

# KIC 001570924

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
001570924-01	OBS	No	322.161386	427.400397	1288.7	2.822	11.3	5.1	0.76	4961	2.84	0.46
001570924-02	OBS	No	443.672193	454.293039	791.0	3.400	15.3	3.9	0.76	4961	2.51	0.30
001570924-03	OBS	No	223.374345	295.466269	893.0	2.871	11.2	6.5	0.76	4961	2.39	0.74

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
001570924-01	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—CENT_FEW_DIFFS—HALO_GHOST
001570924-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
001570924-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_KIC_POS

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

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

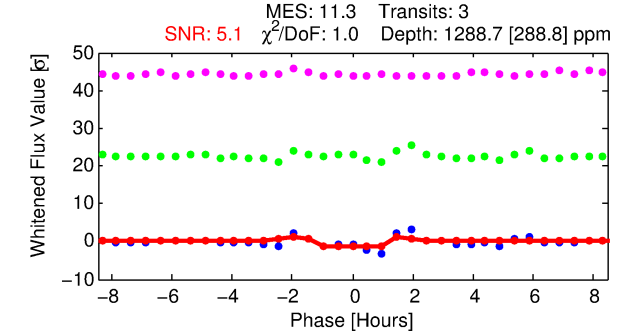
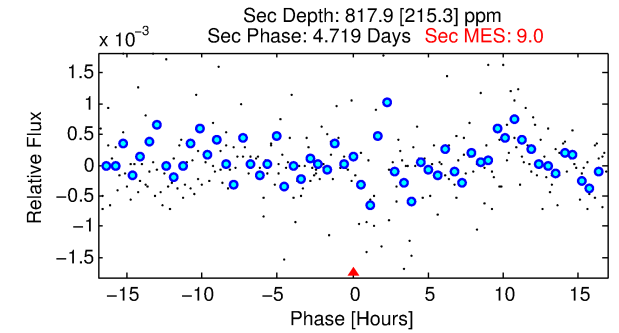
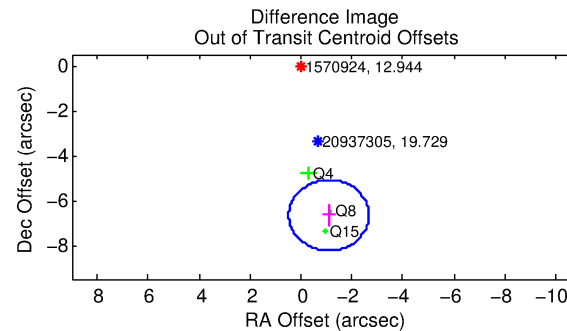
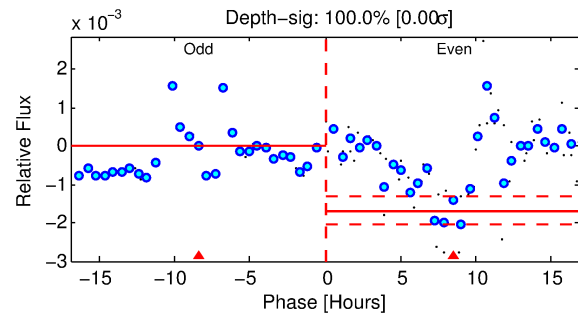
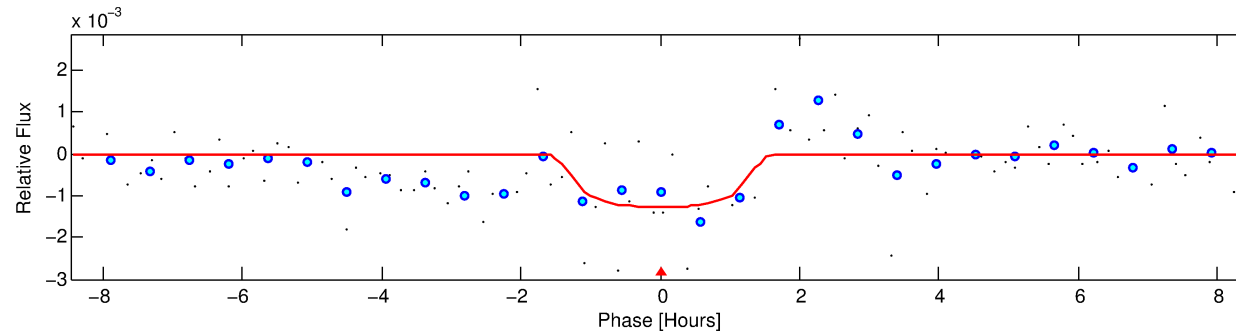
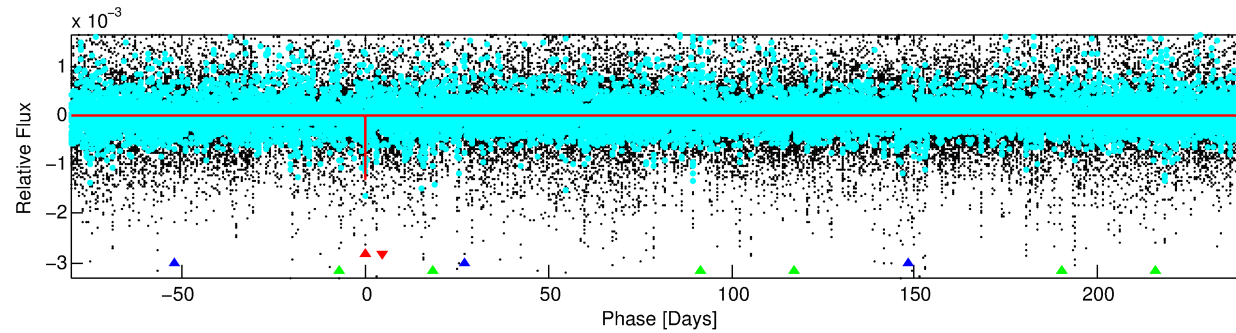
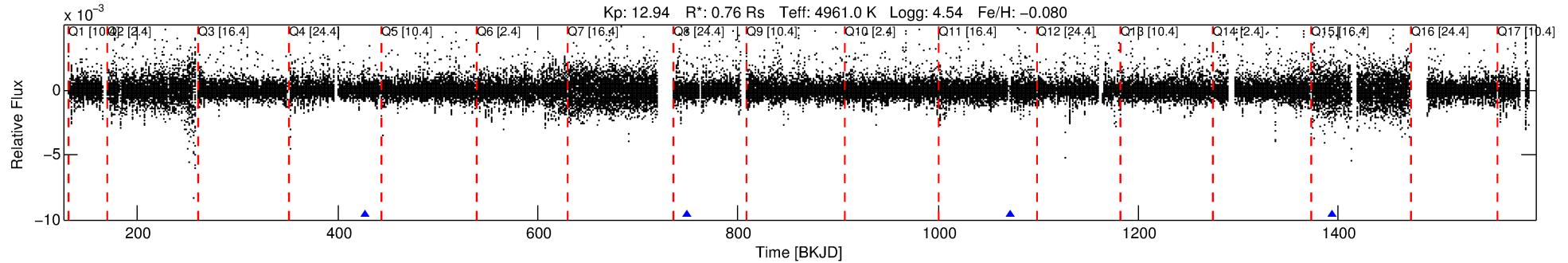
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 001570924-01

No Significant Match Found

# DV One-Page Summary

KIC: 1570924 Candidate: 1 of 3 Period: 322.161 d



## DV Fit Results:

Period = 322.16139 [0.00542] d  
Epoch = 427.4004 [0.0054] BKJD  
Rp/R\* = 0.0341 [0.0646]  
a/R\* = 727.20 [4743.89]  
b = 0.61 [6.85]  
Seff = 0.46 [0.08]  
Teq = 209 [9] K  
Rp = 2.84 [5.38] Re  
a = 0.8319 [0.0730] AU  
Ag = 38719.17 [147203.84] [0.26 $\sigma$ ]  
Teffp = 4543 [4317] K [1.00 $\sigma$ ]

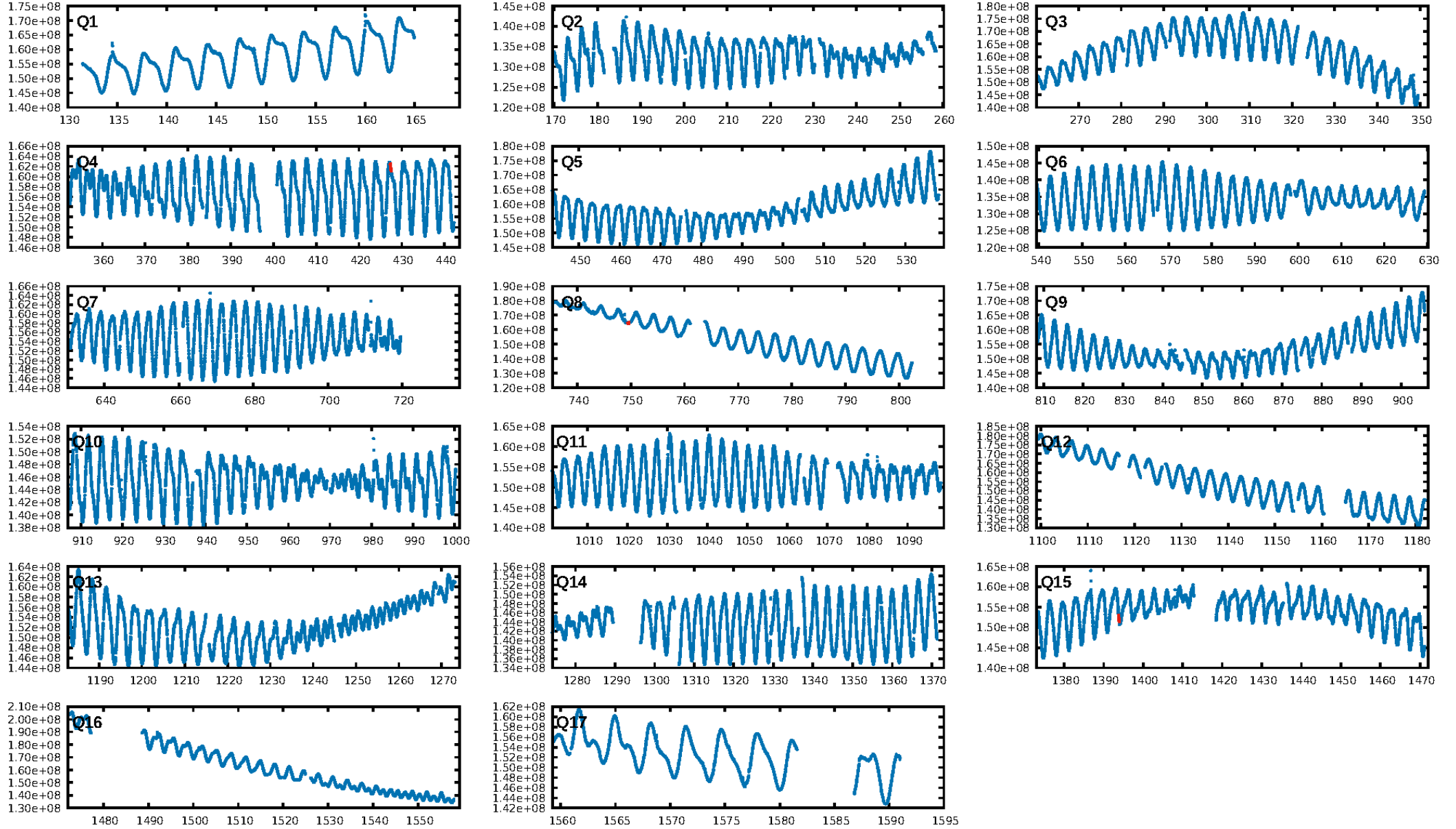
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [588.90 $\sigma$ ]  
LongPeriod-sig: 100.0% [659.99 $\sigma$ ]  
ModelChiSquare2-sig: 32.4%  
ModelChiSquareGof-sig: 81.9%  
**Bootstrap-pfa: 1.11e-08**  
RollingBand-fgt: 1.00 [3/3]  
**GhostDiagnostic-chr: -0.002257**  
Centroid-sig: 93.9%  
Centroid-so: 3.012 arcsec [1.90 $\sigma$ ]  
**OotOffset-rm: 6.755 arcsec [12.90 $\sigma$ ]**  
KicOffset-rm: 0.339 arcsec [1.03 $\sigma$ ]  
OotOffset-st: 0/1/2/0 [3]  
KicOffset-st: 0/1/2/0 [3]  
DiffImageQuality-fgm: 0.67 [2/3]  
DiffImageOverlap-fno: 1.00 [3/3]

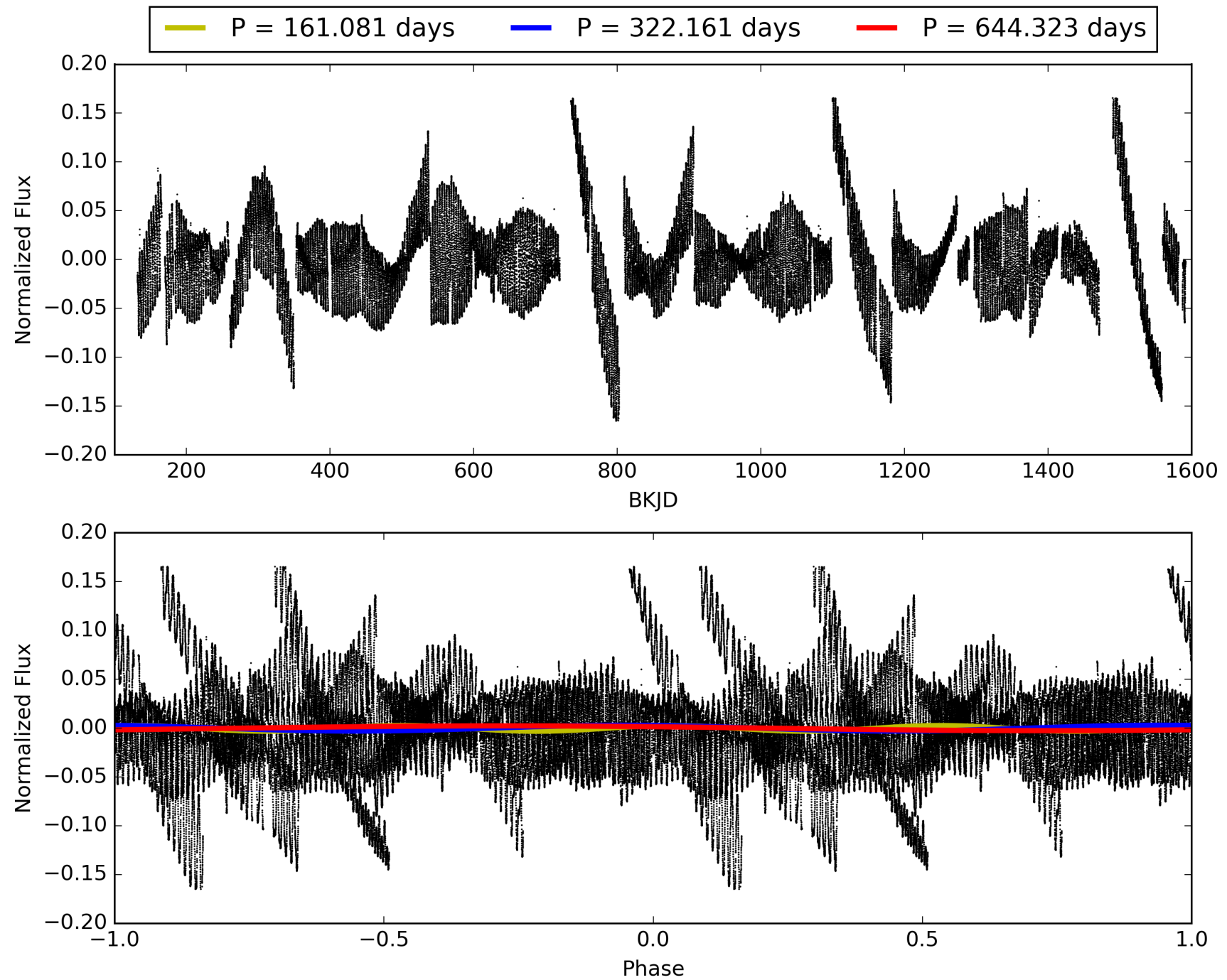
Software Revision: svn-ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 23:22:16 Z

