

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008882561-01	OBS	No	1.514201	131.737652	22.8	8.481	8.2	9.1	3.99	6883	2.63	29149.21
008882561-02	OBS	No	601.244806	376.846737	316.0	50.859	14.8	8.2	3.99	6883	8.76	9.99
008882561-03	OBS	No	116.422525	143.577886	272.5	2.242	10.4	9.2	3.99	6883	7.27	89.16
008882561-04	OBS	No	260.182597	343.643718	233.8	26.146	9.6	9.2	3.99	6883	6.57	30.51
008882561-05	OBS	No	150.633582	152.436456	294.4	5.530	9.7	10.3	3.99	6883	8.88	63.24
008882561-06	OBS	No	77.374847	162.329719	299.9	3.243	9.2	10.3	3.99	6883	11.25	153.72
008882561-07	OBS	No	18.718323	141.178432	101.8	6.533	8.9	9.7	3.99	6883	4.60	1019.80
008882561-08	OBS	No	426.915106	225.078632	241.7	5.371	8.7	9.3	3.99	6883	6.96	15.77
008882561-09	OBS	No	150.401601	210.659704	277.3	2.596	8.6	9.4	3.99	6883	7.70	63.37

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008882561-01	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV—CENT_SATURATED
008882561-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_SATURATED
008882561-03	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
008882561-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_SATURATED
008882561-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL_SKYE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
008882561-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
008882561-07	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED—HALO_GHOST
008882561-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—CENT_SATURATED
008882561-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED

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

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

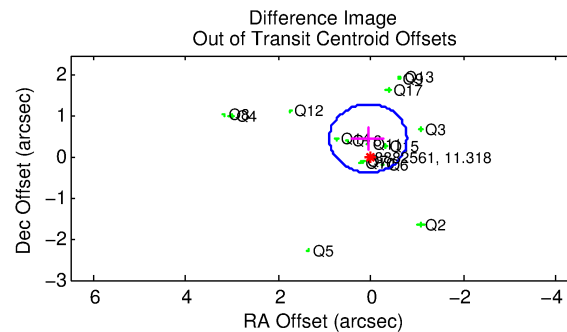
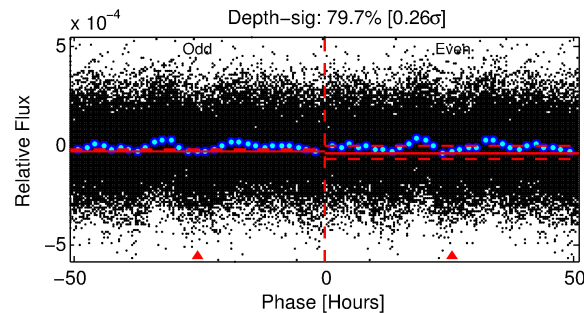
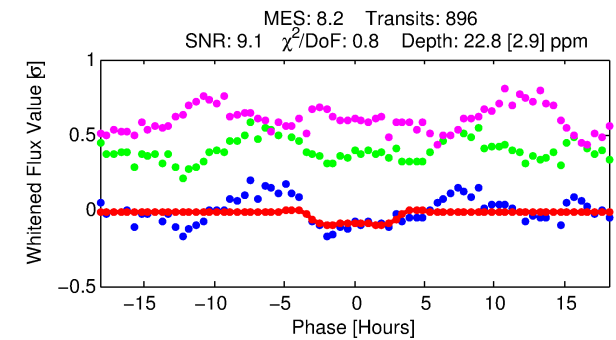
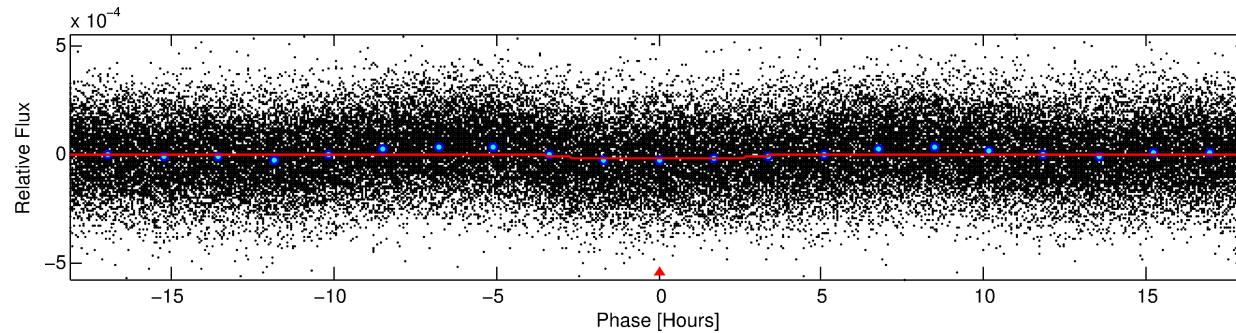
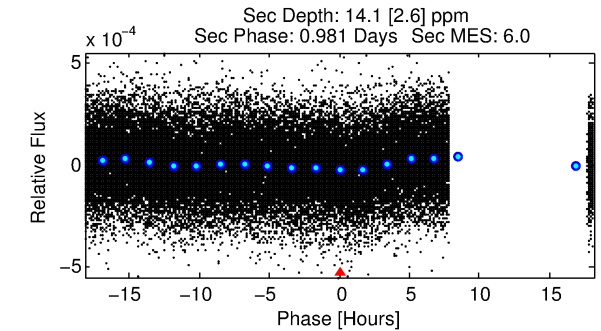
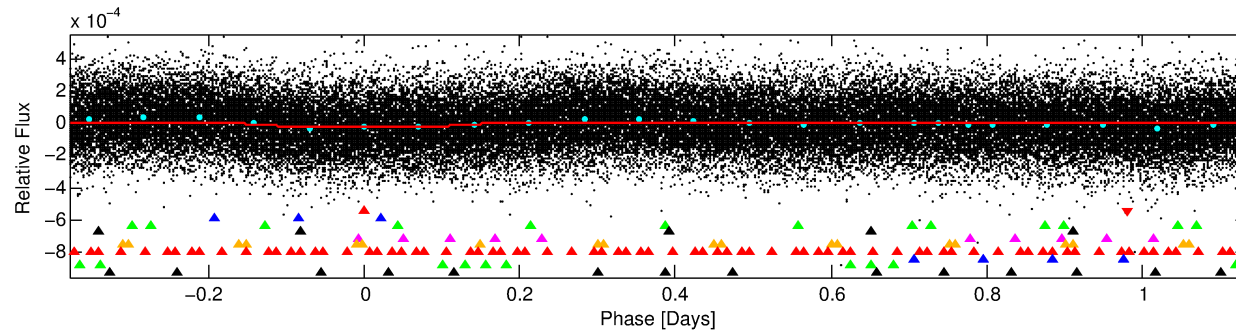
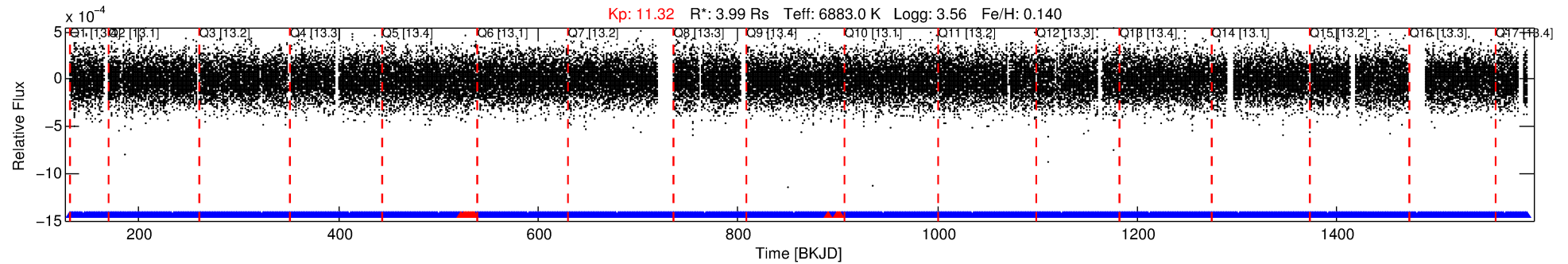
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 008882561-01

No Significant Match Found

# DV One-Page Summary

KIC: 8882561 Candidate: 1 of 10 Period: 1.514 d



## DV Fit Results:

Period = 1.51420 [0.00003] d  
Epoch = 131.7377 [0.0119] BKJD  
 $R_p/R^* = 0.0060$  [0.0004]  
 $a/R^* = 1.02$  [0.01]  
 $b = 0.99$  [0.00]  
 $S_{\text{eff}} = 29149.21$  [15083.09]  
 $T_{\text{eq}} = 3332$  [431] K  
 $R_p = 2.63$  [0.95]  $R_e$   
 $a = 0.0332$  [0.0107] AU  
 $A_g = 1.23$  [0.68] [0.34σ]  
 $T_{\text{eff}} = 5429$  [361] K [3.73σ]

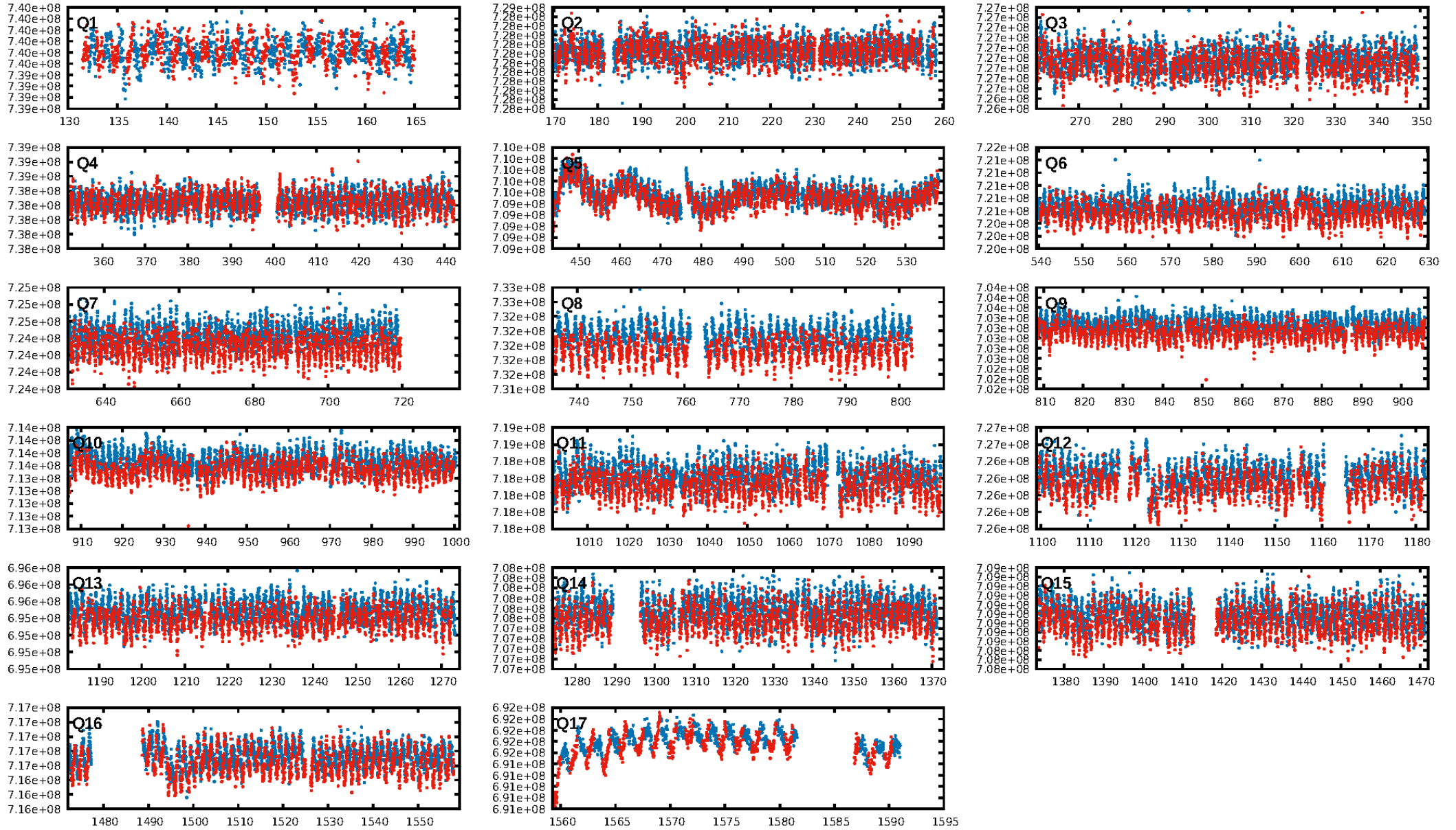
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [38.57σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 0.98 [842/855]  
**GhostDiagnostic-chr: 0.6561**  
Centroid-sig: 1.6%  
Centroid-so: 0.786 arcsec [1.84σ]  
OotOffset-rm: 0.470 arcsec [1.68σ]  
KicOffset-rm: 0.412 arcsec [1.37σ]  
OotOffset-st: 4/4/4/4 [16]  
KicOffset-st: 4/4/4/4 [16]  
DiffImageQuality-fgm: 0.94 [15/16]  
DiffImageOverlap-fno: 1.00 [17/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 21:26:26 Z

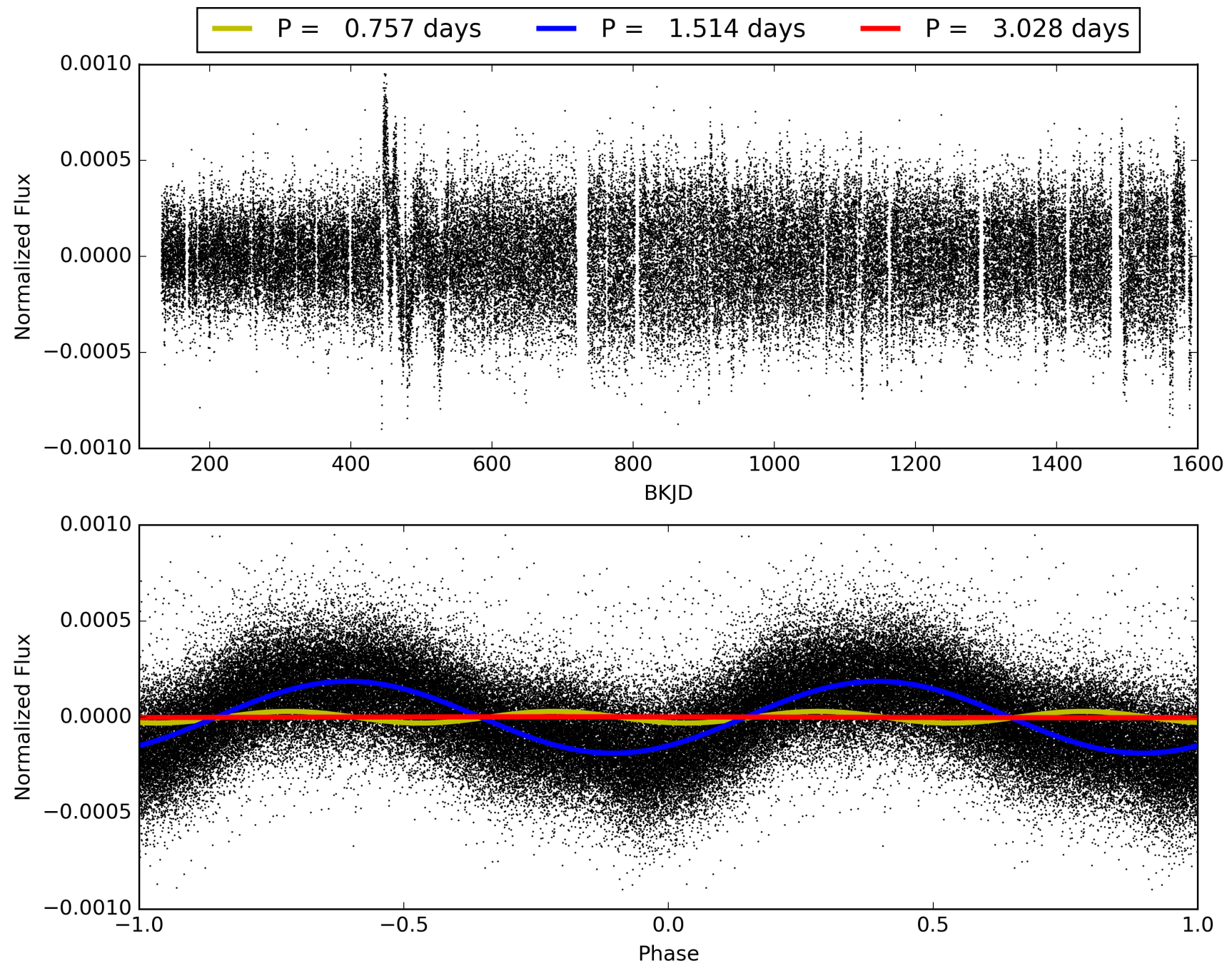
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 008882561-01, PDC Light Curves





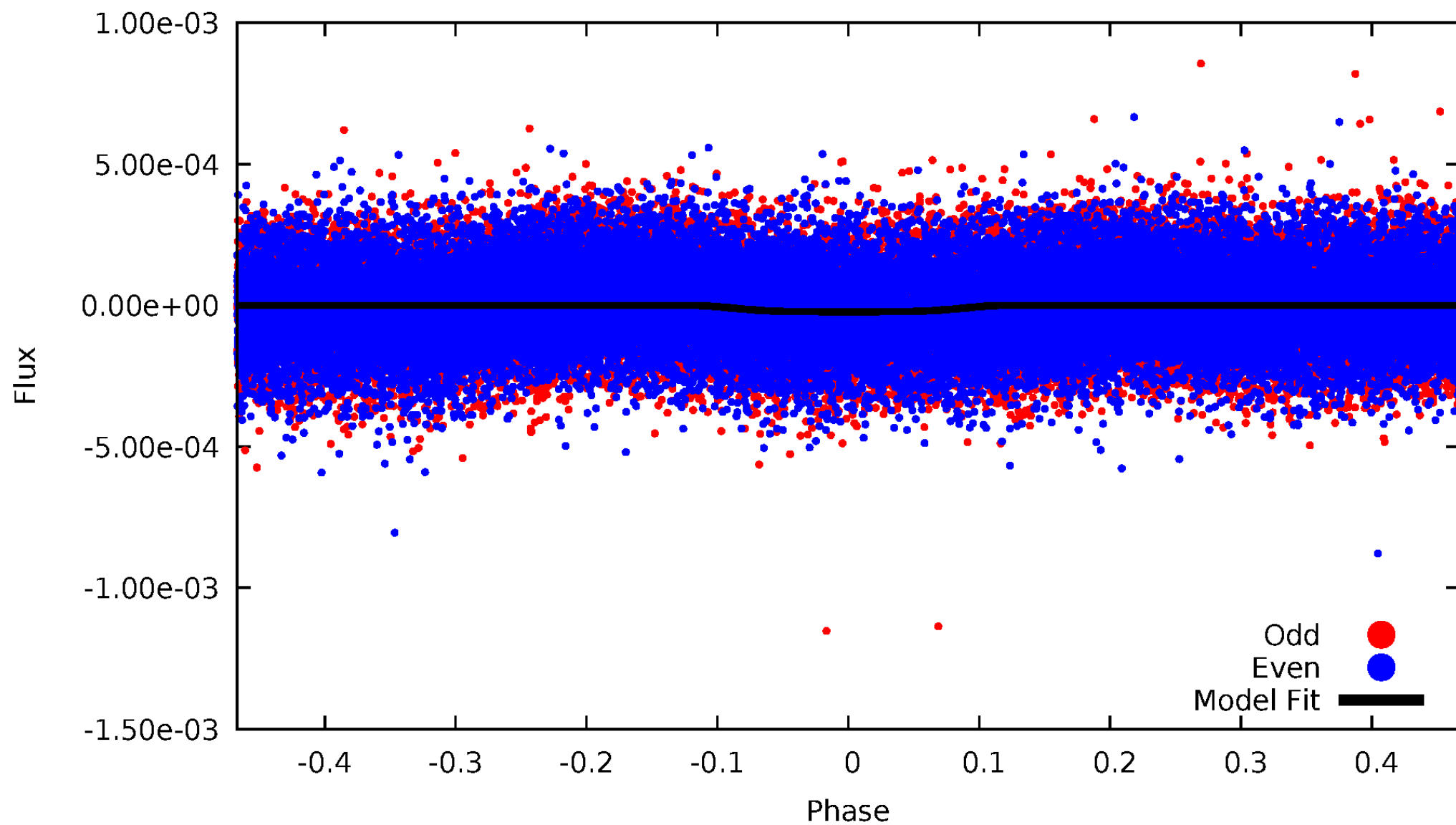
TCE 008882561-01





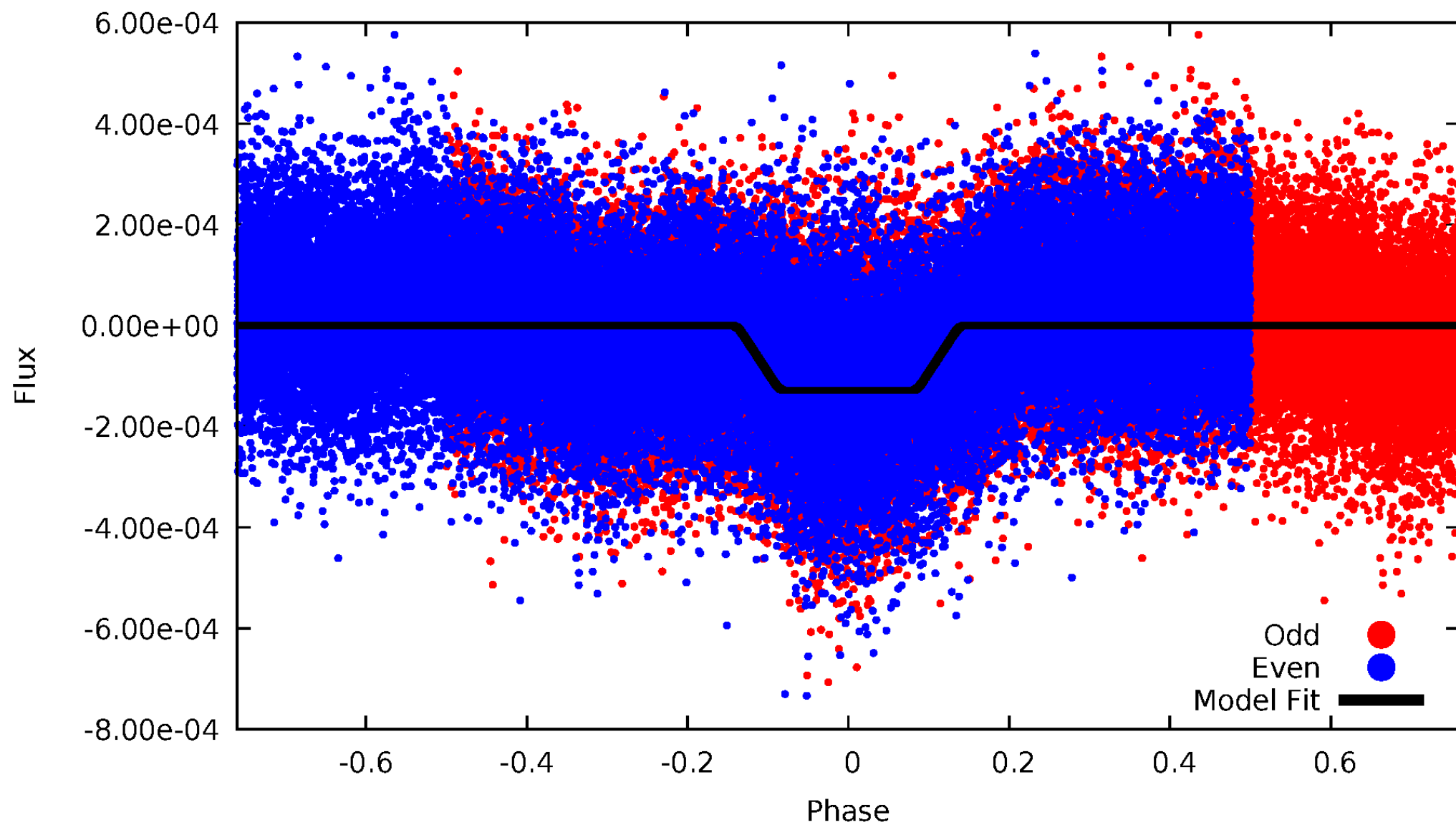
# DV Odd/Even

TCE 008882561-01

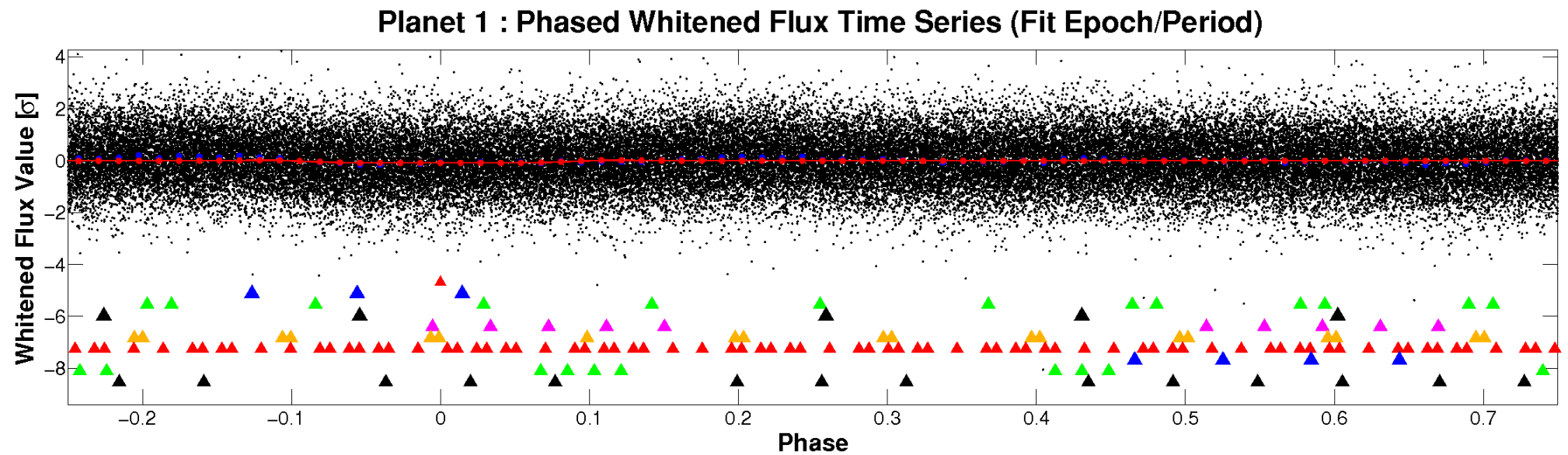
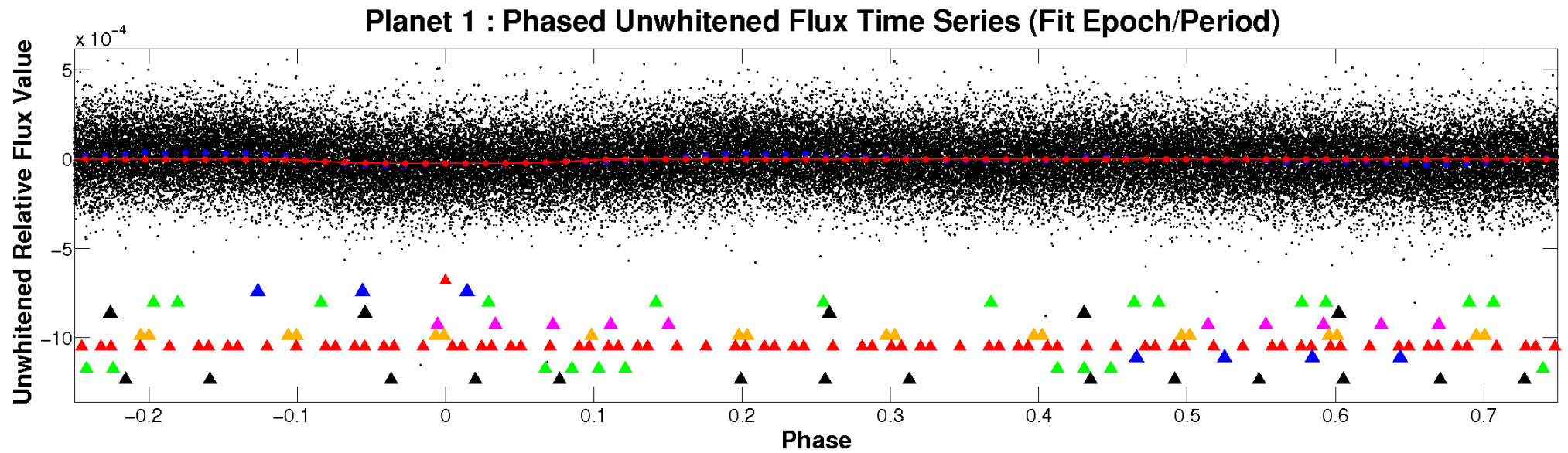


# ALT Odd/Even

TCE 008882561-01



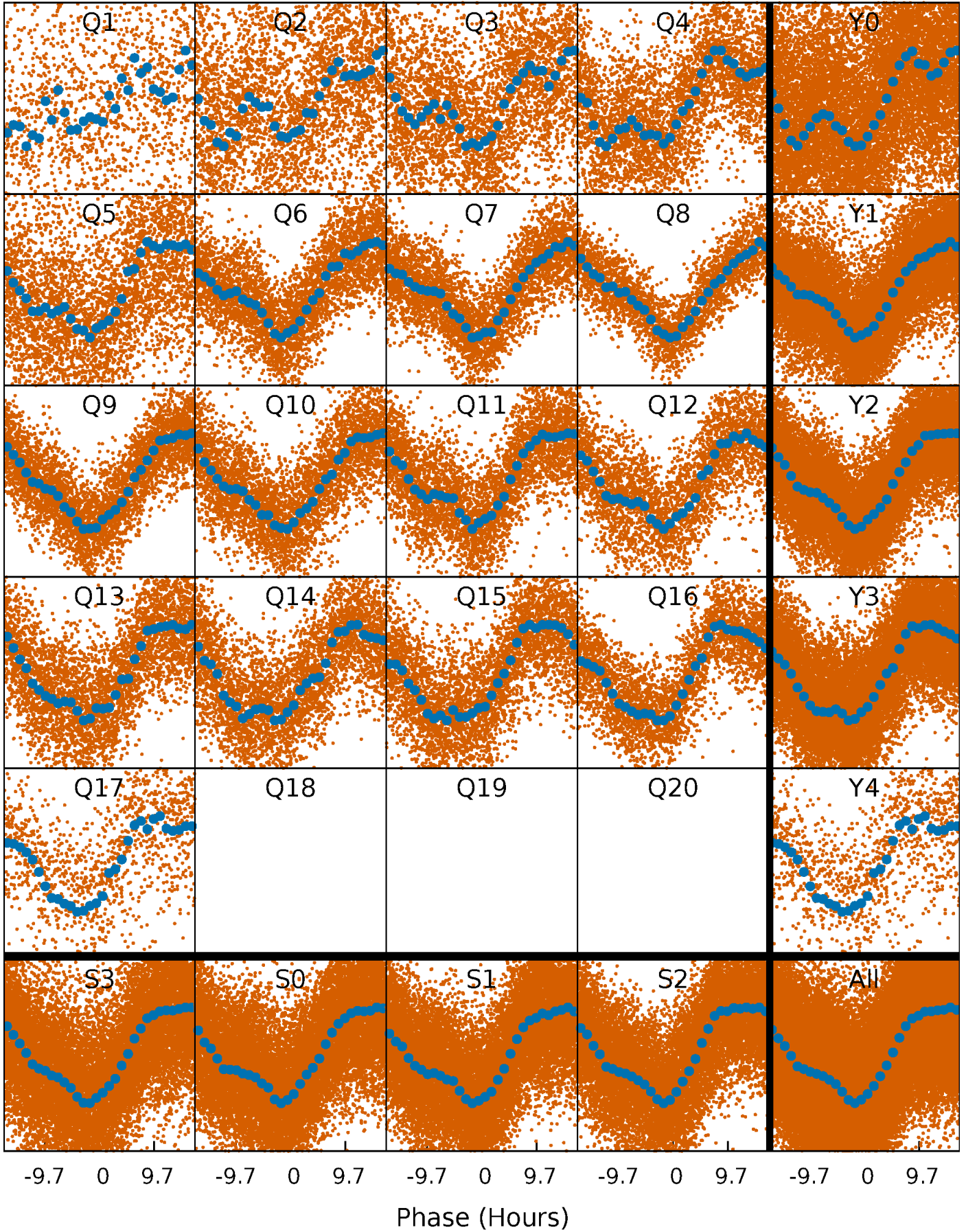
# Non-Whitened Vs. Whitened Light Curve





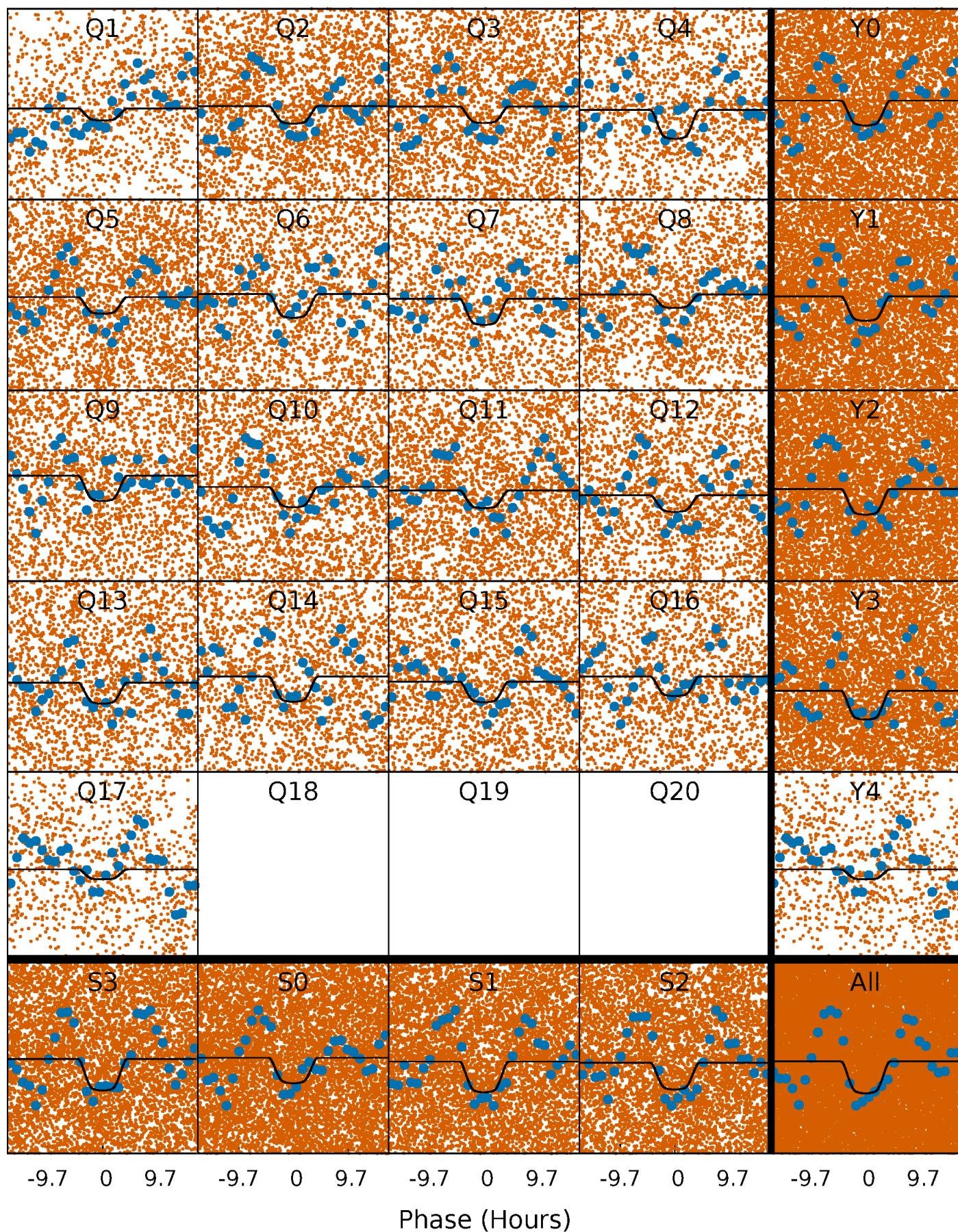
# PDC Quarter-Phased Transit Curves

TCE 008882561-01   P= 1.514201 Days    $T_0=131.737652$  (BKJD)



# DV Quarter-Phased Transit Curves

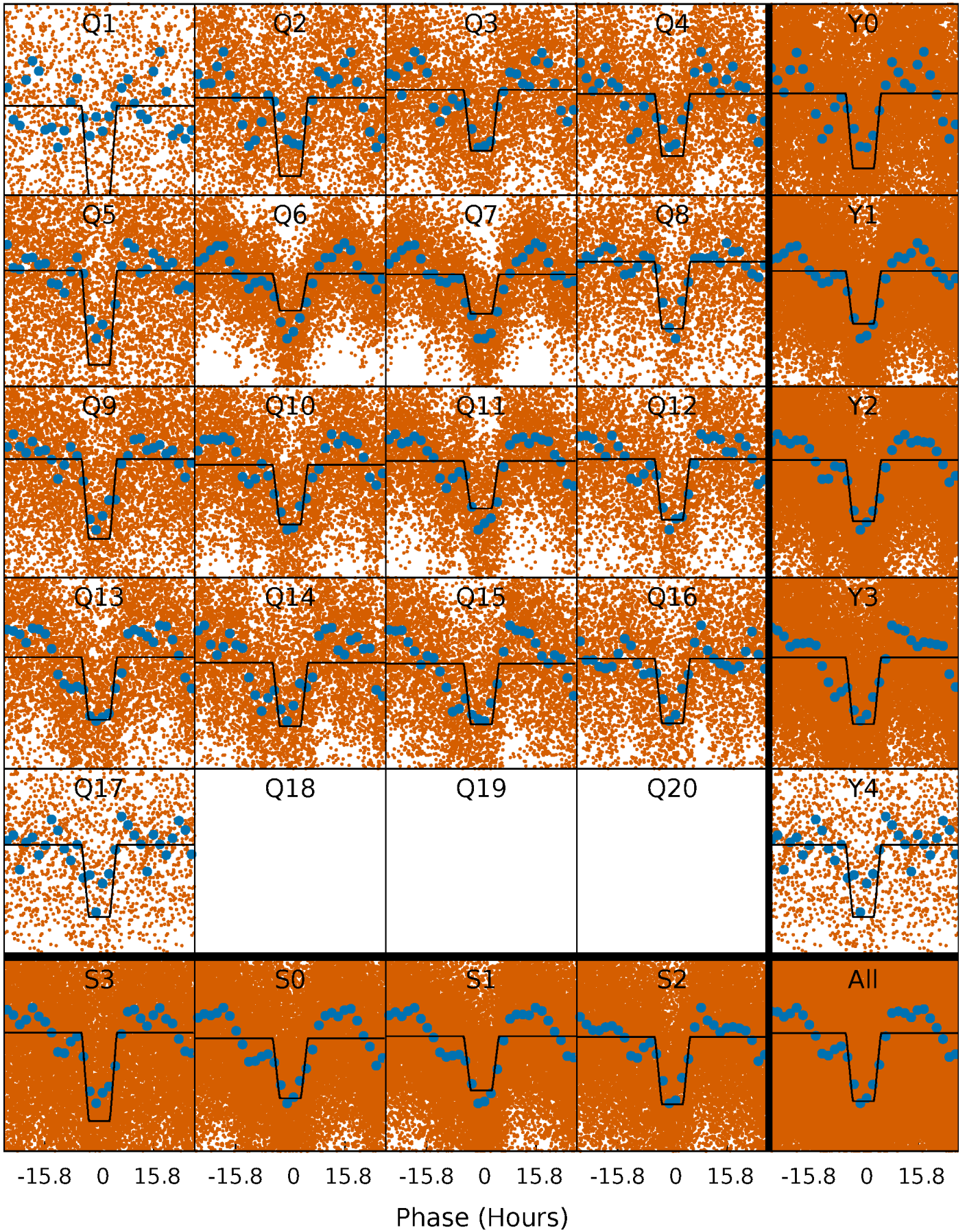
TCE 008882561-01 P= 1.514201 Days  $T_0=131.737652$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

TCE 008882561-01 P= 1.514229 Days  $T_0=131.698705$  (BKJD)

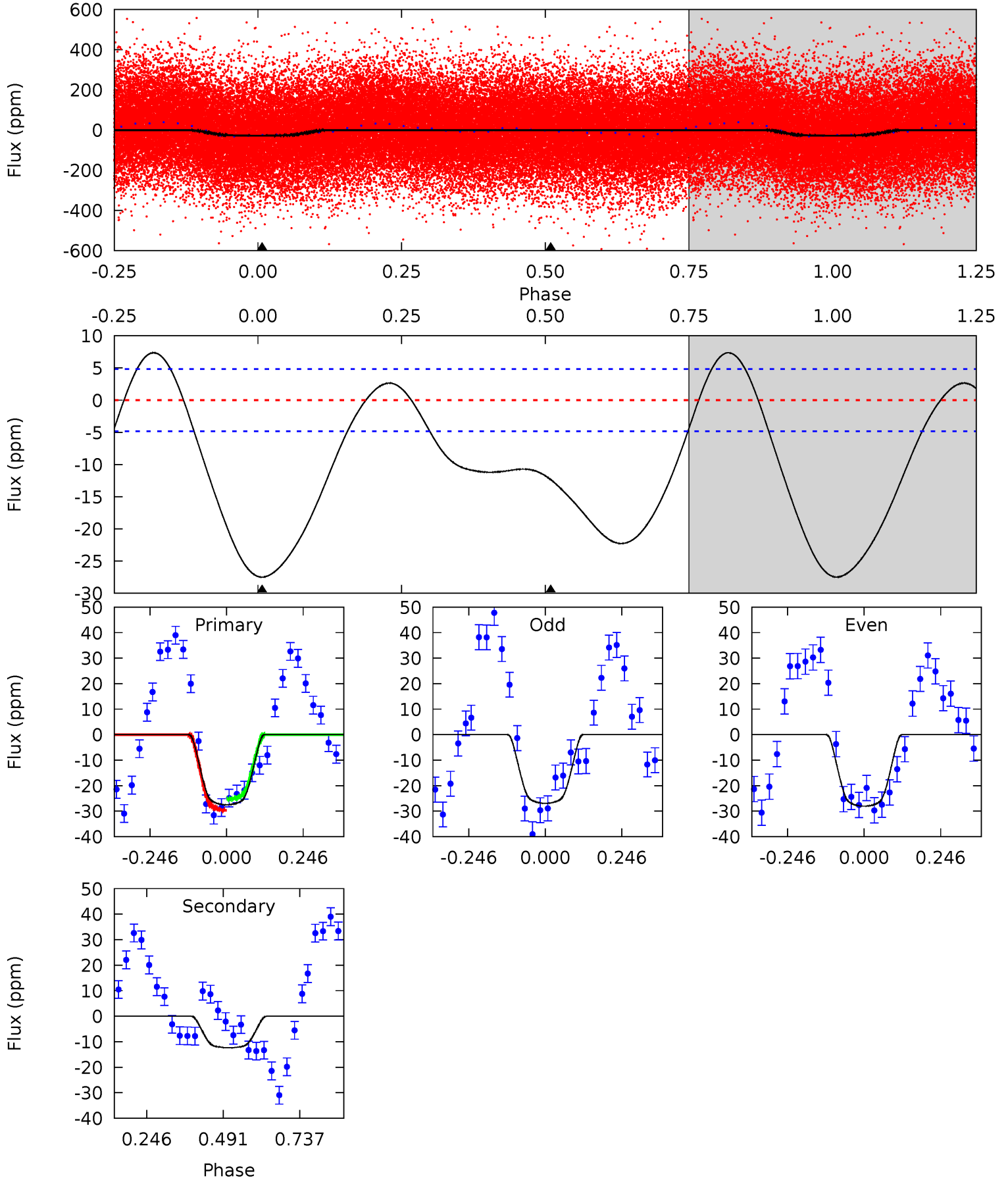




# DV Model-Shift Uniqueness Test

008882561-01, P = 1.514201 Days, E = 130.223451 Days

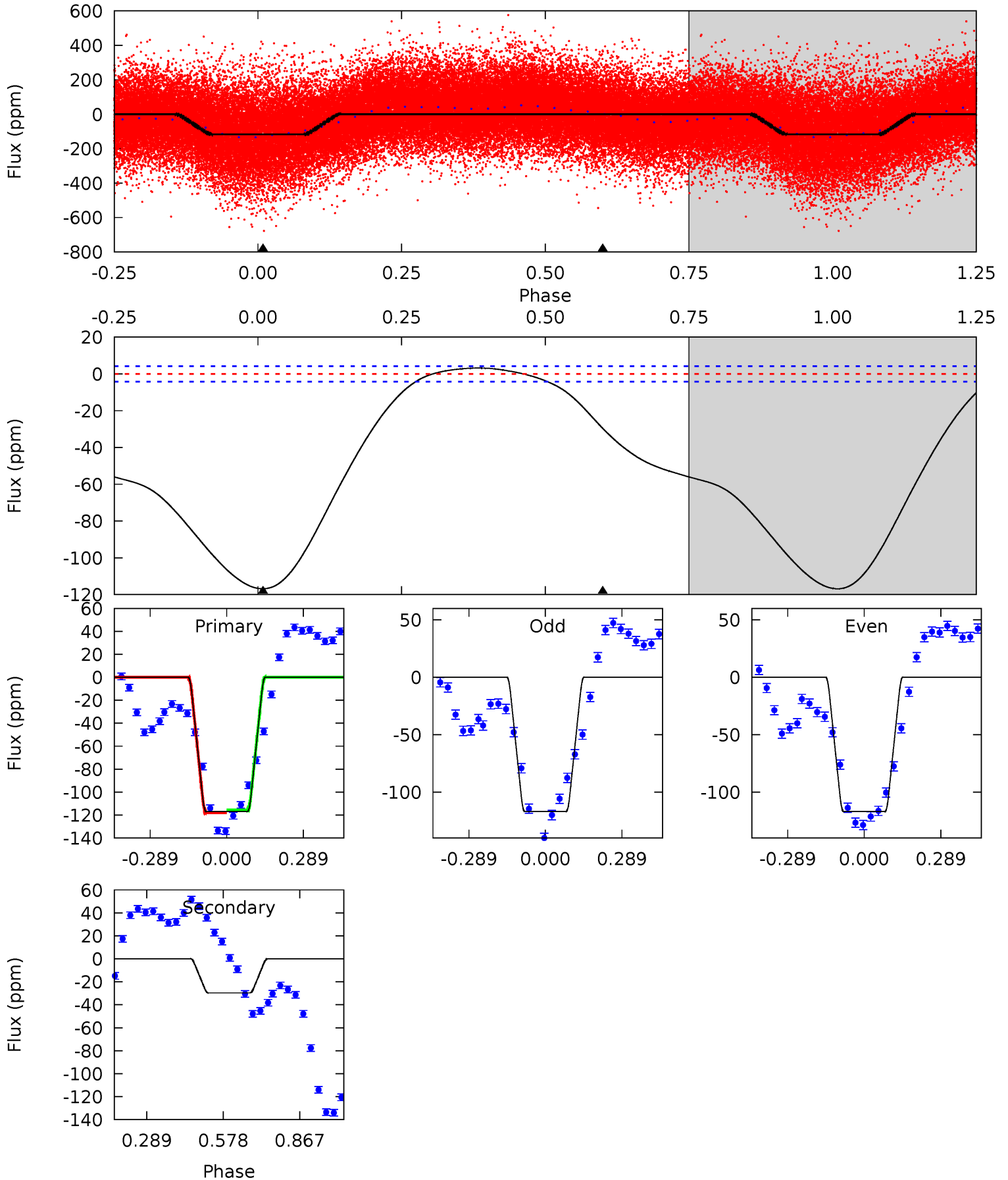
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
24.9	11.2	0	0	4.37	1.16	2.74	24.9	24.9	11.2	11.2	0.51	0.97	0.21	1.97



# Alt Model-Shift Uniqueness Test

008882561-01, P = 1.514229 Days, E = 130.184476 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
121.3	30.8	0	0	4.34	1.06	3.42	121.3	121.3	30.8	30.8	0.02	1.03	0.03	1.26



### Stellar Parameters For KIC 008882561

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6883^{+153}_{-222}$	$3.562^{+0.288}_{-0.032}$	$0.140^{+0.200}_{-0.250}$	$3.993^{+0.249}_{-1.413}$	$2.119^{+0.073}_{-0.416}$	$0.047^{+0.093}_{-0.006}$
	+2%/-3%	+8%/-1%	+143%/-179%	+6%/-35%	+3%/-20%	+199%/-12%
Source	PHO1	FLK73	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 008882561-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-12 \pm 1$	$2.44^{+0.31}_{-0.45}$	$4492^{+234}_{-401}$	$4956^{+284}_{-270}$	$1.241^{+0.508}_{-0.279}$
Alt.	$-30 \pm 1$	$4.69^{+0.43}_{-0.82}$	$4522^{+220}_{-387}$	$4430^{+186}_{-177}$	$0.811^{+0.304}_{-0.127}$

$T_{max}$  = Theoretical Maximum Planetary Temperature

$T_{obs}$  = Observed Planetary Temperature (Assuming  $A=0.3$ )

$A_{obs}$  = Observed Albedo (Assuming  $T=0$ )

If a secondary eclipse is present, the system is likely an EB if  $T_{obs} \gg T_{max}$  AND  $A_{obs} \gg 1.0$



## DV Centroid Data

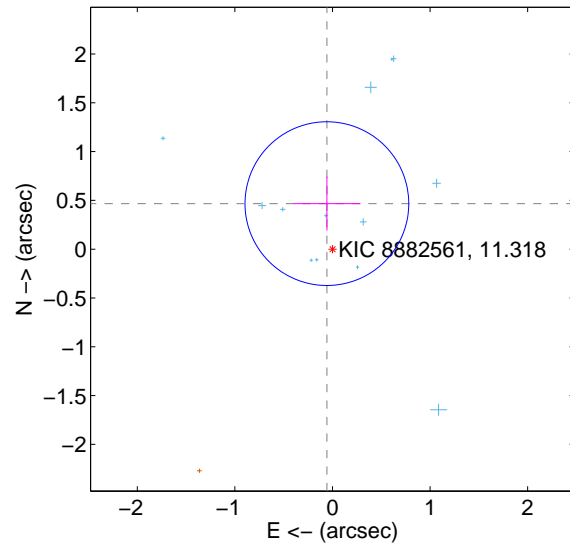
Supplemental centroid analysis for 008882561-01. **Kepler magnitude: 11.32.** Transit SNR 9.09

There are 15 quarters with good PRF difference image offsets

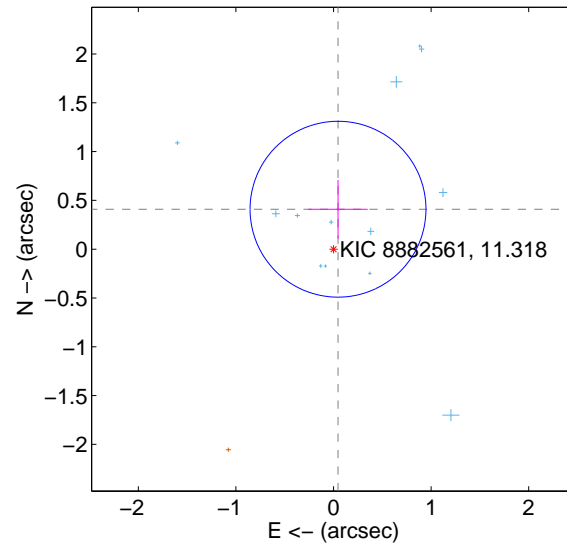
The direct PRF centroid is offset from the target star catalog position by about 0.26 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.470 \pm 0.280$	1.68	$0.057 \pm 0.344$	$0.467 \pm 0.276$
PRF-fit source offset from KIC position	$0.412 \pm 0.300$	1.37	$-0.046 \pm 0.304$	$0.410 \pm 0.300$
photometric centroid source offset	$0.79 \pm 0.43$	1.84	$0.65 \pm 0.43$	$0.44 \pm 0.41$

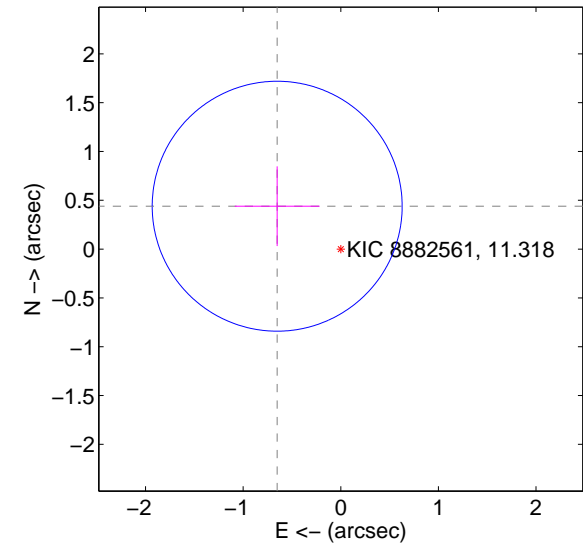
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

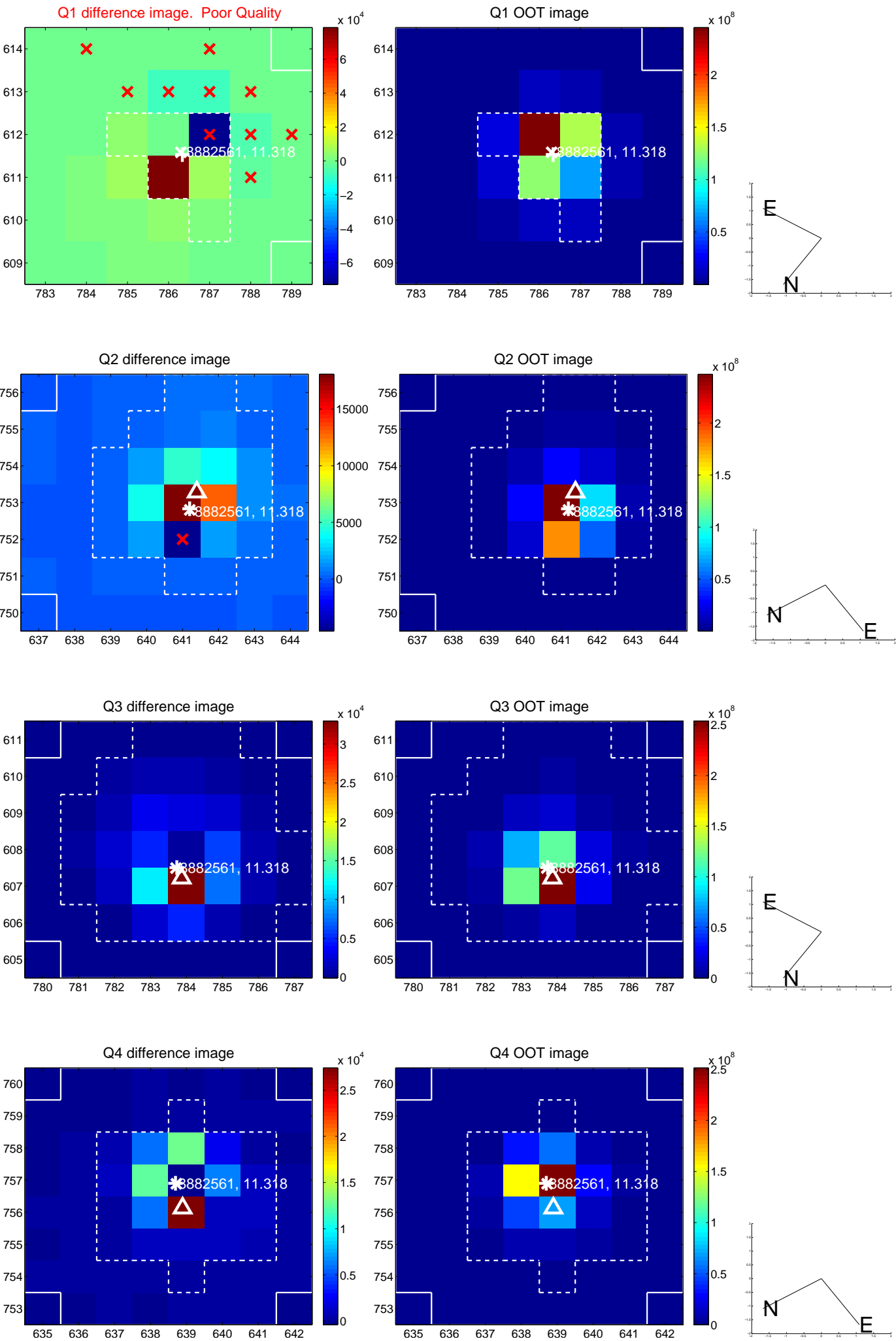


offset from photometric centroids

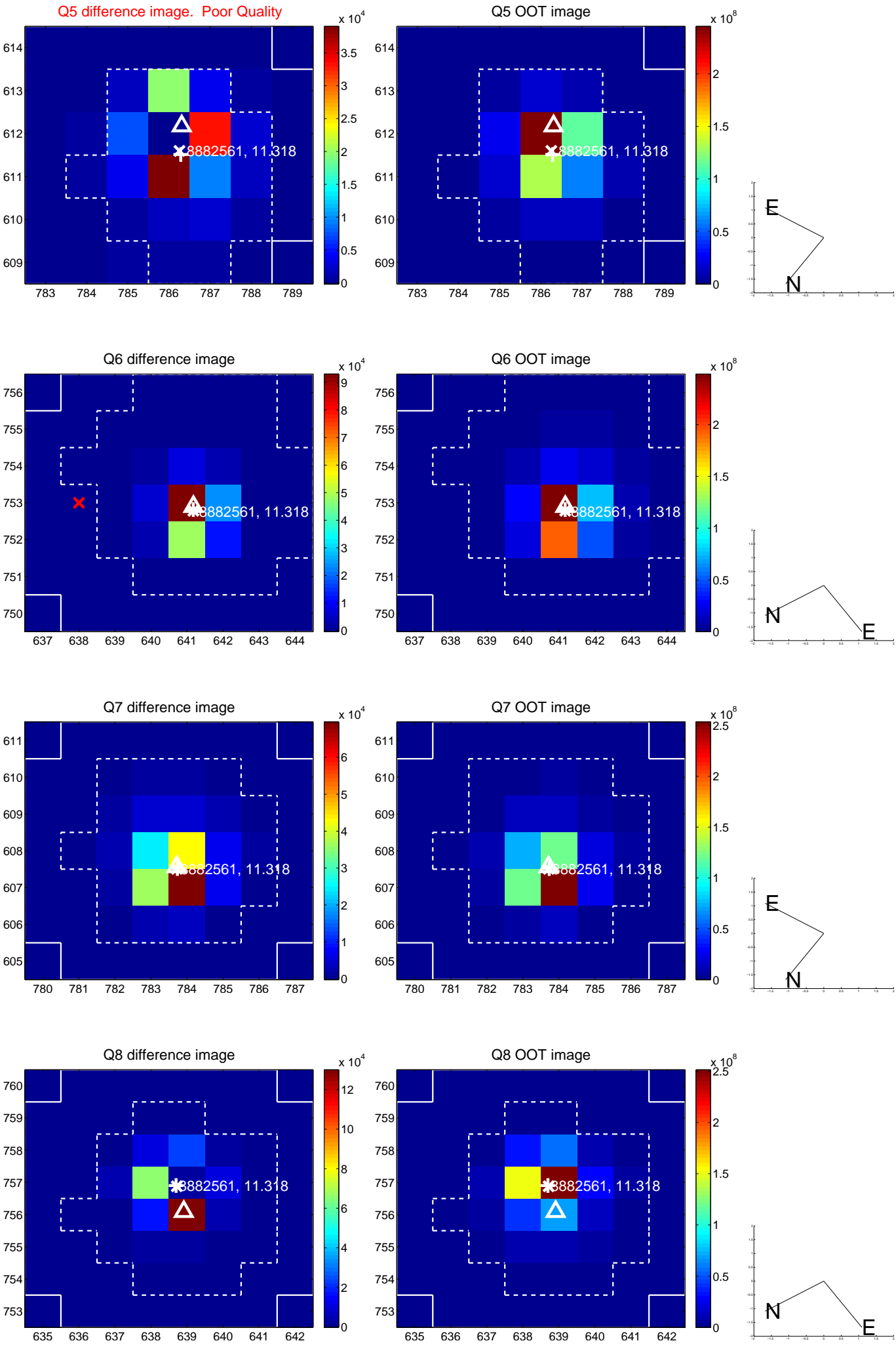


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

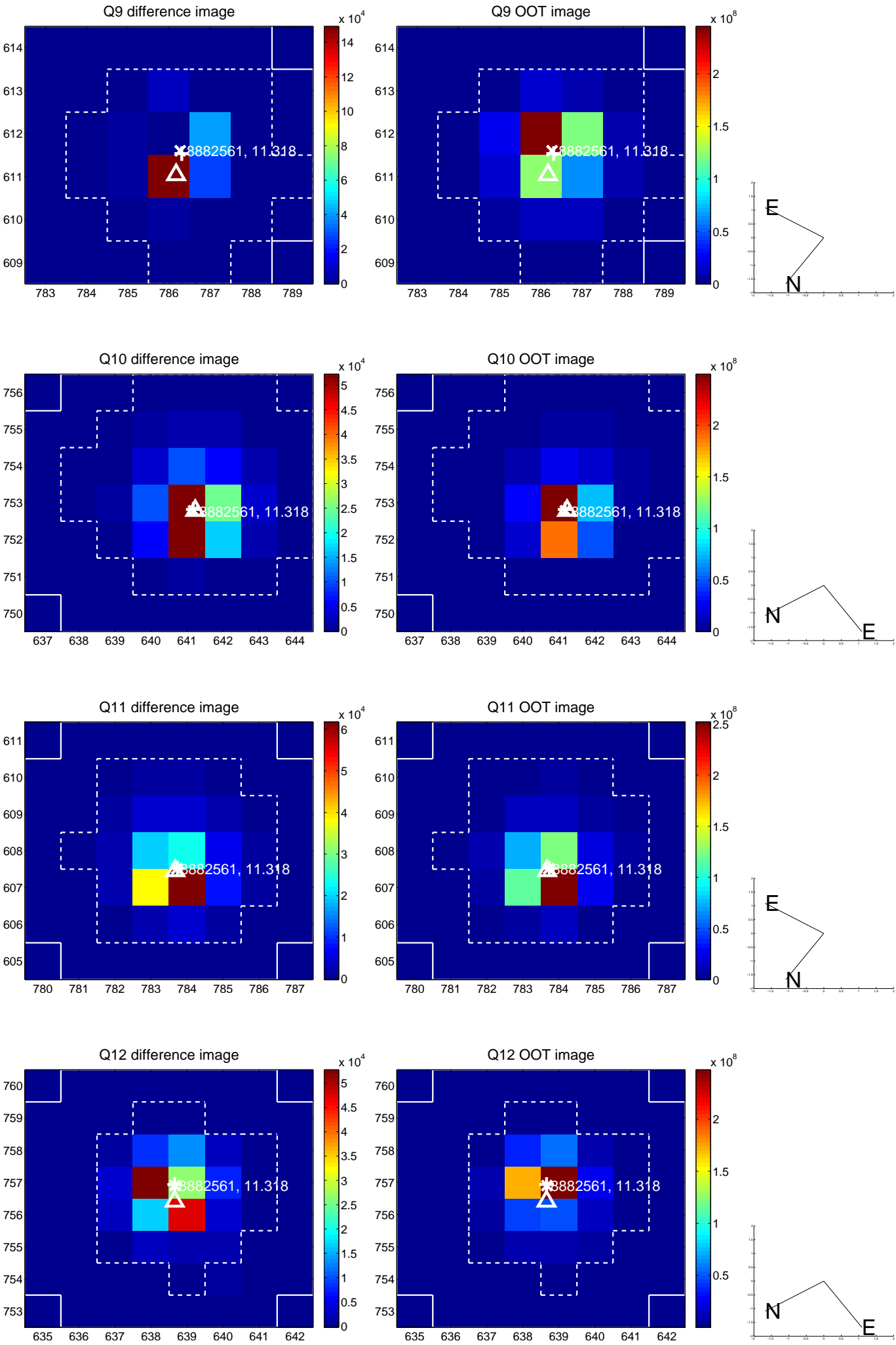


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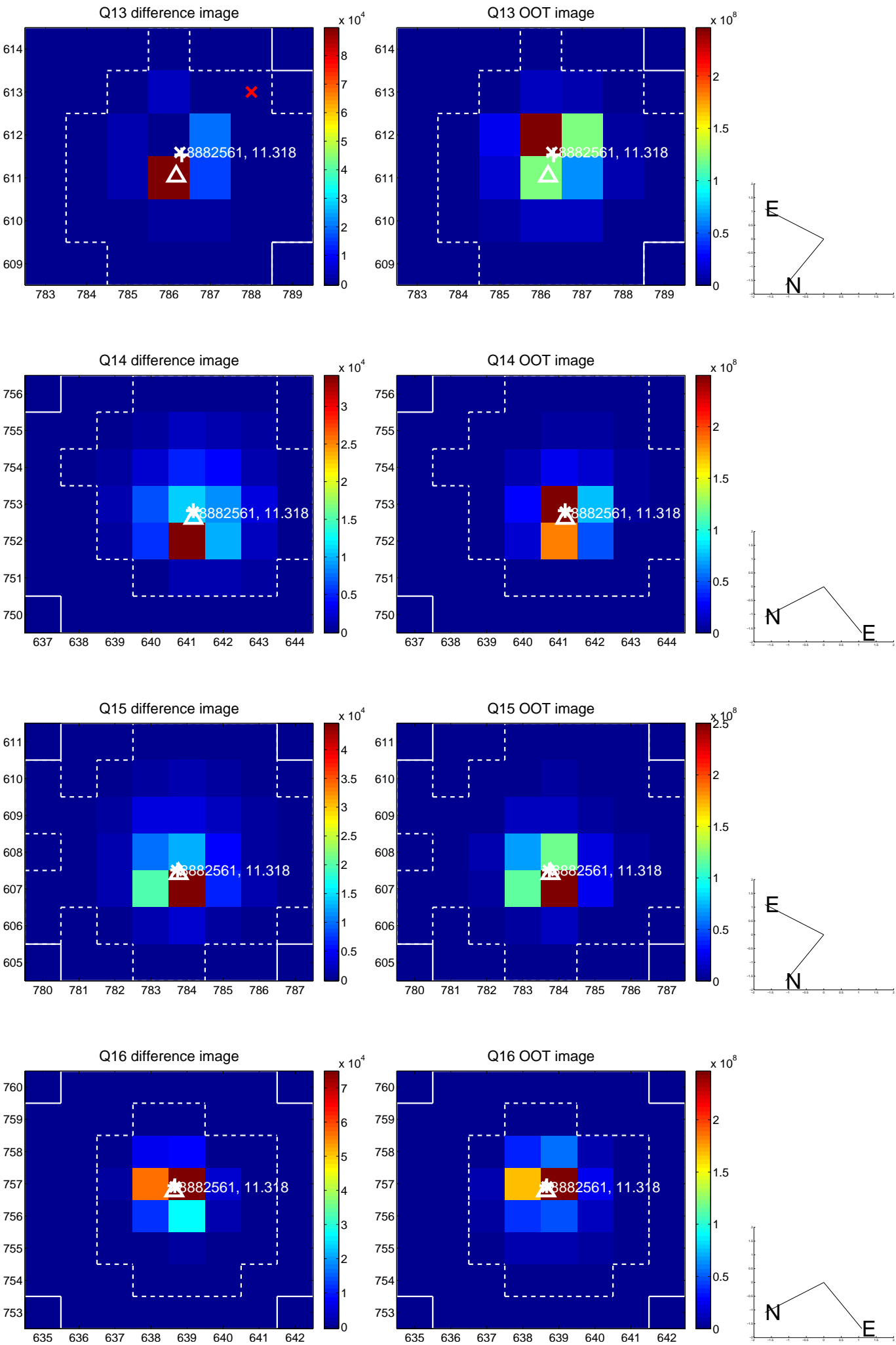




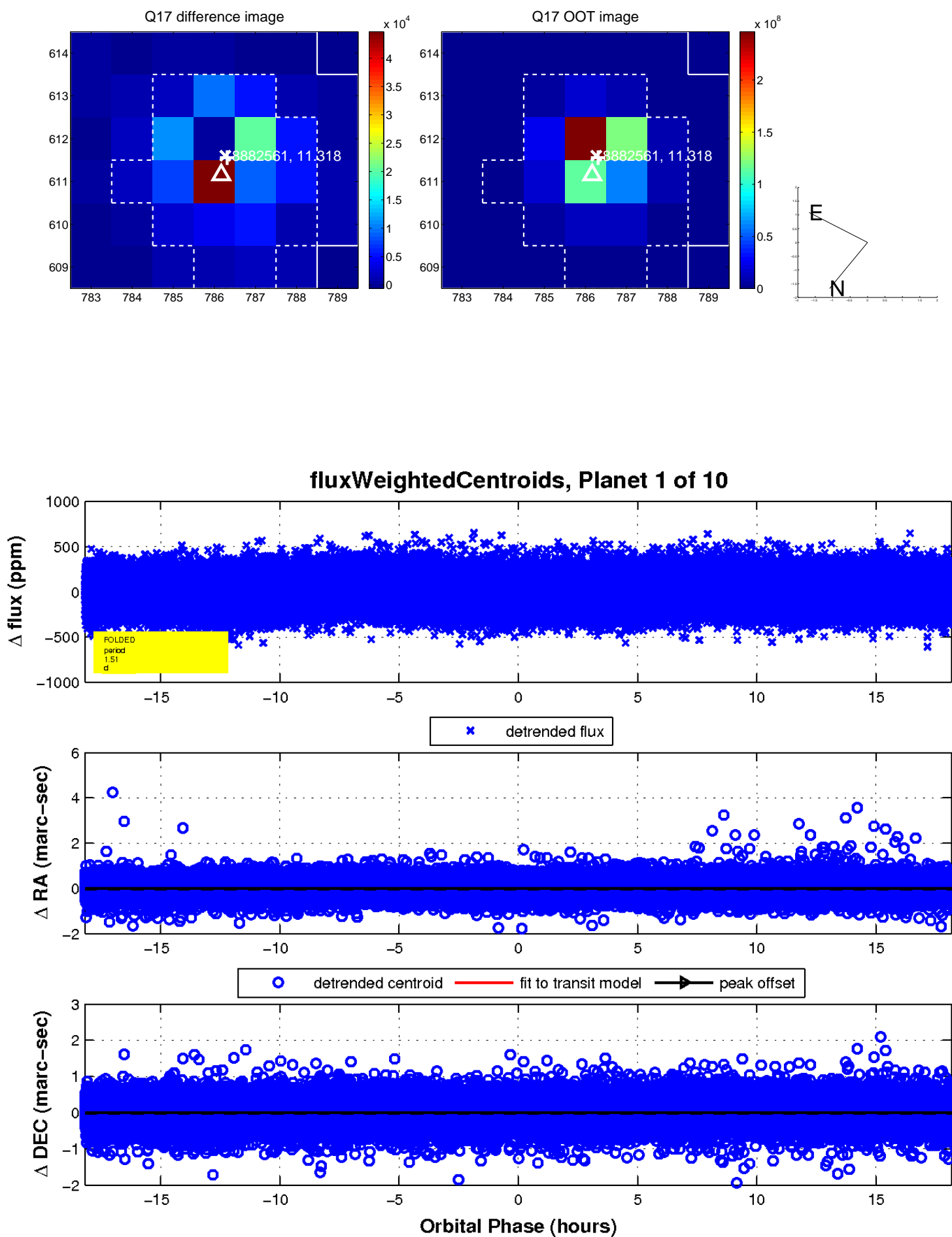
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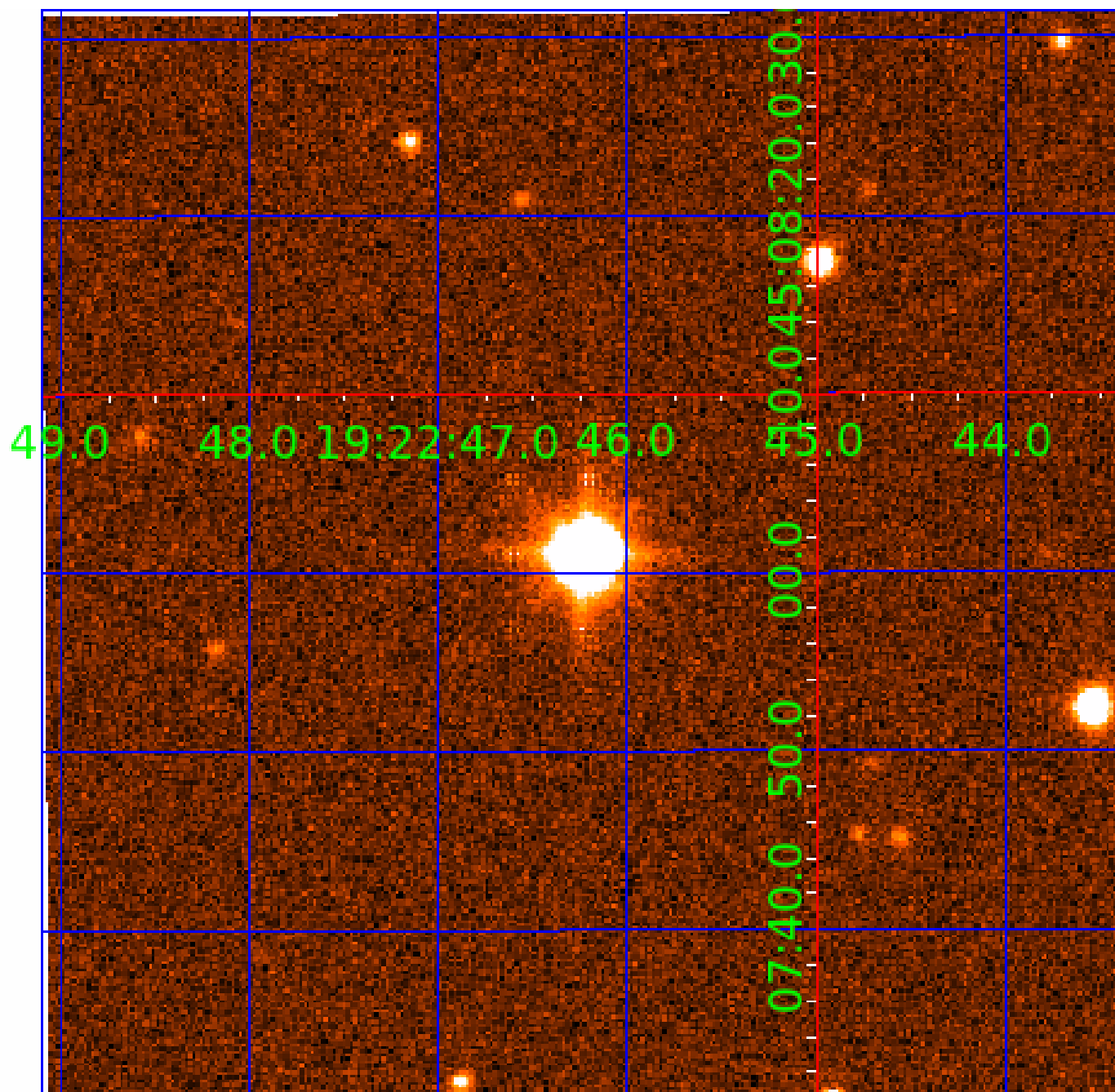


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UKIRT Image

Declination





## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
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## Robovetter Results

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008882561-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_SATURATED
008882561-03	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
008882561-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_SATURATED
008882561-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL_SKYE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
008882561-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
008882561-07	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED—HALO_GHOST
008882561-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—CENT_SATURATED
008882561-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED

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

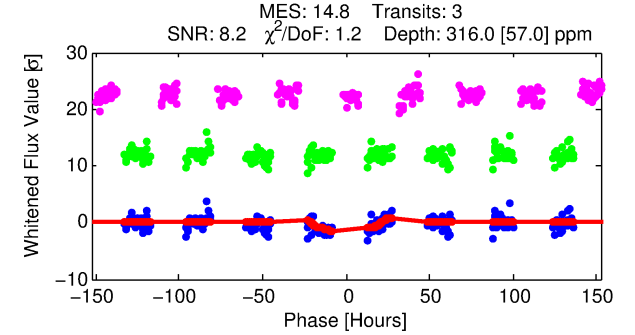
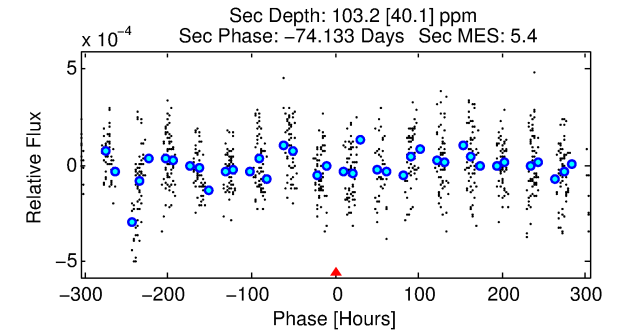
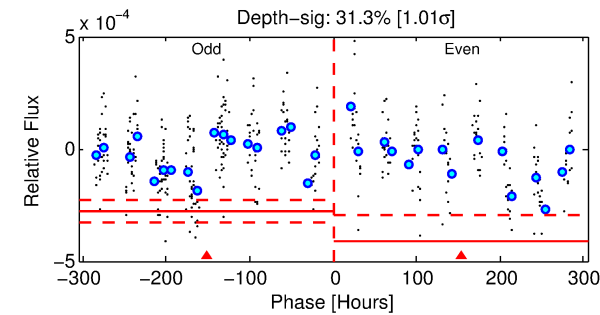
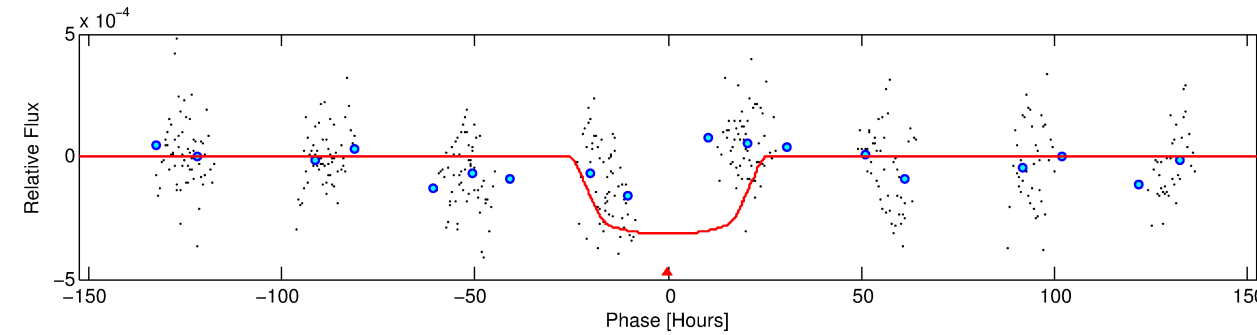
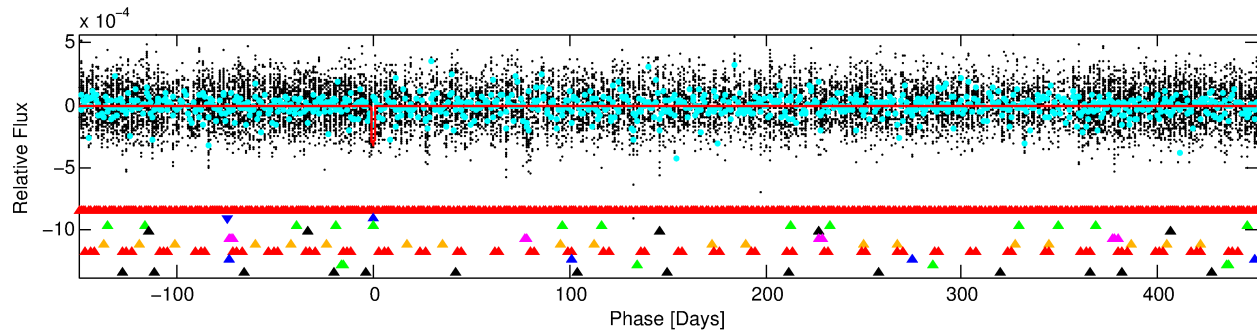
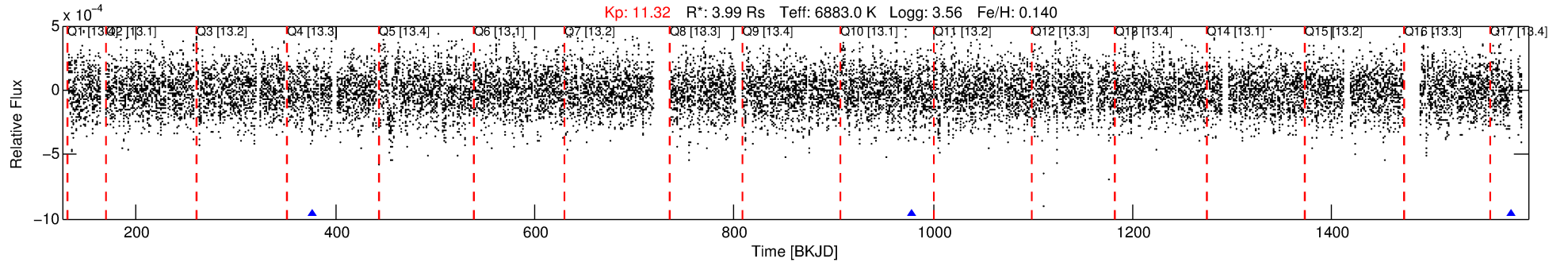
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 008882561-02

No Significant Match Found

# DV One-Page Summary

KIC: 8882561 Candidate: 2 of 10 Period: 601.245 d



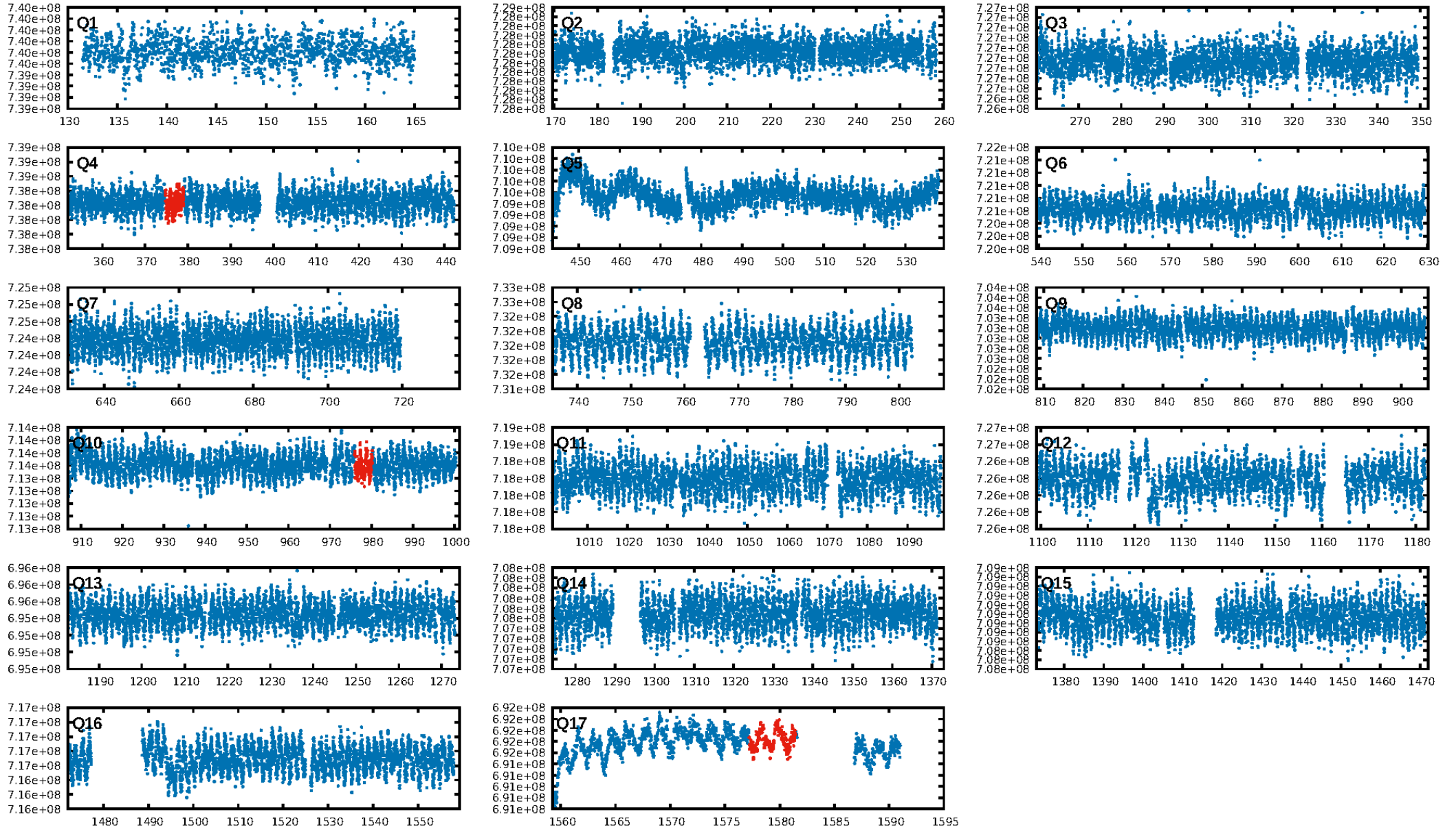
## DV Fit Results:

