

# KIC 005176547

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005176547-01	OBS	No	588.761353	369.242123	670.7	2.762	14.0	8.7	1.78	5129	5.43	1.13
005176547-02	OBS	No	281.463692	253.267178	531.8	4.144	11.0	6.5	1.78	5129	4.48	3.02
005176547-03	OBS	No	471.826432	480.635125	786.4	5.186	14.7	9.4	1.78	5129	5.08	1.51
005176547-04	OBS	No	361.706110	478.173387	529.8	3.180	12.5	7.4	1.78	5129	4.03	2.16
005176547-05	OBS	No	592.452498	390.537666	564.2	7.394	11.0	6.8	1.78	5129	4.45	1.12

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005176547-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
005176547-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005176547-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005176547-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_POS_DV—CENT_FEW_DIFFS
005176547-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

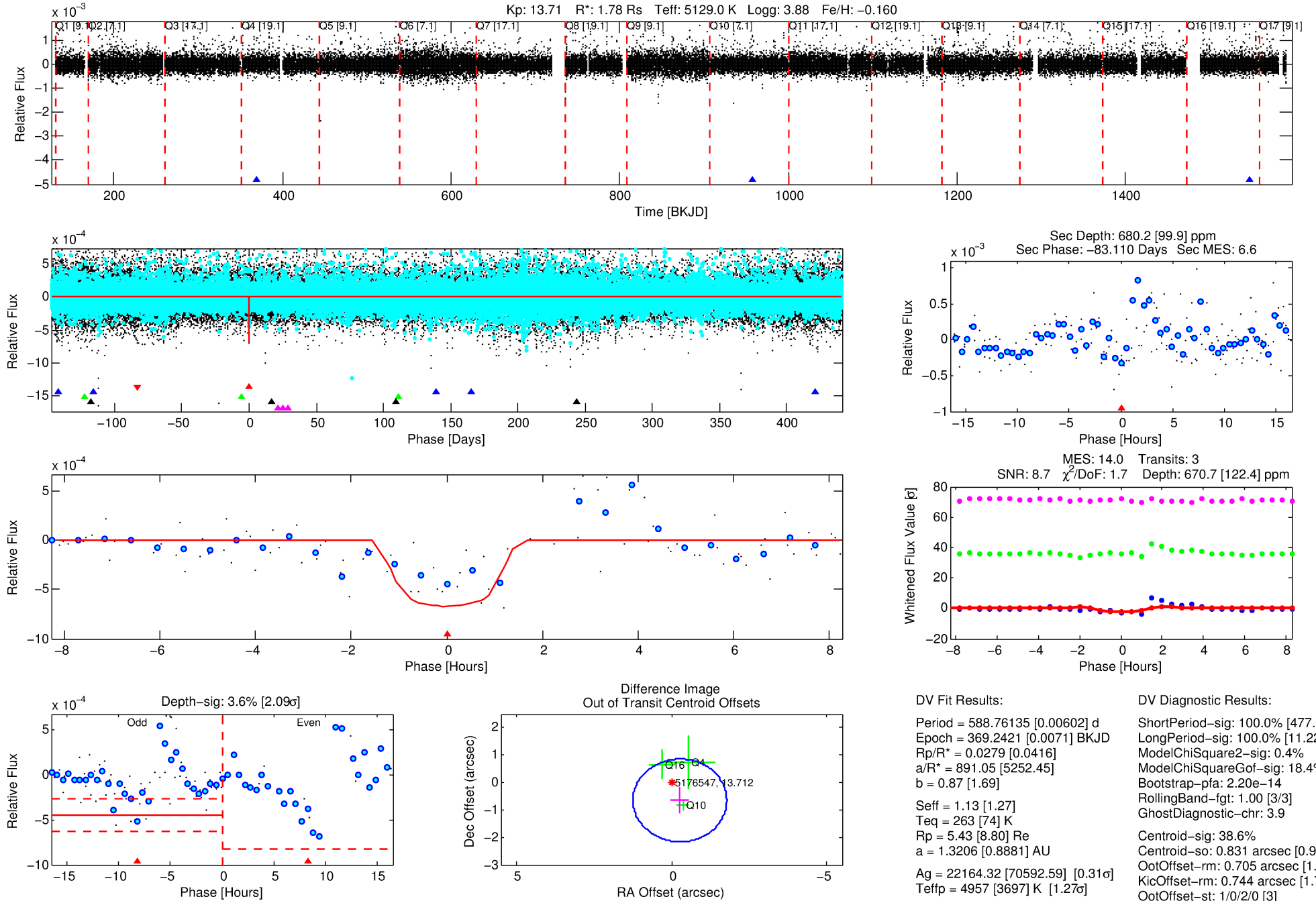
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 005176547-01

No Significant Match Found

# DV One-Page Summary

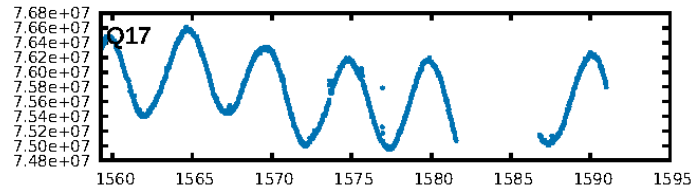
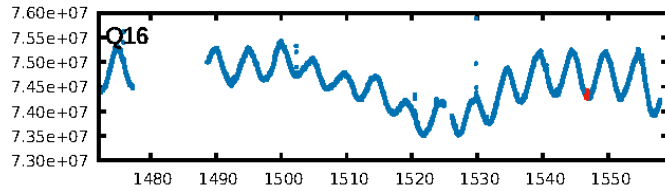
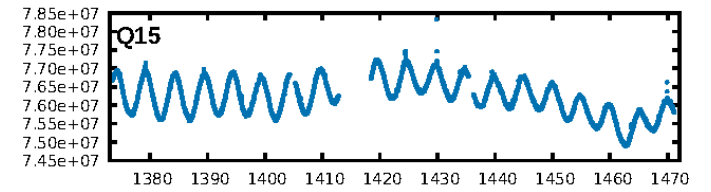
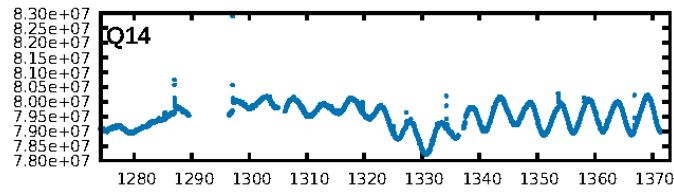
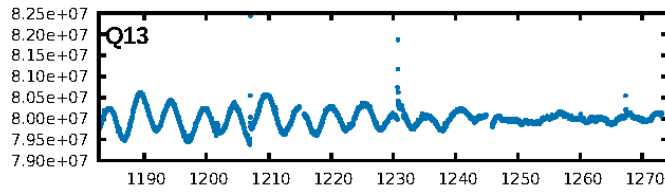
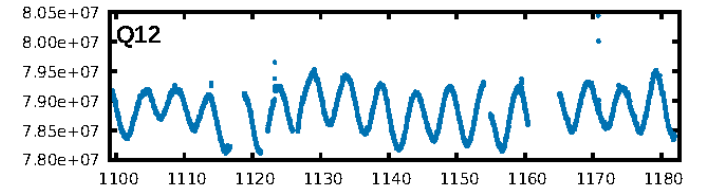
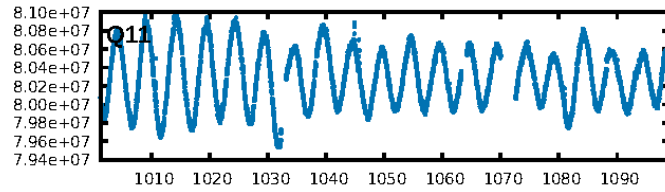
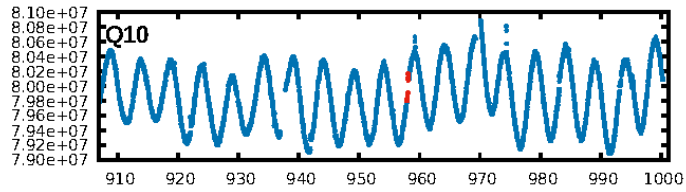
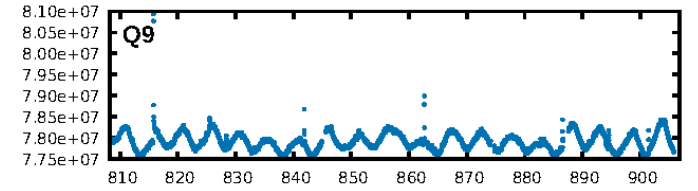
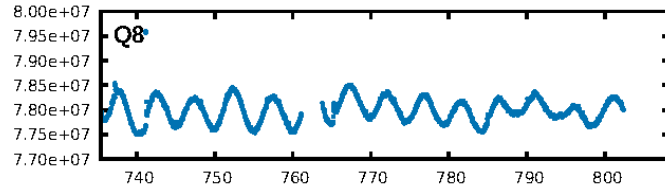
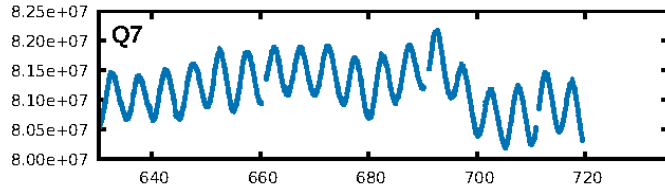
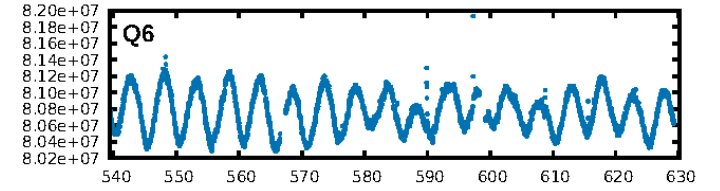
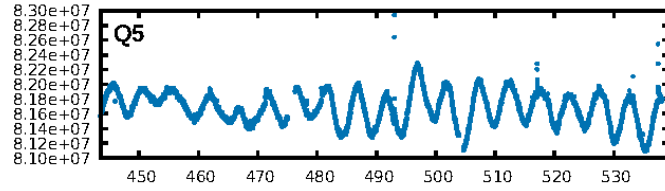
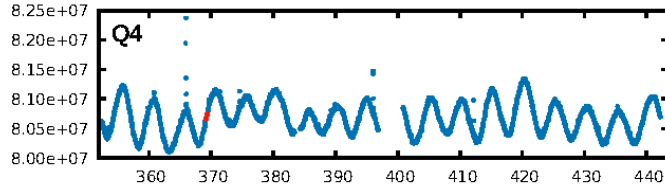
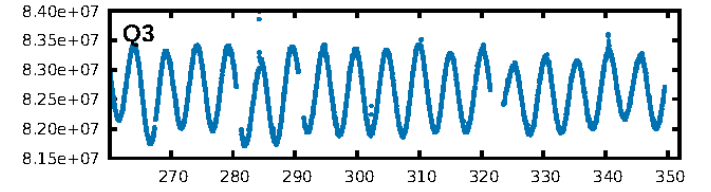
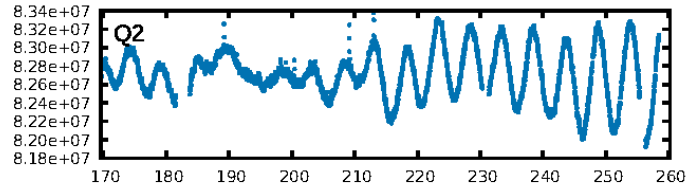
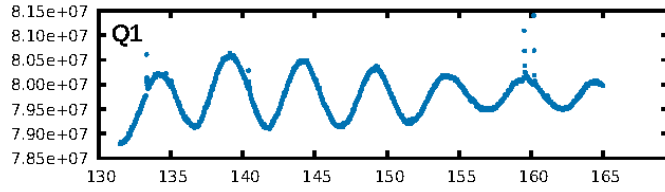
KIC: 5176547 Candidate: 1 of 5 Period: 588.761 d



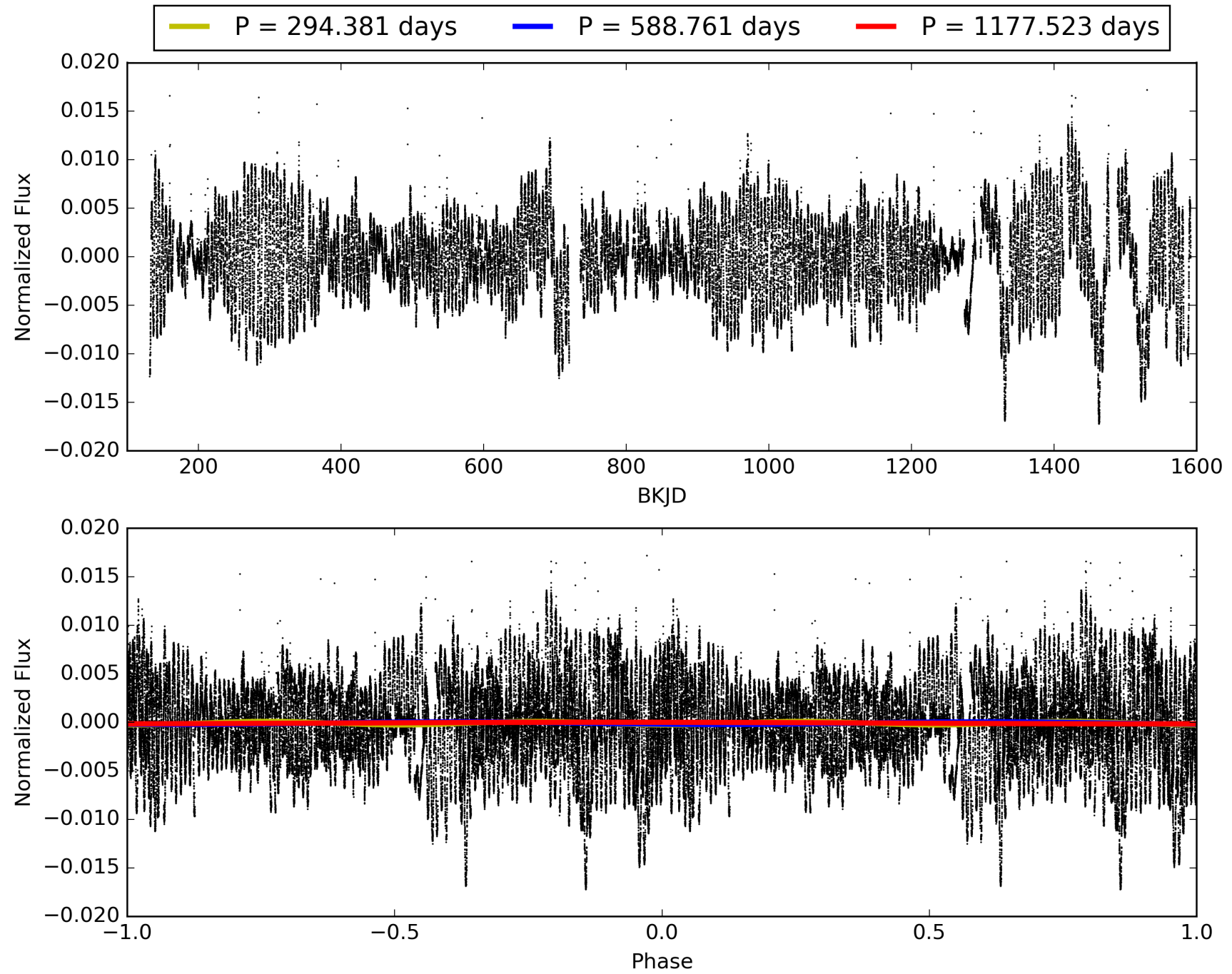
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 22:34:56 Z

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

# TCE 005176547-01, PDC Light Curves



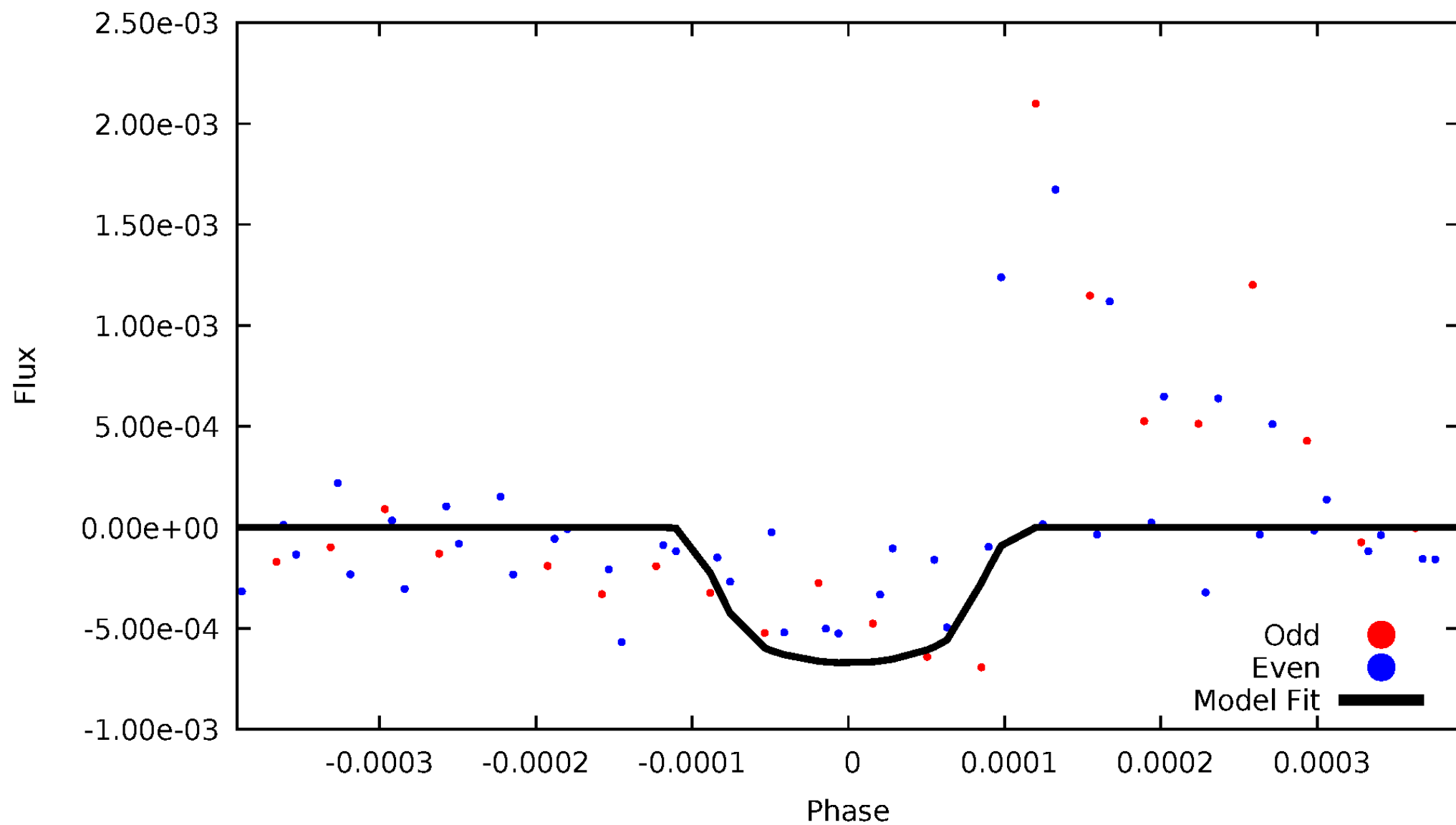
TCE 005176547-01





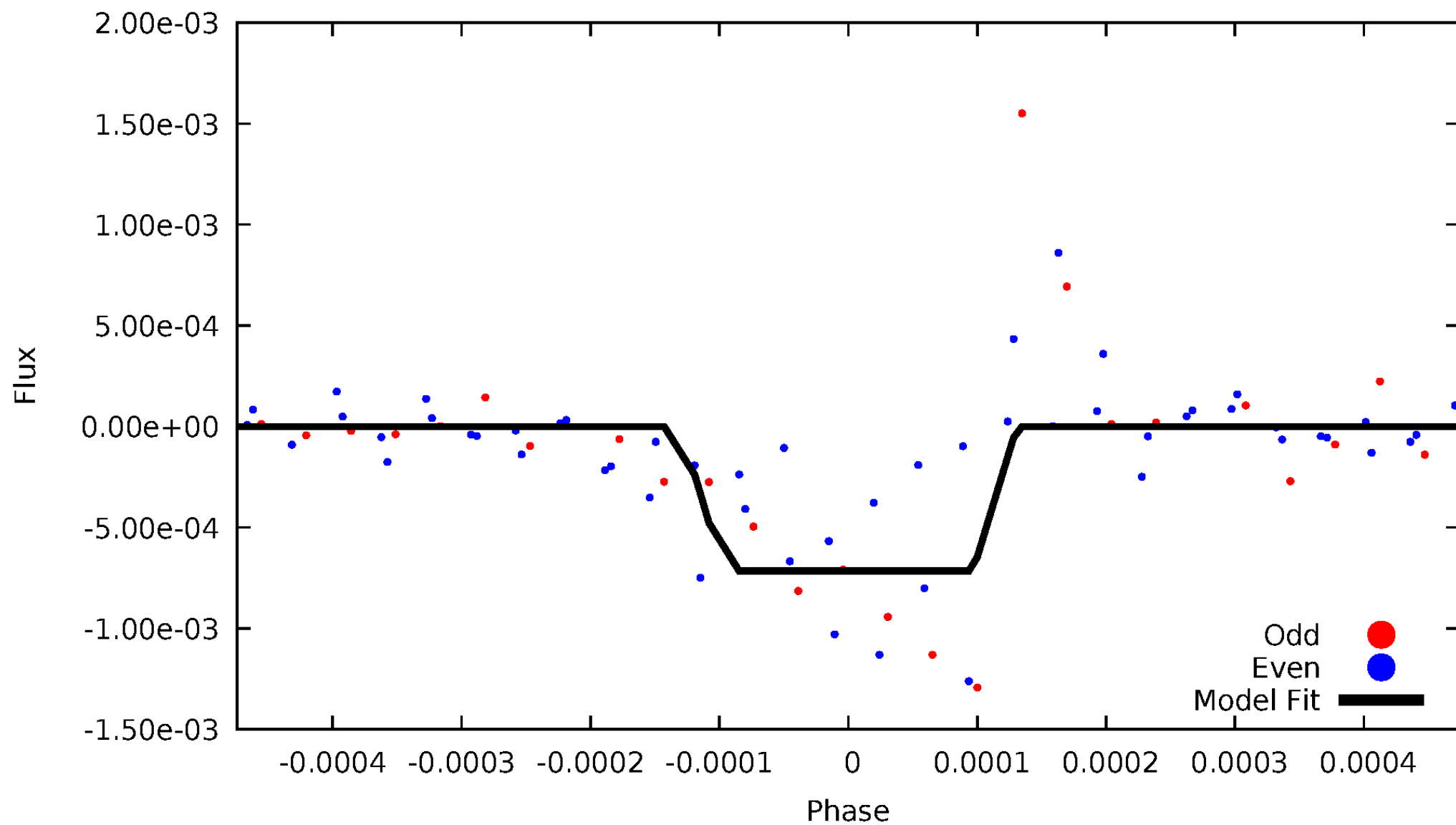
# DV Odd/Even

TCE 005176547-01



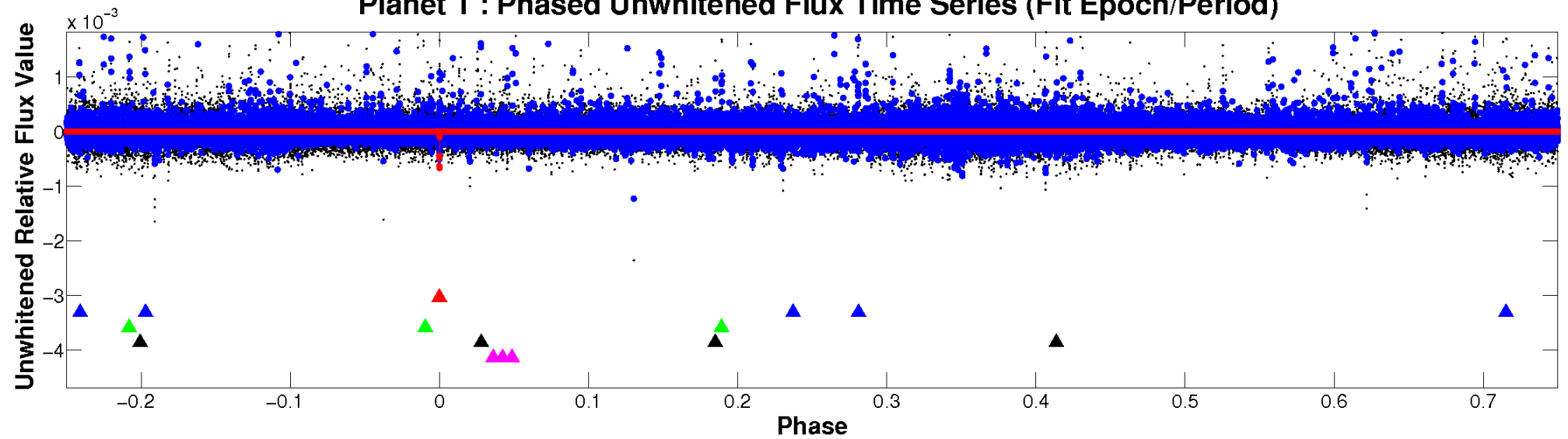
# ALT Odd/Even

TCE 005176547-01

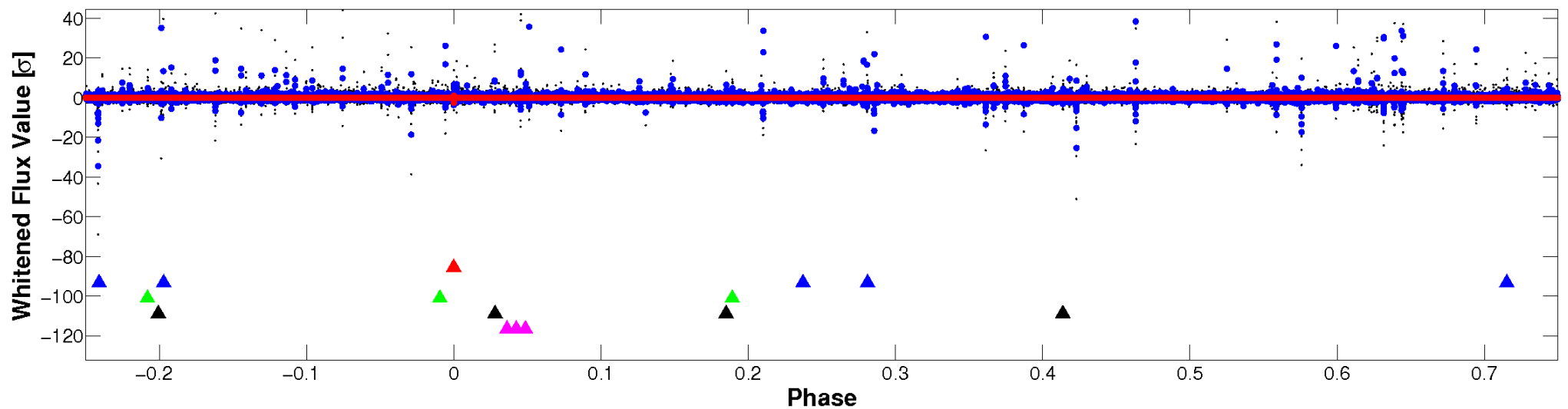


# Non-Whitened Vs. Whitened Light Curve

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

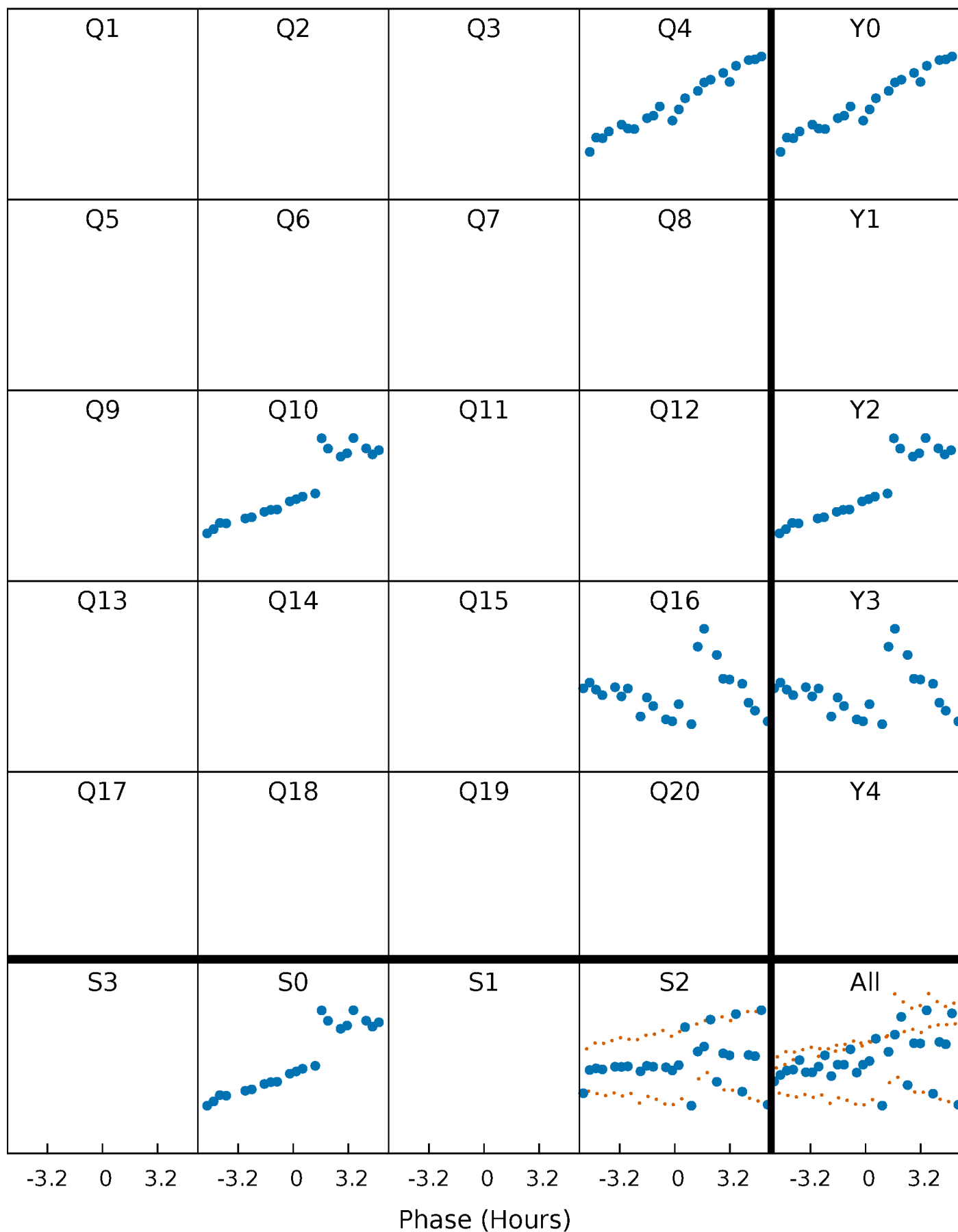


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



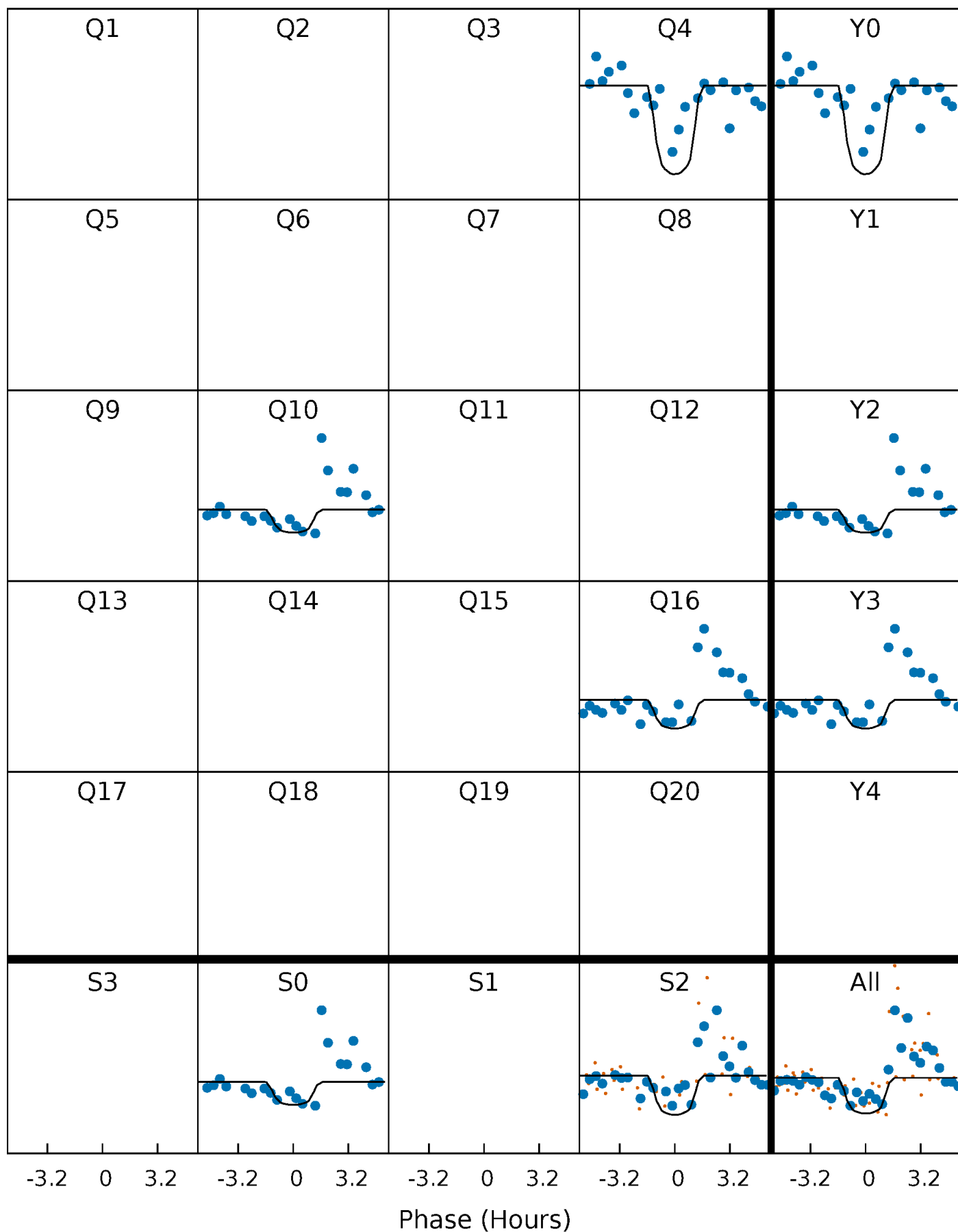
# PDC Quarter-Phased Transit Curves

TCE 005176547-01 P=588.761353 Days  $T_0=369.242123$  (BKJD)



# DV Quarter-Phased Transit Curves

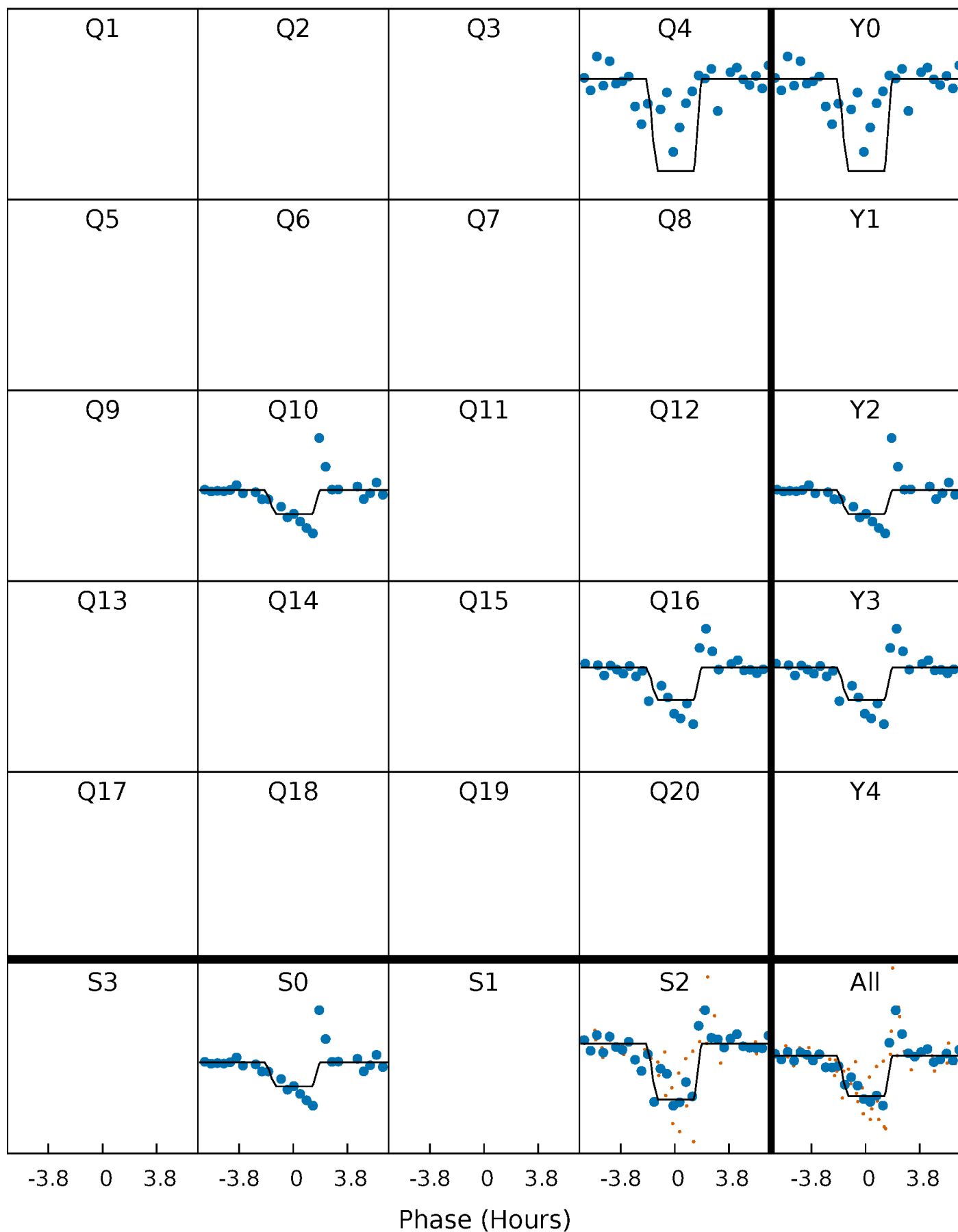
TCE 005176547-01 P=588.761353 Days  $T_0=369.242123$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

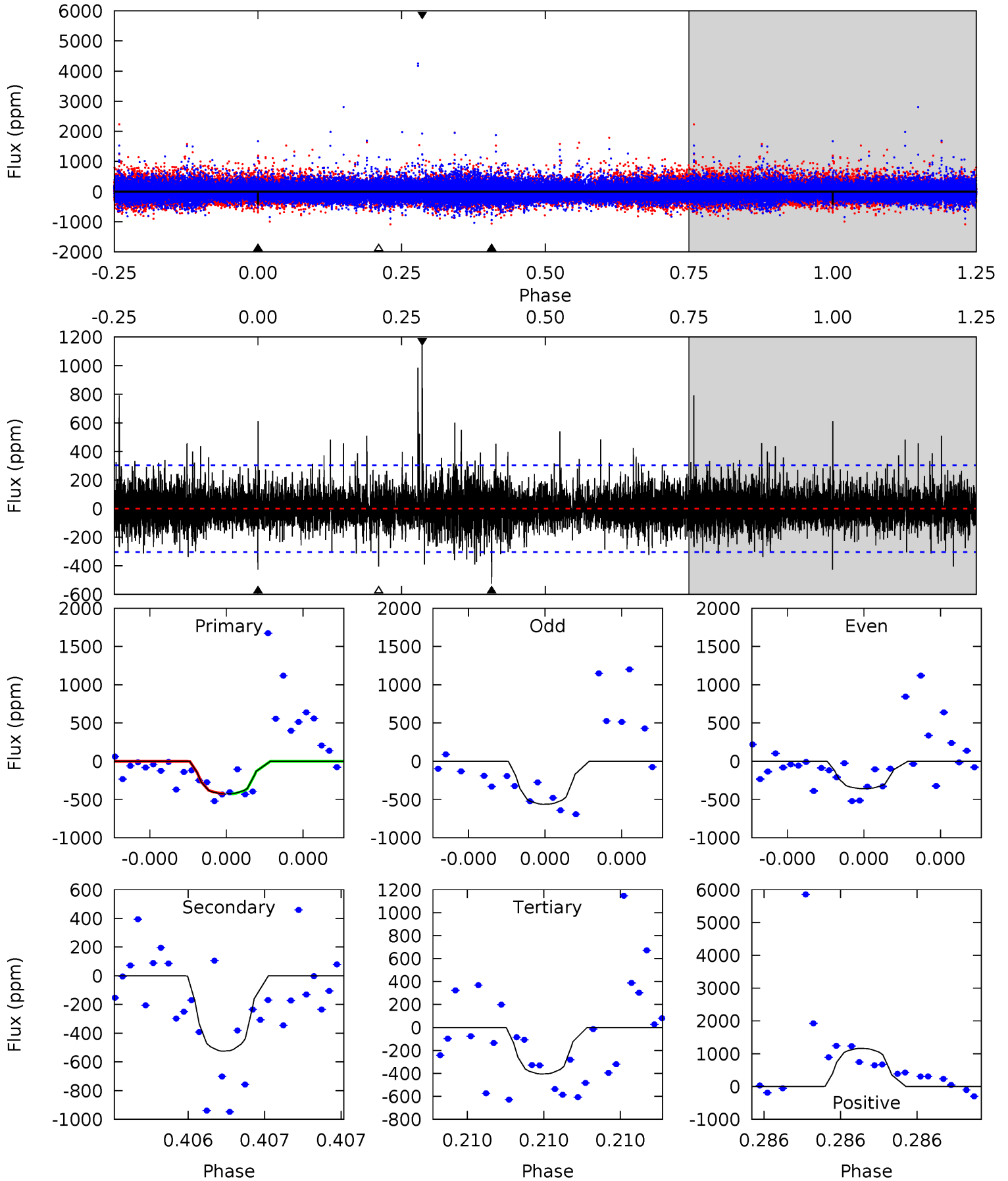
TCE 005176547-01 P=588.752164 Days  $T_0=369.242602$  (BKJD)