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

# TCE 001570924-01, PDC Light Curves

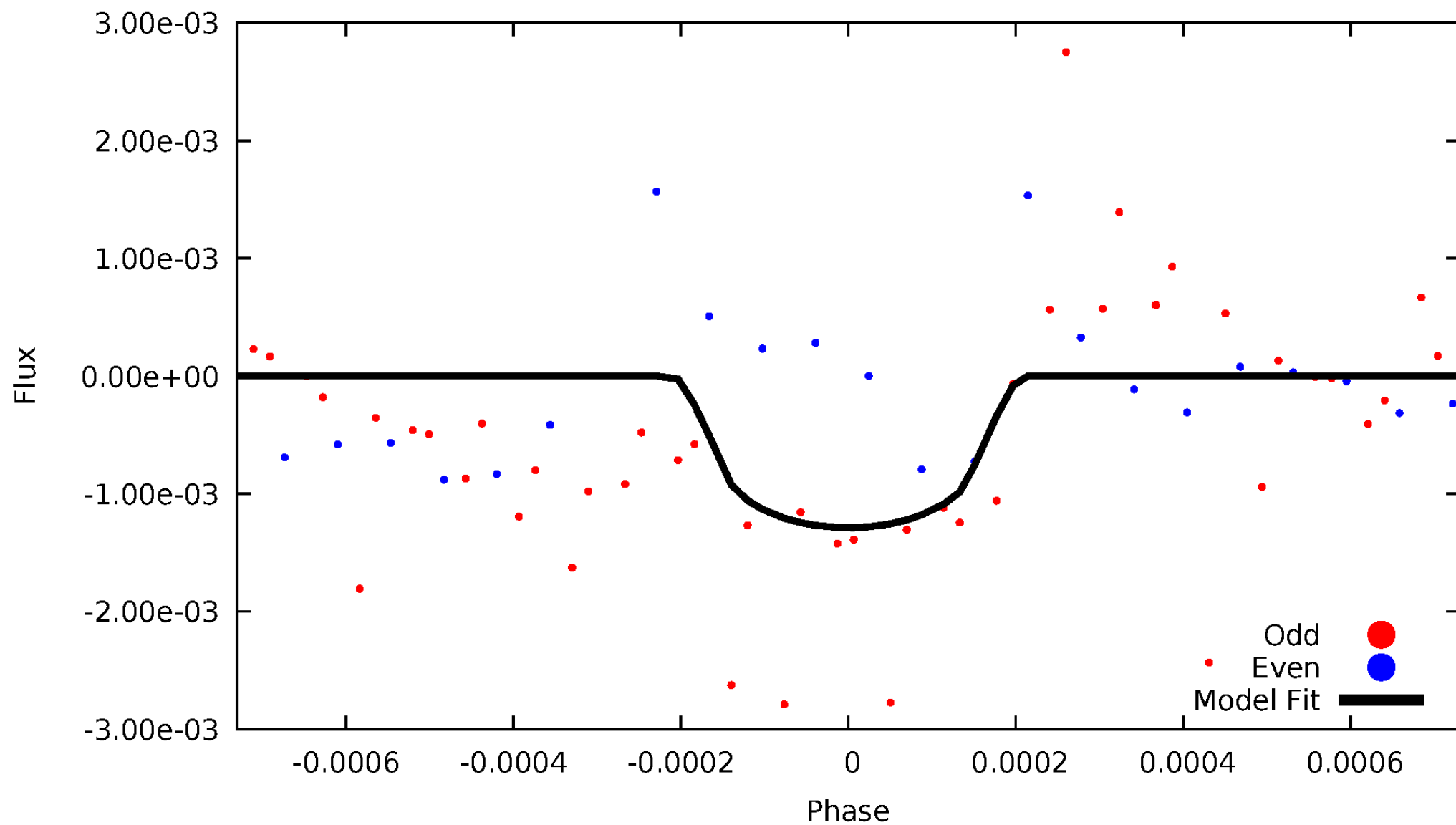


TCE 001570924-01



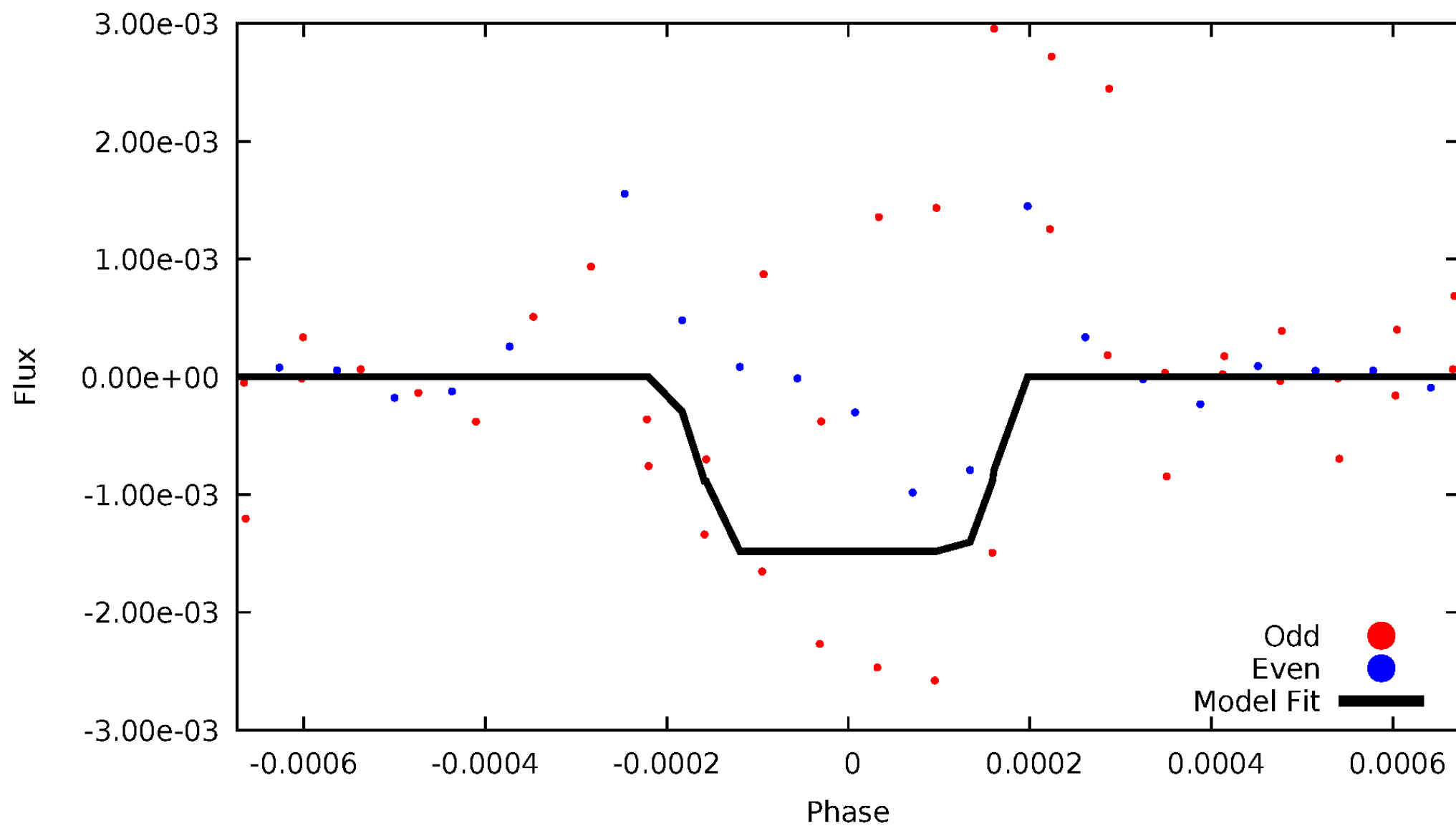
# DV Odd/Even

TCE 001570924-01



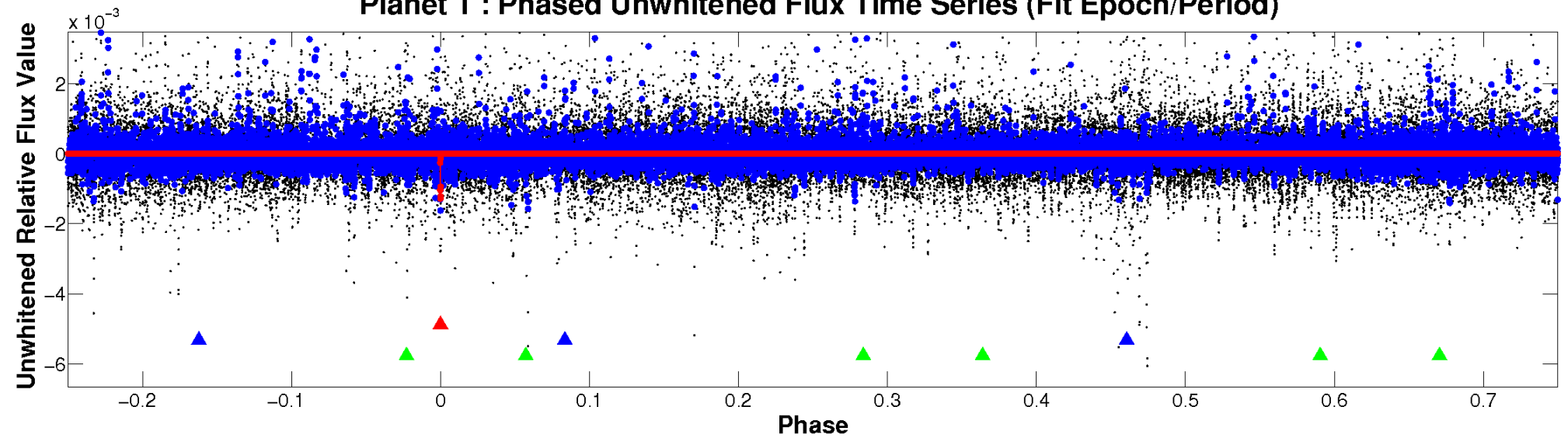
# ALT Odd/Even

TCE 001570924-01

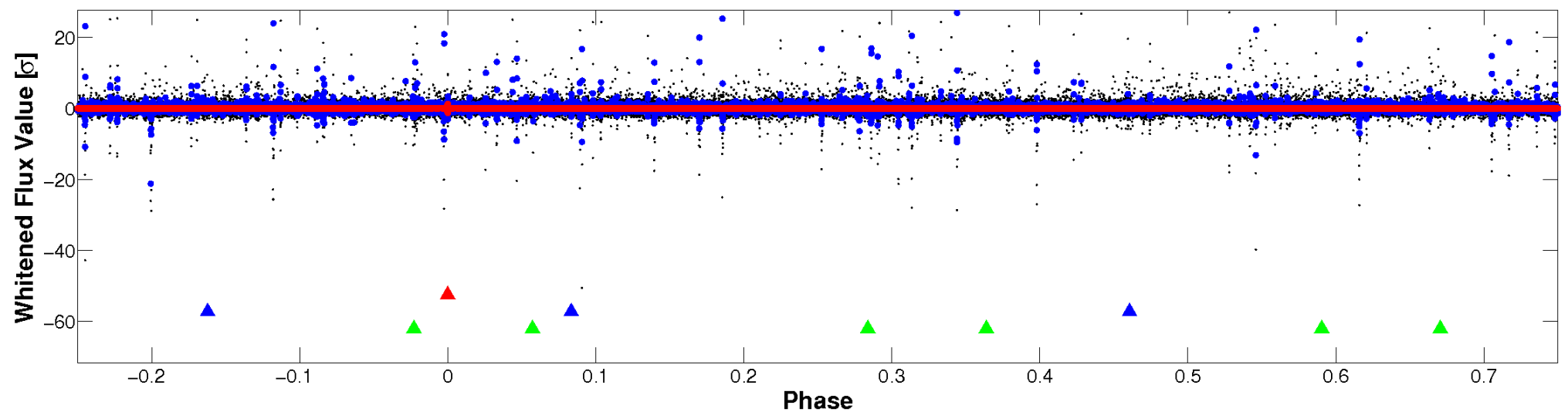


# Non-Whitened Vs. Whitened Light Curve

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

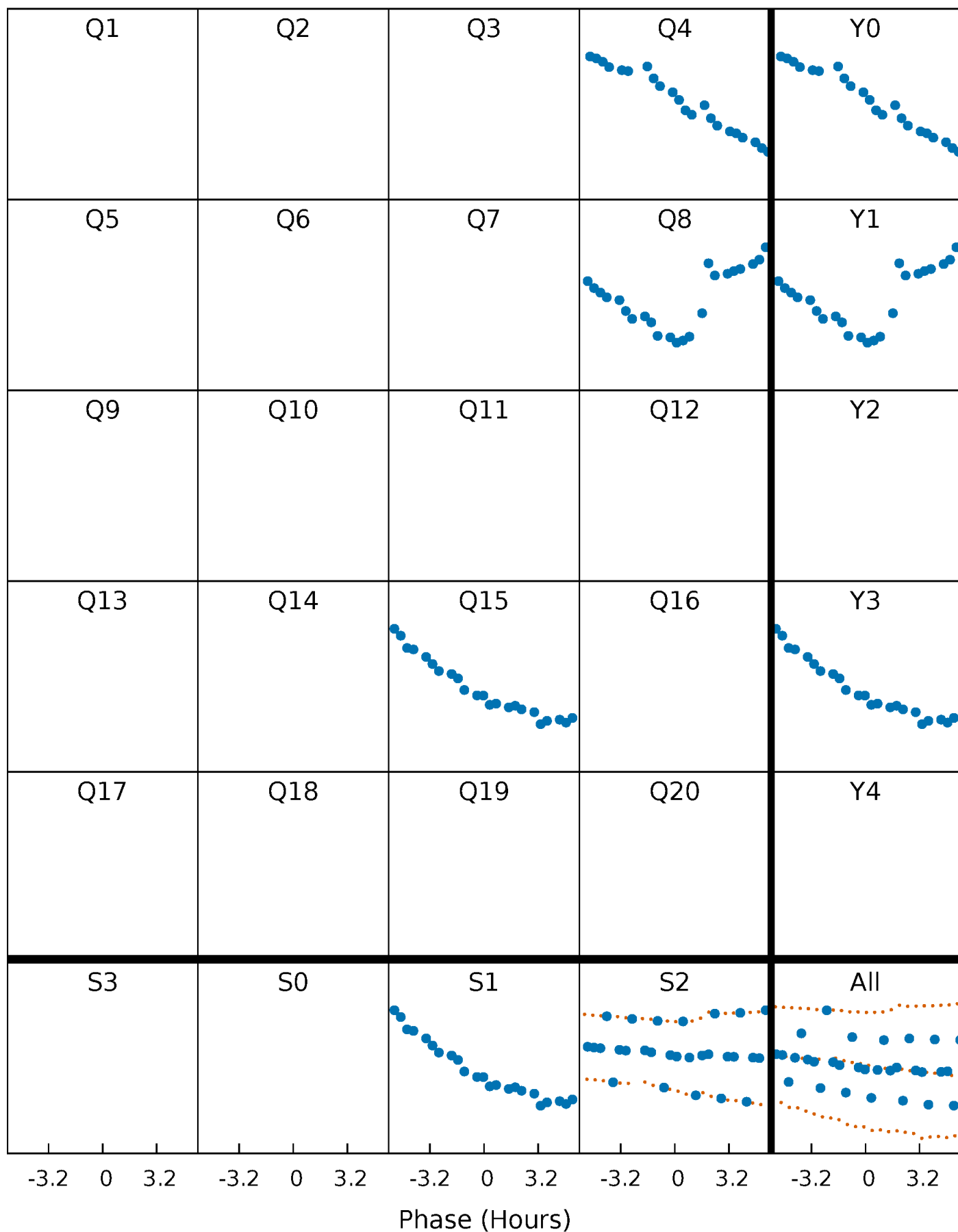


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

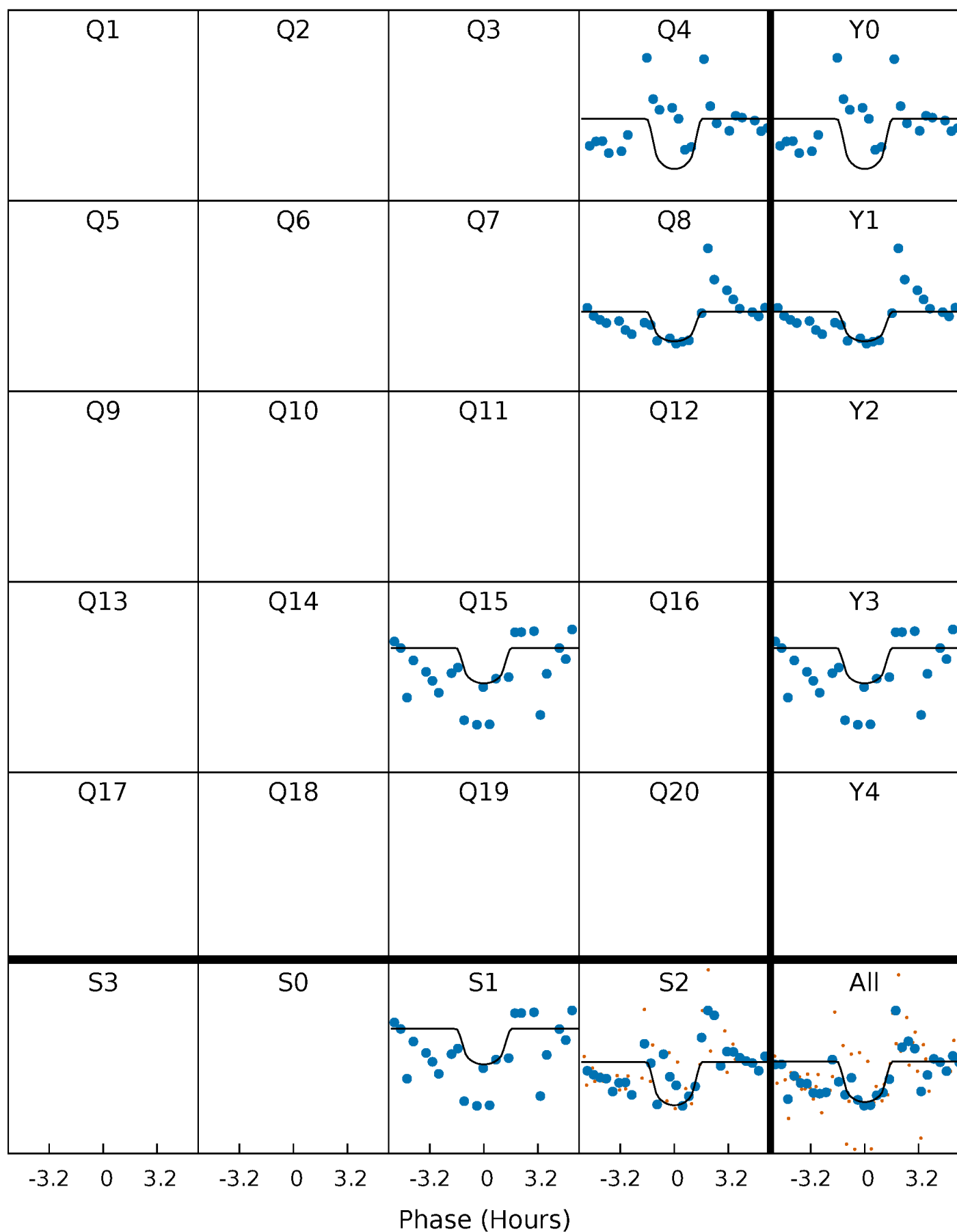
TCE 001570924-01 P=322.161386 Days  $T_0=427.400397$  (BKJD)





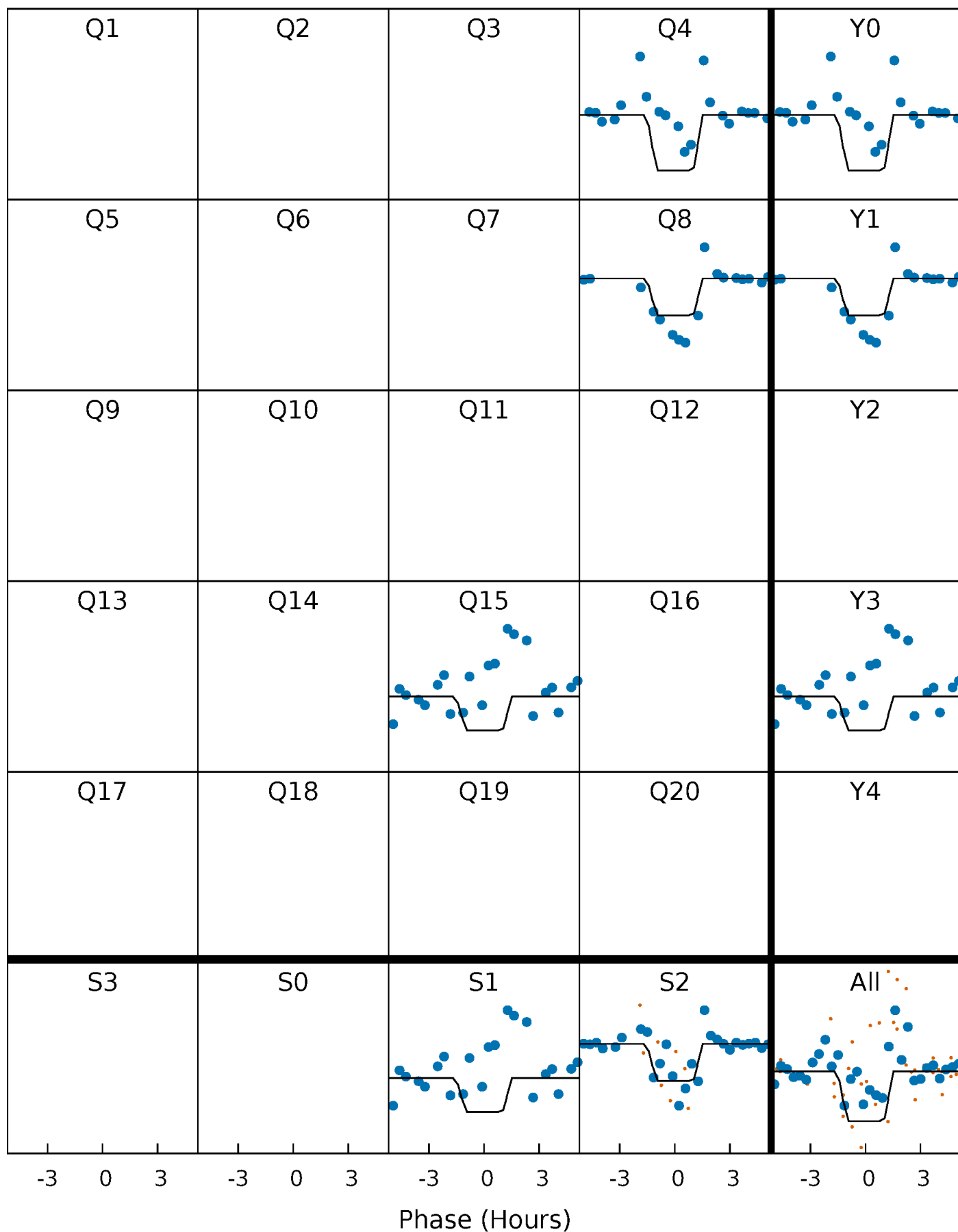
# DV Quarter-Phased Transit Curves

TCE 001570924-01 P=322.161386 Days  $T_0=427.400397$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

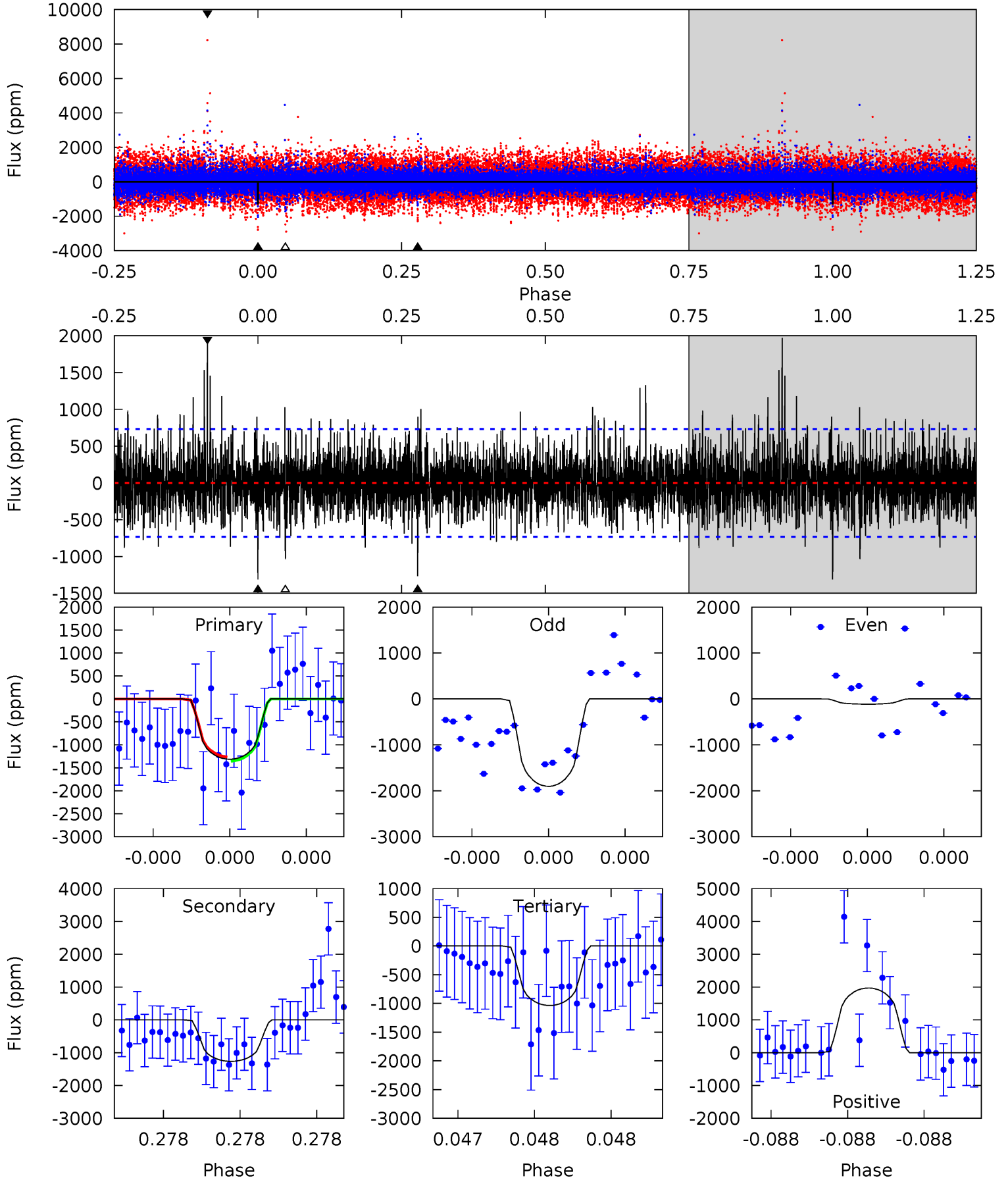
TCE 001570924-01 P=322.168177 Days  $T_0=427.405843$  (BKJD)



# DV Model-Shift Uniqueness Test

001570924-01, P = 322.161386 Days, E = 105.239011 Days

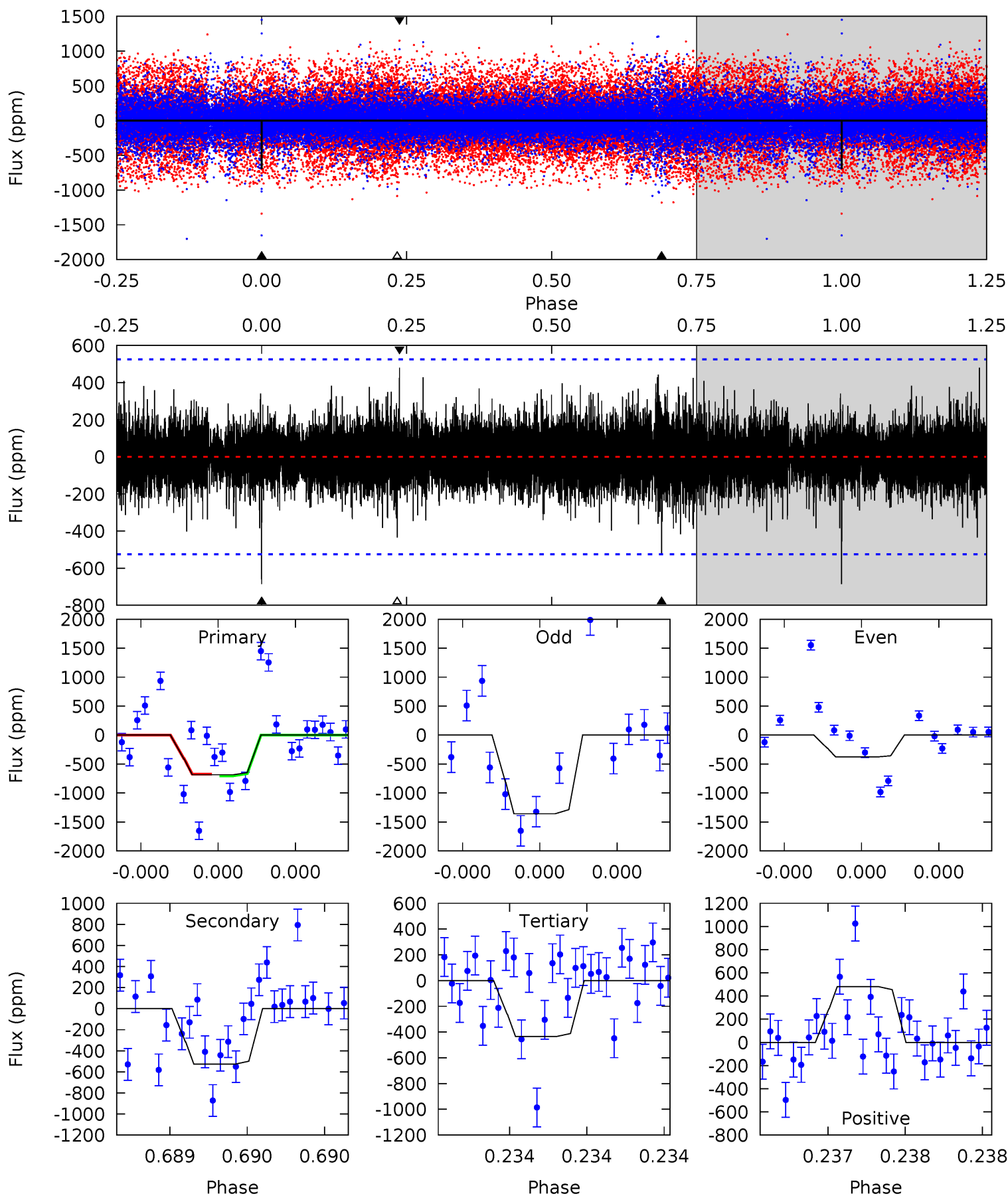
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.1	9.70	7.95	15.1	5.61	3.54	1.96	2.12	-5.06	1.76	-5.42	6.21	0.92	0.60	0.35



# Alt Model-Shift Uniqueness Test

001570924-01, P = 322.168177 Days, E = 105.237666 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
7.36	5.66	4.66	5.16	5.63	3.57	1.01	2.69	2.20	1.00	0.50	6.23	1.48	0.41	0.15



### Stellar Parameters For KIC 001570924

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4961^{+136}_{-136}$	$4.543^{+0.072}_{-0.044}$	$-0.080^{+0.300}_{-0.300}$	$0.762^{+0.065}_{-0.078}$	$0.741^{+0.087}_{-0.063}$	$2.355^{+0.721}_{-0.356}$
	+3%/-3%	+2%/-1%	+375%/-375%	+9%/-10%	+12%/-9%	+31%/-15%
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 001570924-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-1265 \pm 130$	$4.49^{+4.56}_{-3.06}$	$291^{+11}_{-9}$	$4188^{+2808}_{-883}$	$24026^{+222493}_{-18144}$
Alt.	$-527 \pm 93$	$4.83^{+4.34}_{-3.04}$	$291^{+11}_{-10}$	$3503^{+1624}_{-596}$	$8351^{+56748}_{-6086}$

$T_{\text{max}}$  = 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

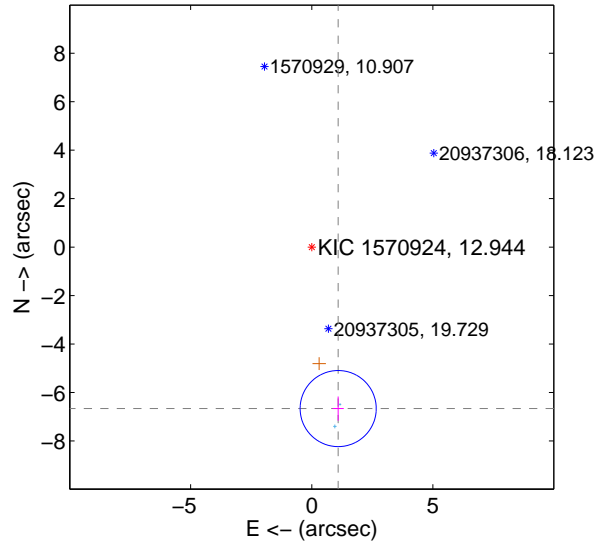
Supplemental centroid analysis for 001570924-01. Kepler magnitude: 12.94. Transit SNR 5.06

There are 2 quarters with good PRF difference image offsets

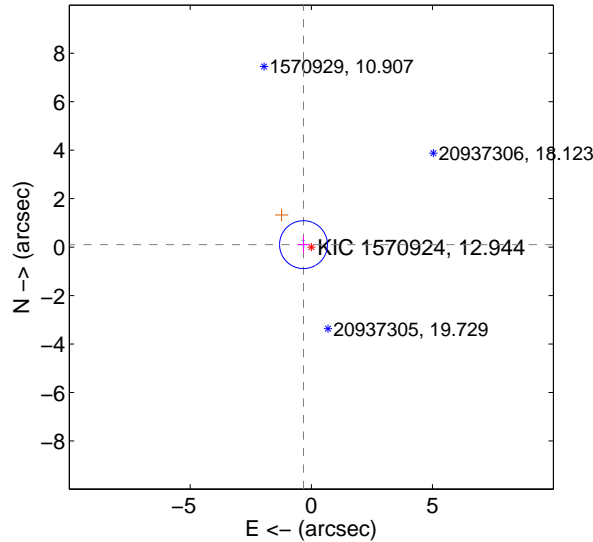
The OOT PRF centroid is offset from the target star catalog position by about 7.78 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$6.755 \pm 0.524$	12.90	$-1.091 \pm 0.230$	$-6.666 \pm 0.498$
PRF-fit source offset from KIC position	$0.339 \pm 0.329$	1.03	$0.323 \pm 0.245$	$0.101 \pm 0.334$
photometric centroid source offset	$3.01 \pm 1.58$	1.90	$1.14 \pm 0.45$	$2.79 \pm 1.70$

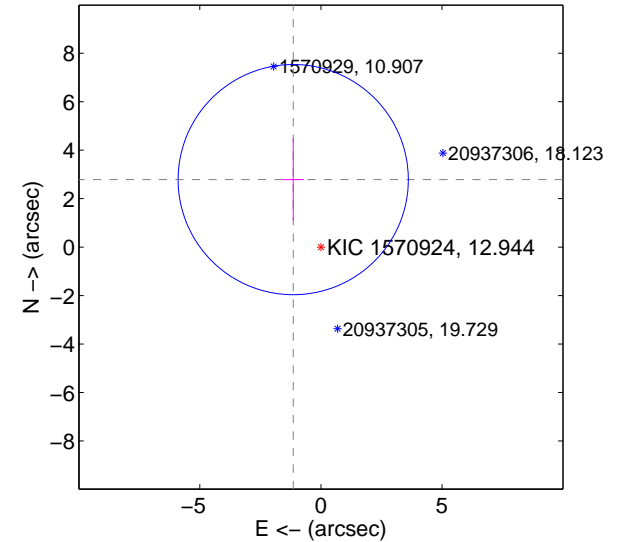
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

