

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005475641-01	OBS	2895.01	1.069827	132.452550	68.4	4.298	11.2	13.7	0.79	4999	0.81	997.60
005475641-02	OBS	No	239.487671	140.863826	812.0	8.997	18.4	7.6	0.79	4999	2.37	0.73
005475641-03	OBS	No	280.872905	271.644348	1182.9	7.500	15.9	-1.0	0.79	4999	2.62	0.59
005475641-04	OBS	No	152.776853	162.394839	673.1	9.042	13.6	7.7	0.79	4999	2.20	1.34
005475641-05	OBS	No	180.020691	233.604204	856.6	11.672	12.6	7.7	0.79	4999	2.70	1.07
005475641-07	OBS	No	475.792717	447.008273	1185.4	12.541	12.7	6.2	0.79	4999	2.68	0.29
005475641-08	OBS	No	393.701860	188.565963	1971.7	21.017	11.9	8.1	0.79	4999	4.07	0.38
005475641-09	OBS	No	147.912710	257.518469	516.6	19.634	11.2	4.7	0.79	4999	1.75	1.40

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005475641-01	OBS	FP	0.00	0	0	1	1	CENT_RESOLVED_OFFSET—HALO_GHOST—EPHEM_MATCH
005475641-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005475641-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_NOFITS
005475641-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005475641-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—ALL_TRANS_CHASES—CENT_FEW_DIFFS—HALO_GHOST
005475641-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
005475641-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—CENT_FEW_DIFFS
005475641-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES

**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 005475641-01

TCE (1)	KIC	Parent (2)	Parent KIC	$P_1:P_2$	Dist ( $''$ )	$\Delta$ Row	$\Delta$ Col	$m_2$	$m_1$	$D_2/D_1$	Mechanism	Flag	$\sigma_P$	$\sigma_T$
005475641-01	5475641	005475624-pri	5475624	1:1	13.1	-3	-2	15.55	14.30	3335.30	Direct-PRF	0	1.39	0.25

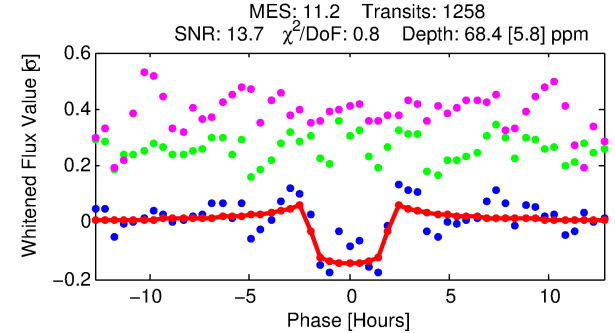
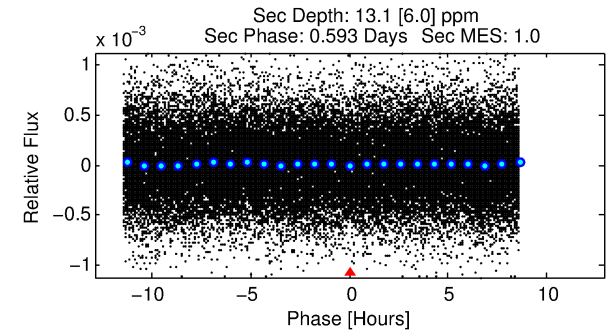
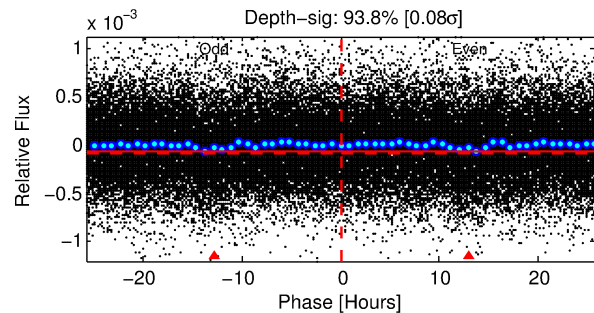
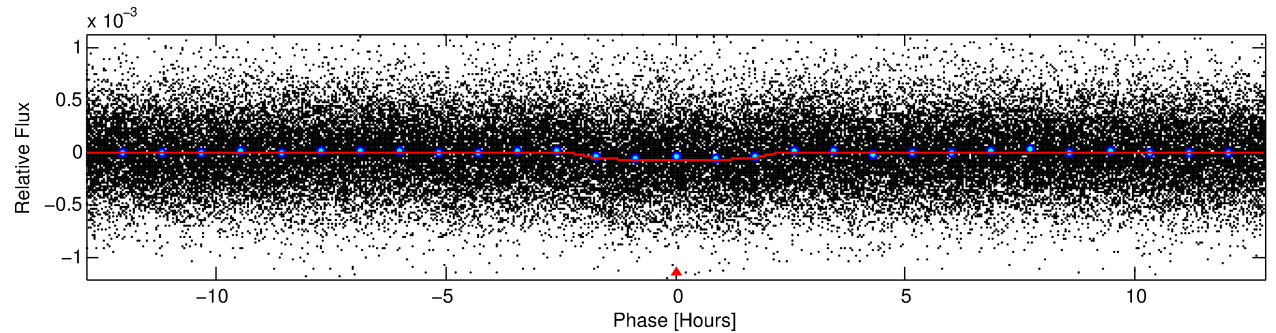
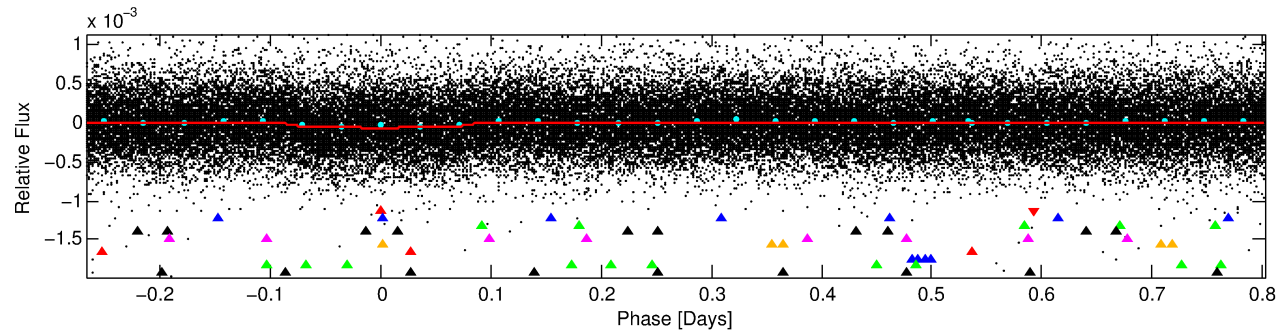
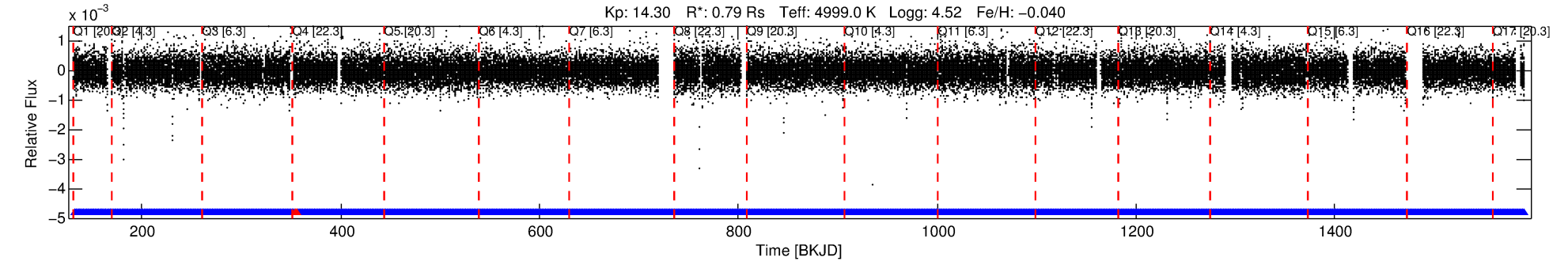
**Notes:**  $P_1:P_2$  is the period ratio. Dist is the distance in arcseconds.  $\Delta$ Row and  $\Delta$ Col are the number of pixels apart in row and column.  $m_2$  and  $m_1$  are the magnitudes of the parent and child.  $D_2/D_1$  is the parent's transit depth divided by the child's.  $\sigma_P$  and  $\sigma_T$  are the significance of the match in period and epoch. For a match to be considered significant  $\sigma_P < 5.0$  and  $\sigma_T < 5.0$ . Matches which have  $\sigma_P$  and  $\sigma_T$  very close to this cutoff should receive extra scrutiny, especially if the period ratio is very large.

# DV One-Page Summary

KIC: 5475641 Candidate: 1 of 10 Period: 1.070 d

KOI: K02895.01 Corr: 0.908

Kp: 14.30 R\*: 0.79 Rs Teff: 4999.0 K Logg: 4.52 Fe/H: -0.040



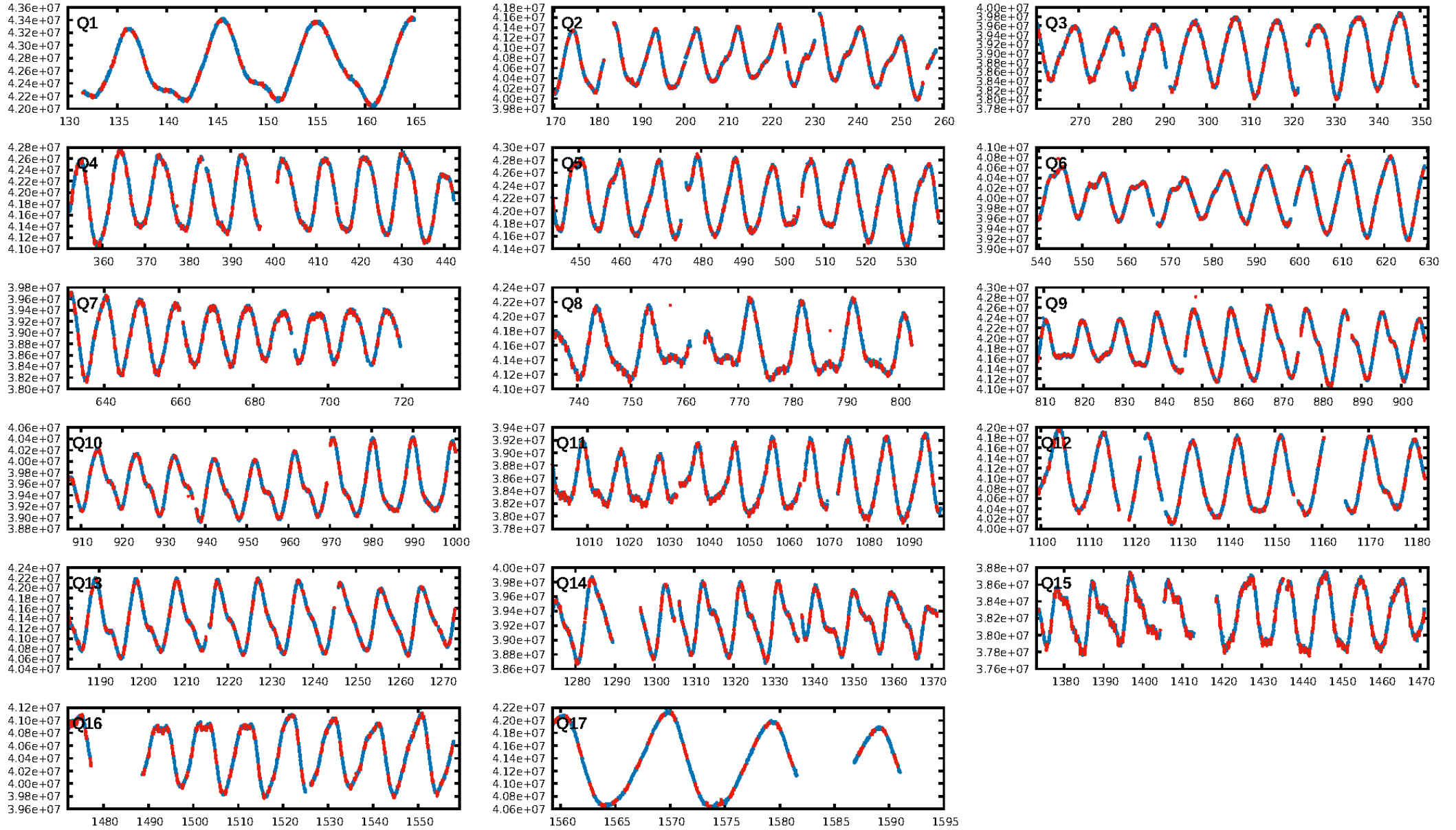
## DV Fit Results:

Period = 1.06983 [0.00001] d  
Epoch = 132.4525 [0.0027] BKJD  
Rp/R\* = 0.0095 [0.0027]  
a/R\* = 1.24 [0.51]  
b = 0.92 [0.20]  
Seff = 997.60 [182.39]  
Teff = 1433 [65] K  
Rp = 0.81 [0.24] Re  
a = 0.0186 [0.0017] AU  
Ag = 3.78 [2.81] [0.99σ]  
Teffp = 3089 [572] K [2.88σ]

## DV Diagnostic Results:

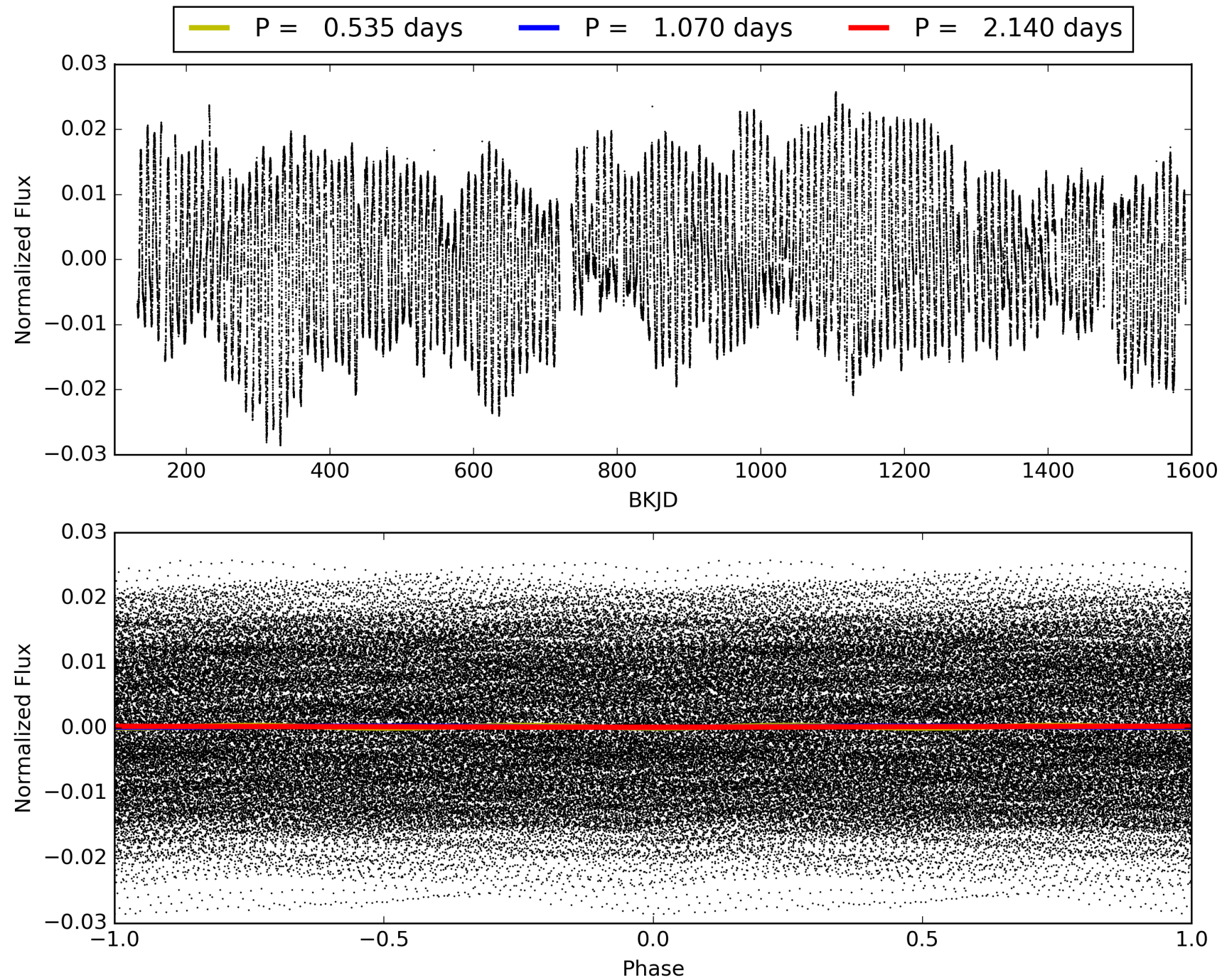
ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [175.35σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [1200/1202]  
**GhostDiagnostic-chr: -0.1103**  
Centroid-sig: N/A  
Centroid-so: N/A  
OotOffset-rm: N/A  
KicOffset-rm: N/A  
OotOffset-st: 0/0/0/0 [0]  
KicOffset-st: 0/0/0/0 [0]  
DiffImageQuality-fgm: N/A  
DiffImageOverlap-fno: 1.00 [17/17]

# TCE 005475641-01, PDC Light Curves





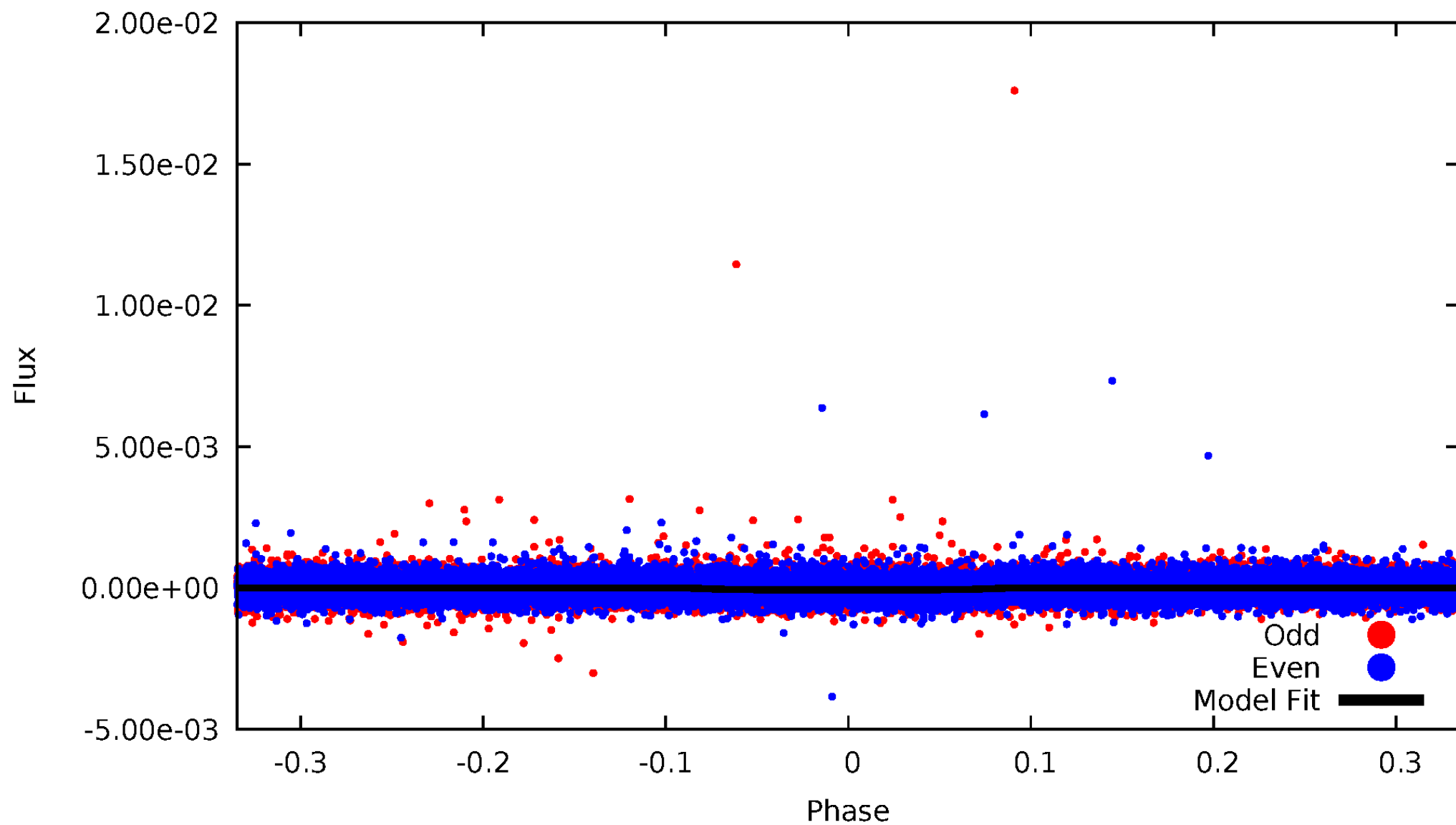
TCE 005475641-01





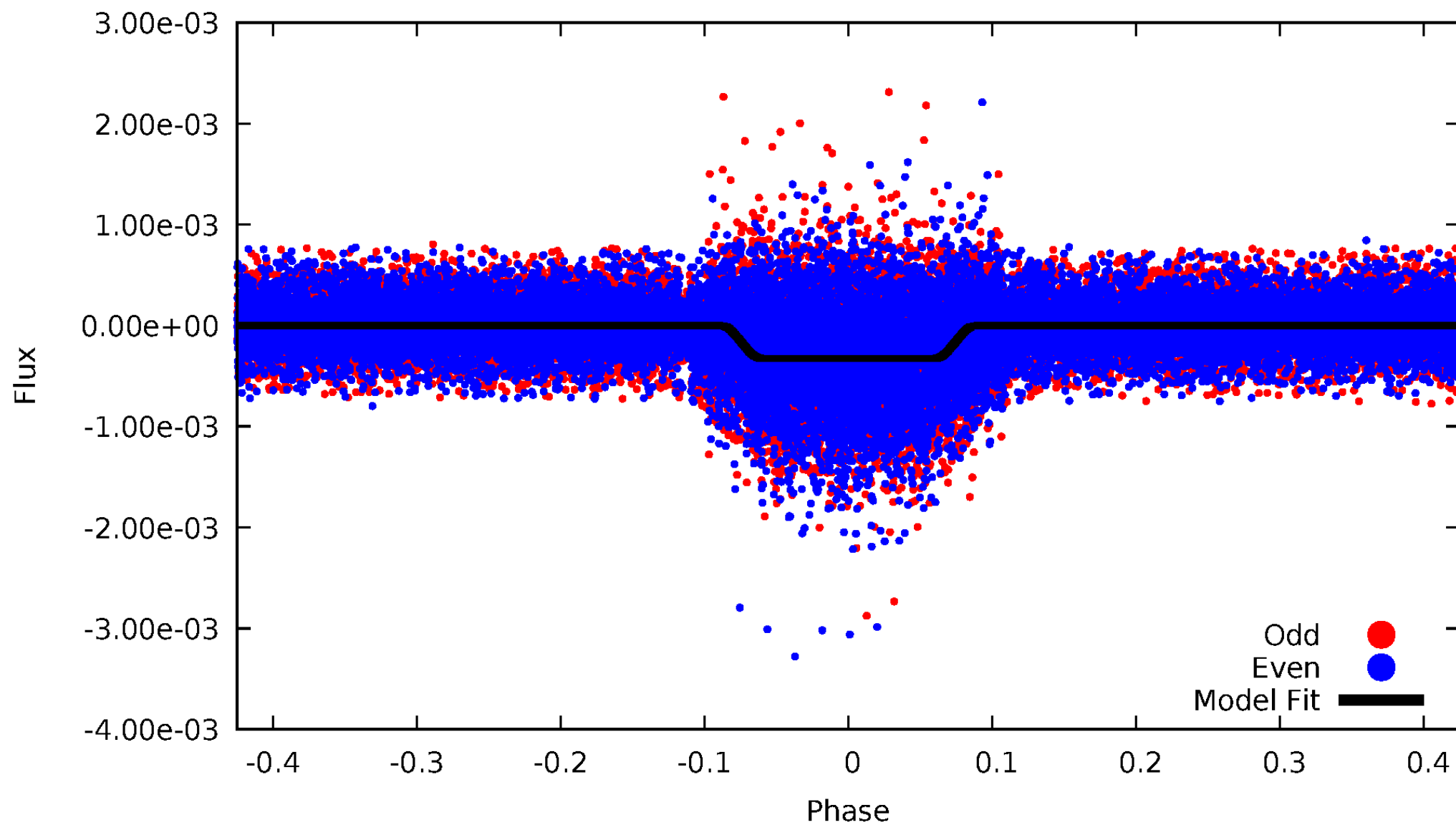
# DV Odd/Even

TCE 005475641-01



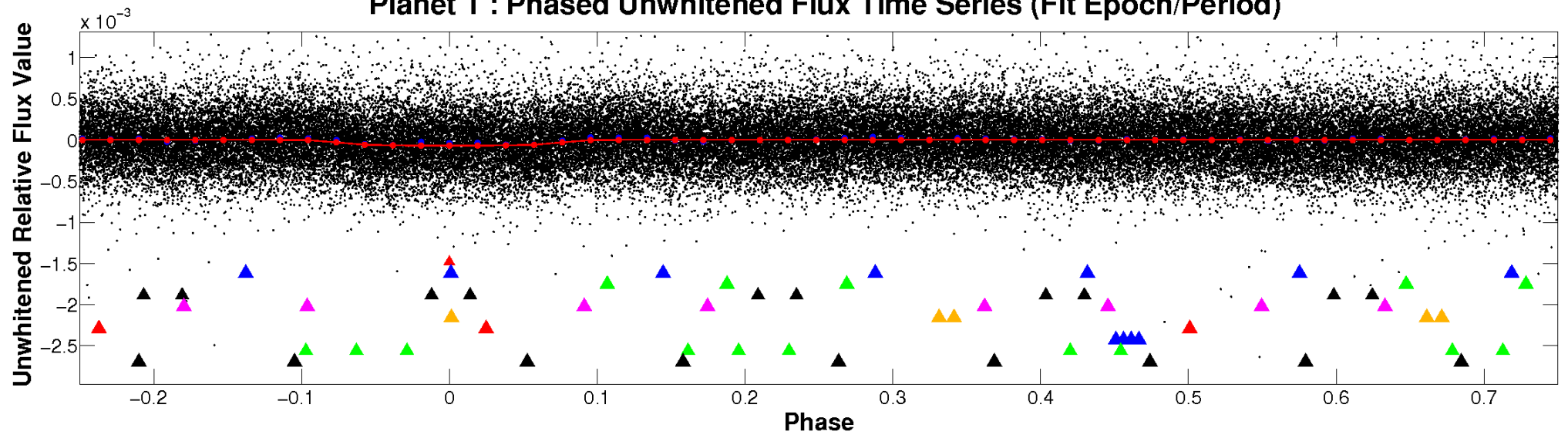
# ALT Odd/Even

TCE 005475641-01

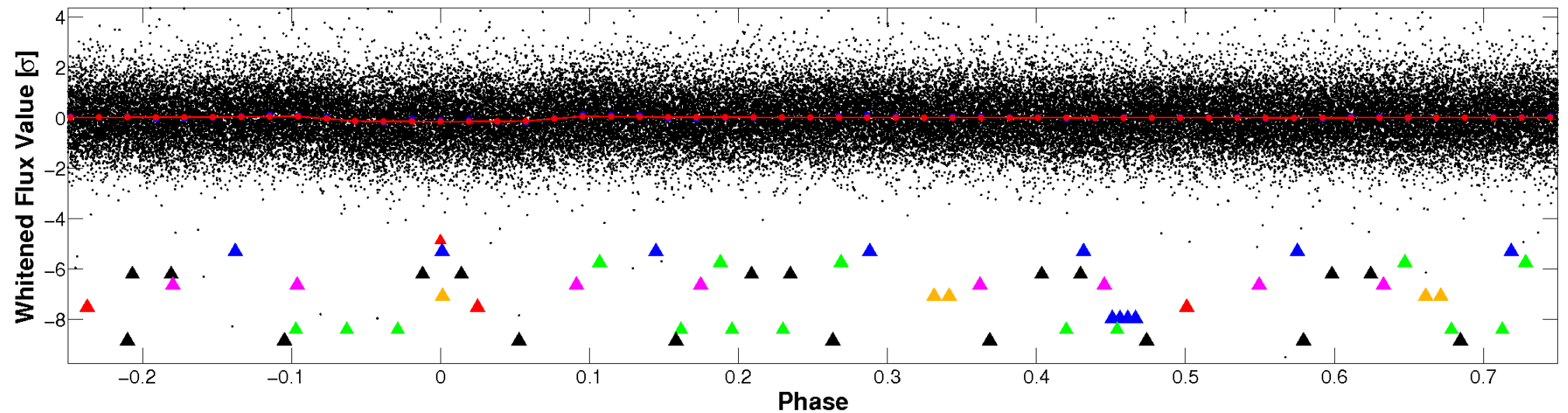


# Non-Whitened Vs. Whitened Light Curve

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



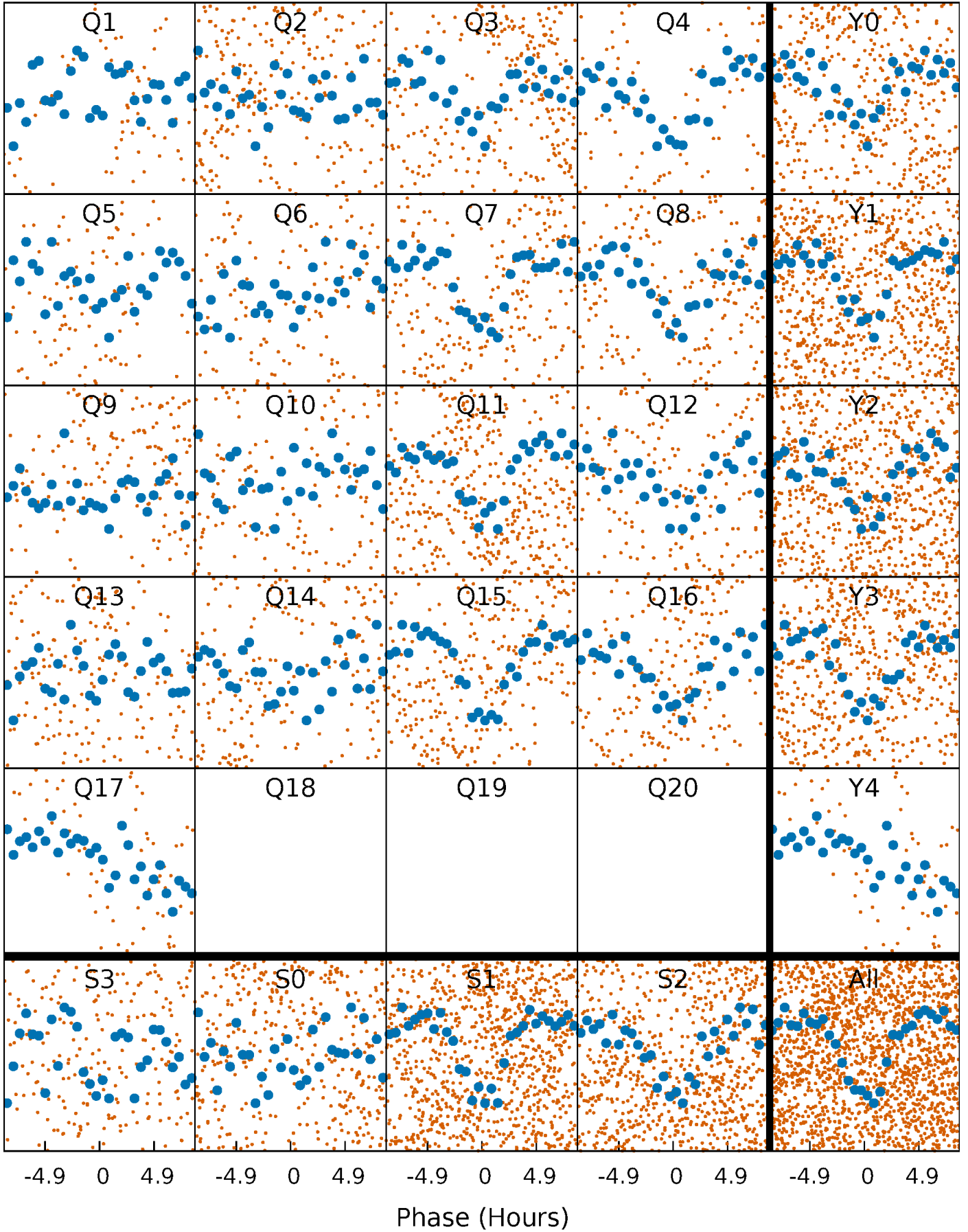
**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**





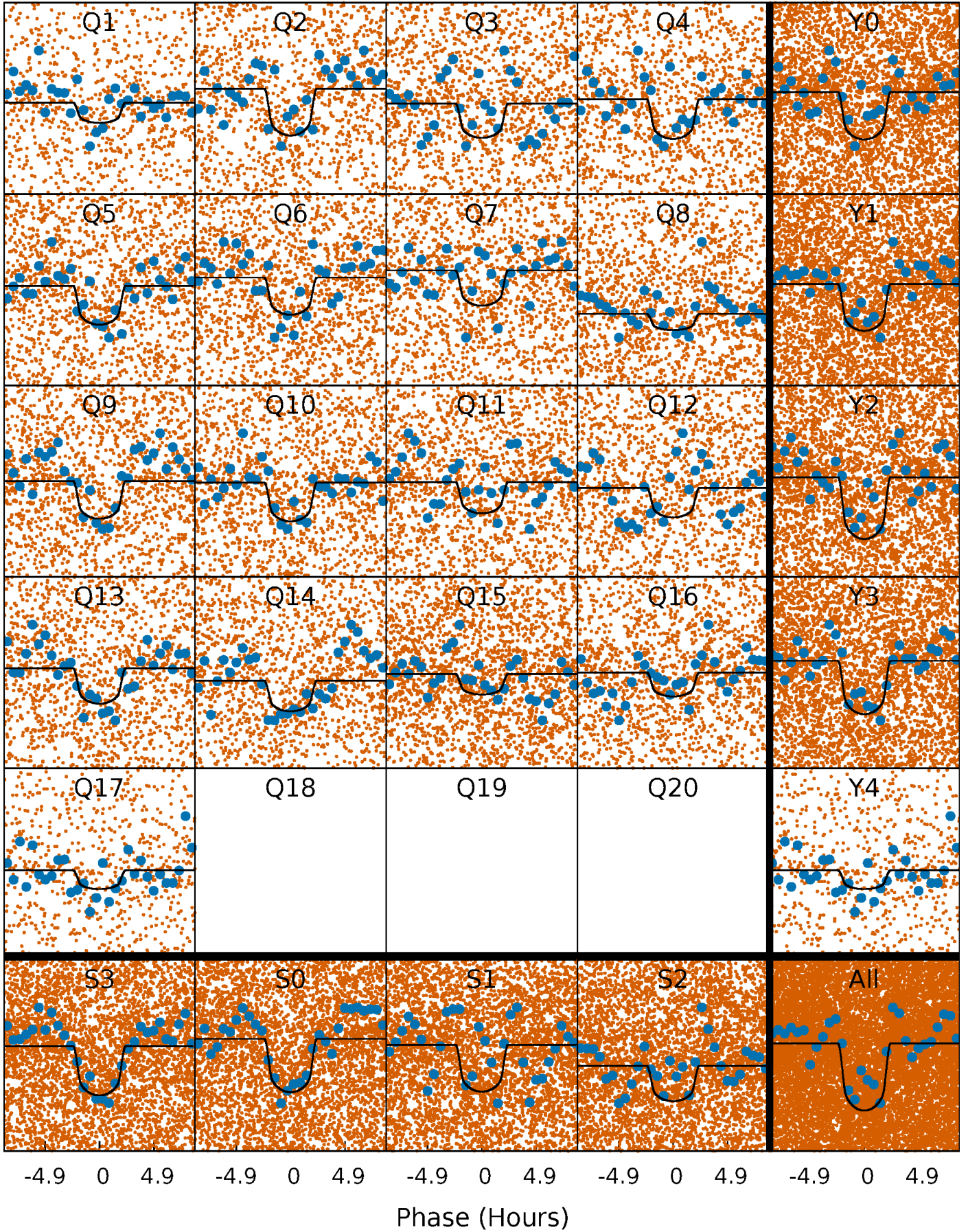
# PDC Quarter-Phased Transit Curves

TCE 005475641-01 P= 1.069827 Days  $T_0=132.452550$  (BKJD)



# DV Quarter-Phased Transit Curves

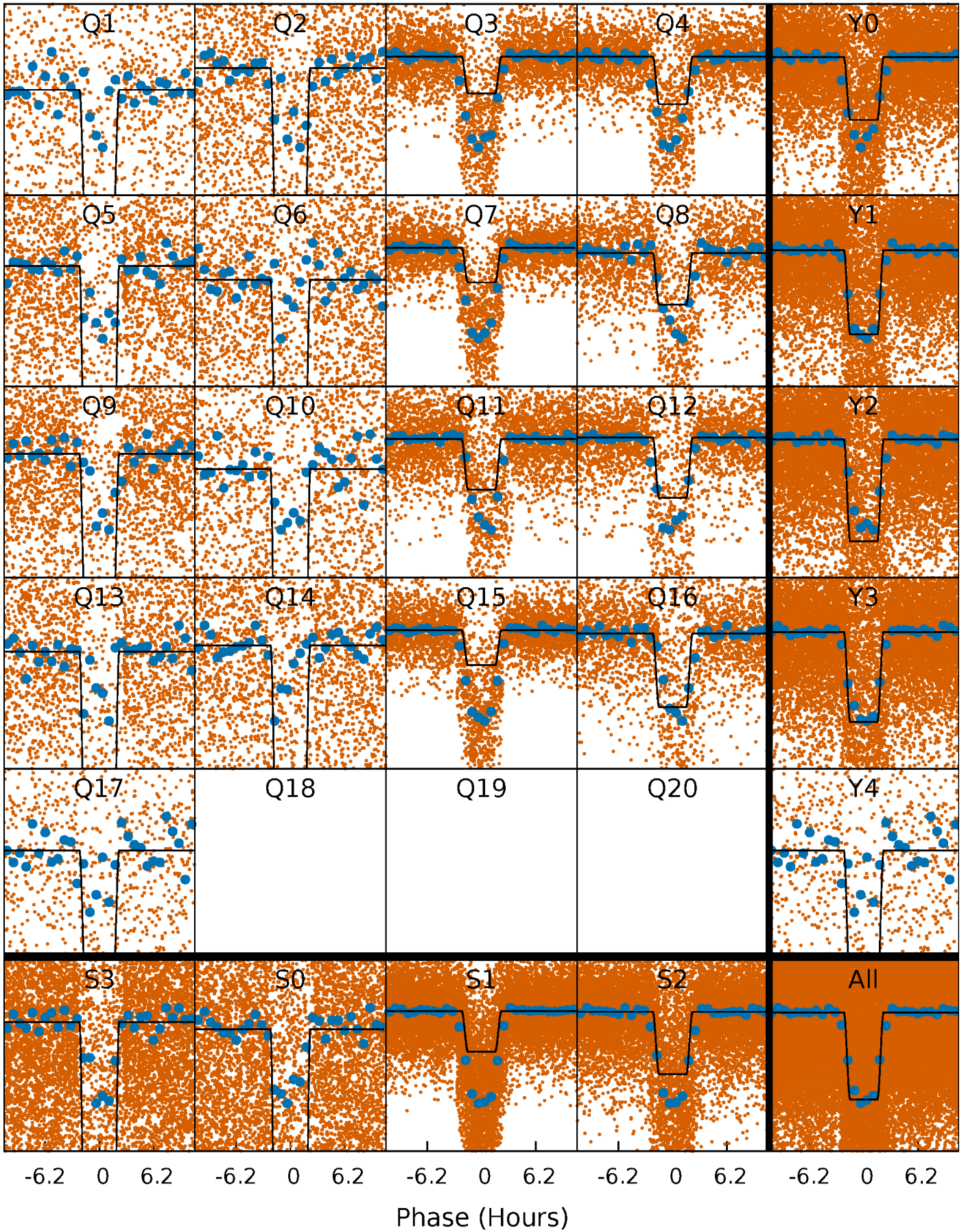
TCE 005475641-01 P= 1.069827 Days  $T_0=132.452550$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

TCE 005475641-01 P= 1.069836 Days  $T_0=132.446735$  (BKJD)

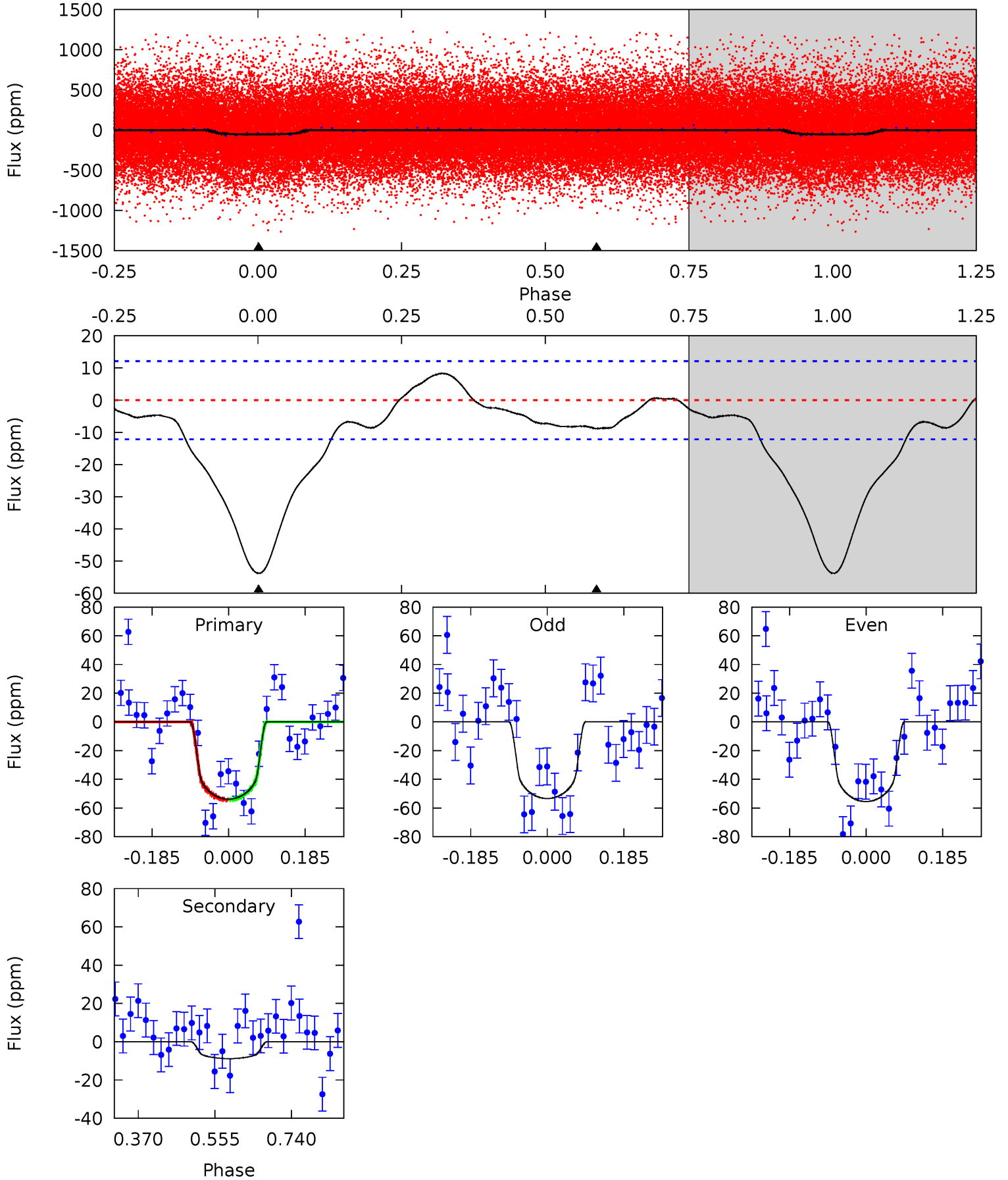




# DV Model-Shift Uniqueness Test

005475641-01, P = 1.069827 Days, E = 131.382723 Days

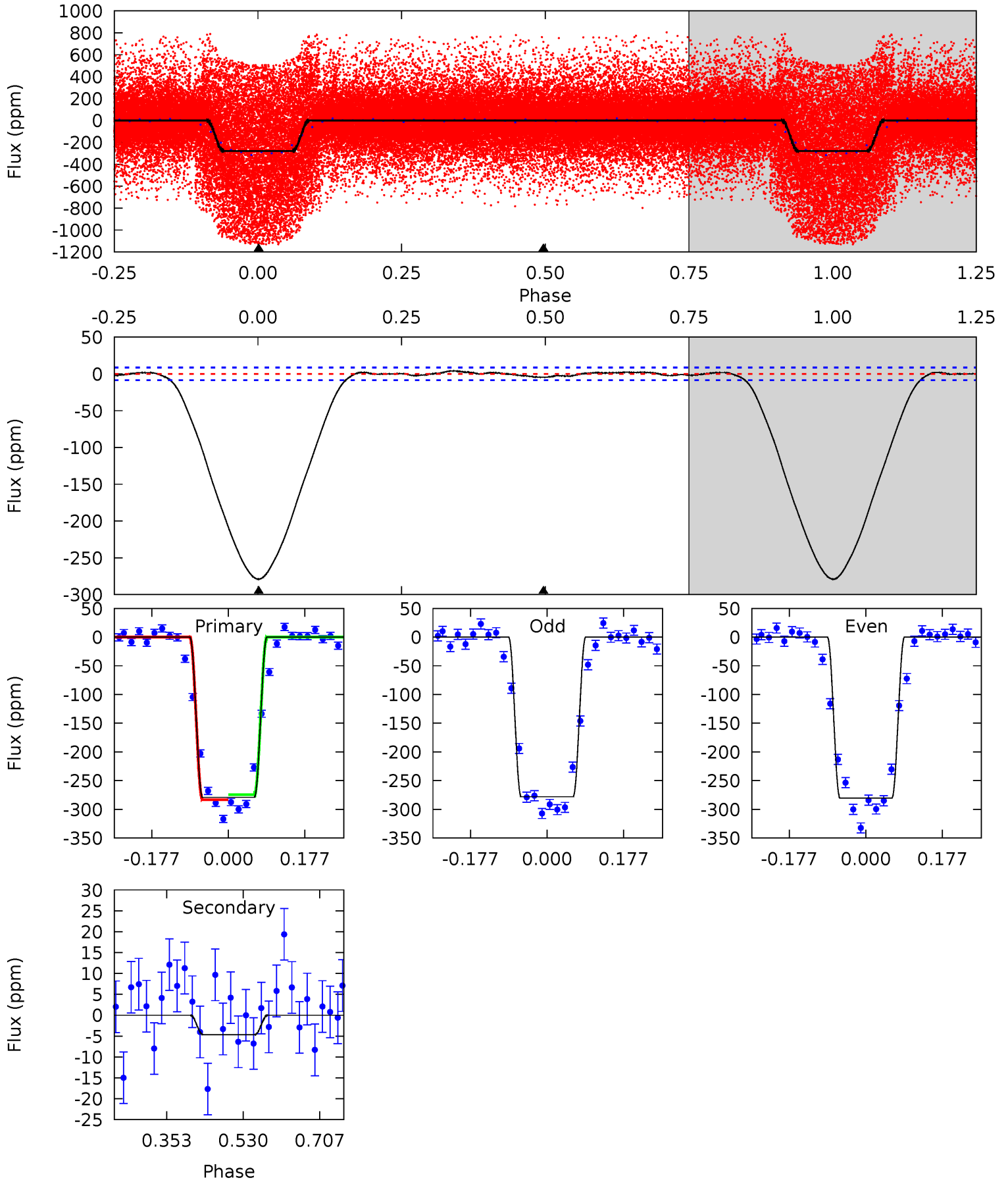
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
19.7	3.22	0	0	4.43	1.33	2.01	19.7	19.7	3.22	3.22	0.38	1.06	0.13	0.03



# Alt Model-Shift Uniqueness Test

005475641-01, P = 1.069836 Days, E = 131.376899 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
144.1	2.40	0	0	4.44	1.35	0.67	144.1	144.1	2.40	2.40	0.55	1.14	0.01	2.19



### Stellar Parameters For KIC 005475641

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4999^{+151}_{-136}$	$4.523^{+0.078}_{-0.052}$	$-0.040^{+0.300}_{-0.300}$	$0.786^{+0.063}_{-0.079}$	$0.752^{+0.085}_{-0.057}$	$2.180^{+0.701}_{-0.371}$
	+3%/-3%	+2%/-1%	+750%/-750%	+8%/-10%	+11%/-8%	+32%/-17%
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 005475641-01 / KOI 2895.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-9 \pm 3$	$0.81^{+0.25}_{-0.24}$	$1993^{+72}_{-77}$	$3235^{+461}_{-338}$	$2.556^{+3.083}_{-1.208}$
Alt.	$-5 \pm 2$	$1.53^{+0.26}_{-0.25}$	$1998^{+76}_{-76}$	$2089^{+398}_{-4281}$	$0.371^{+0.228}_{-0.168}$

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



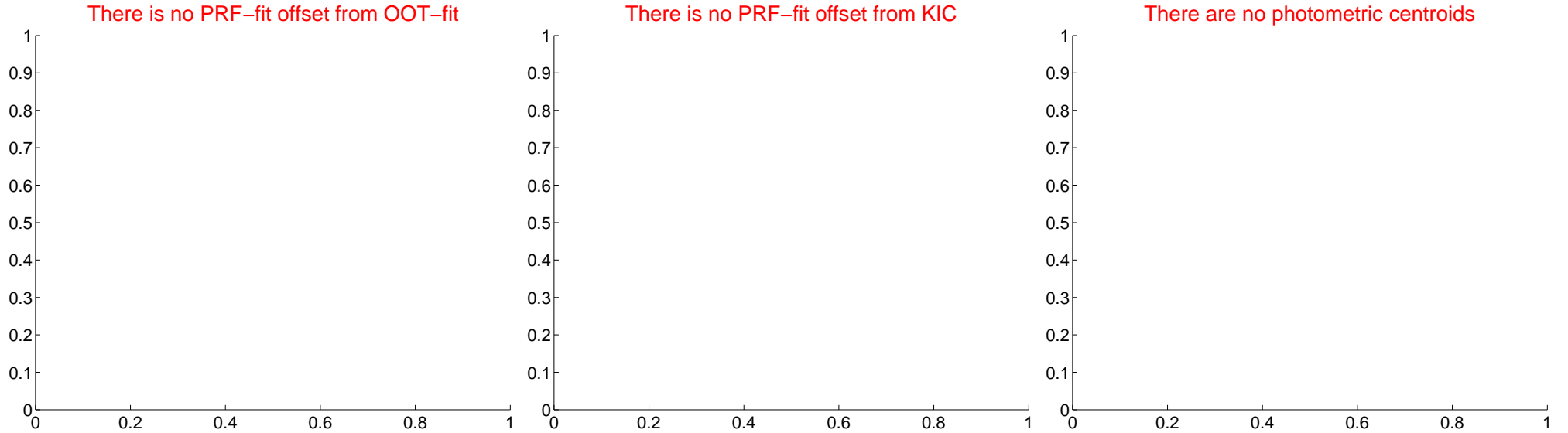
## DV Centroid Data

Supplemental centroid analysis for 005475641-01. Kepler magnitude: 14.30. Transit SNR 13.73

There are 0 quarters with good PRF difference image offsets

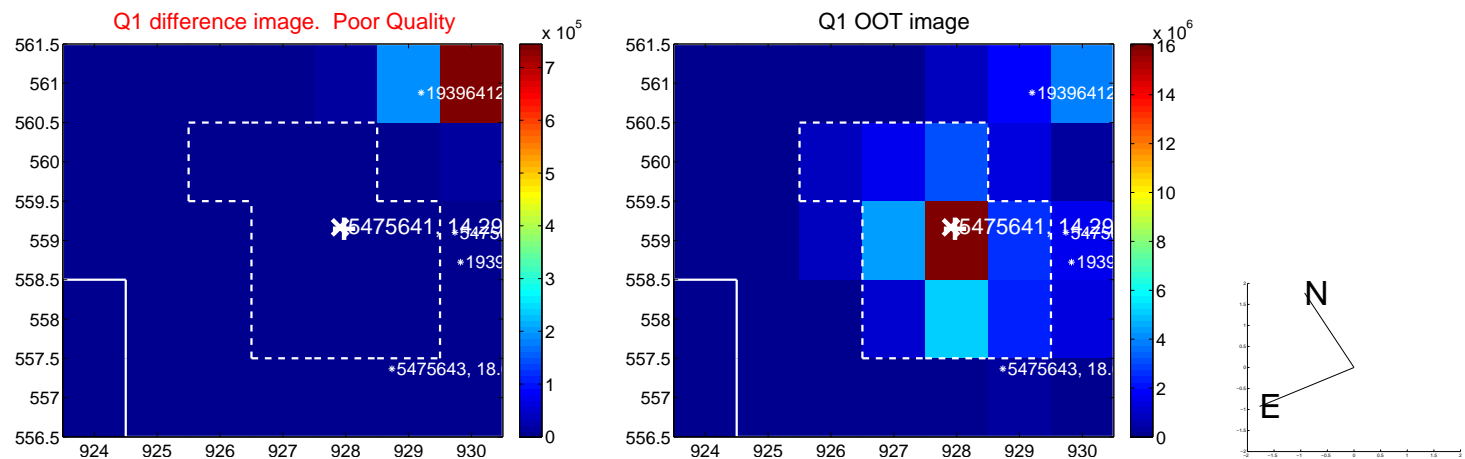
The direct PRF centroid is offset from the target star catalog position by about NaN arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	—	—	—	—
PRF-fit source offset from KIC position	—	—	—	—
photometric centroid source offset	—	—	—	—

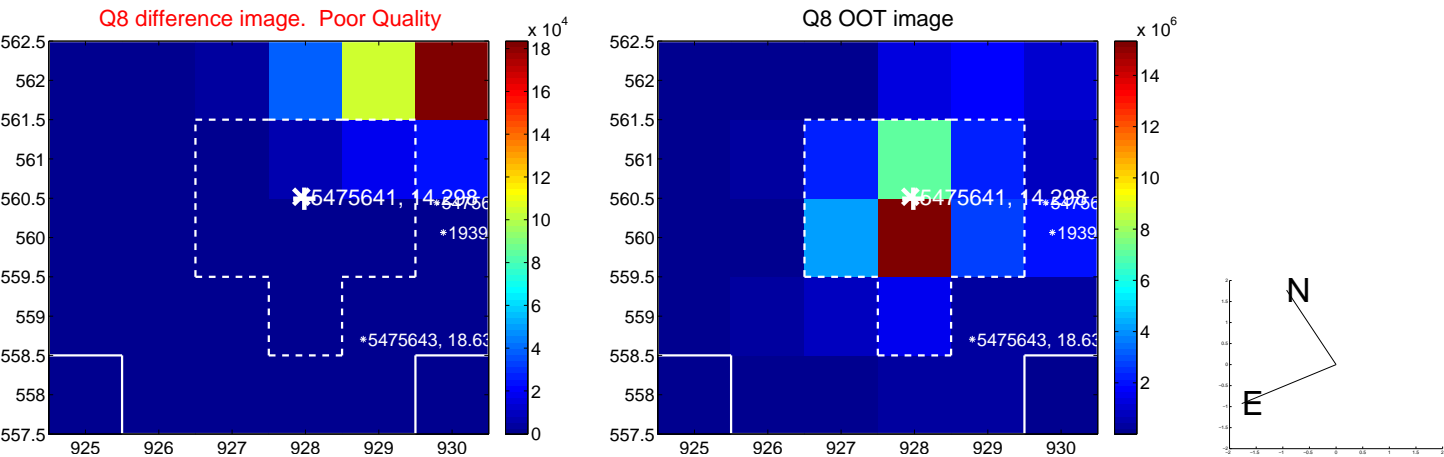
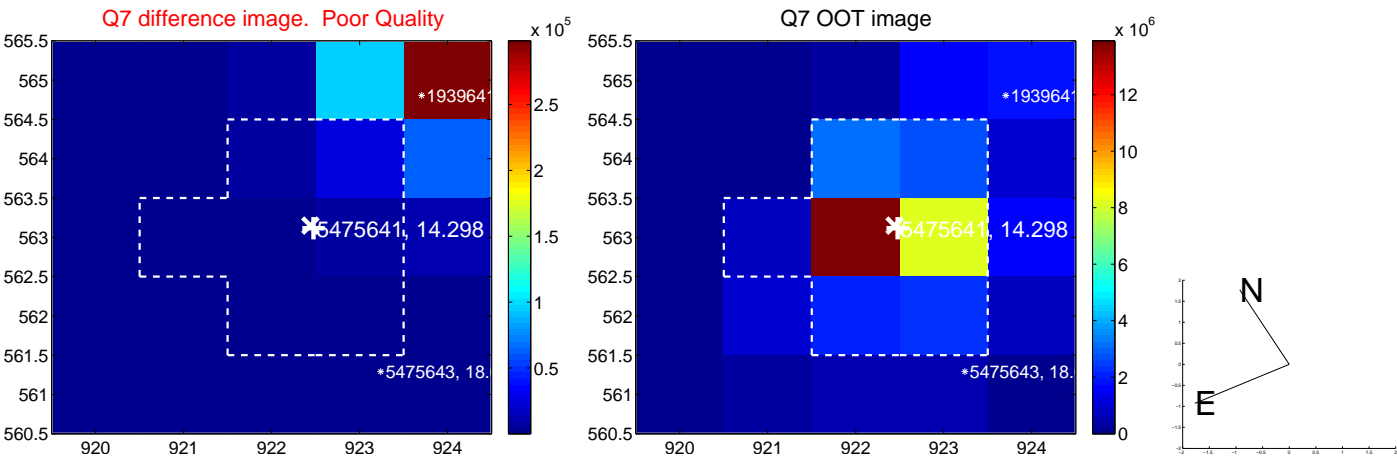
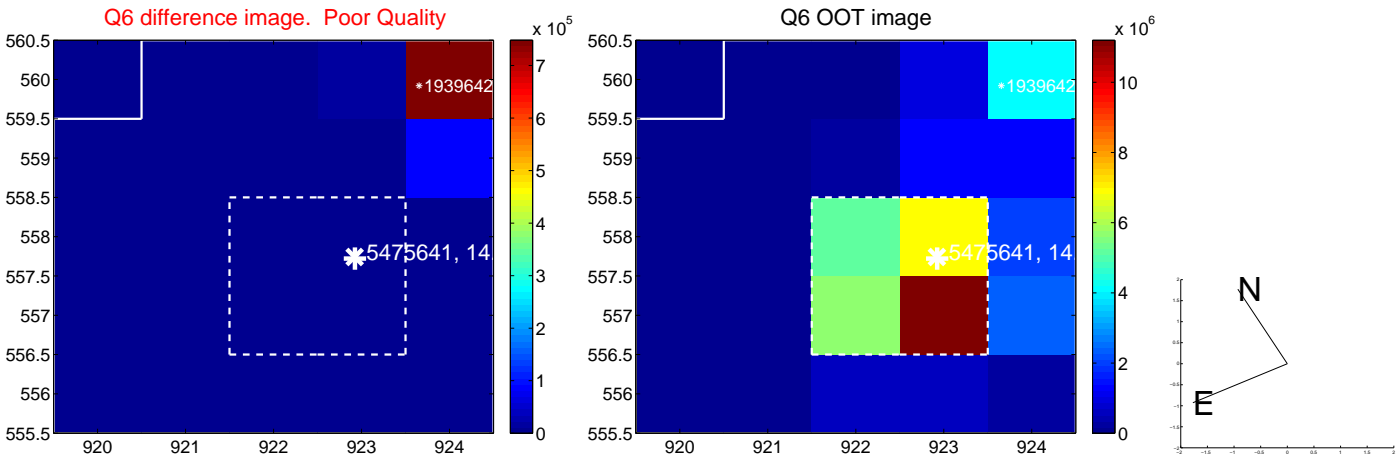
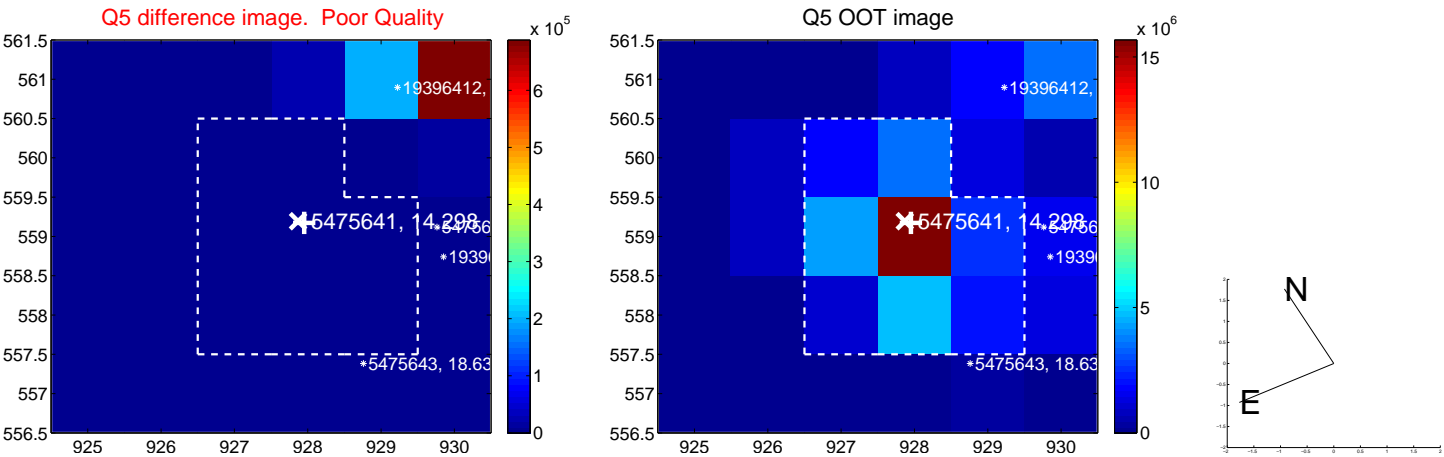


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

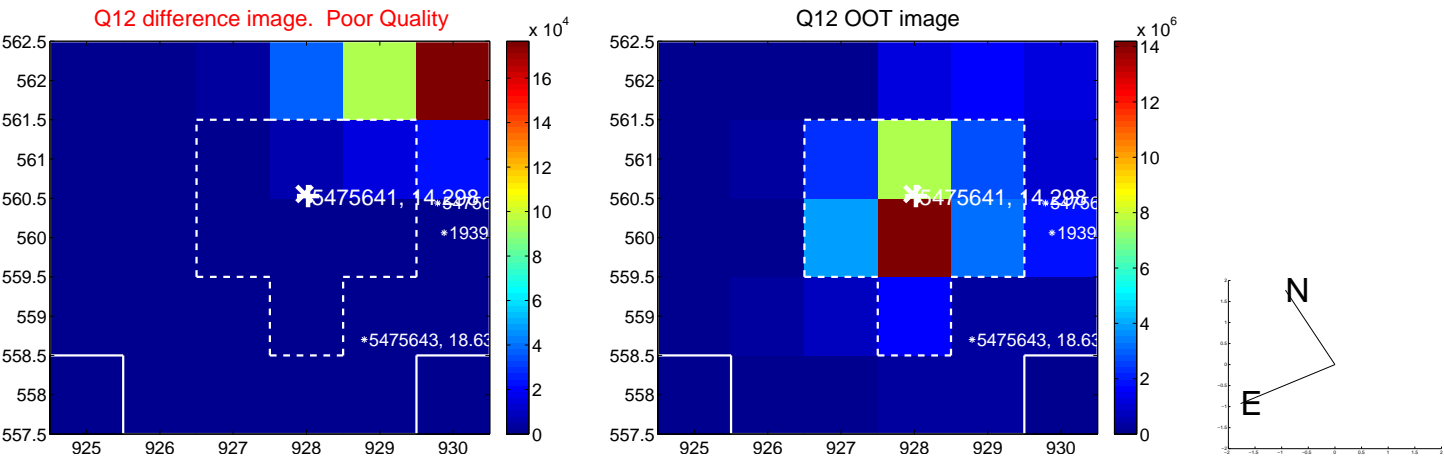
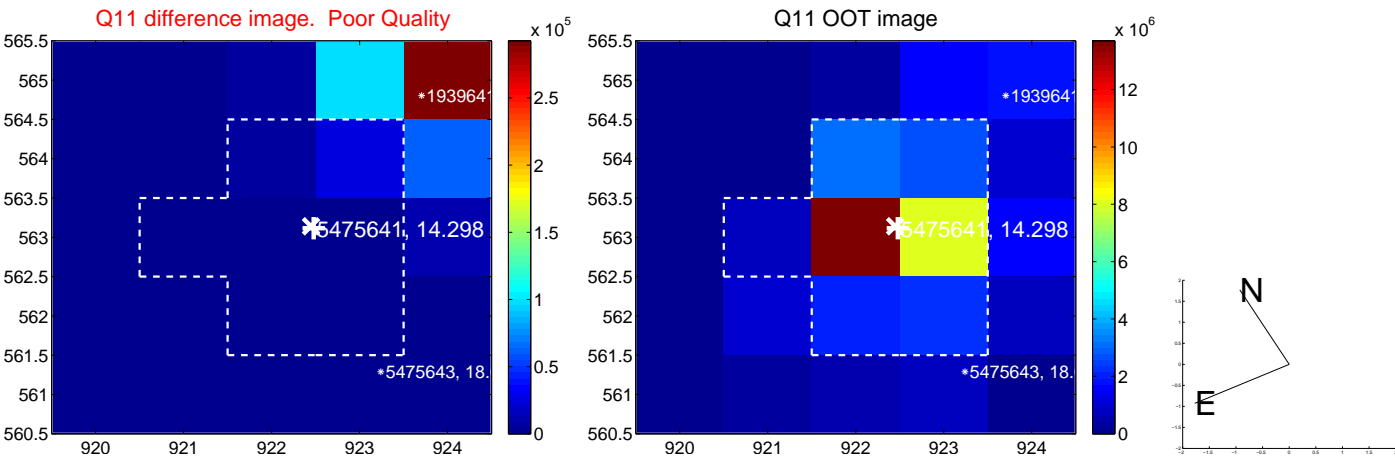
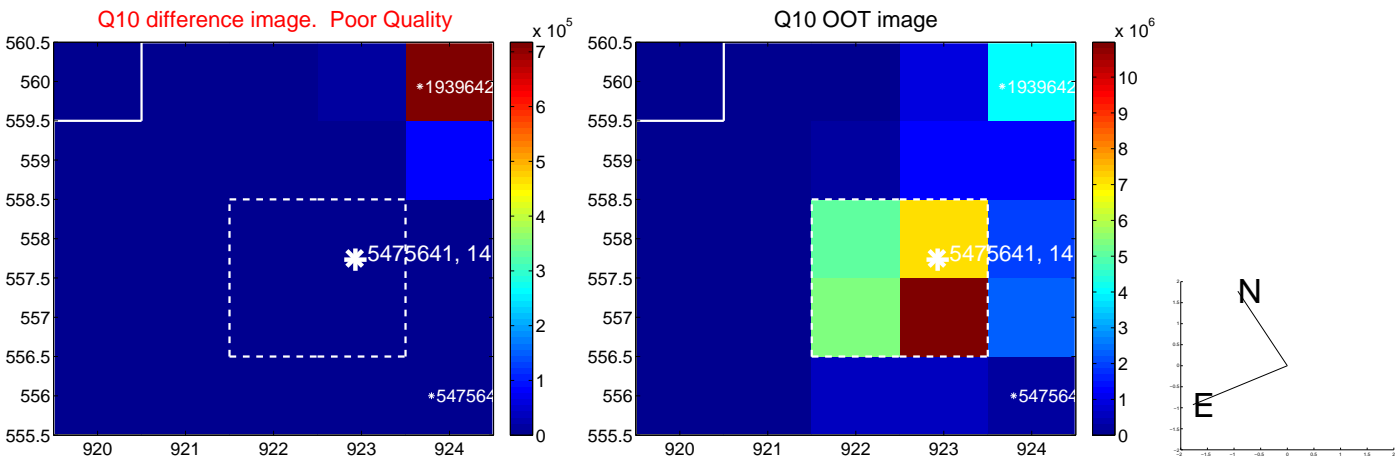
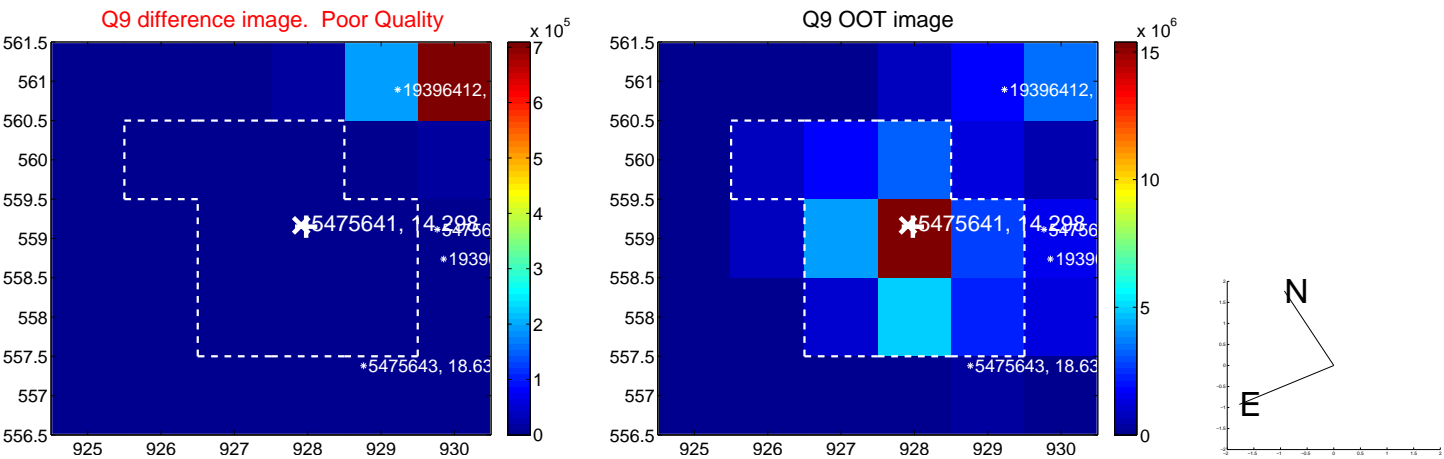


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

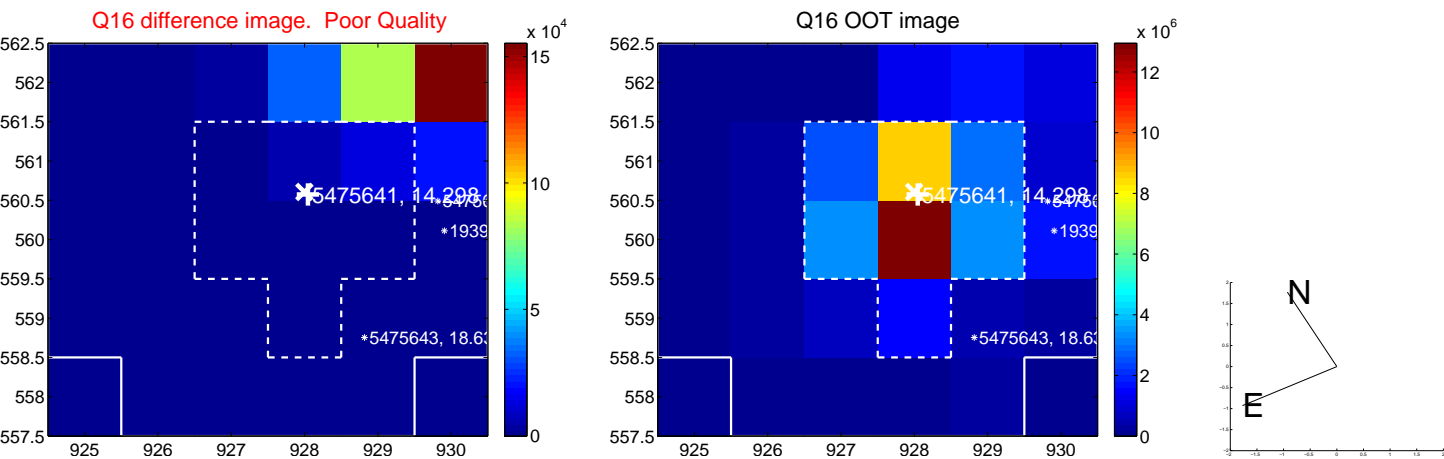
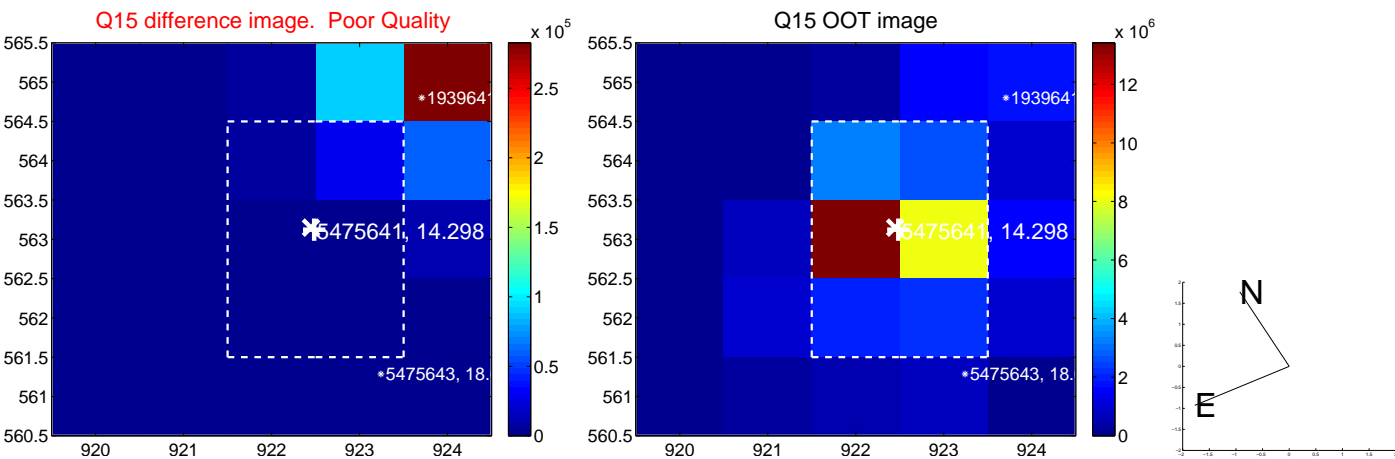
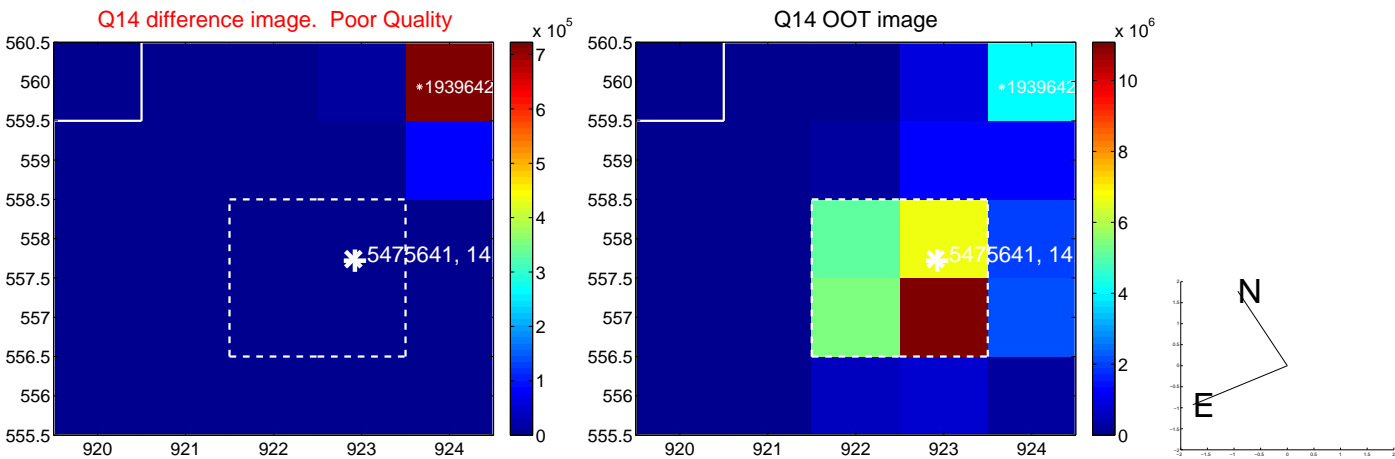
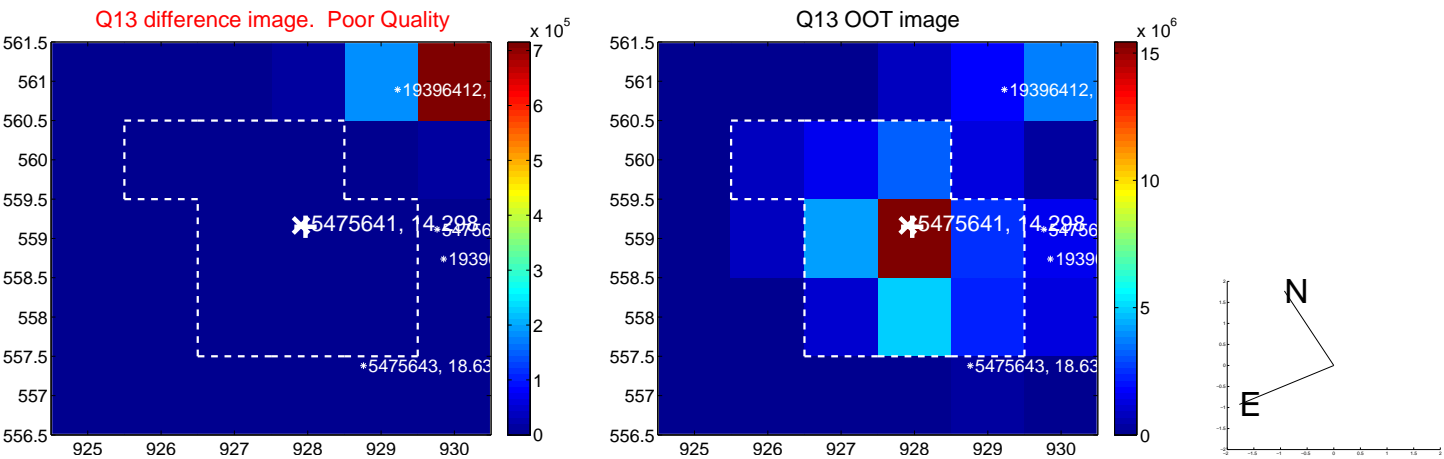




