

# KIC 011620101

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
011620101-01	OBS	No	1.461649	132.498323	189.3	1.613	8.1	7.0	2.53	7333	4.09	17709.08
011620101-02	OBS	No	0.907980	131.559276	163.3	3.029	8.7	7.8	2.53	7333	3.75	33410.65
011620101-03	OBS	No	9.220393	135.207269	820.3	11.496	8.5	10.1	2.53	7333	13.32	1519.34
011620101-04	OBS	No	129.639080	257.177764	2309.5	6.978	7.3	8.6	2.53	7333	13.67	44.77

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
011620101-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
011620101-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
011620101-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_ZUMA—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
011620101-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT

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

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

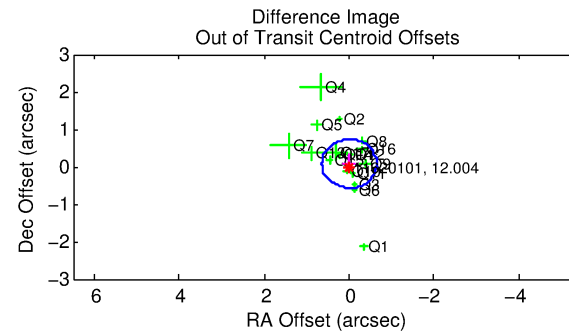
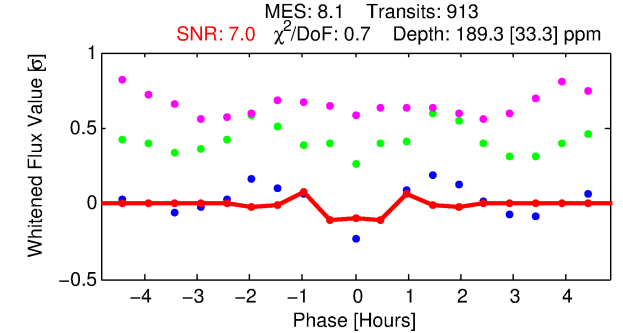
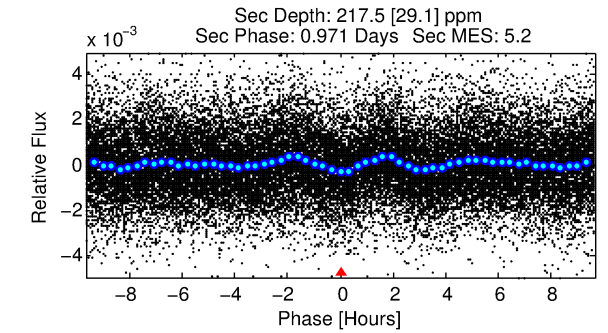
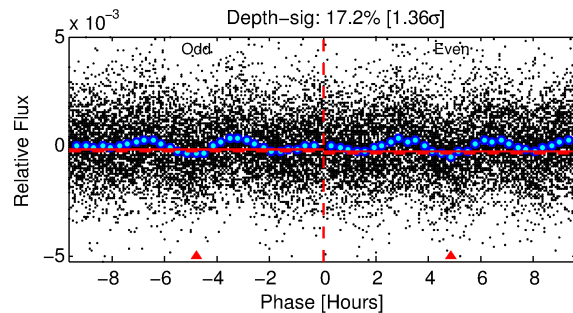
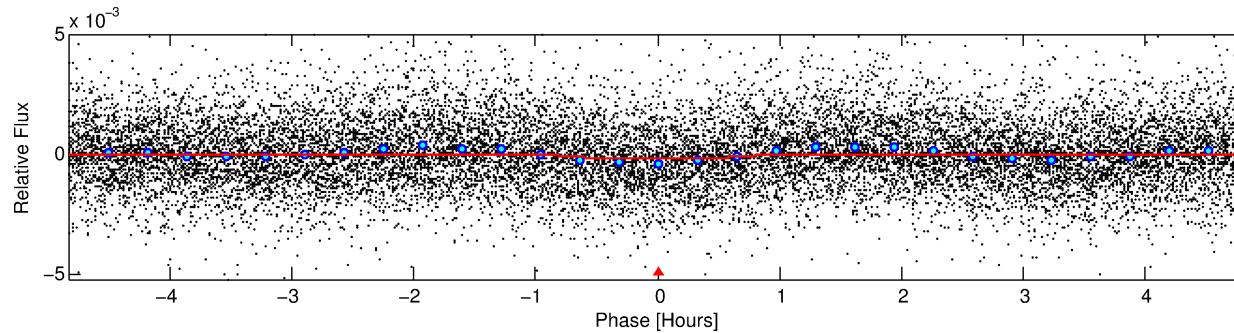
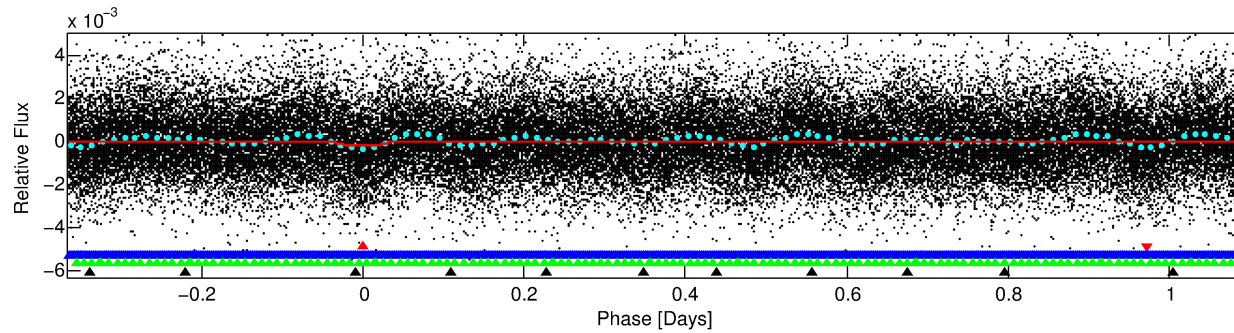
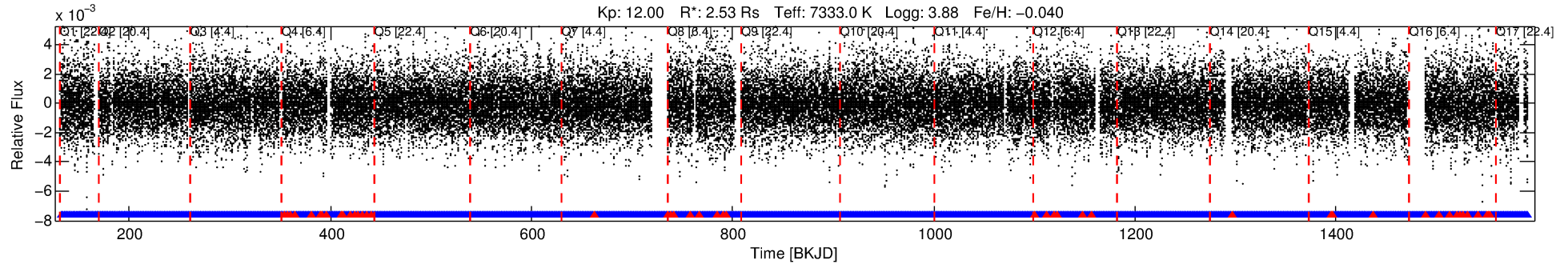
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 011620101-01

No Significant Match Found

# DV One-Page Summary

KIC: 11620101 Candidate: 1 of 4 Period: 1.462 d



## DV Fit Results:

Period = 1.46165 [0.00001] d  
Epoch = 132.4983 [0.0013] BKJD  
Rp/R\* = 0.0148 [0.0035]  
a/R\* = 3.16 [3.78]  
b = 0.92 [0.23]  
Seff = 17709.08 [9683.10]  
Teq = 2942 [402] K  
Rp = 4.09 [1.72] Re  
a = 0.0306 [0.0100] AU  
Ag = 6.68 [4.78] [1.19 $\sigma$ ]  
Teffp = 7312 [964] K [4.18 $\sigma$ ]

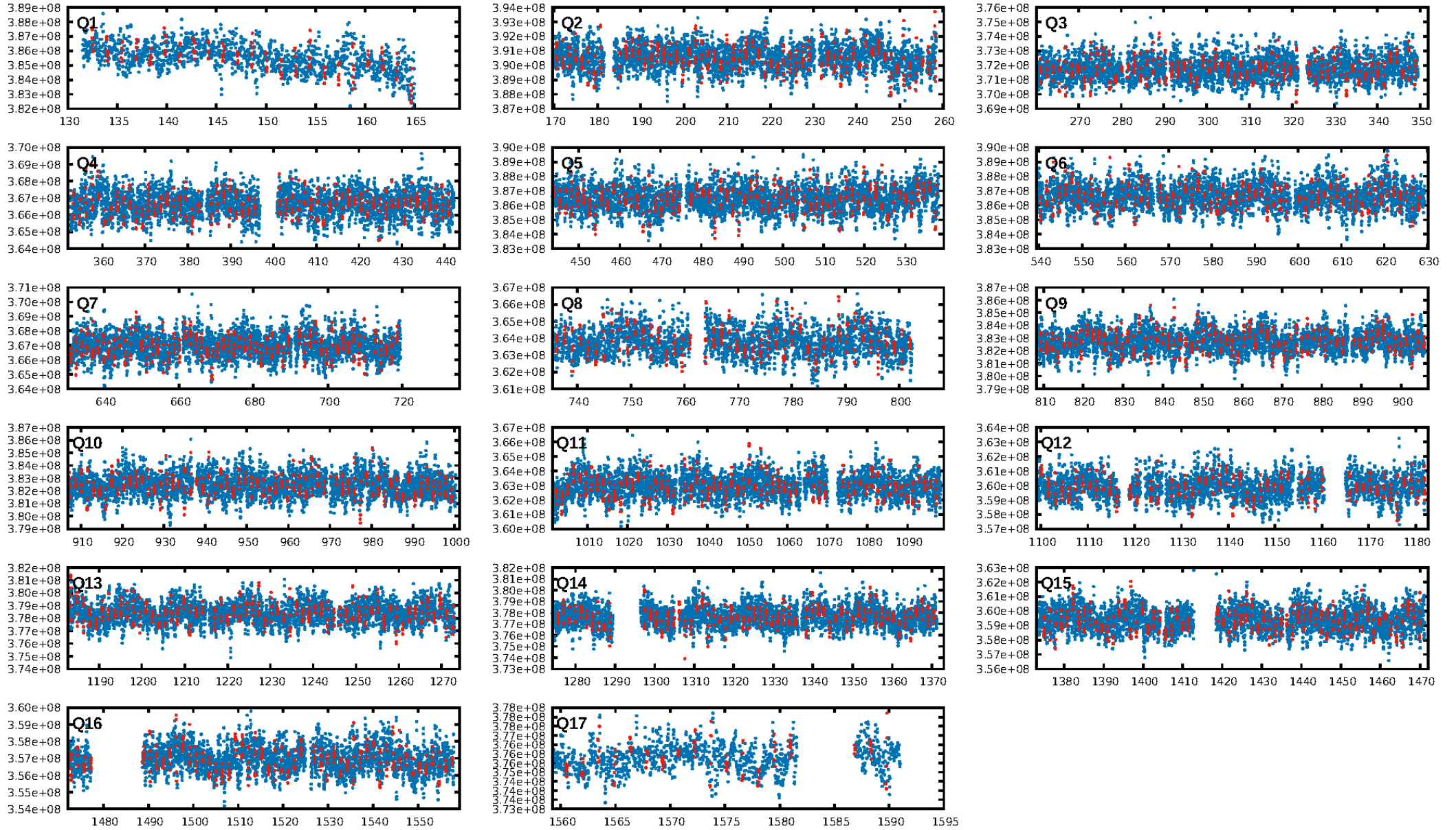
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [3.87 $\sigma$ ]  
LongPeriod-sig: 100.0% [16.04 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 8.46e-26  
RollingBand-fgt: 0.95 [826/872]  
**GhostDiagnostic-chr: 0.8898**  
Centroid-sig: 0.1%  
Centroid-so: 0.243 arcsec [1.45 $\sigma$ ]  
OotOffset-rm: 0.079 arcsec [0.37 $\sigma$ ]  
KicOffset-rm: 0.036 arcsec [0.20 $\sigma$ ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 1.00 [17/17]  
DiffImageOverlap-fno: 1.00 [17/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:04:11 Z

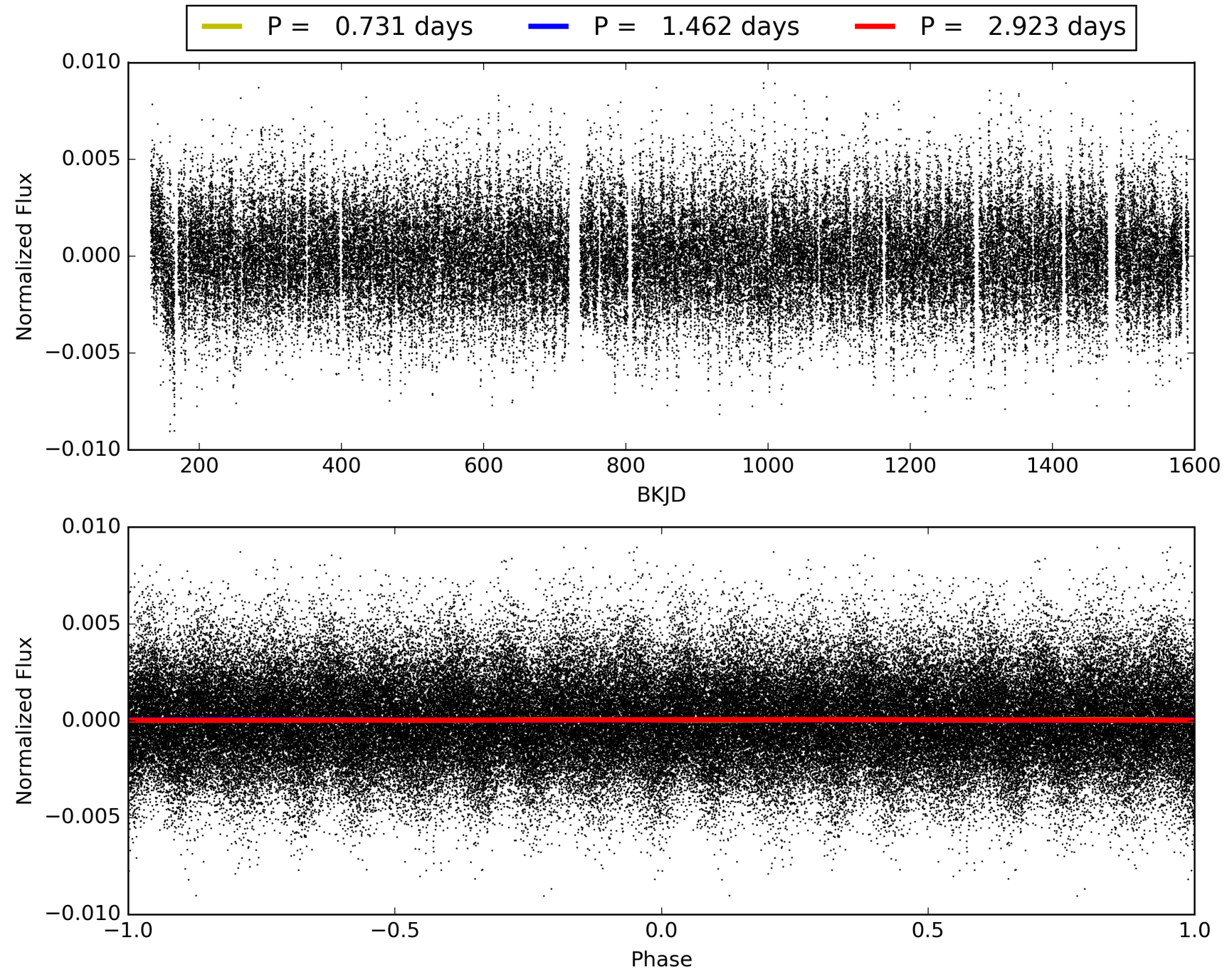
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 011620101-01, PDC Light Curves





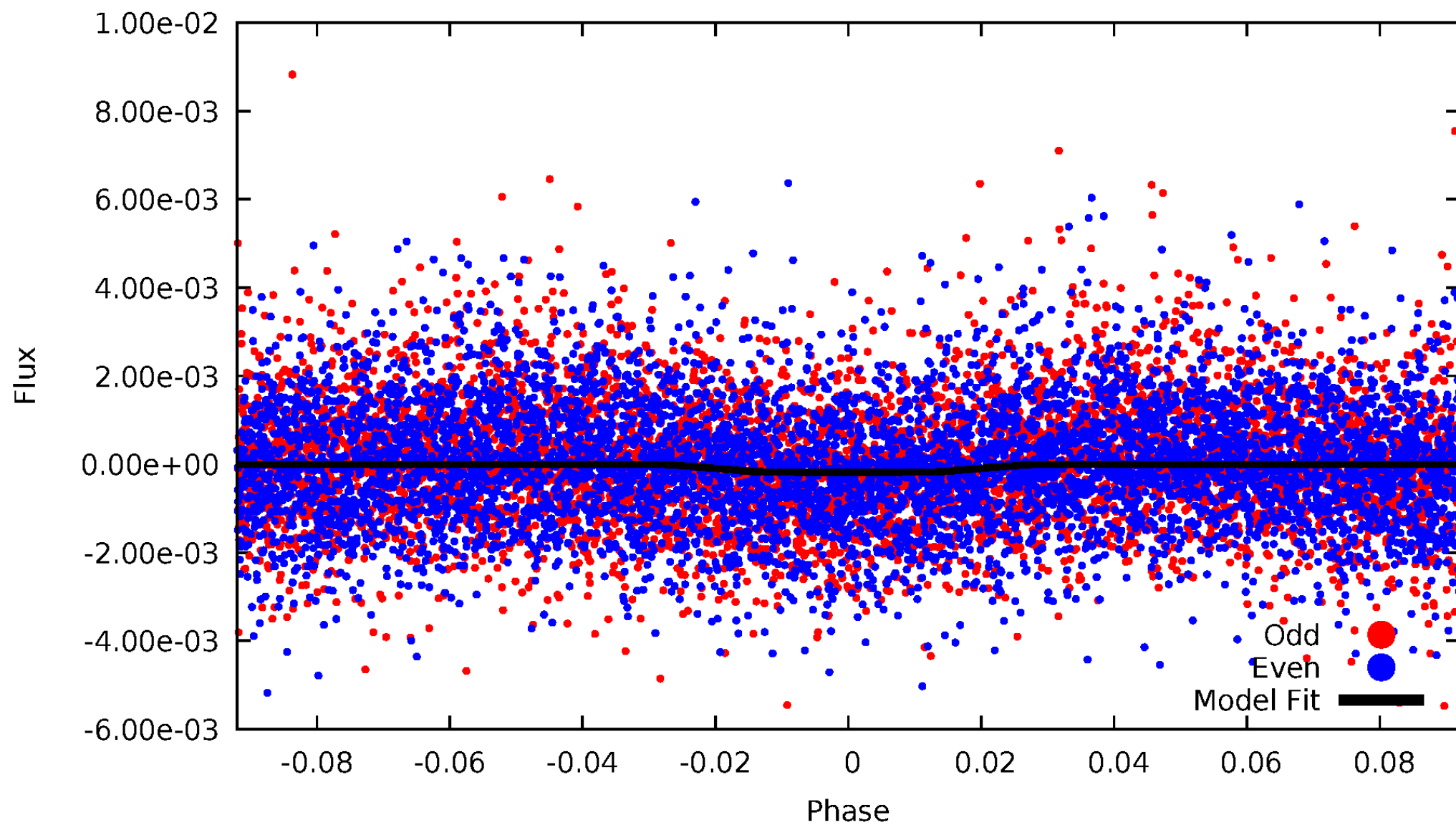
# TCE 011620101-01





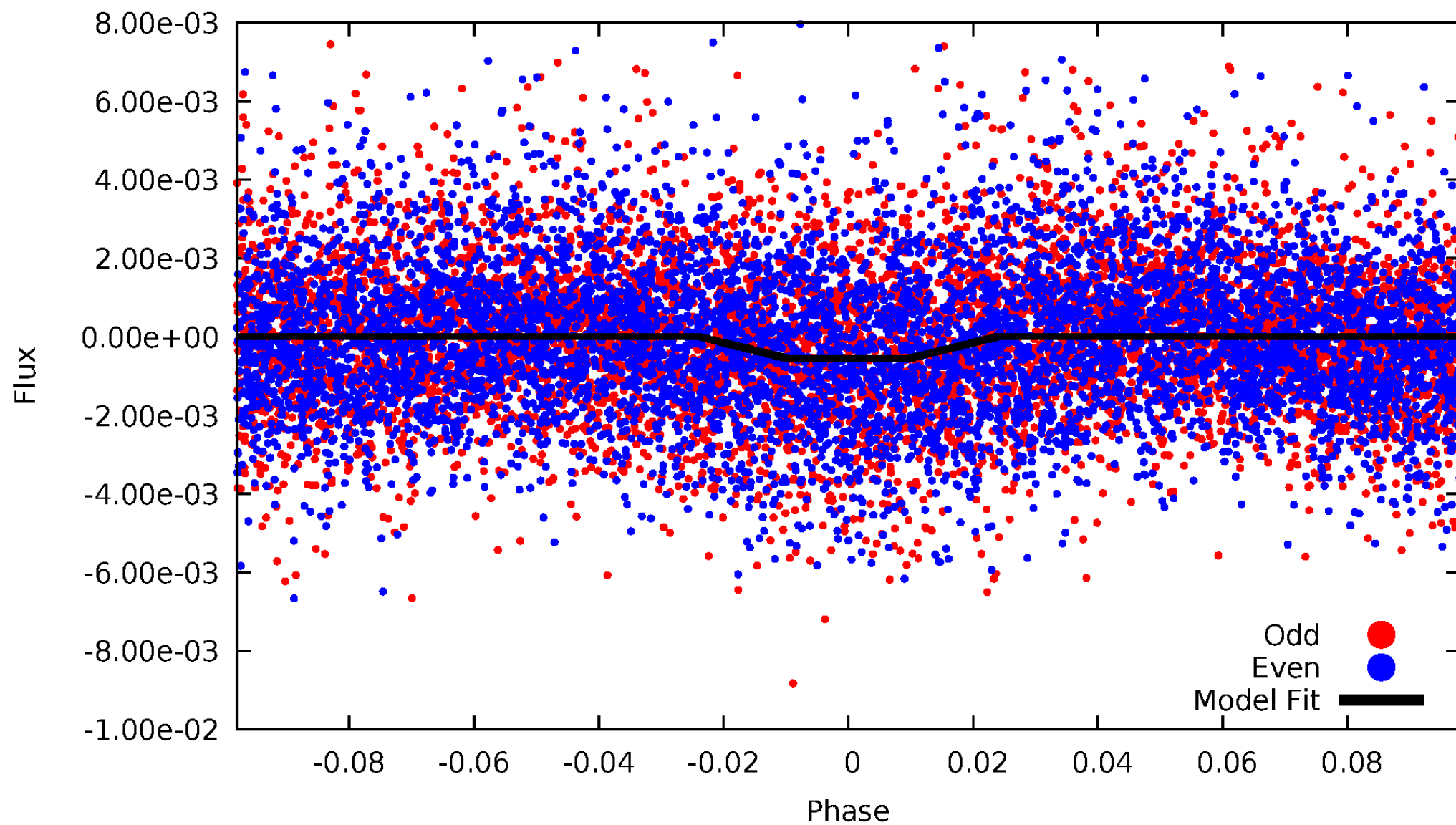
# DV Odd/Even

TCE 011620101-01

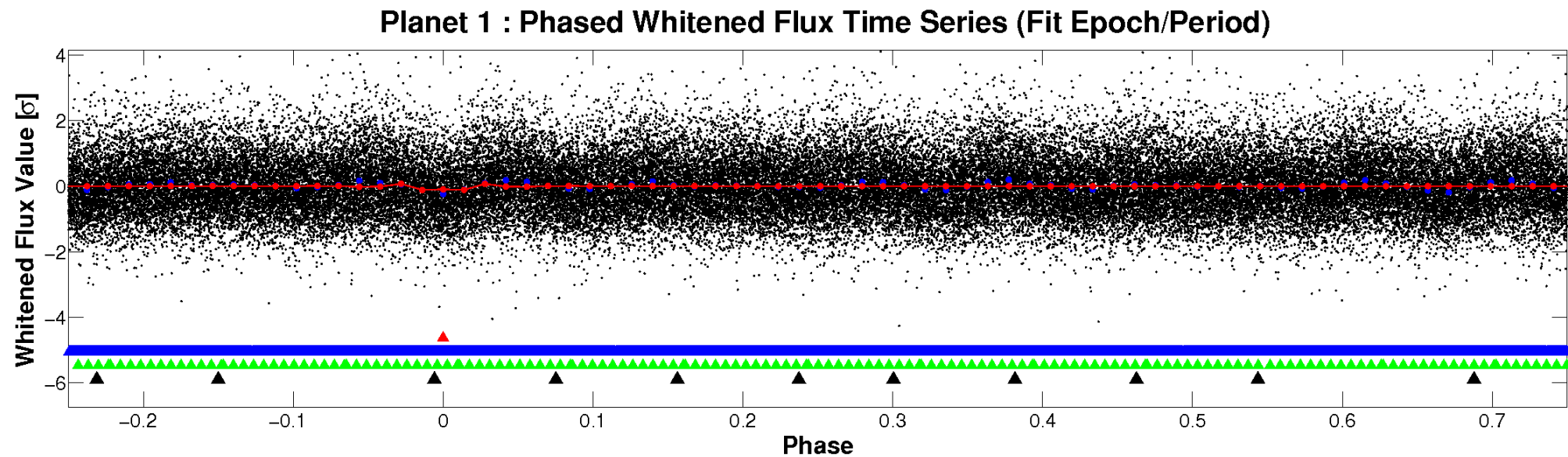
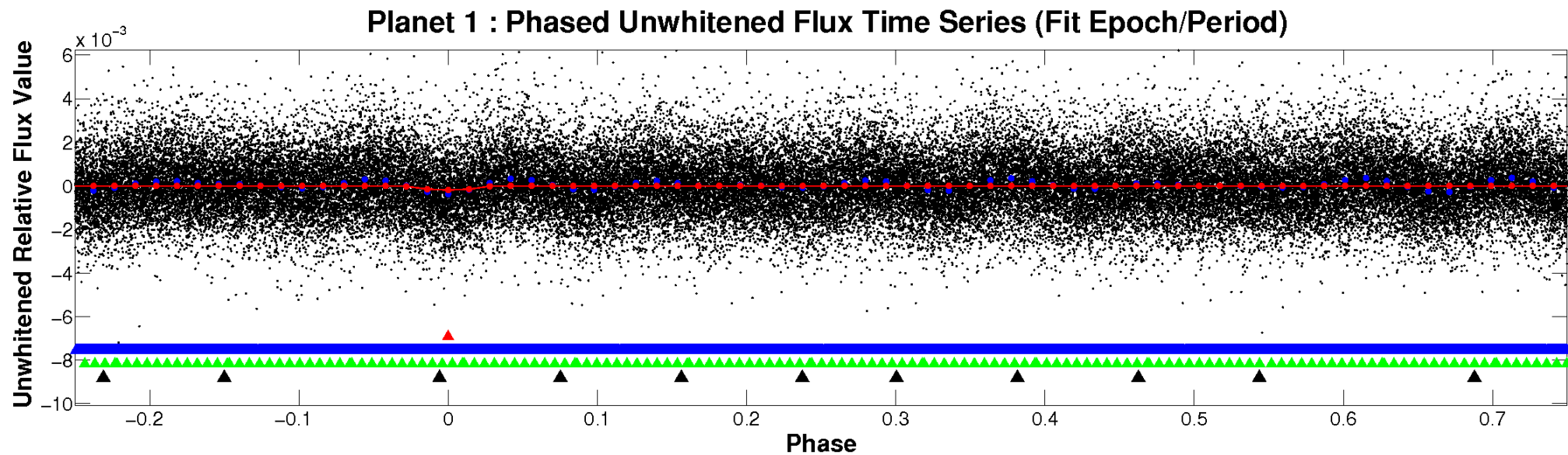


# ALT Odd/Even

TCE 011620101-01



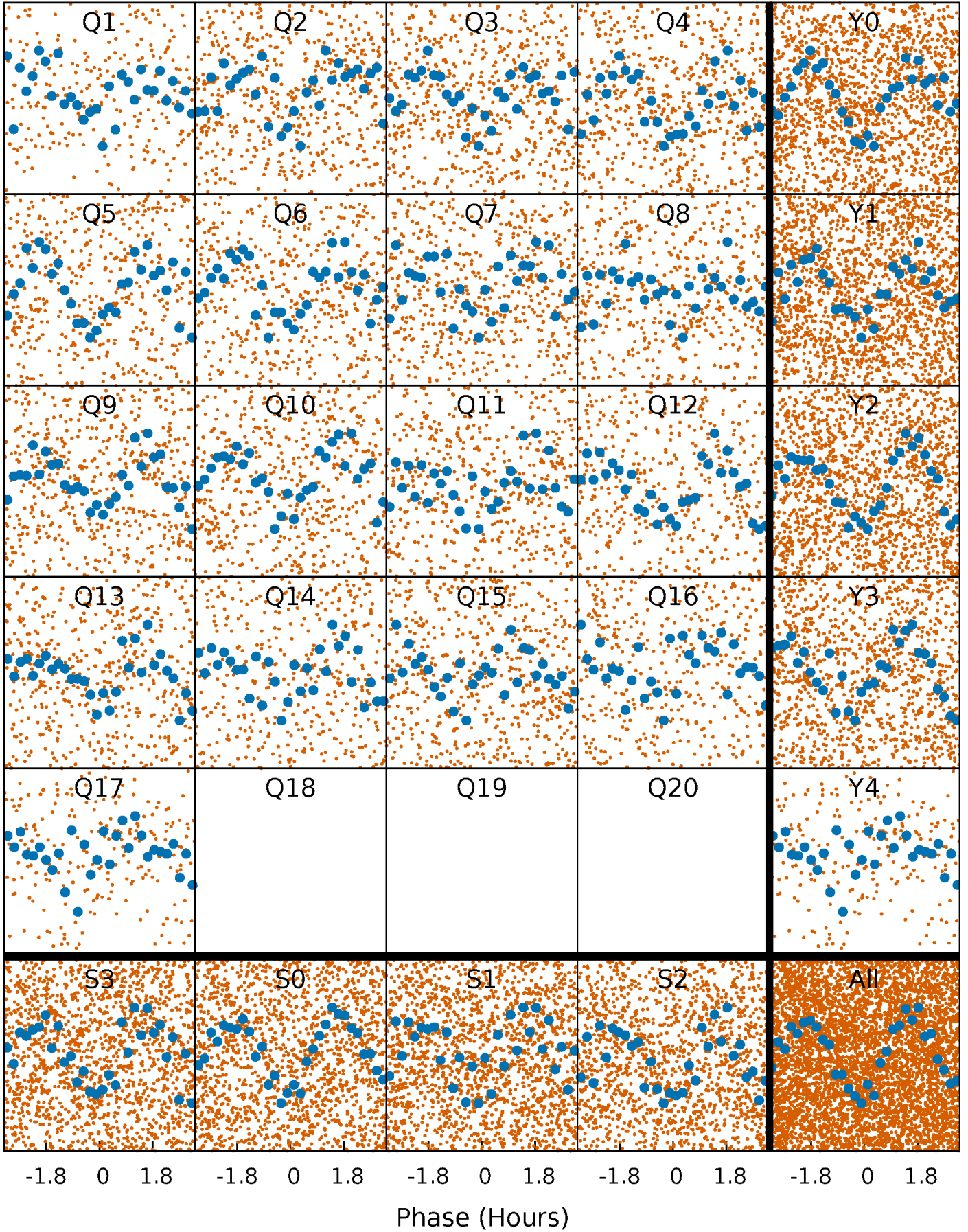
# Non-Whitened Vs. Whitened Light Curve





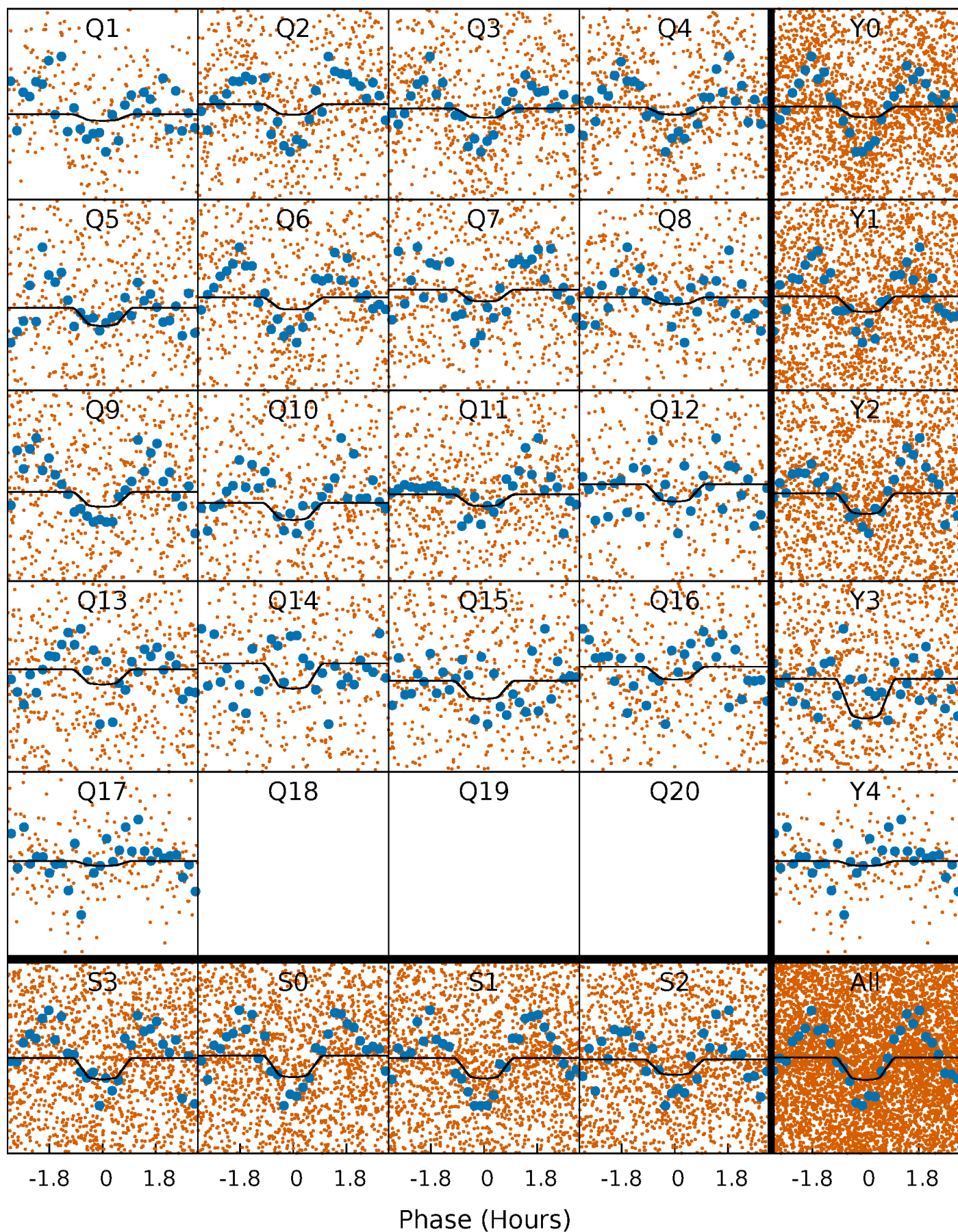
# PDC Quarter-Phased Transit Curves

TCE 011620101-01     $P = 1.461649$  Days     $T_0 = 132.498323$  (BKJD)



# DV Quarter-Phased Transit Curves

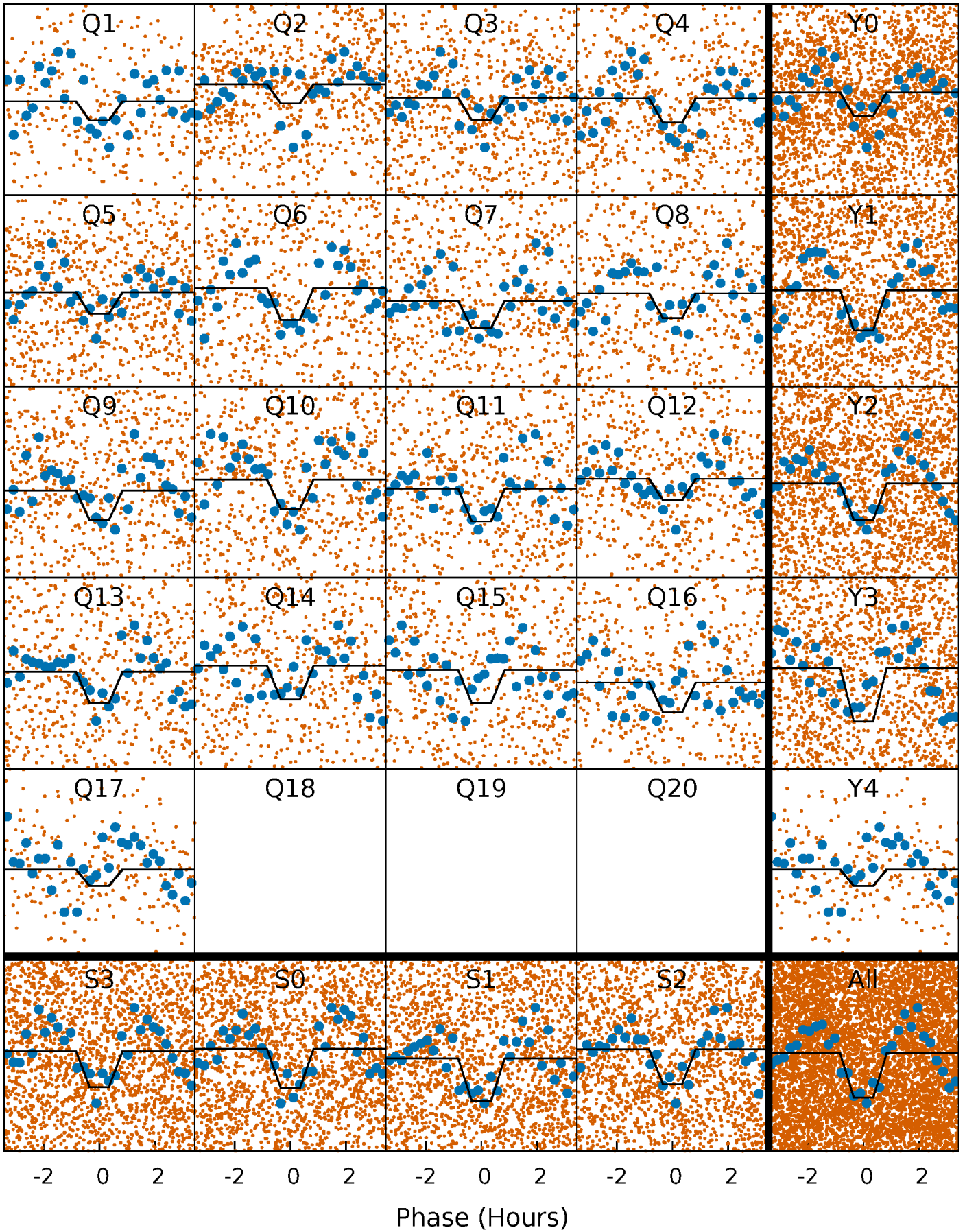
TCE 011620101-01 P= 1.461649 Days  $T_0=132.498323$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

TCE 011620101-01 P= 1.461667 Days  $T_0=132.483663$  (BKJD)

