

# KIC 009268159

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009268159-01	OBS	No	6.777840	137.320347	51.4	15.646	9.0	8.6	3.64	7365	3.02	4399.18
009268159-02	OBS	No	526.197511	330.783574	232.8	2.543	8.8	4.3	3.64	7365	6.32	13.28
009268159-03	OBS	8180.01	185.975337	299.693751	287.0	7.977	8.9	7.2	3.64	7365	6.68	53.16
009268159-04	OBS	No	192.138774	244.002270	285.7	11.124	7.2	8.4	3.64	7365	7.25	50.90

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009268159-01	OBS	FP	0.00	1	0	0	0	LPP_DV—CENT_SATURATED
009268159-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV— MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
009268159-03	OBS	PC	0.29	0	0	0	0	CENT_SATURATED
009268159-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_SKYE—CENT_SATURATED

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

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

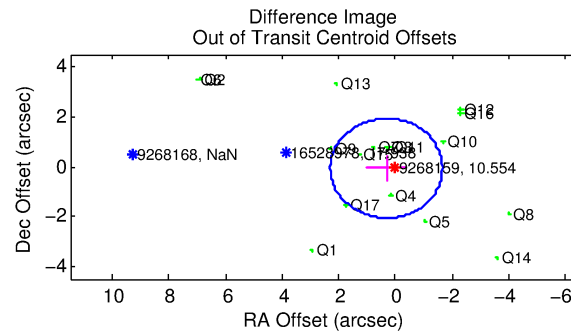
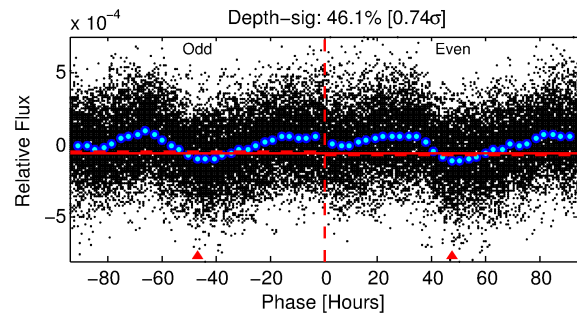
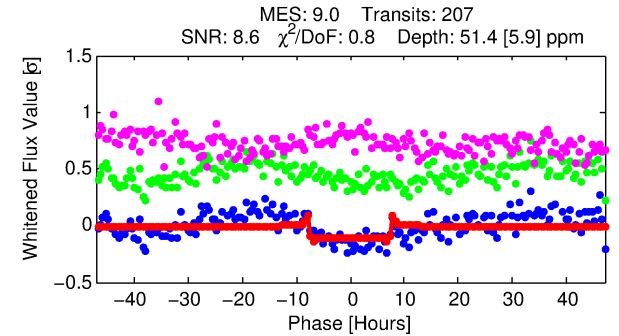
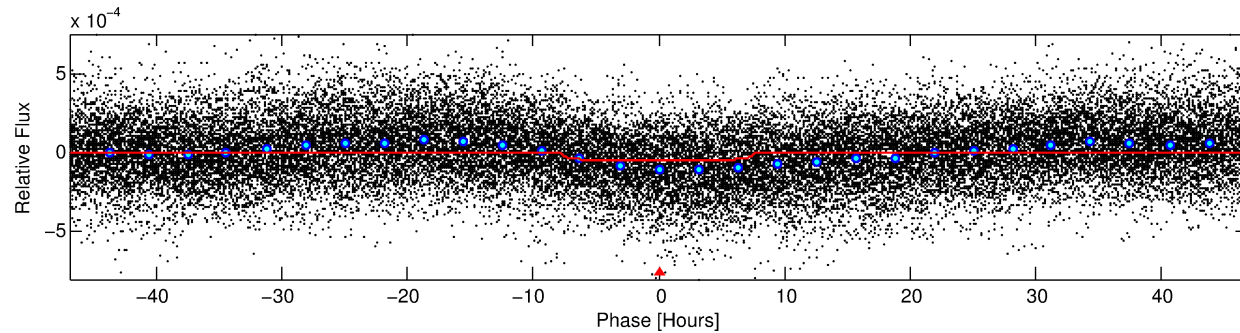
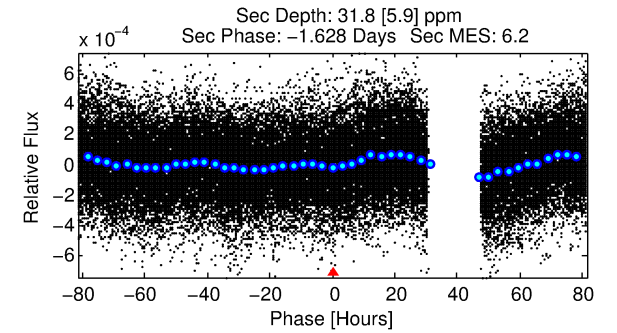
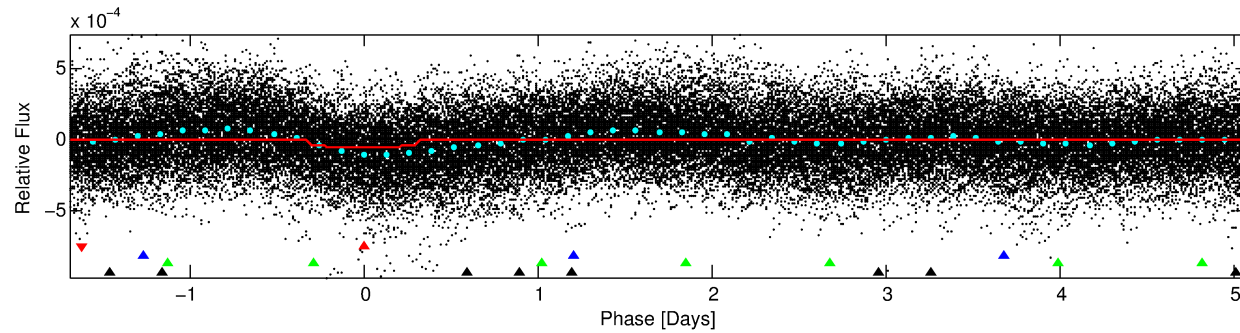
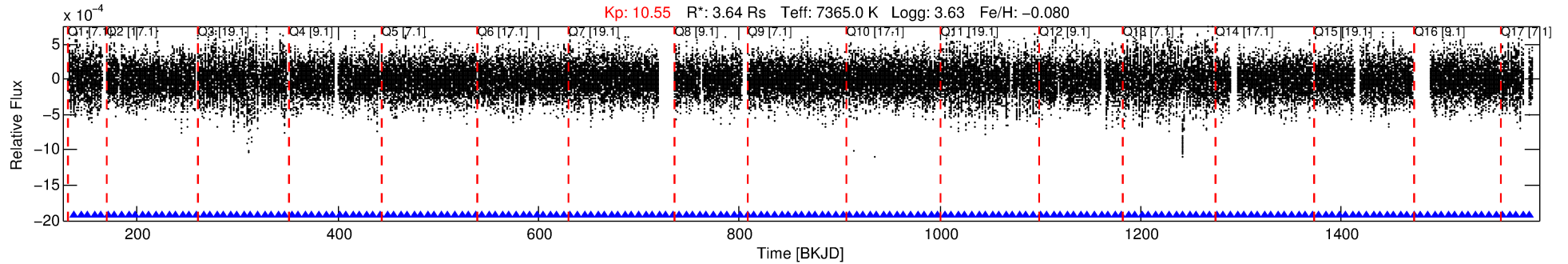
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009268159-01

No Significant Match Found

# DV One-Page Summary

KIC: 9268159 Candidate: 1 of 4 Period: 6.778 d



## DV Fit Results:

Period = 6.77784 [0.00006] d  
Epoch = 137.3203 [0.0059] BKJD  
 $R_p/R^* = 0.0076$  [0.0005]  
 $a/R^* = 1.77$  [0.26]  
 $b = 0.90$  [0.05]  
 $S_{\text{eff}} = 4399.18$  [3789.22]  
 $T_{\text{eq}} = 2077$  [447] K  
 $R_p = 3.02$  [1.53]  $R_e$   
 $a = 0.0891$  [0.0455] AU  
 $A_g = 15.18$  [13.26] [1.07σ]  
 $T_{\text{eff}} = 6337$  [464] K [6.61σ]

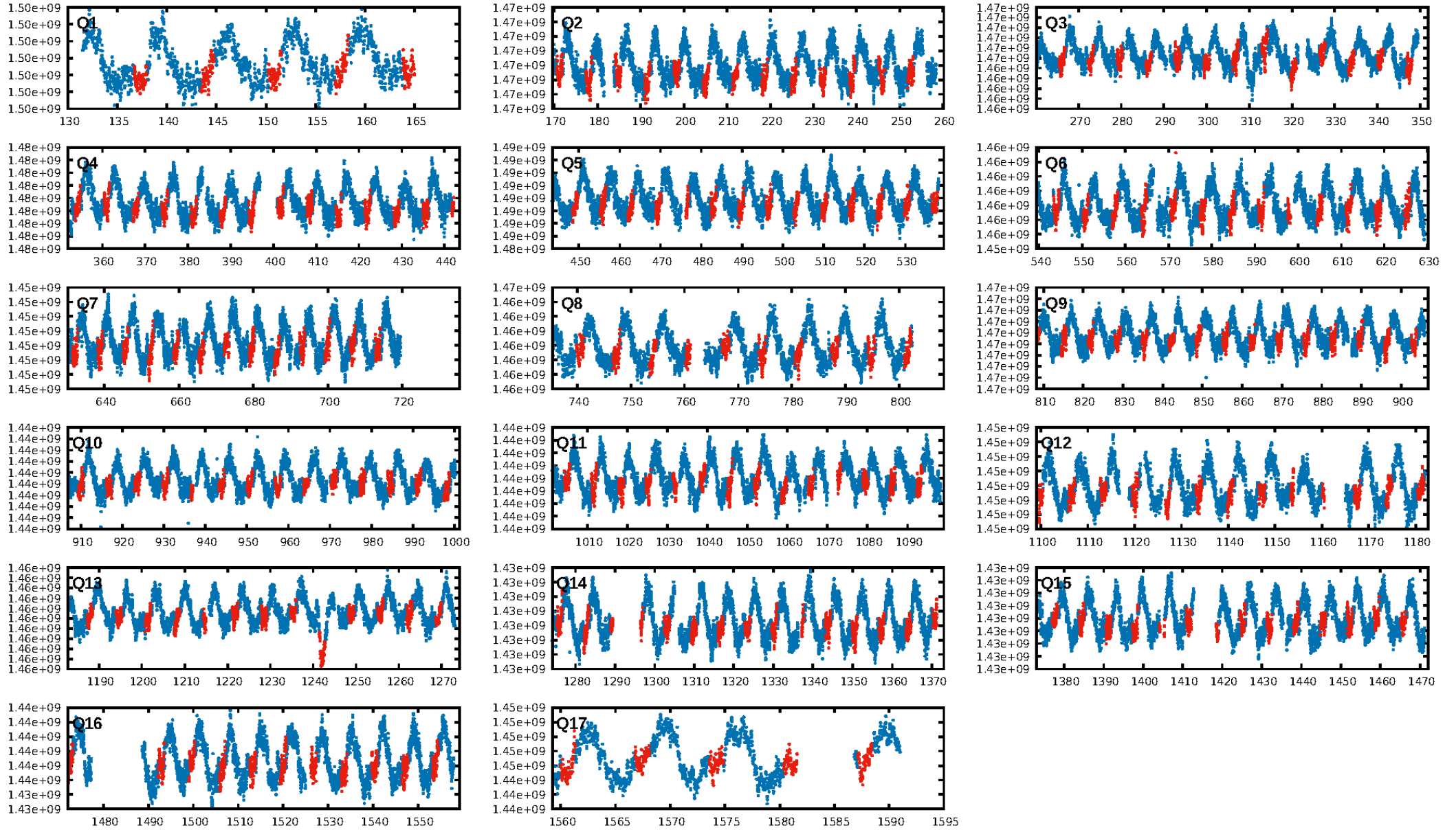
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [244.89σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
**Bootstrap-pfa: 2.27e-12**  
RollingBand-fgt: 1.00 [197/197]  
GhostDiagnostic-chr: 1.834  
**Centroid-sig: 0.0%**  
**Centroid-so: 2.181 arcsec [4.90σ]**  
OotOffset-rm: 0.323 arcsec [0.49σ]  
**KicOffset-rm: 2.340 arcsec [3.10σ]**  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 0.29 [5/17]  
DiffImageOverlap-fno: 1.00 [17/17]

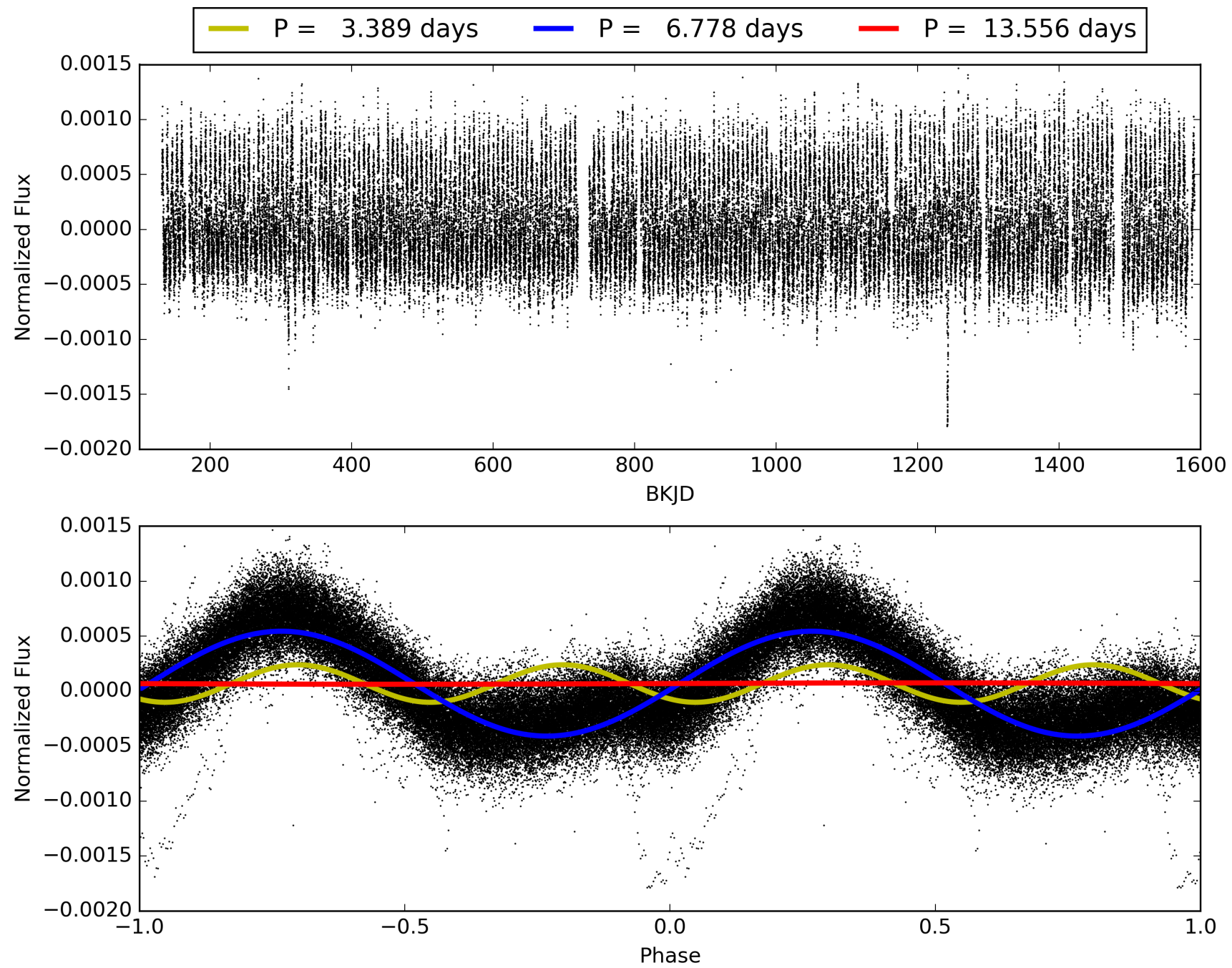
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 12:11:05 Z

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

# TCE 009268159-01, PDC Light Curves



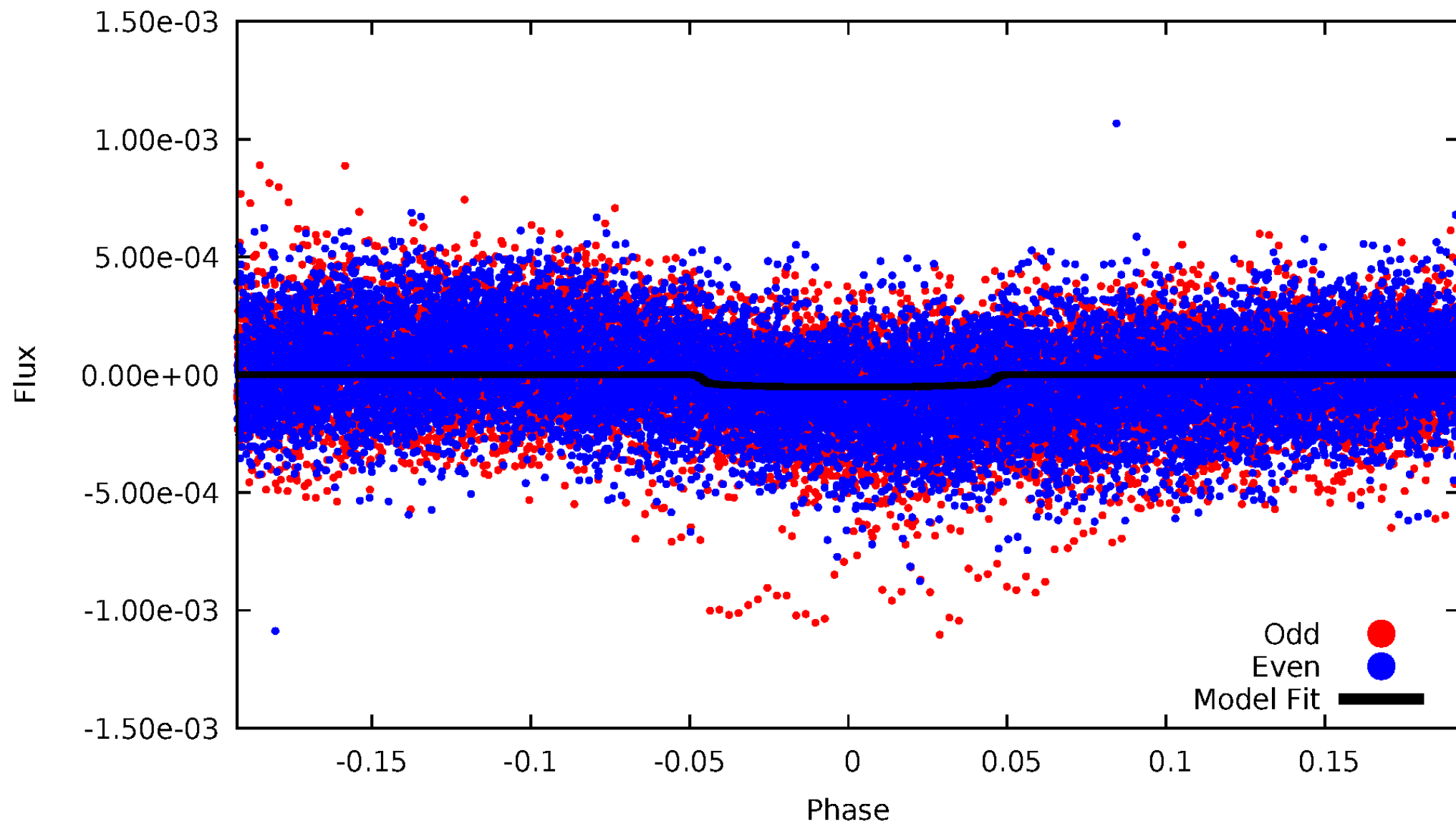
TCE 009268159-01





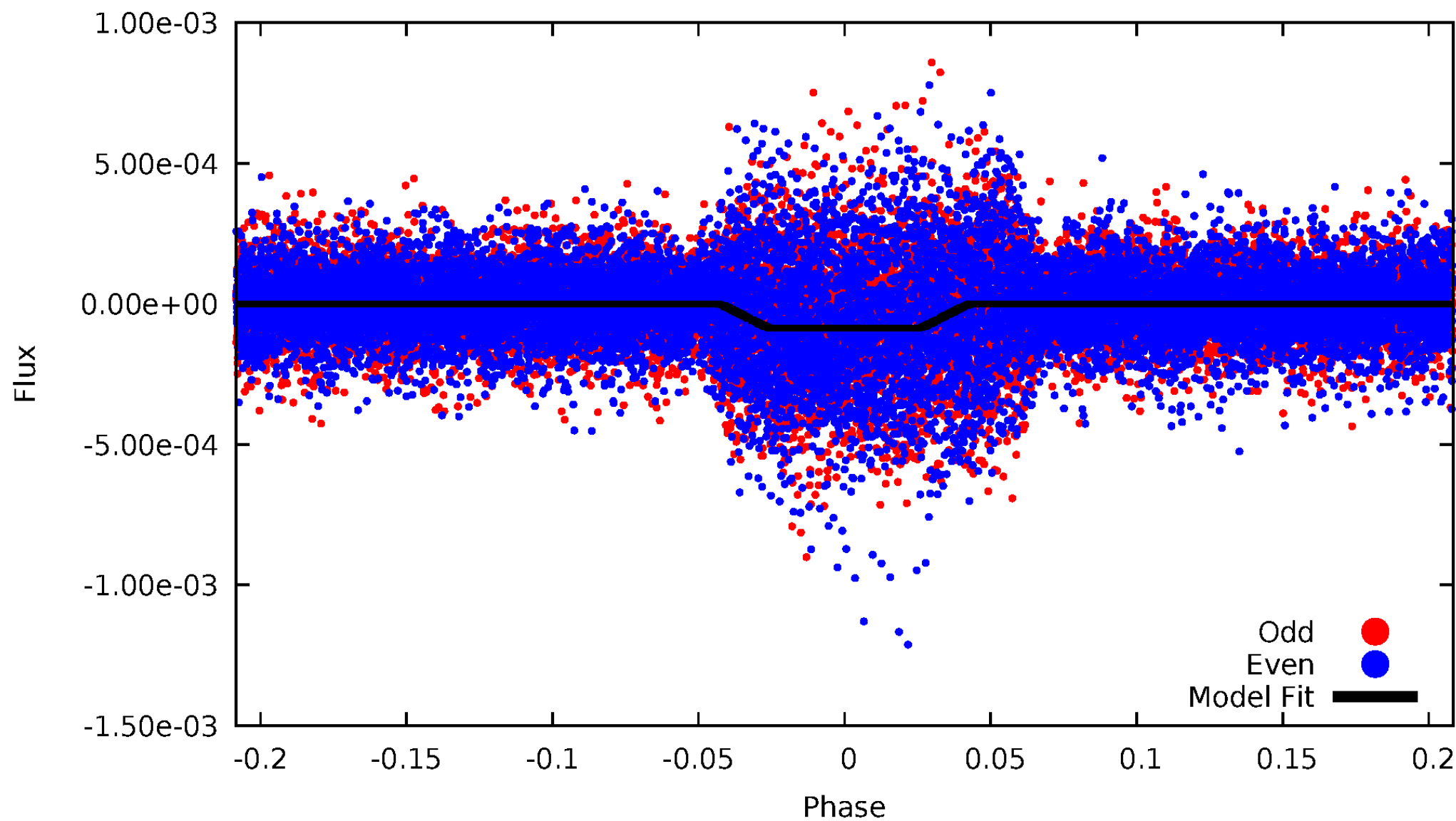
# DV Odd/Even

TCE 009268159-01

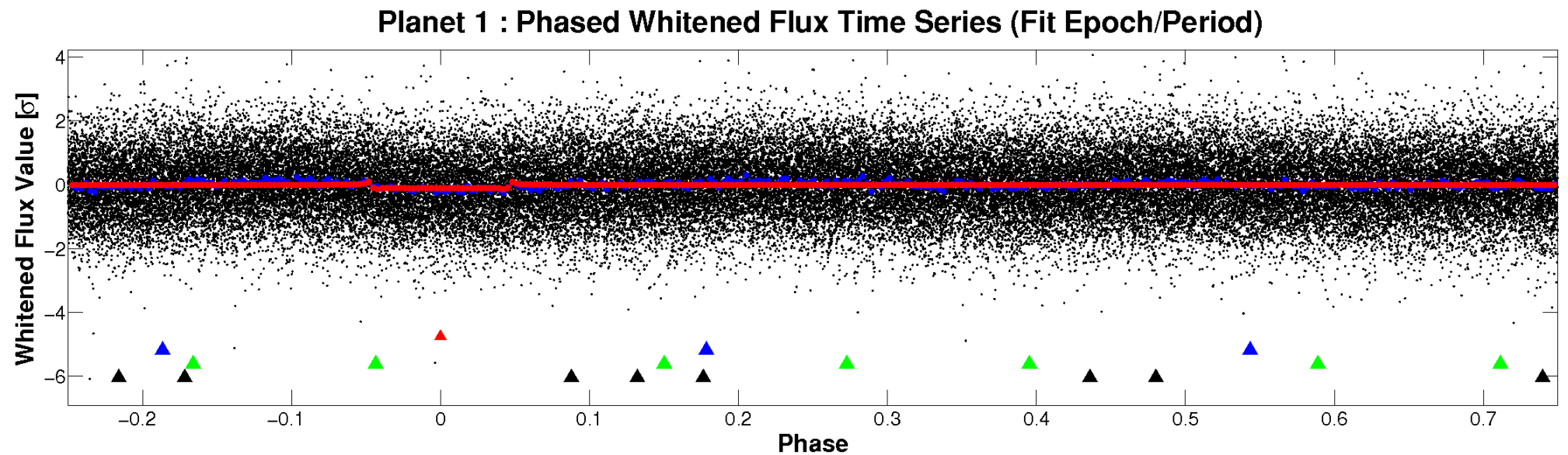
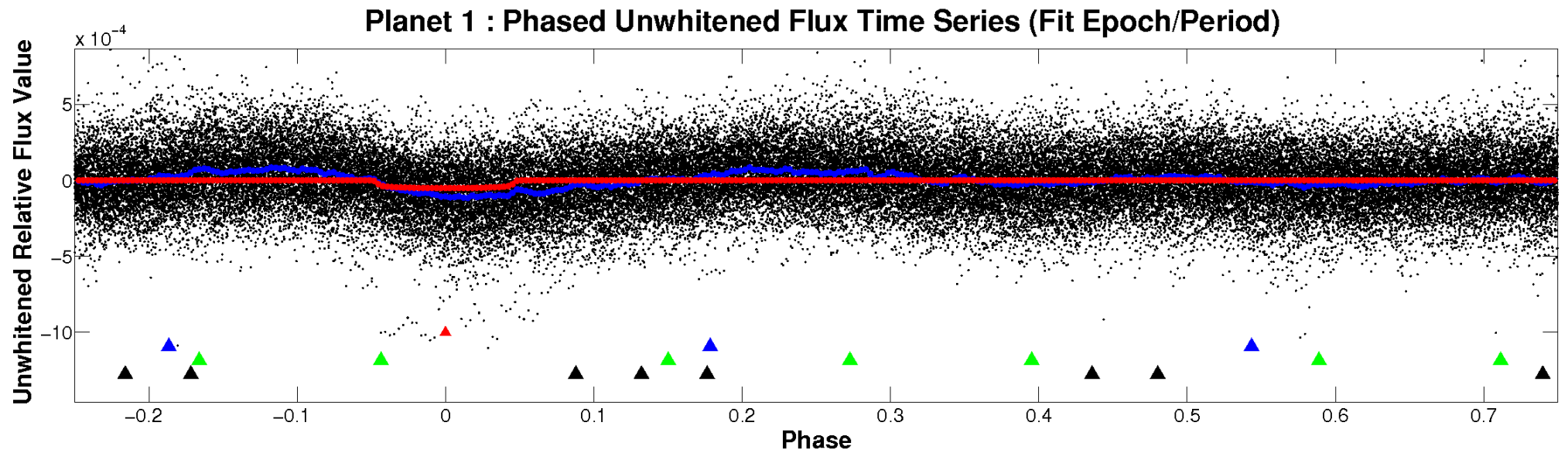


# ALT Odd/Even

TCE 009268159-01

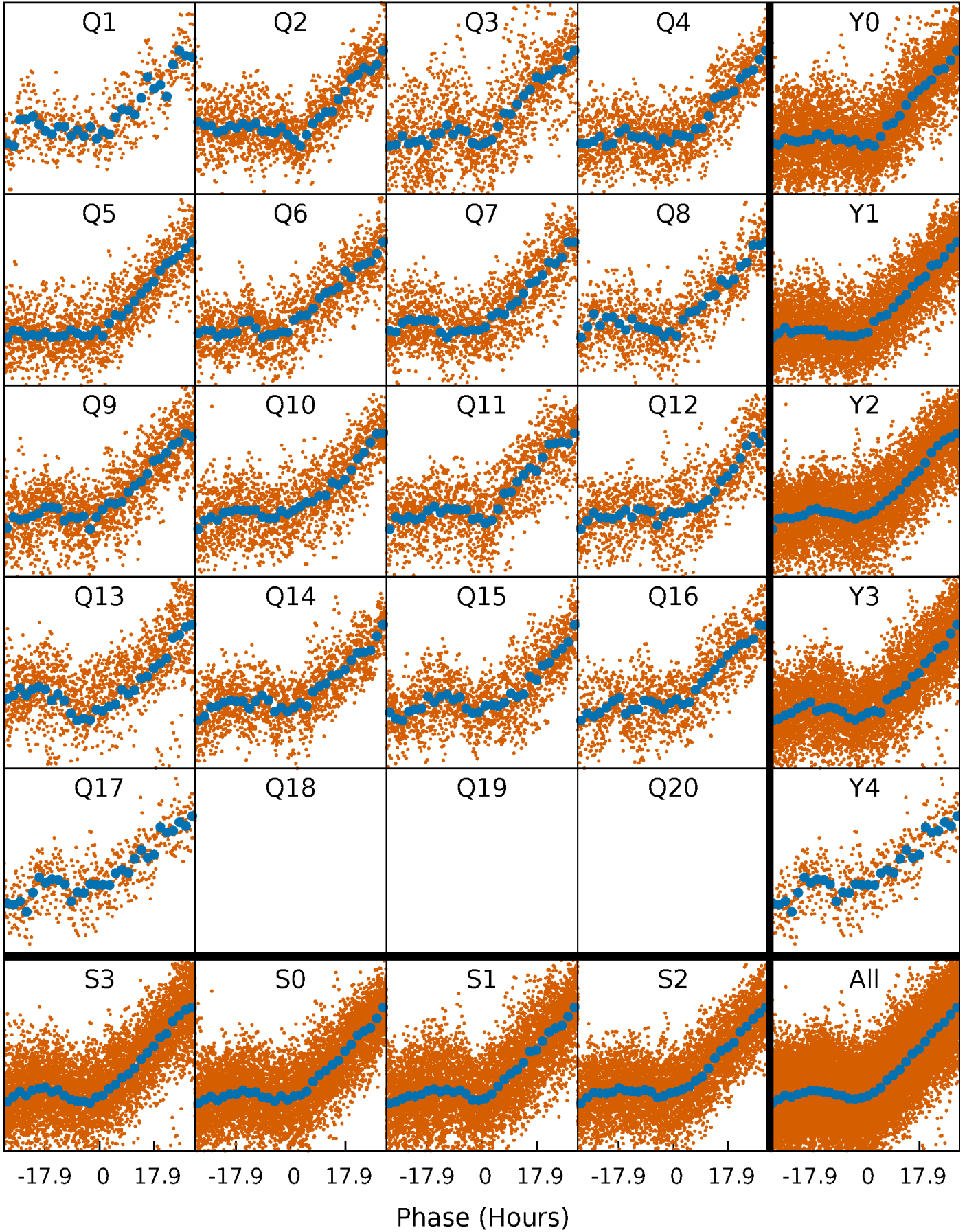


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

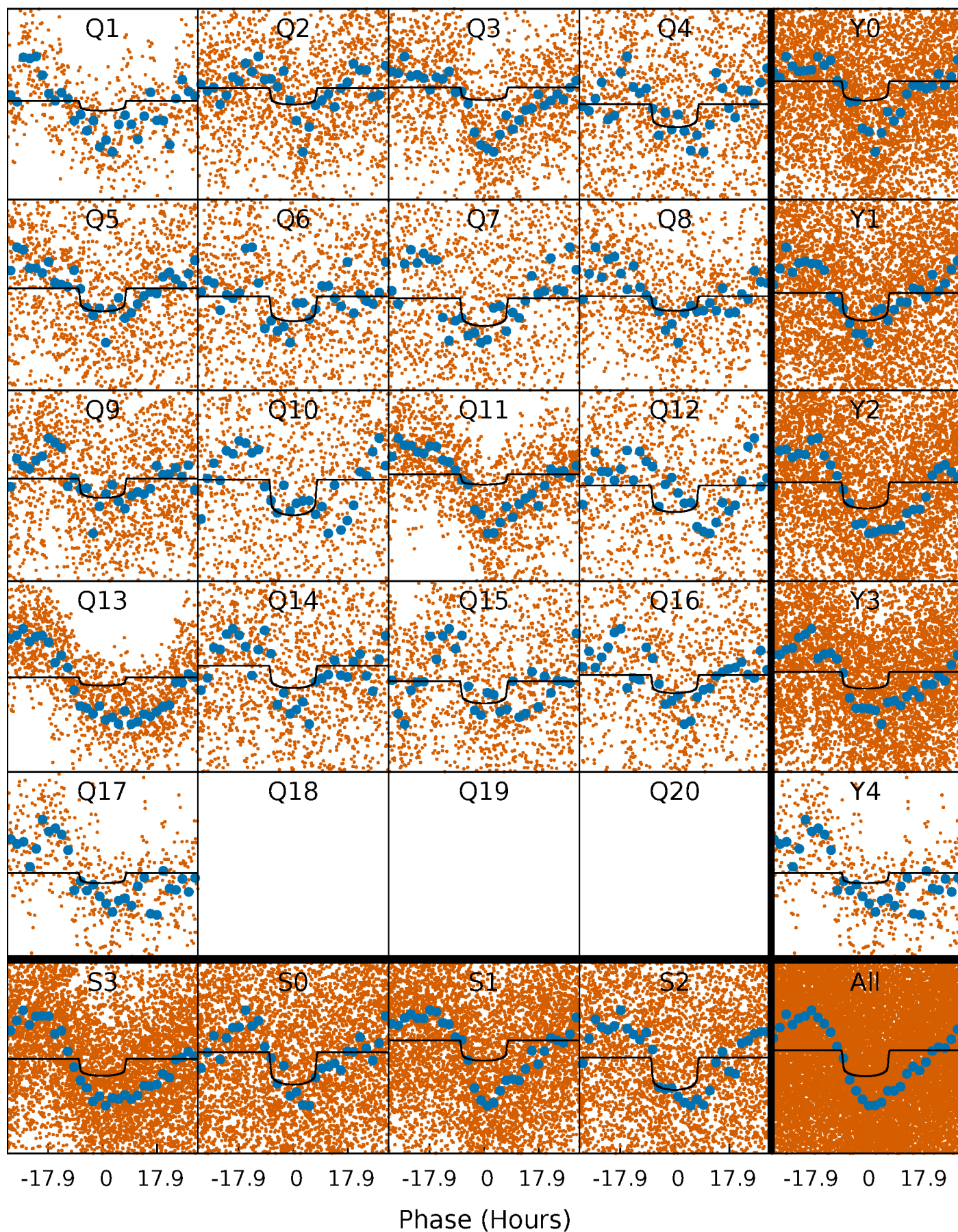
TCE 009268159-01 P= 6.777840 Days  $T_0=137.320347$  (BKJD)





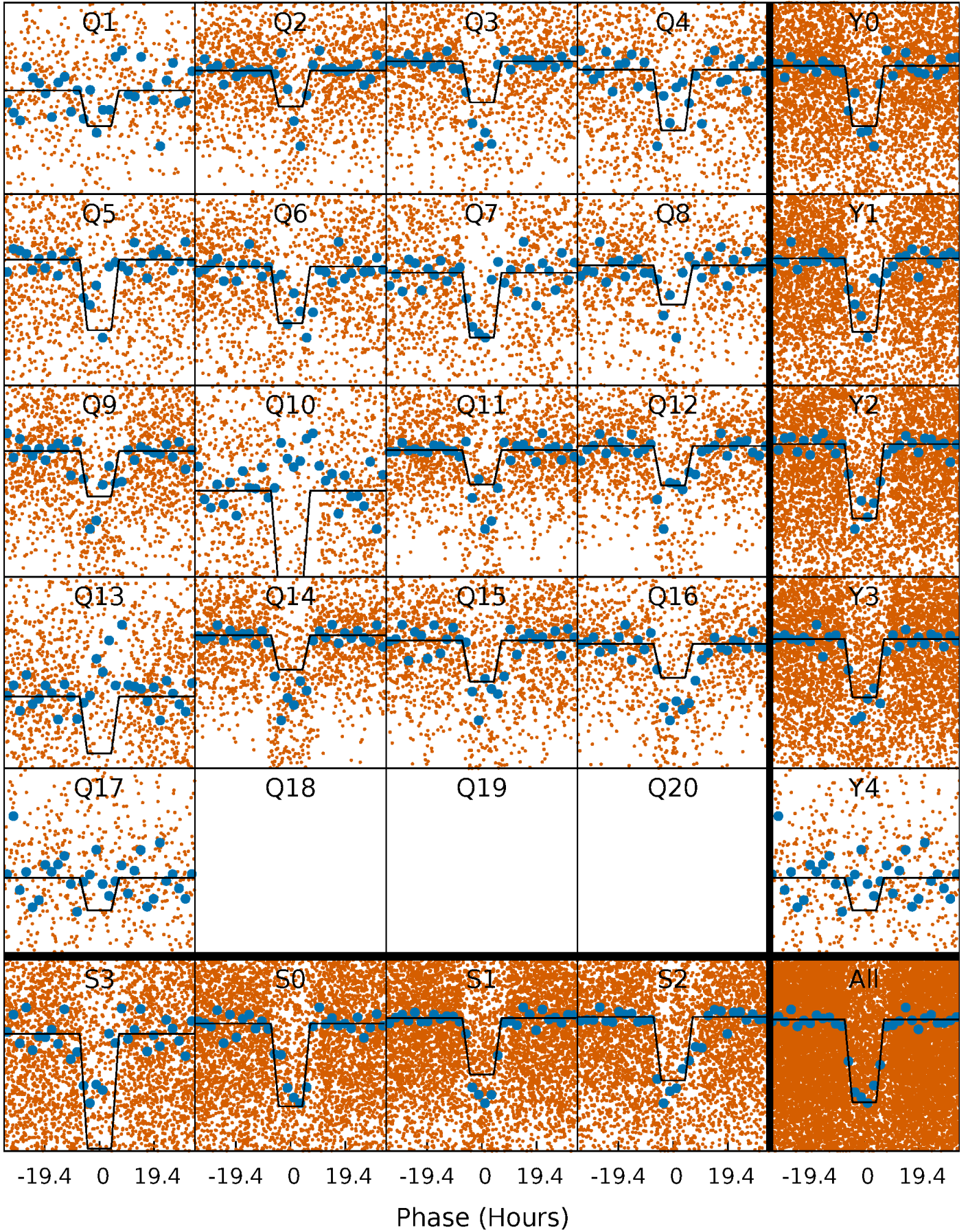
# DV Quarter-Phased Transit Curves

TCE 009268159-01 P= 6.777840 Days  $T_0=137.320347$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 009268159-01 P= 6.777612 Days  $T_0=137.332209$  (BKJD)

