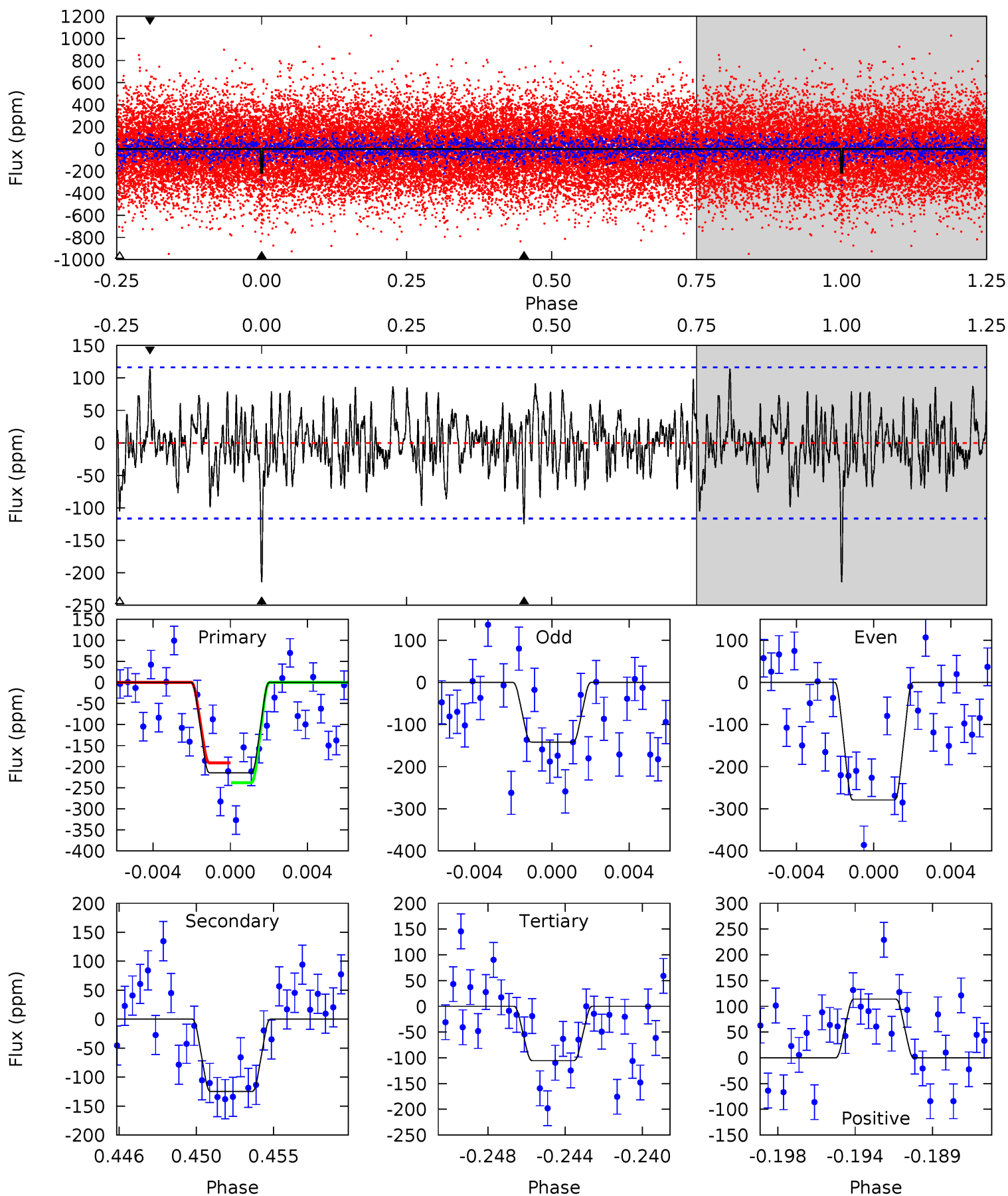
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.4	5.51	5.32	6.22	5.12	2.75	1.97	8.13	7.22	0.20	-0.70	3.73	0.96	0.32	1.01



# Alt Model-Shift Uniqueness Test

009612084-07, P = 29.442339 Days, E = 119.961780 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
9.55	5.56	4.70	5.08	5.19	2.86	1.52	4.85	4.47	0.86	0.48	3.06	1.21	0.35	1.05



### Stellar Parameters For KIC 009612084

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5095^{+45}_{-121}$	$3.052^{+0.195}_{-0.105}$	$-0.060^{+0.100}_{-0.250}$	$7.094^{+1.066}_{-2.666}$	$2.070^{+0.533}_{-0.799}$	$0.008^{+0.011}_{-0.003}$
	+1%/-2%	+6%/-3%	+167%/-417%	+15%/-38%	+26%/-39%	+136%/-31%
Source	SPE74	SPE74	SPE74	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology  
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

### Secondary Eclipse Parameters for KIC 009612084-07 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-87 \pm 16$	$11.54^{+8.12}_{-6.43}$	$1703^{+78}_{-111}$	$4178^{+1620}_{-740}$	$21^{+80}_{-14}$
Alt.	$-125 \pm 22$	$12.65^{+8.70}_{-7.00}$	$1694^{+79}_{-108}$	$4278^{+1682}_{-703}$	$24^{+87}_{-16}$

$T_{\text{max}}$  = 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

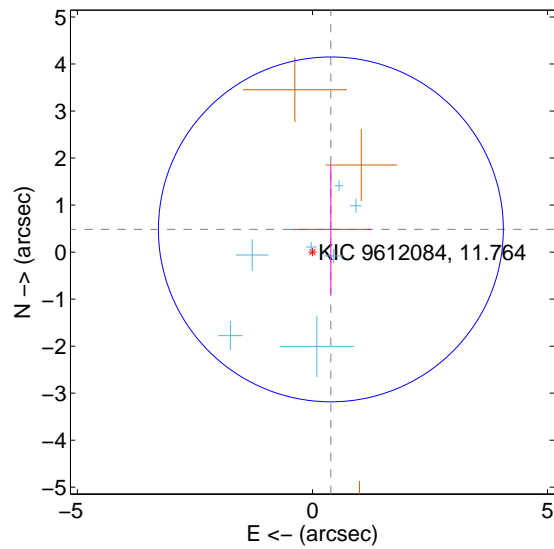
Supplemental centroid analysis for 009612084-07. **Kepler magnitude: 11.76.** Transit SNR 8.40

There are 7 quarters with good PRF difference image offsets

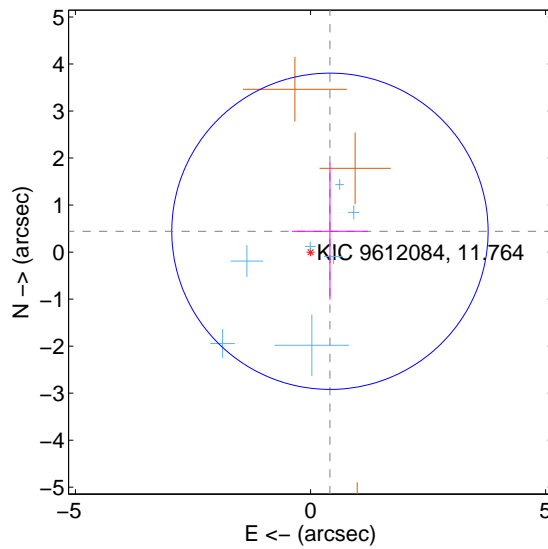
The direct PRF centroid is offset from the target star catalog position by about 0.04 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.622 \pm 1.222$	0.51	$-0.392 \pm 0.854$	$0.483 \pm 1.375$
PRF-fit source offset from KIC position	$0.606 \pm 1.121$	0.54	$-0.413 \pm 0.806$	$0.443 \pm 1.452$
photometric centroid source offset	$0.42 \pm 0.34$	1.24	$-0.27 \pm 0.38$	$-0.33 \pm 0.31$

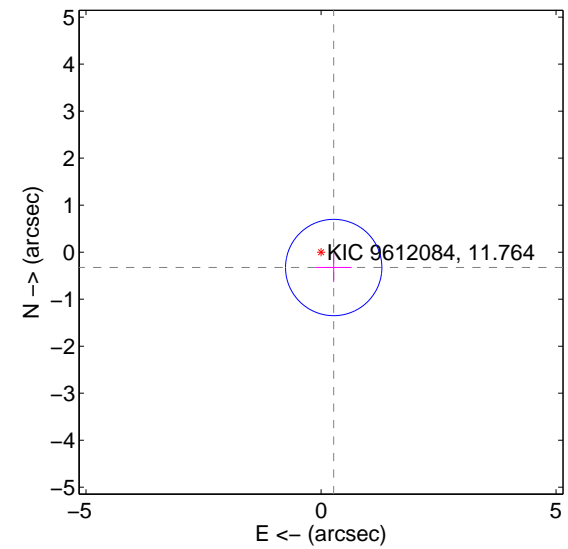
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