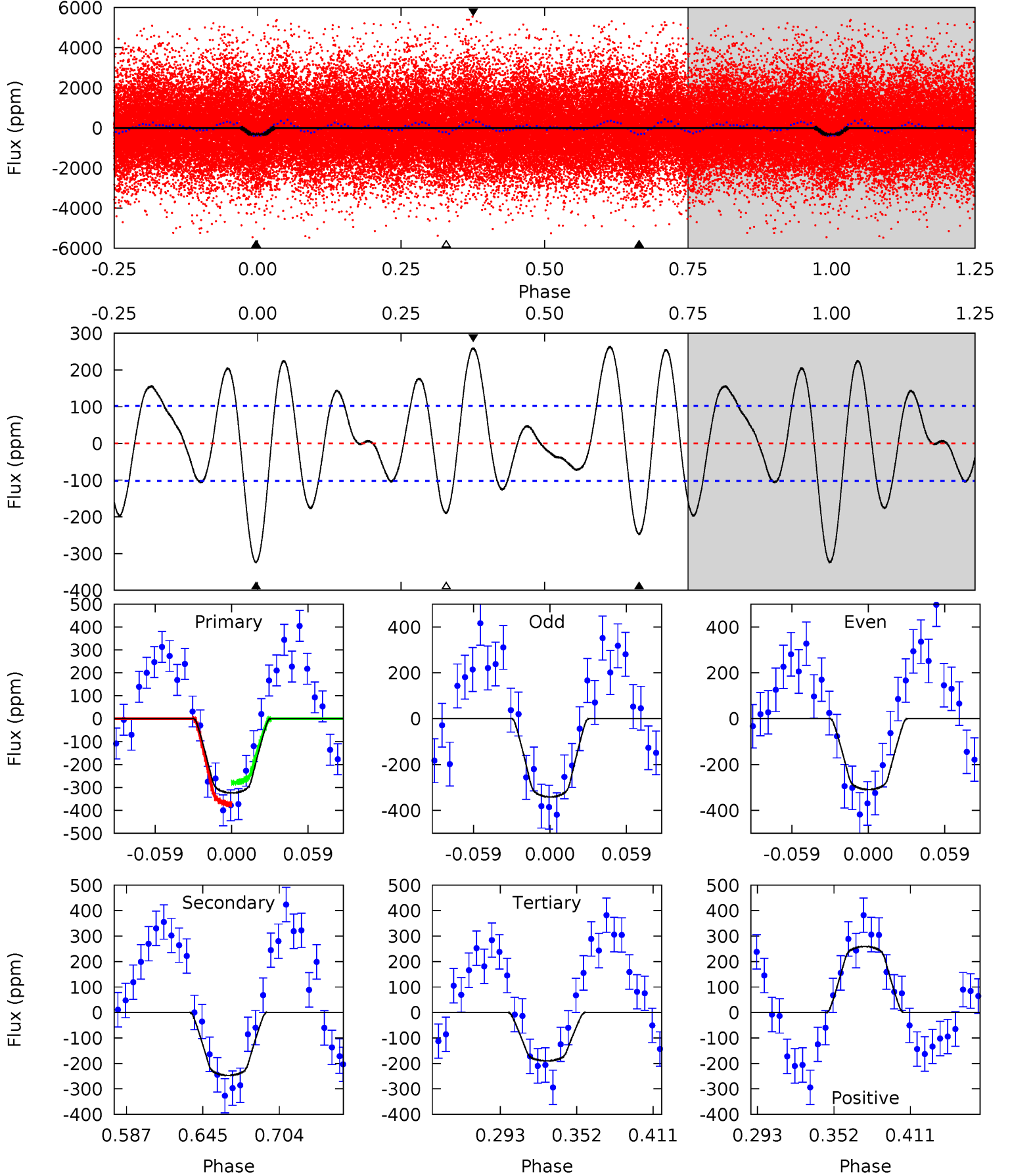




# DV Model-Shift Uniqueness Test

011620101-01, P = 1.461649 Days, E = 131.036674 Days

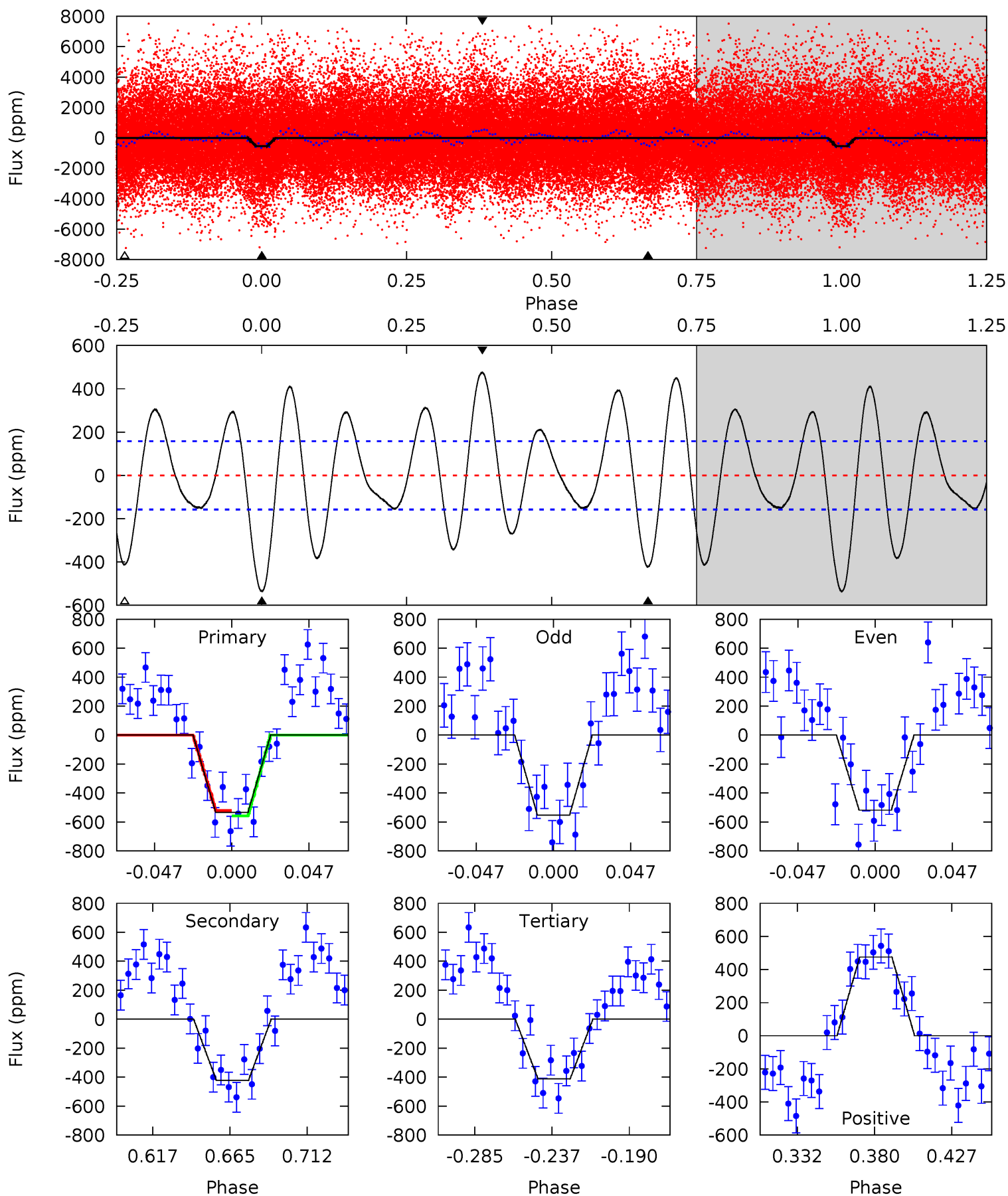
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
14.8	11.3	8.66	11.8	4.68	1.89	4.83	6.13	2.96	2.62	-0.55	0.74	1.07	0.45	2.15



# Alt Model-Shift Uniqueness Test

011620101-01, P = 1.461667 Days, E = 131.021996 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
16.0	12.6	12.3	14.2	4.72	1.98	6.49	3.67	1.79	0.29	-1.60	0.51	1.26	0.47	0.56



### Stellar Parameters For KIC 011620101

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7333^{+203}_{-330}$	$3.884^{+0.301}_{-0.129}$	$-0.040^{+0.200}_{-0.350}$	$2.529^{+0.510}_{-0.874}$	$1.785^{+0.175}_{-0.409}$	$0.155^{+0.332}_{-0.060}$
	+3%/-5%	+8%/-3%	+500%/-875%	+20%/-35%	+10%/-23%	+214%/-39%
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 011620101-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-247 \pm 22$	$3.86^{+1.17}_{-1.16}$	$4028^{+291}_{-366}$	$7480^{+1569}_{-906}$	$8.461^{+8.057}_{-3.342}$
Alt.	$-422 \pm 33$	$6.06^{+1.39}_{-1.39}$	$4014^{+279}_{-357}$	$6705^{+724}_{-605}$	$5.765^{+3.649}_{-1.868}$

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



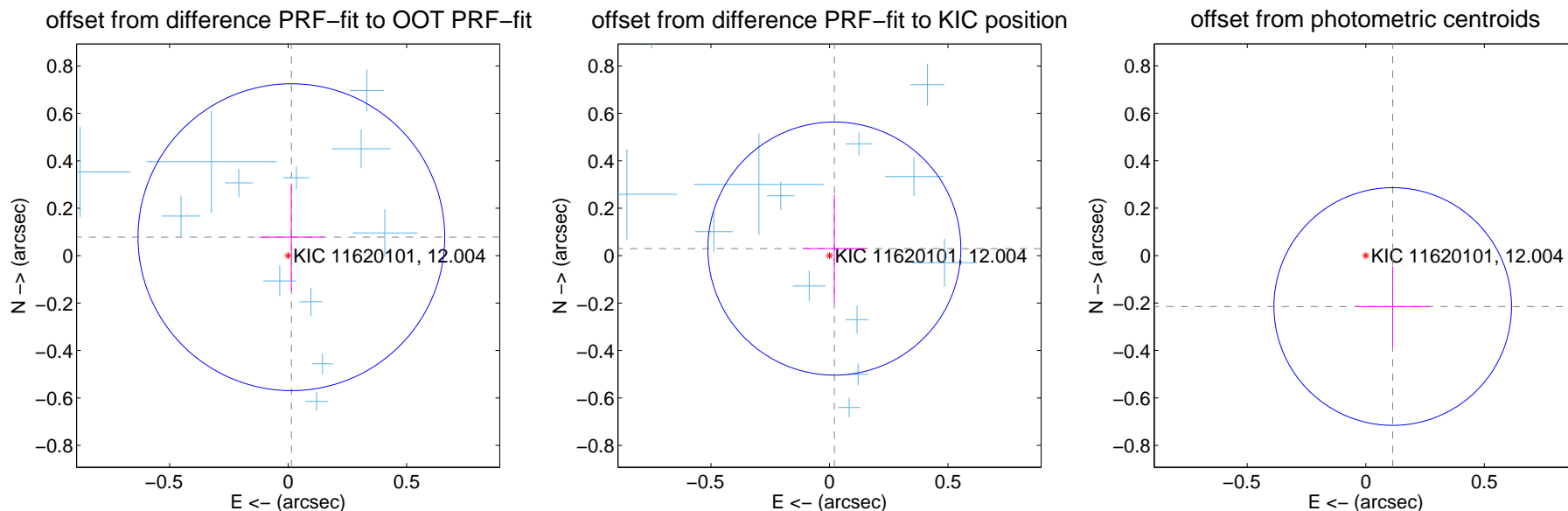
## DV Centroid Data

Supplemental centroid analysis for 011620101-01. Kepler magnitude: 12.00. Transit SNR 7.00

There are 17 quarters with good PRF difference image offsets

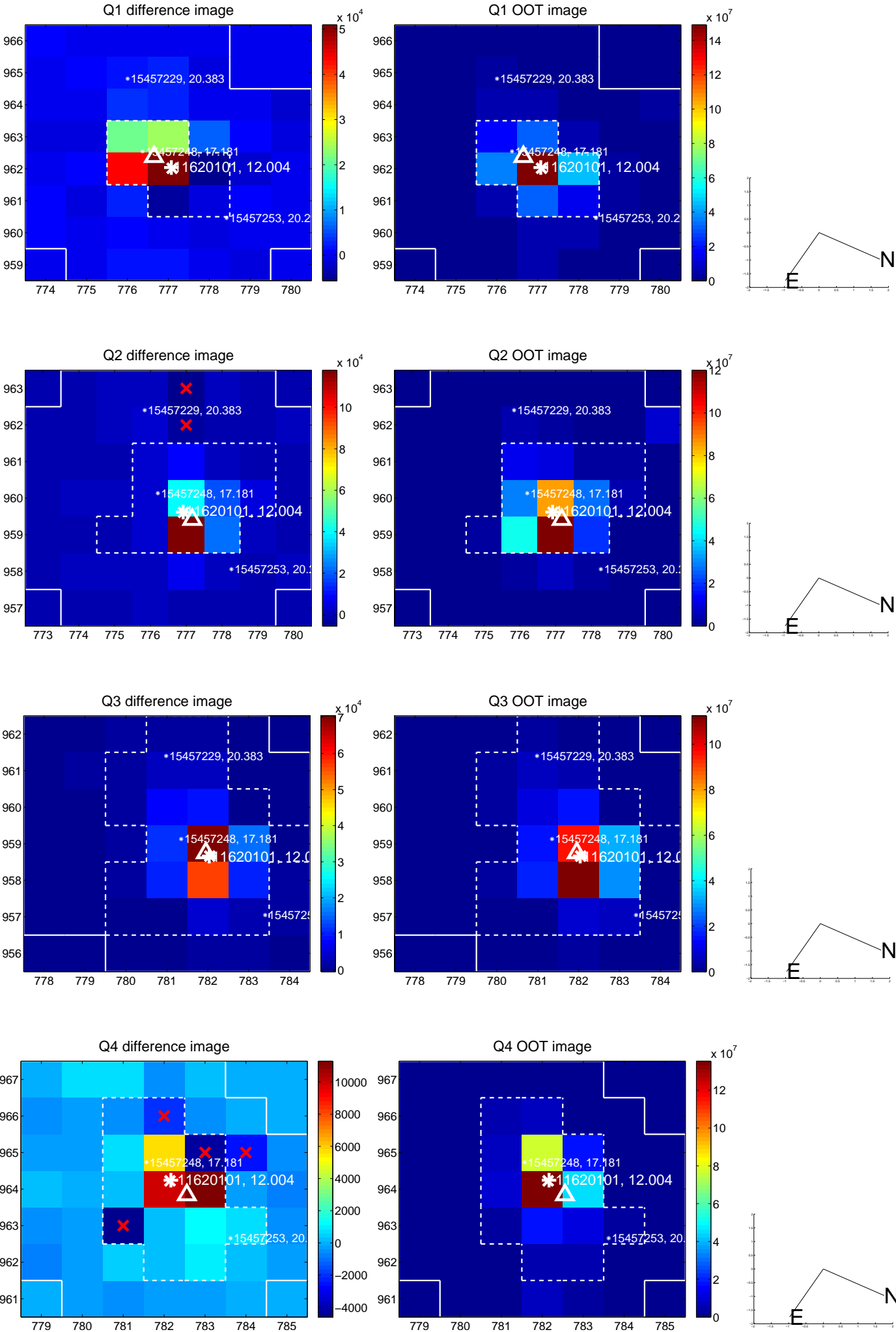
The direct PRF centroid is offset from the target star catalog position by about 0.10 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.079 \pm 0.216$	0.37	$-0.014 \pm 0.137$	$0.078 \pm 0.227$
PRF-fit source offset from KIC position	$0.036 \pm 0.178$	0.20	$-0.021 \pm 0.133$	$0.030 \pm 0.228$
photometric centroid source offset	$0.24 \pm 0.17$	1.45	$-0.11 \pm 0.16$	$-0.21 \pm 0.17$

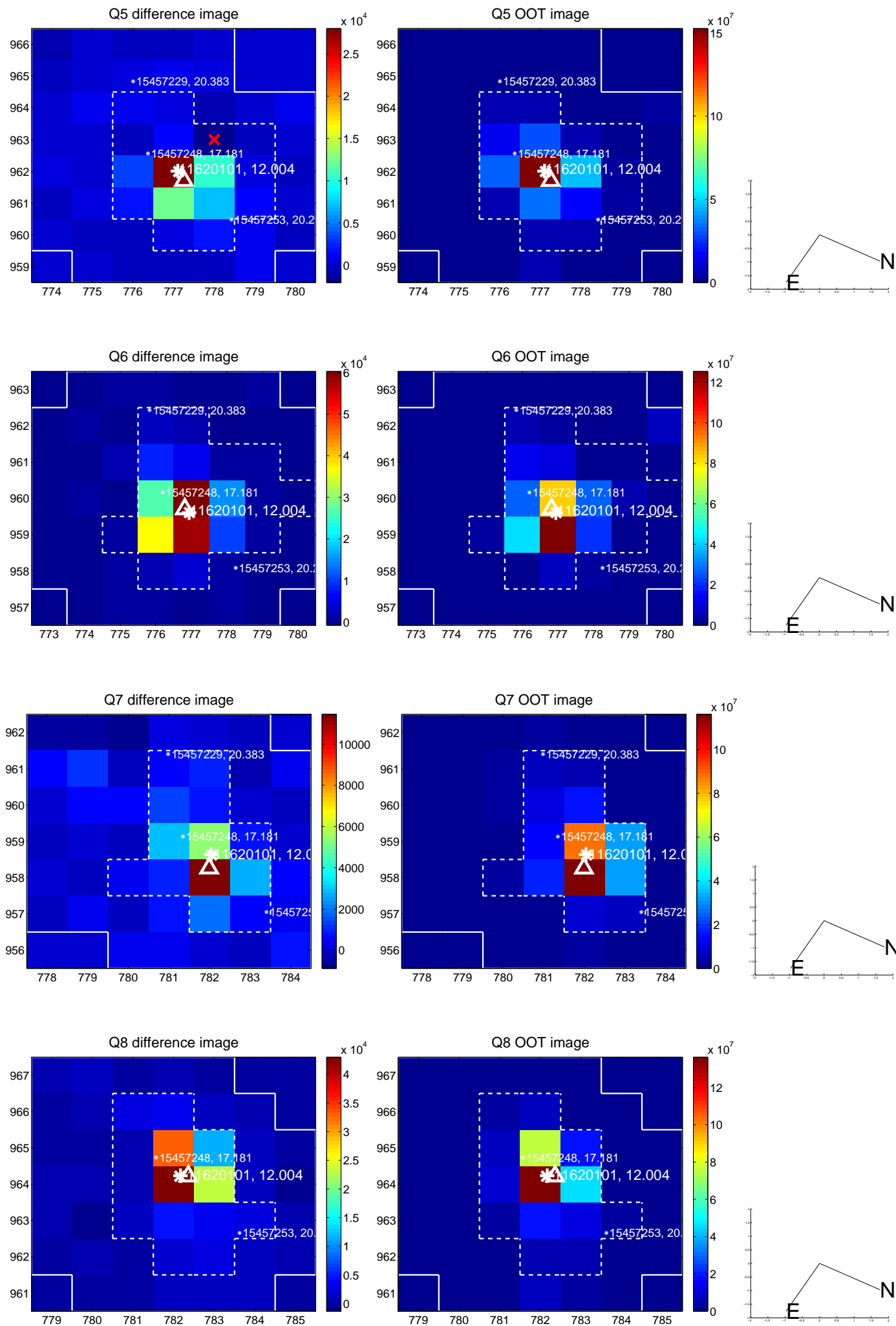


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

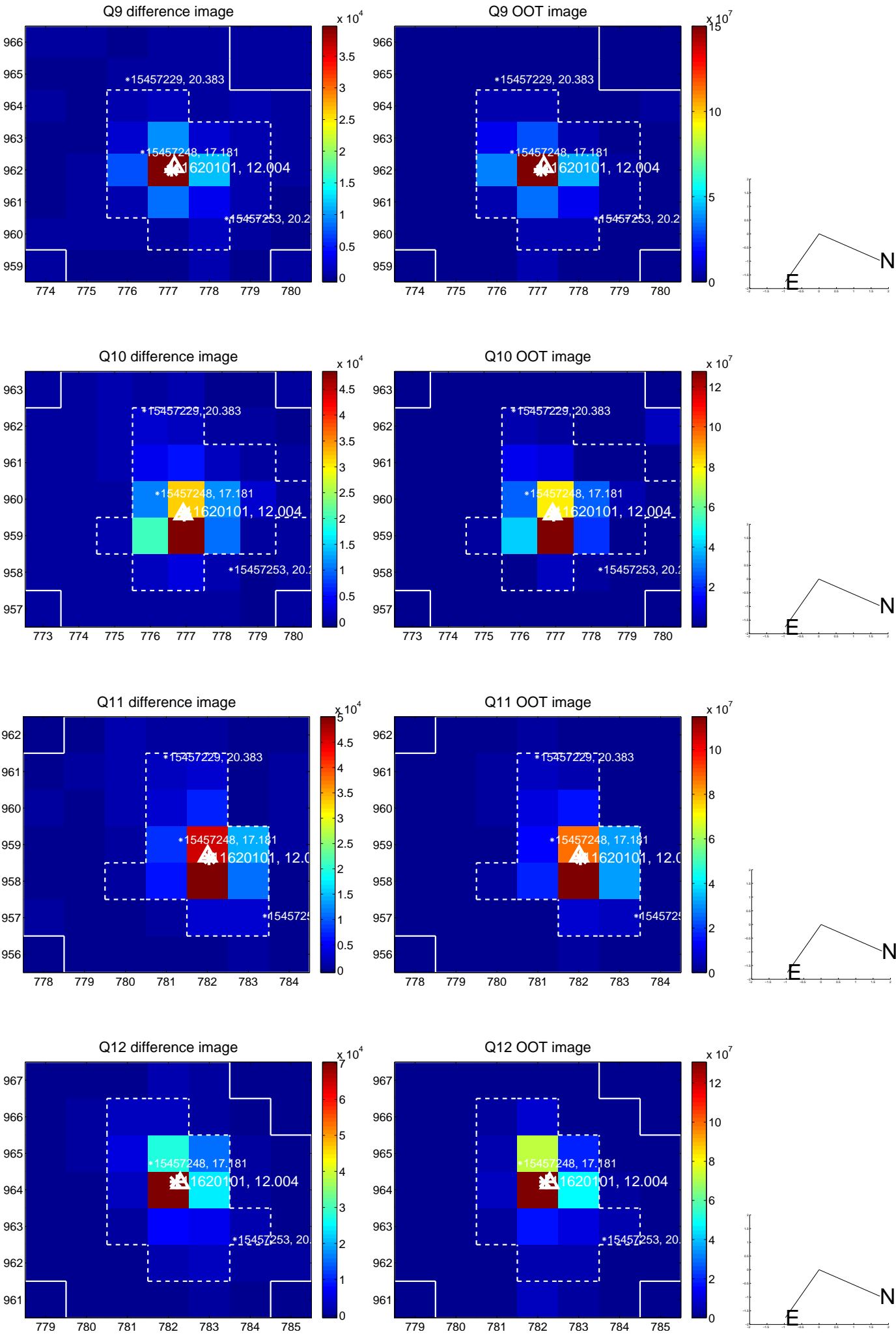


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

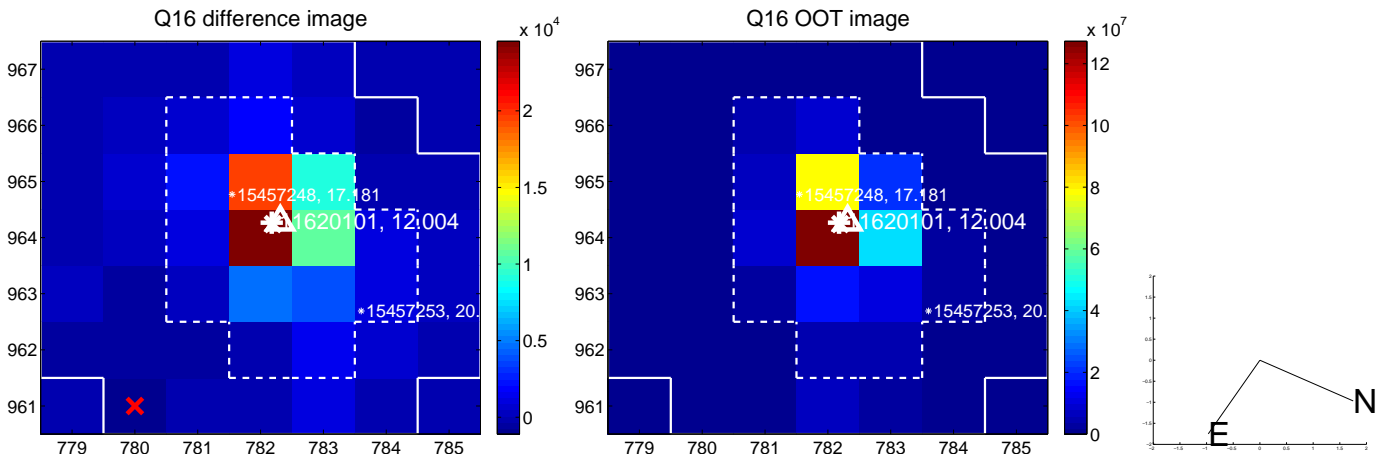
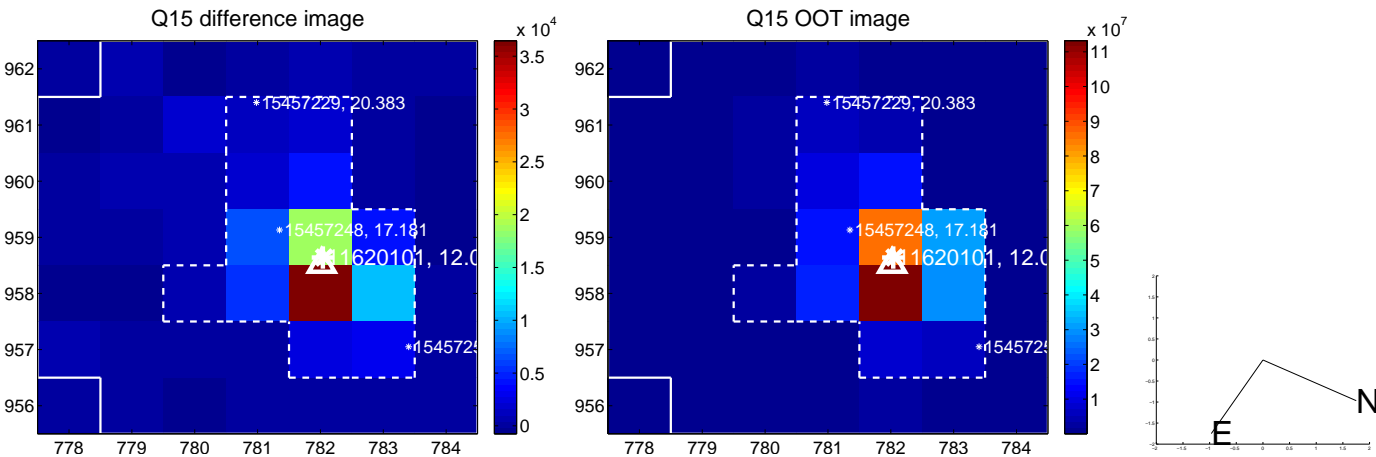
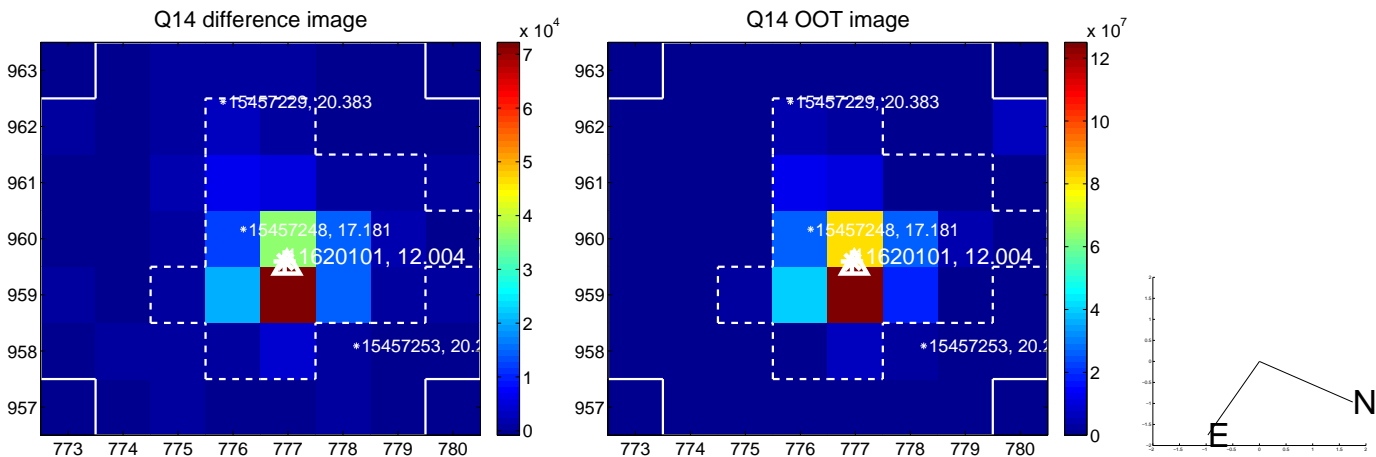
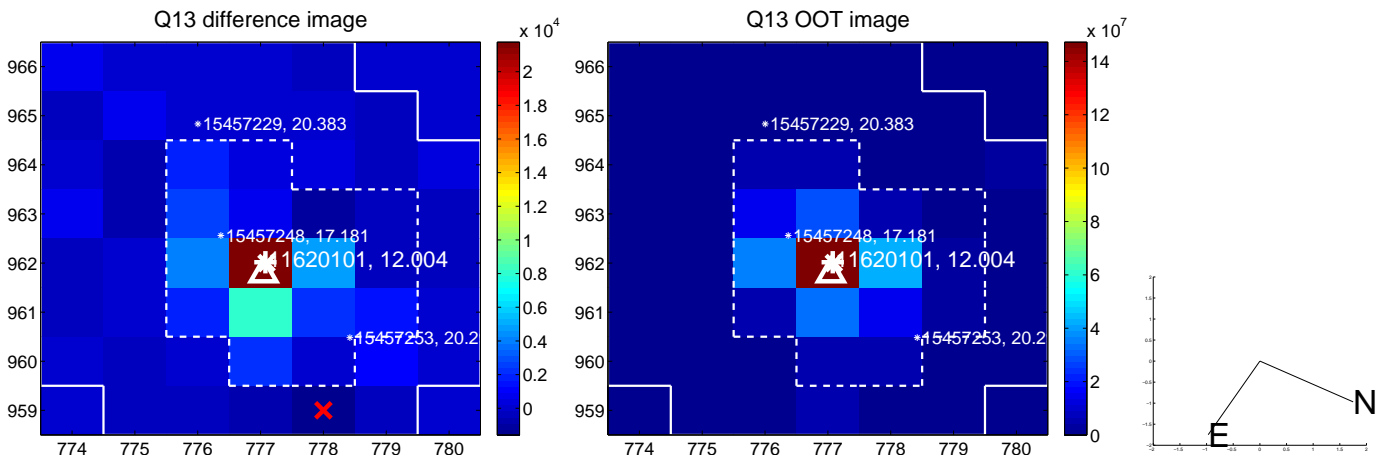




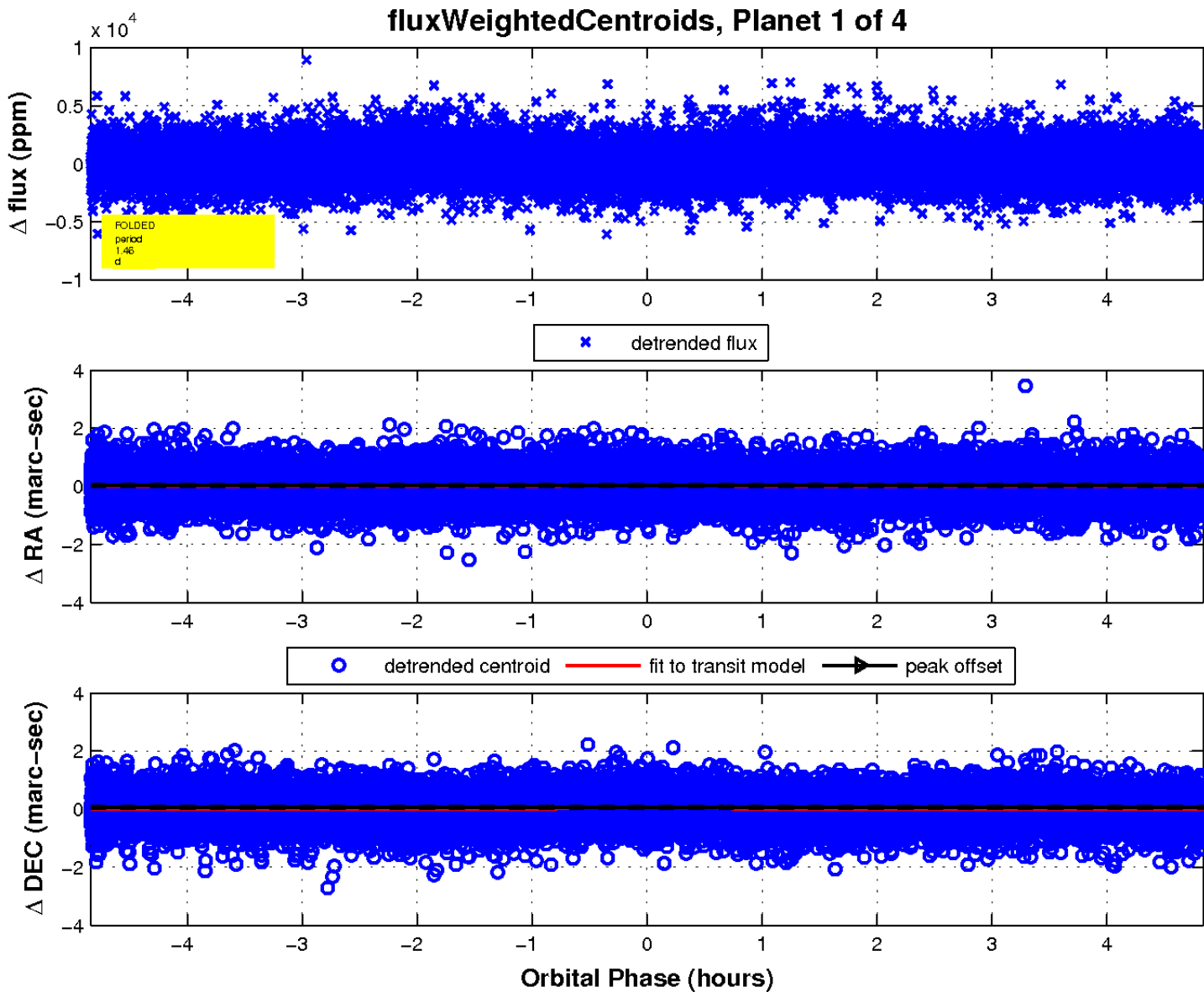
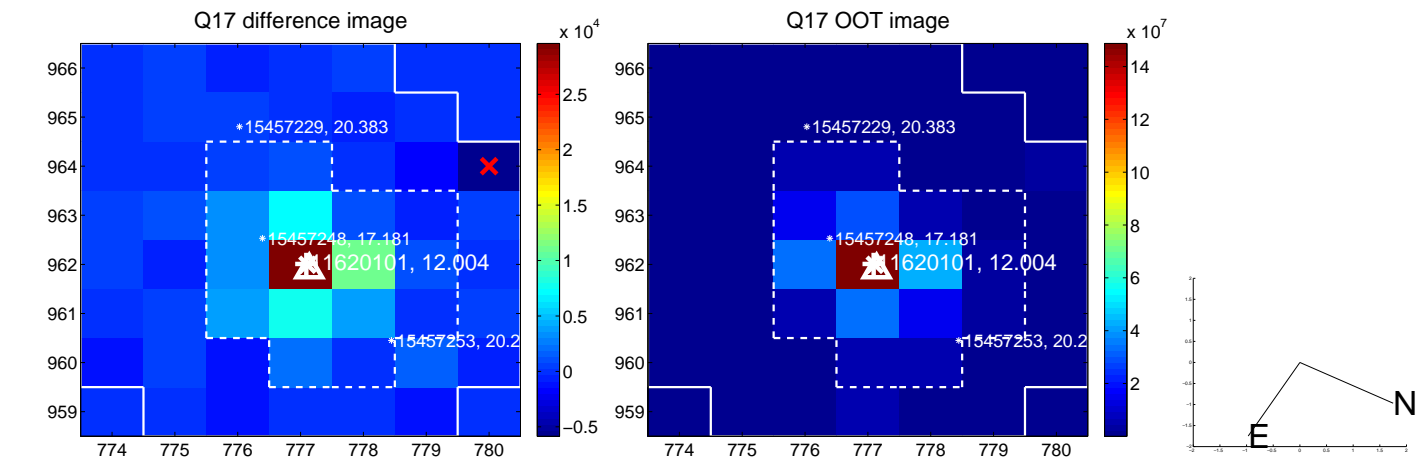
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

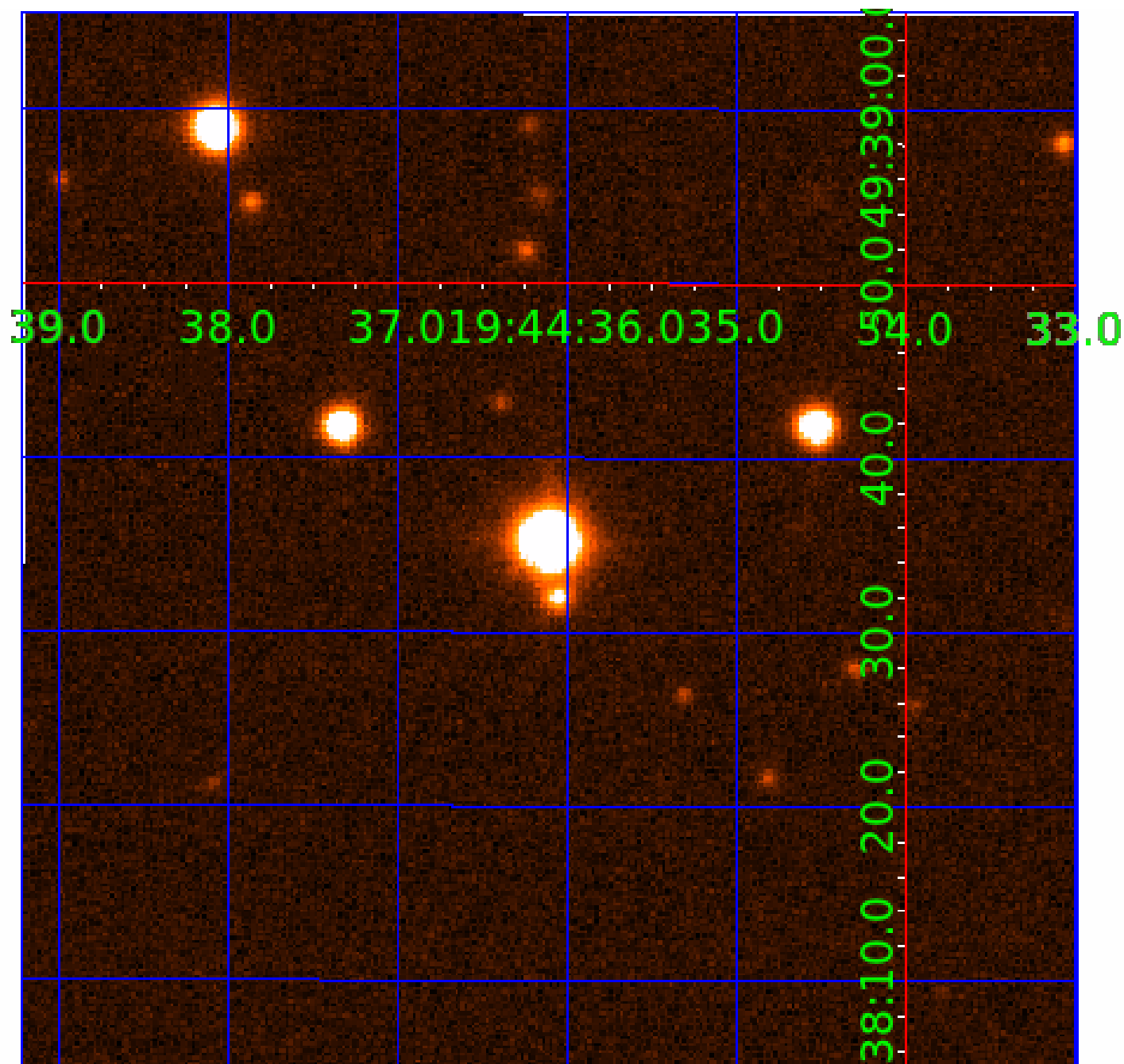


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 011620101

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
011620101-01	OBS	No	1.461649	132.498323	189.3	1.613	8.1	7.0	2.53	7333	4.09	17709.08
011620101-02	OBS	No	0.907980	131.559276	163.3	3.029	8.7	7.8	2.53	7333	3.75	33410.65
011620101-03	OBS	No	9.220393	135.207269	820.3	11.496	8.5	10.1	2.53	7333	13.32	1519.34
011620101-04	OBS	No	129.639080	257.177764	2309.5	6.978	7.3	8.6	2.53	7333	13.67	44.77

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
011620101-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
011620101-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
011620101-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_ZUMA—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
011620101-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT

**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.

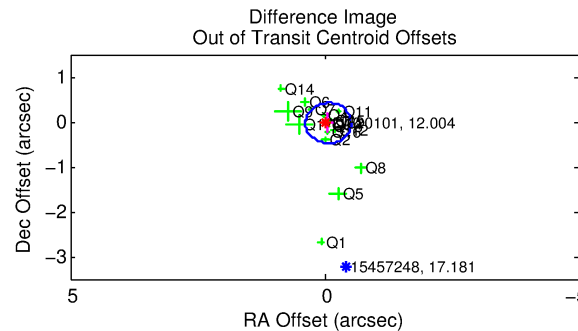
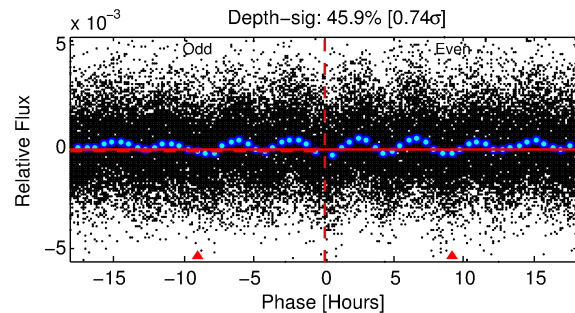
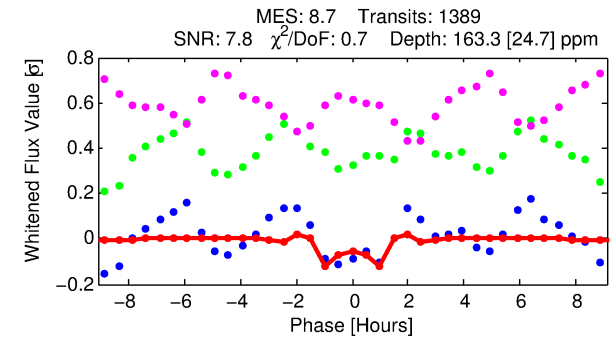
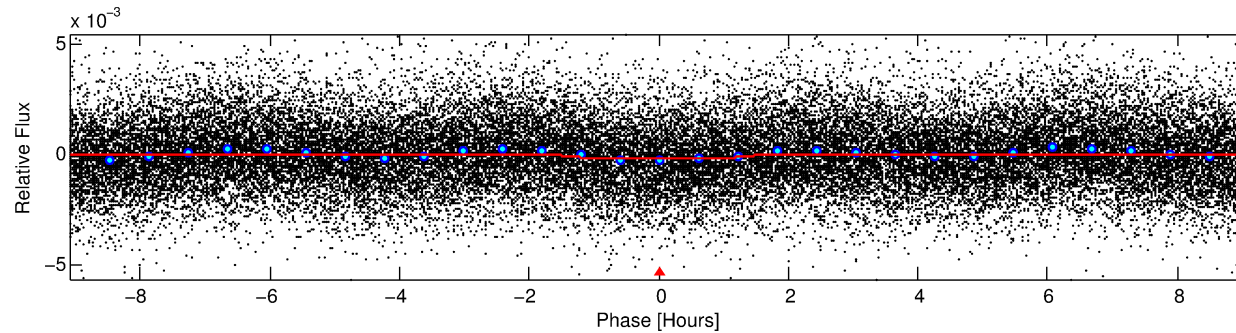
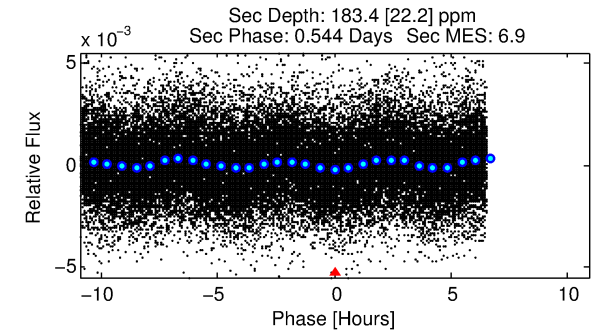
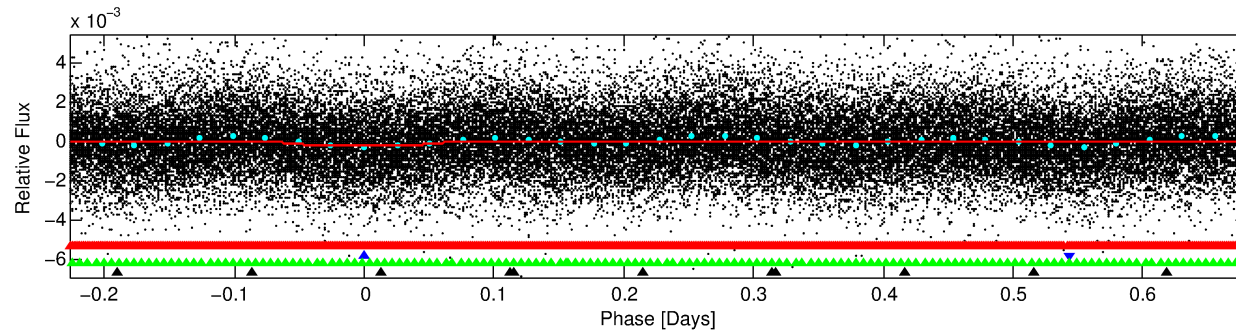
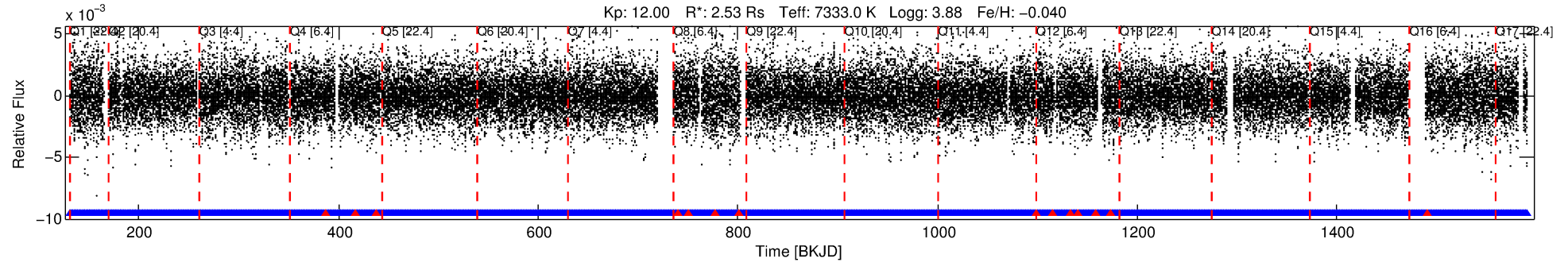
Ephemeris Match Information For 011620101-02