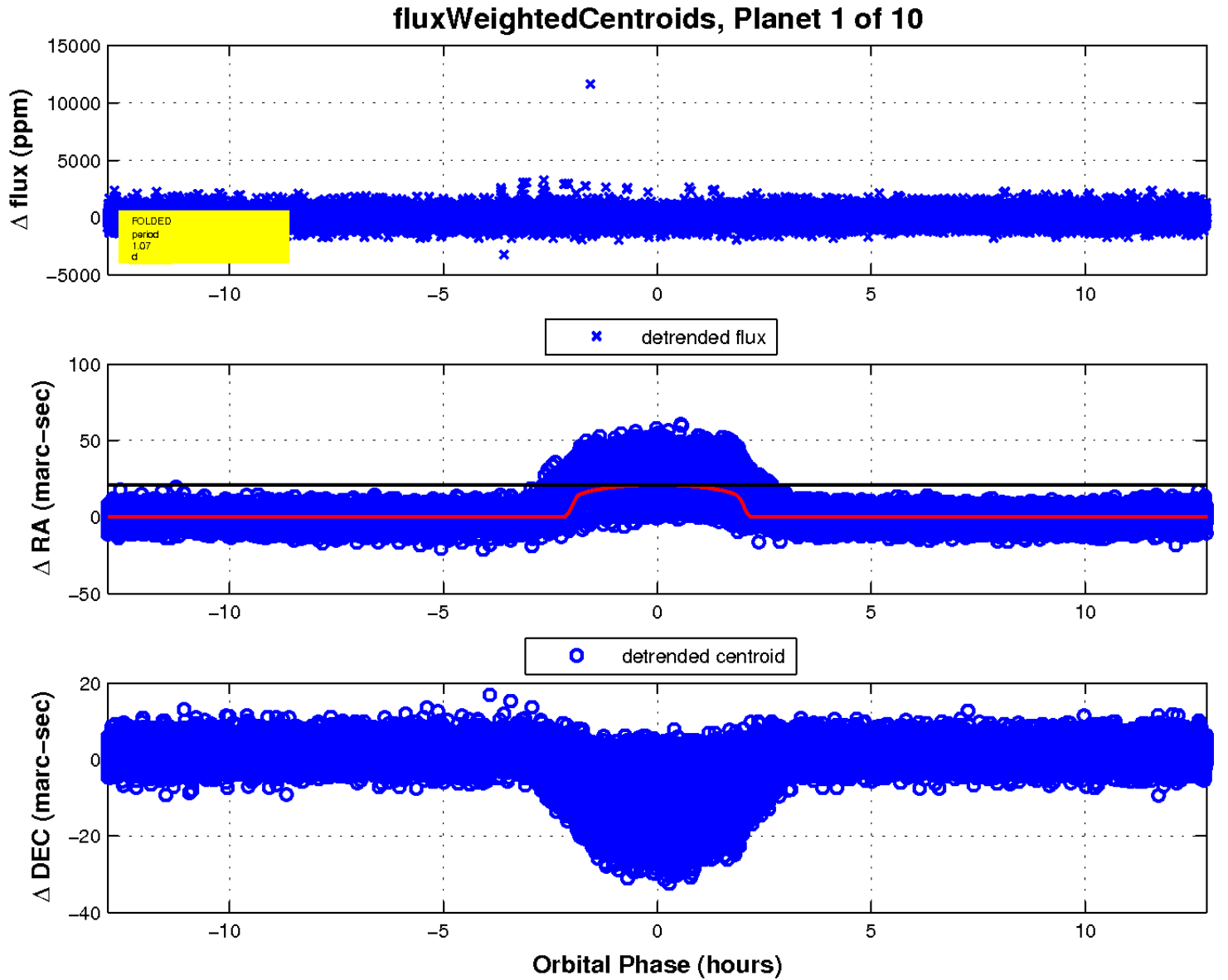
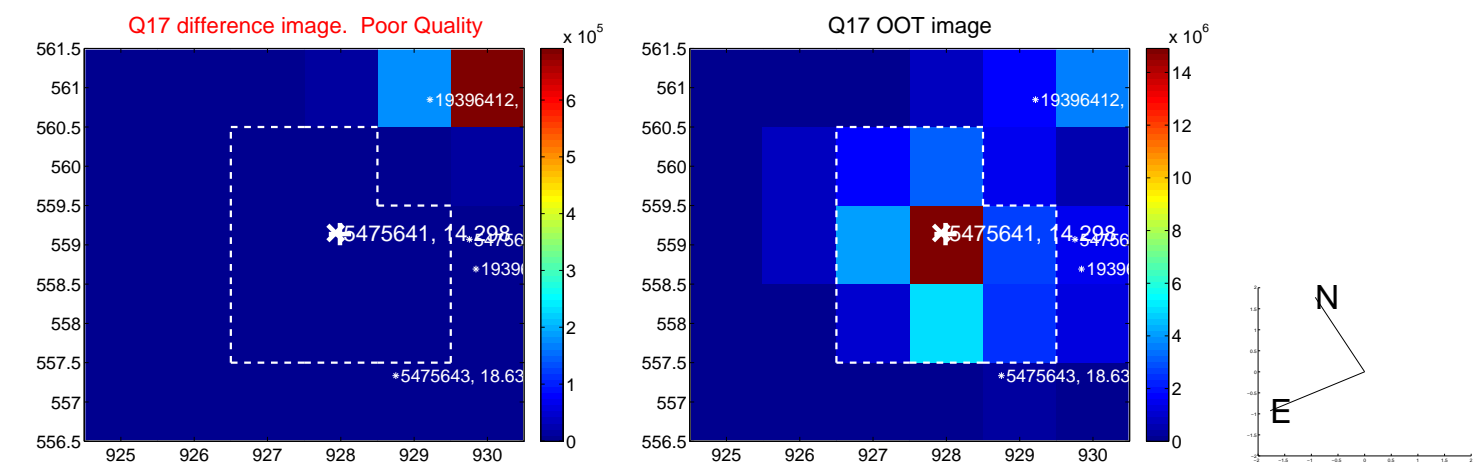
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

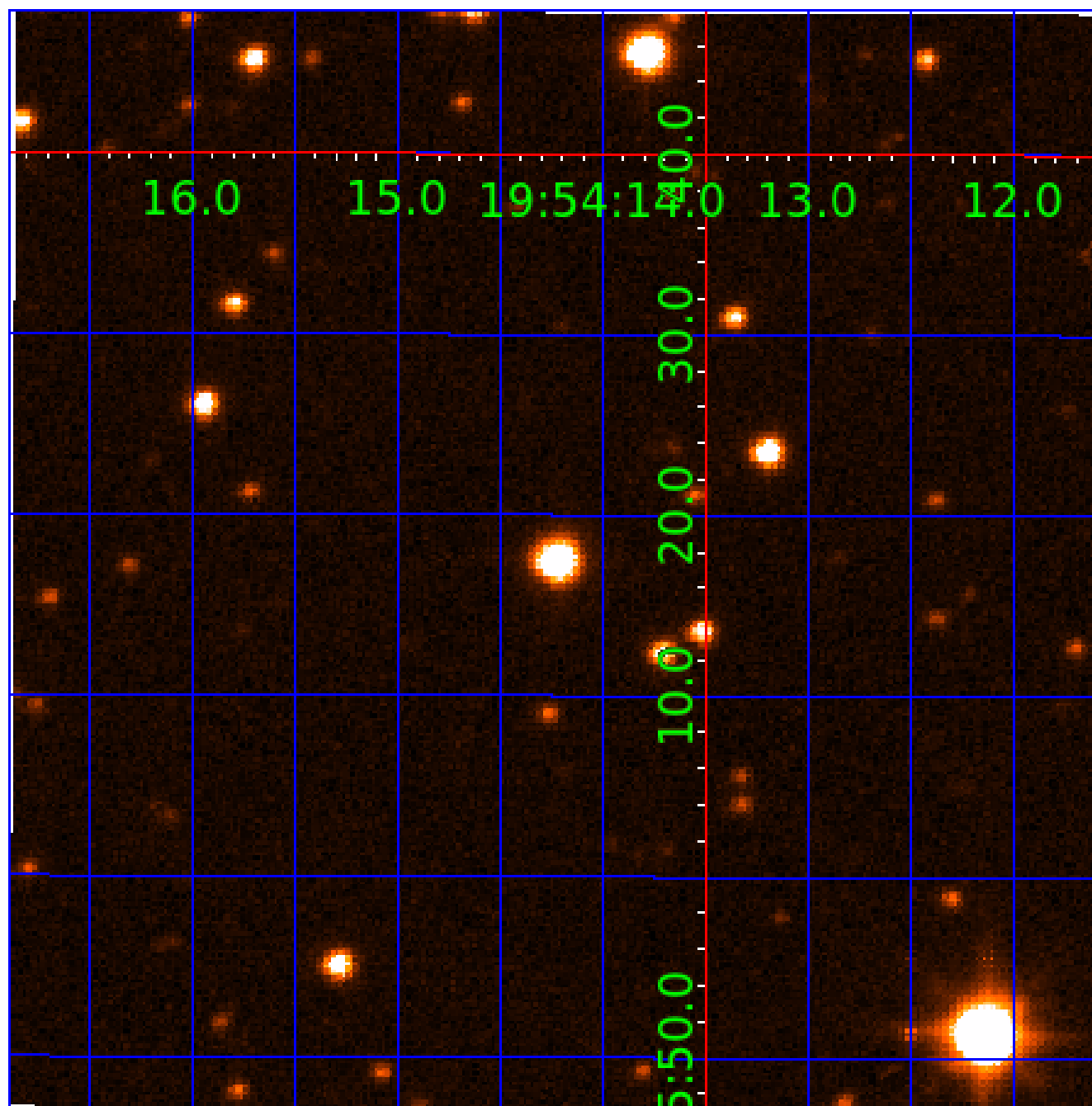


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 005475641

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005475641-01	OBS	2895.01	1.069827	132.452550	68.4	4.298	11.2	13.7	0.79	4999	0.81	997.60
005475641-02	OBS	No	239.487671	140.863826	812.0	8.997	18.4	7.6	0.79	4999	2.37	0.73
005475641-03	OBS	No	280.872905	271.644348	1182.9	7.500	15.9	-1.0	0.79	4999	2.62	0.59
005475641-04	OBS	No	152.776853	162.394839	673.1	9.042	13.6	7.7	0.79	4999	2.20	1.34
005475641-05	OBS	No	180.020691	233.604204	856.6	11.672	12.6	7.7	0.79	4999	2.70	1.07
005475641-07	OBS	No	475.792717	447.008273	1185.4	12.541	12.7	6.2	0.79	4999	2.68	0.29
005475641-08	OBS	No	393.701860	188.565963	1971.7	21.017	11.9	8.1	0.79	4999	4.07	0.38
005475641-09	OBS	No	147.912710	257.518469	516.6	19.634	11.2	4.7	0.79	4999	1.75	1.40

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005475641-01	OBS	FP	0.00	0	0	1	1	CENT_RESOLVED_OFFSET—HALO_GHOST—EPHEM_MATCH
005475641-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005475641-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_NOFITS
005475641-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005475641-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—ALL_TRANS_CHASES—CENT_FEW_DIFFS—HALO_GHOST
005475641-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
005475641-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—CENT_FEW_DIFFS
005475641-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES

**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.

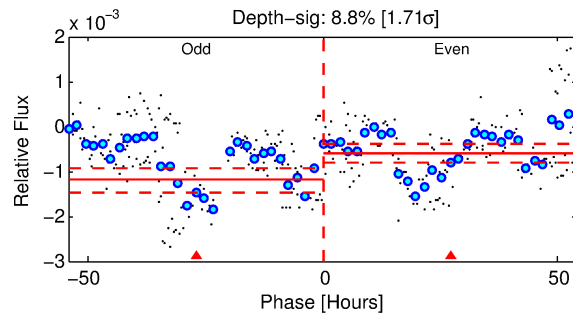
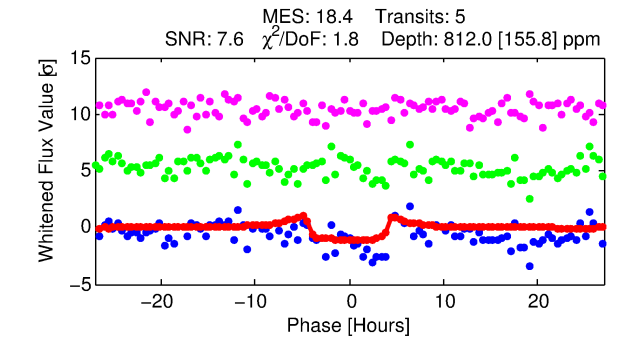
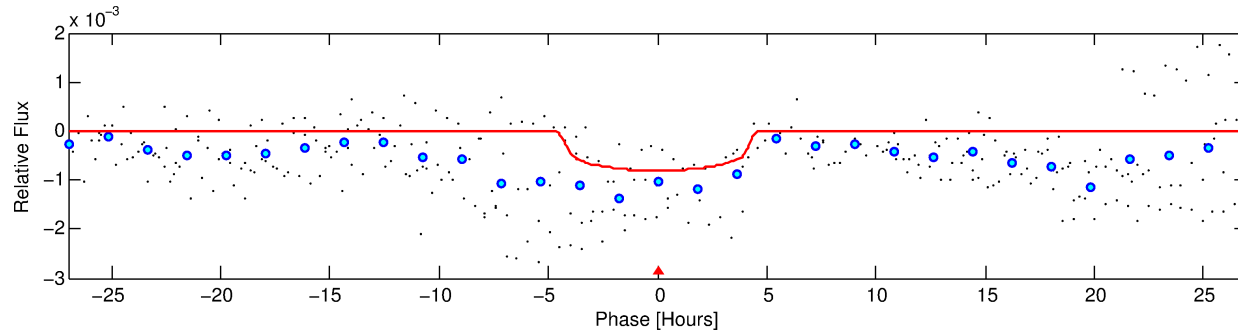
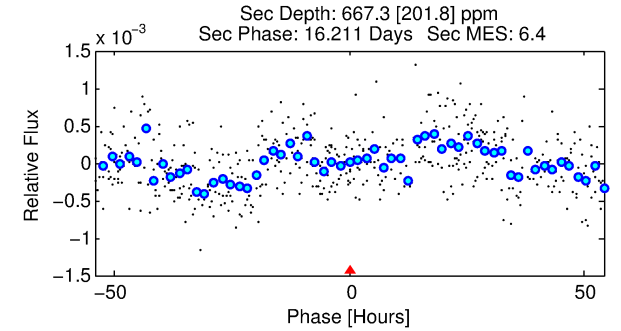
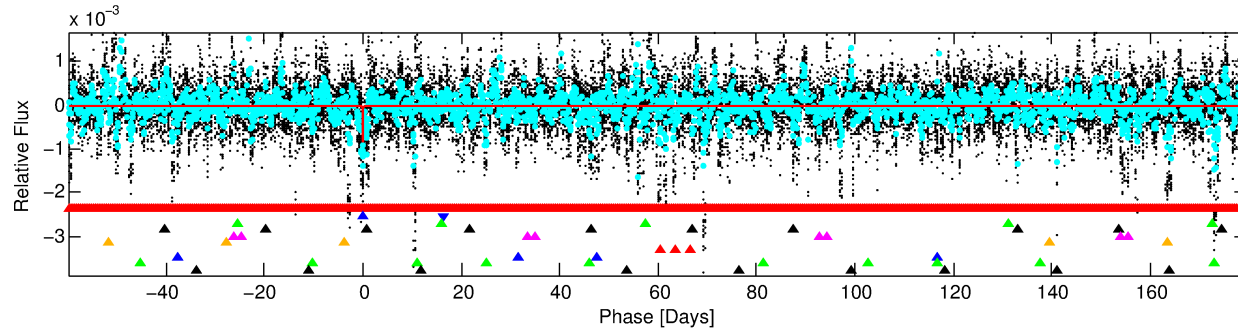
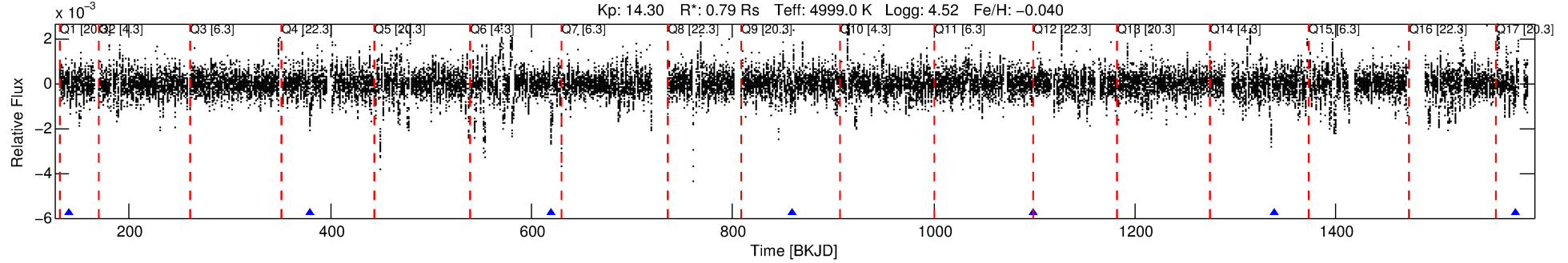
Ephemeris Match Information For 005475641-02

No Significant Match Found

# DV One-Page Summary

KIC: 5475641 Candidate: 2 of 10 Period: 239.488 d  
KOI: K02895 Corr: No Ephemeris Match

Kp: 14.30 R\*: 0.79 Rs Teff: 4999.0 K Logg: 4.52 Fe/H: -0.040



## DV Fit Results:

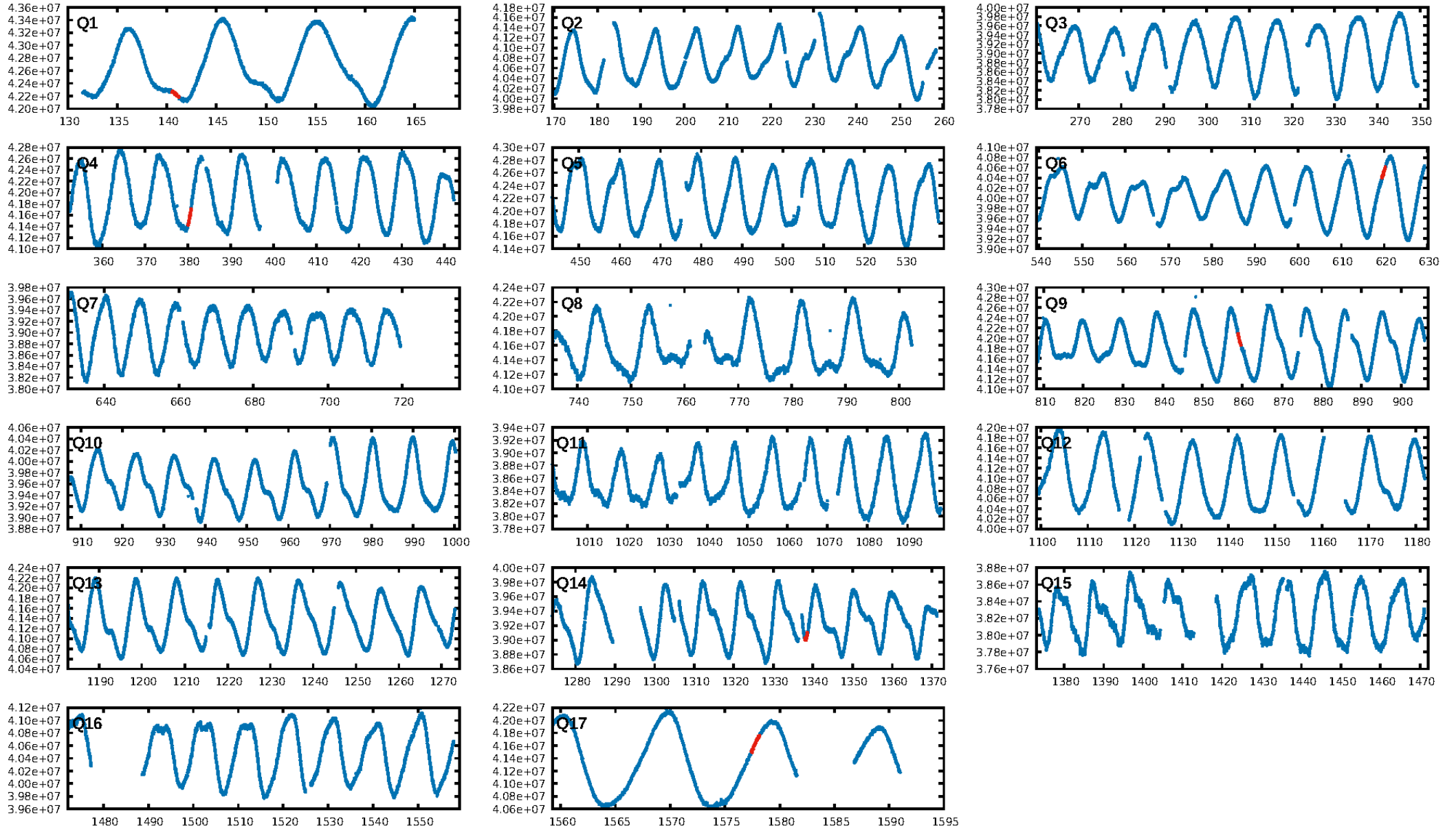
Period = 239.48767 [0.00701] d  
Epoch = 140.8638 [0.0205] BKJD  
Rp/R\* = 0.0277 [0.0149]  
a/R\* = 155.80 [284.27]  
b = 0.68 [1.44]  
Seff = 0.73 [0.13]  
Teq = 236 [11] K  
Rp = 2.37 [1.30] Re  
a = 0.6863 [0.0617] AU  
Ag = 30673.06 [34543.81] [0.89σ]  
Teffp = 4829 [1357] K [3.38σ]

## DV Diagnostic Results:

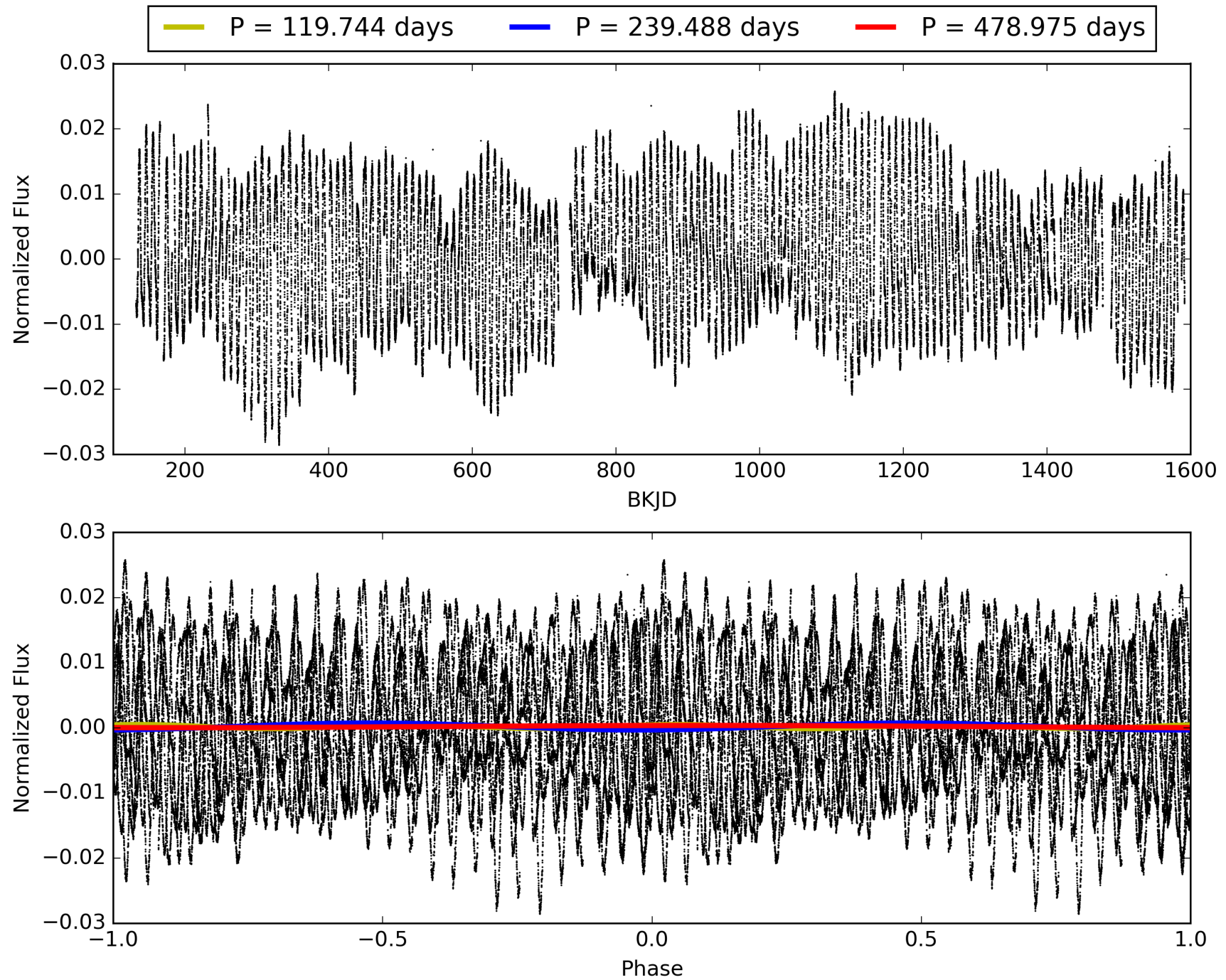
ShortPeriod-sig: 100.0% [96.85σ]  
LongPeriod-sig: 100.0% [58.33σ]  
ModelChiSquare2-sig: 0.8%  
ModelChiSquareGof-sig: 99.8%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: -2.095  
Centroid-sig: N/A  
Centroid-so: 1.825 arcsec [0.96σ]  
OotOffset-rm: N/A  
OotOffset-st: 0/0/0 [0]  
KicOffset-rm: N/A  
KicOffset-st: 0/0/0 [0]  
DiffImageQuality-fgm: N/A  
DiffImageOverlap-fno: 0.00 [0/5]



# TCE 005475641-02, PDC Light Curves

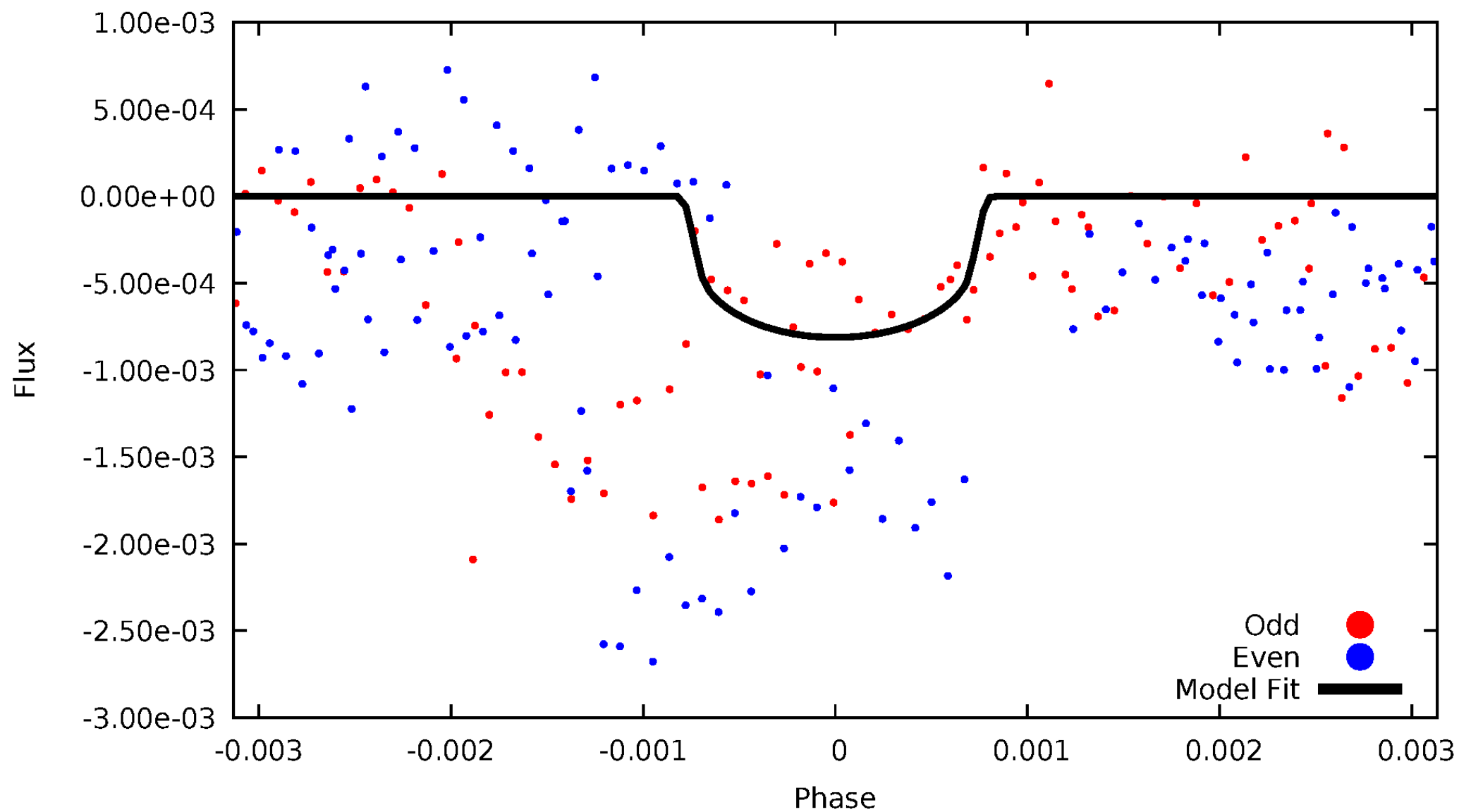


TCE 005475641-02



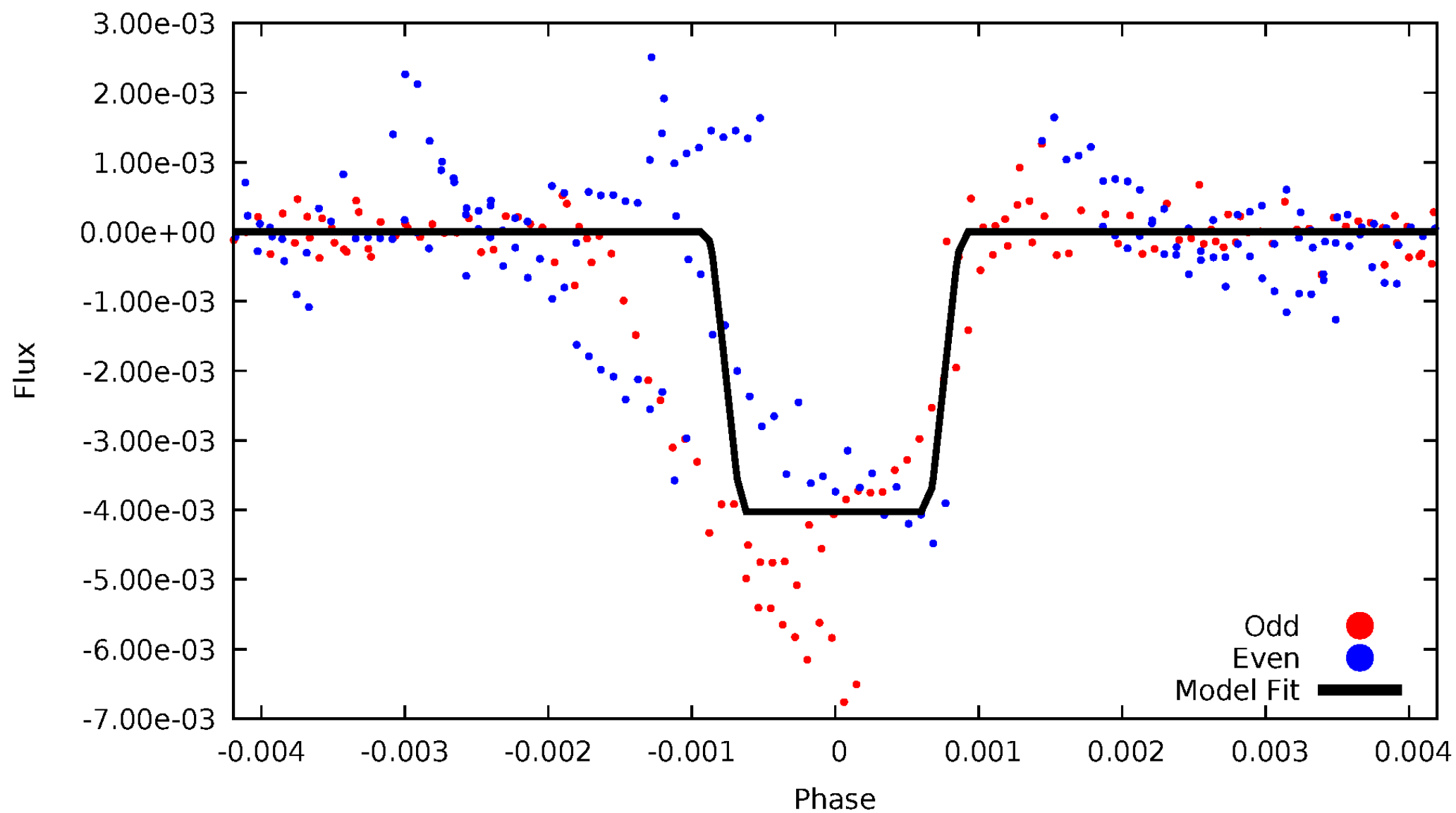
# DV Odd/Even

TCE 005475641-02



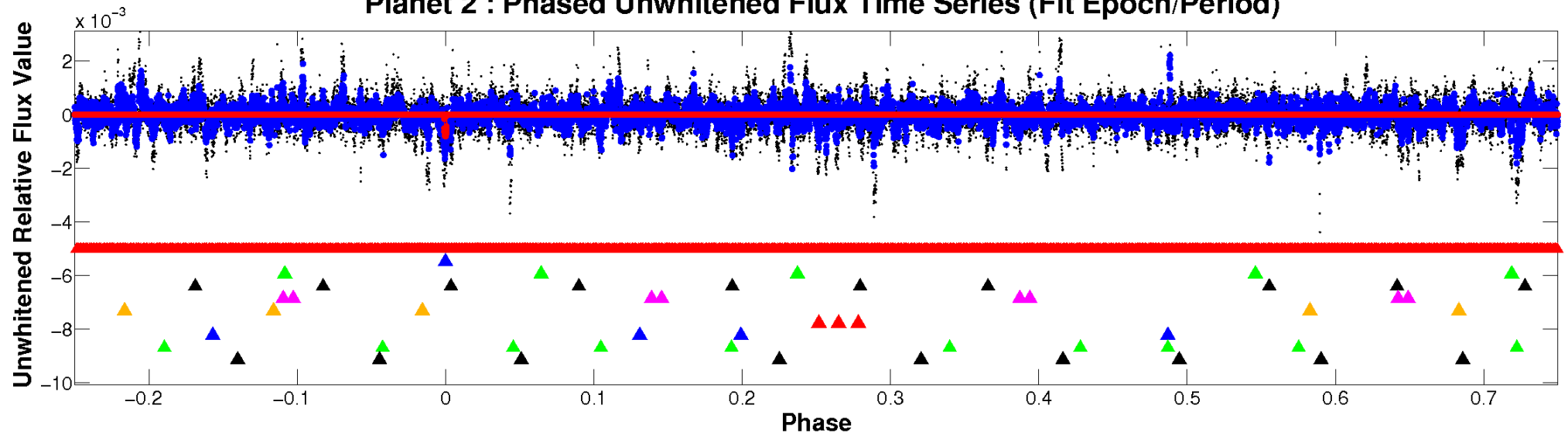
# ALT Odd/Even

TCE 005475641-02

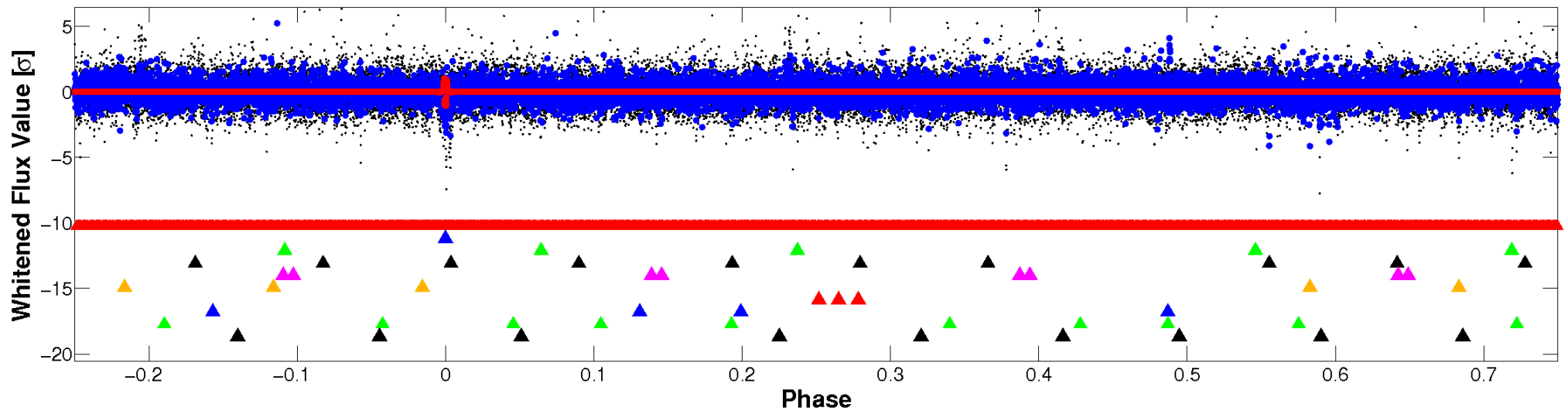


# Non-Whitened Vs. Whitened Light Curve

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



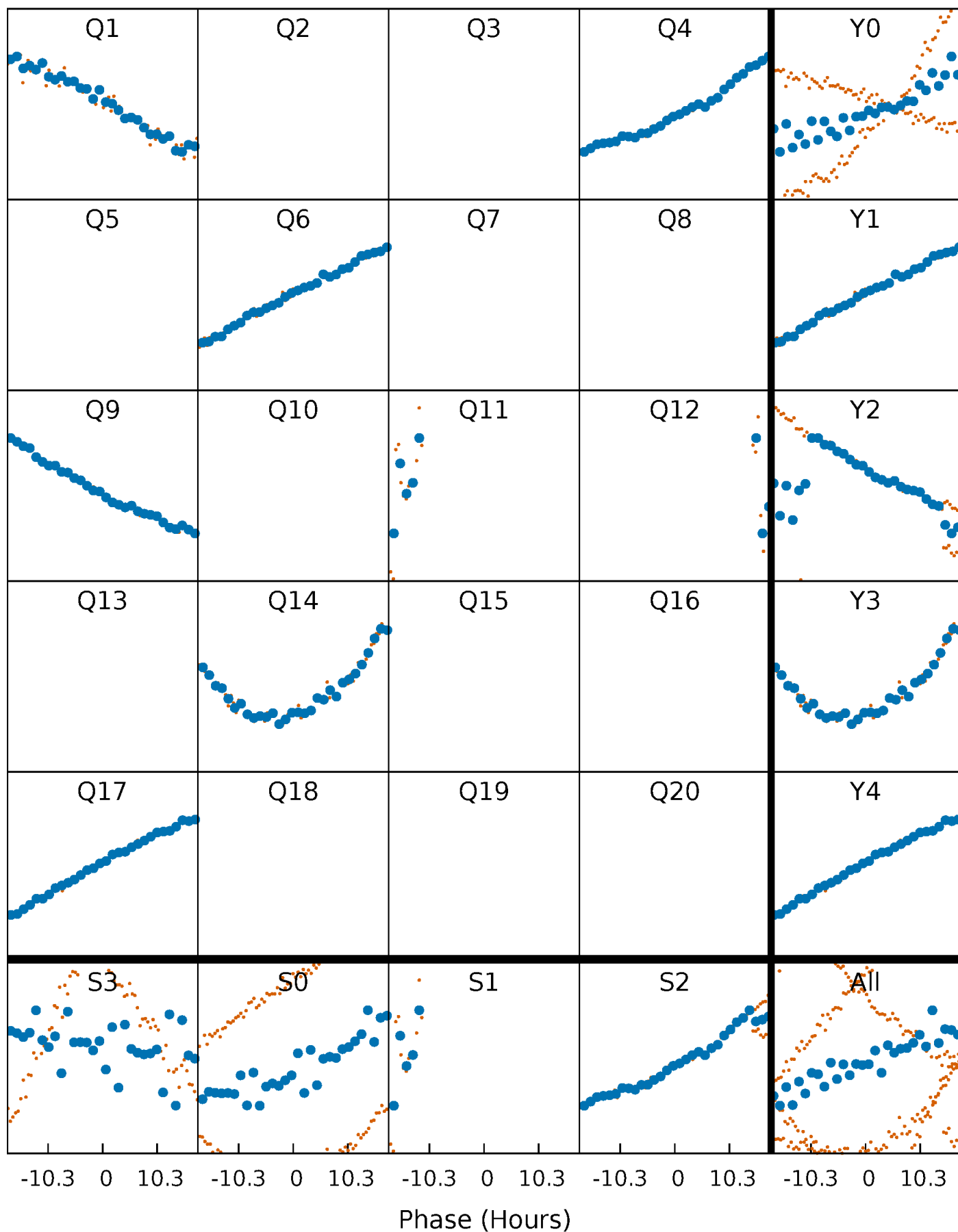
Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)





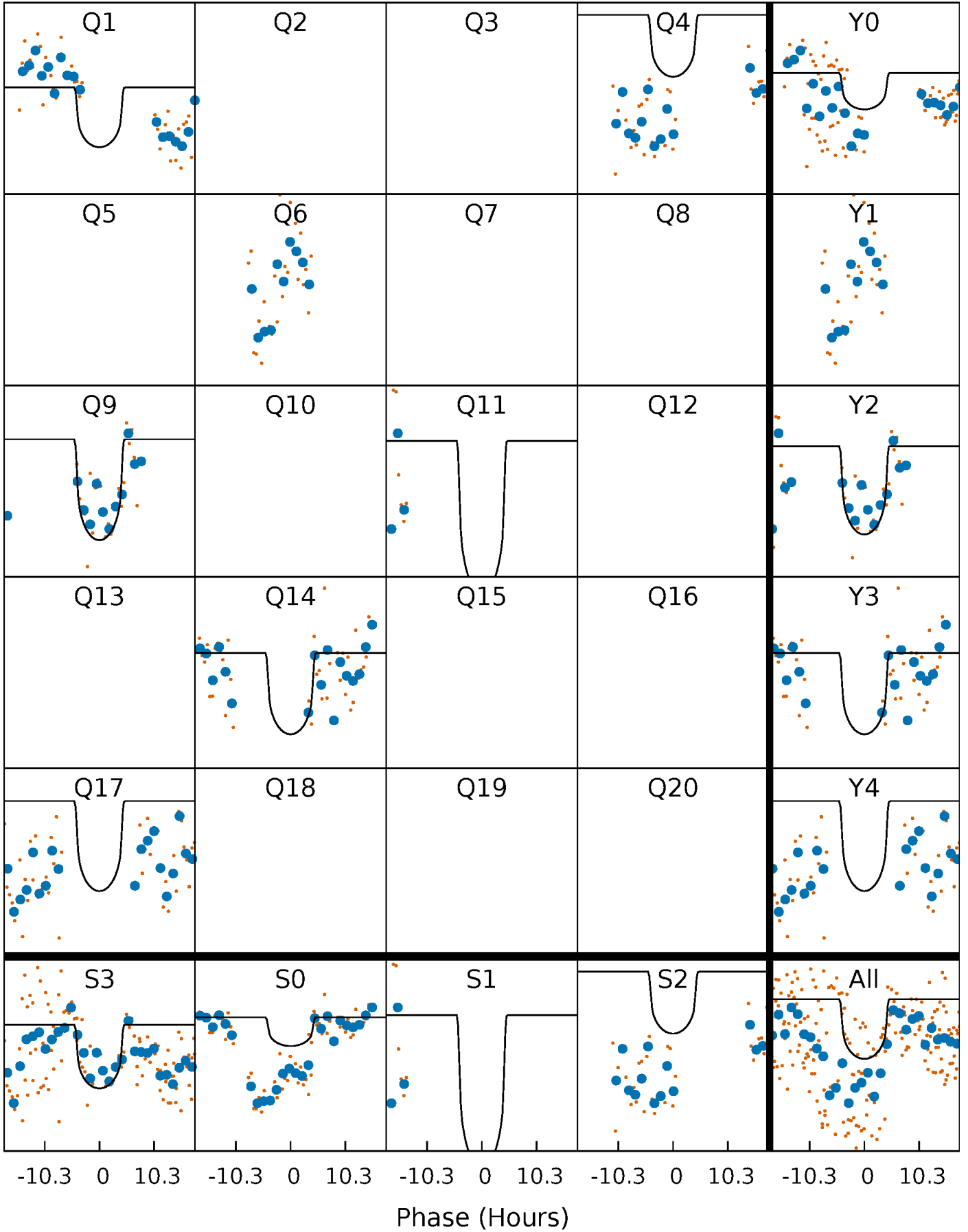
# PDC Quarter-Phased Transit Curves

TCE 005475641-02 P=239.487671 Days  $T_0=140.863826$  (BKJD)



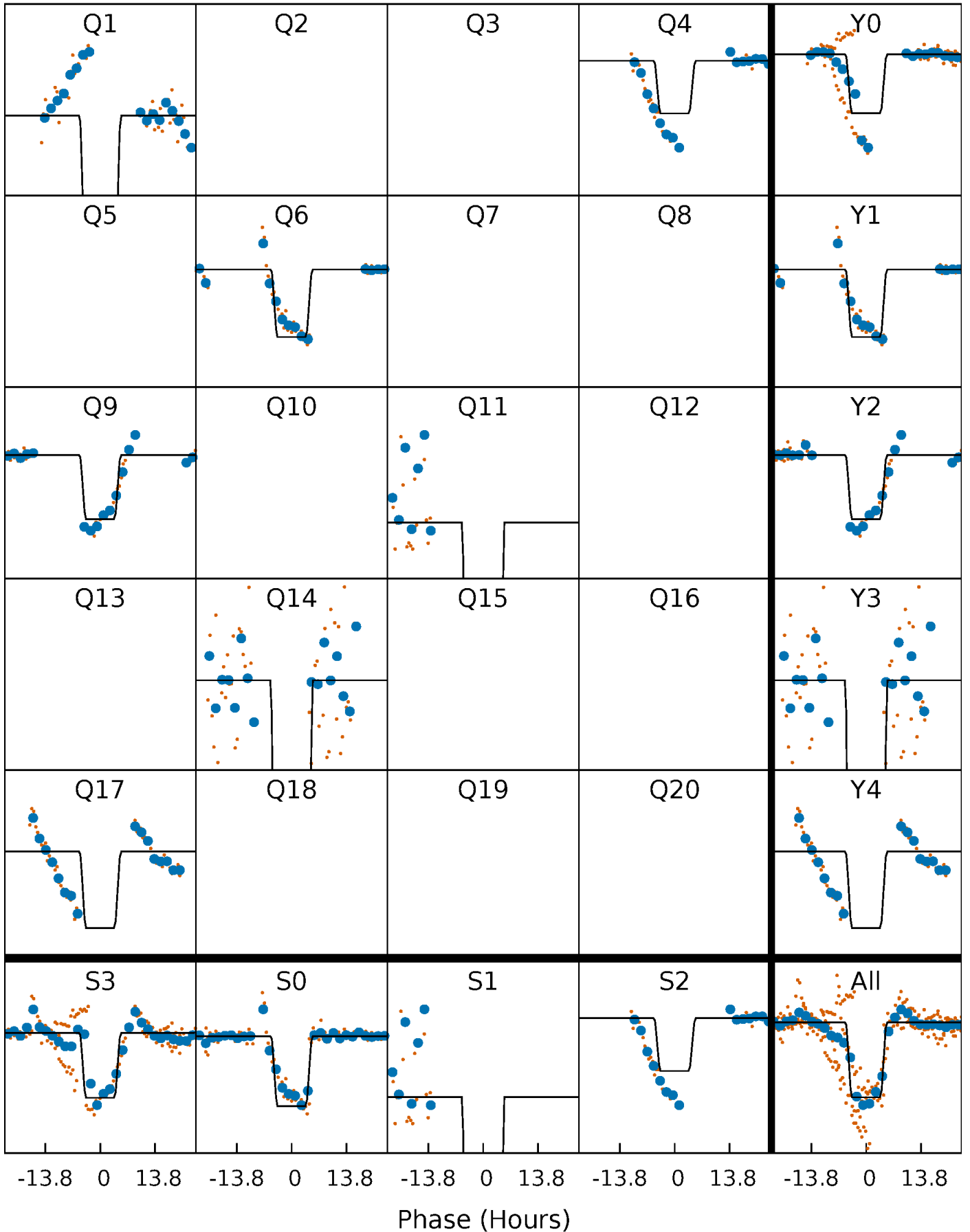
# DV Quarter-Phased Transit Curves

TCE 005475641-02     $P=239.487671$  Days     $T_0=140.863826$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

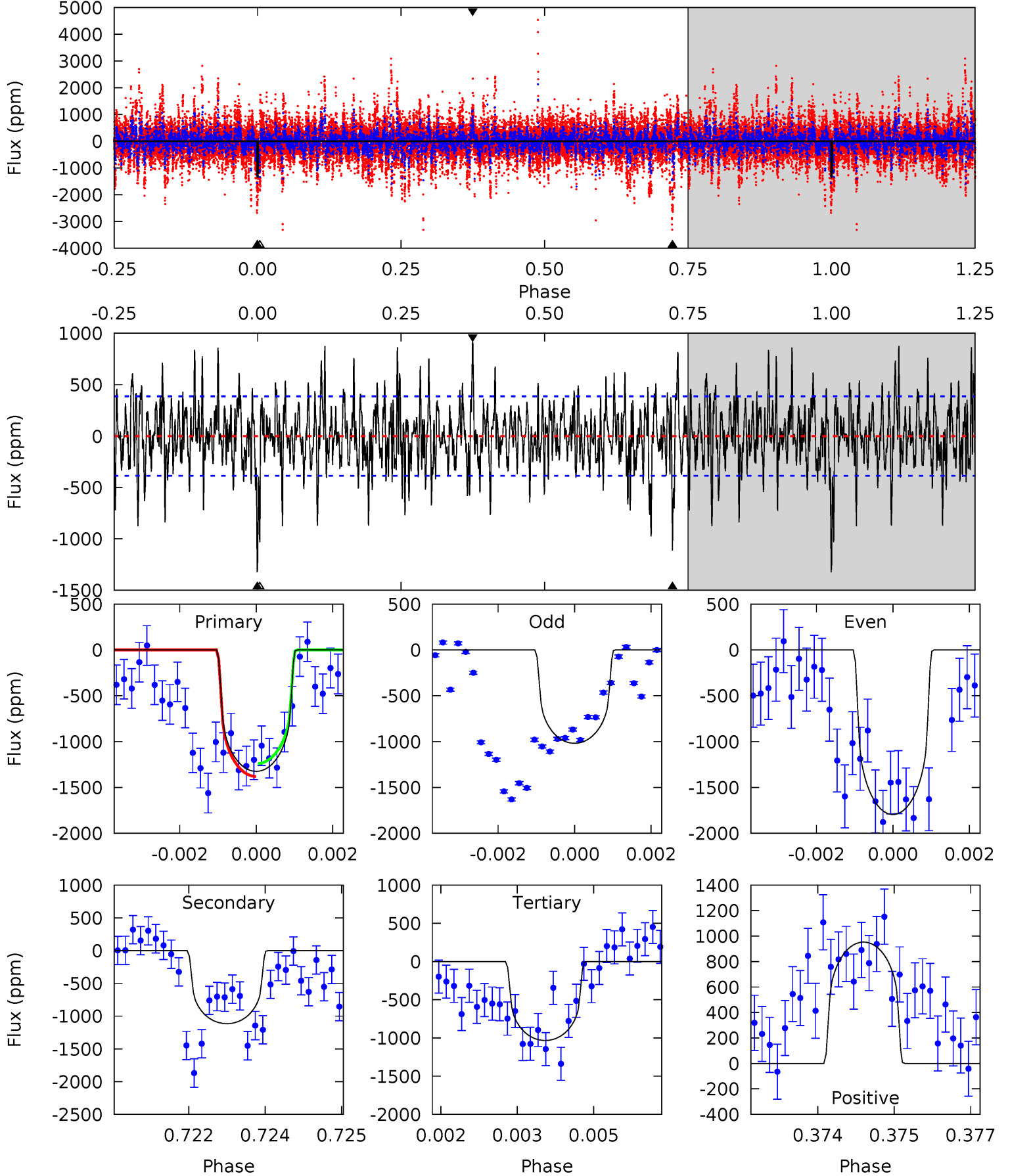
TCE 005475641-02     $P=239.481323$  Days     $T_0=140.853339$  (BKJD)



# DV Model-Shift Uniqueness Test

005475641-02, P = 239.487671 Days, E = 140.863826 Days

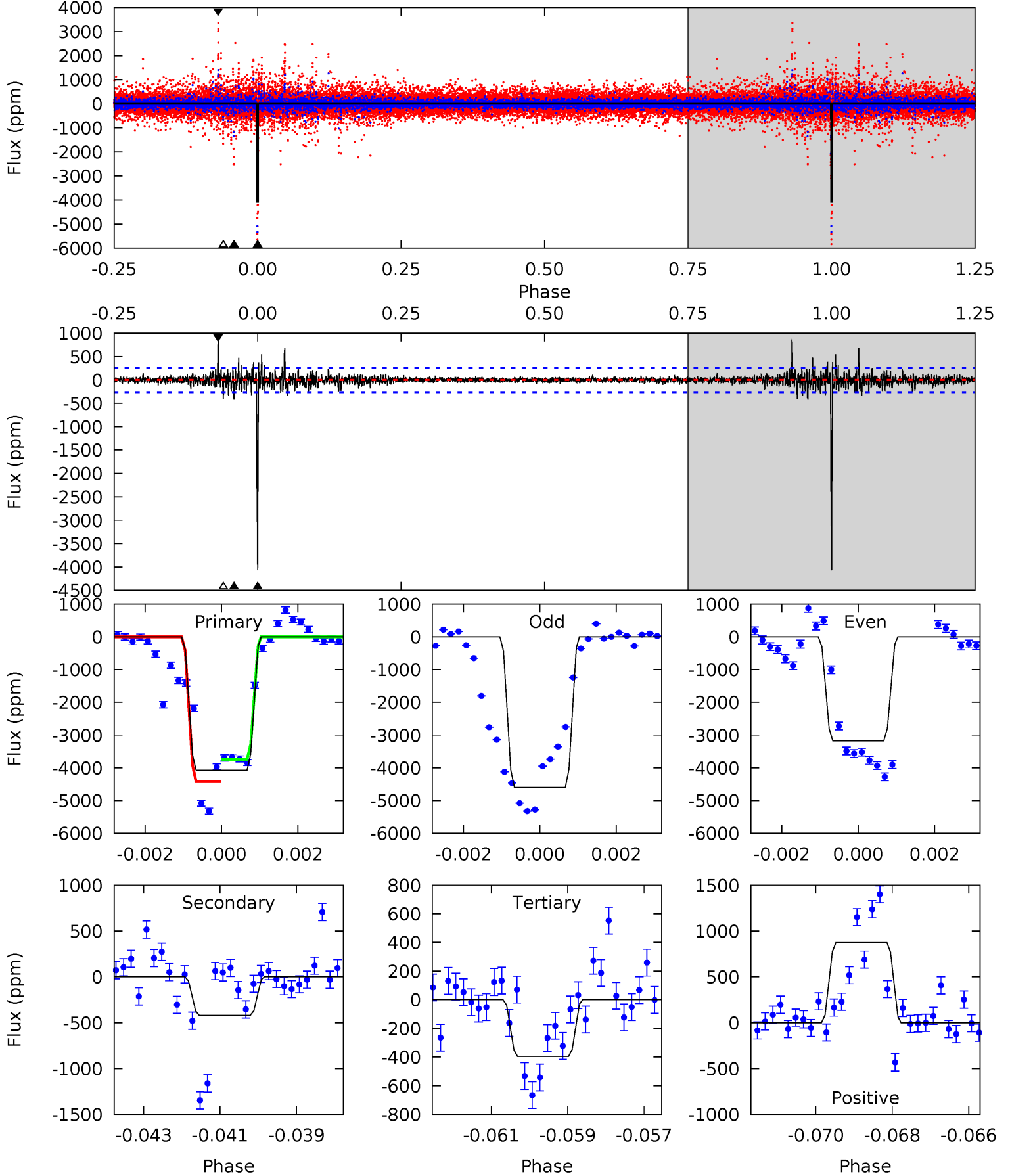
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
18.4	15.5	14.3	13.2	5.37	3.16	3.72	4.04	5.16	1.13	2.25	4.93	1.24	0.42	0.94



# Alt Model-Shift Uniqueness Test

005475641-02, P = 239.481323 Days, E = 140.853339 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
84.2	8.70	8.18	18.1	5.35	3.12	1.45	76.0	66.1	0.52	-9.38	13.5	0.70	0.18	7.13





### Stellar Parameters For KIC 005475641

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4999^{+151}_{-136}$	$4.523^{+0.078}_{-0.052}$	$-0.040^{+0.300}_{-0.300}$	$0.786^{+0.063}_{-0.079}$	$0.752^{+0.085}_{-0.057}$	$2.180^{+0.701}_{-0.371}$
	+3%/-3%	+2%/-1%	+750%/-750%	+8%/-10%	+11%/-8%	+32%/-17%
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 005475641-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-1115 \pm 72$	$2.41^{+1.28}_{-1.14}$	$329^{+12}_{-12}$	$5403^{+2118}_{-921}$	$50992^{+130909}_{-29831}$
Alt.	$-421 \pm 48$	$5.49^{+1.28}_{-1.30}$	$329^{+12}_{-13}$	$3335^{+276}_{-231}$	$3661^{+2627}_{-1298}$

$T_{\text{max}}$  = 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

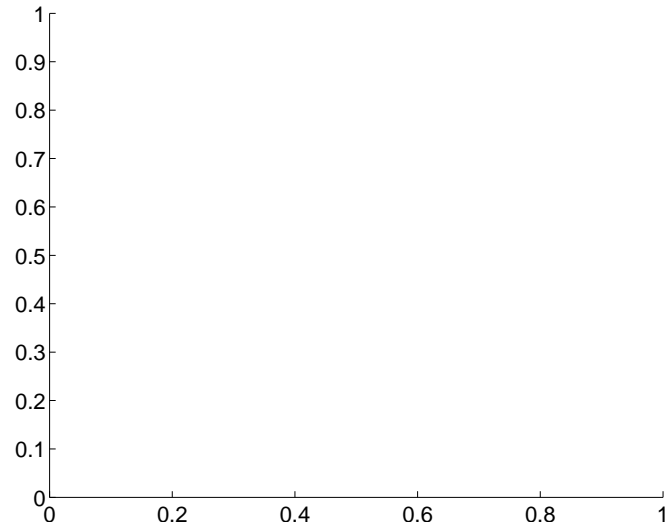
Supplemental centroid analysis for 005475641-02. Kepler magnitude: 14.30. Transit SNR 7.57

There are 0 quarters with good PRF difference image offsets

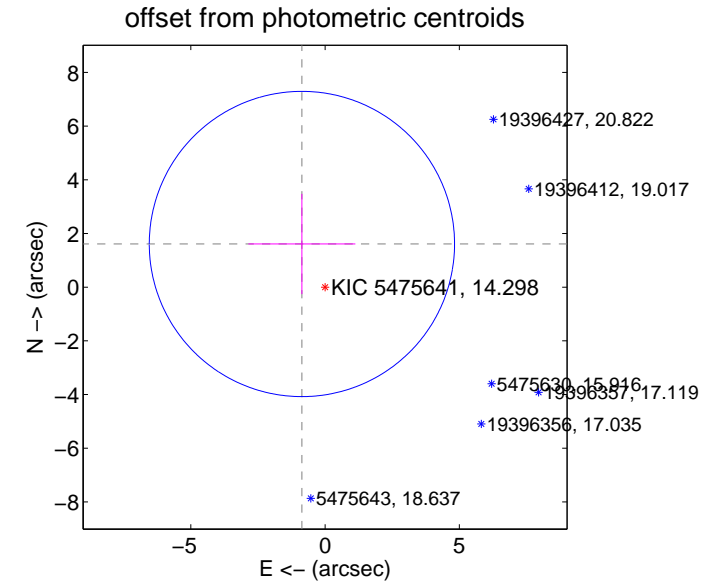
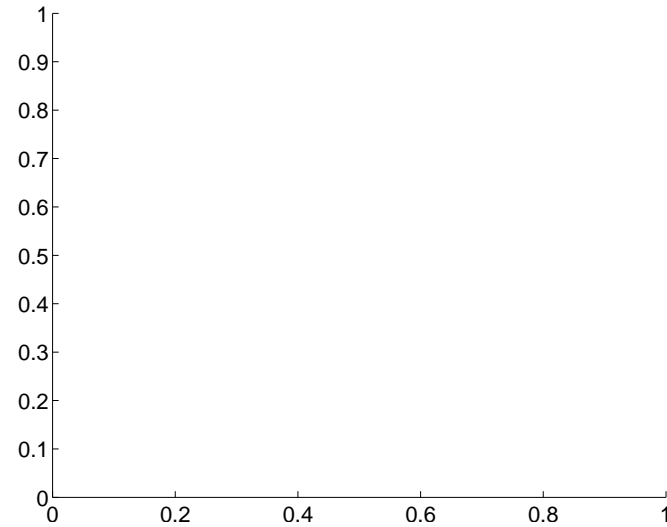
The direct PRF centroid is offset from the target star catalog position by about NaN arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	—	—	—	—
PRF-fit source offset from KIC position	—	—	—	—
photometric centroid source offset	$1.83 \pm 1.90$	0.96	$0.86 \pm 1.99$	$1.61 \pm 1.87$

There is no PRF-fit offset from OOT-fit

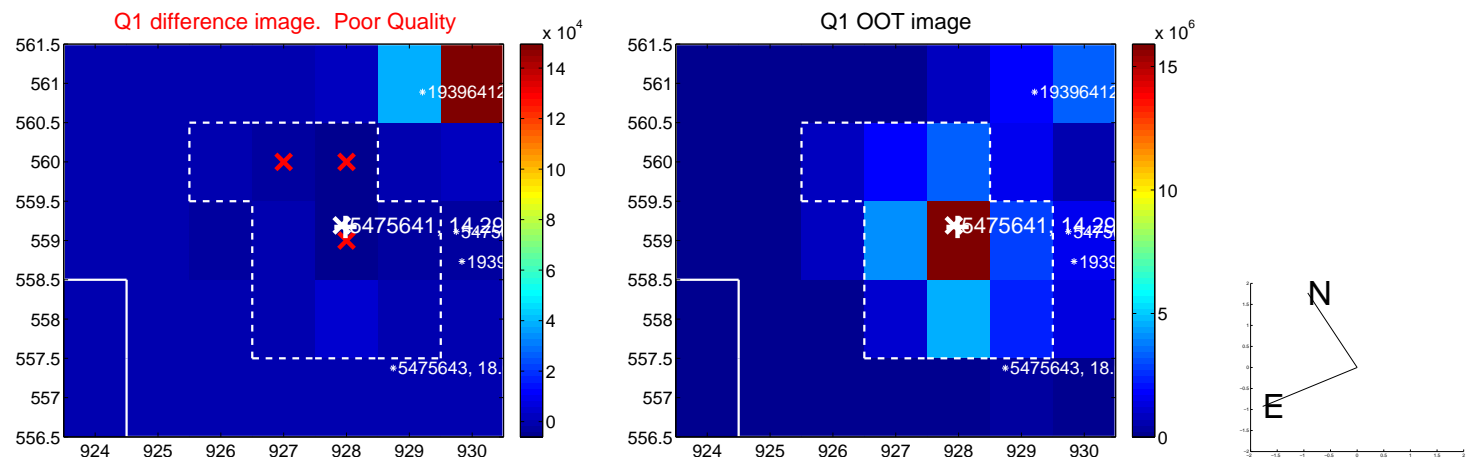


There is no PRF-fit offset from KIC

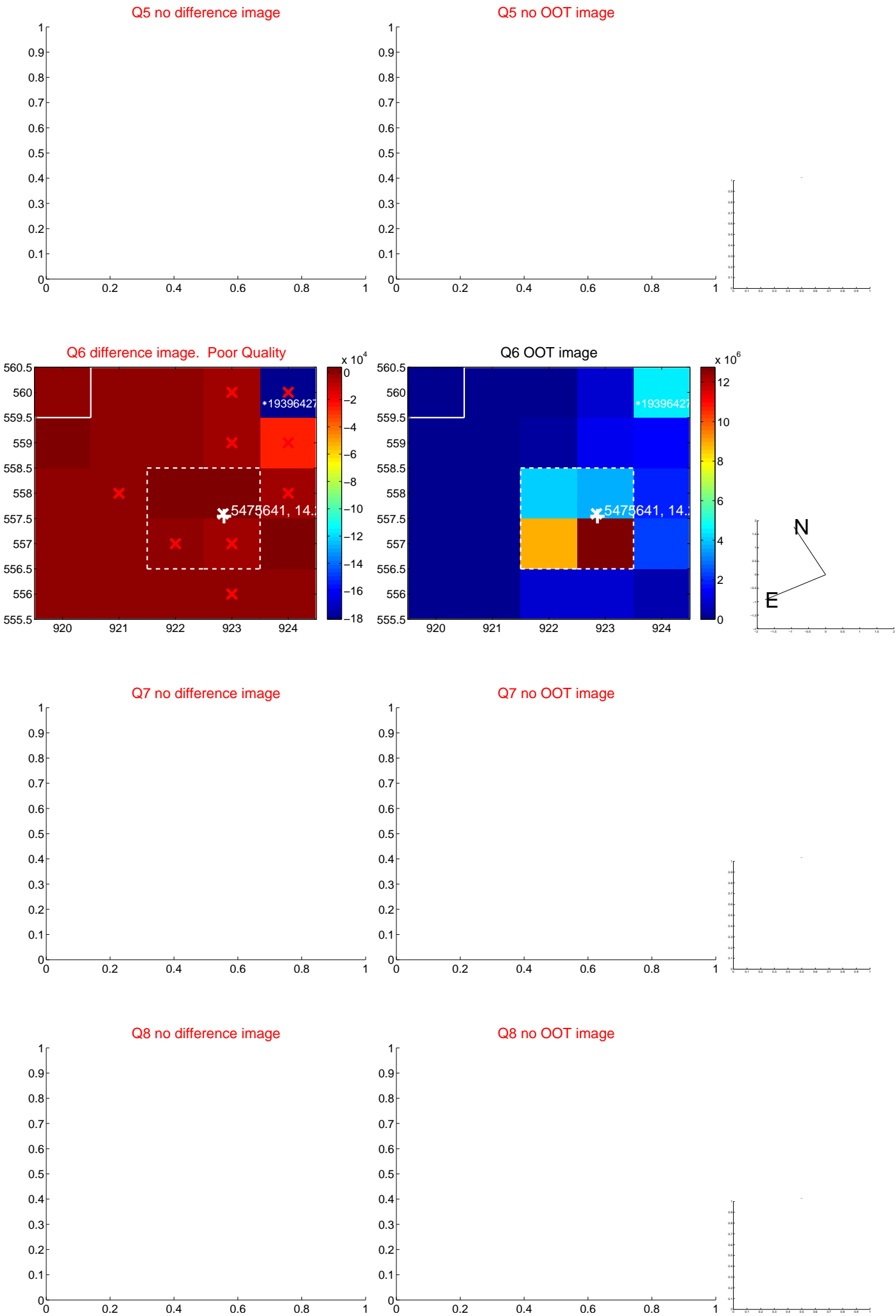


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

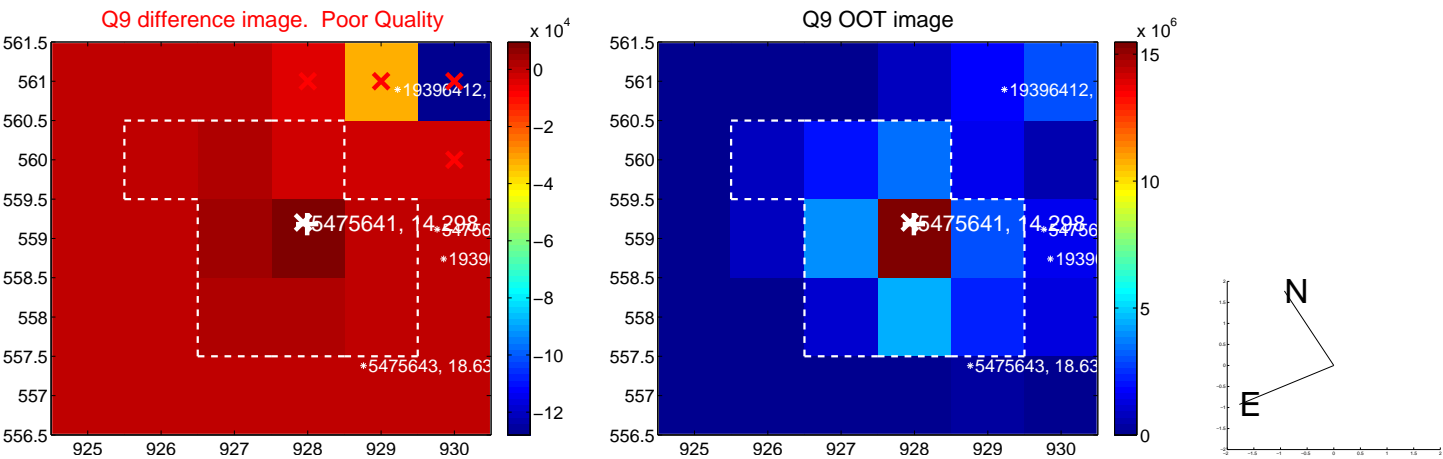
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



white ×: 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.

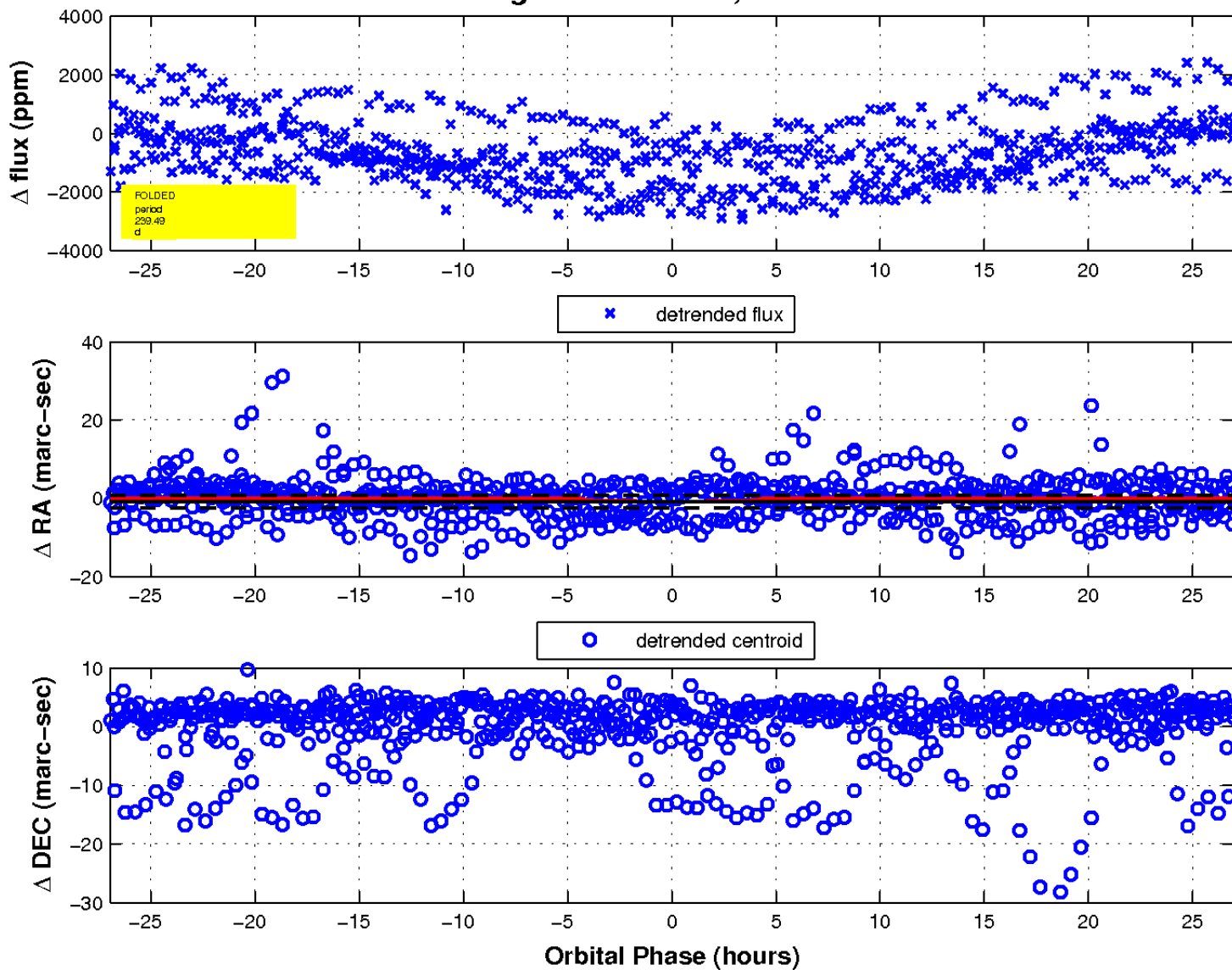
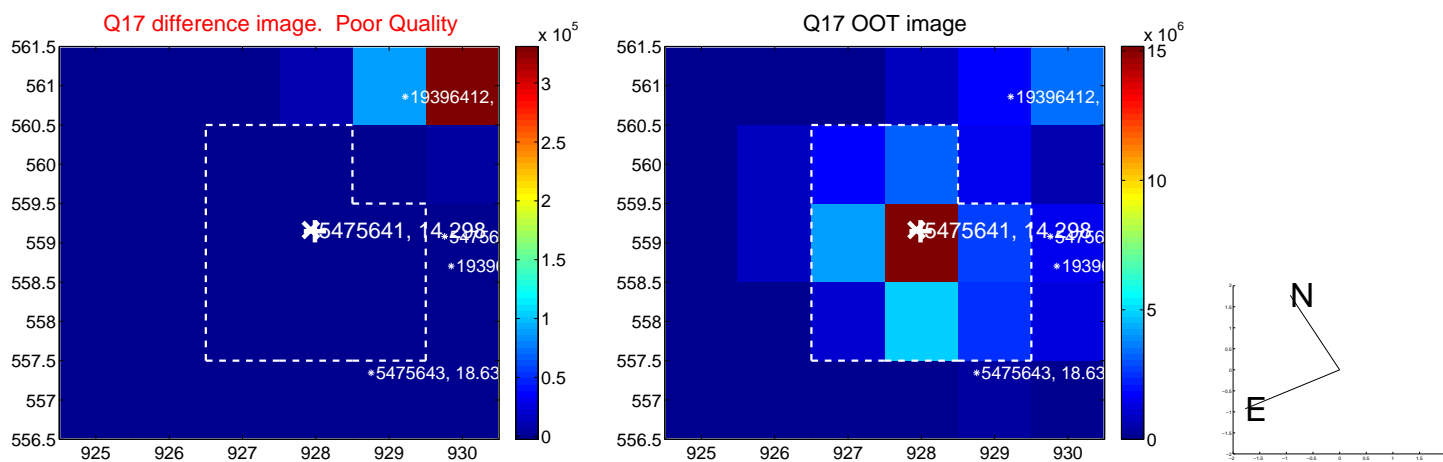




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

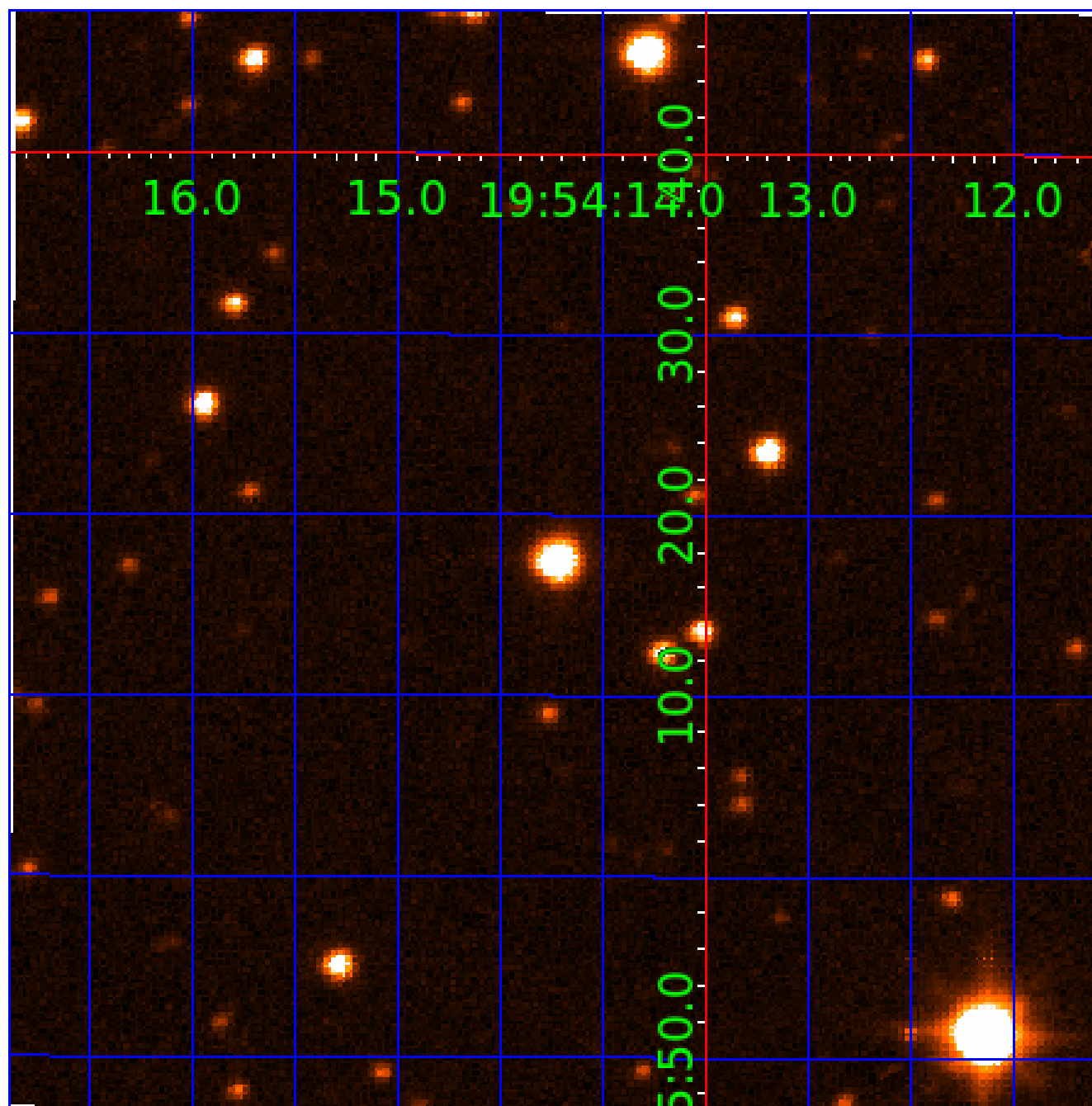


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 005475641

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005475641-01	OBS	2895.01	1.069827	132.452550	68.4	4.298	11.2	13.7	0.79	4999	0.81	997.60
005475641-02	OBS	No	239.487671	140.863826	812.0	8.997	18.4	7.6	0.79	4999	2.37	0.73
005475641-03	OBS	No	280.872905	271.644348	1182.9	7.500	15.9	-1.0	0.79	4999	2.62	0.59
005475641-04	OBS	No	152.776853	162.394839	673.1	9.042	13.6	7.7	0.79	4999	2.20	1.34
005475641-05	OBS	No	180.020691	233.604204	856.6	11.672	12.6	7.7	0.79	4999	2.70	1.07
005475641-07	OBS	No	475.792717	447.008273	1185.4	12.541	12.7	6.2	0.79	4999	2.68	0.29
005475641-08	OBS	No	393.701860	188.565963	1971.7	21.017	11.9	8.1	0.79	4999	4.07	0.38
005475641-09	OBS	No	147.912710	257.518469	516.6	19.634	11.2	4.7	0.79	4999	1.75	1.40

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005475641-01	OBS	FP	0.00	0	0	1	1	CENT_RESOLVED_OFFSET—HALO_GHOST—EPHEM_MATCH
005475641-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005475641-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_NOFITS
005475641-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005475641-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—ALL_TRANS_CHASES—CENT_FEW_DIFFS—HALO_GHOST
005475641-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
005475641-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—CENT_FEW_DIFFS
005475641-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES

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

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

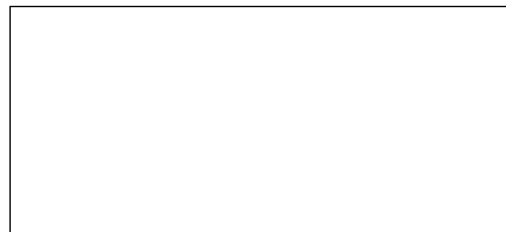
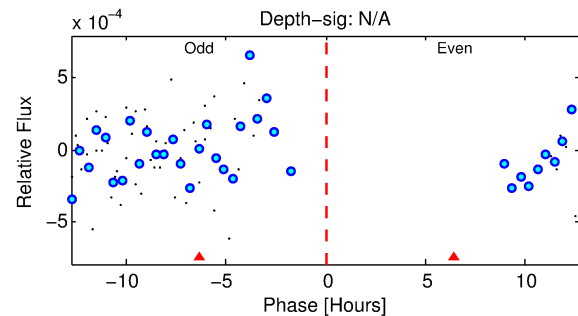
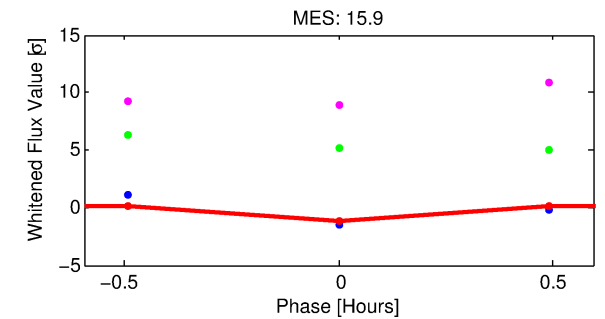
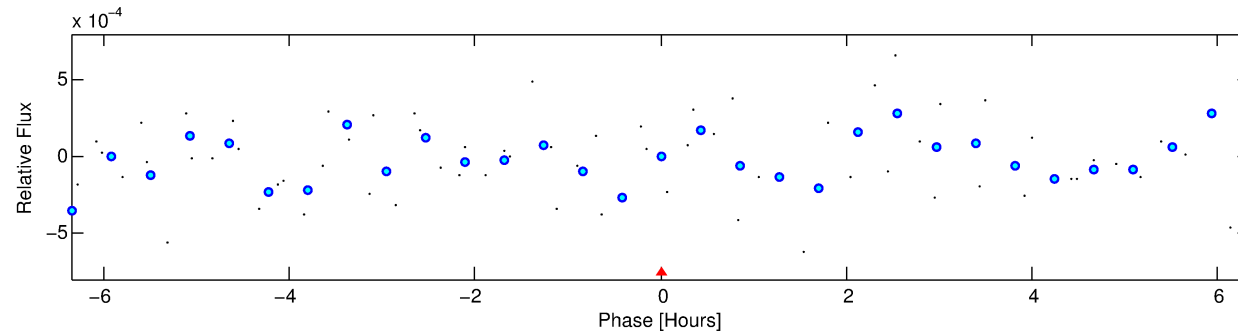
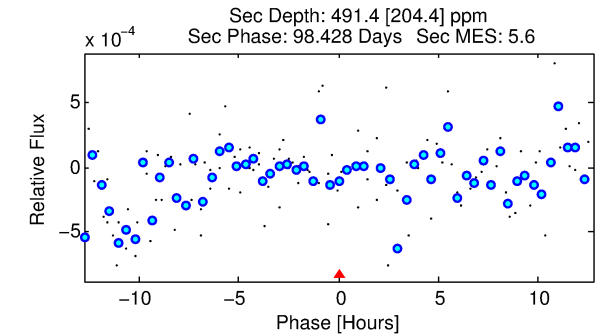
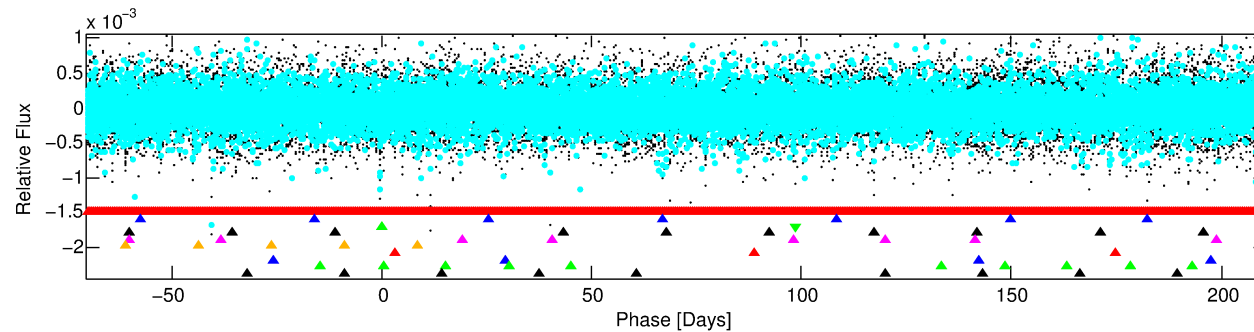
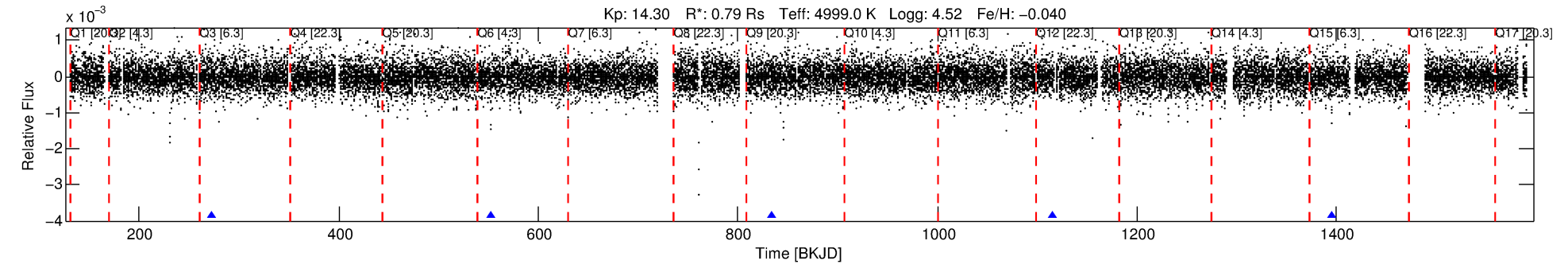
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 005475641-03