# DV Model-Shift Uniqueness Test

005176547-01, P = 588.761353 Days, E = 369.242123 Days

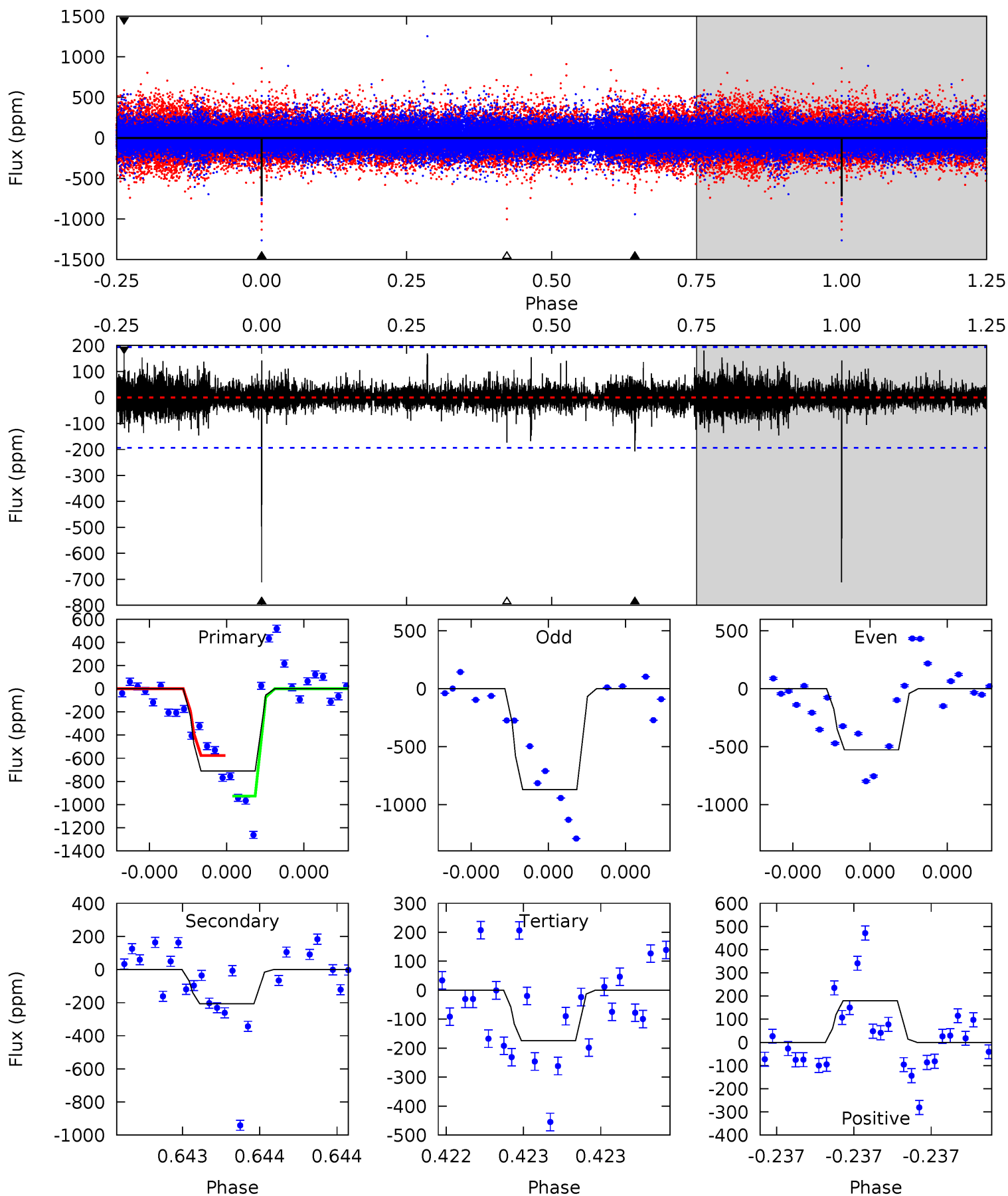
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.02	9.87	7.61	21.8	5.71	3.68	1.77	0.40	-13.8	2.25	-12.0	0.99	1.06	0.69	0.04



# Alt Model-Shift Uniqueness Test

005176547-01, P = 588.752164 Days, E = 369.242602 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
20.9	6.08	5.11	5.28	5.69	3.66	0.79	15.8	15.6	0.97	0.80	4.70	0.78	0.20	5.10



### Stellar Parameters For KIC 005176547

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5129^{+138}_{-153}$	$3.884^{+0.676}_{-0.312}$	$-0.160^{+0.300}_{-0.300}$	$1.781^{+1.039}_{-1.143}$	$0.887^{+0.147}_{-0.161}$	$0.221^{+2.914}_{-0.153}$
	+3%/-3%	+17%/-8%	+188%/-188%	+58%/-64%	+17%/-18%	+1317%/-69%
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 005176547-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-525 \pm 53$	$7.68^{+7.68}_{-5.28}$	$361^{+57}_{-61}$	$4000^{+2591}_{-688}$	$8539^{+79807}_{-6314}$
Alt.	$-207 \pm 34$	$7.06^{+7.71}_{-4.73}$	$360^{+53}_{-61}$	$3492^{+1589}_{-587}$	$3747^{+31981}_{-2797}$

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

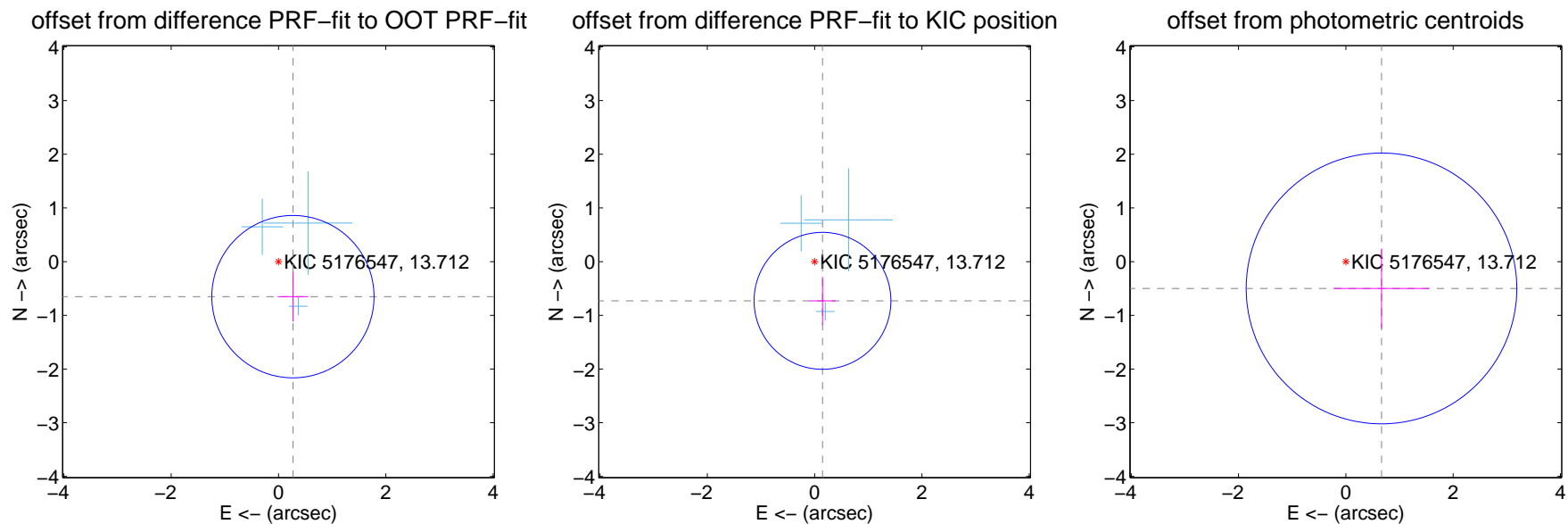
## DV Centroid Data

Supplemental centroid analysis for 005176547-01. Kepler magnitude: 13.71. Transit SNR 8.75

There are 3 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.08 arcsec

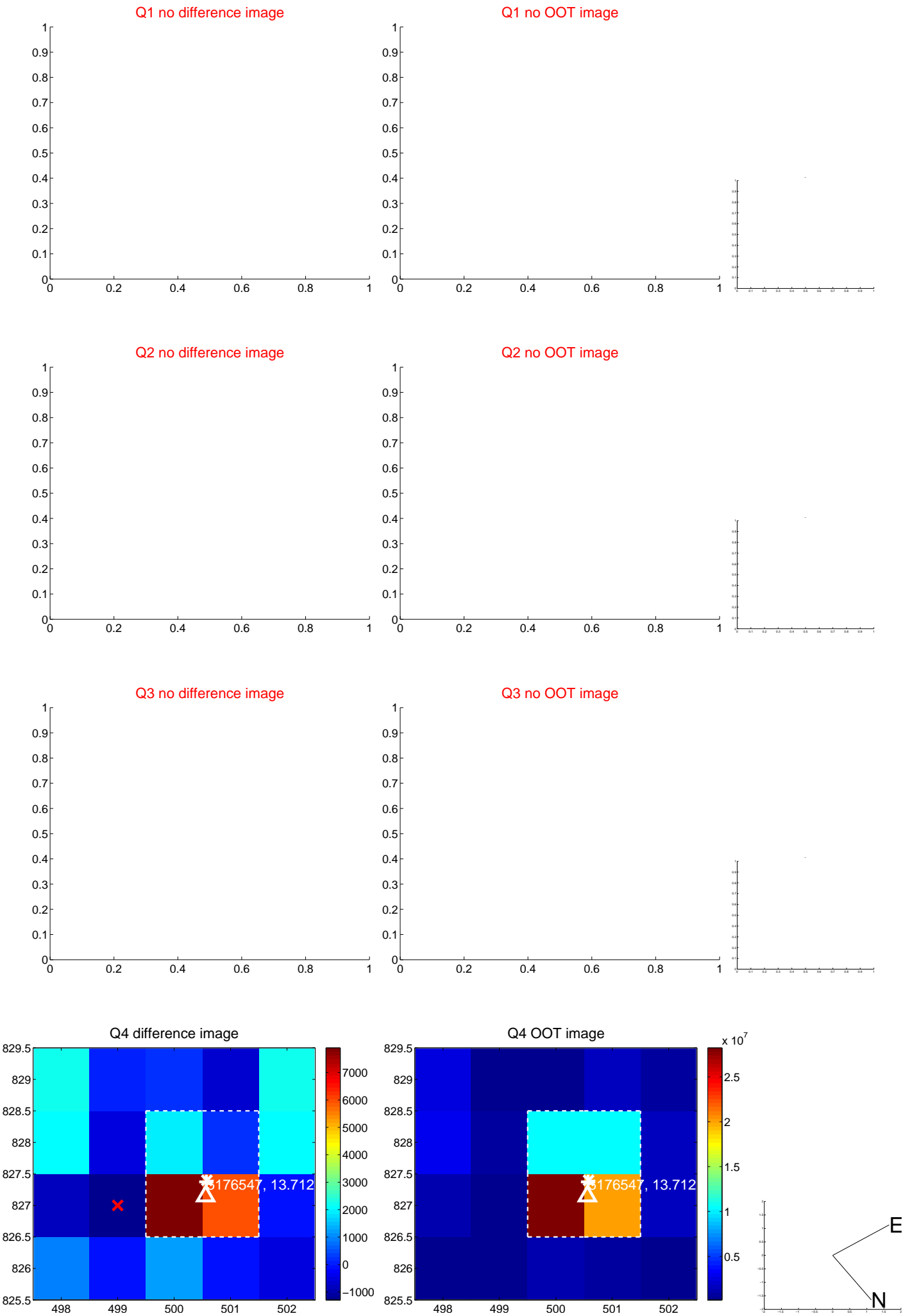
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.705 \pm 0.504$	1.40	$-0.269 \pm 0.284$	$-0.652 \pm 0.465$
PRF-fit source offset from KIC position	$0.744 \pm 0.425$	1.75	$-0.147 \pm 0.247$	$-0.730 \pm 0.447$
photometric centroid source offset	$0.83 \pm 0.84$	0.99	$-0.66 \pm 0.89$	$-0.50 \pm 0.74$



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.



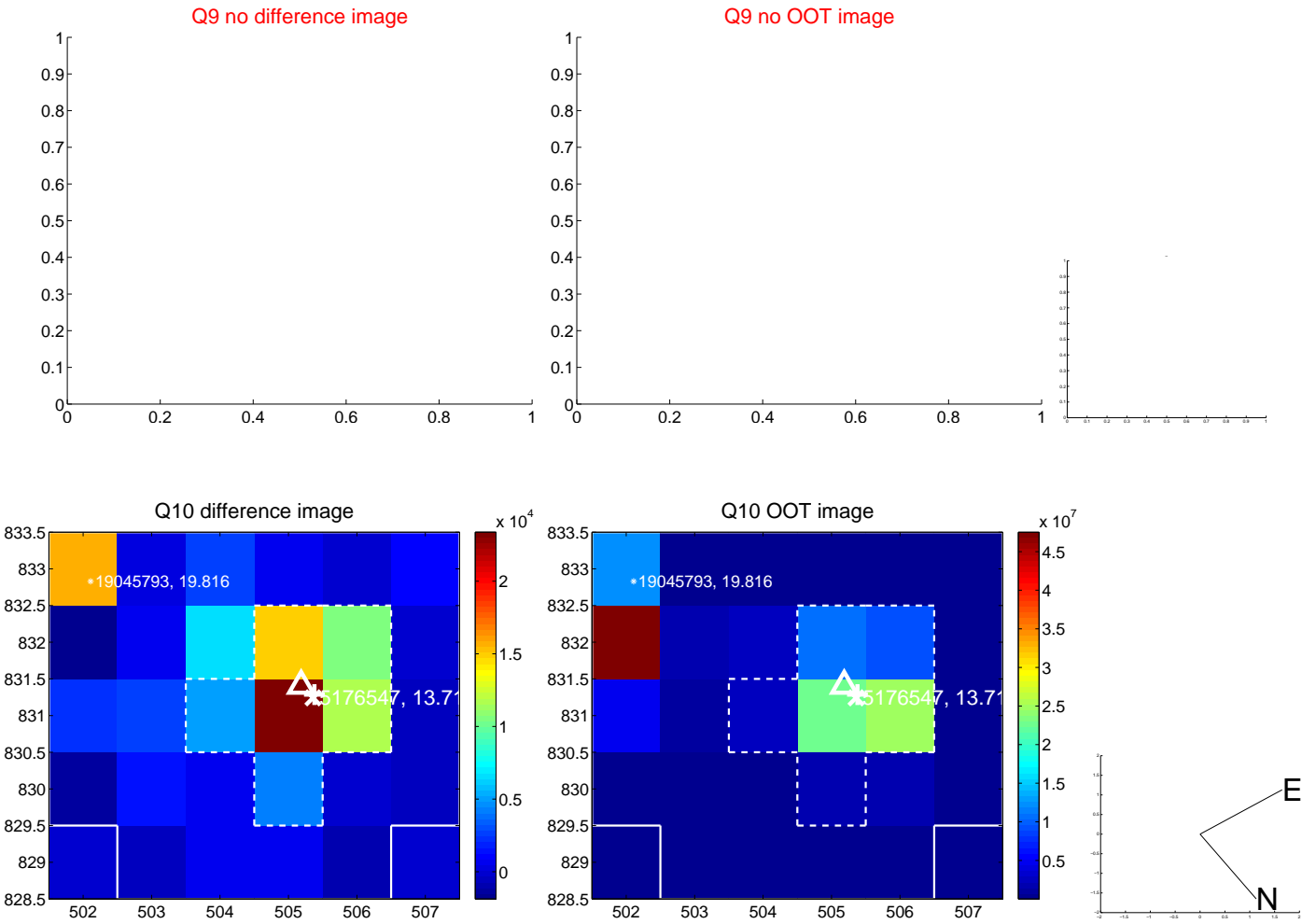
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



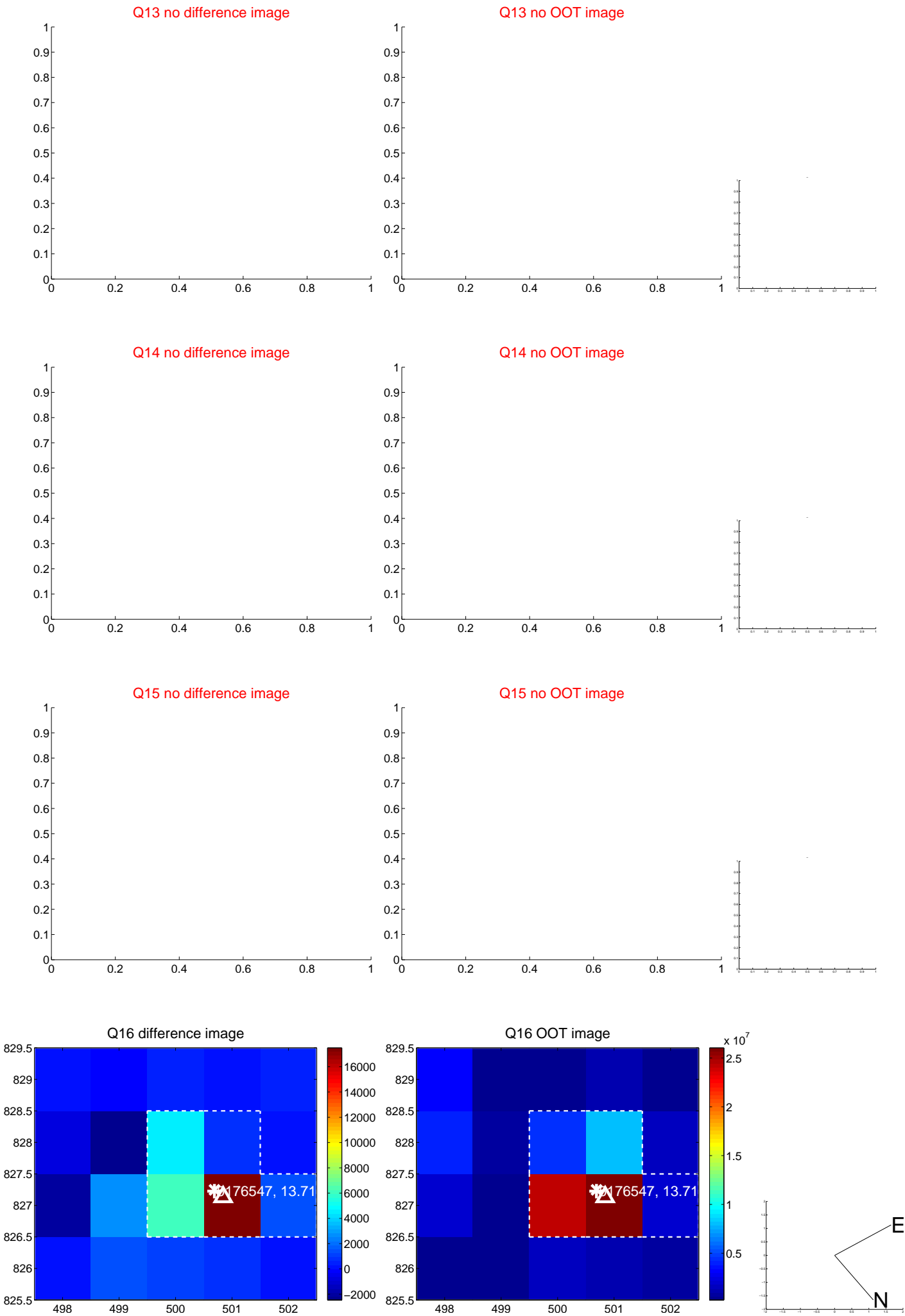
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



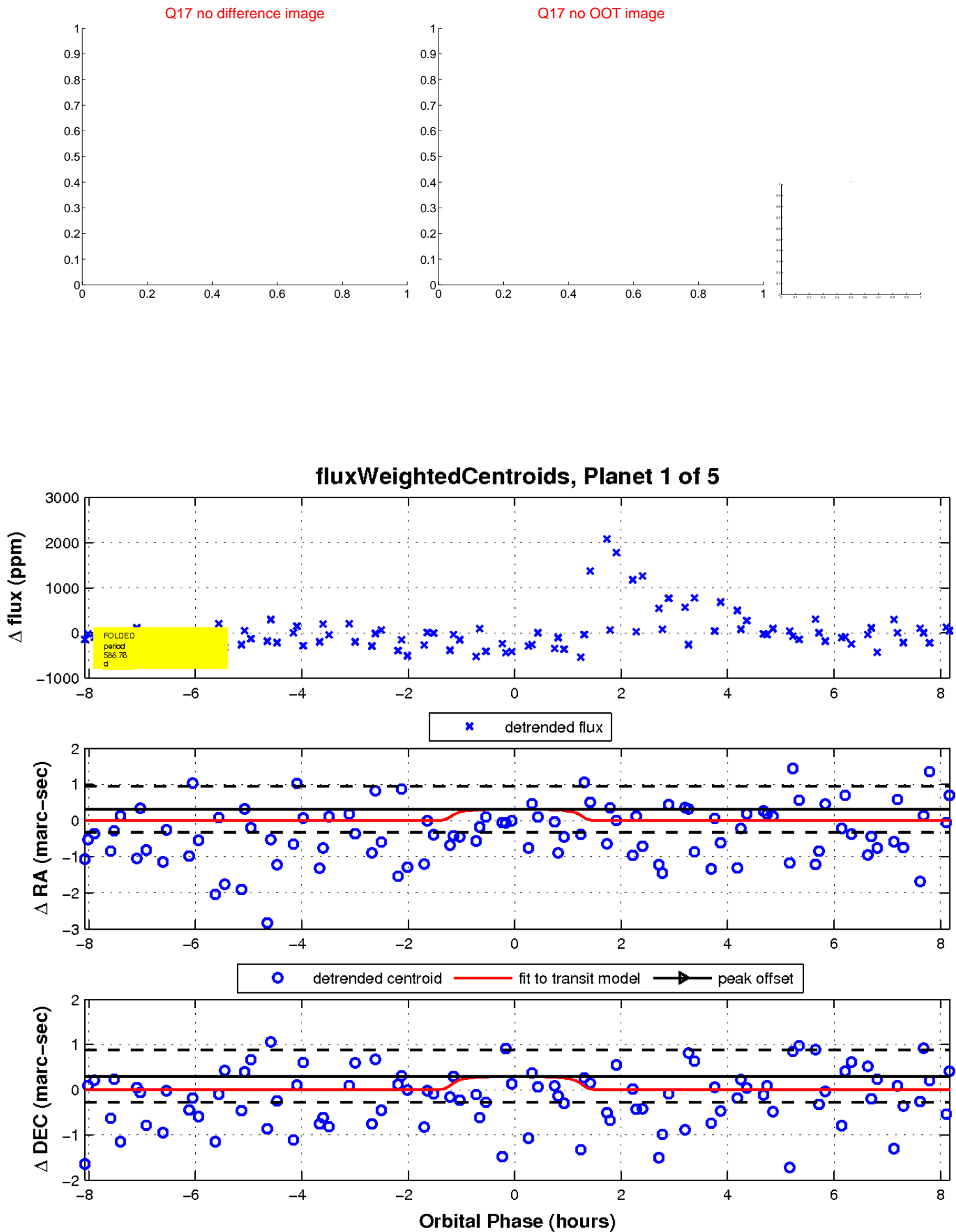
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



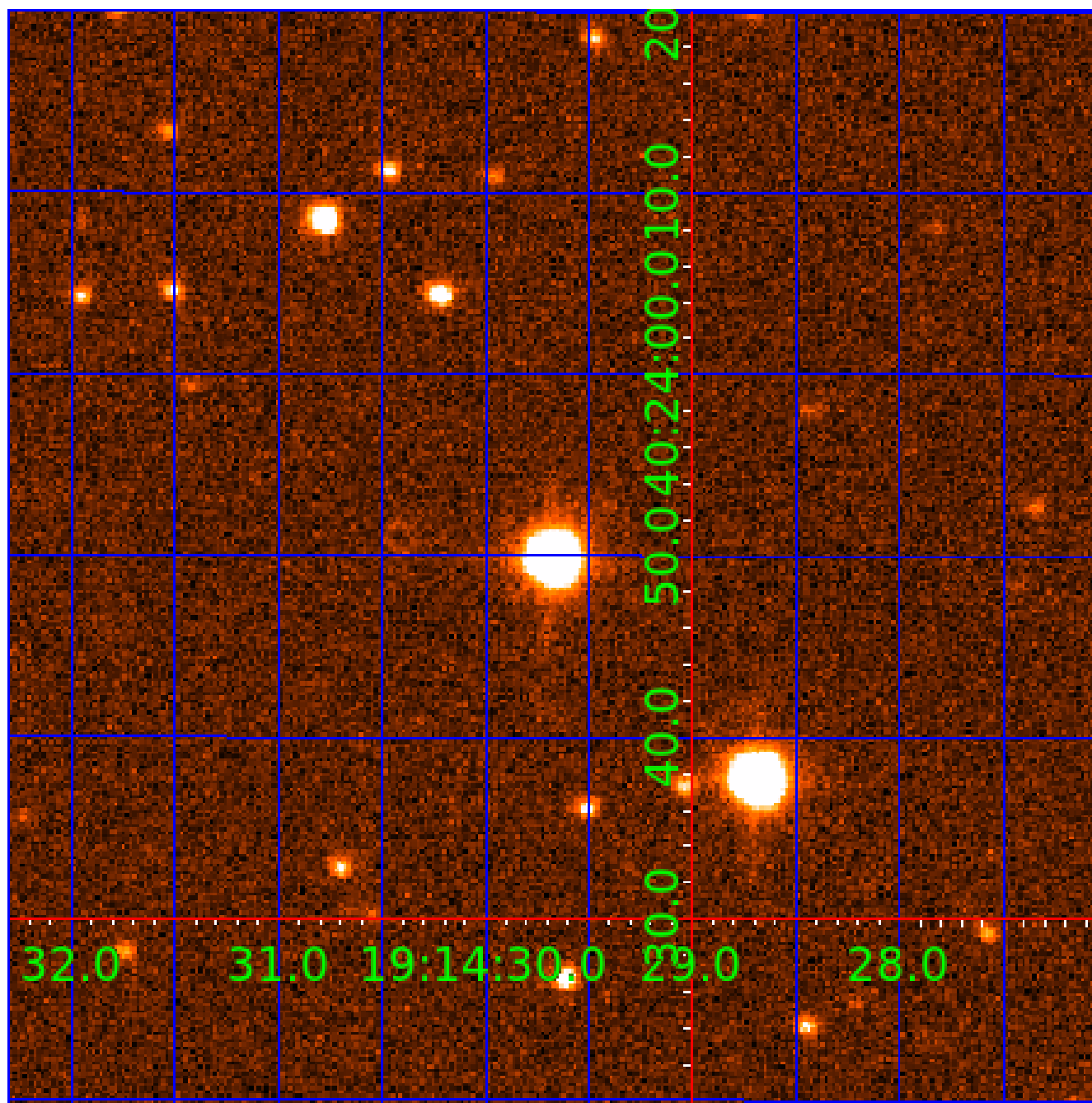
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





UKIRT Image

Declination



# KIC 005176547

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005176547-01	OBS	No	588.761353	369.242123	670.7	2.762	14.0	8.7	1.78	5129	5.43	1.13
005176547-02	OBS	No	281.463692	253.267178	531.8	4.144	11.0	6.5	1.78	5129	4.48	3.02
005176547-03	OBS	No	471.826432	480.635125	786.4	5.186	14.7	9.4	1.78	5129	5.08	1.51
005176547-04	OBS	No	361.706110	478.173387	529.8	3.180	12.5	7.4	1.78	5129	4.03	2.16
005176547-05	OBS	No	592.452498	390.537666	564.2	7.394	11.0	6.8	1.78	5129	4.45	1.12

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005176547-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
005176547-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005176547-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005176547-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_POS_DV—CENT_FEW_DIFFS
005176547-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

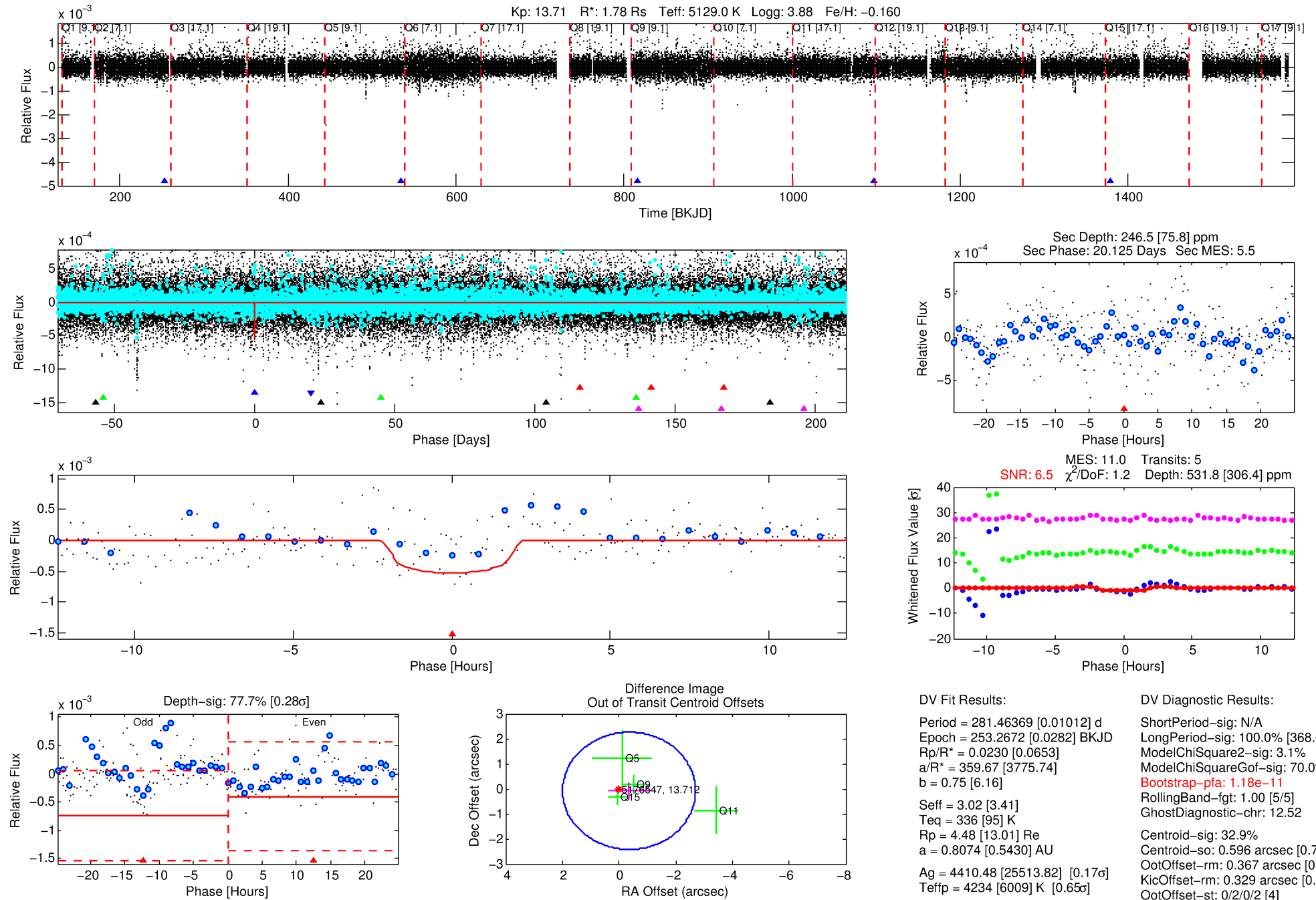
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 005176547-02

No Significant Match Found

# DV One-Page Summary

KIC: 5176547 Candidate: 2 of 5 Period: 281.464 d



## DV Fit Results:

Period = 281.46369 [0.01012] d  
Epoch = 253.2672 [0.0282] BKJD  
Rp/R\* = 0.0230 [0.0653]  
a/R\* = 359.67 [3775.74]  
b = 0.75 [6.16]  
Seff = 3.02 [3.41]  
Teff = 336 [95] K  
Rp = 4.48 [13.01] Re  
a = 0.8074 [0.5430] AU  
Ag = 4410.48 [25513.82] [0.17 $\sigma$ ]  
Teffp = 4234 [6009] K [0.65 $\sigma$ ]

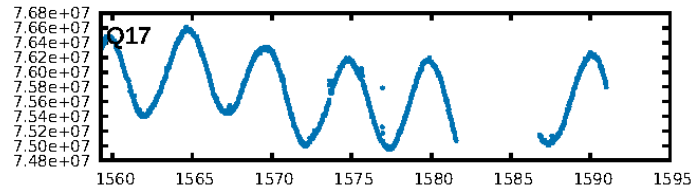
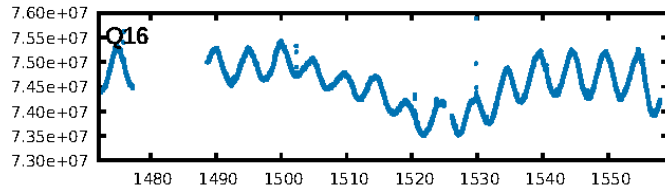
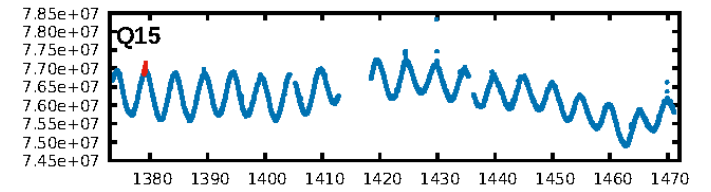
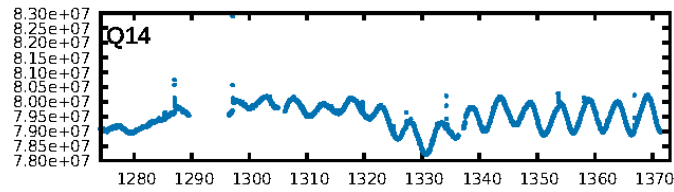
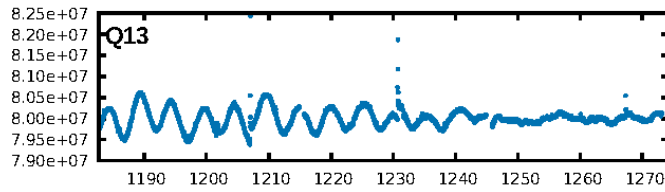
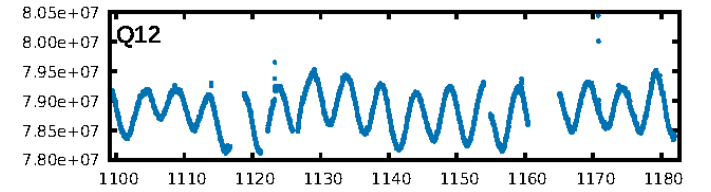
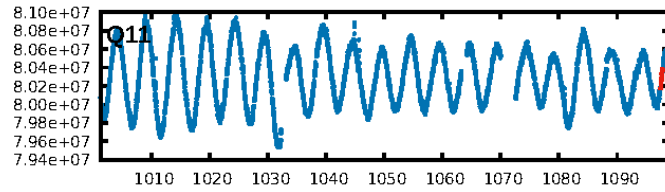
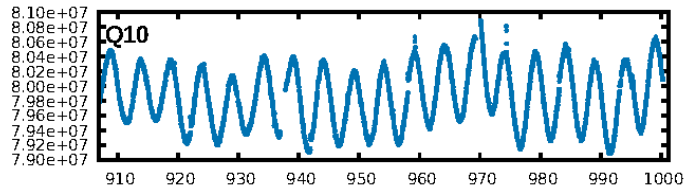
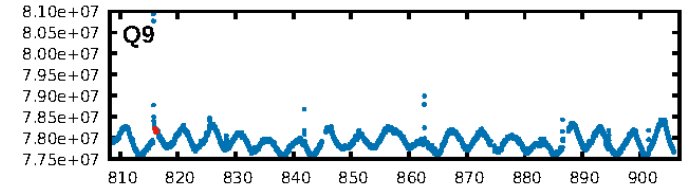
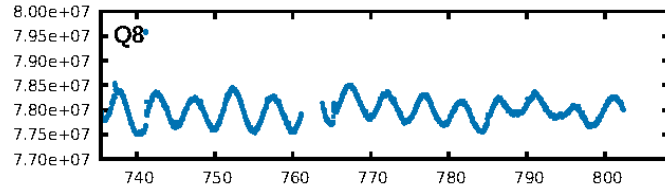
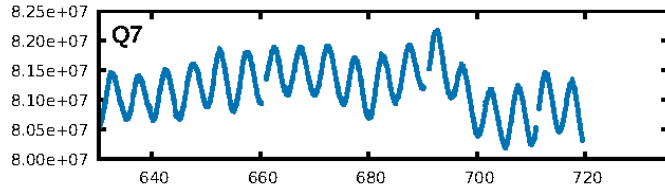
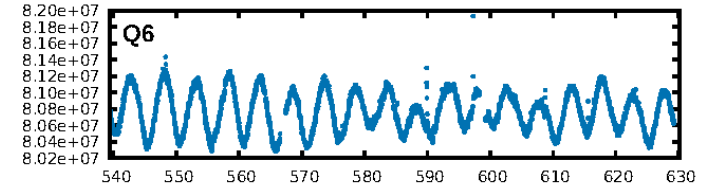
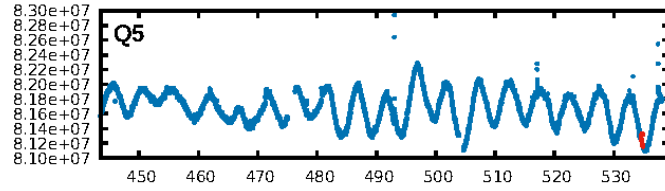
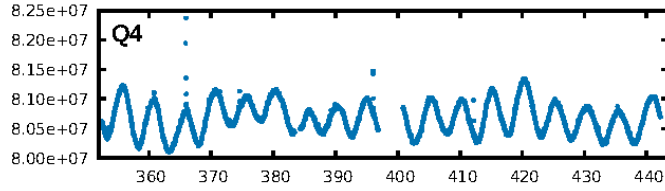
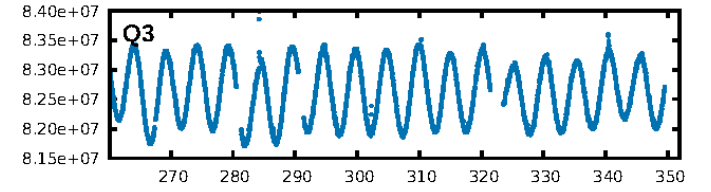
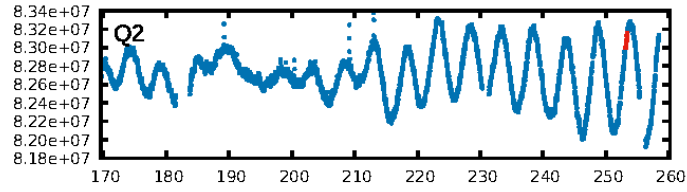
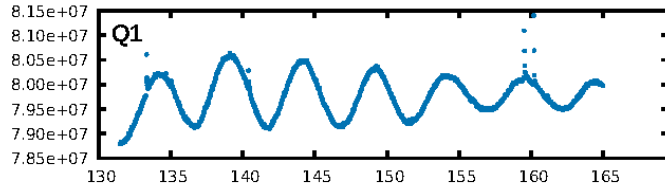
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [368.69 $\sigma$ ]  
ModelChiSquare2-sig: 3.1%  
ModelChiSquareGof-sig: 70.0%  
**Bootstrap-pfa: 1.18e-11**  
RollingBand-fgt: 1.00 [5/5]  
GhostDiagnostic-chr: 12.52  
Centroid-sig: 32.9%  
Centroid-so: 0.596 arcsec [0.78 $\sigma$ ]  
OotOffset-rm: 0.367 arcsec [0.47 $\sigma$ ]  
KicOffset-rm: 0.329 arcsec [0.32 $\sigma$ ]  
OotOffset-st: 0/2/0/2 [4]  
KicOffset-st: 0/2/0/2 [4]  
DiffImageQuality-fgm: 0.25 [1/4]  
DiffImageOverlap-fno: 1.00 [5/5]

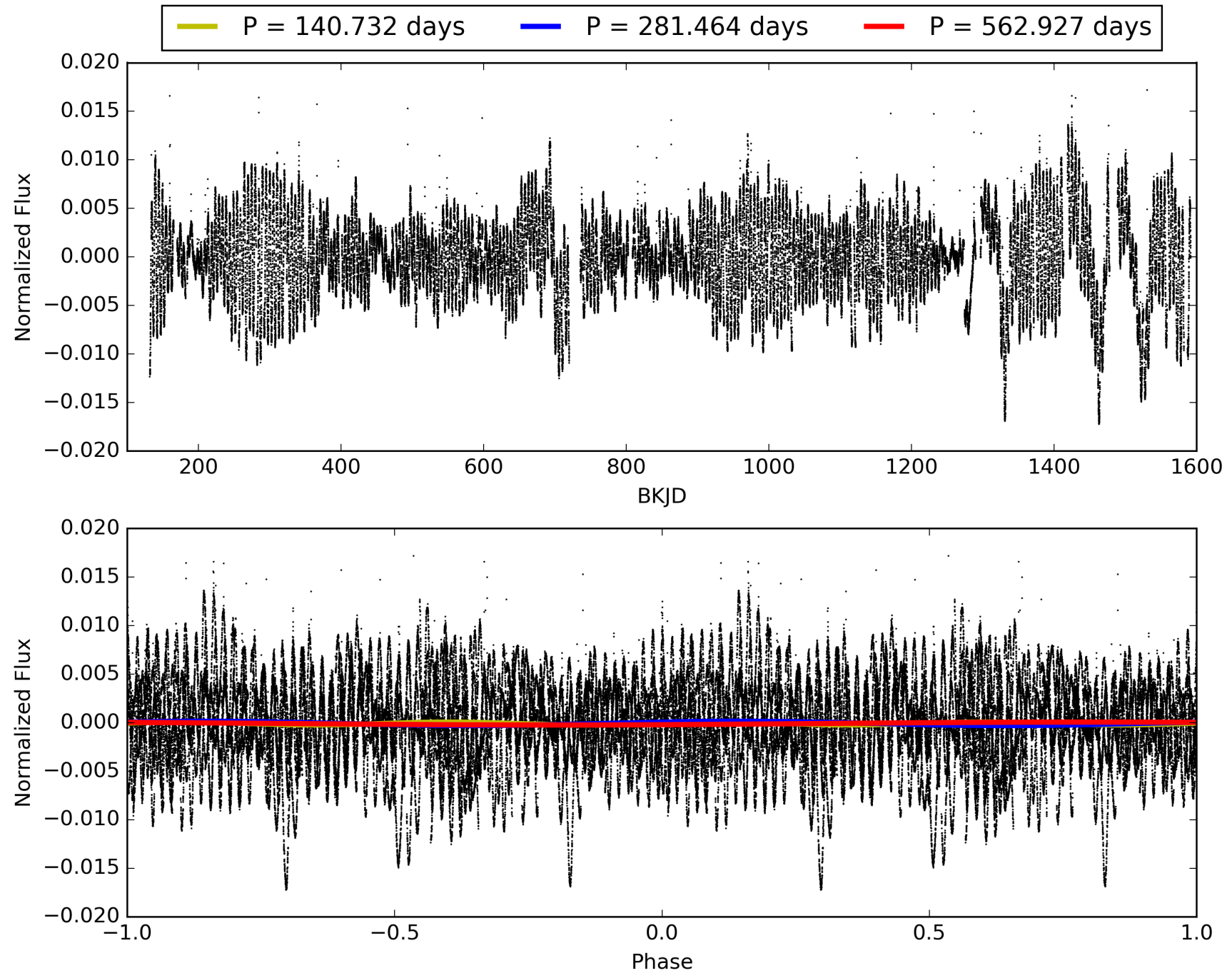
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 22:35:09 Z

