

# KIC 004752451

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004752451-01	OBS	0109.01	6.414970	132.865588	152.5	3.967	44.7	36.9	1.18	6170	2.66	418.57
004752451-02	OBS	No	483.543072	535.345522	176.3	6.133	8.7	8.2	1.18	6170	1.78	1.31
004752451-03	OBS	No	3.207385	132.888154	30.6	2.976	8.2	8.8	1.18	6170	0.78	1054.77

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004752451-01	OBS	FP	0.00	0	1	1	0	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE—CENT_RESOLVED_OFFSET
004752451-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS
004752451-03	OBS	FP	0.00	1	1	1	0	IS_SEC_TCE—CENT_RESOLVED_OFFSET—HALO_GHOST

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

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

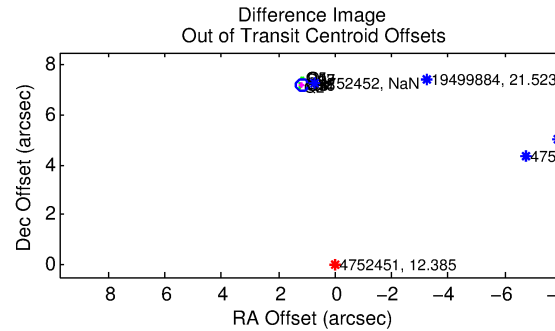
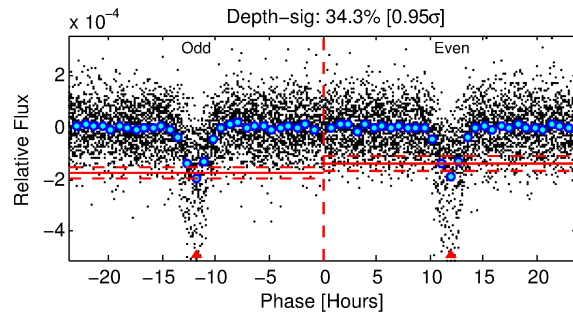
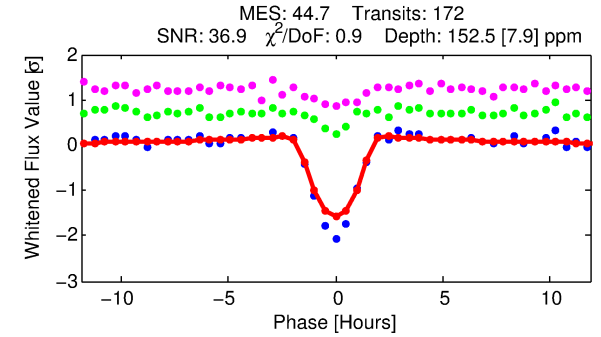
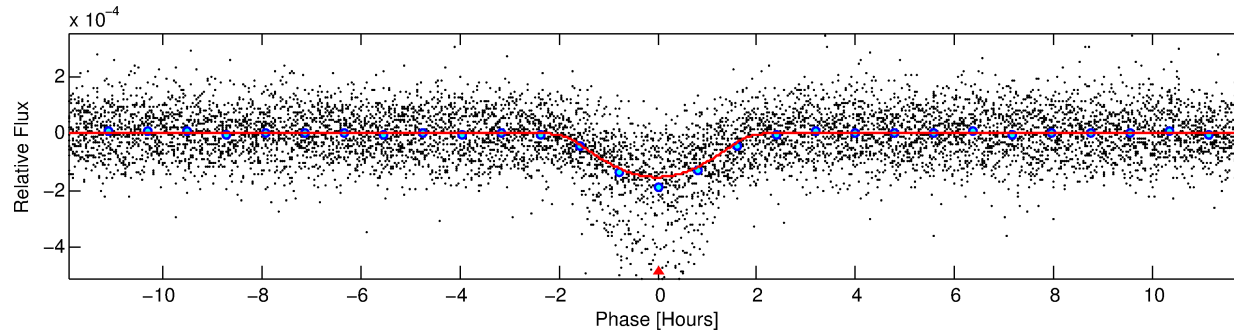
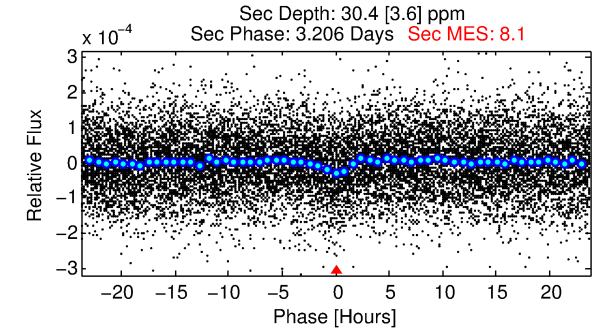
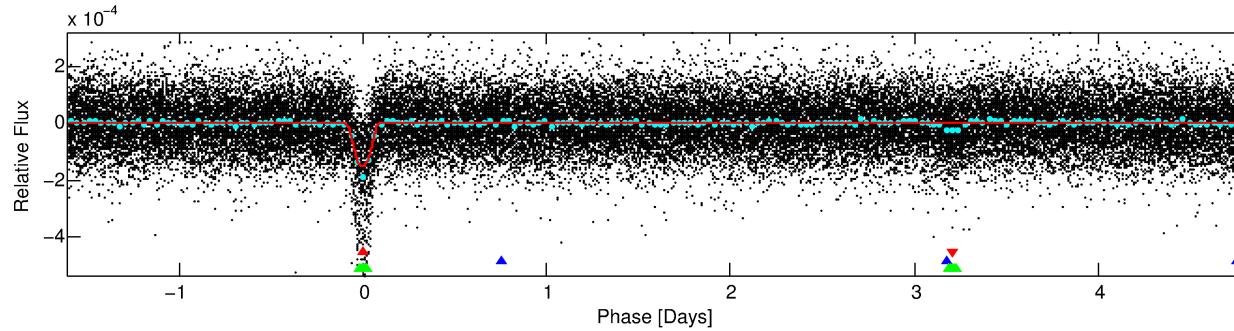
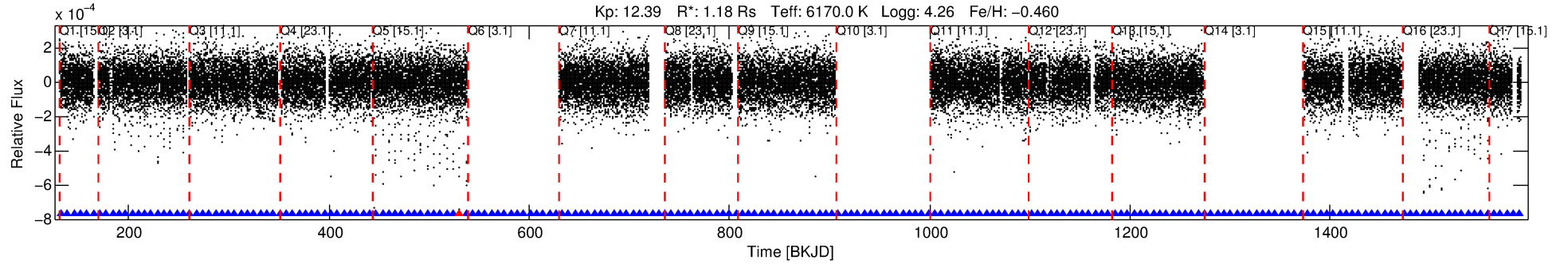
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 004752451-01

No Significant Match Found

# DV One-Page Summary

KIC: 4752451 Candidate: 1 of 3 Period: 6.415 d  
KOI: K00109.01 Corr: 0.982



## DV Fit Results:

Period = 6.41497 [0.00002] d  
Epoch = 132.8656 [0.0022] BKJD  
Rp/R\* = 0.0206 [0.0136]  
a/R\* = 2.90 [0.53]  
b = 1.00 [0.02]  
Seff = 418.57 [141.93]  
Teq = 1153 [98] K  
Rp = 2.66 [1.84] Re  
a = 0.0659 [0.0130] AU  
Ag = 10.30 [14.09] [0.66σ]  
Teff = 3194 [1068] K [1.90σ]

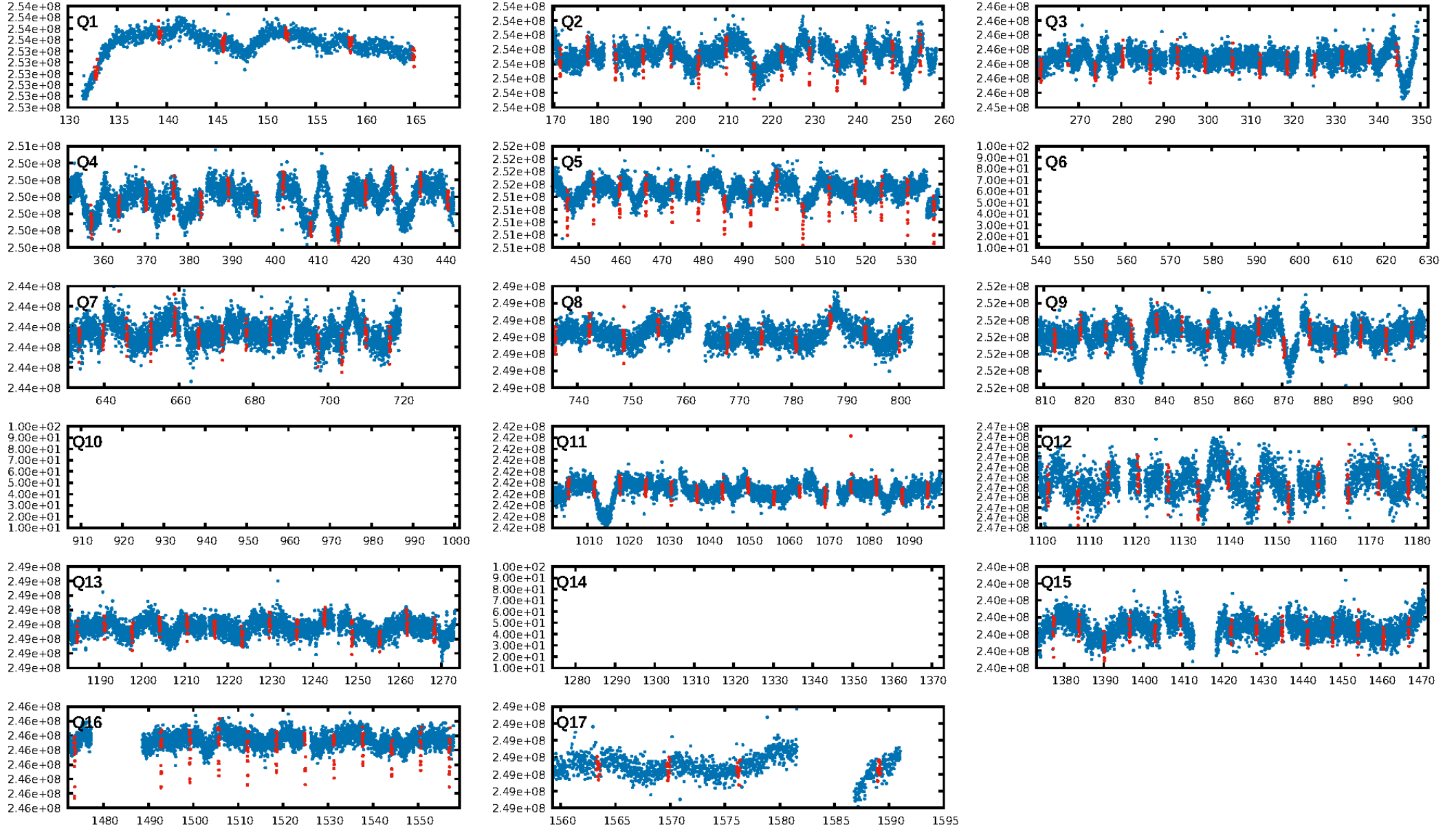
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [15.52σ]  
LongPeriod-sig: 100.0% [1567.77σ]  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 0.99 [161/162]  
GhostDiagnostic-chr: -0.2778  
Centroid-sig: 0.0%  
Centroid-so: 41.257 arcsec [105.68σ]  
OotOffset-rm: 7.282 arcsec [94.14σ]  
KicOffset-rm: 7.403 arcsec [104.71σ]  
OotOffset-st: 1/4/4/5 [14]  
KicOffset-st: 1/4/4/5 [14]  
DiffImageQuality-fgm: 1.00 [14/14]  
DiffImageOverlap-fno: 0.00 [0/14]

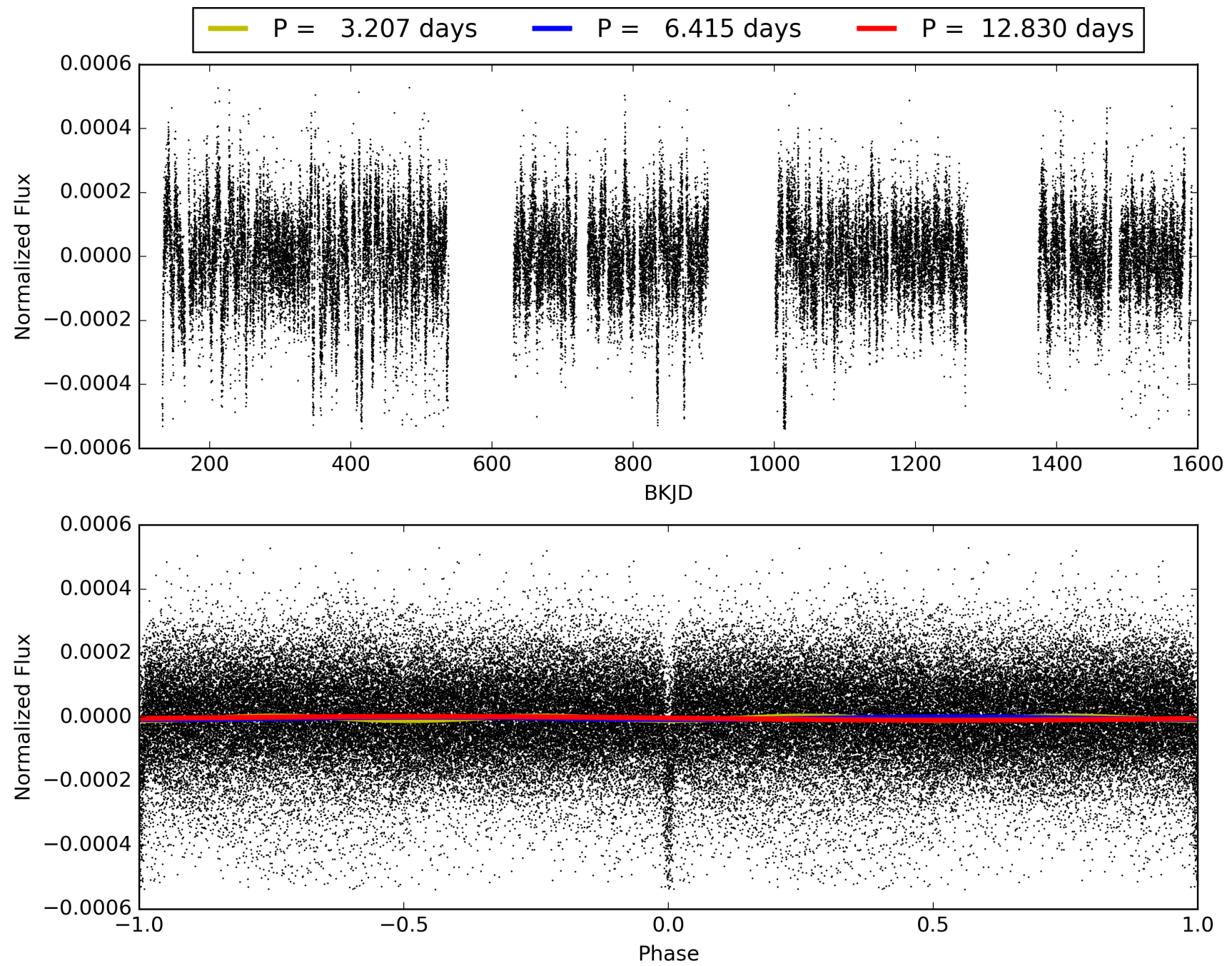
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 13:57:56 Z