Period = 601.24481 [0.04275] d  
Epoch = 376.8467 [0.0596] BKJD  
Rp/R\* = 0.0201 [0.0021]  
a/R\* = 32.80 [6.39]  
b = 0.95 [0.02]  
Seff = 9.99 [5.17]  
Teq = 453 [59] K  
Rp = 8.76 [3.23] Re  
a = 1.7917 [0.5792] AU  
Ag = 2376.83 [1586.12] [1.50σ]  
Teffp = 4894 [562] K [7.86σ]

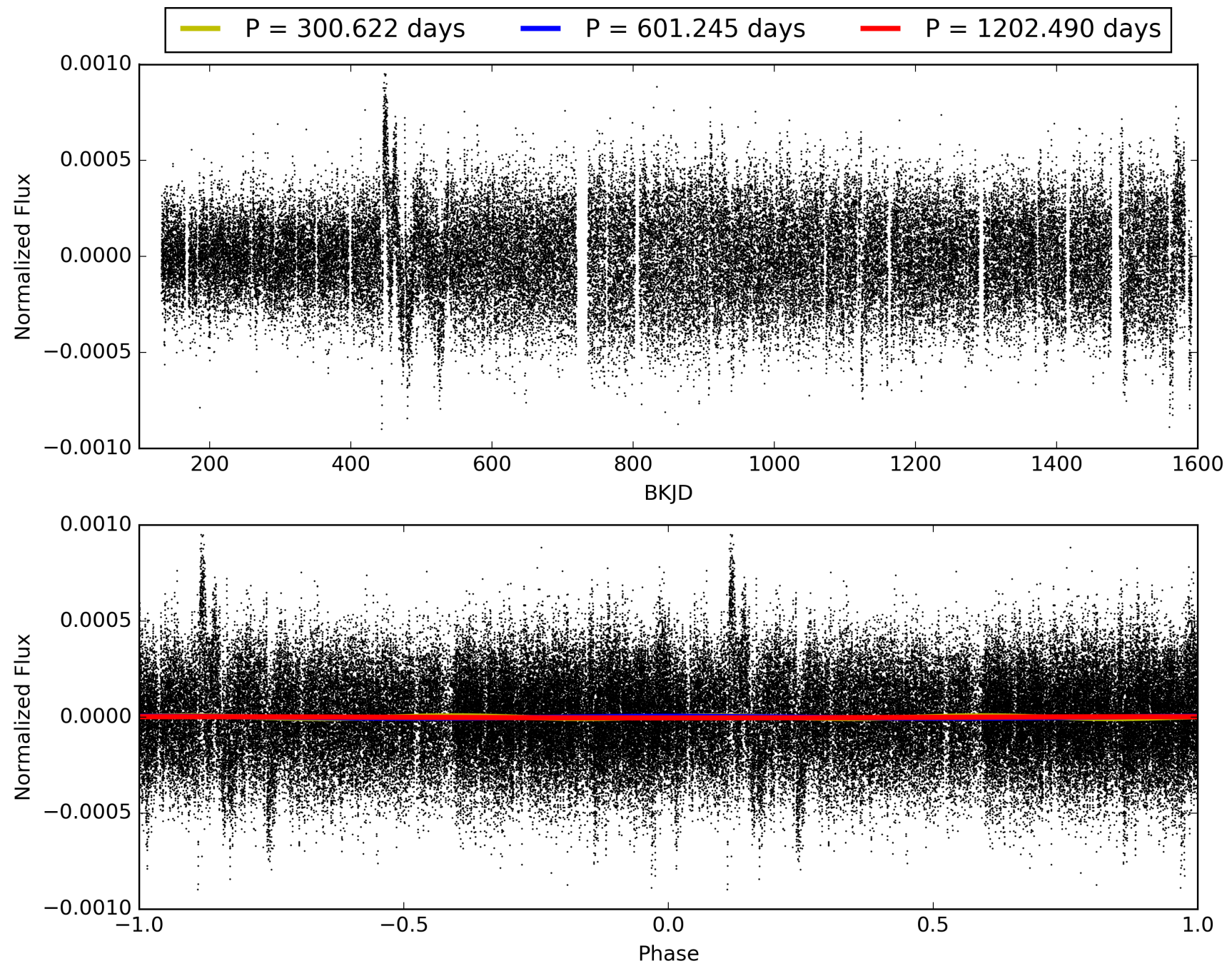
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [81.81σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 7.1%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [2/2]  
GhostDiagnostic-chr: 1.269  
Centroid-sig: 56.5%  
Centroid-so: 0.115 arcsec [0.49σ]  
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 [0/2]

# TCE 008882561-02, PDC Light Curves



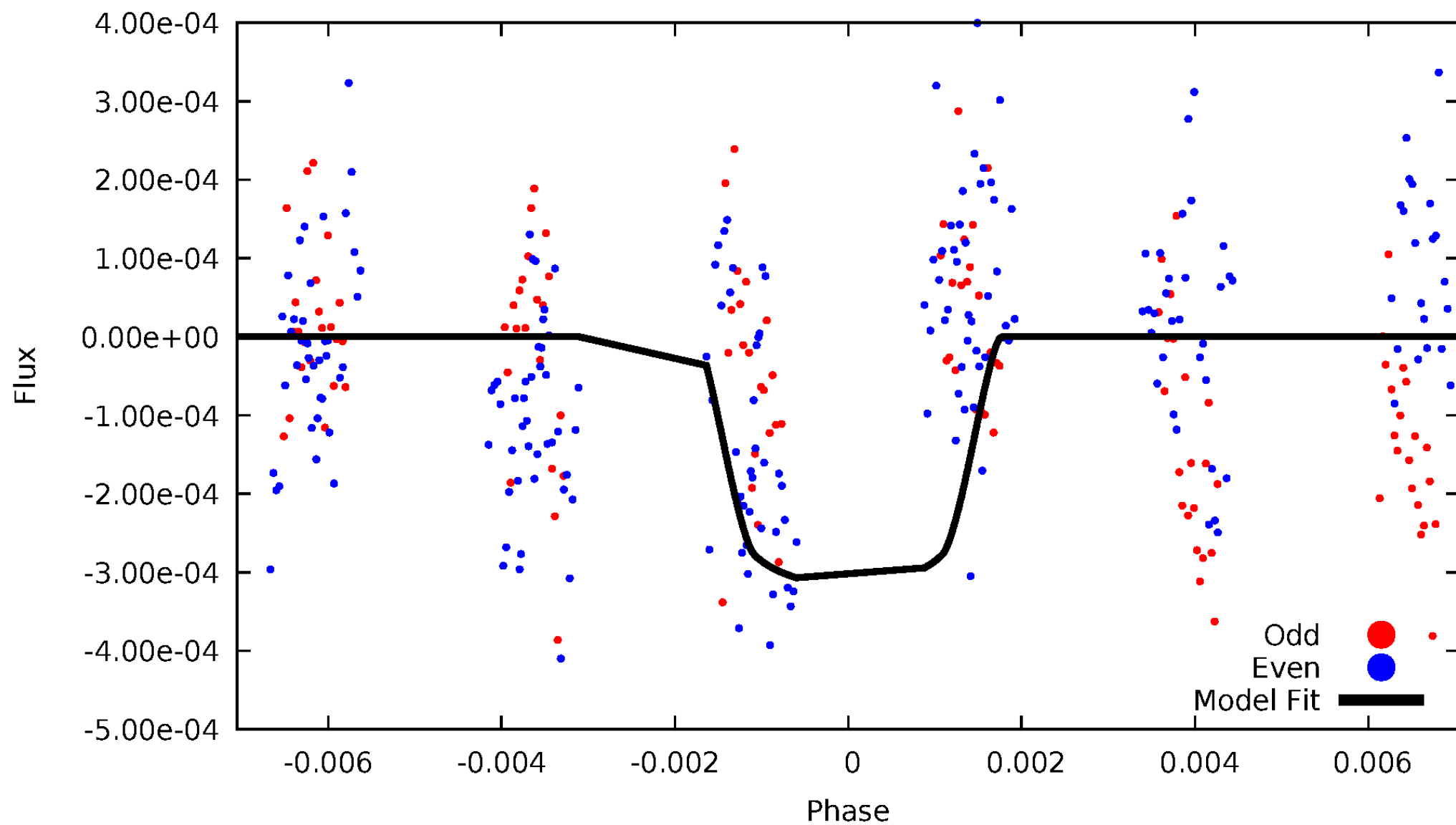
TCE 008882561-02





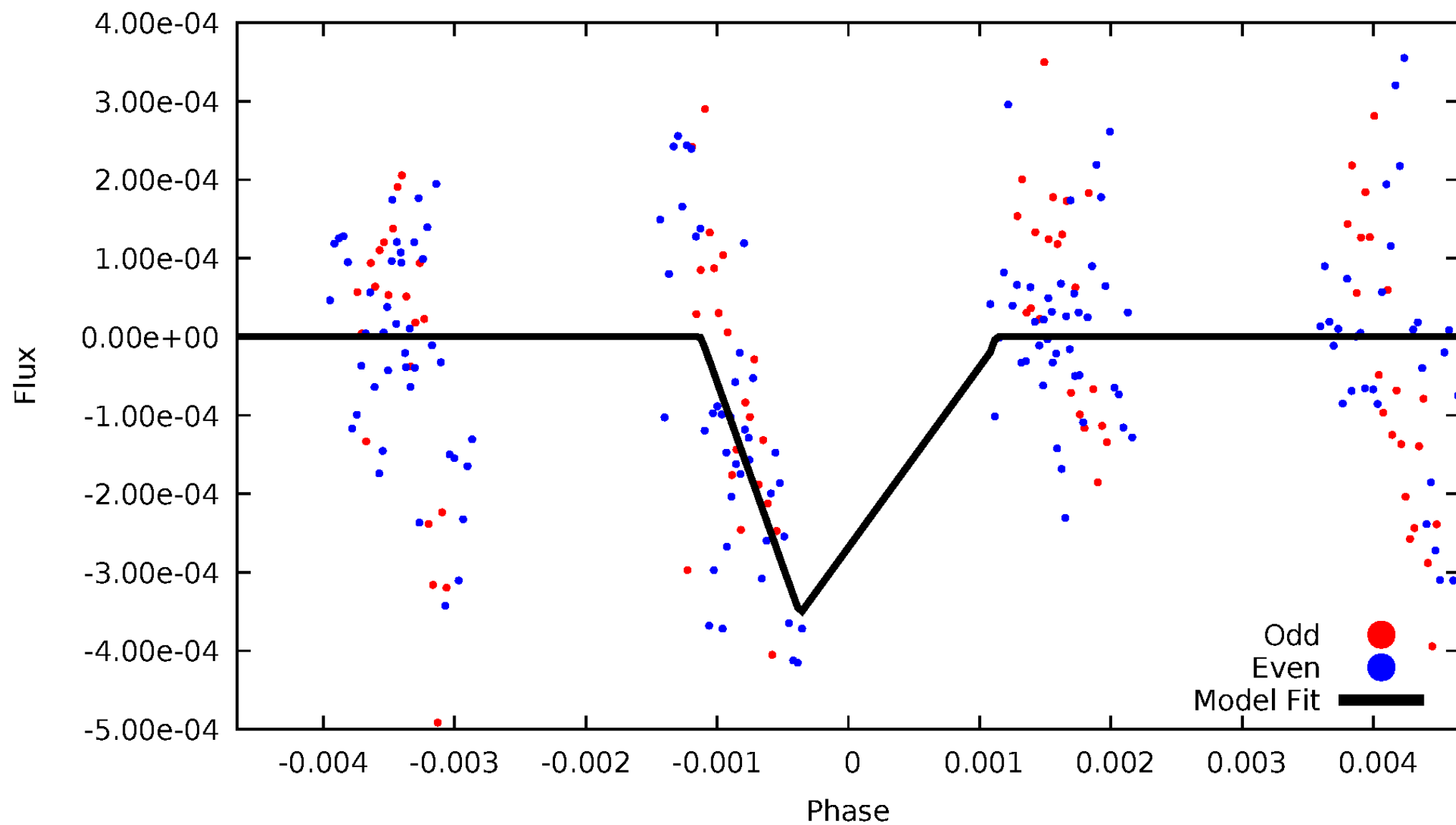
# DV Odd/Even

TCE 008882561-02



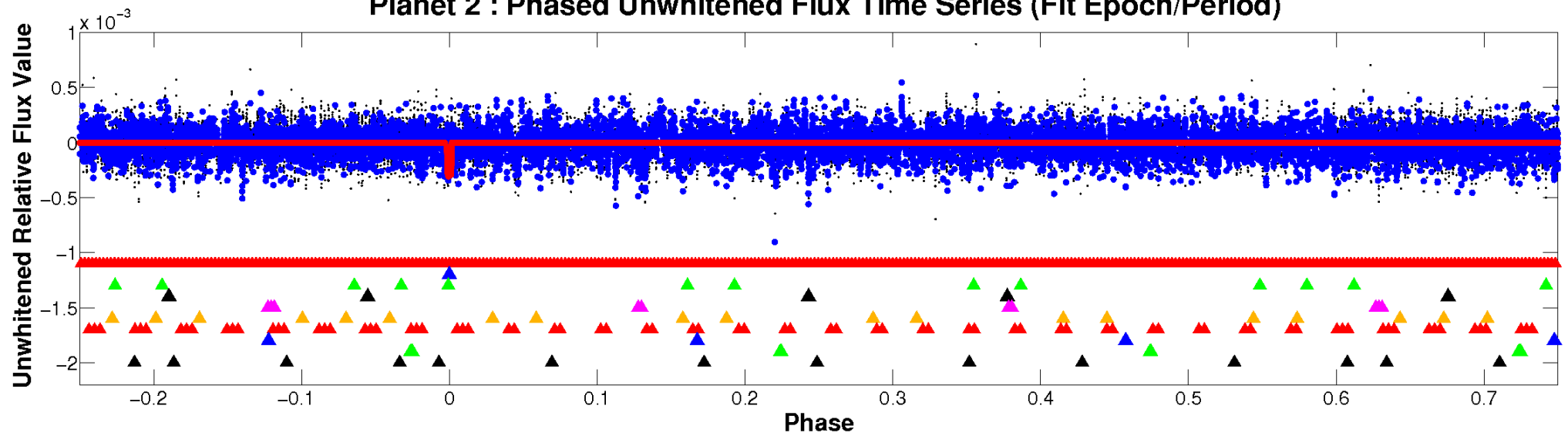
# ALT Odd/Even

TCE 008882561-02

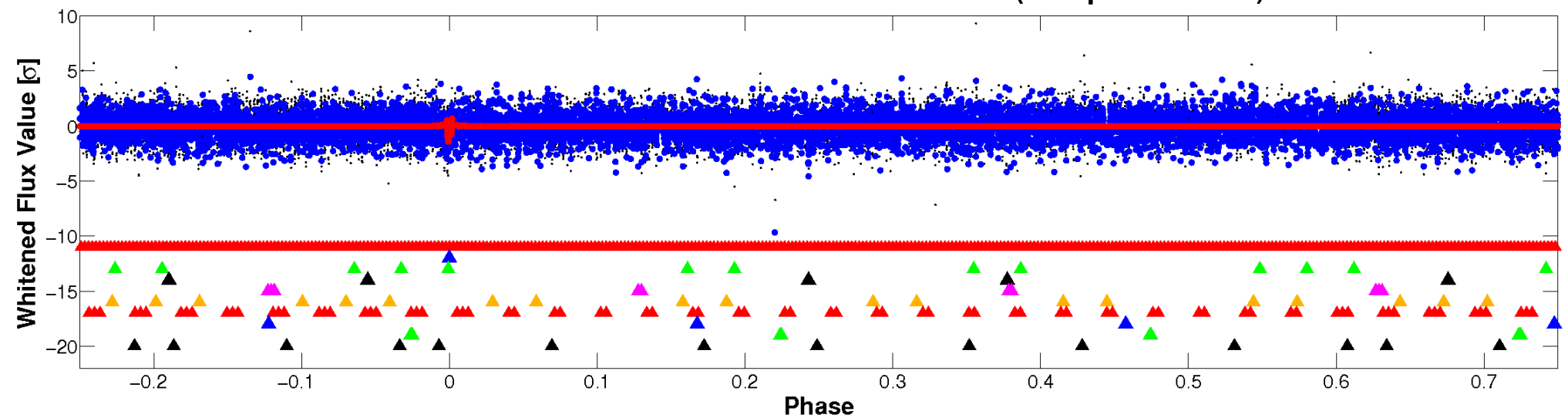


# Non-Whitened Vs. Whitened Light Curve

## 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

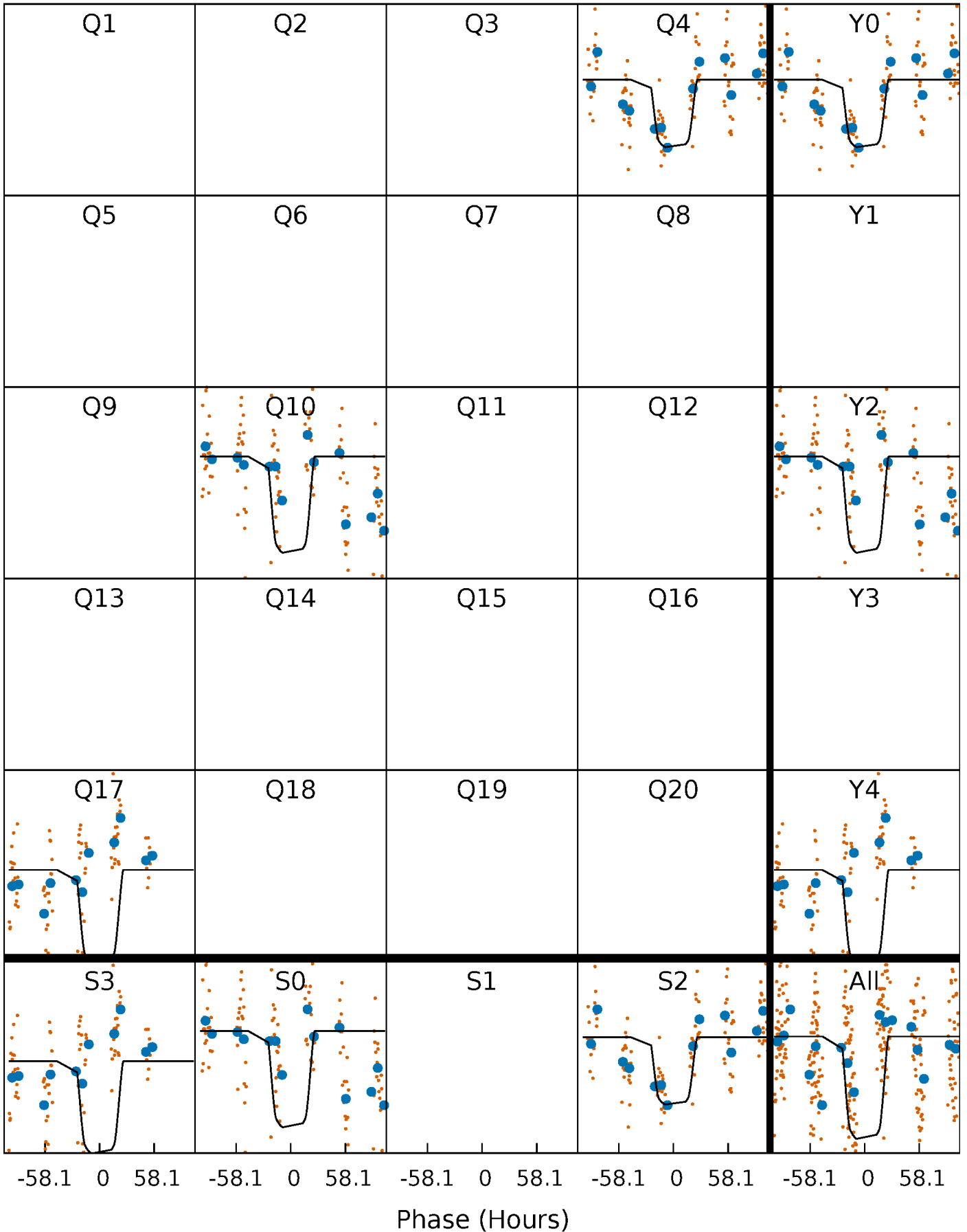
TCE 008882561-02 P=601.244806 Days  $T_0=376.846737$  (BKJD)





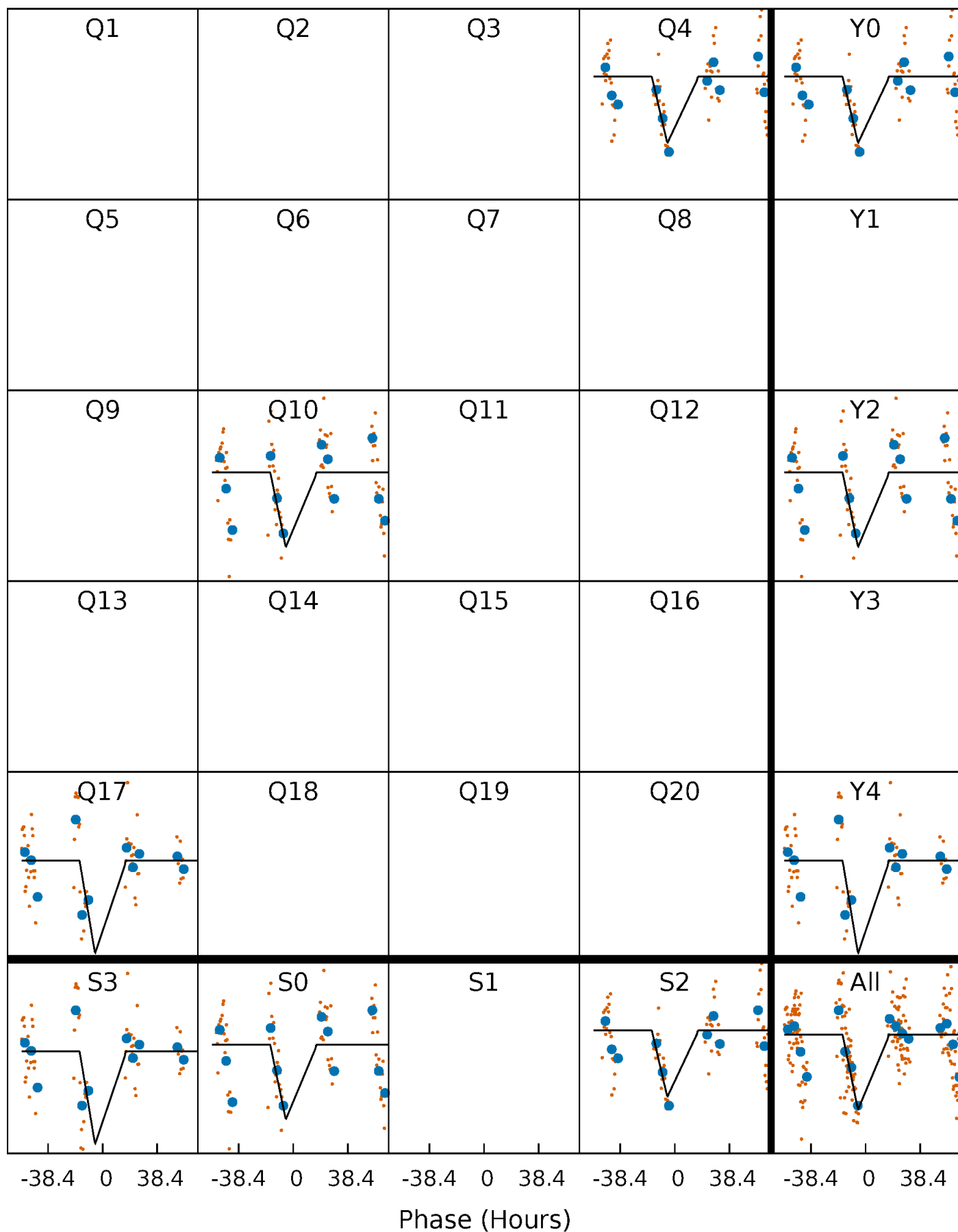
# DV Quarter-Phased Transit Curves

TCE 008882561-02 P=601.244806 Days  $T_0=376.846737$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

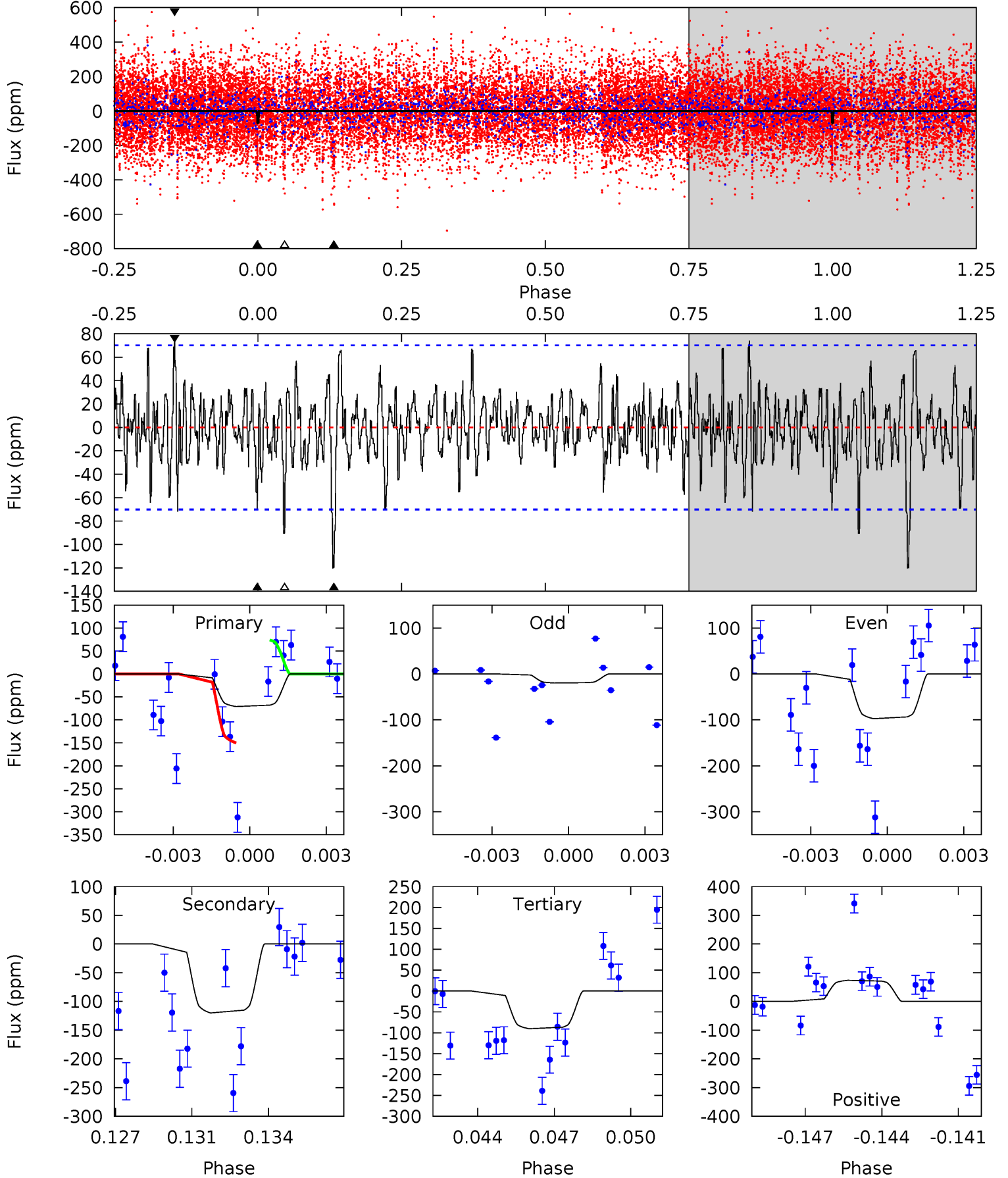
TCE 008882561-02 P=601.257503 Days  $T_0=376.699591$  (BKJD)



# DV Model-Shift Uniqueness Test

008882561-02, P = 601.244806 Days, E = 376.846737 Days

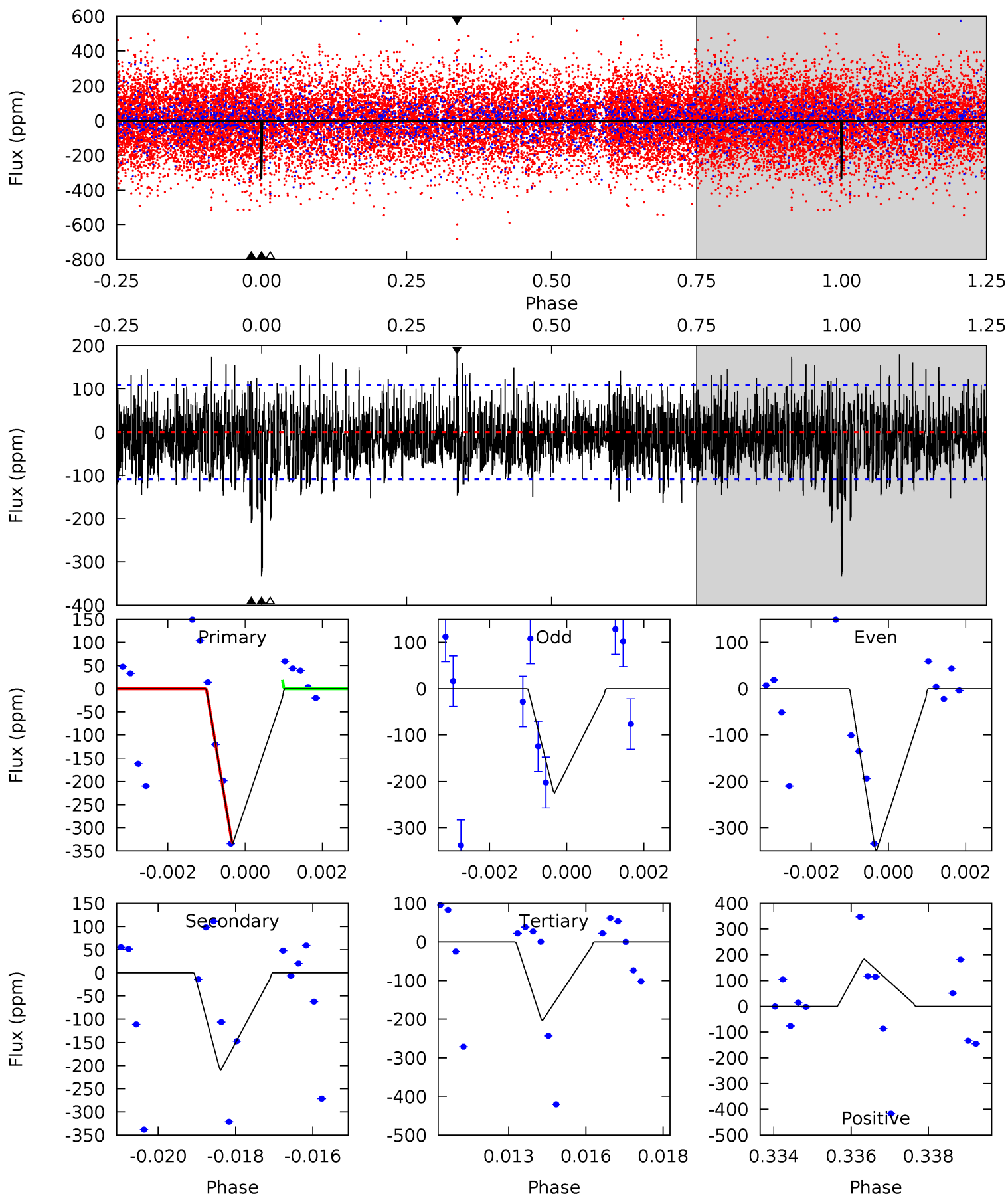
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.29	8.96	6.74	5.51	5.23	2.93	1.69	-1.45	-0.22	2.23	3.45	2.82	3.64	0.38	2.83



## Alt Model-Shift Uniqueness Test

008882561-02, P = 601.257503 Days, E = 376.699591 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
16.3	10.2	9.94	8.99	5.31	3.06	2.41	6.36	7.31	0.31	1.26	2.95	1.20	0.36	2.16





### Stellar Parameters For KIC 008882561

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6883^{+153}_{-222}$	$3.562^{+0.288}_{-0.032}$	$0.140^{+0.200}_{-0.250}$	$3.993^{+0.249}_{-1.413}$	$2.119^{+0.073}_{-0.416}$	$0.047^{+0.093}_{-0.006}$
	+2%/-3%	+8%/-1%	+143%/-179%	+6%/-35%	+3%/-20%	+199%/-12%
Source	PHO1	FLK73	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 008882561-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-120 \pm 13$	$8.14^{+1.35}_{-1.46}$	$614^{+30}_{-45}$	$5092^{+324}_{-245}$	$3164^{+1407}_{-833}$
Alt.	$-210 \pm 20$	$7.58^{+1.28}_{-1.47}$	$616^{+30}_{-54}$	$5967^{+431}_{-323}$	$6244^{+3110}_{-1550}$

$T_{max}$  = Theoretical Maximum Planetary Temperature

$T_{obs}$  = Observed Planetary Temperature (Assuming  $A=0.3$ )

$A_{obs}$  = Observed Albedo (Assuming  $T=0$ )

If a secondary eclipse is present, the system is likely an EB if  $T_{obs} \gg T_{max}$  AND  $A_{obs} \gg 1.0$

## DV Centroid Data

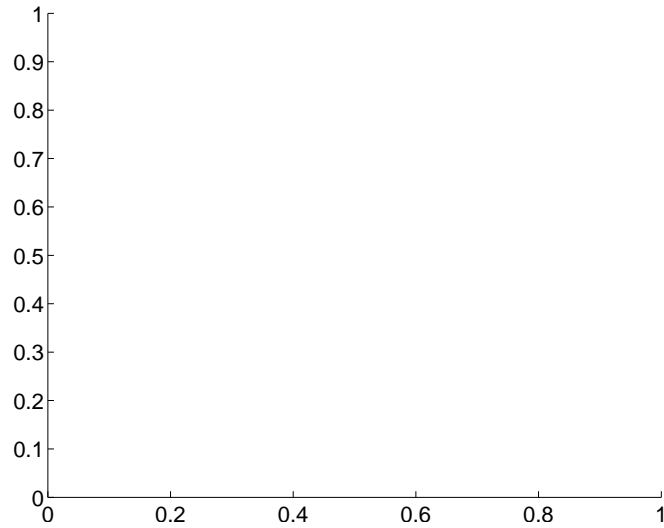
Supplemental centroid analysis for 008882561-02. **Kepler magnitude: 11.32.** Transit SNR 8.16

**There are 0 quarters with good PRF difference image offsets**

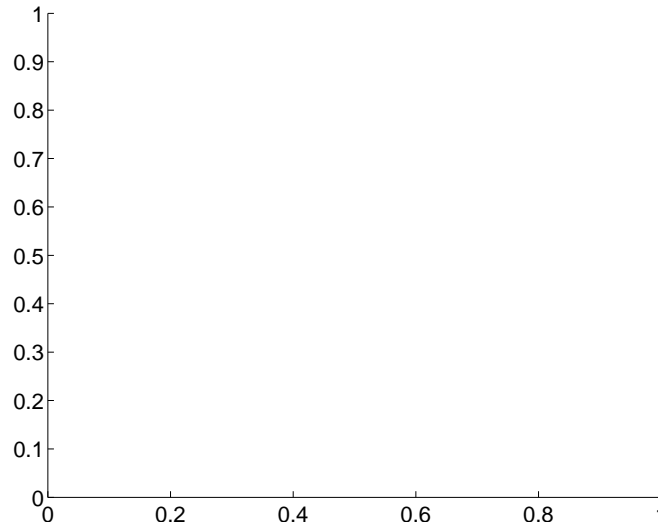
The direct PRF centroid is offset from the target star catalog position by about NaN arcsec

	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	$0.11 \pm 0.24$	0.49	$-0.04 \pm 0.25$	$-0.11 \pm 0.23$

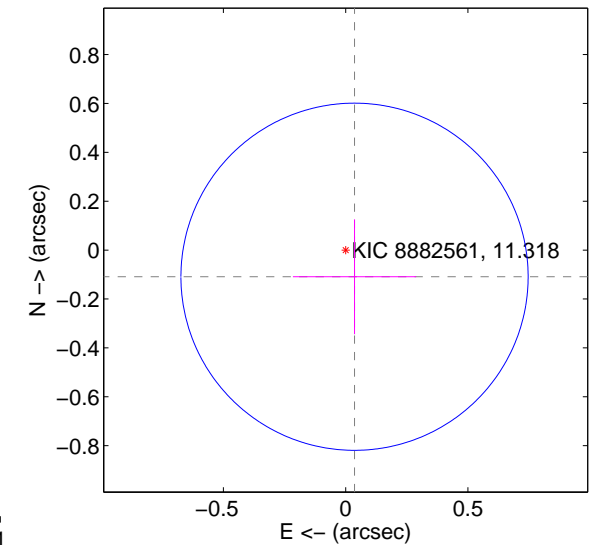
There is no PRF-fit offset from OOT-fit



There is no PRF-fit offset from KIC

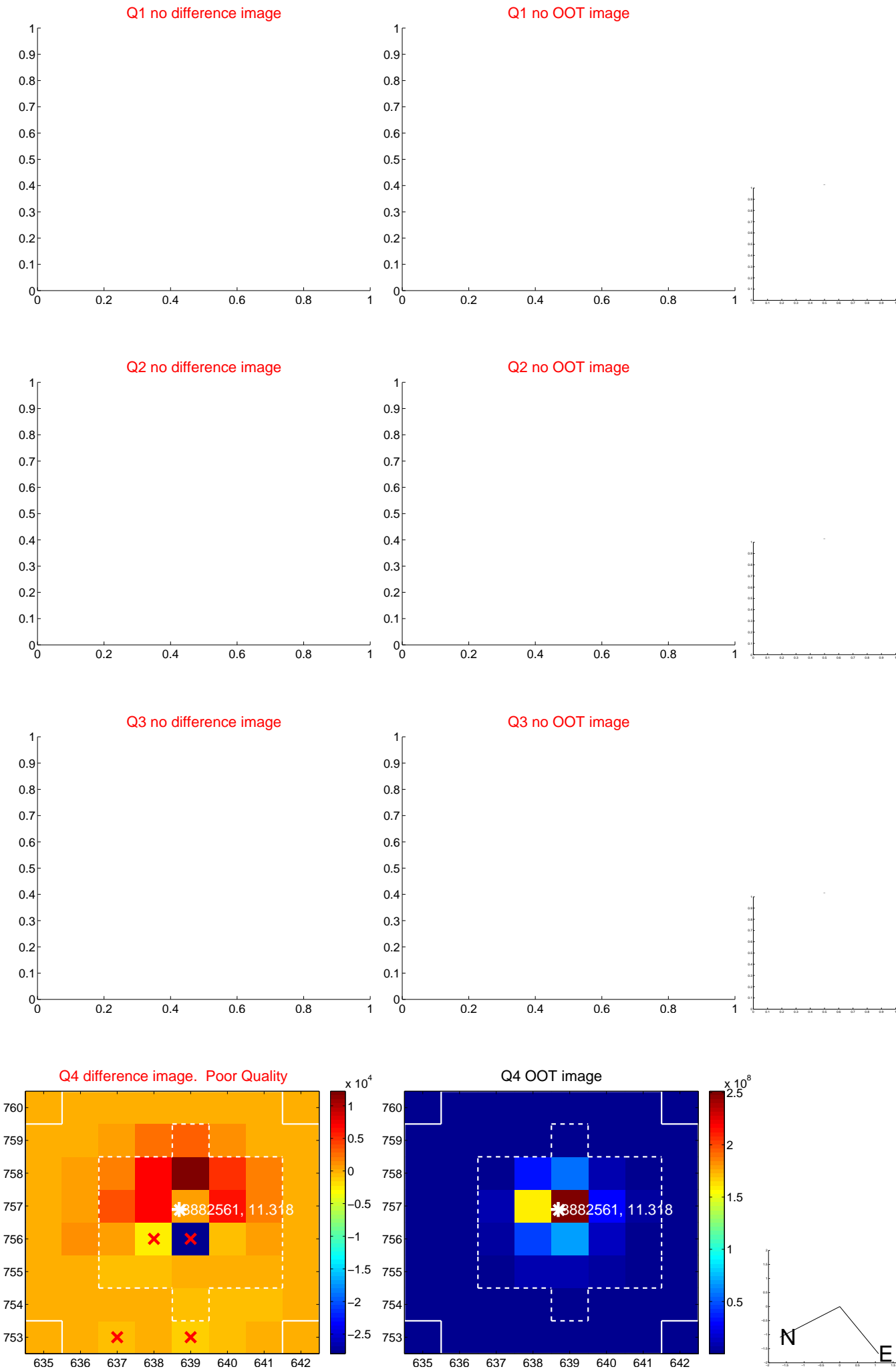


offset from photometric centroids



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

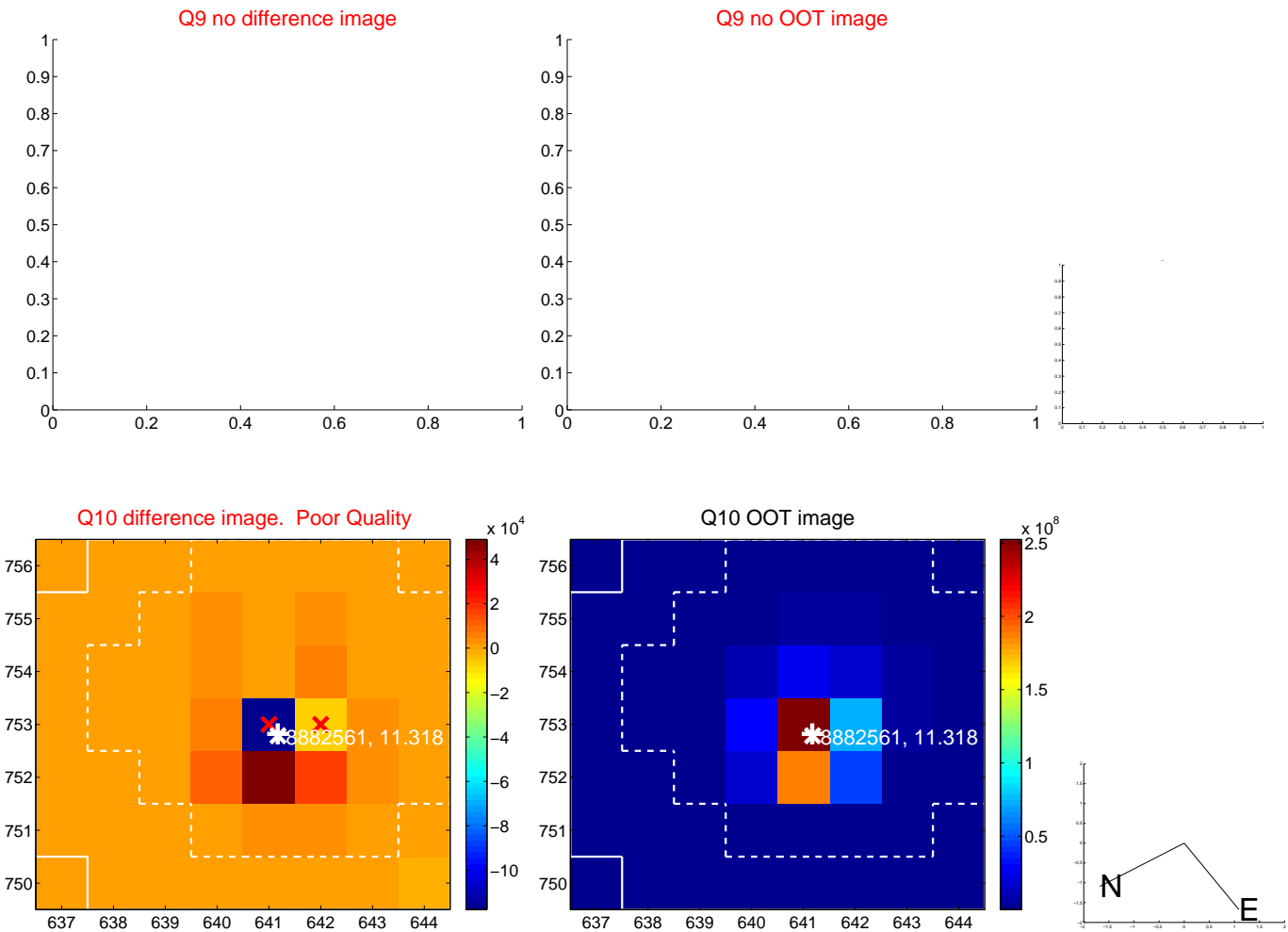
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



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

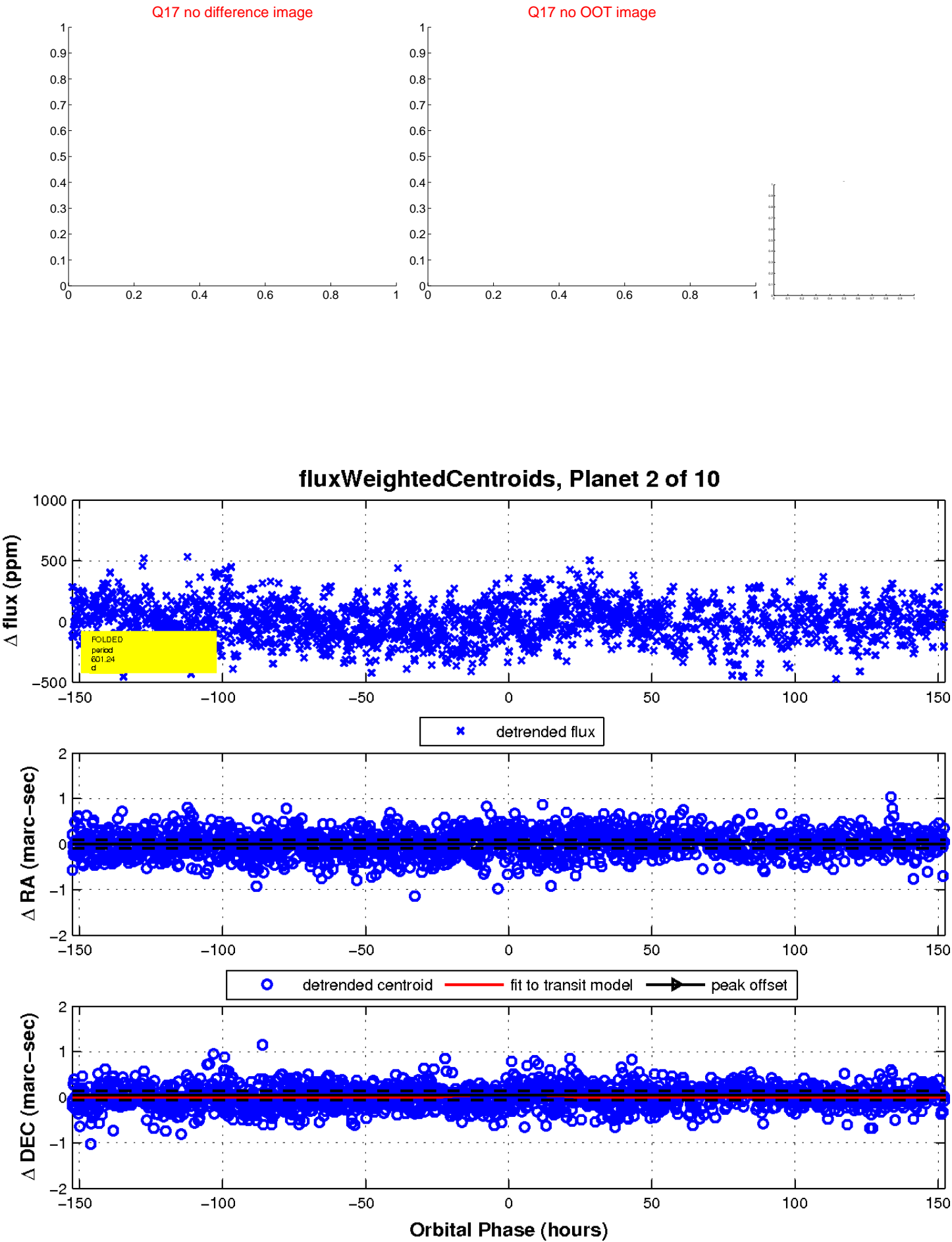




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

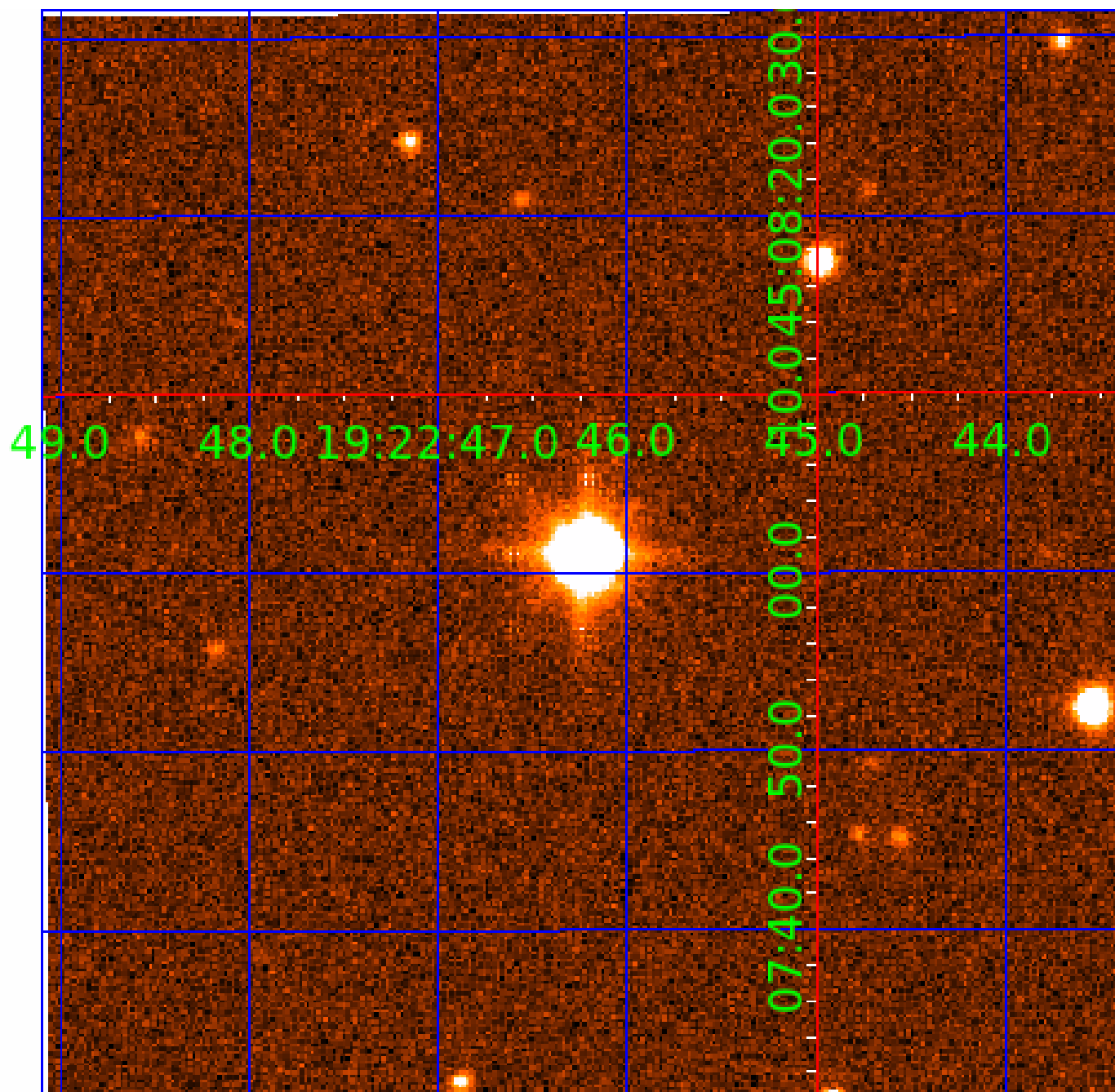


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008882561-01	OBS	No	1.514201	131.737652	22.8	8.481	8.2	9.1	3.99	6883	2.63	29149.21
008882561-02	OBS	No	601.244806	376.846737	316.0	50.859	14.8	8.2	3.99	6883	8.76	9.99
008882561-03	OBS	No	116.422525	143.577886	272.5	2.242	10.4	9.2	3.99	6883	7.27	89.16
008882561-04	OBS	No	260.182597	343.643718	233.8	26.146	9.6	9.2	3.99	6883	6.57	30.51
008882561-05	OBS	No	150.633582	152.436456	294.4	5.530	9.7	10.3	3.99	6883	8.88	63.24
008882561-06	OBS	No	77.374847	162.329719	299.9	3.243	9.2	10.3	3.99	6883	11.25	153.72
008882561-07	OBS	No	18.718323	141.178432	101.8	6.533	8.9	9.7	3.99	6883	4.60	1019.80
008882561-08	OBS	No	426.915106	225.078632	241.7	5.371	8.7	9.3	3.99	6883	6.96	15.77
008882561-09	OBS	No	150.401601	210.659704	277.3	2.596	8.6	9.4	3.99	6883	7.70	63.37

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008882561-01	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV—CENT_SATURATED
008882561-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_SATURATED
008882561-03	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
008882561-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_SATURATED
008882561-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL_SKYE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
008882561-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
008882561-07	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED—HALO_GHOST
008882561-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—CENT_SATURATED
008882561-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED

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

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

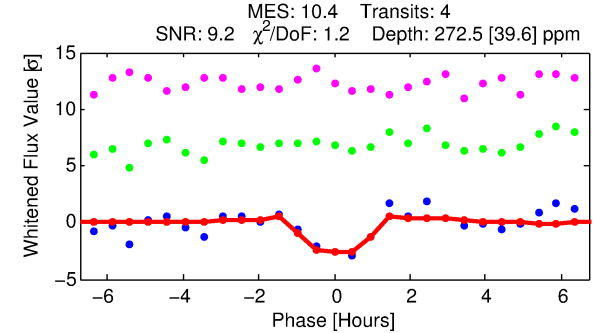
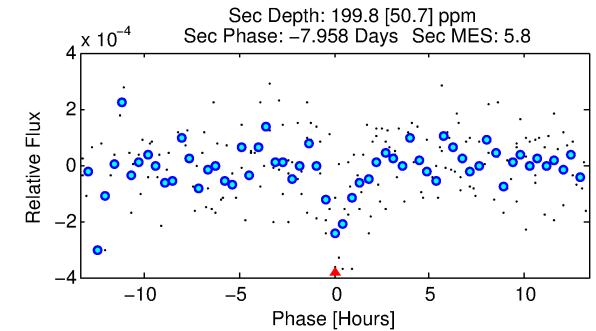
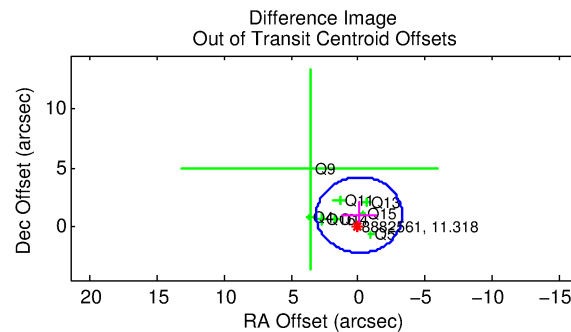
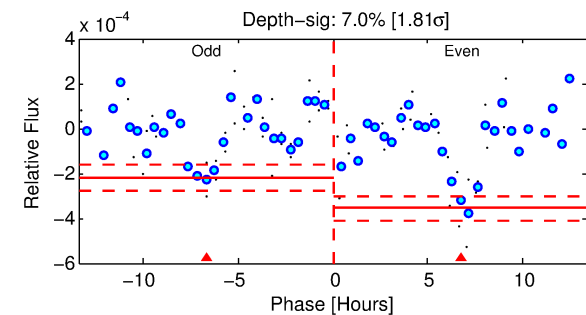
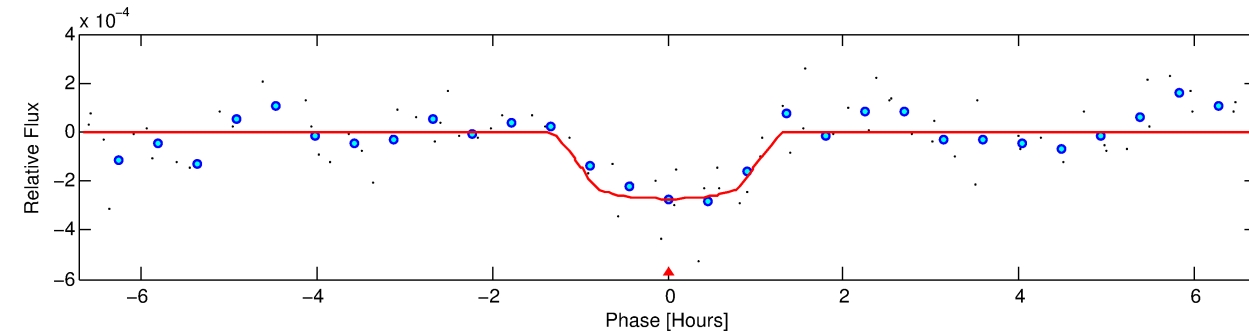
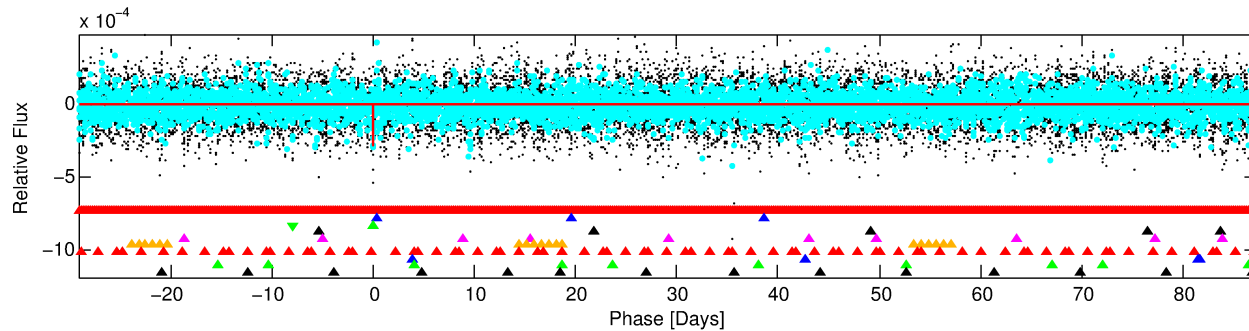
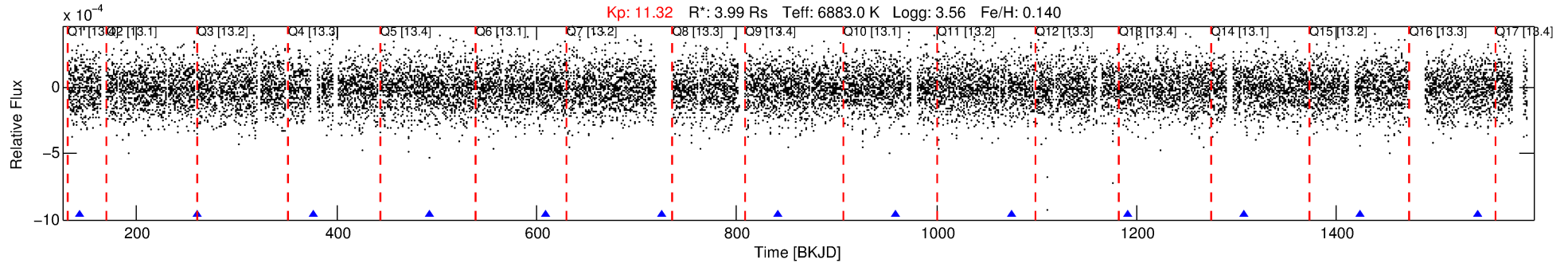
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 008882561-03

No Significant Match Found

# DV One-Page Summary

KIC: 8882561 Candidate: 3 of 10 Period: 116.423 d



## DV Fit Results:

Period = 116.42252 [0.00087] d  
Epoch = 143.5779 [0.0094] BKJD  
Rp/R\* = 0.0167 [0.0253]  
a/R\* = 250.38 [2215.00]  
b = 0.80 [4.08]  
Seff = 89.16 [46.13]  
Teq = 784 [101] K  
Rp = 7.27 [11.31] Re  
a = 0.5997 [0.1939] AU  
Ag = 747.22 [2301.91] [0.32 $\sigma$ ]  
Teffp = 6334 [4817] K [1.15 $\sigma$ ]

## DV Diagnostic Results:

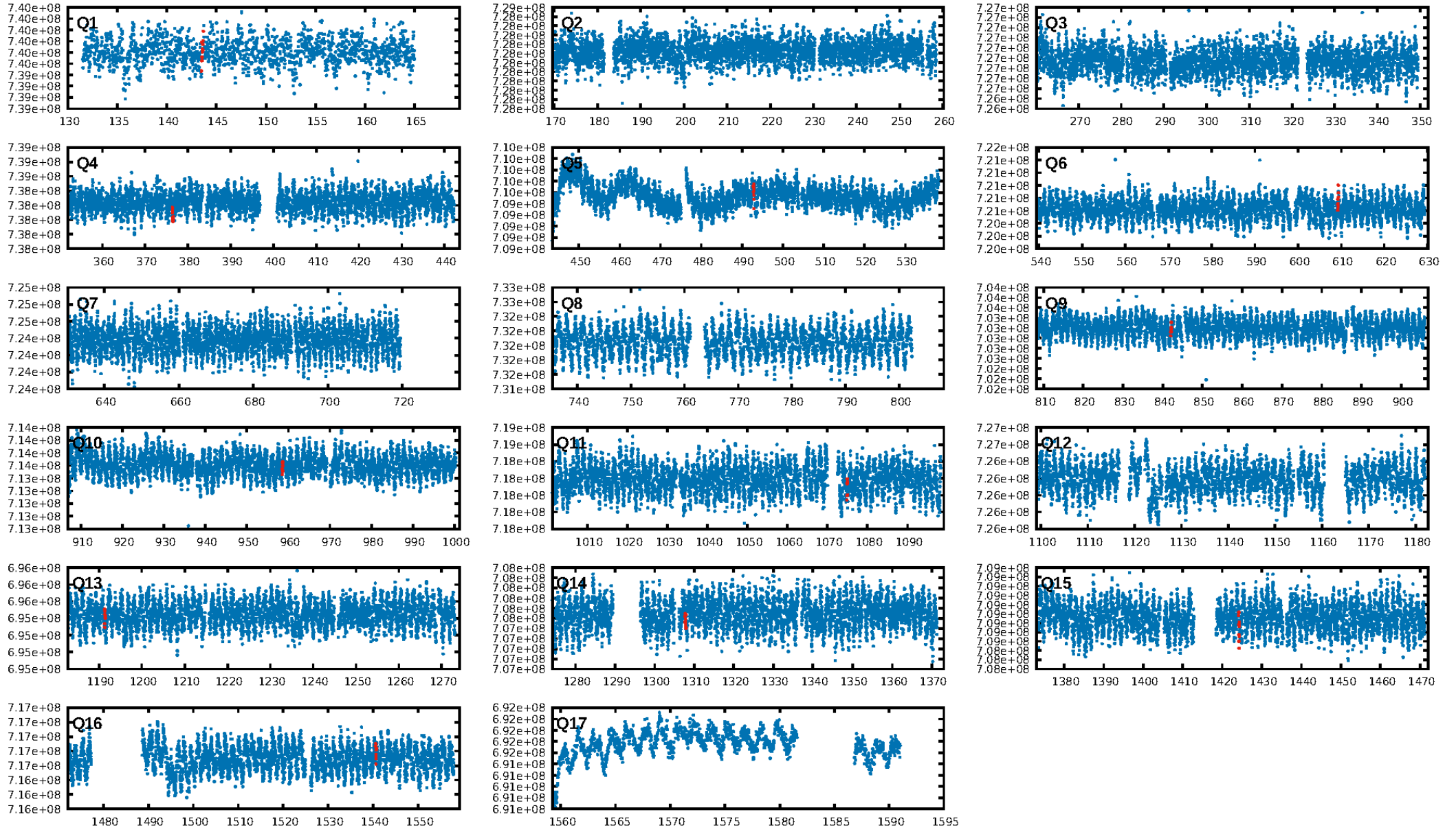
ShortPeriod-sig: 100.0% [52.96 $\sigma$ ]  
LongPeriod-sig: 100.0% [237.75 $\sigma$ ]  
ModelChiSquare2-sig: 11.7%  
ModelChiSquareGof-sig: 78.2%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: 1.482  
Centroid-sig: 1.3%  
Centroid-so: 0.800 arcsec [1.72 $\sigma$ ]  
OotOffset-rm: 1.008 arcsec [0.94 $\sigma$ ]  
OotOffset-st: 1/2/2/3 [8]  
KicOffset-rm: 0.988 arcsec [0.92 $\sigma$ ]  
KicOffset-st: 1/2/2/3 [8]  
DiffImageQuality-fgm: 0.50 [4/8]  
DiffImageOverlap-fno: 0.36 [4/11]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 21:26:44 Z

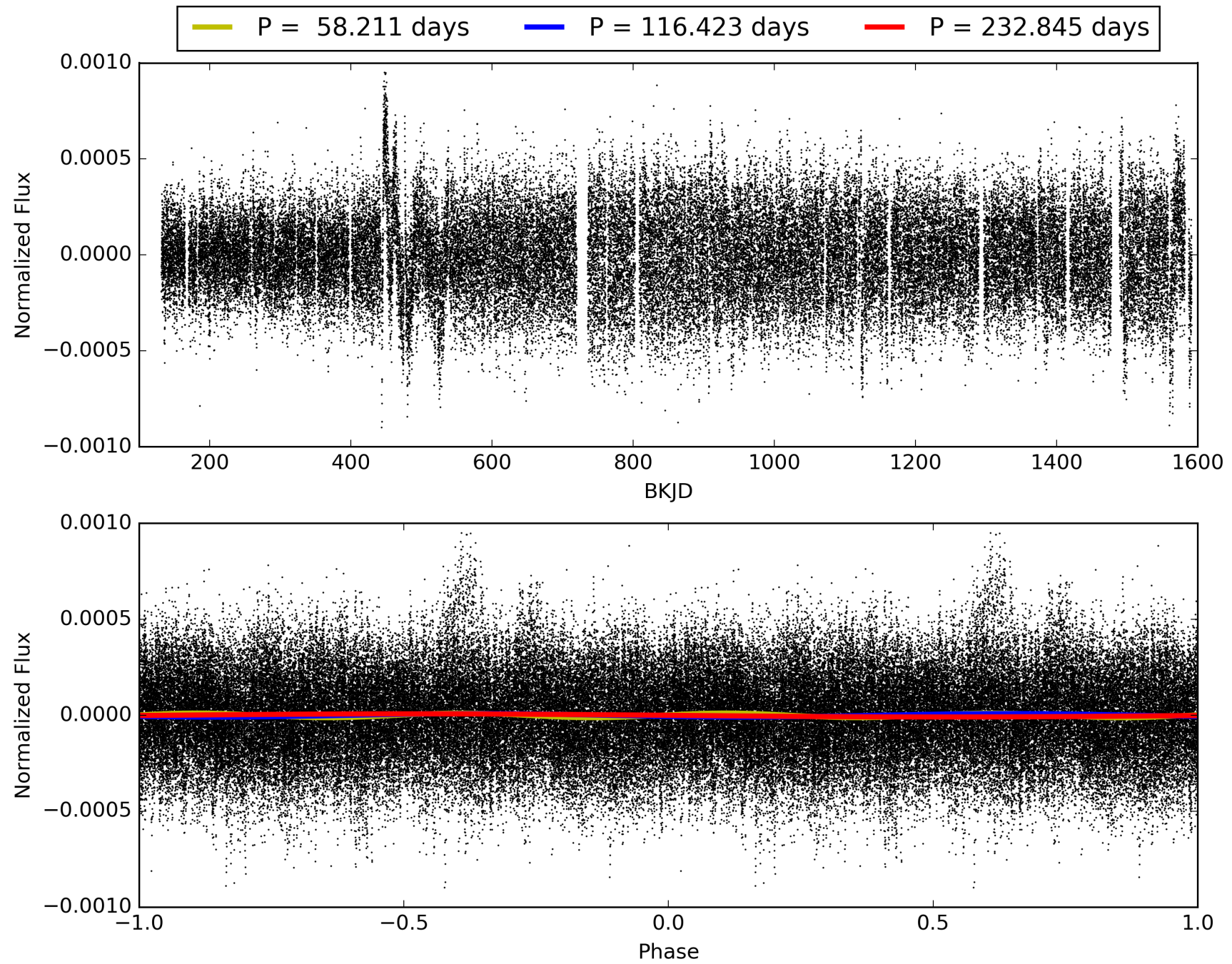
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 008882561-03, PDC Light Curves

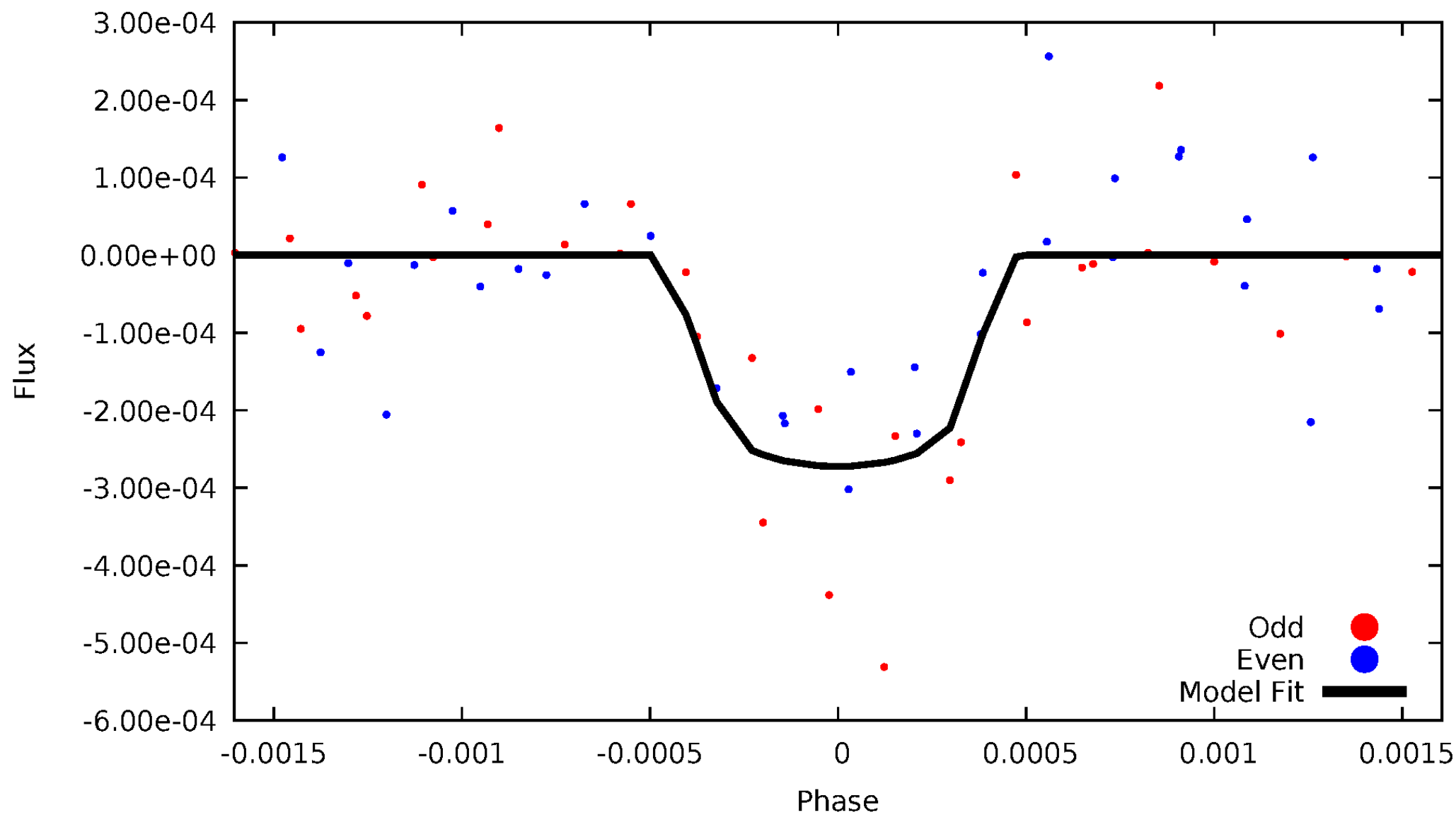


TCE 008882561-03



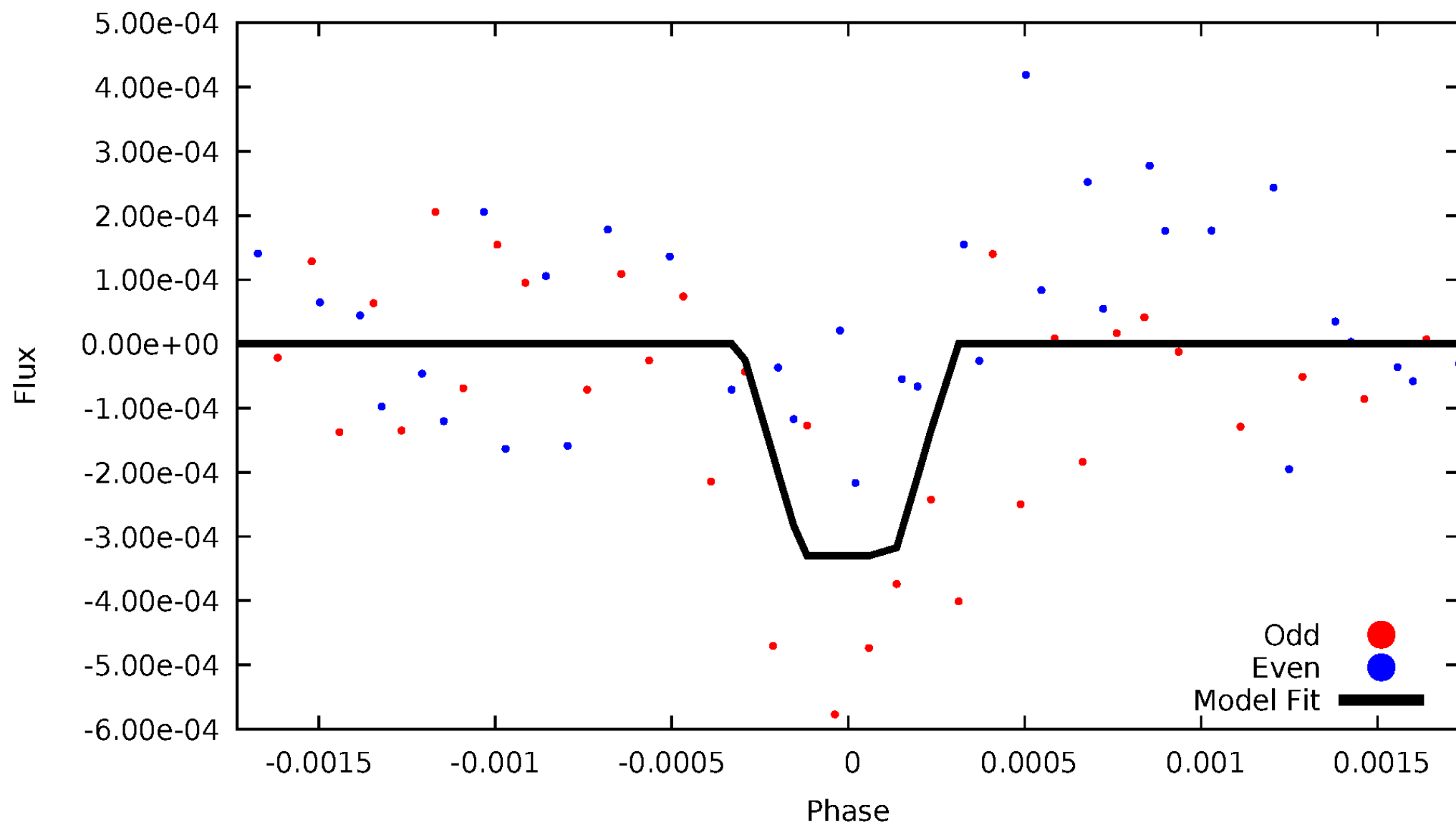
# DV Odd/Even

TCE 008882561-03

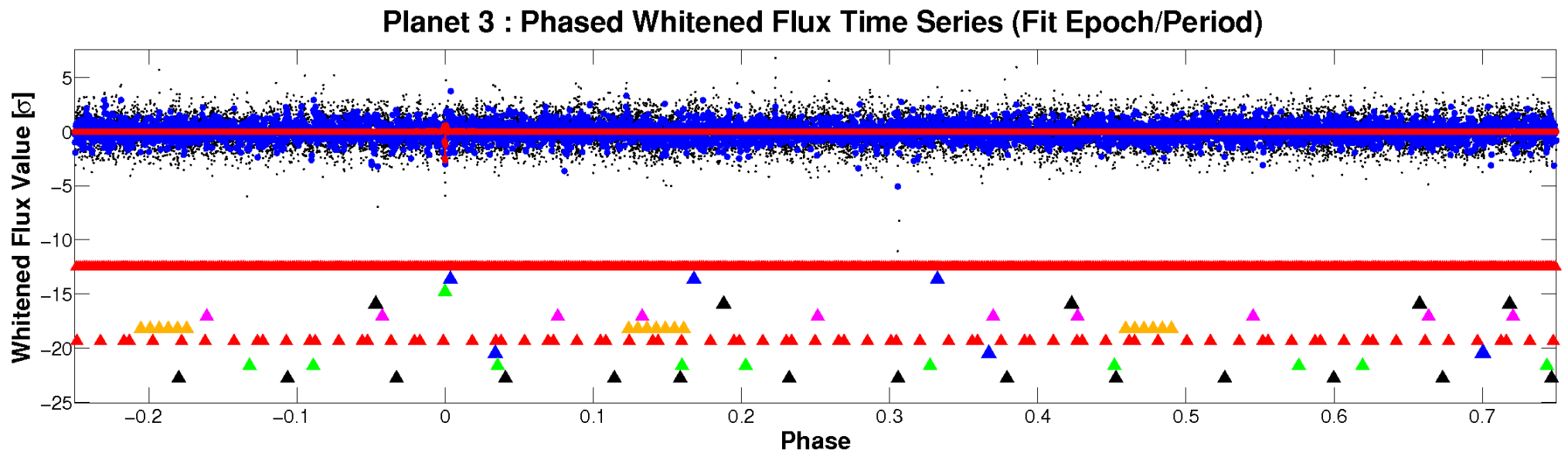
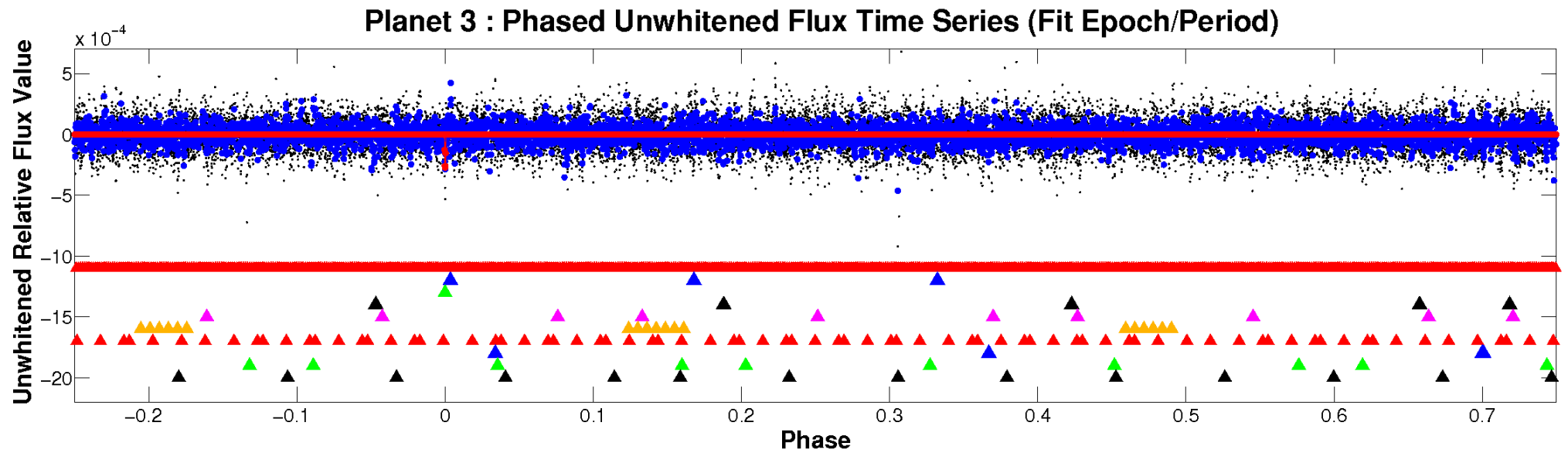


# ALT Odd/Even

TCE 008882561-03

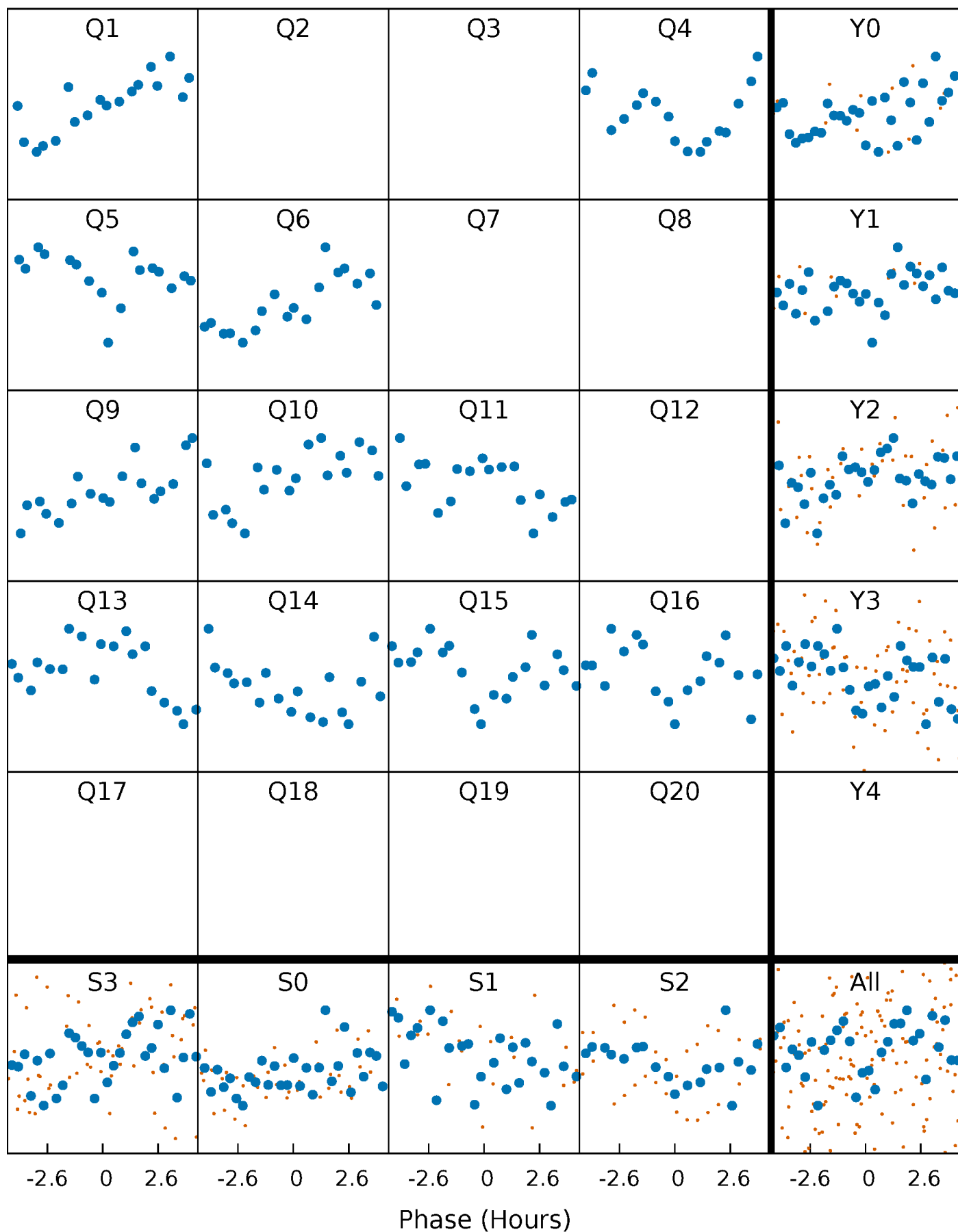


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

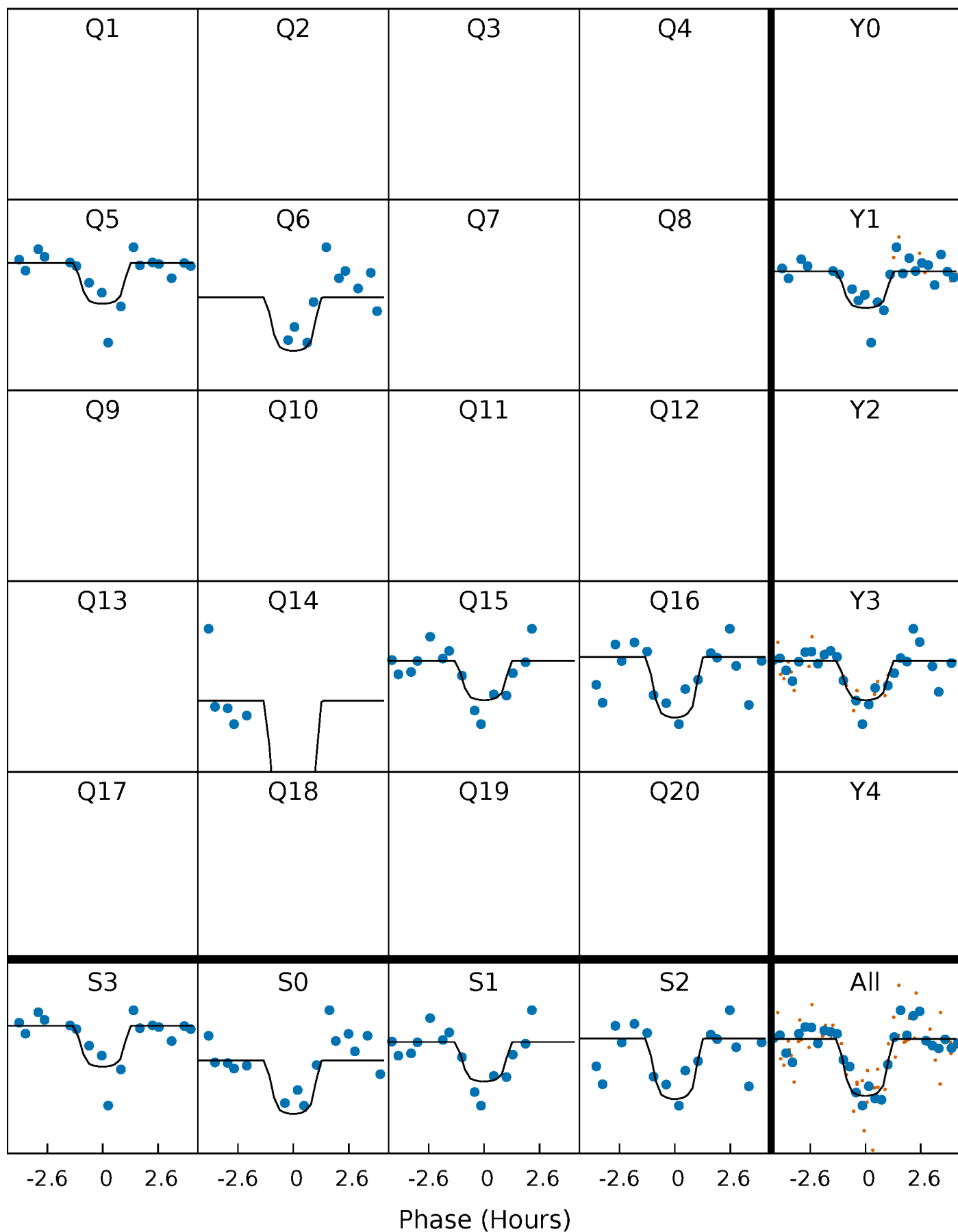
TCE 008882561-03 P=116.422525 Days  $T_0=143.577886$  (BKJD)