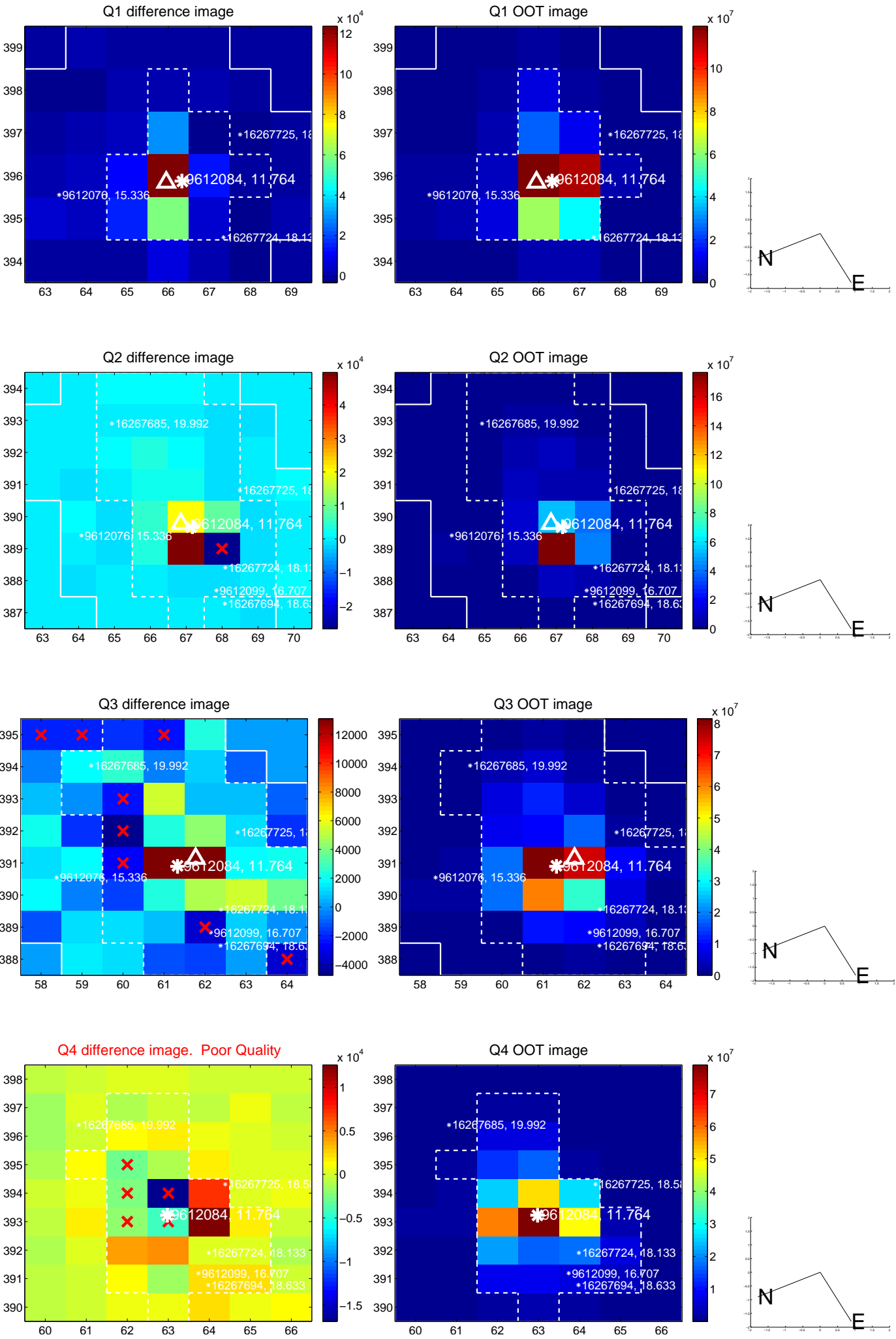


offset from photometric centroids

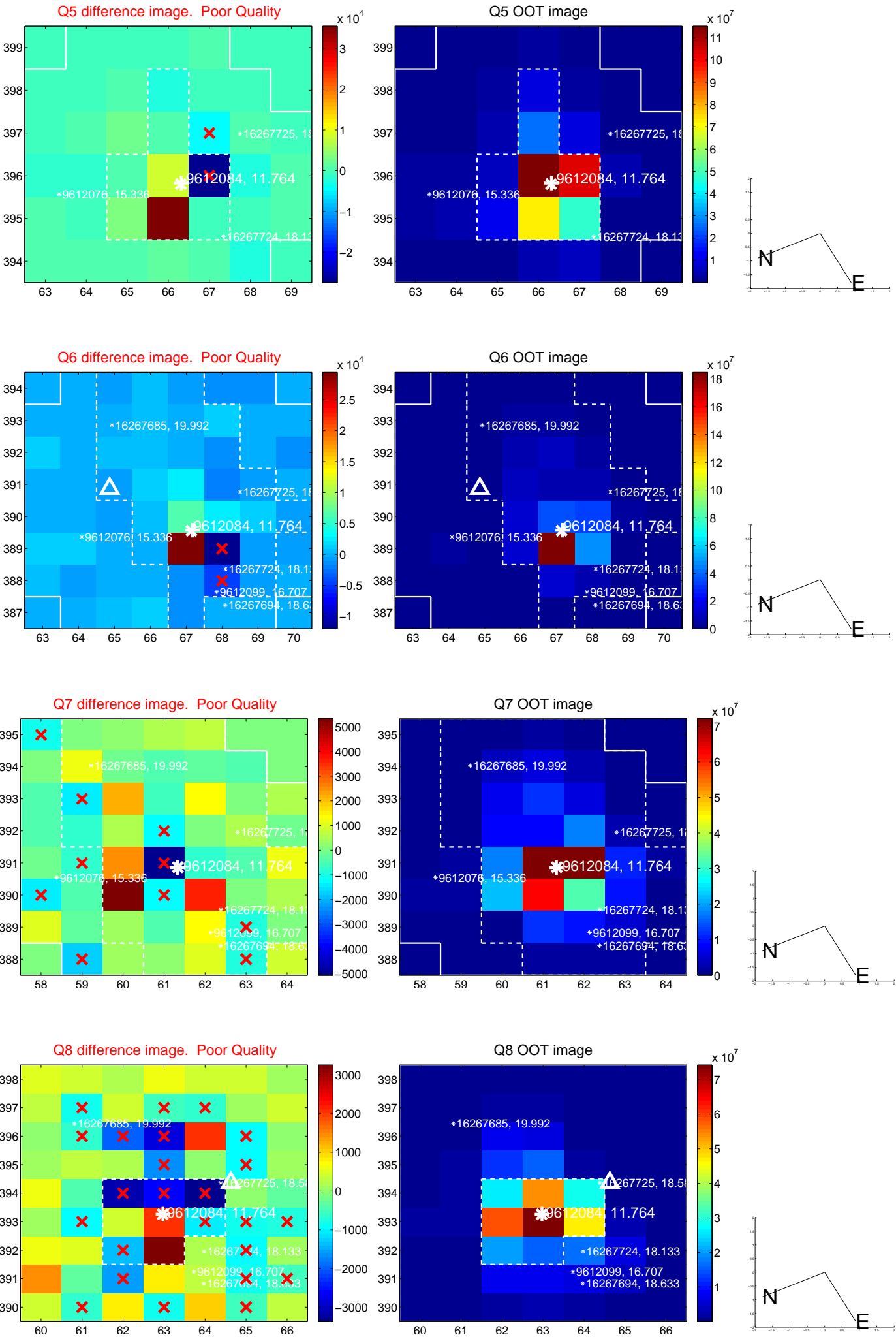


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

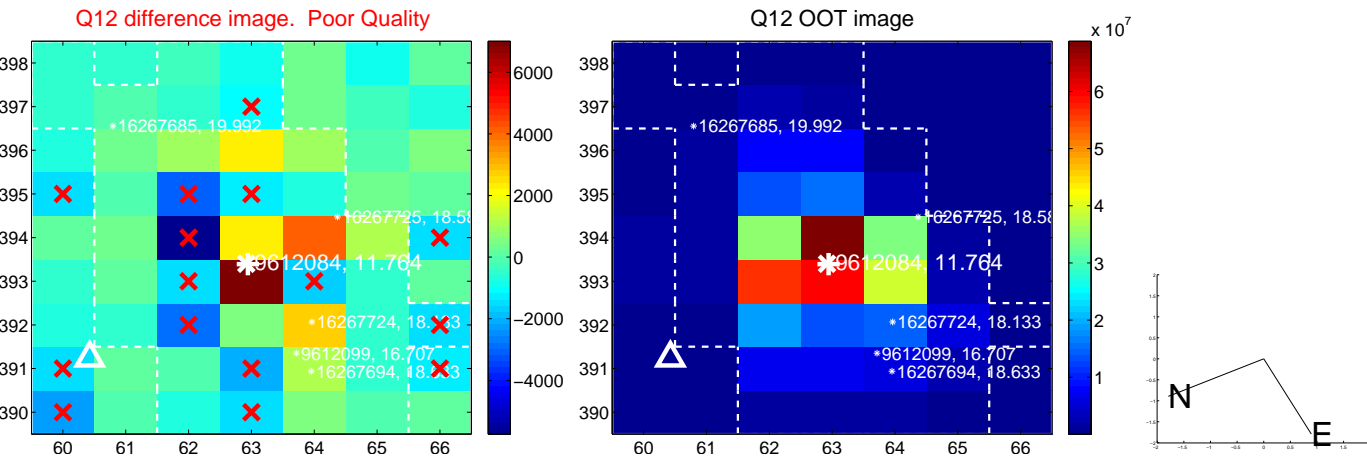
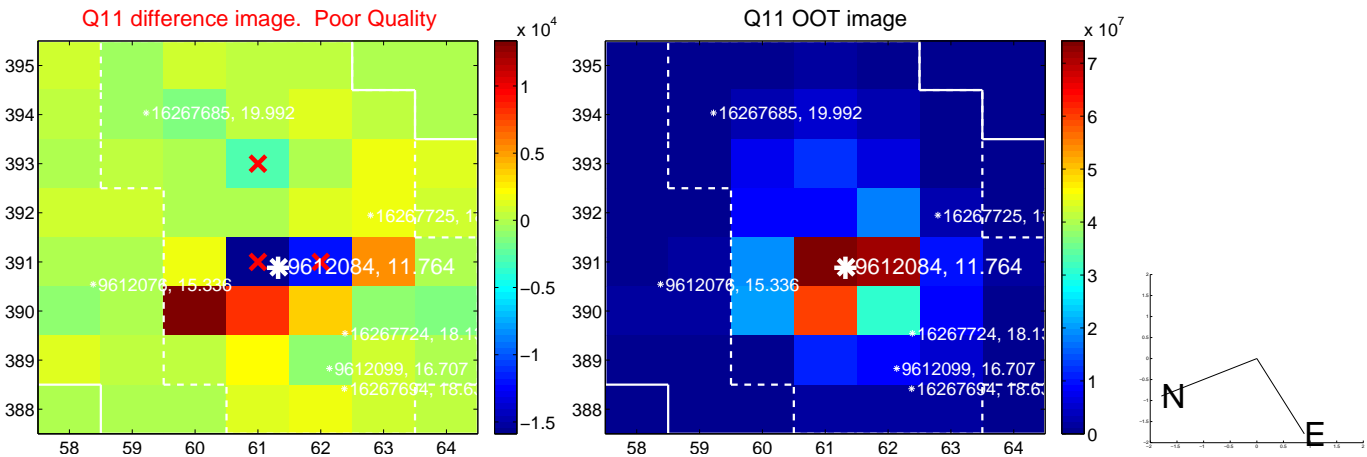
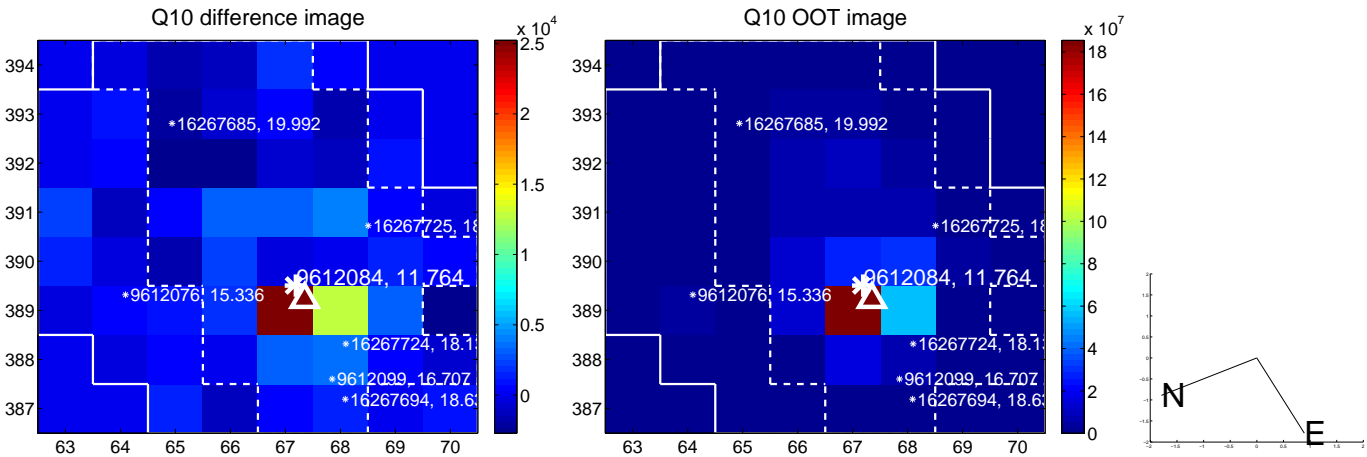
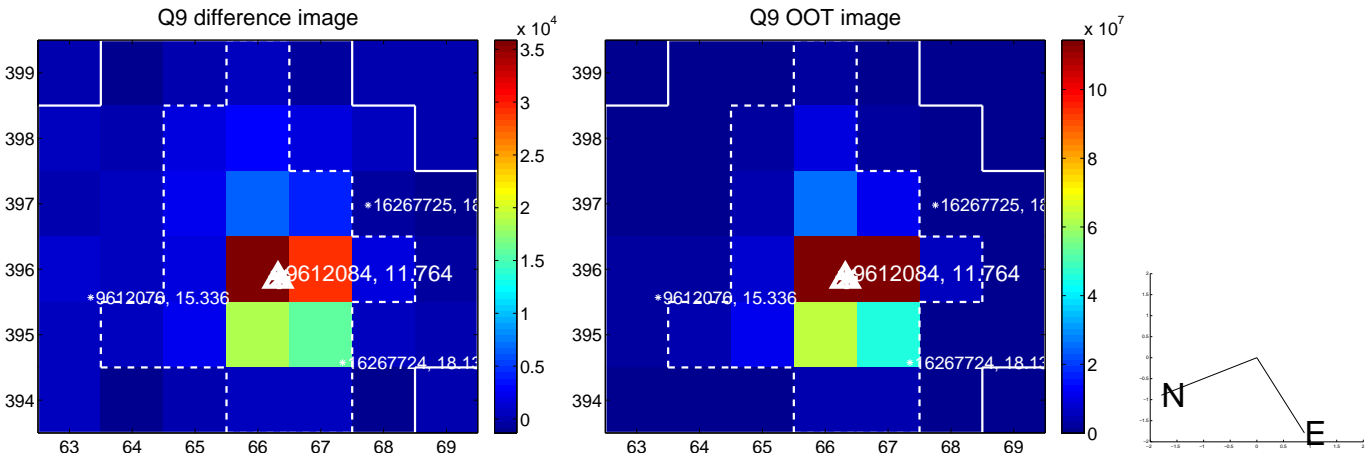


