

# KIC 010666510

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010666510-01	OBS	No	421.687916	365.815942	931.8	5.128	15.1	9.8	15.15	5155	66.91	52.17
010666510-02	OBS	No	379.586929	153.240185	800.6	3.691	16.7	8.9	15.15	5155	47.35	60.02
010666510-03	OBS	No	388.900666	250.517919	927.2	7.134	14.8	9.4	15.15	5155	60.21	58.12
010666510-04	OBS	No	430.407843	241.669278	417.6	2.098	13.9	5.6	15.15	5155	34.31	50.77
010666510-05	OBS	No	382.409441	357.475831	147.2	3.000	15.1	-1.0	15.15	5155	17.93	59.44

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010666510-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_SATURATED
010666510-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_SATURATED
010666510-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—CENT_SATURATED
010666510-04	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—INCONSISTENT_TRANS—CENT_SATURATED
010666510-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—INCONSISTENT_TRANS—CENT_SATURATED

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

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

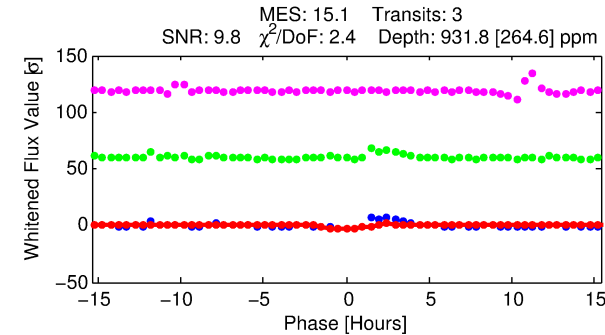
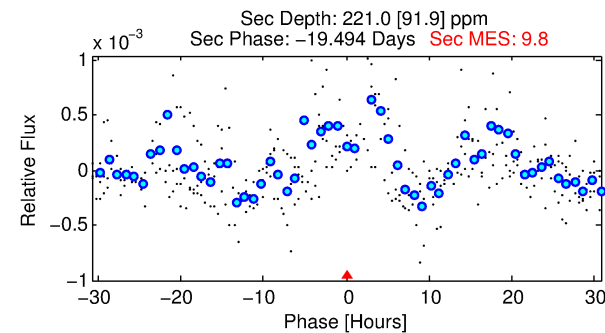
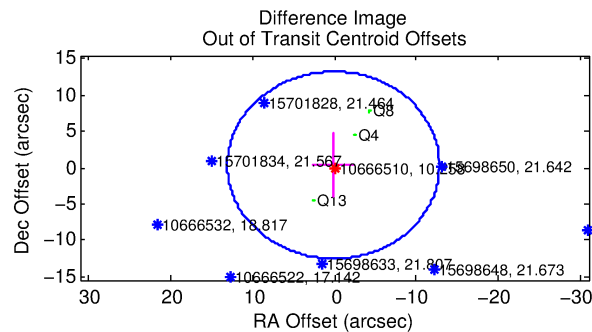
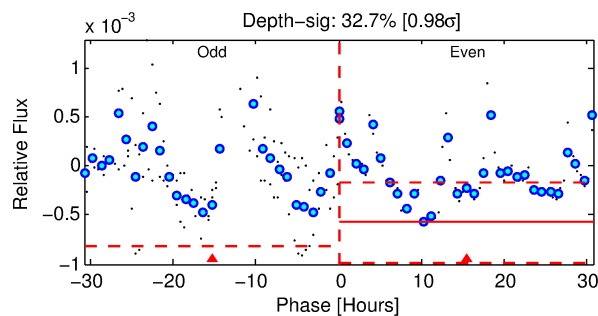
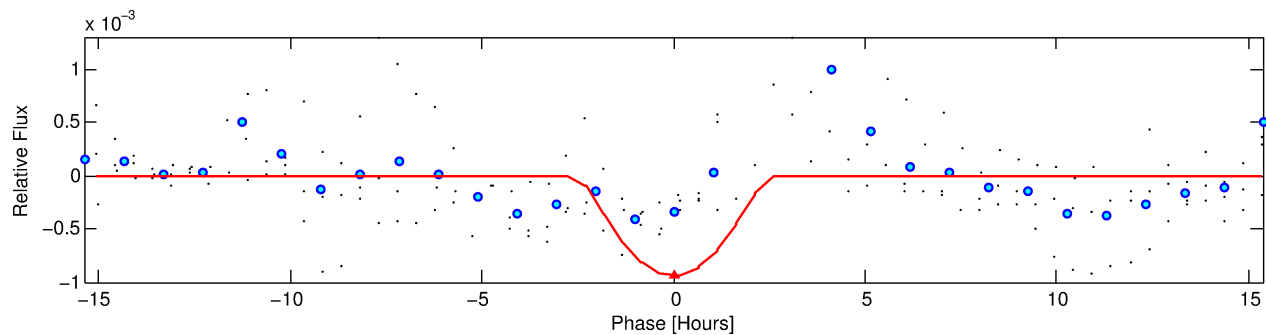
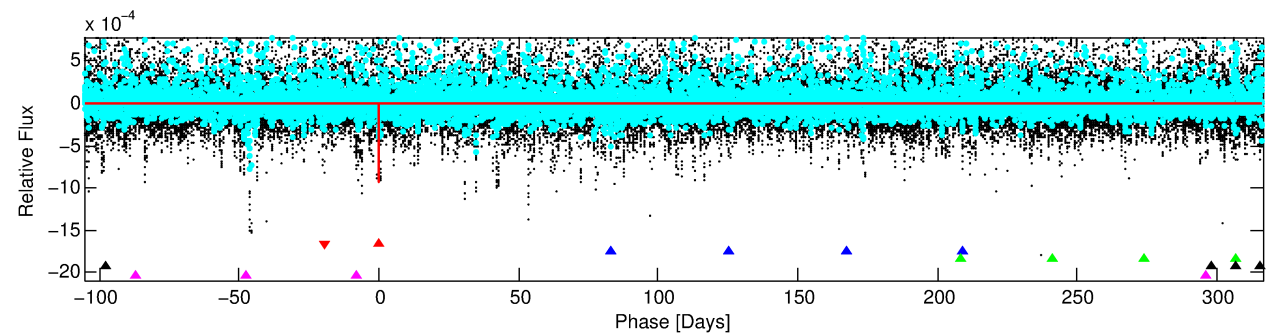
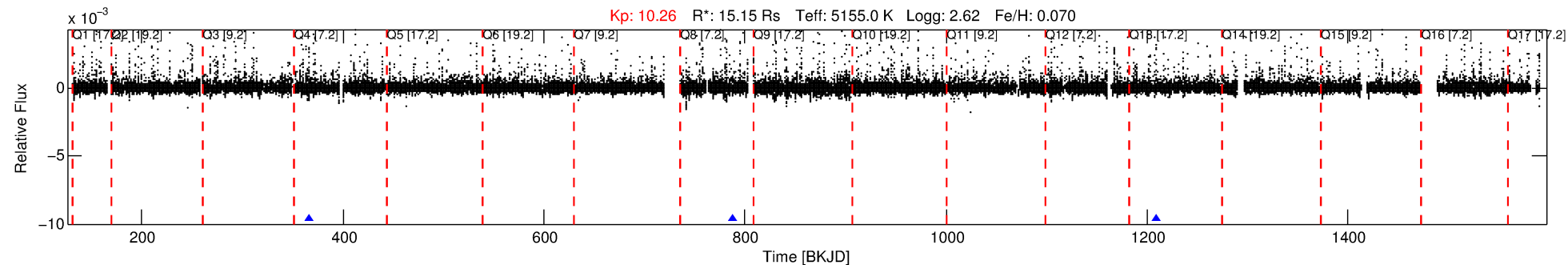
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 010666510-01

No Significant Match Found

# DV One-Page Summary

KIC: 10666510 Candidate: 1 of 5 Period: 421.688 d



## DV Fit Results:

Period = 421.68792 [0.00974] d  
Epoch = 365.8159 [0.0147] BKJD  
Rp/R\* = 0.0405 [0.0257]  
a/R\* = 234.97 [82.52]  
b = 0.97 [0.06]  
Seff = 52.17 [59.35]  
Teq = 685 [195] K  
Rp = 66.91 [65.89] Re  
a = 1.6684 [1.1831] AU  
Ag = 75.61 [131.91] [0.57 $\sigma$ ]  
Teffp = 3124 [1055] K [2.27 $\sigma$ ]

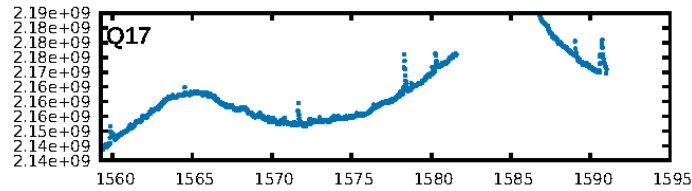
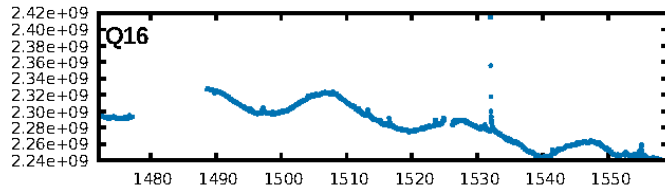
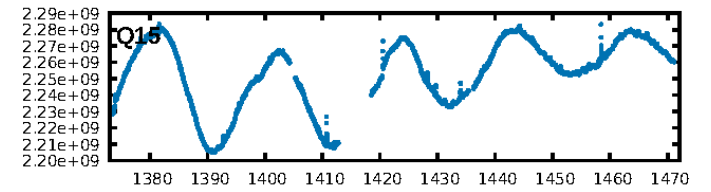
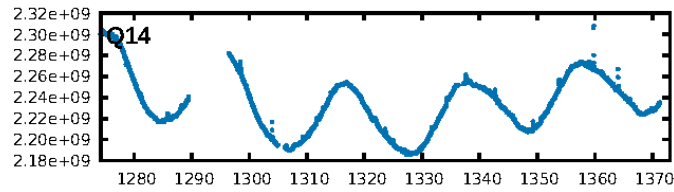
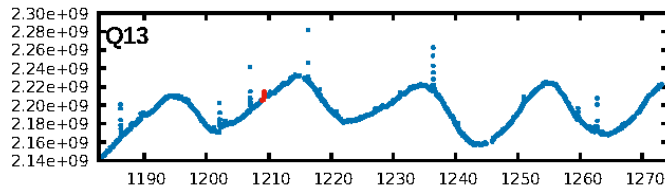
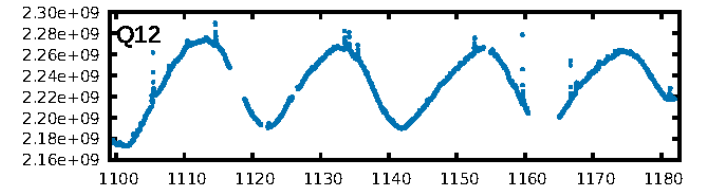
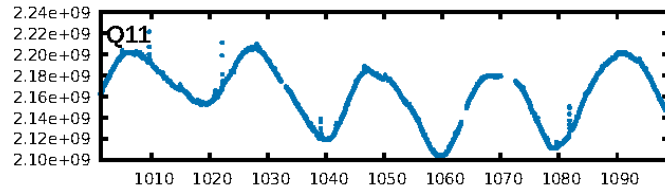
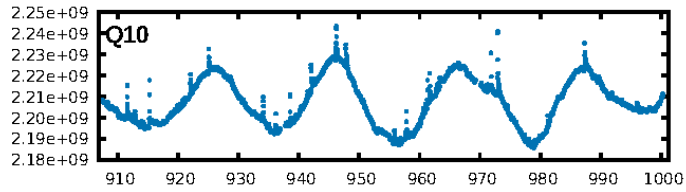
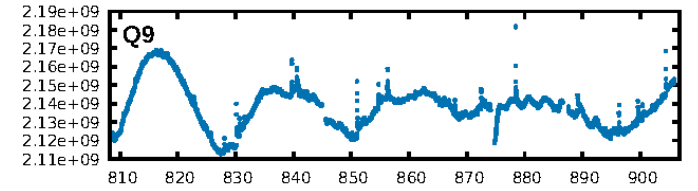
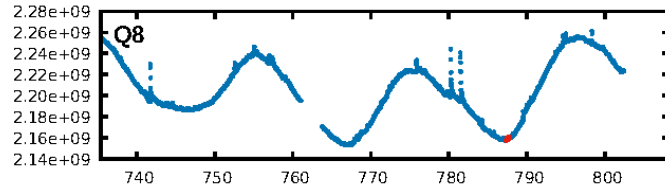
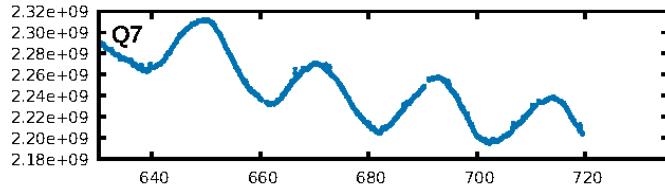
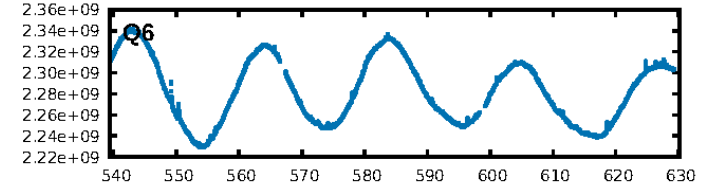
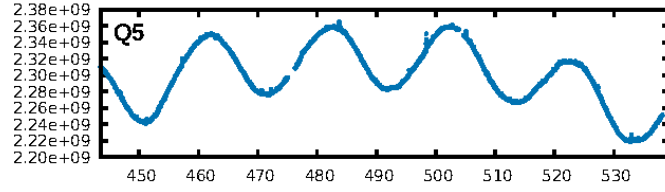
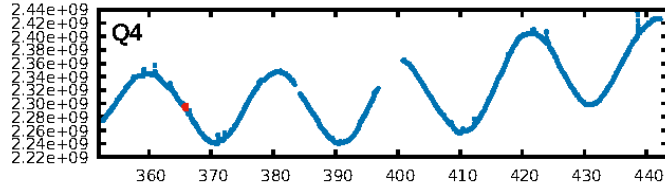
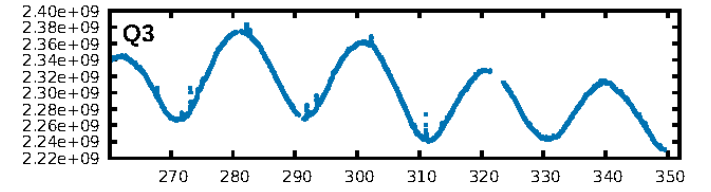
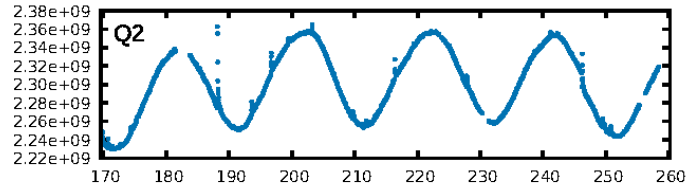
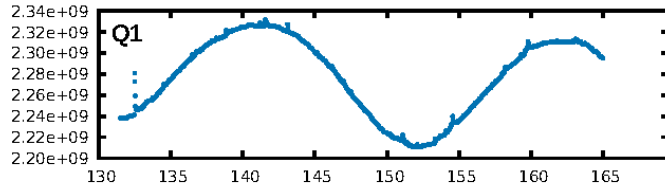
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [89.57 $\sigma$ ]  
LongPeriod-sig: 100.0% [37.78 $\sigma$ ]  
ModelChiSquare2-sig: 17.3%  
ModelChiSquareGof-sig: 1.5%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: N/A  
Centroid-sig: N/A  
Centroid-so: 2.235 arcsec [4.59 $\sigma$ ]  
OotOffset-rm: 0.357 arcsec [0.08 $\sigma$ ]  
KicOffset-rm: 1.807 arcsec [0.65 $\sigma$ ]  
OotOffset-st: 0/0/2/1 [3]  
KicOffset-st: 0/0/2/1 [3]  
DiffImageQuality-fgm: 0.33 [1/3]  
DiffImageOverlap-fno: 1.00 [3/3]

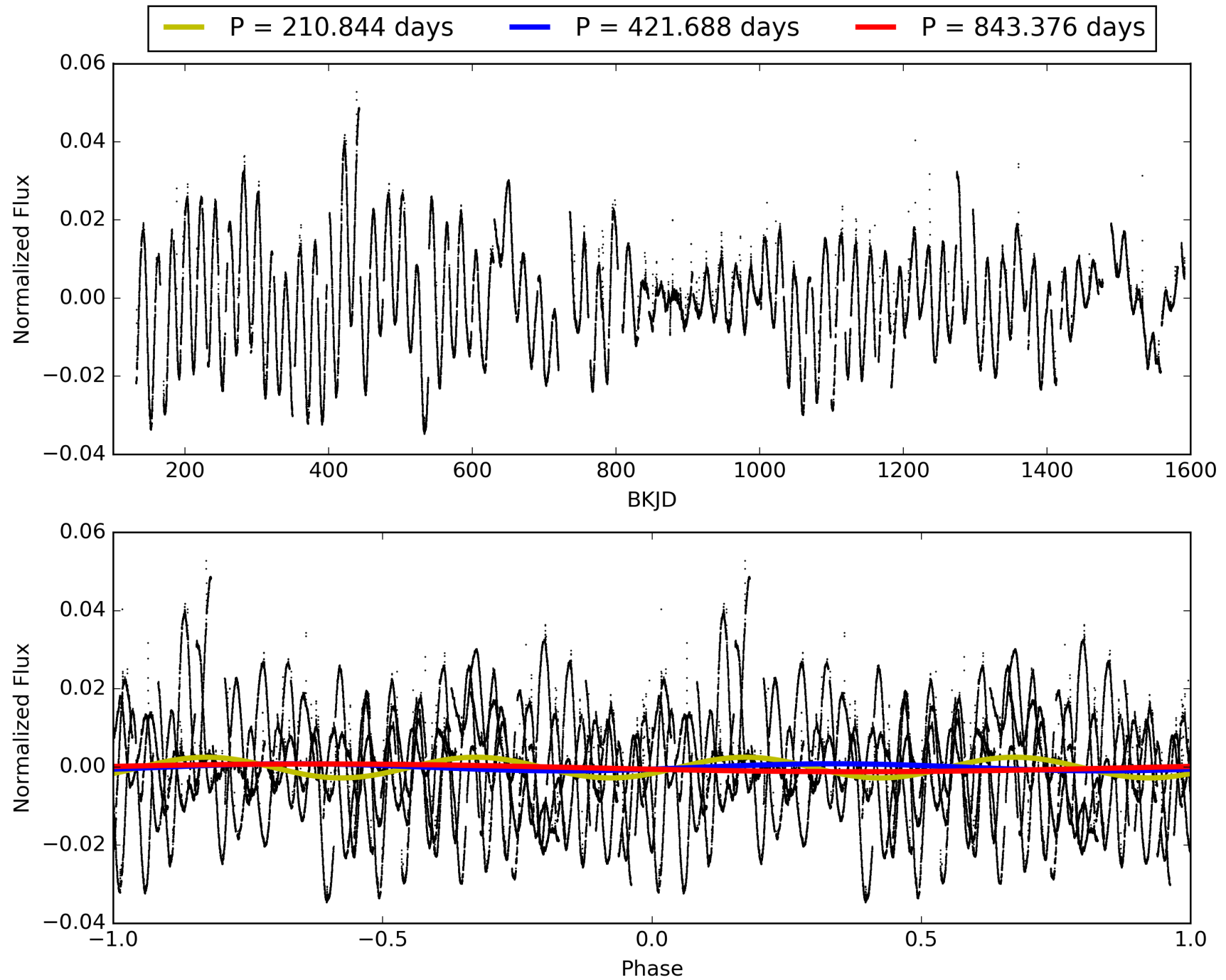
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:30:41 Z

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

# TCE 010666510-01, PDC Light Curves



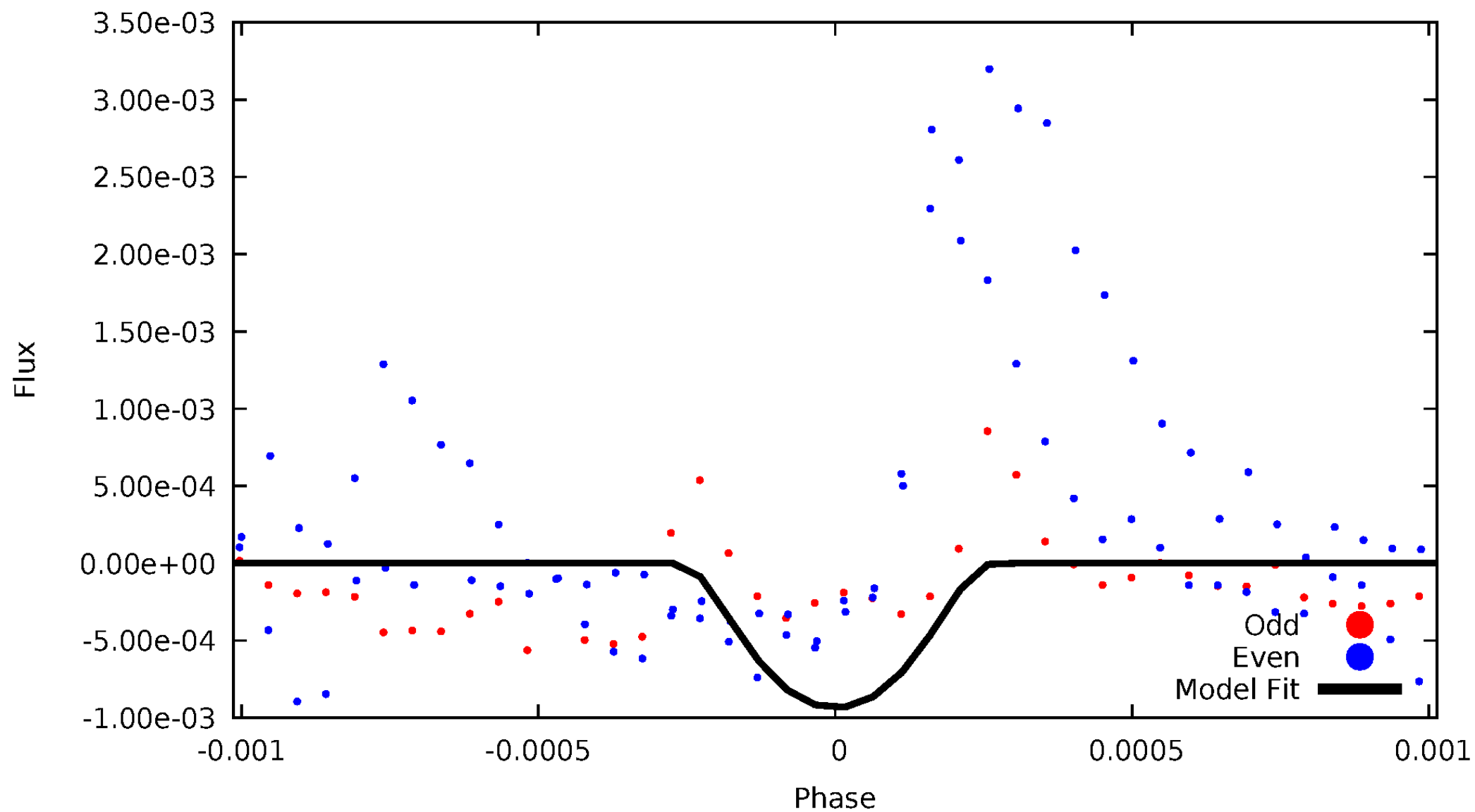
# TCE 010666510-01





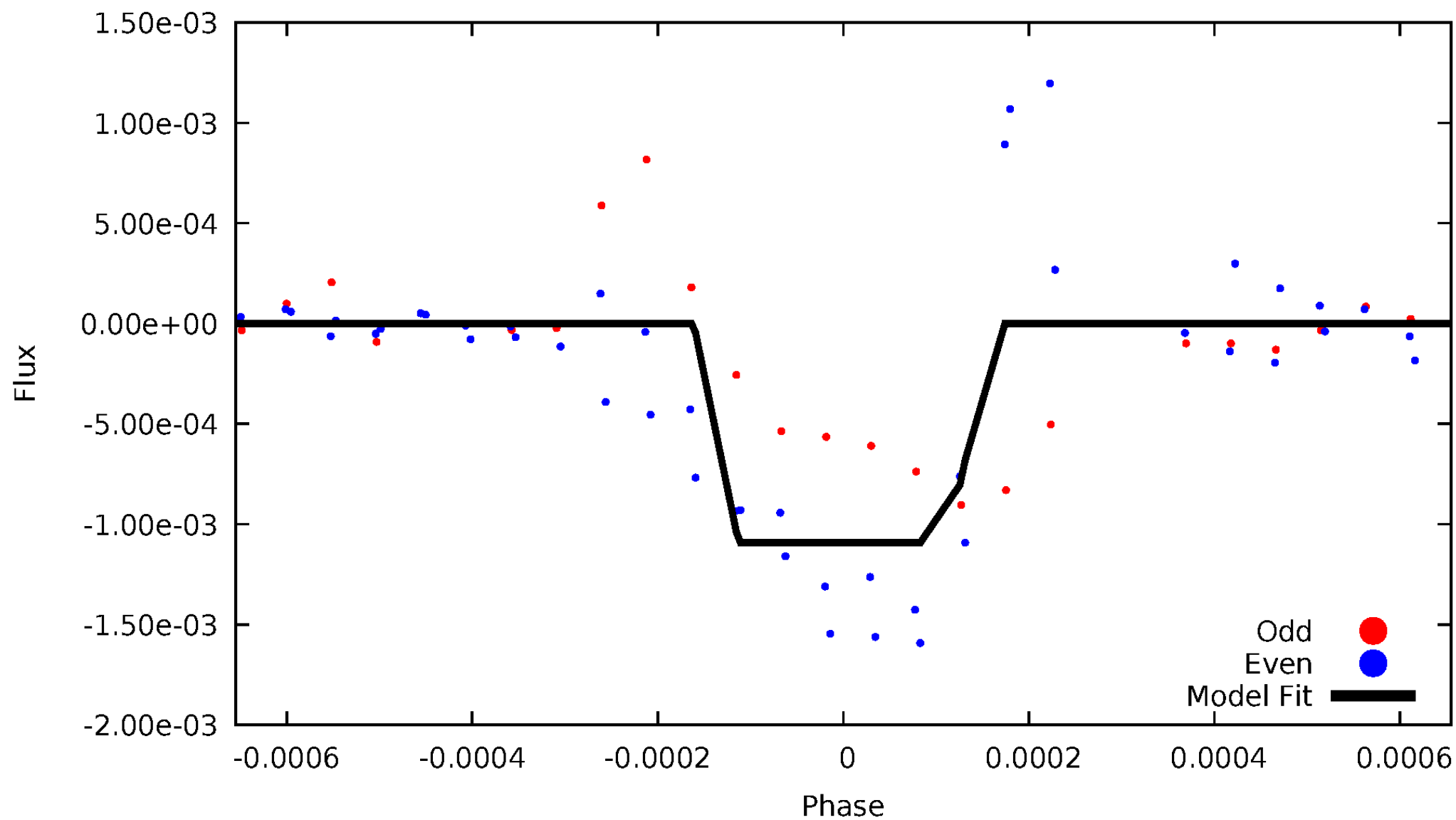
# DV Odd/Even

TCE 010666510-01



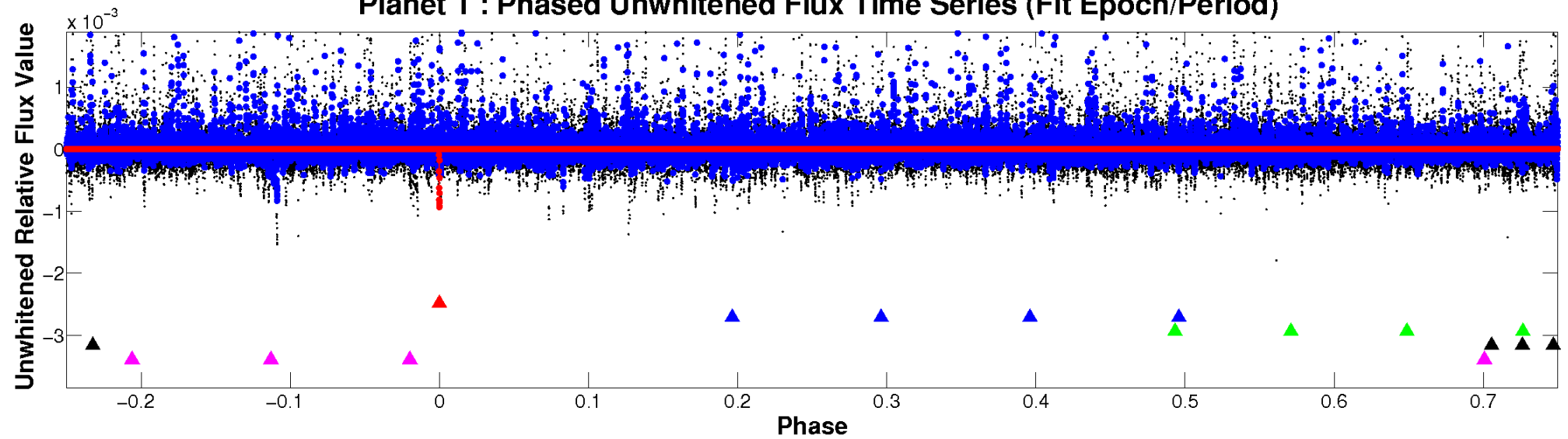
# ALT Odd/Even

TCE 010666510-01

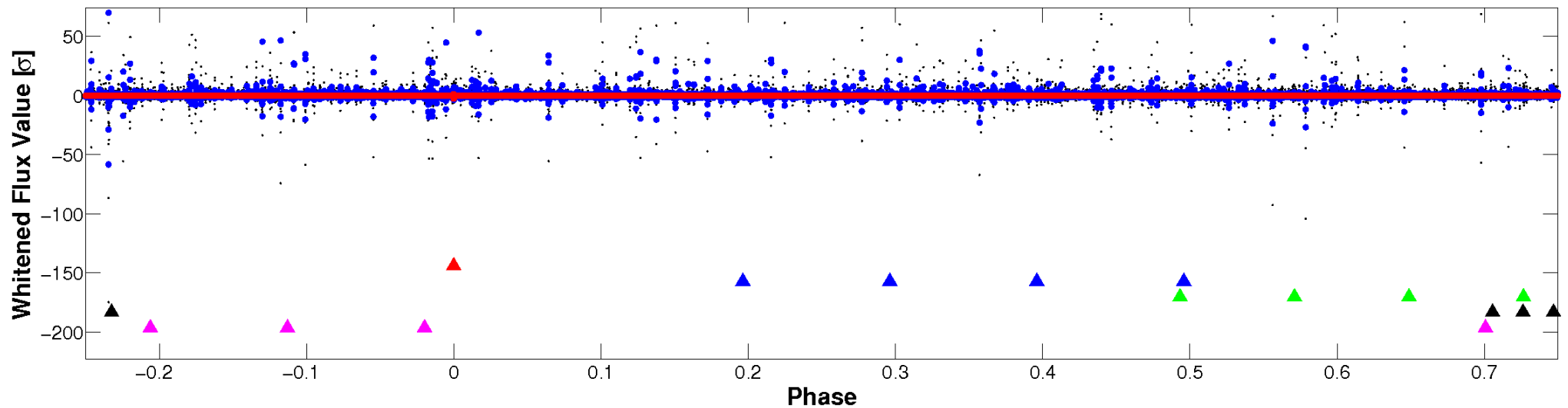


# Non-Whitened Vs. Whitened Light Curve

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

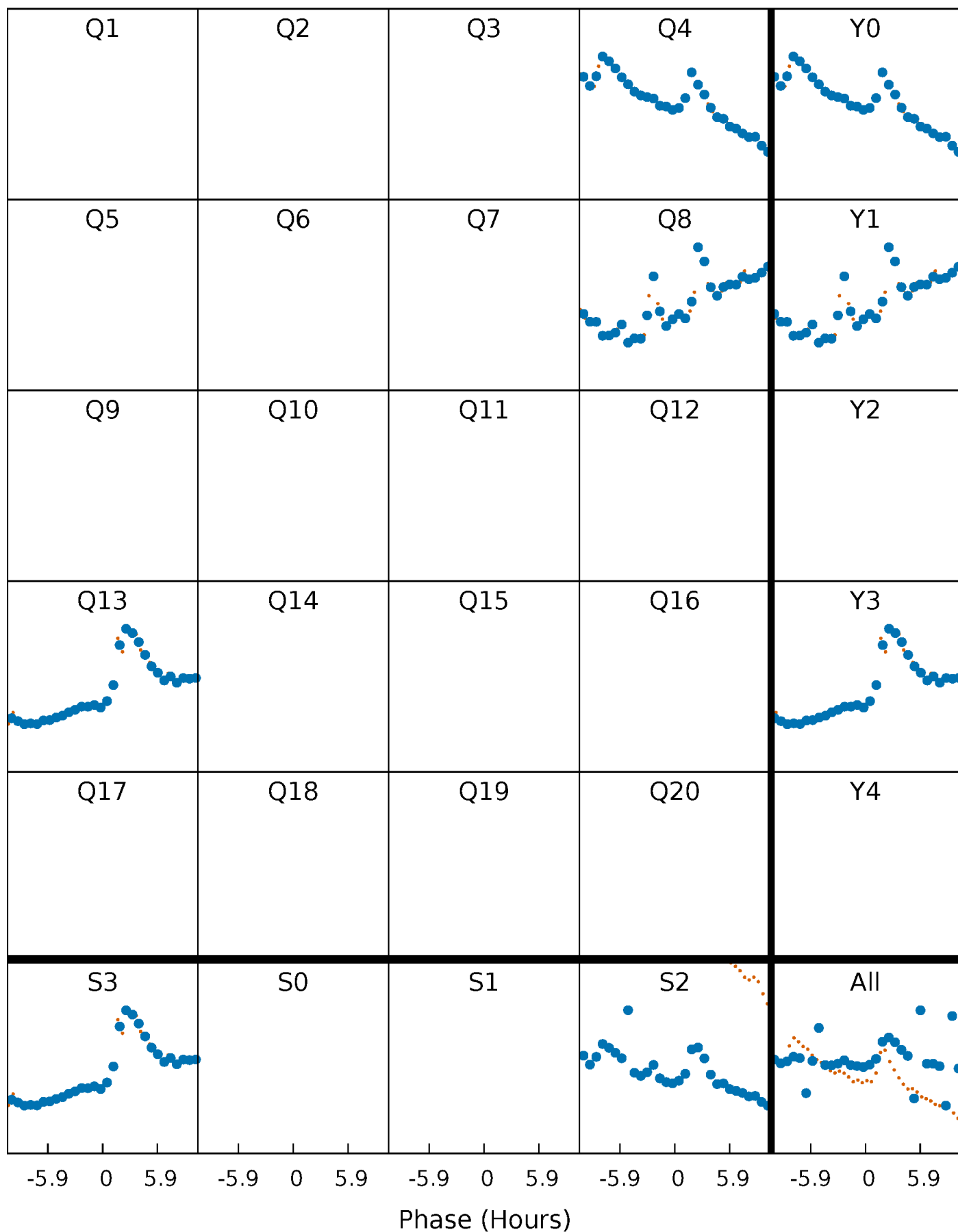


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



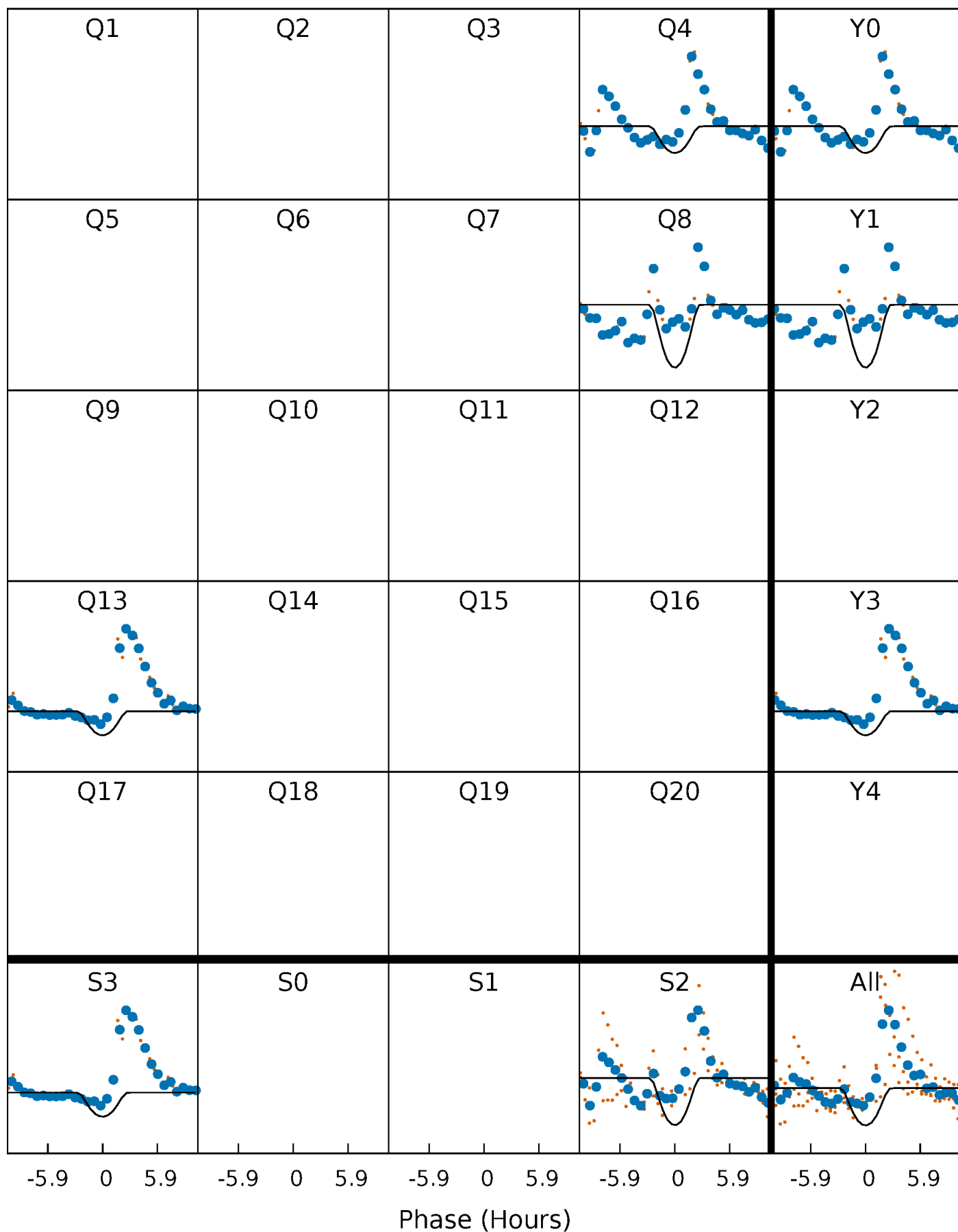
# PDC Quarter-Phased Transit Curves

TCE 010666510-01 P=421.687916 Days  $T_0=365.815942$  (BKJD)



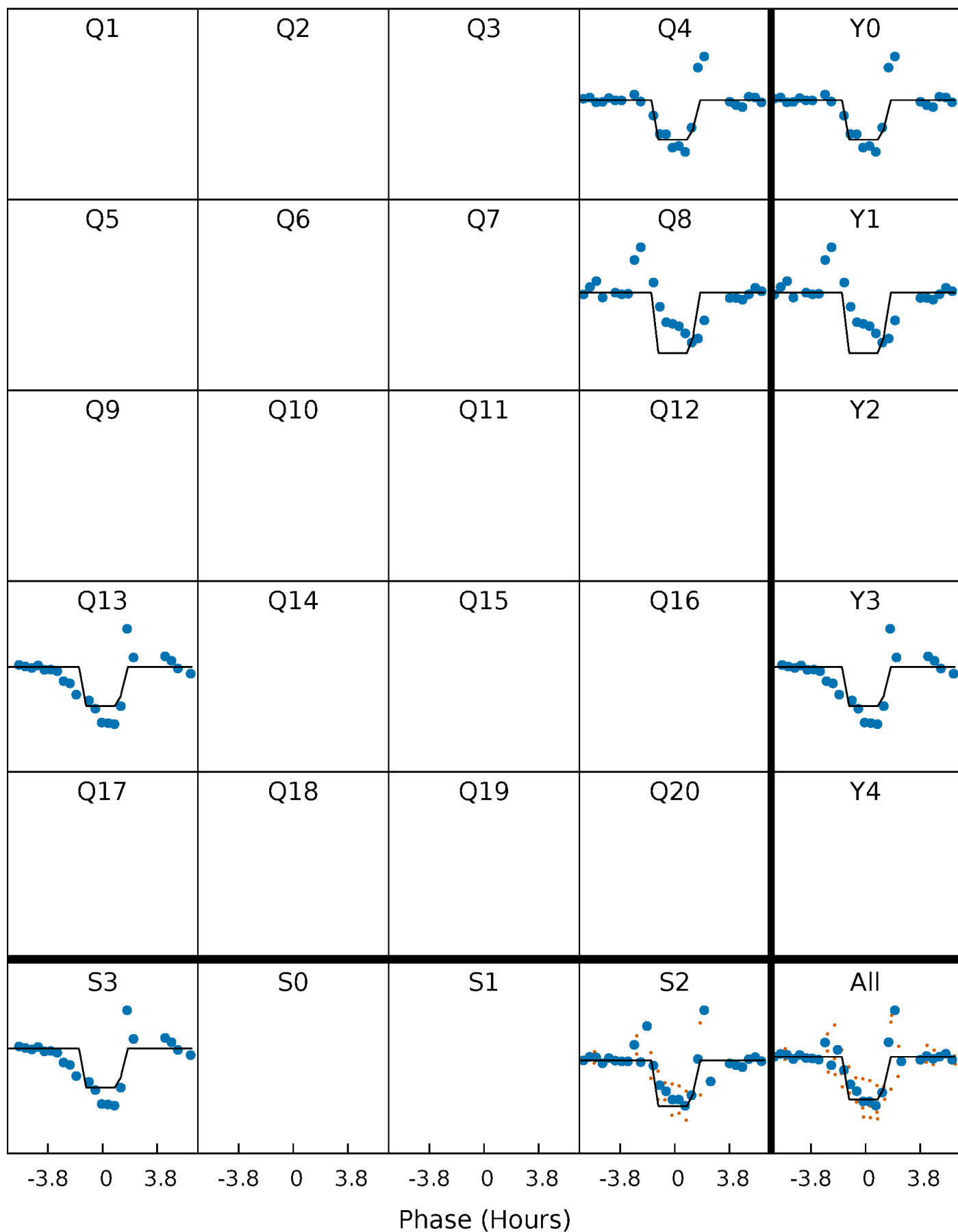
# DV Quarter-Phased Transit Curves

TCE 010666510-01 P=421.687916 Days  $T_0=365.815942$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

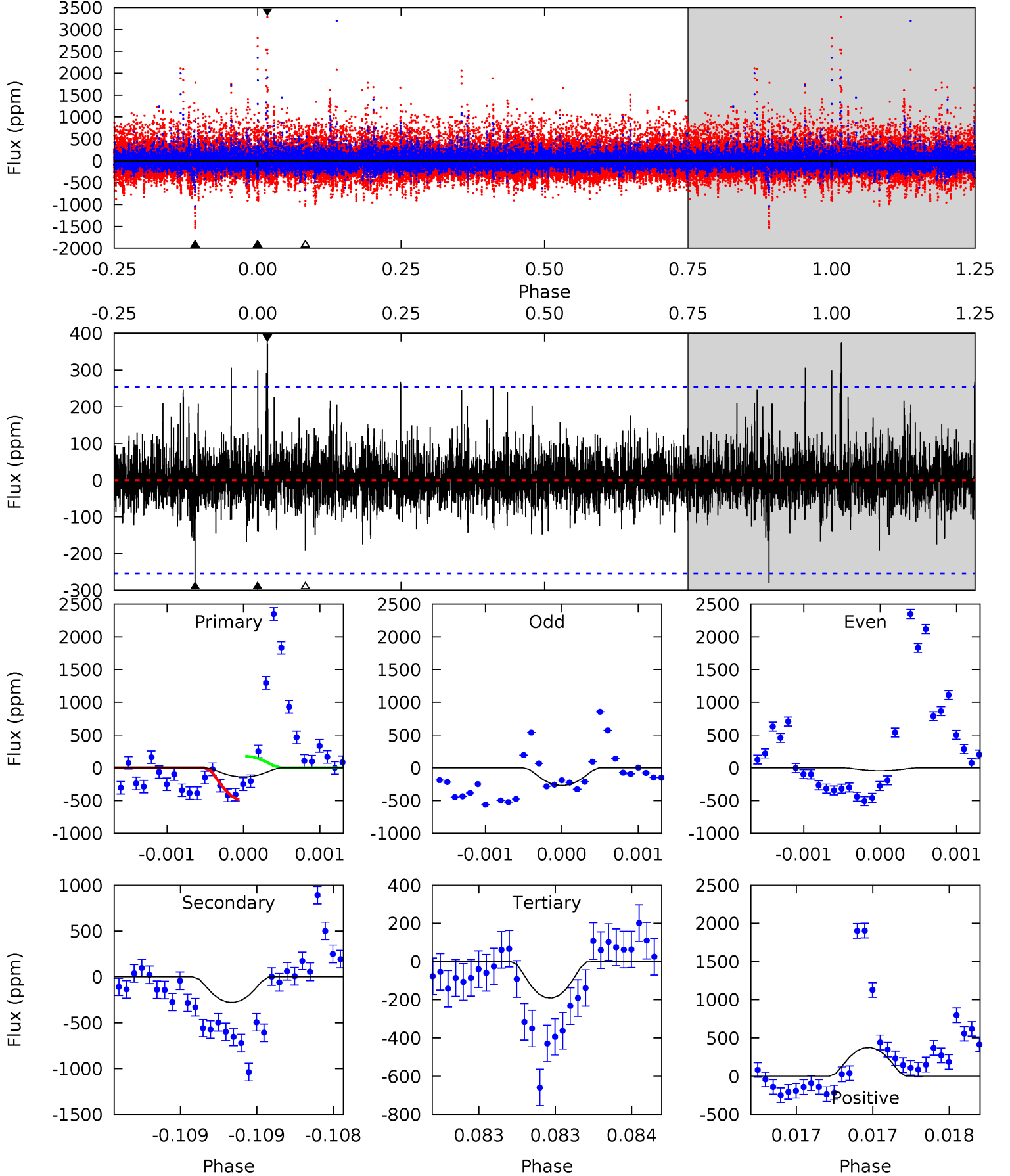
TCE 010666510-01 P=421.687378 Days  $T_0=365.809884$  (BKJD)