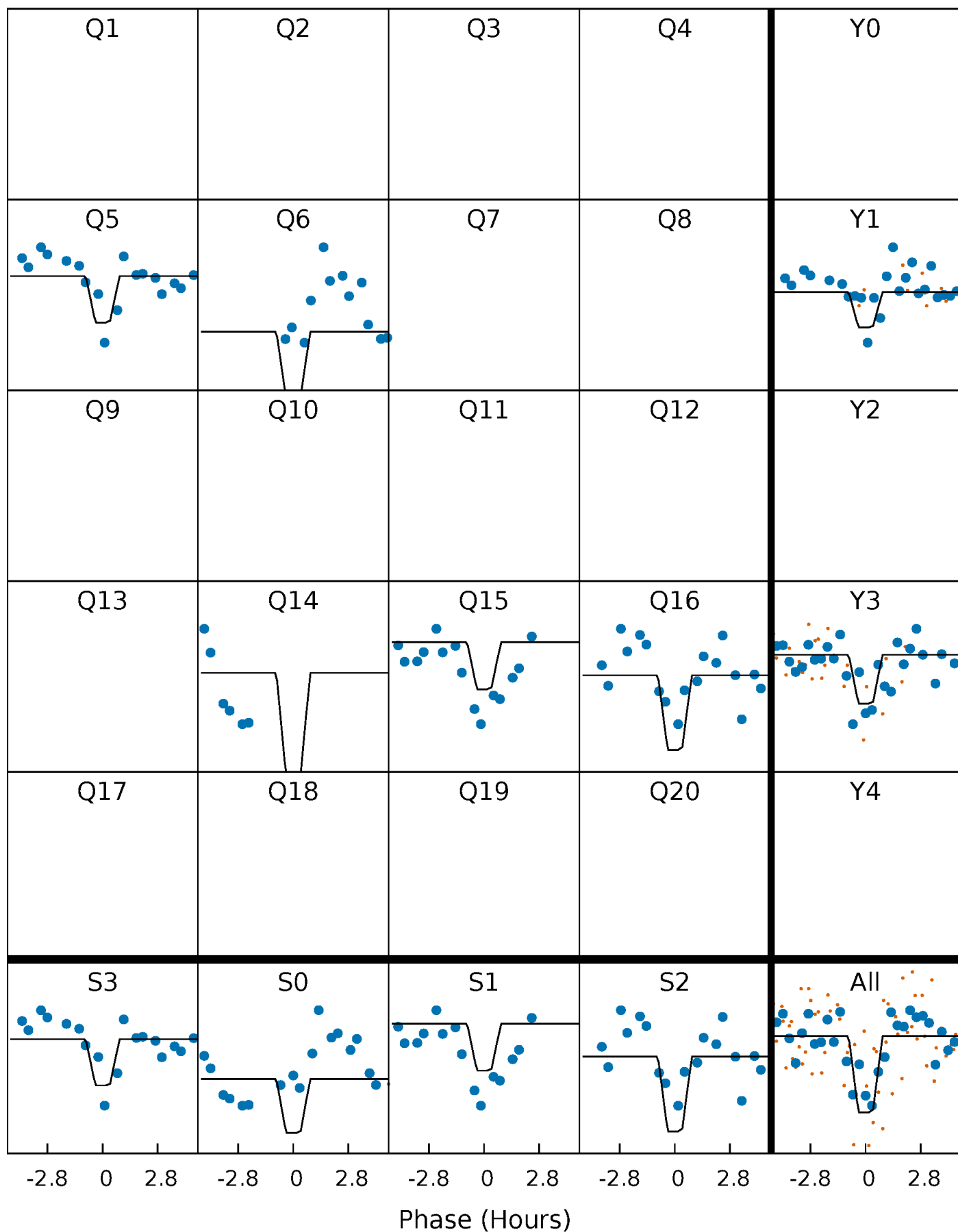
# DV Quarter-Phased Transit Curves

TCE 008882561-03 P=116.422525 Days  $T_0=143.577886$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

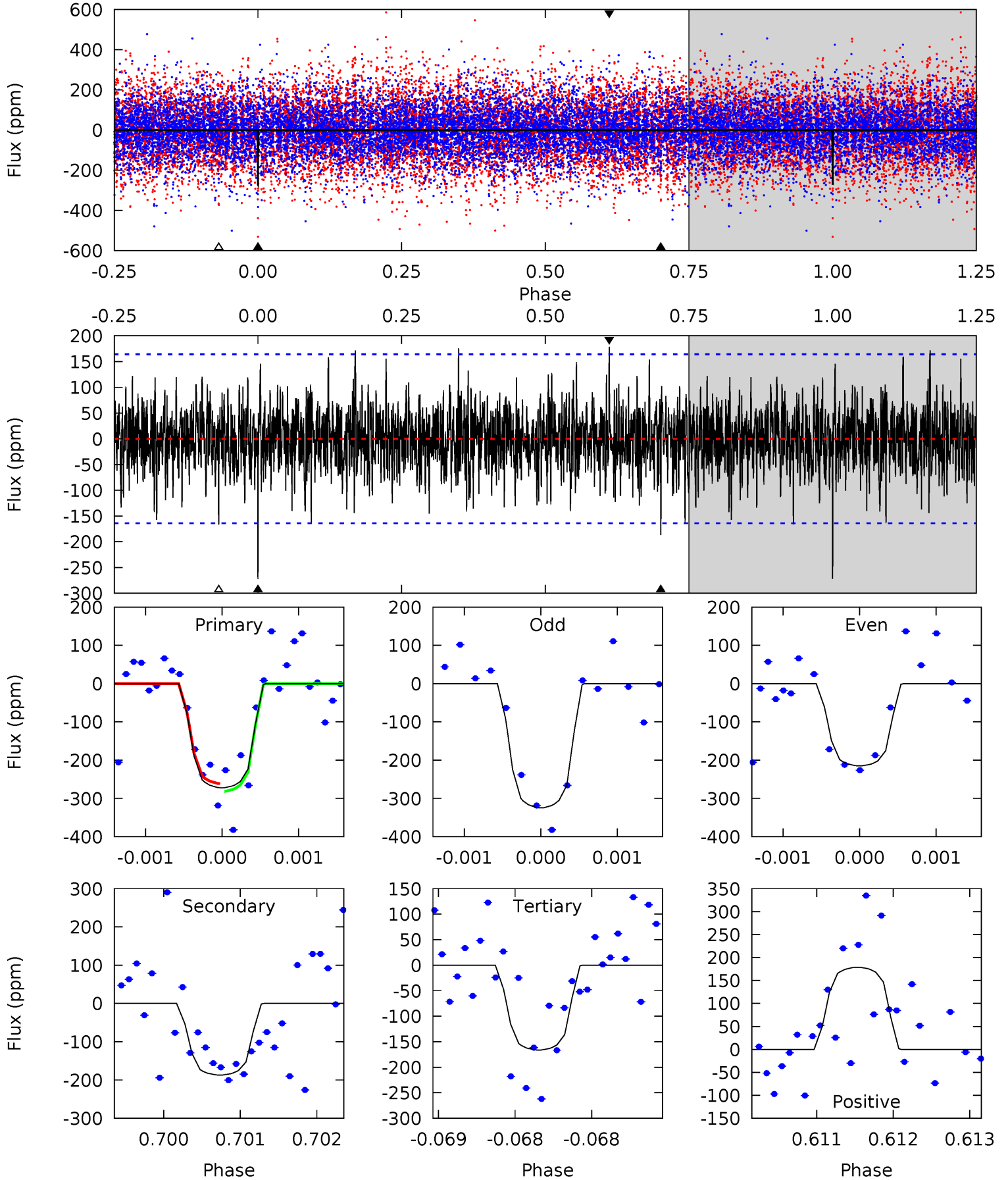
TCE 008882561-03 P=116.421804 Days  $T_0=143.587471$  (BKJD)



# DV Model-Shift Uniqueness Test

008882561-03, P = 116.422525 Days, E = 27.155361 Days

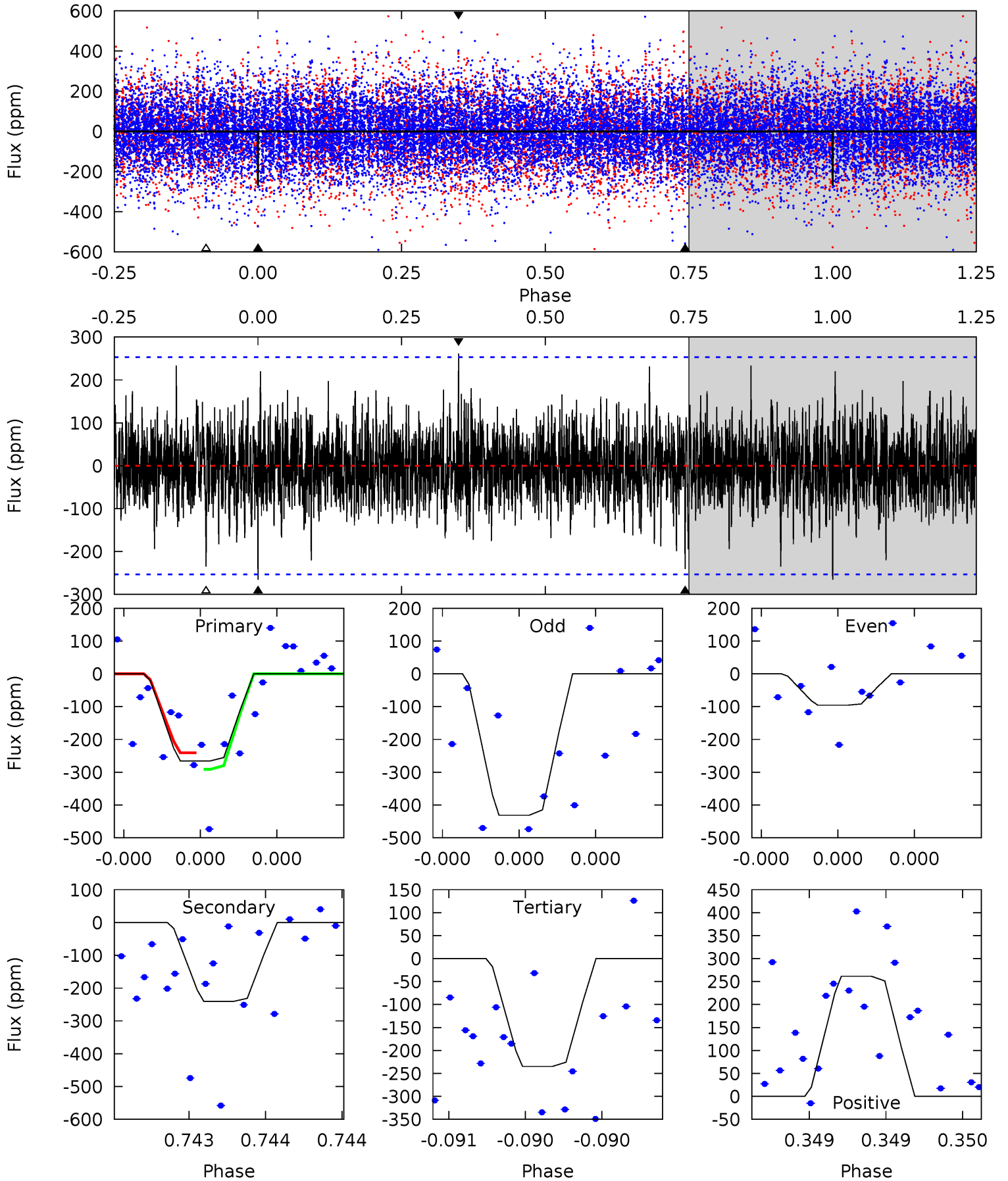
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.08	6.24	5.55	5.97	5.47	3.33	1.60	3.53	3.11	0.69	0.27	1.83	1.01	0.40	0.34



# Alt Model-Shift Uniqueness Test

008882561-03, P = 116.421804 Days, E = 27.165667 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.87	5.31	5.19	5.78	5.59	3.51	1.33	0.68	0.09	0.12	-0.47	3.63	1.07	0.50	0.56



### Stellar Parameters For KIC 008882561

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6883^{+153}_{-222}$	$3.562^{+0.288}_{-0.032}$	$0.140^{+0.200}_{-0.250}$	$3.993^{+0.249}_{-1.413}$	$2.119^{+0.073}_{-0.416}$	$0.047^{+0.093}_{-0.006}$
	+2%/-3%	+8%/-1%	+143%/-179%	+6%/-35%	+3%/-20%	+199%/-12%
Source	PHO1	FLK73	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 008882561-03 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-187 \pm 30$	$9.71^{+8.72}_{-6.64}$	$1060^{+52}_{-90}$	$5097^{+4525}_{-1089}$	$369^{+3366}_{-265}$
Alt.	$-240 \pm 45$	$10.04^{+8.65}_{-6.77}$	$1060^{+51}_{-92}$	$5336^{+4776}_{-1151}$	$496^{+3924}_{-364}$

$T_{max}$  = Theoretical Maximum Planetary Temperature

$T_{obs}$  = Observed Planetary Temperature (Assuming  $A=0.3$ )

$A_{obs}$  = Observed Albedo (Assuming  $T=0$ )

If a secondary eclipse is present, the system is likely an EB if  $T_{obs} \gg T_{max}$  AND  $A_{obs} \gg 1.0$

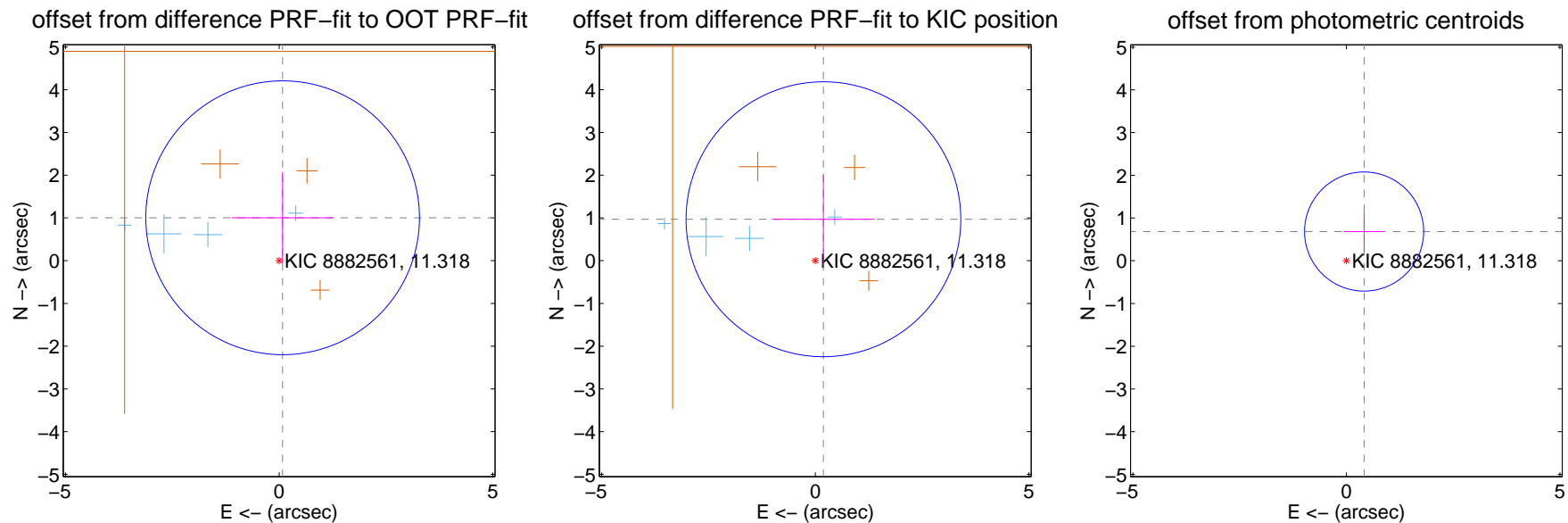
## DV Centroid Data

Supplemental centroid analysis for 008882561-03. **Kepler magnitude: 11.32.** Transit SNR 9.16

There are 4 quarters with good PRF difference image offsets

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

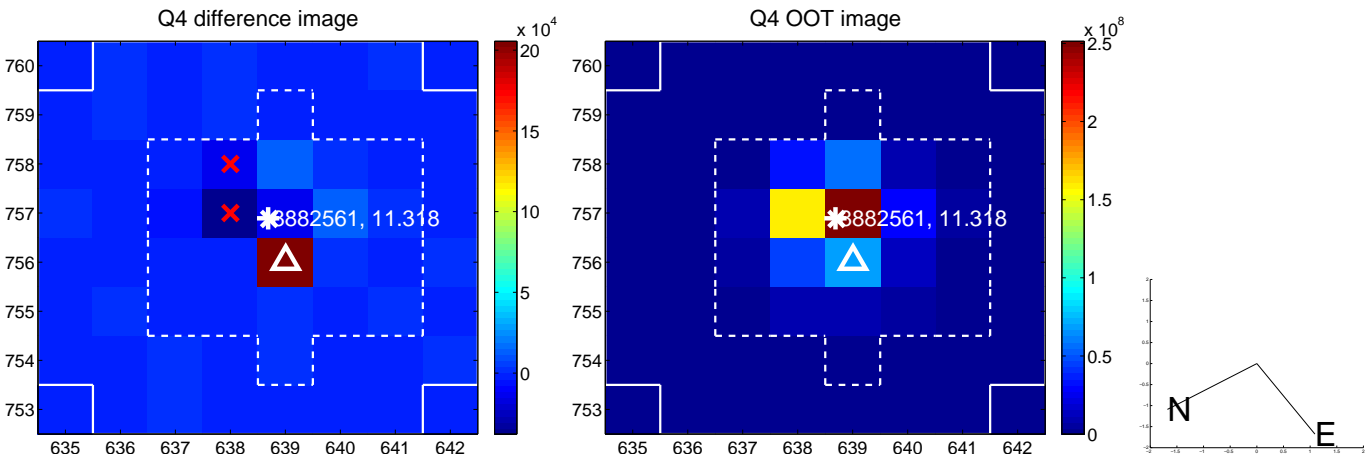
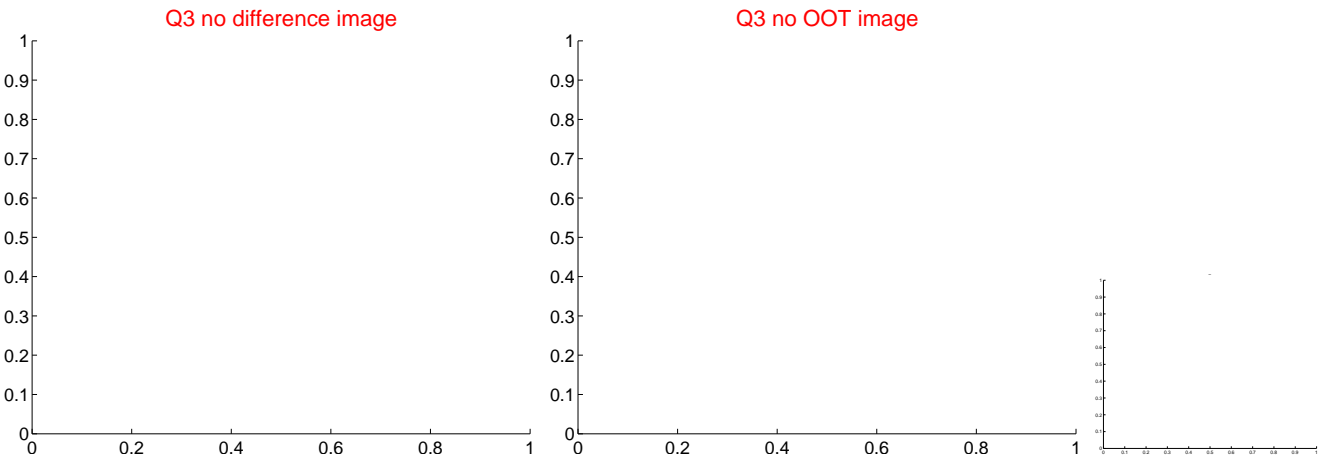
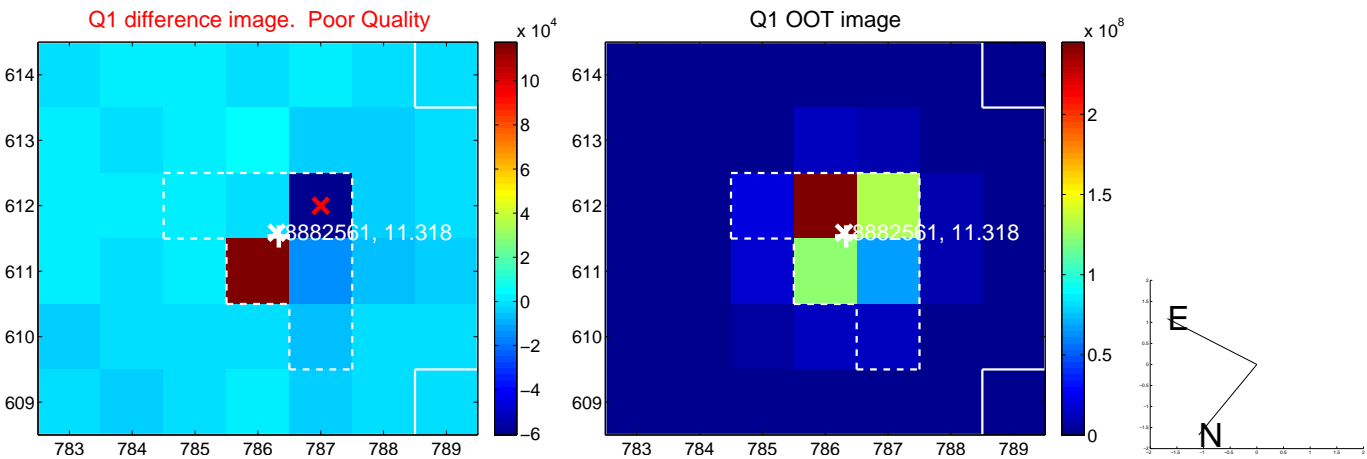
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.008 \pm 1.068$	0.94	$-0.081 \pm 1.195$	$1.004 \pm 1.067$
PRF-fit source offset from KIC position	$0.988 \pm 1.072$	0.92	$-0.191 \pm 1.195$	$0.970 \pm 1.067$
photometric centroid source offset	$0.80 \pm 0.46$	1.72	$-0.41 \pm 0.48$	$0.68 \pm 0.46$



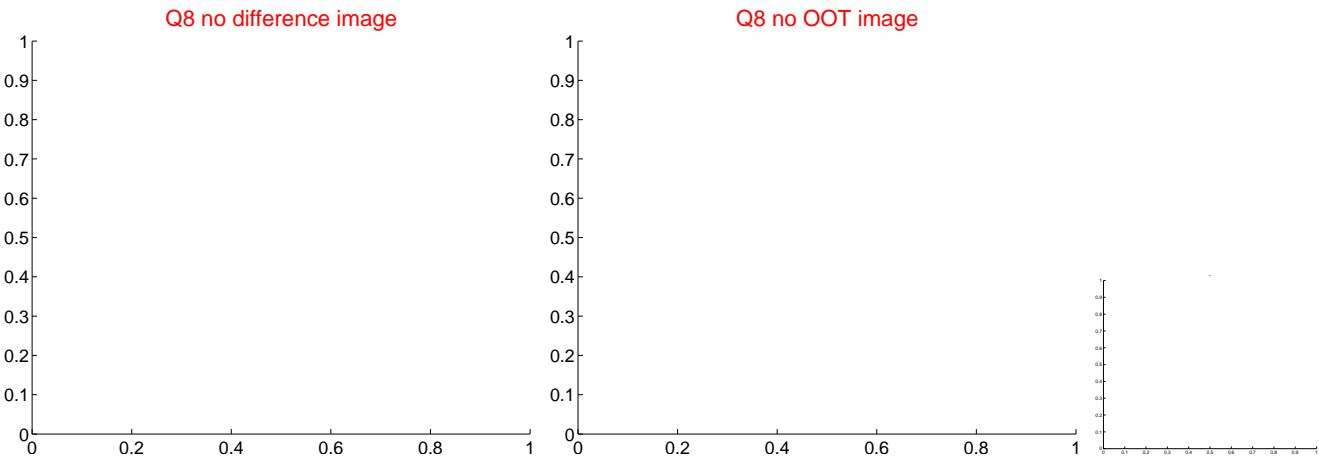
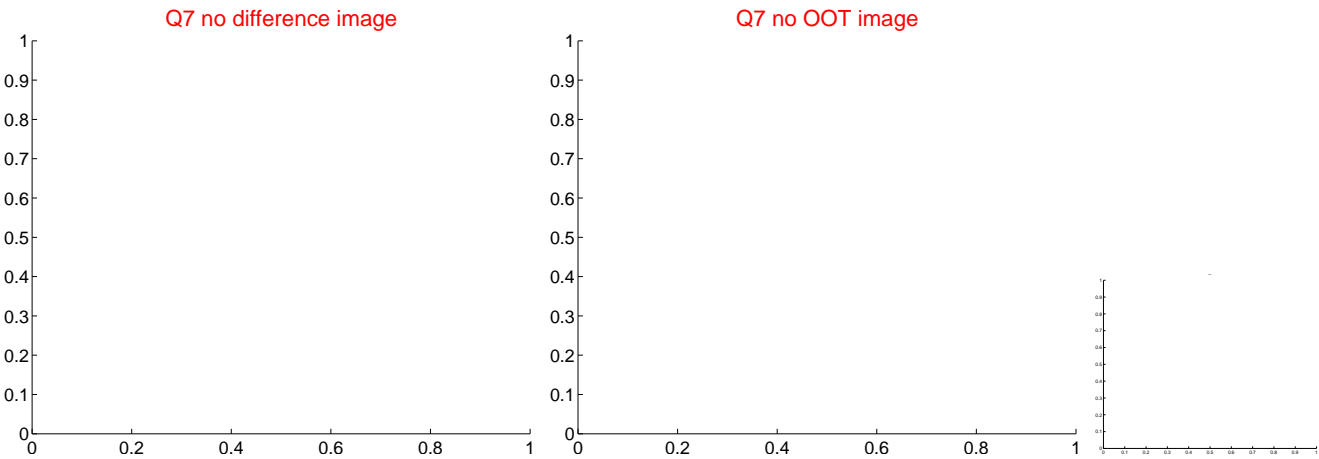
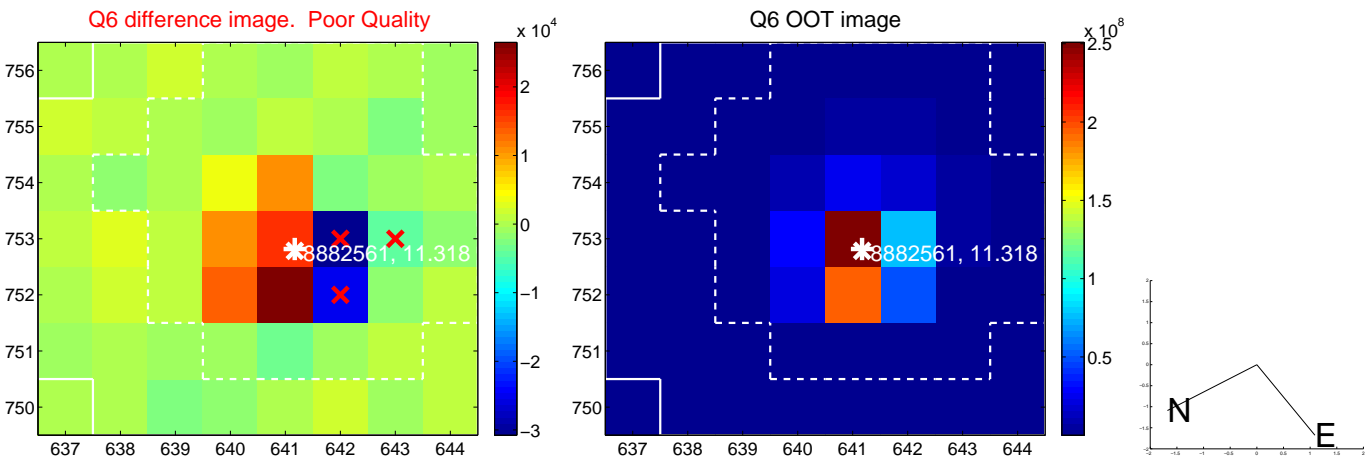
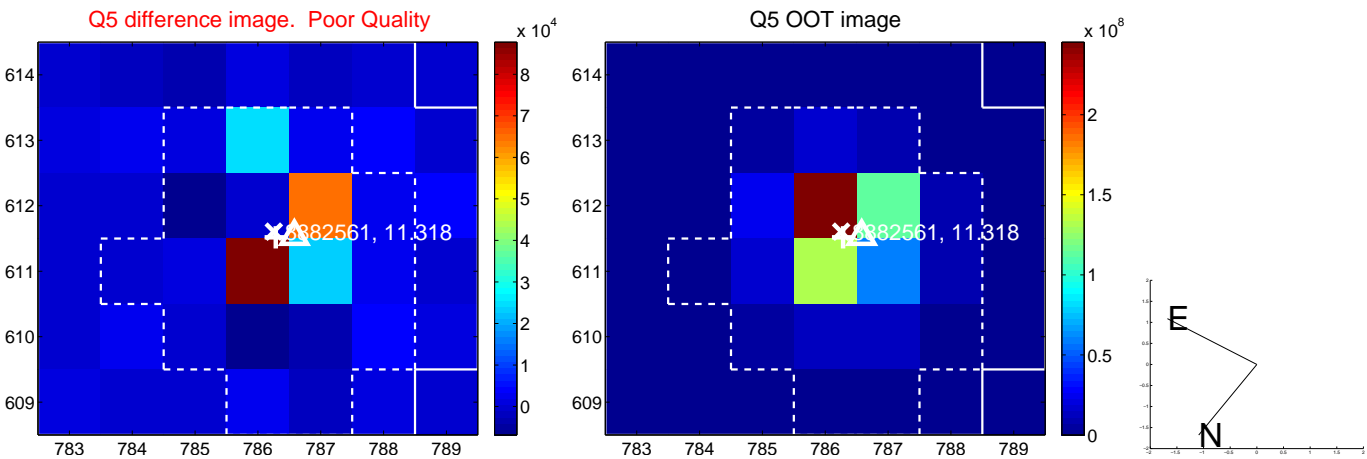
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



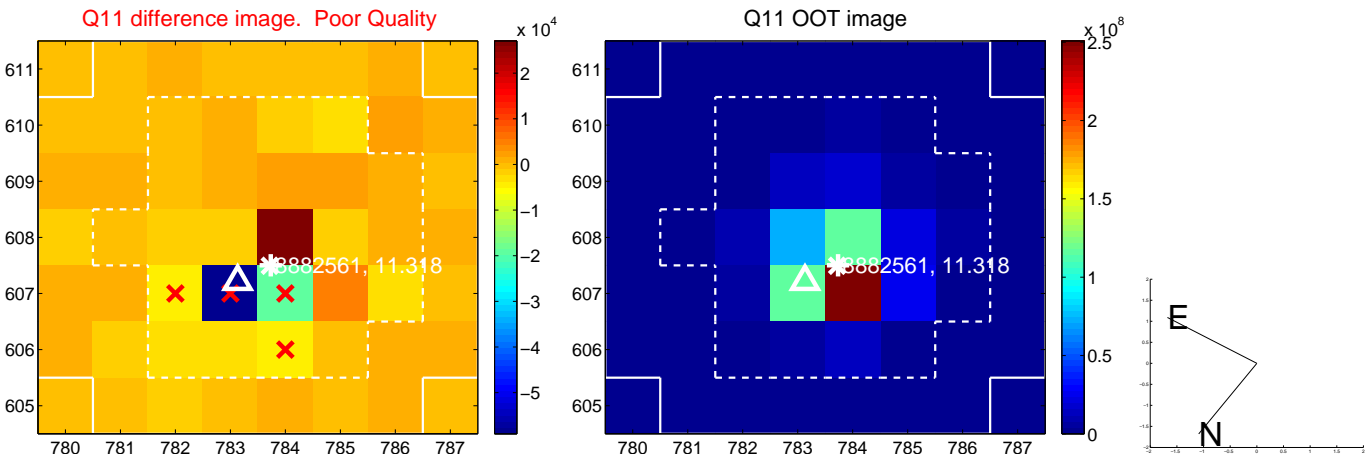
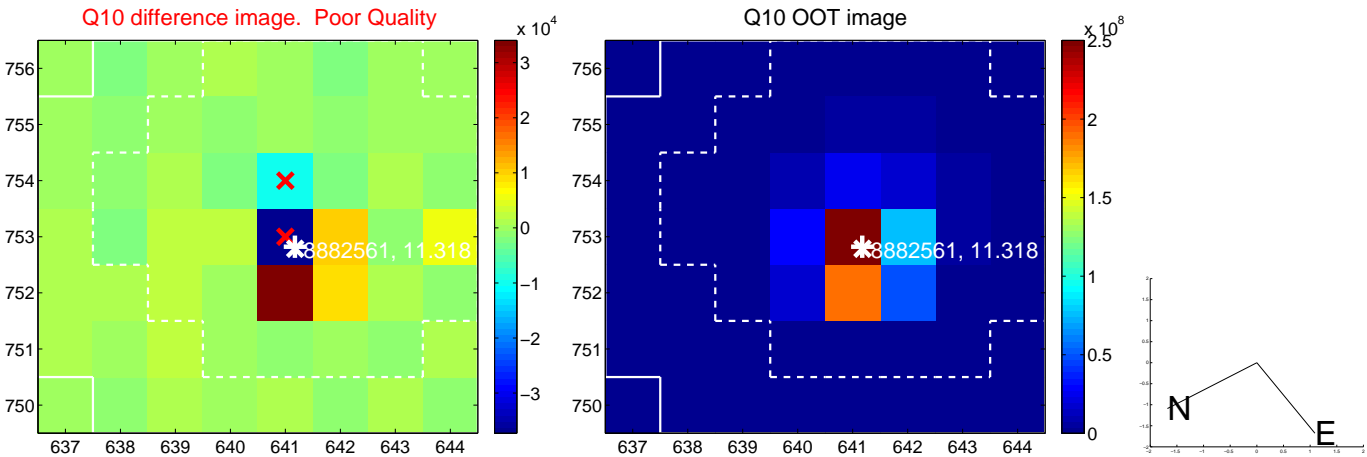
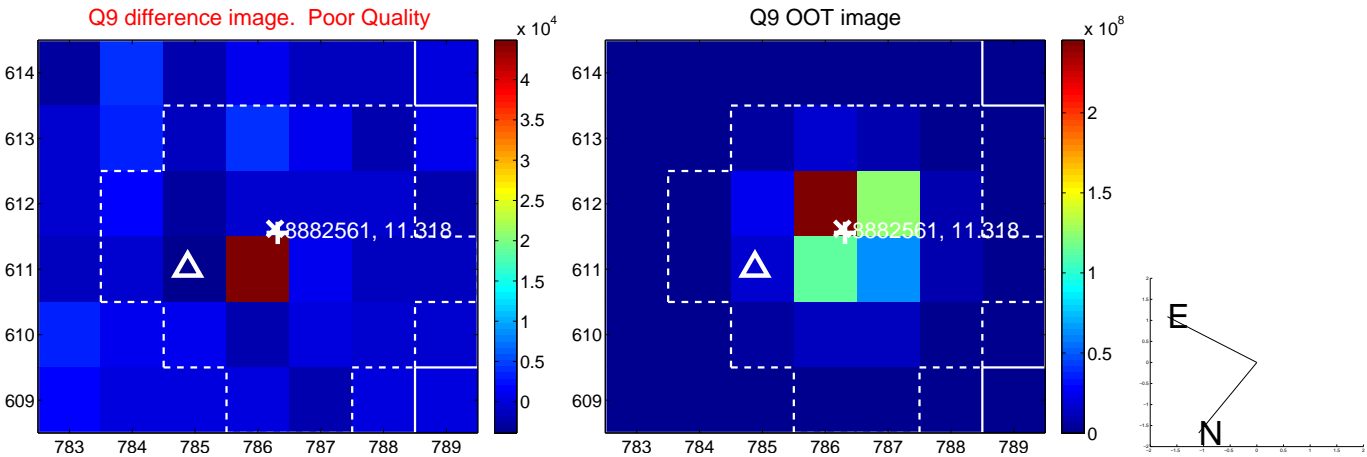
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.



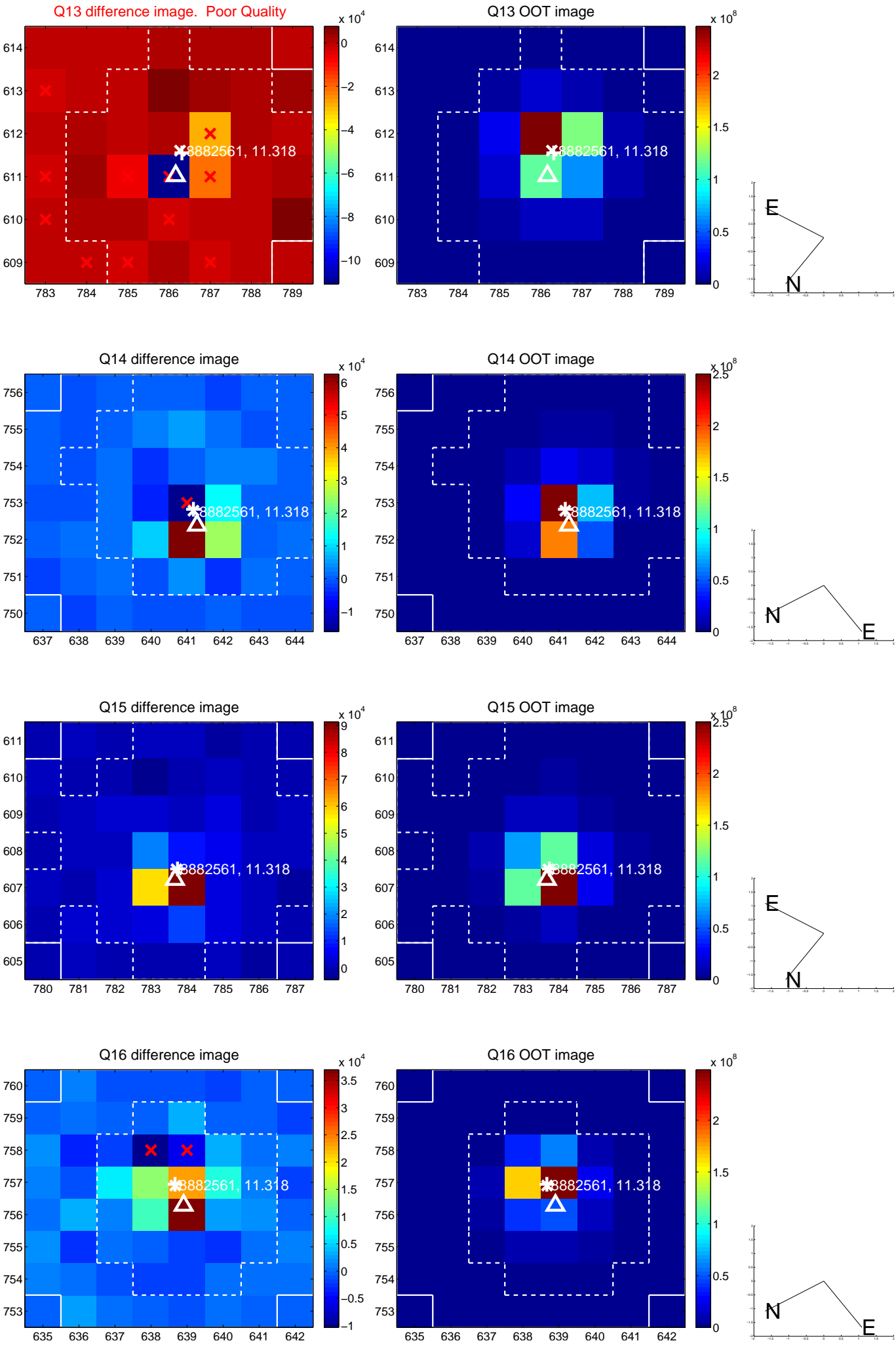
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



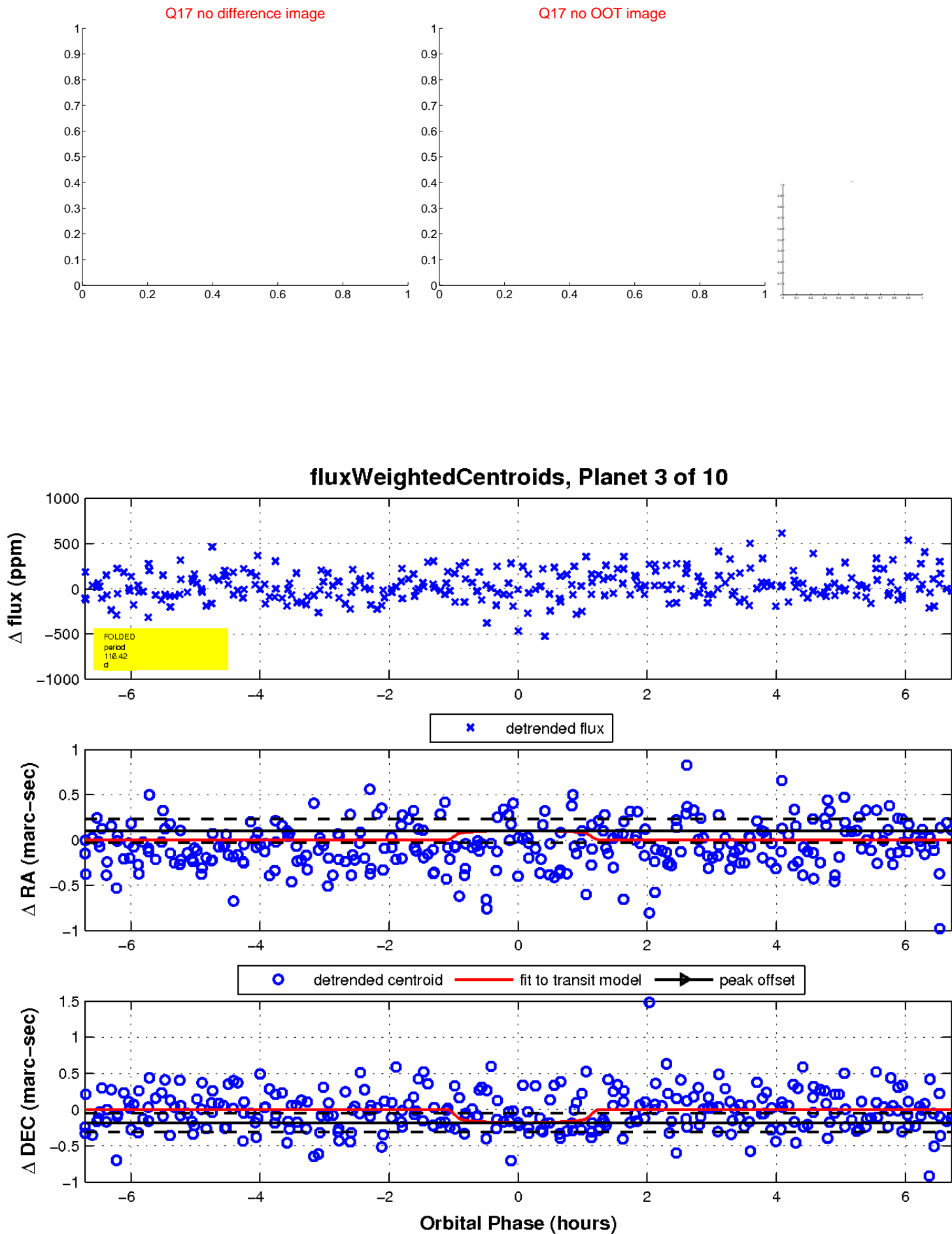
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

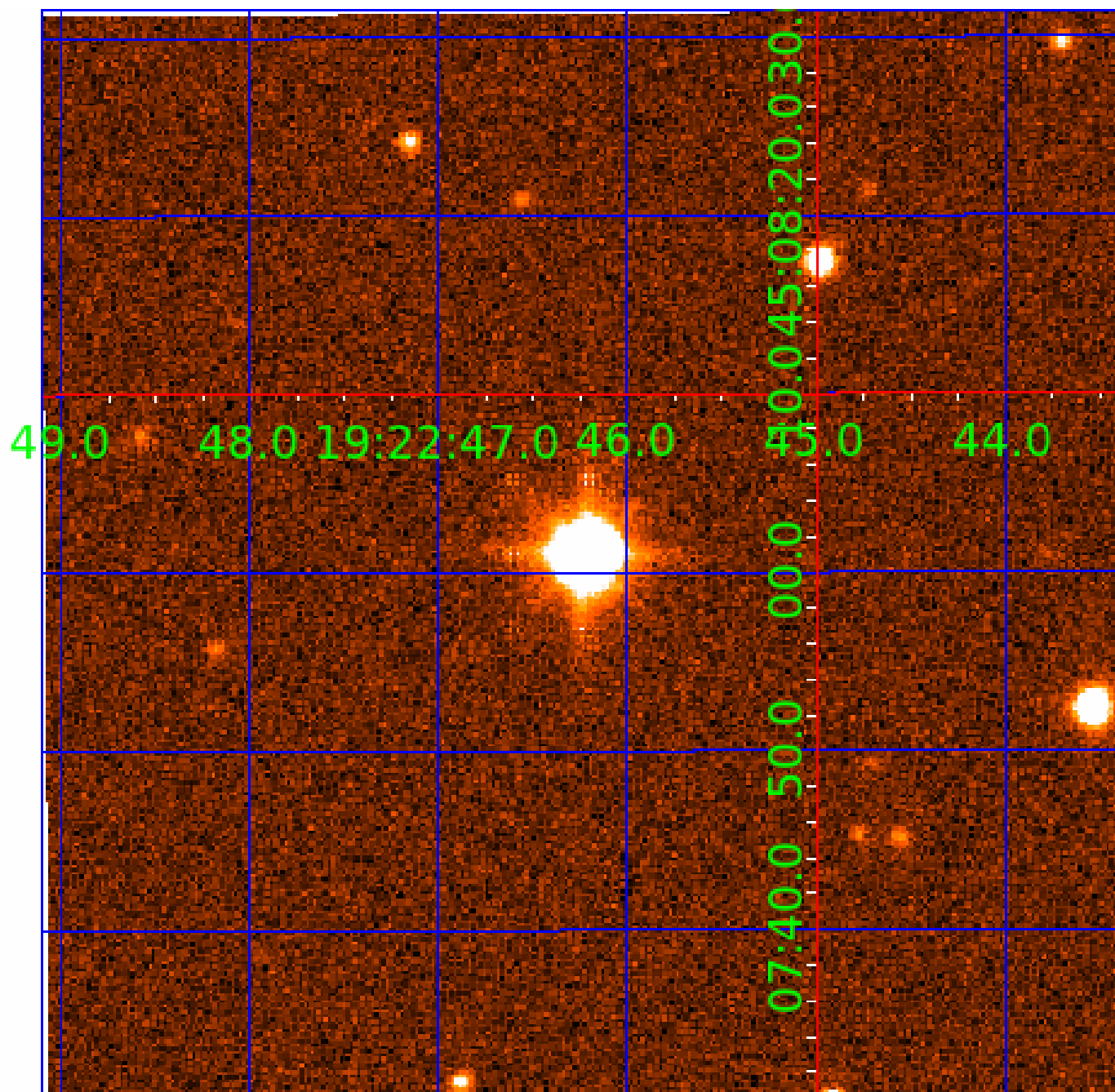


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008882561-01	OBS	No	1.514201	131.737652	22.8	8.481	8.2	9.1	3.99	6883	2.63	29149.21
008882561-02	OBS	No	601.244806	376.846737	316.0	50.859	14.8	8.2	3.99	6883	8.76	9.99
008882561-03	OBS	No	116.422525	143.577886	272.5	2.242	10.4	9.2	3.99	6883	7.27	89.16
008882561-04	OBS	No	260.182597	343.643718	233.8	26.146	9.6	9.2	3.99	6883	6.57	30.51
008882561-05	OBS	No	150.633582	152.436456	294.4	5.530	9.7	10.3	3.99	6883	8.88	63.24
008882561-06	OBS	No	77.374847	162.329719	299.9	3.243	9.2	10.3	3.99	6883	11.25	153.72
008882561-07	OBS	No	18.718323	141.178432	101.8	6.533	8.9	9.7	3.99	6883	4.60	1019.80
008882561-08	OBS	No	426.915106	225.078632	241.7	5.371	8.7	9.3	3.99	6883	6.96	15.77
008882561-09	OBS	No	150.401601	210.659704	277.3	2.596	8.6	9.4	3.99	6883	7.70	63.37

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008882561-01	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV—CENT_SATURATED
008882561-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_SATURATED
008882561-03	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
008882561-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_SATURATED
008882561-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL_SKYE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
008882561-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
008882561-07	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED—HALO_GHOST
008882561-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—CENT_SATURATED
008882561-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED

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

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

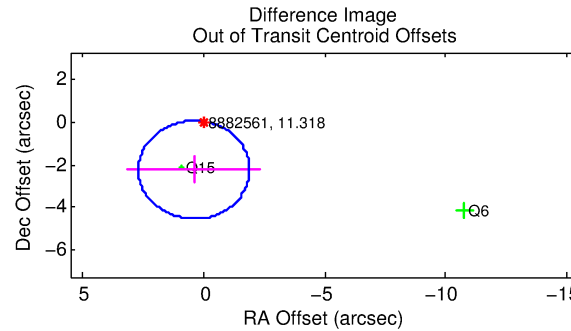
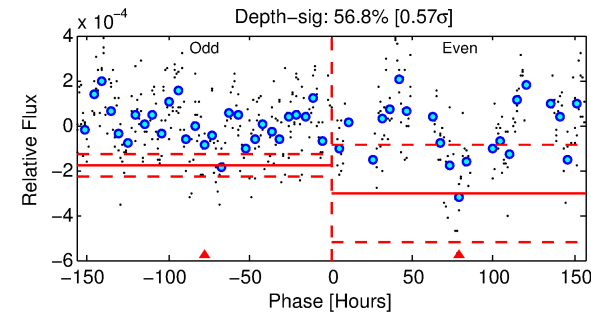
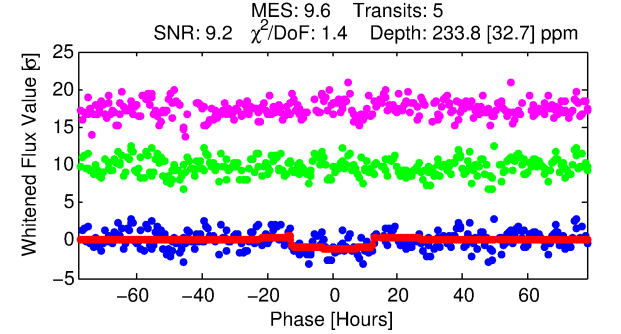
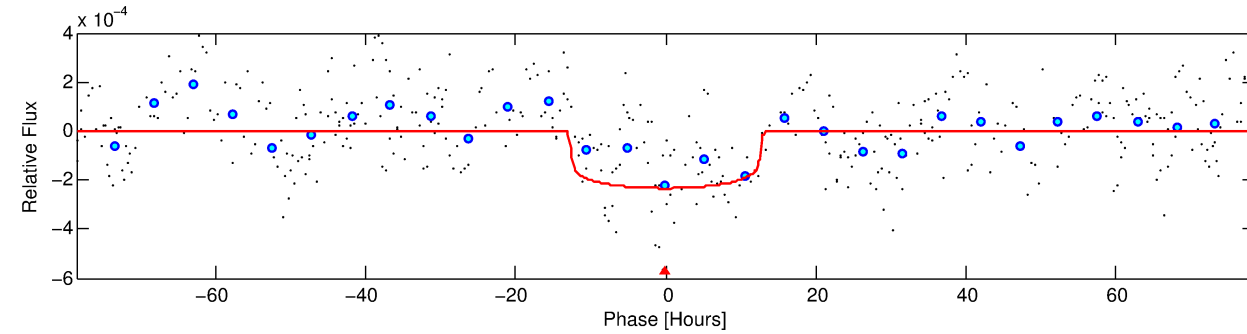
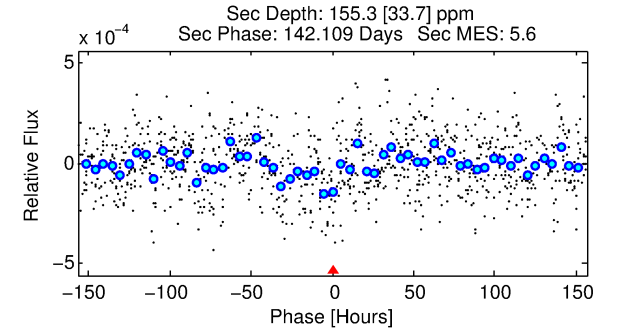
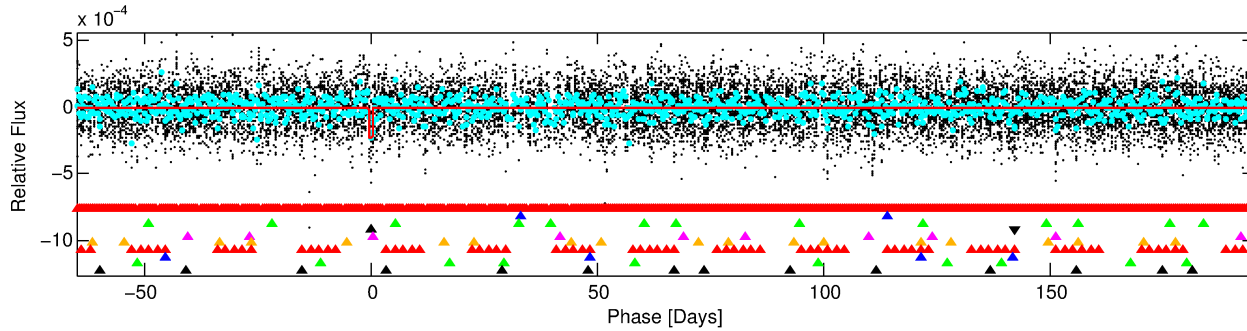
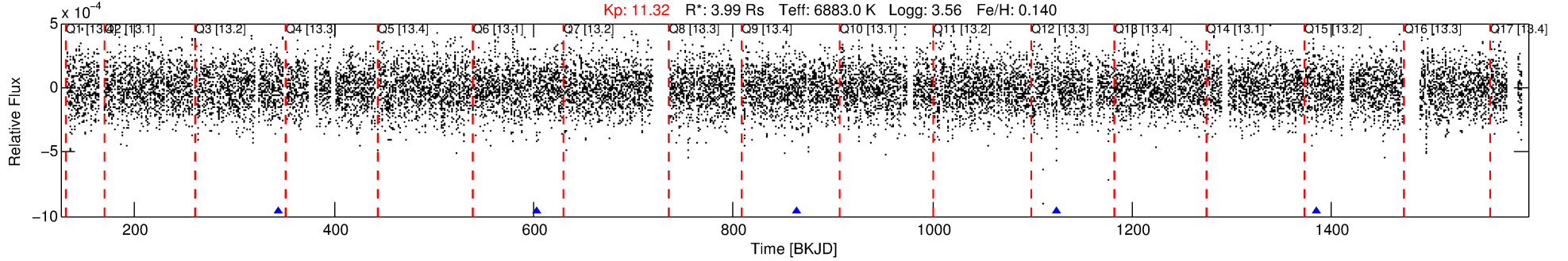
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 008882561-04

No Significant Match Found

# DV One-Page Summary

KIC: 8882561 Candidate: 4 of 10 Period: 260.183 d



## DV Fit Results:

Period = 260.18260 [0.03441] d  
Epoch = 343.6437 [0.0789] BKJD  
Rp/R\* = 0.0151 [0.0024]  
a/R\* = 54.60 [43.80]  
b = 0.72 [0.58]  
Seff = 30.51 [15.79]  
Teq = 599 [78] K  
Rp = 6.56 [2.55] Re  
a = 1.0251 [0.3314] AU  
Ag = 2083.19 [1320.37] [1.58σ]  
Teffp = 6260 [640] K [8.78σ]

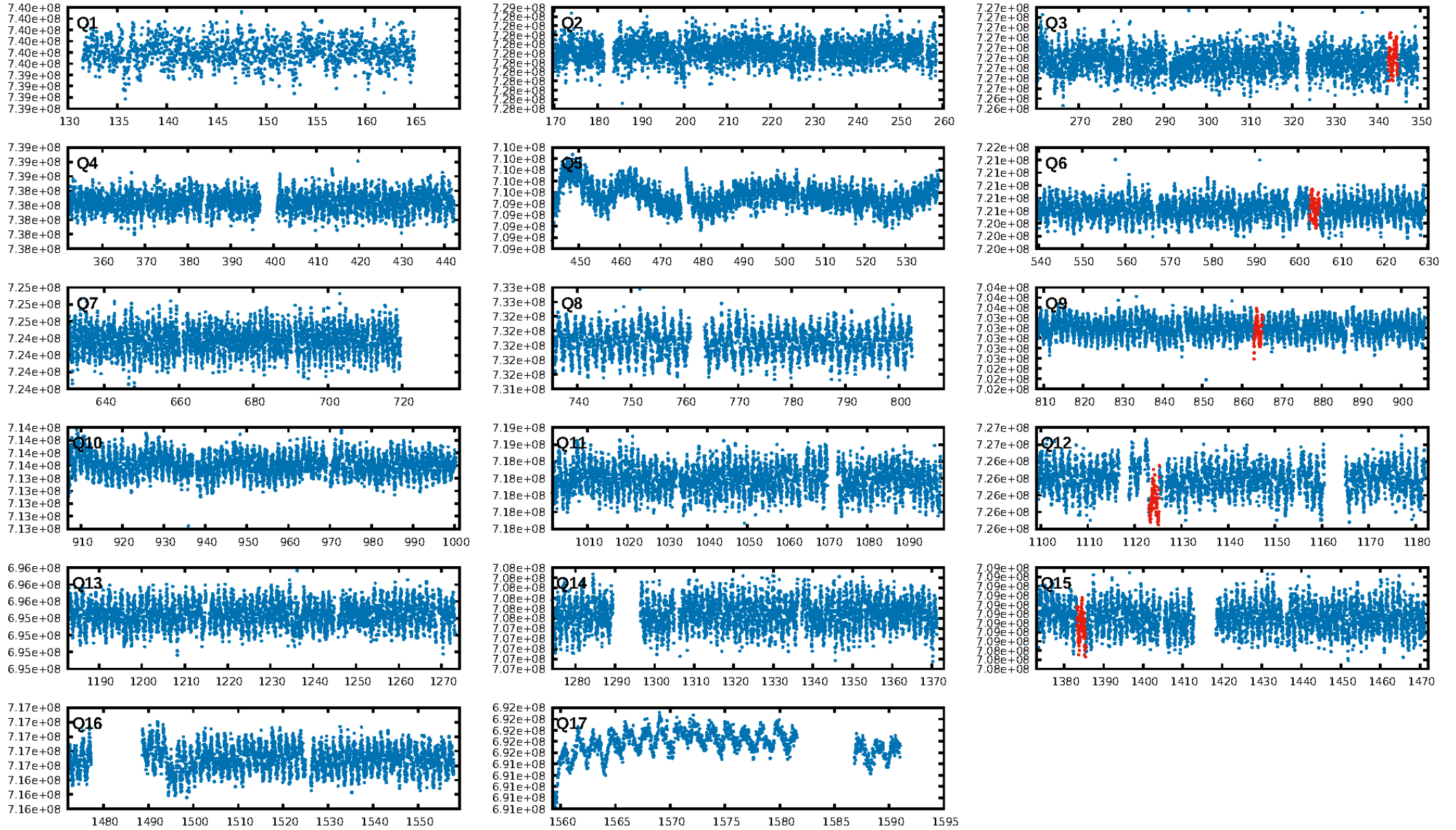
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [98.38σ]  
LongPeriod-sig: 100.0% [149.92σ]  
ModelChiSquare2-sig: 16.9%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [5/5]  
GhostDiagnostic-chr: -0.7452  
Centroid-sig: 85.1%  
Centroid-so: 0.137 arcsec [0.33σ]  
OotOffset-rm: 2.275 arcsec [2.97σ]  
OotOffset-st: 1/1/0/0 [2]  
KicOffset-rm: 2.355 arcsec [3.35σ]  
KicOffset-st: 1/1/0/0 [2]  
DiffImageQuality-fgm: 0.00 [0/2]  
DiffImageOverlap-fno: 0.00 [0/4]

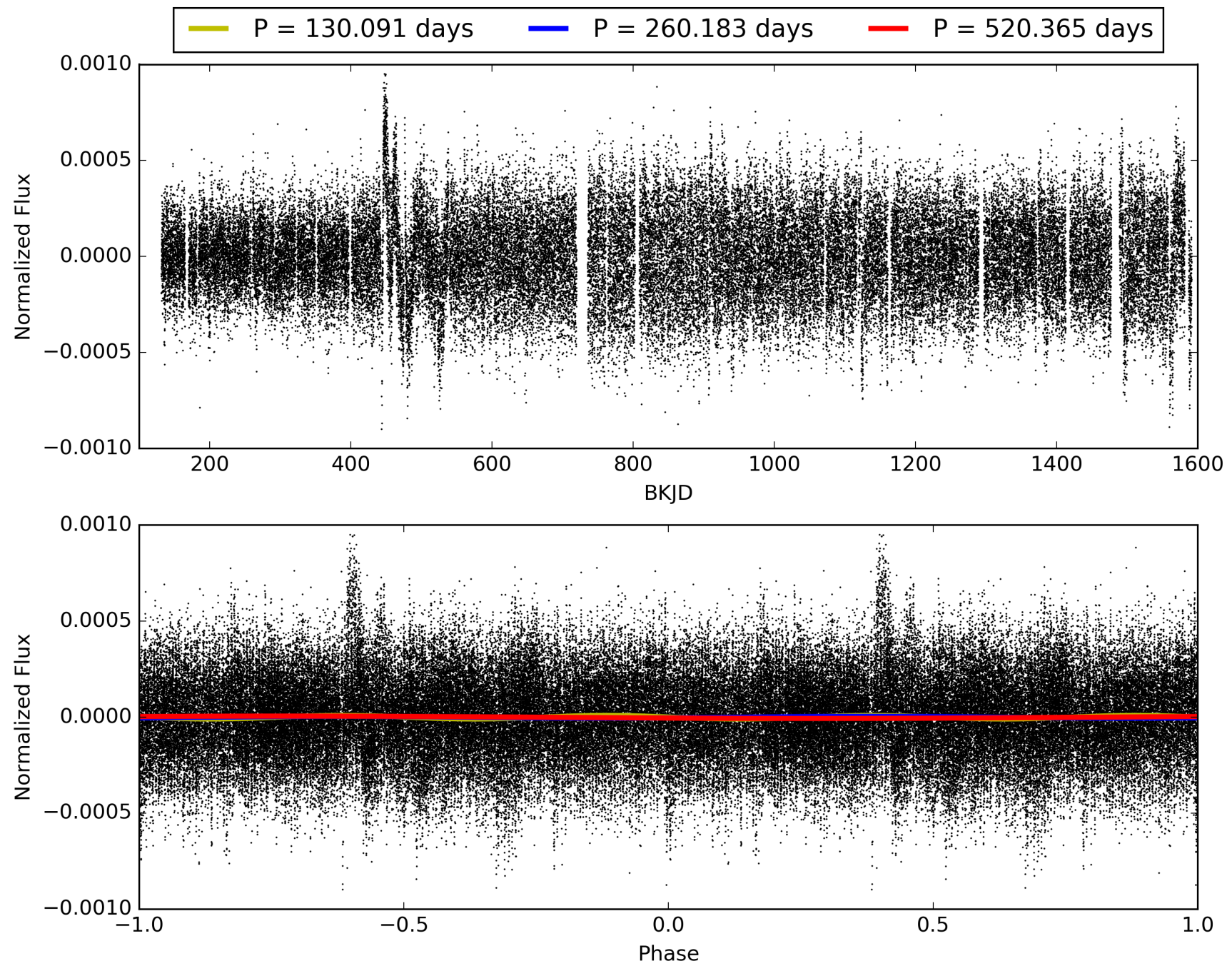
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 21:26:49 Z

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

# TCE 008882561-04, PDC Light Curves

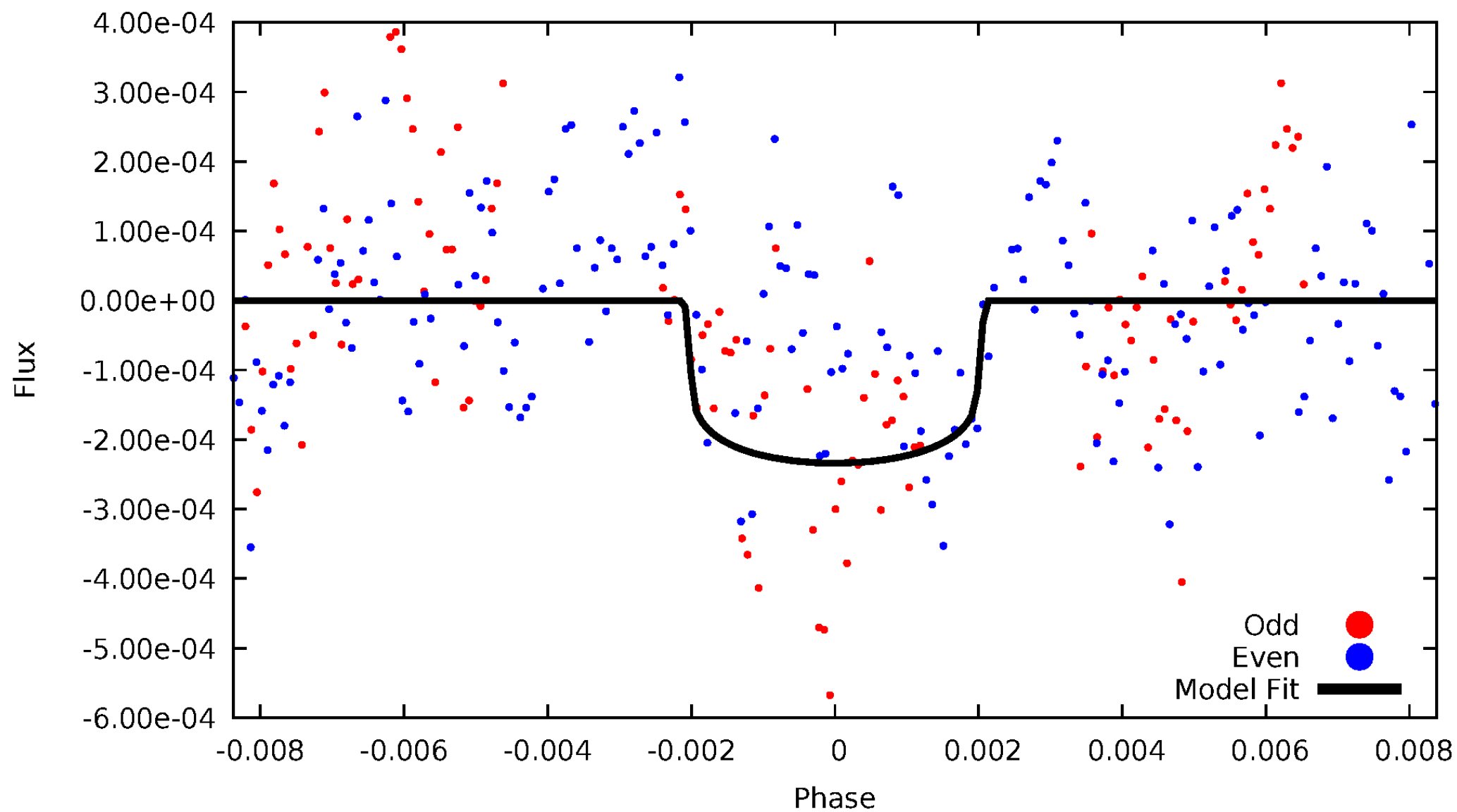


TCE 008882561-04



# DV Odd/Even

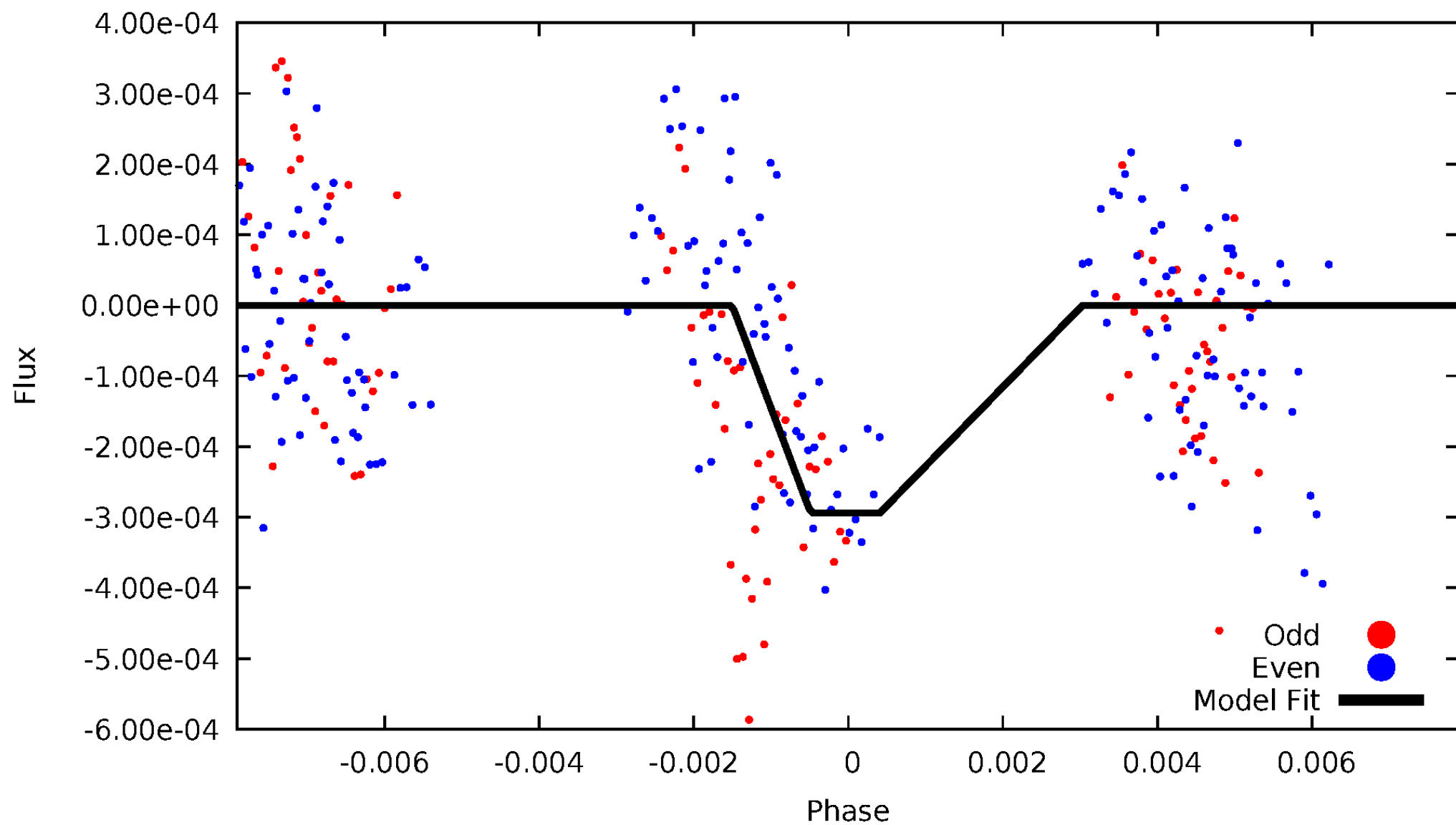
TCE 008882561-04





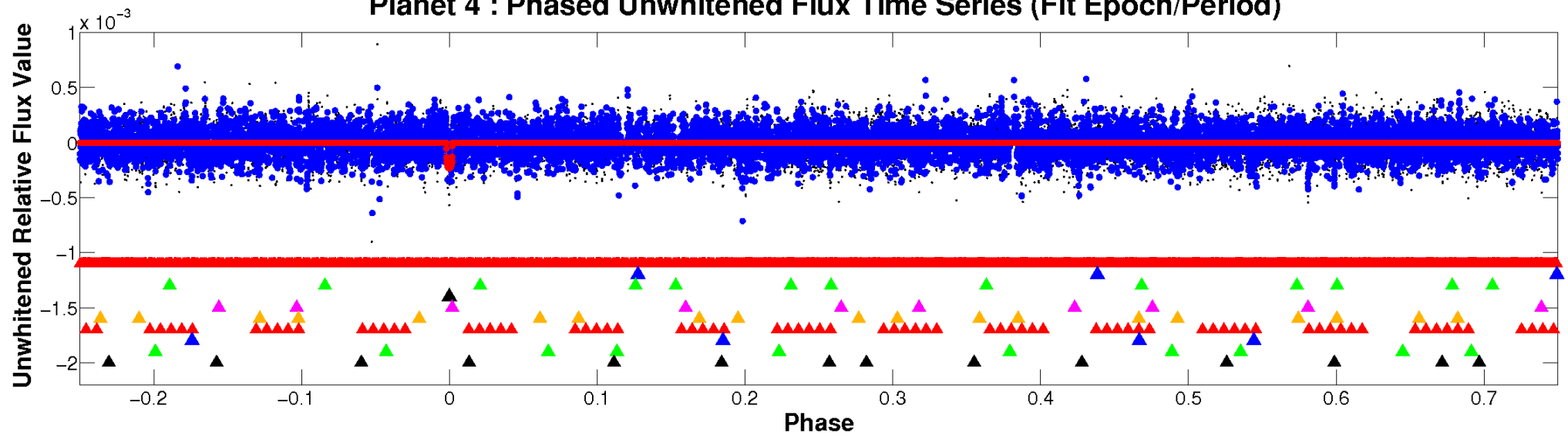
# ALT Odd/Even

TCE 008882561-04

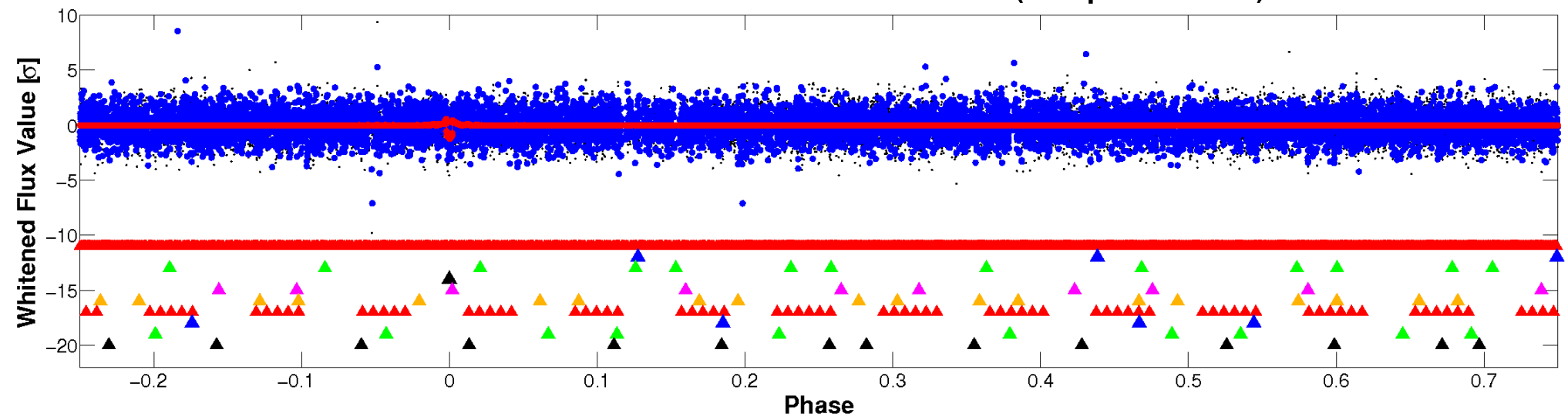


# Non-Whitened Vs. Whitened Light Curve

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



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





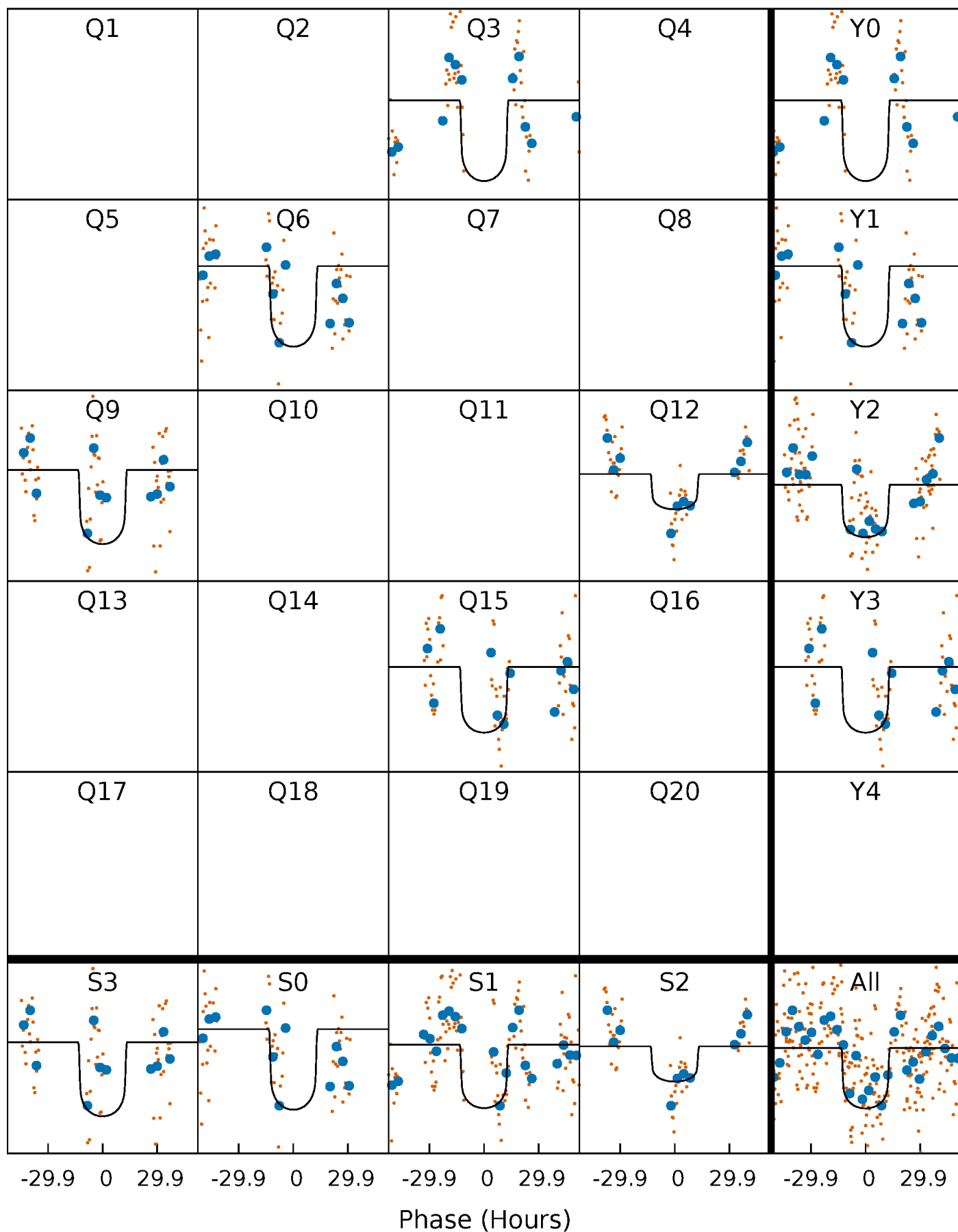
# PDC Quarter-Phased Transit Curves

TCE 008882561-04     $P=260.182597$  Days     $T_0=343.643717$  (BKJD)



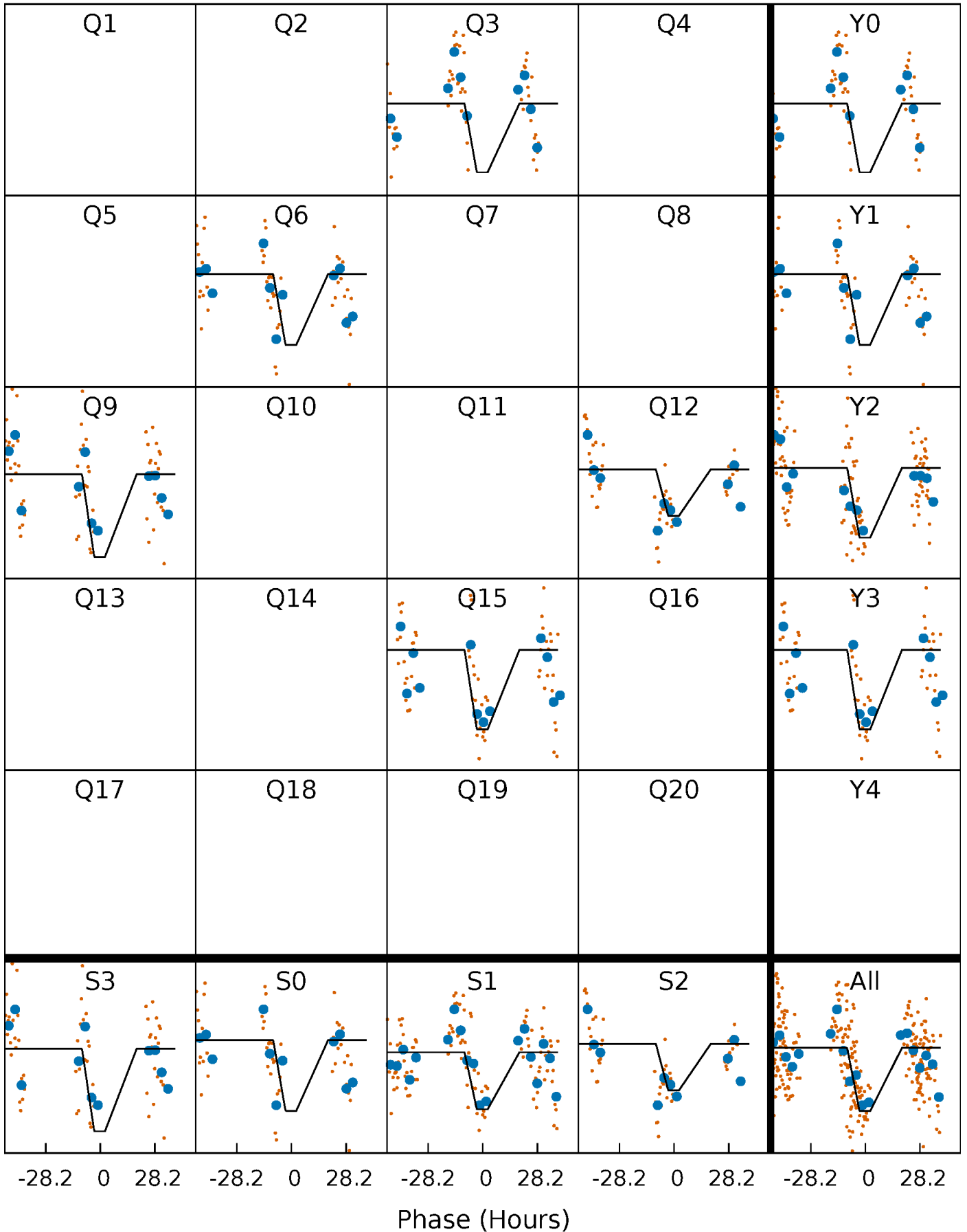
# DV Quarter-Phased Transit Curves

TCE 008882561-04 P=260.182597 Days  $T_0=343.643717$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