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

# TCE 005176547-02, PDC Light Curves



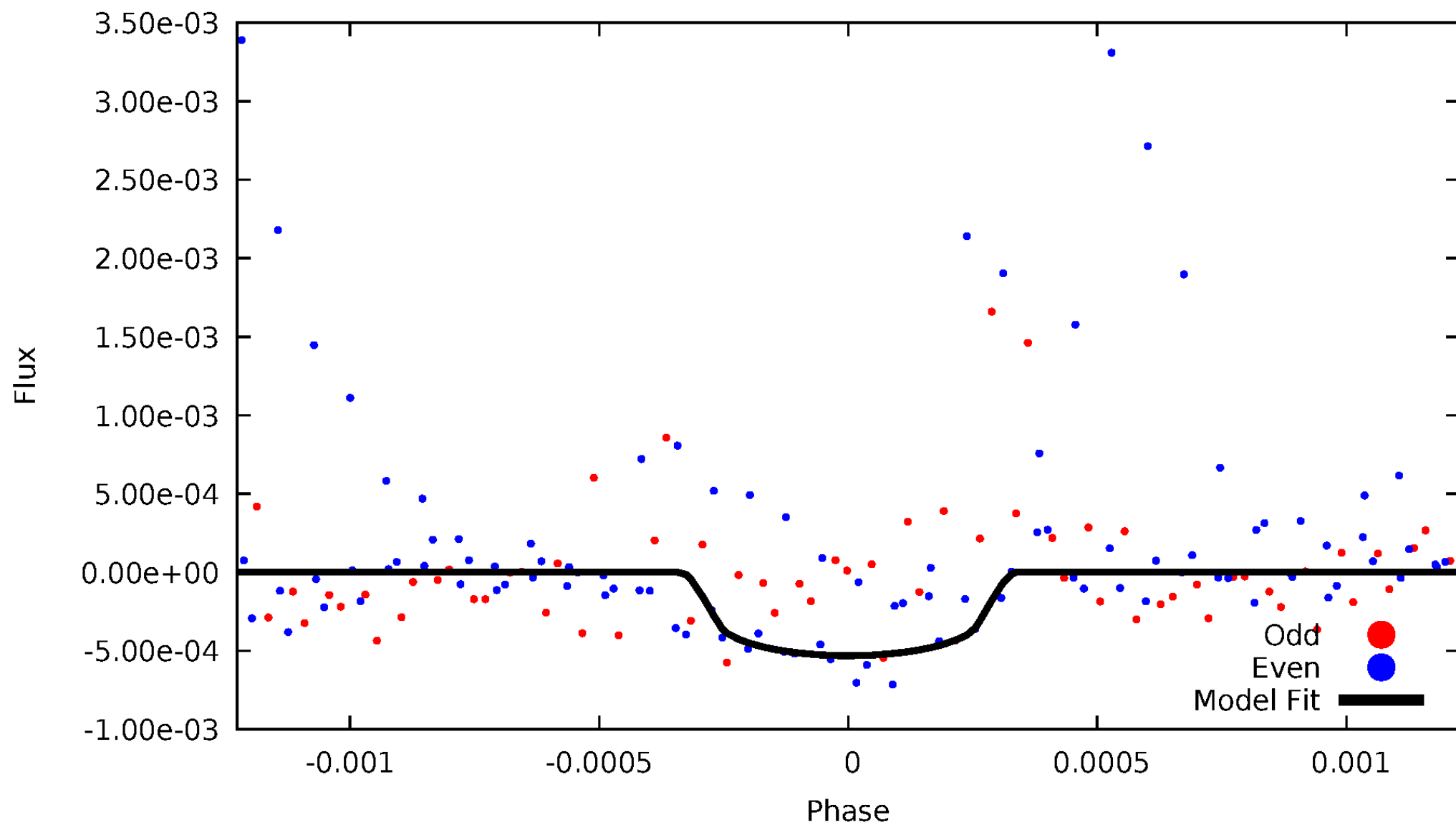
TCE 005176547-02





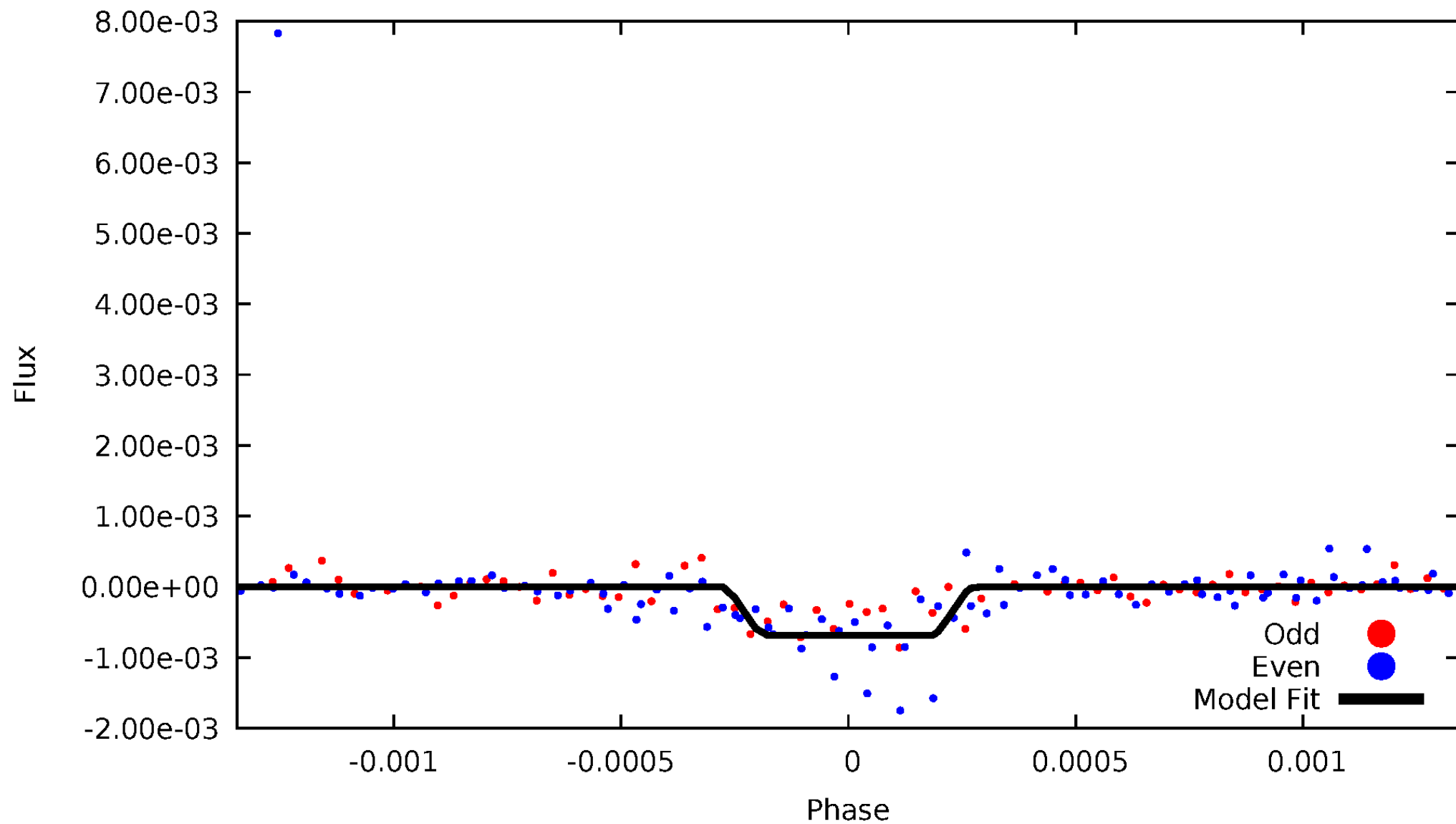
# DV Odd/Even

TCE 005176547-02



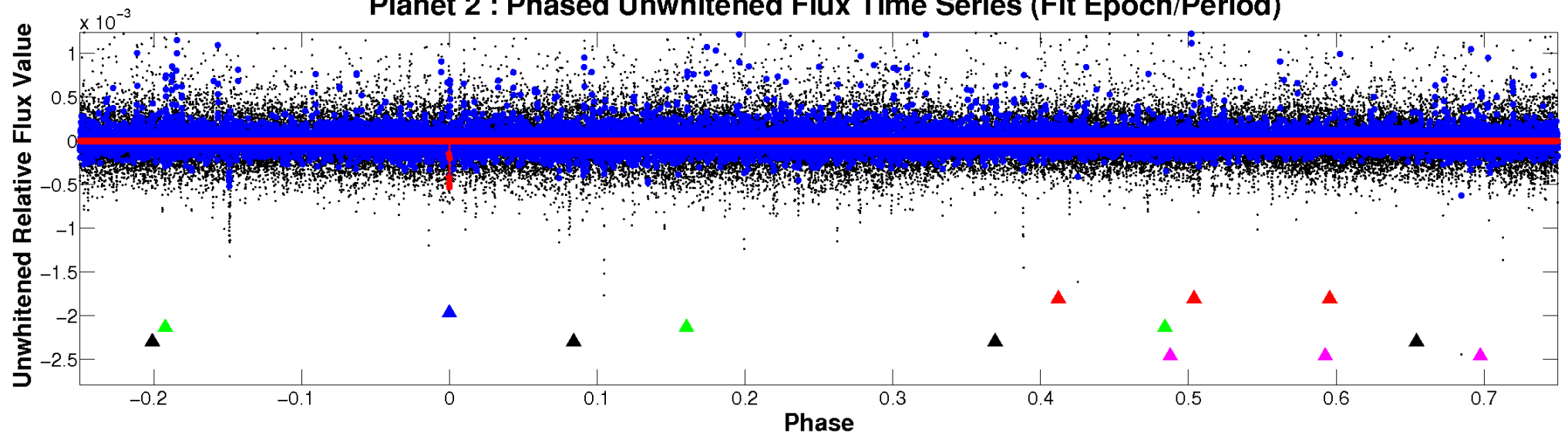
# ALT Odd/Even

TCE 005176547-02

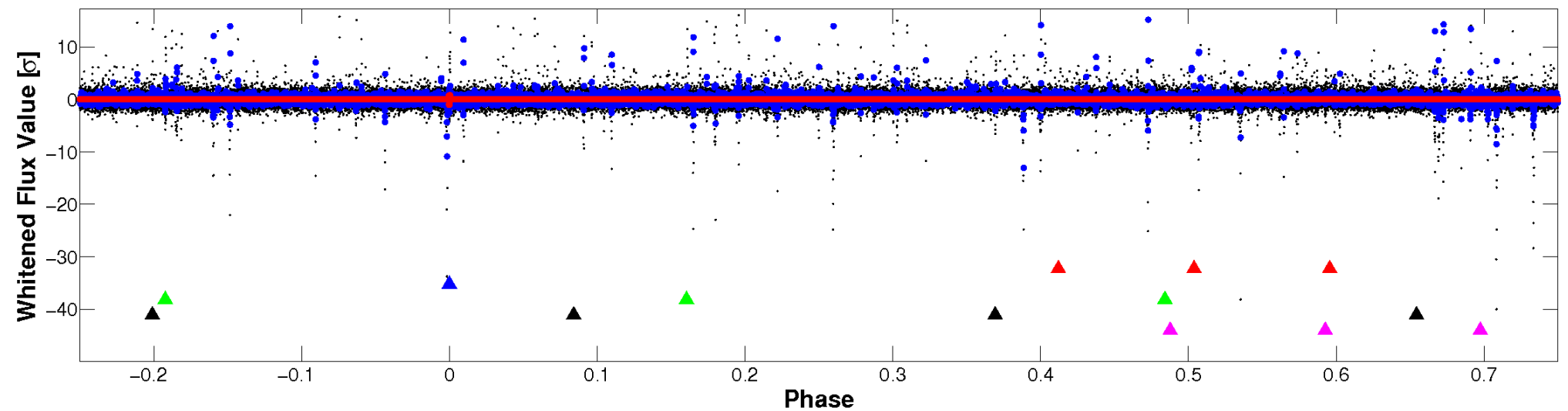


# Non-Whitened Vs. Whitened Light Curve

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

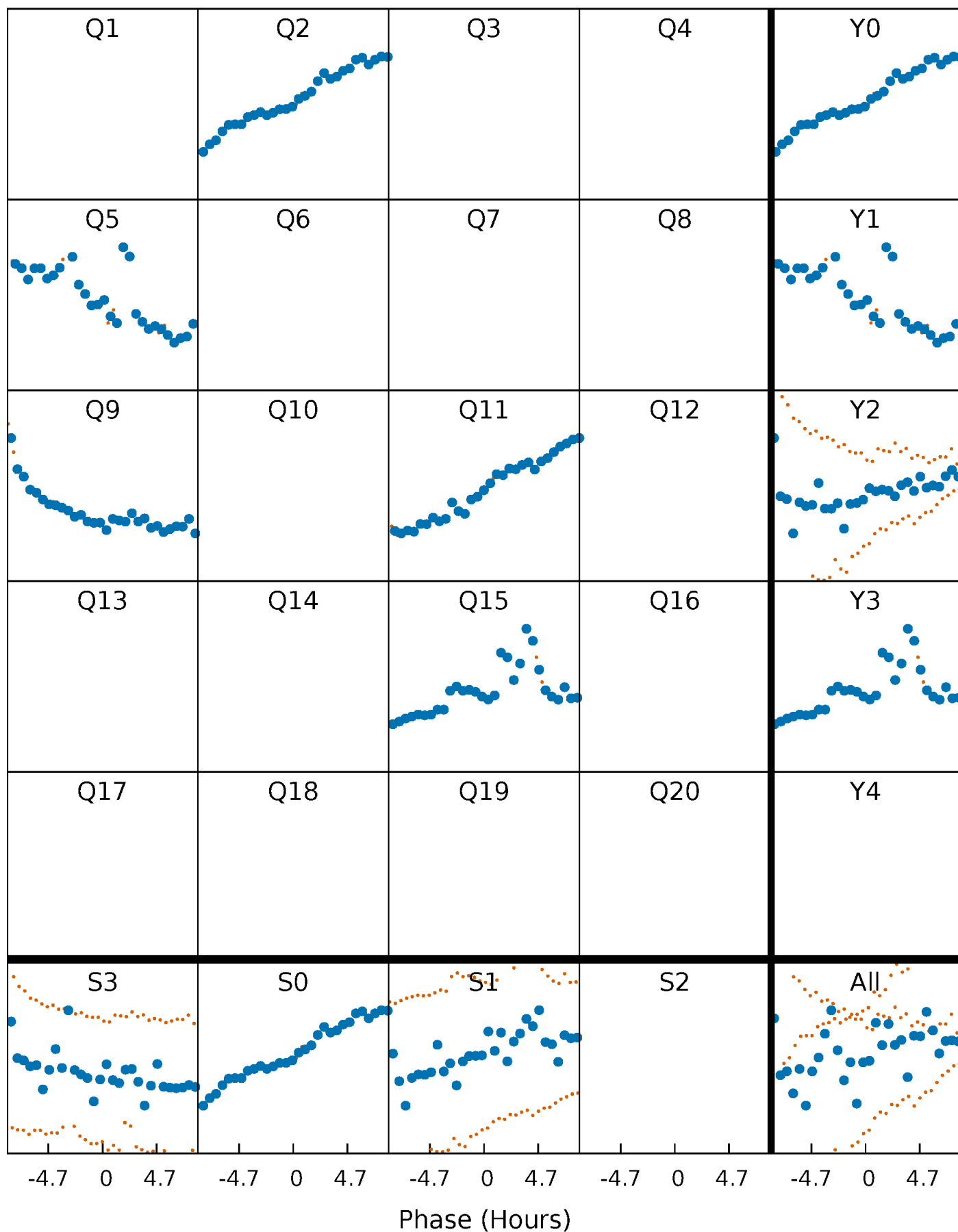


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



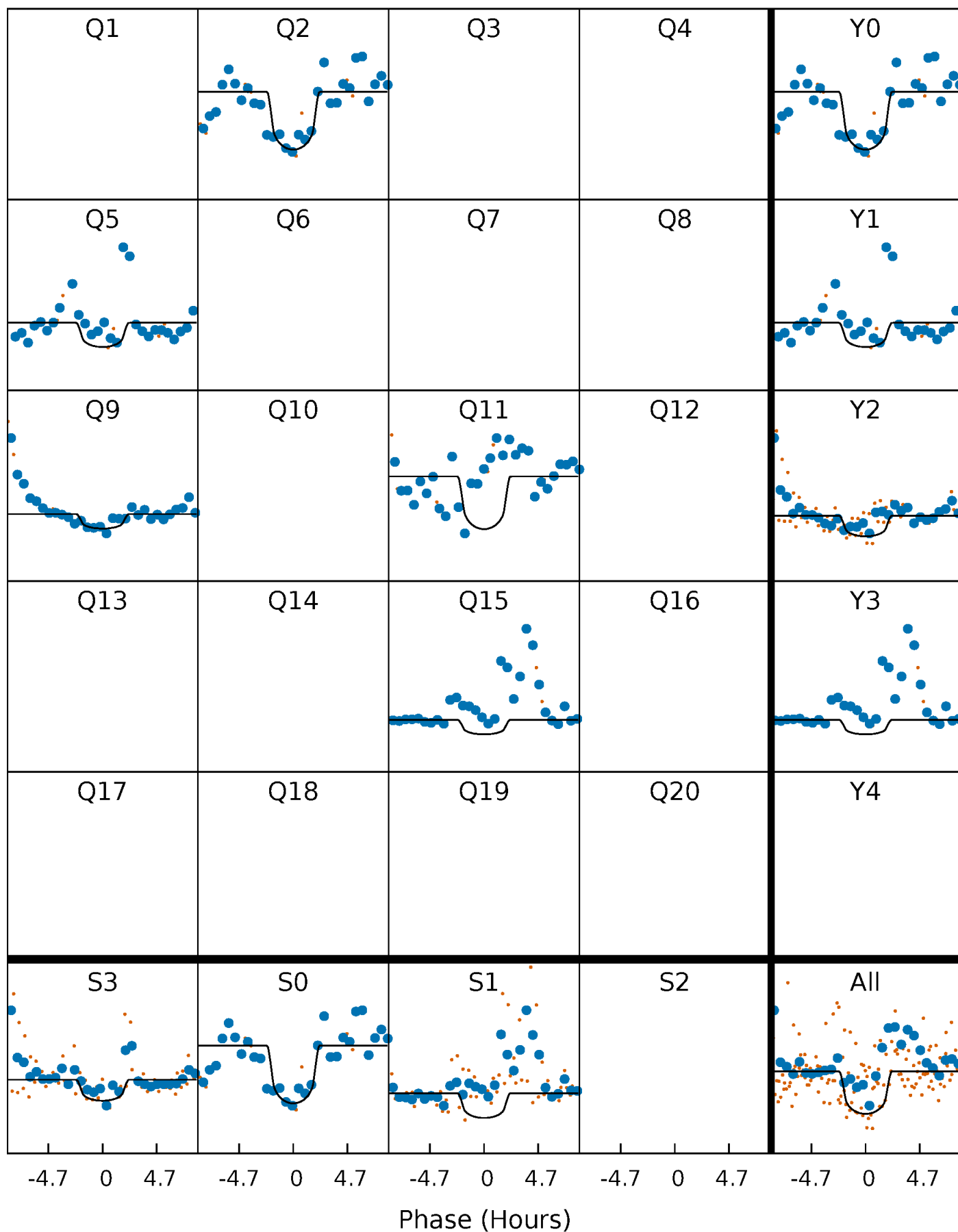
# PDC Quarter-Phased Transit Curves

TCE 005176547-02 P=281.463691 Days  $T_0=253.267178$  (BKJD)



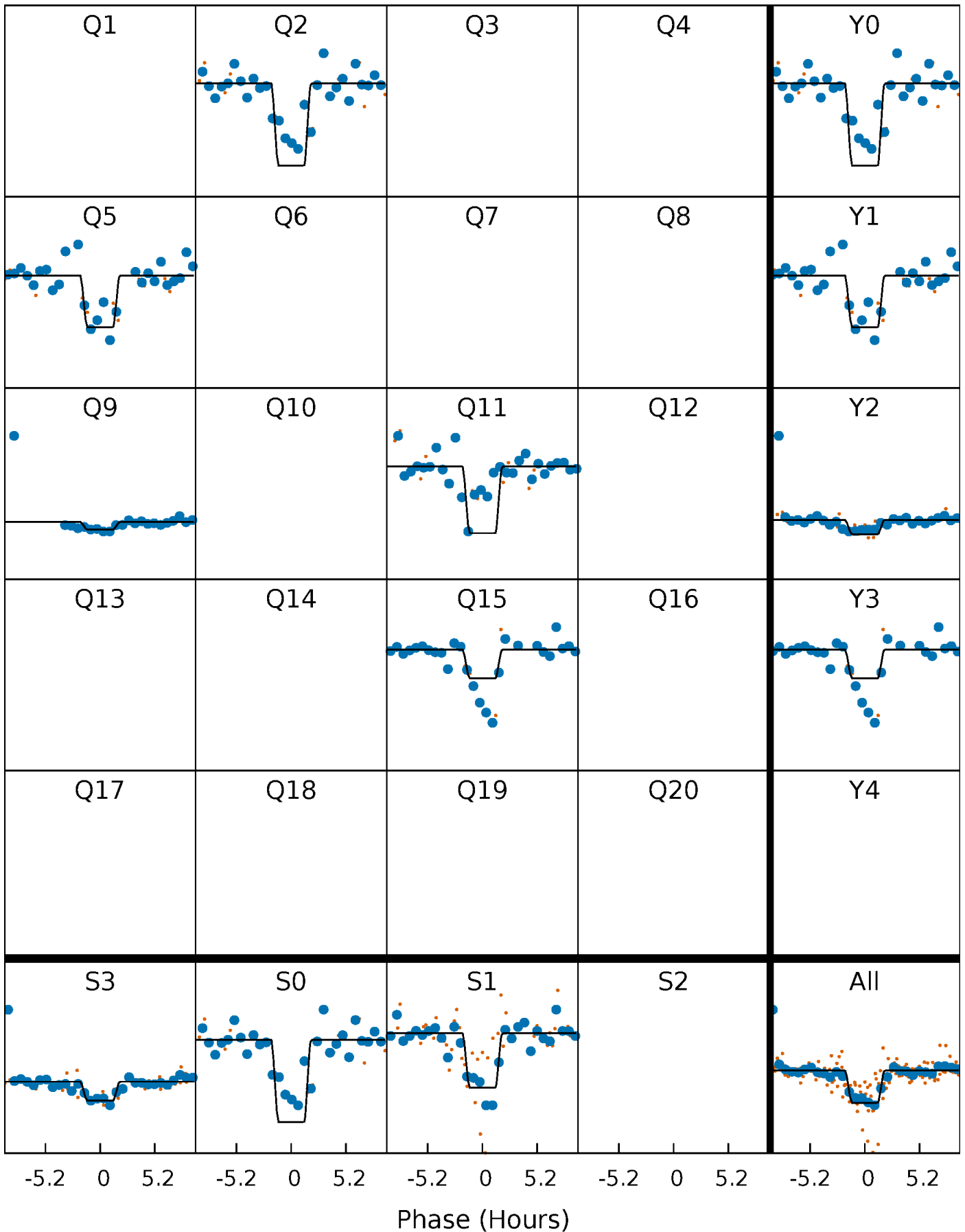
# DV Quarter-Phased Transit Curves

TCE 005176547-02 P=281.463691 Days  $T_0=253.267178$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

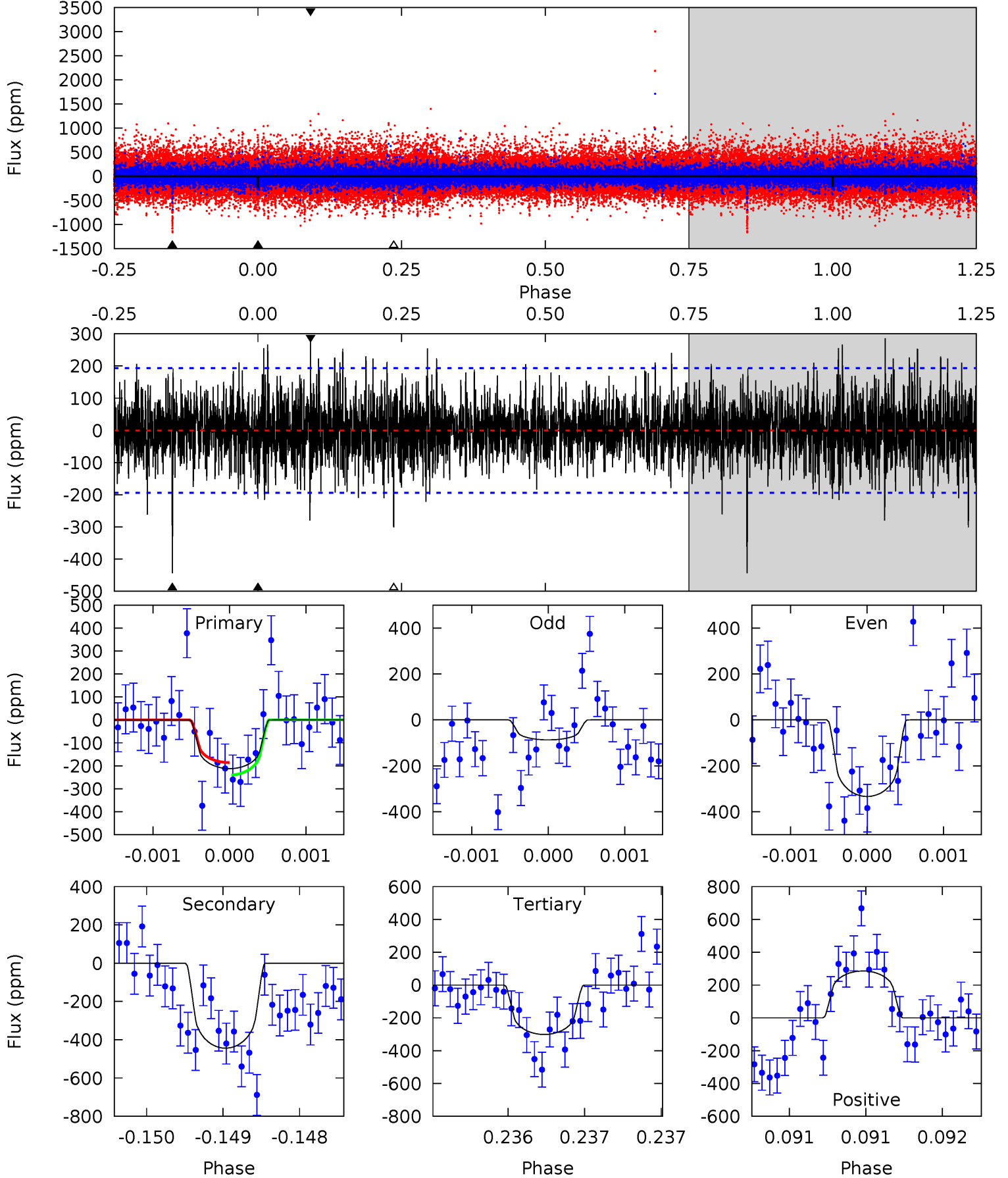
TCE 005176547-02 P=281.465667 Days  $T_0=253.253196$  (BKJD)



# DV Model-Shift Uniqueness Test

005176547-02, P = 281.463691 Days, E = 253.267178 Days

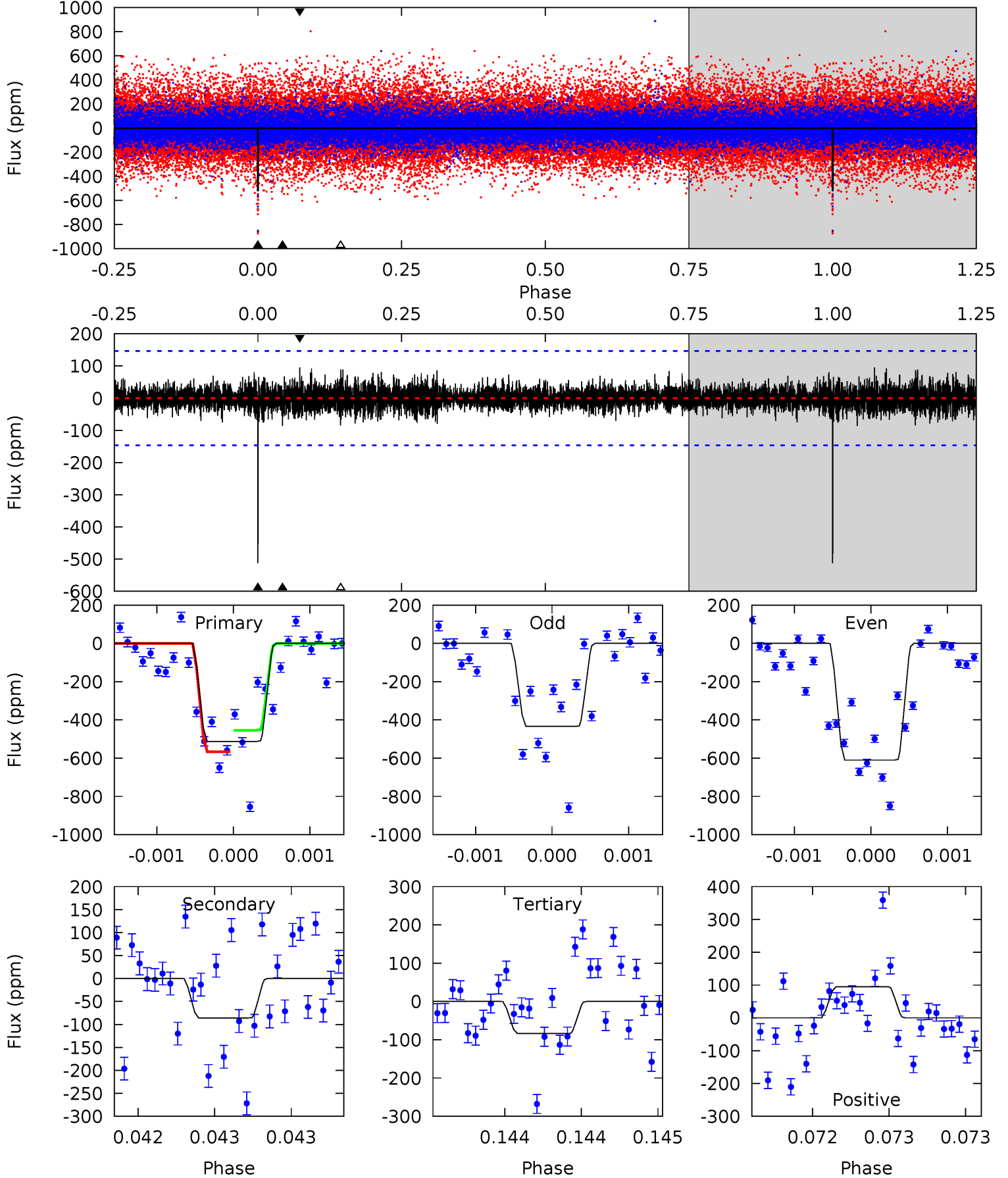
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.06	12.7	8.60	8.15	5.53	3.41	1.91	-2.54	-2.09	4.07	4.52	3.30	0.97	0.39	0.77



# Alt Model-Shift Uniqueness Test

005176547-02, P = 281.465667 Days, E = 253.253196 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
19.5	3.26	3.19	3.61	5.57	3.47	0.82	16.3	15.9	0.07	-0.35	3.28	1.11	0.16	2.15





### Stellar Parameters For KIC 005176547

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5129^{+138}_{-153}$	$3.884^{+0.676}_{-0.312}$	$-0.160^{+0.300}_{-0.300}$	$1.781^{+1.039}_{-1.143}$	$0.887^{+0.147}_{-0.161}$	$0.221^{+2.914}_{-0.153}$
	+3%/-3%	+17%/-8%	+188%/-188%	+58%/-64%	+17%/-18%	+1317%/-69%
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 005176547-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-444 \pm 35$	$9.73^{+11.11}_{-7.25}$	$463^{+67}_{-76}$	$3582^{+2573}_{-655}$	$1716^{+24318}_{-1351}$
Alt.	$-86 \pm 26$	$9.55^{+12.09}_{-6.67}$	$461^{+73}_{-82}$	$2794^{+1047}_{-460}$	$329^{+3257}_{-271}$

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

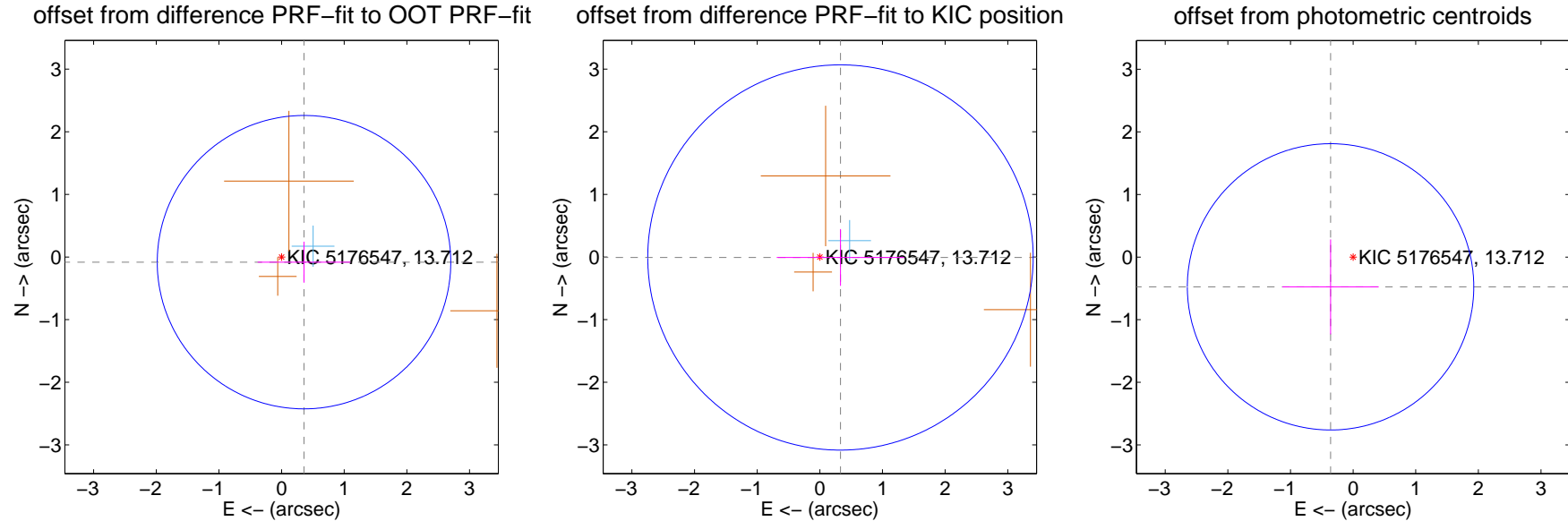
## DV Centroid Data

Supplemental centroid analysis for 005176547-02. Kepler magnitude: 13.71. Transit SNR 6.53

There are 1 quarters with good PRF difference image offsets

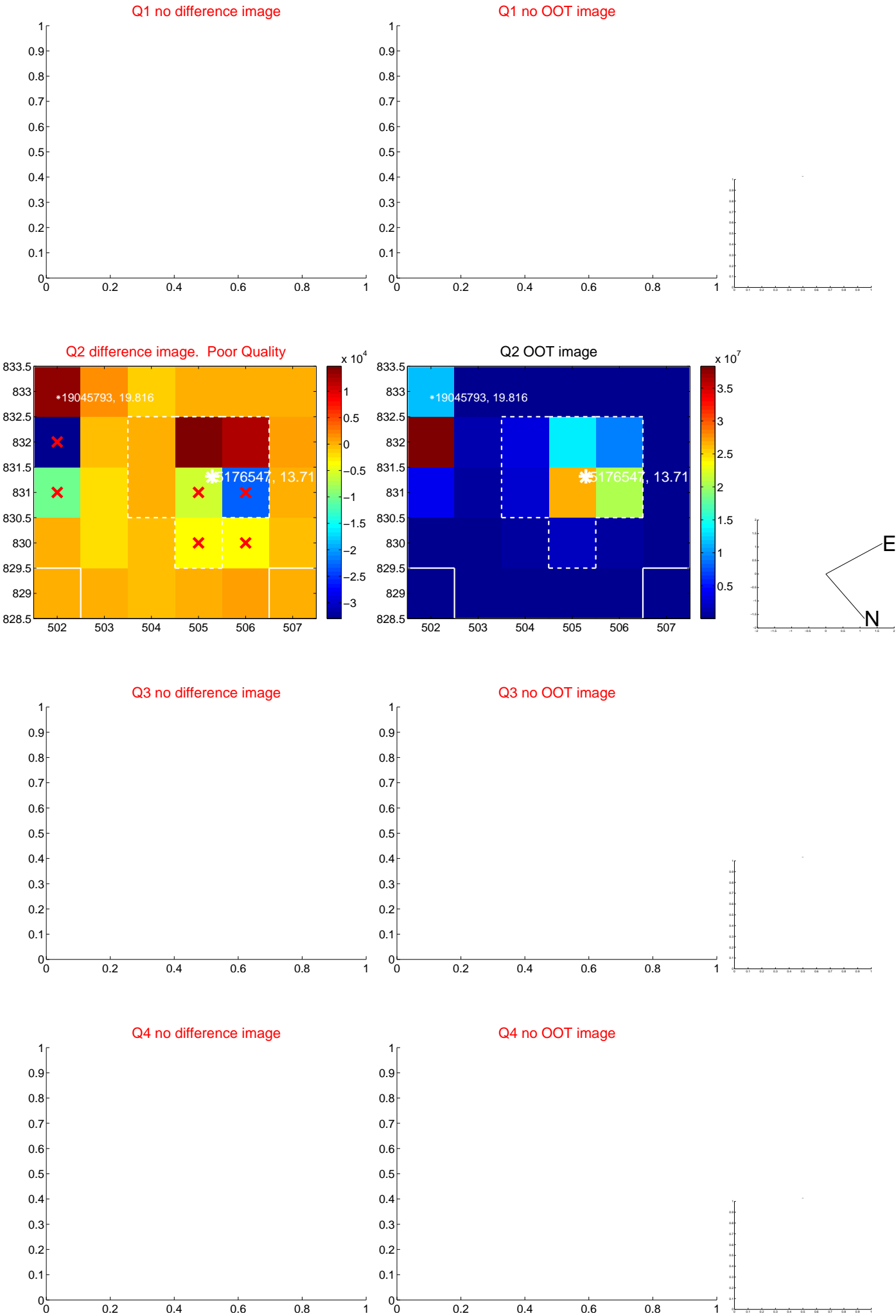
The direct PRF centroid is offset from the target star catalog position by about 0.08 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.367 \pm 0.781$	0.47	$-0.358 \pm 0.740$	$-0.082 \pm 0.328$
PRF-fit source offset from KIC position	$0.329 \pm 1.025$	0.32	$-0.329 \pm 1.018$	$-0.007 \pm 0.453$
photometric centroid source offset	$0.60 \pm 0.76$	0.78	$0.36 \pm 0.77$	$-0.48 \pm 0.76$