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

# TCE 004752451-01, PDC Light Curves



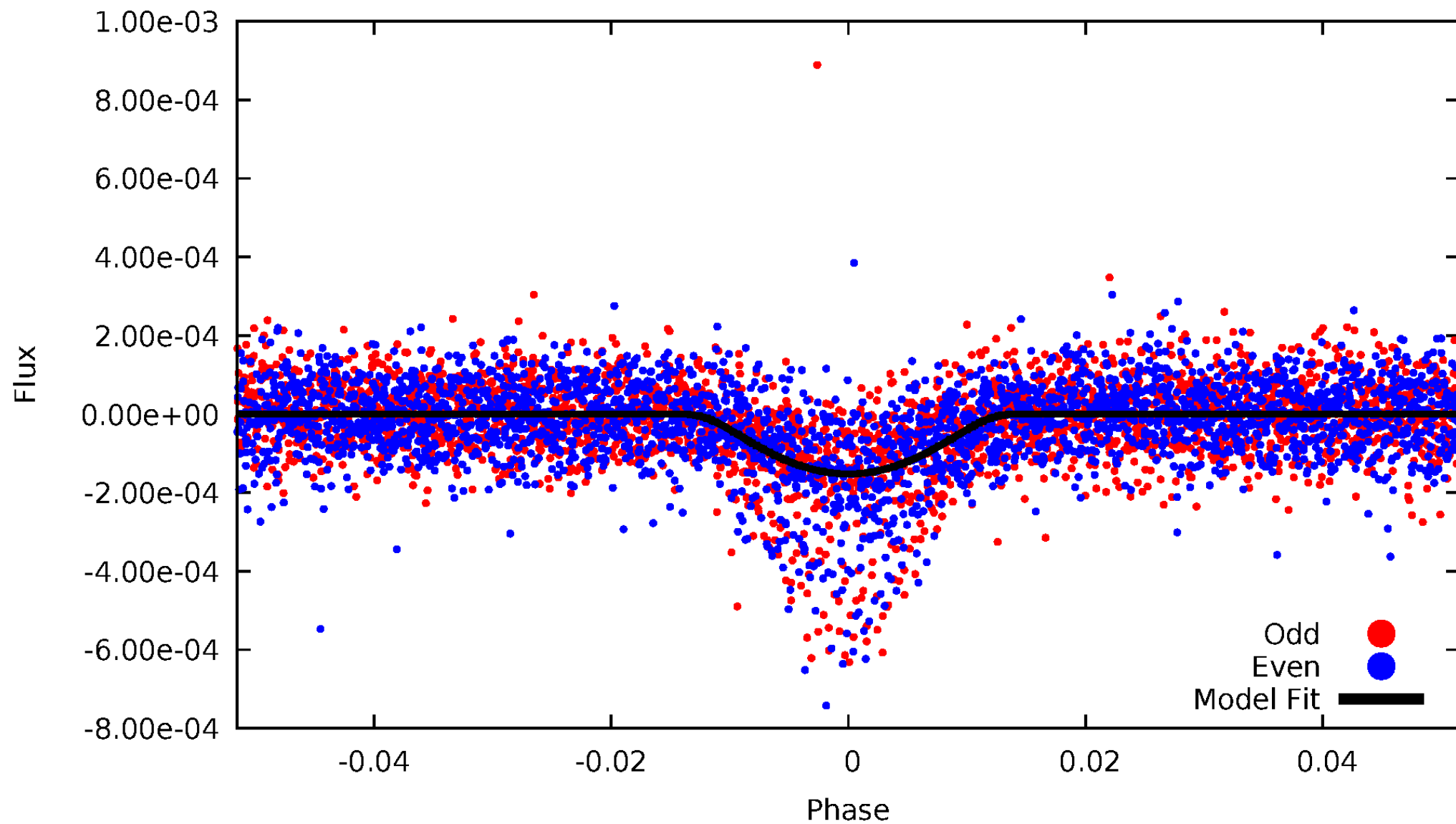
TCE 004752451-01





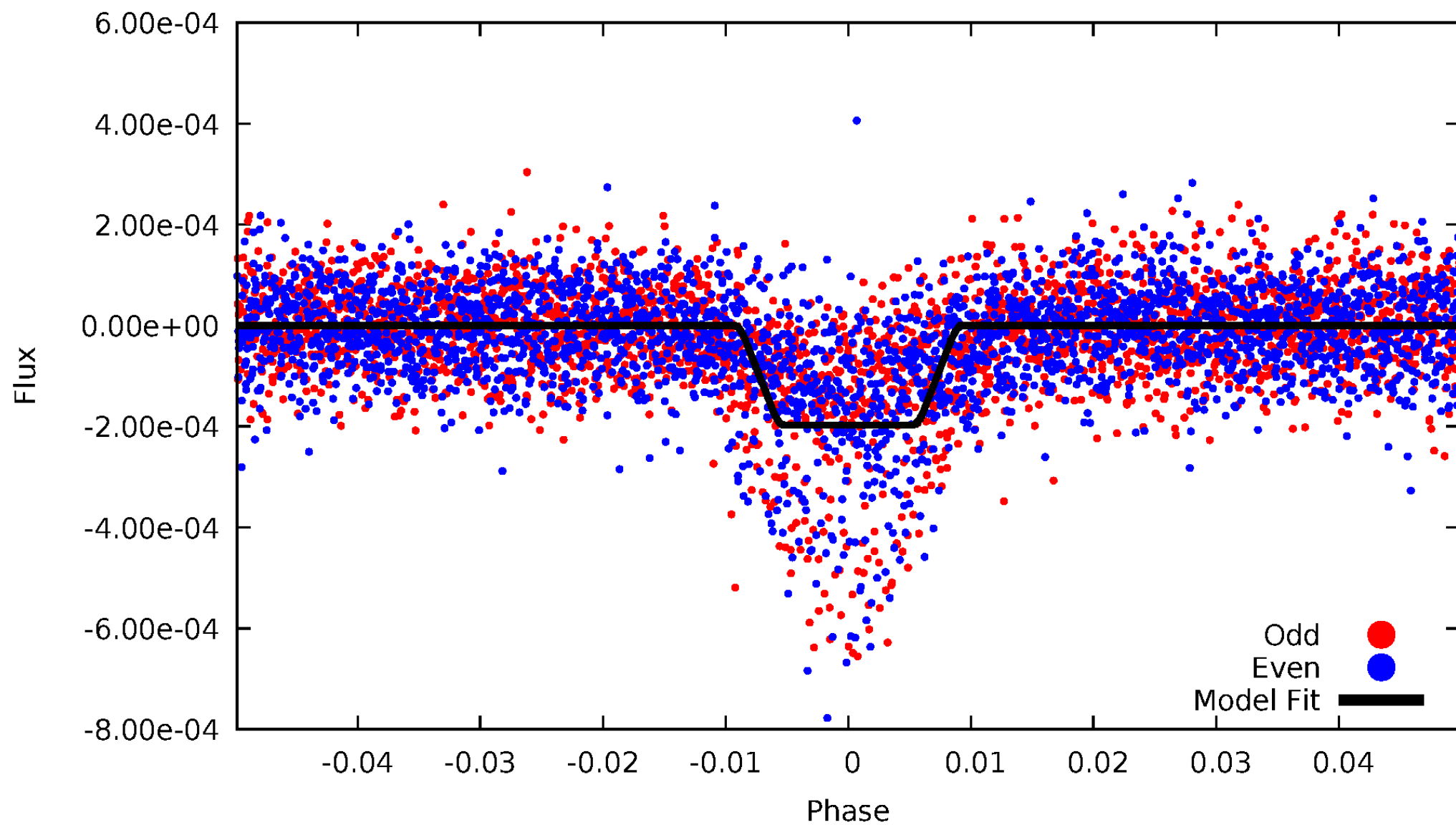
# DV Odd/Even

TCE 004752451-01



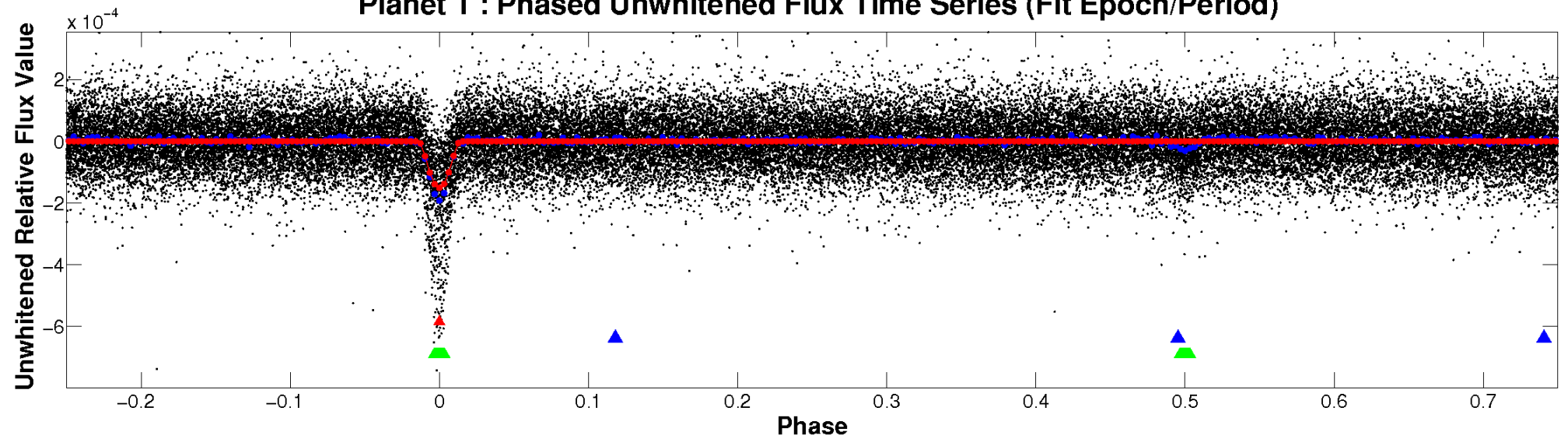
# ALT Odd/Even

TCE 004752451-01

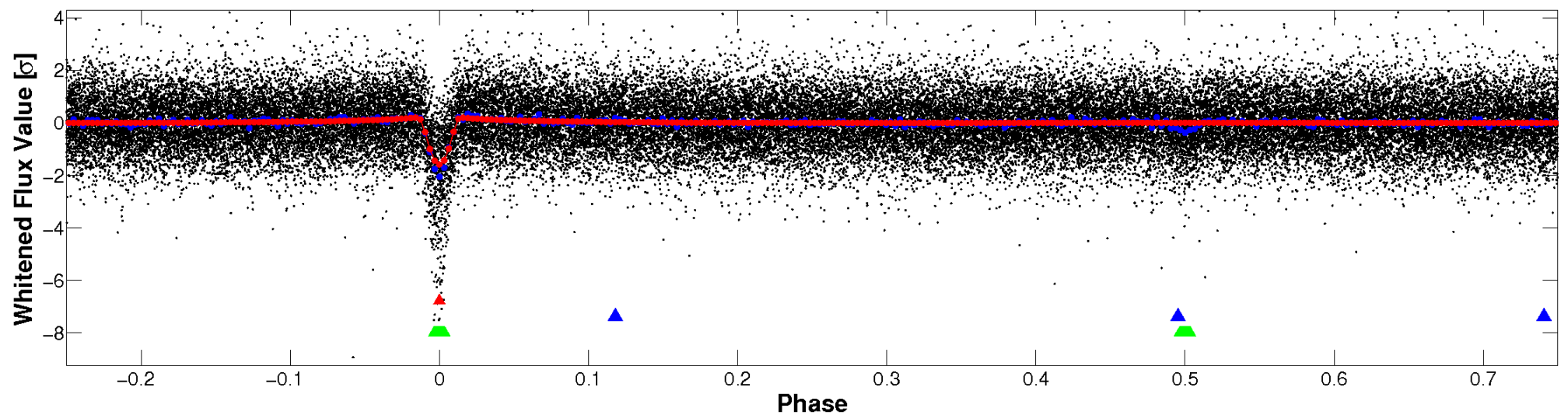


# Non-Whitened Vs. Whitened Light Curve

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

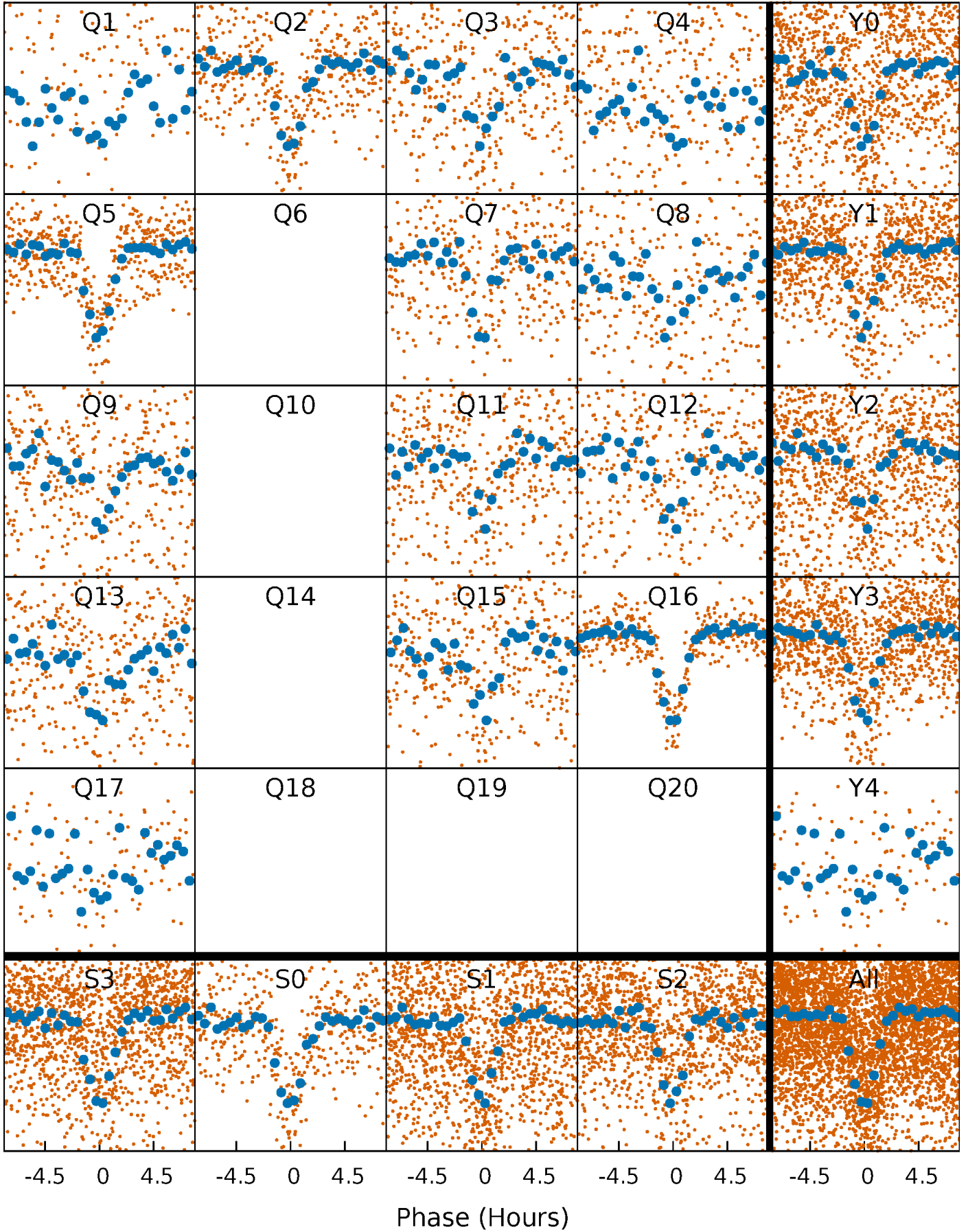


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

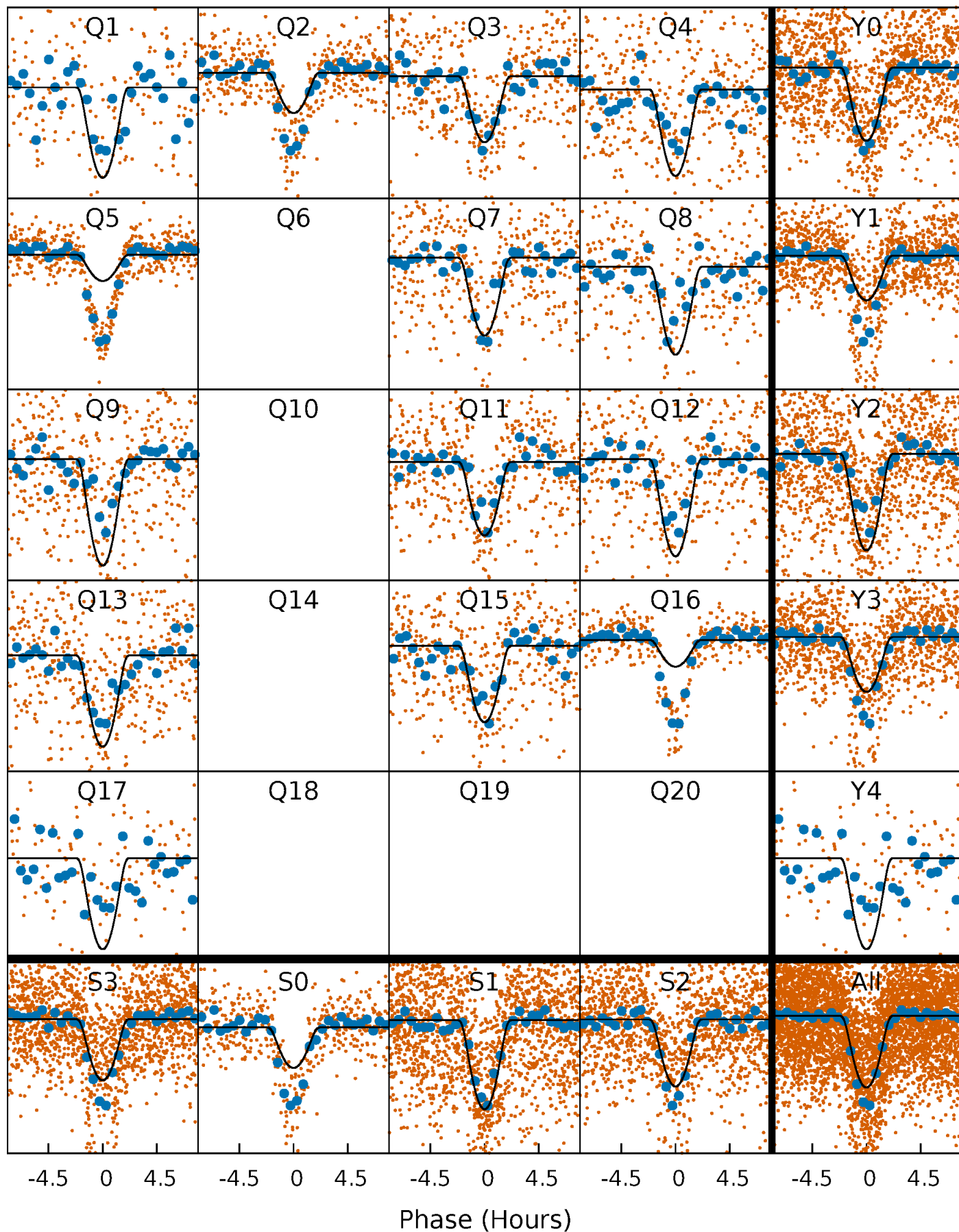
TCE 004752451-01 P= 6.414970 Days  $T_0=132.865588$  (BKJD)





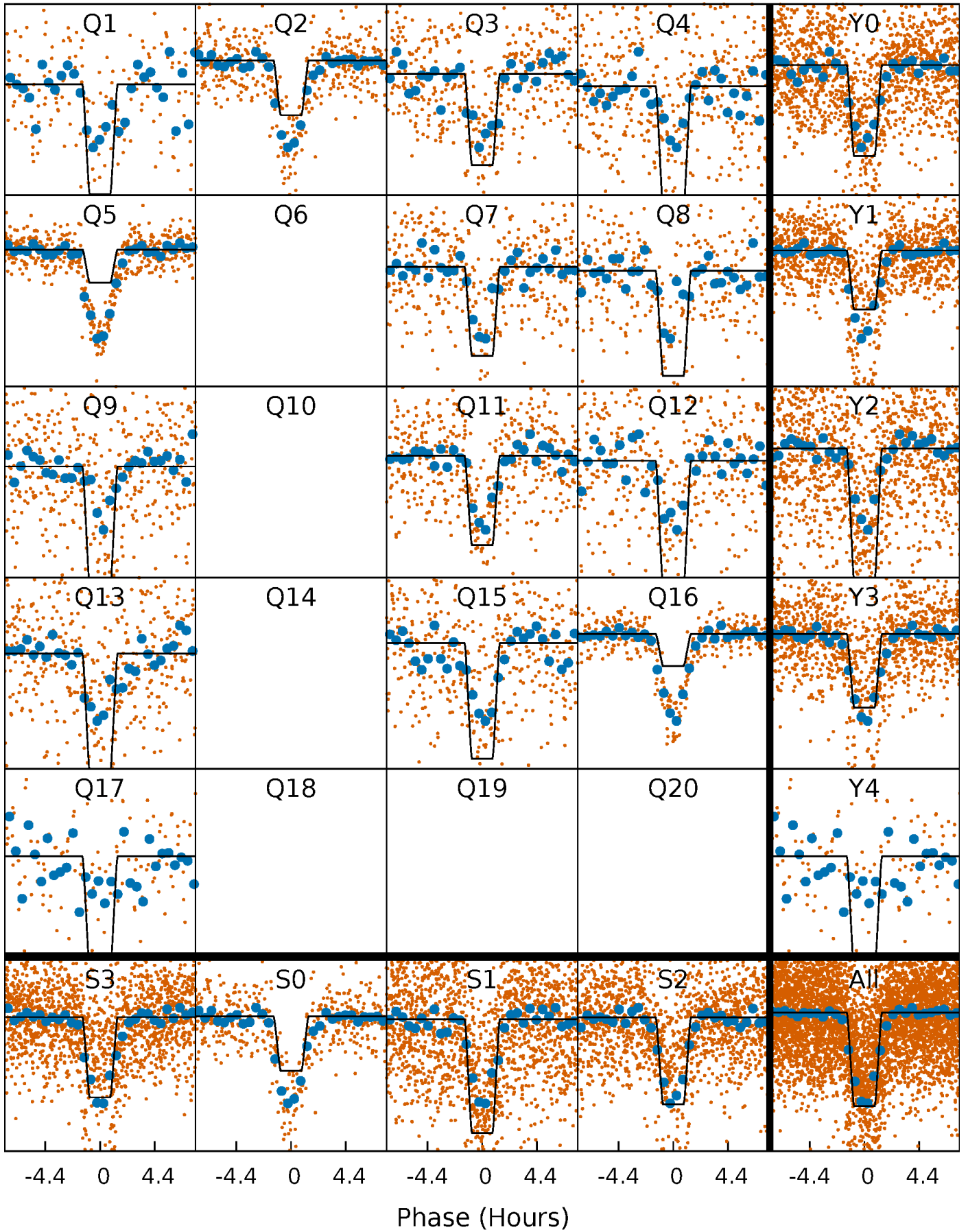
# DV Quarter-Phased Transit Curves

TCE 004752451-01   P= 6.414970 Days    $T_0=132.865588$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

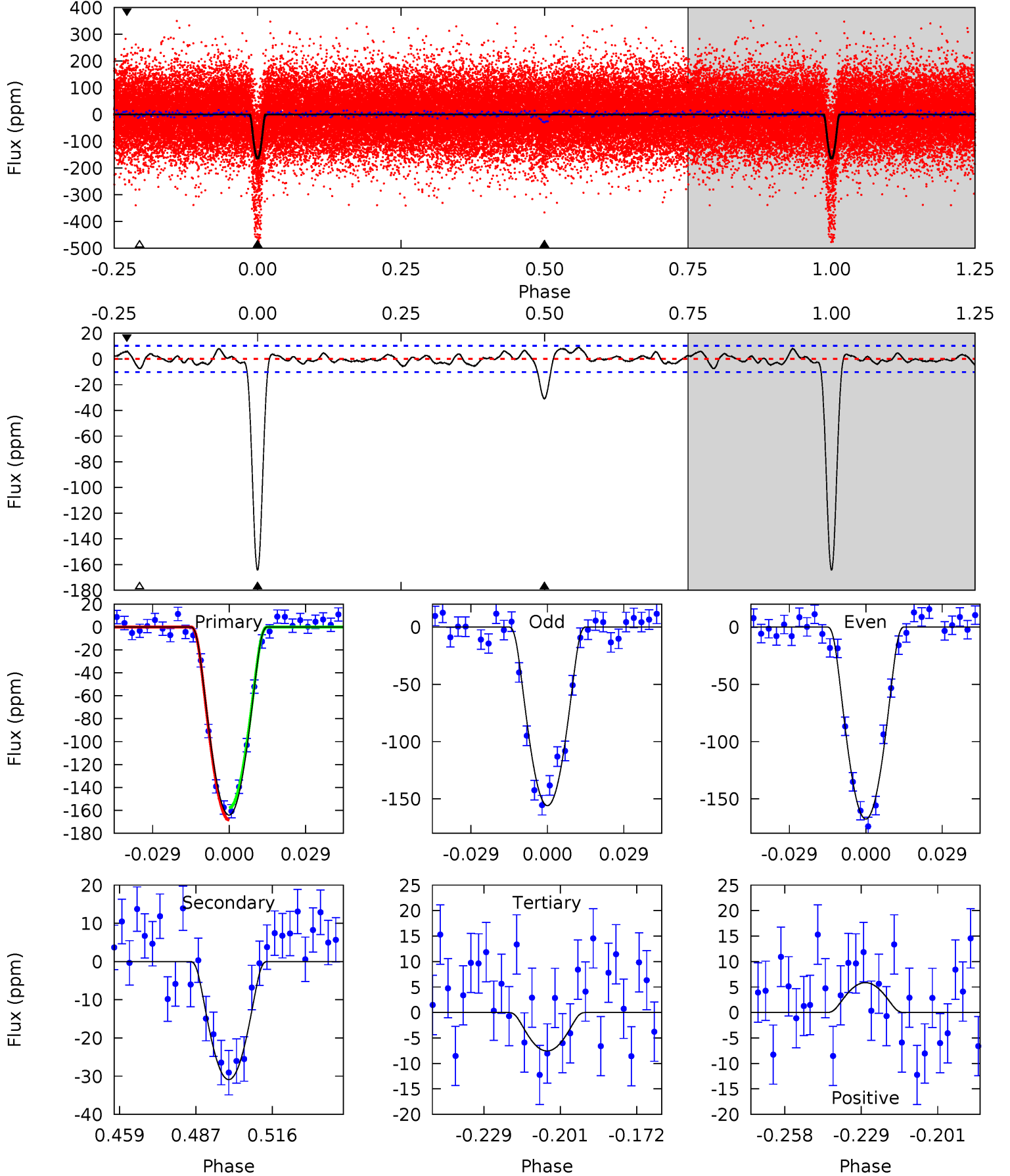
TCE 004752451-01 P= 6.414963 Days  $T_0=132.865124$  (BKJD)



# DV Model-Shift Uniqueness Test

004752451-01, P = 6.414970 Days, E = 126.450618 Days

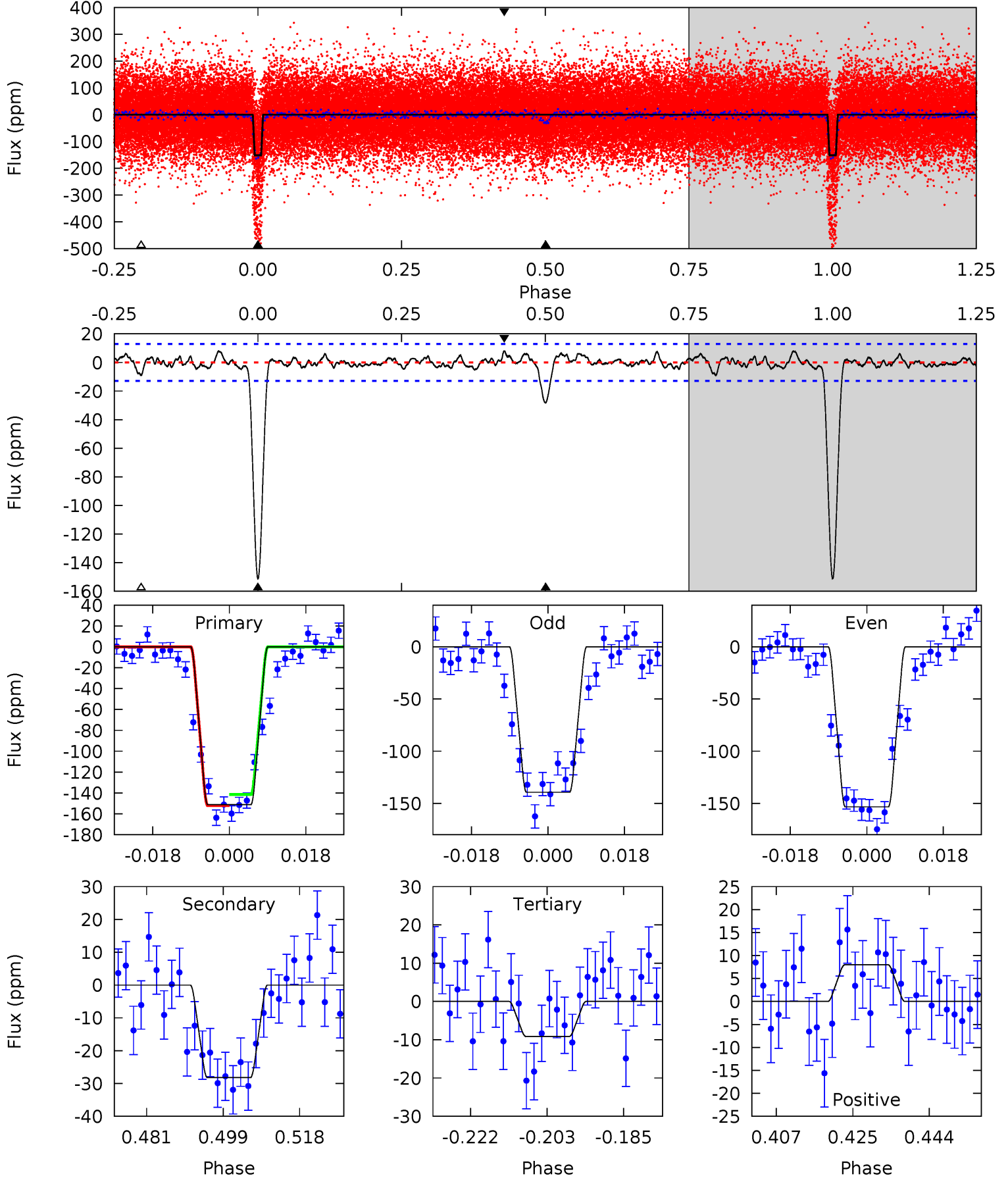
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
77.1	14.5	3.55	2.75	4.82	2.19	1.44	73.5	74.3	11.0	11.8	2.73	1.37	0.05	2.46



# Alt Model-Shift Uniqueness Test

004752451-01, P = 6.414963 Days, E = 126.450161 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
57.3	10.7	3.47	3.02	4.91	2.36	1.07	53.8	54.3	7.22	7.67	2.63	1.45	0.05	2.01





### Stellar Parameters For KIC 004752451

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6170^{+169}_{-188}$	$4.259^{+0.186}_{-0.124}$	$-0.460^{+0.300}_{-0.300}$	$1.183^{+0.242}_{-0.242}$	$0.927^{+0.136}_{-0.090}$	$0.789^{+0.684}_{-0.317}$
	+3%/-3%	+4%/-3%	+65%/-65%	+20%/-20%	+15%/-10%	+87%/-40%
Source	PHO1	FLK73	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 004752451-01 / KOI 0109.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-31 \pm 2$	$2.72^{+1.72}_{-1.44}$	$1599^{+99}_{-100}$	$3596^{+1128}_{-527}$	$10^{+37}_{-7}$
Alt.	$-28 \pm 3$	$1.99^{+1.80}_{-1.22}$	$1595^{+99}_{-104}$	$3885^{+1771}_{-709}$	$17^{+104}_{-12}$

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

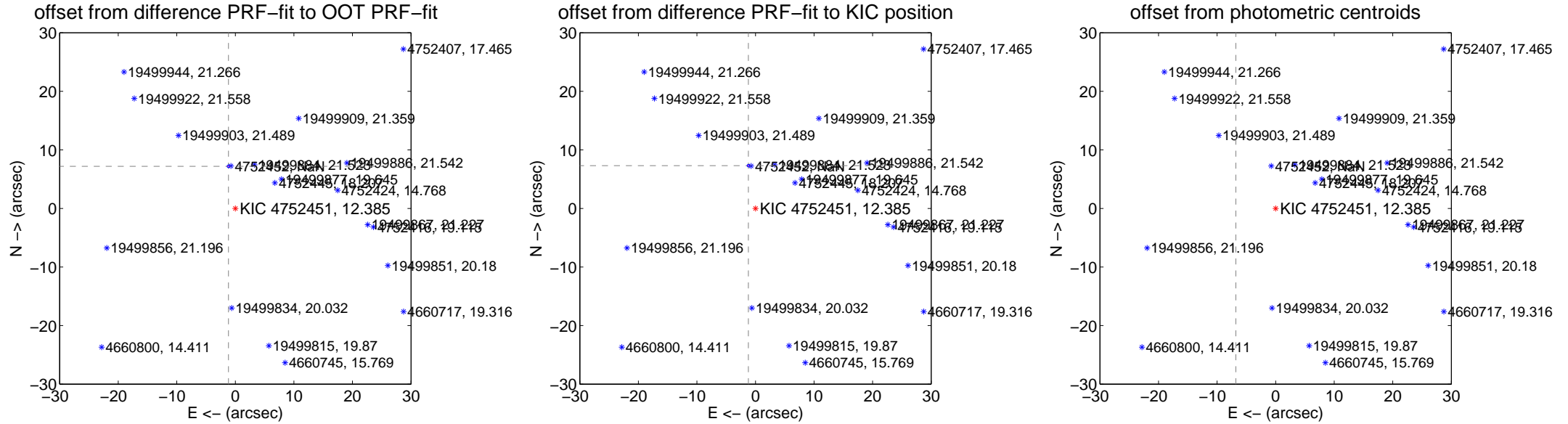
## DV Centroid Data

Supplemental centroid analysis for 004752451-01. Kepler magnitude: 12.38. Transit SNR 36.89

There are 14 quarters with good PRF difference image offsets

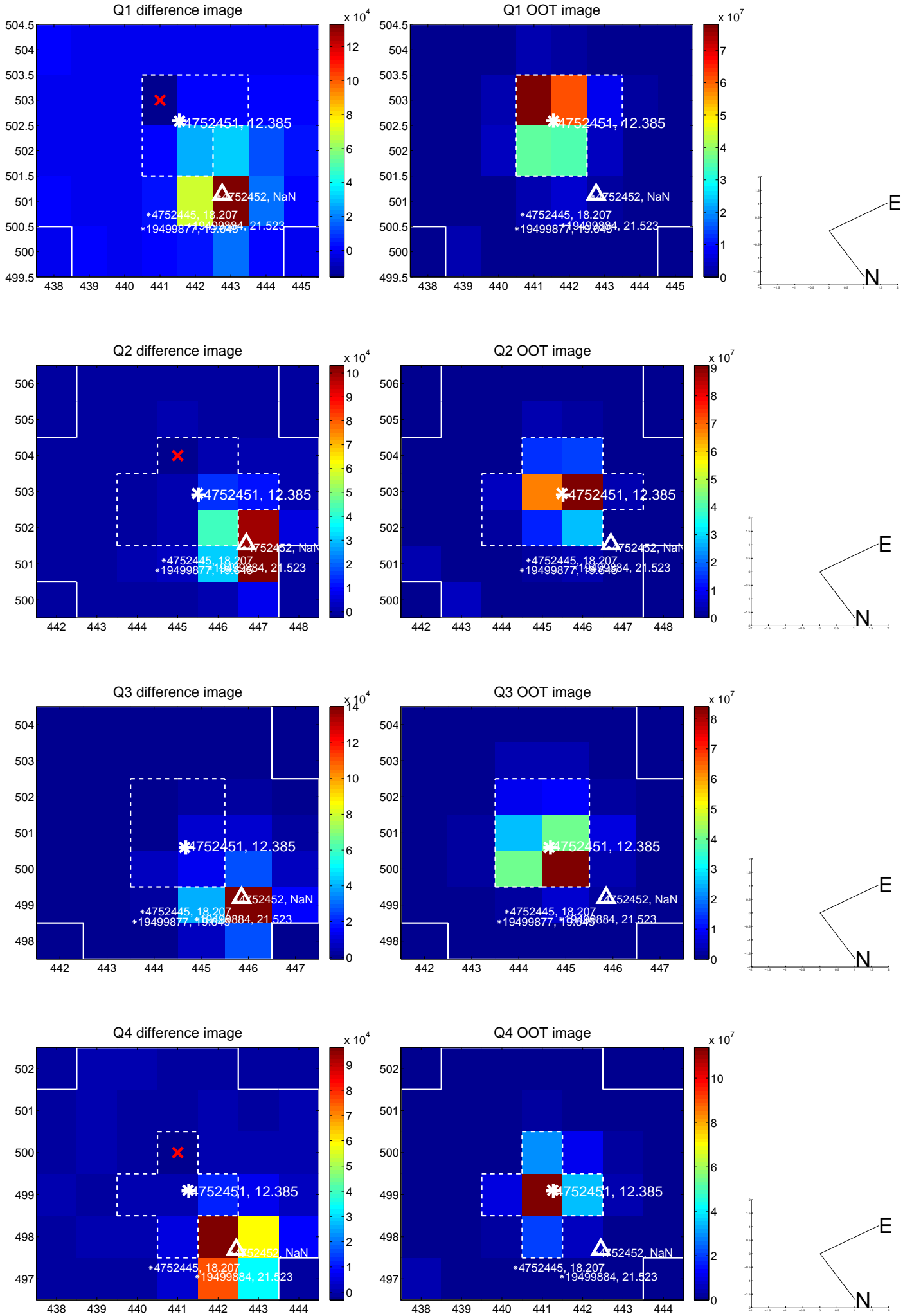
The direct PRF centroid is offset from the target star catalog position by about 0.04 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$7.282 \pm 0.077$	94.14	$1.167 \pm 0.067$	$7.188 \pm 0.078$
PRF-fit source offset from KIC position	$7.403 \pm 0.071$	104.71	$1.214 \pm 0.067$	$7.303 \pm 0.071$
photometric centroid source offset	$41.26 \pm 0.39$	105.68	$6.80 \pm 0.32$	$40.69 \pm 0.39$

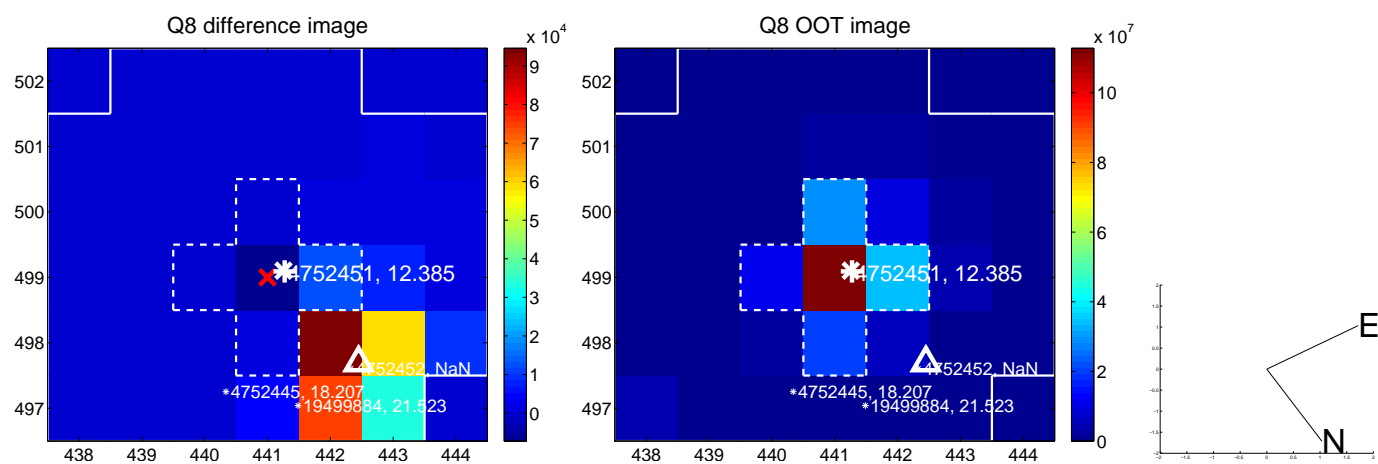
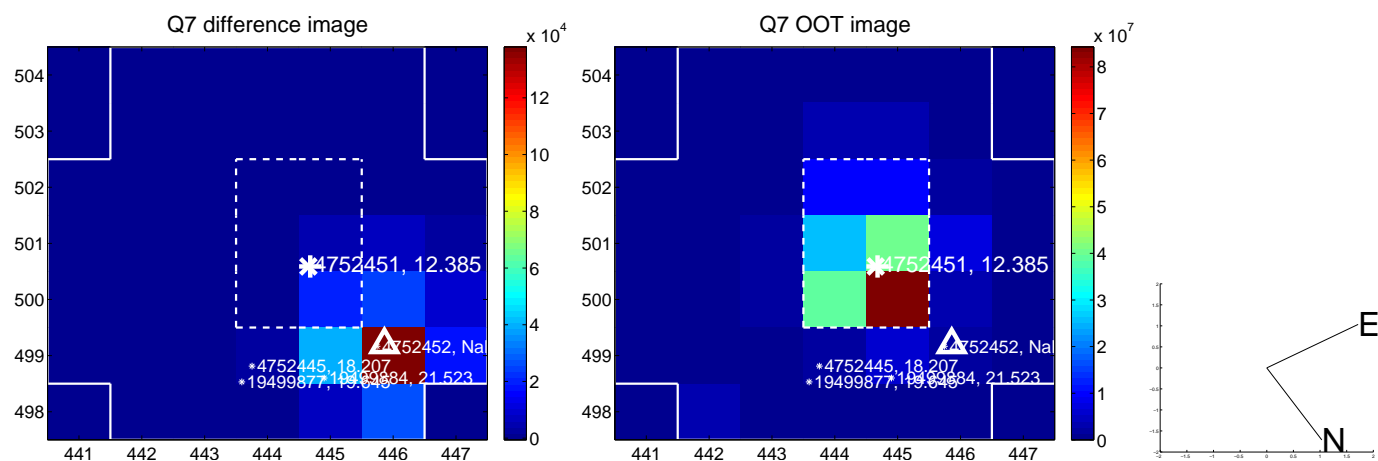
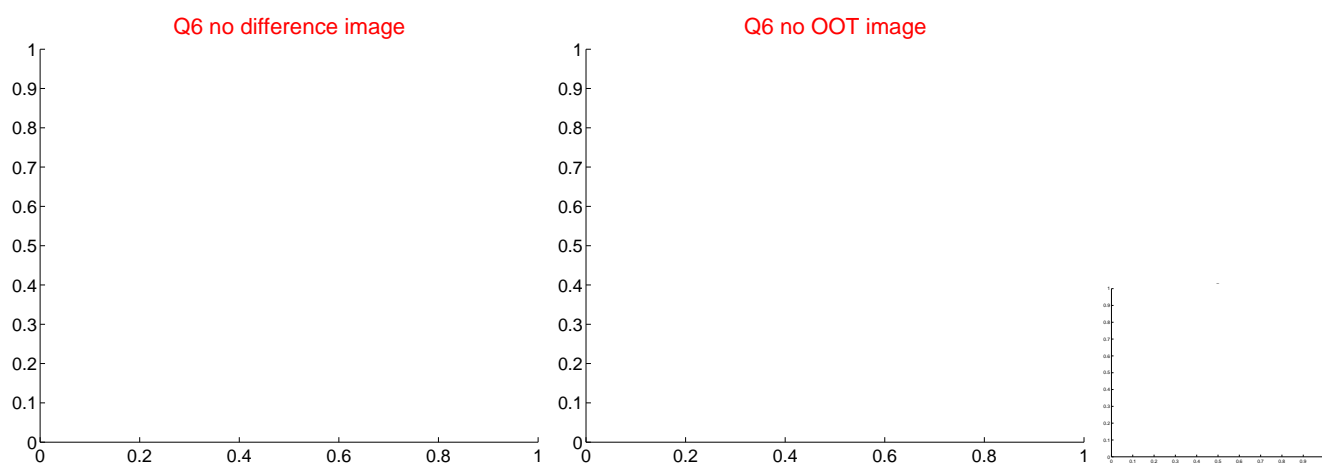
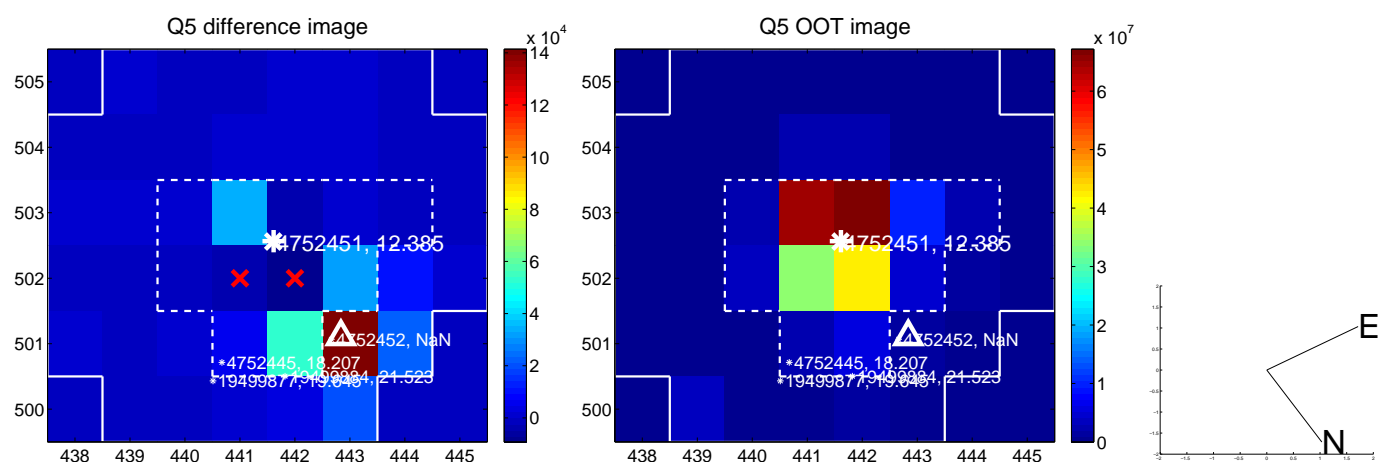