# DV Model-Shift Uniqueness Test

010666510-01, P = 421.687916 Days, E = 365.815942 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
3.05	6.10	4.18	8.20	5.56	3.46	1.08	-1.12	-5.14	1.93	-2.10	1.32	-26.6	0.57	3.42

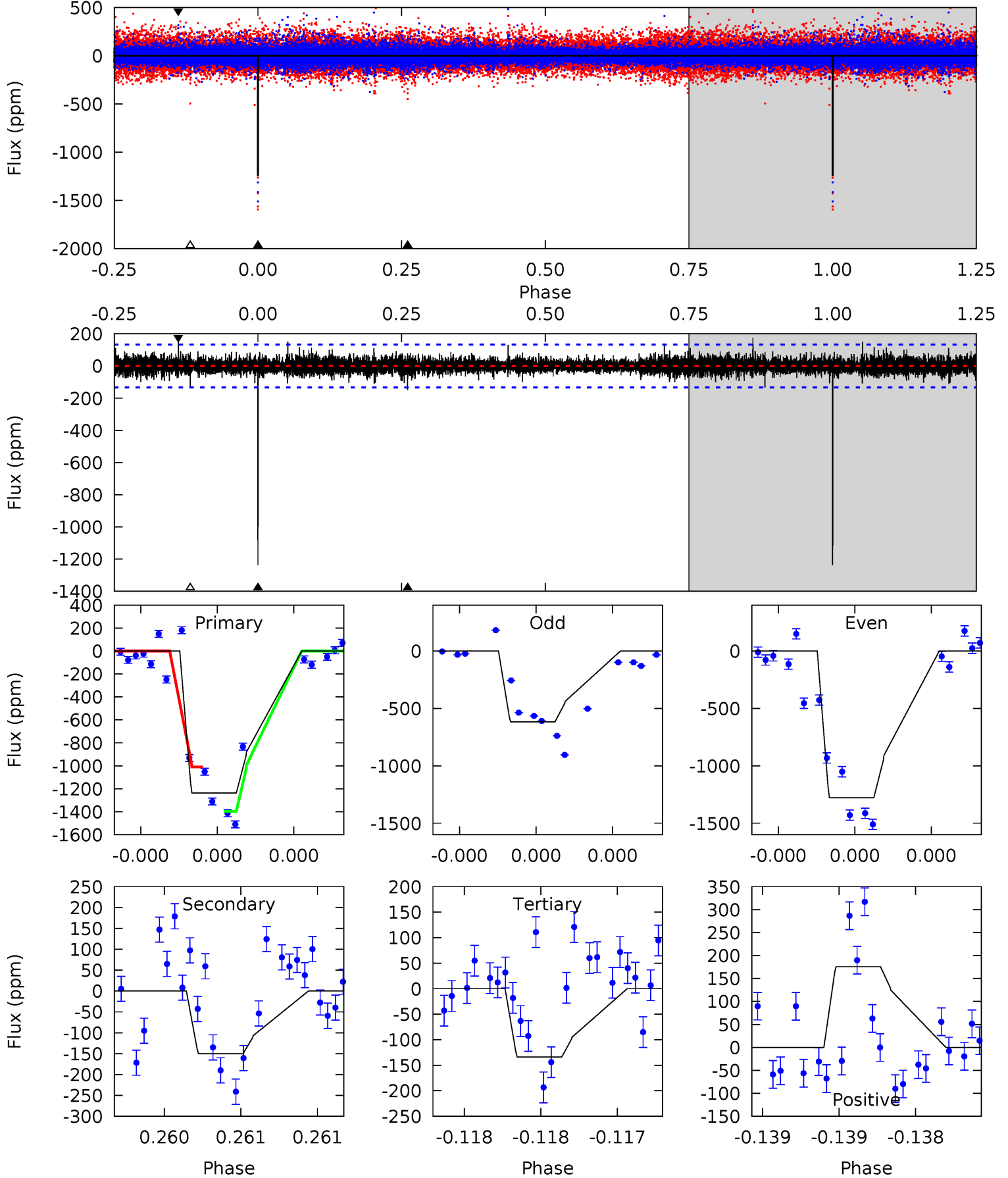




# Alt Model-Shift Uniqueness Test

010666510-01, P = 421.687378 Days, E = 365.809884 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
52.6	6.39	5.70	7.47	5.64	3.59	1.03	46.9	45.1	0.69	-1.08	13.6	0.90	0.12	0



### Stellar Parameters For KIC 010666510

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5155^{+107}_{-250}$	$2.619^{+0.653}_{-0.218}$	$0.070^{+0.150}_{-0.550}$	$15.150^{+3.563}_{-11.400}$	$3.481^{+0.126}_{-2.393}$	$0.001^{+0.022}_{-0.001}$
	+2%/-5%	+25%/-8%	+214%/-786%	+24%/-75%	+4%/-69%	+1530%/-37%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 010666510-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-279 \pm 46$	$59.30^{+49.00}_{-35.30}$	$956^{+84}_{-165}$	$3657^{+1181}_{-534}$	$110^{+510}_{-74}$
Alt.	$-150 \pm 24$	$54.03^{+41.32}_{-32.76}$	$951^{+85}_{-172}$	$3438^{+988}_{-484}$	$72^{+354}_{-48}$

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

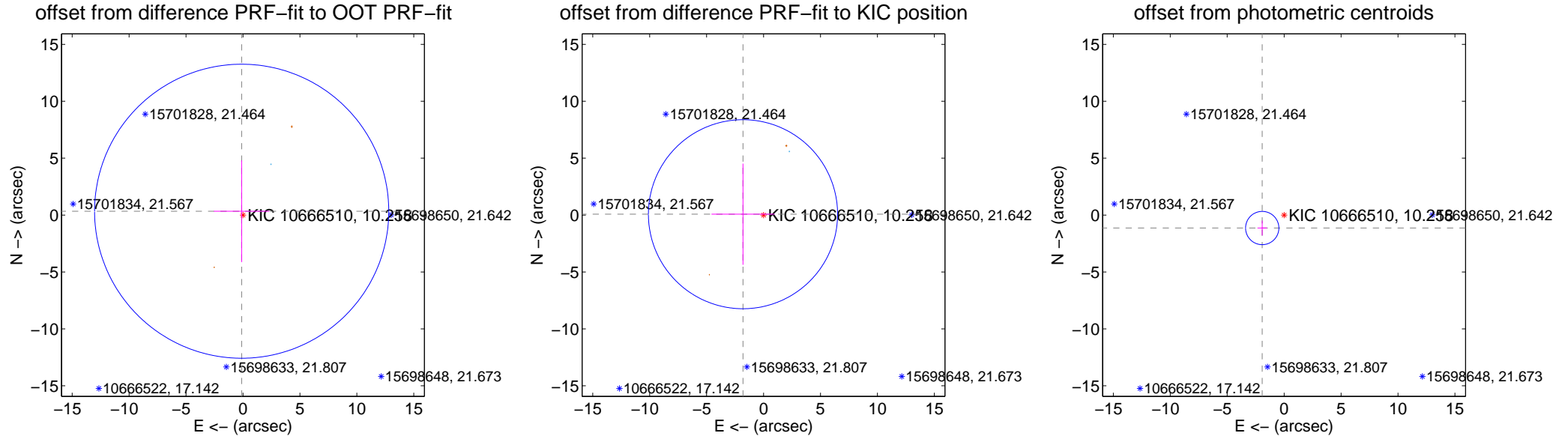
## DV Centroid Data

Supplemental centroid analysis for 010666510-01. **Kepler magnitude: 10.26.** Transit SNR 9.84

There are 1 quarters with good PRF difference image offsets

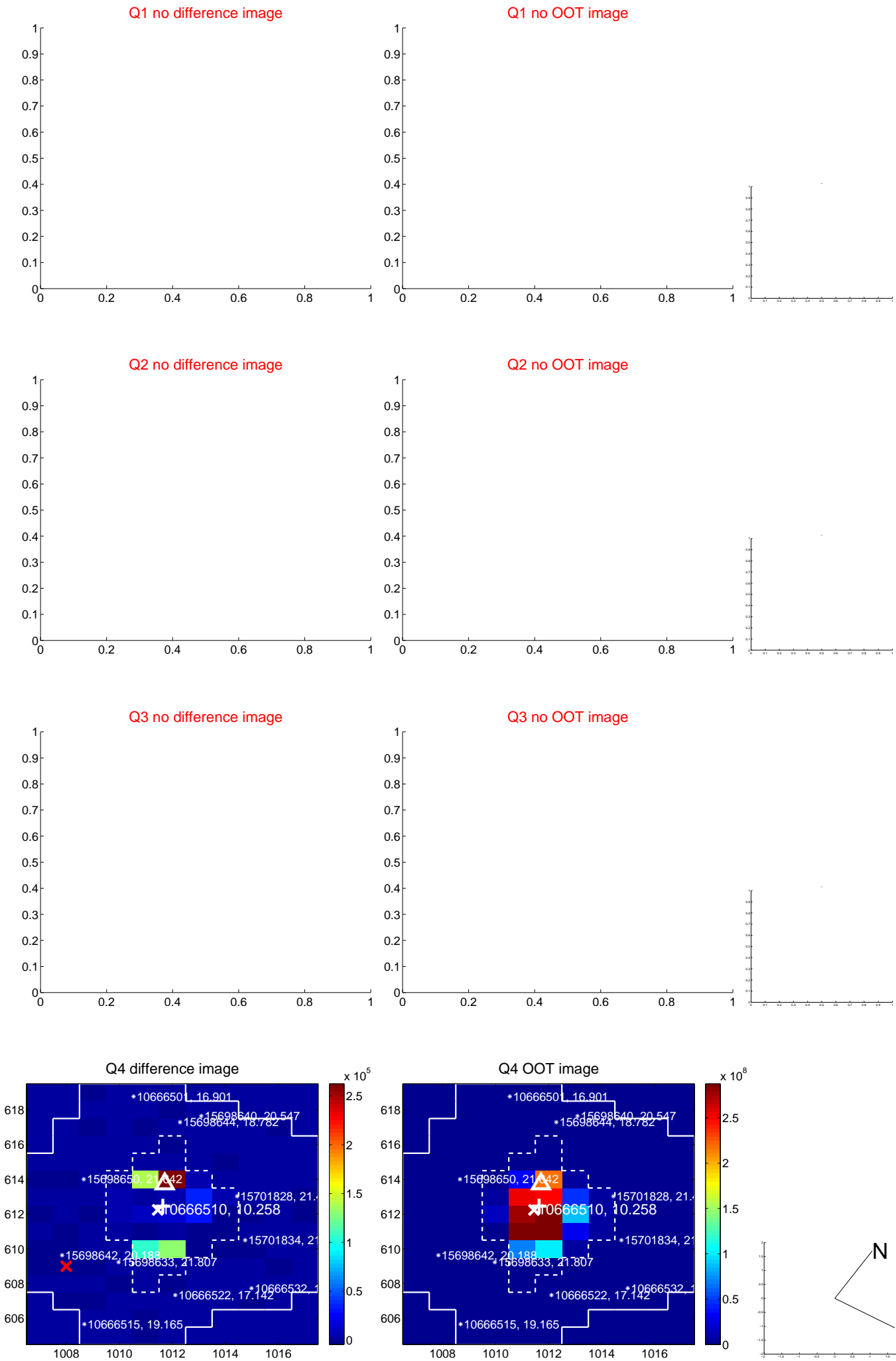
The OOT PRF centroid is offset from the target star catalog position by about 2.32 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.357 \pm 4.305$	0.08	$0.115 \pm 2.443$	$0.338 \pm 4.470$
PRF-fit source offset from KIC position	$1.807 \pm 2.768$	0.65	$1.805 \pm 2.764$	$0.076 \pm 4.444$
photometric centroid source offset	$2.24 \pm 0.49$	4.59	$1.92 \pm 0.41$	$-1.14 \pm 0.65$

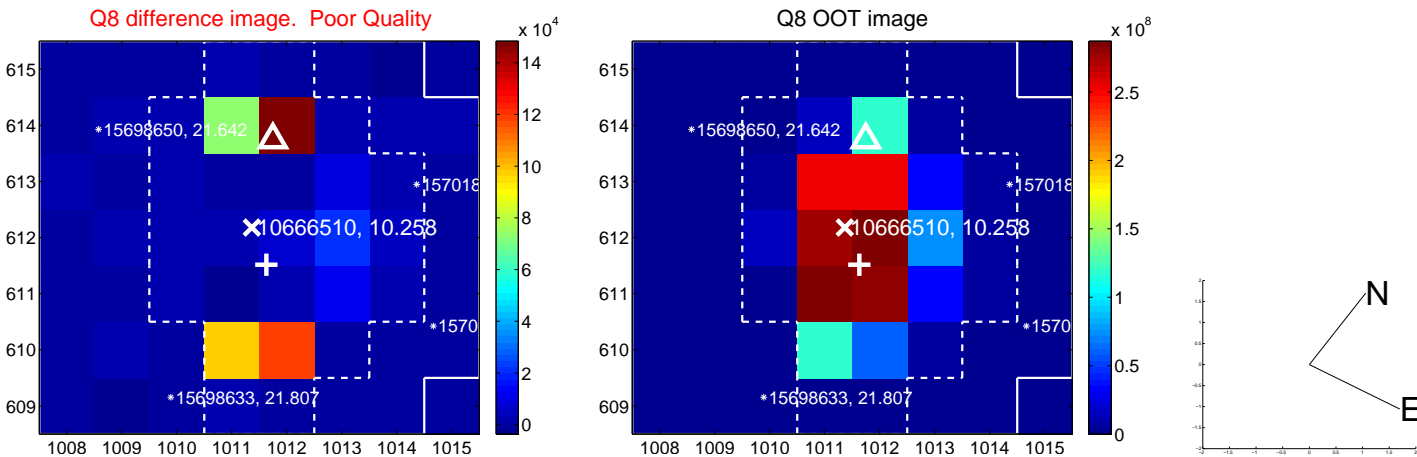


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

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



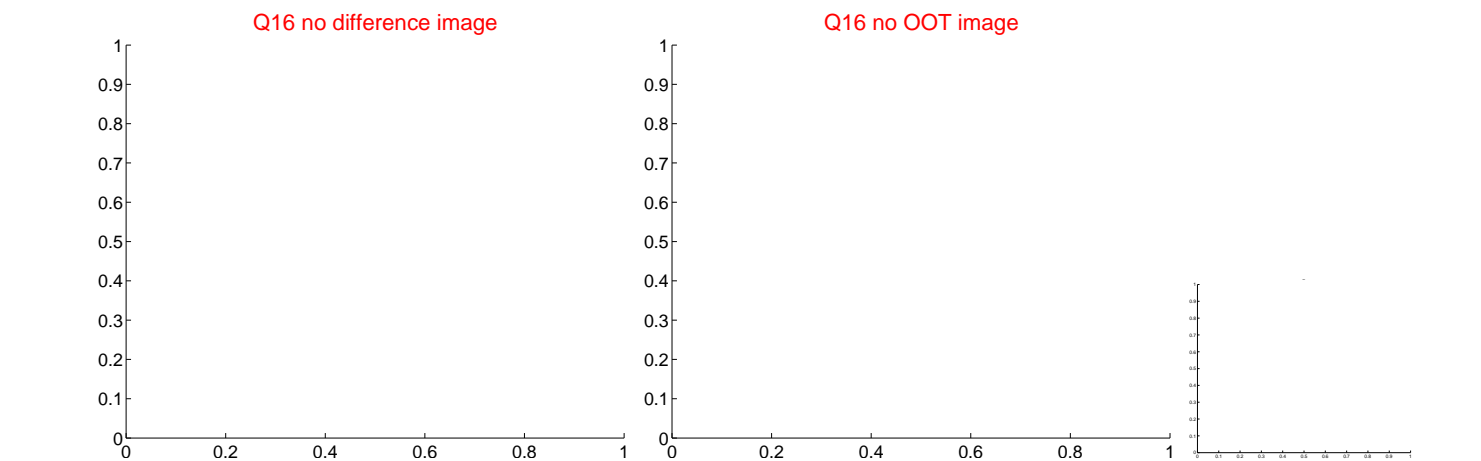
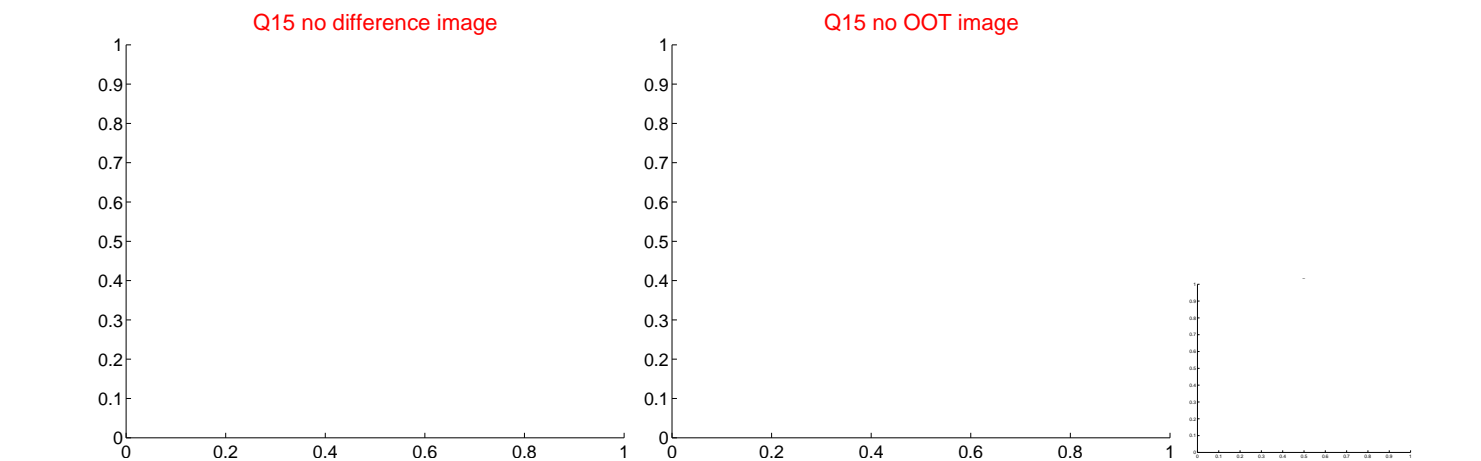
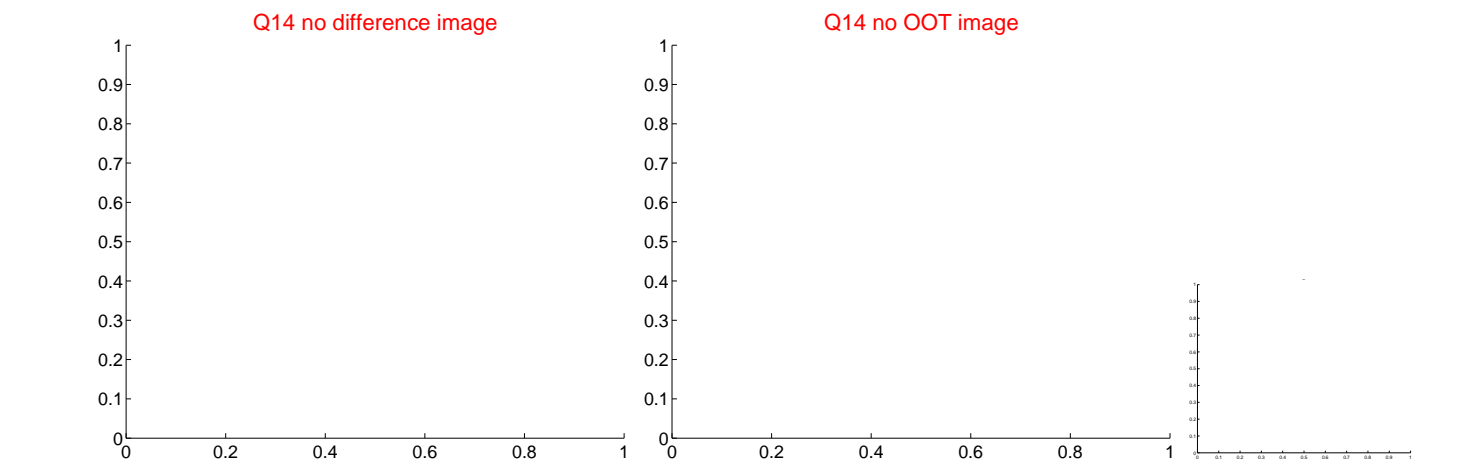
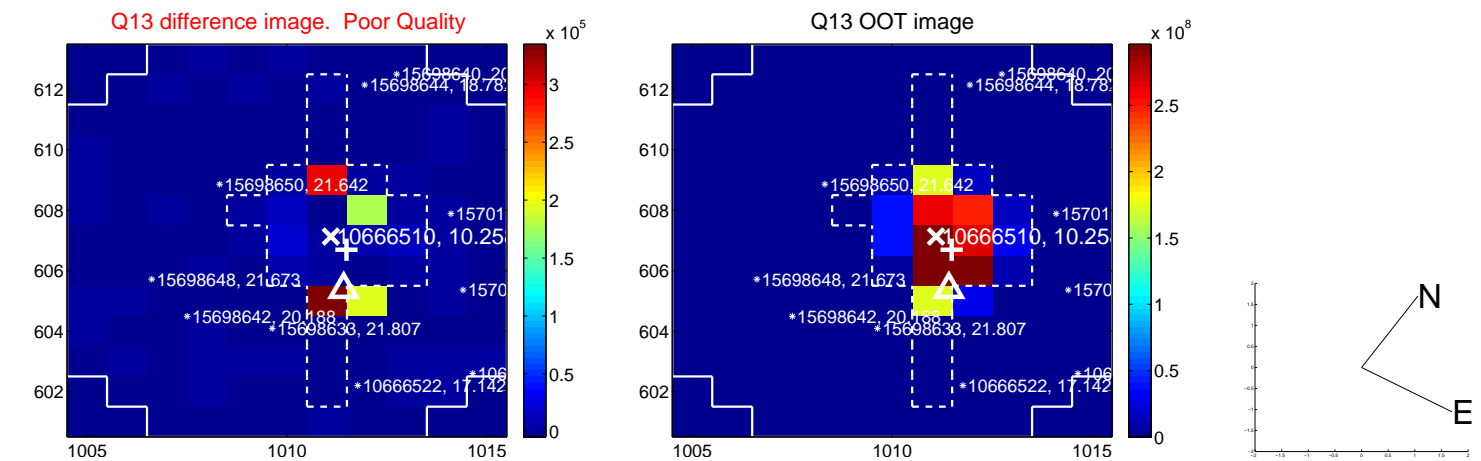
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

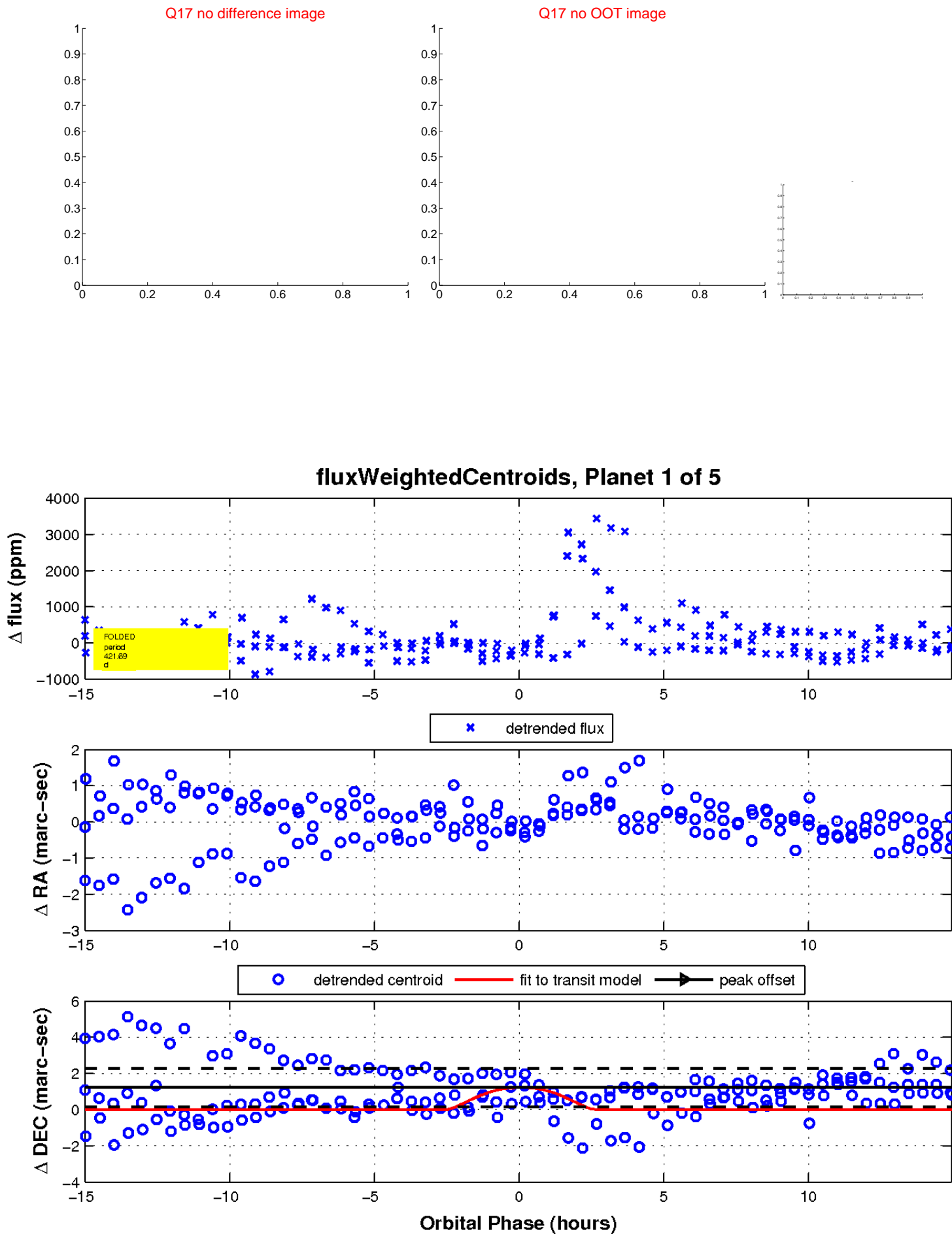


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

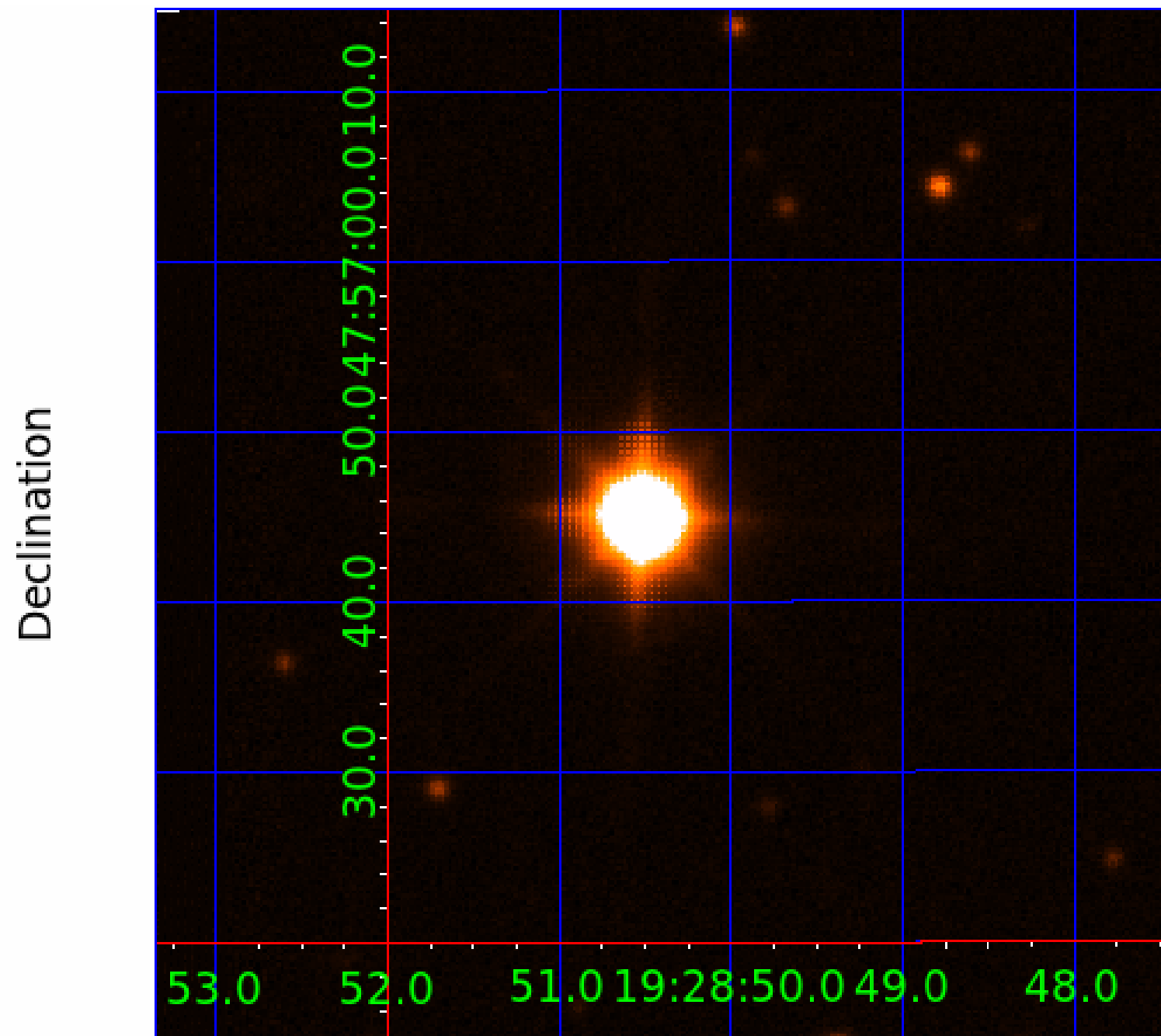




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image



# KIC 010666510

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010666510-01	OBS	No	421.687916	365.815942	931.8	5.128	15.1	9.8	15.15	5155	66.91	52.17
010666510-02	OBS	No	379.586929	153.240185	800.6	3.691	16.7	8.9	15.15	5155	47.35	60.02
010666510-03	OBS	No	388.900666	250.517919	927.2	7.134	14.8	9.4	15.15	5155	60.21	58.12
010666510-04	OBS	No	430.407843	241.669278	417.6	2.098	13.9	5.6	15.15	5155	34.31	50.77
010666510-05	OBS	No	382.409441	357.475831	147.2	3.000	15.1	-1.0	15.15	5155	17.93	59.44

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010666510-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_SATURATED
010666510-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_SATURATED
010666510-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—CENT_SATURATED
010666510-04	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—INCONSISTENT_TRANS—CENT_SATURATED
010666510-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—INCONSISTENT_TRANS—CENT_SATURATED

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

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

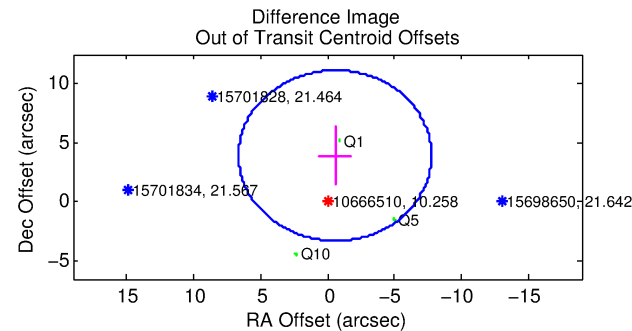
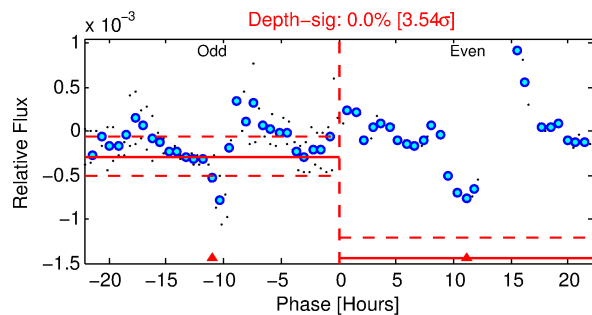
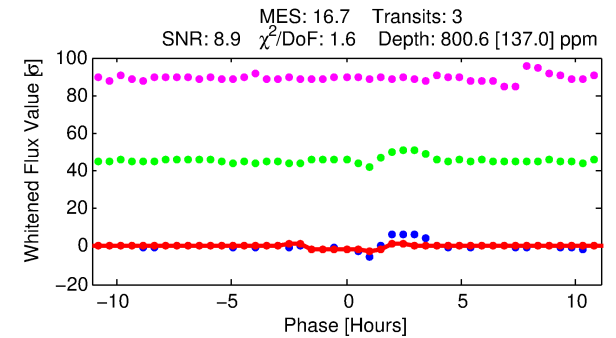
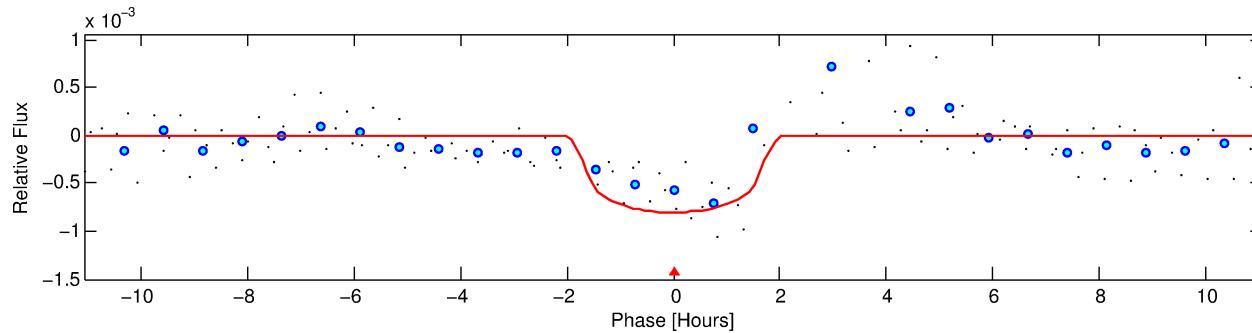
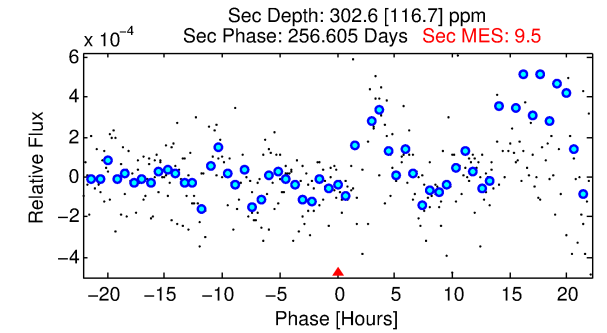
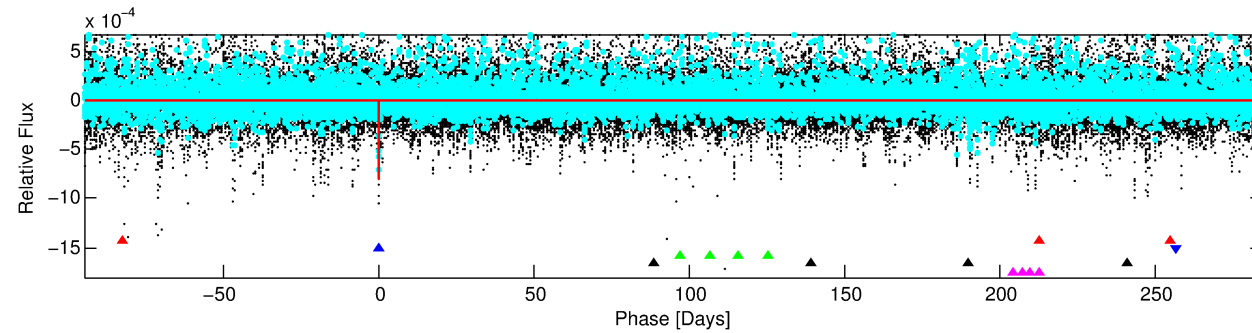
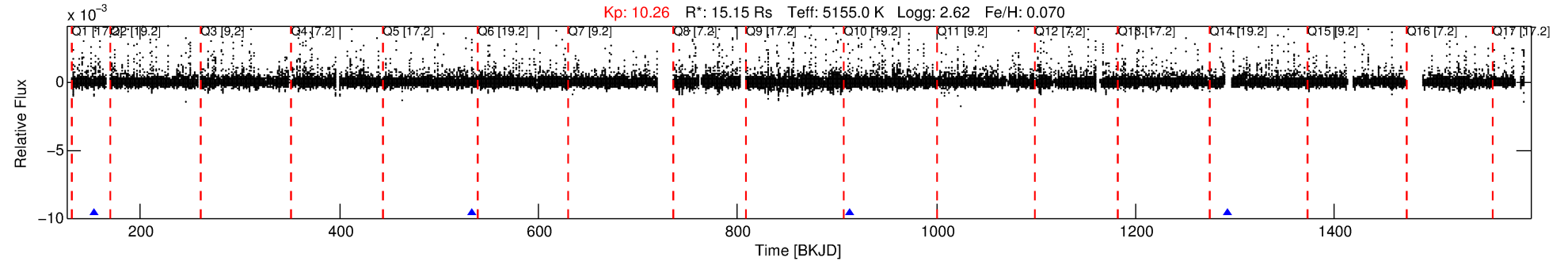
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 010666510-02

No Significant Match Found

# DV One-Page Summary

KIC: 10666510 Candidate: 2 of 5 Period: 379.587 d



## DV Fit Results:

Period = 379.58693 [0.00403] d  
Epoch = 153.2402 [0.0049] BKJD  
Rp/R\* = 0.0286 [0.0131]  
a/R\* = 527.97 [864.65]  
b = 0.78 [0.84]  
Seff = 60.03 [68.28]  
Teq = 710 [202] K  
Rp = 47.35 [41.69] Re  
a = 1.5554 [1.1030] AU  
Ag = 179.66 [268.99] [0.66σ]  
Teffp = 4018 [1016] K [3.19σ]

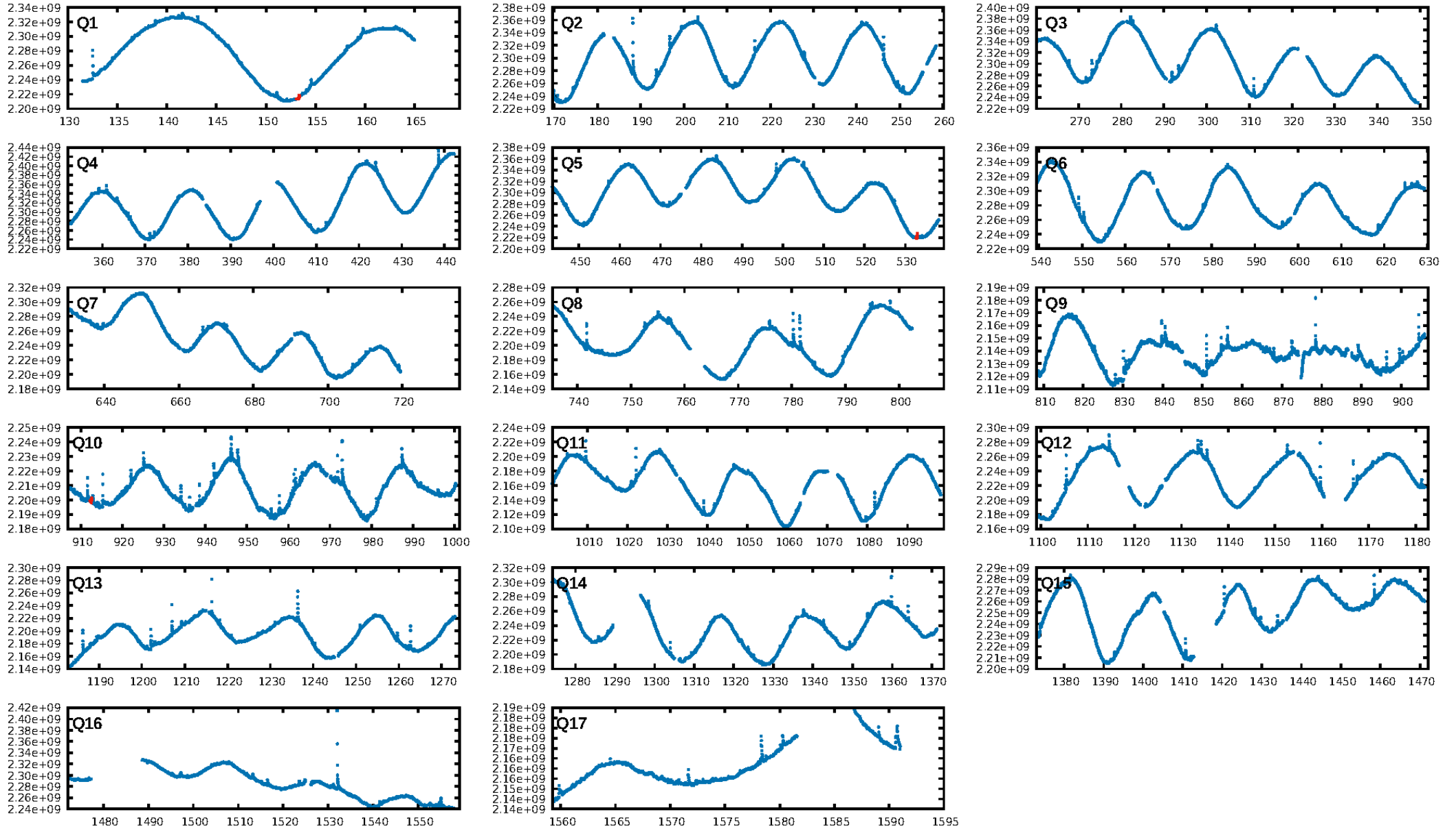
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [14.24σ]  
ModelChiSquare2-sig: 0.5%  
ModelChiSquareGof-sig: 8.4%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [2/2]  
GhostDiagnostic-chr: N/A  
Centroid-sig: N/A  
Centroid-so: 1.169 arcsec [3.56σ]  
OotOffset-rm: 3.974 arcsec [1.65σ]  
KicOffset-rm: 3.575 arcsec [1.57σ]  
OotOffset-st: 1/0/0/2 [3]  
KicOffset-st: 1/0/0/2 [3]  
DiffImageQuality-fgm: 0.00 [0/3]  
DiffImageOverlap-fno: 1.00 [3/3]

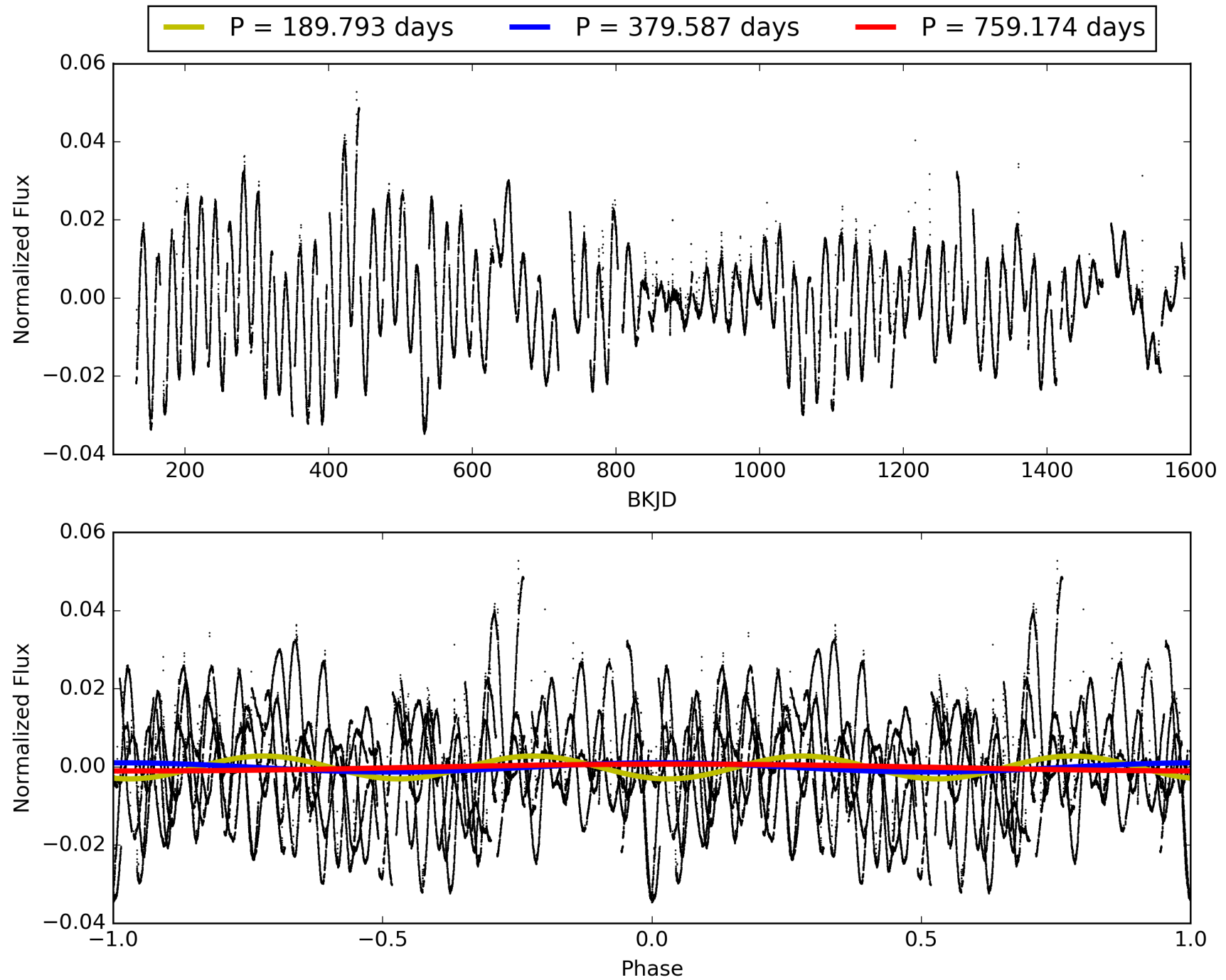
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:30:57 Z

