

# KIC 011457191

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
011457191-01	OBS	7447.01	1.149182	131.826173	28130.3	3.960	2384.6	1094.9	0.87	5858	20.23	1932.20
011457191-02	OBS	No	209.612719	174.767630	1383.2	14.684	15.7	4.0	0.87	5858	3.28	1.87
011457191-03	OBS	No	231.134684	161.206540	1963.0	4.164	11.4	6.2	0.87	5858	5.41	1.64
011457191-04	OBS	No	396.072268	376.947744	3889.6	7.404	10.3	9.2	0.87	5858	6.07	0.80

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
011457191-01	OBS	FP	0.00	0	1	0	0	SWEET_EB—DEPTH_ODDEVEN_DV—DEPTH_ODDEVEN_ALT—MOD_ODDEVEN_DV—MOD_ODDEVEN_ALT—DEEP_V_SHAPED
011457191-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
011457191-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
011457191-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS

**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.

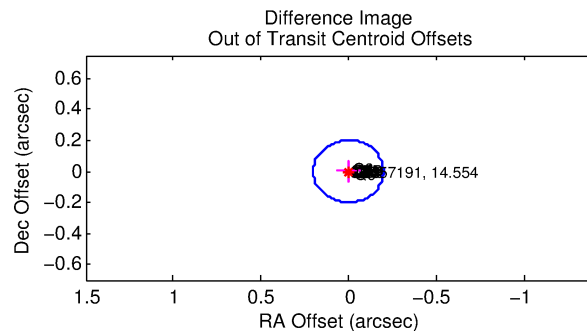
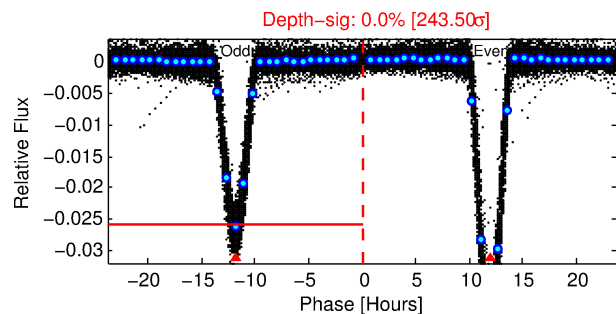
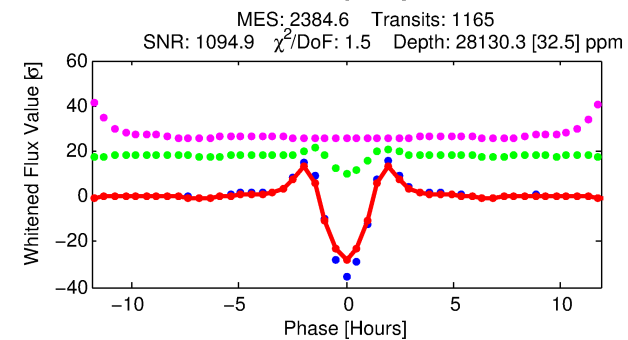
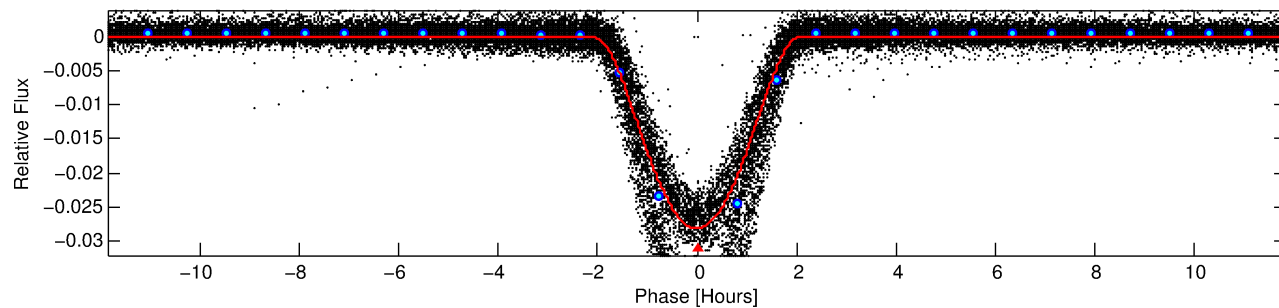
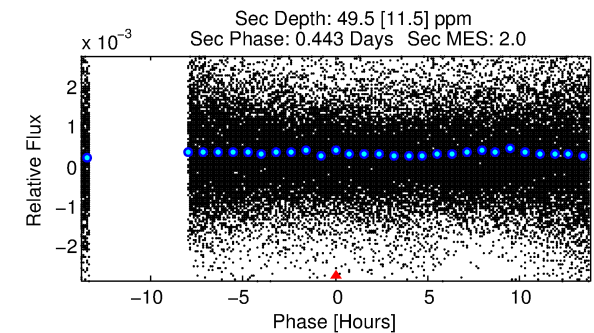
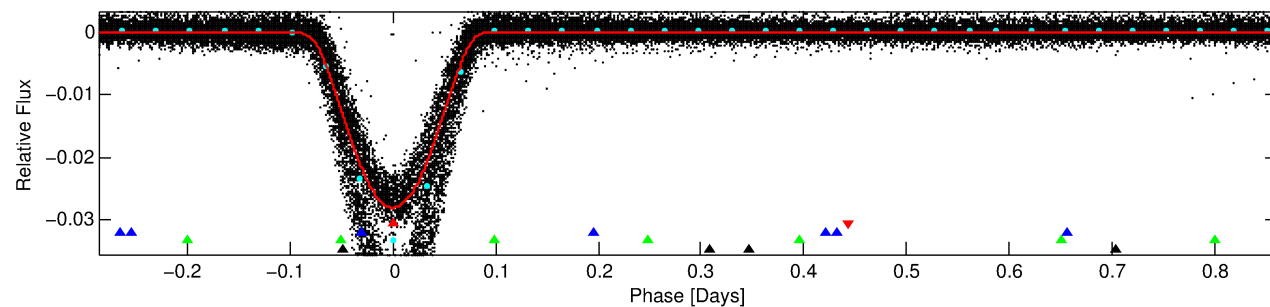
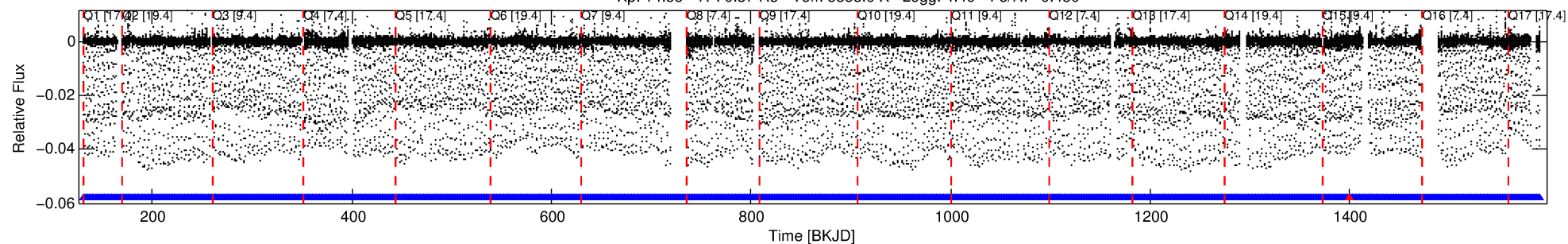
## Ephemeris Match Information For 011457191-01

No Significant Match Found

# DV One-Page Summary

KIC: 11457191 Candidate: 1 of 4 Period: 1.149 d  
KOI: K07447.01 Corr: 0.964

Kp: 14.55 R\*: 0.87 Rs Teff: 5858.0 K Logg: 4.49 Fe/H: -0.480



## DV Fit Results:

Period = 1.14918 [0.00000] d  
Epoch = 131.8262 [0.0000] BKJD  
Rp/R\* = 0.2139 [0.0017]  
a/R\* = 2.04 [0.00]  
b = 0.92 [0.00]  
Seff = 1932.20 [639.54]  
Teq = 1691 [140] K  
Rp = 20.24 [5.30] Re  
a = 0.0203 [0.0044] AU  
Ag = 0.03 [0.01] [-91.29σ]  
Teffp = 1063 [68] K [-4.03σ]

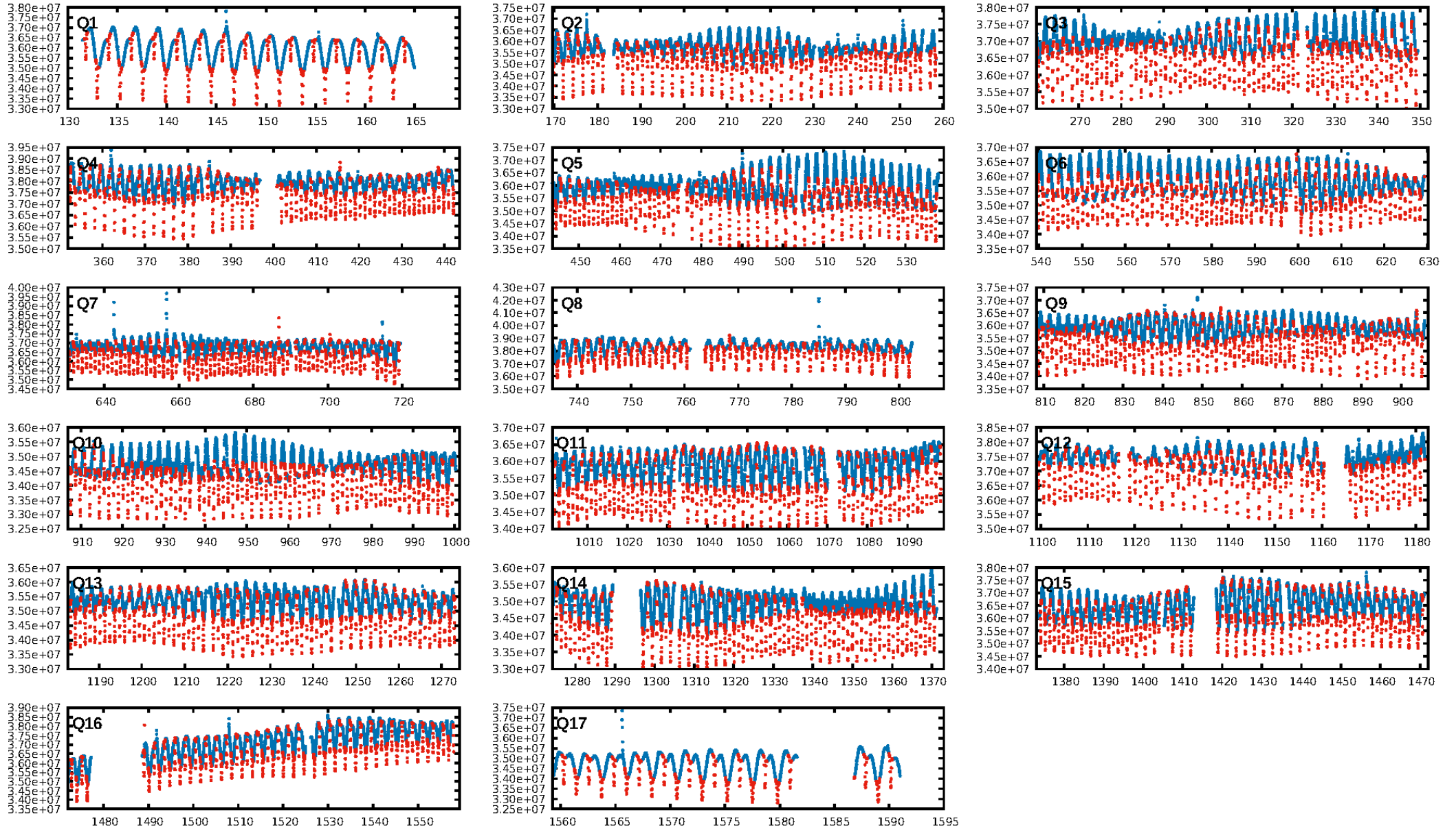
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [328.98σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 1.00 [1113/1114]  
GhostDiagnostic-chr: 1.547  
Centroid-sig: 2.1%  
Centroid-so: 0.179 arcsec [82.48σ]  
OotOffset-rm: 0.004 arcsec [0.06σ]  
KicOffset-rm: 0.145 arcsec [2.13σ]  
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]

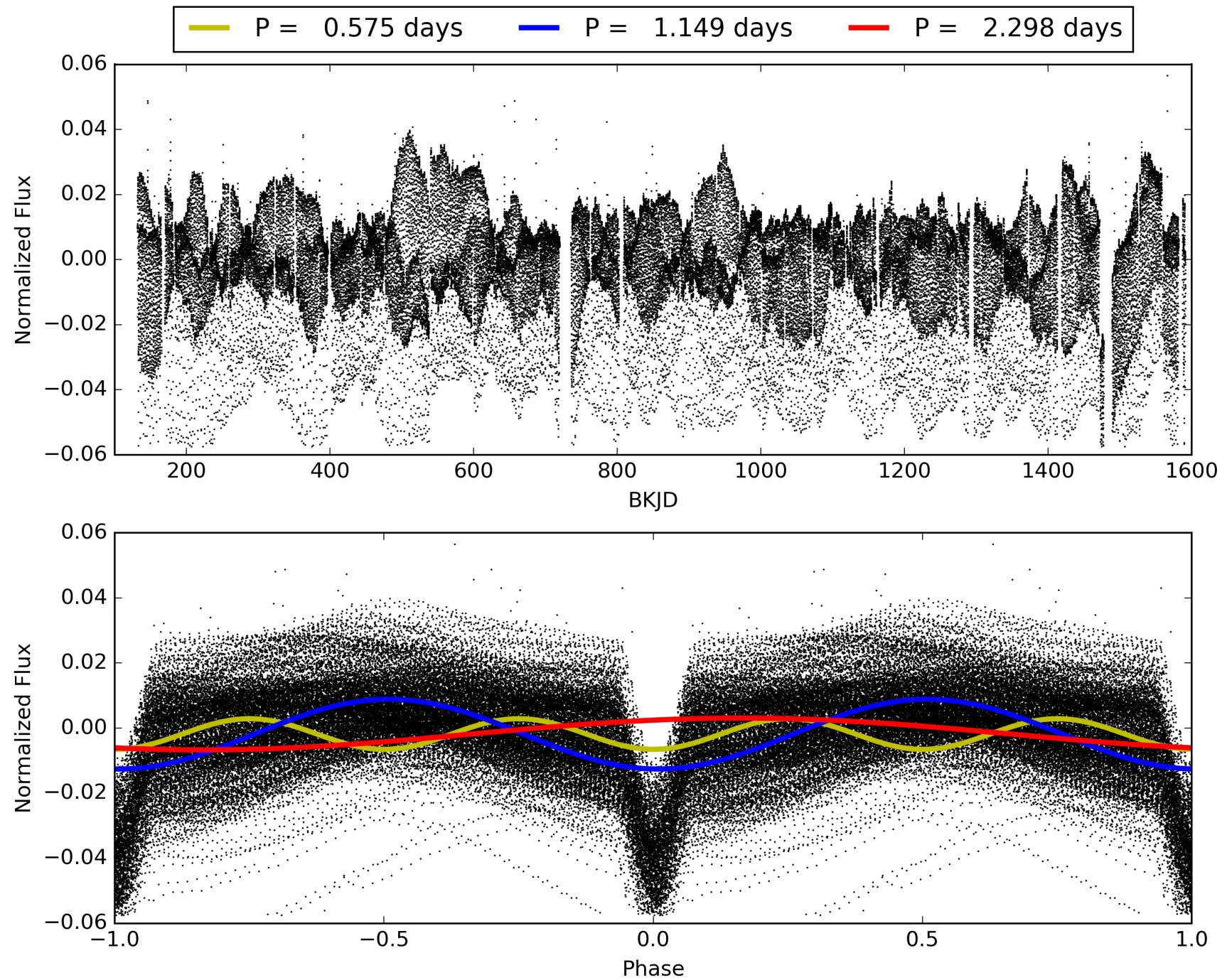
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:48:47 Z

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

# TCE 011457191-01, PDC Light Curves



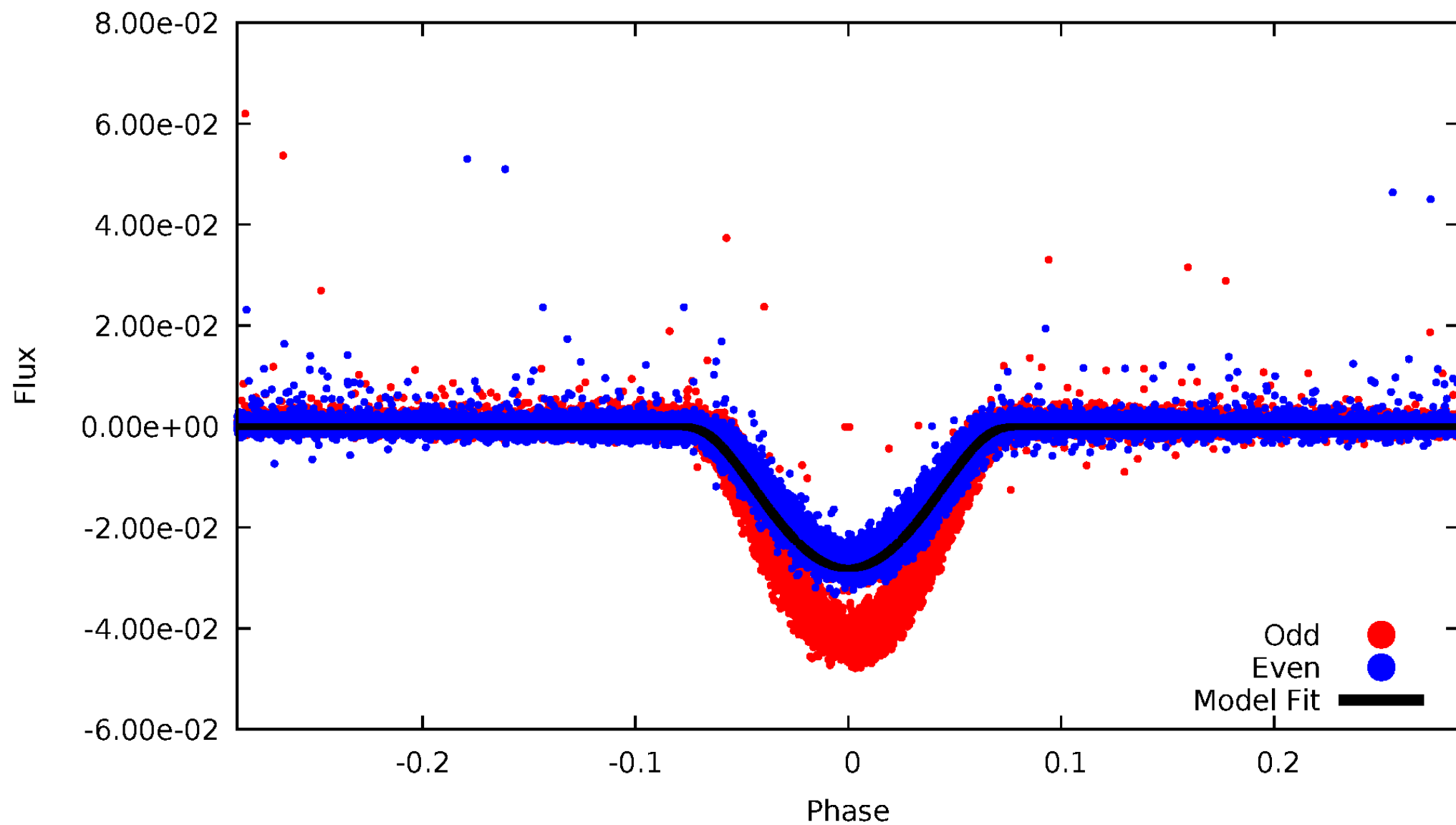
TCE 011457191-01





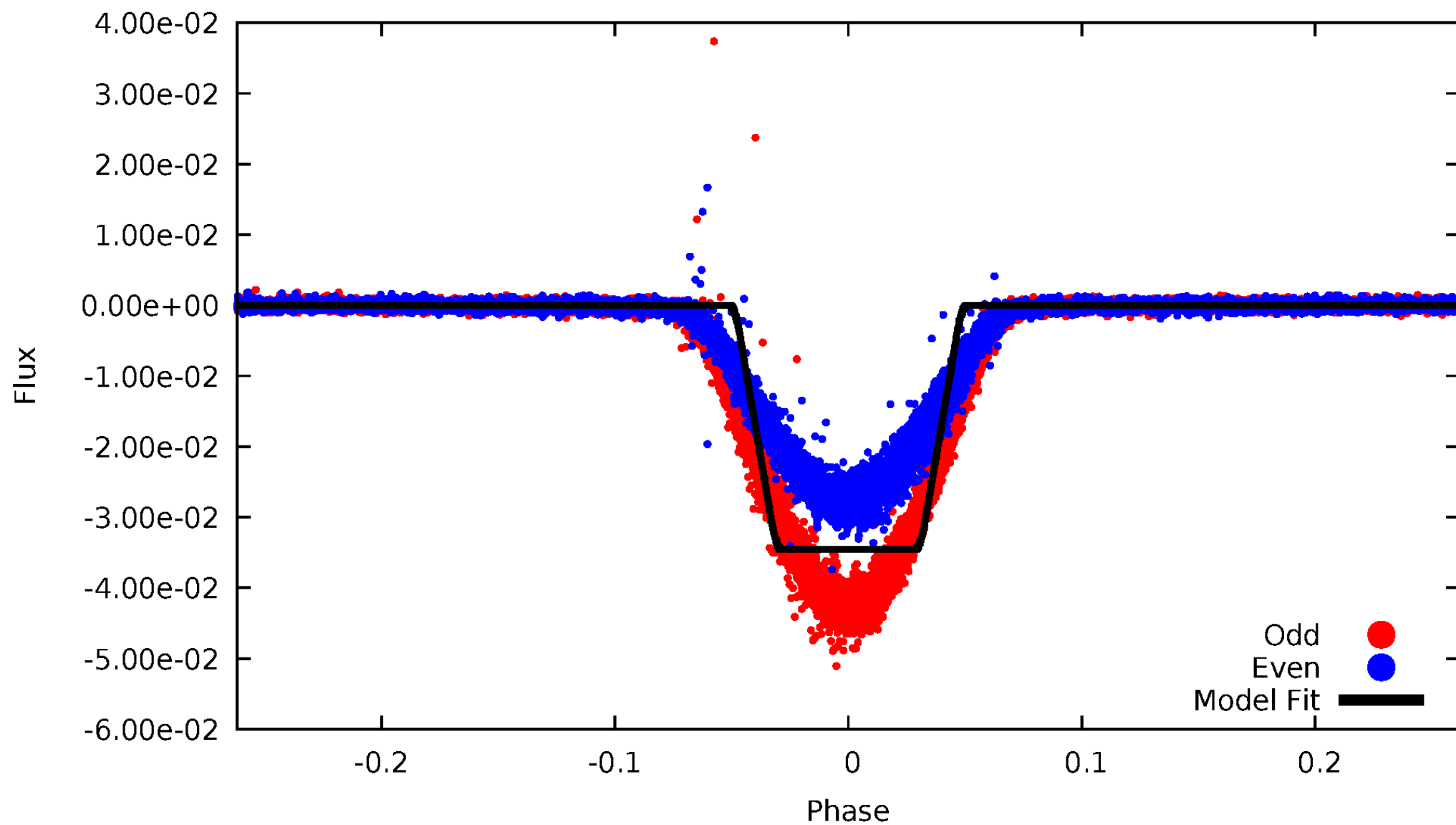
# DV Odd/Even

TCE 011457191-01



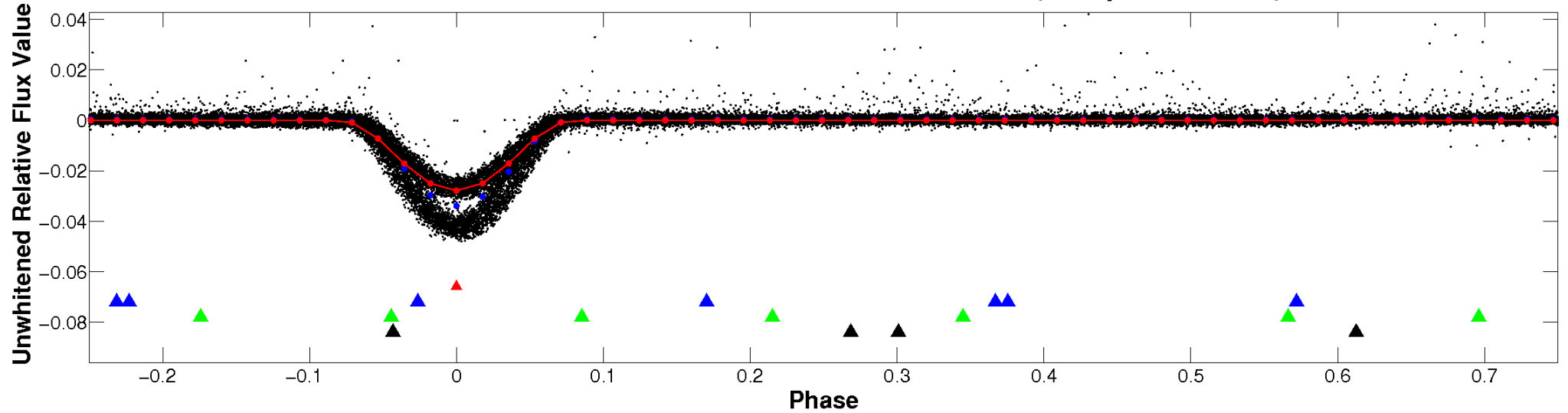
# ALT Odd/Even

TCE 011457191-01

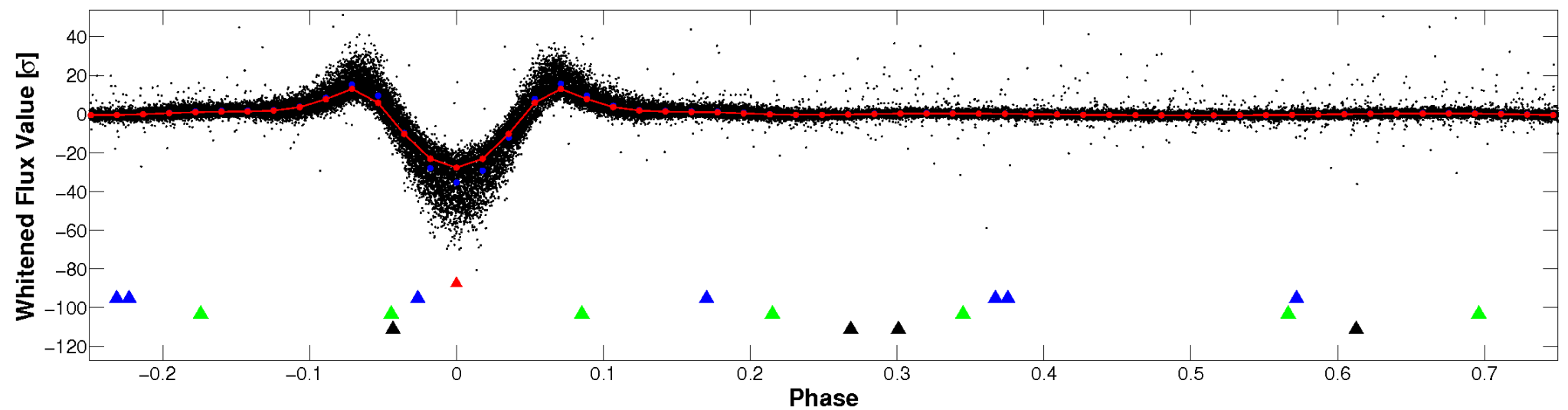


# Non-Whitened Vs. Whitened Light Curve

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

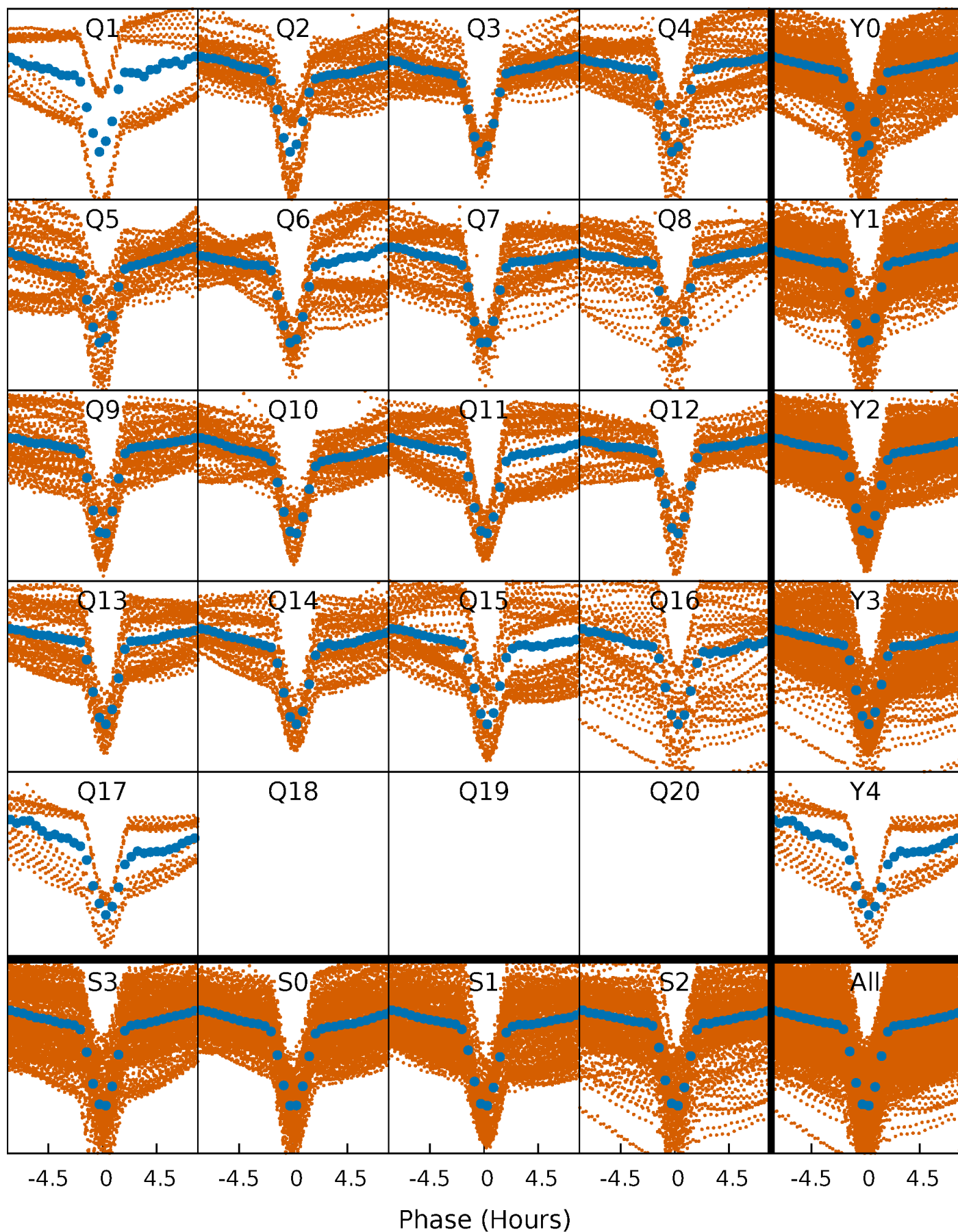


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

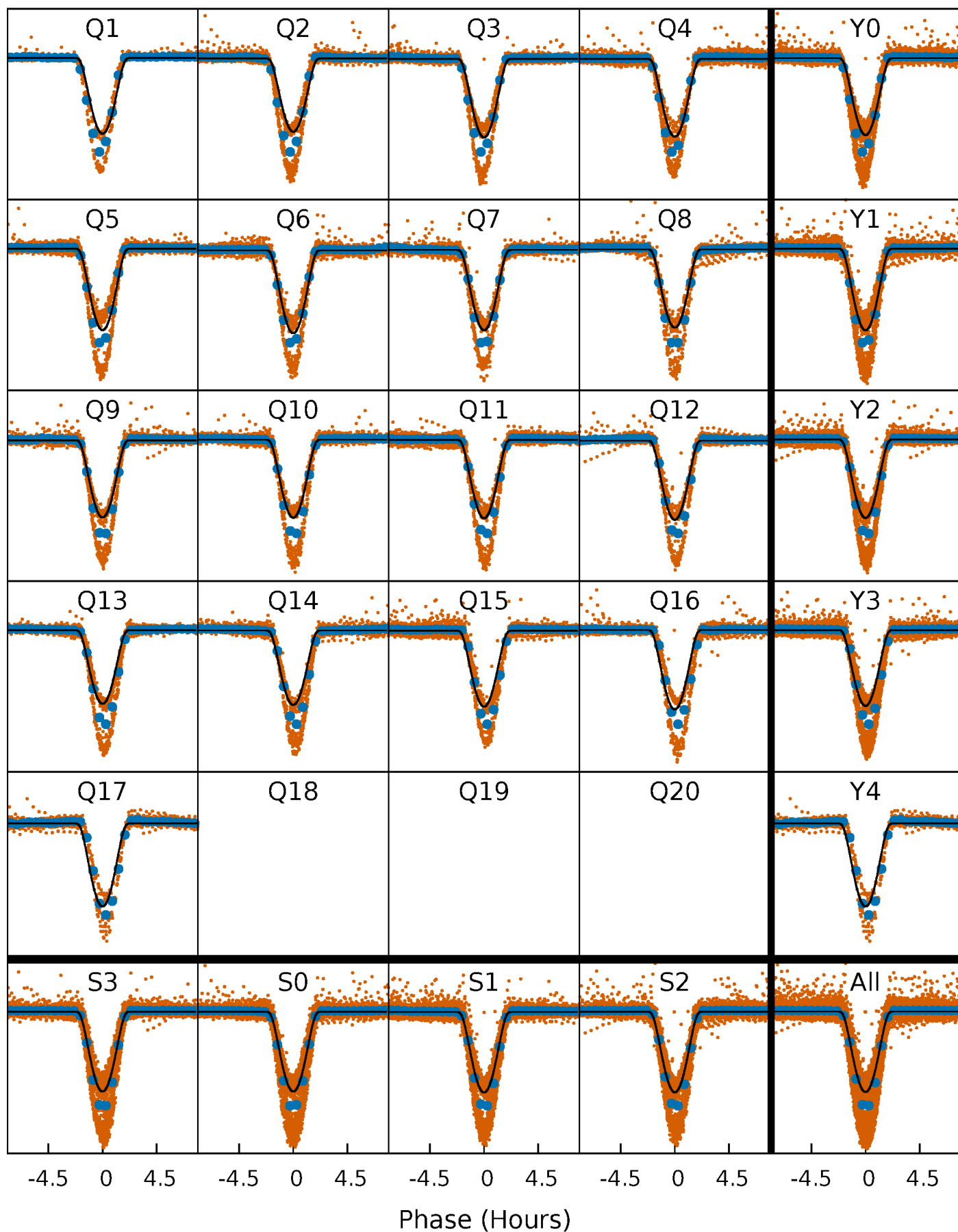
TCE 011457191-01 P= 1.149182 Days  $T_0=131.826173$  (BKJD)





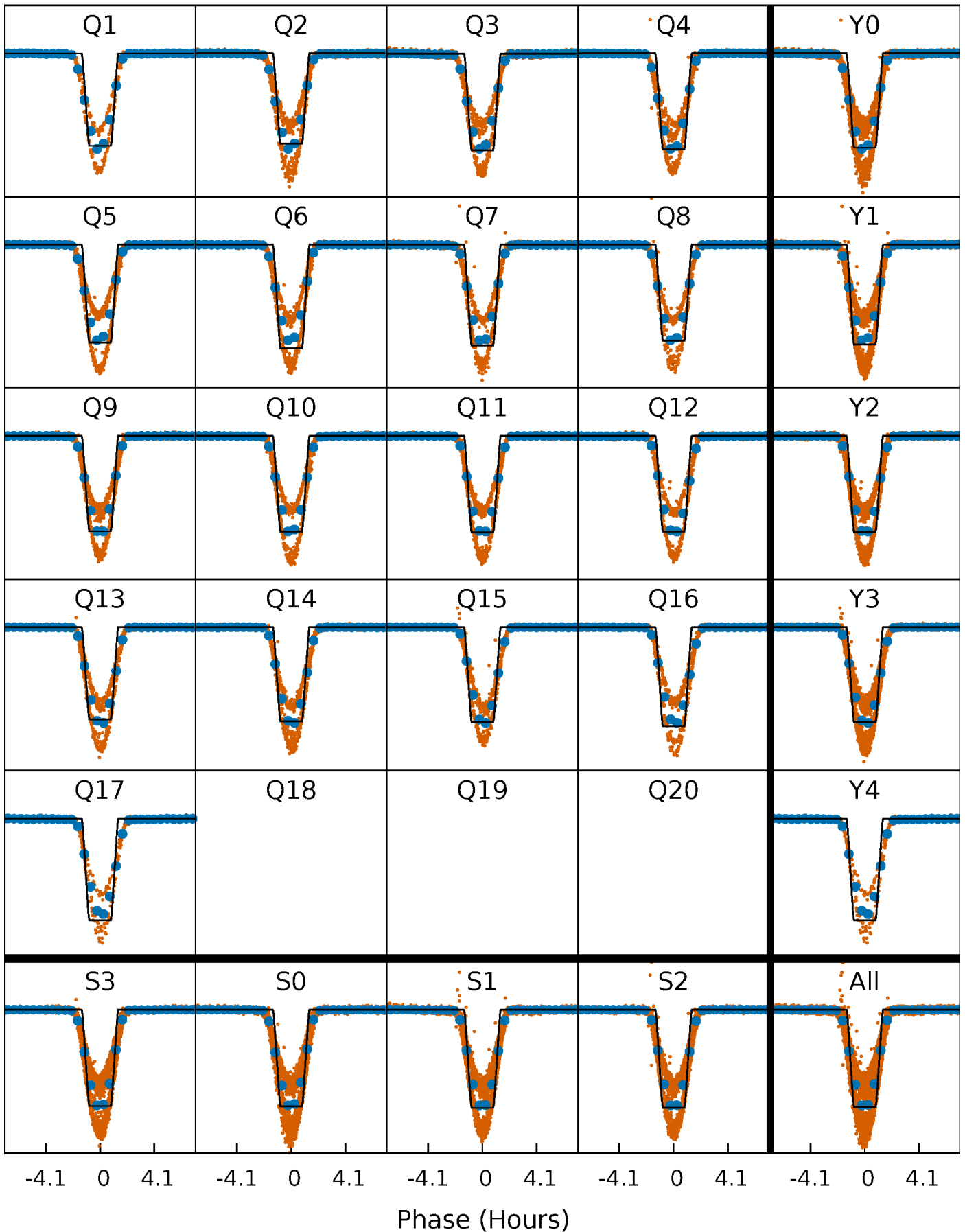
# DV Quarter-Phased Transit Curves

TCE 011457191-01 P= 1.149182 Days  $T_0=131.826173$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