No Significant Match Found

# DV One-Page Summary

KIC: 5475641 Candidate: 3 of 10 Period: 280.873 d  
KOI: K02895 Corr: No Ephemeris Match



## TPS TCE Results:

Period = 280.87290 d  
Epoch = 271.6443 BKJD

DV fit results are unavailable

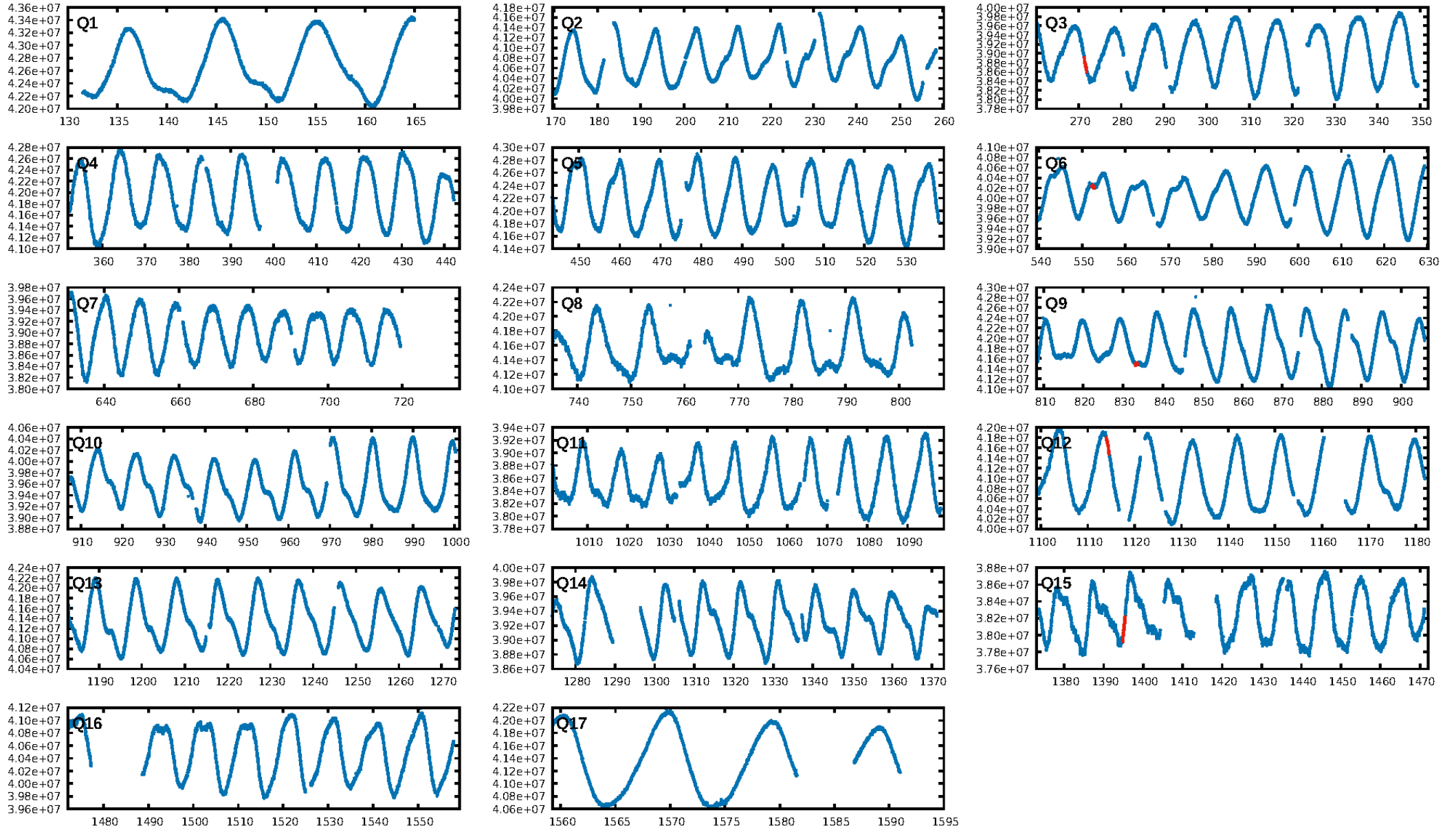
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [48.65σ]  
LongPeriod-sig: 100.0% [121.35σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: -0.6645  
Centroid-sig: N/A  
Centroid-so: 4.310 arcsec [1.29σ]  
OotOffset-rm: N/A  
KicOffset-rm: N/A  
OotOffset-st: 0/0/0 [0]  
KicOffset-st: 0/0/0 [0]  
DiffImageQuality-fgm: N/A  
DiffImageOverlap-fno: 0.40 [2/5]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 17:59:02 Z

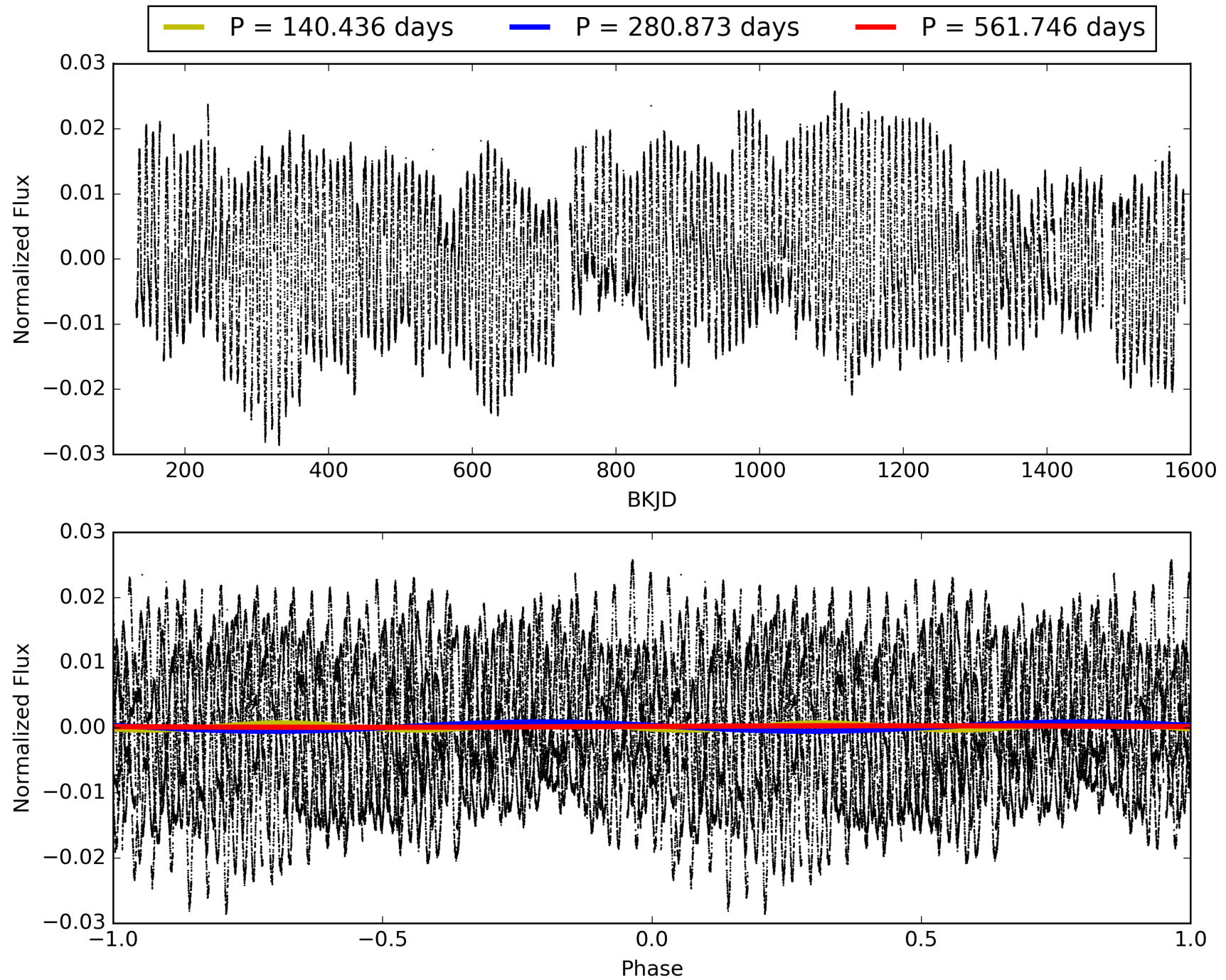
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 005475641-03, PDC Light Curves



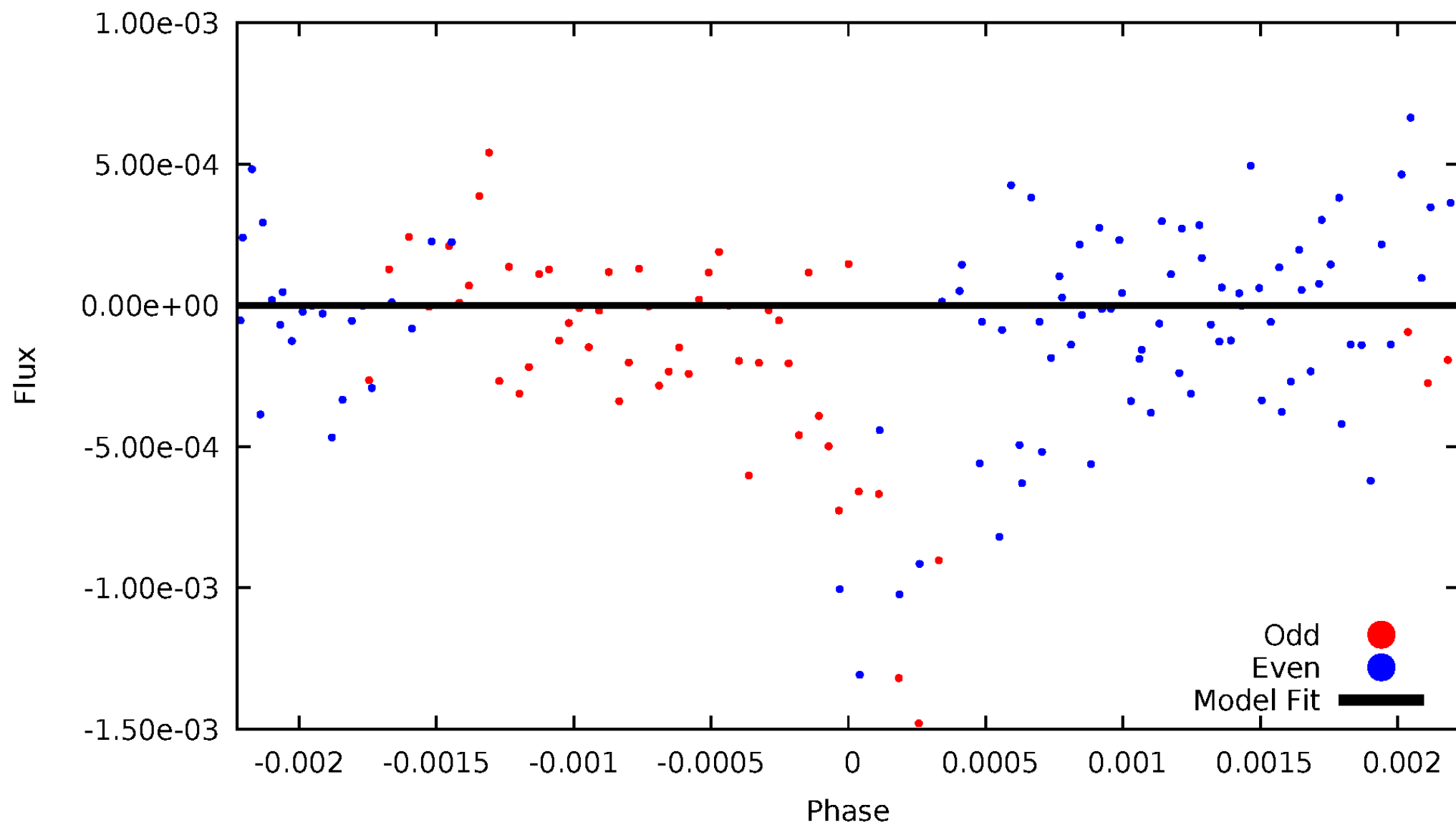


TCE 005475641-03



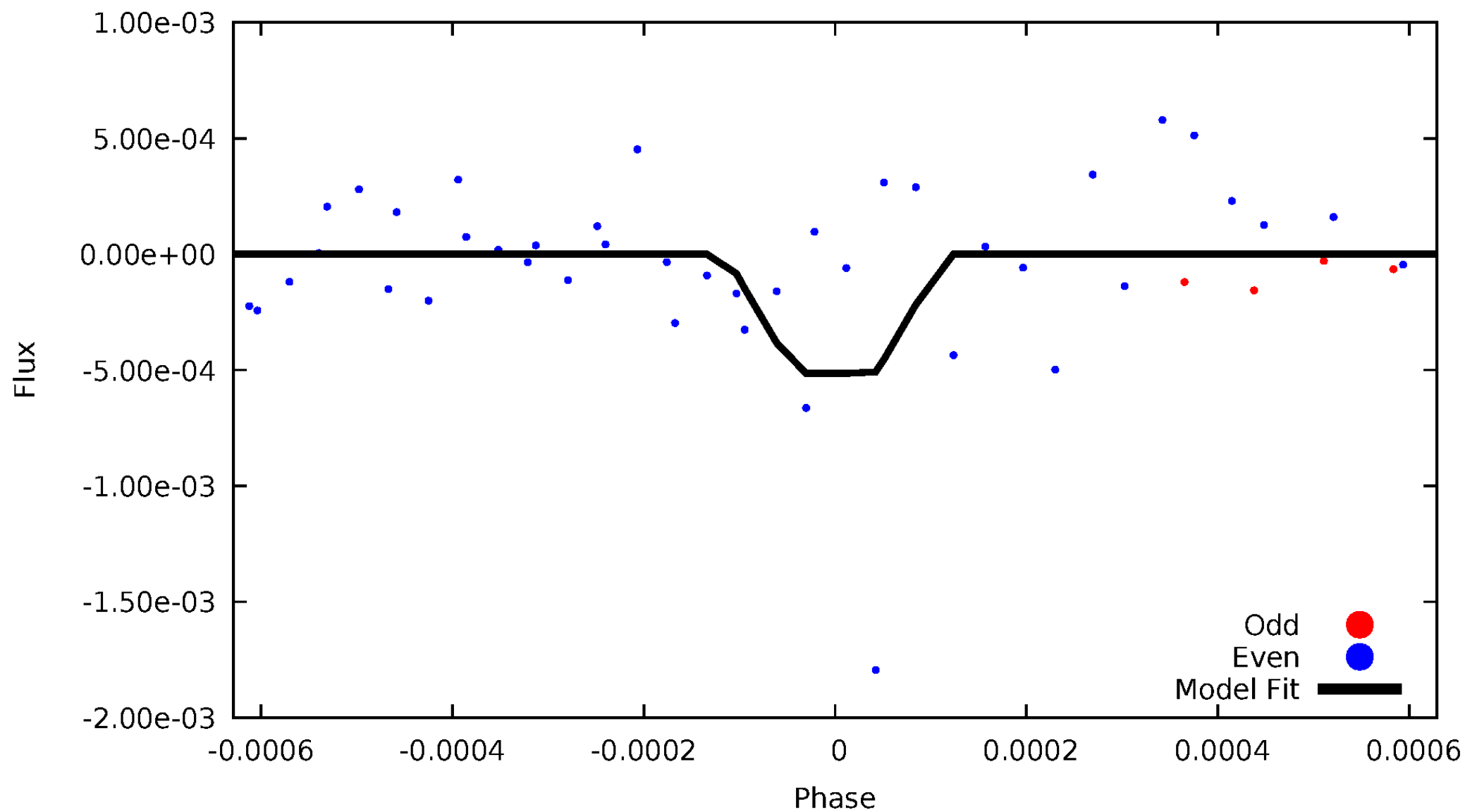
# DV Odd/Even

TCE 005475641-03

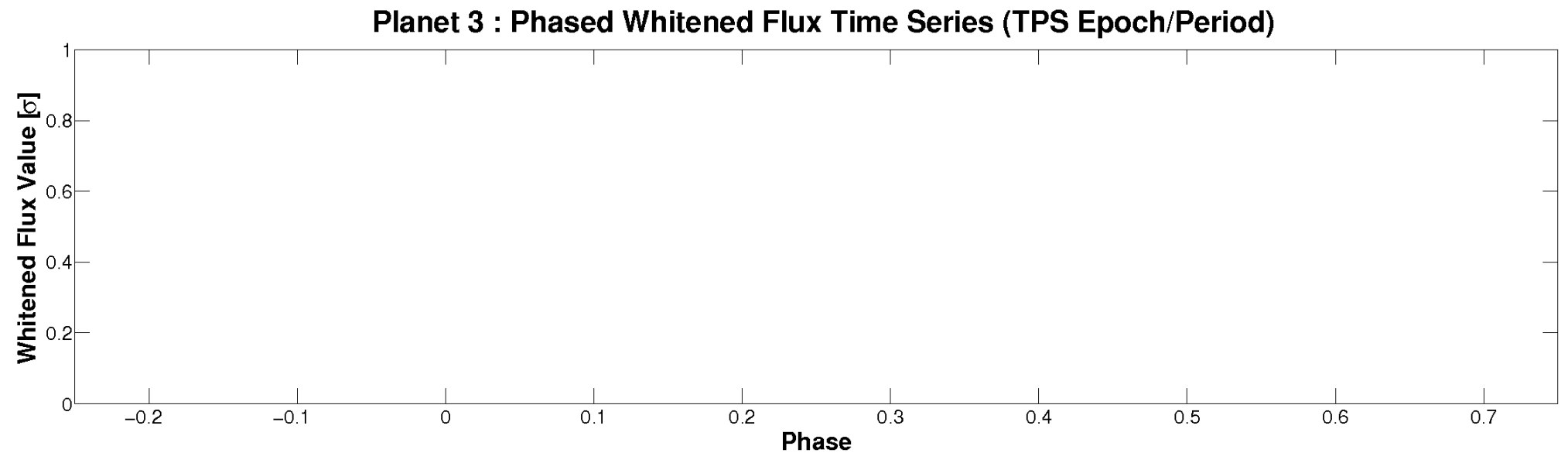
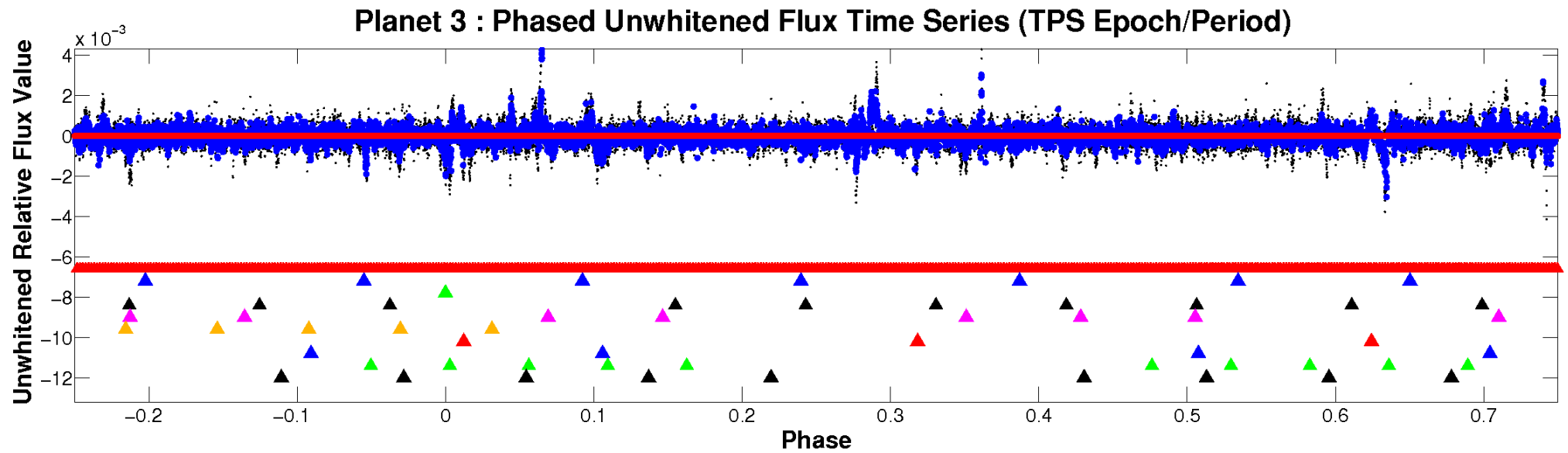


# ALT Odd/Even

TCE 005475641-03

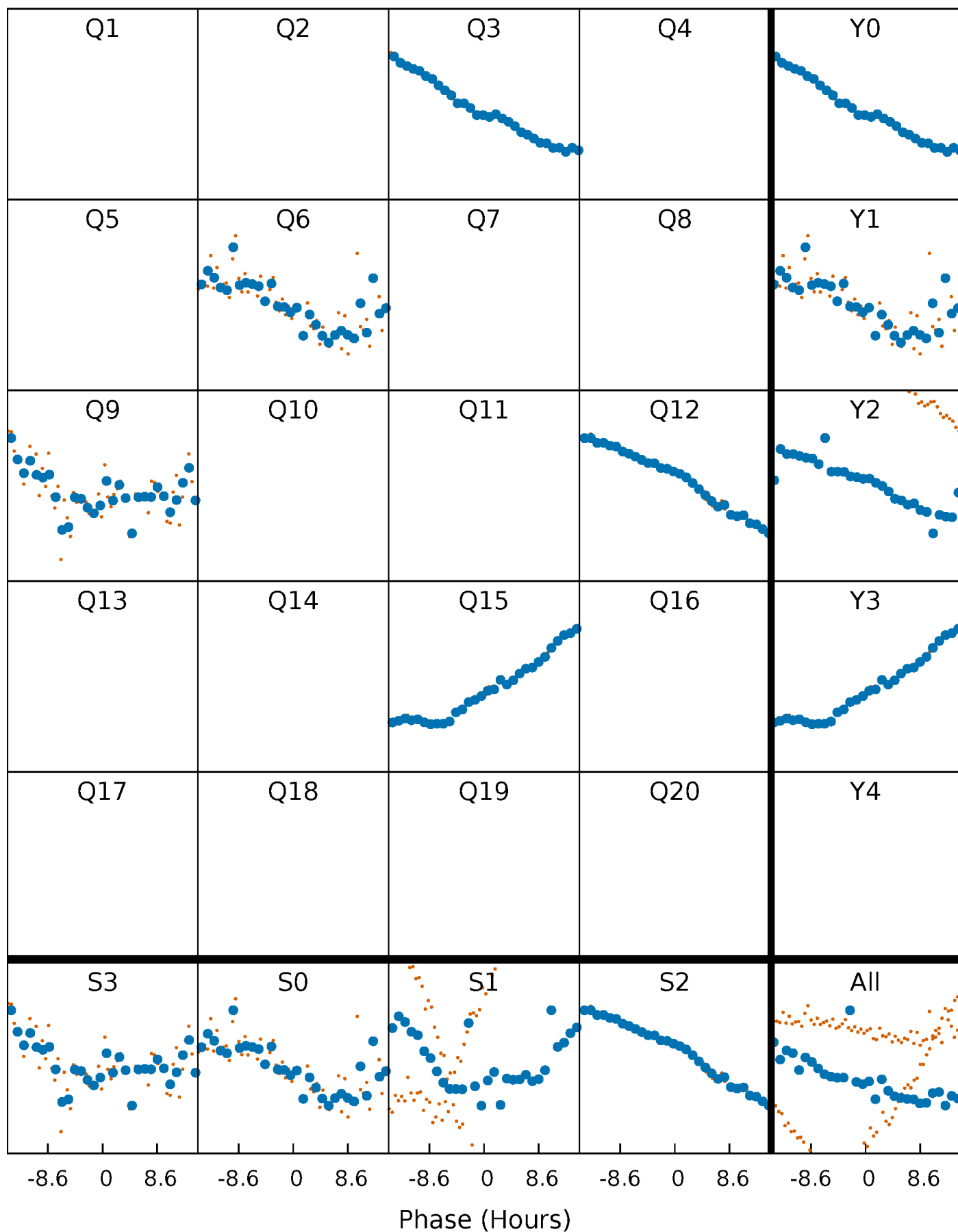


# Non-Whitened Vs. Whitened Light Curve



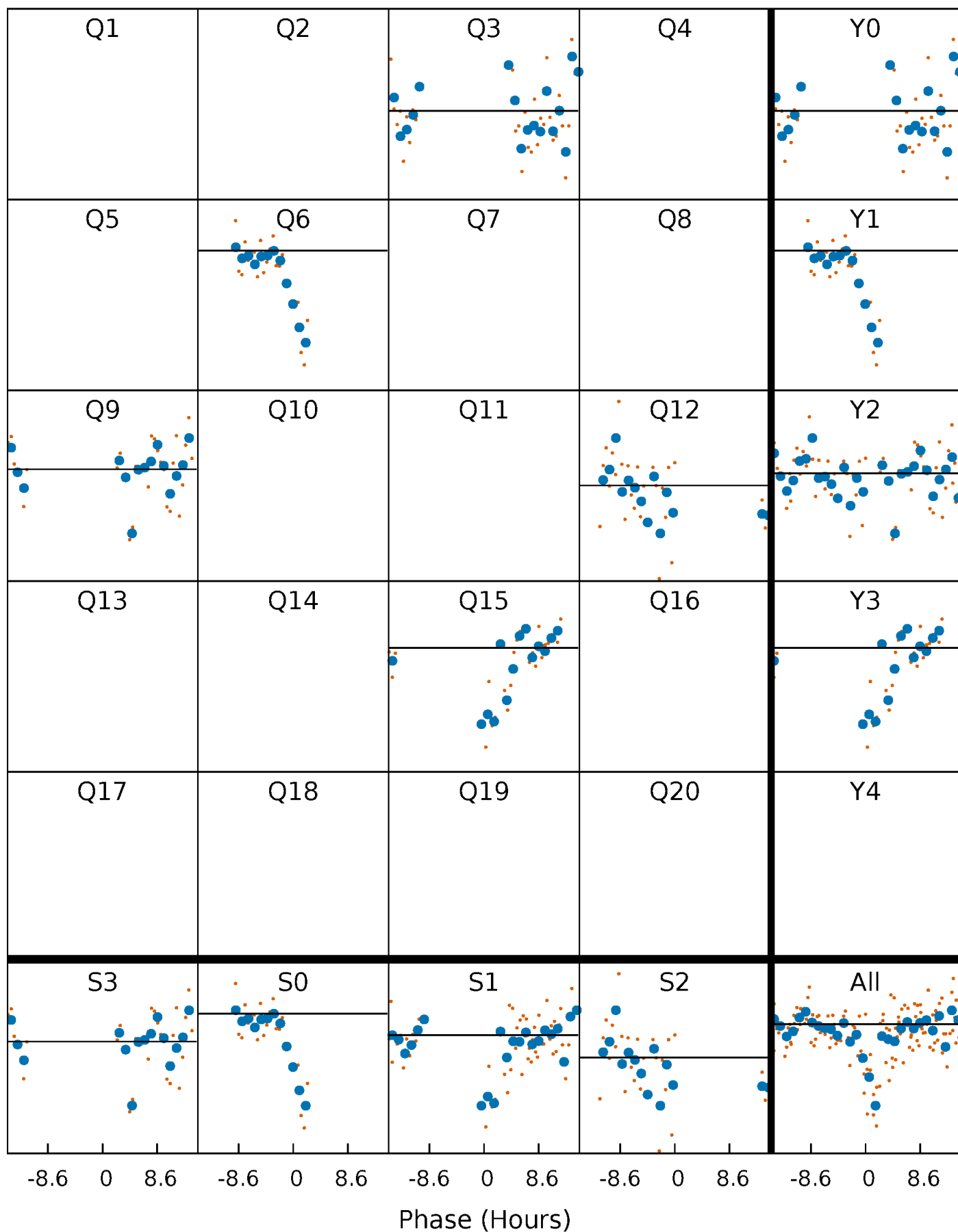
# PDC Quarter-Phased Transit Curves

TCE 005475641-03     $P=280.872905$  Days     $T_0=271.644348$  (BKJD)



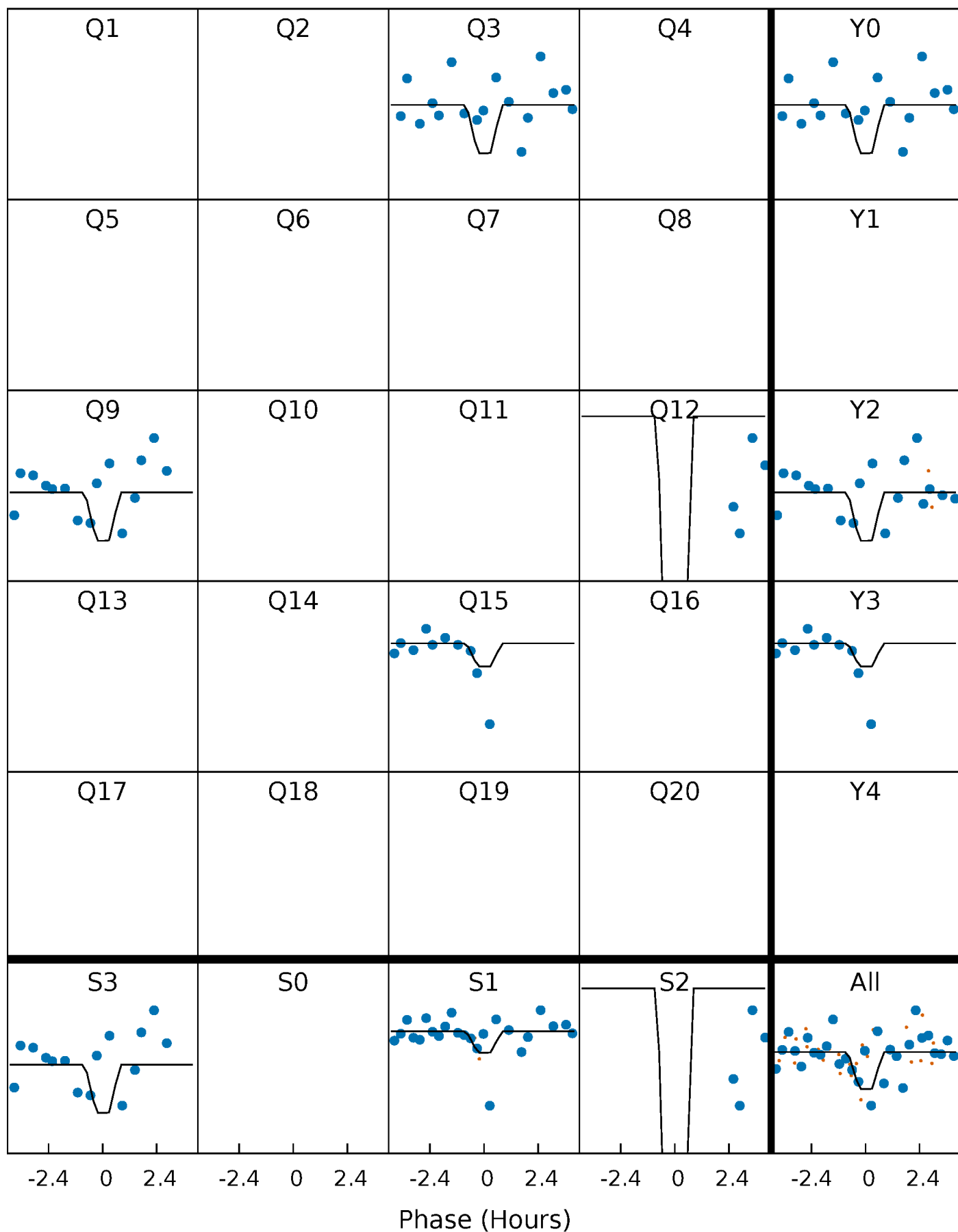
# DV Quarter-Phased Transit Curves

TCE 005475641-03     $P=280.872905$  Days     $T_0=271.644348$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 005475641-03 P=280.872905 Days  $T_0=272.114083$  (BKJD)

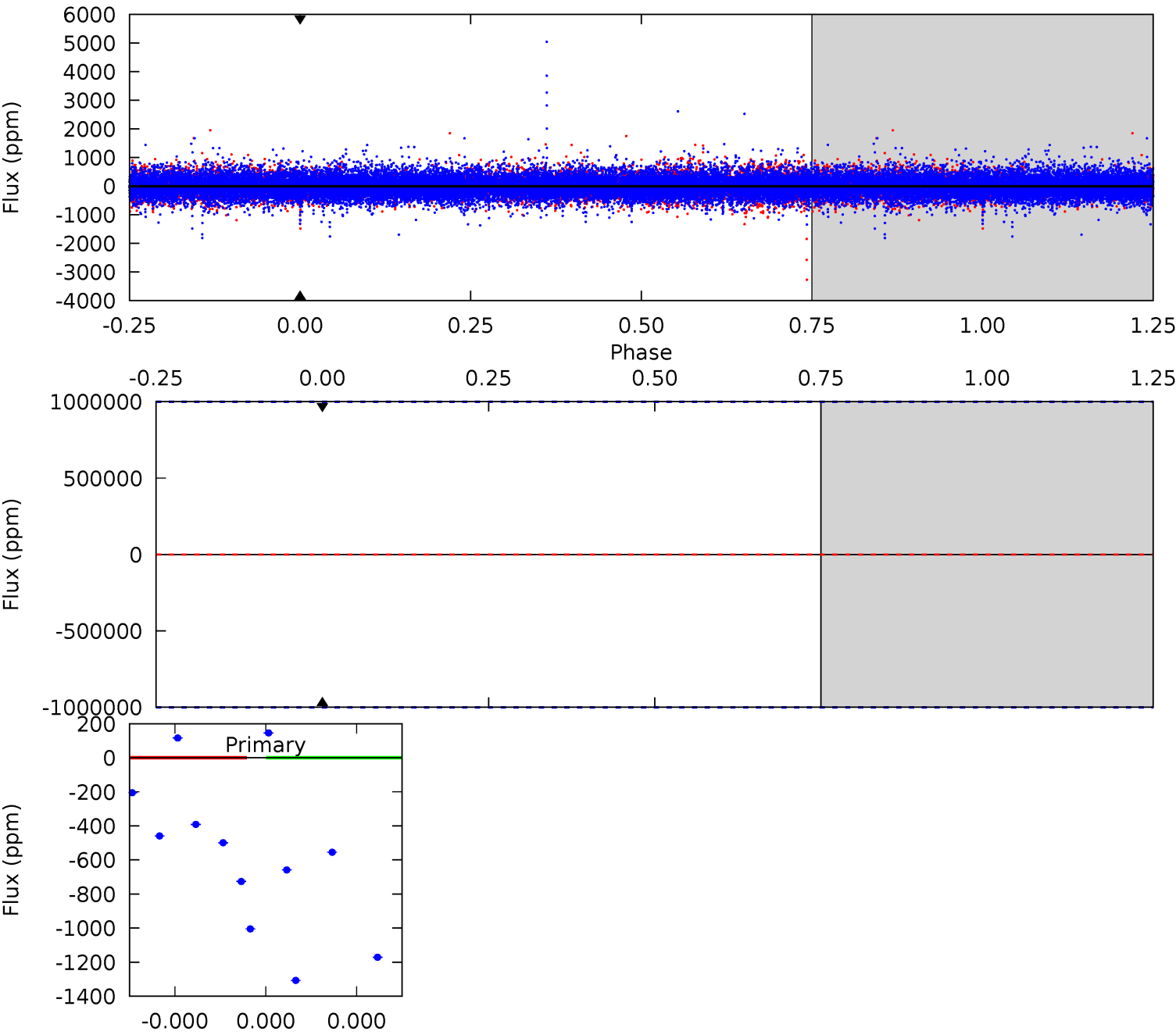




# DV Model-Shift Uniqueness Test

005475641-03, P = 280.872905 Days, E = 271.644348 Days

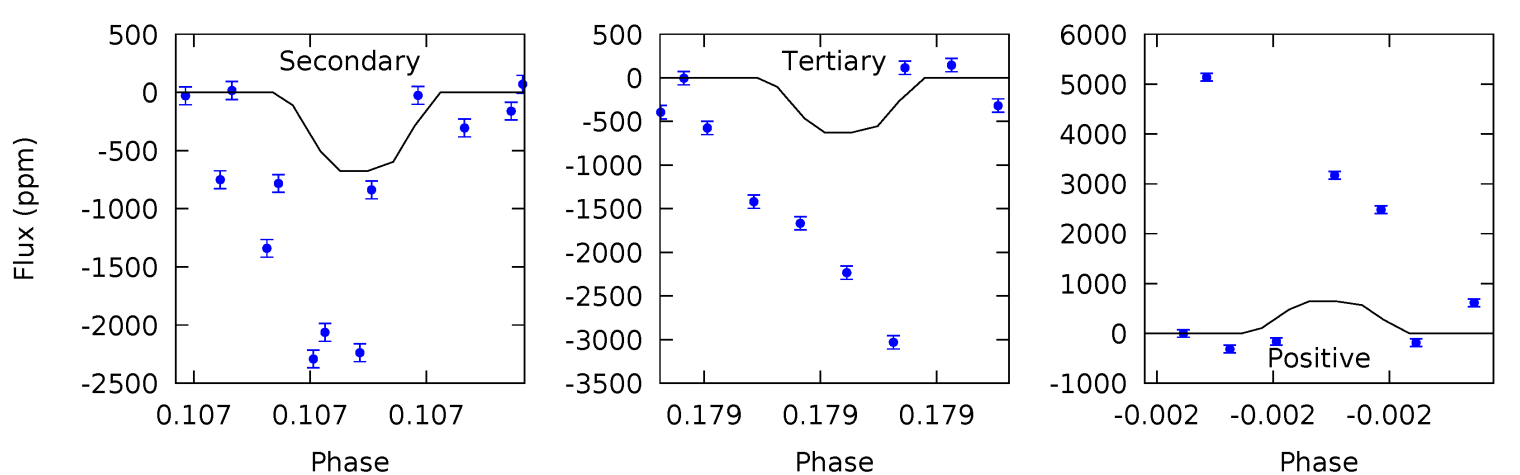
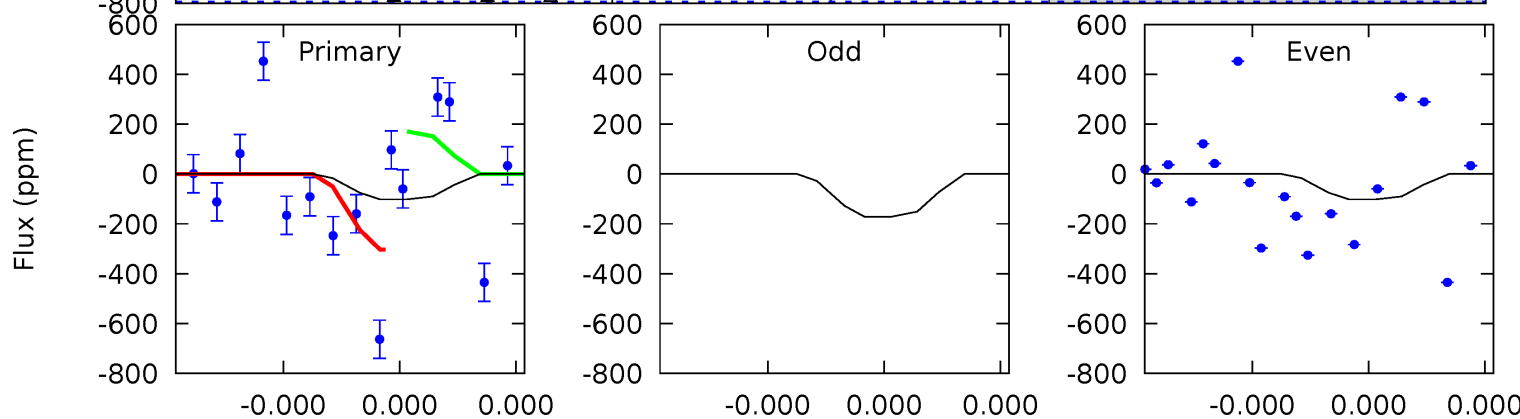
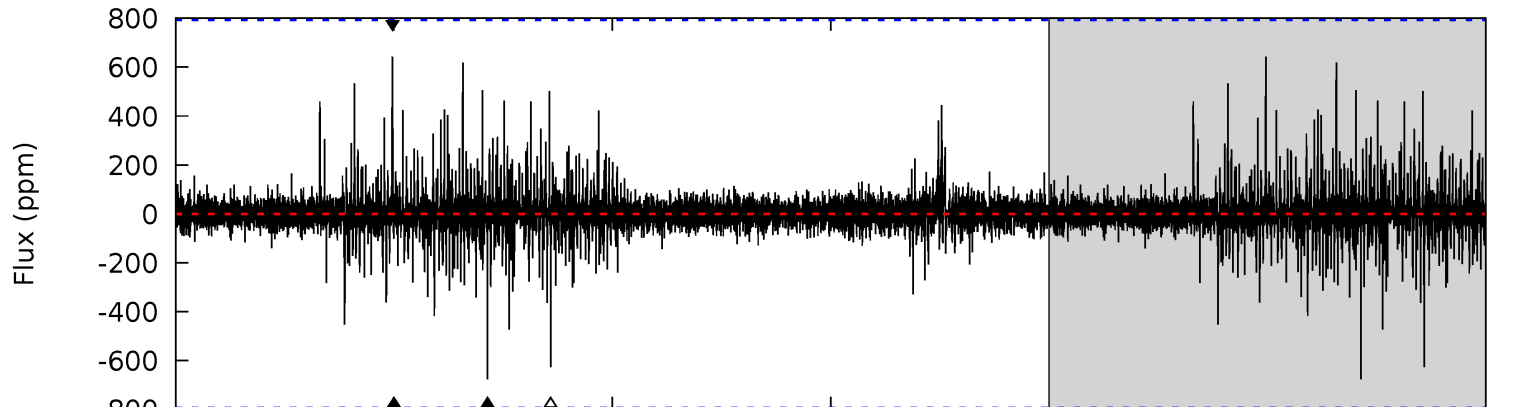
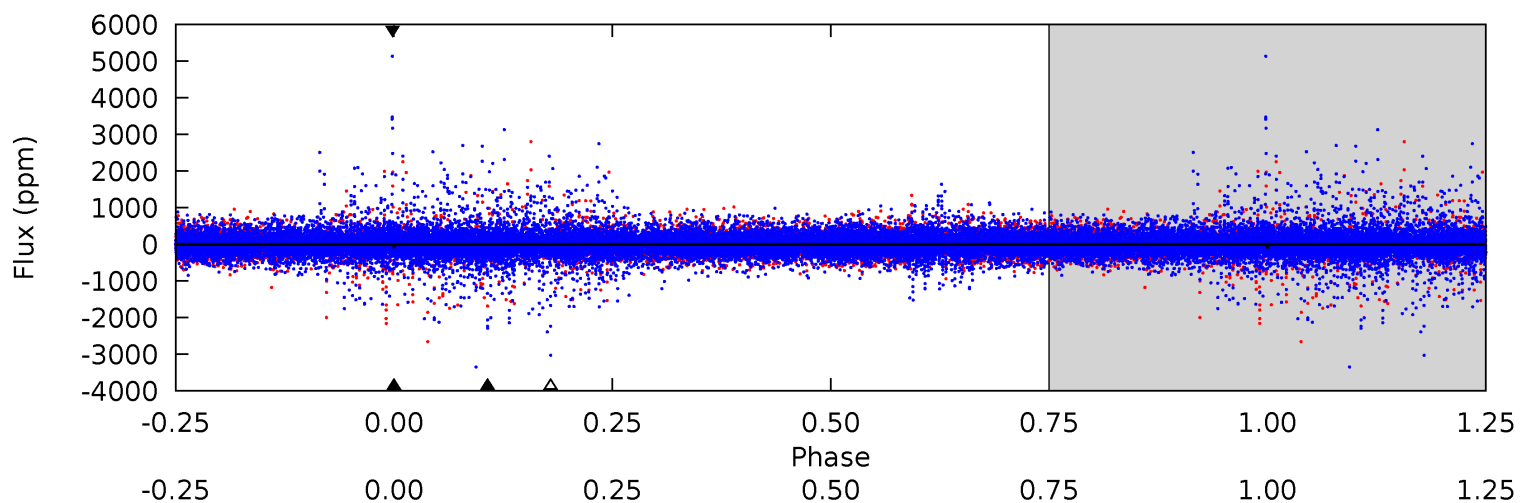
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



# Alt Model-Shift Uniqueness Test

005475641-03, P = 280.872905 Days, E = 272.114083 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0.74	4.90	4.53	4.66	5.75	3.75	0.43	-3.80	-3.92	0.36	0.24	0.26	11.5	0.49	0.46



### Stellar Parameters For KIC 005475641

	$T_{\text{eff}} (K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4999^{+151}_{-136}$	$4.523^{+0.078}_{-0.052}$	$-0.040^{+0.300}_{-0.300}$	$0.786^{+0.063}_{-0.079}$	$0.752^{+0.085}_{-0.057}$	$2.180^{+0.701}_{-0.371}$
	+3%/-3%	+2%/-1%	+750%/-750%	+8%/-10%	+11%/-8%	+32%/-17%
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 005475641-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$0 \pm 1000000$	$6.47^{+6.86}_{-4.39}$	$312^{+11}_{-11}$	$-3254^{+20097}_{-9624}$	$-4140.207^{+1763937.410}_{-1018048.752}$
Alt.	$-676 \pm 138$	$6.81^{+6.94}_{-4.56}$	$312^{+12}_{-11}$	$3372^{+1700}_{-626}$	$4754^{+40576}_{-3621}$

$T_{\text{max}}$  = 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

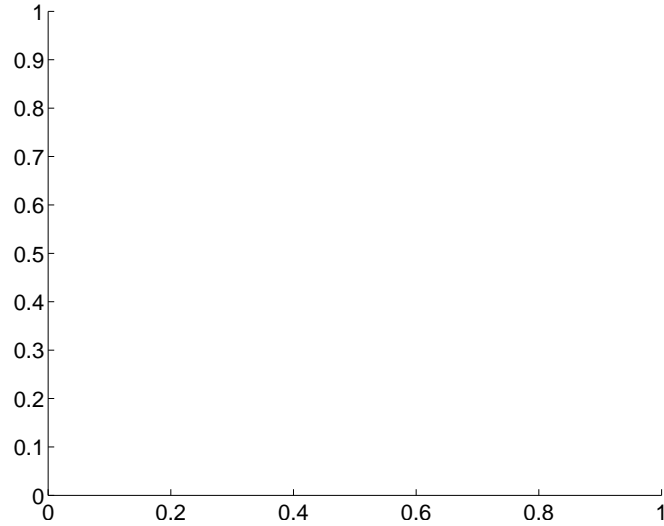
Supplemental centroid analysis for 005475641-03. Kepler magnitude: 14.30. Transit SNR -1.00

There are 0 quarters with good PRF difference image offsets

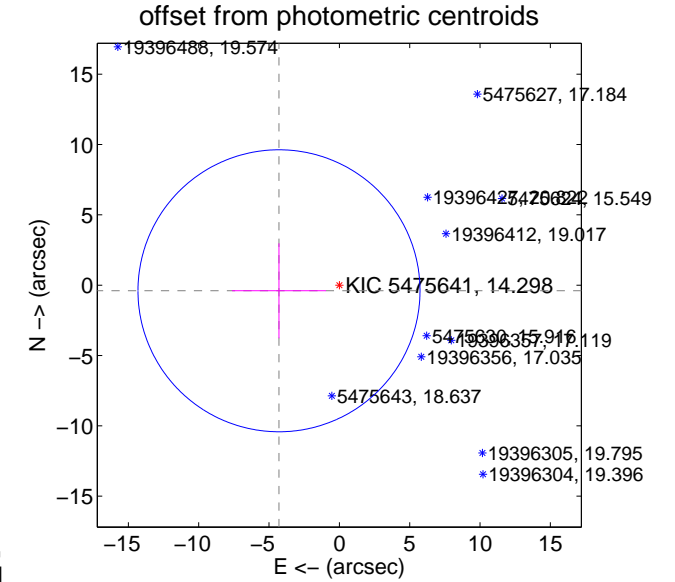
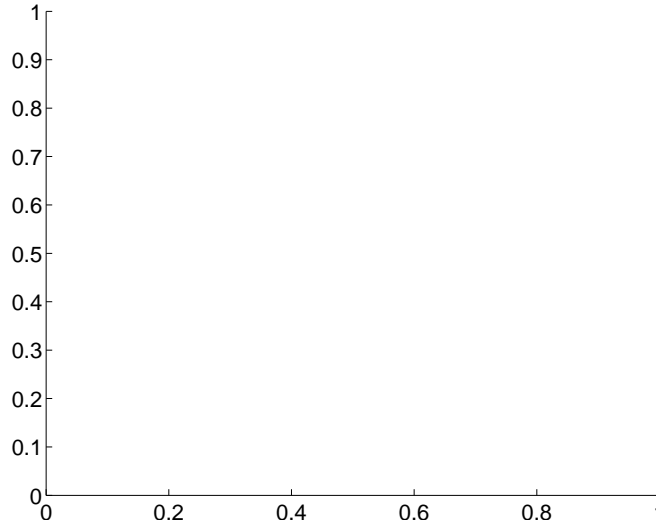
The direct PRF centroid is offset from the target star catalog position by about NaN arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	—	—	—	—
PRF-fit source offset from KIC position	—	—	—	—
photometric centroid source offset	$4.31 \pm 3.34$	1.29	$4.29 \pm 3.34$	$-0.40 \pm 3.38$

There is no PRF-fit offset from OOT-fit

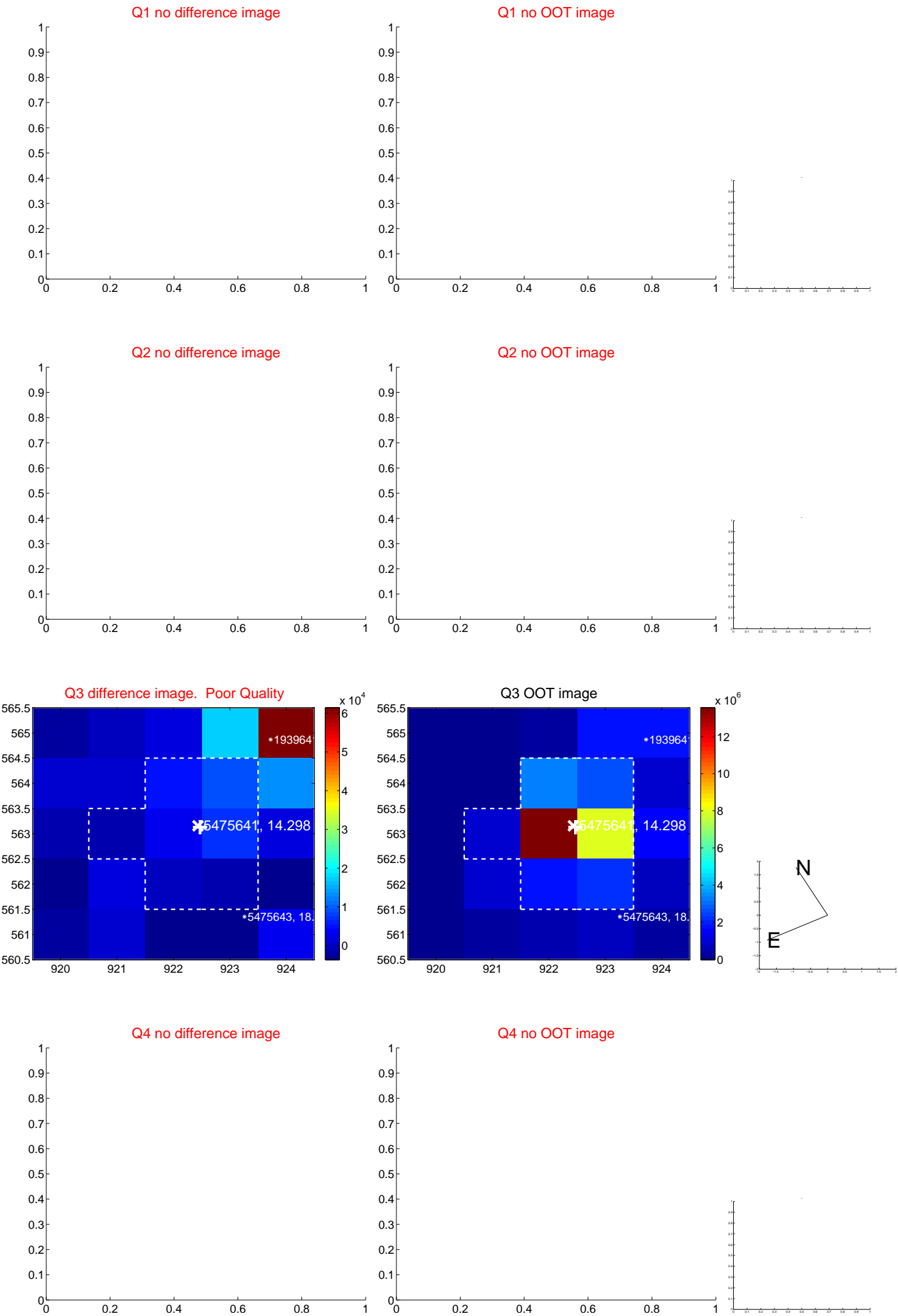


There is no PRF-fit offset from KIC

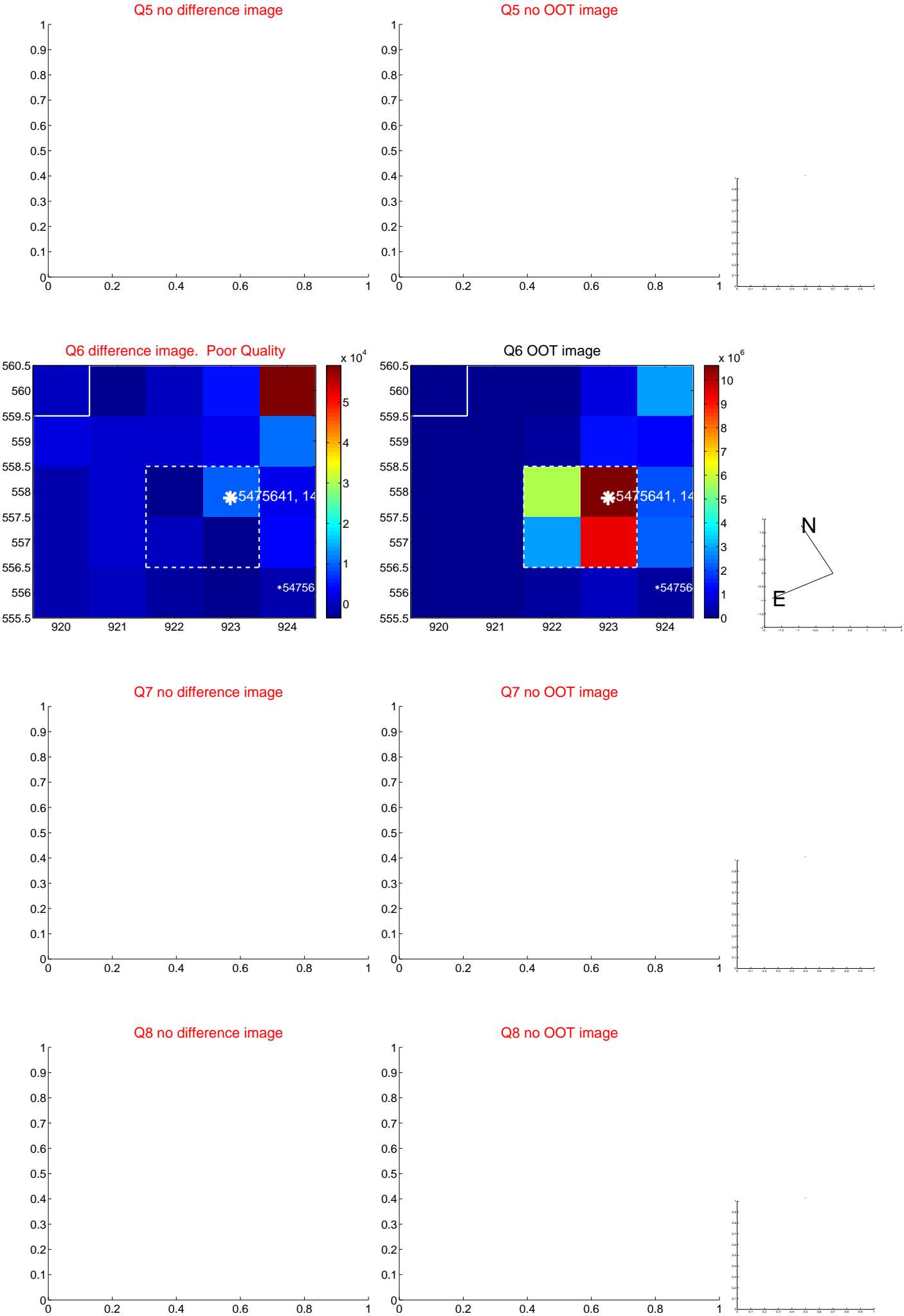


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

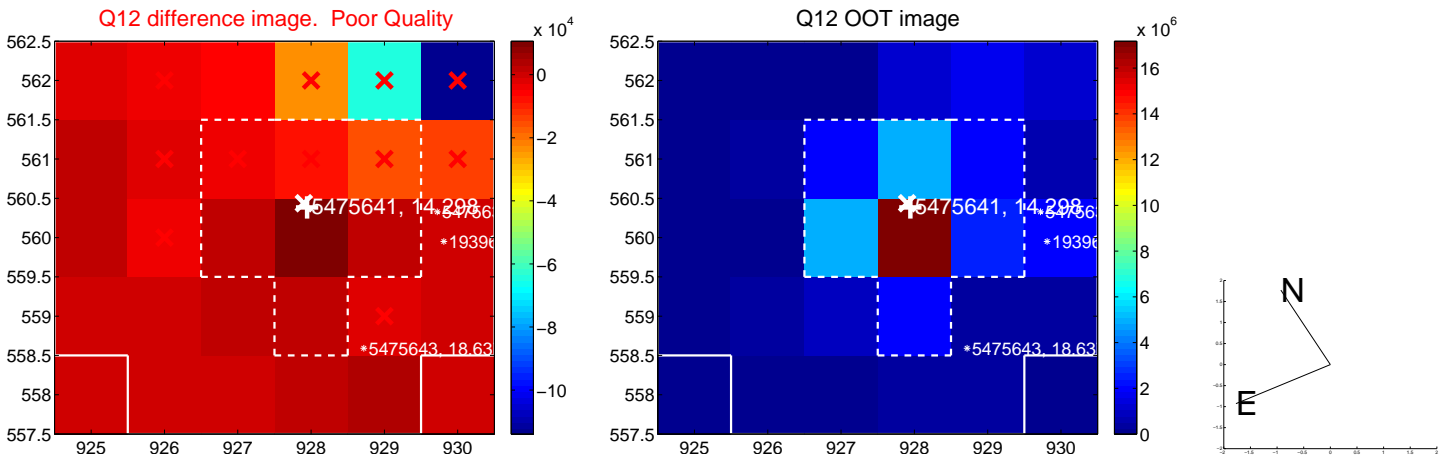
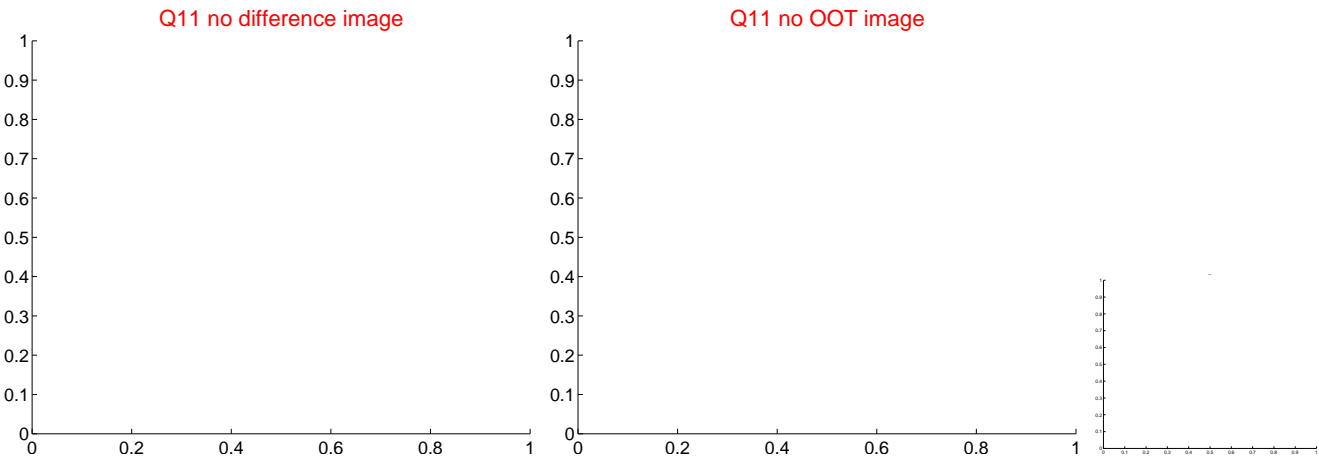
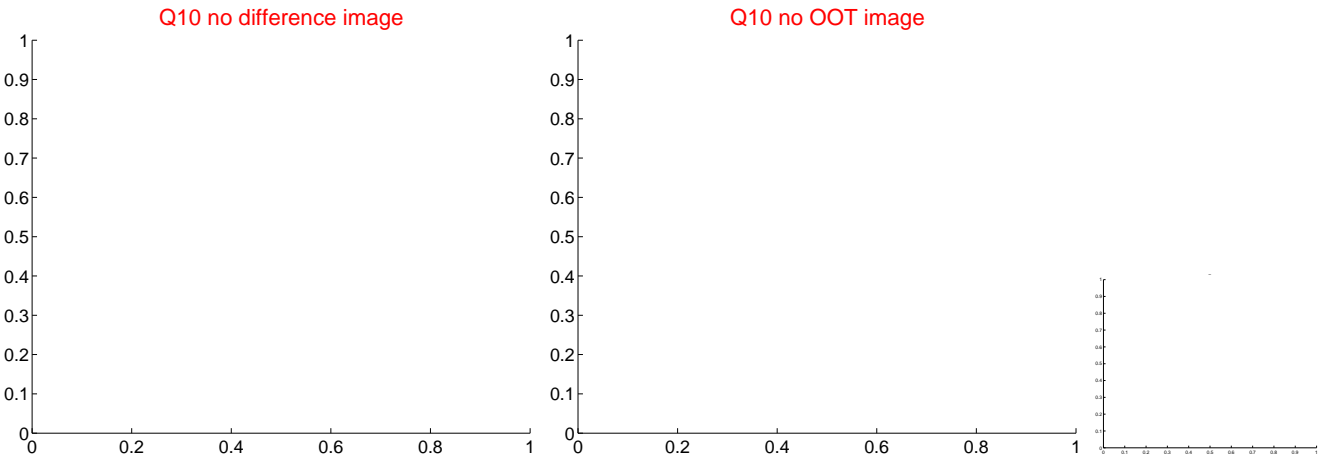
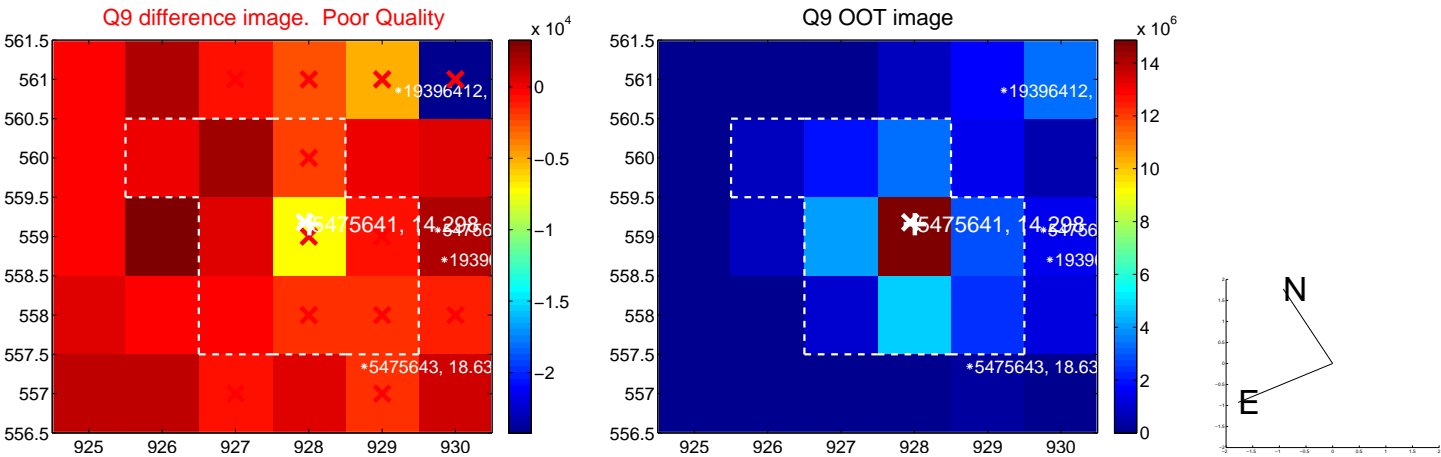
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

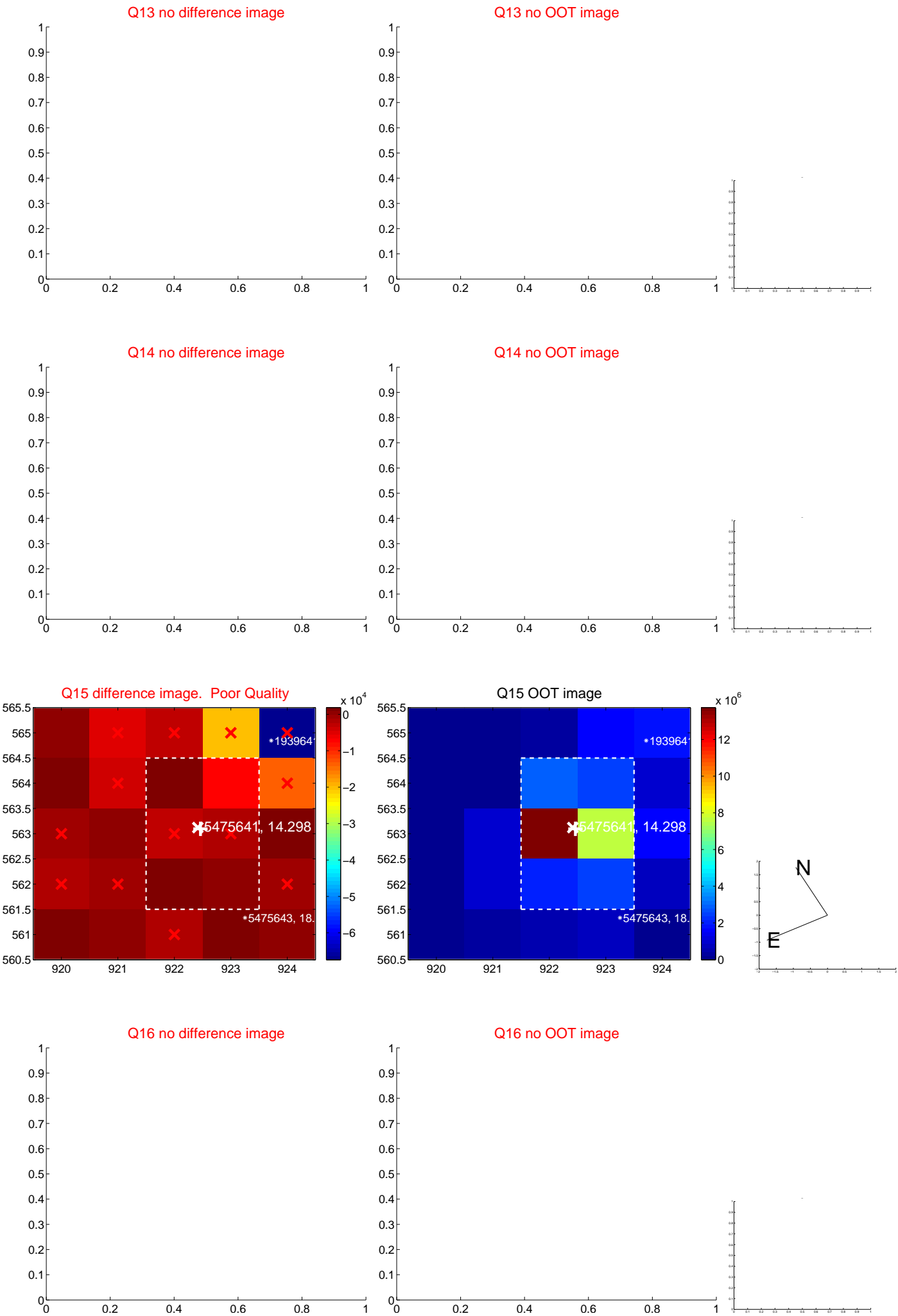


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

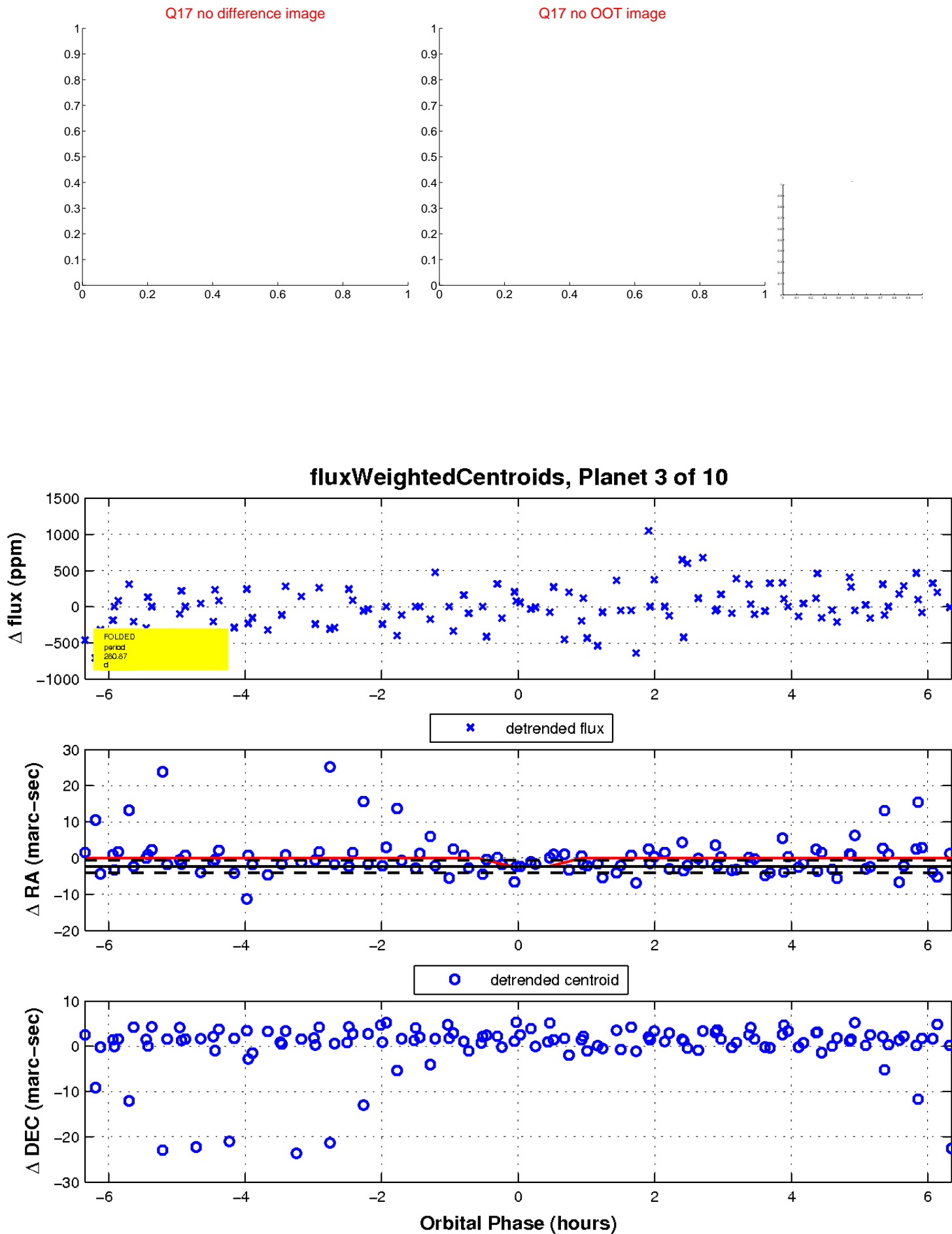




white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.