No Significant Match Found



# DV One-Page Summary

KIC: 11620101 Candidate: 2 of 4 Period: 0.908 d



## DV Fit Results:

Period = 0.90798 [0.00001] d  
Epoch = 131.5593 [0.0017] BKJD  
Rp/R\* = 0.0136 [0.0023]  
a/R\* = 1.42 [0.63]  
b = 0.90 [0.18]  
Seff = 33410.65 [18268.53]  
Teq = 3447 [471] K  
Rp = 3.75 [1.44] Re  
a = 0.0223 [0.0073] AU  
Ag = 3.56 [2.24] [1.14σ]  
Teffp = 7321 [733] K [4.45σ]

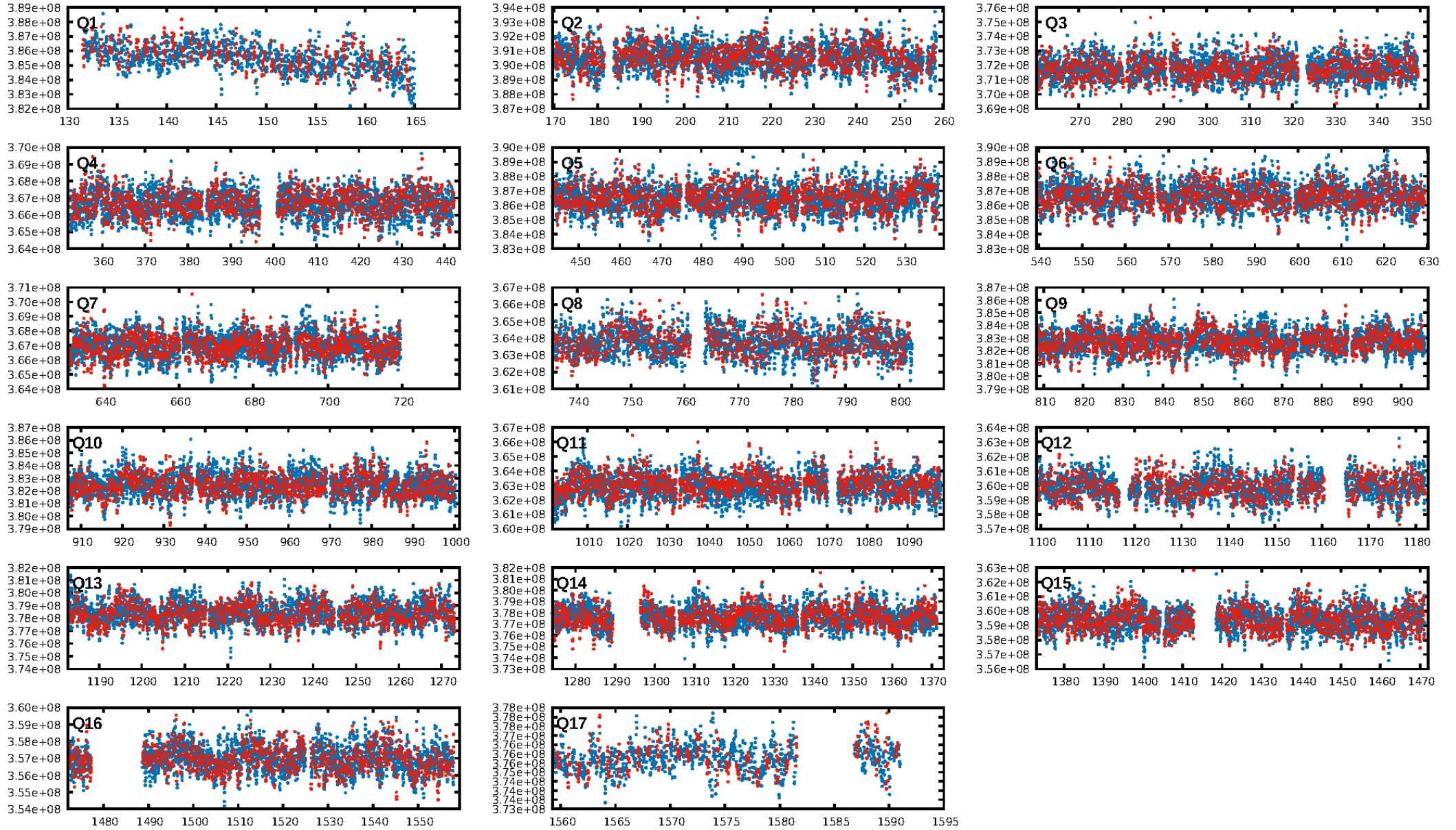
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [3.87σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
**Bootstrap-pfa: 3.35e-12**  
RollingBand-fgt: 0.99 [1313/1327]  
GhostDiagnostic-chr: 1.13  
**Centroid-sig: 0.0%**  
Centroid-so: 0.201 arcsec [1.83σ]  
OotOffset-rm: 0.077 arcsec [0.51σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-rm: 0.102 arcsec [0.55σ]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 0.71 [12/17]  
DiffImageOverlap-fno: 1.00 [17/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:04:21 Z

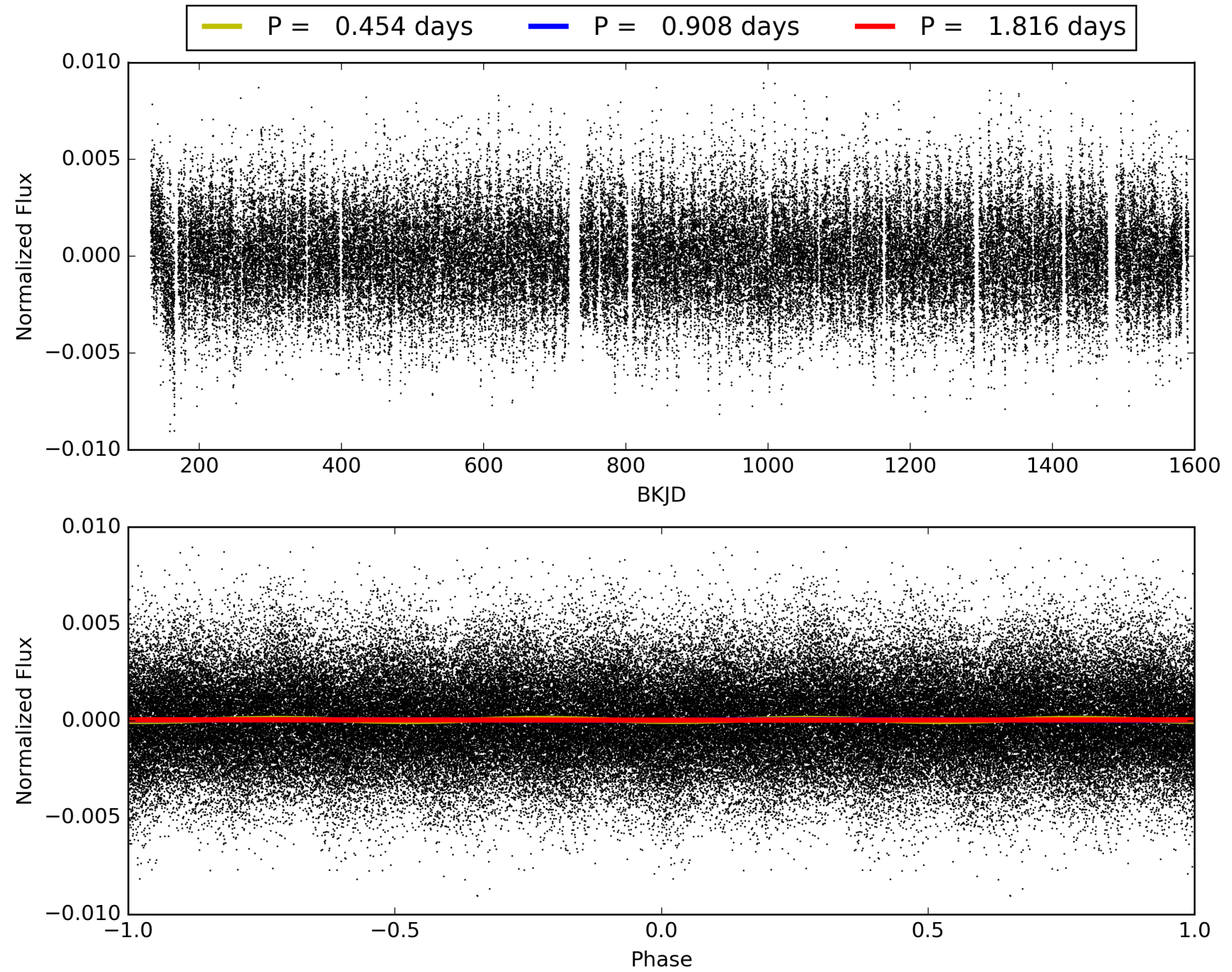
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 011620101-02, PDC Light Curves



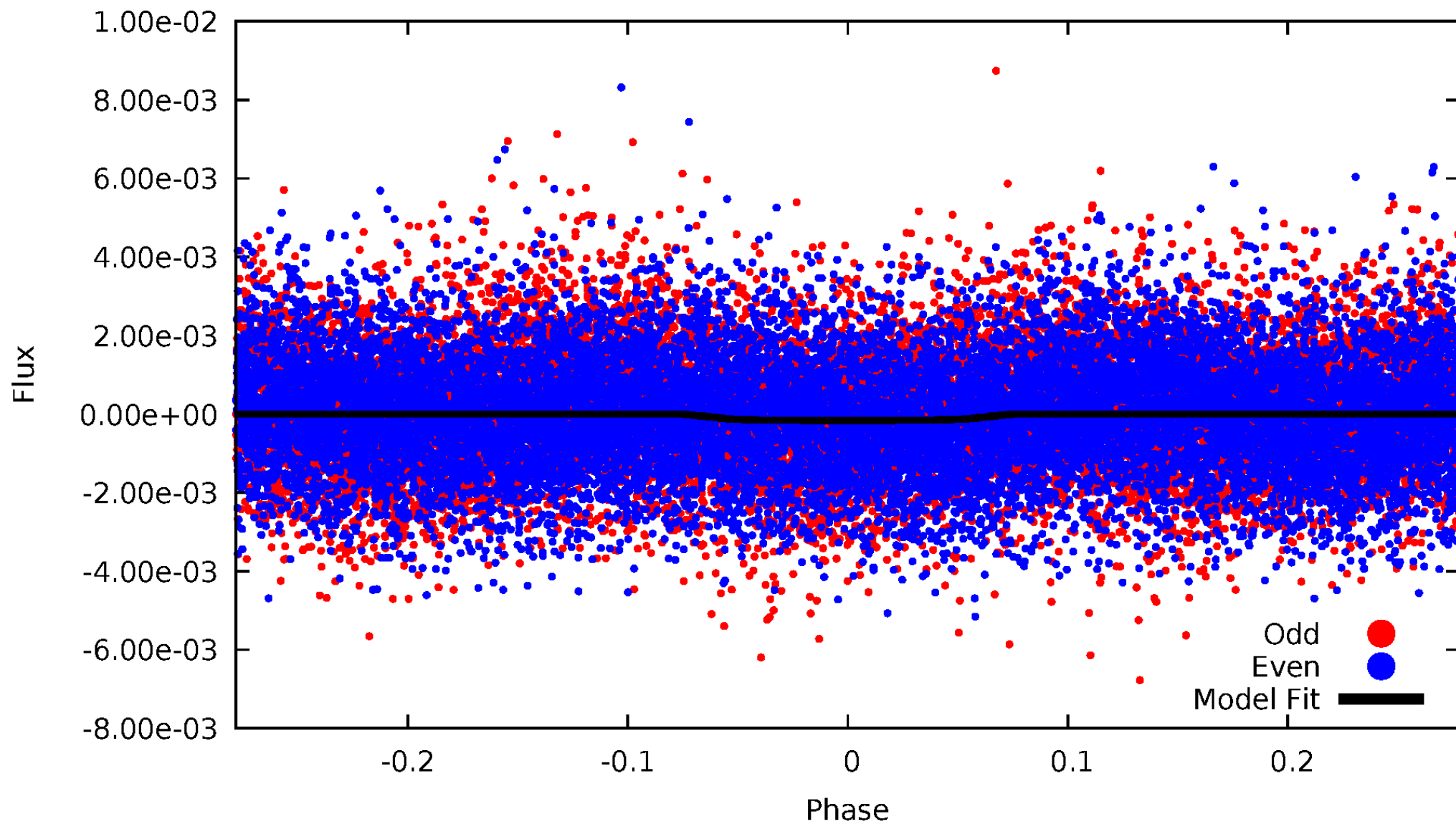


# TCE 011620101-02



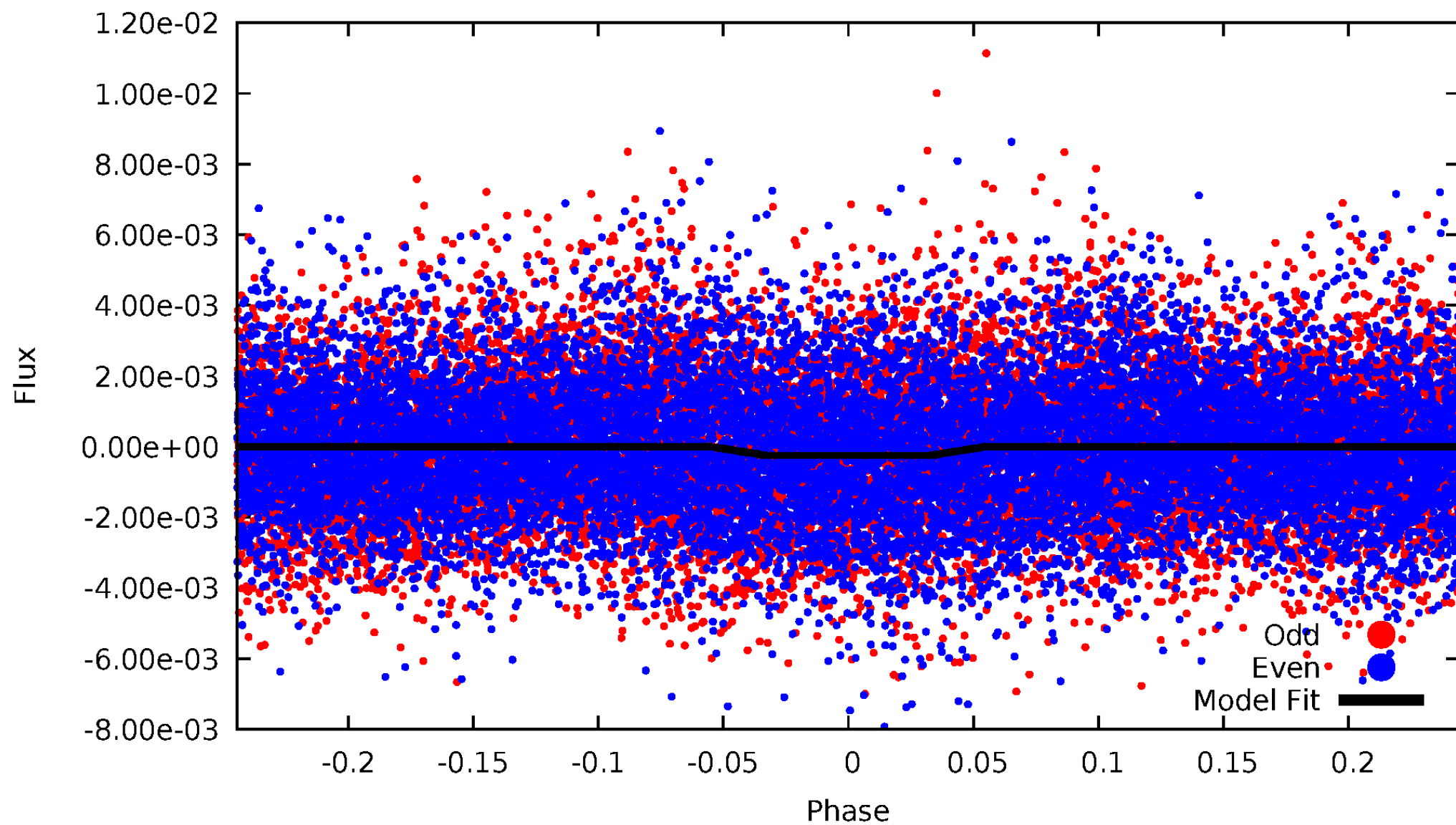
# DV Odd/Even

TCE 011620101-02



# ALT Odd/Even

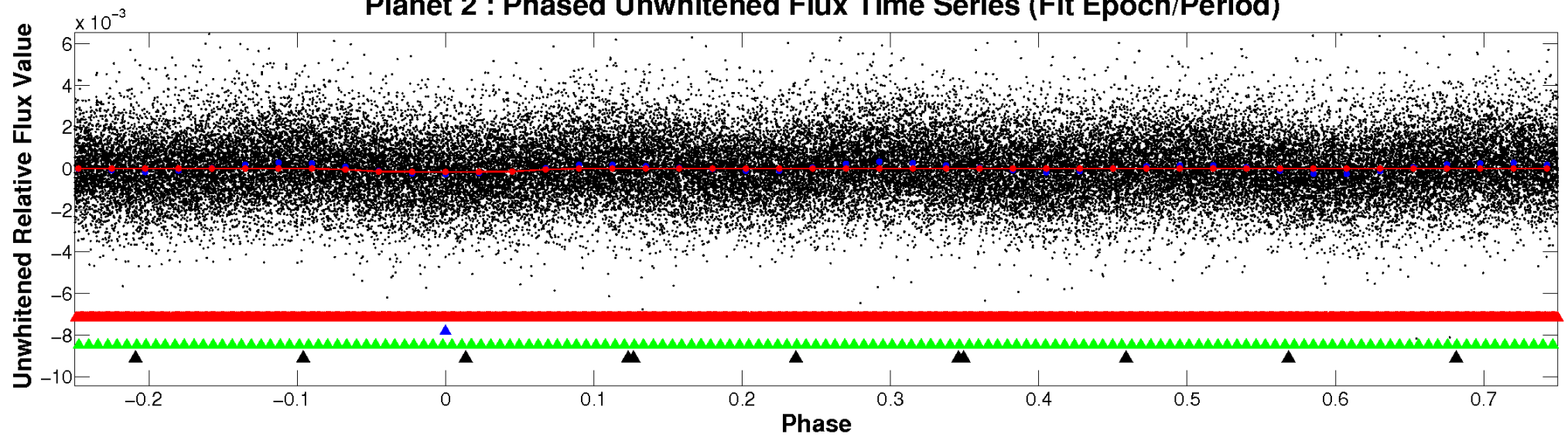
TCE 011620101-02



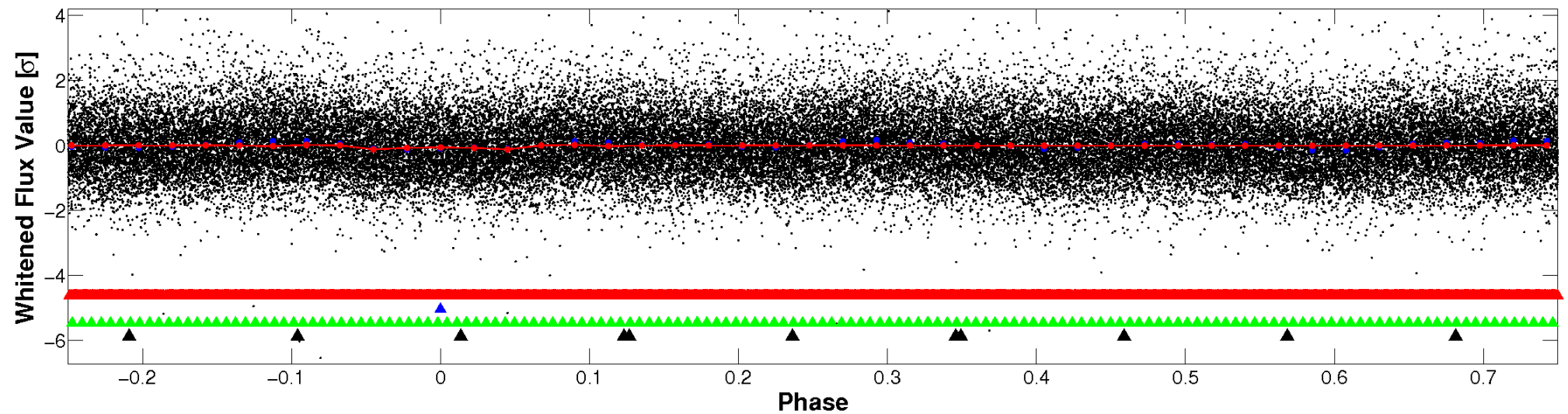


# Non-Whitened Vs. Whitened Light Curve

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

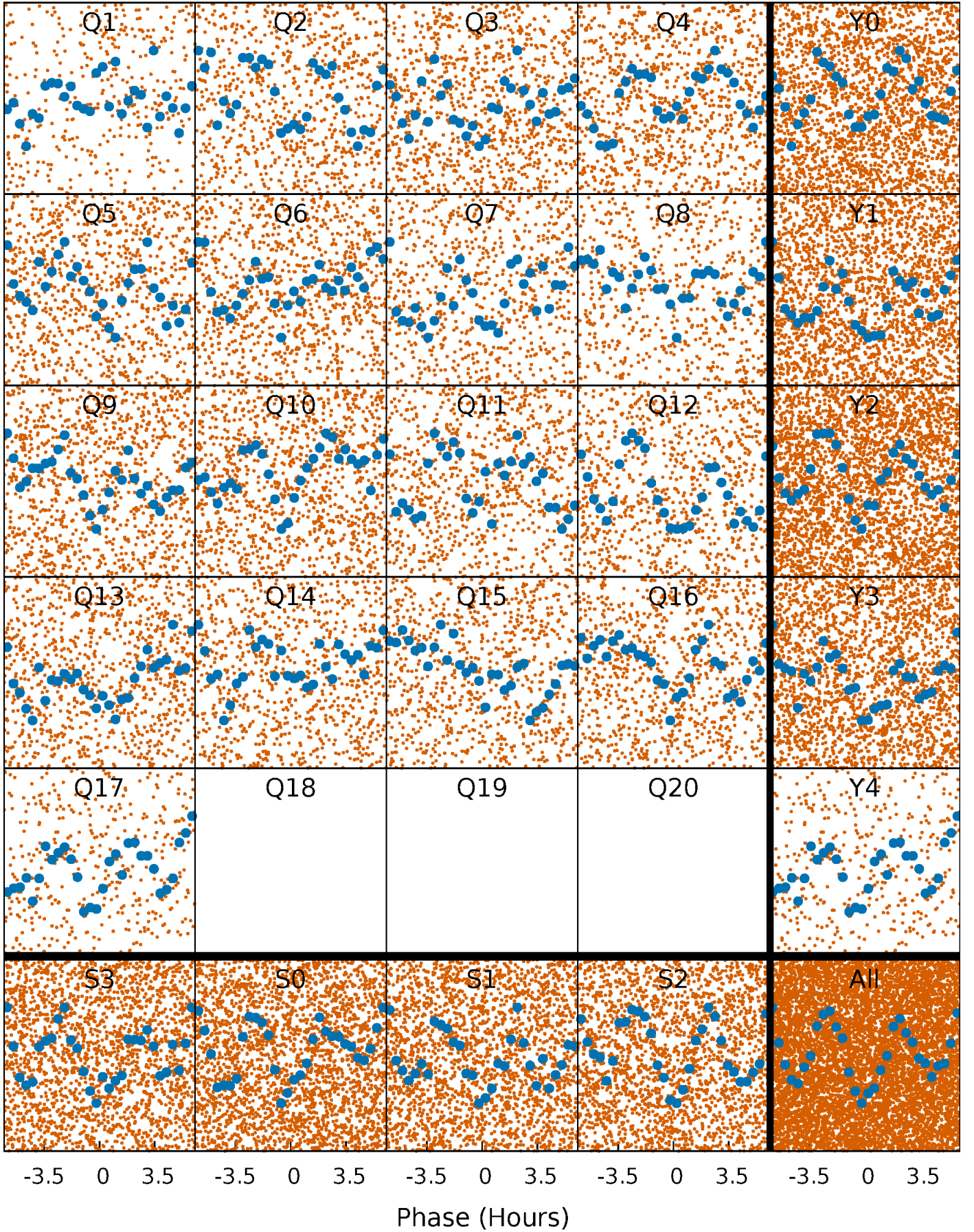


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

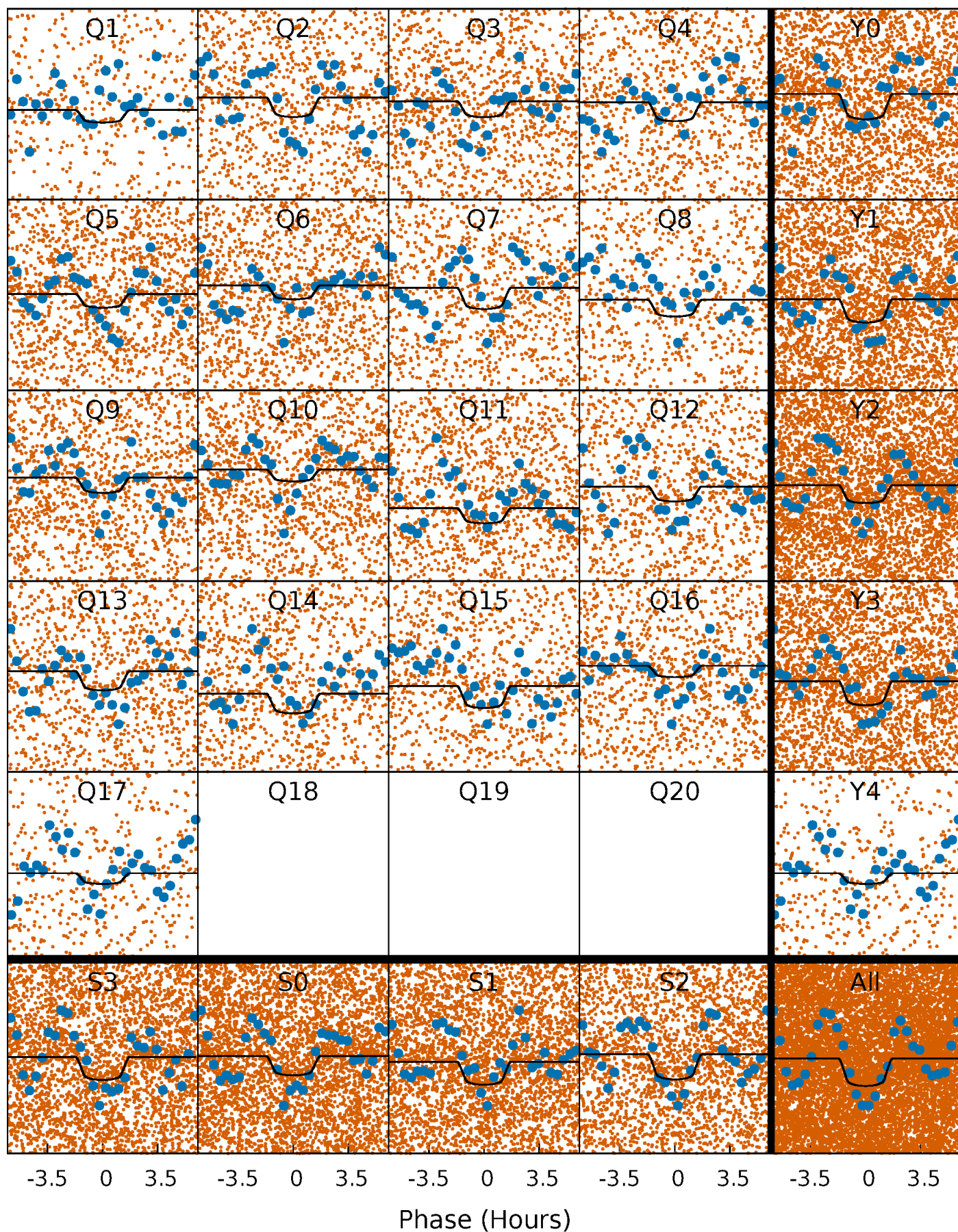
TCE 011620101-02   P= 0.907980 Days    $T_0=131.559276$  (BKJD)





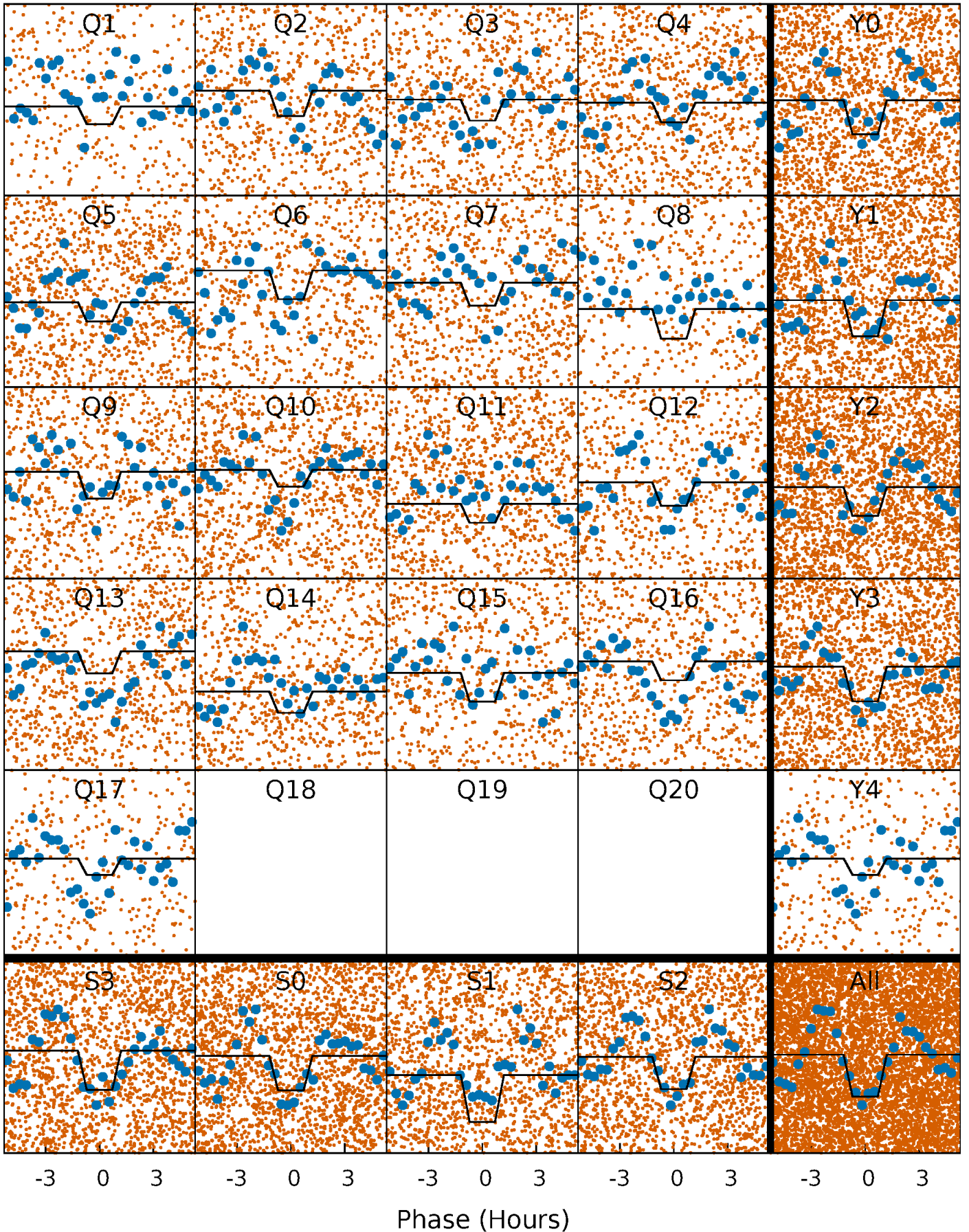
# DV Quarter-Phased Transit Curves

TCE 011620101-02   P= 0.907980 Days    $T_0=131.559276$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 011620101-02 P= 0.907999 Days  $T_0=131.543655$  (BKJD)

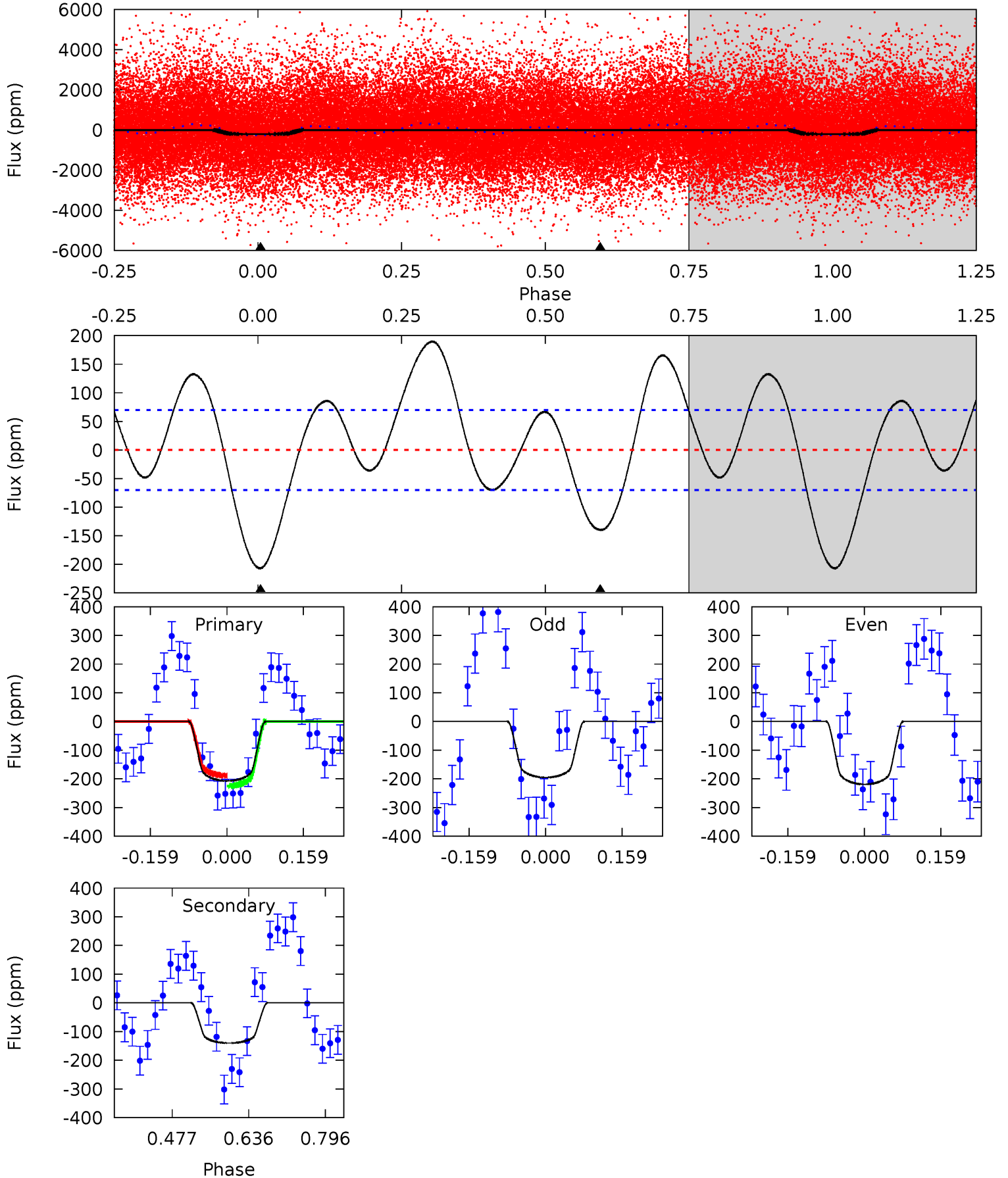




# DV Model-Shift Uniqueness Test

011620101-02, P = 0.907980 Days, E = 130.651296 Days

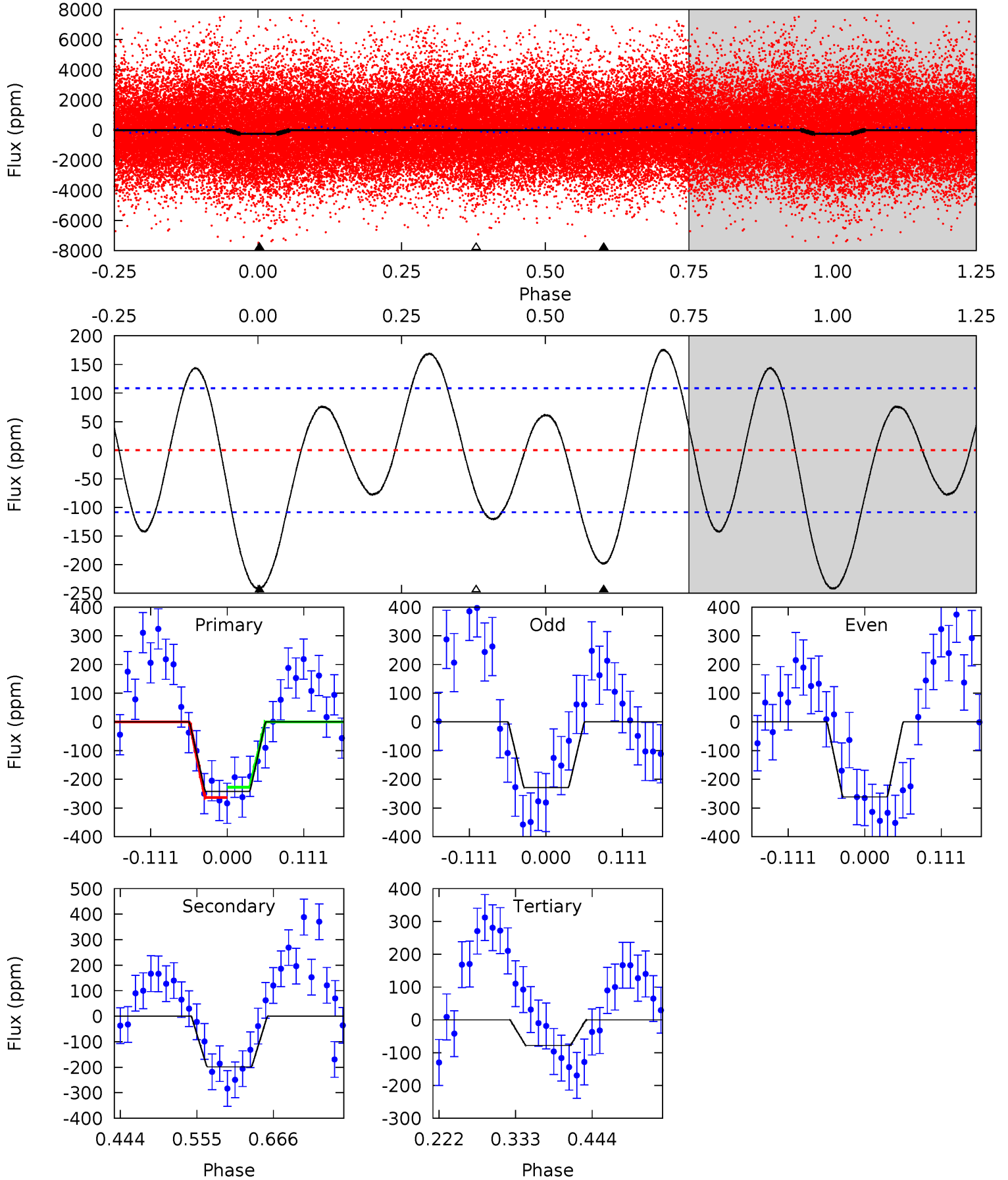
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.2	8.95	0	0	4.47	1.41	5.27	13.2	13.2	8.95	8.95	0.77	1.09	0.48	1.16