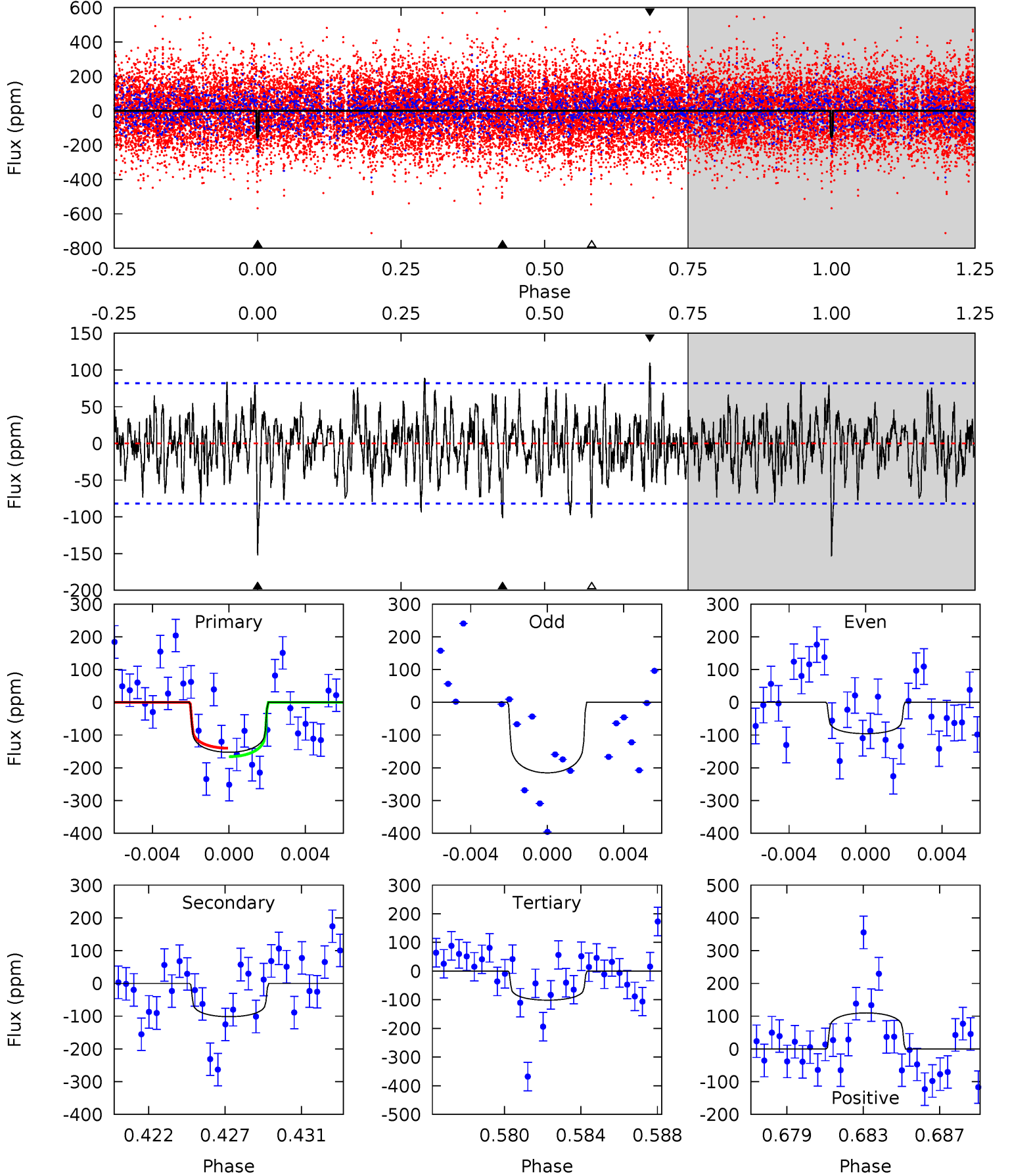
TCE 008882561-04 P=260.337177 Days  $T_0=343.496558$  (BKJD)



# DV Model-Shift Uniqueness Test

008882561-04,  $P = 260.182597$  Days,  $E = 83.461120$  Days

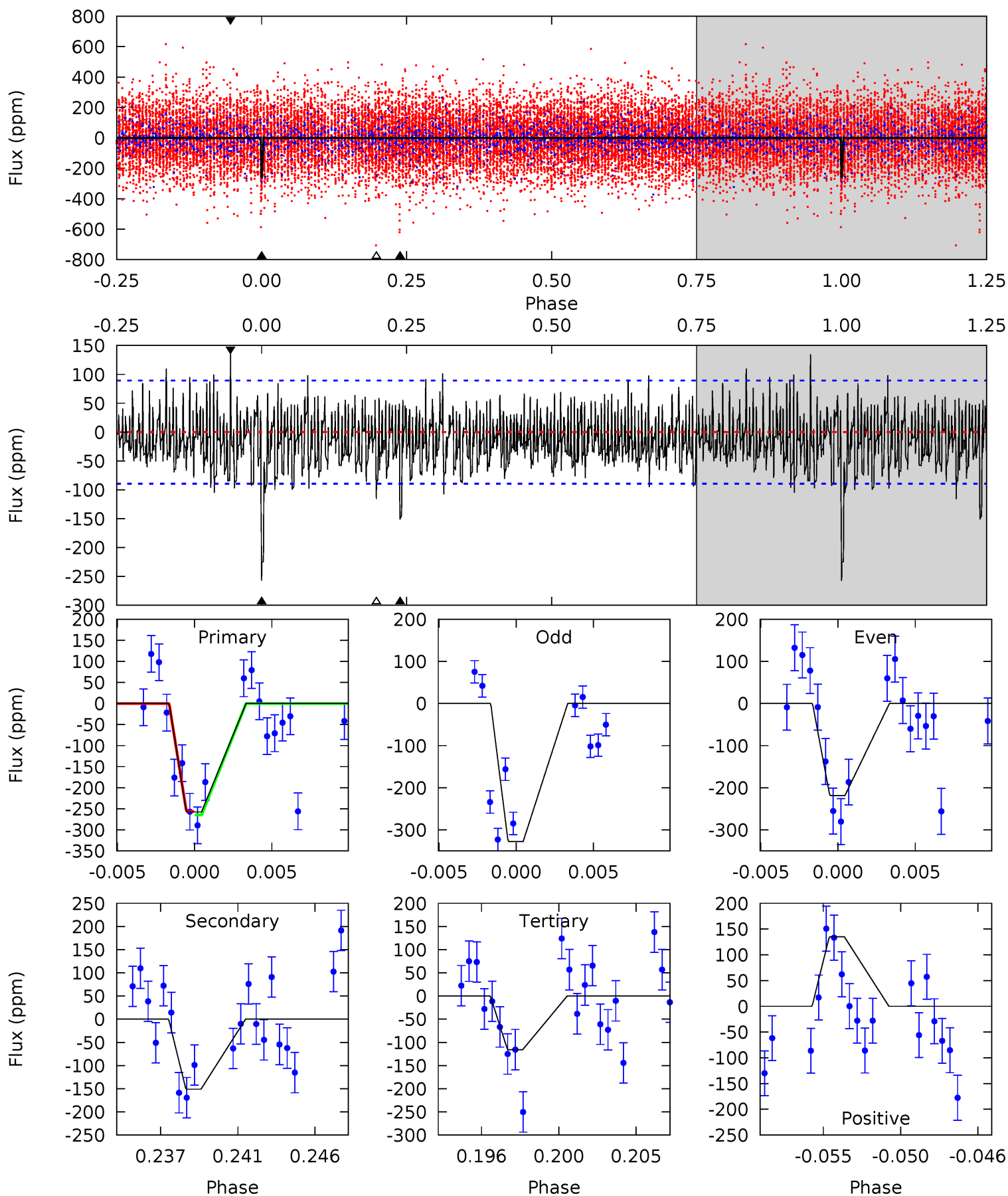
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.65	6.44	6.42	6.95	5.19	2.87	1.97	3.23	2.70	0.02	-0.51	3.78	0.99	0.42	0.82



# Alt Model-Shift Uniqueness Test

008882561-04, P = 260.337177 Days, E = 83.159381 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
14.9	8.75	6.71	7.81	5.18	2.84	1.98	8.21	7.11	2.03	0.93	3.13	1.33	0.34	0.15



### Stellar Parameters For KIC 008882561

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6883^{+153}_{-222}$	$3.562^{+0.288}_{-0.032}$	$0.140^{+0.200}_{-0.250}$	$3.993^{+0.249}_{-1.413}$	$2.119^{+0.073}_{-0.416}$	$0.047^{+0.093}_{-0.006}$
	+2%/-3%	+8%/-1%	+143%/-179%	+6%/-35%	+3%/-20%	+199%/-12%
Source	PHO1	FLK73	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 008882561-04 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-102 \pm 16$	$5.97^{+1.30}_{-1.25}$	$812^{+39}_{-64}$	$5616^{+532}_{-450}$	$1621^{+930}_{-558}$
Alt.	$-151 \pm 17$	$6.91^{+1.40}_{-1.37}$	$815^{+36}_{-67}$	$5769^{+510}_{-401}$	$1793^{+1000}_{-540}$

$T_{max}$  = Theoretical Maximum Planetary Temperature

$T_{obs}$  = Observed Planetary Temperature (Assuming  $A=0.3$ )

$A_{obs}$  = Observed Albedo (Assuming  $T=0$ )

If a secondary eclipse is present, the system is likely an EB if  $T_{obs} \gg T_{max}$  AND  $A_{obs} \gg 1.0$

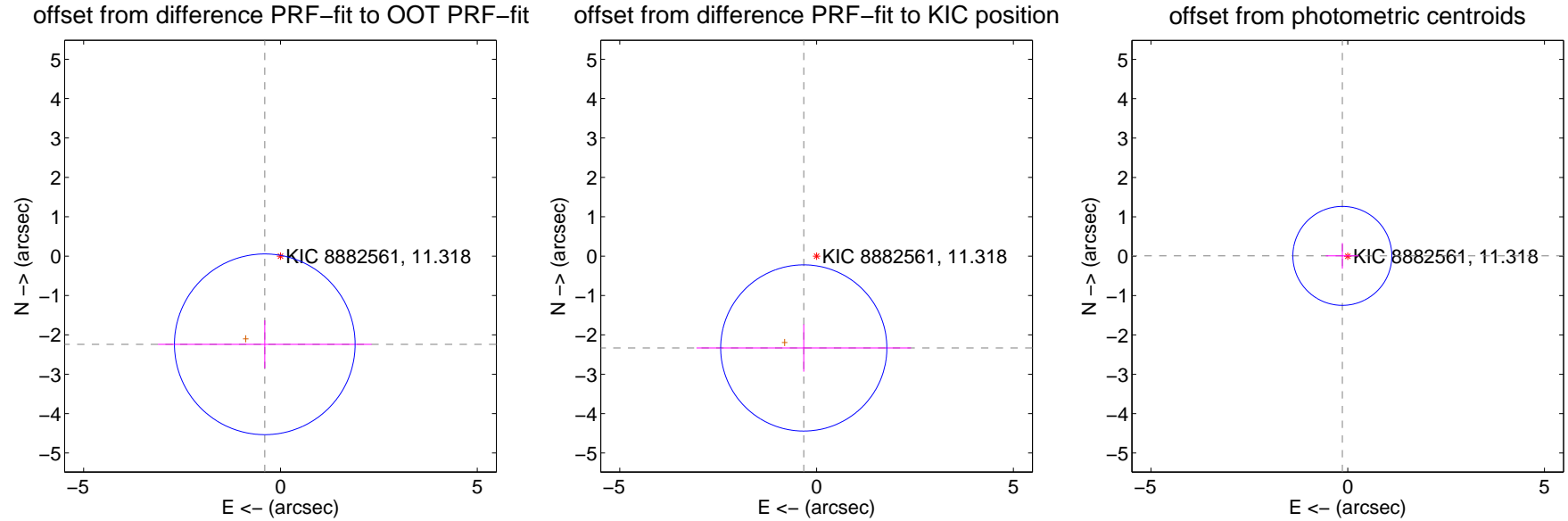
## DV Centroid Data

Supplemental centroid analysis for 008882561-04. **Kepler magnitude: 11.32.** Transit SNR 9.15

**There are 0 quarters with good PRF difference image offsets**

The direct PRF centroid is offset from the target star catalog position by about 0.12 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.275 \pm 0.765$	2.97	$0.398 \pm 2.713$	$-2.240 \pm 0.609$
PRF-fit source offset from KIC position	<b><math>2.355 \pm 0.704</math></b>	<b>3.35</b>	$0.325 \pm 2.724$	$-2.332 \pm 0.600$
photometric centroid source offset	$0.14 \pm 0.42$	0.33	$0.14 \pm 0.42$	$0.01 \pm 0.32$



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



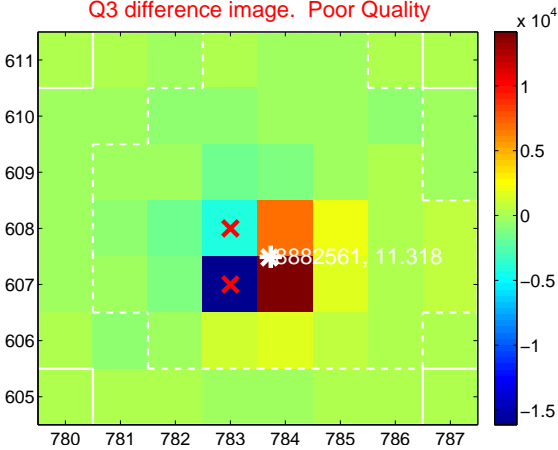
Q2 no difference image



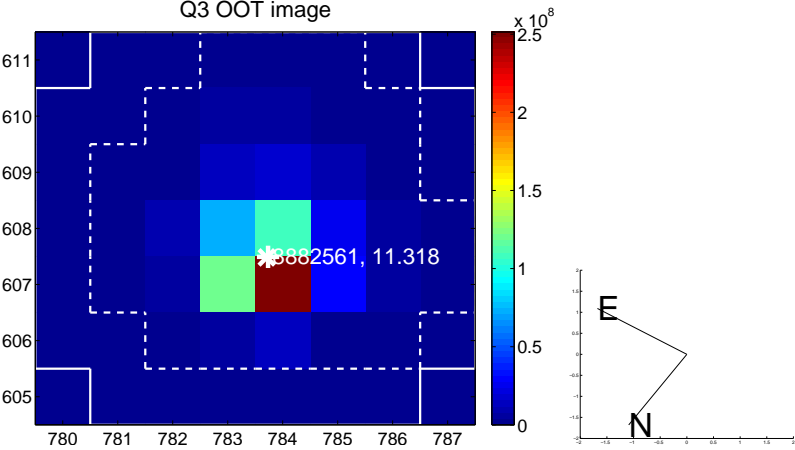
Q2 no OOT image



Q3 difference image. Poor Quality



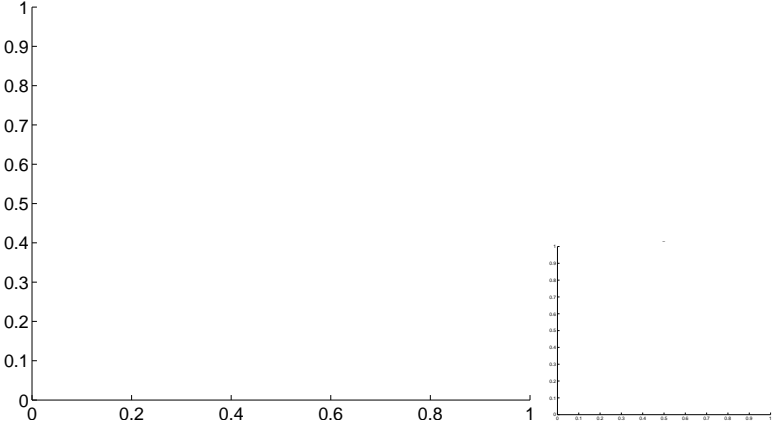
Q3 OOT image



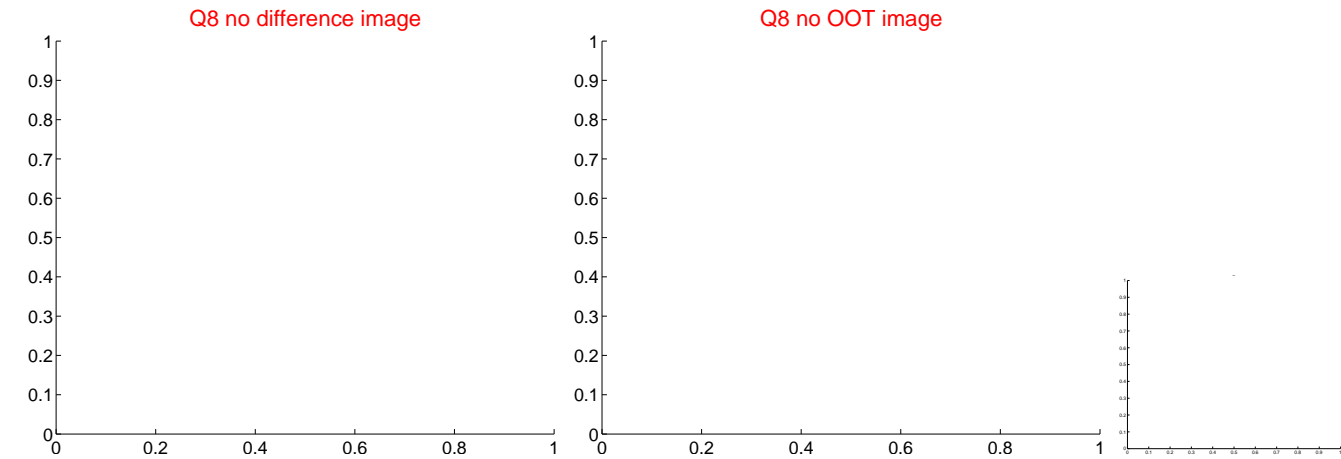
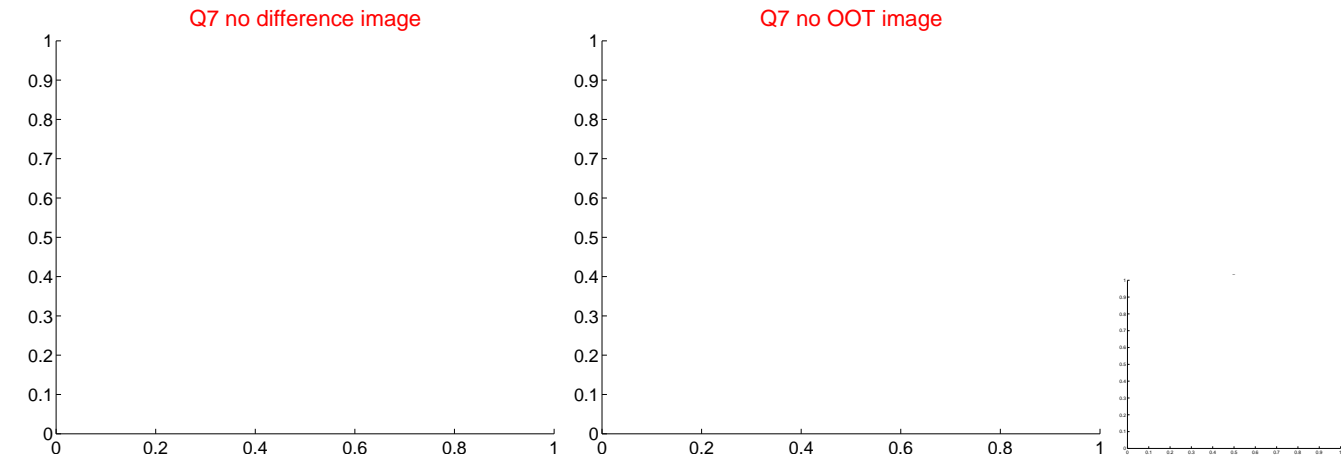
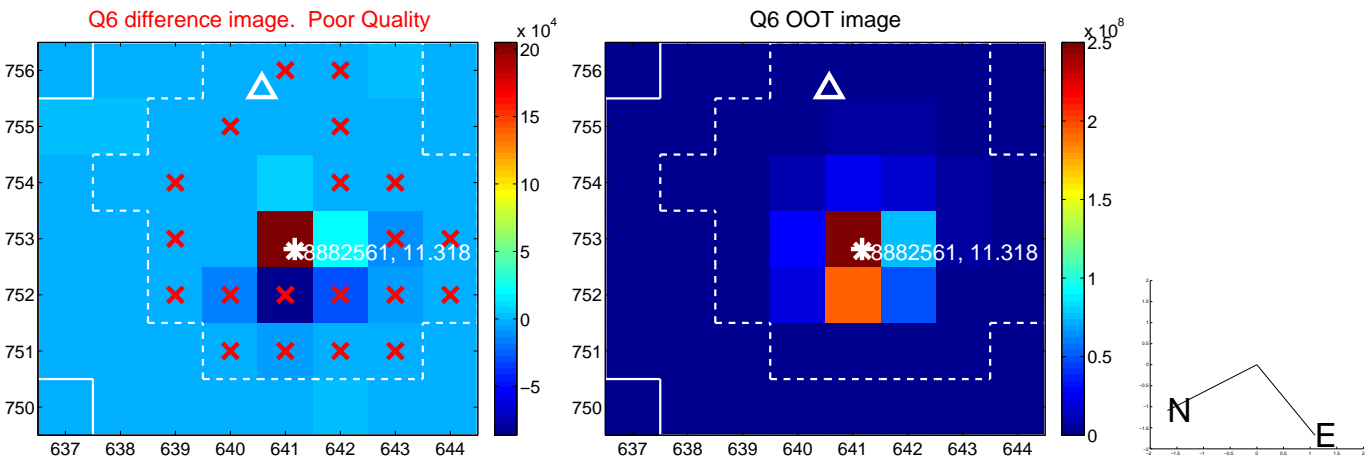
Q4 no difference image



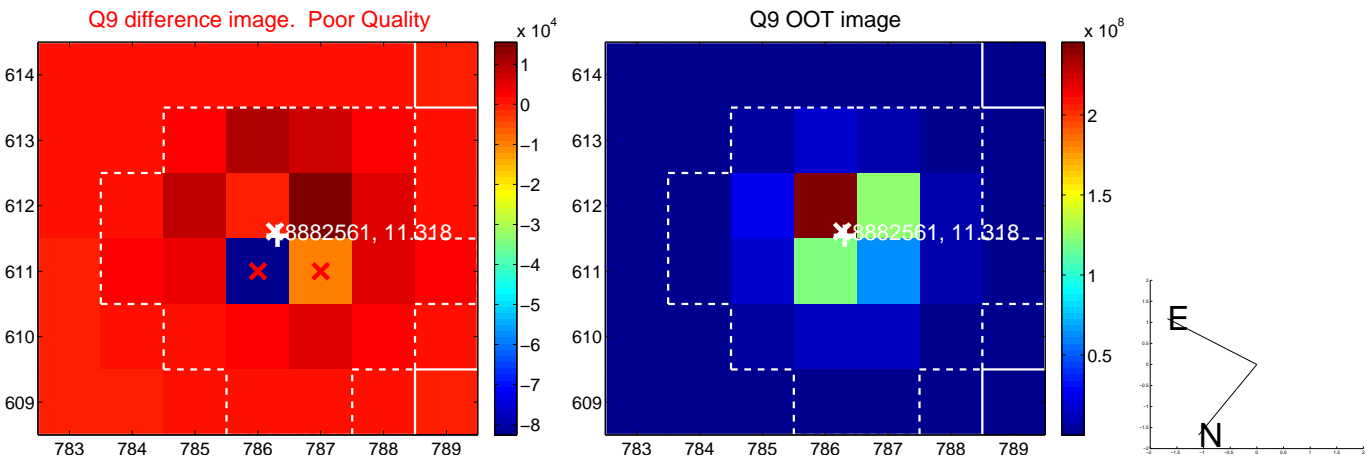
Q4 no OOT image



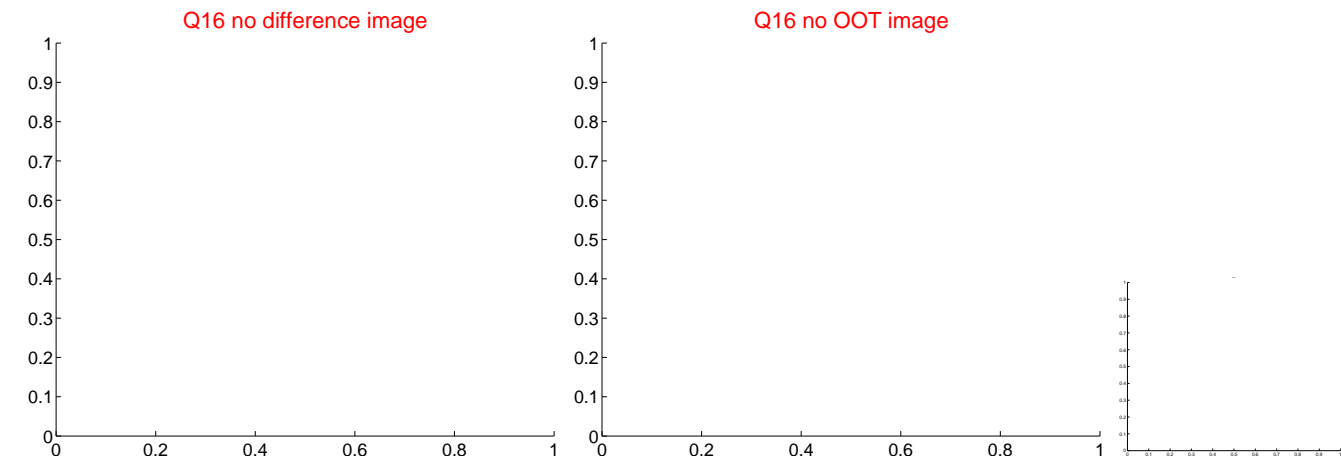
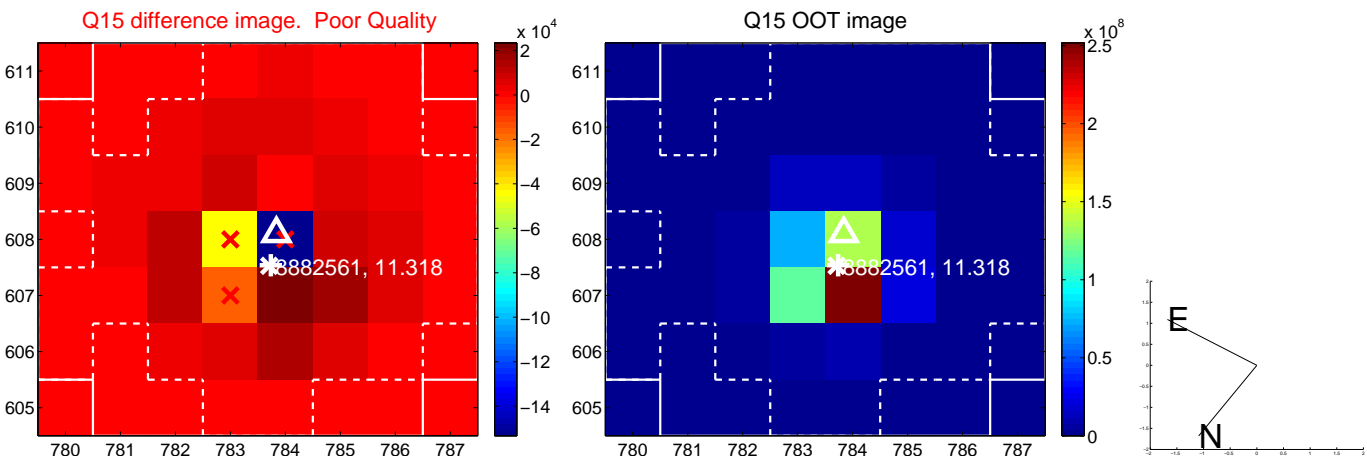
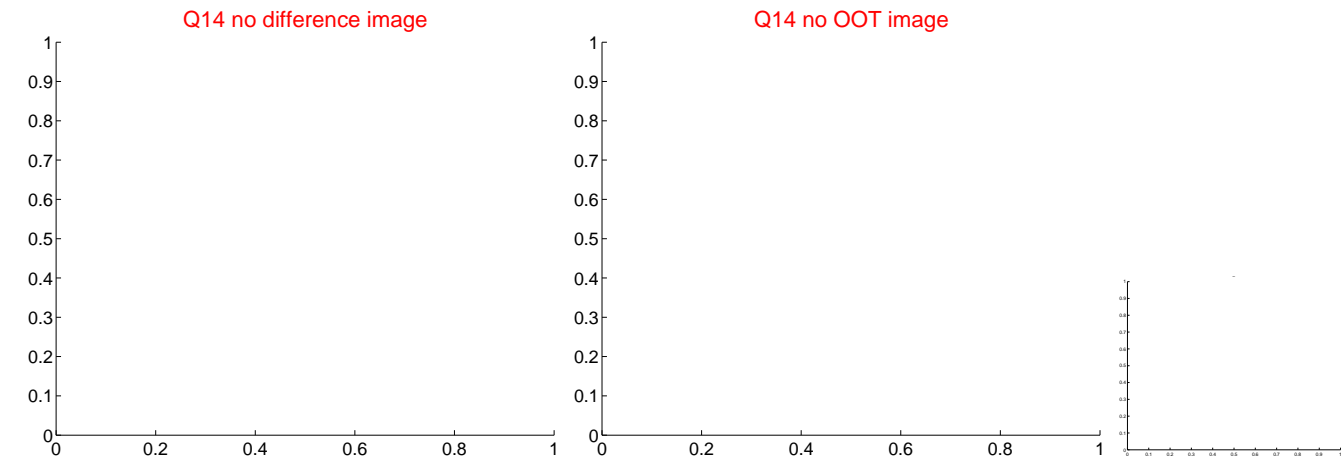
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



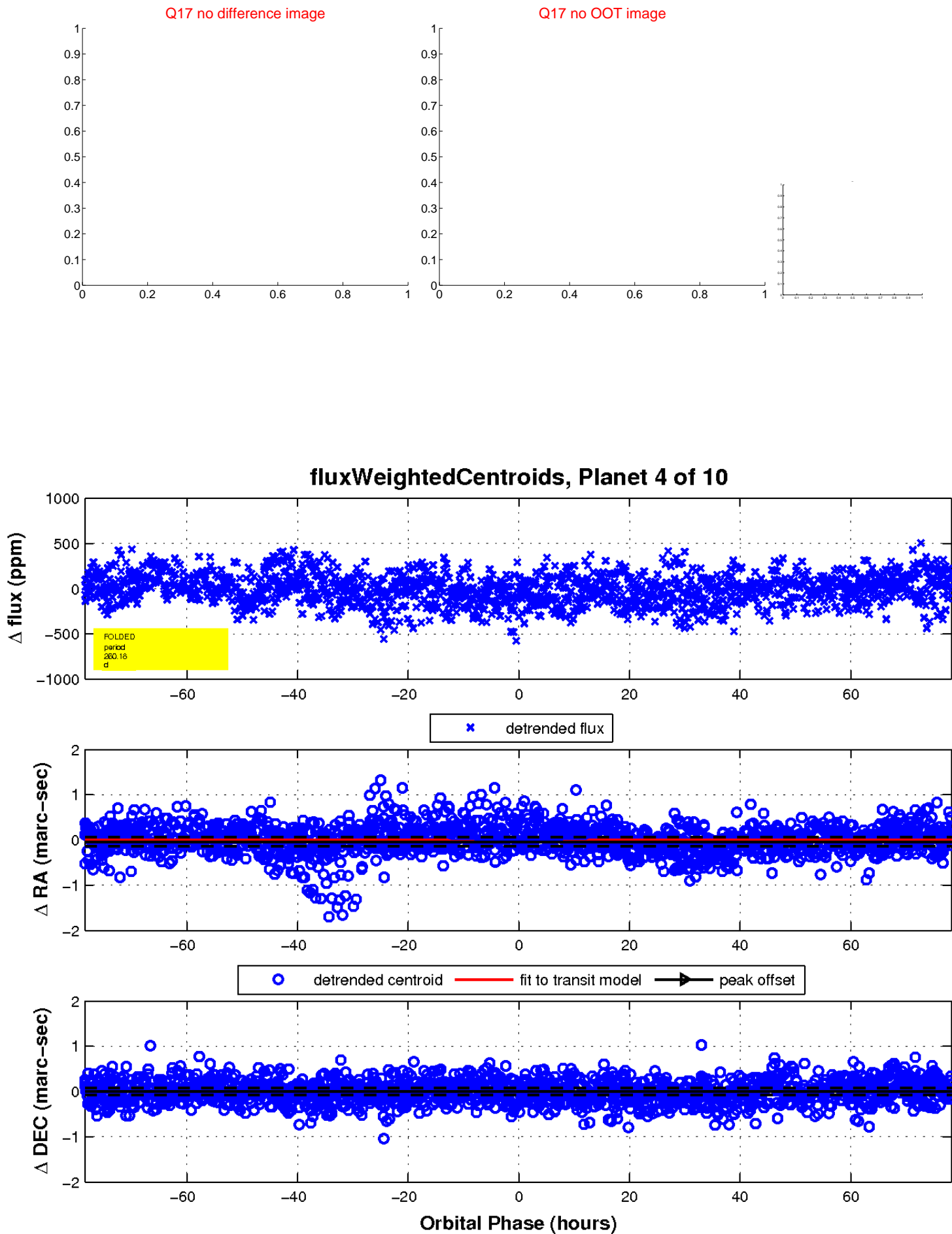
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.



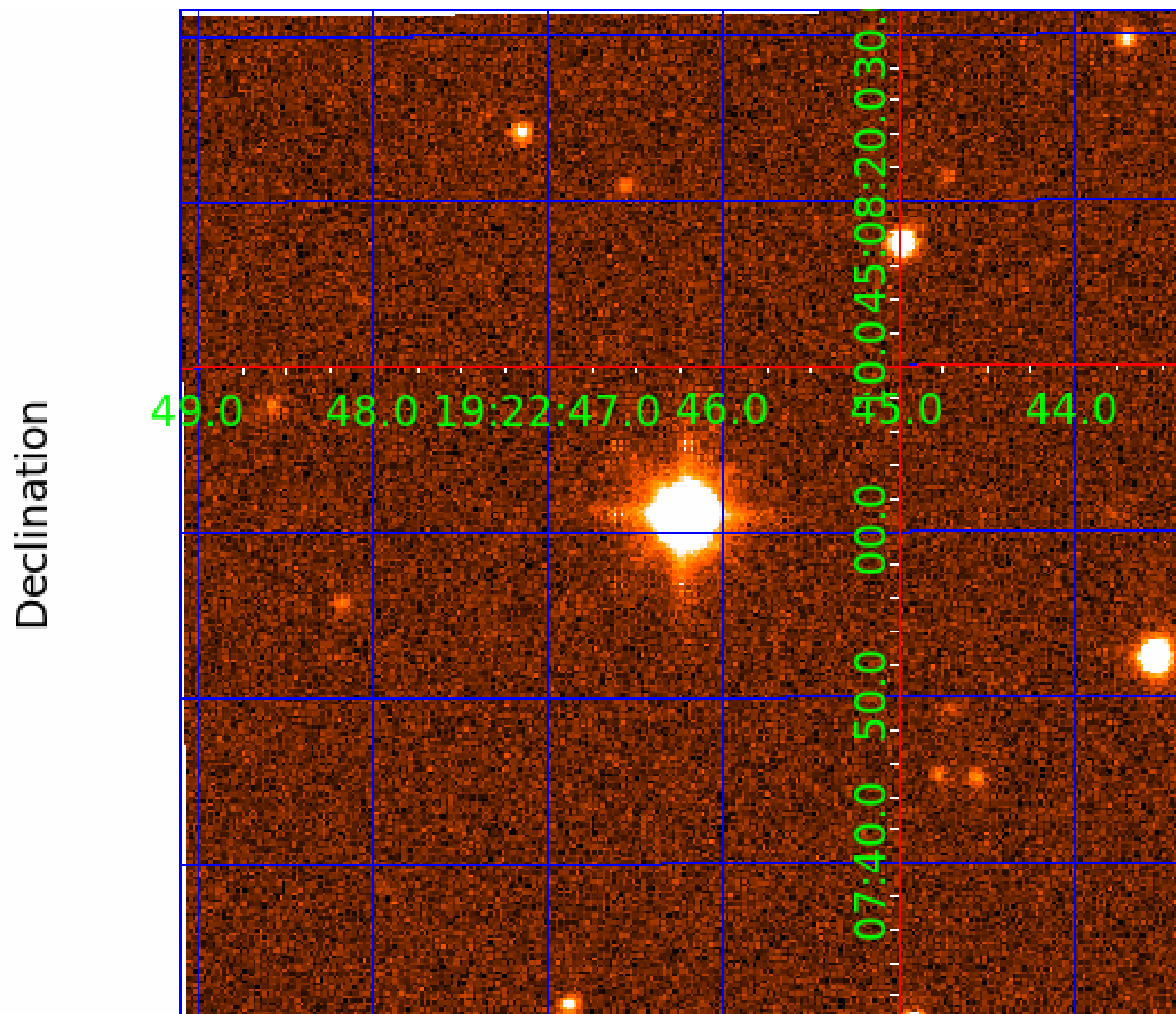
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image



## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008882561-01	OBS	No	1.514201	131.737652	22.8	8.481	8.2	9.1	3.99	6883	2.63	29149.21
008882561-02	OBS	No	601.244806	376.846737	316.0	50.859	14.8	8.2	3.99	6883	8.76	9.99
008882561-03	OBS	No	116.422525	143.577886	272.5	2.242	10.4	9.2	3.99	6883	7.27	89.16
008882561-04	OBS	No	260.182597	343.643718	233.8	26.146	9.6	9.2	3.99	6883	6.57	30.51
008882561-05	OBS	No	150.633582	152.436456	294.4	5.530	9.7	10.3	3.99	6883	8.88	63.24
008882561-06	OBS	No	77.374847	162.329719	299.9	3.243	9.2	10.3	3.99	6883	11.25	153.72
008882561-07	OBS	No	18.718323	141.178432	101.8	6.533	8.9	9.7	3.99	6883	4.60	1019.80
008882561-08	OBS	No	426.915106	225.078632	241.7	5.371	8.7	9.3	3.99	6883	6.96	15.77
008882561-09	OBS	No	150.401601	210.659704	277.3	2.596	8.6	9.4	3.99	6883	7.70	63.37

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008882561-01	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV—CENT_SATURATED
008882561-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_SATURATED
008882561-03	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
008882561-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_SATURATED
008882561-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL_SKYE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
008882561-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
008882561-07	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED—HALO_GHOST
008882561-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—CENT_SATURATED
008882561-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED

**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.

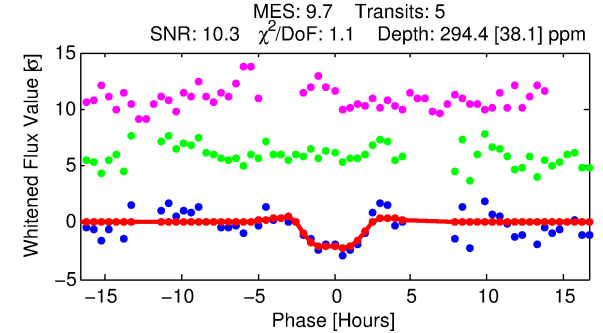
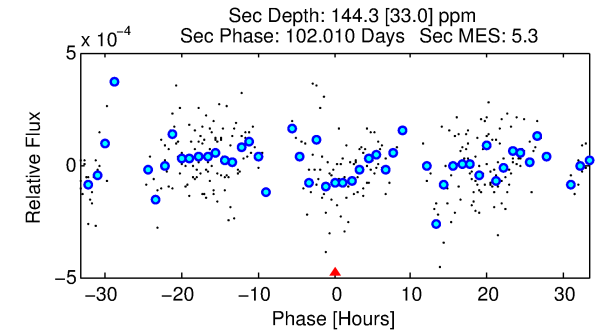
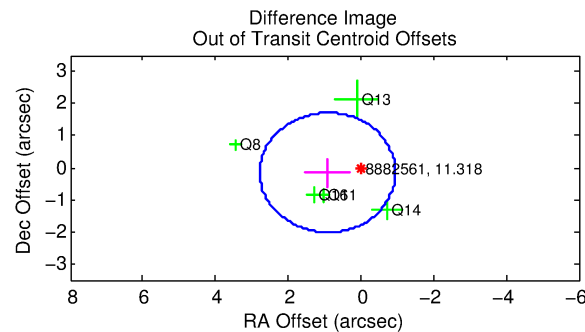
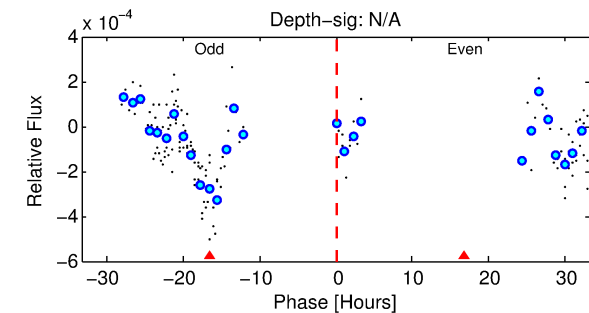
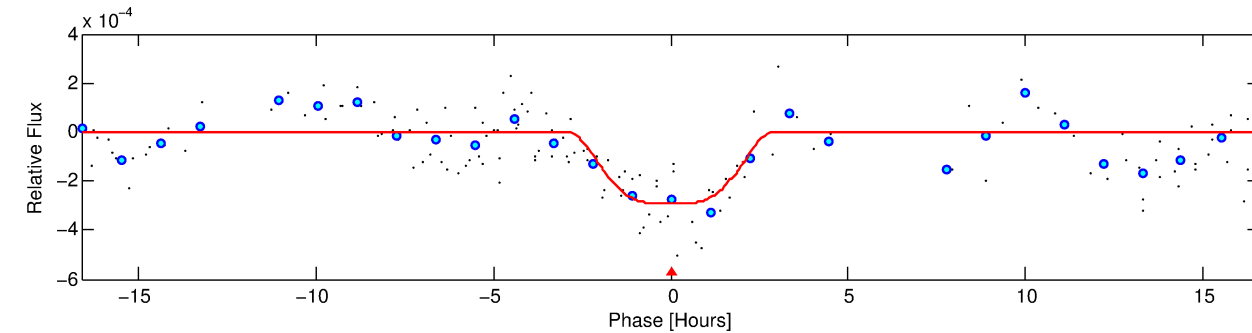
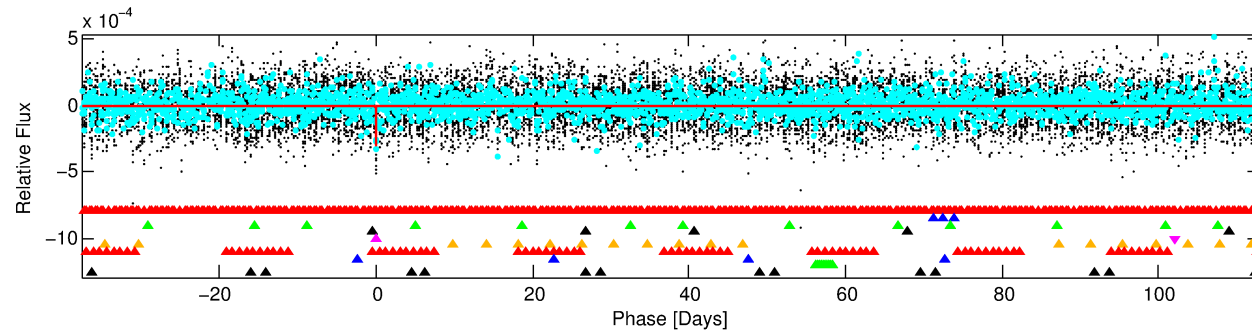
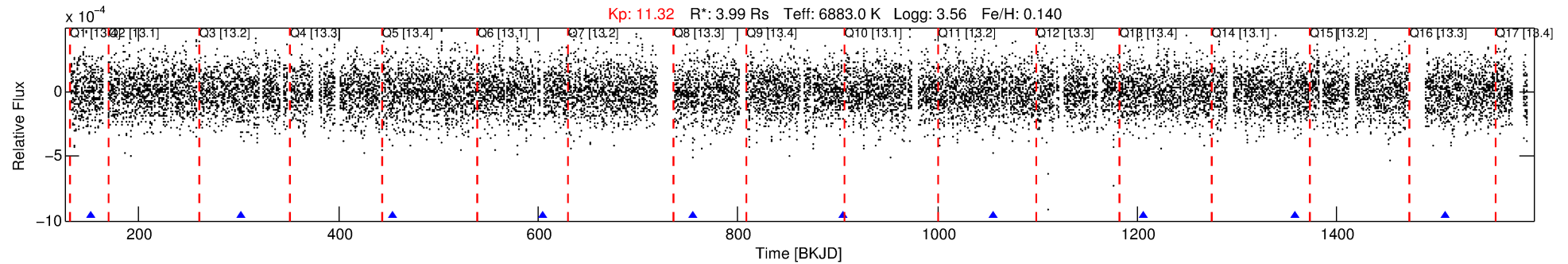
Ephemeris Match Information For 008882561-05

No Significant Match Found



# DV One-Page Summary

KIC: 8882561 Candidate: 5 of 10 Period: 150.634 d



## DV Fit Results:

Period = 150.63358 [0.00232] d  
Epoch = 152.4365 [0.0138] BKJD  
Rp/R\* = 0.0204 [0.0017]  
a/R\* = 62.66 [12.08]  
b = 0.97 [0.01]  
Seff = 63.24 [32.72]  
Teq = 719 [93] K  
Rp = 8.88 [3.23] Re  
a = 0.7121 [0.2302] AU  
Ag = 510.14 [293.82] [1.73σ]  
Teffp = 5284 [412] K [10.81σ]

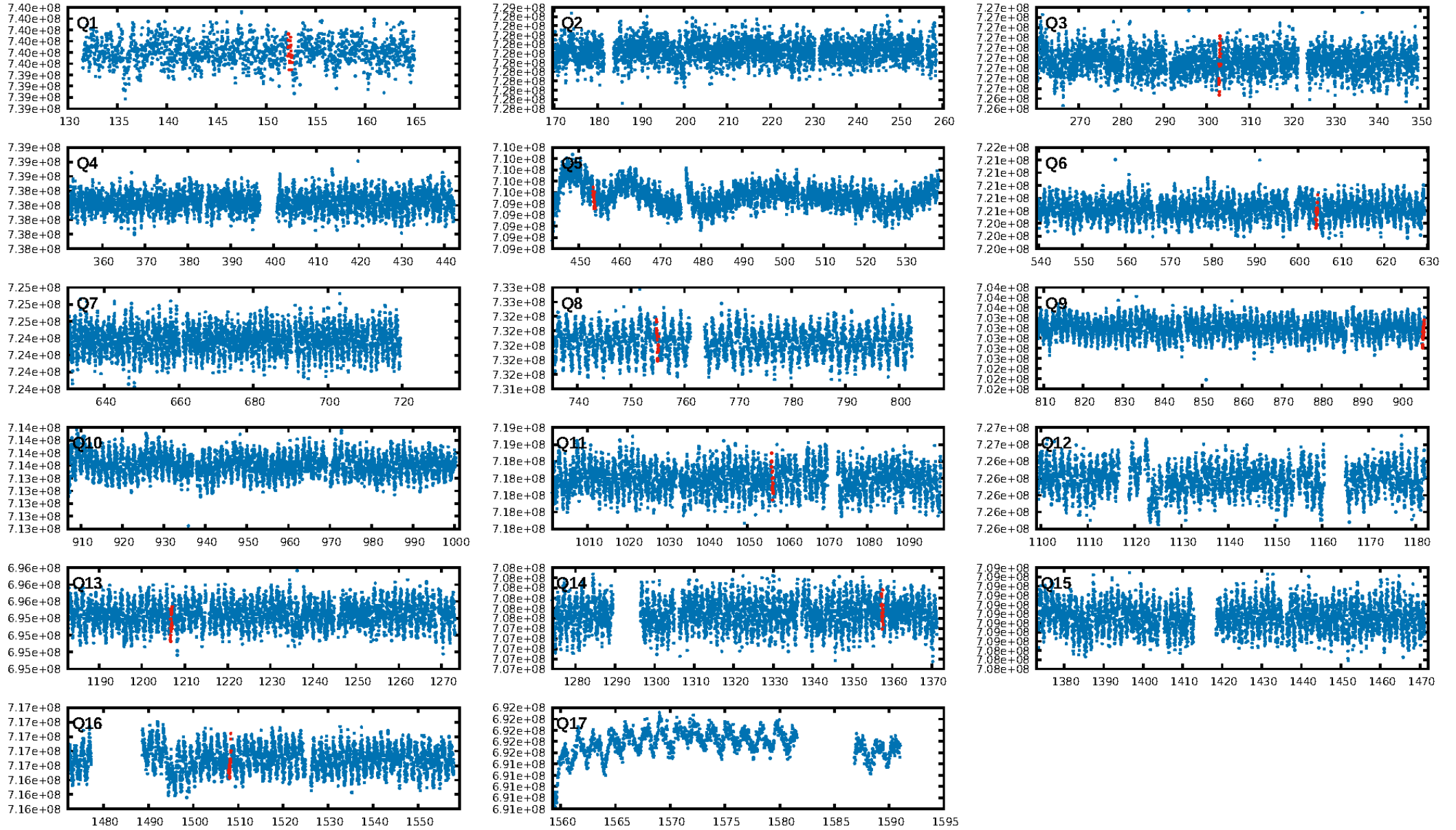
## DV Diagnostic Results:

ShortPeriod-sig: 63.8% [0.91σ]  
LongPeriod-sig: 100.0% [98.38σ]  
ModelChiSquare2-sig: 56.5%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: 3.925  
Centroid-sig: 21.1%  
Centroid-so: 0.357 arcsec [0.95σ]  
OotOffset-rm: 0.931 arcsec [1.50σ]  
KicOffset-rm: 0.855 arcsec [1.28σ]  
OotOffset-st: 1/1/2/1 [5]  
KicOffset-st: 1/1/2/1 [5]  
DiffImageQuality-fgm: 1.00 [5/5]  
DiffImageOverlap-fno: 0.11 [1/9]

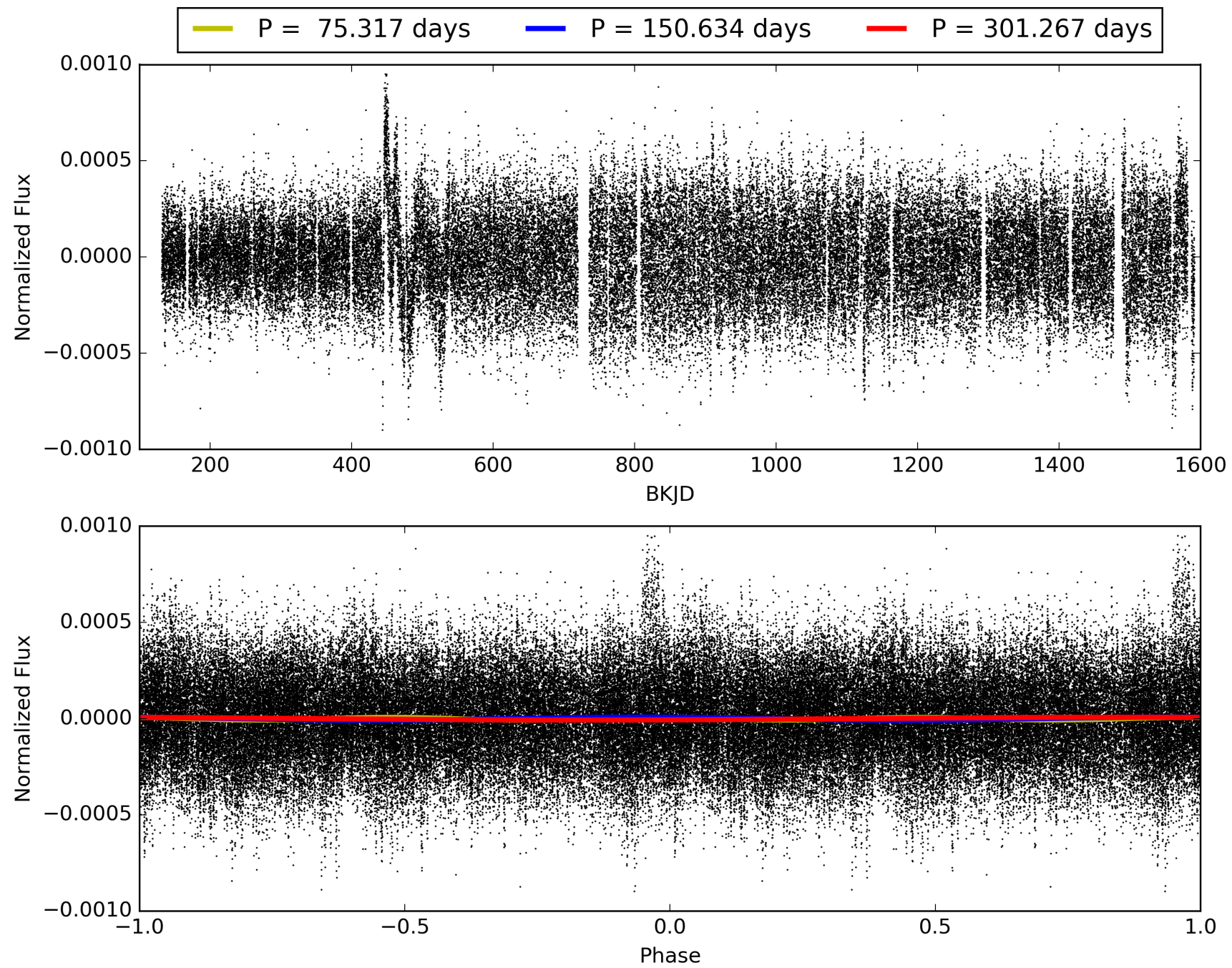
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 21:26:53 Z

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

# TCE 008882561-05, PDC Light Curves

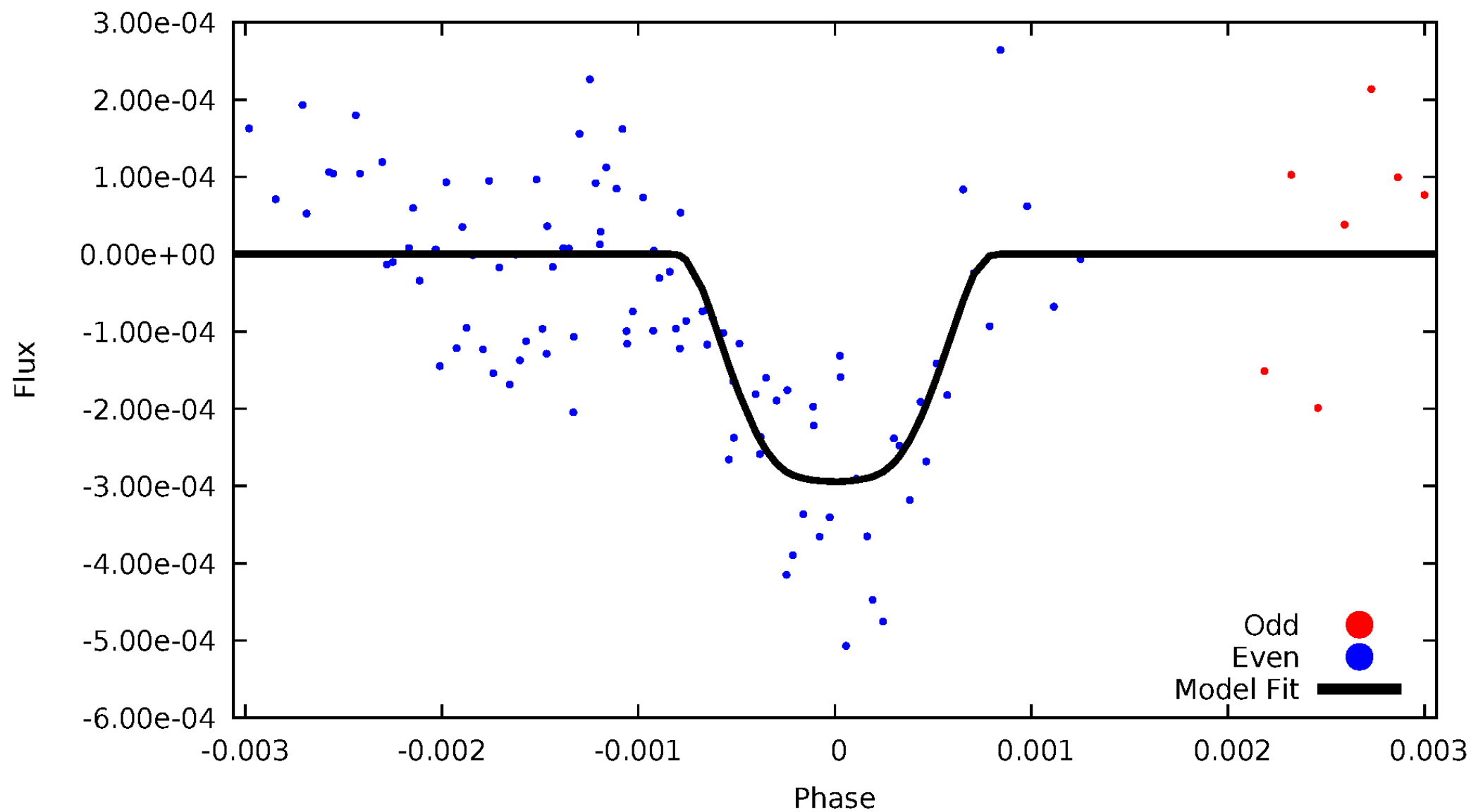


TCE 008882561-05



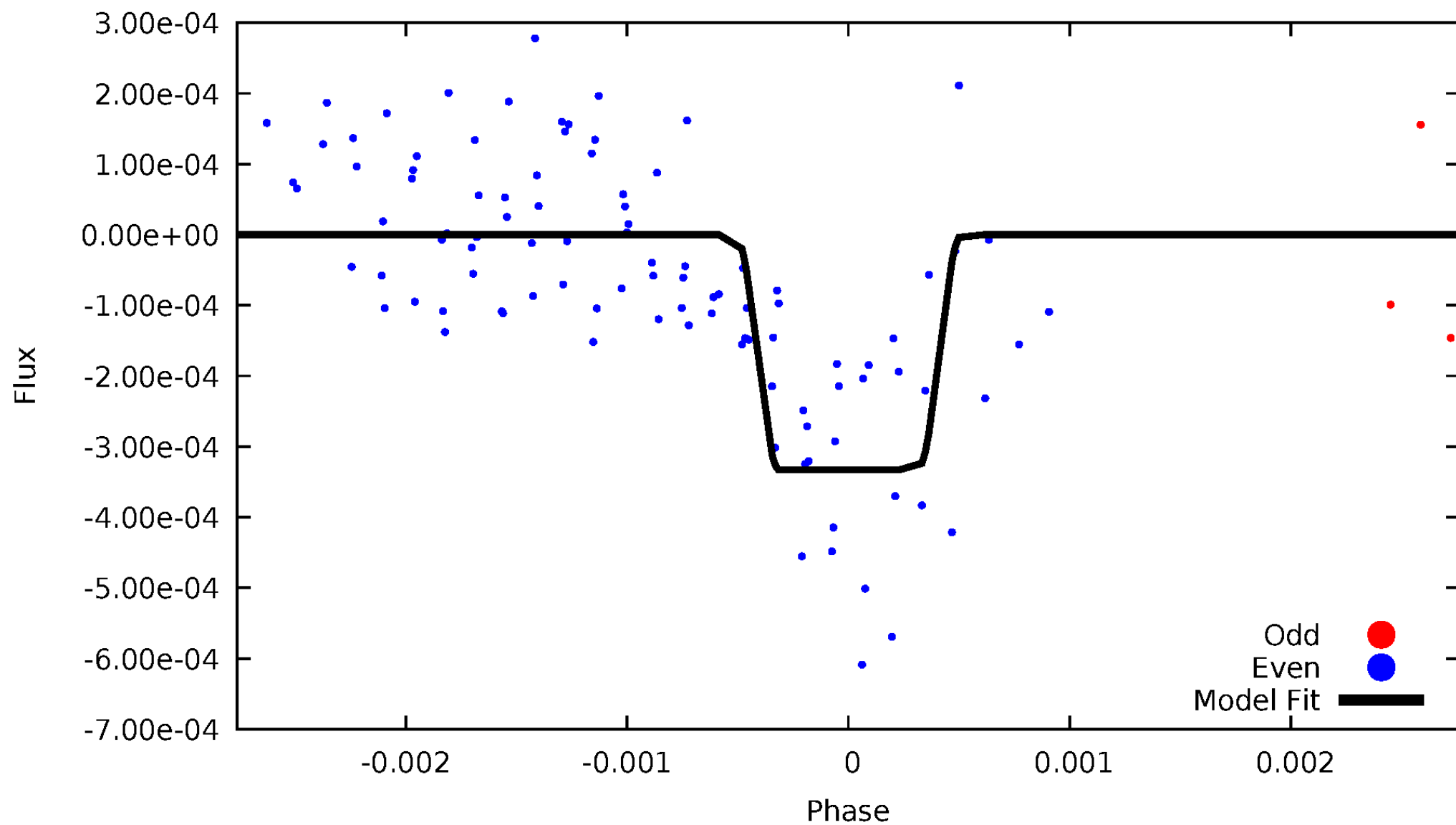
# DV Odd/Even

TCE 008882561-05

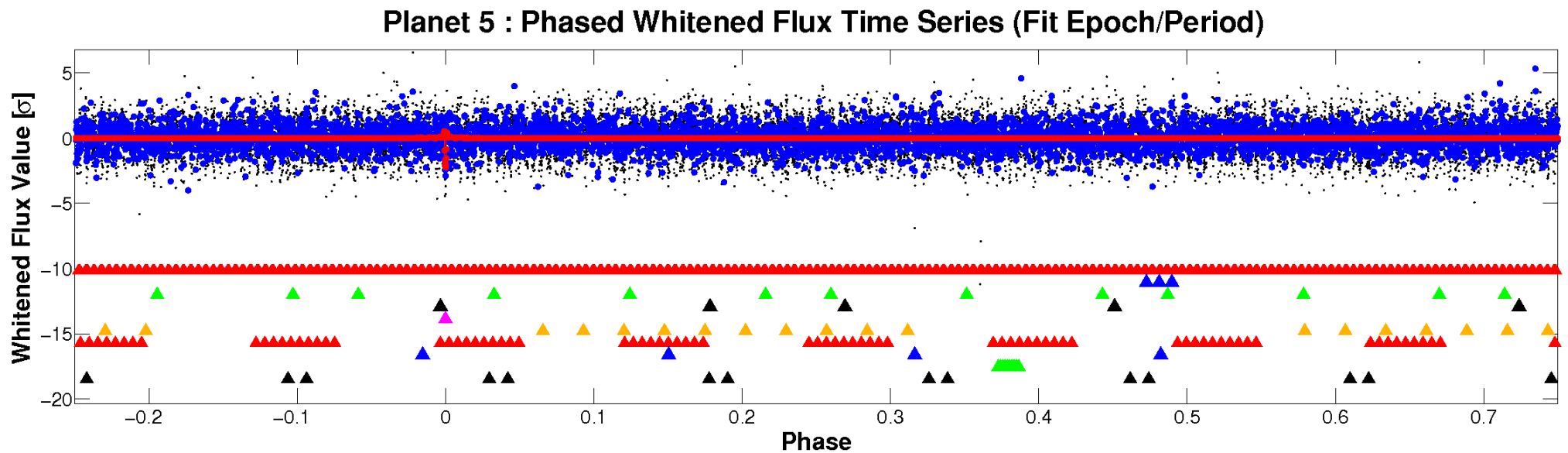
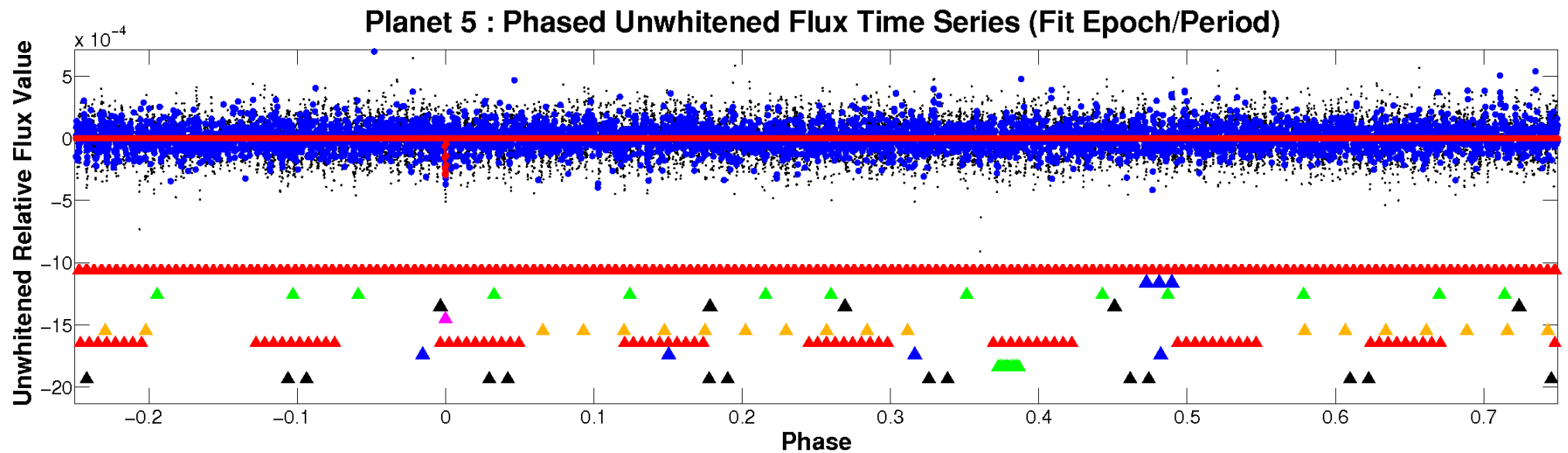


# ALT Odd/Even

TCE 008882561-05



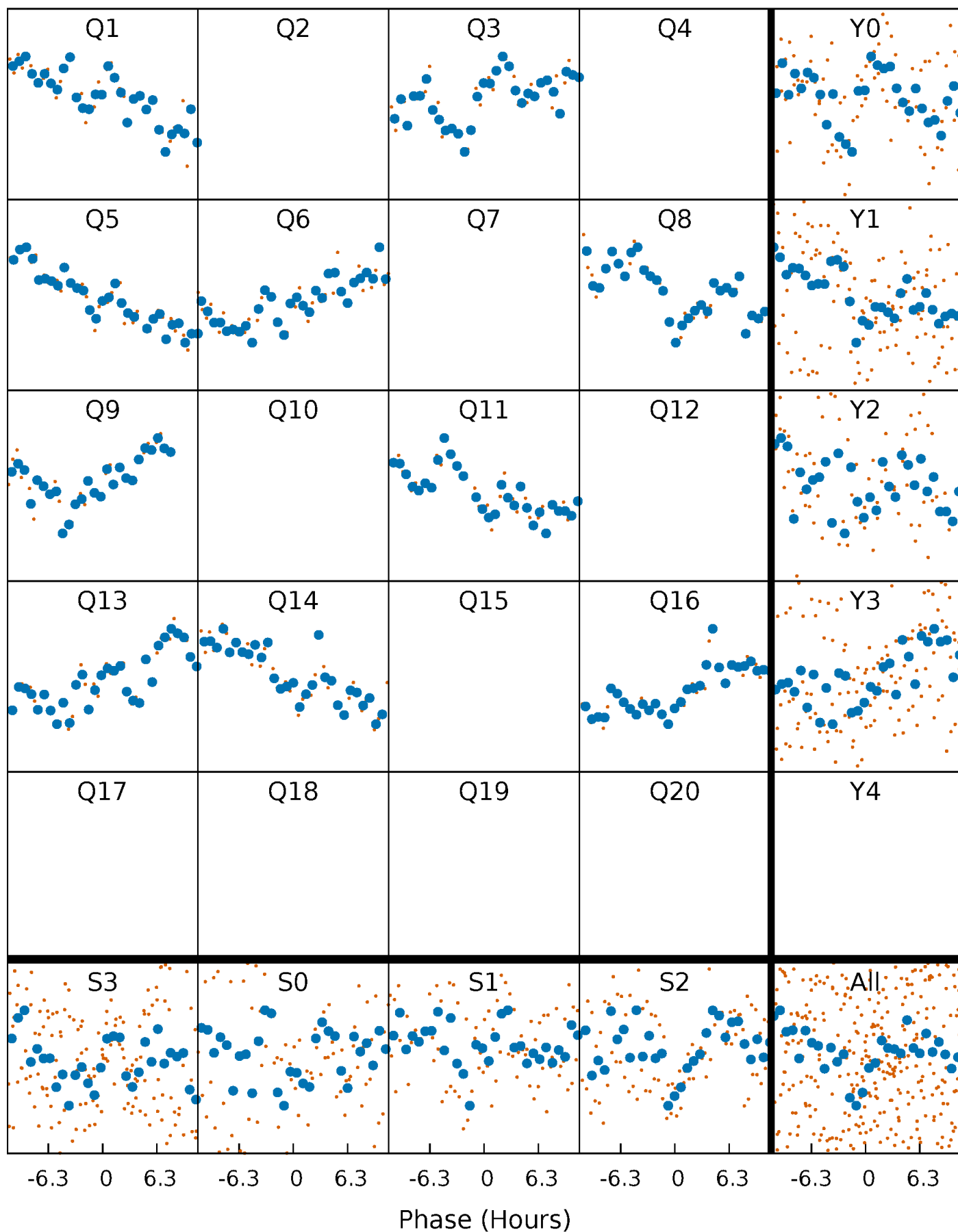
# Non-Whitened Vs. Whitened Light Curve





# PDC Quarter-Phased Transit Curves

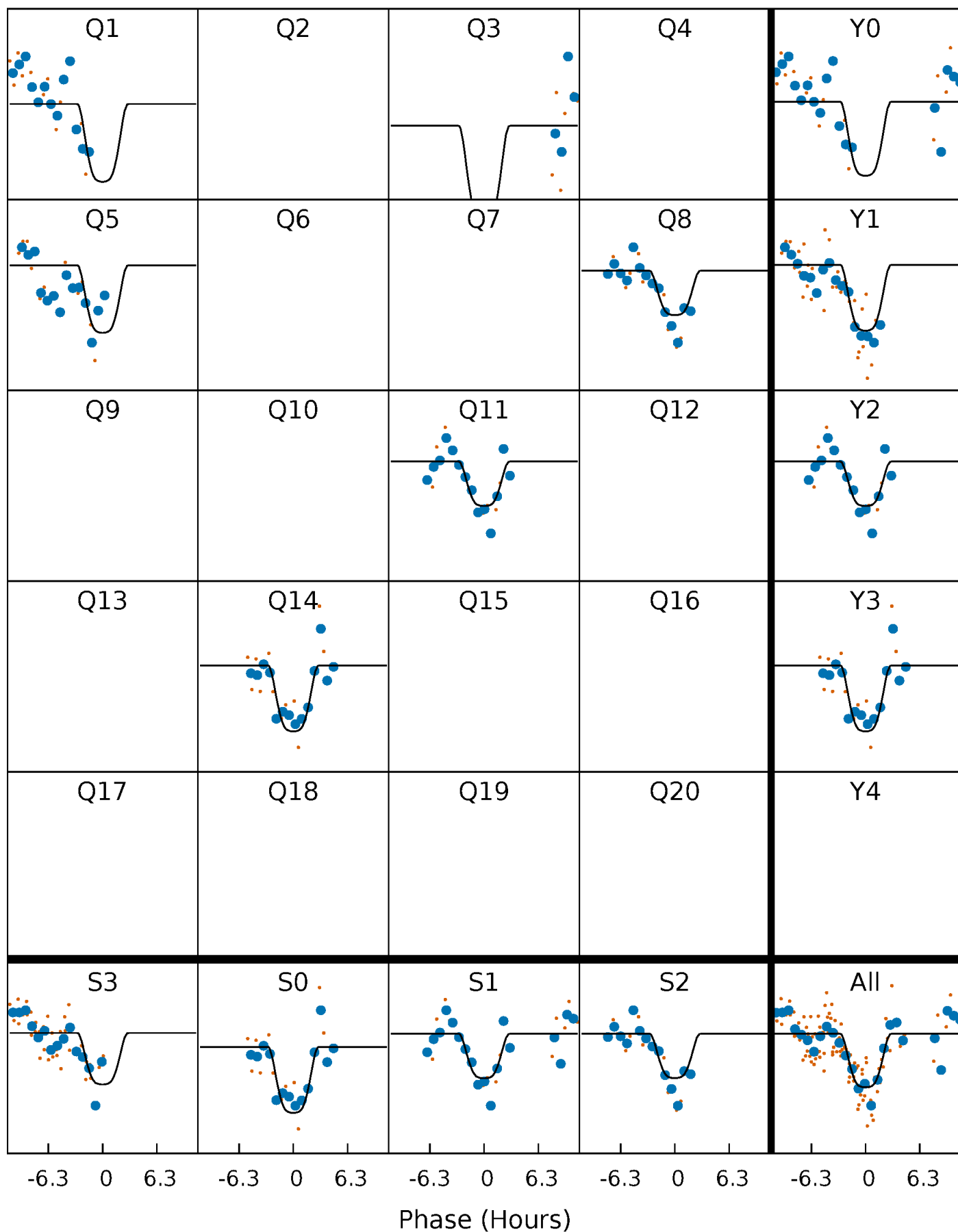
TCE 008882561-05     $P=150.633582$  Days     $T_0=152.436456$  (BKJD)





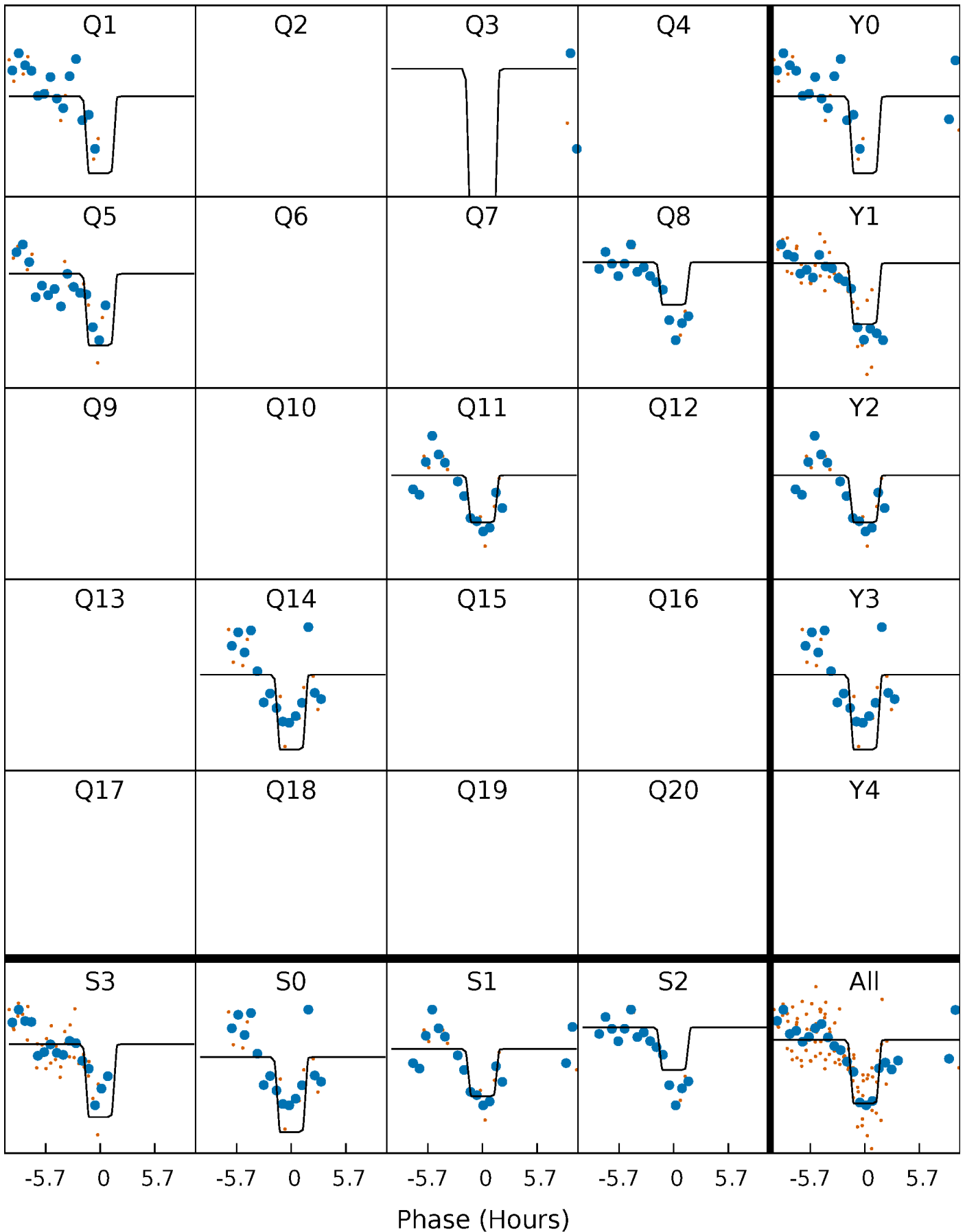
# DV Quarter-Phased Transit Curves

TCE 008882561-05     $P=150.633582$  Days     $T_0=152.436456$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

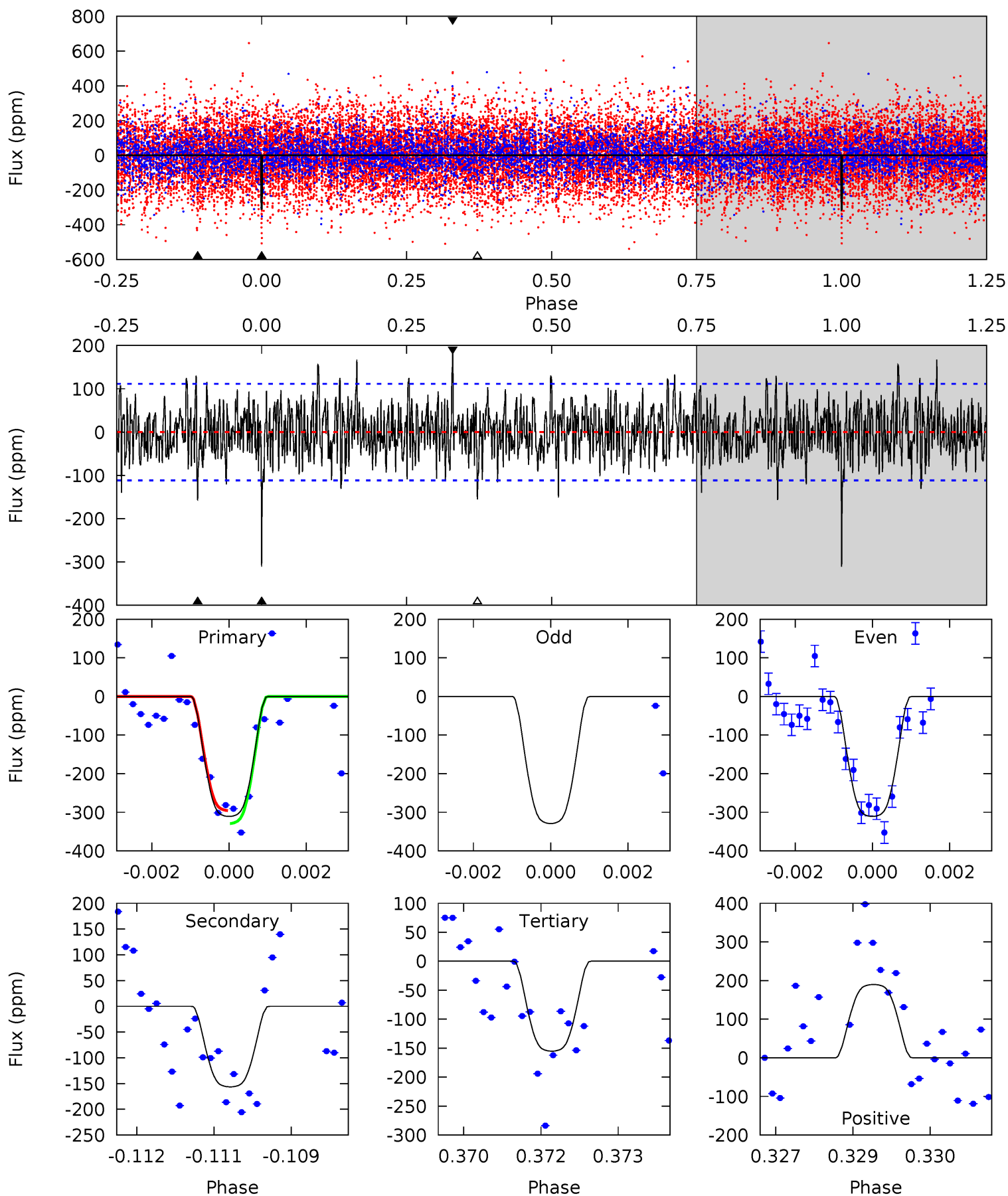
TCE 008882561-05     $P=150.646667$  Days     $T_0=152.383442$  (BKJD)



# DV Model-Shift Uniqueness Test

008882561-05, P = 150.633582 Days, E = 1.802874 Days

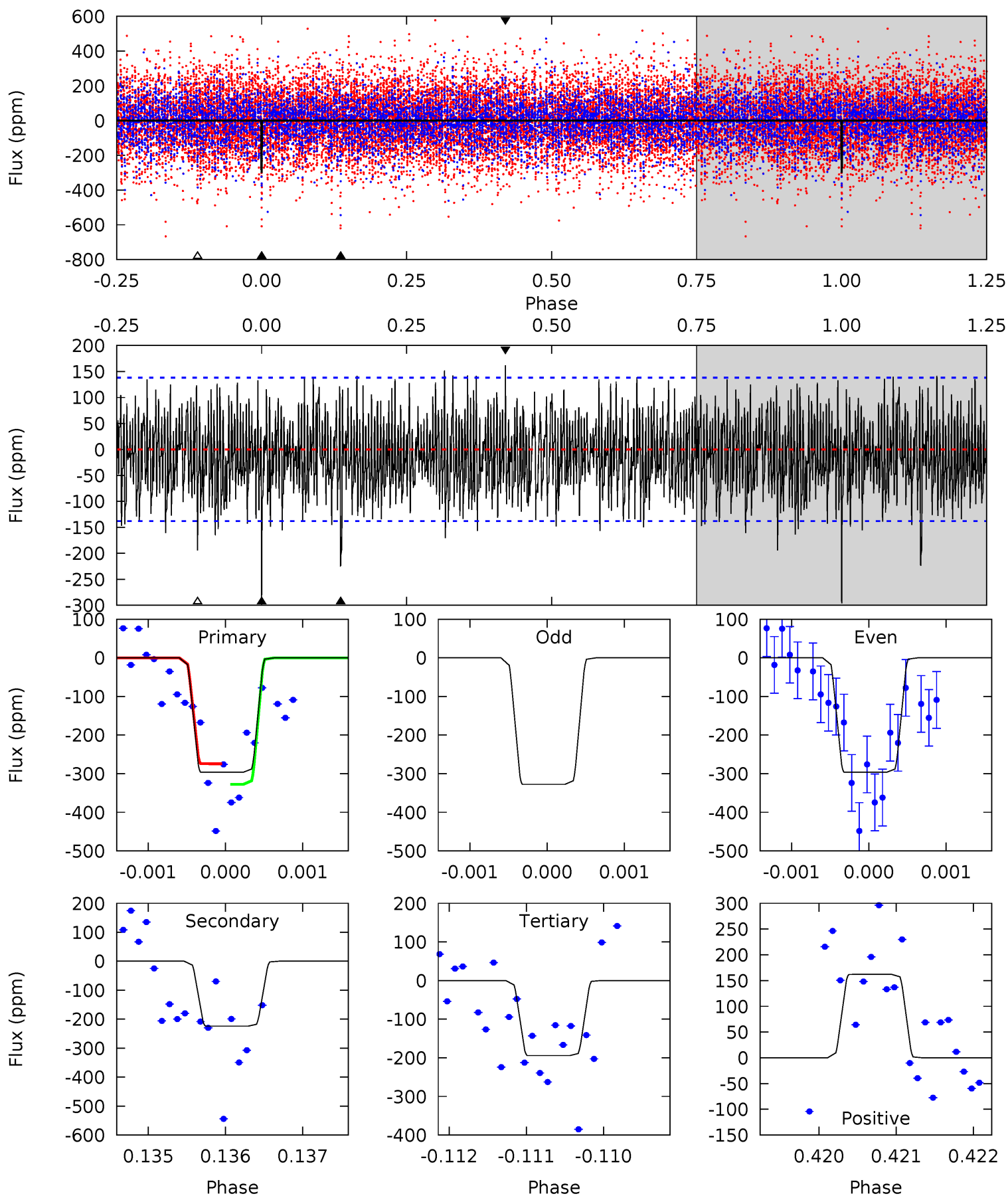
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
14.9	7.51	7.45	9.11	5.36	3.15	2.18	7.48	5.82	0.06	-1.60	0.47	0.96	0.38	0.79