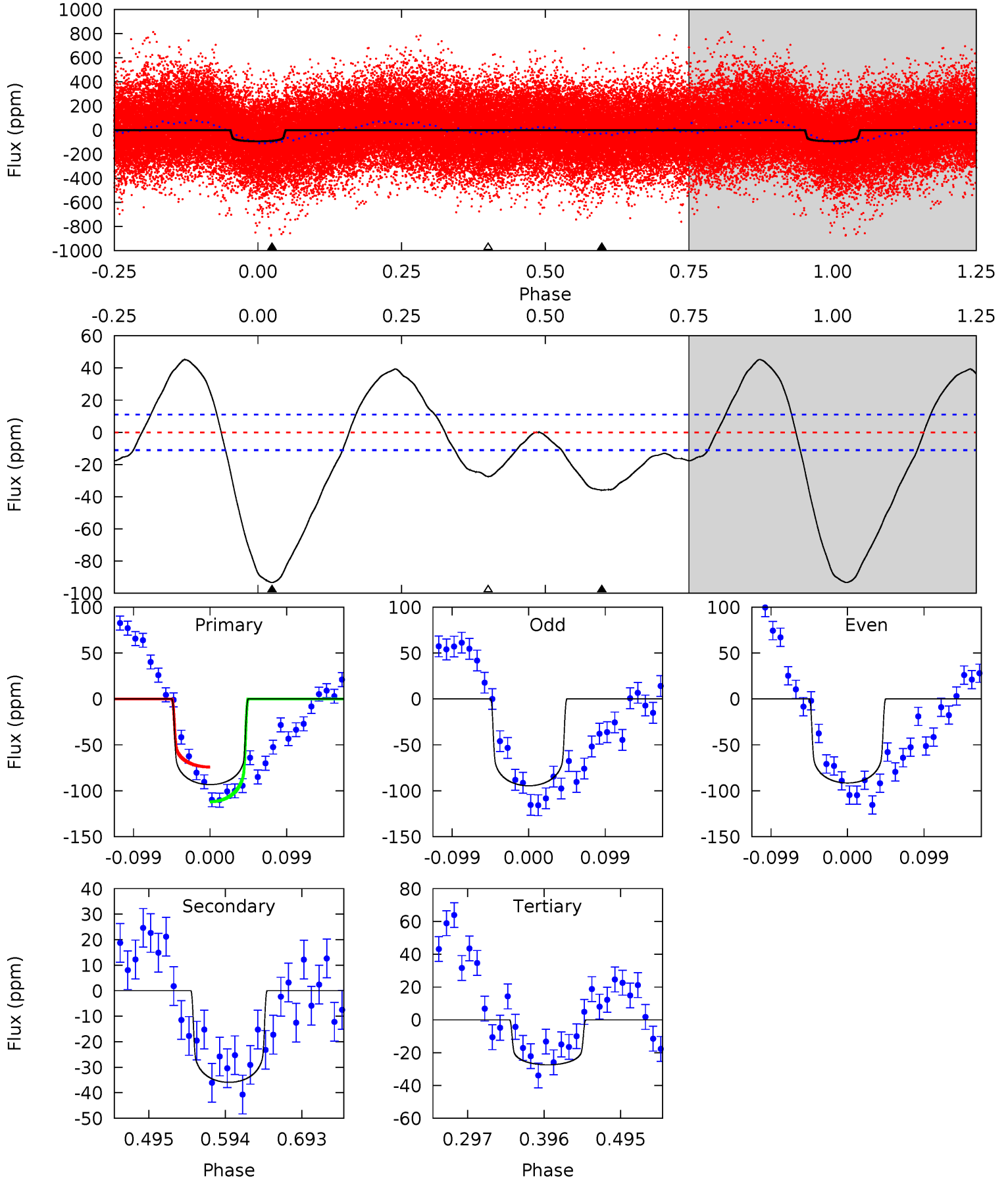




# DV Model-Shift Uniqueness Test

009268159-01, P = 6.777840 Days, E = 130.542507 Days

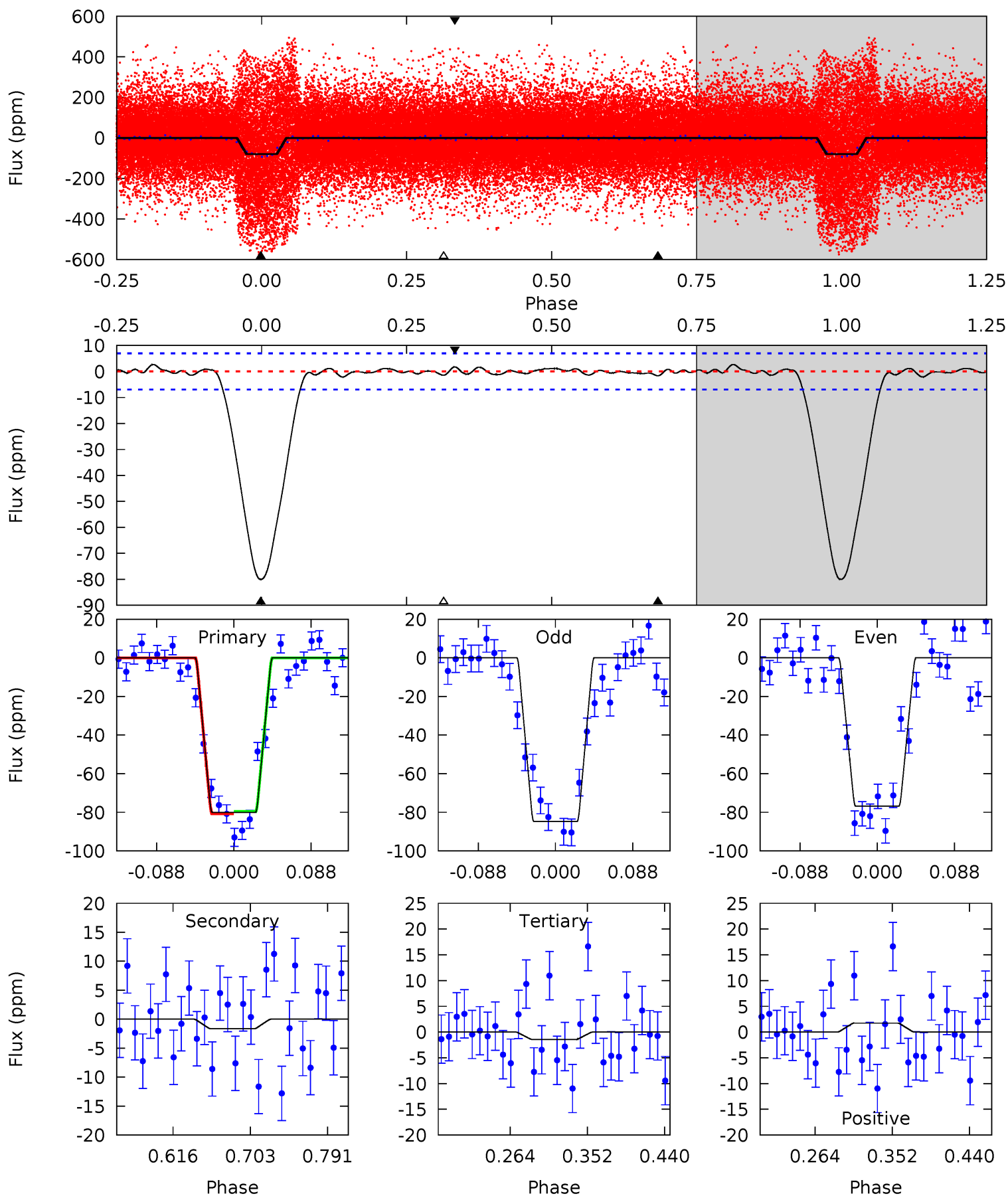
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
38.7	14.9	11.4	0	4.57	1.65	9.53	27.3	38.7	3.53	14.9	0.62	1.13	0.33	7.90



# Alt Model-Shift Uniqueness Test

009268159-01, P = 6.777612 Days, E = 130.554597 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
52.7	1.09	0.95	1.15	4.59	1.71	0.58	51.8	51.6	0.14	-0.06	2.60	1.11	0.03	0.36





### Stellar Parameters For KIC 009268159

	$T_{\text{eff}} (K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7365^{+203}_{-330}$	$3.628^{+0.504}_{-0.056}$	$-0.080^{+0.250}_{-0.300}$	$3.638^{+0.341}_{-1.820}$	$2.049^{+0.152}_{-0.608}$	$0.060^{+0.343}_{-0.011}$
	+3%/-4%	+14%/-2%	+312%/-375%	+9%/-50%	+7%/-30%	+572%/-19%
Source	KIC0	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 009268159-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-36 \pm 2$	$2.81^{+0.45}_{-0.73}$	$2782^{+181}_{-339}$	$6384^{+355}_{-327}$	$20^{+13}_{-5}$
Alt.	$-2 \pm 2$	$3.44^{+0.51}_{-0.92}$	$2796^{+167}_{-361}$	$2987^{+481}_{-5850}$	$0.643^{+0.763}_{-0.605}$

$T_{max}$  = Theoretical Maximum Planetary Temperature

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

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

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

## DV Centroid Data

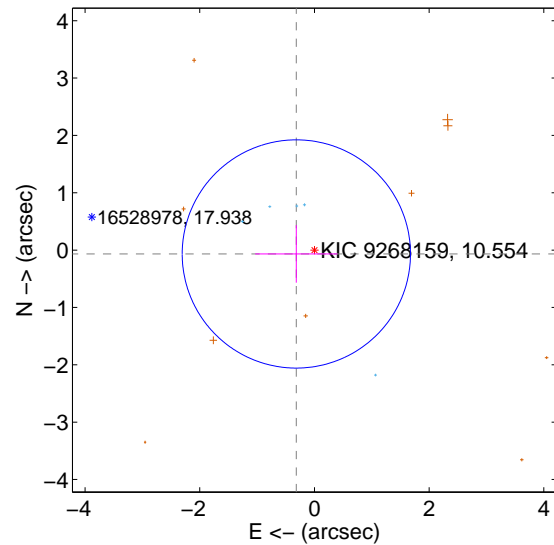
Supplemental centroid analysis for 009268159-01. **Kepler magnitude: 10.55.** Transit SNR 8.64

There are 5 quarters with good PRF difference image offsets

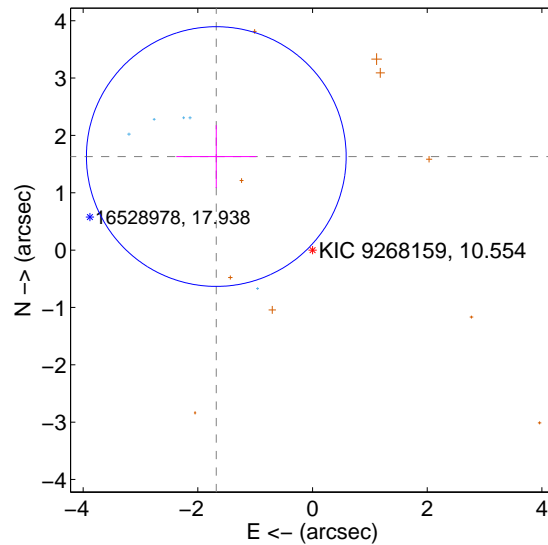
The direct PRF centroid is offset from the target star catalog position by about 1.19 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.323 \pm 0.663$	0.49	$0.316 \pm 0.718$	$-0.067 \pm 0.501$
PRF-fit source offset from KIC position	<b><math>2.340 \pm 0.755</math></b>	<b>3.10</b>	$1.678 \pm 0.699$	$1.631 \pm 0.547$
photometric centroid source offset	<b><math>2.18 \pm 0.45</math></b>	<b>4.90</b>	$1.50 \pm 0.48$	$1.59 \pm 0.41$

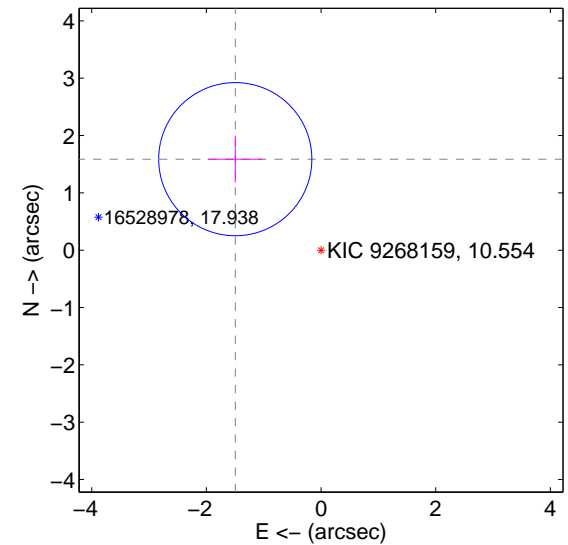
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

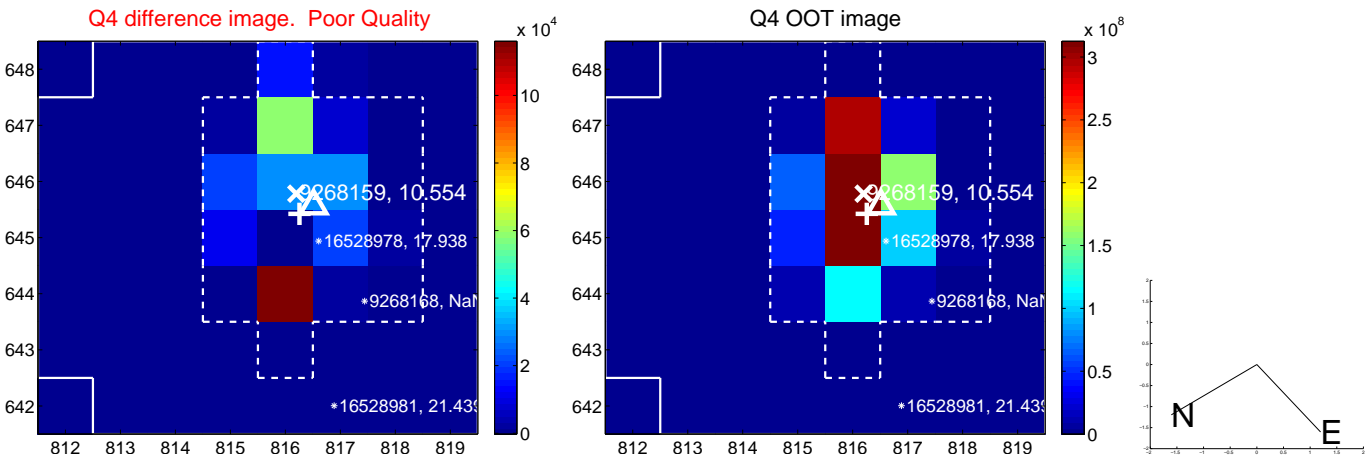
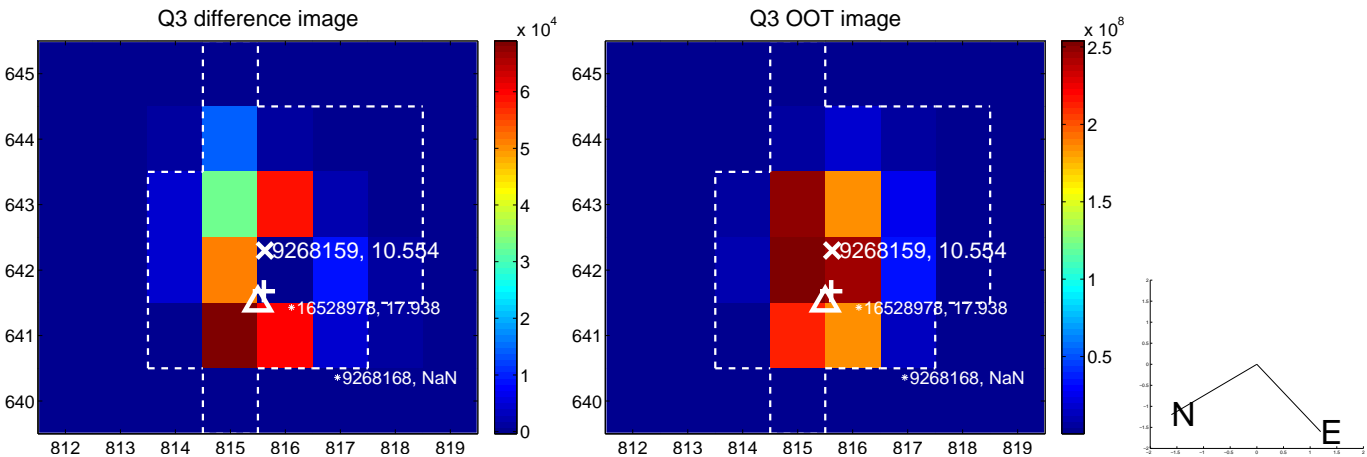
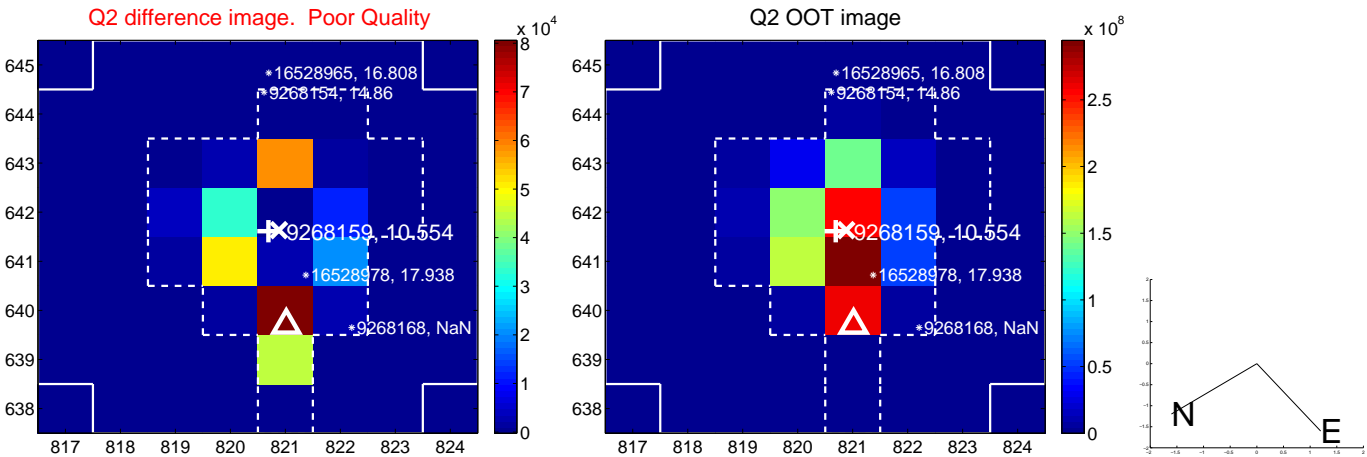
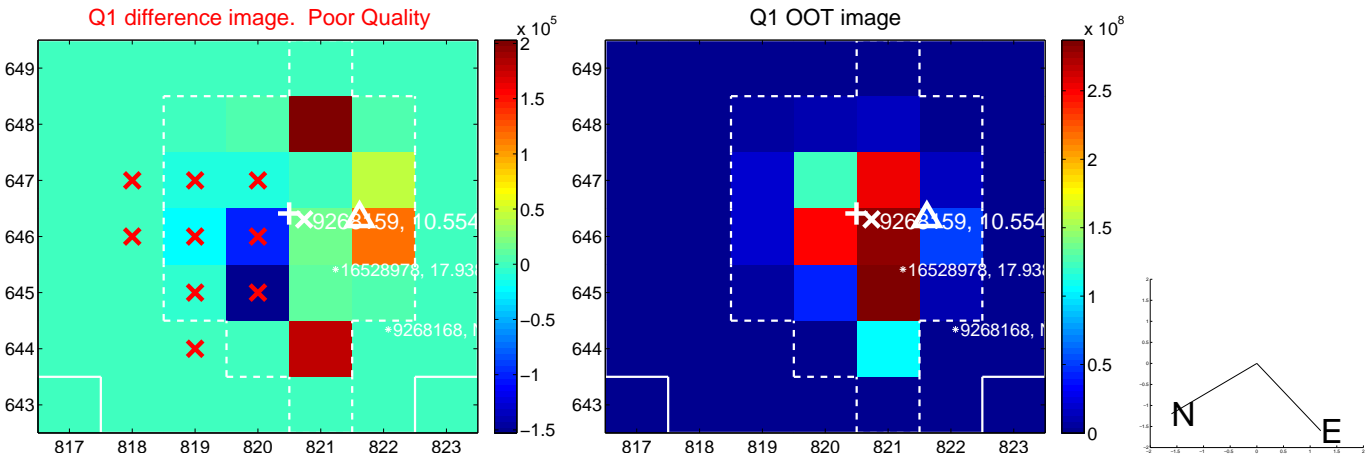


offset from photometric centroids

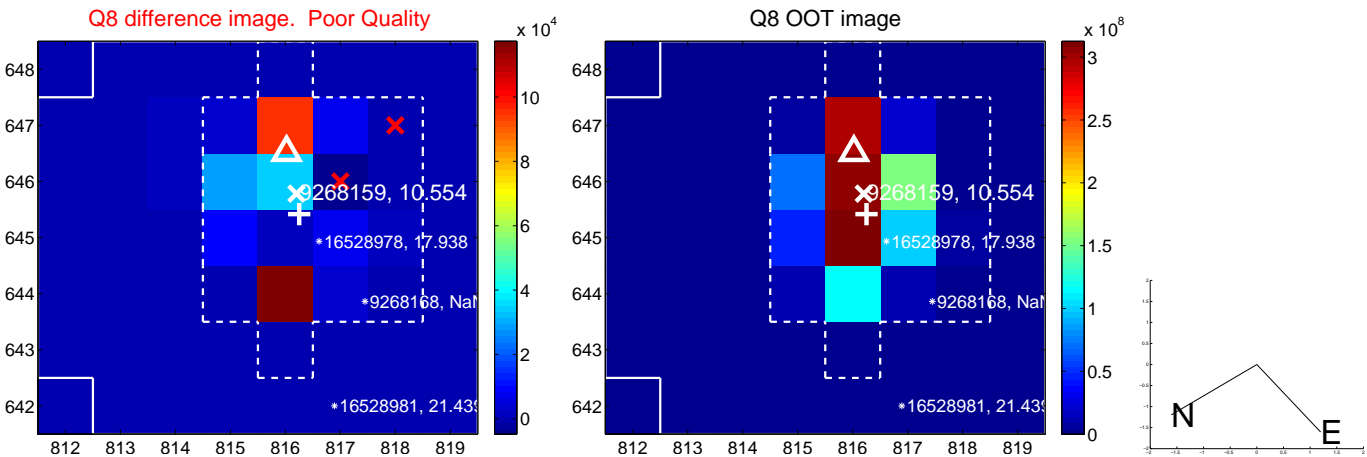
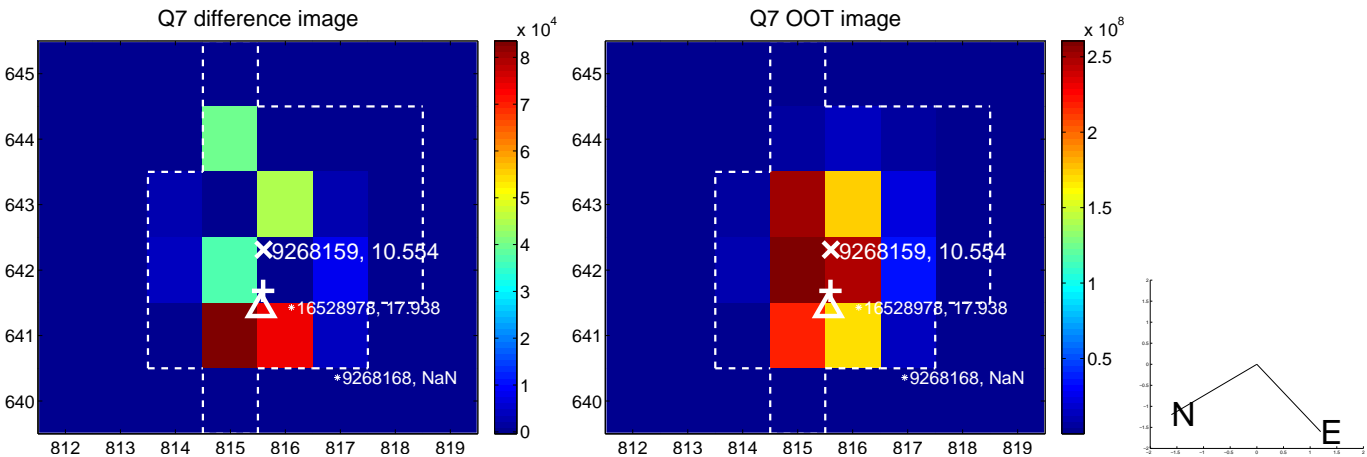
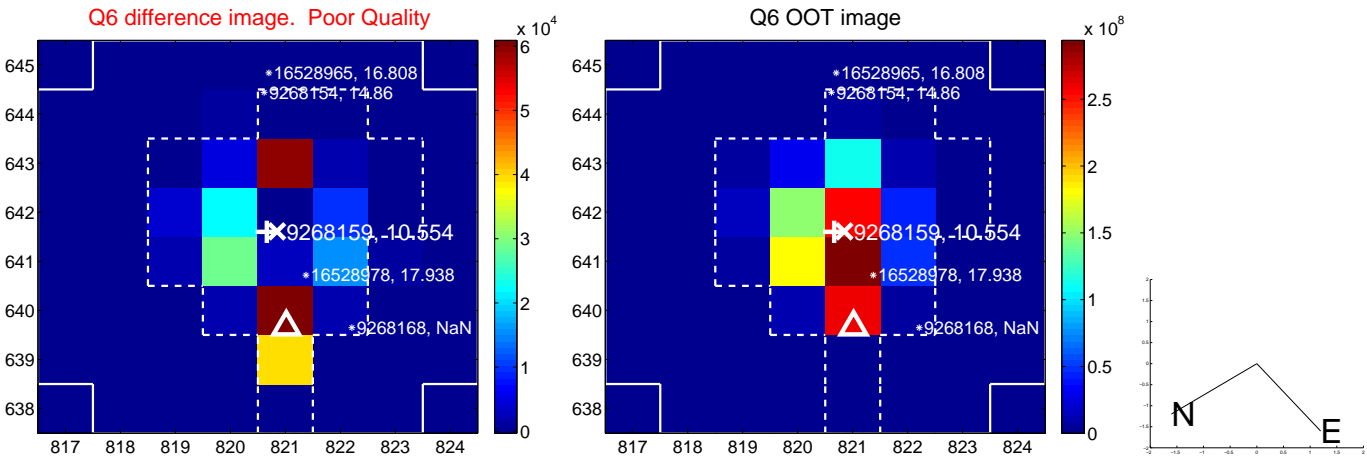
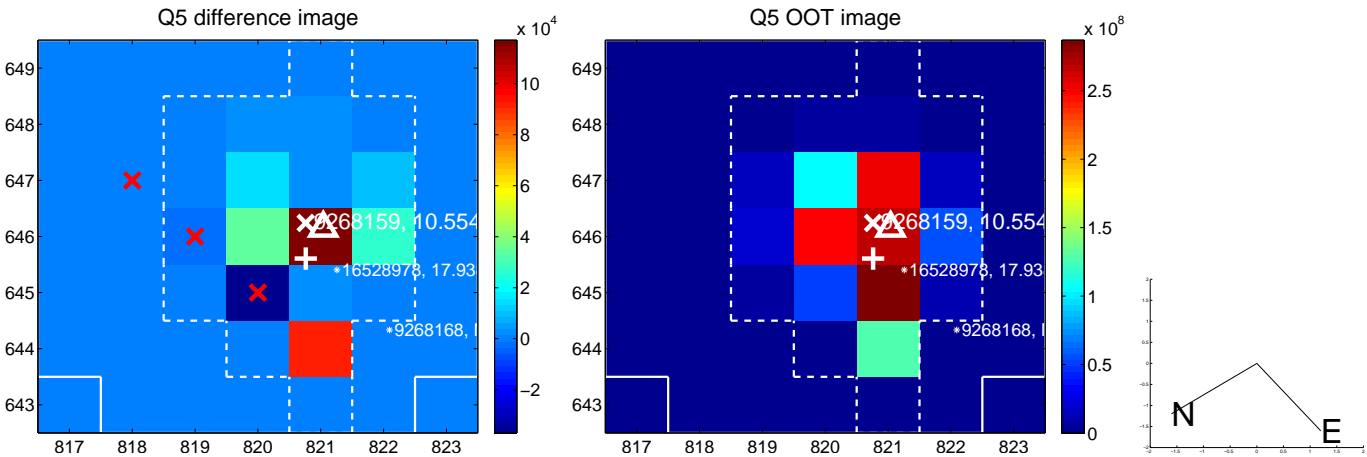


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

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

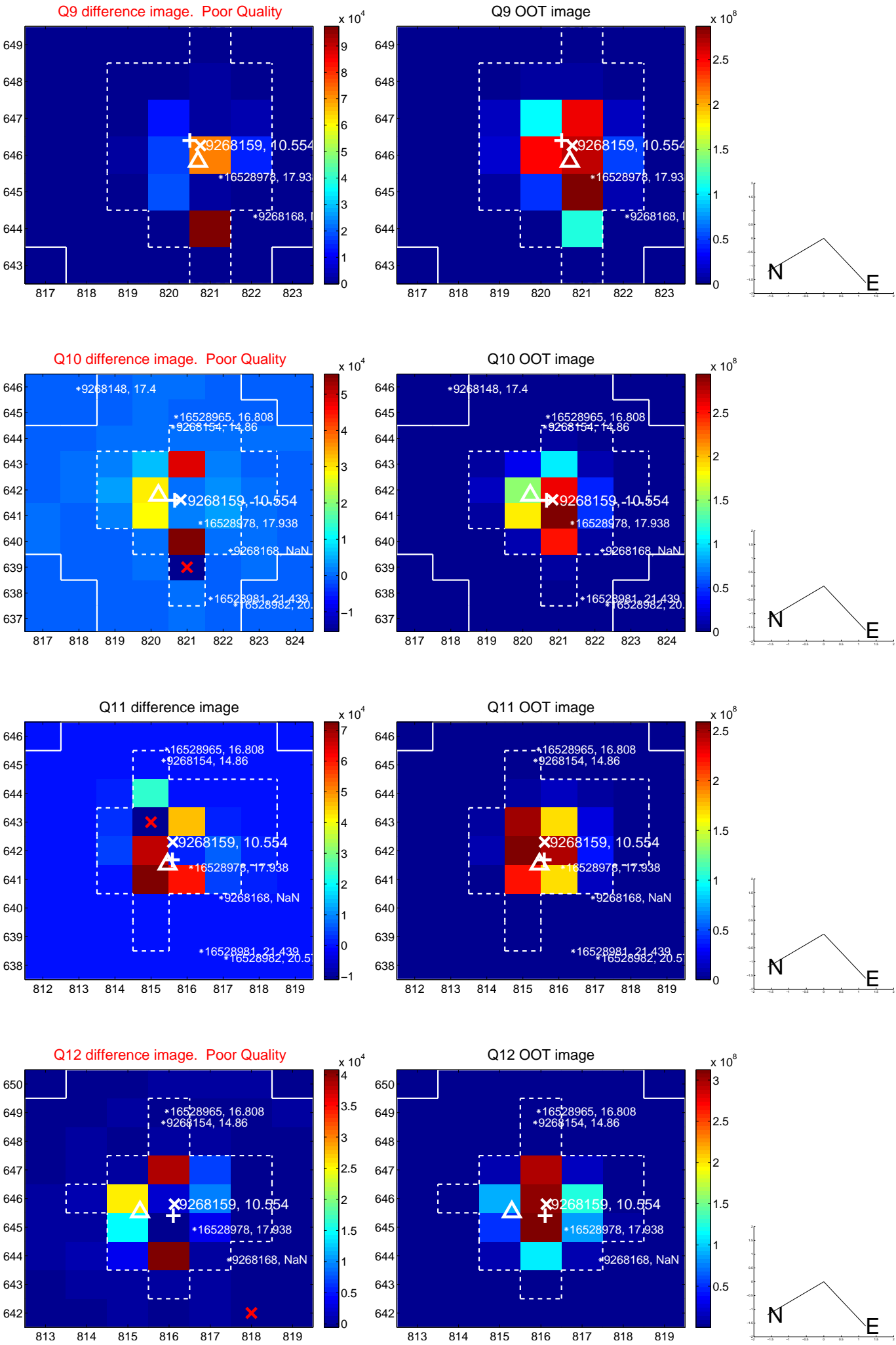


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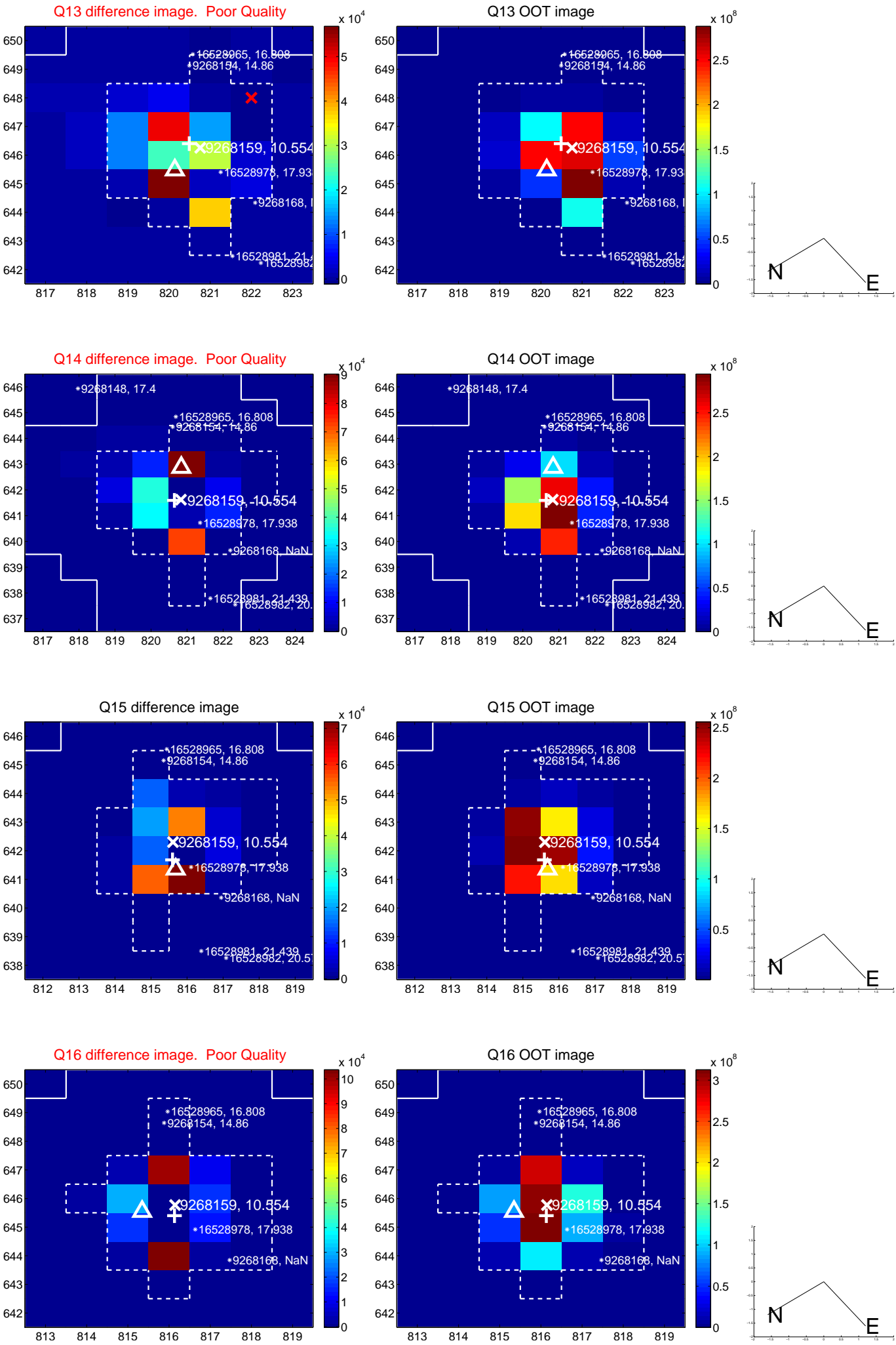




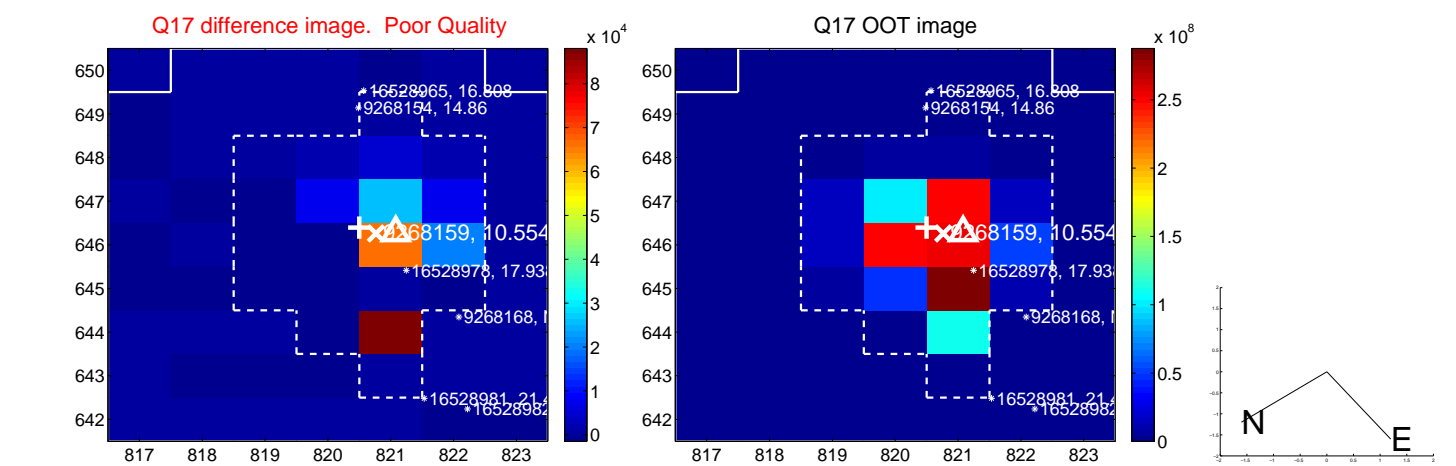
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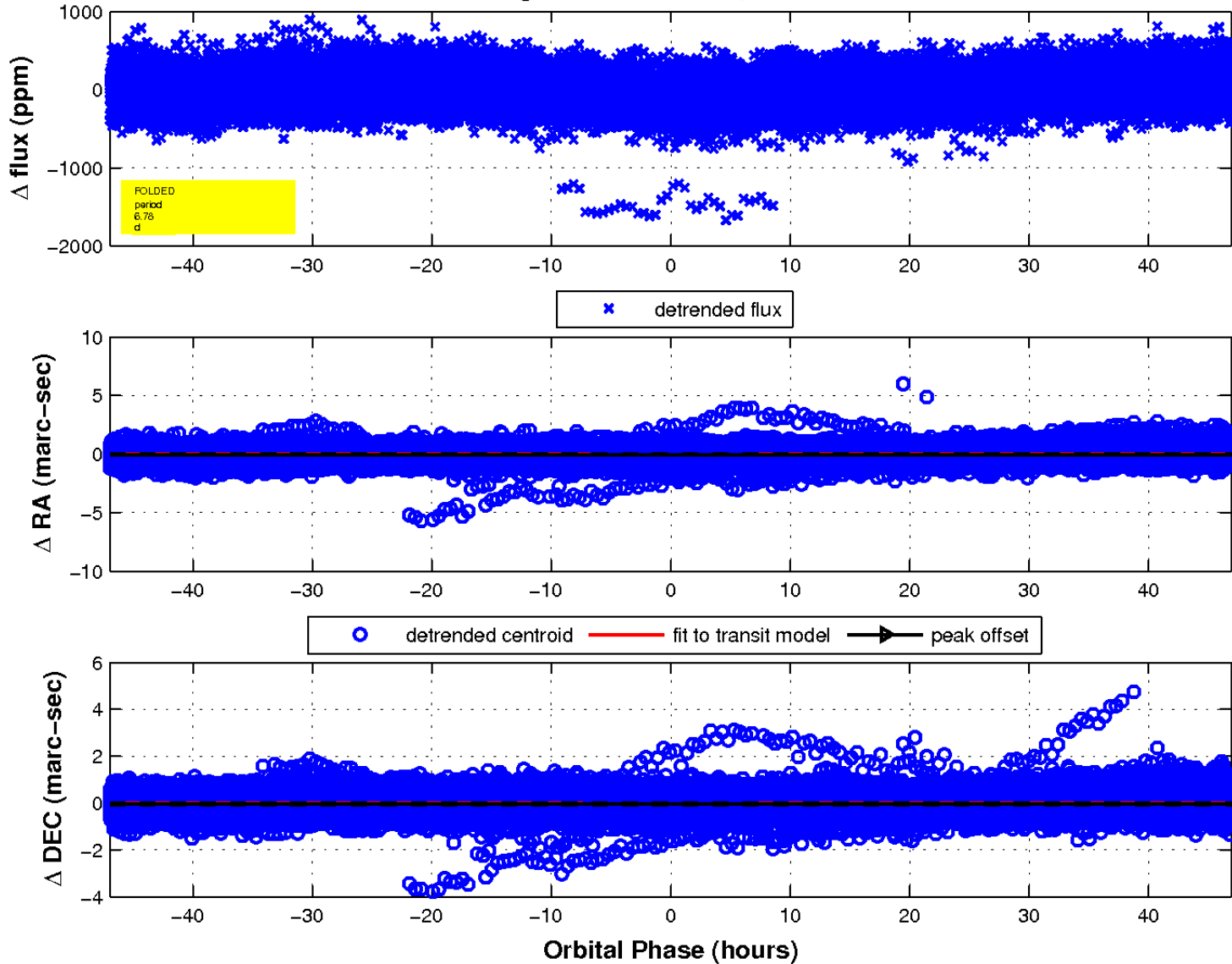
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