# Alt Model-Shift Uniqueness Test

011620101-02, P = 0.907999 Days, E = 130.635656 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.2	8.32	3.28	0	4.54	1.59	3.86	6.88	10.2	5.04	8.32	0.68	1.16	0.42	0.75



### Stellar Parameters For KIC 011620101

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7333^{+203}_{-330}$	$3.884^{+0.301}_{-0.129}$	$-0.040^{+0.200}_{-0.350}$	$2.529^{+0.510}_{-0.874}$	$1.785^{+0.175}_{-0.409}$	$0.155^{+0.332}_{-0.060}$
	+3%/-5%	+8%/-3%	+500%/-875%	+20%/-35%	+10%/-23%	+214%/-39%
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 011620101-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-140 \pm 16$	$3.53^{+0.93}_{-0.75}$	$4696^{+376}_{-421}$	$6538^{+732}_{-654}$	$3.025^{+1.852}_{-1.139}$
Alt.	$-198 \pm 24$	$4.17^{+0.97}_{-0.94}$	$4705^{+369}_{-425}$	$6645^{+706}_{-666}$	$3.099^{+1.832}_{-1.120}$

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

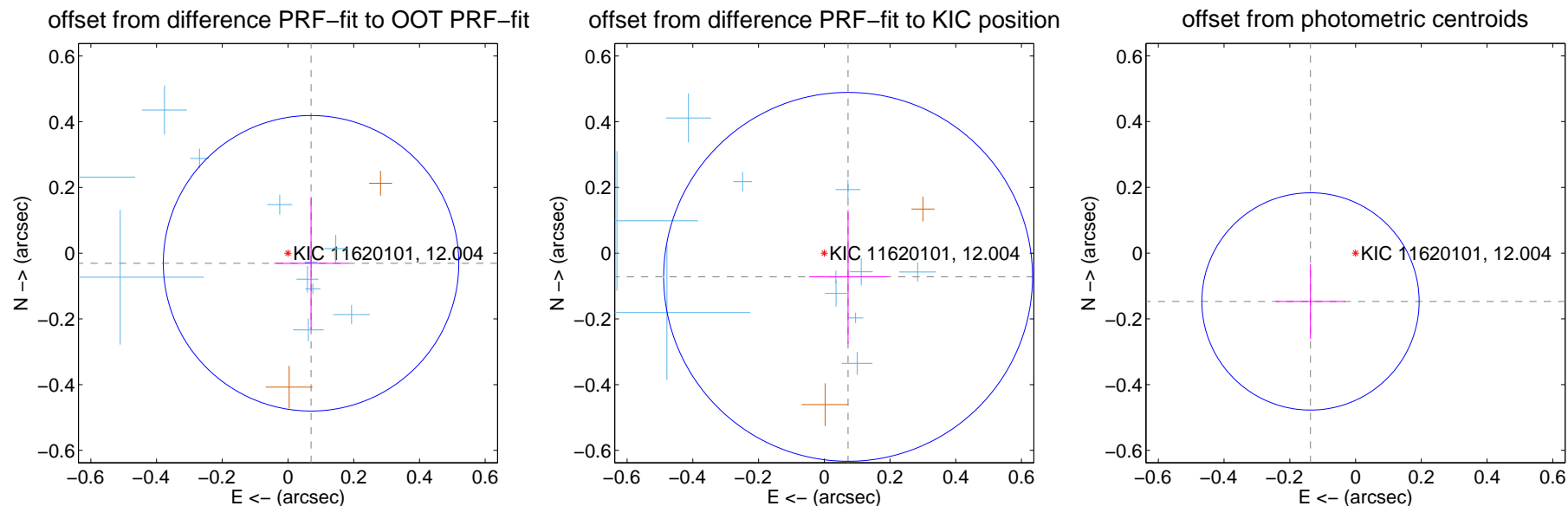
## DV Centroid Data

Supplemental centroid analysis for 011620101-02. Kepler magnitude: 12.00. Transit SNR 7.79

There are 12 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.11 arcsec

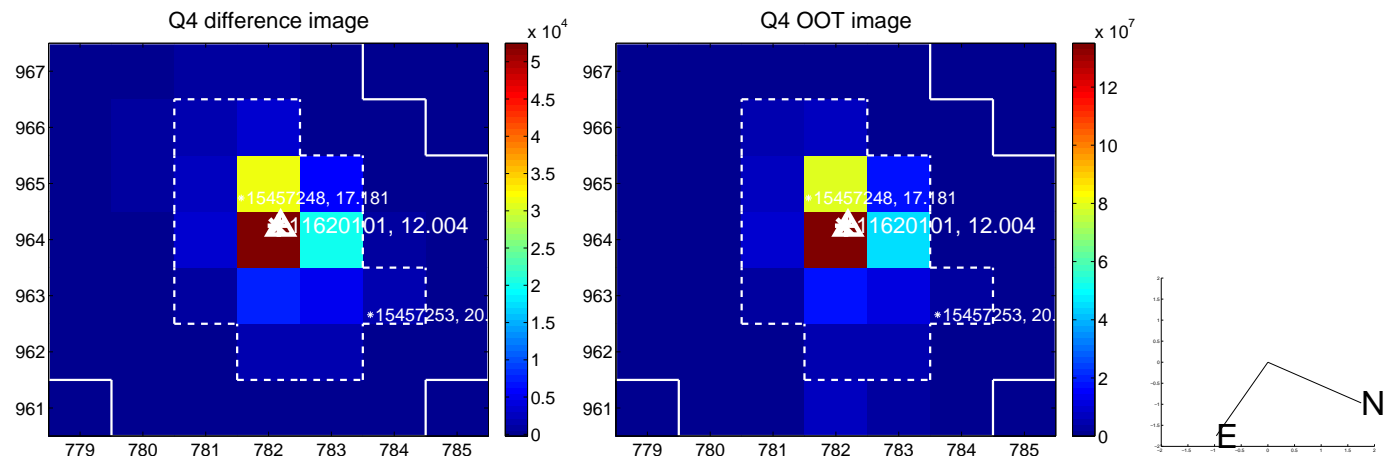
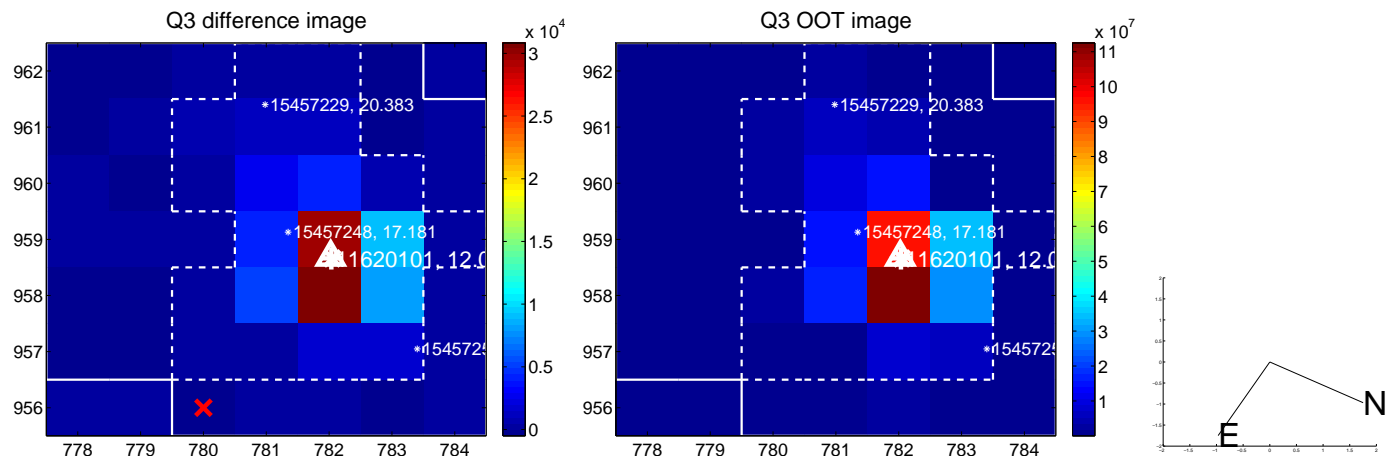
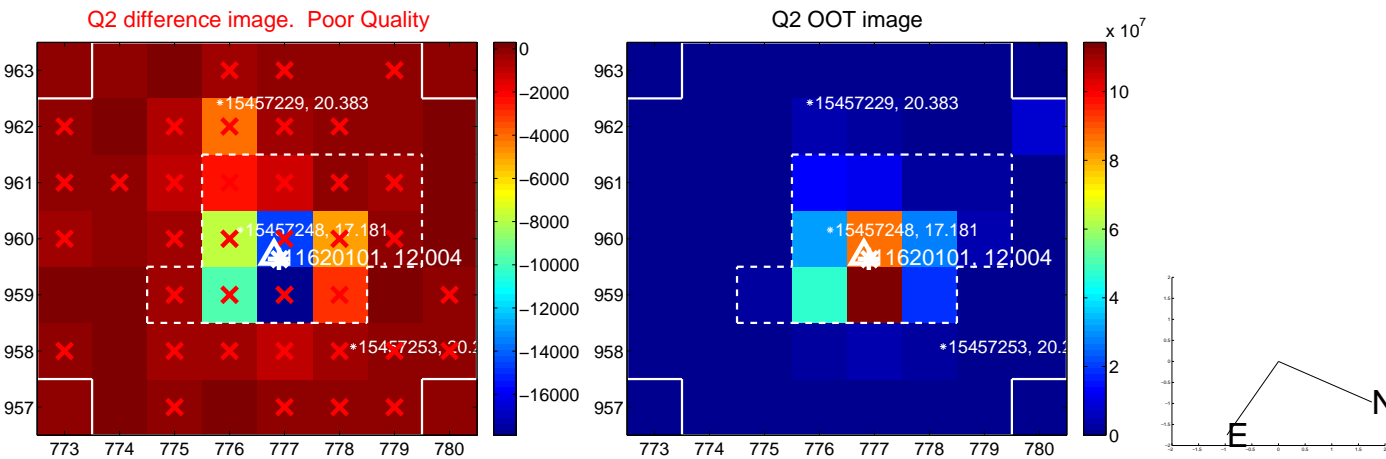
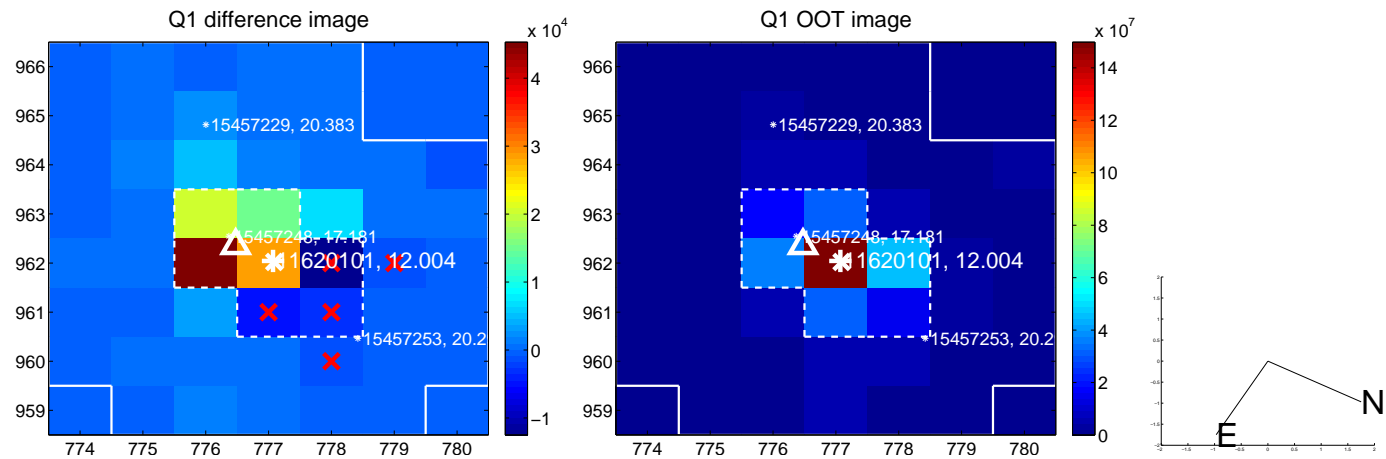
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.077 \pm 0.150$	0.51	$-0.070 \pm 0.112$	$-0.031 \pm 0.202$
PRF-fit source offset from KIC position	$0.102 \pm 0.187$	0.55	$-0.072 \pm 0.119$	$-0.072 \pm 0.203$
photometric centroid source offset	$0.20 \pm 0.11$	1.83	$0.14 \pm 0.11$	$-0.15 \pm 0.11$



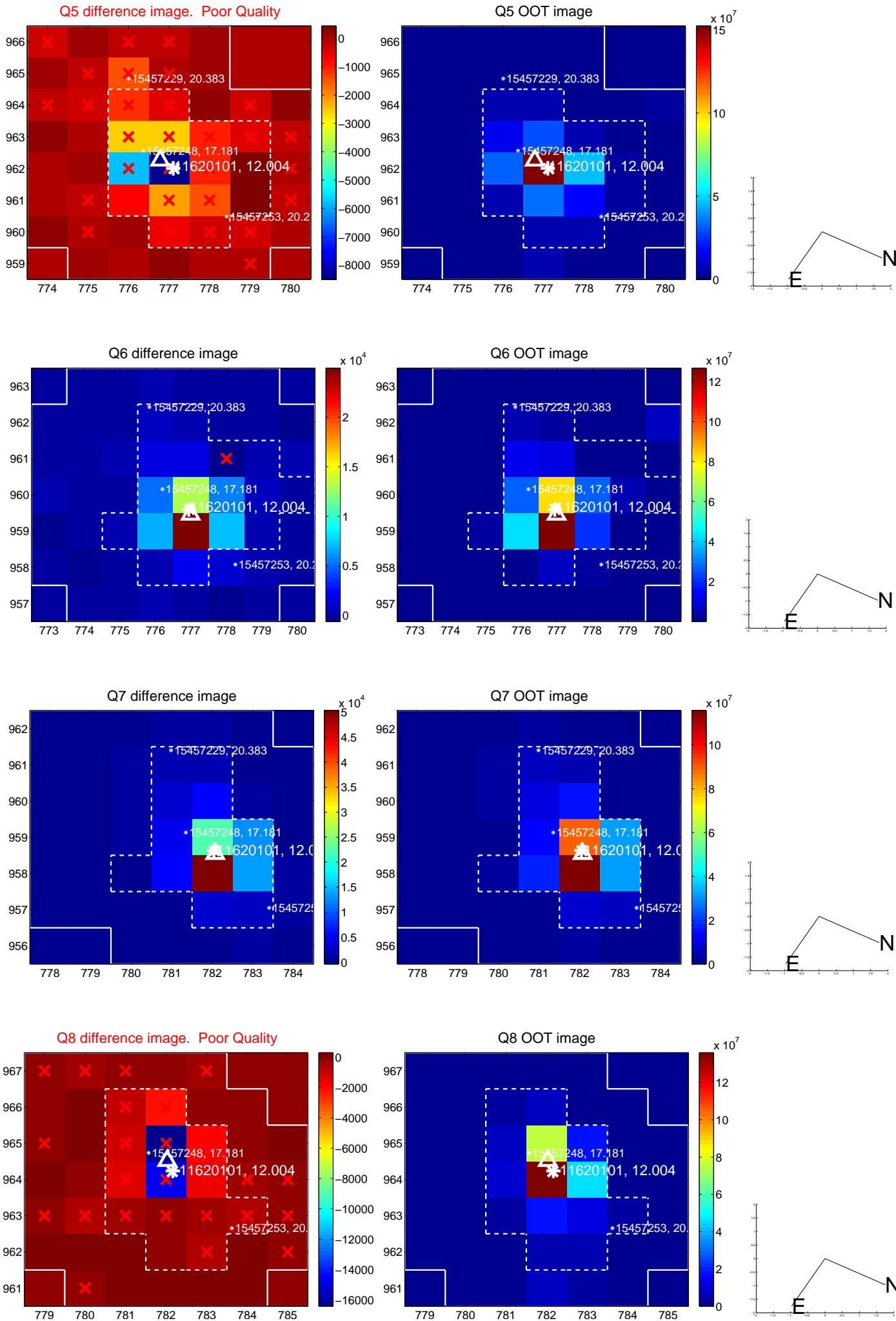
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



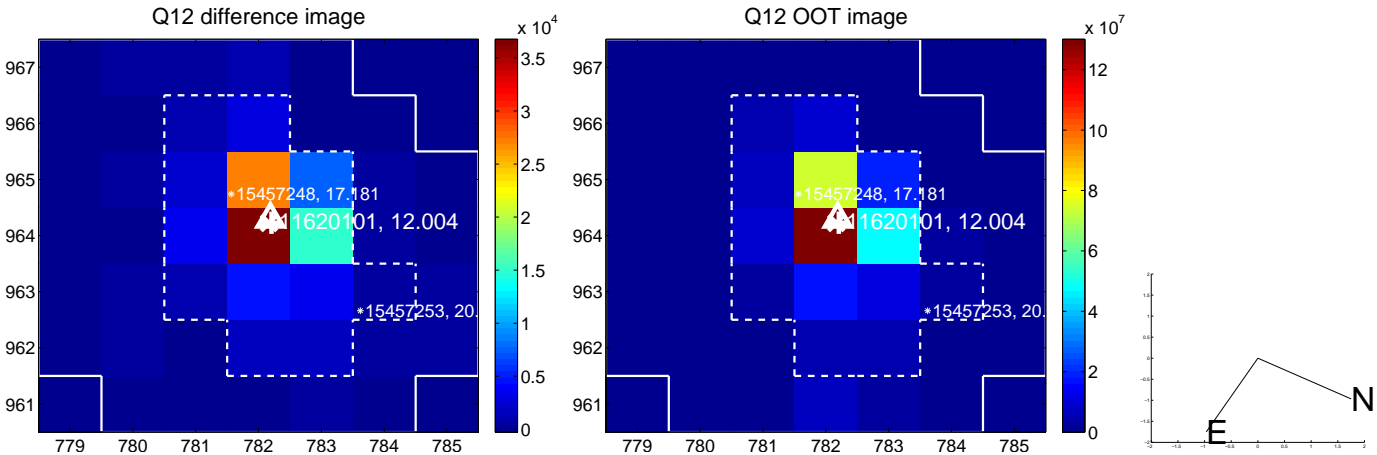
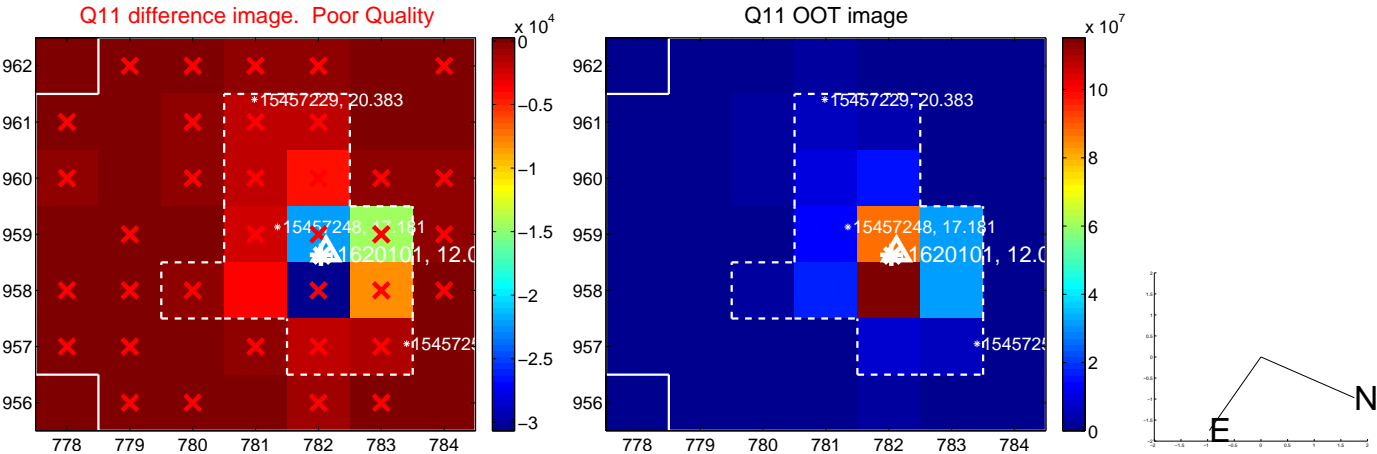
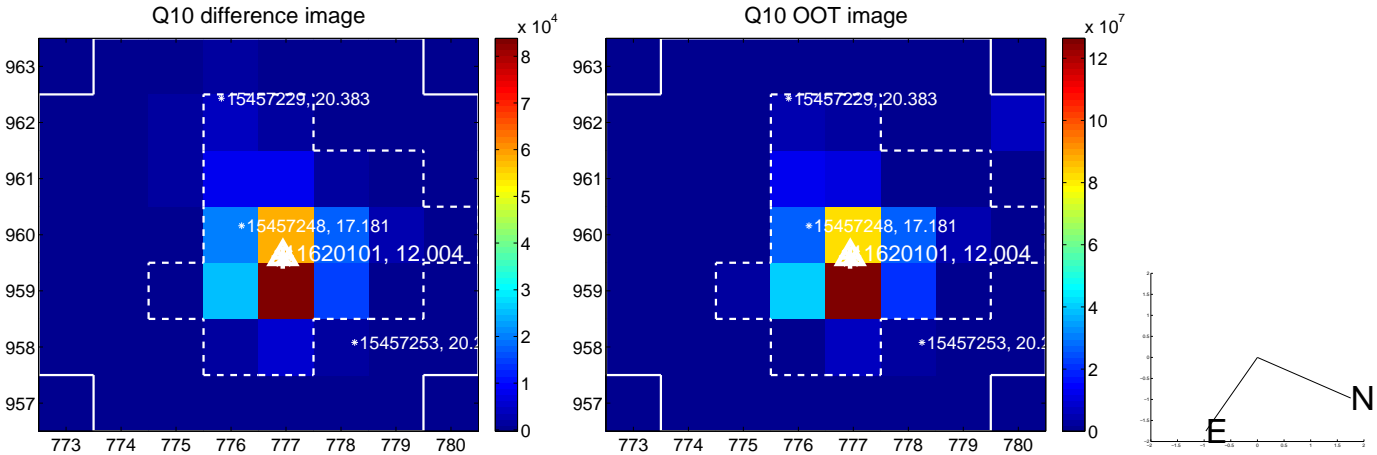
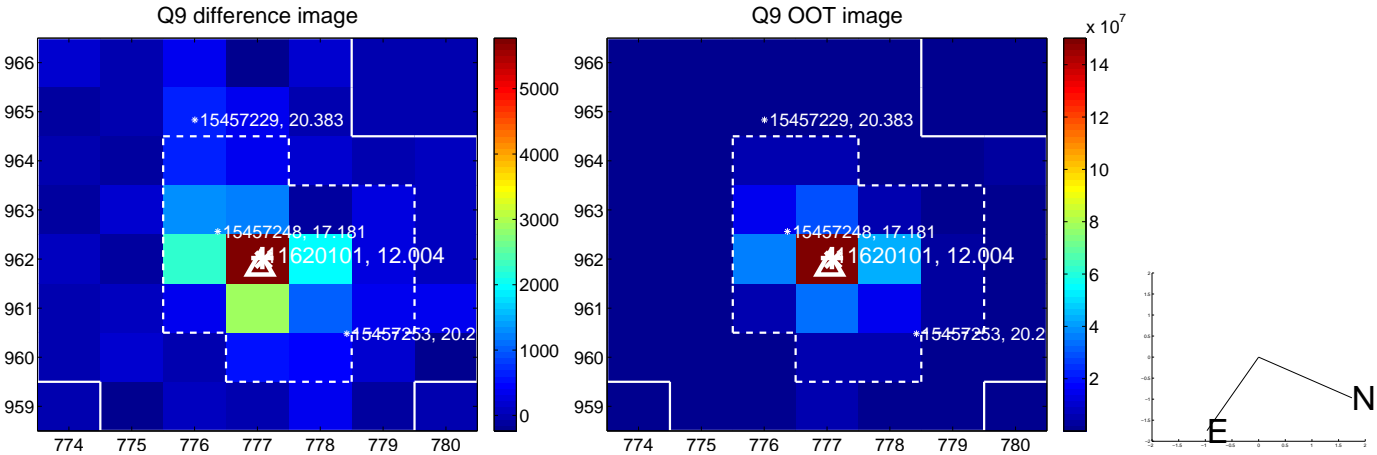
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



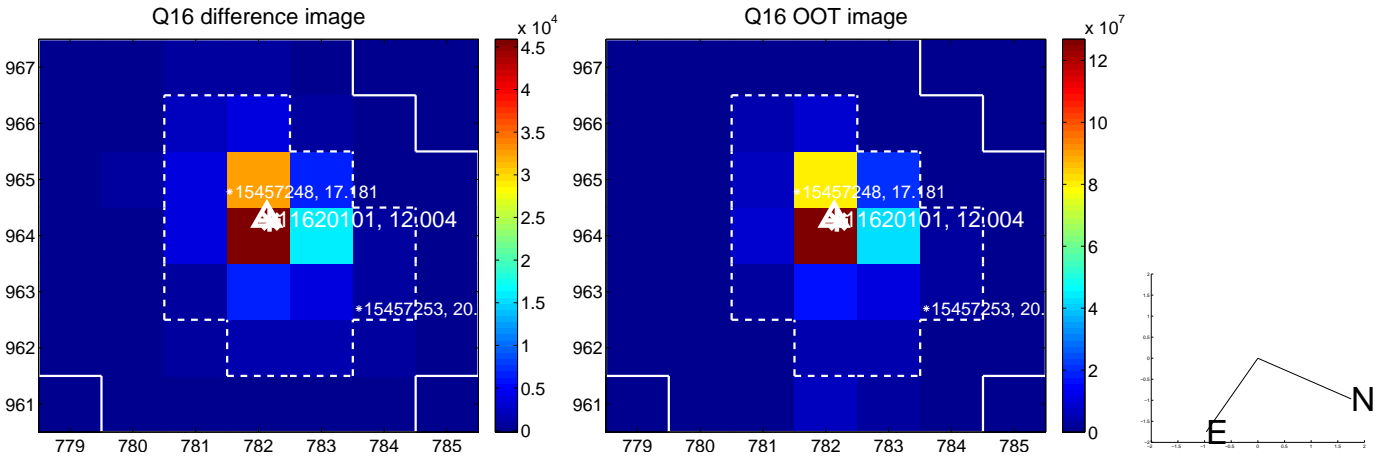
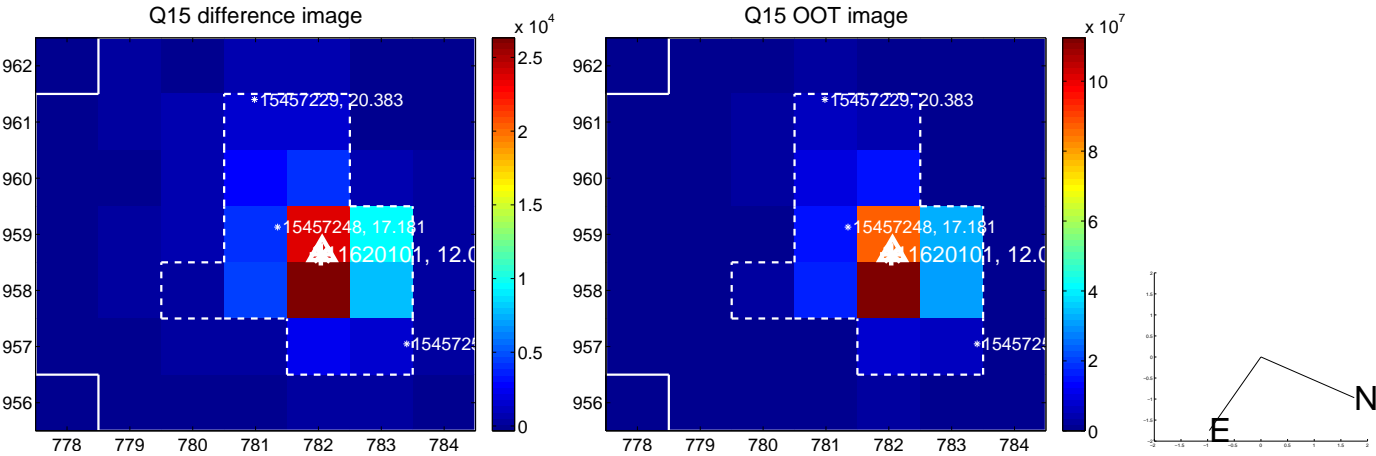
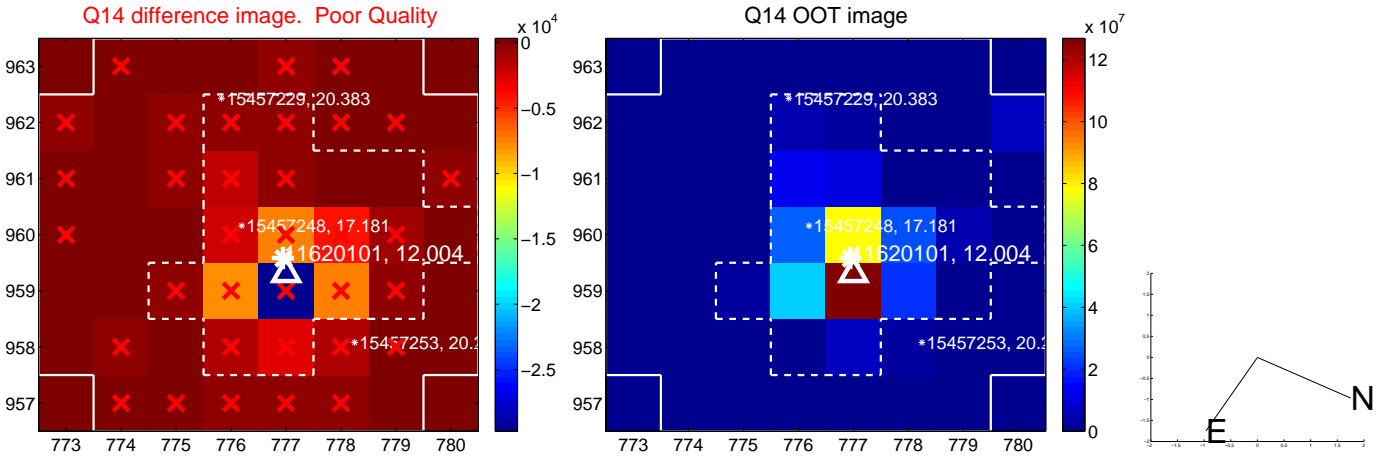
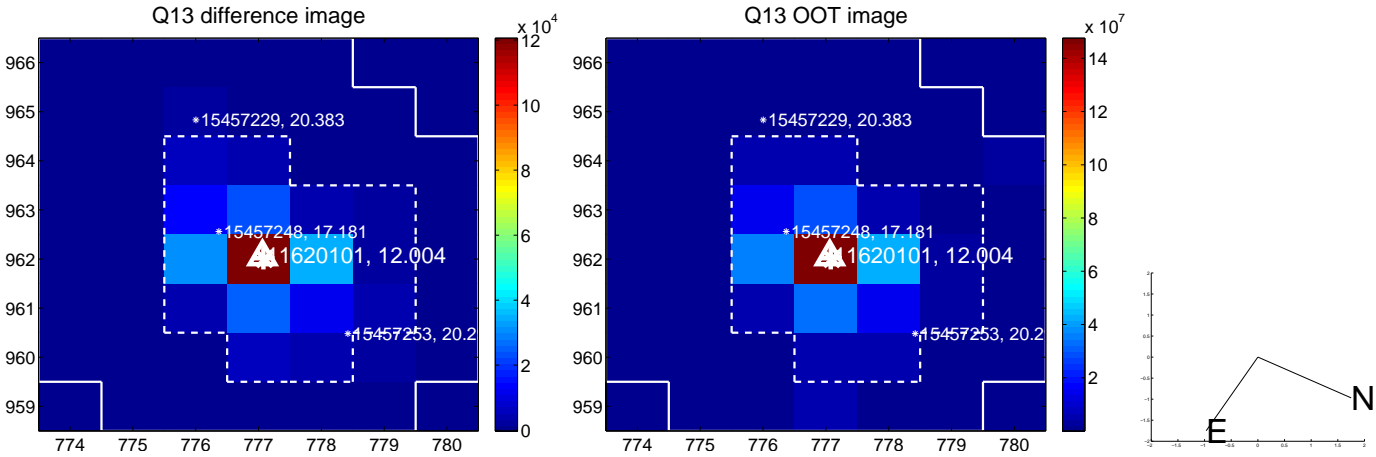
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



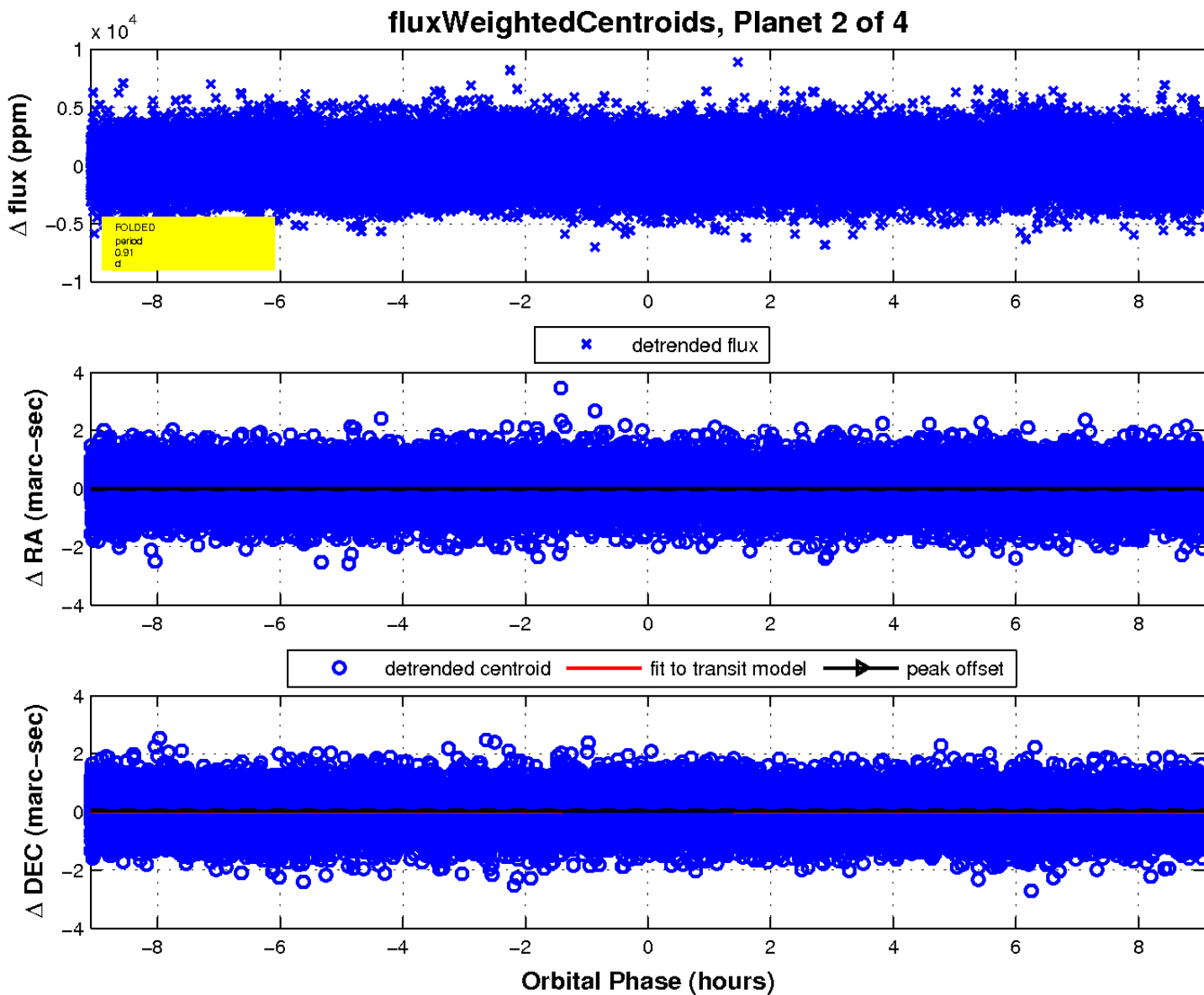
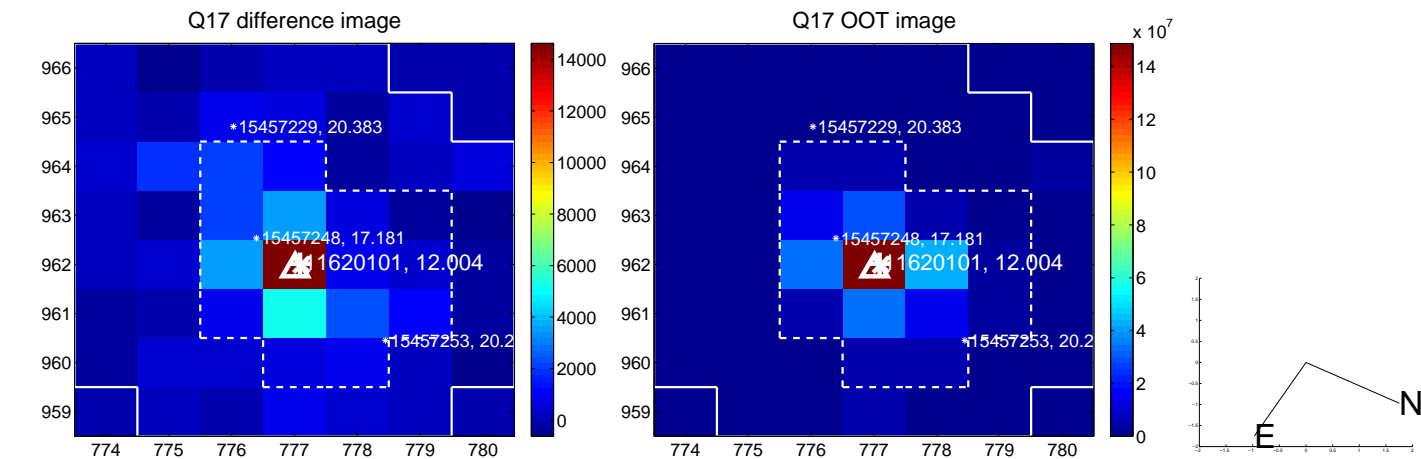
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



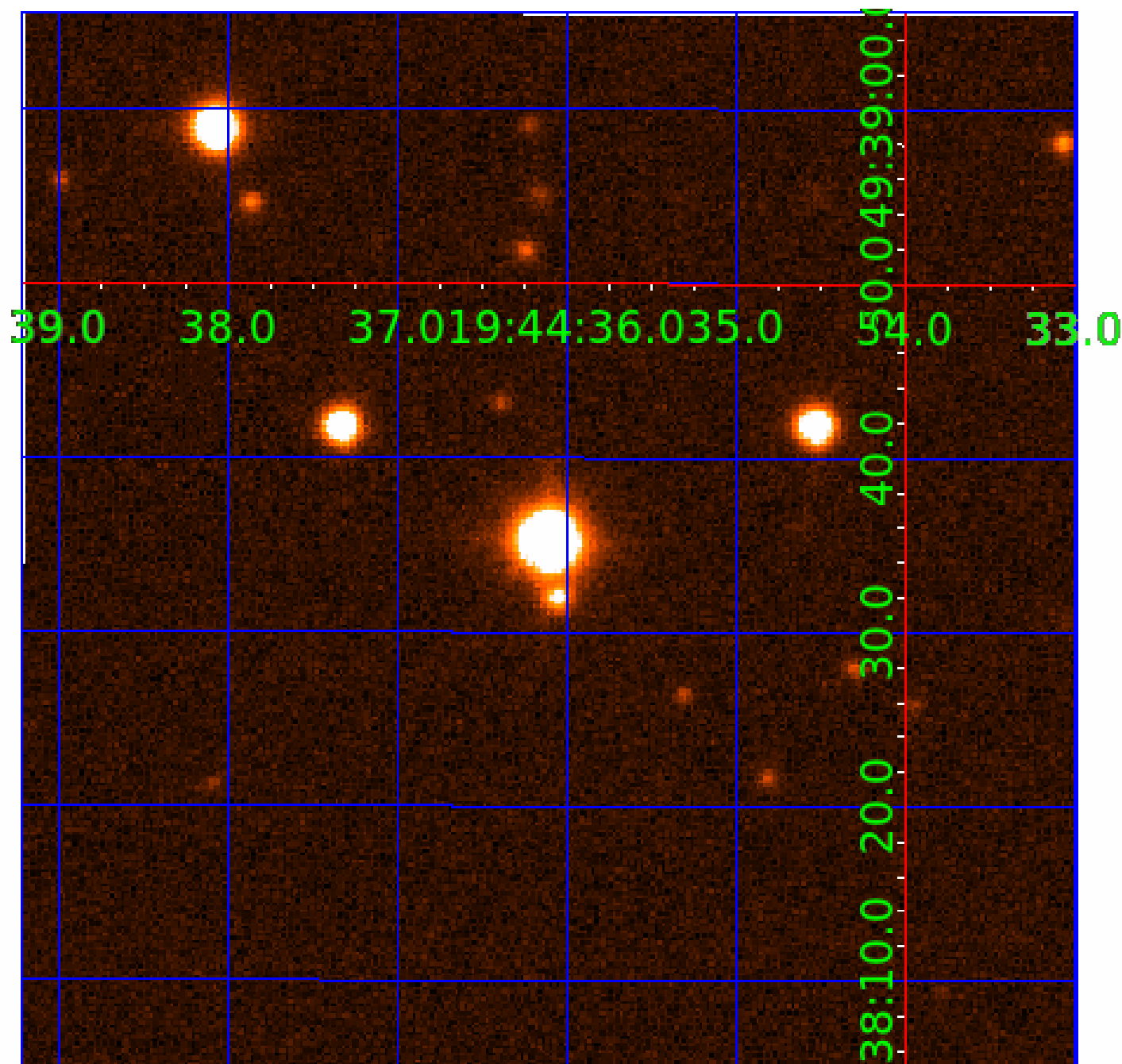
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