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

# TCE 010666510-02, PDC Light Curves

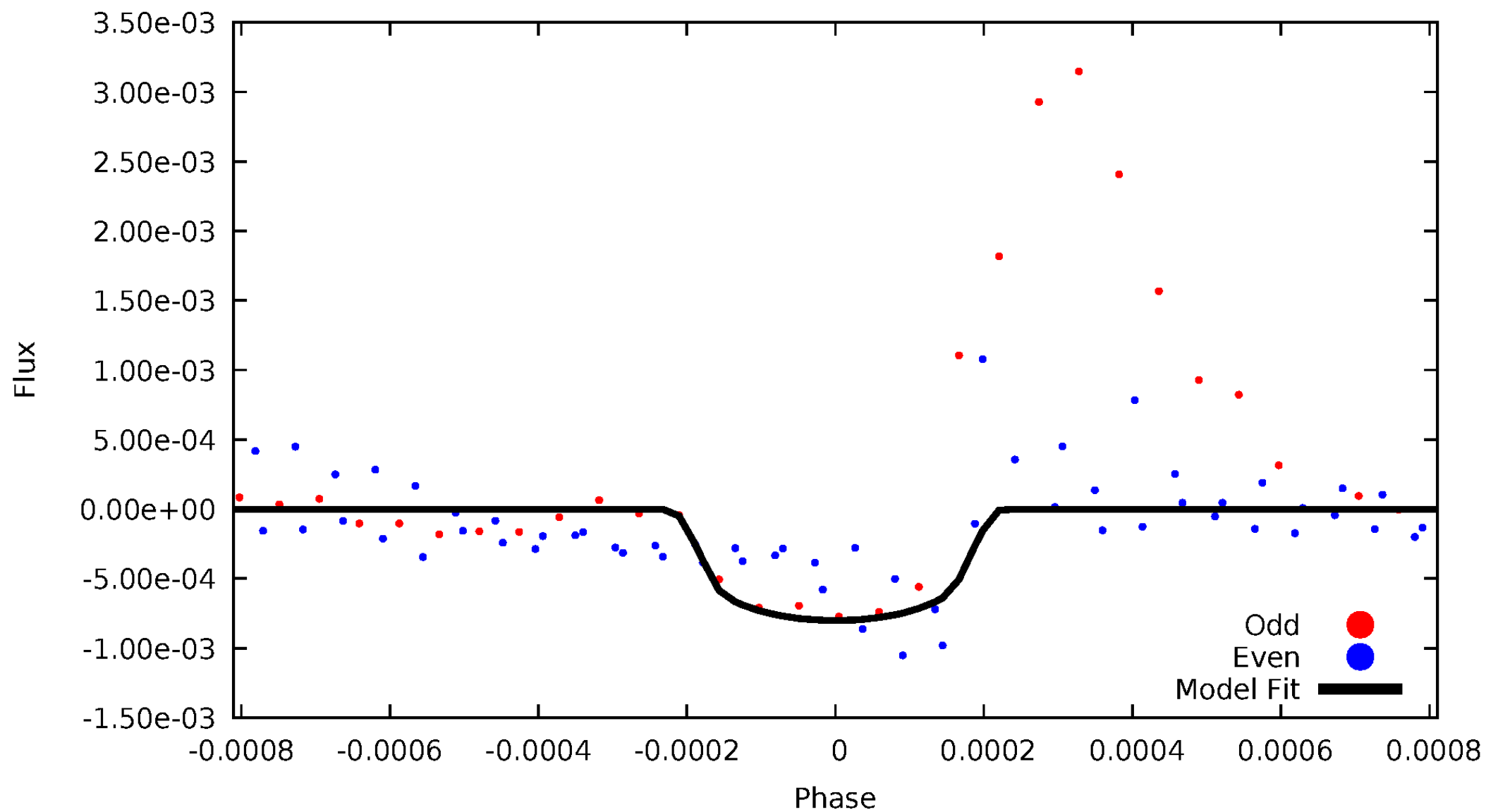


# TCE 010666510-02



# DV Odd/Even

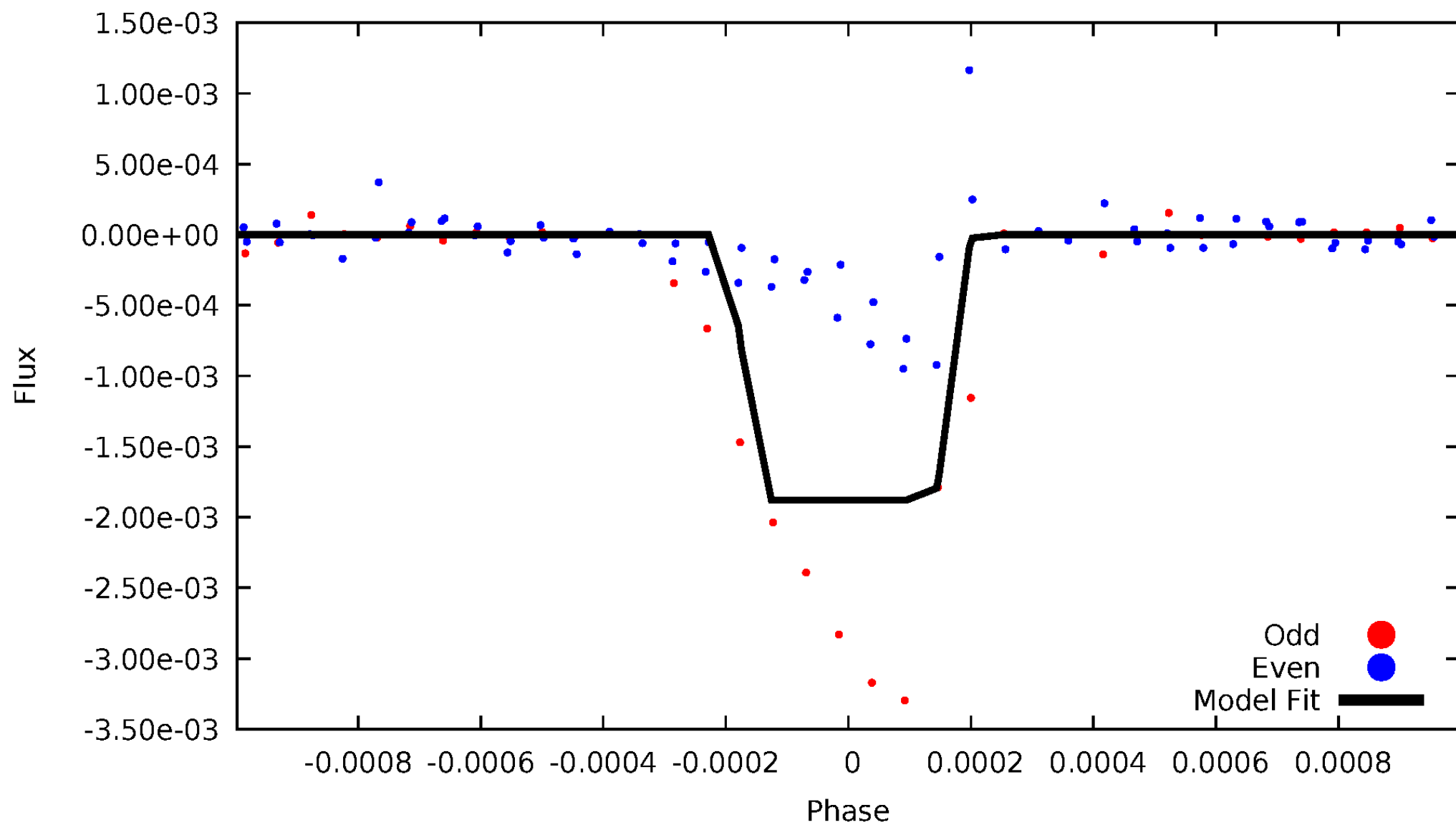
TCE 010666510-02





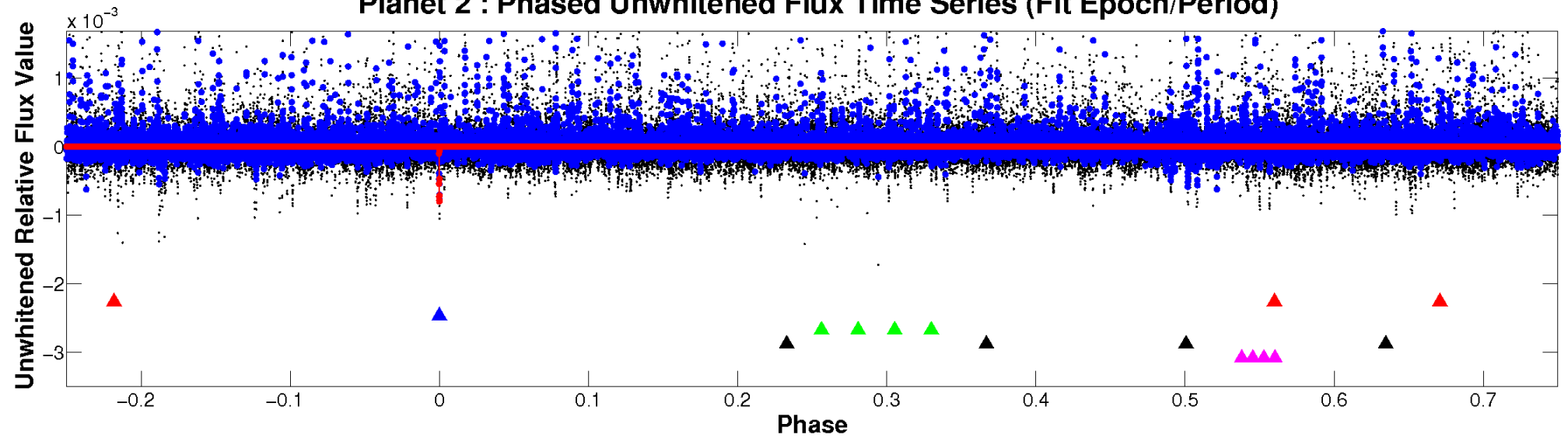
# ALT Odd/Even

TCE 010666510-02

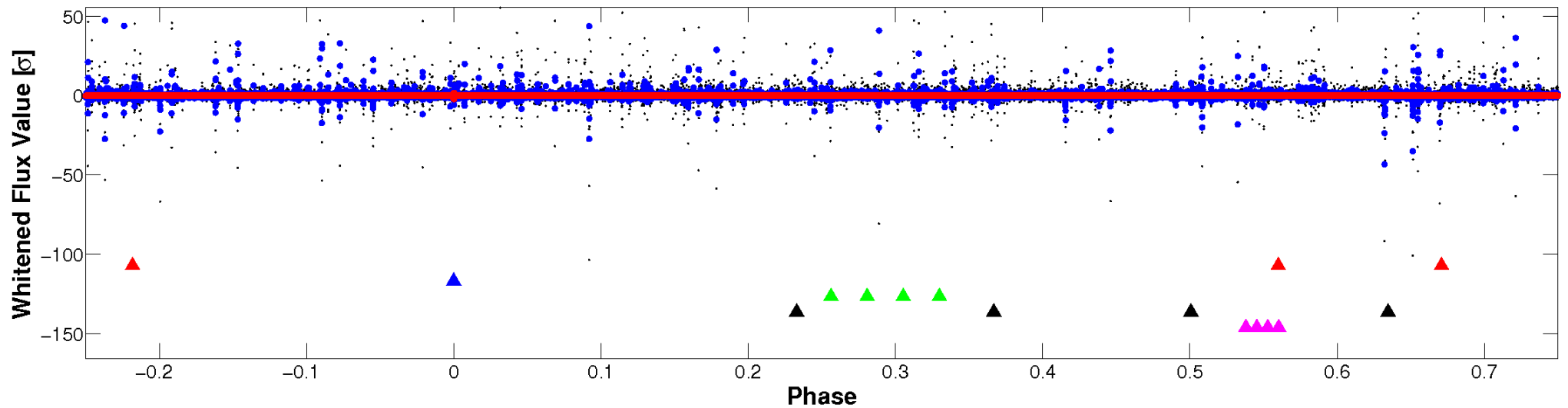


# Non-Whitened Vs. Whitened Light Curve

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

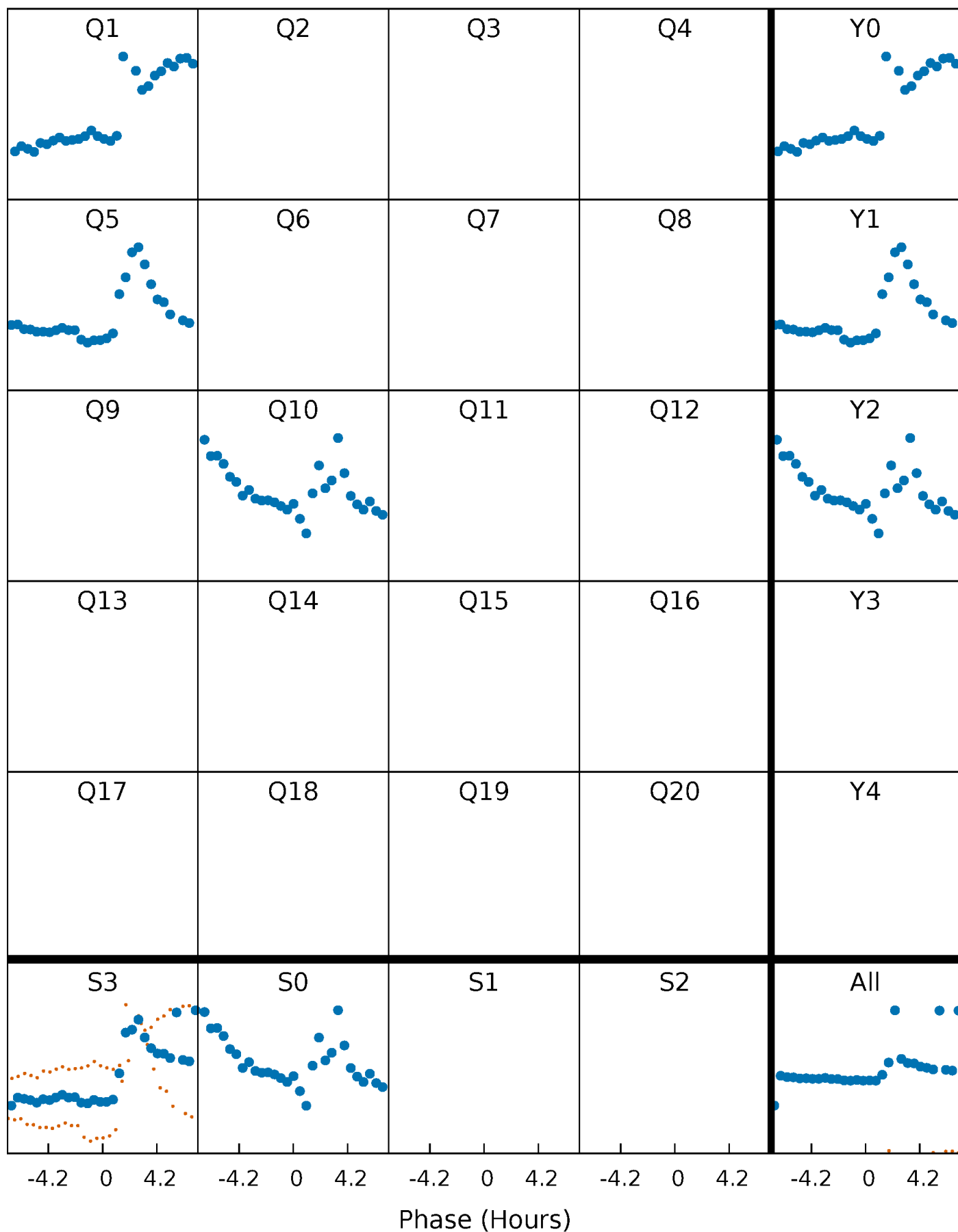


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



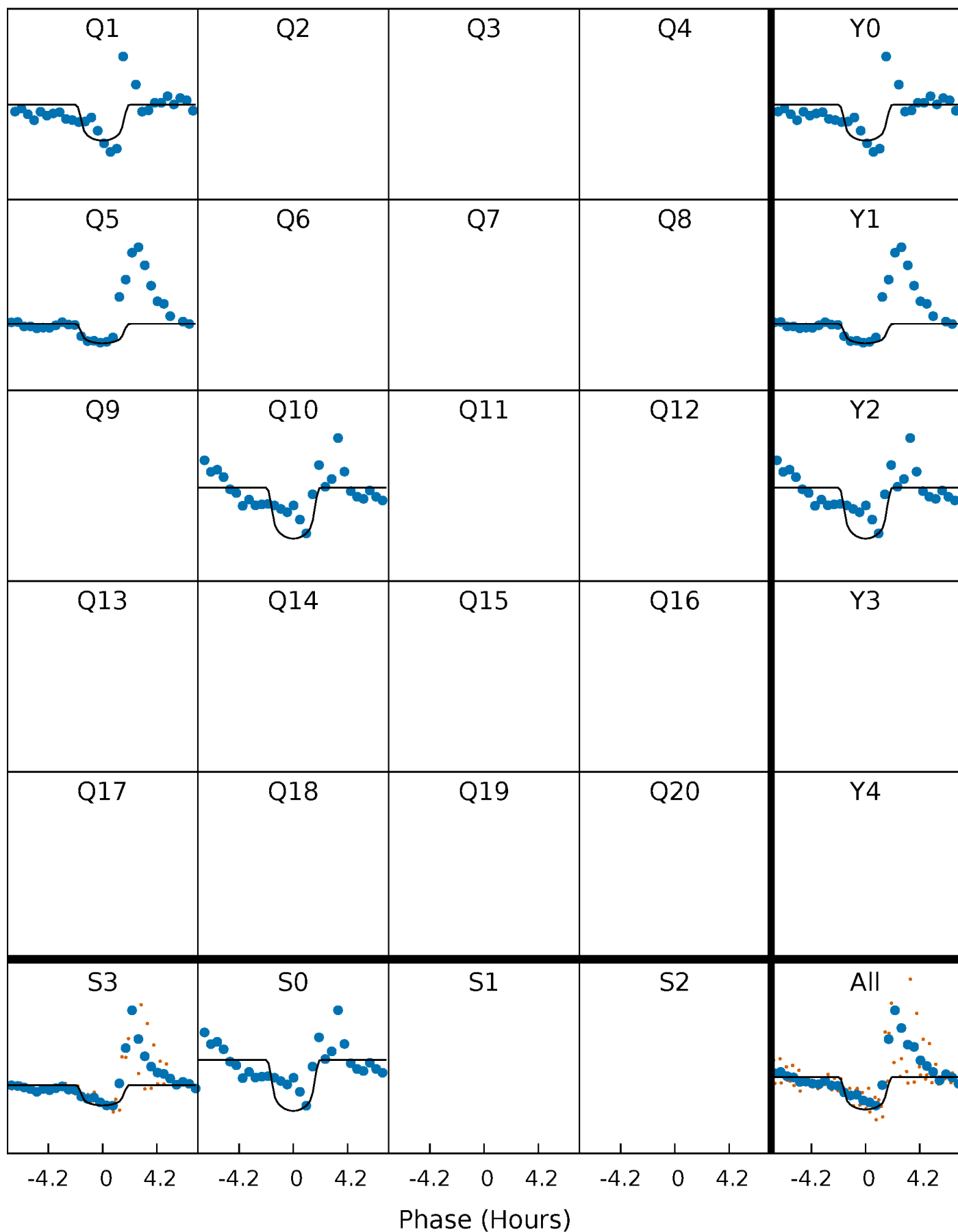
# PDC Quarter-Phased Transit Curves

TCE 010666510-02 P=379.586929 Days  $T_0=153.240185$  (BKJD)



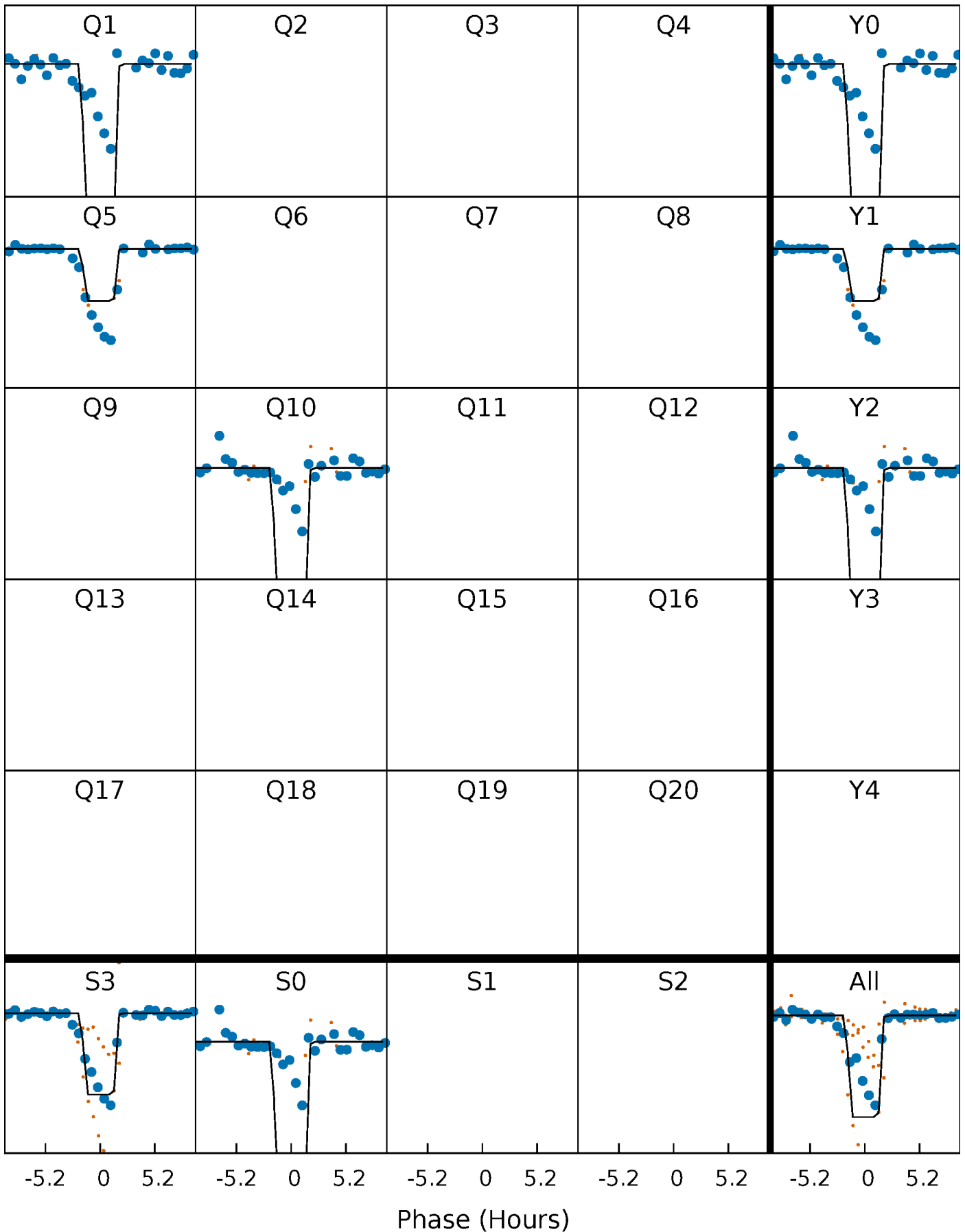
# DV Quarter-Phased Transit Curves

TCE 010666510-02 P=379.586929 Days  $T_0=153.240185$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

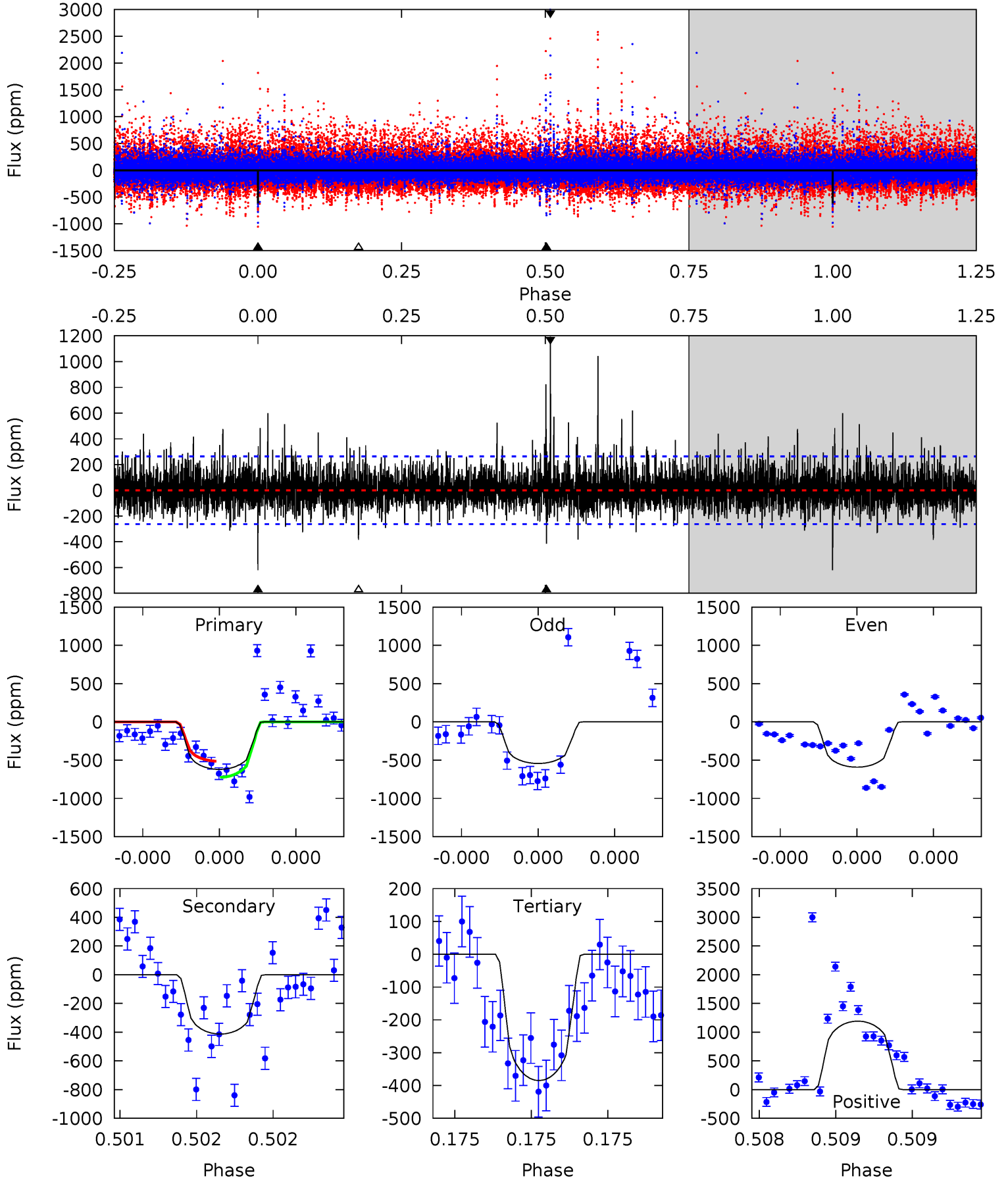
TCE 010666510-02 P=379.594244 Days  $T_0=153.240485$  (BKJD)



# DV Model-Shift Uniqueness Test

010666510-02, P = 379.586929 Days, E = 153.240185 Days

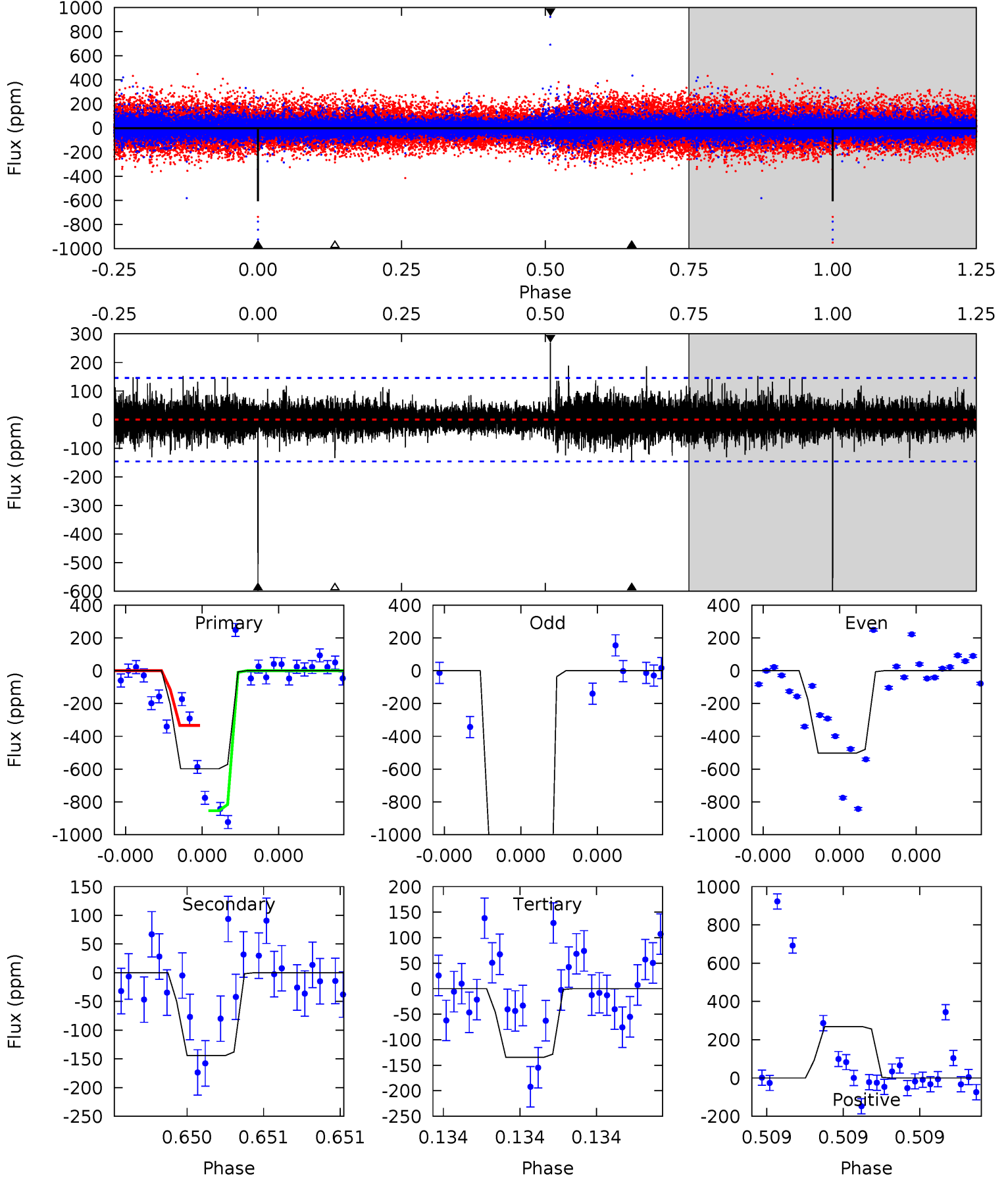
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.2	8.80	8.20	25.4	5.61	3.53	2.20	5.02	-12.2	0.60	-16.6	0.35	1.03	0.66	2.24



# Alt Model-Shift Uniqueness Test

010666510-02, P = 379.594244 Days, E = 153.240485 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
22.9	5.54	5.16	10.3	5.60	3.52	1.11	17.8	12.7	0.39	-4.75	56.3	1.86	0.31	10.9





### Stellar Parameters For KIC 010666510

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5155^{+107}_{-250}$	$2.619^{+0.653}_{-0.218}$	$0.070^{+0.150}_{-0.550}$	$15.150^{+3.563}_{-11.400}$	$3.481^{+0.126}_{-2.393}$	$0.001^{+0.022}_{-0.001}$
	+2%/-5%	+25%/-8%	+214%/-786%	+24%/-75%	+4%/-69%	+1530%/-37%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 010666510-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-413 \pm 47$	$44.79^{+25.69}_{-23.44}$	$972^{+101}_{-159}$	$4326^{+1187}_{-533}$	$258^{+727}_{-151}$
Alt.	$-144 \pm 26$	$66.59^{+27.60}_{-29.75}$	$978^{+93}_{-163}$	$3227^{+421}_{-273}$	$42^{+83}_{-22}$

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

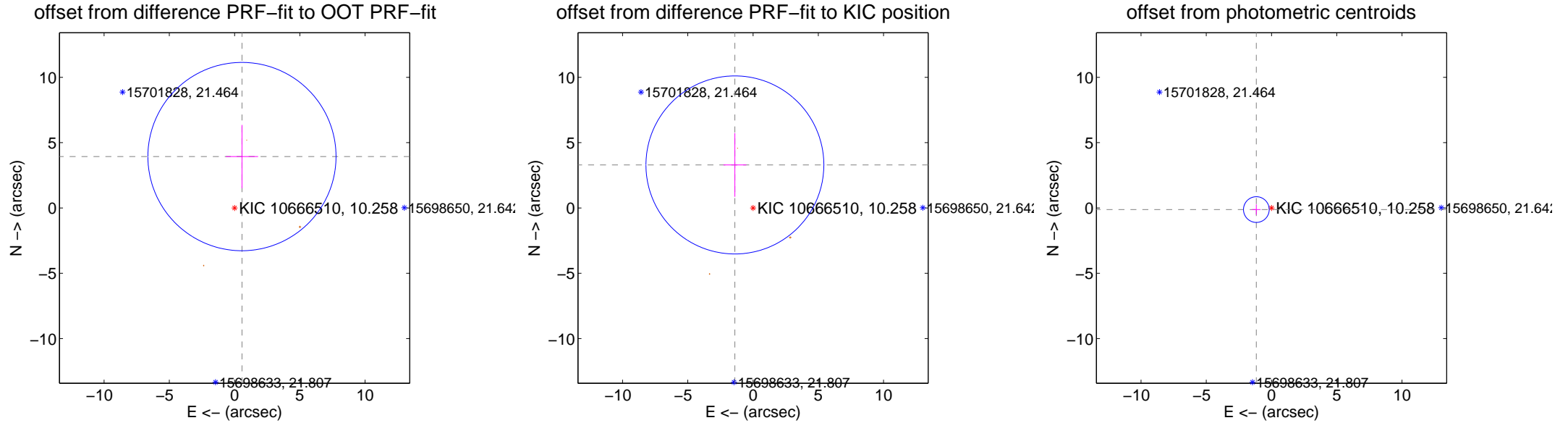
## DV Centroid Data

Supplemental centroid analysis for 010666510-02. **Kepler magnitude: 10.26.** Transit SNR 8.91

**There are 0 quarters with good PRF difference image offsets**

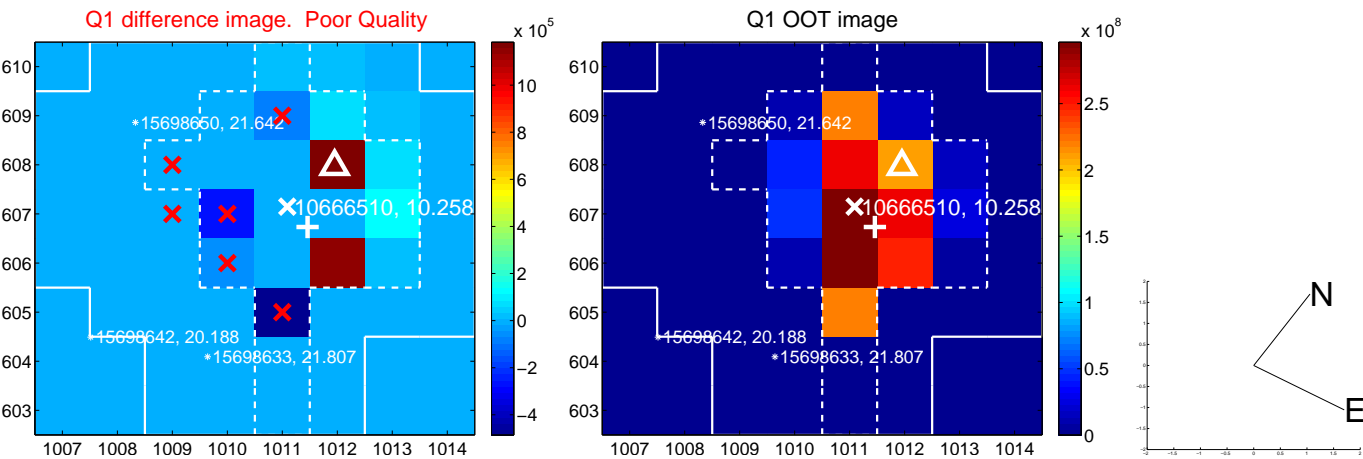
The direct PRF centroid is offset from the target star catalog position by about 1.16 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$3.974 \pm 2.403$	1.65	$-0.566 \pm 1.233$	$3.934 \pm 2.421$
PRF-fit source offset from KIC position	$3.575 \pm 2.272$	1.57	$1.391 \pm 0.871$	$3.293 \pm 2.439$
photometric centroid source offset	$1.17 \pm 0.33$	<b>3.56</b>	$1.16 \pm 0.33$	$-0.12 \pm 0.39$

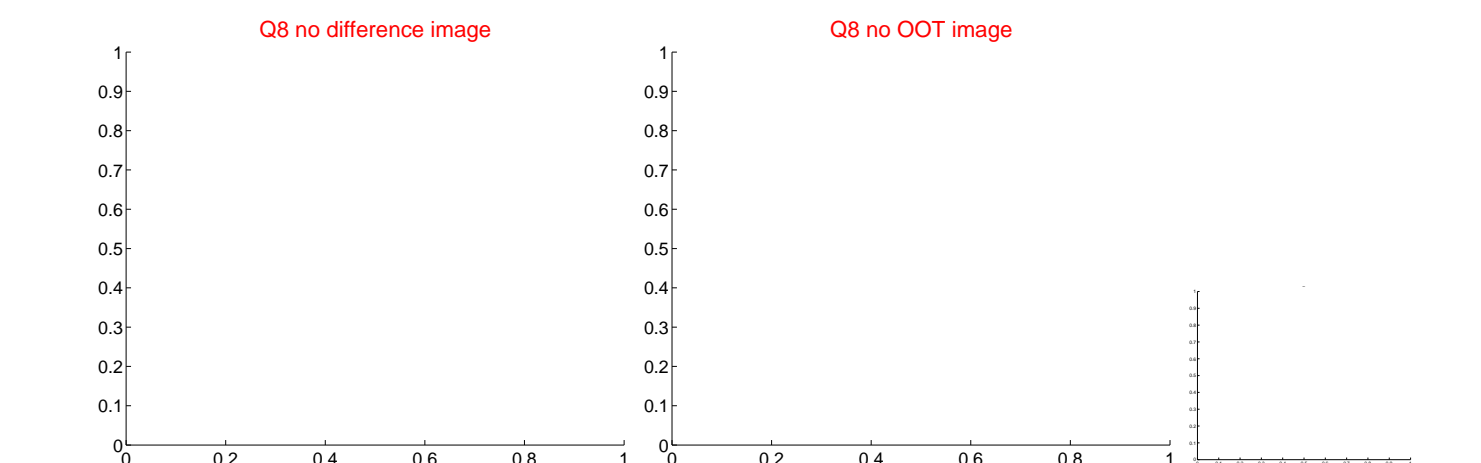
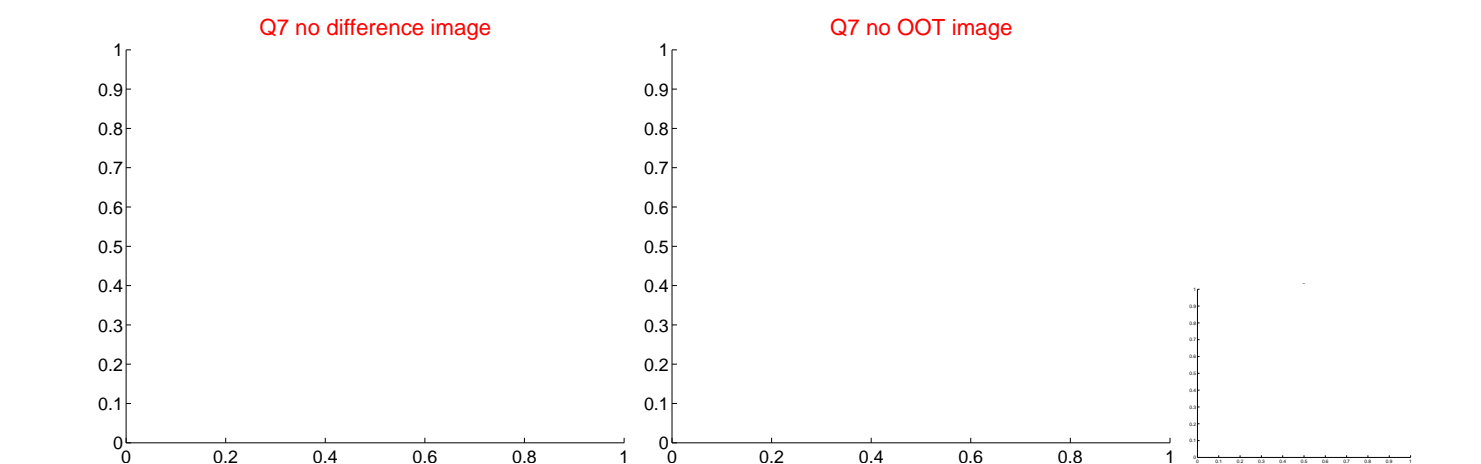
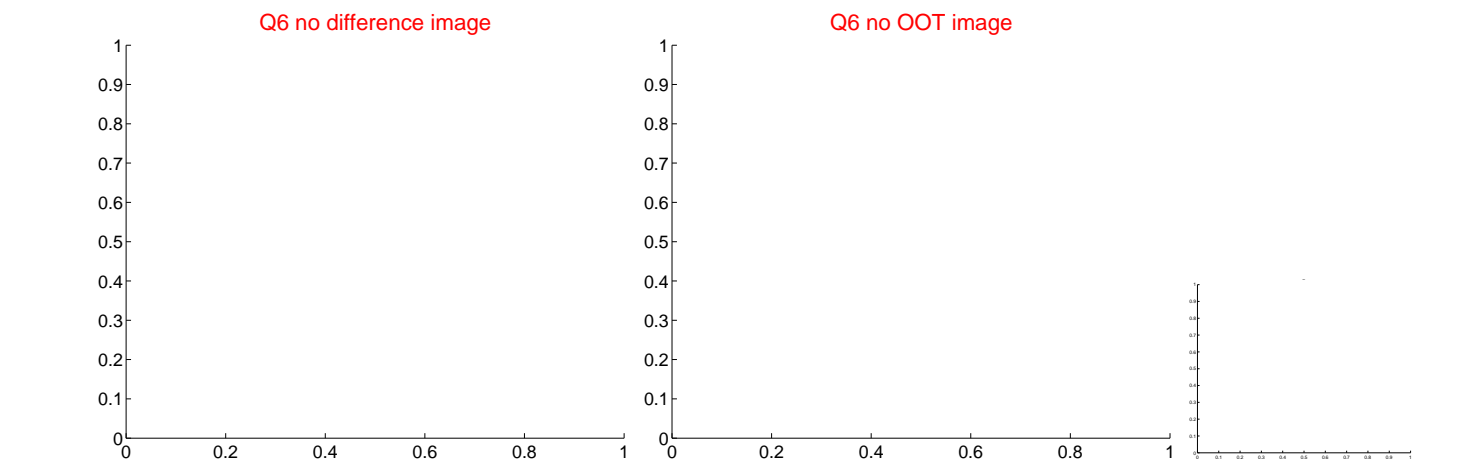
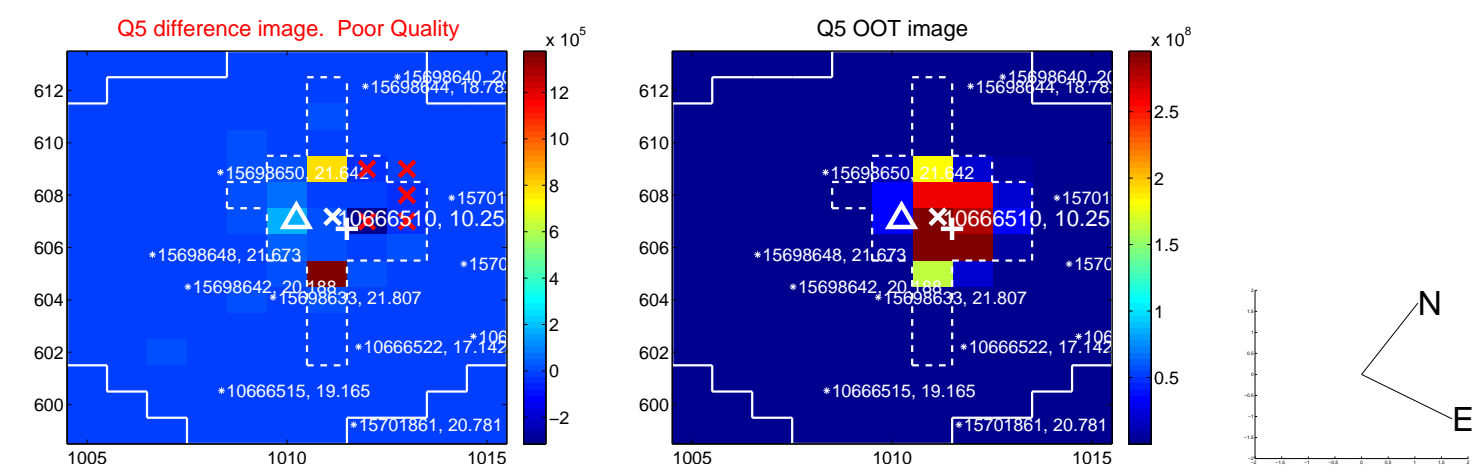