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

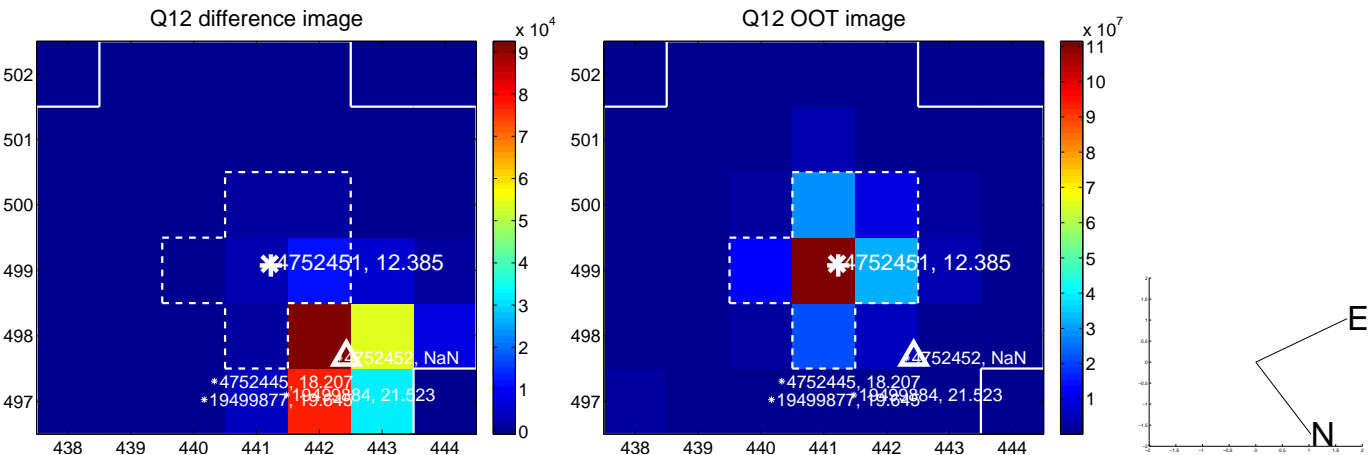
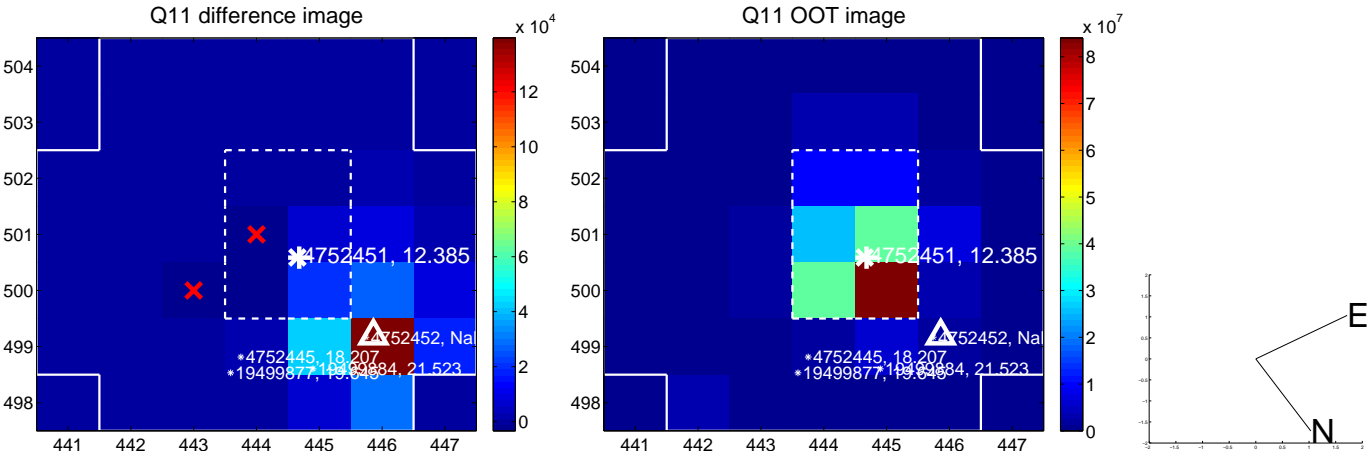
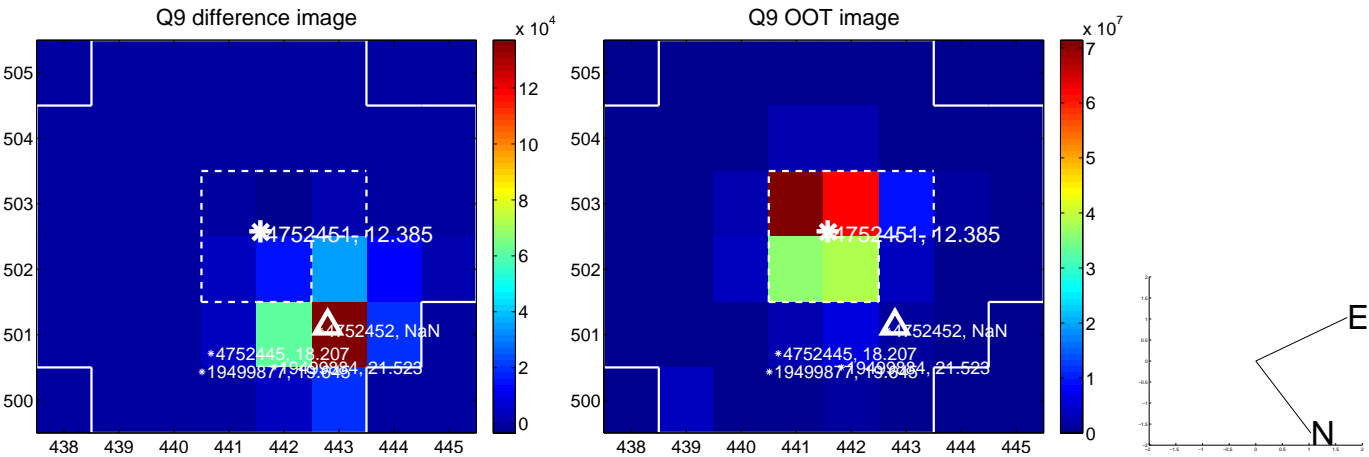


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value

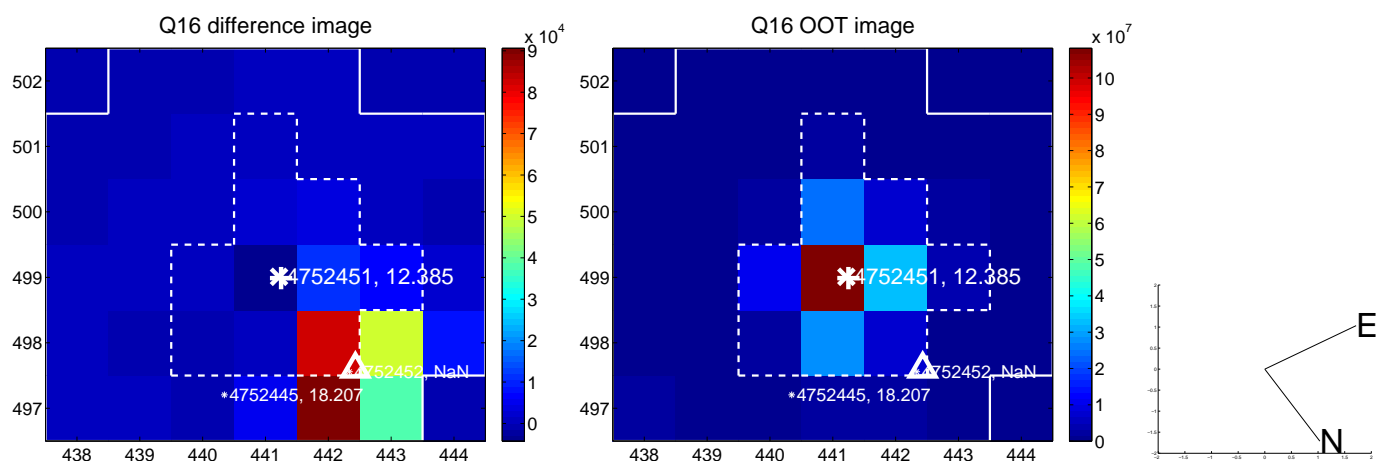
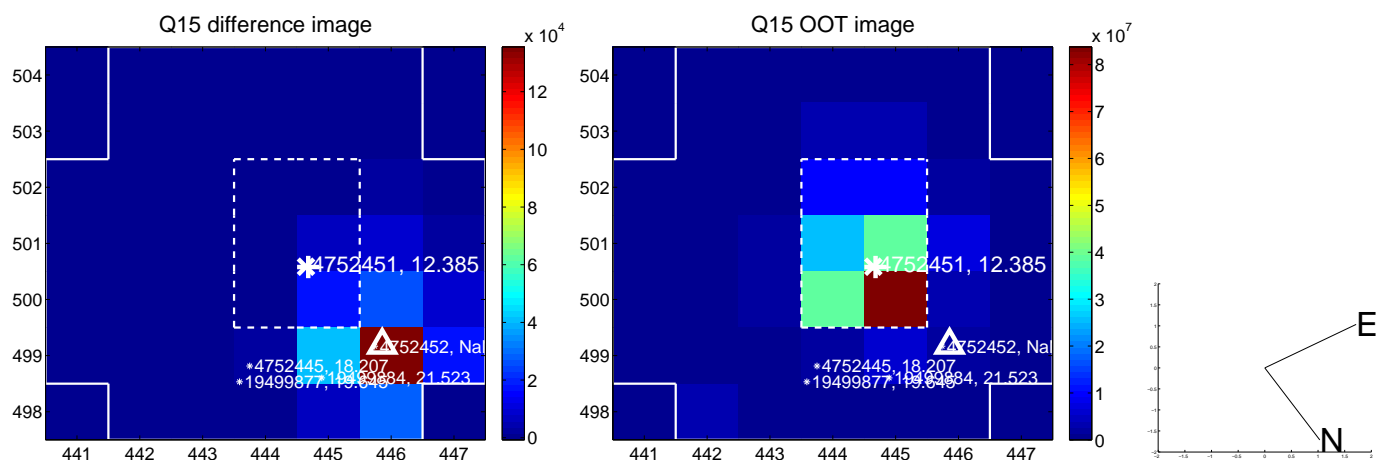
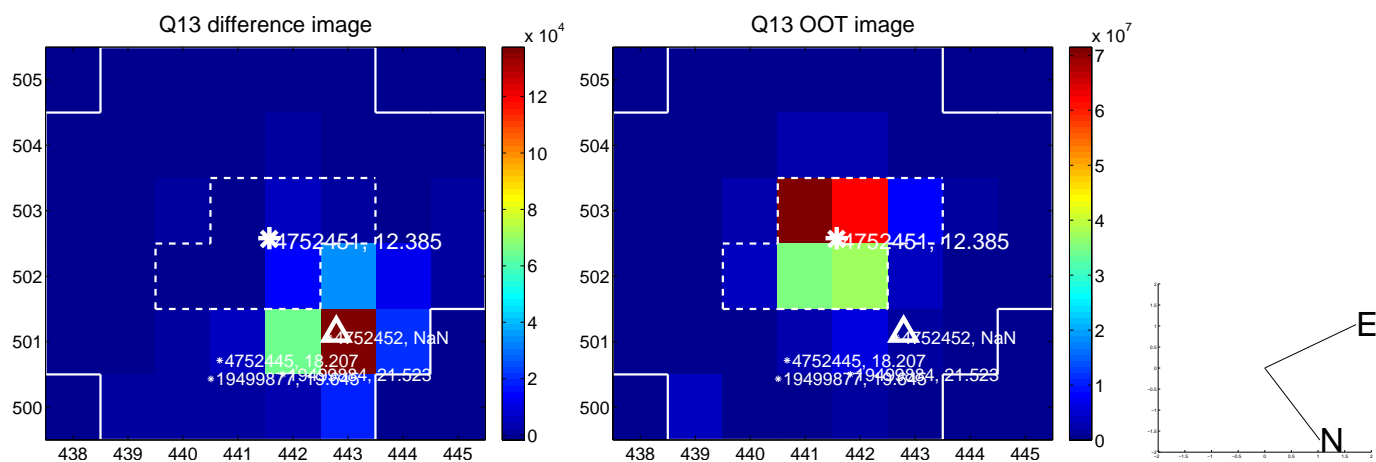




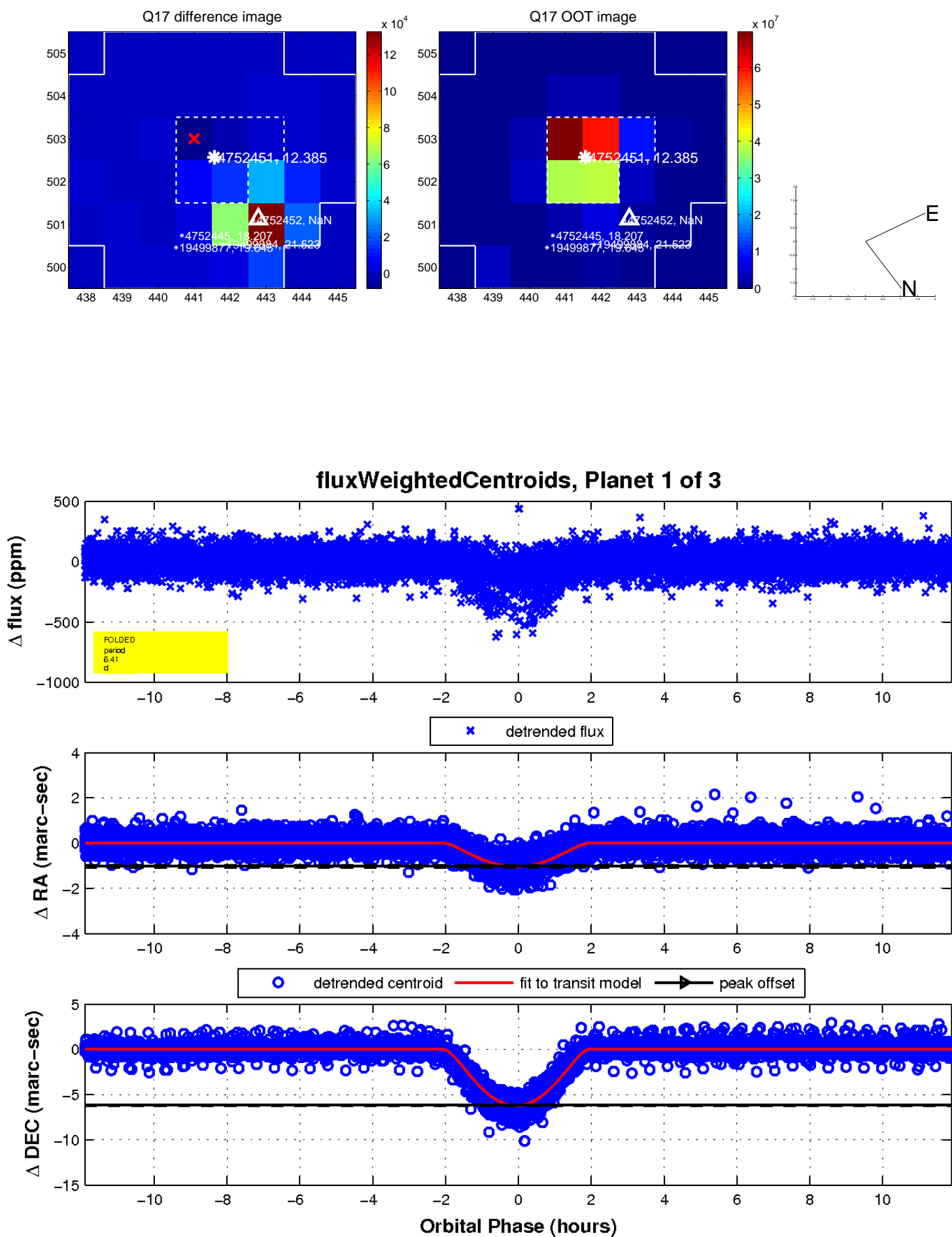
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

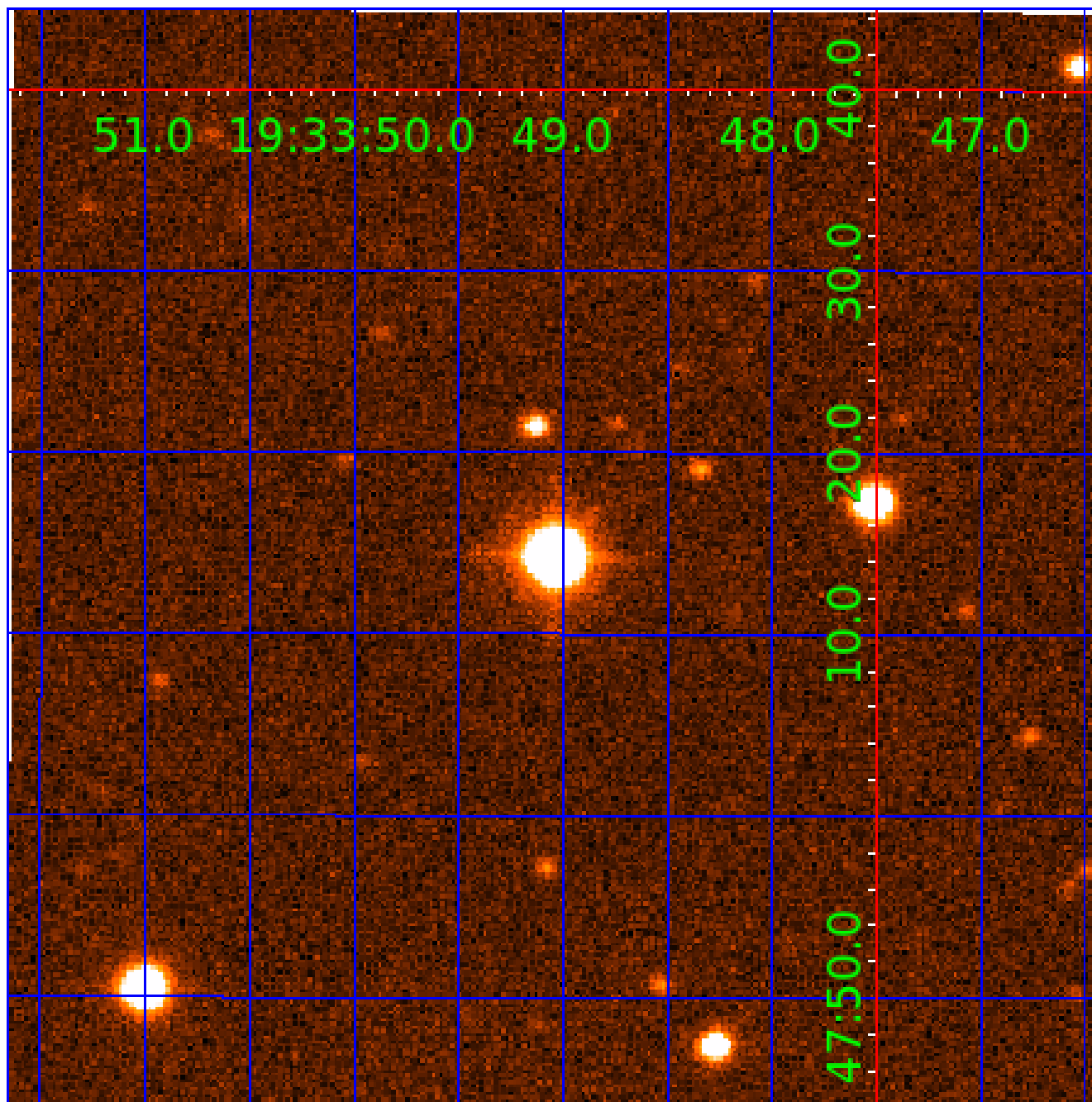


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 004752451

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004752451-01	OBS	0109.01	6.414970	132.865588	152.5	3.967	44.7	36.9	1.18	6170	2.66	418.57
004752451-02	OBS	No	483.543072	535.345522	176.3	6.133	8.7	8.2	1.18	6170	1.78	1.31
004752451-03	OBS	No	3.207385	132.888154	30.6	2.976	8.2	8.8	1.18	6170	0.78	1054.77

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004752451-01	OBS	FP	0.00	0	1	1	0	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE—CENT_RESOLVED_OFFSET
004752451-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS
004752451-03	OBS	FP	0.00	1	1	1	0	IS_SEC_TCE—CENT_RESOLVED_OFFSET—HALO_GHOST

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

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

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

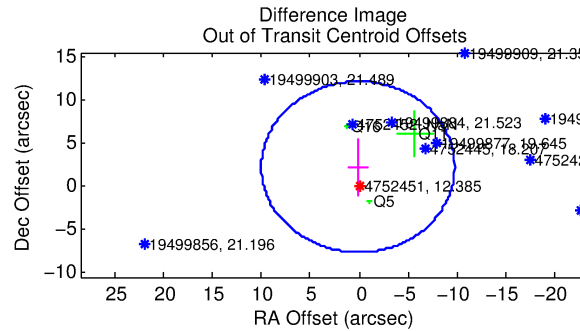
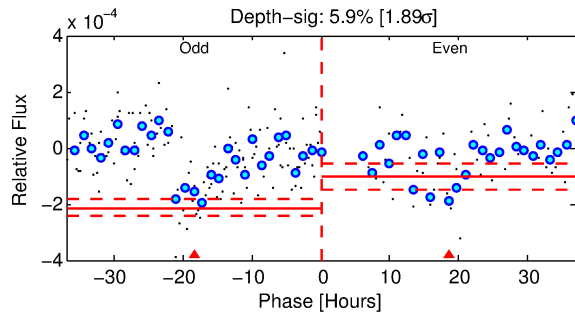
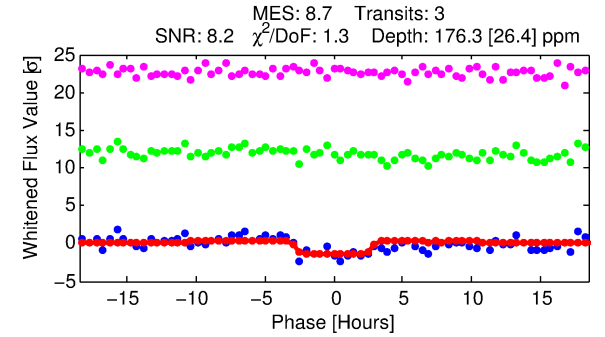
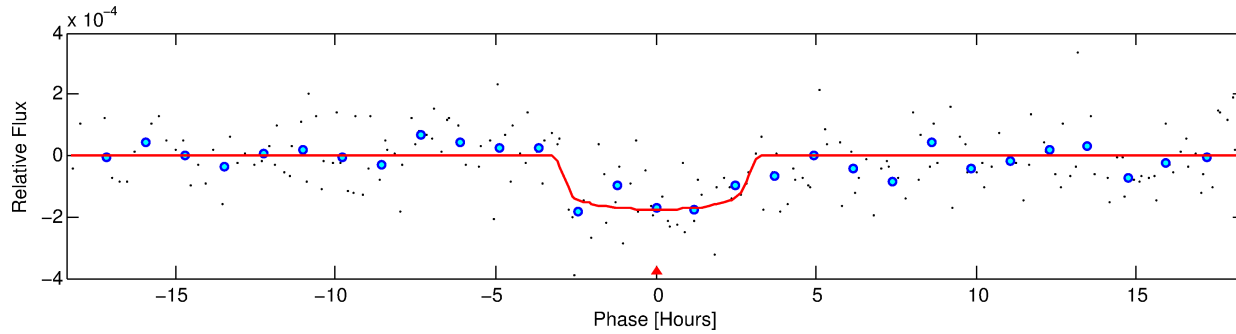
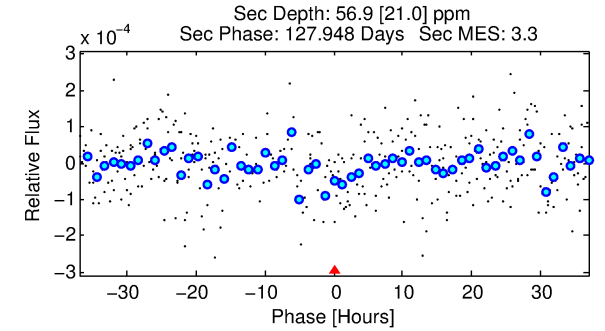
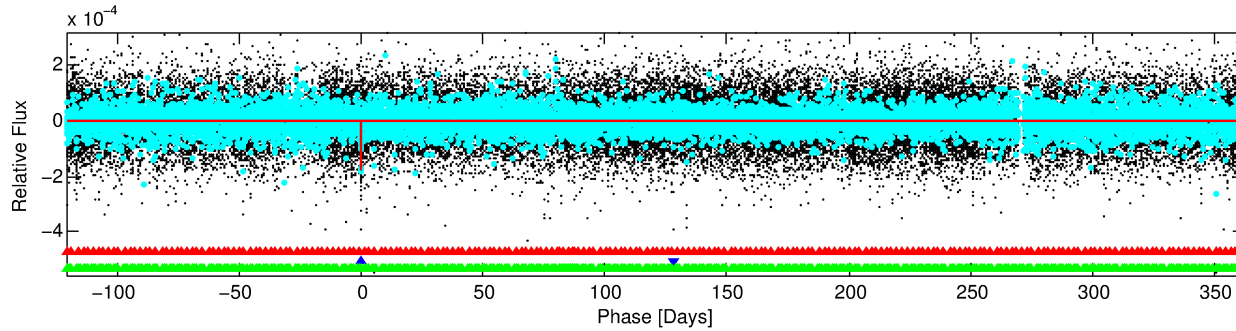
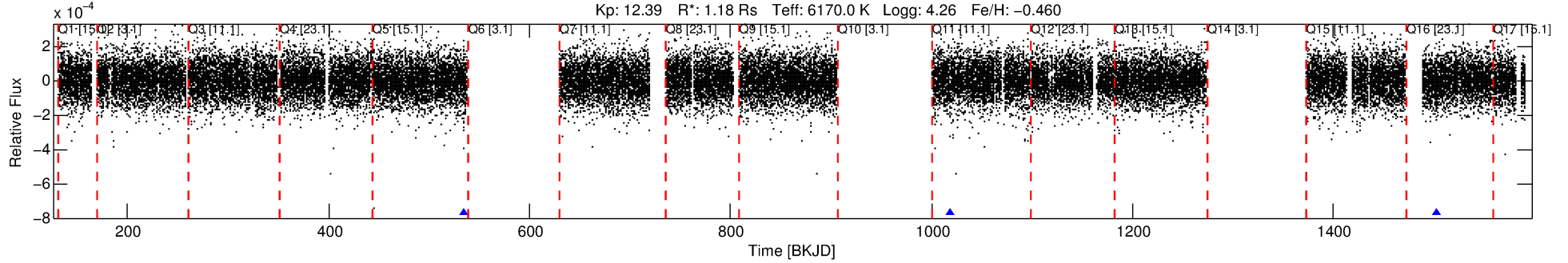
## Ephemeris Match Information For 004752451-02

No Significant Match Found

# DV One-Page Summary

KIC: 4752451 Candidate: 2 of 3 Period: 483.543 d  
KOI: K00109 Corr: No Ephemeris Match

Kp: 12.39 R\*: 1.18 Rs Teff: 6170.0 K Logg: 4.26 Fe/H: -0.460



## DV Fit Results:

Period = 483.54307 [0.00909] d  
Epoch = 535.3455 [0.0120] BKJD  
Rp/R\* = 0.0138 [0.0068]  
a/R\* = 326.69 [856.77]  
b = 0.86 [0.82]  
Seff = 1.31 [0.45]  
Teq = 273 [23] K  
Rp = 1.79 [0.95] Re  
a = 1.1757 [0.2321] AU  
Ag = 13583.80 [14888.45] [0.91] $\sigma$   
Teff = 4557 [1204] K [3.56] $\sigma$