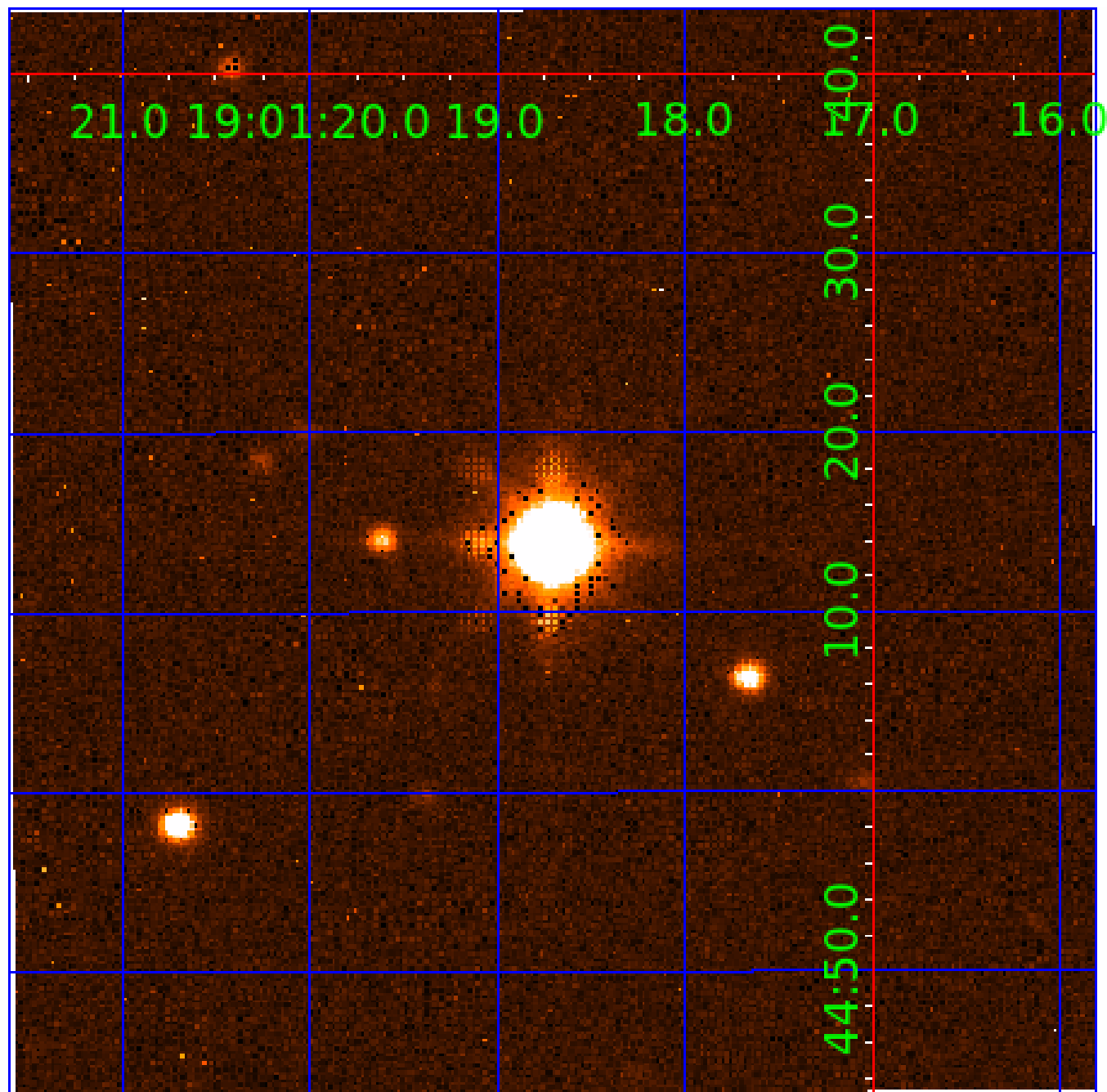


fluxWeightedCentroids, Planet 1 of 4



UKIRT Image

Declination





# KIC 009268159

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009268159-01	OBS	No	6.777840	137.320347	51.4	15.646	9.0	8.6	3.64	7365	3.02	4399.18
009268159-02	OBS	No	526.197511	330.783574	232.8	2.543	8.8	4.3	3.64	7365	6.32	13.28
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009268159-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV— MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
009268159-03	OBS	PC	0.29	0	0	0	0	CENT_SATURATED
009268159-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_SKYE—CENT_SATURATED

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

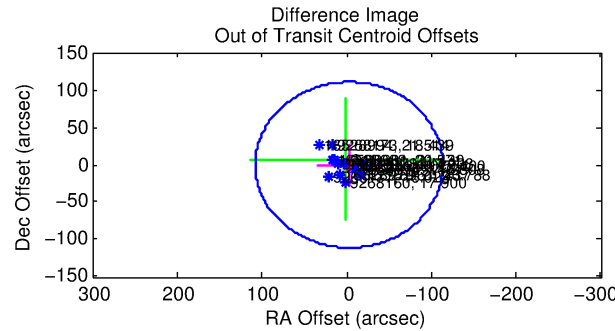
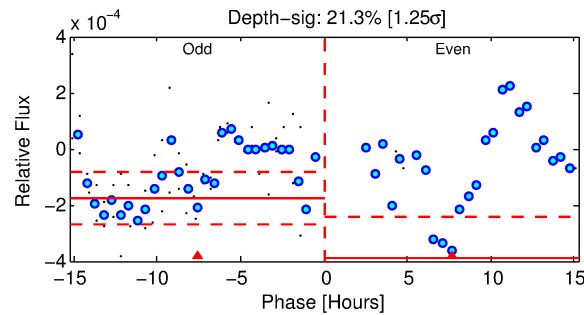
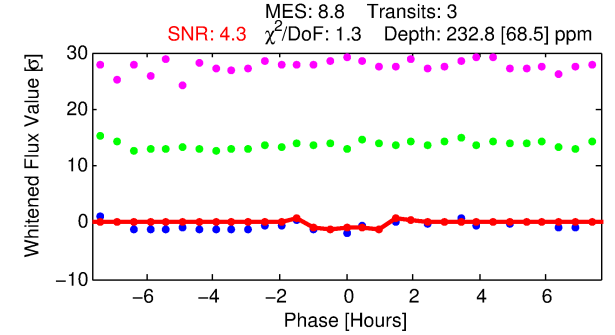
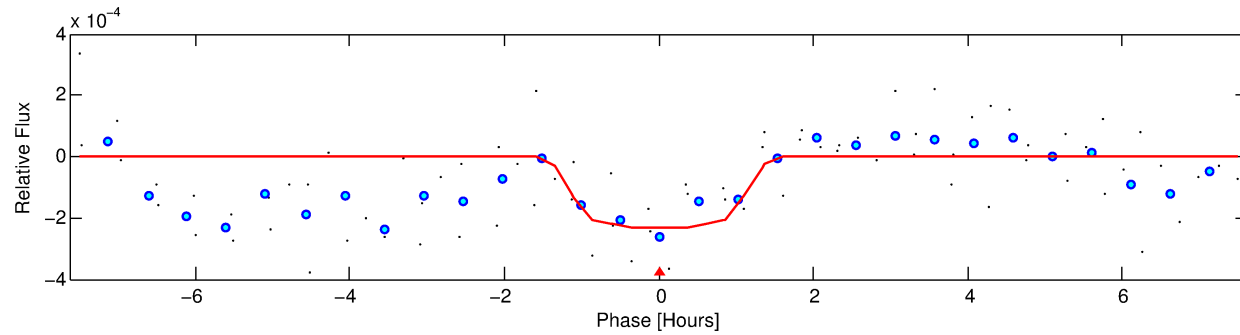
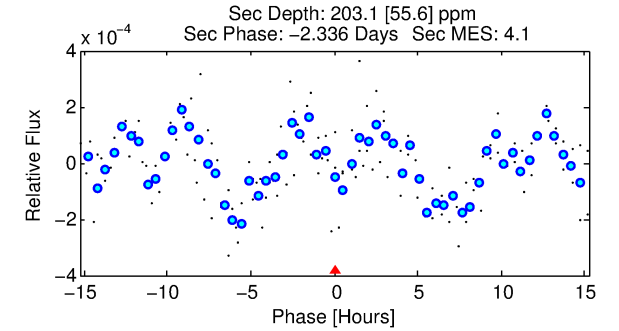
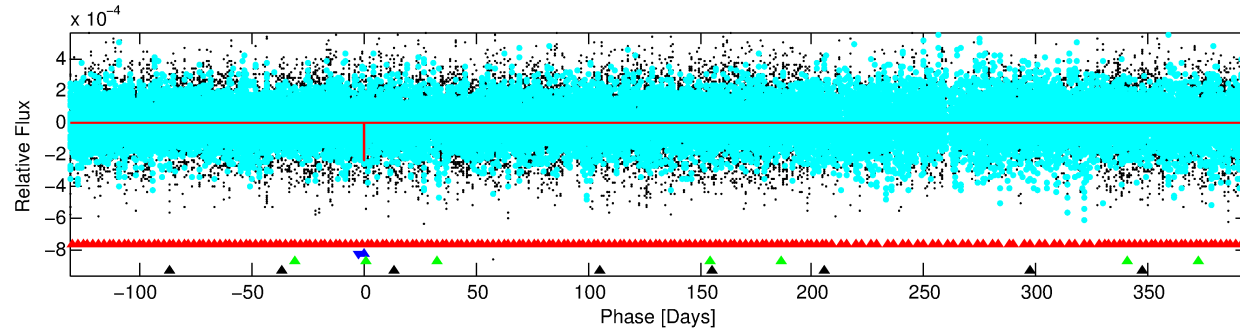
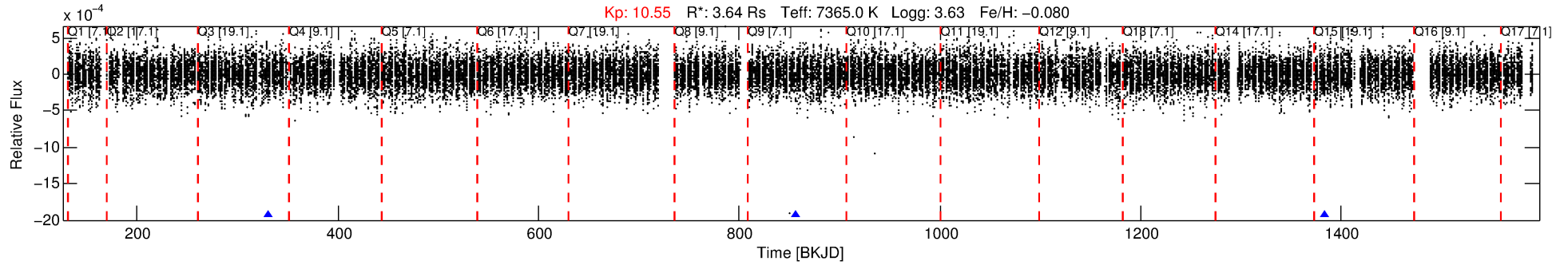
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009268159-02

No Significant Match Found

# DV One-Page Summary

KIC: 9268159 Candidate: 2 of 4 Period: 526.198 d



## DV Fit Results:

Period = 526.19751 [0.00924] d  
Epoch = 330.7836 [0.0104] BKJD  
Rp/R\* = 0.0159 [0.0491]  
a/R\* = 835.05 [16737.27]  
b = 0.87 [5.77]  
Seff = 13.28 [11.44]  
Teq = 487 [105] K  
Rp = 6.32 [19.74] Re  
a = 1.6207 [0.8278] AU  
Ag = 7358.17 [45873.93] [0.16 $\sigma$ ]  
Teffp = 6971 [10770] K [0.60 $\sigma$ ]

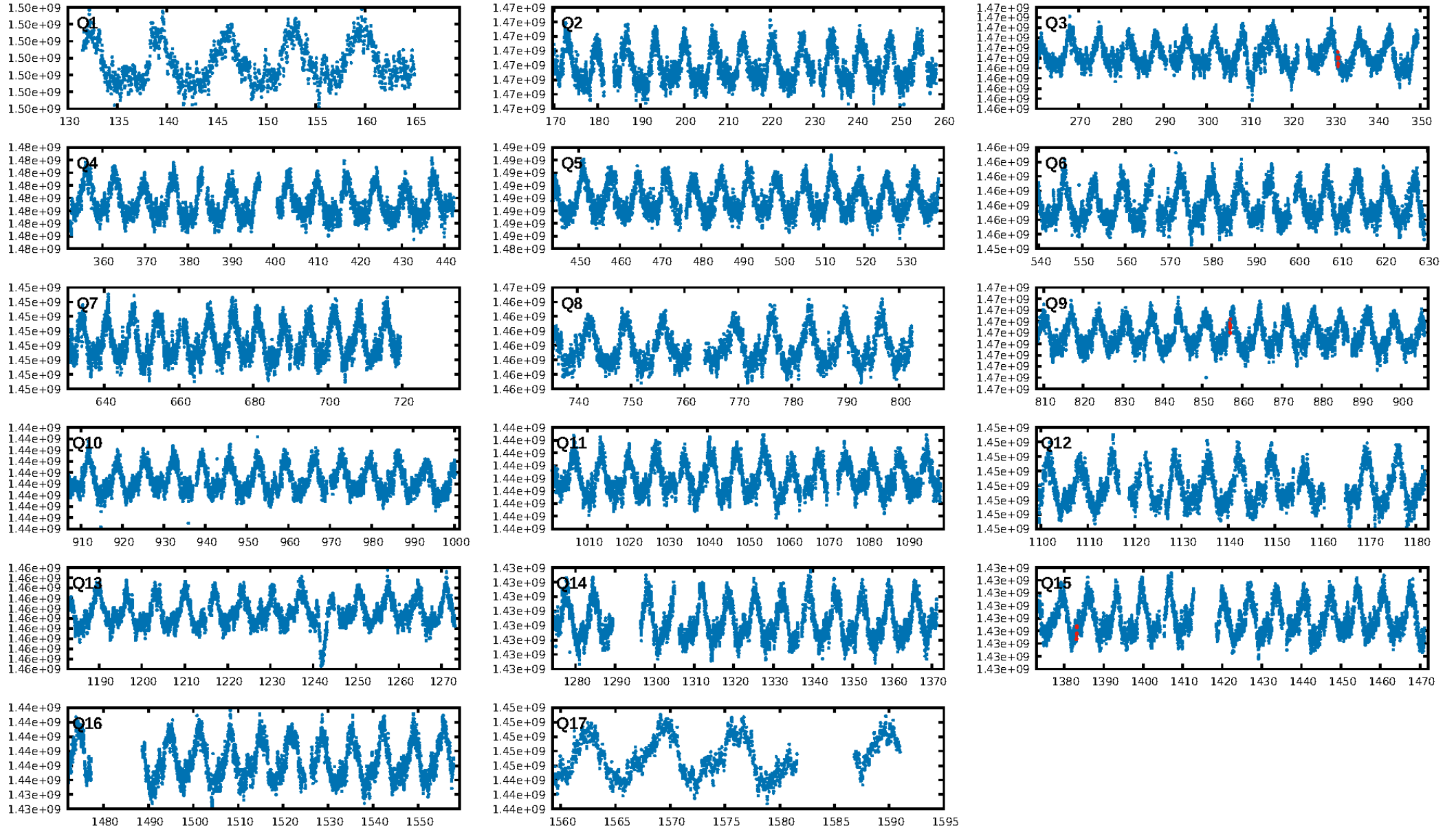
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [702.60 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 9.8%  
ModelChiSquareGof-sig: 71.6%  
**Bootstrap-pfa: 3.49e-10**  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 3.394  
Centroid-sig: 1.5%  
Centroid-so: 2.614 arcsec [2.61 $\sigma$ ]  
OotOffset-rm: 2.851 arcsec [0.08 $\sigma$ ]  
OotOffset-st: 0.2/0/1 [3]  
KicOffset-rm: 1.404 arcsec [0.04 $\sigma$ ]  
KicOffset-st: 0.2/0/1 [3]  
DiffImageQuality-fgm: 0.67 [2/3]  
DiffImageOverlap-fno: 1.00 [3/3]

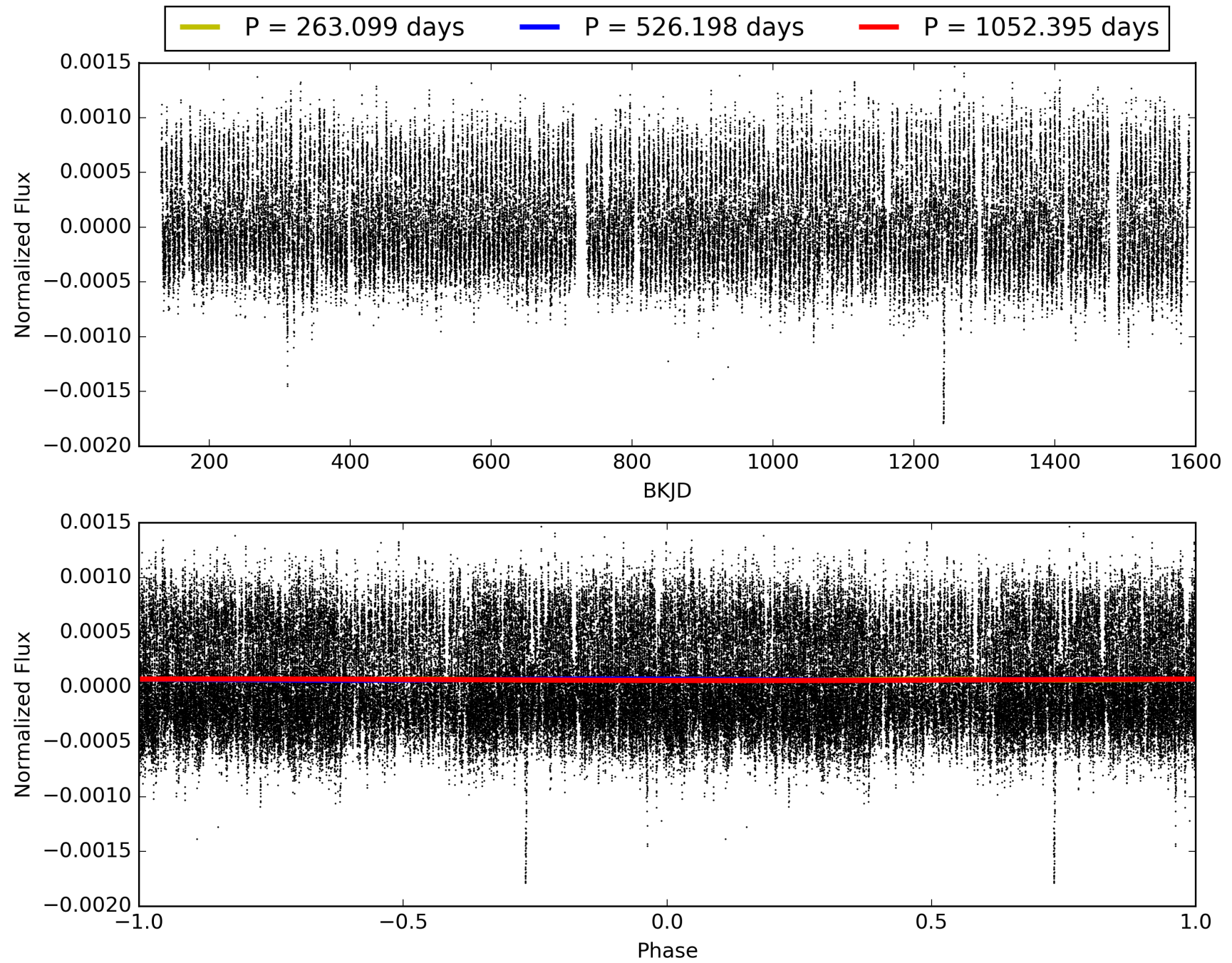
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 12:11:28 Z

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

# TCE 009268159-02, PDC Light Curves

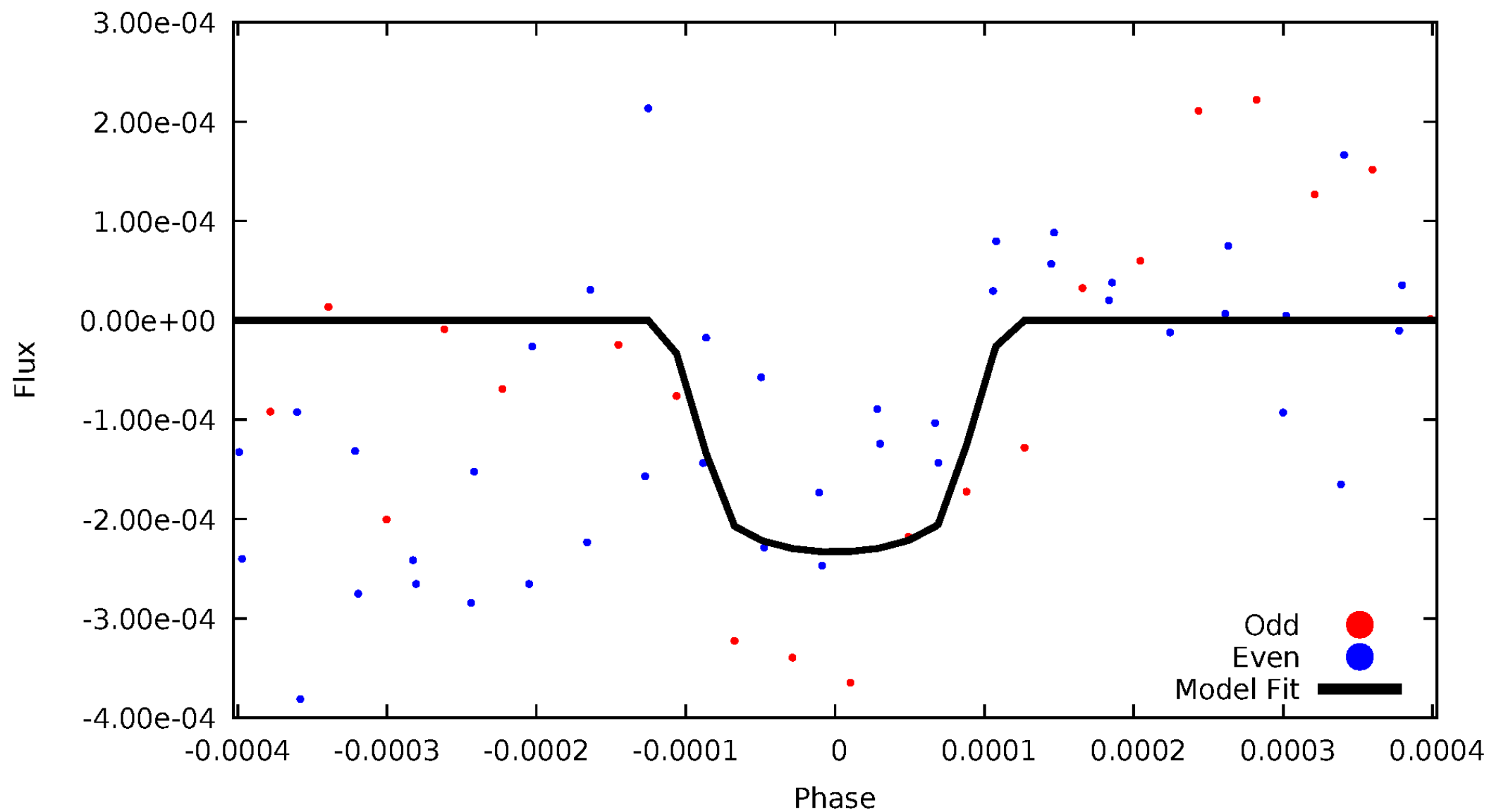


TCE 009268159-02



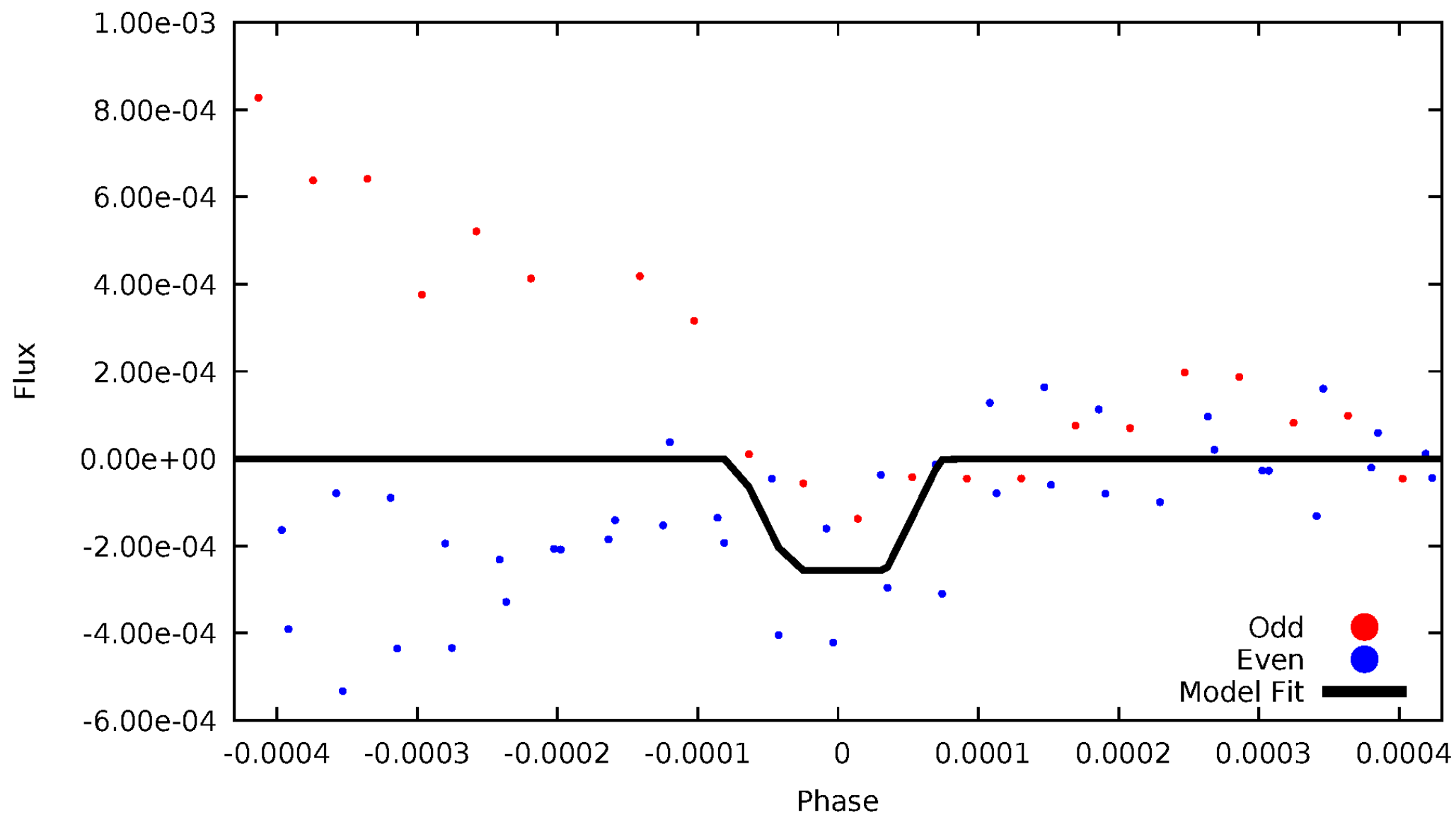
# DV Odd/Even

TCE 009268159-02



# ALT Odd/Even

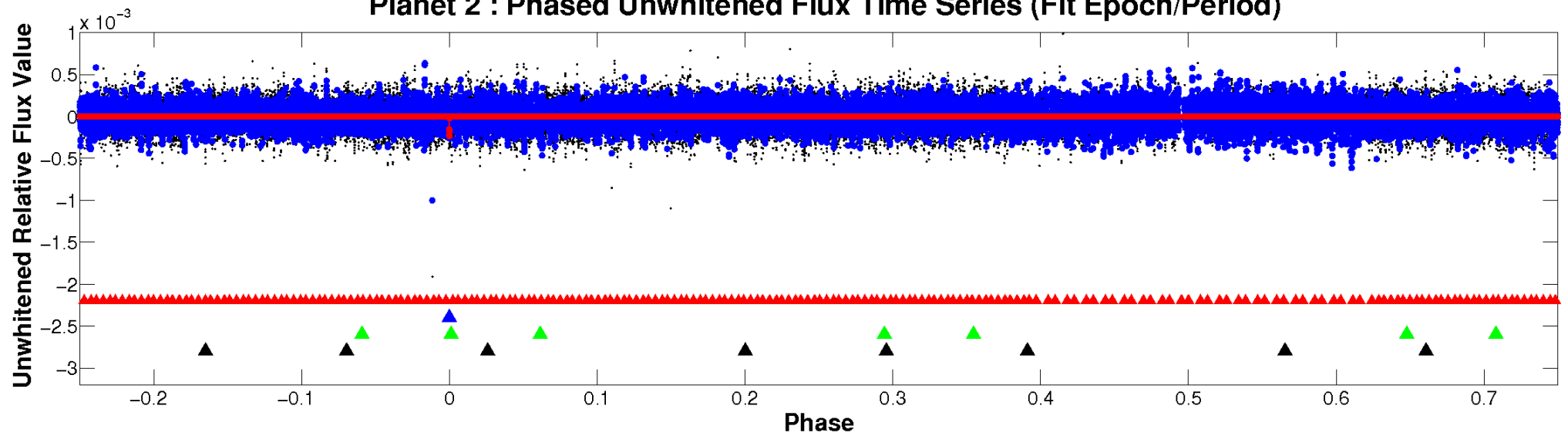
TCE 009268159-02



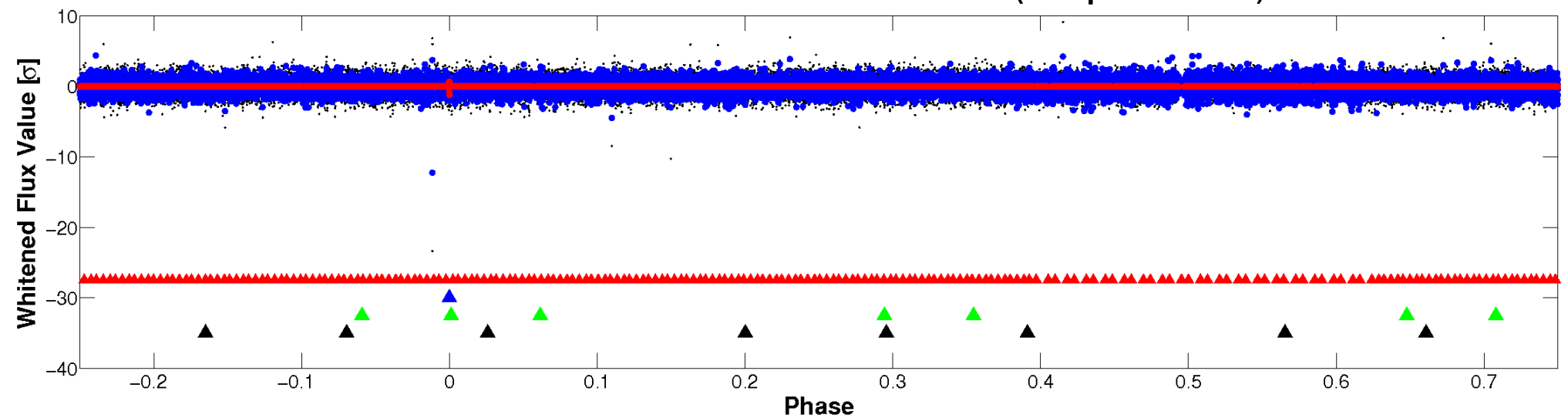


# Non-Whitened Vs. Whitened Light Curve

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

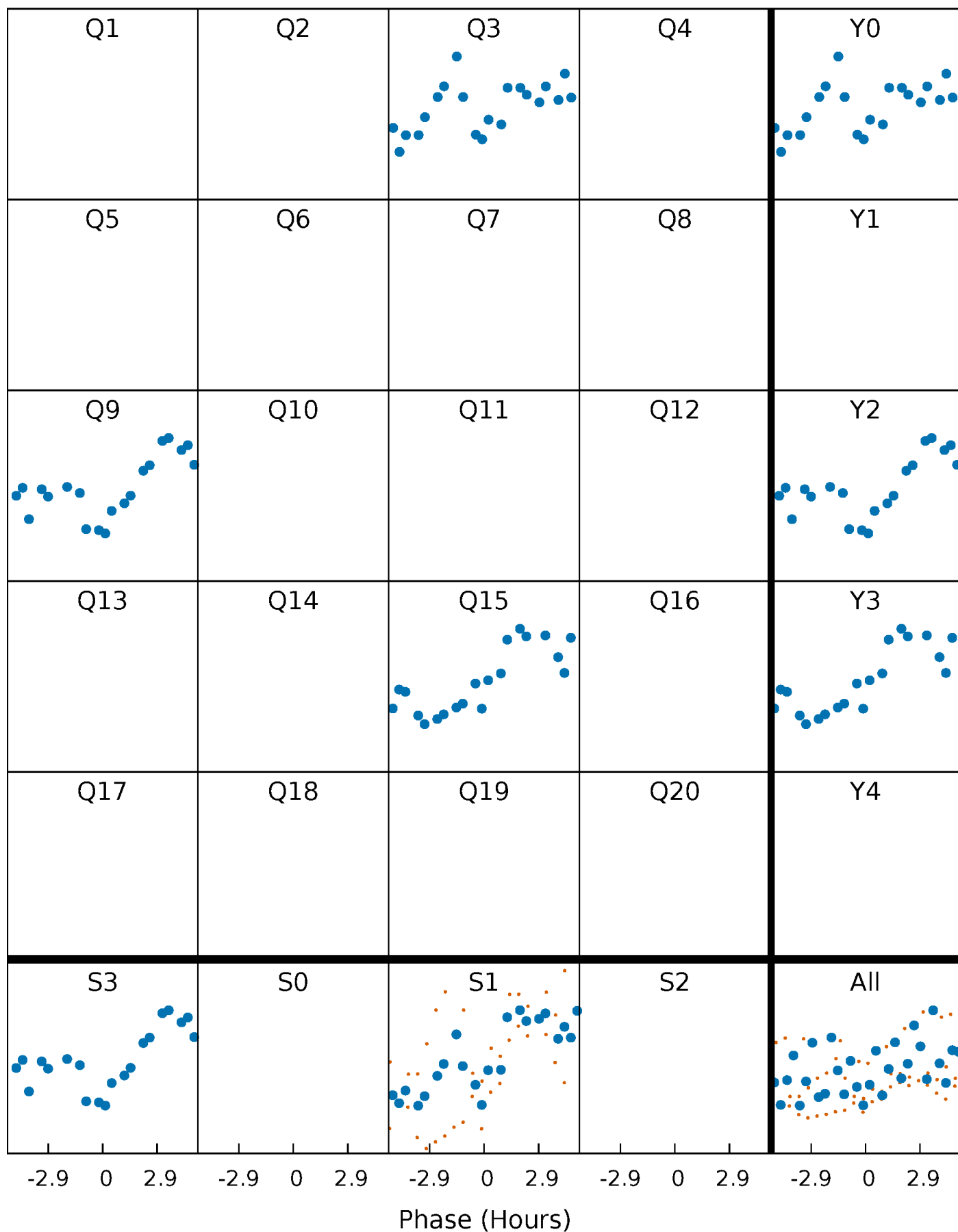


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



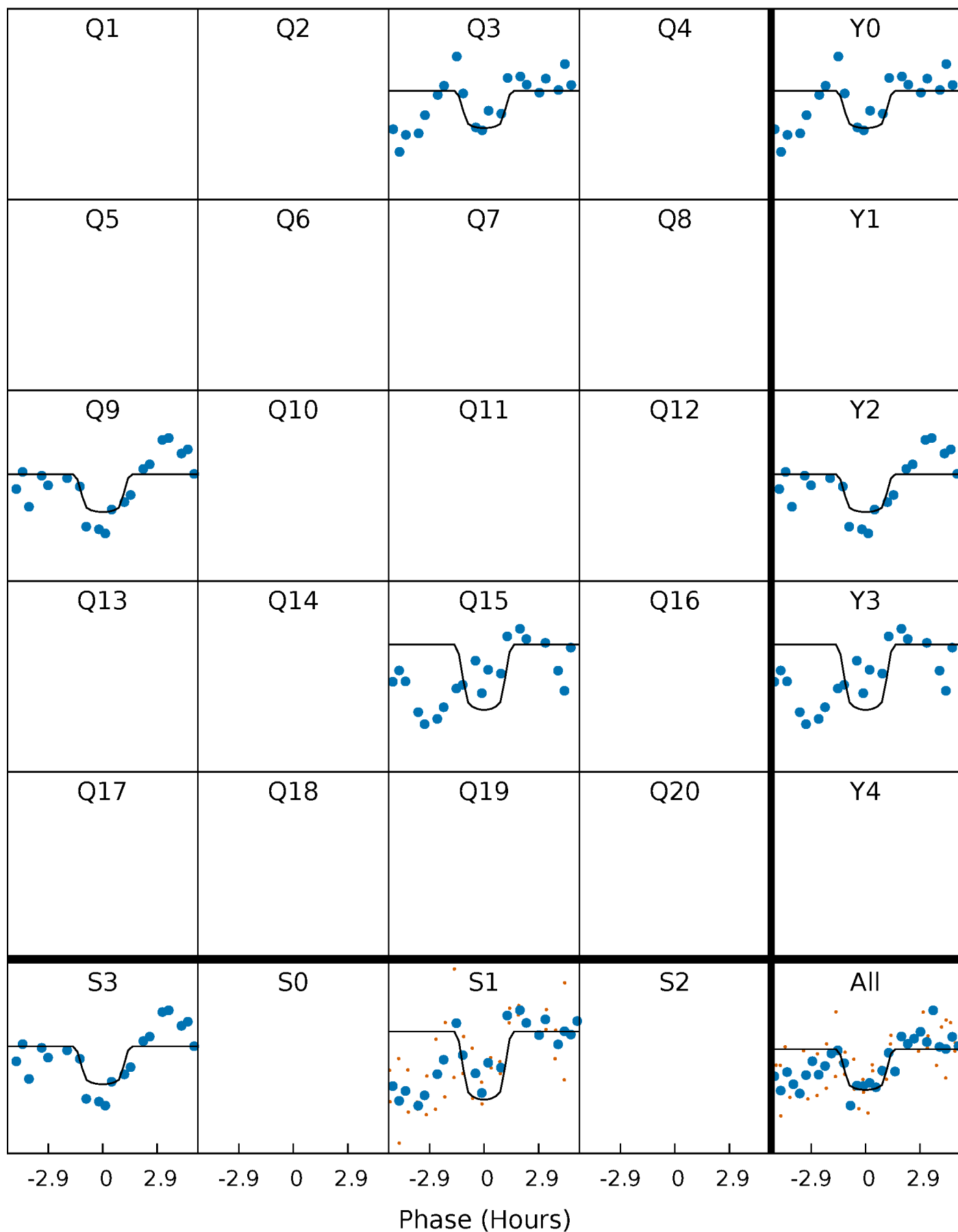
# PDC Quarter-Phased Transit Curves

TCE 009268159-02   P=526.197511 Days    $T_0=330.783574$  (BKJD)