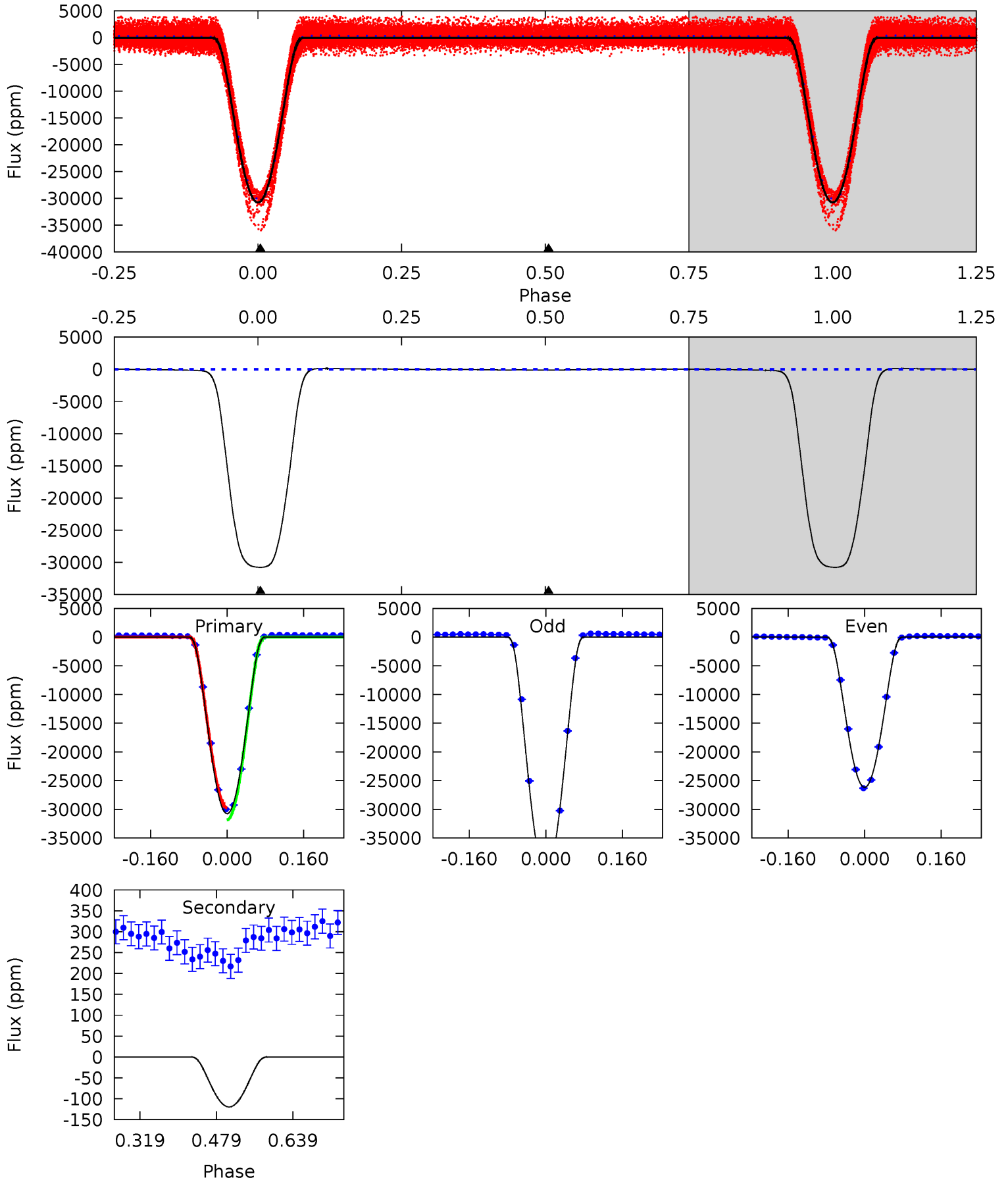
TCE 011457191-01 P= 1.149190 Days  $T_0=131.822575$  (BKJD)



# DV Model-Shift Uniqueness Test

011457191-01, P = 1.149182 Days, E = 130.676991 Days

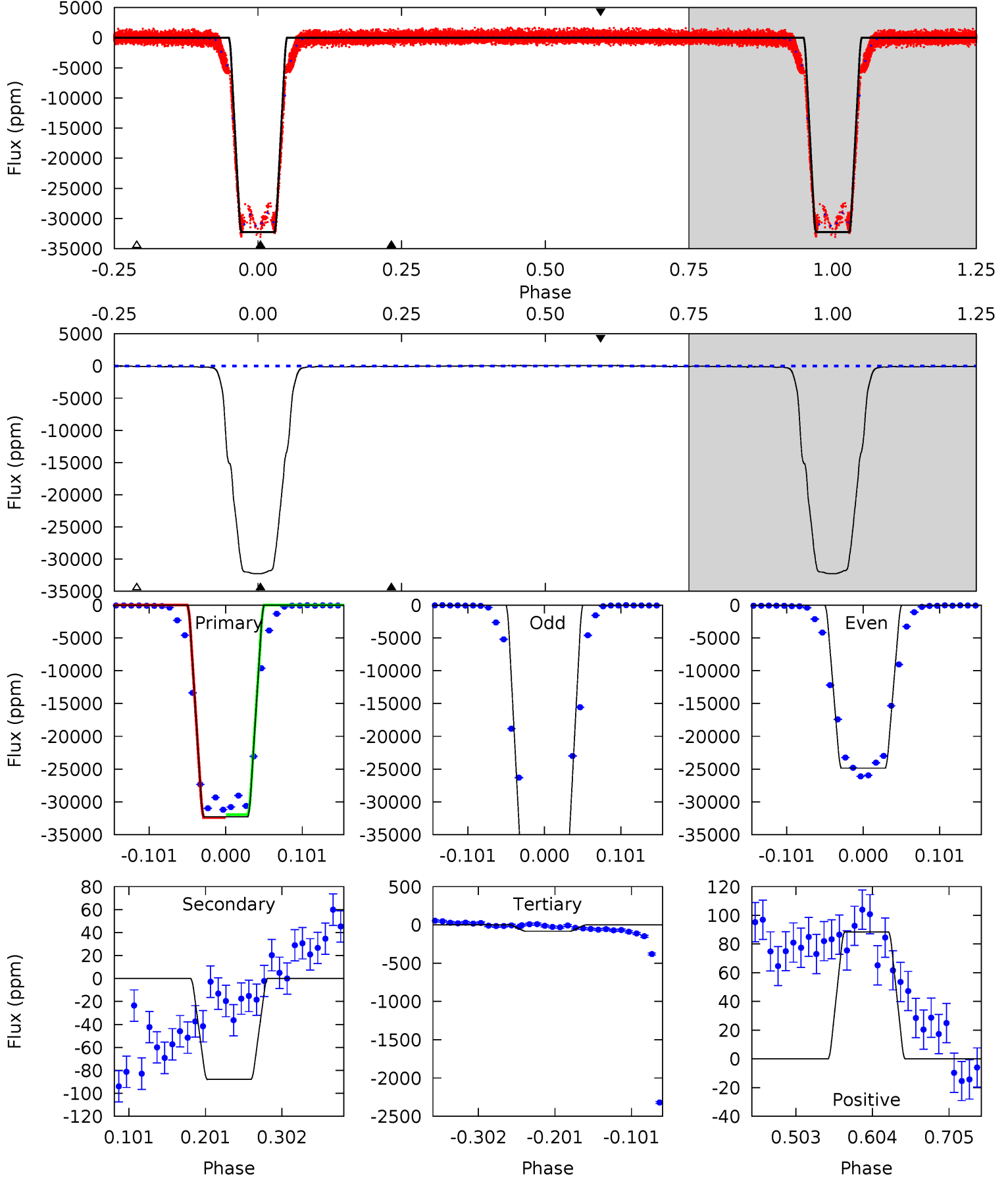
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2435	9.48	0	0	4.47	1.41	2.41	2435	2435	9.48	9.48	705.7	1.05	0.00	0



# Alt Model-Shift Uniqueness Test

011457191-01, P = 1.149190 Days, E = 130.673385 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
2544	6.92	6.55	6.97	4.56	1.64	5.27	2537	2537	0.37	-0.04	992.7	0.96	0.00	0





### Stellar Parameters For KIC 011457191

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5858^{+159}_{-159}$	$4.486^{+0.091}_{-0.169}$	$-0.480^{+0.300}_{-0.300}$	$0.867^{+0.227}_{-0.097}$	$0.840^{+0.106}_{-0.070}$	$1.813^{+0.721}_{-0.845}$
	+3%/-3%	+2%/-4%	+62%/-62%	+26%/-11%	+13%/-8%	+40%/-47%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 011457191-01 / KOI 7447.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-120 \pm 13$	$20.23^{+2.90}_{-1.29}$	$2378^{+146}_{-113}$	$-2636^{+76}_{-108}$	$0.065^{+0.012}_{-0.015}$
Alt.	$-88 \pm 13$	$17.62^{+2.58}_{-1.25}$	$2378^{+163}_{-116}$	$-2643^{+81}_{-112}$	$0.061^{+0.016}_{-0.014}$

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

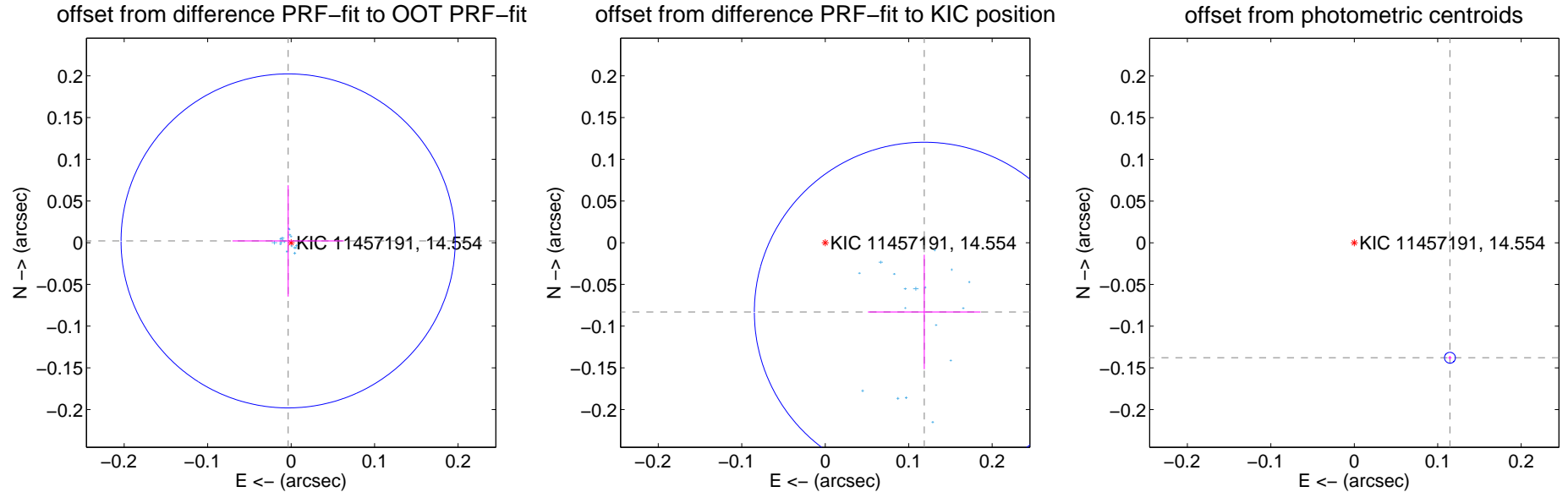
## DV Centroid Data

Supplemental centroid analysis for 011457191-01. Kepler magnitude: 14.55. Transit SNR 1094.91

There are 17 quarters with good PRF difference image offsets

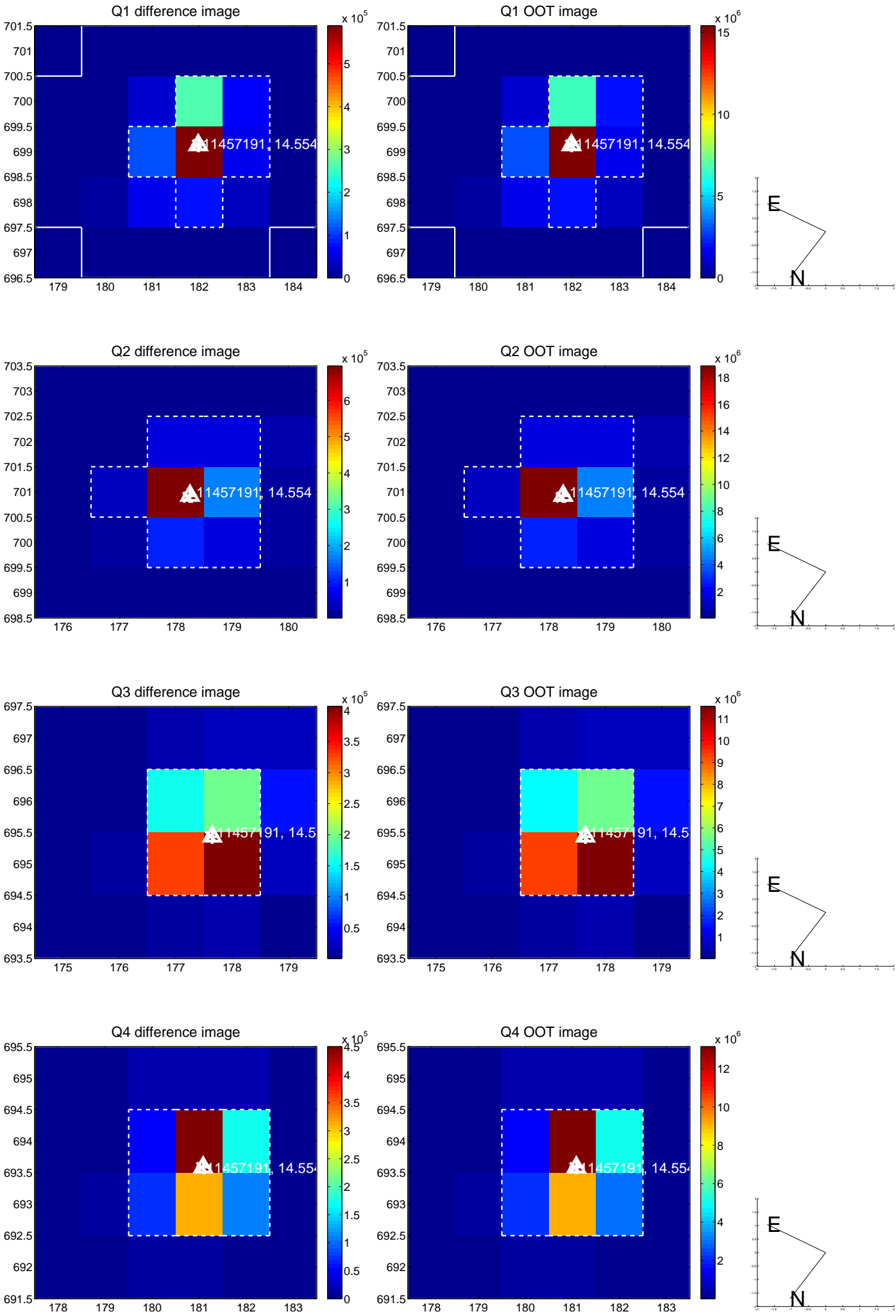
The direct PRF centroid is offset from the target star catalog position by about 0.14 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.004 \pm 0.067$	0.06	$0.004 \pm 0.067$	$0.002 \pm 0.067$
PRF-fit source offset from KIC position	$0.145 \pm 0.068$	2.13	$-0.119 \pm 0.067$	$-0.083 \pm 0.069$
photometric centroid source offset	$0.18 \pm 0.00$	82.48	$-0.11 \pm 0.00$	$-0.14 \pm 0.00$

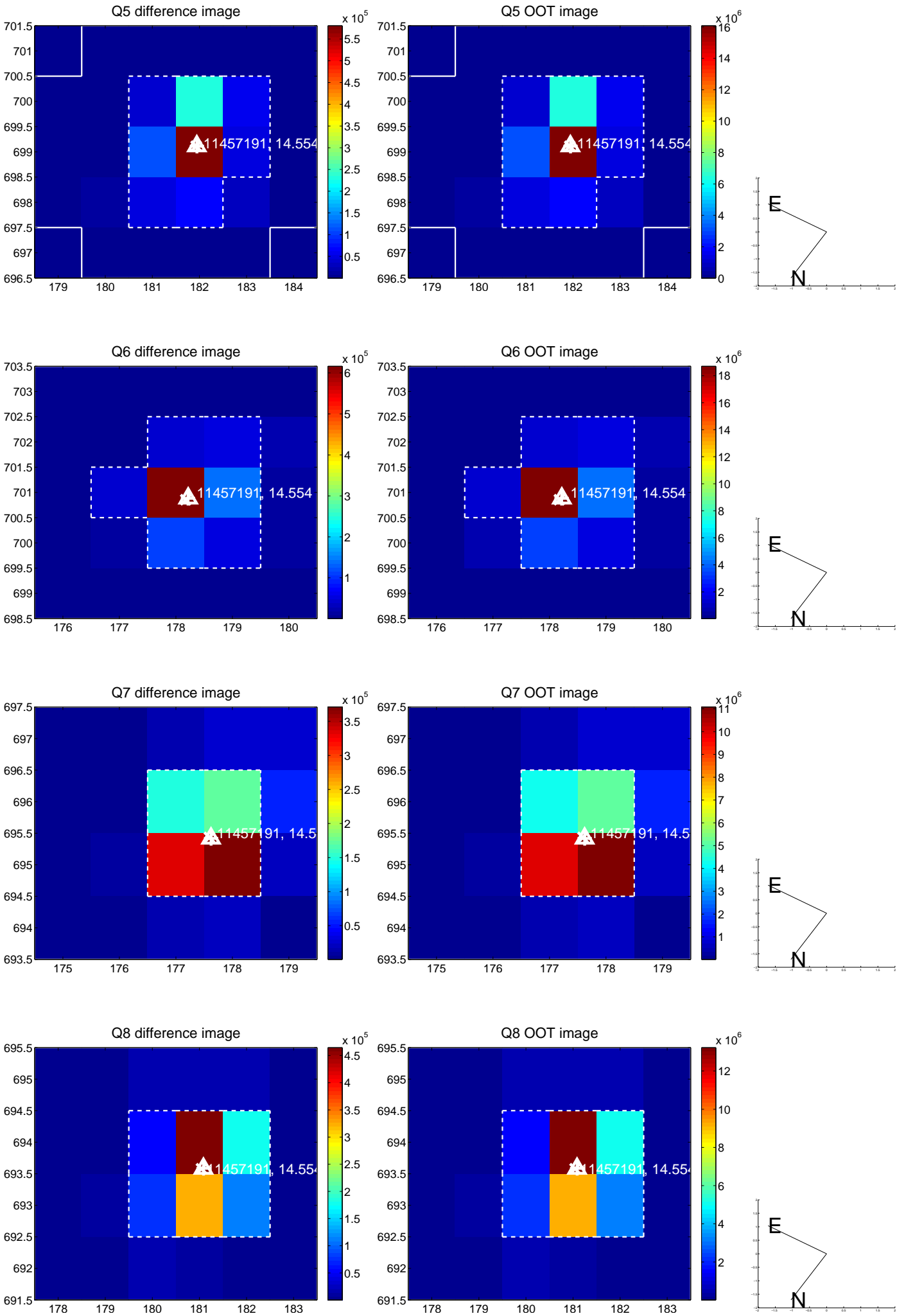


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

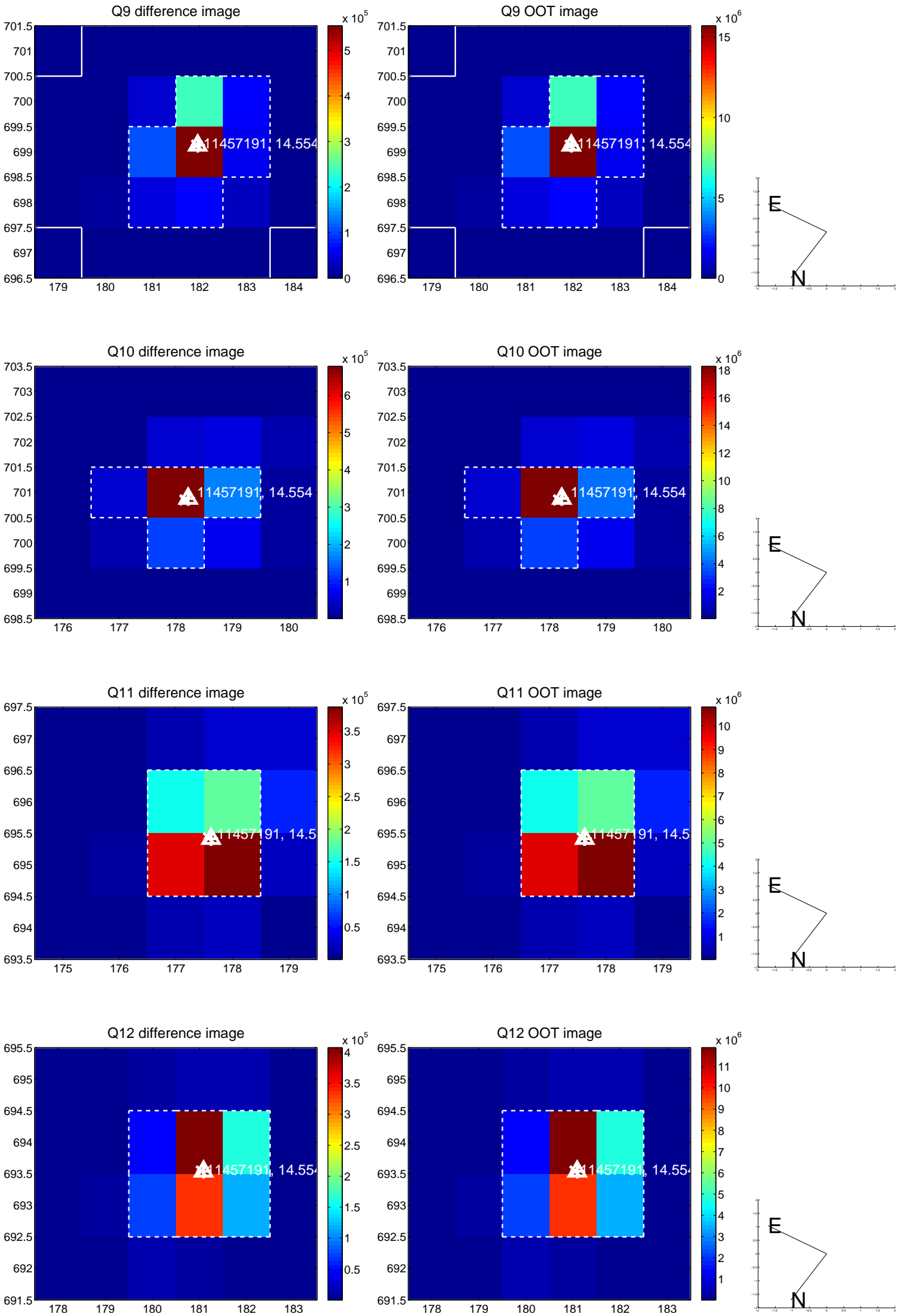


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

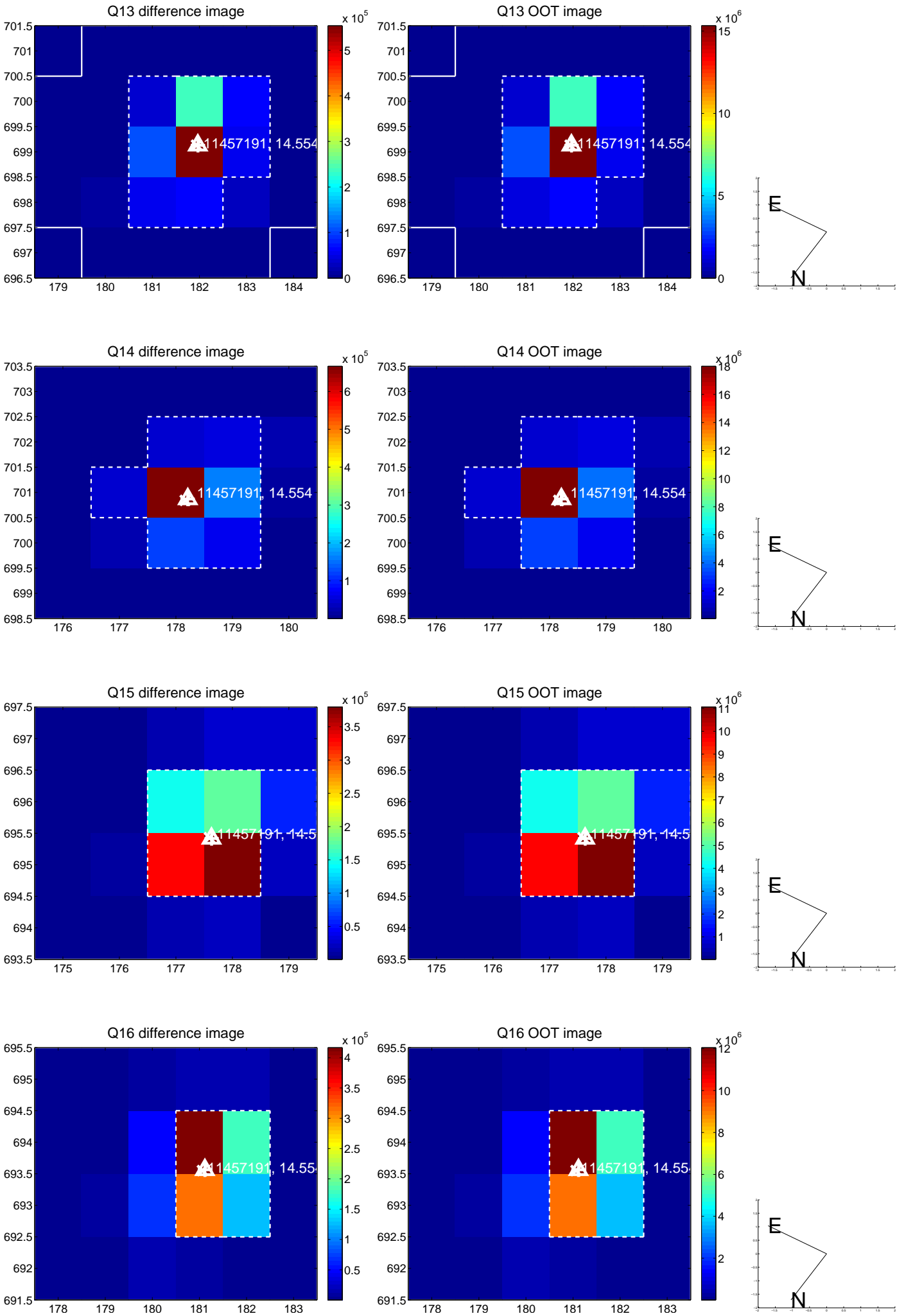




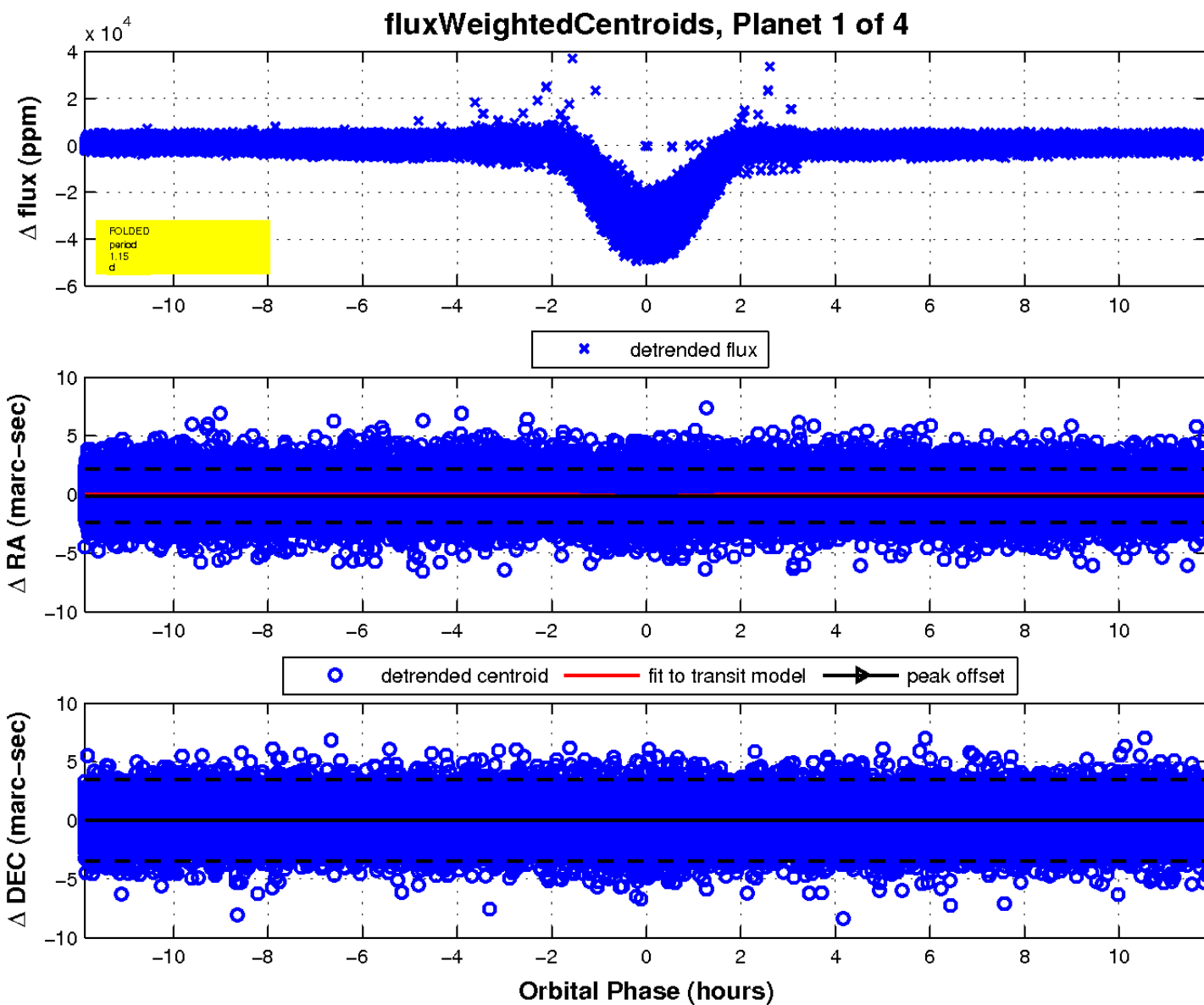
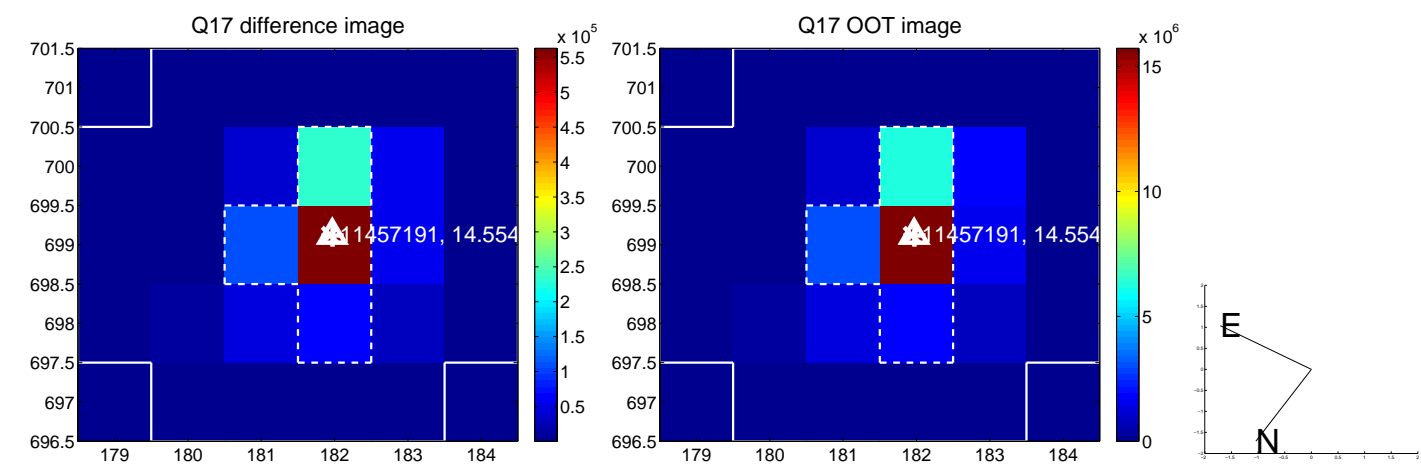
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

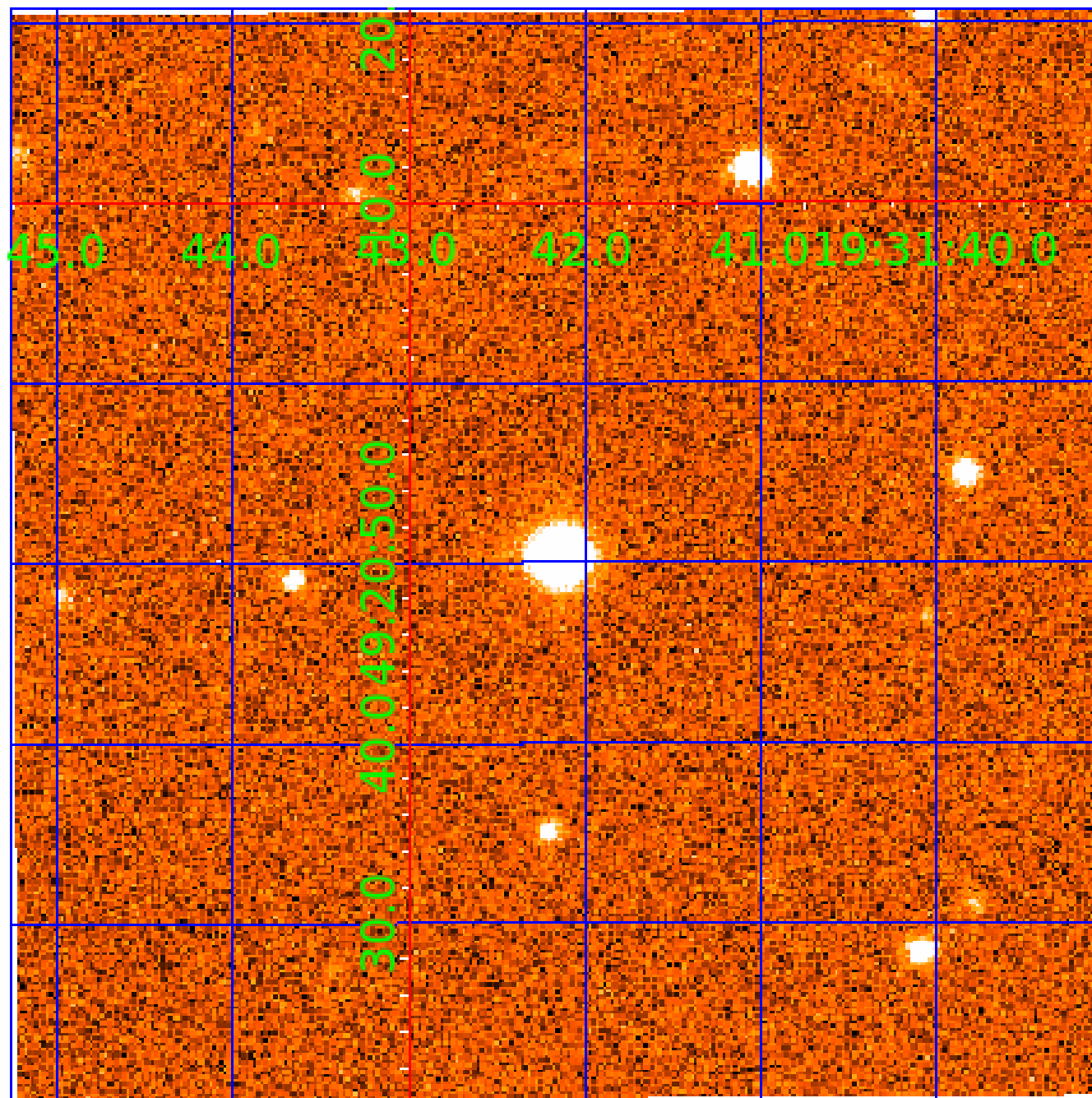


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 011457191

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
011457191-01	OBS	7447.01	1.149182	131.826173	28130.3	3.960	2384.6	1094.9	0.87	5858	20.23	1932.20
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## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
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011457191-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
011457191-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
011457191-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS