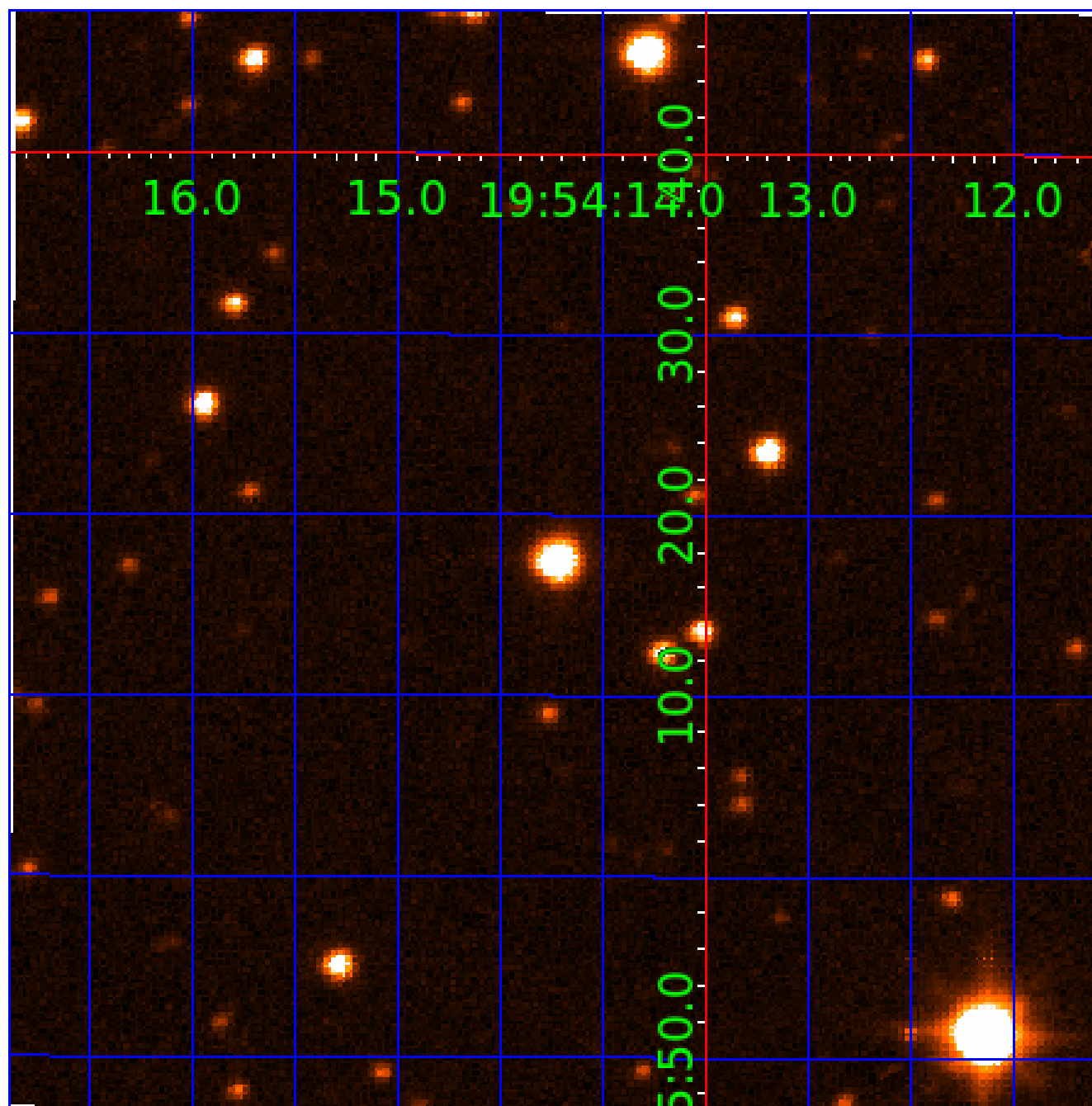


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 005475641

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005475641-01	OBS	2895.01	1.069827	132.452550	68.4	4.298	11.2	13.7	0.79	4999	0.81	997.60
005475641-02	OBS	No	239.487671	140.863826	812.0	8.997	18.4	7.6	0.79	4999	2.37	0.73
005475641-03	OBS	No	280.872905	271.644348	1182.9	7.500	15.9	-1.0	0.79	4999	2.62	0.59
005475641-04	OBS	No	152.776853	162.394839	673.1	9.042	13.6	7.7	0.79	4999	2.20	1.34
005475641-05	OBS	No	180.020691	233.604204	856.6	11.672	12.6	7.7	0.79	4999	2.70	1.07
005475641-07	OBS	No	475.792717	447.008273	1185.4	12.541	12.7	6.2	0.79	4999	2.68	0.29
005475641-08	OBS	No	393.701860	188.565963	1971.7	21.017	11.9	8.1	0.79	4999	4.07	0.38
005475641-09	OBS	No	147.912710	257.518469	516.6	19.634	11.2	4.7	0.79	4999	1.75	1.40

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005475641-01	OBS	FP	0.00	0	0	1	1	CENT_RESOLVED_OFFSET—HALO_GHOST—EPHEM_MATCH
005475641-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005475641-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_NOFITS
005475641-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005475641-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—ALL_TRANS_CHASES—CENT_FEW_DIFFS—HALO_GHOST
005475641-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
005475641-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—CENT_FEW_DIFFS
005475641-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES

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

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

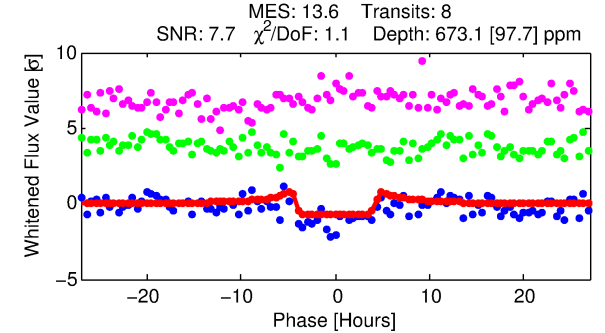
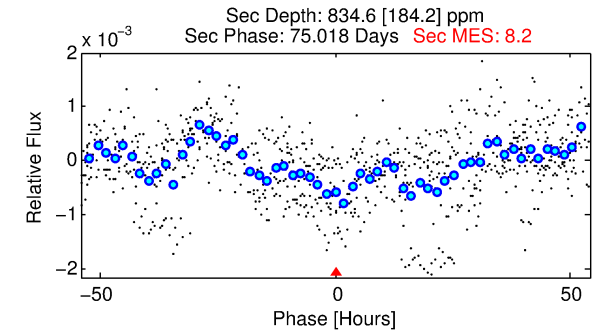
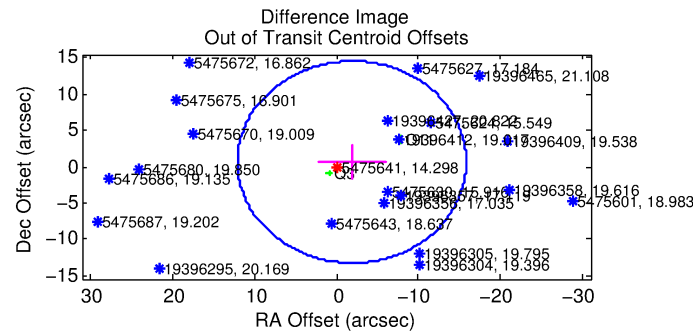
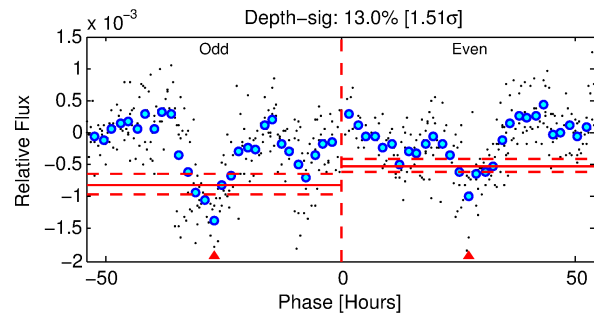
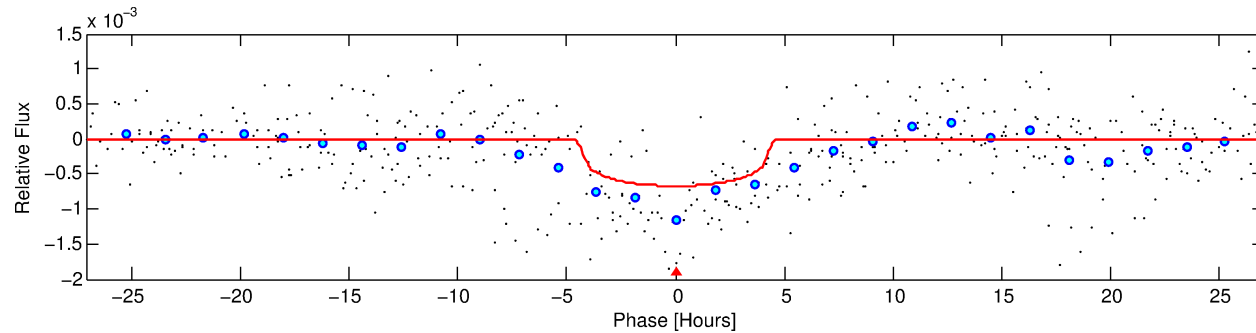
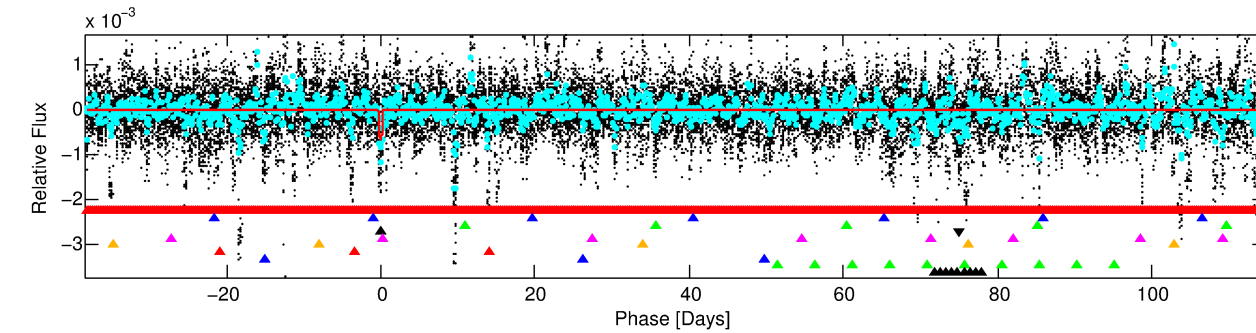
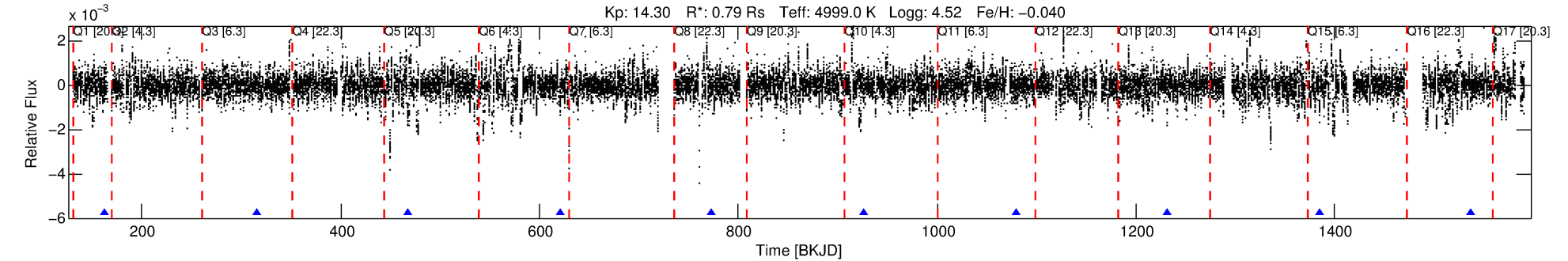
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 005475641-04

No Significant Match Found

# DV One-Page Summary

KIC: 5475641 Candidate: 4 of 10 Period: 152.777 d  
KOI: K02895 Corr: No Ephemeris Match



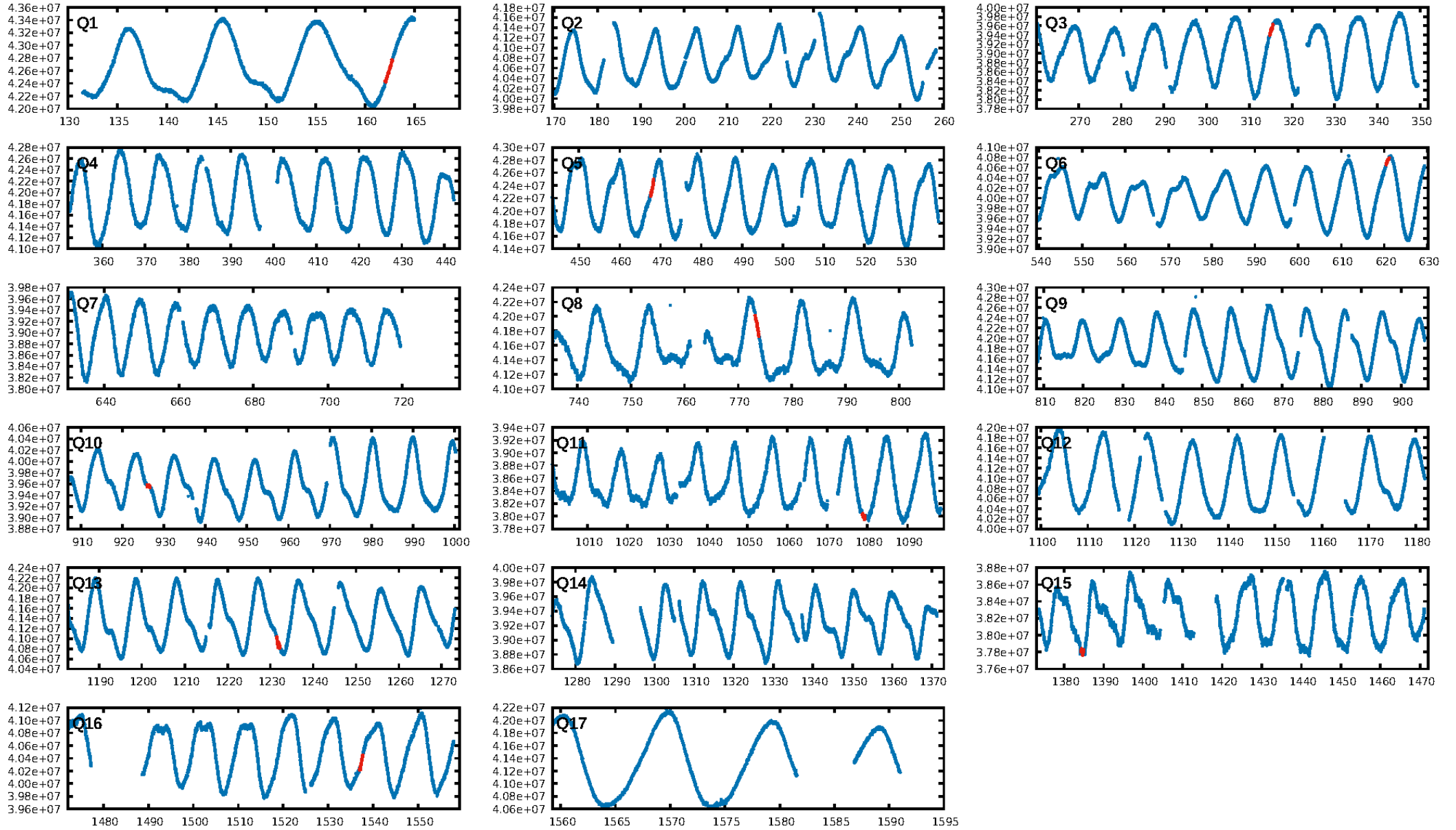
## DV Fit Results:

Period = 152.77685 [0.00253] d  
Epoch = 162.3948 [0.0150] BKJD  
Rp/R\* = 0.0257 [0.0117]  
a/R\* = 92.71 [147.52]  
b = 0.73 [1.02]  
Seff = 1.34 [0.24]  
Teff = 274 [13] K  
Rp = 2.20 [1.02] Re  
a = 0.5086 [0.0457] AU  
Ag = 24456.49 [23100.91] [1.06 $\sigma$ ]  
Teffp = 5301 [1249] K [4.03 $\sigma$ ]

## DV Diagnostic Results:

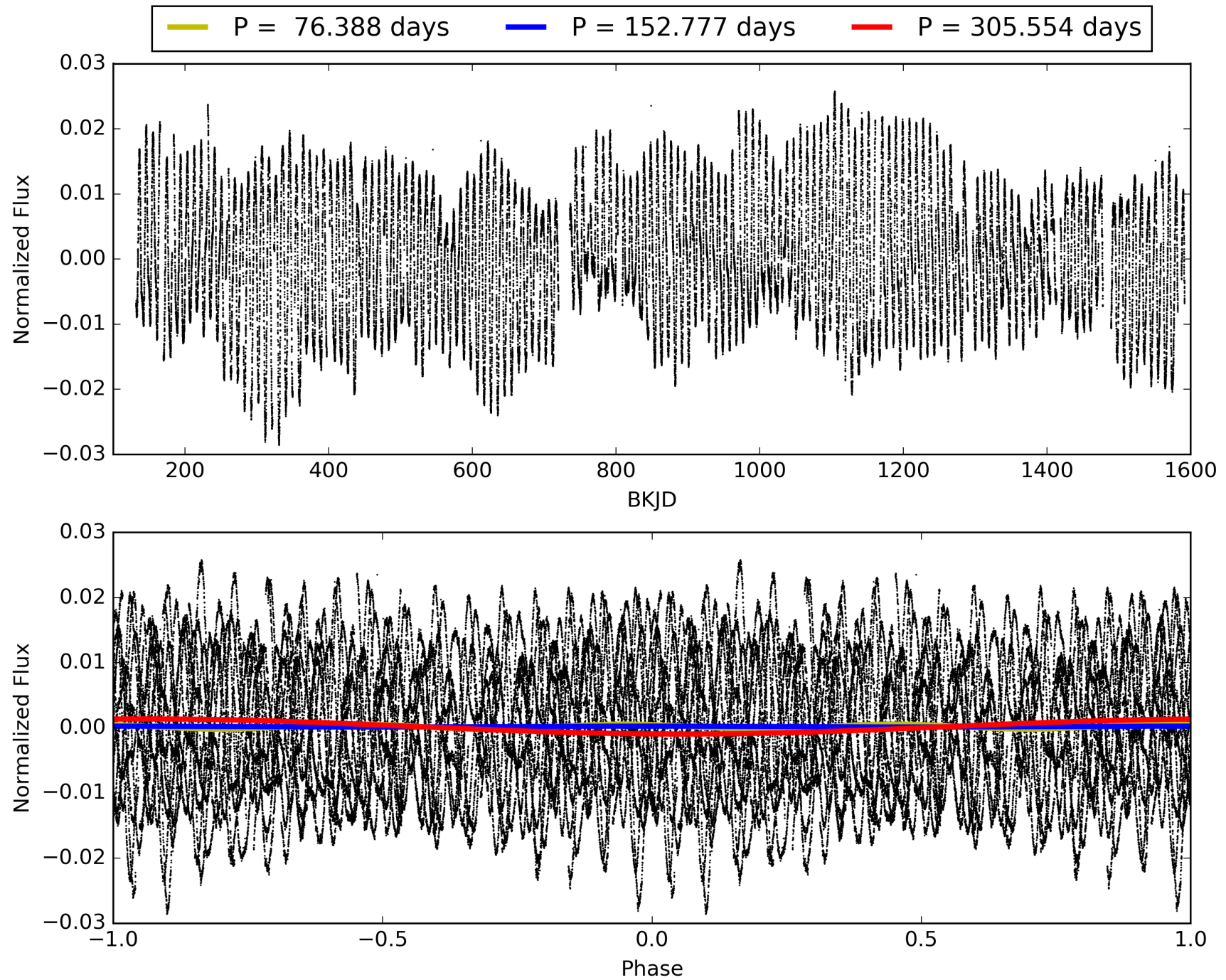
ShortPeriod-sig: 90.2% [1.66 $\sigma$ ]  
LongPeriod-sig: 100.0% [44.29 $\sigma$ ]  
ModelChiSquare2-sig: 21.4%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [8/8]  
GhostDiagnostic-chr: 0.7148  
Centroid-sig: N/A  
Centroid-so: 2.605 arcsec [1.54 $\sigma$ ]  
OotOffset-rm: 1.980 arcsec [0.43 $\sigma$ ]  
KicOffset-rm: 1.978 arcsec [0.43 $\sigma$ ]  
OotOffset-st: 0/2/0/0 [2]  
KicOffset-st: 0/2/0/0 [2]  
DiffImageQuality-fgm: 0.00 [0/2]  
DiffImageOverlap-fno: 0.00 [0/9]

# TCE 005475641-04, PDC Light Curves





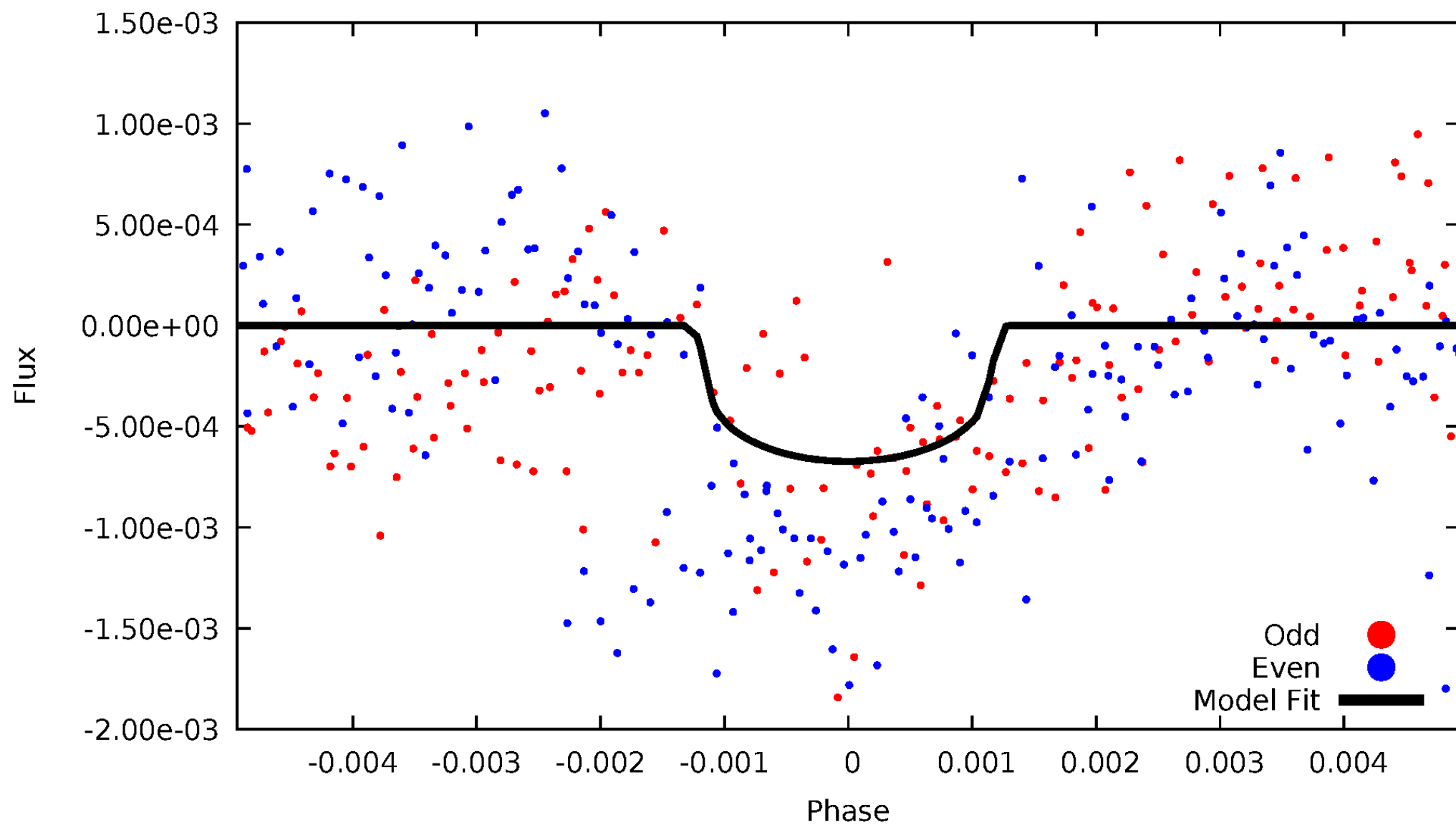
TCE 005475641-04





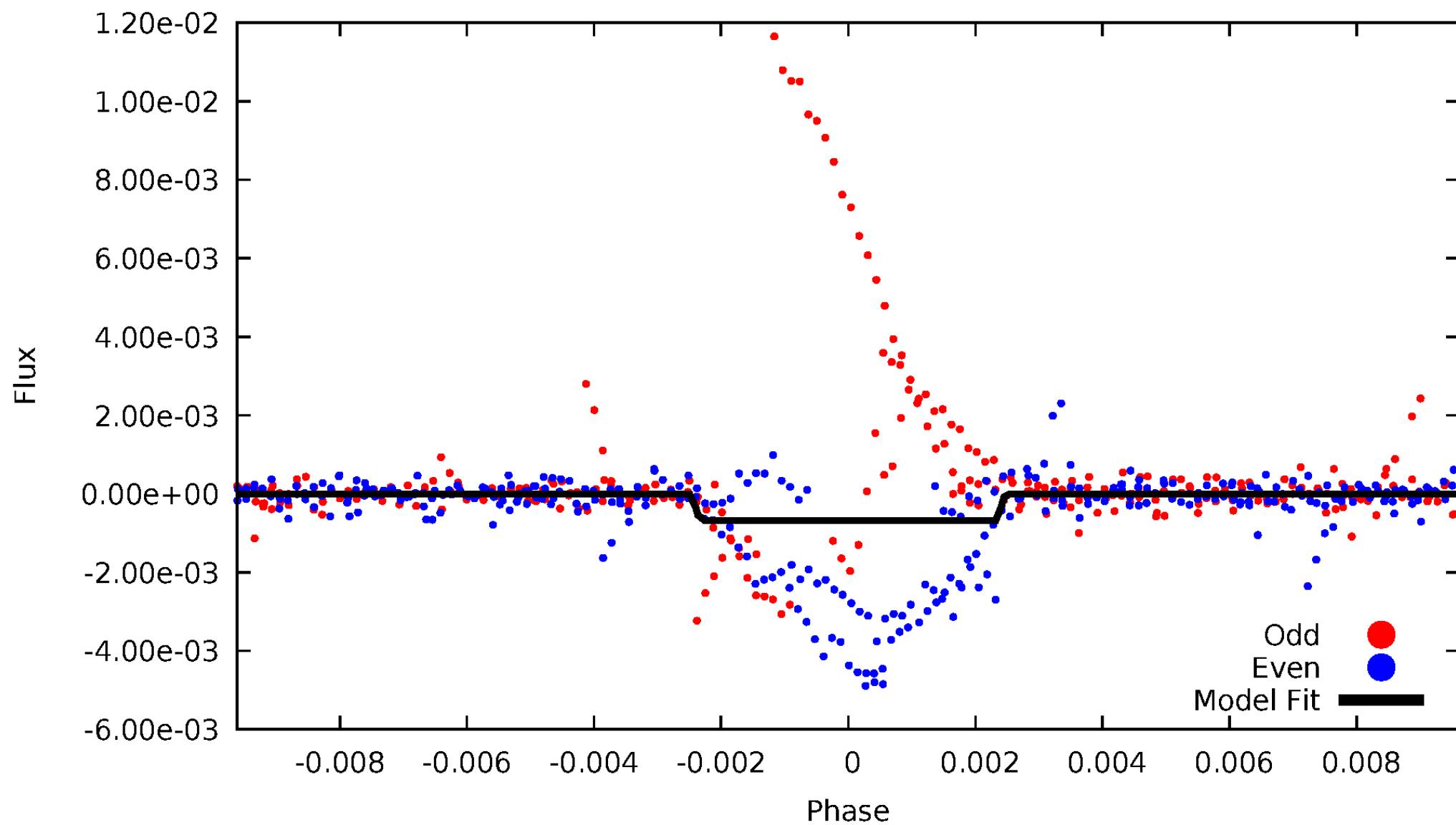
# DV Odd/Even

TCE 005475641-04



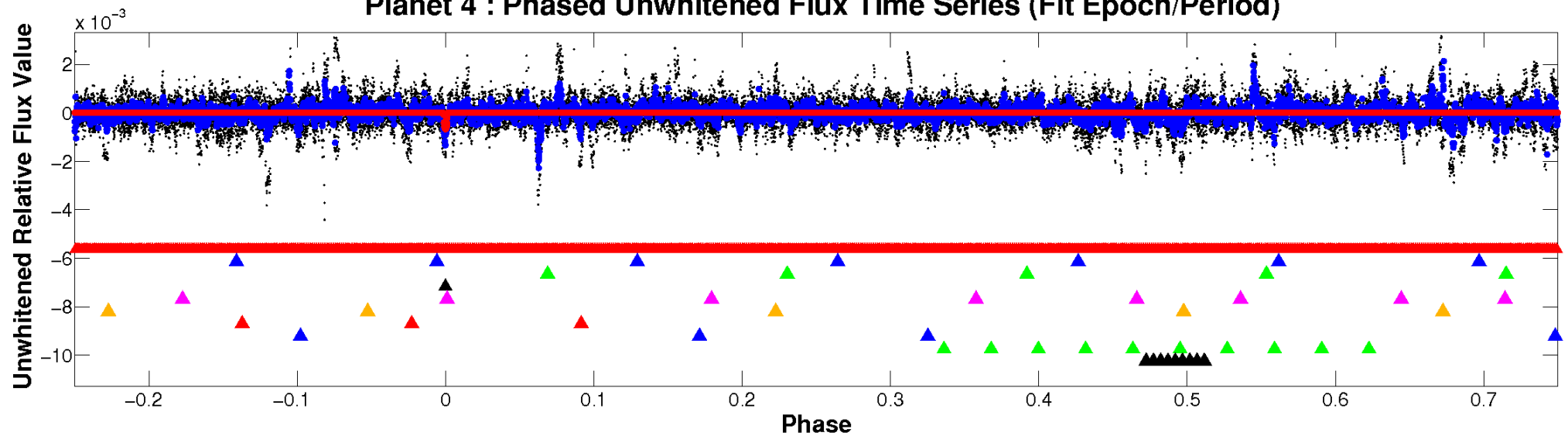
# ALT Odd/Even

TCE 005475641-04

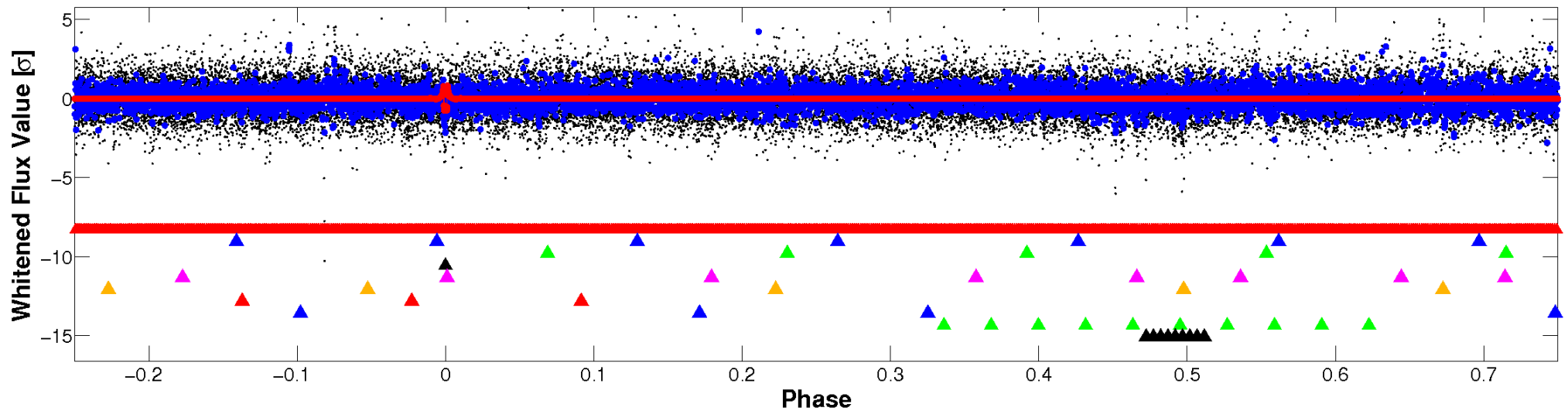


# Non-Whitened Vs. Whitened Light Curve

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

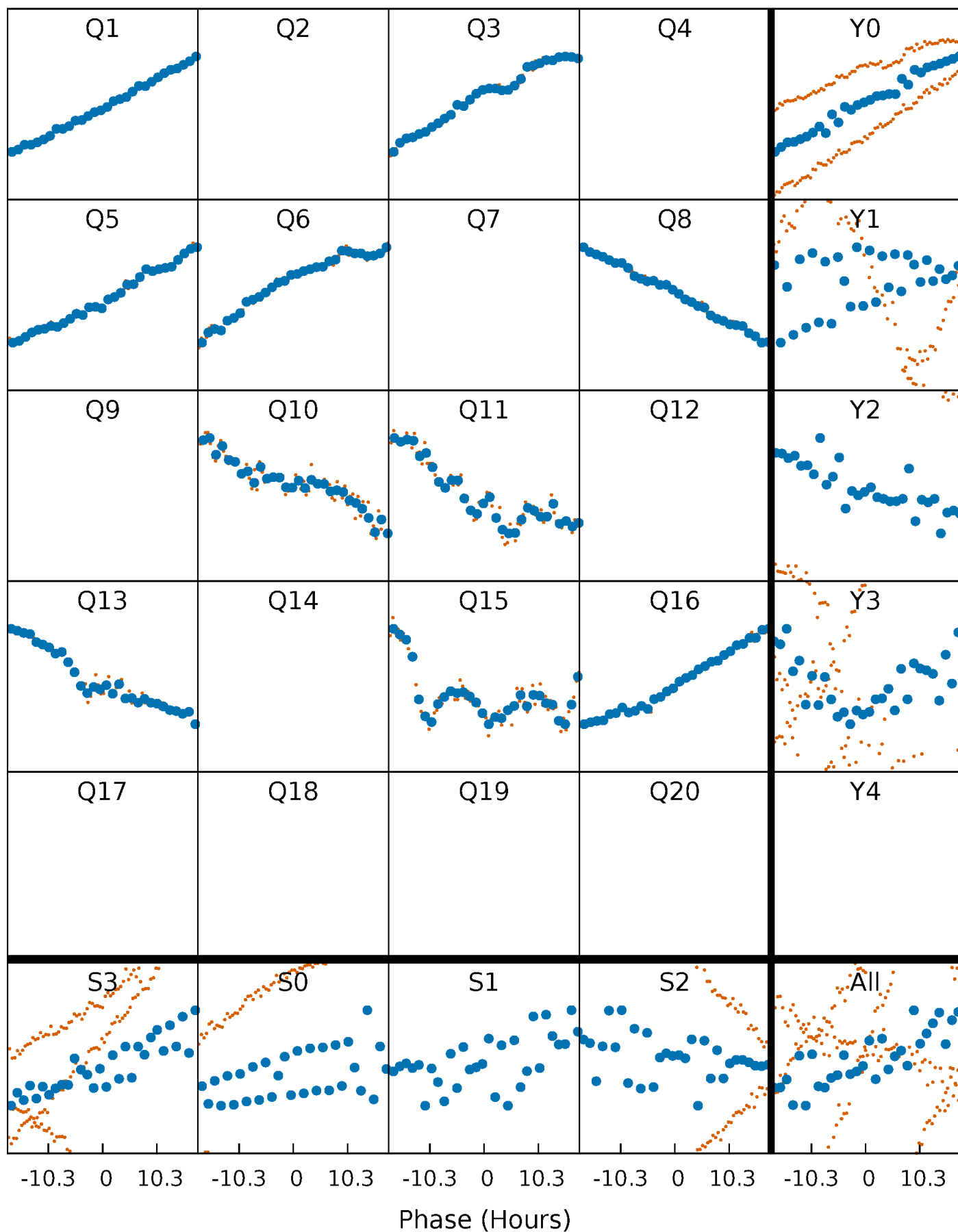


## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



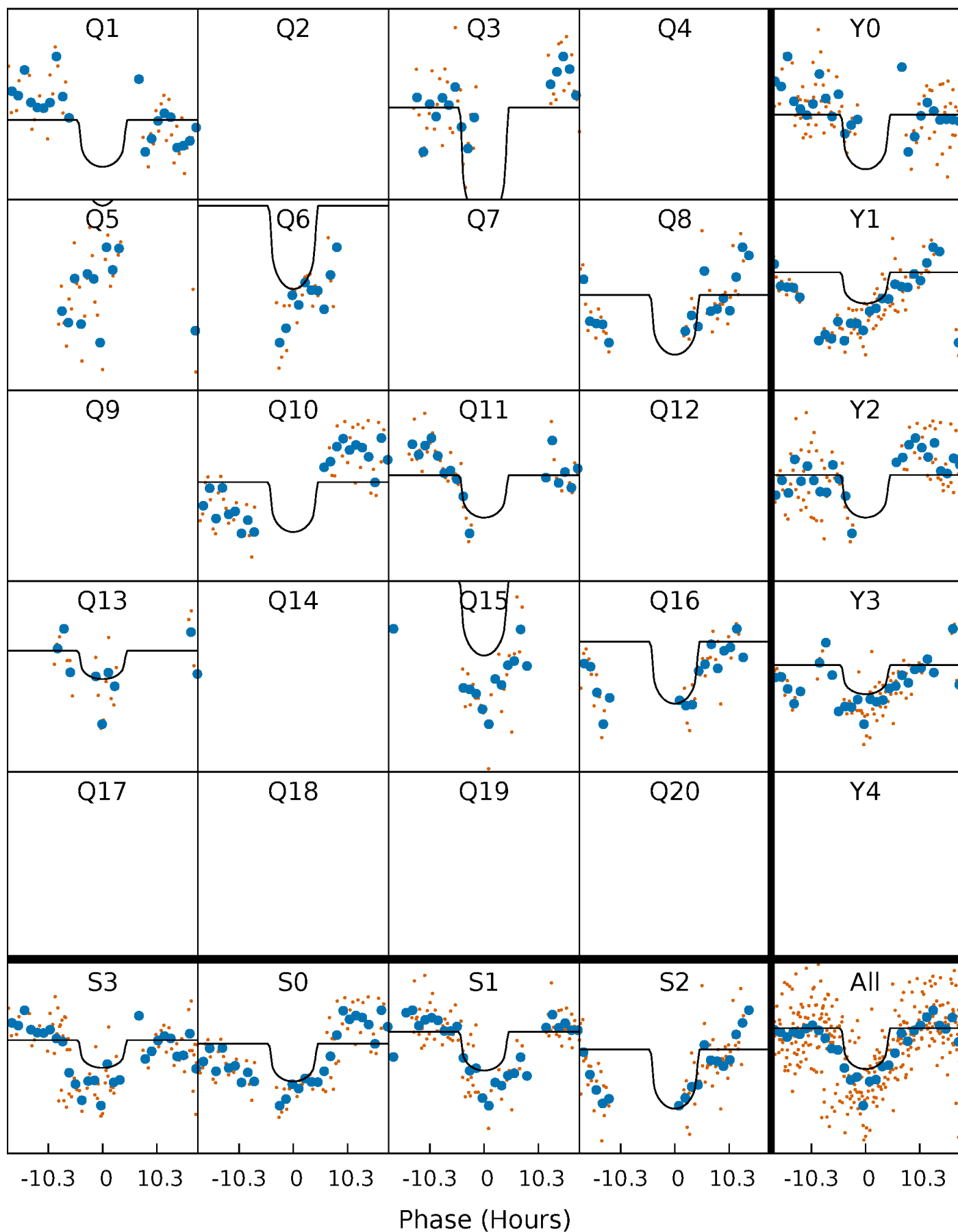
# PDC Quarter-Phased Transit Curves

TCE 005475641-04 P=152.776853 Days  $T_0=162.394839$  (BKJD)



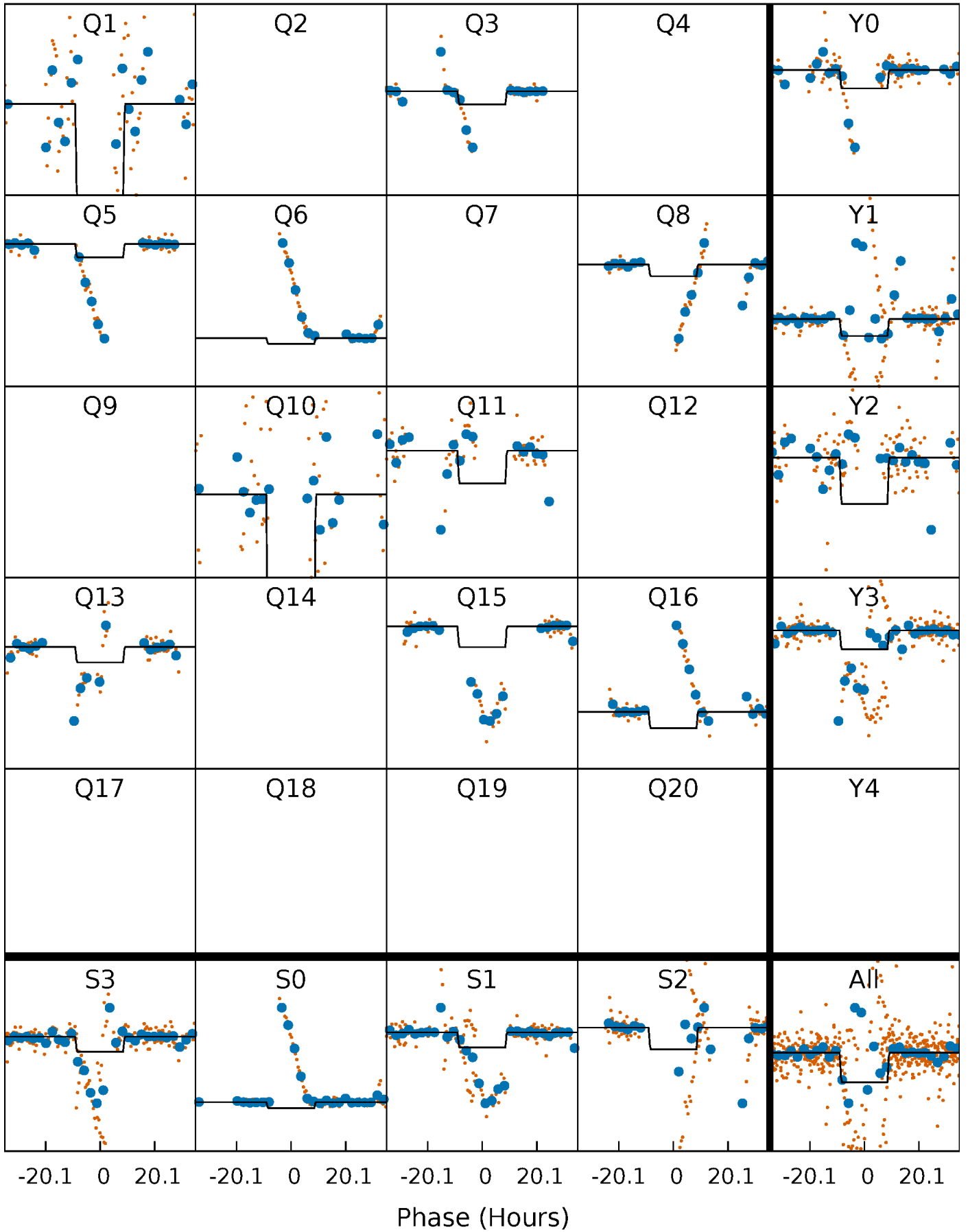
# DV Quarter-Phased Transit Curves

TCE 005475641-04 P=152.776853 Days  $T_0=162.394839$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

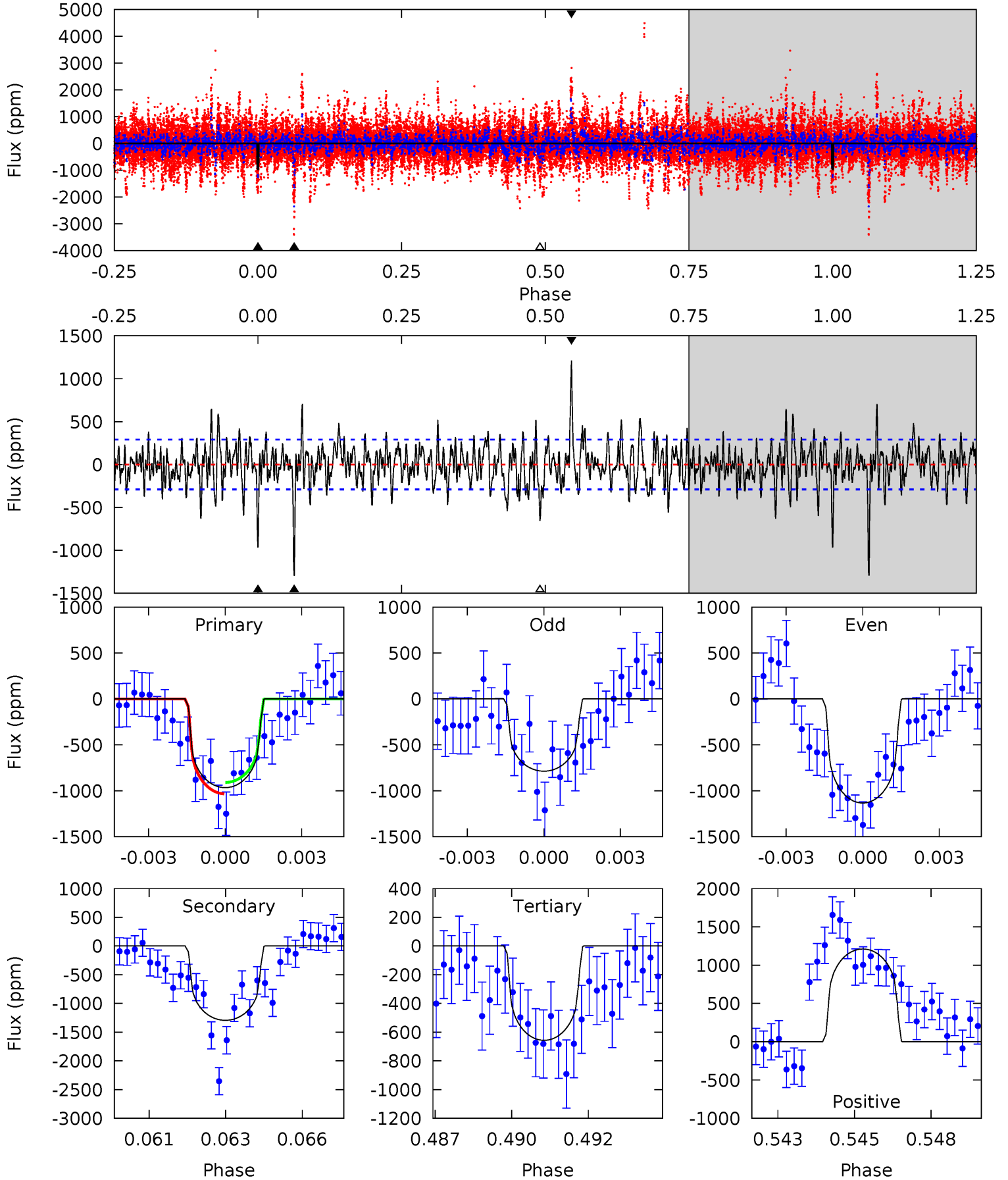
TCE 005475641-04 P=152.761295 Days  $T_0=162.486715$  (BKJD)



# DV Model-Shift Uniqueness Test

005475641-04, P = 152.776853 Days, E = 9.617986 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
17.5	23.5	11.9	22.0	5.28	3.02	3.61	5.61	-4.45	11.6	1.50	2.97	0.91	0.48	1.11

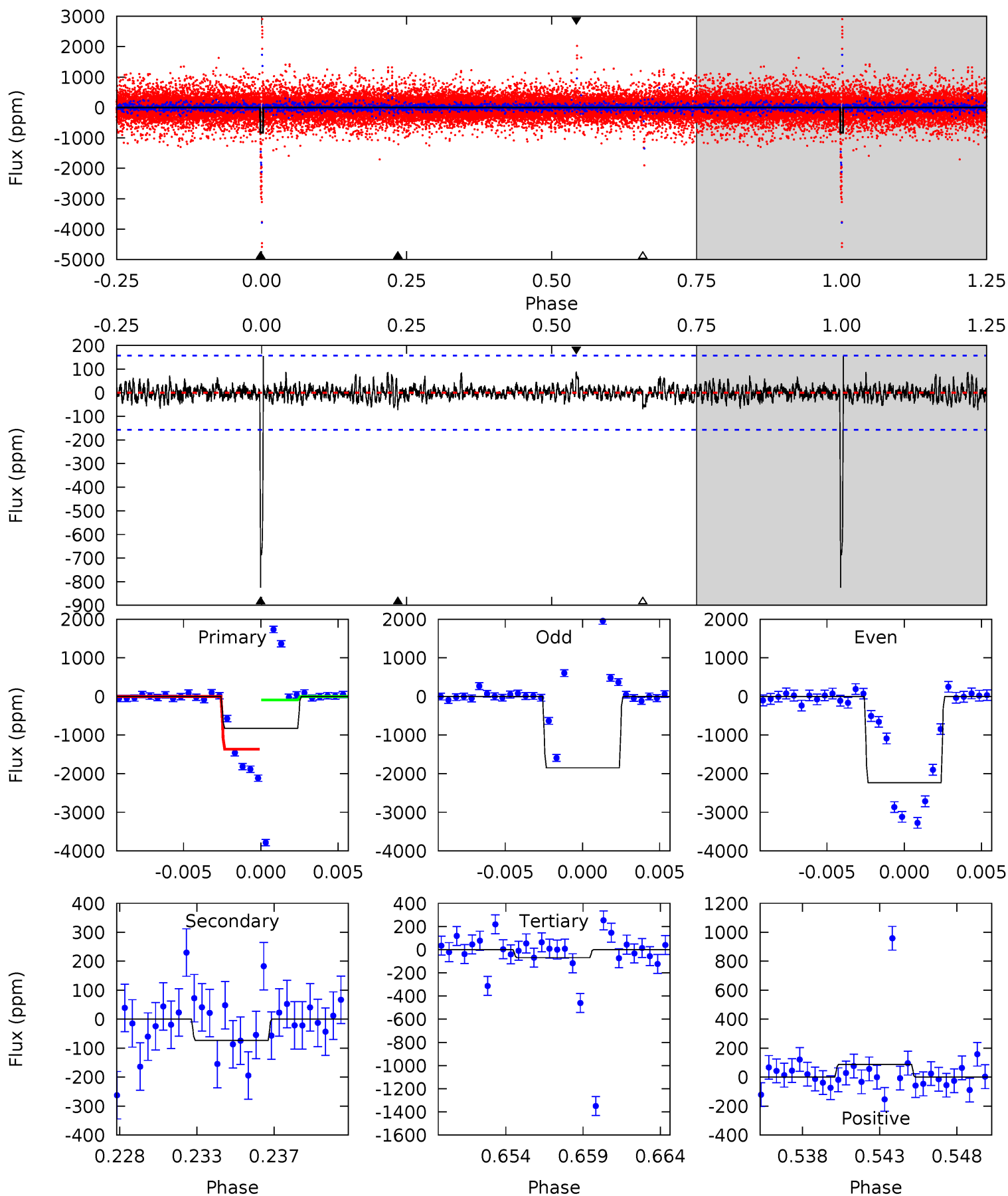




# Alt Model-Shift Uniqueness Test

005475641-04, P = 152.761295 Days, E = 9.725420 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
27.1	2.39	2.27	2.91	5.16	2.82	0.71	24.8	24.2	0.12	-0.52	7.33	0.64	0.16	20.8



### Stellar Parameters For KIC 005475641

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4999^{+151}_{-136}$	$4.523^{+0.078}_{-0.052}$	$-0.040^{+0.300}_{-0.300}$	$0.786^{+0.063}_{-0.079}$	$0.752^{+0.085}_{-0.057}$	$2.180^{+0.701}_{-0.371}$
	+3%/-3%	+2%/-1%	+750%/-750%	+8%/-10%	+11%/-8%	+32%/-17%
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 005475641-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-1294 \pm 55$	$2.27^{+1.05}_{-0.93}$	$382^{+14}_{-14}$	$5733^{+1797}_{-850}$	$35440^{+66795}_{-18216}$
Alt.	$-73 \pm 30$	$2.27^{+0.99}_{-1.02}$	$382^{+15}_{-15}$	$3306^{+686}_{-394}$	$1934^{+3955}_{-1129}$

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

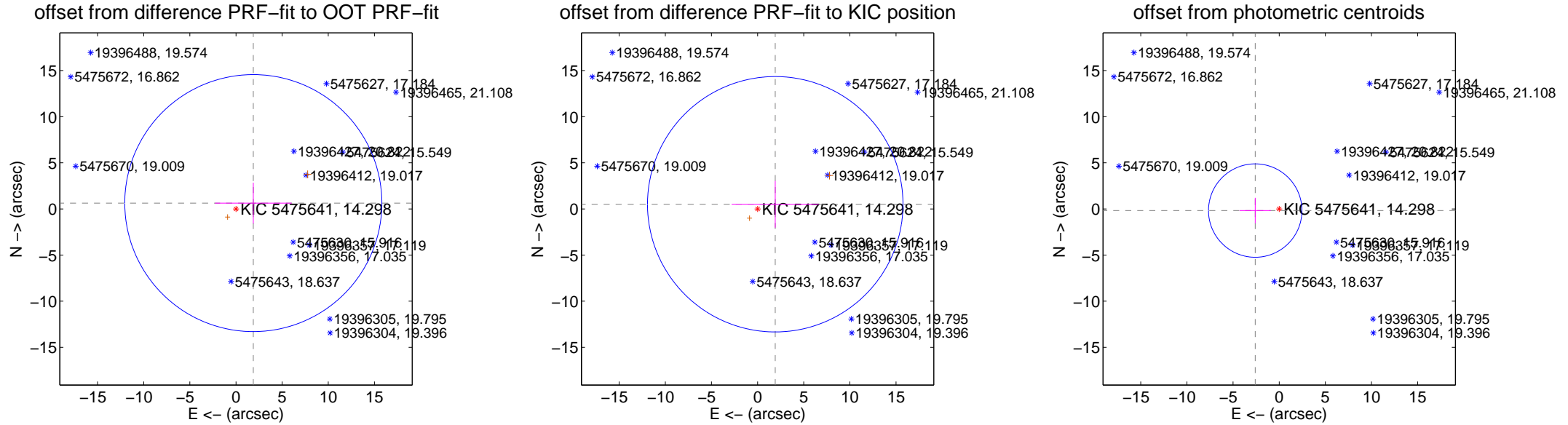
## DV Centroid Data

Supplemental centroid analysis for 005475641-04. Kepler magnitude: 14.30. Transit SNR 7.74

There are 0 quarters with good PRF difference image offsets

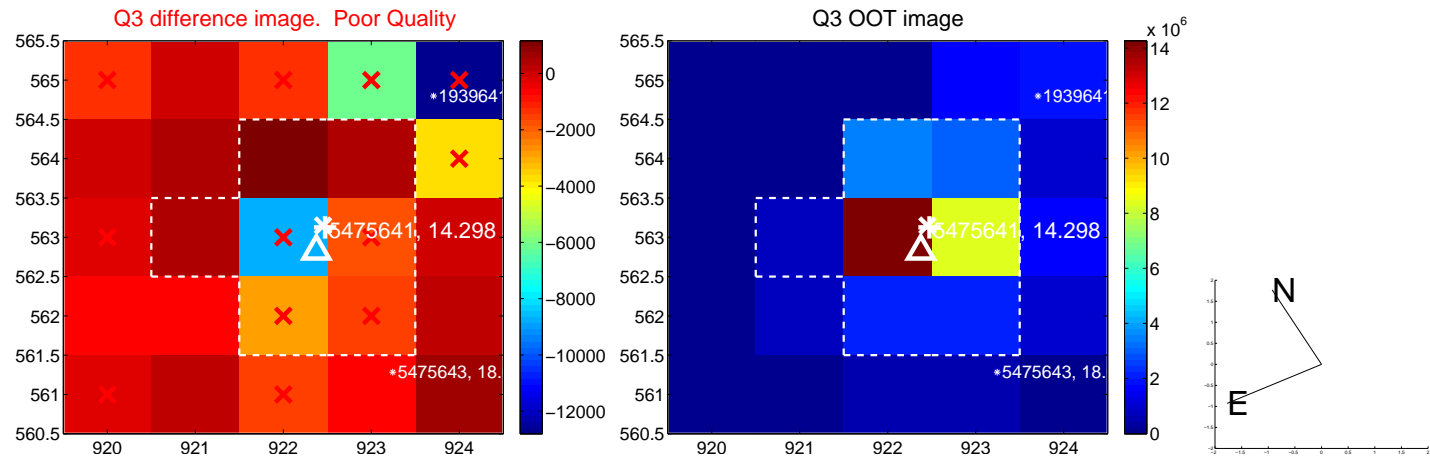
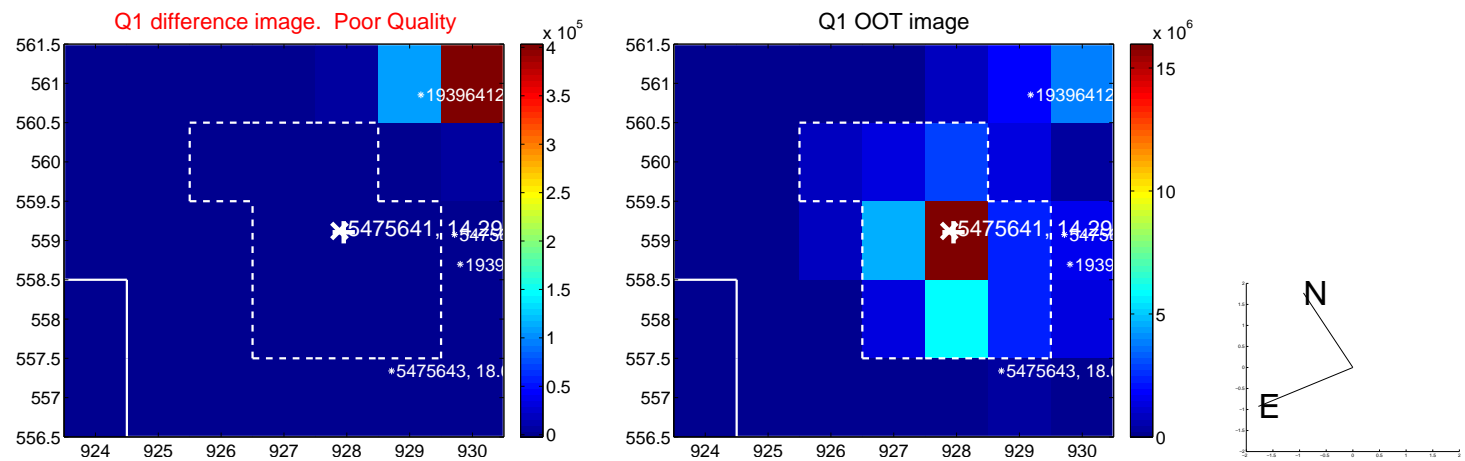
The direct PRF centroid is offset from the target star catalog position by about 0.13 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.980 \pm 4.643$	0.43	$-1.876 \pm 4.154$	$0.632 \pm 2.215$
PRF-fit source offset from KIC position	$1.978 \pm 4.614$	0.43	$-1.912 \pm 4.726$	$0.508 \pm 2.534$
photometric centroid source offset	$2.60 \pm 1.69$	1.54	$2.60 \pm 1.69$	$-0.18 \pm 1.38$

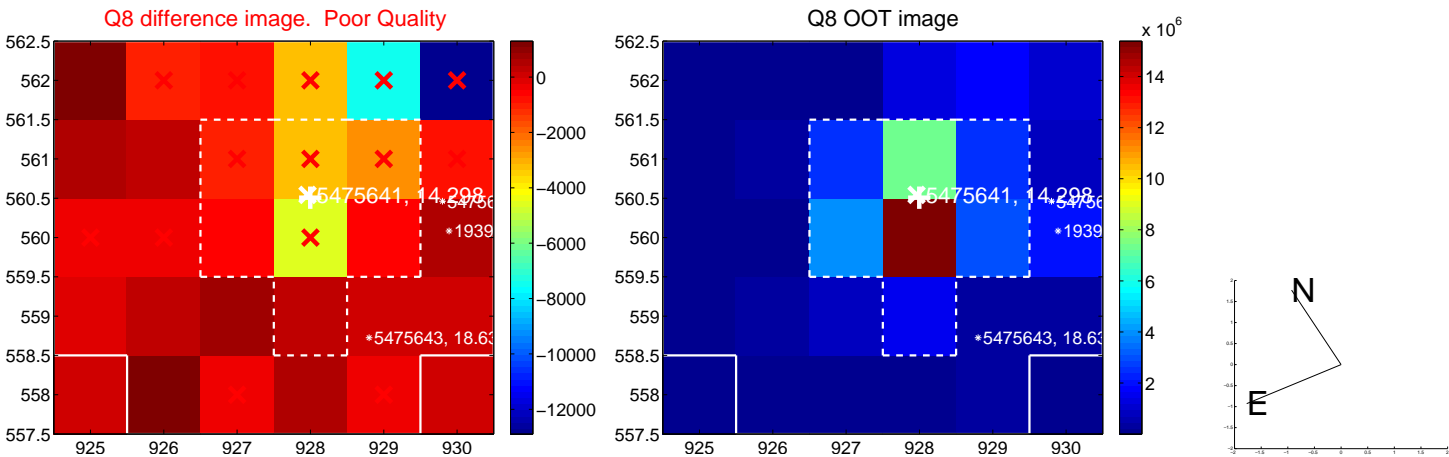
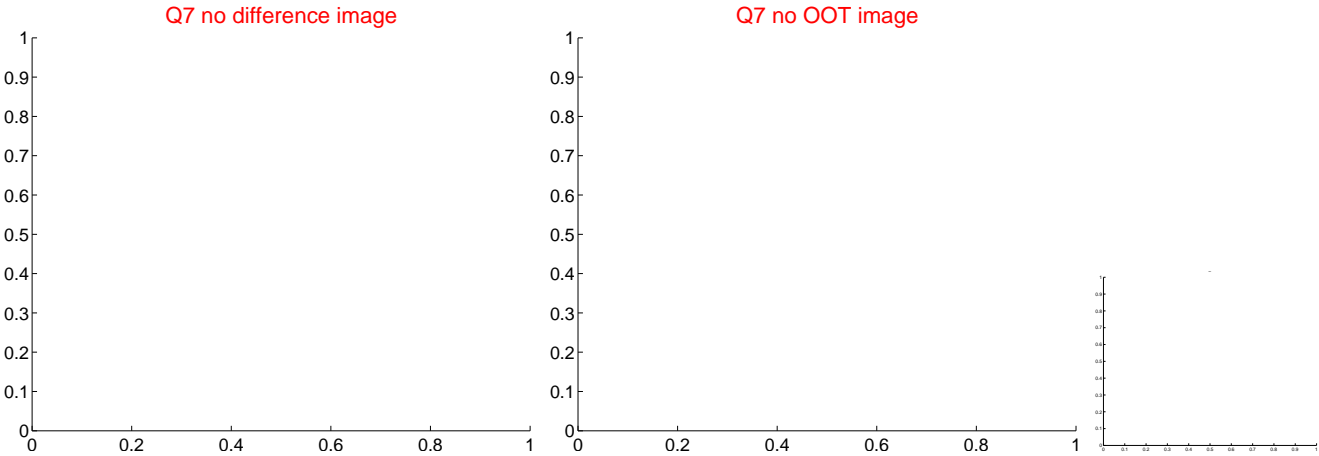
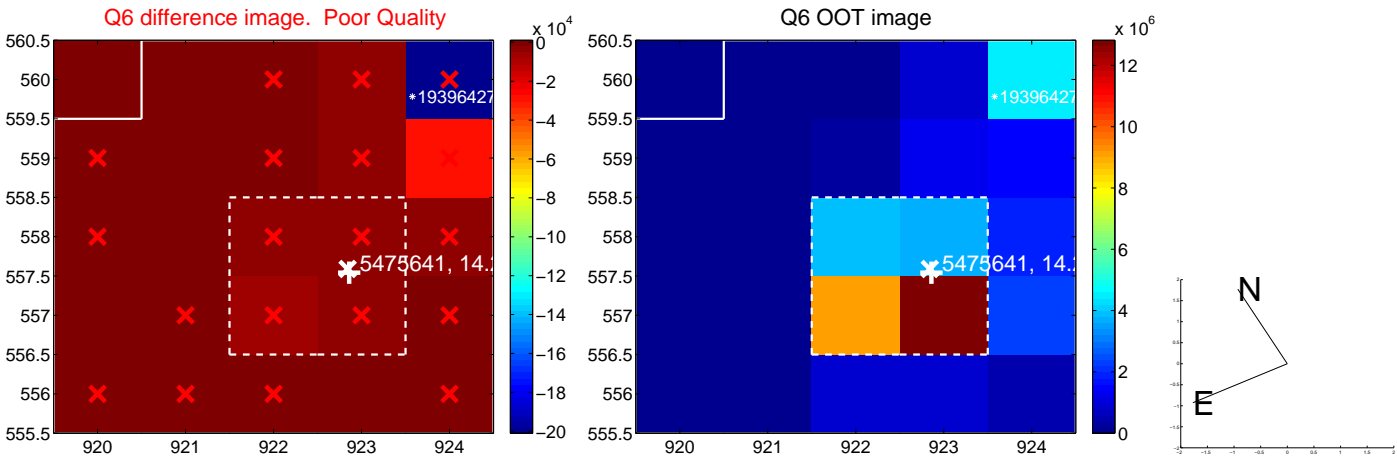
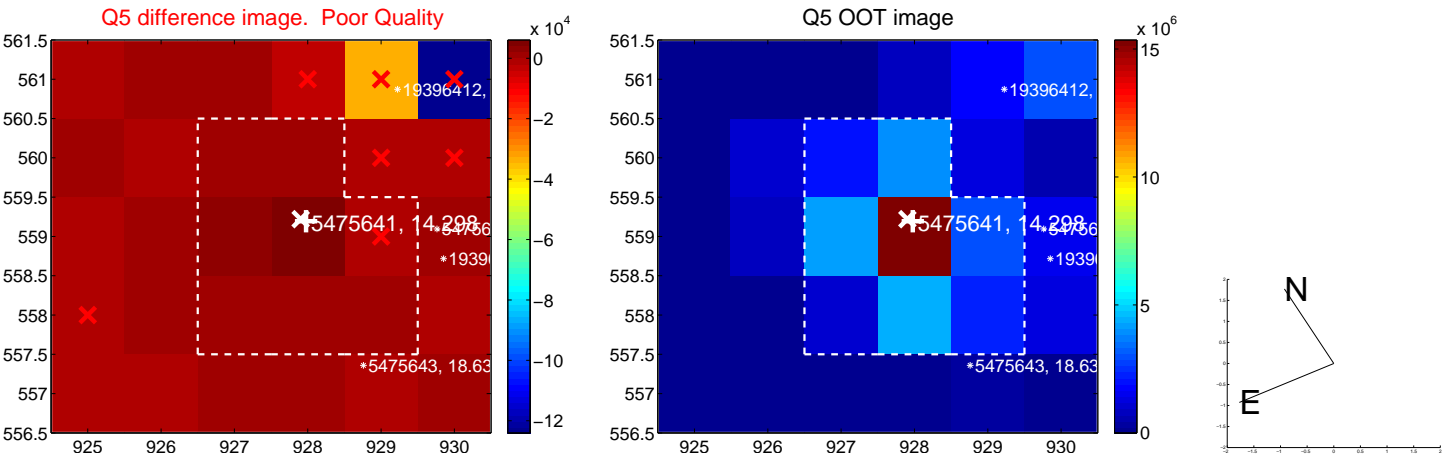


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

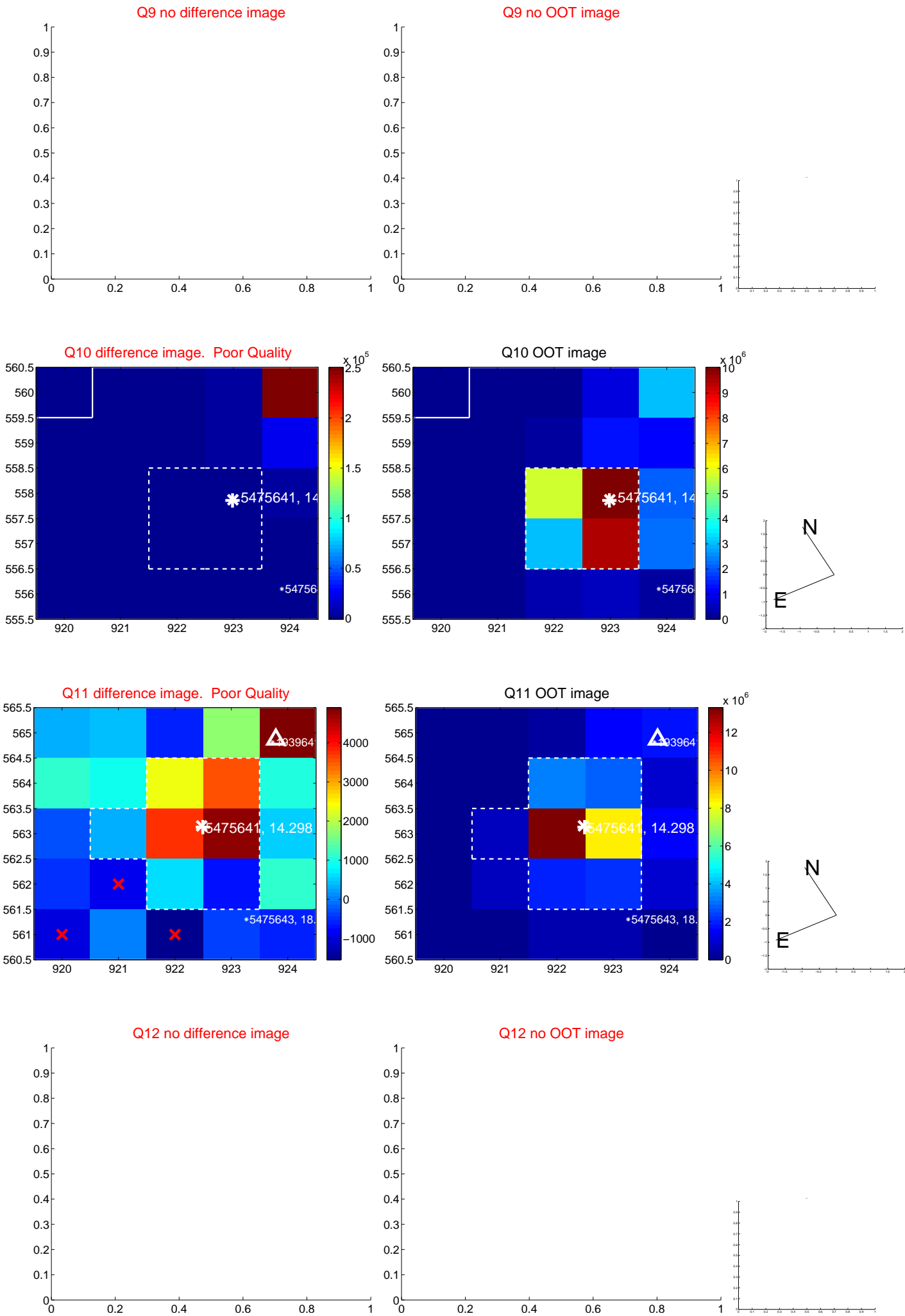
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.



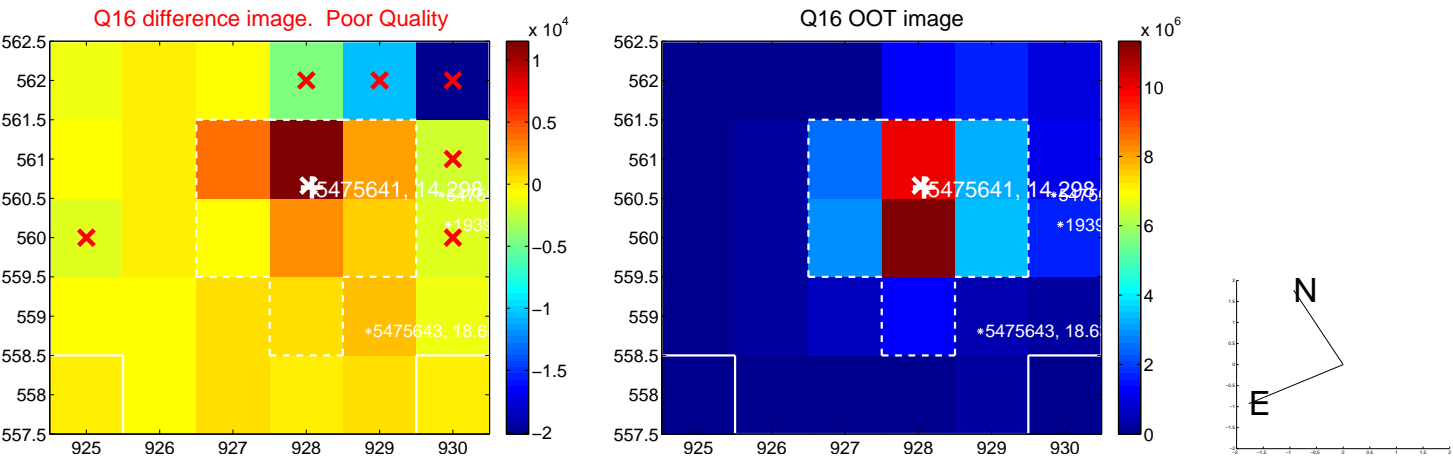
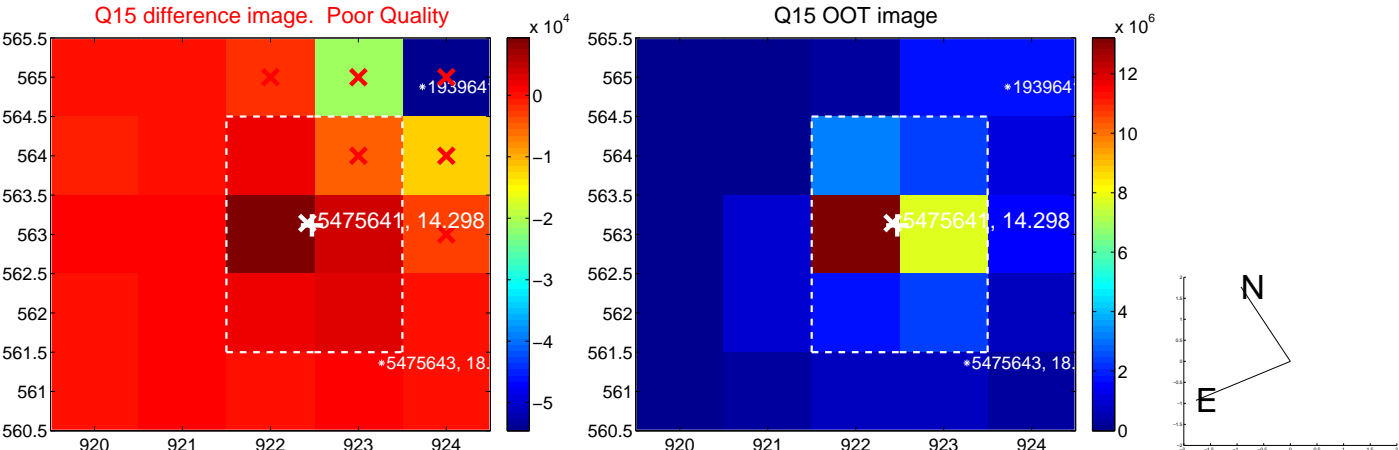
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



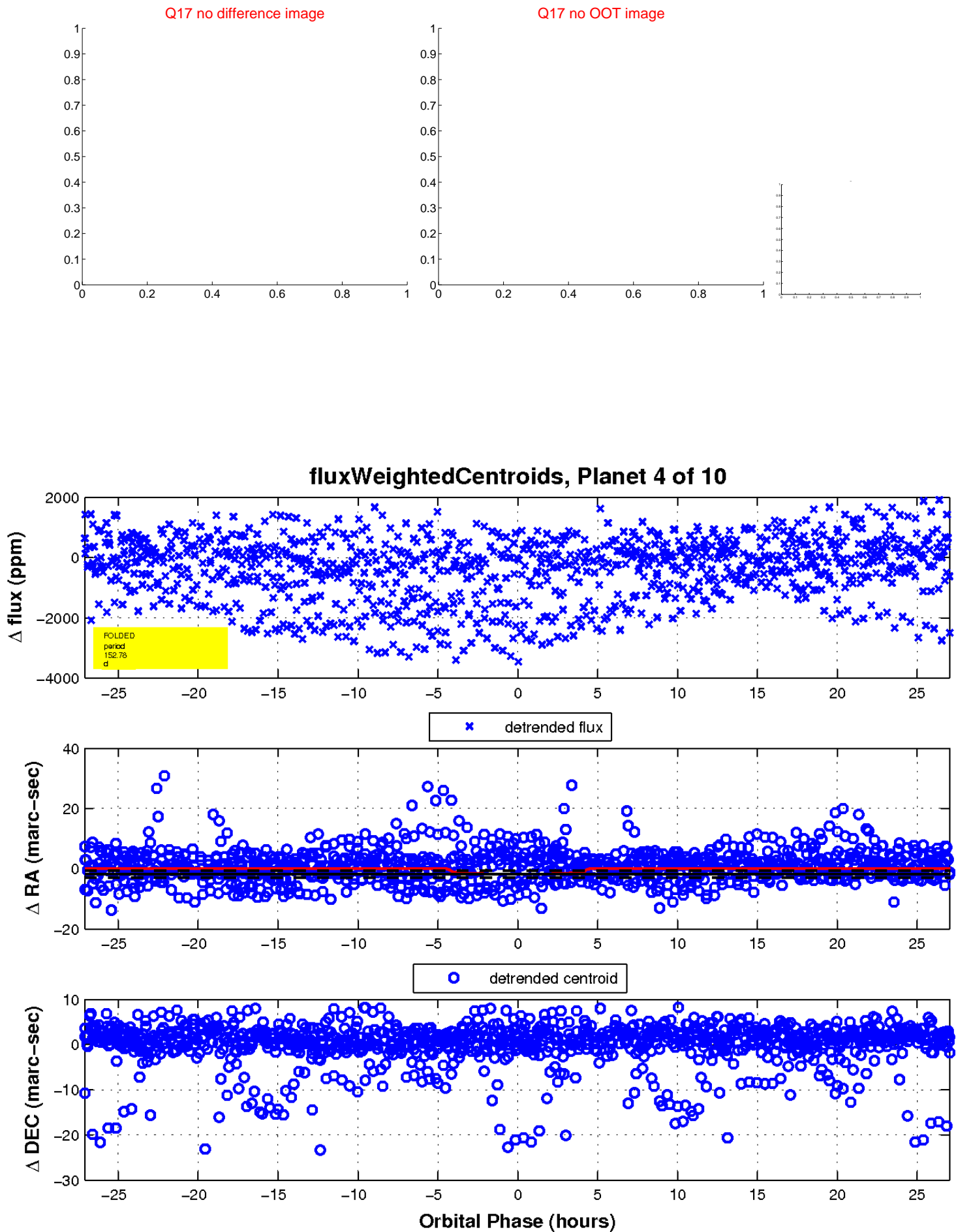
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



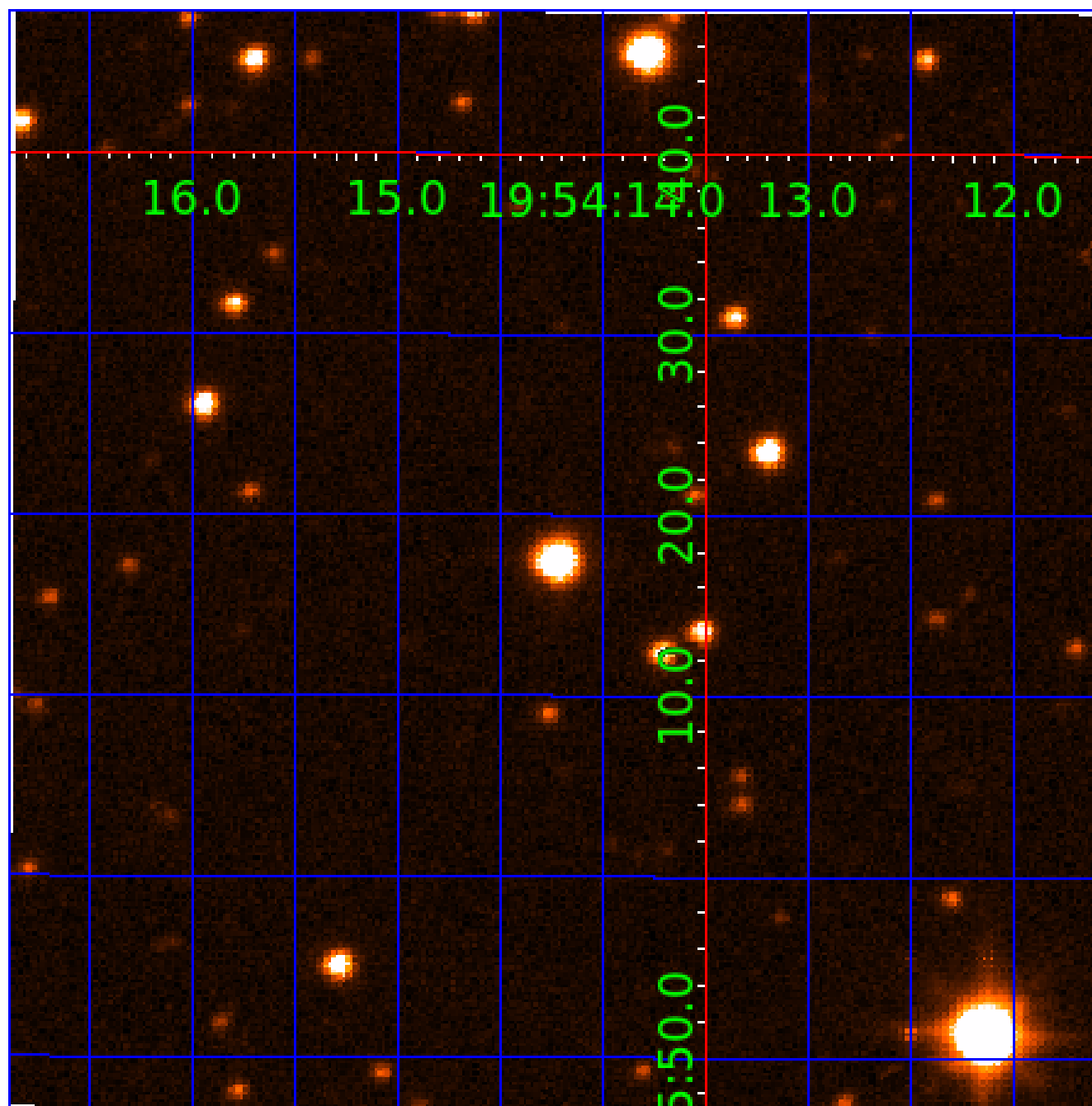
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





UKIRT Image

Declination



# KIC 005475641

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005475641-01	OBS	2895.01	1.069827	132.452550	68.4	4.298	11.2	13.7	0.79	4999	0.81	997.60
005475641-02	OBS	No	239.487671	140.863826	812.0	8.997	18.4	7.6	0.79	4999	2.37	0.73
005475641-03	OBS	No	280.872905	271.644348	1182.9	7.500	15.9	-1.0	0.79	4999	2.62	0.59
005475641-04	OBS	No	152.776853	162.394839	673.1	9.042	13.6	7.7	0.79	4999	2.20	1.34
005475641-05	OBS	No	180.020691	233.604204	856.6	11.672	12.6	7.7	0.79	4999	2.70	1.07
005475641-07	OBS	No	475.792717	447.008273	1185.4	12.541	12.7	6.2	0.79	4999	2.68	0.29
005475641-08	OBS	No	393.701860	188.565963	1971.7	21.017	11.9	8.1	0.79	4999	4.07	0.38
005475641-09	OBS	No	147.912710	257.518469	516.6	19.634	11.2	4.7	0.79	4999	1.75	1.40

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005475641-01	OBS	FP	0.00	0	0	1	1	CENT_RESOLVED_OFFSET—HALO_GHOST—EPHEM_MATCH
005475641-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005475641-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_NOFITS
005475641-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005475641-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—ALL_TRANS_CHASES—CENT_FEW_DIFFS—HALO_GHOST
005475641-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
005475641-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—CENT_FEW_DIFFS
005475641-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES