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

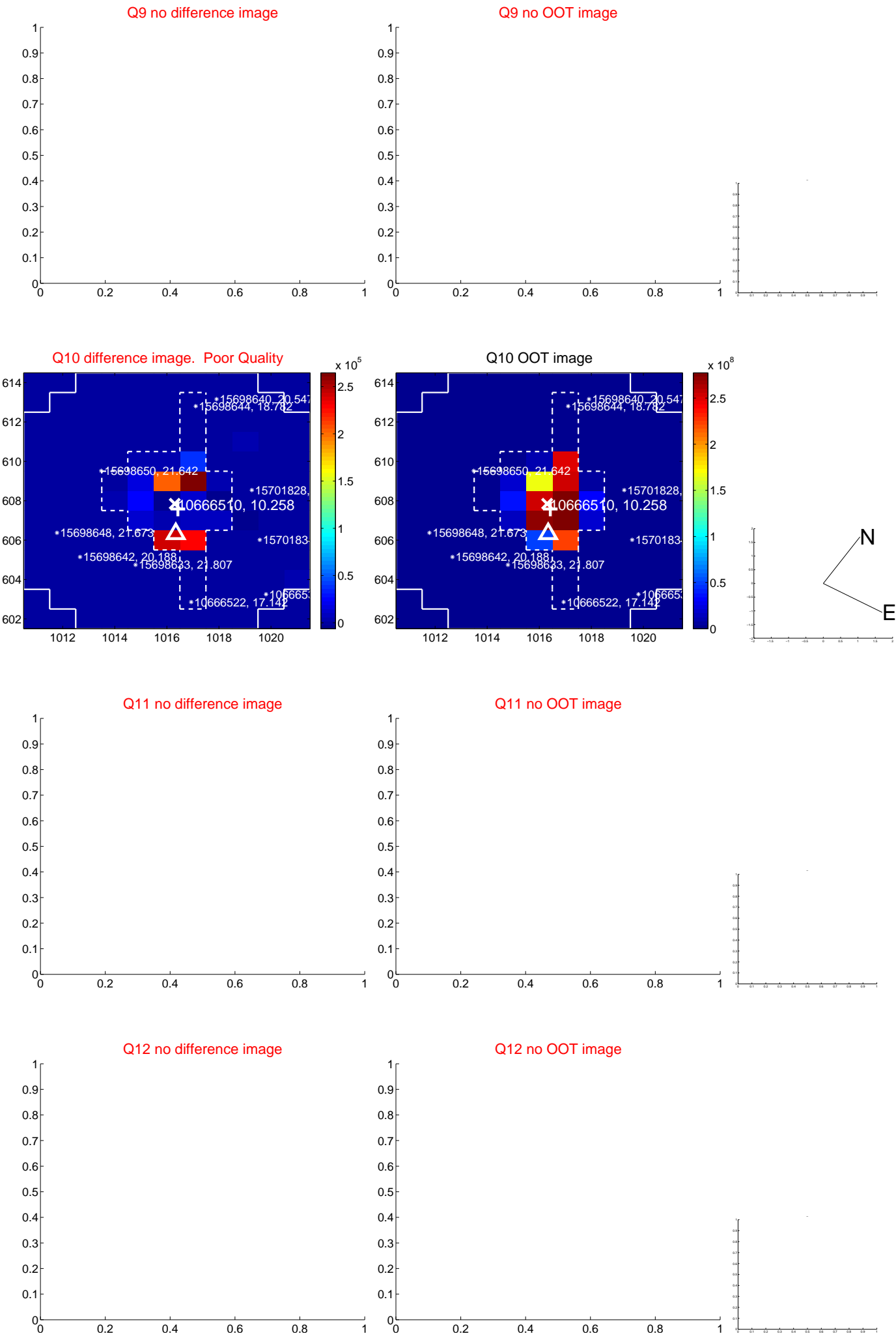
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



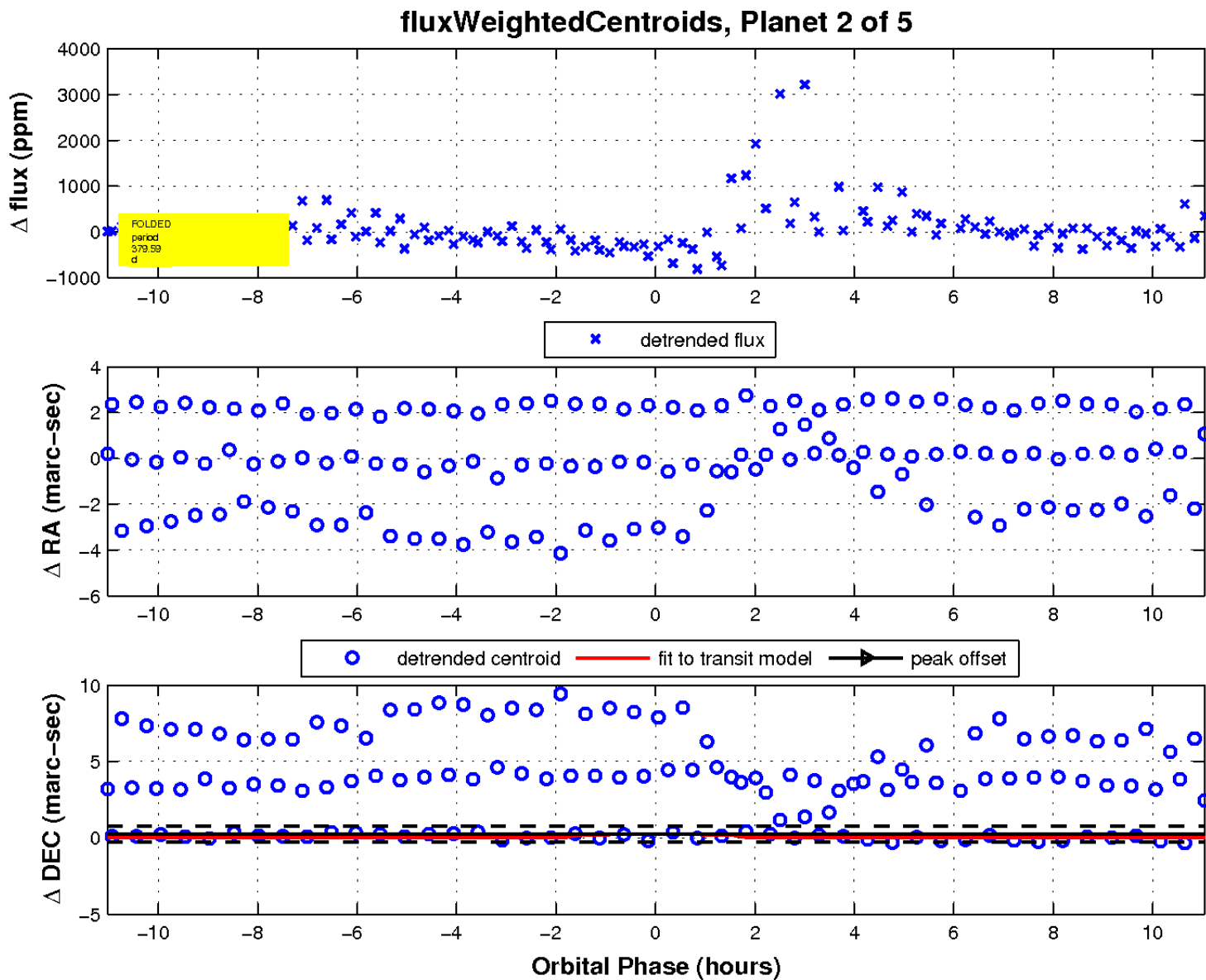
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



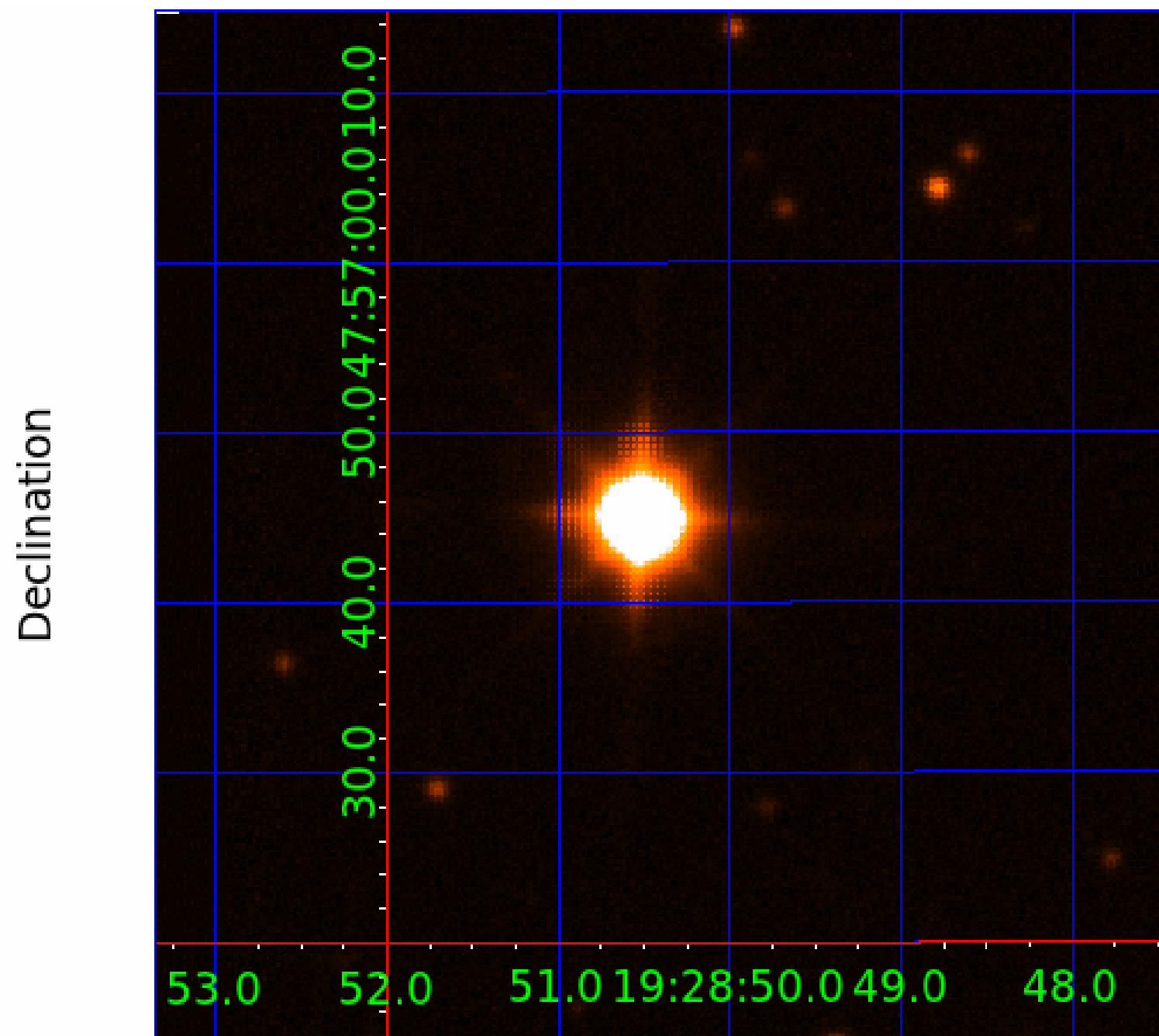
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image





# KIC 010666510

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010666510-01	OBS	No	421.687916	365.815942	931.8	5.128	15.1	9.8	15.15	5155	66.91	52.17
010666510-02	OBS	No	379.586929	153.240185	800.6	3.691	16.7	8.9	15.15	5155	47.35	60.02
010666510-03	OBS	No	388.900666	250.517919	927.2	7.134	14.8	9.4	15.15	5155	60.21	58.12
010666510-04	OBS	No	430.407843	241.669278	417.6	2.098	13.9	5.6	15.15	5155	34.31	50.77
010666510-05	OBS	No	382.409441	357.475831	147.2	3.000	15.1	-1.0	15.15	5155	17.93	59.44

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010666510-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_SATURATED
010666510-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_SATURATED
010666510-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—CENT_SATURATED
010666510-04	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—INCONSISTENT_TRANS—CENT_SATURATED
010666510-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—INCONSISTENT_TRANS—CENT_SATURATED

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

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

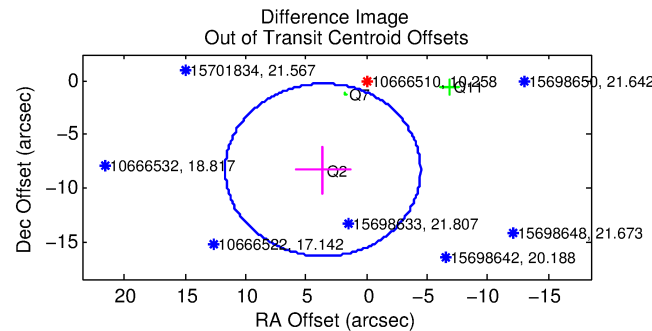
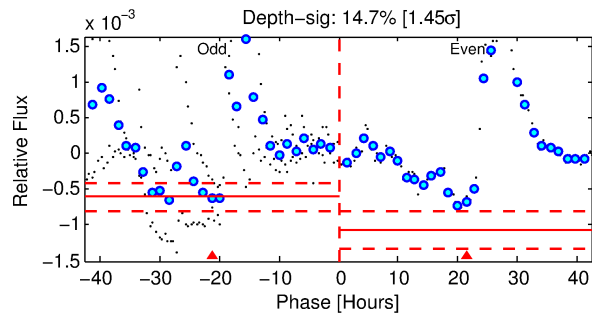
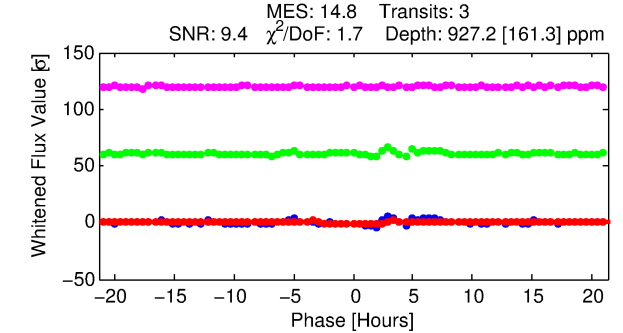
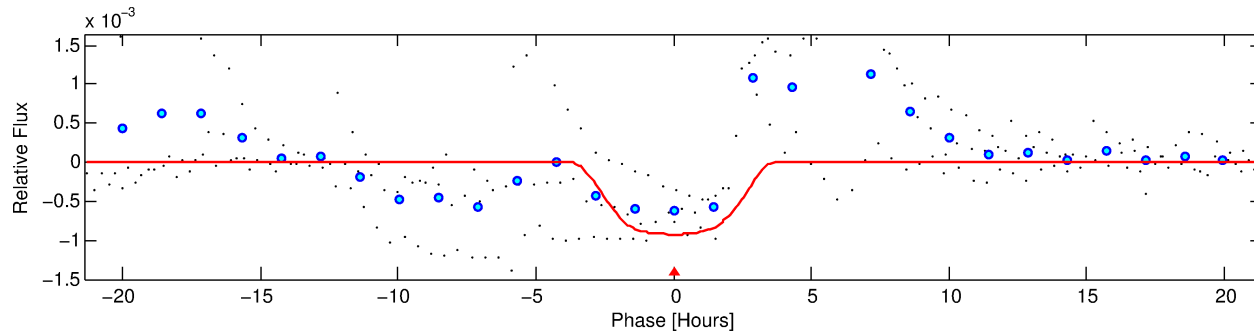
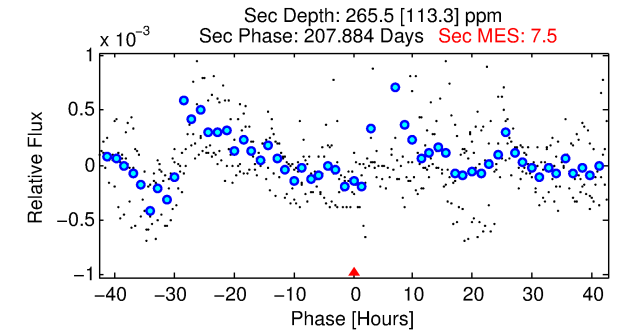
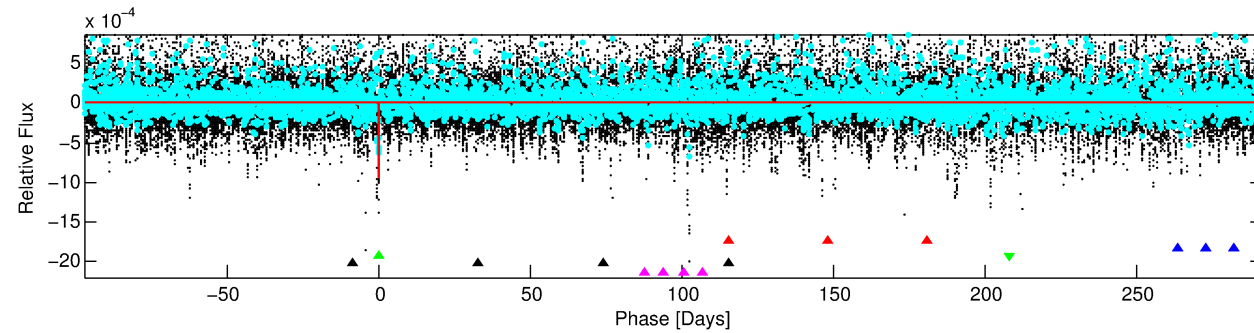
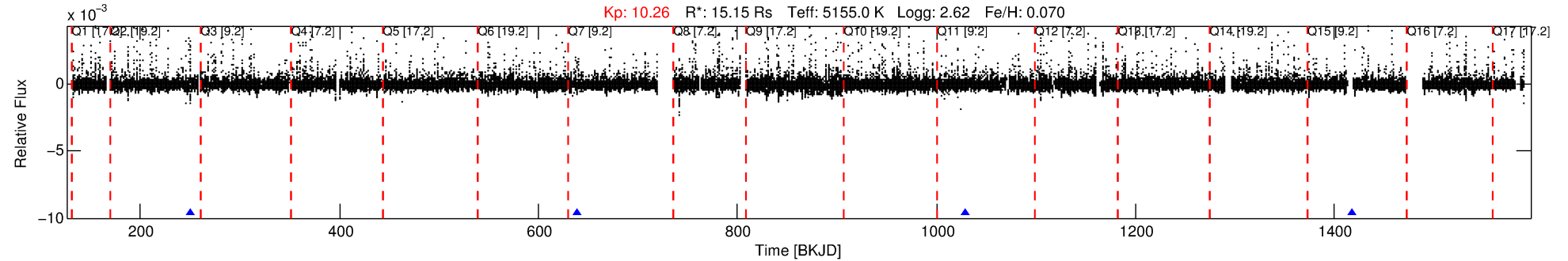
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 010666510-03

No Significant Match Found

# DV One-Page Summary

KIC: 10666510 Candidate: 3 of 5 Period: 388.901 d



## DV Fit Results:

Period = 388.90067 [0.01022] d  
Epoch = 250.5179 [0.0126] BKJD  
Rp/R\* = 0.0364 [0.0036]  
a/R\* = 173.34 [22.16]  
b = 0.95 [0.02]  
Seff = 58.12 [66.11]  
Teq = 704 [200] K  
Rp = 60.21 [45.70] Re  
a = 1.5808 [1.1209] AU  
Ag = 100.67 [122.38] [0.81σ]  
Teffp = 3448 [439] K [5.69σ]

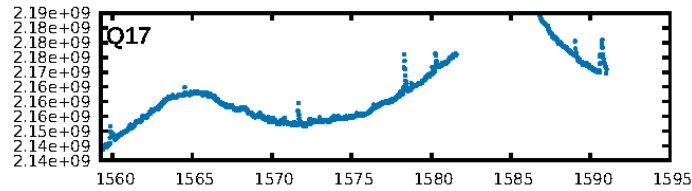
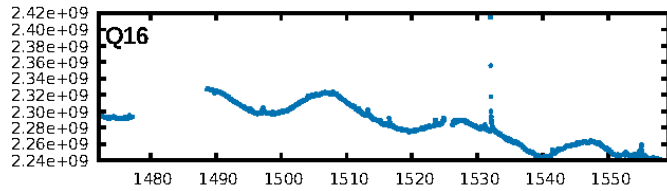
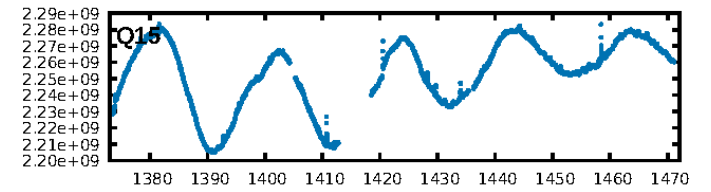
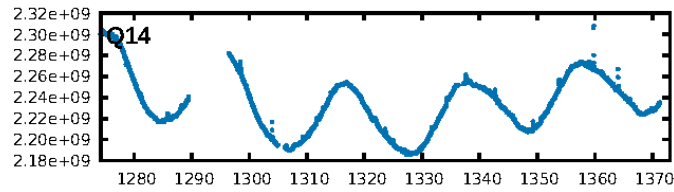
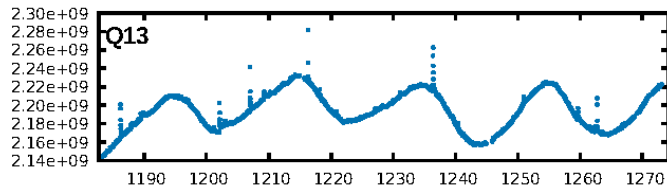
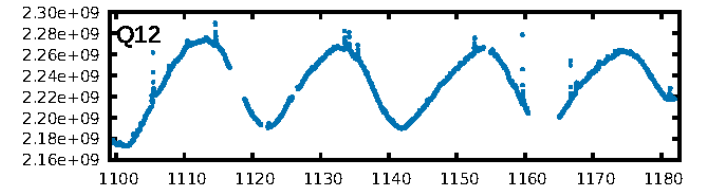
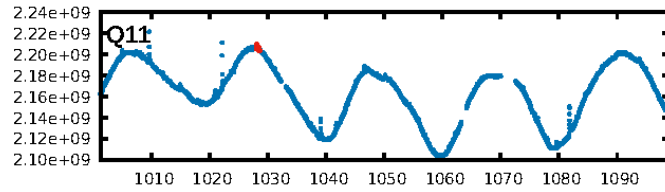
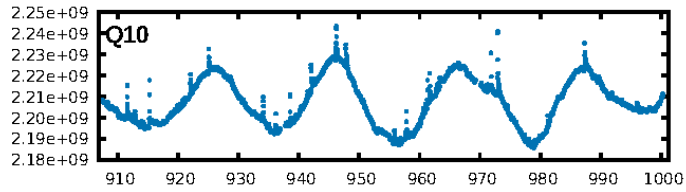
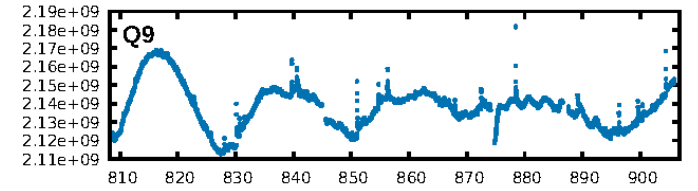
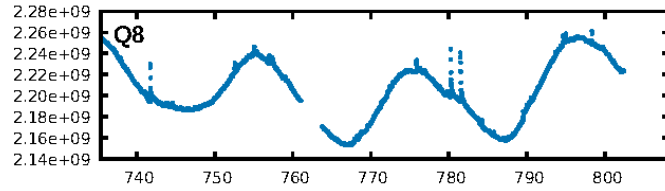
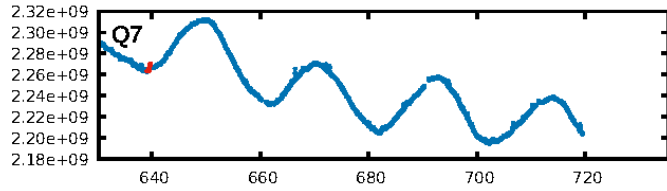
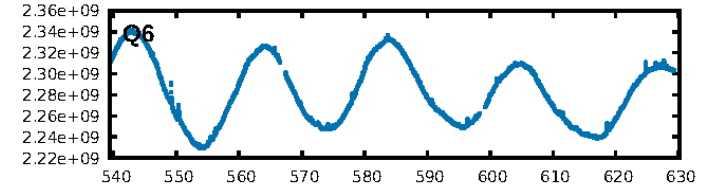
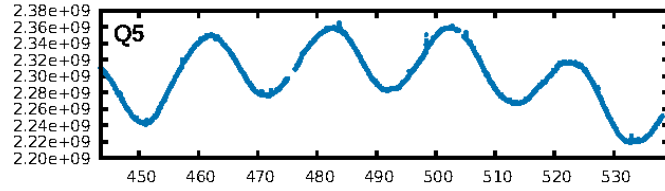
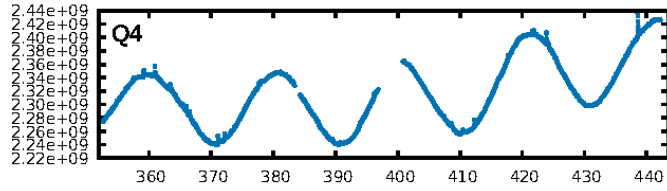
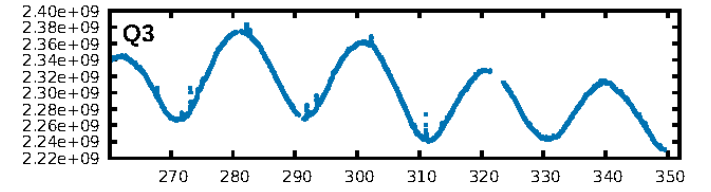
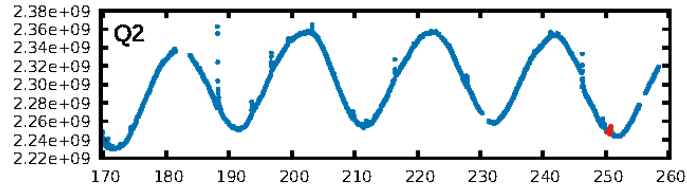
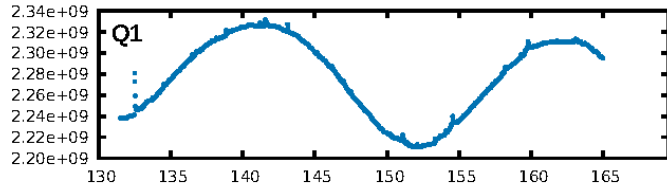
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [20.13σ]  
LongPeriod-sig: 100.0% [89.57σ]  
ModelChiSquare2-sig: 5.1%  
ModelChiSquareGof-sig: 72.7%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: N/A  
Centroid-sig: N/A  
Centroid-so: 1.470 arcsec [3.63σ]  
OotOffset-rm: 9.058 arcsec [3.37σ]  
KicOffset-rm: 6.898 arcsec [4.17σ]  
OotOffset-st: 1/2/0/0 [3]  
KicOffset-st: 1/2/0/0 [3]  
DiffImageQuality-fgm: 0.00 [0/3]  
DiffImageOverlap-fno: 1.00 [3/3]

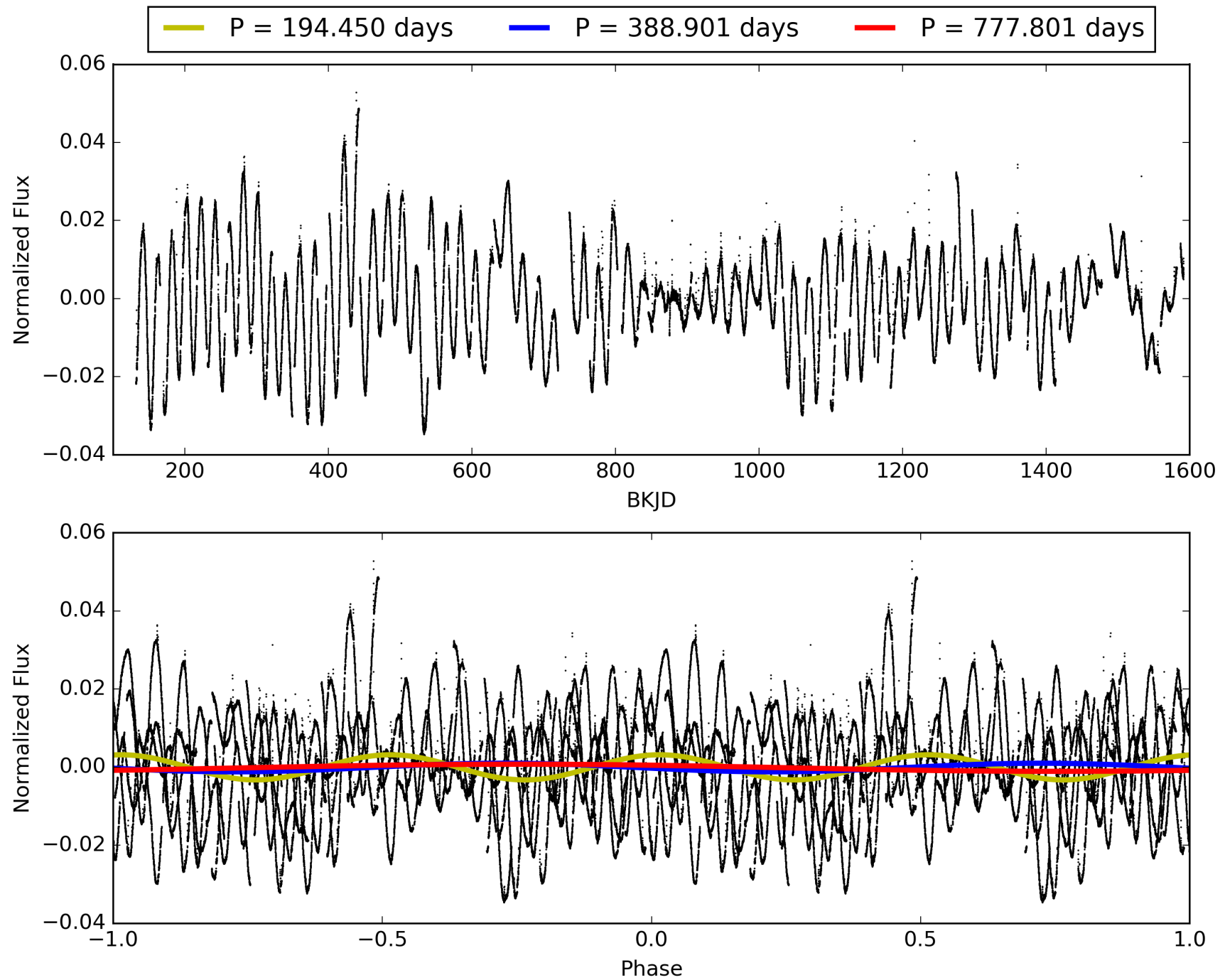
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:31:08 Z

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

# TCE 01066510-03, PDC Light Curves

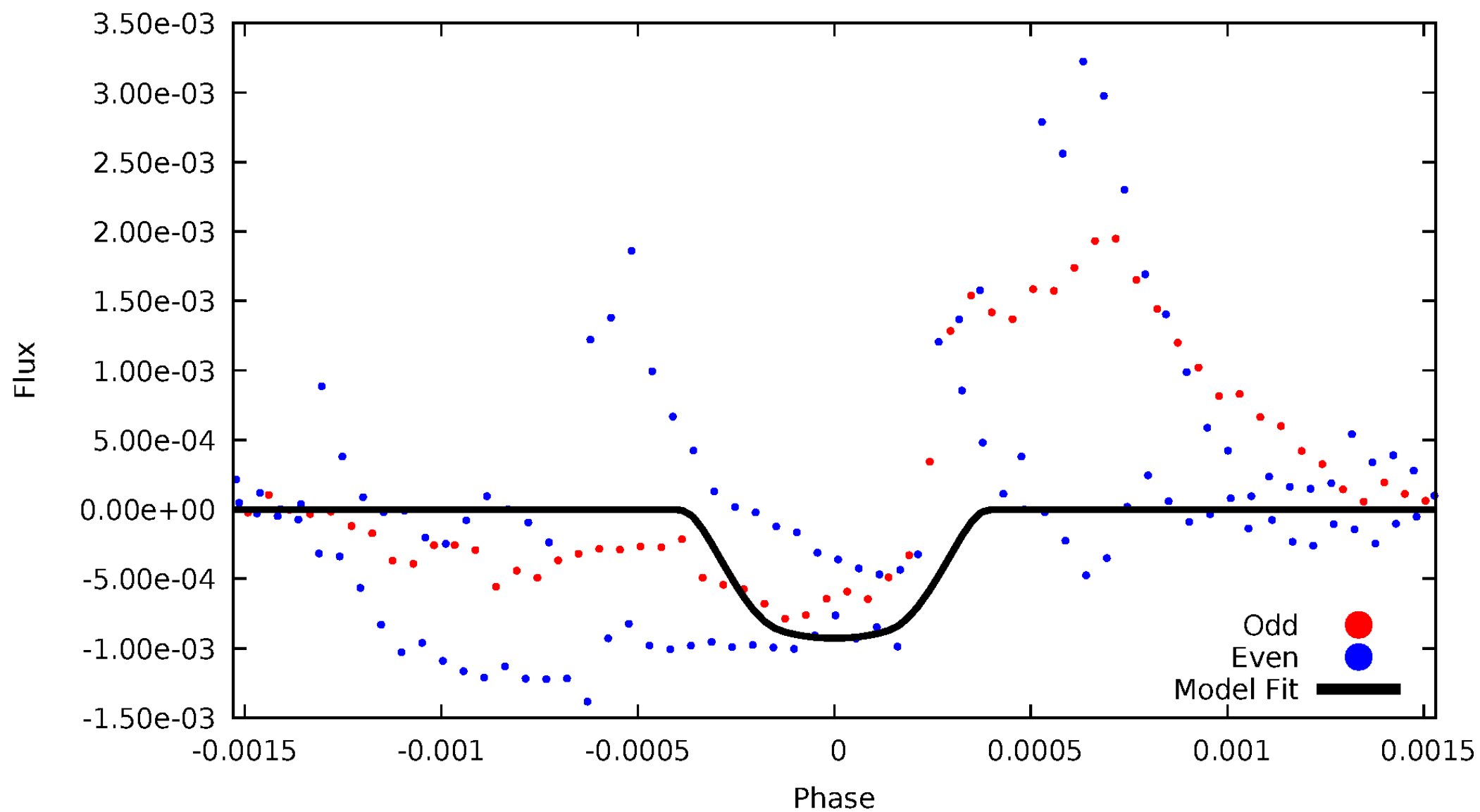


# TCE 010666510-03



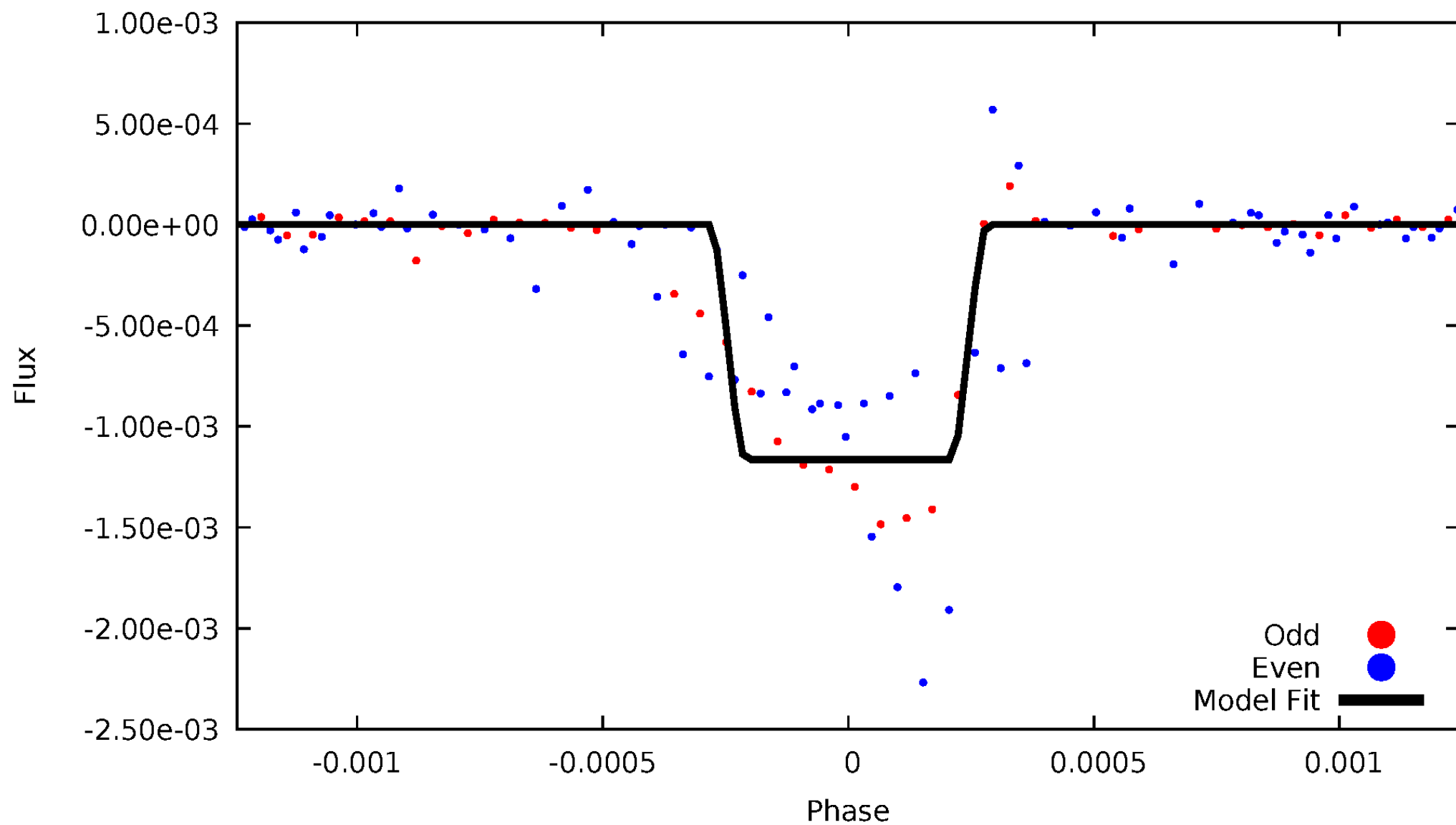
# DV Odd/Even

TCE 010666510-03



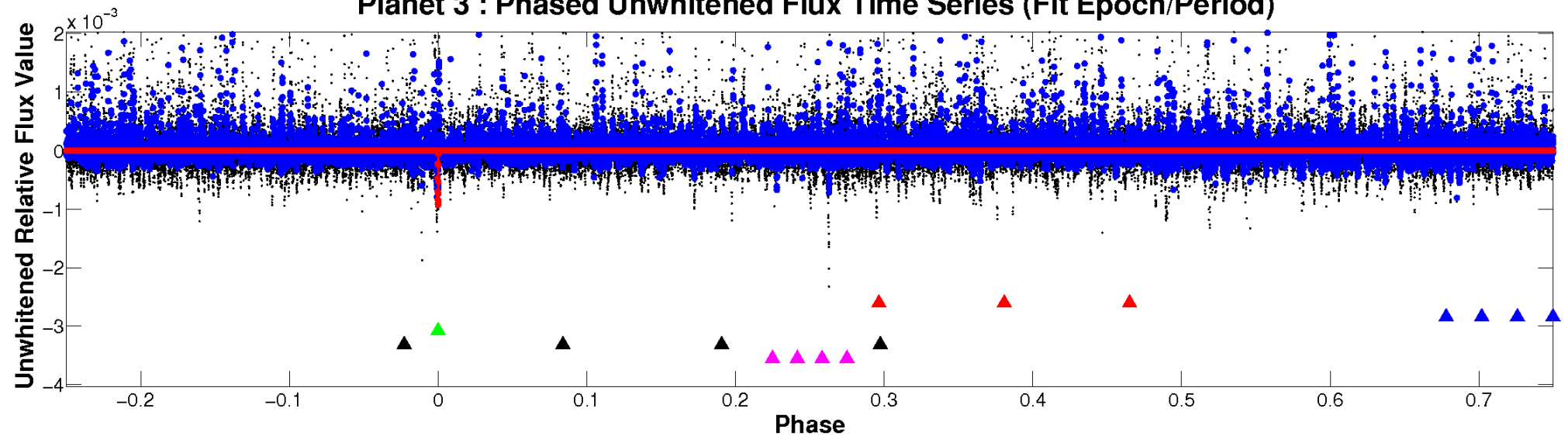
# ALT Odd/Even

TCE 010666510-03

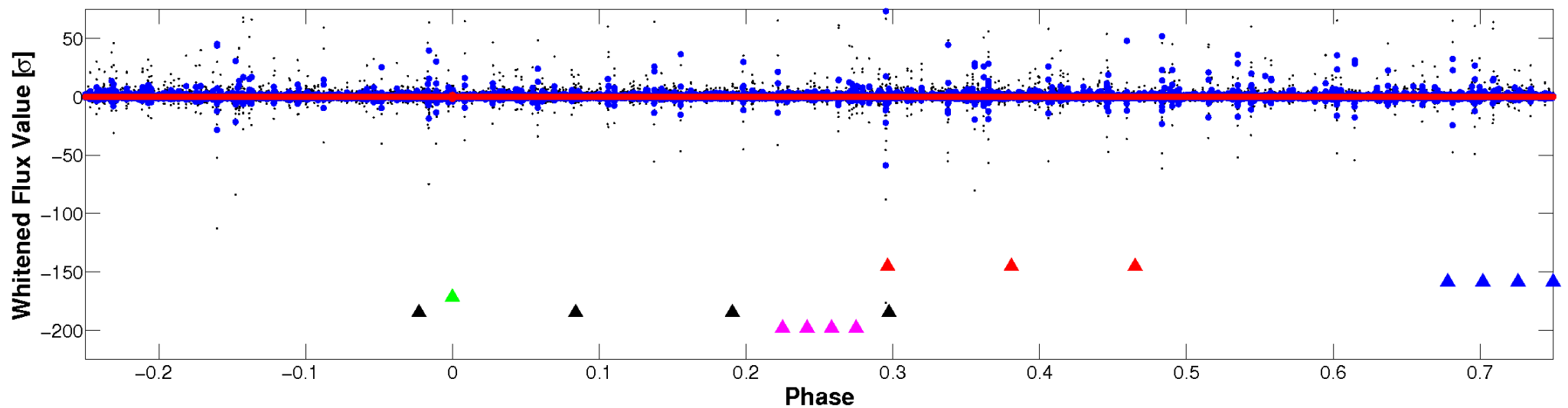


# Non-Whitened Vs. Whitened Light Curve

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

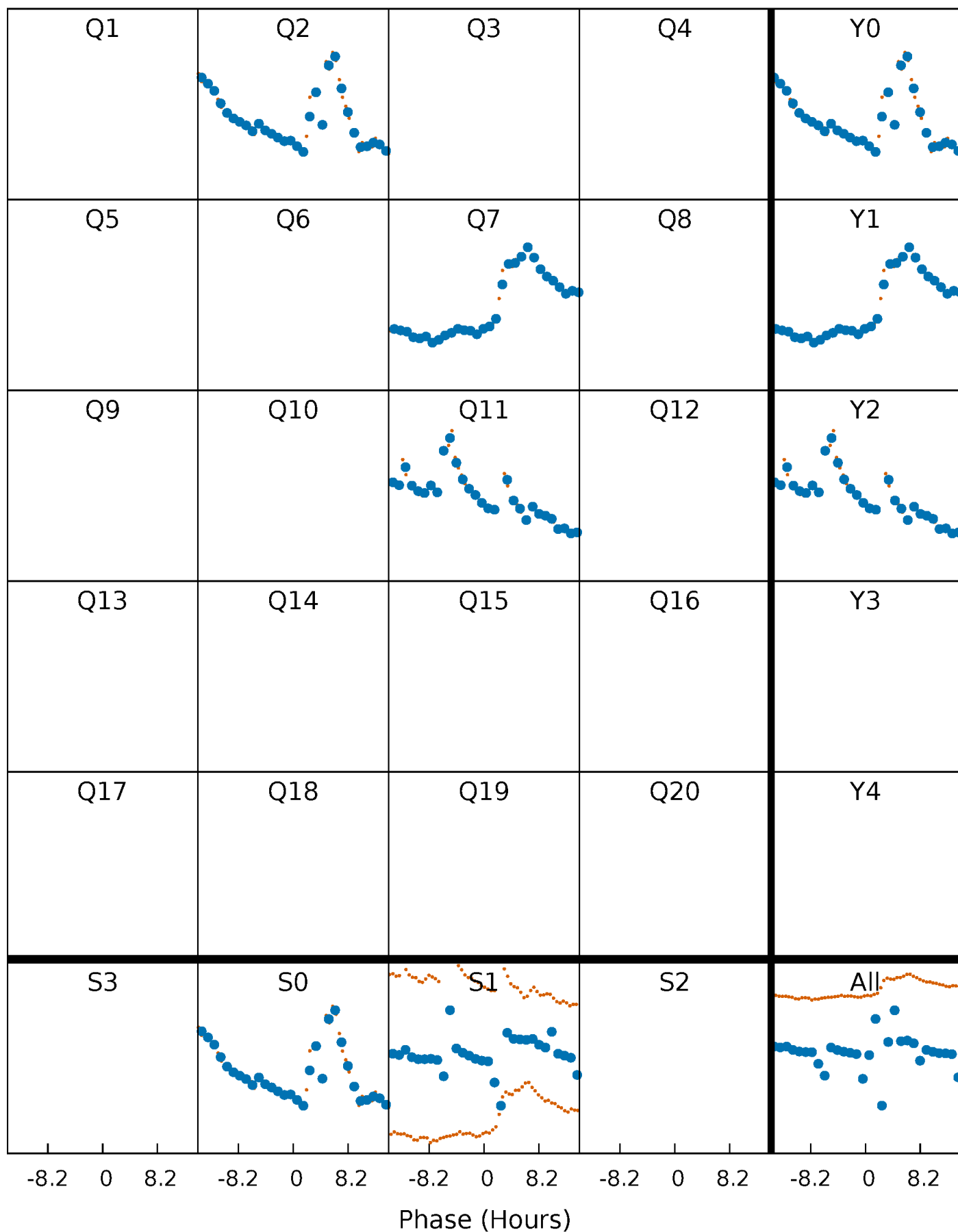


## Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

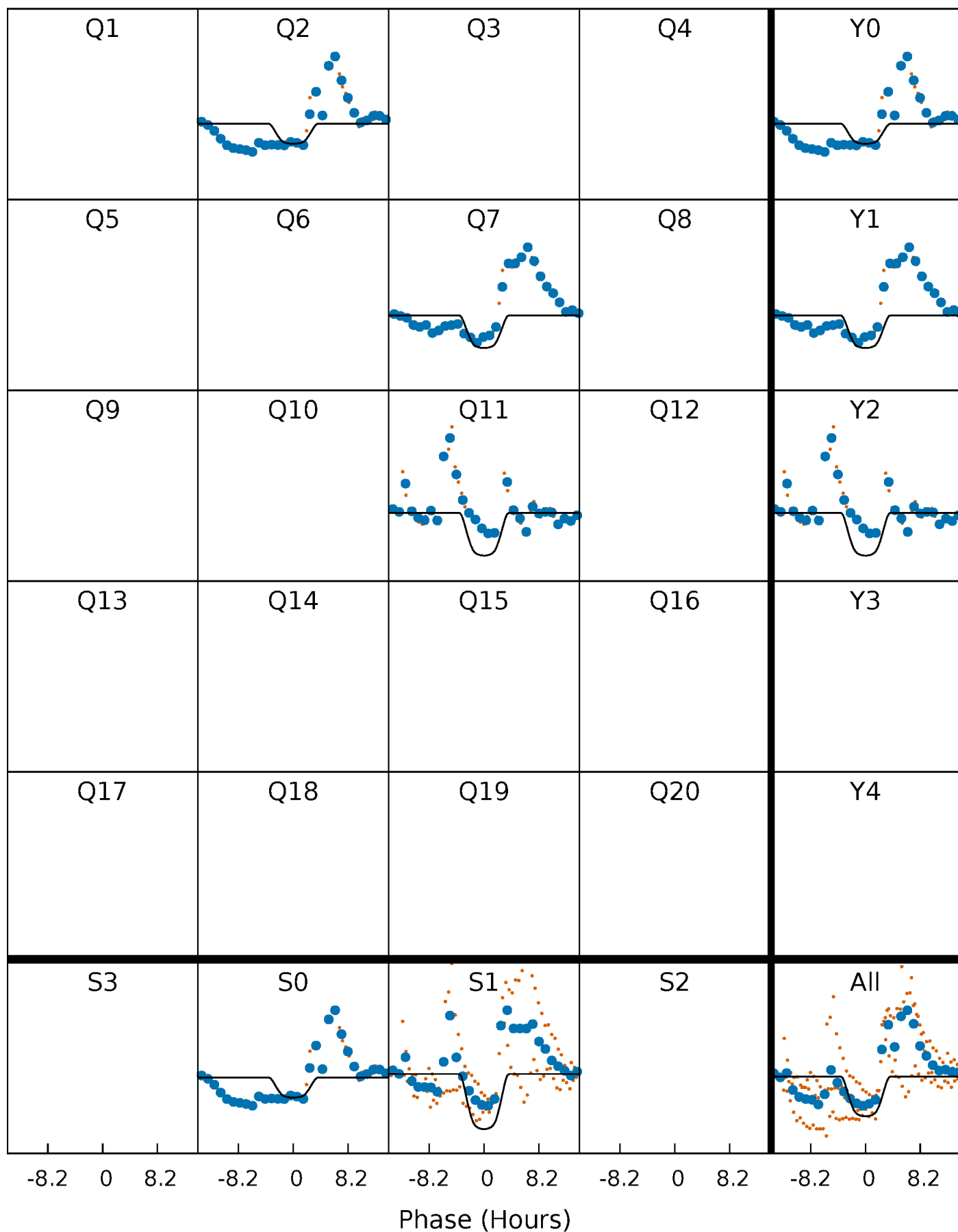
TCE 010666510-03 P=388.900666 Days  $T_0=250.517919$  (BKJD)