UKIRT Image

Declination



# KIC 011620101

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
011620101-01	OBS	No	1.461649	132.498323	189.3	1.613	8.1	7.0	2.53	7333	4.09	17709.08
011620101-02	OBS	No	0.907980	131.559276	163.3	3.029	8.7	7.8	2.53	7333	3.75	33410.65
011620101-03	OBS	No	9.220393	135.207269	820.3	11.496	8.5	10.1	2.53	7333	13.32	1519.34
011620101-04	OBS	No	129.639080	257.177764	2309.5	6.978	7.3	8.6	2.53	7333	13.67	44.77

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
011620101-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
011620101-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
011620101-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_ZUMA—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
011620101-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT

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

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

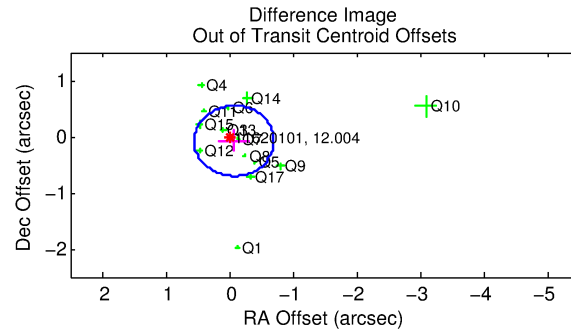
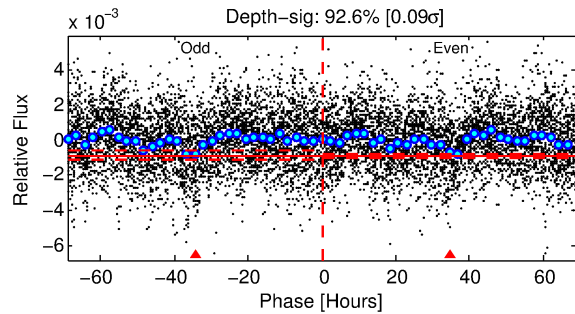
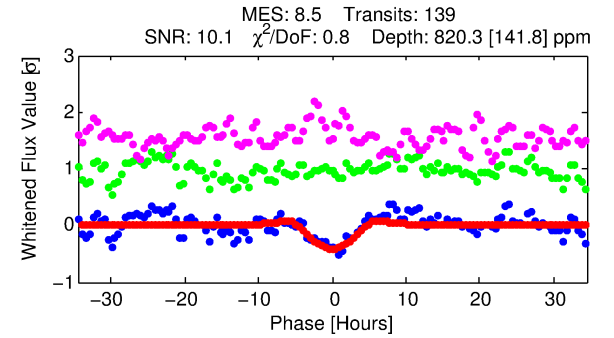
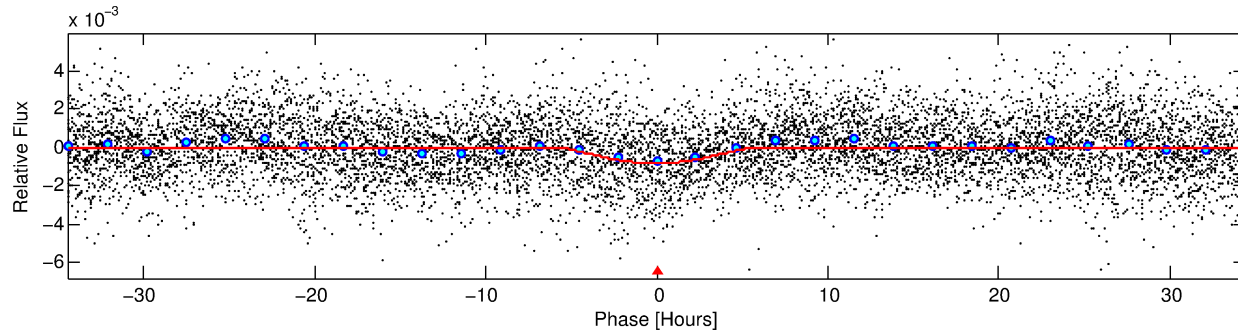
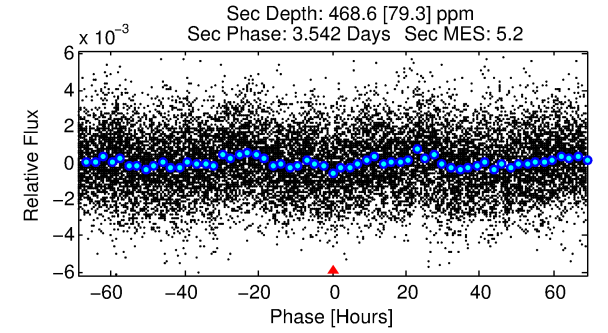
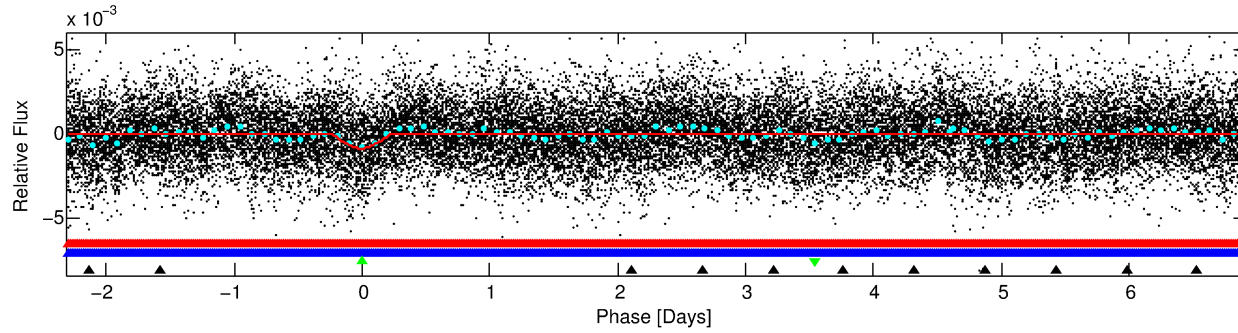
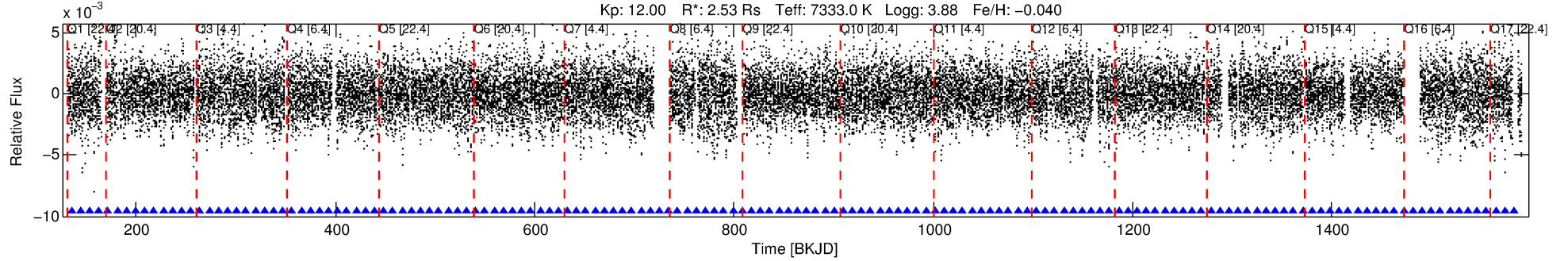
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 011620101-03

No Significant Match Found

# DV One-Page Summary

KIC: 11620101 Candidate: 3 of 4 Period: 9.220 d



## DV Fit Results:

Period = 9.22039 [0.00024] d  
Epoch = 135.2073 [0.0213] BKJD  
Rp/R\* = 0.0483 [0.1321]  
a/R\* = 2.19 [1.11]  
b = 1.00 [0.20]  
Seff = 1519.34 [830.75]  
Teq = 1592 [218] K  
Rp = 13.32 [36.76] Re  
a = 0.1044 [0.0341] AU  
Ag = 15.85 [87.27] [0.17σ]  
Teffp = 4912 [6732] K [0.49σ]

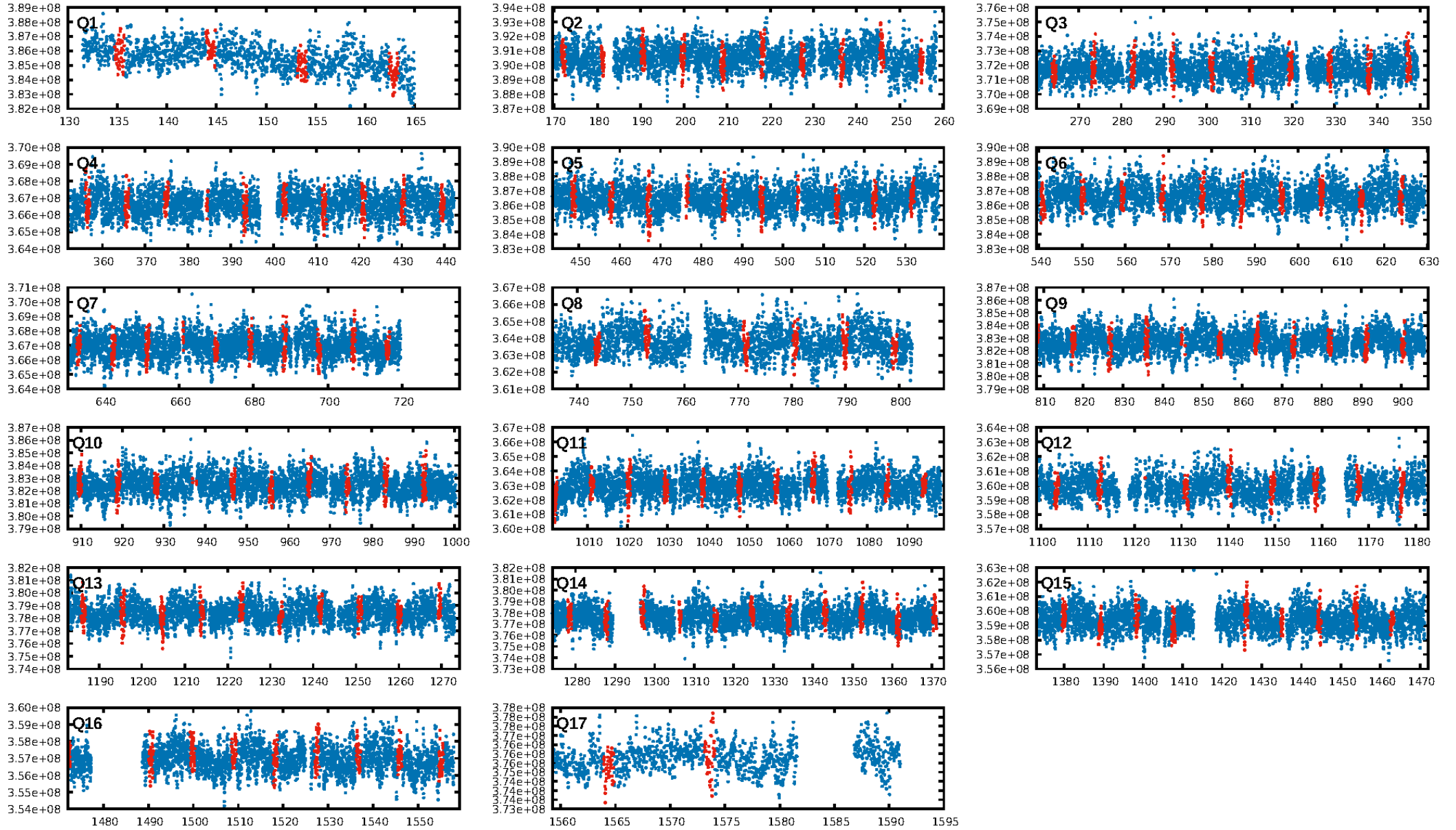
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [16.04σ]  
LongPeriod-sig: 100.0% [214.91σ]  
ModelChiSquare2-sig: 10.2%  
ModelChiSquareGof-sig: 100.0%  
**Bootstrap-pfa: 6.53e-10**  
RollingBand-fgt: 1.00 [133/133]  
GhostDiagnostic-chr: 1.169  
**Centroid-sig: 0.0%**  
Centroid-so: 0.111 arcsec [2.01σ]  
OotOffset-rm: 0.107 arcsec [0.51σ]  
OotOffset-st: 3/4/3/5 [15]  
KicOffset-rm: 0.158 arcsec [0.72σ]  
KicOffset-st: 3/4/3/5 [15]  
DiffImageQuality-fgm: 0.80 [12/15]  
DiffImageOverlap-fno: 0.00 [0/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:04:31 Z

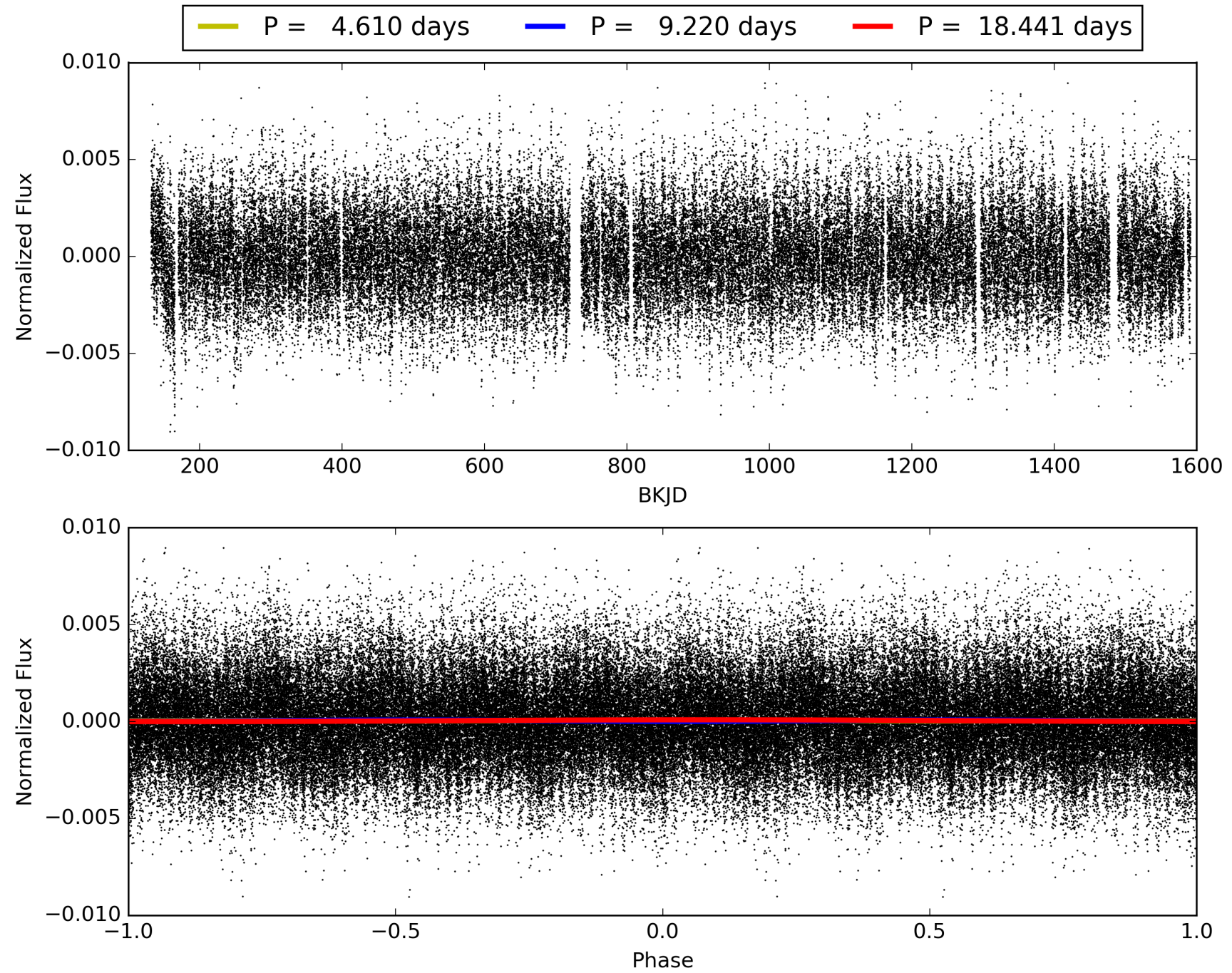
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 011620101-03, PDC Light Curves



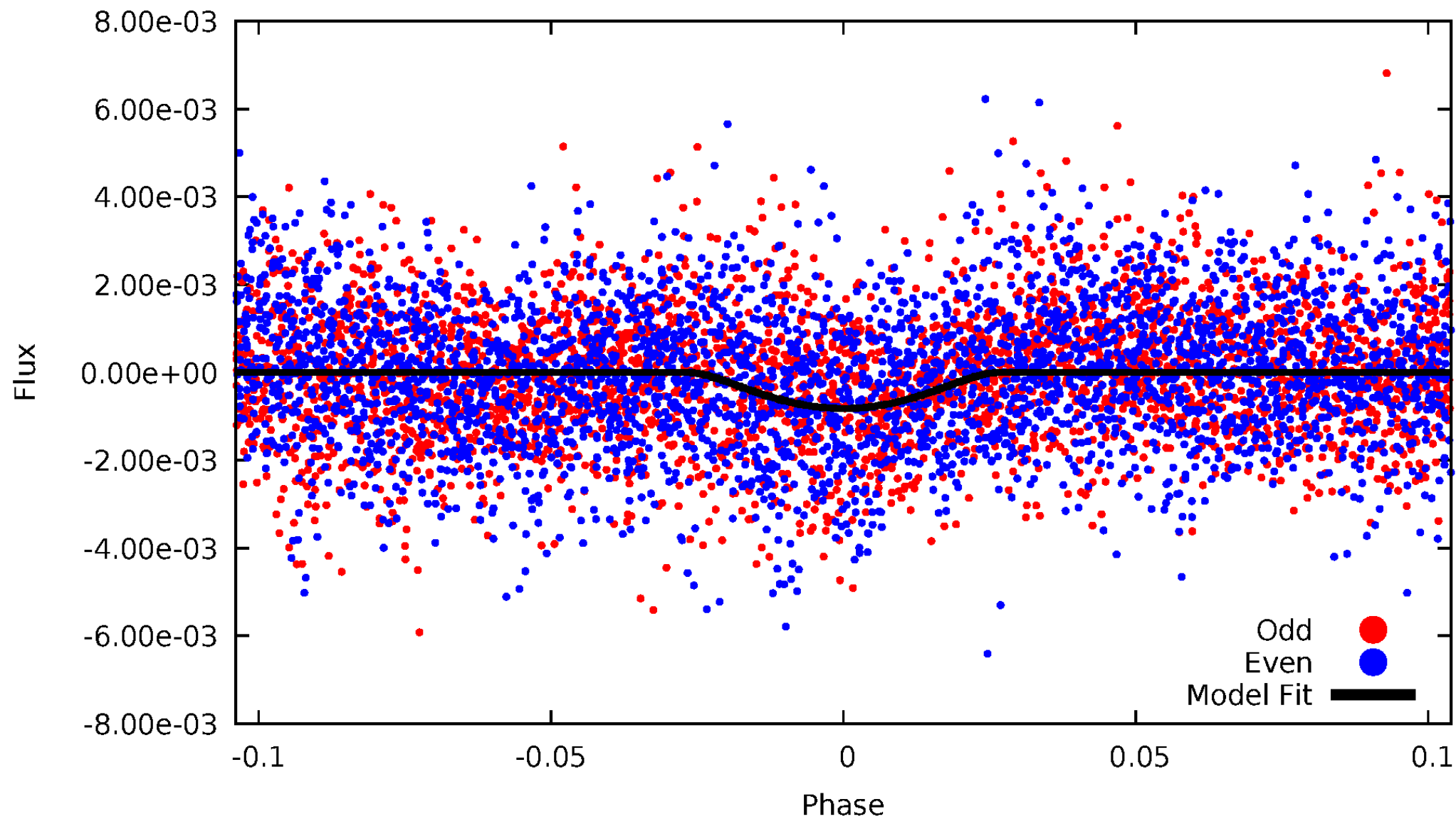


TCE 011620101-03



DV Odd/Even

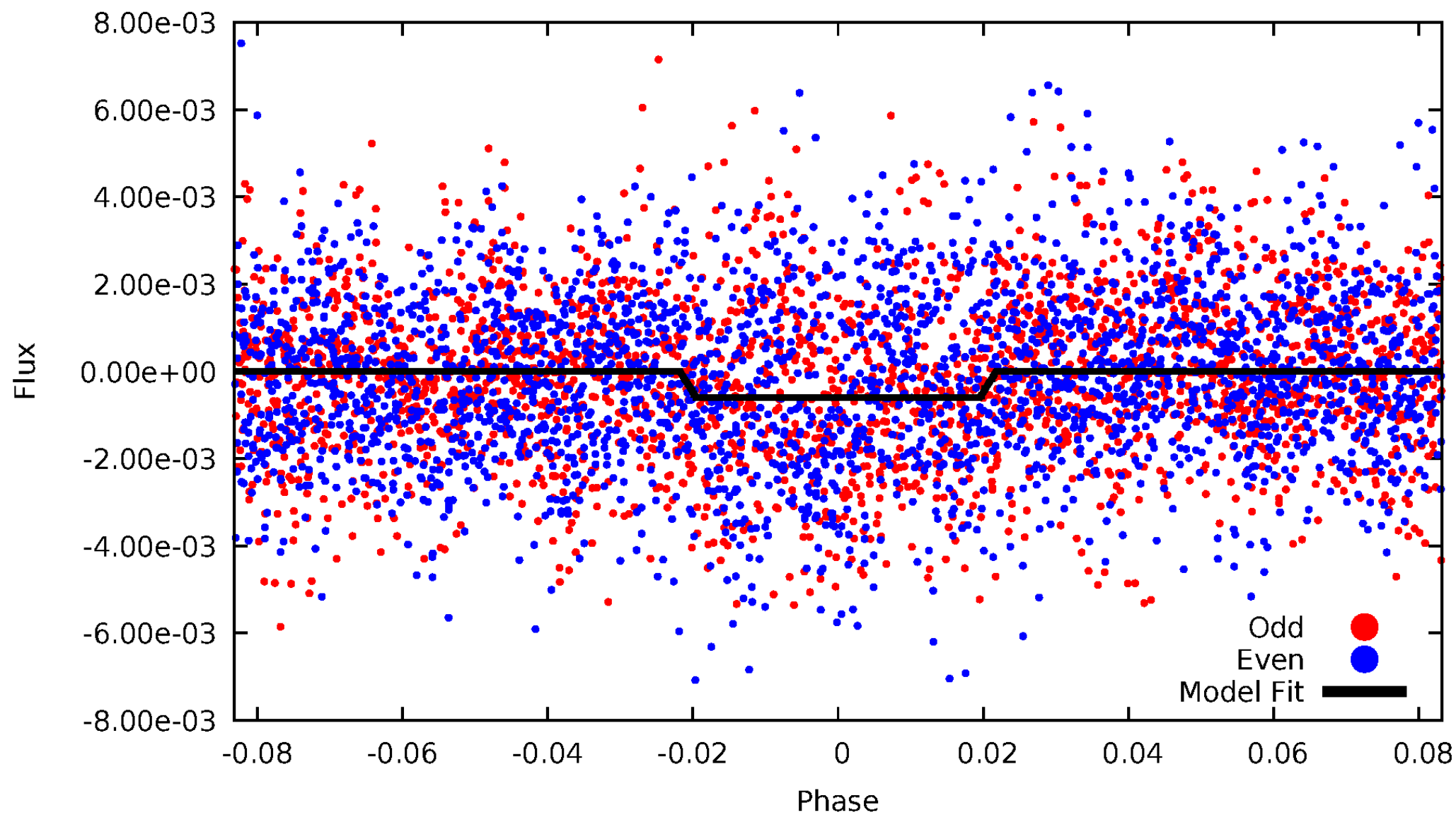
TCE 011620101-03



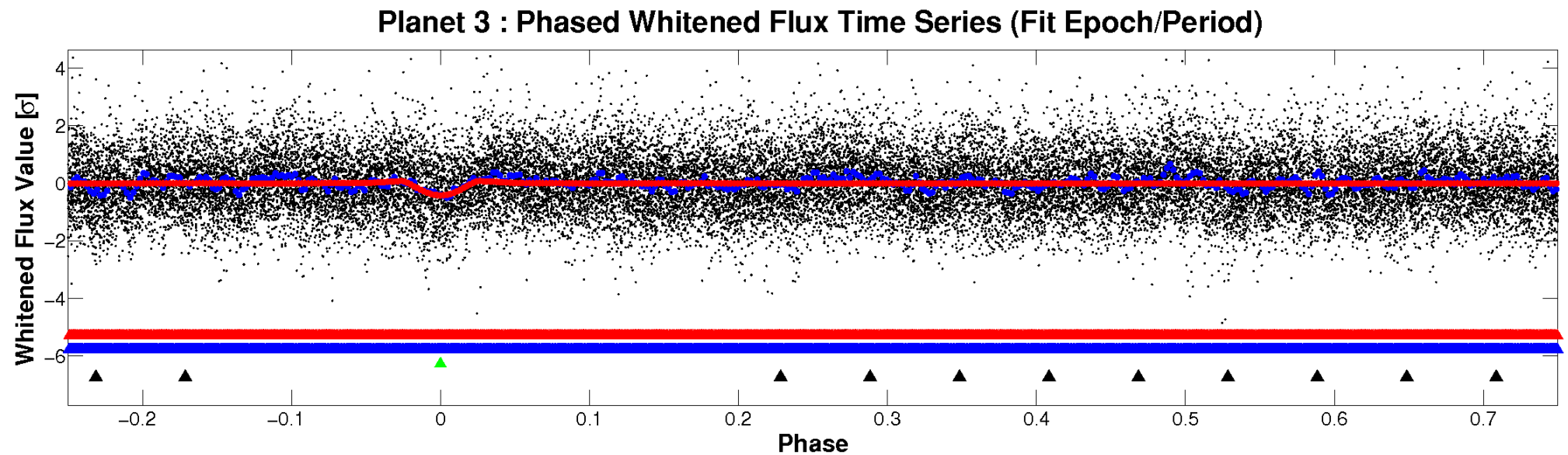
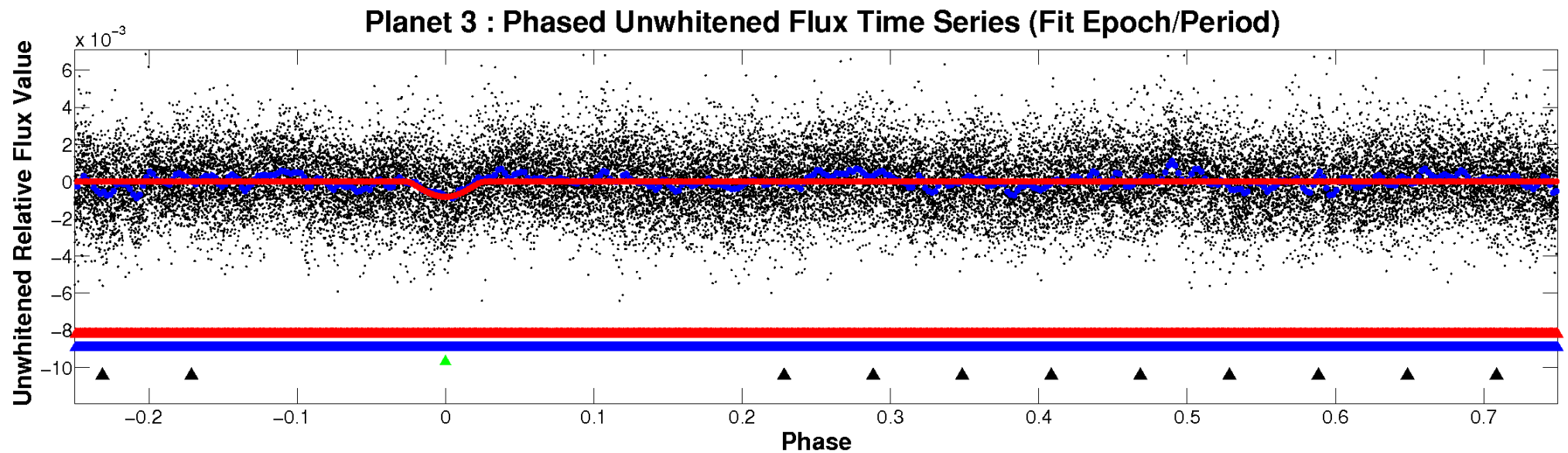


# ALT Odd/Even

TCE 011620101-03

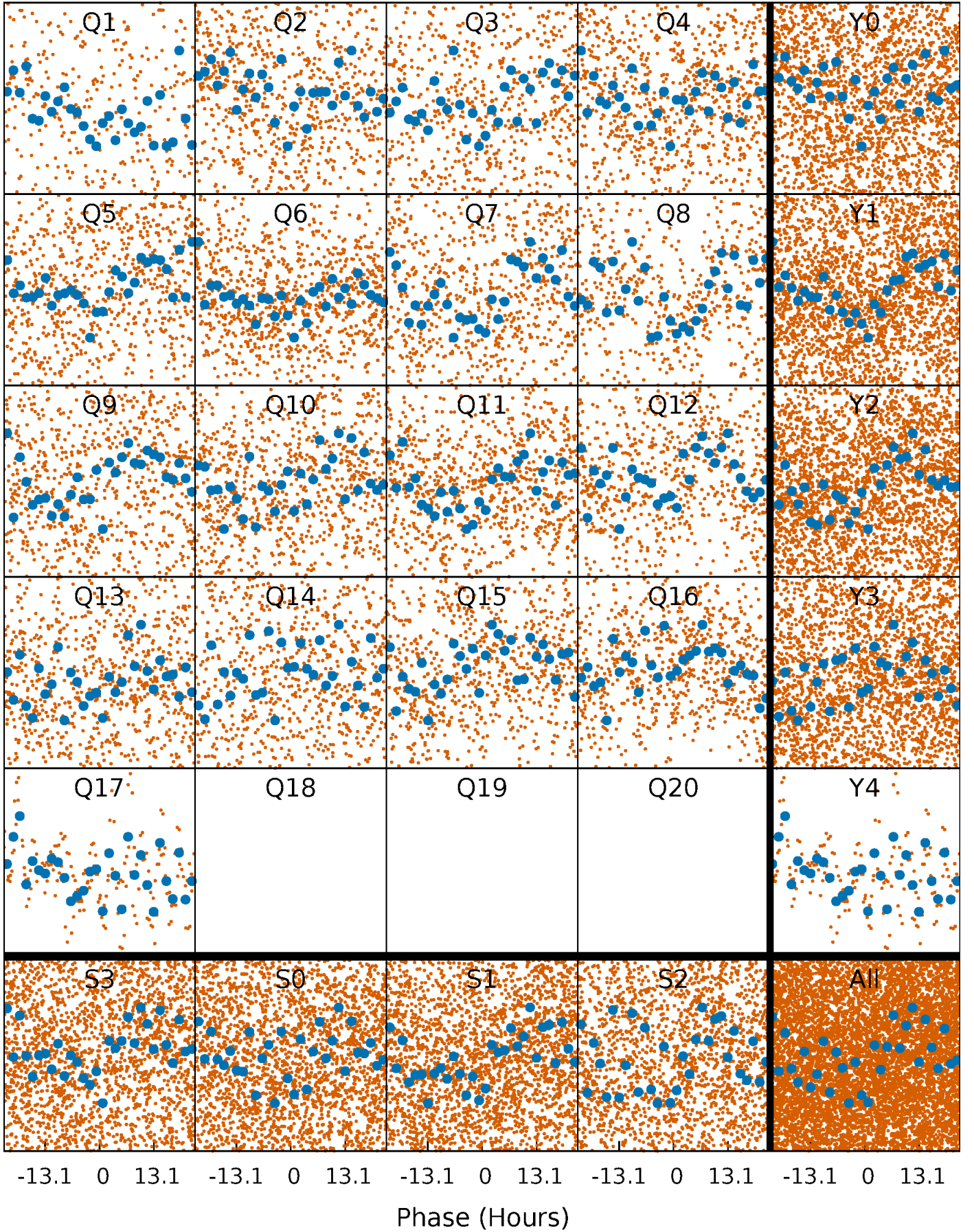


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

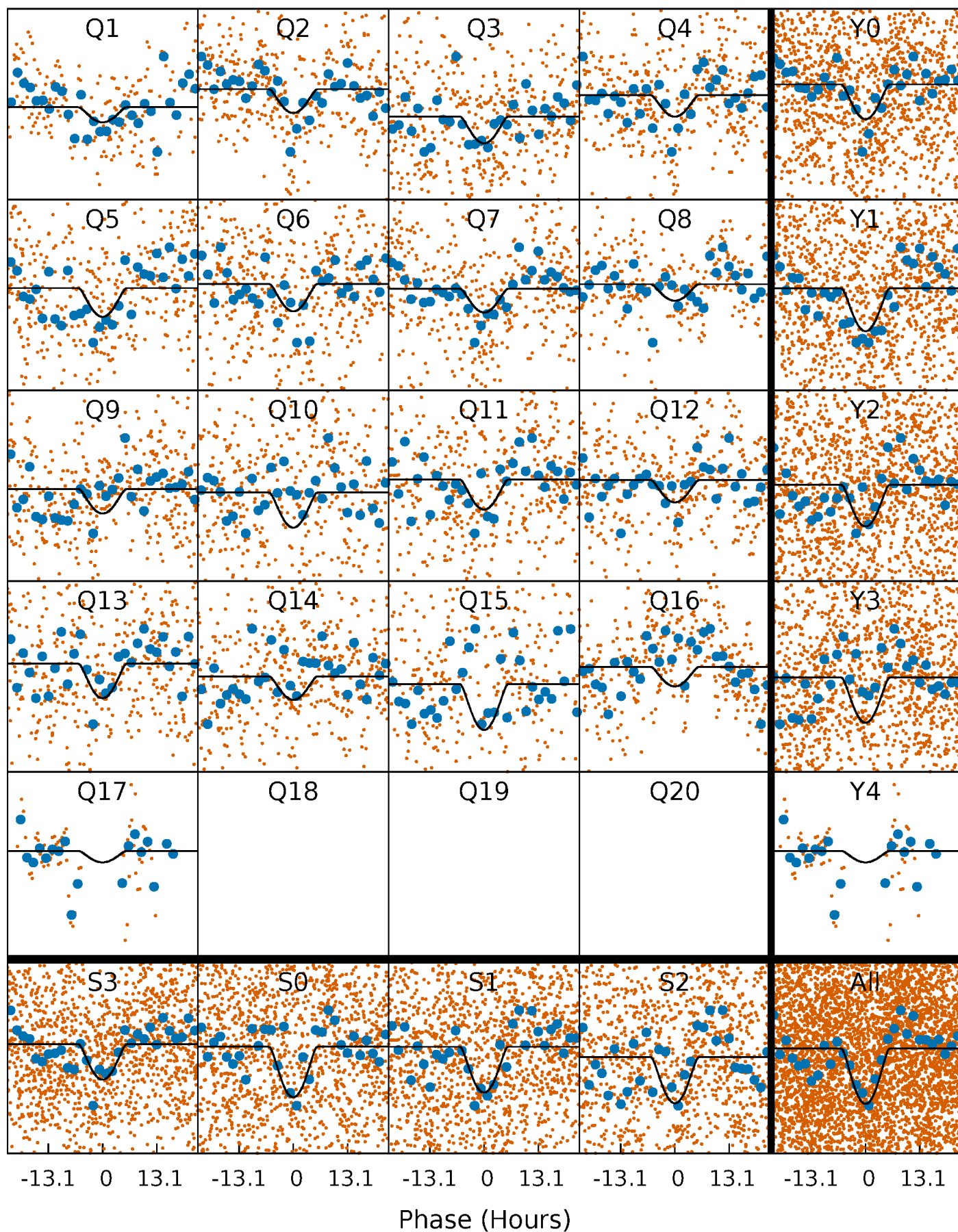
TCE 011620101-03 P= 9.220393 Days  $T_0=135.207269$  (BKJD)





# DV Quarter-Phased Transit Curves

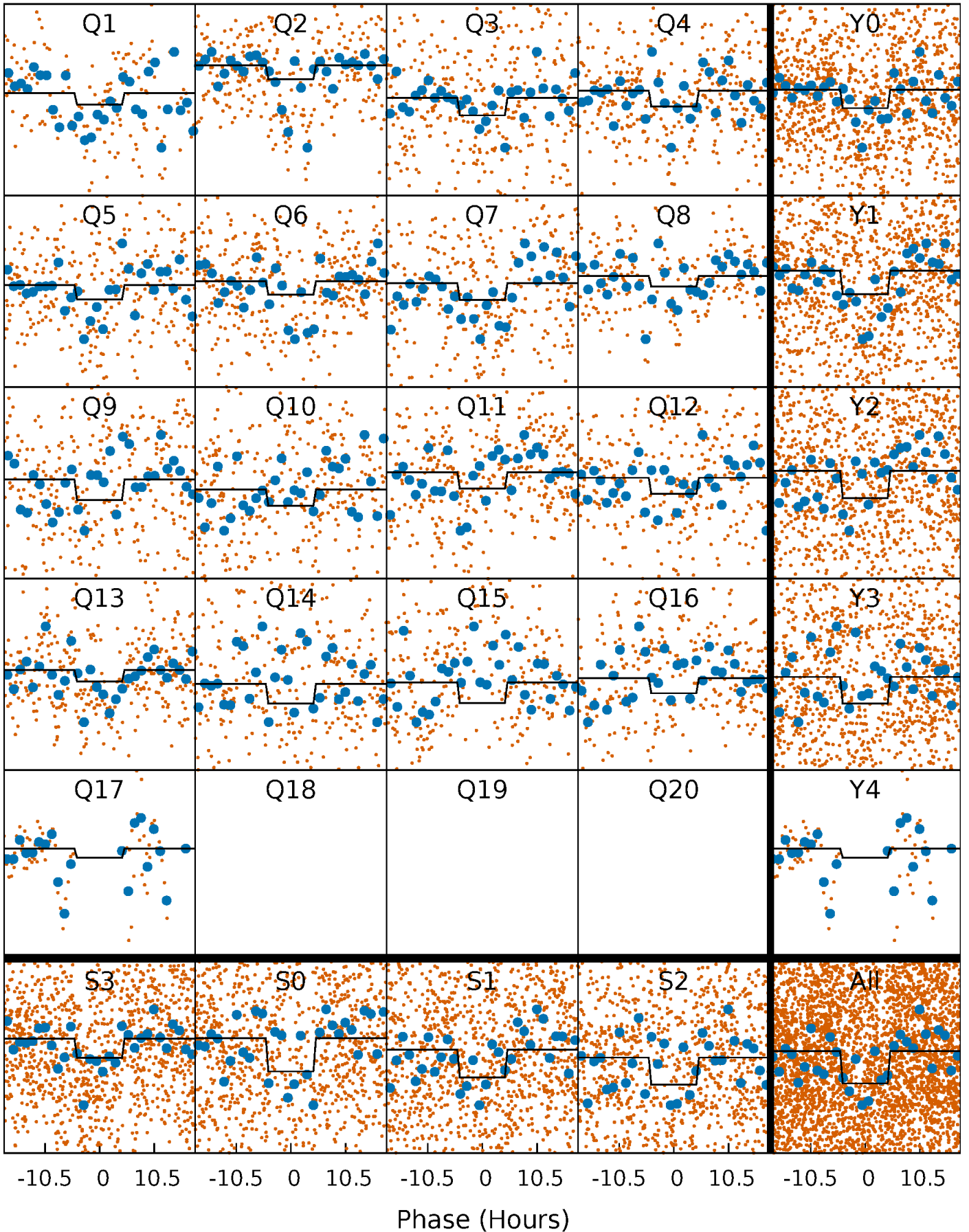
TCE 011620101-03 P= 9.220393 Days  $T_0=135.207269$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

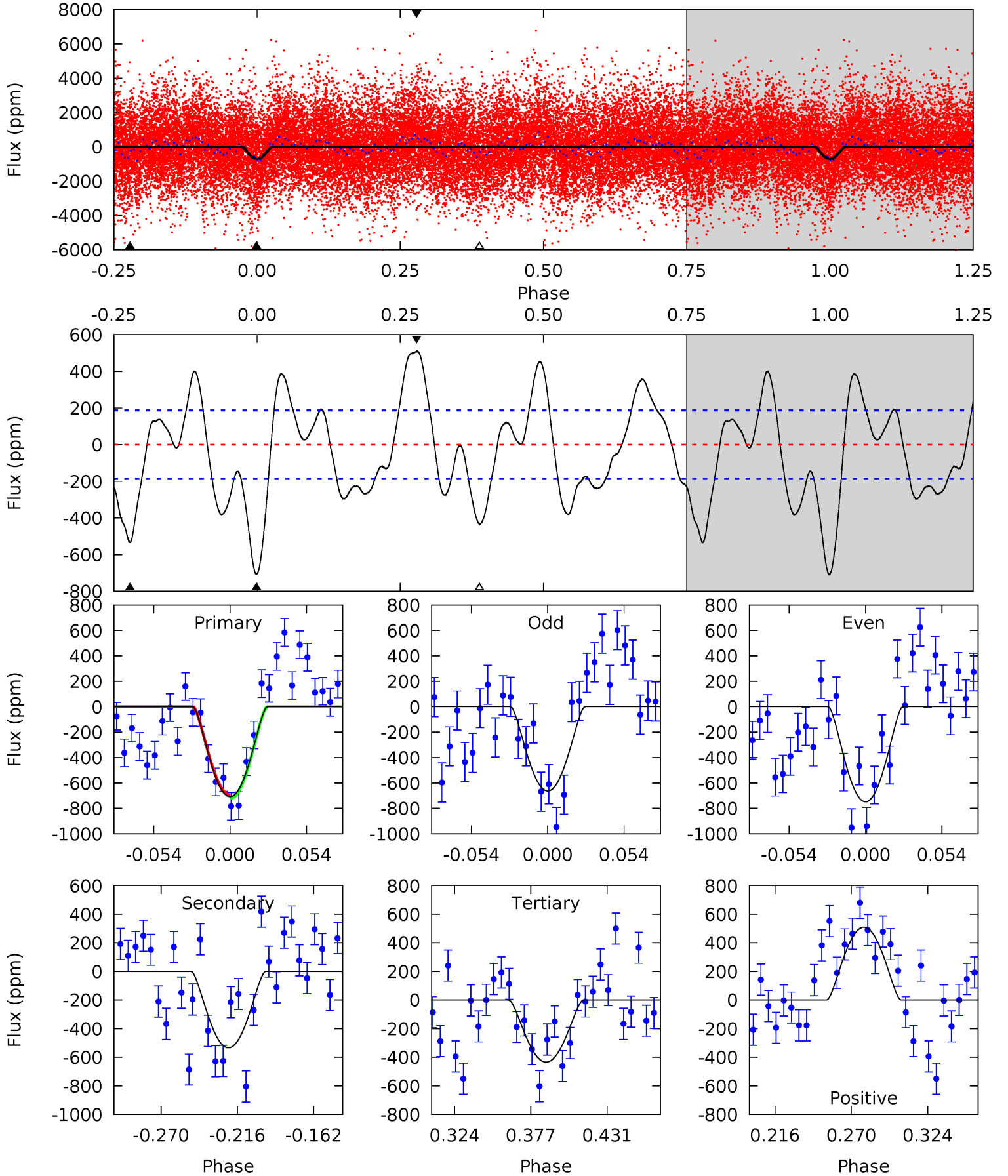
TCE 011620101-03 P= 9.220143 Days  $T_0=135.238522$  (BKJD)