**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 005475641-05

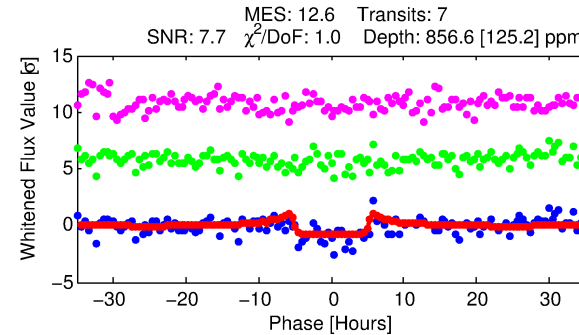
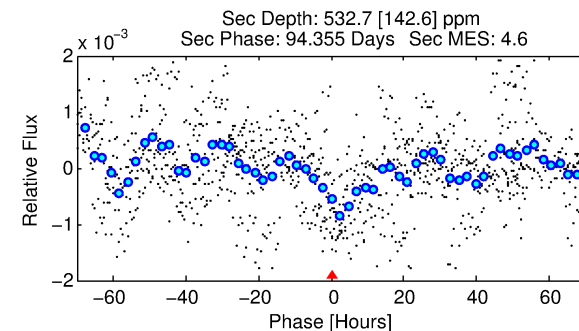
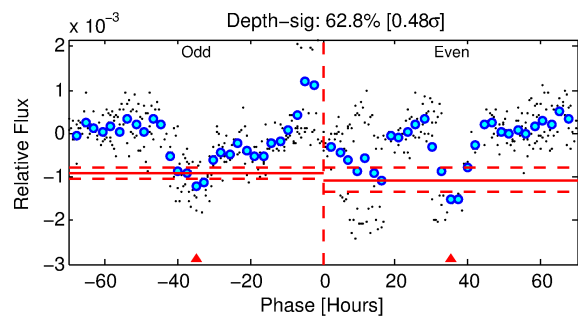
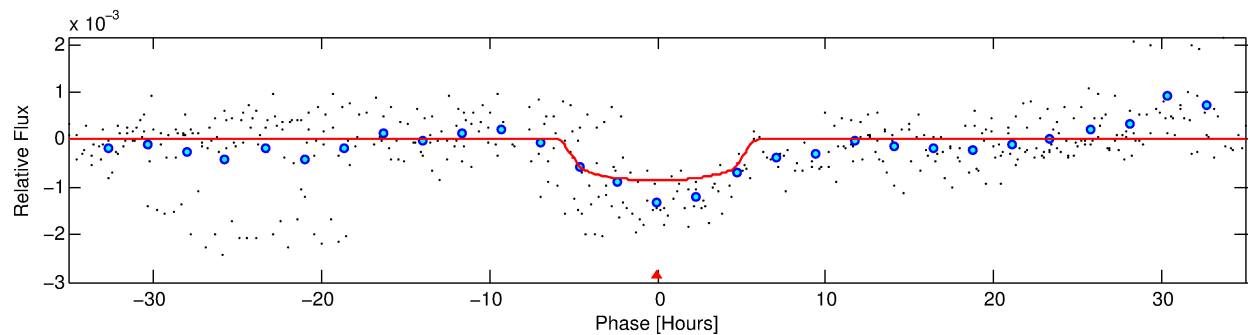
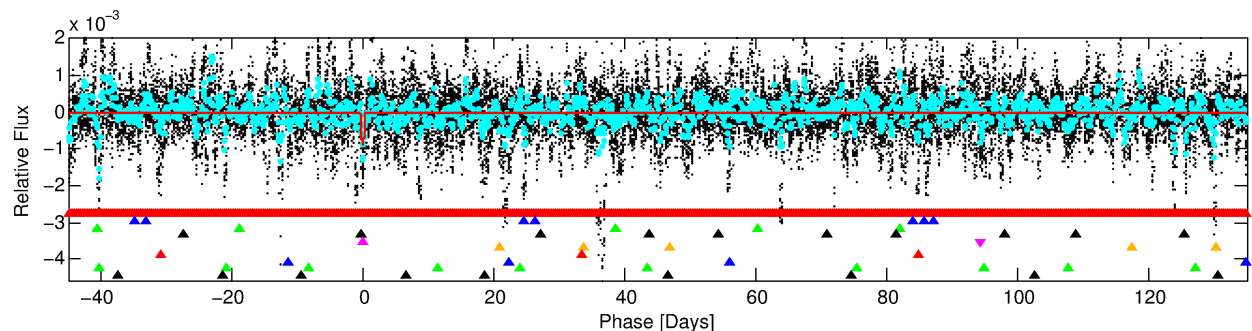
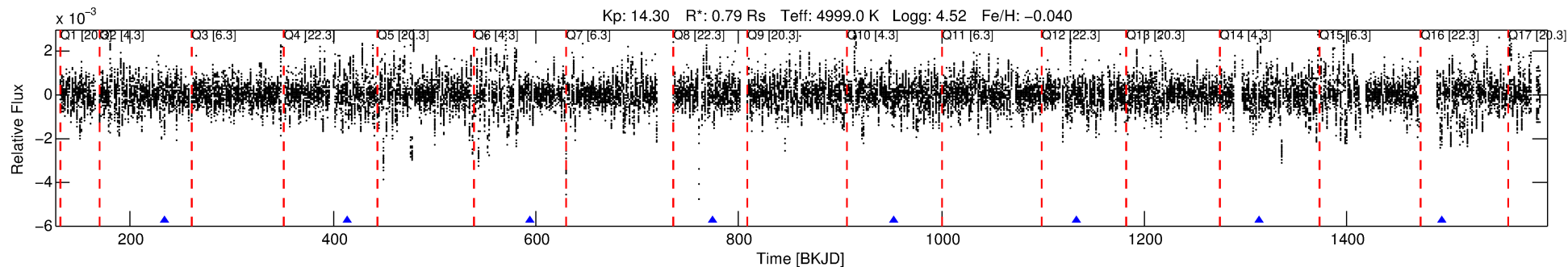
No Significant Match Found

# DV One-Page Summary

KIC: 5475641 Candidate: 5 of 10 Period: 180.021 d

KOI: K02895 Corr: No Ephemeris Match

Kp: 14.30 R\*: 0.79 Rs Teff: 4999.0 K Logg: 4.52 Fe/H: -0.040



## DV Fit Results:

Period = 180.02069 [0.00299] d  
Epoch = 233.6042 [0.0127] BKJD  
Rp/R\* = 0.0315 [0.0036]  
a/R\* = 66.25 [19.37]  
b = 0.86 [0.09]  
Seff = 1.07 [0.20]  
Teq = 260 [12] K  
Rp = 2.70 [0.41] Re  
a = 0.5674 [0.0510] AU  
Ag = 12923.70 [4898.13] [2.64σ]  
Teffp = 4279 [399] K [10.06σ]

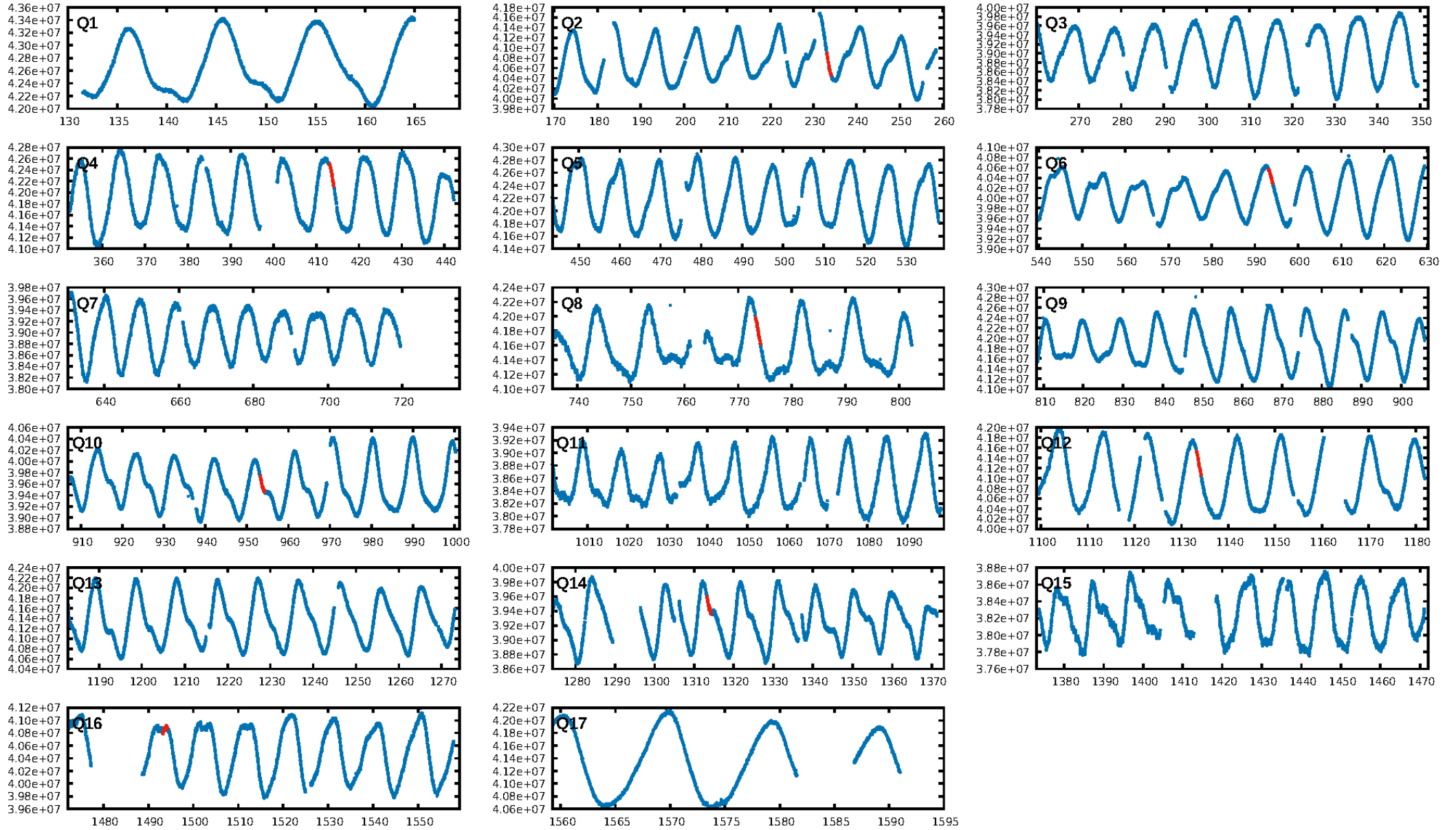
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [44.29σ]  
LongPeriod-sig: 100.0% [96.85σ]  
ModelChiSquare2-sig: 74.8%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [7/7]  
GhostDiagnostic-chr: 0.1765  
Centroid-sig: N/A  
Centroid-so: 1.711 arcsec [1.18σ]  
OotOffset-rm: N/A  
KicOffset-rm: N/A  
OotOffset-st: 0/0/0/0 [0]  
KicOffset-st: 0/0/0/0 [0]  
DiffImageQuality-fgm: N/A  
DiffImageOverlap-fno: 0.00 [0/7]

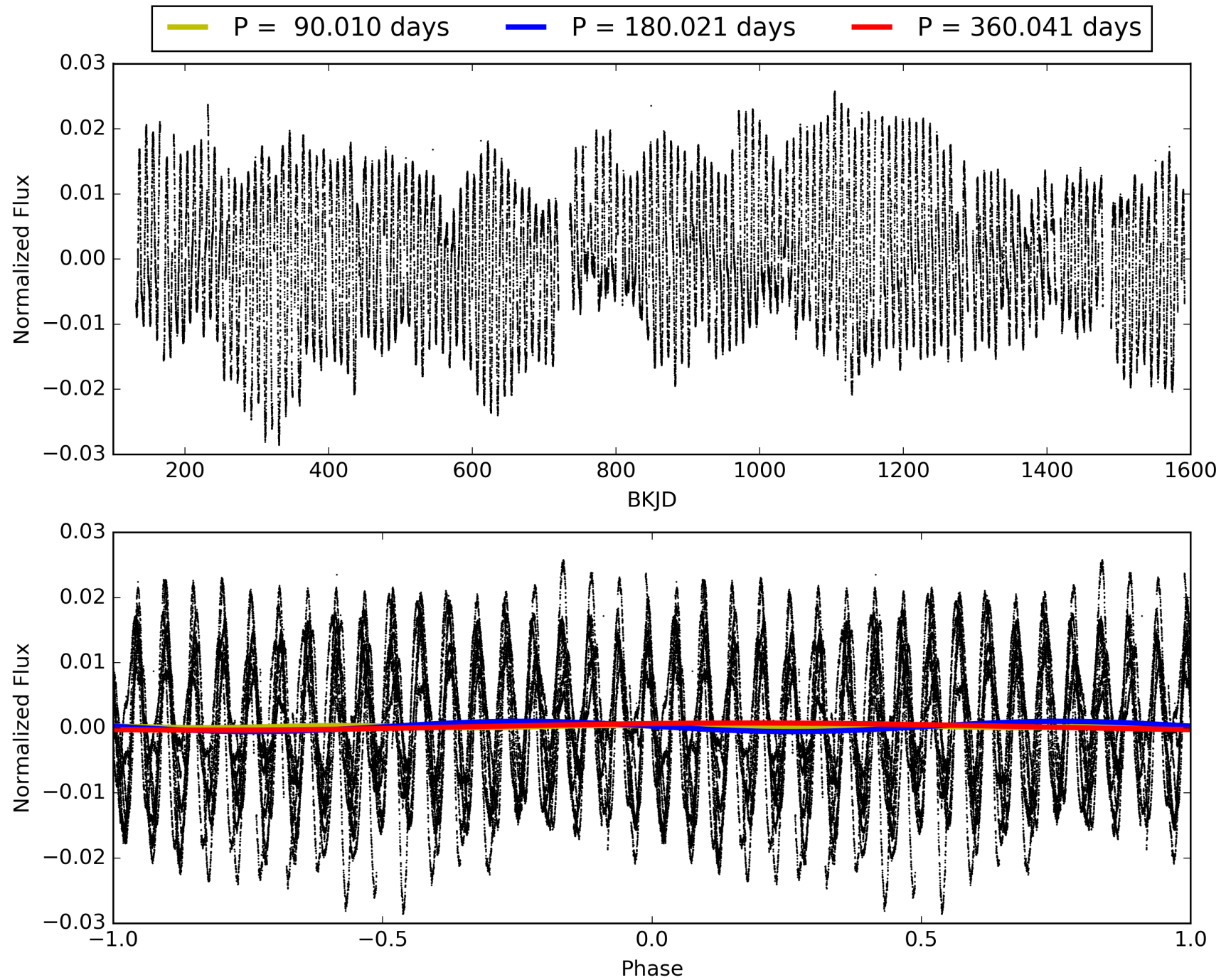
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 17:59:13 Z

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

# TCE 005475641-05, PDC Light Curves

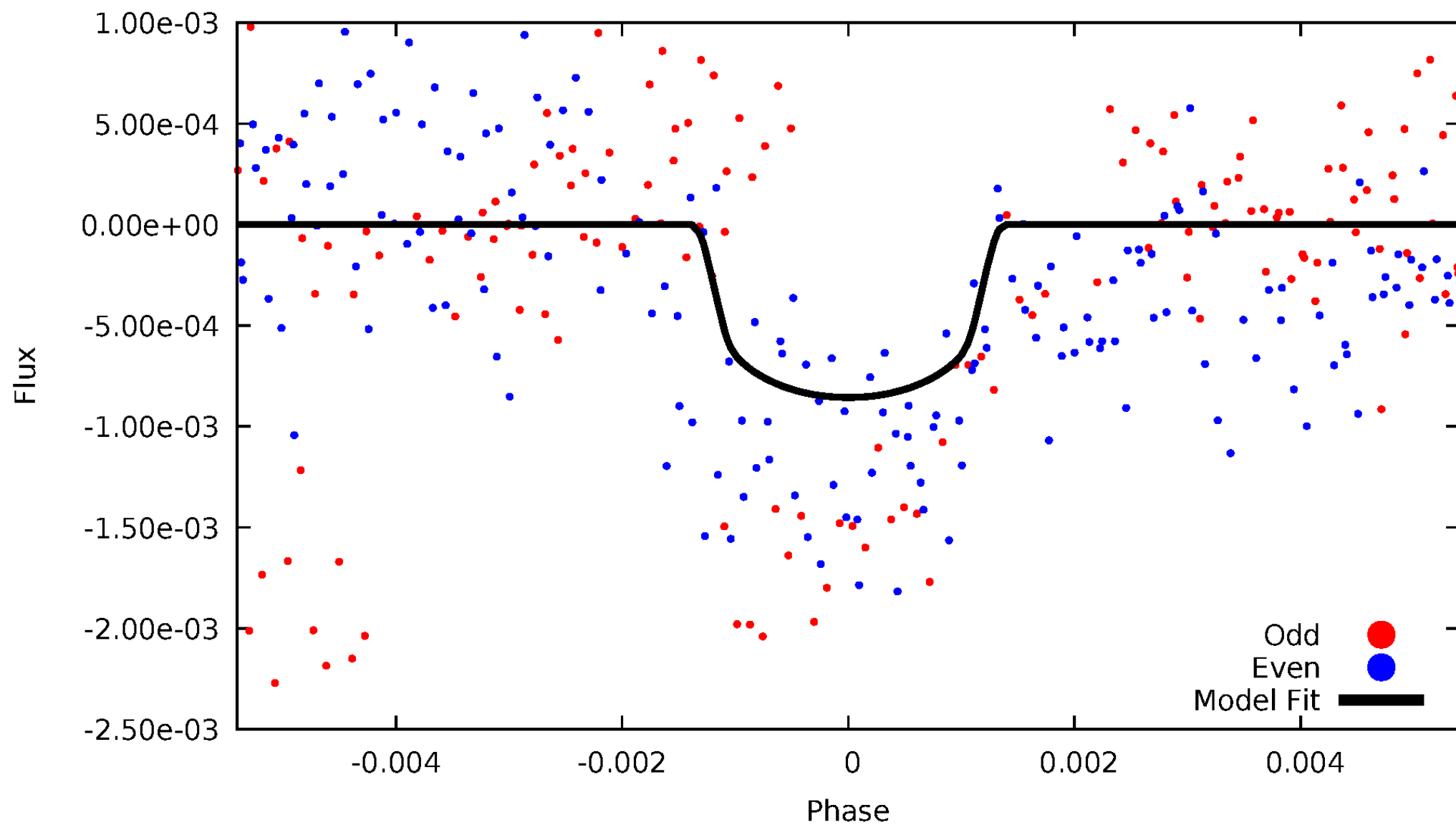


TCE 005475641-05



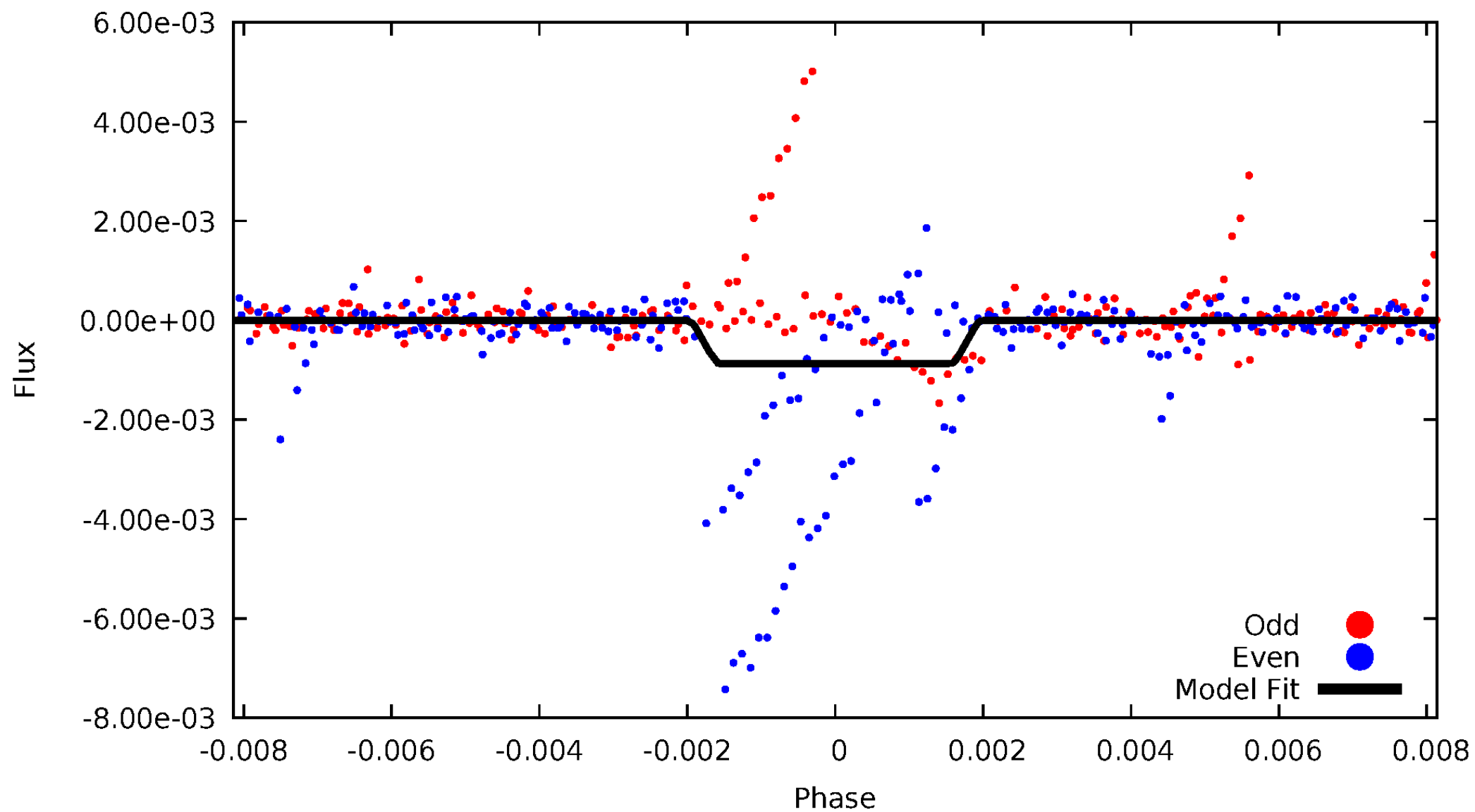
# DV Odd/Even

TCE 005475641-05



# ALT Odd/Even

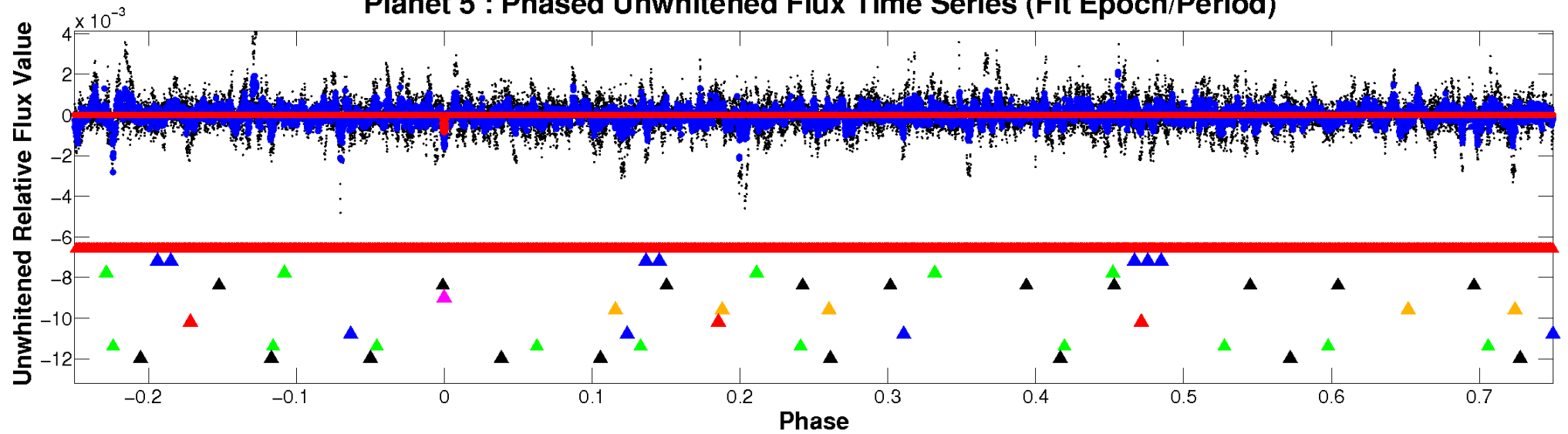
TCE 005475641-05



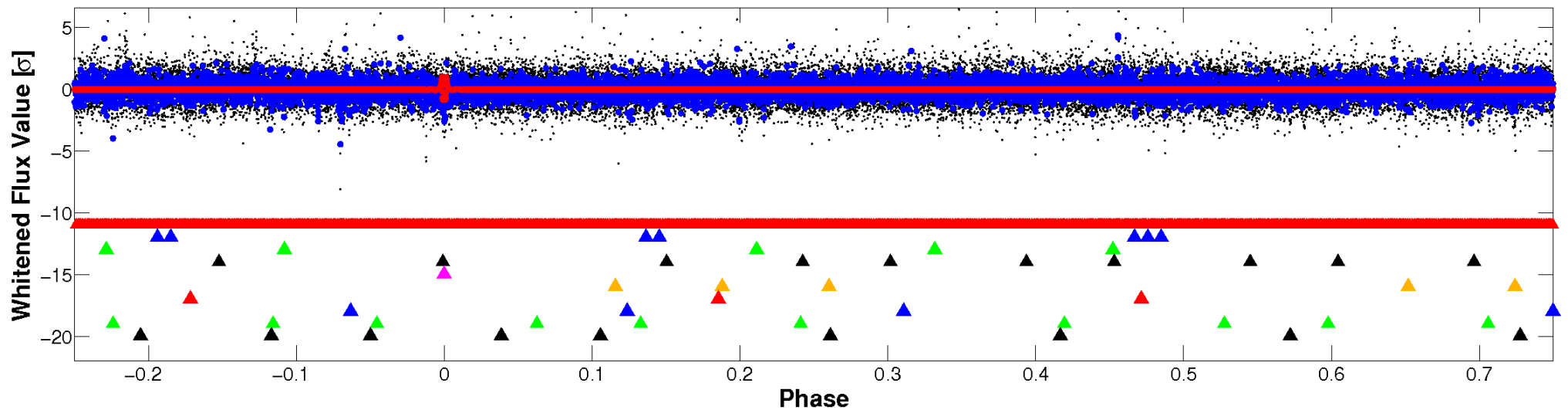


# Non-Whitened Vs. Whitened Light Curve

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



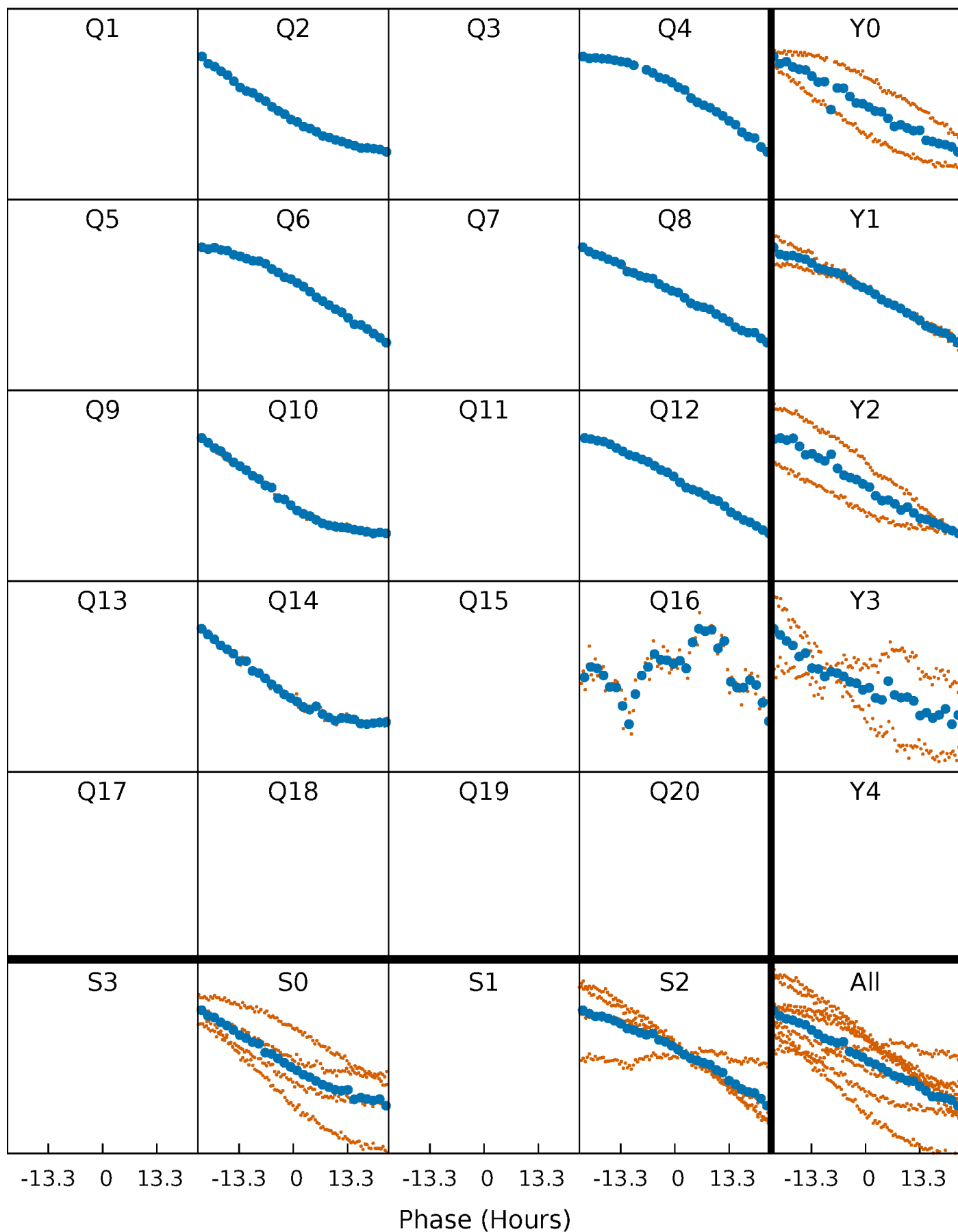
## Planet 5 : Phased Whitened Flux Time Series (Fit Epoch/Period)





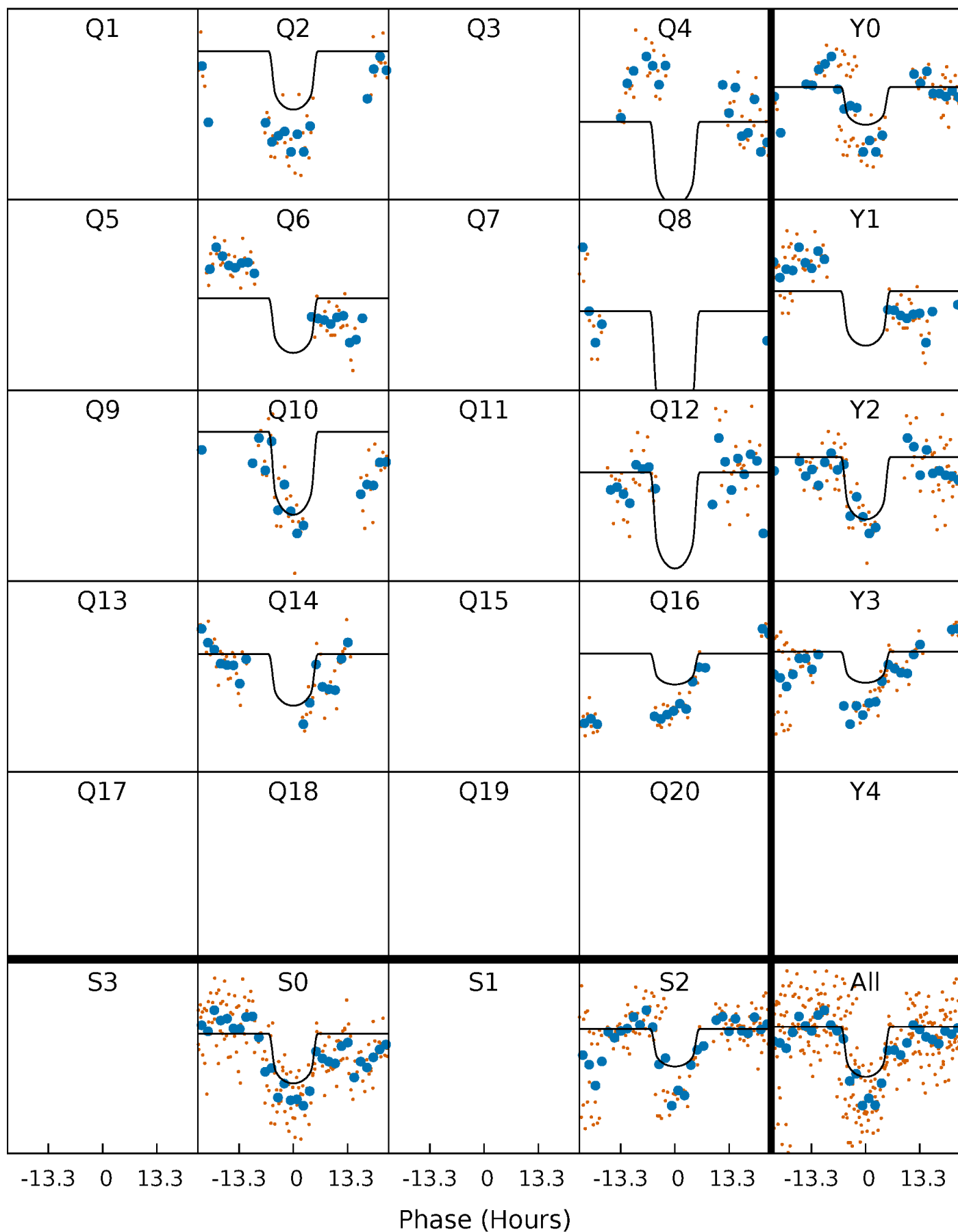
# PDC Quarter-Phased Transit Curves

TCE 005475641-05     $P=180.020691$  Days     $T_0=233.604204$  (BKJD)



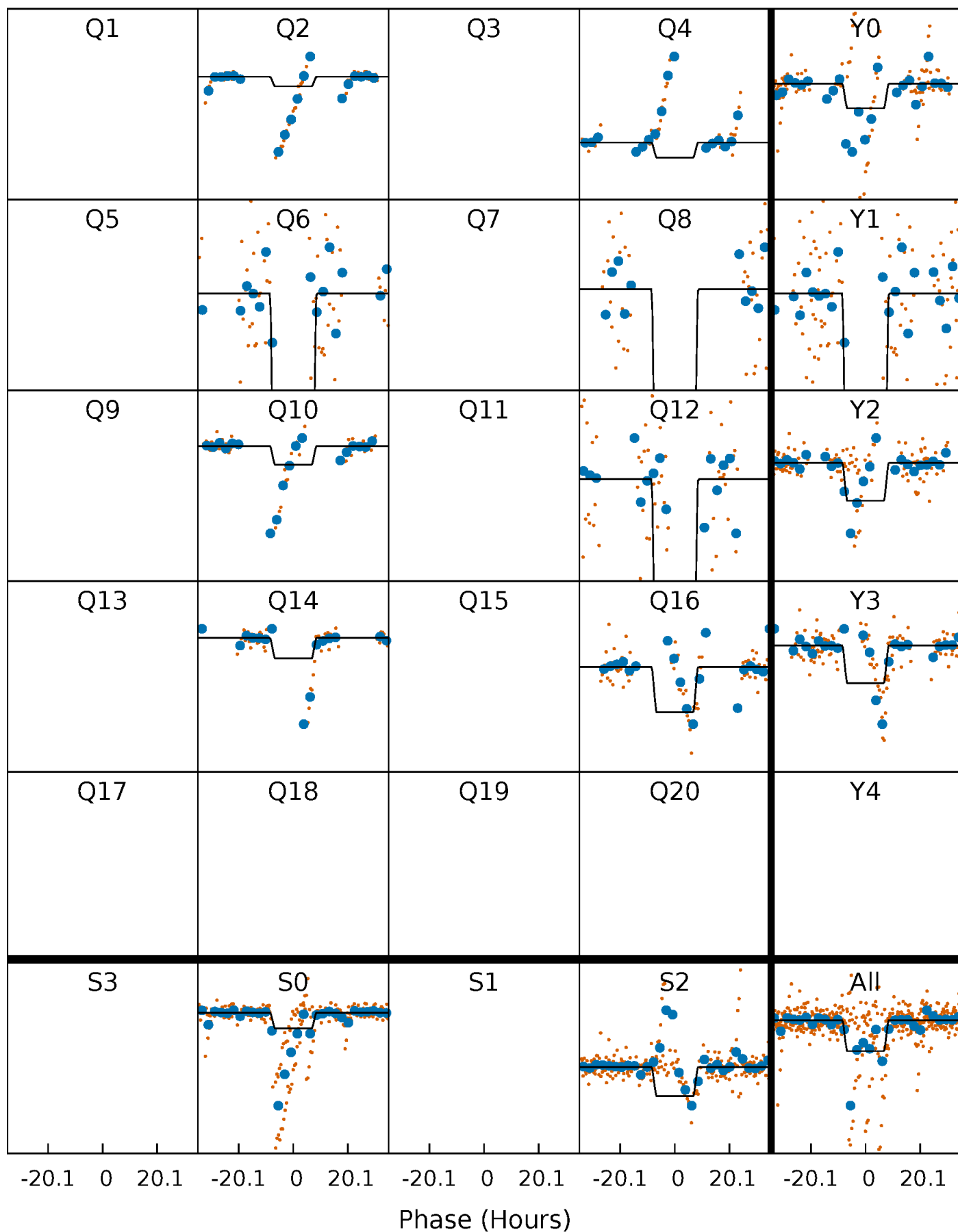
# DV Quarter-Phased Transit Curves

TCE 005475641-05     $P=180.020691$  Days     $T_0=233.604204$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

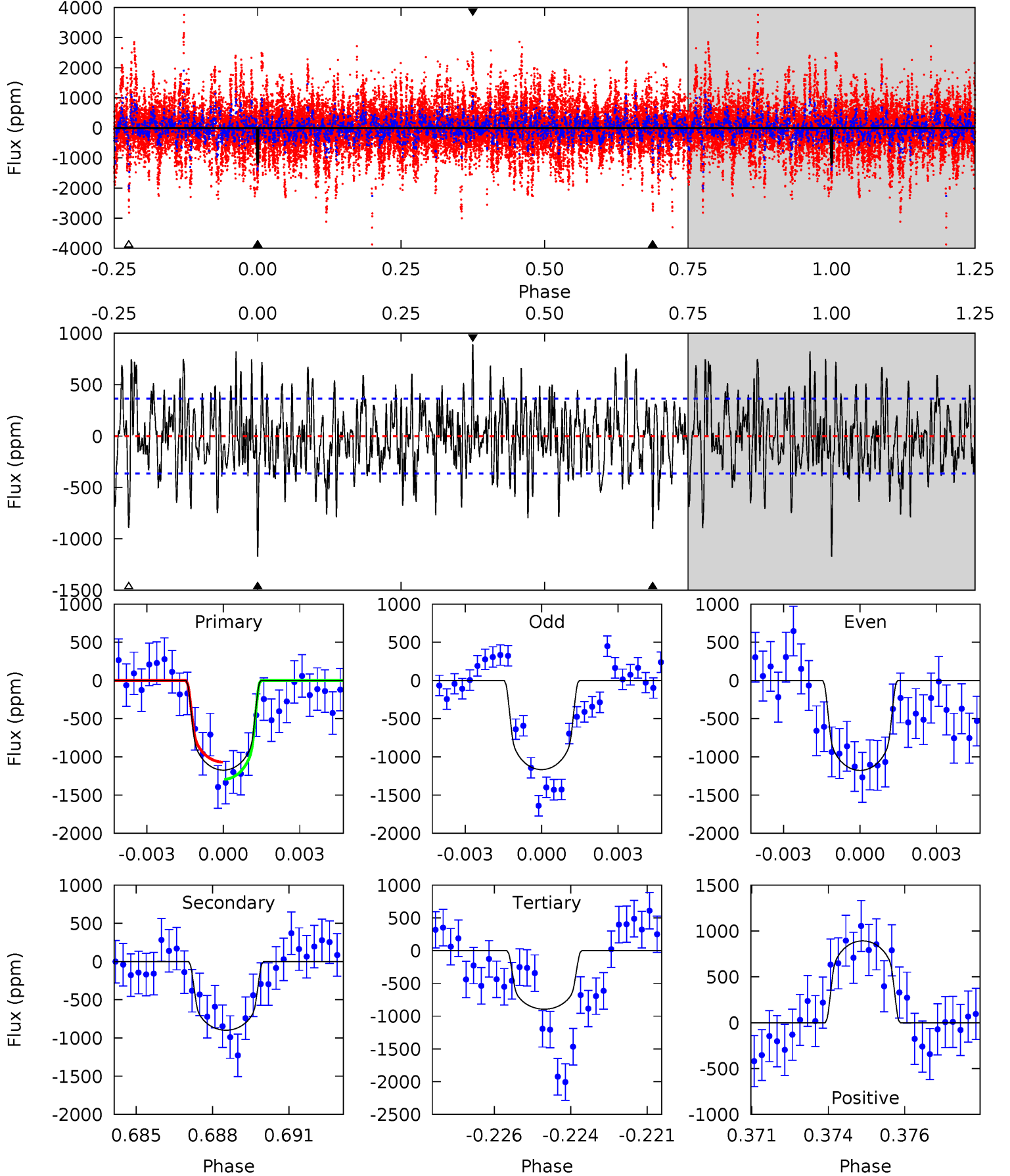
TCE 005475641-05     $P=180.006041$  Days     $T_0=233.582536$  (BKJD)



# DV Model-Shift Uniqueness Test

005475641-05, P = 180.020691 Days, E = 53.583513 Days

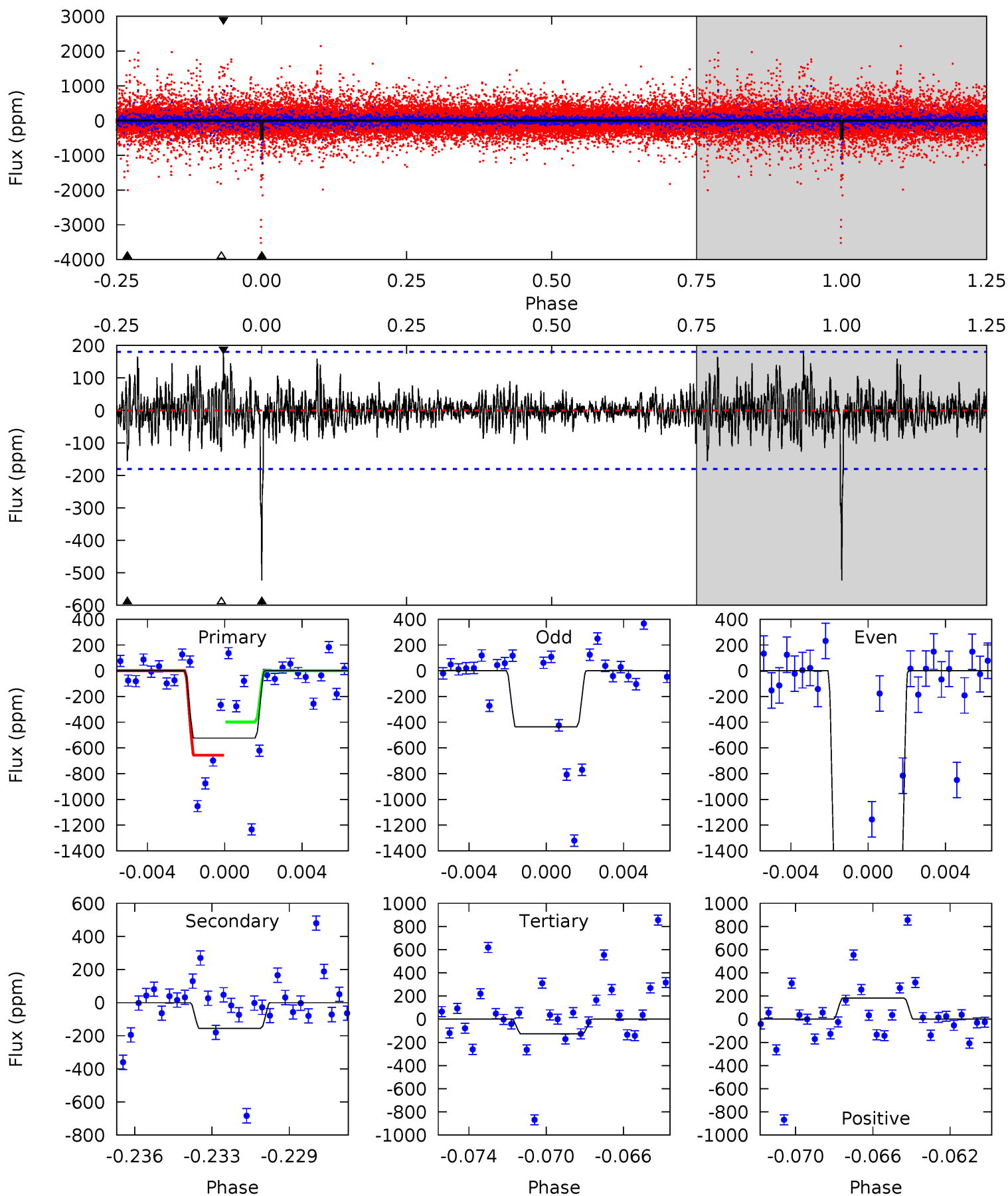
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
17.0	13.0	12.9	12.9	5.26	2.99	4.12	4.04	4.07	0.07	0.10	0.07	0.92	0.43	1.64



# Alt Model-Shift Uniqueness Test

005475641-05, P = 180.006041 Days, E = 53.576495 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
15.1	4.51	3.66	5.27	5.21	2.89	1.04	11.5	9.85	0.85	-0.76	24.8	1.66	0.26	0



### Stellar Parameters For KIC 005475641

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4999^{+151}_{-136}$	$4.523^{+0.078}_{-0.052}$	$-0.040^{+0.300}_{-0.300}$	$0.786^{+0.063}_{-0.079}$	$0.752^{+0.085}_{-0.057}$	$2.180^{+0.701}_{-0.371}$
	+3%/-3%	+2%/-1%	+750%/-750%	+8%/-10%	+11%/-8%	+32%/-17%
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 005475641-05 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-899 \pm 69$	$2.69^{+0.36}_{-0.35}$	$362^{+14}_{-14}$	$4908^{+324}_{-249}$	$22160^{+7295}_{-4761}$
Alt.	$-156 \pm 35$	$2.51^{+0.35}_{-0.34}$	$361^{+14}_{-13}$	$3630^{+220}_{-188}$	$4371^{+1839}_{-1254}$

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

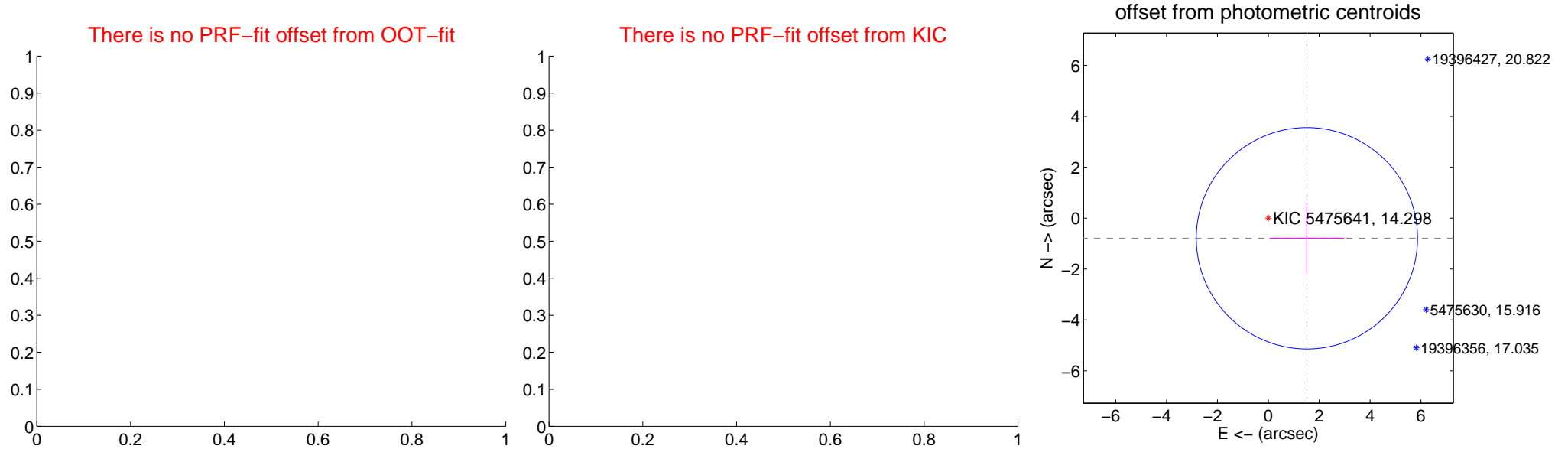
## DV Centroid Data

Supplemental centroid analysis for 005475641-05. Kepler magnitude: 14.30. Transit SNR 7.65

There are 0 quarters with good PRF difference image offsets

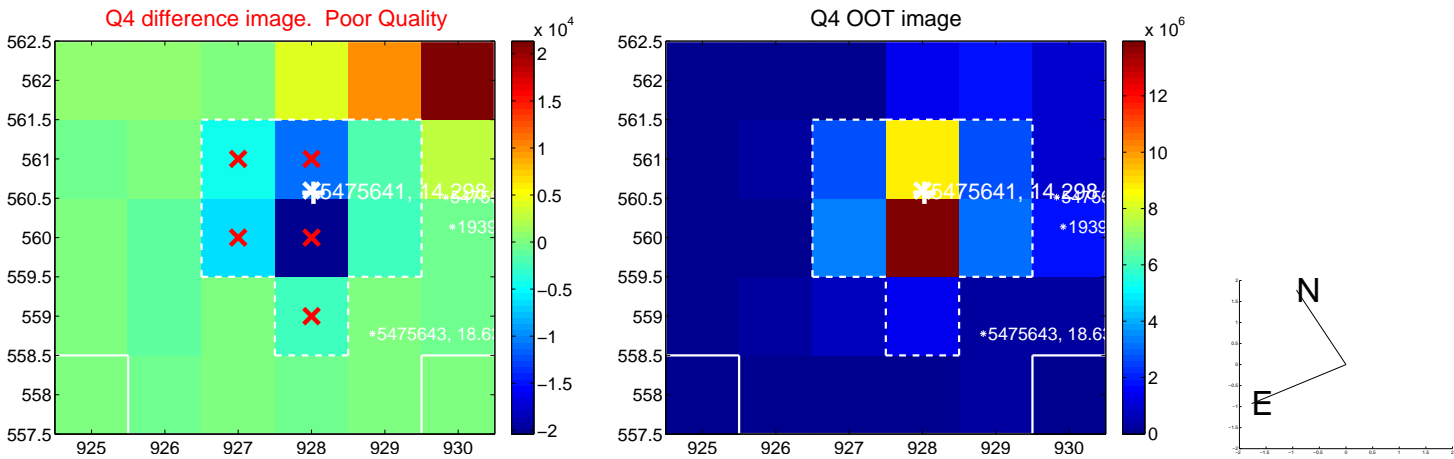
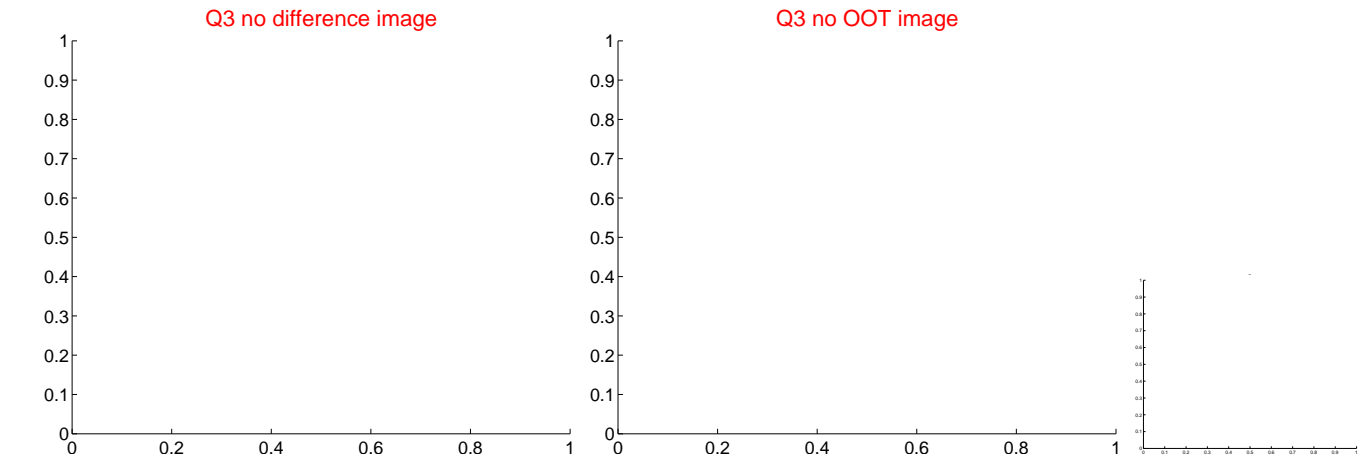
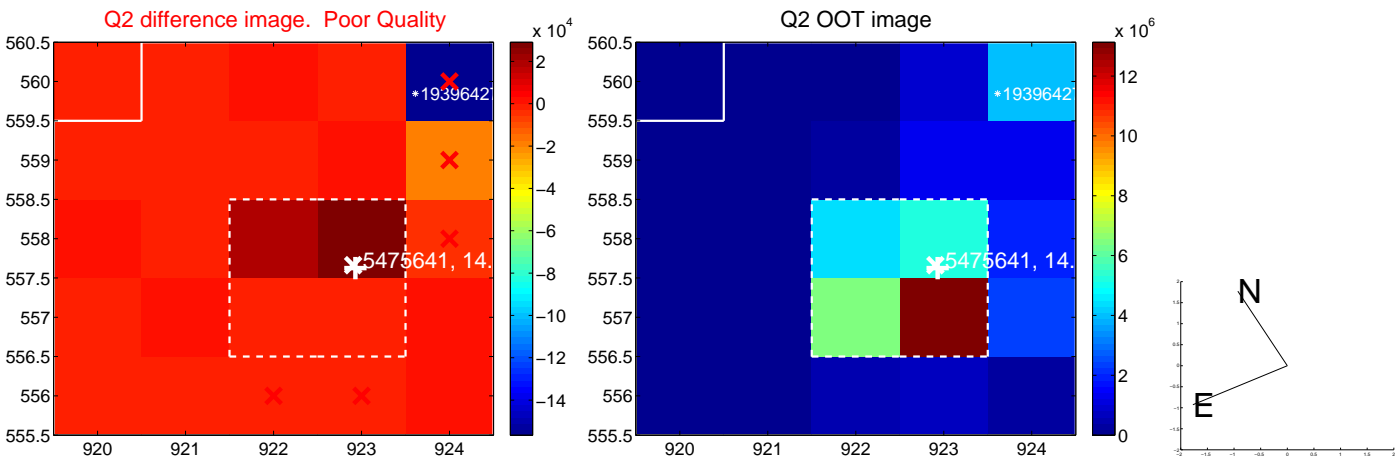
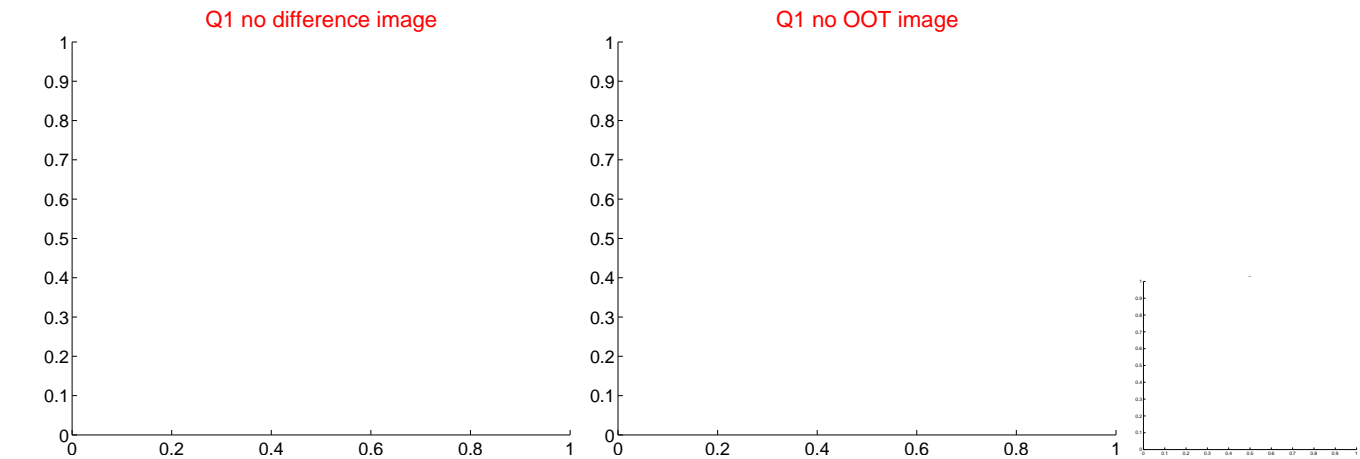
The direct PRF centroid is offset from the target star catalog position by about NaN arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	—	—	—	—
PRF-fit source offset from KIC position	—	—	—	—
photometric centroid source offset	$1.71 \pm 1.45$	1.18	$-1.52 \pm 1.47$	$-0.79 \pm 1.39$



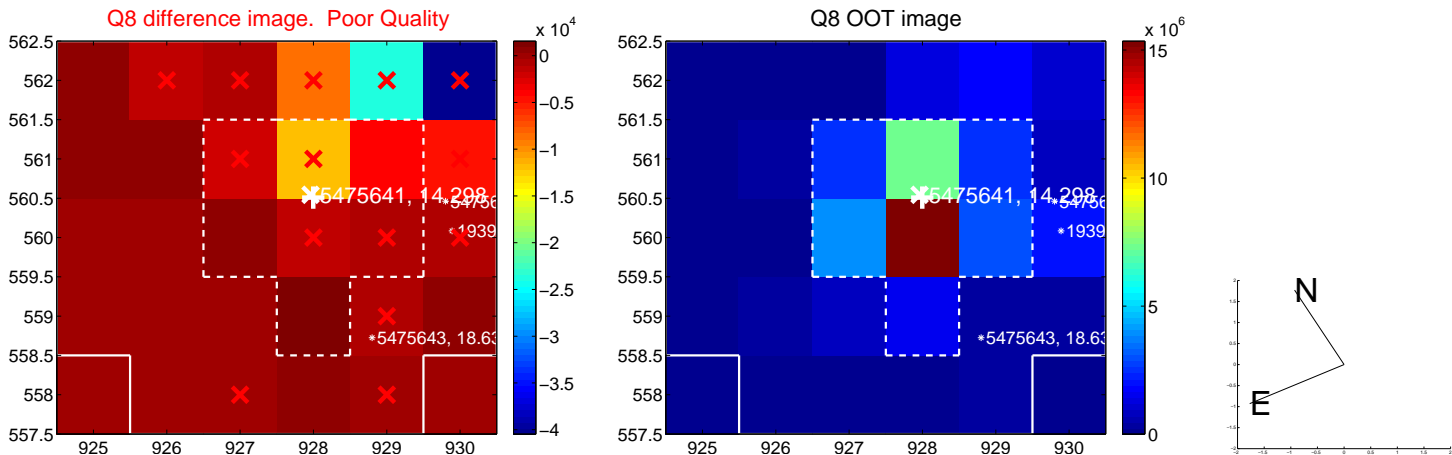
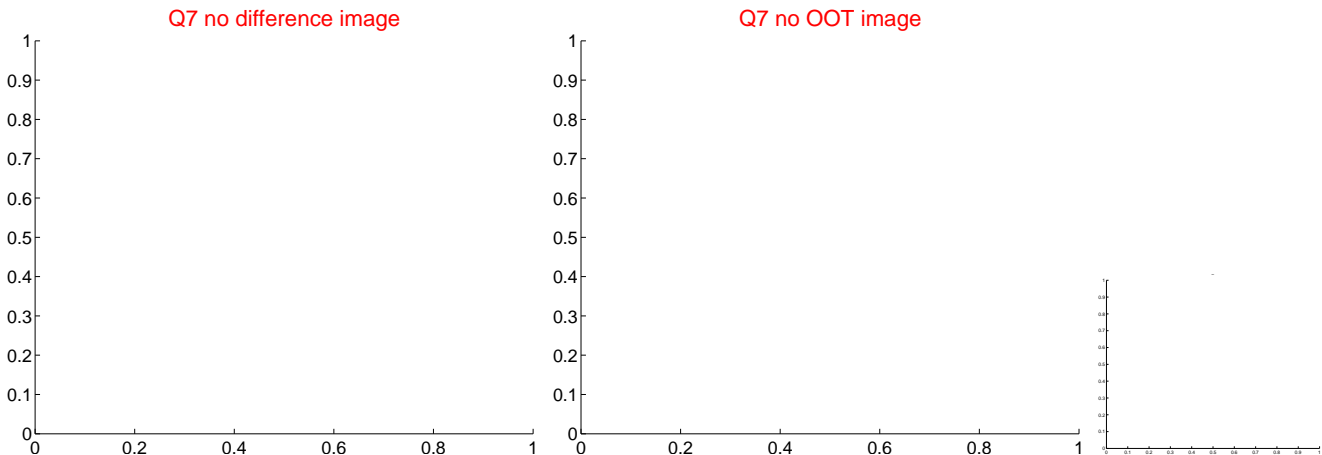
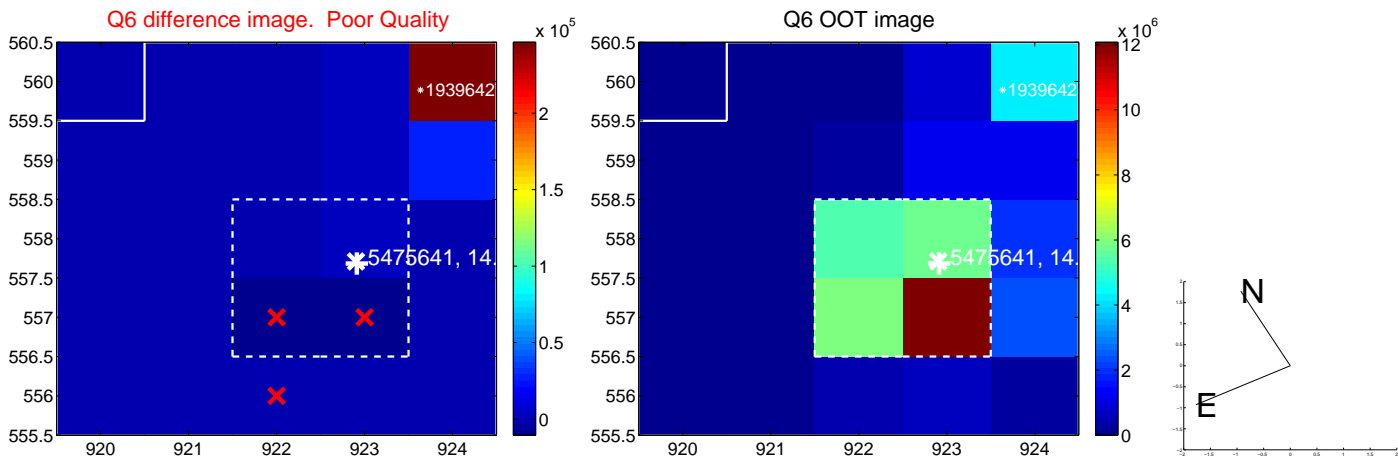
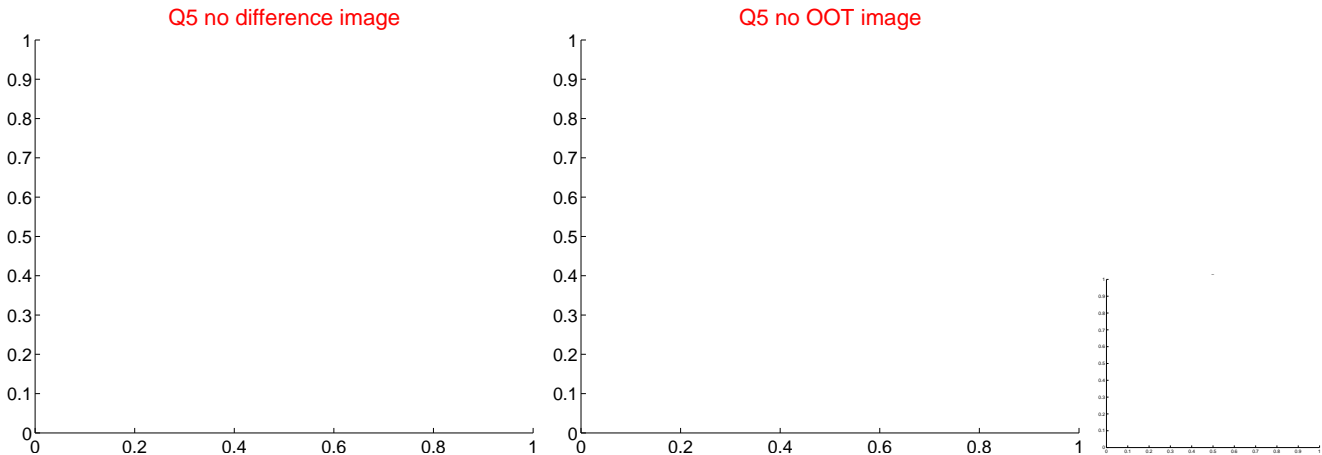
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

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

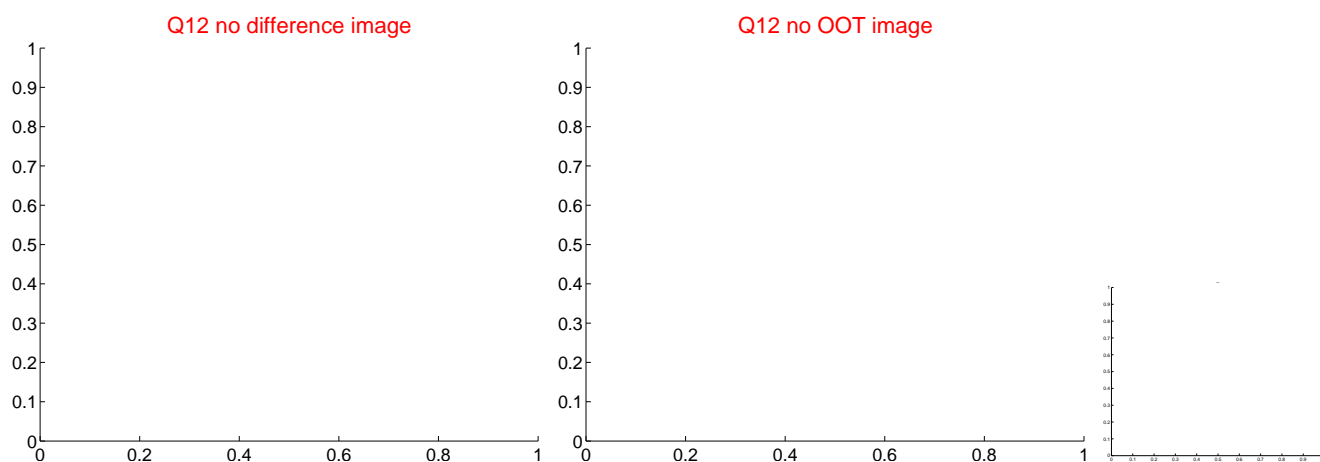
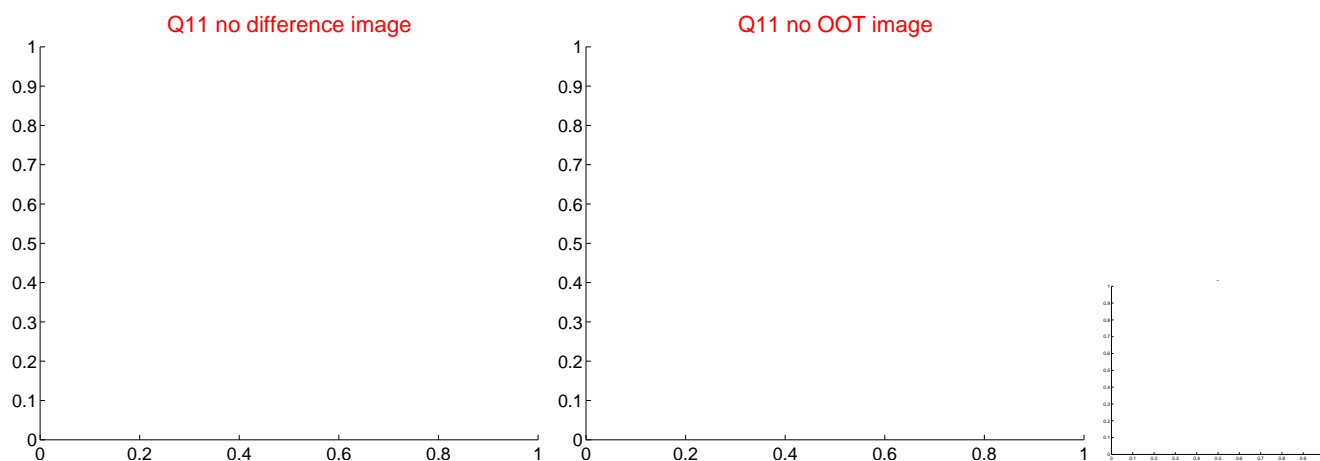
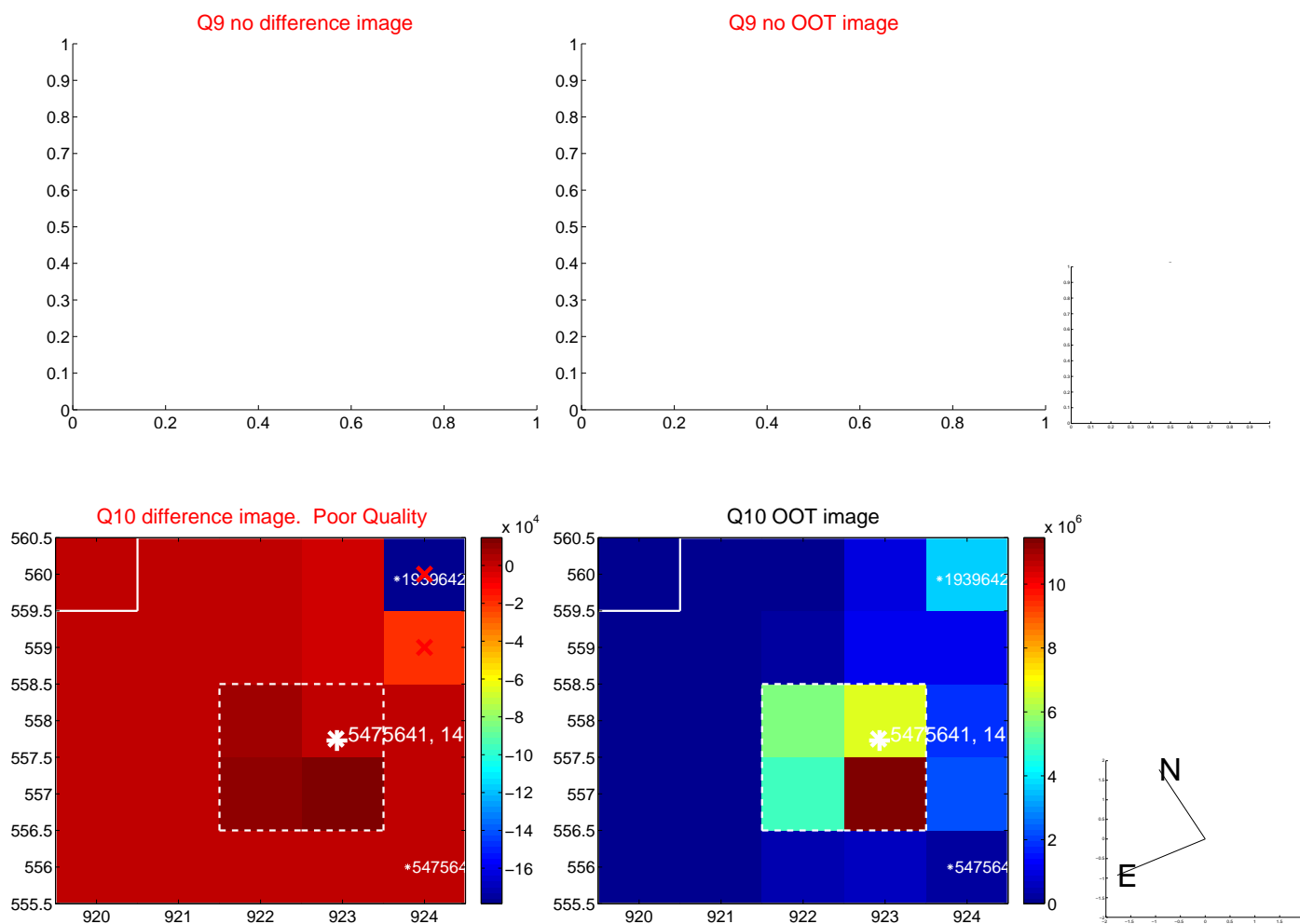




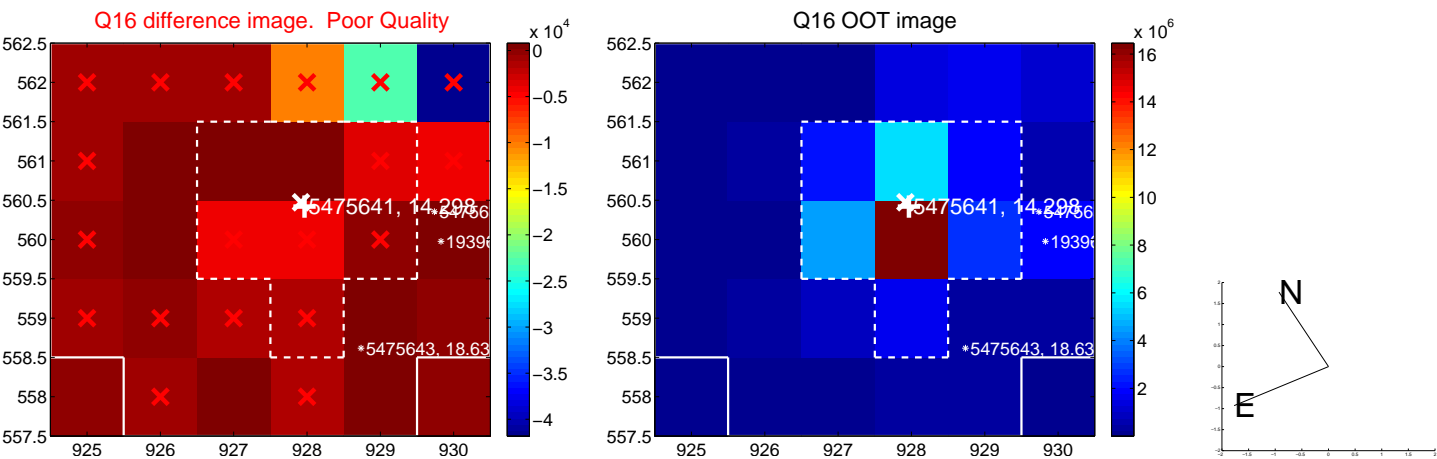
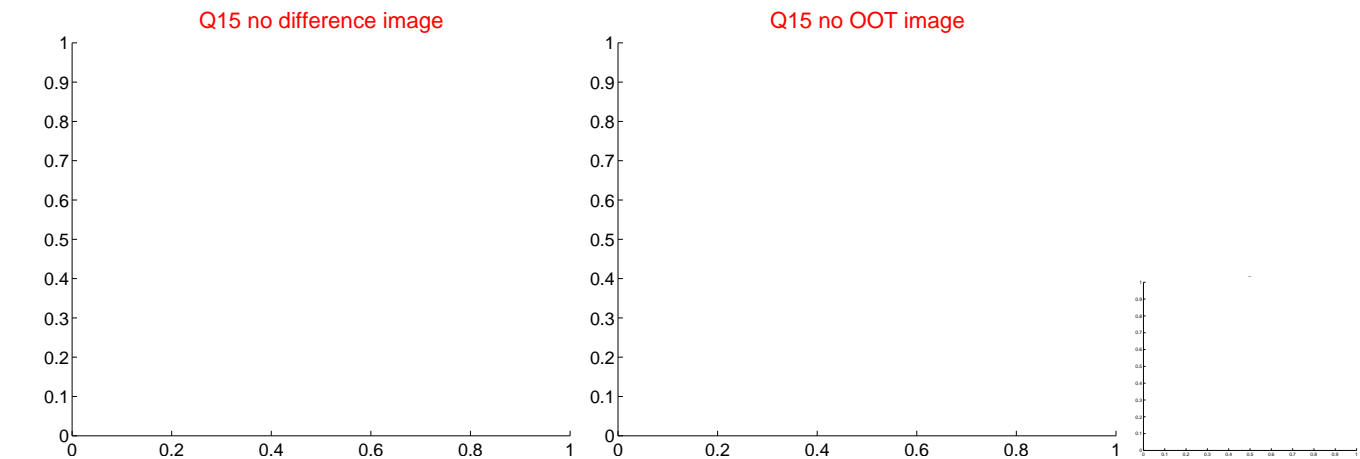
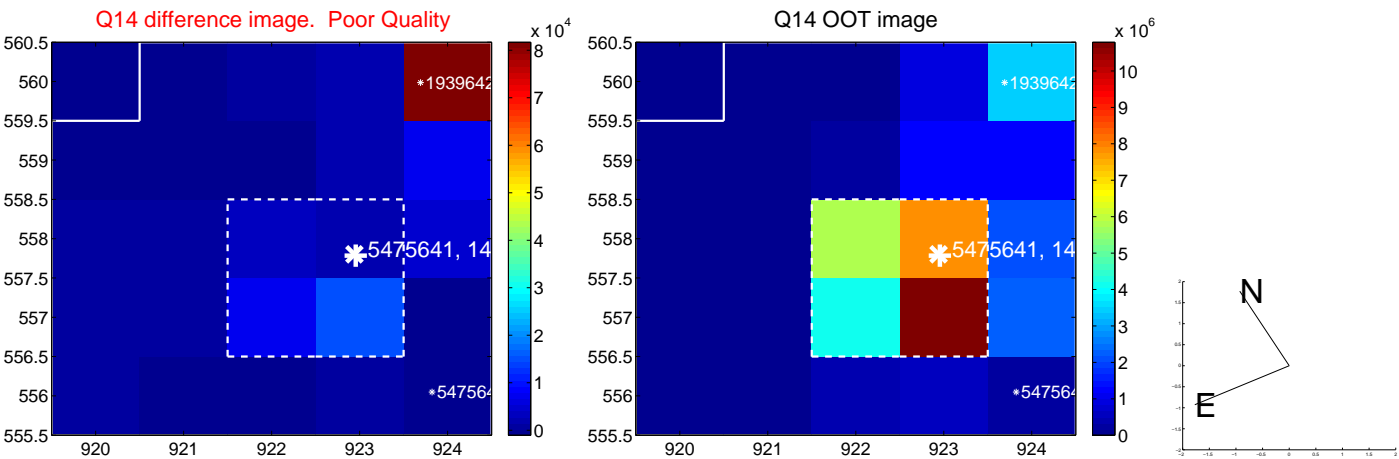
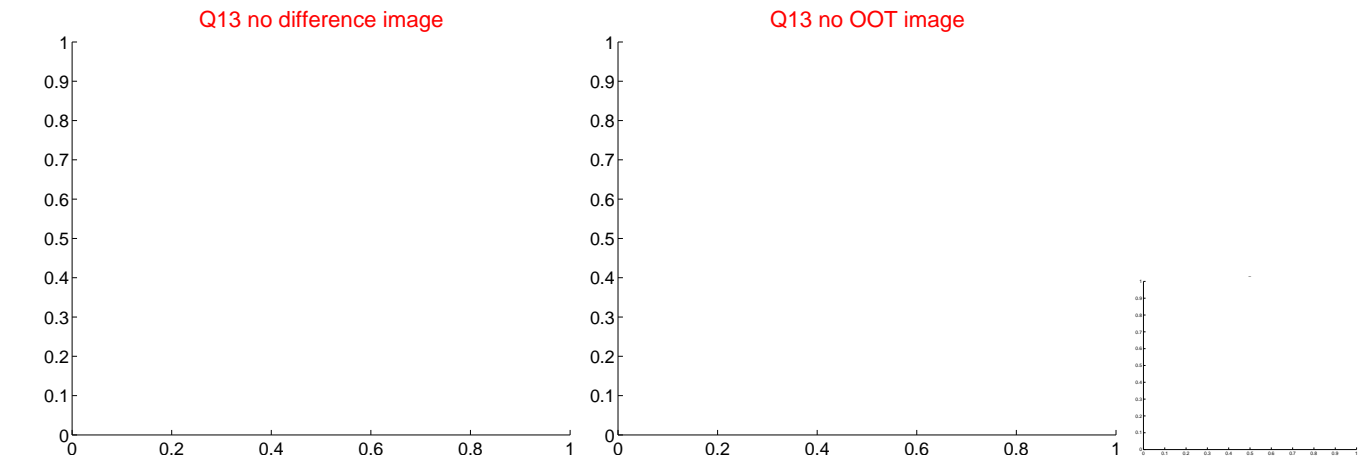
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value



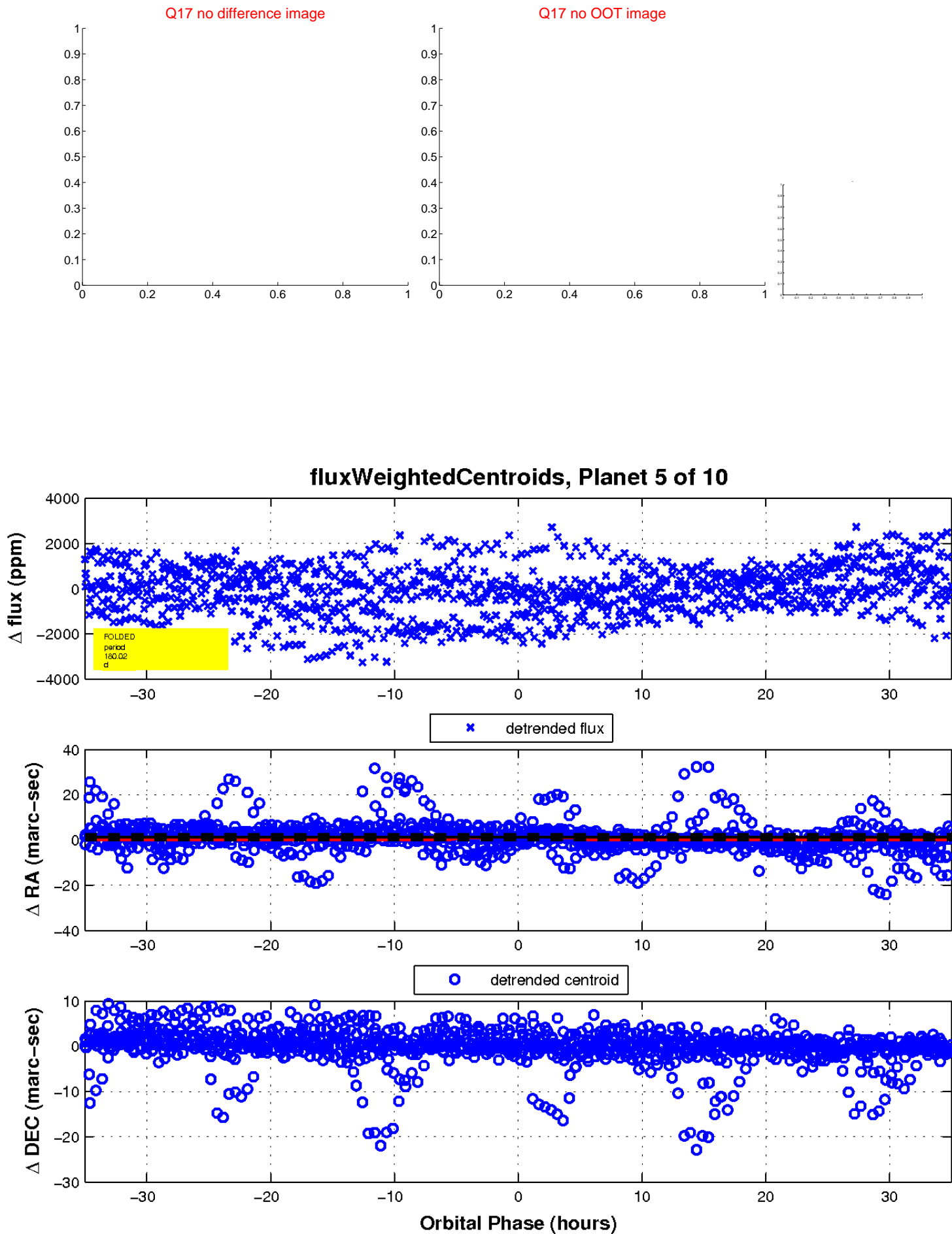
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value