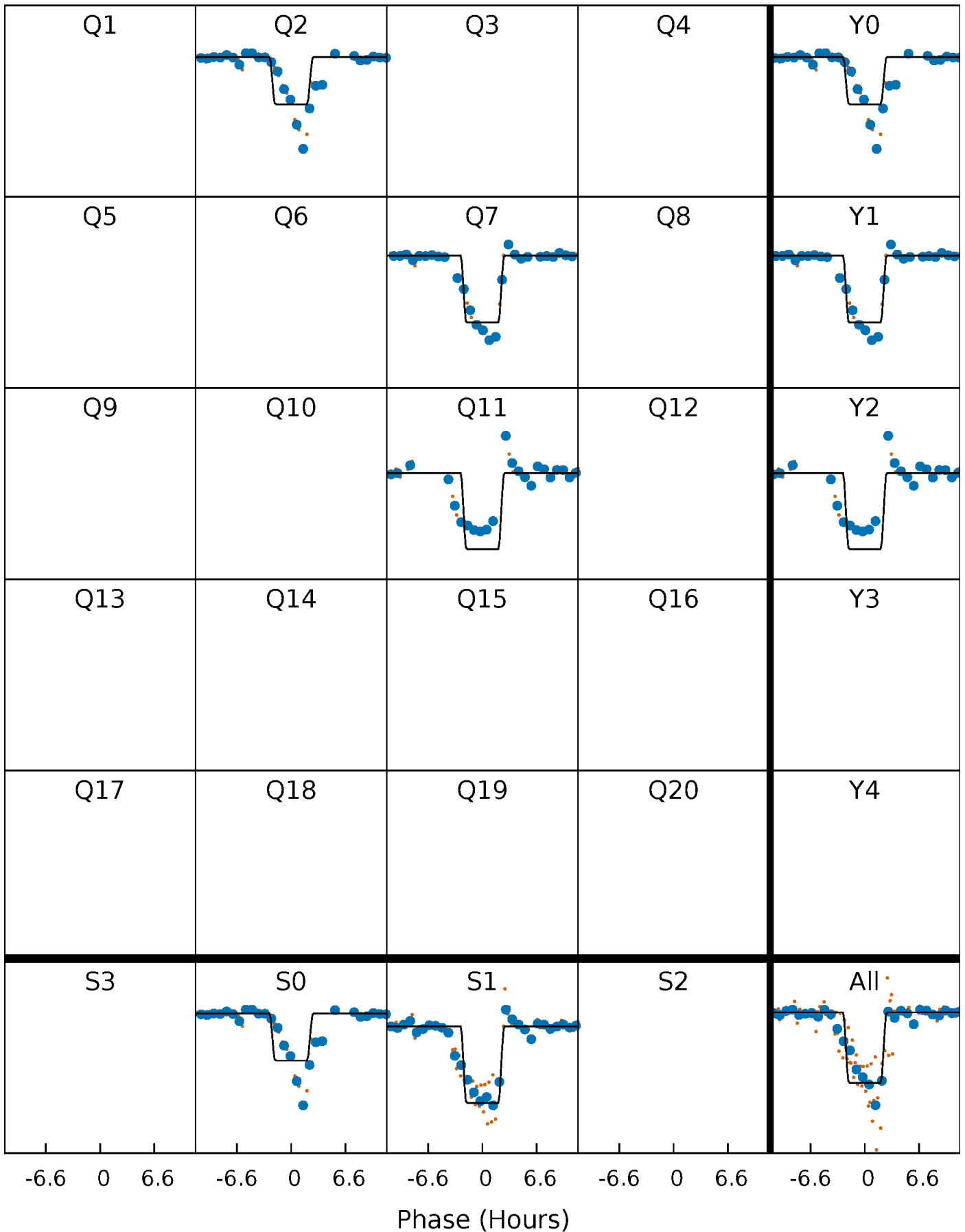
# DV Quarter-Phased Transit Curves

TCE 010666510-03     $P=388.900666$  Days     $T_0=250.517919$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

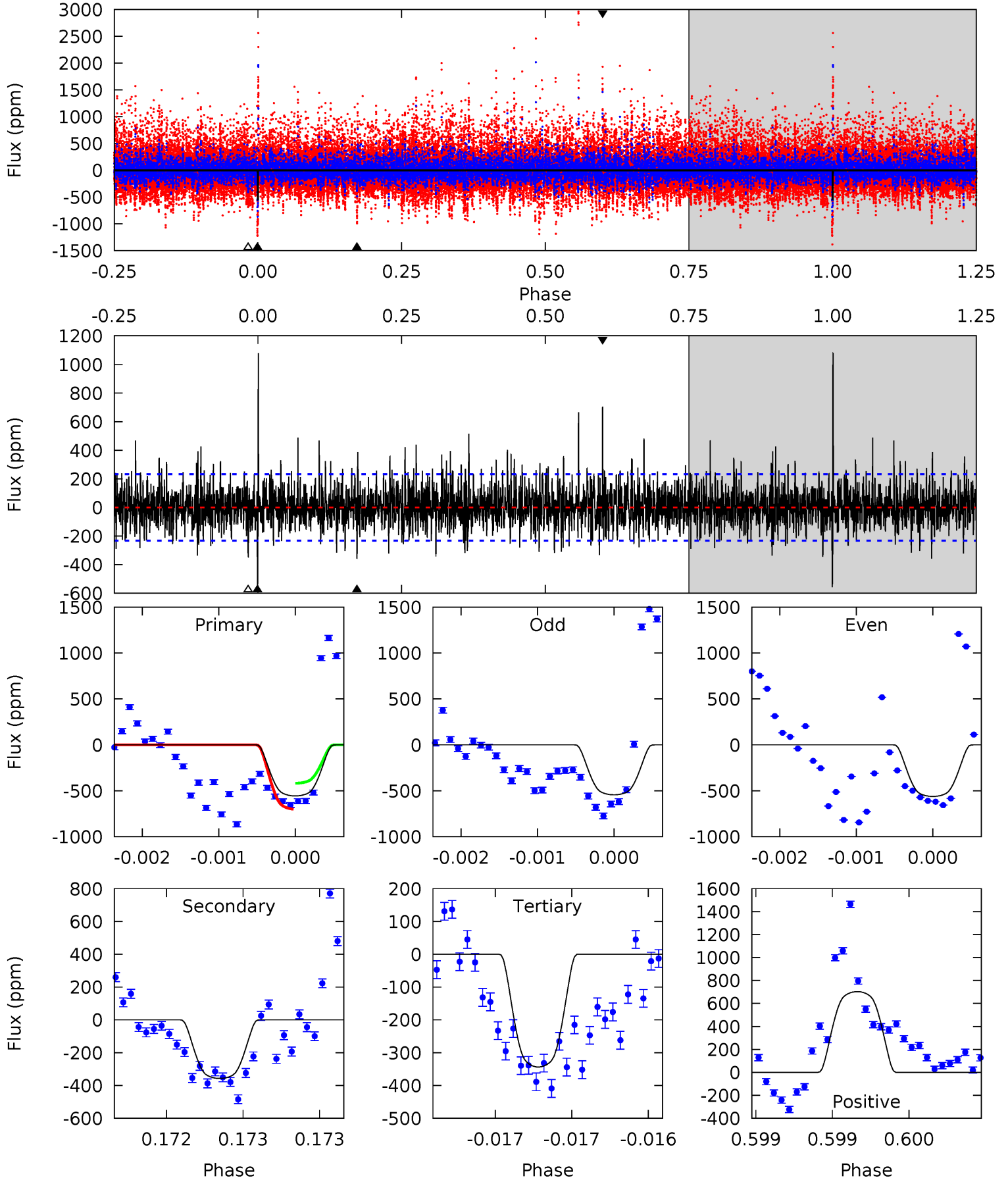
TCE 010666510-03 P=388.905136 Days  $T_0=250.520884$  (BKJD)



# DV Model-Shift Uniqueness Test

010666510-03, P = 388.900666 Days, E = 250.517919 Days

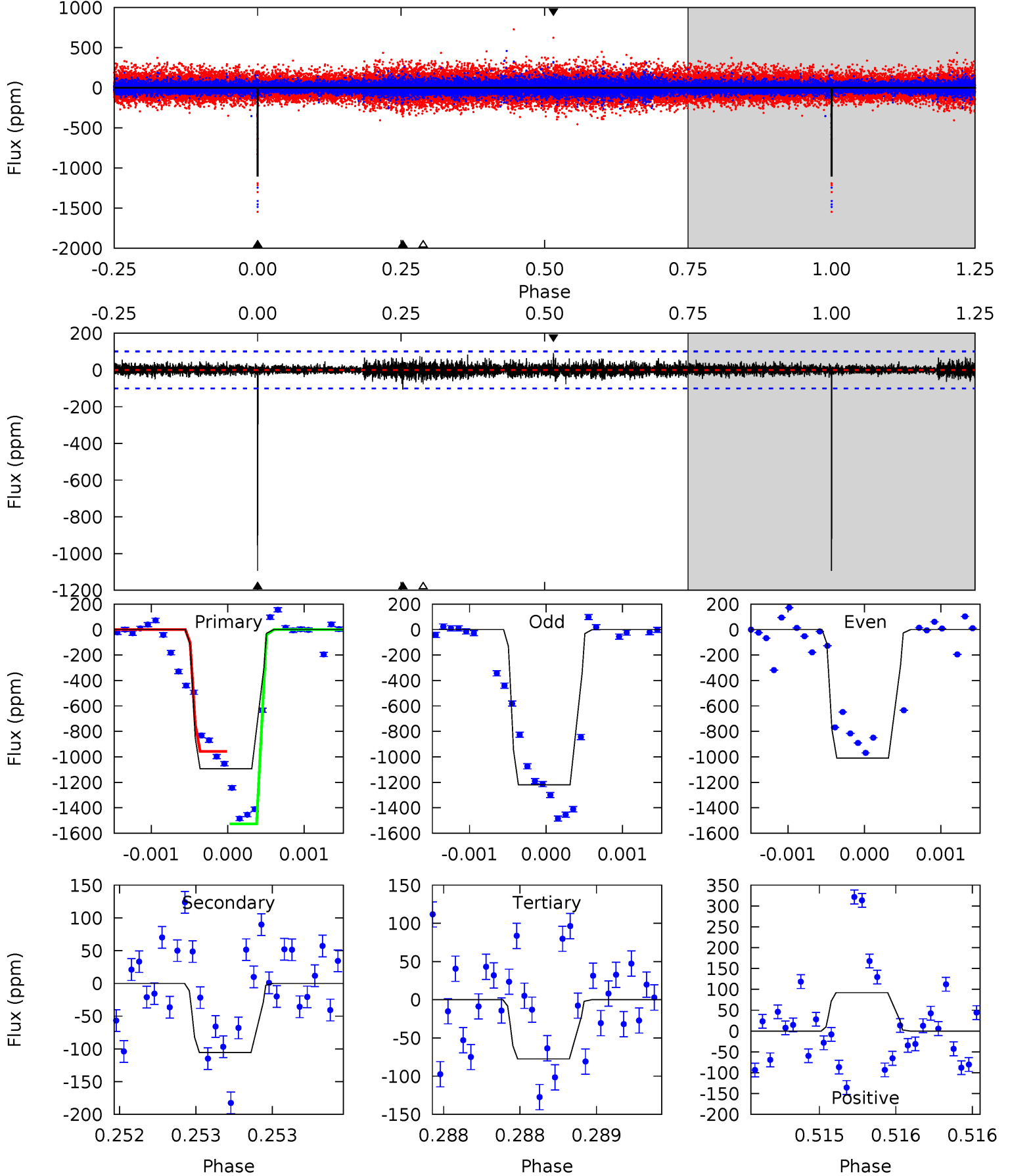
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.2	8.45	8.13	16.6	5.49	3.35	2.66	5.03	-3.47	0.32	-8.19	0.15	1.00	0.66	3.38



# Alt Model-Shift Uniqueness Test

010666510-03, P = 388.905136 Days, E = 250.520884 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
60.3	5.82	4.27	5.08	5.56	3.46	0.86	56.0	55.2	1.55	0.74	5.59	0.90	0.08	15.2



### Stellar Parameters For KIC 010666510

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5155^{+107}_{-250}$	$2.619^{+0.653}_{-0.218}$	$0.070^{+0.150}_{-0.550}$	$15.150^{+3.563}_{-11.400}$	$3.481^{+0.126}_{-2.393}$	$0.001^{+0.022}_{-0.001}$
	+2%/-5%	+25%/-8%	+214%/-786%	+24%/-75%	+4%/-69%	+1530%/-37%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 010666510-03 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-357 \pm 42$	$58.10^{+13.49}_{-21.18}$	$971^{+84}_{-163}$	$3962^{+210}_{-207}$	$142^{+147}_{-49}$
Alt.	$-106 \pm 18$	$55.19^{+13.06}_{-19.79}$	$976^{+89}_{-163}$	$3309^{+170}_{-153}$	$46^{+54}_{-17}$

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

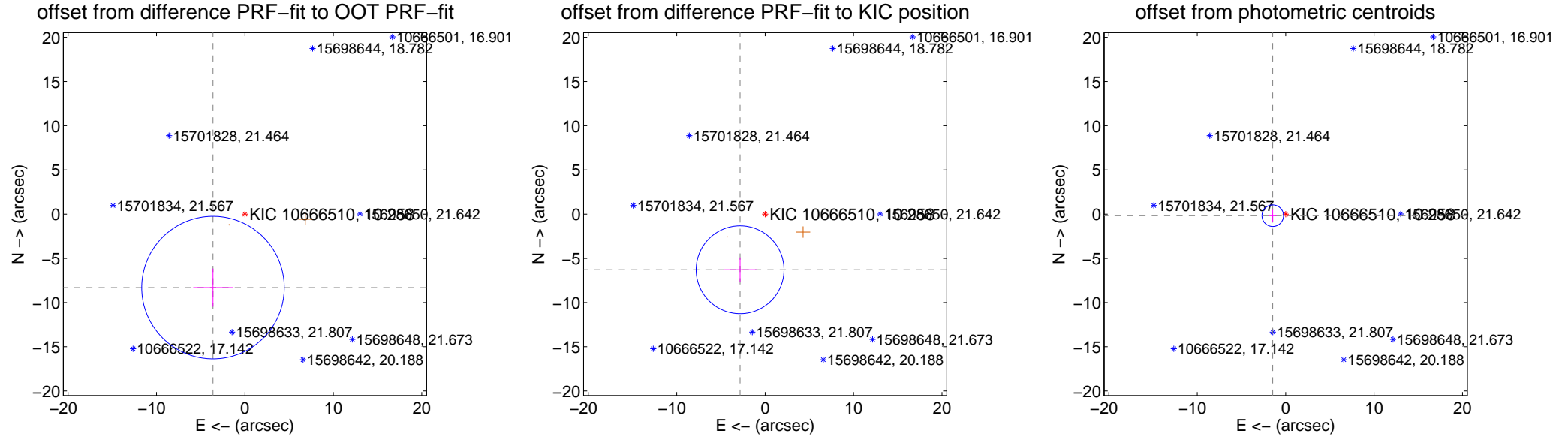
## DV Centroid Data

Supplemental centroid analysis for 010666510-03. **Kepler magnitude: 10.26.** Transit SNR 9.42

There are 0 quarters with good PRF difference image offsets

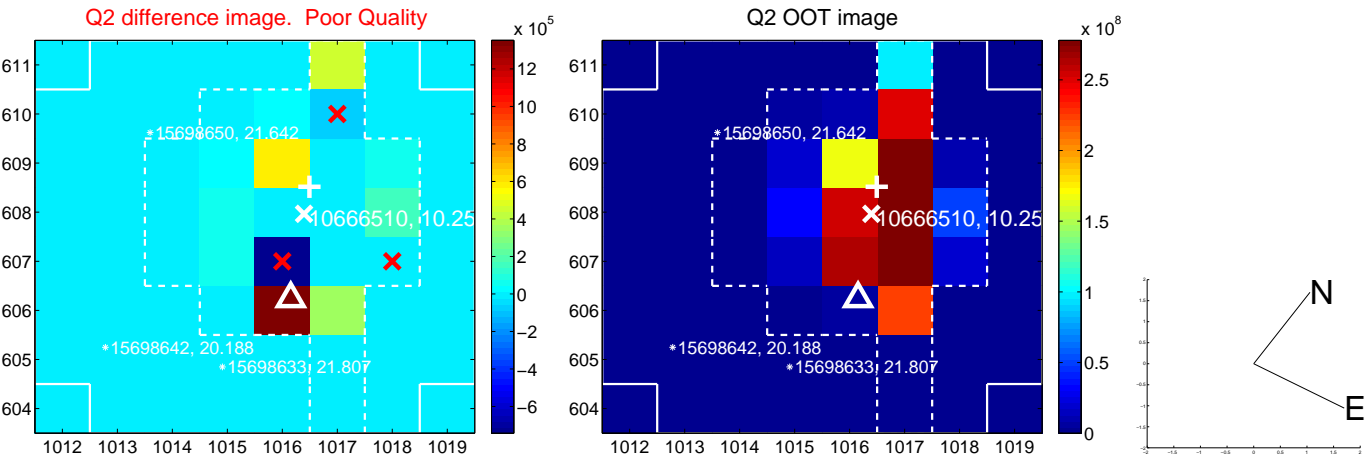
The OOT PRF centroid is offset from the target star catalog position by about 2.92 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b>9.058 <math>\pm</math> 2.687</b>	<b>3.37</b>	3.611 $\pm$ 2.235	-8.307 $\pm$ 2.156
PRF-fit source offset from KIC position	<b>6.898 <math>\pm</math> 1.656</b>	<b>4.17</b>	2.835 $\pm$ 1.854	-6.289 $\pm$ 1.391
photometric centroid source offset	<b>1.47 <math>\pm</math> 0.41</b>	<b>3.63</b>	1.46 $\pm$ 0.40	-0.18 $\pm$ 0.66



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.

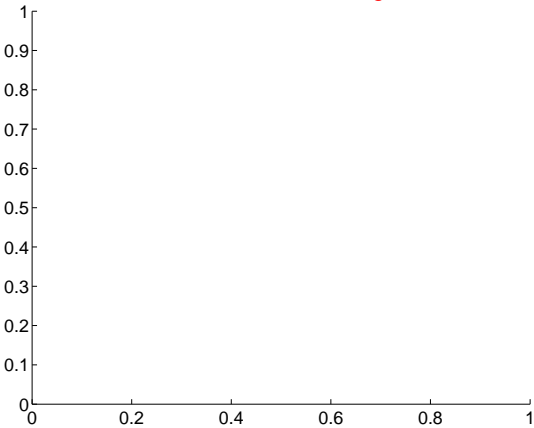
Q5 no difference image



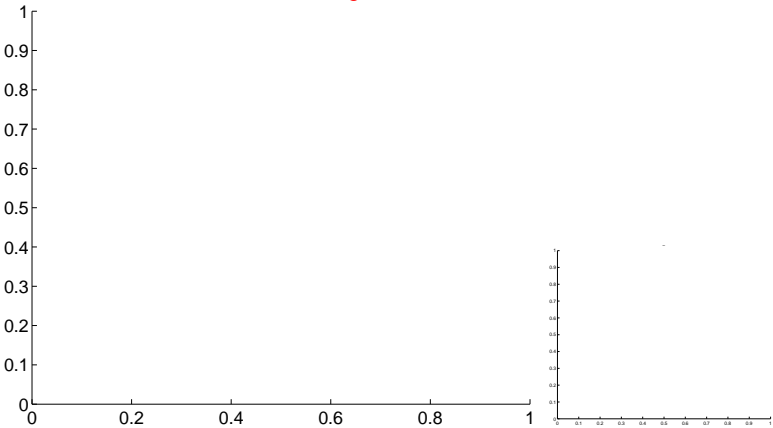
Q5 no OOT image



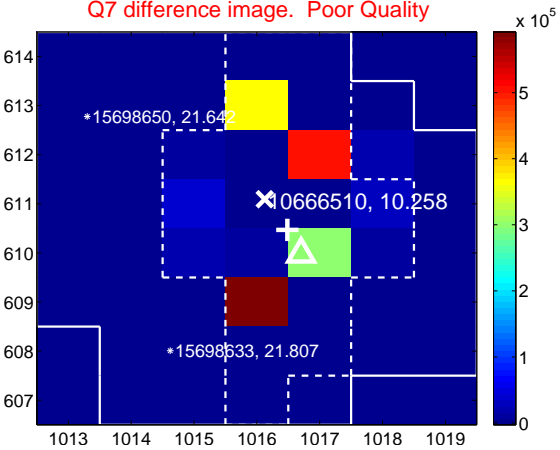
Q6 no difference image



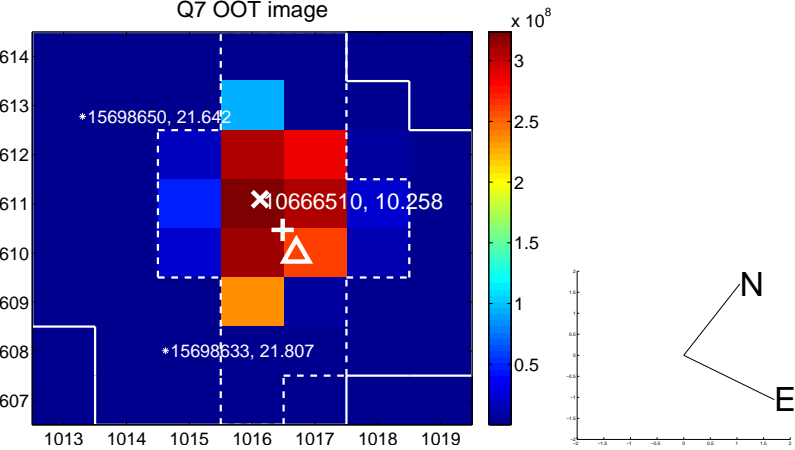
Q6 no OOT image



Q7 difference image. Poor Quality



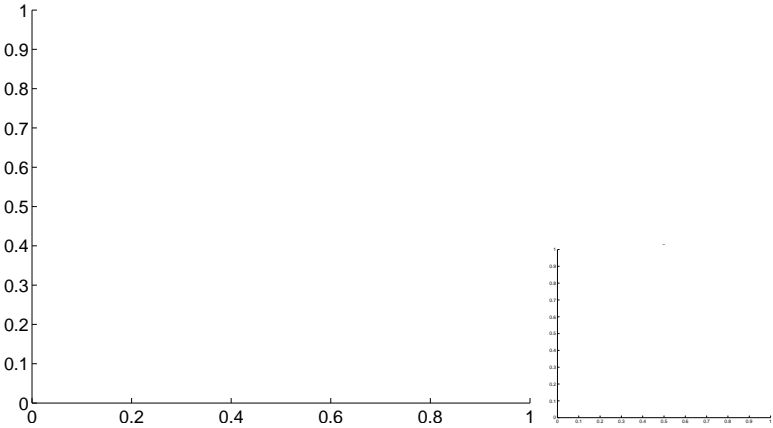
Q7 OOT image



Q8 no difference image

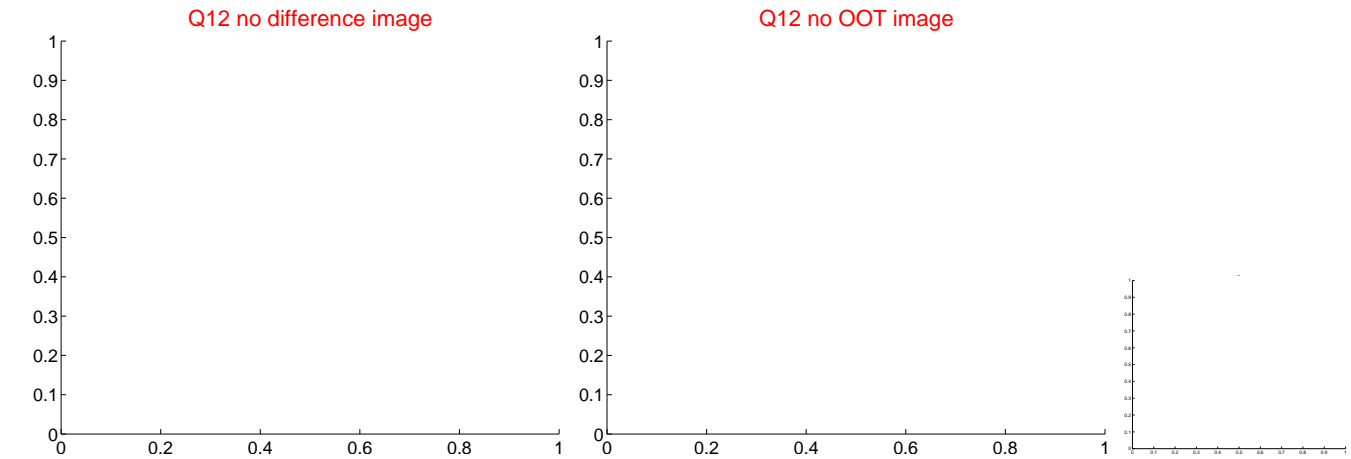
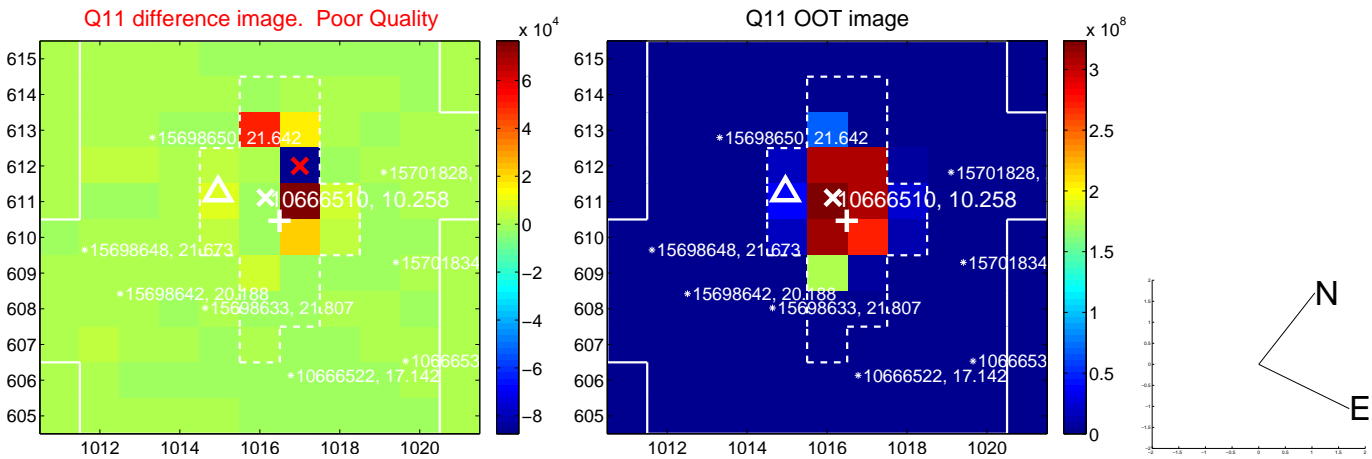
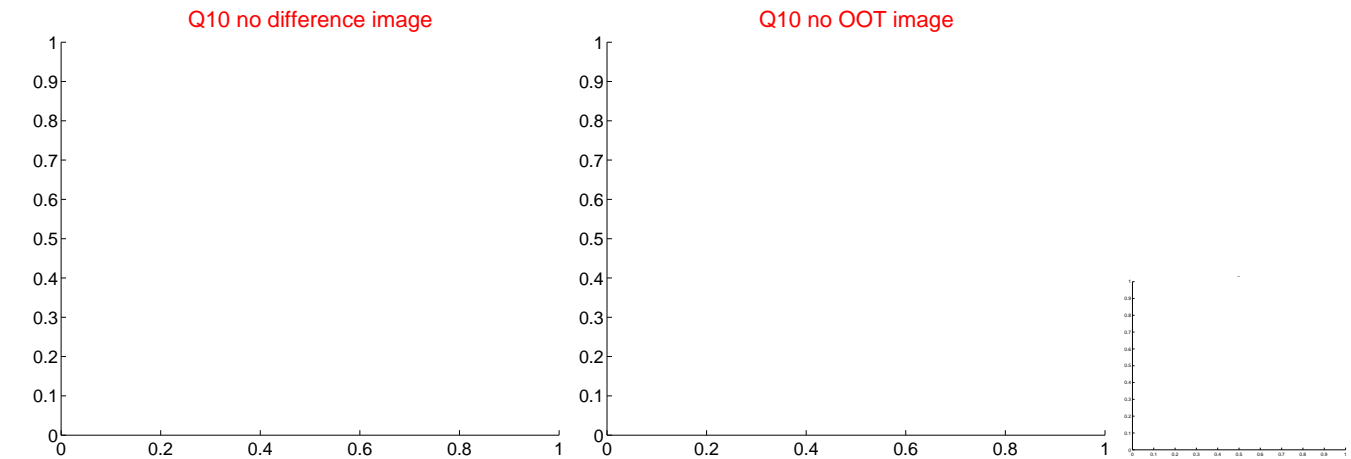
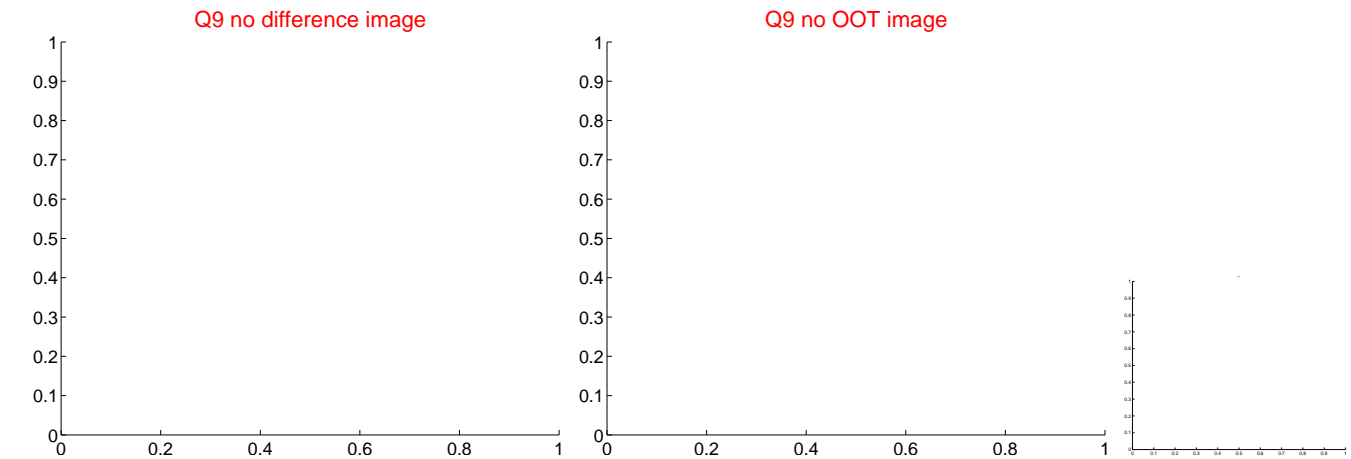


Q8 no OOT image





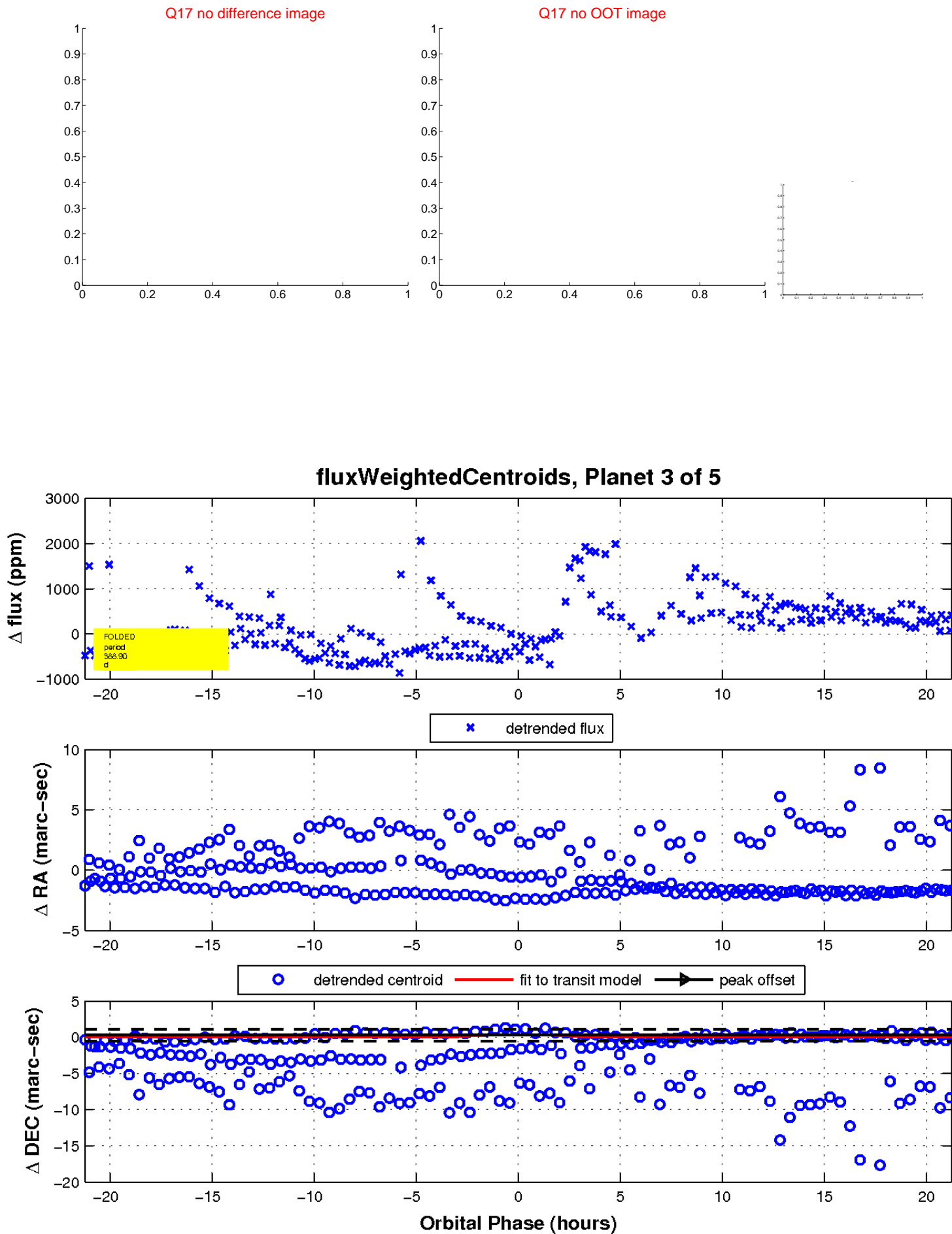
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



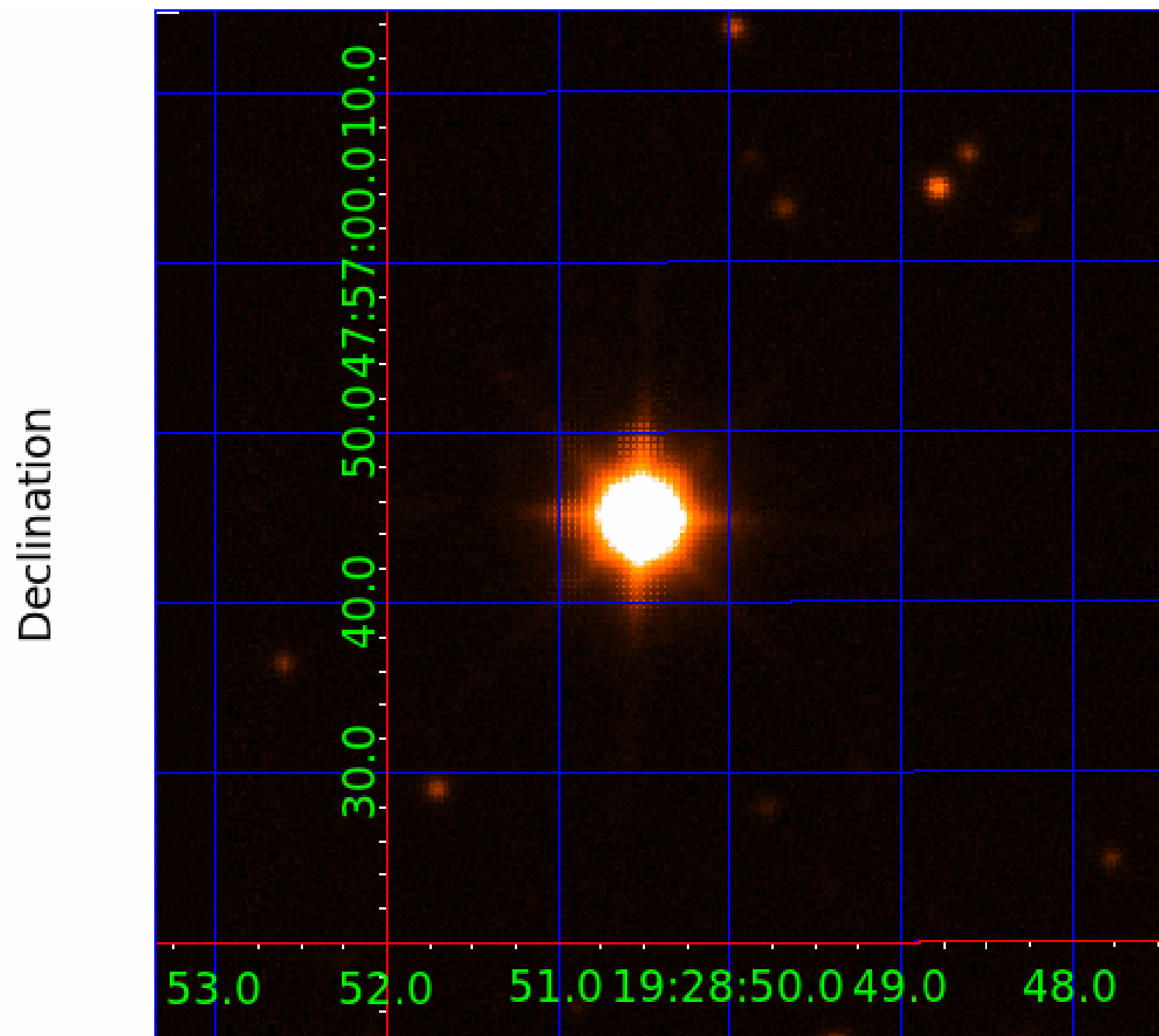
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image



# KIC 010666510

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010666510-01	OBS	No	421.687916	365.815942	931.8	5.128	15.1	9.8	15.15	5155	66.91	52.17
010666510-02	OBS	No	379.586929	153.240185	800.6	3.691	16.7	8.9	15.15	5155	47.35	60.02
010666510-03	OBS	No	388.900666	250.517919	927.2	7.134	14.8	9.4	15.15	5155	60.21	58.12
010666510-04	OBS	No	430.407843	241.669278	417.6	2.098	13.9	5.6	15.15	5155	34.31	50.77
010666510-05	OBS	No	382.409441	357.475831	147.2	3.000	15.1	-1.0	15.15	5155	17.93	59.44

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010666510-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_SATURATED
010666510-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_SATURATED
010666510-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—CENT_SATURATED
010666510-04	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—INCONSISTENT_TRANS—CENT_SATURATED
010666510-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—INCONSISTENT_TRANS—CENT_SATURATED

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

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

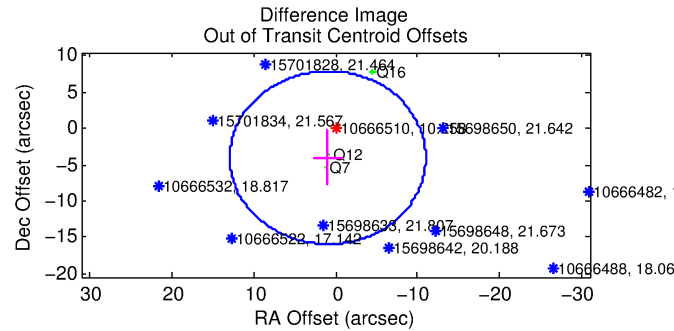
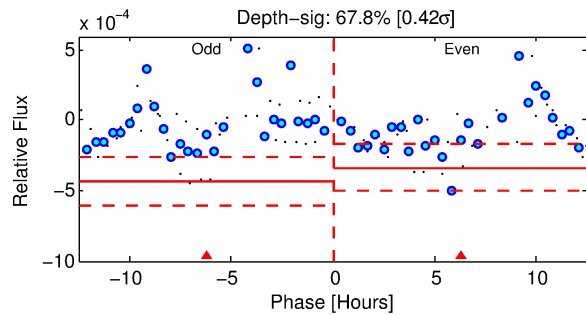
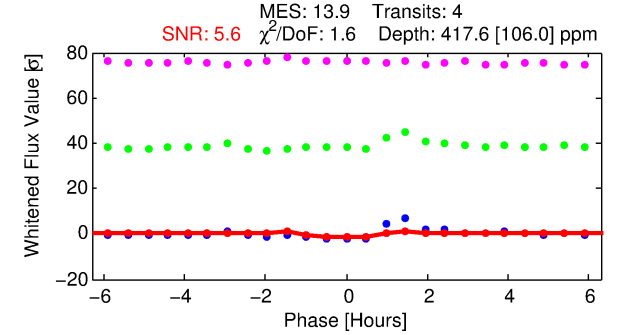
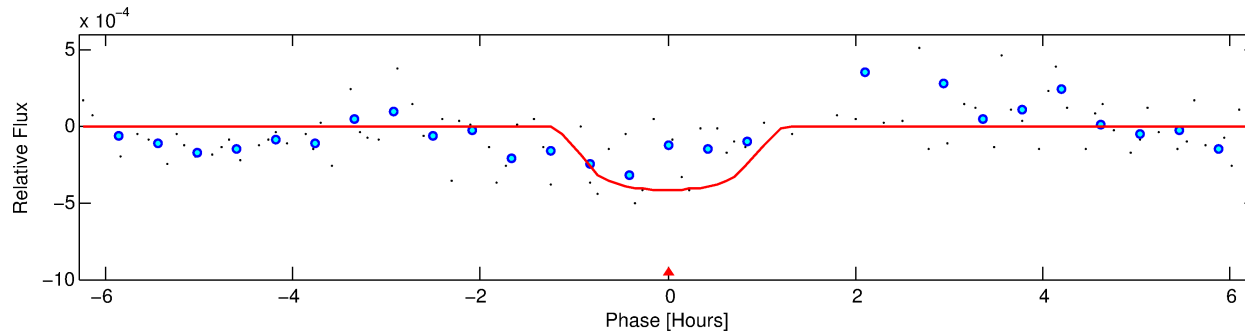
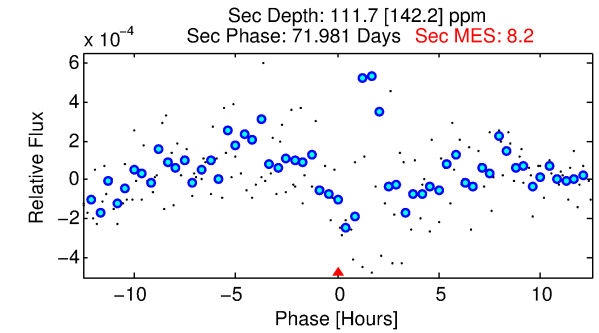
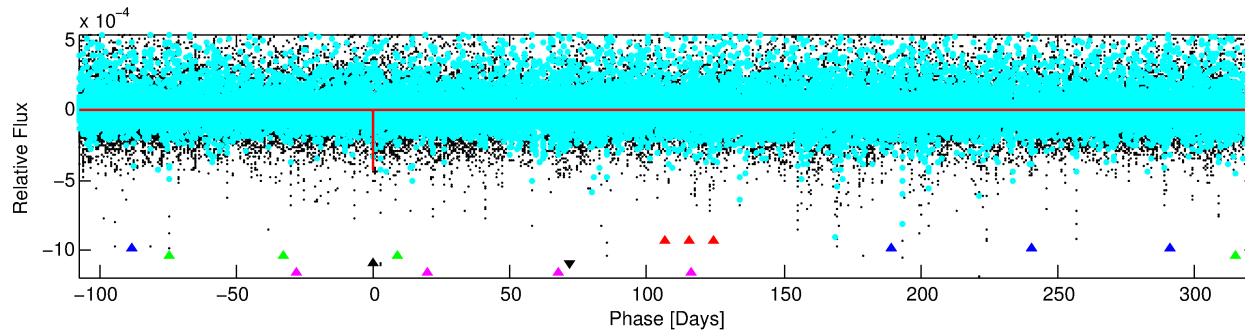
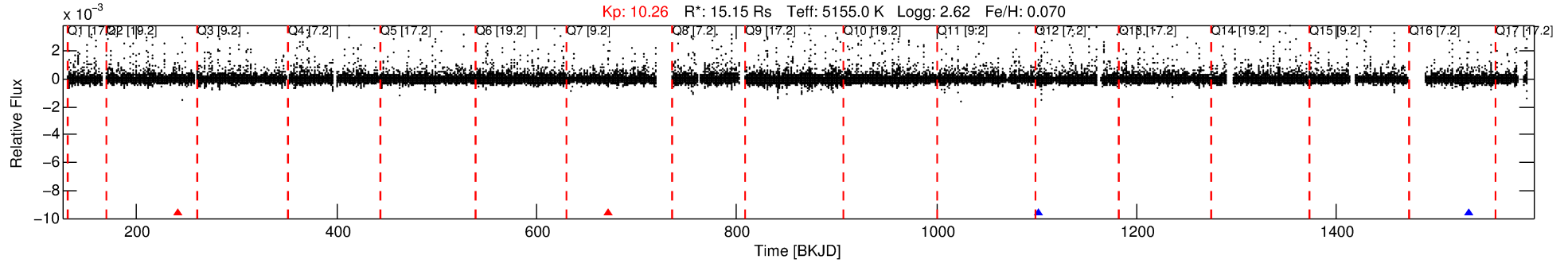
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 010666510-04