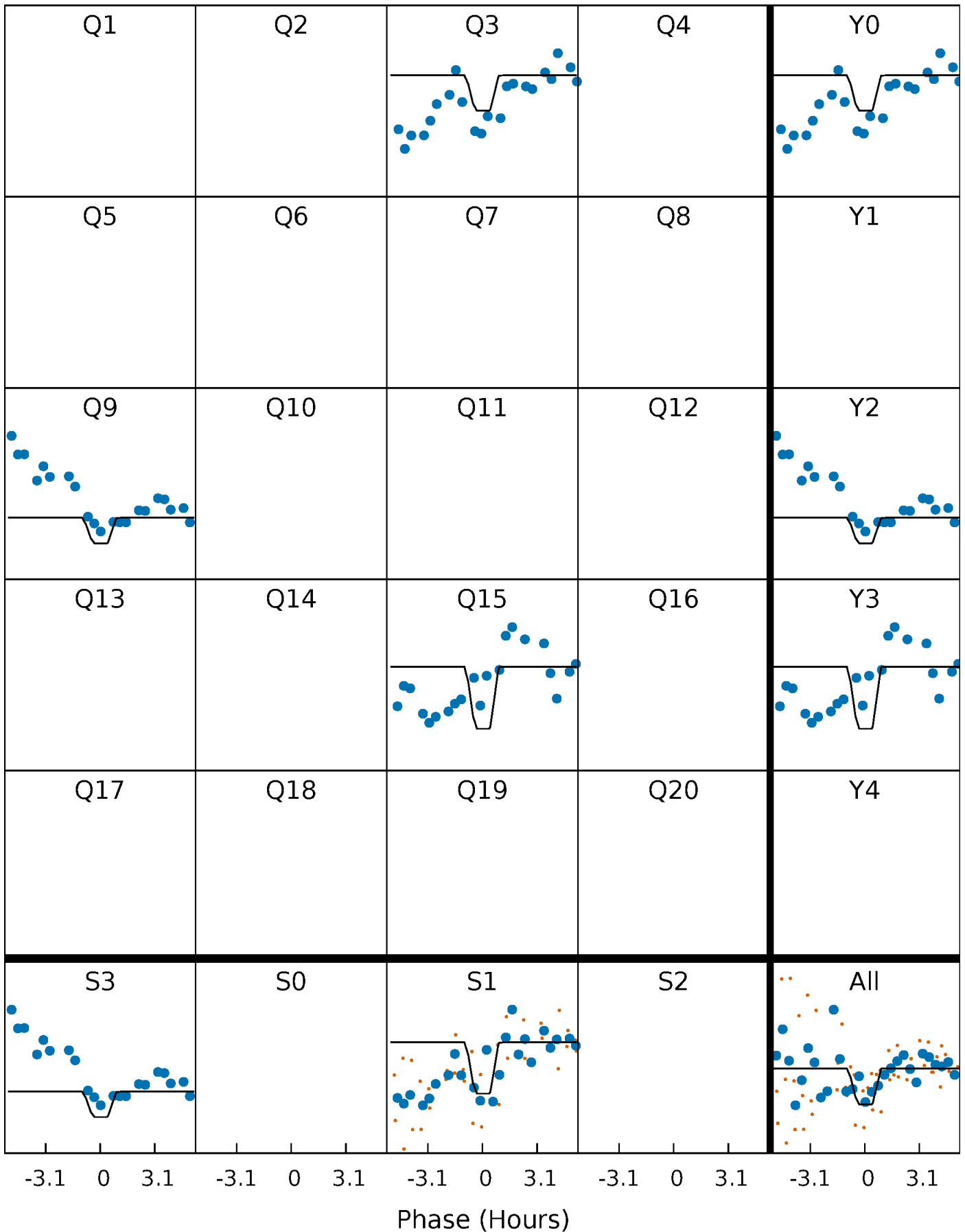
# DV Quarter-Phased Transit Curves

TCE 009268159-02 P=526.197511 Days  $T_0=330.783574$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

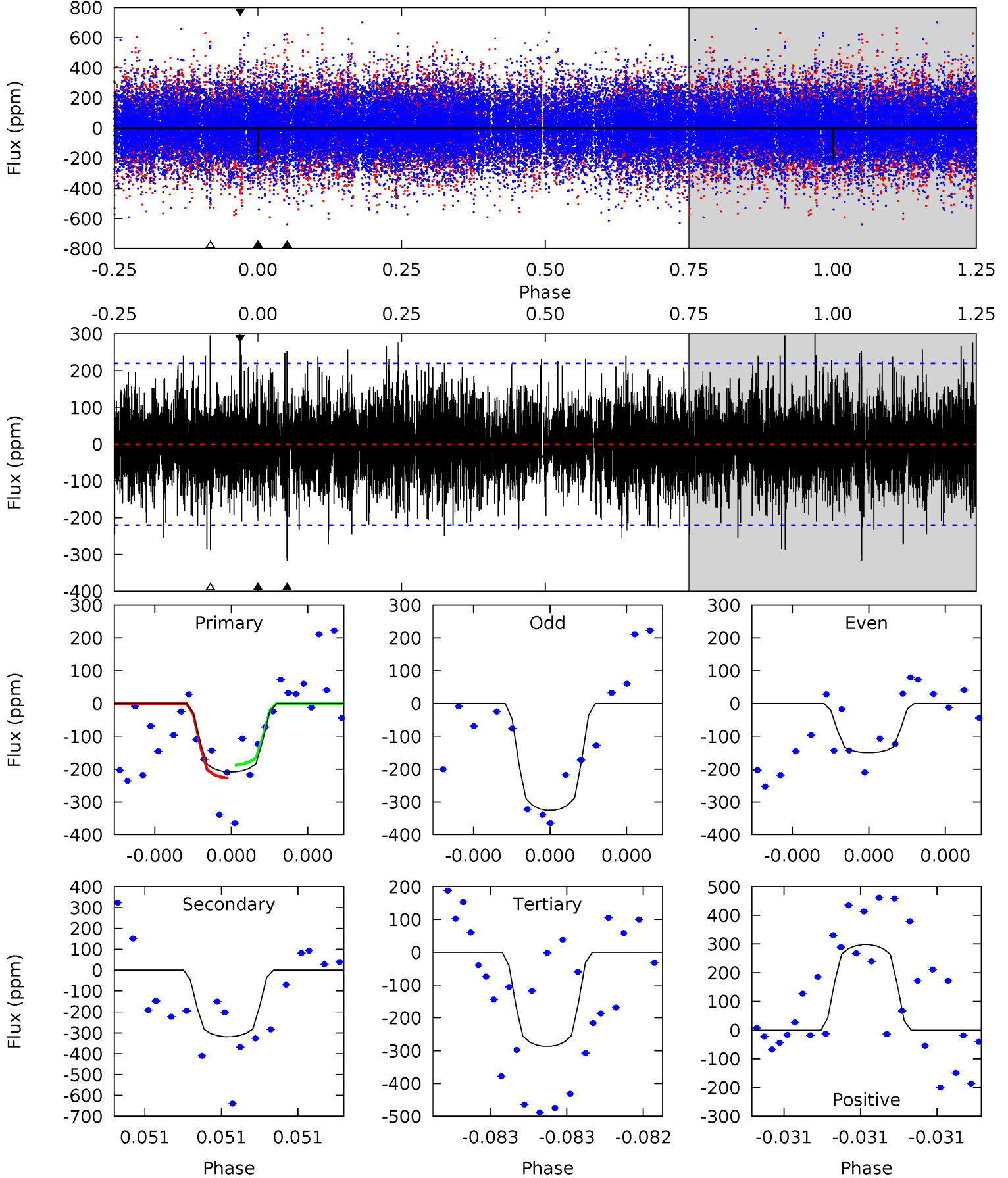
TCE 009268159-02 P=526.198226 Days  $T_0=330.780855$  (BKJD)



# DV Model-Shift Uniqueness Test

009268159-02, P = 526.197511 Days, E = 330.783574 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.42	8.28	7.46	7.74	5.72	3.70	1.86	-2.04	-2.33	0.82	0.54	2.13	1.17	0.48	0.51

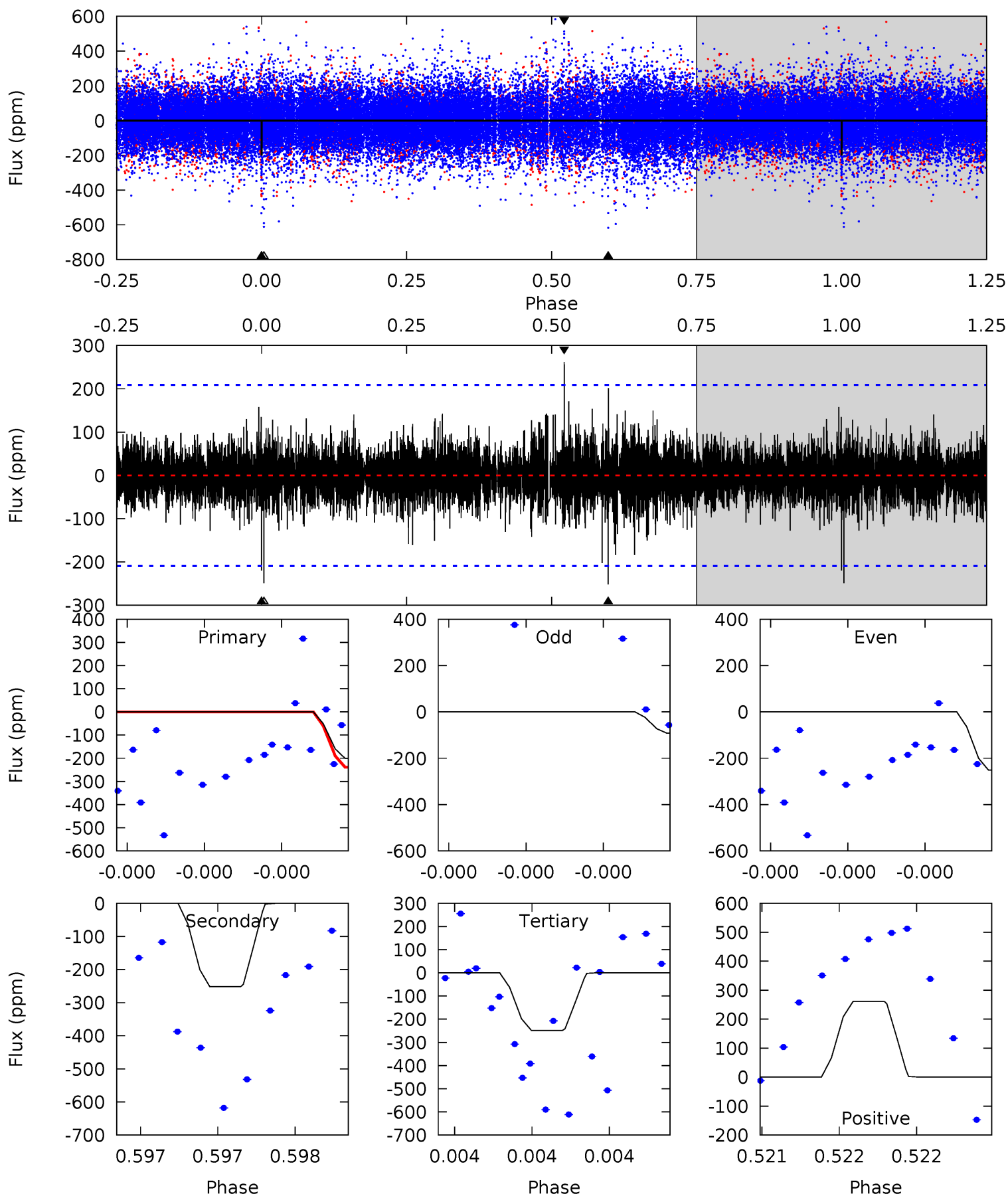




# Alt Model-Shift Uniqueness Test

009268159-02, P = 526.198226 Days, E = 330.780855 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.55	6.98	6.89	7.25	5.79	3.81	1.03	-1.34	-1.70	0.09	-0.28	2.02	2.09	0.51	1.20



### Stellar Parameters For KIC 009268159

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7365^{+203}_{-330}$	$3.628^{+0.504}_{-0.056}$	$-0.080^{+0.250}_{-0.300}$	$3.638^{+0.341}_{-1.820}$	$2.049^{+0.152}_{-0.608}$	$0.060^{+0.343}_{-0.011}$
	+3%/-4%	+14%/-2%	+312%/-375%	+9%/-50%	+7%/-30%	+572%/-19%
Source	KIC0	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 009268159-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-319 \pm 38$	$13.90^{+14.49}_{-9.30}$	$653^{+43}_{-85}$	$4852^{+3827}_{-1093}$	$2268^{+18138}_{-1709}$
Alt.	$-252 \pm 36$	$14.00^{+14.35}_{-9.81}$	$648^{+47}_{-85}$	$4624^{+3650}_{-994}$	$1847^{+18537}_{-1402}$

$T_{max}$  = Theoretical Maximum Planetary Temperature

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

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

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

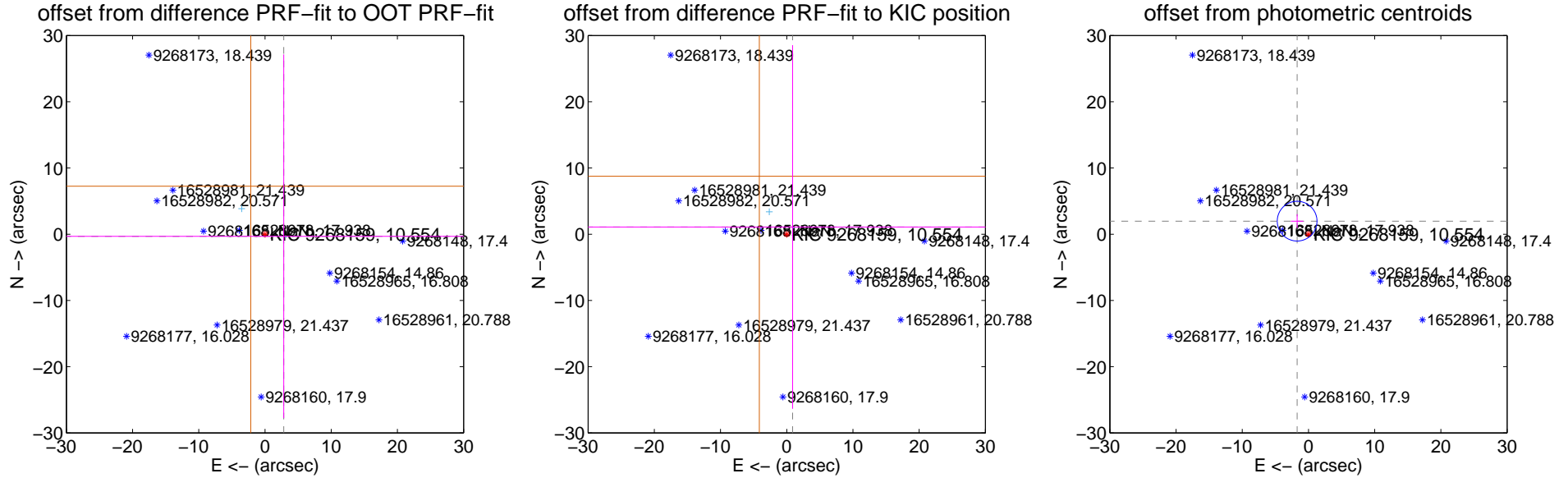
## DV Centroid Data

Supplemental centroid analysis for 009268159-02. **Kepler magnitude: 10.55.** Transit SNR 4.27

There are 2 quarters with good PRF difference image offsets

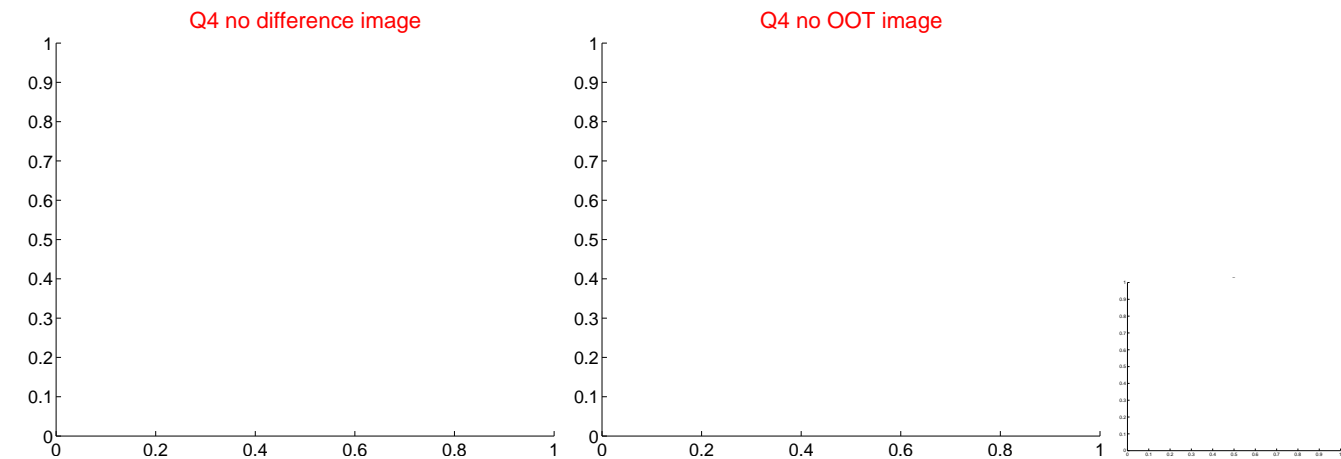
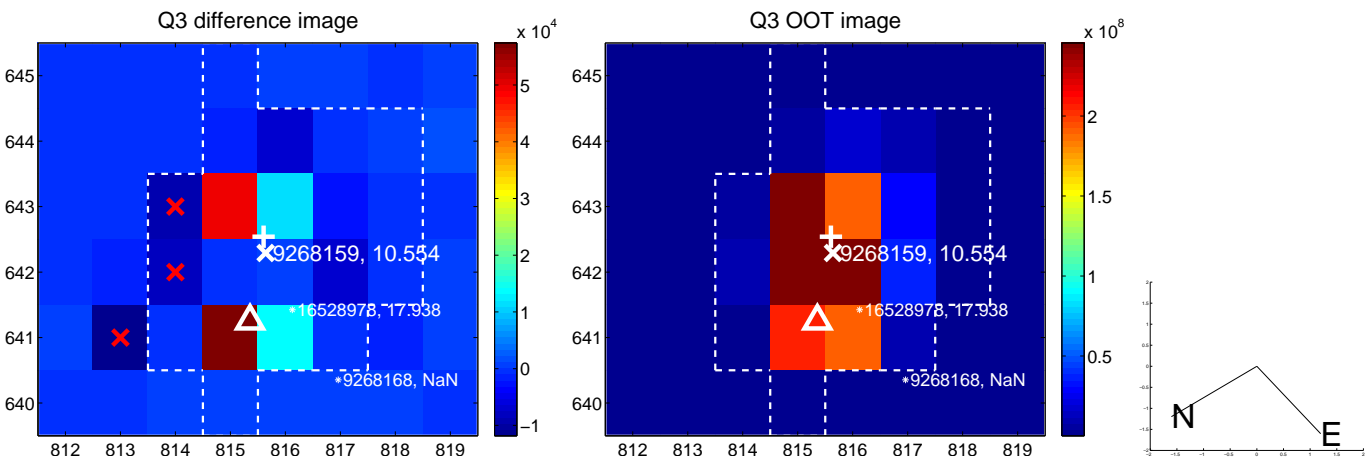
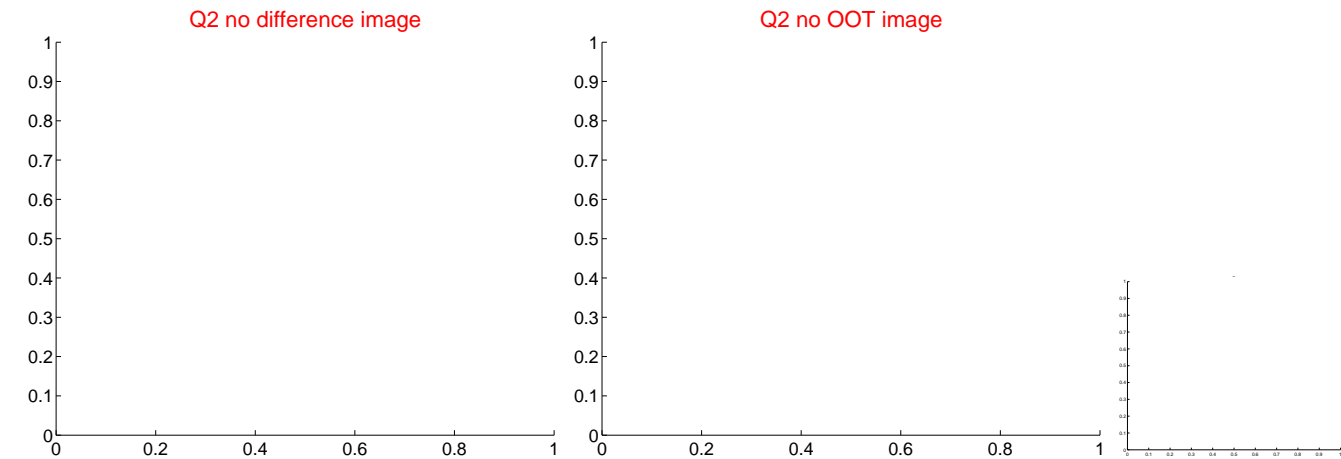
The OOT PRF centroid is offset from the target star catalog position by about 2.49 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.851 \pm 36.993$	0.08	$-2.834 \pm 37.094$	$-0.313 \pm 27.448$
PRF-fit source offset from KIC position	$1.404 \pm 31.617$	0.04	$-0.883 \pm 37.094$	$1.092 \pm 27.448$
photometric centroid source offset	$2.61 \pm 1.00$	2.61	$1.71 \pm 0.94$	$1.97 \pm 1.04$



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.

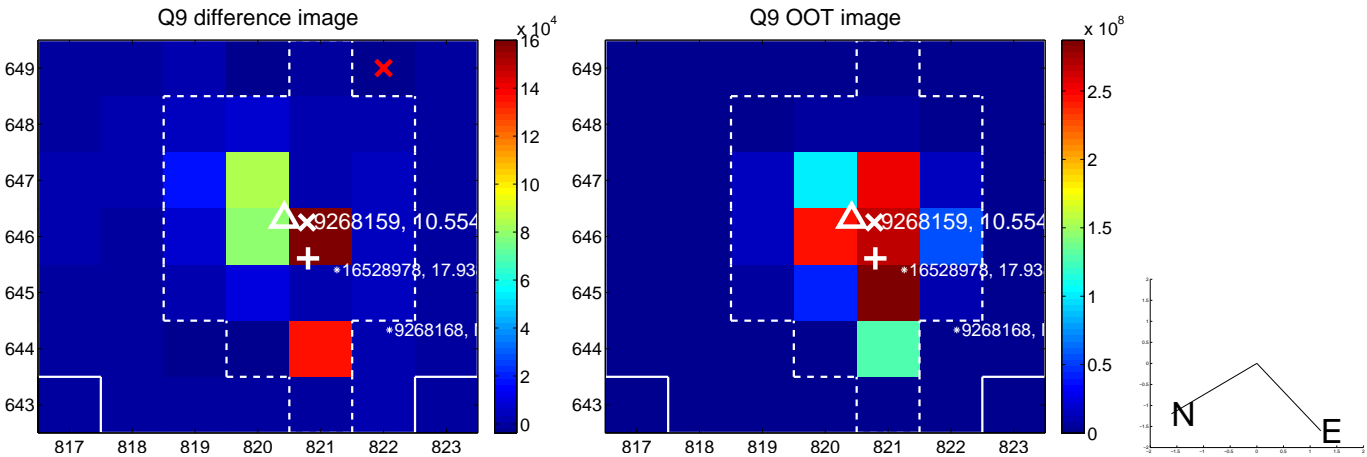


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

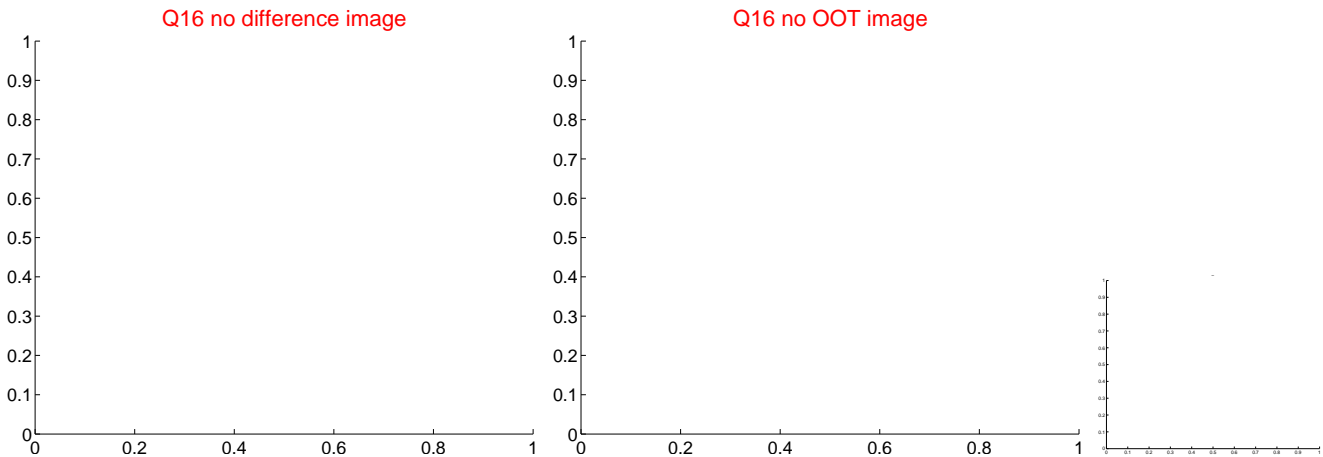
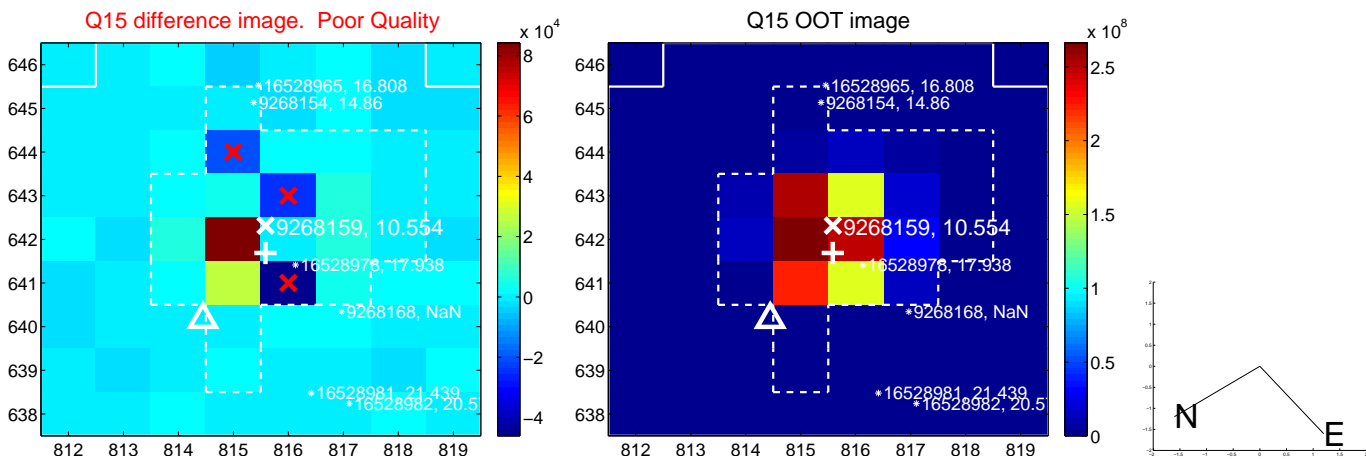
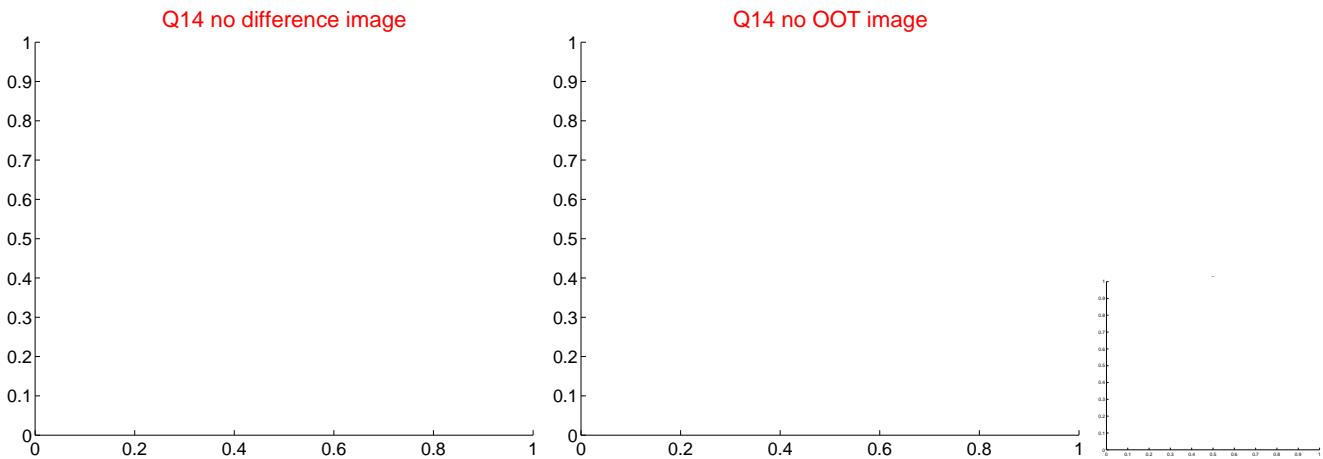
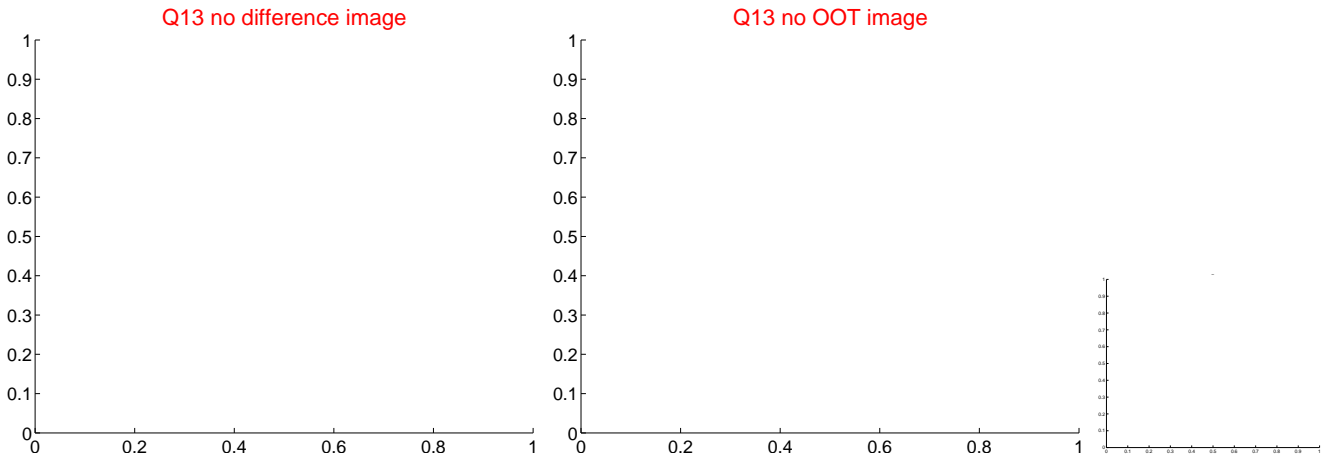




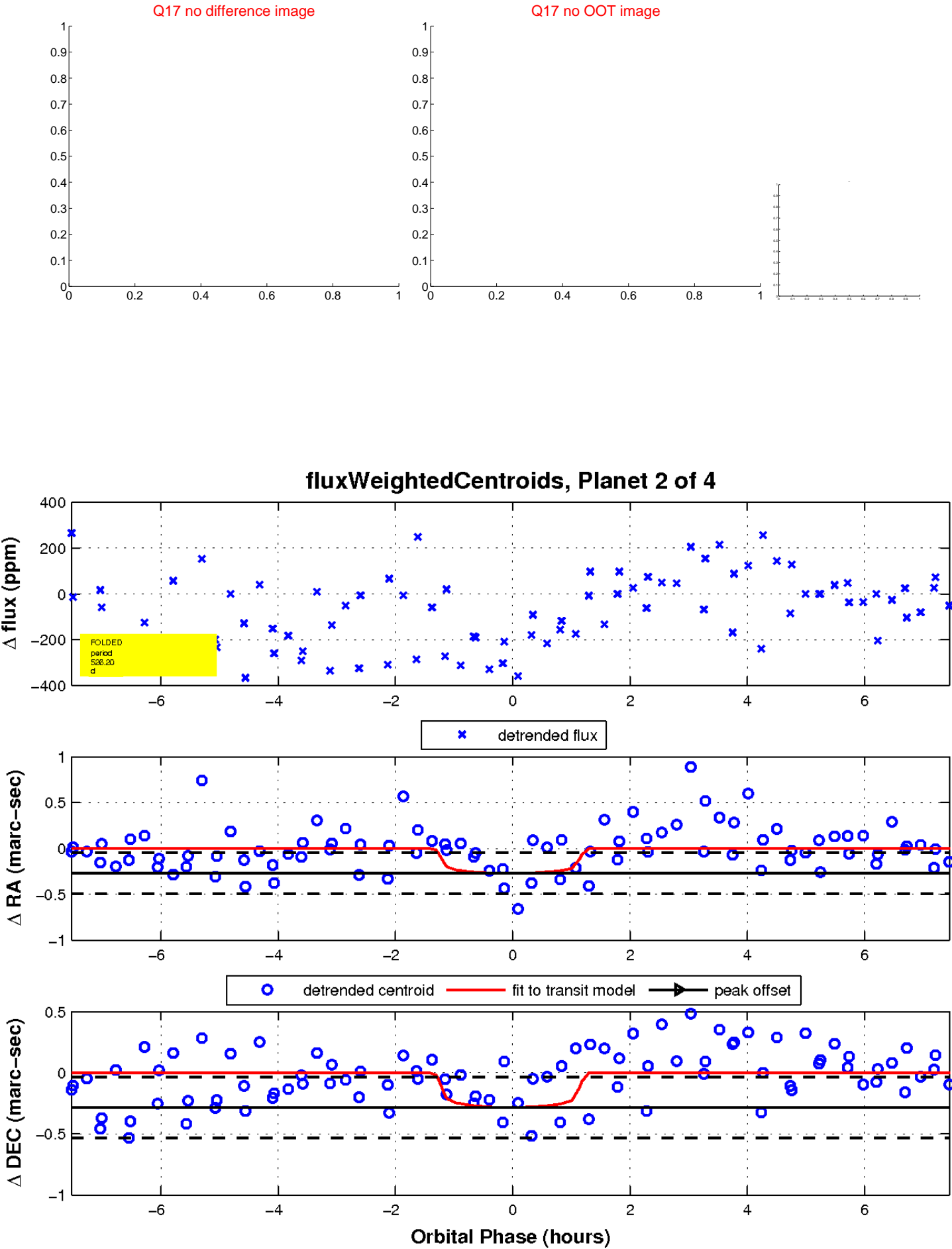
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