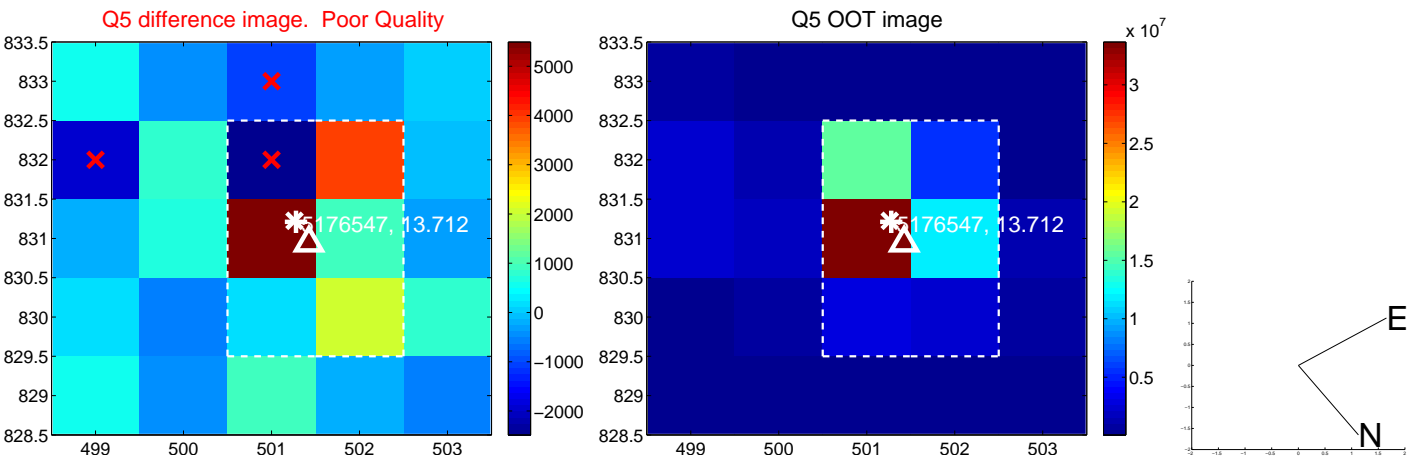


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

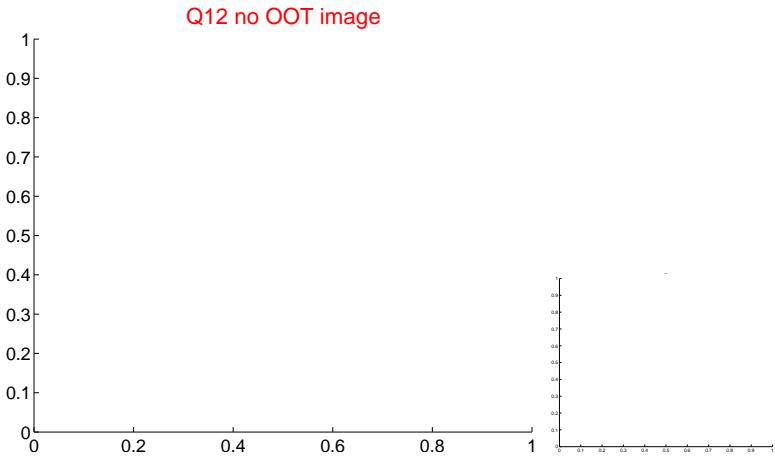
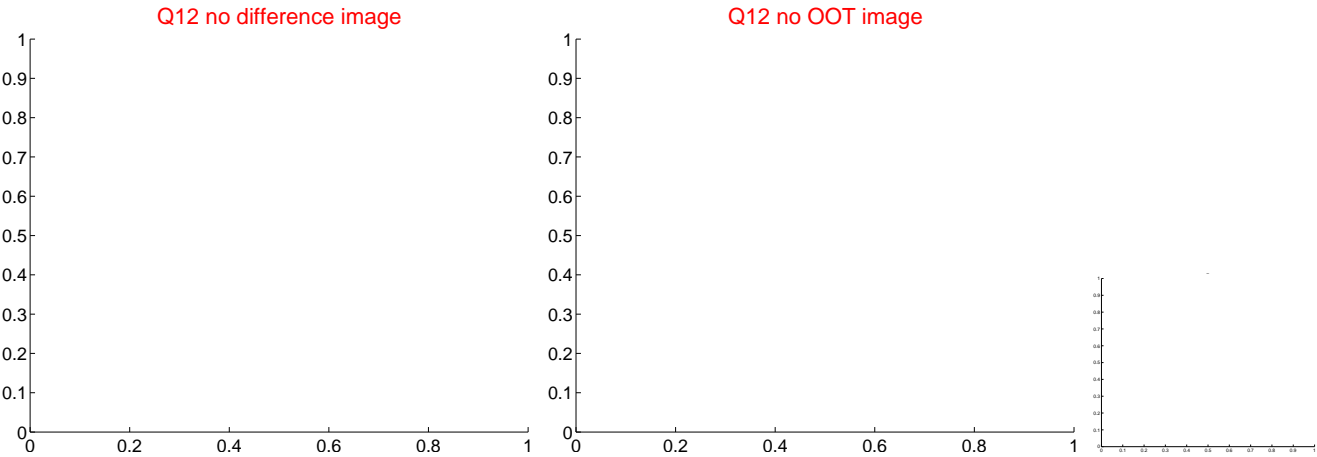
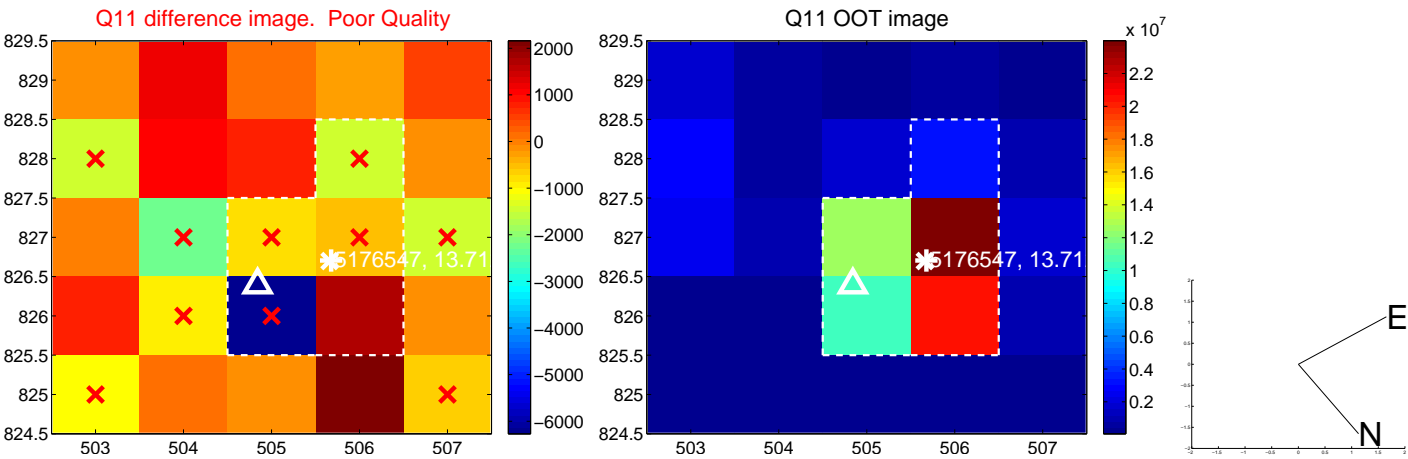
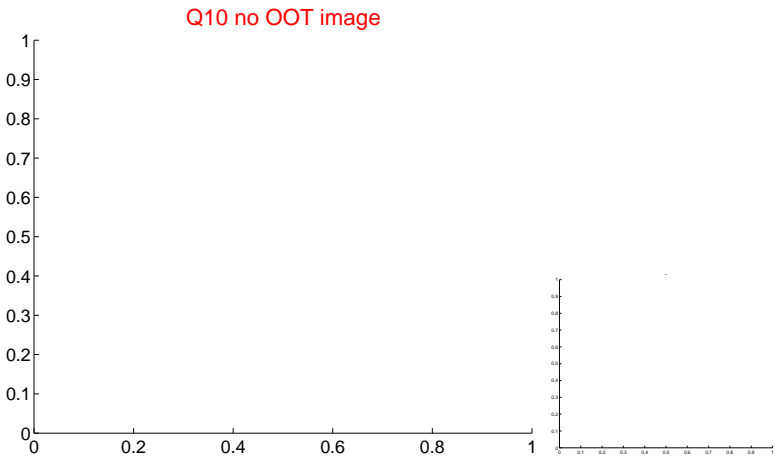
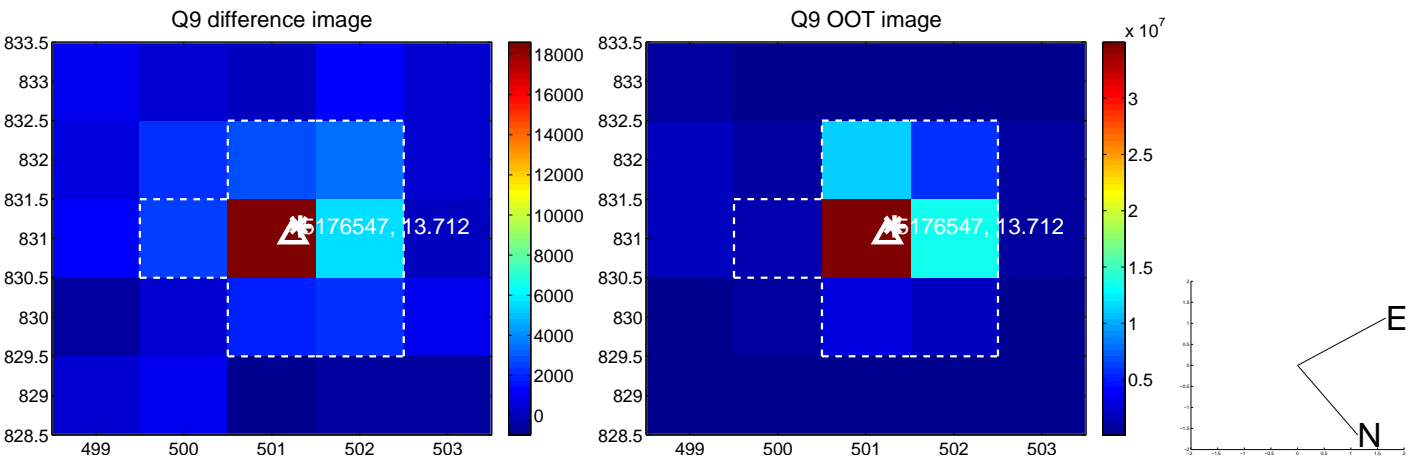
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



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



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



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

Q13 no difference image



Q13 no OOT image



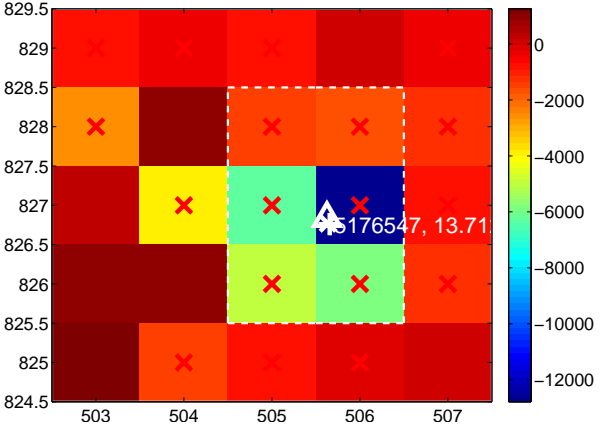
Q14 no difference image



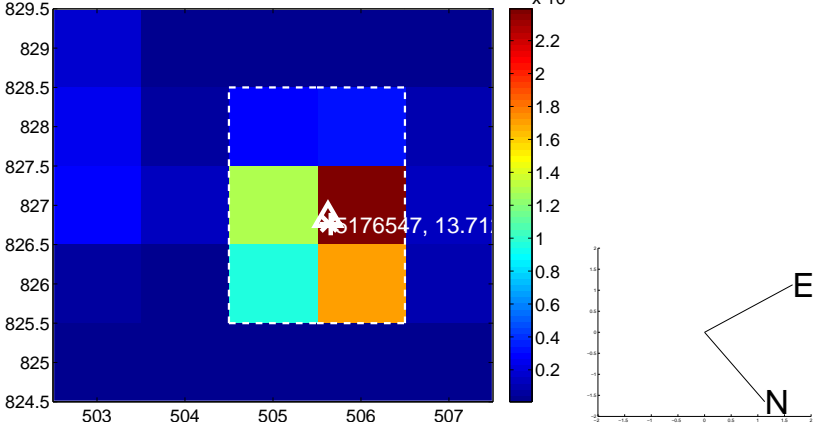
Q14 no OOT image



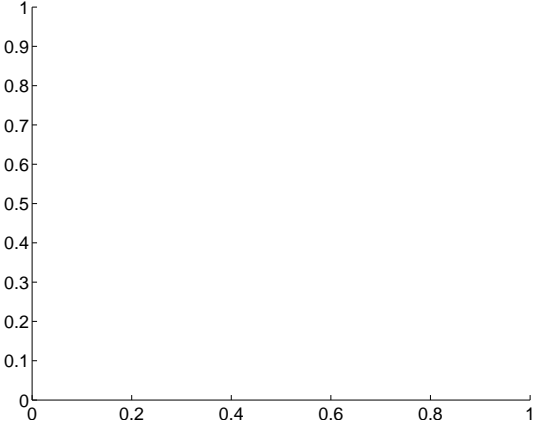
Q15 difference image. Poor Quality



Q15 OOT image



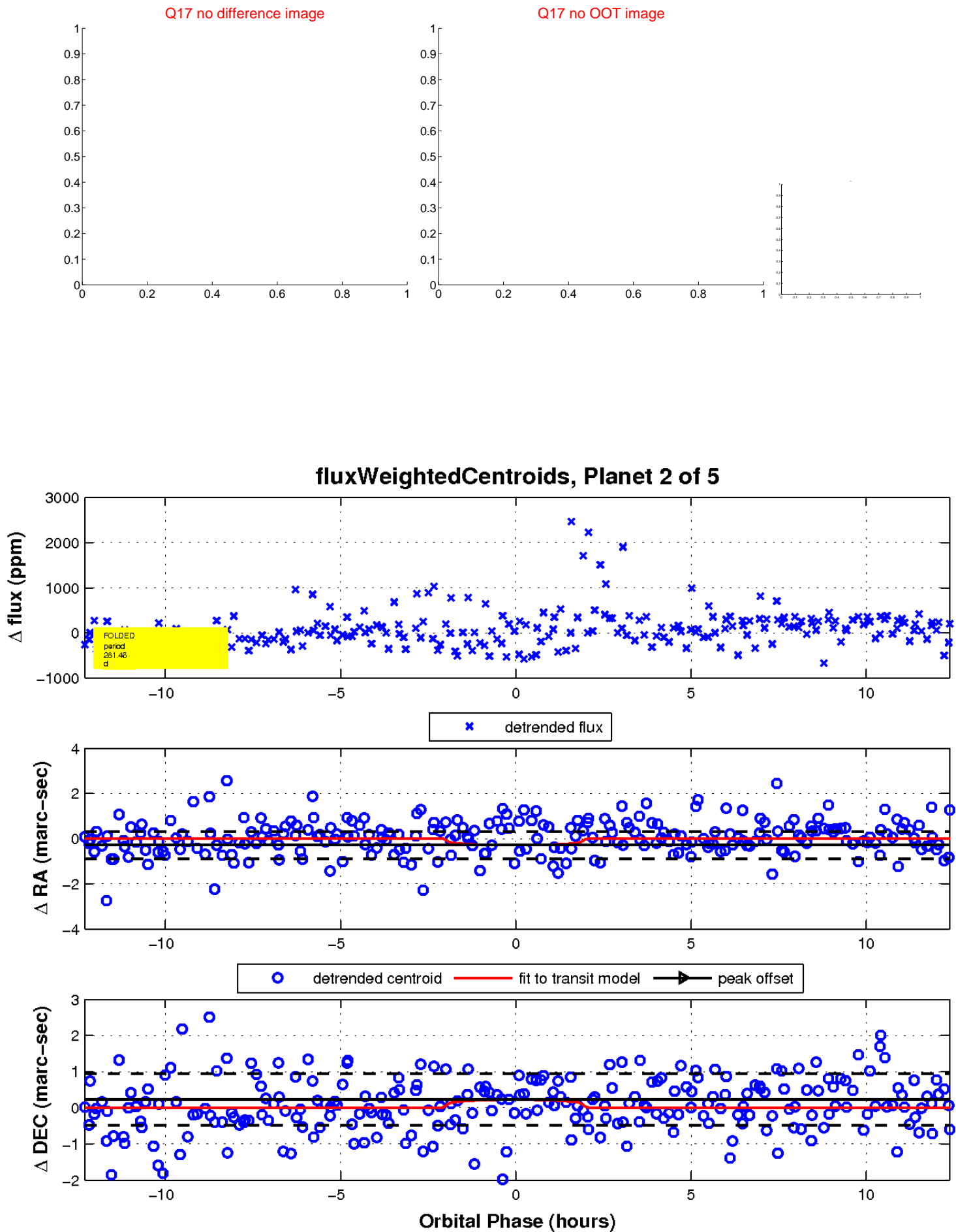
Q16 no difference image



Q16 no OOT image

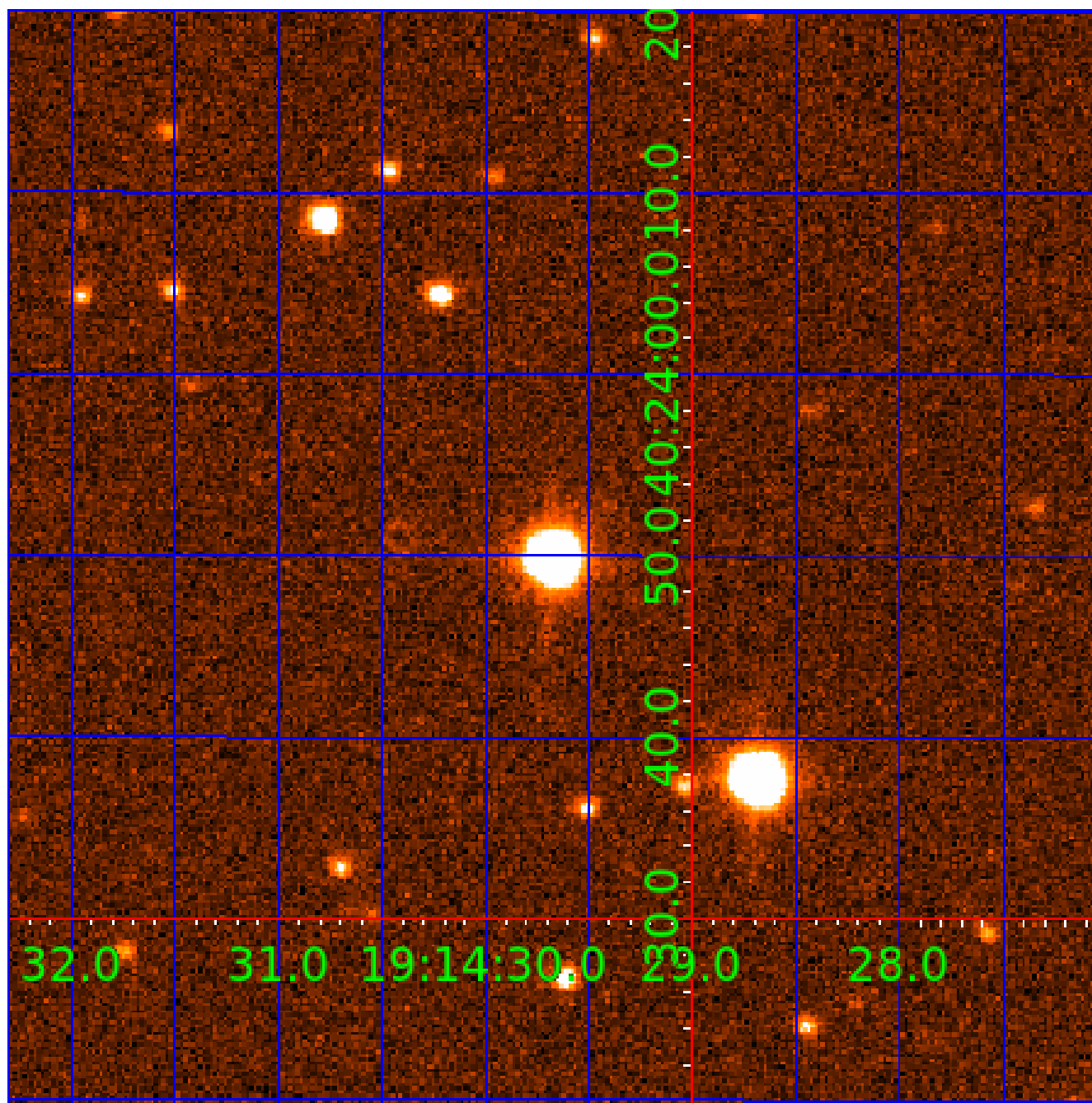


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 005176547

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005176547-01	OBS	No	588.761353	369.242123	670.7	2.762	14.0	8.7	1.78	5129	5.43	1.13
005176547-02	OBS	No	281.463692	253.267178	531.8	4.144	11.0	6.5	1.78	5129	4.48	3.02
005176547-03	OBS	No	471.826432	480.635125	786.4	5.186	14.7	9.4	1.78	5129	5.08	1.51
005176547-04	OBS	No	361.706110	478.173387	529.8	3.180	12.5	7.4	1.78	5129	4.03	2.16
005176547-05	OBS	No	592.452498	390.537666	564.2	7.394	11.0	6.8	1.78	5129	4.45	1.12

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005176547-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
005176547-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005176547-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005176547-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_POS_DV—CENT_FEW_DIFFS
005176547-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

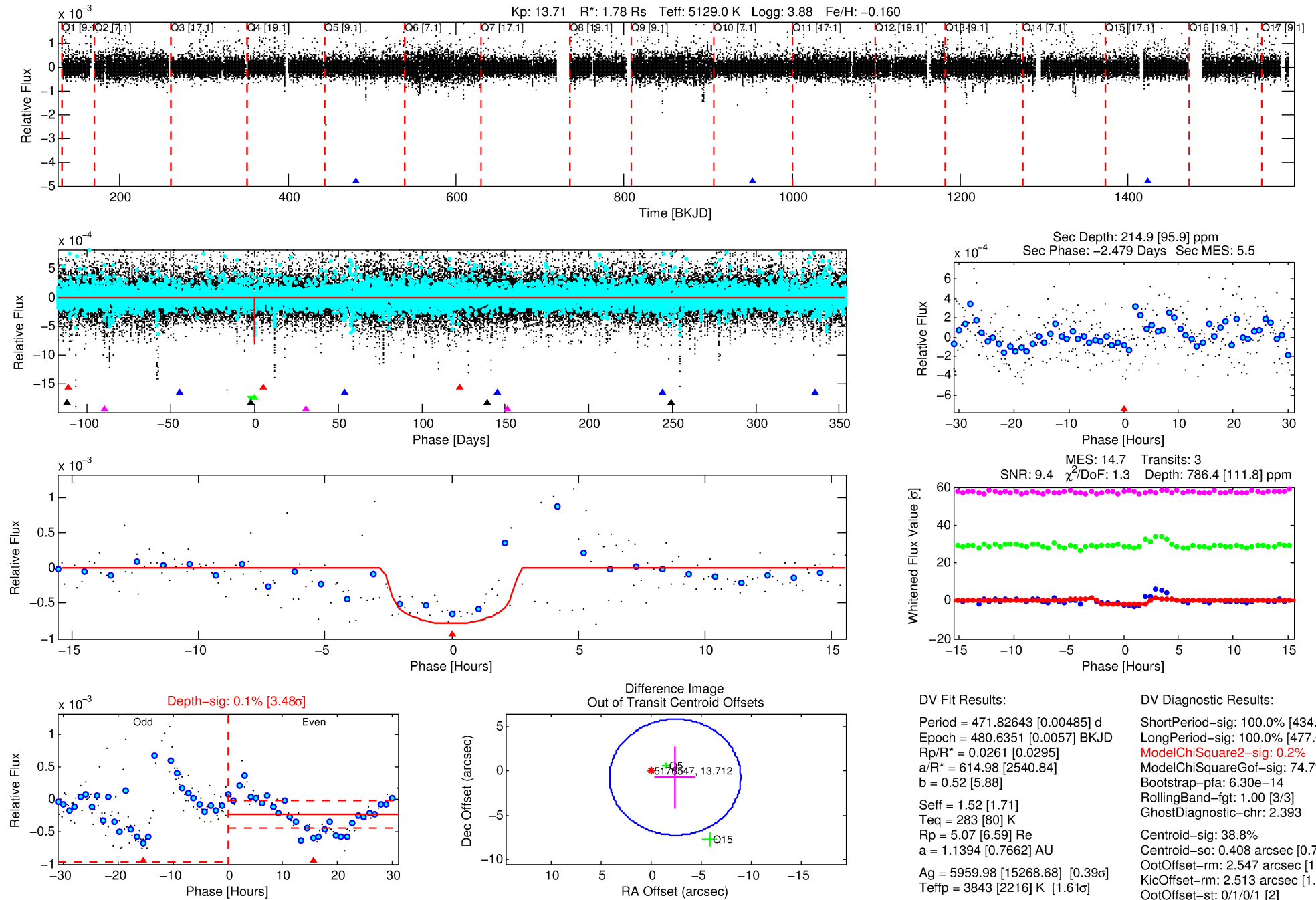
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 005176547-03

No Significant Match Found

# DV One-Page Summary

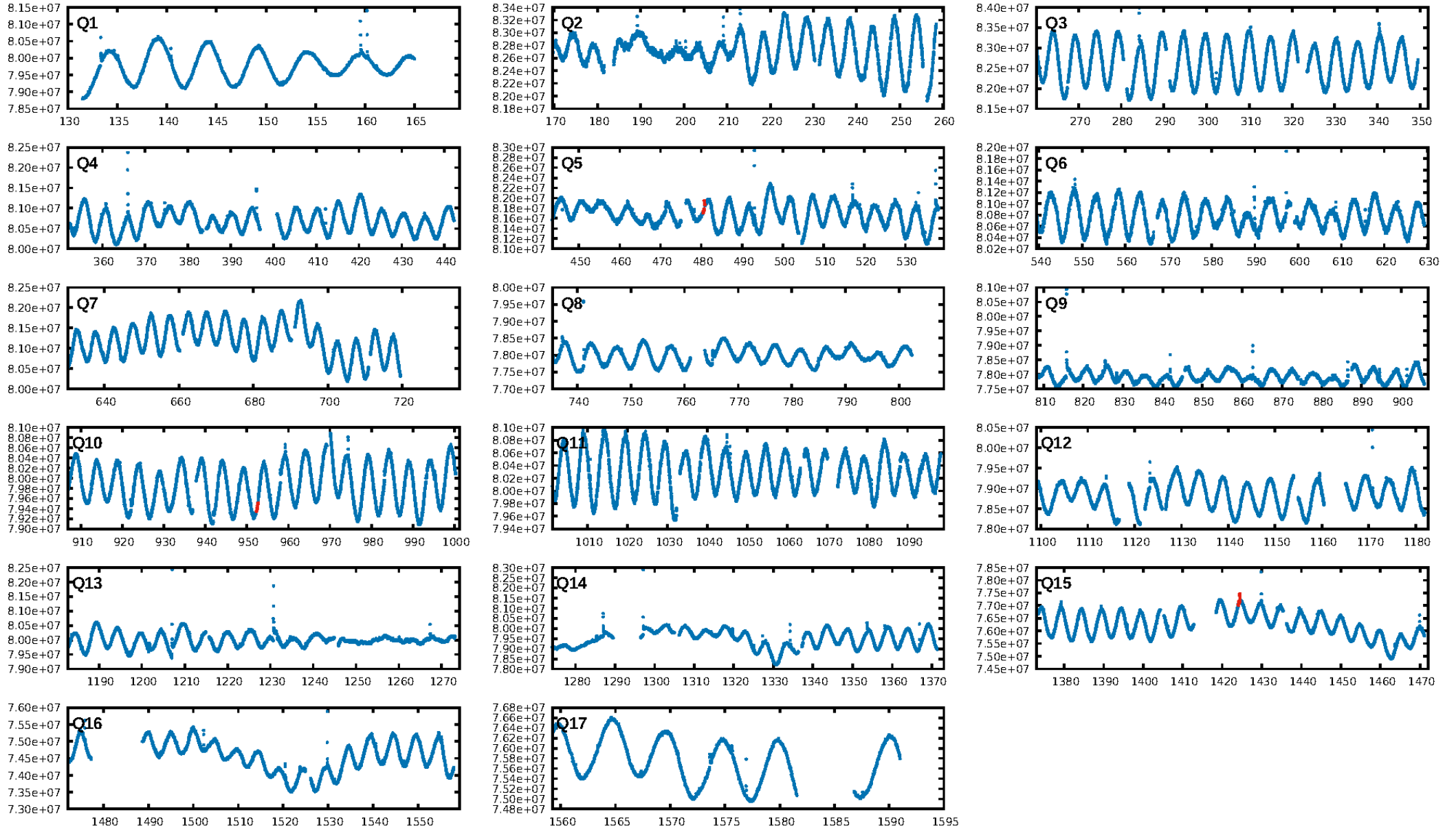
KIC: 5176547 Candidate: 3 of 5 Period: 471.826 d



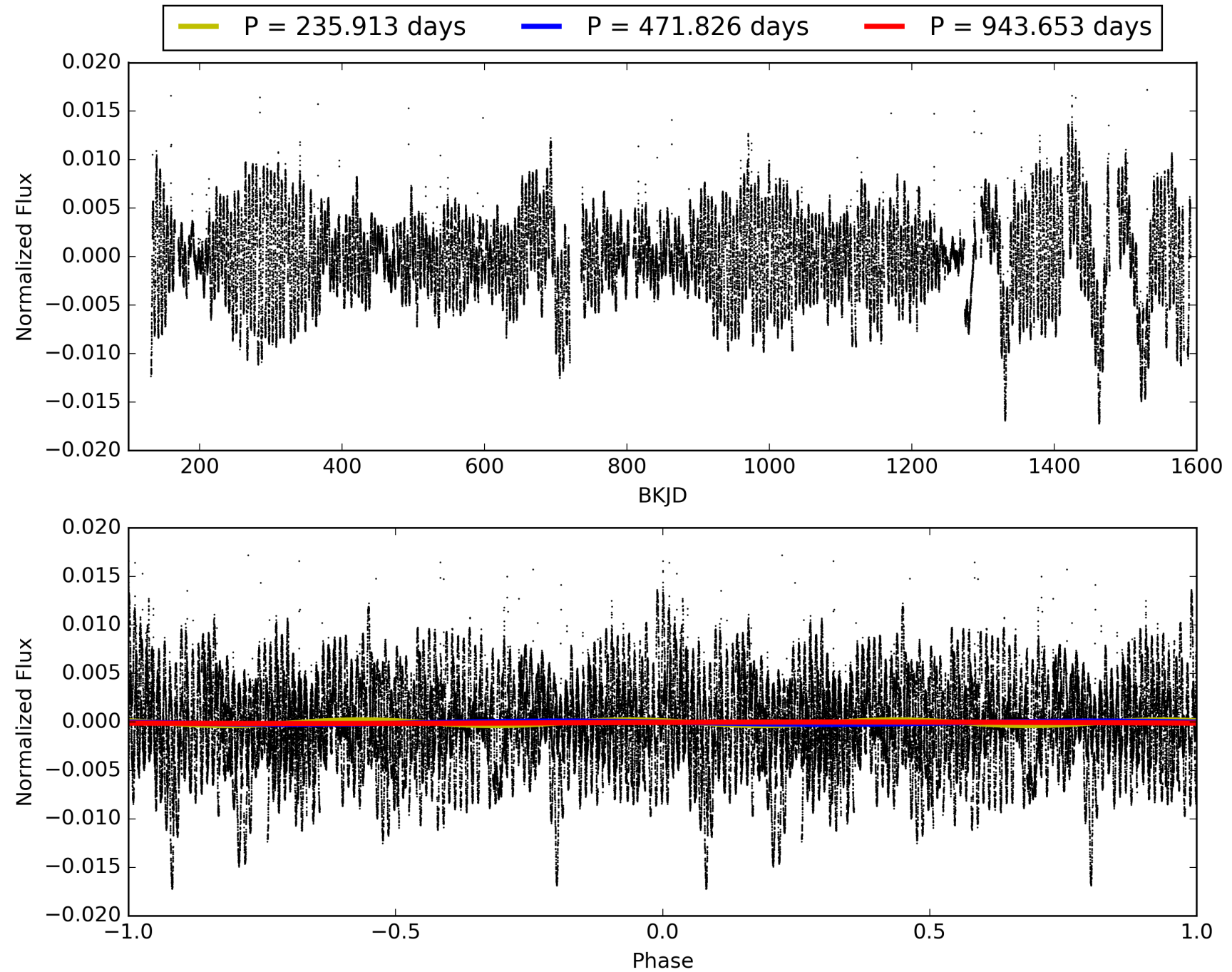
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 22:35:24 Z

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

# TCE 005176547-03, PDC Light Curves

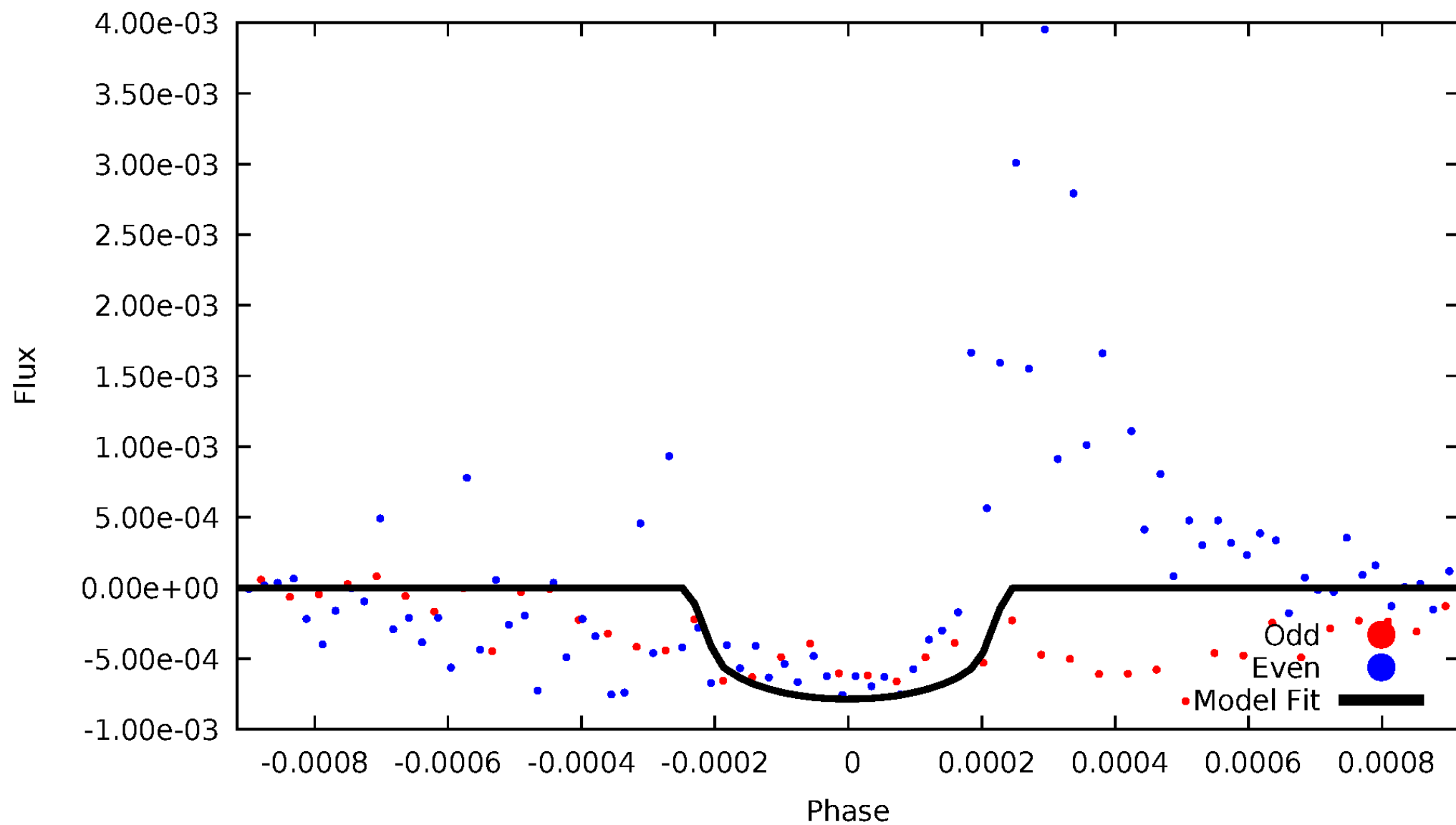


TCE 005176547-03



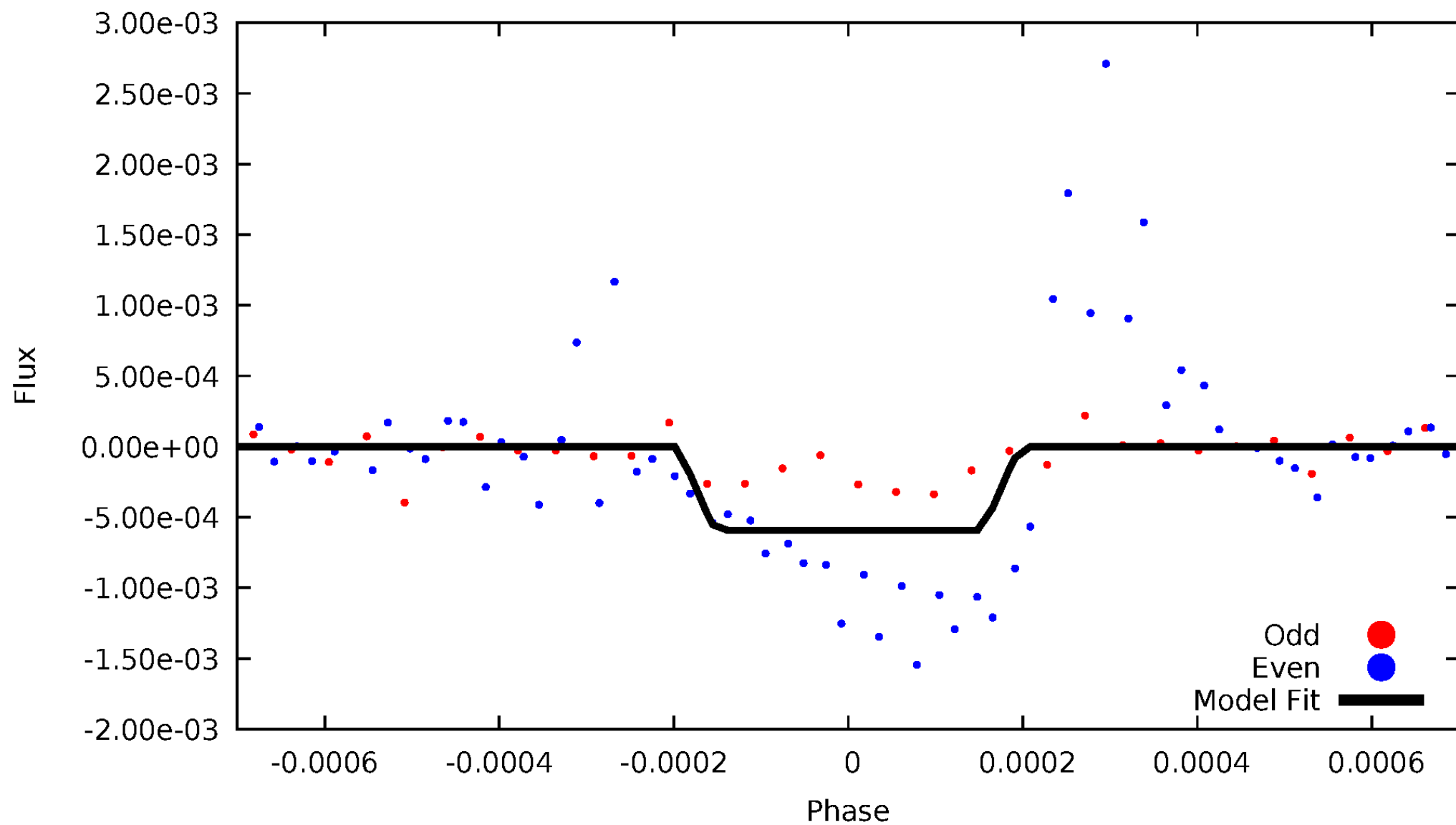
# DV Odd/Even

TCE 005176547-03



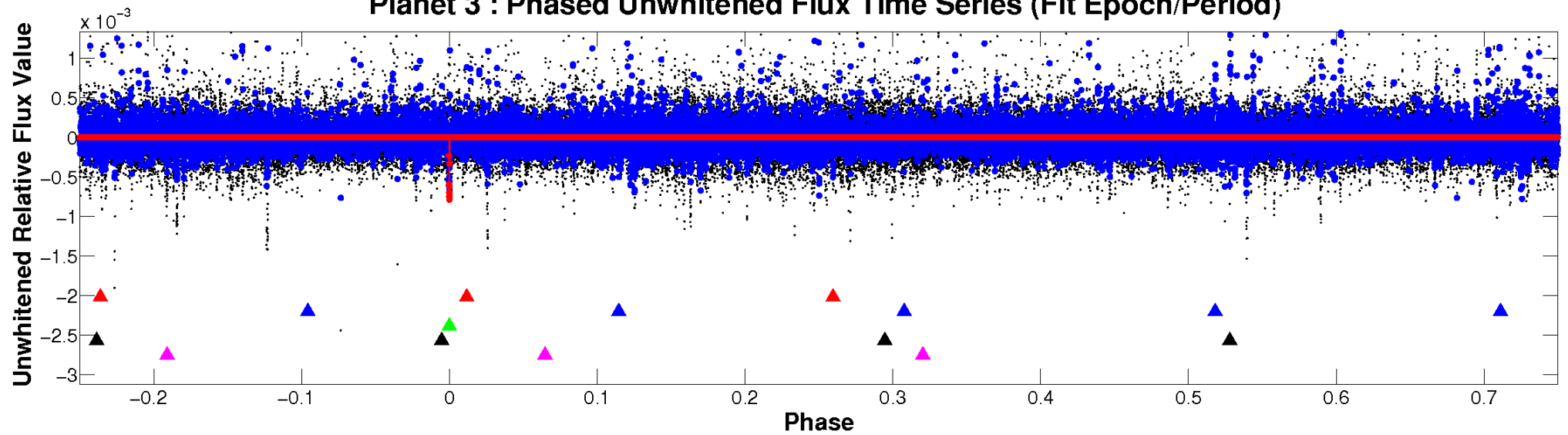
# ALT Odd/Even

TCE 005176547-03

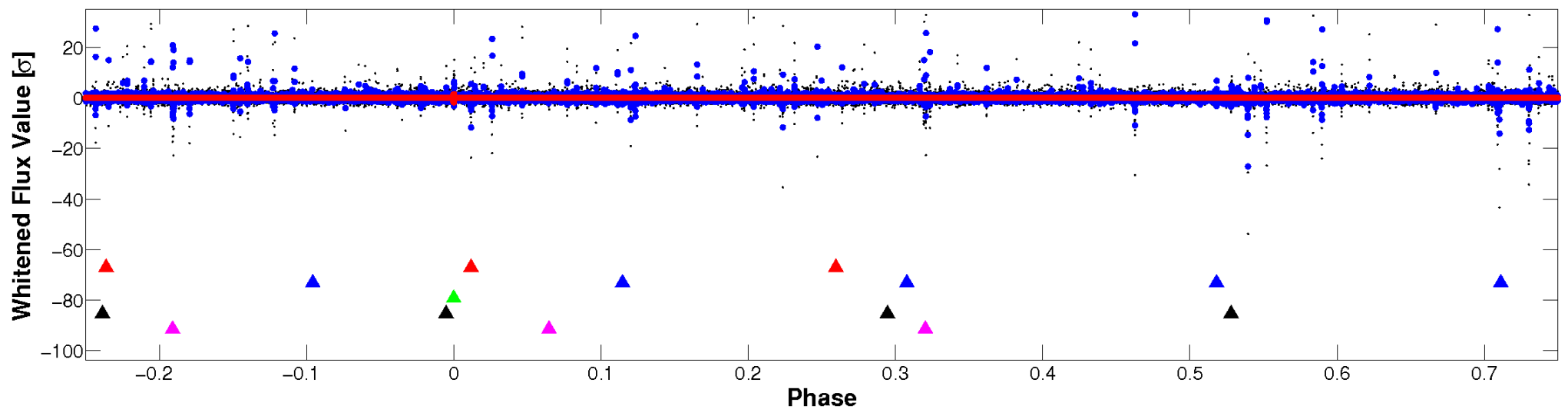


# Non-Whitened Vs. Whitened Light Curve

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

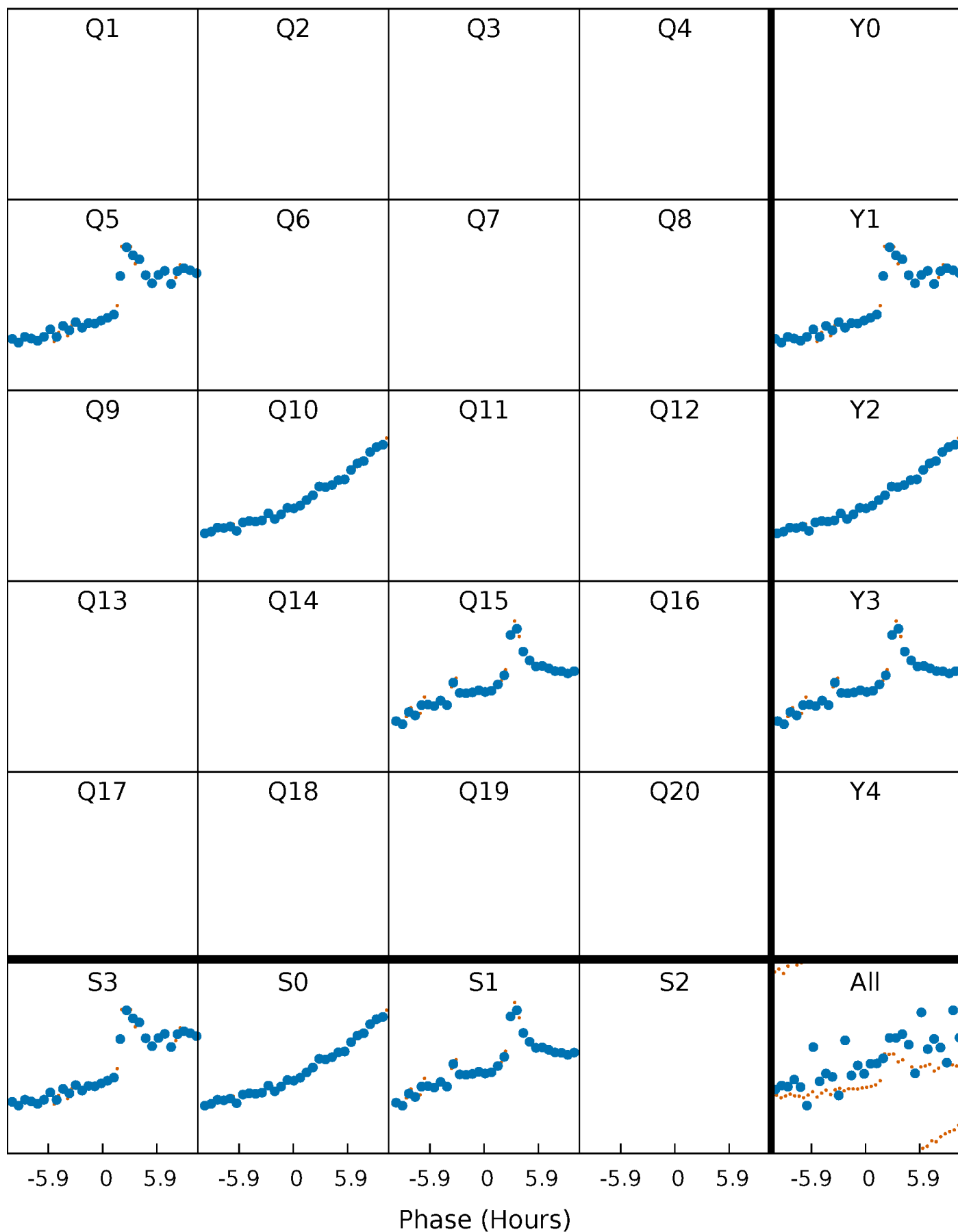


## Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

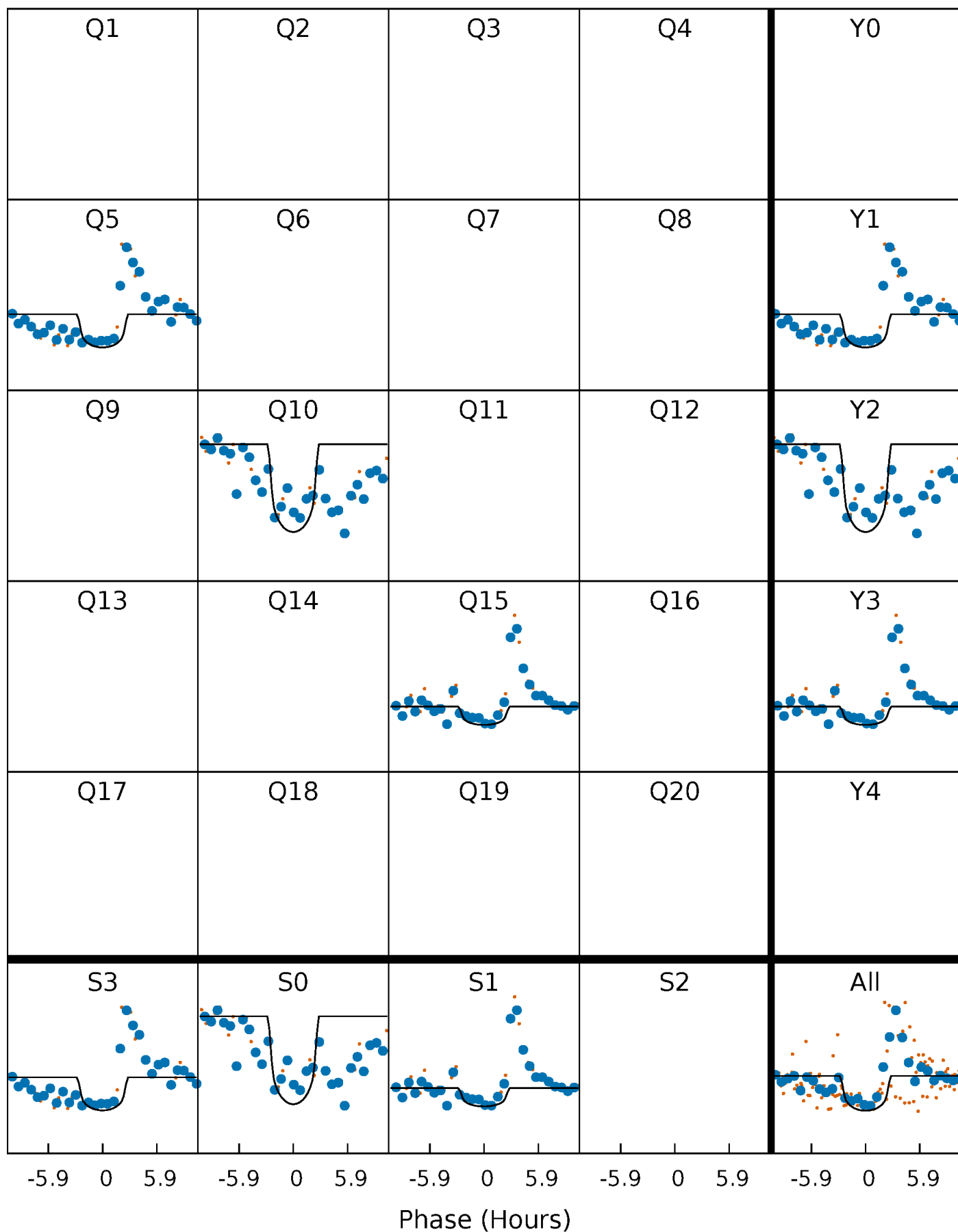
TCE 005176547-03 P=471.826432 Days  $T_0=480.635125$  (BKJD)