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

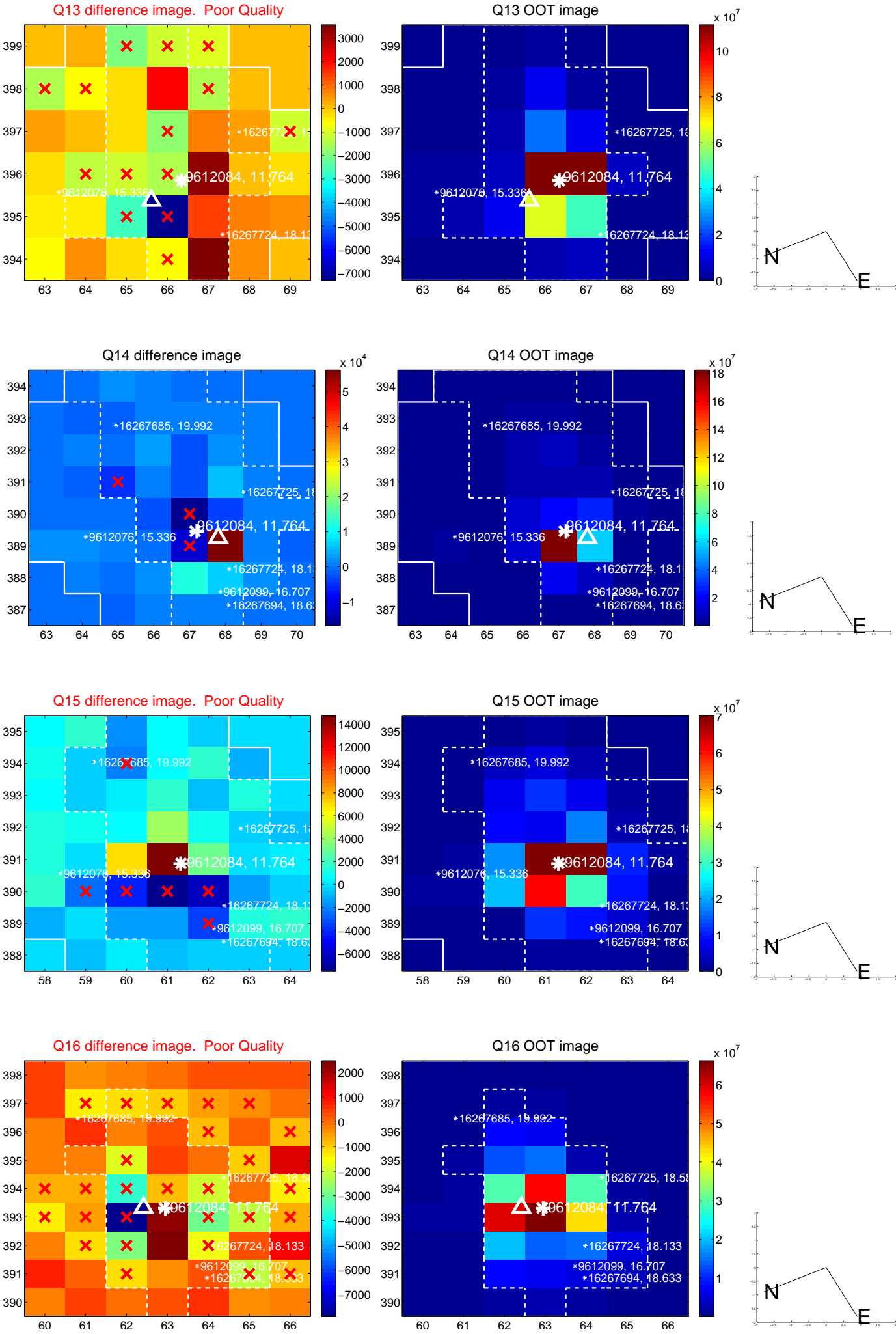




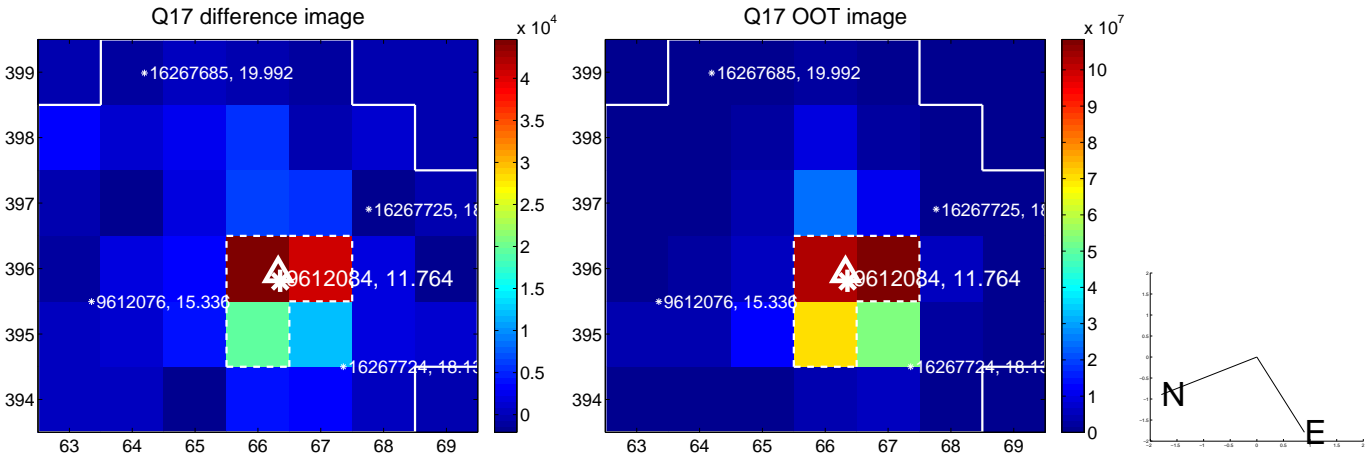
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



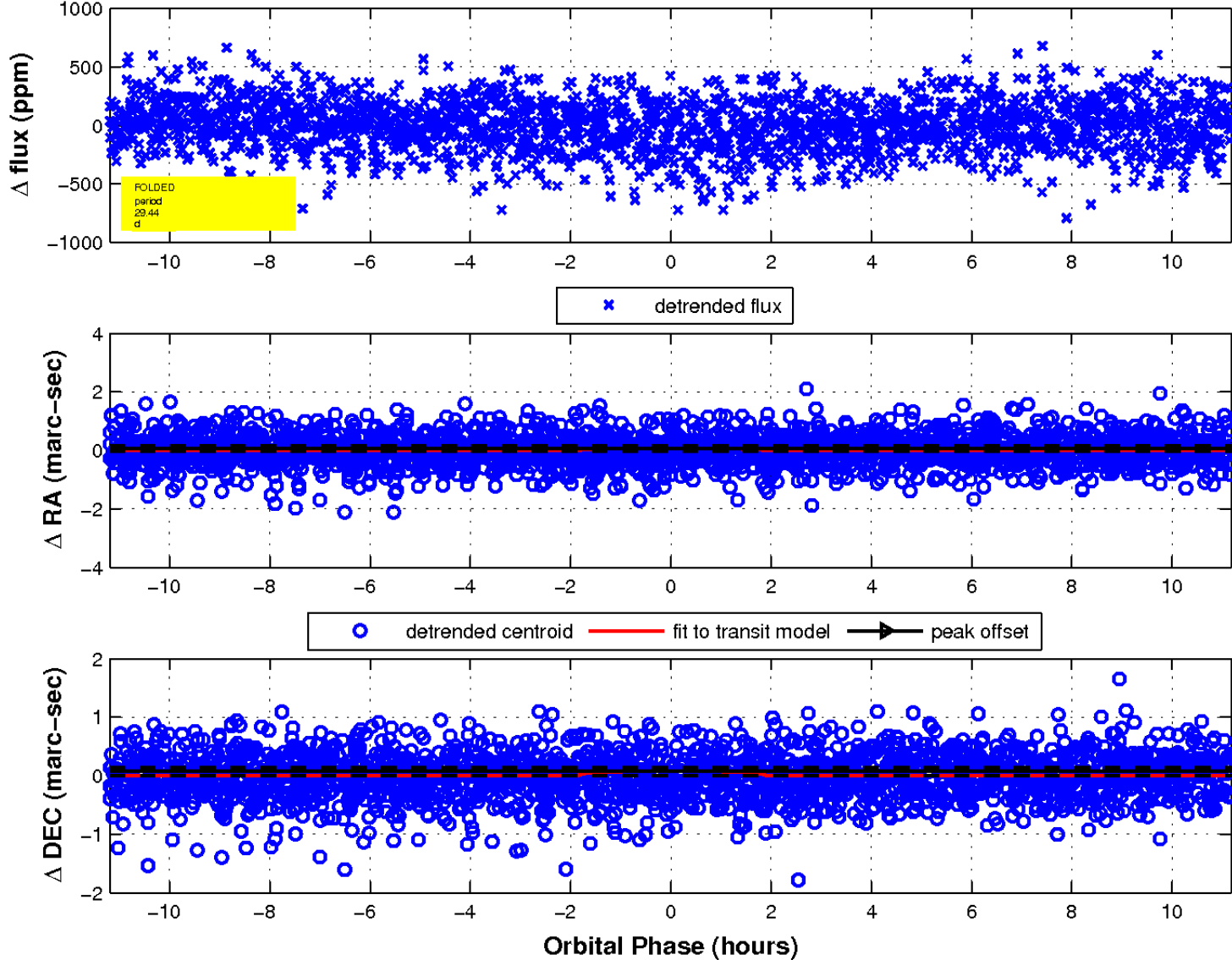
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

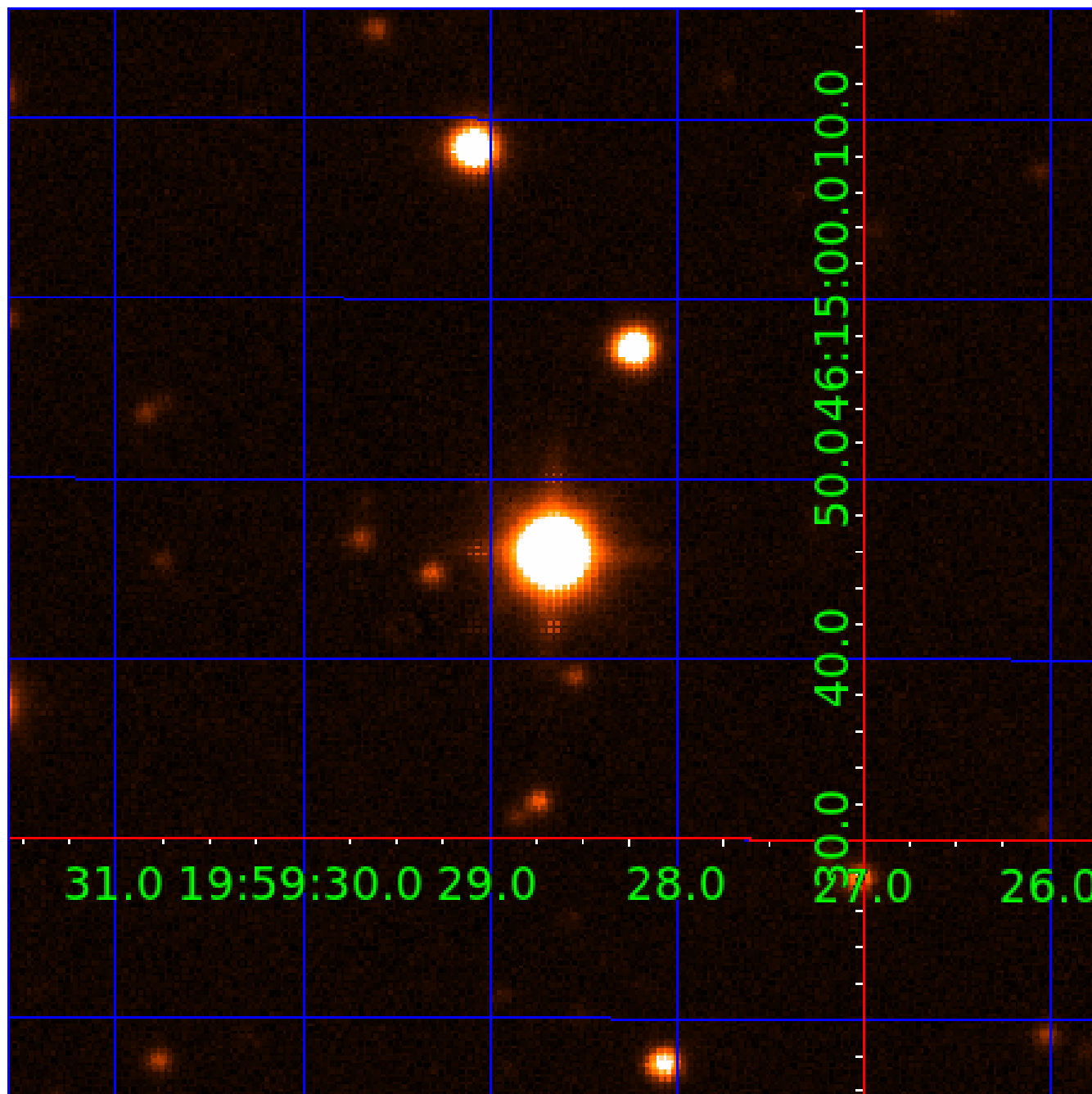


fluxWeightedCentroids, Planet 7 of 8



UKIRT Image

Declination



# KIC 009612084

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009612084-01	OBS	No	1.072278	132.559506	29.2	4.632	8.4	8.2	7.09	5095	4.49	0.00
009612084-02	OBS	No	175.465170	258.536516	601.6	2.271	8.3	9.2	7.09	5095	19.07	49.71
009612084-03	OBS	No	202.221958	170.176293	489.3	4.495	8.7	8.4	7.09	5095	18.78	41.14
009612084-04	OBS	No	81.760399	139.458312	302.5	3.181	8.5	8.8	7.09	5095	13.05	137.62
009612084-05	OBS	No	139.808662	242.670574	358.0	6.969	8.1	7.7	7.09	5095	14.89	67.30
009612084-06	OBS	No	273.160085	376.365574	457.8	4.949	7.7	8.1	7.09	5095	17.53	27.55
009612084-07	OBS	No	29.442997	149.385149	210.3	3.733	8.0	8.4	7.09	5095	11.14	537.14
009612084-08	OBS	No	483.641932	300.213871	109.9	6.000	7.6	-1.0	7.09	5095	7.24	12.86