# DV Model-Shift Uniqueness Test

011620101-03, P = 9.220393 Days, E = 125.986876 Days

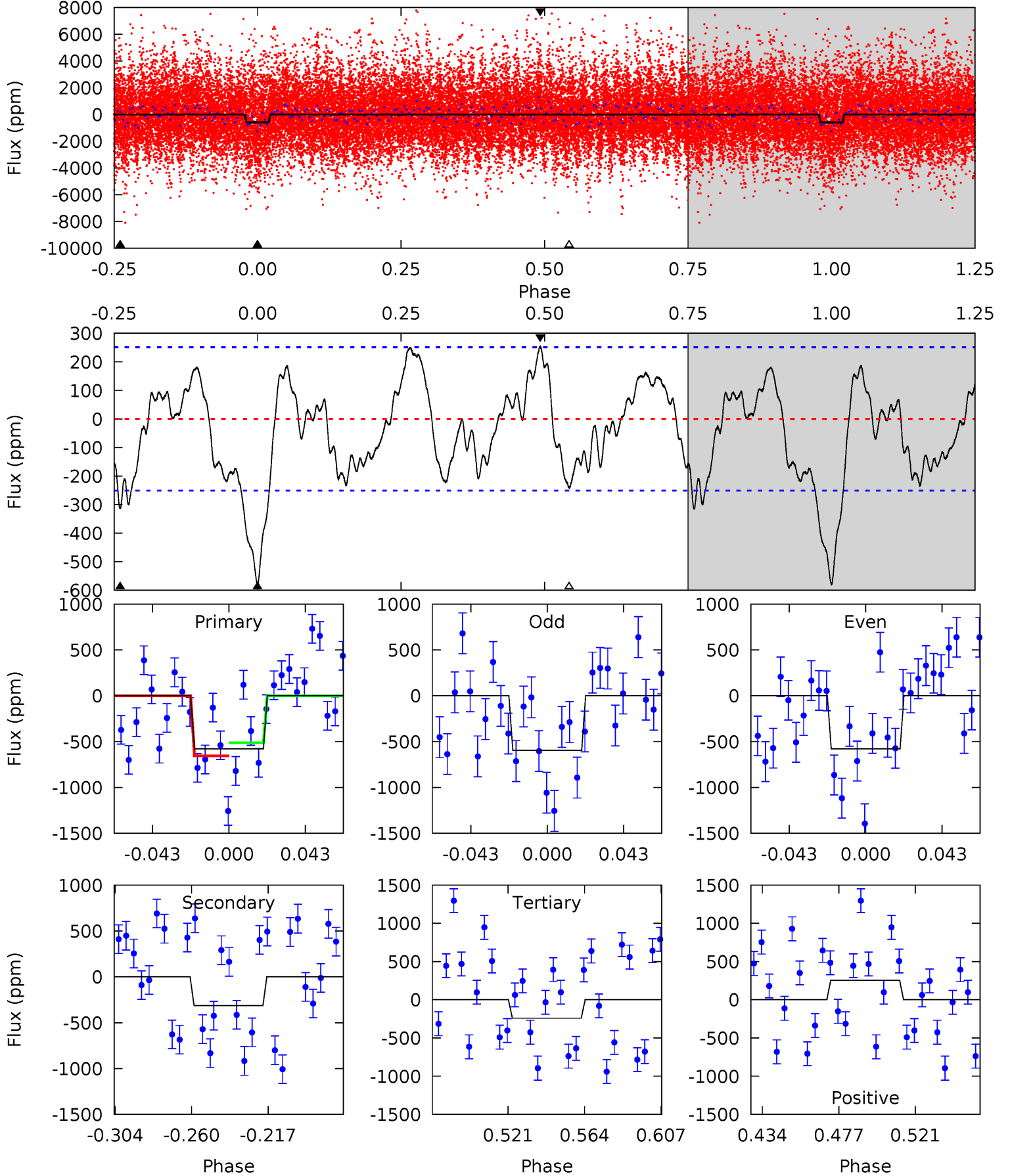
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
17.7	13.4	10.9	12.7	4.69	1.93	5.91	6.85	4.97	2.51	0.63	1.08	3.15	0.42	0.30



# Alt Model-Shift Uniqueness Test

011620101-03, P = 9.220143 Days, E = 126.018379 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.0	5.92	4.56	4.81	4.74	2.02	2.40	6.39	6.14	1.36	1.11	0.17	0.84	0.31	1.35



### Stellar Parameters For KIC 011620101

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7333^{+203}_{-330}$	$3.884^{+0.301}_{-0.129}$	$-0.040^{+0.200}_{-0.350}$	$2.529^{+0.510}_{-0.874}$	$1.785^{+0.175}_{-0.409}$	$0.155^{+0.332}_{-0.060}$
	+3%/-5%	+8%/-3%	+500%/-875%	+20%/-35%	+10%/-23%	+214%/-39%
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 011620101-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-534 \pm 40$	$29.75^{+28.47}_{-20.88}$	$2183^{+156}_{-199}$	$3616^{+1978}_{-769}$	$3.411^{+32.219}_{-2.494}$
Alt.	$-314 \pm 53$	$25.53^{+27.81}_{-17.32}$	$2172^{+160}_{-207}$	$3453^{+1741}_{-871}$	$2.853^{+24.532}_{-2.238}$

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



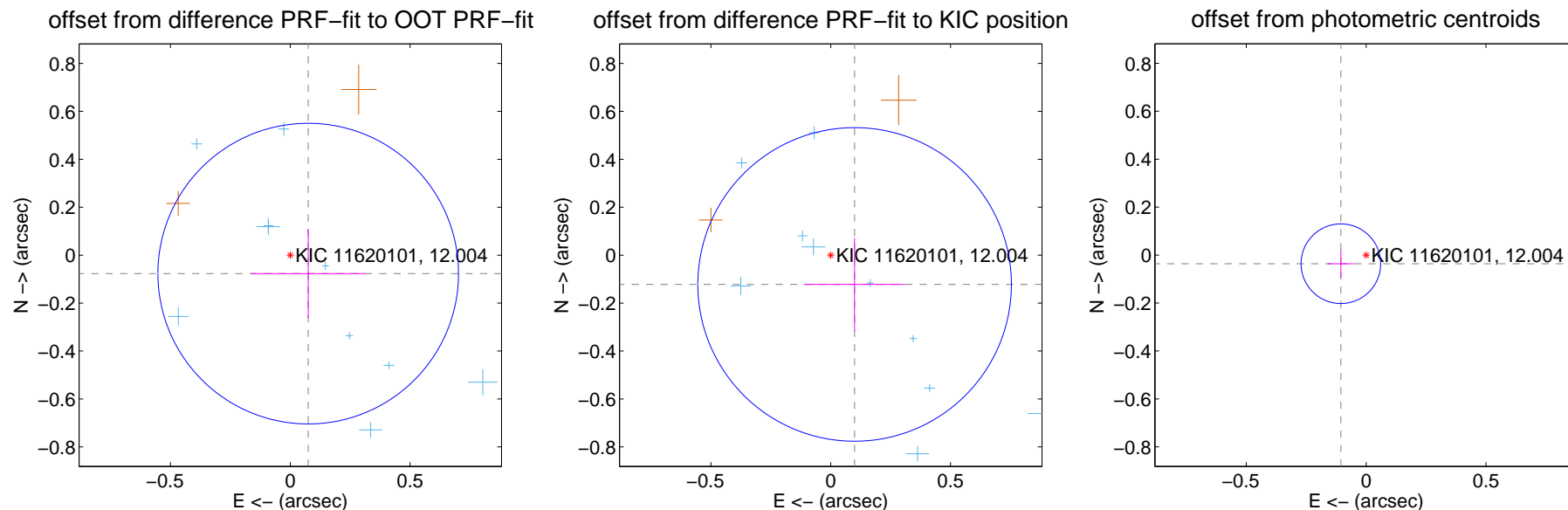
## DV Centroid Data

Supplemental centroid analysis for 011620101-03. Kepler magnitude: 12.00. Transit SNR 10.13

There are 12 quarters with good PRF difference image offsets

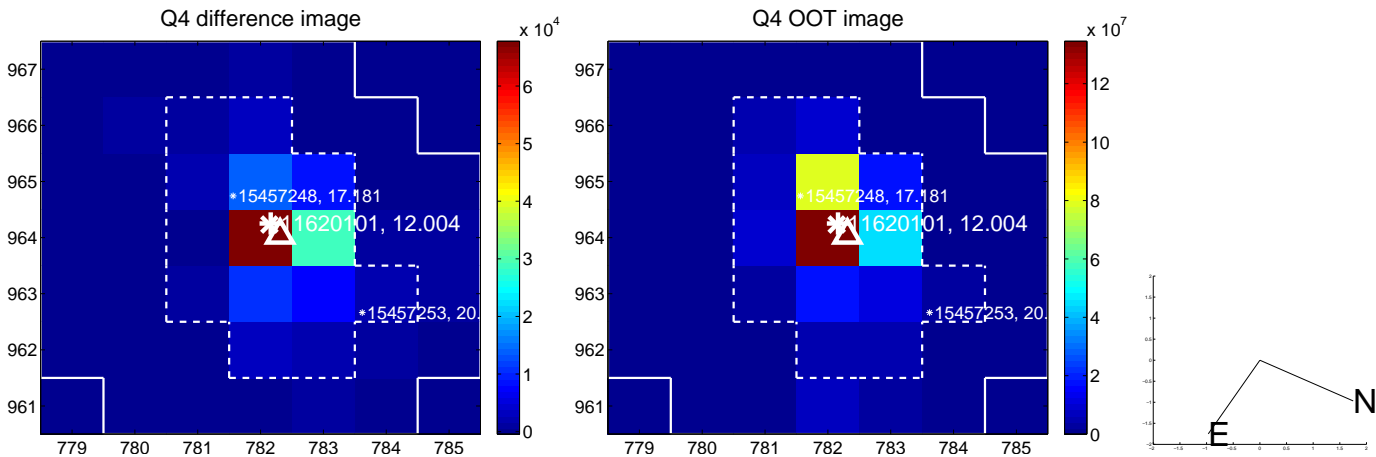
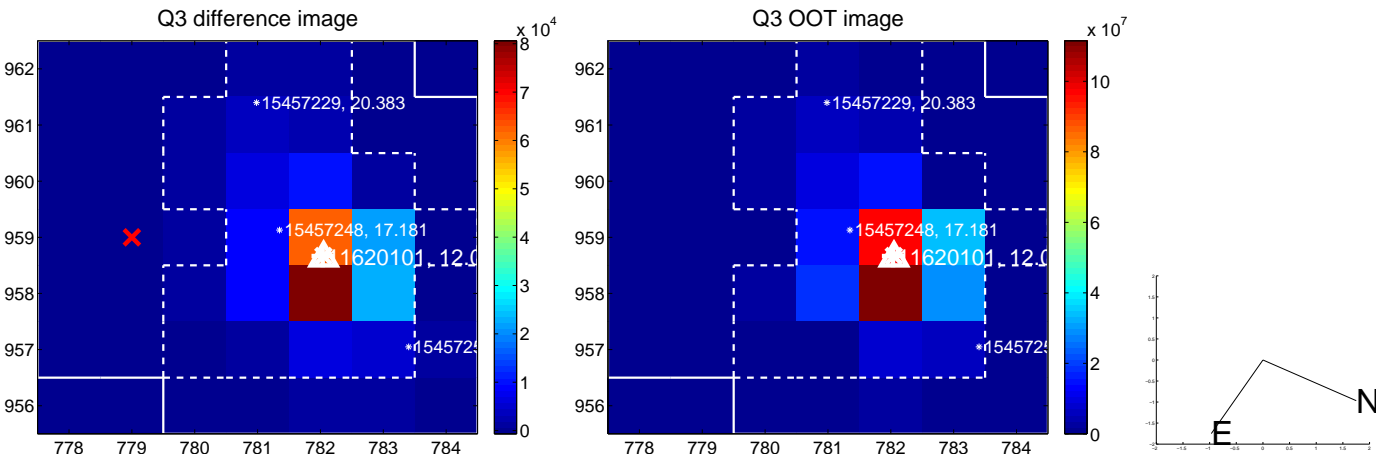
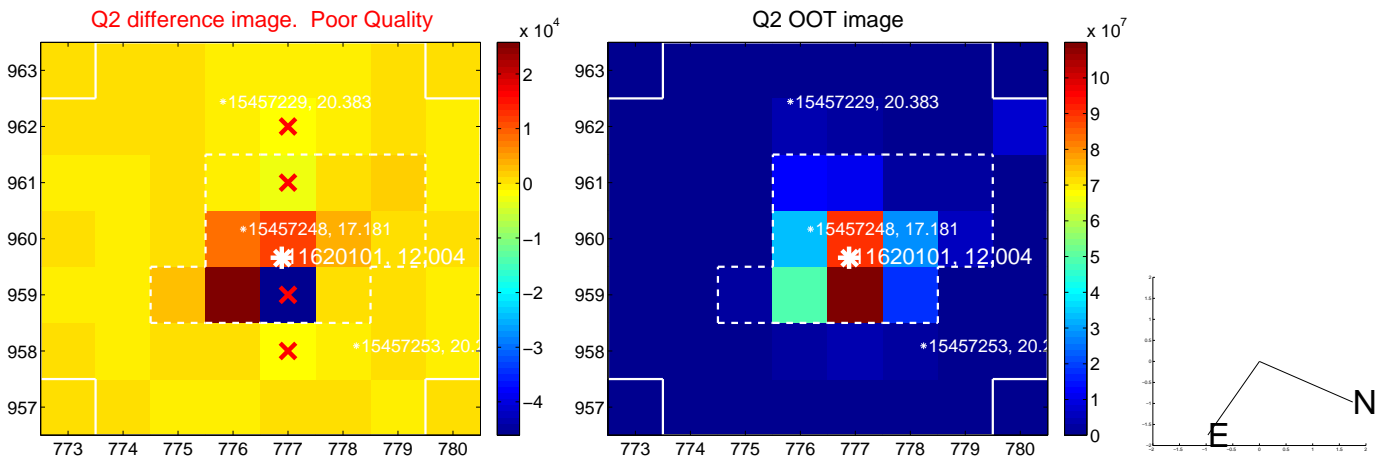
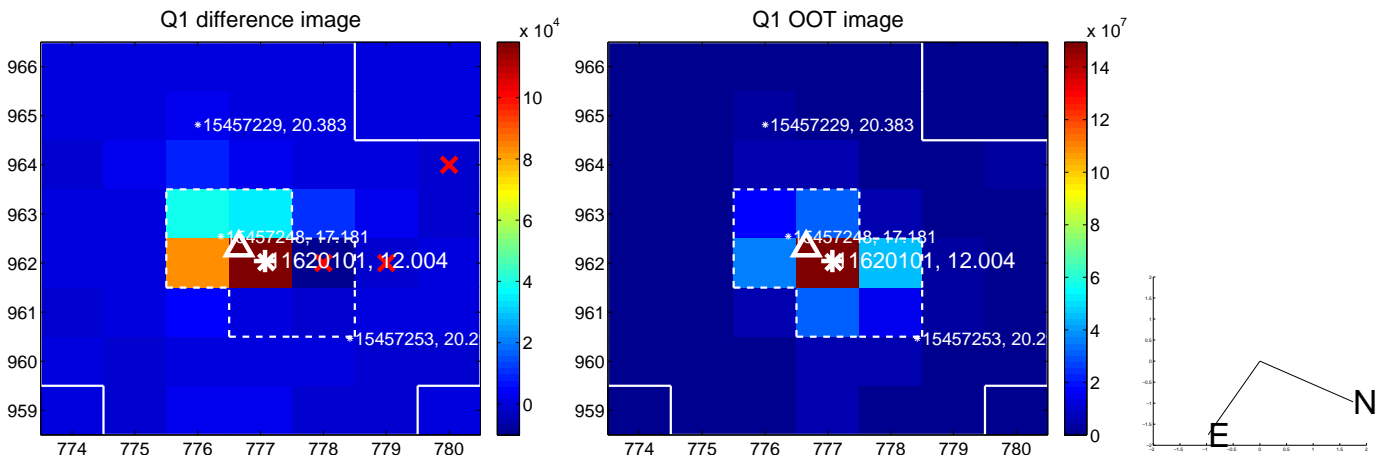
The direct PRF centroid is offset from the target star catalog position by about 0.10 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.107 \pm 0.209$	0.51	$-0.075 \pm 0.239$	$-0.077 \pm 0.185$
PRF-fit source offset from KIC position	$0.158 \pm 0.218$	0.72	$-0.100 \pm 0.211$	$-0.122 \pm 0.194$
photometric centroid source offset	$0.11 \pm 0.06$	2.01	$0.11 \pm 0.05$	$-0.04 \pm 0.06$

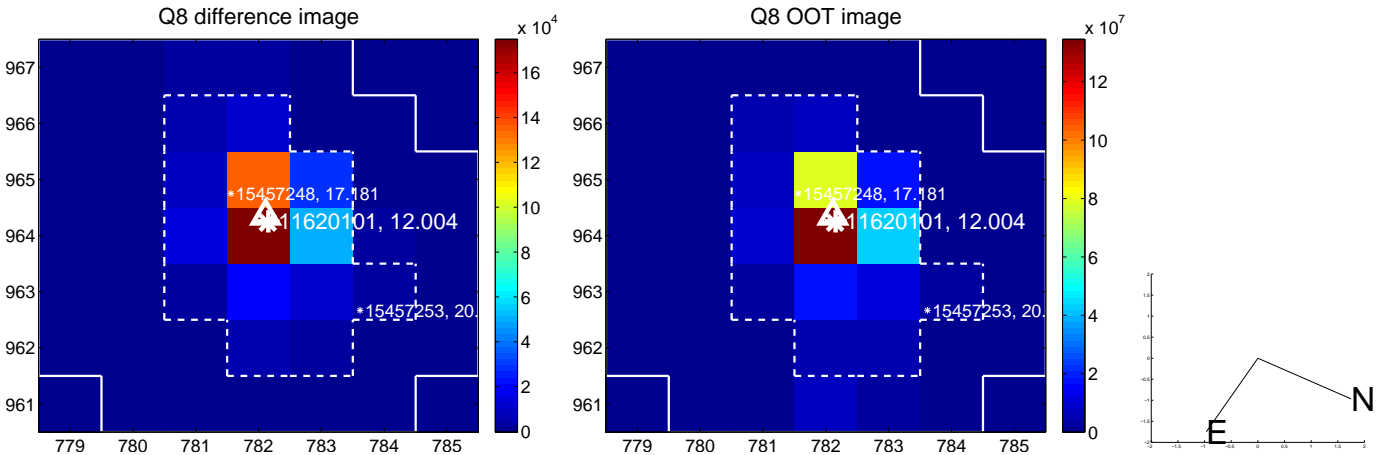
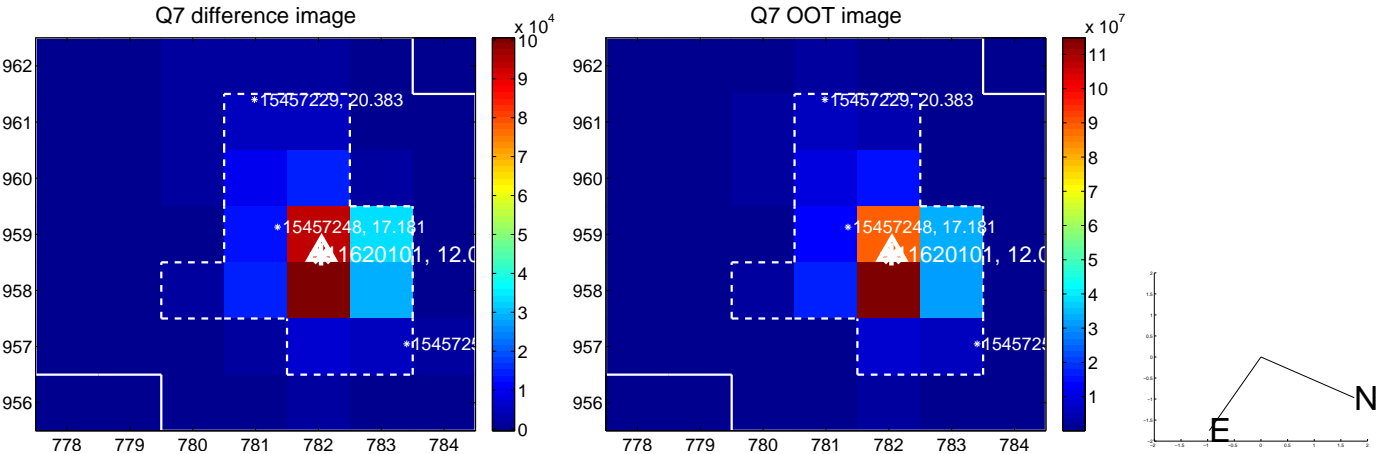
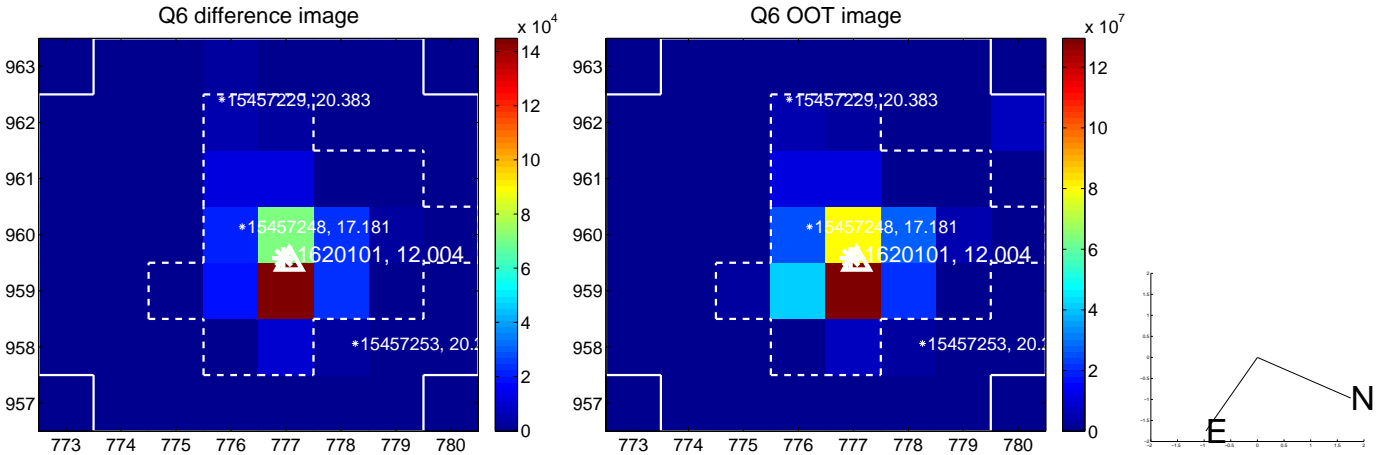
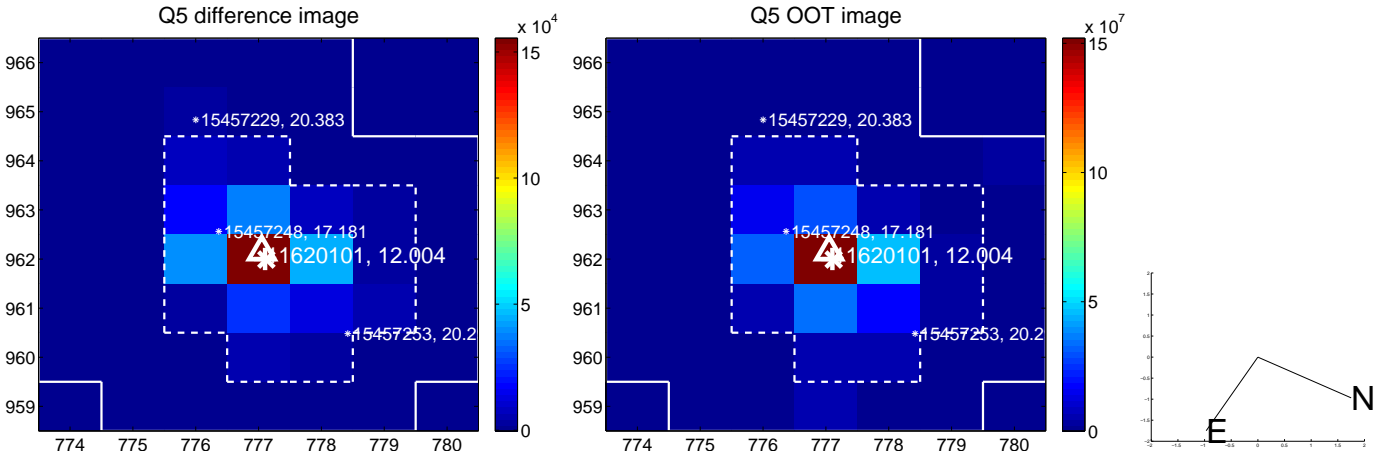


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

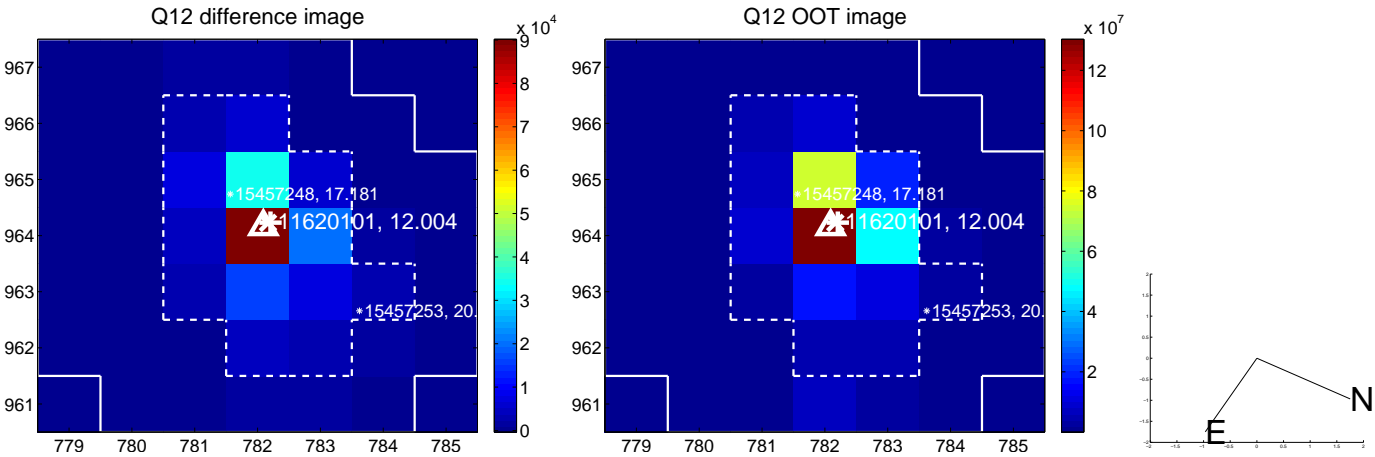
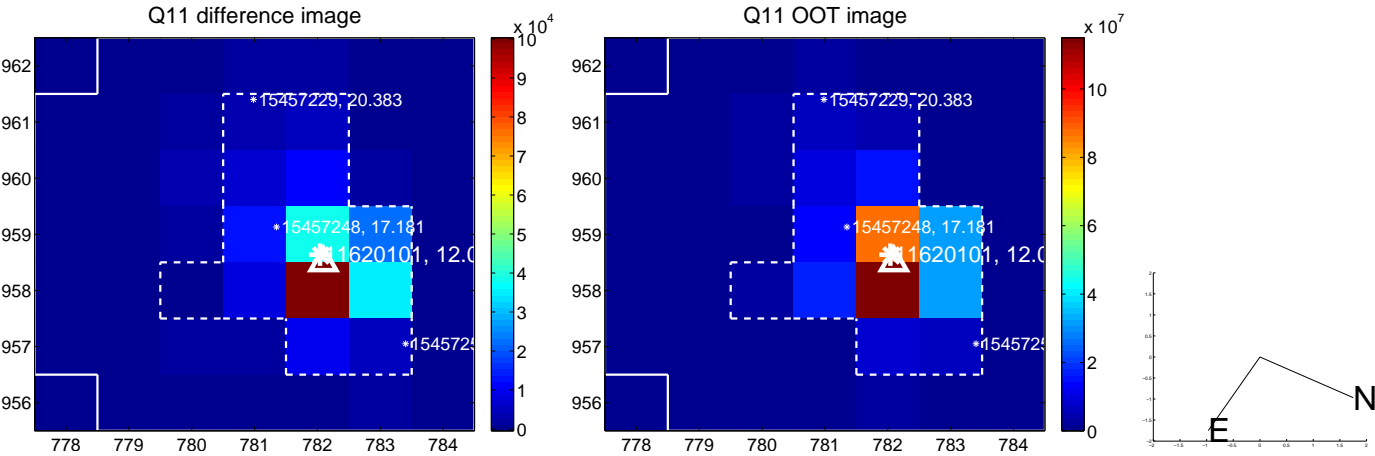
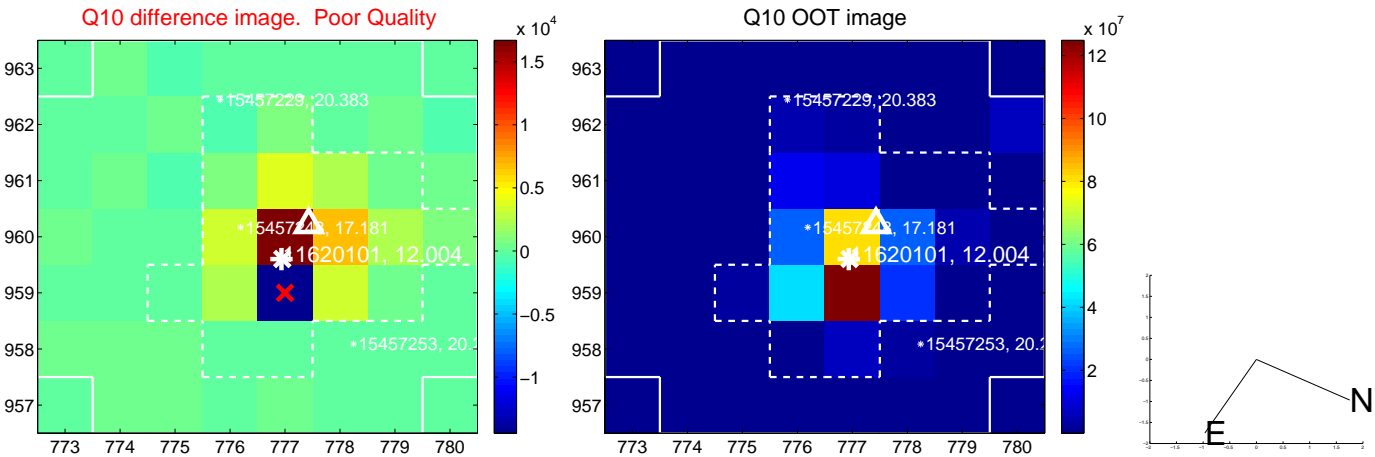
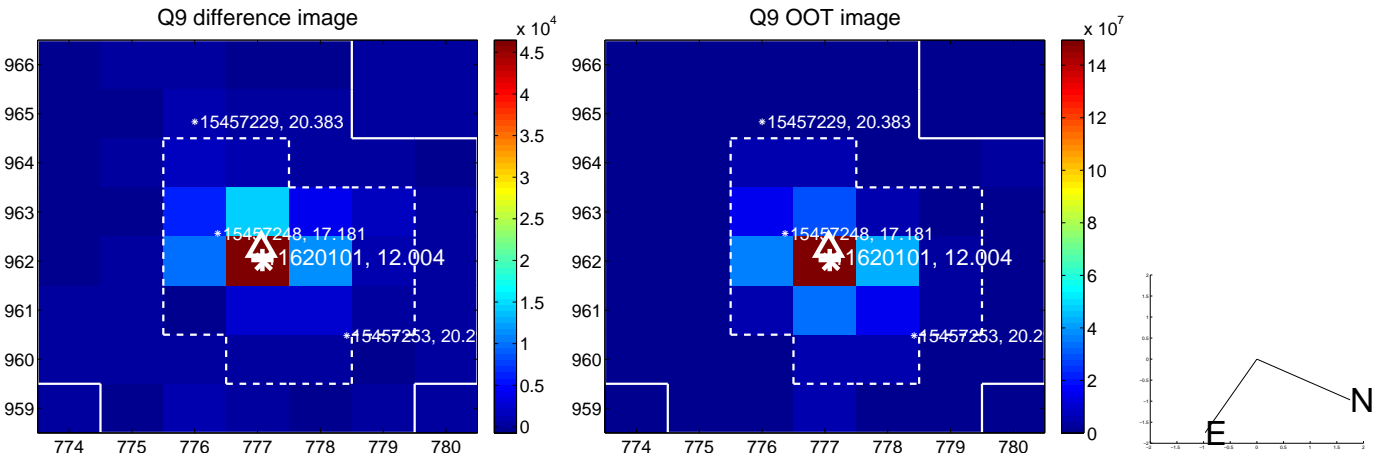
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



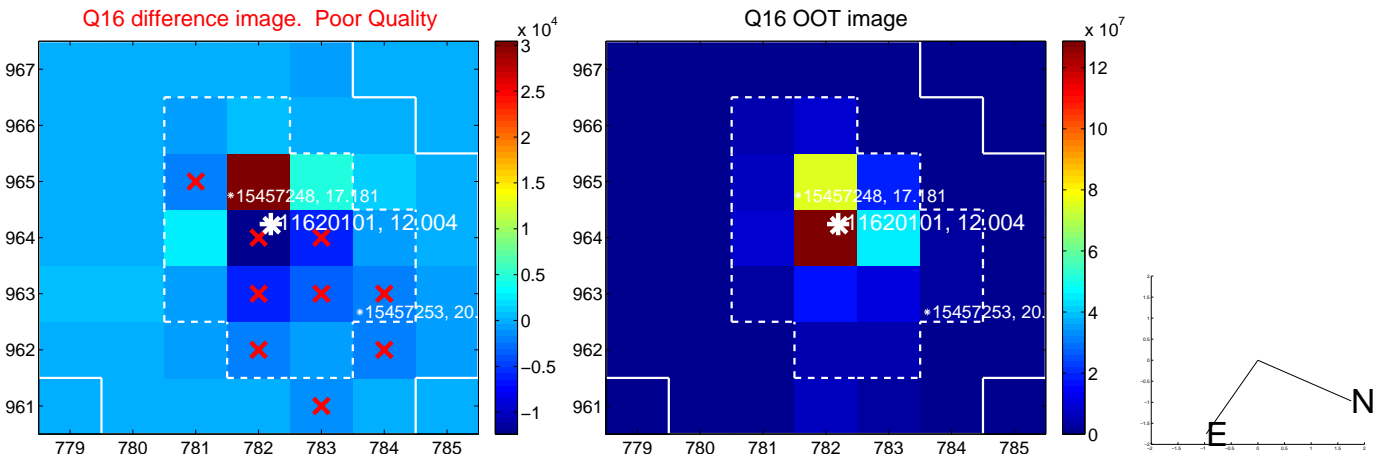
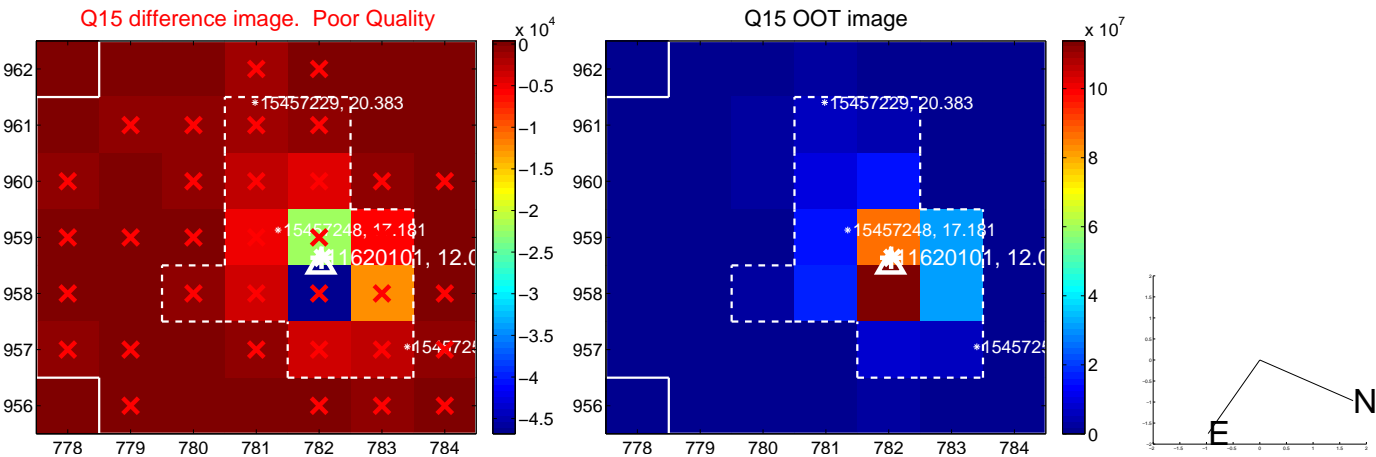
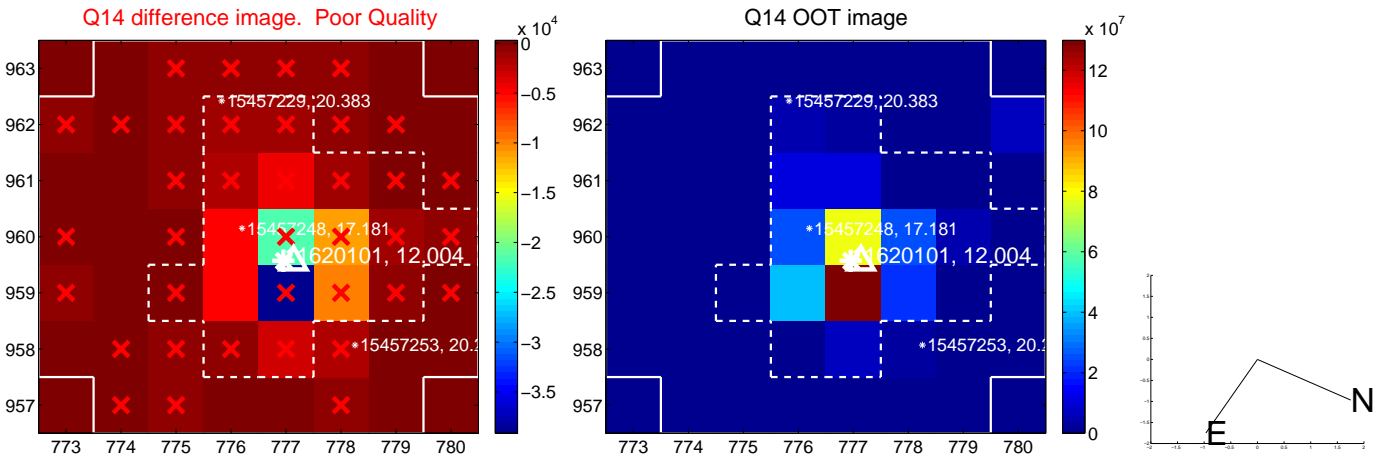
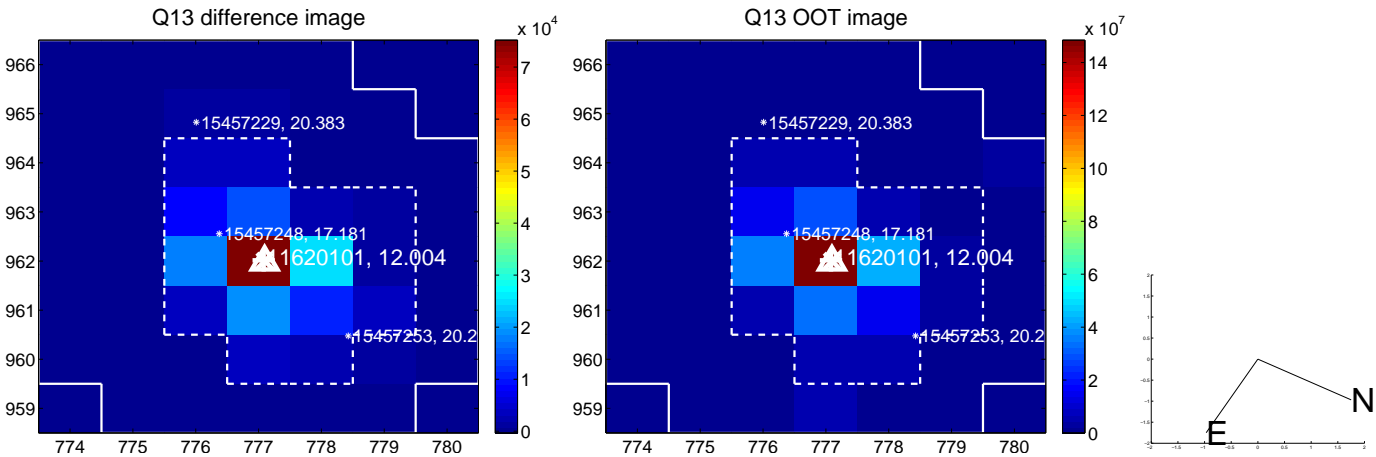
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