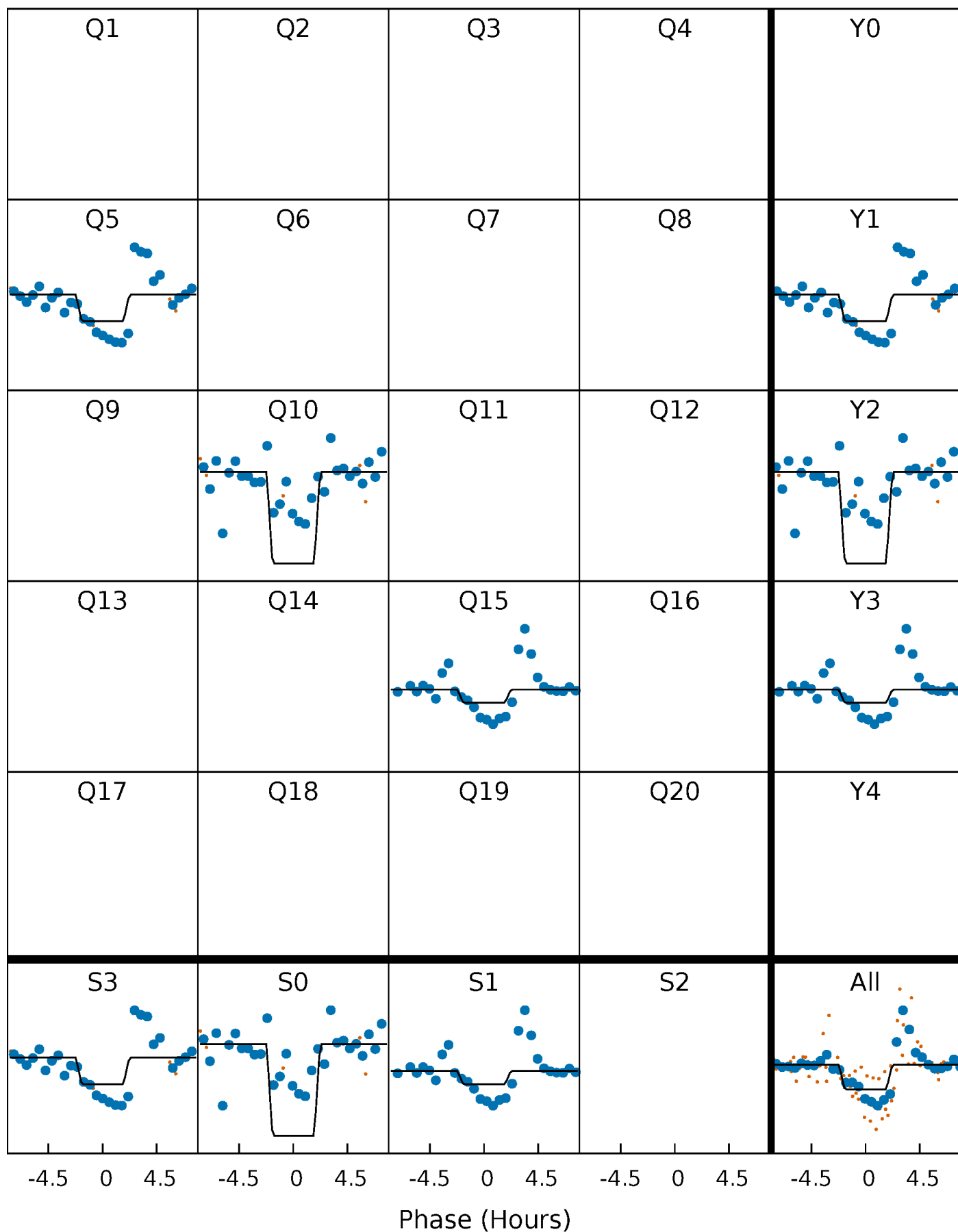
# DV Quarter-Phased Transit Curves

TCE 005176547-03     $P=471.826432$  Days     $T_0=480.635125$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

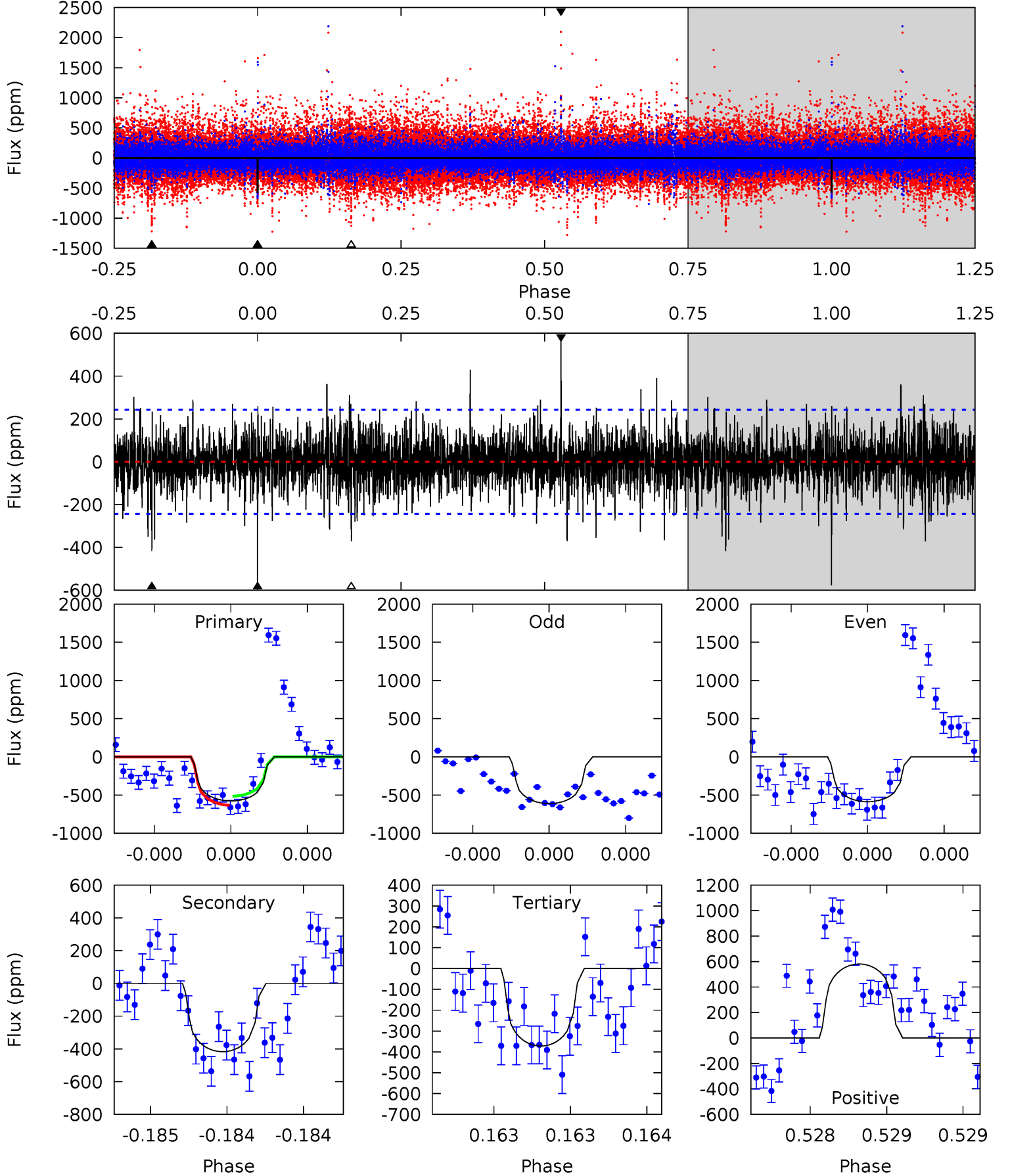
TCE 005176547-03 P=471.838145 Days  $T_0=480.611372$  (BKJD)



# DV Model-Shift Uniqueness Test

005176547-03, P = 471.826432 Days, E = 8.808693 Days

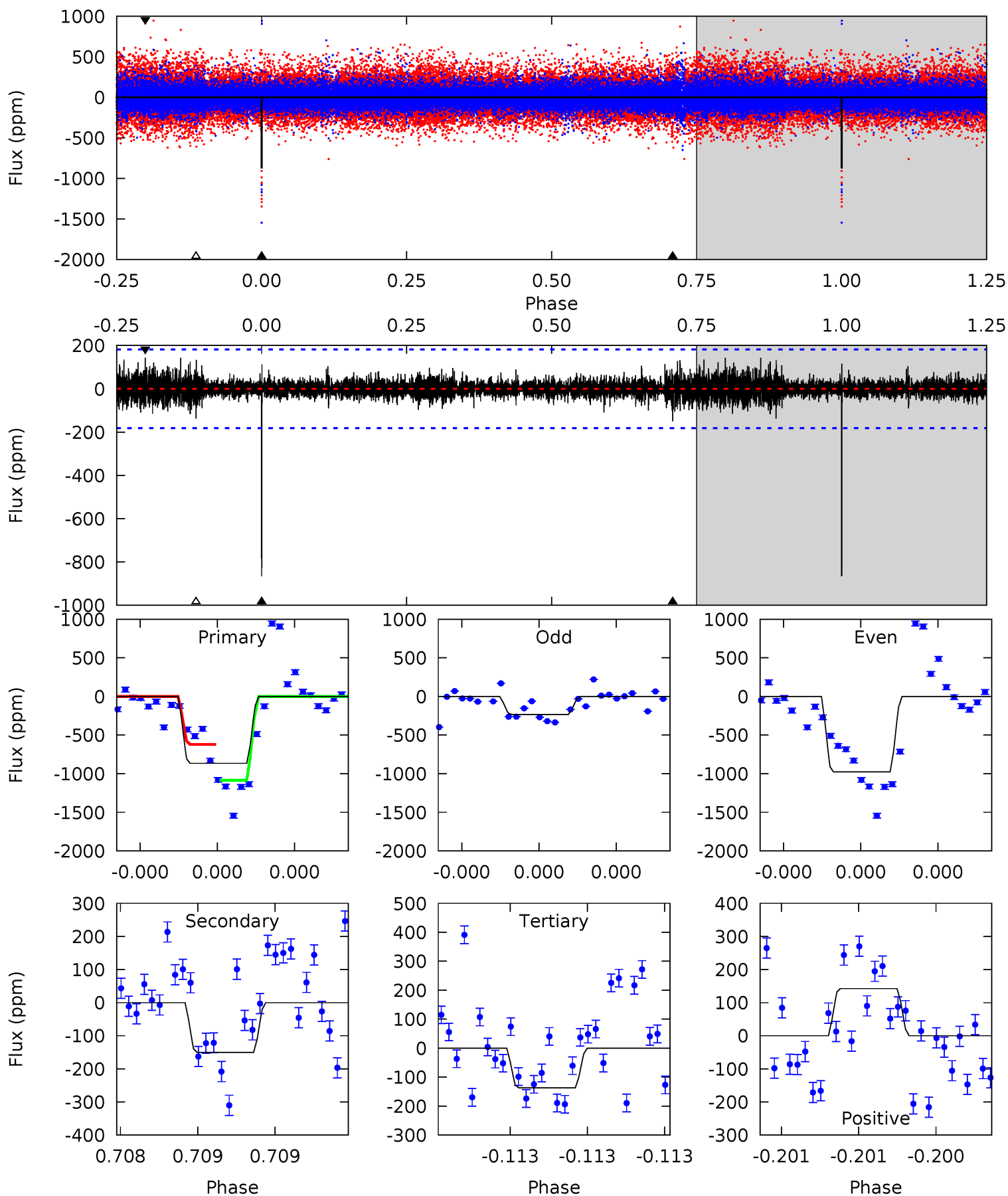
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.2	9.56	8.53	13.3	5.58	3.49	1.93	4.70	-0.08	1.03	-3.75	0.18	0.99	0.50	1.36



# Alt Model-Shift Uniqueness Test

005176547-03, P = 471.838145 Days, E = 8.773227 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
26.8	4.65	4.24	4.41	5.62	3.55	0.80	22.6	22.4	0.41	0.24	11.8	0.86	0.14	7.22



### Stellar Parameters For KIC 005176547

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5129^{+138}_{-153}$	$3.884^{+0.676}_{-0.312}$	$-0.160^{+0.300}_{-0.300}$	$1.781^{+1.039}_{-1.143}$	$0.887^{+0.147}_{-0.161}$	$0.221^{+2.914}_{-0.153}$
	+3%/-3%	+17%/-8%	+188%/-188%	+58%/-64%	+17%/-18%	+1317%/-69%
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 005176547-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-417 \pm 44$	$6.25^{+6.02}_{-4.18}$	$391^{+65}_{-64}$	$4180^{+2254}_{-762}$	$7719^{+57921}_{-5720}$
Alt.	$-150 \pm 32$	$5.49^{+5.86}_{-3.50}$	$391^{+57}_{-63}$	$3581^{+1634}_{-582}$	$3383^{+25131}_{-2574}$

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

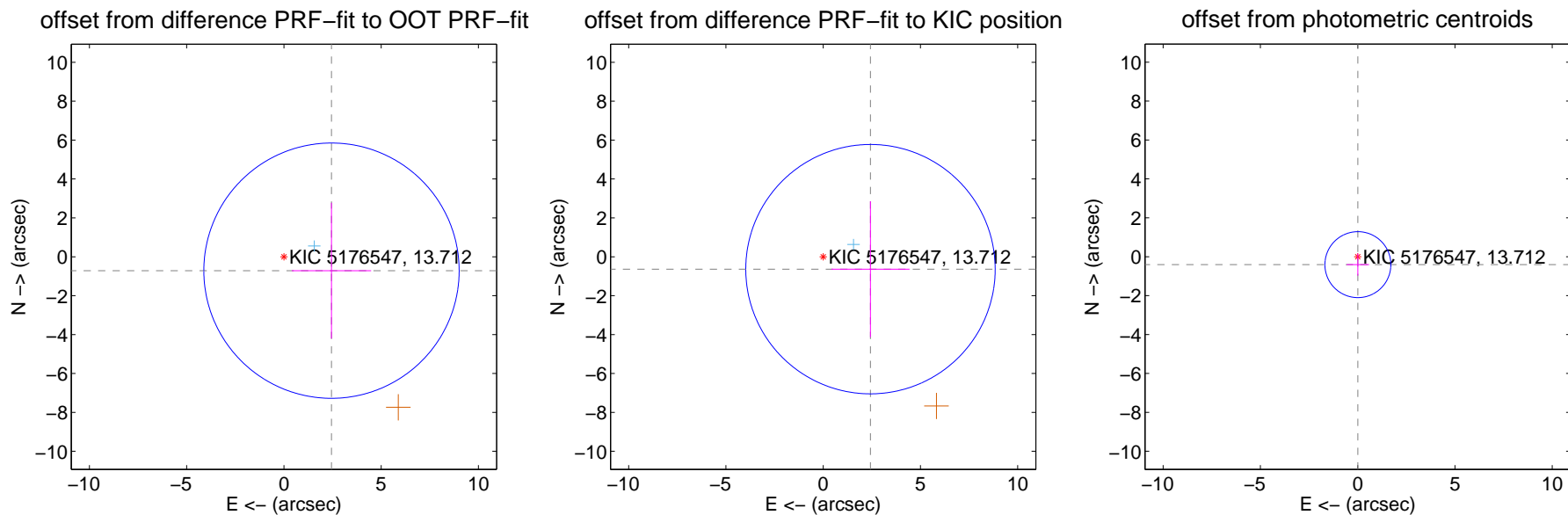
## DV Centroid Data

Supplemental centroid analysis for 005176547-03. Kepler magnitude: 13.71. Transit SNR 9.35

There are 1 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.09 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.547 \pm 2.187$	1.16	$-2.445 \pm 2.038$	$-0.714 \pm 3.489$
PRF-fit source offset from KIC position	$2.513 \pm 2.137$	1.18	$-2.431 \pm 2.011$	$-0.637 \pm 3.494$
photometric centroid source offset	$0.41 \pm 0.56$	0.72	$-0.01 \pm 0.58$	$-0.41 \pm 0.56$

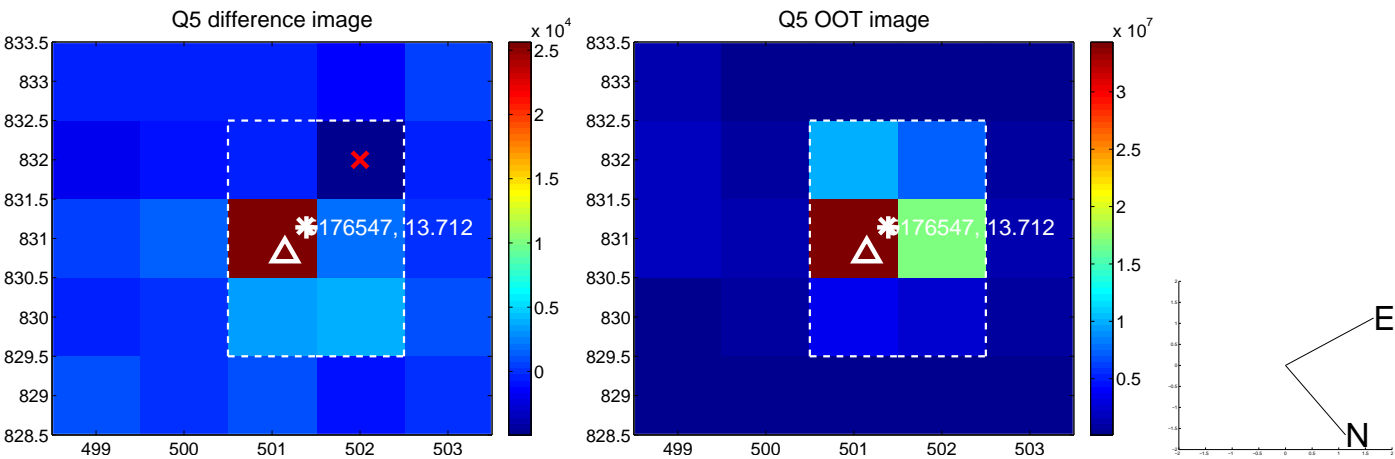


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

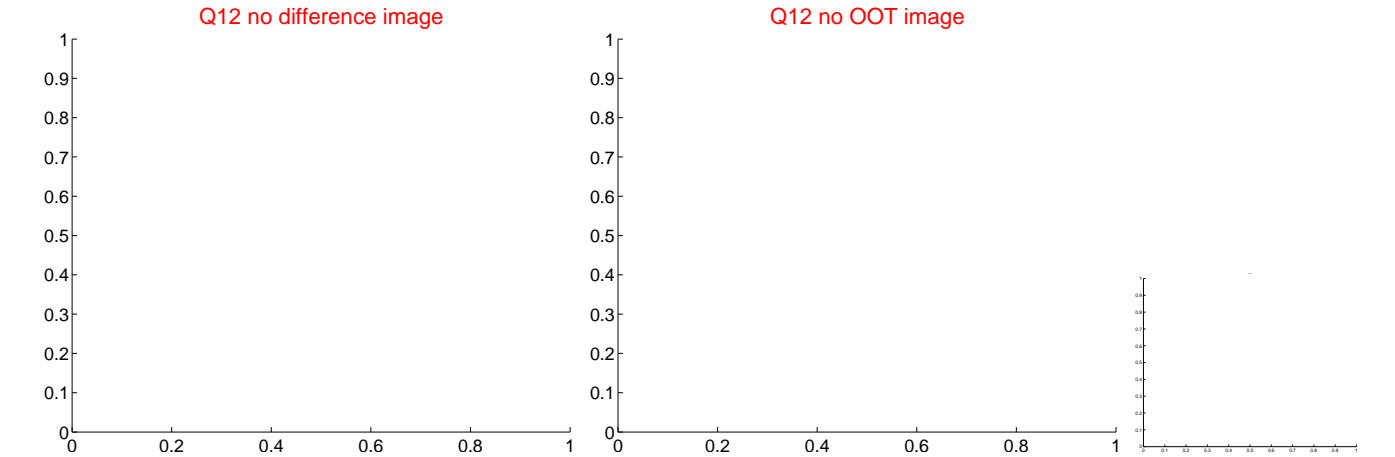
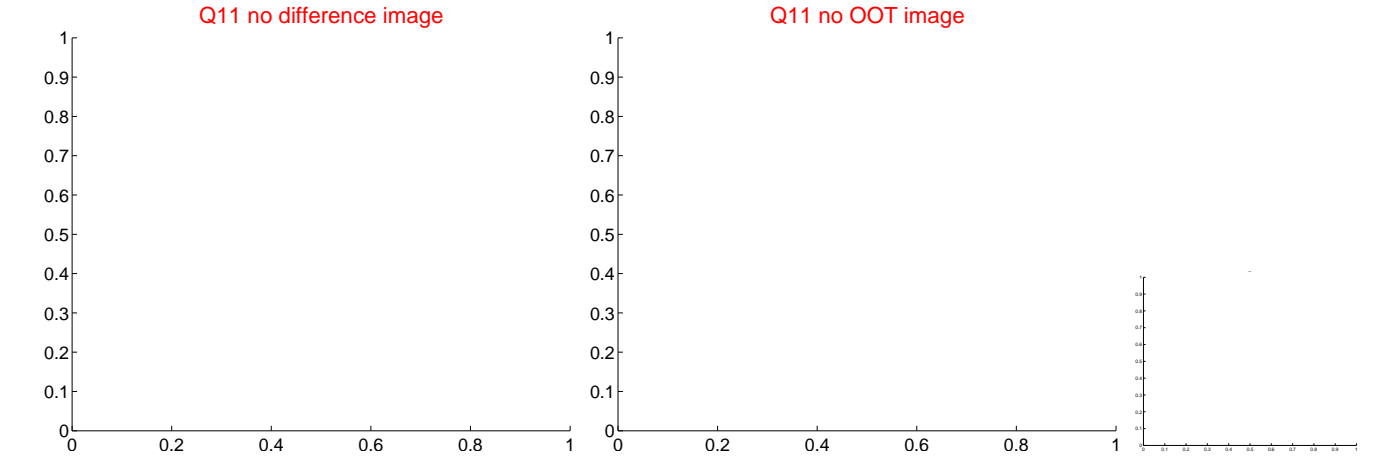
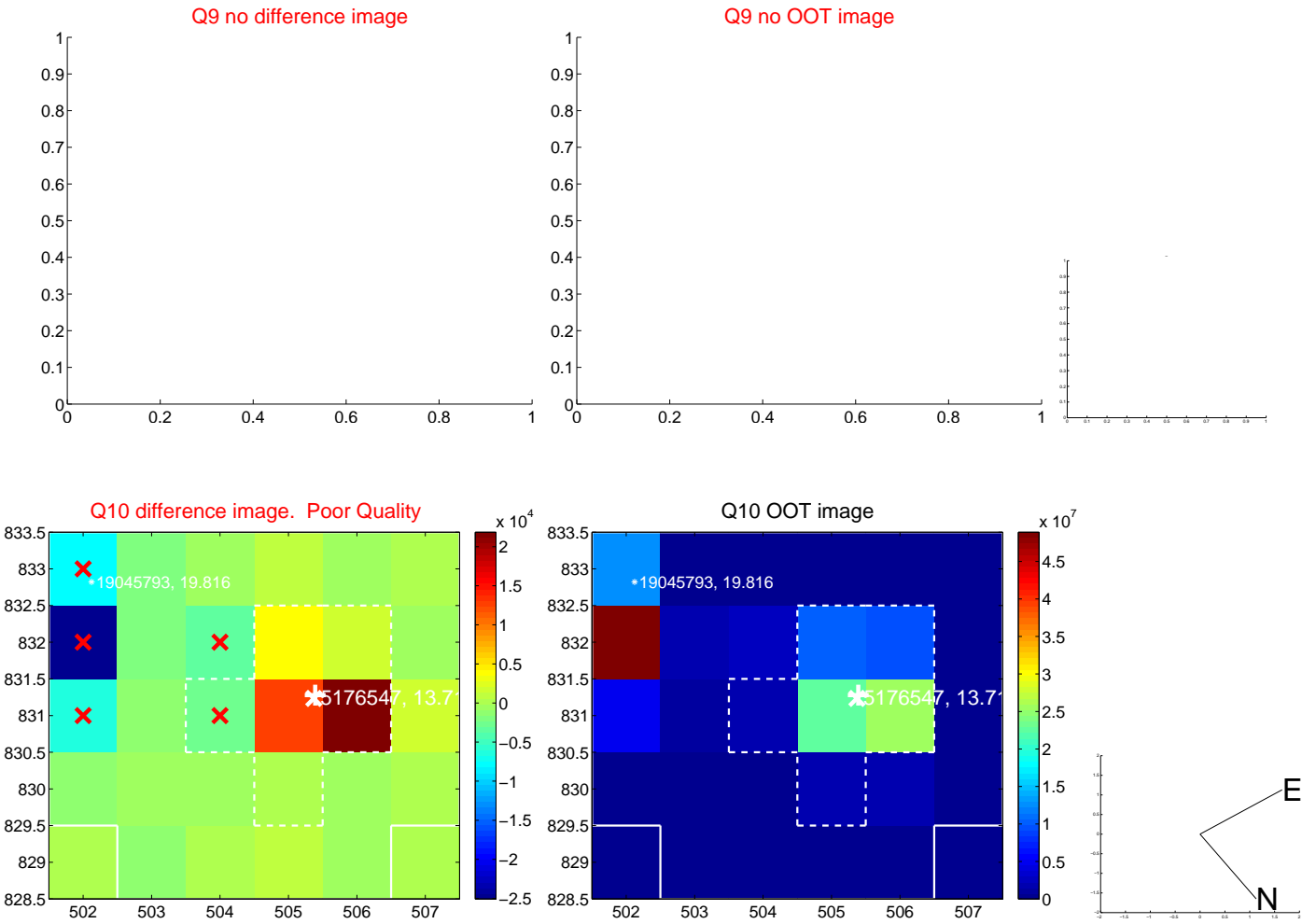


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

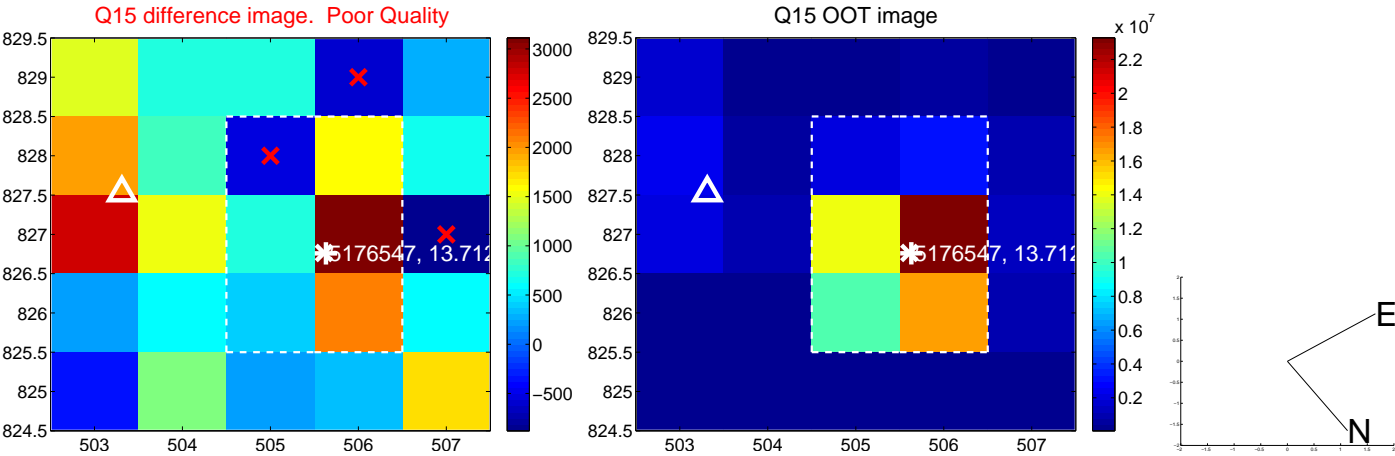




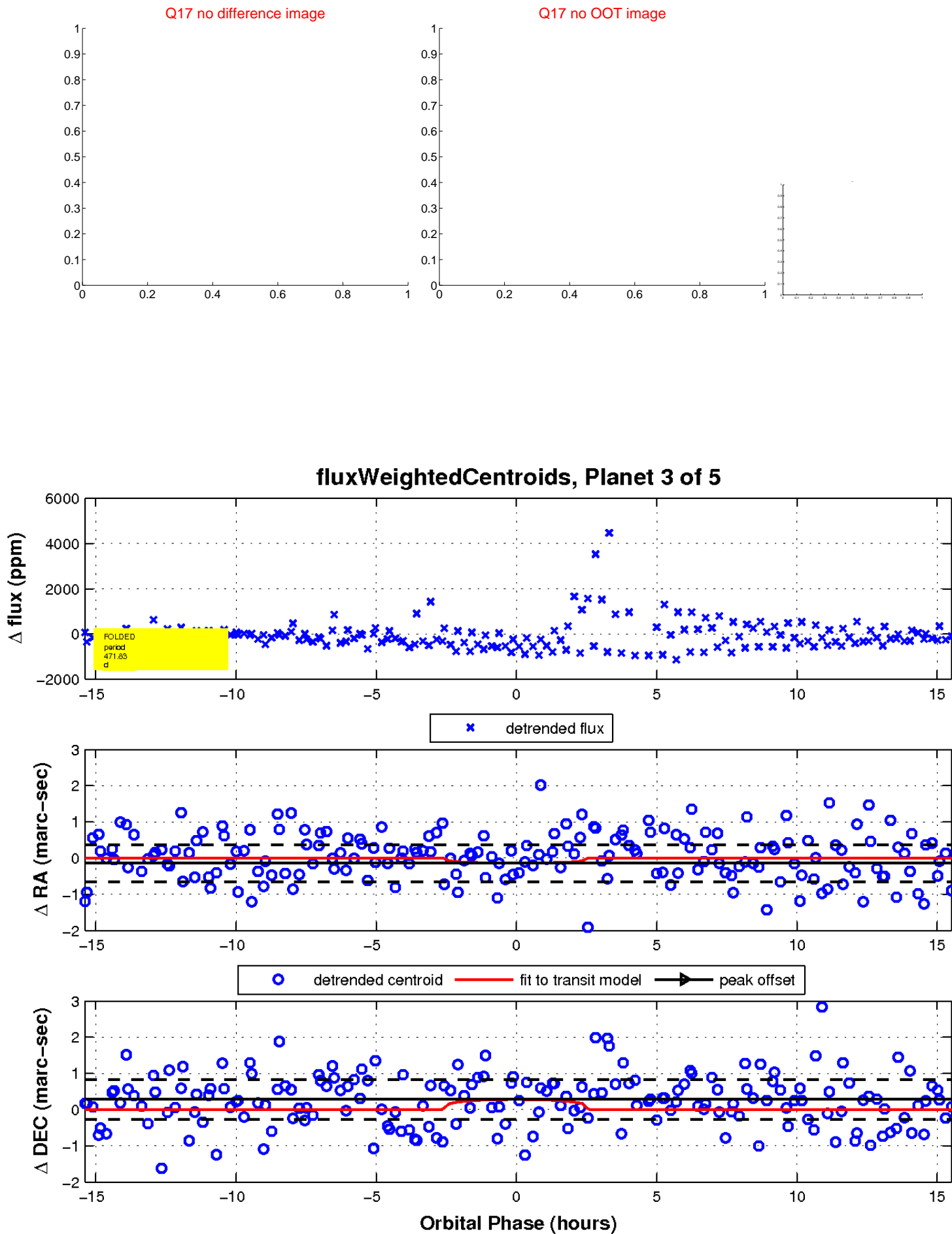
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



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

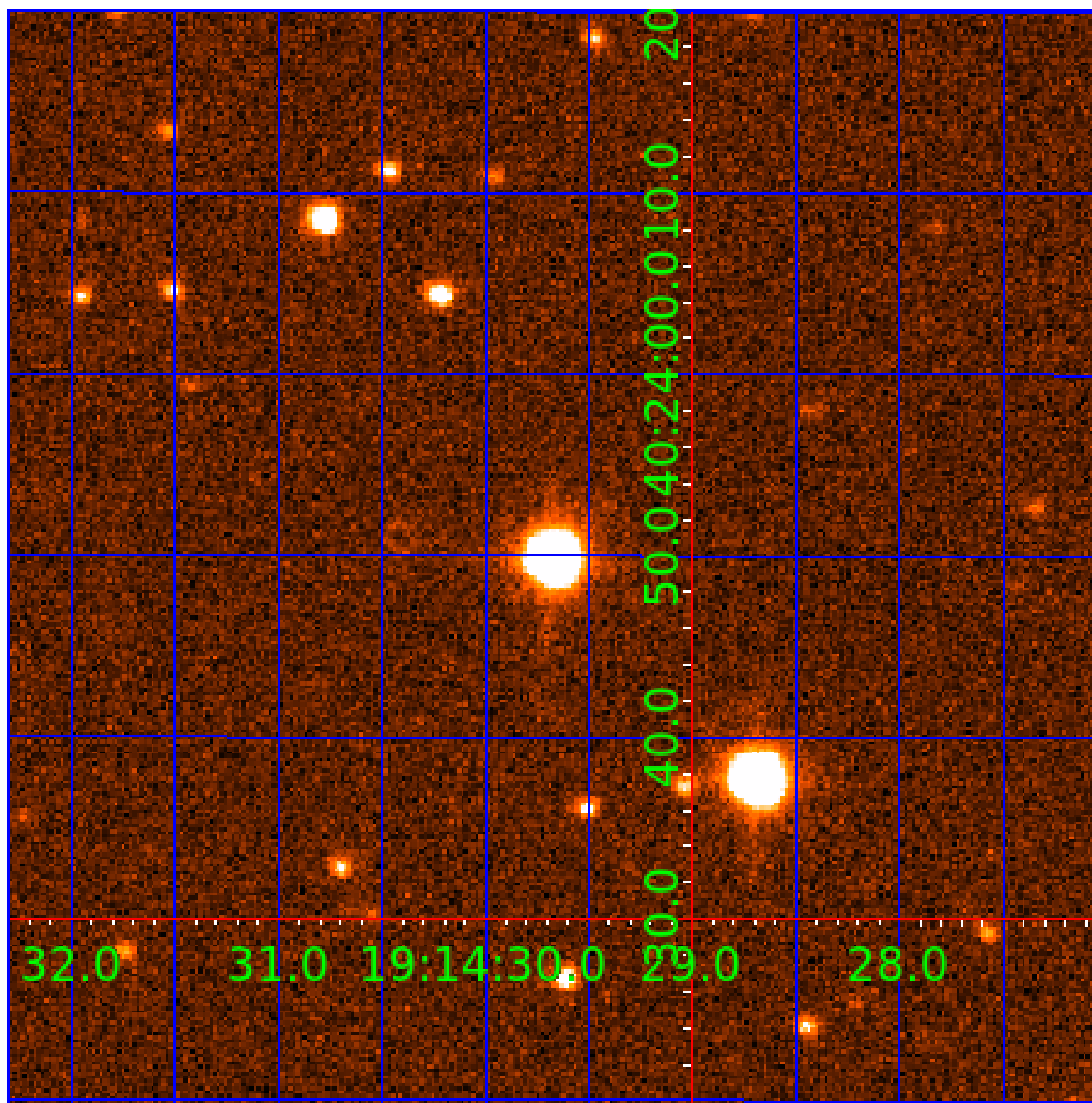


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 005176547

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005176547-01	OBS	No	588.761353	369.242123	670.7	2.762	14.0	8.7	1.78	5129	5.43	1.13
005176547-02	OBS	No	281.463692	253.267178	531.8	4.144	11.0	6.5	1.78	5129	4.48	3.02
005176547-03	OBS	No	471.826432	480.635125	786.4	5.186	14.7	9.4	1.78	5129	5.08	1.51
005176547-04	OBS	No	361.706110	478.173387	529.8	3.180	12.5	7.4	1.78	5129	4.03	2.16
005176547-05	OBS	No	592.452498	390.537666	564.2	7.394	11.0	6.8	1.78	5129	4.45	1.12

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005176547-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
005176547-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005176547-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005176547-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_POS_DV—CENT_FEW_DIFFS
005176547-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

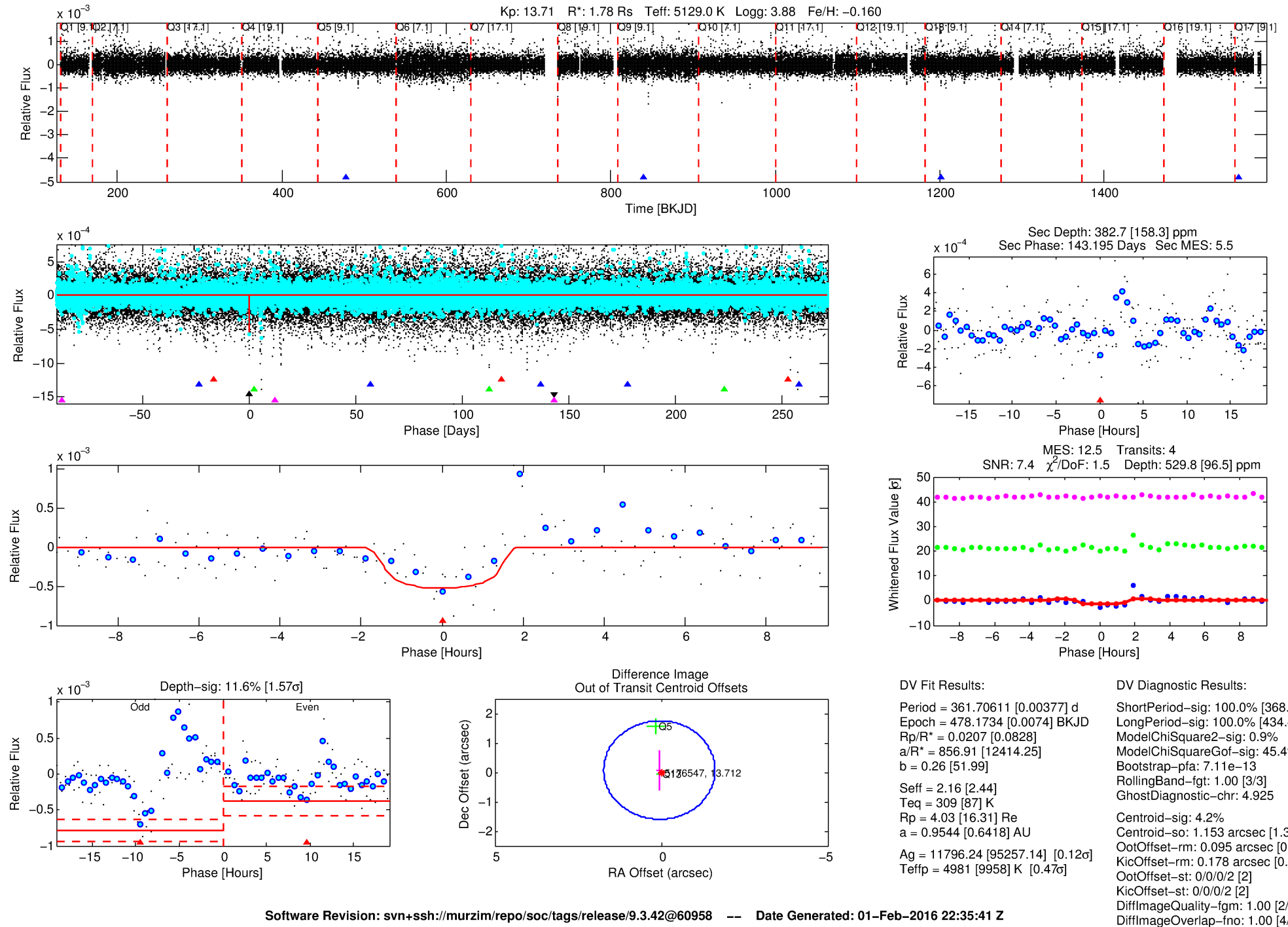
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 005176547-04