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009612084-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
009612084-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT
009612084-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES—TRANS_GAPPED—MOD_NONUNIQ_ALT
009612084-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
009612084-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS
009612084-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
009612084-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_ZUMA—TRANS_GAPPED—MOD_NONUNIQ_ALT
009612084-08	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—CENT_NOFITS—HALO_GHOST

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

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

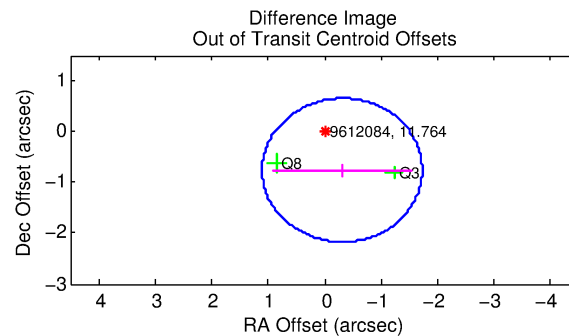
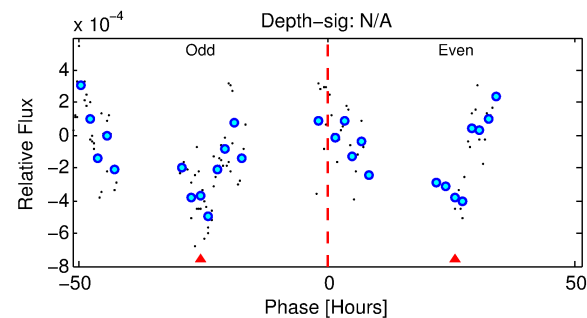
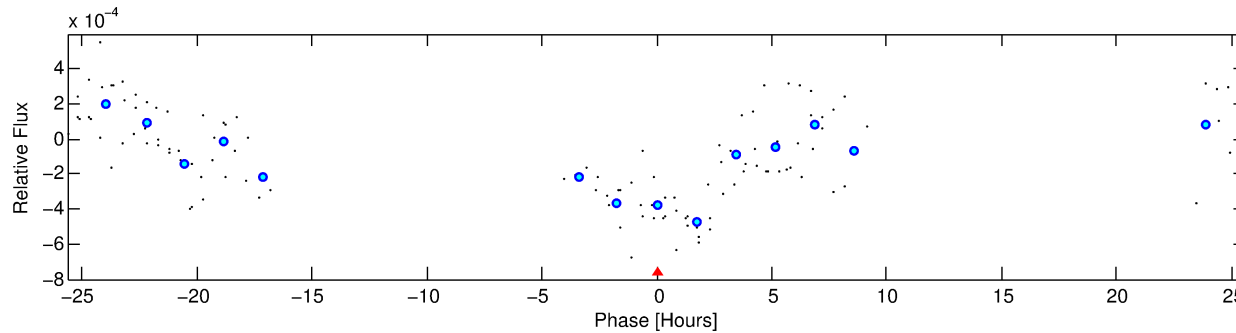
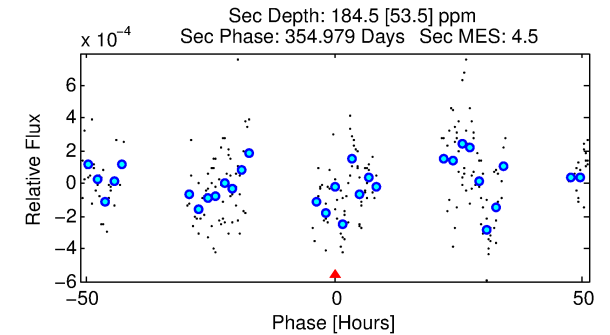
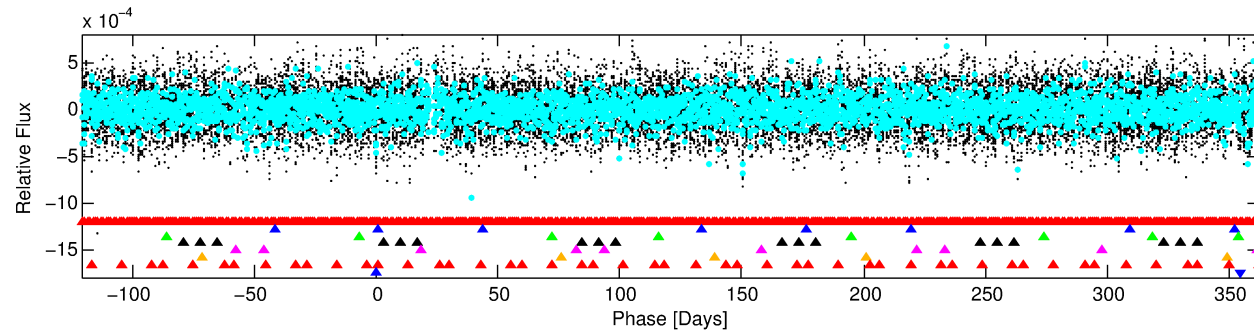
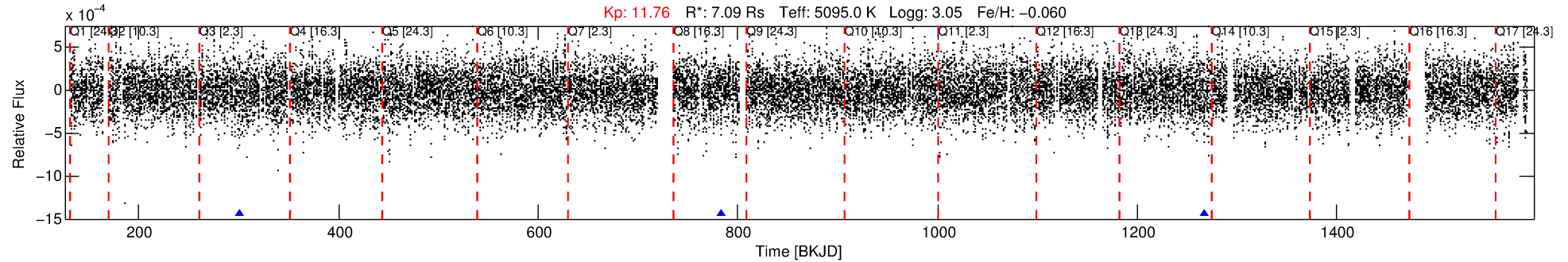
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 009612084-08

No Significant Match Found

# DV One-Page Summary

KIC: 9612084 Candidate: 8 of 8 Period: 483.642 d



## TPS TCE Results:

Period = 483.64193 d  
Epoch = 300.2139 BKJD

DV fit results are unavailable

## DV Diagnostic Results:

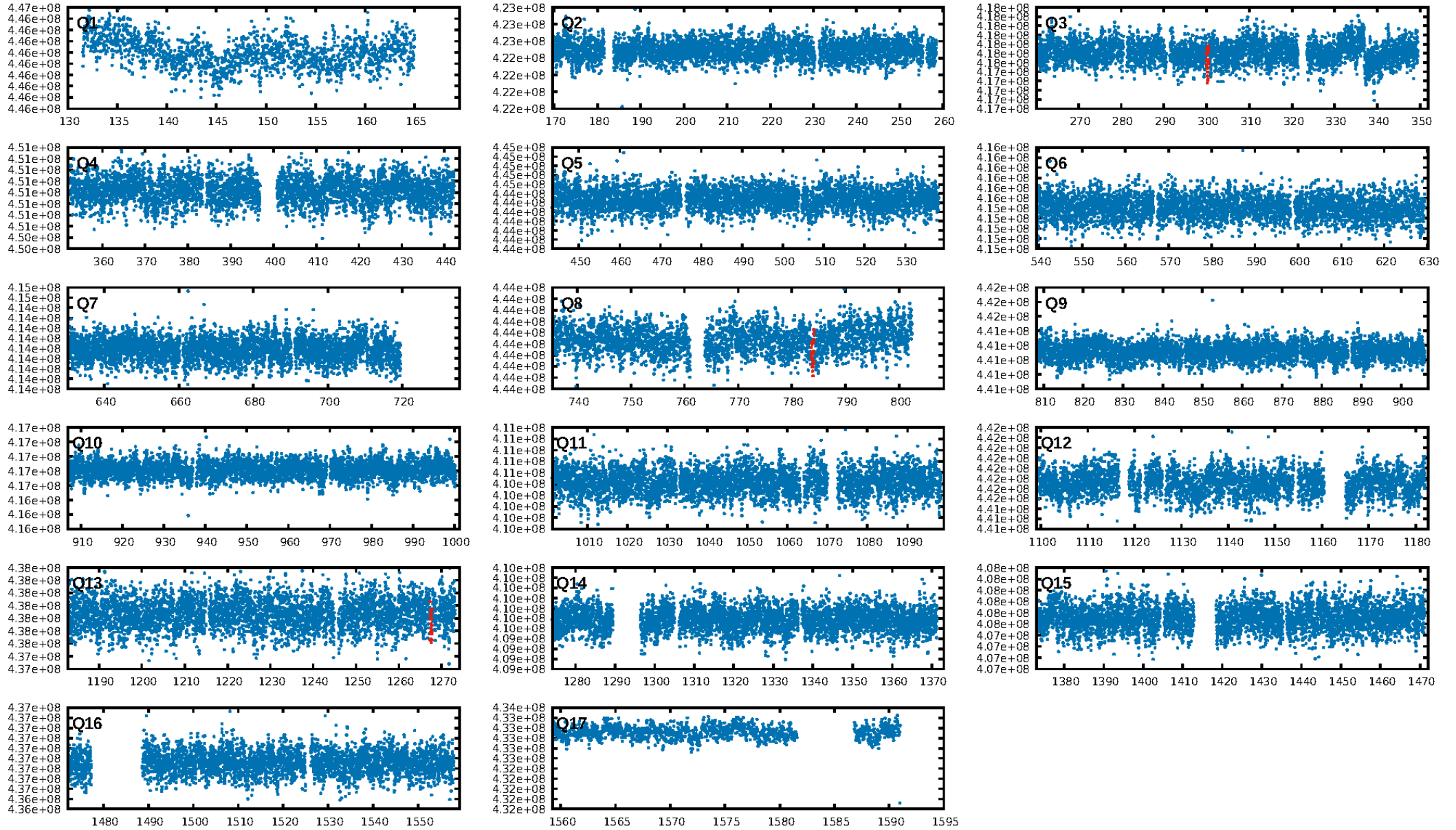
ShortPeriod-sig: 100.0% [649.47σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 0.2451