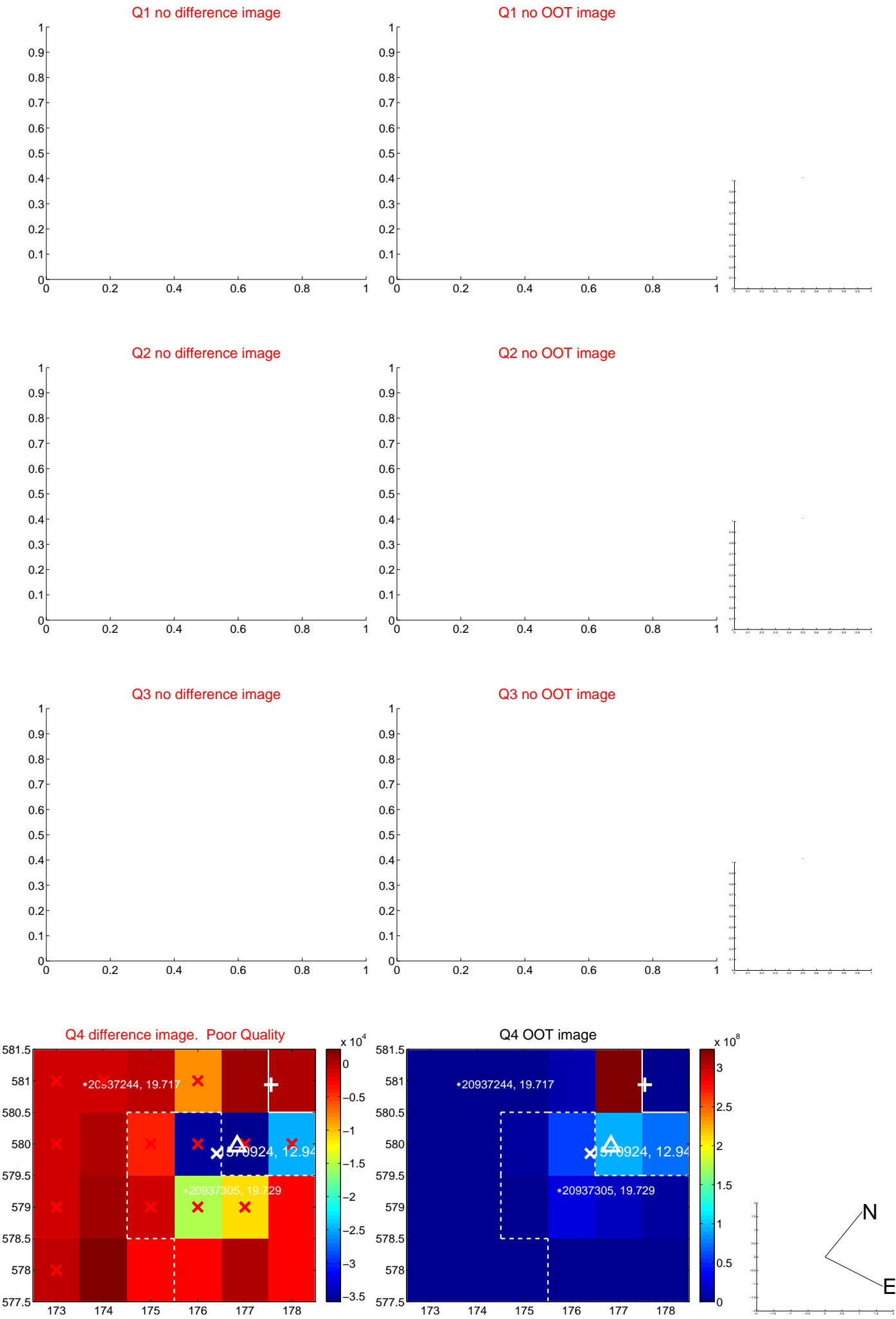


offset from photometric centroids

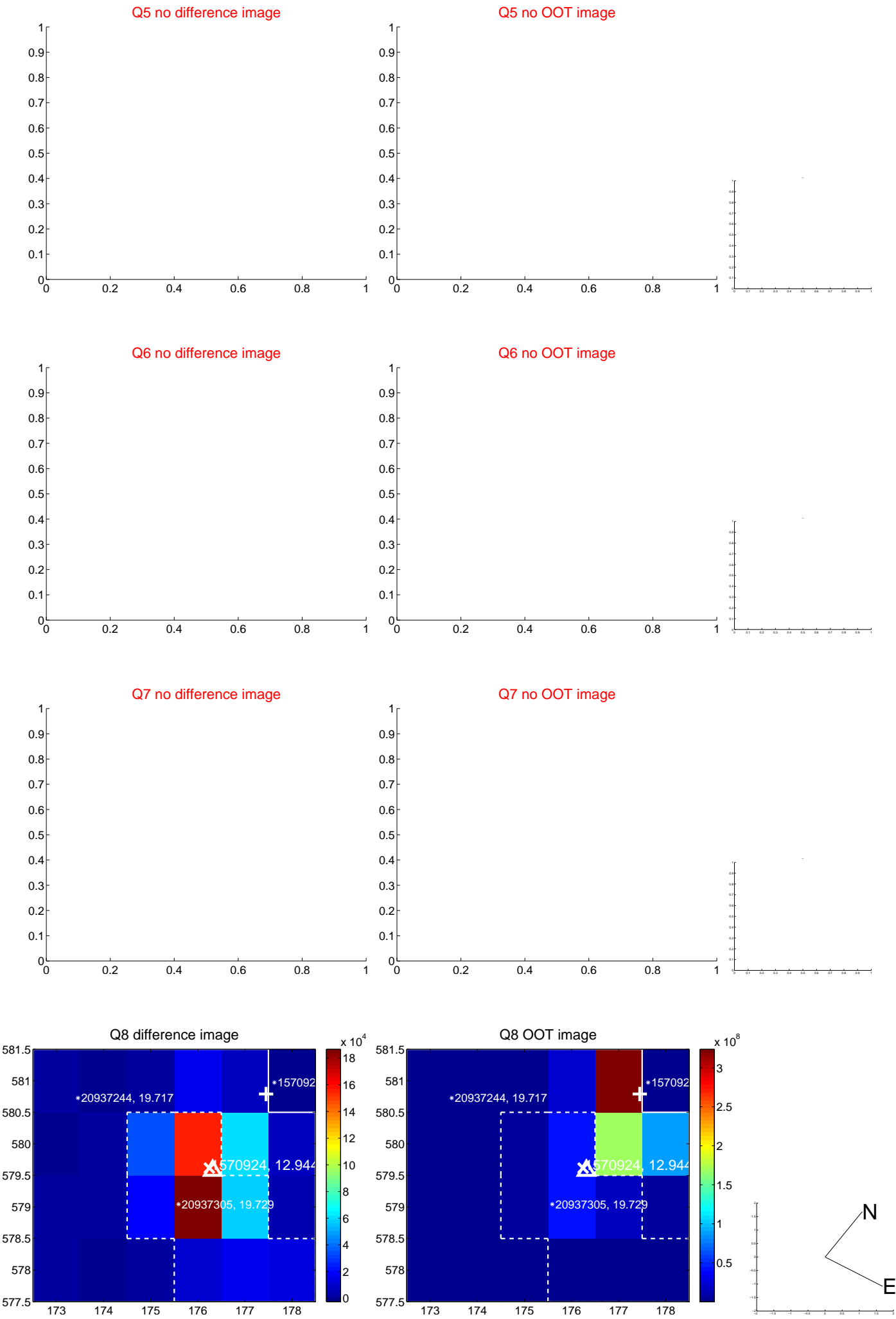


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

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



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

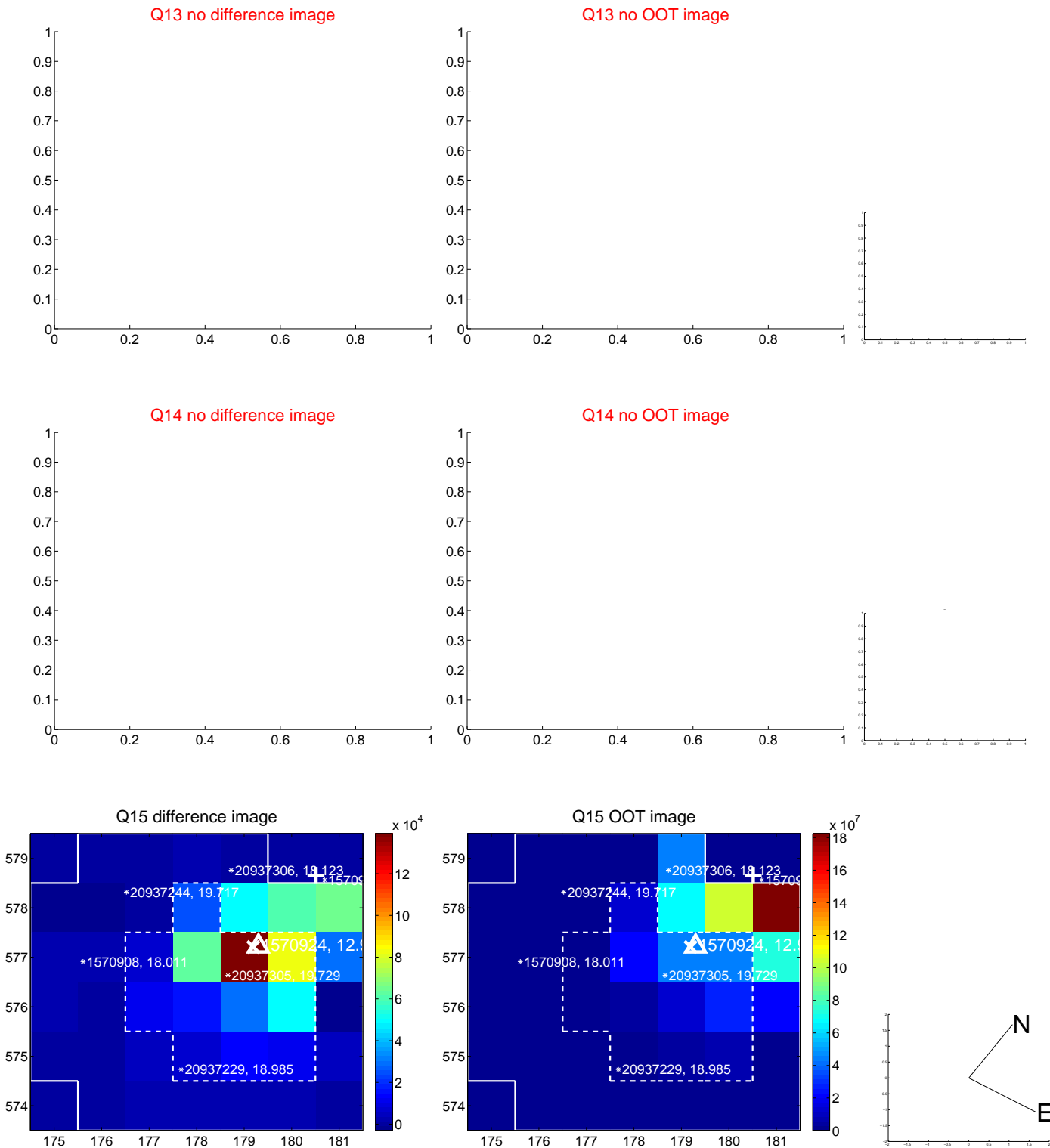




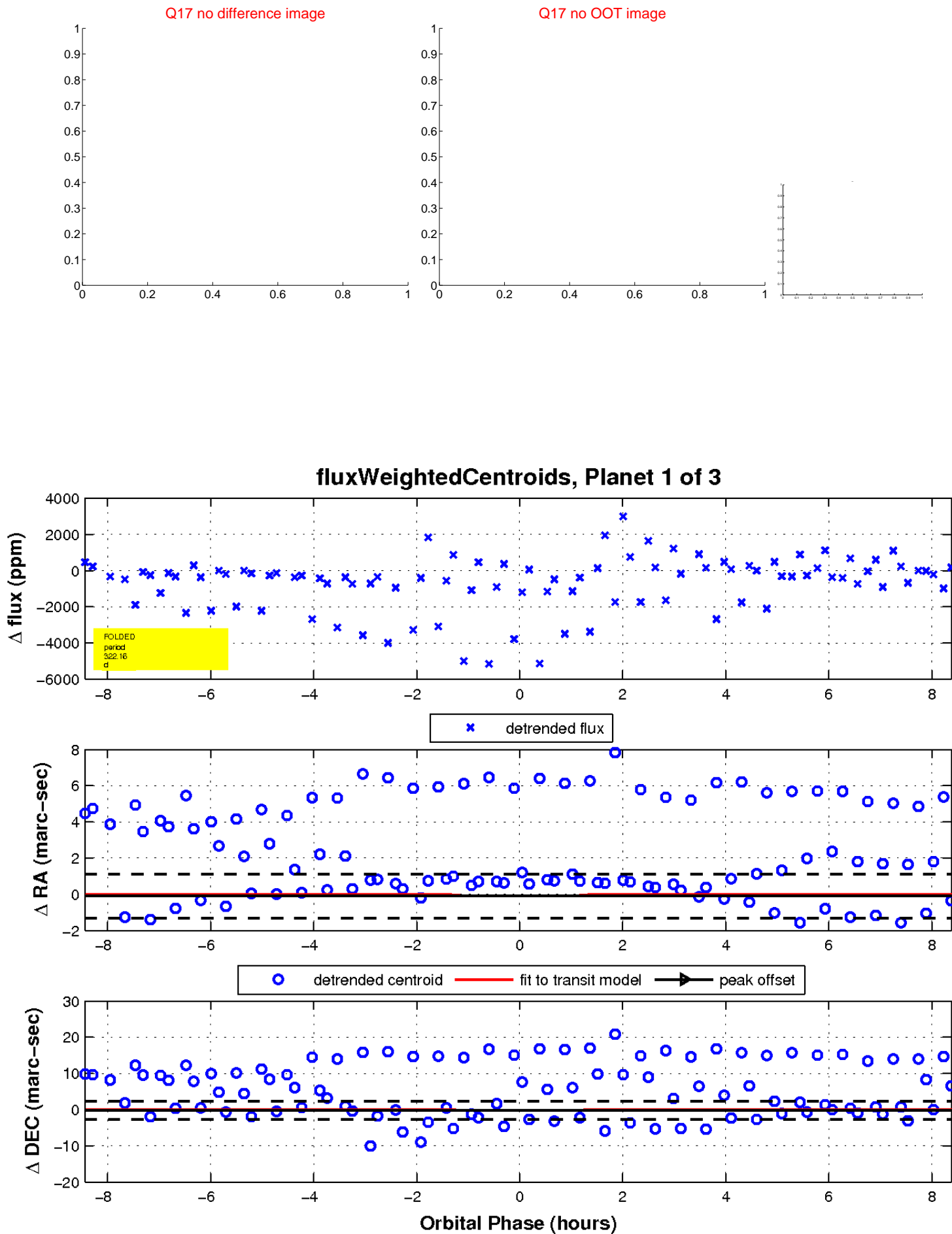
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



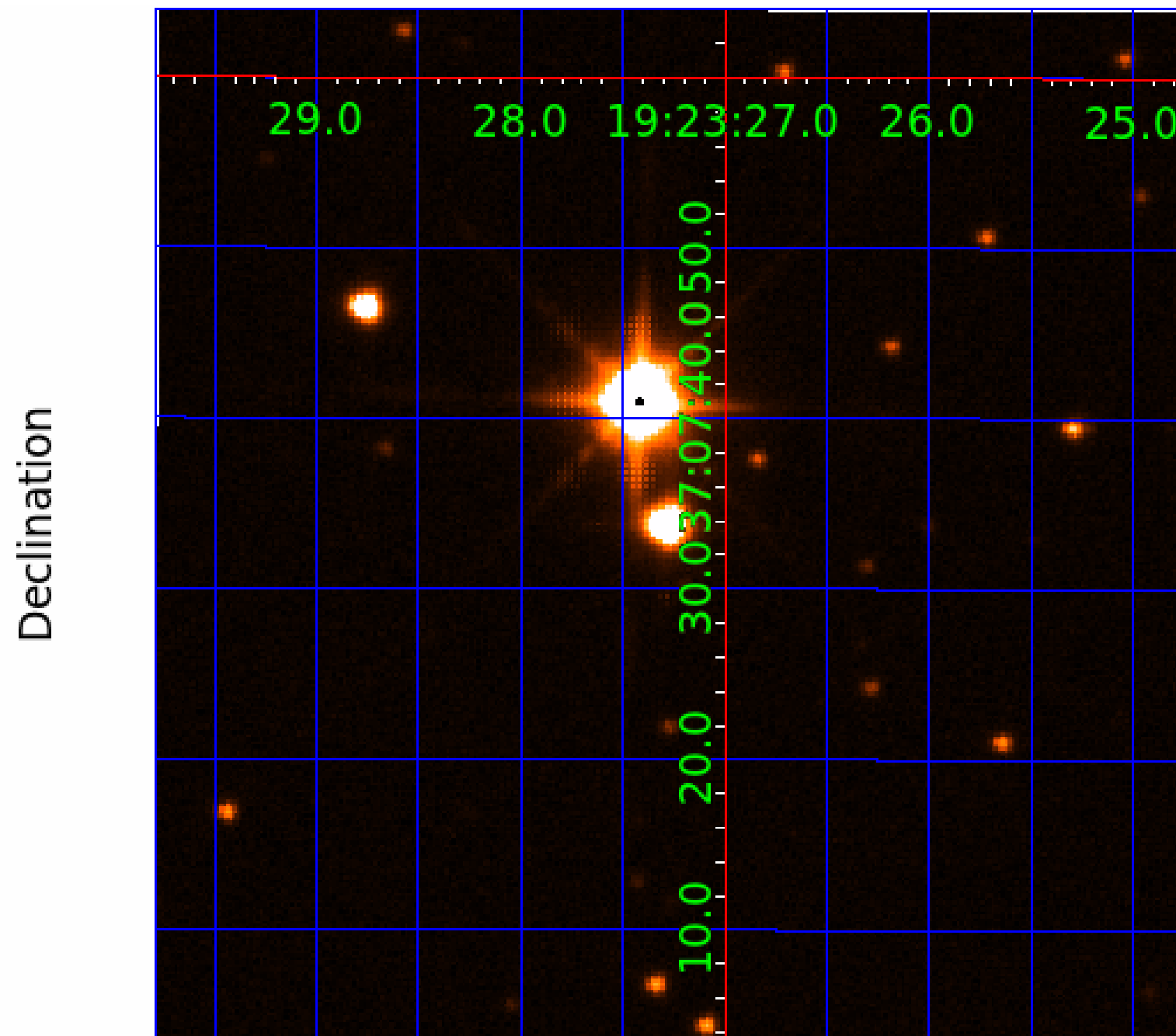
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image



# KIC 001570924

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
001570924-01	OBS	No	322.161386	427.400397	1288.7	2.822	11.3	5.1	0.76	4961	2.84	0.46
001570924-02	OBS	No	443.672193	454.293039	791.0	3.400	15.3	3.9	0.76	4961	2.51	0.30
001570924-03	OBS	No	223.374345	295.466269	893.0	2.871	11.2	6.5	0.76	4961	2.39	0.74

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
001570924-01	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—CENT_FEW_DIFFS—HALO_GHOST
001570924-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
001570924-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_KIC_POS

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

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

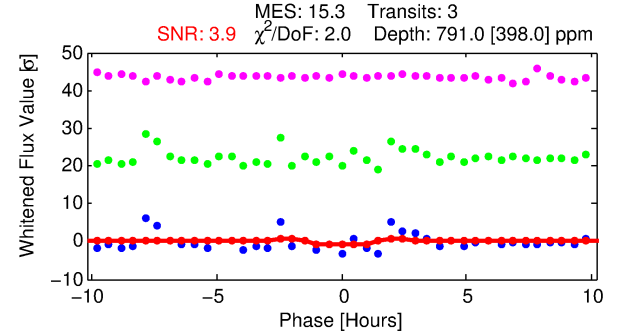
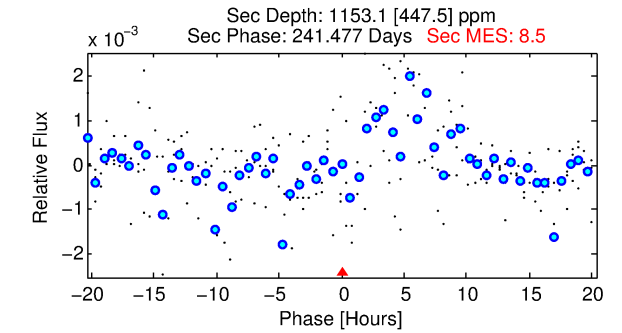
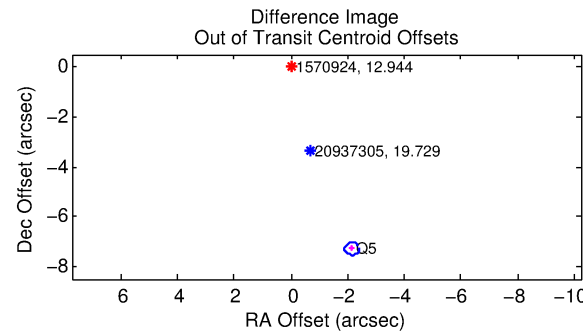
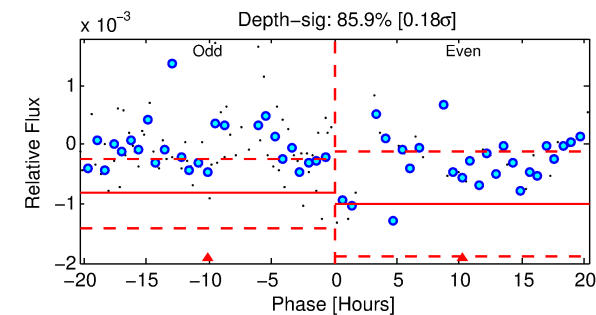
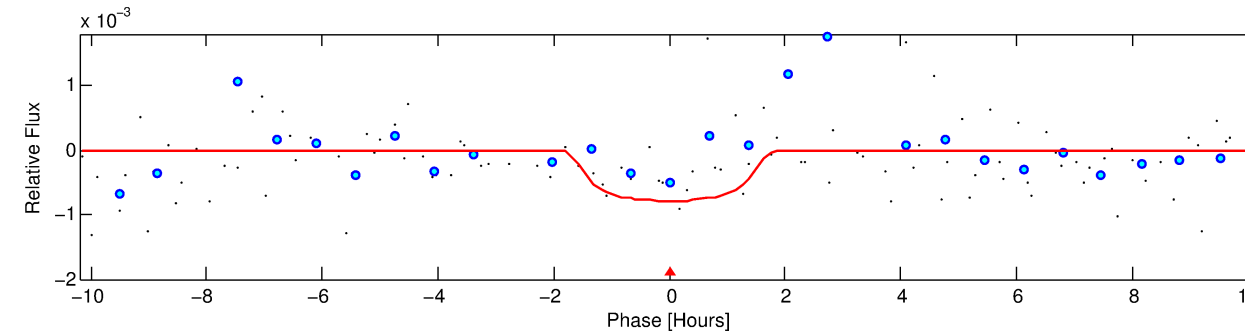
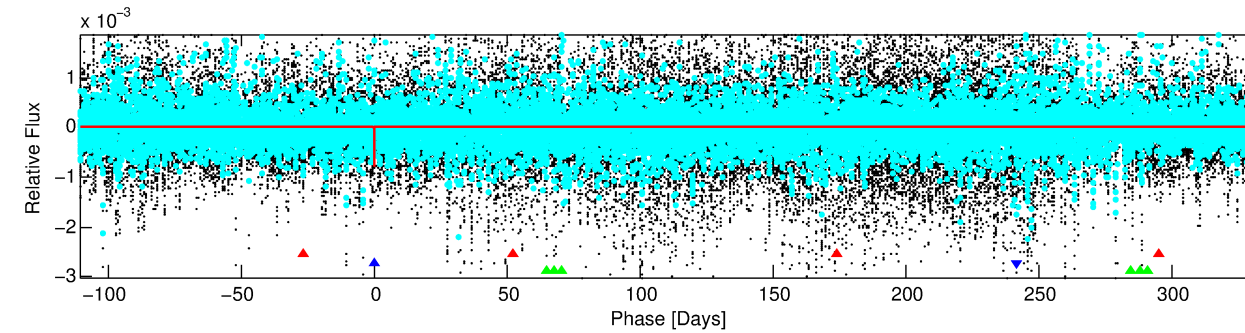
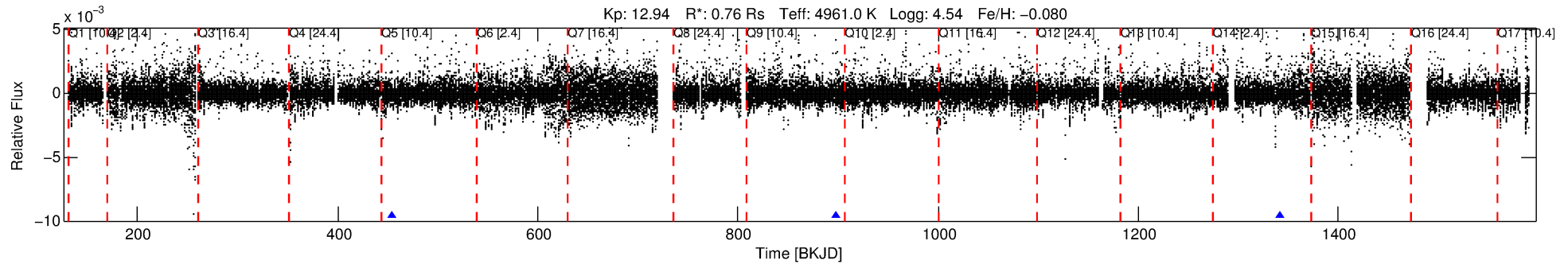
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 001570924-02

No Significant Match Found

# DV One-Page Summary

KIC: 1570924 Candidate: 2 of 3 Period: 443.672 d



## DV Fit Results:

Period = 443.67219 [0.01202] d  
Epoch = 454.2930 [0.0168] BKJD  
Rp/R\* = 0.0302 [0.0364]  
a/R\* = 563.75 [2348.94]  
b = 0.86 [1.27]  
Seff = 0.30 [0.05]  
Teq = 188 [8] K  
Rp = 2.51 [3.04] Re  
a = 1.0297 [0.0904] AU  
Ag = 106440.14 [259911.10] [0.41 $\sigma$ ]  
Teffp = 5258 [3208] K [1.58 $\sigma$ ]