**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 011457191-02

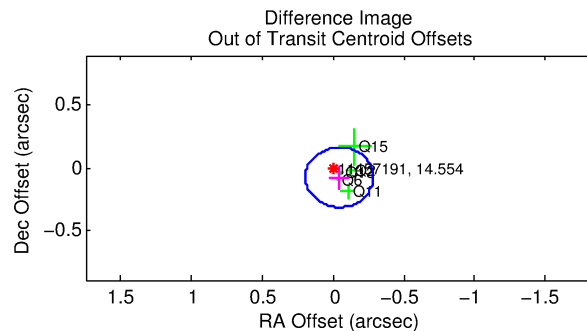
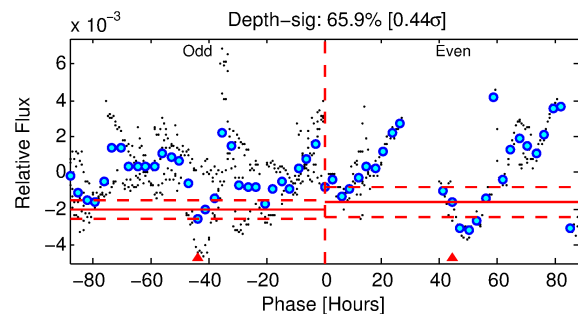
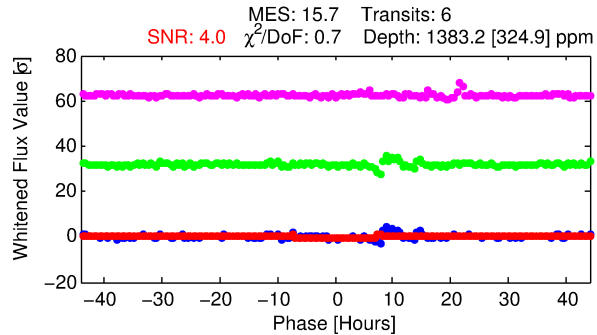
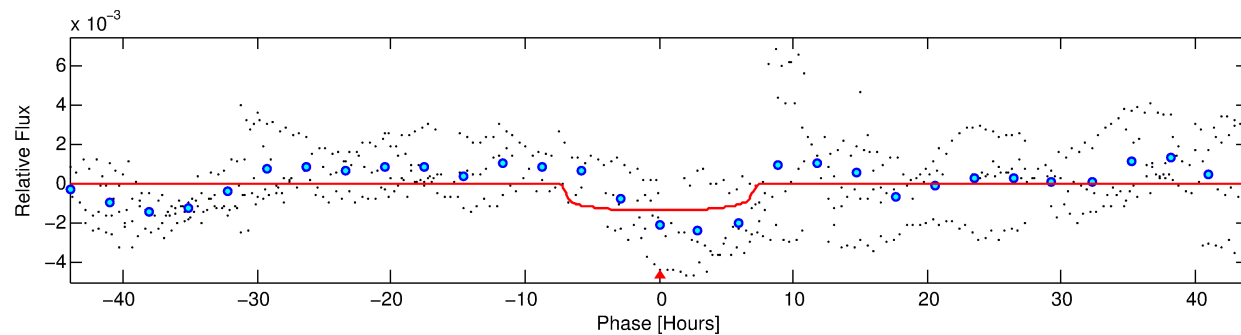
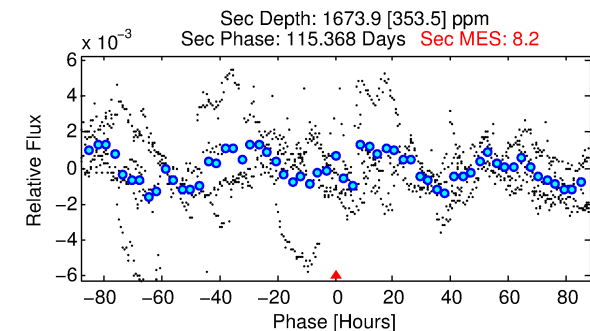
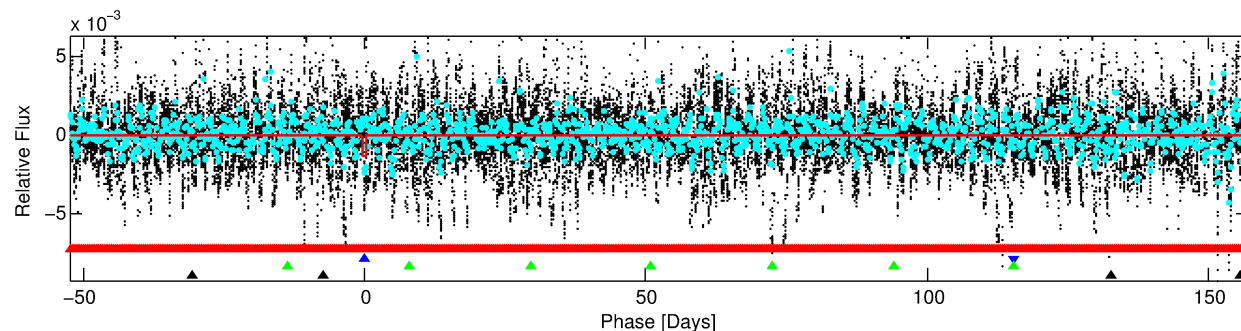
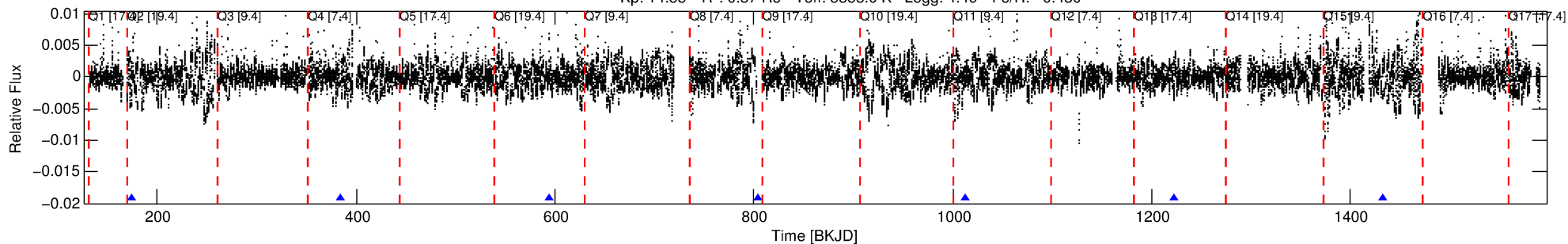
No Significant Match Found

# DV One-Page Summary

KIC: 11457191 Candidate: 2 of 4 Period: 209.613 d

KOI: K07447 Corr: No Ephemeris Match

Kp: 14.55 R\*: 0.87 Rs Teff: 5858.0 K Logg: 4.49 Fe/H: -0.480



## DV Fit Results:

Period = 209.61272 [0.00258] d  
Epoch = 174.7676 [0.0115] BKJD  
Rp/R\* = 0.0347 [0.0074]  
a/R\* = 102.98 [71.31]  
b = 0.42 [1.34]  
Seff = 1.87 [0.62]  
Teq = 298 [25] K  
Rp = 3.28 [1.11] Re  
a = 0.6516 [0.1417] AU  
Ag = 36323.00 [20653.65] [1.76σ]  
Teffp = 6363 [775] K [7.82σ]

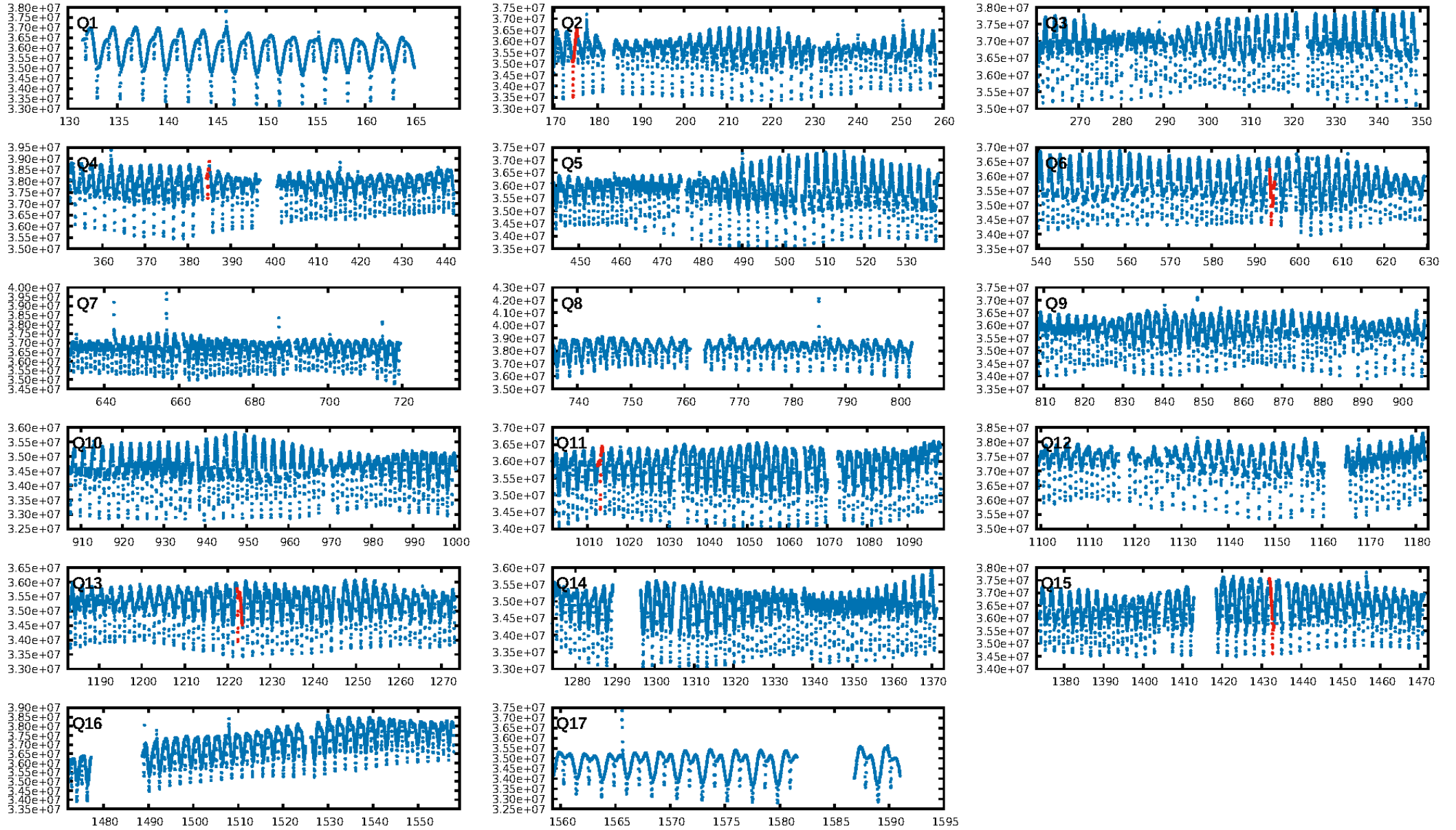
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [328.98σ]  
LongPeriod-sig: 100.0% [33.84σ]  
ModelChiSquare2-sig: 73.3%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 1.74e-17  
RollingBand-fgt: 1.00 [6/6]  
GhostDiagnostic-chr: 8.545  
Centroid-sig: 45.5%  
Centroid-so: 0.163 arcsec [0.61σ]  
OotOffset-rm: 0.088 arcsec [1.11σ]  
KicOffset-rm: 0.177 arcsec [2.45σ]  
OotOffset-st: 2/2/0/1 [5]  
KicOffset-st: 2/2/0/1 [5]  
DiffImageQuality-fgm: 0.60 [3/5]  
DiffImageOverlap-fno: 0.00 [0/5]

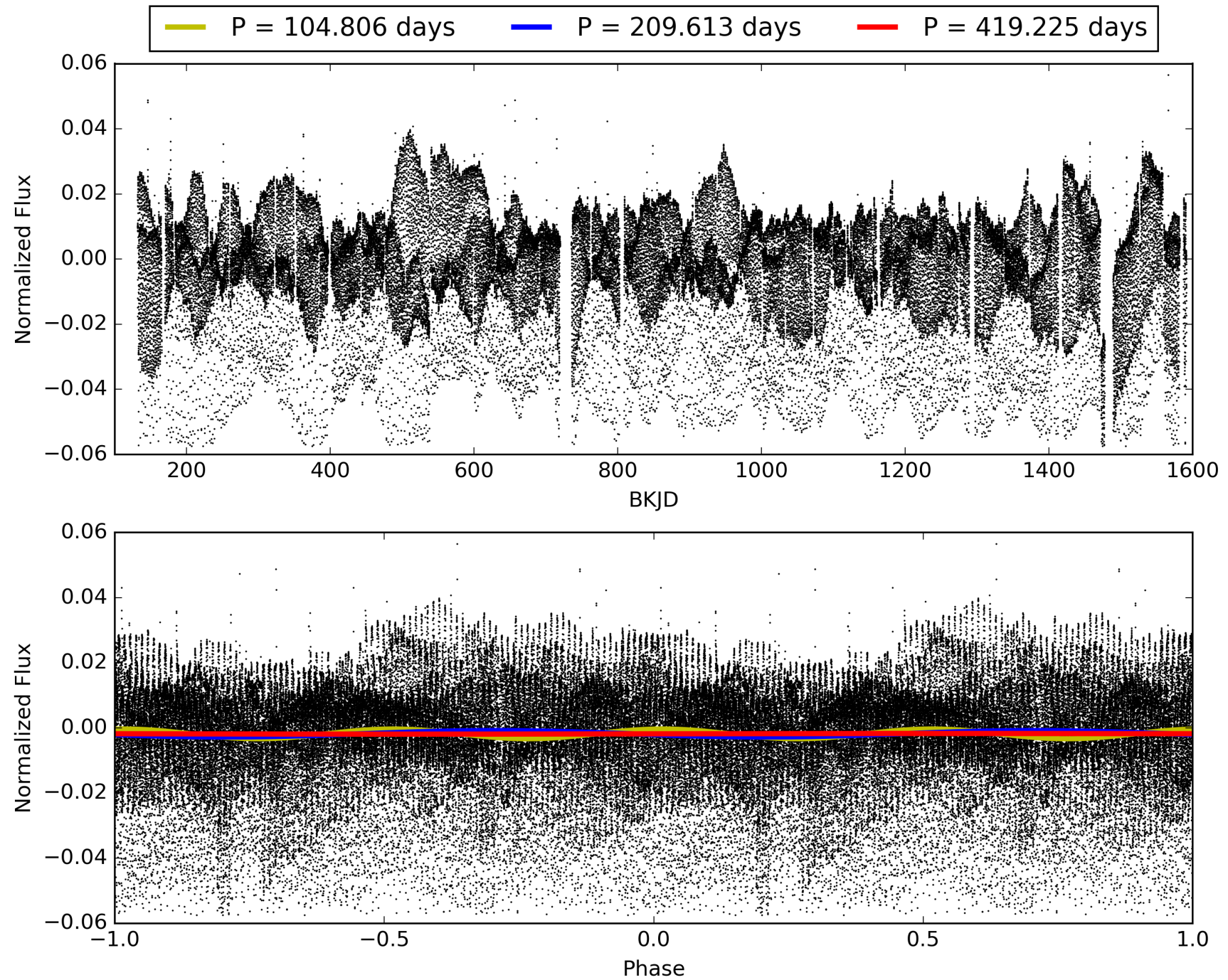
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:48:56 Z

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

# TCE 011457191-02, PDC Light Curves

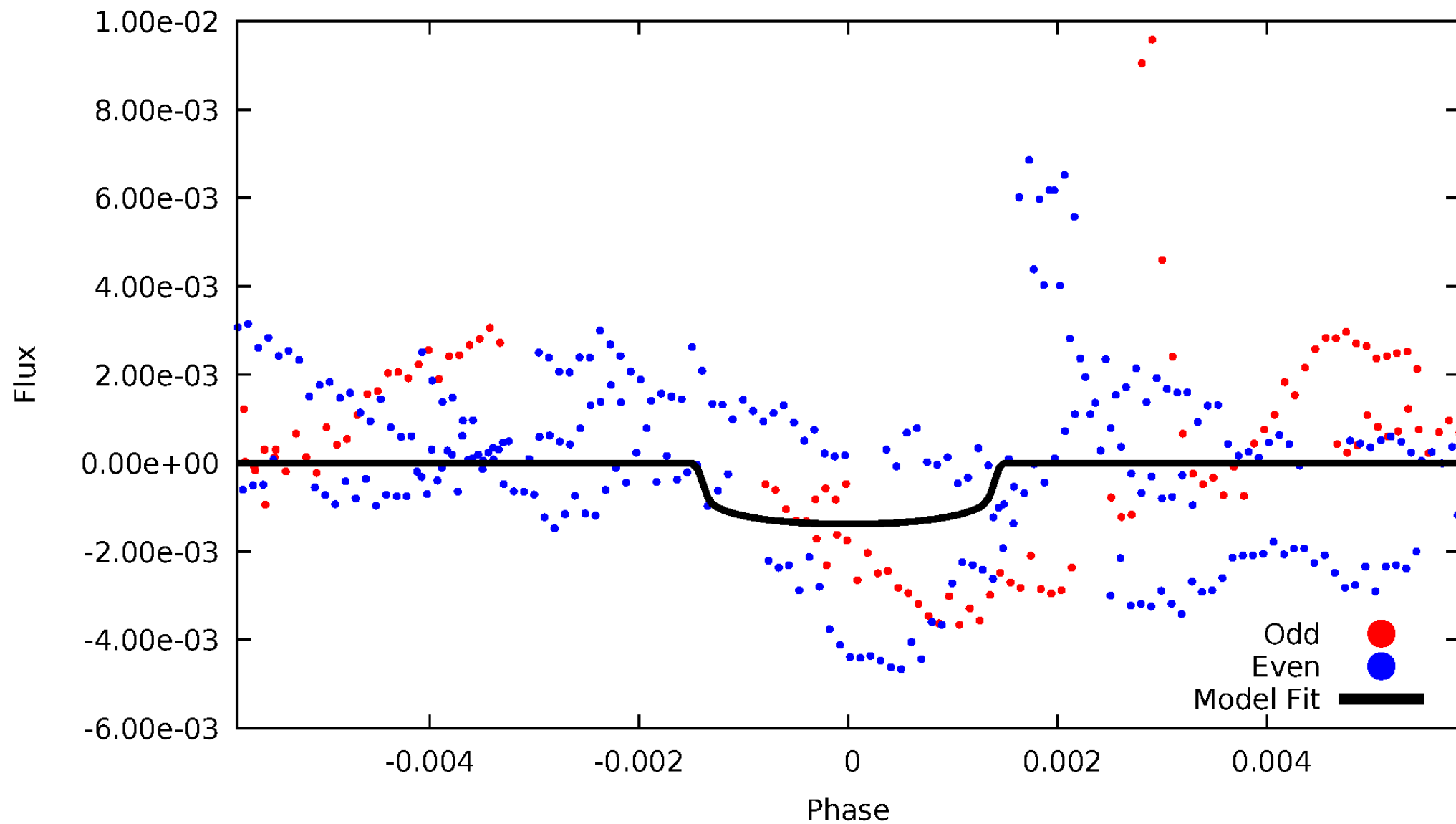


TCE 011457191-02



# DV Odd/Even

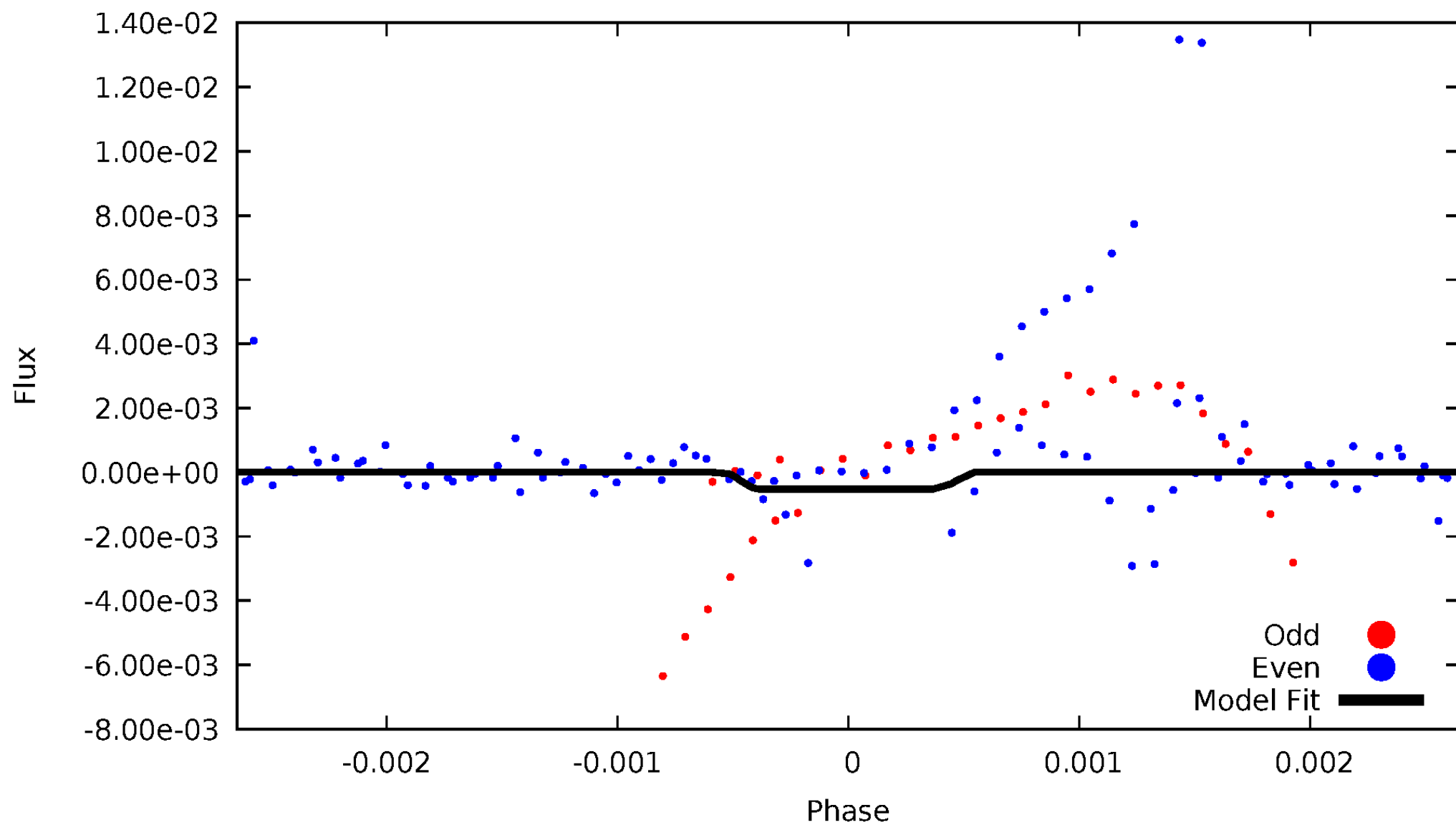
TCE 011457191-02





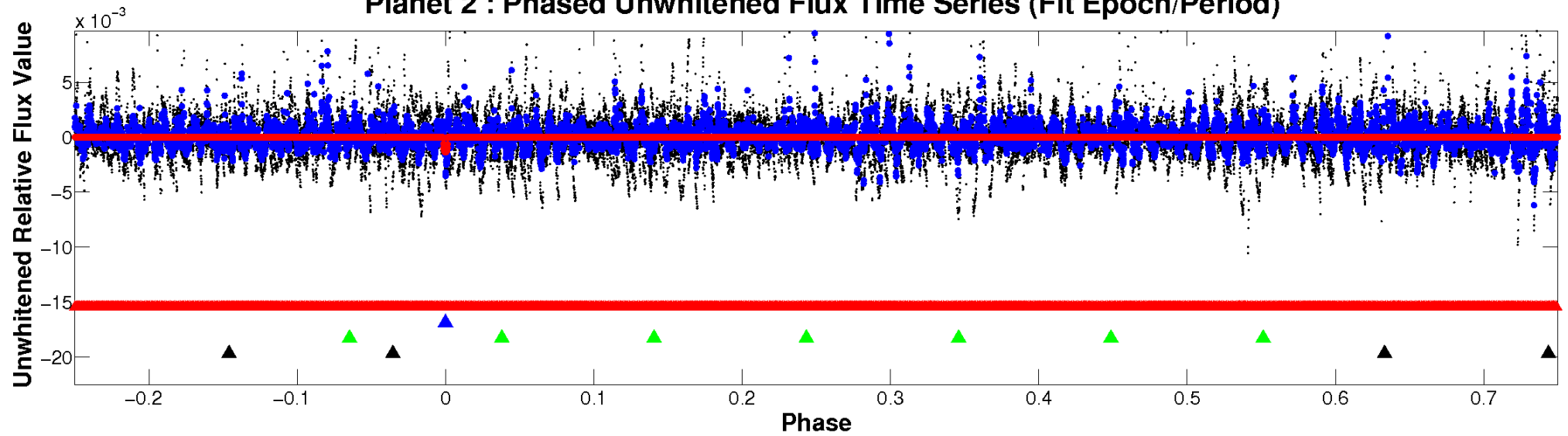
# ALT Odd/Even

TCE 011457191-02

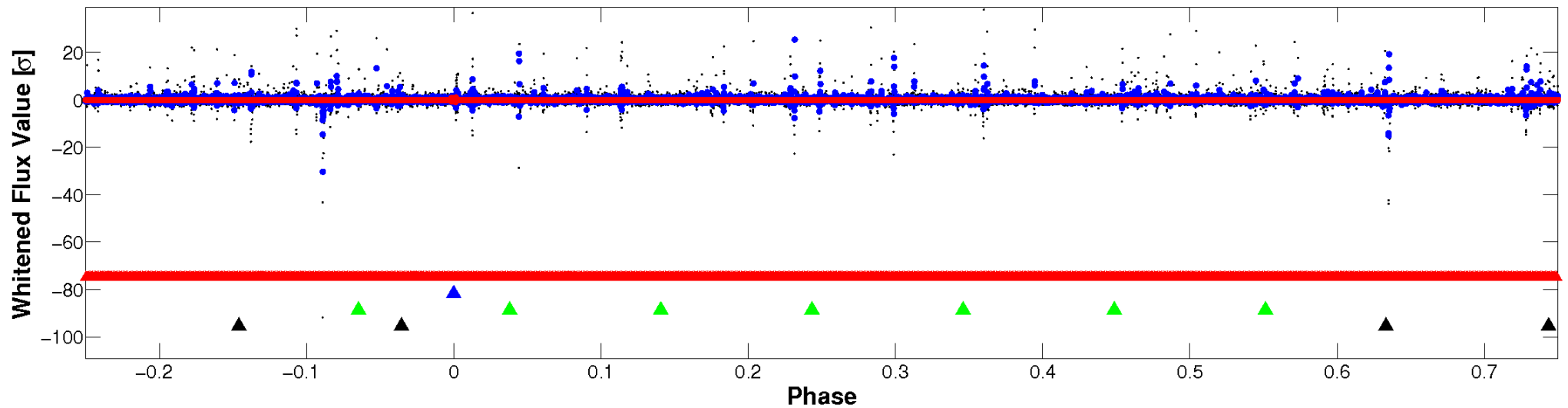


# Non-Whitened Vs. Whitened Light Curve

## 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 011457191-02   P=209.612719 Days    $T_0=174.767630$  (BKJD)



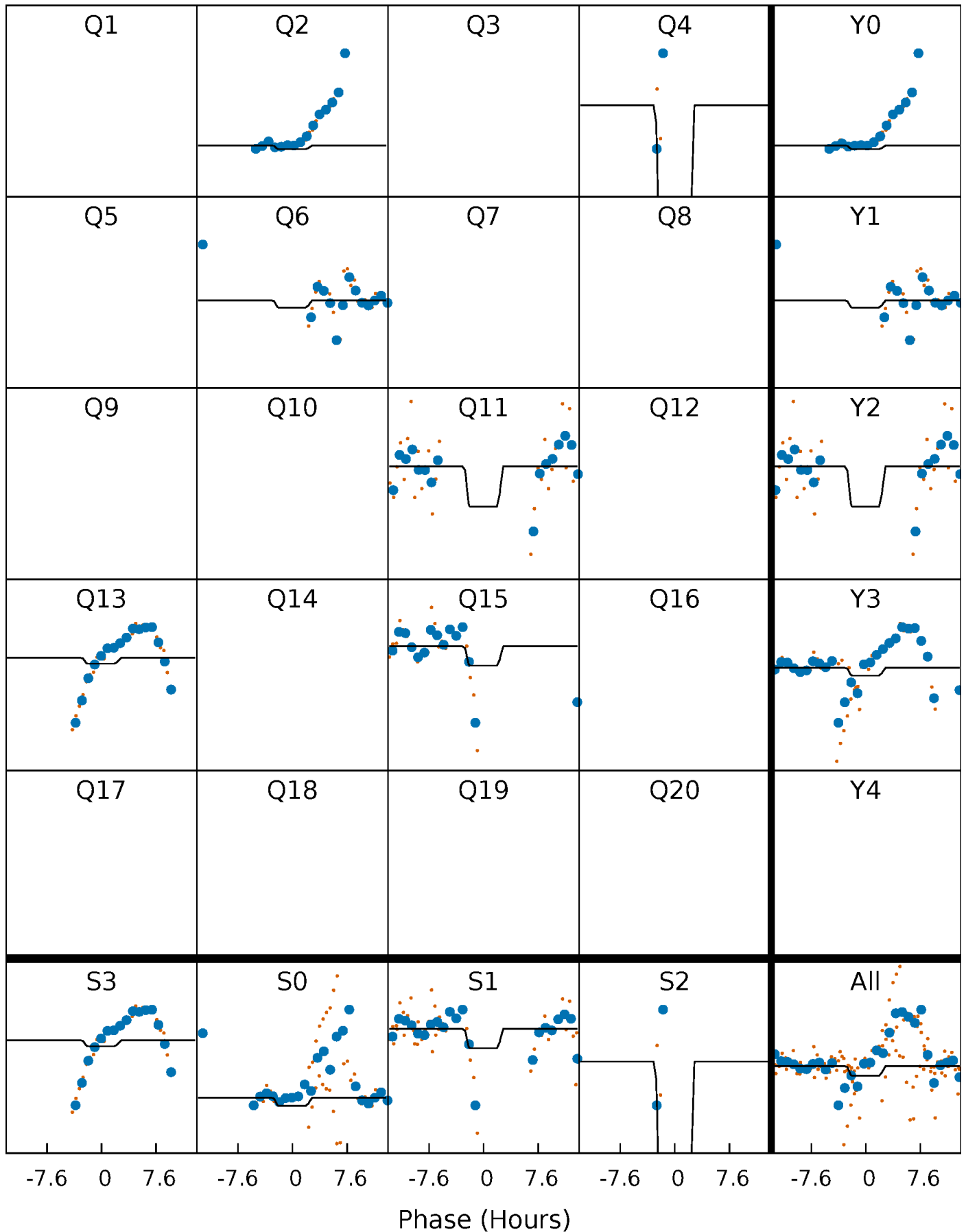
# DV Quarter-Phased Transit Curves

TCE 011457191-02     $P=209.612719$  Days     $T_0=174.767630$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

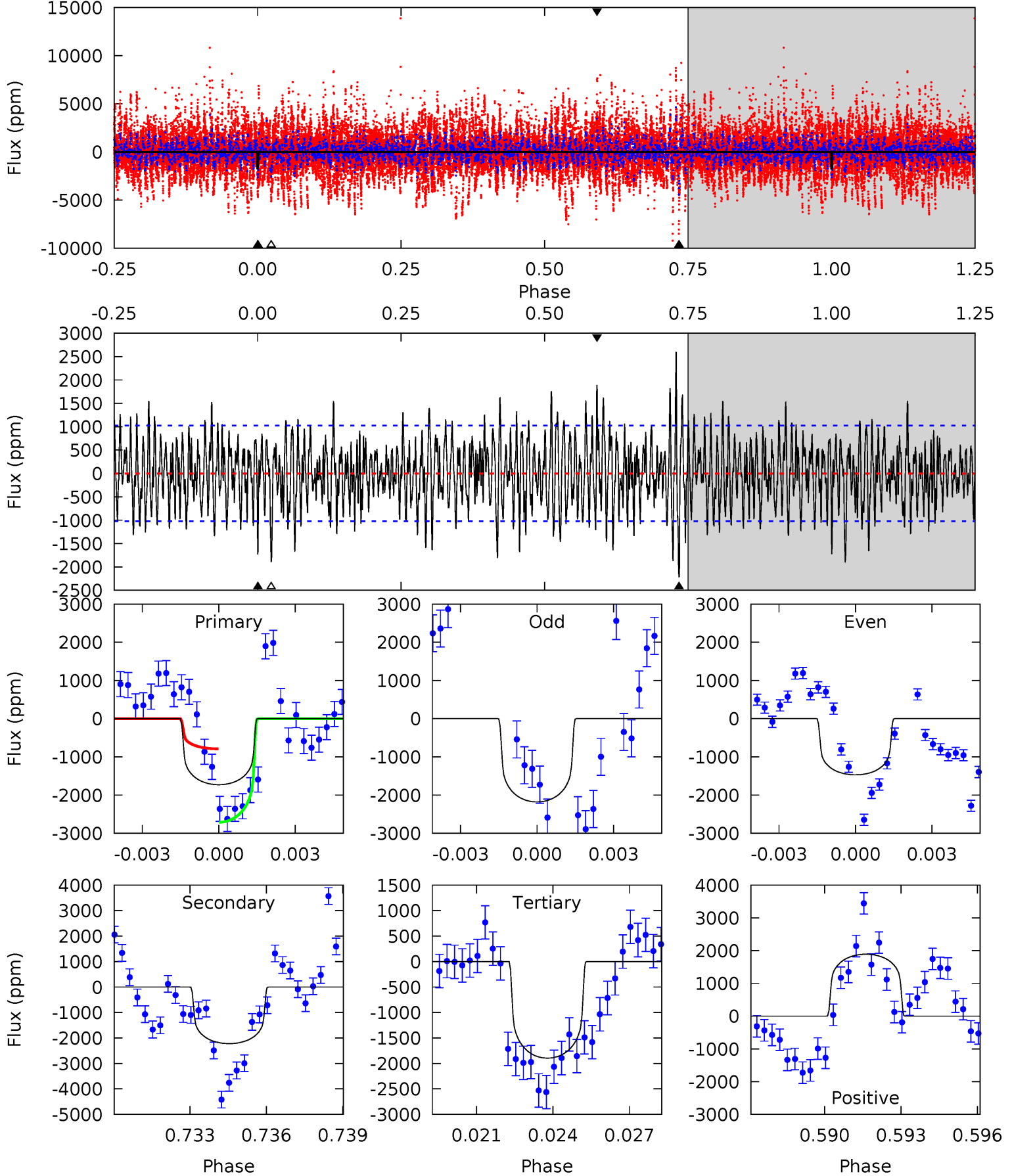
TCE 011457191-02 P=209.599043 Days  $T_0=174.838493$  (BKJD)



# DV Model-Shift Uniqueness Test

011457191-02, P = 209.612719 Days, E = 174.767630 Days

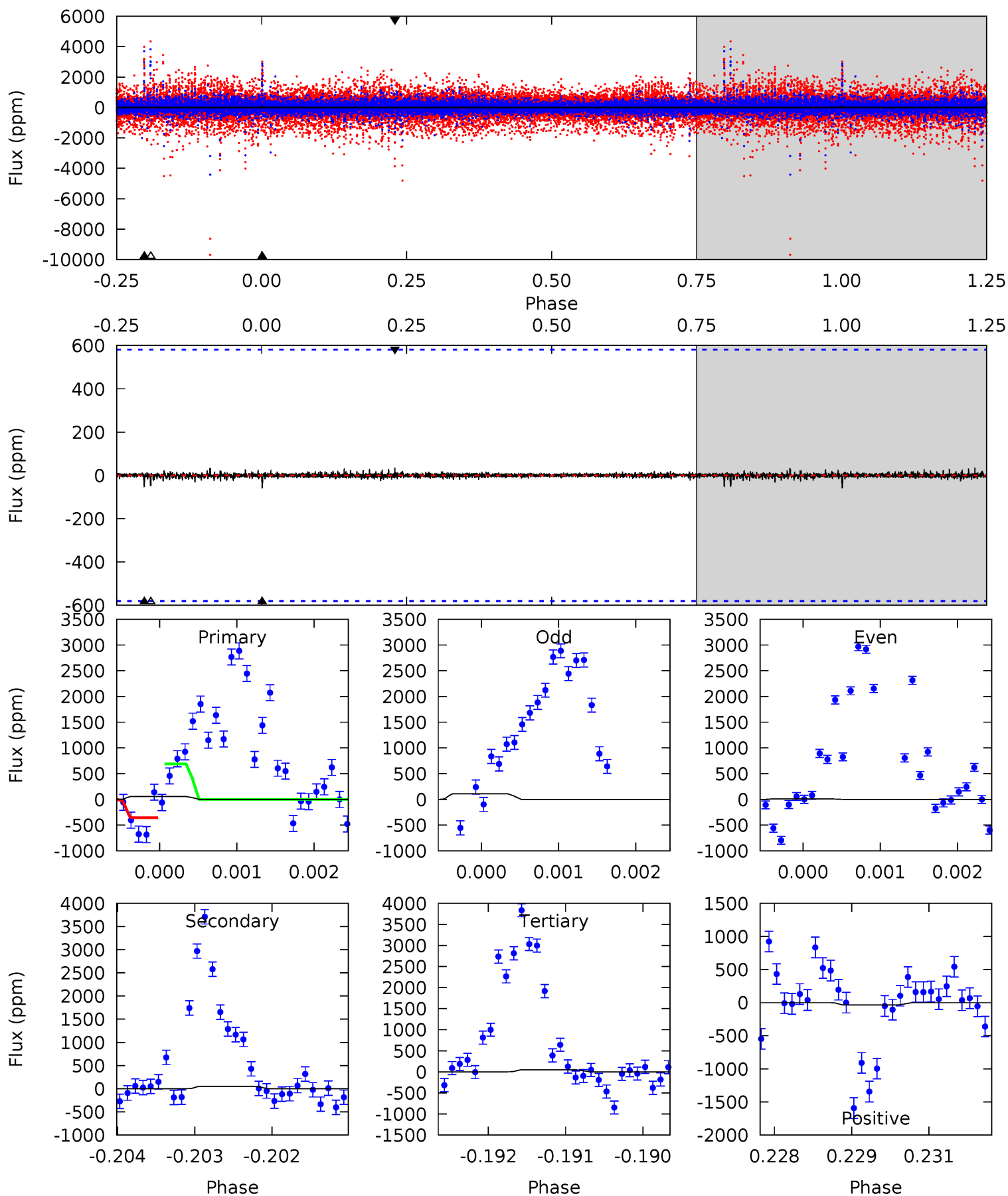
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.88	11.4	9.73	9.71	5.25	2.97	3.25	-0.86	-0.83	1.68	1.70	1.72	1.33	0.54	4.94



# Alt Model-Shift Uniqueness Test

011457191-02, P = 209.599043 Days, E = 174.838493 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0.54	0.48	0.46	0.33	5.44	3.27	0.06	0.08	0.21	0.02	0.15	0.29	4.79	0.38	1.60



### Stellar Parameters For KIC 011457191

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5858^{+159}_{-159}$	$4.486^{+0.091}_{-0.169}$	$-0.480^{+0.300}_{-0.300}$	$0.867^{+0.227}_{-0.097}$	$0.840^{+0.106}_{-0.070}$	$1.813^{+0.721}_{-0.845}$
	+3%/-3%	+2%/-4%	+62%/-62%	+26%/-11%	+13%/-8%	+40%/-47%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 011457191-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-2222 \pm 195$	$3.38^{+0.87}_{-0.79}$	$420^{+27}_{-20}$	$6842^{+1039}_{-706}$	$45326^{+32045}_{-15983}$
Alt.	$-51 \pm 107$	$2.23^{+0.78}_{-0.75}$	$420^{+27}_{-20}$	$3583^{+1093}_{-7349}$	$1944^{+6869}_{-4698}$