Centroid-sig: 77.5%  
Centroid-so: 0.258 arcsec [0.55σ]  
OotOffset-rm: 0.819 arcsec [1.74σ]  
KicOffset-rm: 0.776 arcsec [1.89σ]  
OotOffset-st: 0/1/1/0 [2]  
KicOffset-st: 0/1/1/0 [2]  
DiffImageQuality-fgm: 1.00 [2/2]  
DiffImageOverlap-fno: 0.00 [0/2]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 13:21:38 Z

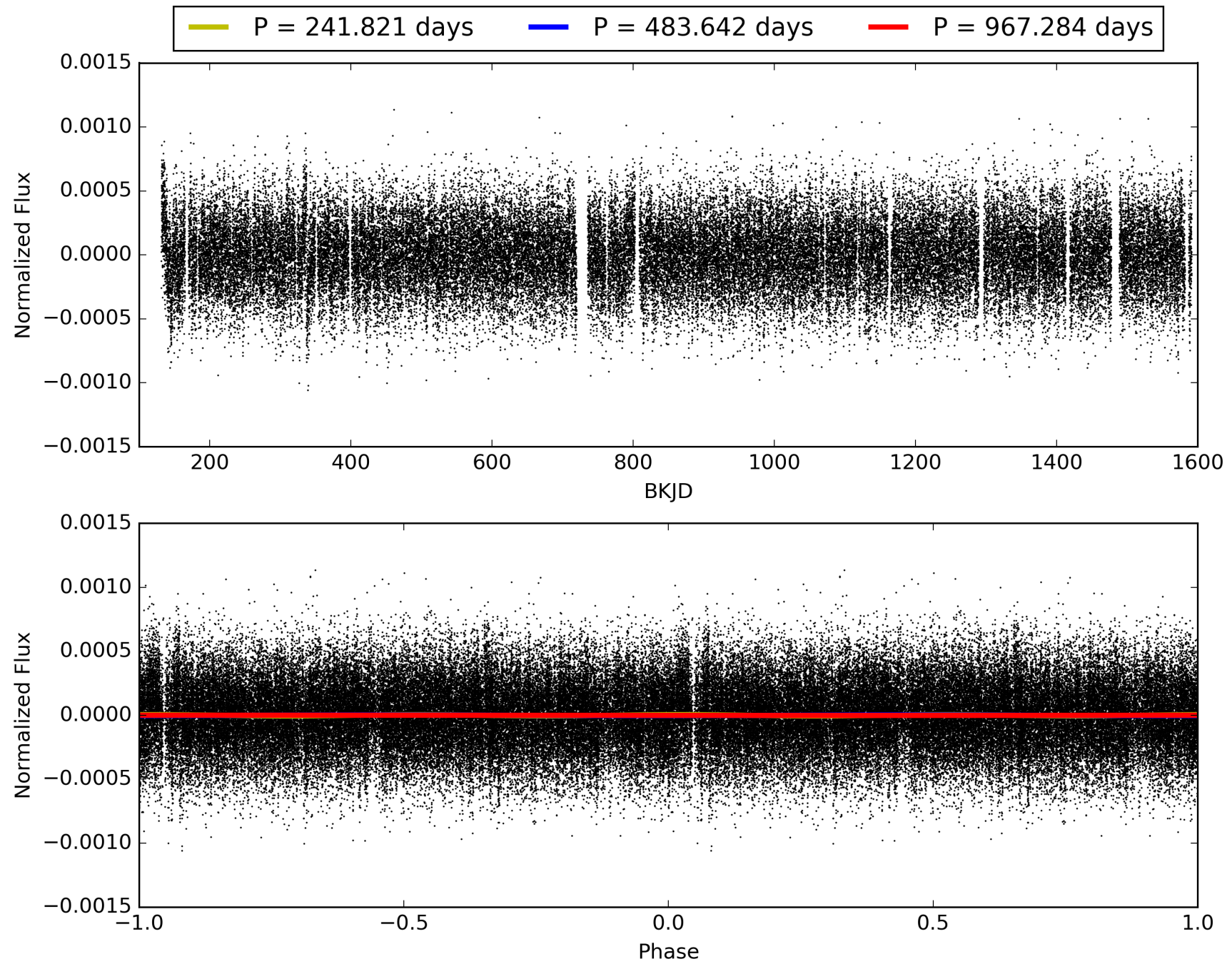
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 009612084-08, PDC Light Curves