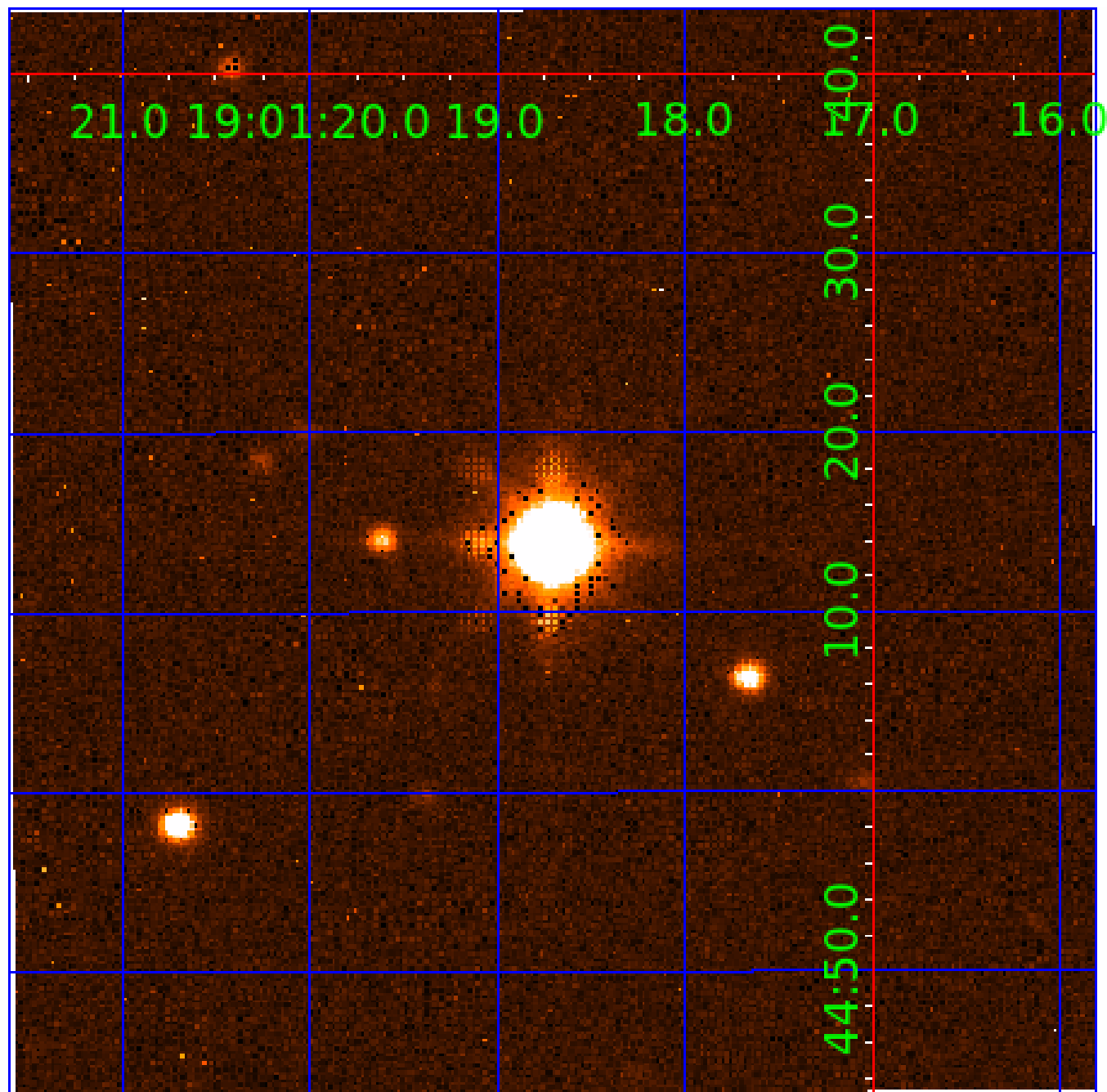


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 009268159

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009268159-01	OBS	No	6.777840	137.320347	51.4	15.646	9.0	8.6	3.64	7365	3.02	4399.18
009268159-02	OBS	No	526.197511	330.783574	232.8	2.543	8.8	4.3	3.64	7365	6.32	13.28
009268159-03	OBS	8180.01	185.975337	299.693751	287.0	7.977	8.9	7.2	3.64	7365	6.68	53.16
009268159-04	OBS	No	192.138774	244.002270	285.7	11.124	7.2	8.4	3.64	7365	7.25	50.90

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009268159-01	OBS	FP	0.00	1	0	0	0	LPP_DV—CENT_SATURATED
009268159-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV— MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
009268159-03	OBS	PC	0.29	0	0	0	0	CENT_SATURATED
009268159-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_SKYE—CENT_SATURATED

**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.

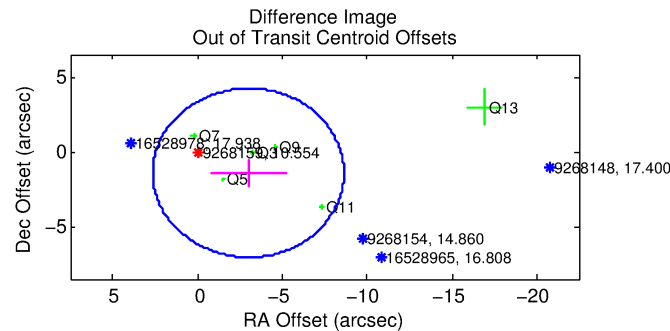
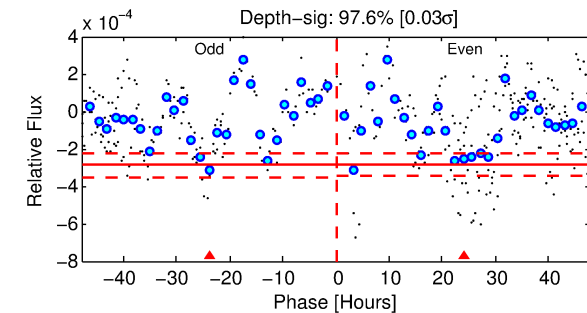
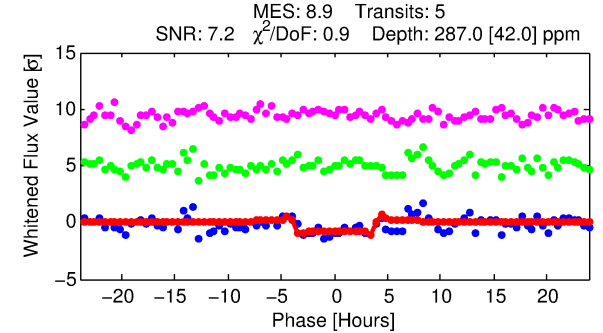
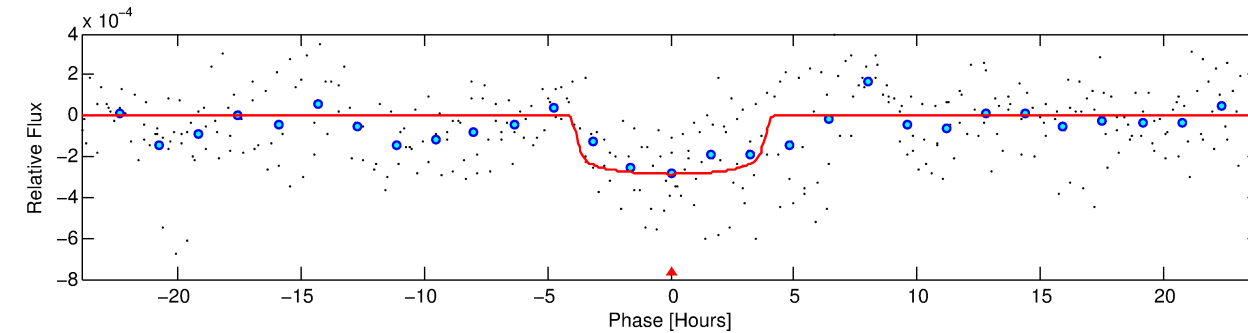
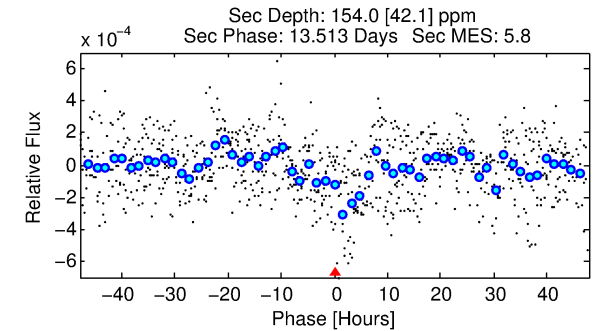
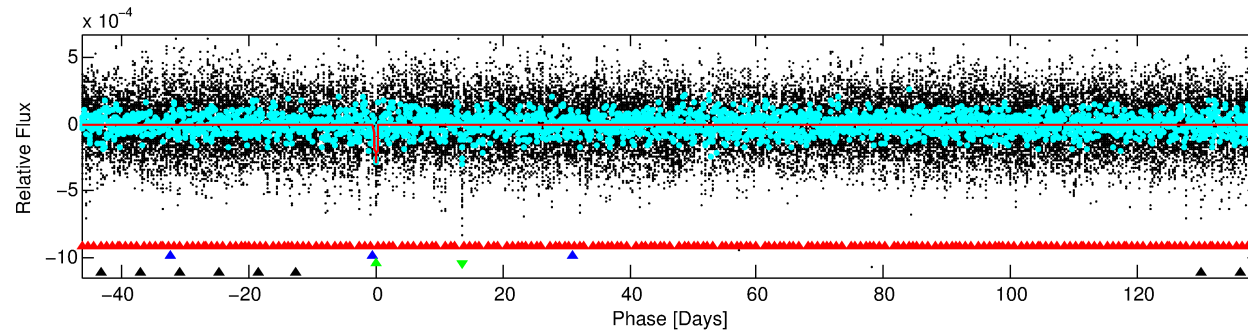
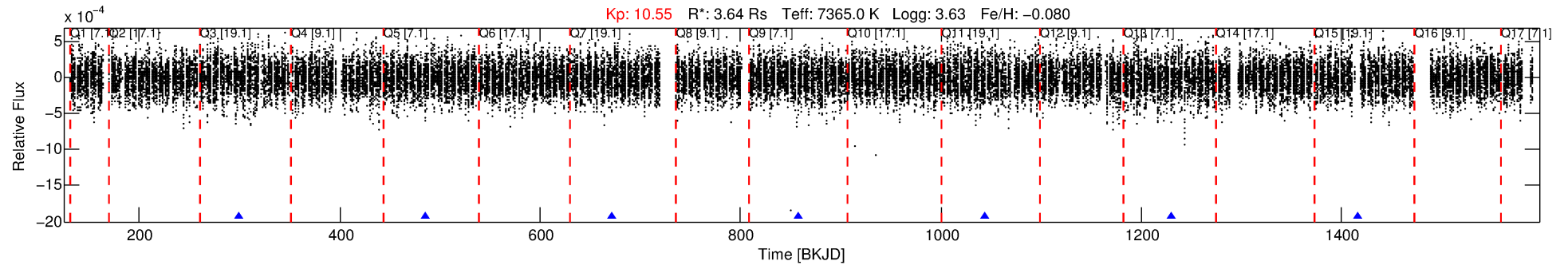
## Ephemeris Match Information For 009268159-03

No Significant Match Found



# DV One-Page Summary

KIC: 9268159 Candidate: 3 of 4 Period: 185.975 d



## DV Fit Results:

Period = 185.97534 [0.00331] d  
Epoch = 299.6938 [0.0095] BKJD  
Rp/R\* = 0.0168 [0.0046]  
a/R\* = 123.12 [195.67]  
b = 0.75 [0.94]  
Seff = 53.16 [45.79]  
Teq = 689 [148] K  
Rp = 6.68 [3.82] Re  
a = 0.8102 [0.4138] AU  
Ag = 1245.43 [1300.00] [0.96σ]  
Teffp = 6324 [1015] K [5.50σ]

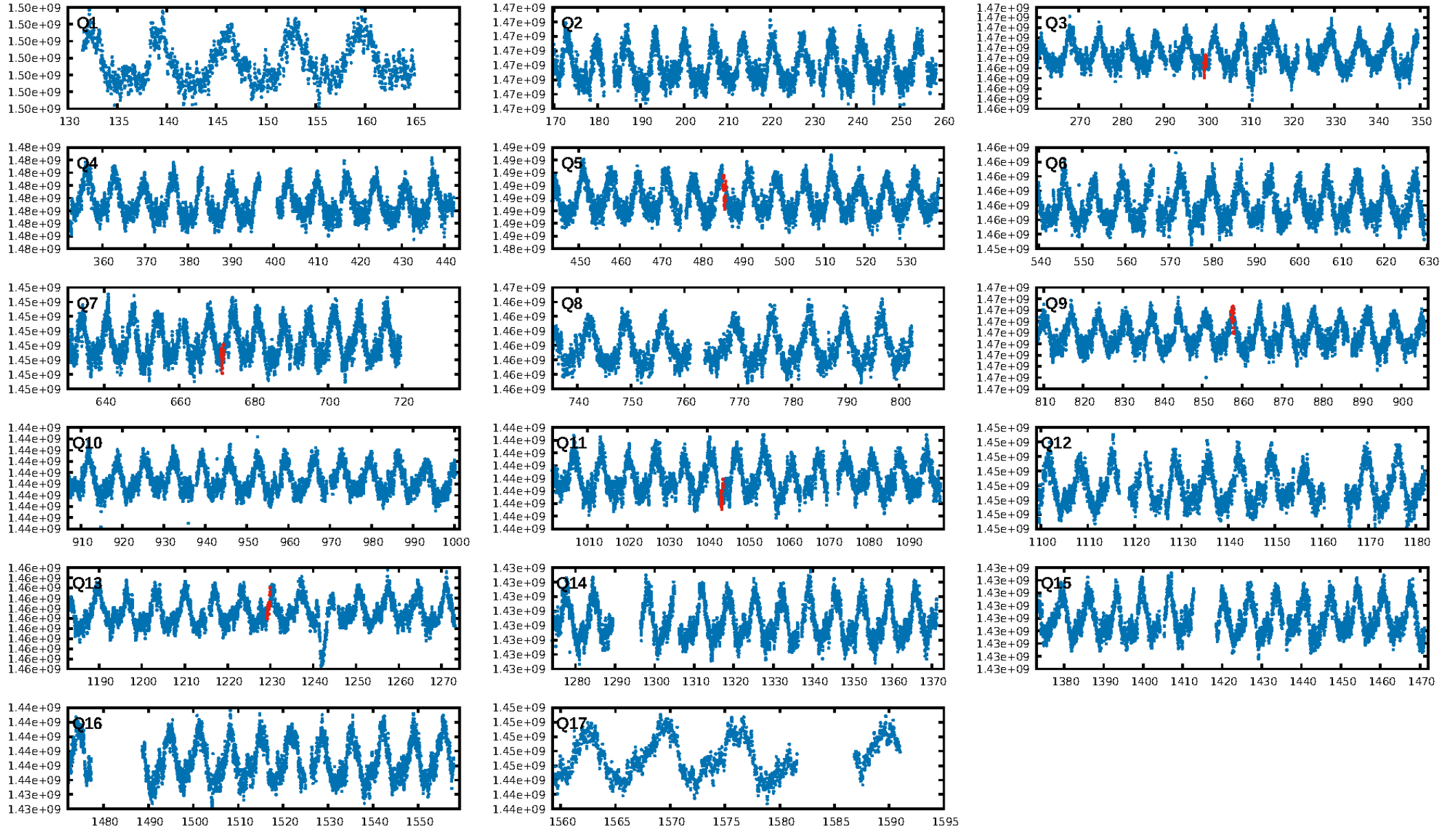
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [244.89σ]  
LongPeriod-sig: 100.0% [10.81σ]  
ModelChiSquare2-sig: 63.2%  
ModelChiSquareGof-sig: 100.0%  
**Bootstrap-pfa: 2.84e-11**  
RollingBand-fgt: 1.00 [5/5]  
GhostDiagnostic-chr: 1.524  
Centroid-sig: 29.5%  
Centroid-so: 1.423 arcsec [2.46σ]  
OotOffset-rm: 3.321 arcsec [1.77σ]  
OotOffset-st: 0/3/0/3 [6]  
KicOffset-rm: 0.990 arcsec [0.32σ]  
KicOffset-st: 0/3/0/3 [6]  
DiffImageQuality-fgm: 0.33 [2/6]  
DiffImageOverlap-fno: 0.67 [4/6]

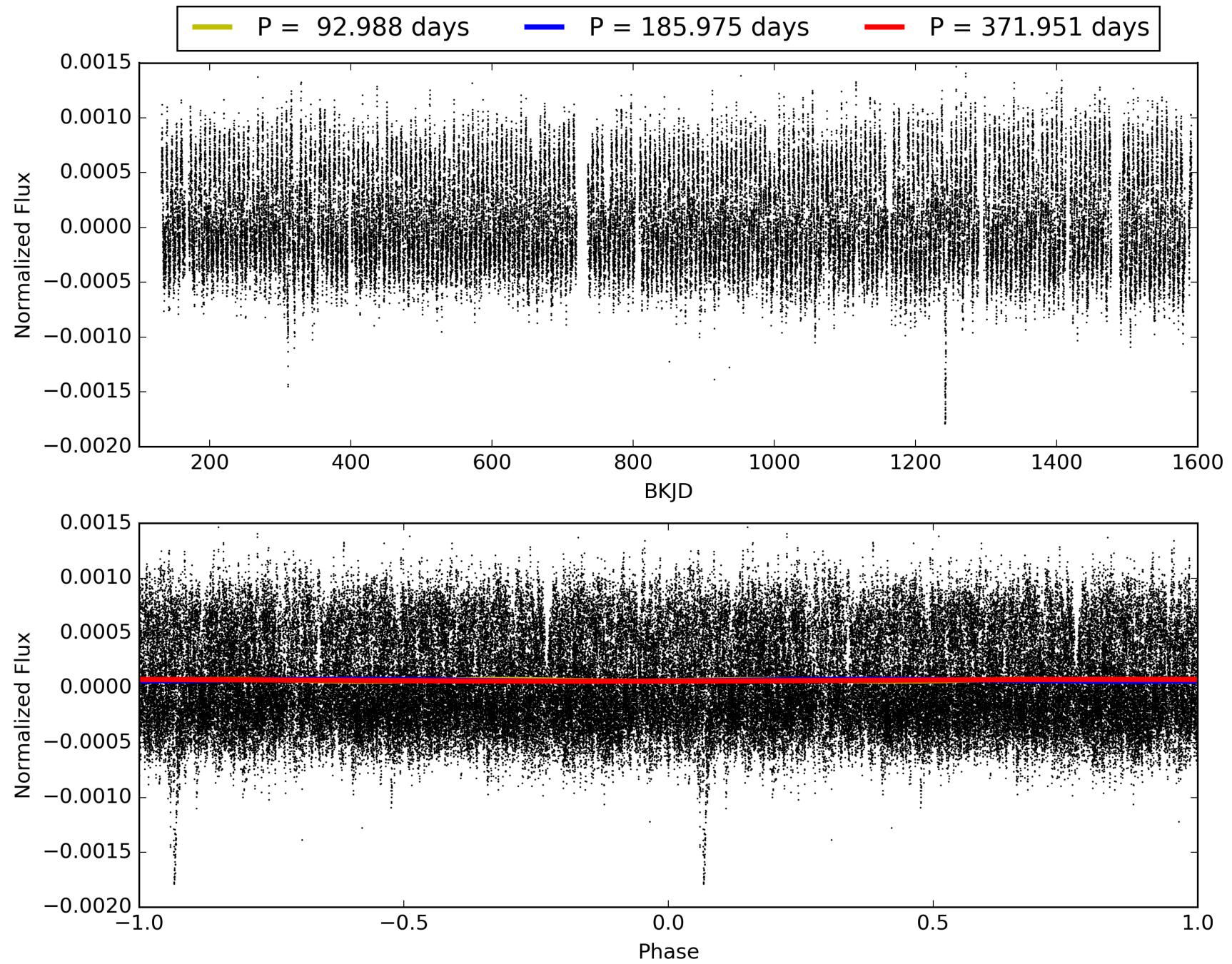
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 12:11:36 Z

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

# TCE 009268159-03, PDC Light Curves

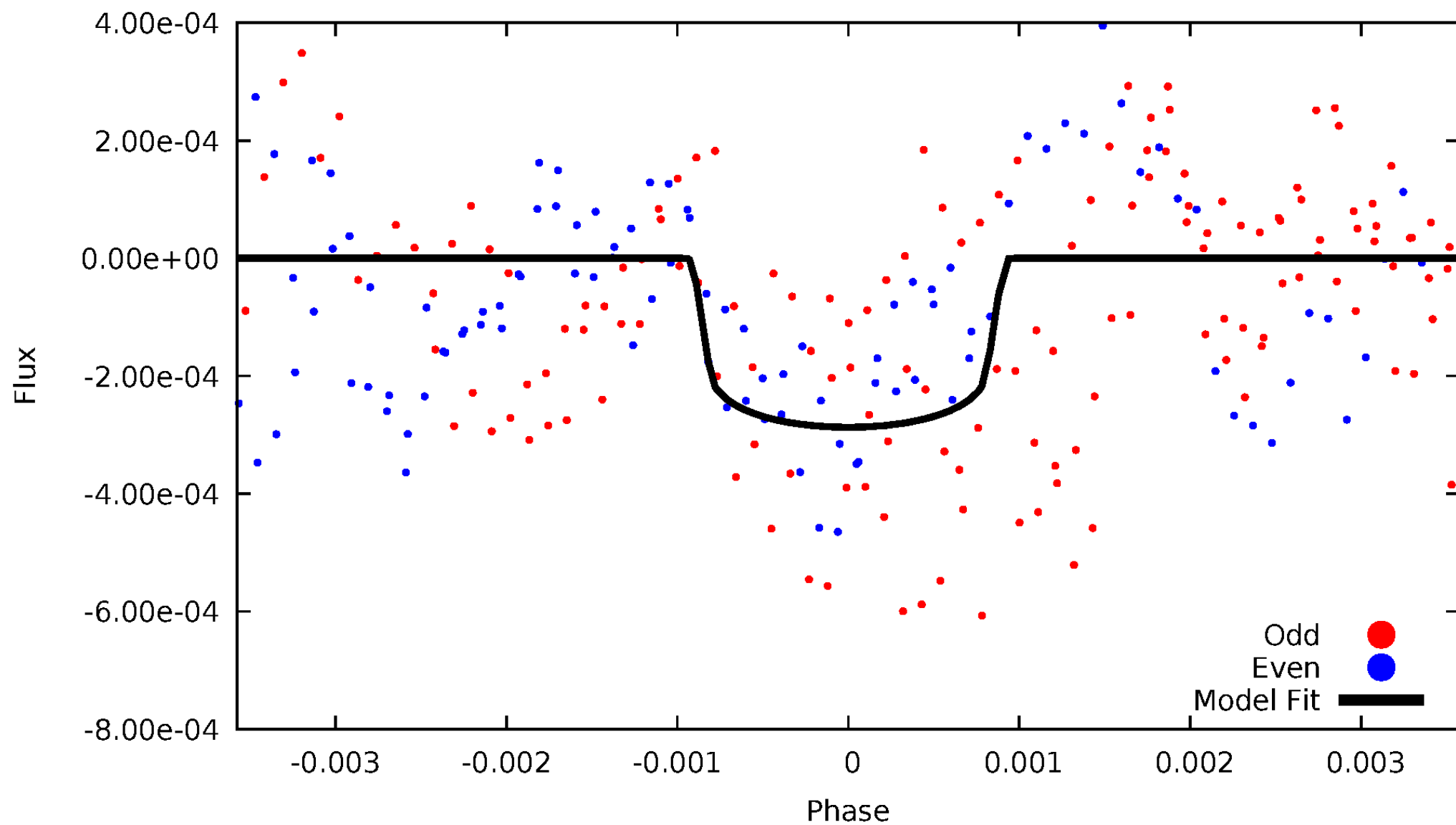


TCE 009268159-03



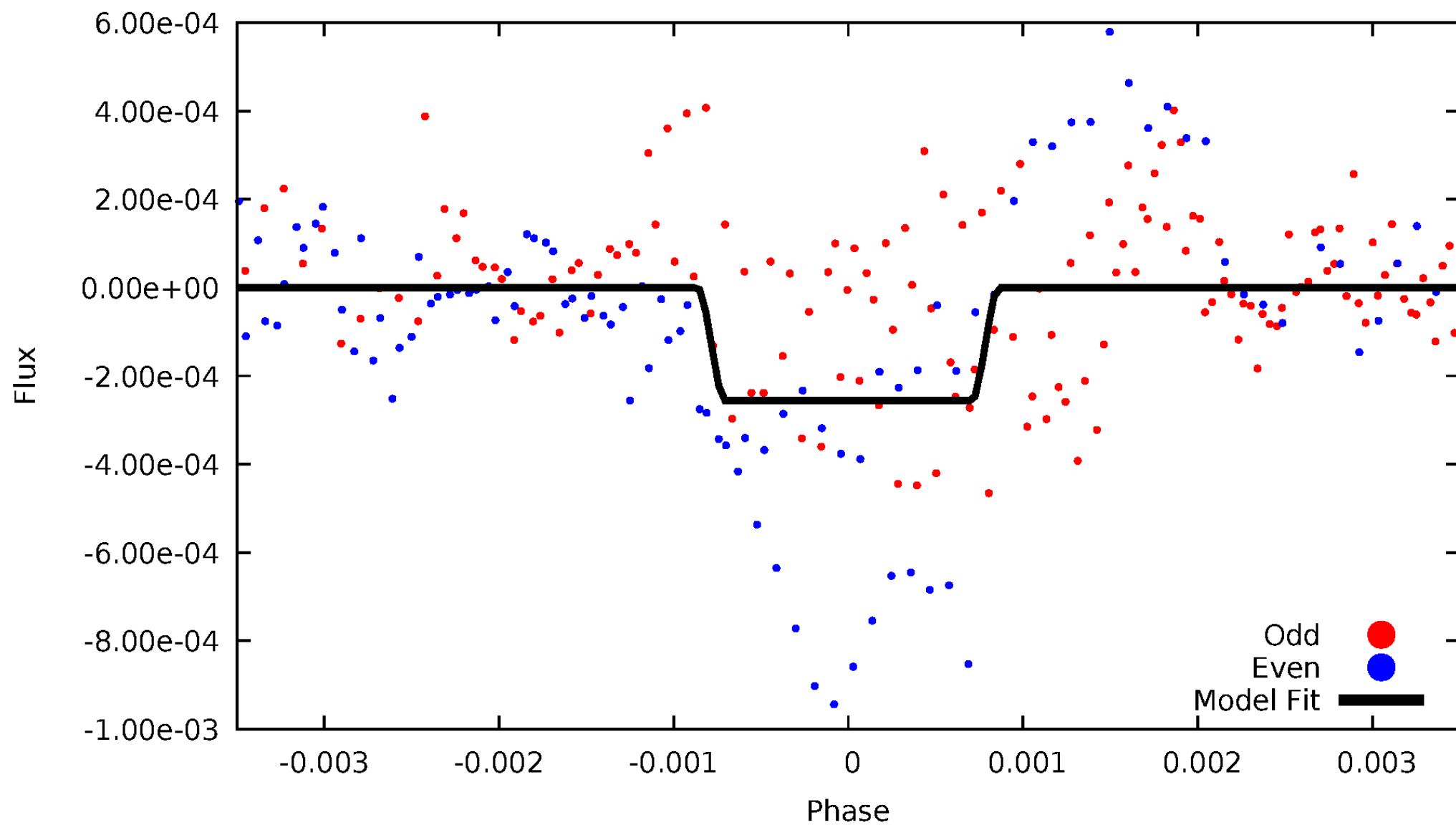
# DV Odd/Even

TCE 009268159-03



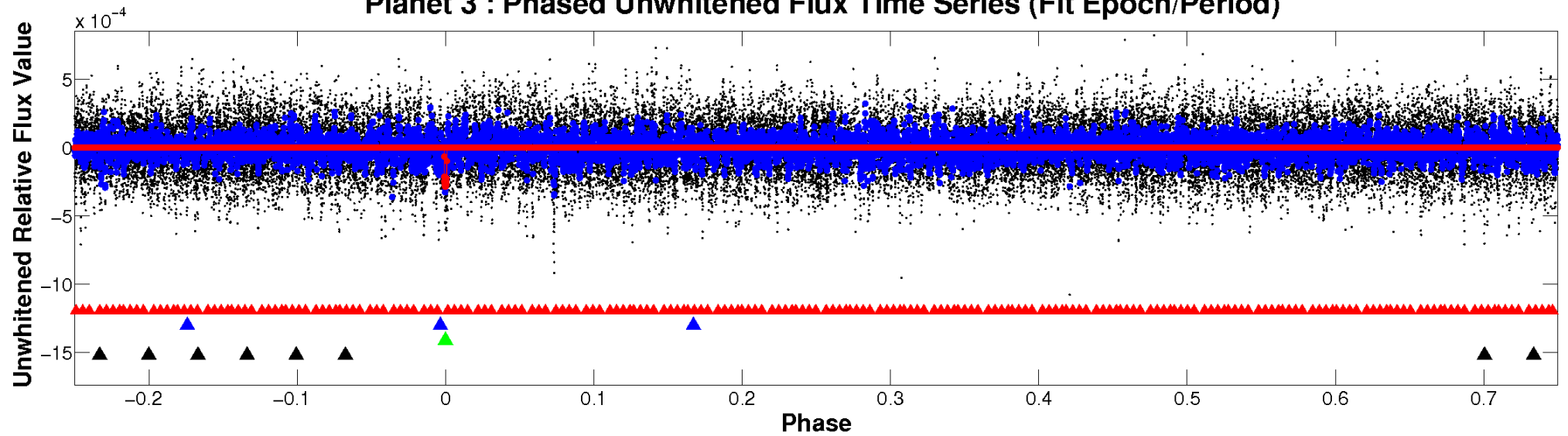
# ALT Odd/Even

TCE 009268159-03

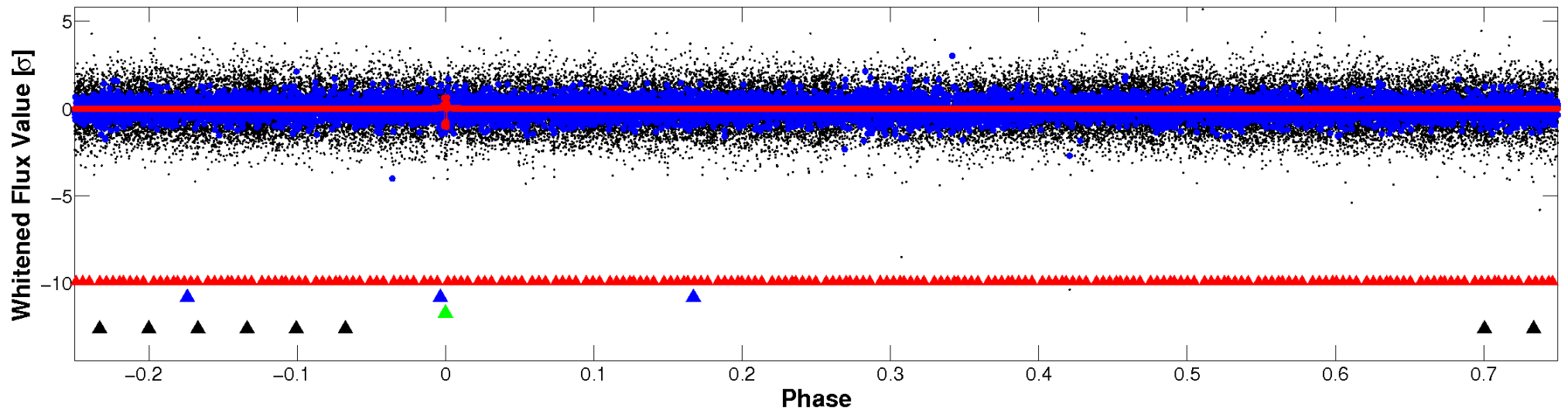


# Non-Whitened Vs. Whitened Light Curve

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

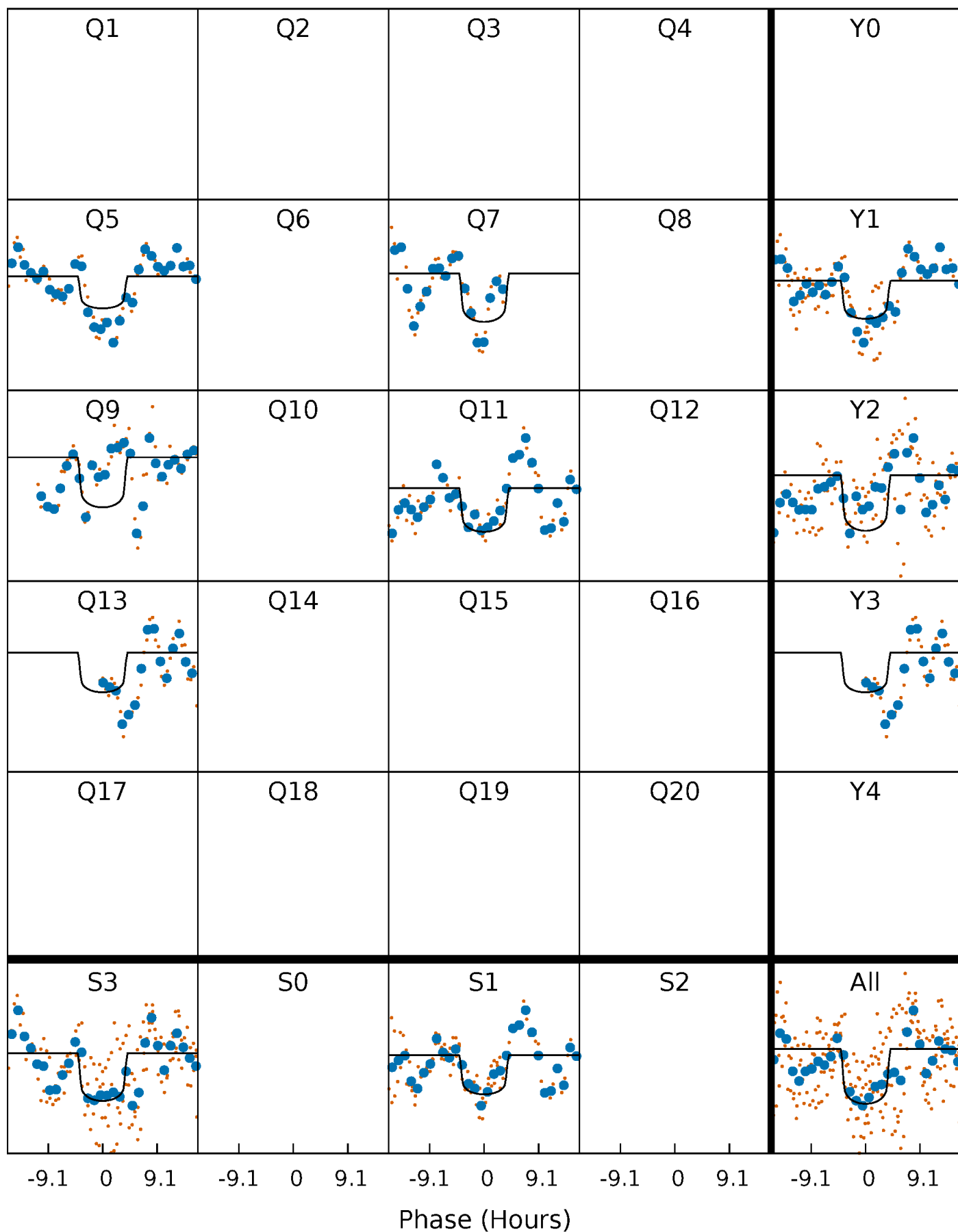
TCE 009268159-03 P=185.975337 Days  $T_0=299.693751$  (BKJD)





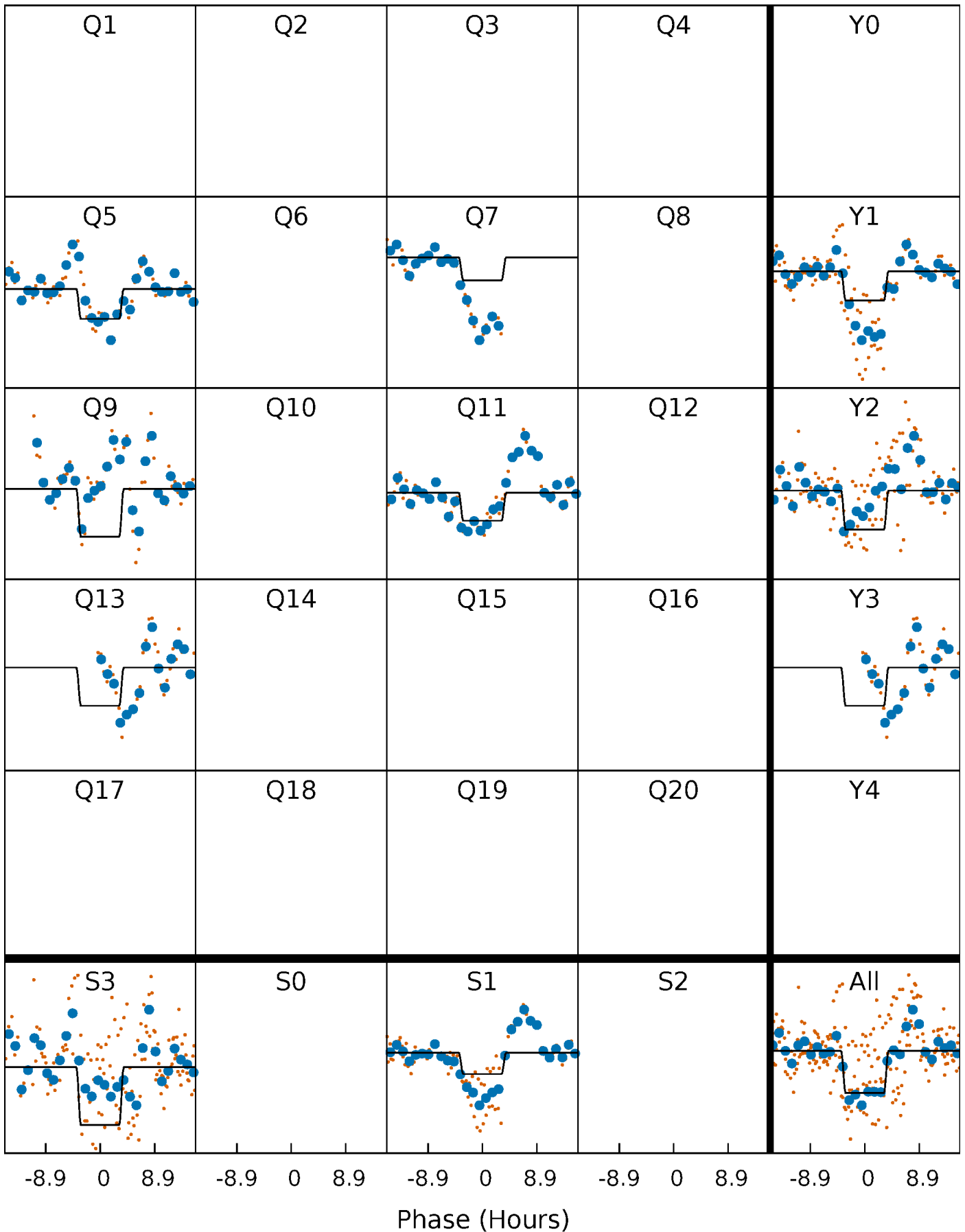
# DV Quarter-Phased Transit Curves

TCE 009268159-03 P=185.975337 Days  $T_0=299.693751$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