$T_{\text{max}}$  = 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

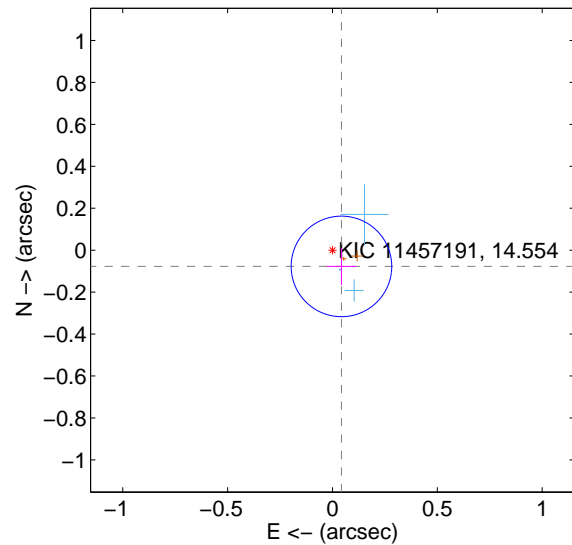
Supplemental centroid analysis for 011457191-02. Kepler magnitude: 14.55. Transit SNR 4.04

There are 3 quarters with good PRF difference image offsets

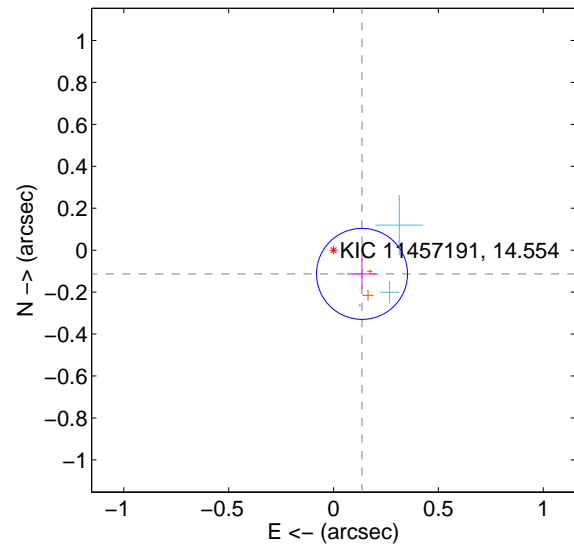
The direct PRF centroid is offset from the target star catalog position by about 0.17 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.088 \pm 0.080$	1.11	$-0.043 \pm 0.071$	$-0.077 \pm 0.089$
PRF-fit source offset from KIC position	$0.177 \pm 0.072$	2.45	$-0.136 \pm 0.071$	$-0.113 \pm 0.074$
photometric centroid source offset	$0.16 \pm 0.27$	0.61	$0.15 \pm 0.26$	$-0.07 \pm 0.28$

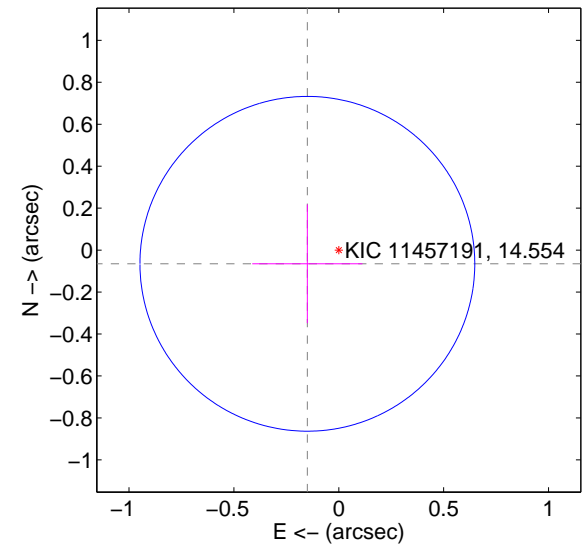
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



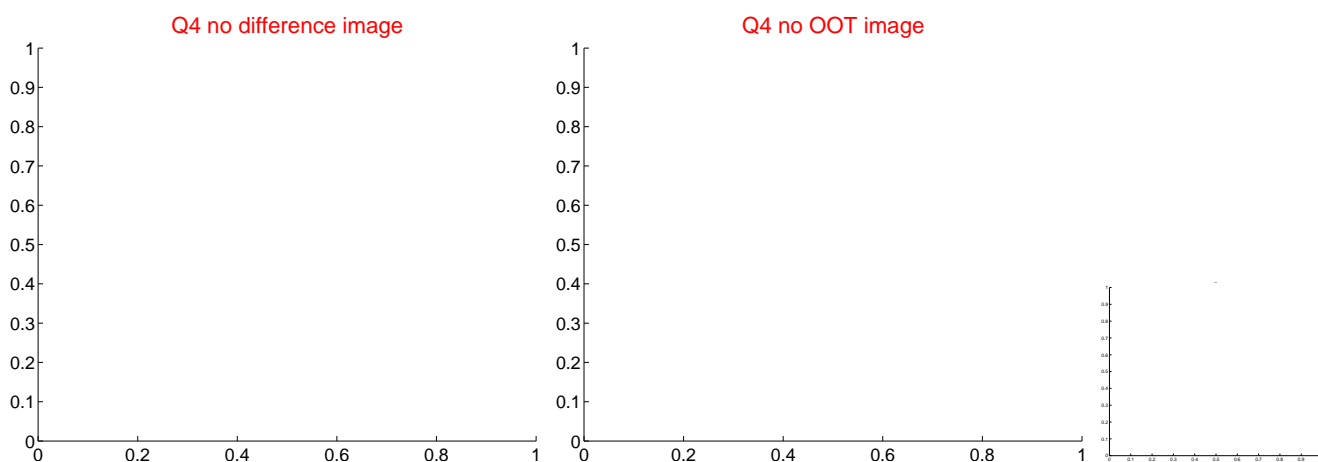
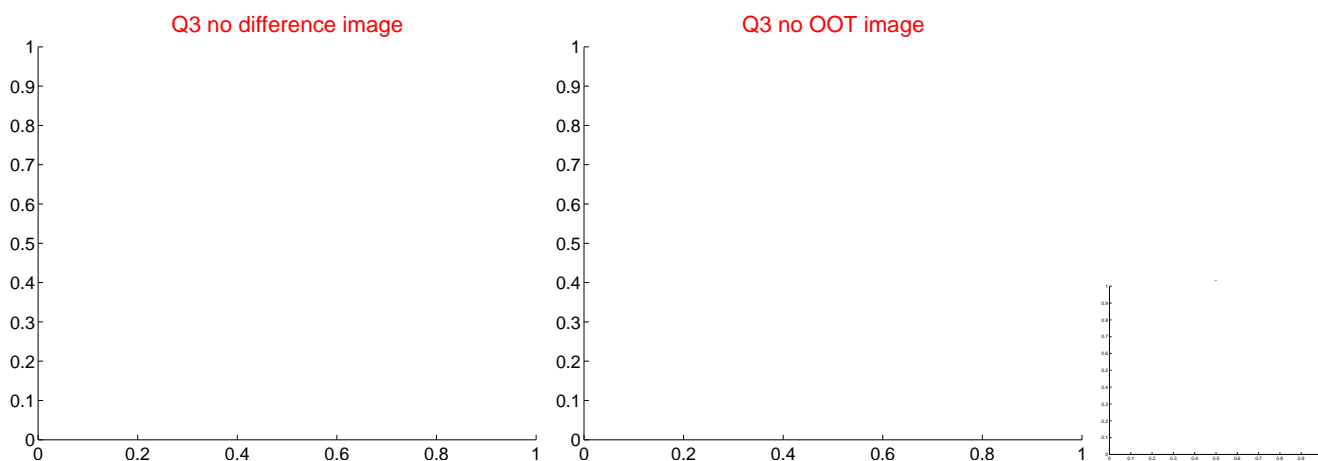
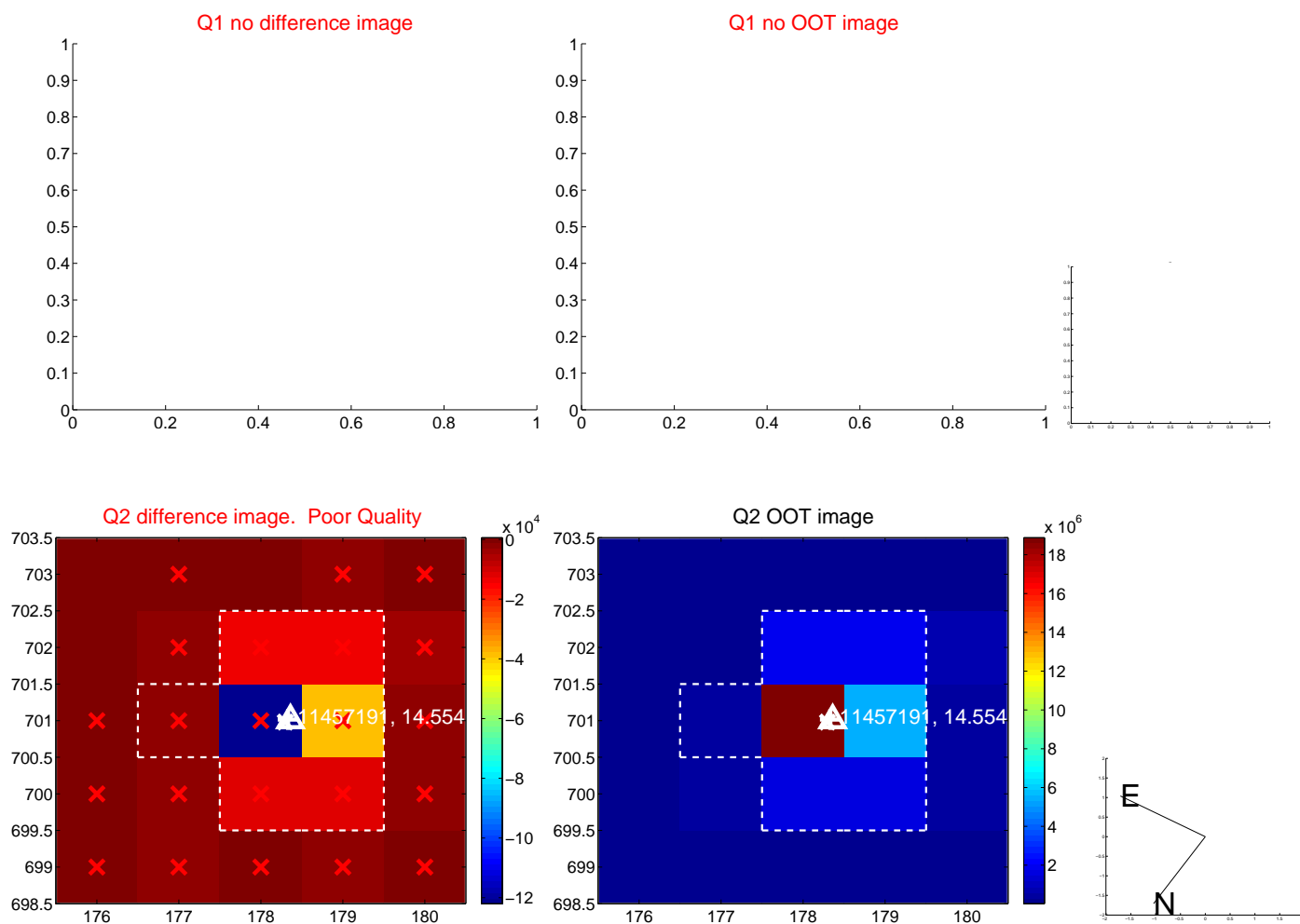
offset from photometric centroids



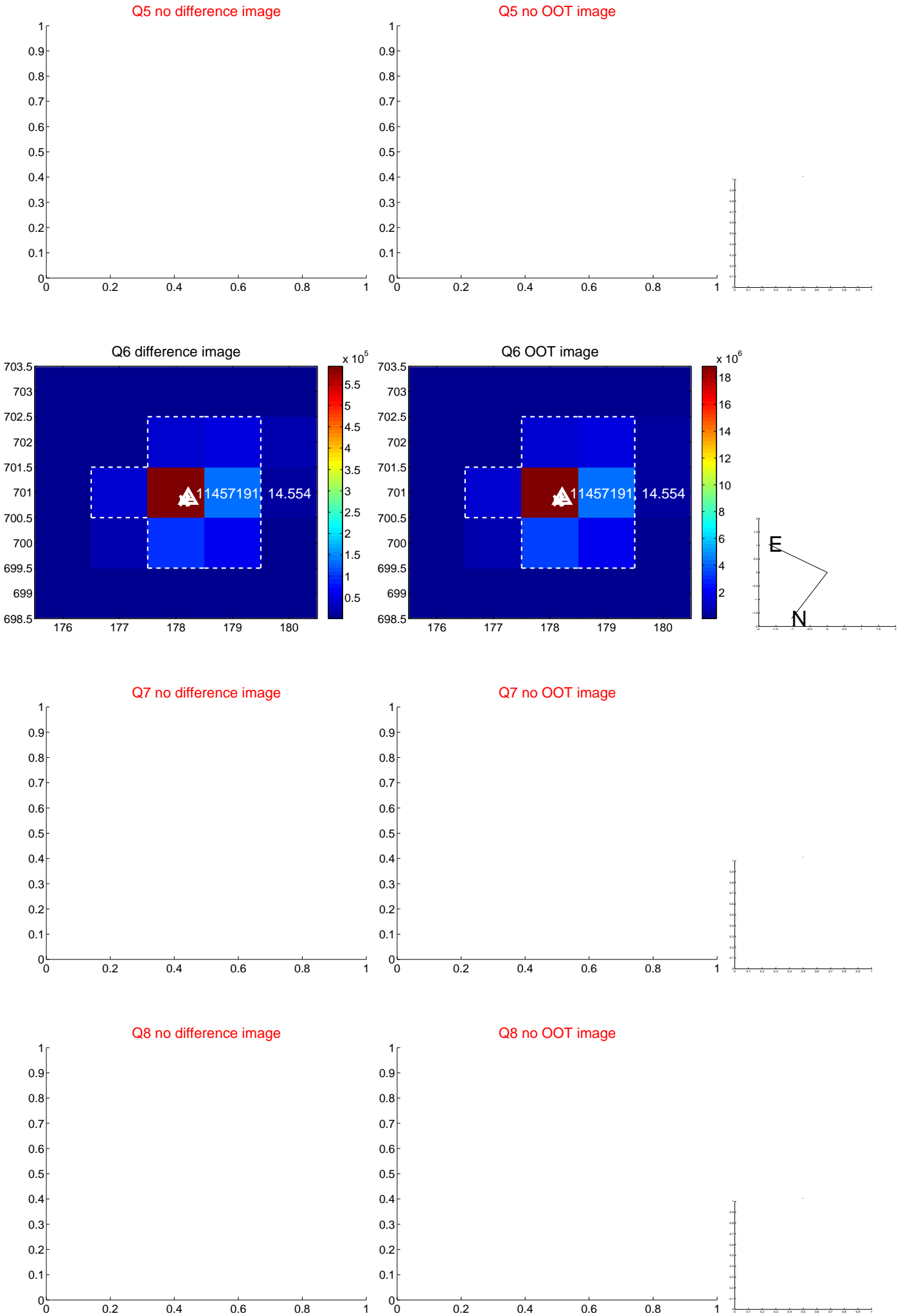
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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



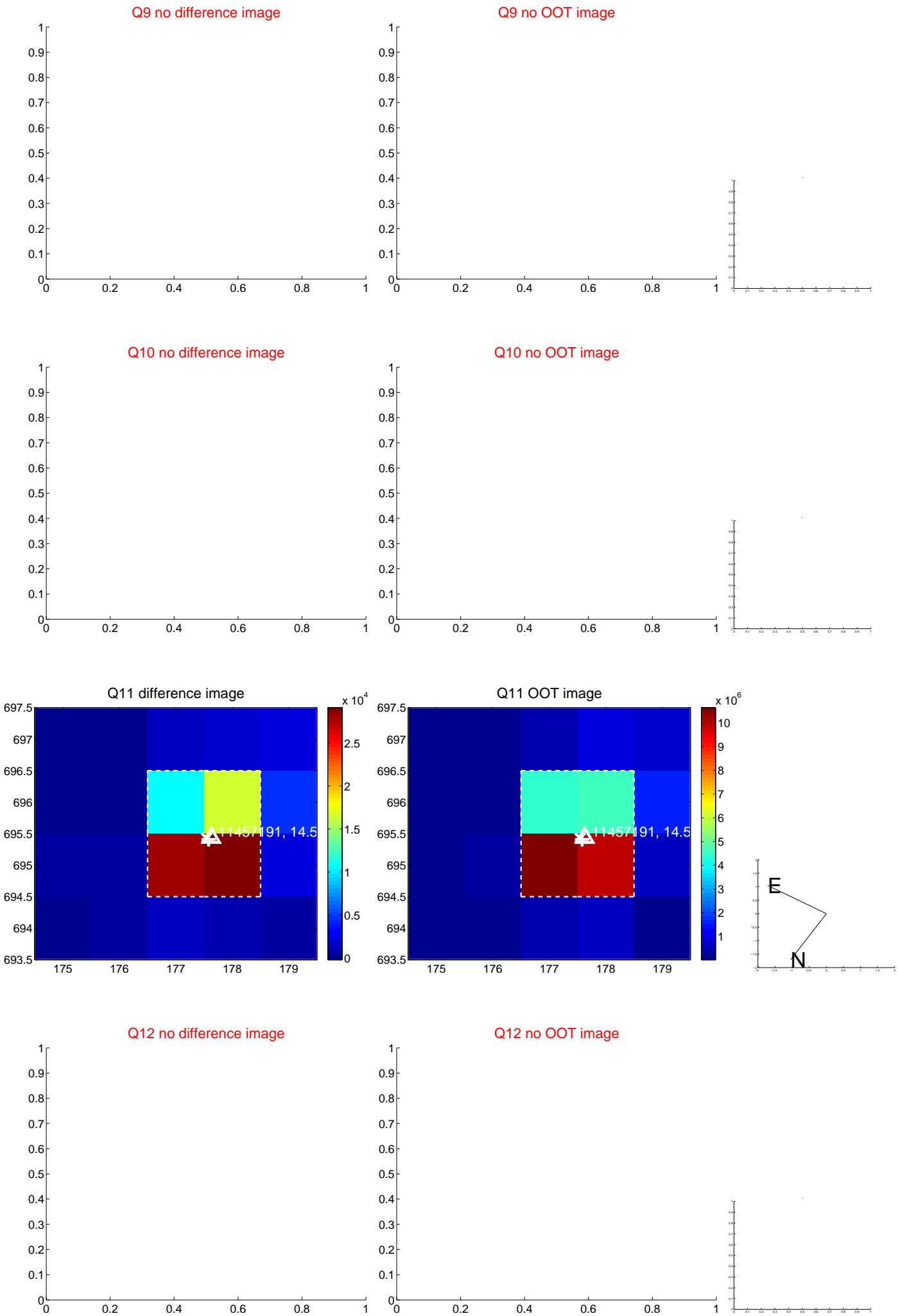
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value



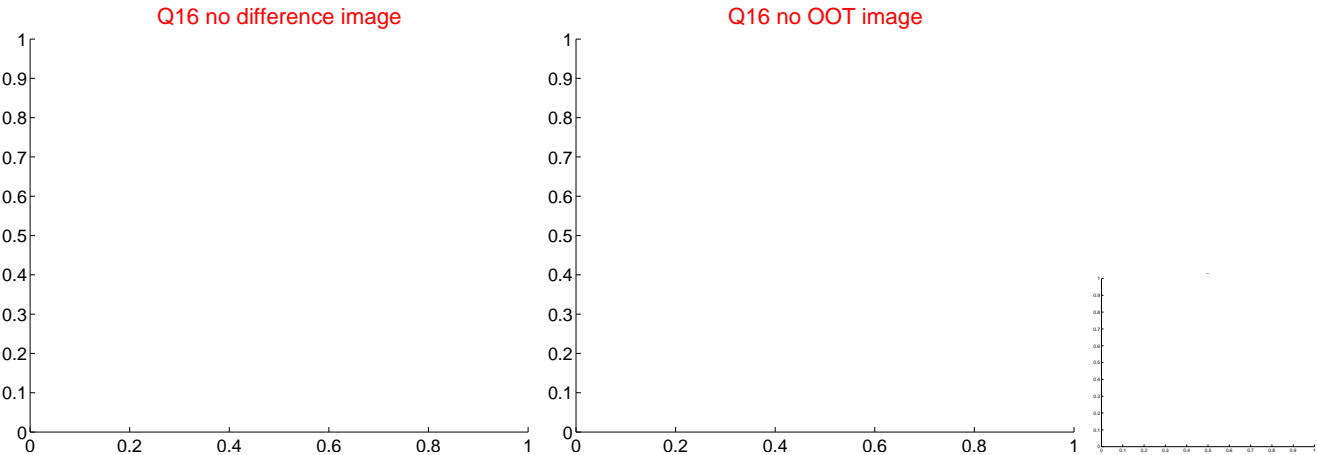
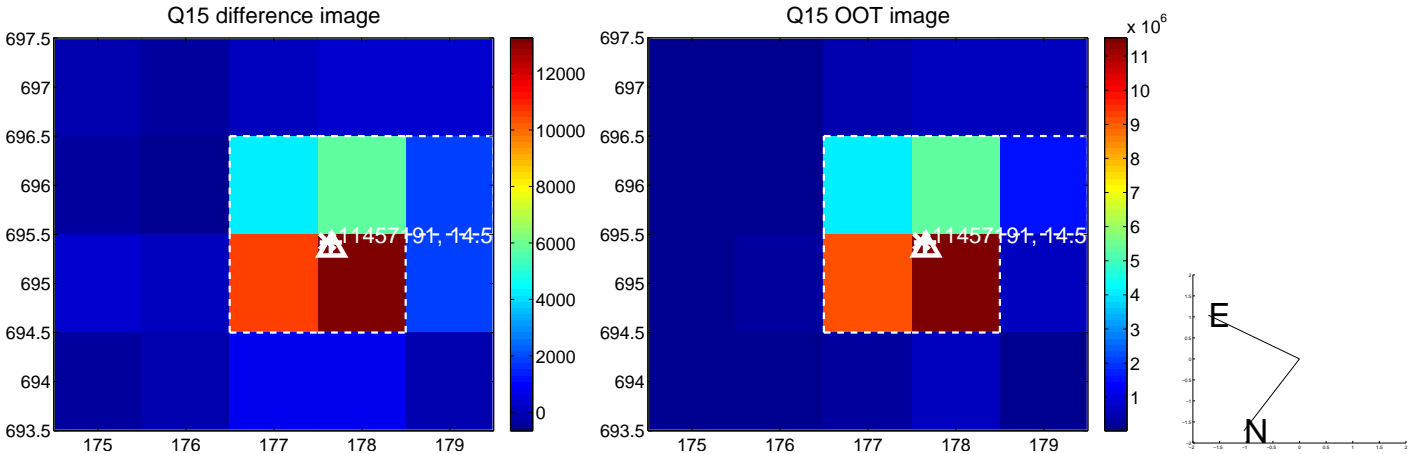
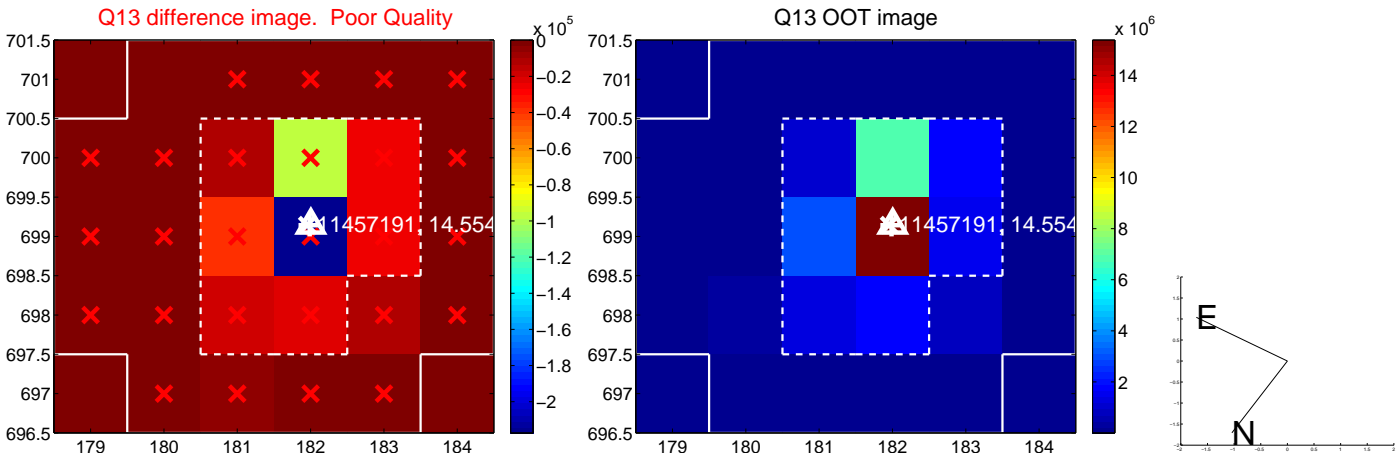
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



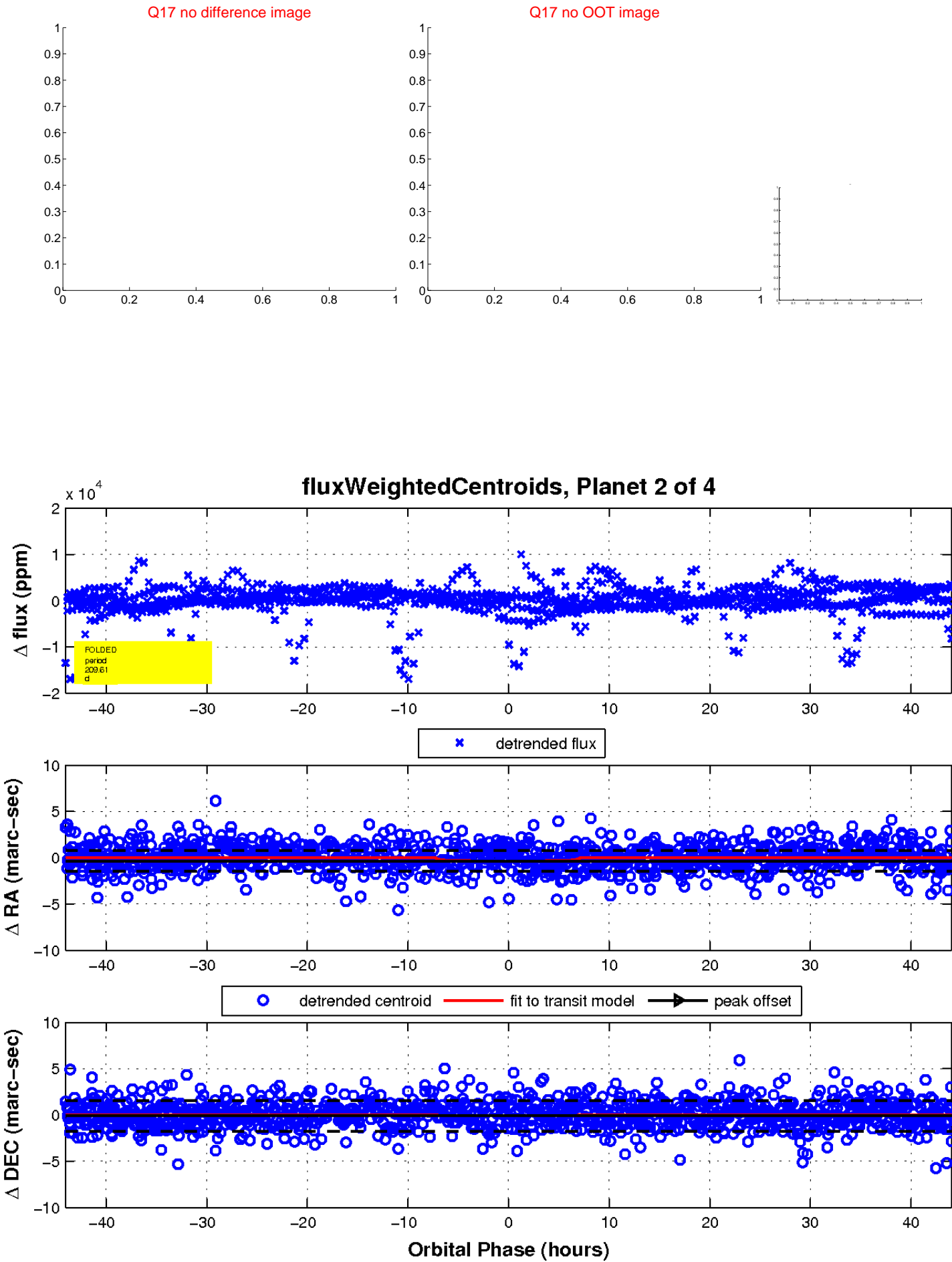
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



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

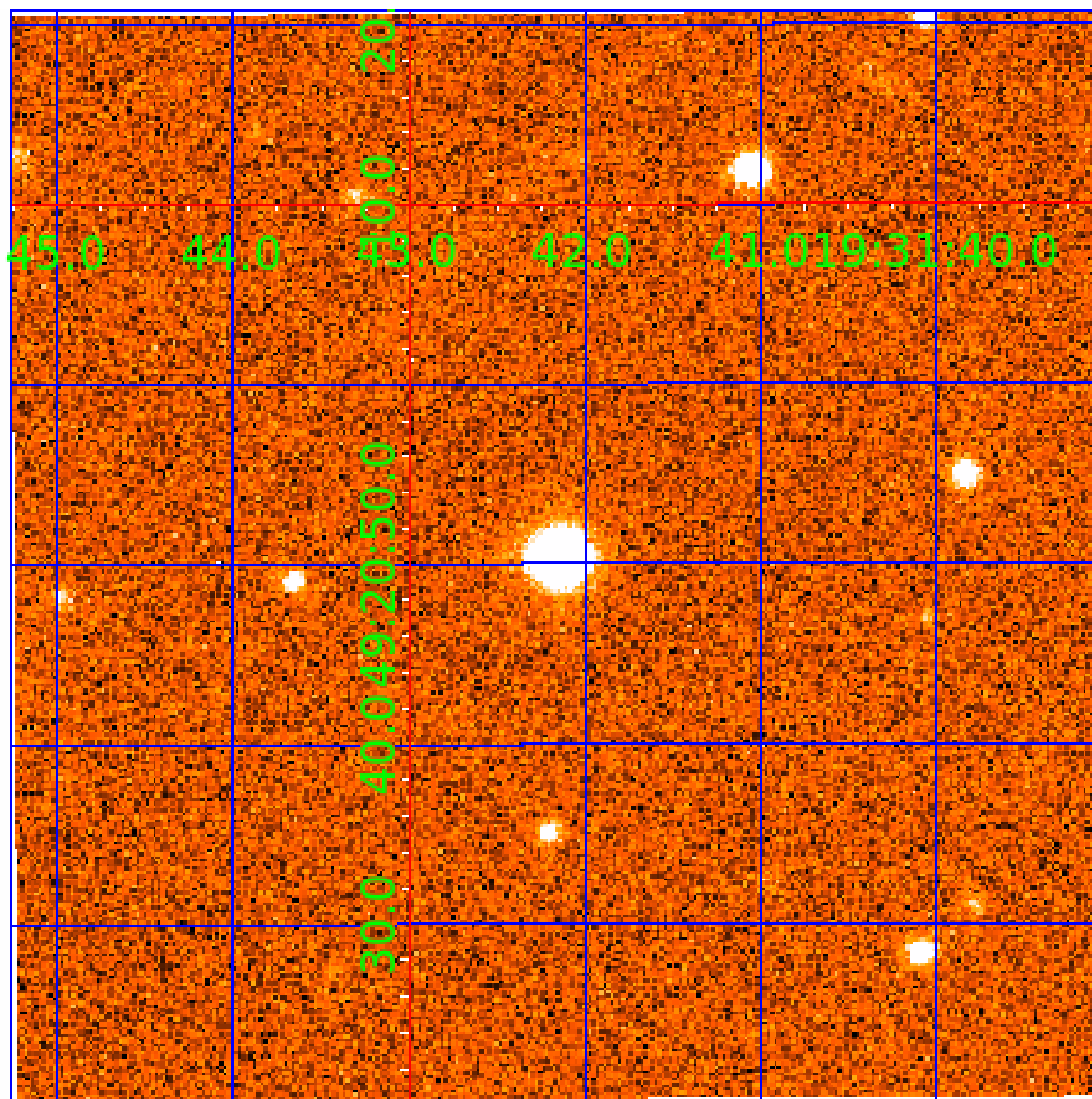


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 011457191

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
011457191-01	OBS	7447.01	1.149182	131.826173	28130.3	3.960	2384.6	1094.9	0.87	5858	20.23	1932.20
011457191-02	OBS	No	209.612719	174.767630	1383.2	14.684	15.7	4.0	0.87	5858	3.28	1.87
011457191-03	OBS	No	231.134684	161.206540	1963.0	4.164	11.4	6.2	0.87	5858	5.41	1.64
011457191-04	OBS	No	396.072268	376.947744	3889.6	7.404	10.3	9.2	0.87	5858	6.07	0.80

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
011457191-01	OBS	FP	0.00	0	1	0	0	SWEET_EB—DEPTH_ODDEVEN_DV—DEPTH_ODDEVEN_ALT—MOD_ODDEVEN_DV—MOD_ODDEVEN_ALT—DEEP_V_SHAPED
011457191-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
011457191-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
011457191-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS

**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.

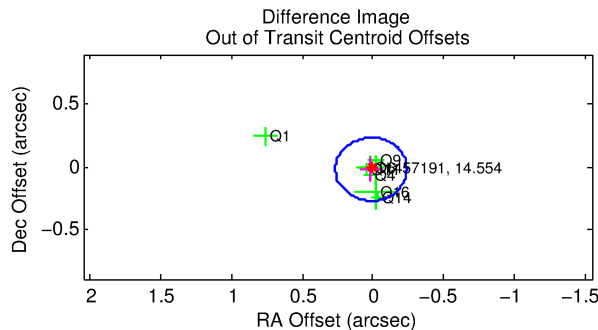
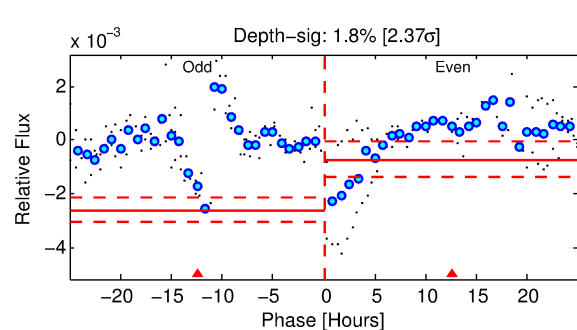
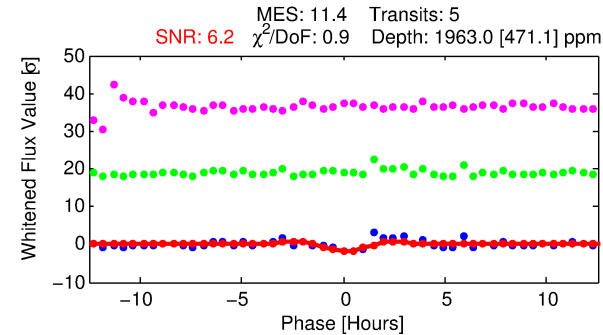
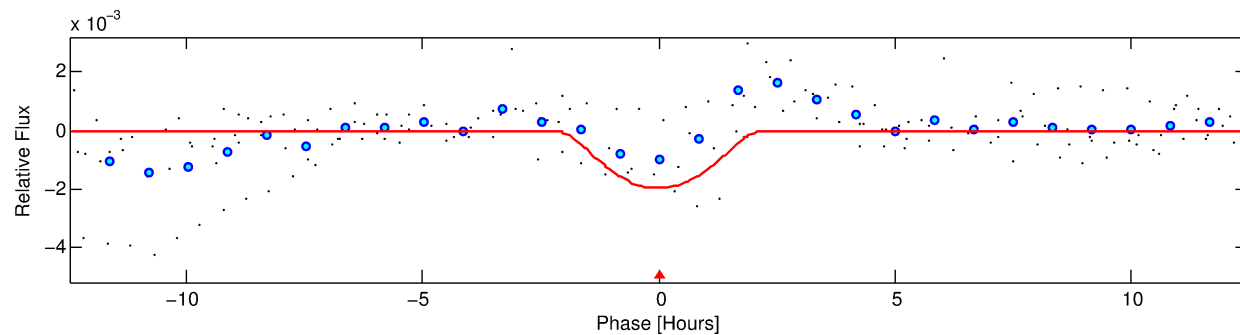
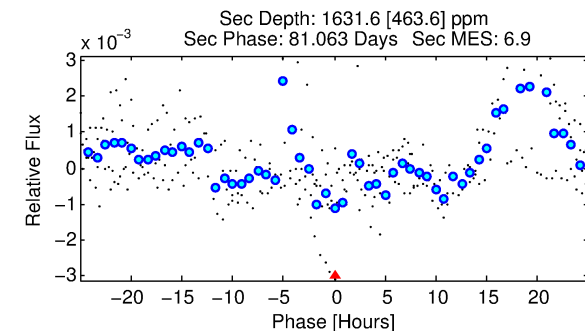
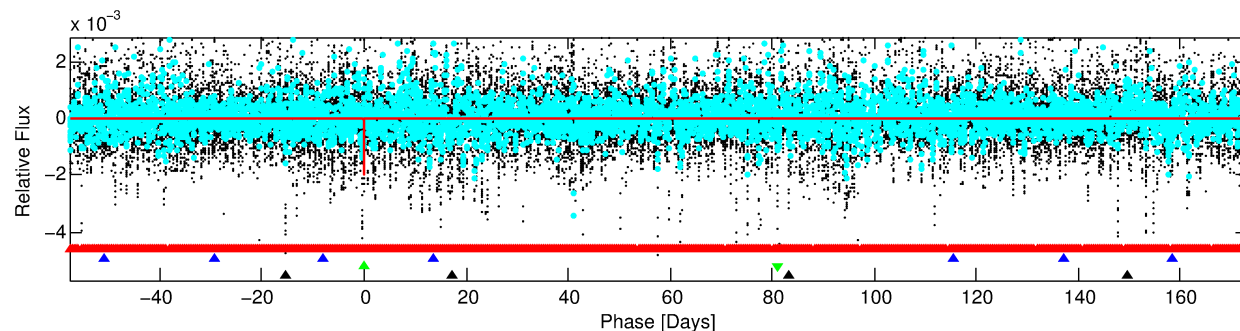
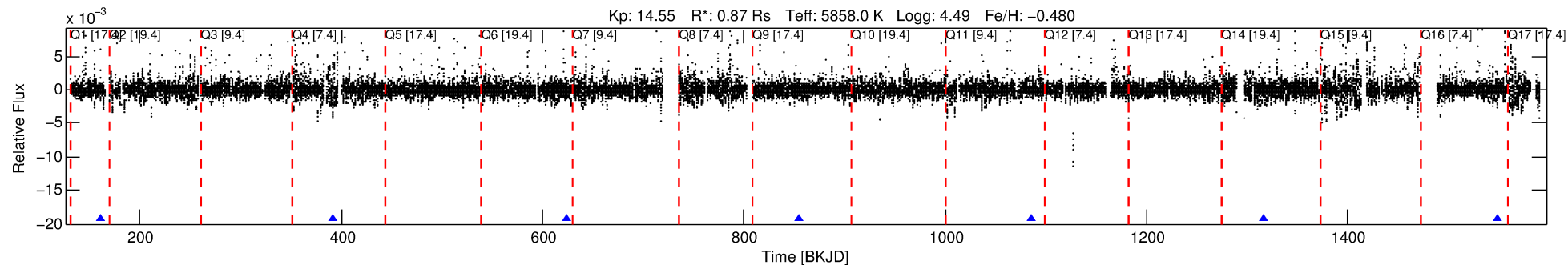
## Ephemeris Match Information For 011457191-03