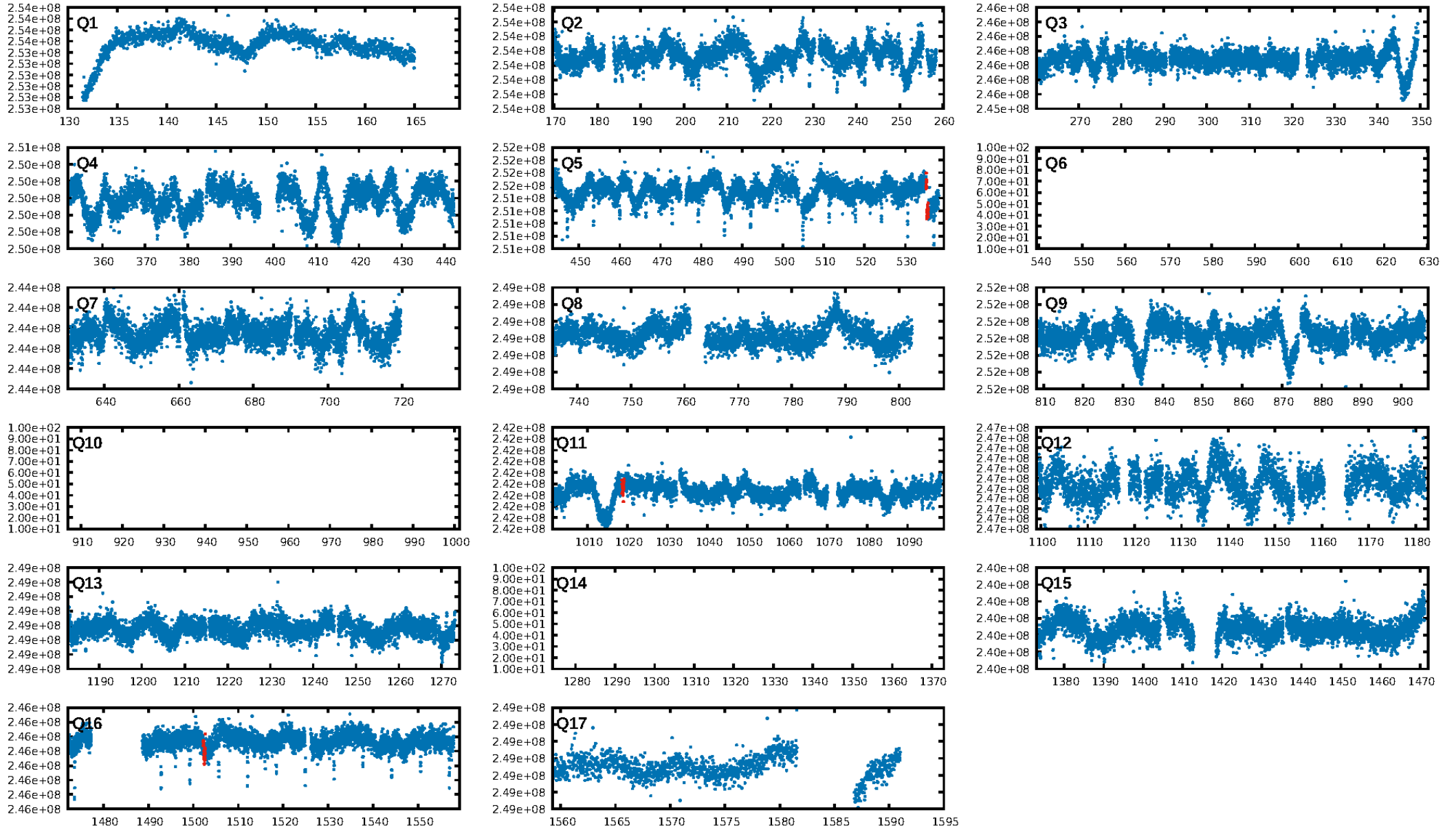
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [1567.77 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 2.7%  
ModelChiSquareGof-sig: 85.0%  
Bootstrap-pfa: 7.38e-15  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 13.08  
Centroid-sig: 7.3%  
Centroid-so: 2.043 arcsec [1.33 $\sigma$ ]  
OotOffset-rm: 2.238 arcsec [0.68 $\sigma$ ]  
KicOffset-rm: 2.288 arcsec [0.69 $\sigma$ ]  
OotOffset-st: 0/1/1/1 [3]  
KicOffset-st: 0/1/1/1 [3]  
DiffImageQuality-fgm: 0.33 [1/3]  
DiffImageOverlap-fno: 0.67 [2/3]

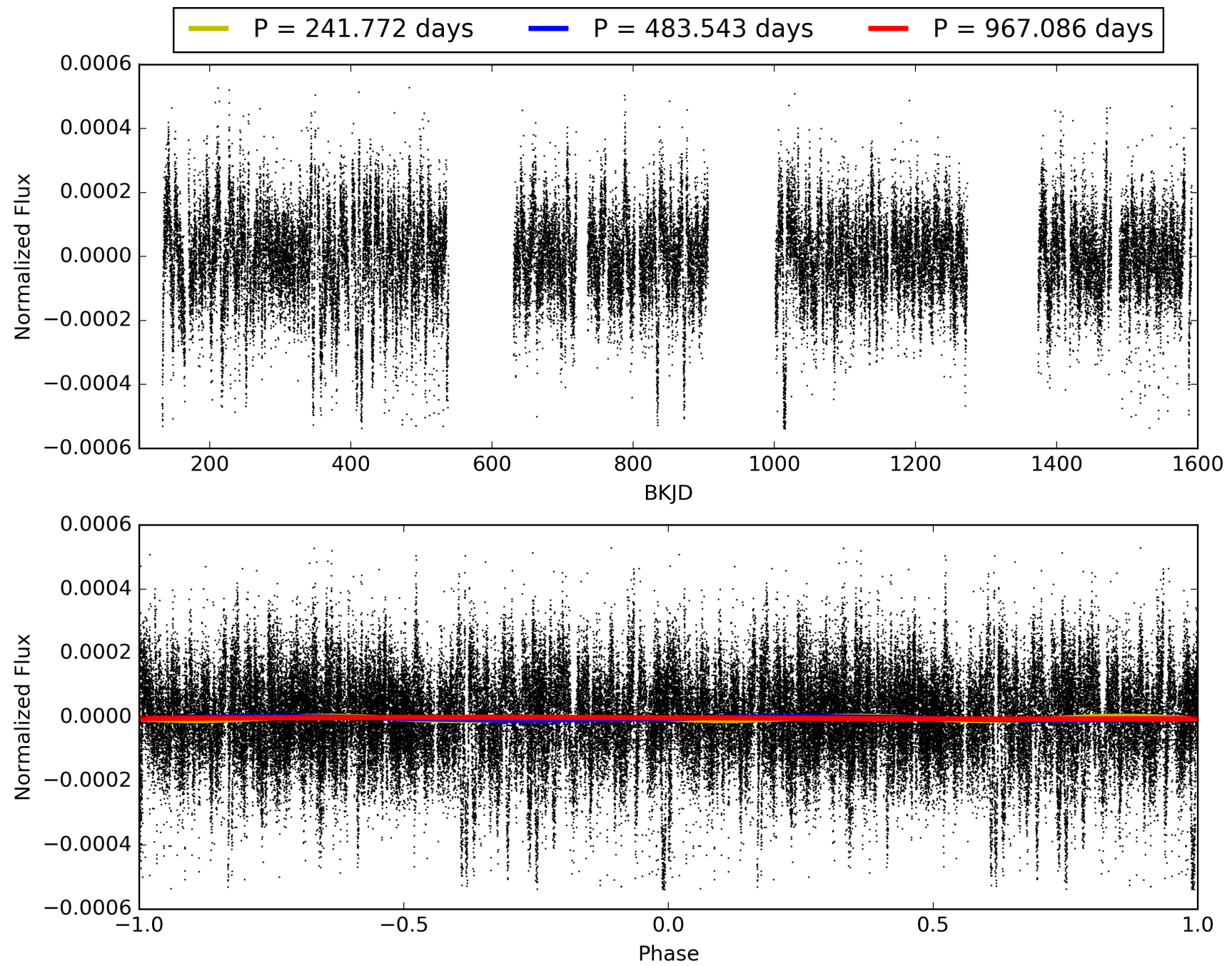
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 13:58:08 Z

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

# TCE 004752451-02, PDC Light Curves

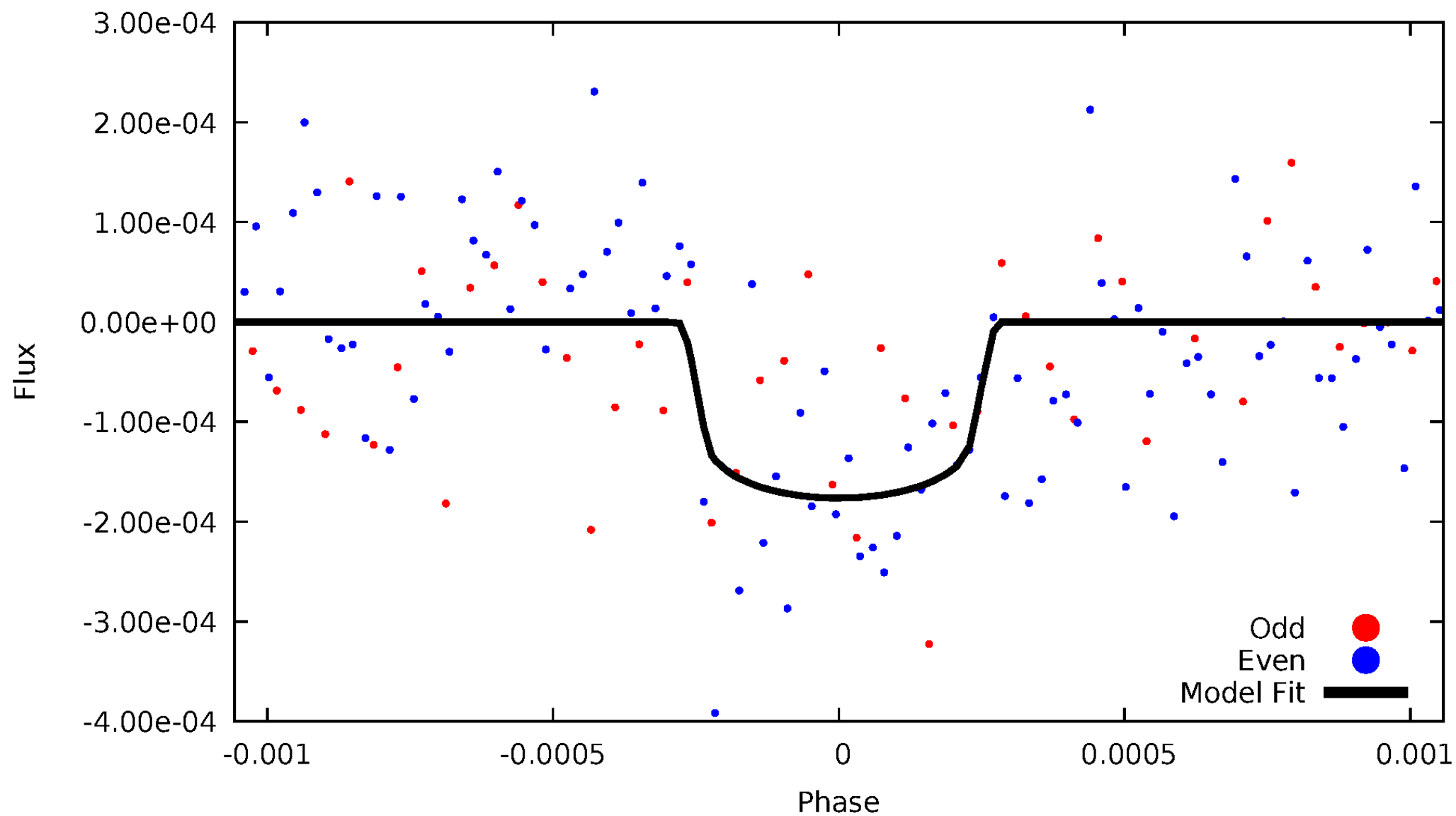


TCE 004752451-02



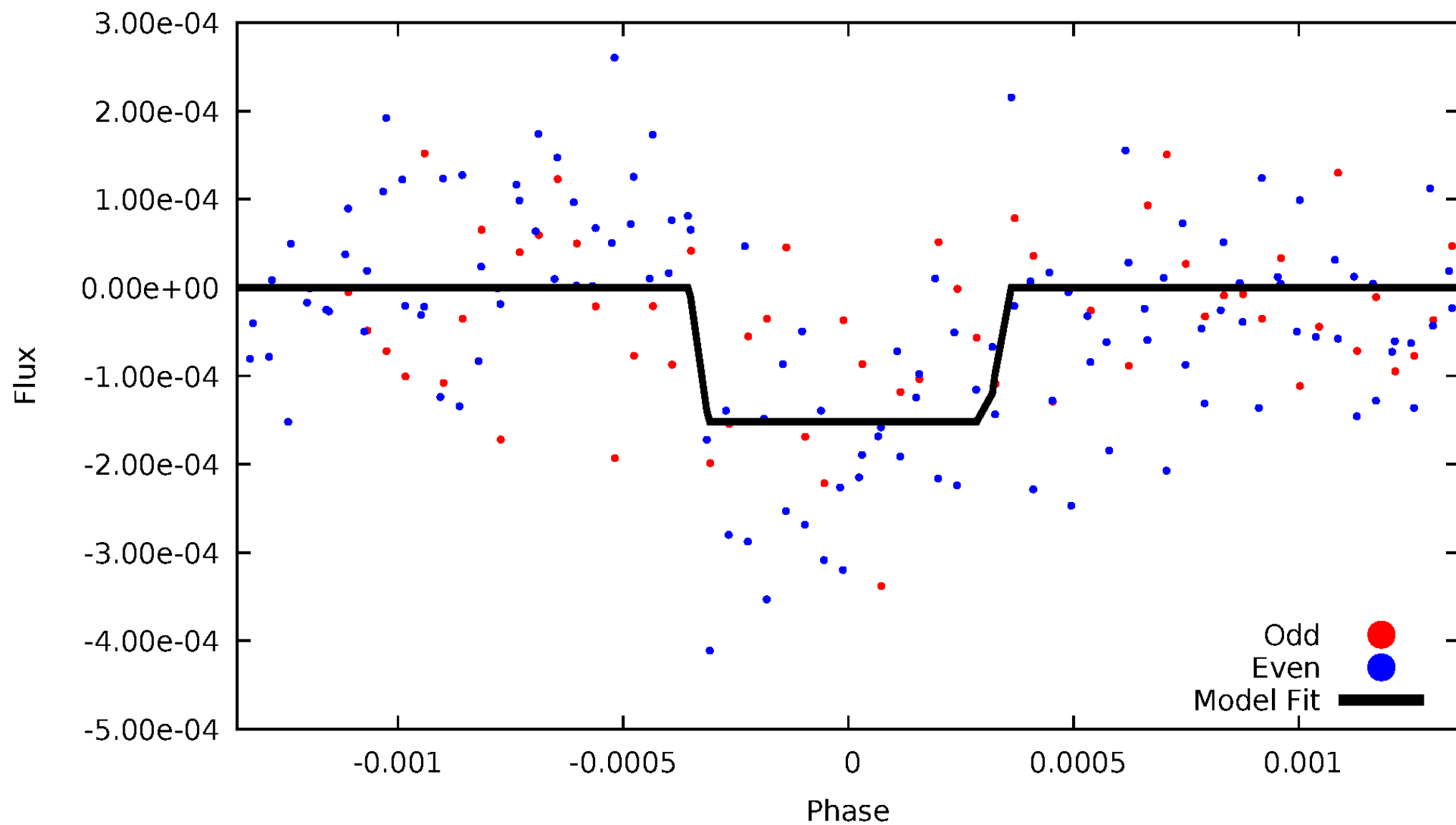
# DV Odd/Even

TCE 004752451-02



# ALT Odd/Even

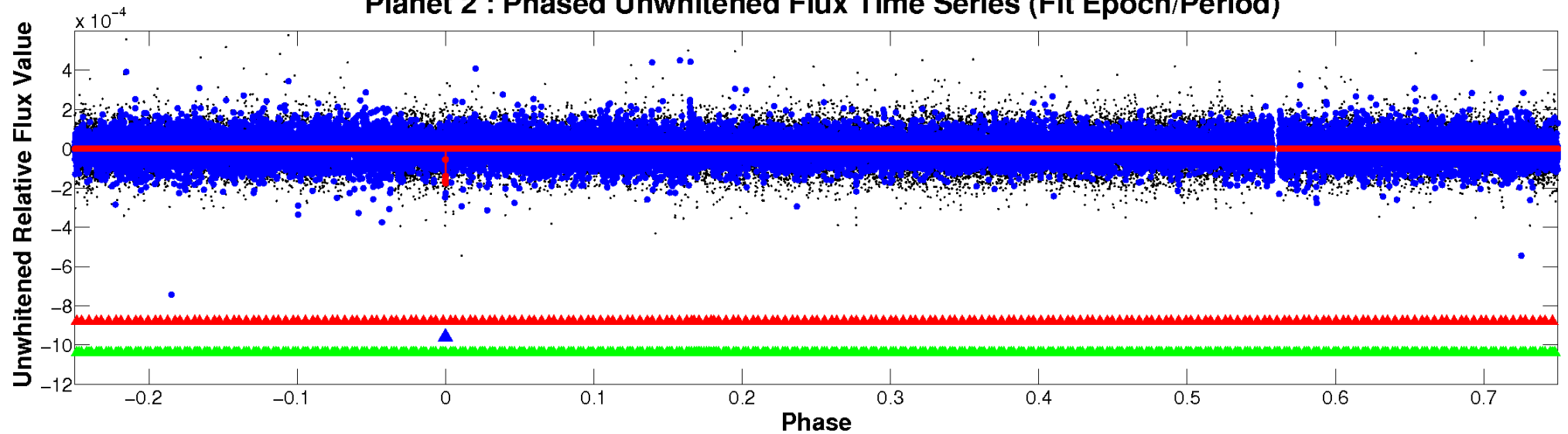
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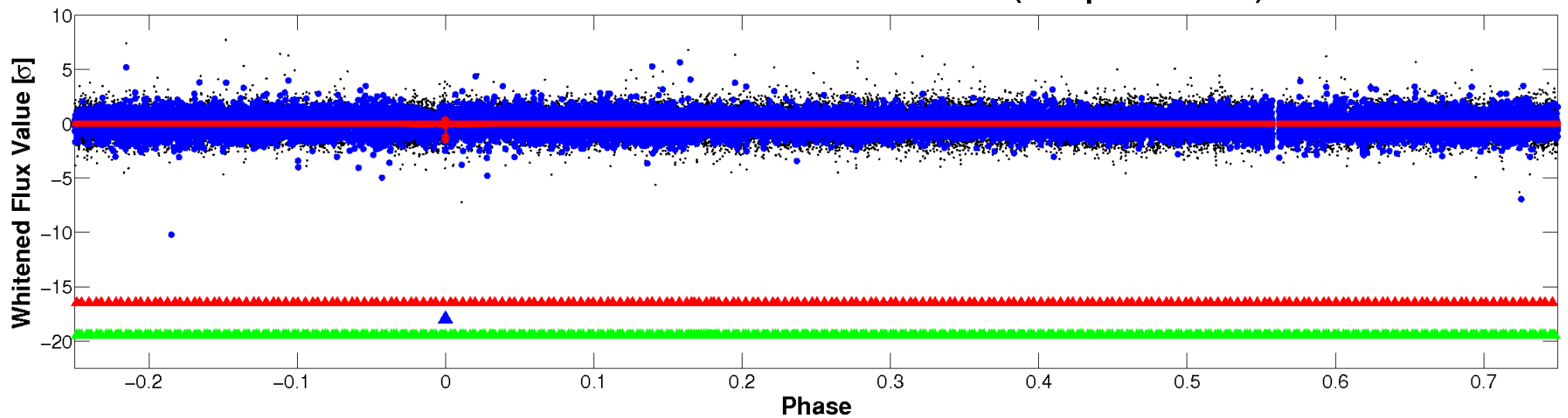


# Non-Whitened Vs. Whitened Light Curve

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

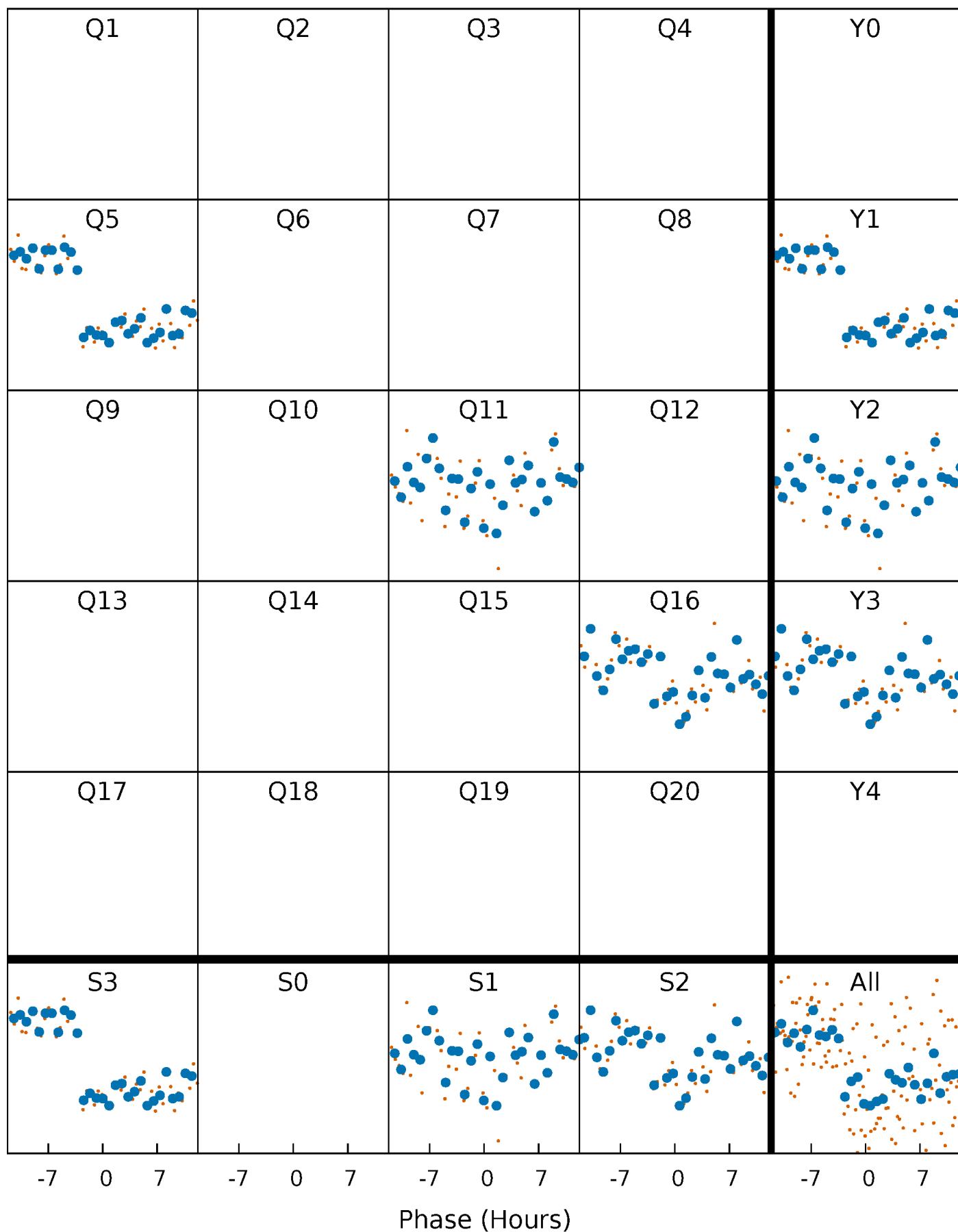


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



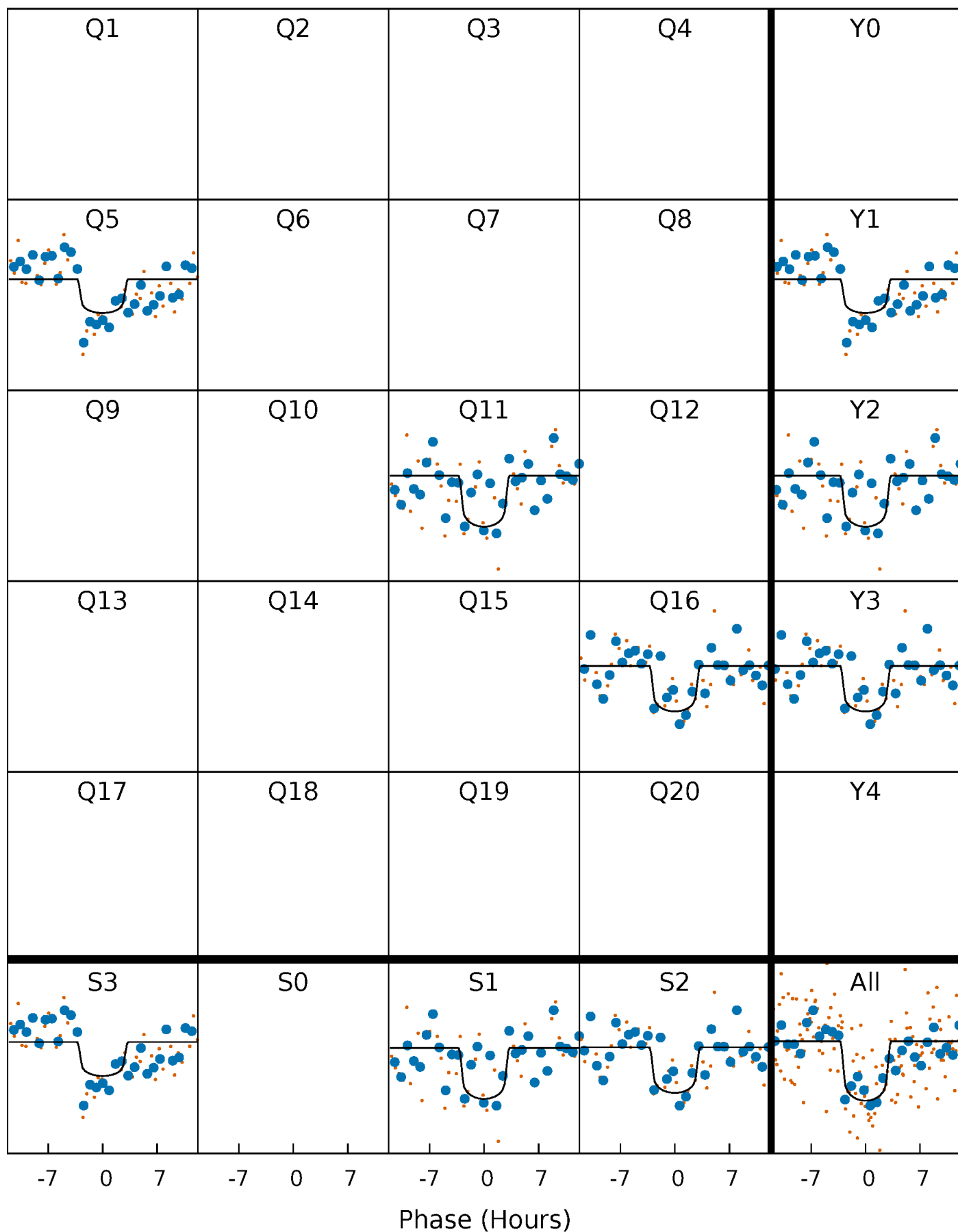
# PDC Quarter-Phased Transit Curves

TCE 004752451-02     $P=483.543072$  Days     $T_0=535.345522$  (BKJD)



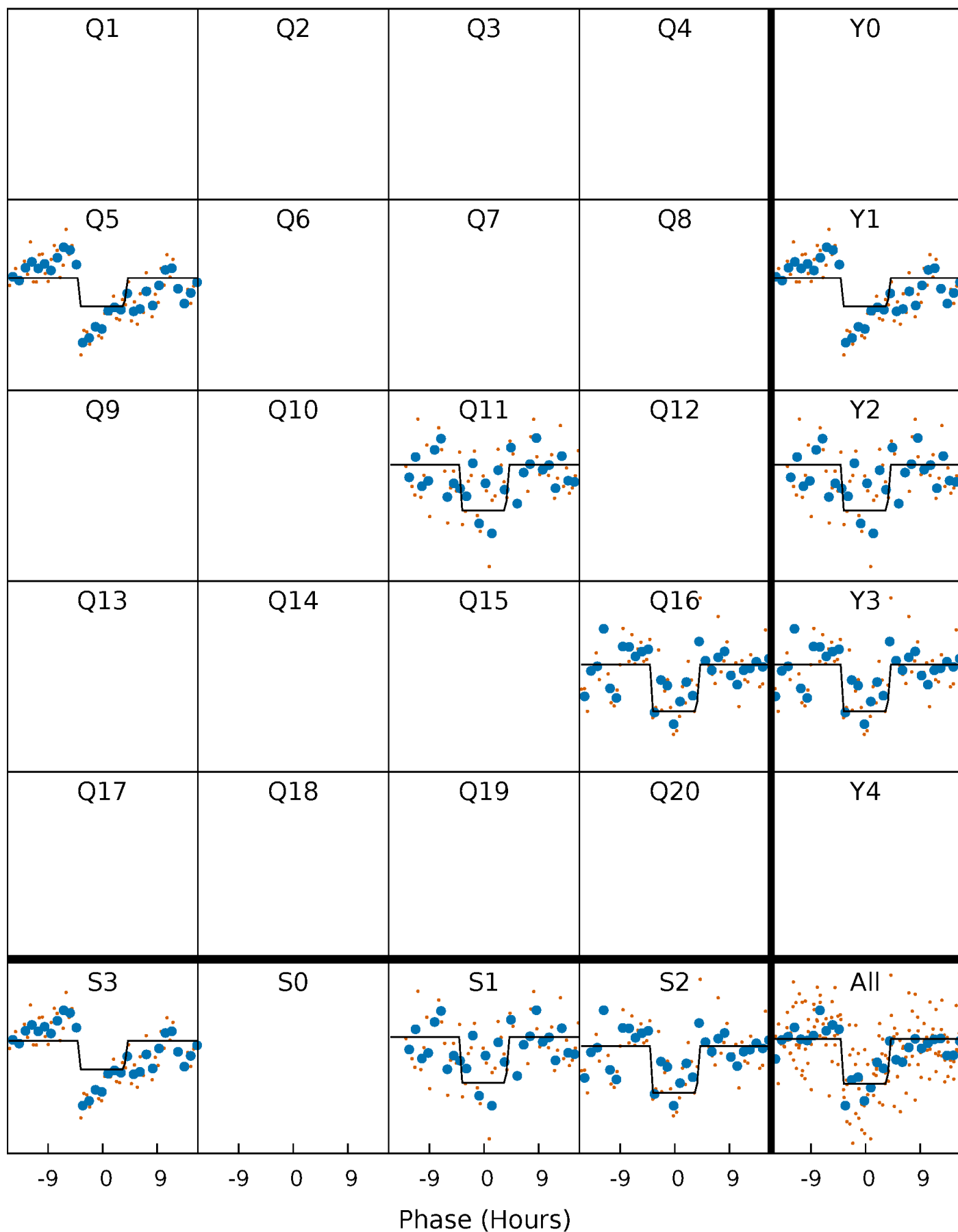
# DV Quarter-Phased Transit Curves

TCE 004752451-02     $P=483.543072$  Days     $T_0=535.345522$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