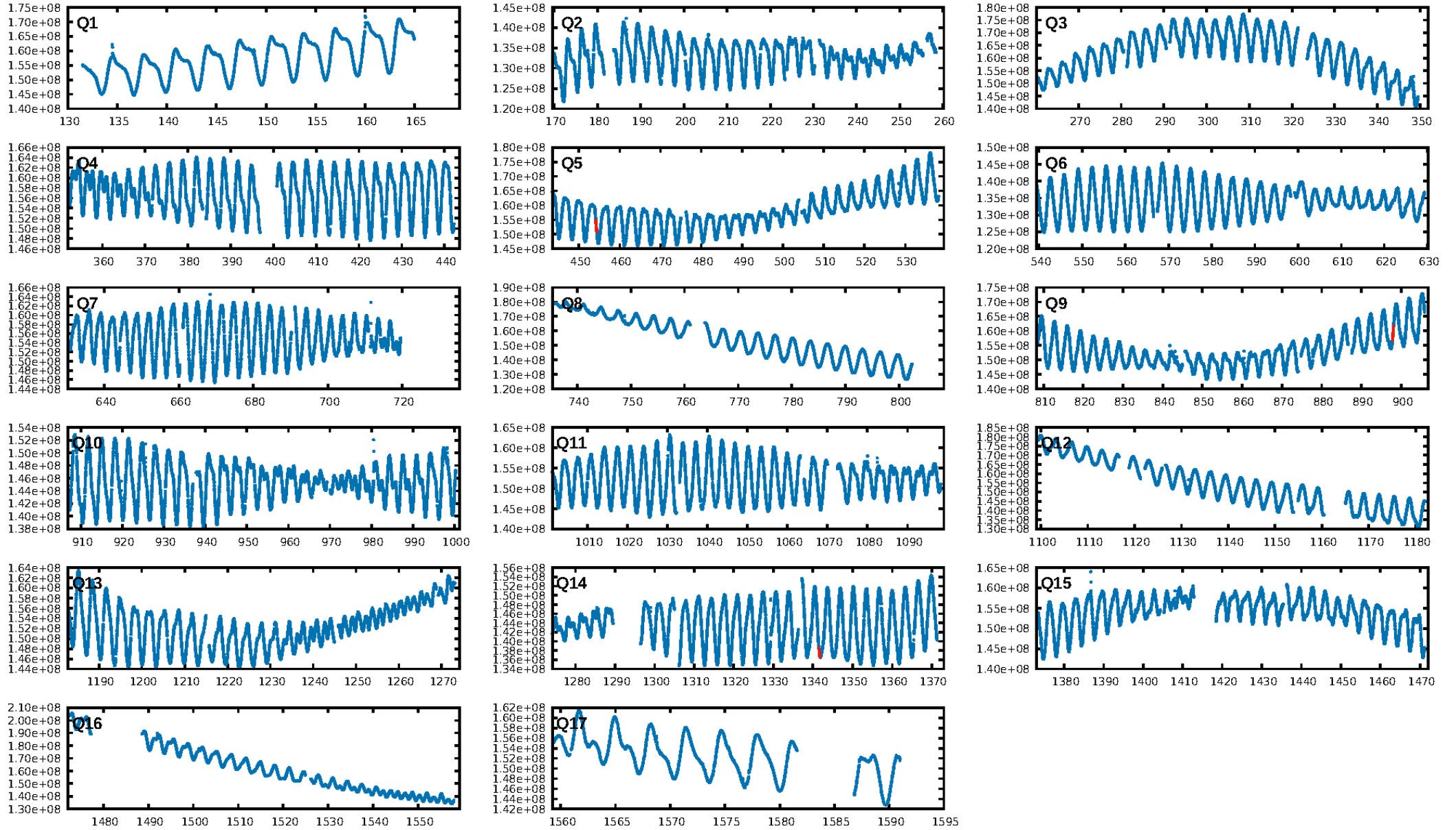
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [659.99 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 13.7%  
ModelChiSquareGof-sig: 67.6%  
Bootstrap-pfa: 8.53e-12  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: -1.002  
Centroid-sig: 10.8%  
Centroid-so: 5.510 arcsec [1.40 $\sigma$ ]  
OotOffset-rm: 7.586 arcsec [89.04 $\sigma$ ]  
KicOffset-rm: 0.113 arcsec [1.50 $\sigma$ ]  
OotOffset-st: 0/0/0/1 [1]  
KicOffset-st: 1/0/0/1 [2]  
DiffImageQuality-fgm: 1.00 [2/2]  
DiffImageOverlap-fno: 1.00 [3/3]

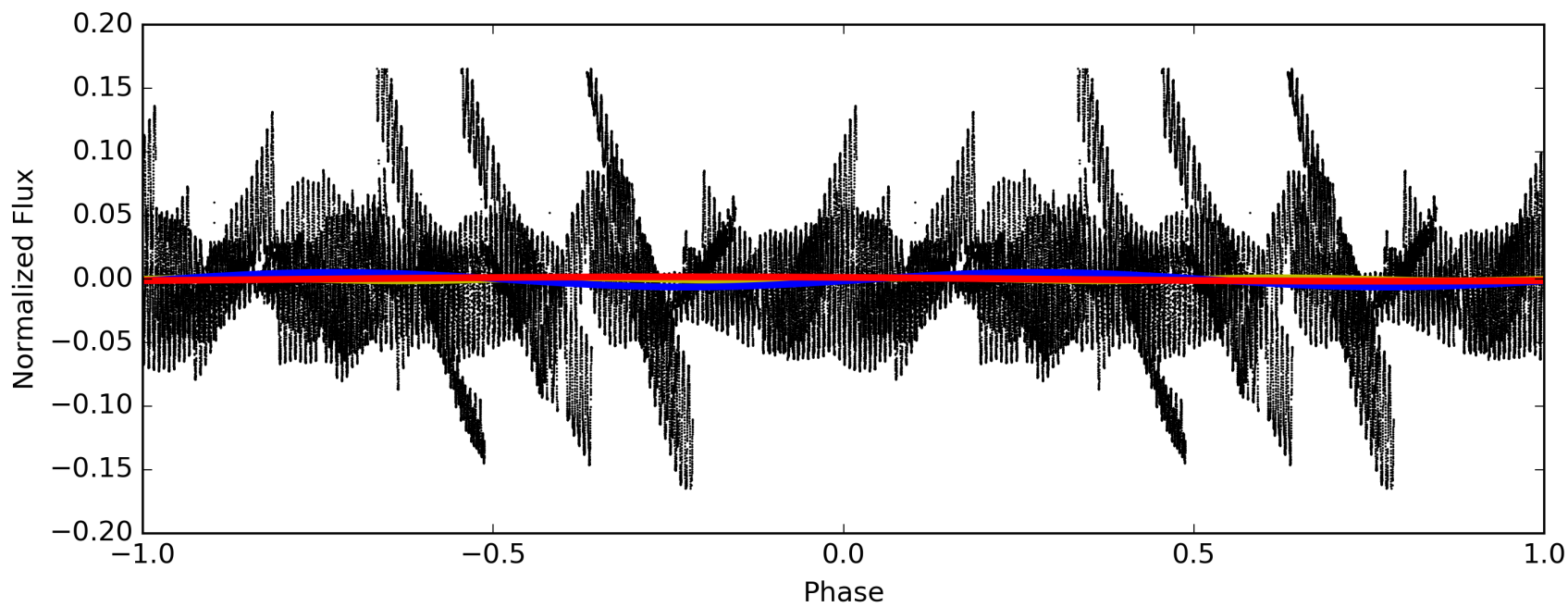
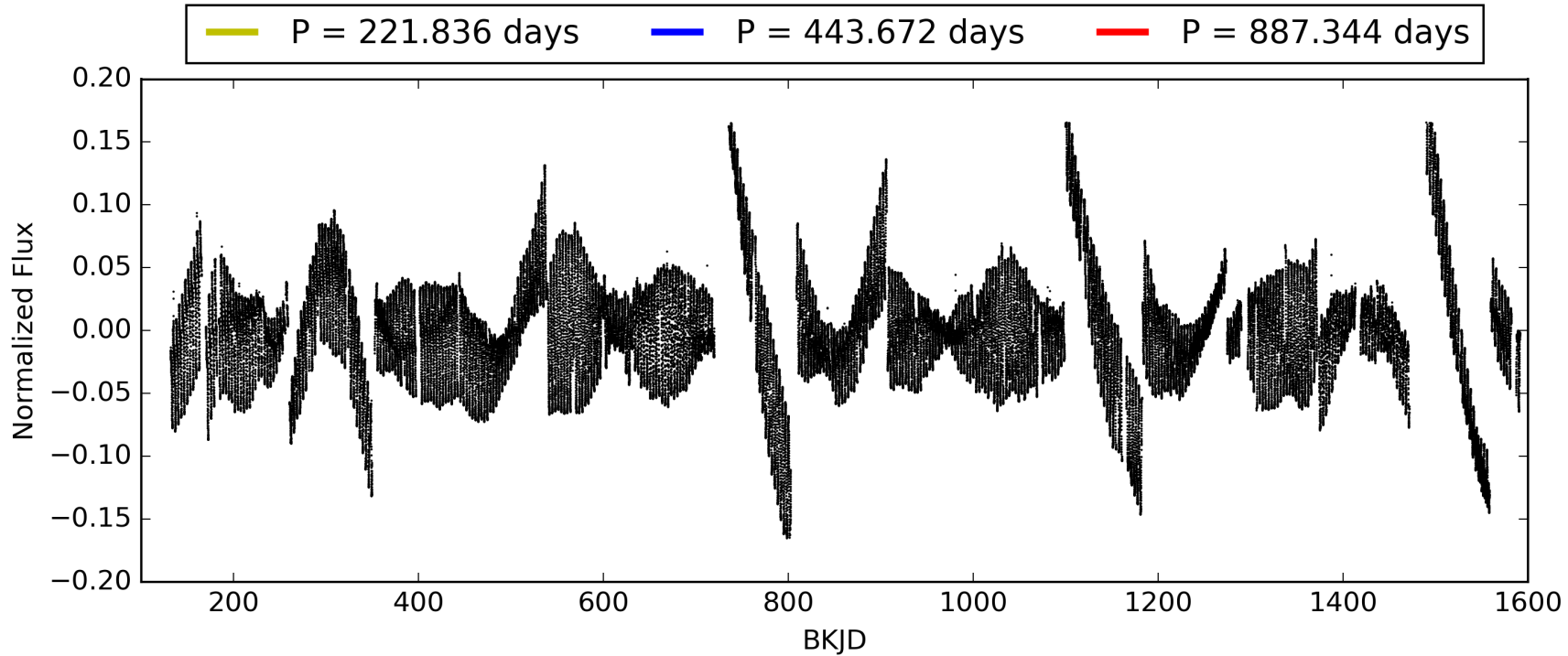
Software Revision: svn-ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 23:22:36 Z

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

# TCE 001570924-02, PDC Light Curves



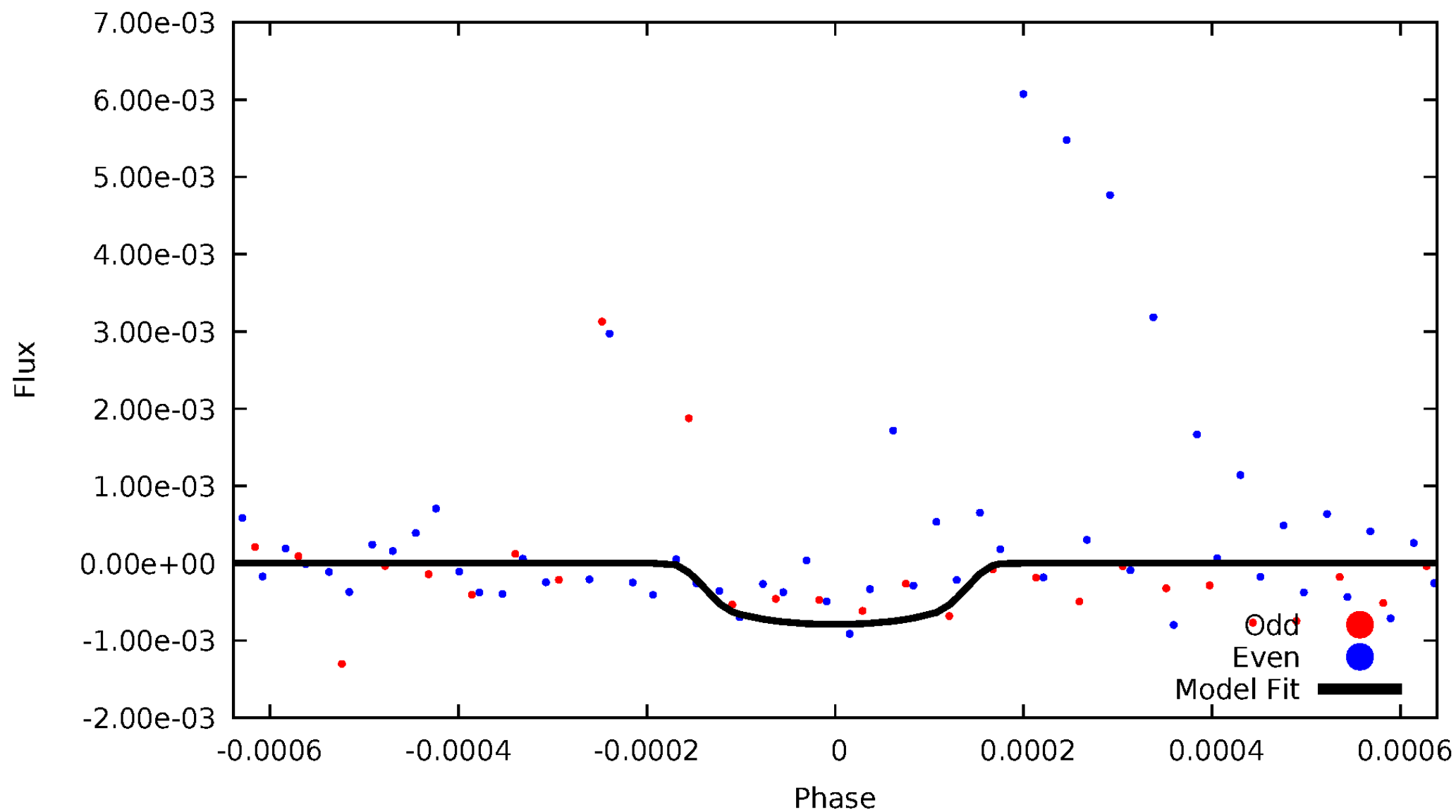
TCE 001570924-02





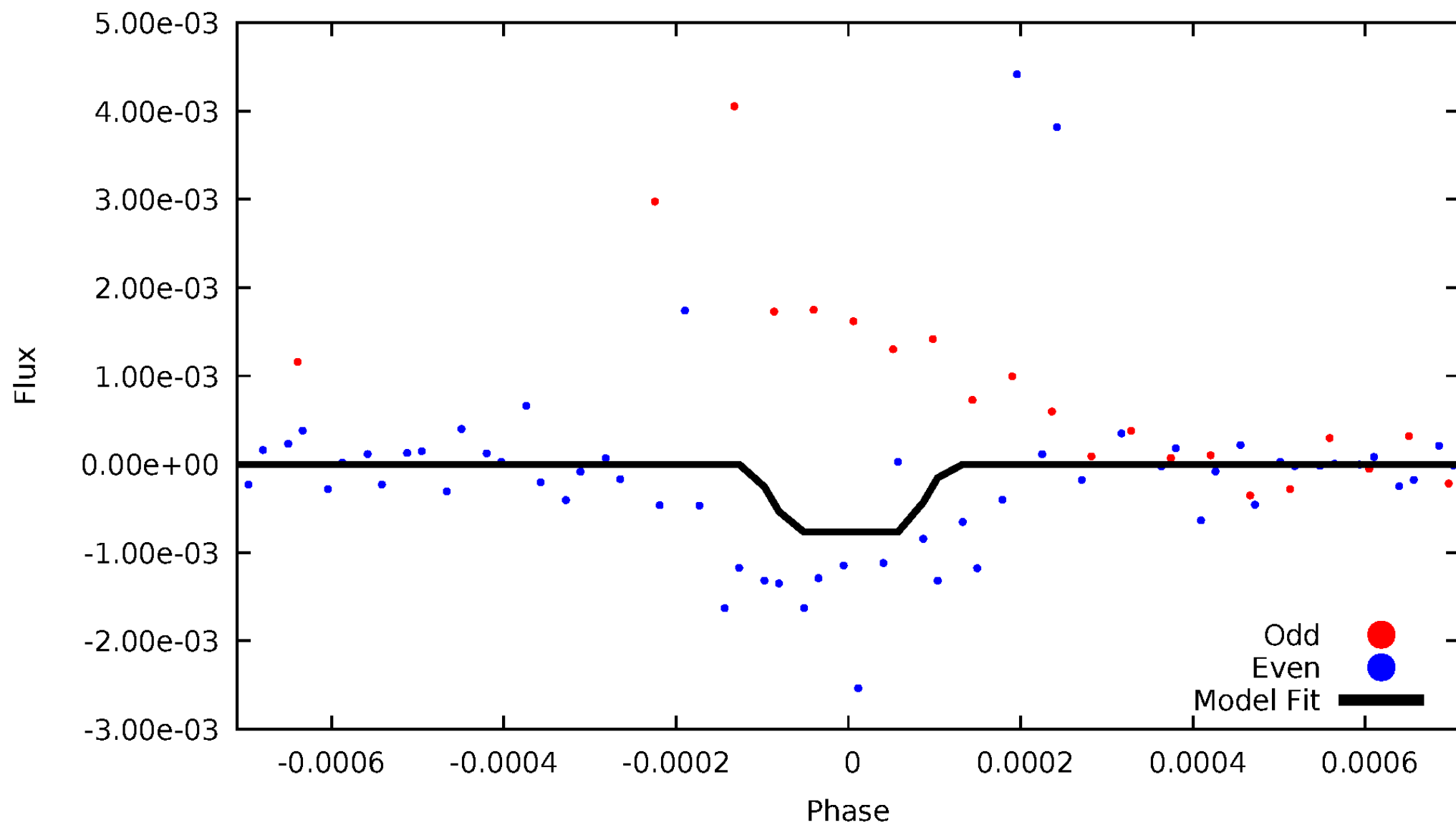
# DV Odd/Even

TCE 001570924-02



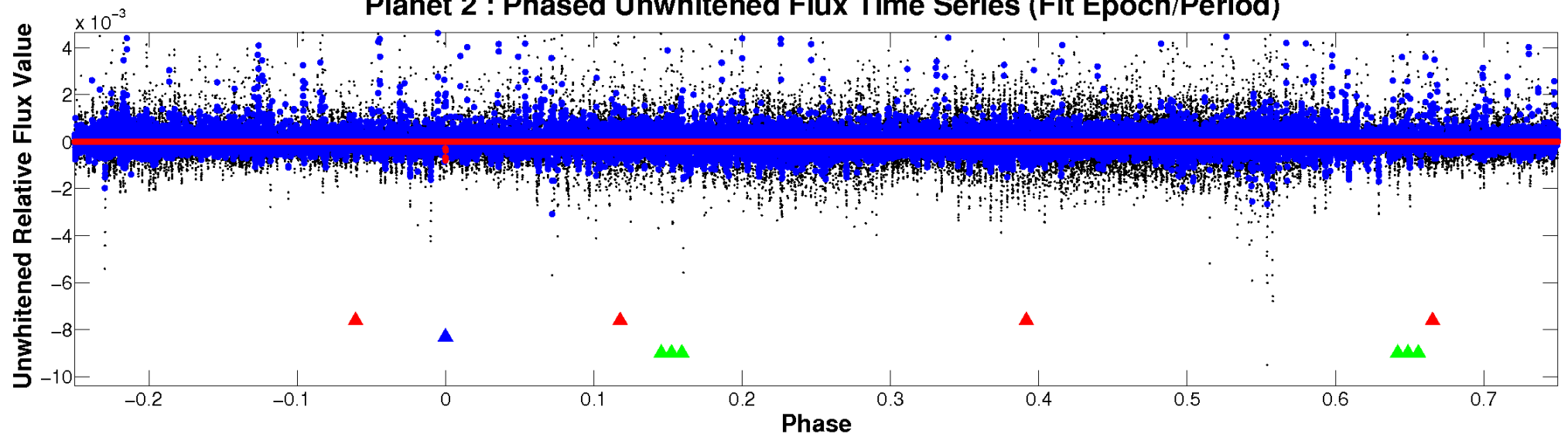
# ALT Odd/Even

TCE 001570924-02

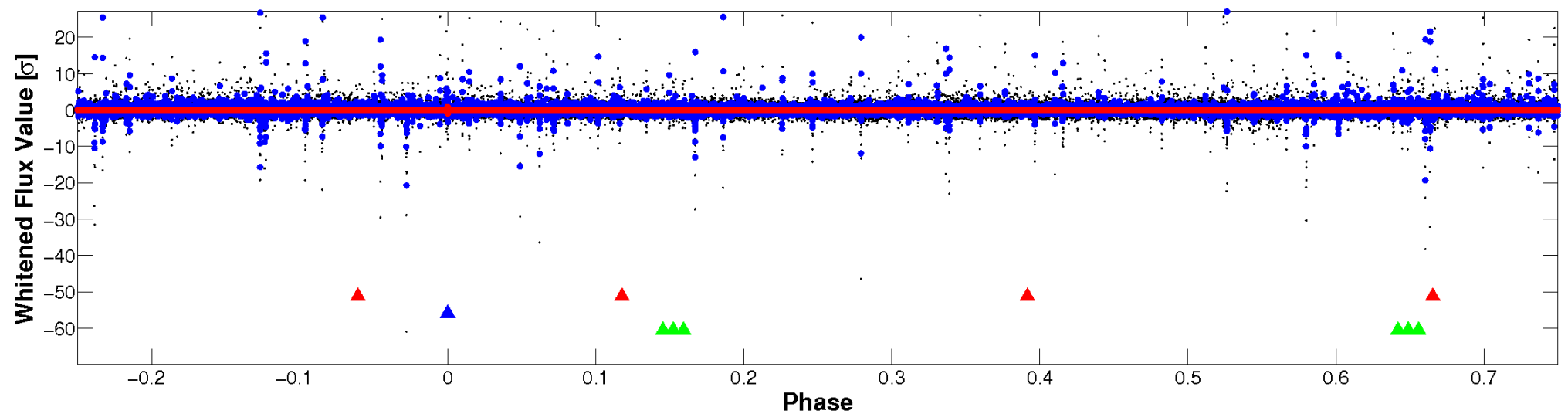


# Non-Whitened Vs. Whitened Light Curve

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

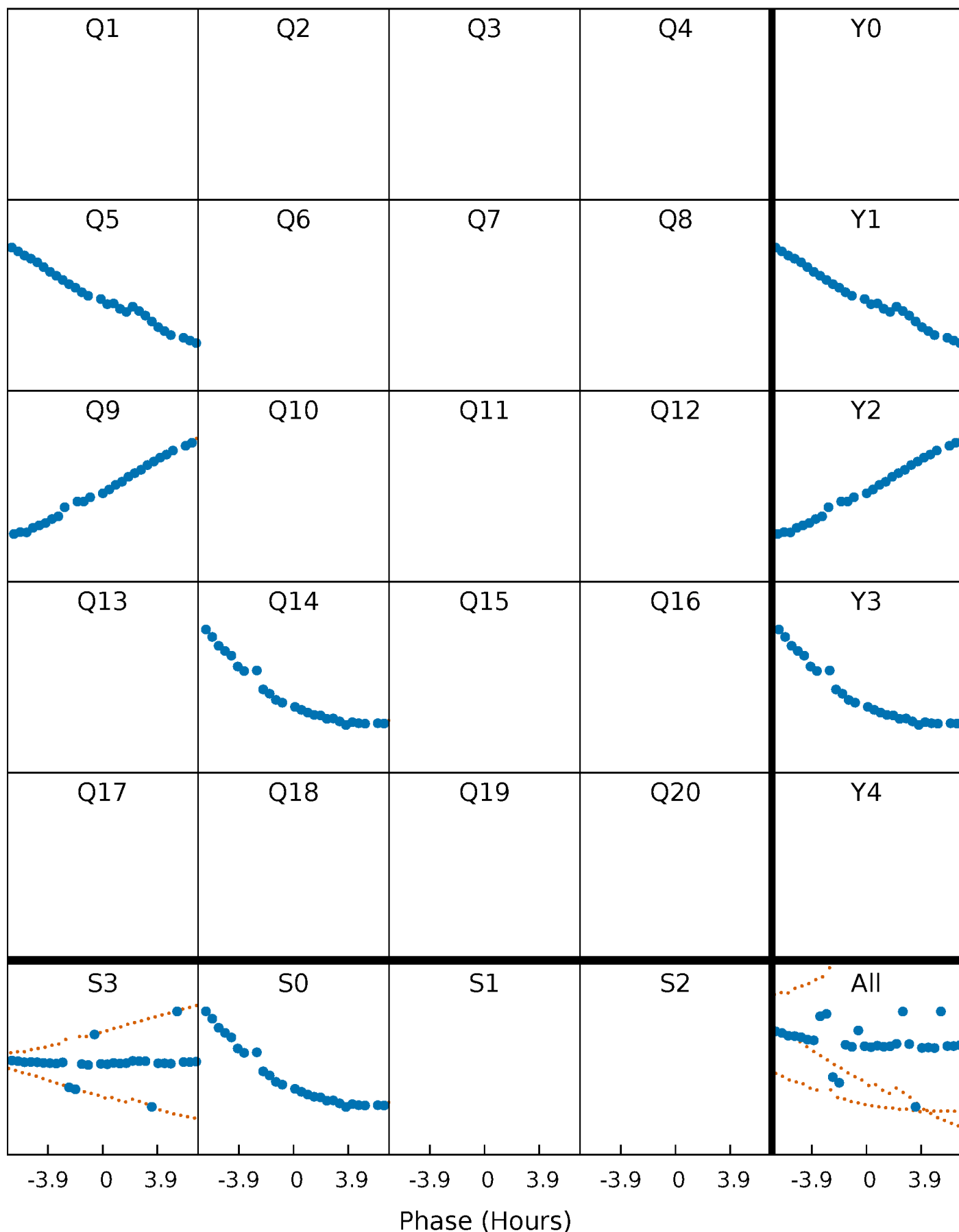


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



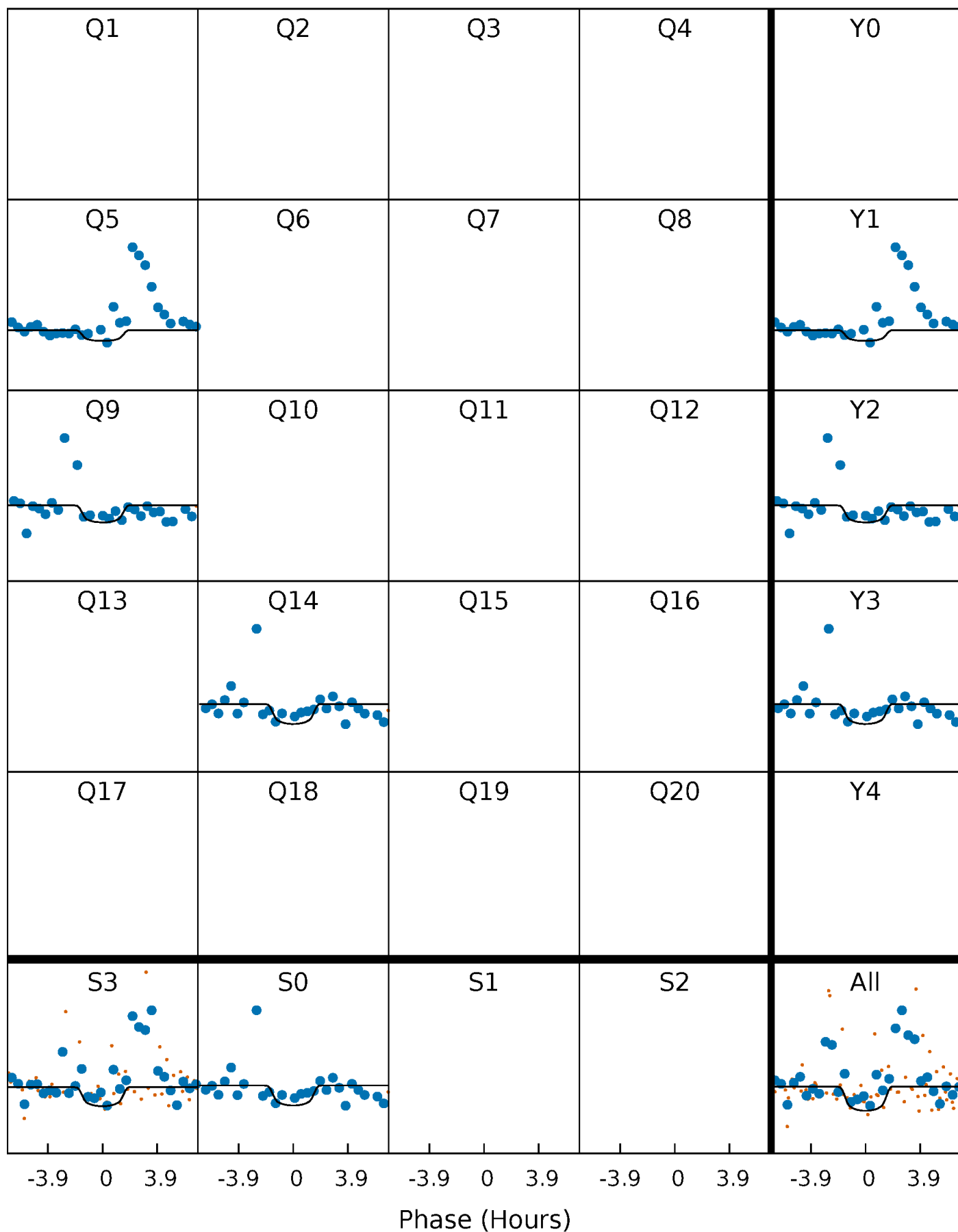
# PDC Quarter-Phased Transit Curves

TCE 001570924-02 P=443.672193 Days  $T_0=454.293039$  (BKJD)