No Significant Match Found

# DV One-Page Summary

KIC: 10666510 Candidate: 4 of 5 Period: 430.408 d



## DV Fit Results:

Period = 430.40784 [0.00451] d  
Epoch = 241.6693 [0.0066] BKJD  
Rp/R\* = 0.0208 [0.0426]  
a/R\* = 1029.50 [7961.93]  
b = 0.78 [3.97]  
Self = 50.77 [57.75]  
Teq = 681 [194] K  
Rp = 34.31 [75.02] Re  
a = 1.6913 [1.1993] AU  
Ag = 149.39 [663.69] [0.22 $\sigma$ ]  
Teffp = 3679 [3958] K [0.76 $\sigma$ ]

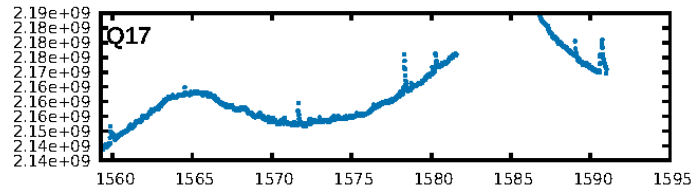
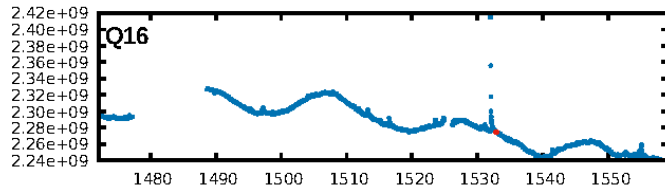
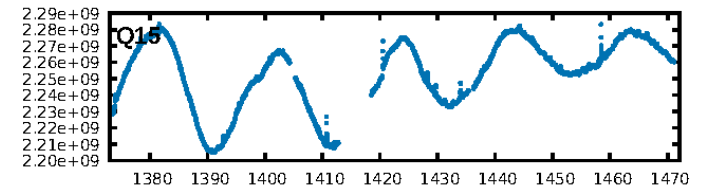
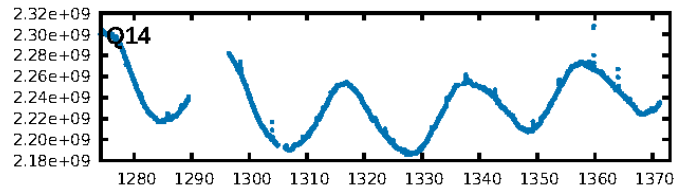
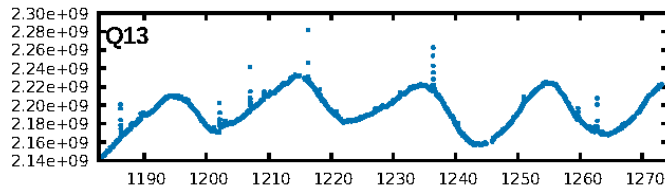
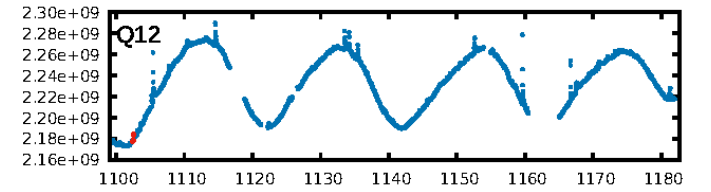
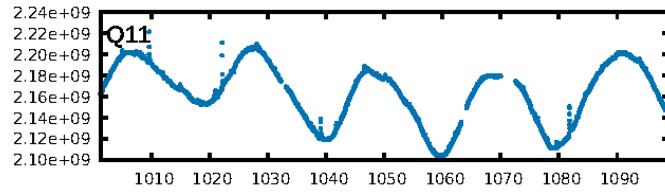
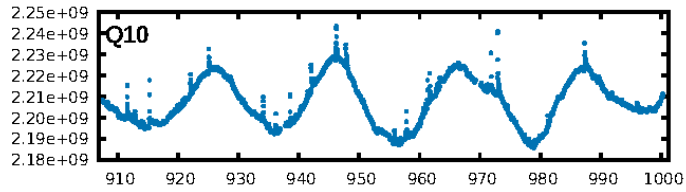
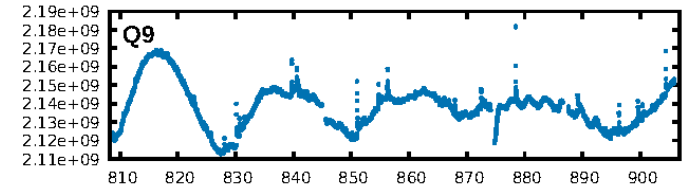
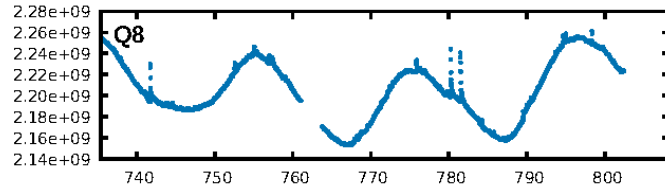
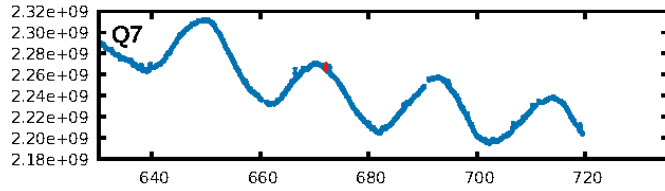
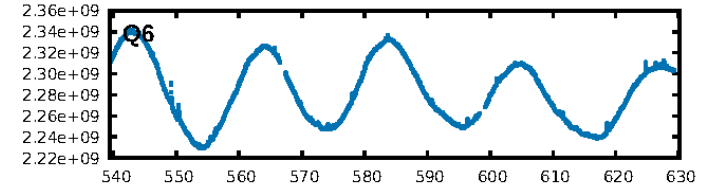
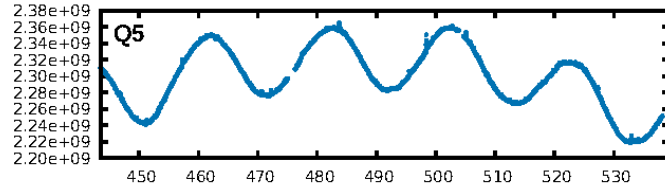
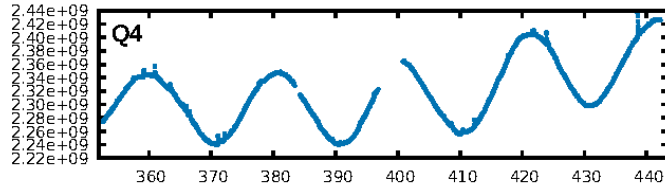
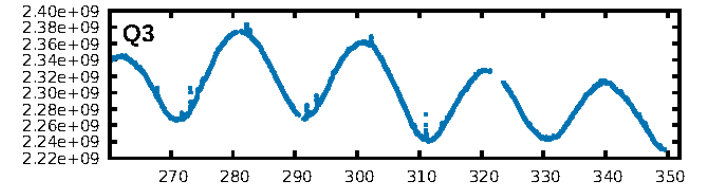
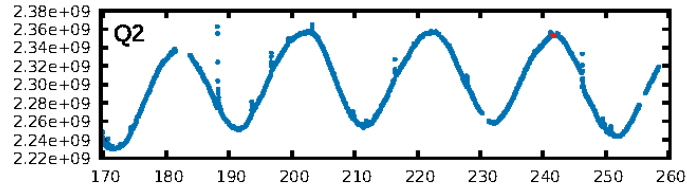
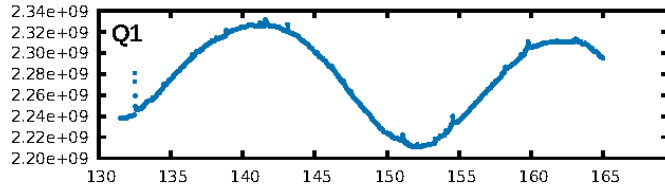
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [37.78 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 18.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 0.50 [2/4]  
GhostDiagnostic-chr: N/A  
Centroid-sig: N/A  
Centroid-so: 2.191 arcsec [3.75 $\sigma$ ]  
OotOffset-rm: 4.156 arcsec [1.04 $\sigma$ ]  
KicOffset-rm: 4.814 arcsec [1.63 $\sigma$ ]  
OotOffset-st: 0/1/2/0 [3]  
KicOffset-st: 0/1/2/0 [3]  
DiffImageQuality-fgm: 0.33 [1/3]  
DiffImageOverlap-fno: 1.00 [4/4]

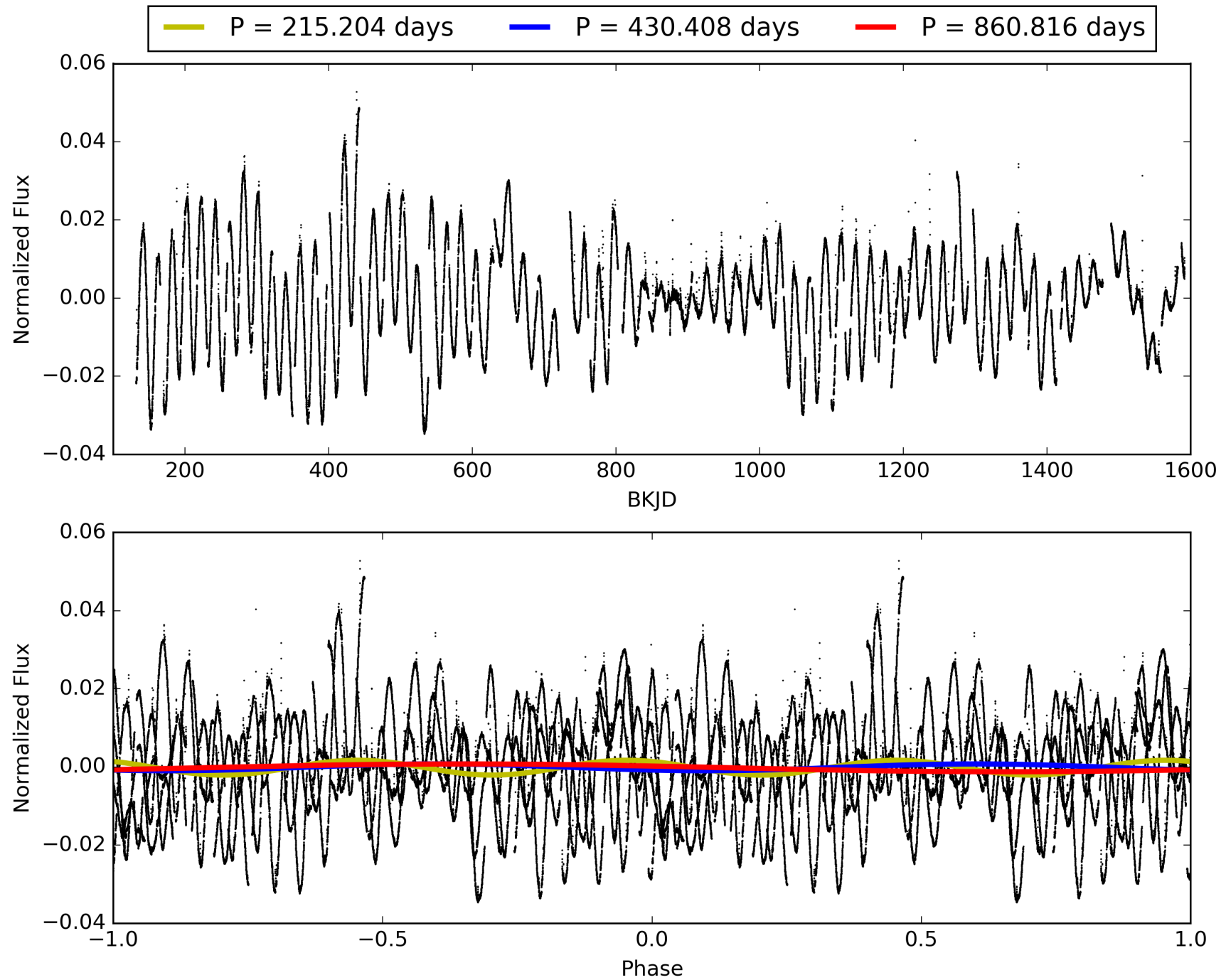
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:31:34 Z

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

# TCE 010666510-04, PDC Light Curves



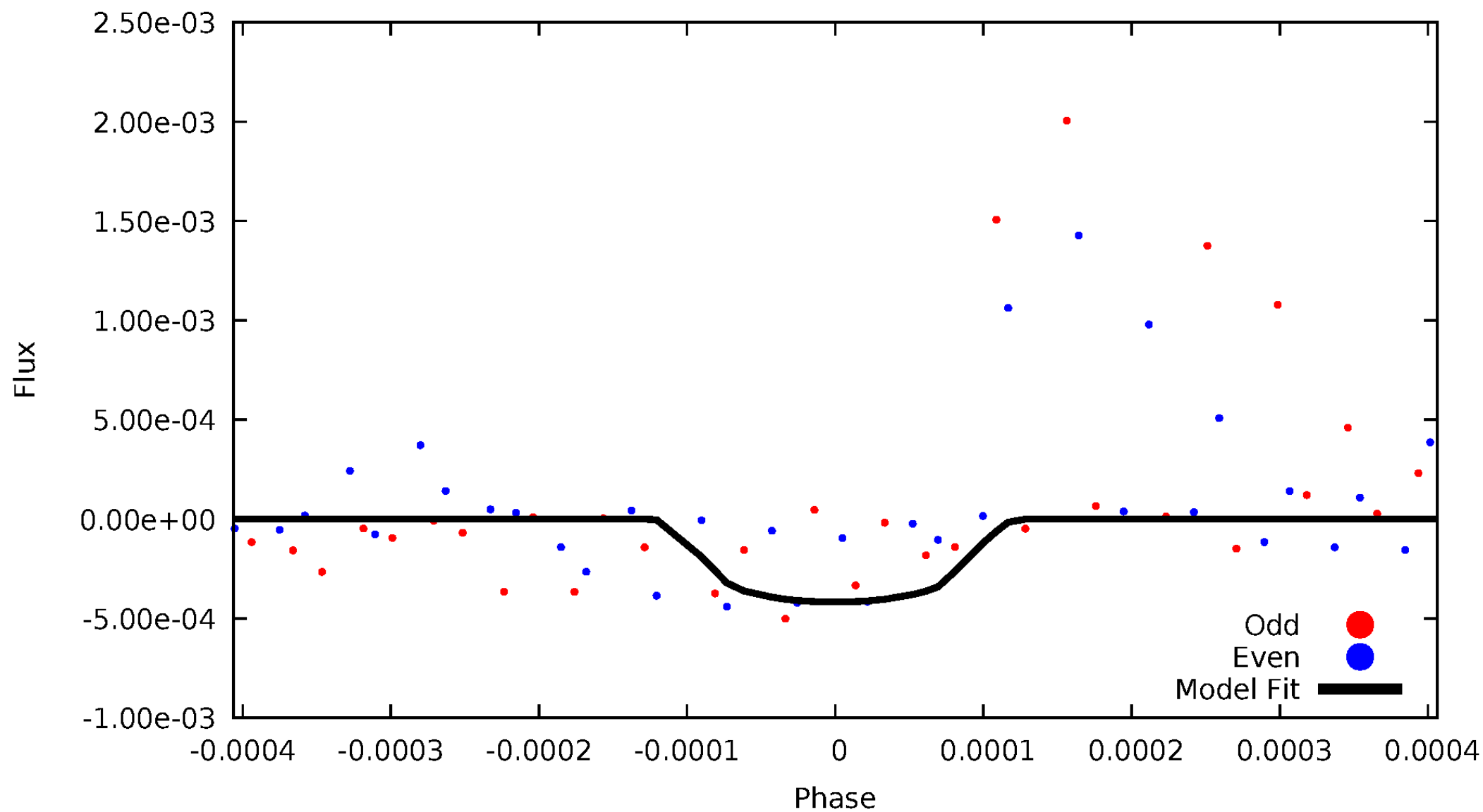
# TCE 010666510-04





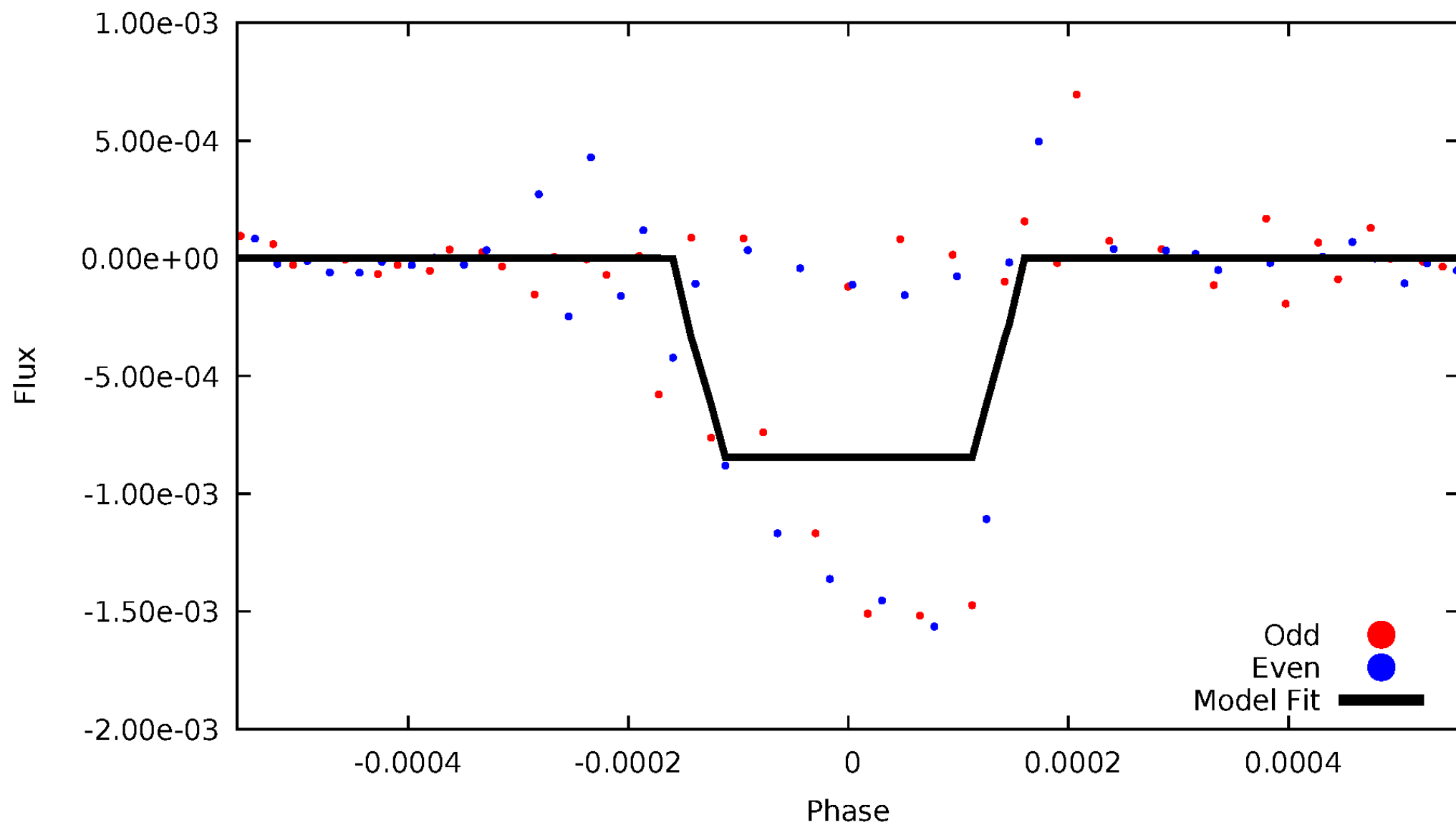
# DV Odd/Even

TCE 010666510-04



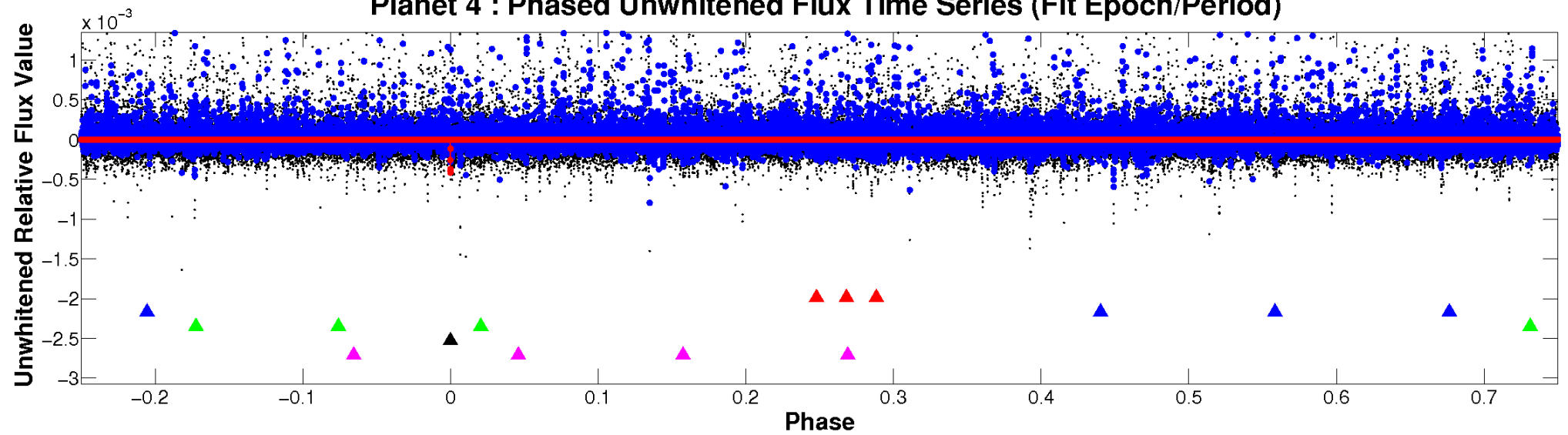
# ALT Odd/Even

TCE 010666510-04

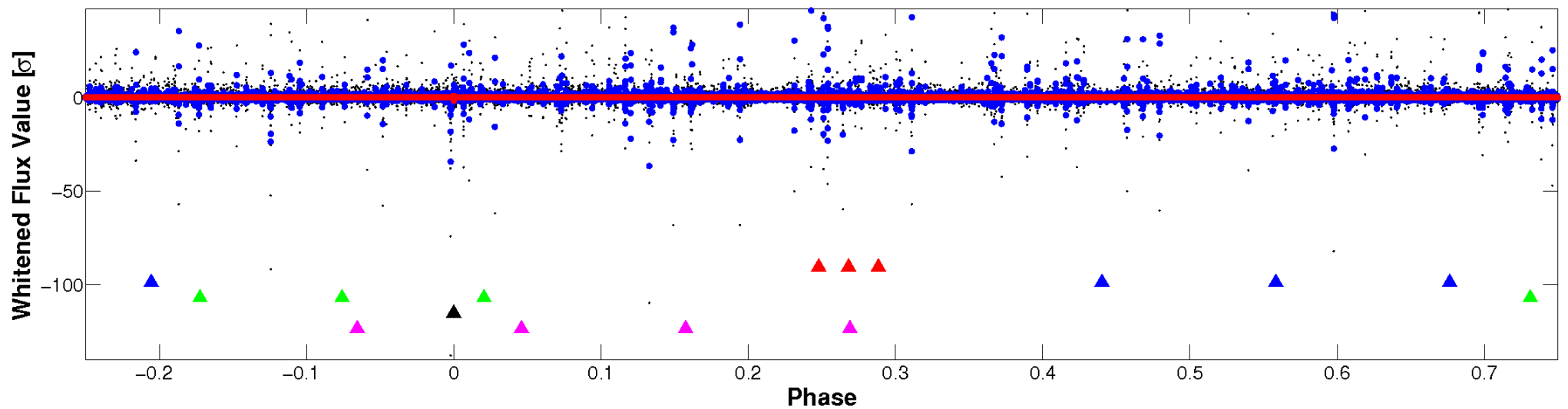


# Non-Whitened Vs. Whitened Light Curve

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

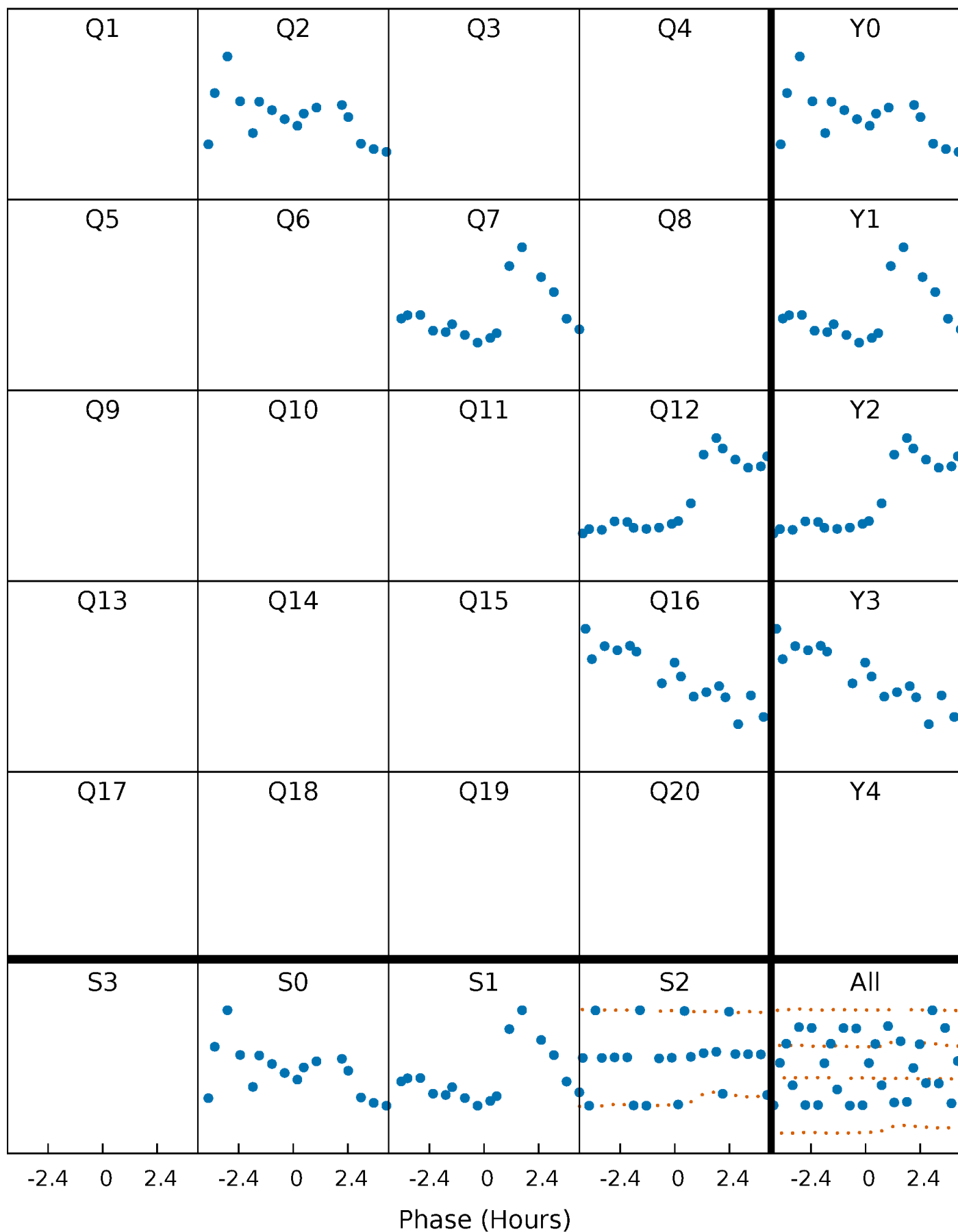


## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



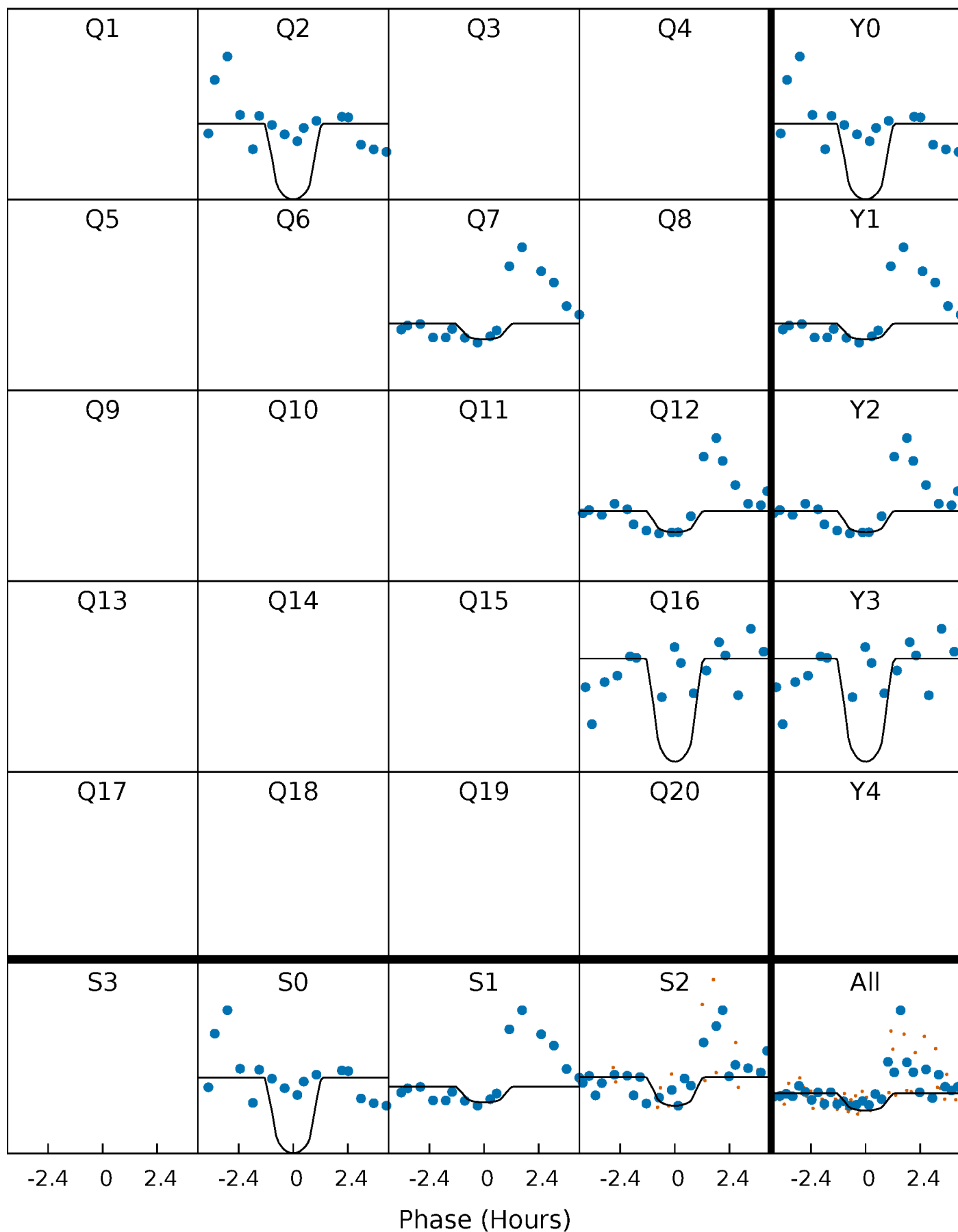
# PDC Quarter-Phased Transit Curves

TCE 010666510-04 P=430.407843 Days  $T_0=241.669278$  (BKJD)



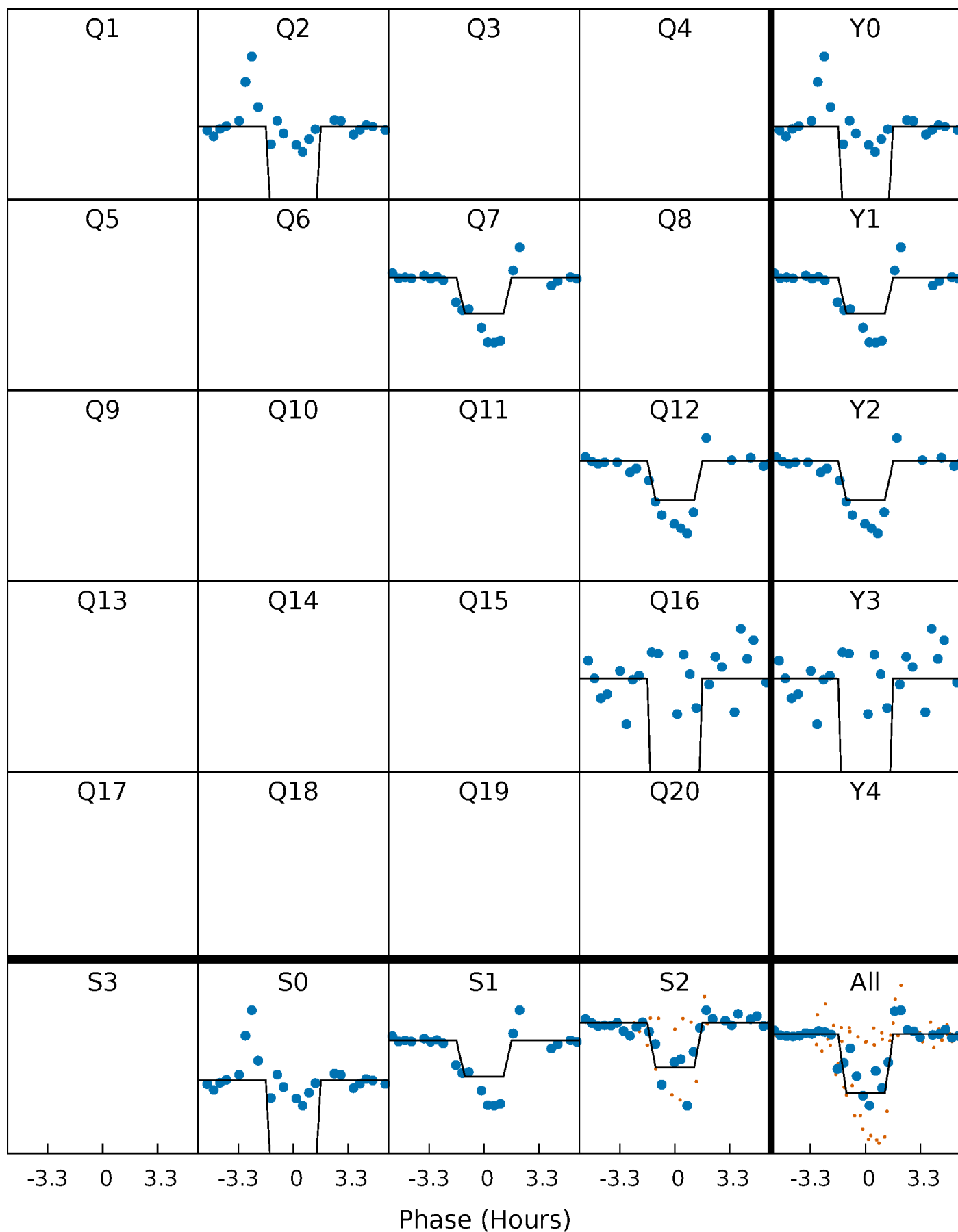
# DV Quarter-Phased Transit Curves

TCE 010666510-04 P=430.407843 Days  $T_0=241.669278$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

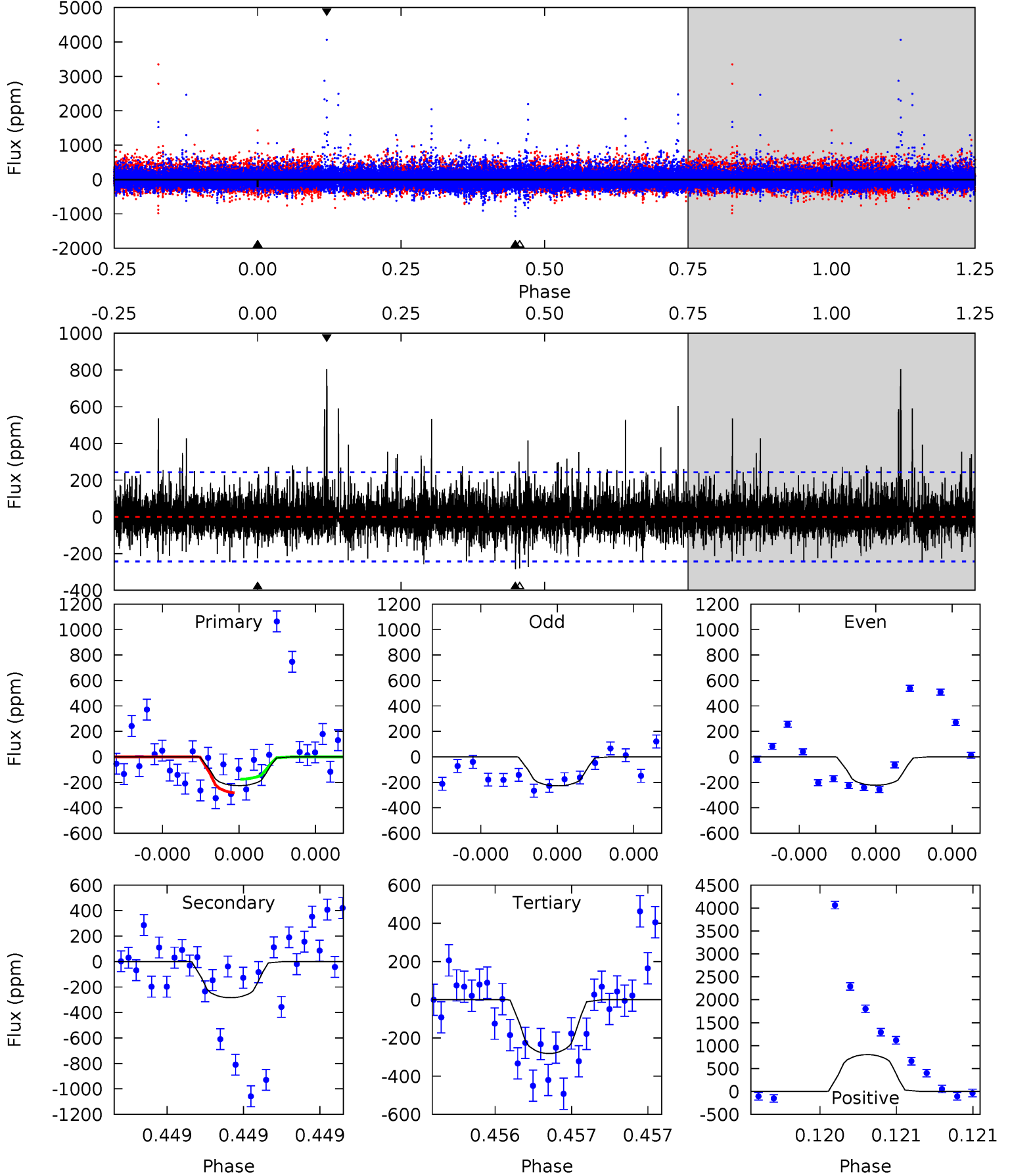
TCE 010666510-04 P=430.405697 Days  $T_0=241.649321$  (BKJD)



# DV Model-Shift Uniqueness Test

010666510-04, P = 430.407843 Days, E = 241.669278 Days

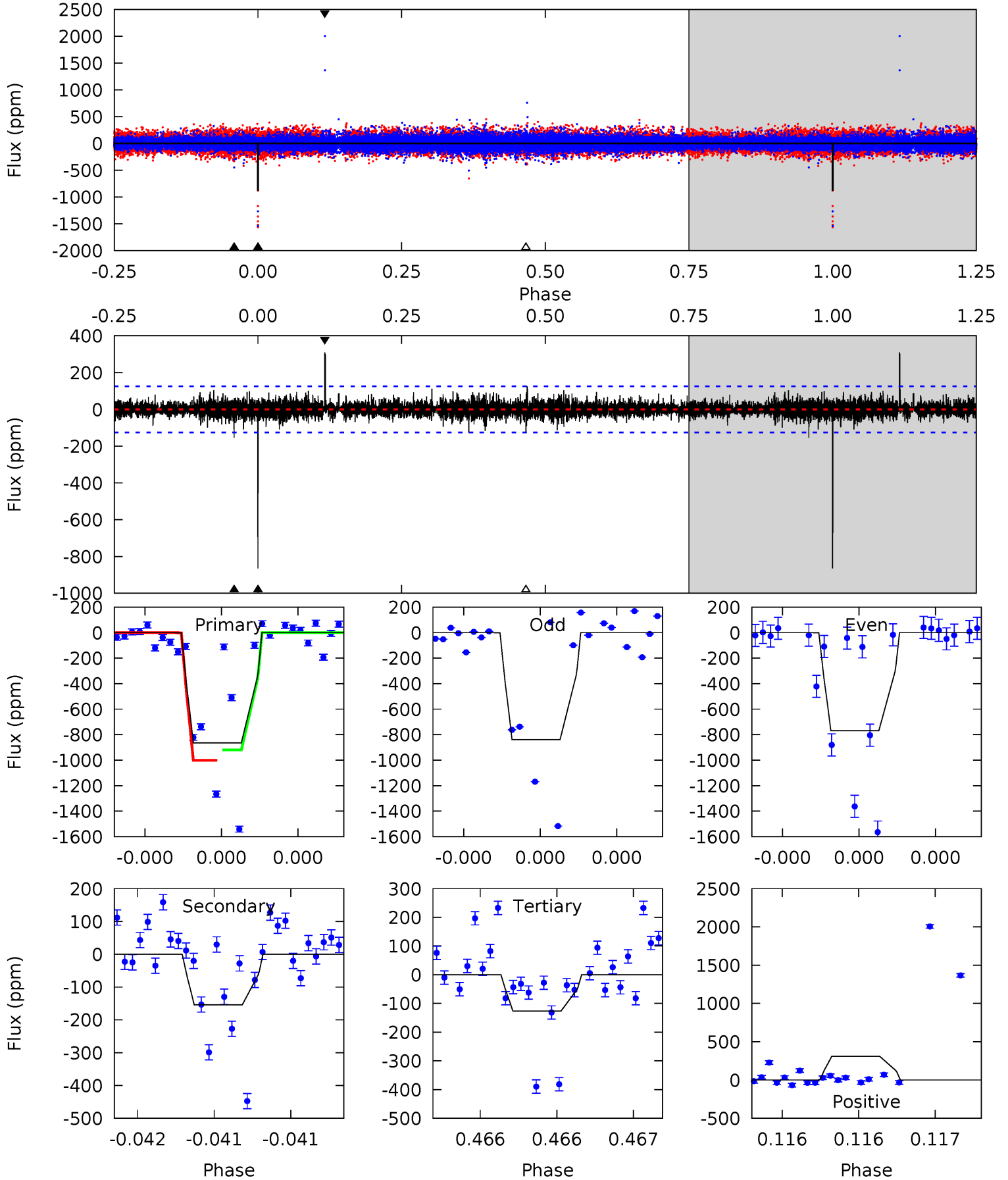
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.30	6.66	6.60	18.8	5.70	3.68	1.72	-1.30	-13.5	0.07	-12.2	0.03	1.07	0.74	1.27