# Alt Model-Shift Uniqueness Test

008882561-05, P = 150.646667 Days, E = 1.736775 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.7	8.85	7.68	6.40	5.45	3.30	2.30	4.04	5.31	1.17	2.45	0.66	1.20	0.35	1.04



### Stellar Parameters For KIC 008882561

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6883^{+153}_{-222}$	$3.562^{+0.288}_{-0.032}$	$0.140^{+0.200}_{-0.250}$	$3.993^{+0.249}_{-1.413}$	$2.119^{+0.073}_{-0.416}$	$0.047^{+0.093}_{-0.006}$
	+2%/-3%	+8%/-1%	+143%/-179%	+6%/-35%	+3%/-20%	+199%/-12%
Source	PHO1	FLK73	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 008882561-05 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-156 \pm 21$	$8.19^{+1.20}_{-1.43}$	$971^{+51}_{-77}$	$5391^{+305}_{-299}$	$645^{+273}_{-166}$
Alt.	$-224 \pm 25$	$7.41^{+1.05}_{-1.32}$	$975^{+46}_{-82}$	$6182^{+356}_{-362}$	$1134^{+490}_{-274}$

$T_{max}$  = Theoretical Maximum Planetary Temperature

$T_{obs}$  = Observed Planetary Temperature (Assuming  $A=0.3$ )

$A_{obs}$  = Observed Albedo (Assuming  $T=0$ )

If a secondary eclipse is present, the system is likely an EB if  $T_{obs} \gg T_{max}$  AND  $A_{obs} \gg 1.0$

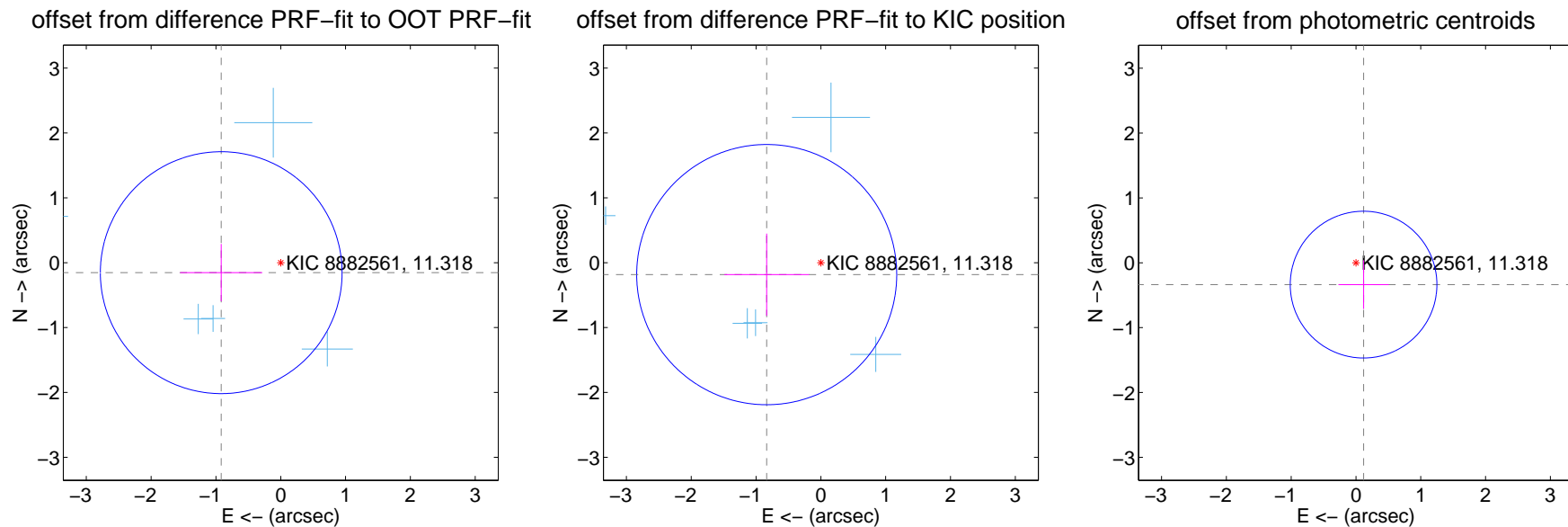
## DV Centroid Data

Supplemental centroid analysis for 008882561-05. **Kepler magnitude: 11.32.** Transit SNR 10.33

There are 5 quarters with good PRF difference image offsets

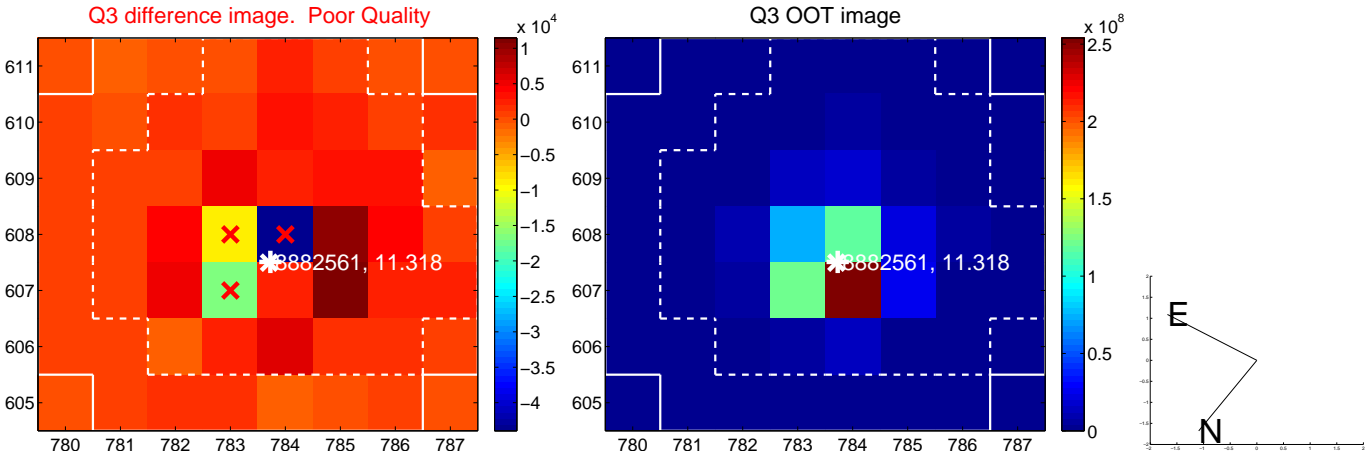
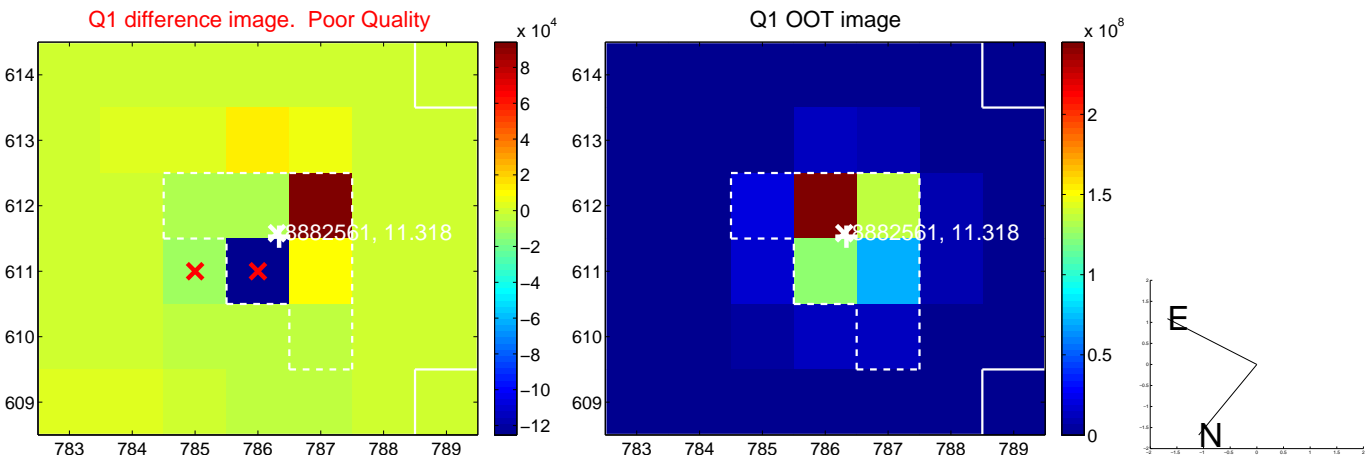
The direct PRF centroid is offset from the target star catalog position by about 0.15 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.931 \pm 0.621$	1.50	$0.918 \pm 0.634$	$-0.154 \pm 0.441$
PRF-fit source offset from KIC position	$0.855 \pm 0.668$	1.28	$0.835 \pm 0.653$	$-0.184 \pm 0.633$
photometric centroid source offset	$0.36 \pm 0.38$	0.95	$-0.12 \pm 0.39$	$-0.34 \pm 0.38$



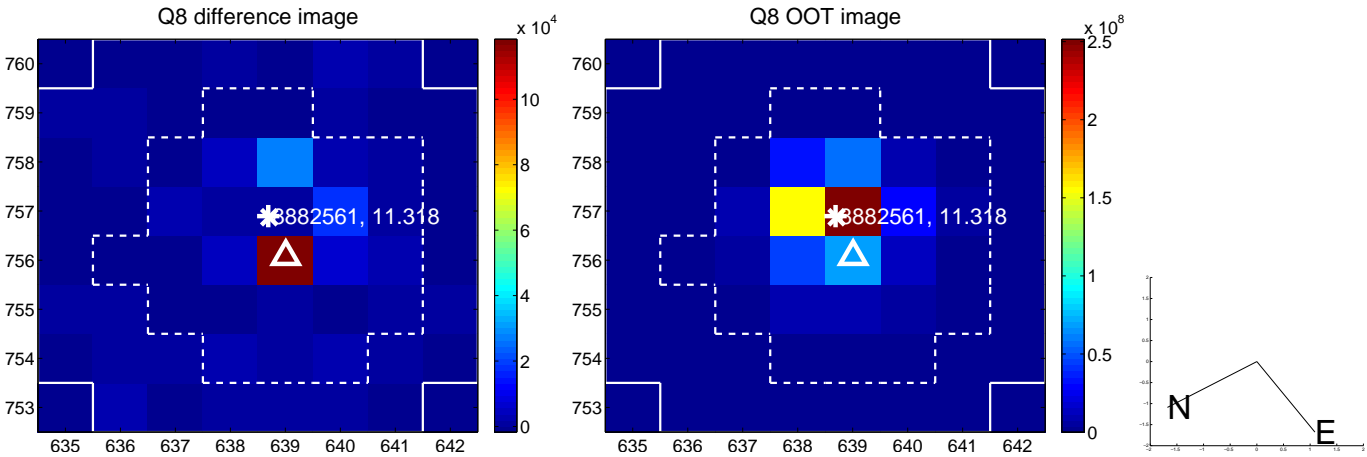
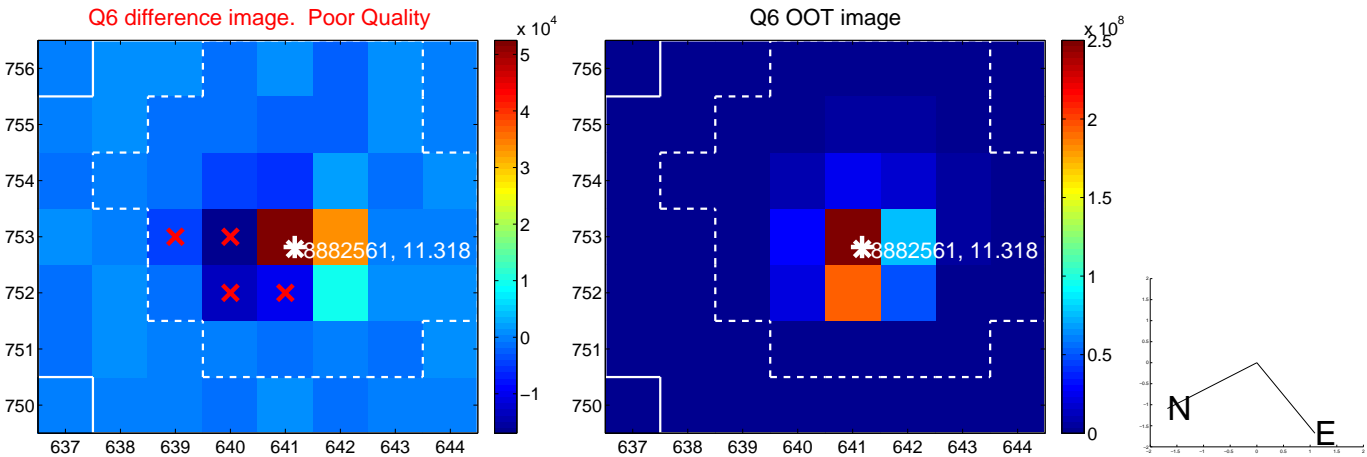
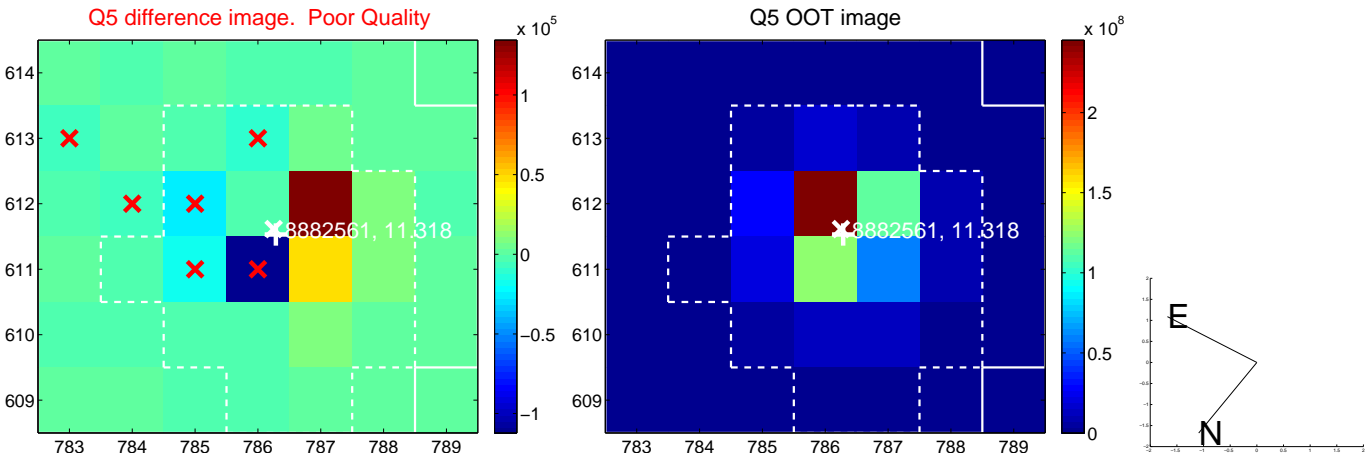
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: 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  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

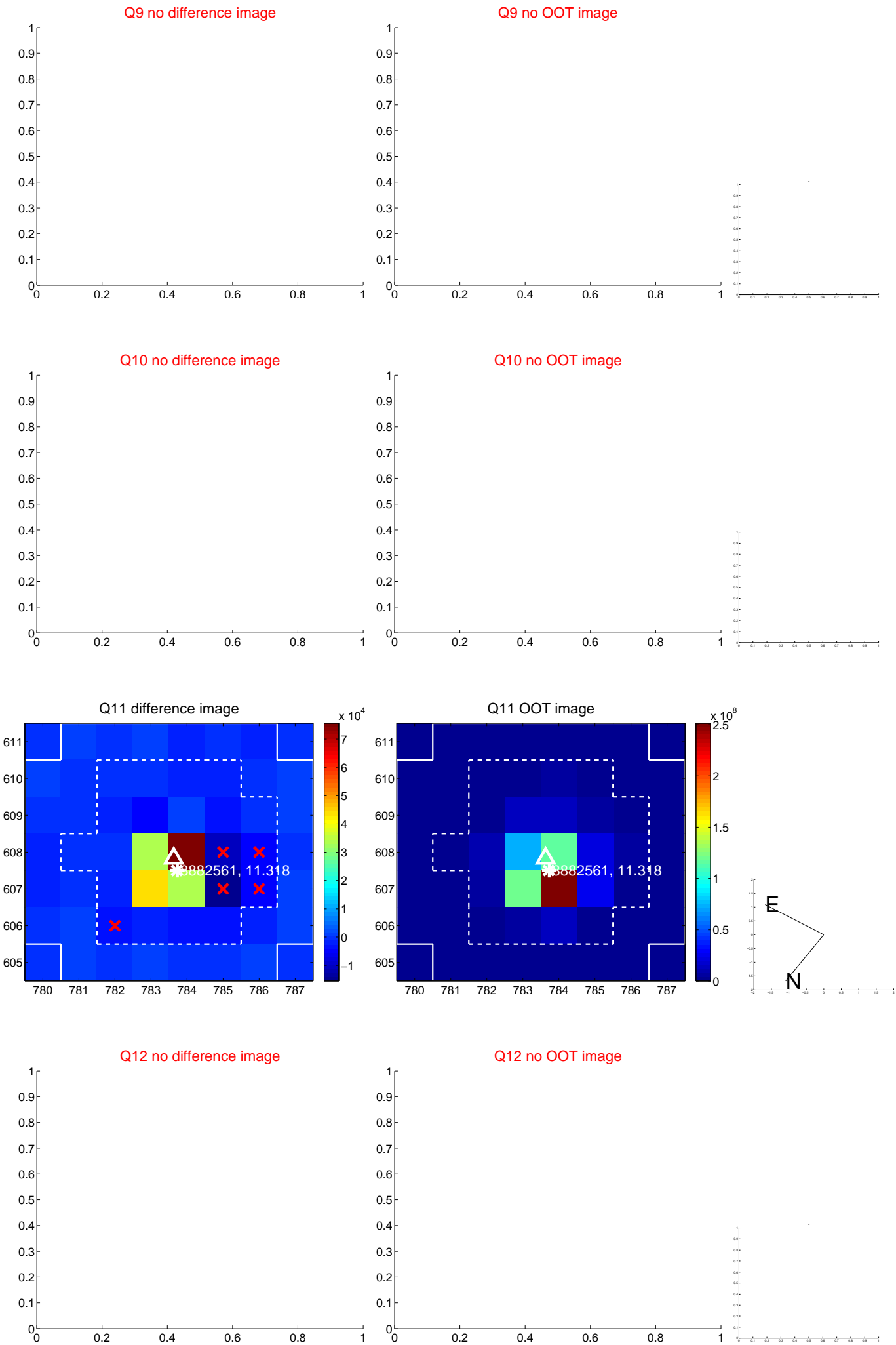




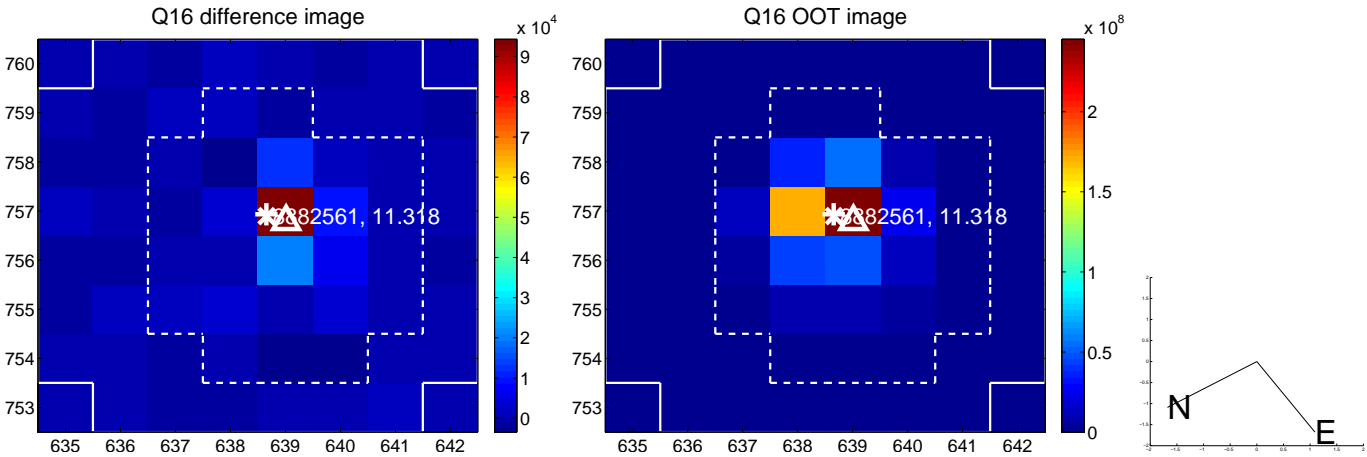
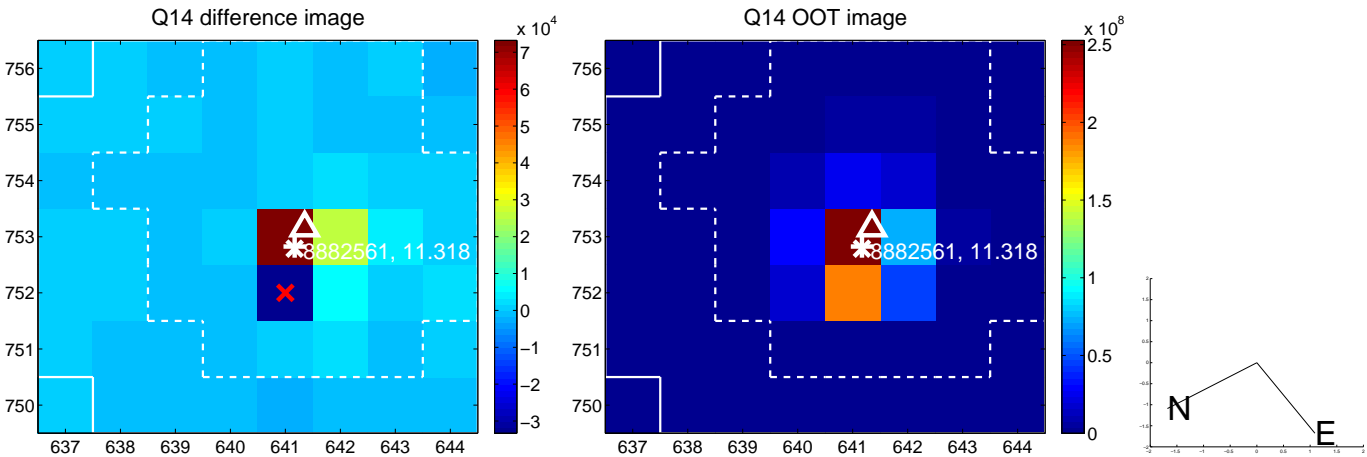
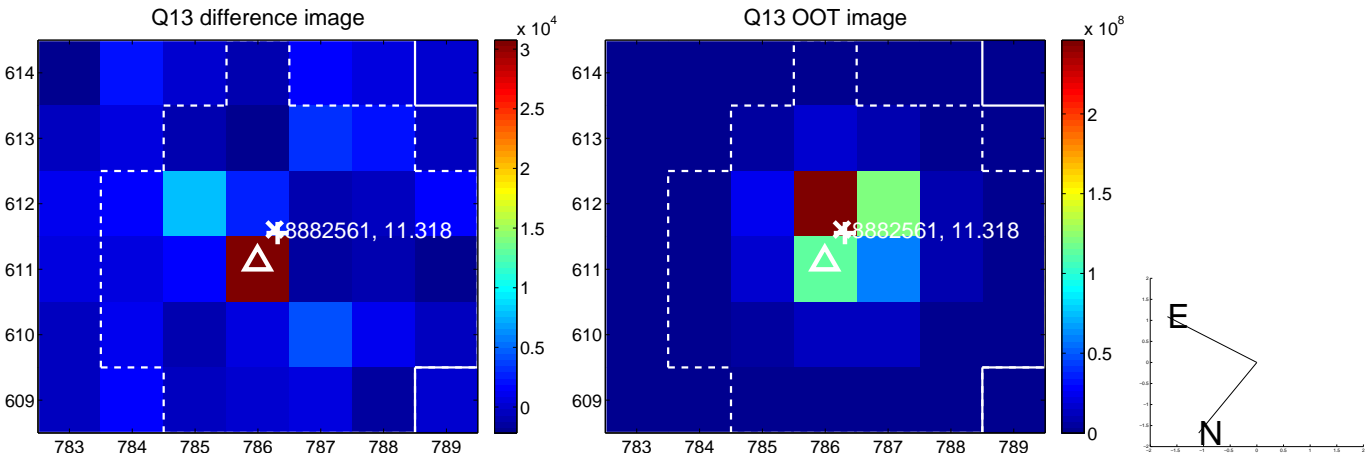
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



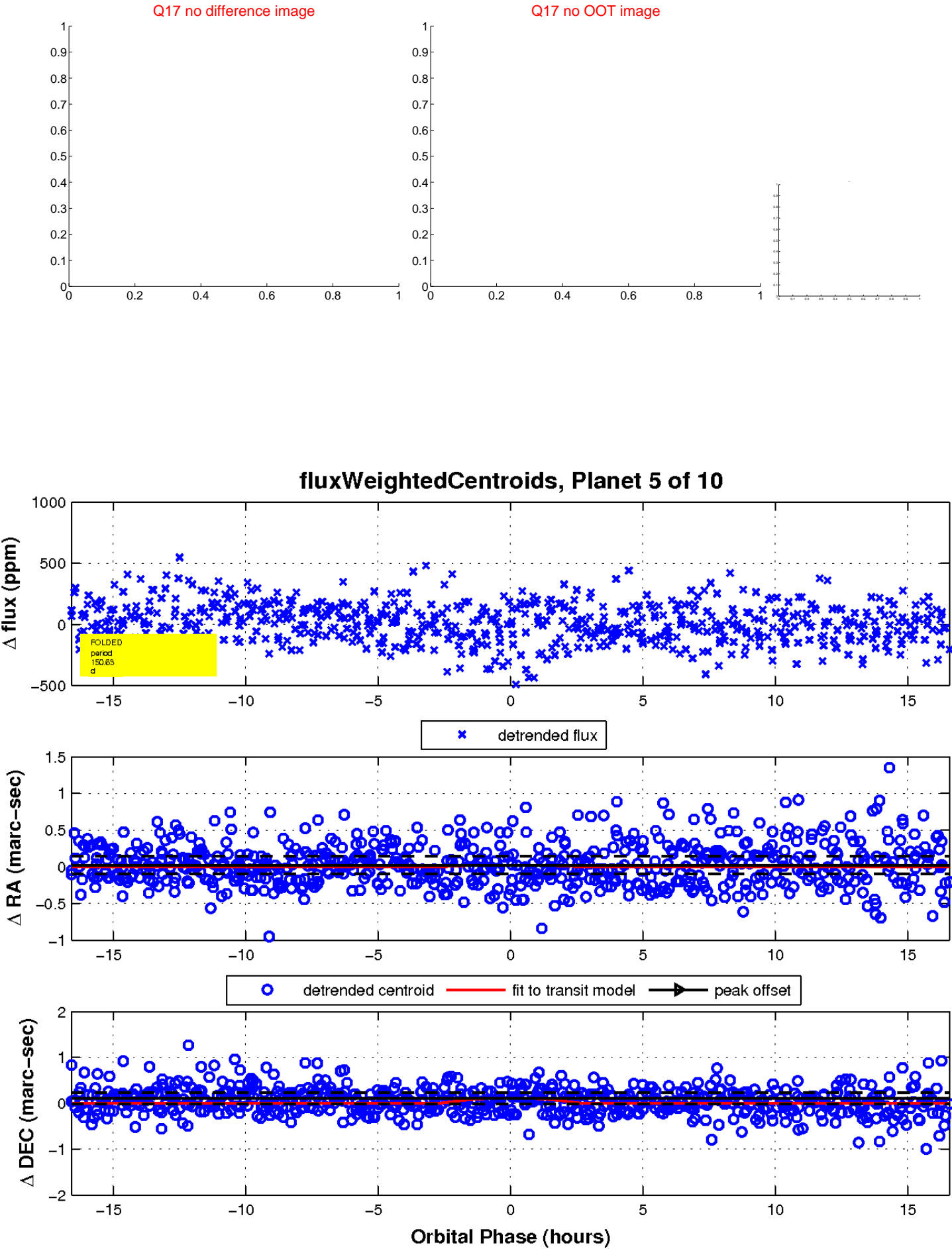
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



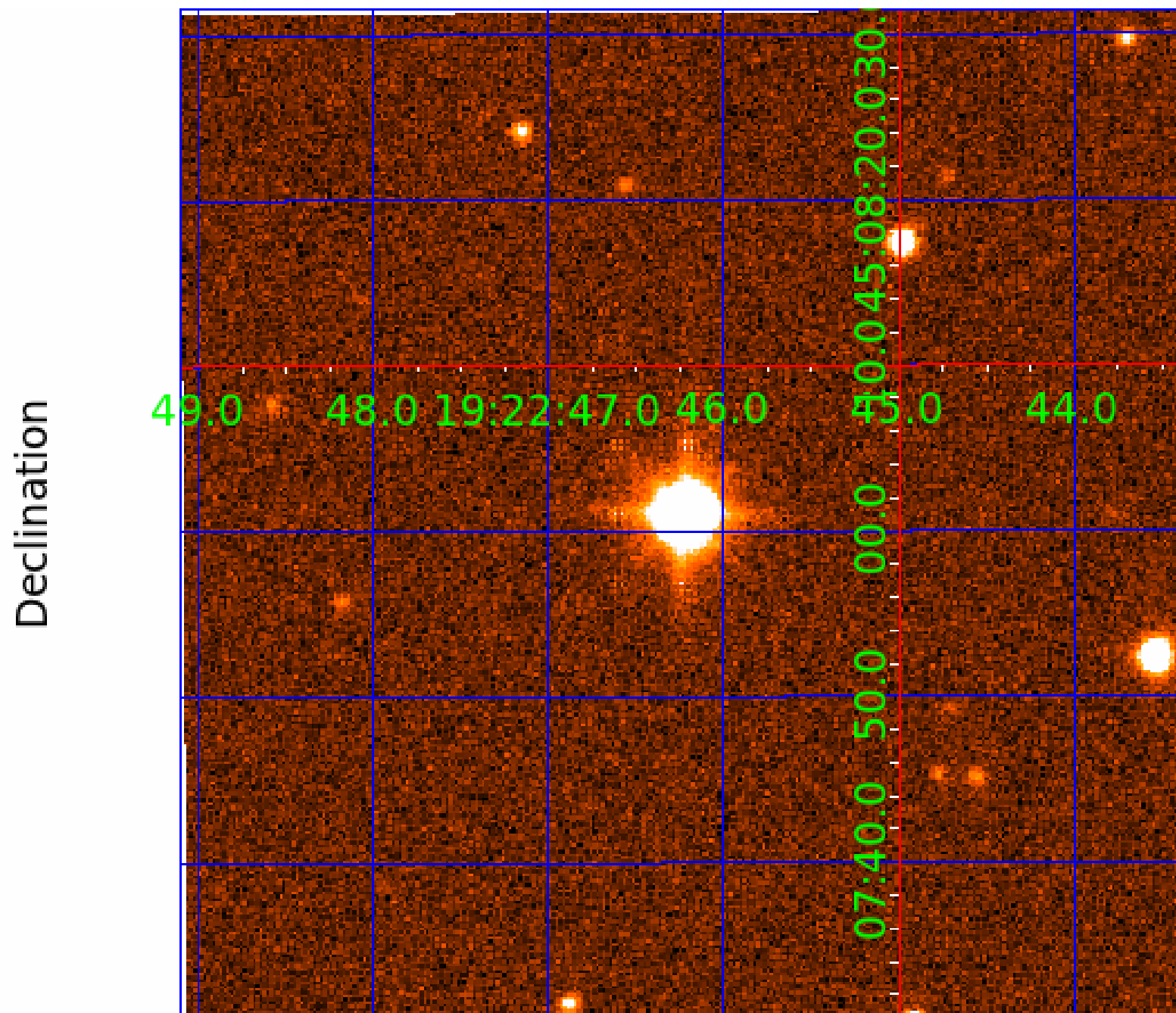
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image



## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008882561-01	OBS	No	1.514201	131.737652	22.8	8.481	8.2	9.1	3.99	6883	2.63	29149.21
008882561-02	OBS	No	601.244806	376.846737	316.0	50.859	14.8	8.2	3.99	6883	8.76	9.99
008882561-03	OBS	No	116.422525	143.577886	272.5	2.242	10.4	9.2	3.99	6883	7.27	89.16
008882561-04	OBS	No	260.182597	343.643718	233.8	26.146	9.6	9.2	3.99	6883	6.57	30.51
008882561-05	OBS	No	150.633582	152.436456	294.4	5.530	9.7	10.3	3.99	6883	8.88	63.24
008882561-06	OBS	No	77.374847	162.329719	299.9	3.243	9.2	10.3	3.99	6883	11.25	153.72
008882561-07	OBS	No	18.718323	141.178432	101.8	6.533	8.9	9.7	3.99	6883	4.60	1019.80
008882561-08	OBS	No	426.915106	225.078632	241.7	5.371	8.7	9.3	3.99	6883	6.96	15.77
008882561-09	OBS	No	150.401601	210.659704	277.3	2.596	8.6	9.4	3.99	6883	7.70	63.37

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008882561-01	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV—CENT_SATURATED
008882561-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_SATURATED
008882561-03	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
008882561-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_SATURATED
008882561-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL_SKYE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
008882561-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
008882561-07	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED—HALO_GHOST
008882561-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—CENT_SATURATED
008882561-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED

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

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

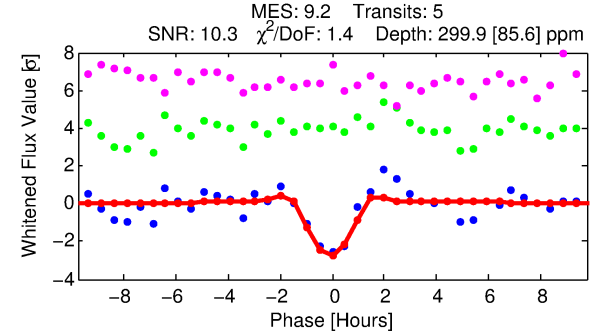
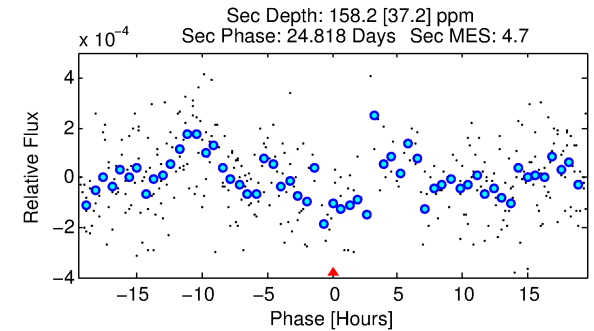
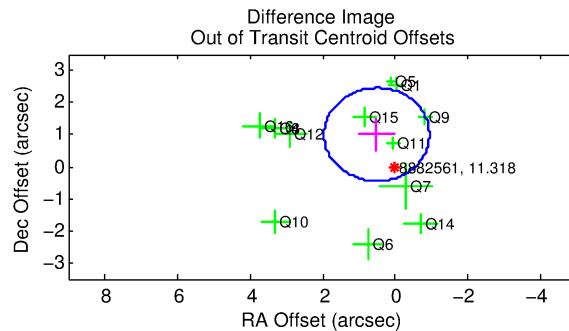
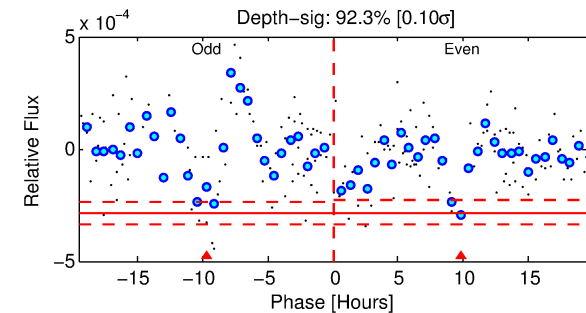
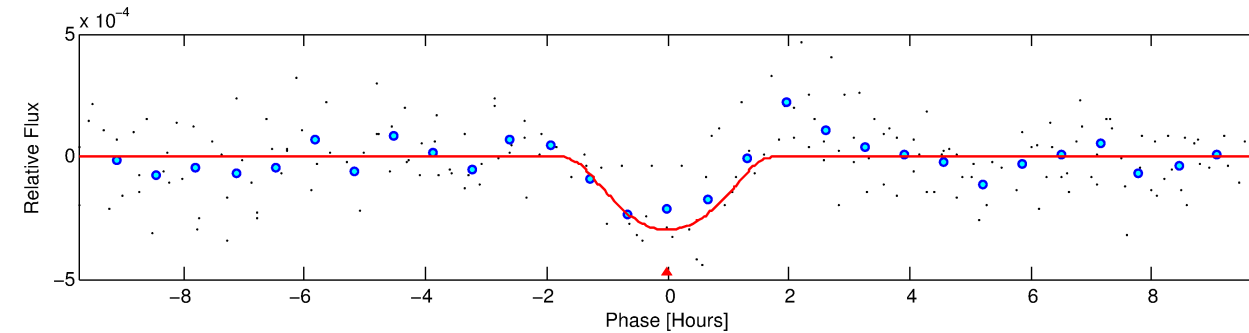
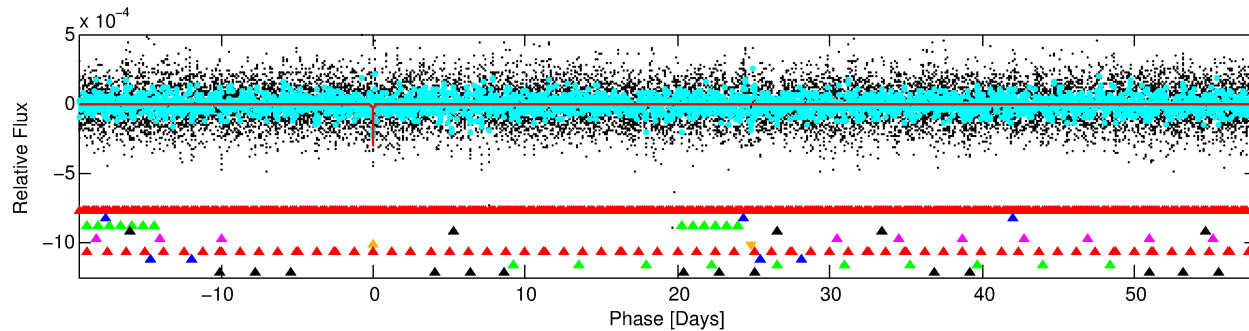
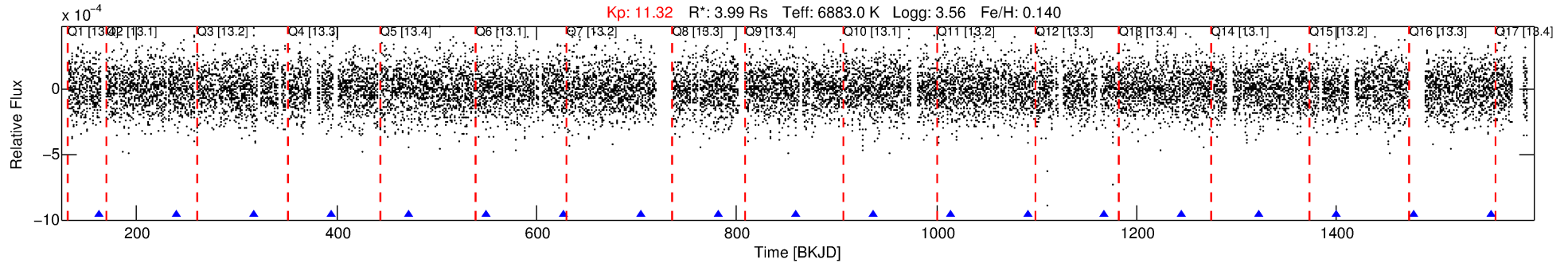
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 008882561-06

No Significant Match Found

# DV One-Page Summary

KIC: 8882561 Candidate: 6 of 10 Period: 77.375 d



## DV Fit Results:

Period = 77.37485 [0.00088] d  
Epoch = 162.3297 [0.0085] BKJD  
Rp/R\* = 0.0258 [0.0563]  
a/R\* = 47.84 [38.85]  
b = 0.99 [0.10]  
Seff = 153.72 [79.54]  
Teff = 898 [116] K  
Rp = 11.25 [24.85] Re  
a = 0.4567 [0.1476] AU  
Ag = 143.41 [630.40] [0.23 $\sigma$ ]  
Teffp = 4804 [5247] K [0.74 $\sigma$ ]

## DV Diagnostic Results:

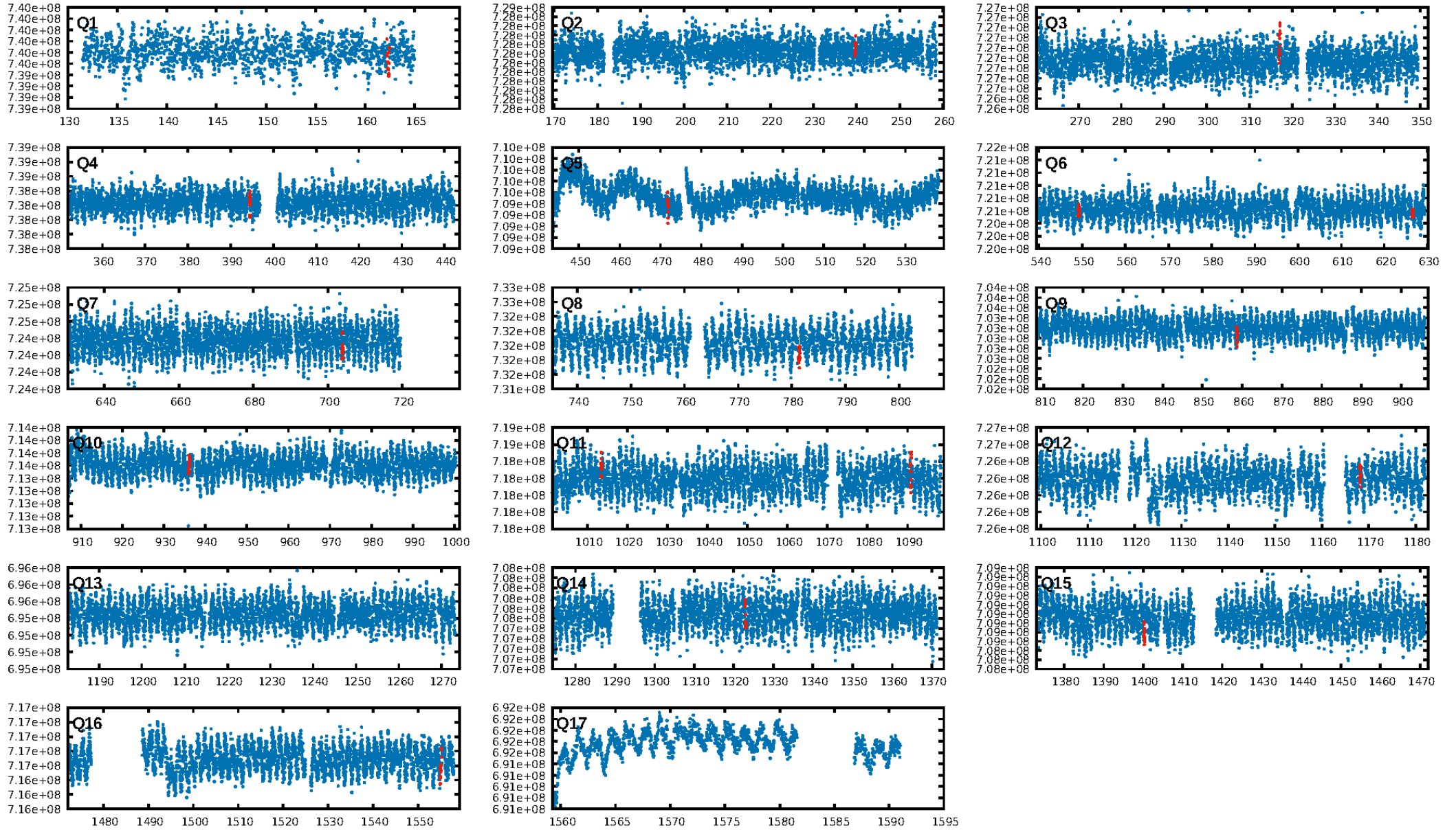
ShortPeriod-sig: 100.0% [193.01 $\sigma$ ]  
LongPeriod-sig: 100.0% [161.49 $\sigma$ ]  
ModelChiSquare2-sig: 6.2%  
ModelChiSquareGof-sig: 94.8%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [5/5]  
GhostDiagnostic-chr: 1.451  
Centroid-sig: 0.0%  
Centroid-so: 0.779 arcsec [2.18 $\sigma$ ]  
OotOffset-rm: 1.122 arcsec [2.32 $\sigma$ ]  
KicOffset-rm: 1.048 arcsec [2.15 $\sigma$ ]  
OotOffset-st: 3/3/4/3 [13]  
KicOffset-st: 3/3/4/3 [13]  
DiffImageQuality-fgm: 0.77 [10/13]  
DiffImageOverlap-fno: 0.33 [5/15]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 21:26:58 Z

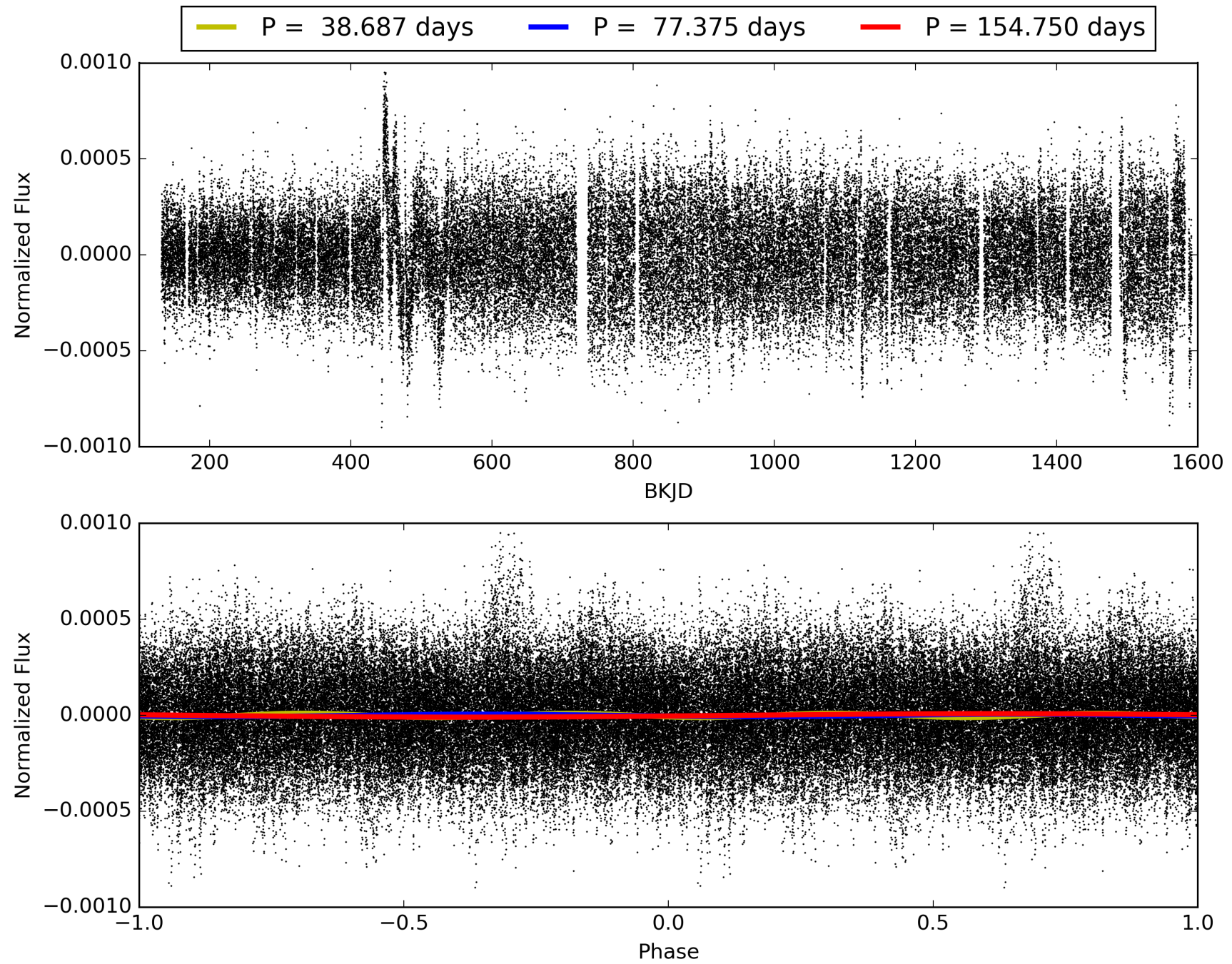
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 008882561-06, PDC Light Curves

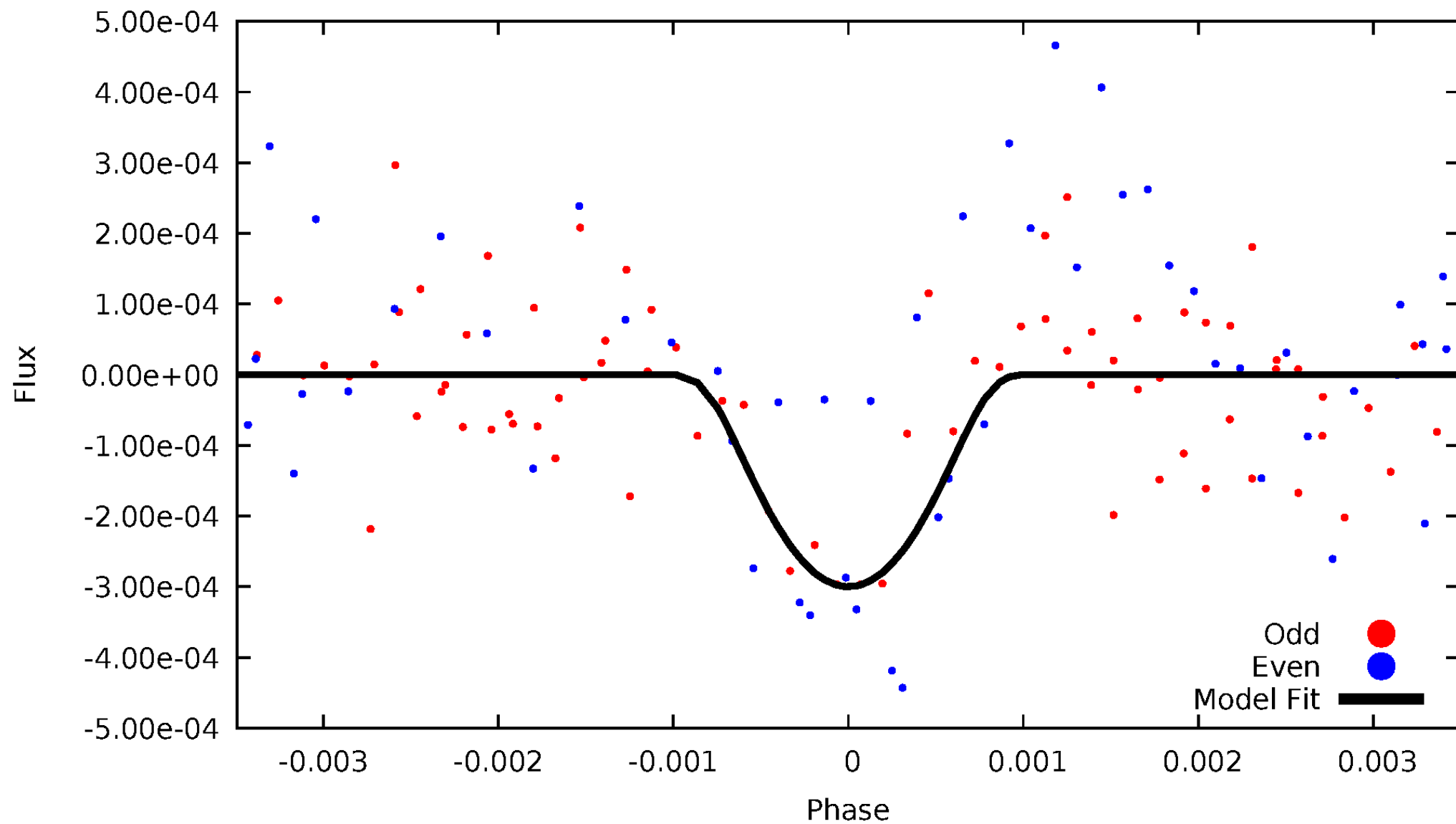


TCE 008882561-06



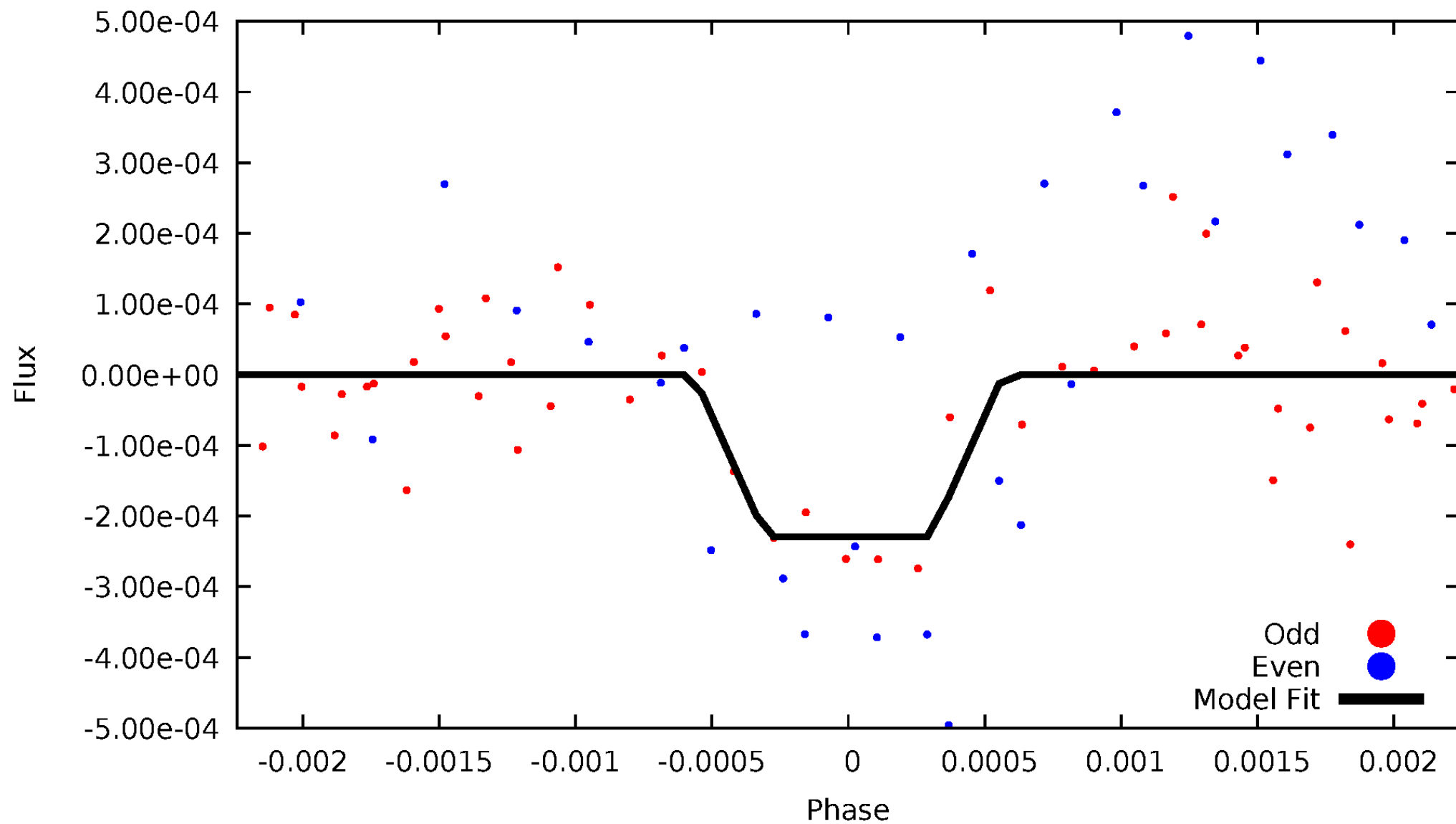
# DV Odd/Even

TCE 008882561-06



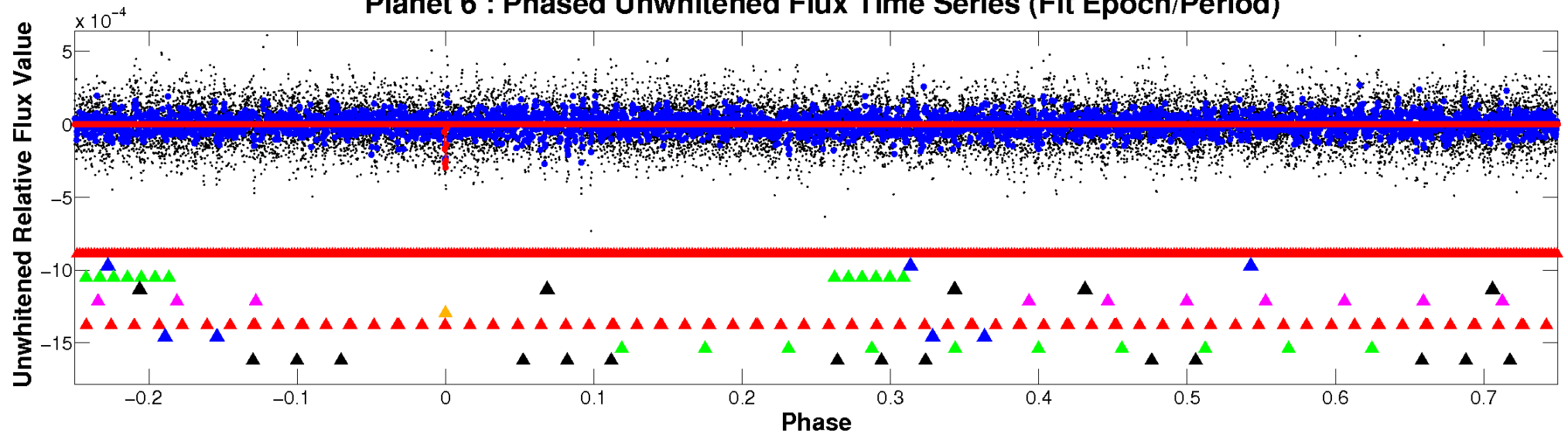
# ALT Odd/Even

TCE 008882561-06

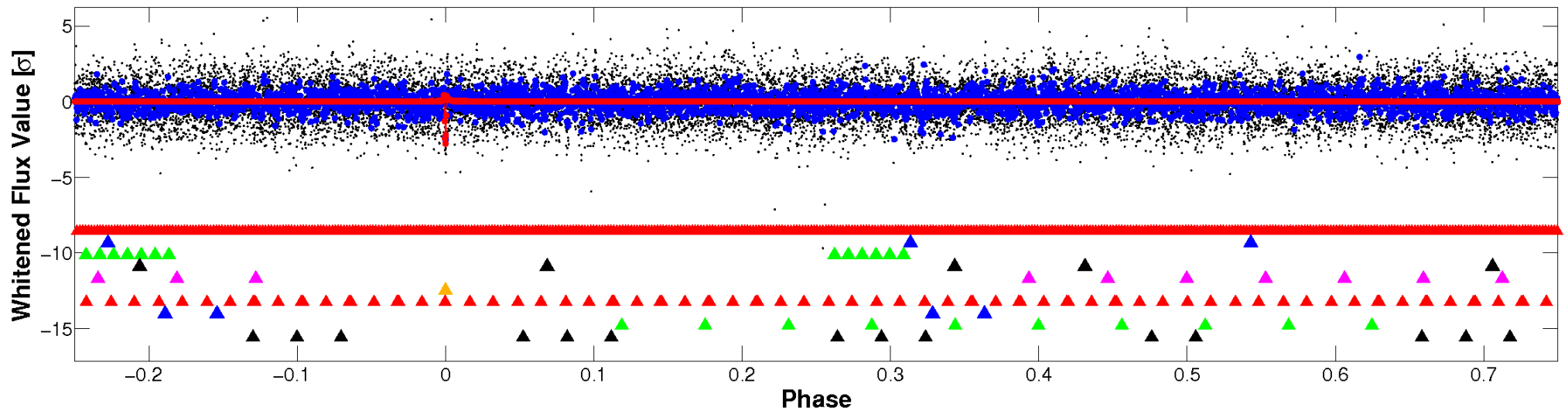


# Non-Whitened Vs. Whitened Light Curve

## Planet 6 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

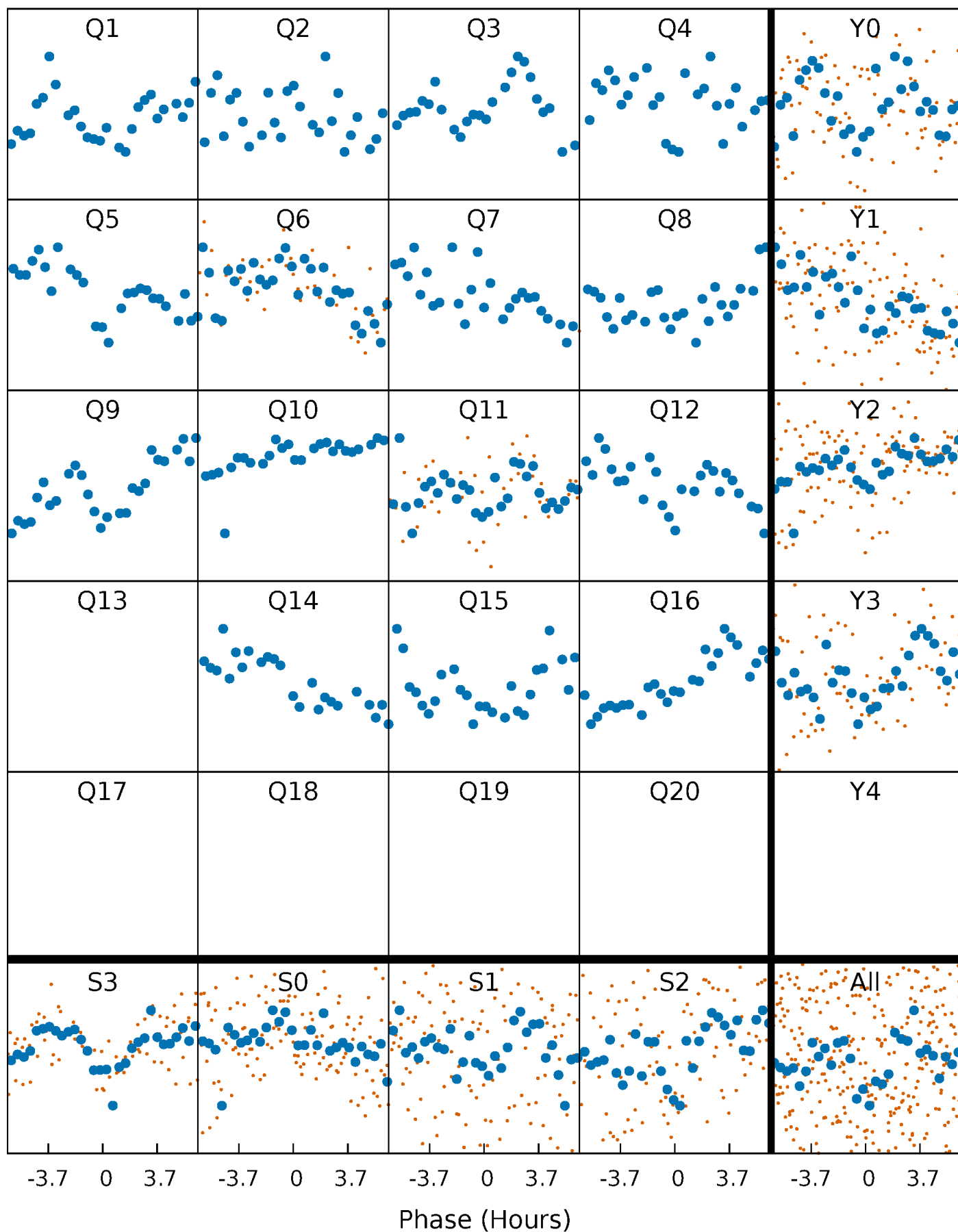


## Planet 6 : Phased Whitened Flux Time Series (Fit Epoch/Period)



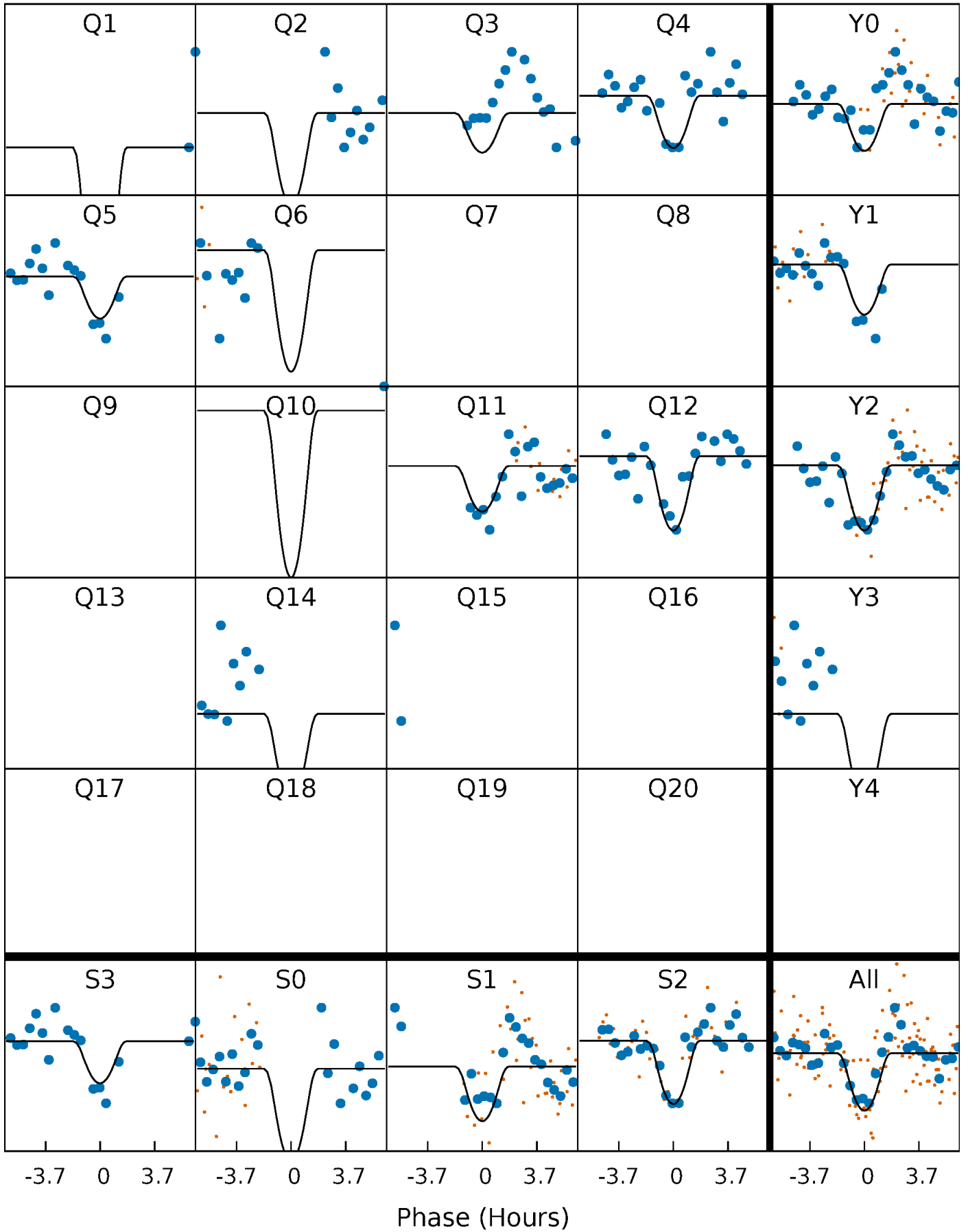
# PDC Quarter-Phased Transit Curves

TCE 008882561-06 P= 77.374847 Days  $T_0=162.329719$  (BKJD)



# DV Quarter-Phased Transit Curves

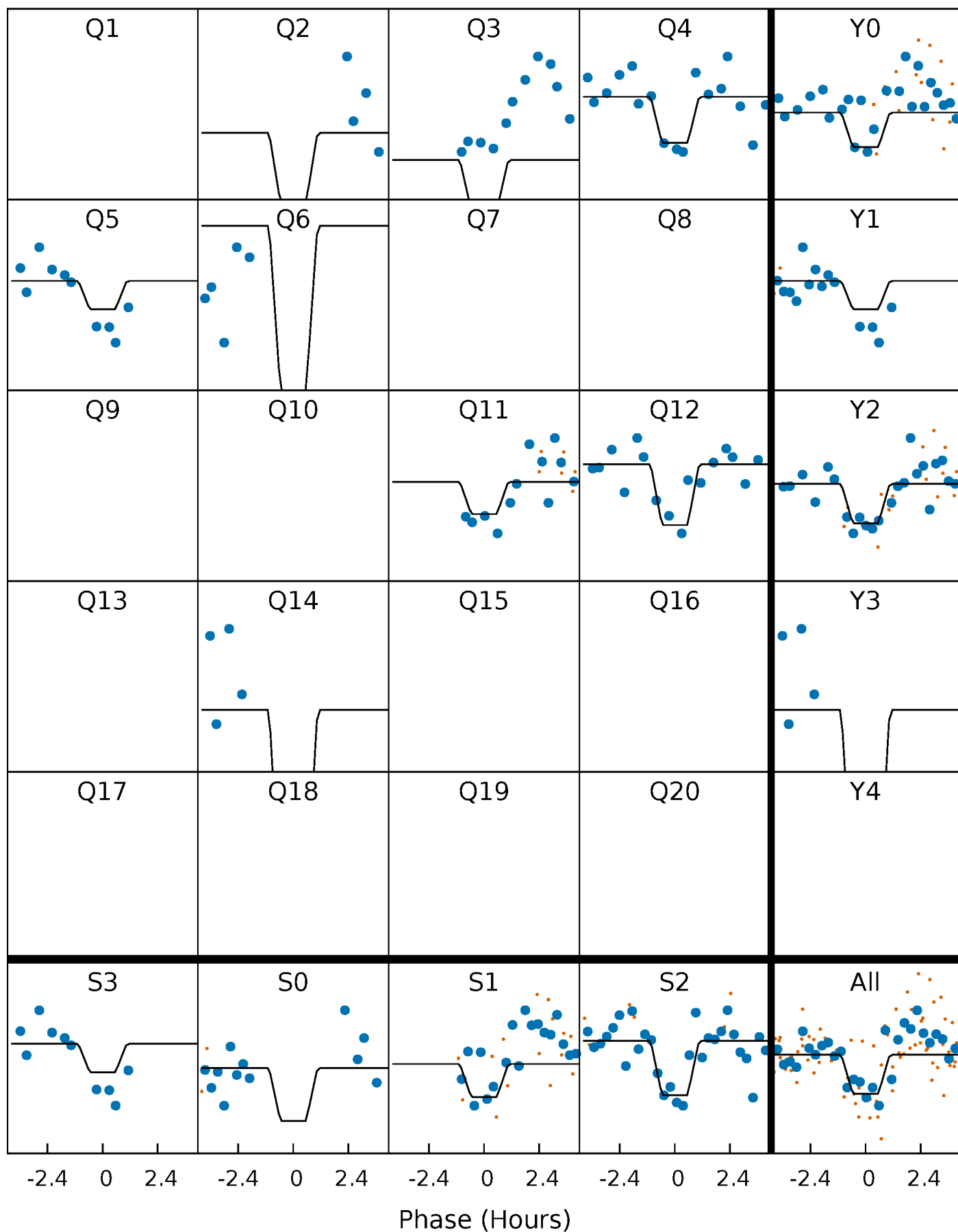
TCE 008882561-06   P= 77.374847 Days    $T_0=162.329719$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

TCE 008882561-06 P= 77.375032 Days  $T_0=162.324485$  (BKJD)

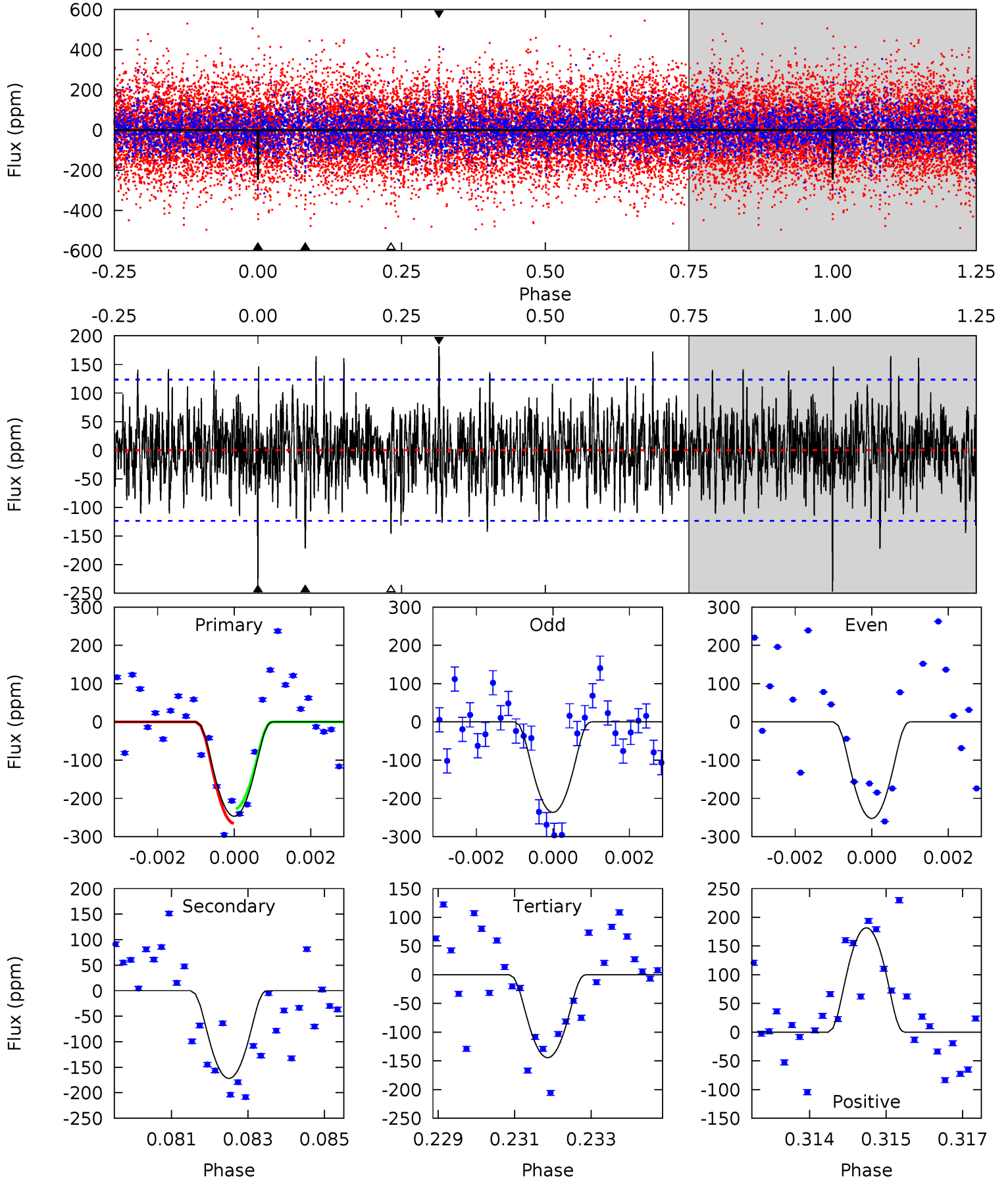




# DV Model-Shift Uniqueness Test

008882561-06, P = 77.374847 Days, E = 84.954872 Days

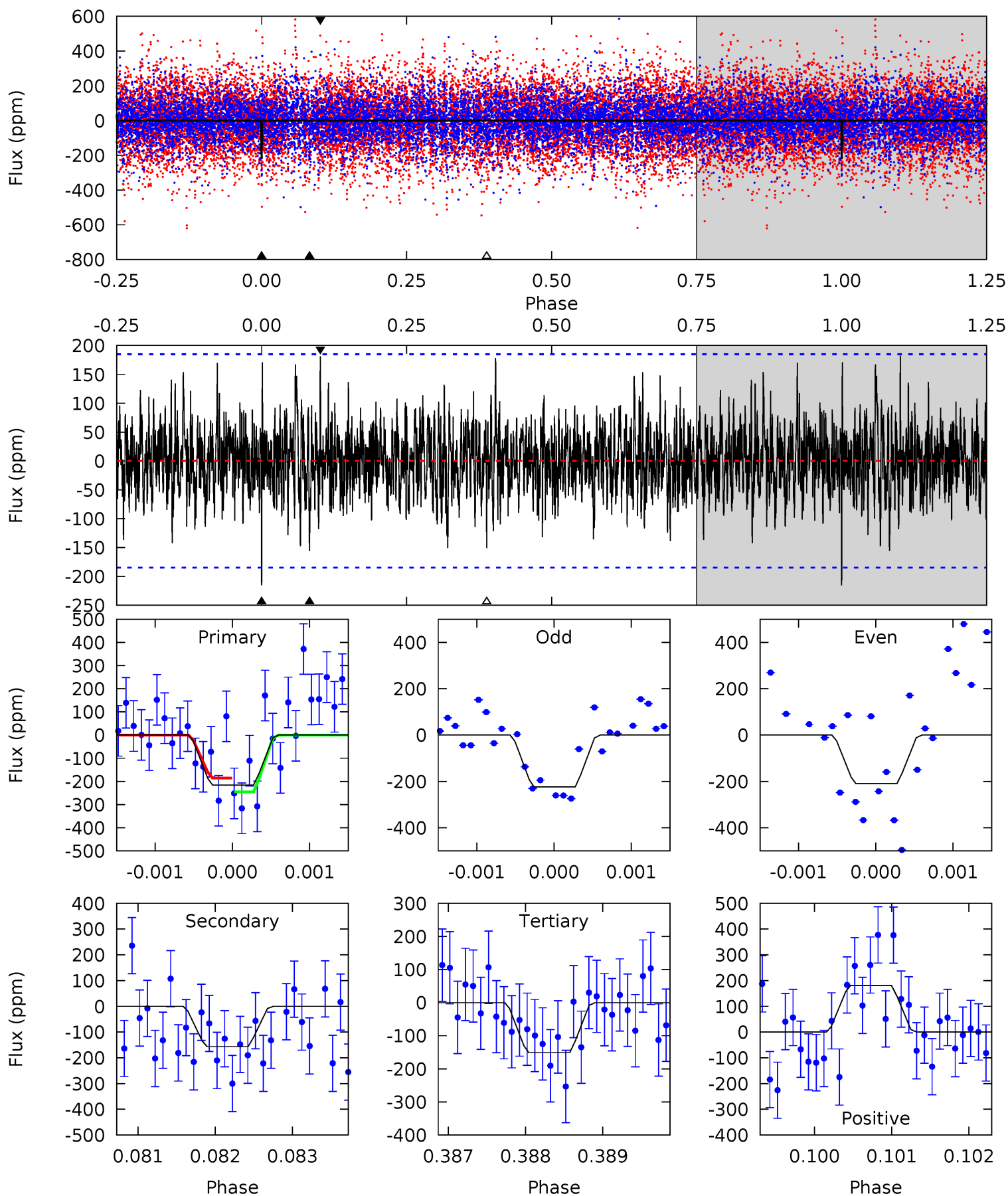
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.7	7.42	6.24	7.85	5.33	3.09	1.98	4.42	2.81	1.19	-0.42	0.34	1.04	0.42	0.81



# Alt Model-Shift Uniqueness Test

008882561-06, P = 77.375032 Days, E = 84.949453 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.34	4.59	4.44	5.33	5.44	3.28	1.42	1.91	1.02	0.16	-0.73	0.20	0.90	0.46	0.88



### Stellar Parameters For KIC 008882561

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6883^{+153}_{-222}$	$3.562^{+0.288}_{-0.032}$	$0.140^{+0.200}_{-0.250}$	$3.993^{+0.249}_{-1.413}$	$2.119^{+0.073}_{-0.416}$	$0.047^{+0.093}_{-0.006}$
	+2%/-3%	+8%/-1%	+143%/-179%	+6%/-35%	+3%/-20%	+199%/-12%
Source	PHO1	FLK73	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 008882561-06 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-172 \pm 23$	$19.40^{+18.01}_{-13.65}$	$1216^{+57}_{-101}$	$3864^{+2527}_{-735}$	$52^{+538}_{-39}$
Alt.	$-156 \pm 34$	$18.21^{+16.90}_{-12.97}$	$1216^{+59}_{-98}$	$3886^{+2798}_{-734}$	$52^{+599}_{-38}$

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

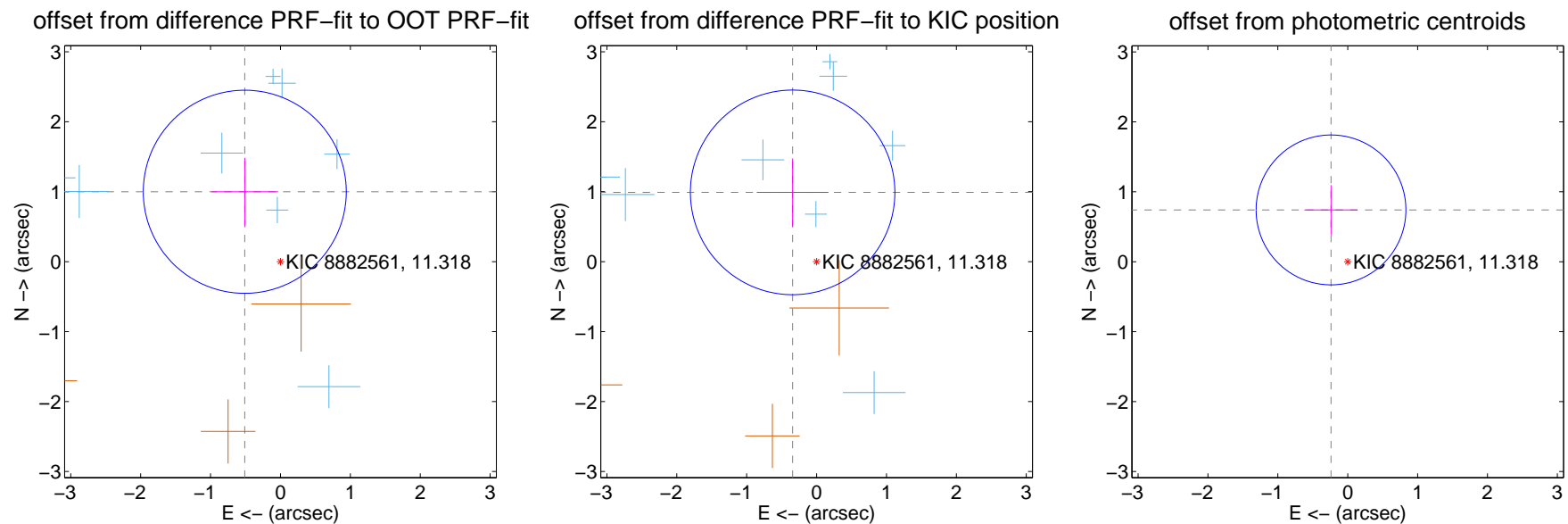
## DV Centroid Data

Supplemental centroid analysis for 008882561-06. **Kepler magnitude: 11.32.** Transit SNR 10.29