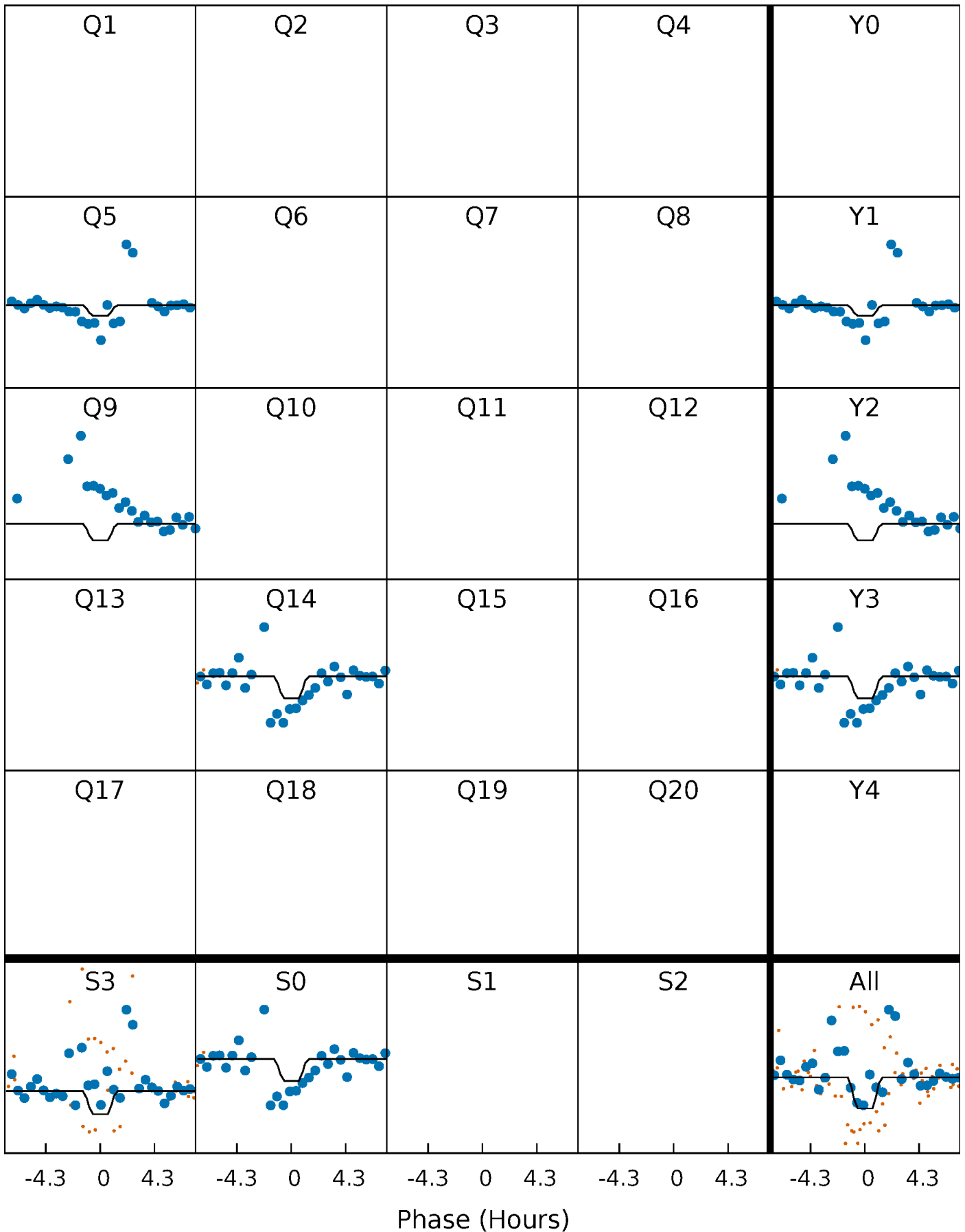
# DV Quarter-Phased Transit Curves

TCE 001570924-02     $P=443.672193$  Days     $T_0=454.293039$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

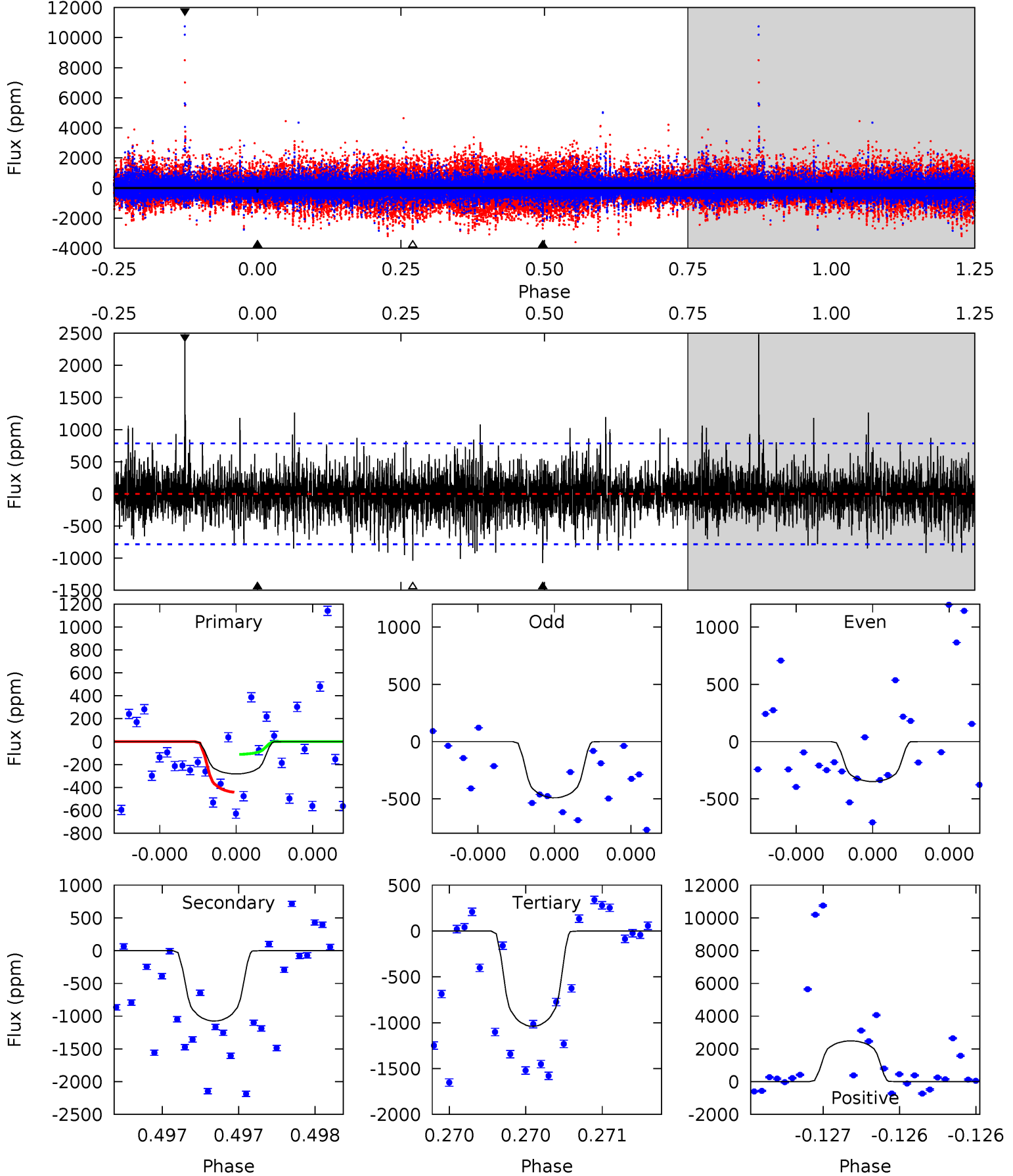
TCE 001570924-02     $P=443.660266$  Days     $T_0=454.294777$  (BKJD)



# DV Model-Shift Uniqueness Test

001570924-02,  $P = 443.672193$  Days,  $E = 10.620846$  Days

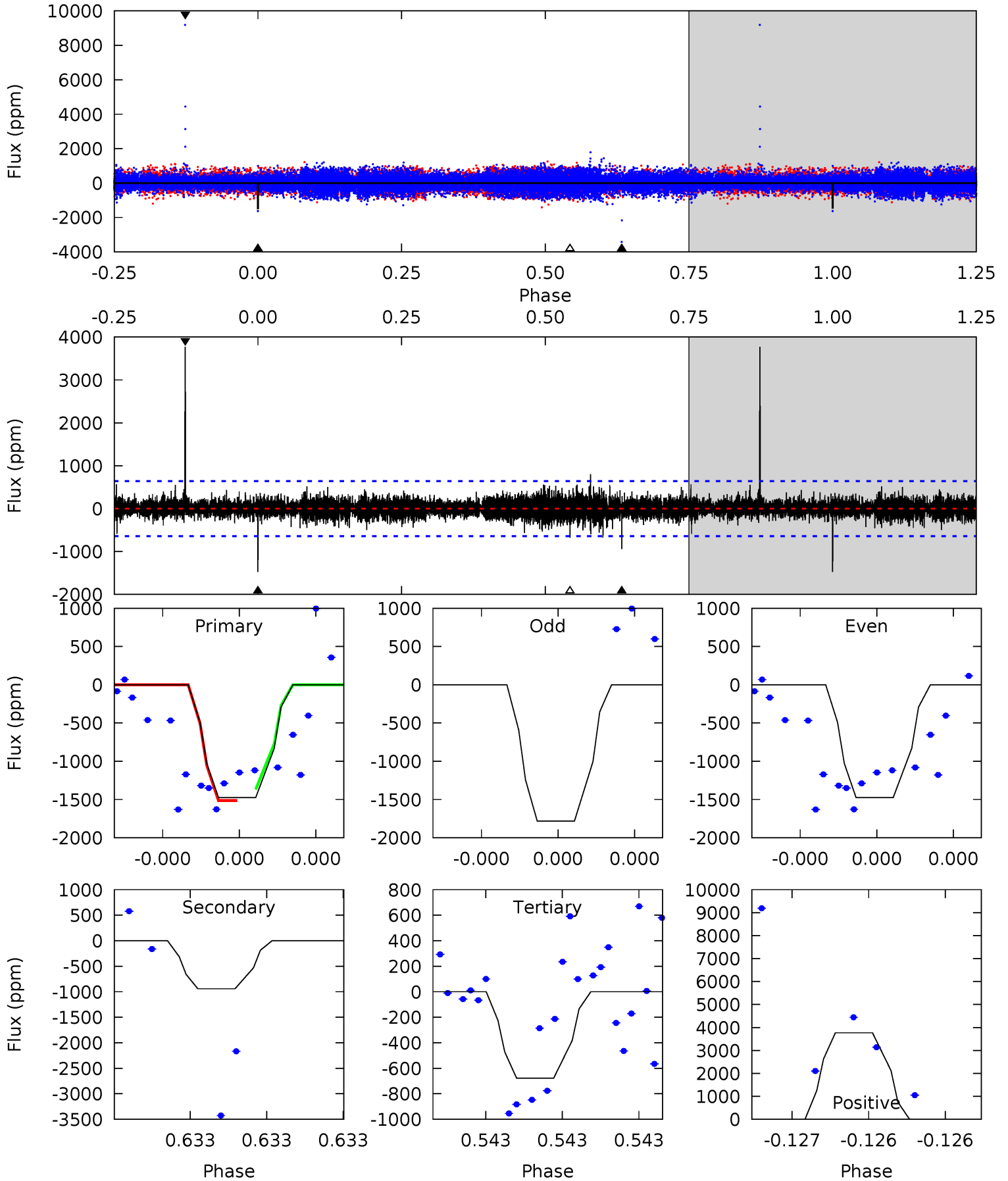
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2.02	7.71	7.46	17.9	5.63	3.57	1.74	-5.44	-15.8	0.25	-10.1	0.35	0.56	0.70	1.20



# Alt Model-Shift Uniqueness Test

001570924-02, P = 443.660266 Days, E = 10.634511 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.2	8.45	6.07	33.8	5.74	3.73	1.09	7.14	-20.6	2.38	-25.3	1.72	0.25	0.72	0.62





### Stellar Parameters For KIC 001570924

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4961^{+136}_{-136}$	$4.543^{+0.072}_{-0.044}$	$-0.080^{+0.300}_{-0.300}$	$0.762^{+0.065}_{-0.078}$	$0.741^{+0.087}_{-0.063}$	$2.355^{+0.721}_{-0.356}$
	+3%/-3%	+2%/-1%	+375%/-375%	+9%/-10%	+12%/-9%	+31%/-15%
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 001570924-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-1074 \pm 139$	$3.22^{+2.74}_{-2.14}$	$262^{+9}_{-10}$	$4613^{+3215}_{-935}$	$59190^{+458596}_{-41188}$
Alt.	$-942 \pm 111$	$2.98^{+2.59}_{-1.91}$	$261^{+9}_{-10}$	$4639^{+2985}_{-980}$	$61665^{+450737}_{-44169}$

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

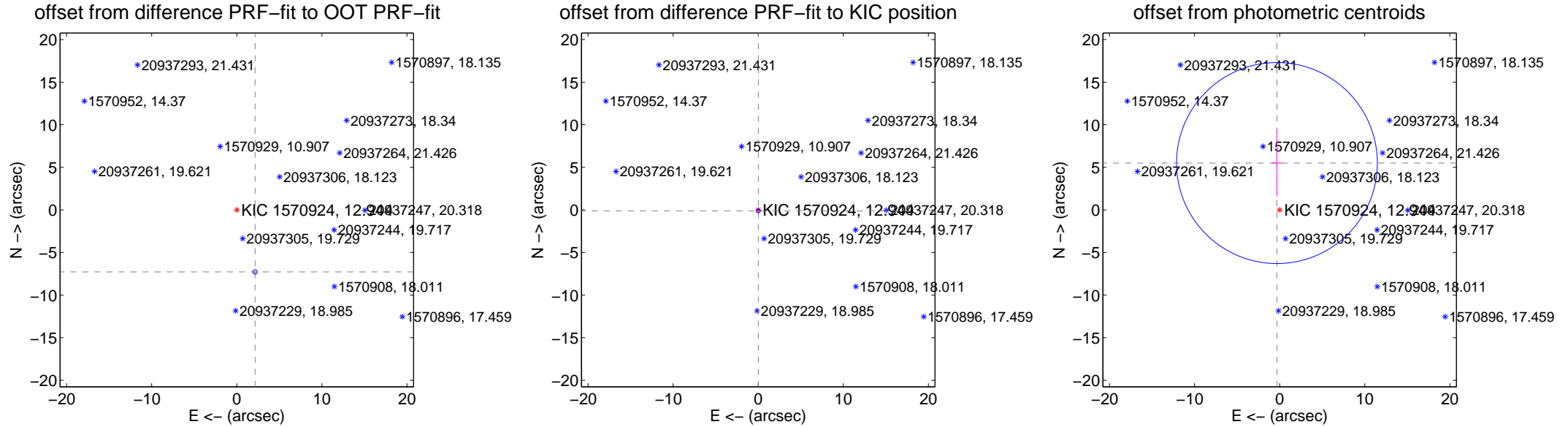
## DV Centroid Data

Supplemental centroid analysis for 001570924-02. Kepler magnitude: 12.94. Transit SNR 3.92

There are 2 quarters with good PRF difference image offsets

The OOT PRF centroid is offset from the target star catalog position by about 7.43 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b>7.586 <math>\pm</math> 0.085</b>	<b>89.04</b>	-2.147 $\pm$ 0.083	-7.276 $\pm$ 0.085
PRF-fit source offset from KIC position	0.113 $\pm$ 0.076	1.50	-0.017 $\pm$ 0.075	-0.112 $\pm$ 0.076
photometric centroid source offset	5.51 $\pm$ 3.93	1.40	0.32 $\pm$ 0.63	5.50 $\pm$ 3.94

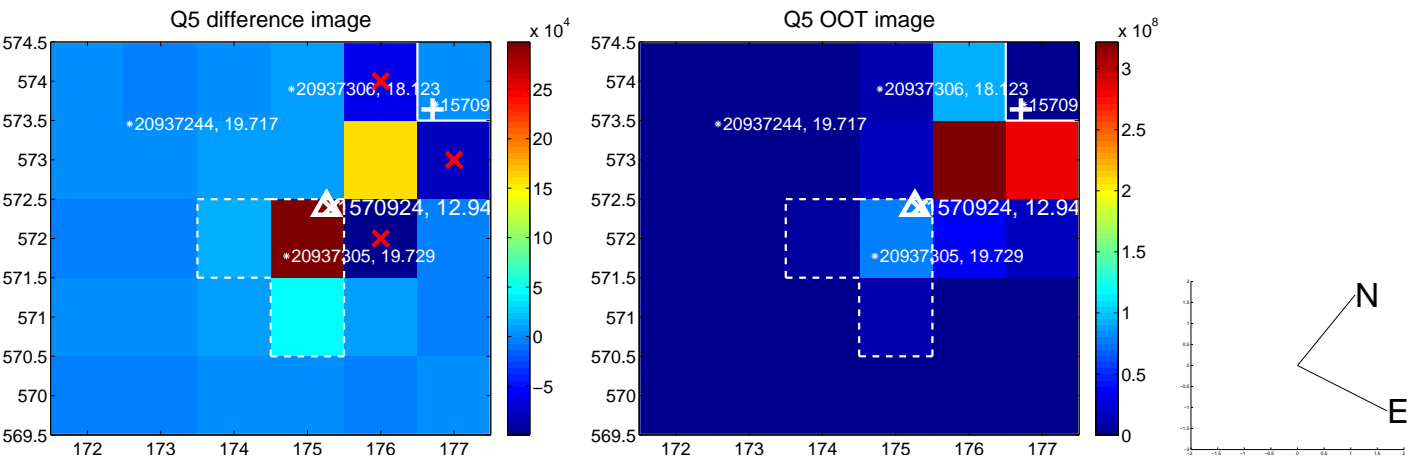


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

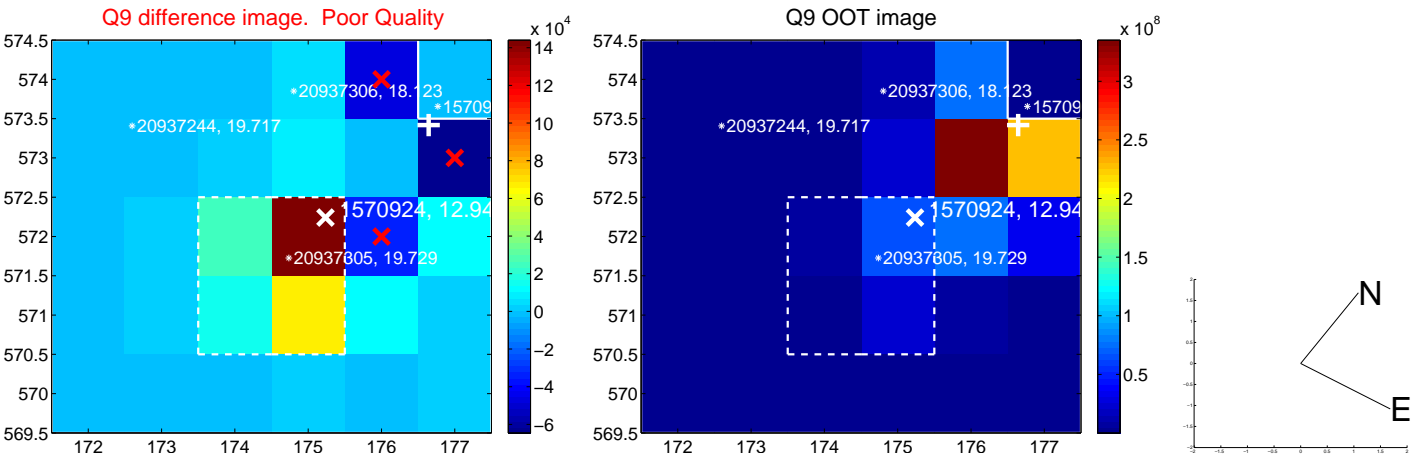
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