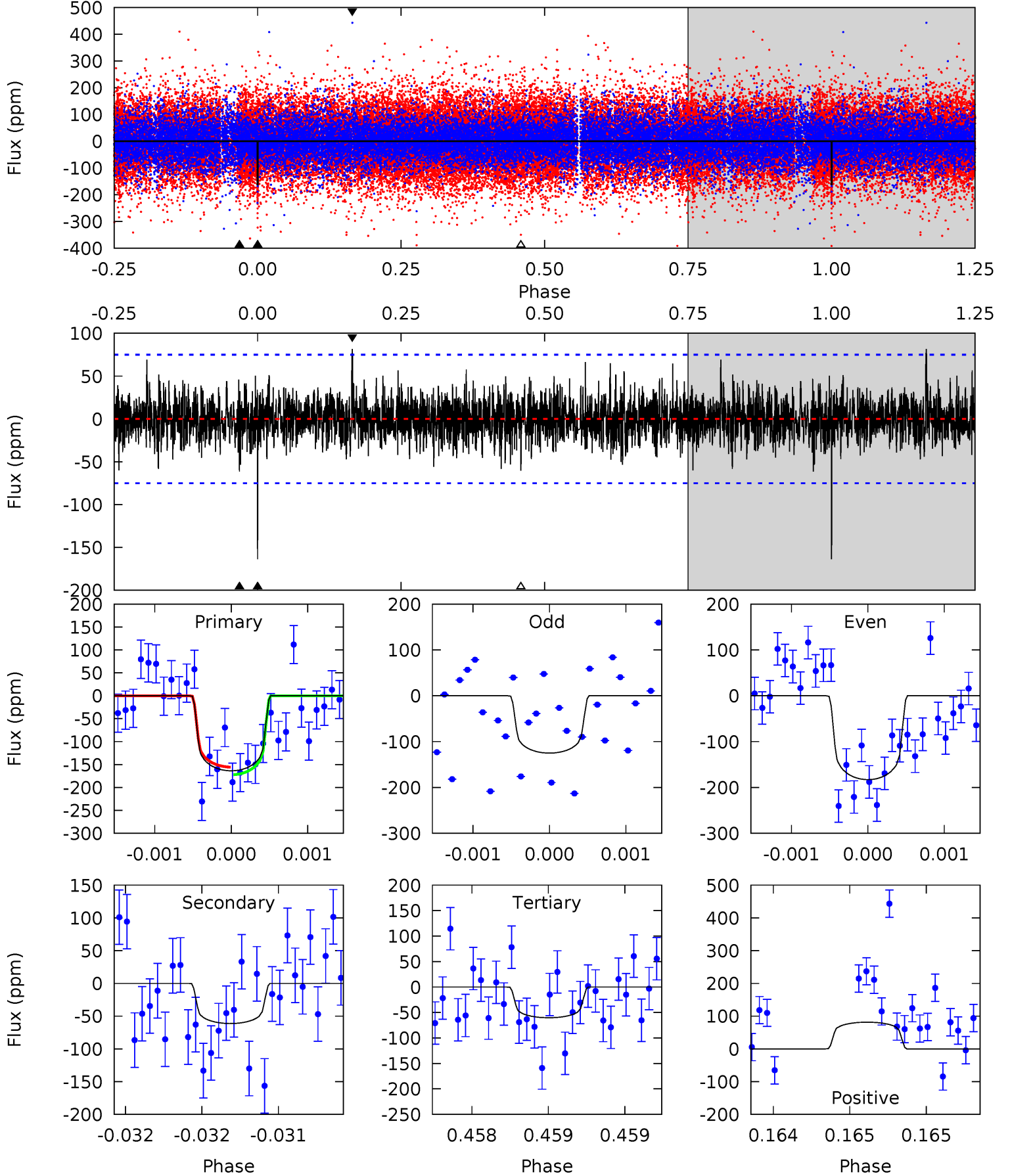
TCE 004752451-02     $P=483.539764$  Days     $T_0=535.389698$  (BKJD)



# DV Model-Shift Uniqueness Test

004752451-02, P = 483.543072 Days, E = 51.802450 Days

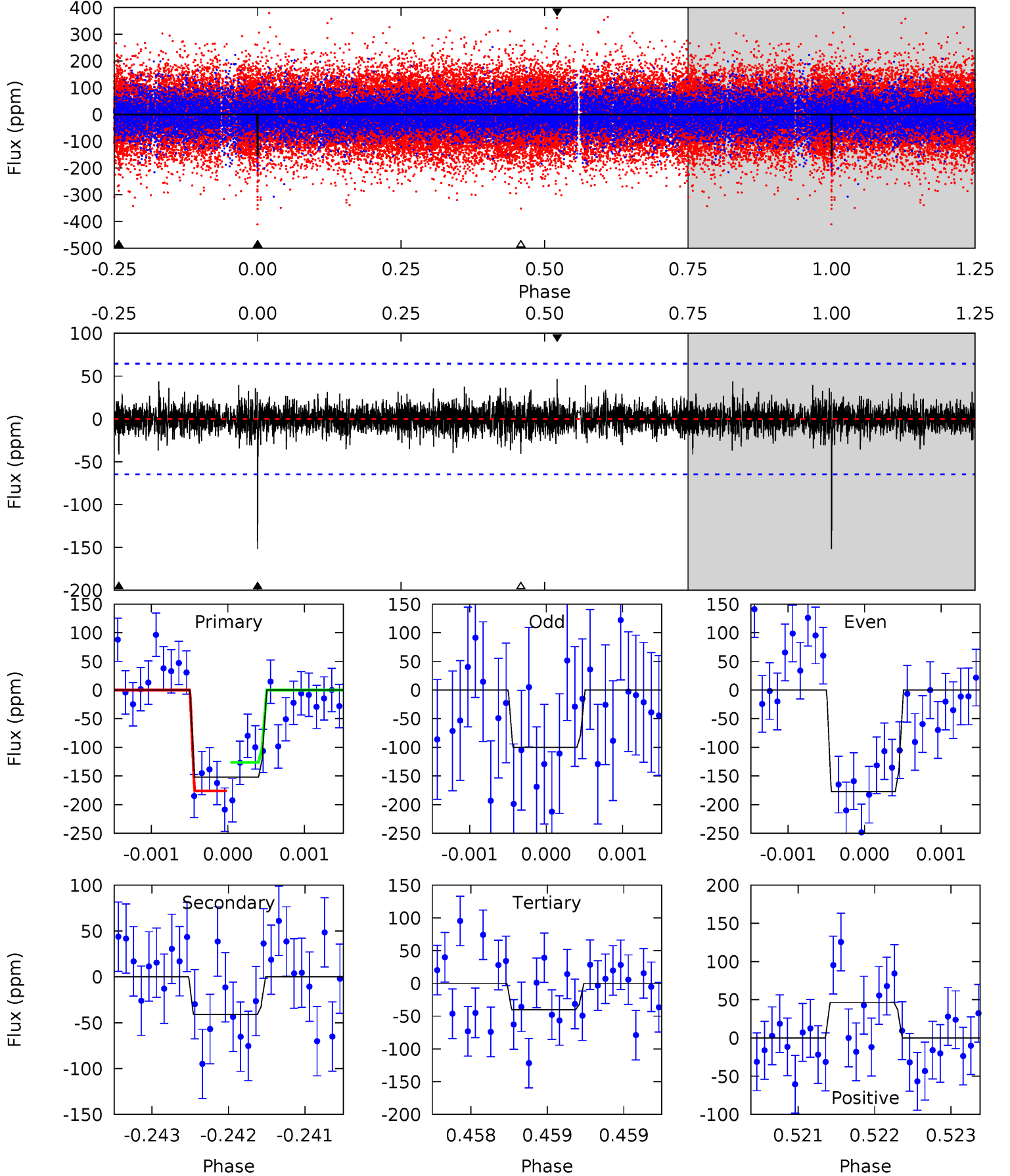
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.1	4.54	4.47	6.05	5.56	3.46	1.28	7.67	6.09	0.07	-1.51	2.04	1.19	0.33	0.62



# Alt Model-Shift Uniqueness Test

004752451-02,  $P = 483.539764$  Days,  $E = 51.849934$  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	3.52	3.45	3.97	5.51	3.39	0.87	9.53	9.00	0.07	-0.45	3.14	1.36	0.23	2.13



### Stellar Parameters For KIC 004752451

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6170^{+169}_{-188}$	$4.259^{+0.186}_{-0.124}$	$-0.460^{+0.300}_{-0.300}$	$1.183^{+0.242}_{-0.242}$	$0.927^{+0.136}_{-0.090}$	$0.789^{+0.684}_{-0.317}$
	+3%/-3%	+4%/-3%	+65%/-65%	+20%/-20%	+15%/-10%	+87%/-40%
Source	PHO1	FLK73	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 004752451-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-61 \pm 13$	$1.81^{+0.89}_{-0.89}$	$379^{+22}_{-23}$	$4736^{+1736}_{-725}$	$14273^{+42681}_{-8123}$
Alt.	$-41 \pm 12$	$1.62^{+0.87}_{-0.81}$	$378^{+24}_{-25}$	$4549^{+1611}_{-707}$	$12060^{+35985}_{-7326}$

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



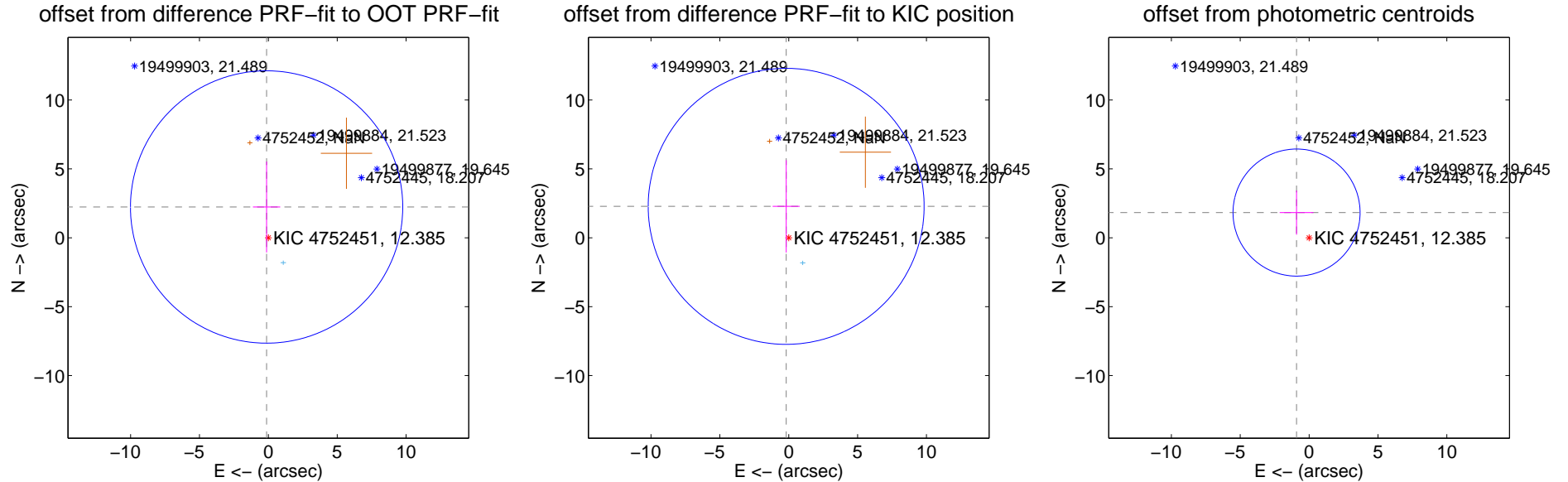
## DV Centroid Data

Supplemental centroid analysis for 004752451-02. Kepler magnitude: 12.38. Transit SNR 8.15

There are 1 quarters with good PRF difference image offsets

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

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.238 \pm 3.294$	0.68	$0.126 \pm 0.990$	$2.234 \pm 3.298$
PRF-fit source offset from KIC position	$2.288 \pm 3.338$	0.69	$0.186 \pm 0.983$	$2.280 \pm 3.348$
photometric centroid source offset	$2.04 \pm 1.54$	1.33	$0.91 \pm 1.22$	$1.83 \pm 1.61$

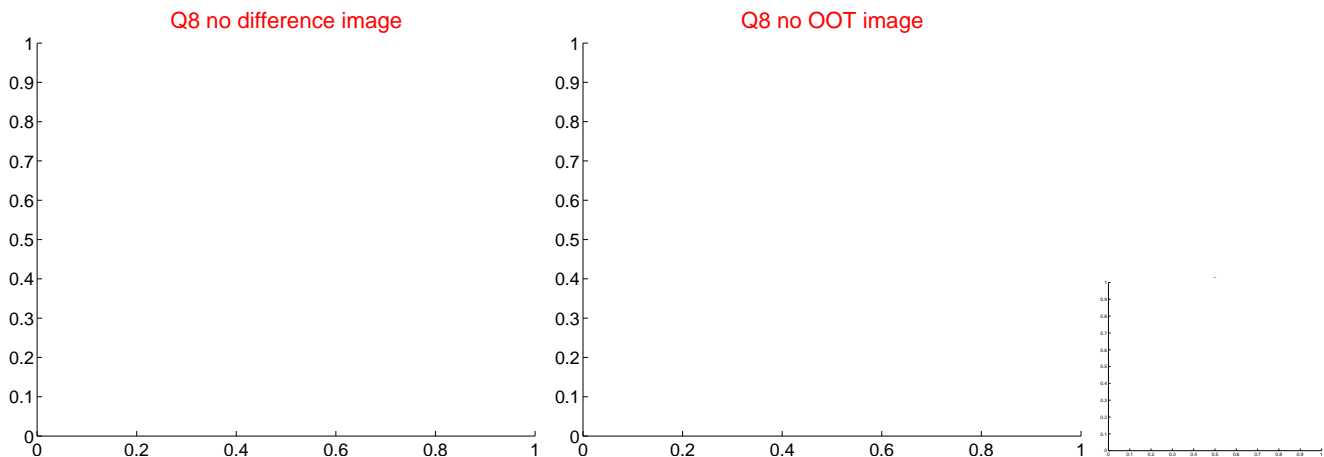
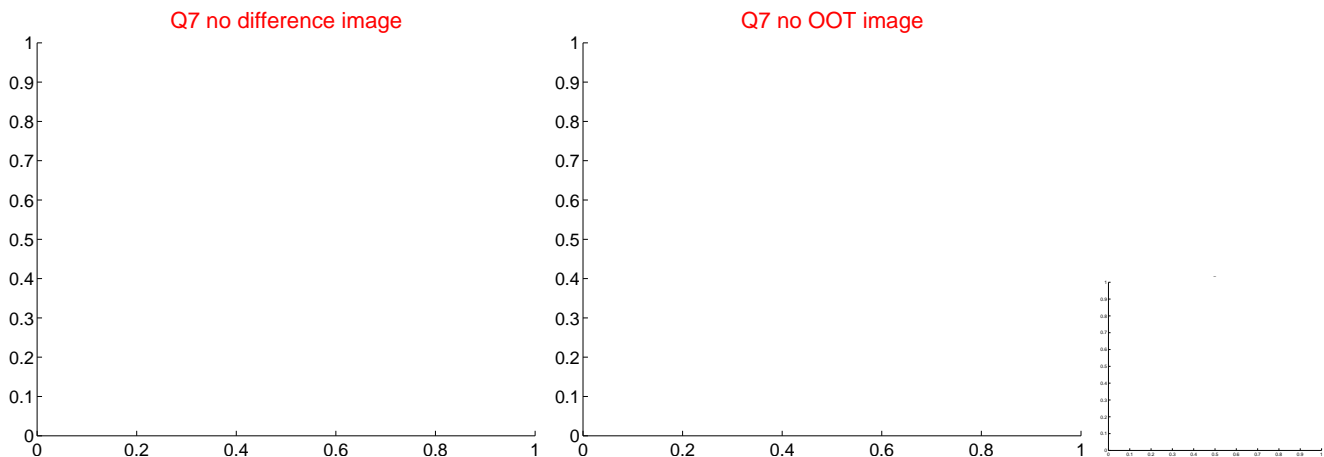
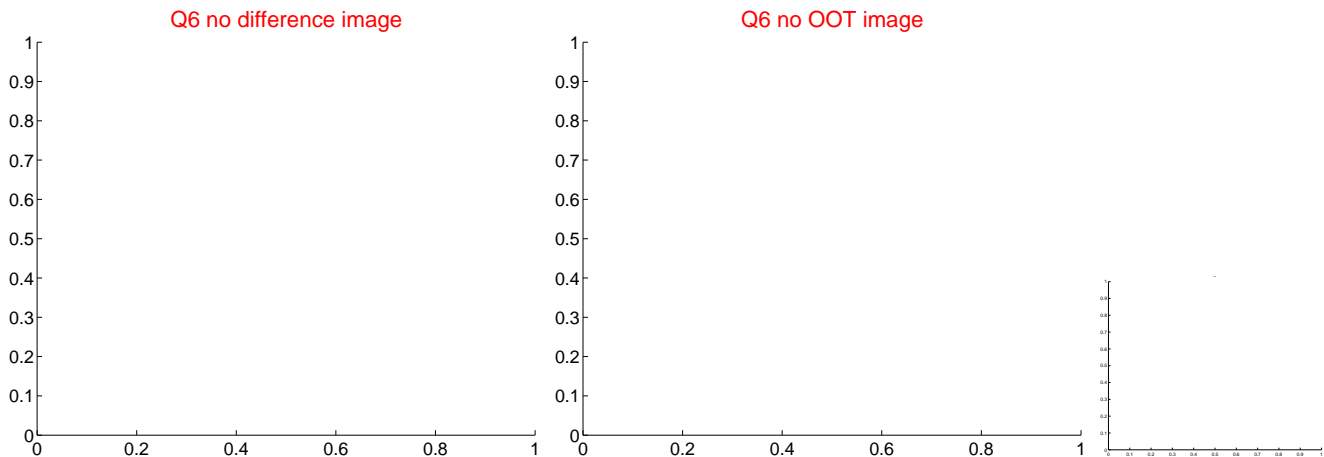
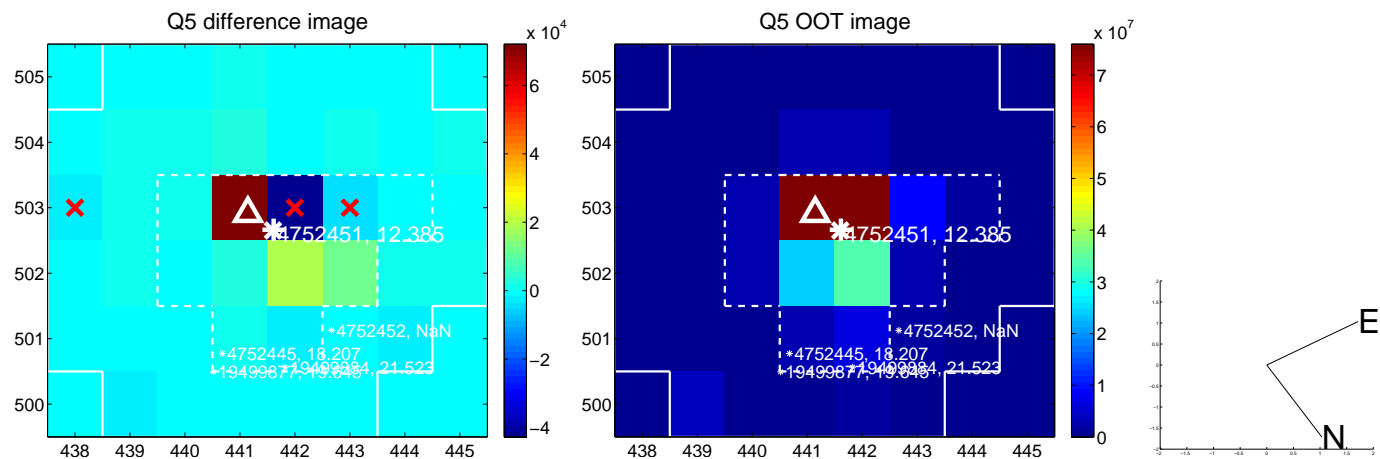


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

Q9 no difference image



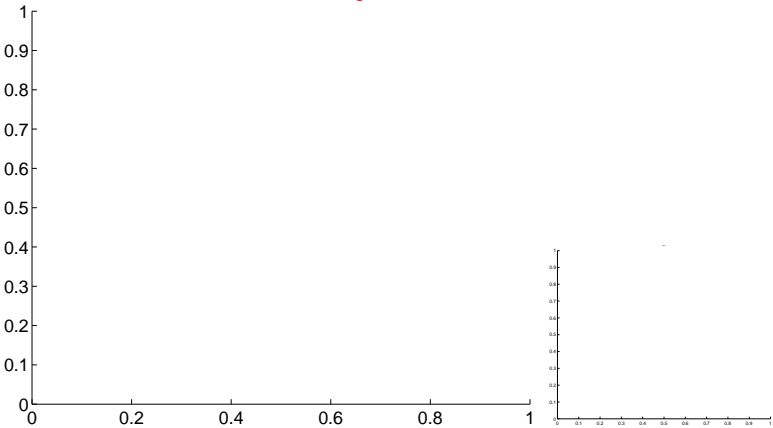
Q9 no OOT image



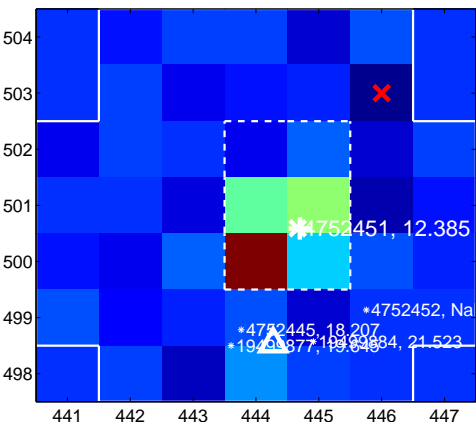
Q10 no difference image



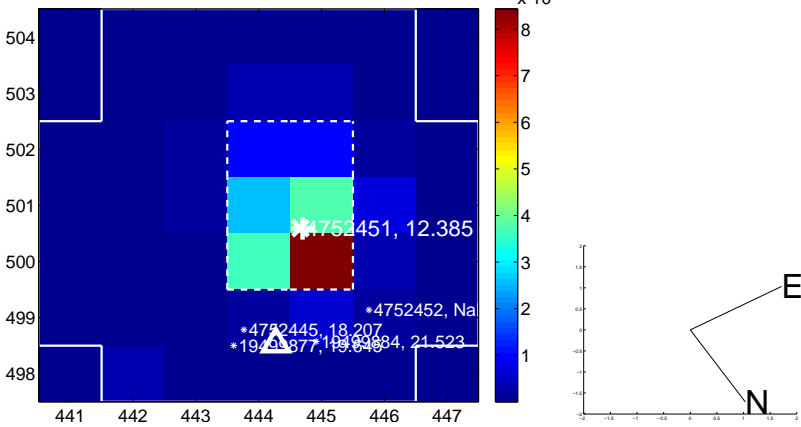
Q10 no OOT image



Q11 difference image. Poor Quality



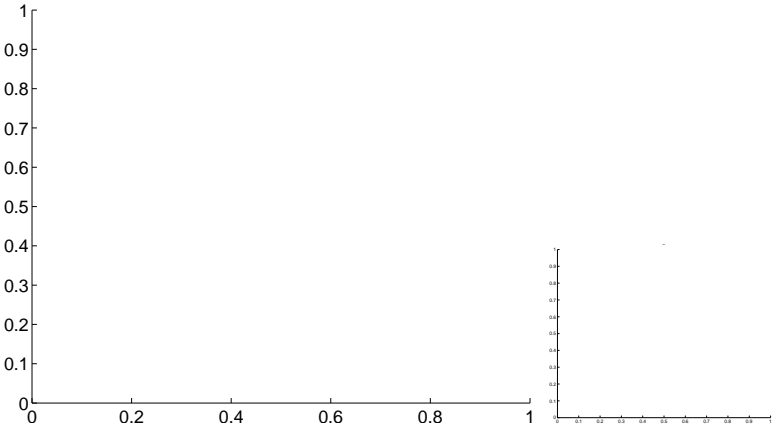
Q11 OOT image



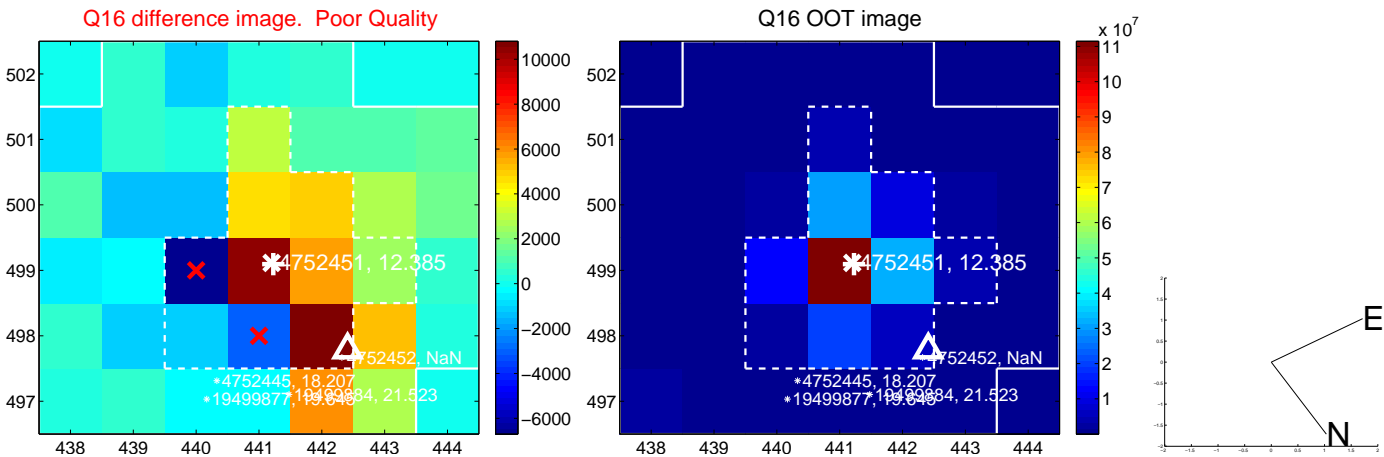
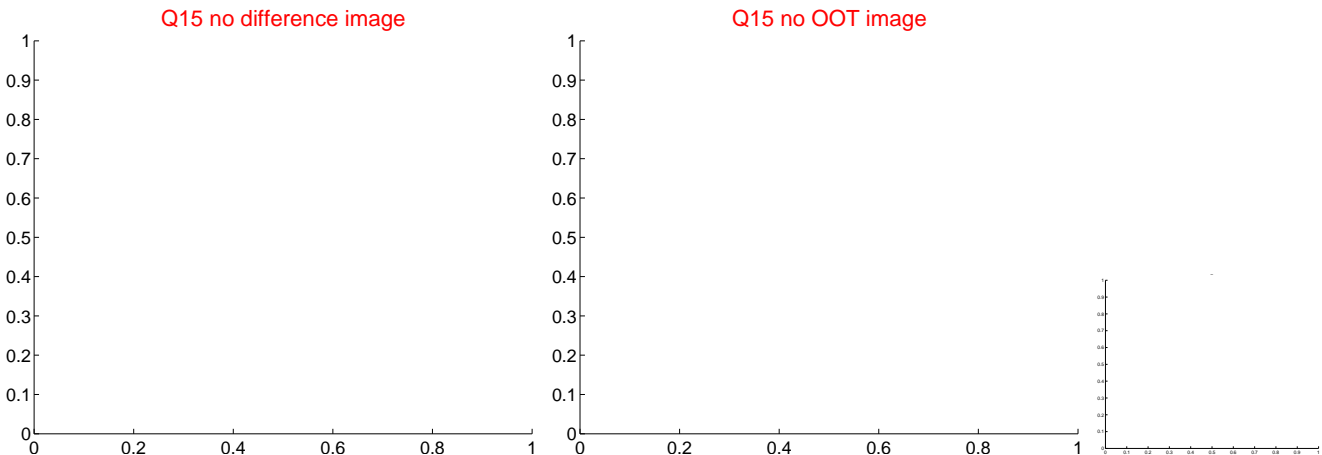
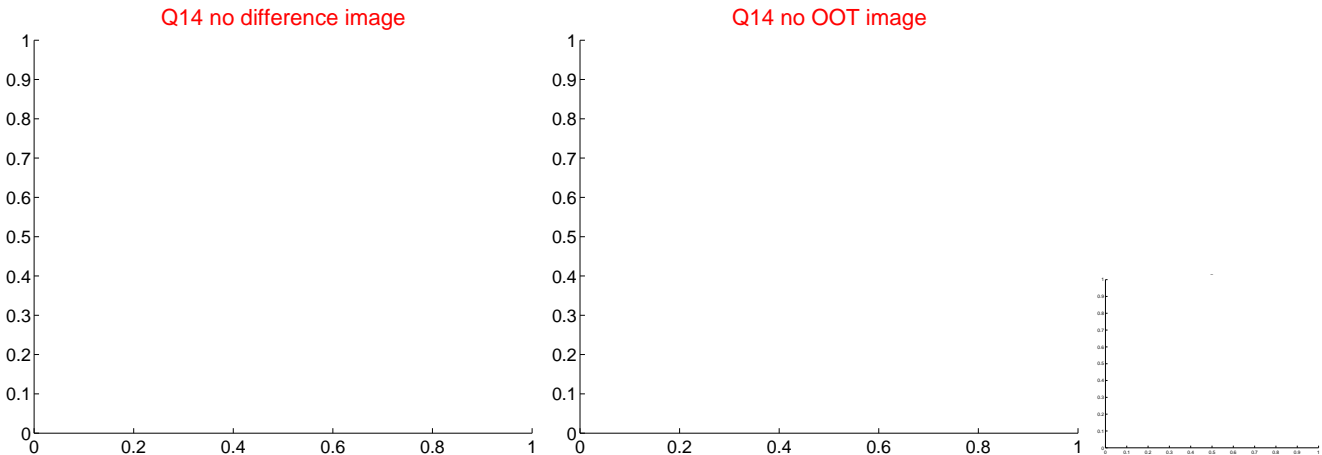
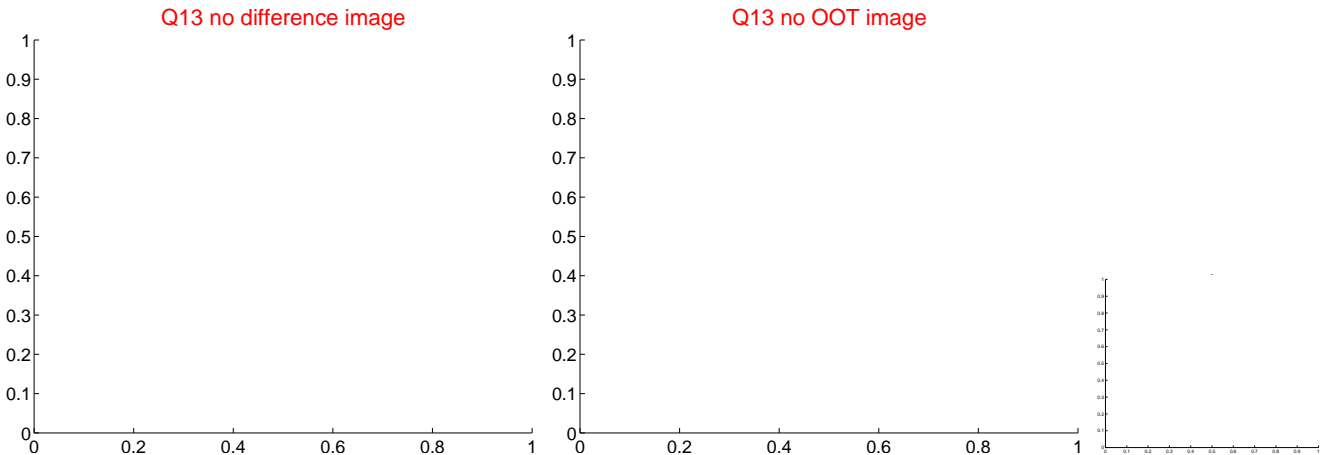
Q12 no difference image