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

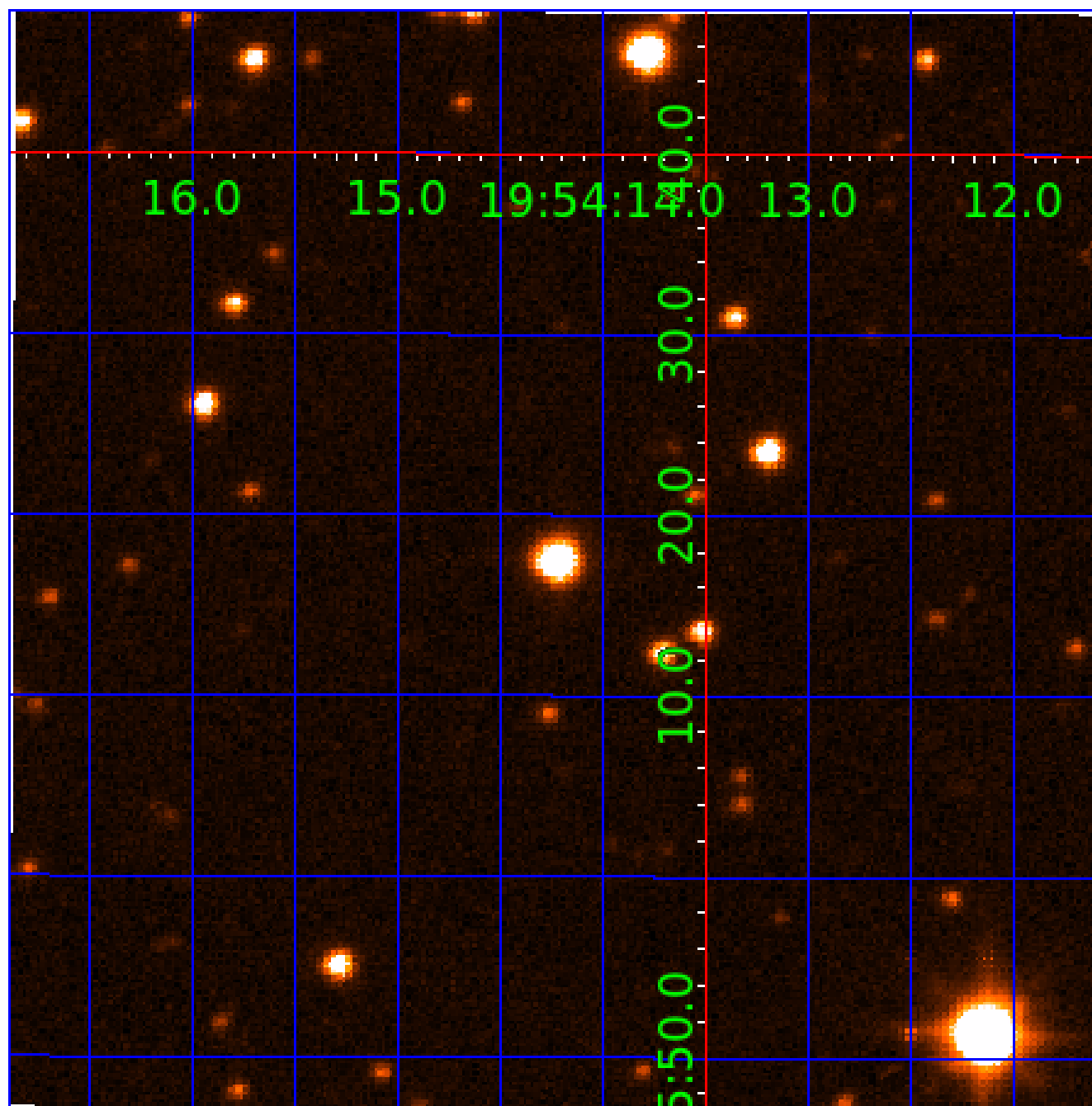


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 005475641

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005475641-01	OBS	2895.01	1.069827	132.452550	68.4	4.298	11.2	13.7	0.79	4999	0.81	997.60
005475641-02	OBS	No	239.487671	140.863826	812.0	8.997	18.4	7.6	0.79	4999	2.37	0.73
005475641-03	OBS	No	280.872905	271.644348	1182.9	7.500	15.9	-1.0	0.79	4999	2.62	0.59
005475641-04	OBS	No	152.776853	162.394839	673.1	9.042	13.6	7.7	0.79	4999	2.20	1.34
005475641-05	OBS	No	180.020691	233.604204	856.6	11.672	12.6	7.7	0.79	4999	2.70	1.07
005475641-07	OBS	No	475.792717	447.008273	1185.4	12.541	12.7	6.2	0.79	4999	2.68	0.29
005475641-08	OBS	No	393.701860	188.565963	1971.7	21.017	11.9	8.1	0.79	4999	4.07	0.38
005475641-09	OBS	No	147.912710	257.518469	516.6	19.634	11.2	4.7	0.79	4999	1.75	1.40

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005475641-01	OBS	FP	0.00	0	0	1	1	CENT_RESOLVED_OFFSET—HALO_GHOST—EPHEM_MATCH
005475641-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005475641-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_NOFITS
005475641-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005475641-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—ALL_TRANS_CHASES—CENT_FEW_DIFFS—HALO_GHOST
005475641-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
005475641-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—CENT_FEW_DIFFS
005475641-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES

**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.

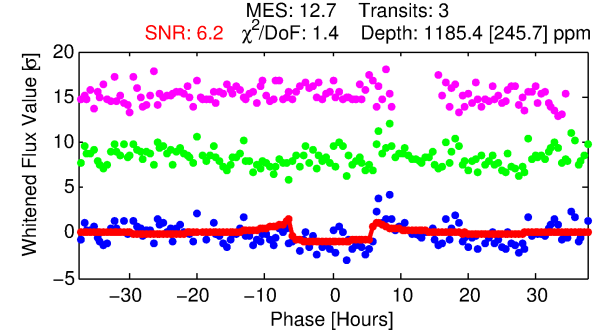
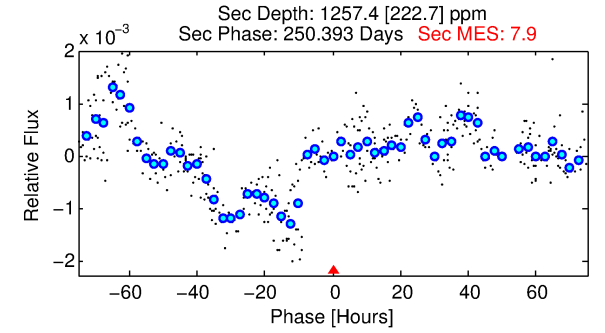
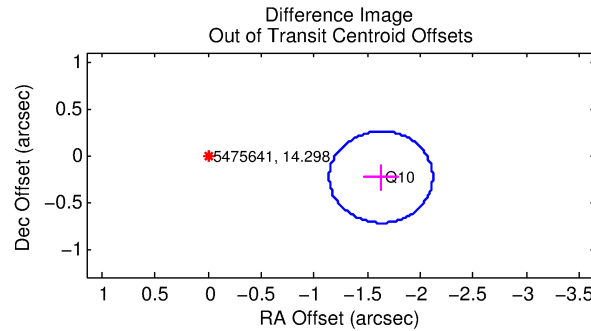
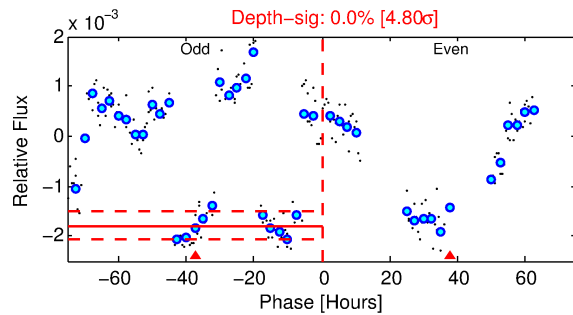
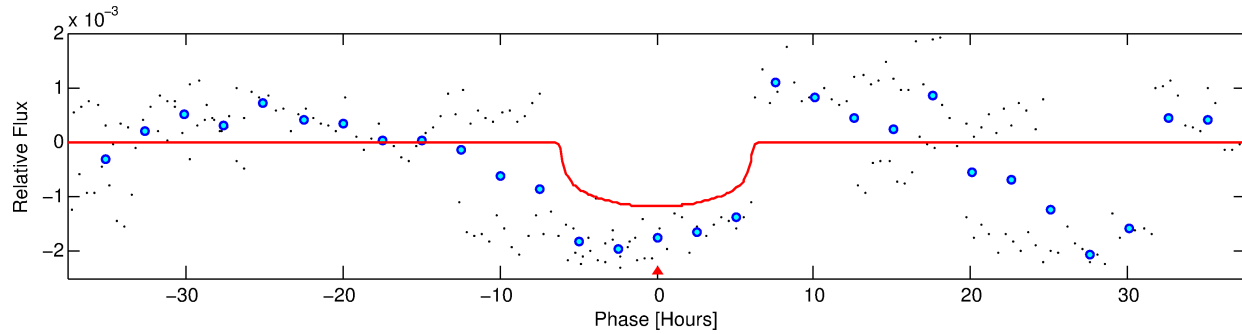
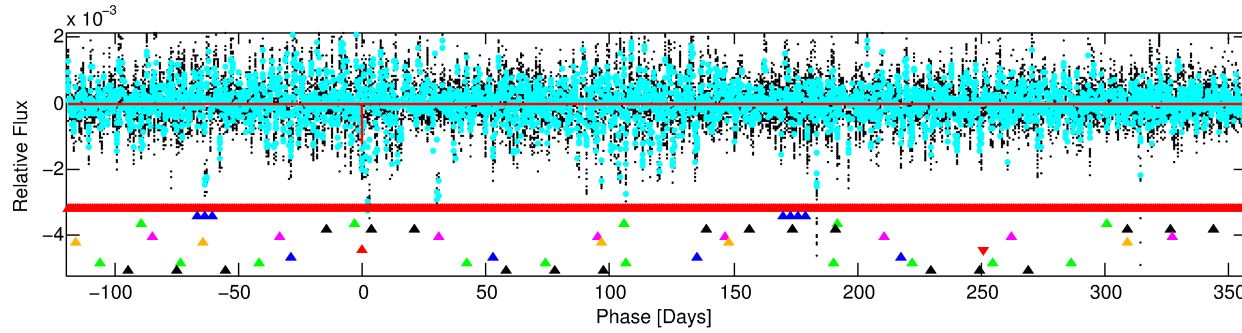
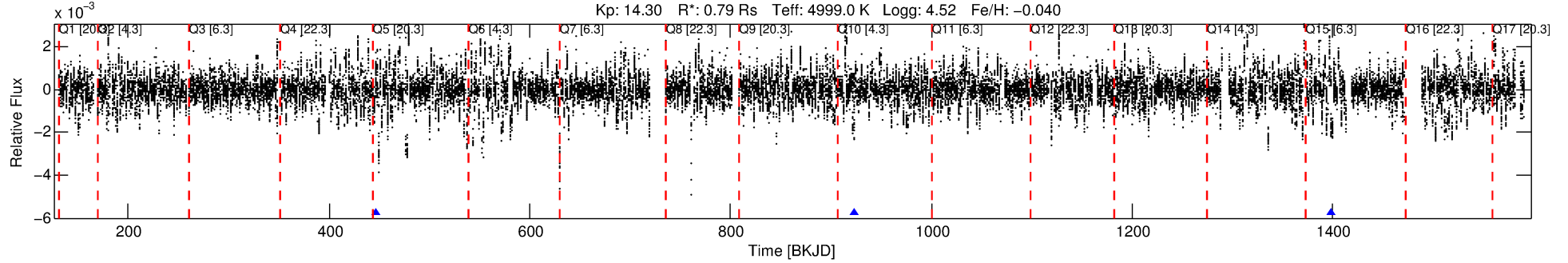
Ephemeris Match Information For 005475641-07

No Significant Match Found

# DV One-Page Summary

KIC: 5475641 Candidate: 7 of 10 Period: 475.793 d  
KOI: K02895 Corr: No Ephemeris Match

Kp: 14.30 R\*: 0.79 Rs Teff: 4999.0 K Logg: 4.52 Fe/H: -0.040

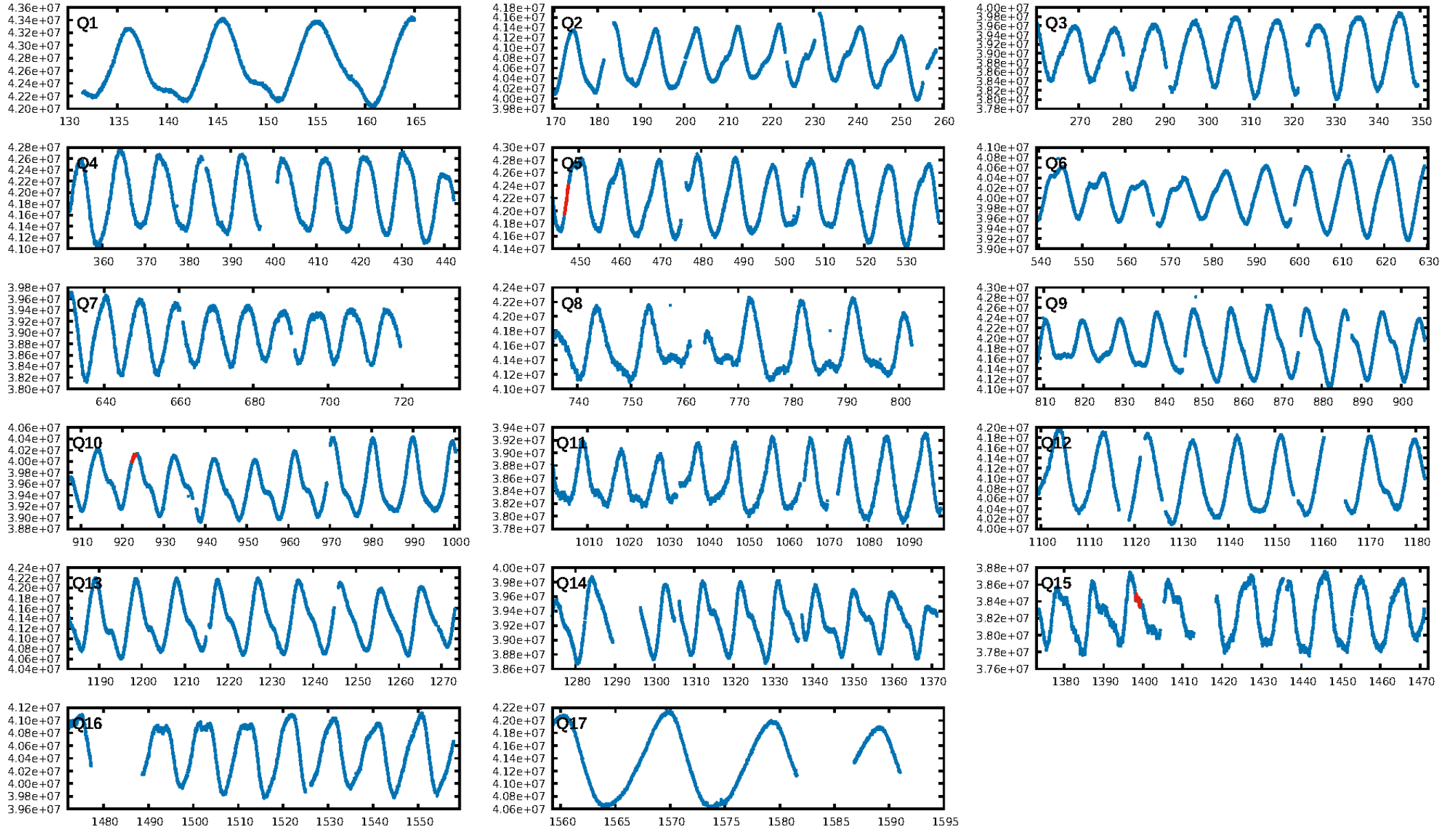


DV Fit Results:	DV Diagnostic Results:
Period = 475.79272 [0.01729] d	ShortPeriod-sig: 100.0% [80.50σ]
Epoch = 447.0083 [0.0274] BKJD	LongPeriod-sig: N/A
Rp/R* = 0.0313 [0.0214]	ModelChiSquare2-sig: 75.4%
a/R* = 275.49 [632.68]	ModelChiSquareGoF-sig: 100.0%
b = 0.40 [4.88]	Bootstrap-pfa: N/A
Seff = 0.29 [0.05]	RollingBand-fgt: 1.00 [3/3]
Teq = 188 [9] K	GhostDiagnostic-chr: 3.29
Rp = 2.68 [1.86] Re	Centroid-sig: N/A
a = 1.0846 [0.0975] AU	Centroid-so: 3.449 arcsec [2.48σ]
Ag = 112954.90 [156883.70] [0.72σ]	OotOffset-rm: 1.645 arcsec [10.11σ]
Teff = 5321 [1846] K [2.78σ]	KicOffset-rm: 1.594 arcsec [9.80σ]
	OotOffset-st: 1/0/0/0 [1]
	KicOffset-st: 1/0/0/0 [1]
	DiffImageQuality-fgm: 0.00 [0/1]
	DiffImageOverlap-fno: 0.00 [0/3]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 17:59:27 Z

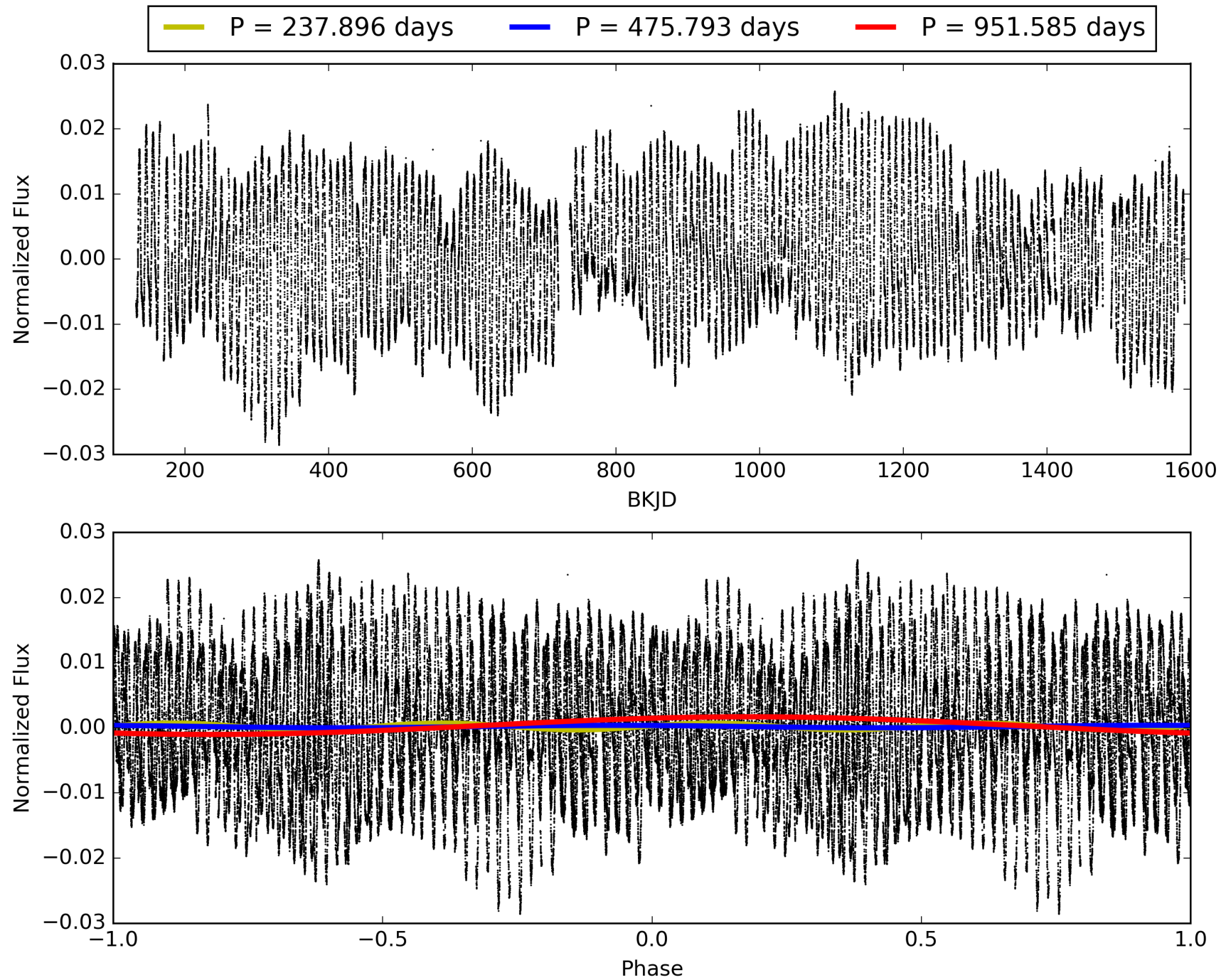
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 005475641-07, PDC Light Curves



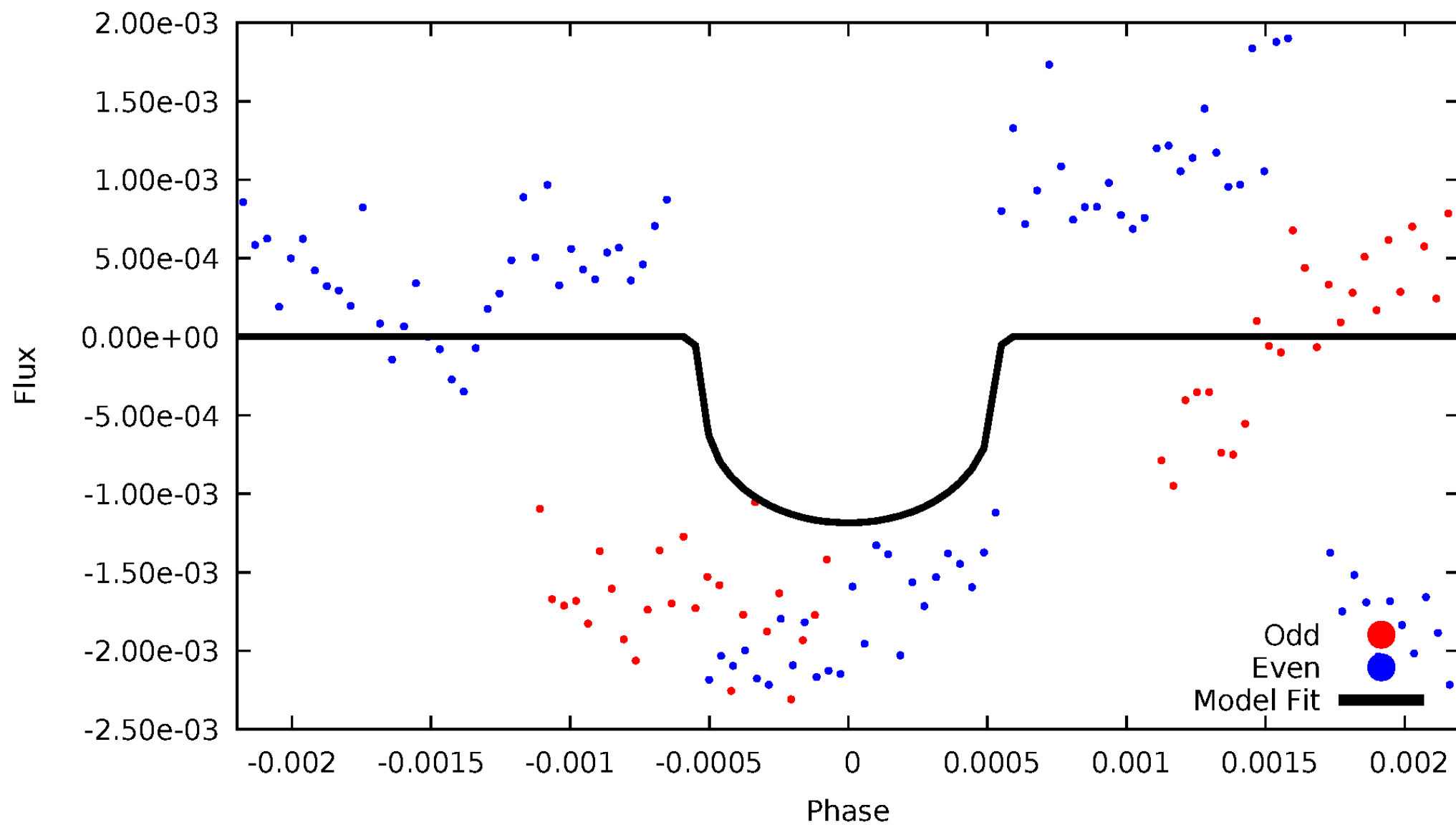


TCE 005475641-07



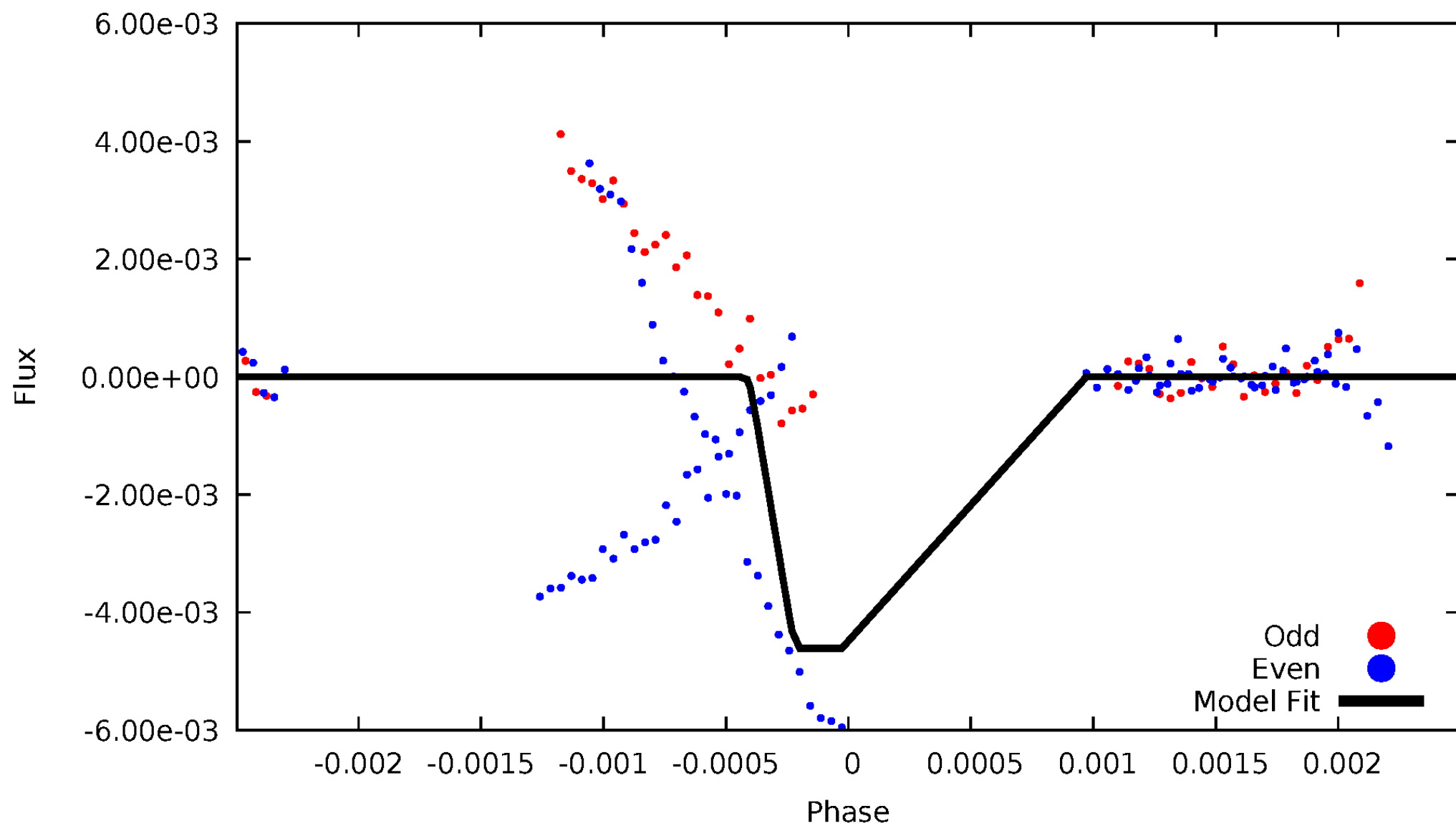
# DV Odd/Even

TCE 005475641-07



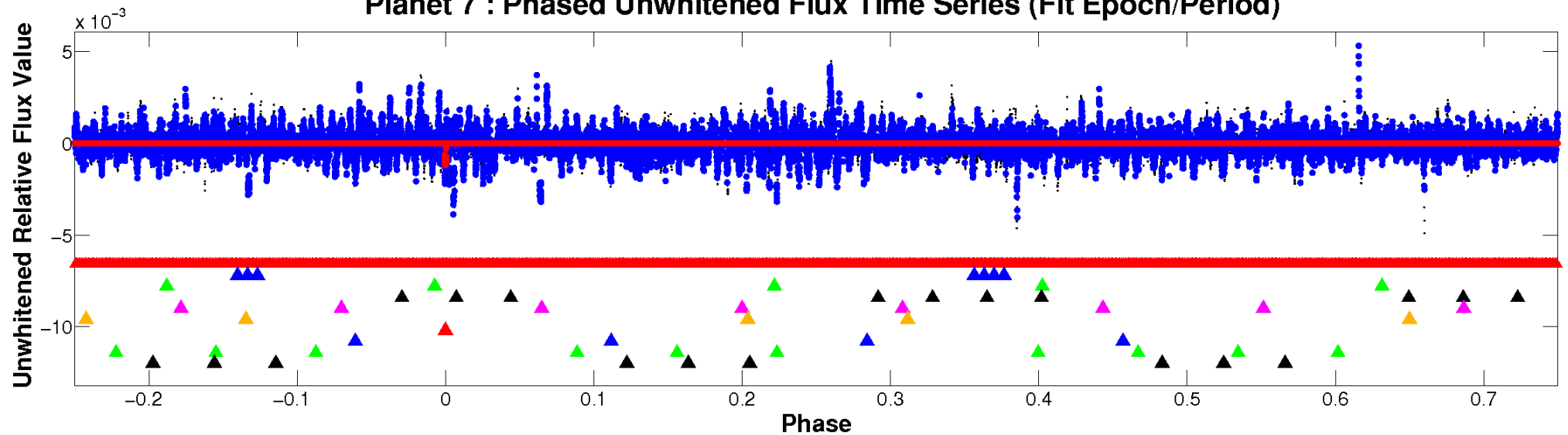
# ALT Odd/Even

TCE 005475641-07

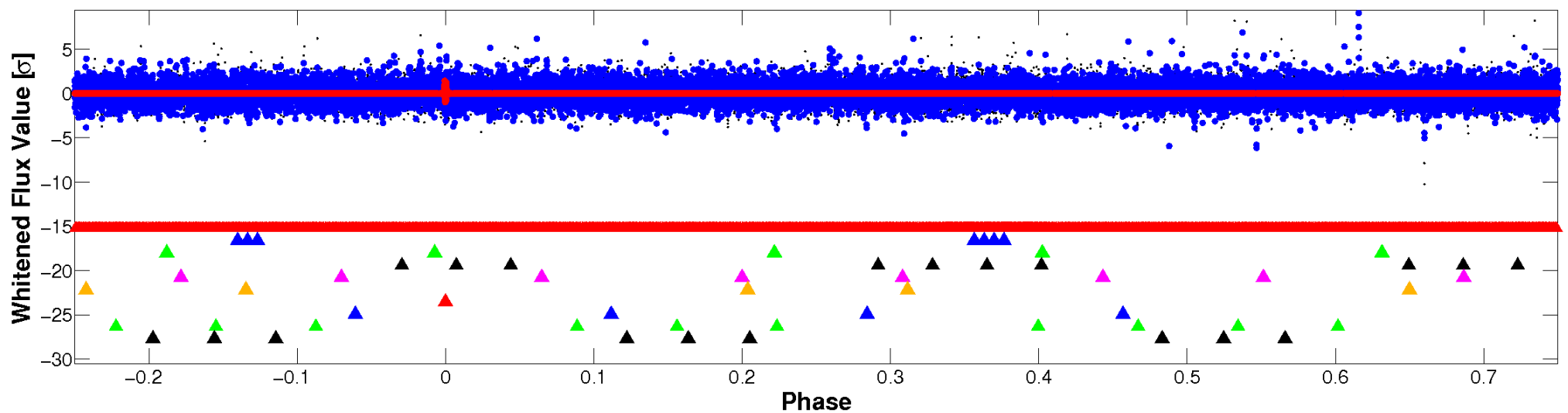


# Non-Whitened Vs. Whitened Light Curve

Planet 7 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

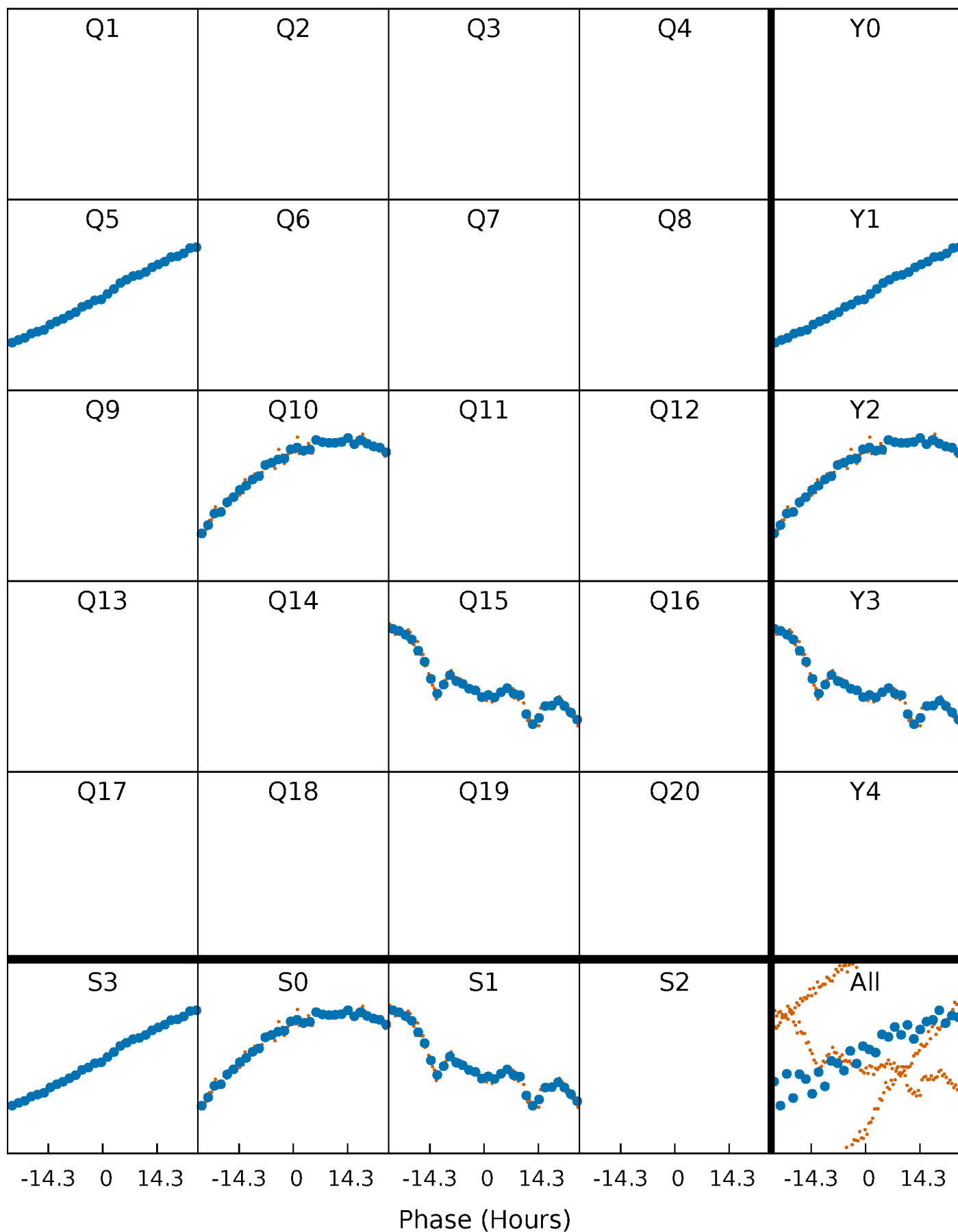


Planet 7 : Phased Whitened Flux Time Series (Fit Epoch/Period)



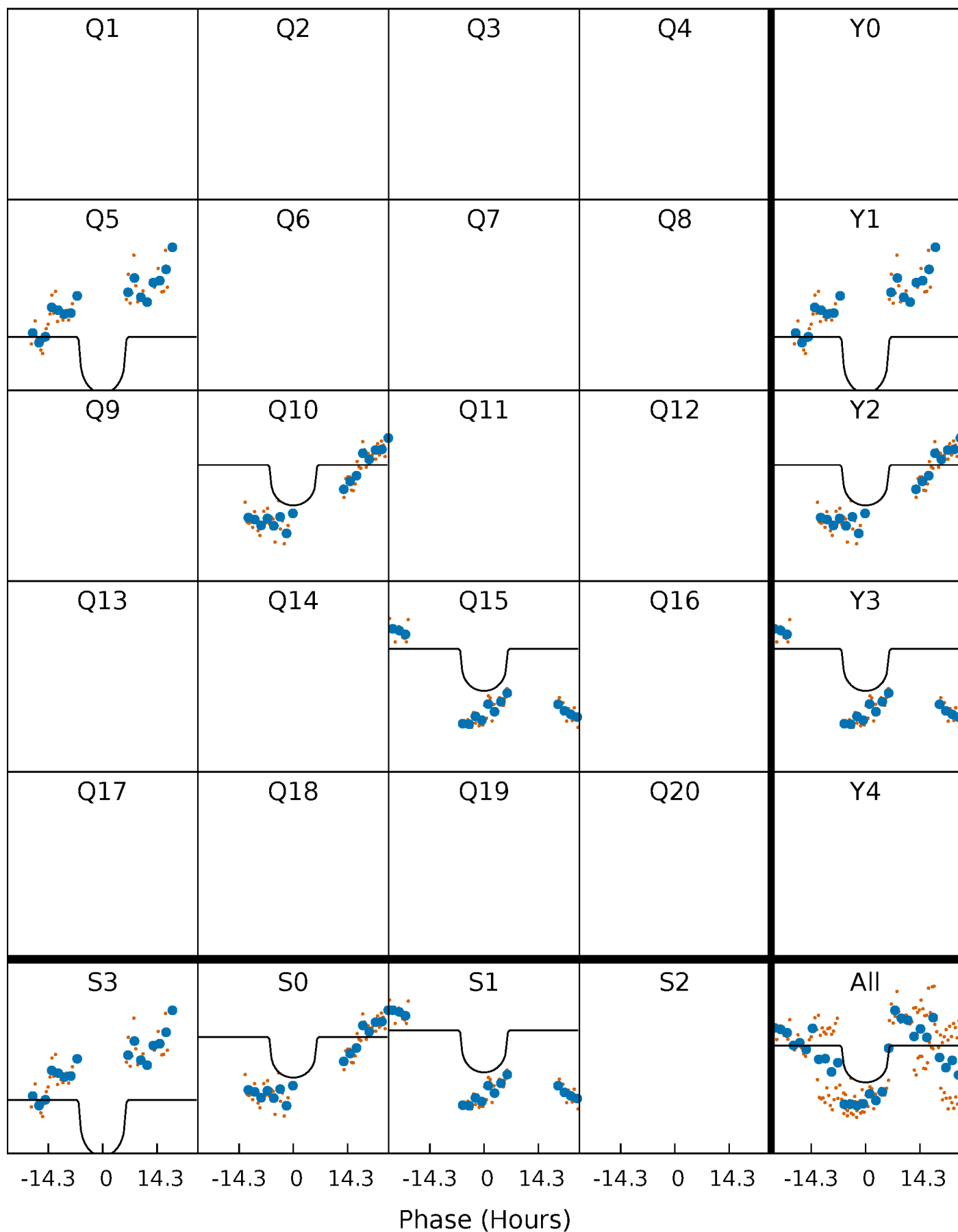
# PDC Quarter-Phased Transit Curves

TCE 005475641-07     $P=475.792717$  Days     $T_0=447.008273$  (BKJD)



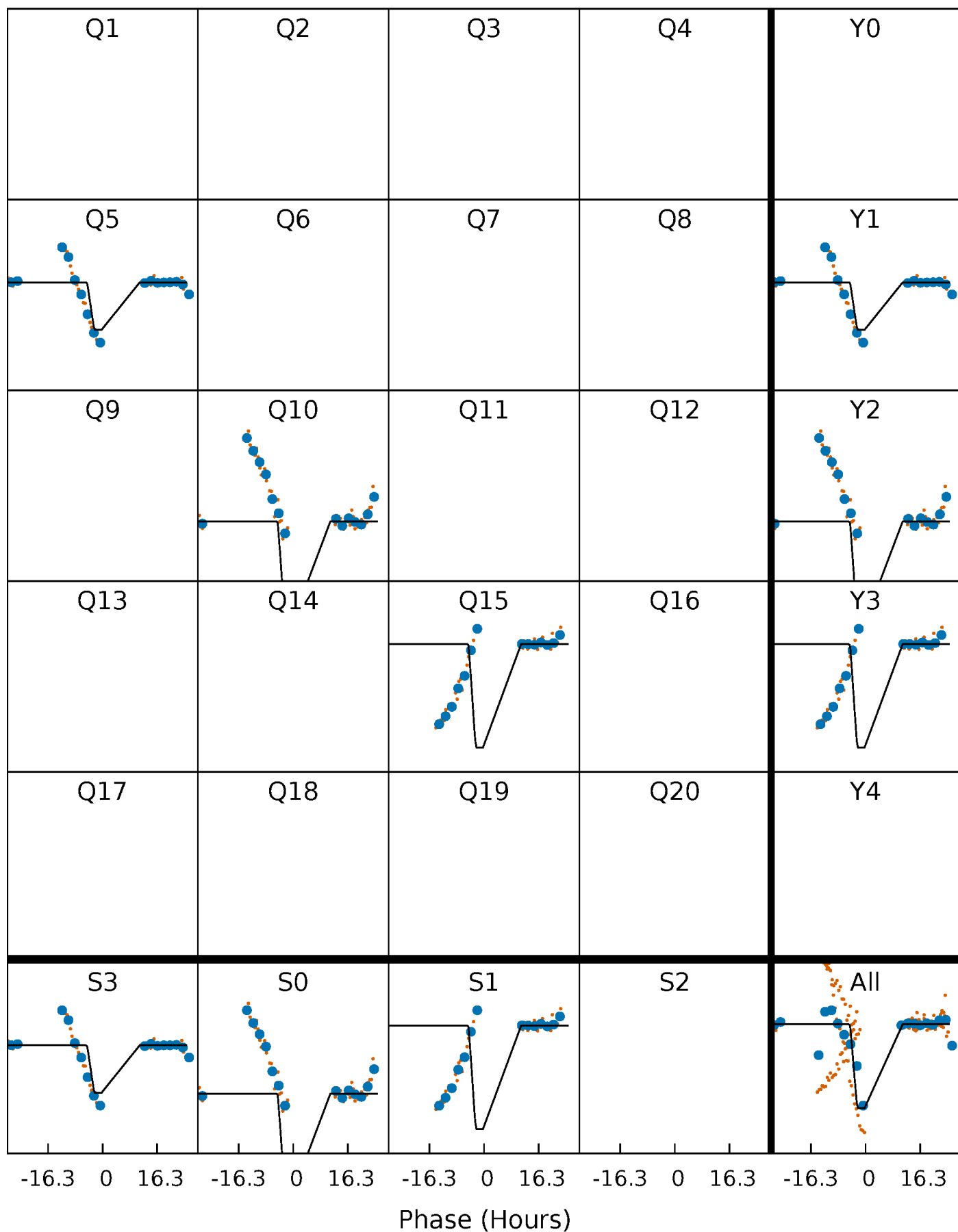
# DV Quarter-Phased Transit Curves

TCE 005475641-07     $P=475.792717$  Days     $T_0=447.008273$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

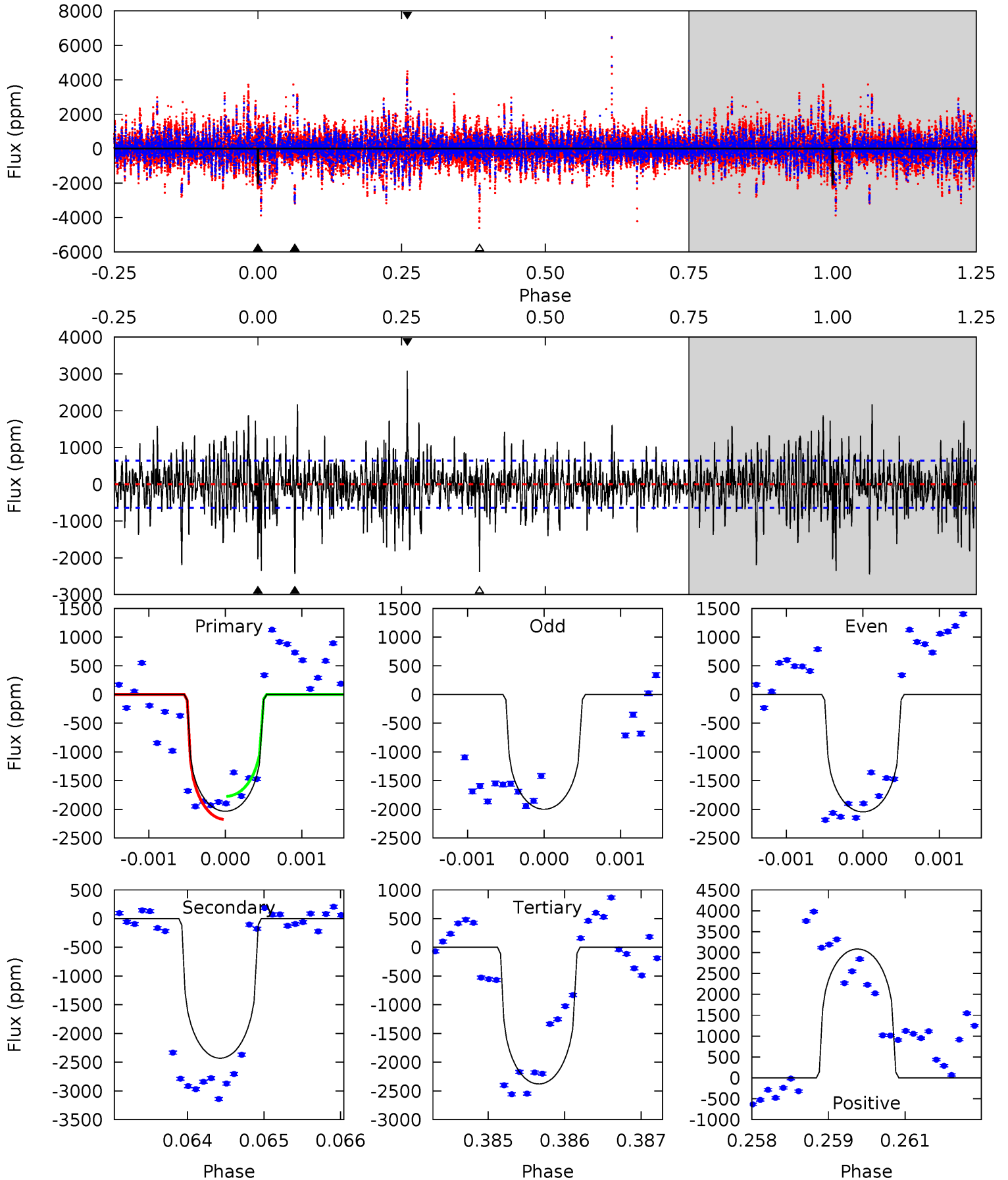
TCE 005475641-07     $P=476.122382$  Days     $T_0=446.710610$  (BKJD)



# DV Model-Shift Uniqueness Test

005475641-07, P = 475.792717 Days, E = 447.008273 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
17.3	20.6	20.2	26.2	5.43	3.26	4.22	-2.93	-8.91	0.43	-5.56	0.18	1.00	0.56	1.65

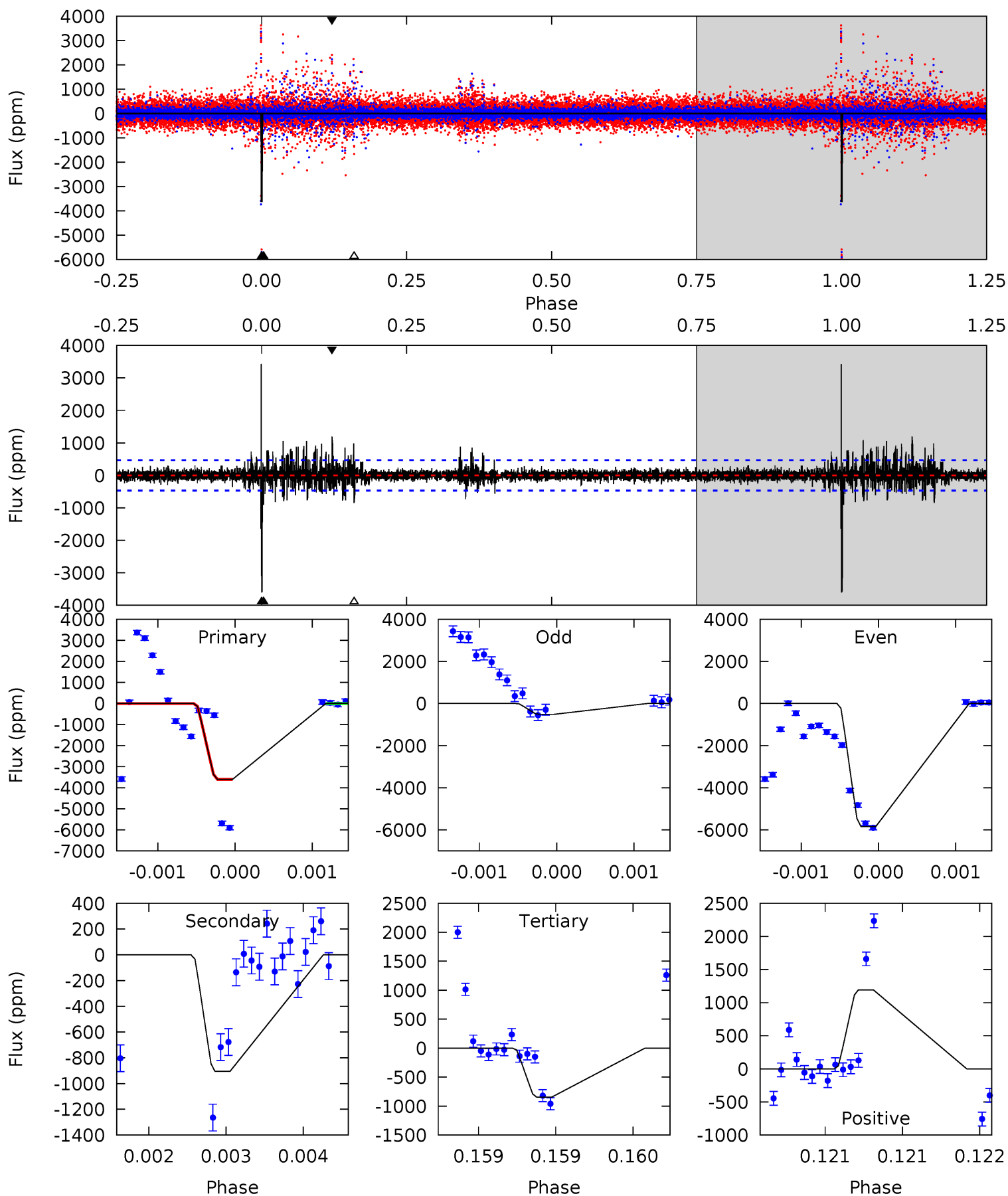




# Alt Model-Shift Uniqueness Test

005475641-07, P = 476.122382 Days, E = 446.710610 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
42.1	10.6	9.89	14.0	5.49	3.34	1.57	32.2	28.2	0.70	-3.36	31.9	0	0.49	0



### Stellar Parameters For KIC 005475641

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4999^{+151}_{-136}$	$4.523^{+0.078}_{-0.052}$	$-0.040^{+0.300}_{-0.300}$	$0.786^{+0.063}_{-0.079}$	$0.752^{+0.085}_{-0.057}$	$2.180^{+0.701}_{-0.371}$
	+3%/-3%	+2%/-1%	+750%/-750%	+8%/-10%	+11%/-8%	+32%/-17%
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 005475641-07 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-2430 \pm 118$	$2.79^{+1.92}_{-1.59}$	$262^{+9}_{-11}$	$6033^{+4009}_{-1234}$	$203934^{+903599}_{-130894}$
Alt.	$-906 \pm 86$	$5.65^{+1.91}_{-1.70}$	$262^{+10}_{-10}$	$3721^{+509}_{-325}$	$18186^{+19835}_{-8046}$

$T_{\text{max}}$  = 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

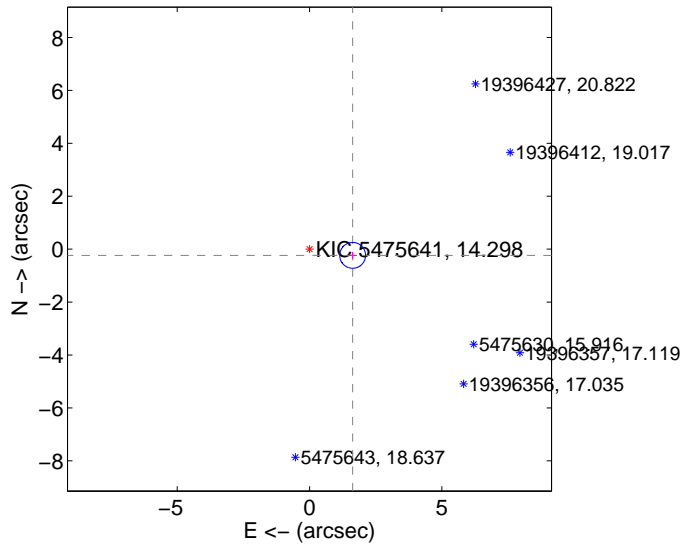
Supplemental centroid analysis for 005475641-07. Kepler magnitude: 14.30. Transit SNR 6.22

There are 0 quarters with good PRF difference image offsets

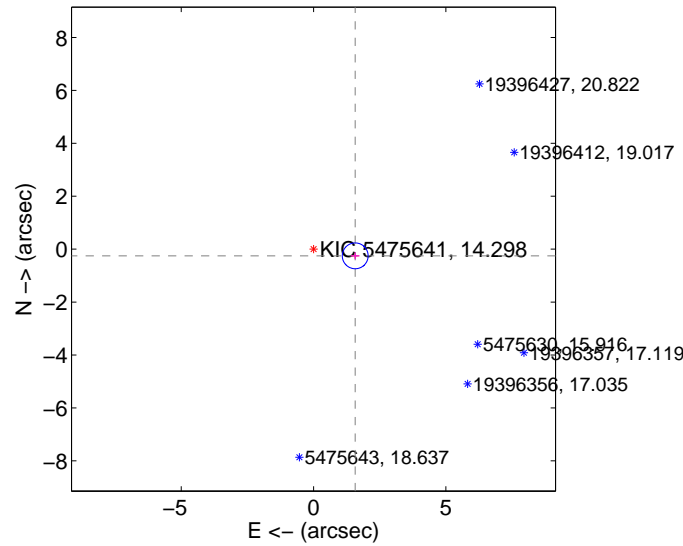
The direct PRF centroid is offset from the target star catalog position by about 0.06 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.645 \pm 0.163$	10.11	$-1.629 \pm 0.163$	$-0.234 \pm 0.129$
PRF-fit source offset from KIC position	$1.594 \pm 0.163$	9.80	$-1.574 \pm 0.163$	$-0.252 \pm 0.129$
photometric centroid source offset	$3.45 \pm 1.39$	2.48	$3.11 \pm 1.41$	$-1.50 \pm 1.32$

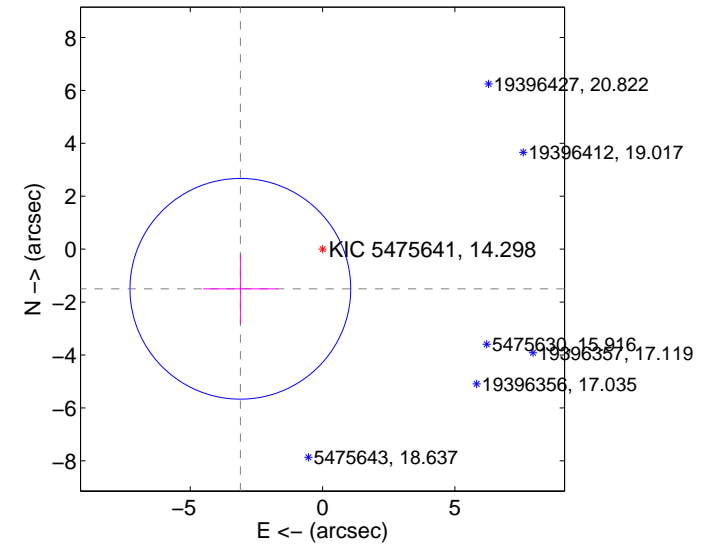
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



offset from photometric centroids

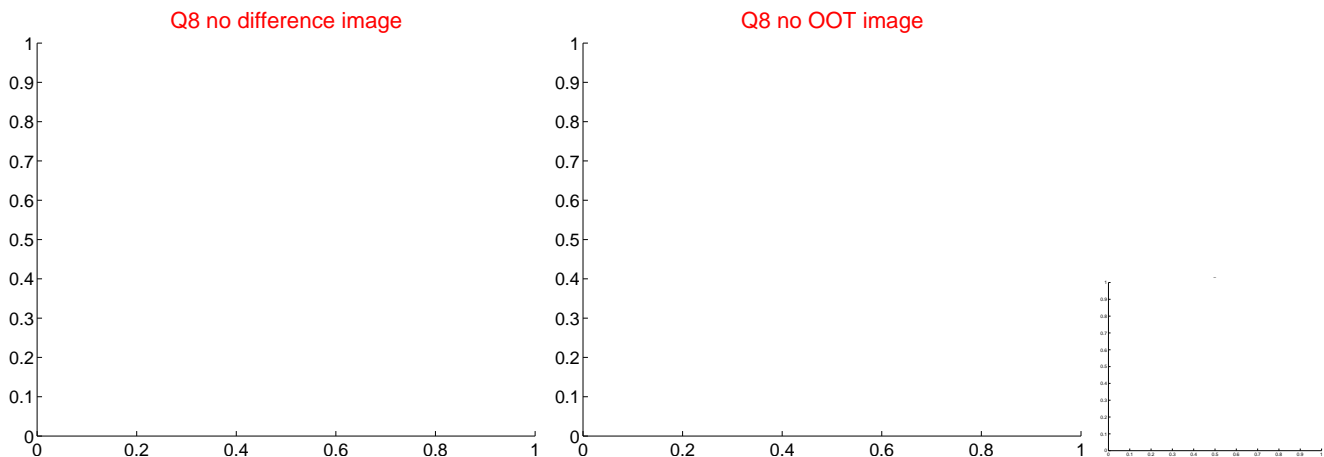
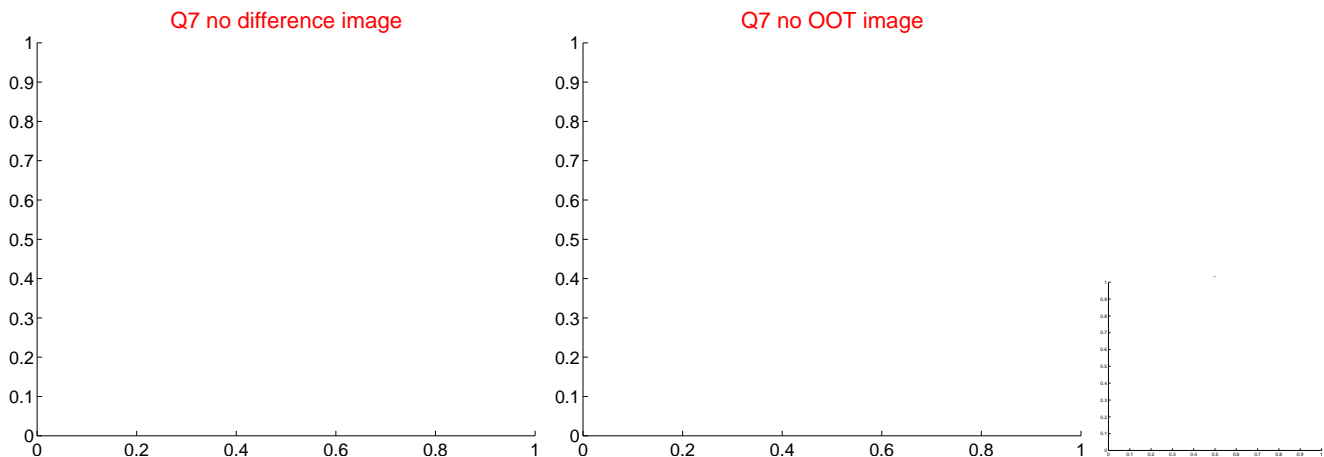
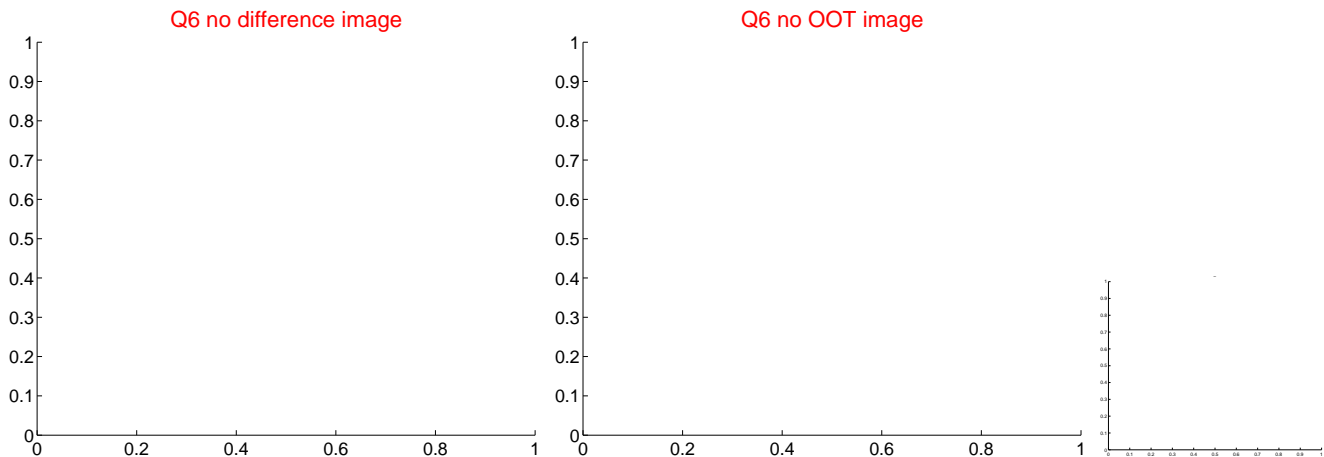
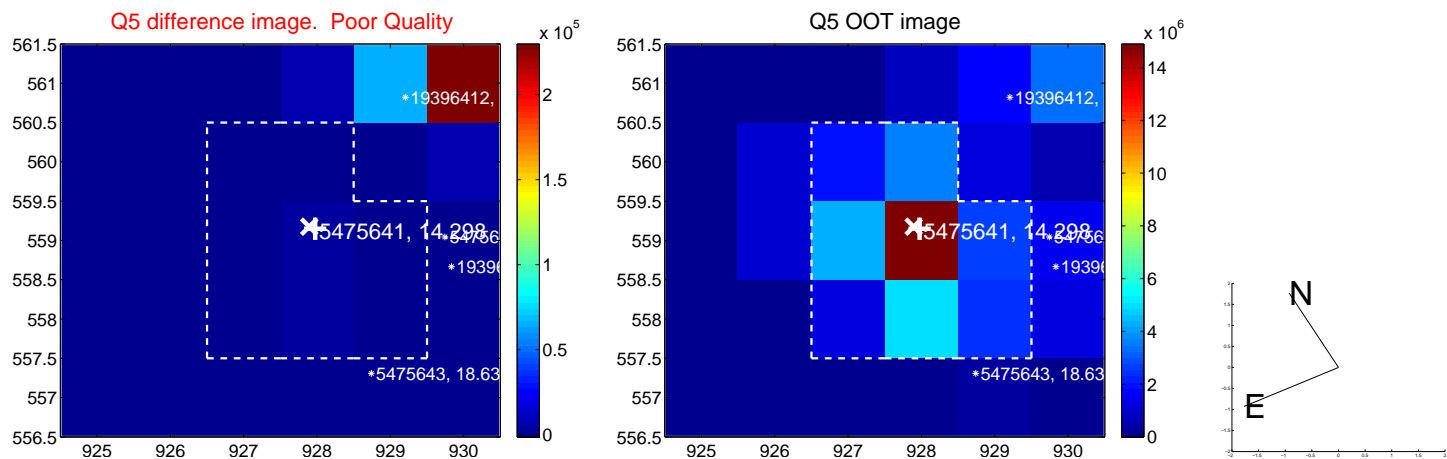


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

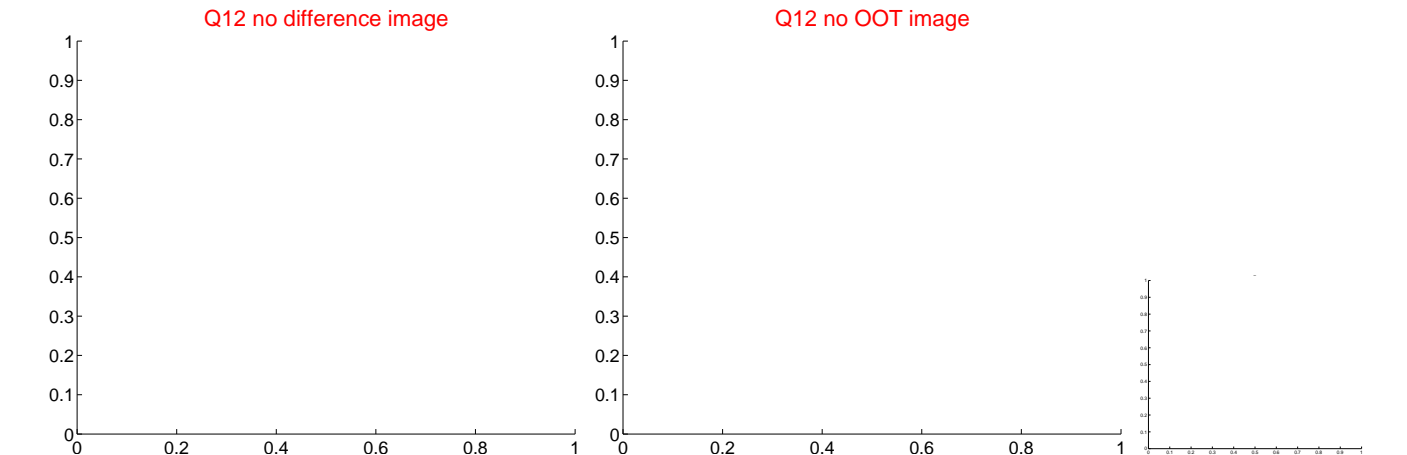
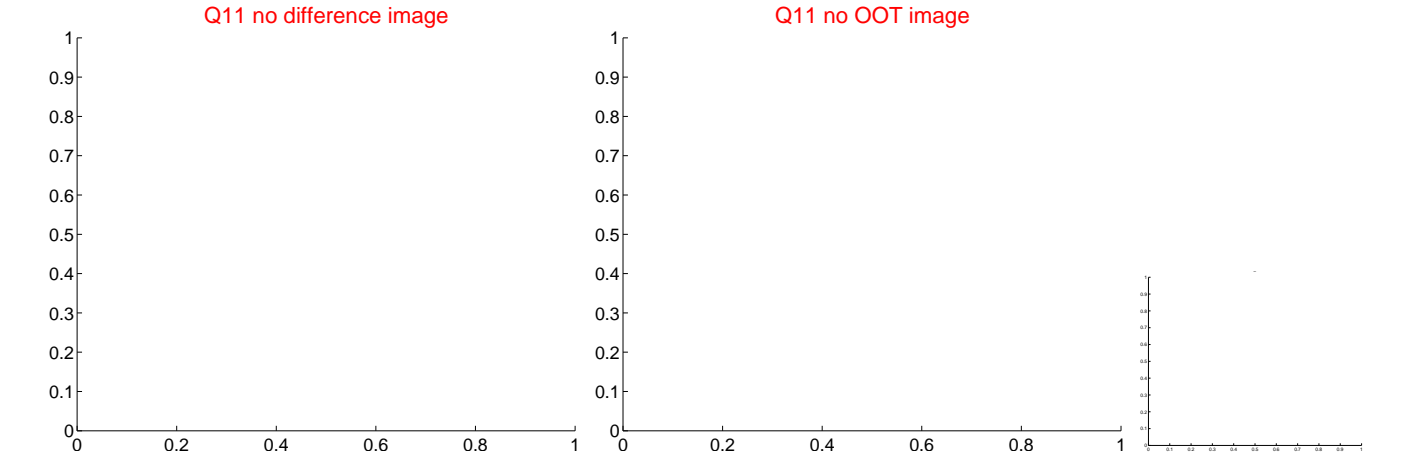
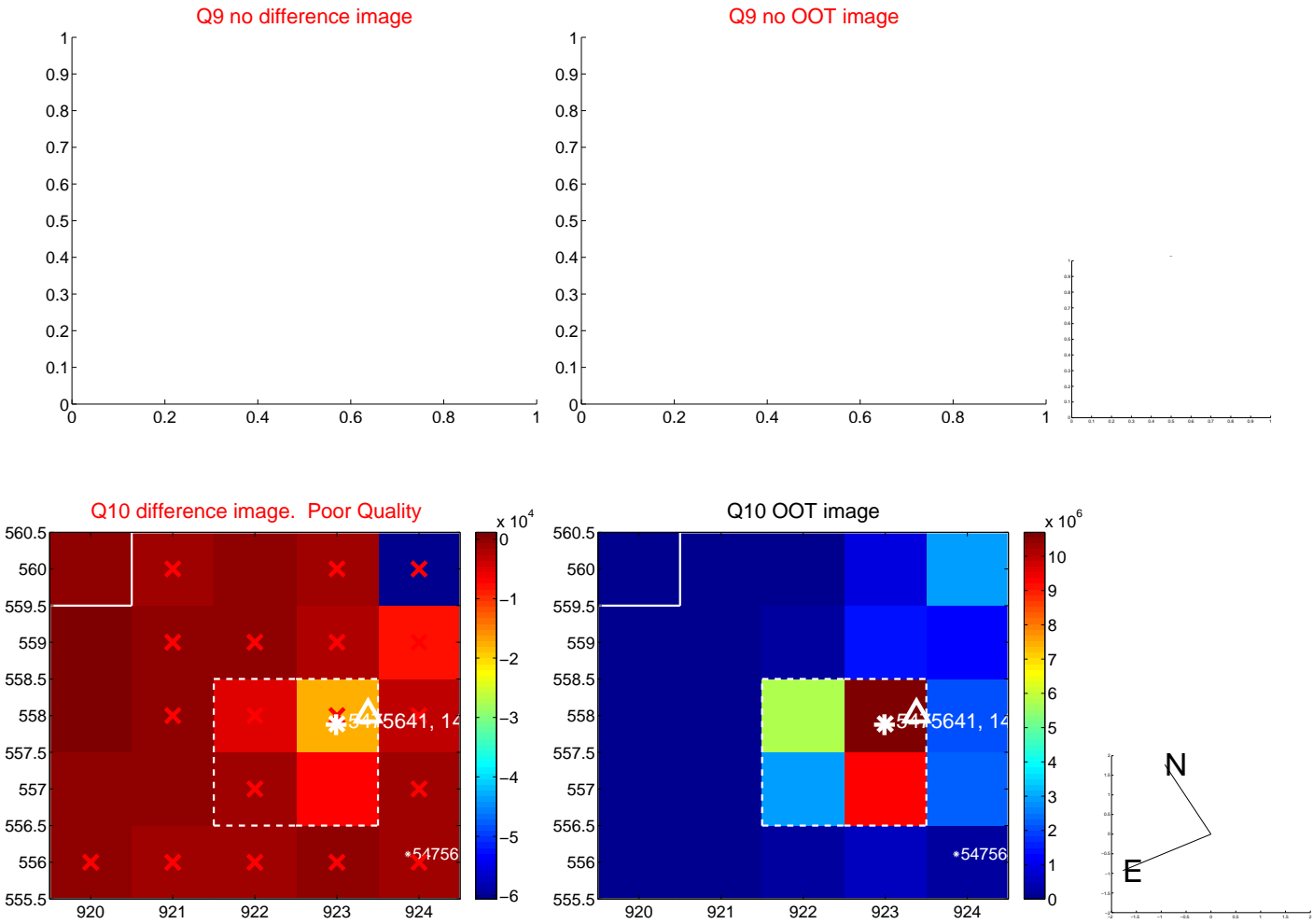
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



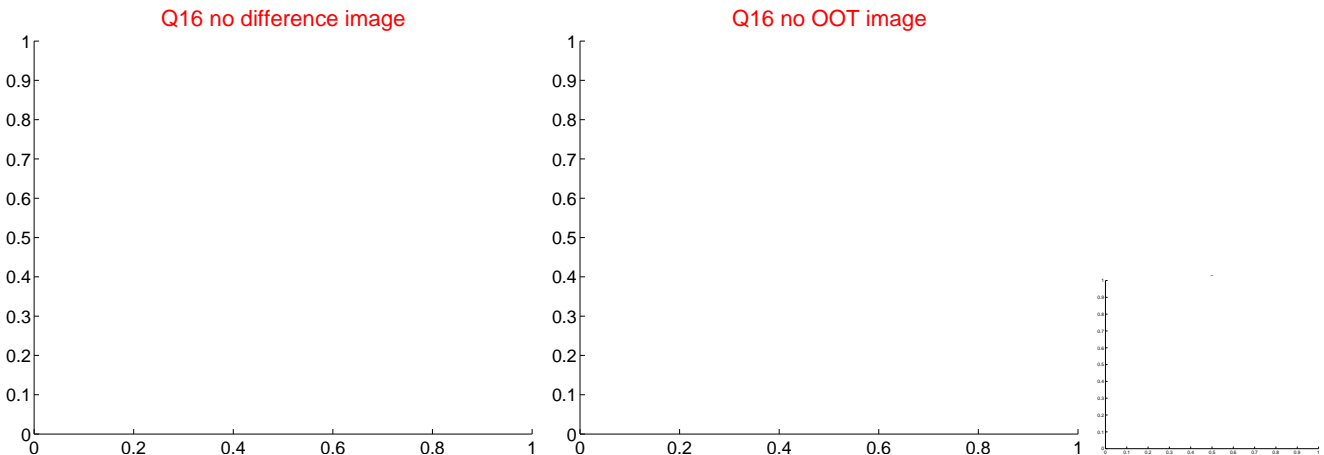
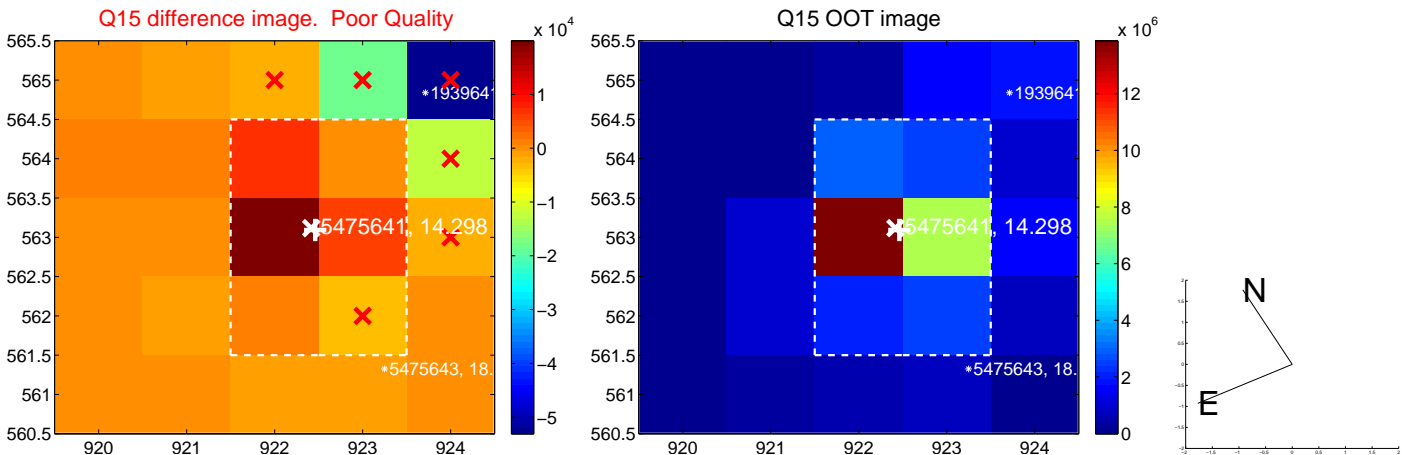
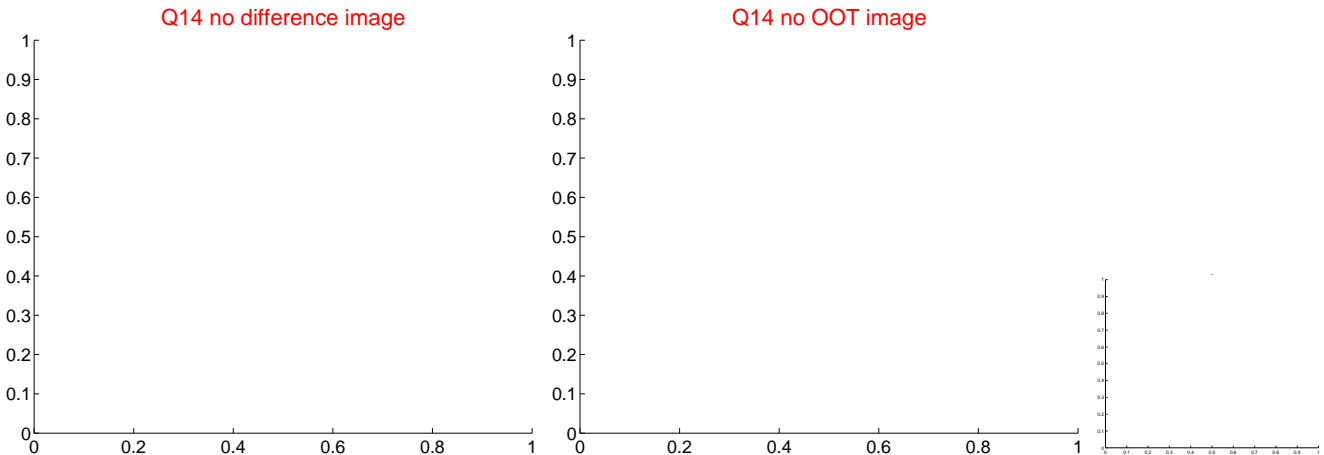
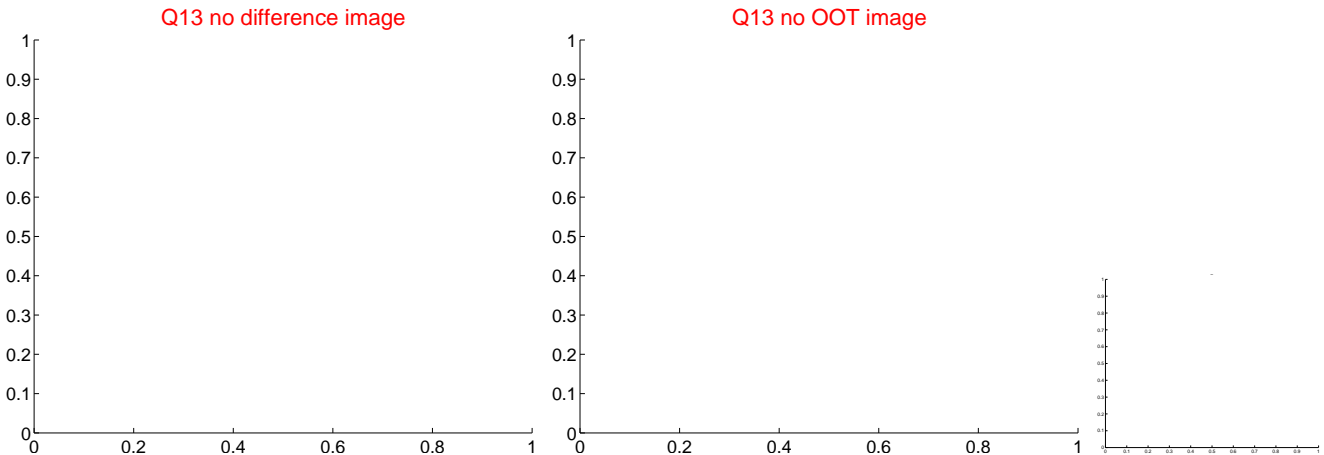
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