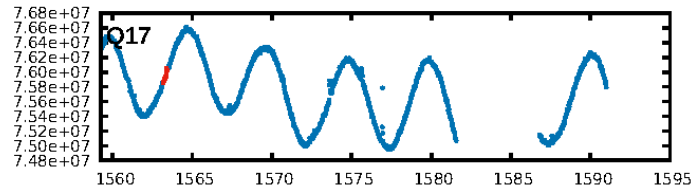
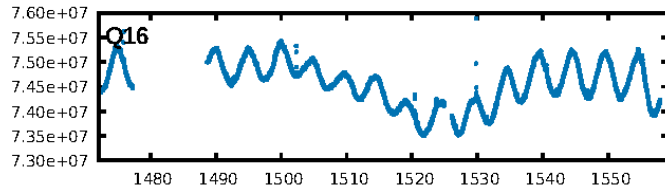
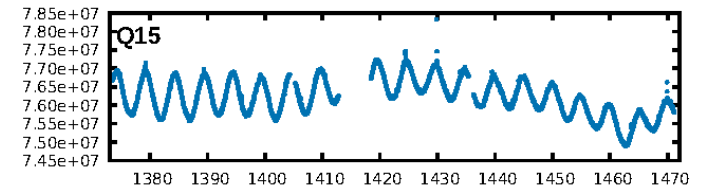
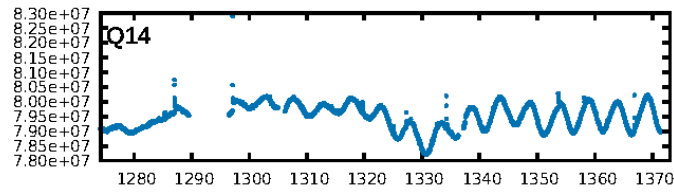
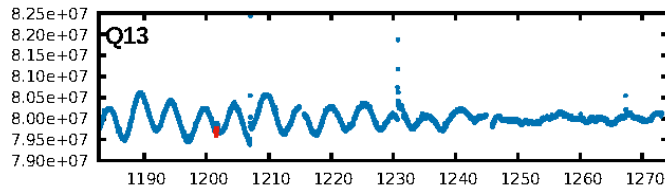
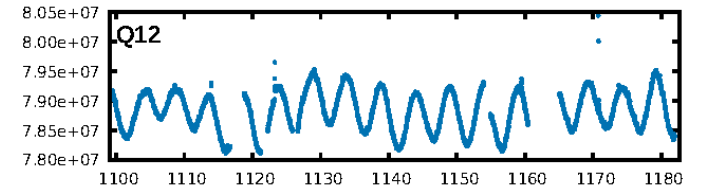
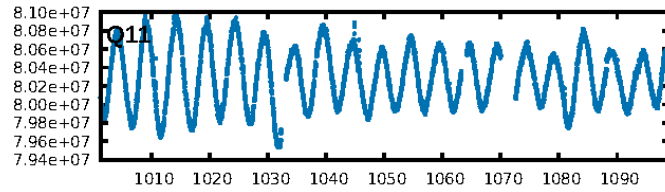
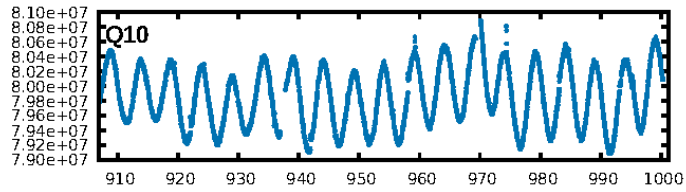
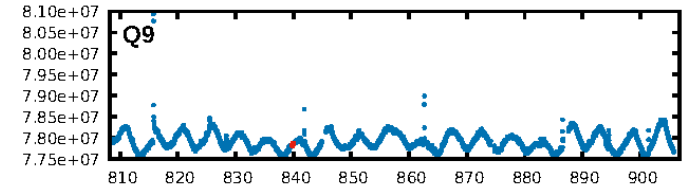
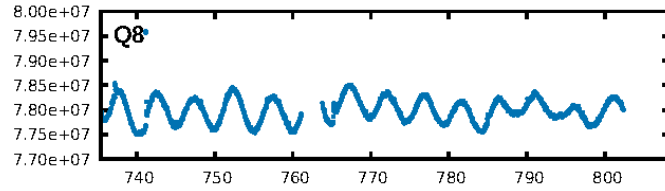
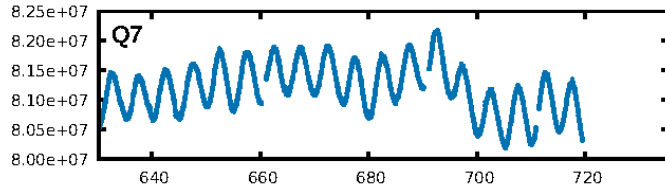
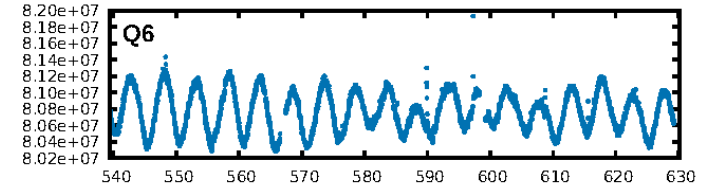
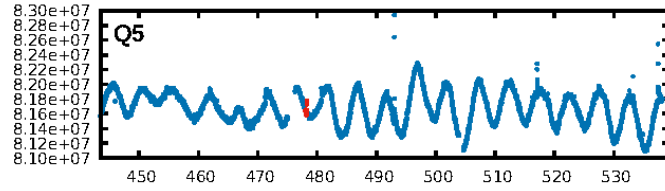
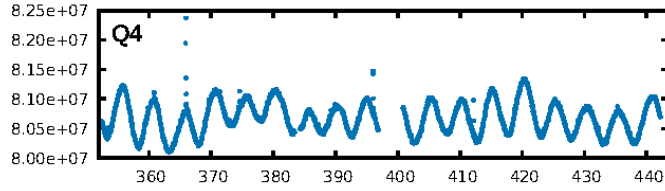
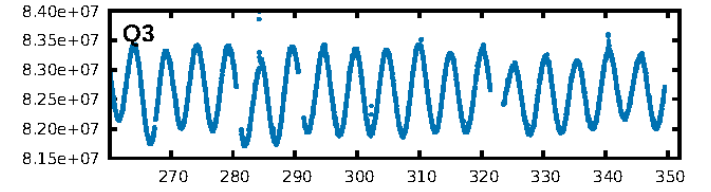
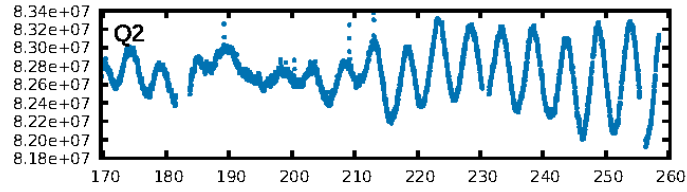
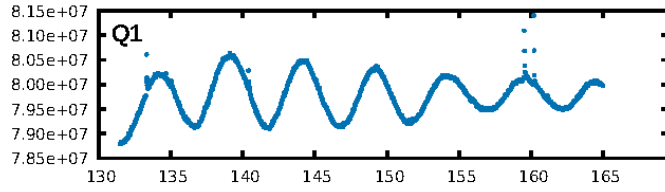
No Significant Match Found

# DV One-Page Summary

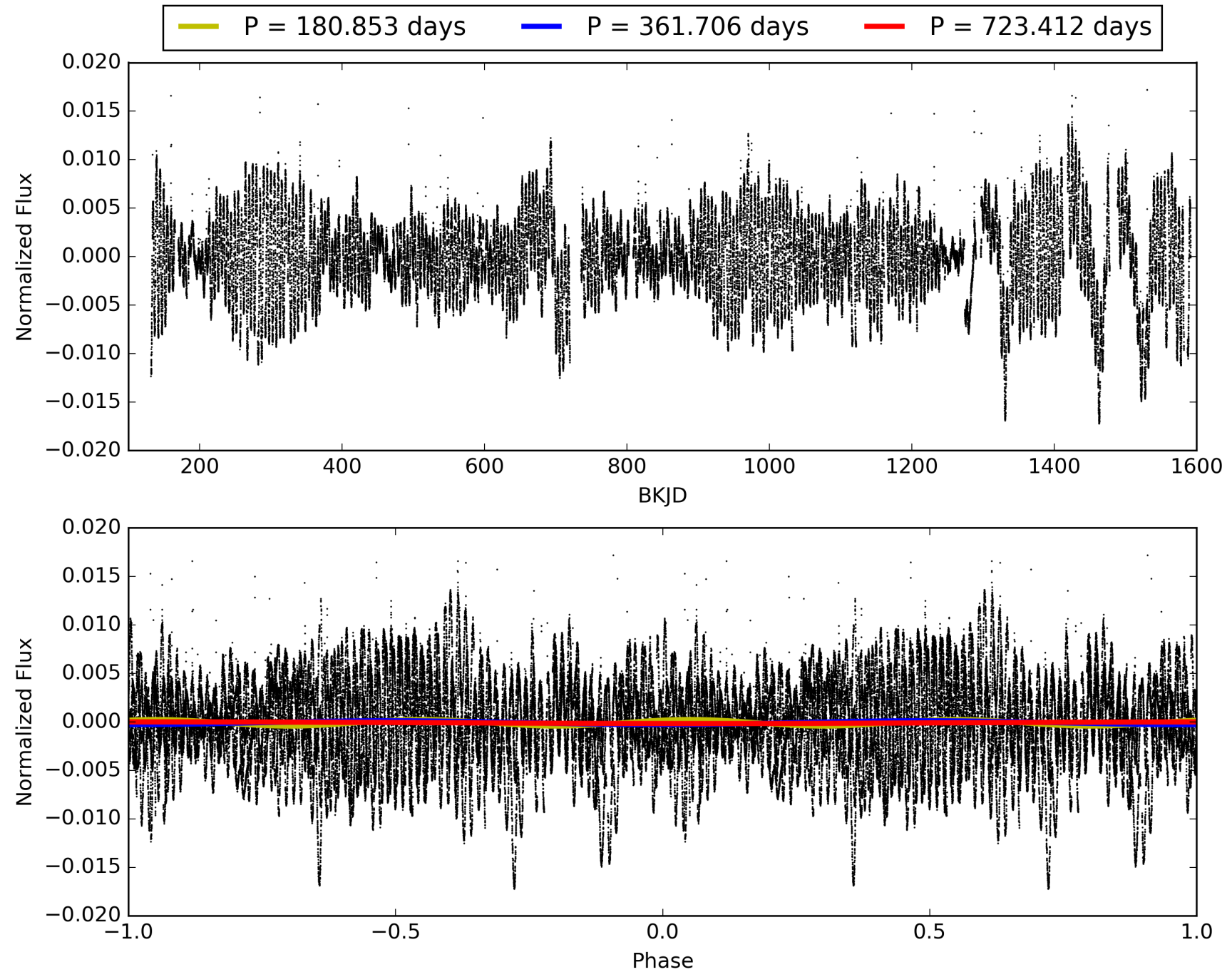
KIC: 5176547 Candidate: 4 of 5 Period: 361.706 d



# TCE 005176547-04, PDC Light Curves



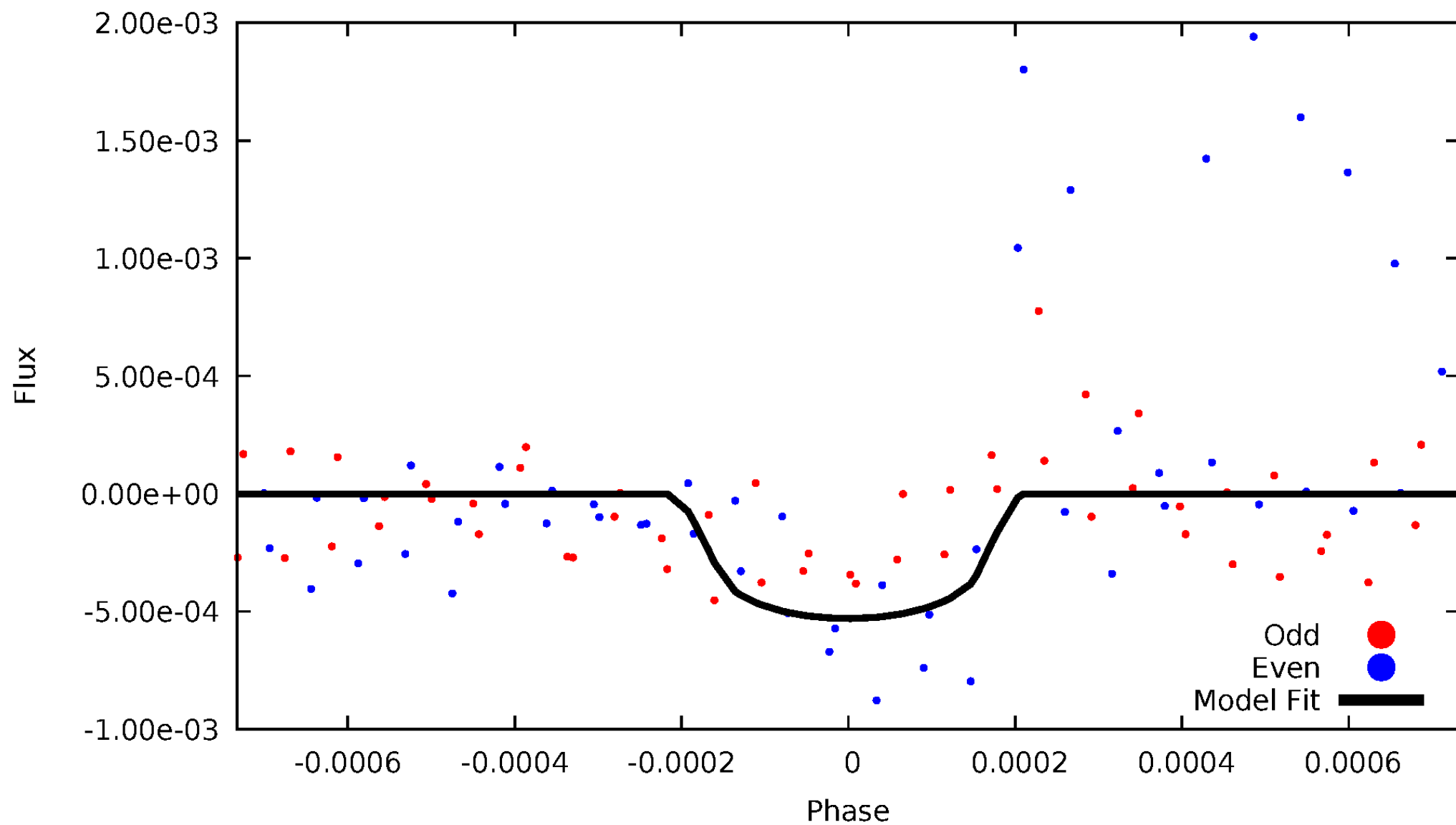
TCE 005176547-04





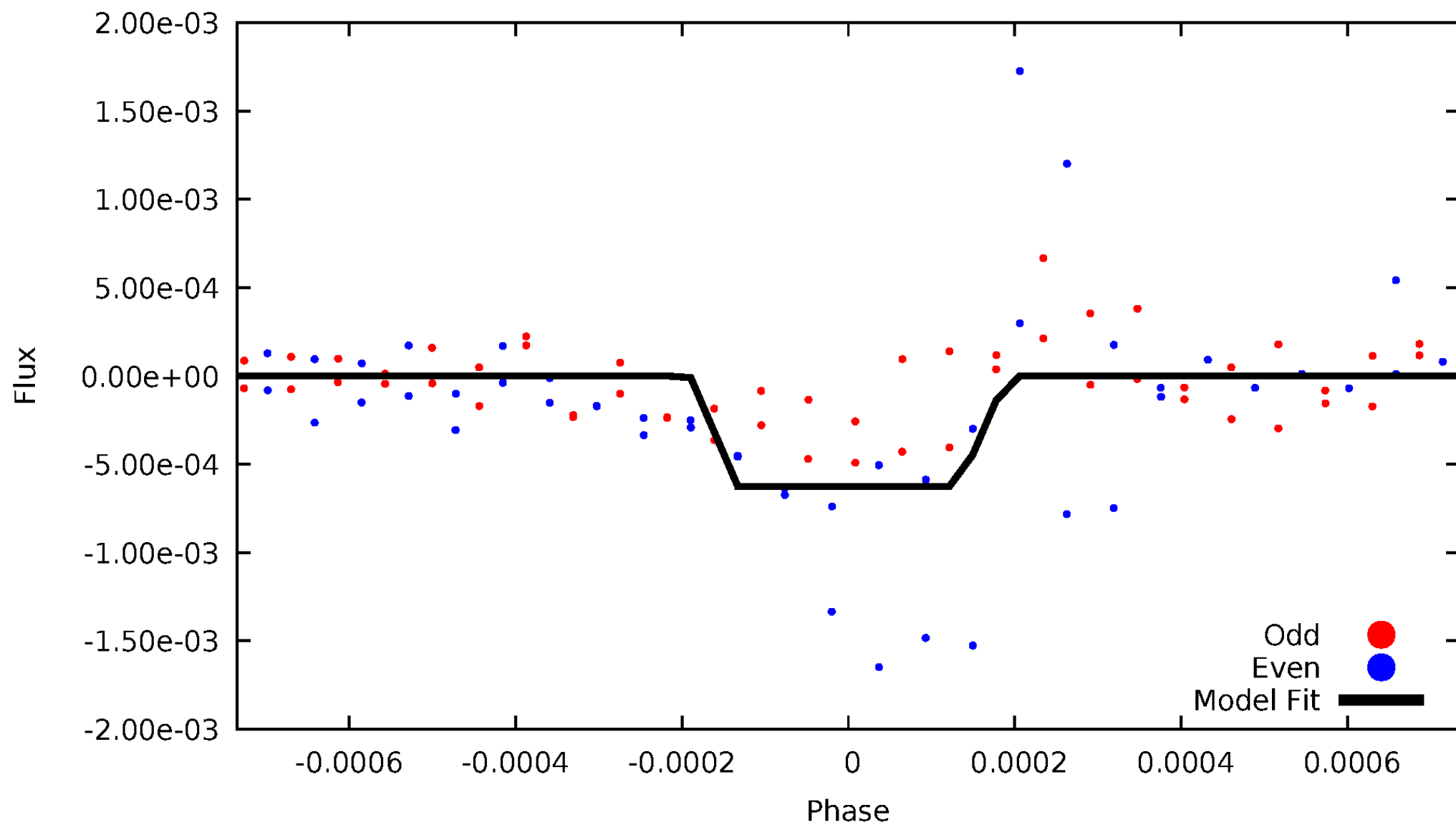
# DV Odd/Even

TCE 005176547-04



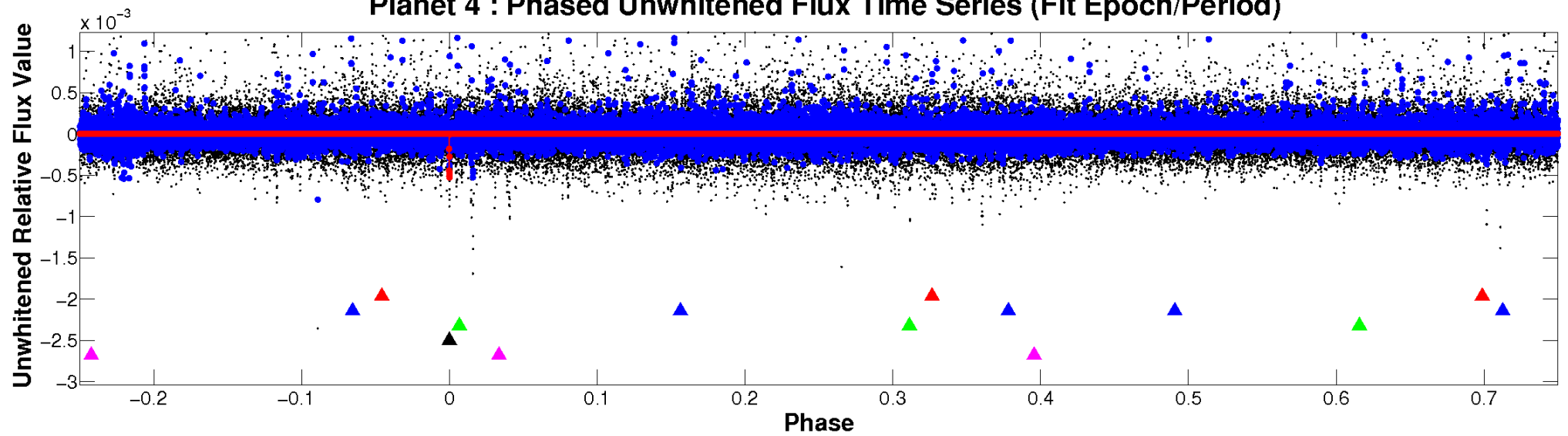
# ALT Odd/Even

TCE 005176547-04

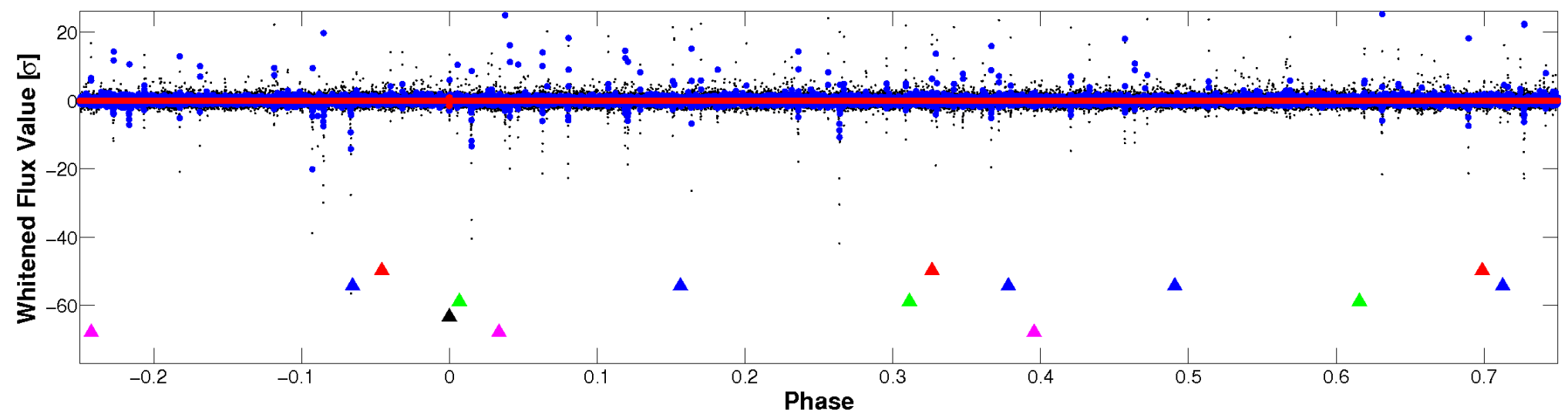


# Non-Whitened Vs. Whitened Light Curve

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

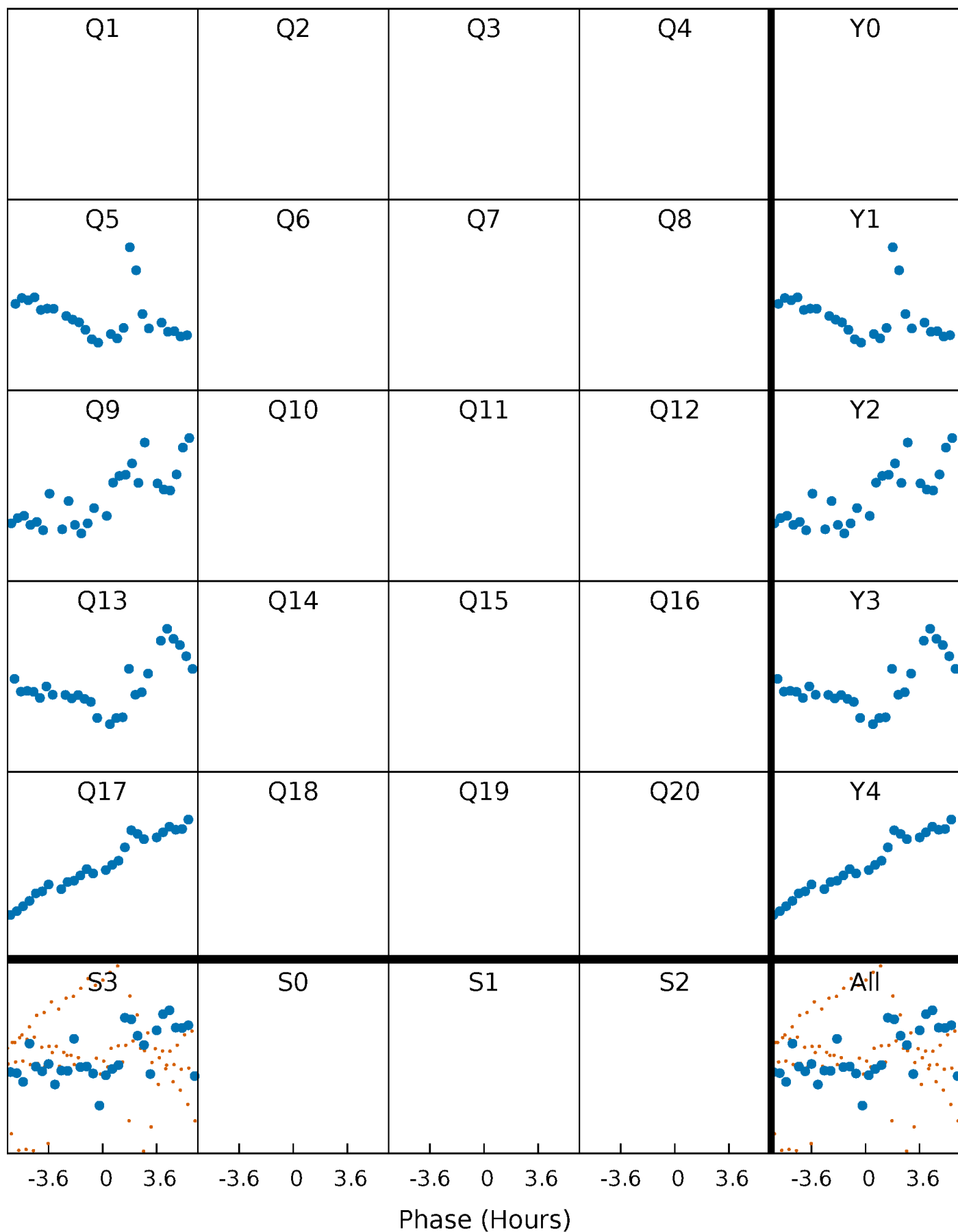


## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



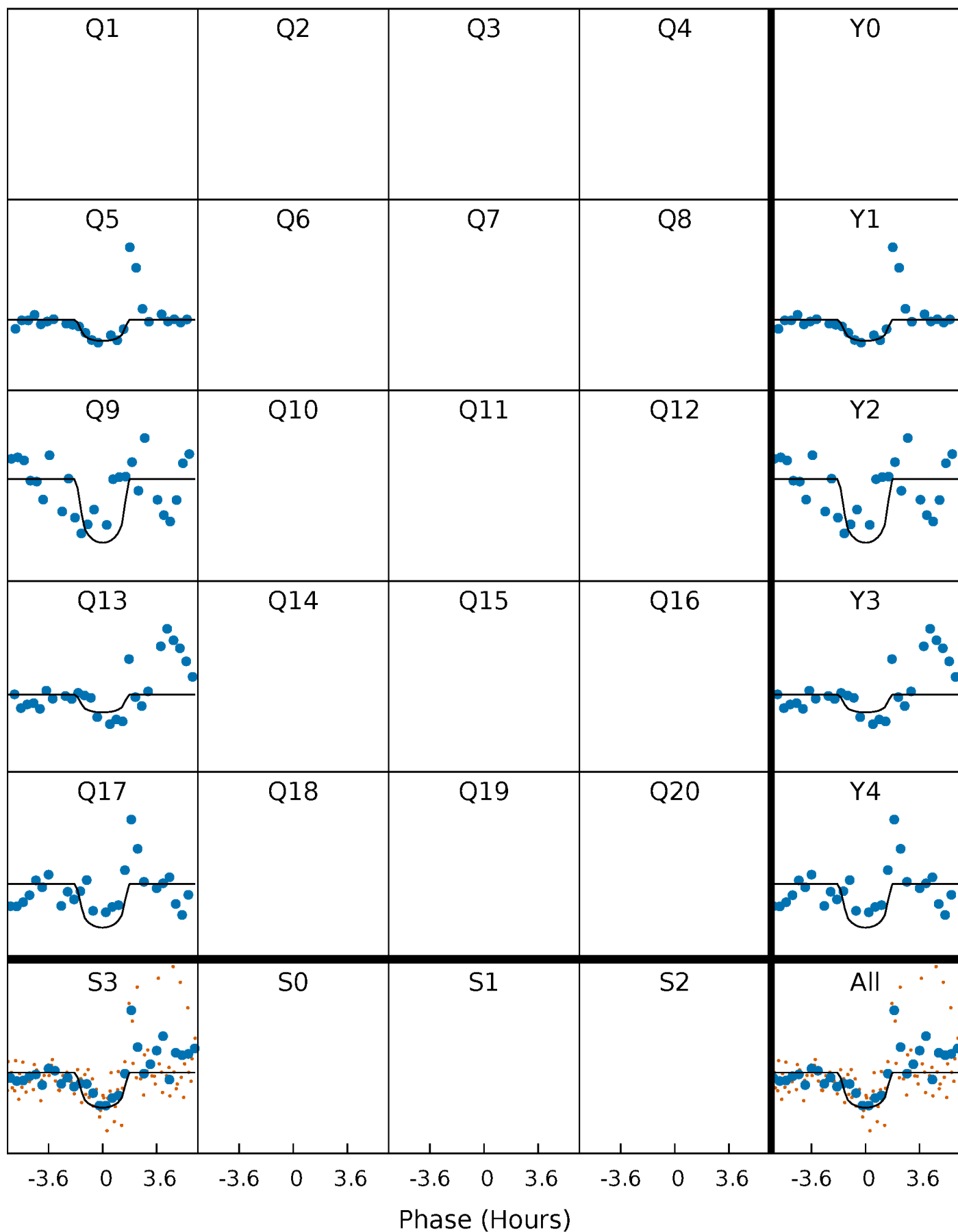
# PDC Quarter-Phased Transit Curves

TCE 005176547-04 P=361.706110 Days  $T_0=478.173387$  (BKJD)



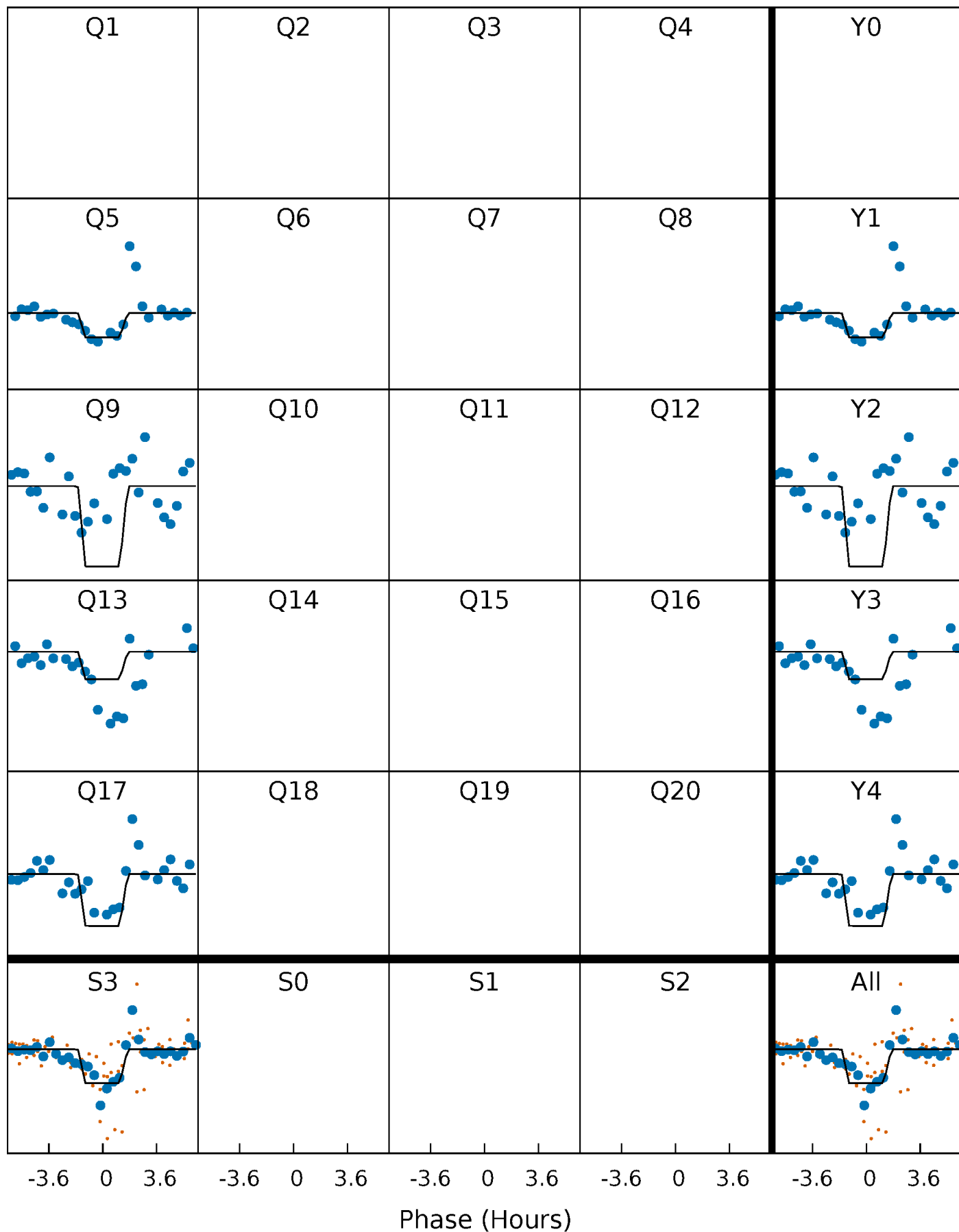
# DV Quarter-Phased Transit Curves

TCE 005176547-04     $P=361.706110$  Days     $T_0=478.173387$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

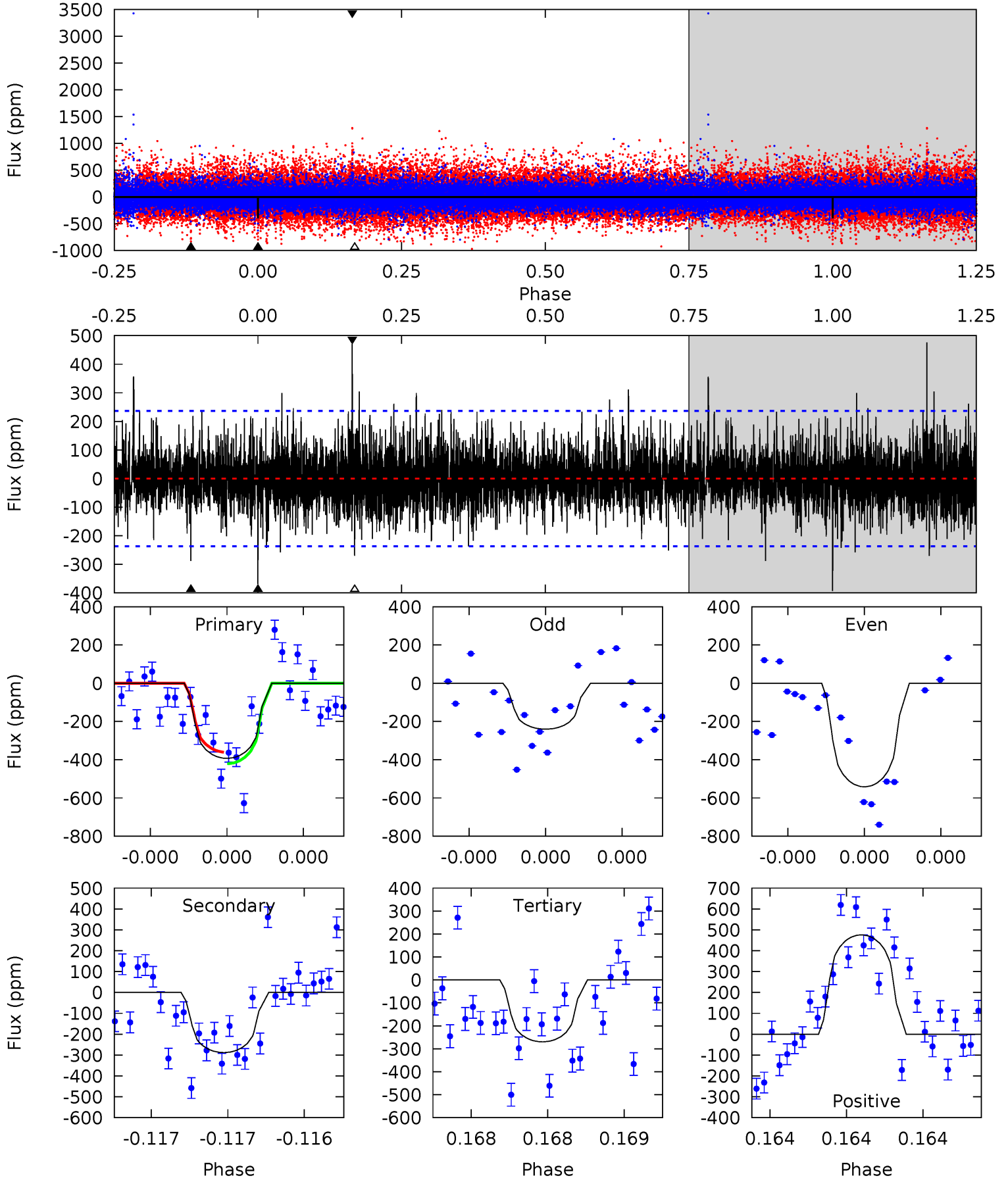
TCE 005176547-04     $P=361.704913$  Days     $T_0=478.174785$  (BKJD)



# DV Model-Shift Uniqueness Test

005176547-04, P = 361.706110 Days, E = 116.467277 Days

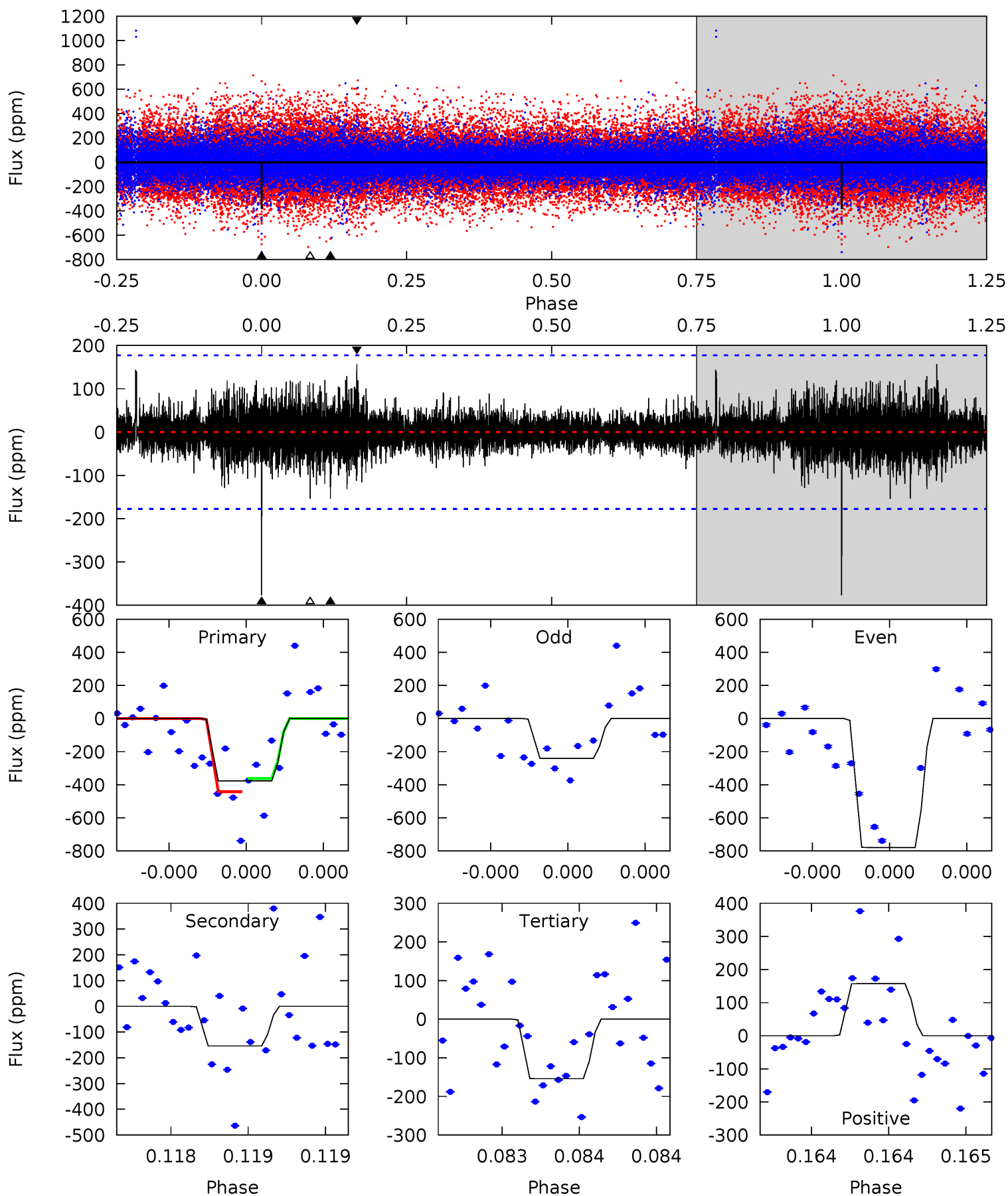
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.32	6.84	6.40	11.3	5.62	3.55	1.72	2.92	-1.97	0.44	-4.45	3.34	1.05	0.55	0.72



# Alt Model-Shift Uniqueness Test

005176547-04, P = 361.704913 Days, E = 116.469872 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.0	4.89	4.88	4.98	5.63	3.56	0.87	7.07	6.97	0.00	-0.09	8.84	1.20	0.29	1.23





### Stellar Parameters For KIC 005176547

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5129^{+138}_{-153}$	$3.884^{+0.676}_{-0.312}$	$-0.160^{+0.300}_{-0.300}$	$1.781^{+1.039}_{-1.143}$	$0.887^{+0.147}_{-0.161}$	$0.221^{+2.914}_{-0.153}$
	+3%/-3%	+17%/-8%	+188%/-188%	+58%/-64%	+17%/-18%	+1317%/-69%
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 005176547-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-288 \pm 42$	$11.43^{+14.30}_{-8.16}$	$428^{+63}_{-77}$	$3193^{+1583}_{-585}$	$1073^{+12068}_{-856}$
Alt.	$-154 \pm 32$	$10.97^{+16.56}_{-7.57}$	$430^{+63}_{-75}$	$2957^{+1298}_{-548}$	$583^{+5884}_{-480}$