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



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

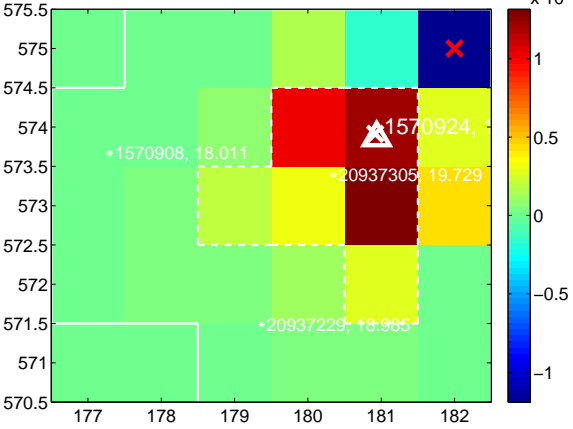
Q13 no difference image



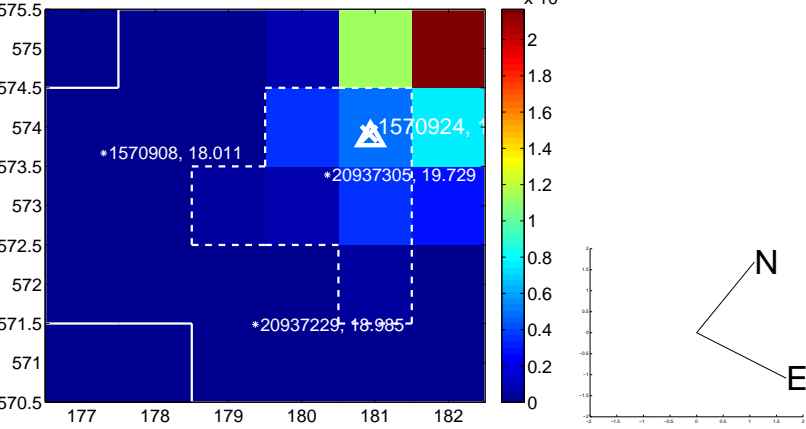
Q13 no OOT image



Q14 difference image



Q14 OOT image



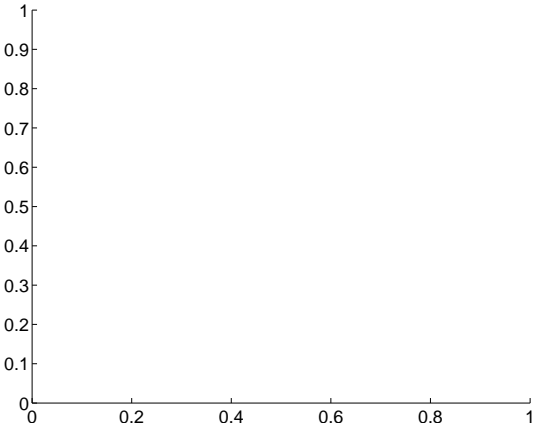
Q15 no difference image



Q15 no OOT image



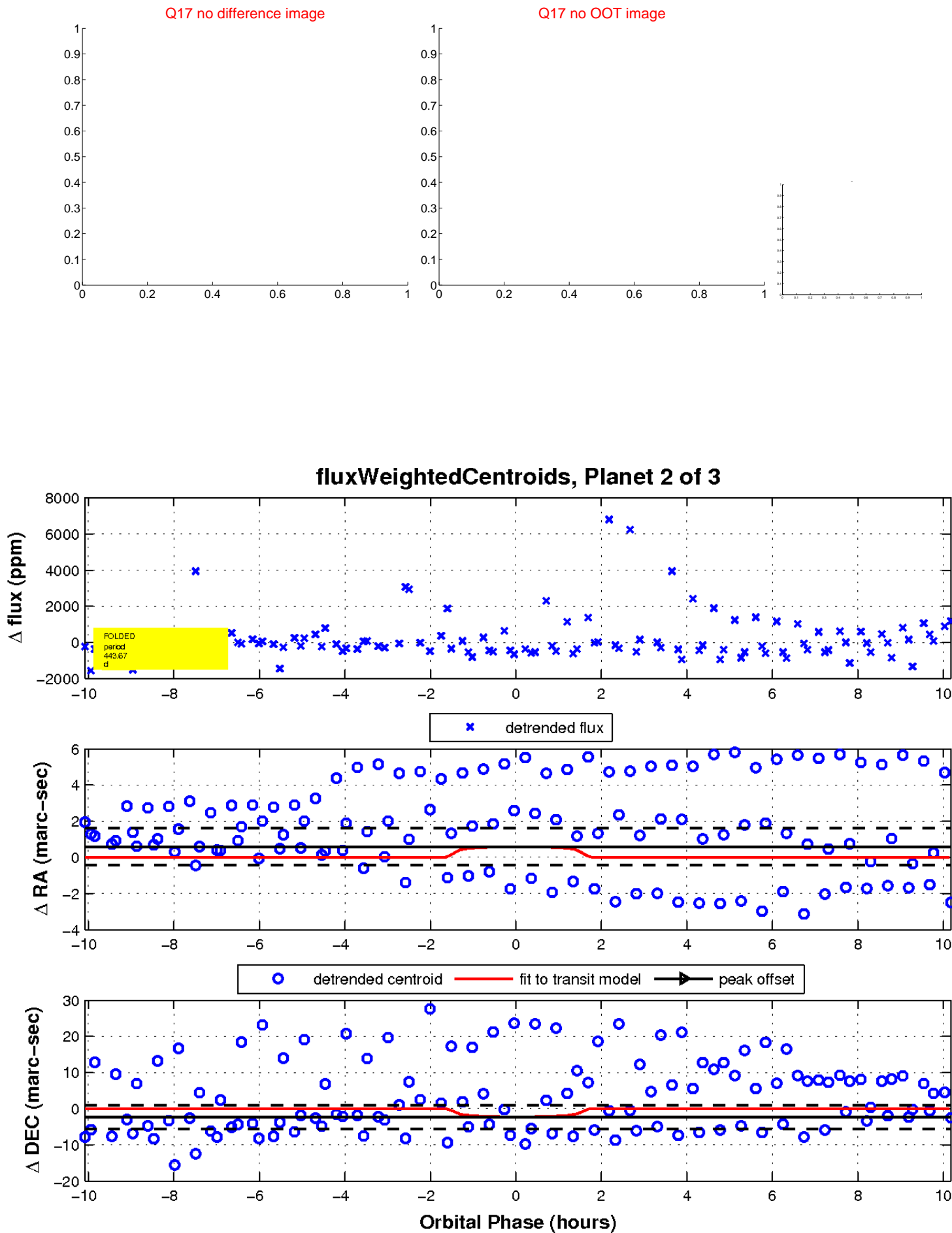
Q16 no difference image



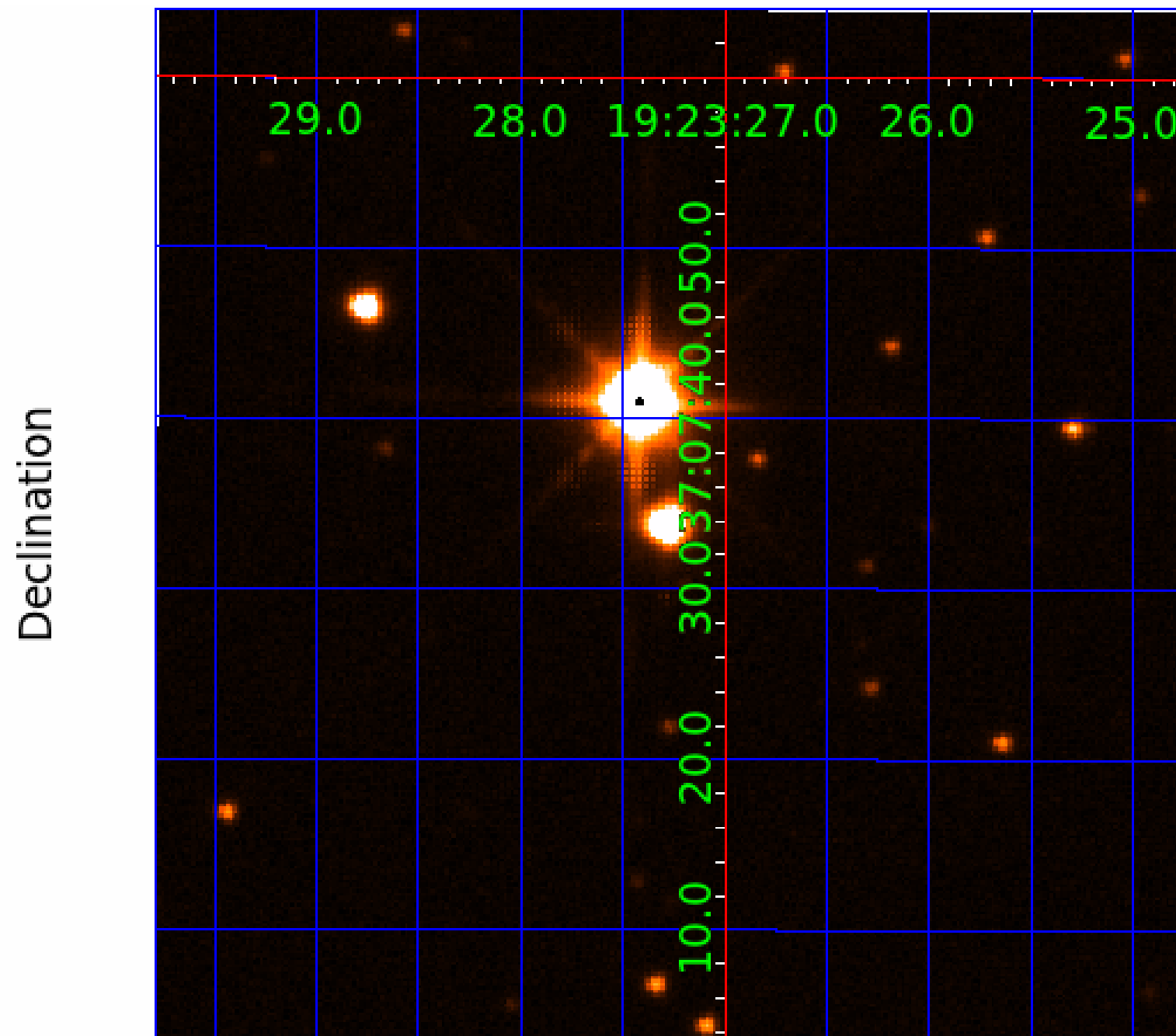
Q16 no OOT image



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



UKIRT Image





# KIC 001570924

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
001570924-01	OBS	No	322.161386	427.400397	1288.7	2.822	11.3	5.1	0.76	4961	2.84	0.46
001570924-02	OBS	No	443.672193	454.293039	791.0	3.400	15.3	3.9	0.76	4961	2.51	0.30
001570924-03	OBS	No	223.374345	295.466269	893.0	2.871	11.2	6.5	0.76	4961	2.39	0.74

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
001570924-01	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—CENT_FEW_DIFFS—HALO_GHOST
001570924-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
001570924-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_KIC_POS

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

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

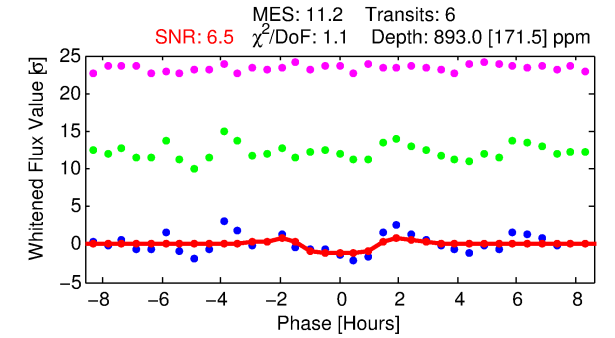
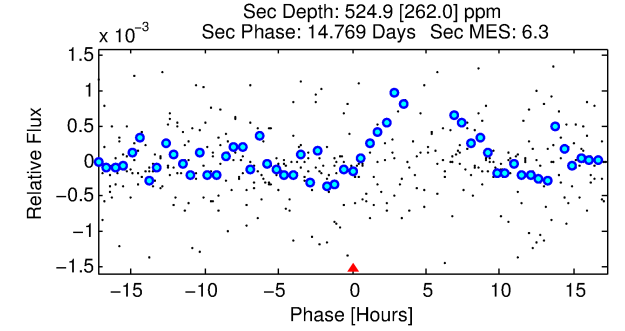
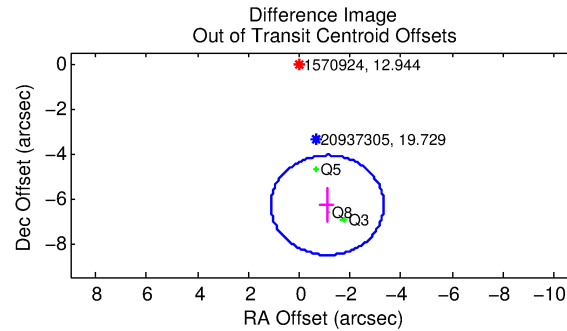
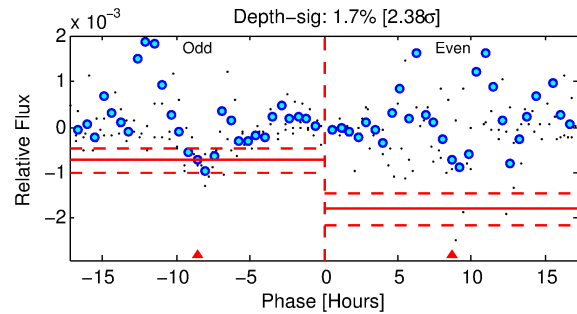
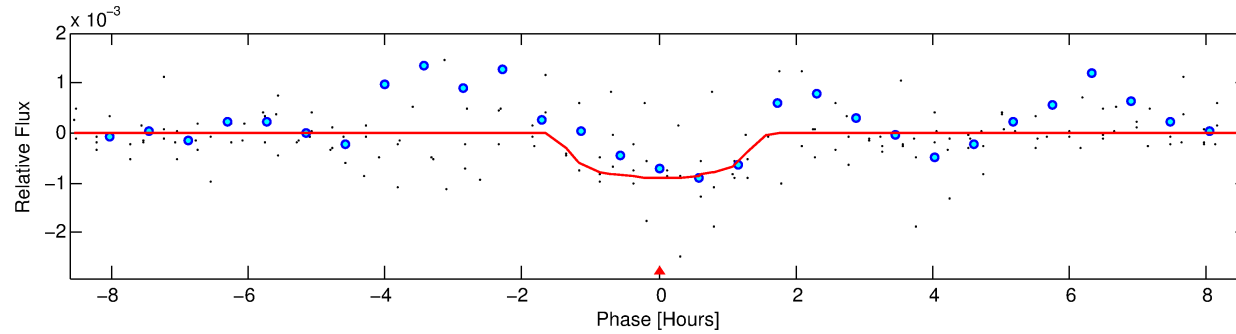
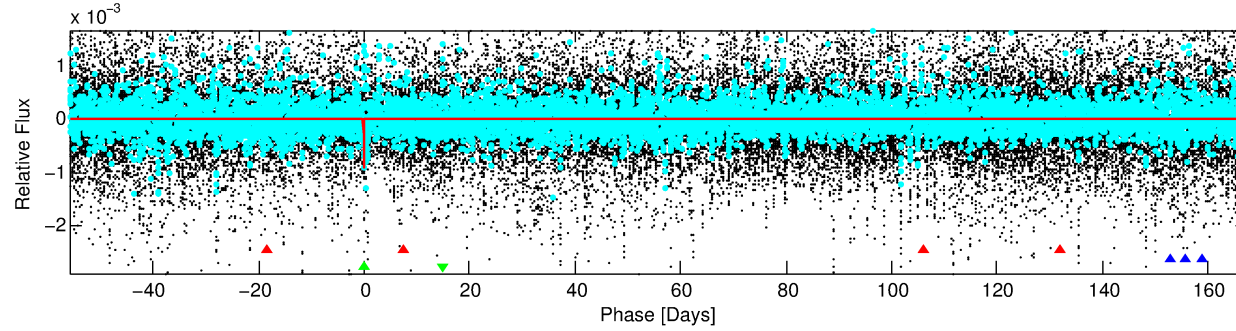
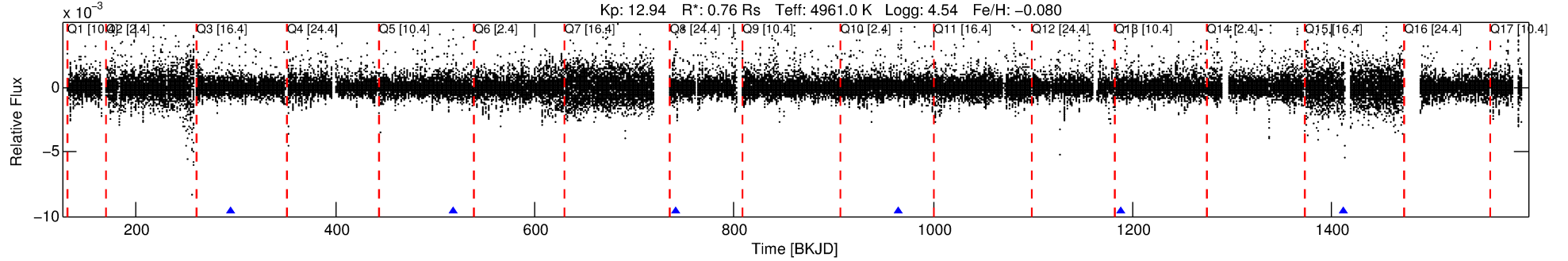
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 001570924-03

No Significant Match Found

# DV One-Page Summary

KIC: 1570924 Candidate: 3 of 3 Period: 223.374 d



## DV Fit Results:

Period = 223.37434 [0.00313] d  
Epoch = 295.4663 [0.0084] BKJD  
Rp/R\* = 0.0287 [0.0614]  
a/R\* = 474.52 [3414.32]  
b = 0.65 [6.59]  
Seff = 0.74 [0.13]  
Teq = 237 [10] K  
Rp = 2.39 [5.11] Re  
a = 0.6517 [0.0572] AU  
Ag = 21478.79 [92499.38] [0.23 $\sigma$ ]  
Teffp = 4430 [4769] K [0.88 $\sigma$ ]

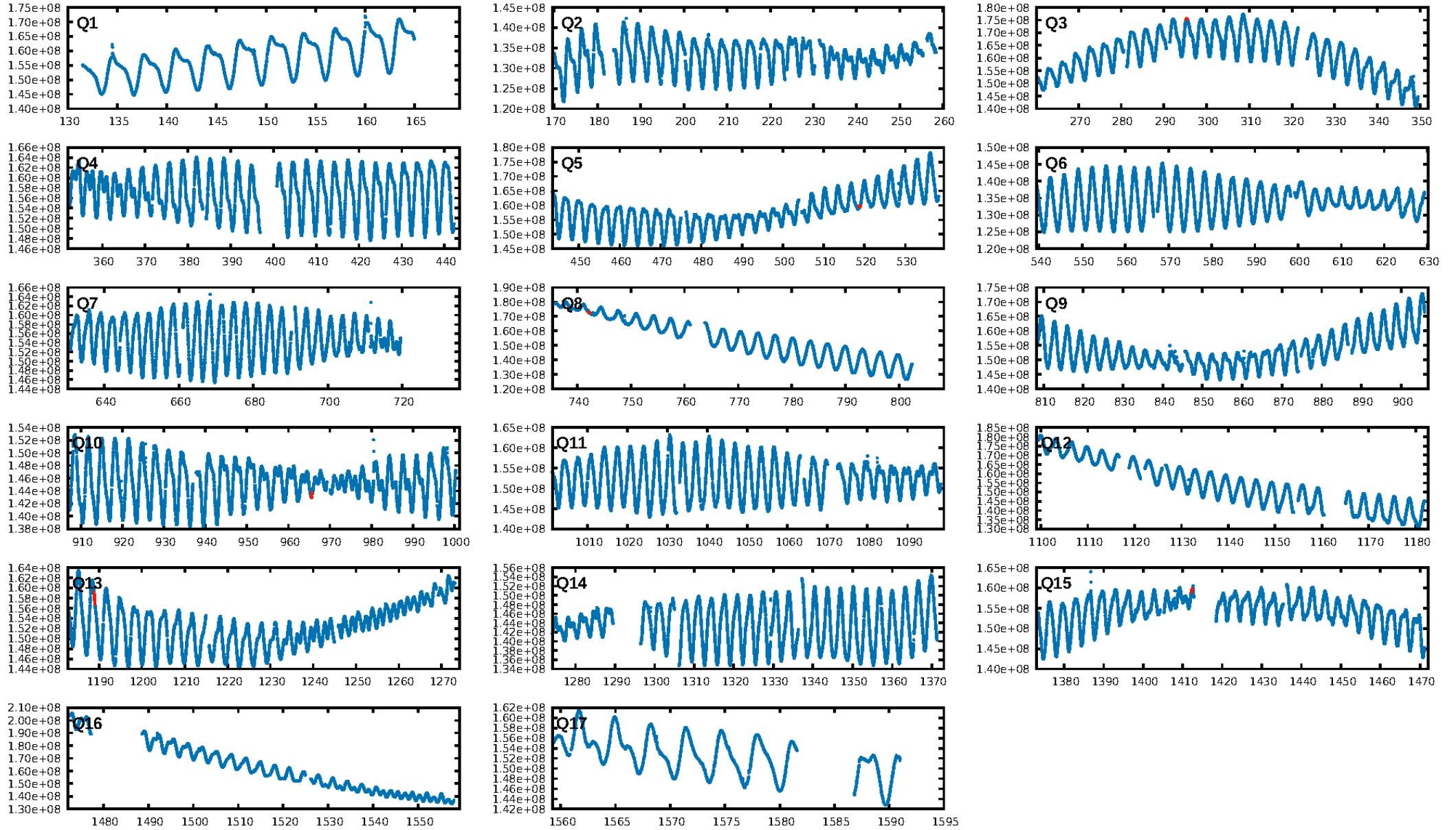
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [588.90 $\sigma$ ]  
ModelChiSquare2-sig: 22.1%  
ModelChiSquareGof-sig: 90.8%  
Bootstrap-pfa: 3.06e-09  
RollingBand-fgt: 1.00 [6/6]  
GhostDiagnostic-chr: -1.626  
Centroid-sig: 2.6%  
Centroid-so: 1.222 arcsec [0.63 $\sigma$ ]  
OotOffset-rm: 6.399 arcsec [8.64 $\sigma$ ]  
KicOffset-rm: 0.416 arcsec [1.24 $\sigma$ ]  
OotOffset-st: 0/1/1/1 [3]  
KicOffset-st: 1/1/1/1 [4]  
DiffImageQuality-fgm: 0.75 [3/4]  
DiffImageOverlap-fno: 1.00 [5/5]

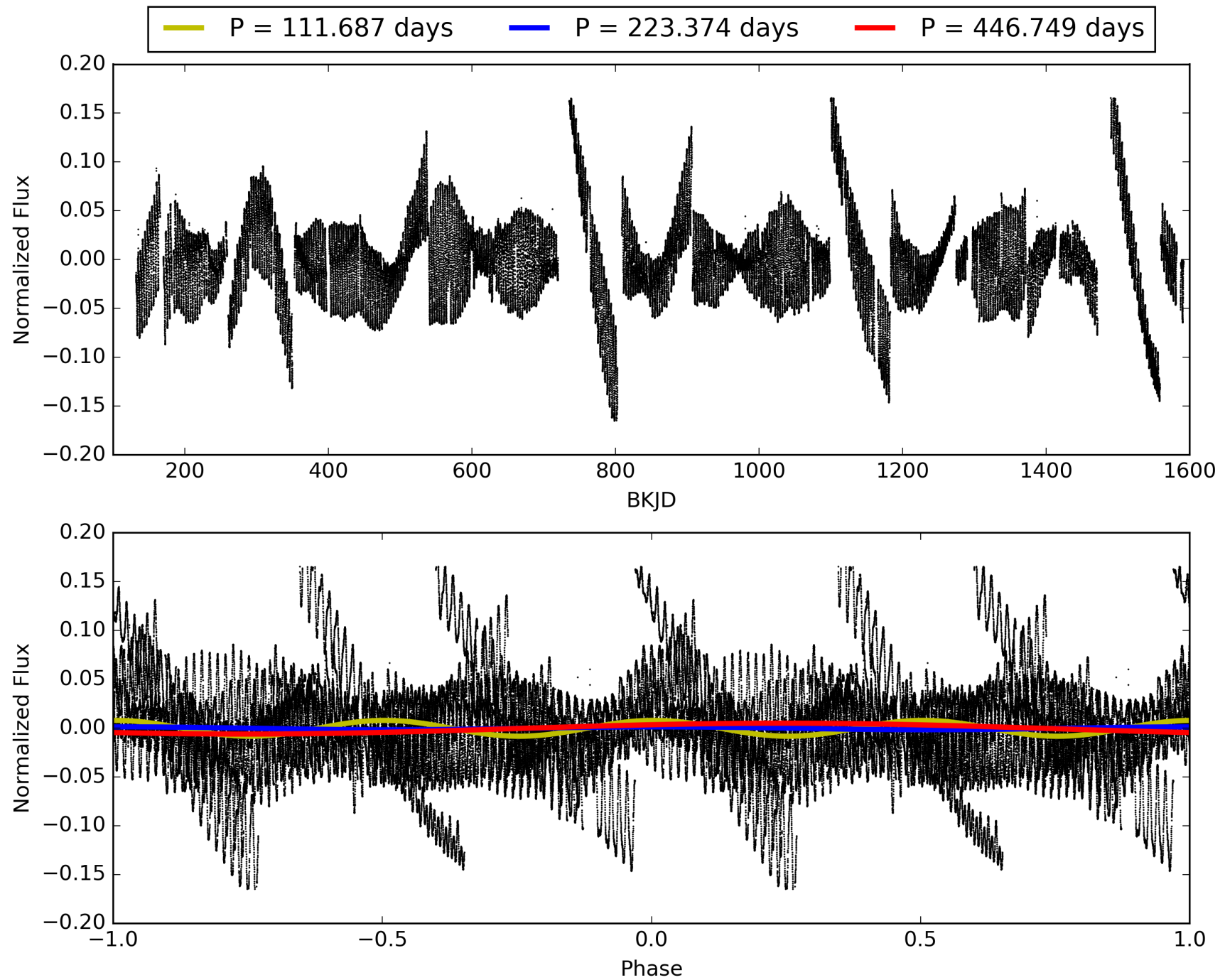
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 23:22:50 Z