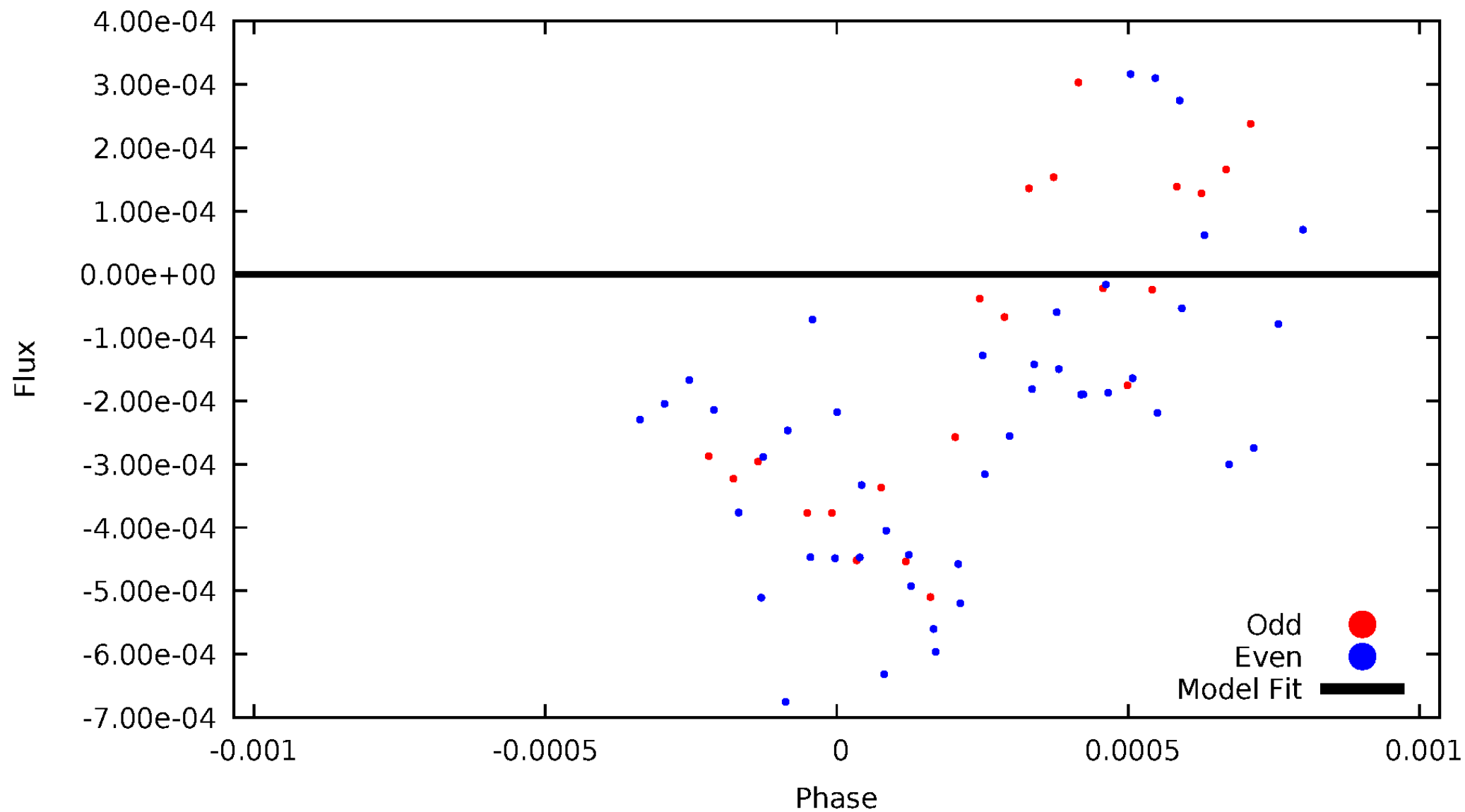
TCE 009612084-08





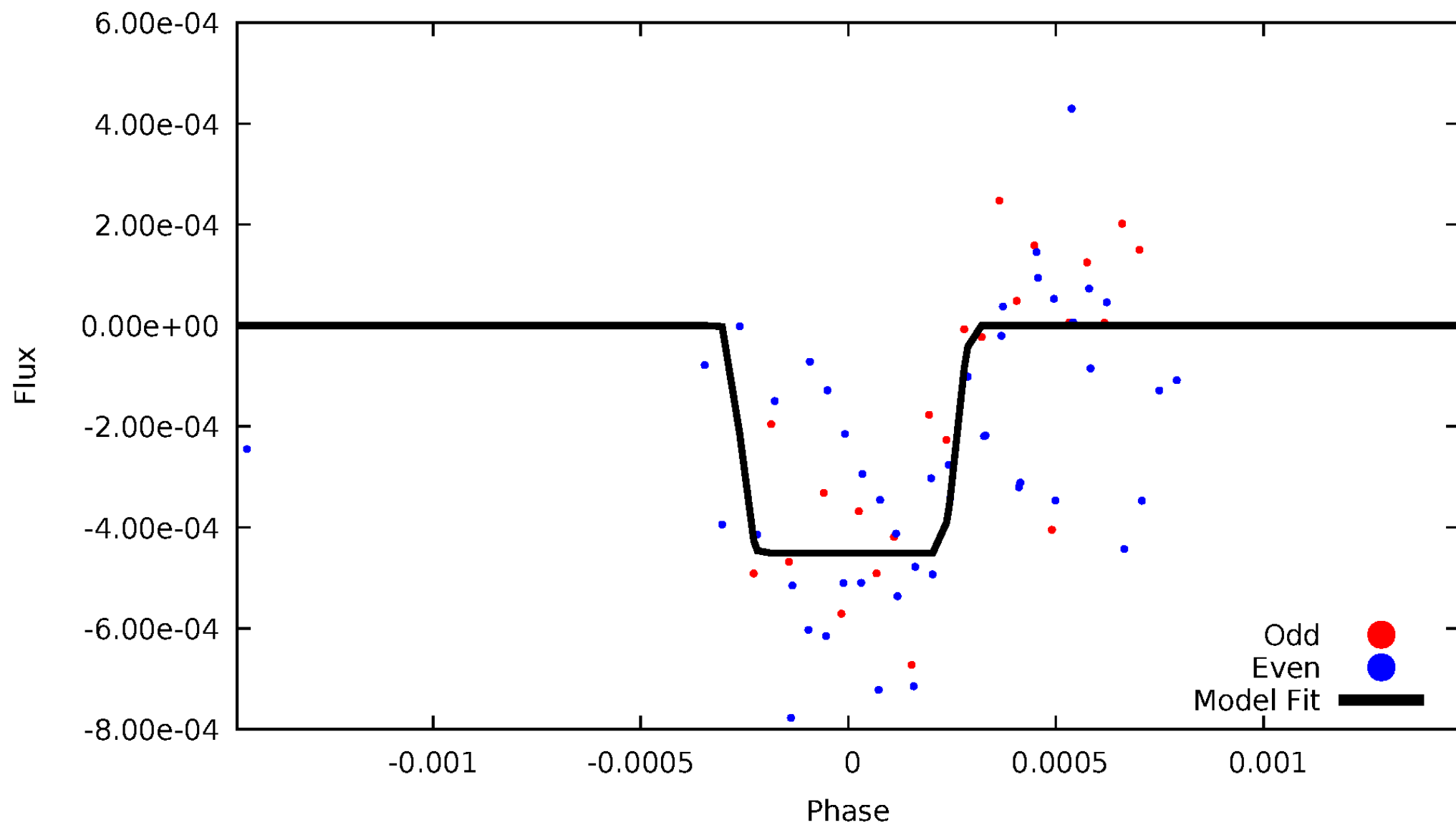
# DV Odd/Even

TCE 009612084-08



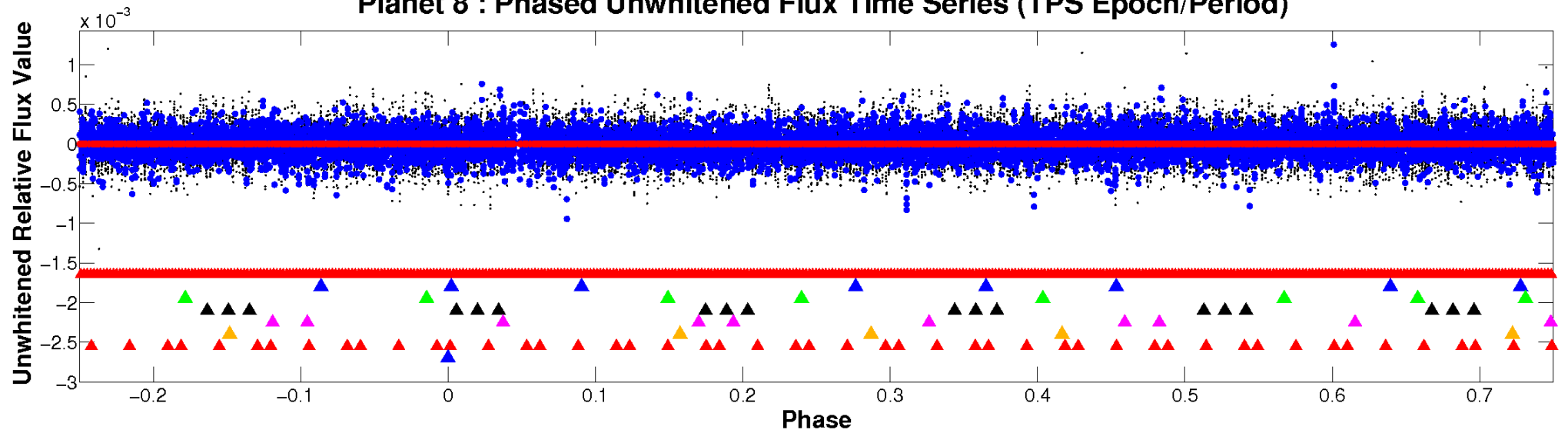
# ALT Odd/Even

TCE 009612084-08



# Non-Whitened Vs. Whitened Light Curve

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

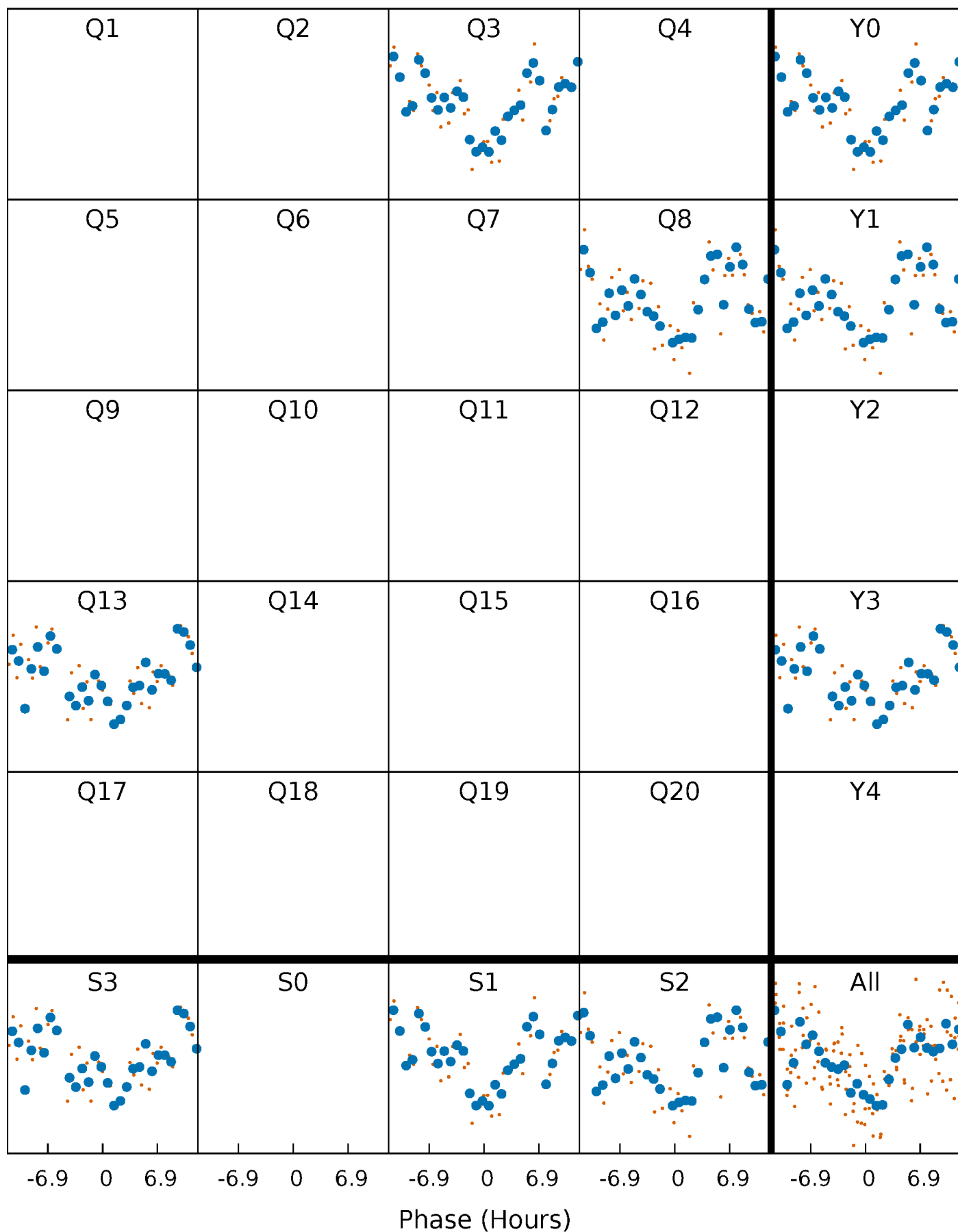


Planet 8 : Phased Whitened Flux Time Series (TPS Epoch/Period)



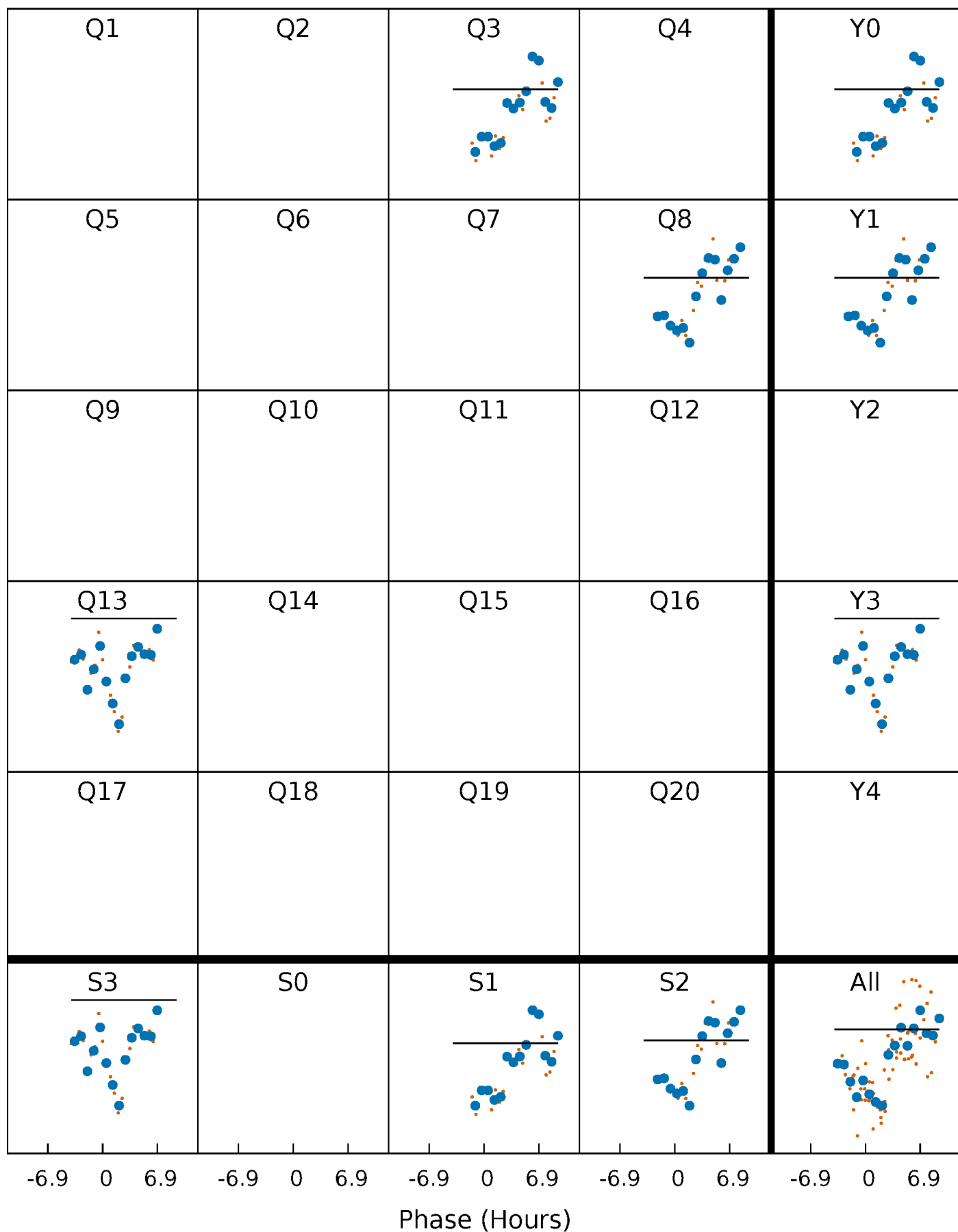
# PDC Quarter-Phased Transit Curves

TCE 009612084-08     $P=483.641932$  Days     $T_0=300.213871$  (BKJD)



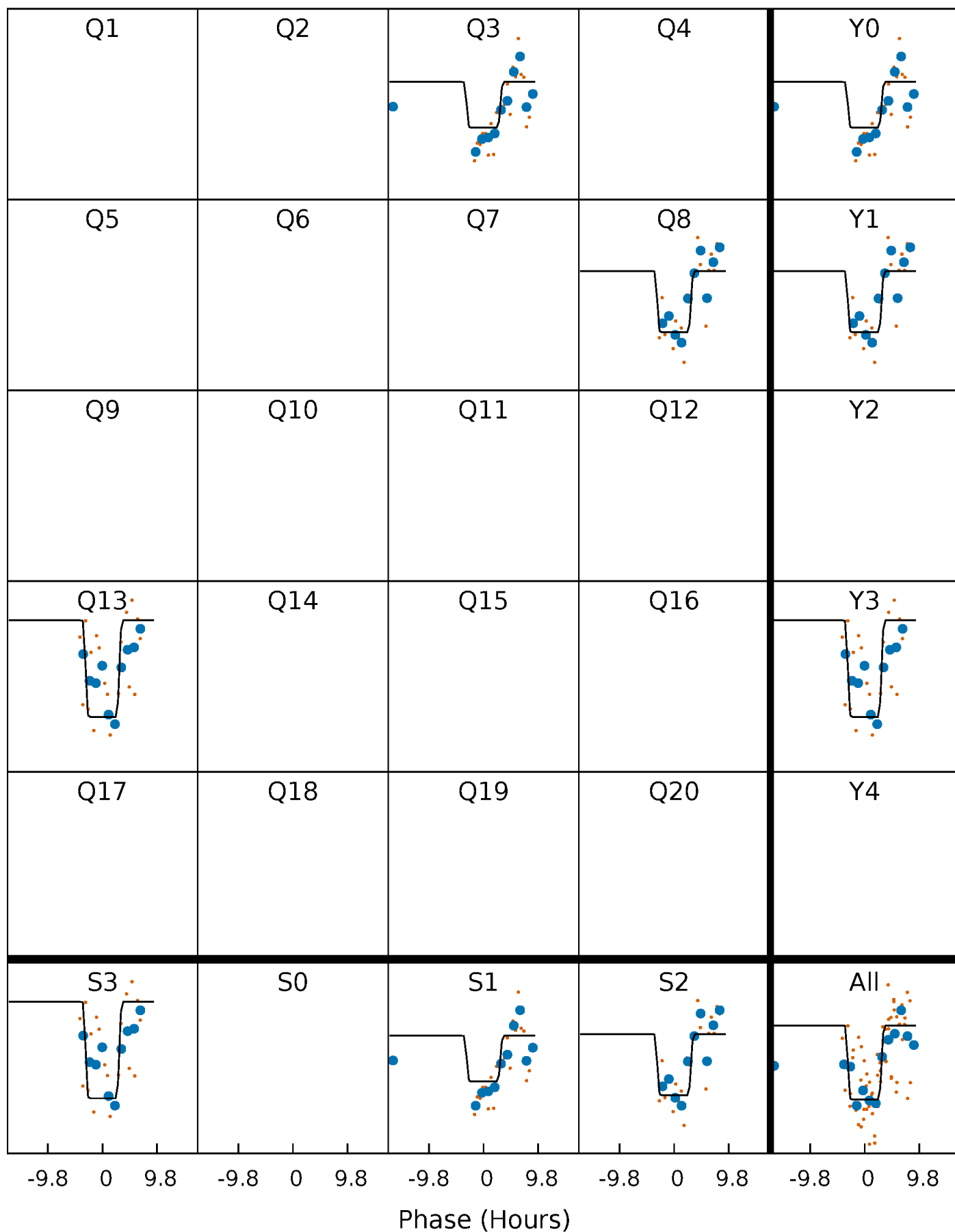
# DV Quarter-Phased Transit Curves

TCE 009612084-08     $P=483.641932$  Days     $T_0=300.213871$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