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

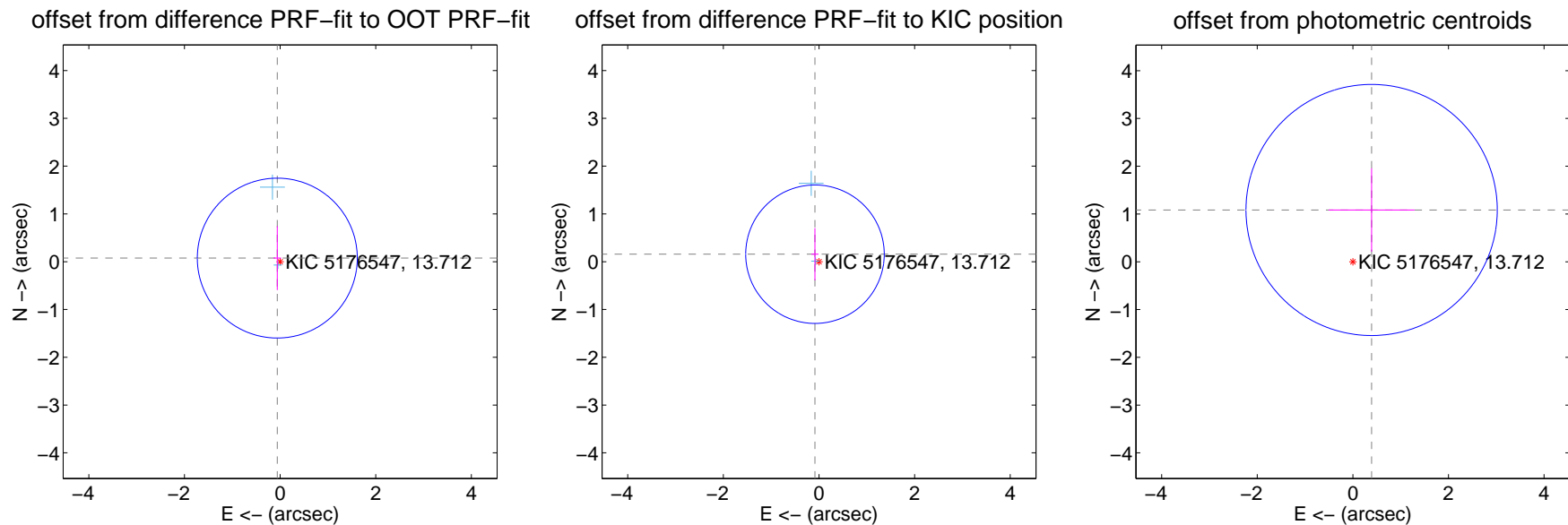
## DV Centroid Data

Supplemental centroid analysis for 005176547-04. Kepler magnitude: 13.71. Transit SNR 7.41

There are 2 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.09 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.095 \pm 0.558$	0.17	$0.059 \pm 0.081$	$0.075 \pm 0.669$
PRF-fit source offset from KIC position	$0.178 \pm 0.483$	0.37	$0.084 \pm 0.074$	$0.157 \pm 0.546$
photometric centroid source offset	$1.15 \pm 0.88$	1.32	$-0.39 \pm 0.90$	$1.08 \pm 0.87$

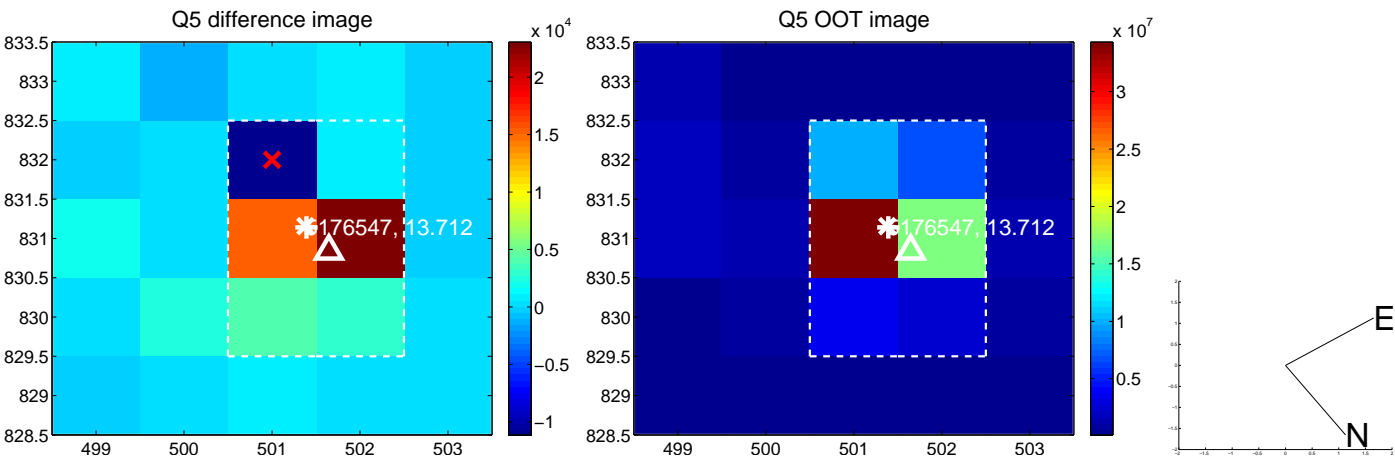


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

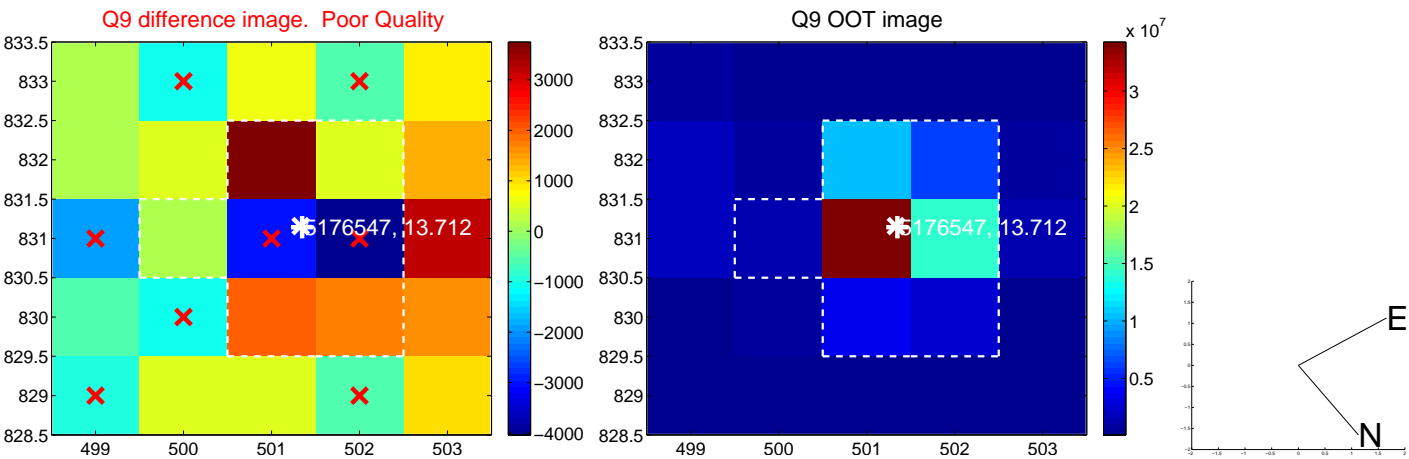
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



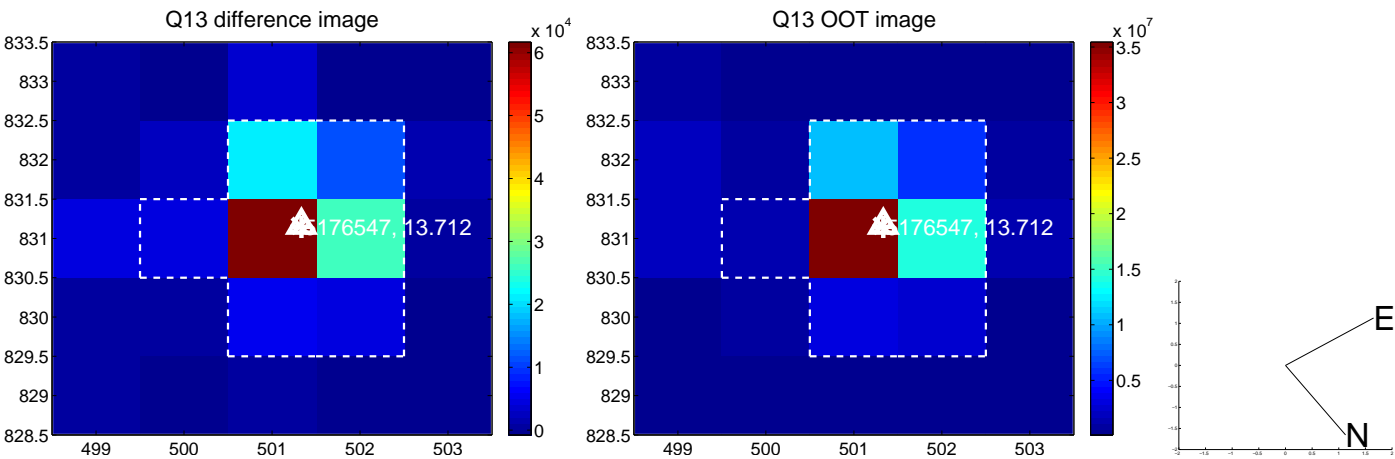
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



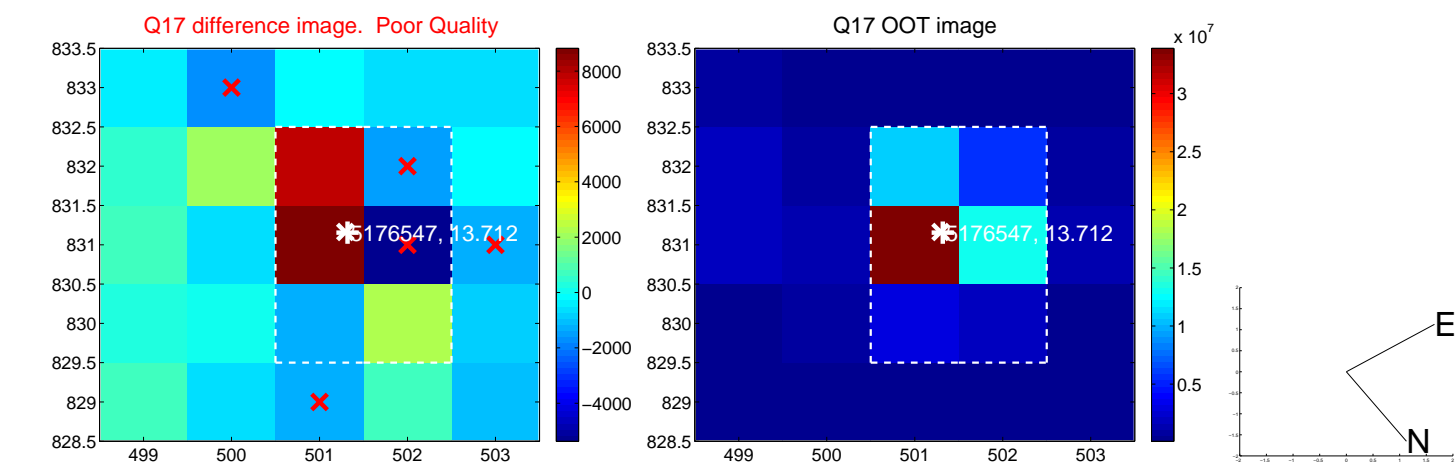
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.



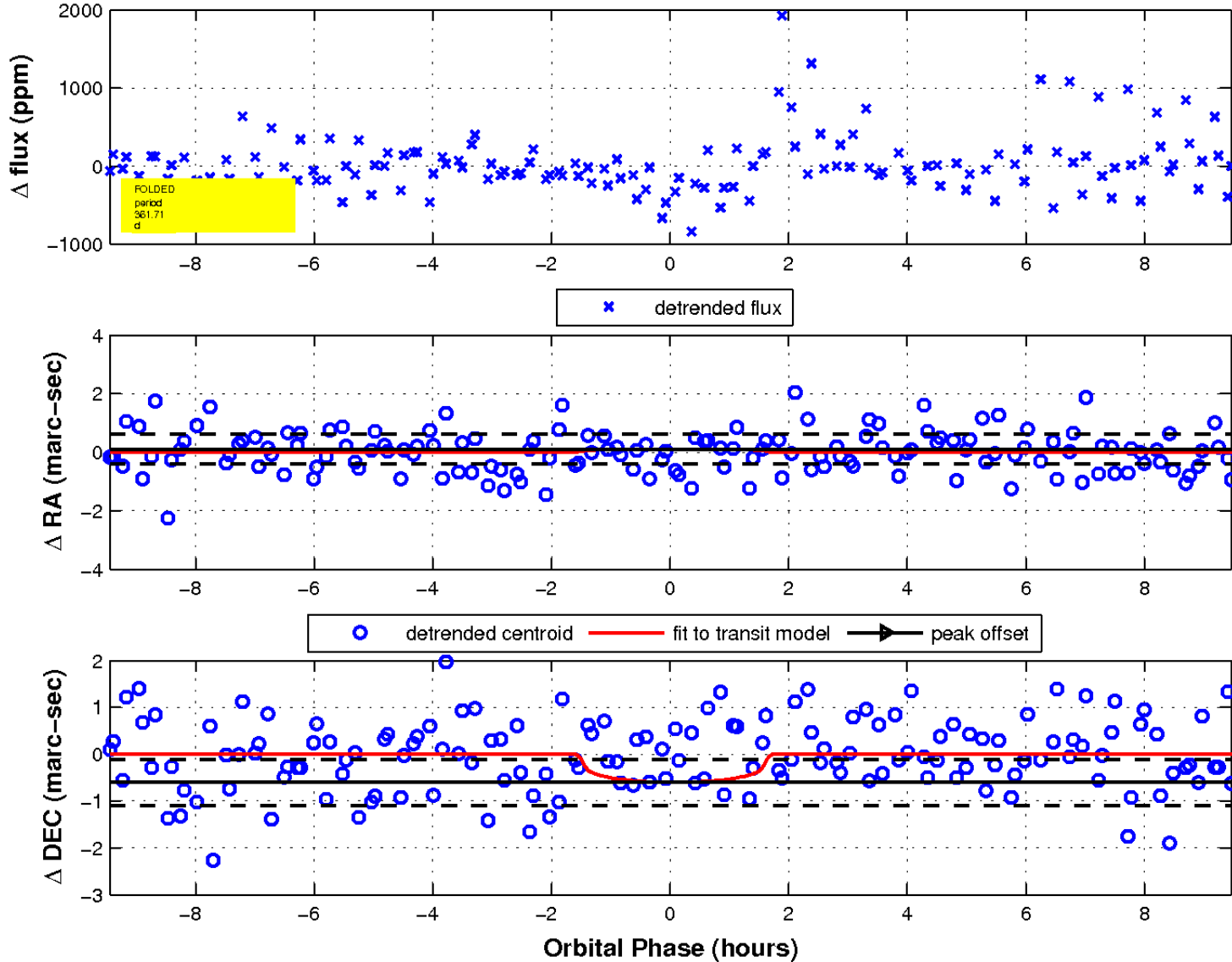
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

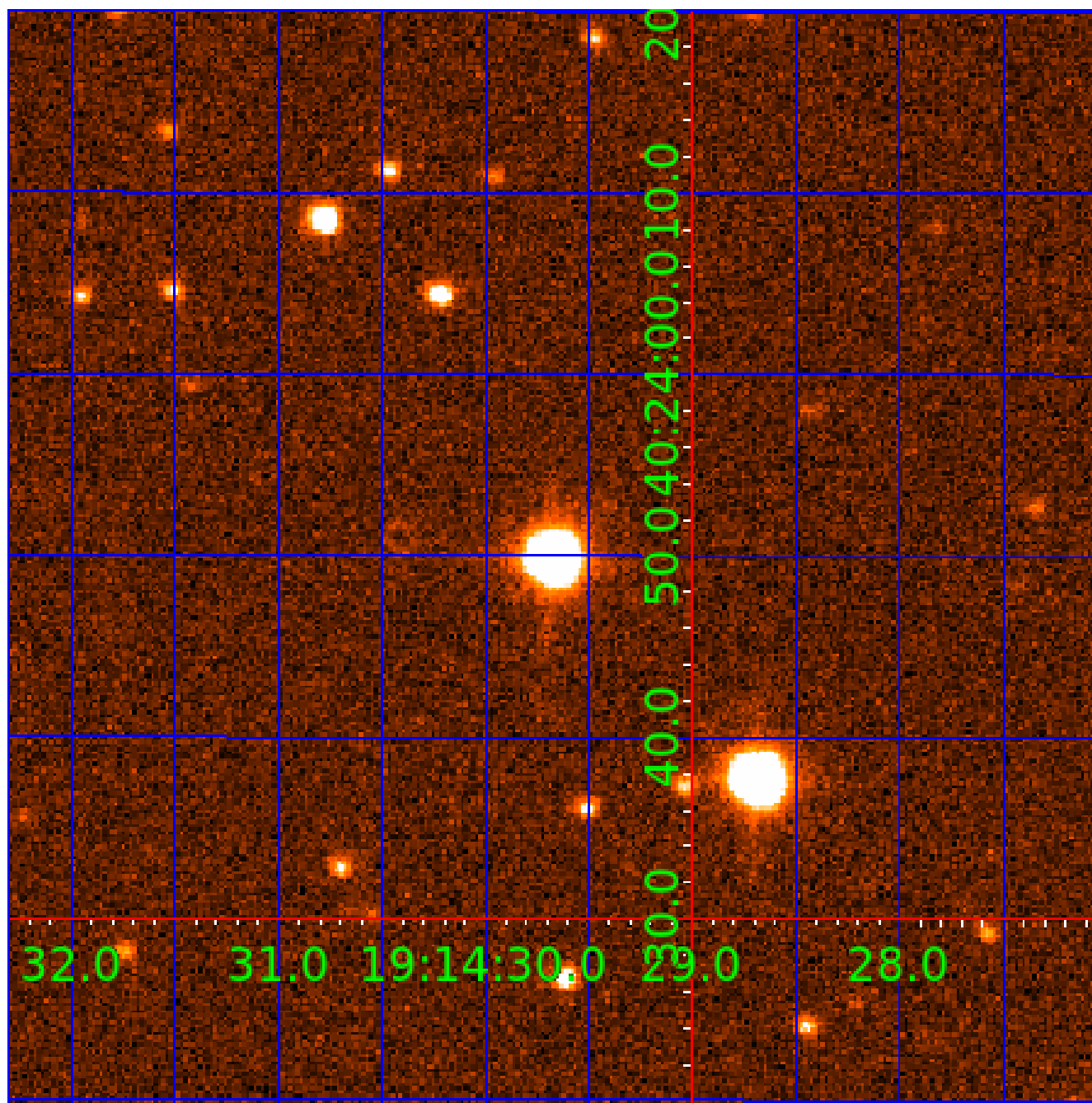


fluxWeightedCentroids, Planet 4 of 5



UKIRT Image

Declination





# KIC 005176547

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005176547-01	OBS	No	588.761353	369.242123	670.7	2.762	14.0	8.7	1.78	5129	5.43	1.13
005176547-02	OBS	No	281.463692	253.267178	531.8	4.144	11.0	6.5	1.78	5129	4.48	3.02
005176547-03	OBS	No	471.826432	480.635125	786.4	5.186	14.7	9.4	1.78	5129	5.08	1.51
005176547-04	OBS	No	361.706110	478.173387	529.8	3.180	12.5	7.4	1.78	5129	4.03	2.16
005176547-05	OBS	No	592.452498	390.537666	564.2	7.394	11.0	6.8	1.78	5129	4.45	1.12

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005176547-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
005176547-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005176547-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005176547-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_POS_DV—CENT_FEW_DIFFS
005176547-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

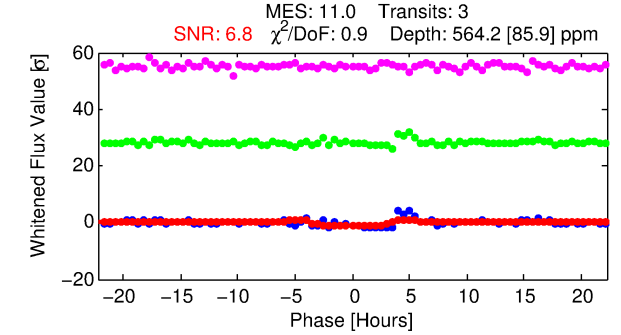
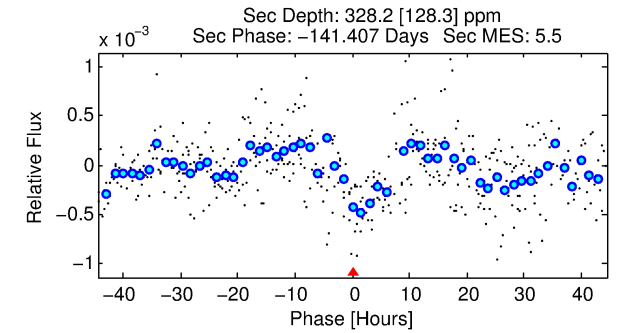
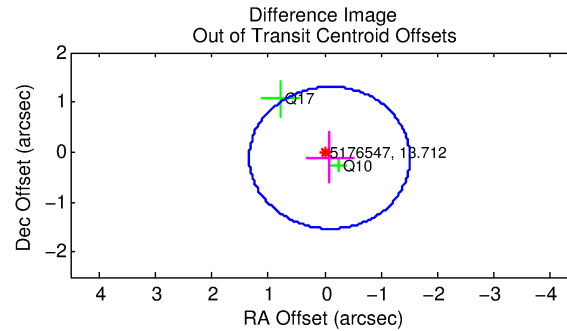
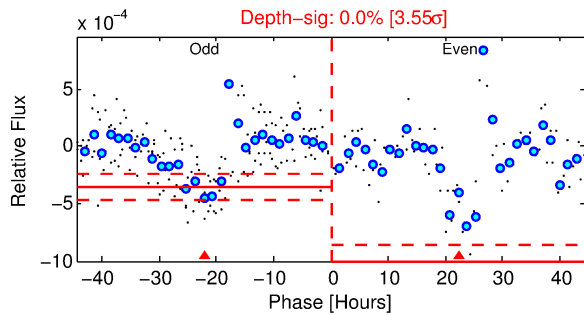
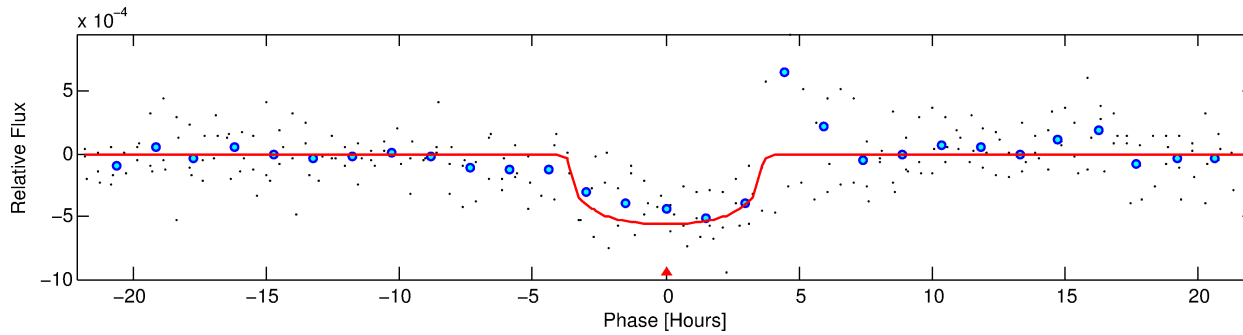
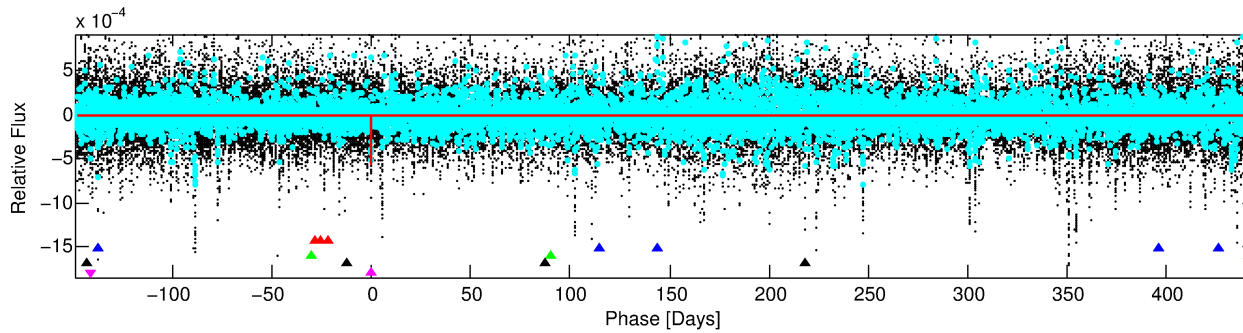
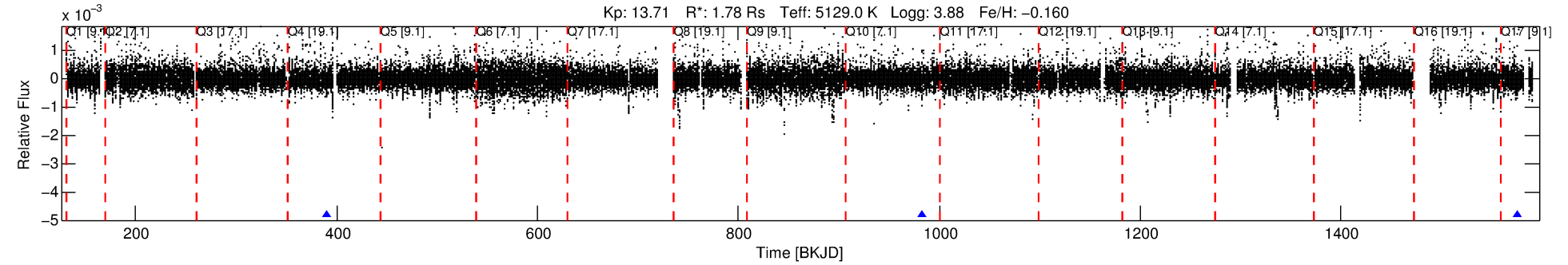
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 005176547-05

No Significant Match Found

# DV One-Page Summary

KIC: 5176547 Candidate: 5 of 5 Period: 592.452 d



## DV Fit Results:

Period = 592.45250 [0.00699] d  
Epoch = 390.5377 [0.0090] BKJD  
Rp/R\* = 0.0229 [0.0139]  
a/R\* = 480.38 [1065.24]  
b = 0.66 [1.96]  
Seff = 1.12 [1.26]  
Teq = 262 [74] K  
Rp = 4.45 [3.94] Re  
a = 1.3261 [0.8918] AU  
Ag = 16066.35 [27356.41] [0.59 $\sigma$ ]  
Teffp = 4565 [1467] K [2.93 $\sigma$ ]

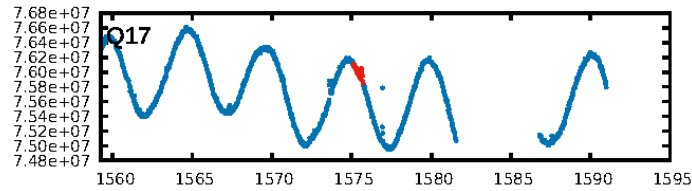
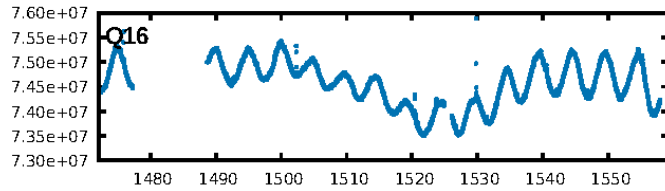
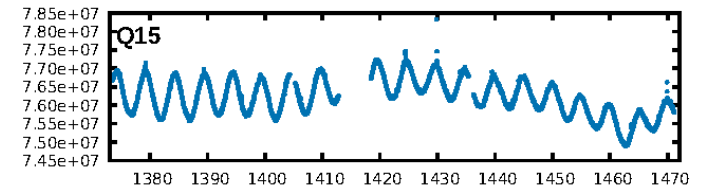
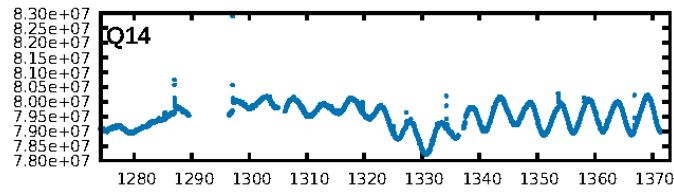
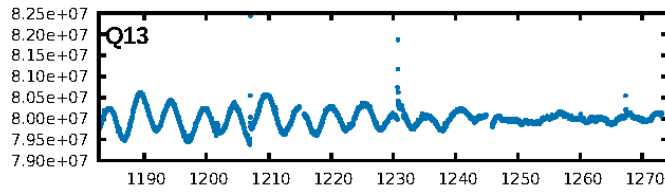
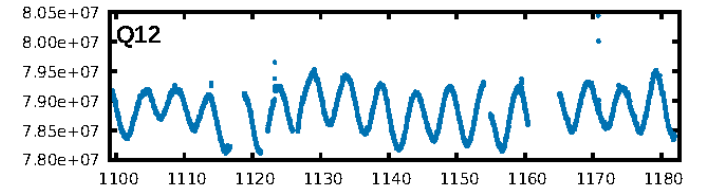
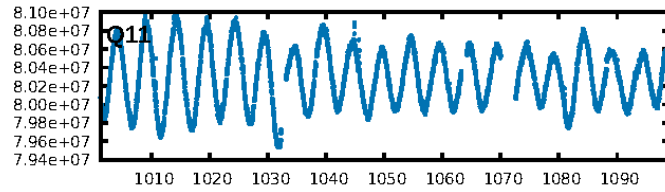
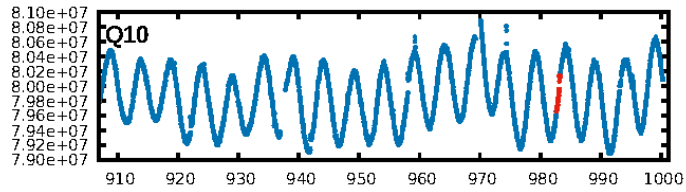
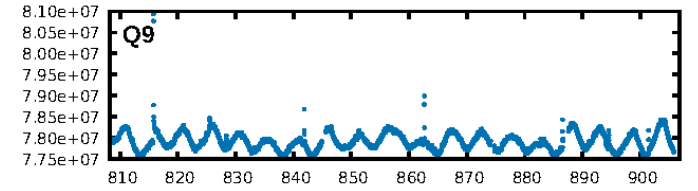
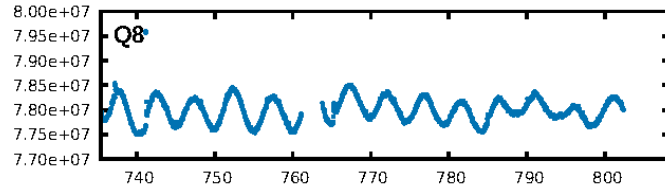
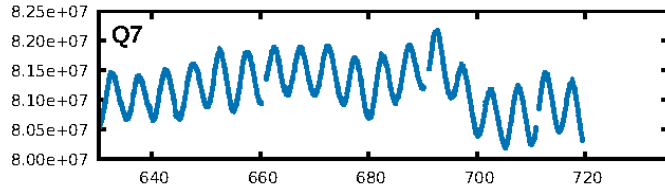
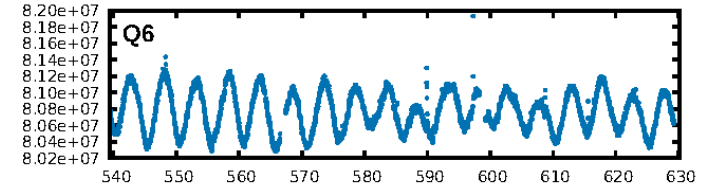
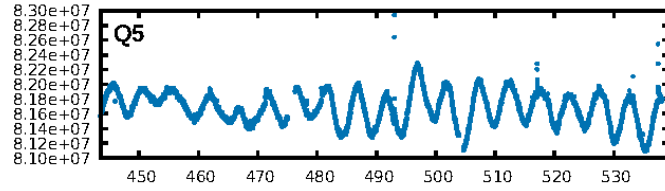
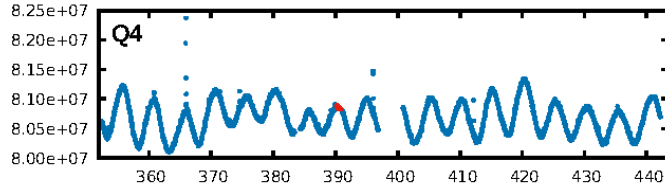
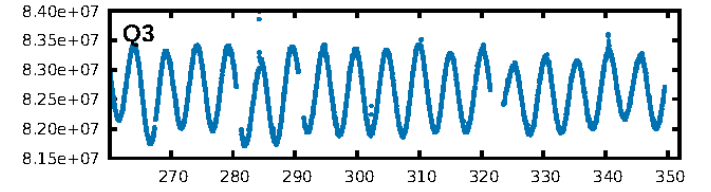
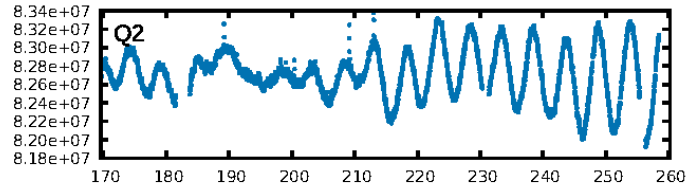
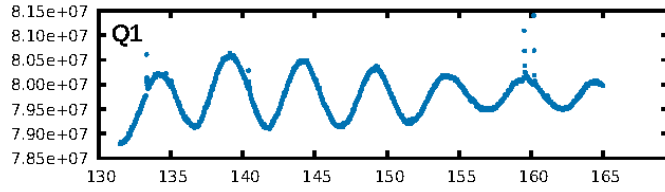
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [11.22 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 4.1%  
ModelChiSquareGof-sig: 95.3%  
Bootstrap-pfa: 5.02e-09  
RollingBand-fgt: 1.00 [2/2]  
GhostDiagnostic-chr: 0.7991  
Centroid-sig: 13.8%  
Centroid-so: 0.659 arcsec [1.13 $\sigma$ ]  
OotOffset-rm: 0.143 arcsec [0.30 $\sigma$ ]  
KicOffset-rm: 0.177 arcsec [0.33 $\sigma$ ]  
OotOffset-st: 1/0/0/1 [2]  
KicOffset-st: 1/0/0/1 [2]  
DiffImageQuality-fgm: 0.50 [1/2]  
DiffImageOverlap-fno: 1.00 [3/3]

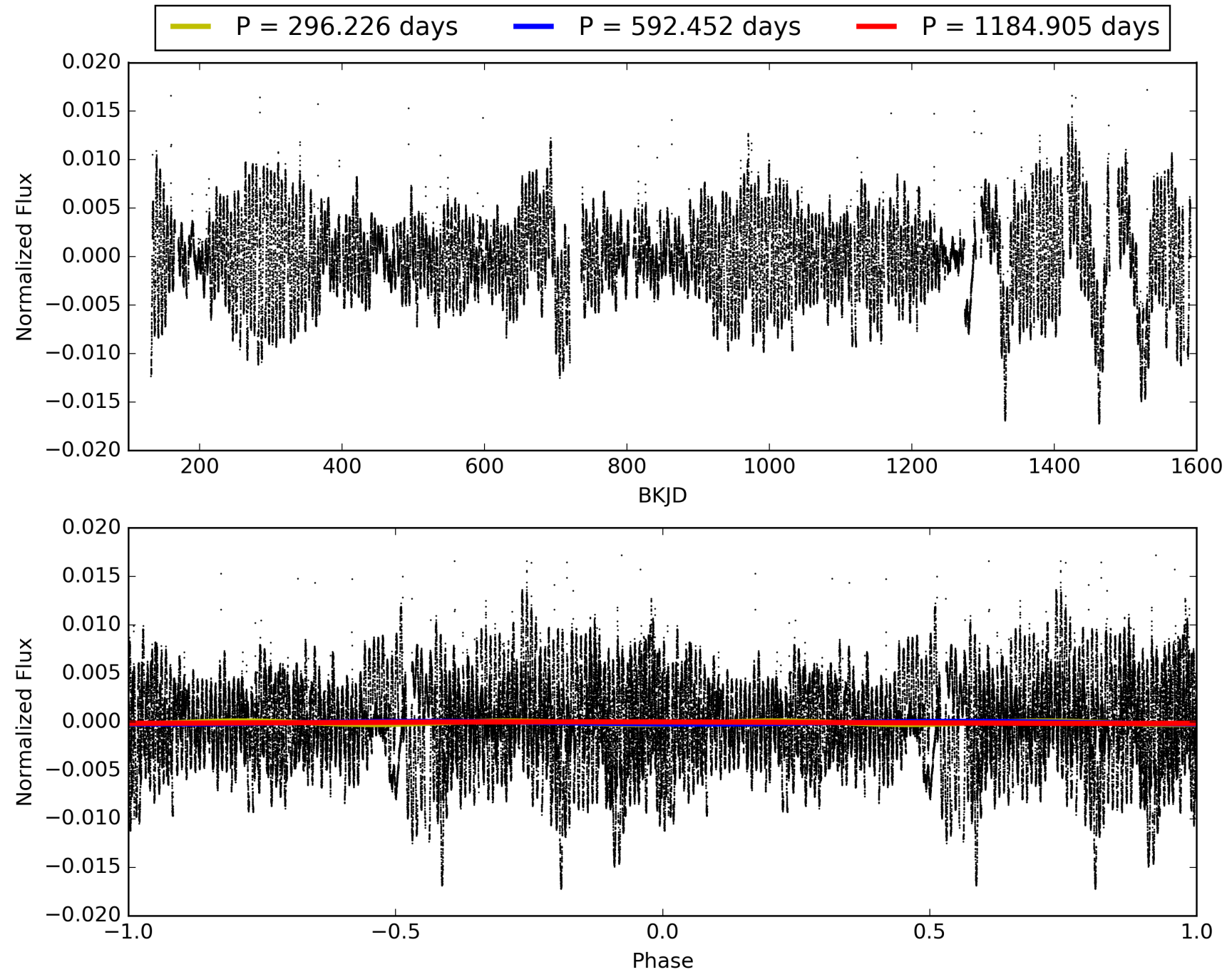
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 22:35:56 Z