There are 10 quarters with good PRF difference image offsets

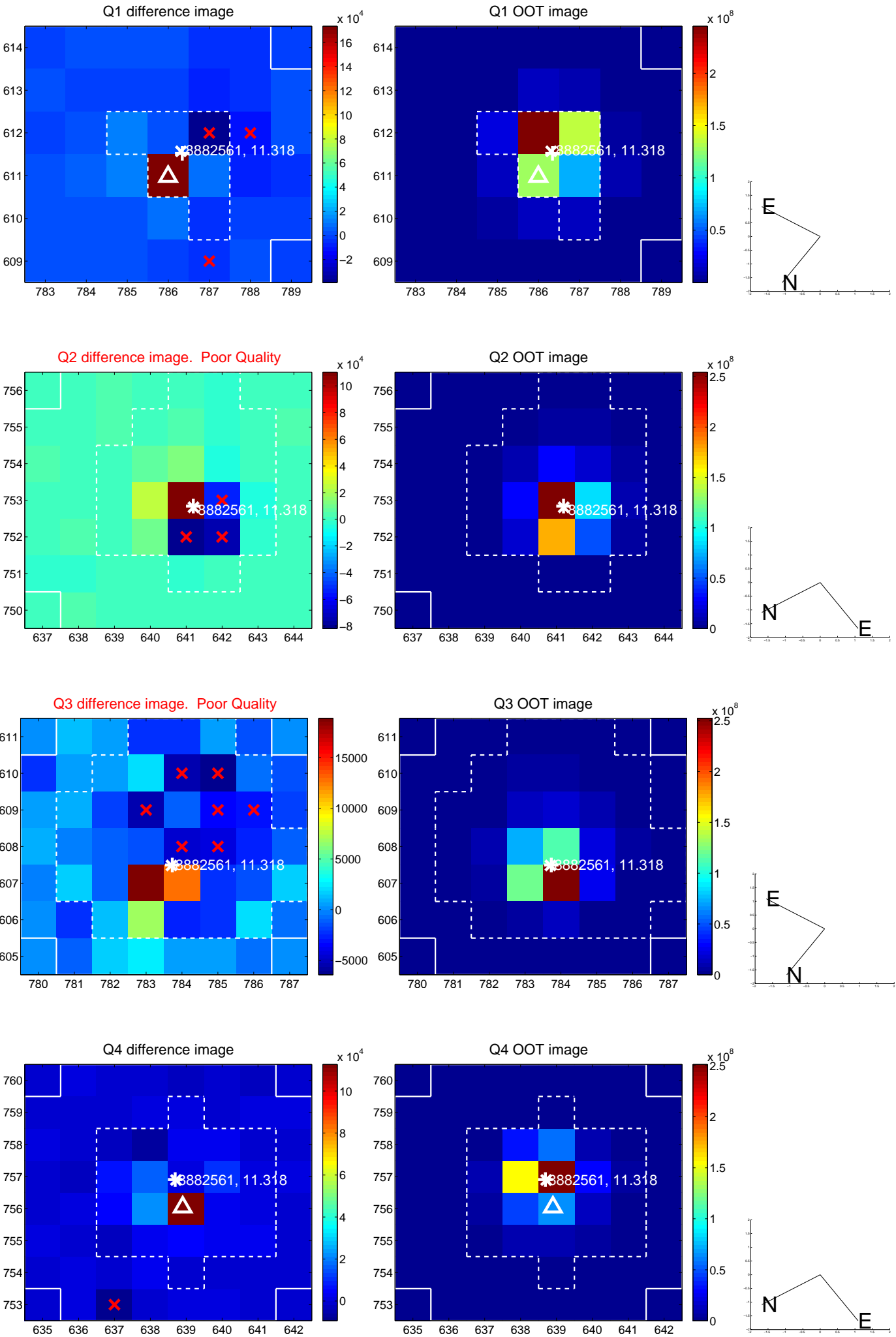
The direct PRF centroid is offset from the target star catalog position by about 0.15 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.122 \pm 0.484$	2.32	$0.510 \pm 0.476$	$0.999 \pm 0.485$
PRF-fit source offset from KIC position	$1.048 \pm 0.488$	2.15	$0.343 \pm 0.513$	$0.990 \pm 0.485$
photometric centroid source offset	$0.78 \pm 0.36$	2.18	$0.24 \pm 0.38$	$0.74 \pm 0.35$

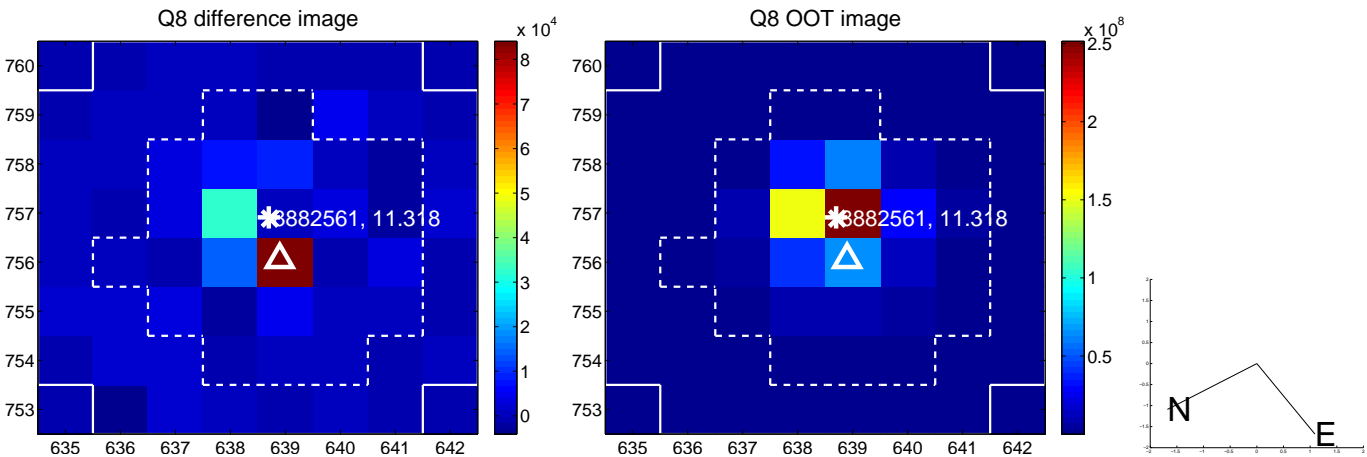
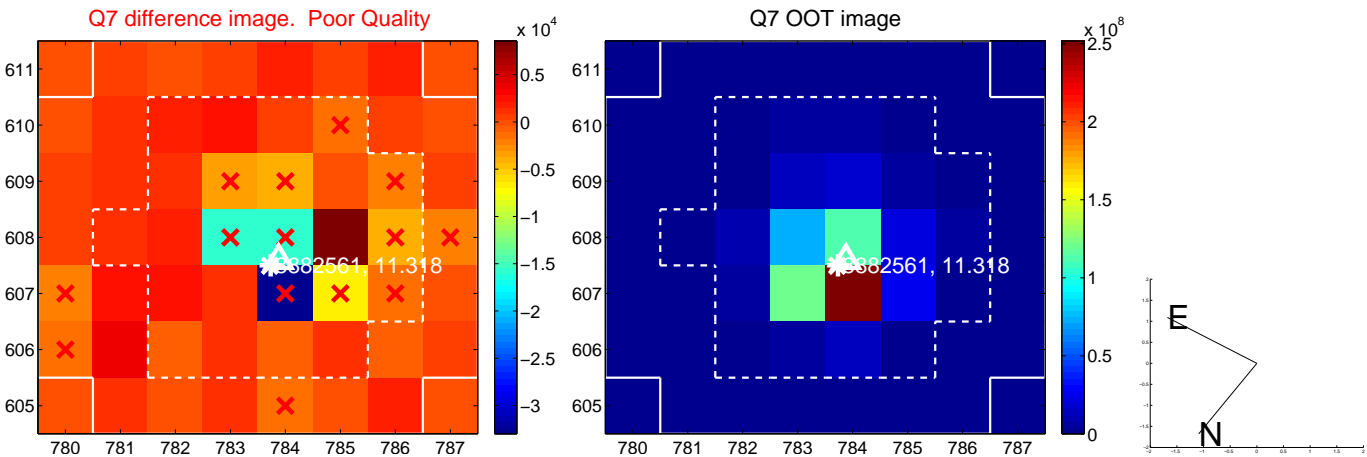
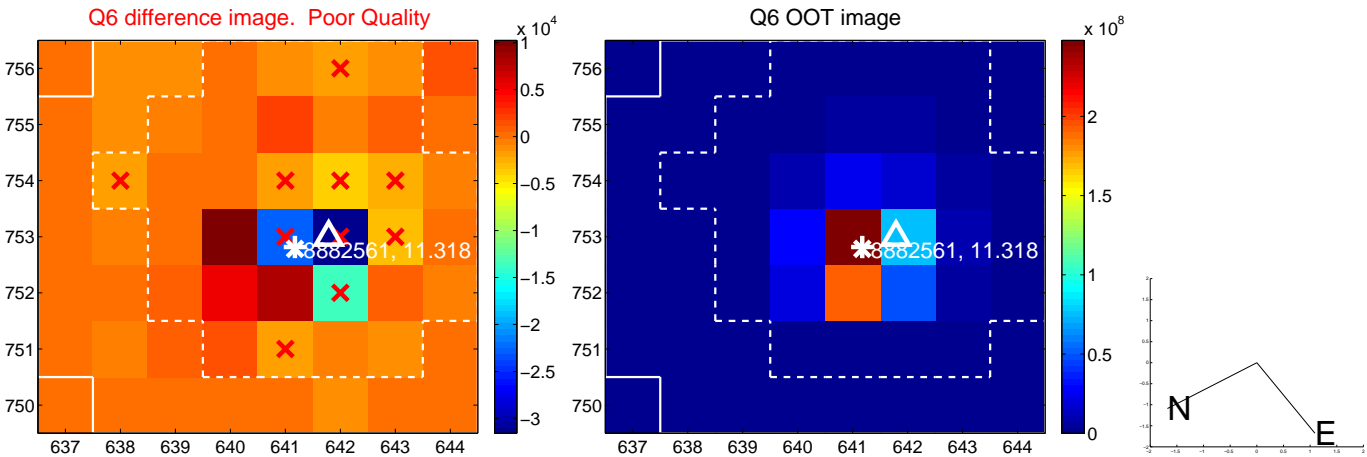
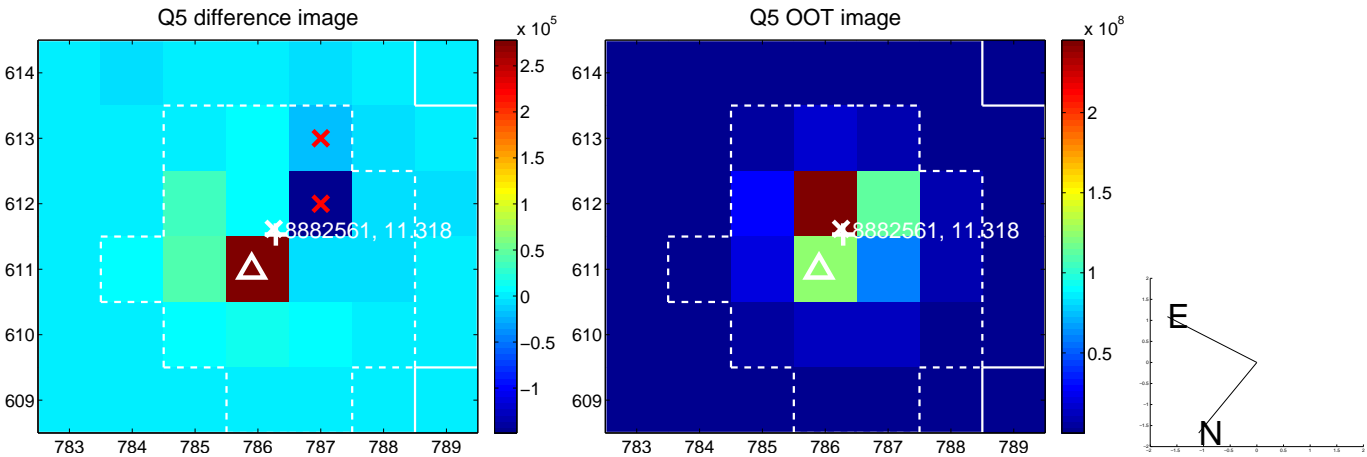


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

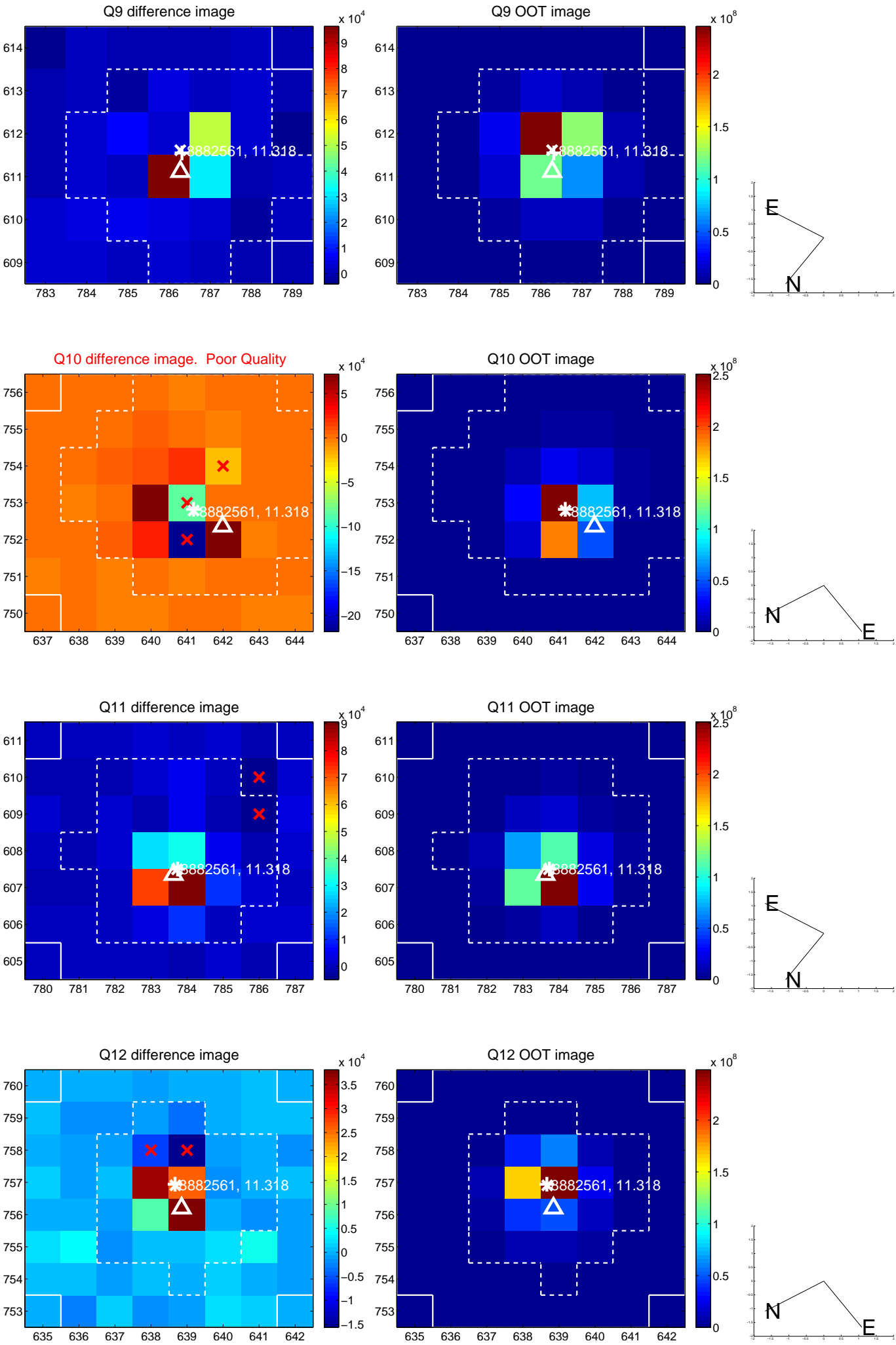
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



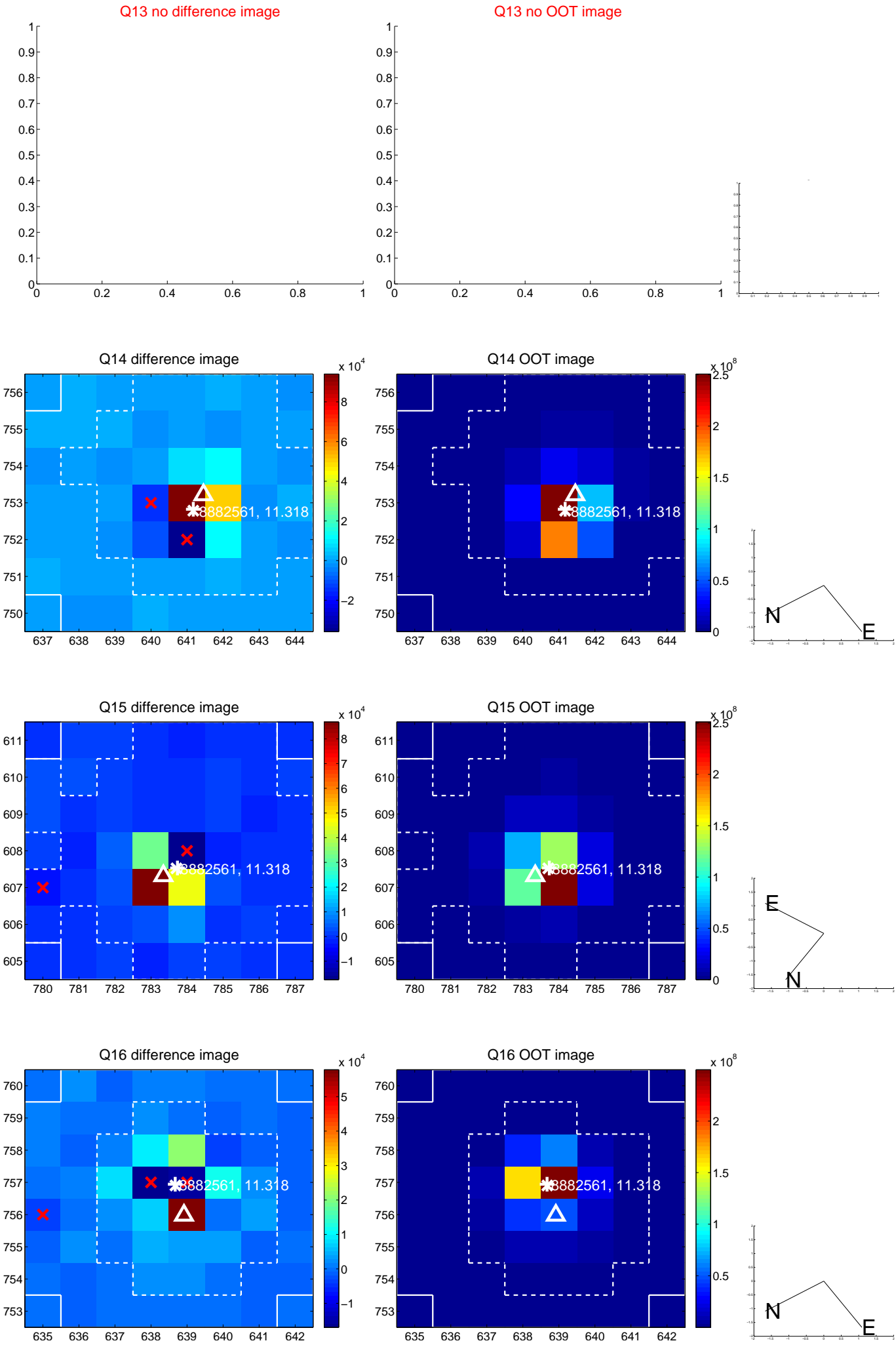
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

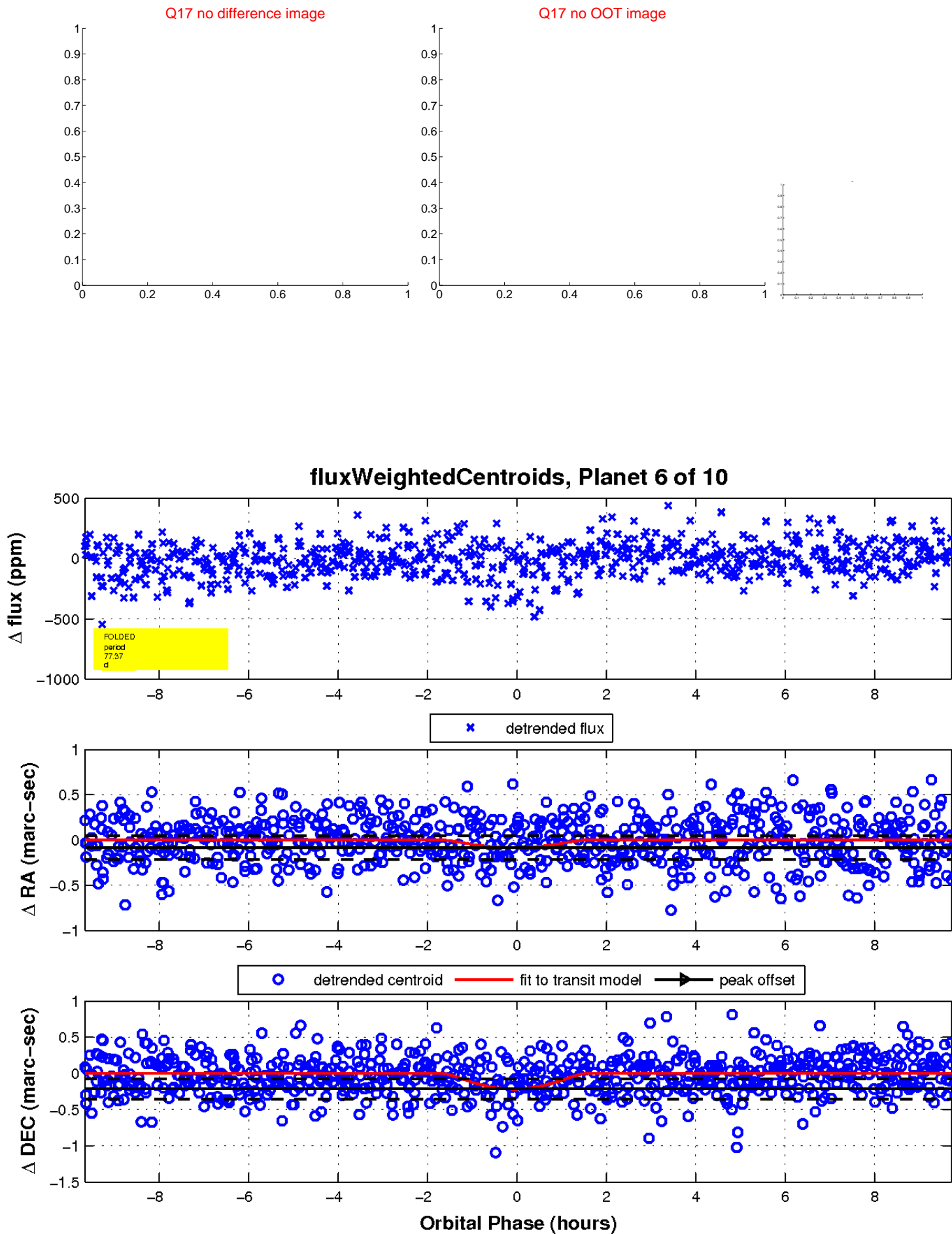


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



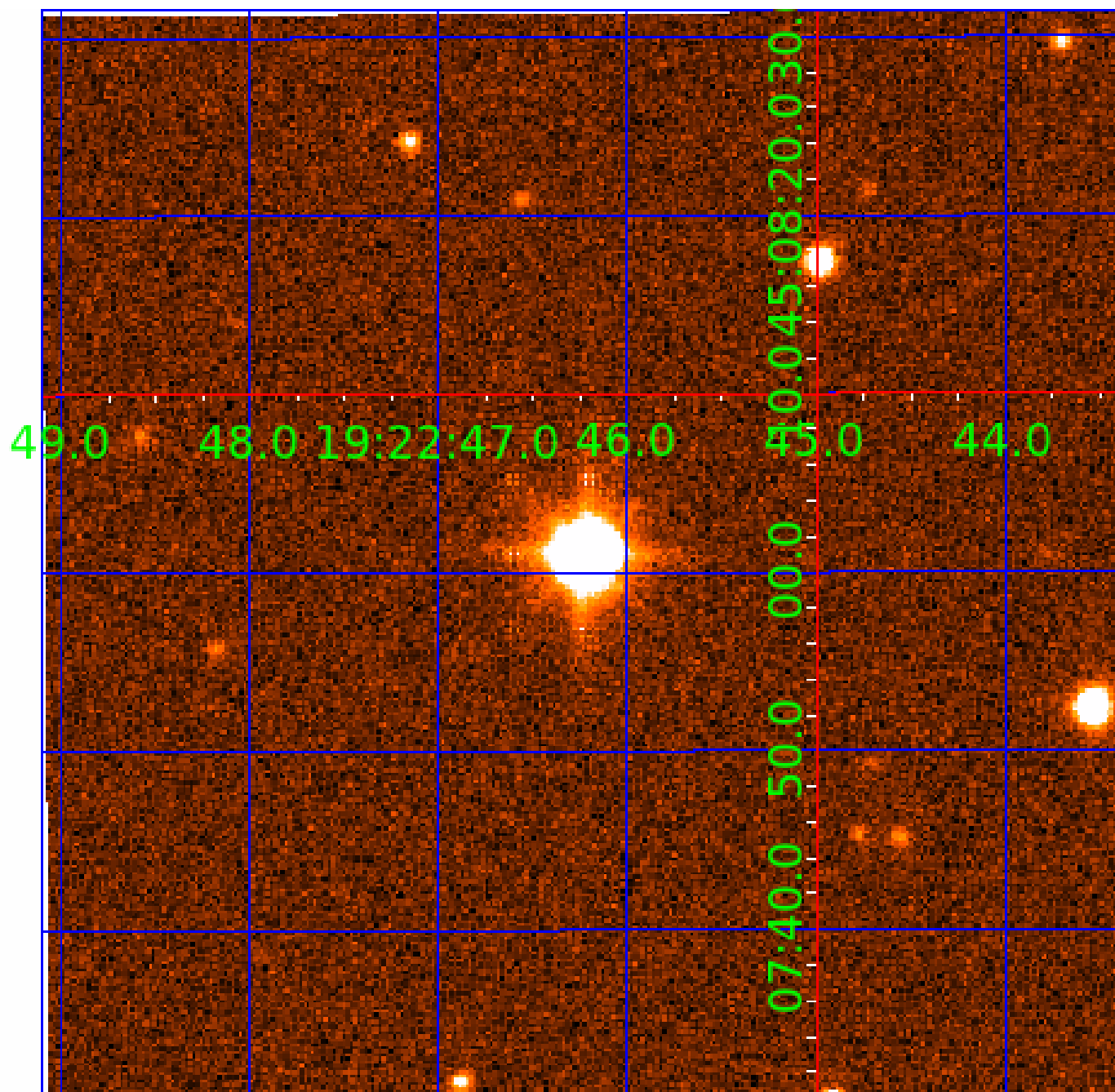


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008882561-01	OBS	No	1.514201	131.737652	22.8	8.481	8.2	9.1	3.99	6883	2.63	29149.21
008882561-02	OBS	No	601.244806	376.846737	316.0	50.859	14.8	8.2	3.99	6883	8.76	9.99
008882561-03	OBS	No	116.422525	143.577886	272.5	2.242	10.4	9.2	3.99	6883	7.27	89.16
008882561-04	OBS	No	260.182597	343.643718	233.8	26.146	9.6	9.2	3.99	6883	6.57	30.51
008882561-05	OBS	No	150.633582	152.436456	294.4	5.530	9.7	10.3	3.99	6883	8.88	63.24
008882561-06	OBS	No	77.374847	162.329719	299.9	3.243	9.2	10.3	3.99	6883	11.25	153.72
008882561-07	OBS	No	18.718323	141.178432	101.8	6.533	8.9	9.7	3.99	6883	4.60	1019.80
008882561-08	OBS	No	426.915106	225.078632	241.7	5.371	8.7	9.3	3.99	6883	6.96	15.77
008882561-09	OBS	No	150.401601	210.659704	277.3	2.596	8.6	9.4	3.99	6883	7.70	63.37

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008882561-01	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV—CENT_SATURATED
008882561-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_SATURATED
008882561-03	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
008882561-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_SATURATED
008882561-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL_SKYE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
008882561-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
008882561-07	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED—HALO_GHOST
008882561-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—CENT_SATURATED
008882561-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED

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

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

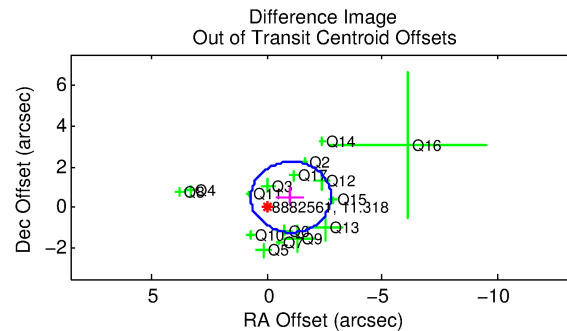
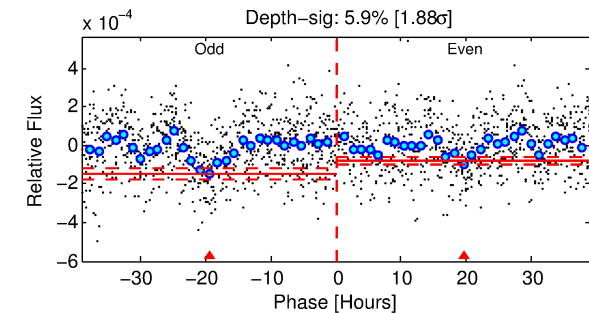
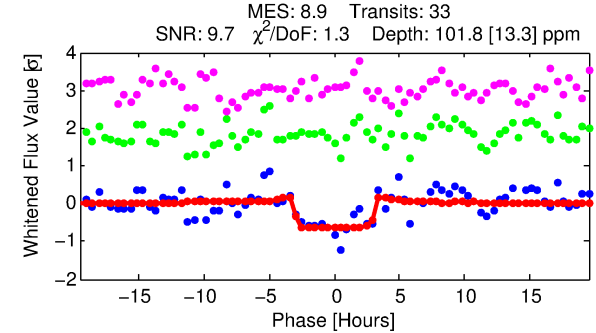
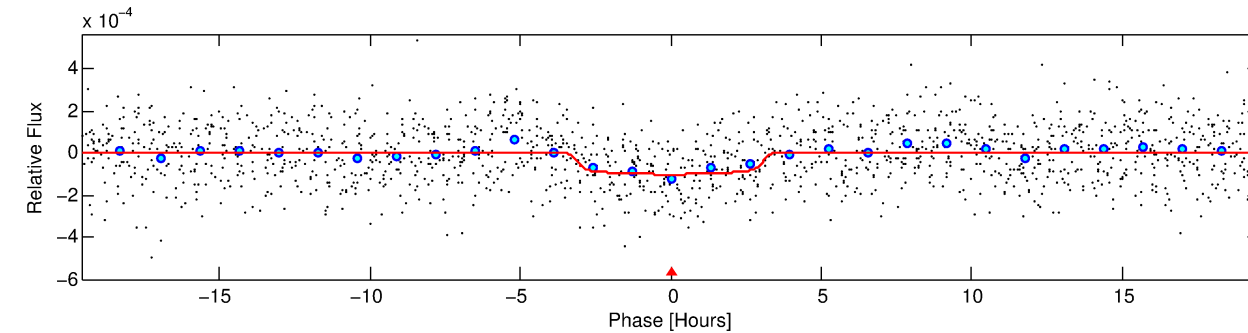
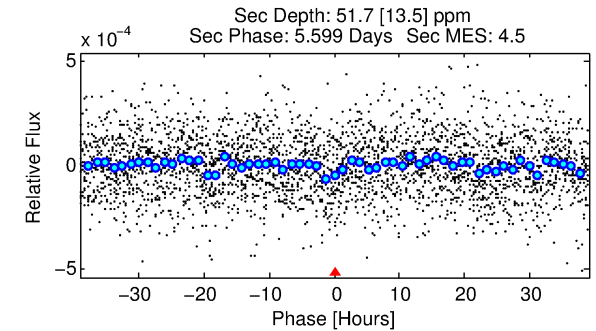
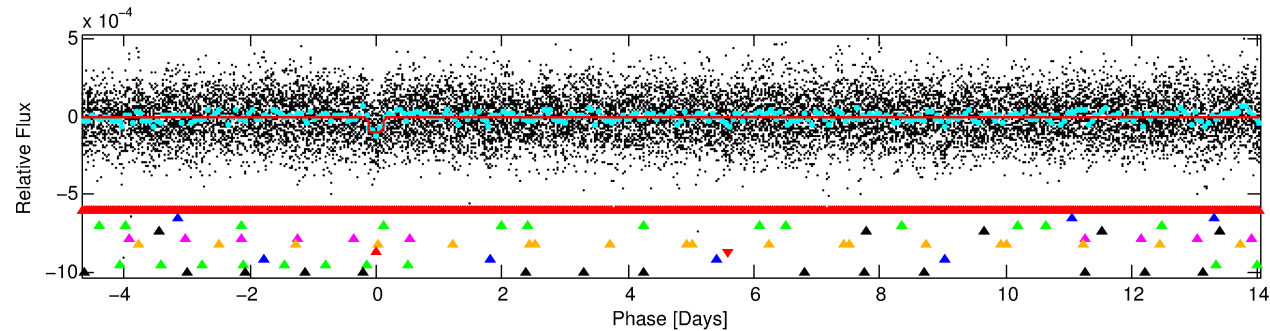
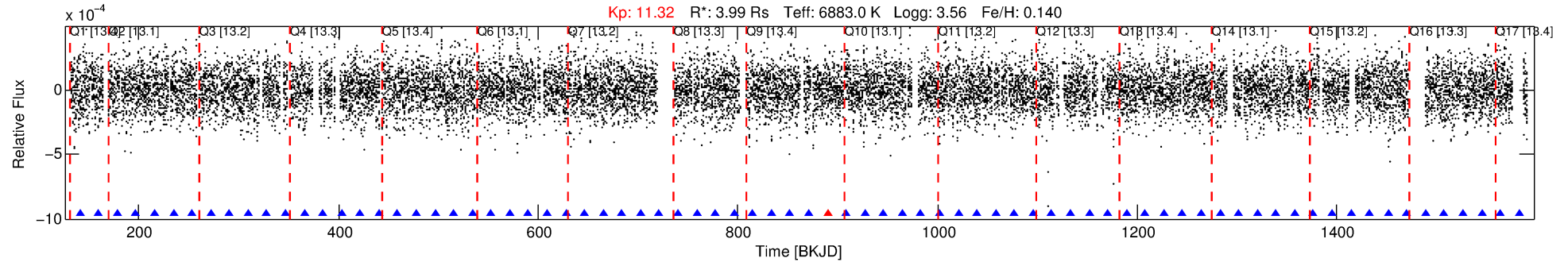
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 008882561-07

No Significant Match Found

# DV One-Page Summary

KIC: 8882561 Candidate: 7 of 10 Period: 18.718 d



## DV Fit Results:

Period = 18.71832 [0.00025] d  
Epoch = 141.1784 [0.0114] BKJD  
Rp/R\* = 0.0106 [0.0030]  
a/R\* = 11.12 [17.87]  
b = 0.87 [0.44]  
Seff = 1019.80 [527.69]  
Teq = 1441 [186] K  
Rp = 4.60 [2.08] Re  
a = 0.1773 [0.0573] AU  
Ag = 42.18 [33.65] [1.22σ]  
Teffp = 5678 [900] K [4.61σ]

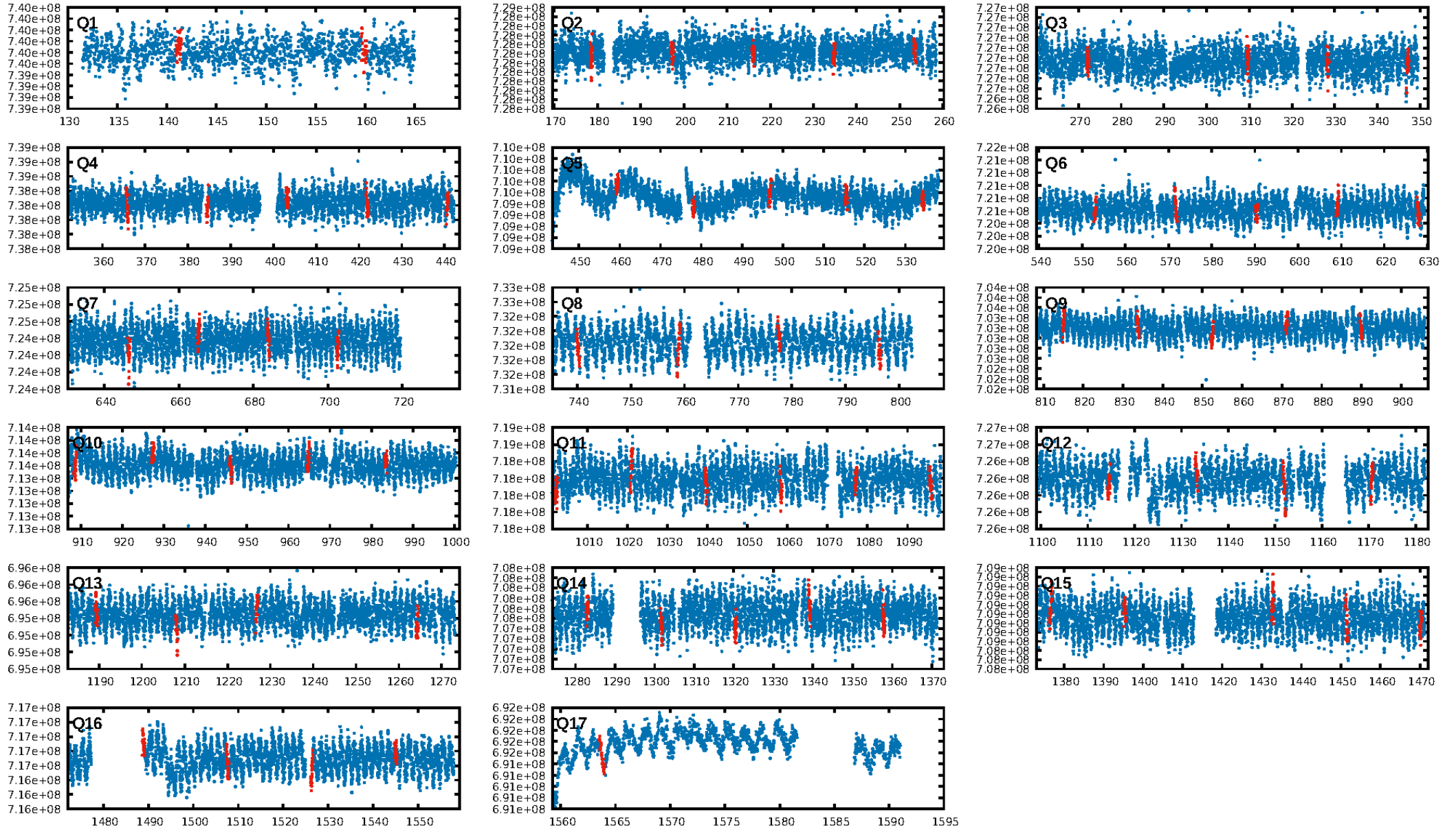
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [38.57σ]  
LongPeriod-sig: 100.0% [193.01σ]  
ModelChiSquare2-sig: 74.9%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 0.97 [31/32]  
GhostDiagnostic-chr: 0.05734  
Centroid-sig: 55.5%  
Centroid-so: 0.218 arcsec [0.66σ]  
OotOffset-rm: 1.157 arcsec [2.00σ]  
KicOffset-rm: 0.781 arcsec [1.35σ]  
OotOffset-st: 4/4/4/4 [16]  
KicOffset-st: 4/4/4/4 [16]  
DiffImageQuality-fgm: 0.56 [9/16]  
DiffImageOverlap-fno: 0.24 [4/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 21:27:02 Z

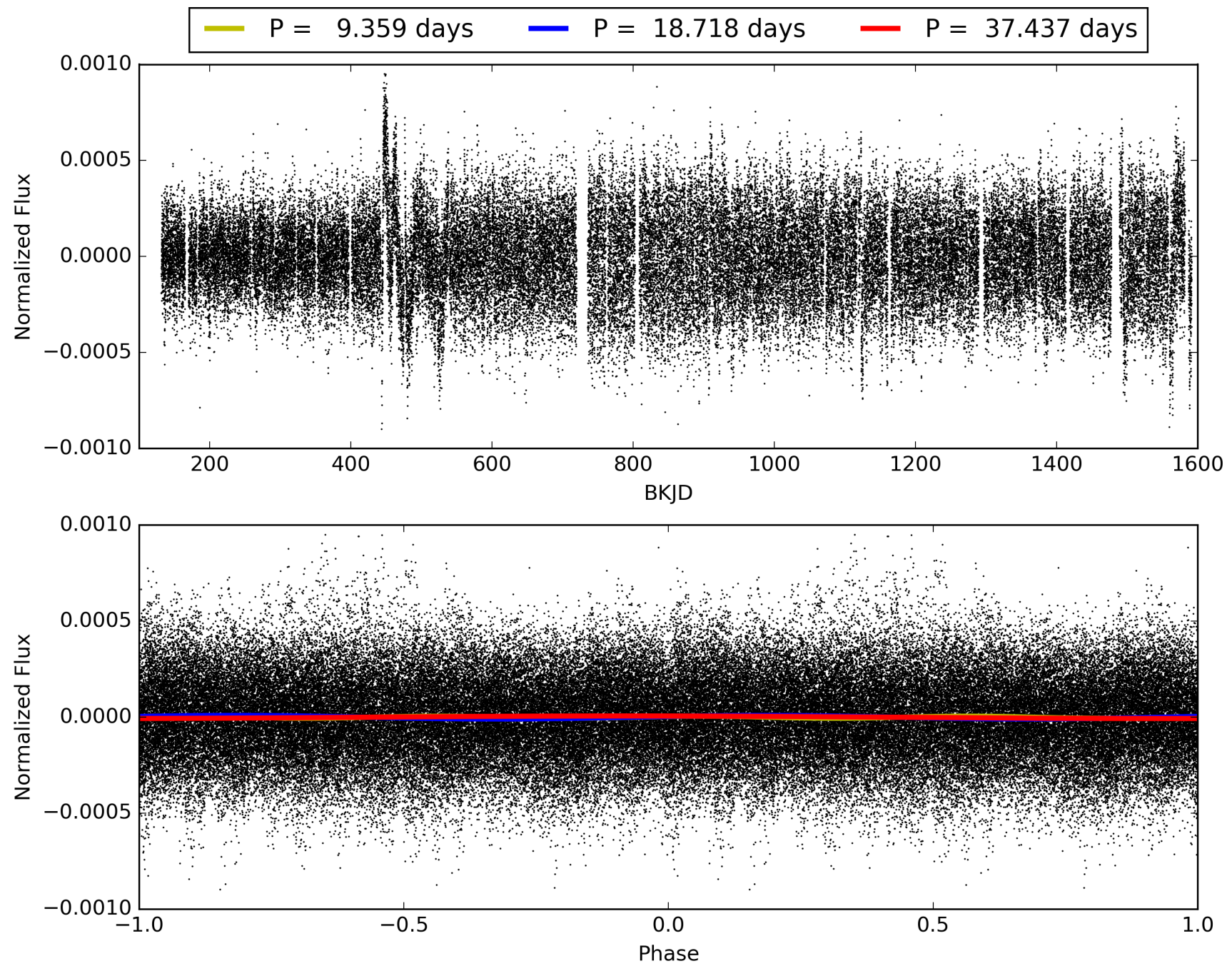
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 008882561-07, PDC Light Curves



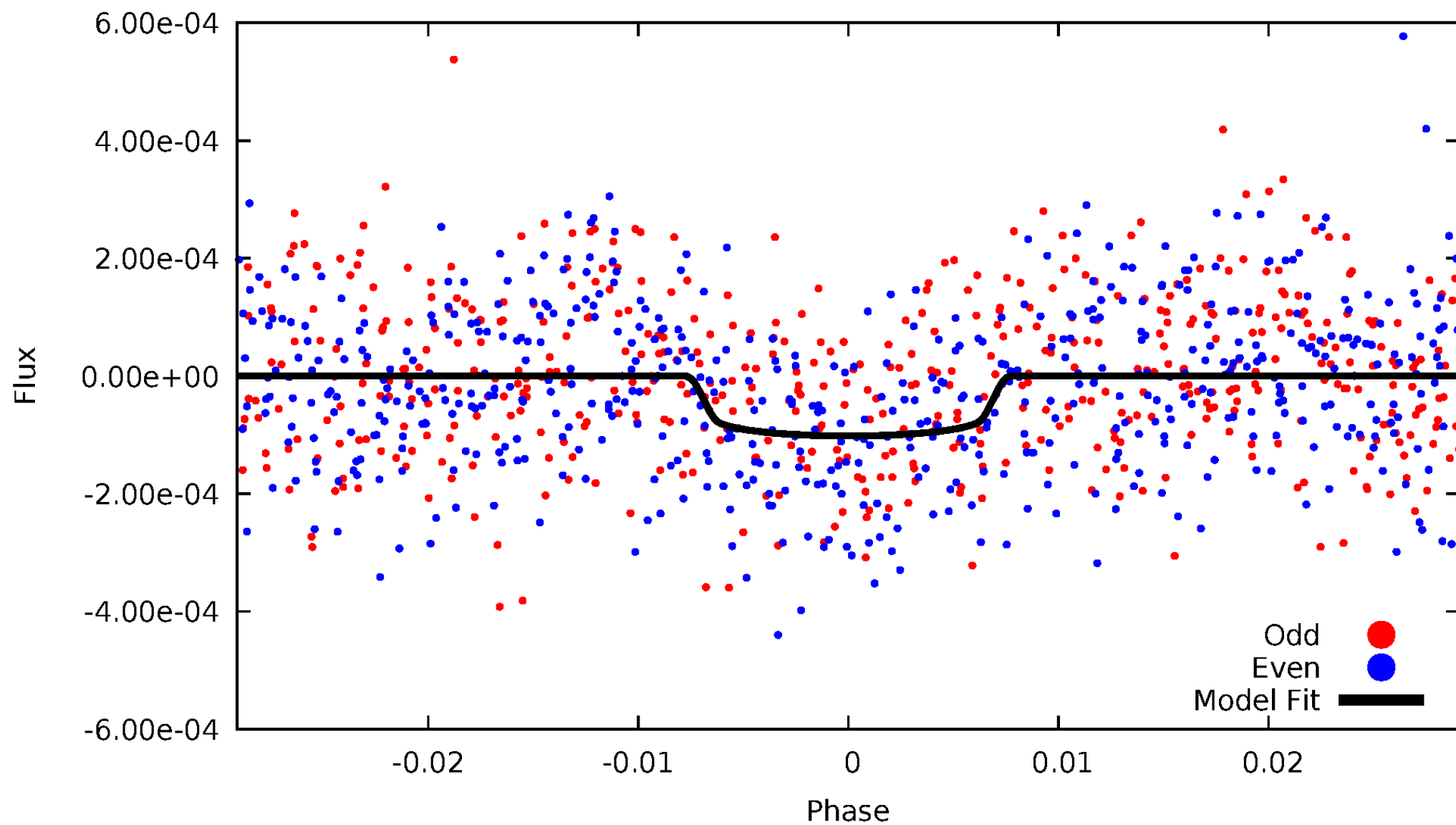


TCE 008882561-07



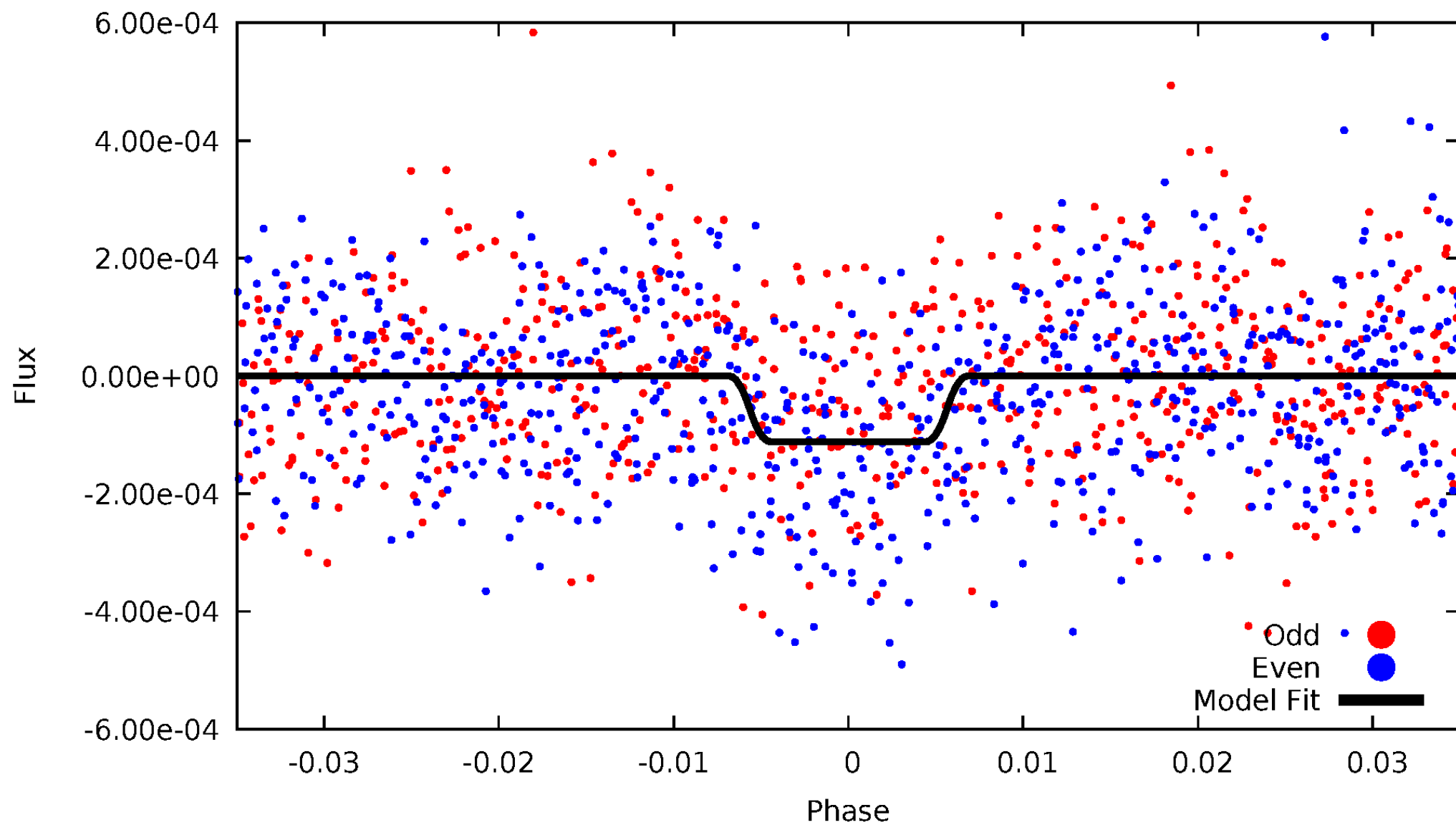
# DV Odd/Even

TCE 008882561-07



# ALT Odd/Even

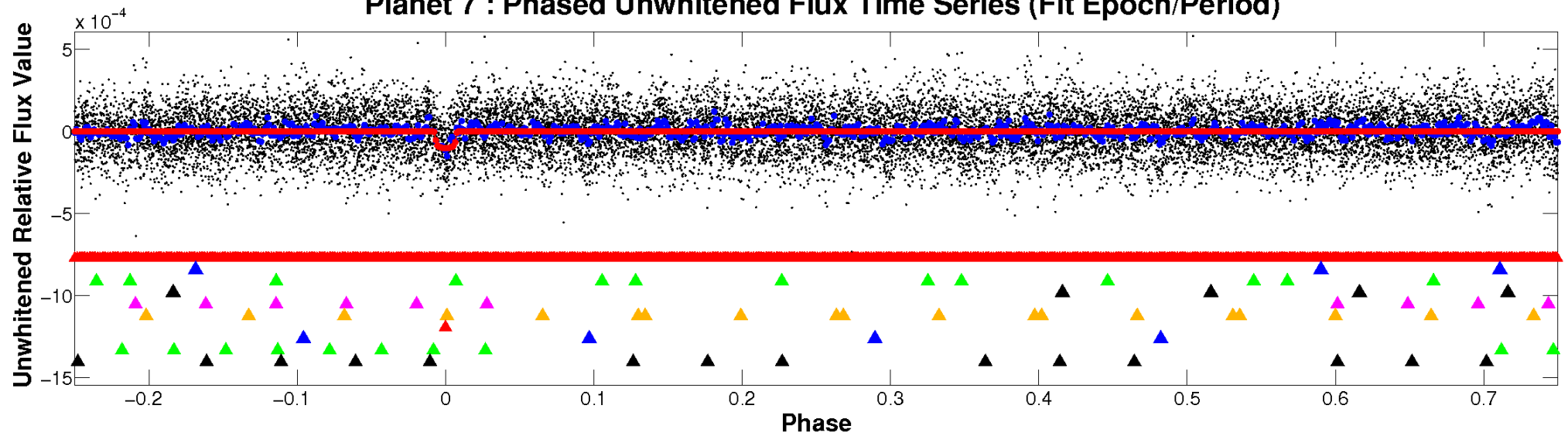
TCE 008882561-07



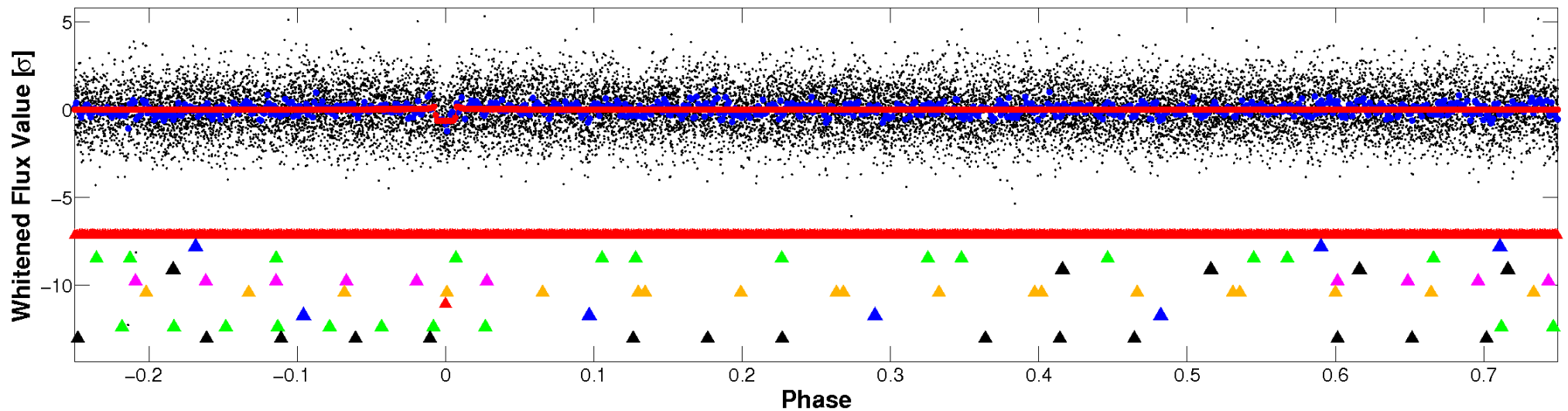


# Non-Whitened Vs. Whitened Light Curve

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

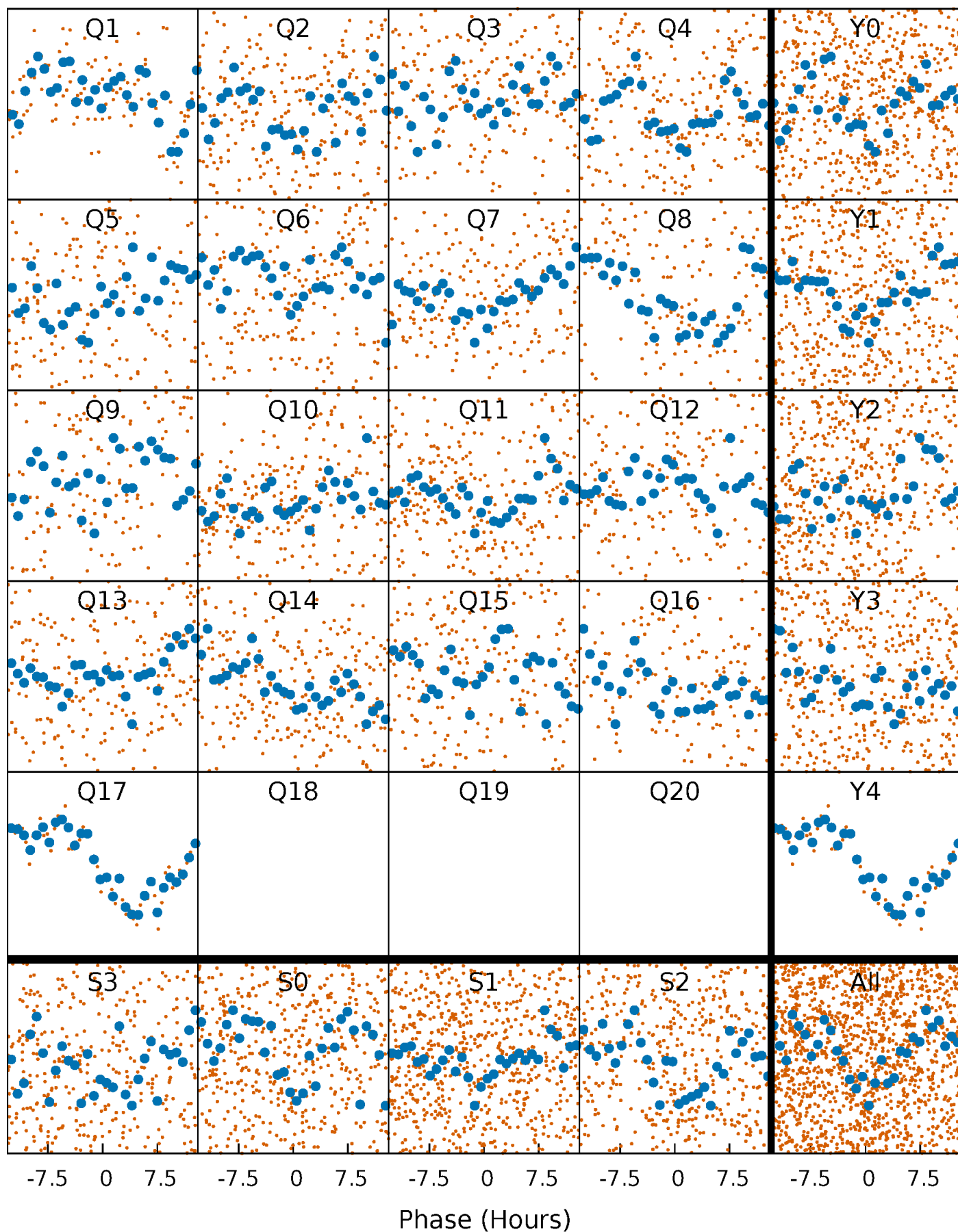


## Planet 7 : Phased Whitened Flux Time Series (Fit Epoch/Period)



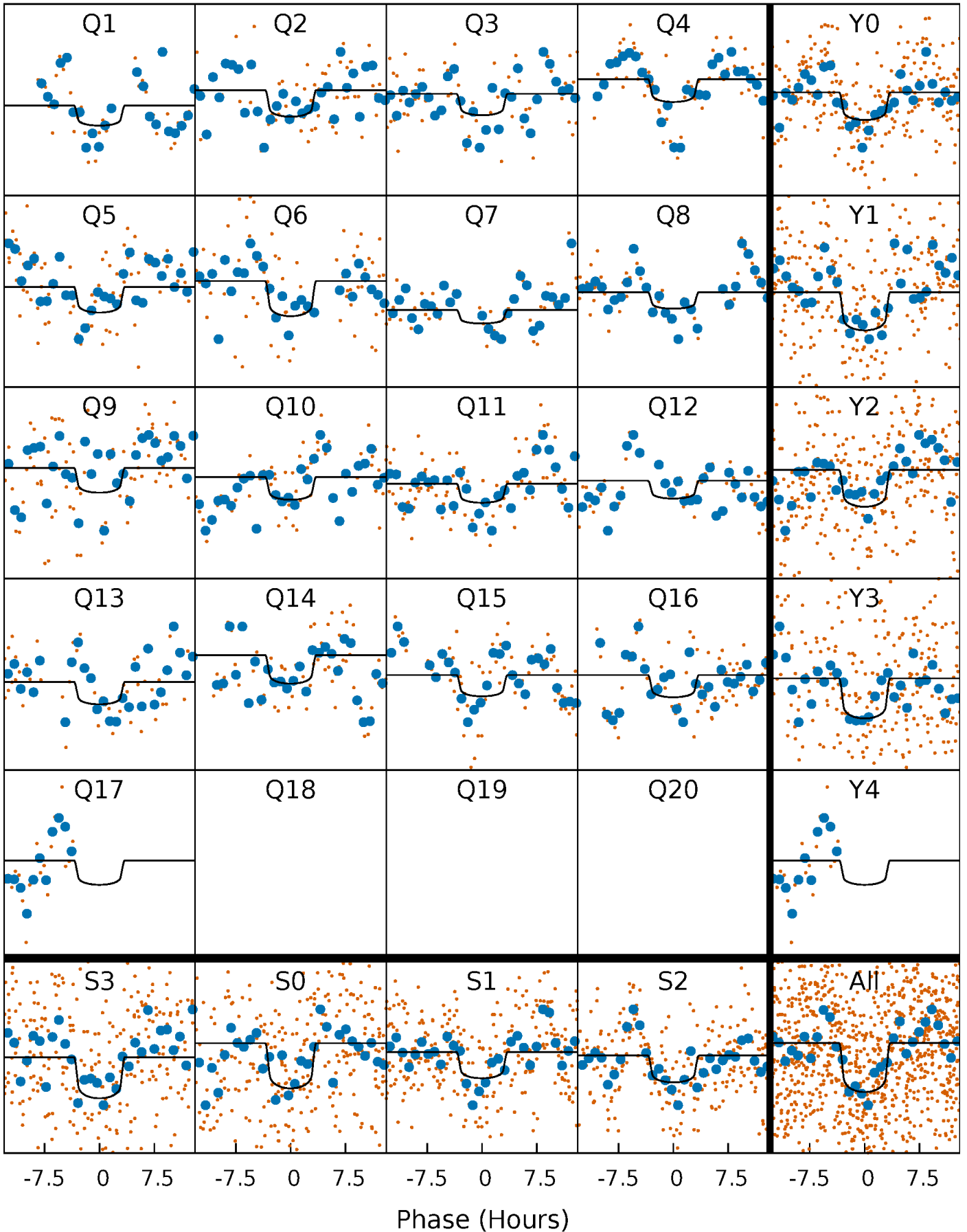
# PDC Quarter-Phased Transit Curves

TCE 008882561-07   P= 18.718323 Days    $T_0=141.178432$  (BKJD)



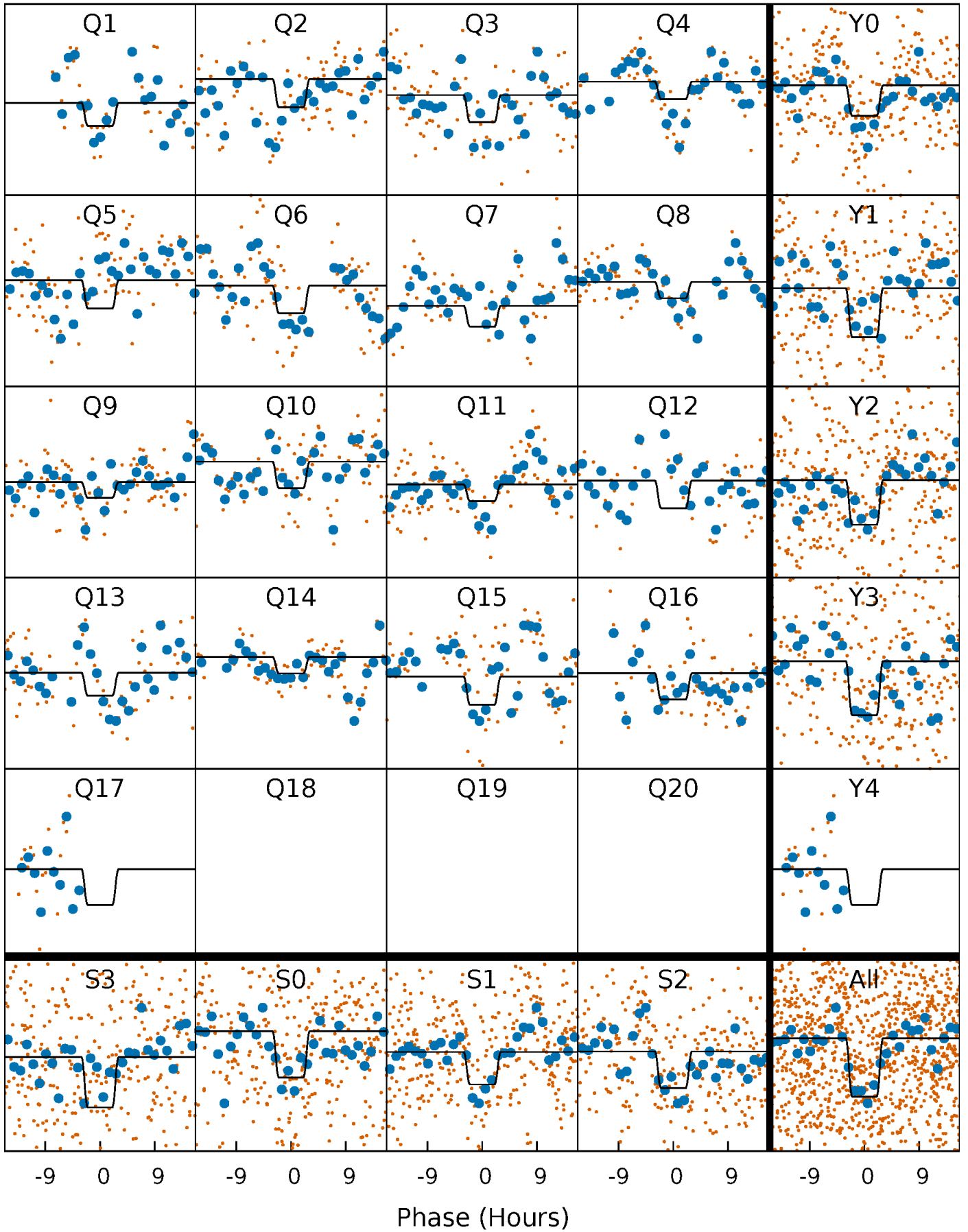
# DV Quarter-Phased Transit Curves

TCE 008882561-07   P= 18.718323 Days    $T_0=141.178432$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

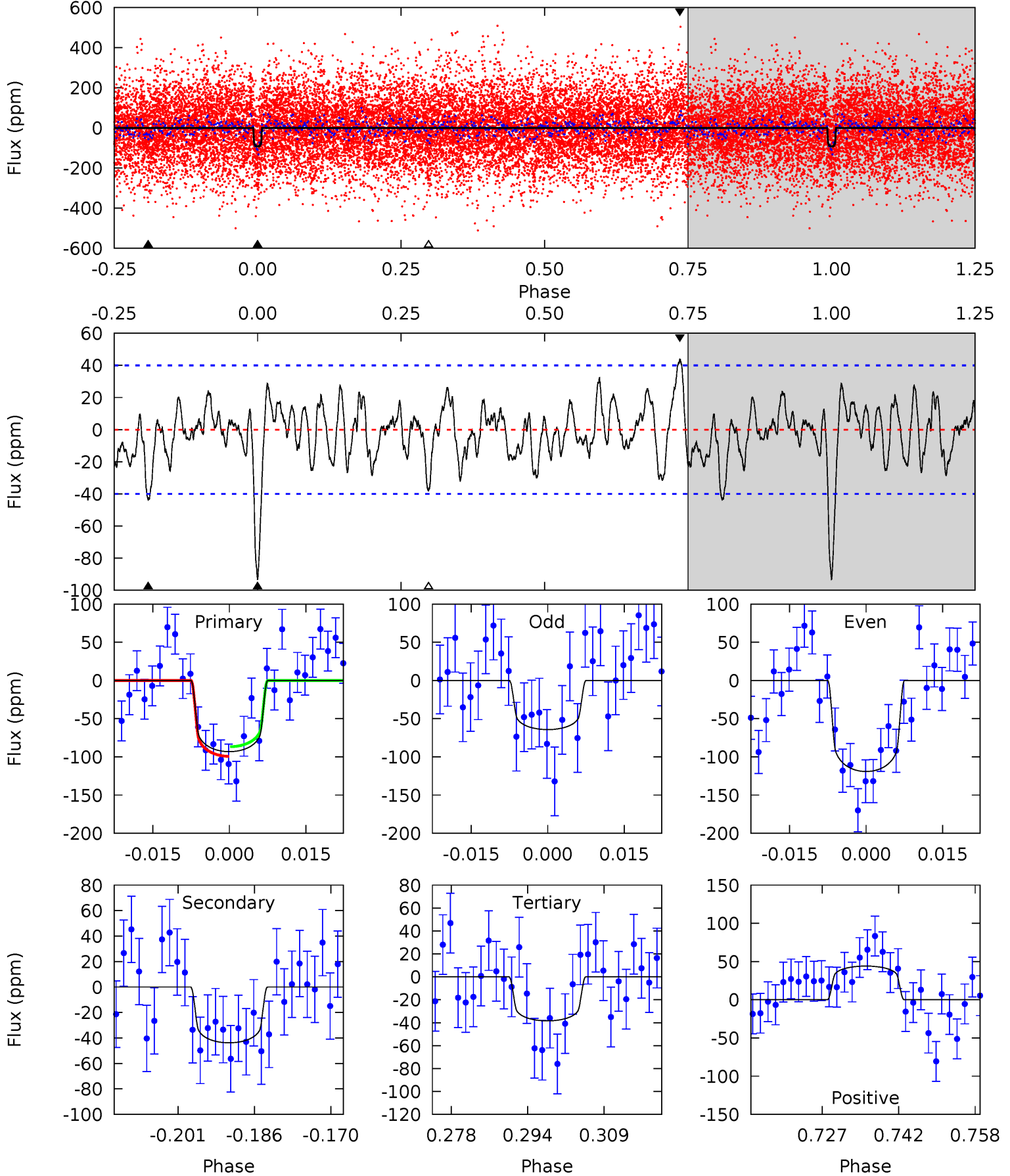
TCE 008882561-07 P= 18.718592 Days  $T_0=141.154314$  (BKJD)



# DV Model-Shift Uniqueness Test

008882561-07, P = 18.718323 Days, E = 122.460109 Days

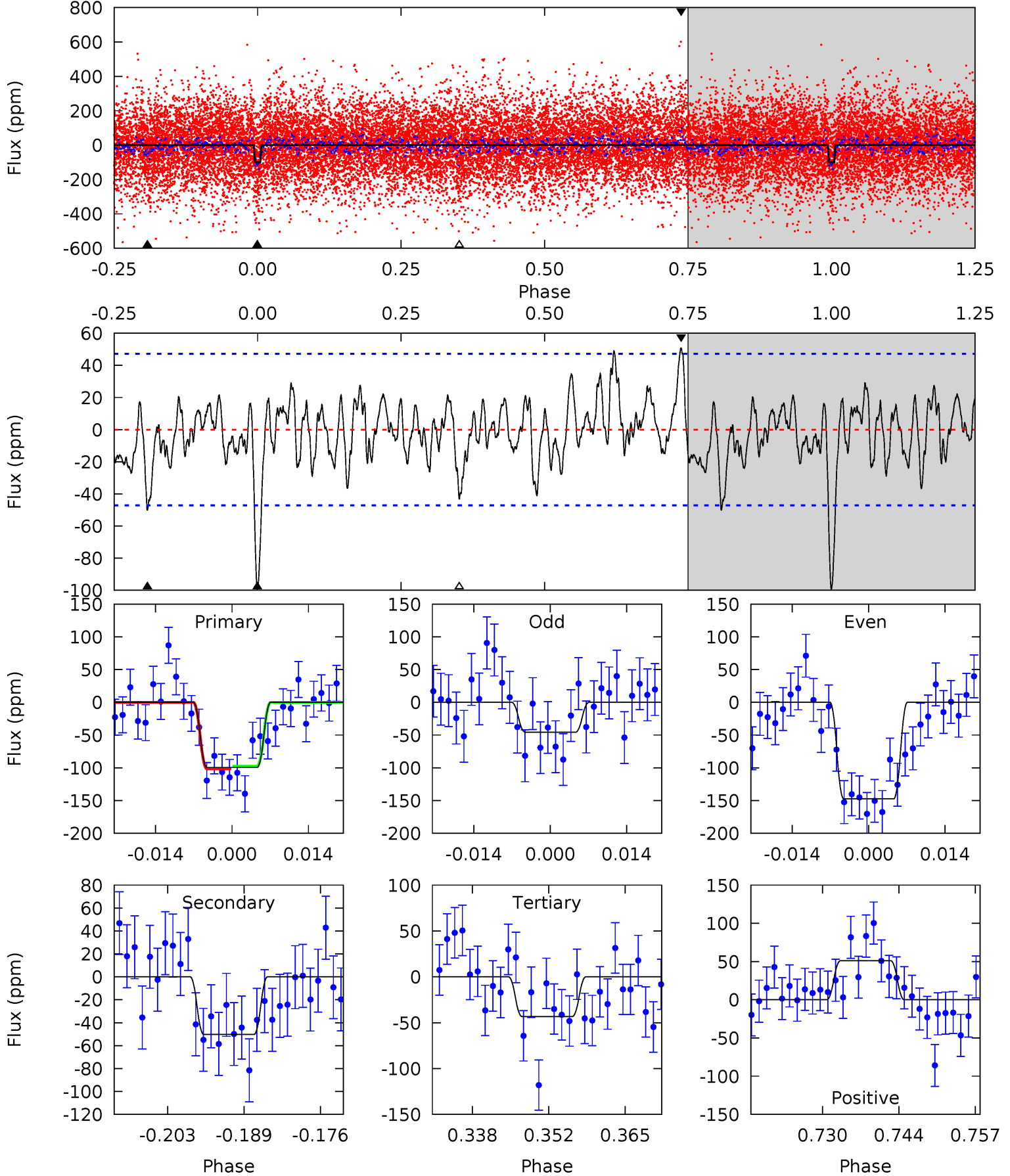
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.5	5.41	4.74	5.44	4.94	2.42	1.75	6.76	6.06	0.67	-0.03	3.41	1.01	0.32	0.78



# Alt Model-Shift Uniqueness Test

008882561-07, P = 18.718592 Days, E = 122.435722 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.5	5.30	4.57	5.38	4.97	2.47	1.66	5.92	5.10	0.73	-0.08	5.40	1.01	0.34	0.21





### Stellar Parameters For KIC 008882561

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6883^{+153}_{-222}$	$3.562^{+0.288}_{-0.032}$	$0.140^{+0.200}_{-0.250}$	$3.993^{+0.249}_{-1.413}$	$2.119^{+0.073}_{-0.416}$	$0.047^{+0.093}_{-0.006}$
	+2%/-3%	+8%/-1%	+143%/-179%	+6%/-35%	+3%/-20%	+199%/-12%
Source	PHO1	FLK73	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 008882561-07 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-44 \pm 8$	$4.10^{+1.40}_{-1.15}$	$1951^{+93}_{-157}$	$5419^{+968}_{-579}$	$43^{+44}_{-19}$
Alt.	$-50 \pm 9$	$4.22^{+1.45}_{-1.38}$	$1946^{+102}_{-163}$	$5589^{+1044}_{-681}$	$48^{+58}_{-22}$

$T_{max}$  = Theoretical Maximum Planetary Temperature

$T_{obs}$  = Observed Planetary Temperature (Assuming  $A=0.3$ )

$A_{obs}$  = Observed Albedo (Assuming  $T=0$ )

If a secondary eclipse is present, the system is likely an EB if  $T_{obs} \gg T_{max}$  AND  $A_{obs} \gg 1.0$

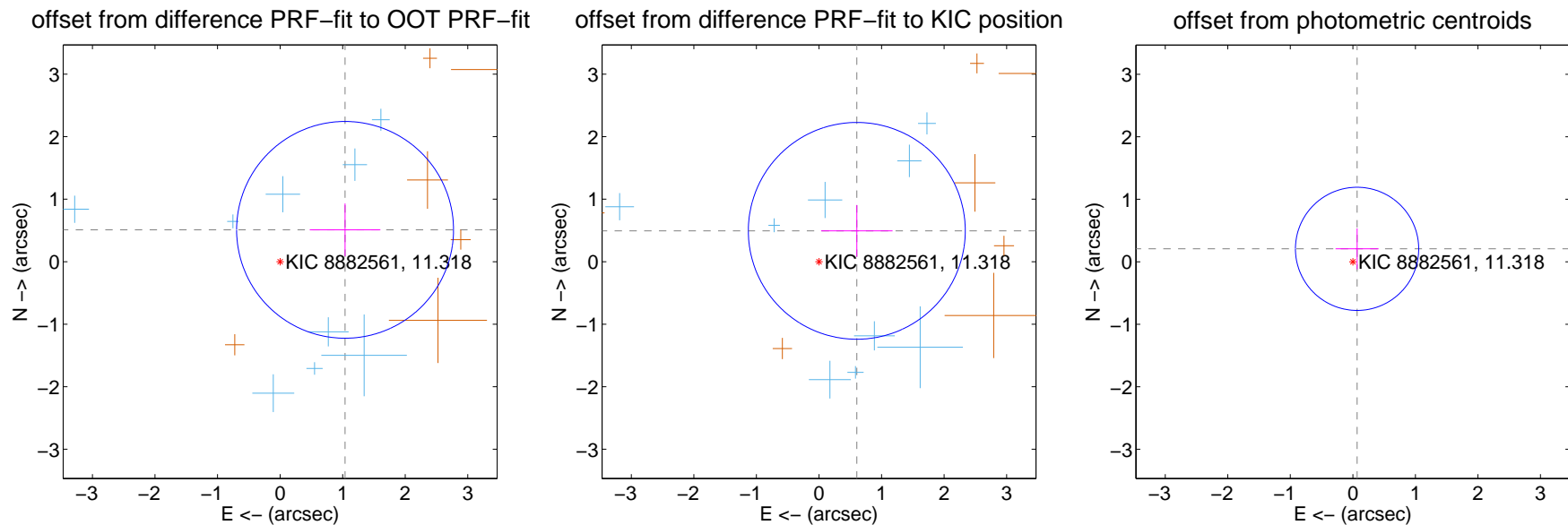
## DV Centroid Data

Supplemental centroid analysis for 008882561-07. **Kepler magnitude: 11.32.** Transit SNR 9.69

There are 9 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.26 arcsec

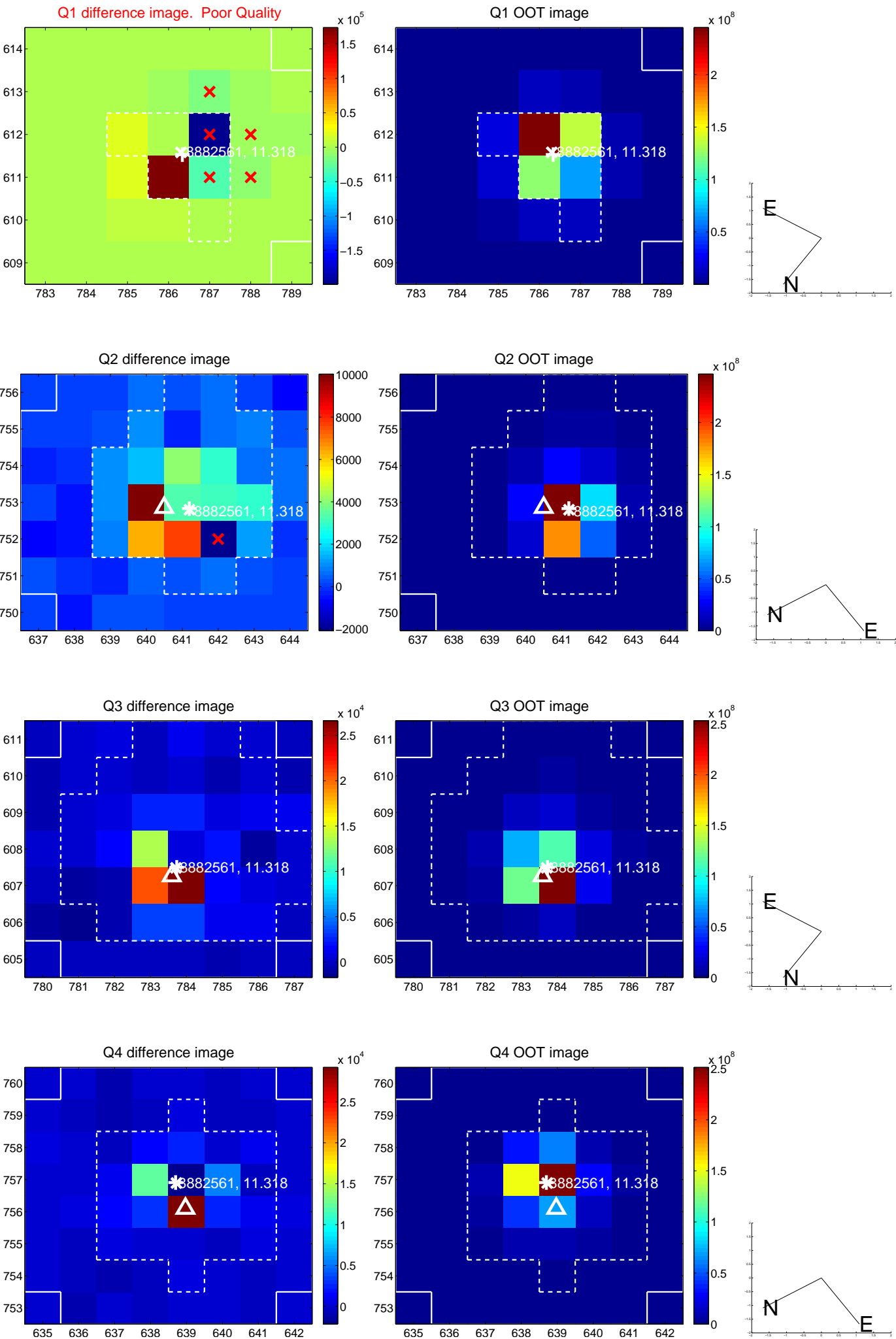
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.157 \pm 0.578$	2.00	$-1.039 \pm 0.565$	$0.510 \pm 0.422$
PRF-fit source offset from KIC position	$0.781 \pm 0.578$	1.35	$-0.605 \pm 0.572$	$0.494 \pm 0.414$
photometric centroid source offset	$0.22 \pm 0.33$	0.66	$-0.07 \pm 0.34$	$0.21 \pm 0.33$



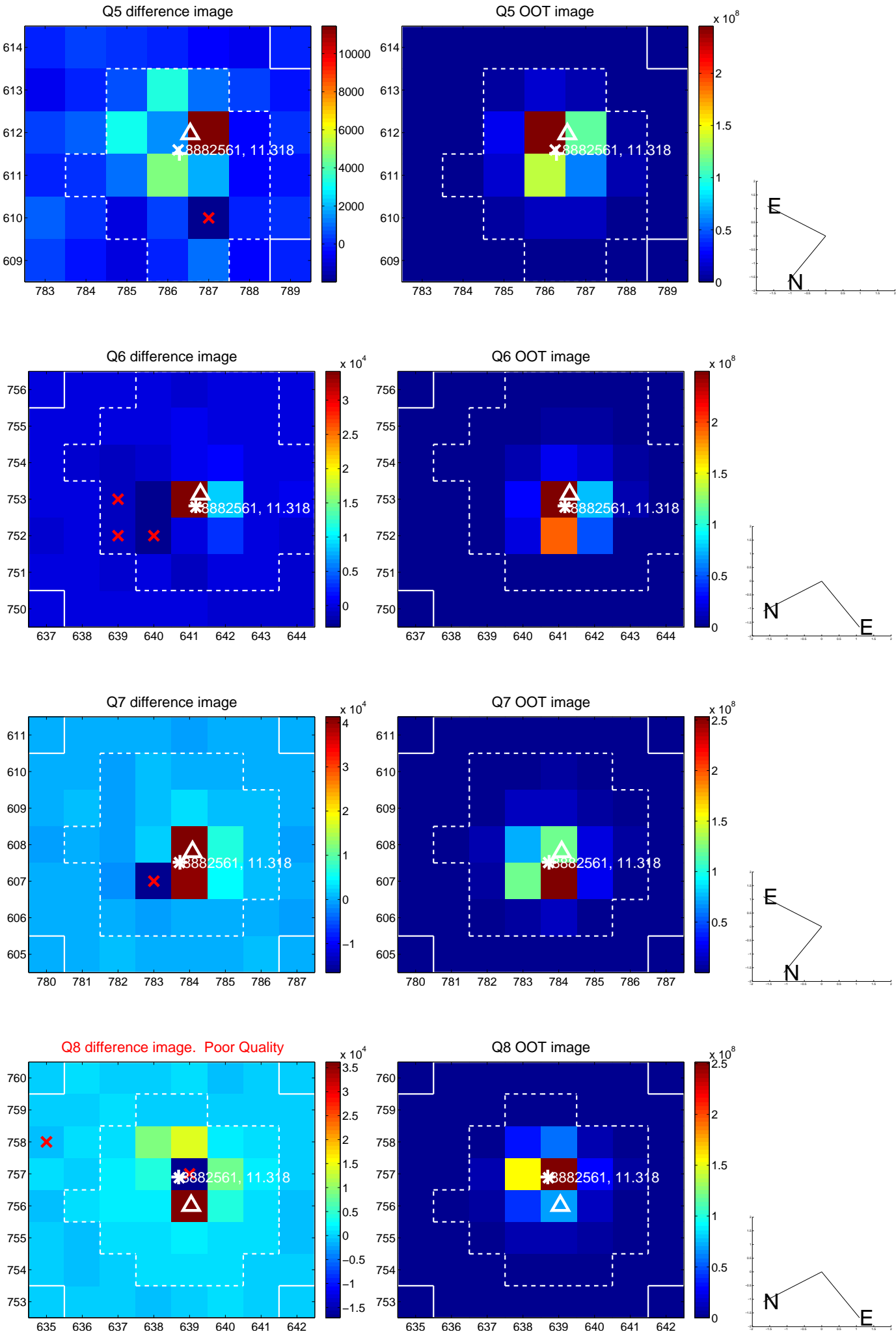
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