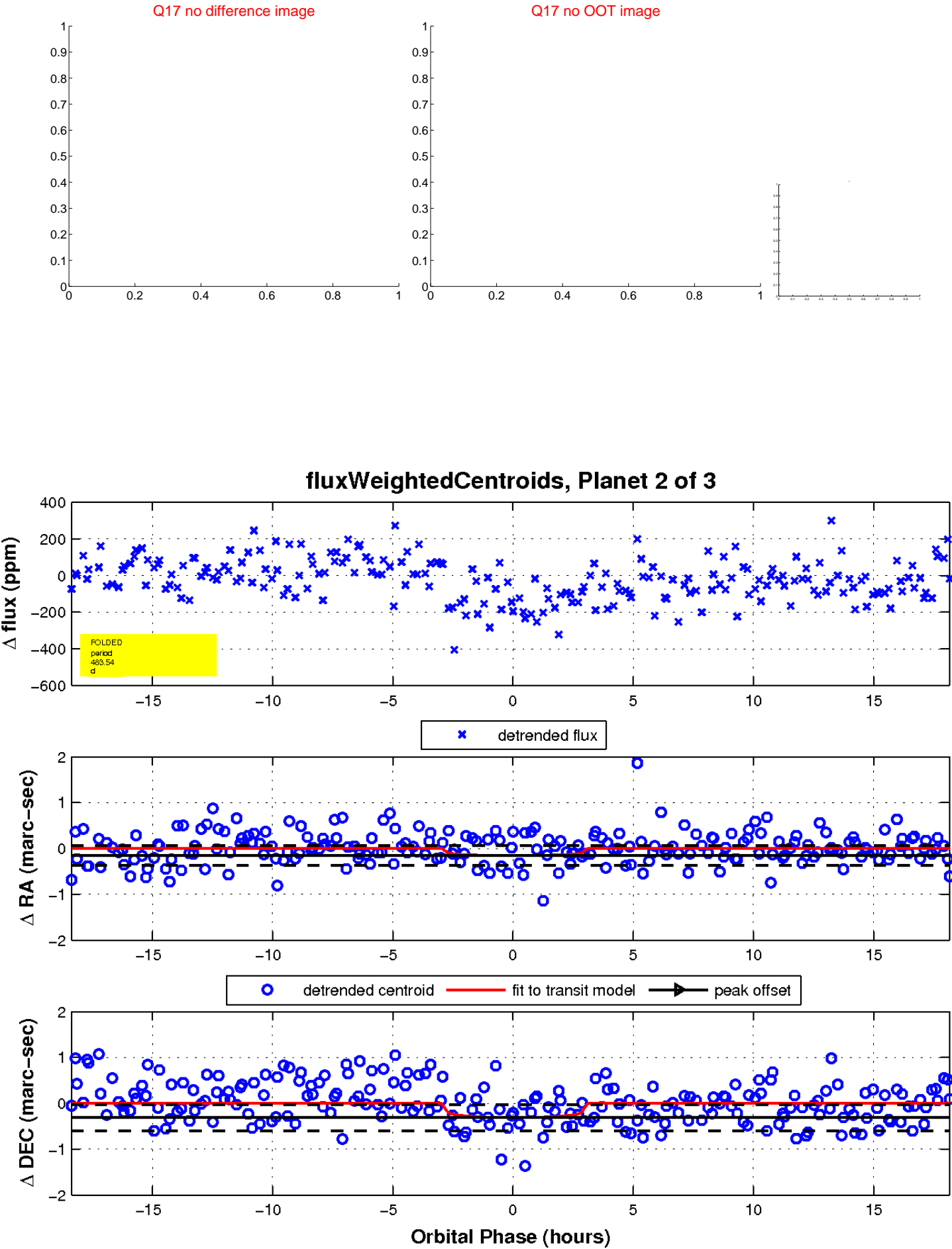
Q12 no OOT image



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



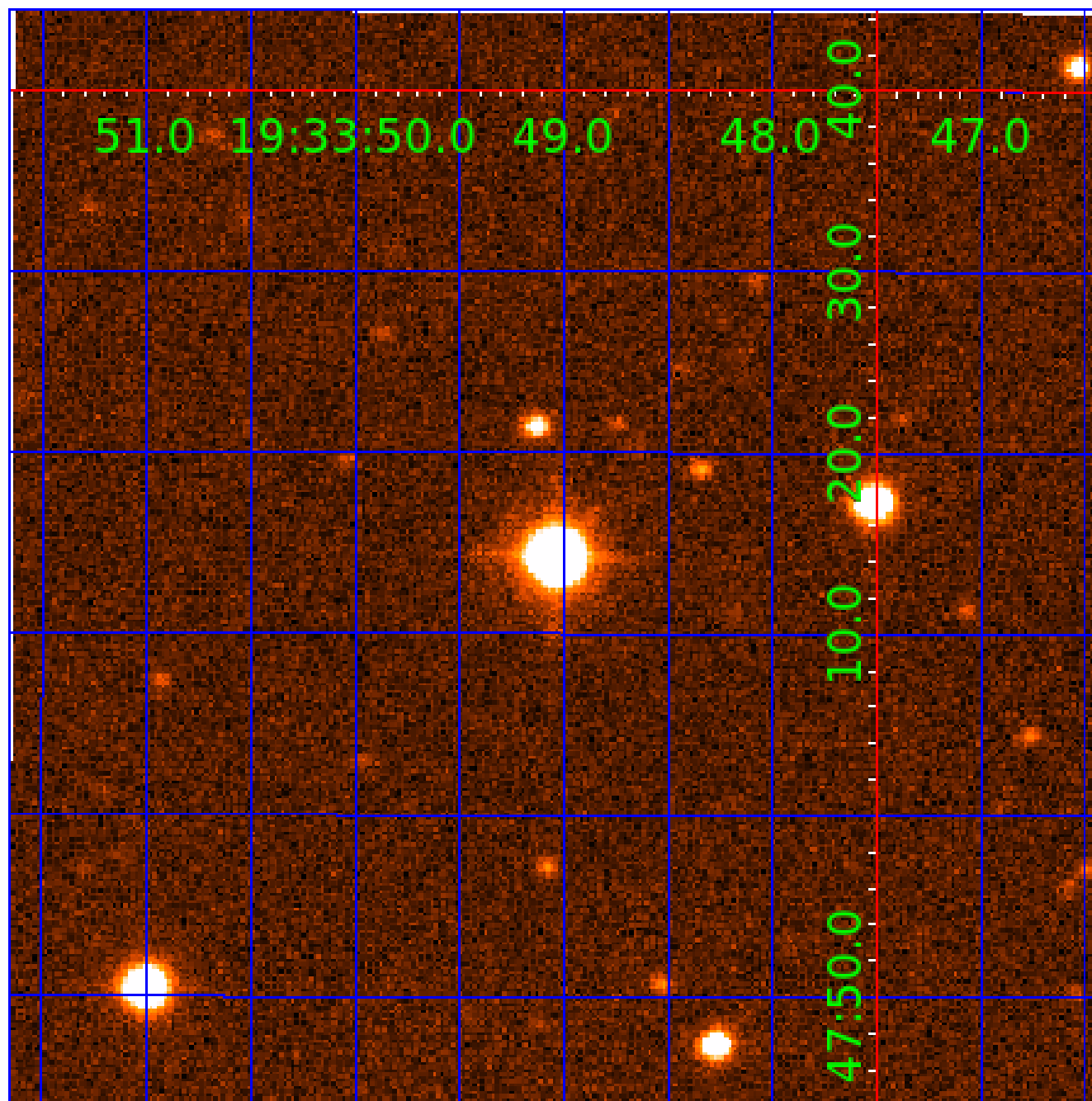
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





UKIRT Image

Declination



# KIC 004752451

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004752451-01	OBS	0109.01	6.414970	132.865588	152.5	3.967	44.7	36.9	1.18	6170	2.66	418.57
004752451-02	OBS	No	483.543072	535.345522	176.3	6.133	8.7	8.2	1.18	6170	1.78	1.31
004752451-03	OBS	No	3.207385	132.888154	30.6	2.976	8.2	8.8	1.18	6170	0.78	1054.77

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004752451-01	OBS	FP	0.00	0	1	1	0	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE—CENT_RESOLVED_OFFSET
004752451-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS
004752451-03	OBS	FP	0.00	1	1	1	0	IS_SEC_TCE—CENT_RESOLVED_OFFSET—HALO_GHOST

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

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

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

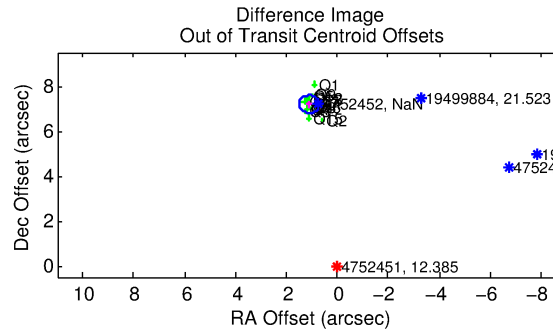
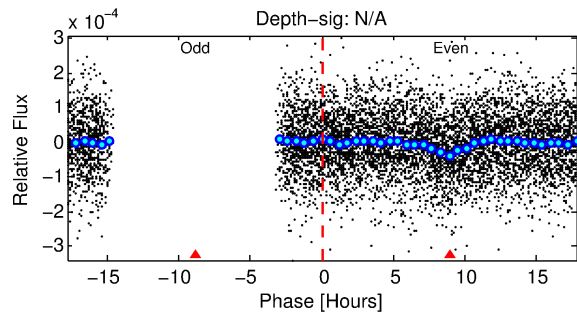
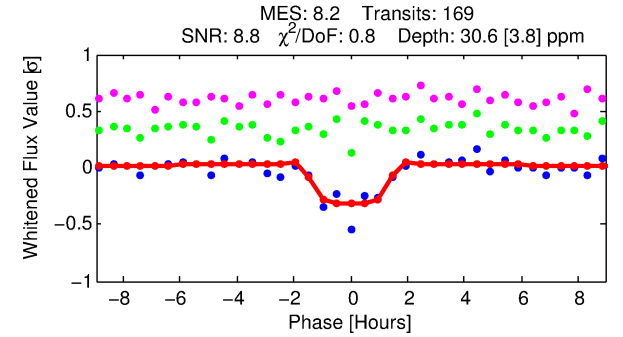
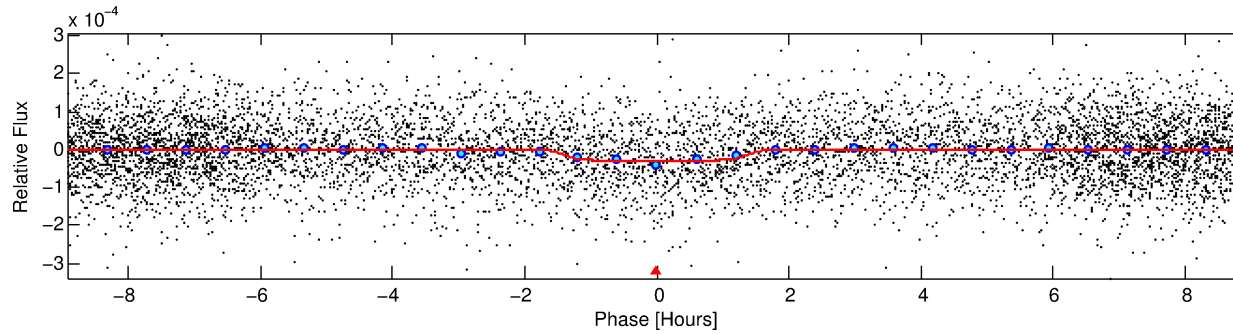
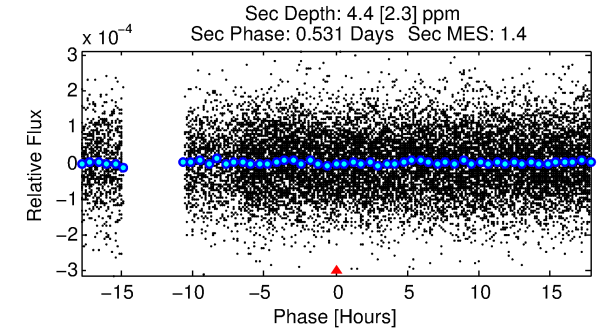
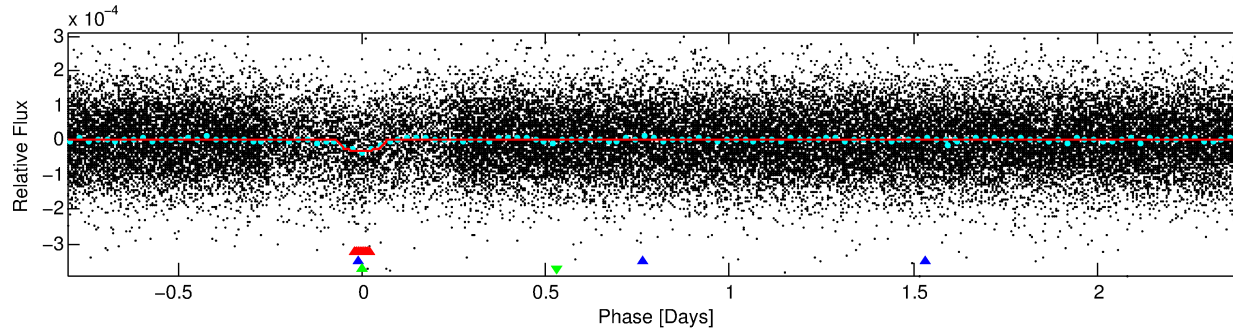
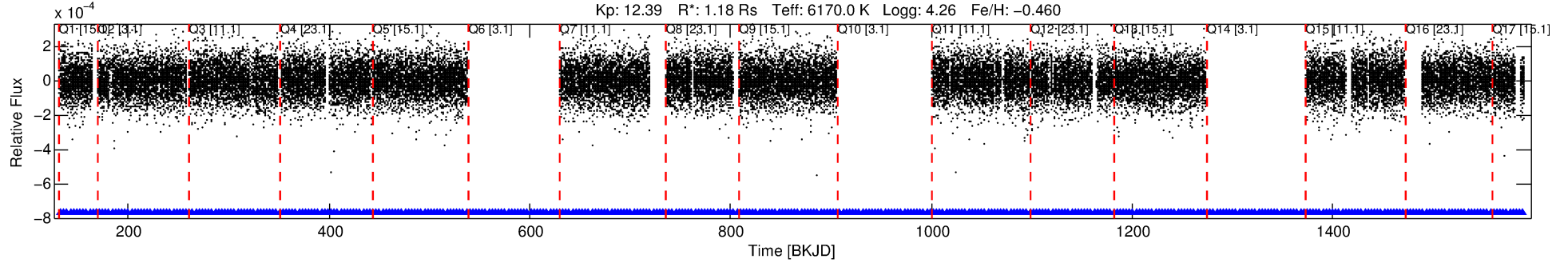
Ephemeris Match Information For 004752451-03

No Significant Match Found

# DV One-Page Summary

KIC: 4752451 Candidate: 3 of 3 Period: 3.207 d  
KOI: K00109 Corr: No Ephemeris Match

Kp: 12.39 R\*: 1.18 Rs Teff: 6170.0 K Logg: 4.26 Fe/H: -0.460



## DV Fit Results:

Period = 3.20738 [0.00002] d  
Epoch = 132.8882 [0.0047] BKJD  
Rp/R\* = 0.0060 [0.0030]  
a/R\* = 3.52 [9.12]  
b = 0.92 [0.49]  
Seff = 1054.77 [357.65]  
Teq = 1453 [123] K  
Rp = 0.78 [0.42] Re  
a = 0.0415 [0.0082] AU  
Ag = 6.81 [7.95] [0.73σ]  
Teff = 3630 [1025] K [2.11σ]

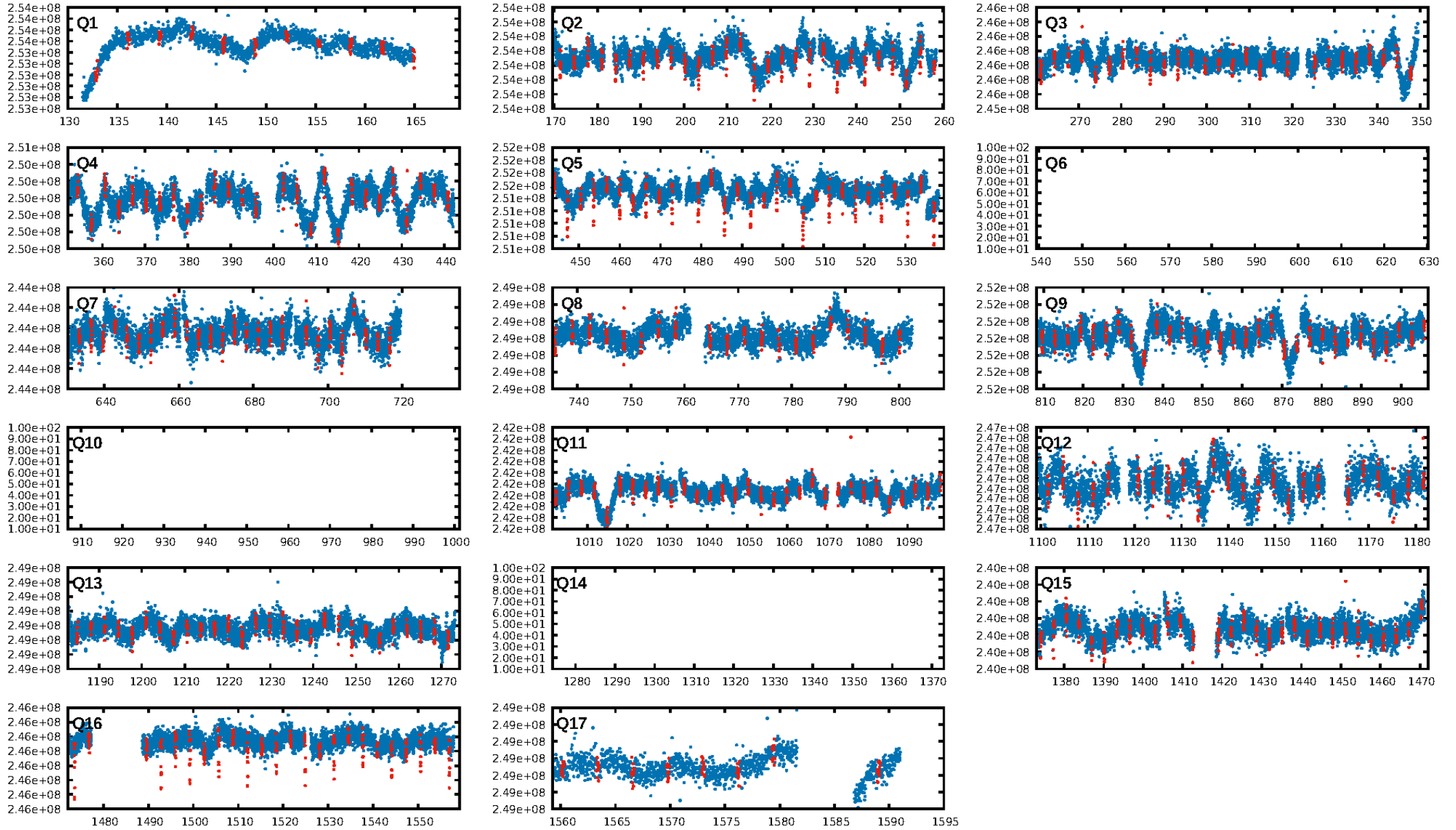
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [15.52σ]  
ModelChiSquare2-sig: 81.6%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 4.58e-16  
RollingBand-fgt: 1.00 [160/160]  
GhostDiagnostic-chr: -0.1322  
Centroid-sig: 0.0%  
Centroid-so: 38.972 arcsec [32.40σ]  
OotOffset-rm: 7.286 arcsec [55.83σ]  
KicOffset-rm: 7.344 arcsec [66.97σ]  
OotOffset-st: 1/4/4/5 [14]  
KicOffset-st: 1/4/4/5 [14]  
DiffImageQuality-fgm: 0.93 [13/14]  
DiffImageOverlap-fno: 1.00 [14/14]

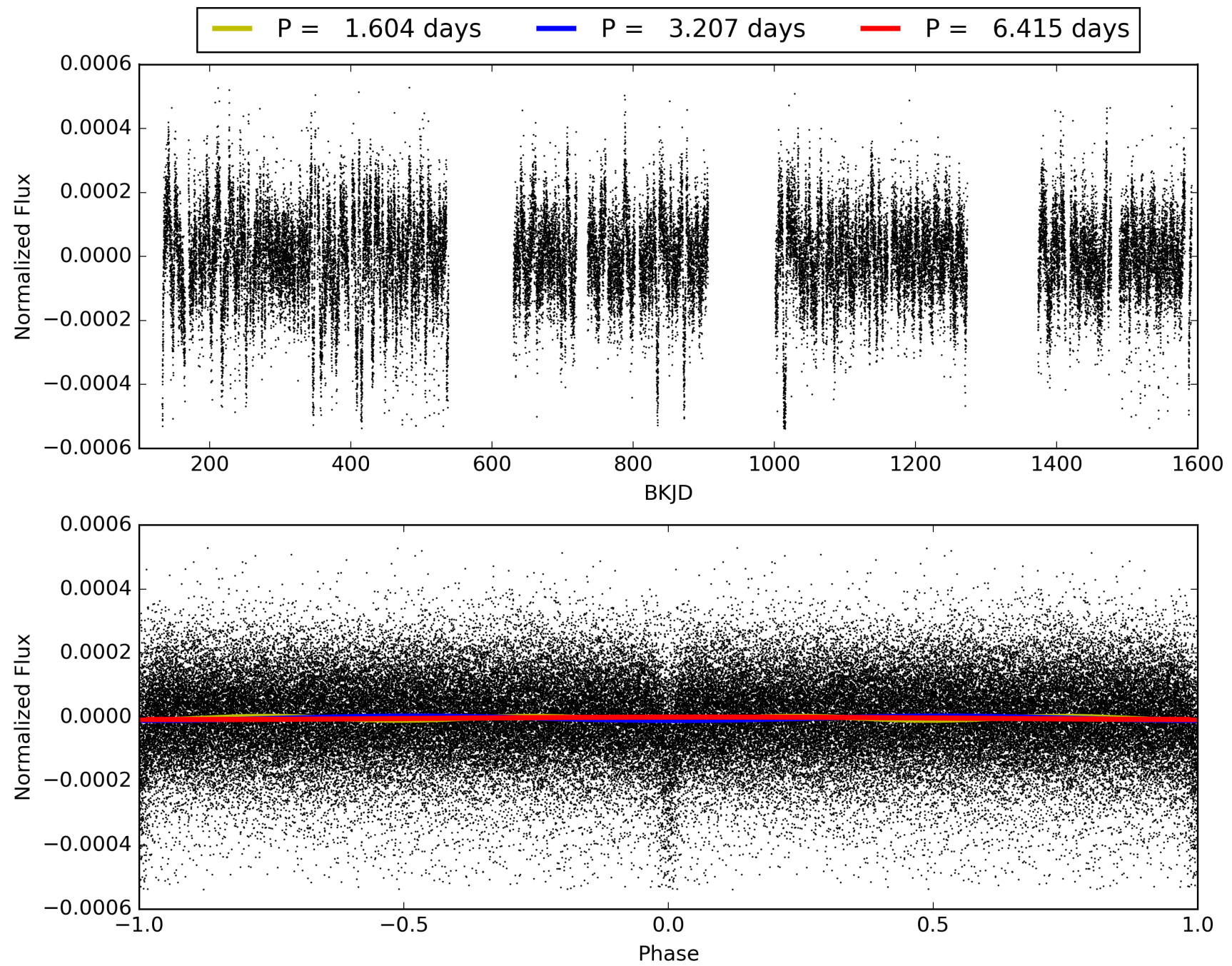
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 13:58:14 Z