No Significant Match Found



# DV One-Page Summary

KIC: 11457191 Candidate: 3 of 4 Period: 231.135 d  
KOI: K07447 Corr: No Ephemeris Match



## DV Fit Results:

Period = 231.13468 [0.00233] d  
Epoch = 161.2065 [0.0084] BKJD  
Rp/R\* = 0.0572 [0.0507]  
a/R\* = 181.58 [70.29]  
b = 0.97 [0.11]  
Seff = 1.64 [0.54]  
Teq = 289 [24] K  
Rp = 5.41 [5.00] Re  
a = 0.6955 [0.1512] AU  
Ag = 14821.92 [27024.78] [0.55 $\sigma$ ]  
Teffp = 4922 [2215] K [2.09 $\sigma$ ]

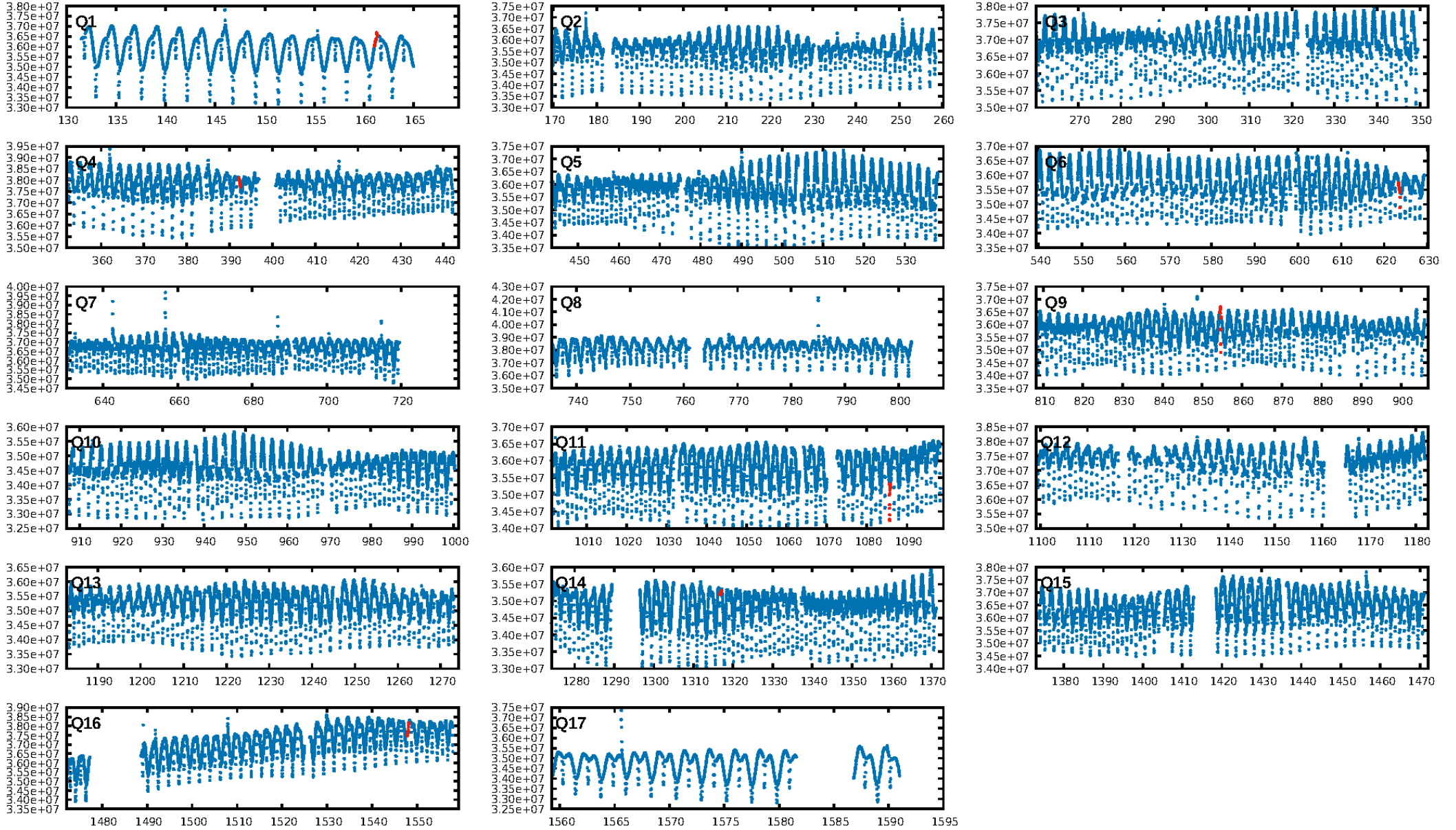
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [33.84 $\sigma$ ]  
LongPeriod-sig: 100.0% [466.00 $\sigma$ ]  
ModelChiSquare2-sig: 8.3%  
ModelChiSquareGof-sig: 99.9%  
**Bootstrap-pfa: 1.02e-11**  
RollingBand-fgt: 1.00 [4/4]  
**GhostDiagnostic-chr: -0.9727**  
Centroid-sig: 90.3%  
Centroid-so: 0.192 arcsec [0.48 $\sigma$ ]  
OotOffset-rm: 0.025 arcsec [0.29 $\sigma$ ]  
KicOffset-rm: 0.144 arcsec [1.00 $\sigma$ ]  
OotOffset-st: 2/1/2/2 [7]  
KicOffset-st: 2/1/2/2 [7]  
DiffImageQuality-fgm: 0.43 [3/7]  
DiffImageOverlap-fno: 0.14 [1/7]

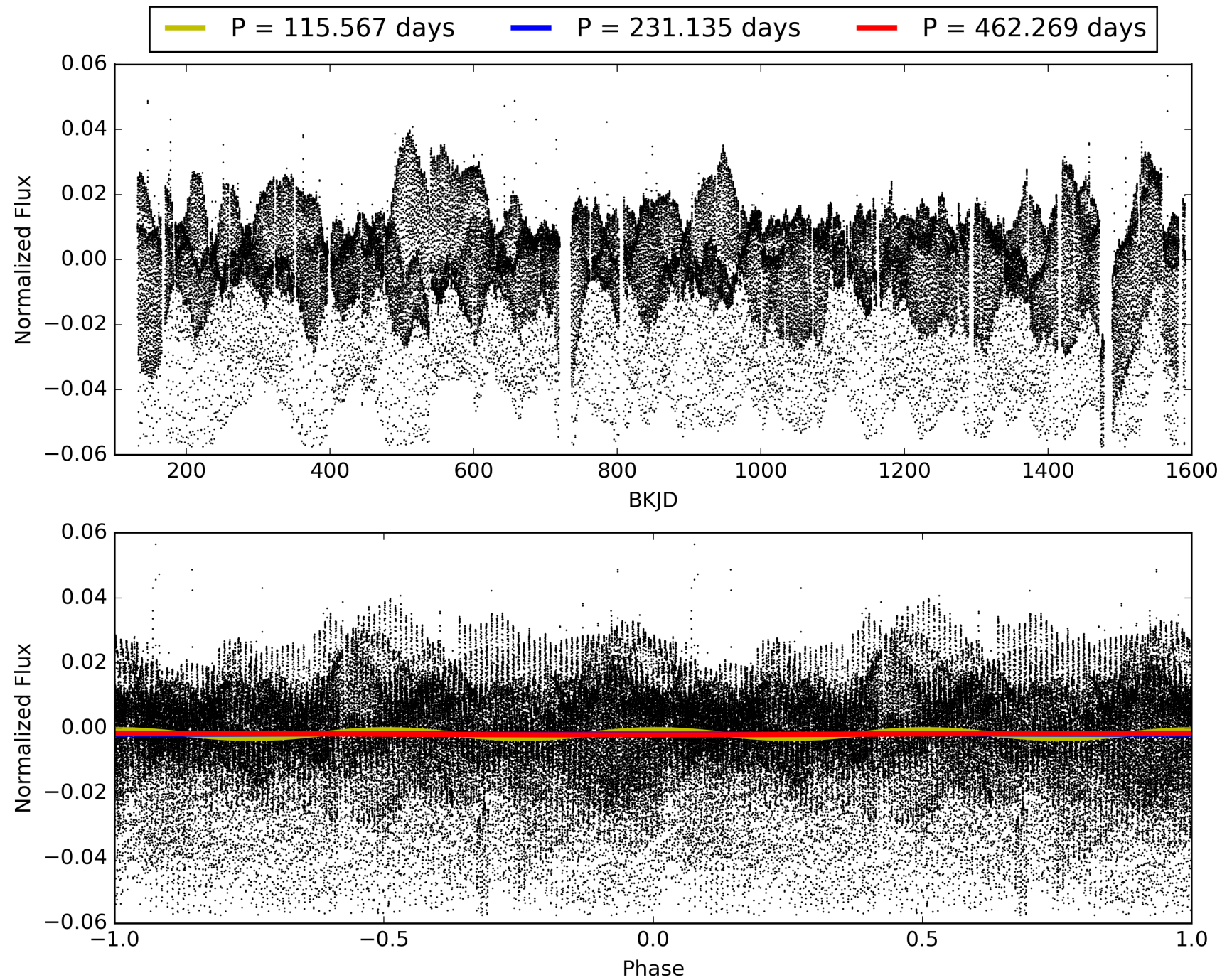
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:49:04 Z

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

# TCE 011457191-03, PDC Light Curves

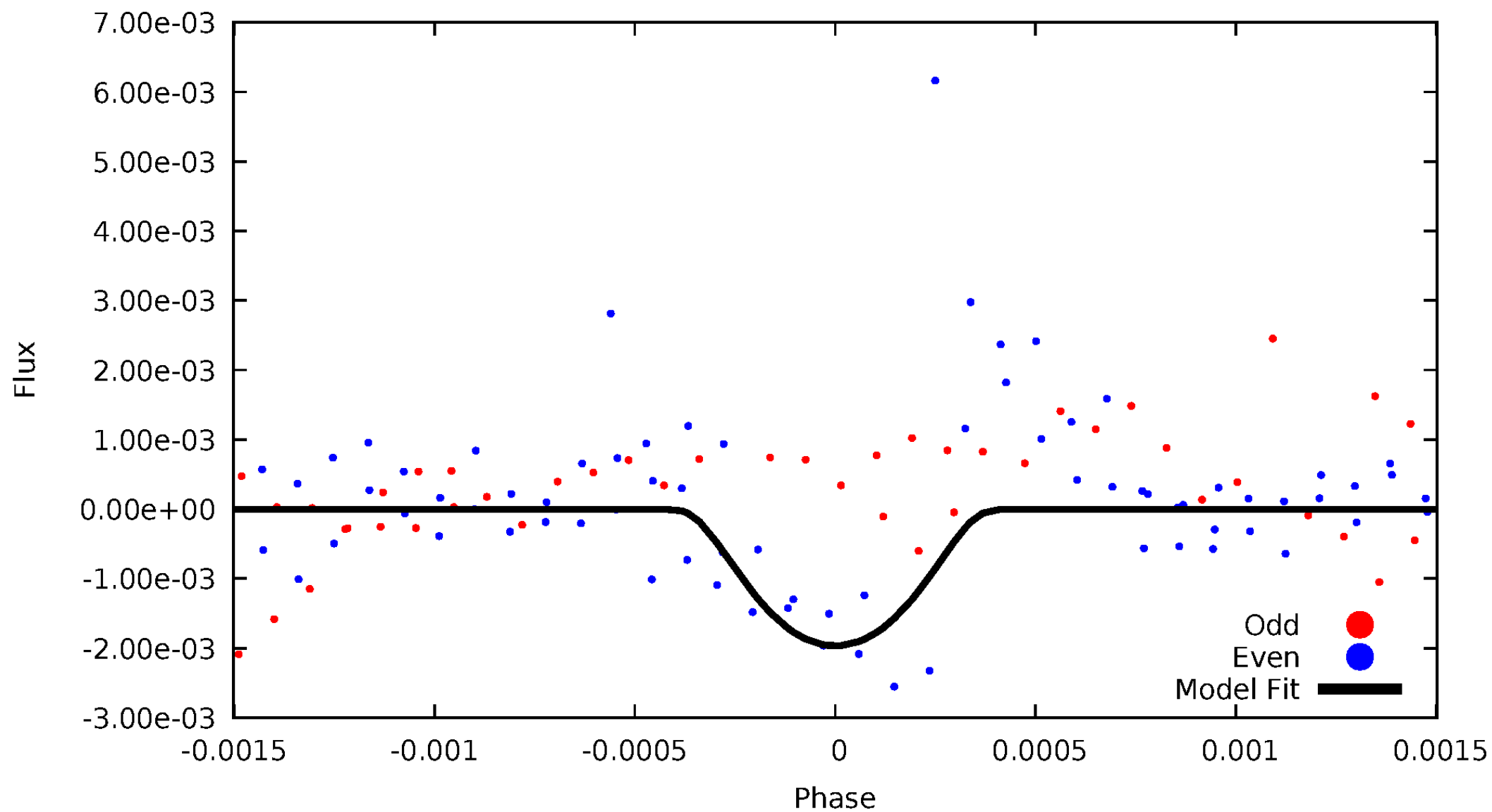


TCE 011457191-03



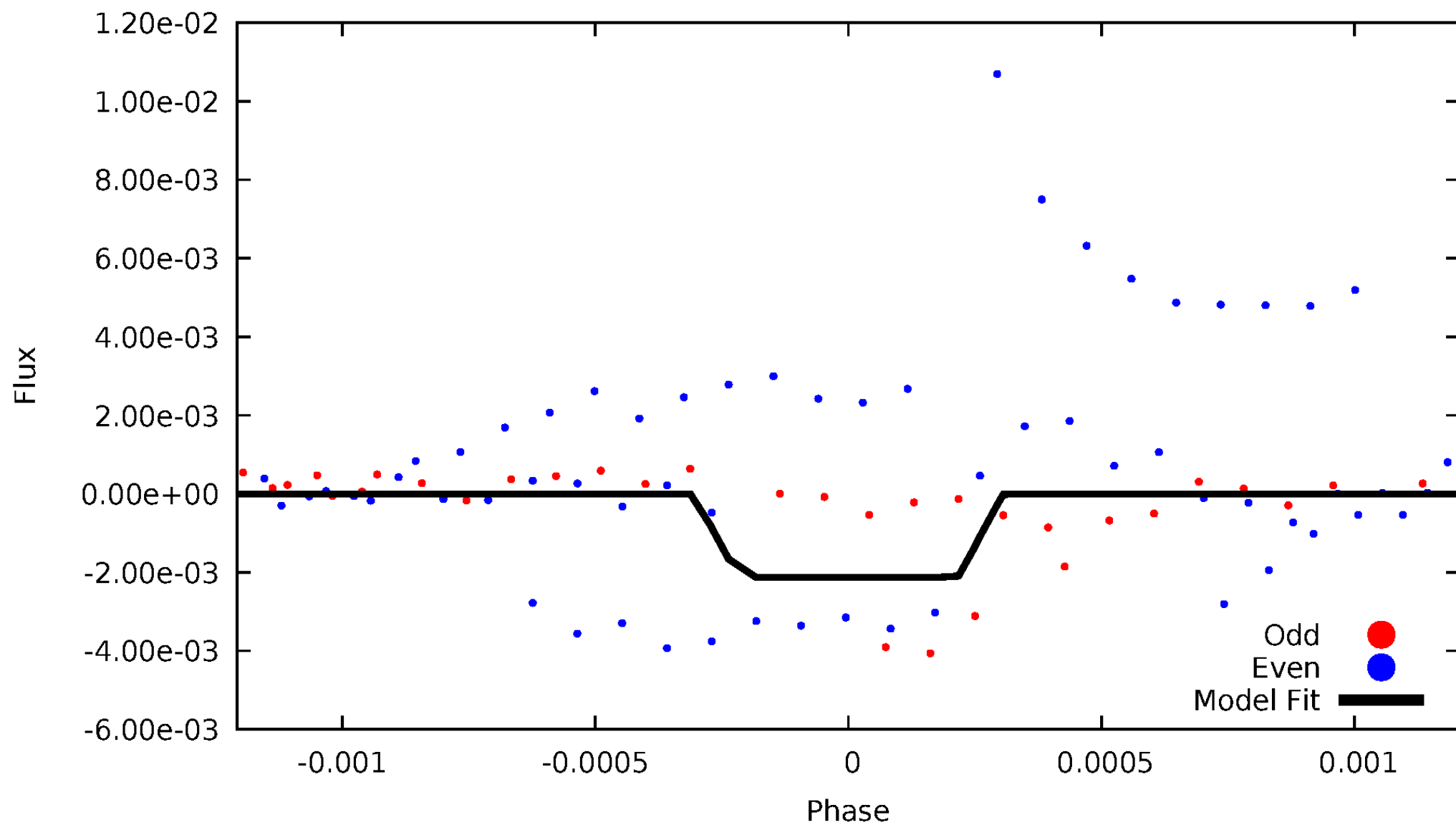
# DV Odd/Even

TCE 011457191-03



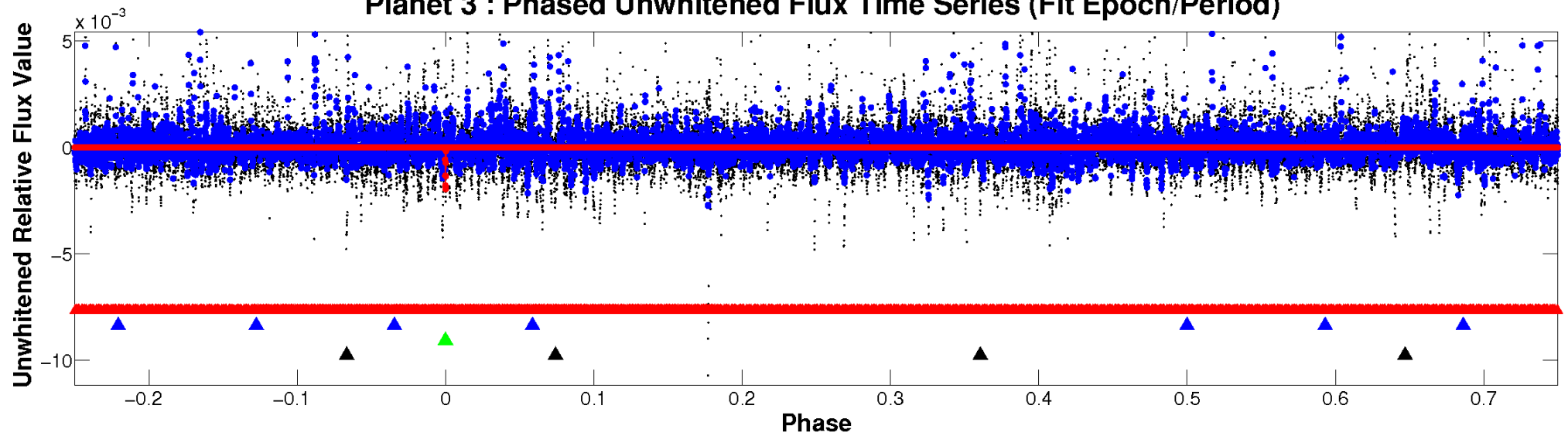
# ALT Odd/Even

TCE 011457191-03

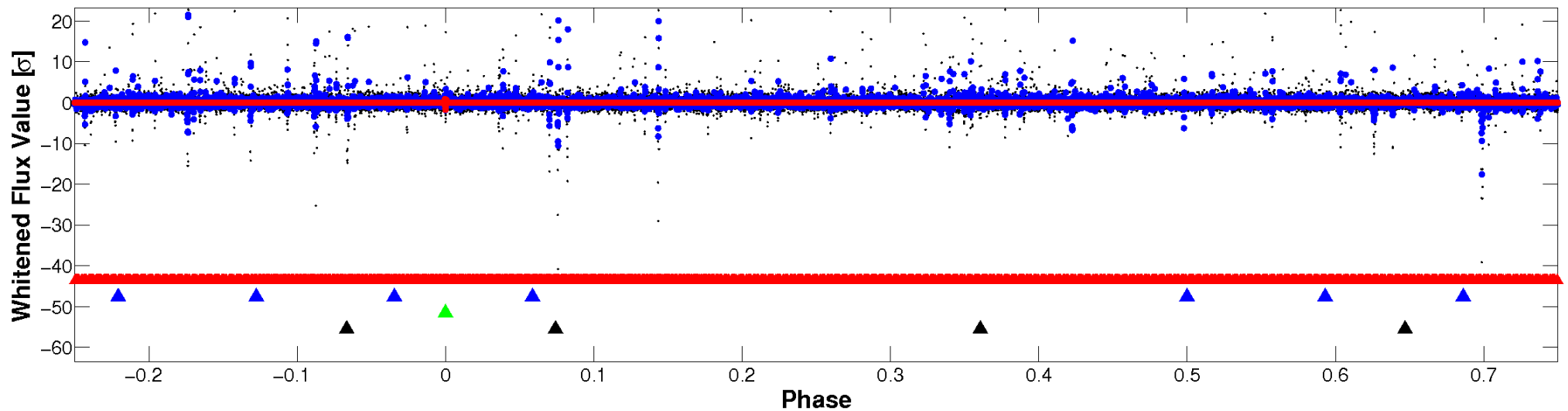


# Non-Whitened Vs. Whitened Light Curve

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



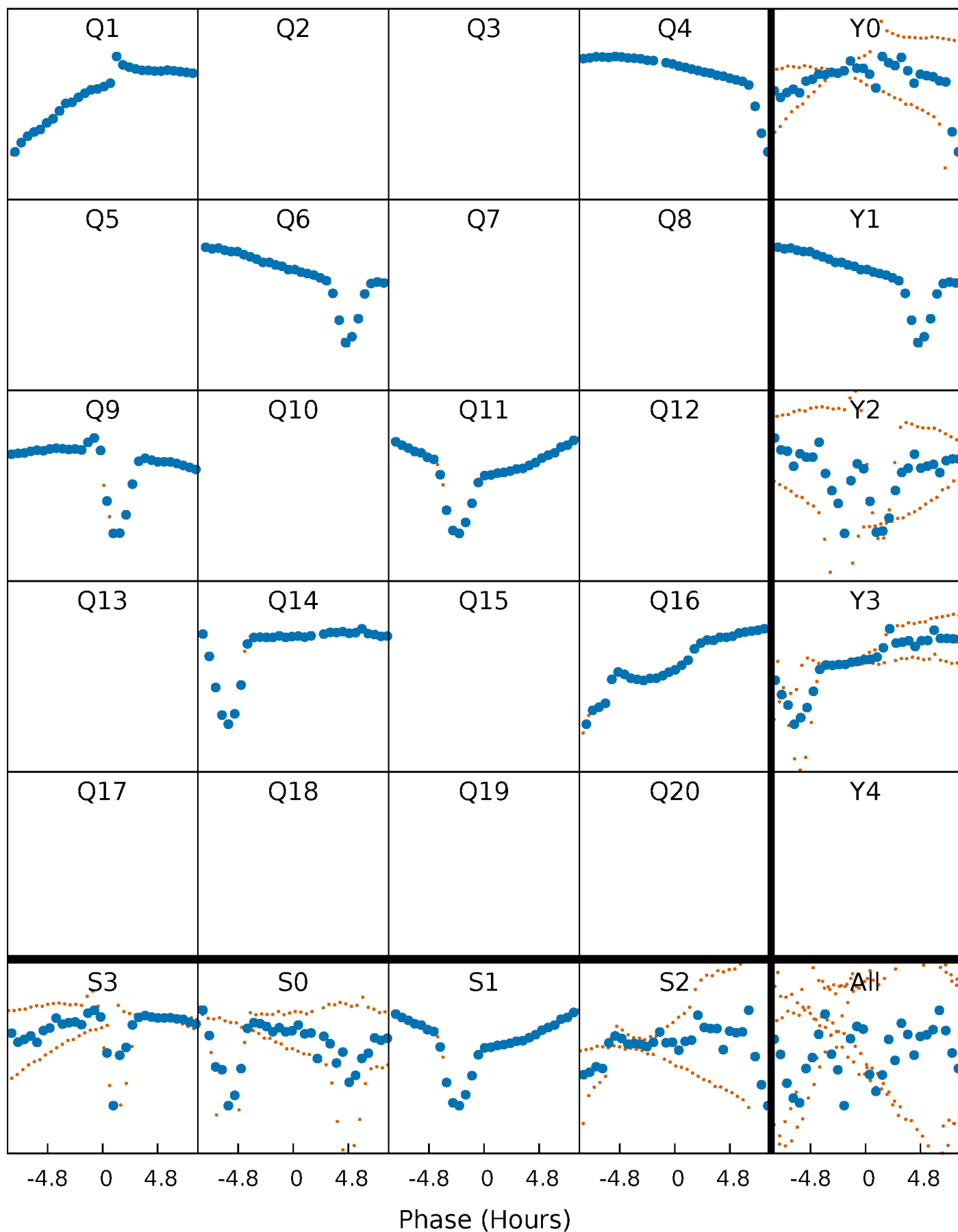
**Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)**





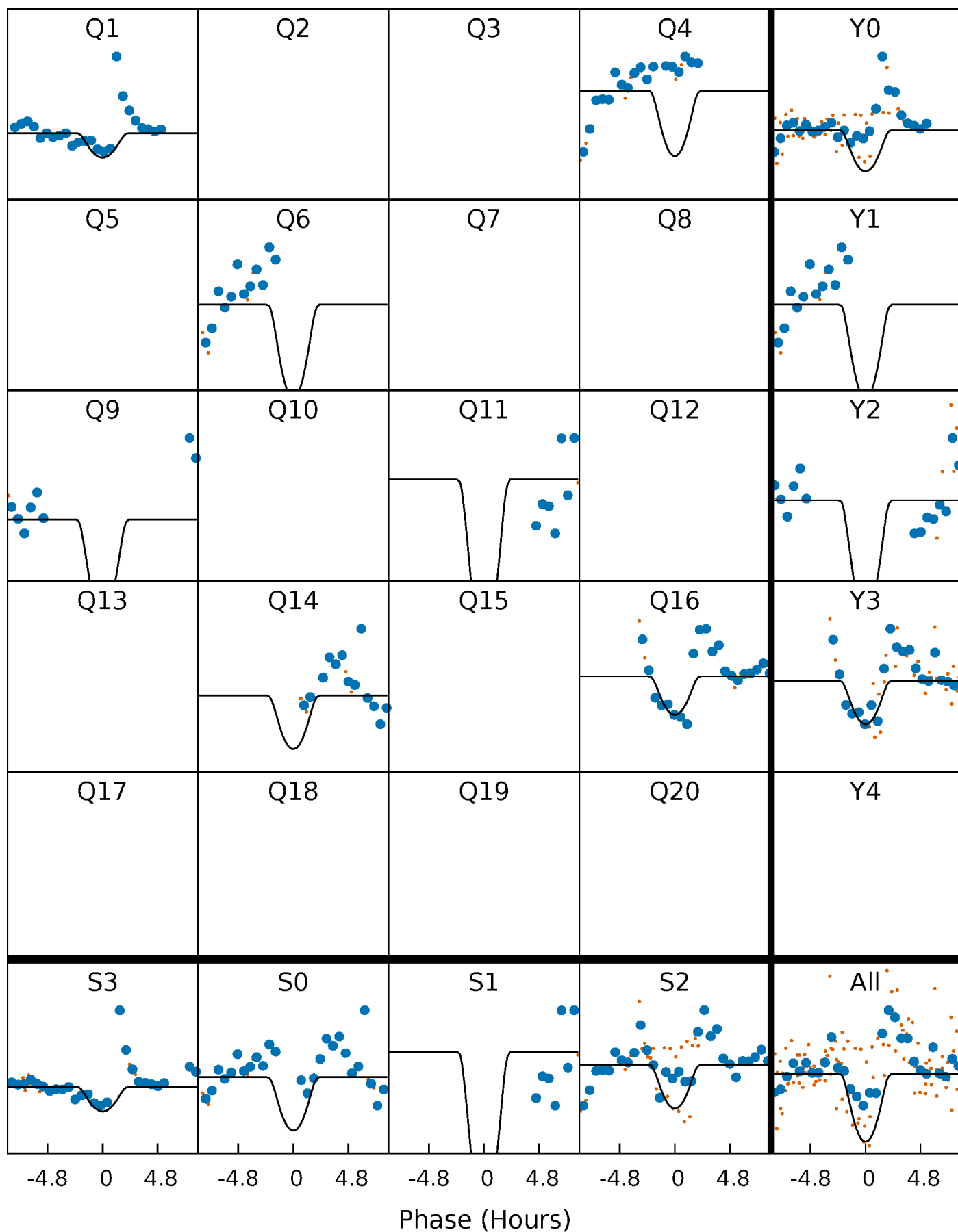
# PDC Quarter-Phased Transit Curves

TCE 011457191-03 P=231.134684 Days  $T_0=161.206540$  (BKJD)



# DV Quarter-Phased Transit Curves

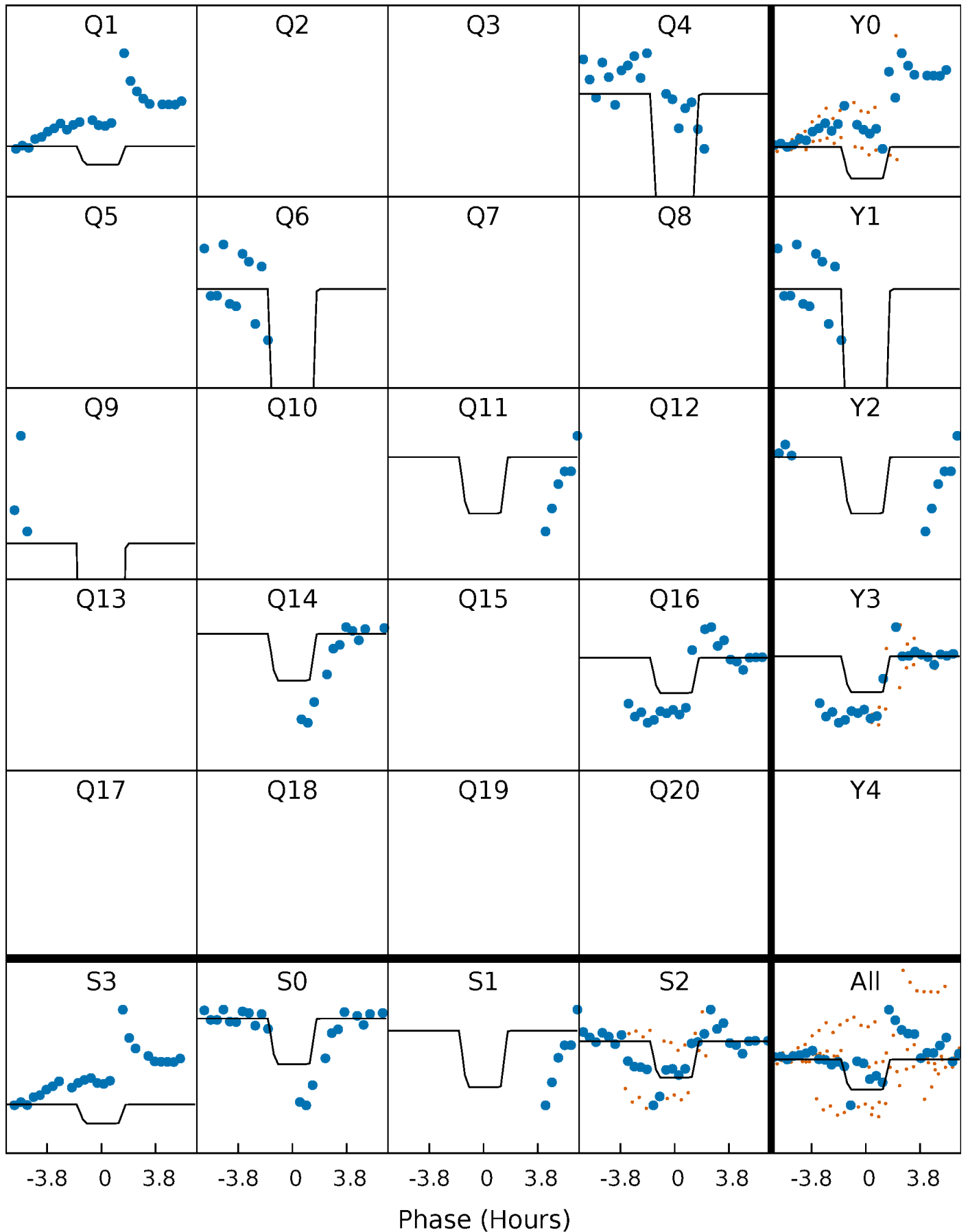
TCE 011457191-03 P=231.134684 Days  $T_0=161.206540$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

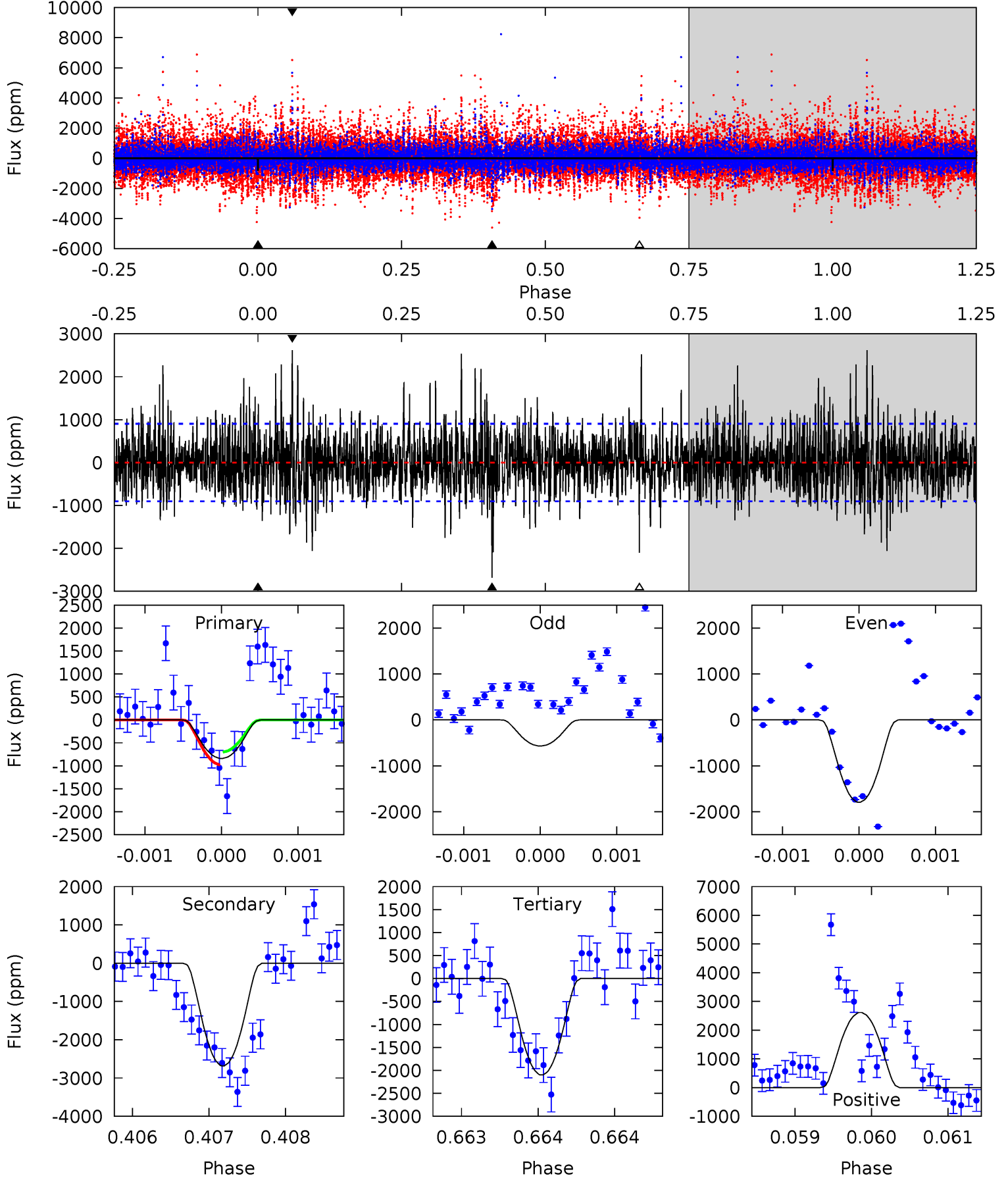
TCE 011457191-03 P=231.138869 Days  $T_0=161.196238$  (BKJD)