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

# TCE 001570924-03, PDC Light Curves

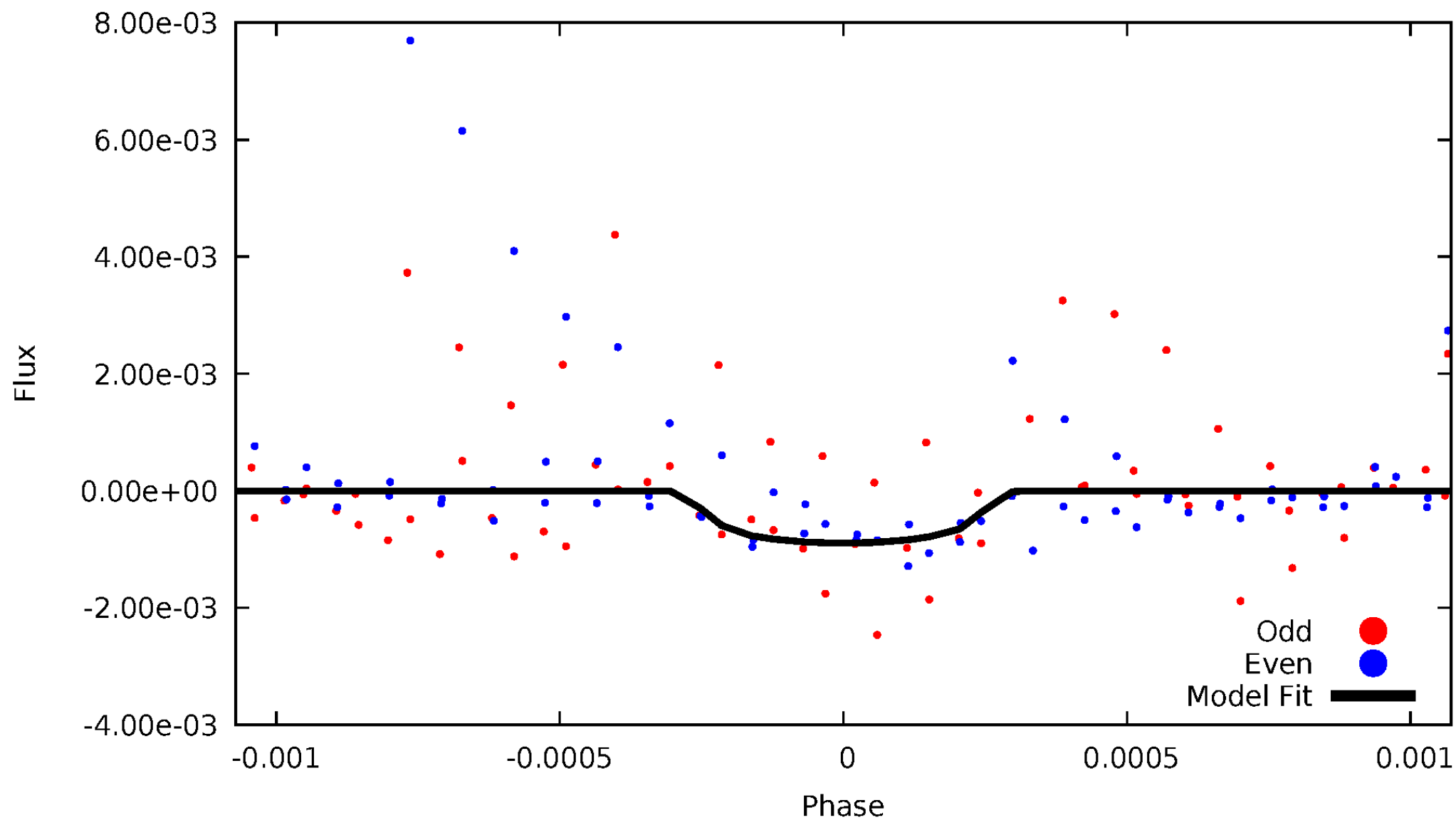


TCE 001570924-03



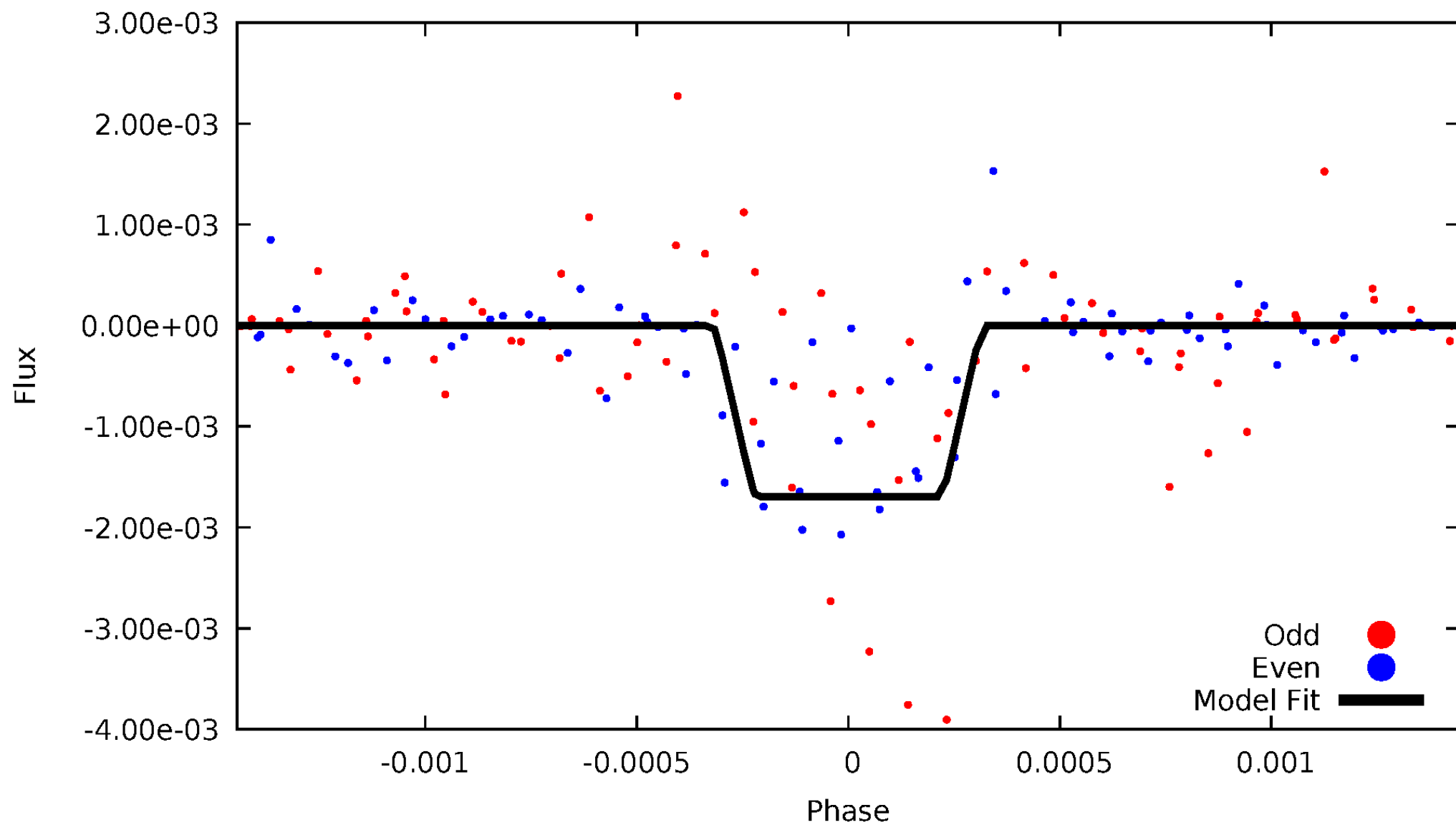
DV Odd/Even

TCE 001570924-03



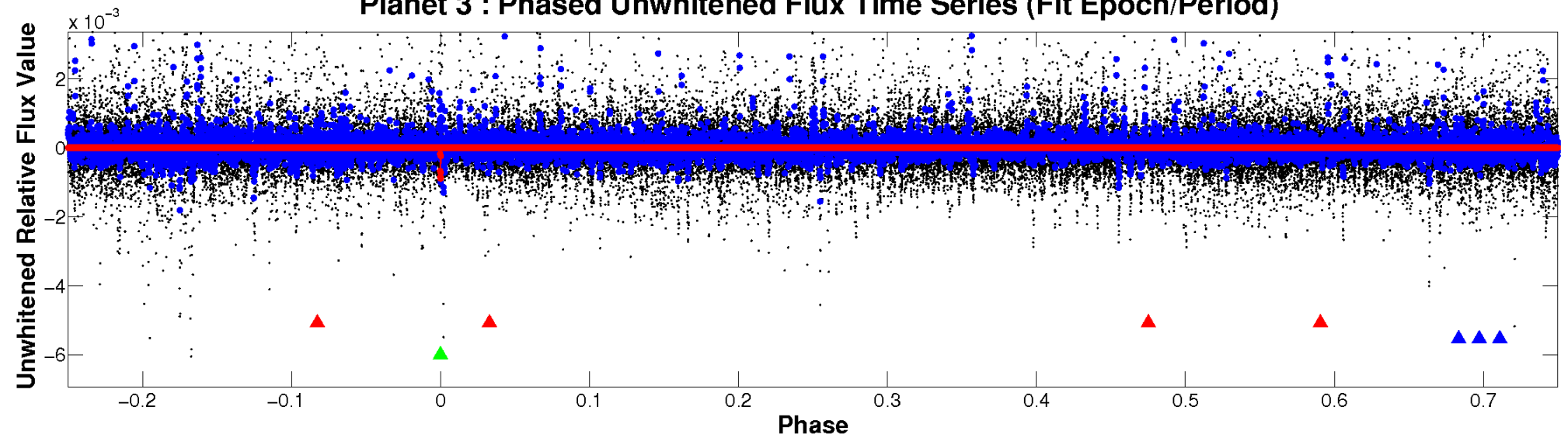
# ALT Odd/Even

TCE 001570924-03

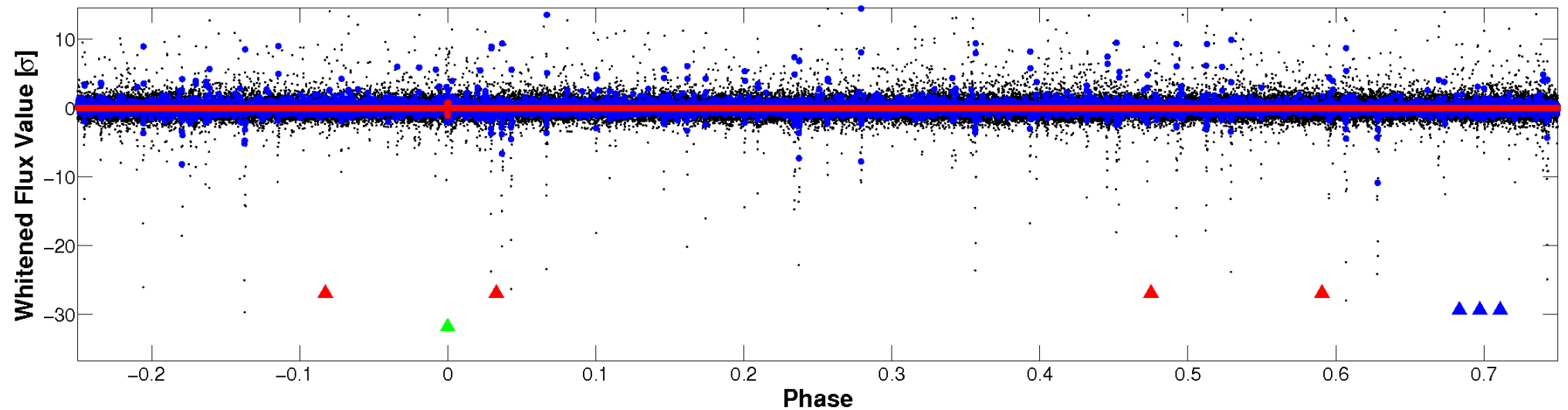


# Non-Whitened Vs. Whitened Light Curve

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

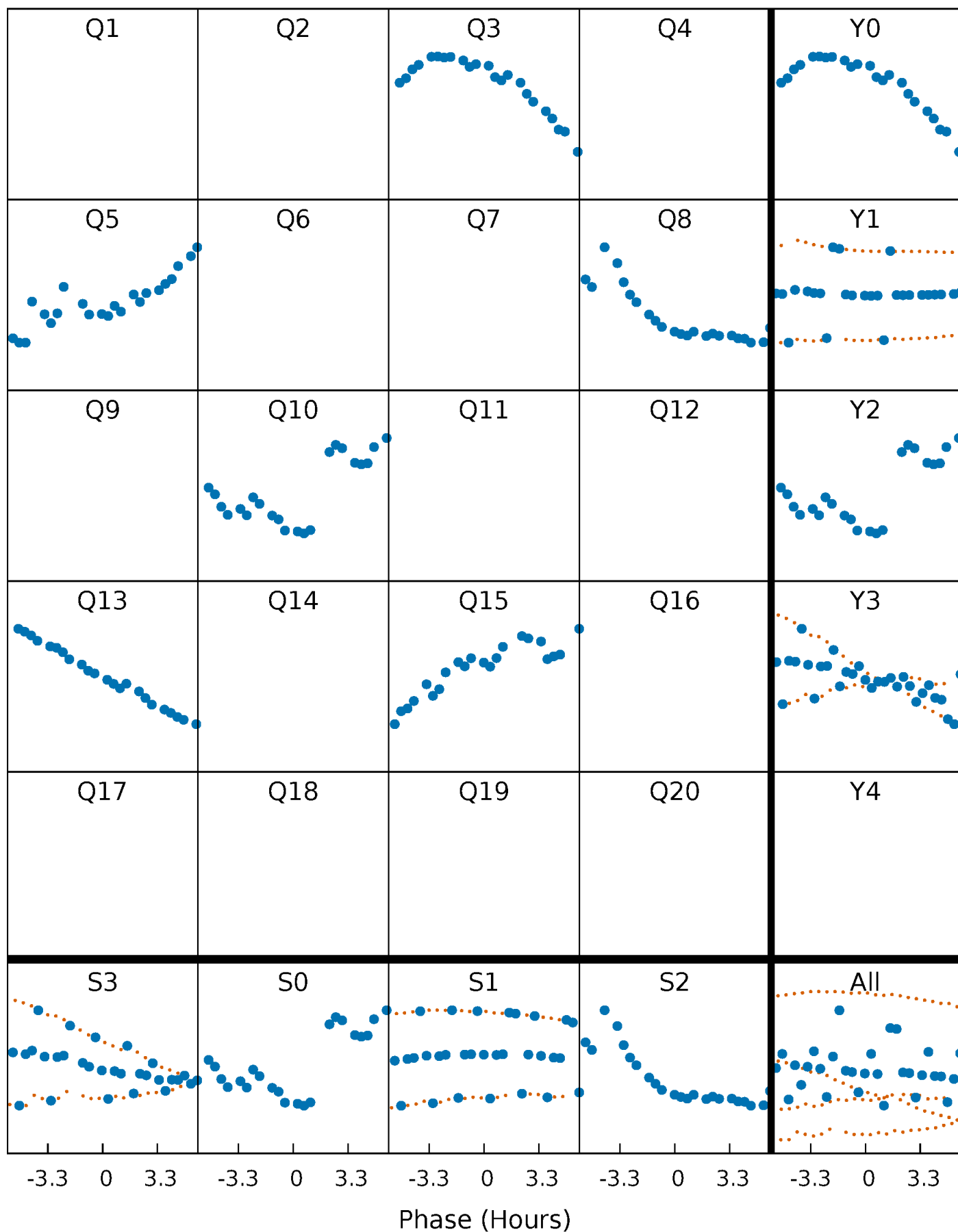


**Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

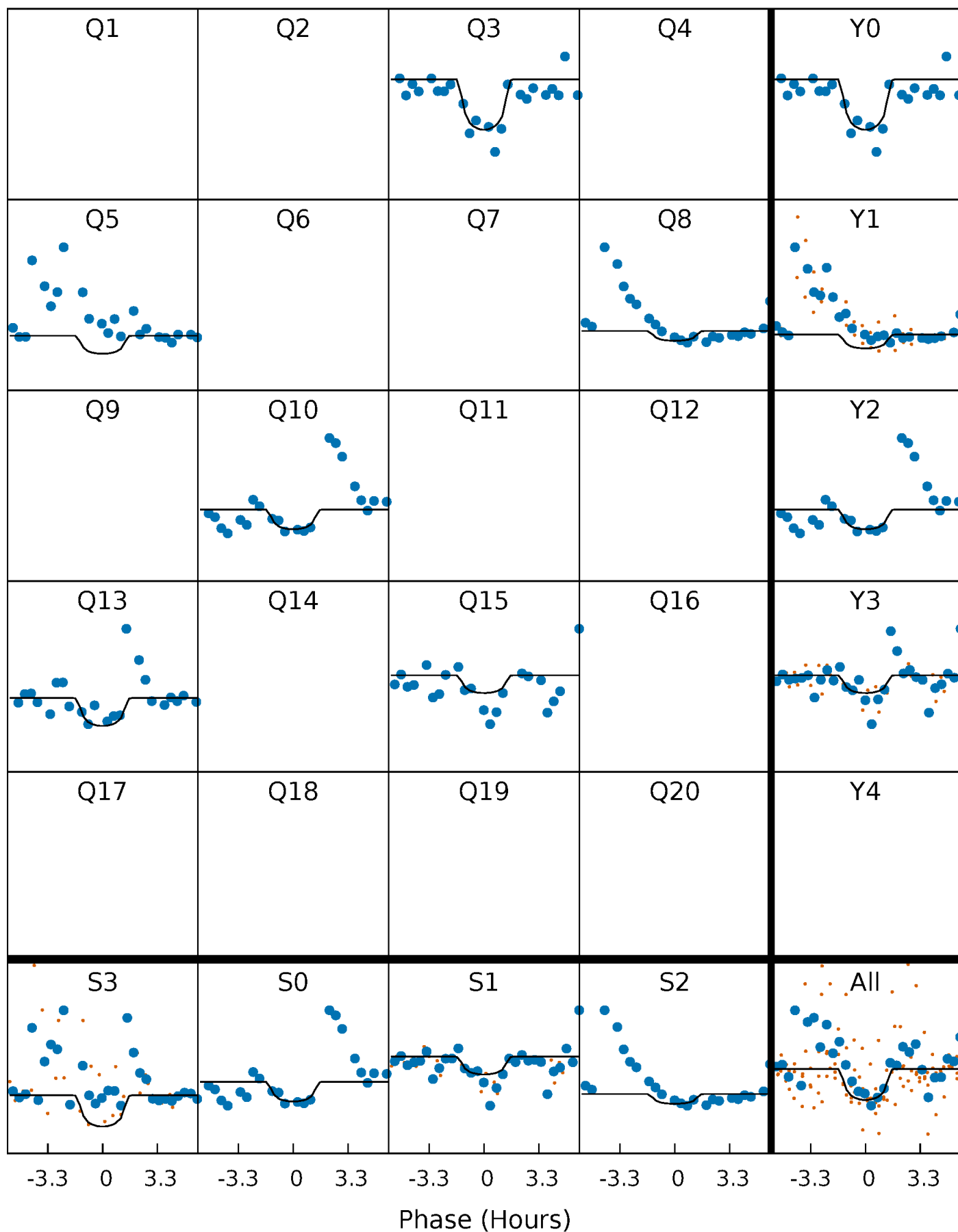
TCE 001570924-03     $P=223.374345$  Days     $T_0=295.466269$  (BKJD)





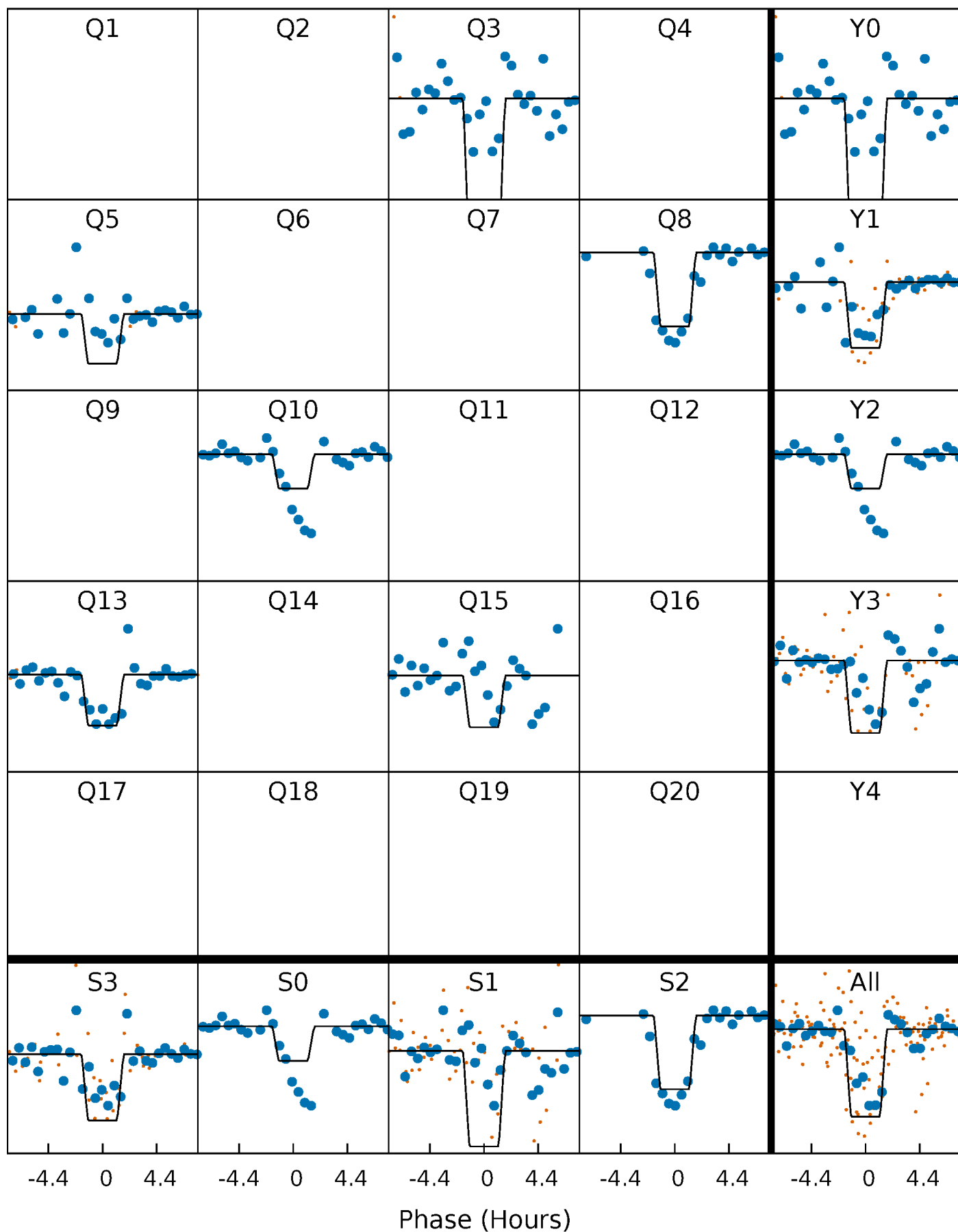
# DV Quarter-Phased Transit Curves

TCE 001570924-03     $P=223.374345$  Days     $T_0=295.466269$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

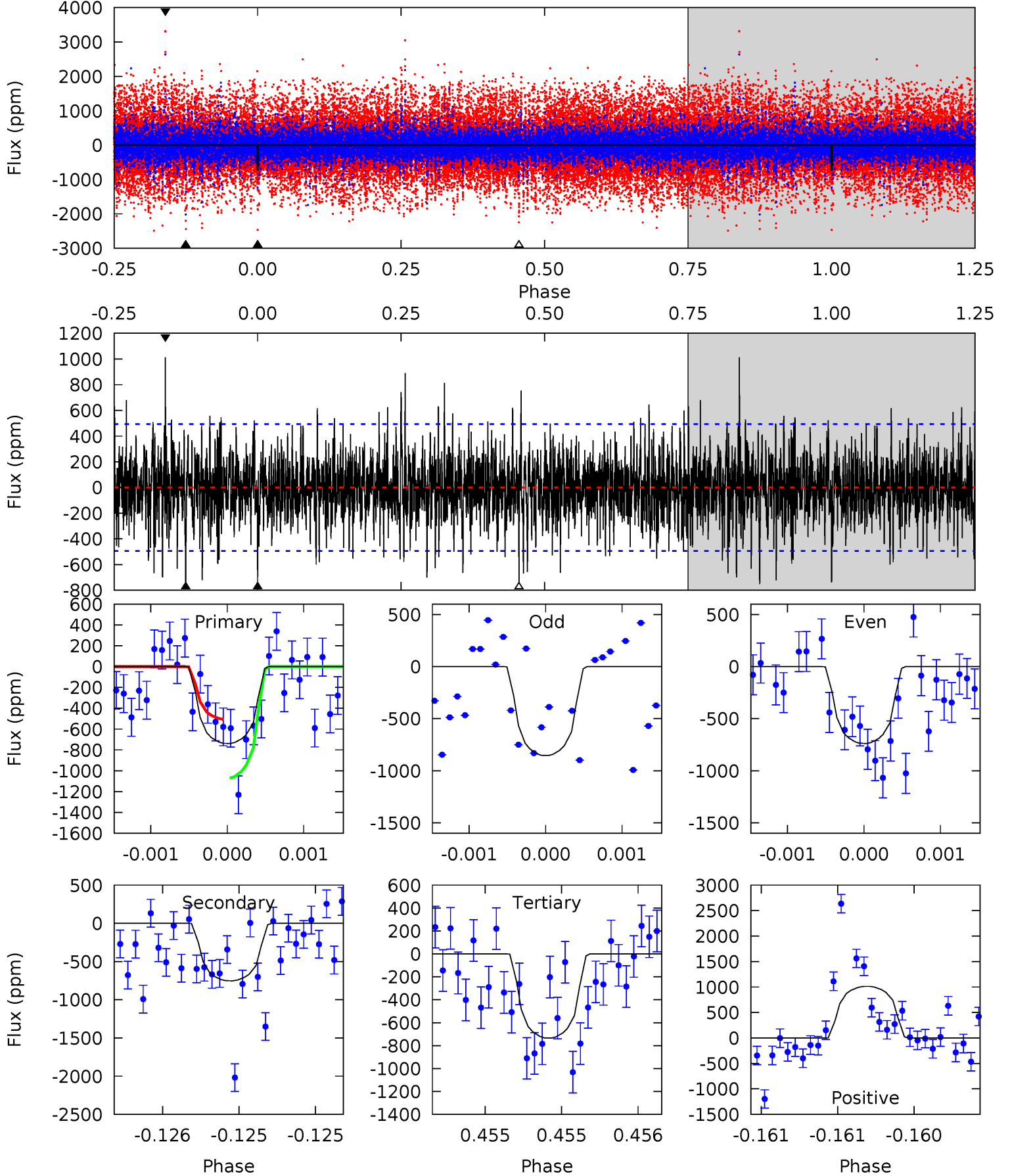
TCE 001570924-03 P=223.371010 Days  $T_0=295.469779$  (BKJD)