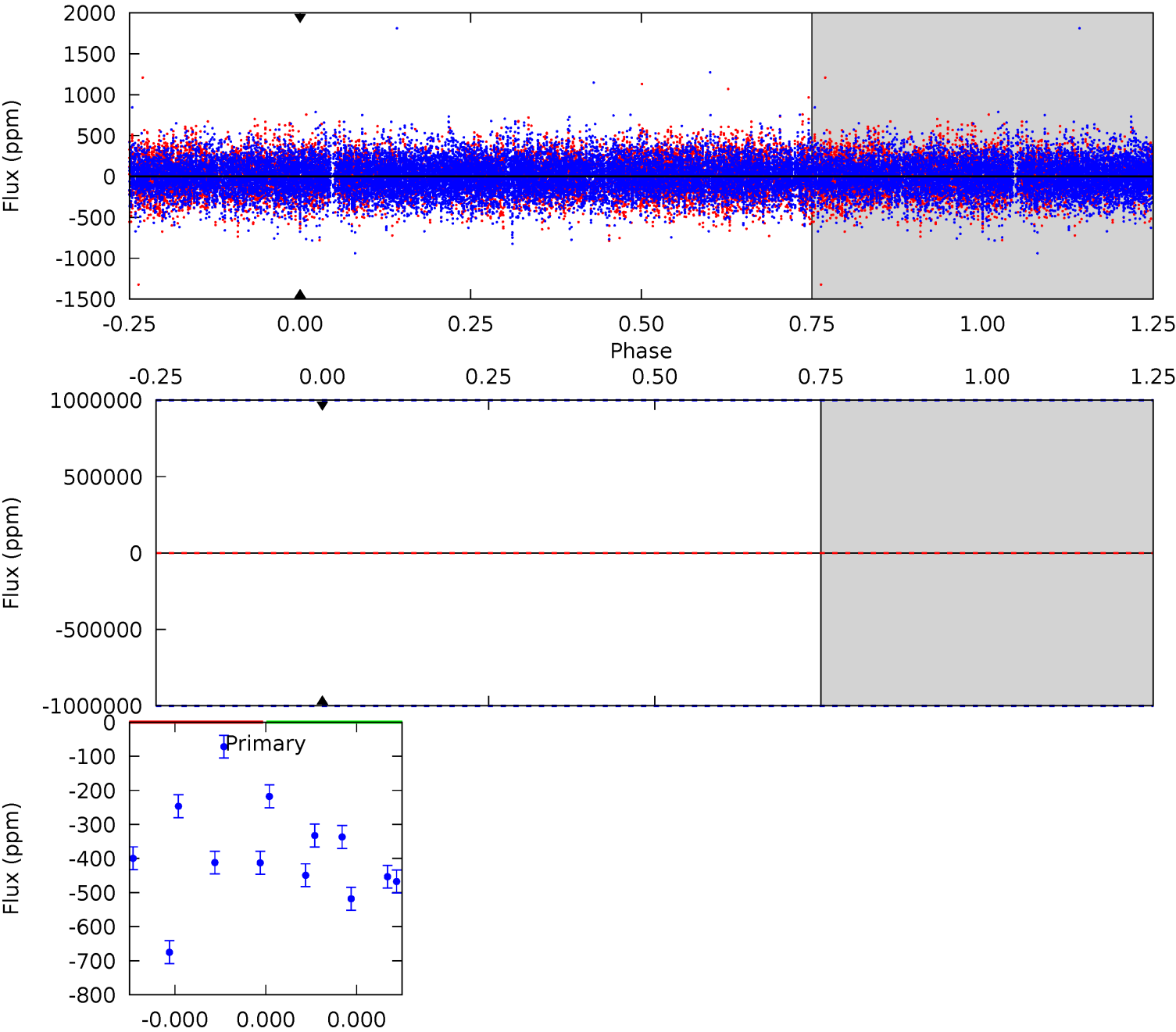
TCE 009612084-08 P=483.641932 Days  $T_0=300.218068$  (BKJD)



DV Model-Shift Uniqueness Test

009612084-08, P = 483.641932 Days, E = 300.213871 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

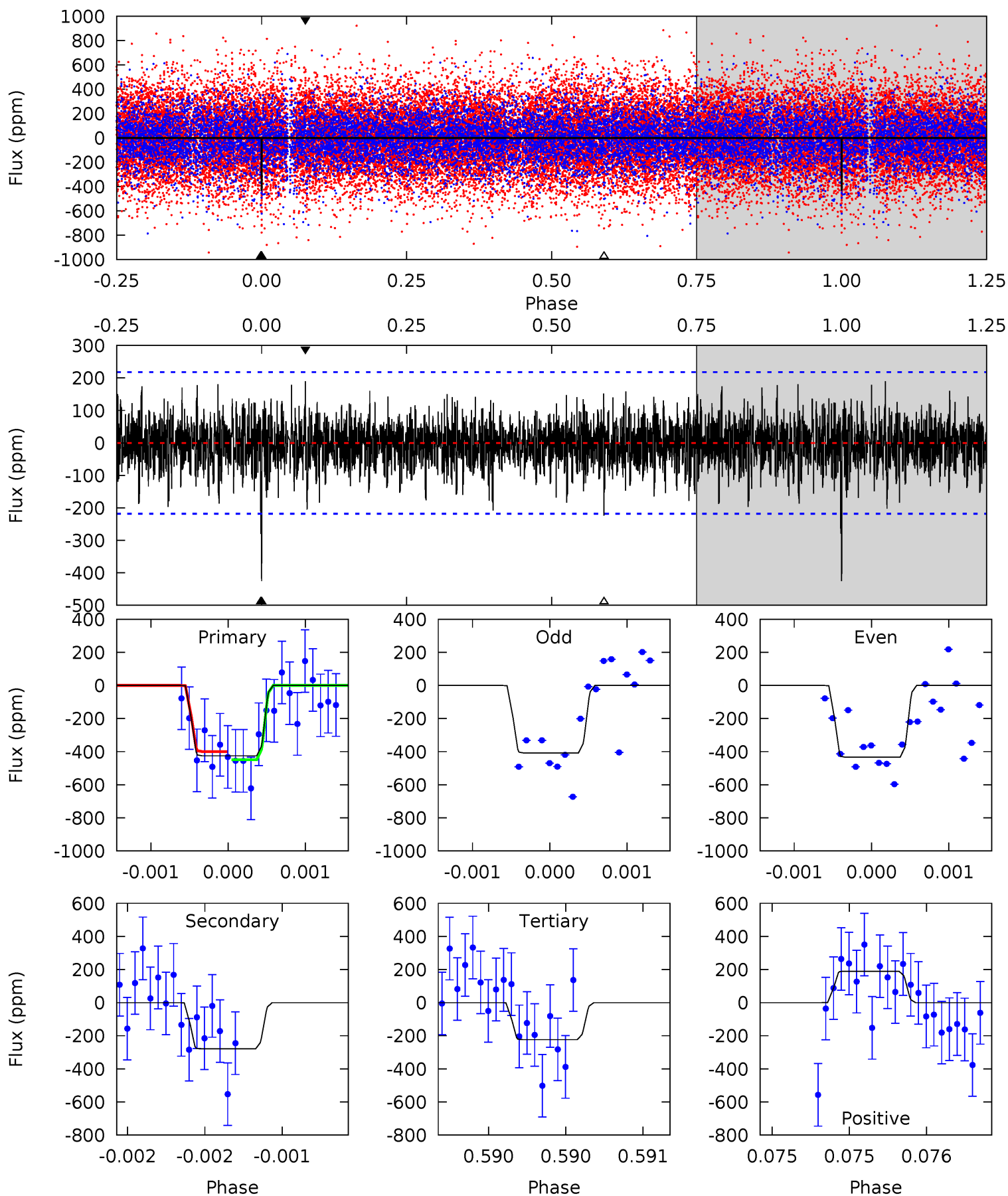




# Alt Model-Shift Uniqueness Test

009612084-08, P = 483.641932 Days, E = 300.218068 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
10.9	7.13	5.70	4.84	5.56	3.46	1.43	5.15	6.01	1.43	2.29	0.32	1.06	0.31	0.62



### Stellar Parameters For KIC 009612084

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5095^{+45}_{-121}$	$3.052^{+0.195}_{-0.105}$	$-0.060^{+0.100}_{-0.250}$	$7.094^{+1.066}_{-2.666}$	$2.070^{+0.533}_{-0.799}$	$0.008^{+0.011}_{-0.003}$
	+1%/-2%	+6%/-3%	+167%/-417%	+15%/-38%	+26%/-39%	+136%/-31%
Source	SPE74	SPE74	SPE74	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology  
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

### Secondary Eclipse Parameters for KIC 009612084-08 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$0 \pm 1000000$	$50.31^{+59.78}_{-35.26}$	$667^{+31}_{-40}$	$-4181^{+21657}_{-11705}$	$-877.475^{+105422.089}_{-76528.774}$
Alt.	$-280 \pm 39$	$56.93^{+58.80}_{-39.90}$	$666^{+33}_{-42}$	$3022^{+1477}_{-521}$	$114^{+1210}_{-87}$

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

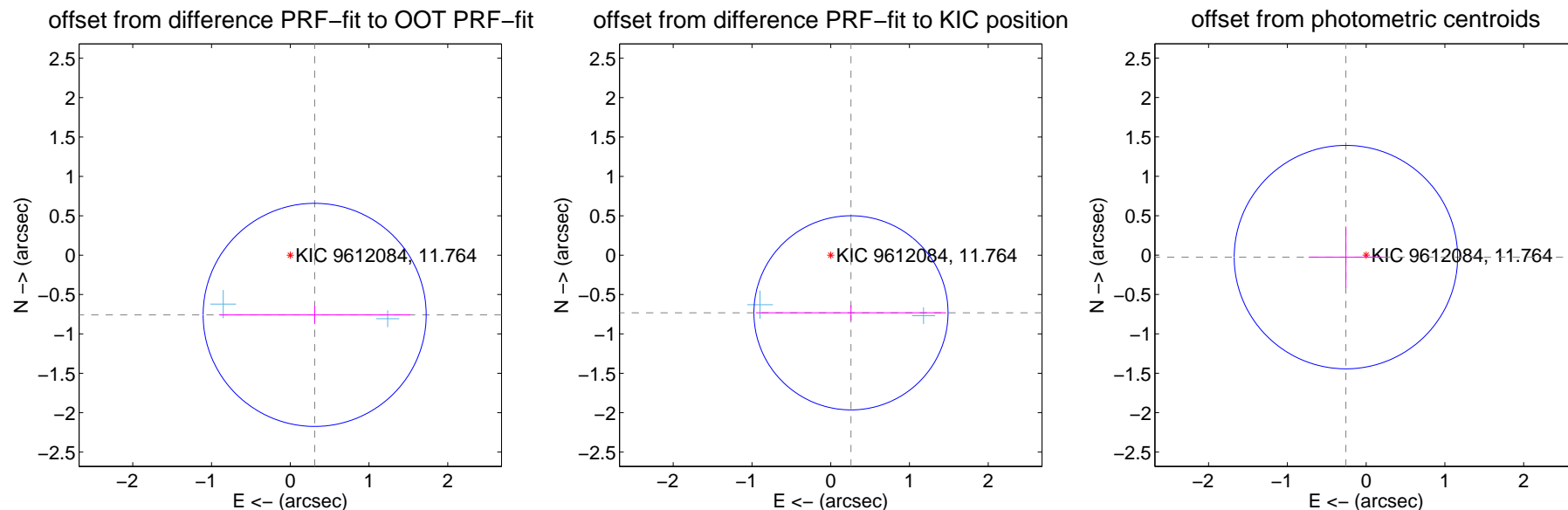
## DV Centroid Data

Supplemental centroid analysis for 009612084-08. **Kepler magnitude: 11.76.** Transit SNR -1.00