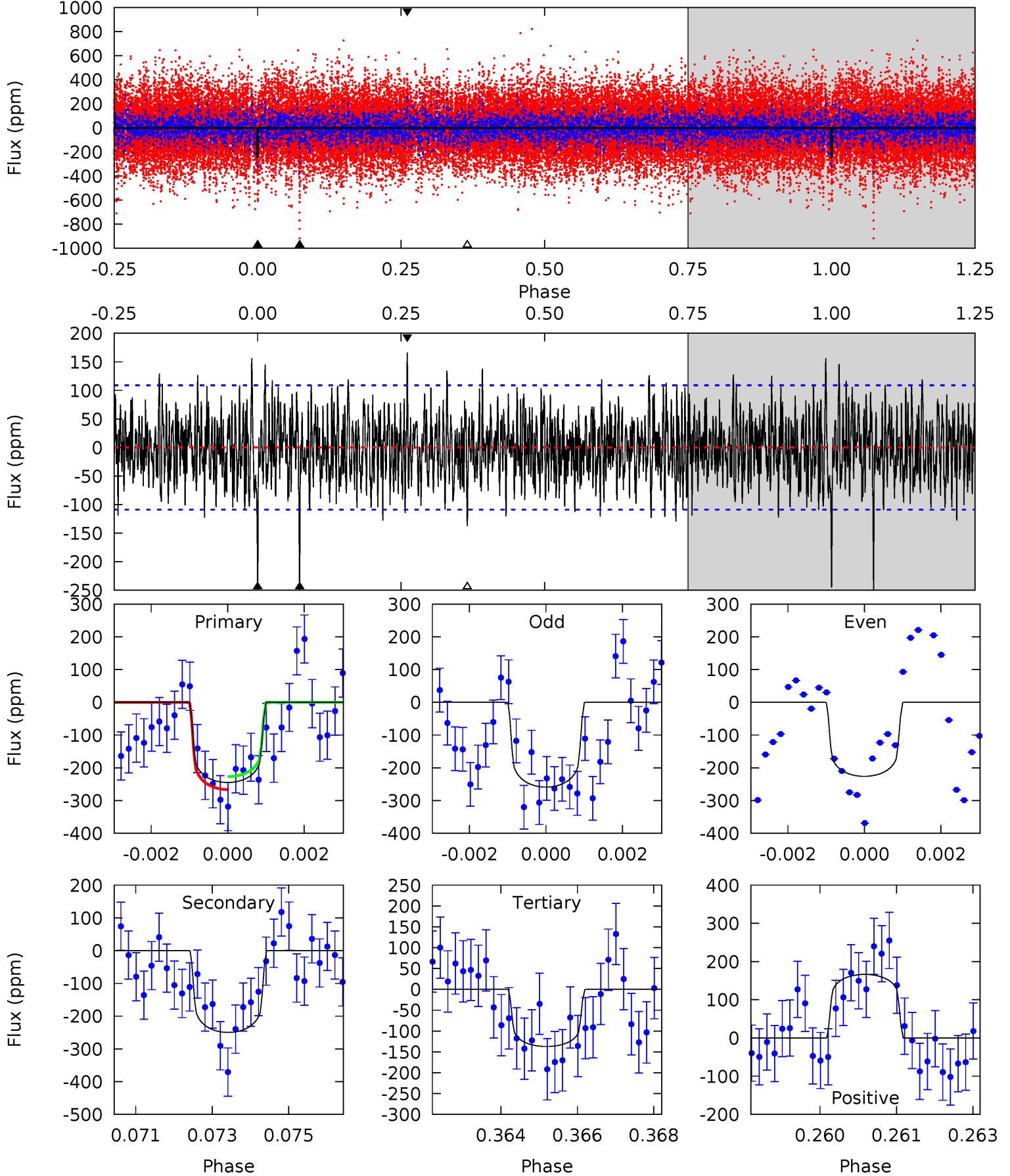
TCE 009268159-03 P=185.972641 Days  $T_0=299.703020$  (BKJD)



# DV Model-Shift Uniqueness Test

009268159-03, P = 185.975337 Days, E = 113.718414 Days

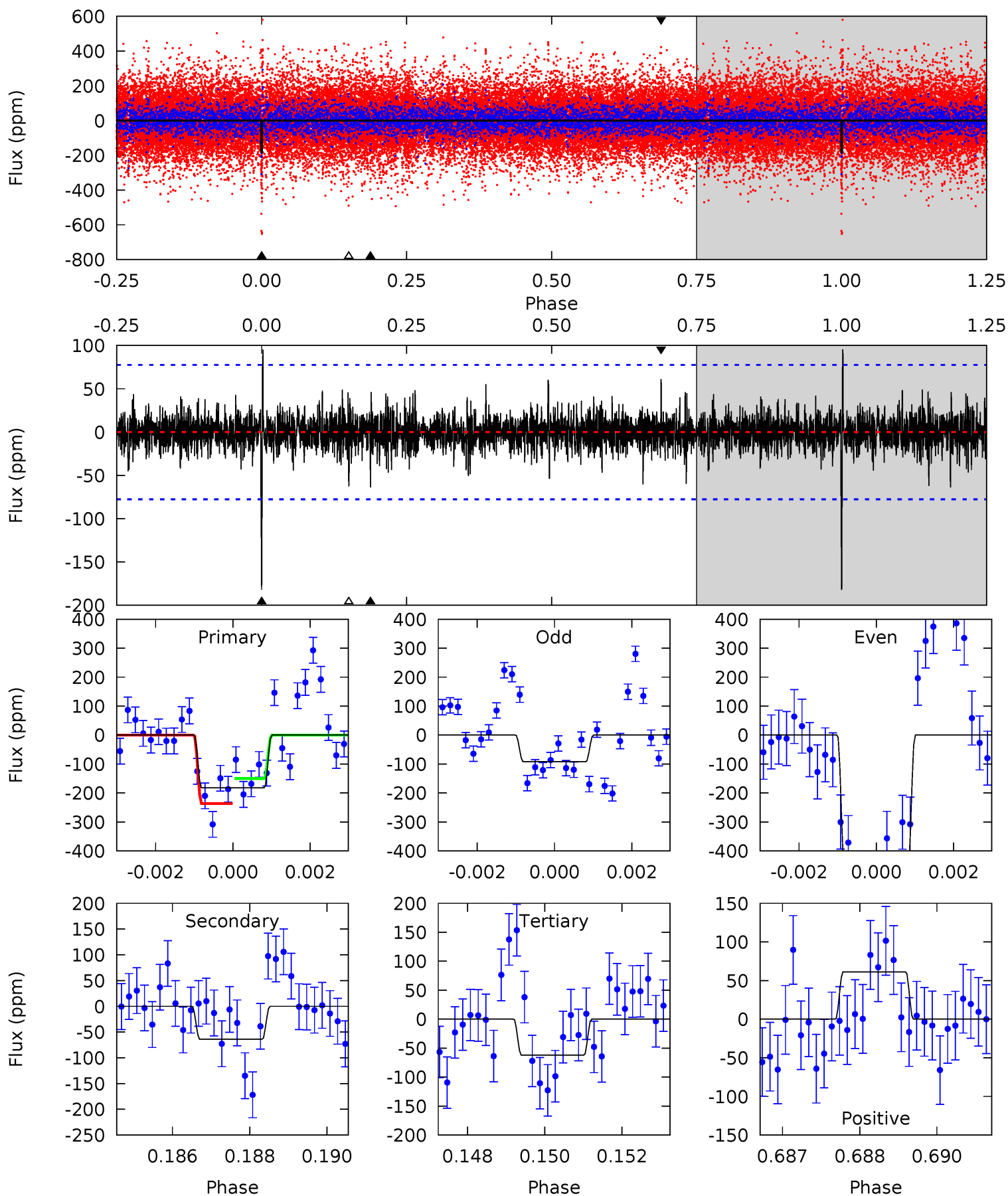
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.0	12.2	6.72	8.16	5.34	3.11	2.30	5.28	3.85	5.52	4.09	0.79	1.08	0.40	0.96



# Alt Model-Shift Uniqueness Test

009268159-03, P = 185.972641 Days, E = 113.730379 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.6	4.39	4.28	4.22	5.35	3.13	0.98	8.28	8.33	0.12	0.17	14.0	1.05	0.34	2.92



### Stellar Parameters For KIC 009268159

	$T_{\text{eff}} (K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7365^{+203}_{-330}$	$3.628^{+0.504}_{-0.056}$	$-0.080^{+0.250}_{-0.300}$	$3.638^{+0.341}_{-1.820}$	$2.049^{+0.152}_{-0.608}$	$0.060^{+0.343}_{-0.011}$
	+3%/-4%	+14%/-2%	+312%/-375%	+9%/-50%	+7%/-30%	+572%/-19%
Source	KIC0	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 009268159-03 / KOI 8180.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-250 \pm 20$	$5.81^{+2.14}_{-2.15}$	$923^{+57}_{-130}$	$7073^{+1726}_{-935}$	$2631^{+3610}_{-1220}$
Alt.	$-64 \pm 14$	$5.58^{+2.06}_{-2.11}$	$922^{+64}_{-122}$	$5161^{+966}_{-584}$	$720^{+1145}_{-346}$

$T_{max}$  = Theoretical Maximum Planetary Temperature

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

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

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

## DV Centroid Data

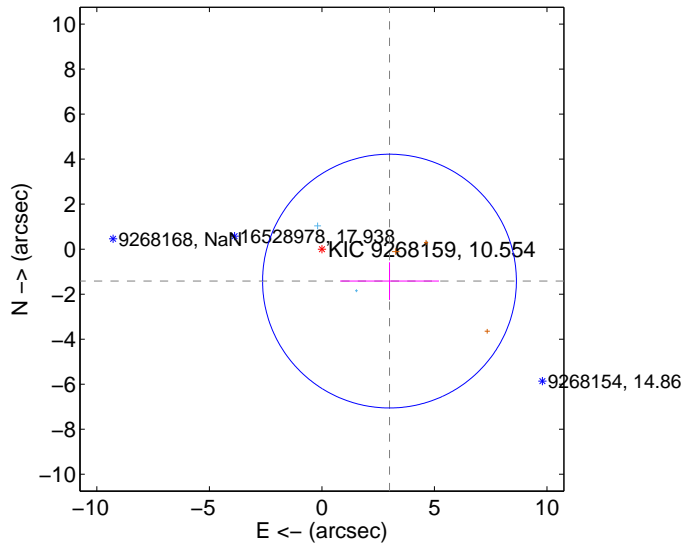
Supplemental centroid analysis for 009268159-03. **Kepler magnitude: 10.55.** Transit SNR 7.19

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

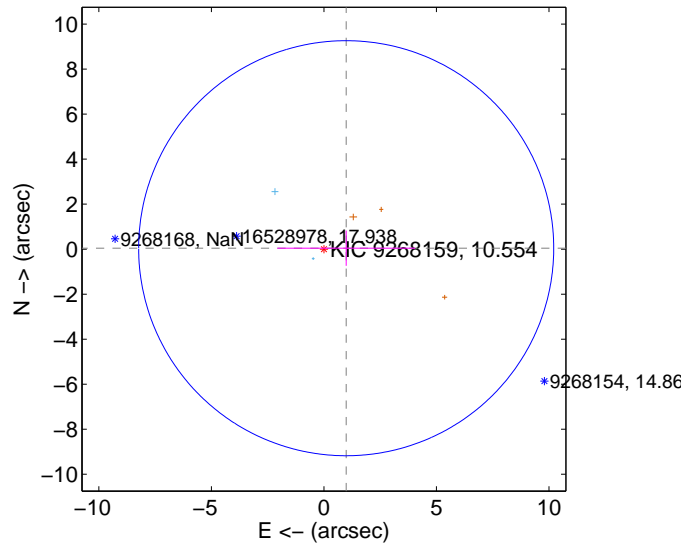
The direct PRF centroid is offset from the target star catalog position by about 1.20 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$3.321 \pm 1.879$	1.77	$-3.003 \pm 2.198$	$-1.418 \pm 0.836$
PRF-fit source offset from KIC position	$0.990 \pm 3.074$	0.32	$-0.989 \pm 3.063$	$0.042 \pm 0.785$
photometric centroid source offset	$1.42 \pm 0.58$	2.46	$0.83 \pm 0.60$	$1.16 \pm 0.57$

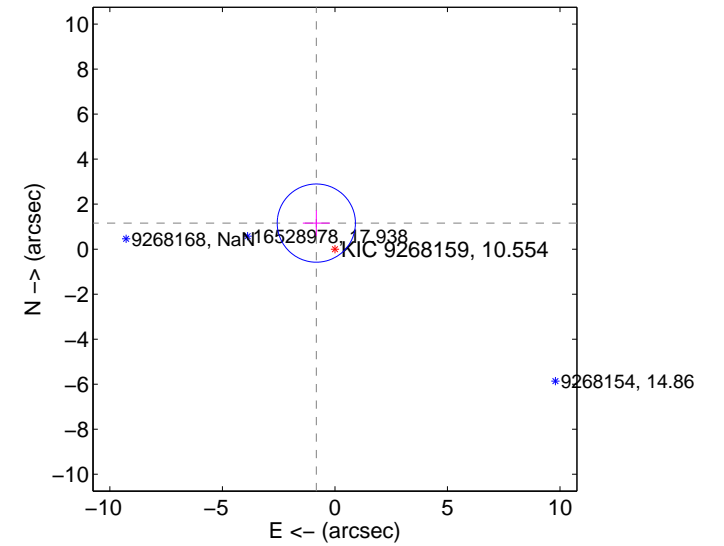
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

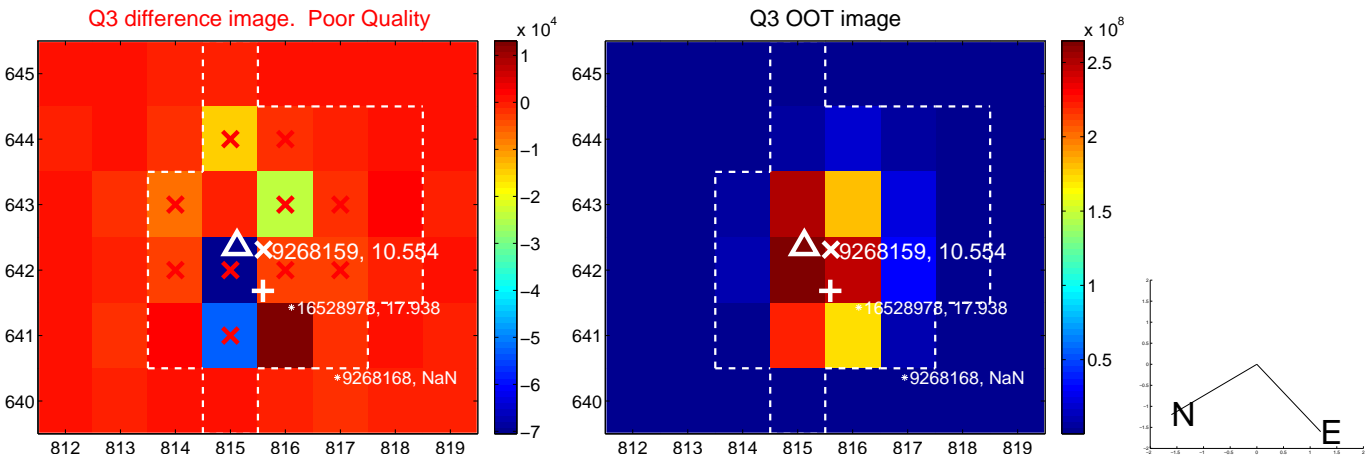


offset from photometric centroids



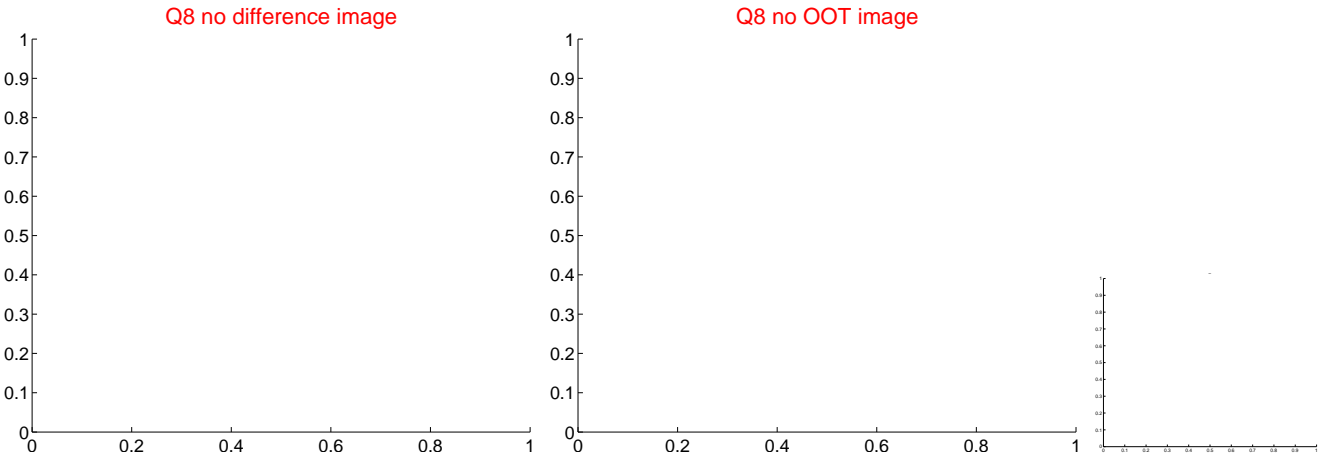
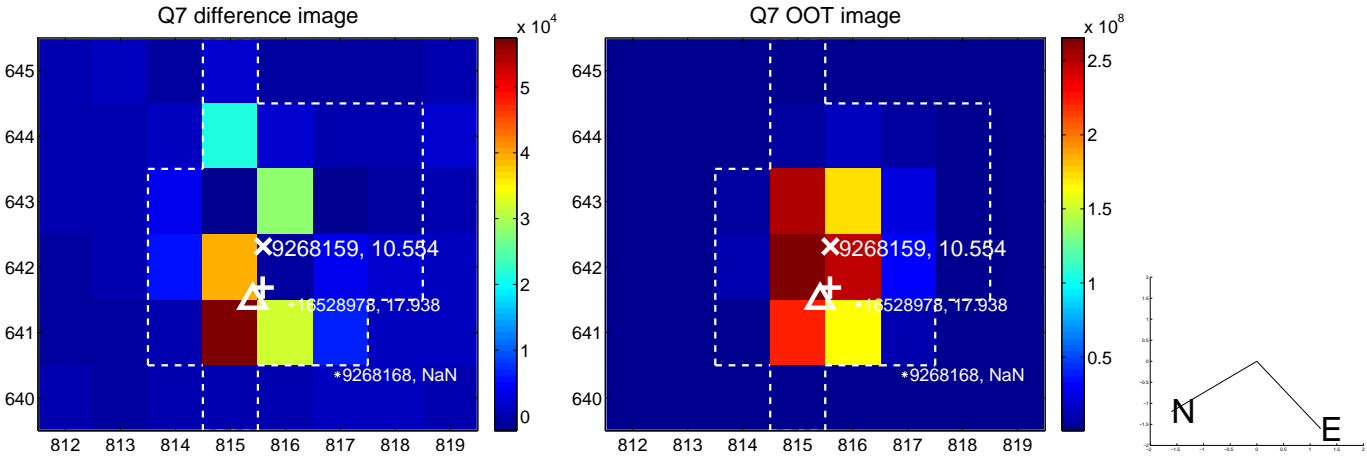
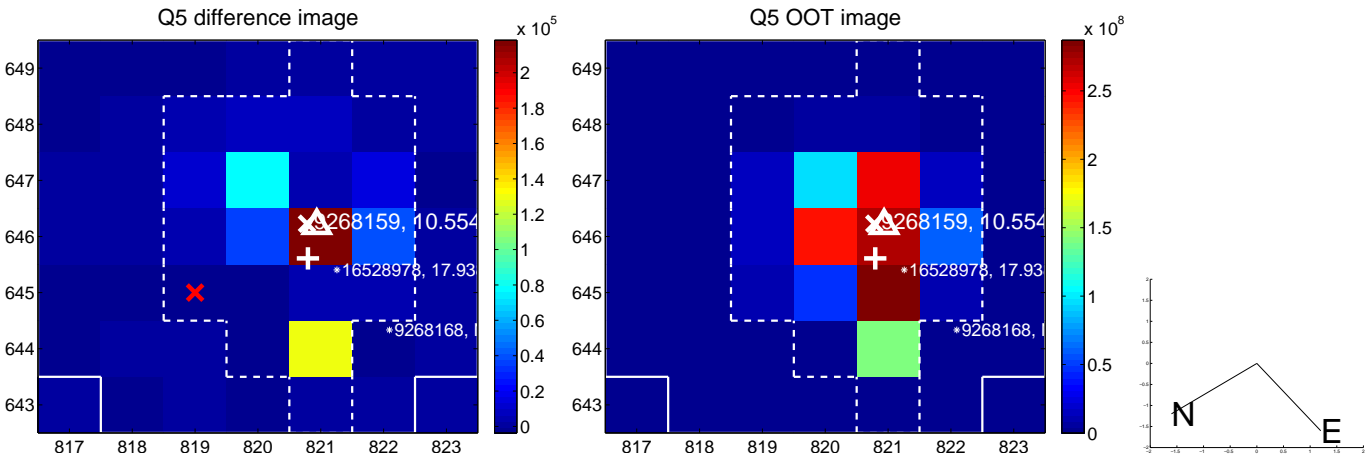
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

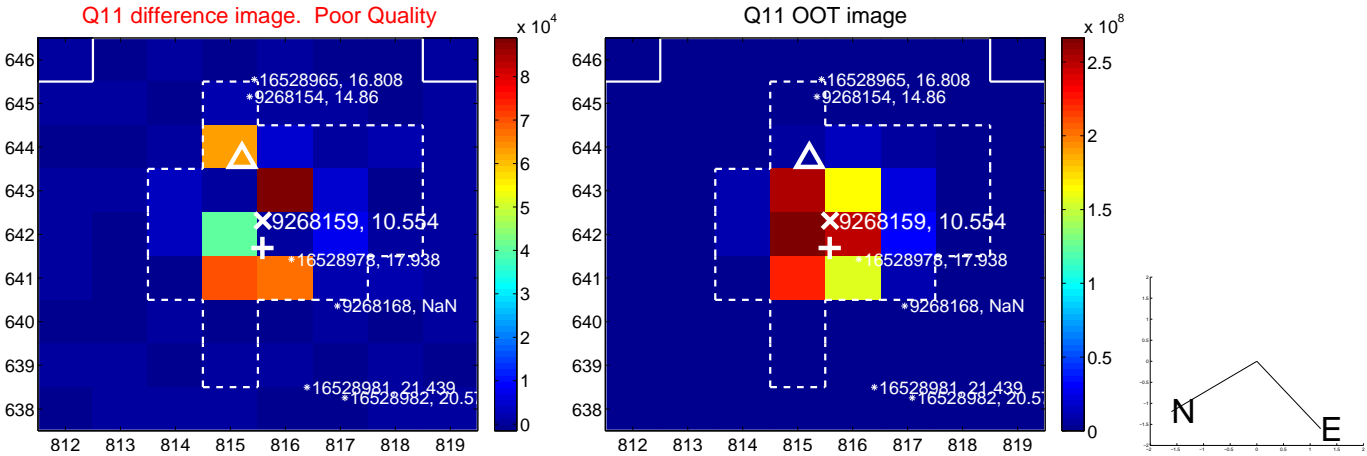
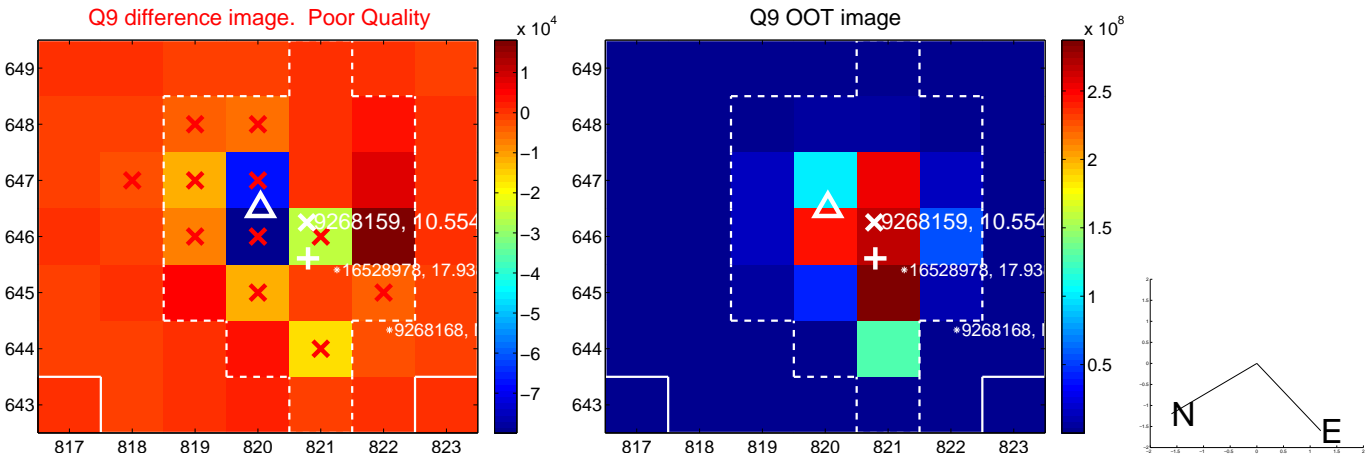




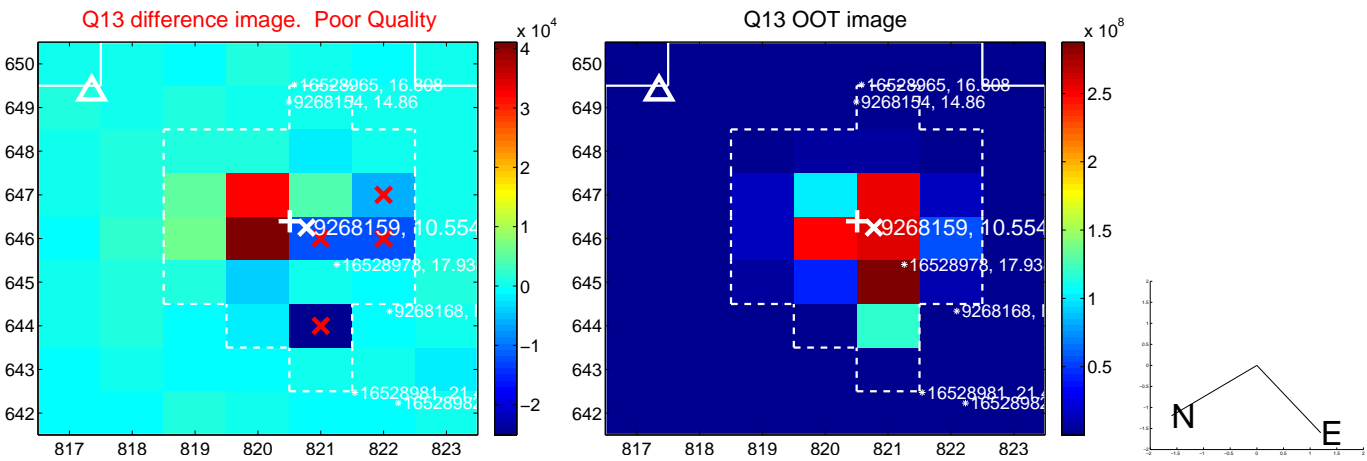
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



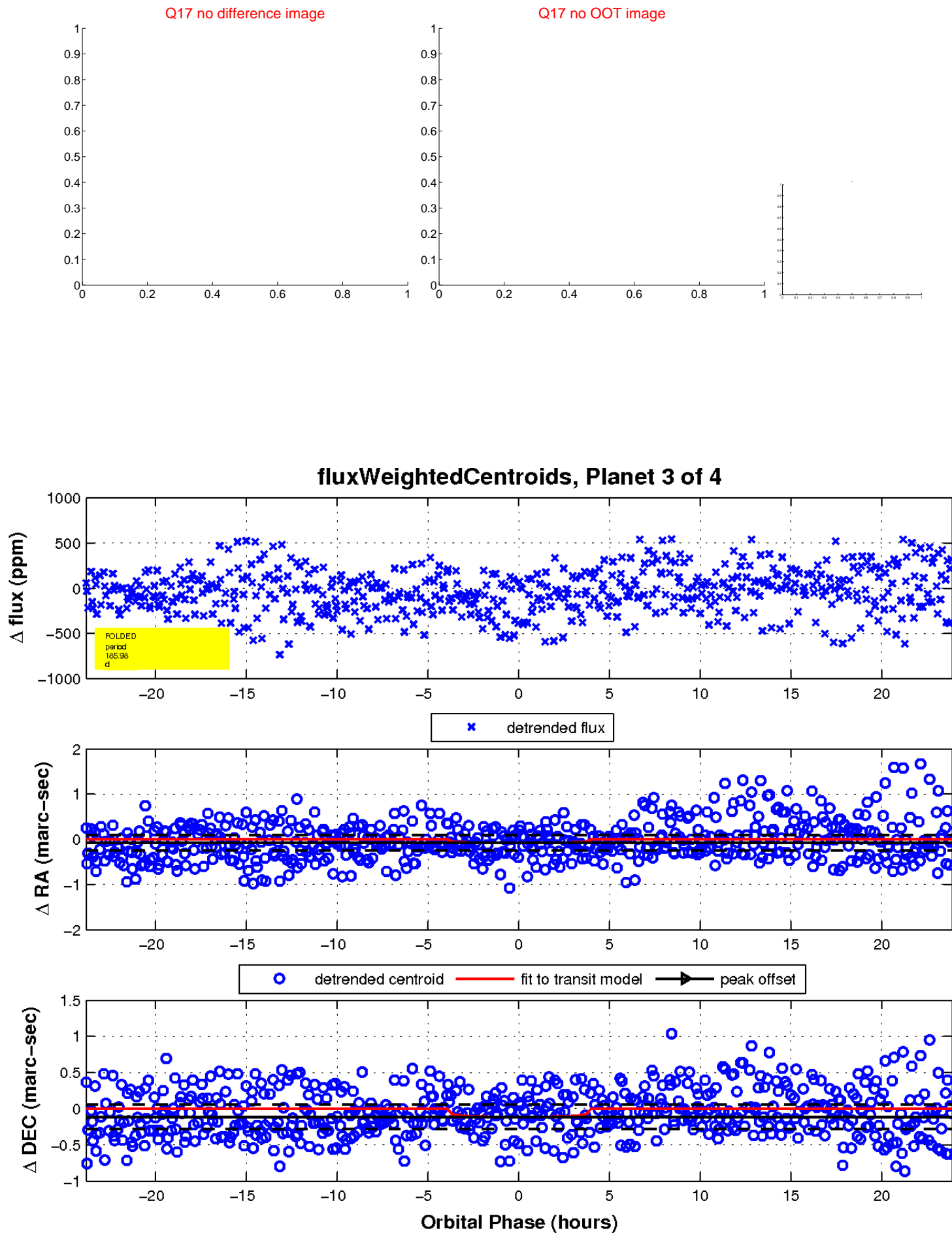
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

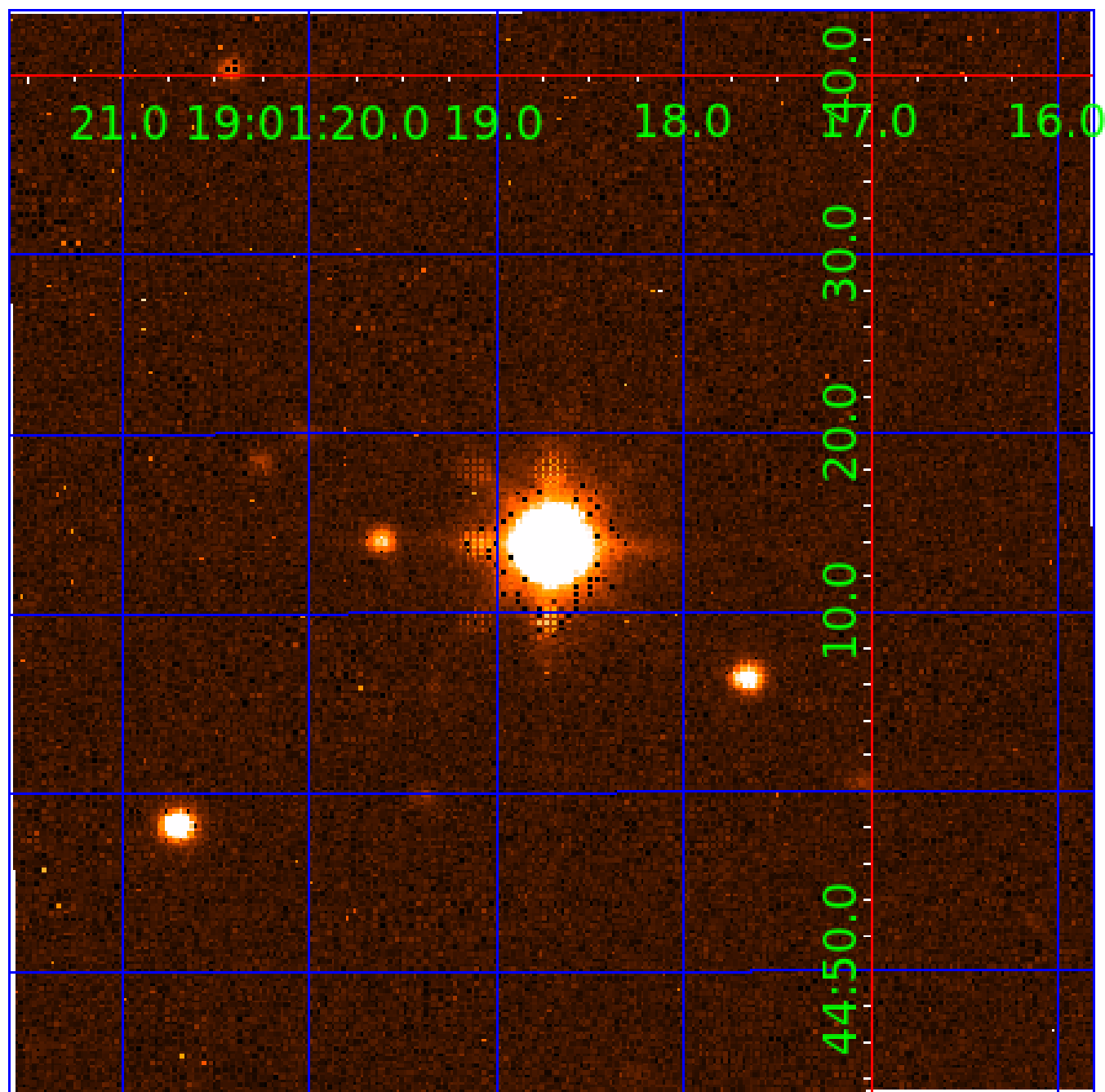


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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# KIC 009268159

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009268159-01	OBS	No	6.777840	137.320347	51.4	15.646	9.0	8.6	3.64	7365	3.02	4399.18
009268159-02	OBS	No	526.197511	330.783574	232.8	2.543	8.8	4.3	3.64	7365	6.32	13.28
009268159-03	OBS	8180.01	185.975337	299.693751	287.0	7.977	8.9	7.2	3.64	7365	6.68	53.16
009268159-04	OBS	No	192.138774	244.002270	285.7	11.124	7.2	8.4	3.64	7365	7.25	50.90

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009268159-01	OBS	FP	0.00	1	0	0	0	LPP_DV—CENT_SATURATED
009268159-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV— MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
009268159-03	OBS	PC	0.29	0	0	0	0	CENT_SATURATED
009268159-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_SKYE—CENT_SATURATED

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

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

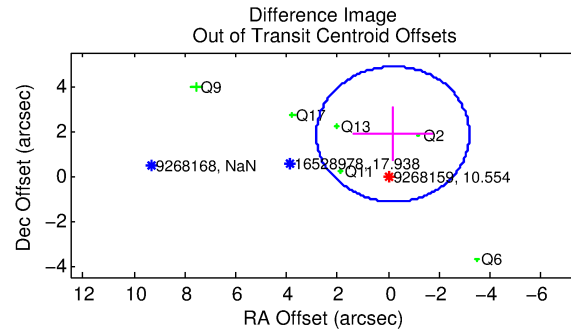
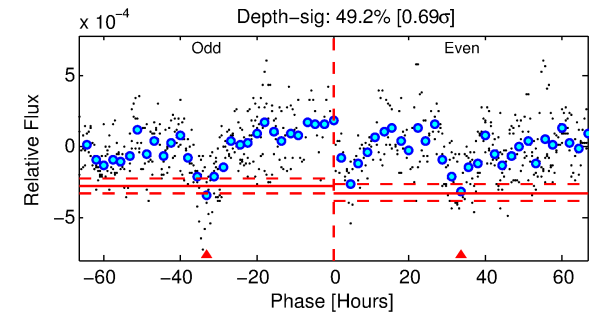
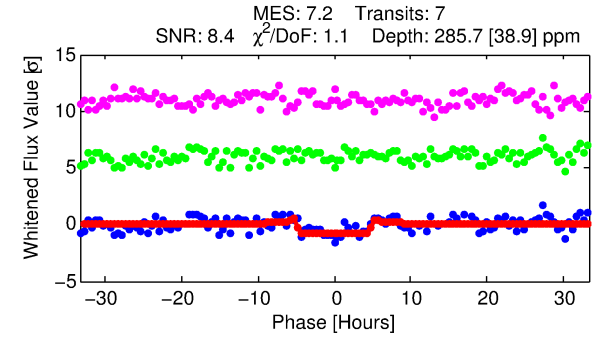
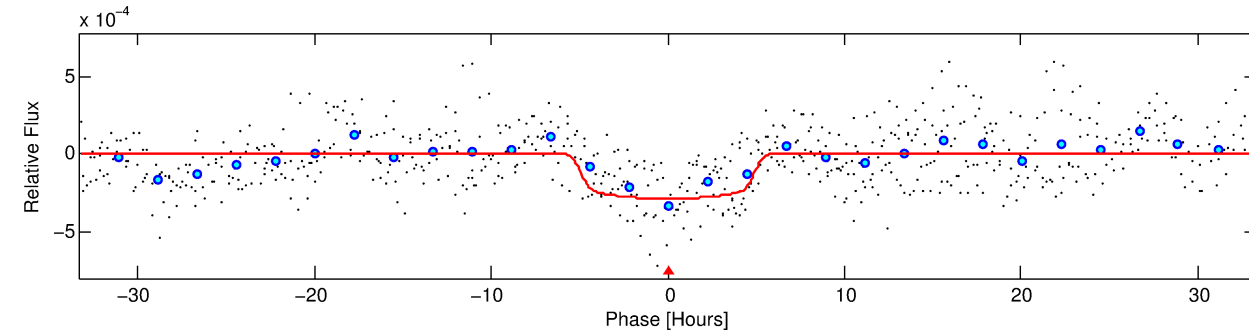
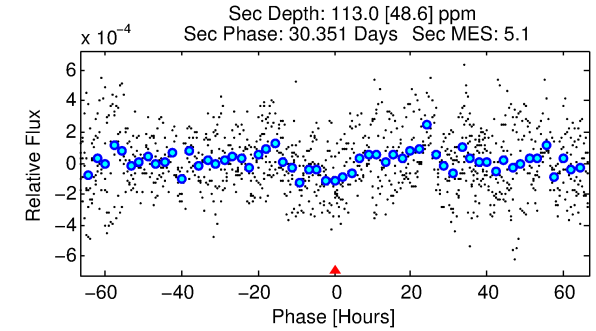
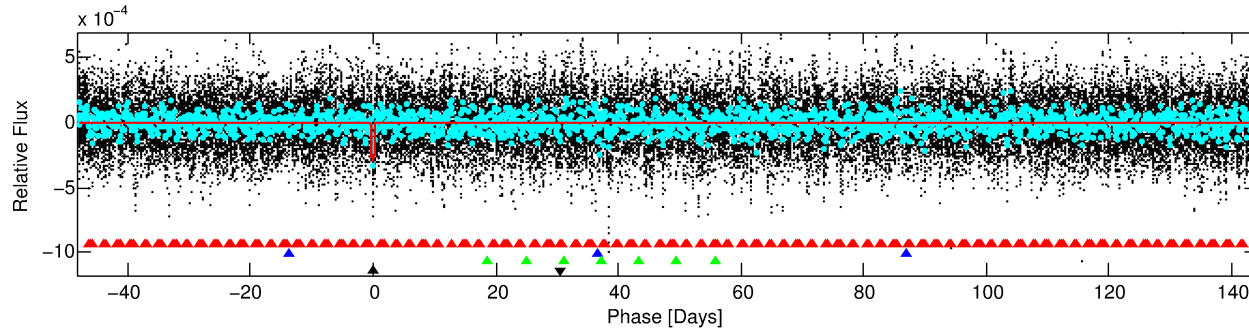
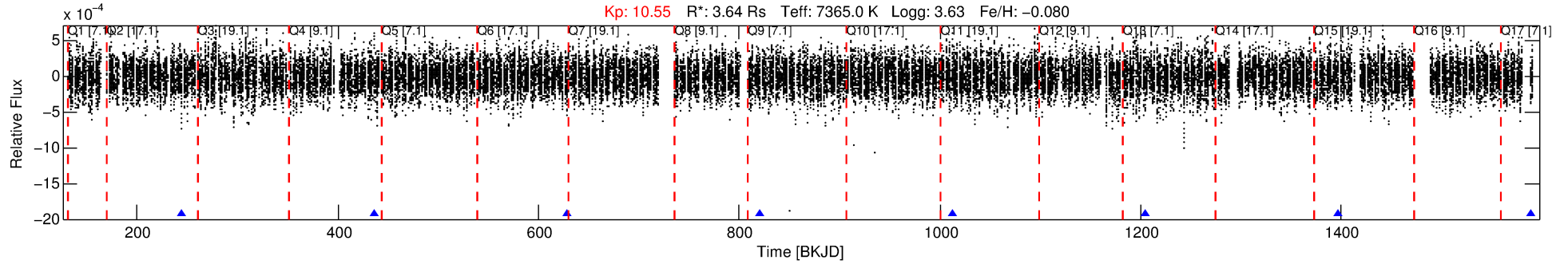
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009268159-04