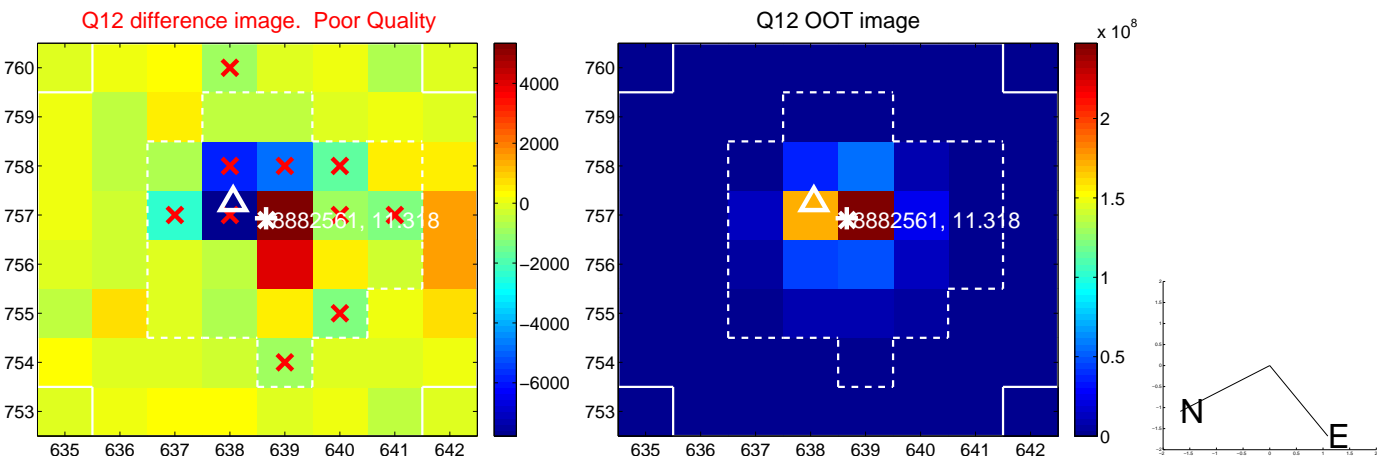
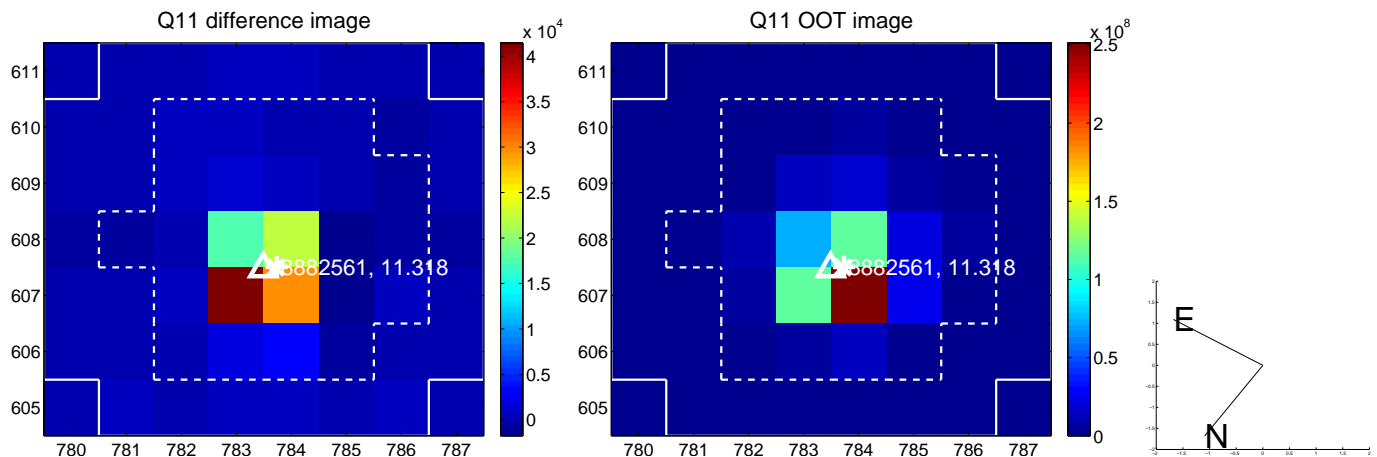
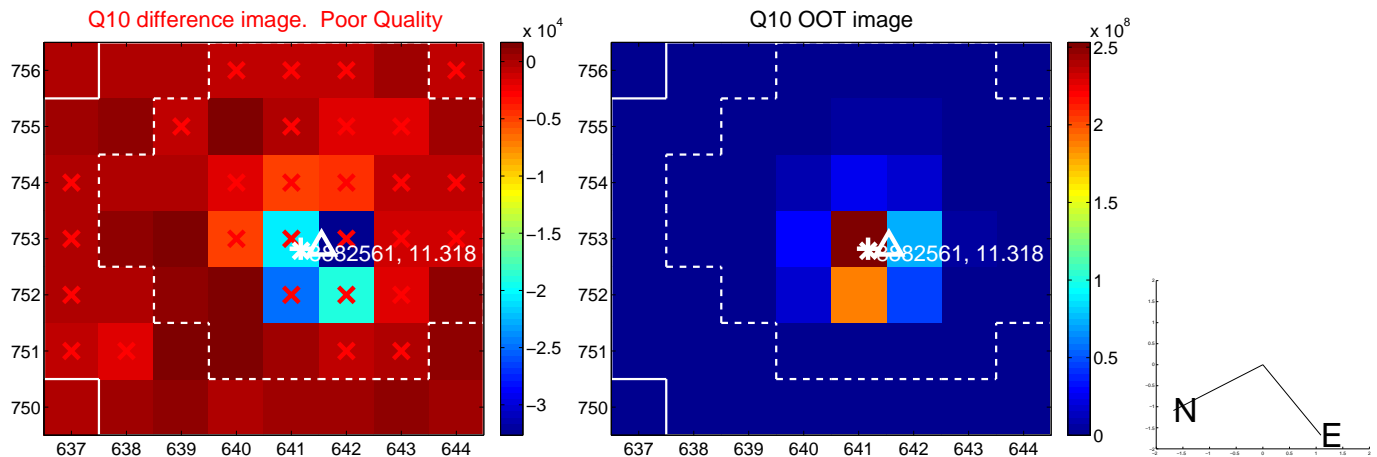
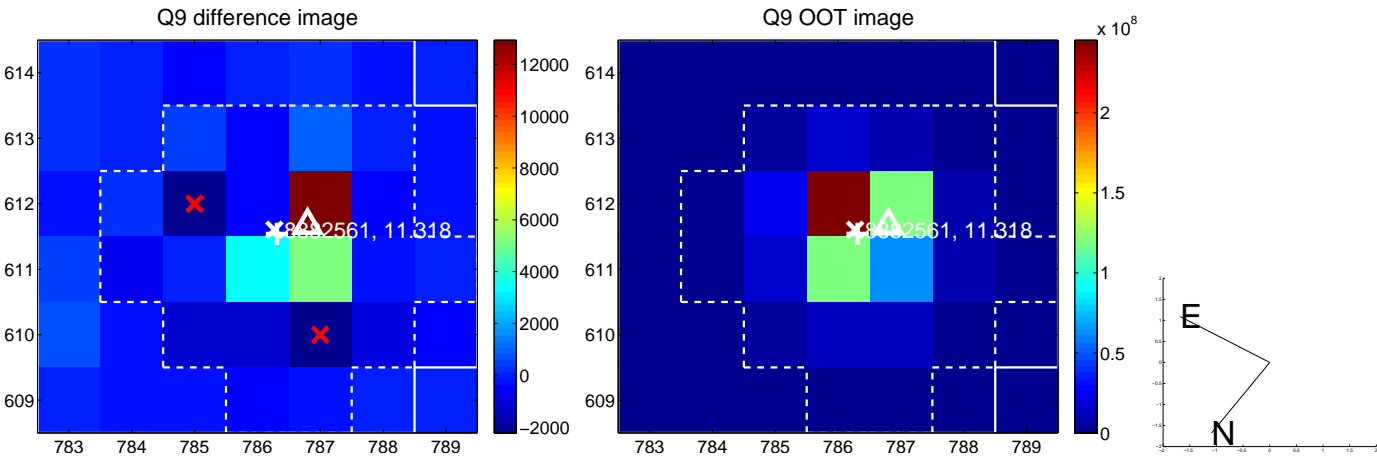
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



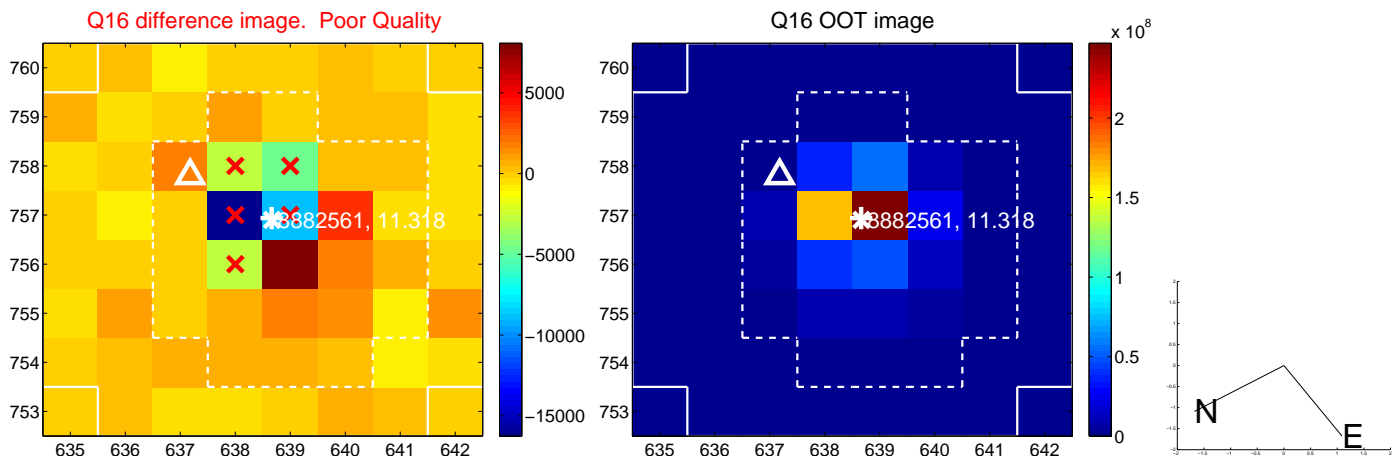
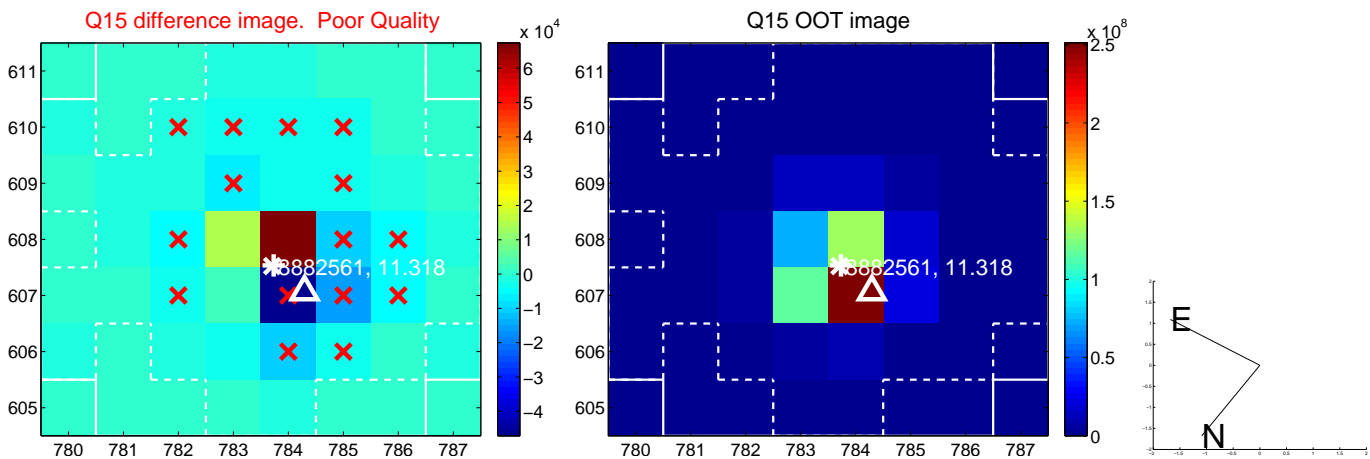
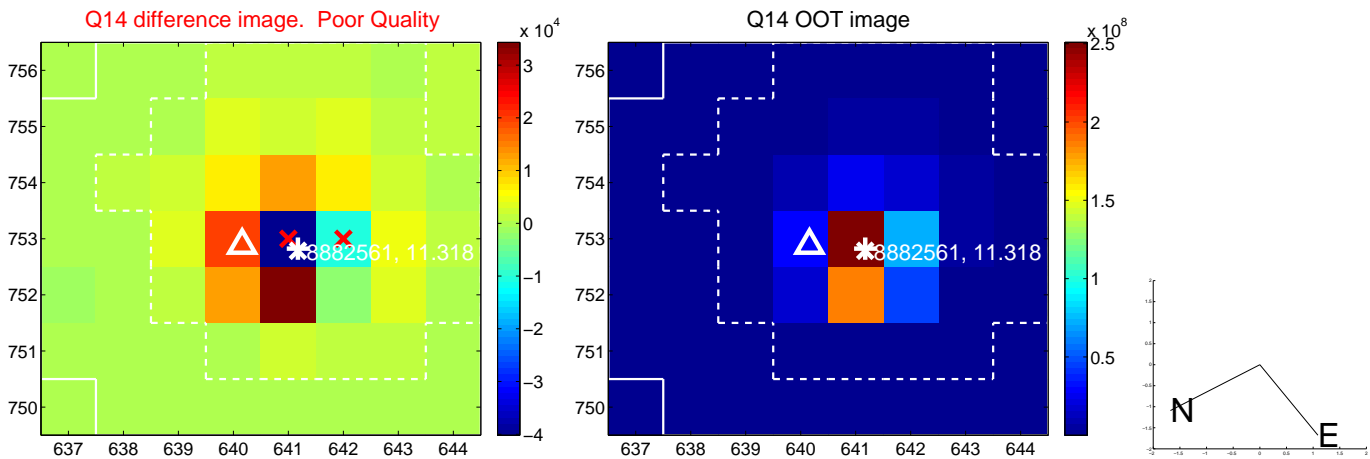
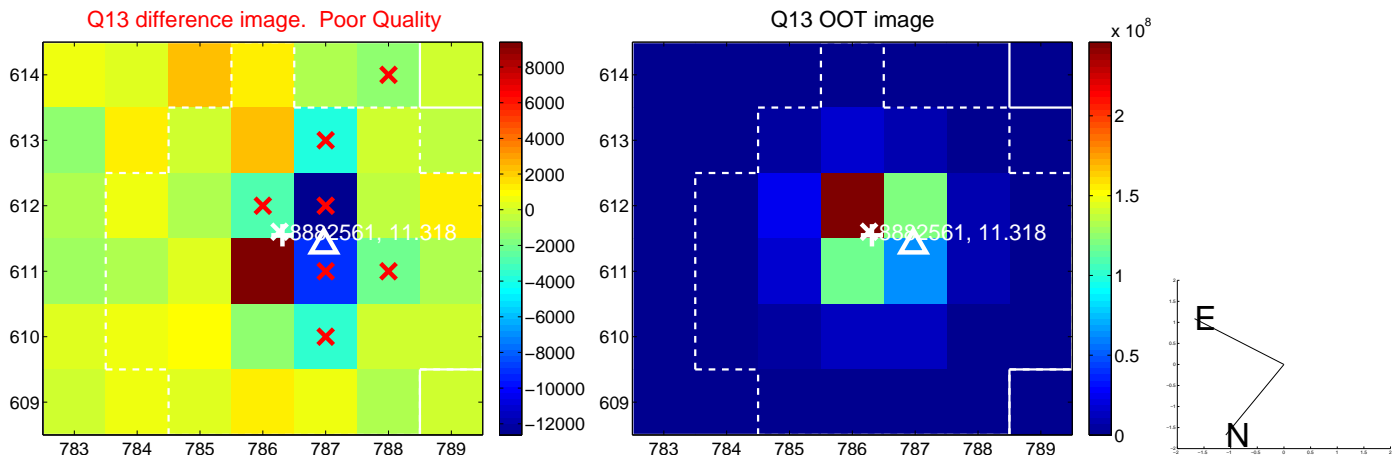
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



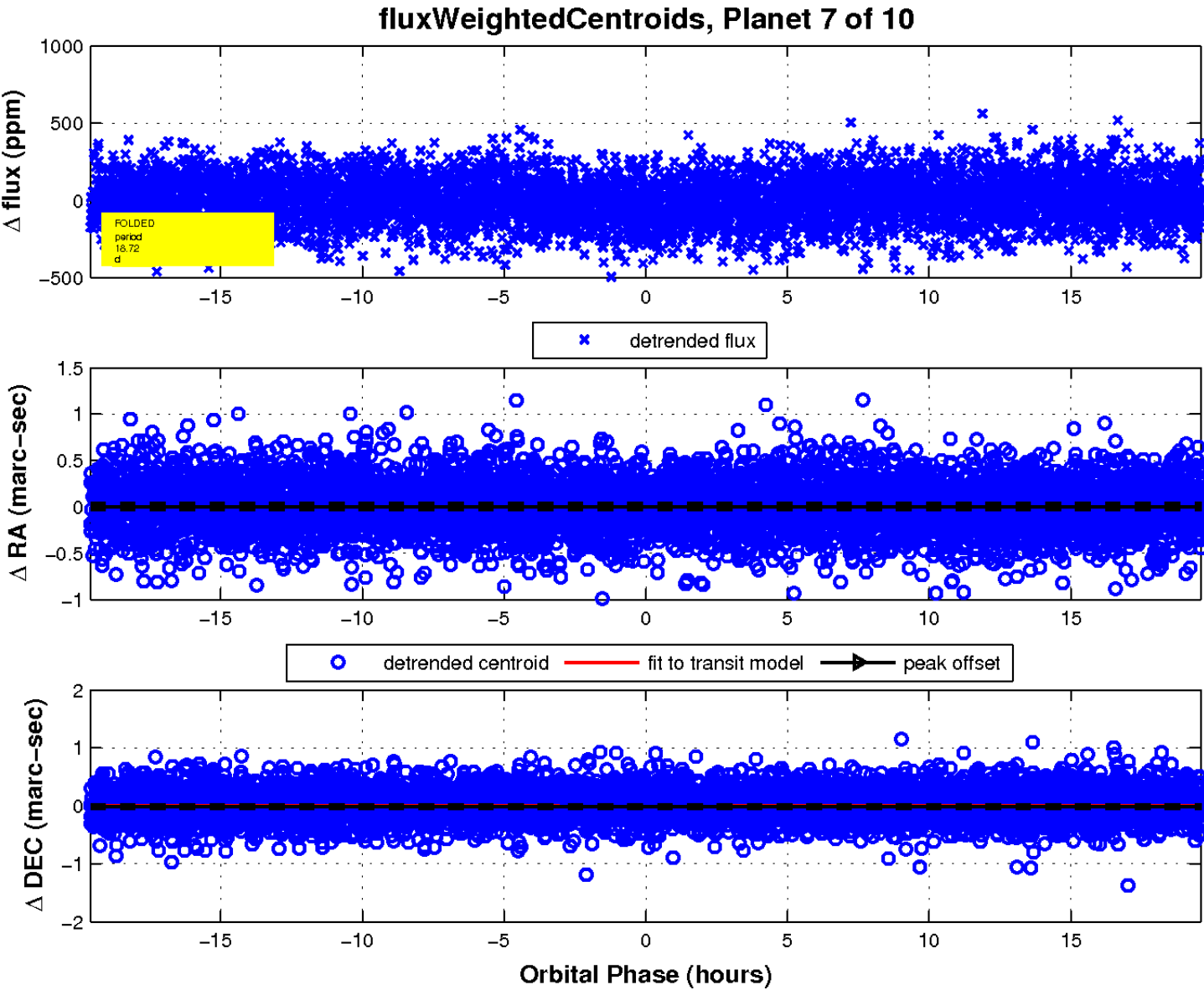
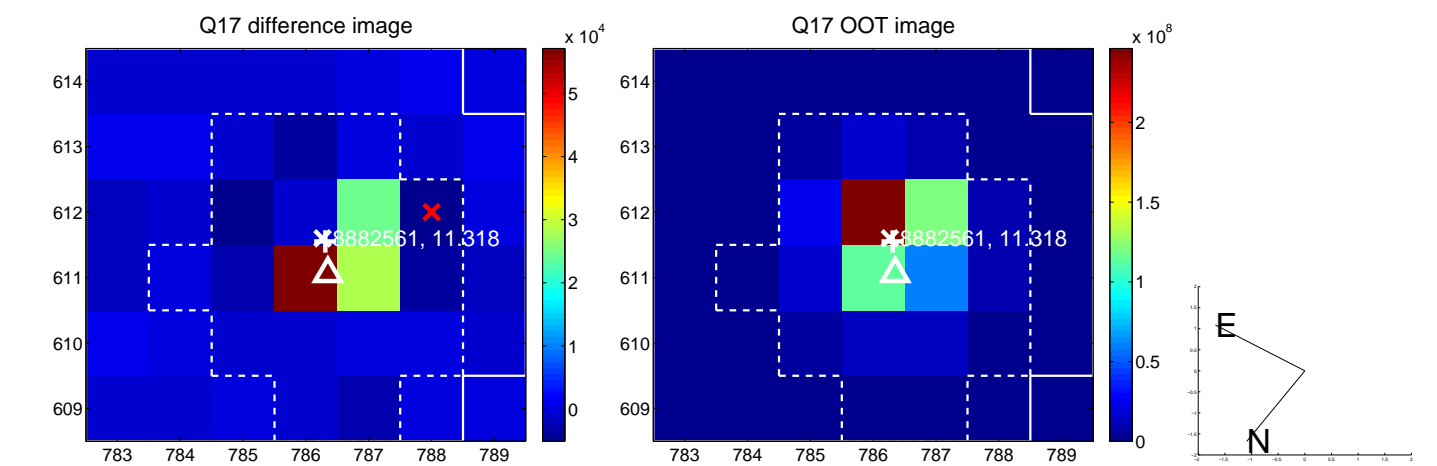
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



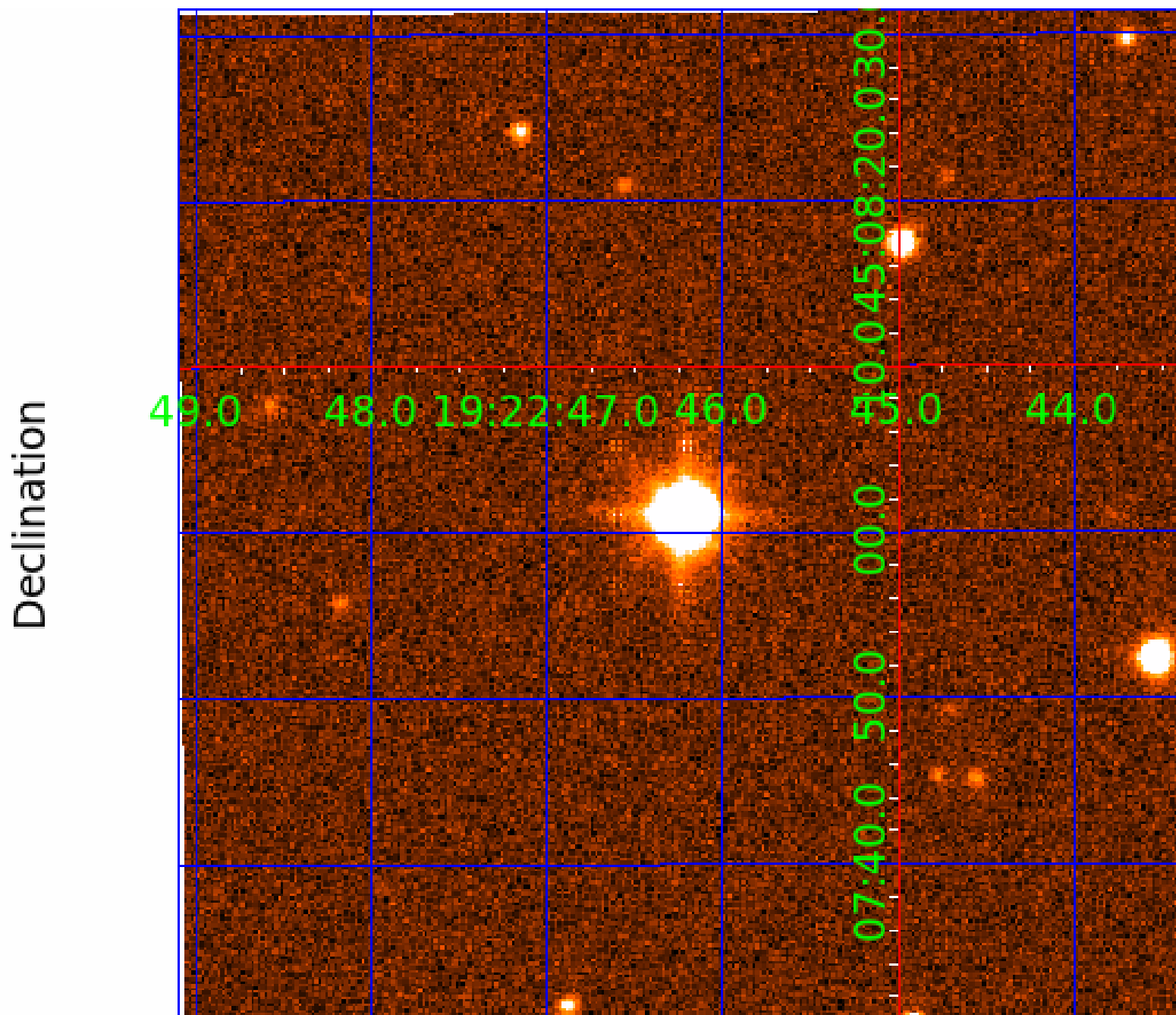
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image



## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008882561-01	OBS	No	1.514201	131.737652	22.8	8.481	8.2	9.1	3.99	6883	2.63	29149.21
008882561-02	OBS	No	601.244806	376.846737	316.0	50.859	14.8	8.2	3.99	6883	8.76	9.99
008882561-03	OBS	No	116.422525	143.577886	272.5	2.242	10.4	9.2	3.99	6883	7.27	89.16
008882561-04	OBS	No	260.182597	343.643718	233.8	26.146	9.6	9.2	3.99	6883	6.57	30.51
008882561-05	OBS	No	150.633582	152.436456	294.4	5.530	9.7	10.3	3.99	6883	8.88	63.24
008882561-06	OBS	No	77.374847	162.329719	299.9	3.243	9.2	10.3	3.99	6883	11.25	153.72
008882561-07	OBS	No	18.718323	141.178432	101.8	6.533	8.9	9.7	3.99	6883	4.60	1019.80
008882561-08	OBS	No	426.915106	225.078632	241.7	5.371	8.7	9.3	3.99	6883	6.96	15.77
008882561-09	OBS	No	150.401601	210.659704	277.3	2.596	8.6	9.4	3.99	6883	7.70	63.37

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008882561-01	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV—CENT_SATURATED
008882561-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_SATURATED
008882561-03	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
008882561-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_SATURATED
008882561-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL_SKYE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
008882561-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
008882561-07	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED—HALO_GHOST
008882561-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—CENT_SATURATED
008882561-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED

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

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

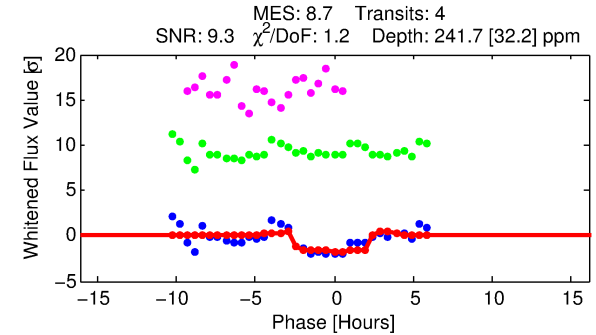
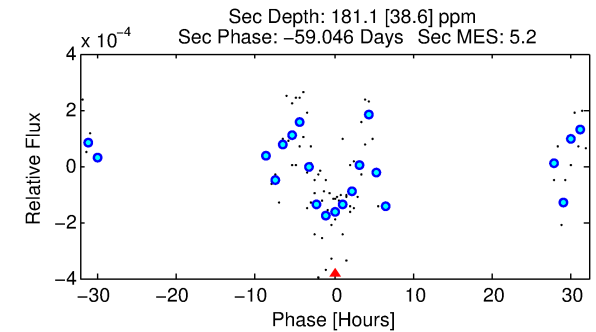
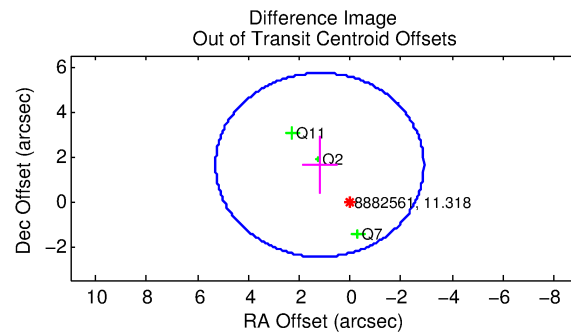
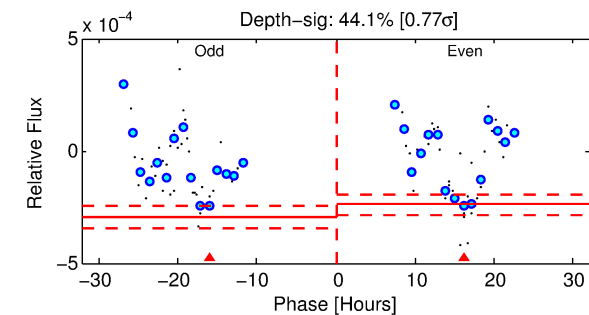
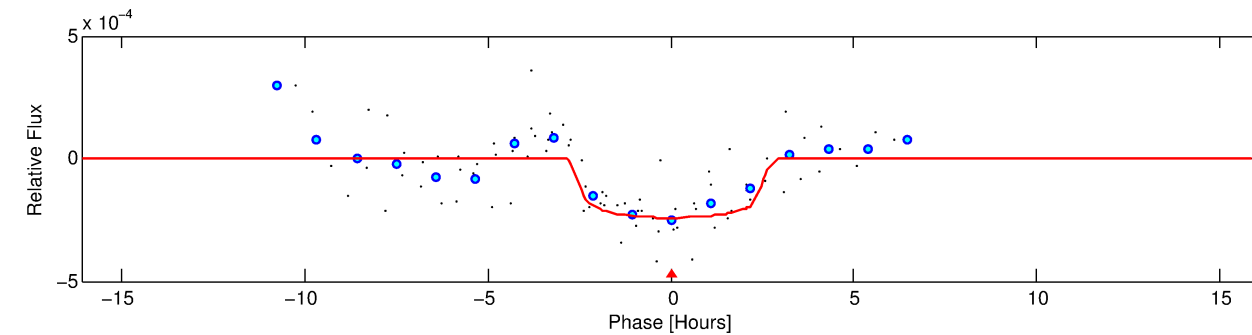
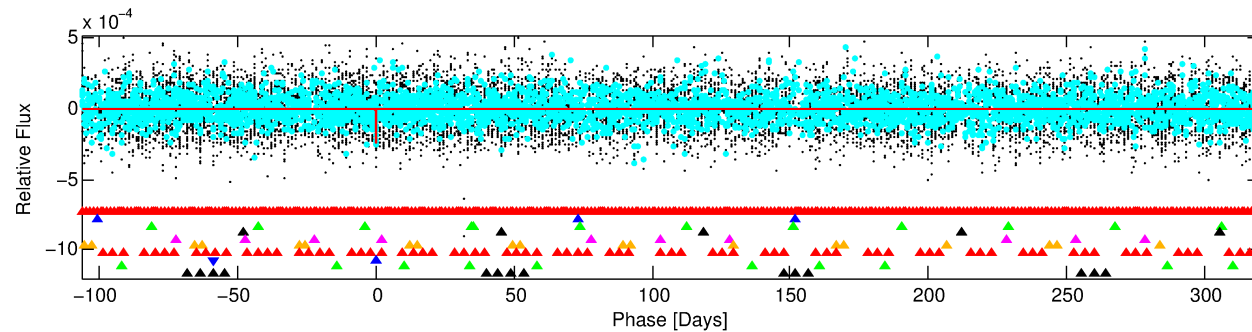
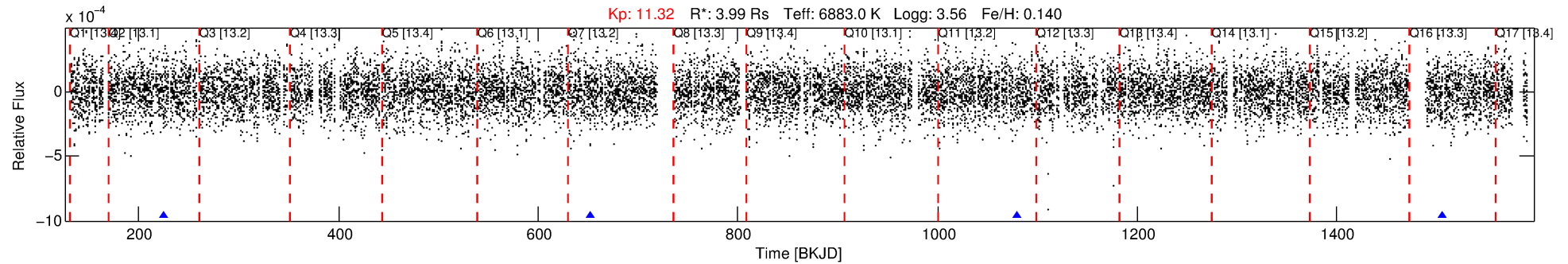
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 008882561-08

No Significant Match Found

# DV One-Page Summary

KIC: 8882561 Candidate: 8 of 10 Period: 426.915 d



## DV Fit Results:

Period = 426.91511 [0.00719] d  
Epoch = 225.0786 [0.0146] BKJD  
Rp/R\* = 0.0160 [0.0073]  
a/R\* = 349.60 [930.95]  
b = 0.84 [0.97]  
Seff = 15.77 [8.16]  
Teq = 508 [66] K  
Rp = 6.96 [4.03] Re  
a = 1.4260 [0.4610] AU  
Ag = 4187.28 [4473.13] [0.94 $\sigma$ ]  
Teffp = 6320 [1504] K [3.86 $\sigma$ ]

## DV Diagnostic Results:

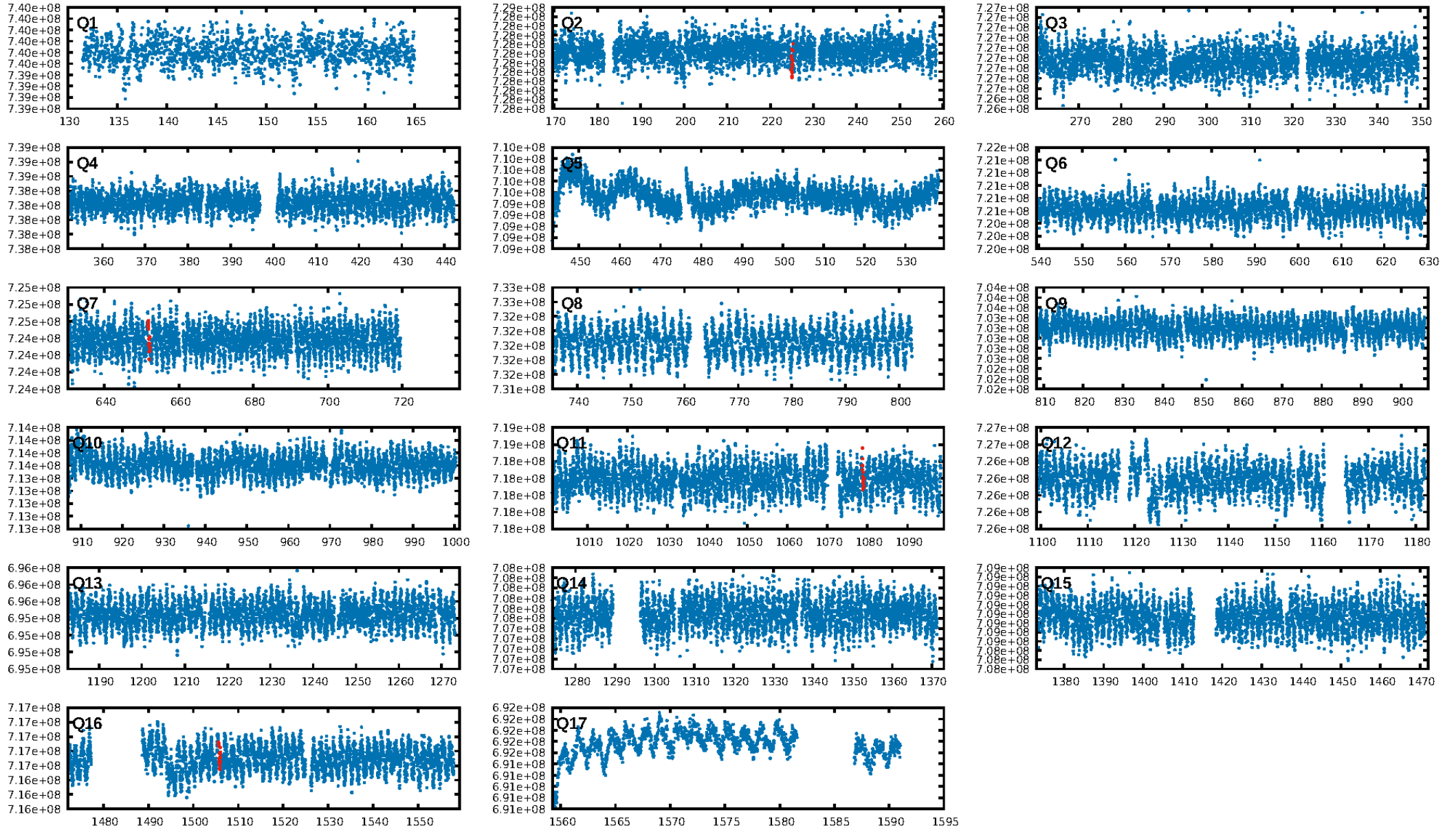
ShortPeriod-sig: 100.0% [149.92 $\sigma$ ]  
LongPeriod-sig: 100.0% [81.81 $\sigma$ ]  
ModelChiSquare2-sig: 60.7%  
ModelChiSquareGof-sig: 99.8%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: -3.927  
Centroid-sig: 9.5%  
Centroid-so: 0.838 arcsec [1.34 $\sigma$ ]  
OotOffset-rm: 2.009 arcsec [1.47 $\sigma$ ]  
KicOffset-rm: 1.905 arcsec [2.09 $\sigma$ ]  
OotOffset-st: 1/2/0/0 [3]  
KicOffset-st: 1/2/0/0 [3]  
DiffImageQuality-fgm: 0.67 [2/3]  
DiffImageOverlap-fno: 0.33 [1/3]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 21:27:08 Z

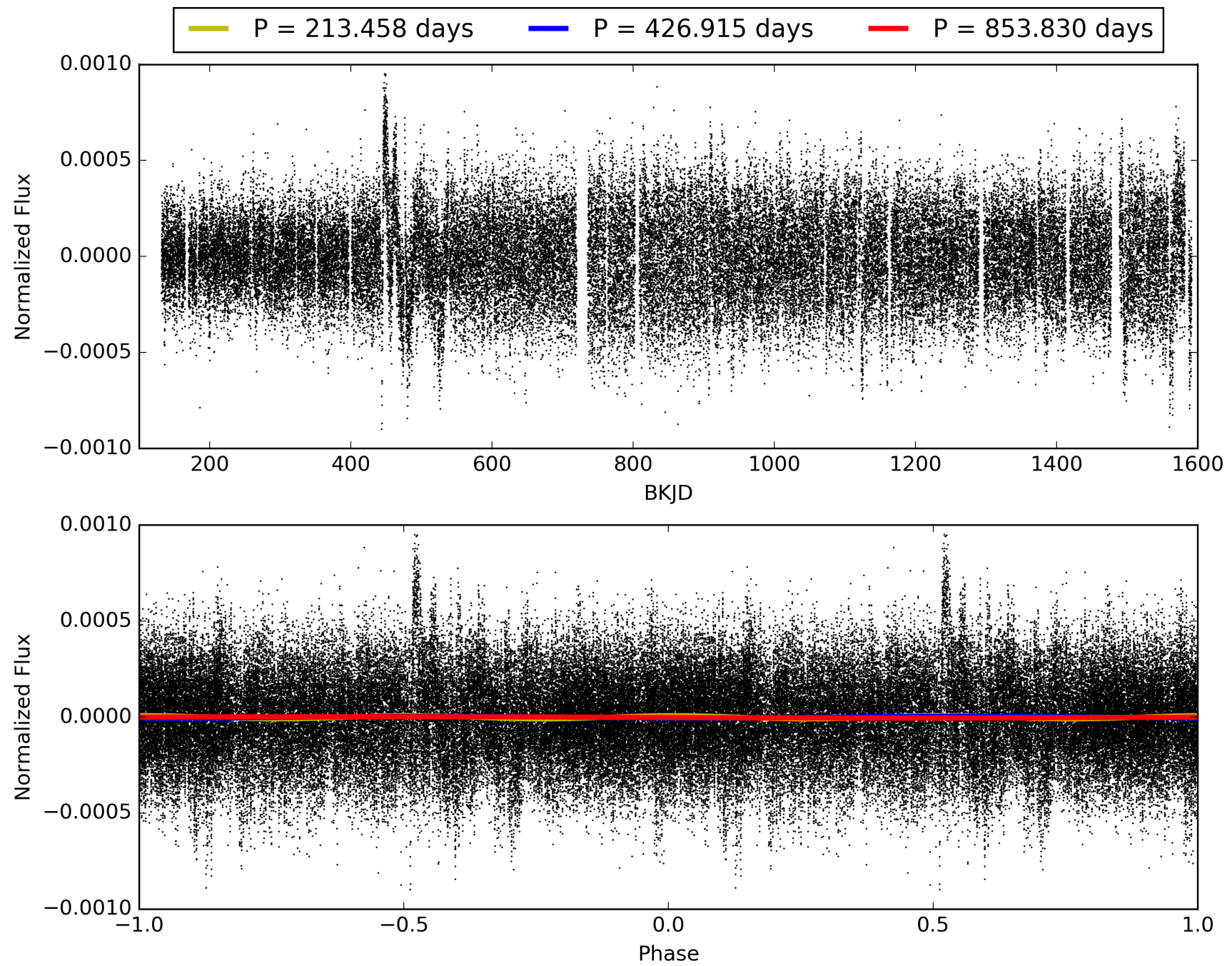
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 008882561-08, PDC Light Curves

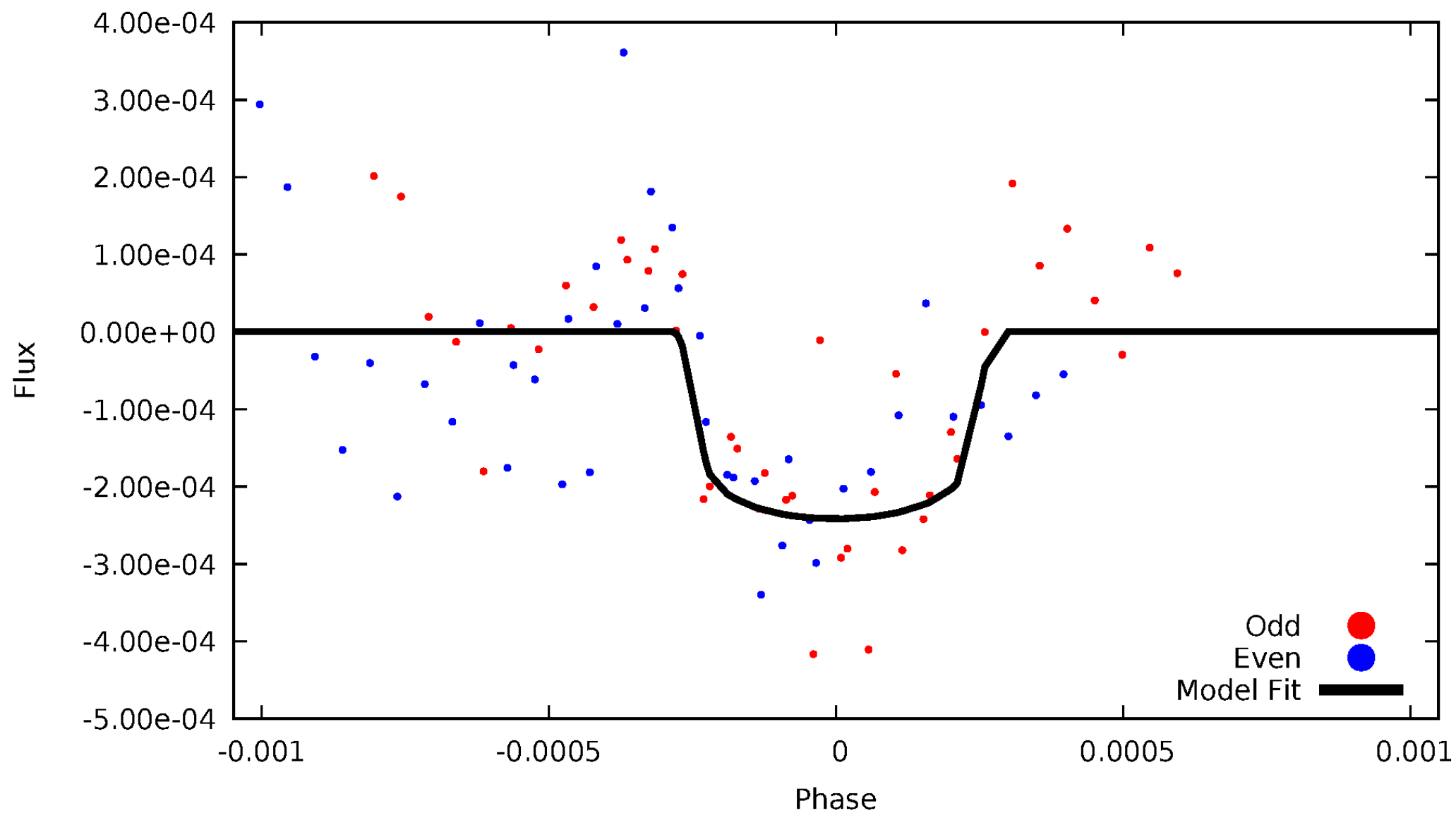


TCE 008882561-08



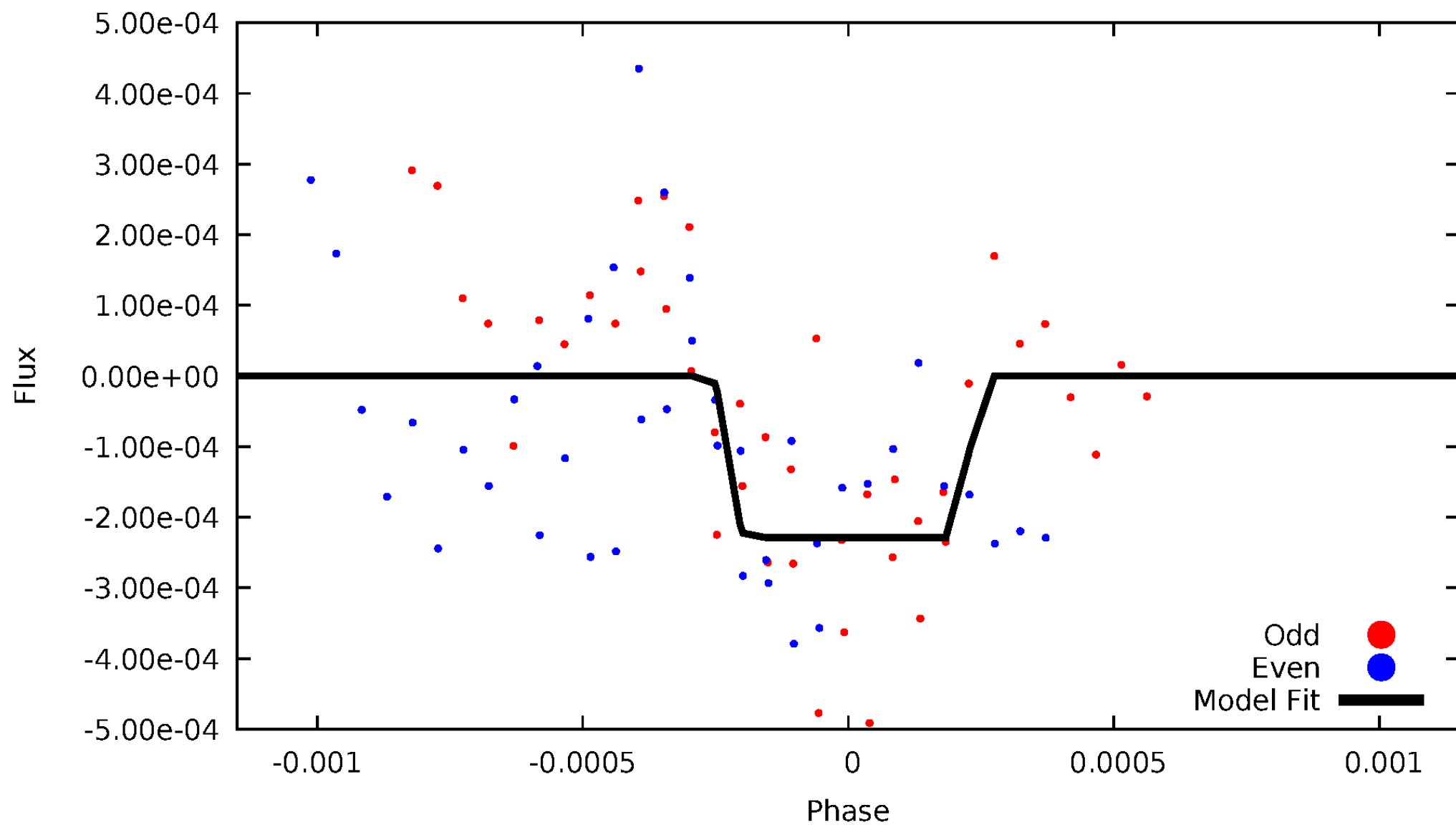
# DV Odd/Even

TCE 008882561-08



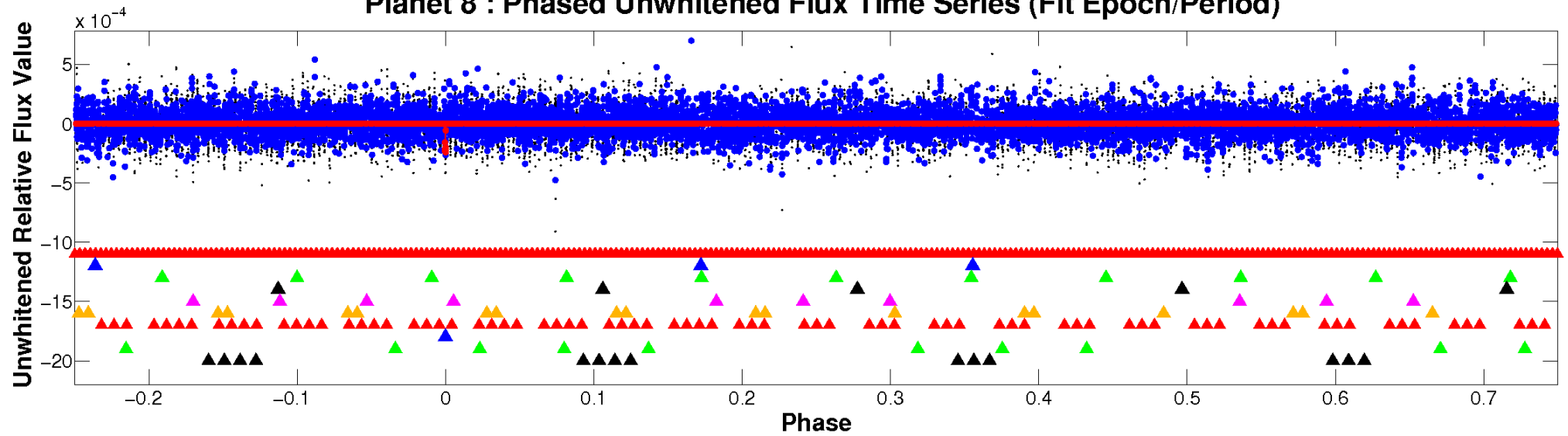
# ALT Odd/Even

TCE 008882561-08

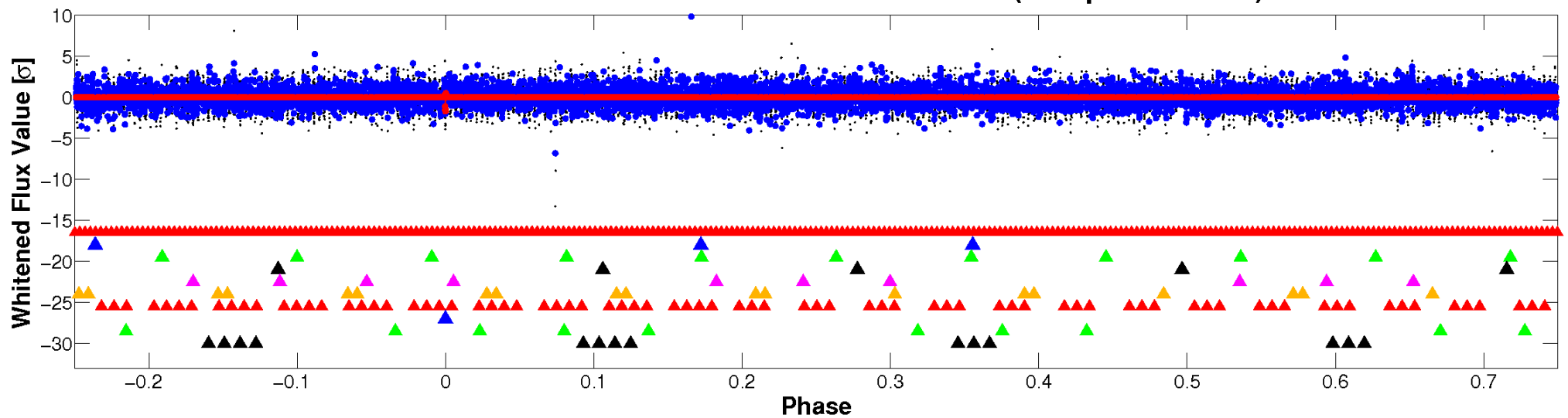


# Non-Whitened Vs. Whitened Light Curve

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

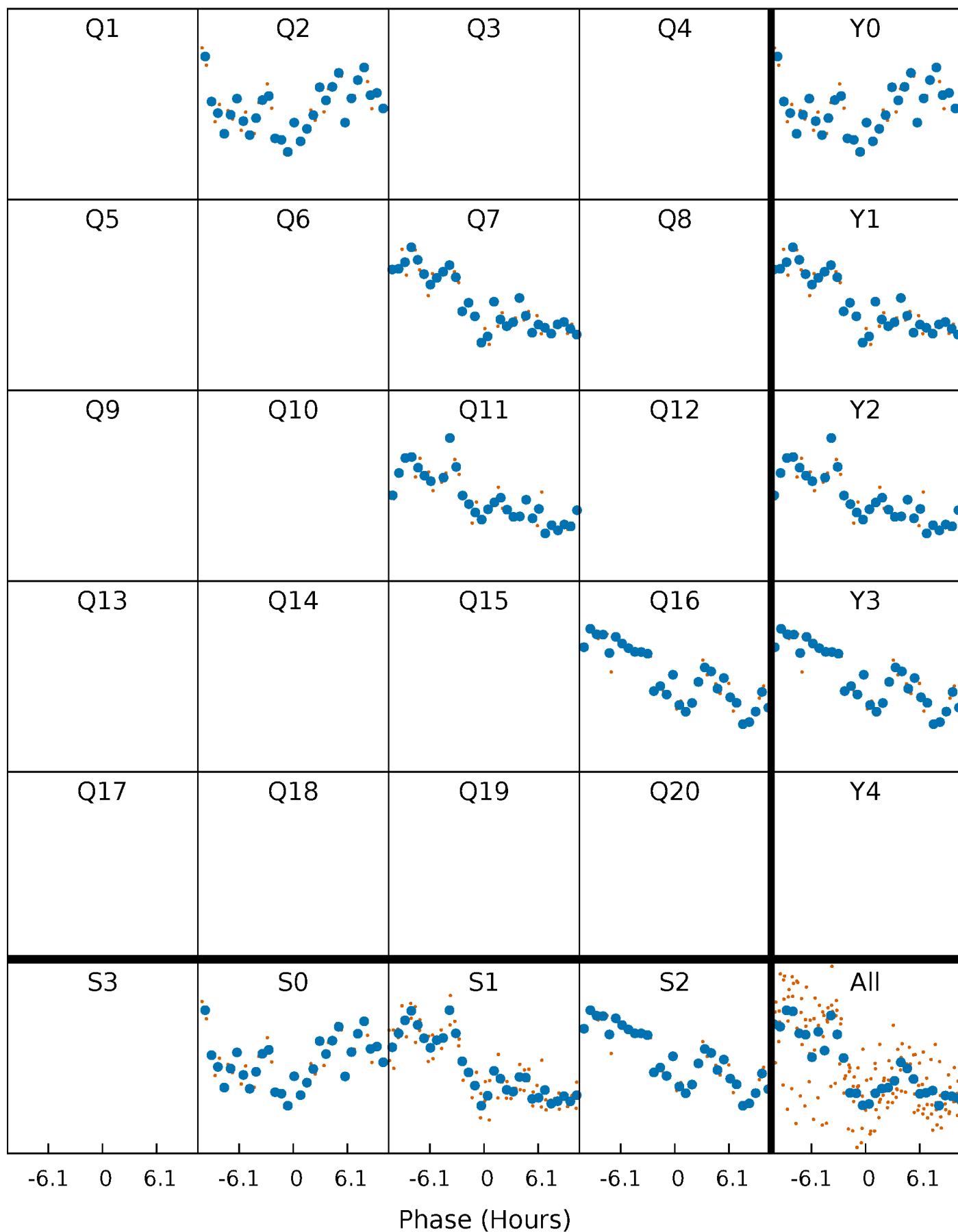


## Planet 8 : Phased Whitened Flux Time Series (Fit Epoch/Period)



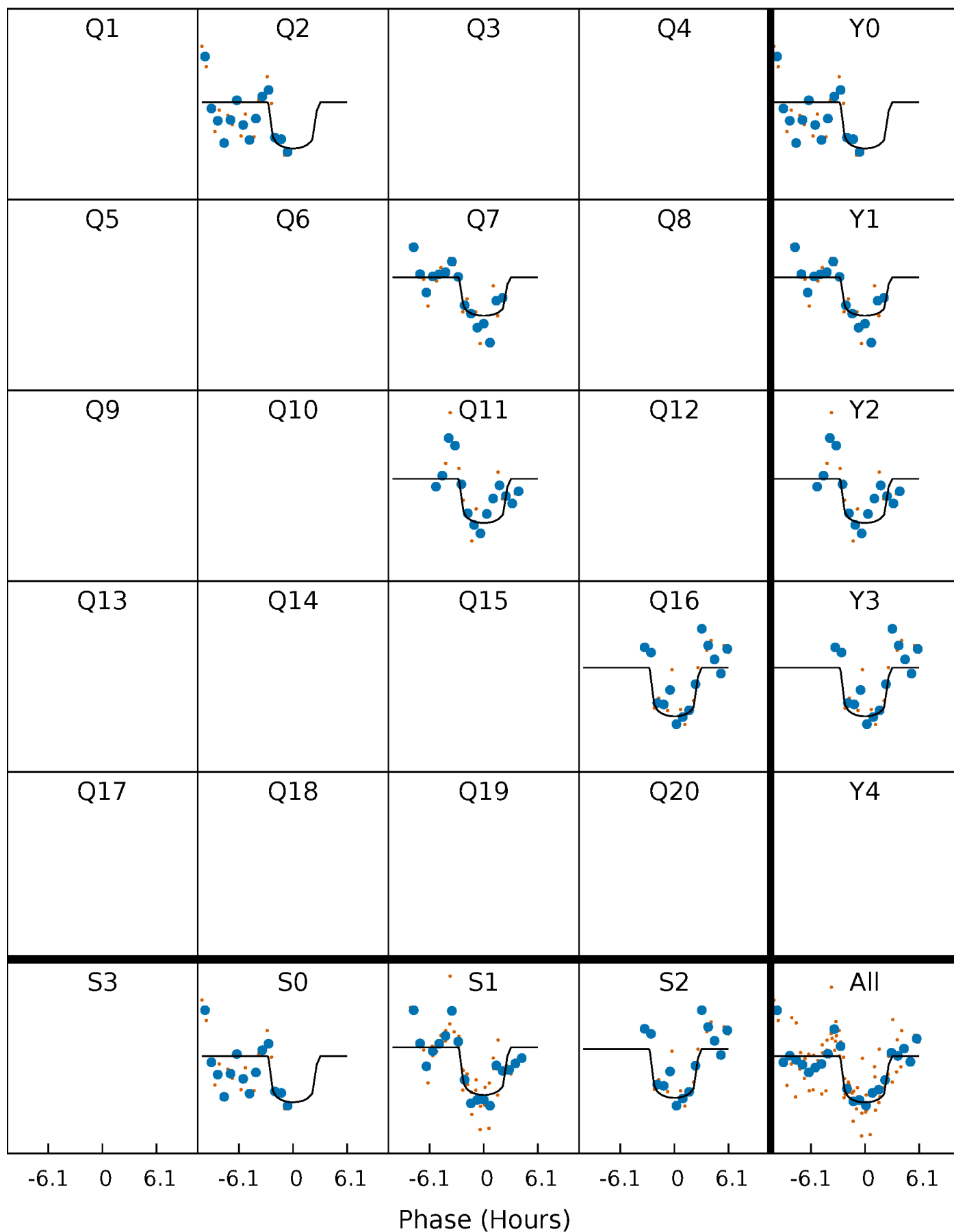
# PDC Quarter-Phased Transit Curves

TCE 008882561-08 P=426.915106 Days  $T_0=225.078632$  (BKJD)



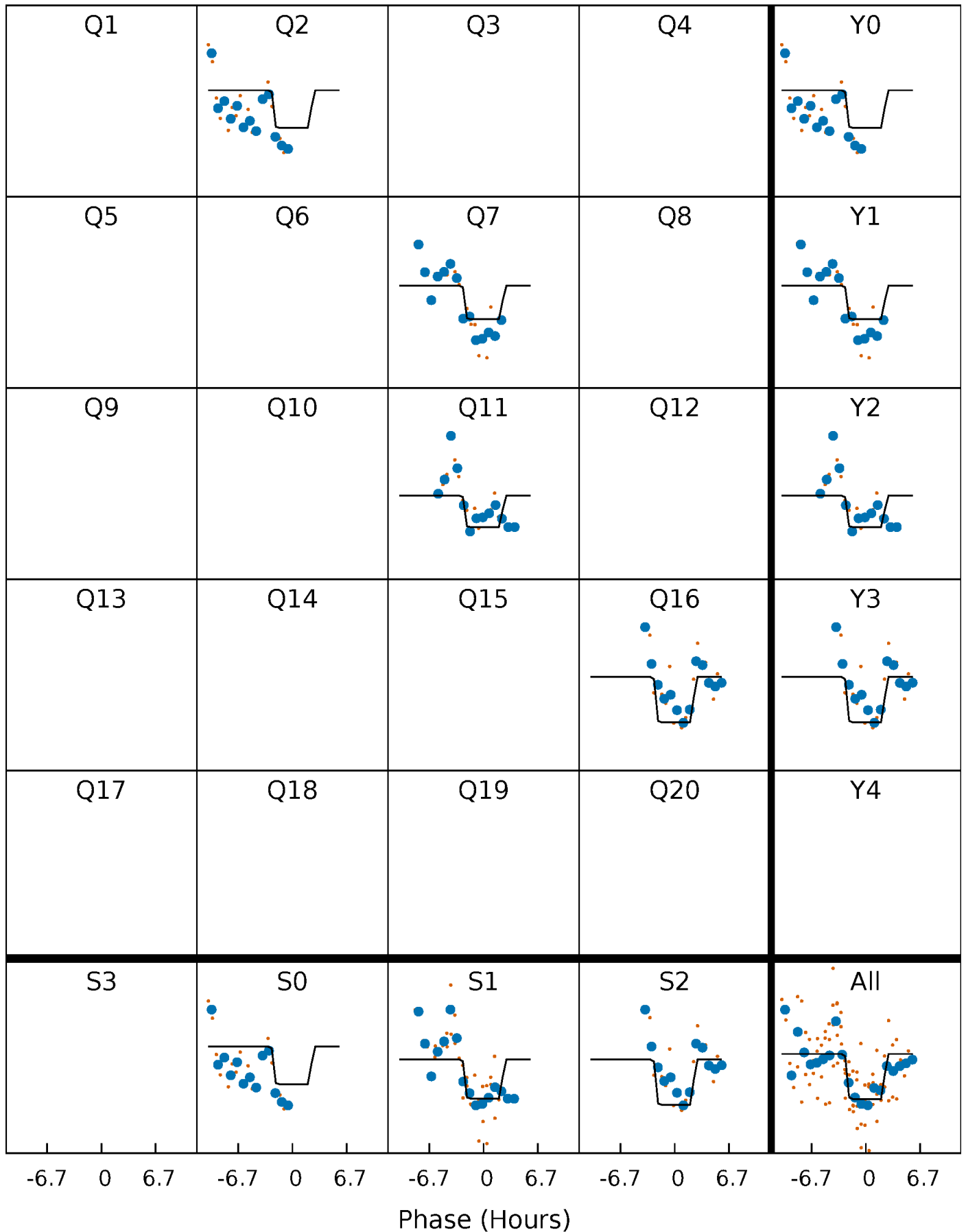
# DV Quarter-Phased Transit Curves

TCE 008882561-08 P=426.915106 Days  $T_0=225.078632$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 008882561-08 P=426.918369 Days  $T_0=225.082499$  (BKJD)

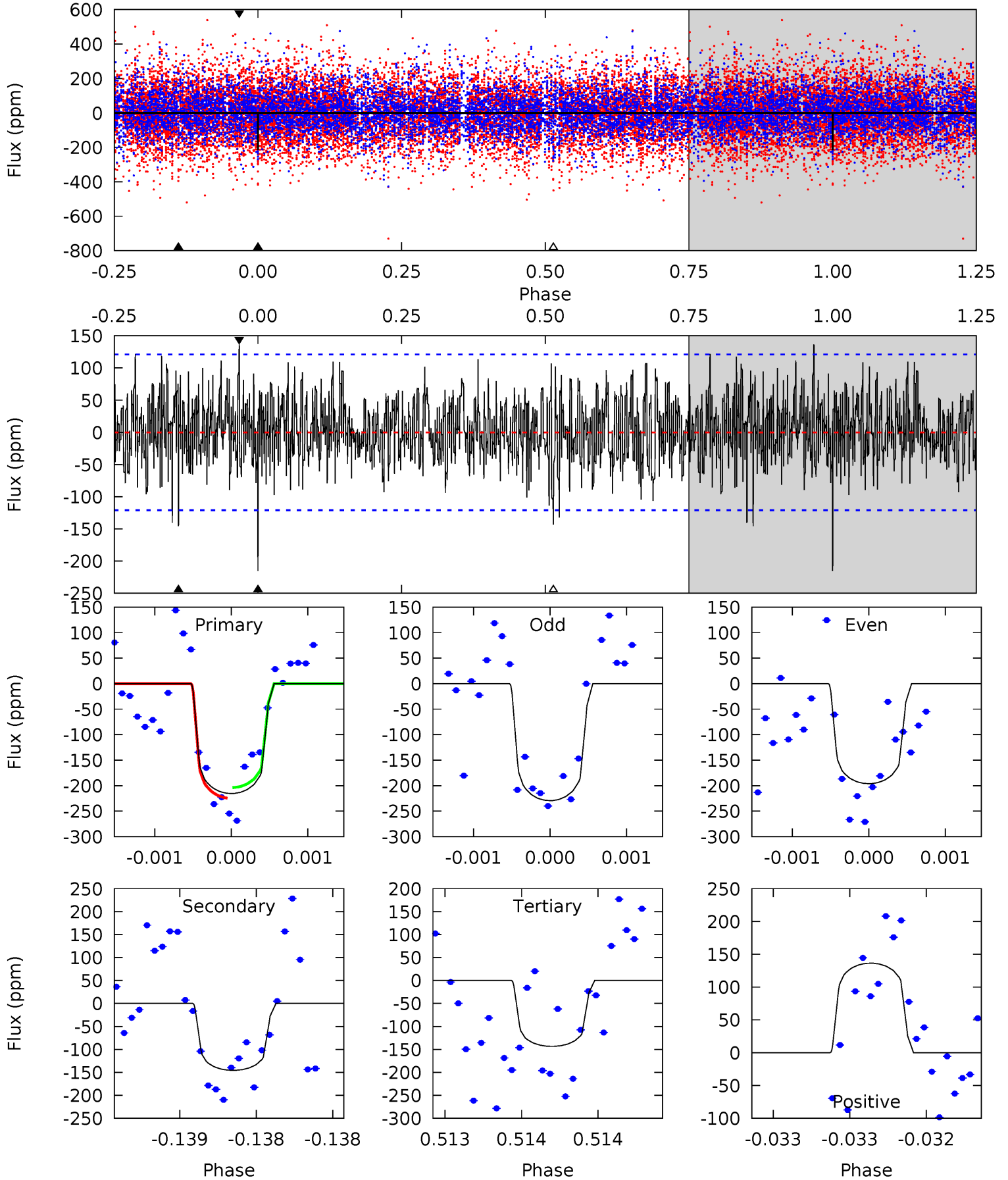




# DV Model-Shift Uniqueness Test

008882561-08, P = 426.915106 Days, E = 225.078632 Days

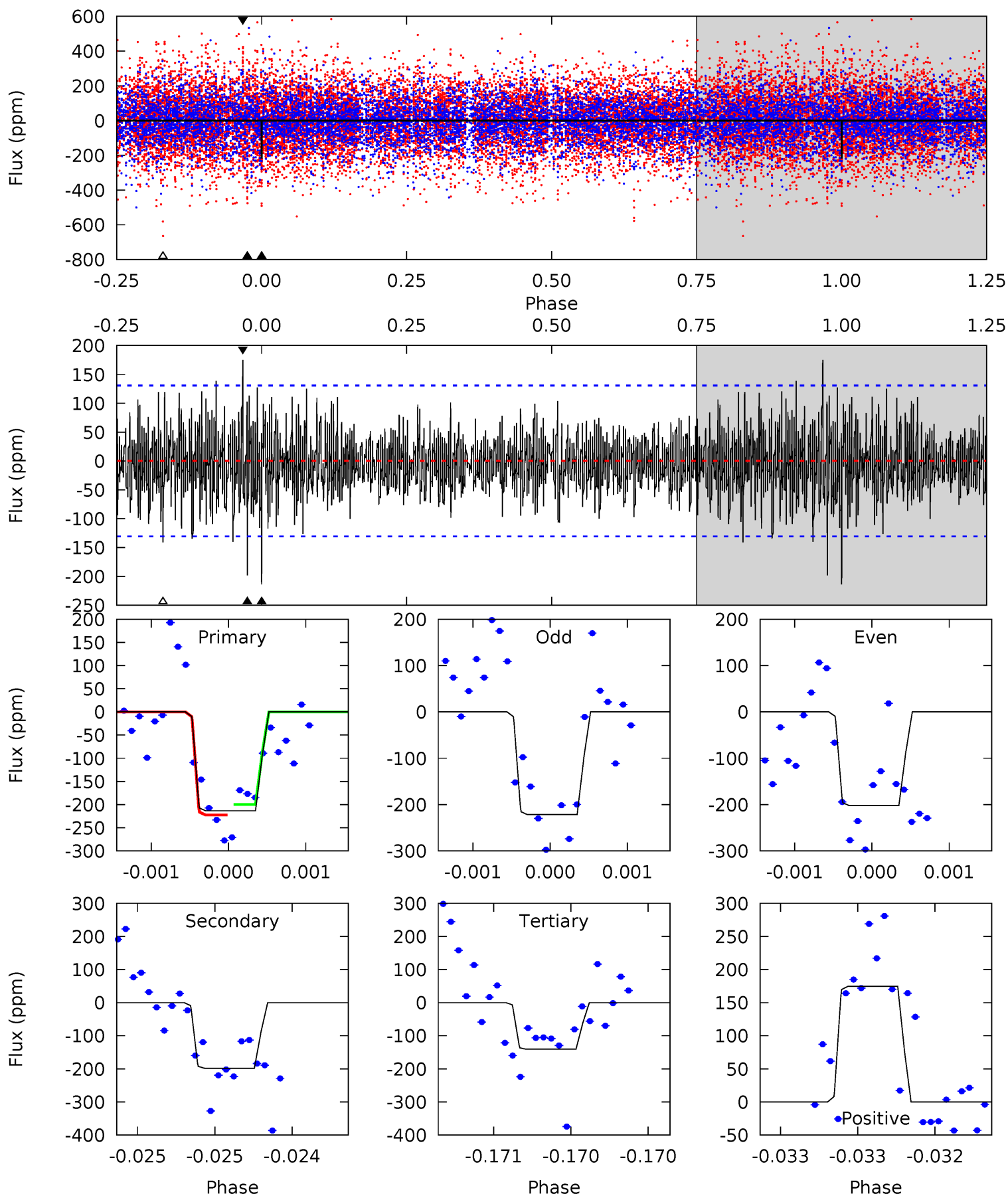
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.89	6.69	6.59	6.26	5.56	3.46	1.85	3.30	3.63	0.10	0.43	0.76	1.02	0.39	0.47



# Alt Model-Shift Uniqueness Test

008882561-08, P = 426.918369 Days, E = 225.082499 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.08	8.43	5.99	7.43	5.56	3.47	1.78	3.09	1.65	2.44	1.00	0.42	1.02	0.45	0.47



### Stellar Parameters For KIC 008882561

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6883^{+153}_{-222}$	$3.562^{+0.288}_{-0.032}$	$0.140^{+0.200}_{-0.250}$	$3.993^{+0.249}_{-1.413}$	$2.119^{+0.073}_{-0.416}$	$0.047^{+0.093}_{-0.006}$
	+2%/-3%	+8%/-1%	+143%/-179%	+6%/-35%	+3%/-20%	+199%/-12%
Source	PHO1	FLK73	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 008882561-08 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-146 \pm 22$	$6.27^{+3.11}_{-2.88}$	$689^{+33}_{-57}$	$5921^{+2315}_{-905}$	$3981^{+10057}_{-2163}$
Alt.	$-198 \pm 23$	$5.68^{+3.43}_{-2.59}$	$687^{+34}_{-60}$	$6736^{+2979}_{-1312}$	$6654^{+16457}_{-4008}$

$T_{max}$  = Theoretical Maximum Planetary Temperature

$T_{obs}$  = Observed Planetary Temperature (Assuming  $A=0.3$ )

$A_{obs}$  = Observed Albedo (Assuming  $T=0$ )

If a secondary eclipse is present, the system is likely an EB if  $T_{obs} \gg T_{max}$  AND  $A_{obs} \gg 1.0$

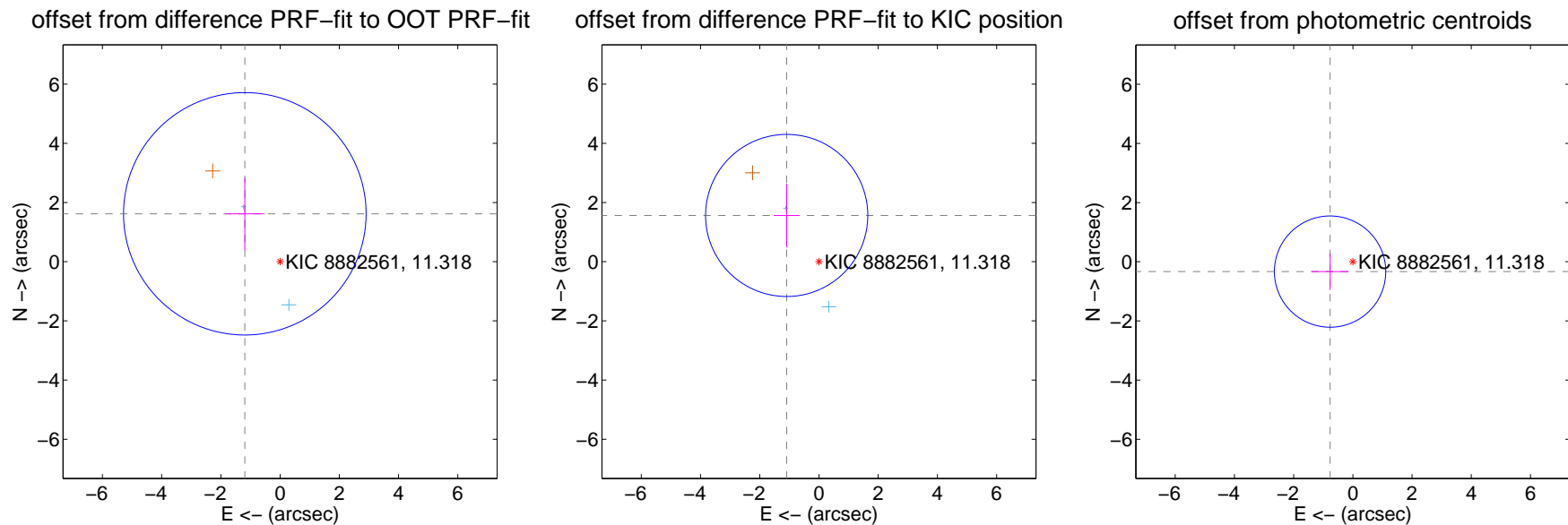
## DV Centroid Data

Supplemental centroid analysis for 008882561-08. **Kepler magnitude: 11.32.** Transit SNR 9.32

**There are 2 quarters with good PRF difference image offsets**

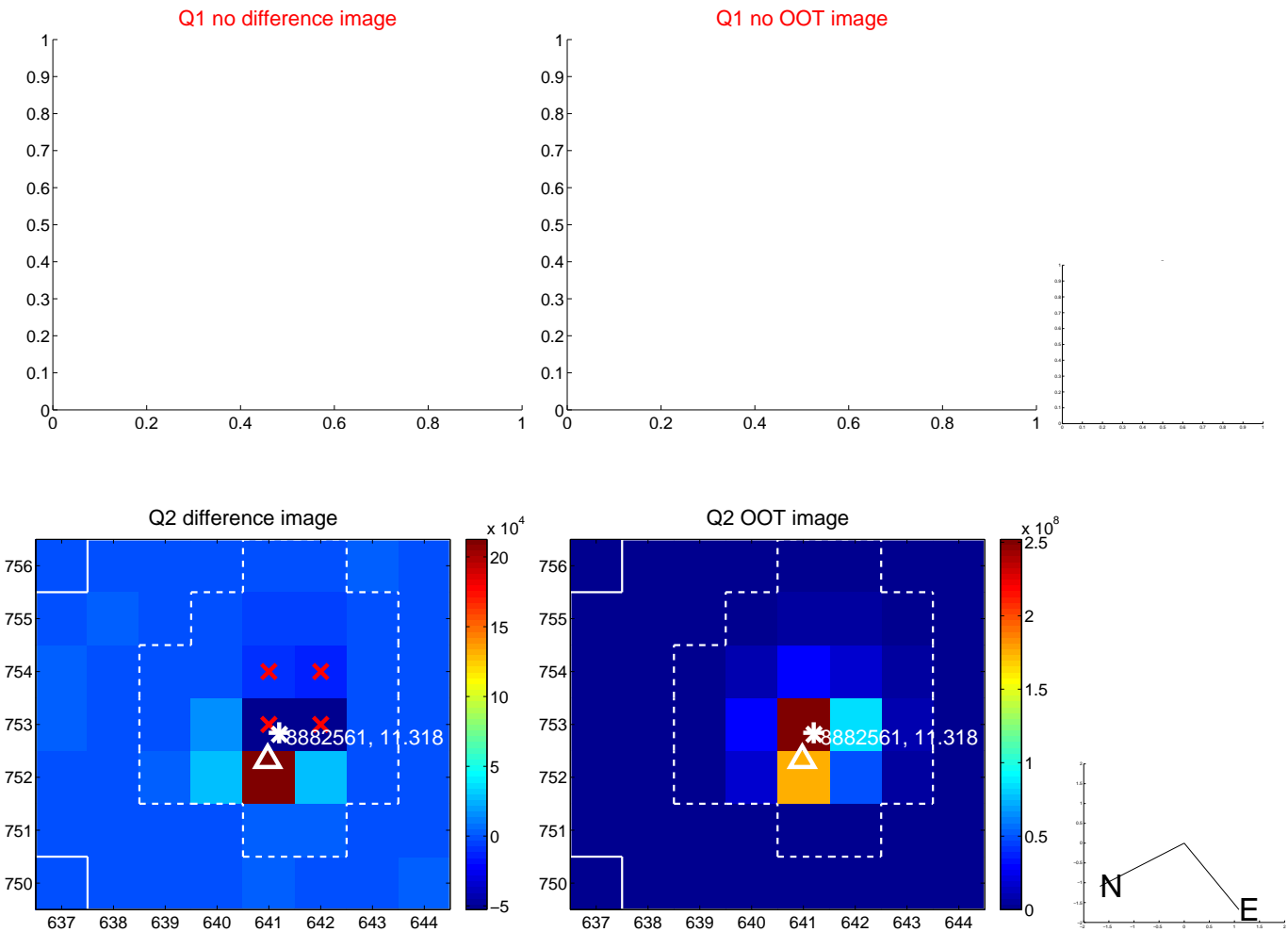
The direct PRF centroid is offset from the target star catalog position by about 0.07 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.009 \pm 1.365$	1.47	$1.191 \pm 0.651$	$1.618 \pm 1.219$
PRF-fit source offset from KIC position	$1.905 \pm 0.913$	2.09	$1.091 \pm 0.436$	$1.562 \pm 1.070$
photometric centroid source offset	$0.84 \pm 0.63$	1.34	$0.77 \pm 0.63$	$-0.33 \pm 0.62$

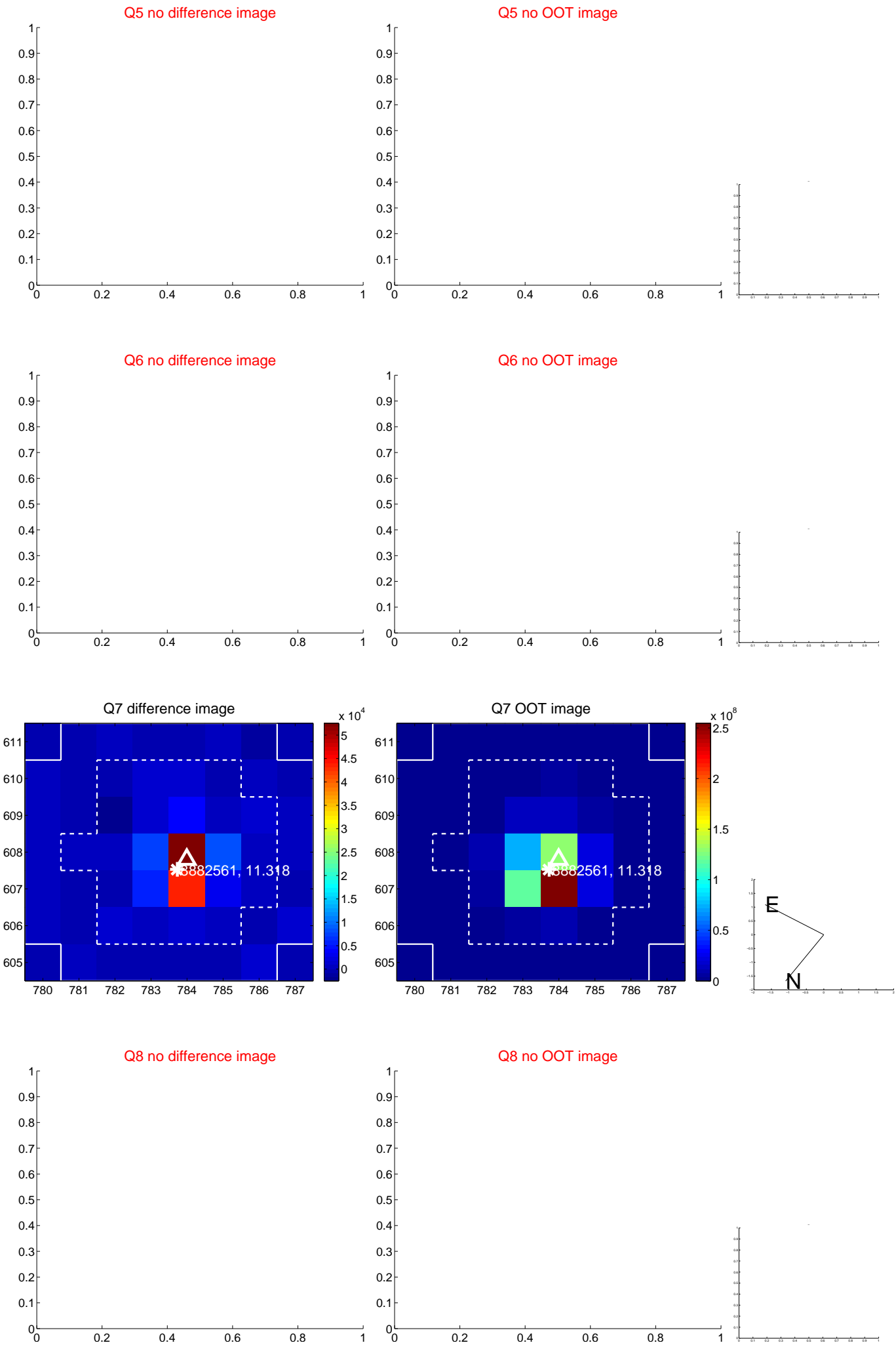


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

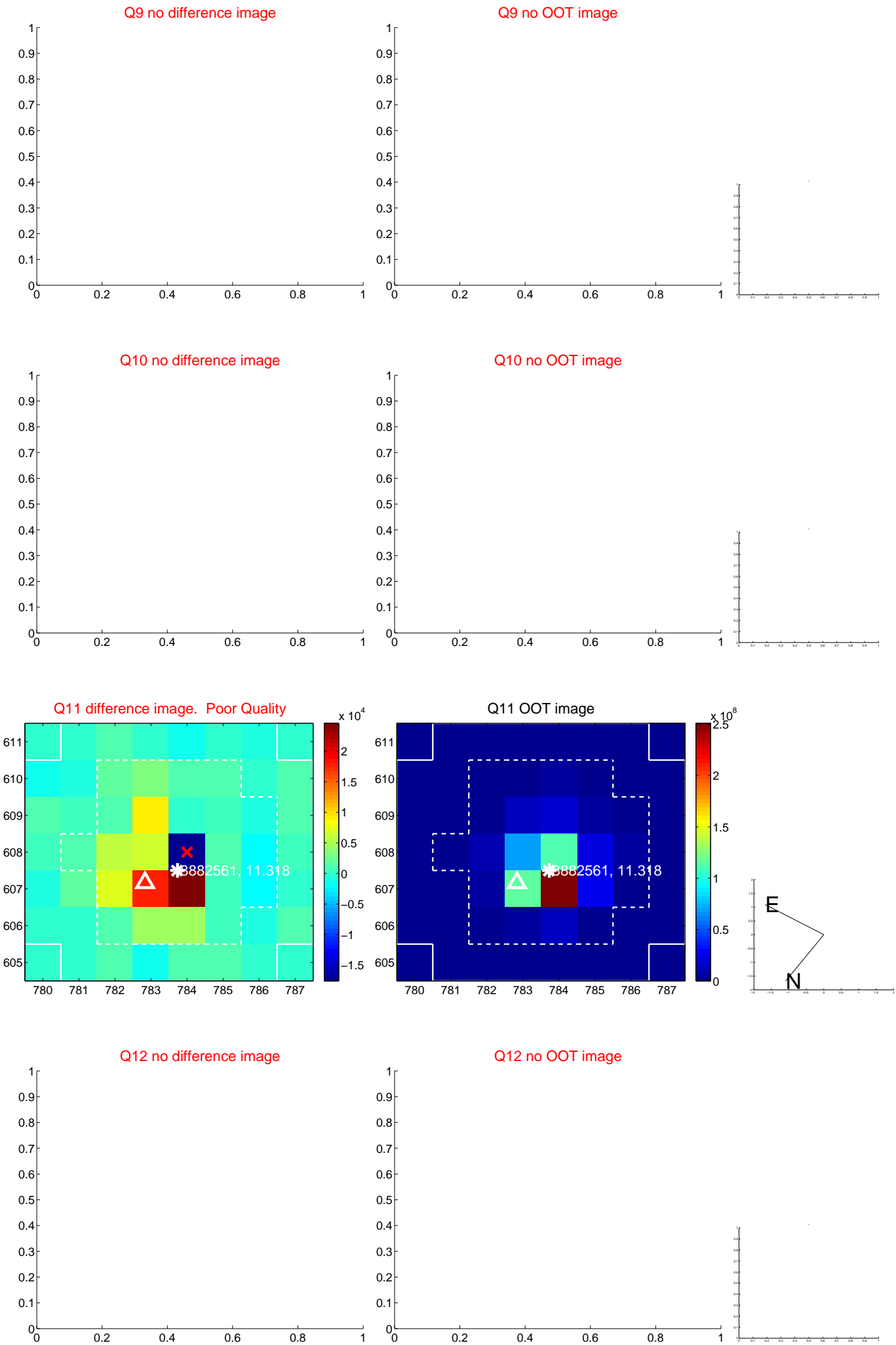
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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.