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

# TCE 004752451-03, PDC Light Curves



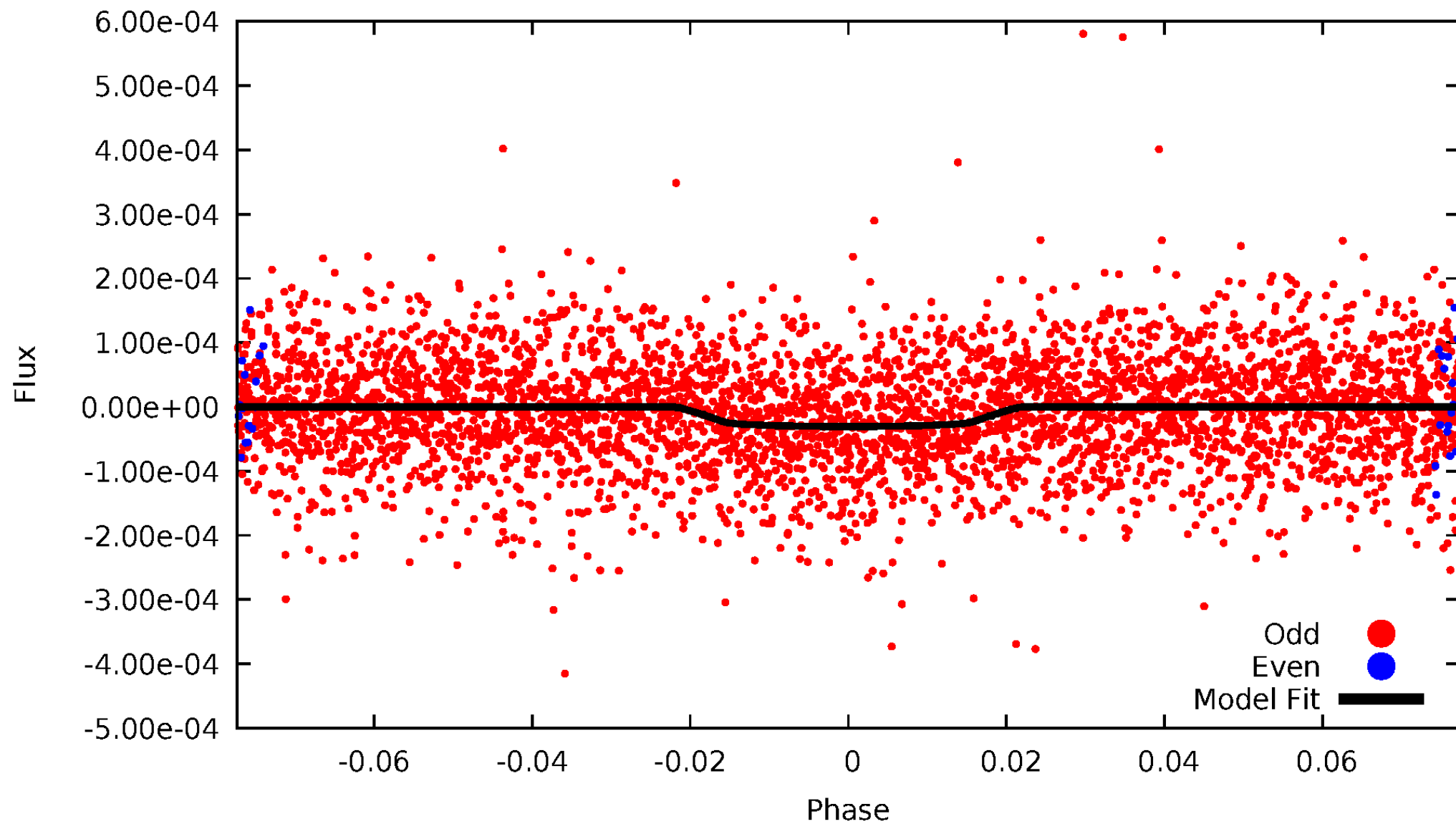
TCE 004752451-03





# DV Odd/Even

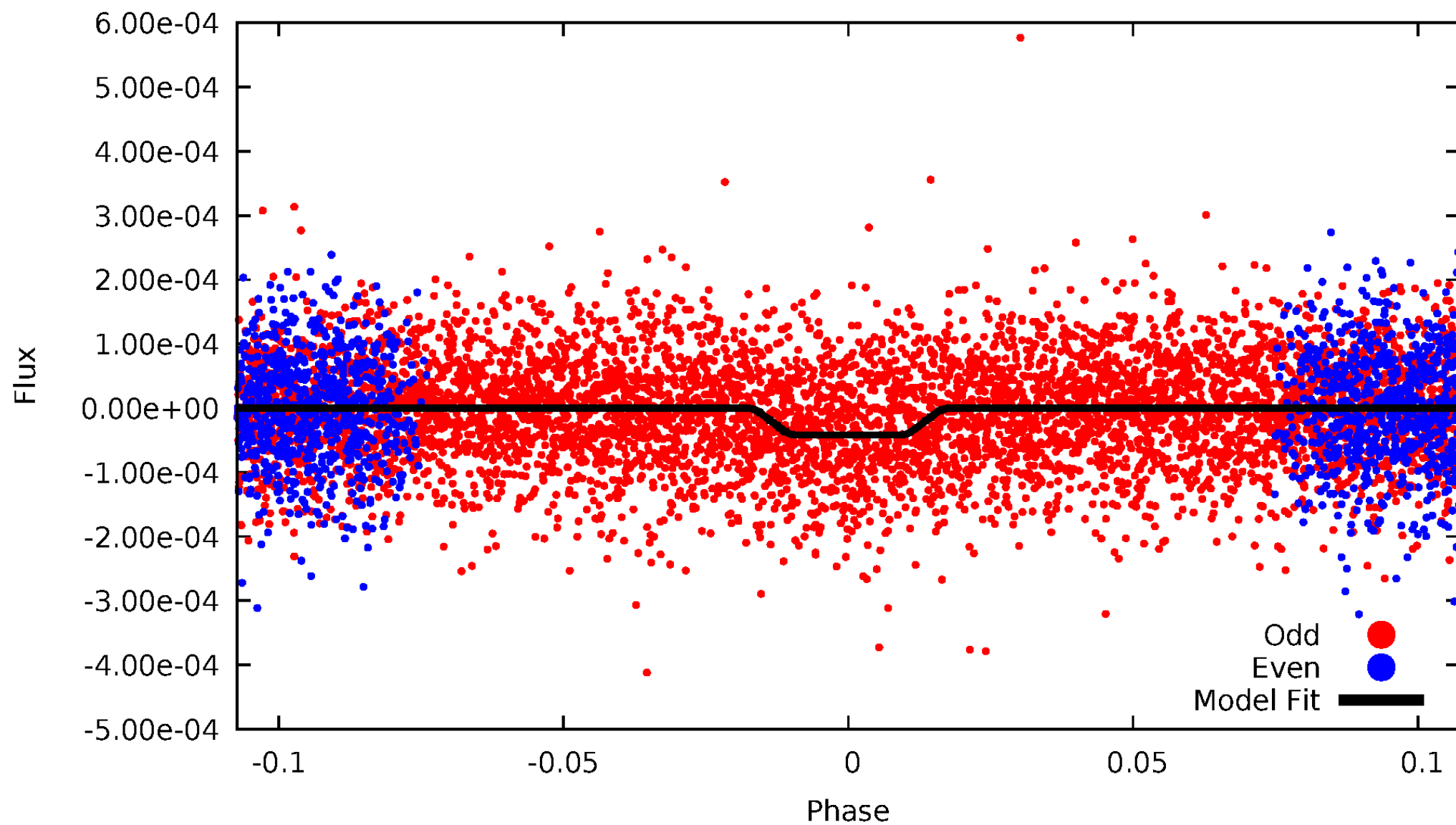
TCE 004752451-03





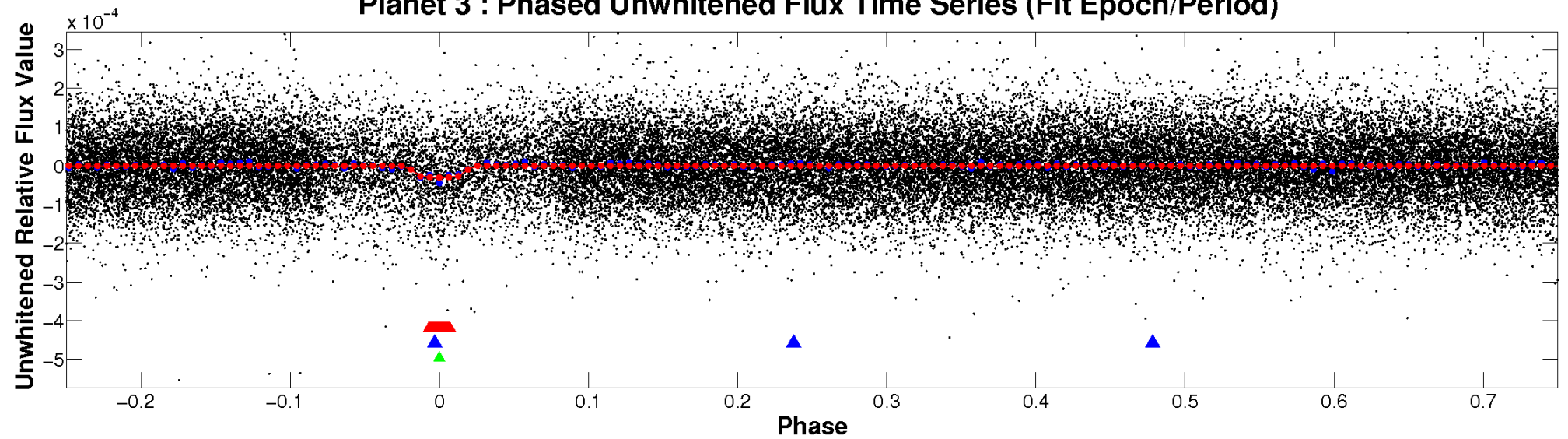
# ALT Odd/Even

TCE 004752451-03

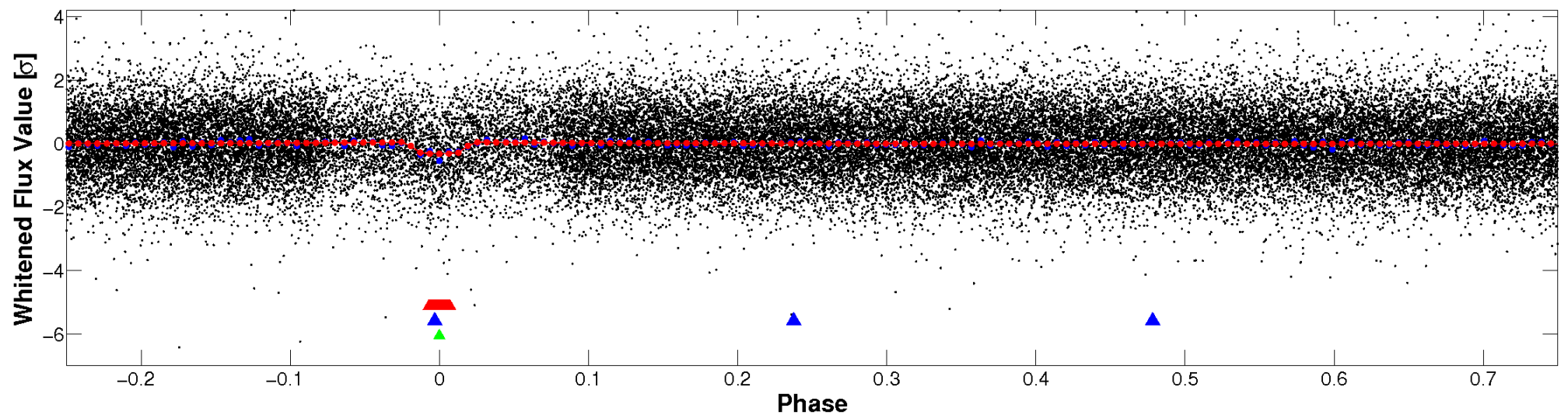


# Non-Whitened Vs. Whitened Light Curve

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

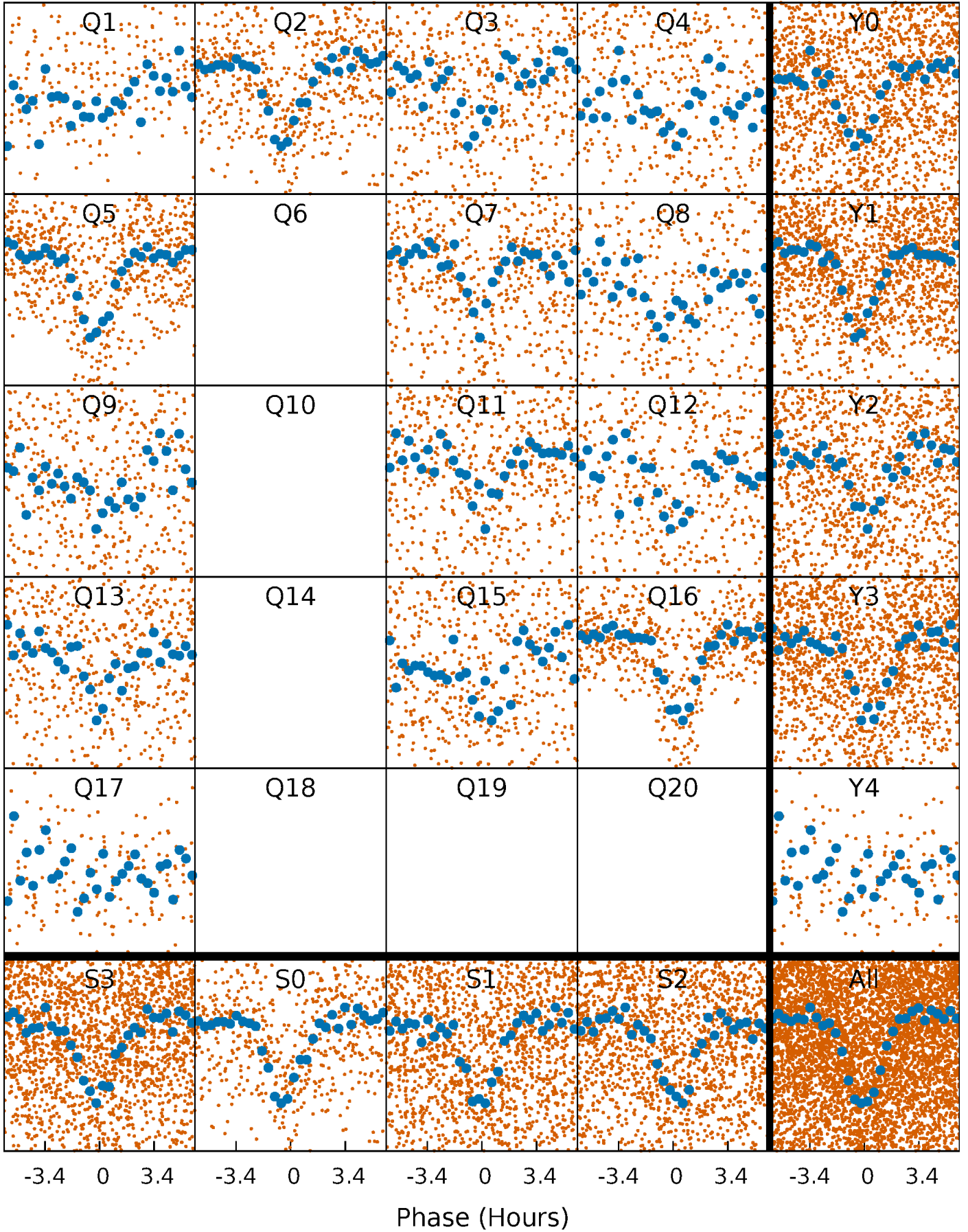


**Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



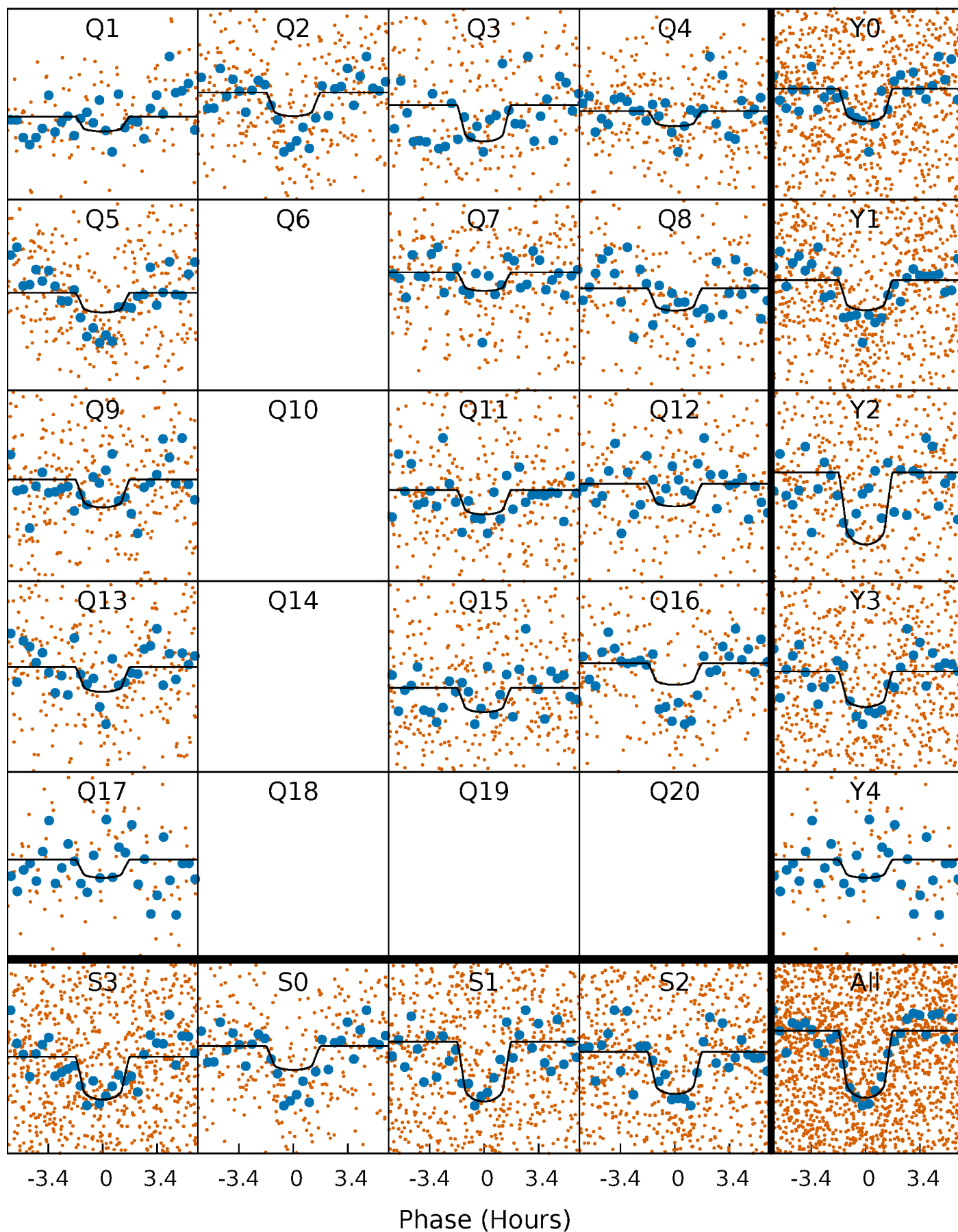
# PDC Quarter-Phased Transit Curves

TCE 004752451-03    P= 3.207385 Days     $T_0=132.888153$  (BKJD)



# DV Quarter-Phased Transit Curves

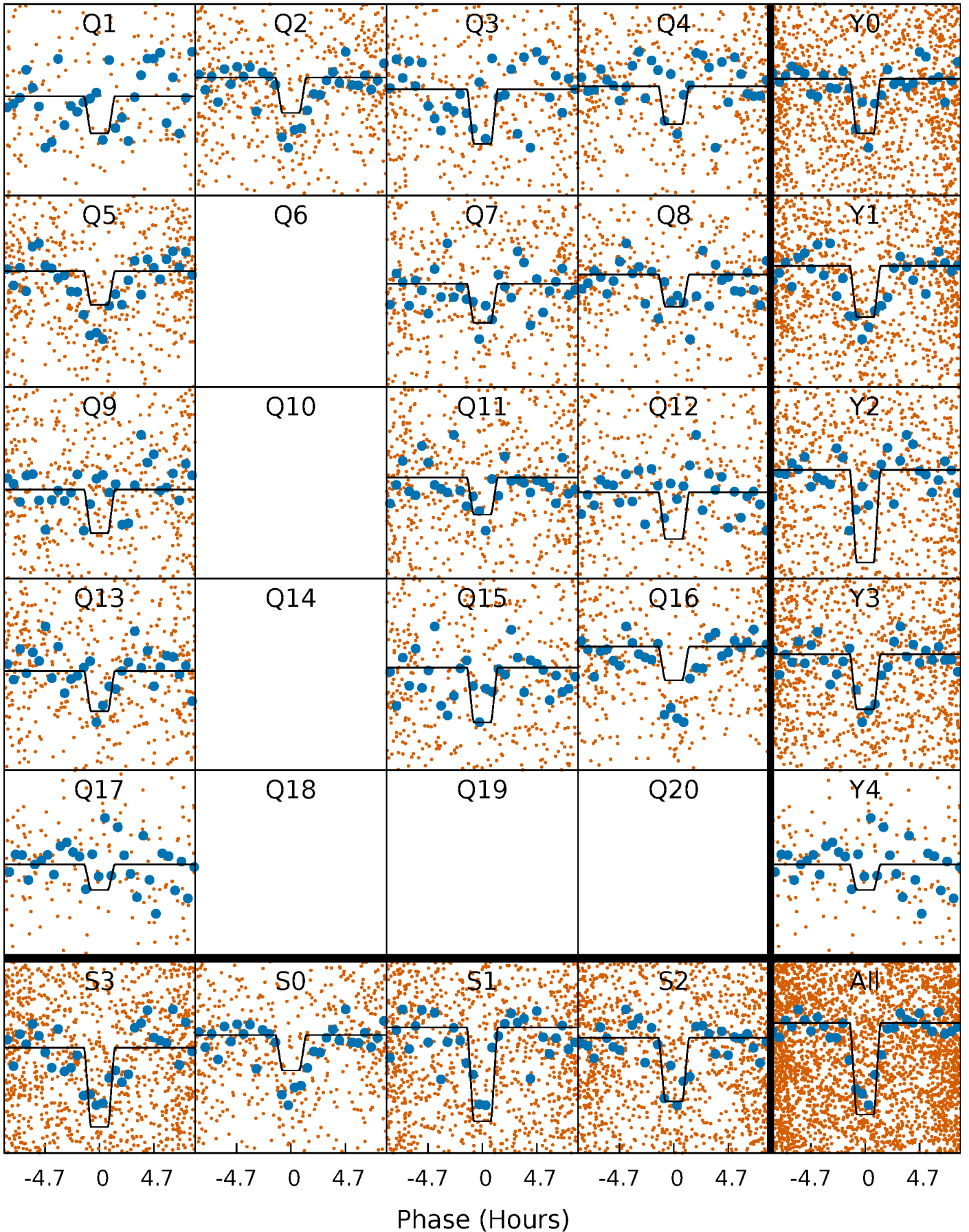
TCE 004752451-03 P= 3.207385 Days  $T_0=132.888153$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

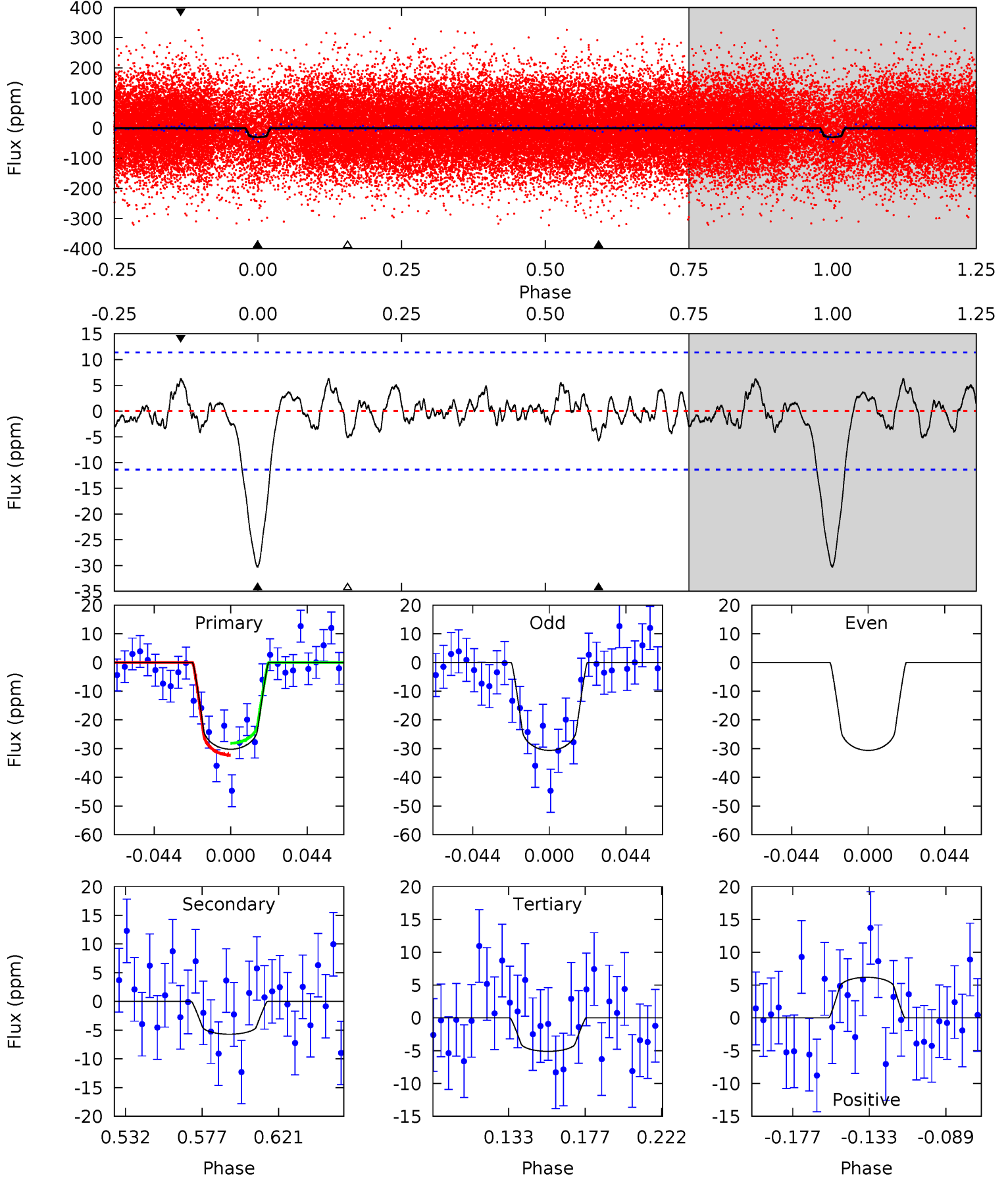
TCE 004752451-03 P= 3.207390 Days  $T_0=132.886184$  (BKJD)



# DV Model-Shift Uniqueness Test

004752451-03, P = 3.207385 Days, E = 129.680768 Days

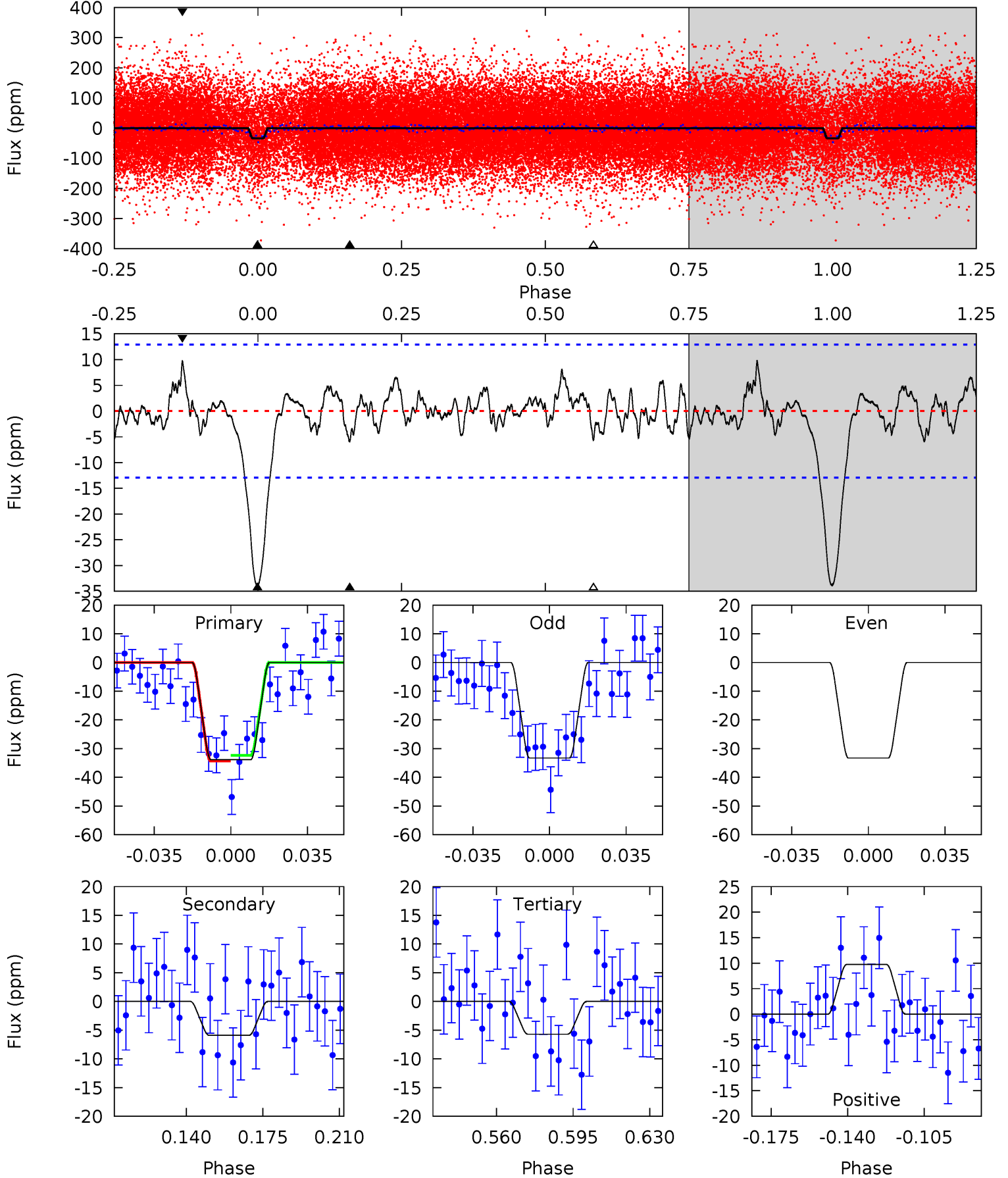
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.6	2.38	2.12	2.57	4.73	2.01	0.97	10.5	10.0	0.25	-0.20	0	1.07	0.17	0.87



# Alt Model-Shift Uniqueness Test

004752451-03, P = 3.207390 Days, E = 129.678794 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
12.5	2.18	2.11	3.60	4.78	2.11	1.00	10.4	8.92	0.07	-1.42	0	1.05	0.22	0.37





### Stellar Parameters For KIC 004752451

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (g \cdot \text{cm}^{-3})$
	$6170^{+169}_{-188}$	$4.259^{+0.186}_{-0.124}$	$-0.460^{+0.300}_{-0.300}$	$1.183^{+0.242}_{-0.242}$	$0.927^{+0.136}_{-0.090}$	$0.789^{+0.684}_{-0.317}$
	+3%/-3%	+4%/-3%	+65%/-65%	+20%/-20%	+15%/-10%	+87%/-40%
Source	PHO1	FLK73	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 004752451-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-6 \pm 2$	$0.77^{+0.43}_{-0.37}$	$2011^{+139}_{-125}$	$4083^{+1219}_{-697}$	$8.652^{+23.285}_{-5.624}$
Alt.	$-6 \pm 3$	$0.85^{+0.39}_{-0.37}$	$2014^{+125}_{-120}$	$3930^{+1184}_{-623}$	$7.366^{+17.421}_{-4.787}$

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

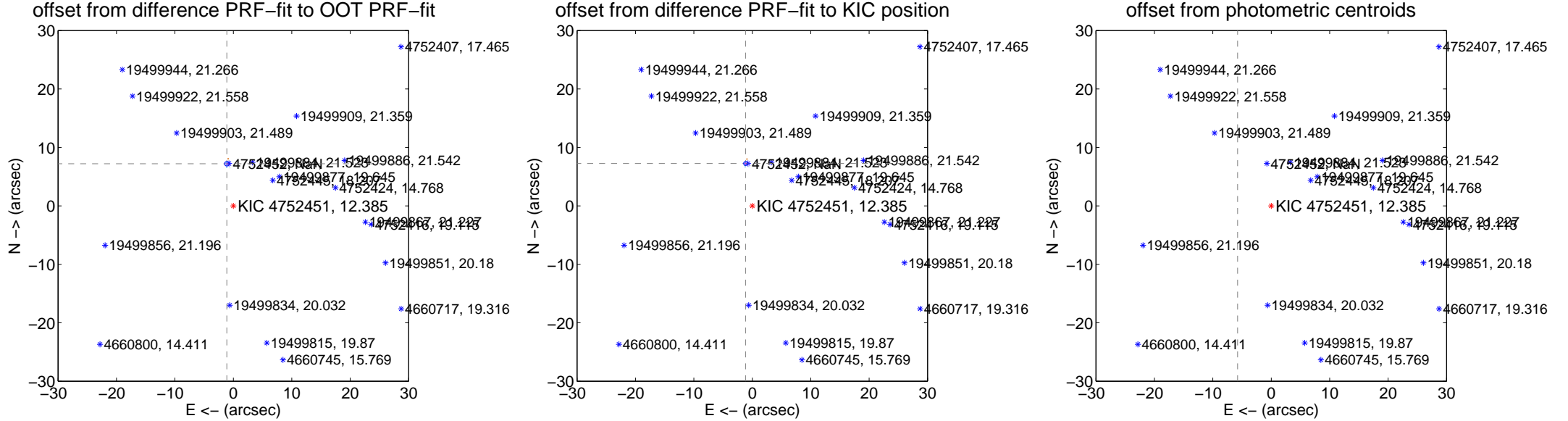
## DV Centroid Data

Supplemental centroid analysis for 004752451-03. Kepler magnitude: 12.38. Transit SNR 8.78