No Significant Match Found

# DV One-Page Summary

KIC: 9268159 Candidate: 4 of 4 Period: 192.139 d



## DV Fit Results:

Period = 192.13877 [0.00290] d  
Epoch = 244.0023 [0.0125] BKJD  
 $R_p/R^*$  = 0.0183 [0.0014]  
 $a/R^*$  = 57.39 [11.19]  
 $b$  = 0.92 [0.03]  
 $S_{\text{eff}}$  = 50.89 [43.84]  
 $T_{\text{eq}}$  = 681 [147] K  
 $R_p$  = 7.25 [3.67]  $R_e$   
 $a$  = 0.8280 [0.4229] AU  
 $A_g$  = 811.00 [777.15] [1.04σ]  
 $T_{\text{effp}}$  = 5619 [689] K [7.01σ]

## DV Diagnostic Results:

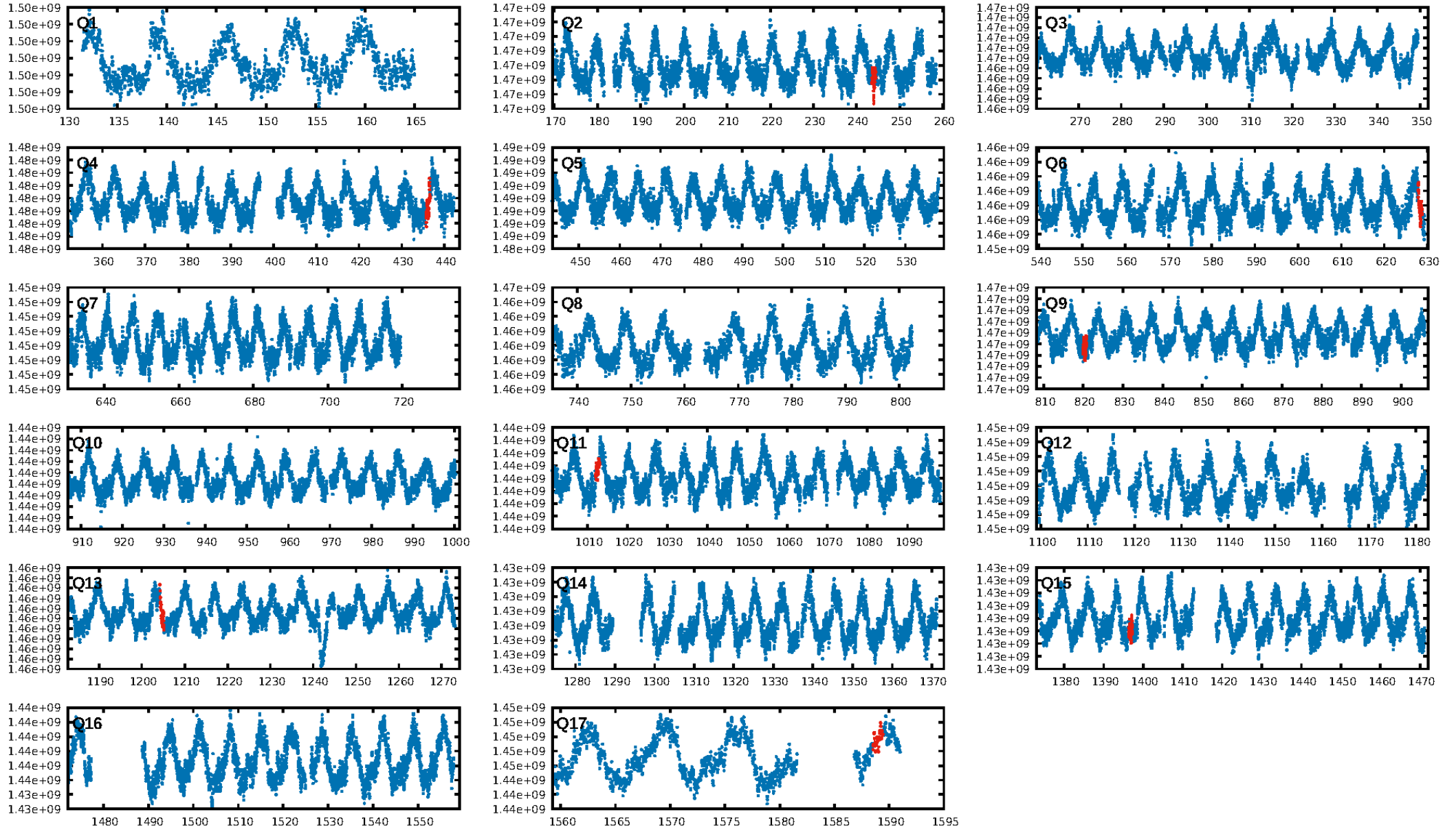
ShortPeriod-sig: 100.0% [10.81σ]  
LongPeriod-sig: 100.0% [702.60σ]  
ModelChiSquare2-sig: 56.2%  
ModelChiSquareGof-sig: 99.9%  
**Bootstrap-pfa: 3.34e-08**  
RollingBand-fgt: 1.00 [6/6]  
GhostDiagnostic-chr: 1.353  
Centroid-sig: 55.1%  
Centroid-so: 0.965 arcsec [2.22σ]  
OotOffset-rm: 1.869 arcsec [1.86σ]  
KicOffset-rm: 2.683 arcsec [2.28σ]  
OotOffset-st: 2/1/0/3 [6]  
KicOffset-st: 2/1/0/3 [6]  
DiffImageQuality-fgm: 0.33 [2/6]  
DiffImageOverlap-fno: 0.83 [5/6]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 12:11:42 Z

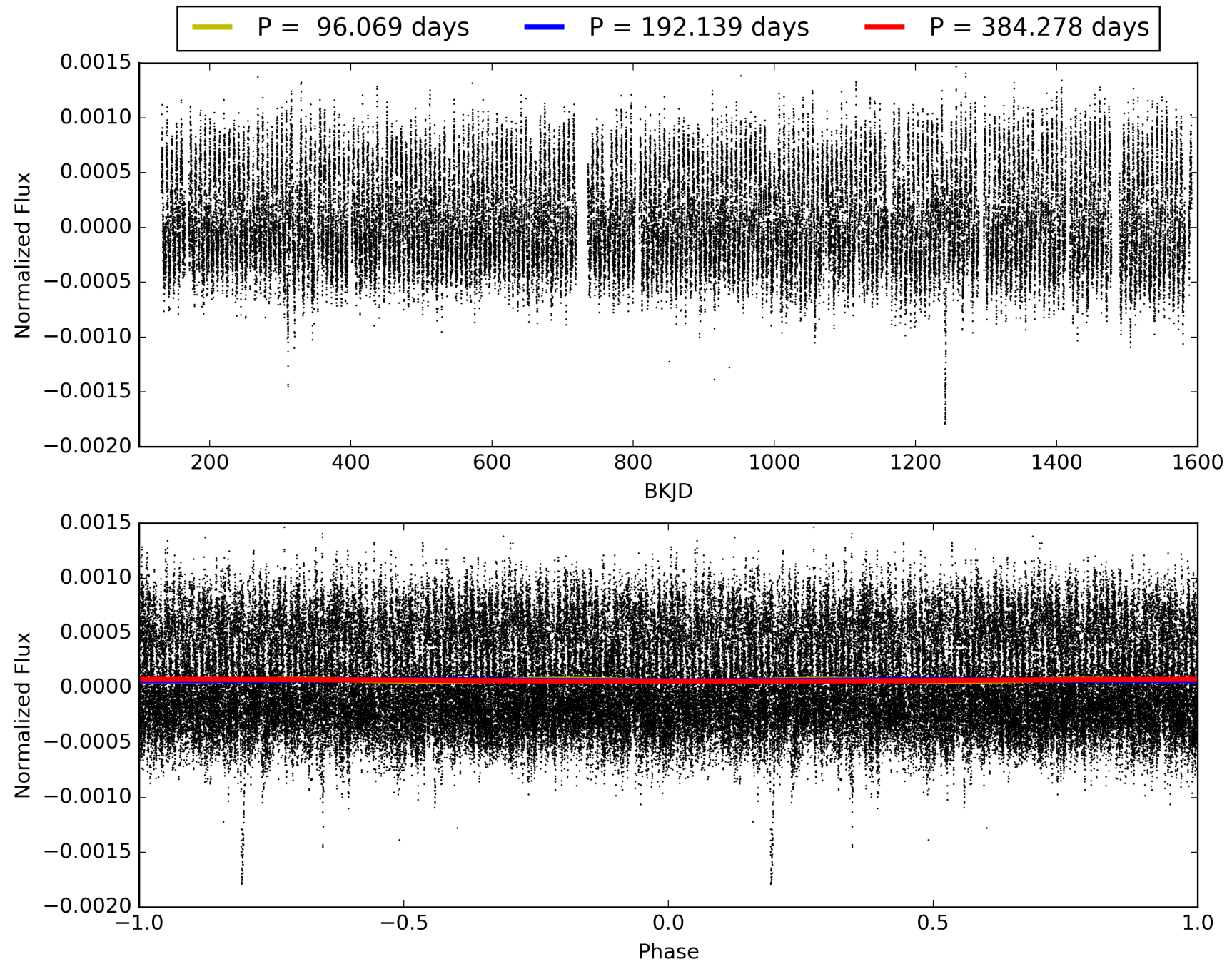
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 009268159-04, PDC Light Curves

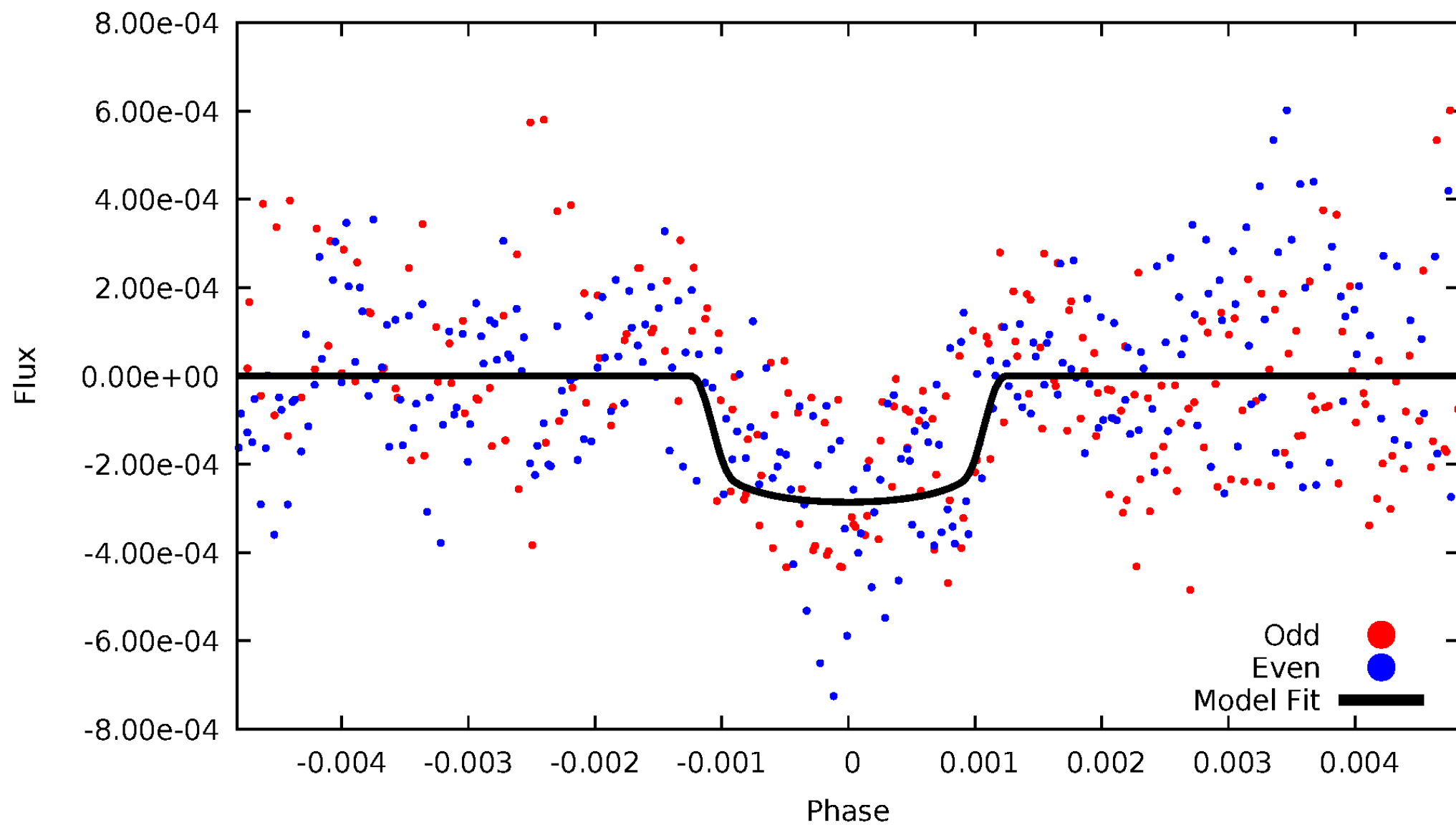


TCE 009268159-04



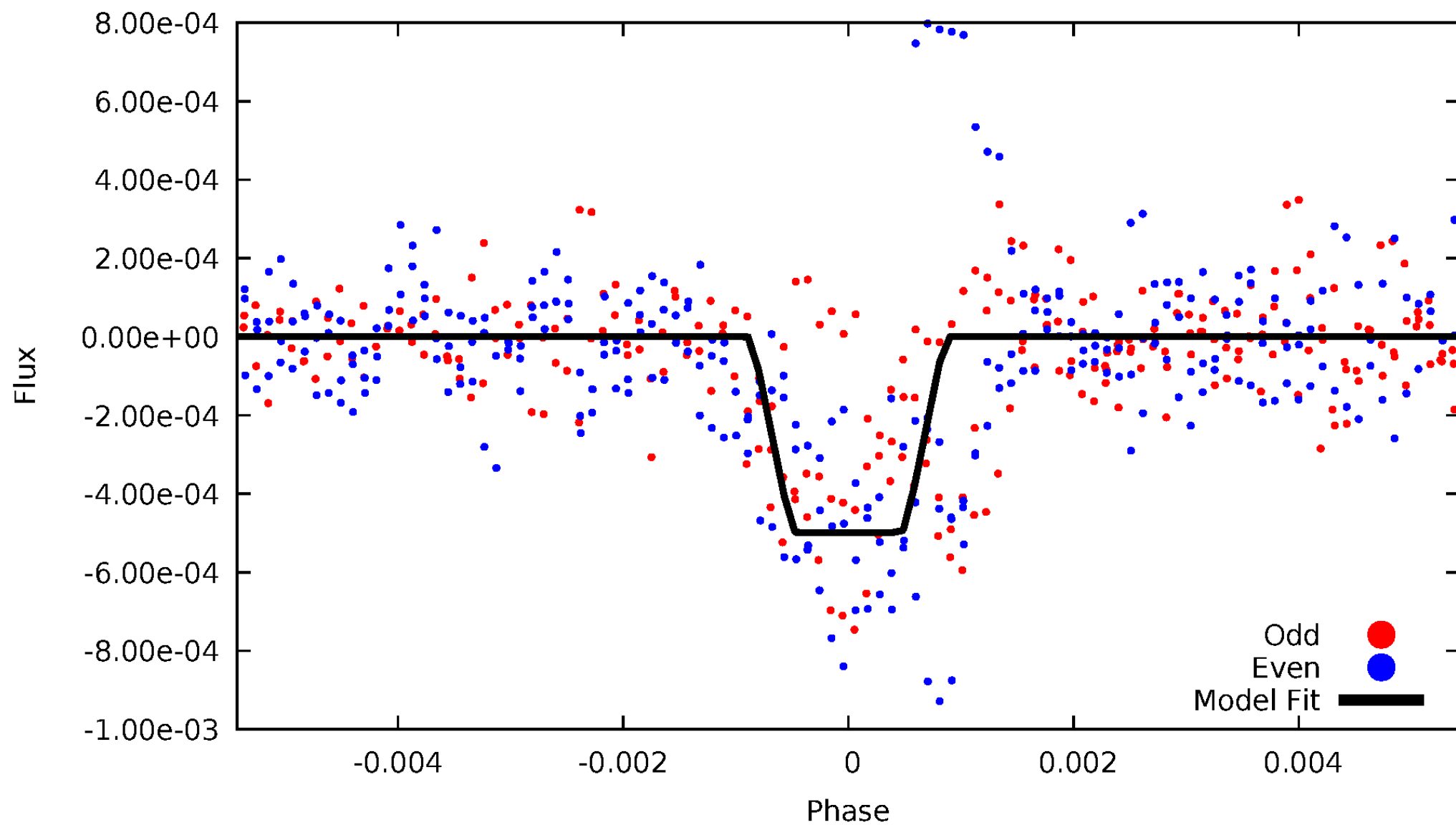
# DV Odd/Even

TCE 009268159-04



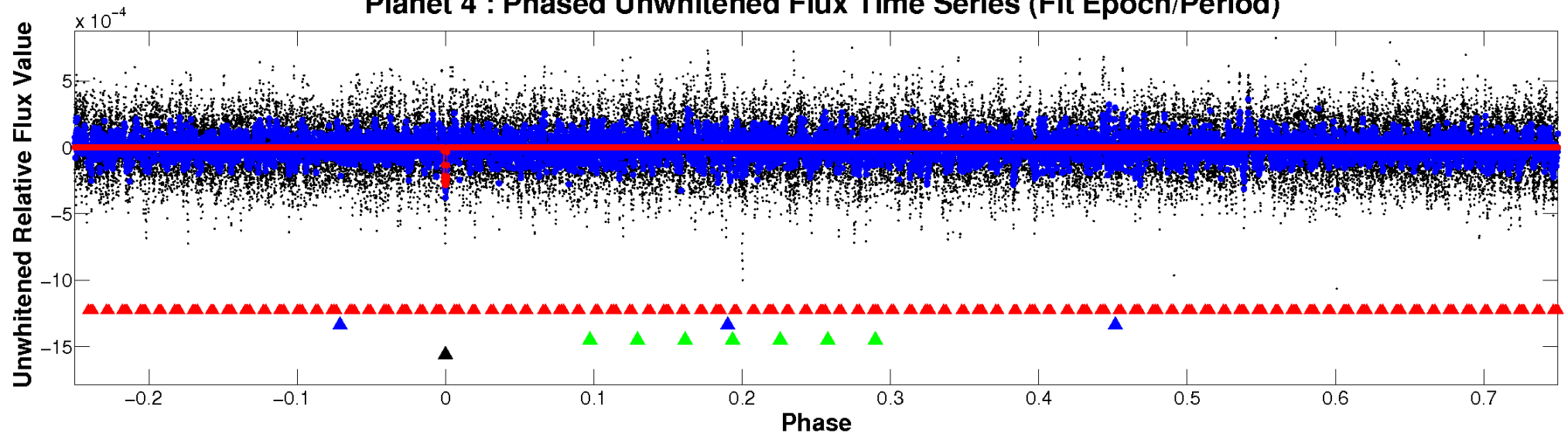
# ALT Odd/Even

TCE 009268159-04

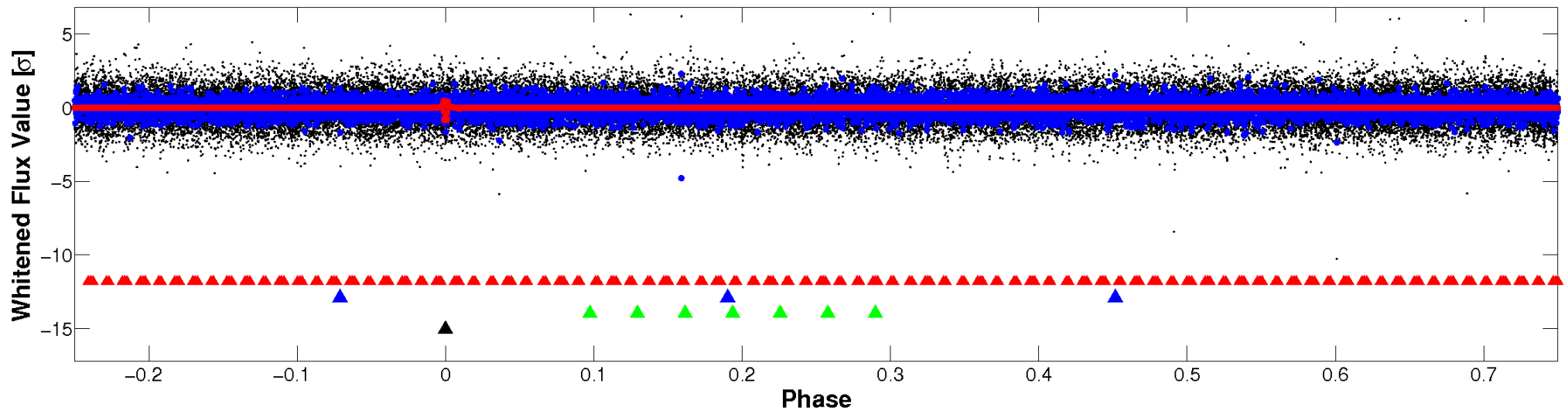


# Non-Whitened Vs. Whitened Light Curve

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

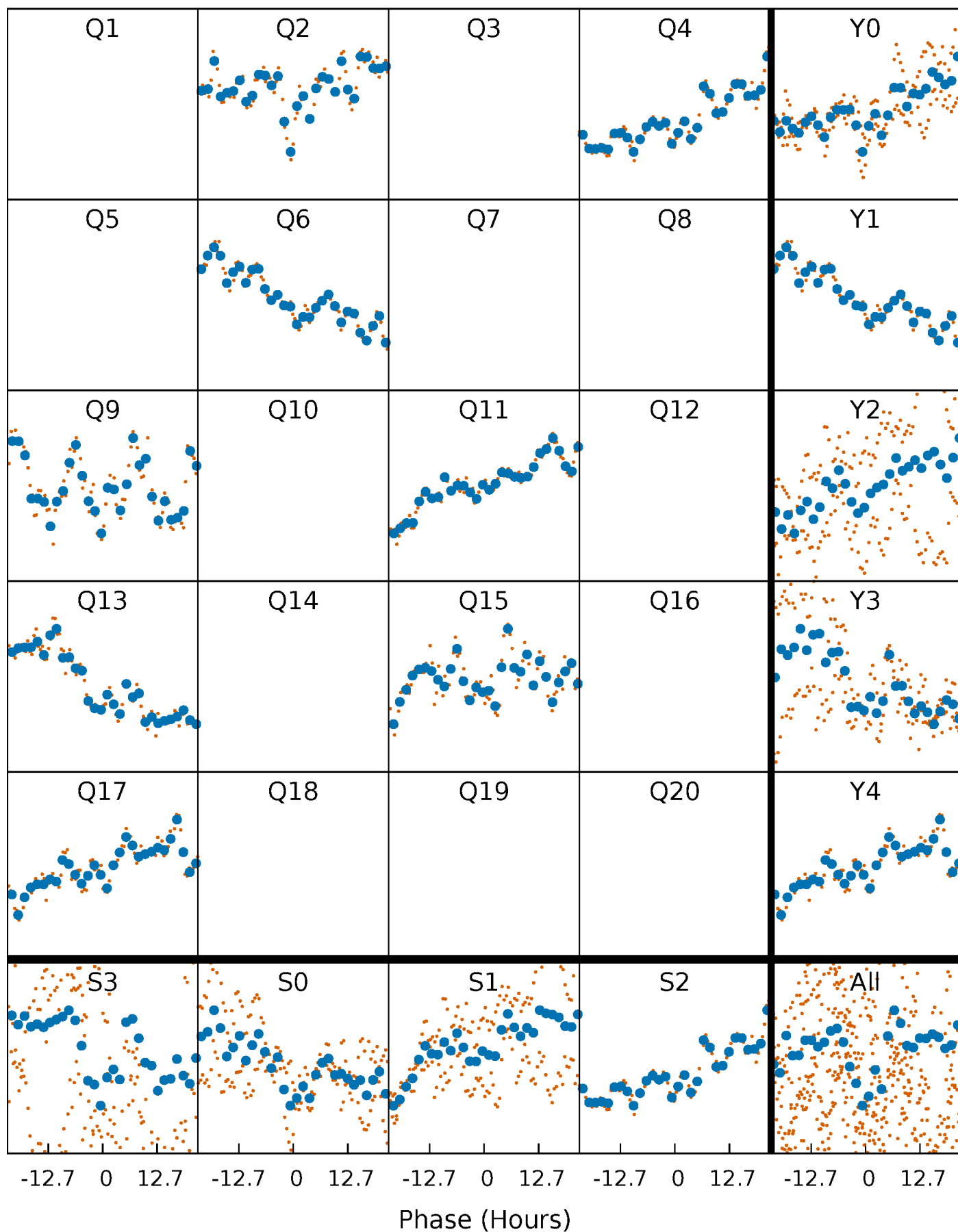


## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



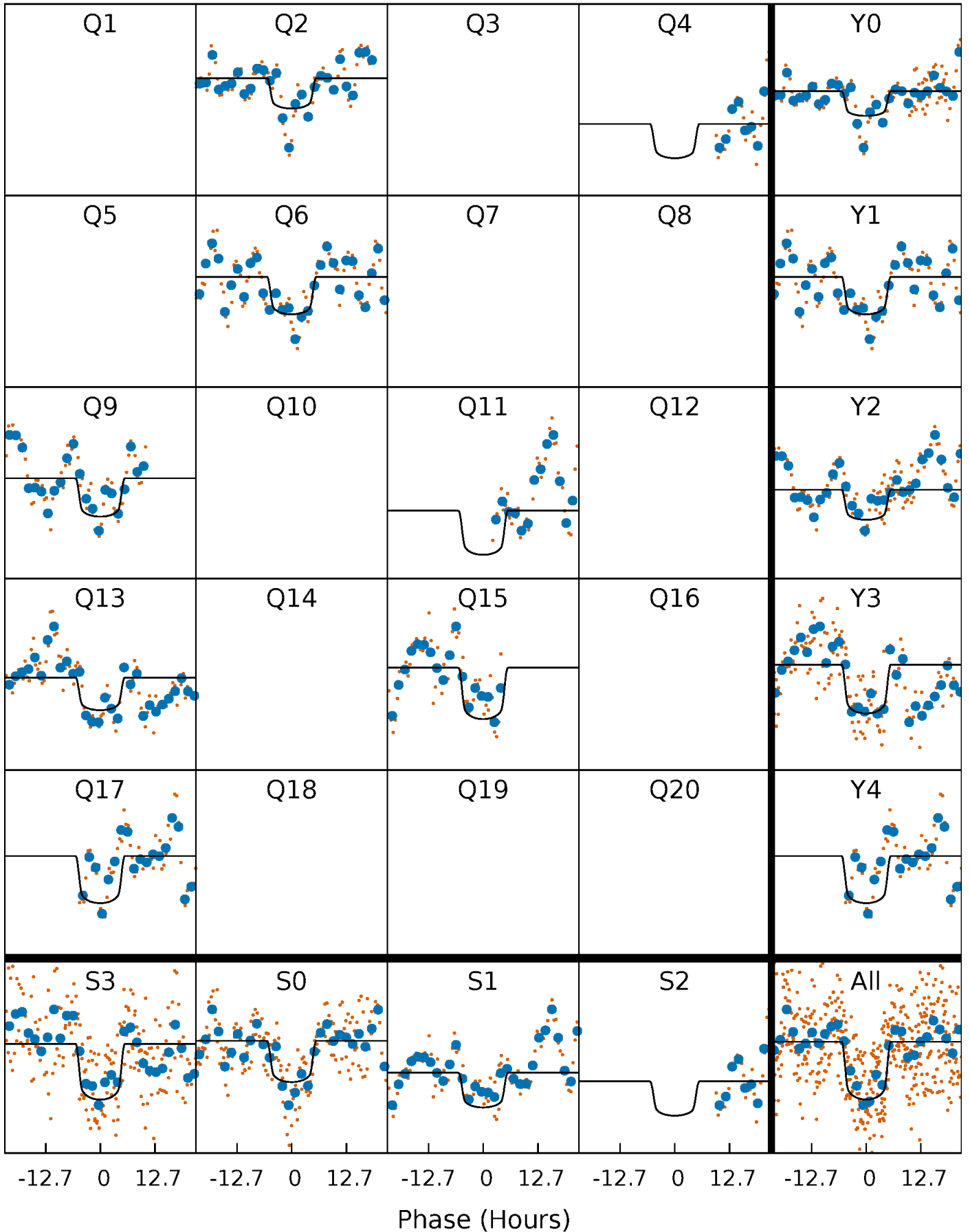
# PDC Quarter-Phased Transit Curves

TCE 009268159-04     $P=192.138774$  Days     $T_0=244.002270$  (BKJD)



# DV Quarter-Phased Transit Curves

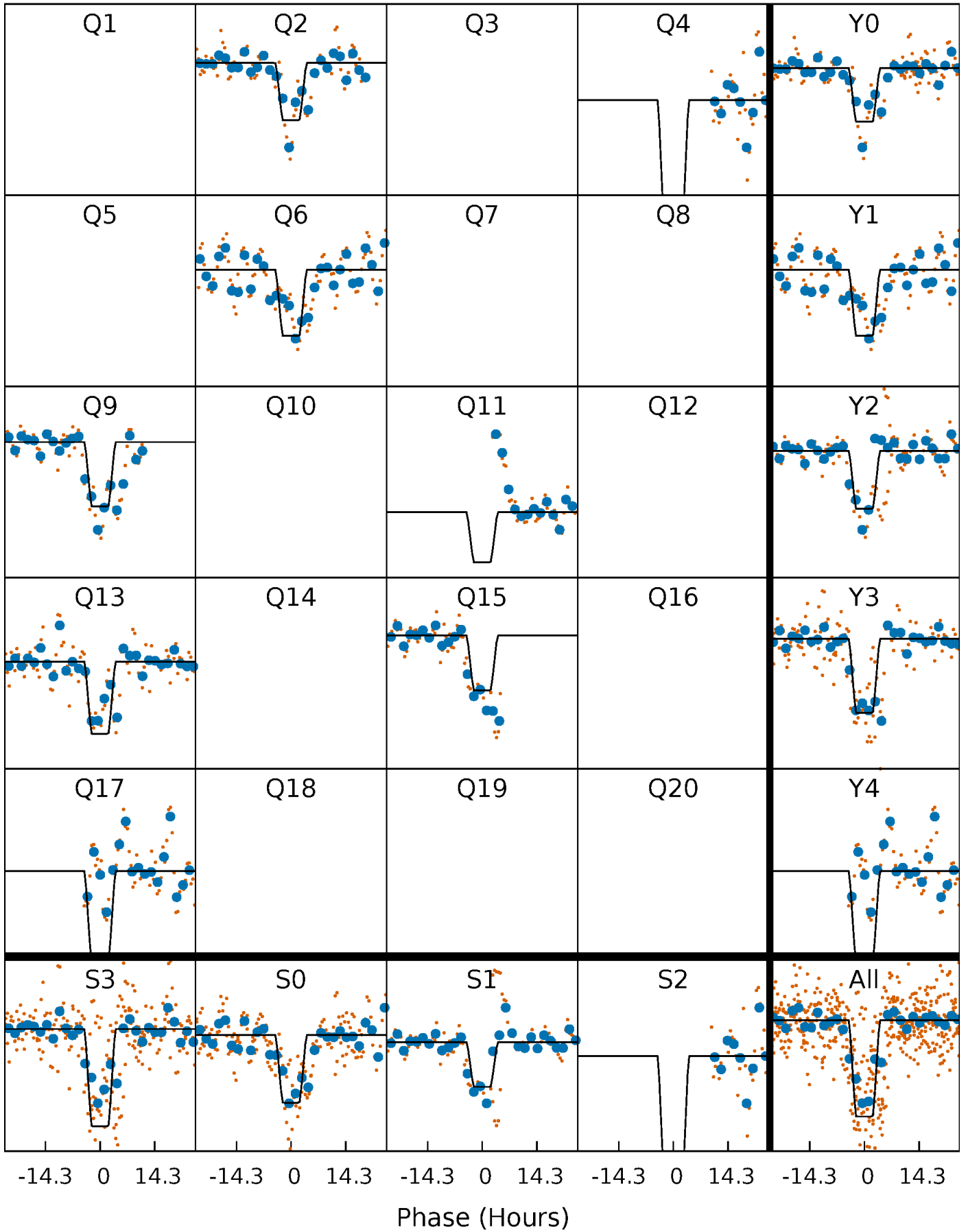
TCE 009268159-04     $P=192.138774$  Days     $T_0=244.002270$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

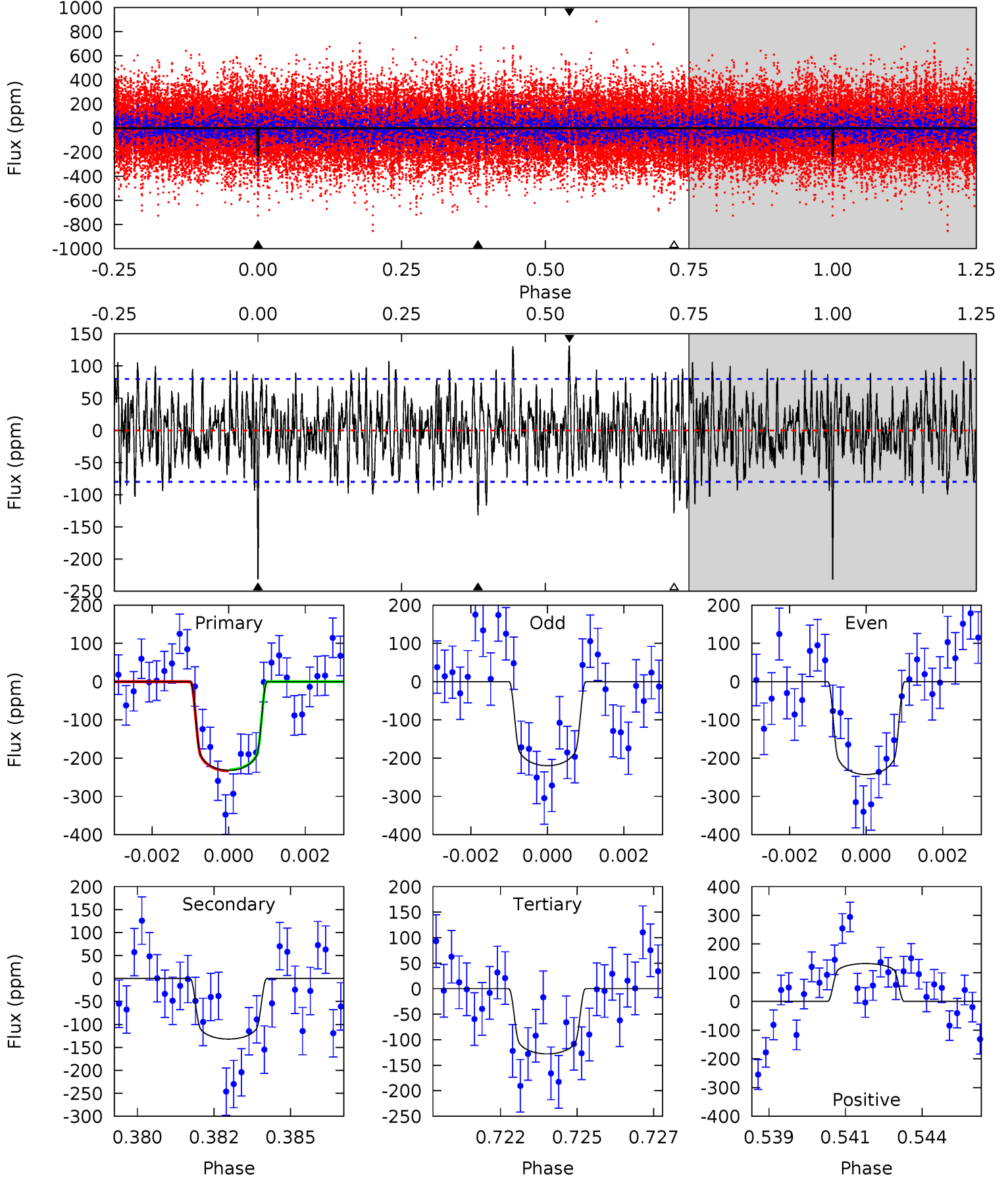
TCE 009268159-04 P=192.136765 Days  $T_0=243.988474$  (BKJD)



# DV Model-Shift Uniqueness Test

009268159-04, P = 192.138774 Days, E = 51.863496 Days

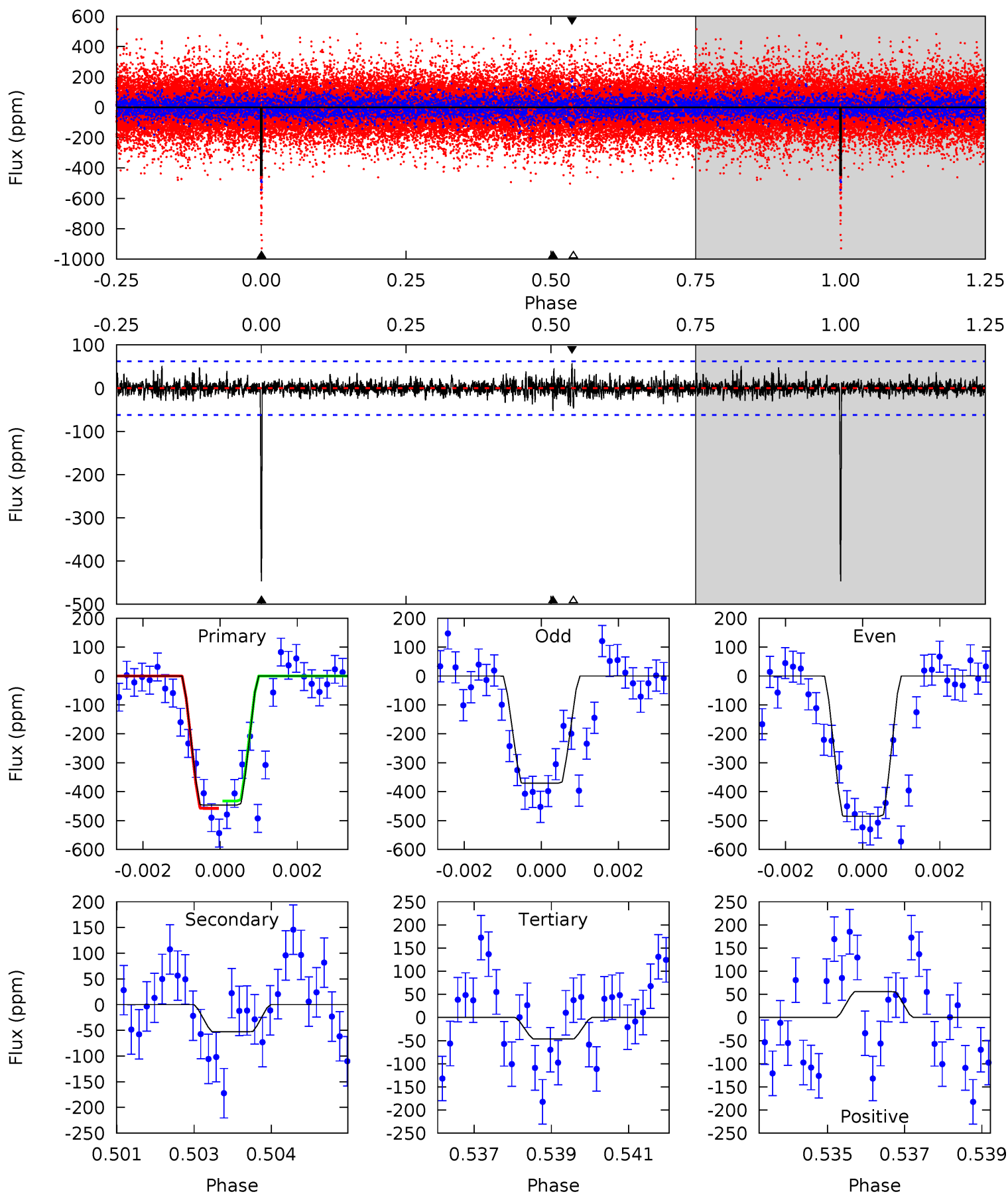
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
15.3	8.73	8.45	8.73	5.29	3.03	2.66	6.88	6.60	0.27	-0.01	0.77	1.02	0.36	0.10