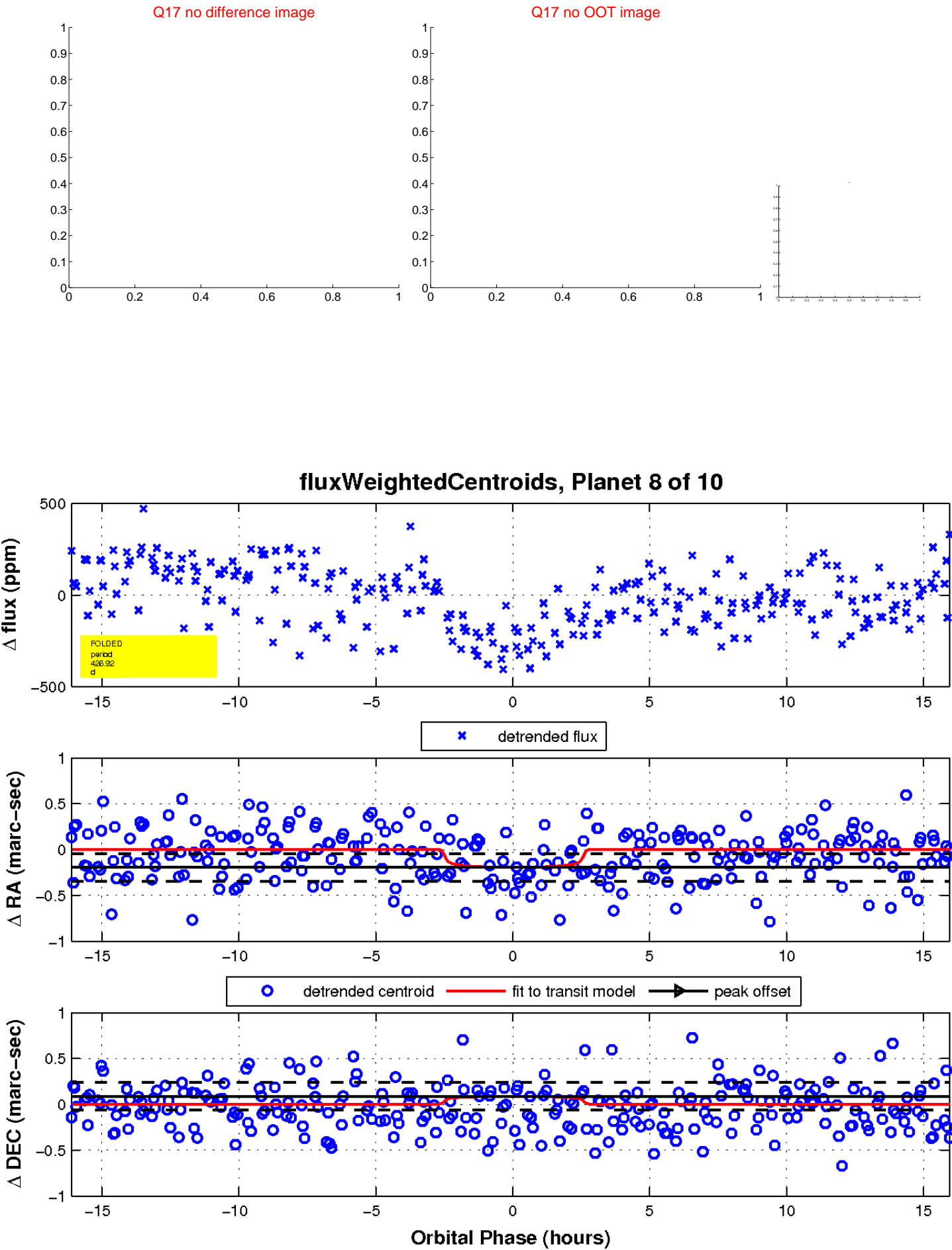


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



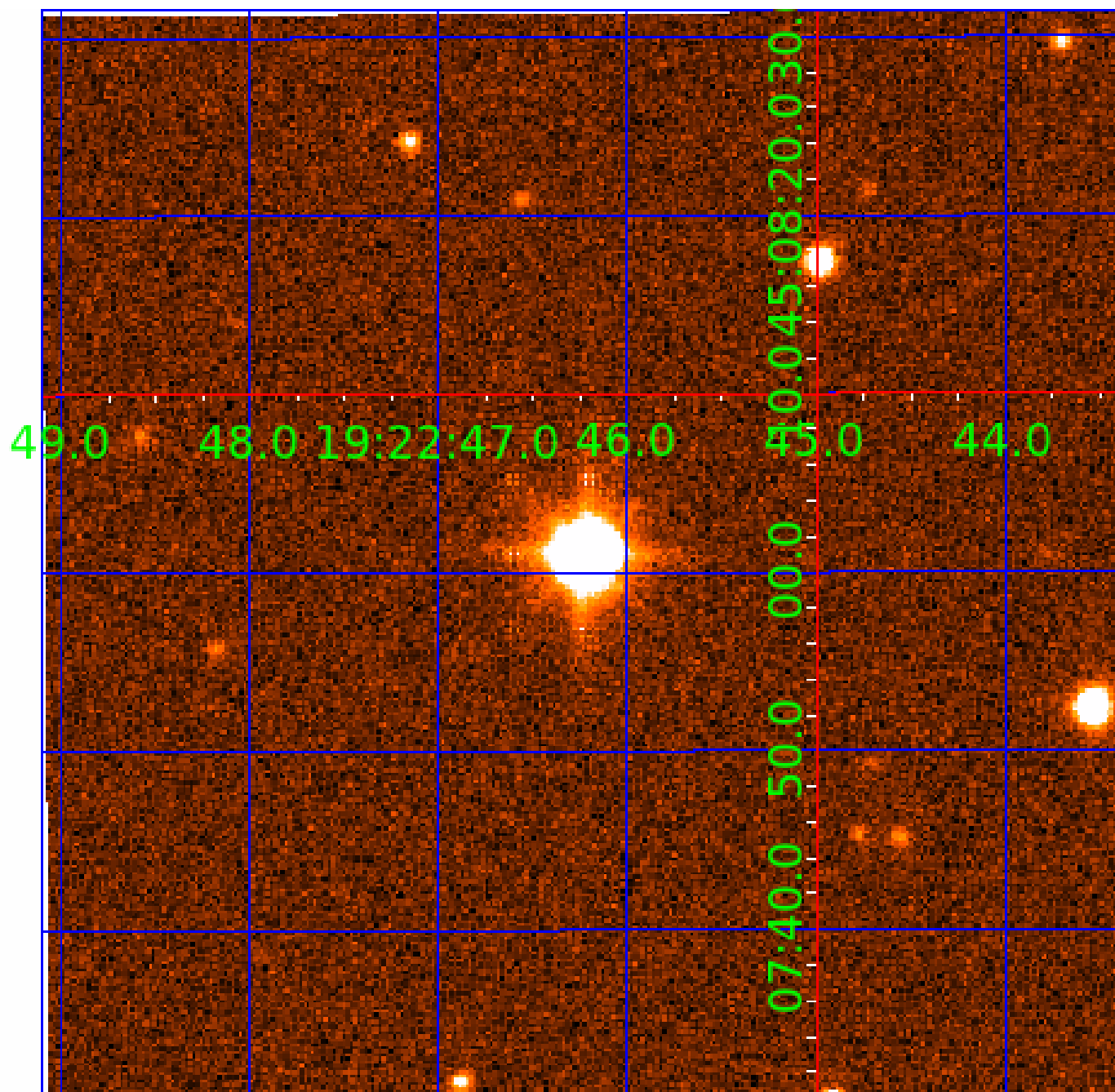


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008882561-01	OBS	No	1.514201	131.737652	22.8	8.481	8.2	9.1	3.99	6883	2.63	29149.21
008882561-02	OBS	No	601.244806	376.846737	316.0	50.859	14.8	8.2	3.99	6883	8.76	9.99
008882561-03	OBS	No	116.422525	143.577886	272.5	2.242	10.4	9.2	3.99	6883	7.27	89.16
008882561-04	OBS	No	260.182597	343.643718	233.8	26.146	9.6	9.2	3.99	6883	6.57	30.51
008882561-05	OBS	No	150.633582	152.436456	294.4	5.530	9.7	10.3	3.99	6883	8.88	63.24
008882561-06	OBS	No	77.374847	162.329719	299.9	3.243	9.2	10.3	3.99	6883	11.25	153.72
008882561-07	OBS	No	18.718323	141.178432	101.8	6.533	8.9	9.7	3.99	6883	4.60	1019.80
008882561-08	OBS	No	426.915106	225.078632	241.7	5.371	8.7	9.3	3.99	6883	6.96	15.77
008882561-09	OBS	No	150.401601	210.659704	277.3	2.596	8.6	9.4	3.99	6883	7.70	63.37

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008882561-01	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV—CENT_SATURATED
008882561-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_SATURATED
008882561-03	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
008882561-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_SATURATED
008882561-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL_SKYE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
008882561-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
008882561-07	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED—HALO_GHOST
008882561-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—CENT_SATURATED
008882561-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED

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

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

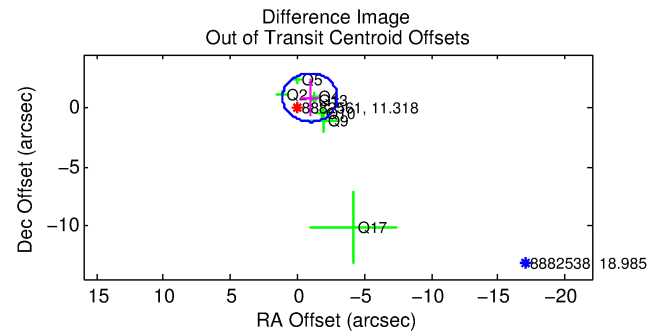
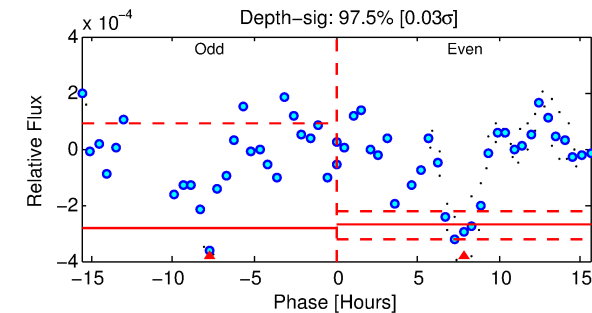
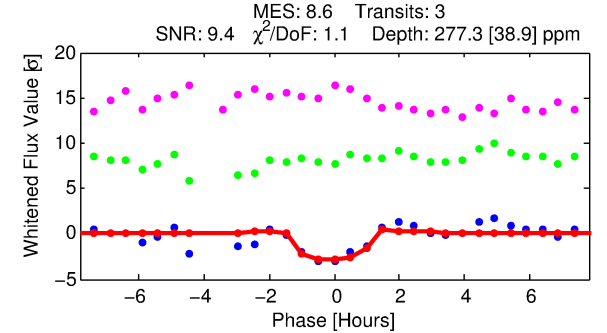
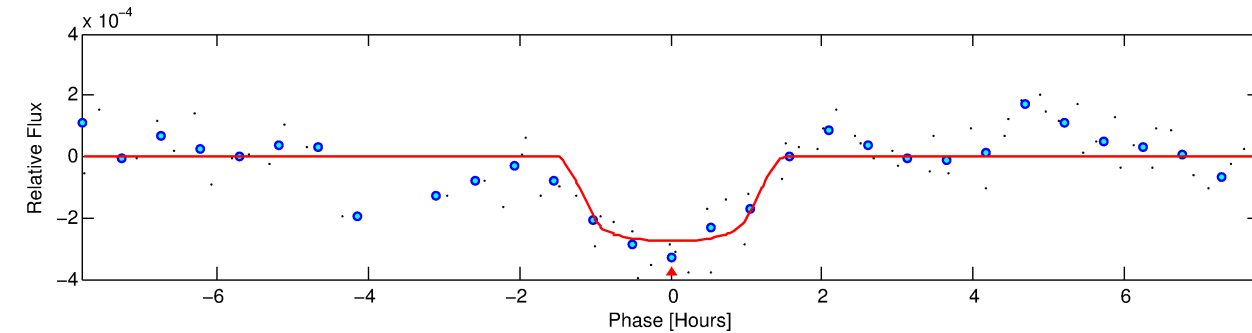
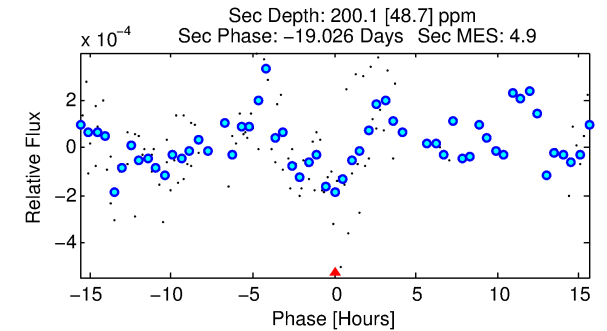
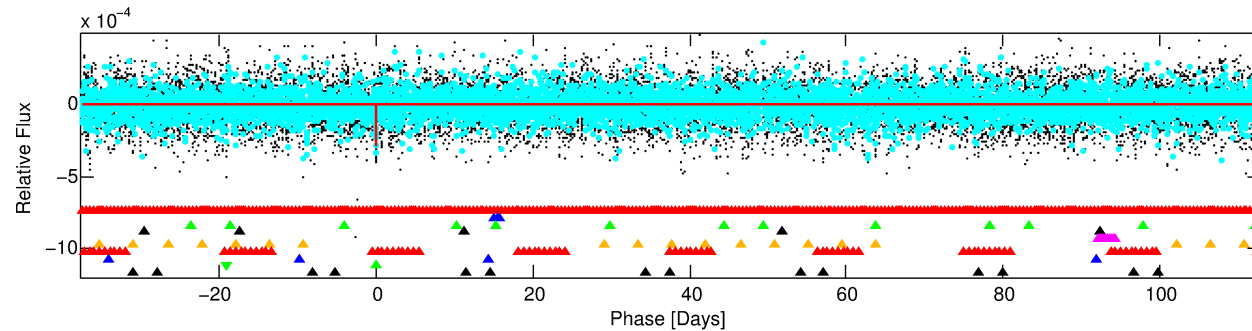
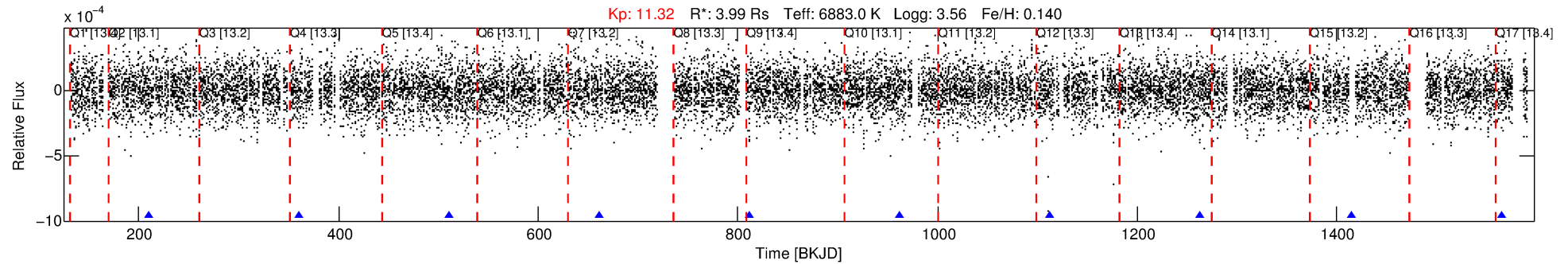
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 008882561-09

No Significant Match Found

# DV One-Page Summary

KIC: 8882561 Candidate: 9 of 10 Period: 150.402 d



## DV Fit Results:

Period = 150.40160 [0.00153] d  
Epoch = 210.6597 [0.0074] BKJD  
Rp/R\* = 0.0177 [0.0067]  
a/R\* = 216.27 [471.94]  
b = 0.89 [0.50]  
Seff = 63.37 [32.79]  
Teq = 719 [93] K  
Rp = 7.70 [3.98] Re  
a = 0.7113 [0.2300] AU  
Ag = 939.45 [879.90] [1.07σ]  
Teffp = 6158 [1234] K [4.39σ]

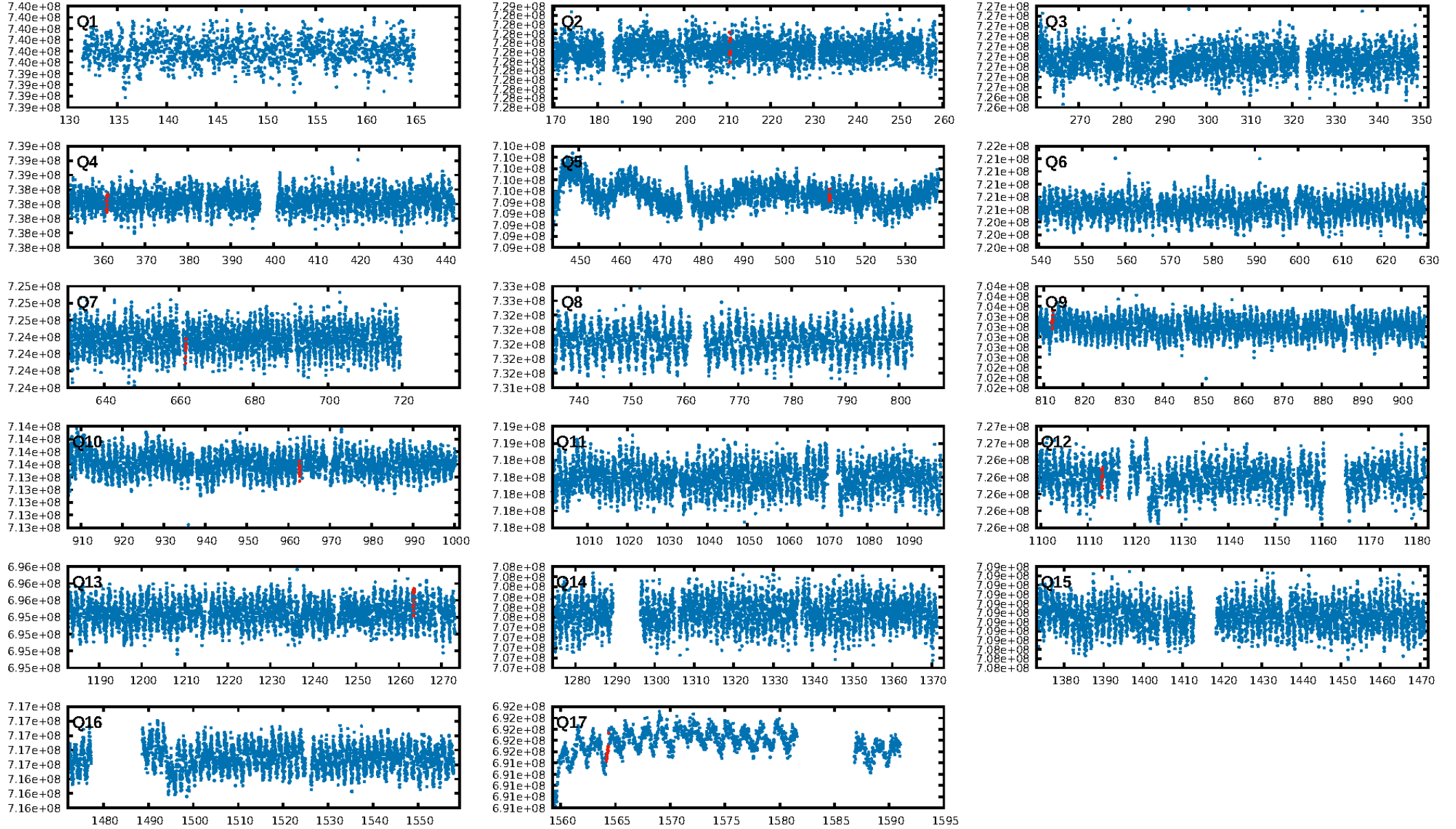
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [237.75σ]  
LongPeriod-sig: 63.8% [0.91σ]  
ModelChiSquare2-sig: 94.9%  
ModelChiSquareGof-sig: 87.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: -15.98  
Centroid-sig: 29.4%  
Centroid-so: 0.487 arcsec [0.95σ]  
OotOffset-rm: 1.265 arcsec [1.85σ]  
KicOffset-rm: 1.478 arcsec [2.75σ]  
OotOffset-st: 2/0/1/4 [7]  
KicOffset-st: 2/0/1/4 [7]  
DiffImageQuality-fgm: 0.71 [5/7]  
DiffImageOverlap-fno: 0.43 [3/7]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 21:27:13 Z

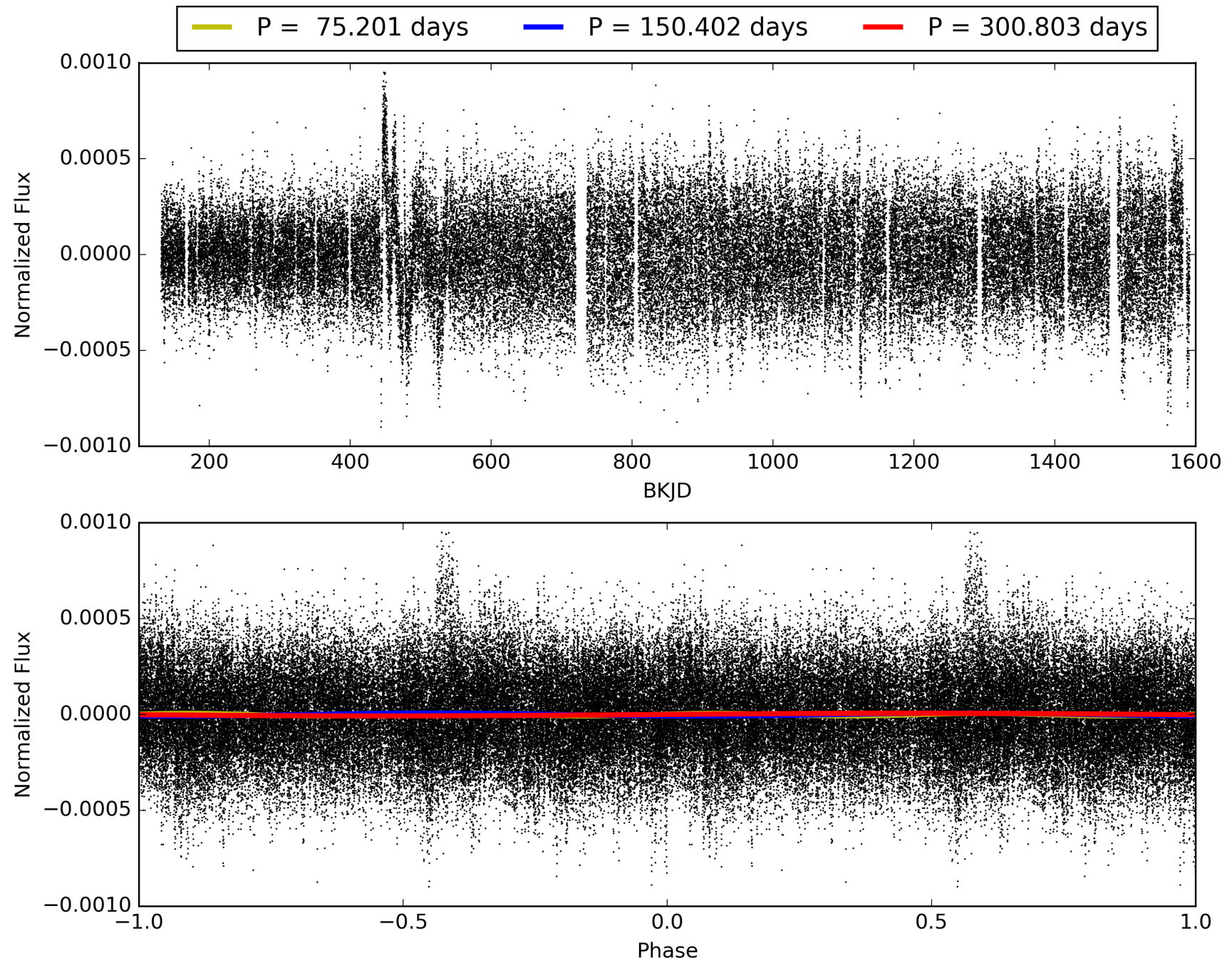
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 008882561-09, PDC Light Curves



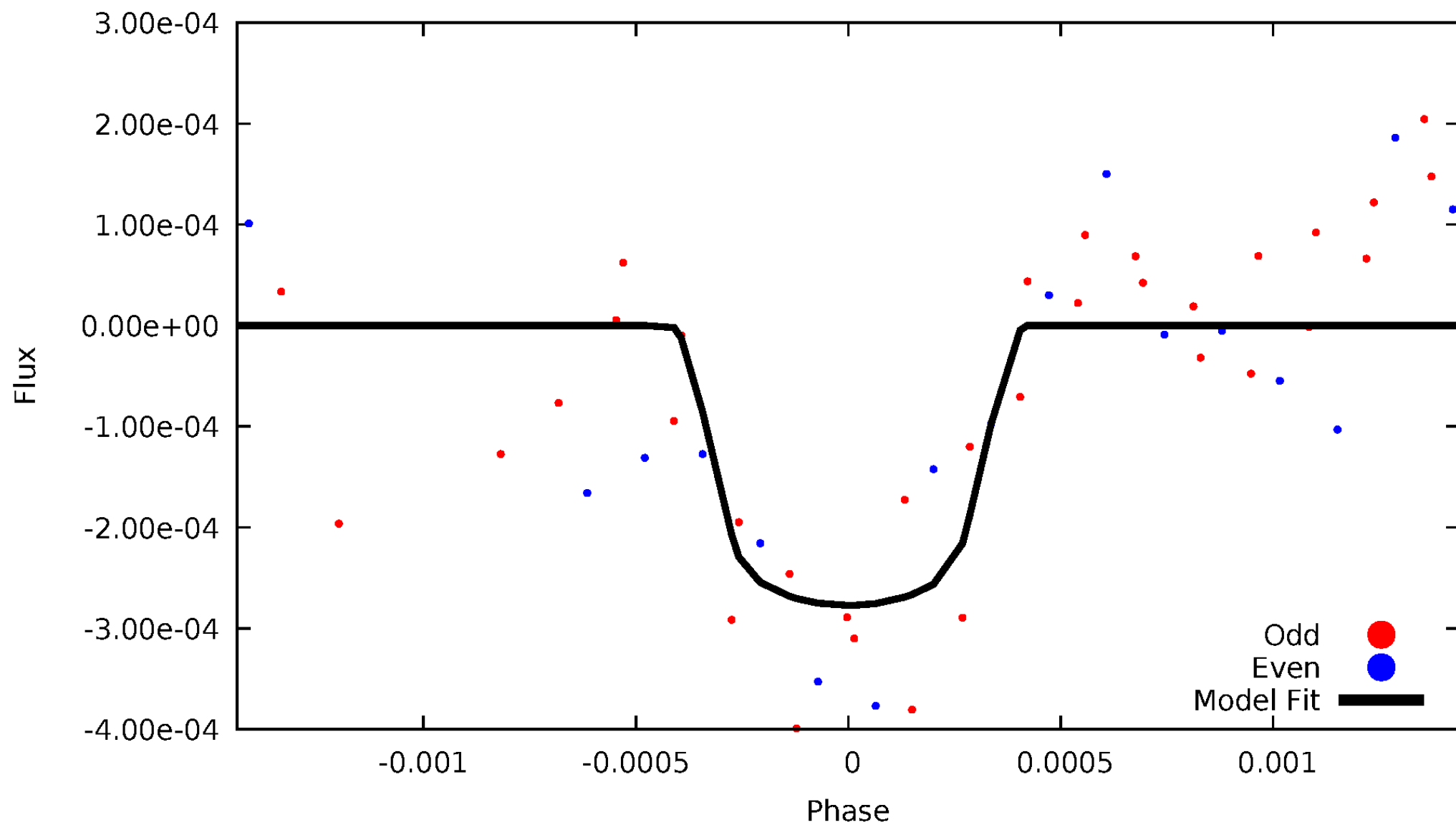


TCE 008882561-09



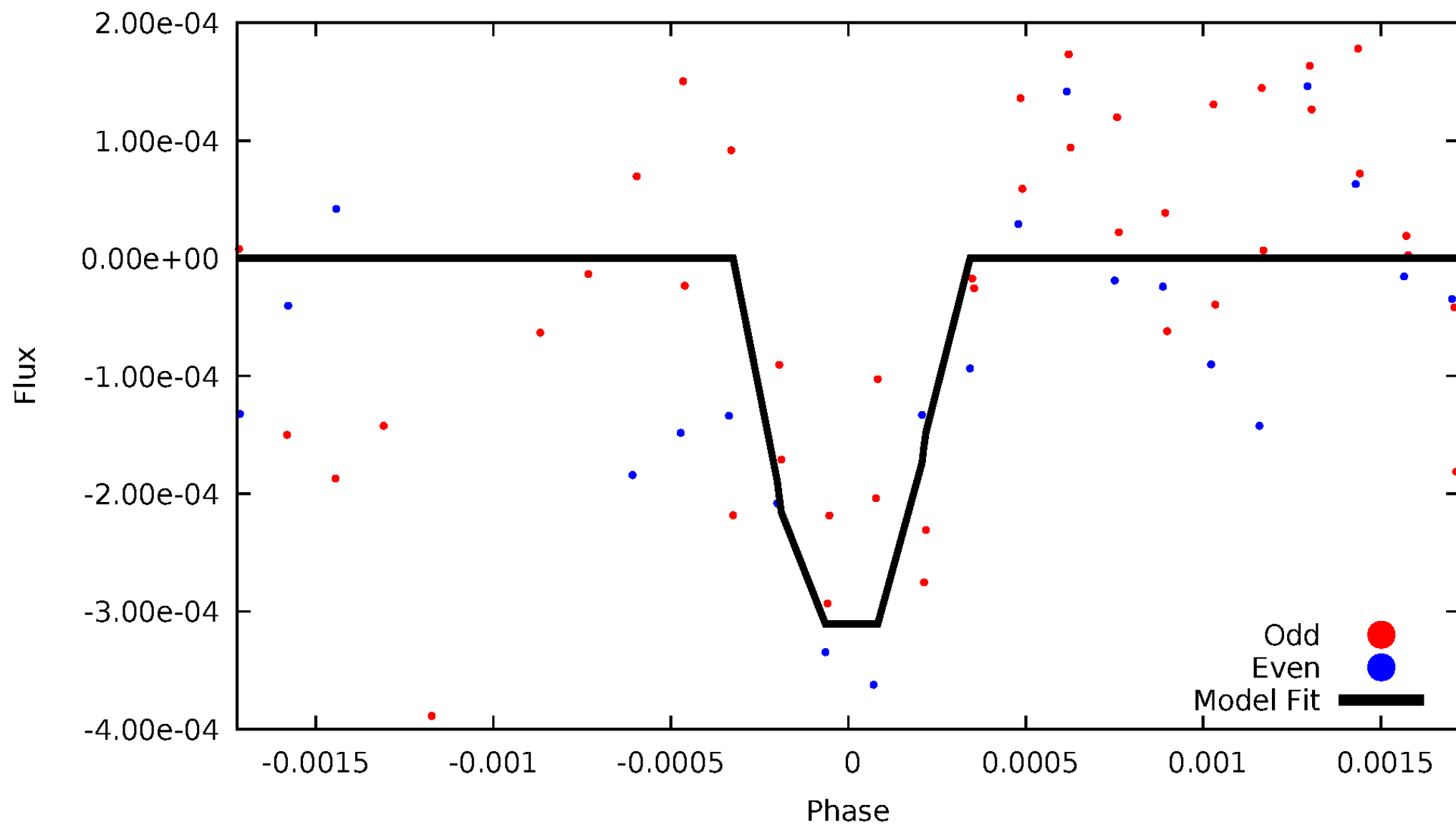
# DV Odd/Even

TCE 008882561-09



# ALT Odd/Even

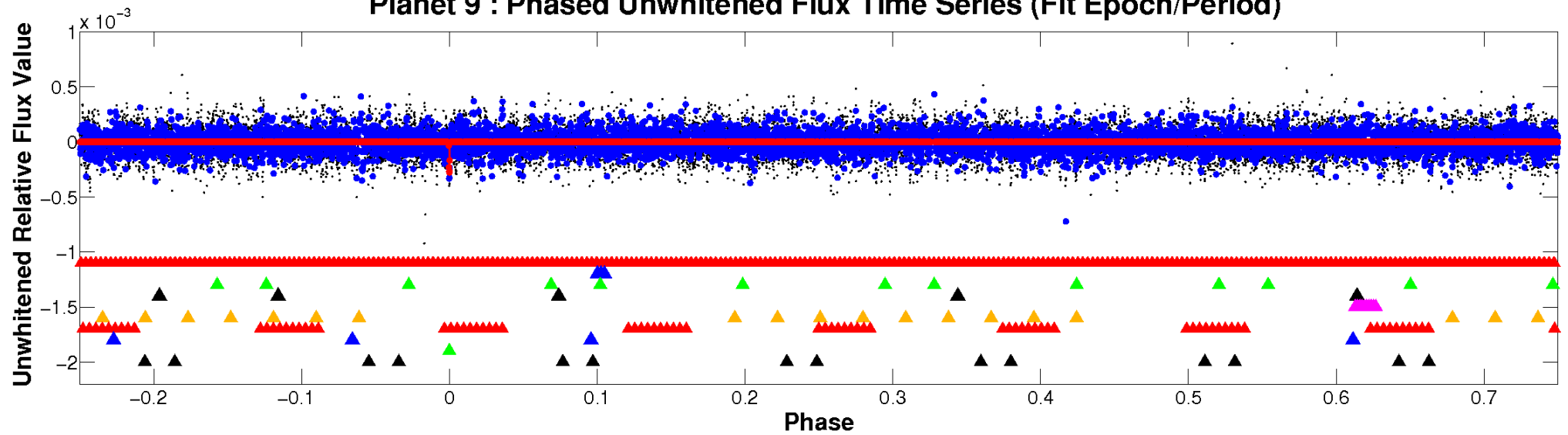
TCE 008882561-09



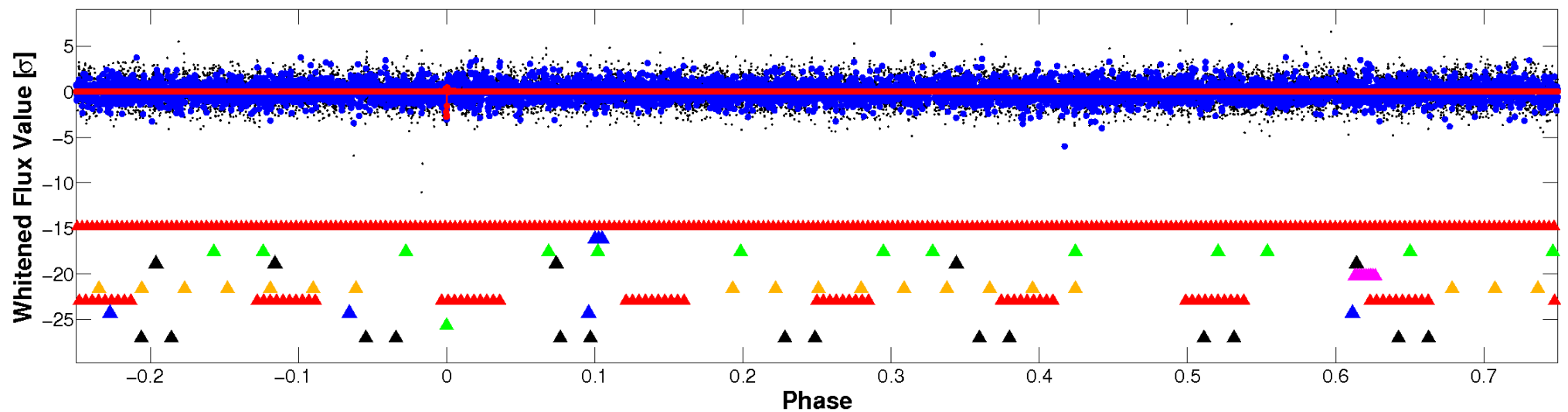


# Non-Whitened Vs. Whitened Light Curve

## Planet 9 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

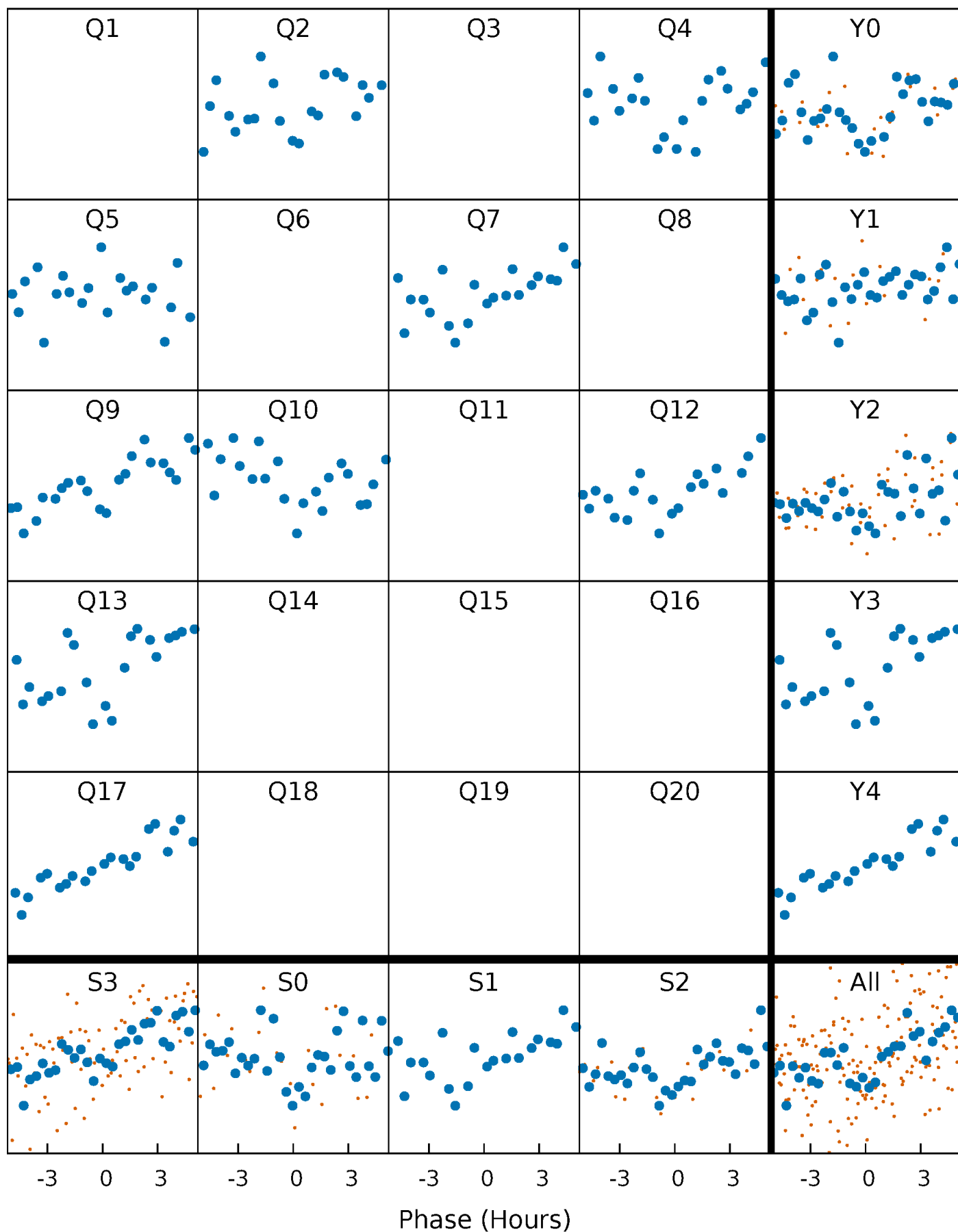


## Planet 9 : Phased Whitened Flux Time Series (Fit Epoch/Period)



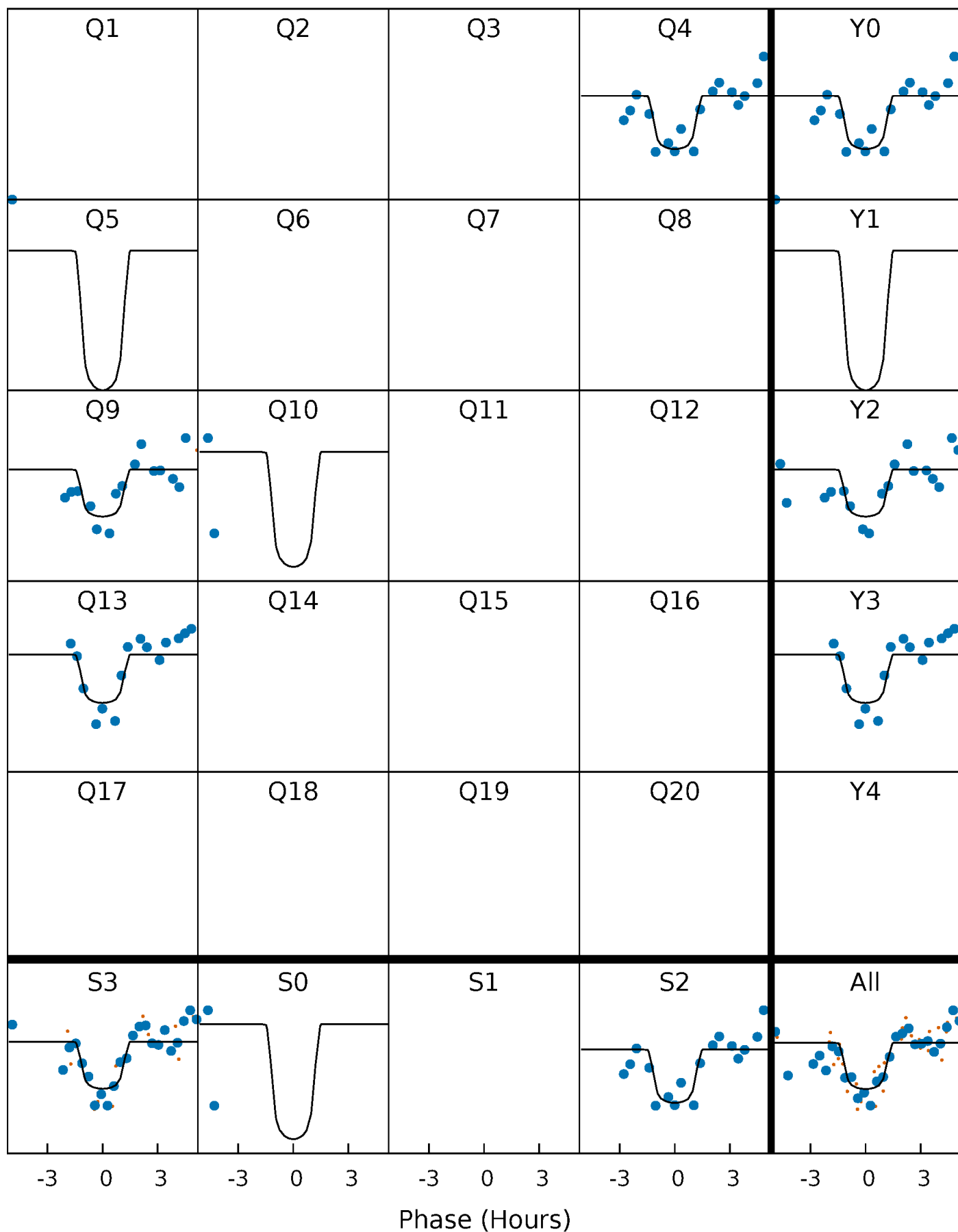
# PDC Quarter-Phased Transit Curves

TCE 008882561-09     $P=150.401601$  Days     $T_0=210.659705$  (BKJD)



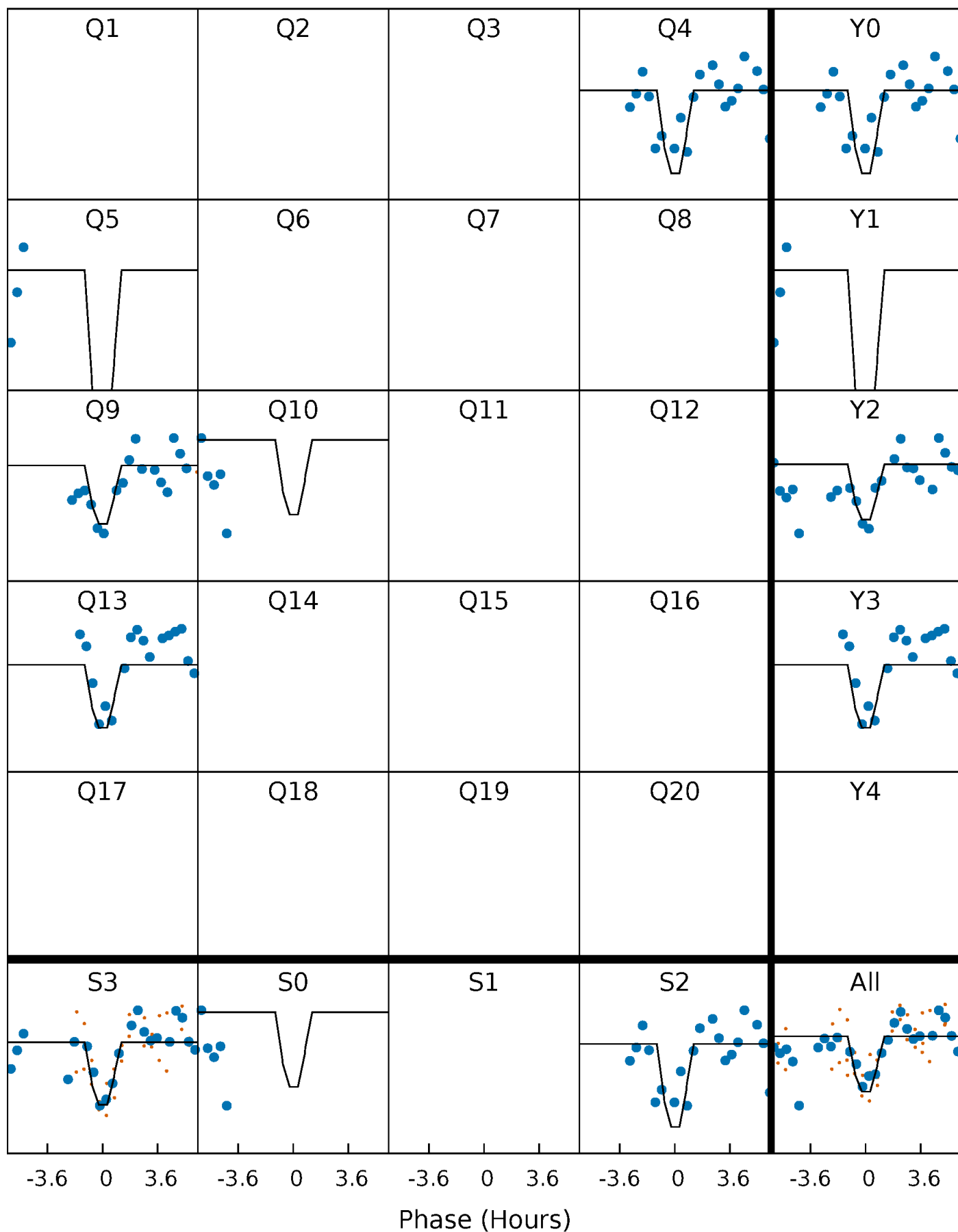
# DV Quarter-Phased Transit Curves

TCE 008882561-09     $P=150.401601$  Days     $T_0=210.659705$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

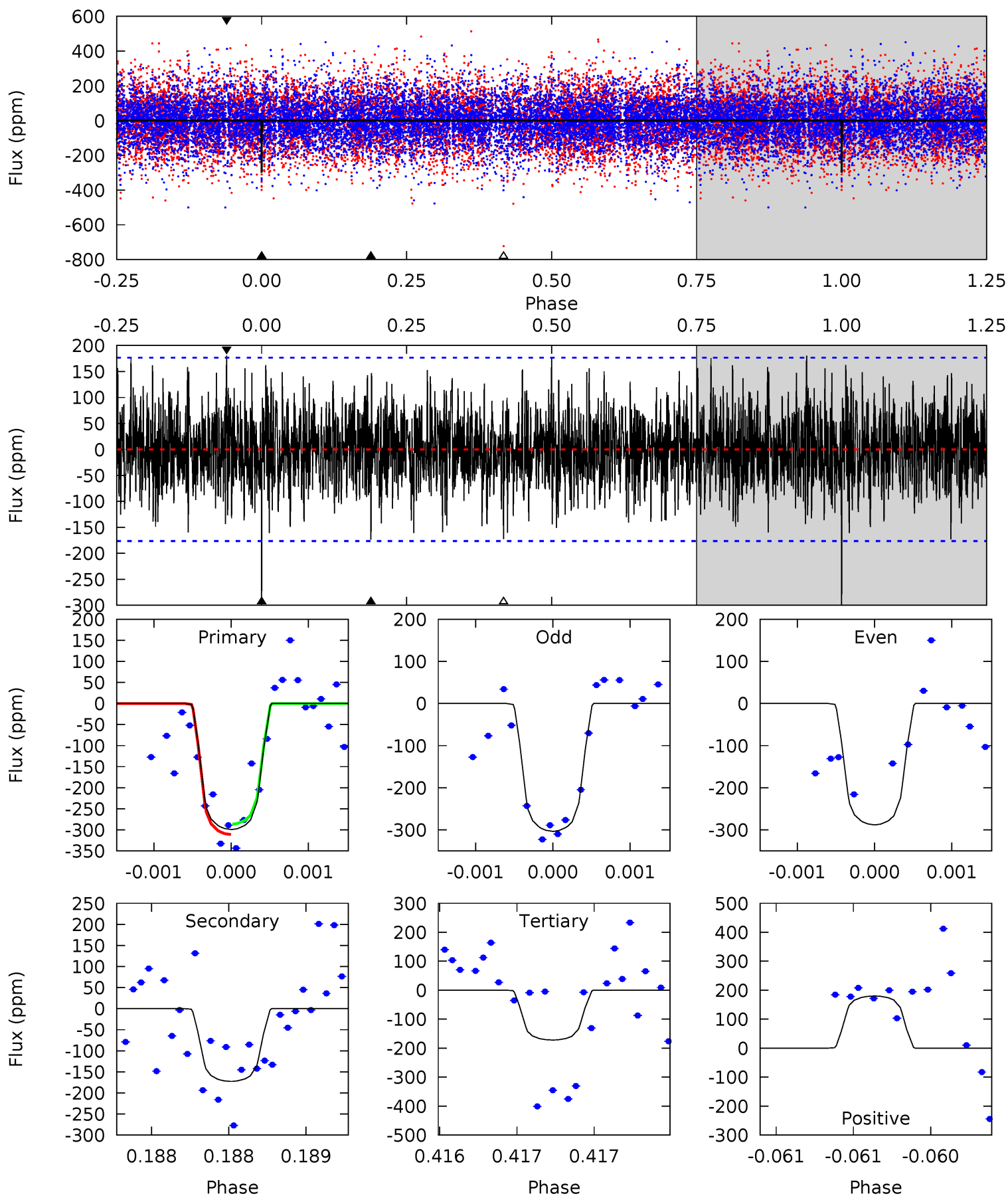
TCE 008882561-09 P=150.398751 Days  $T_0=210.670096$  (BKJD)



# DV Model-Shift Uniqueness Test

008882561-09,  $P = 150.401601$  Days,  $E = 60.258104$  Days

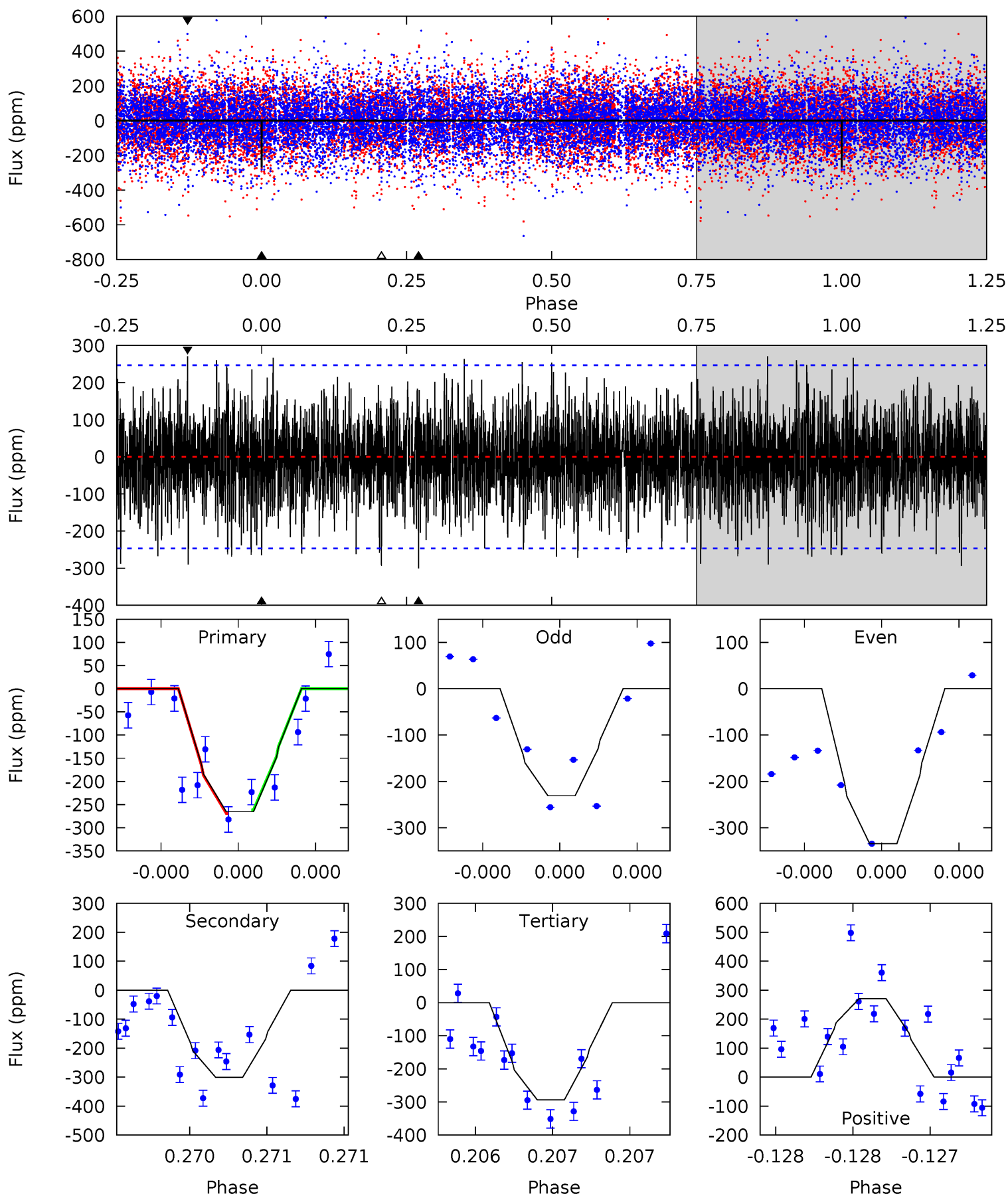
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.30	5.37	5.35	5.60	5.49	3.35	1.65	3.95	3.70	0.02	-0.23	0.23	1.03	0.38	0.38



# Alt Model-Shift Uniqueness Test

008882561-09,  $P = 150.398751$  Days,  $E = 60.271345$  Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.03	6.83	6.67	6.15	5.60	3.53	1.91	-0.64	-0.12	0.16	0.68	1.08	1.02	0.47	0.08



### Stellar Parameters For KIC 008882561

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6883^{+153}_{-222}$	$3.562^{+0.288}_{-0.032}$	$0.140^{+0.200}_{-0.250}$	$3.993^{+0.249}_{-1.413}$	$2.119^{+0.073}_{-0.416}$	$0.047^{+0.093}_{-0.006}$
	+2%/-3%	+8%/-1%	+143%/-179%	+6%/-35%	+3%/-20%	+199%/-12%
Source	PHO1	FLK73	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 008882561-09 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-173 \pm 32$	$6.84^{+2.97}_{-2.61}$	$975^{+47}_{-81}$	$5969^{+1707}_{-906}$	$1029^{+1672}_{-556}$
Alt.	$-301 \pm 44$	$6.96^{+3.03}_{-2.80}$	$974^{+48}_{-82}$	$6795^{+2253}_{-1023}$	$1644^{+2952}_{-825}$

$T_{\text{max}}$  = 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

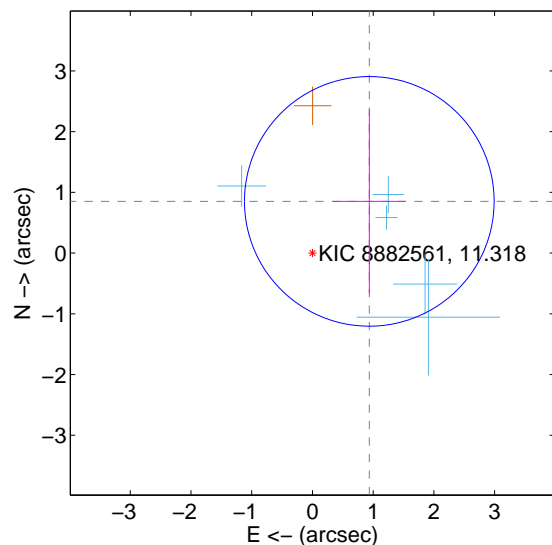
Supplemental centroid analysis for 008882561-09. **Kepler magnitude: 11.32.** Transit SNR 9.36

There are 5 quarters with good PRF difference image offsets

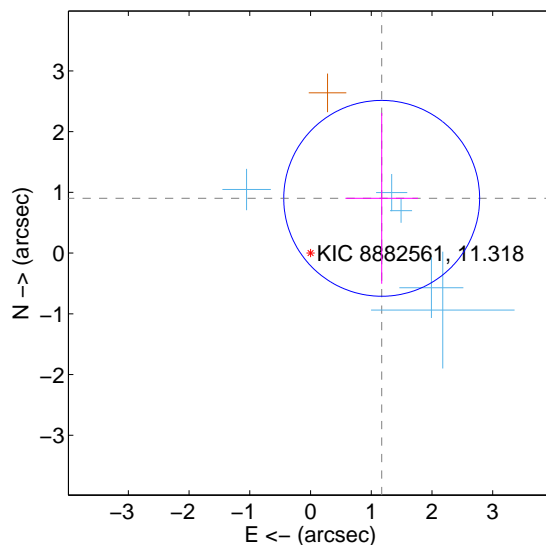
The direct PRF centroid is offset from the target star catalog position by about 0.26 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.265 \pm 0.685$	1.85	$-0.936 \pm 0.600$	$0.852 \pm 1.514$
PRF-fit source offset from KIC position	$1.478 \pm 0.537$	2.75	$-1.172 \pm 0.598$	$0.902 \pm 1.406$
photometric centroid source offset	$0.49 \pm 0.51$	0.95	$0.41 \pm 0.51$	$0.26 \pm 0.51$

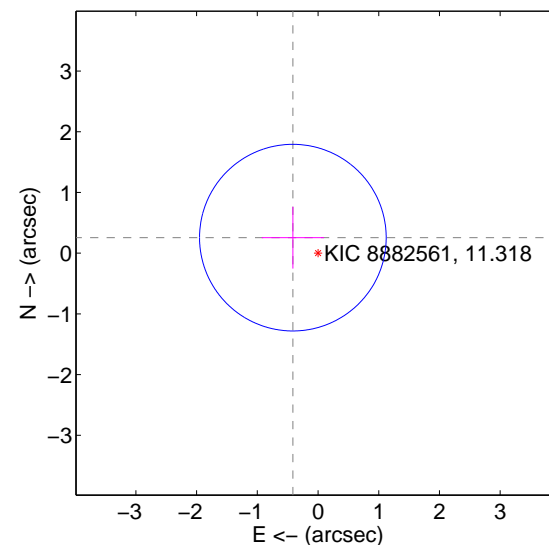
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



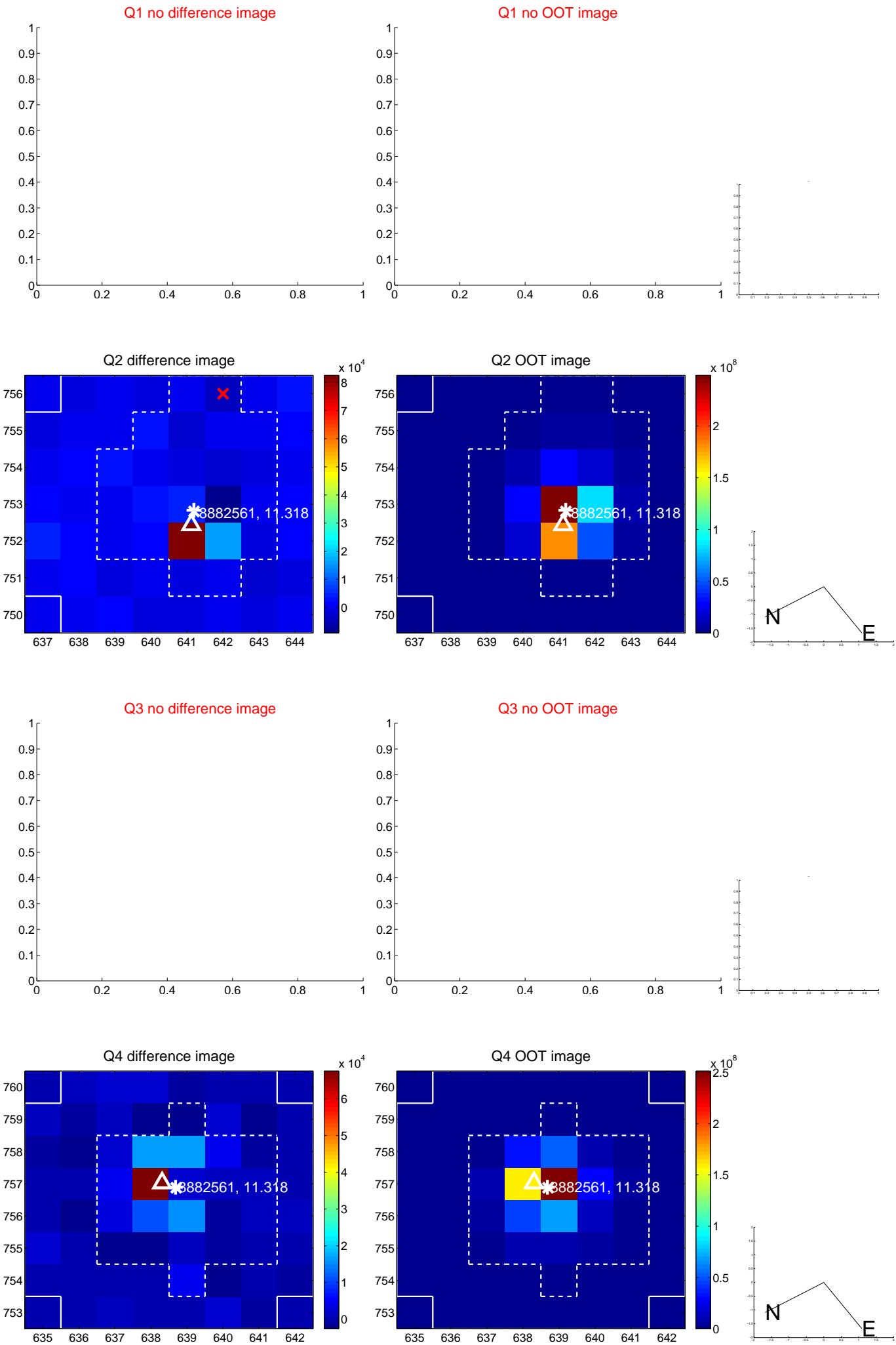
offset from photometric centroids



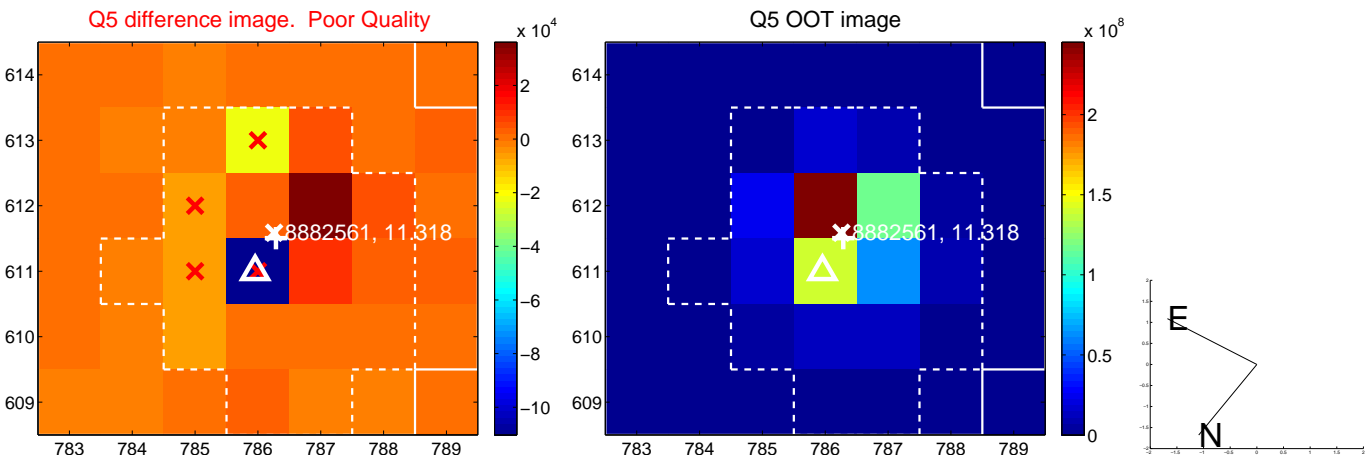
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



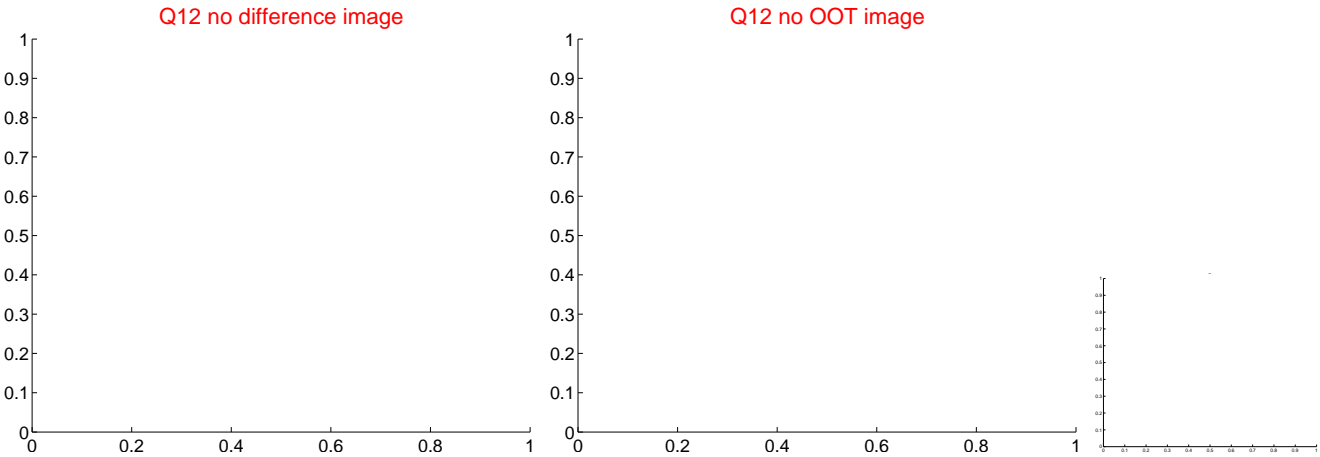
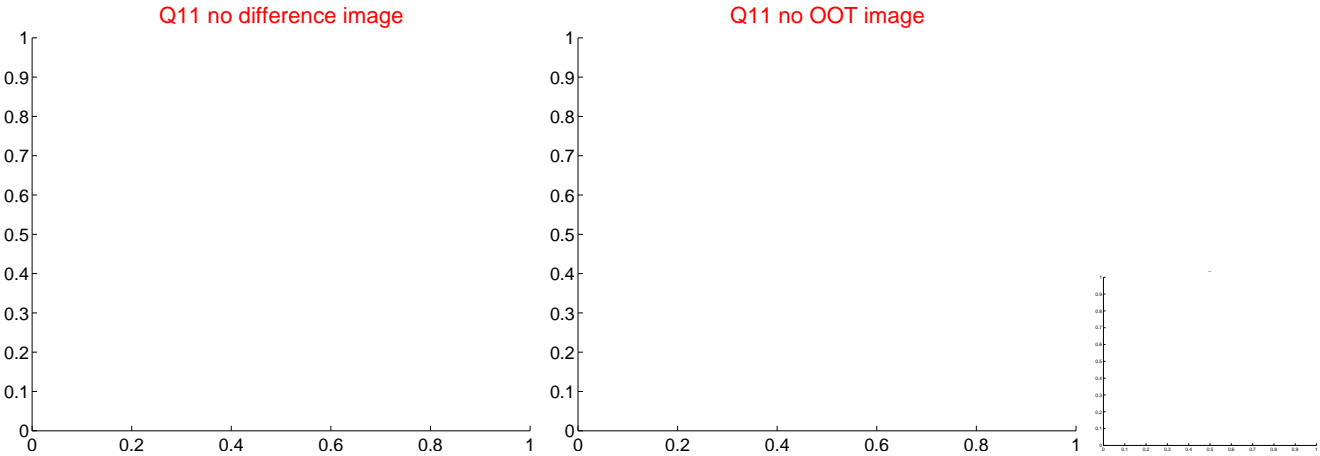
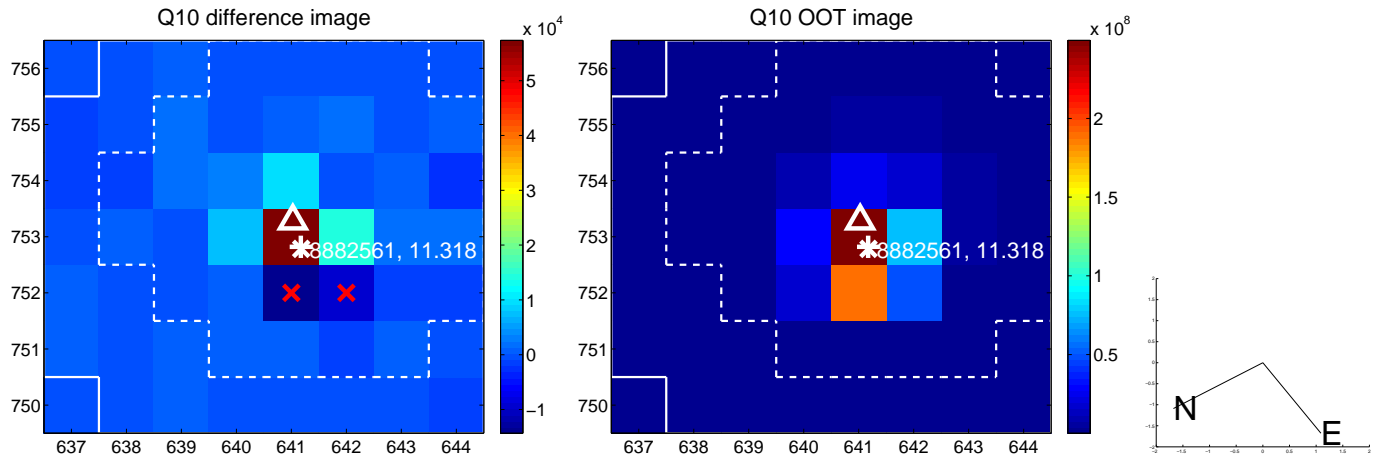
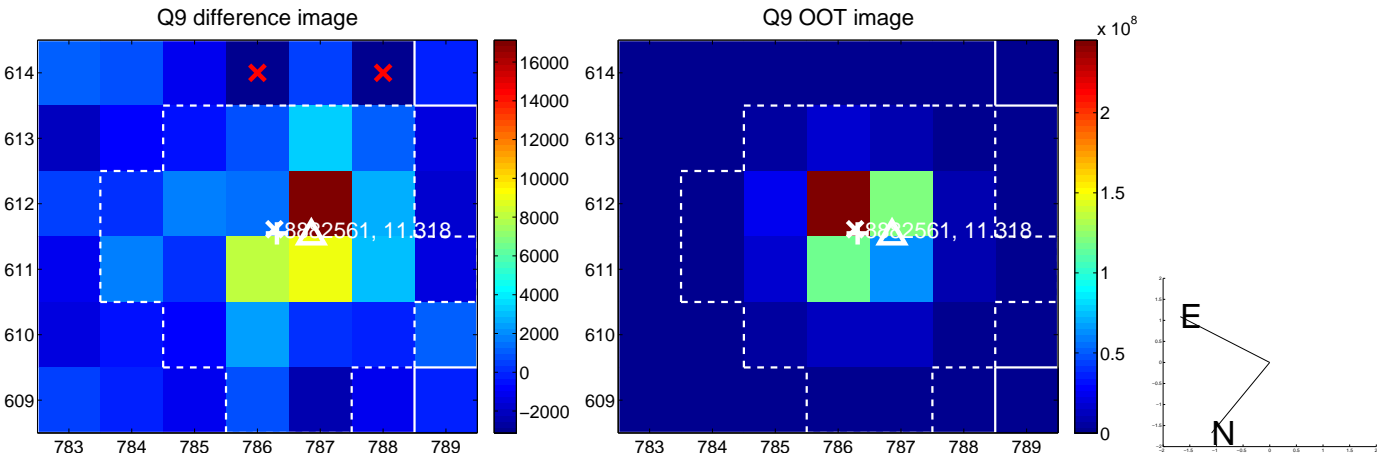
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



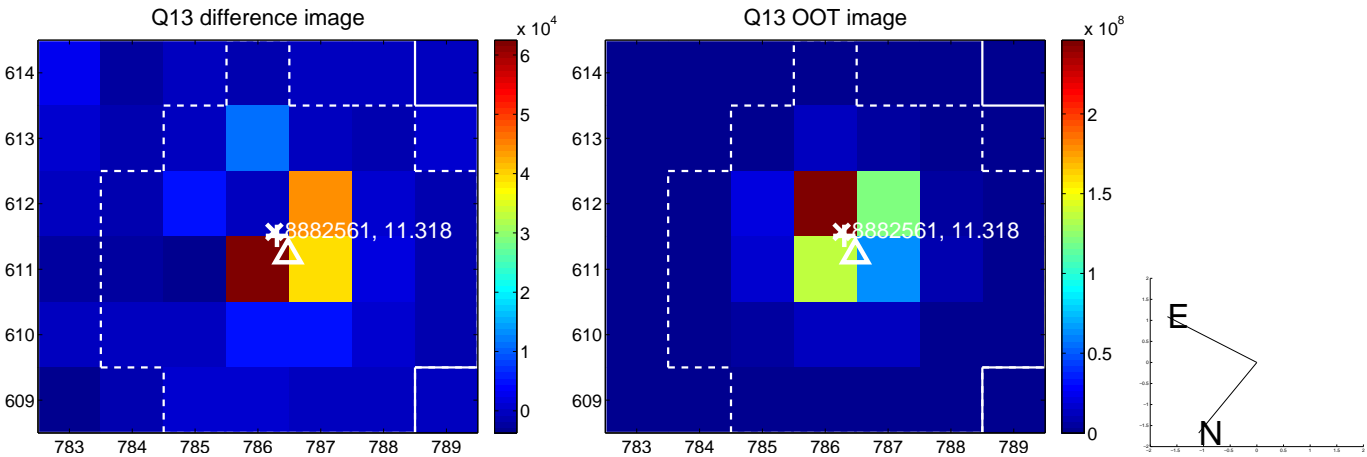
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



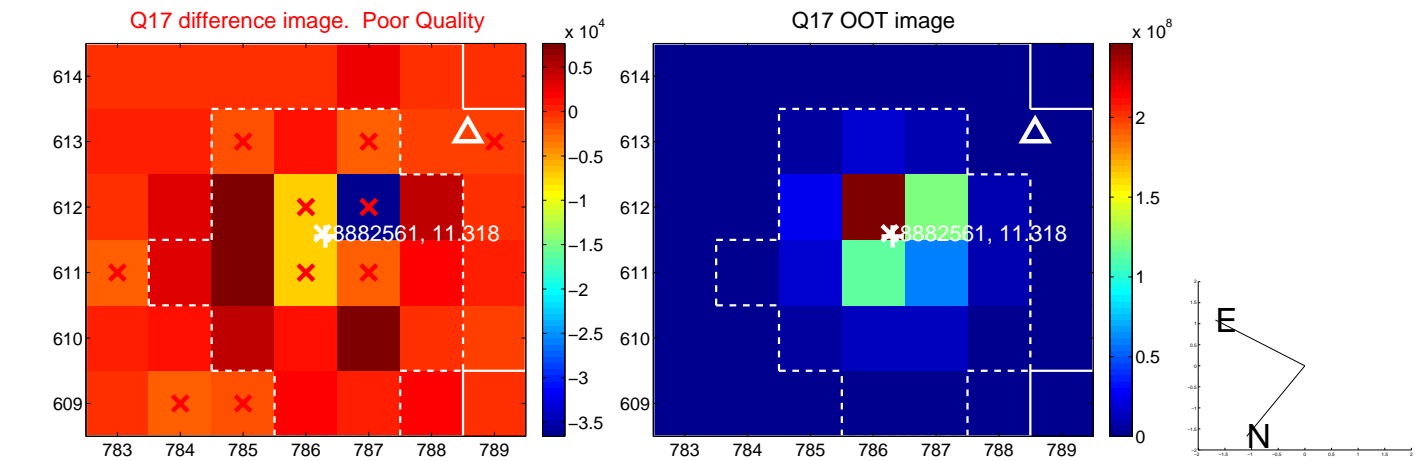
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



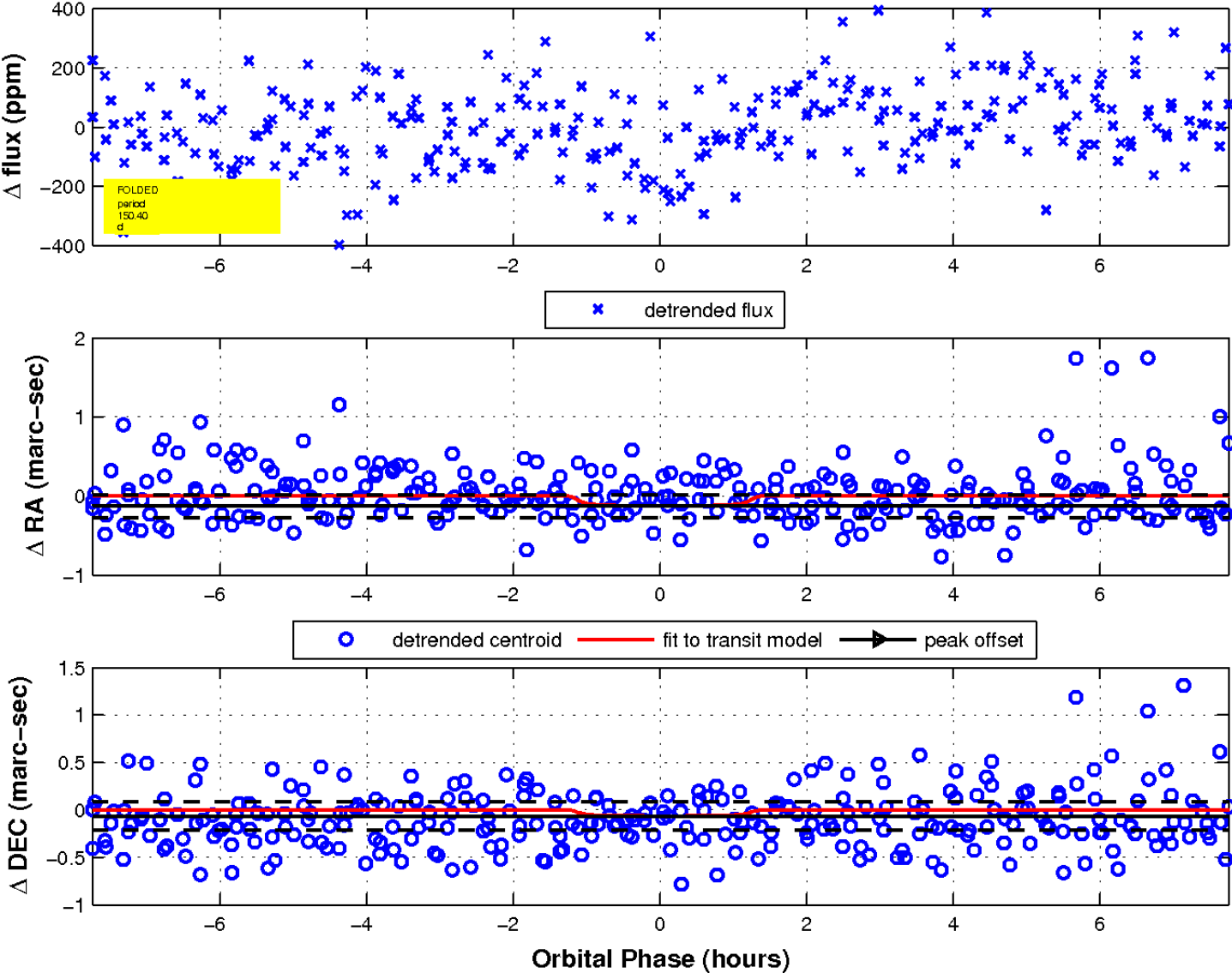
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 9 of 10



UKIRT Image

Declination