# DV Model-Shift Uniqueness Test

011457191-03, P = 231.134684 Days, E = 161.206540 Days

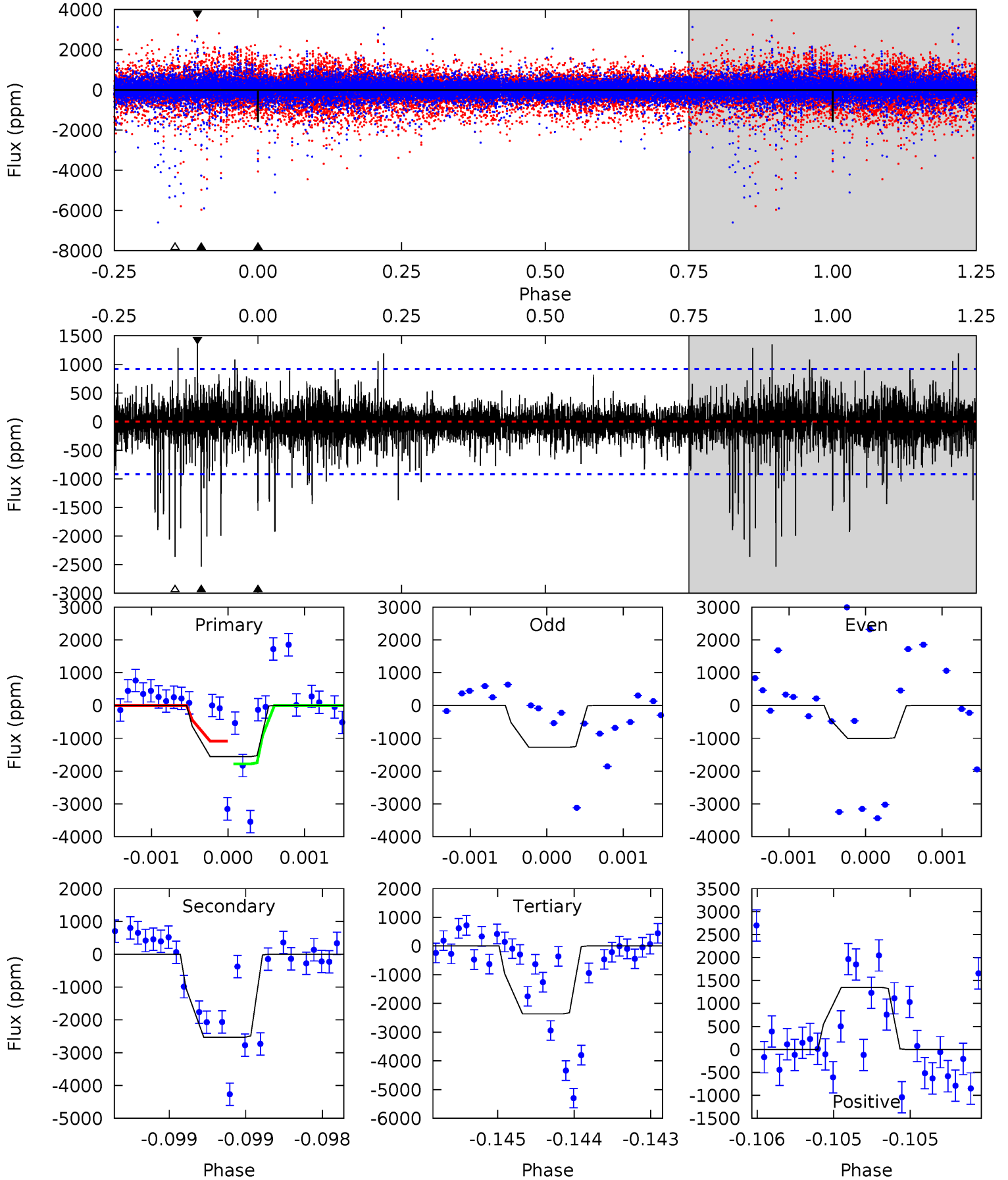
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.09	16.3	12.8	15.9	5.49	3.35	3.20	-7.66	-10.8	3.54	0.41	3.20	-0.51	0.49	0.85



# Alt Model-Shift Uniqueness Test

011457191-03, P = 231.138869 Days, E = 161.196238 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.38	15.3	14.2	8.14	5.55	3.44	1.41	-4.86	1.25	1.03	7.13	0.68	0.66	0.35	1.84



### Stellar Parameters For KIC 011457191

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5858^{+159}_{-159}$	$4.486^{+0.091}_{-0.169}$	$-0.480^{+0.300}_{-0.300}$	$0.867^{+0.227}_{-0.097}$	$0.840^{+0.106}_{-0.070}$	$1.813^{+0.721}_{-0.845}$
	+3%/-3%	+2%/-4%	+62%/-62%	+26%/-11%	+13%/-8%	+40%/-47%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 011457191-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-2683 \pm 165$	$6.43^{+4.78}_{-3.92}$	$406^{+26}_{-19}$	$5286^{+3235}_{-1084}$	$17668^{+91385}_{-11940}$
Alt.	$-2532 \pm 166$	$5.50^{+4.51}_{-3.44}$	$407^{+27}_{-18}$	$5512^{+4162}_{-1178}$	$21562^{+134046}_{-14887}$

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

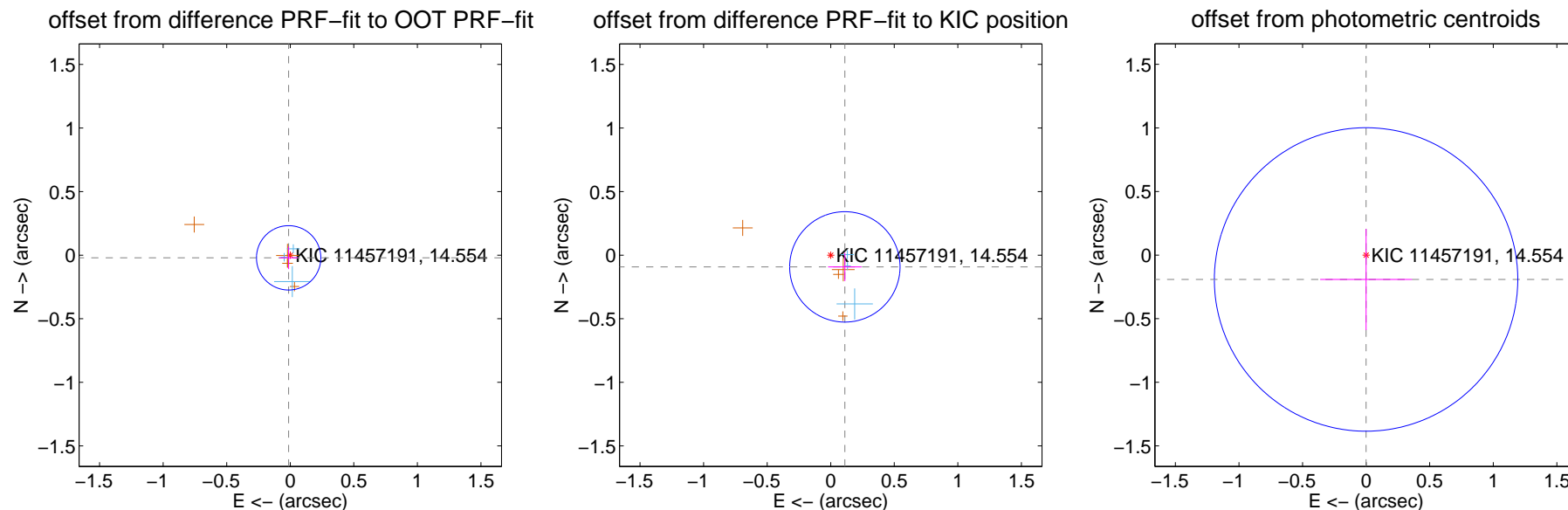
## DV Centroid Data

Supplemental centroid analysis for 011457191-03. Kepler magnitude: 14.55. Transit SNR 6.17

There are 3 quarters with good PRF difference image offsets

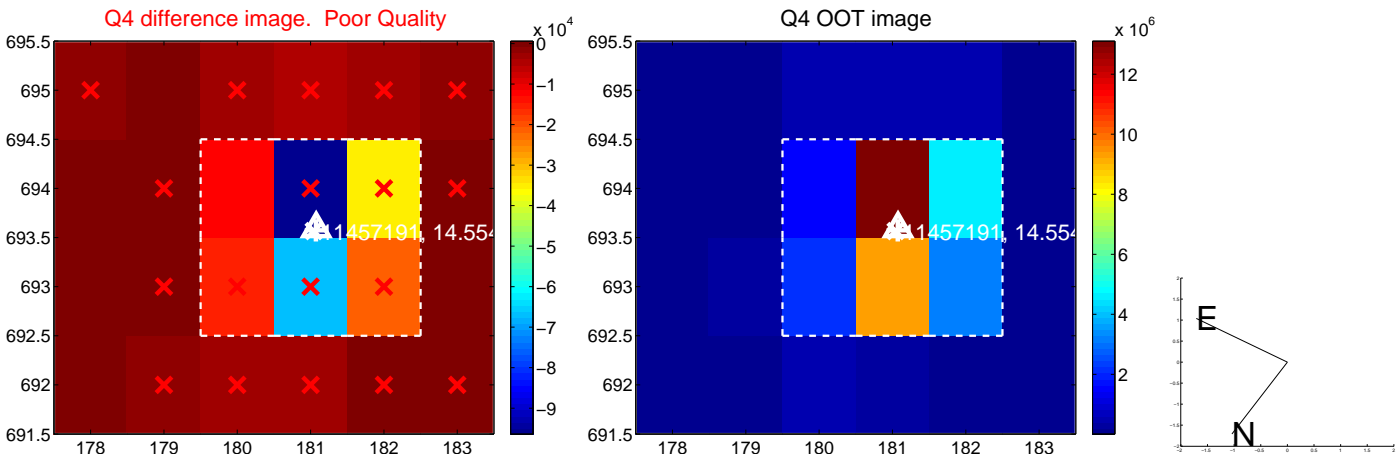
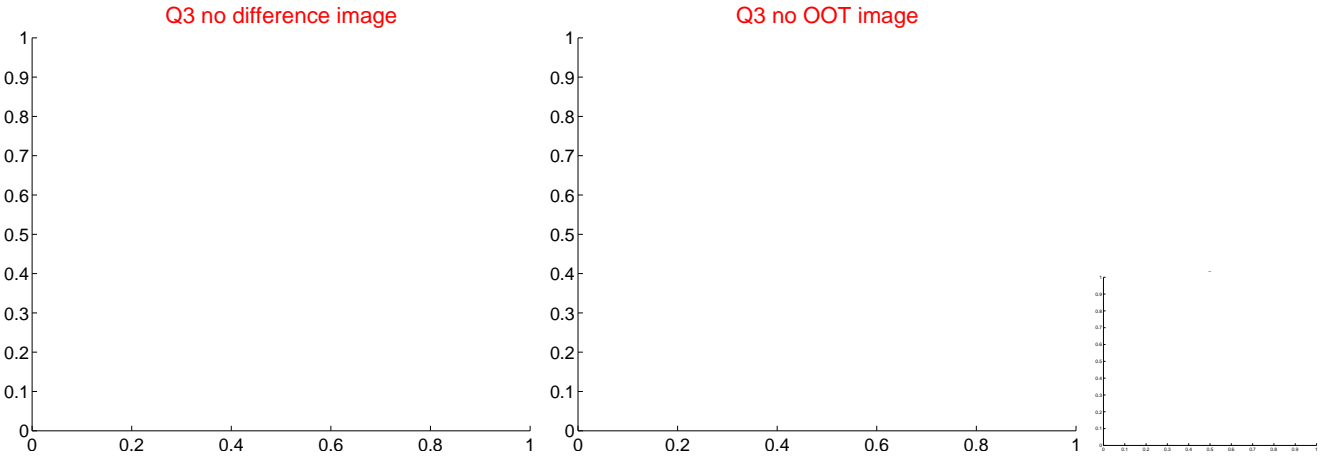
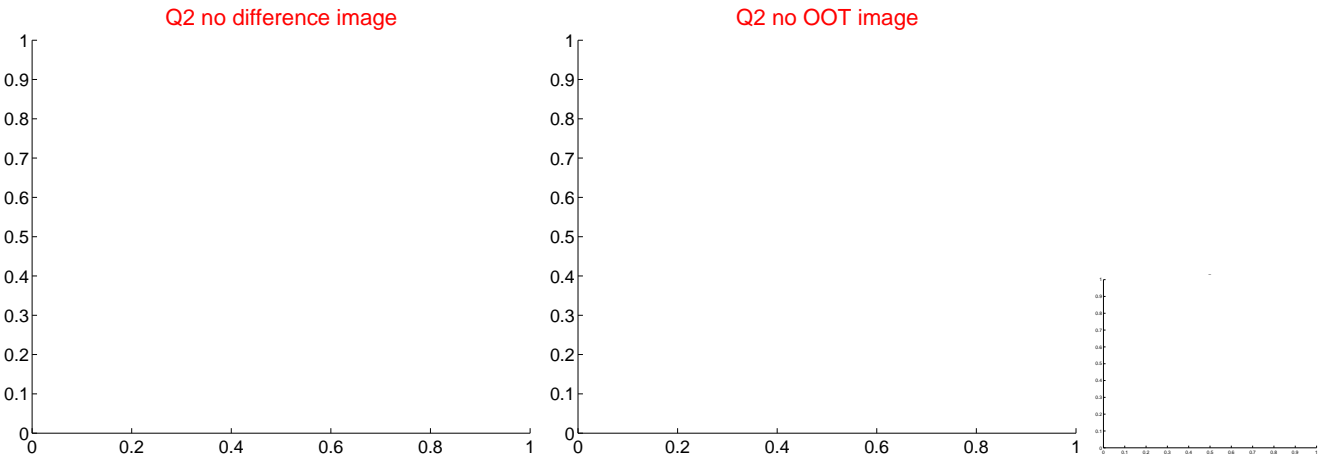
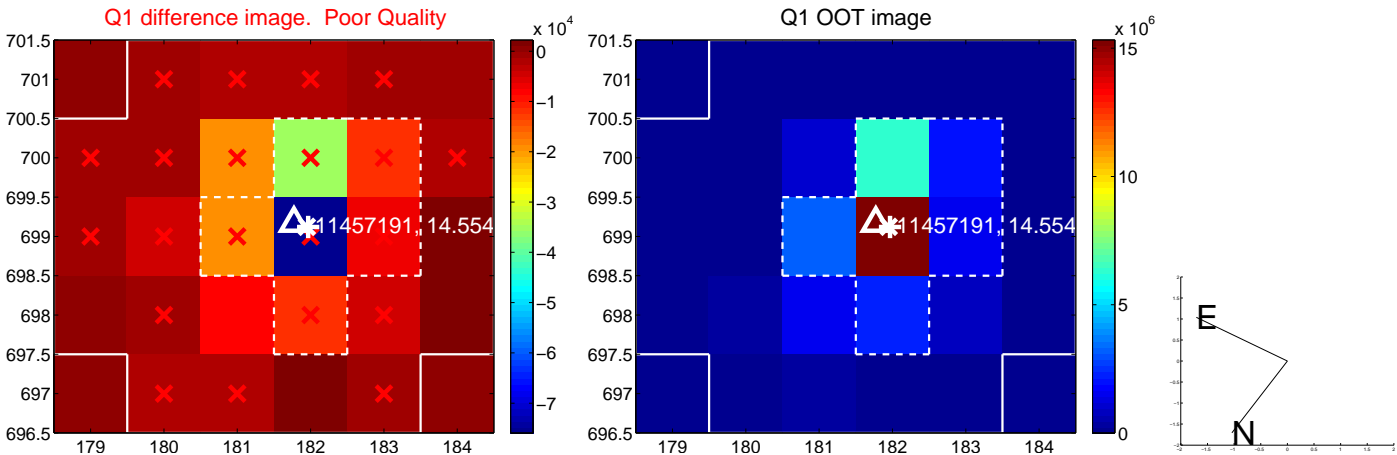
The direct PRF centroid is offset from the target star catalog position by about 0.25 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.025 \pm 0.084$	0.29	$0.013 \pm 0.073$	$-0.021 \pm 0.088$
PRF-fit source offset from KIC position	$0.144 \pm 0.145$	1.00	$-0.111 \pm 0.132$	$-0.092 \pm 0.112$
photometric centroid source offset	$0.19 \pm 0.40$	0.48	$0.00 \pm 0.36$	$-0.19 \pm 0.40$

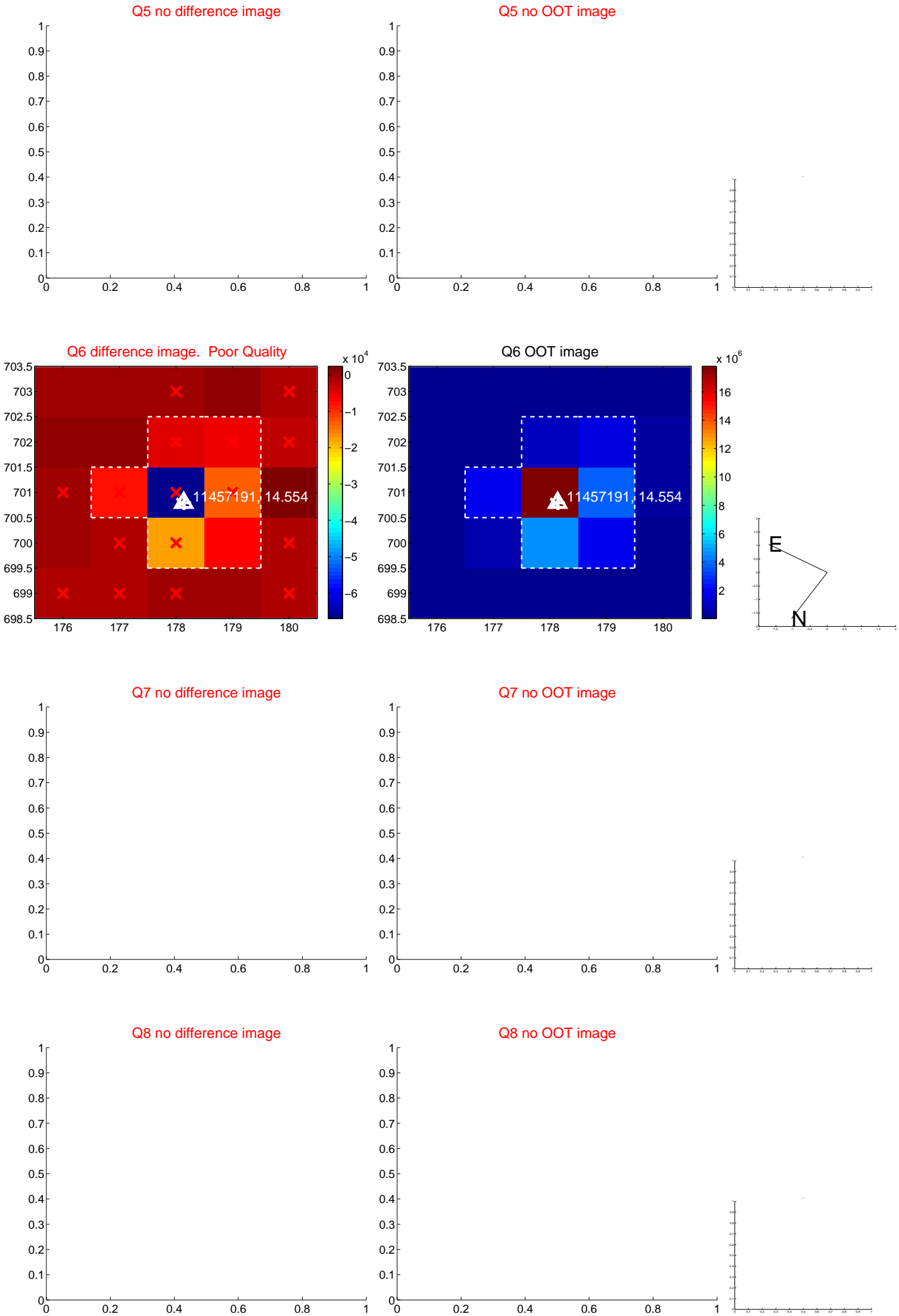


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

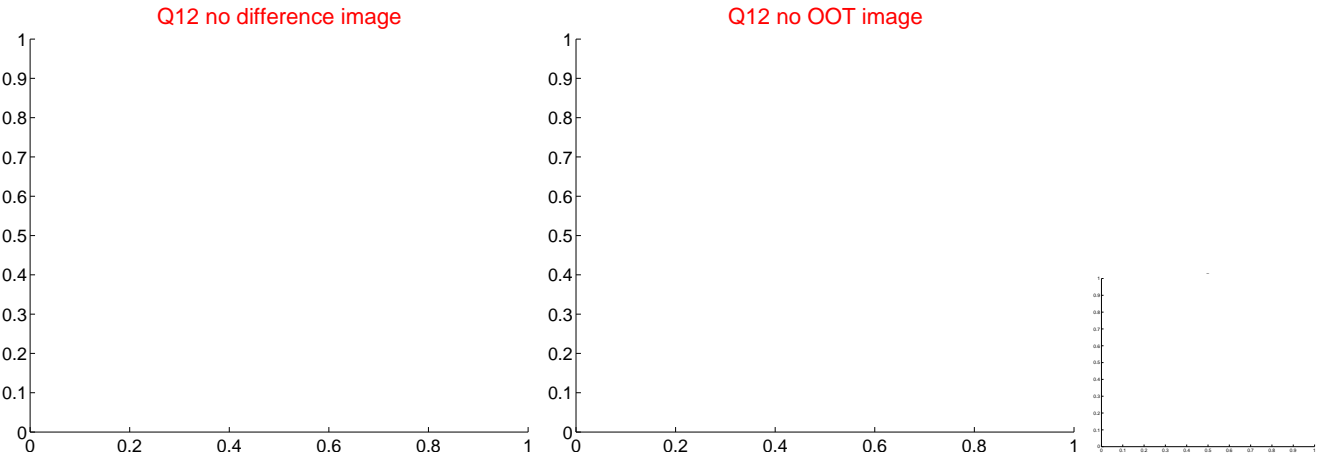
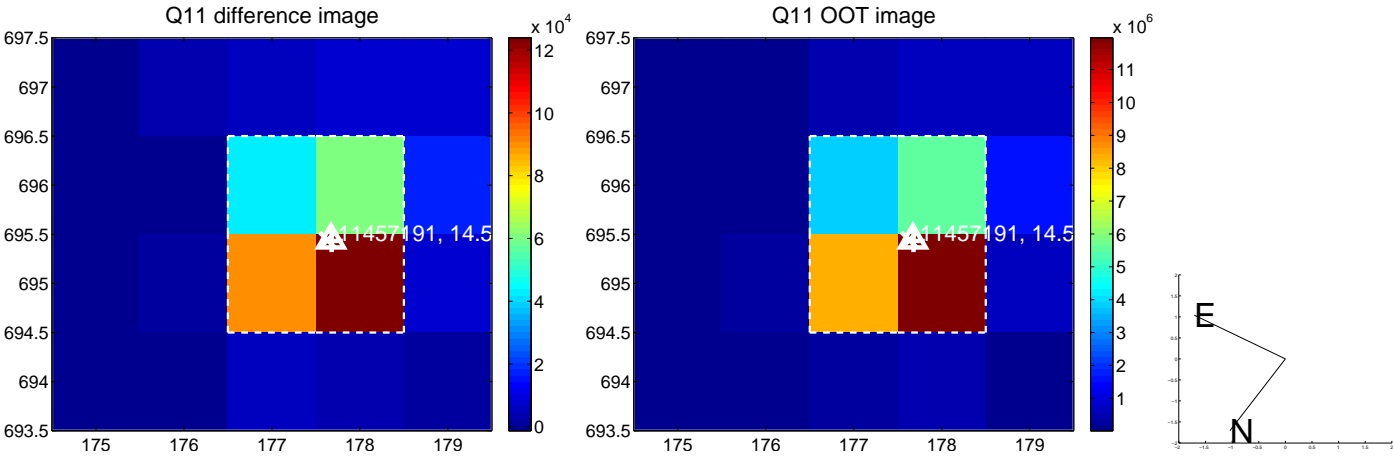
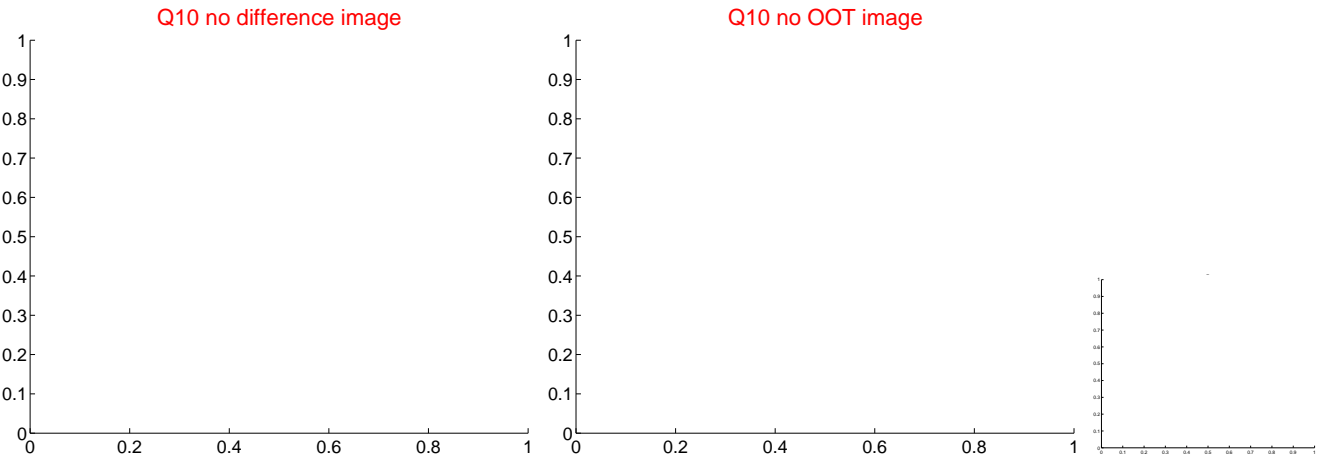
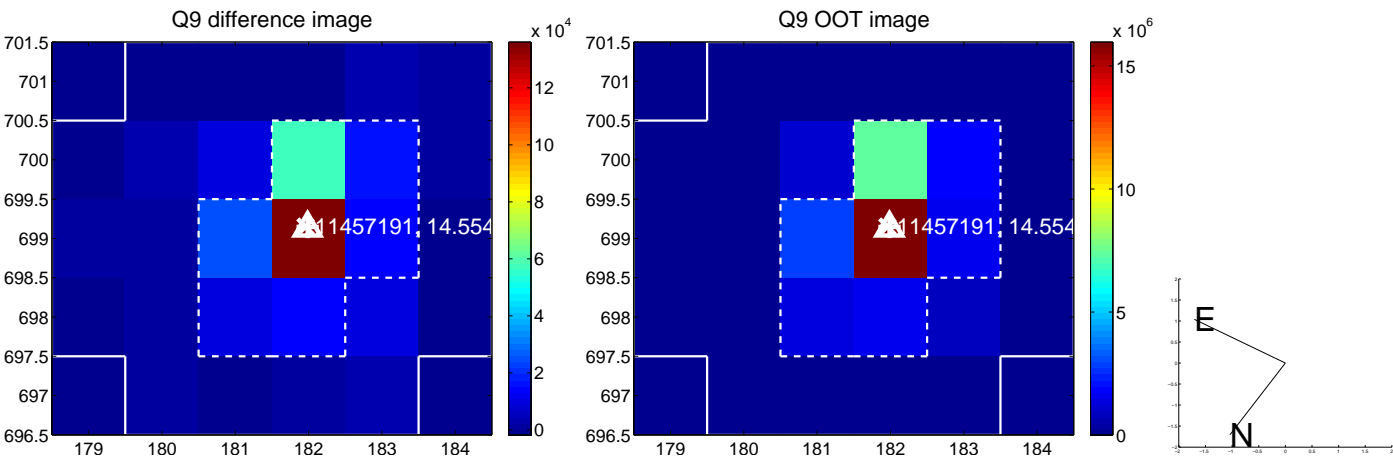
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

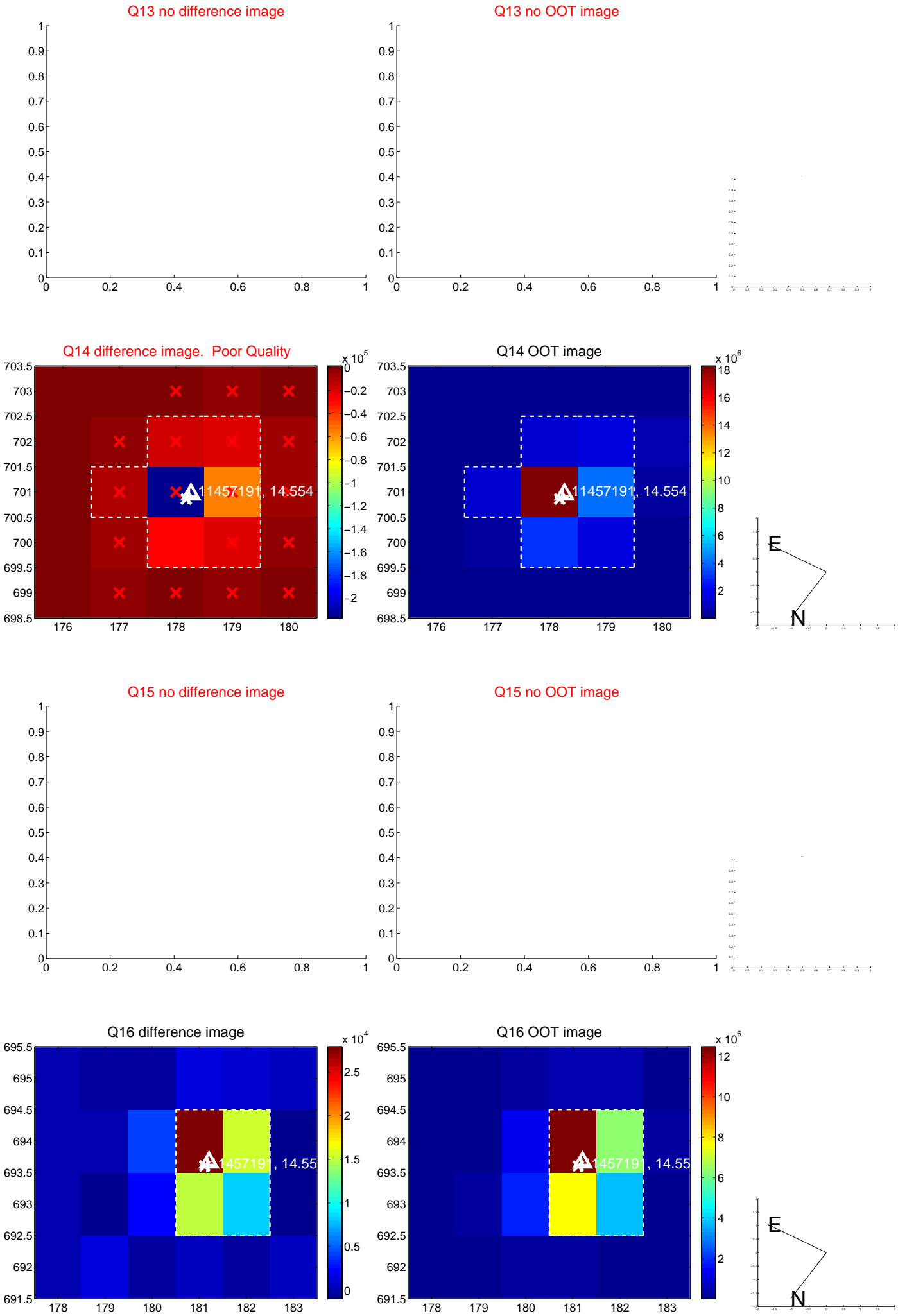


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

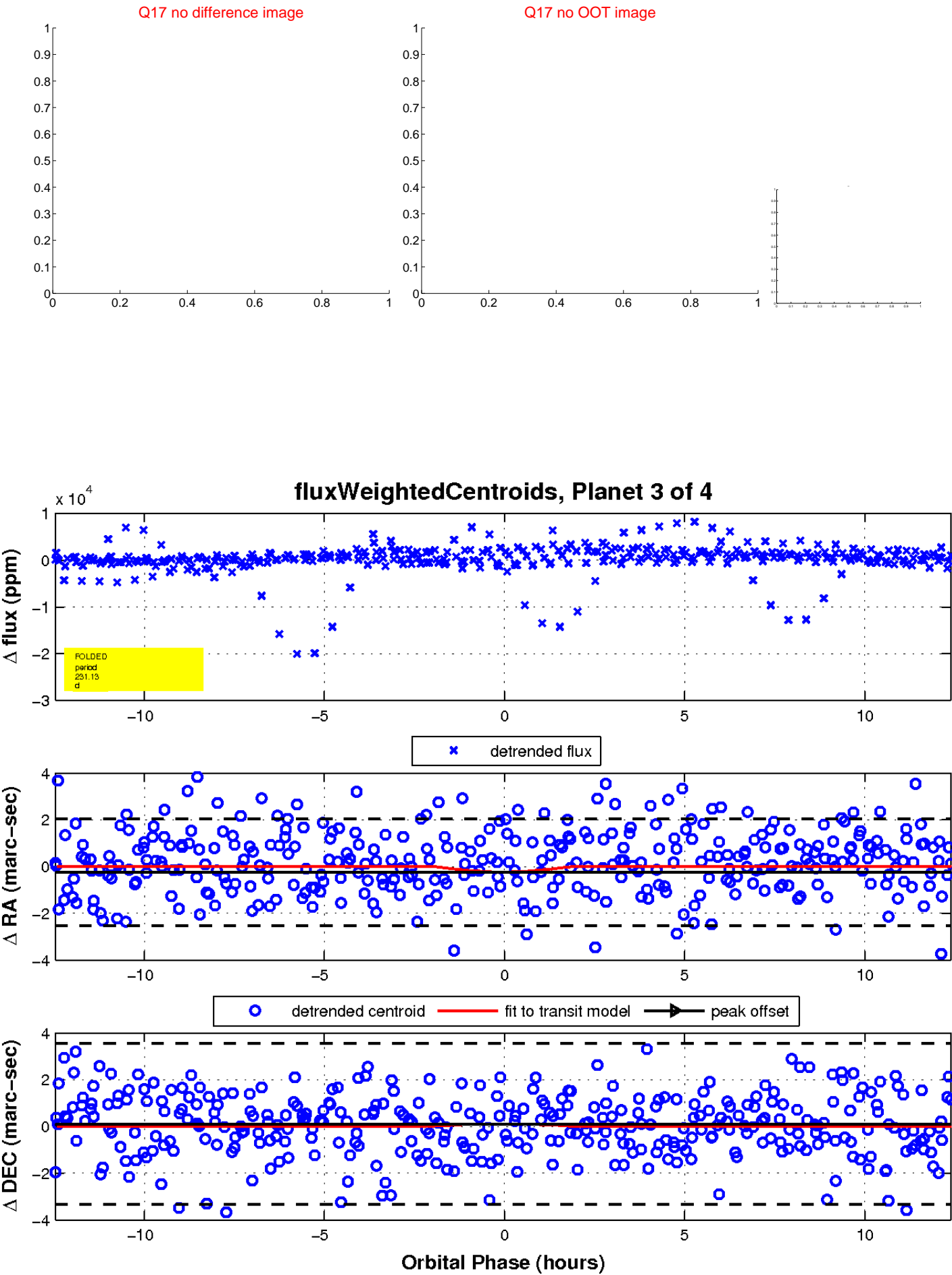




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

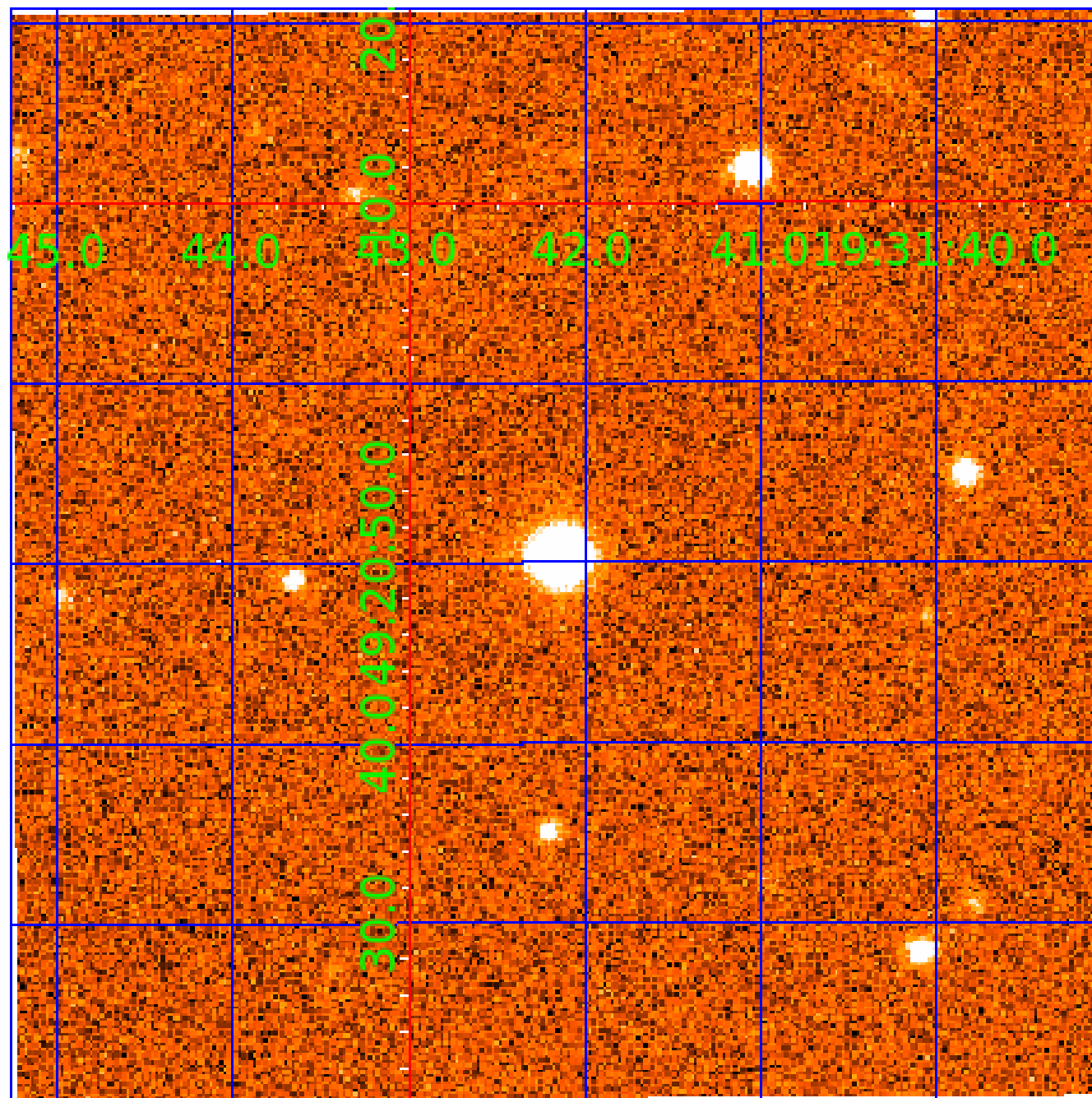


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 011457191

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
011457191-01	OBS	7447.01	1.149182	131.826173	28130.3	3.960	2384.6	1094.9	0.87	5858	20.23	1932.20
011457191-02	OBS	No	209.612719	174.767630	1383.2	14.684	15.7	4.0	0.87	5858	3.28	1.87
011457191-03	OBS	No	231.134684	161.206540	1963.0	4.164	11.4	6.2	0.87	5858	5.41	1.64
011457191-04	OBS	No	396.072268	376.947744	3889.6	7.404	10.3	9.2	0.87	5858	6.07	0.80