# Alt Model-Shift Uniqueness Test

009268159-04, P = 192.136765 Days, E = 51.851709 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
38.4	4.54	4.01	4.81	5.35	3.12	0.92	34.4	33.6	0.53	-0.27	4.95	0.42	0.11	1.08



### Stellar Parameters For KIC 009268159

	$T_{\text{eff}} (K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7365^{+203}_{-330}$	$3.628^{+0.504}_{-0.056}$	$-0.080^{+0.250}_{-0.300}$	$3.638^{+0.341}_{-1.820}$	$2.049^{+0.152}_{-0.608}$	$0.060^{+0.343}_{-0.011}$
	+3%/-4%	+14%/-2%	+312%/-375%	+9%/-50%	+7%/-30%	+572%/-19%
Source	KIC0	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 009268159-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-132 \pm 15$	$6.71^{+0.95}_{-1.74}$	$907^{+65}_{-105}$	$5752^{+348}_{-309}$	$1102^{+753}_{-269}$
Alt.	$-53 \pm 12$	$8.27^{+1.25}_{-2.29}$	$914^{+62}_{-119}$	$4350^{+232}_{-238}$	$303^{+208}_{-99}$

$T_{max}$  = Theoretical Maximum Planetary Temperature

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

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

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

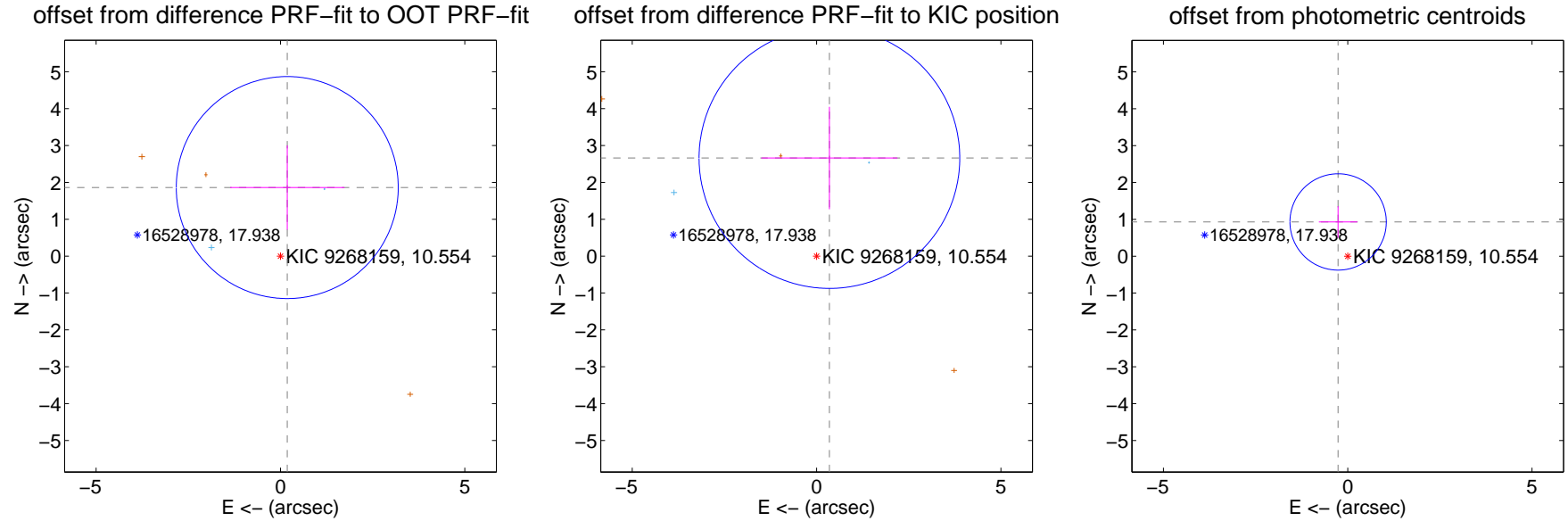
## DV Centroid Data

Supplemental centroid analysis for 009268159-04. **Kepler magnitude: 10.55.** Transit SNR 8.44

There are 2 quarters with good PRF difference image offsets

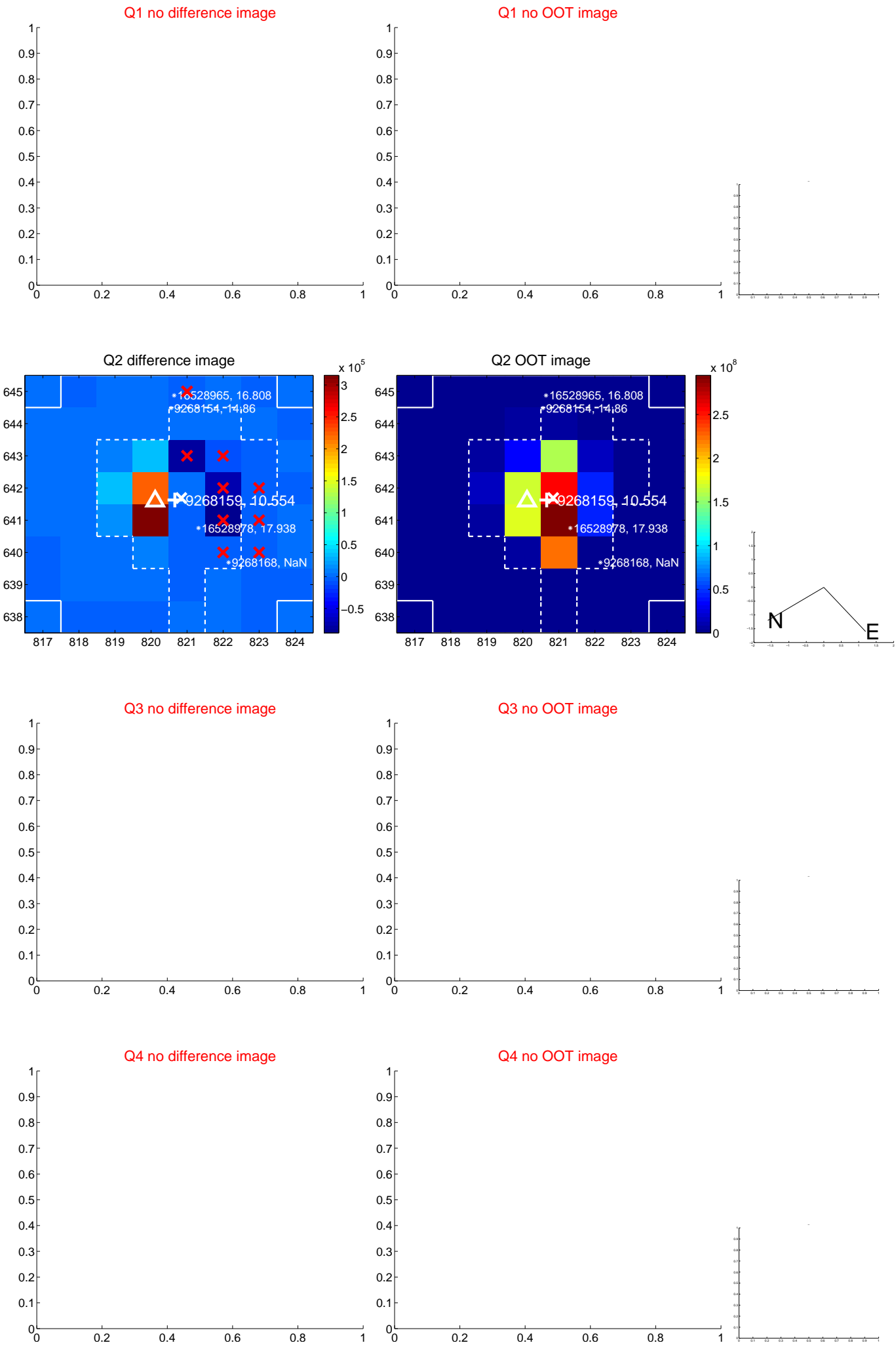
The OOT PRF centroid is offset from the target star catalog position by about 2.59 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.869 \pm 1.003$	1.86	$-0.184 \pm 1.550$	$1.860 \pm 1.142$
PRF-fit source offset from KIC position	$2.683 \pm 1.178$	2.28	$-0.348 \pm 1.846$	$2.660 \pm 1.388$
photometric centroid source offset	$0.97 \pm 0.44$	2.22	$0.26 \pm 0.52$	$0.93 \pm 0.43$

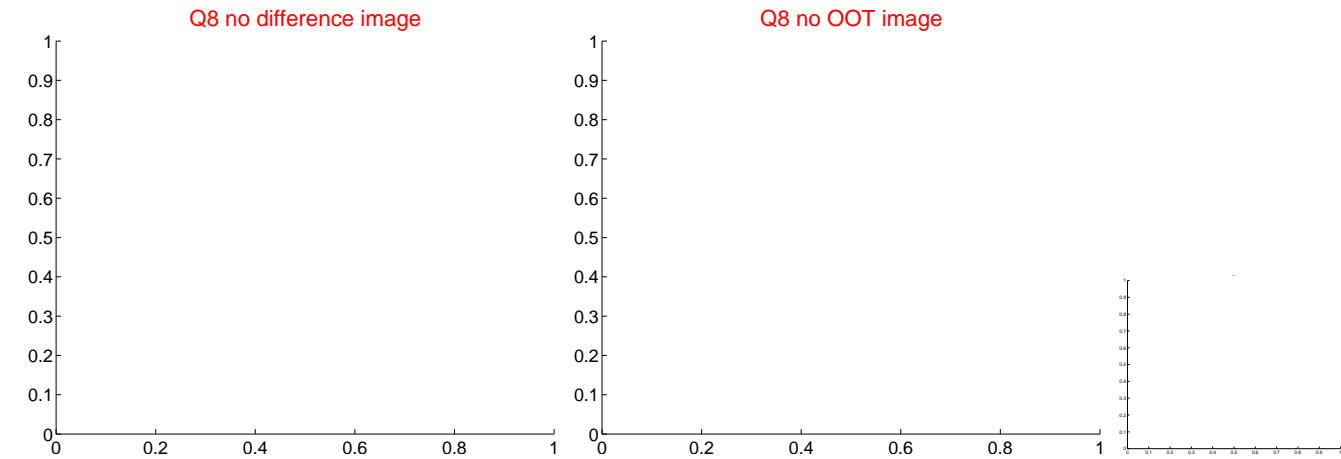
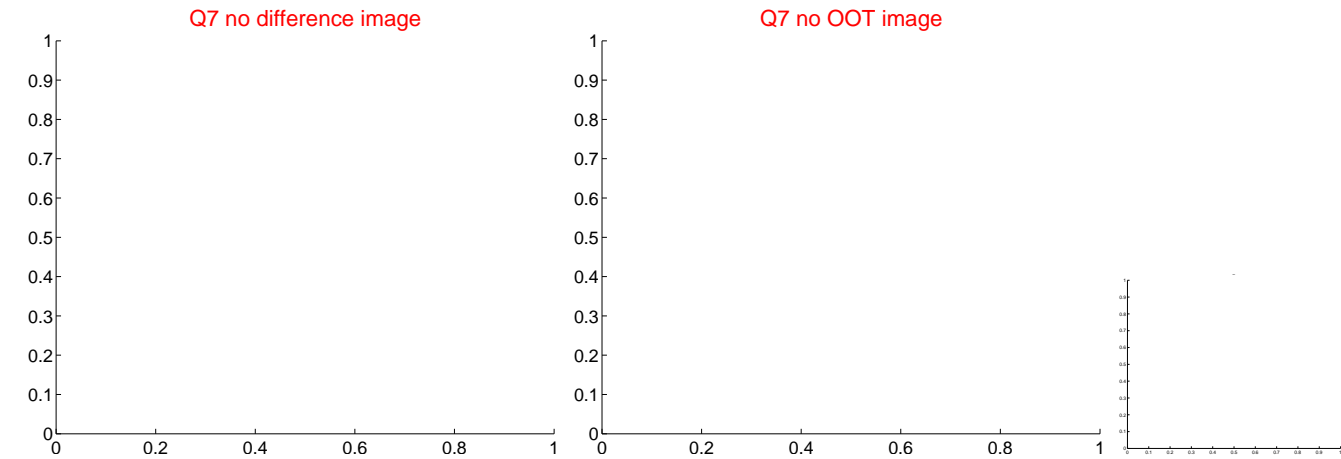
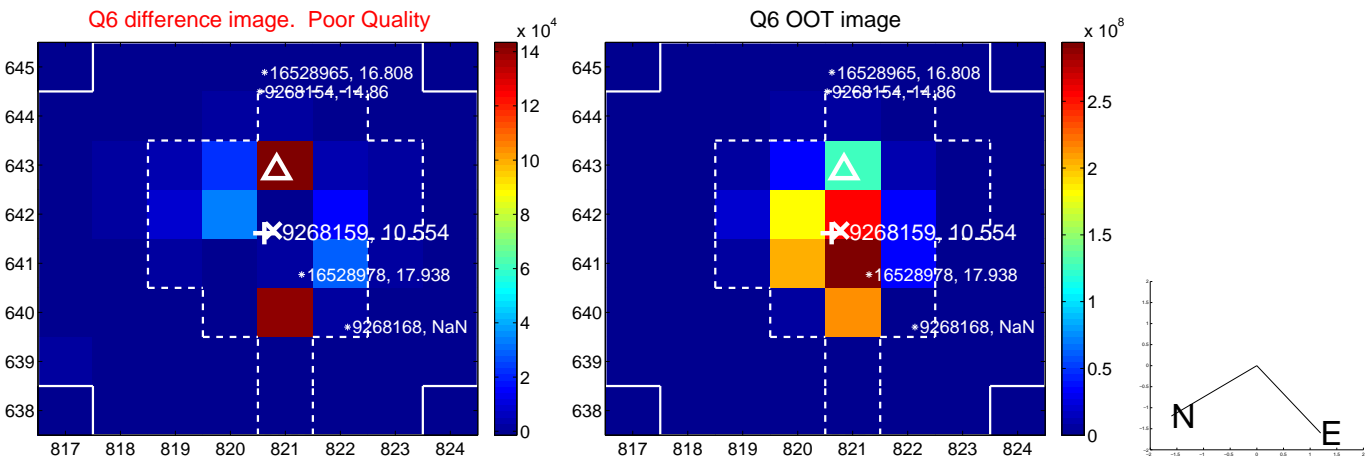
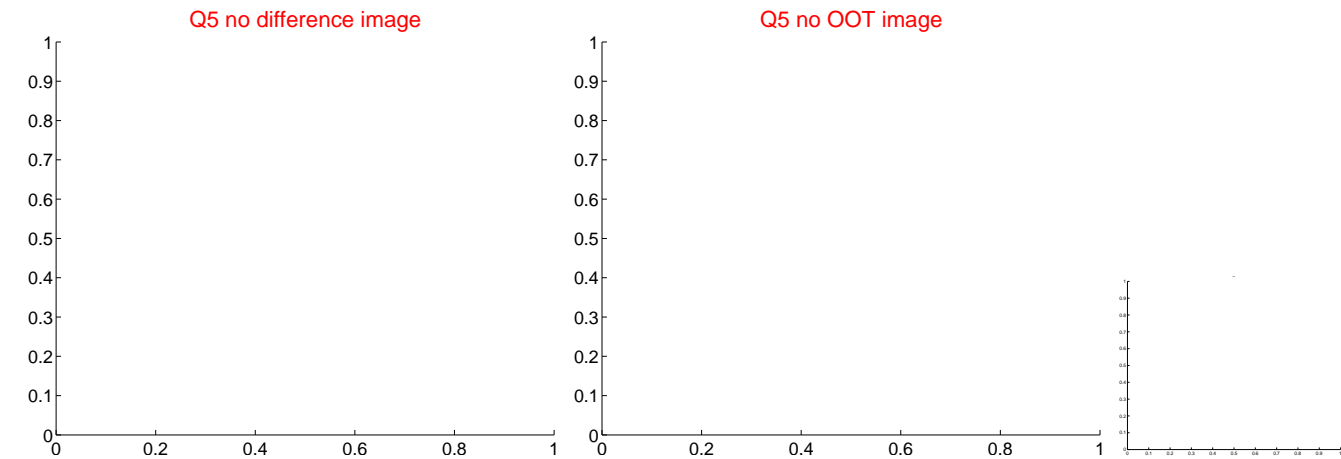


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

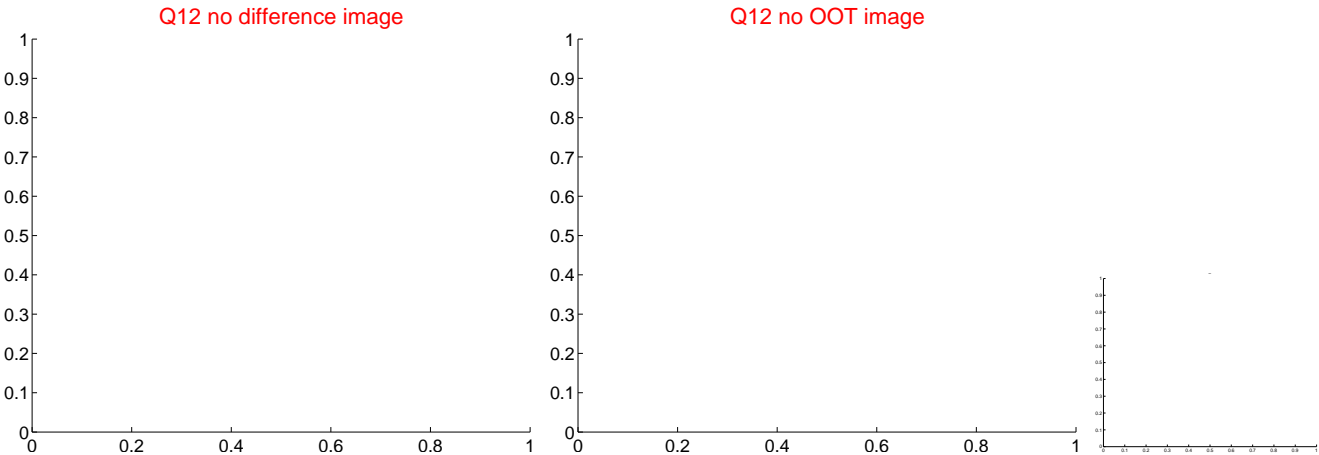
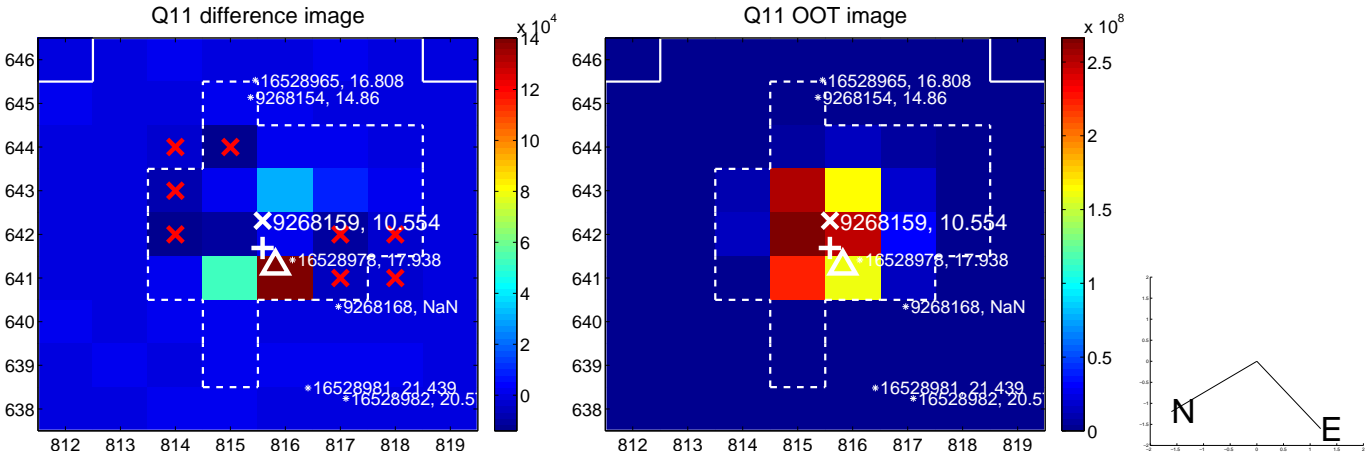
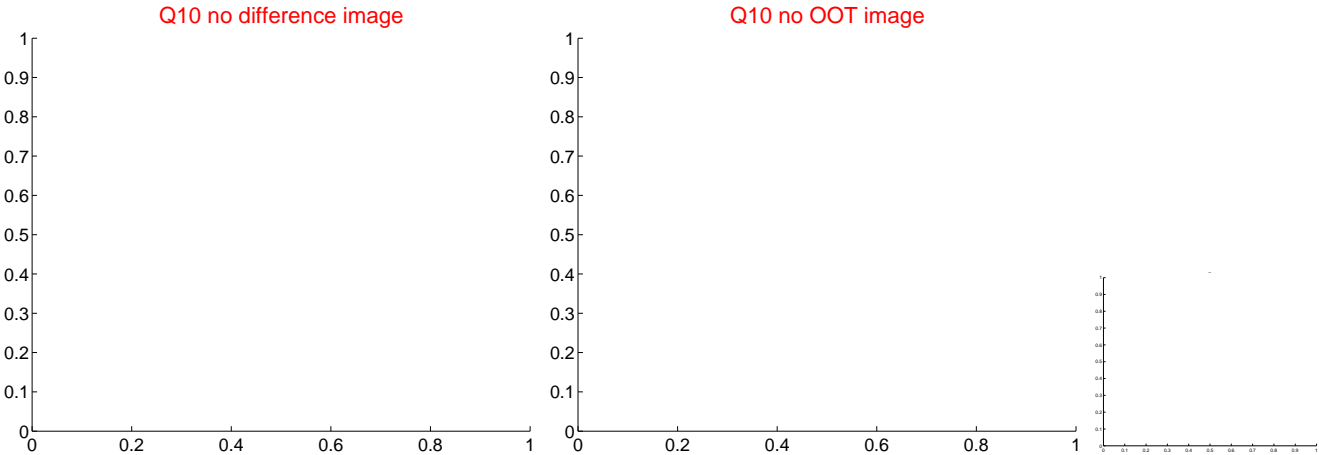
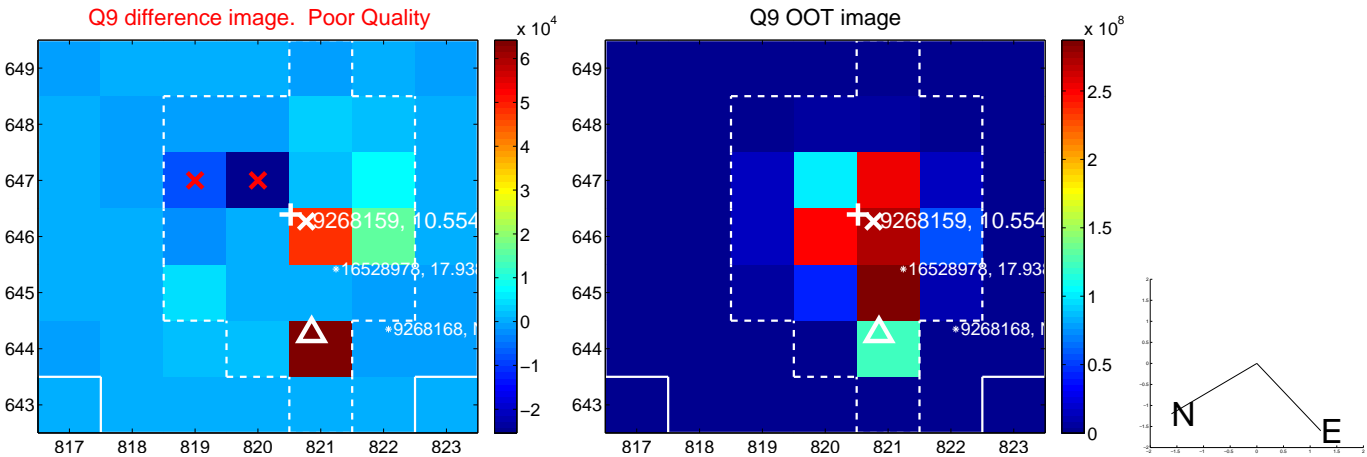
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

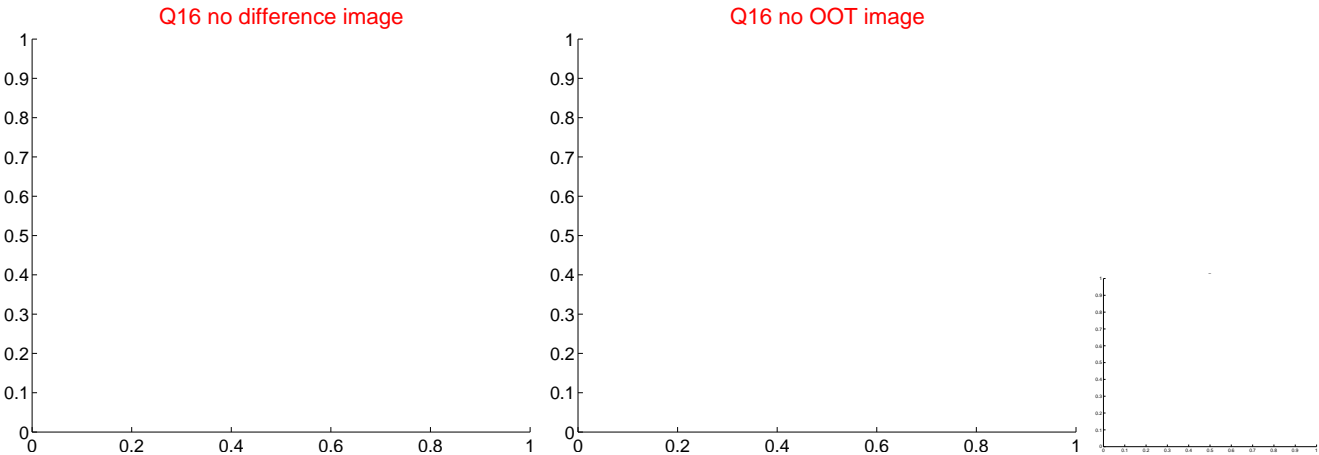
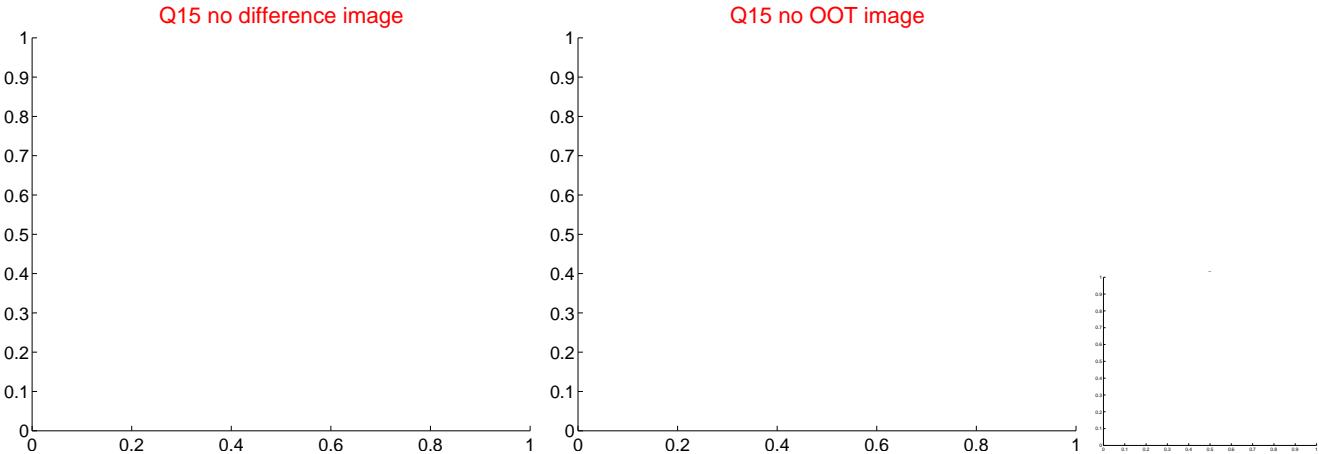
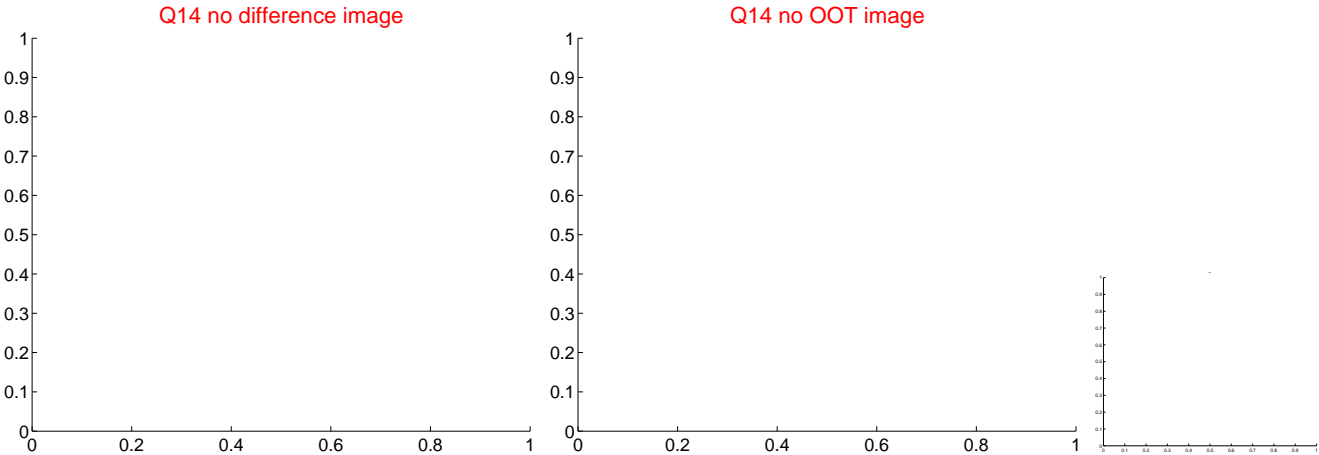
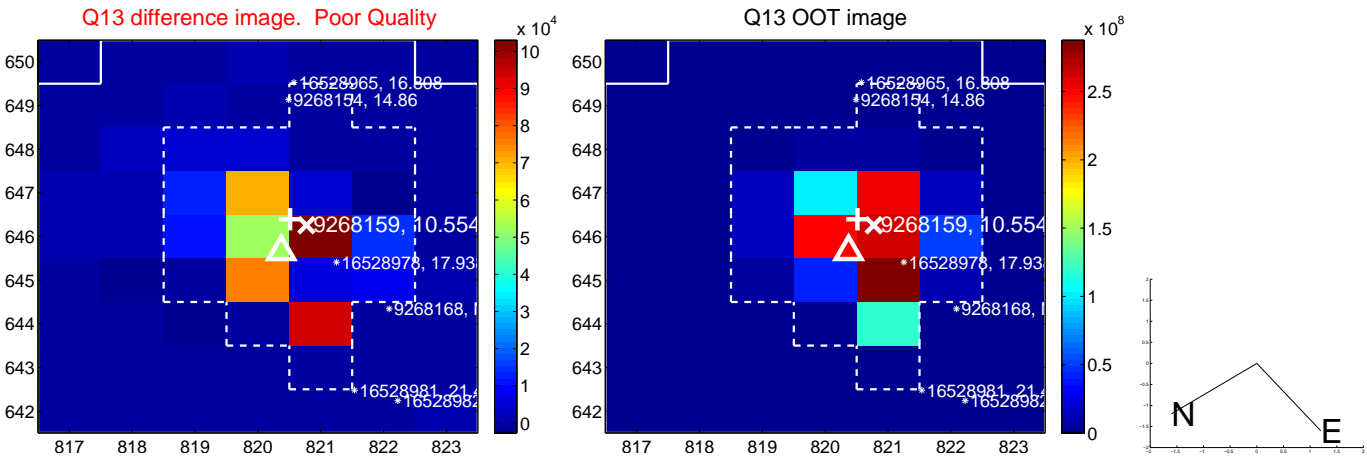


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

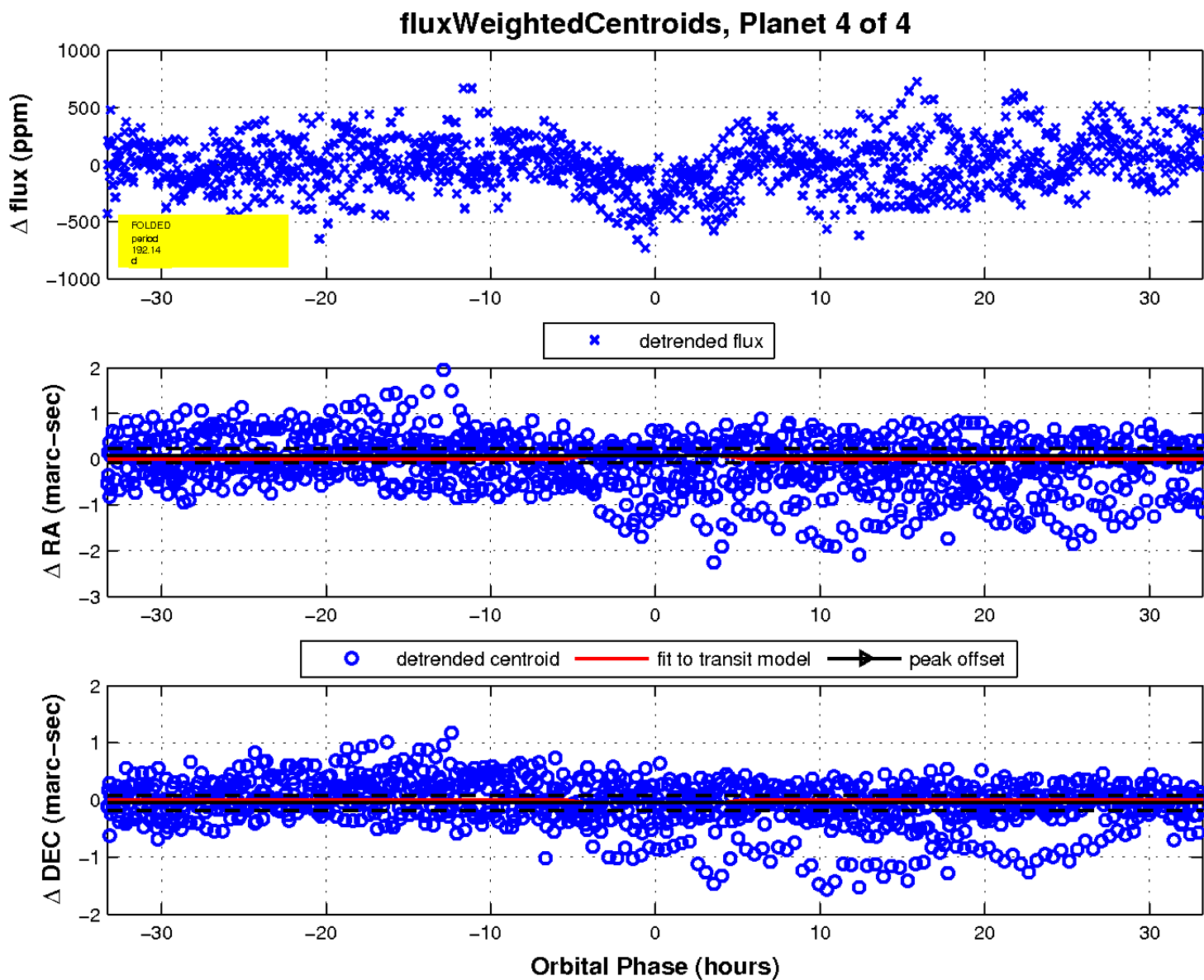
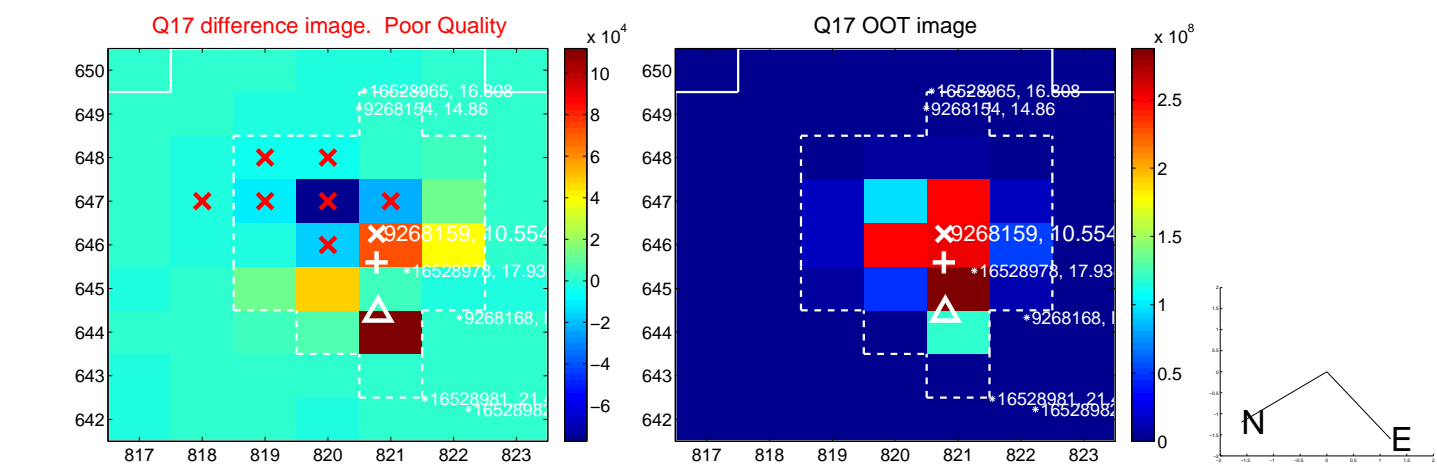




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



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Declination