There are 13 quarters with good PRF difference image offsets

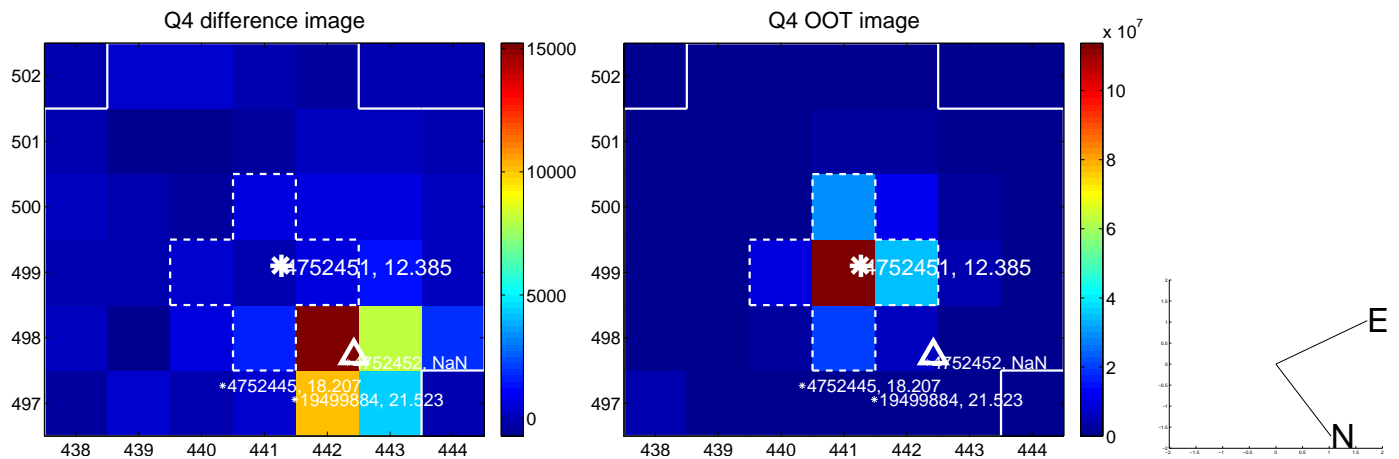
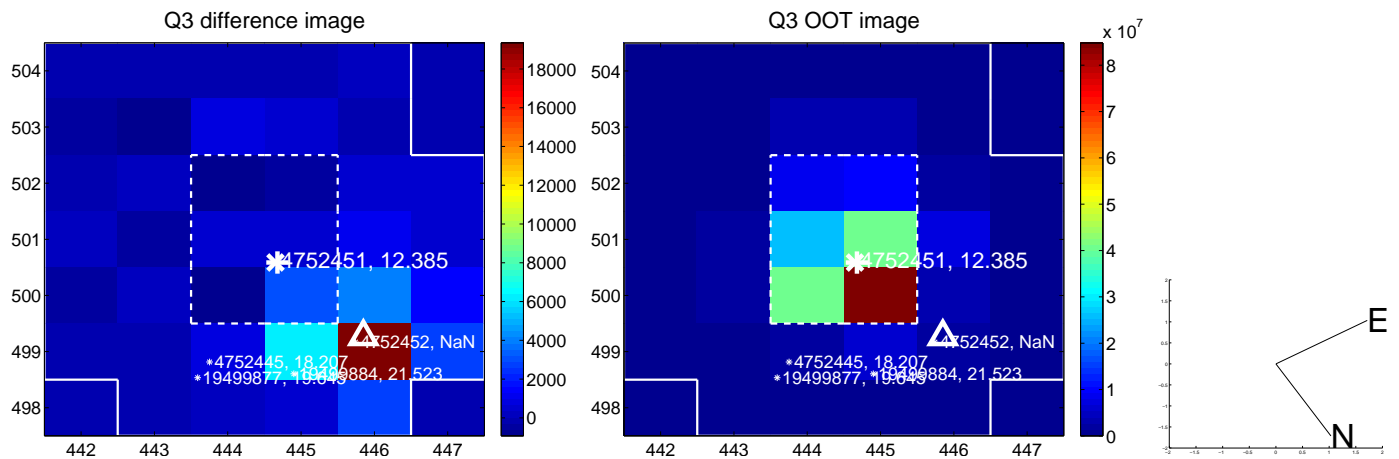
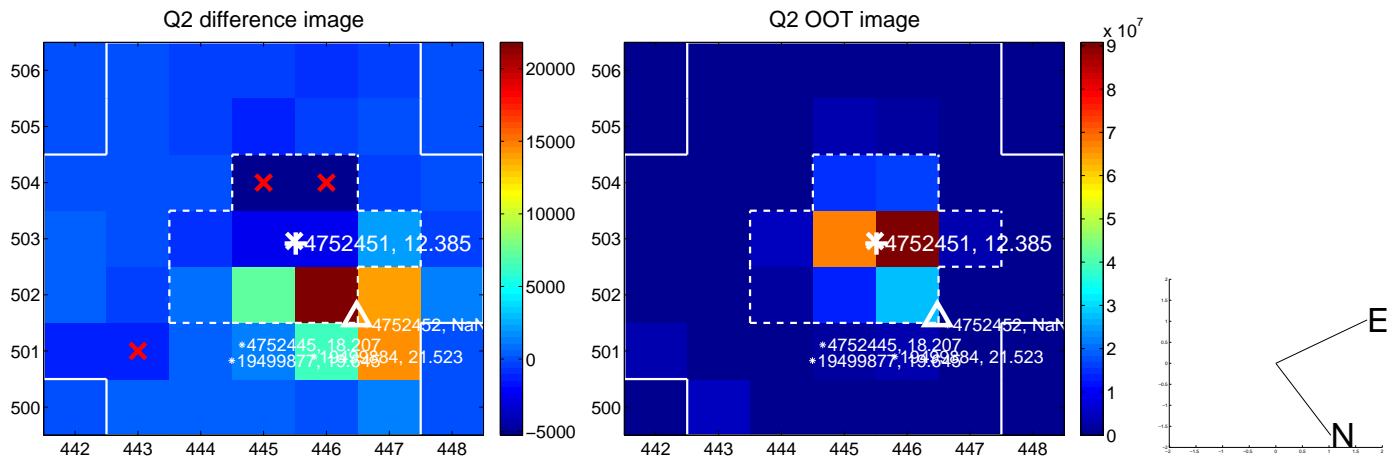
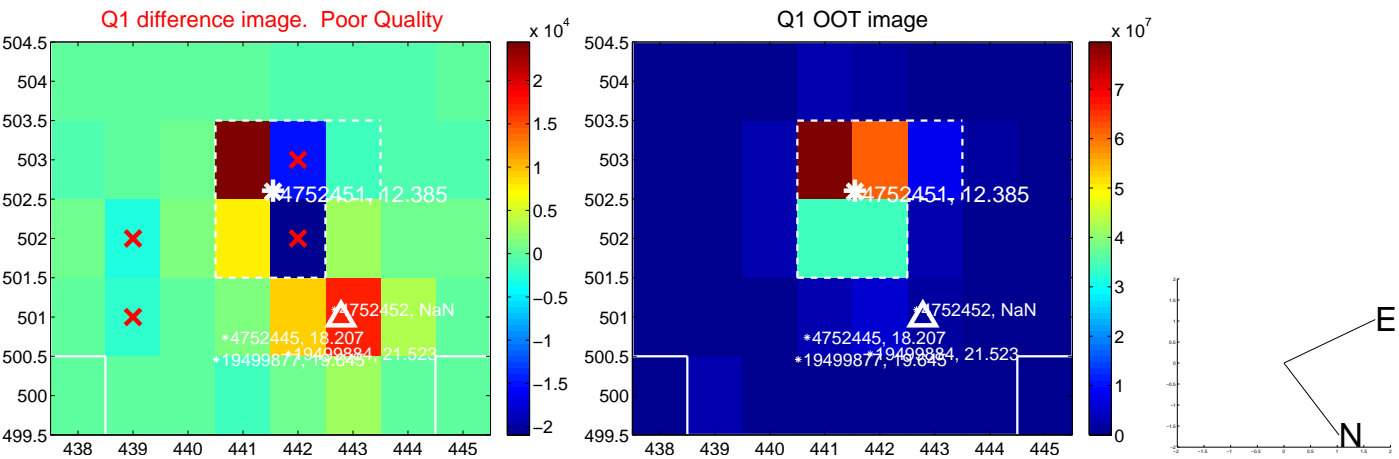
The direct PRF centroid is offset from the target star catalog position by about 0.03 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b>7.286 <math>\pm</math> 0.131</b>	<b>55.83</b>	1.115 $\pm$ 0.080	7.200 $\pm$ 0.130
PRF-fit source offset from KIC position	<b>7.344 <math>\pm</math> 0.110</b>	<b>66.97</b>	1.159 $\pm$ 0.084	7.252 $\pm$ 0.110
photometric centroid source offset	<b>38.97 <math>\pm</math> 1.20</b>	<b>32.40</b>	5.76 $\pm$ 1.00	38.54 $\pm$ 1.21

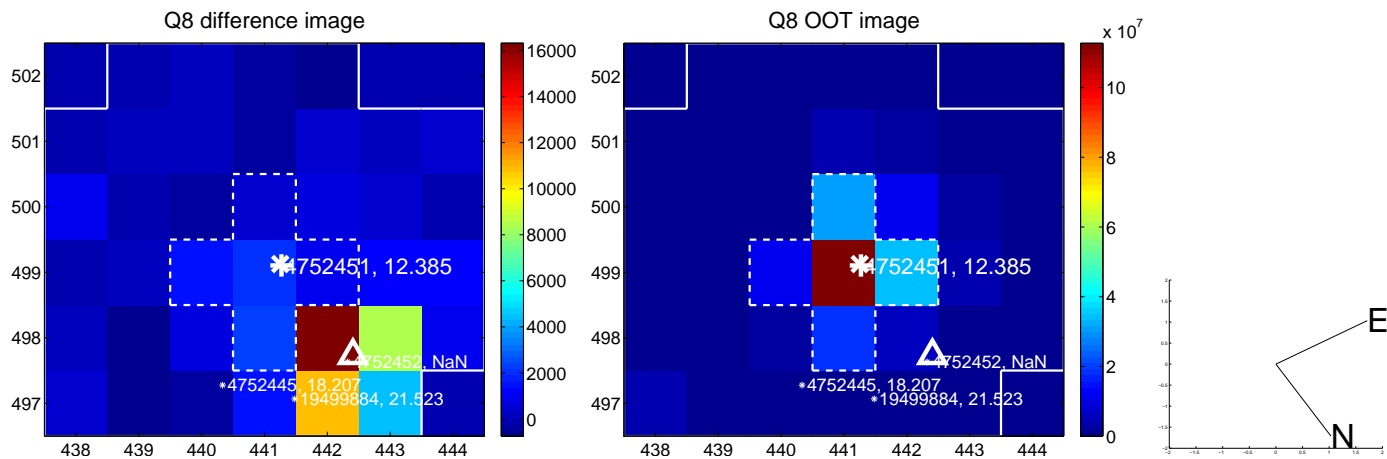
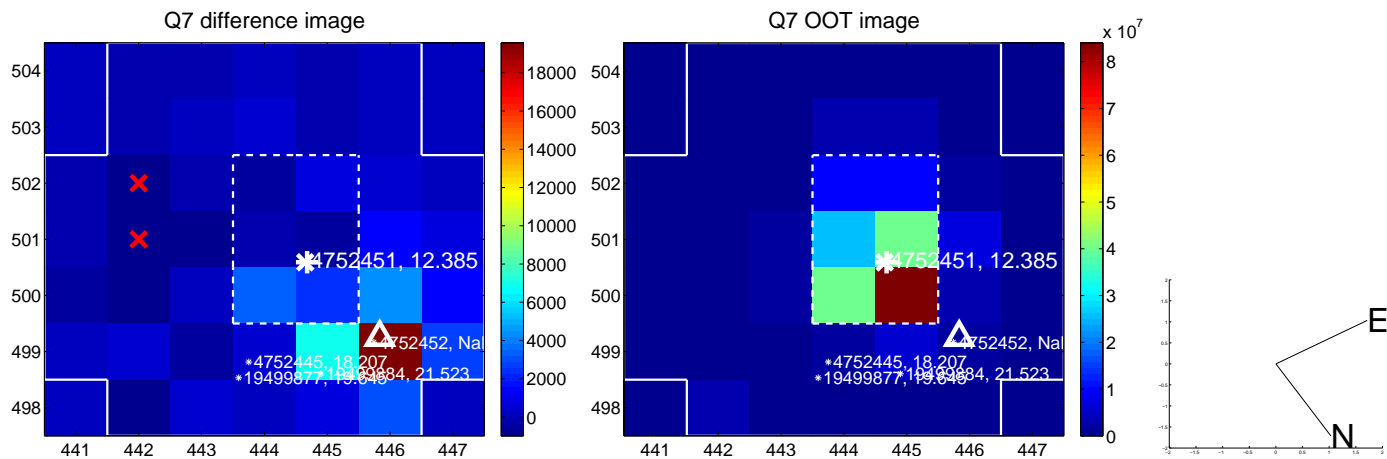
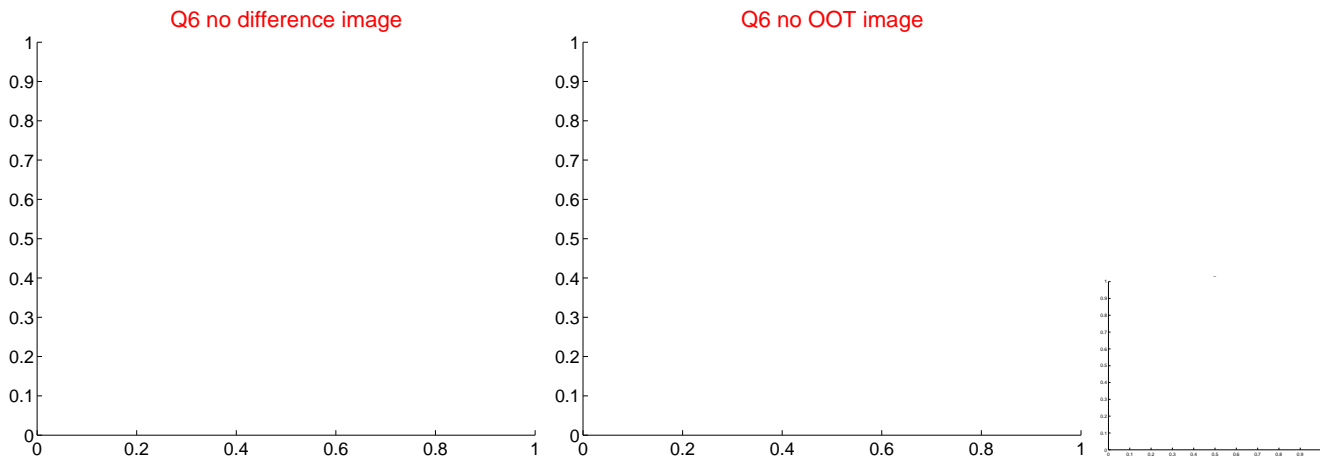
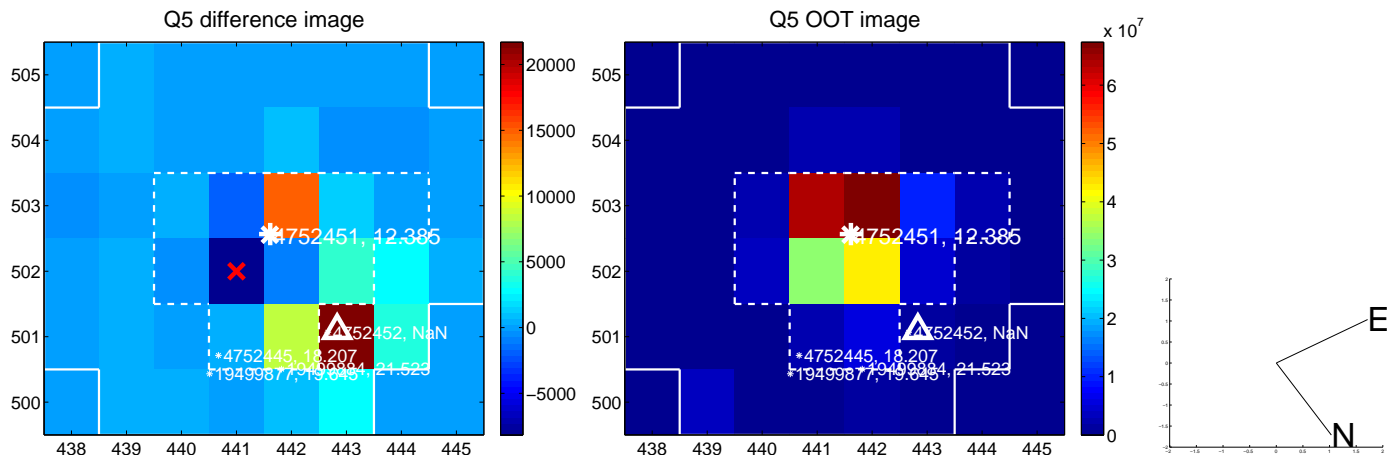


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

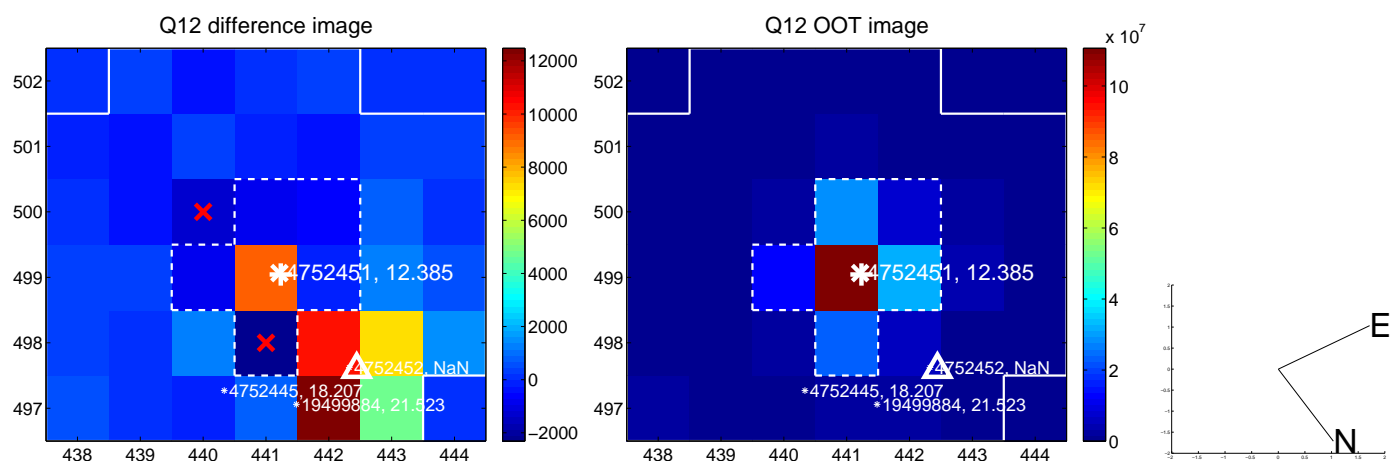
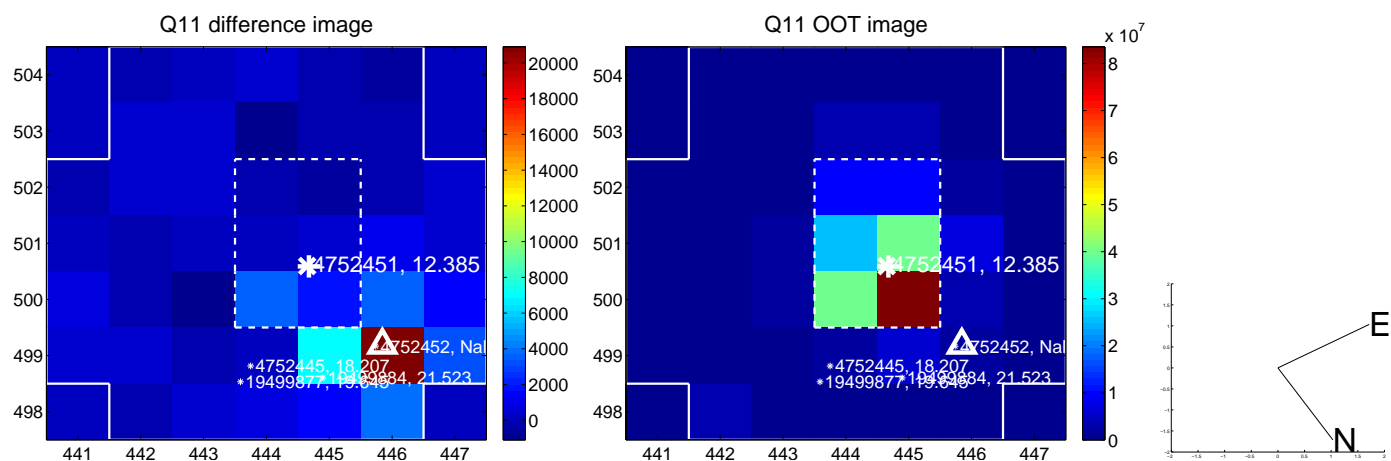
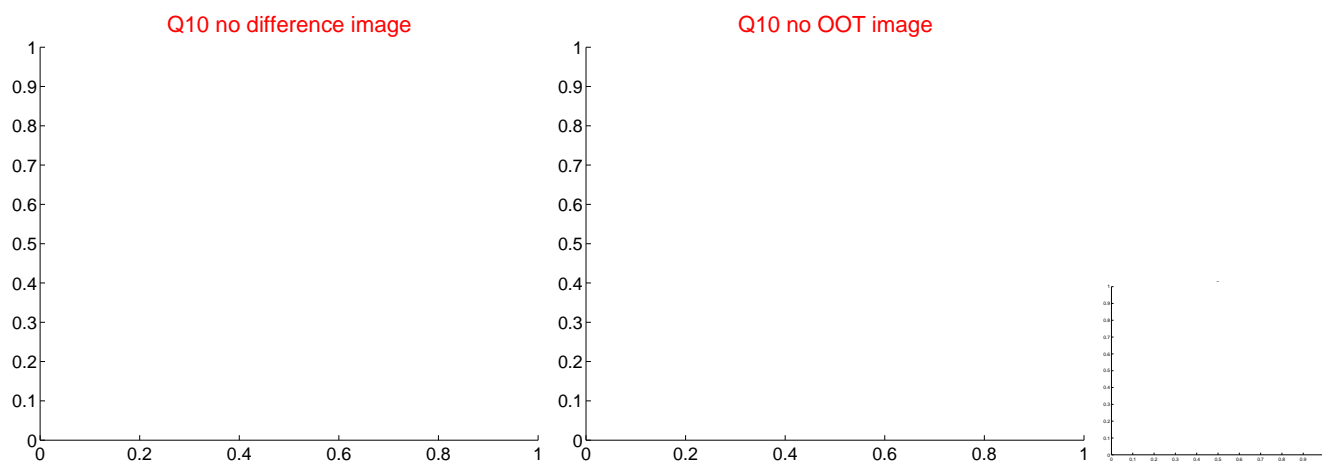
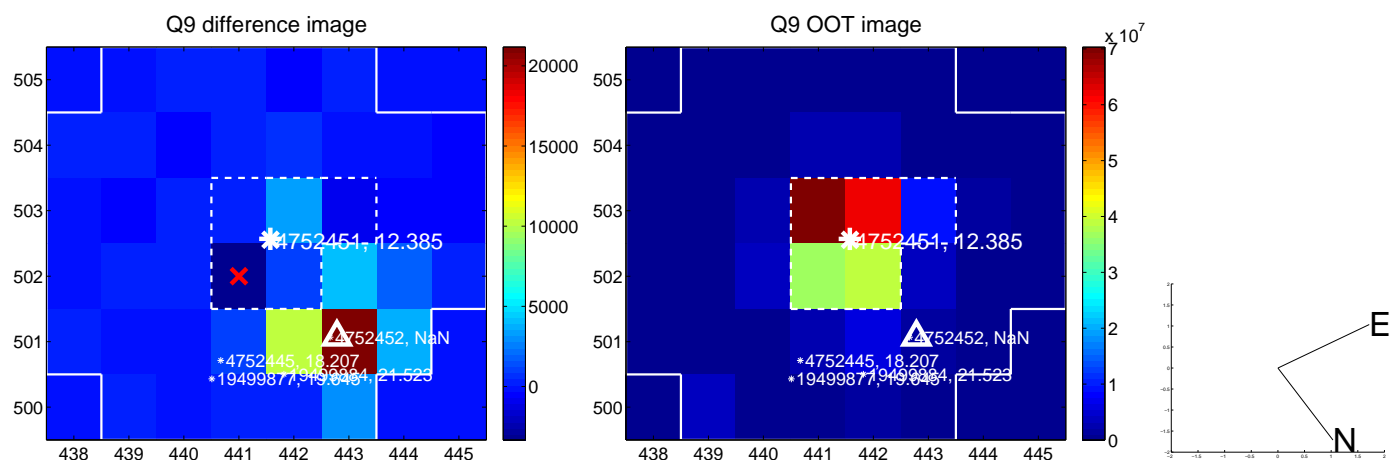
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



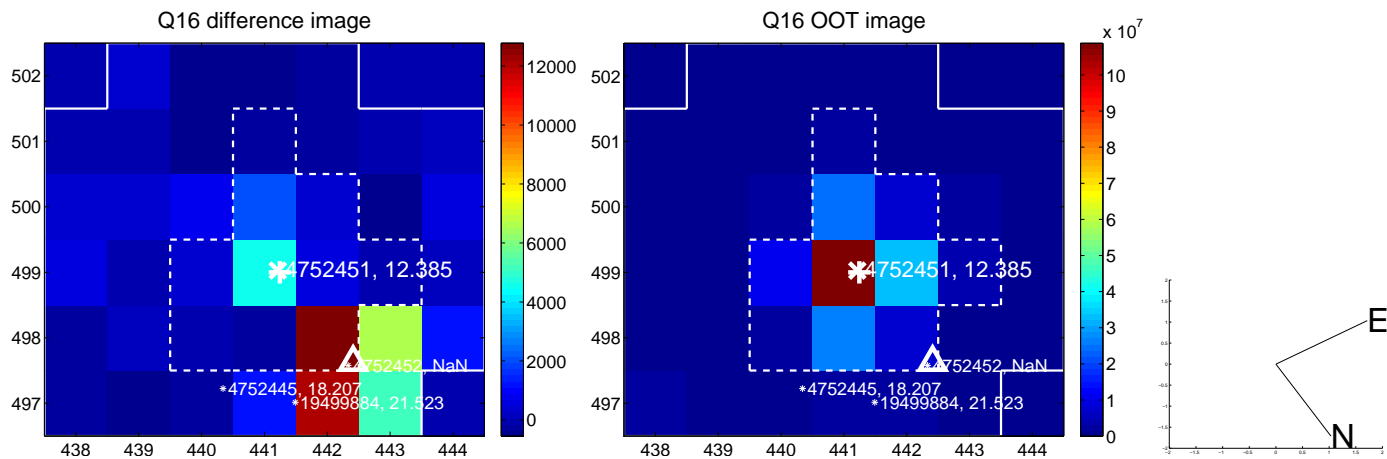
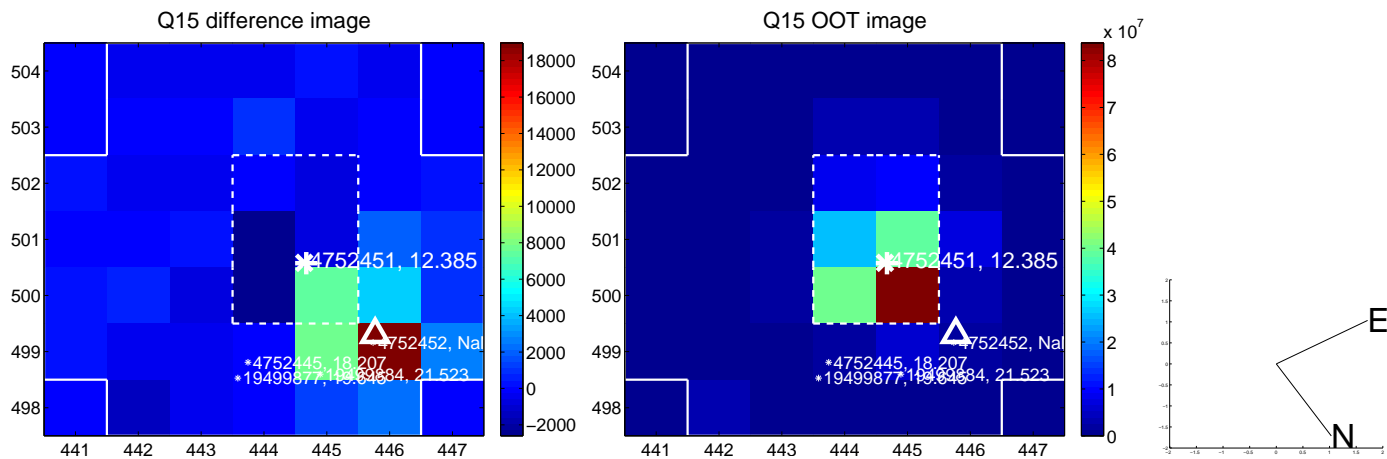
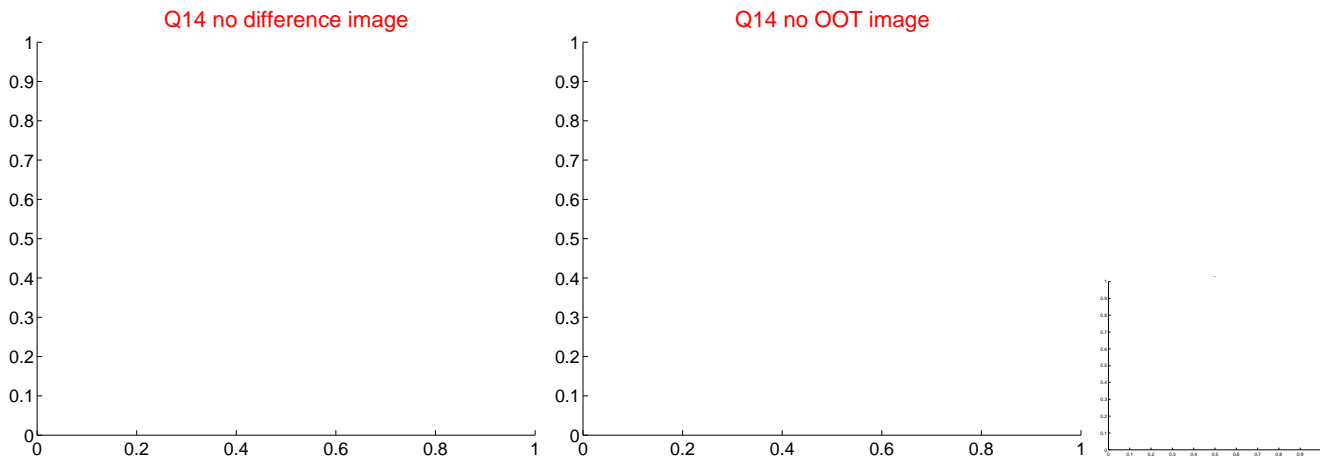
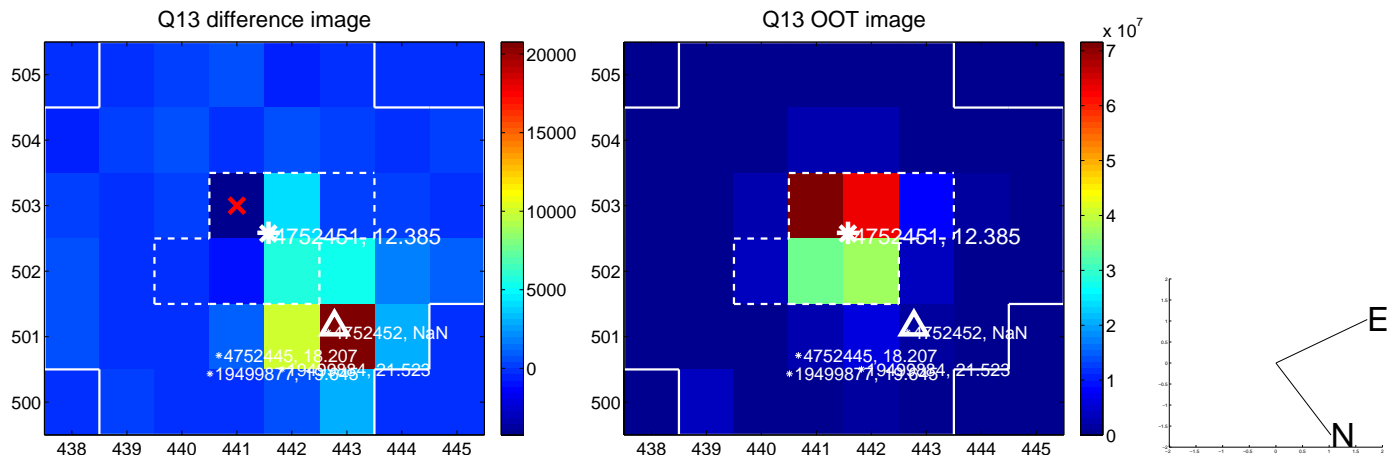
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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.





UKIRT Image

Declination