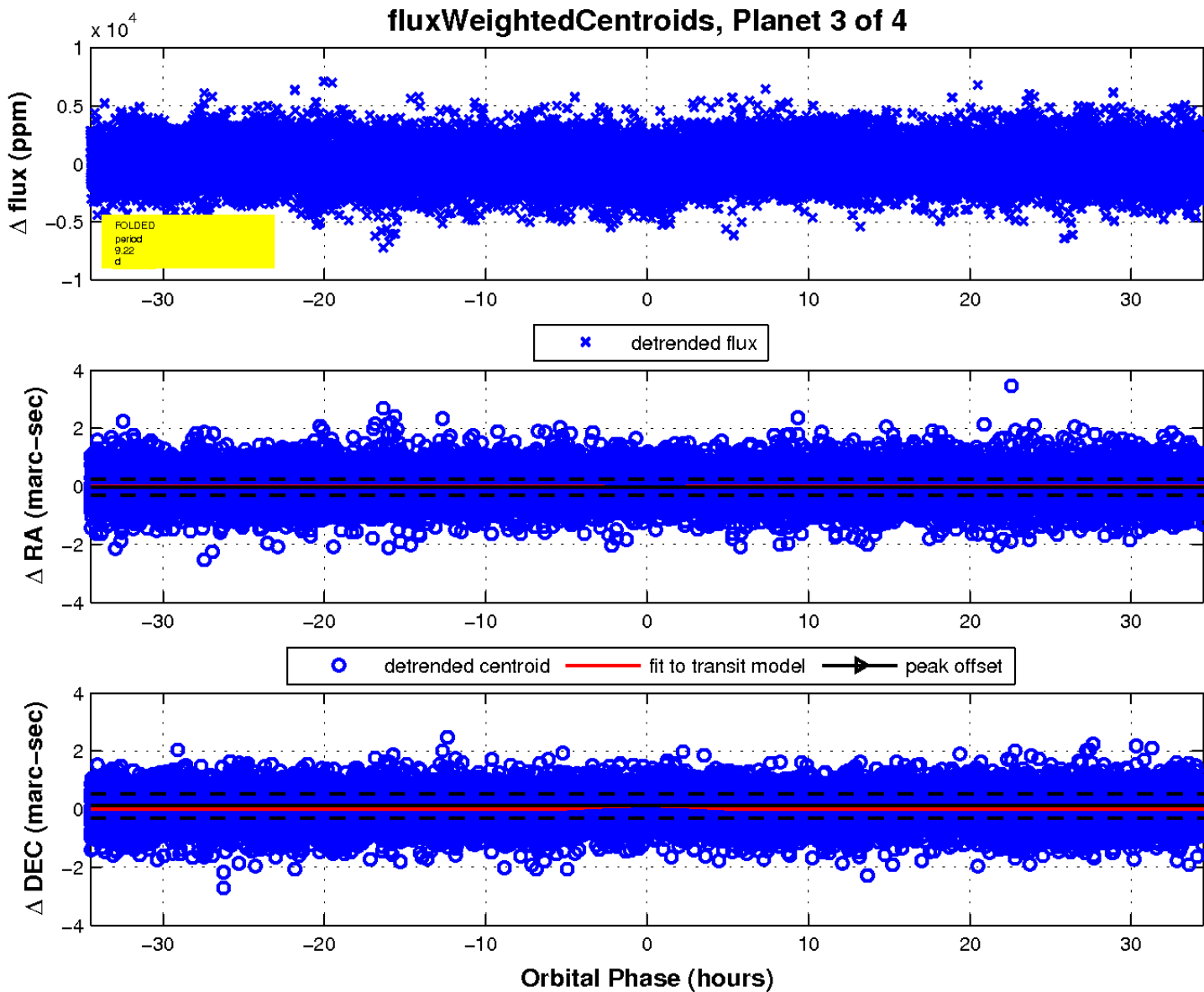
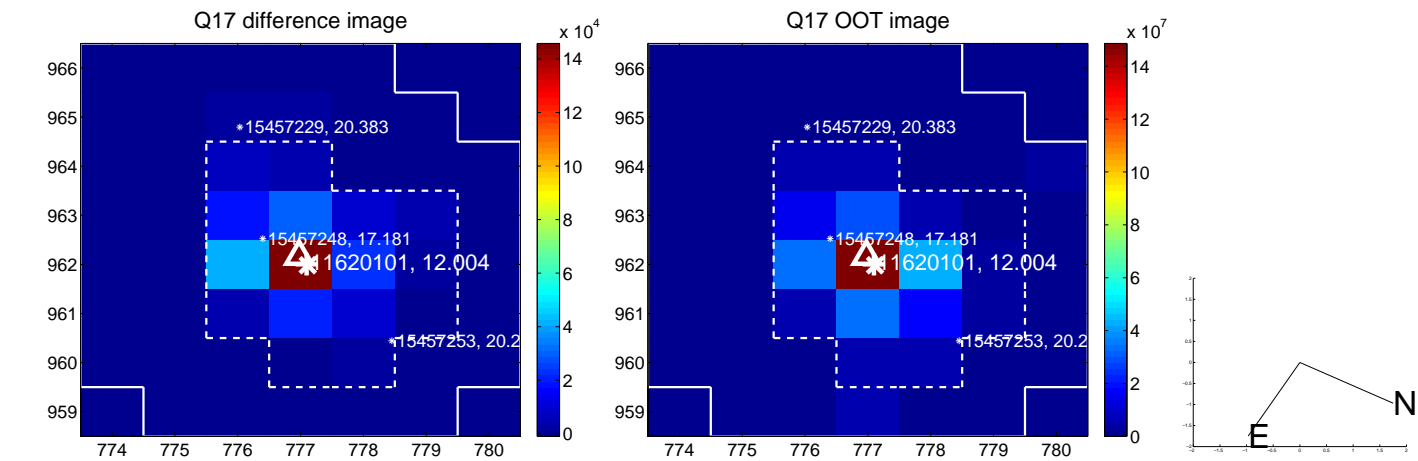


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



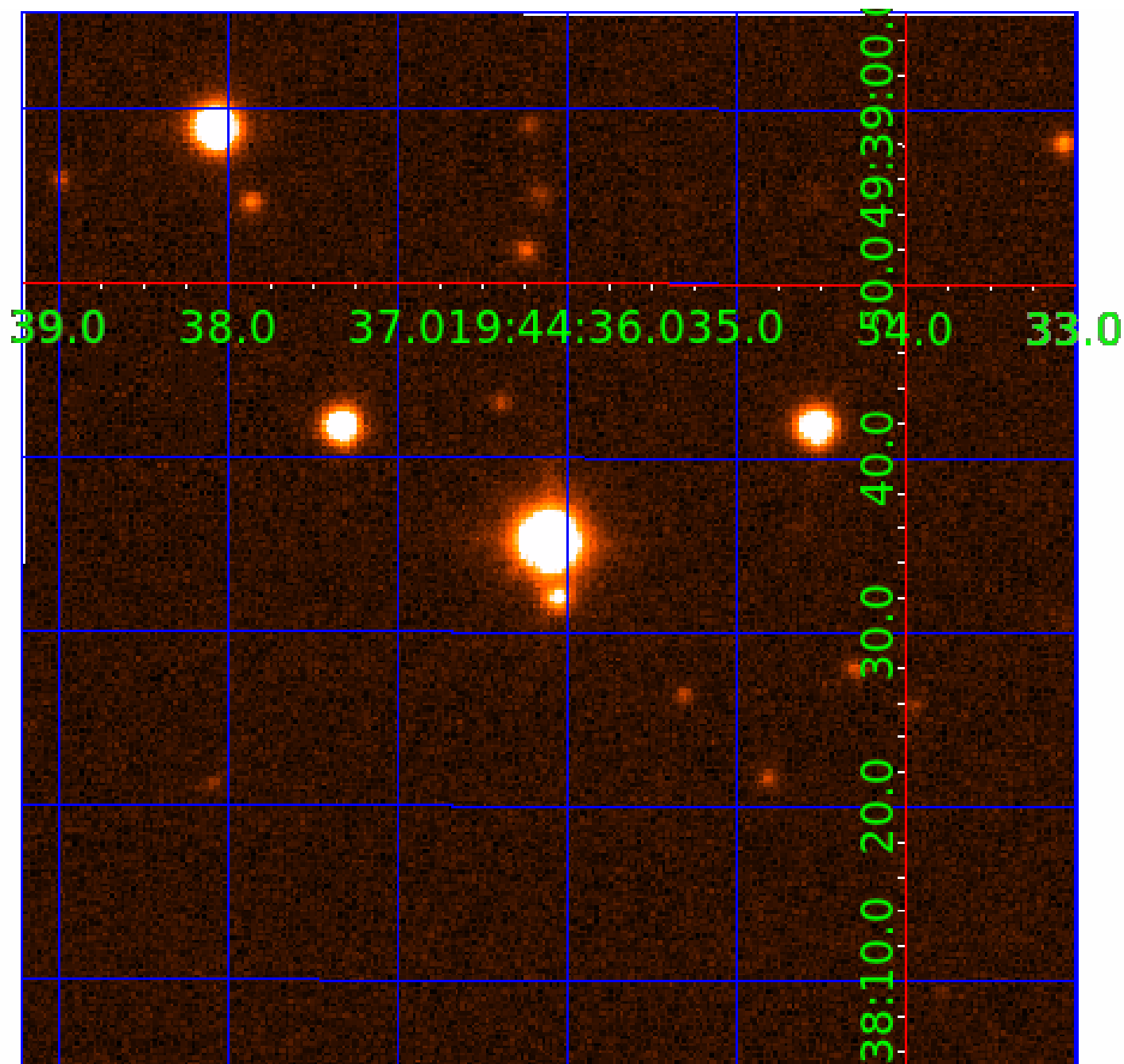


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 011620101

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
011620101-01	OBS	No	1.461649	132.498323	189.3	1.613	8.1	7.0	2.53	7333	4.09	17709.08
011620101-02	OBS	No	0.907980	131.559276	163.3	3.029	8.7	7.8	2.53	7333	3.75	33410.65
011620101-03	OBS	No	9.220393	135.207269	820.3	11.496	8.5	10.1	2.53	7333	13.32	1519.34
011620101-04	OBS	No	129.639080	257.177764	2309.5	6.978	7.3	8.6	2.53	7333	13.67	44.77

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
011620101-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
011620101-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
011620101-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_ZUMA—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
011620101-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT

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

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

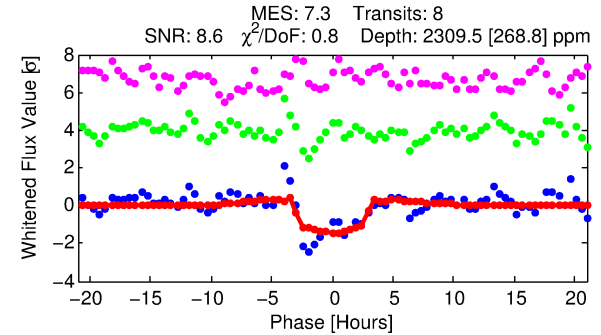
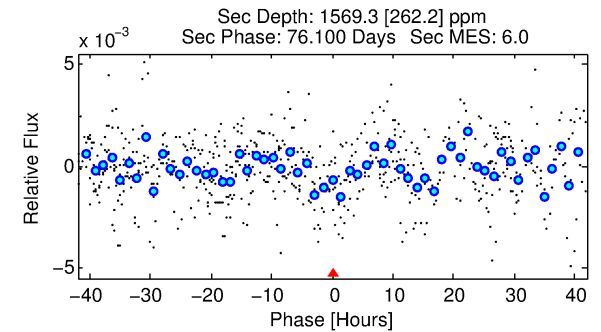
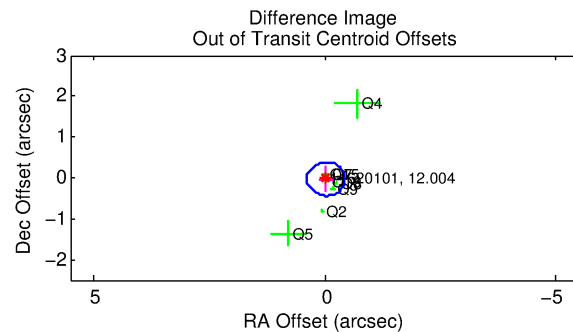
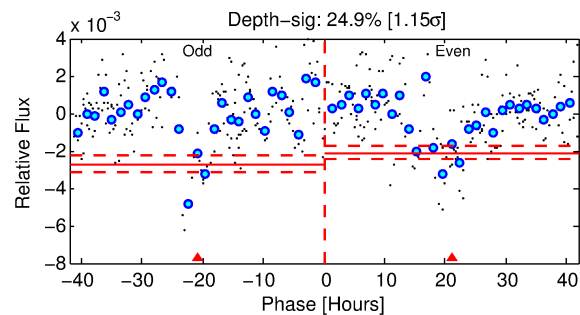
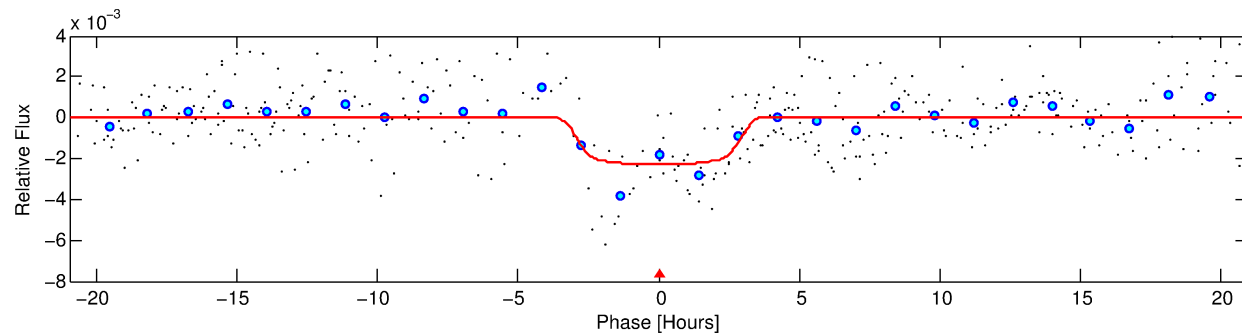
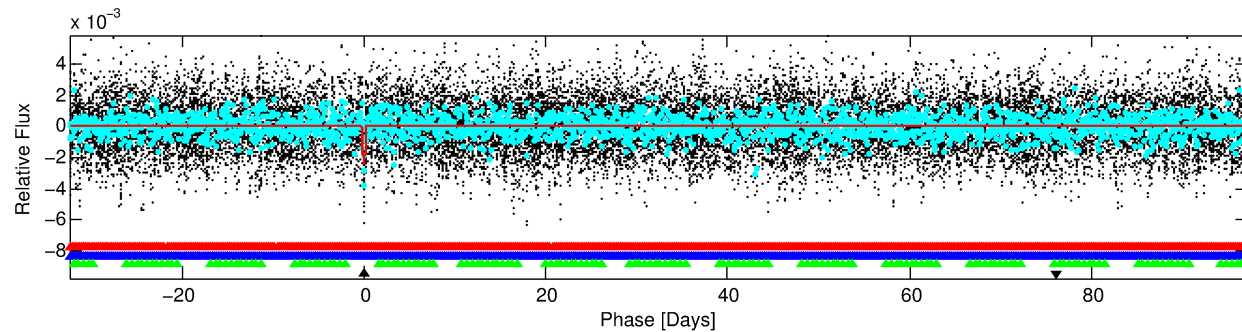
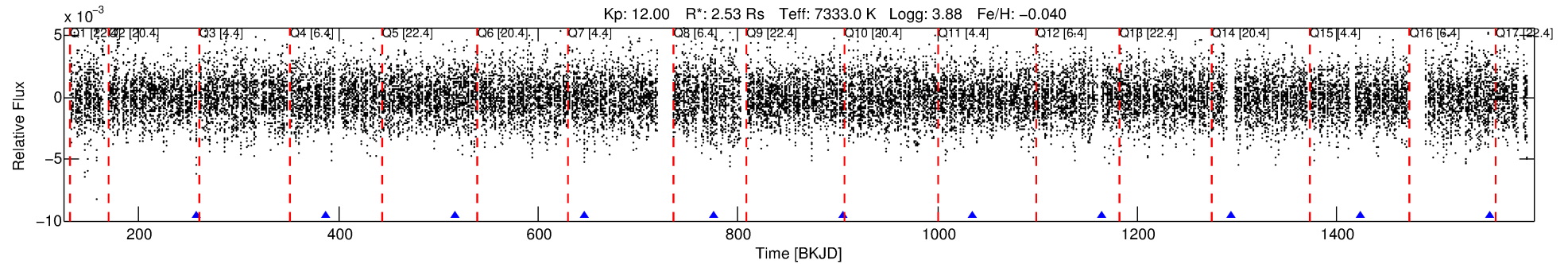
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 011620101-04

No Significant Match Found

# DV One-Page Summary

KIC: 11620101 Candidate: 4 of 4 Period: 129.639 d



## DV Fit Results:

Period = 129.63908 [0.00195] d  
Epoch = 257.1778 [0.0107] BKJD  
Rp/R\* = 0.0495 [0.0038]  
a/R\* = 87.65 [22.03]  
b = 0.85 [0.09]  
Seff = 44.77 [24.48]  
Teq = 660 [90] K  
Rp = 13.67 [4.84] Re  
a = 0.6084 [0.1985] AU  
Ag = 1708.76 [962.80] [1.77σ]  
Teffp = 6557 [473] K [12.24σ]

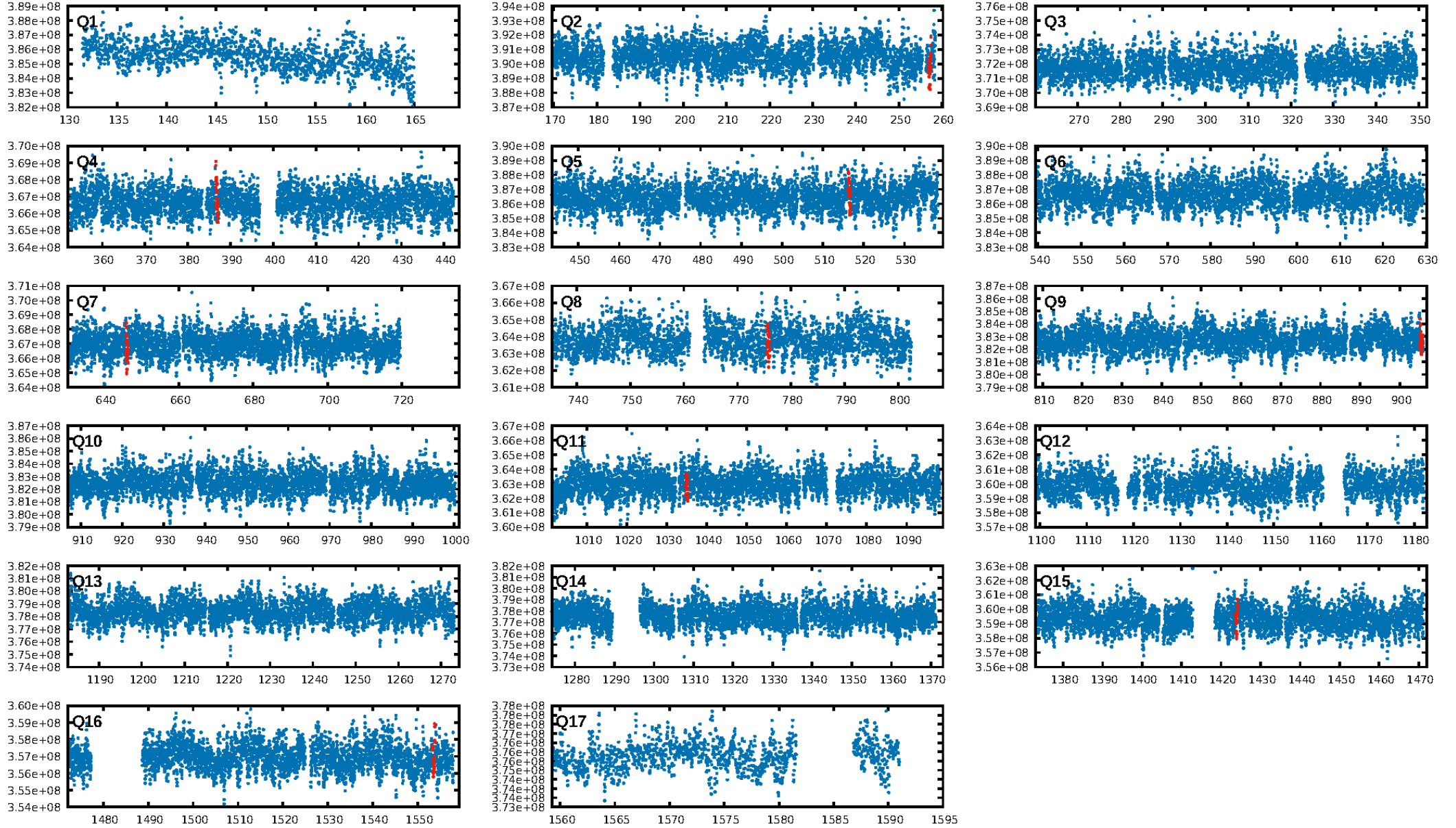
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [214.91σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 49.5%  
ModelChiSquareGof-sig: 100.0%  
**Bootstrap-pfa: 8.85e-08**  
RollingBand-fgt: 1.00 [8/8]  
GhostDiagnostic-chr: 1.593  
**Centroid-sig: 0.1%**  
Centroid-so: 0.033 arcsec [0.41σ]  
OotOffset-rm: 0.045 arcsec [0.33σ]  
KicOffset-rm: 0.137 arcsec [0.48σ]  
OotOffset-st: 1/2/3/2 [8]  
KicOffset-st: 1/2/3/2 [8]  
DiffImageQuality-fgm: 0.88 [7/8]  
DiffImageOverlap-fno: 0.00 [0/9]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:04:37 Z

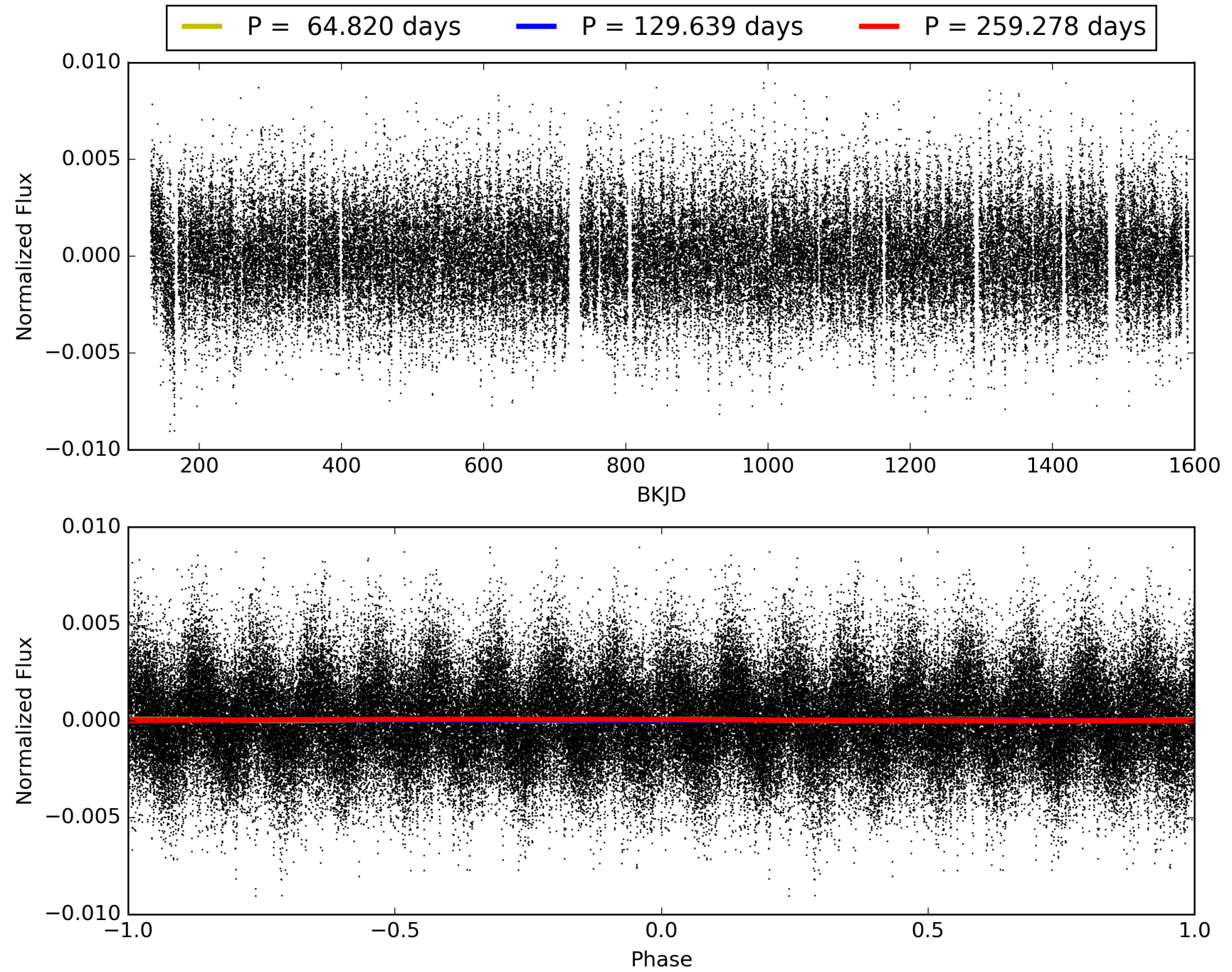
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 011620101-04, PDC Light Curves



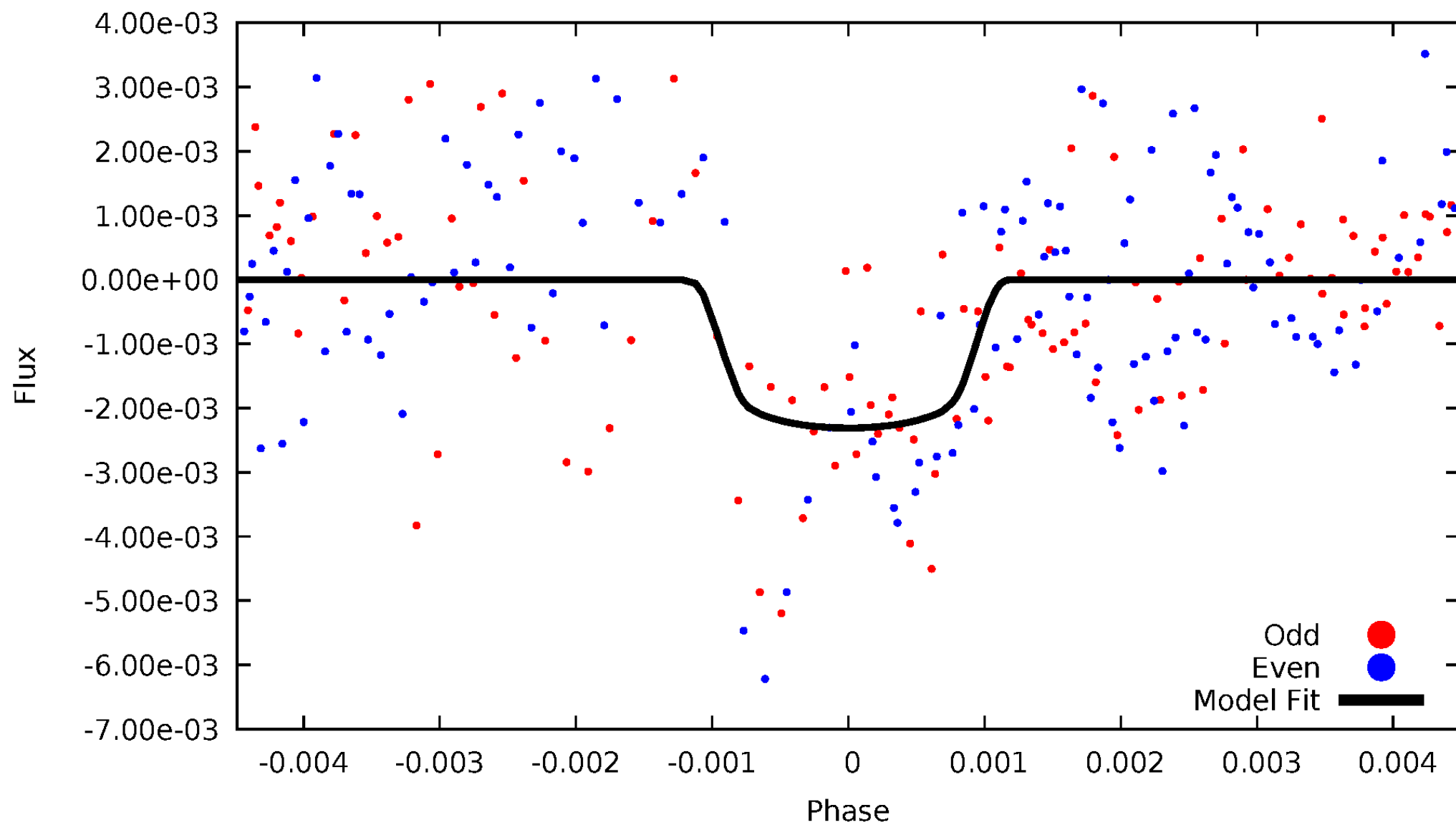


TCE 011620101-04



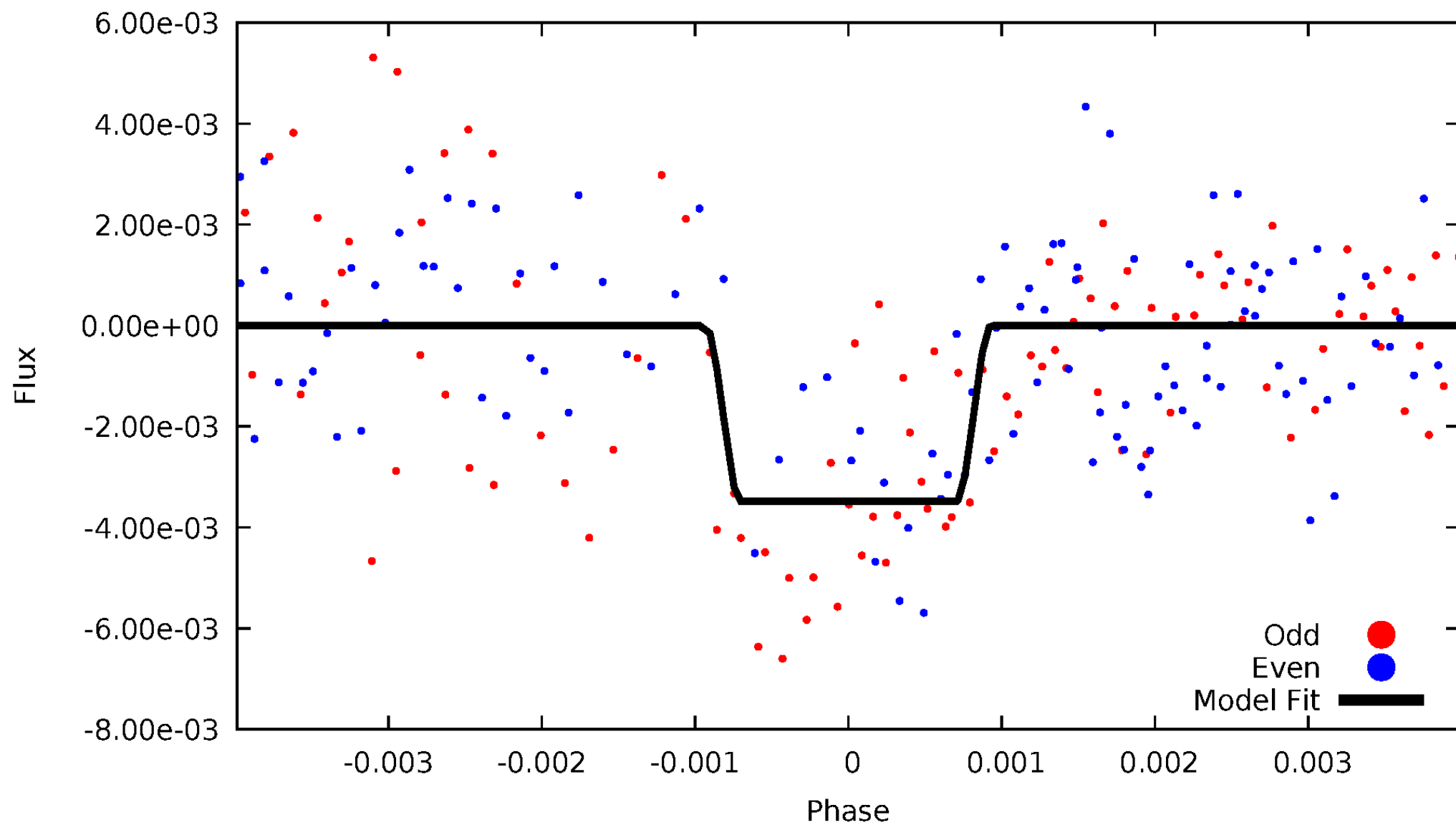
# DV Odd/Even

TCE 011620101-04



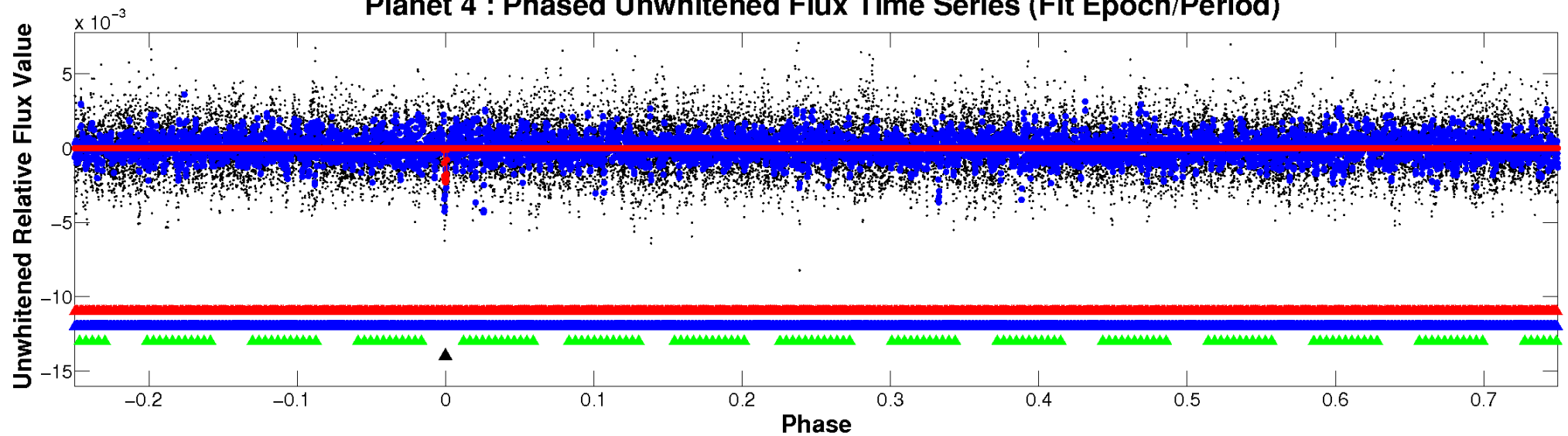
# ALT Odd/Even

TCE 011620101-04

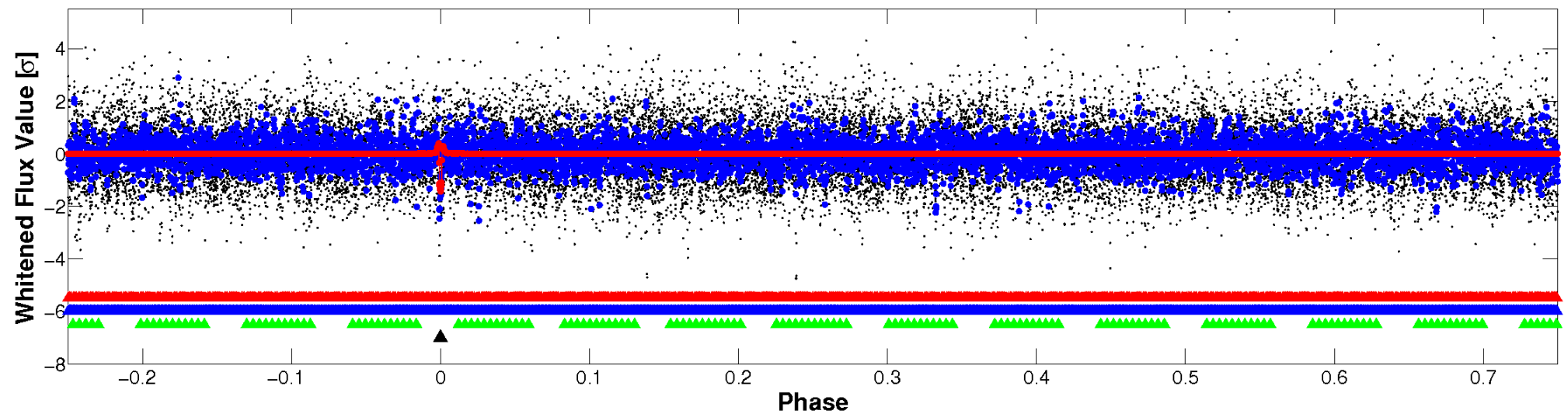


# Non-Whitened Vs. Whitened Light Curve

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

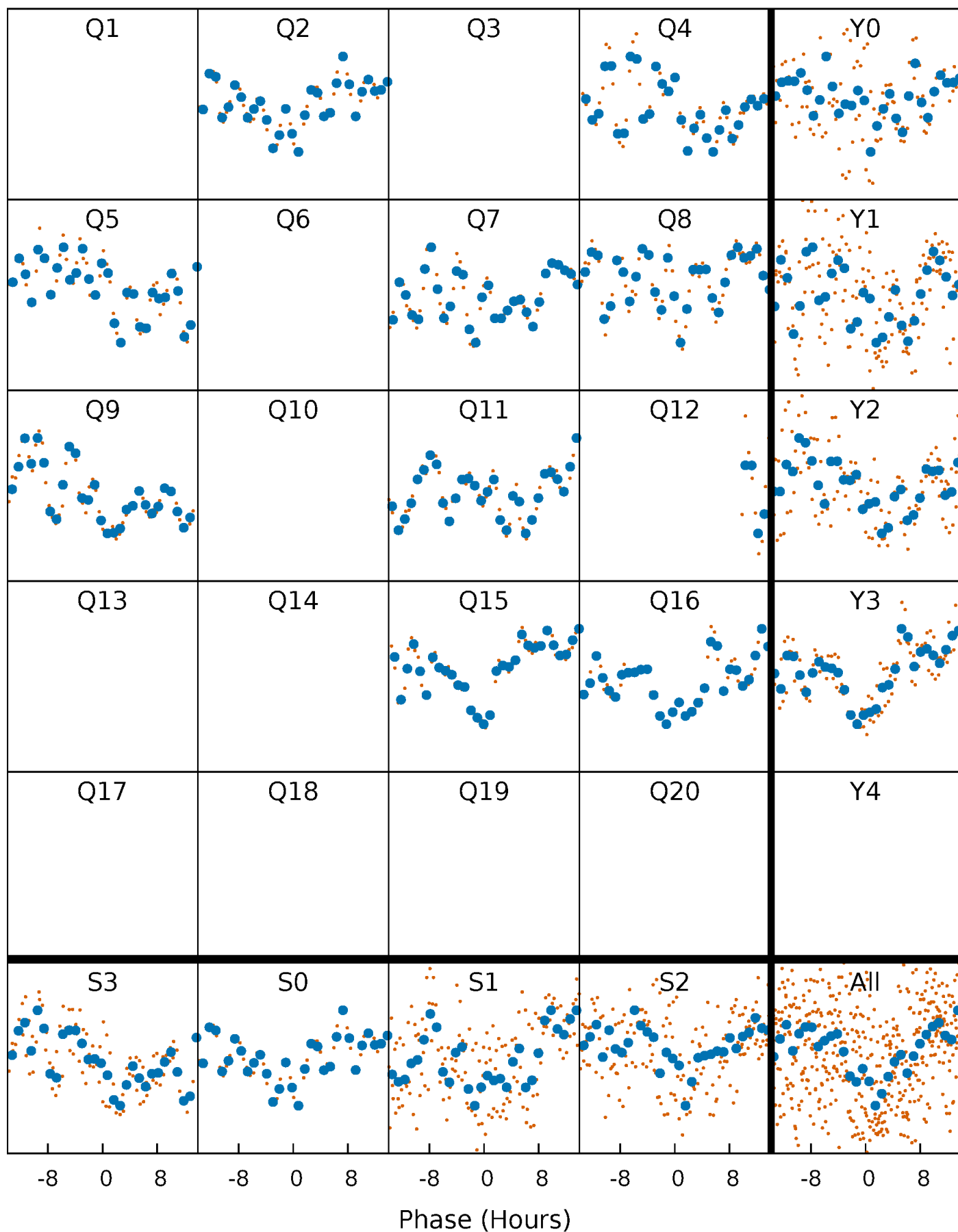


## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

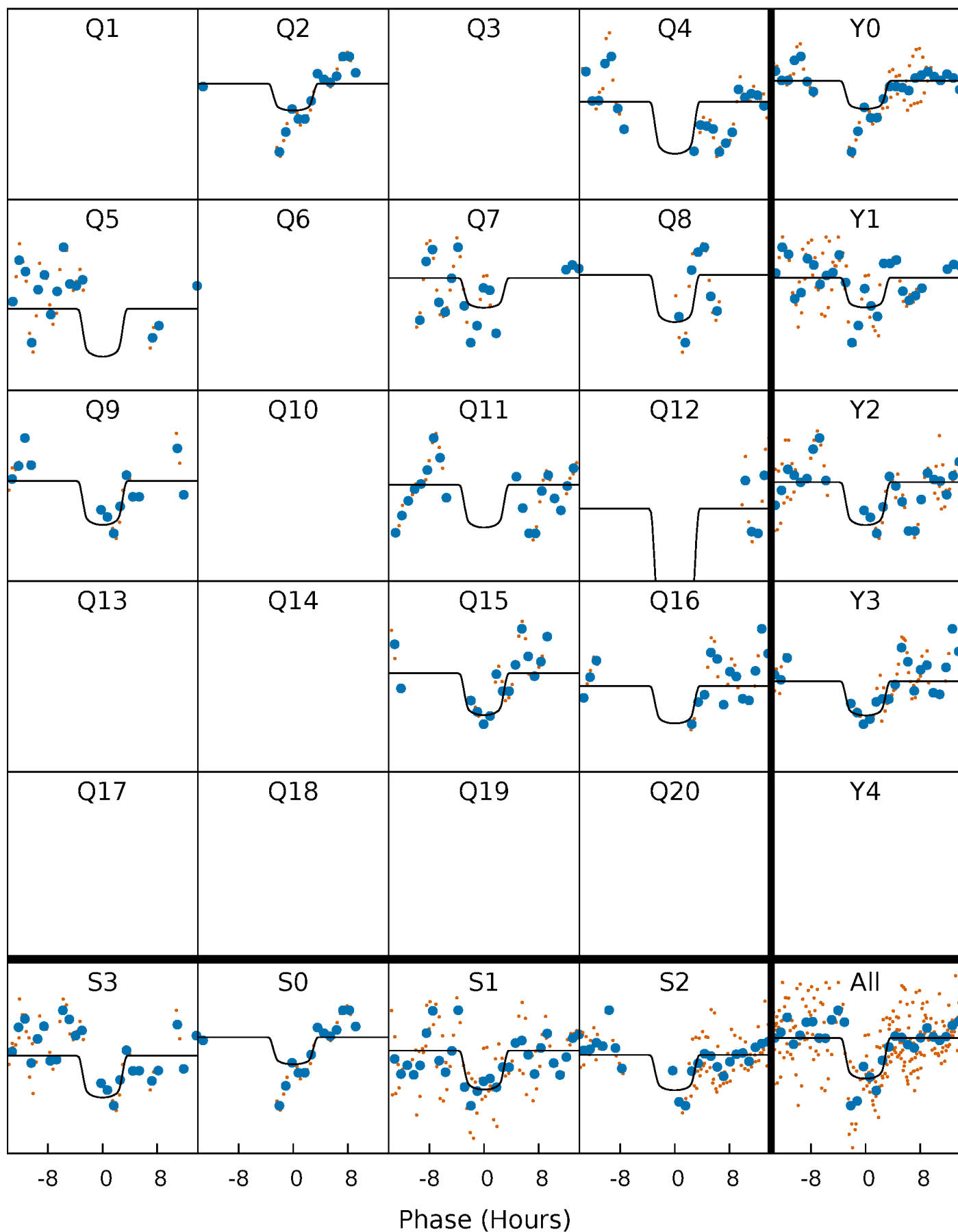
TCE 011620101-04 P=129.639080 Days  $T_0=257.177764$  (BKJD)