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

# TCE 005176547-05, PDC Light Curves

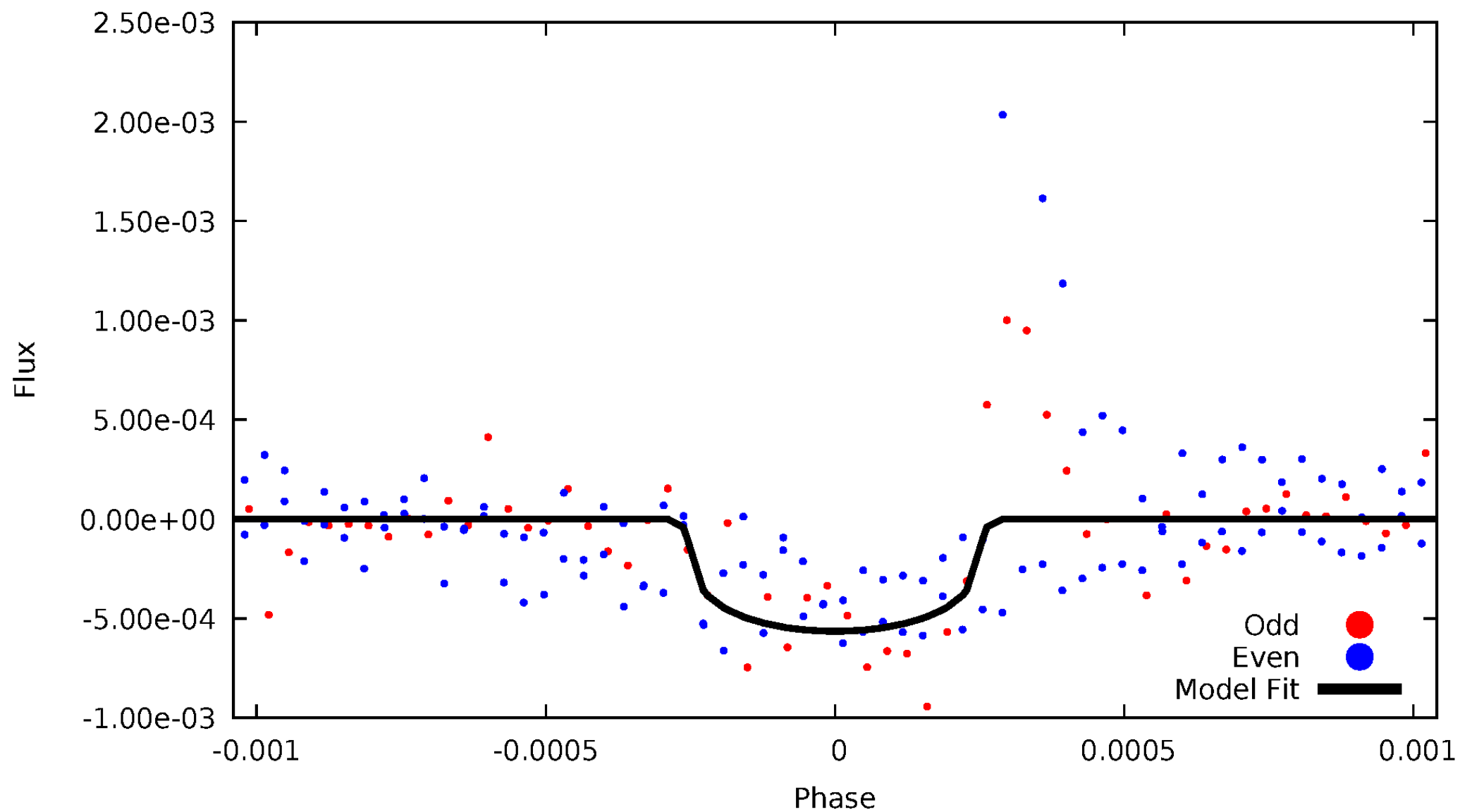


TCE 005176547-05



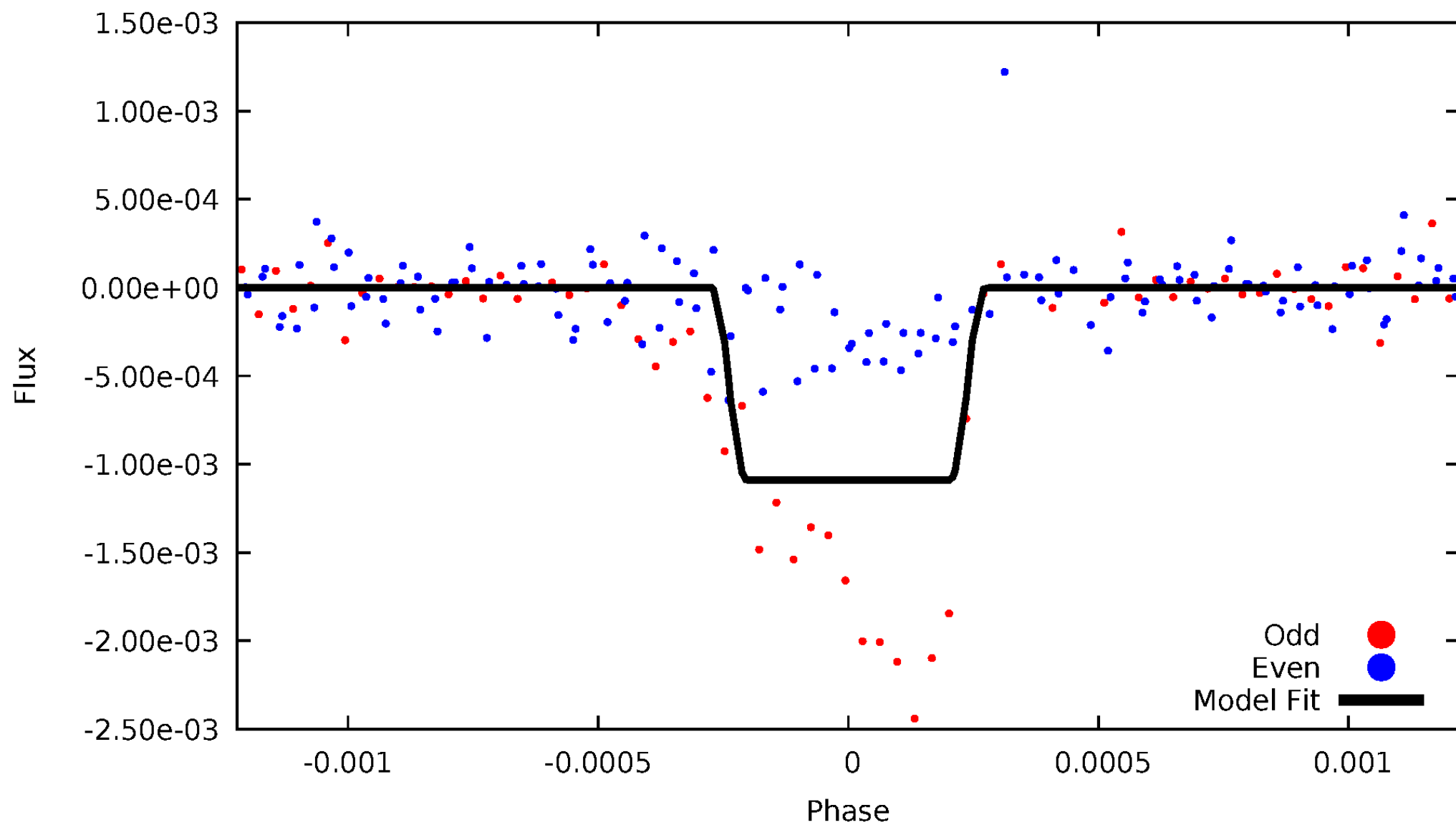
# DV Odd/Even

TCE 005176547-05



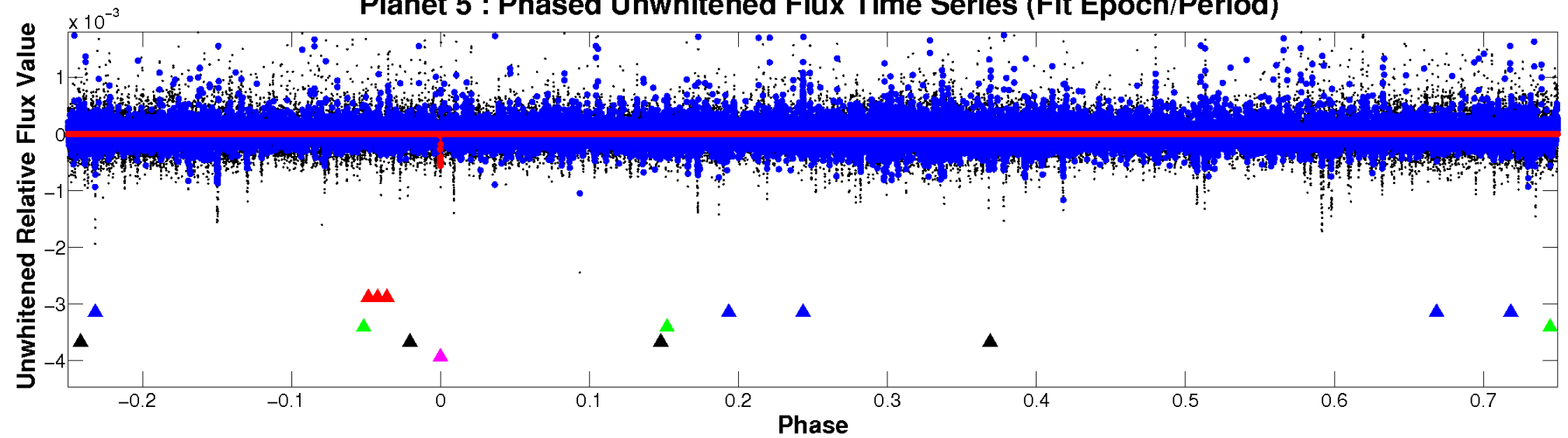
# ALT Odd/Even

TCE 005176547-05

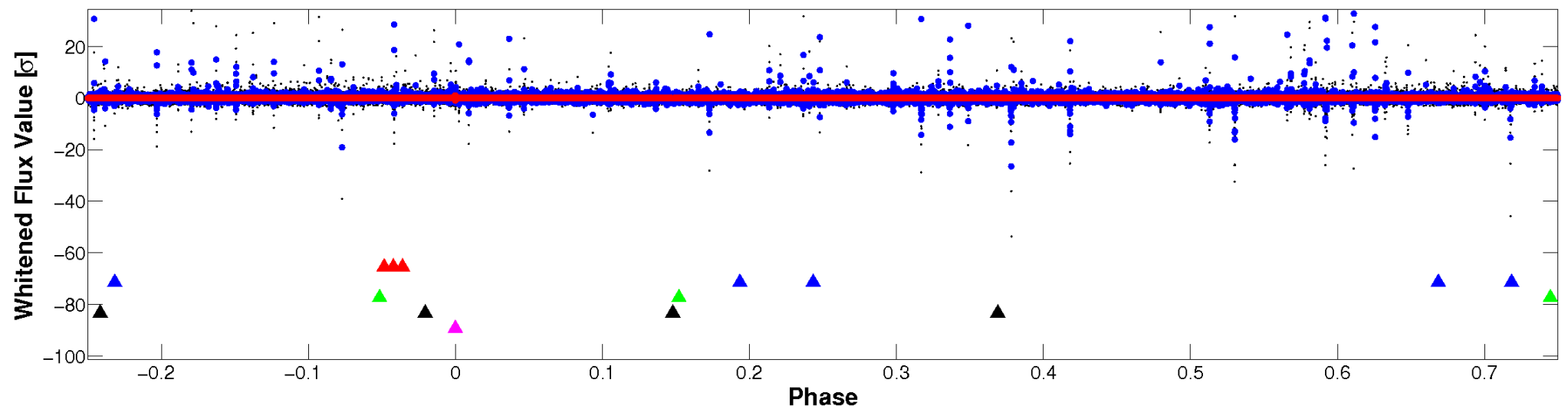


# Non-Whitened Vs. Whitened Light Curve

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

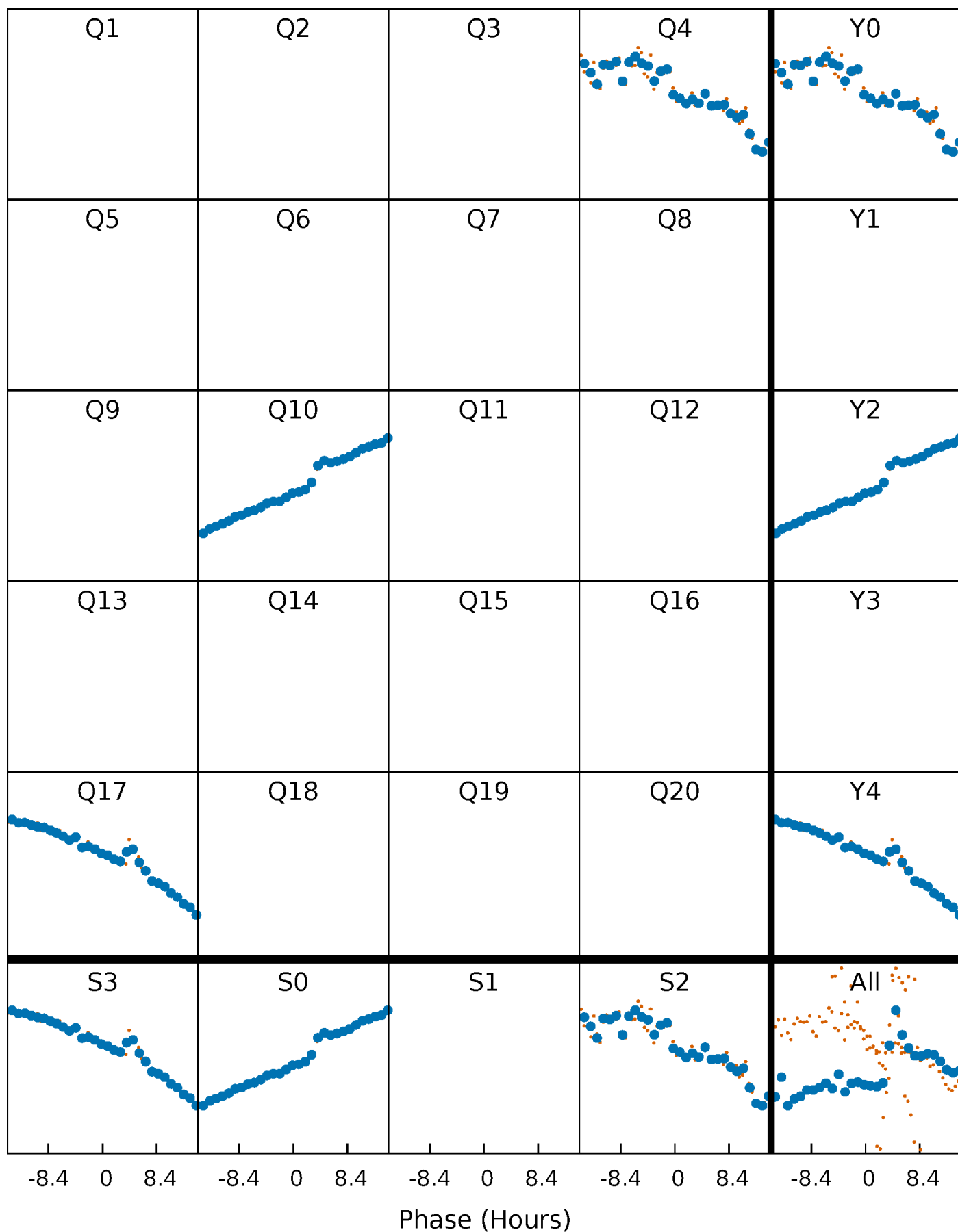


Planet 5 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

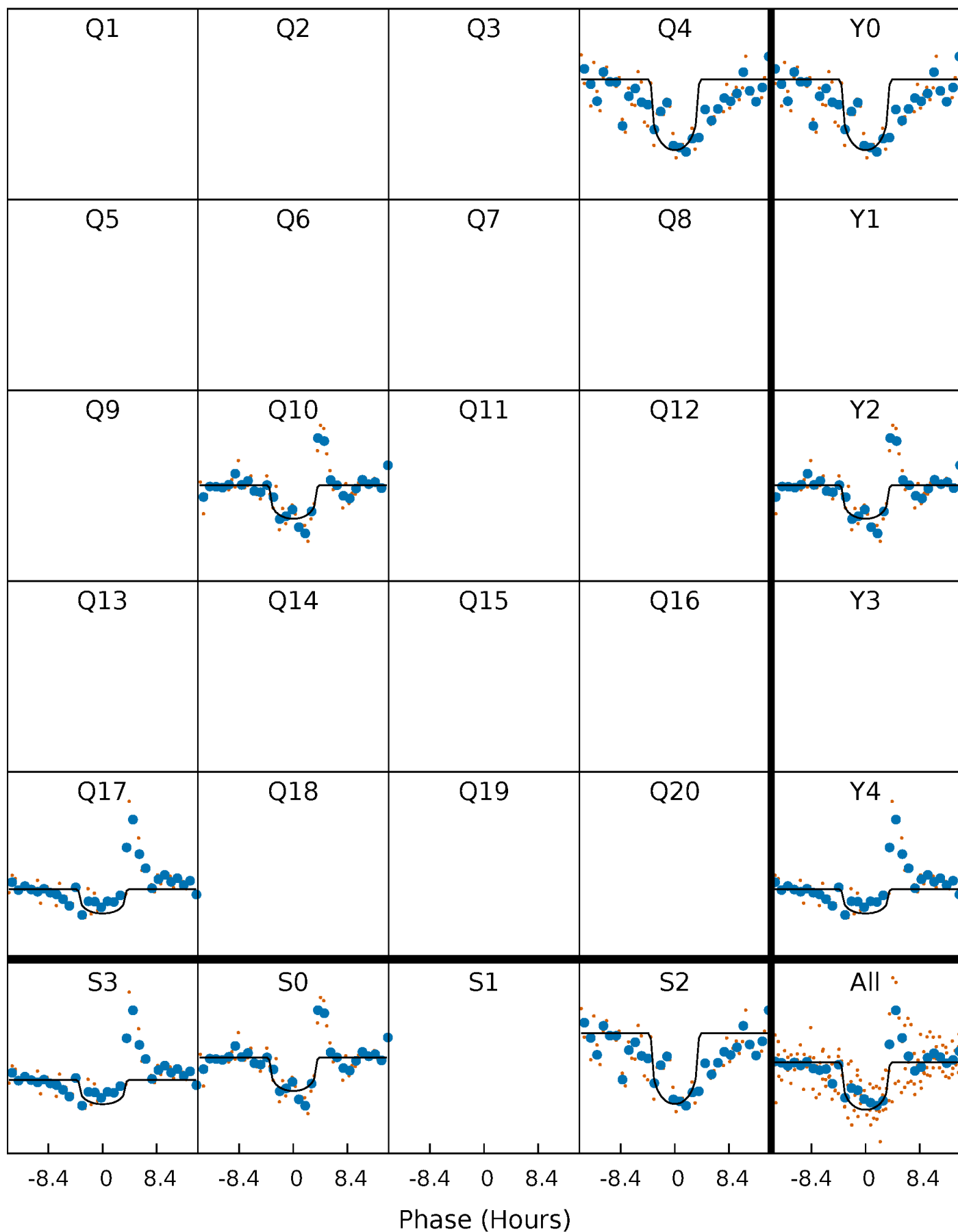
TCE 005176547-05     $P=592.452498$  Days     $T_0=390.537666$  (BKJD)





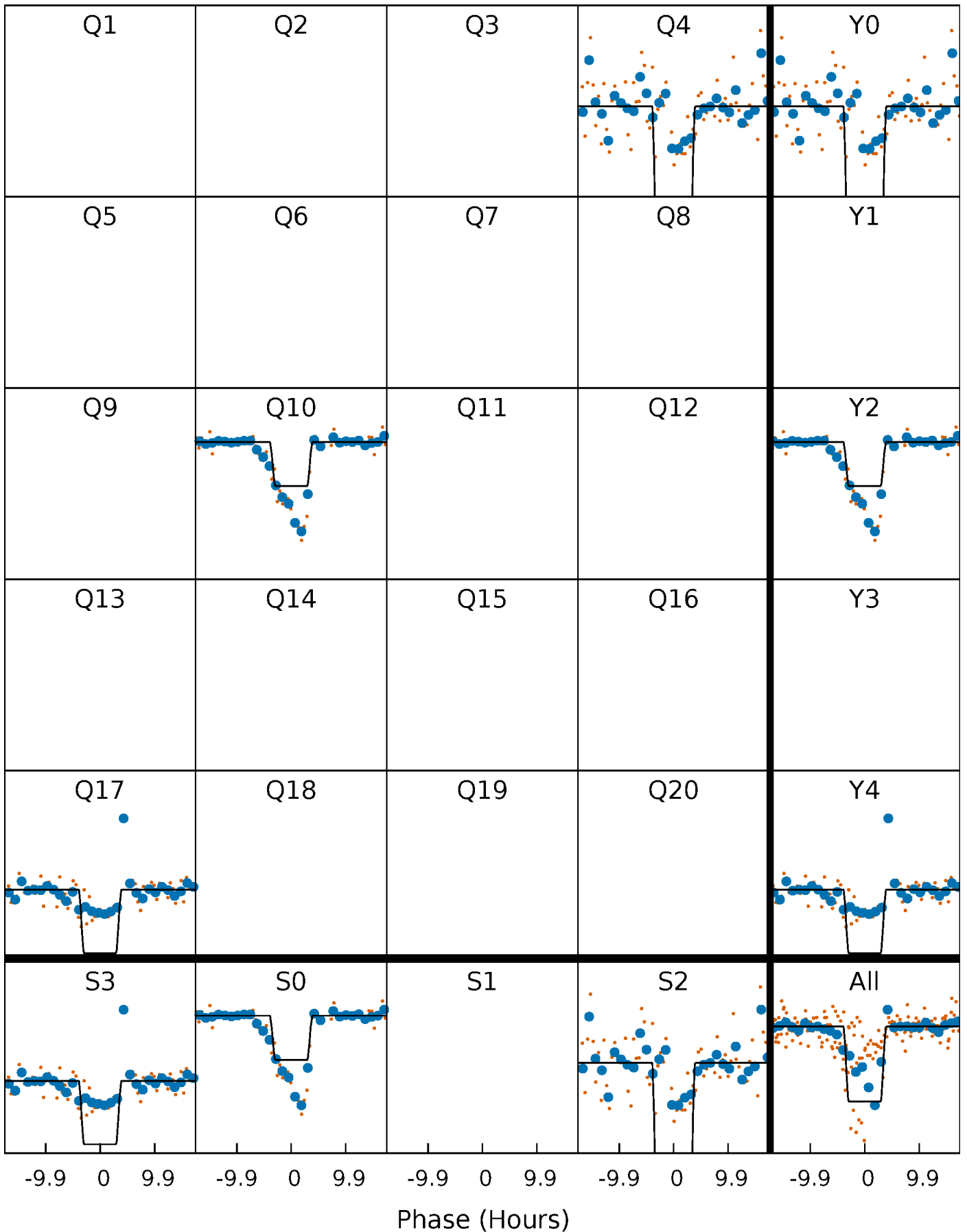
# DV Quarter-Phased Transit Curves

TCE 005176547-05     $P=592.452498$  Days     $T_0=390.537666$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

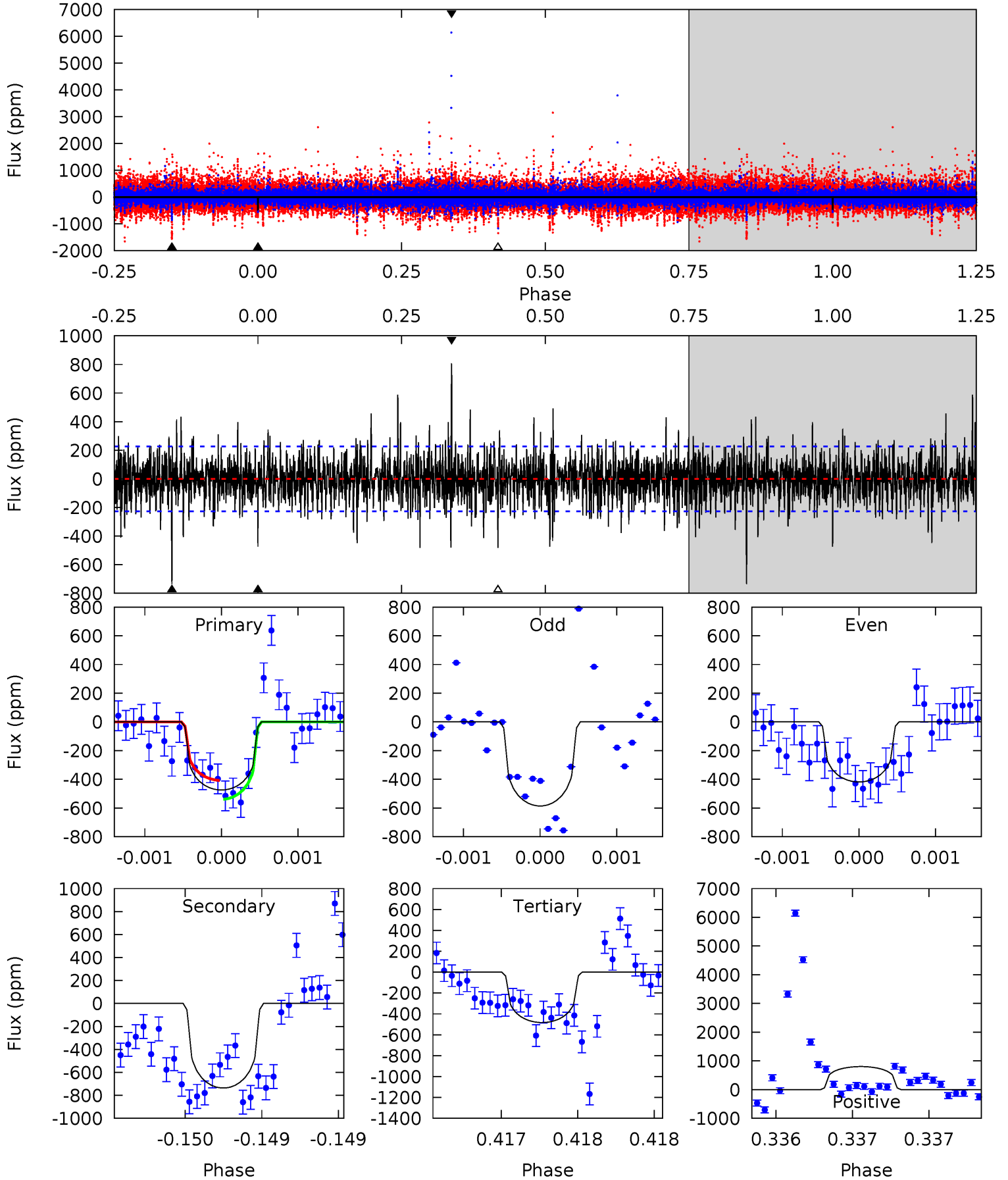
TCE 005176547-05     $P=592.464261$  Days     $T_0=390.541836$  (BKJD)



# DV Model-Shift Uniqueness Test

005176547-05, P = 592.452498 Days, E = 390.537666 Days

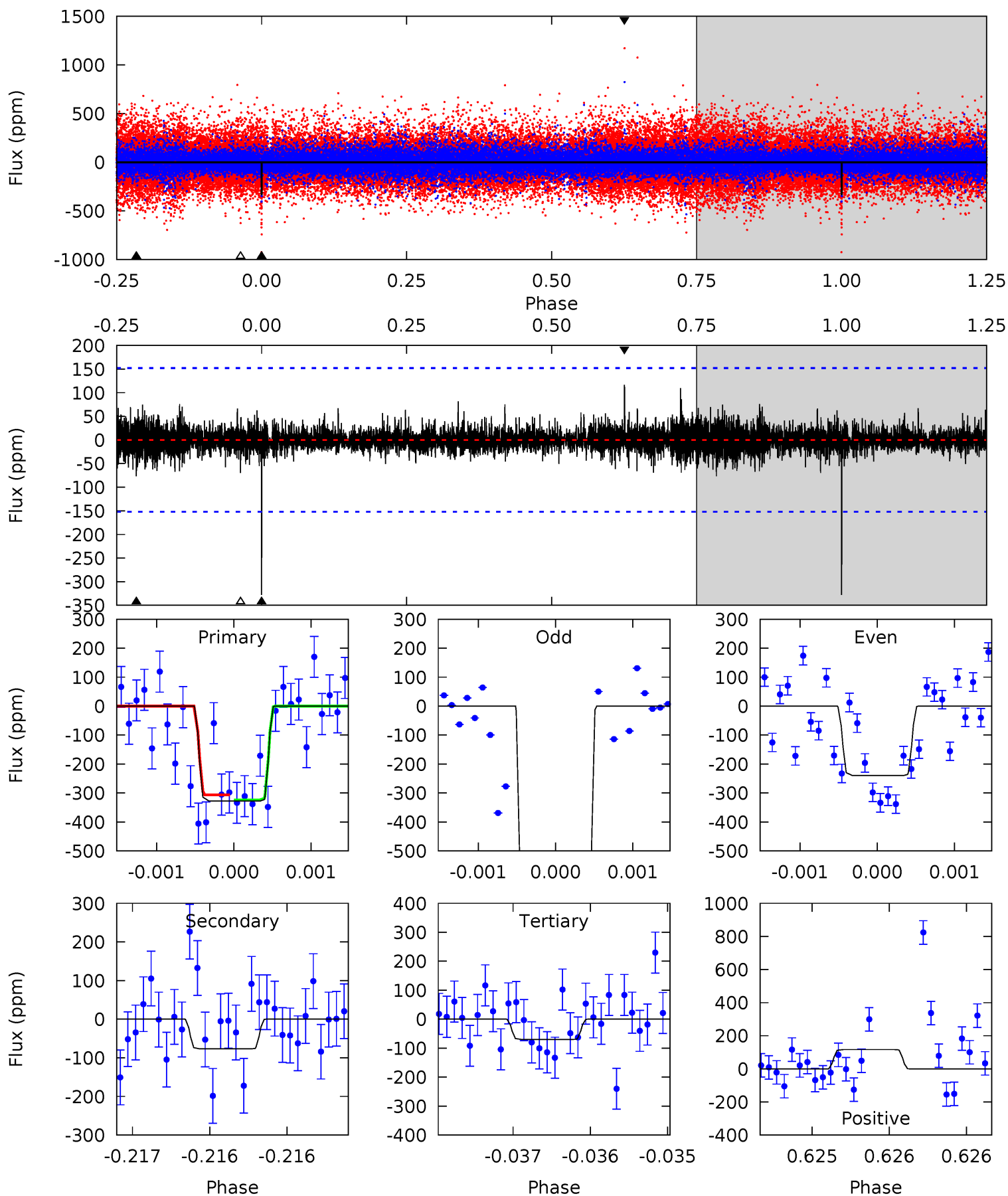
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.6	18.0	11.8	19.6	5.56	3.45	2.80	-0.21	-8.01	6.21	-1.60	1.42	1.01	0.52	1.62



# Alt Model-Shift Uniqueness Test

005176547-05, P = 592.464261 Days, E = 390.541836 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.0	2.81	2.56	4.27	5.56	3.47	0.59	9.44	7.73	0.25	-1.46	30.2	1.90	0.26	0



### Stellar Parameters For KIC 005176547

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5129^{+138}_{-153}$	$3.884^{+0.676}_{-0.312}$	$-0.160^{+0.300}_{-0.300}$	$1.781^{+1.039}_{-1.143}$	$0.887^{+0.147}_{-0.161}$	$0.221^{+2.914}_{-0.153}$
	+3%/-3%	+17%/-8%	+188%/-188%	+58%/-64%	+17%/-18%	+1317%/-69%
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 005176547-05 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-736 \pm 41$	$4.20^{+3.28}_{-2.37}$	$364^{+55}_{-57}$	$5542^{+2762}_{-1076}$	$40459^{+163759}_{-27502}$
Alt.	$-77 \pm 27$	$6.18^{+3.61}_{-3.15}$	$365^{+55}_{-61}$	$3170^{+575}_{-327}$	$1902^{+5500}_{-1243}$

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

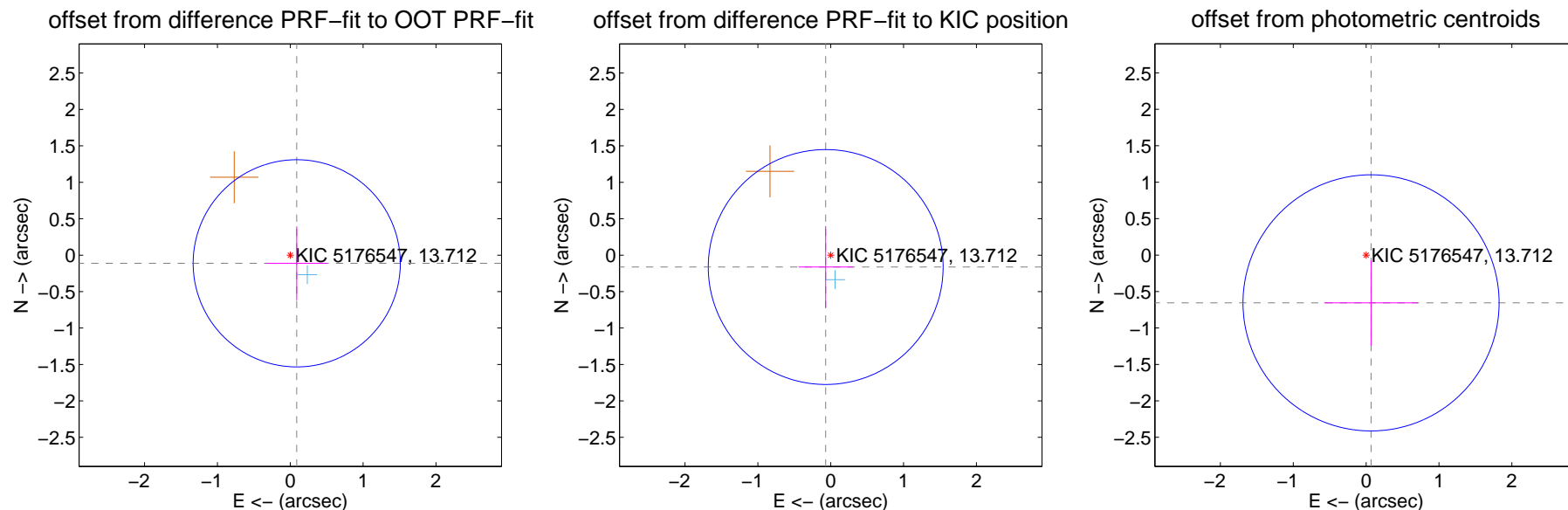
## DV Centroid Data

Supplemental centroid analysis for 005176547-05. Kepler magnitude: 13.71. Transit SNR 6.77

There are 1 quarters with good PRF difference image offsets

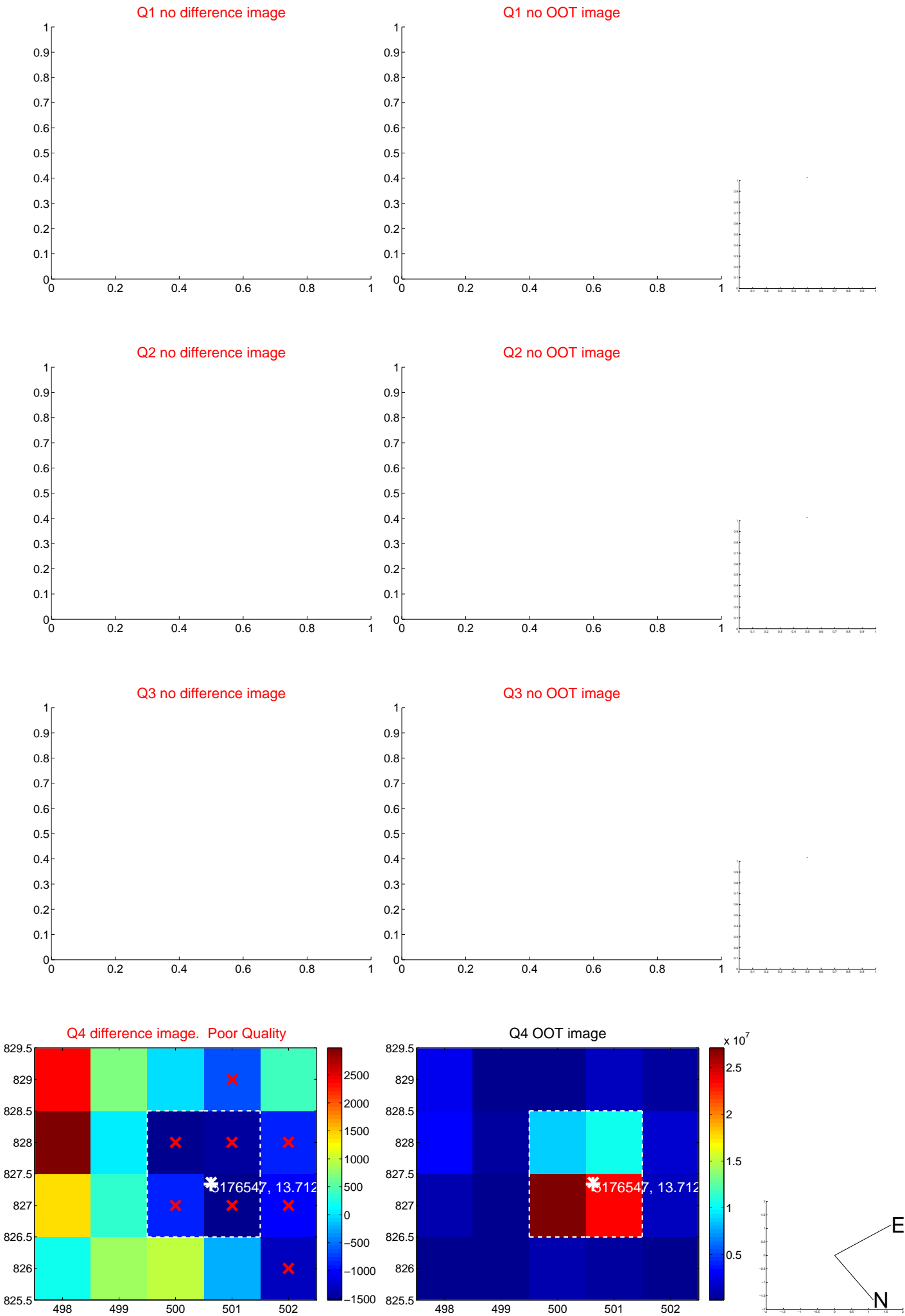
The direct PRF centroid is offset from the target star catalog position by about 0.10 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.143 \pm 0.474$	0.30	$-0.089 \pm 0.418$	$-0.112 \pm 0.506$
PRF-fit source offset from KIC position	$0.177 \pm 0.537$	0.33	$0.069 \pm 0.373$	$-0.163 \pm 0.562$
photometric centroid source offset	$0.66 \pm 0.59$	1.13	$-0.07 \pm 0.64$	$-0.66 \pm 0.59$



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.

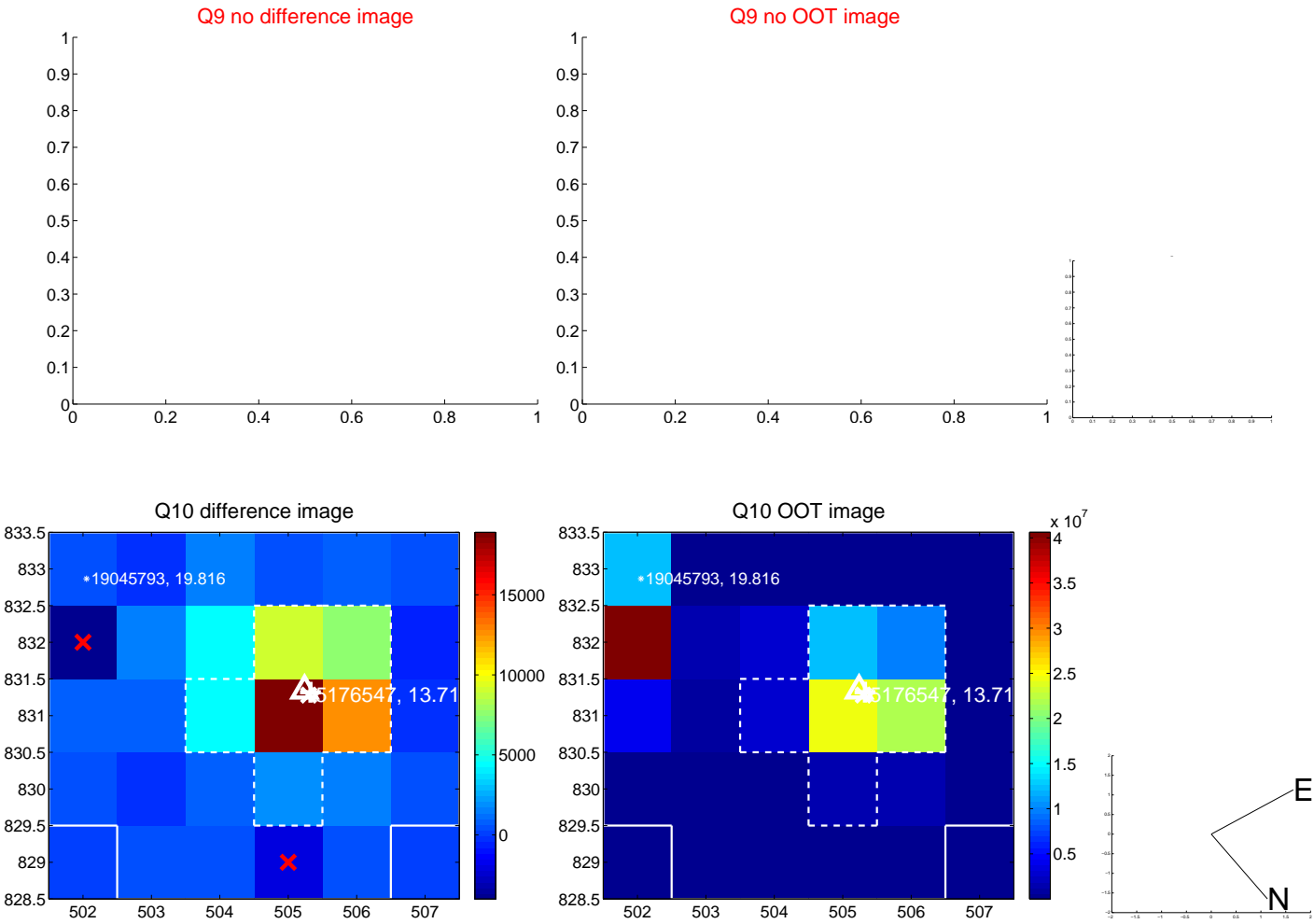


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





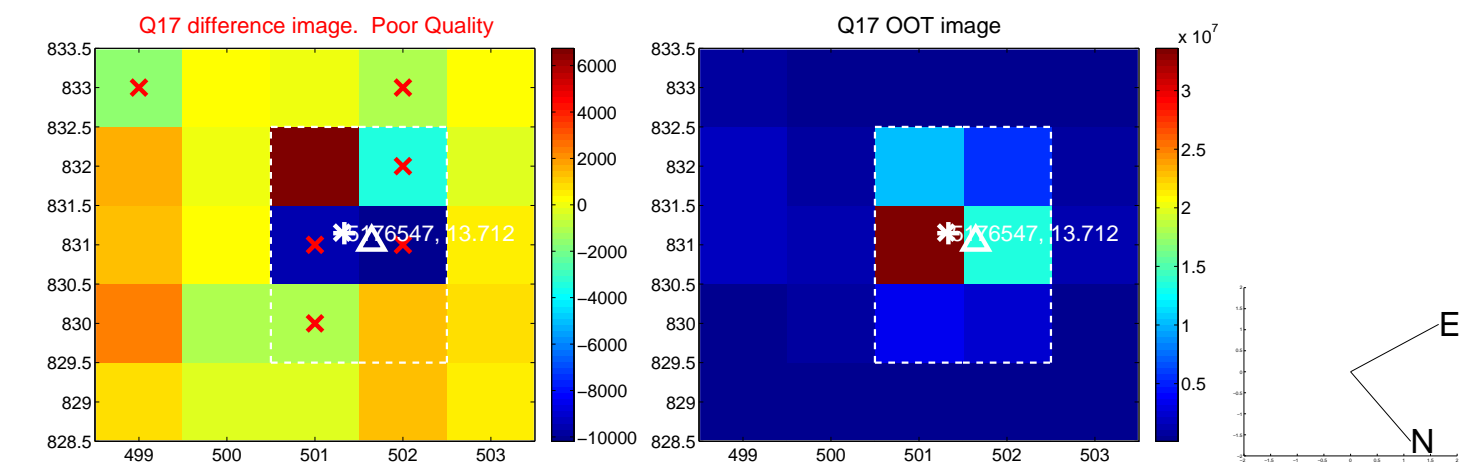
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



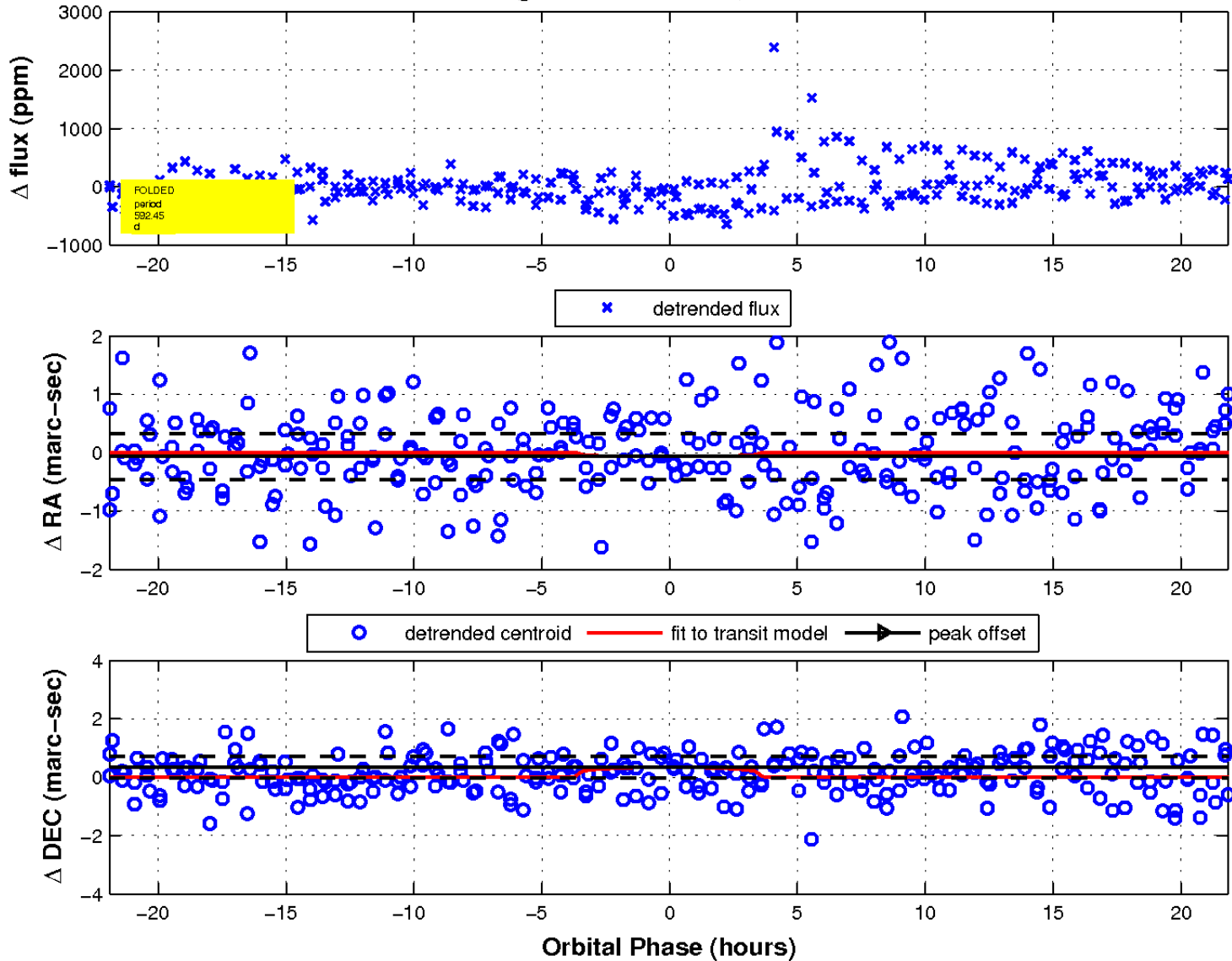
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 5 of 5



UKIRT Image

Declination