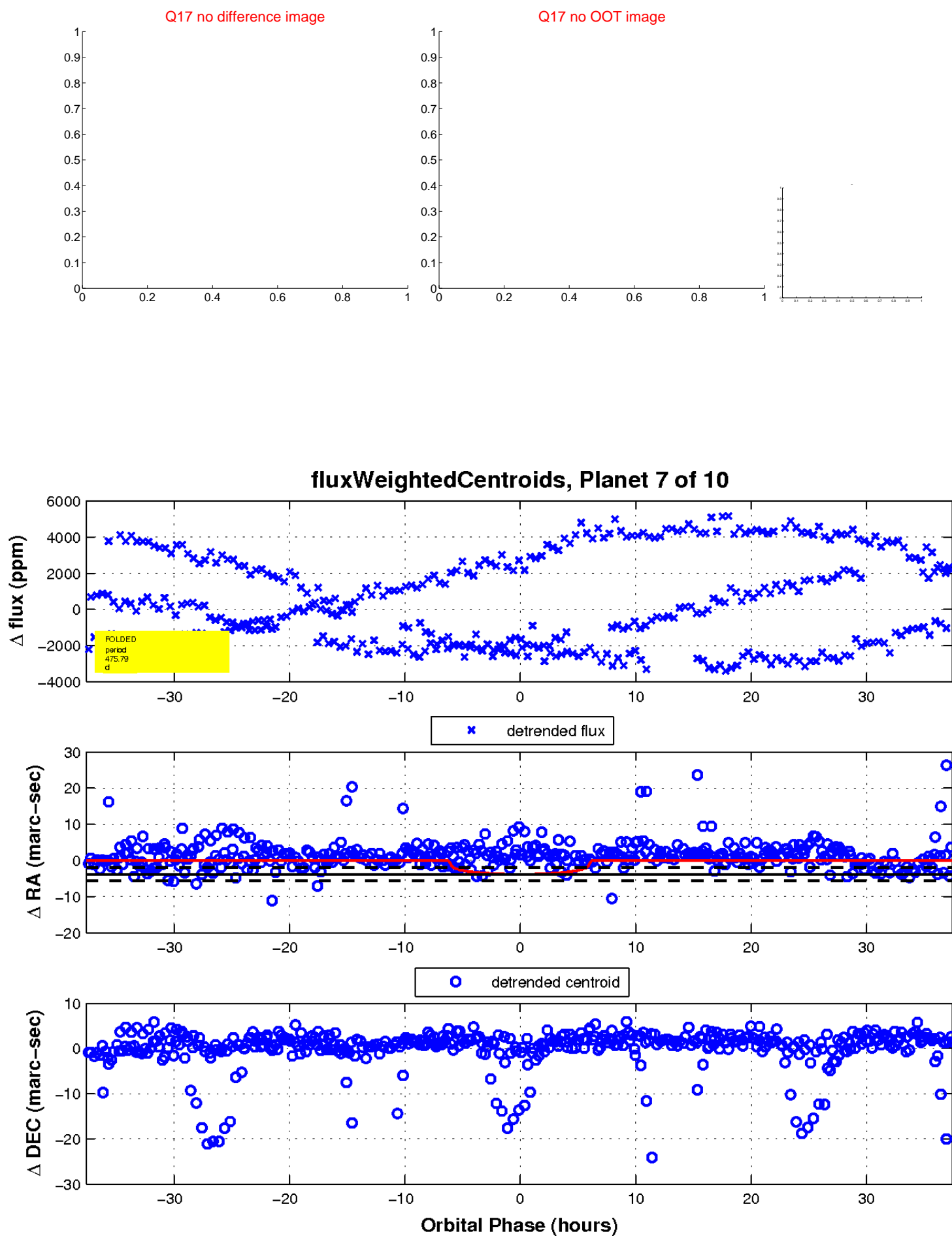
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



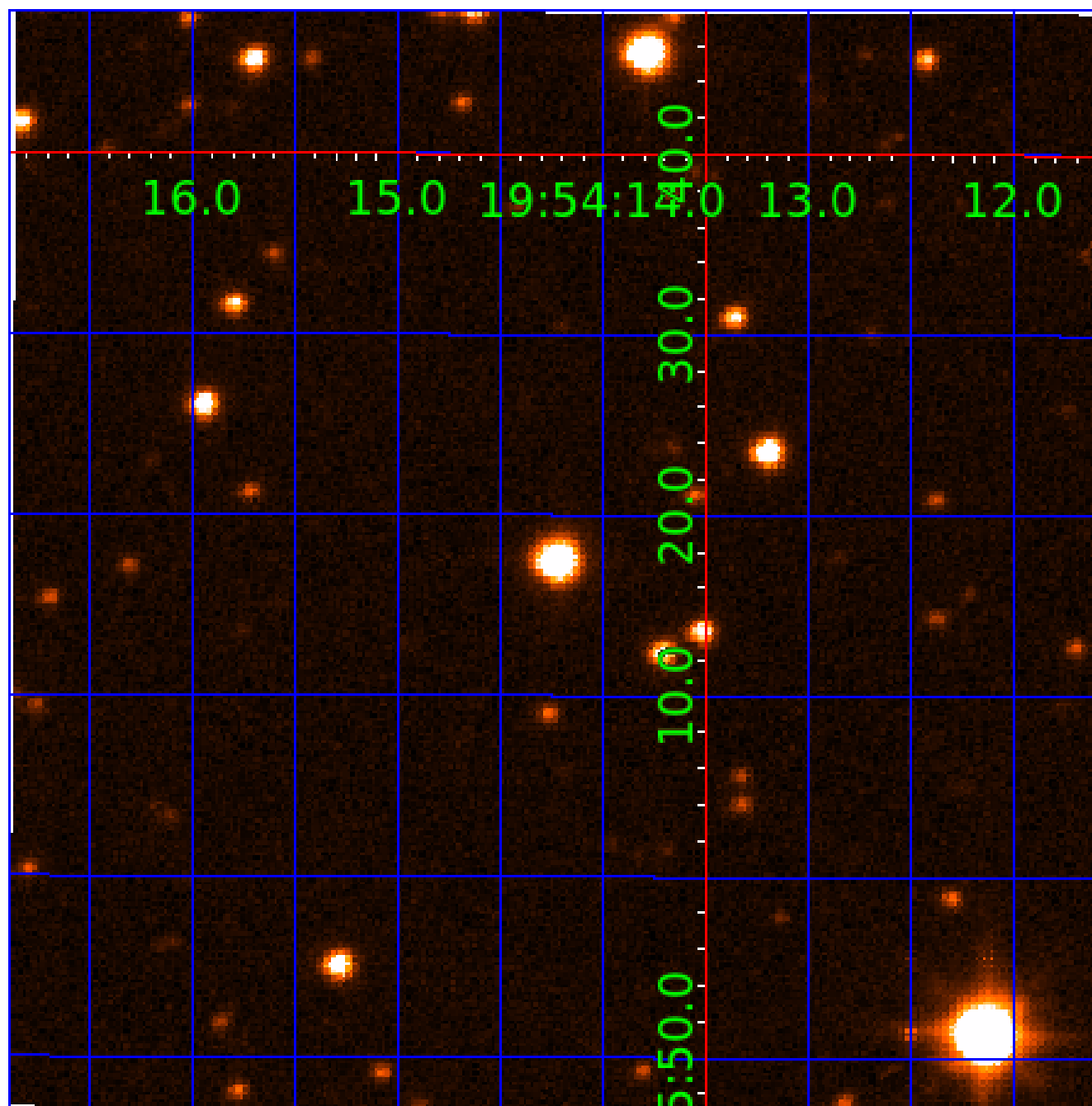
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





UKIRT Image

Declination



# KIC 005475641

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005475641-01	OBS	2895.01	1.069827	132.452550	68.4	4.298	11.2	13.7	0.79	4999	0.81	997.60
005475641-02	OBS	No	239.487671	140.863826	812.0	8.997	18.4	7.6	0.79	4999	2.37	0.73
005475641-03	OBS	No	280.872905	271.644348	1182.9	7.500	15.9	-1.0	0.79	4999	2.62	0.59
005475641-04	OBS	No	152.776853	162.394839	673.1	9.042	13.6	7.7	0.79	4999	2.20	1.34
005475641-05	OBS	No	180.020691	233.604204	856.6	11.672	12.6	7.7	0.79	4999	2.70	1.07
005475641-07	OBS	No	475.792717	447.008273	1185.4	12.541	12.7	6.2	0.79	4999	2.68	0.29
005475641-08	OBS	No	393.701860	188.565963	1971.7	21.017	11.9	8.1	0.79	4999	4.07	0.38
005475641-09	OBS	No	147.912710	257.518469	516.6	19.634	11.2	4.7	0.79	4999	1.75	1.40

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005475641-01	OBS	FP	0.00	0	0	1	1	CENT_RESOLVED_OFFSET—HALO_GHOST—EPHEM_MATCH
005475641-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005475641-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_NOFITS
005475641-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005475641-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—ALL_TRANS_CHASES—CENT_FEW_DIFFS—HALO_GHOST
005475641-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
005475641-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—CENT_FEW_DIFFS
005475641-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES

**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.

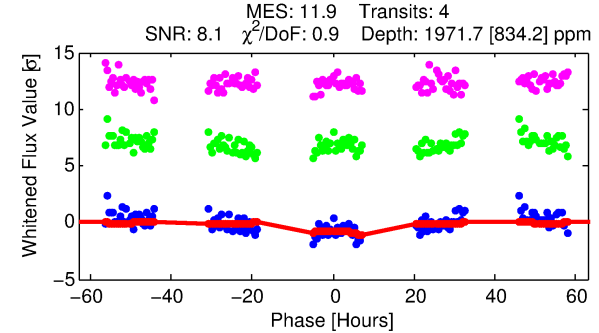
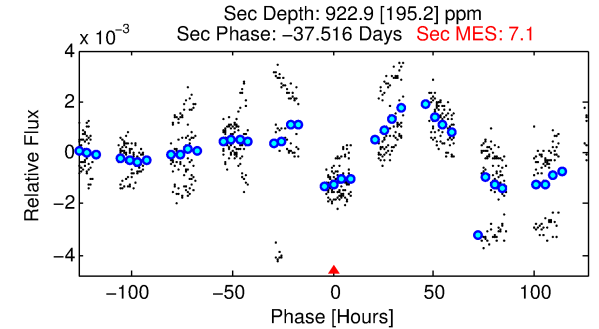
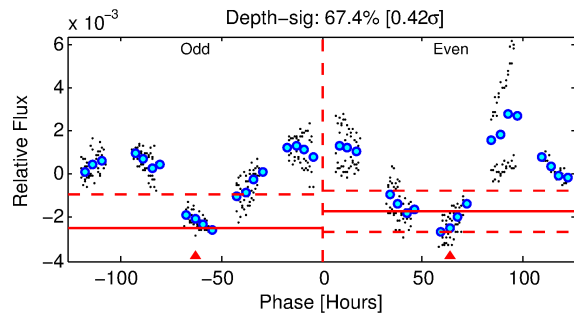
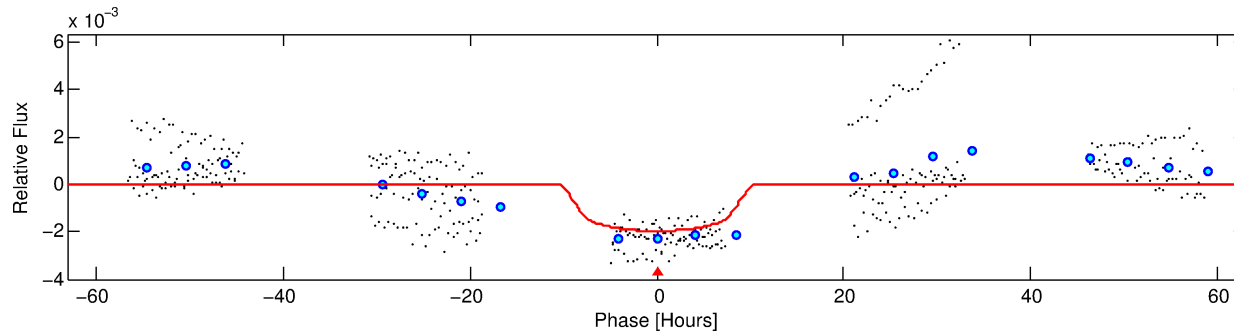
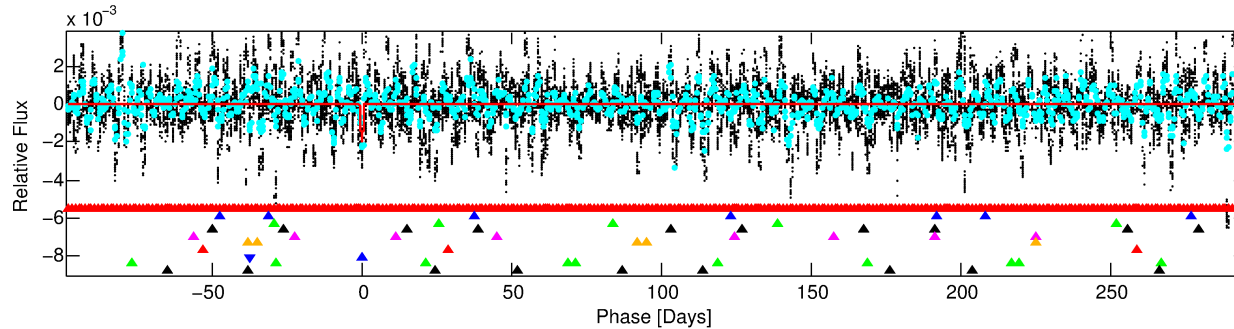
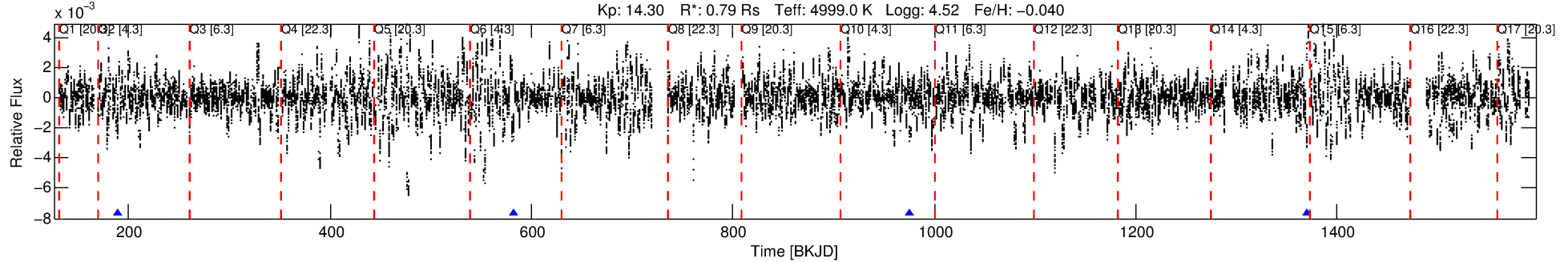
Ephemeris Match Information For 005475641-08

No Significant Match Found

# DV One-Page Summary

KIC: 5475641 Candidate: 8 of 10 Period: 393.702 d  
KOI: K02895 Corr: No Ephemeris Match

Kp: 14.30 R\*: 0.79 Rs Teff: 4999.0 K Logg: 4.52 Fe/H: -0.040



## DV Fit Results:

Period = 393.70186 [0.05933] d  
Epoch = 188.5660 [0.1054] BKJD  
Rp/R\* = 0.0474 [0.0171]  
a/R\* = 86.52 [81.04]  
b = 0.86 [0.26]  
Seff = 0.38 [0.07]  
Teq = 200 [9] K  
Rp = 4.07 [1.52] Re  
a = 0.9559 [0.0859] AU  
Ag = 28030.83 [21397.34] [1.31σ]  
Teffp = 4001 [761] K [5.00σ]

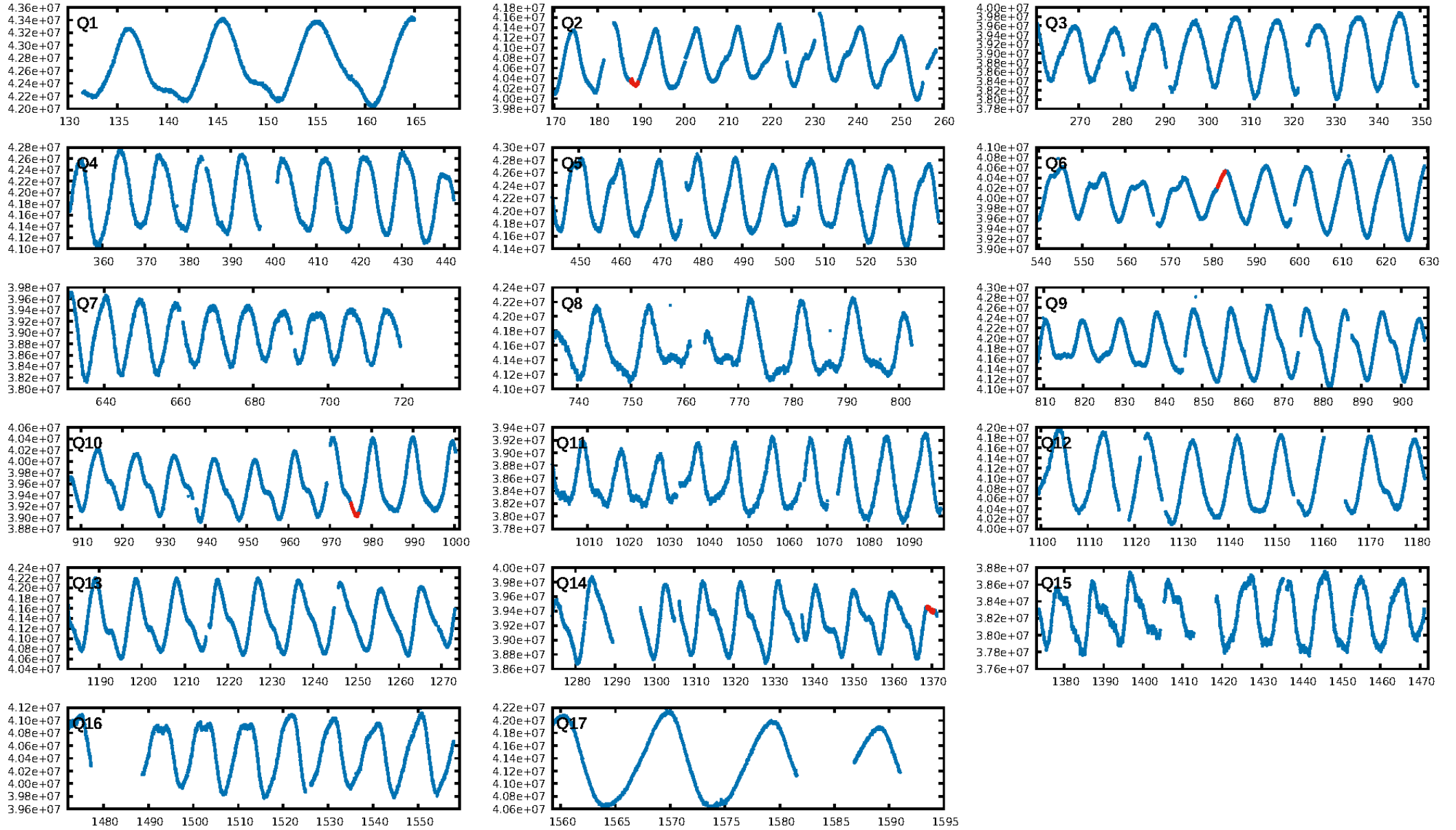
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [121.35σ]  
LongPeriod-sig: 100.0% [80.50σ]  
ModelChiSquare2-sig: 80.3%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: -0.3479  
Centroid-sig: N/A  
Centroid-so: 0.518 arcsec [0.82σ]  
OotOffset-rm: N/A  
OotOffset-st: 0/0/0/0 [0]  
KicOffset-rm: N/A  
KicOffset-st: 0/0/0/0 [0]  
DiffImageQuality-fgm: N/A  
DiffImageOverlap-fno: 0.00 [0/3]

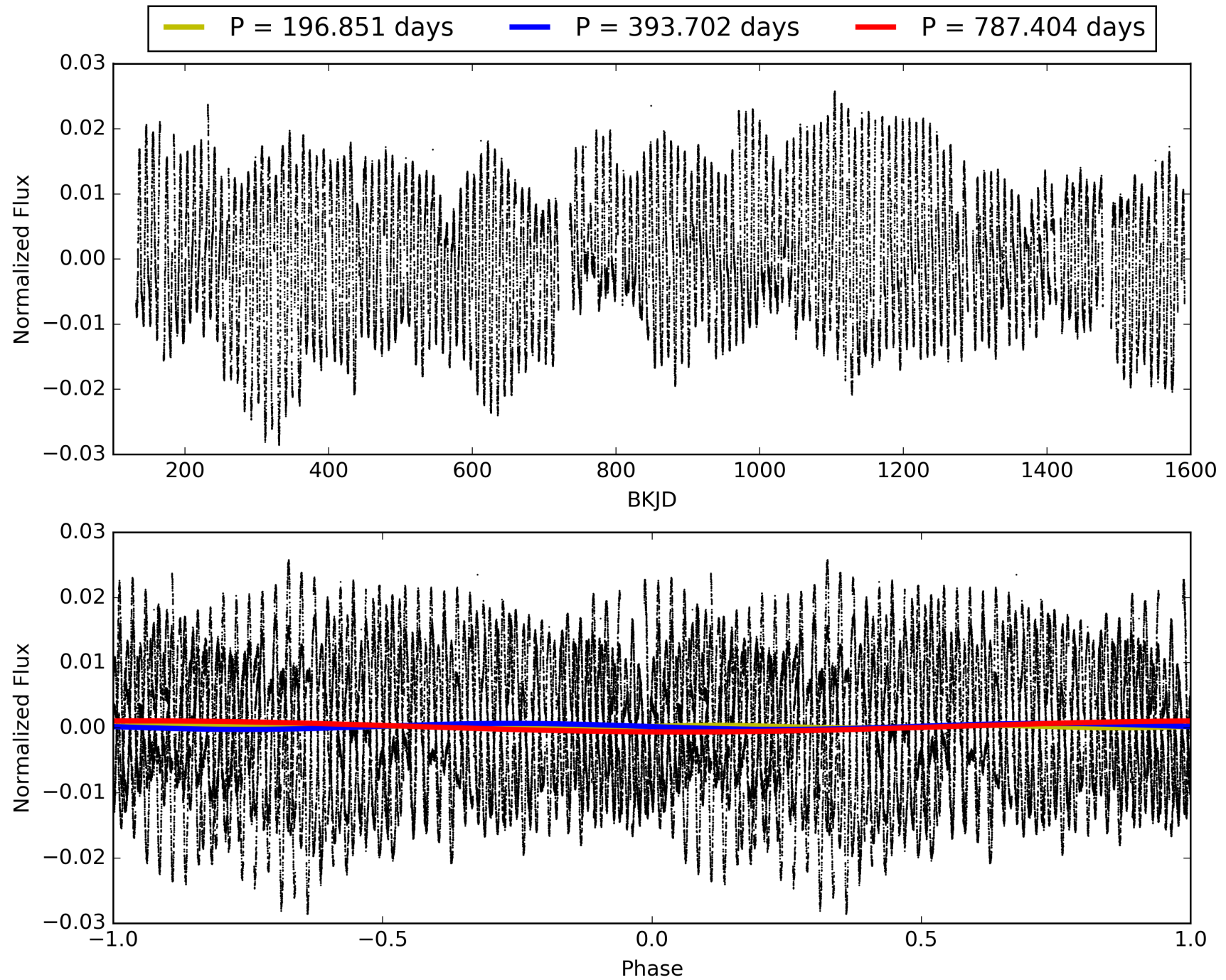
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 17:59:33 Z

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

# TCE 005475641-08, PDC Light Curves

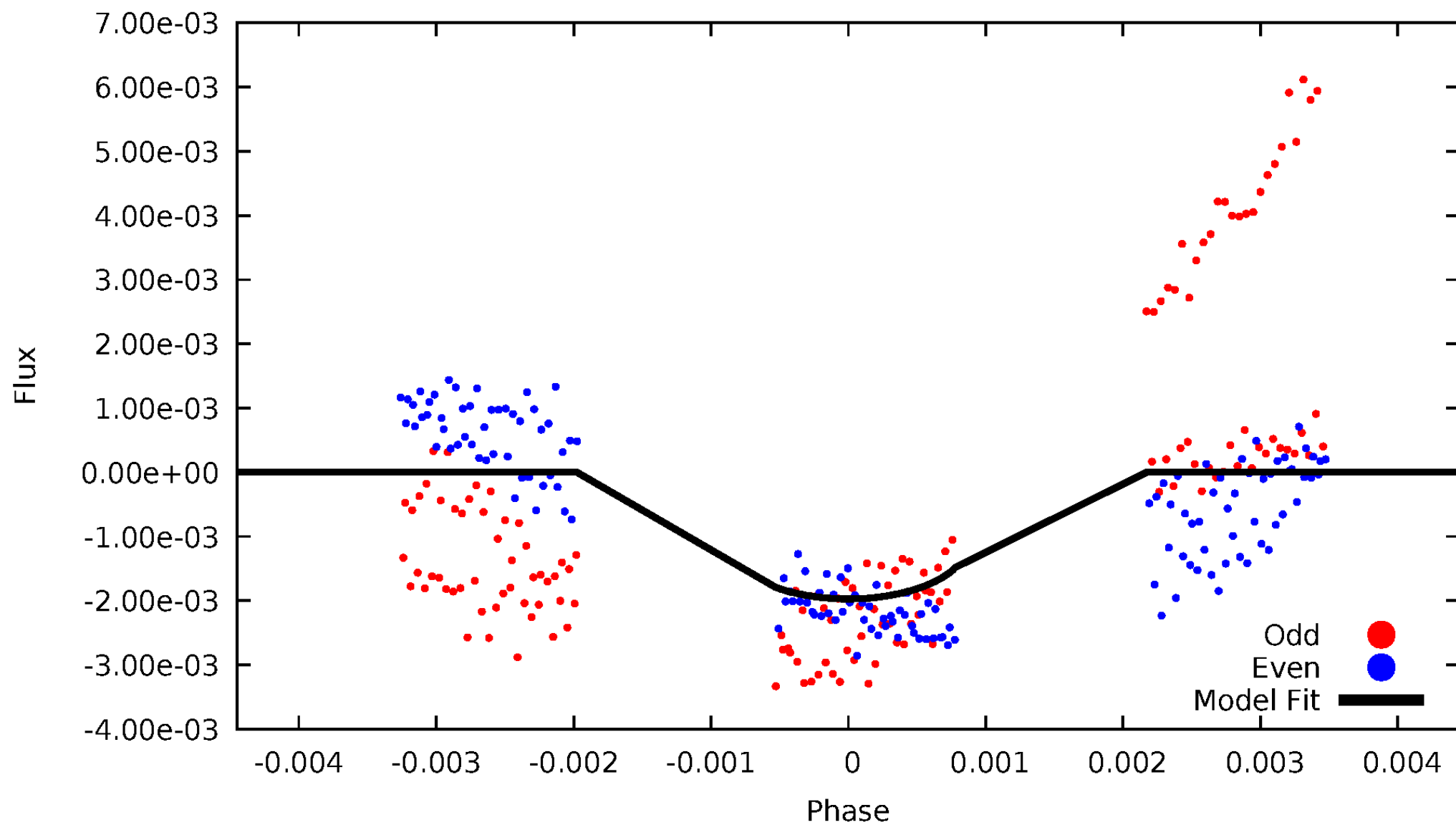


TCE 005475641-08



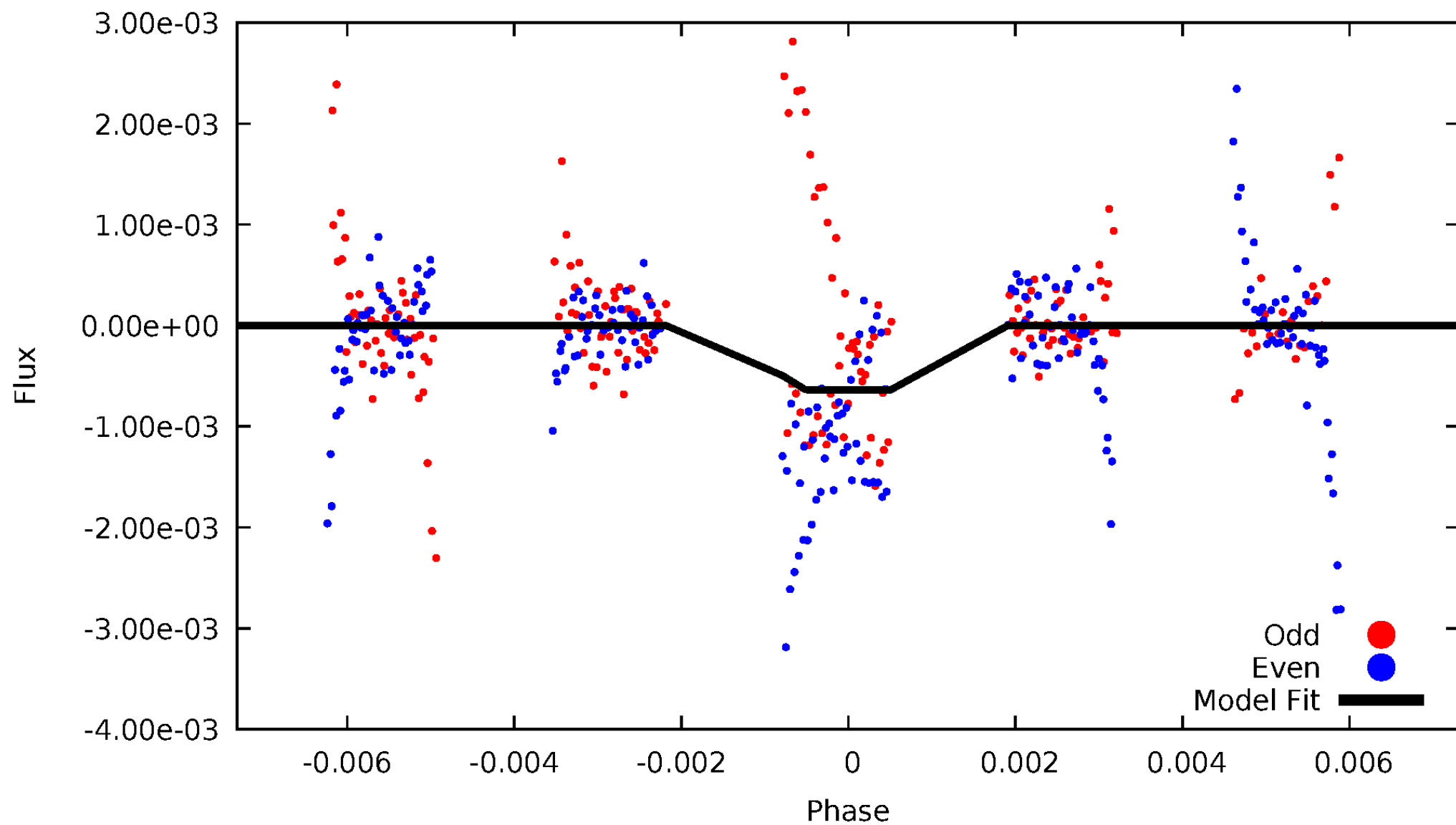
# DV Odd/Even

TCE 005475641-08



# ALT Odd/Even

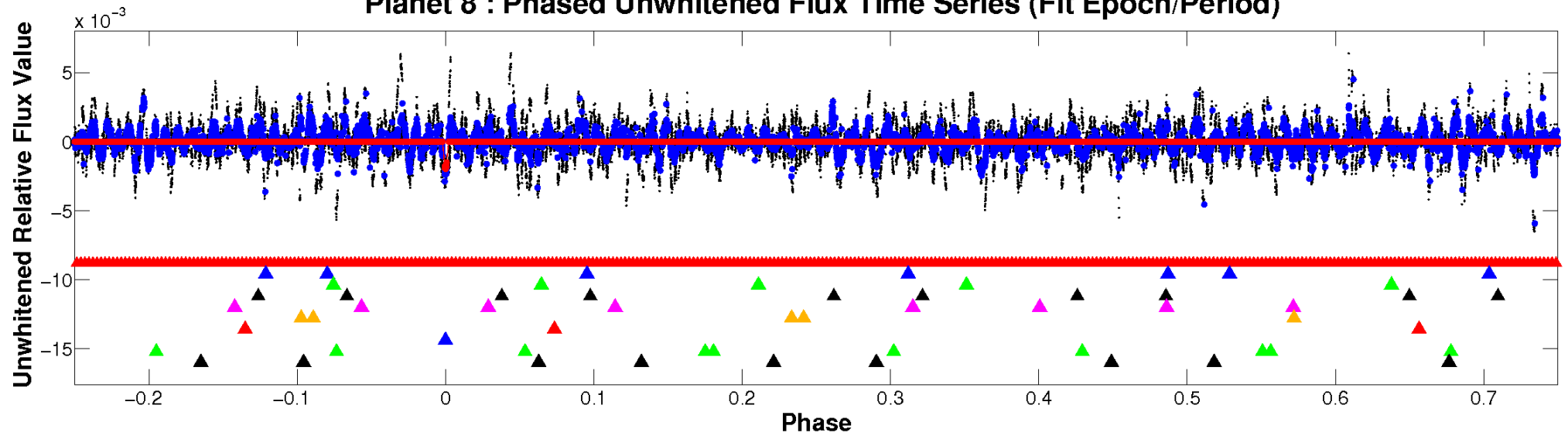
TCE 005475641-08



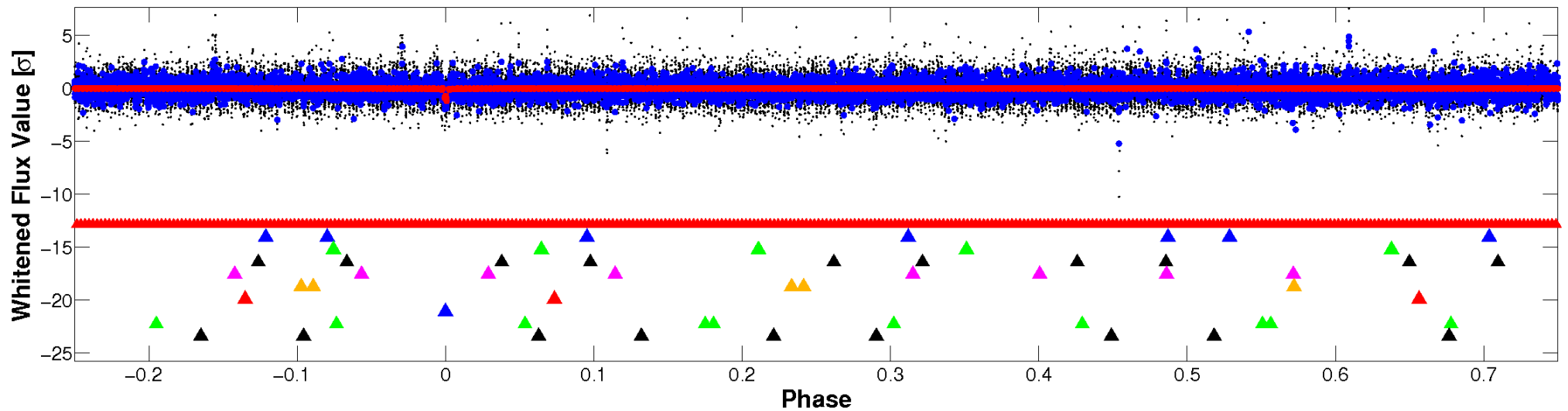


# Non-Whitened Vs. Whitened Light Curve

## Planet 8 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)



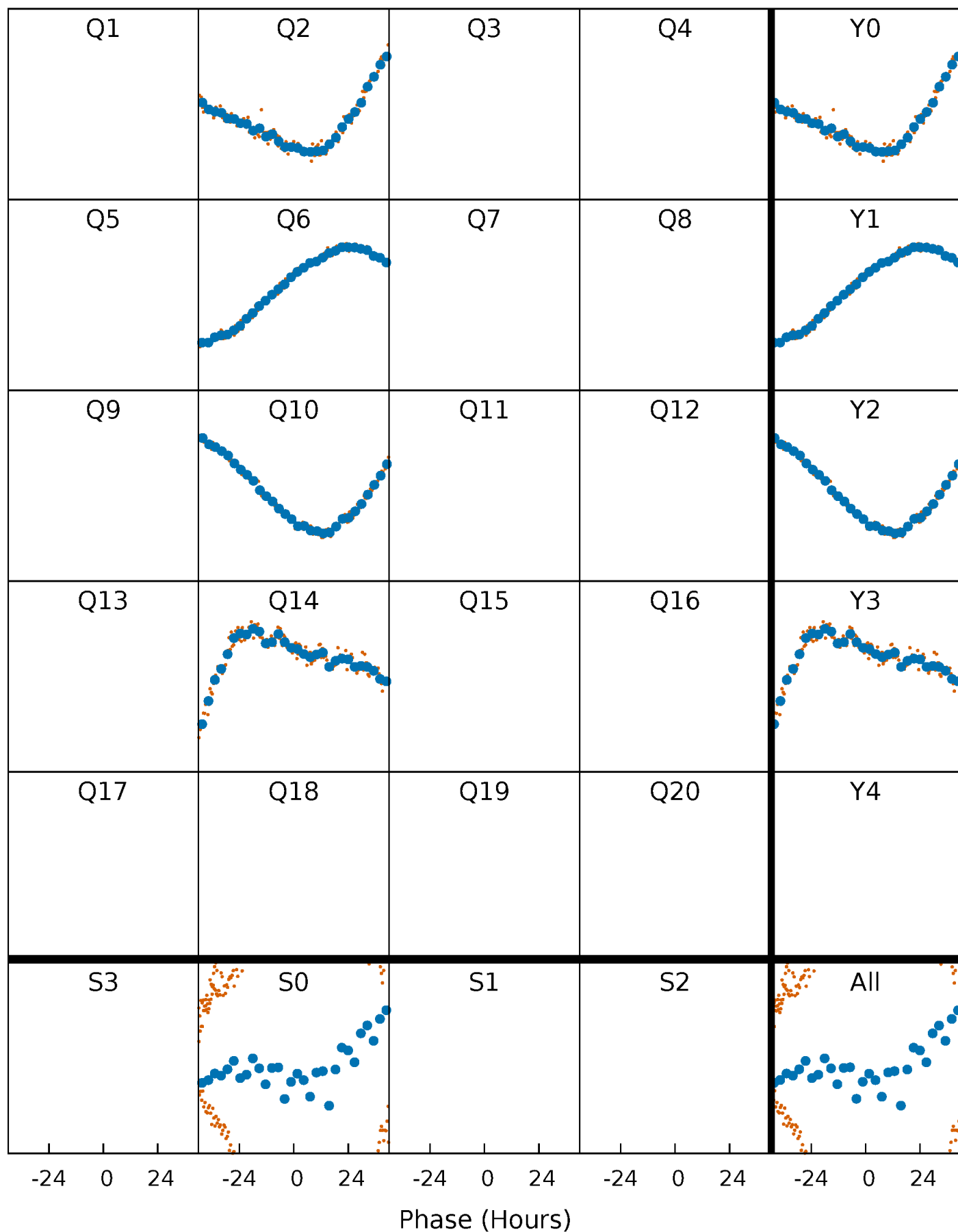
## Planet 8 : Phased Whitened Flux Time Series (Fit Epoch/Period)





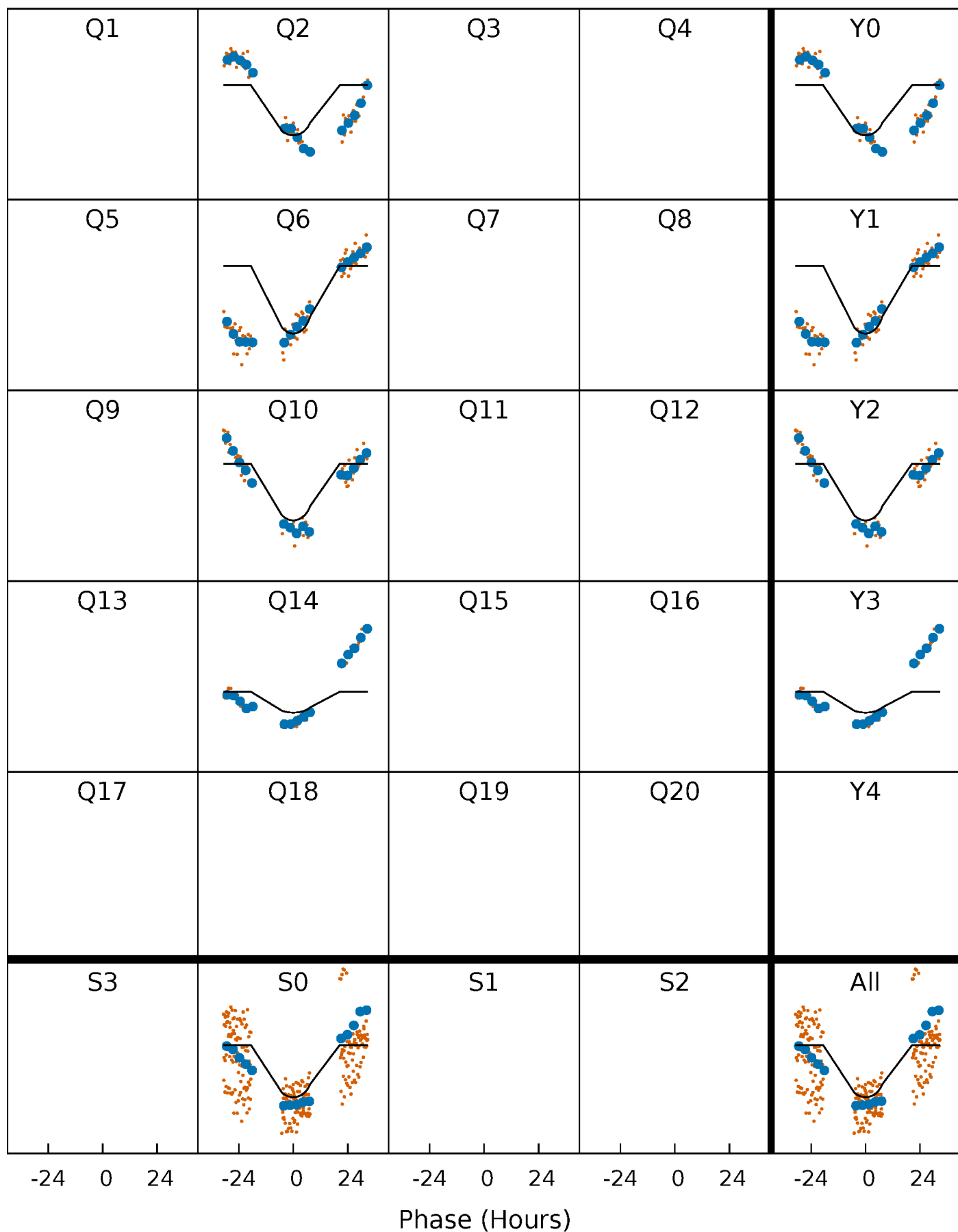
# PDC Quarter-Phased Transit Curves

TCE 005475641-08     $P=393.701860$  Days     $T_0=188.565963$  (BKJD)



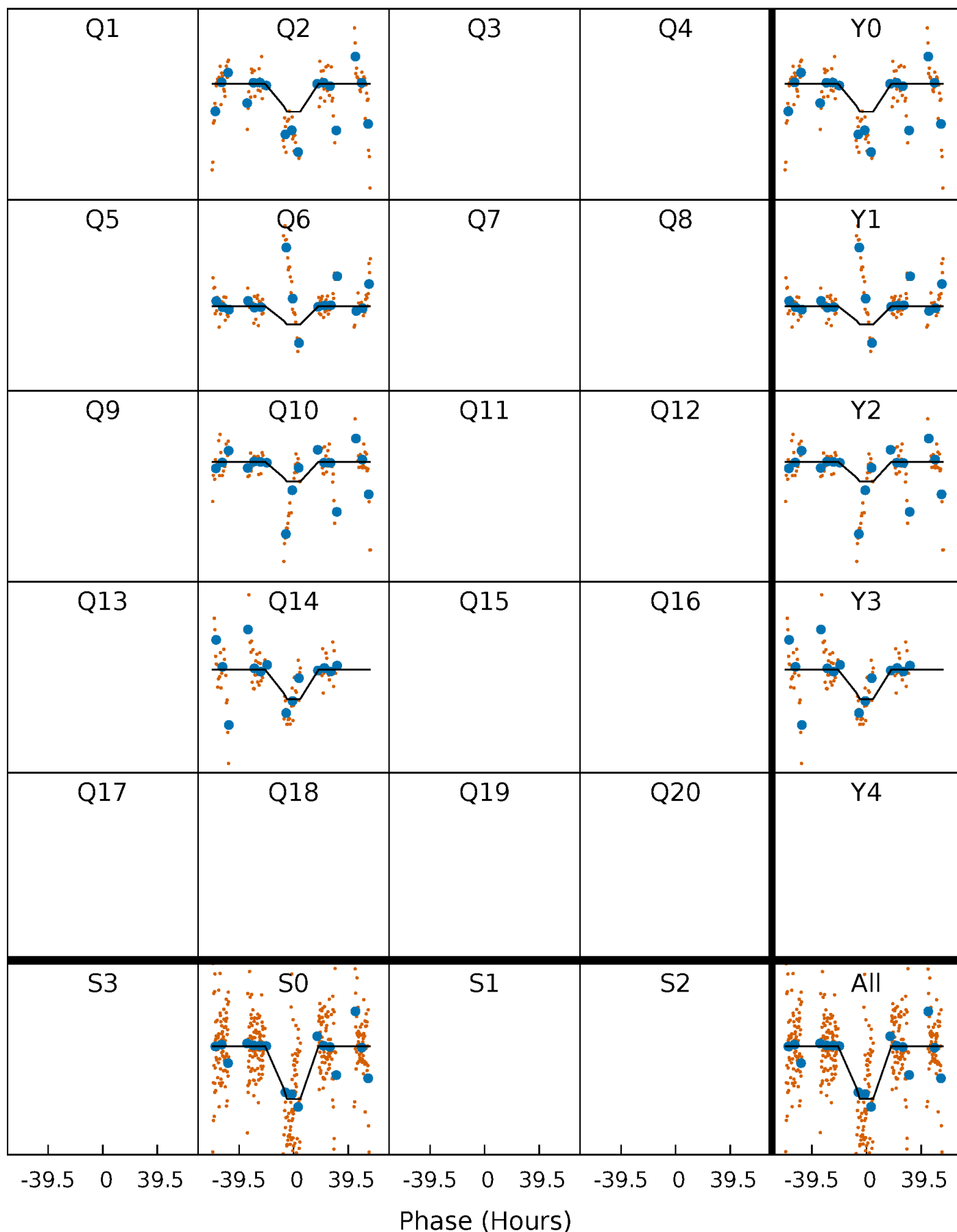
# DV Quarter-Phased Transit Curves

TCE 005475641-08 P=393.701860 Days  $T_0=188.565963$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

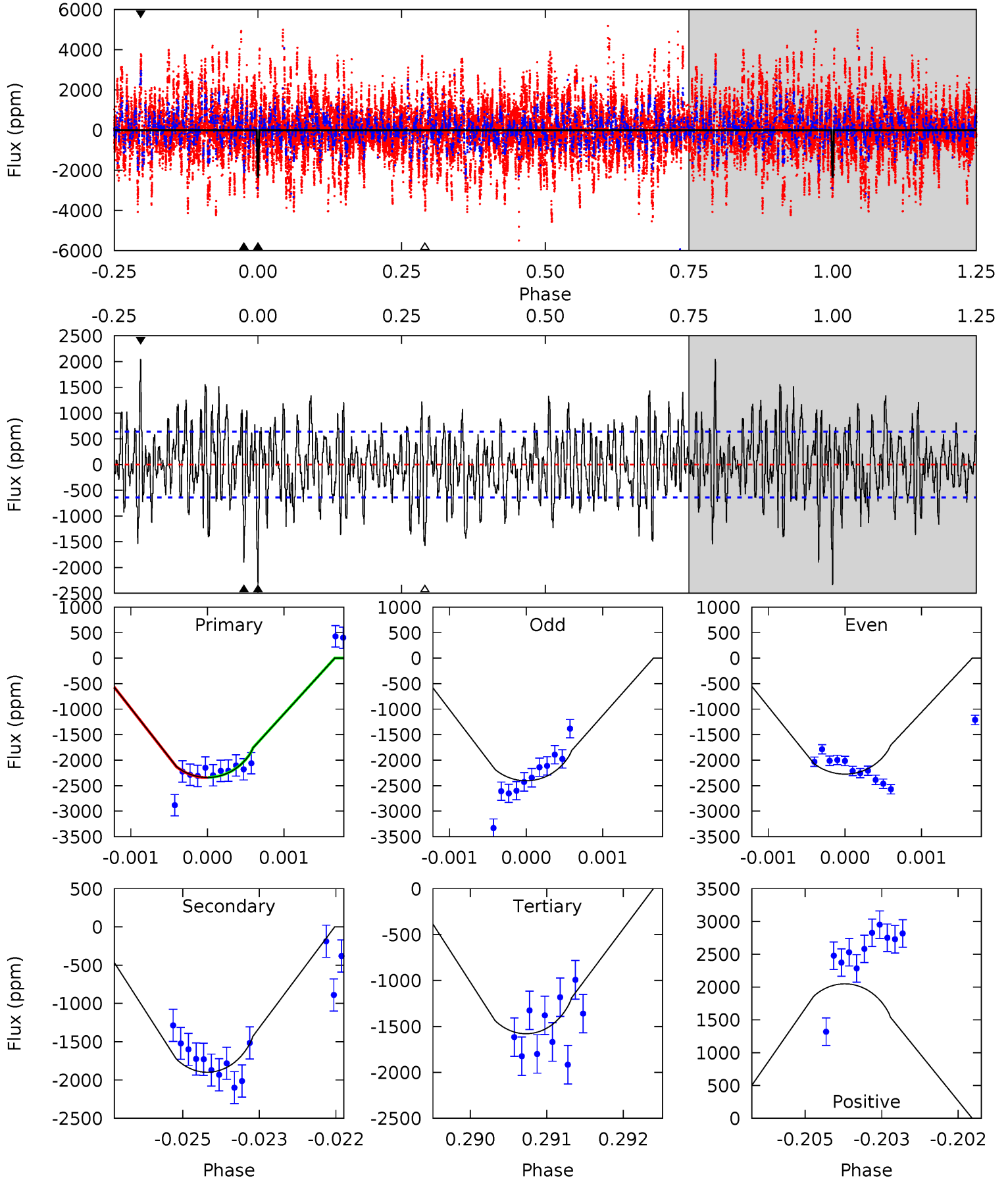
TCE 005475641-08 P=393.686589 Days  $T_0=188.691178$  (BKJD)



# DV Model-Shift Uniqueness Test

005475641-08, P = 393.701860 Days, E = 188.565963 Days

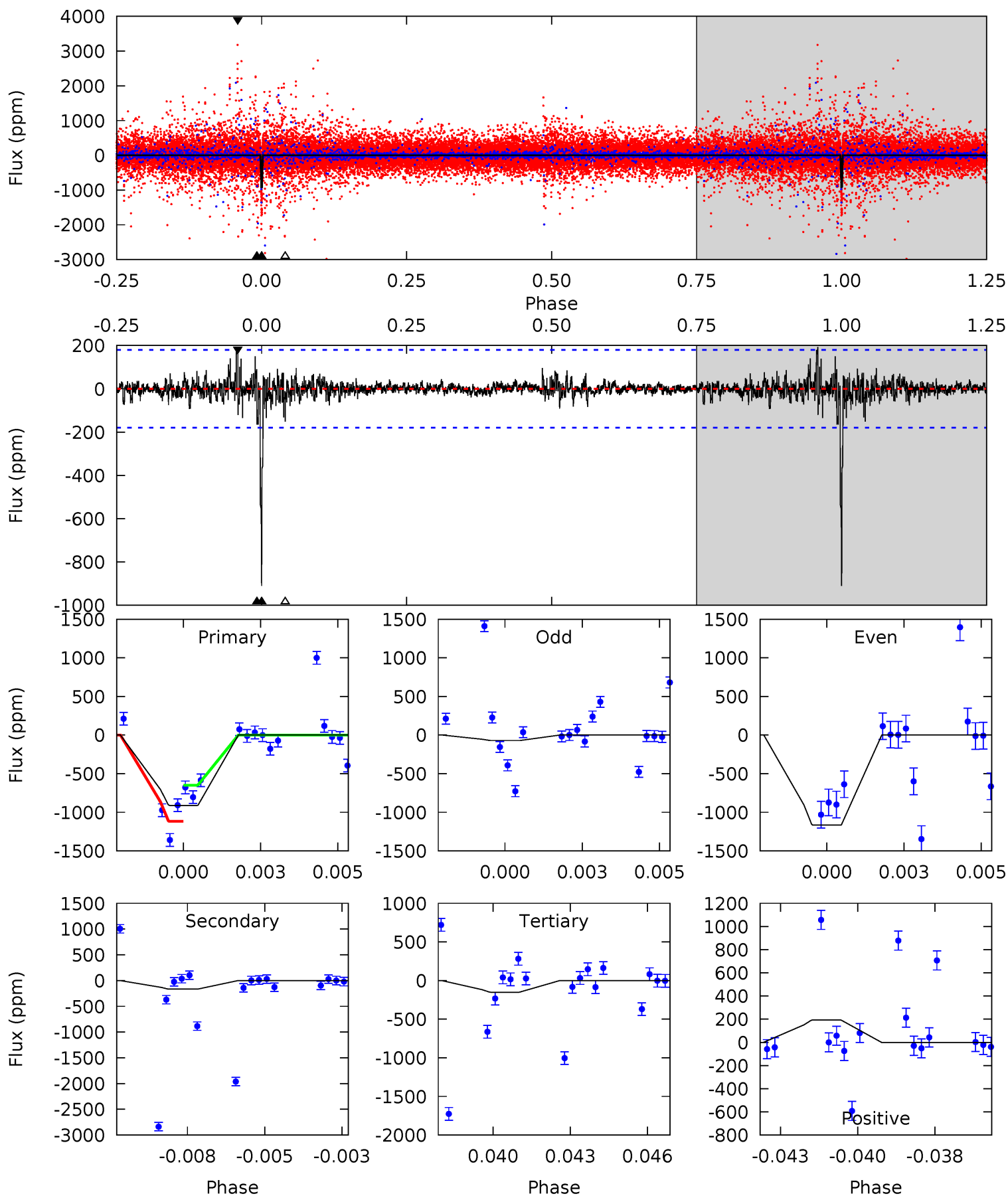
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
19.8	16.0	13.3	17.3	5.40	3.22	4.77	6.42	2.46	2.70	-1.26	0.54	1.03	0.47	0.03



# Alt Model-Shift Uniqueness Test

005475641-08, P = 393.686589 Days, E = 188.691178 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
26.7	4.86	4.43	5.66	5.27	3.00	0.80	22.3	21.1	0.43	-0.80	14.1	0.71	0.17	6.77



### Stellar Parameters For KIC 005475641

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4999^{+151}_{-136}$	$4.523^{+0.078}_{-0.052}$	$-0.040^{+0.300}_{-0.300}$	$0.786^{+0.063}_{-0.079}$	$0.752^{+0.085}_{-0.057}$	$2.180^{+0.701}_{-0.371}$
	+3%/-3%	+2%/-1%	+750%/-750%	+8%/-10%	+11%/-8%	+32%/-17%
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 005475641-08 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-1899 \pm 118$	$4.04^{+1.40}_{-1.52}$	$278^{+11}_{-11}$	$4846^{+1115}_{-559}$	$60537^{+92861}_{-27553}$
Alt.	$-166 \pm 34$	$2.18^{+1.49}_{-1.33}$	$279^{+10}_{-11}$	$3863^{+1675}_{-610}$	$17331^{+90279}_{-10949}$

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

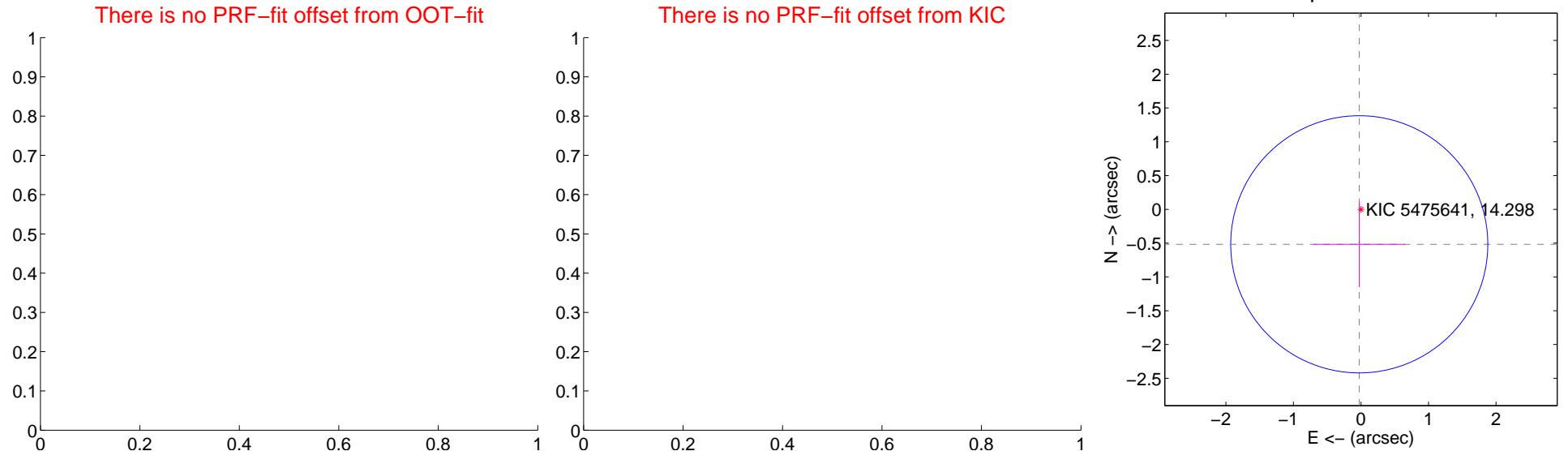
## DV Centroid Data

Supplemental centroid analysis for 005475641-08. Kepler magnitude: 14.30. Transit SNR 8.15

There are 0 quarters with good PRF difference image offsets

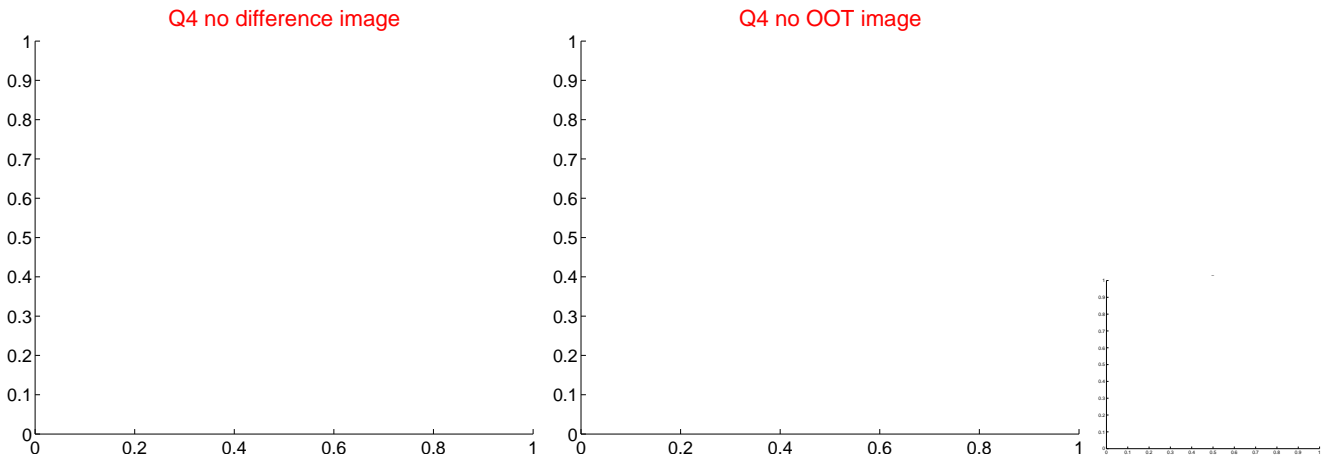
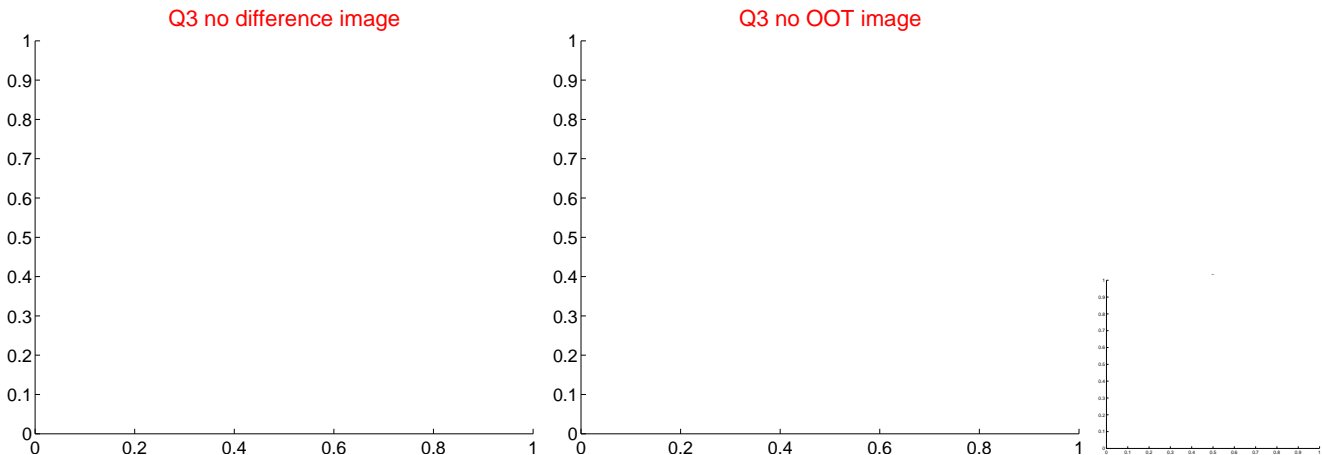
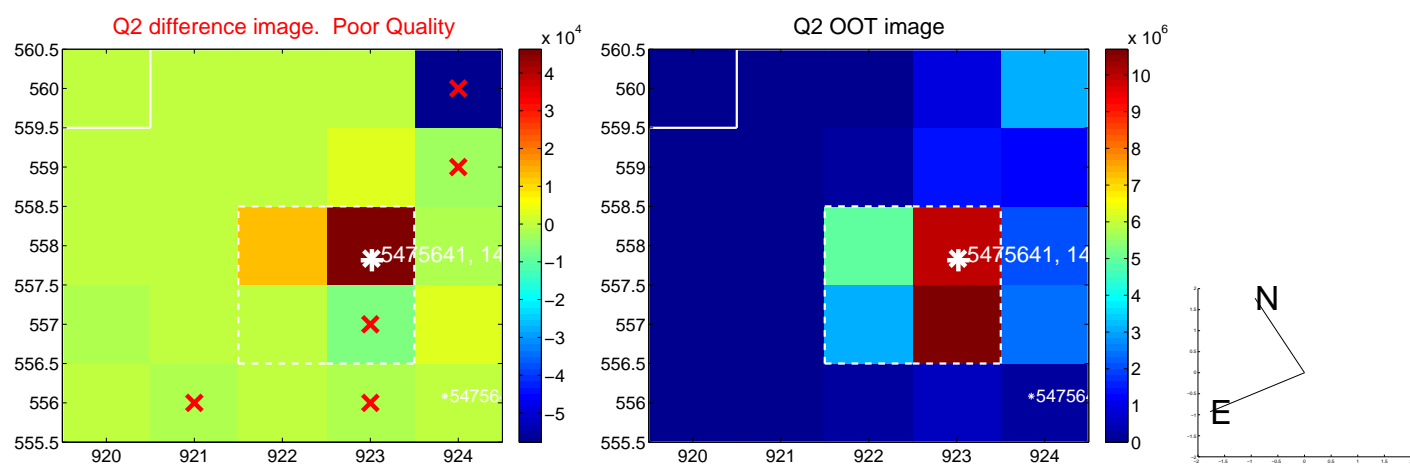
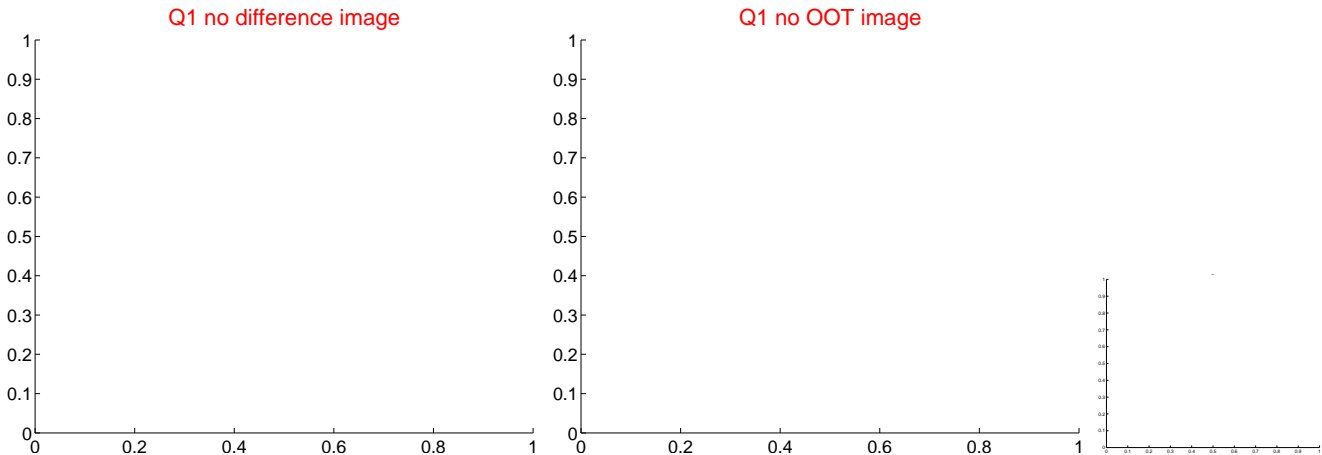
The direct PRF centroid is offset from the target star catalog position by about NaN arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	—	—	—	—
PRF-fit source offset from KIC position	—	—	—	—
photometric centroid source offset	$0.52 \pm 0.63$	0.82	$0.03 \pm 0.68$	$-0.52 \pm 0.63$



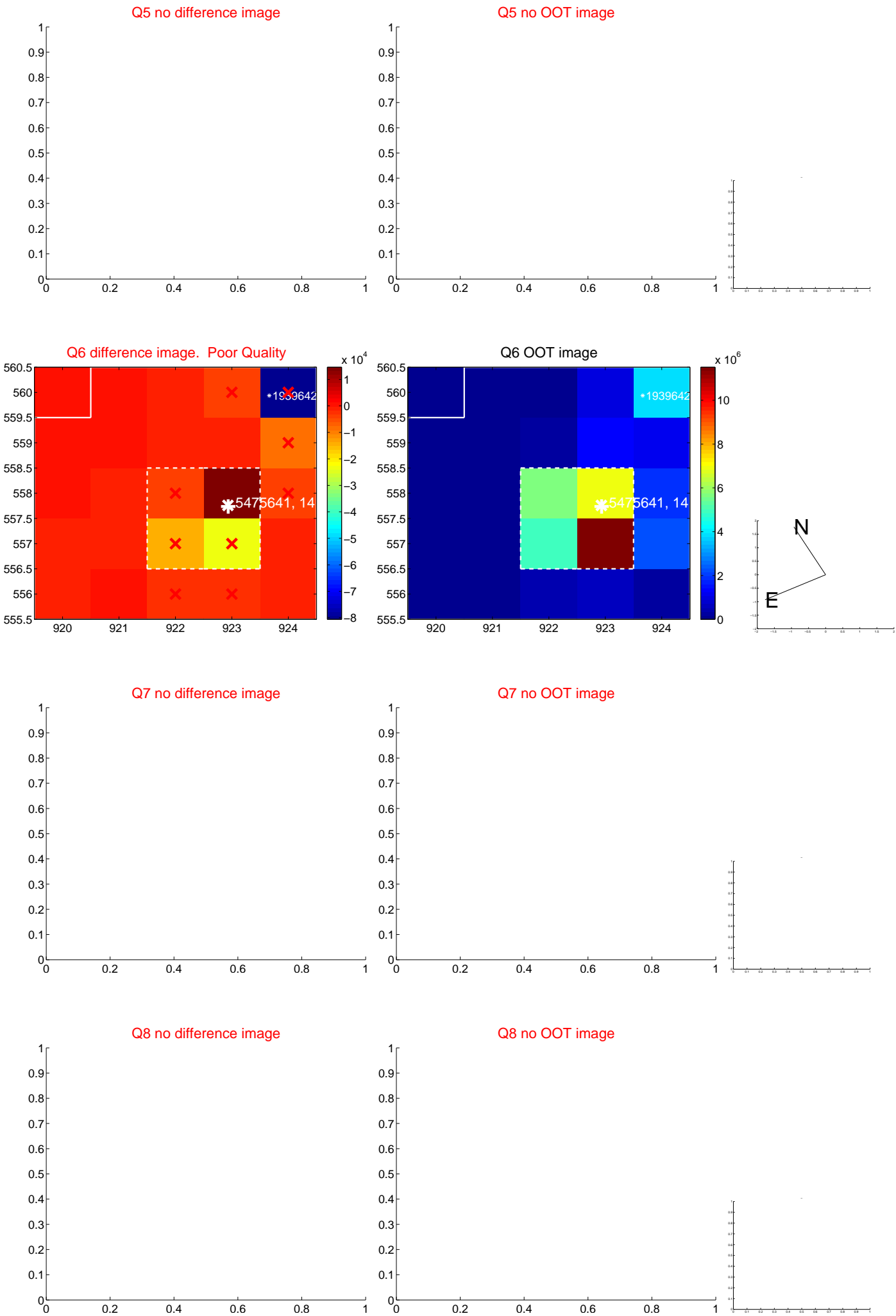
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

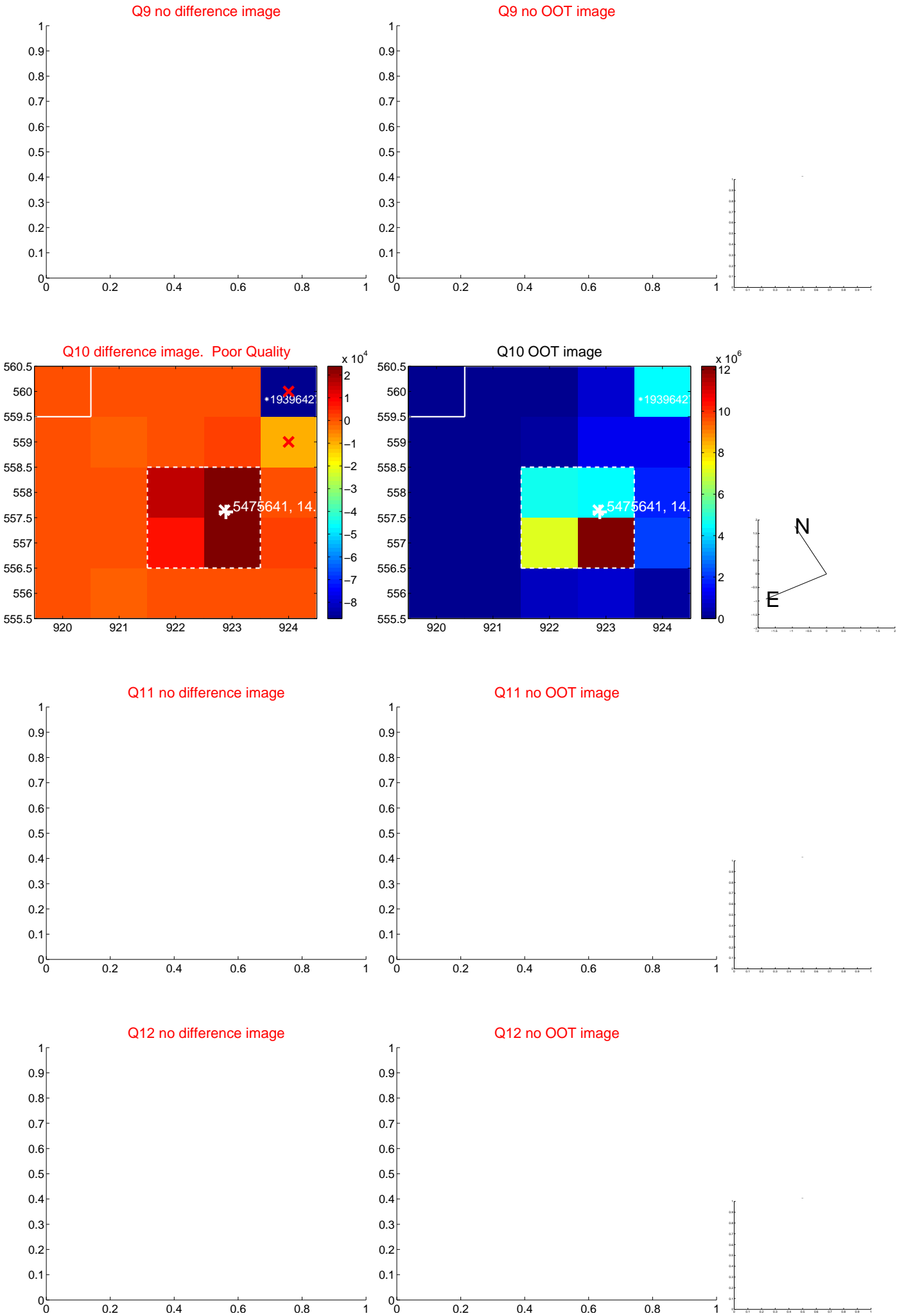




white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



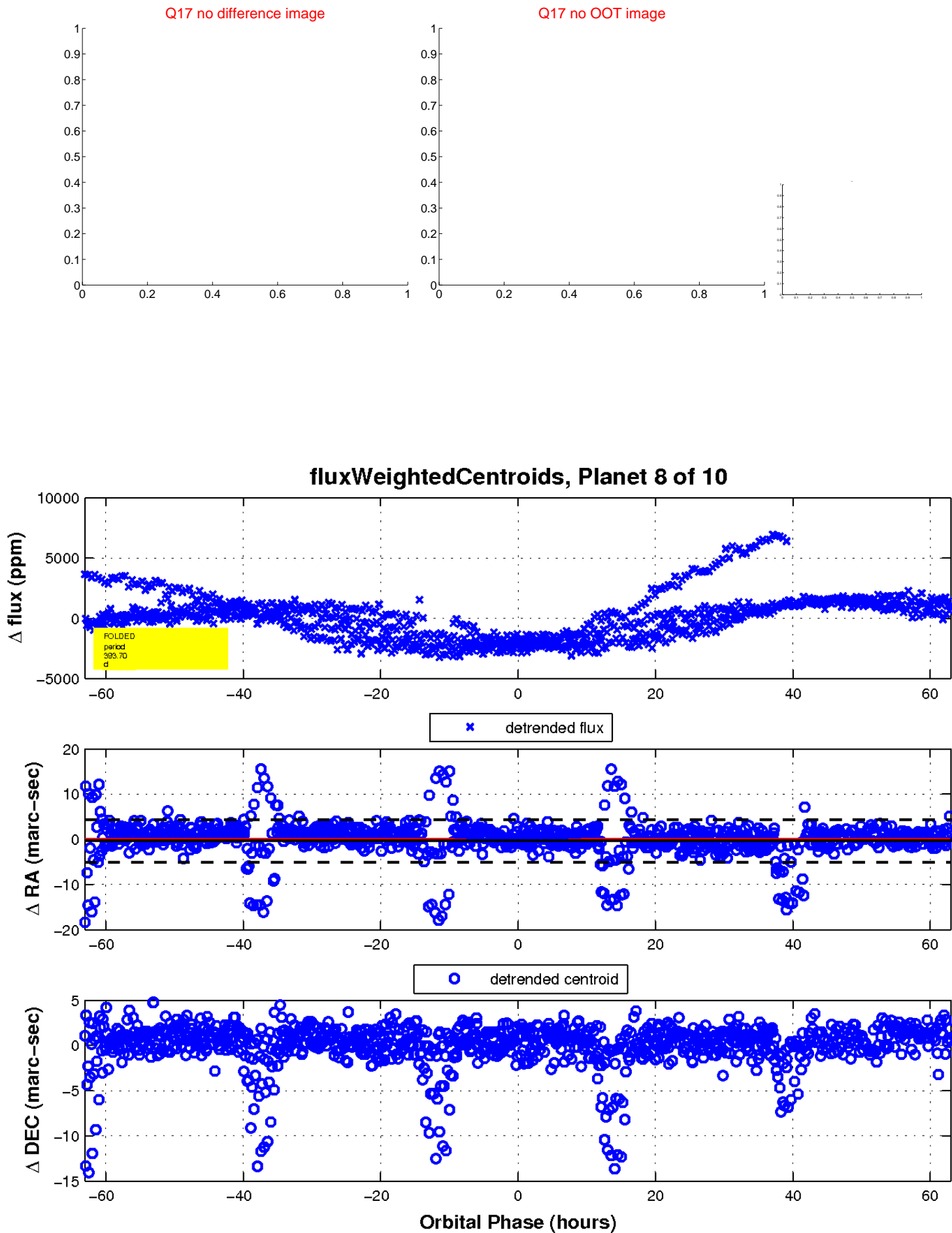
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



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

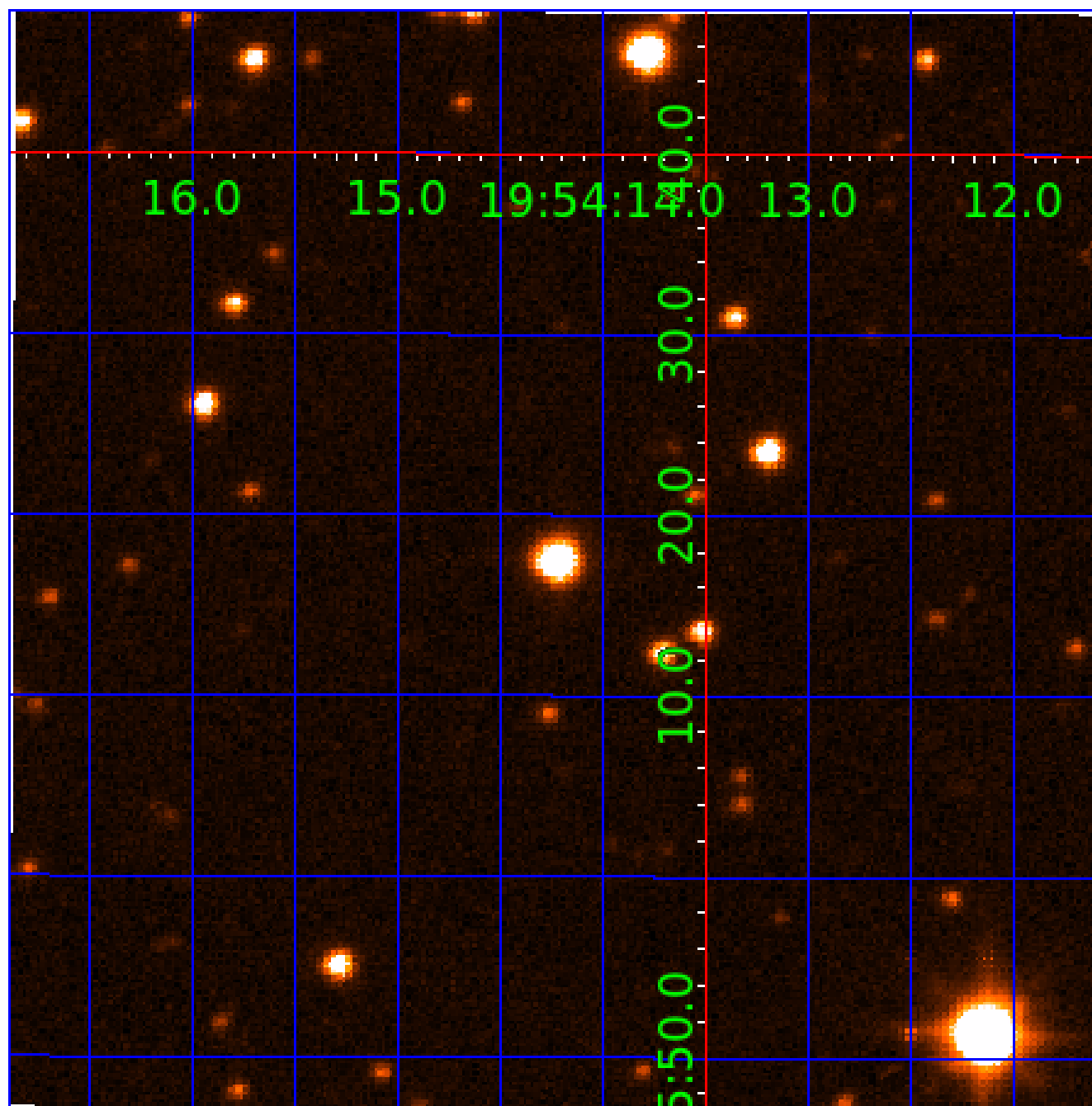


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 005475641

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005475641-01	OBS	2895.01	1.069827	132.452550	68.4	4.298	11.2	13.7	0.79	4999	0.81	997.60
005475641-02	OBS	No	239.487671	140.863826	812.0	8.997	18.4	7.6	0.79	4999	2.37	0.73
005475641-03	OBS	No	280.872905	271.644348	1182.9	7.500	15.9	-1.0	0.79	4999	2.62	0.59
005475641-04	OBS	No	152.776853	162.394839	673.1	9.042	13.6	7.7	0.79	4999	2.20	1.34
005475641-05	OBS	No	180.020691	233.604204	856.6	11.672	12.6	7.7	0.79	4999	2.70	1.07
005475641-07	OBS	No	475.792717	447.008273	1185.4	12.541	12.7	6.2	0.79	4999	2.68	0.29
005475641-08	OBS	No	393.701860	188.565963	1971.7	21.017	11.9	8.1	0.79	4999	4.07	0.38
005475641-09	OBS	No	147.912710	257.518469	516.6	19.634	11.2	4.7	0.79	4999	1.75	1.40