# Alt Model-Shift Uniqueness Test

010666510-04, P = 430.405697 Days, E = 241.649321 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
39.1	6.98	5.73	14.0	5.66	3.61	1.06	33.4	25.1	1.25	-7.00	1.40	0.99	0.26	0





### Stellar Parameters For KIC 010666510

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5155^{+107}_{-250}$	$2.619^{+0.653}_{-0.218}$	$0.070^{+0.150}_{-0.550}$	$15.150^{+3.563}_{-11.400}$	$3.481^{+0.126}_{-2.393}$	$0.001^{+0.022}_{-0.001}$
	+2%/-5%	+25%/-8%	+214%/-786%	+24%/-75%	+4%/-69%	+1530%/-37%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 010666510-04 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-284 \pm 43$	$57.03^{+61.17}_{-41.30}$	$949^{+83}_{-155}$	$3724^{+2264}_{-688}$	$121^{+1418}_{-90}$
Alt.	$-154 \pm 22$	$62.31^{+68.56}_{-41.96}$	$937^{+83}_{-163}$	$3265^{+1342}_{-558}$	$56^{+467}_{-43}$

$T_{max}$  = 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

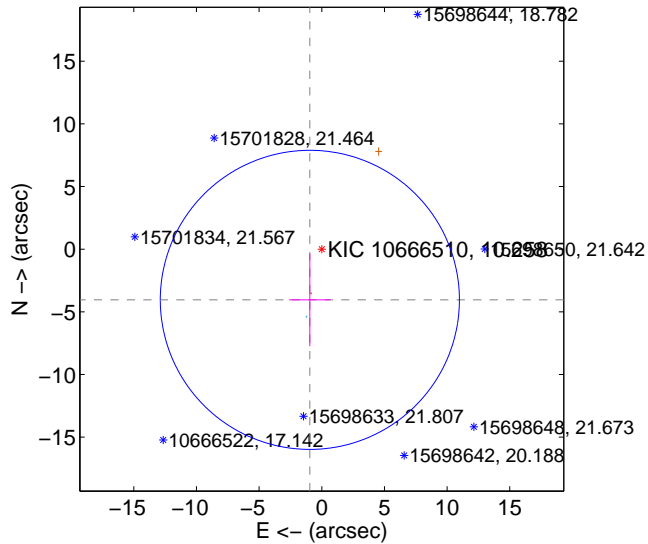
Supplemental centroid analysis for 010666510-04. **Kepler magnitude: 10.26.** Transit SNR 5.56

There are 1 quarters with good PRF difference image offsets

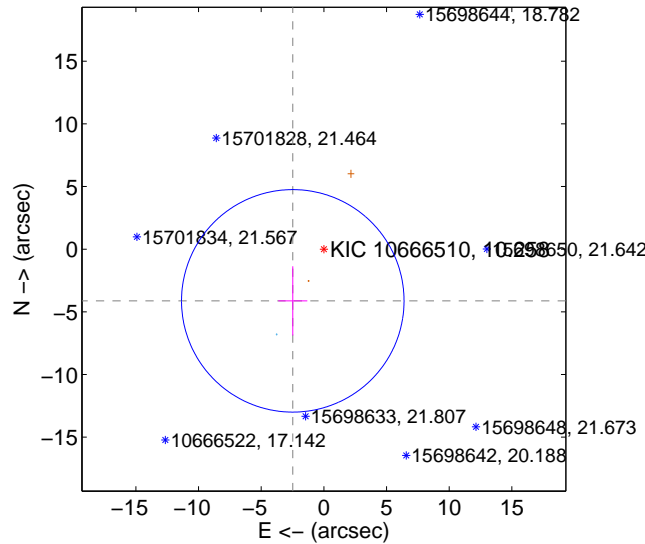
The OOT PRF centroid is offset from the target star catalog position by about 2.97 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$4.156 \pm 3.978$	1.04	$0.953 \pm 1.660$	$-4.045 \pm 3.697$
PRF-fit source offset from KIC position	$4.814 \pm 2.959$	1.63	$2.481 \pm 1.160$	$-4.125 \pm 2.759$
photometric centroid source offset	$2.19 \pm 0.58$	<b>3.75</b>	$2.19 \pm 0.58$	$-0.08 \pm 0.85$

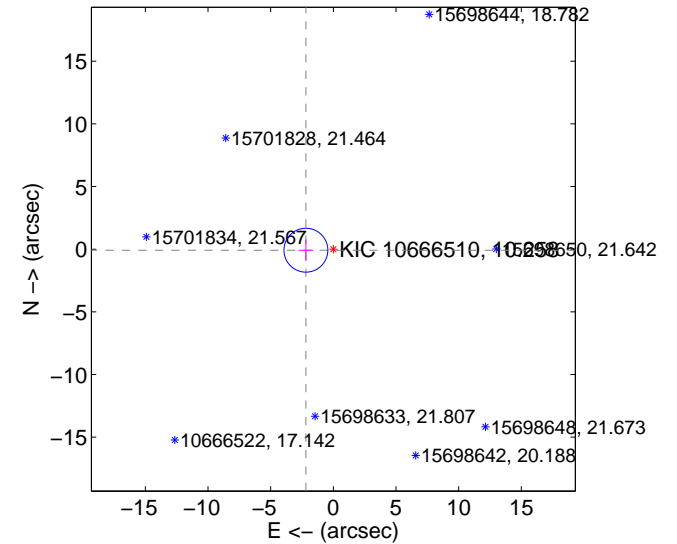
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

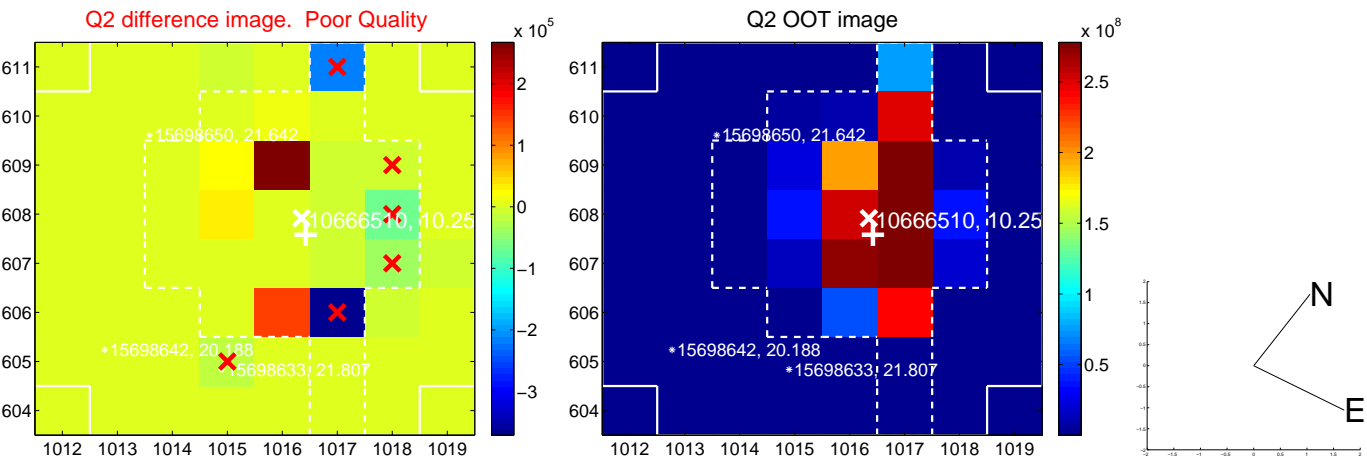


offset from photometric centroids

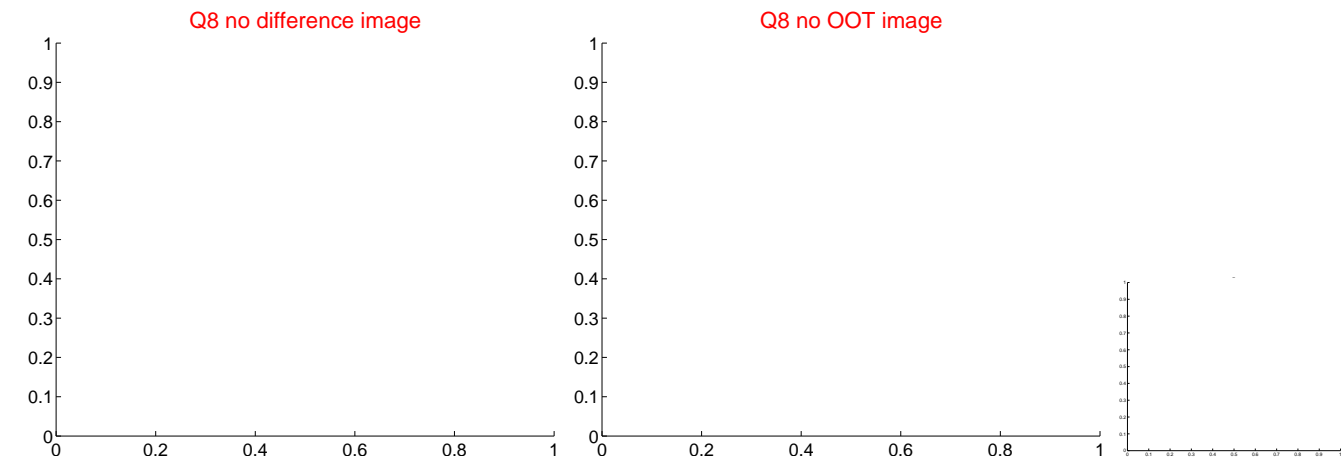
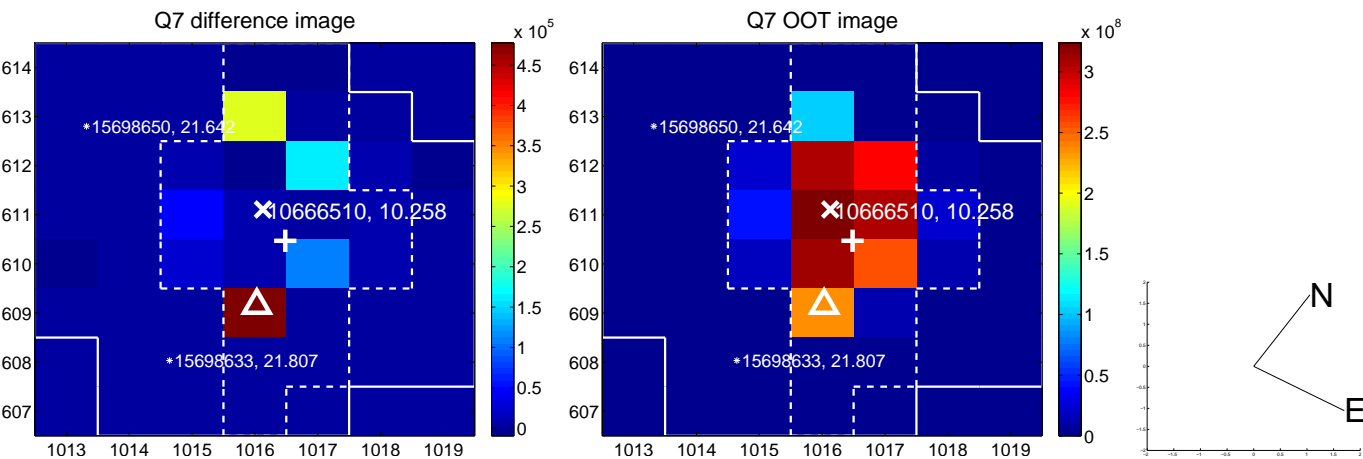


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

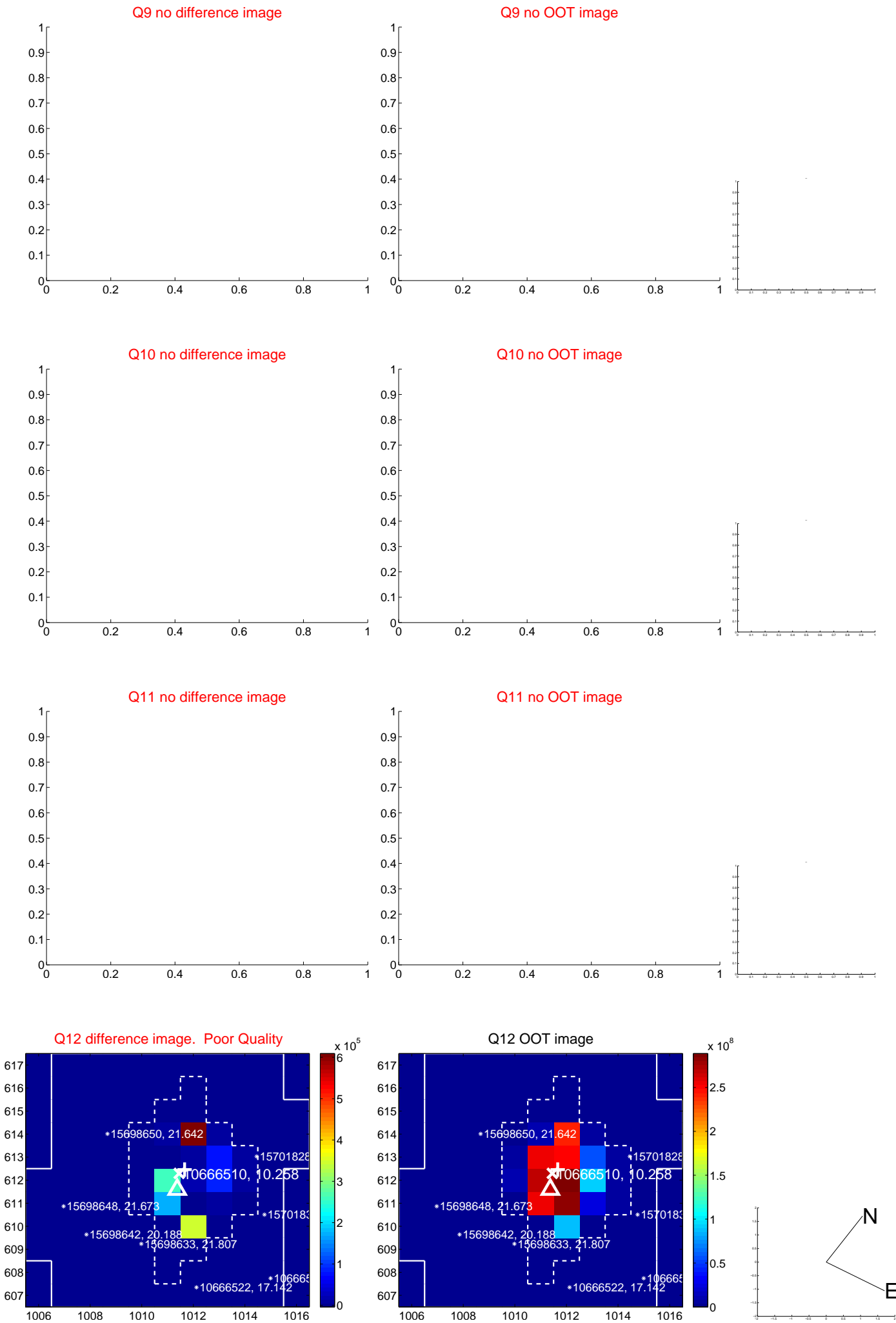
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



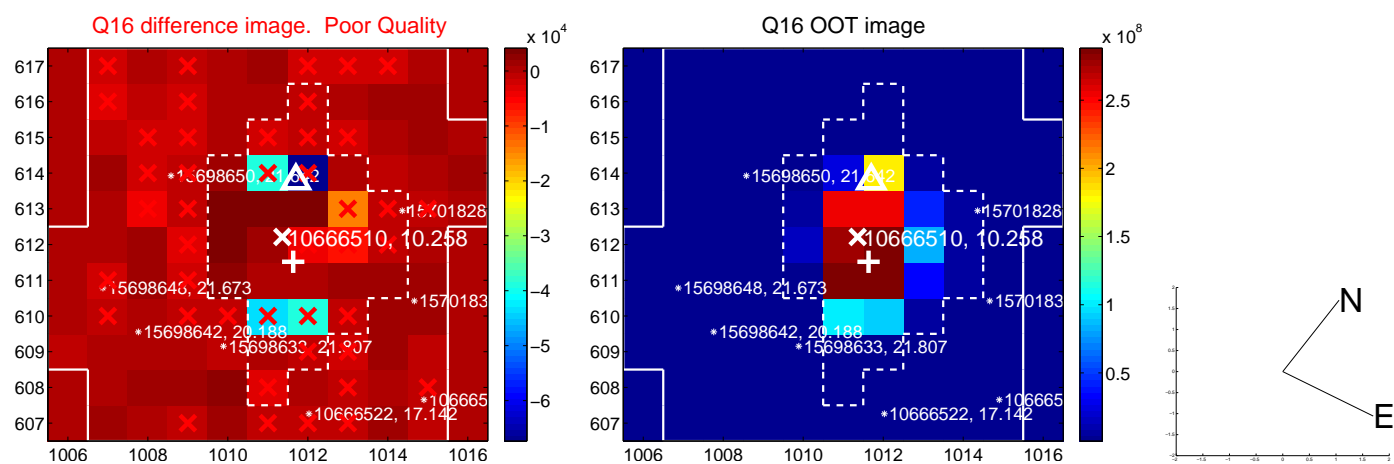
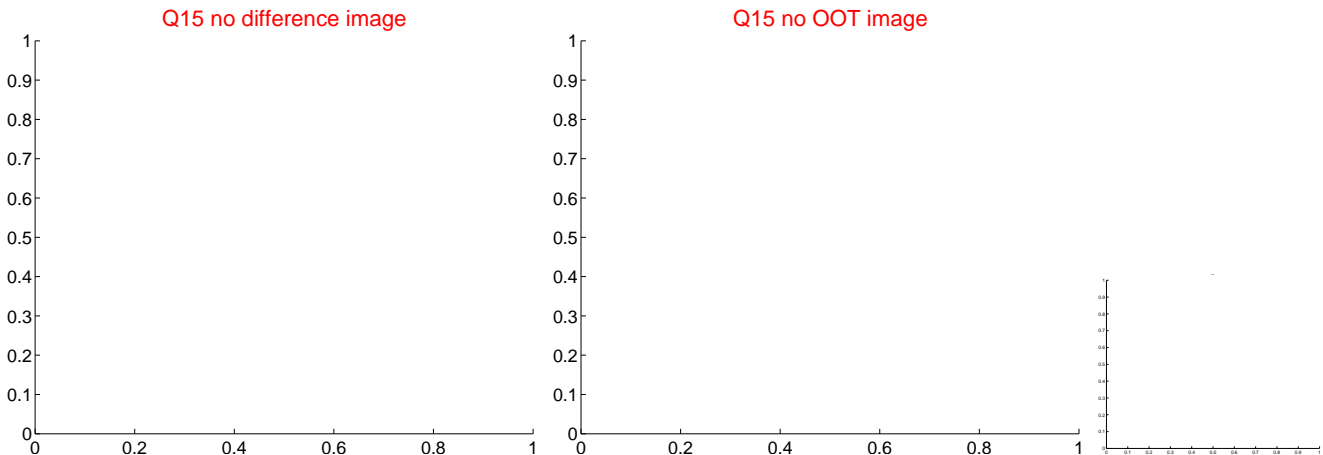
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



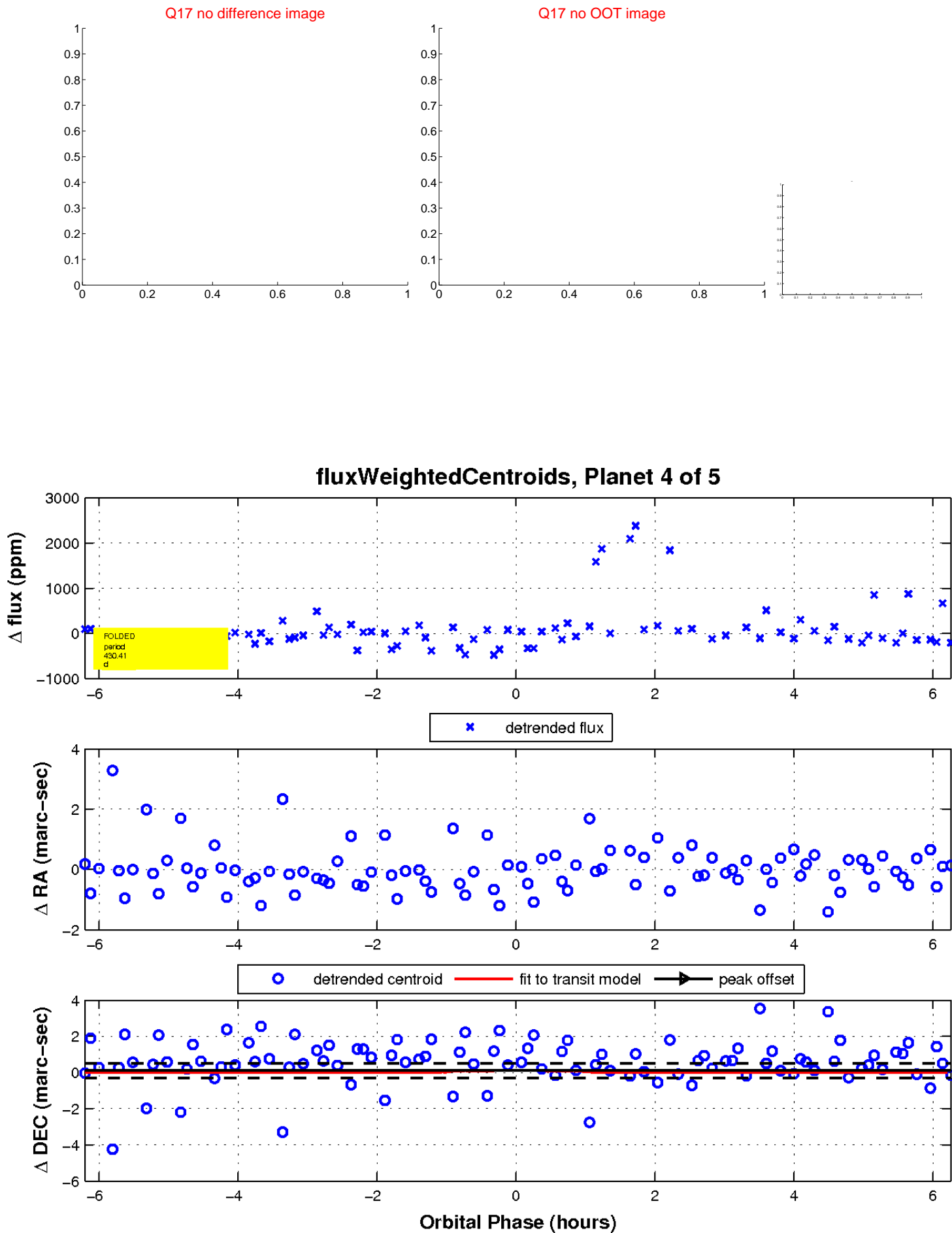
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



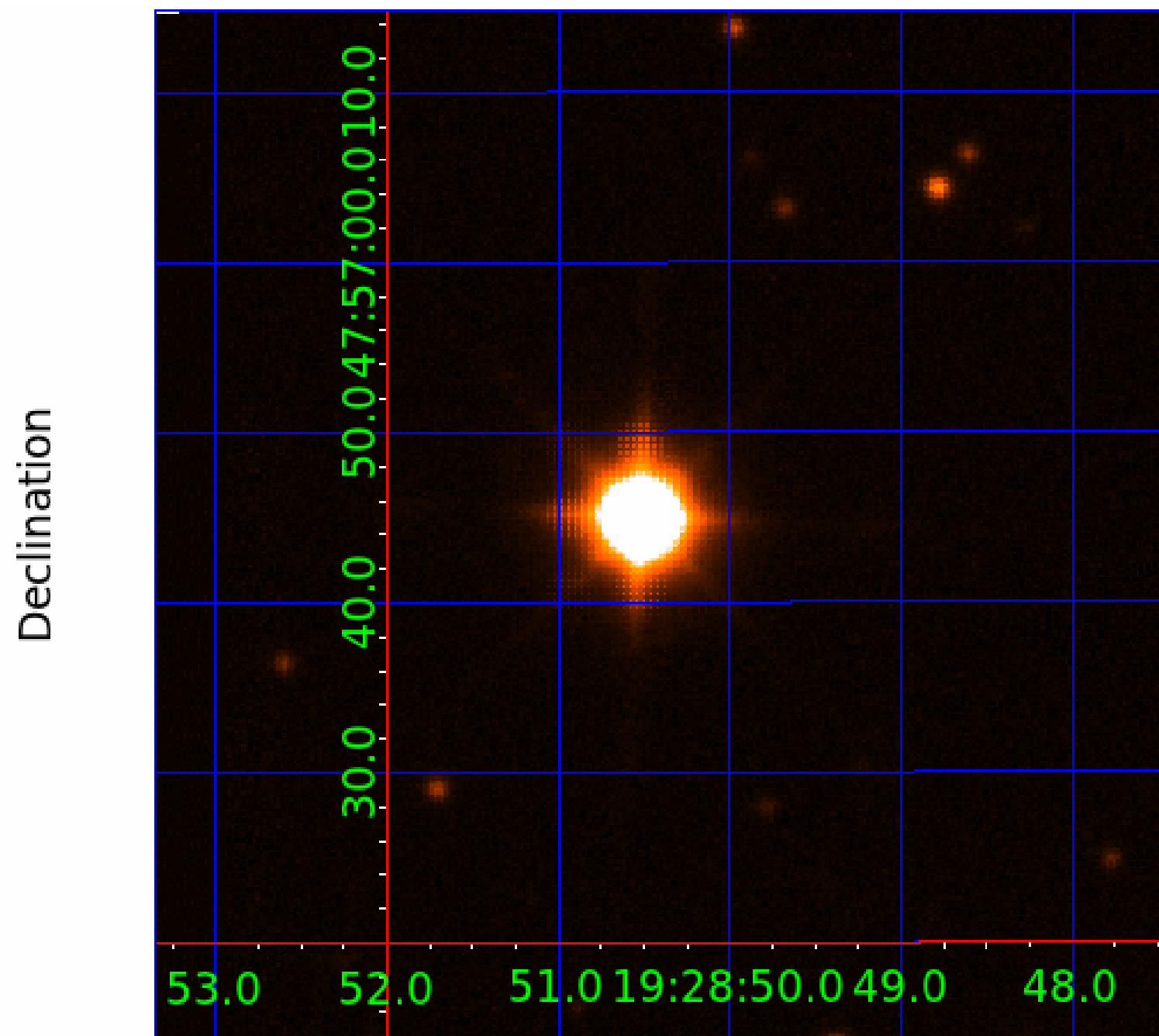
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image





# KIC 010666510

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010666510-01	OBS	No	421.687916	365.815942	931.8	5.128	15.1	9.8	15.15	5155	66.91	52.17
010666510-02	OBS	No	379.586929	153.240185	800.6	3.691	16.7	8.9	15.15	5155	47.35	60.02
010666510-03	OBS	No	388.900666	250.517919	927.2	7.134	14.8	9.4	15.15	5155	60.21	58.12
010666510-04	OBS	No	430.407843	241.669278	417.6	2.098	13.9	5.6	15.15	5155	34.31	50.77
010666510-05	OBS	No	382.409441	357.475831	147.2	3.000	15.1	-1.0	15.15	5155	17.93	59.44

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010666510-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_SATURATED
010666510-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_SATURATED
010666510-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—CENT_SATURATED
010666510-04	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—INCONSISTENT_TRANS—CENT_SATURATED
010666510-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—INCONSISTENT_TRANS—CENT_SATURATED

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

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

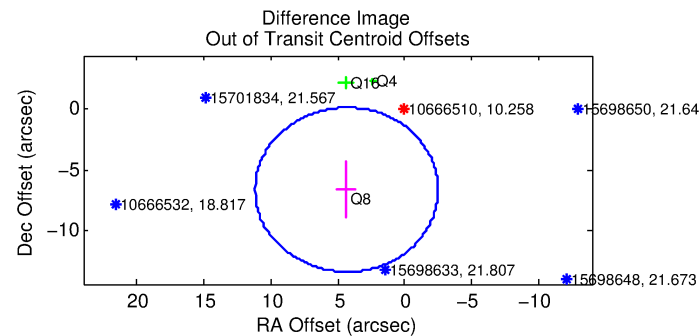
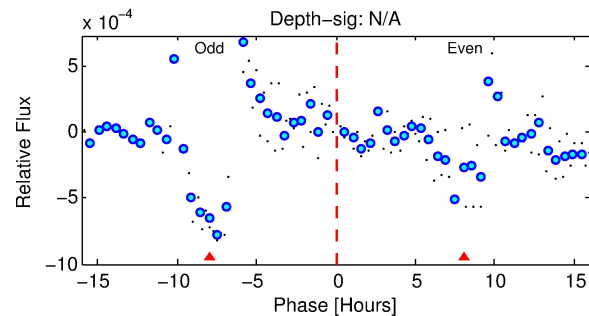
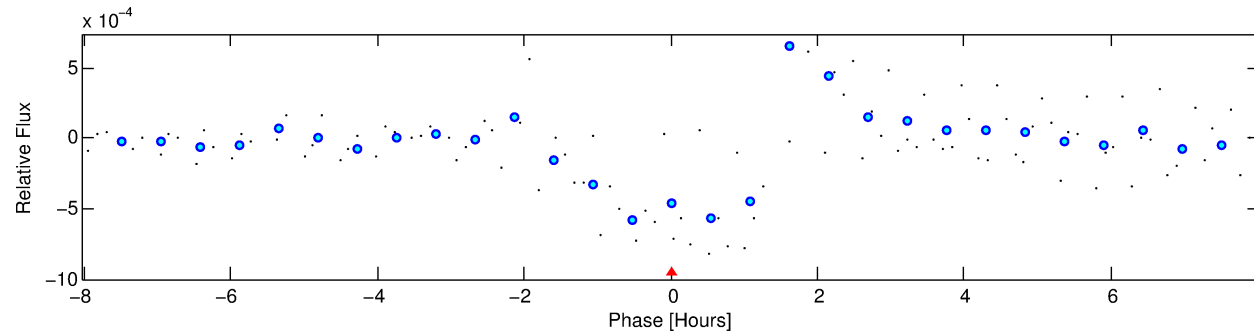
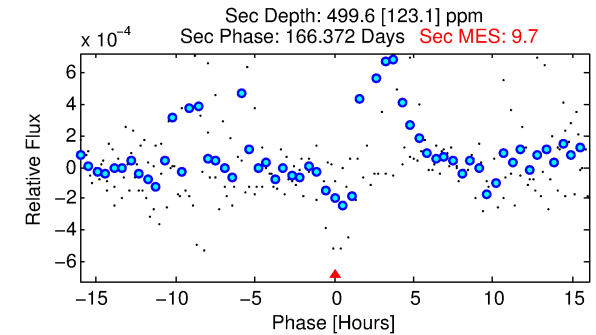
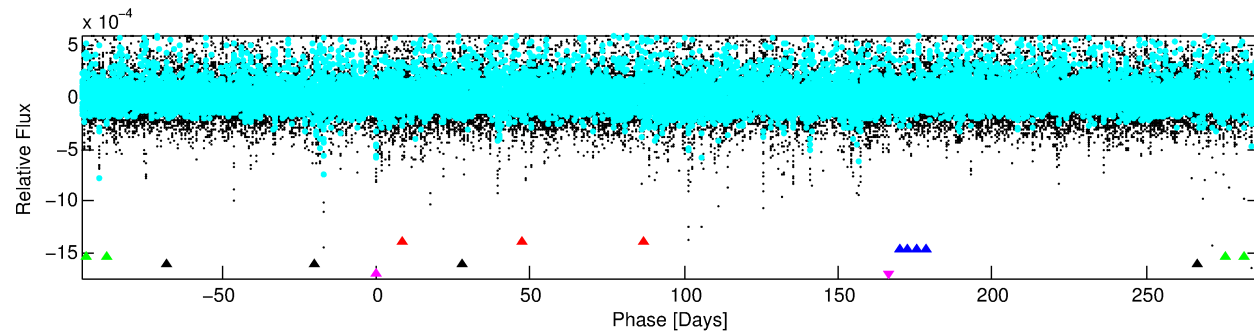
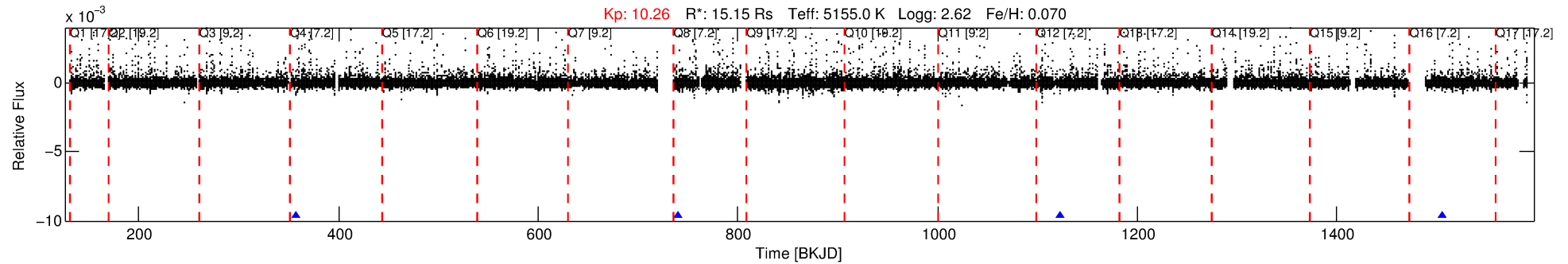
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 010666510-05

No Significant Match Found

# DV One-Page Summary

KIC: 10666510 Candidate: 5 of 5 Period: 382.409 d



## TPS TCE Results:

Period = 382.40944 d  
Epoch = 357.4758 BKJD

DV fit results are unavailable

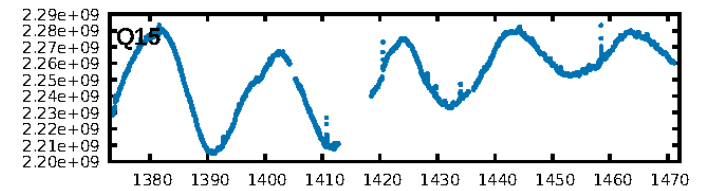
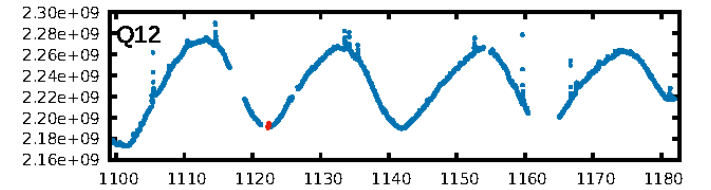
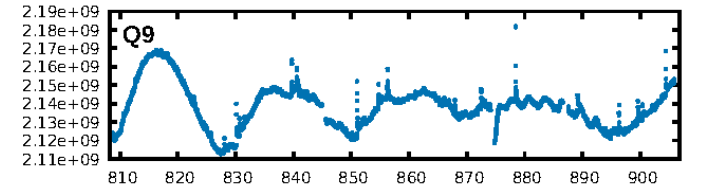
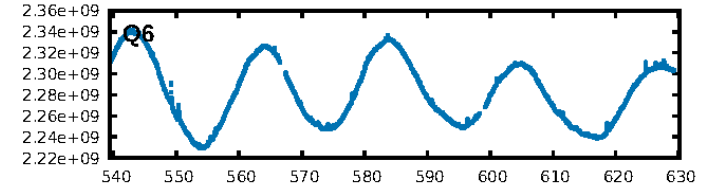
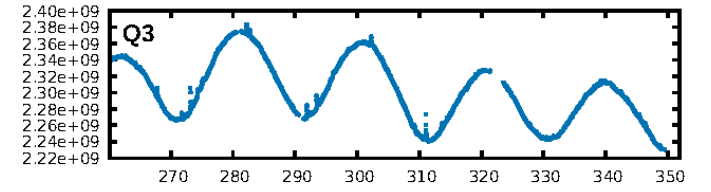
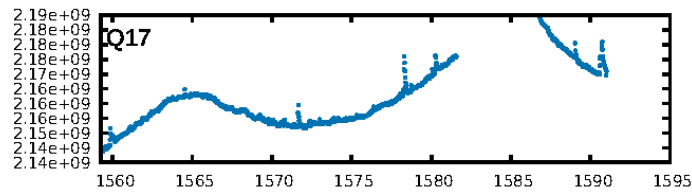
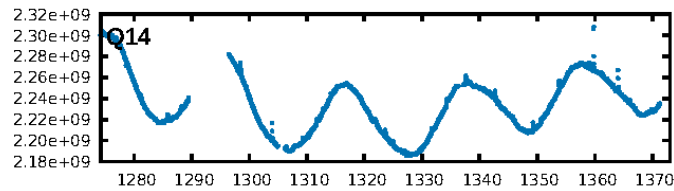
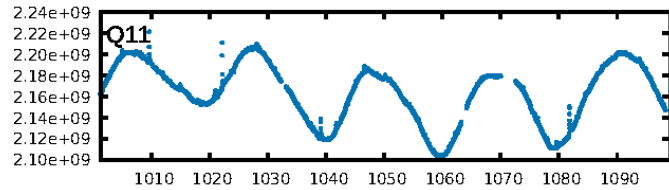
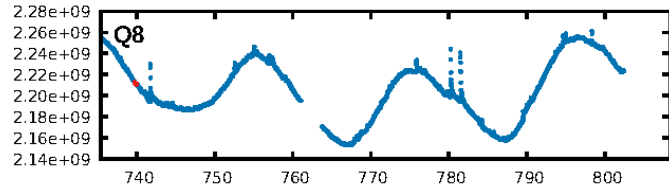
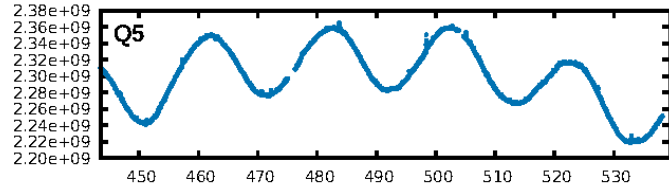
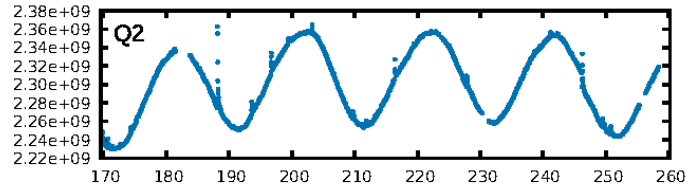
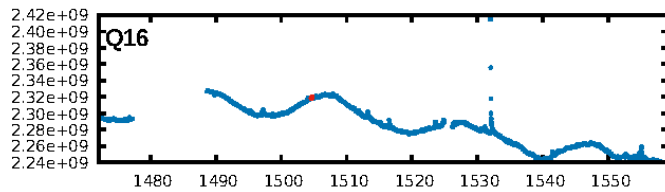
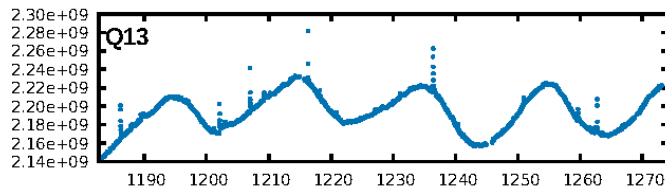
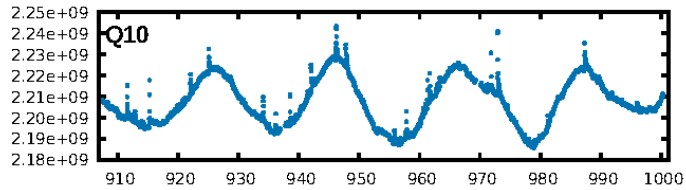
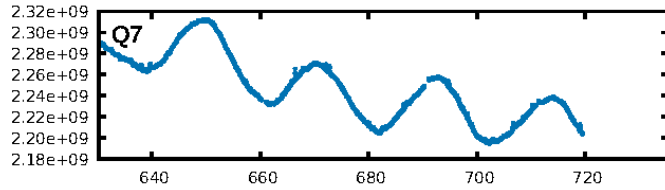
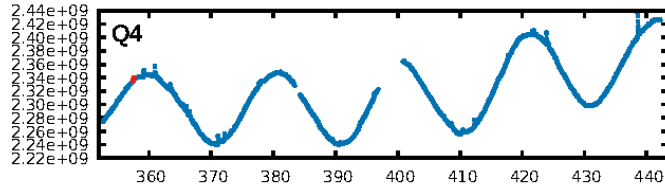
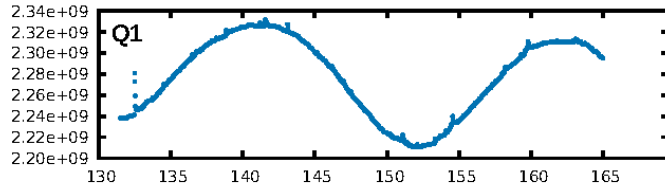
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [14.24 $\sigma$ ]  
LongPeriod-sig: 100.0% [20.13 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: N/A  
Centroid-sig: N/A  
Centroid-so: 1.547 arcsec [5.79 $\sigma$ ]  
OotOffset-rm: 7.941 arcsec [3.49 $\sigma$ ]  
KicOffset-rm: 7.193 arcsec [2.31 $\sigma$ ]  
OotOffset-st: 0/0/3/0 [3]  
KicOffset-st: 0/0/3/0 [3]  
DiffImageQuality-fgm: 0.00 [0/3]  
DiffImageOverlap-fno: 1.00 [3/3]

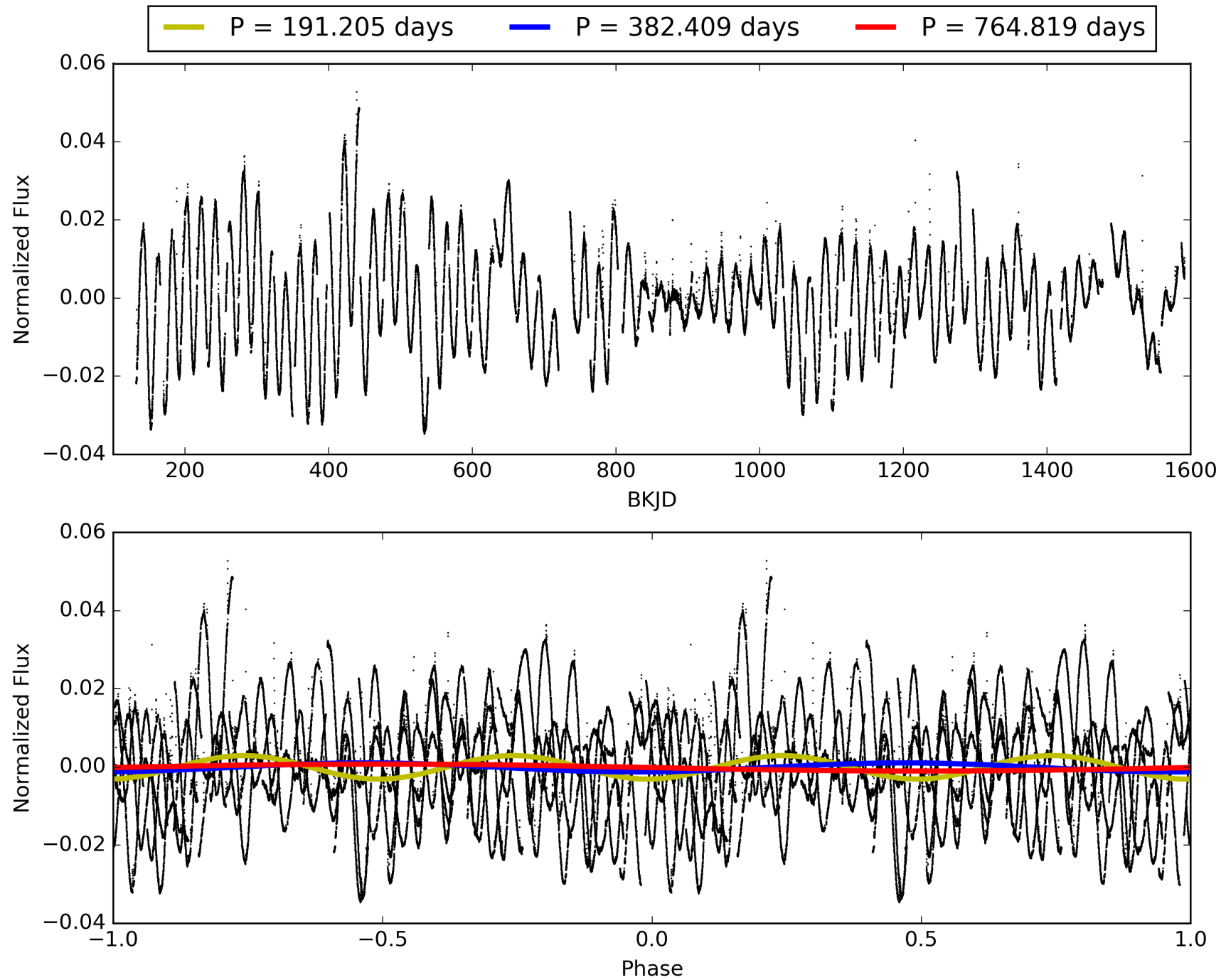
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:31:54 Z