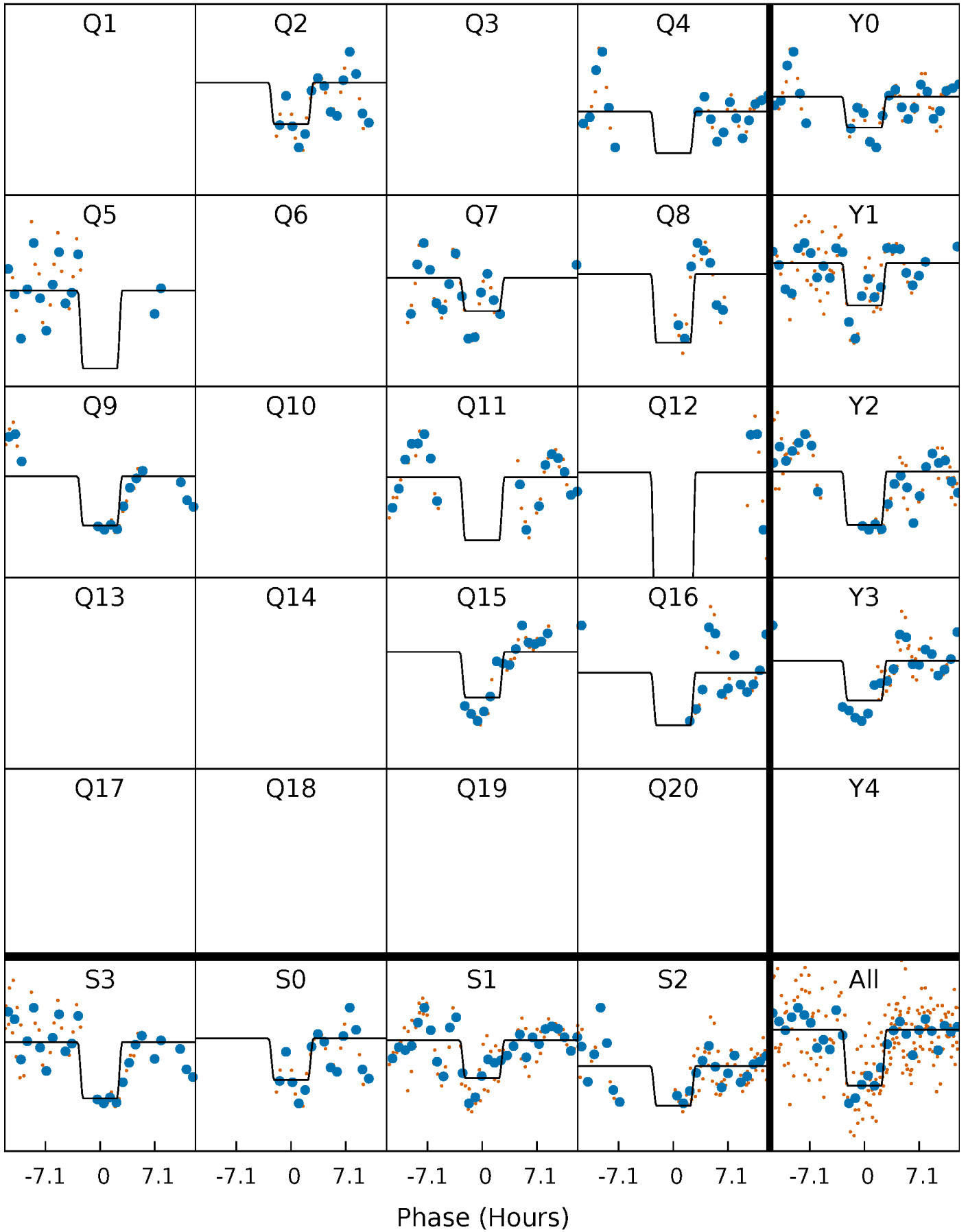
# DV Quarter-Phased Transit Curves

TCE 011620101-04 P=129.639080 Days  $T_0=257.177764$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

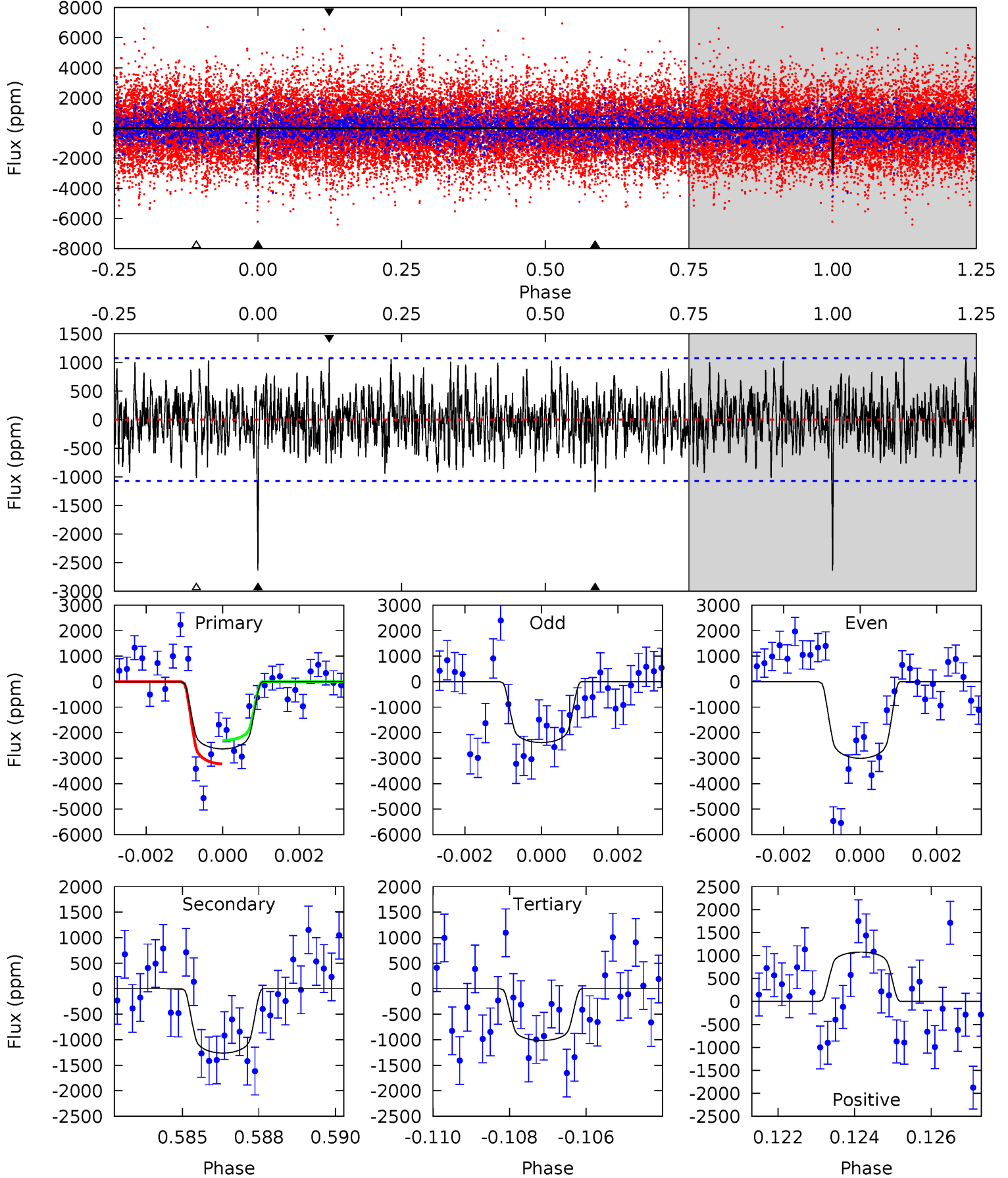
TCE 011620101-04 P=129.643234 Days  $T_0=257.157294$  (BKJD)



# DV Model-Shift Uniqueness Test

011620101-04, P = 129.639080 Days, E = 127.538684 Days

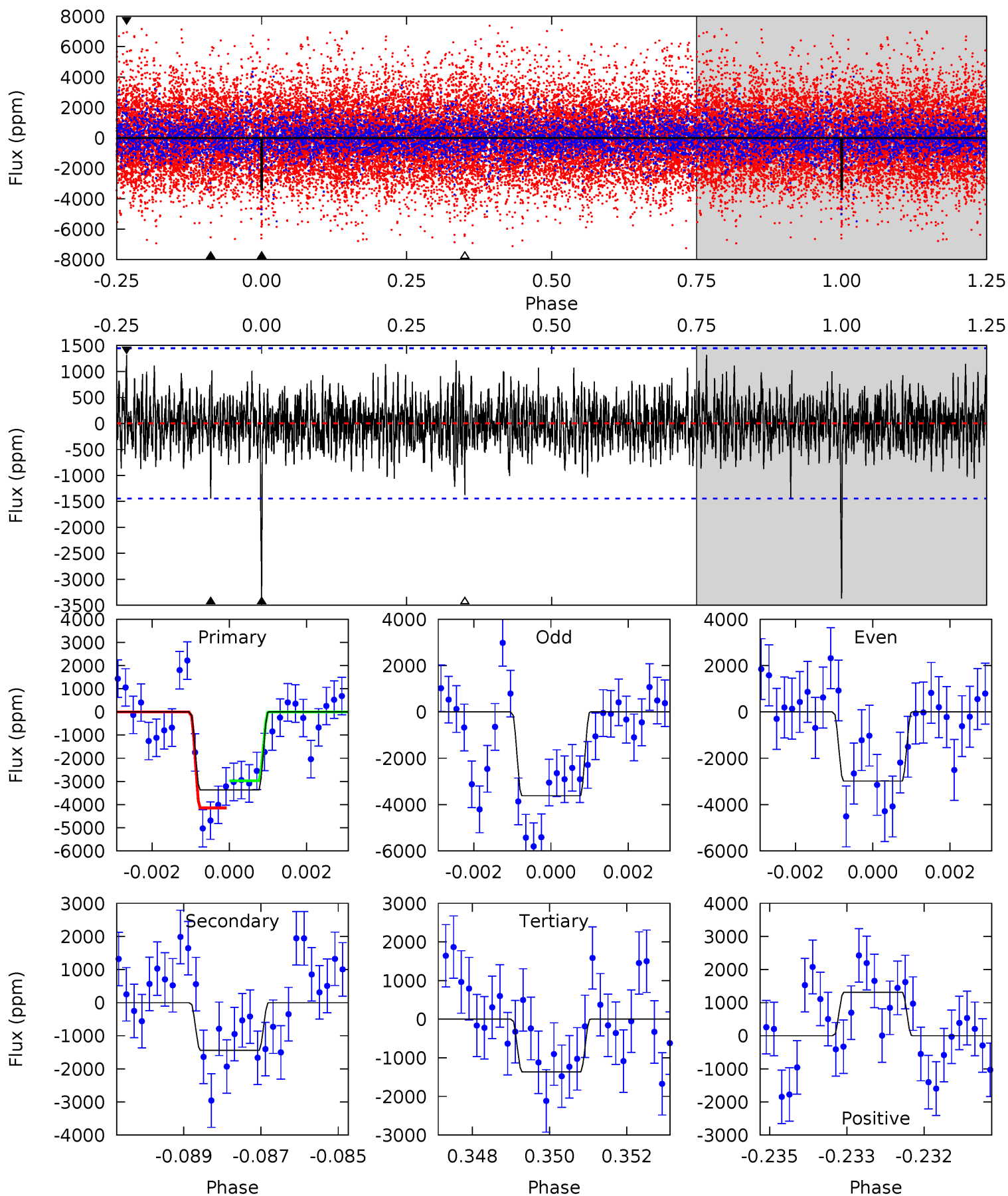
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.0	6.24	5.03	5.32	5.31	3.05	1.74	8.01	7.72	1.21	0.92	1.53	1.25	0.29	2.12



# Alt Model-Shift Uniqueness Test

011620101-04, P = 129.643234 Days, E = 127.514060 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
12.4	5.32	5.03	4.85	5.34	3.11	1.34	7.41	7.59	0.29	0.47	1.15	0.98	0.28	2.05



### Stellar Parameters For KIC 011620101

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7333^{+203}_{-330}$	$3.884^{+0.301}_{-0.129}$	$-0.040^{+0.200}_{-0.350}$	$2.529^{+0.510}_{-0.874}$	$1.785^{+0.175}_{-0.409}$	$0.155^{+0.332}_{-0.060}$
	+3%/-5%	+8%/-3%	+500%/-875%	+20%/-35%	+10%/-23%	+214%/-39%
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 011620101-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-1261 \pm 202$	$13.17^{+2.15}_{-2.62}$	$906^{+63}_{-93}$	$6120^{+410}_{-399}$	$1471^{+823}_{-422}$
Alt.	$-1441 \pm 271$	$15.76^{+2.56}_{-2.94}$	$906^{+63}_{-84}$	$5774^{+357}_{-396}$	$1159^{+593}_{-332}$

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



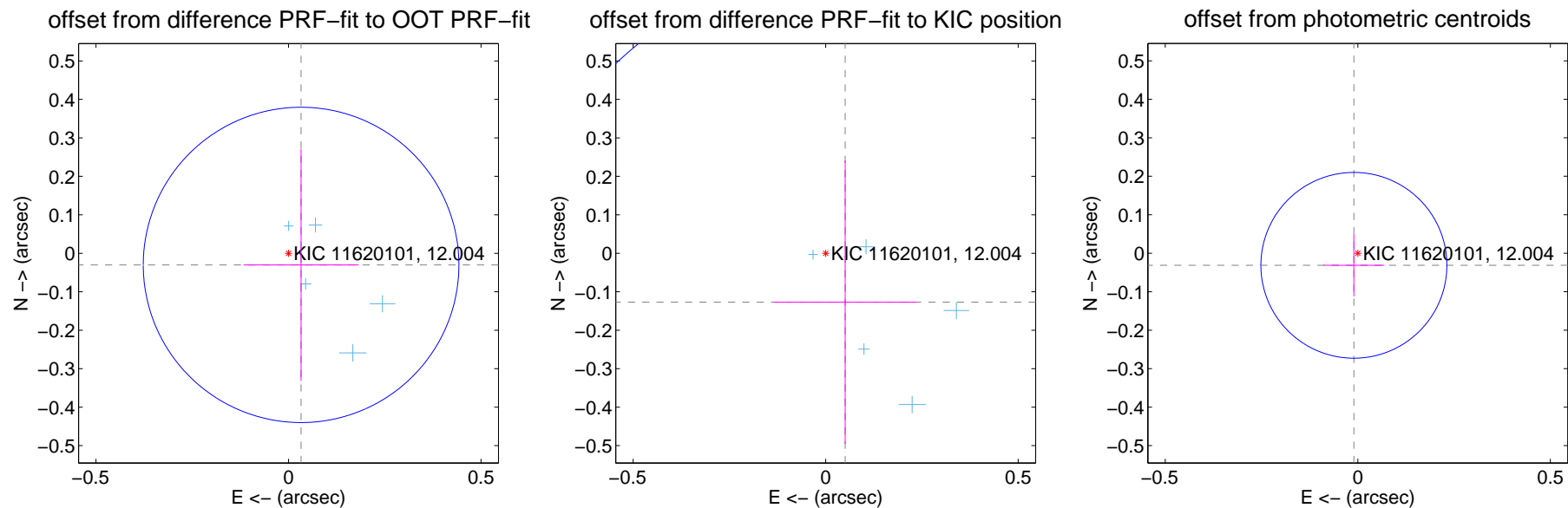
## DV Centroid Data

Supplemental centroid analysis for 011620101-04. Kepler magnitude: 12.00. Transit SNR 8.62

There are 7 quarters with good PRF difference image offsets

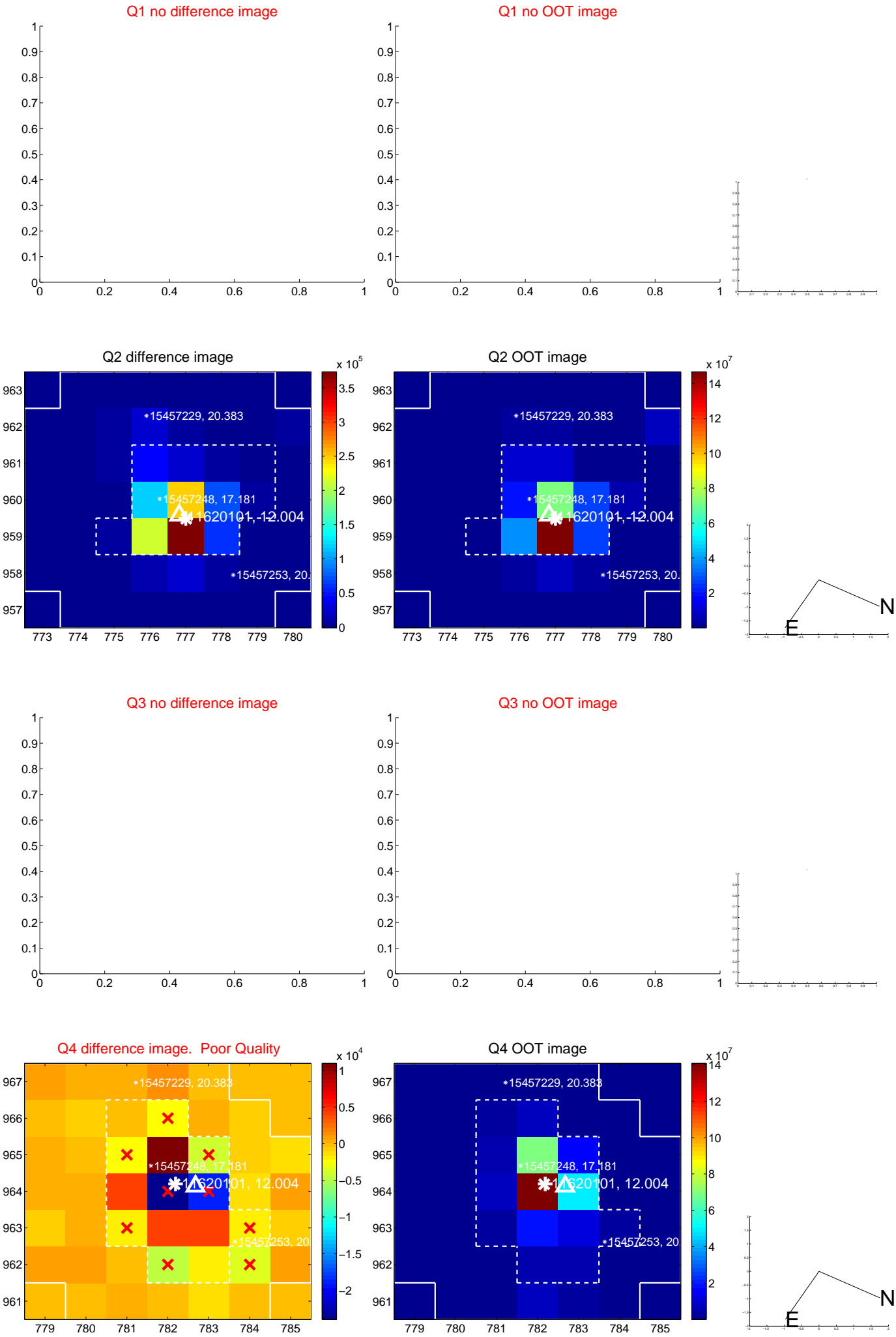
The direct PRF centroid is offset from the target star catalog position by about 0.18 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.045 \pm 0.137$	0.33	$-0.033 \pm 0.149$	$-0.030 \pm 0.301$
PRF-fit source offset from KIC position	$0.137 \pm 0.287$	0.48	$-0.051 \pm 0.185$	$-0.127 \pm 0.368$
photometric centroid source offset	$0.03 \pm 0.08$	0.41	$0.01 \pm 0.08$	$-0.03 \pm 0.08$

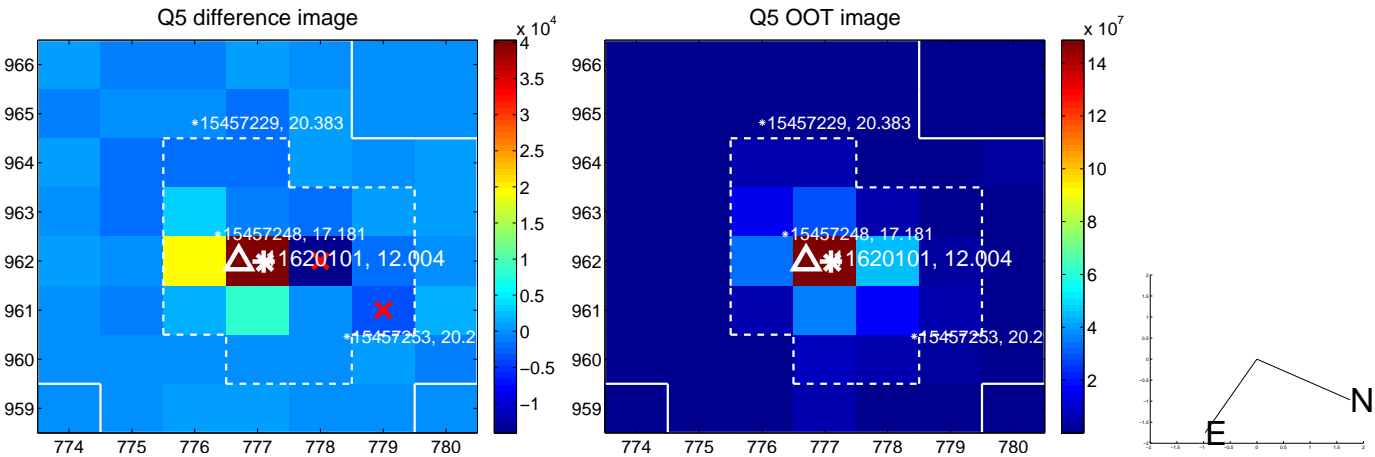


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

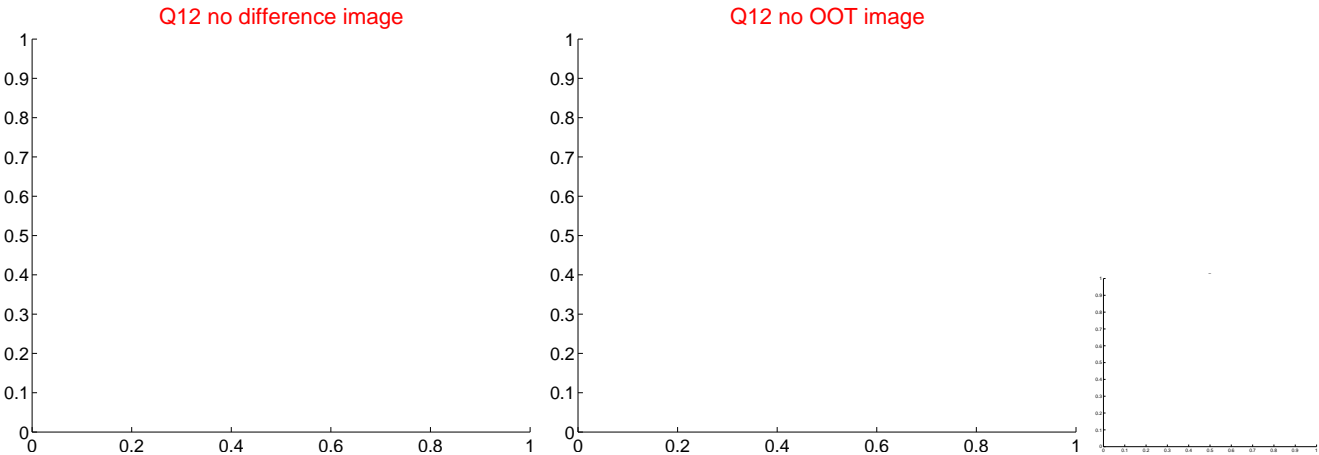
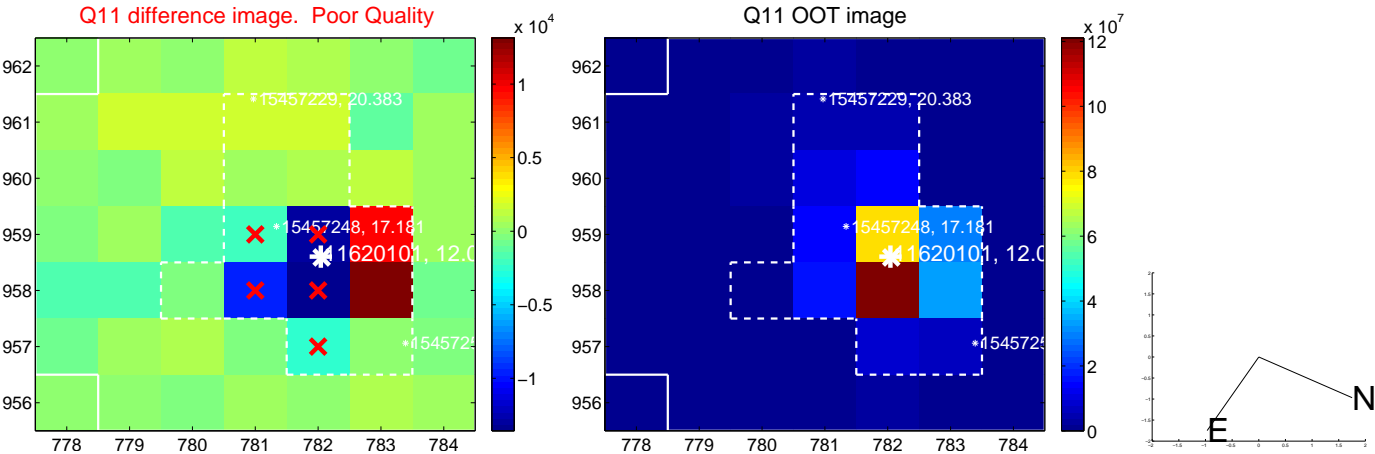
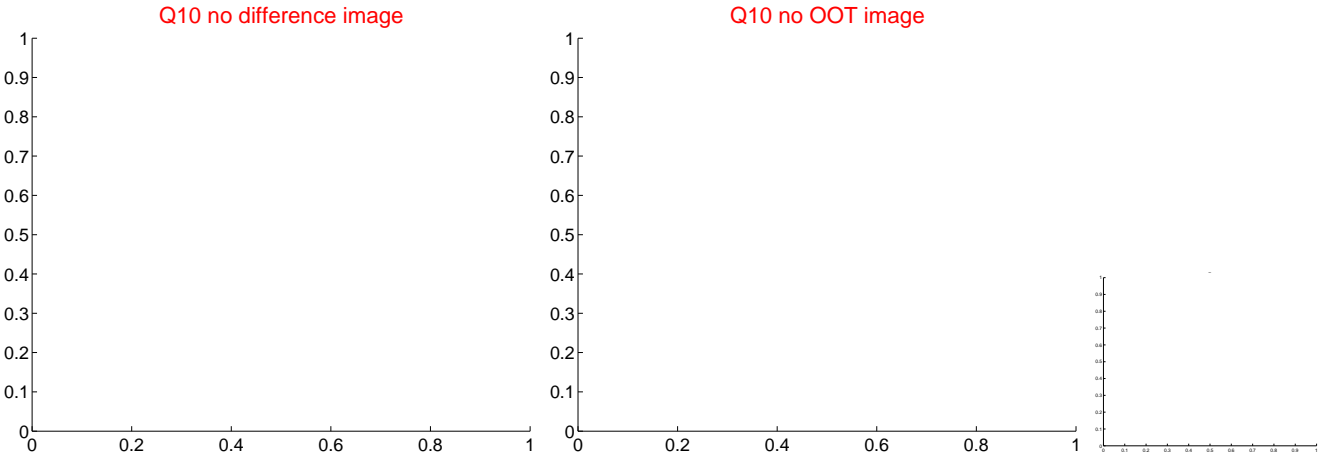
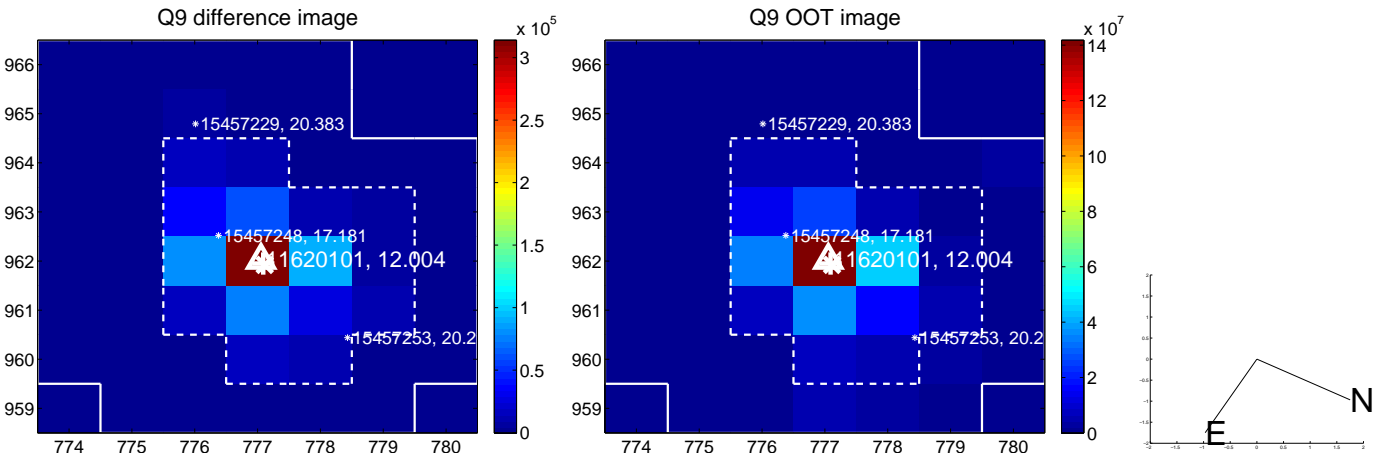
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

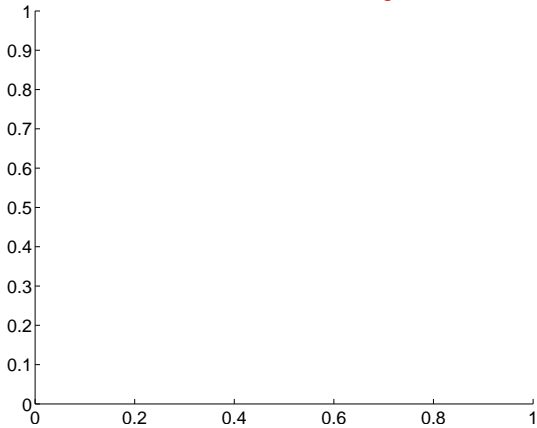


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

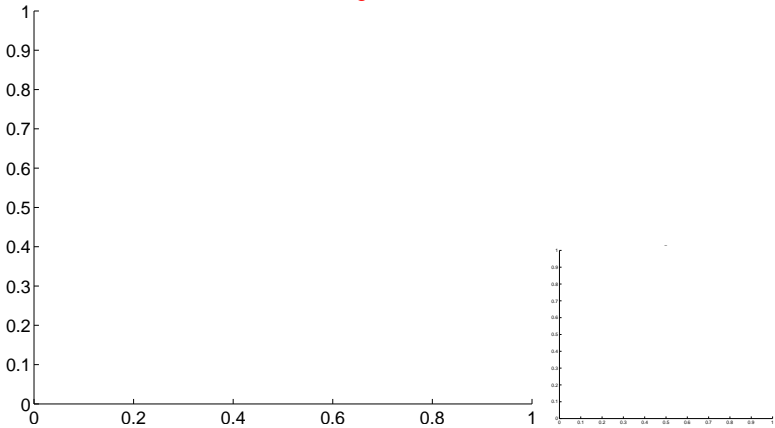


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

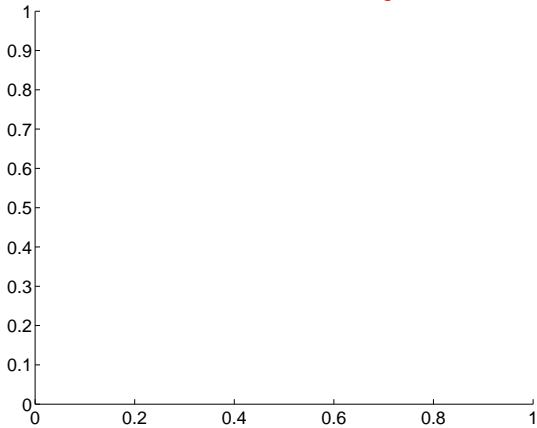
Q13 no difference image



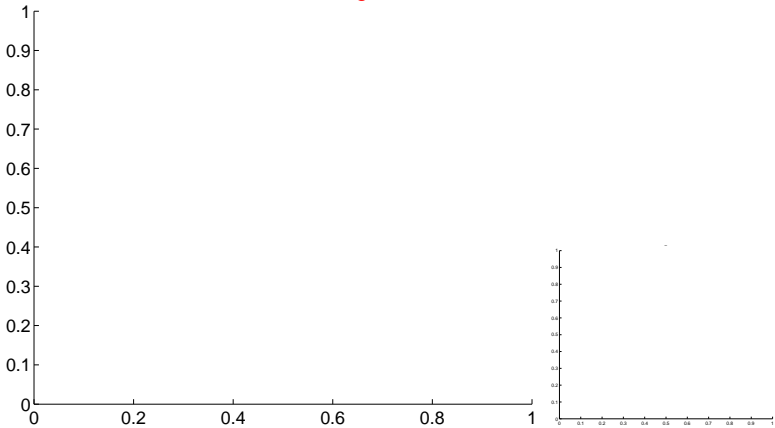
Q13 no OOT image



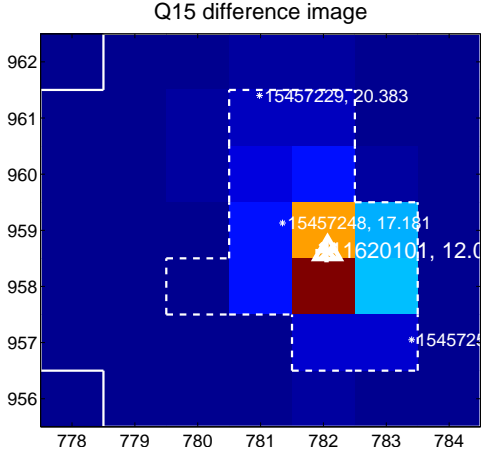
Q14 no difference image



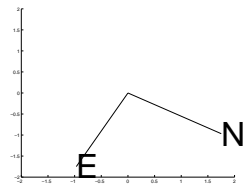
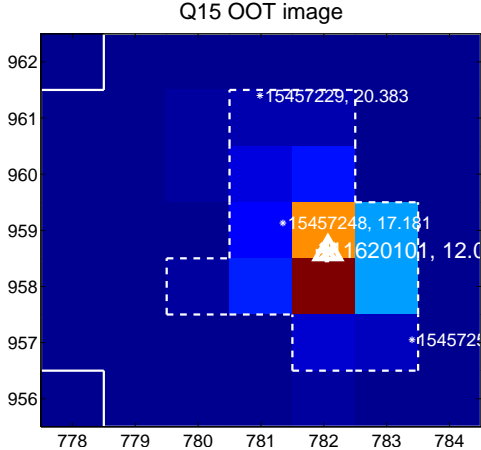
Q14 no OOT image



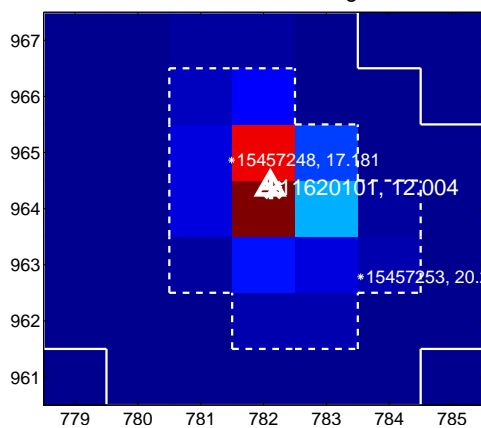
Q15 difference image



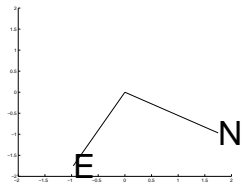
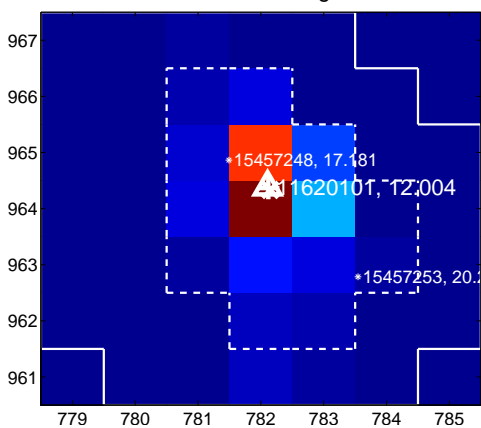
Q15 OOT image



Q16 difference image

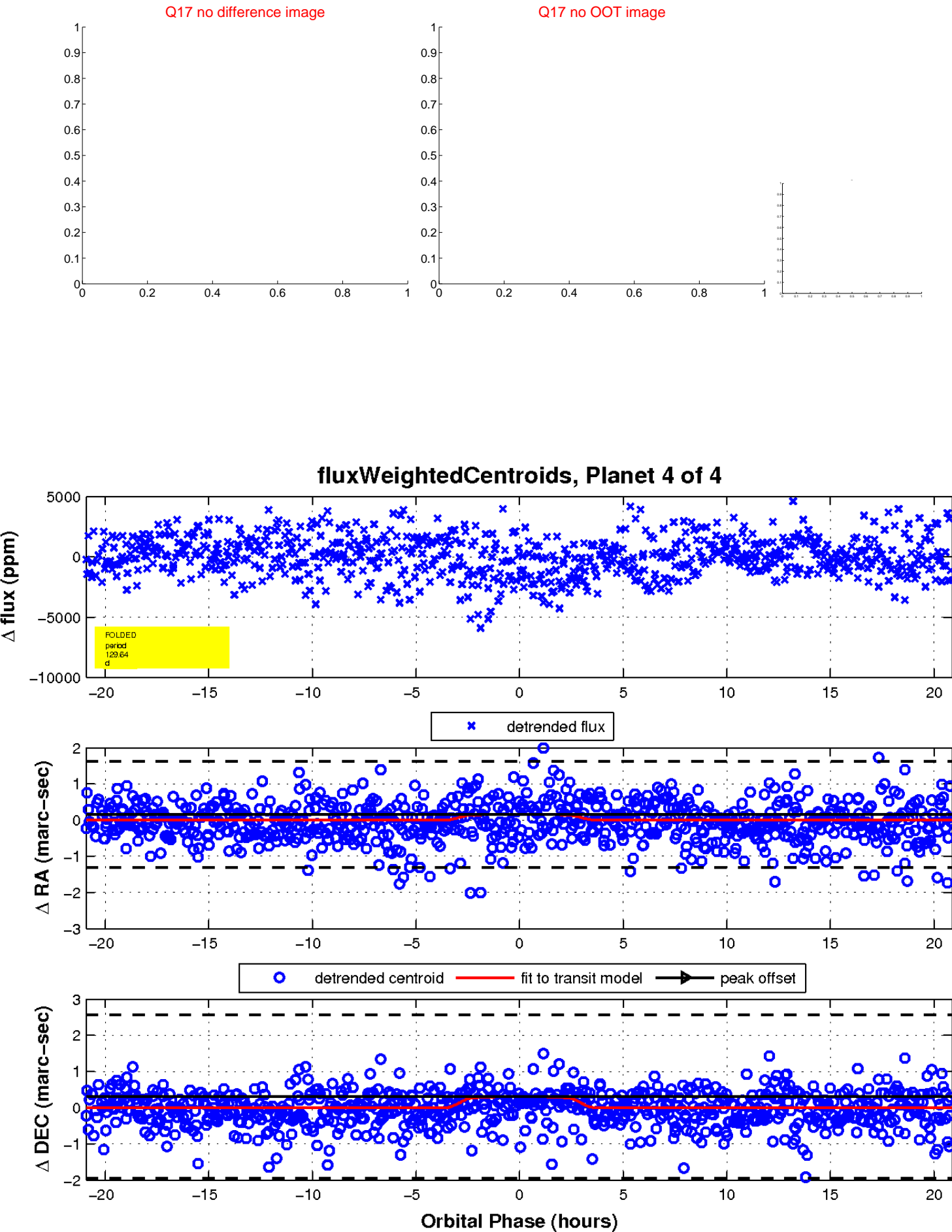


Q16 OOT image





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



UKIRT Image

Declination