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005475641-01	OBS	FP	0.00	0	0	1	1	CENT_RESOLVED_OFFSET—HALO_GHOST—EPHEM_MATCH
005475641-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005475641-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_NOFITS
005475641-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005475641-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—ALL_TRANS_CHASES—CENT_FEW_DIFFS—HALO_GHOST
005475641-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_TRACKER—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
005475641-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—CENT_FEW_DIFFS
005475641-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES

**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.

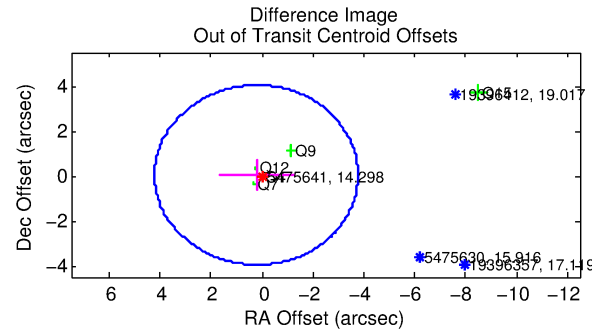
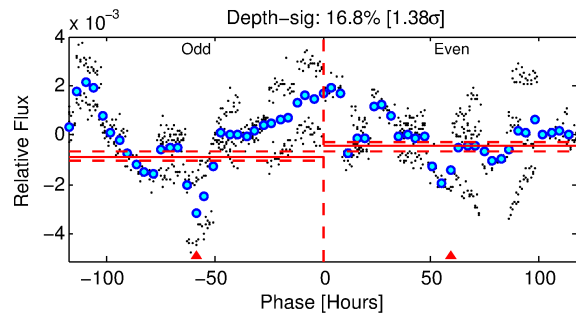
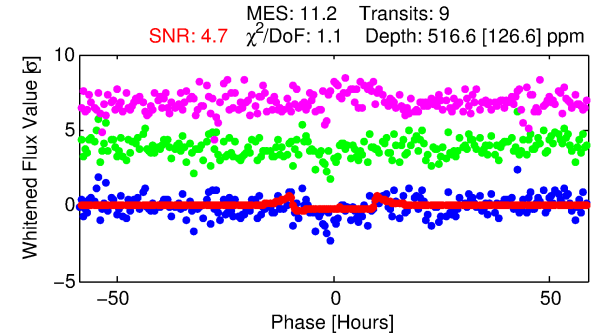
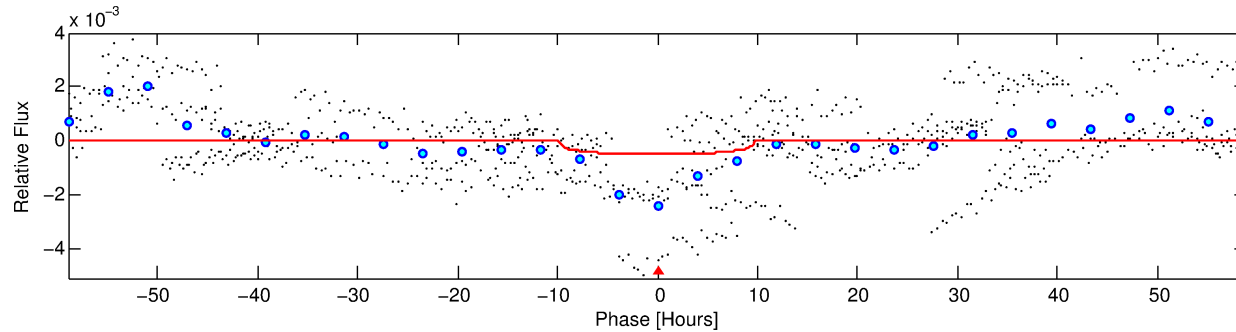
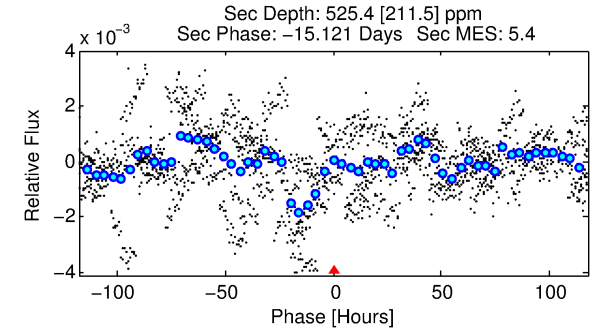
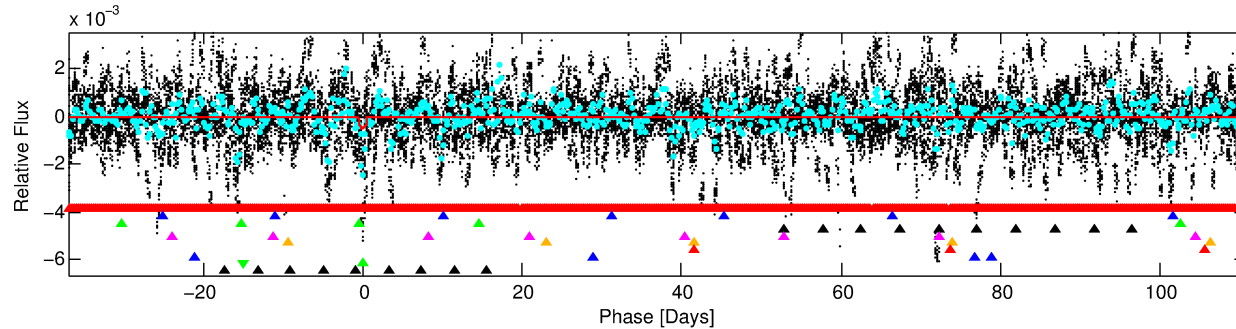
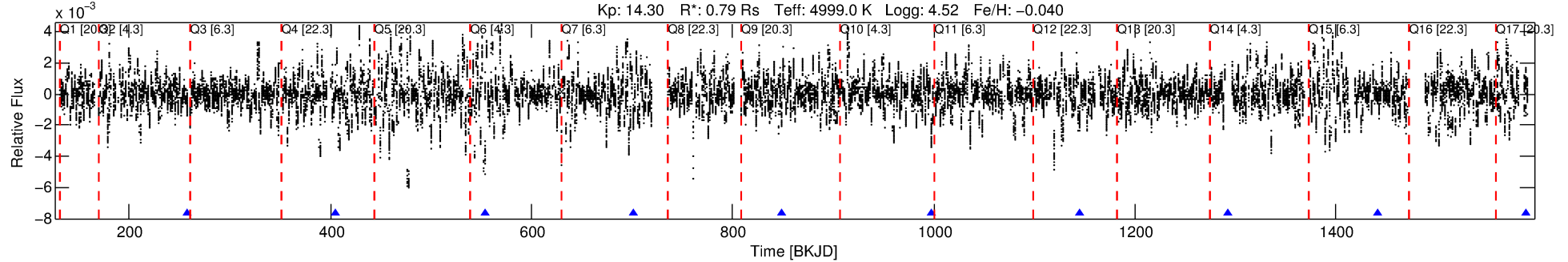
Ephemeris Match Information For 005475641-09

No Significant Match Found

# DV One-Page Summary

KIC: 5475641 Candidate: 9 of 10 Period: 147.913 d  
KOI: K02895 Corr: No Ephemeris Match

Kp: 14.30 R\*: 0.79 Rs Teff: 4999.0 K Logg: 4.52 Fe/H: -0.040



## DV Fit Results:

Period = 147.91271 [0.00312] d  
Epoch = 257.5185 [0.0157] BKJD  
Rp/R\* = 0.0203 [0.0156]  
a/R\* = 56.79 [151.59]  
b = 0.26 [9.65]  
Seff = 1.40 [0.26]  
Teq = 277 [13] K  
Rp = 1.74 [1.35] Re  
a = 0.4977 [0.0447] AU  
Ag = 23521.26 [37408.47] [0.63σ]  
Teffp = 5306 [2108] K [2.39σ]

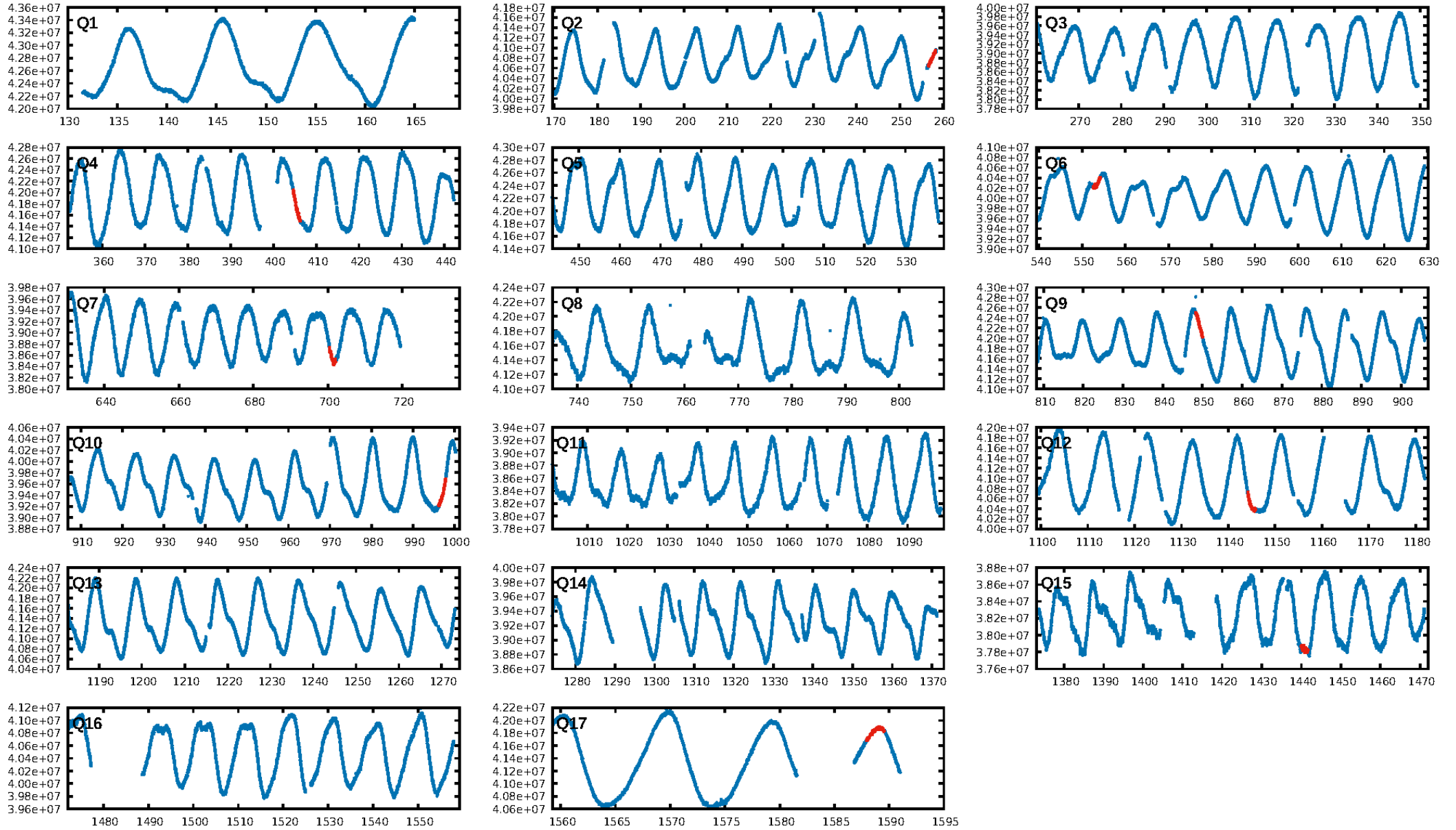
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [175.35σ]  
LongPeriod-sig: 100.0% [4.81σ]  
ModelChiSquare2-sig: 0.9%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [8/8]  
GhostDiagnostic-chr: 0.6816  
Centroid-sig: N/A  
Centroid-so: 4.743 arcsec [2.41σ]  
OotOffset-rm: 0.220 arcsec [0.17σ]  
OotOffset-st: 0/2/2/1 [5]  
KicOffset-rm: 0.211 arcsec [0.13σ]  
KicOffset-st: 0/2/2/1 [5]  
DiffImageQuality-fgm: 0.60 [3/5]  
DiffImageOverlap-fno: 0.00 [0/7]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 17:59:38 Z

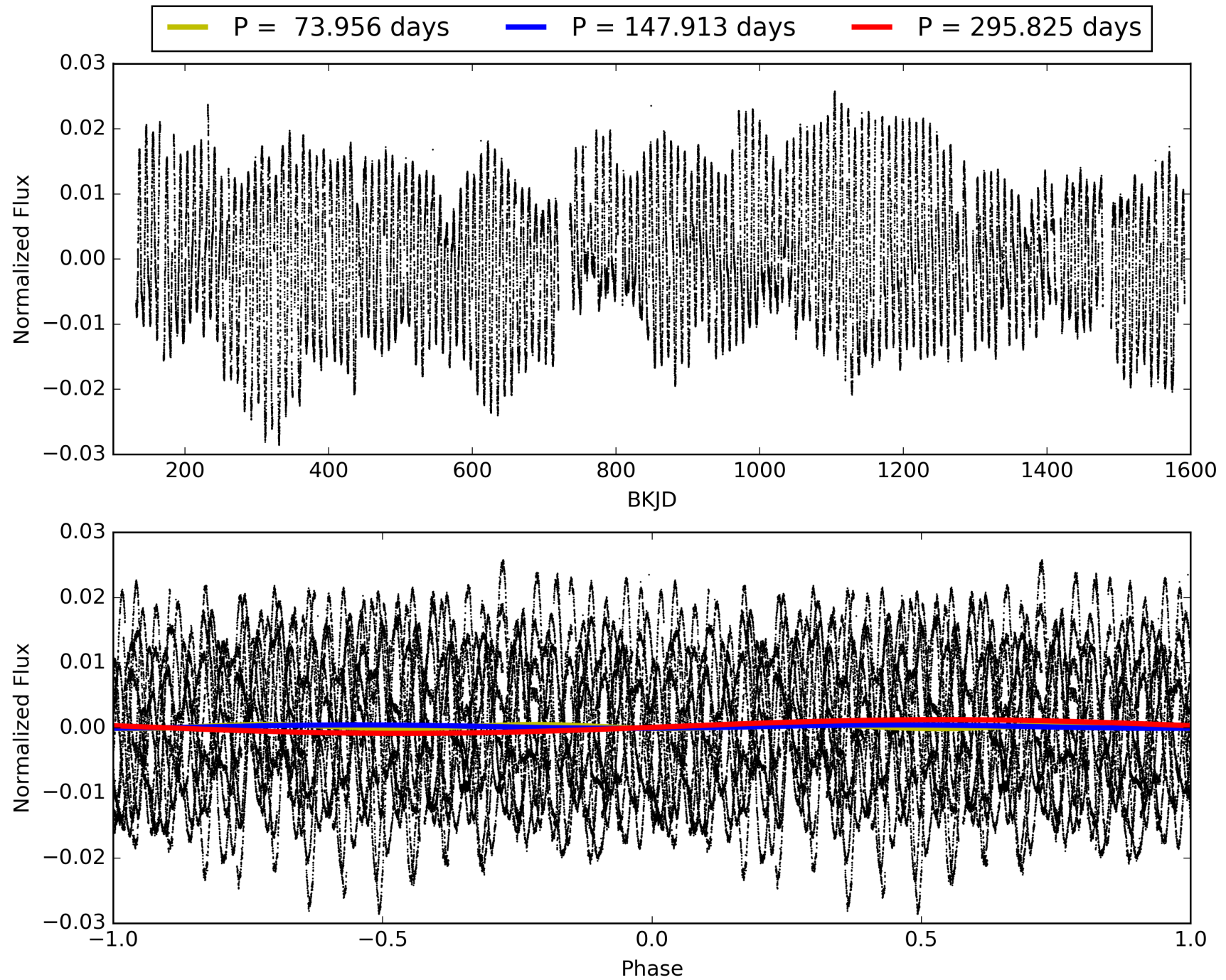
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 005475641-09, PDC Light Curves



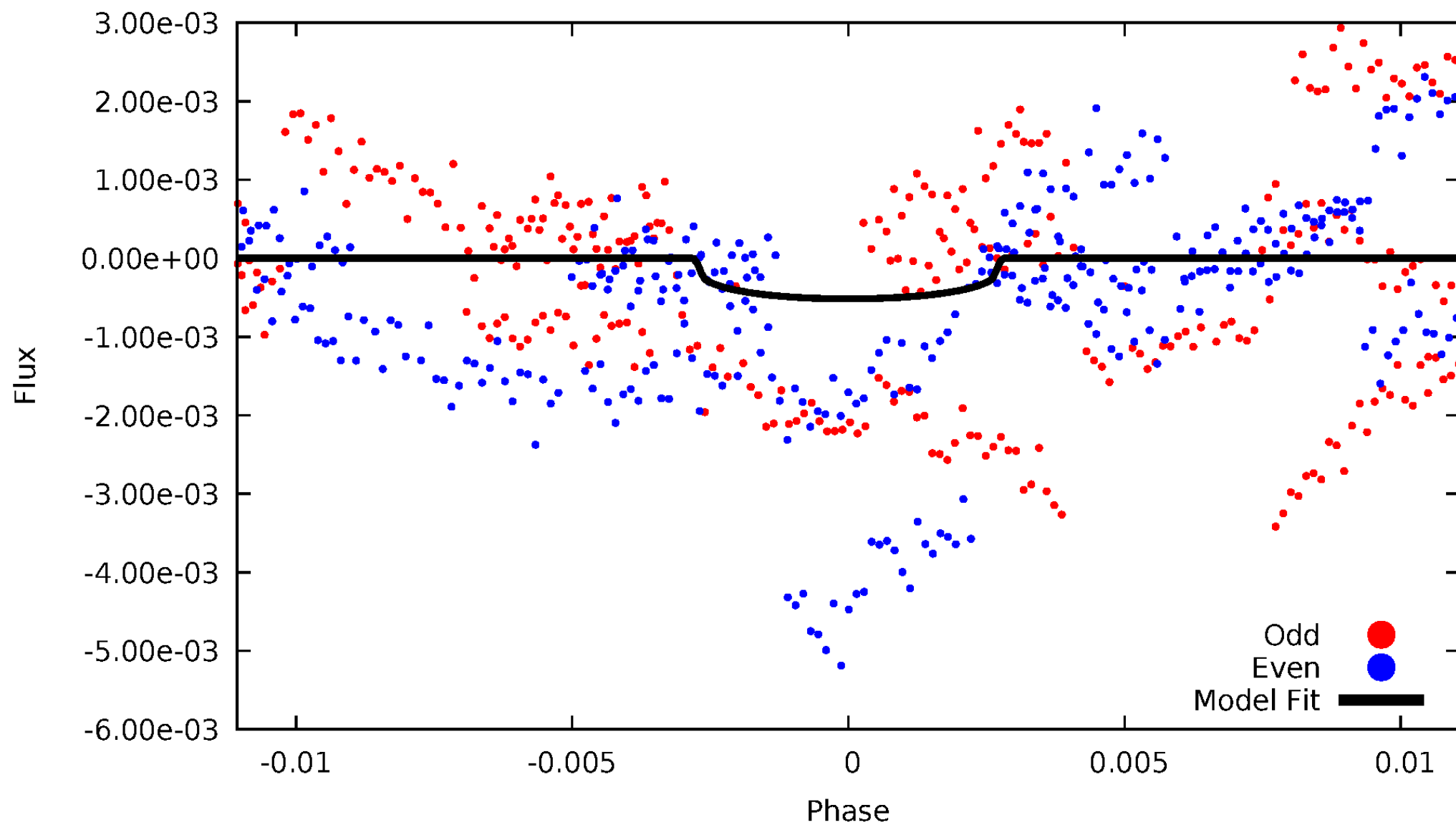


TCE 005475641-09



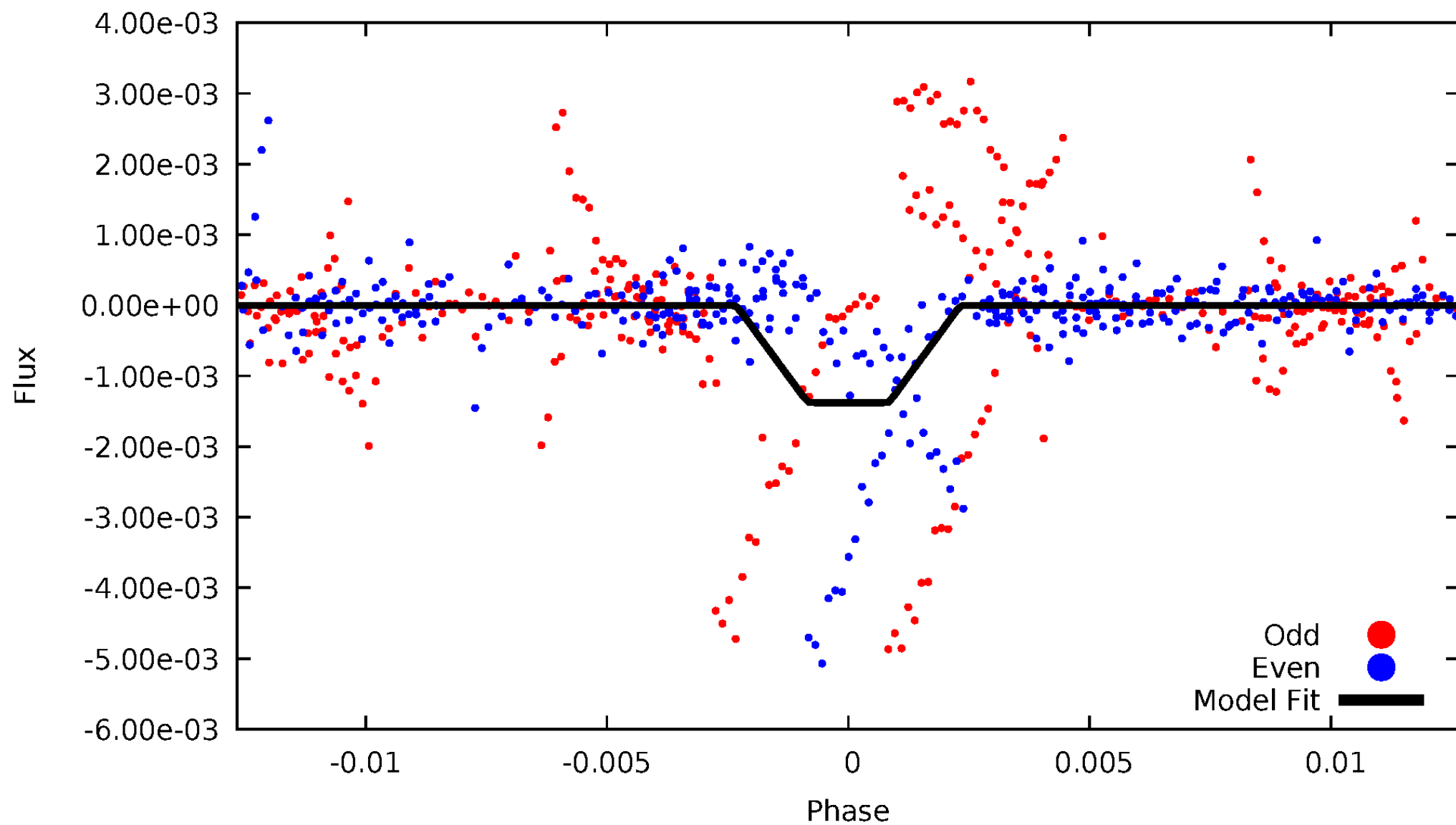
# DV Odd/Even

TCE 005475641-09

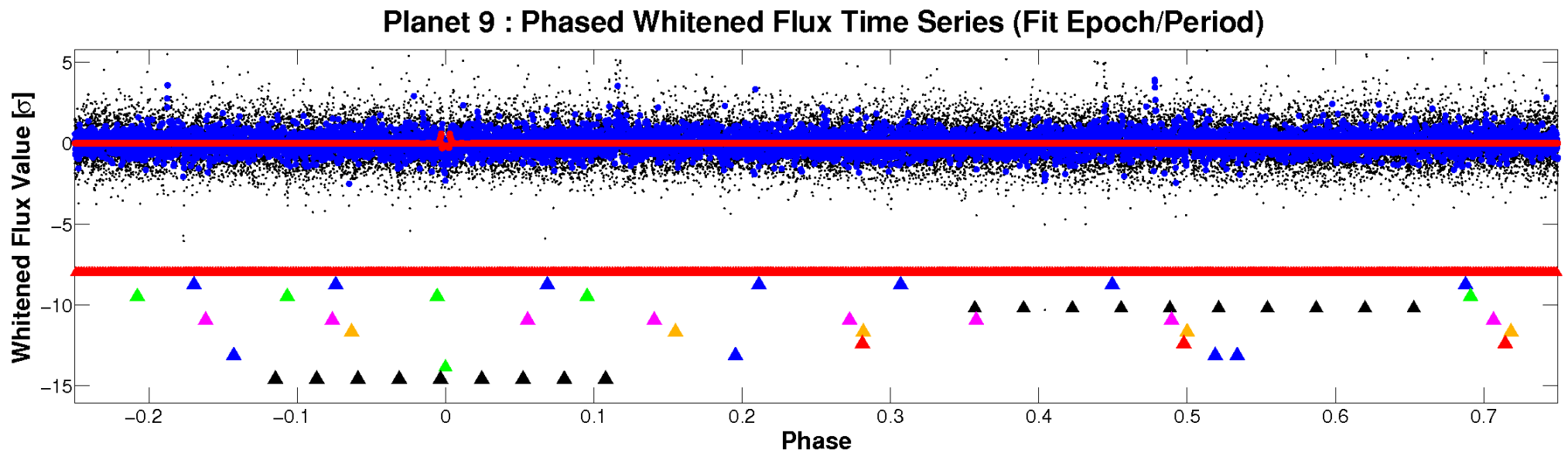
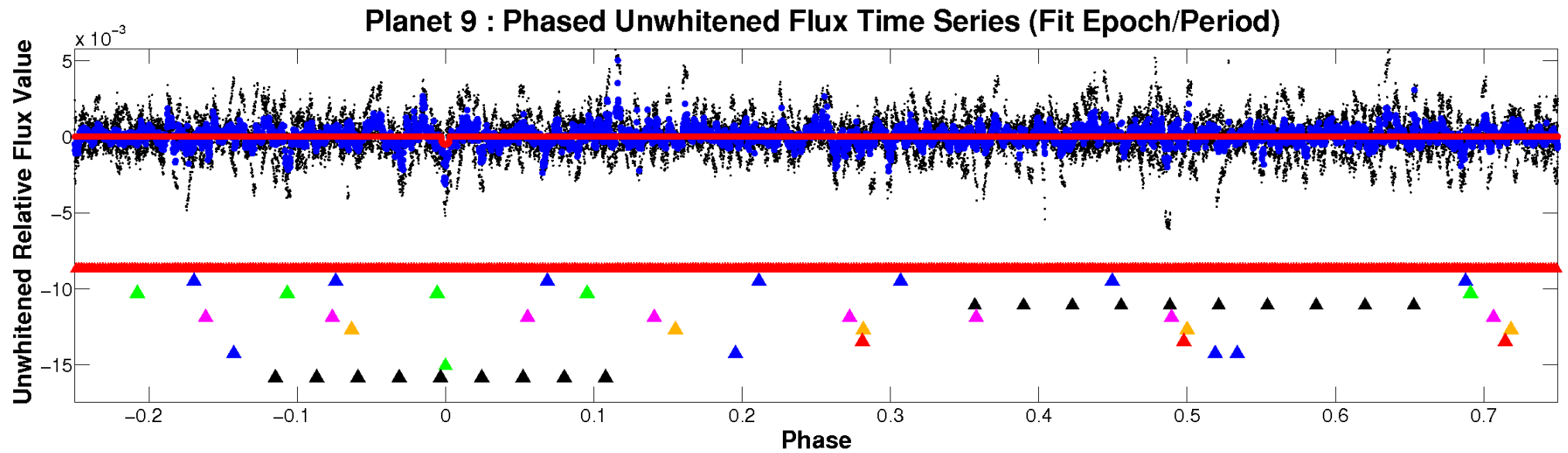


# ALT Odd/Even

TCE 005475641-09

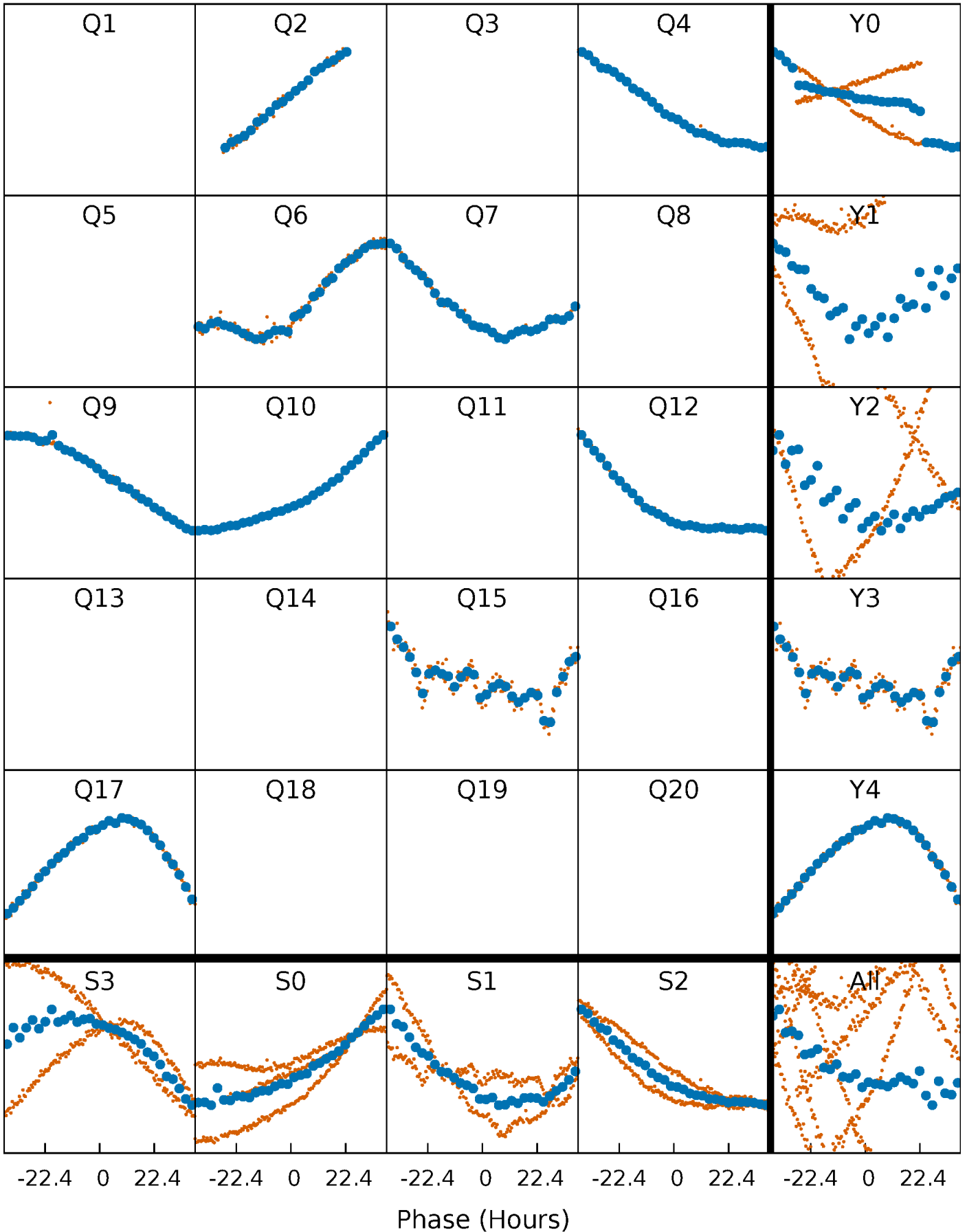


# Non-Whitened Vs. Whitened Light Curve



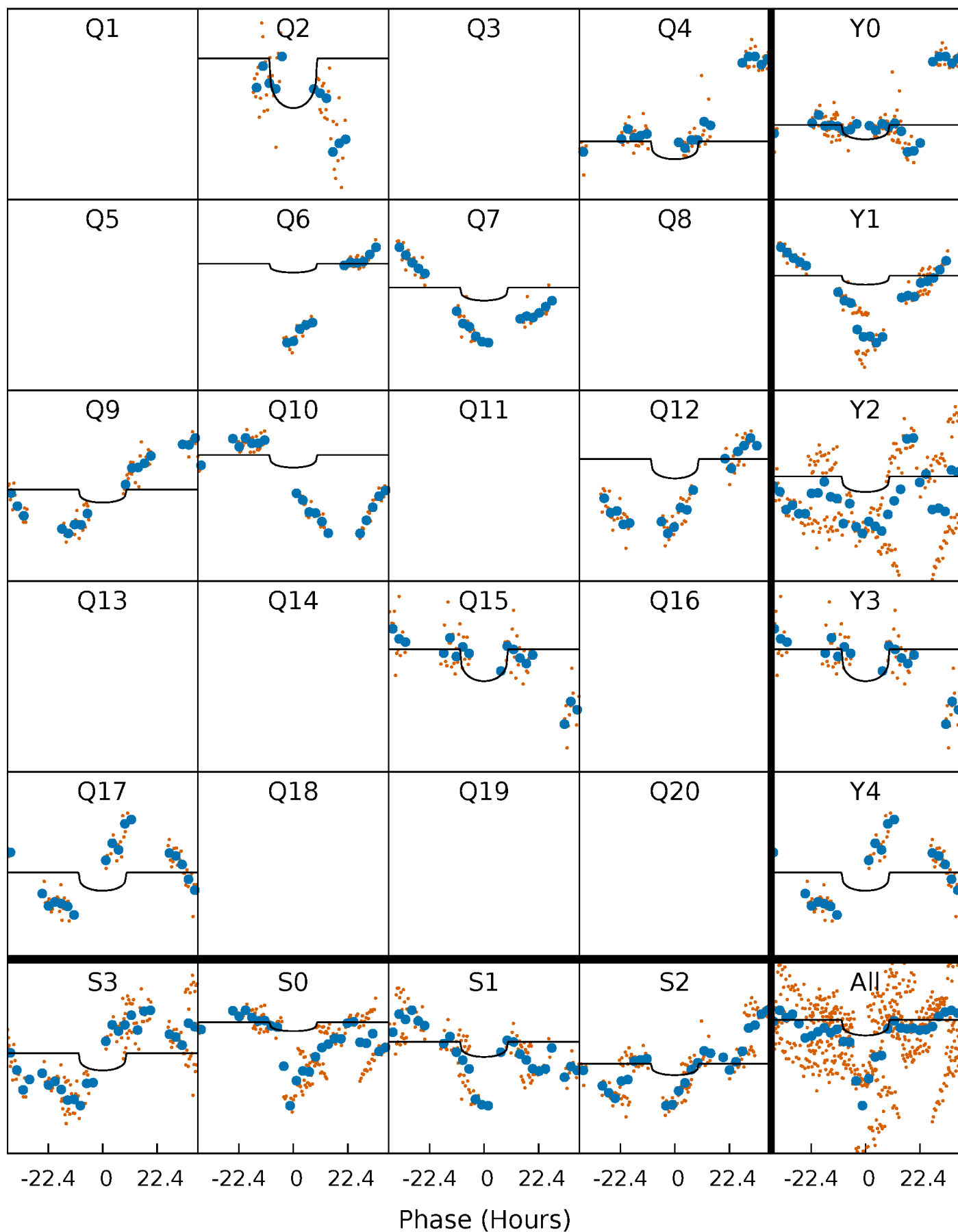
# PDC Quarter-Phased Transit Curves

TCE 005475641-09     $P=147.912710$  Days     $T_0=257.518469$  (BKJD)



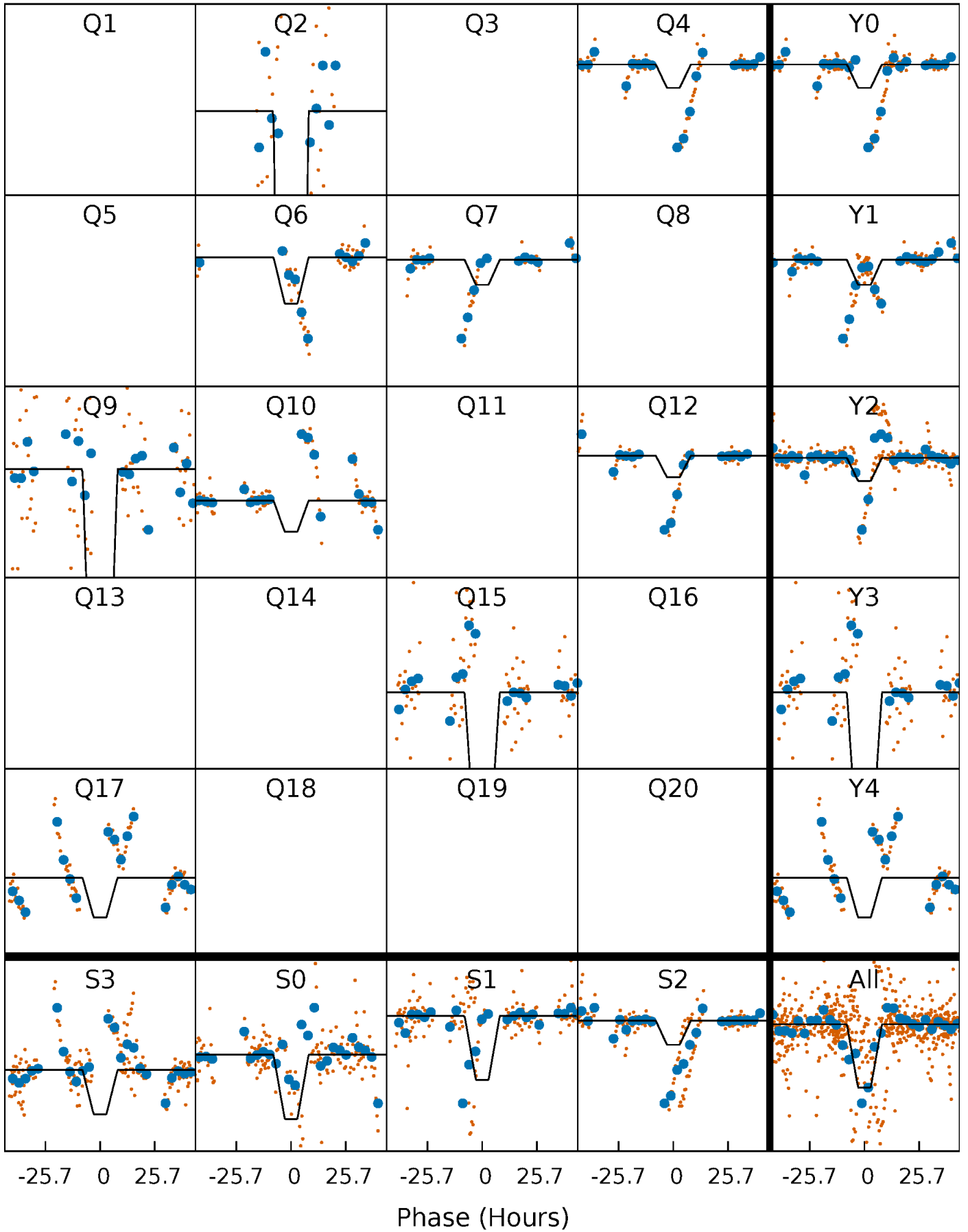
# DV Quarter-Phased Transit Curves

TCE 005475641-09     $P=147.912710$  Days     $T_0=257.518469$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

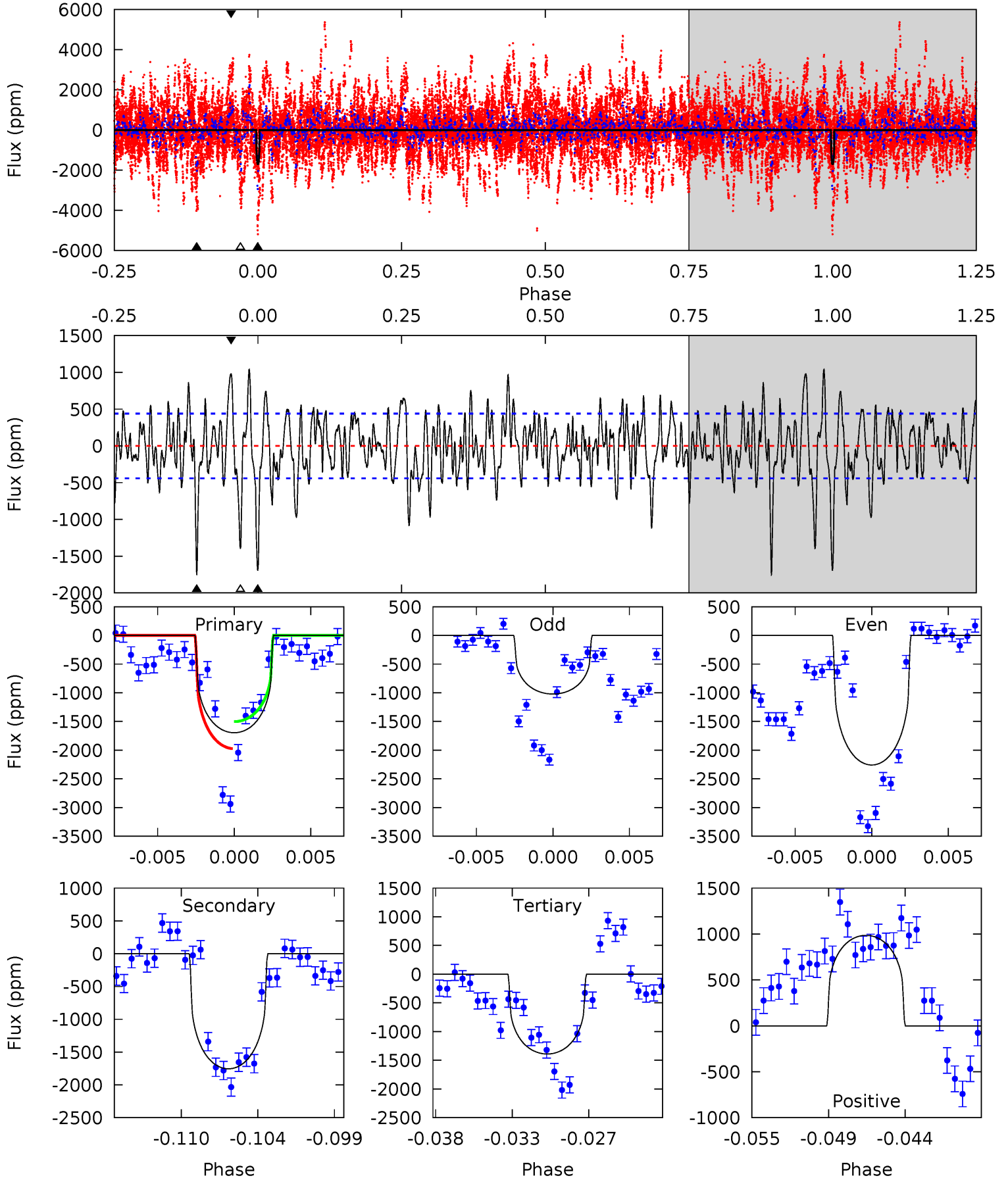
TCE 005475641-09     $P=147.898107$  Days     $T_0=257.523550$  (BKJD)



# DV Model-Shift Uniqueness Test

005475641-09, P = 147.912710 Days, E = 109.605759 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
19.8	20.5	16.2	11.5	5.14	2.78	4.12	3.57	8.30	4.26	8.99	6.95	0.99	0.37	2.72

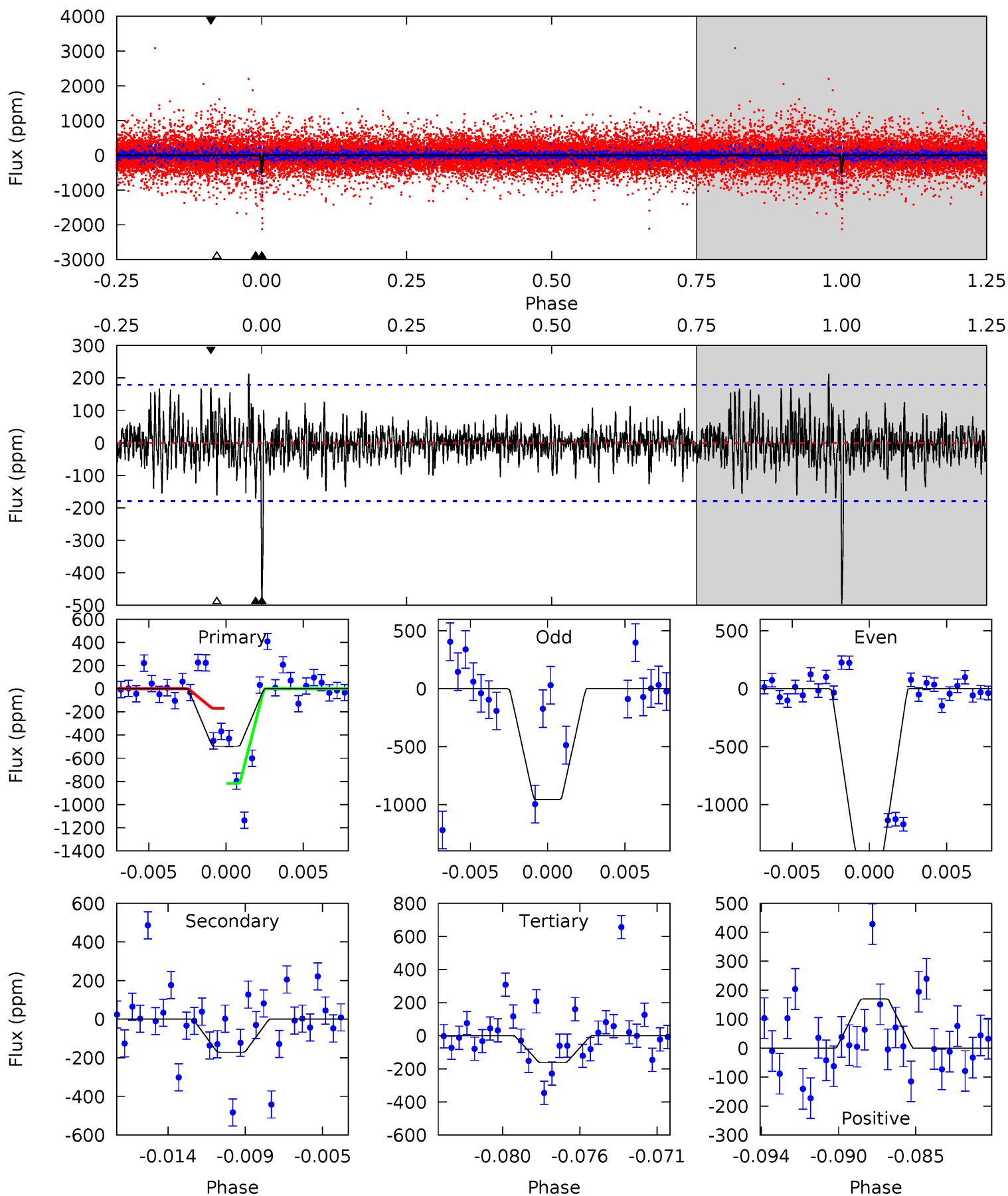




# Alt Model-Shift Uniqueness Test

005475641-09, P = 147.898107 Days, E = 109.625443 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
14.3	4.94	4.66	4.90	5.17	2.83	1.21	9.65	9.41	0.27	0.04	5.65	-35.2	0.30	9.25



### Stellar Parameters For KIC 005475641

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4999^{+151}_{-136}$	$4.523^{+0.078}_{-0.052}$	$-0.040^{+0.300}_{-0.300}$	$0.786^{+0.063}_{-0.079}$	$0.752^{+0.085}_{-0.057}$	$2.180^{+0.701}_{-0.371}$
	+3%/-3%	+2%/-1%	+750%/-750%	+8%/-10%	+11%/-8%	+32%/-17%
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 005475641-09 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-1755 \pm 86$	$1.86^{+1.30}_{-1.03}$	$387^{+15}_{-13}$	$6863^{+5041}_{-1592}$	$70744^{+296272}_{-46619}$
Alt.	$-171 \pm 35$	$3.20^{+1.35}_{-1.27}$	$385^{+14}_{-13}$	$3412^{+665}_{-352}$	$2272^{+4324}_{-1153}$

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

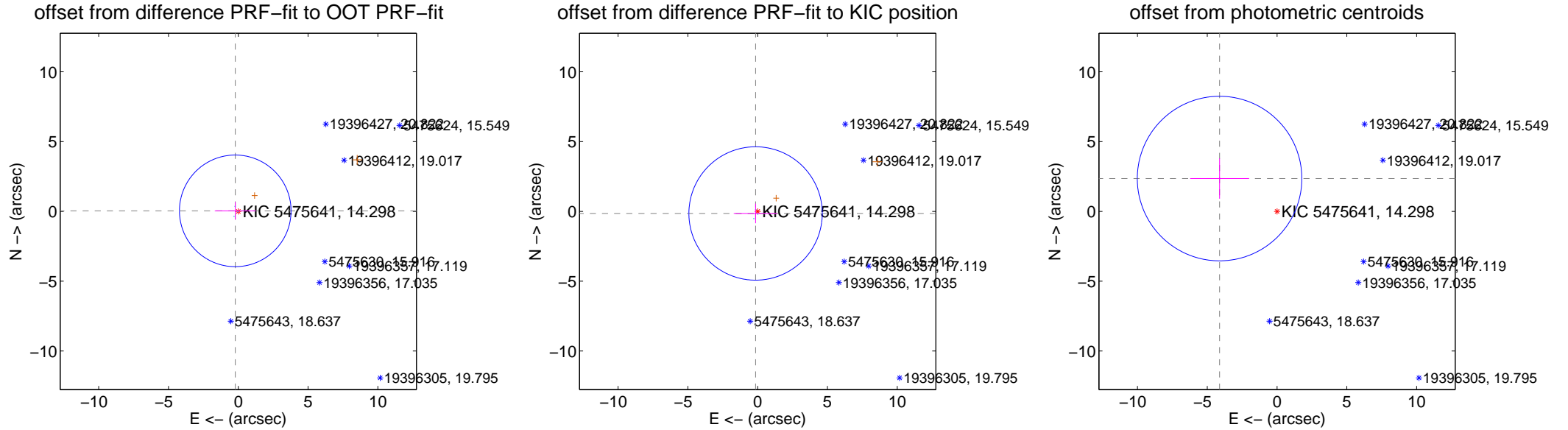
## DV Centroid Data

Supplemental centroid analysis for 005475641-09. Kepler magnitude: 14.30. Transit SNR 4.65

There are 3 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.15 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.220 \pm 1.333$	0.17	$0.217 \pm 1.467$	$0.040 \pm 0.631$
PRF-fit source offset from KIC position	$0.211 \pm 1.593$	0.13	$0.150 \pm 1.560$	$-0.149 \pm 0.700$
photometric centroid source offset	$4.74 \pm 1.96$	2.41	$4.12 \pm 2.11$	$2.35 \pm 1.44$



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.

Q1 no difference image



Q1 no OOT image



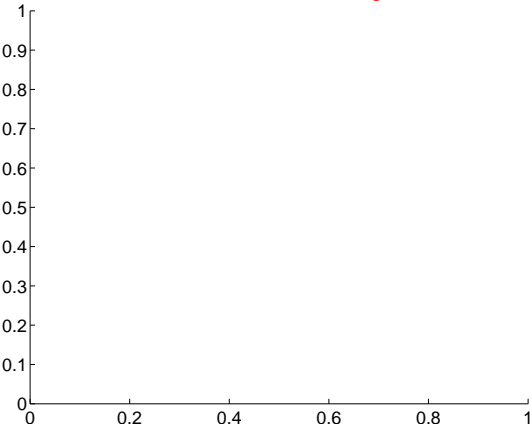
Q2 no difference image



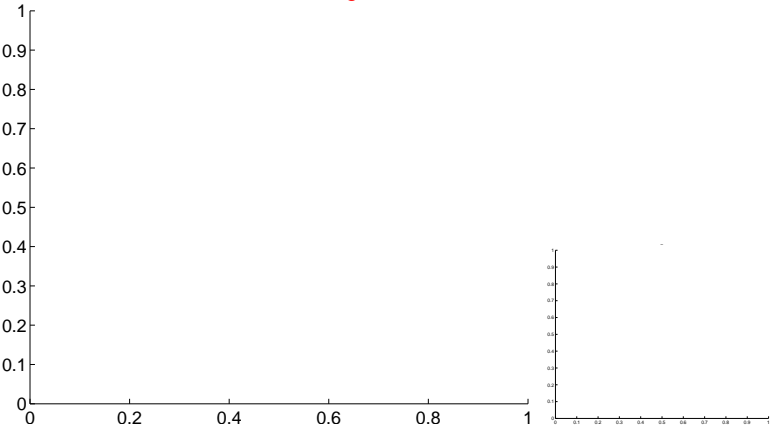
Q2 no OOT image



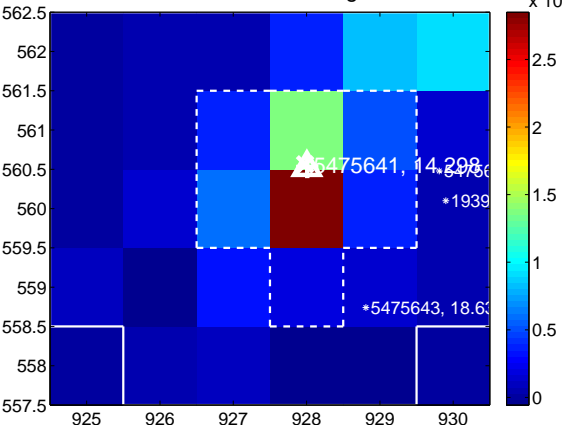
Q3 no difference image



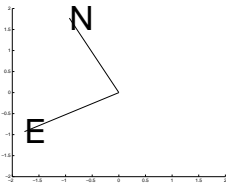
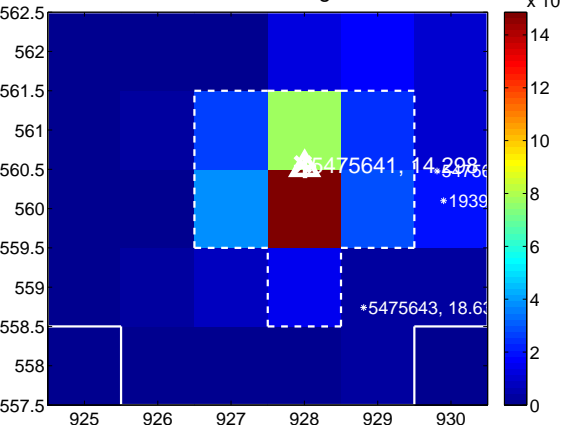
Q3 no OOT image



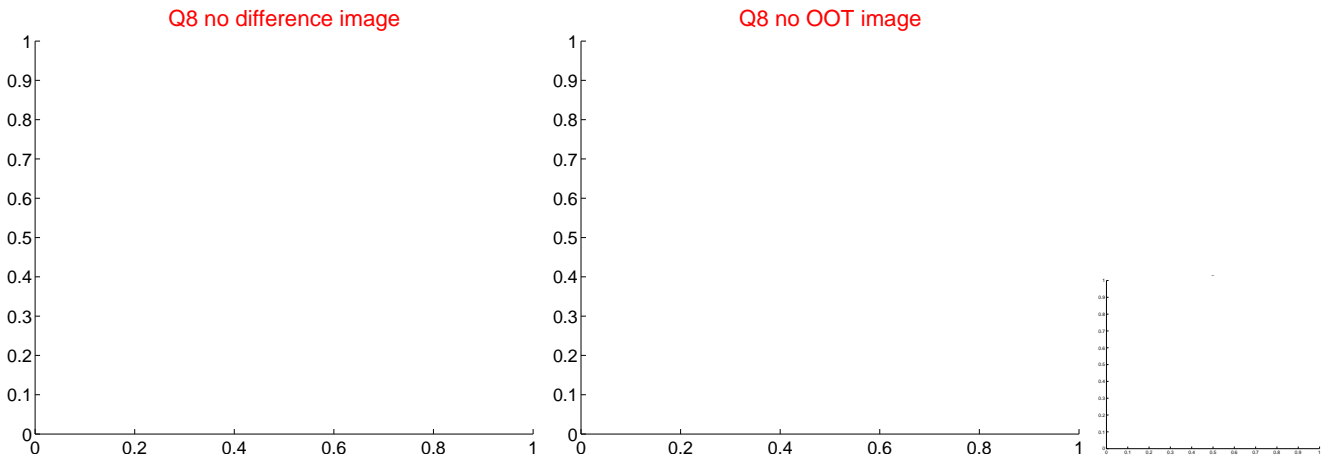
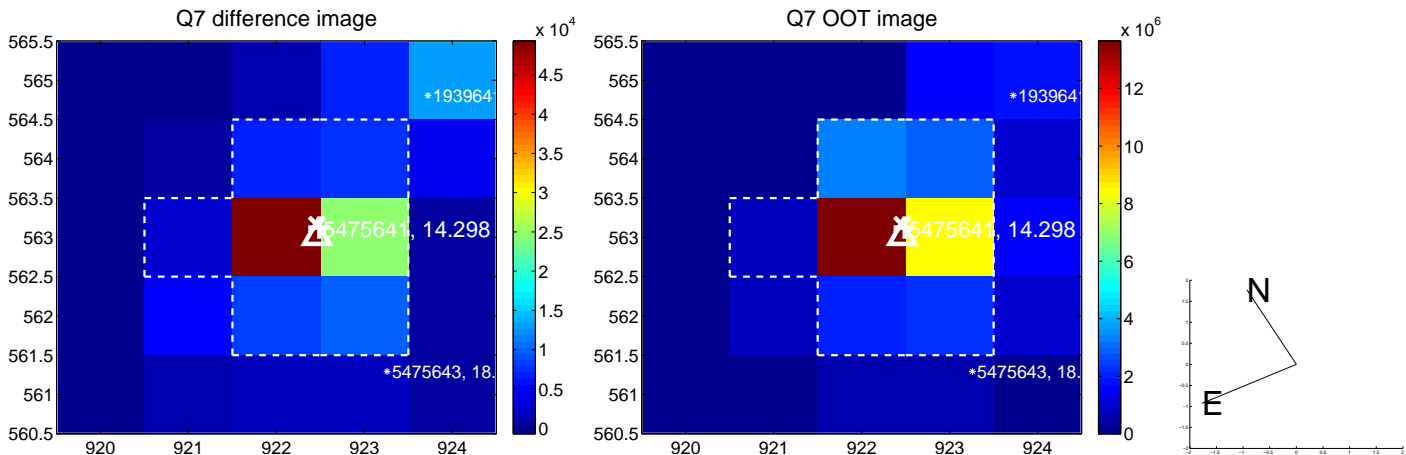
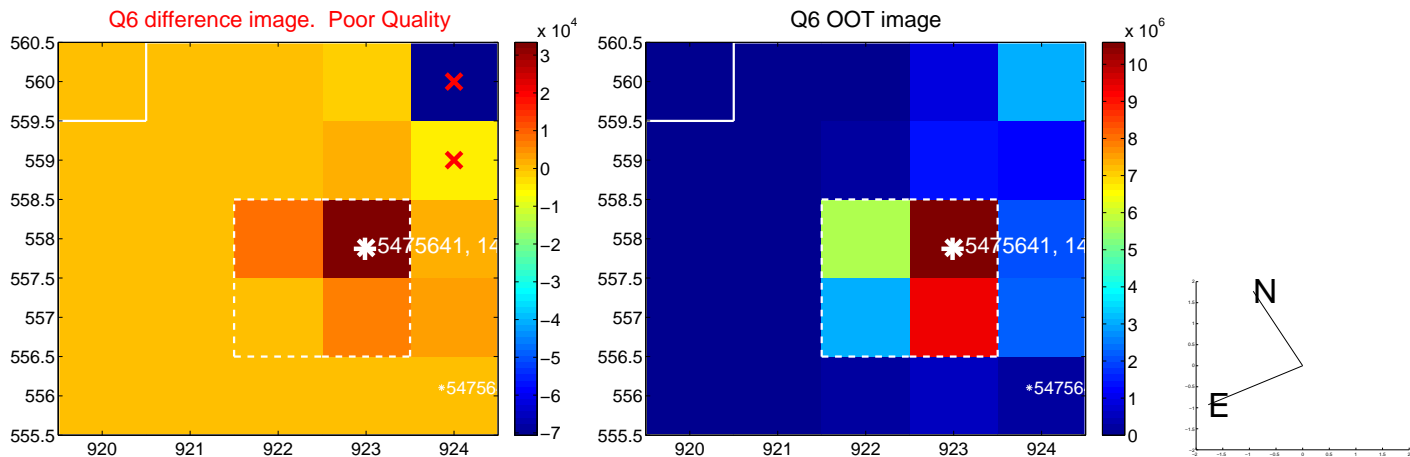
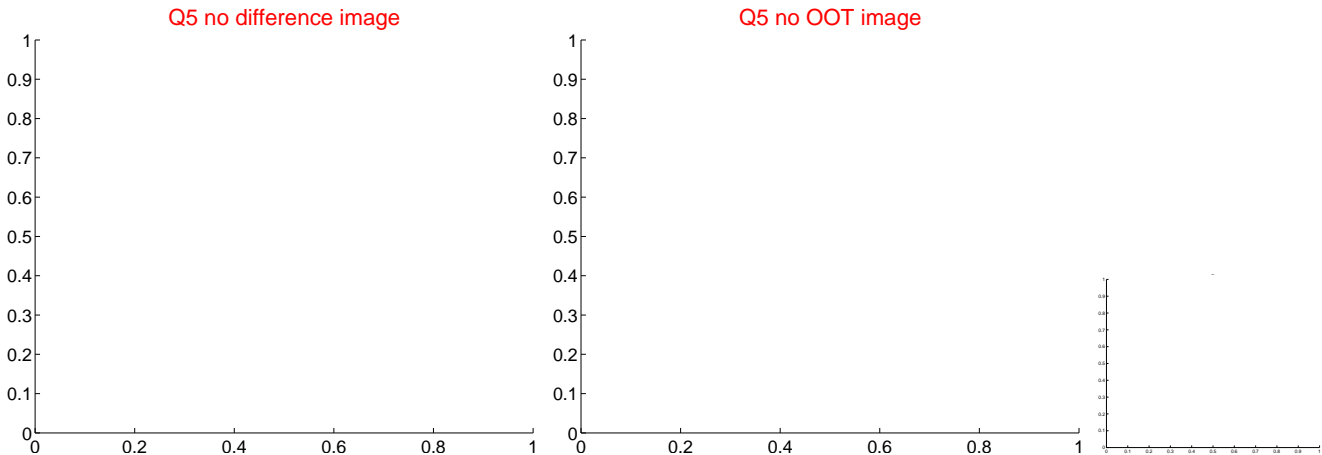
Q4 difference image



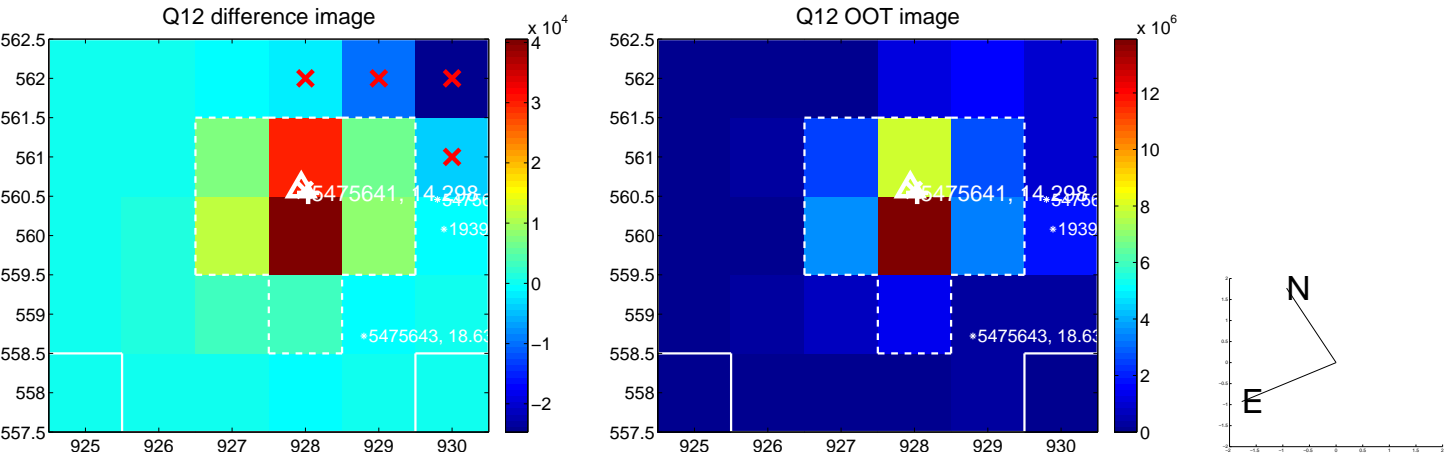
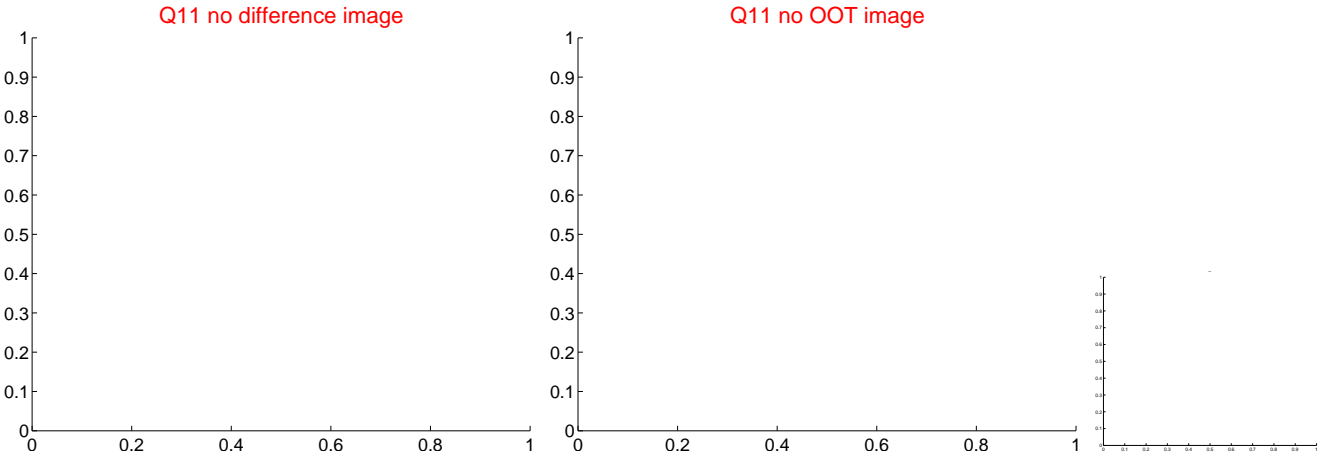
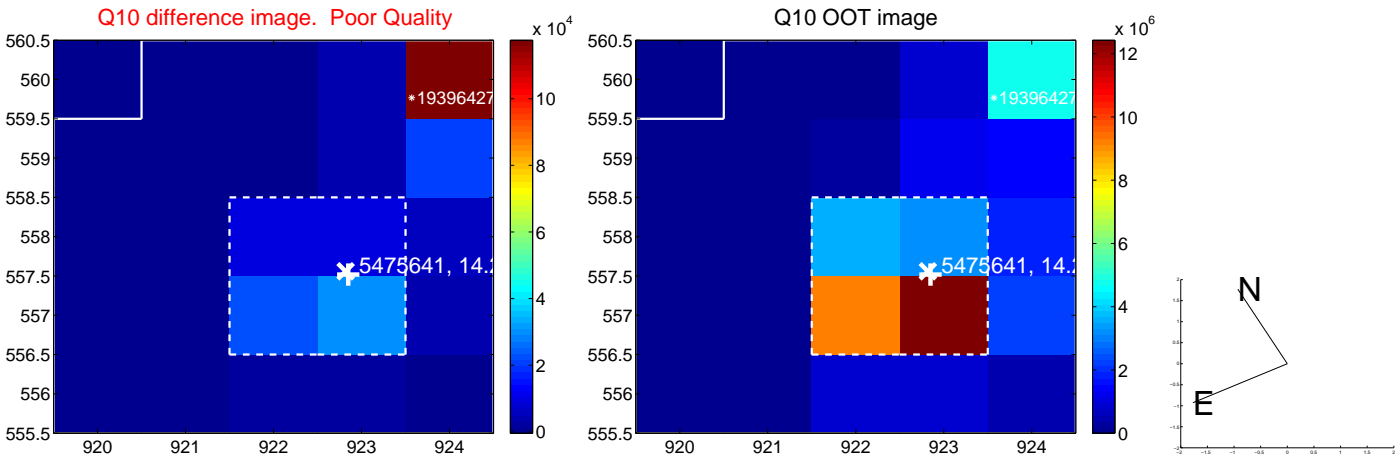
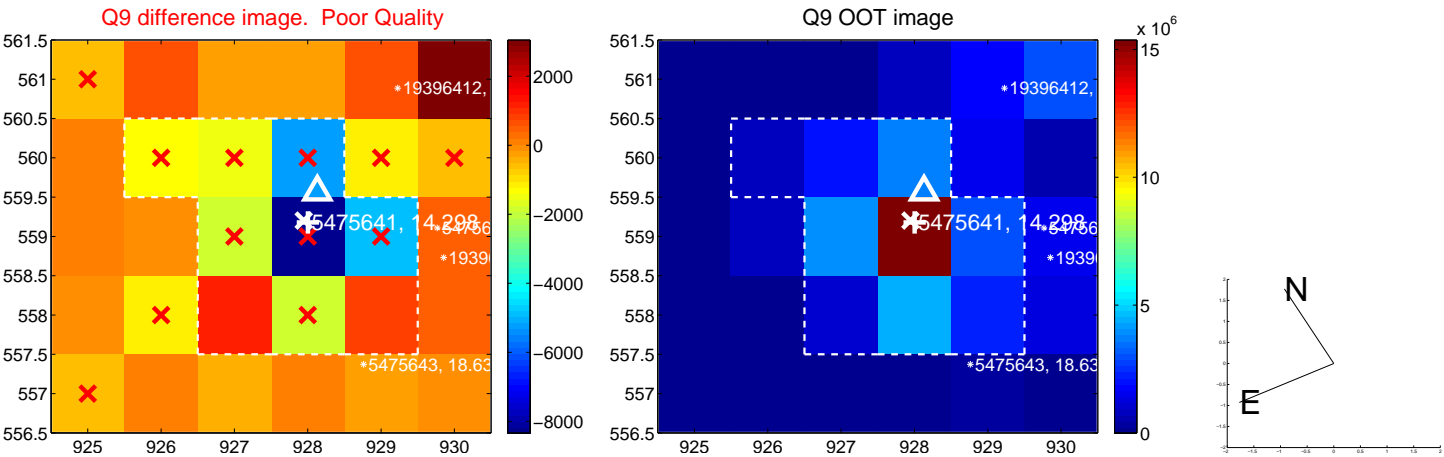
Q4 OOT image



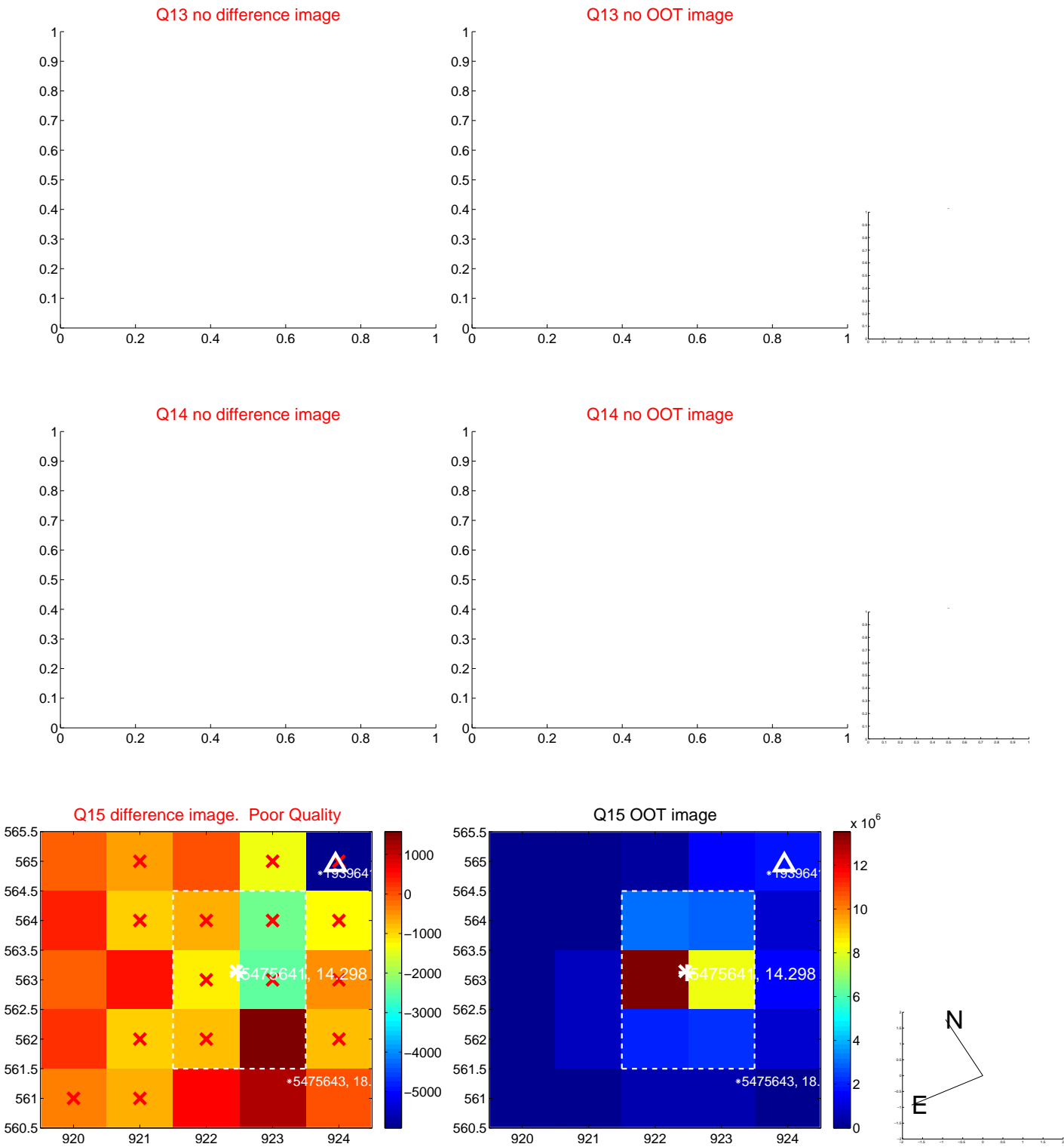
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value



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



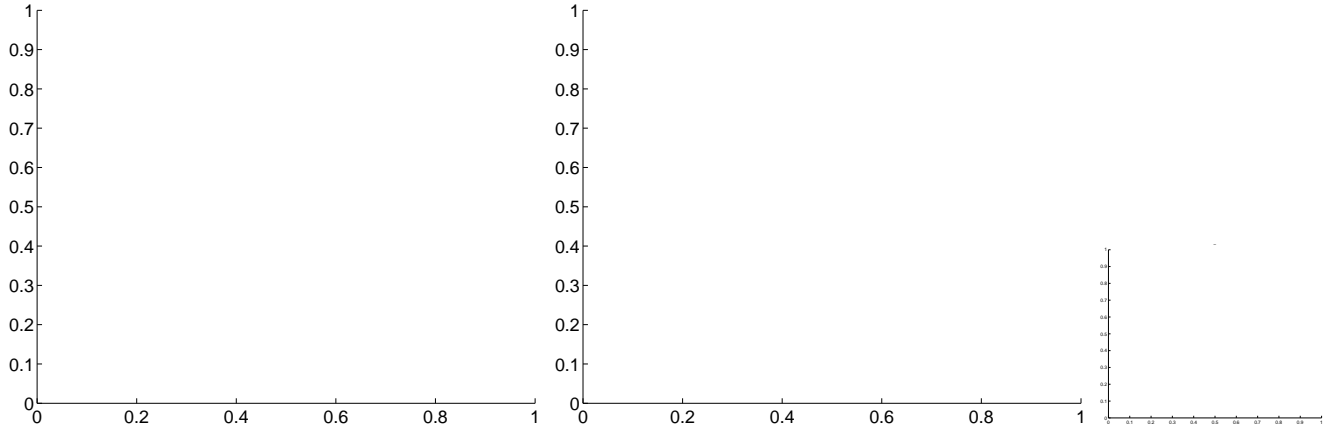
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



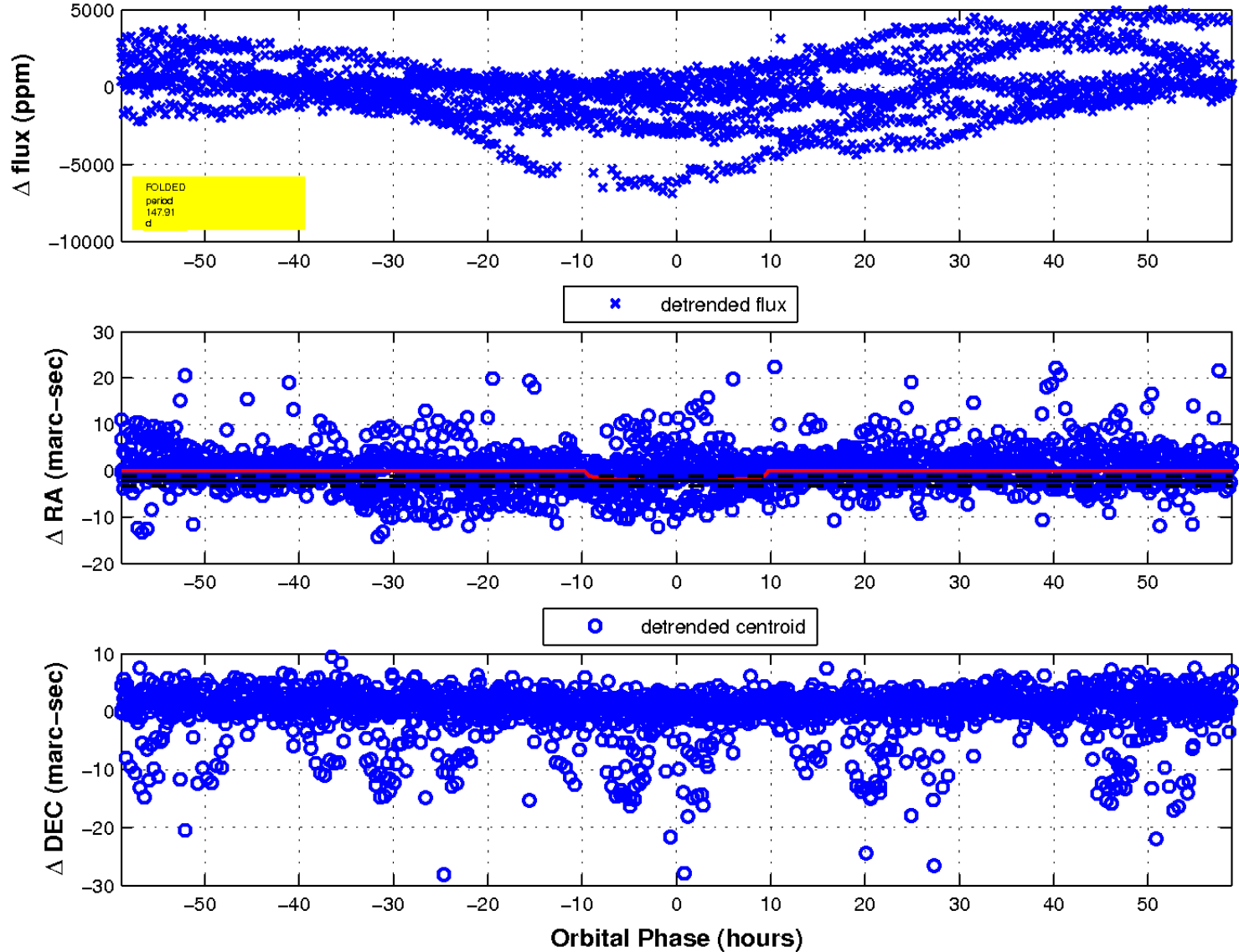
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

Q17 no difference image

Q17 no OOT image



fluxWeightedCentroids, Planet 9 of 10





UKIRT Image

Declination