**There are 2 quarters with good PRF difference image offsets**

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

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.819 \pm 0.472$	1.74	$-0.310 \pm 1.214$	$-0.758 \pm 0.117$
PRF-fit source offset from KIC position	$0.776 \pm 0.411$	1.89	$-0.257 \pm 1.207$	$-0.732 \pm 0.098$
photometric centroid source offset	$0.26 \pm 0.47$	0.55	$0.26 \pm 0.47$	$-0.03 \pm 0.39$



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

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

Q1 no difference image



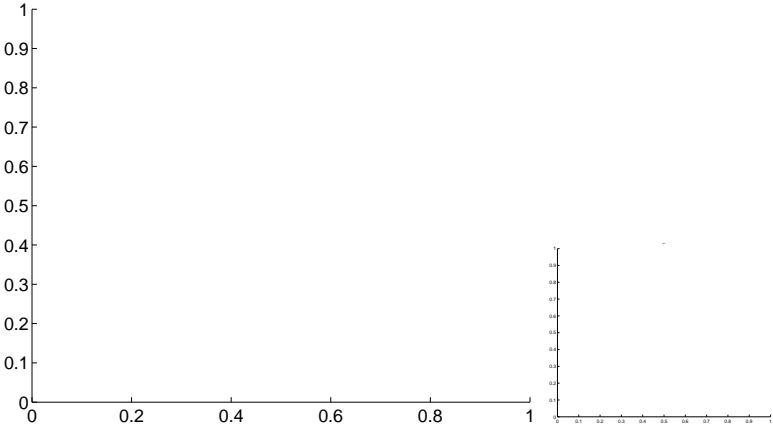
Q1 no OOT image



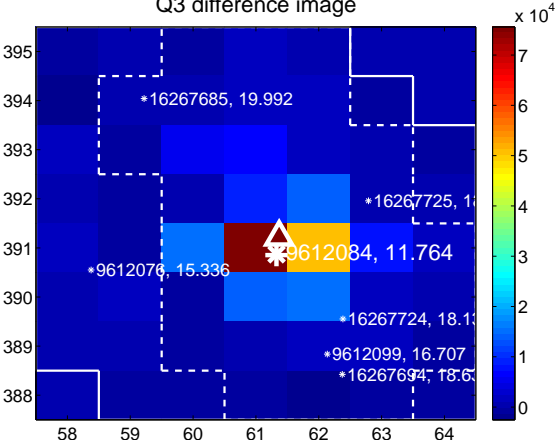
Q2 no difference image



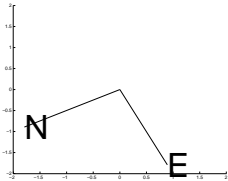
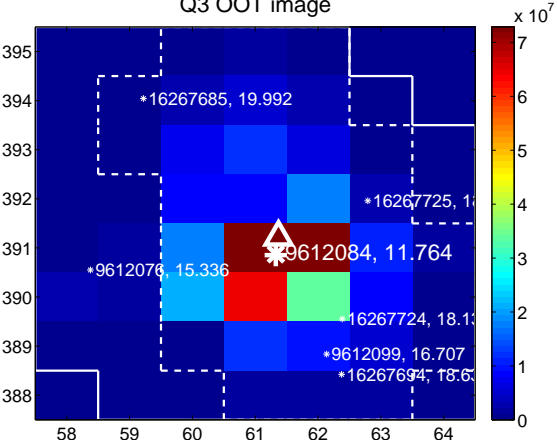
Q2 no OOT image



Q3 difference image



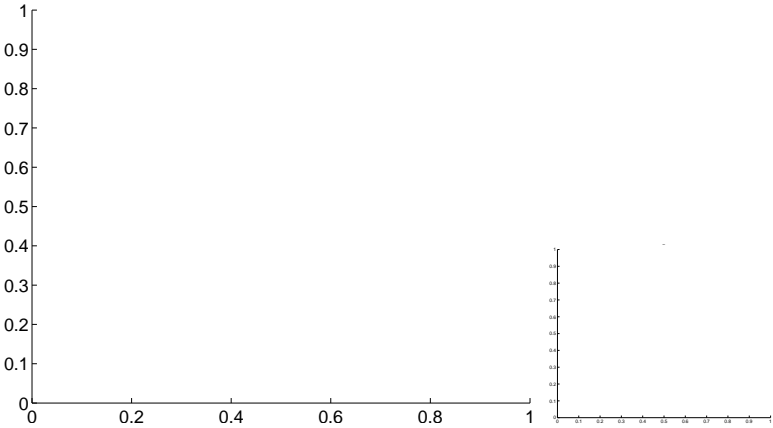
Q3 OOT image



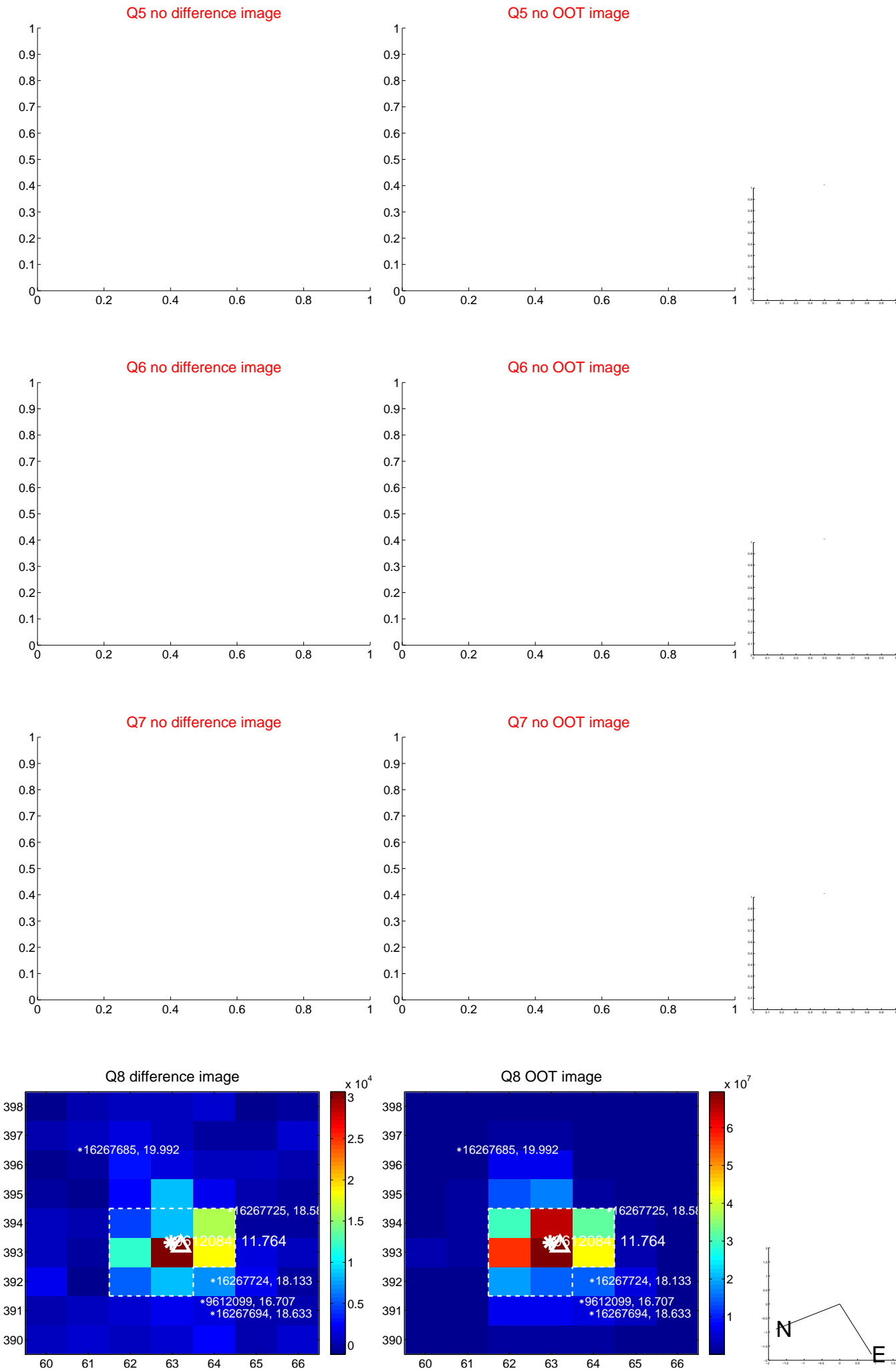
Q4 no difference image



Q4 no OOT image



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



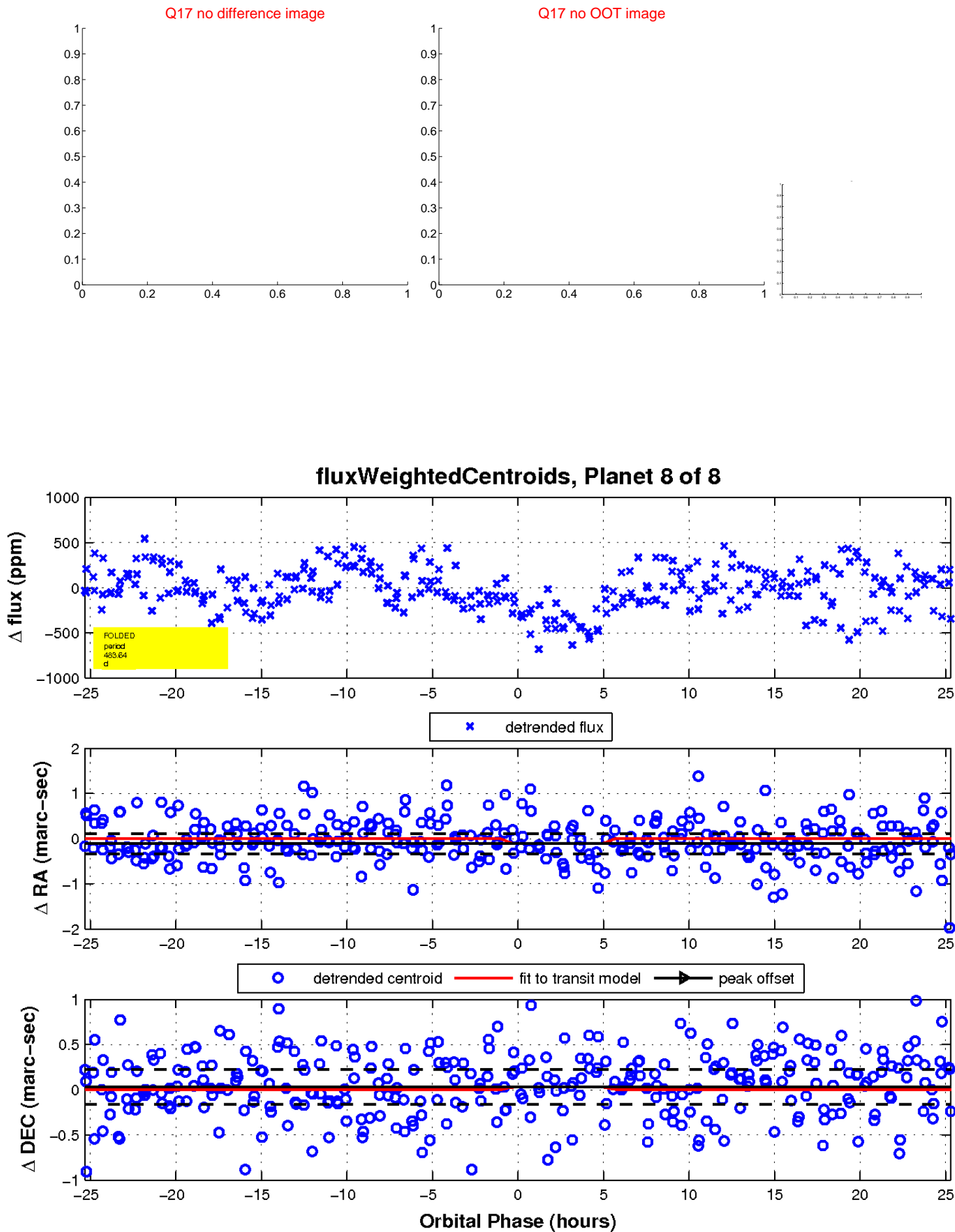
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



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





UKIRT Image

Declination