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
011457191-01	OBS	FP	0.00	0	1	0	0	SWEET_EB—DEPTH_ODDEVEN_DV—DEPTH_ODDEVEN_ALT—MOD_ODDEVEN_DV—MOD_ODDEVEN_ALT—DEEP_V_SHAPED
011457191-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
011457191-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS
011457191-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS

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

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

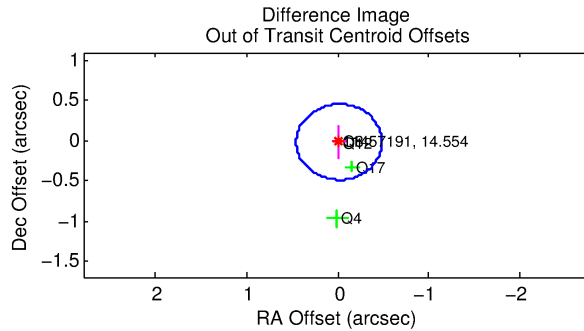
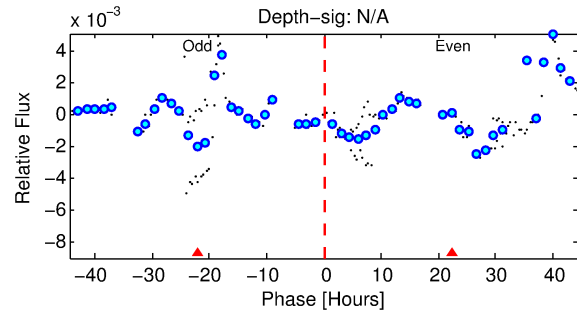
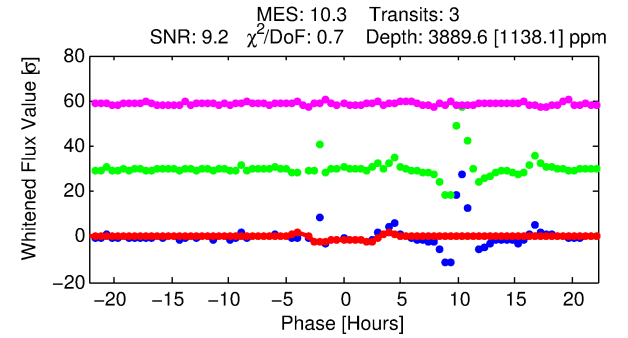
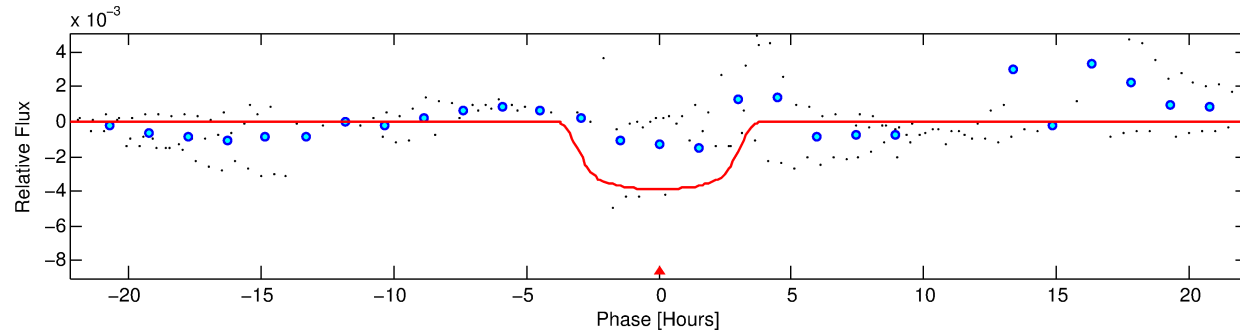
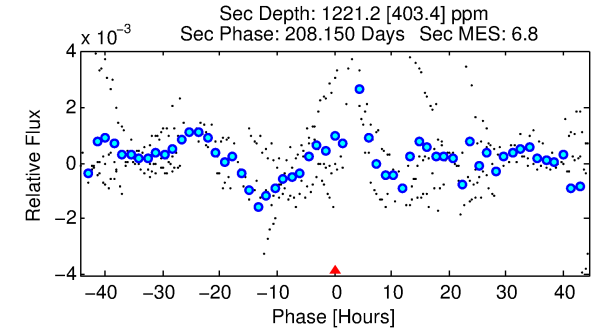
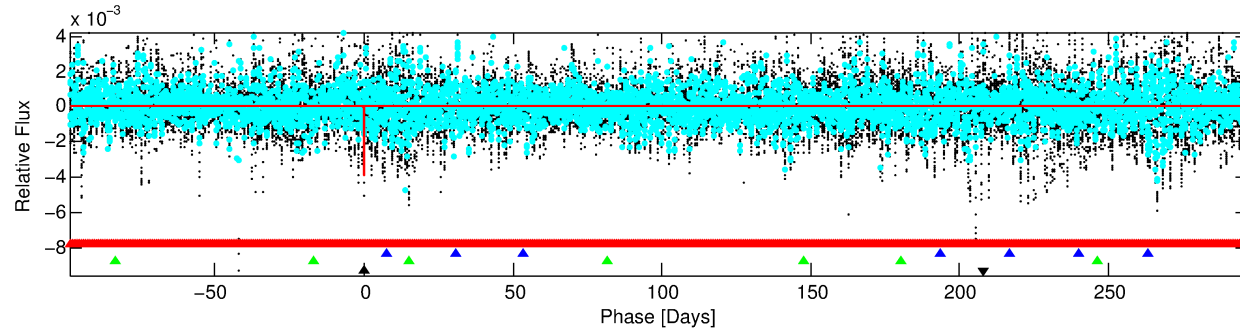
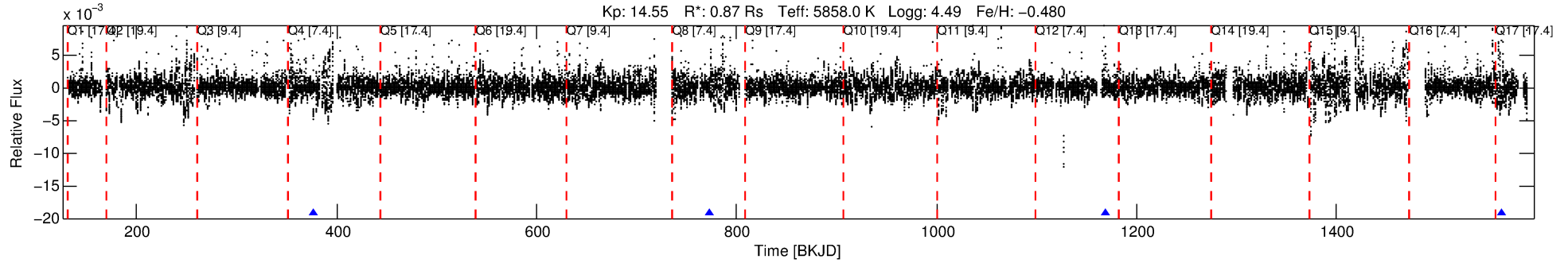
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 011457191-04

No Significant Match Found

# DV One-Page Summary

KIC: 11457191 Candidate: 4 of 4 Period: 396.072 d  
KOI: K07447 Corr: No Ephemeris Match



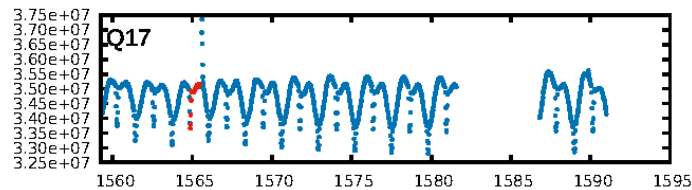
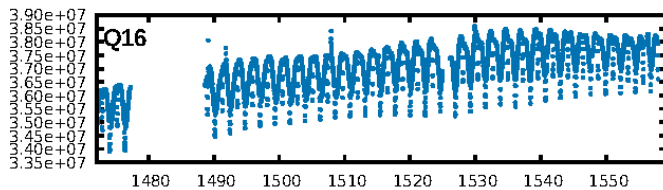
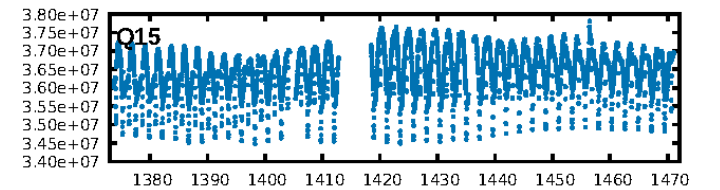
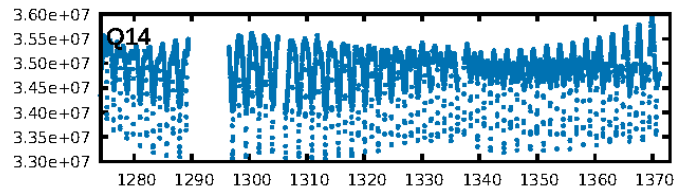
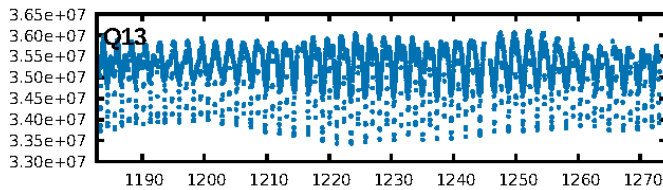
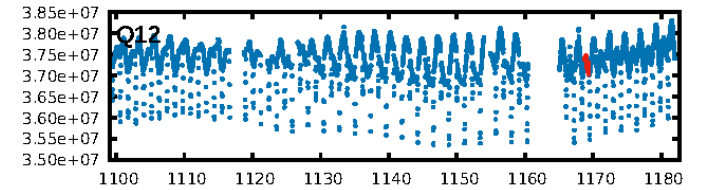
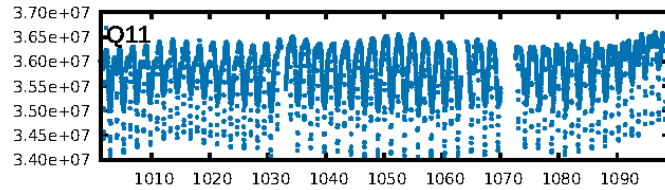
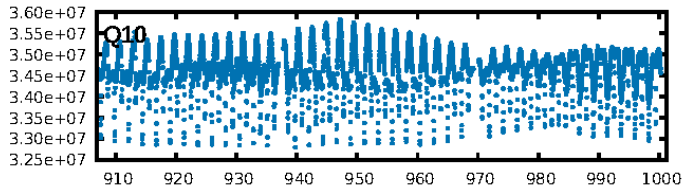
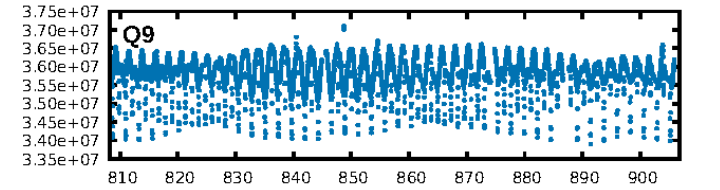
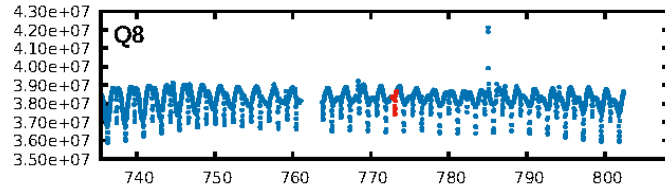
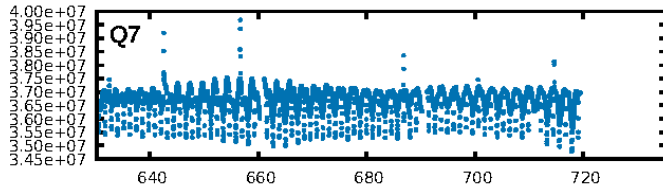
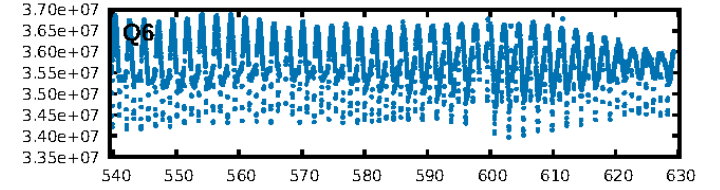
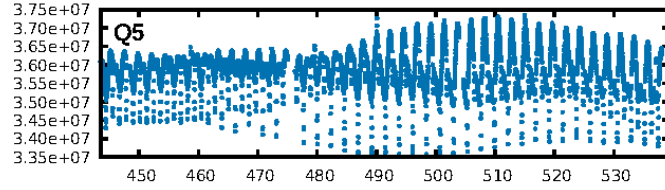
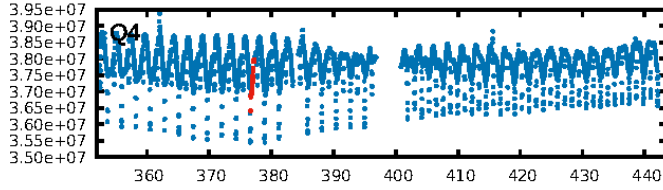
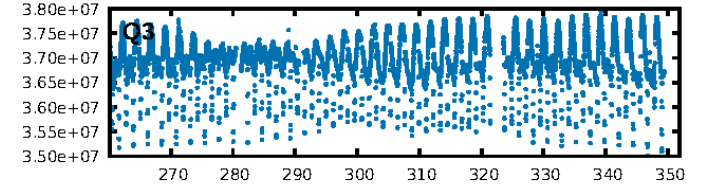
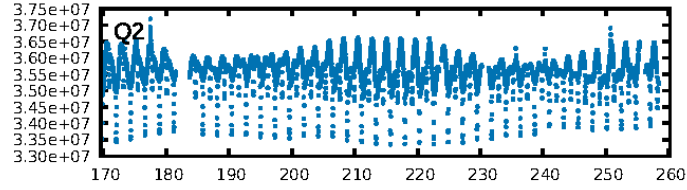
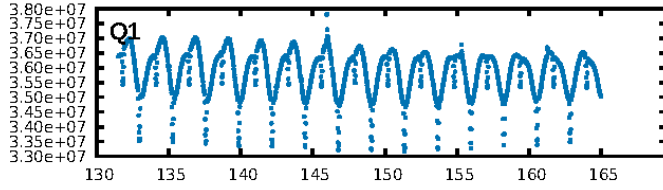
## DV Fit Results:

Period = 396.07227 [0.00978] d  
Epoch = 376.9477 [0.0206] BKJD  
Rp/R\* = 0.0641 [0.0116]  
a/R\* = 274.36 [108.41]  
b = 0.83 [0.15]  
Seff = 0.80 [0.26]  
Teq = 241 [20] K  
Rp = 6.07 [1.93] Re  
a = 0.9959 [0.2166] AU  
Ag = 18096.71 [10504.43] [1.72 $\sigma$ ]  
Teffp = 4324 [542] K [7.53 $\sigma$ ]

## DV Diagnostic Results:

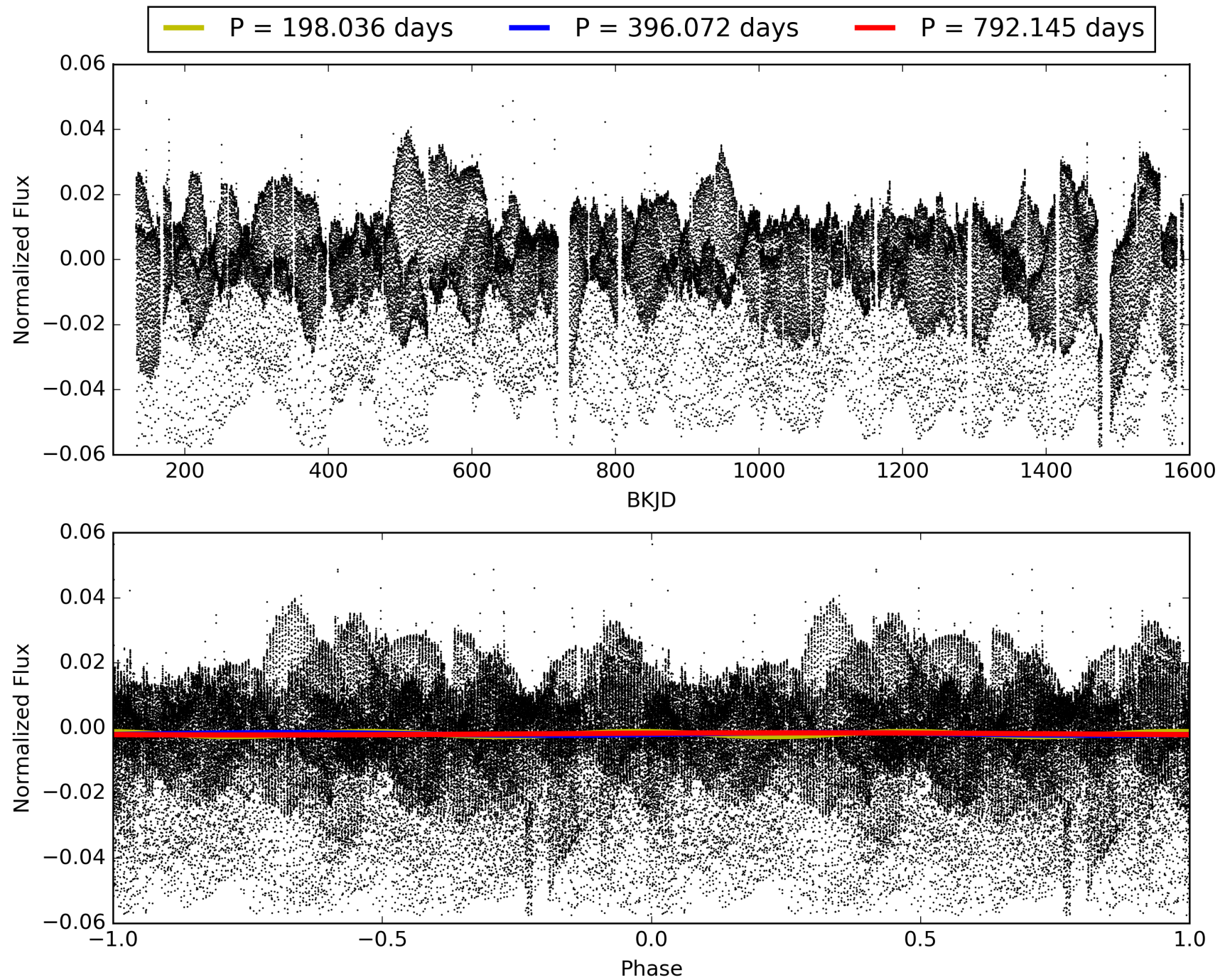
ShortPeriod-sig: 100.0% [466.00 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 42.8%  
ModelChiSquareGof-sig: 100.0%  
**Bootstrap-pfa: 7.20e-09**  
RollingBand-fgt: 1.00 [2/2]  
GhostDiagnostic-chr: 0.4664  
Centroid-sig: 70.5%  
Centroid-so: 0.128 arcsec [0.74 $\sigma$ ]  
OotOffset-rm: 0.024 arcsec [0.15 $\sigma$ ]  
OotOffset-st: 0/0/3/1 [4]  
KicOffset-rm: 0.210 arcsec [1.90 $\sigma$ ]  
KicOffset-st: 0/0/3/1 [4]  
DiffImageQuality-fgm: 0.75 [3/4]  
DiffImageOverlap-fno: 0.00 [0/4]

# TCE 011457191-04, PDC Light Curves



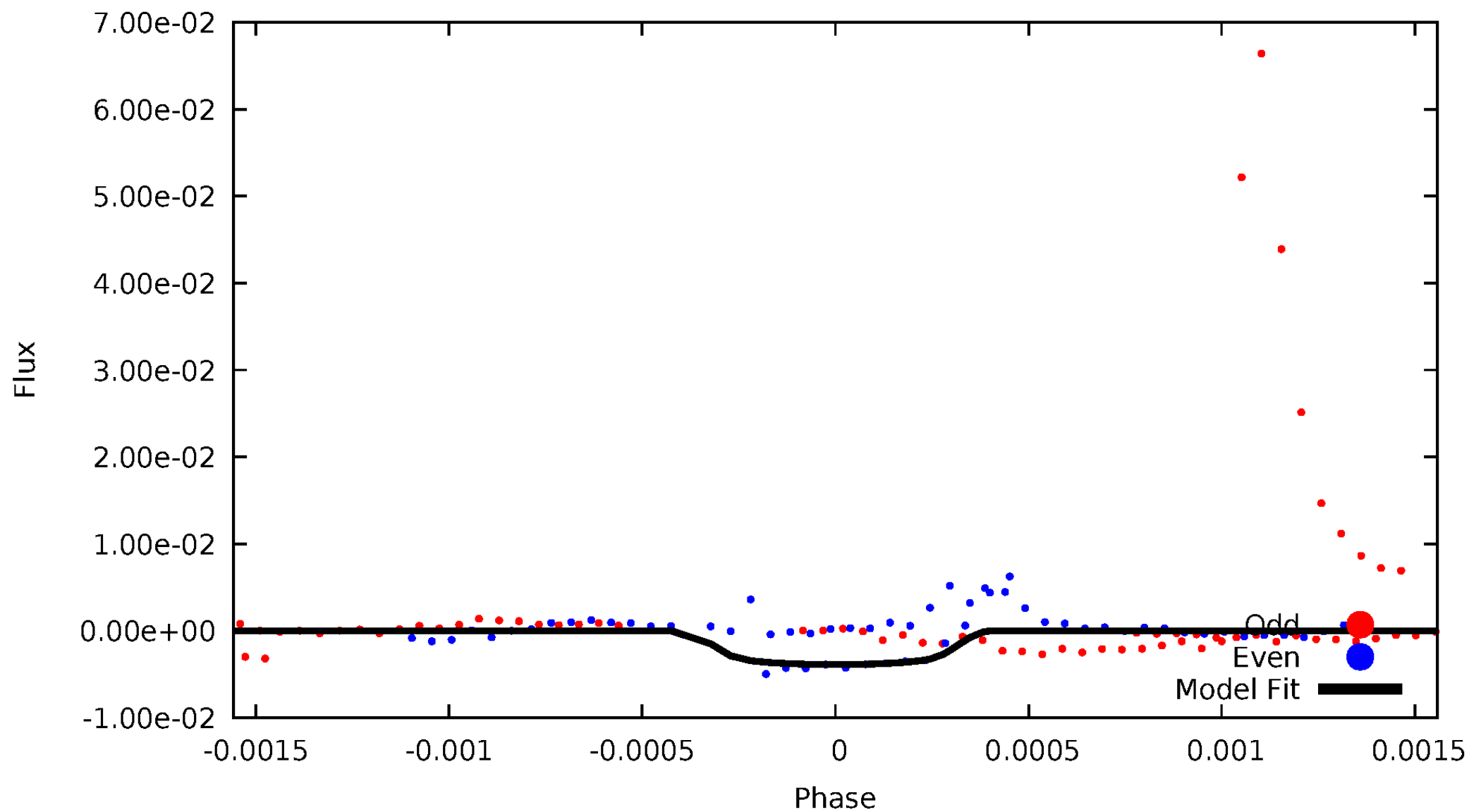


TCE 011457191-04



# DV Odd/Even

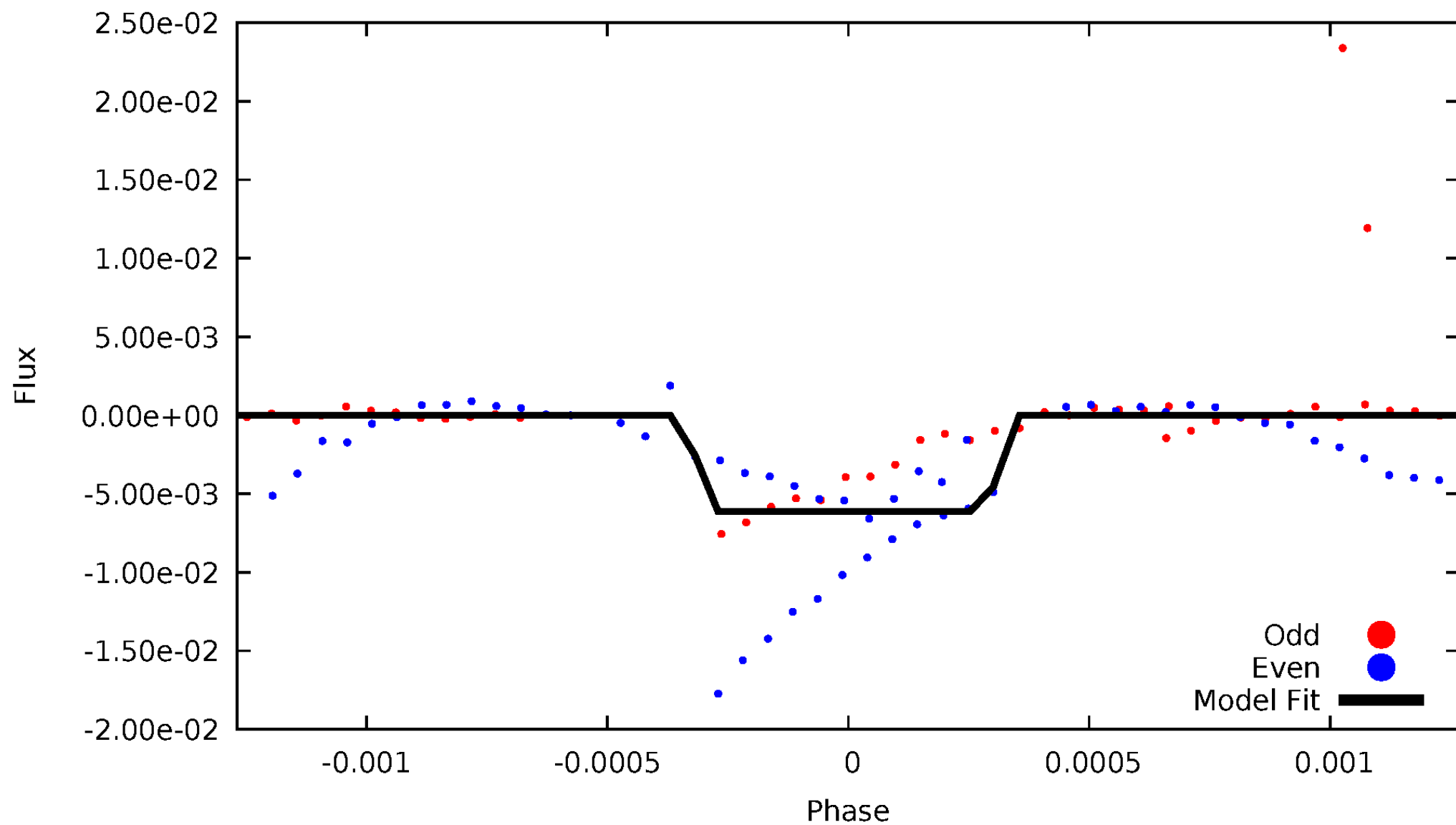
TCE 011457191-04





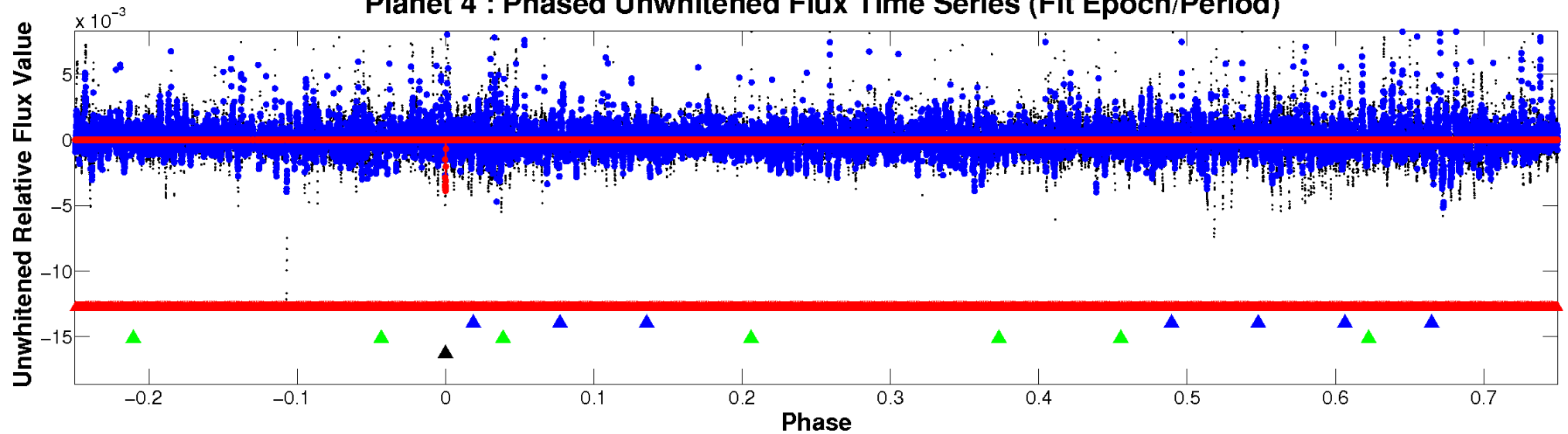
# ALT Odd/Even

TCE 011457191-04

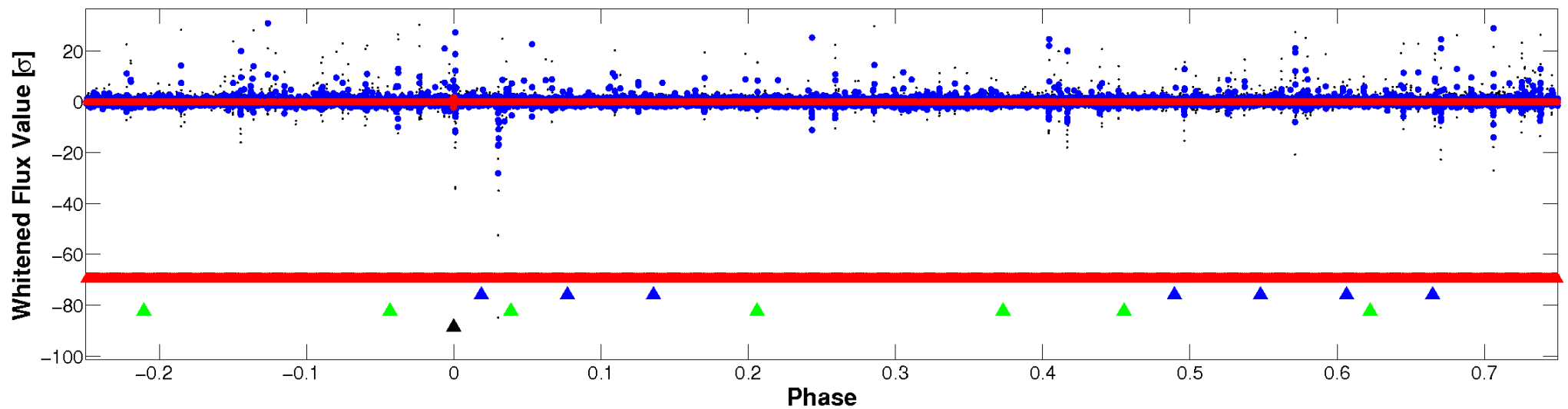


# Non-Whitened Vs. Whitened Light Curve

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

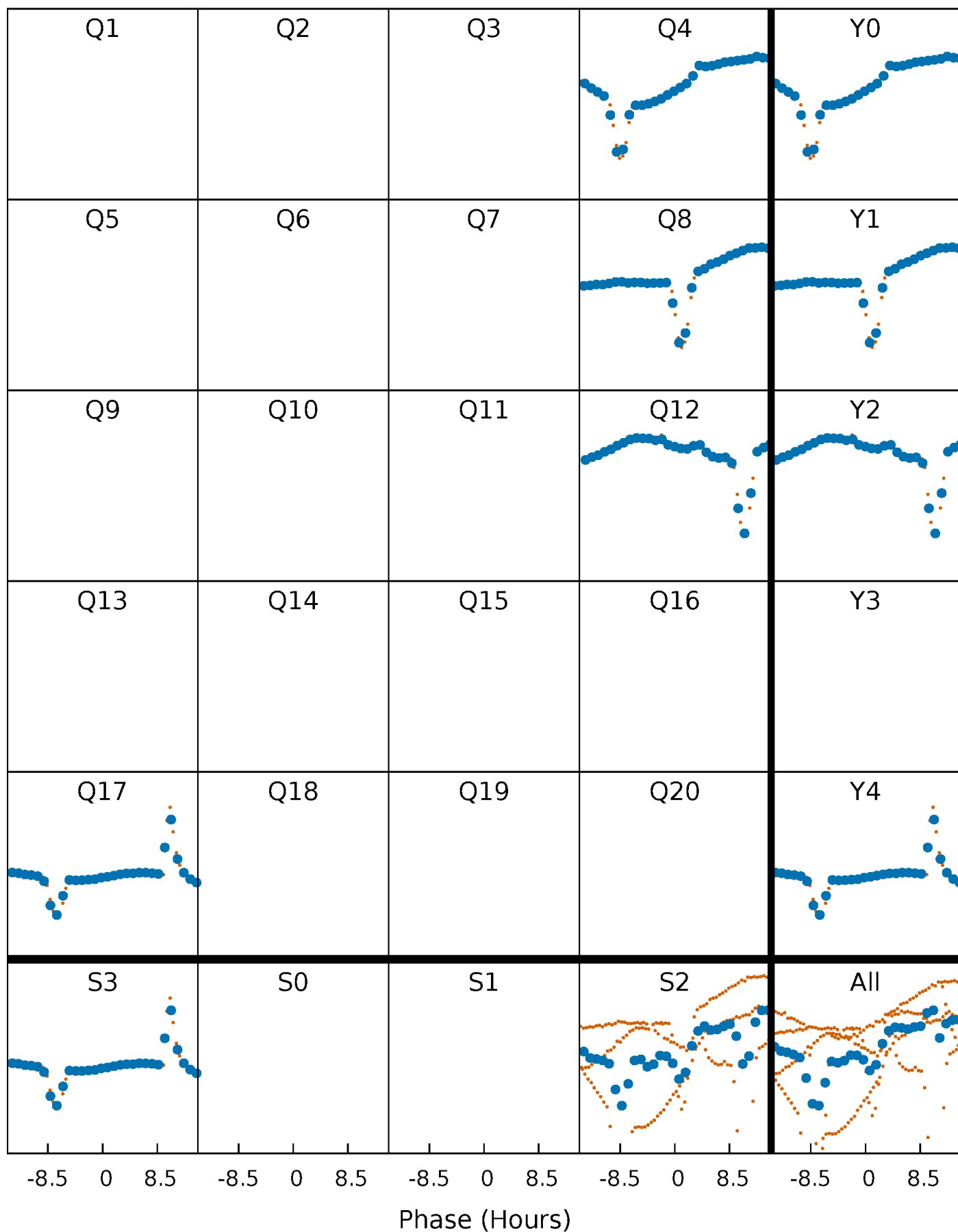


## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



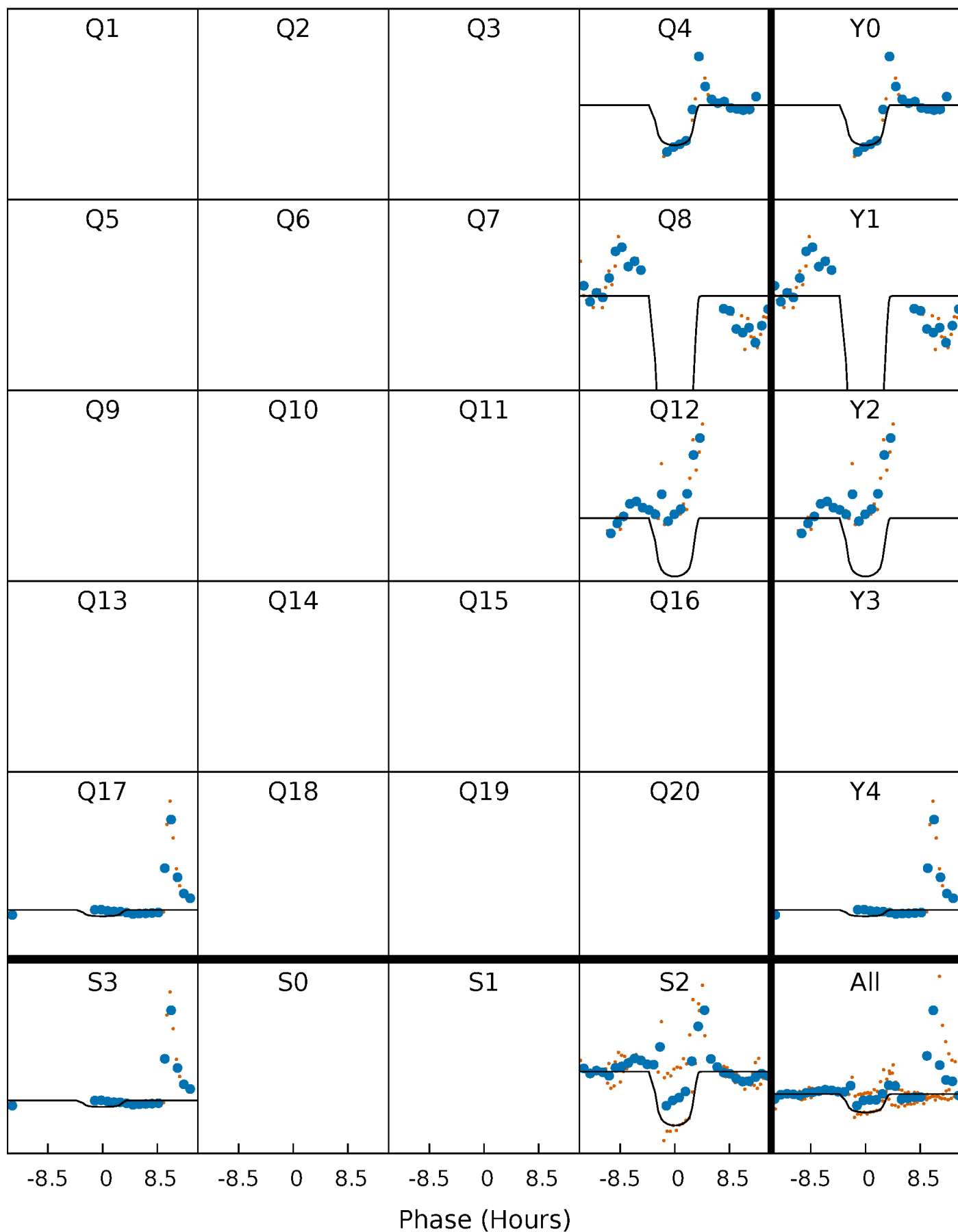
# PDC Quarter-Phased Transit Curves

TCE 011457191-04     $P=396.072268$  Days     $T_0=376.947744$  (BKJD)