# DV Model-Shift Uniqueness Test

001570924-03, P = 223.374345 Days, E = 72.091924 Days

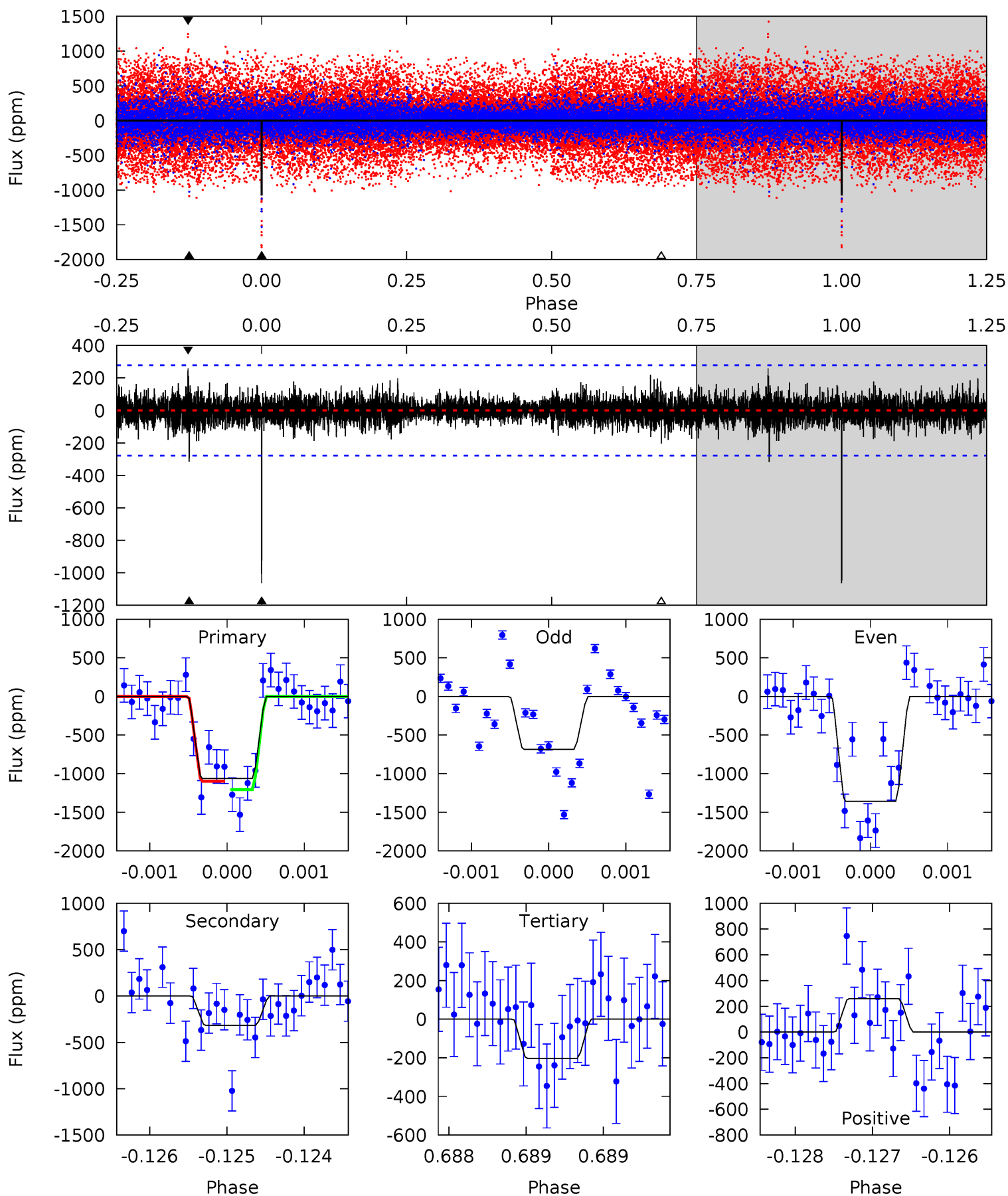
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.28	8.44	8.24	11.4	5.54	3.43	2.16	0.05	-3.08	0.20	-2.92	0.63	0.85	0.57	3.15



# Alt Model-Shift Uniqueness Test

001570924-03, P = 223.371010 Days, E = 72.098769 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
21.1	6.29	4.03	5.13	5.53	3.41	0.97	17.1	16.0	2.27	1.16	6.97	1.24	0.20	1.12



### Stellar Parameters For KIC 001570924

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4961^{+136}_{-136}$	$4.543^{+0.072}_{-0.044}$	$-0.080^{+0.300}_{-0.300}$	$0.762^{+0.065}_{-0.078}$	$0.741^{+0.087}_{-0.063}$	$2.355^{+0.721}_{-0.356}$
	+3%/-3%	+2%/-1%	+375%/-375%	+9%/-10%	+12%/-9%	+31%/-15%
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 001570924-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-752 \pm 89$	$4.65^{+4.03}_{-3.20}$	$330^{+11}_{-12}$	$3779^{+2189}_{-651}$	$8188^{+70458}_{-5805}$
Alt.	$-317 \pm 50$	$4.89^{+4.05}_{-3.24}$	$330^{+12}_{-12}$	$3230^{+1515}_{-487}$	$3084^{+23137}_{-2169}$

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

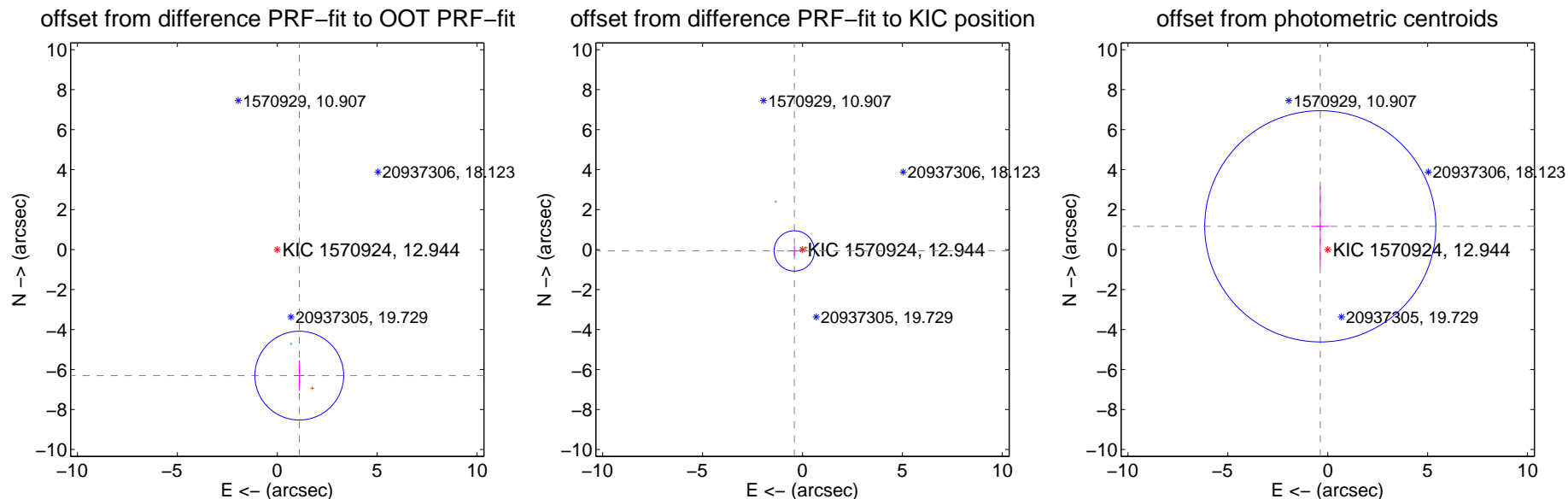
## DV Centroid Data

Supplemental centroid analysis for 001570924-03. Kepler magnitude: 12.94. Transit SNR 6.48

There are 3 quarters with good PRF difference image offsets

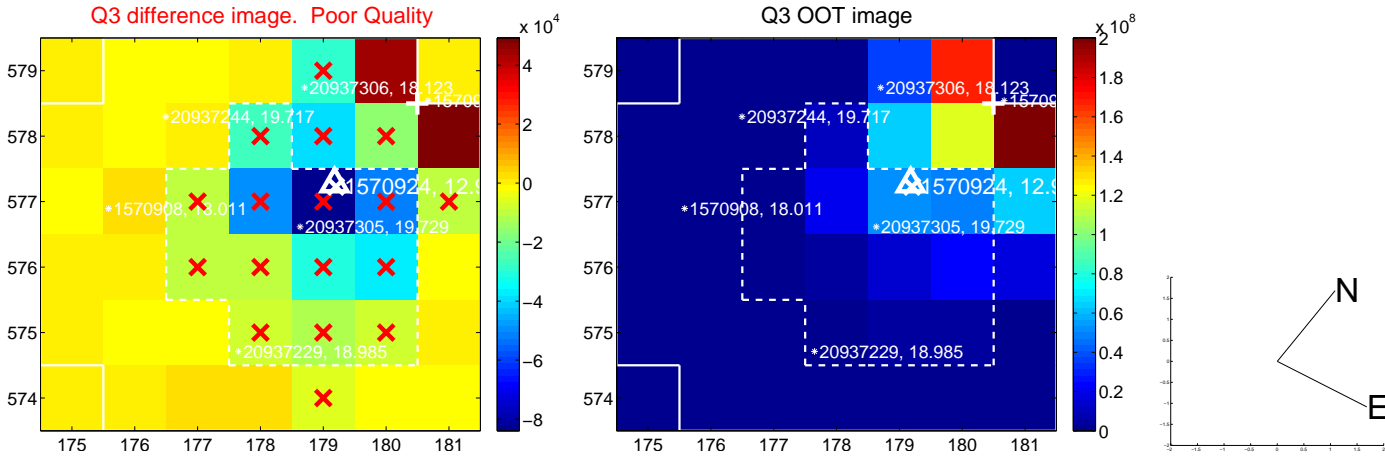
The OOT PRF centroid is offset from the target star catalog position by about 6.72 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$6.399 \pm 0.740$	8.64	$-1.102 \pm 0.258$	$-6.303 \pm 0.750$
PRF-fit source offset from KIC position	$0.416 \pm 0.336$	1.24	$0.410 \pm 0.338$	$-0.067 \pm 0.264$
photometric centroid source offset	$1.22 \pm 1.93$	0.63	$0.37 \pm 0.46$	$1.16 \pm 2.02$

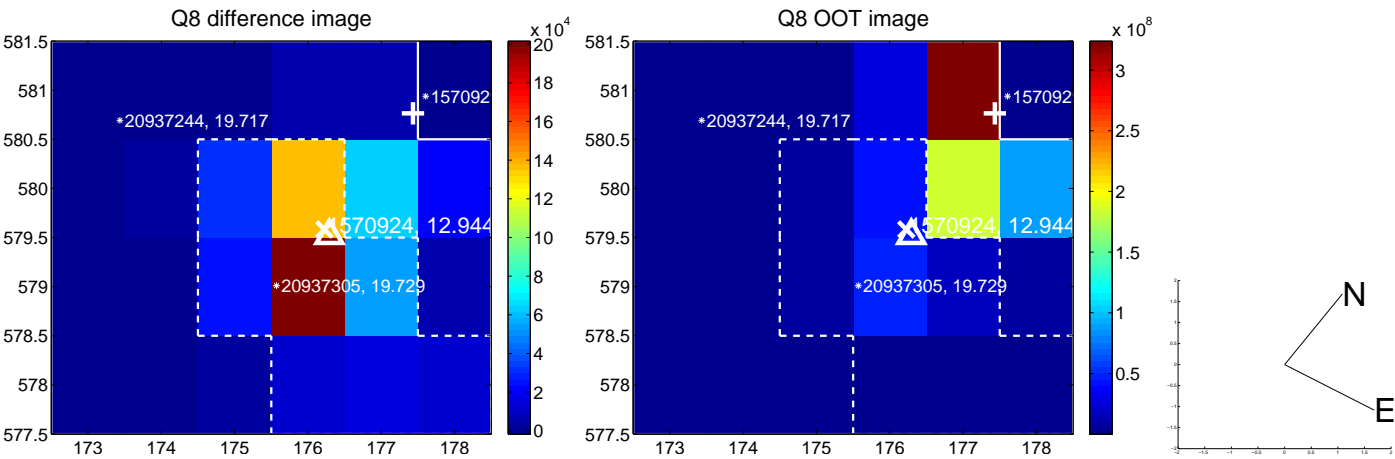
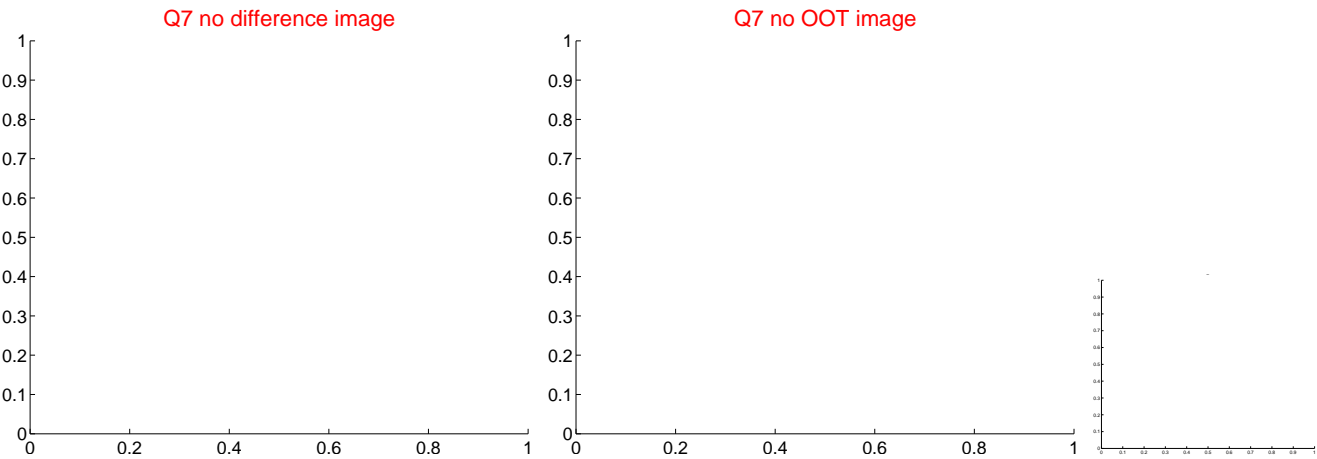
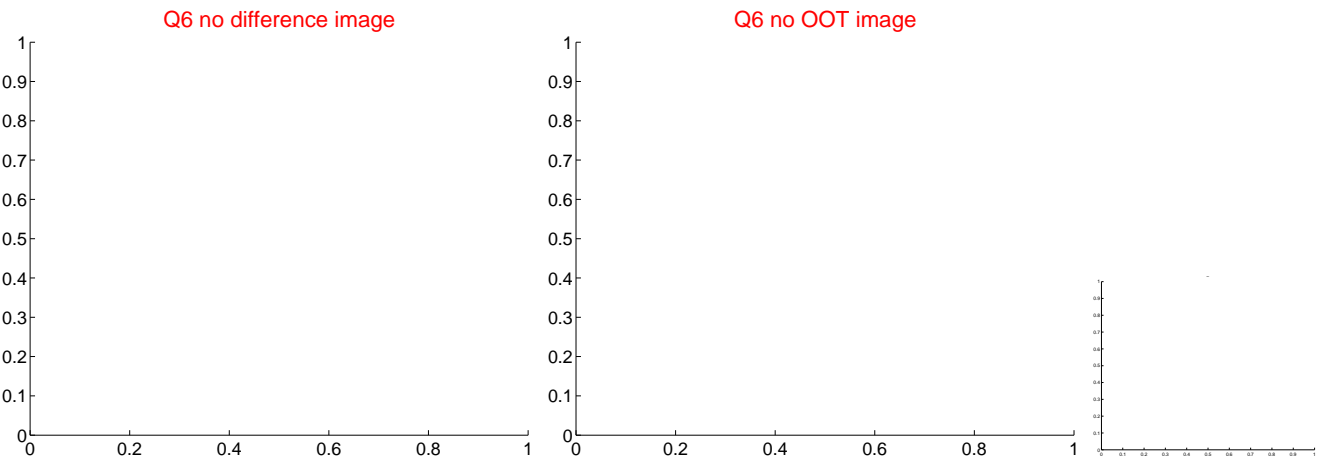
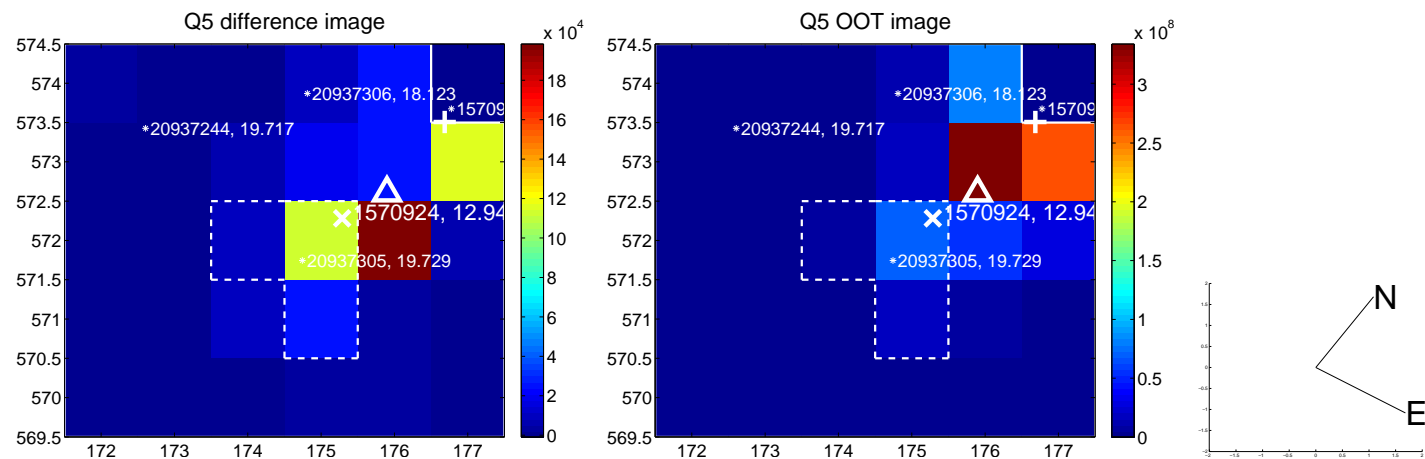


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

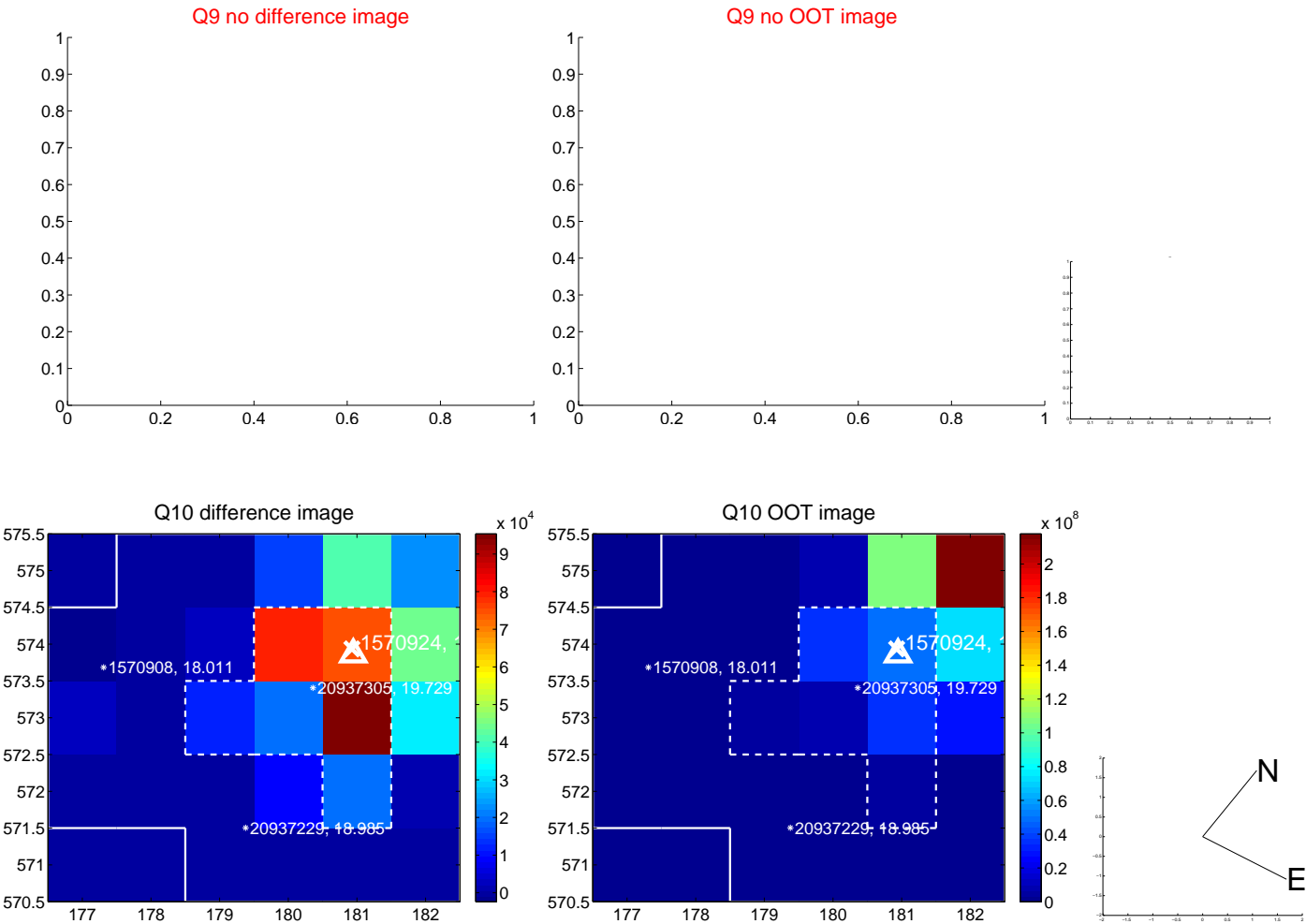


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

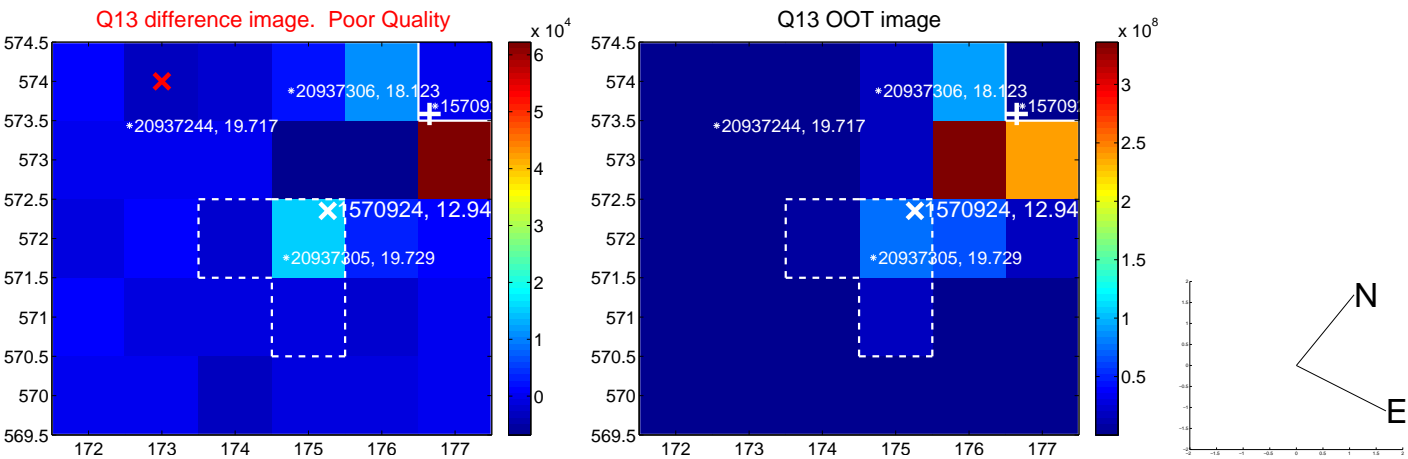




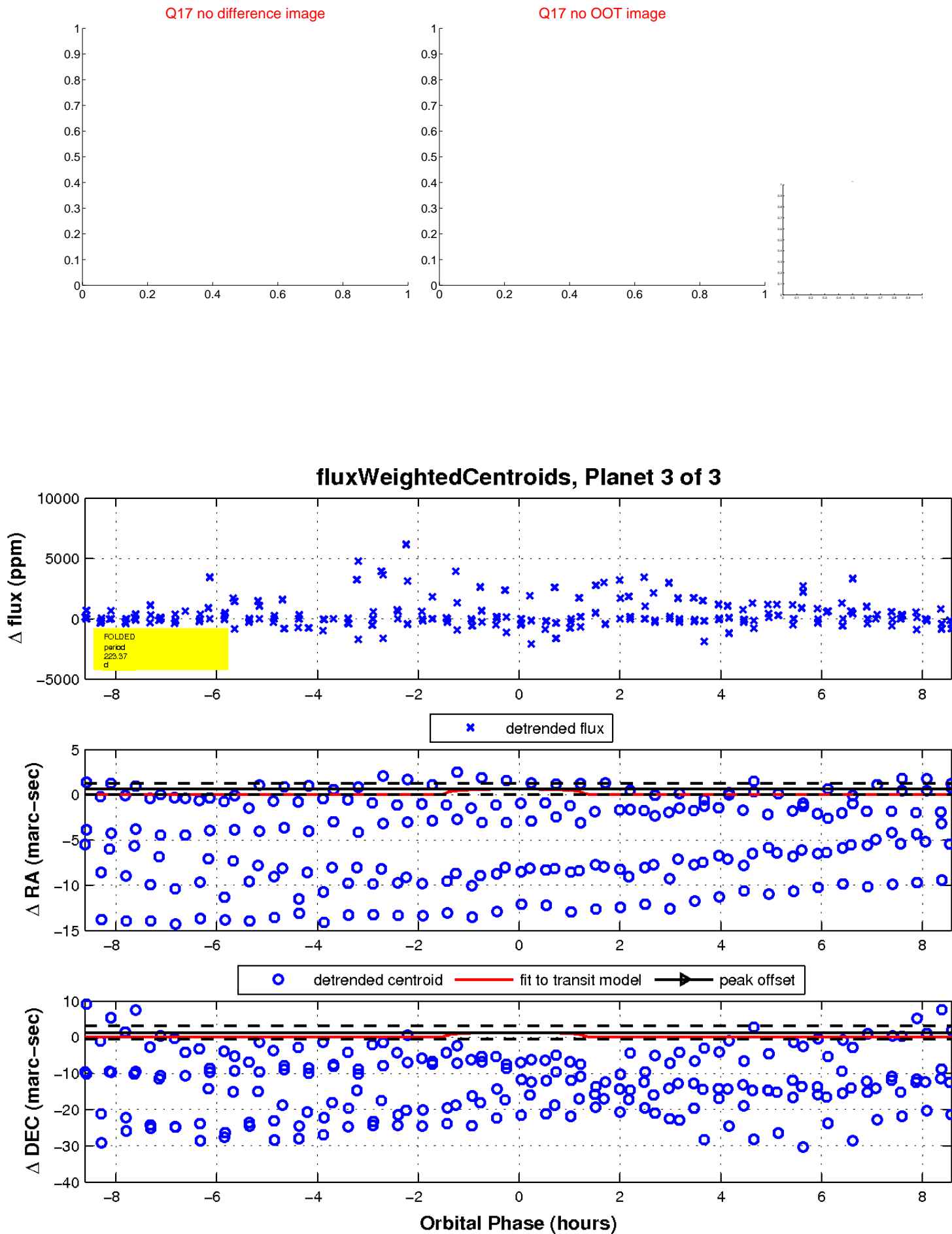
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