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

# TCE 01066510-05, PDC Light Curves

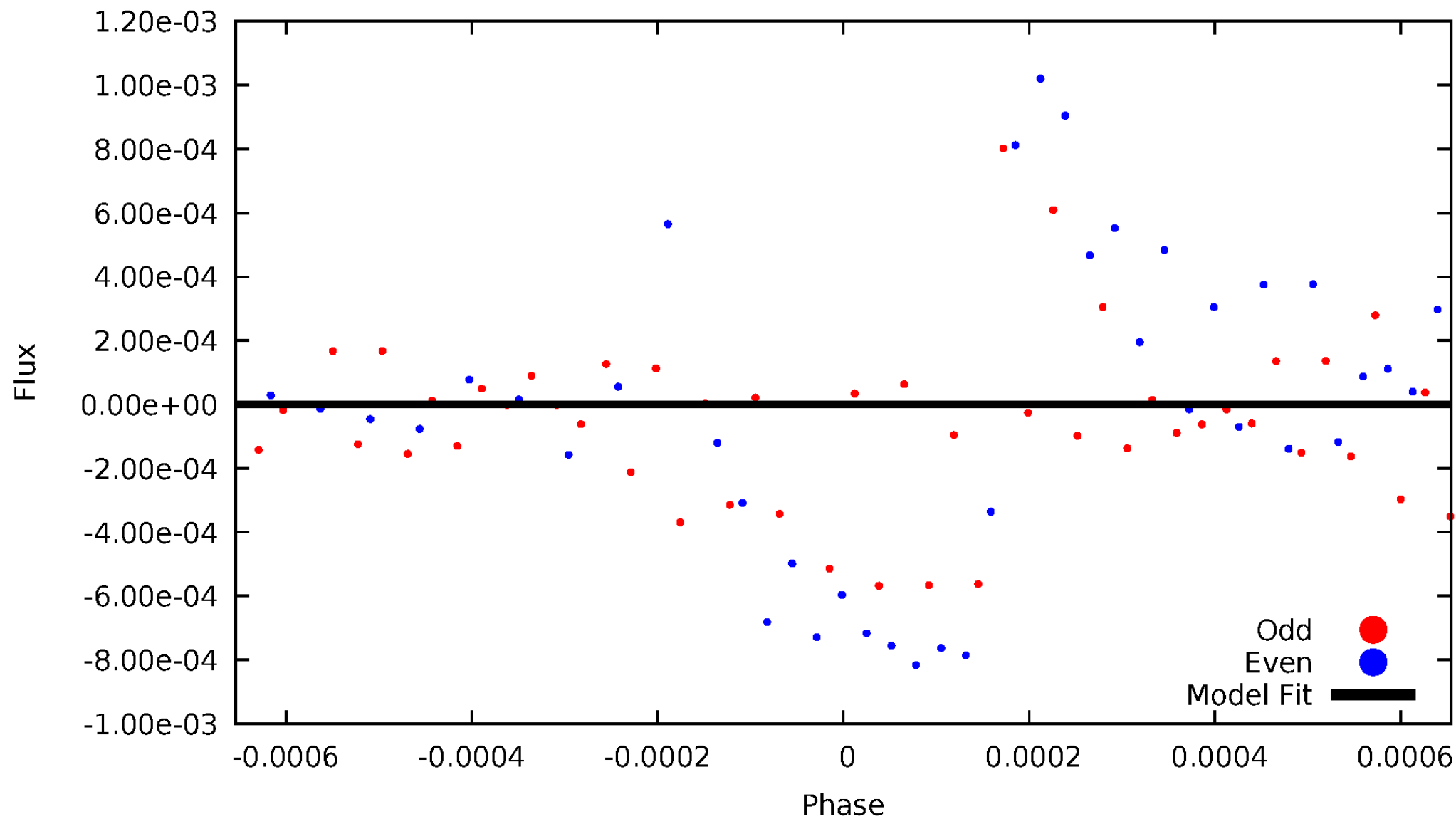


# TCE 010666510-05



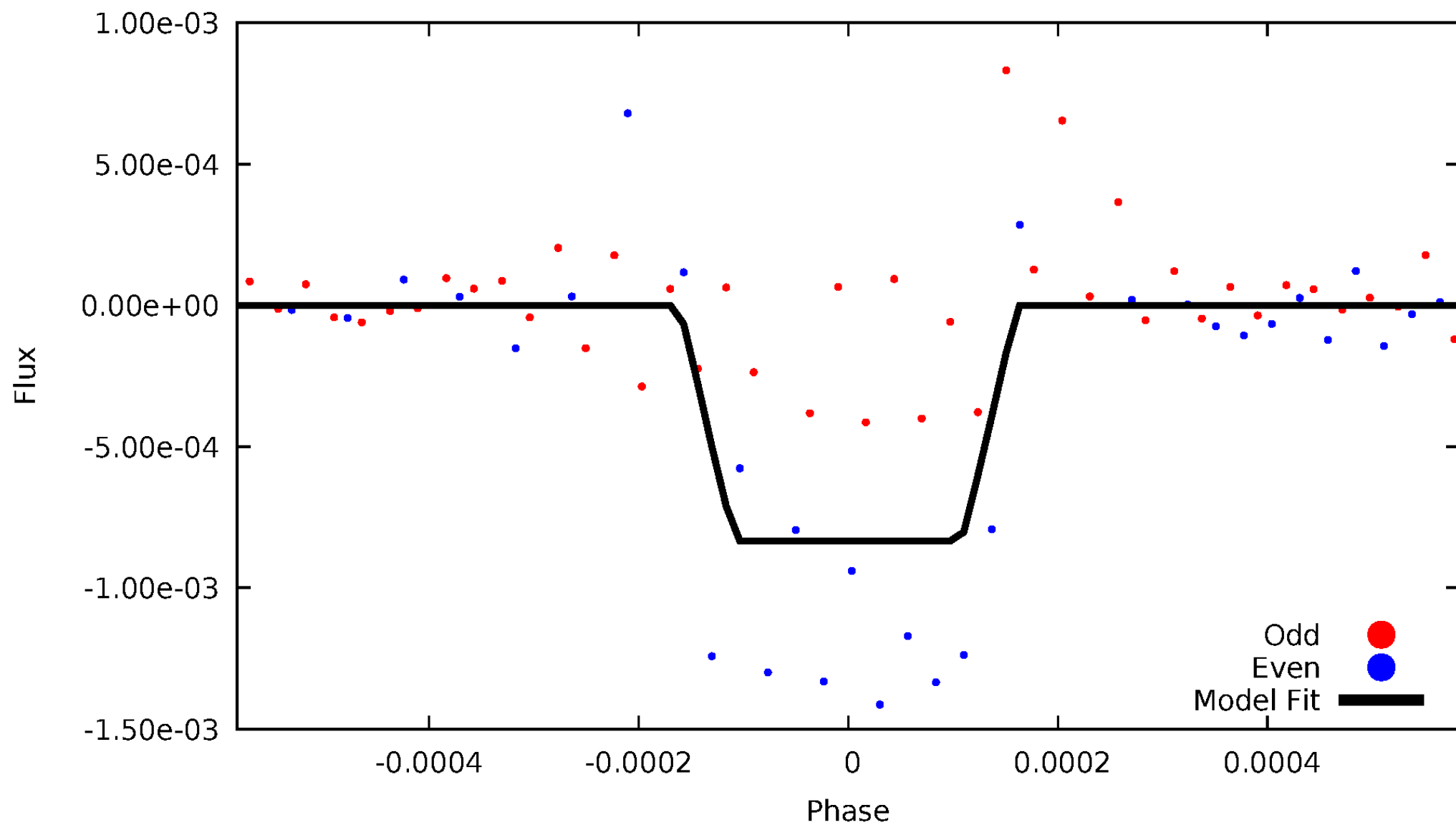
# DV Odd/Even

TCE 010666510-05



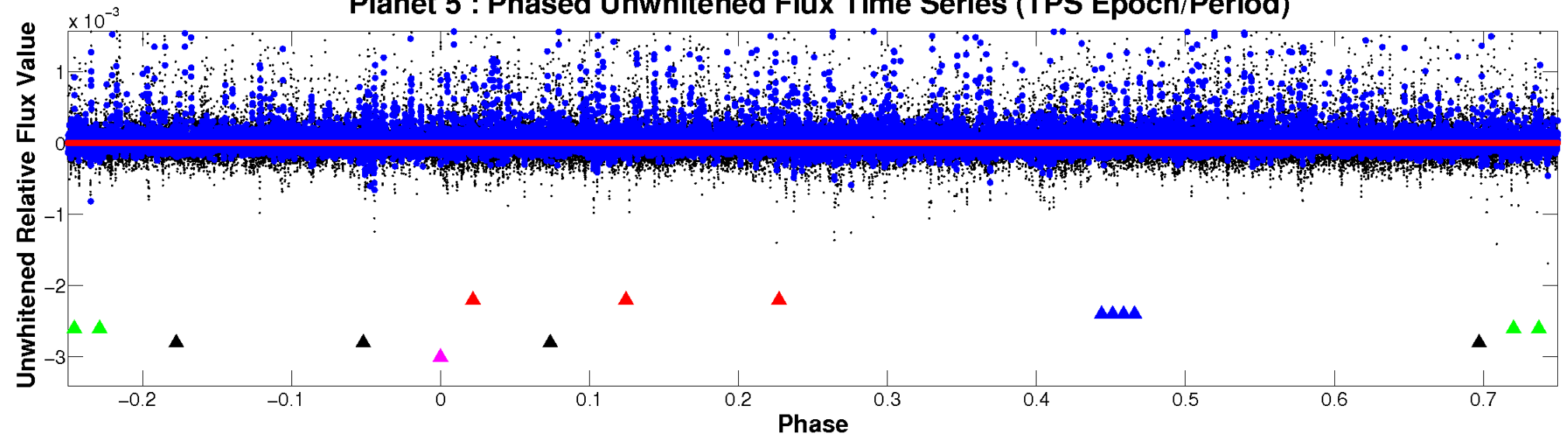
# ALT Odd/Even

TCE 010666510-05



# Non-Whitened Vs. Whitened Light Curve

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

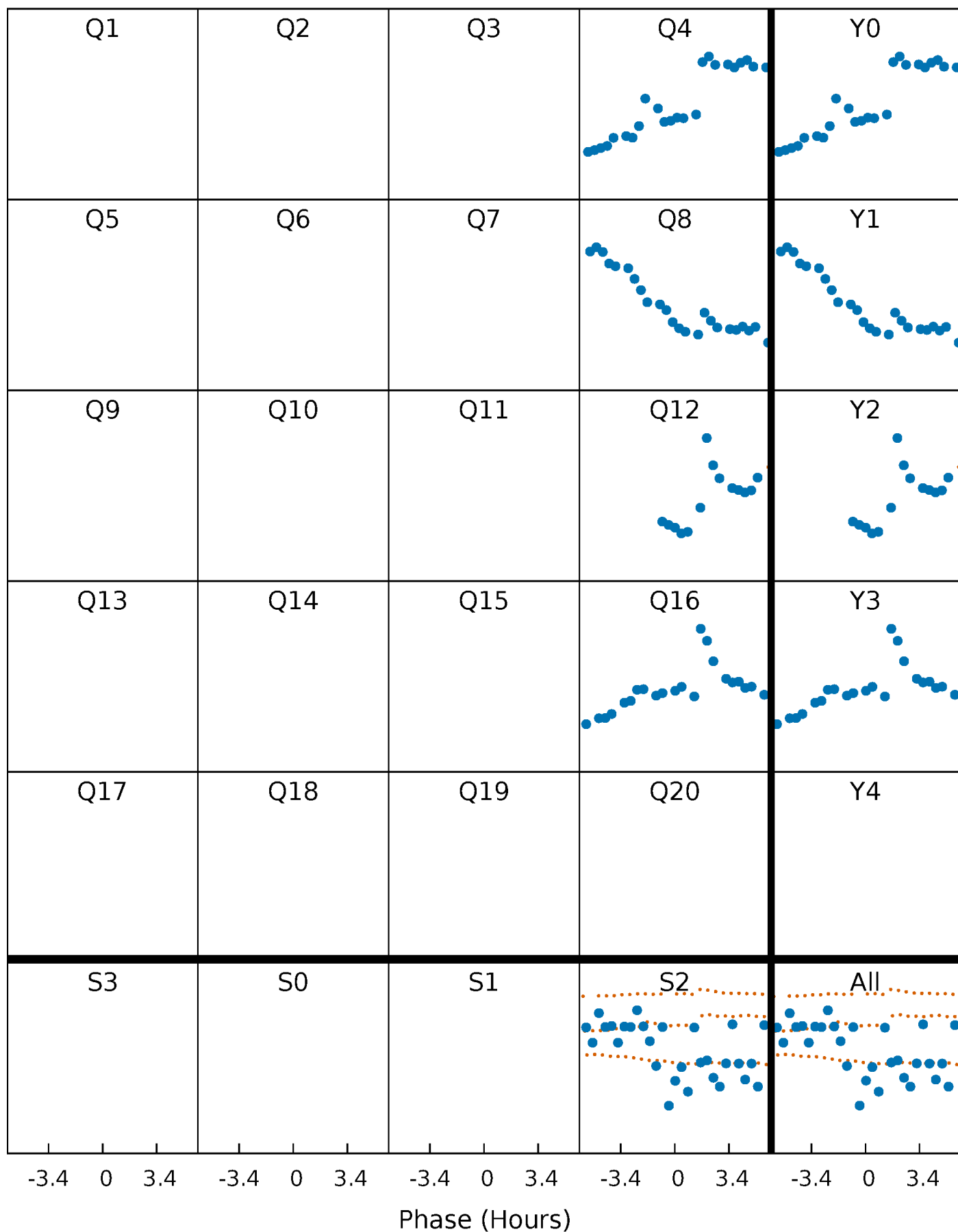


**Planet 5 : Phased Whitened Flux Time Series (TPS Epoch/Period)**



# PDC Quarter-Phased Transit Curves

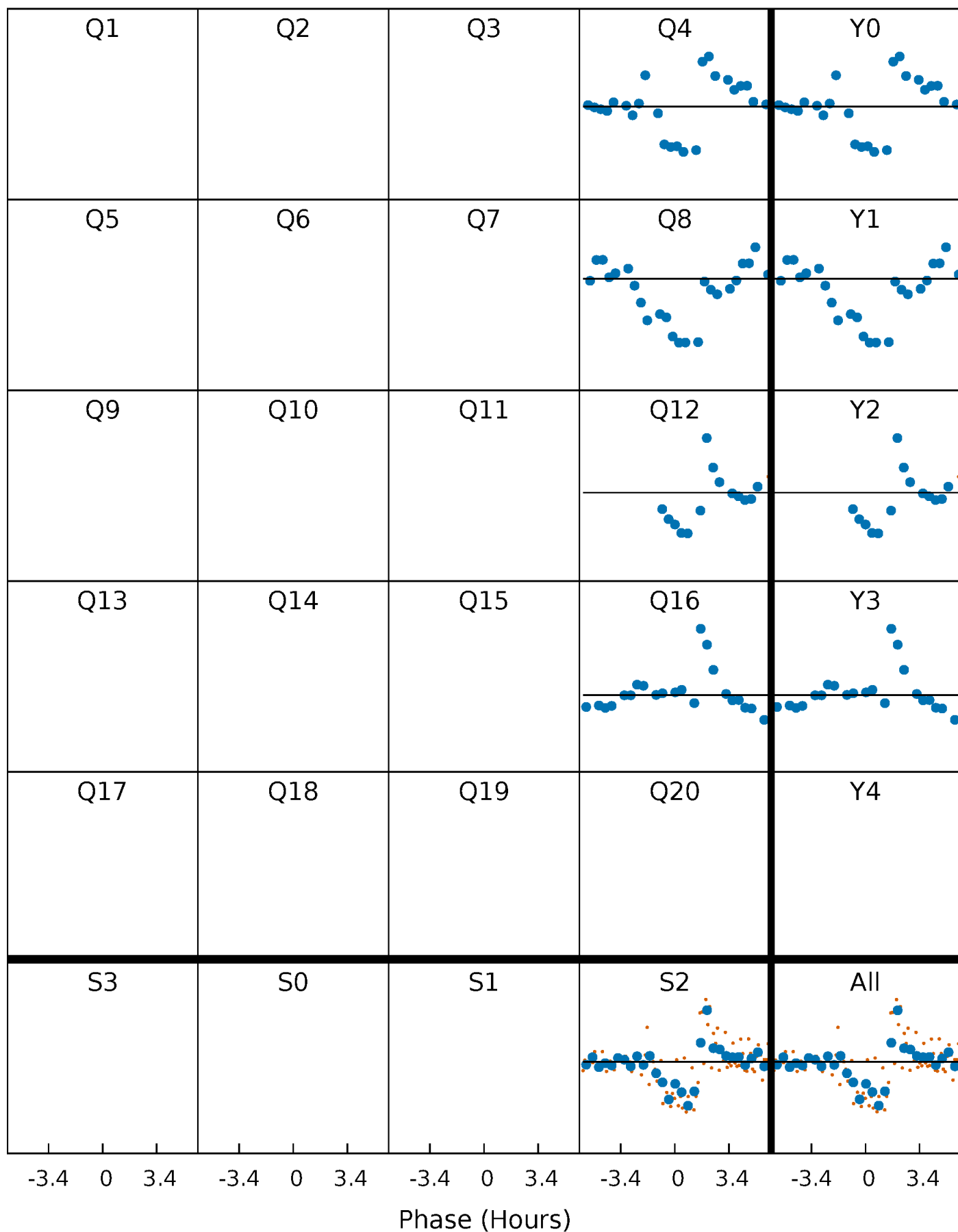
TCE 010666510-05     $P=382.409441$  Days     $T_0=357.475831$  (BKJD)





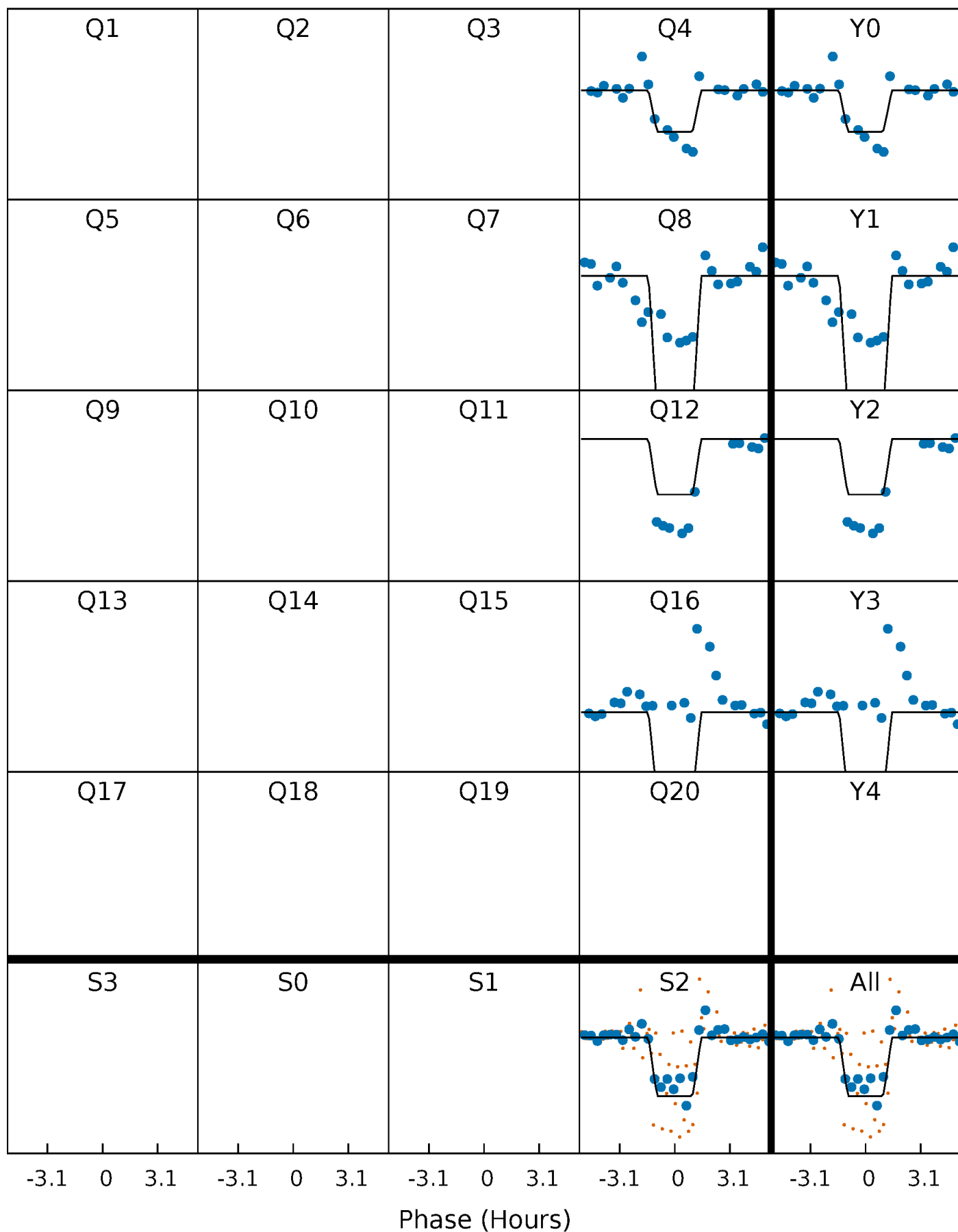
# DV Quarter-Phased Transit Curves

TCE 010666510-05     $P=382.409441$  Days     $T_0=357.475831$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

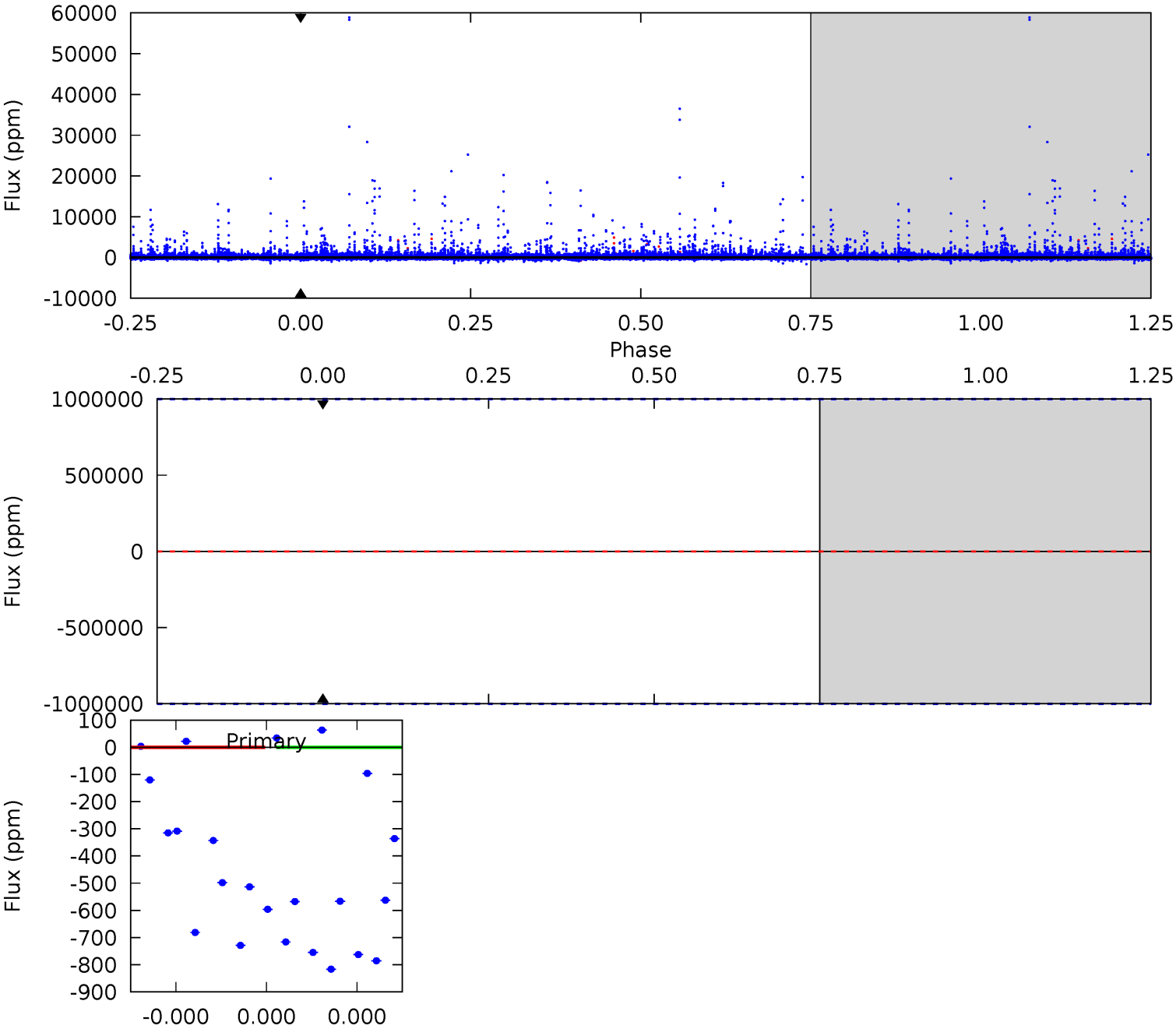
TCE 010666510-05 P=382.409441 Days  $T_0=357.484116$  (BKJD)



# DV Model-Shift Uniqueness Test

010666510-05, P = 382.409441 Days, E = 357.475831 Days

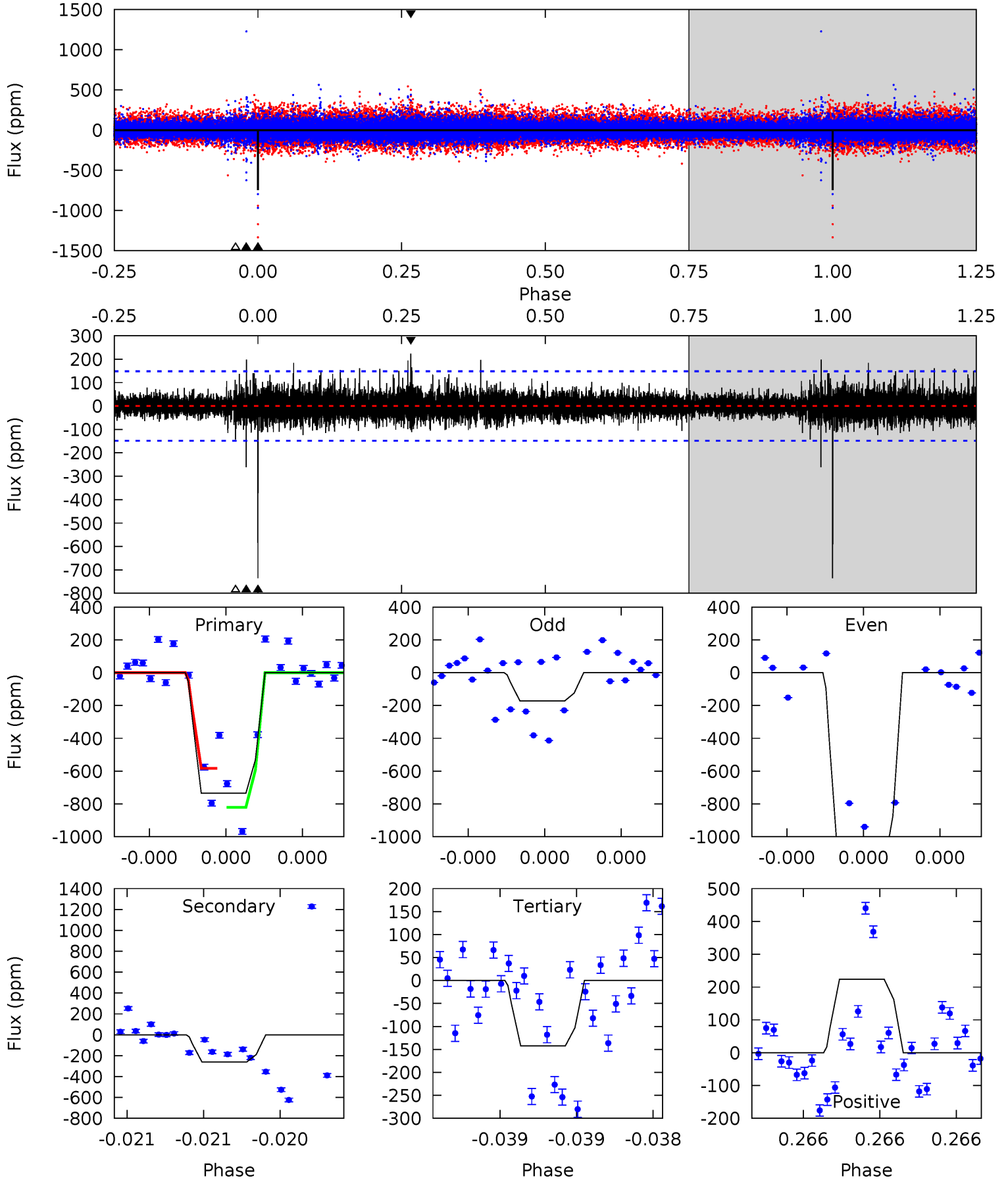
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



# Alt Model-Shift Uniqueness Test

010666510-05, P = 382.409441 Days, E = 357.484116 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
28.0	9.97	5.43	8.55	5.65	3.60	1.13	22.6	19.5	4.55	1.42	24.3	1.00	0.23	0



### Stellar Parameters For KIC 010666510

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5155^{+107}_{-250}$	$2.619^{+0.653}_{-0.218}$	$0.070^{+0.150}_{-0.550}$	$15.150^{+3.563}_{-11.400}$	$3.481^{+0.126}_{-2.393}$	$0.001^{+0.022}_{-0.001}$
	+2%/-5%	+25%/-8%	+214%/-786%	+24%/-75%	+4%/-69%	+1530%/-37%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 010666510-05 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$0 \pm 1000000$	$106.31^{+122.84}_{-79.27}$	$976^{+95}_{-150}$	$4562^{+13793}_{-18755}$	$359^{+27511}_{-17046}$
Alt.	$-262 \pm 26$	$103.87^{+140.09}_{-75.66}$	$971^{+94}_{-169}$	$3021^{+1703}_{-566}$	$31^{+342}_{-25}$

$T_{max}$  = 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

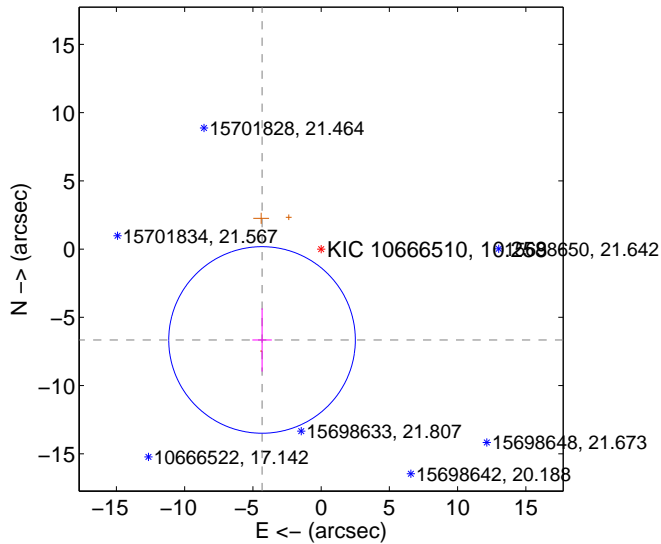
Supplemental centroid analysis for 010666510-05. **Kepler magnitude: 10.26.** Transit SNR -1.00

**There are 0 quarters with good PRF difference image offsets**

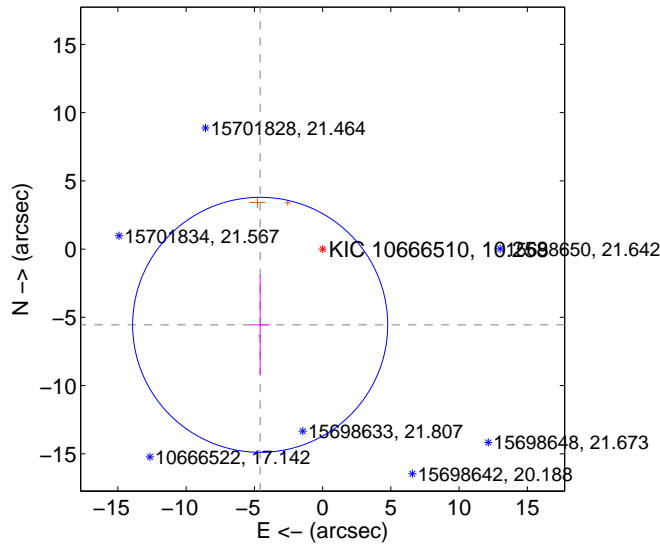
The direct PRF centroid is offset from the target star catalog position by about 1.22 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b><math>7.941 \pm 2.279</math></b>	<b>3.49</b>	$4.329 \pm 0.713$	$-6.657 \pm 2.318$
PRF-fit source offset from KIC position	$7.193 \pm 3.114$	2.31	$4.576 \pm 0.712$	$-5.549 \pm 3.643$
photometric centroid source offset	<b><math>1.55 \pm 0.27</math></b>	<b>5.79</b>	$1.51 \pm 0.26$	$-0.32 \pm 0.35$

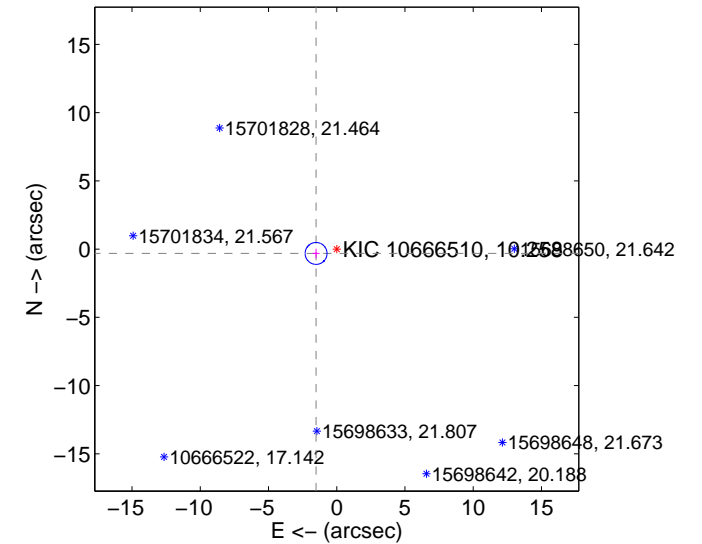
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

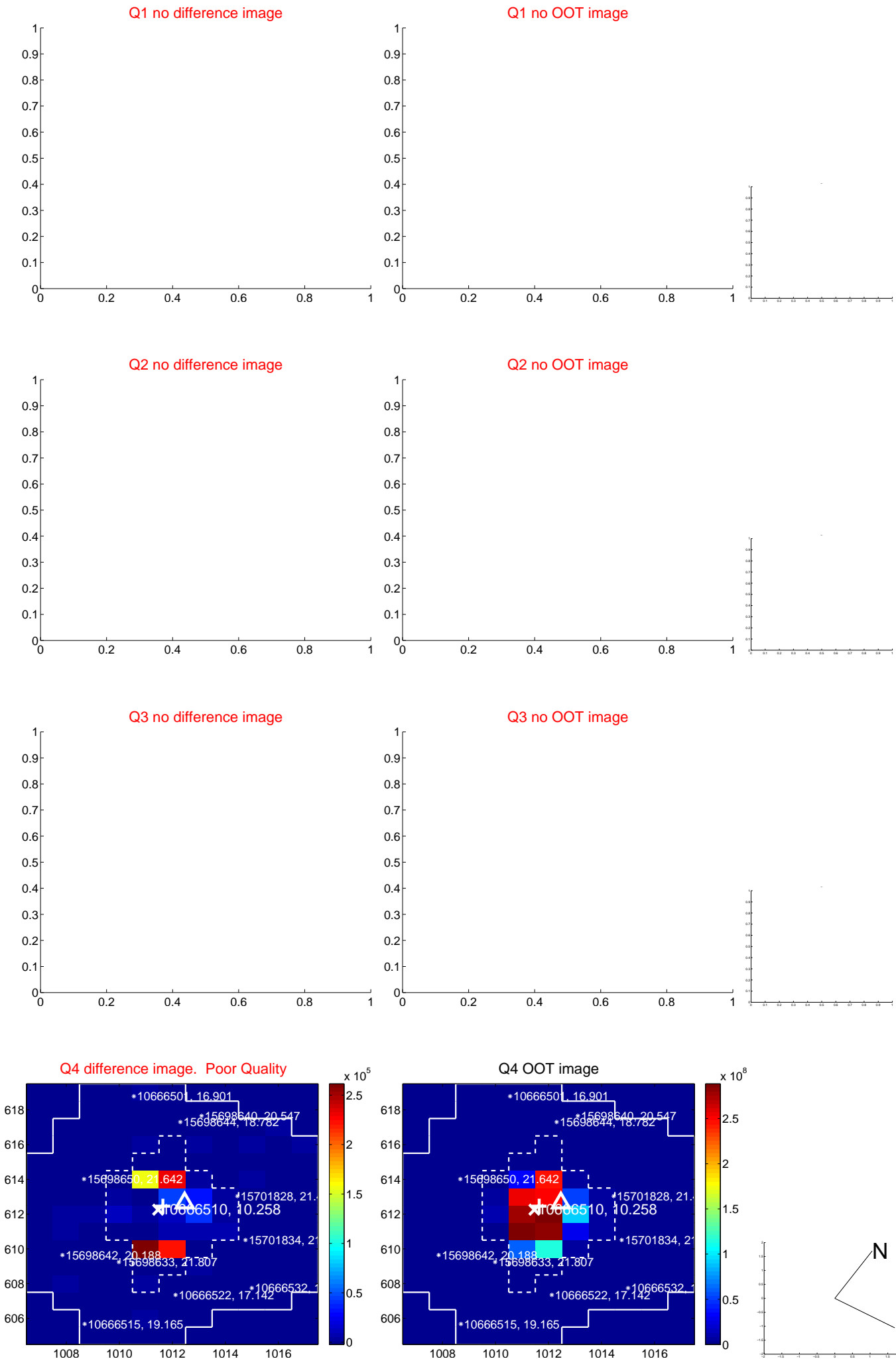


offset from photometric centroids



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



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

Q5 no difference image



Q5 no OOT image



Q6 no difference image



Q6 no OOT image



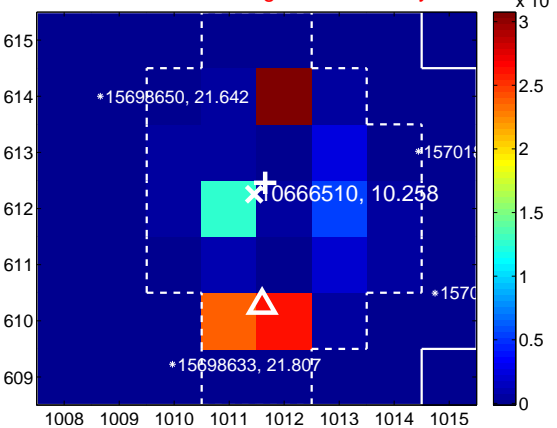
Q7 no difference image



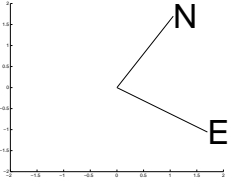
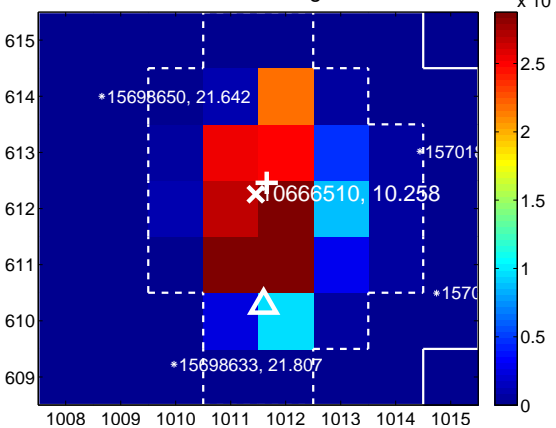
Q7 no OOT image



Q8 difference image. Poor Quality



Q8 OOT image

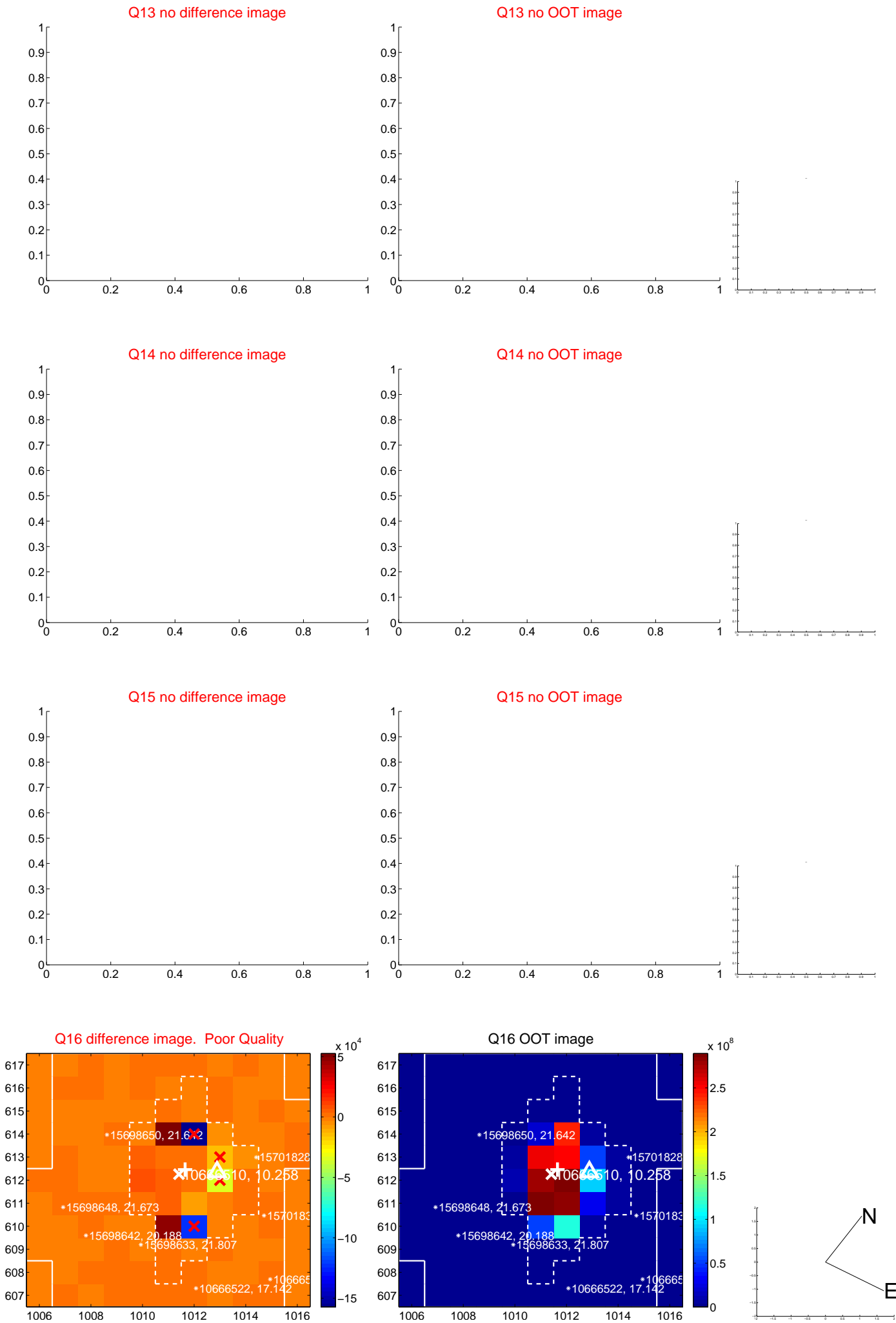




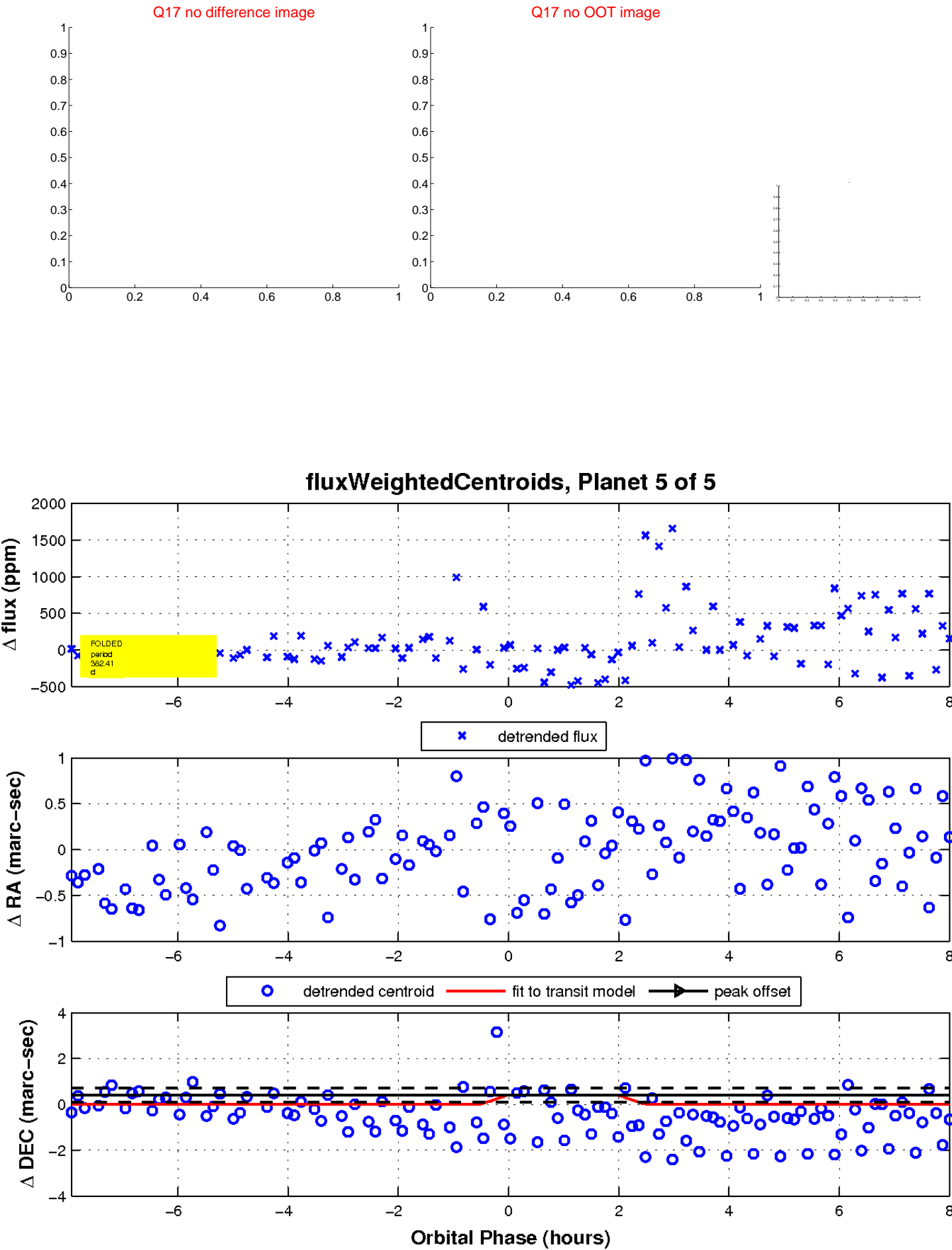
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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.



UKIRT Image