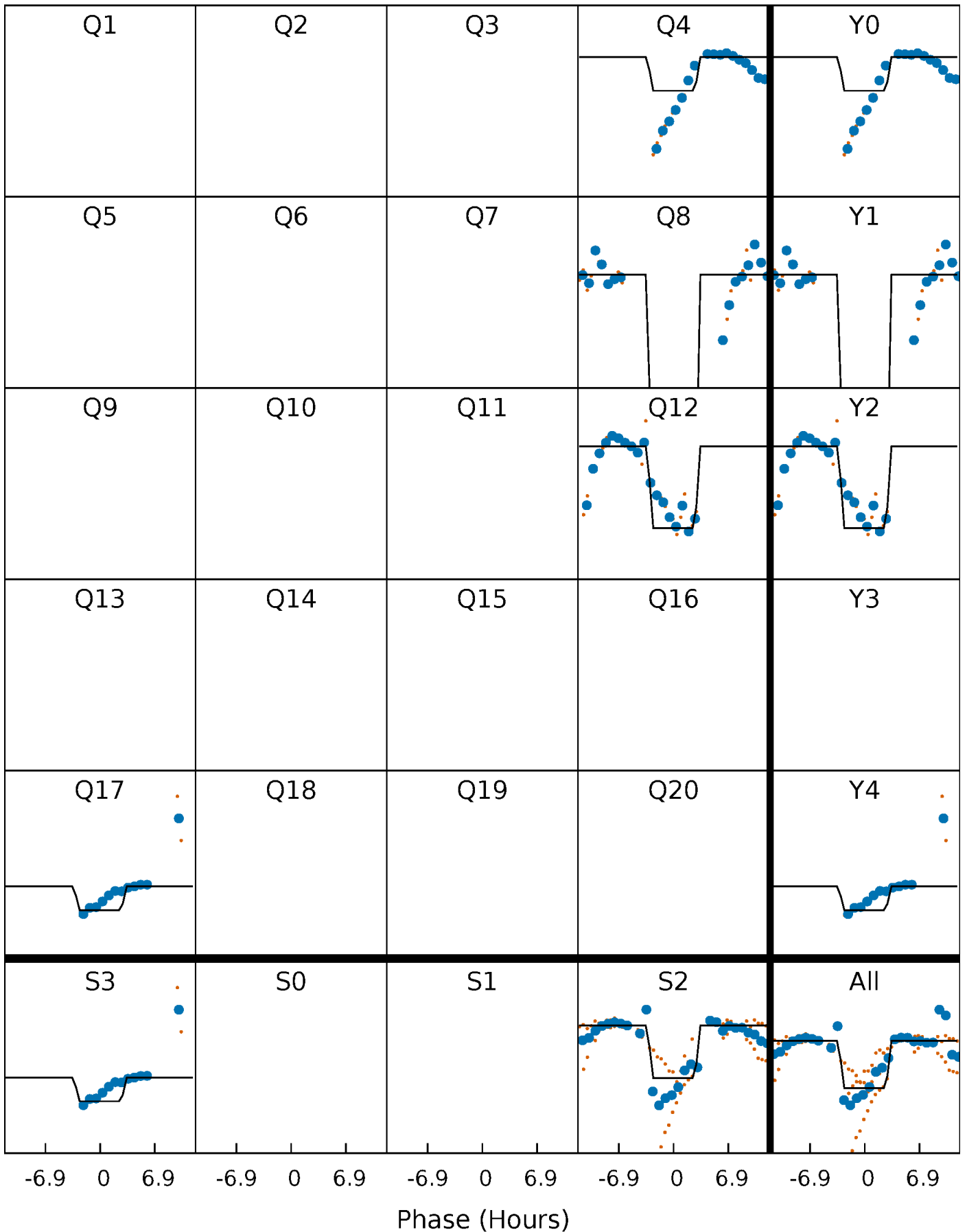
# DV Quarter-Phased Transit Curves

TCE 011457191-04 P=396.072268 Days  $T_0=376.947744$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

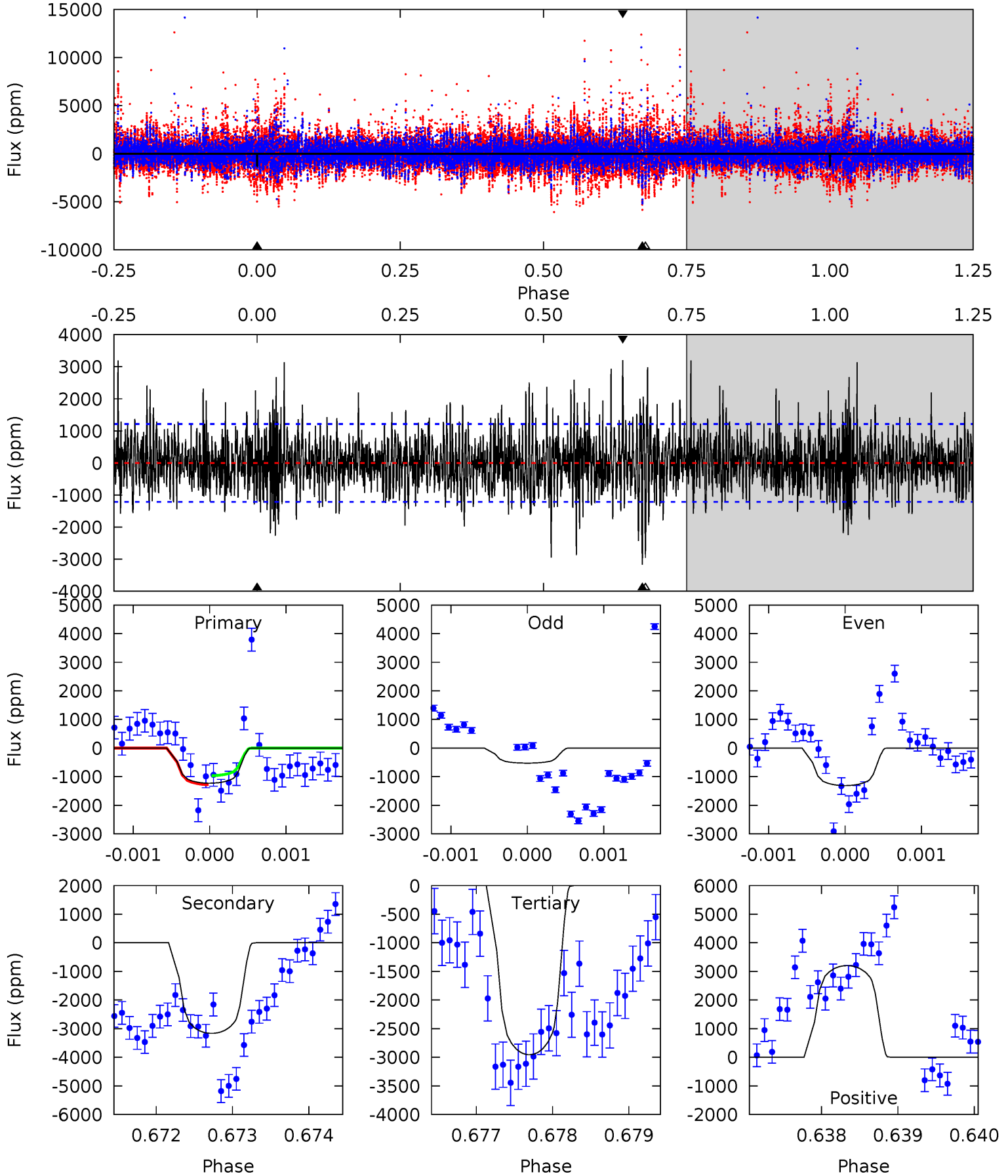
TCE 011457191-04 P=396.084127 Days  $T_0=376.983538$  (BKJD)



# DV Model-Shift Uniqueness Test

011457191-04, P = 396.072268 Days, E = 376.947744 Days

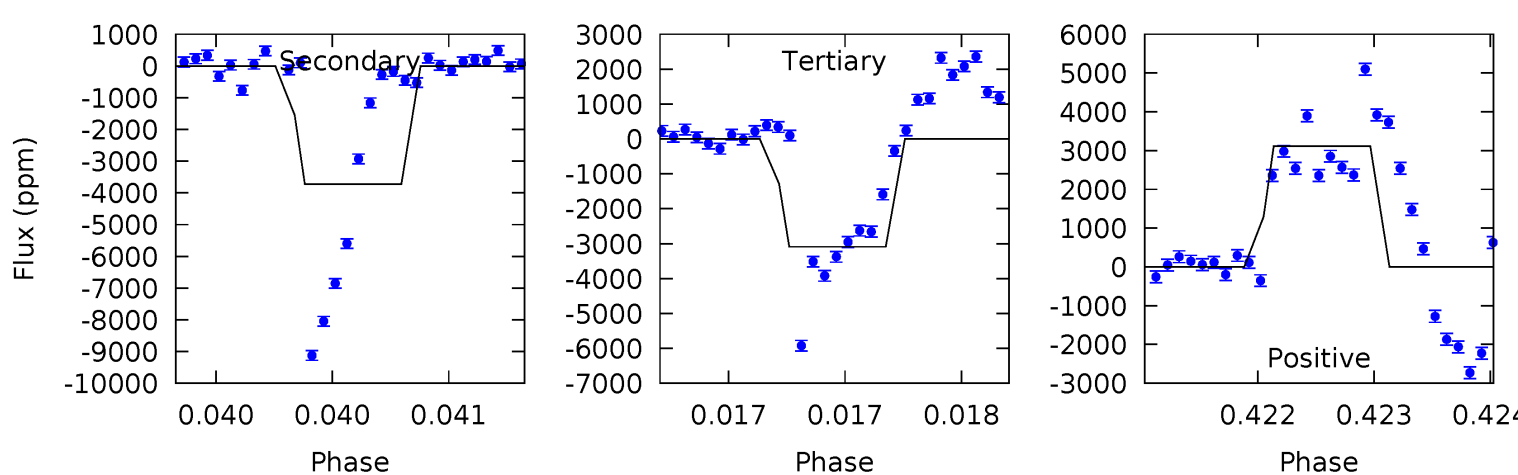
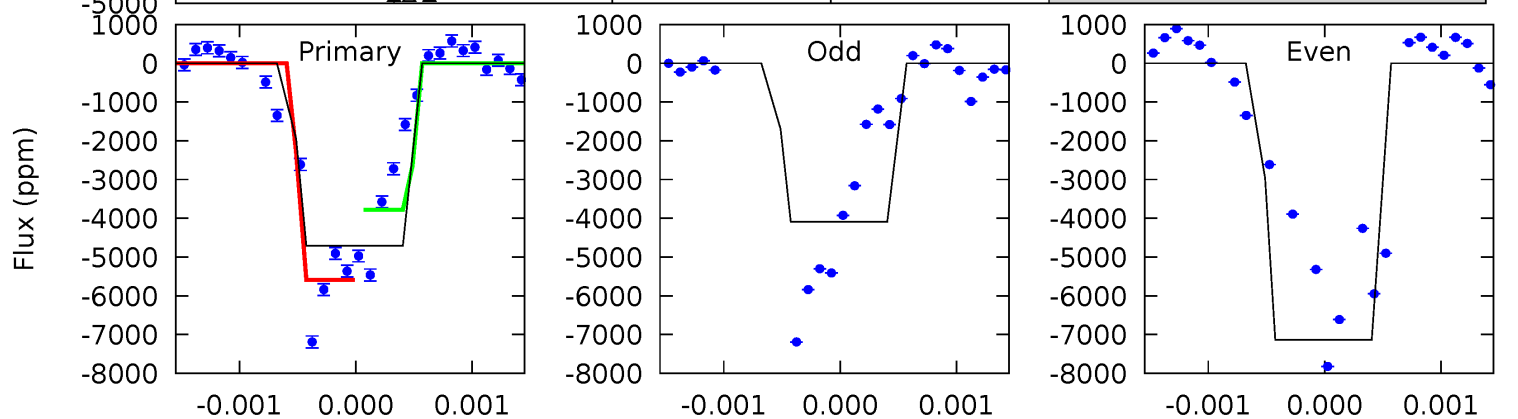
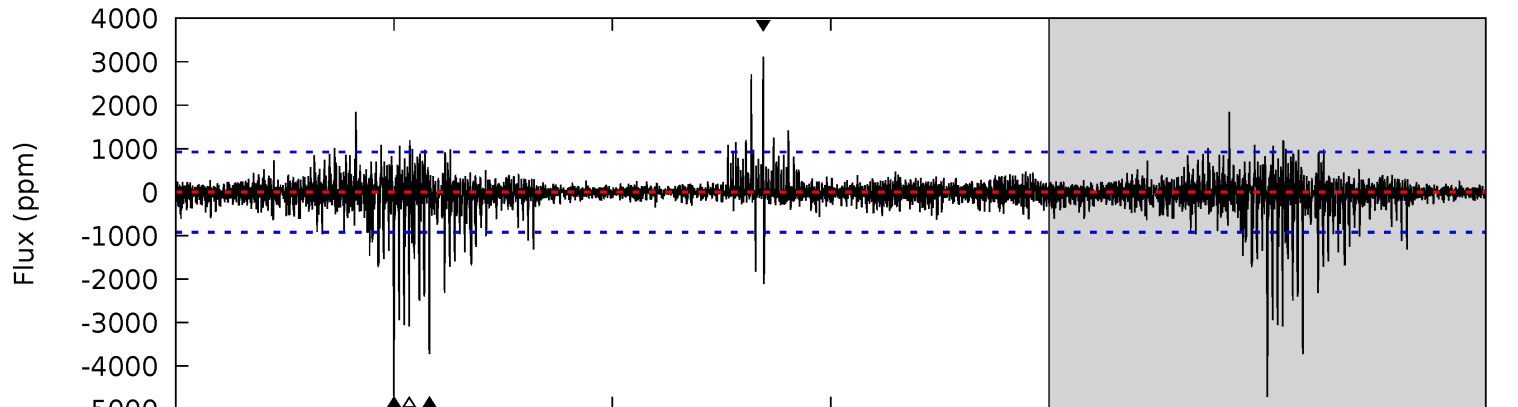
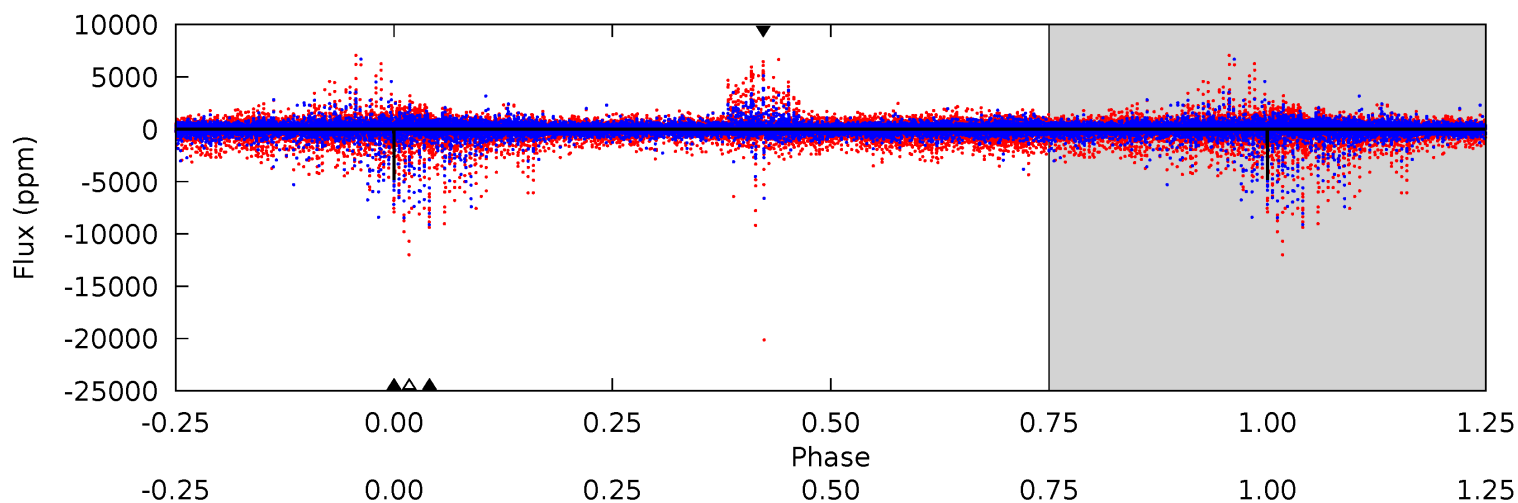
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.57	14.3	13.4	14.5	5.50	3.37	3.29	-7.82	-8.94	0.95	-0.17	1.35	2.21	0.50	0.66



# Alt Model-Shift Uniqueness Test

011457191-04, P = 396.084127 Days, E = 376.983538 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
28.2	22.3	18.5	18.7	5.54	3.42	1.74	9.70	9.55	3.81	3.66	4.81	1.29	0.40	5.28



### Stellar Parameters For KIC 011457191

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5858^{+159}_{-159}$	$4.486^{+0.091}_{-0.169}$	$-0.480^{+0.300}_{-0.300}$	$0.867^{+0.227}_{-0.097}$	$0.840^{+0.106}_{-0.070}$	$1.813^{+0.721}_{-0.845}$
	+3%/-3%	+2%/-4%	+62%/-62%	+26%/-11%	+13%/-8%	+40%/-47%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 011457191-04 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-3164 \pm 221$	$6.30^{+1.28}_{-1.24}$	$340^{+21}_{-16}$	$5493^{+561}_{-419}$	$43402^{+24716}_{-13233}$
Alt.	$-3727 \pm 167$	$7.48^{+1.38}_{-1.21}$	$339^{+23}_{-15}$	$5247^{+384}_{-337}$	$36506^{+15392}_{-10521}$

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



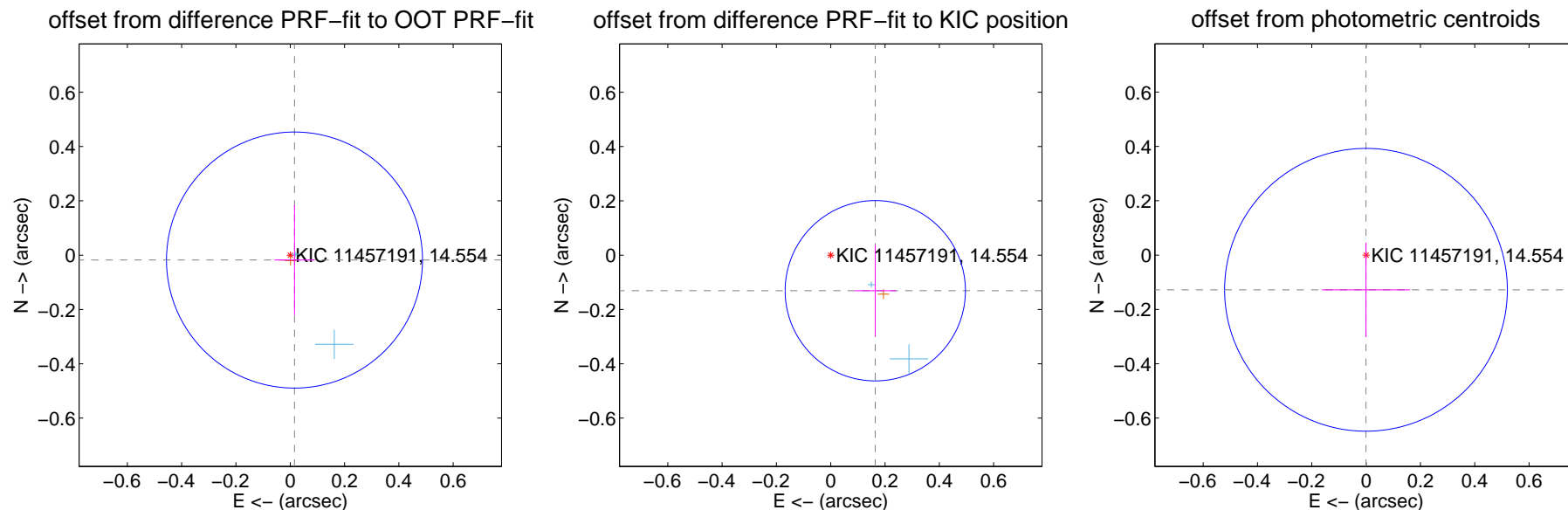
## DV Centroid Data

Supplemental centroid analysis for 011457191-04. Kepler magnitude: 14.55. Transit SNR 9.24

There are 3 quarters with good PRF difference image offsets

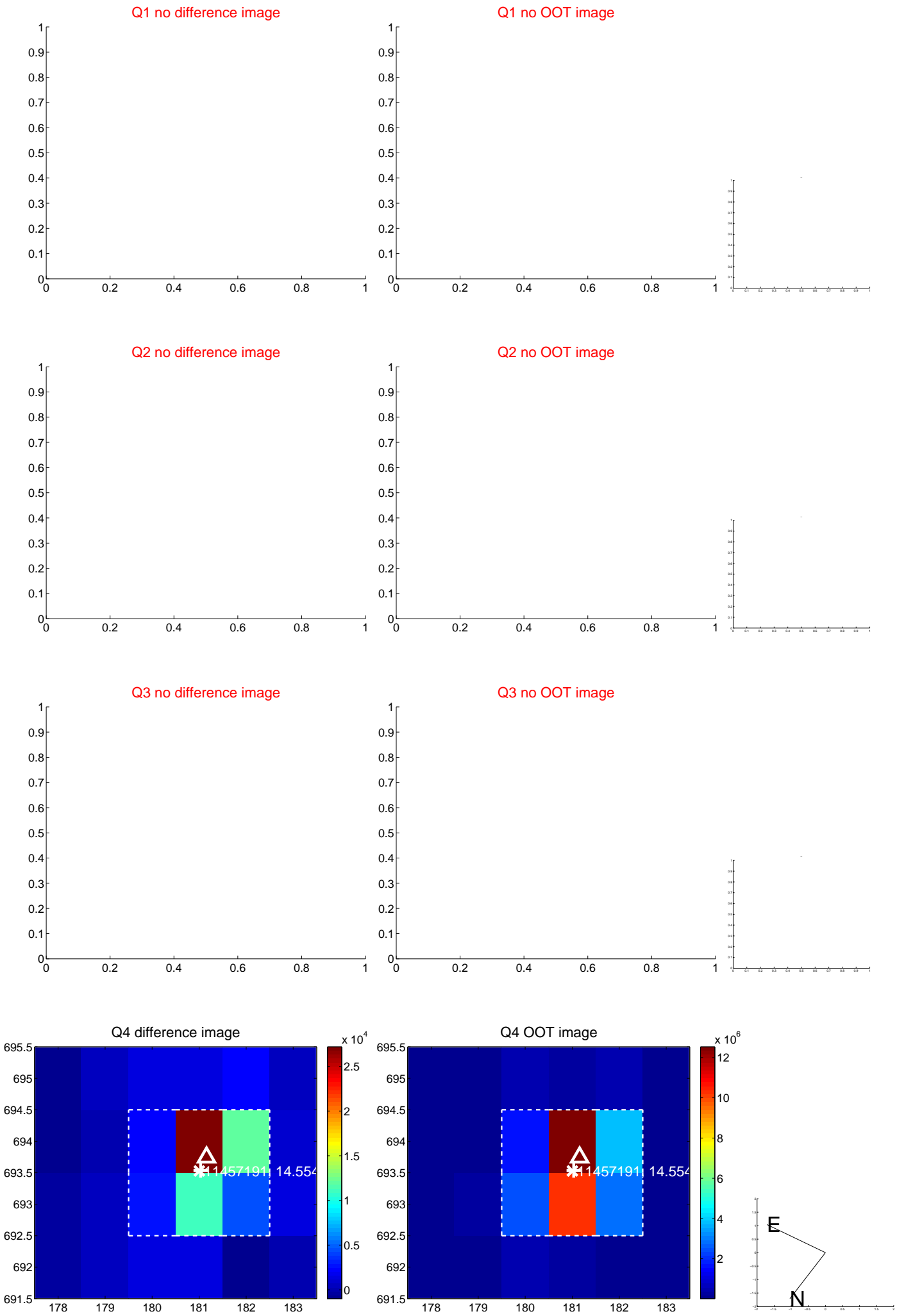
The direct PRF centroid is offset from the target star catalog position by about 0.14 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.024 \pm 0.157$	0.15	$-0.016 \pm 0.074$	$-0.018 \pm 0.202$
PRF-fit source offset from KIC position	$0.210 \pm 0.111$	1.90	$-0.164 \pm 0.076$	$-0.131 \pm 0.168$
photometric centroid source offset	$0.13 \pm 0.17$	0.74	$0.00 \pm 0.16$	$-0.13 \pm 0.17$

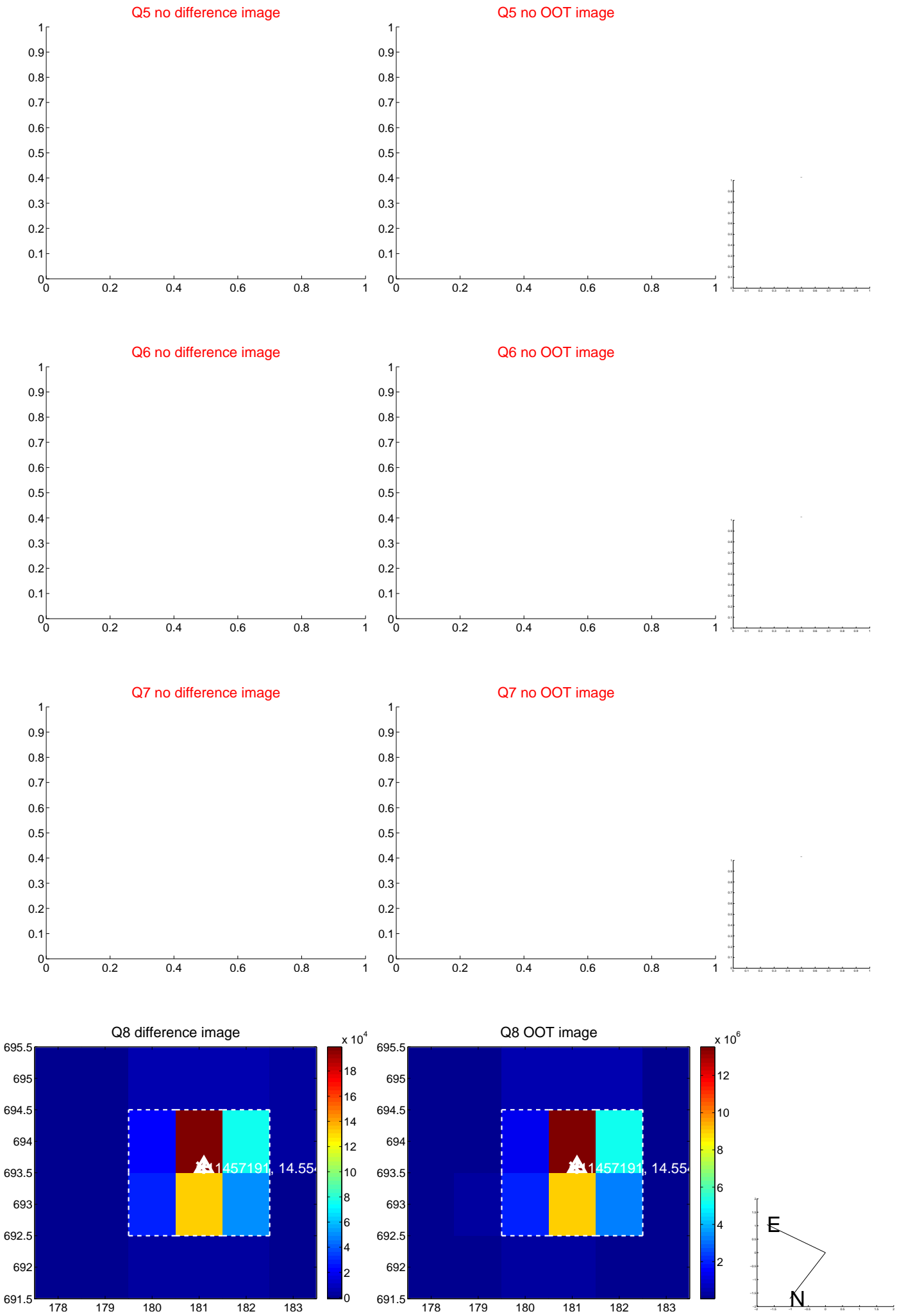


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

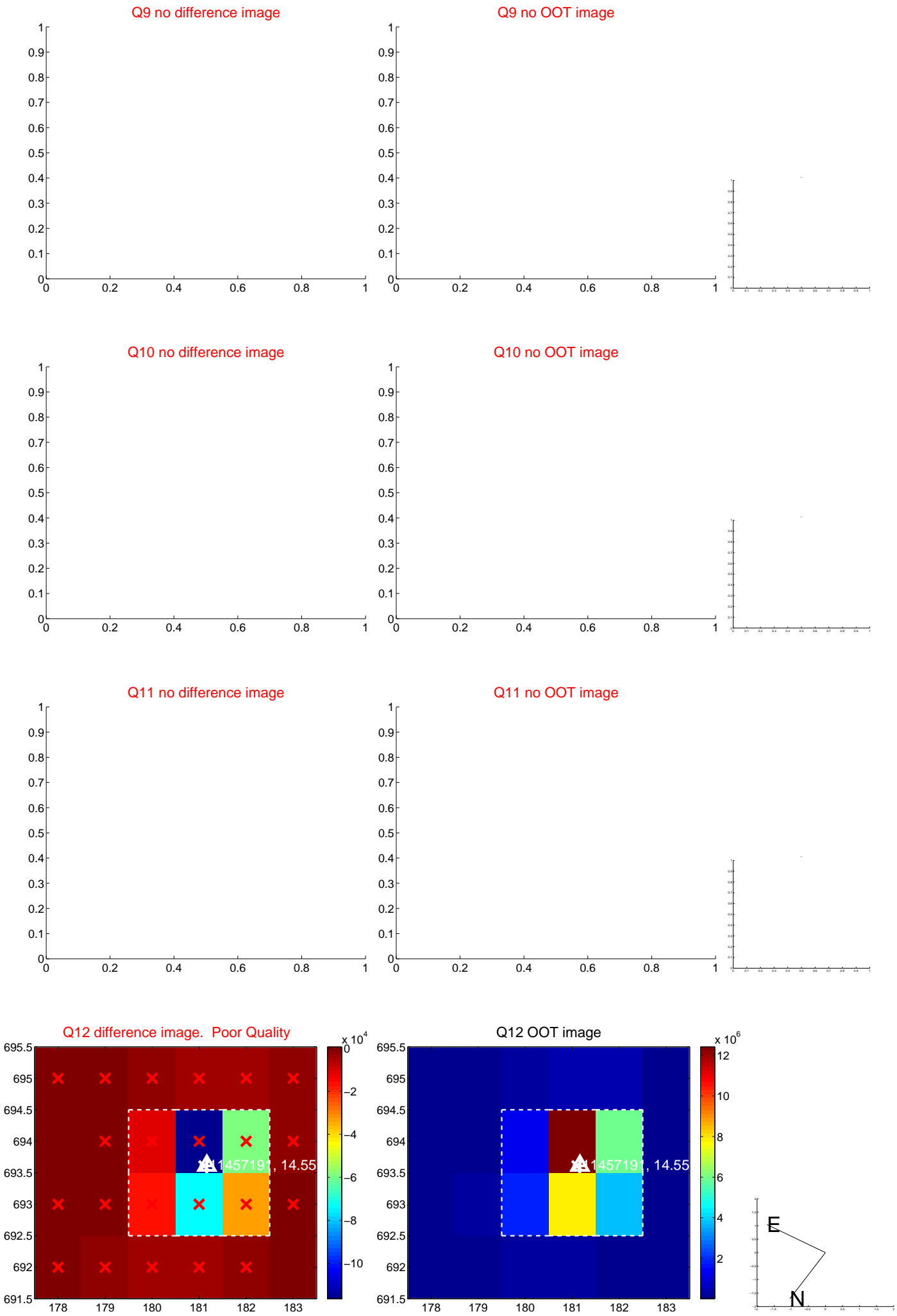
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



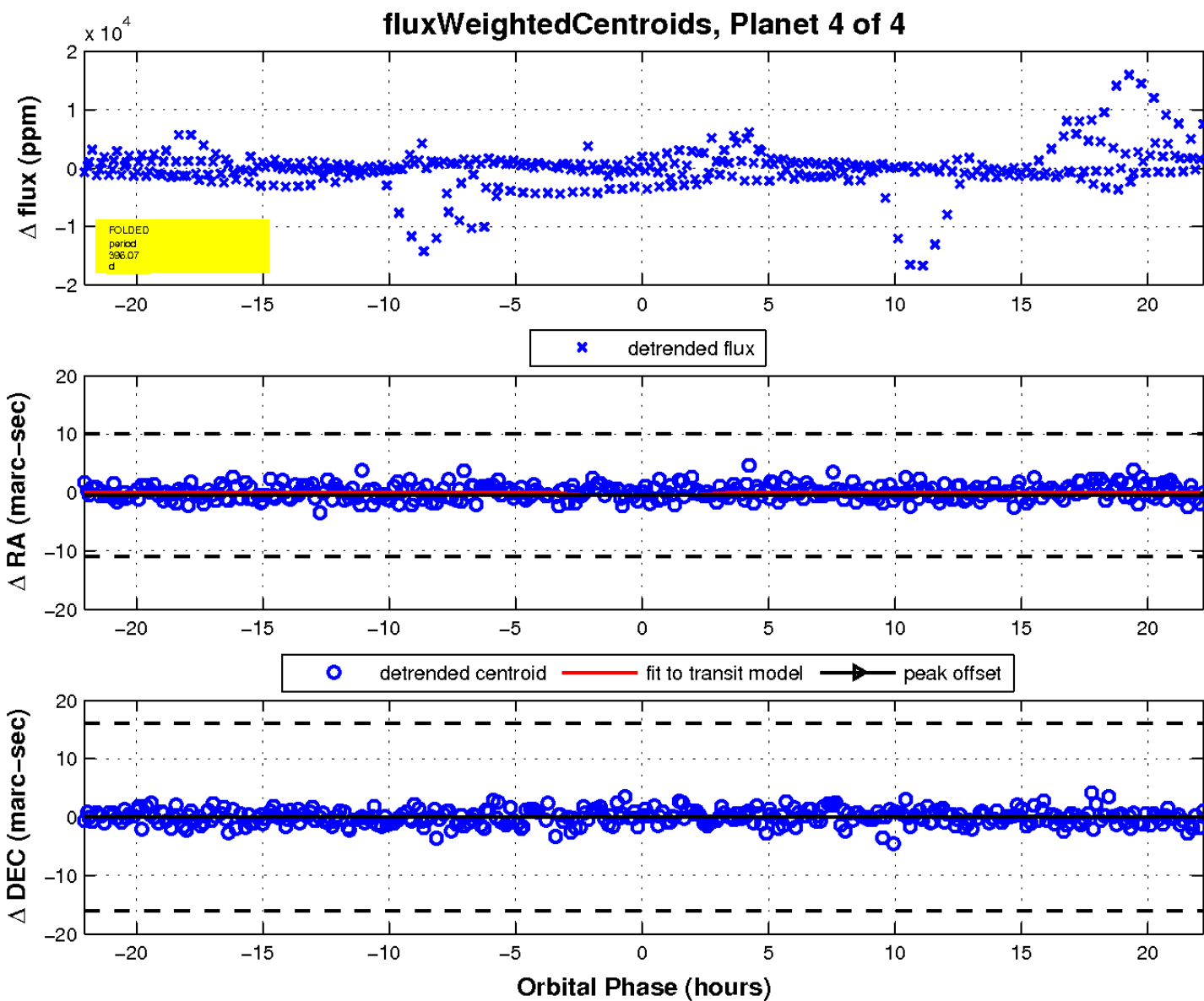
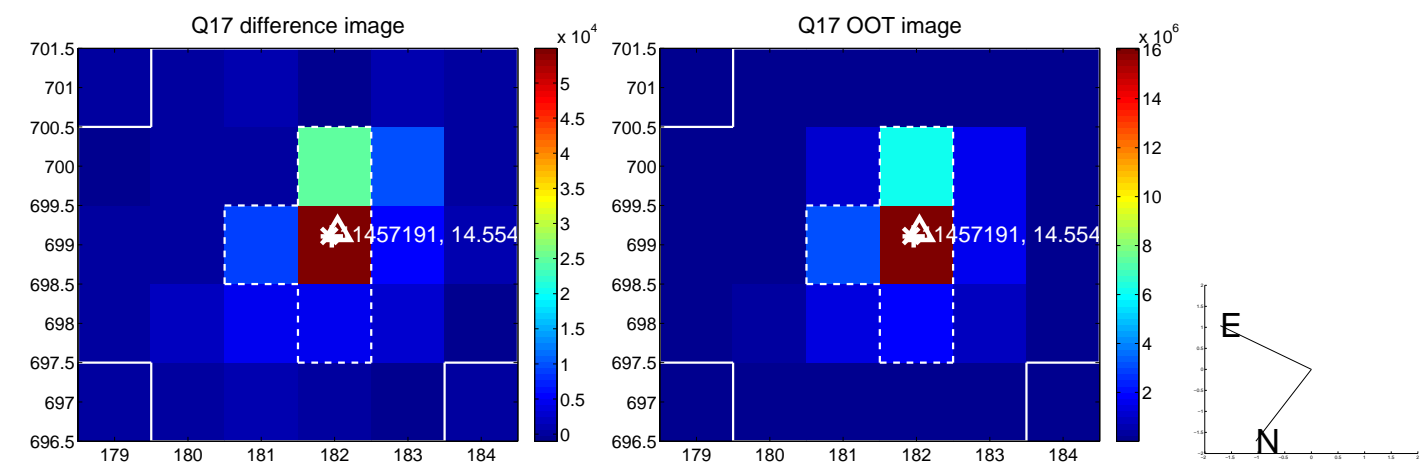
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.



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



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



UKIRT Image

Declination

