

# KIC 010812657

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010812657-01	OBS	No	1.035145	131.673492	0.0	7.075	10.4	0.0	1.56	7349	0.01	12704.67
010812657-02	OBS	No	28.976055	138.407555	2216.0	5.278	10.1	10.5	1.56	7349	13.37	149.48
010812657-03	OBS	No	35.180230	143.795173	300.1	1.153	8.7	1.6	1.56	7349	3.14	115.41
010812657-04	OBS	No	124.132671	139.492680	3660.5	6.477	8.7	9.4	1.56	7349	10.89	21.48
010812657-05	OBS	No	45.516172	151.891165	2053.9	3.772	8.5	7.3	1.56	7349	8.46	81.86
010812657-06	OBS	No	46.561129	143.542107	2902.8	7.319	8.5	8.7	1.56	7349	15.18	79.42
010812657-07	OBS	No	20.673153	151.062505	209.9	5.000	8.2	-1.0	1.56	7349	2.30	234.47

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010812657-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV
010812657-02	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—HALO_GHOST
010812657-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_TER_ALT—MOD_POS_ALT
010812657-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
010812657-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
010812657-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
010812657-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_NOFITS

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

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

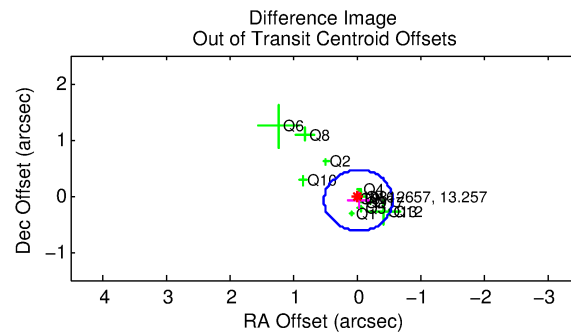
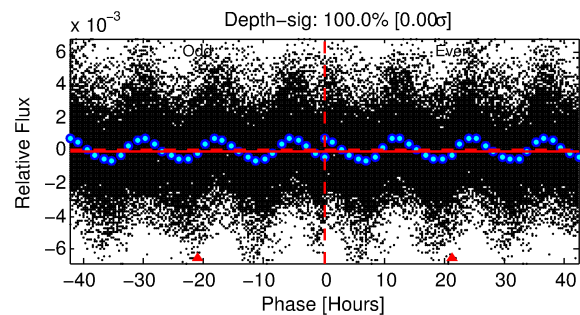
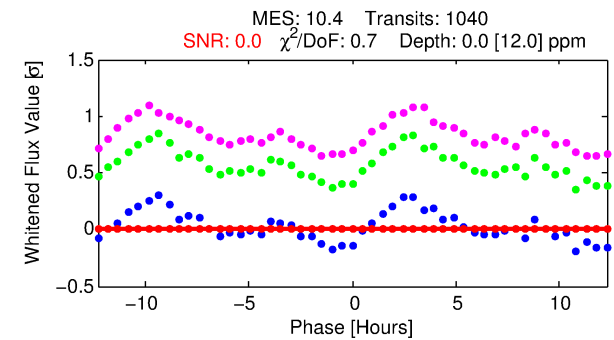
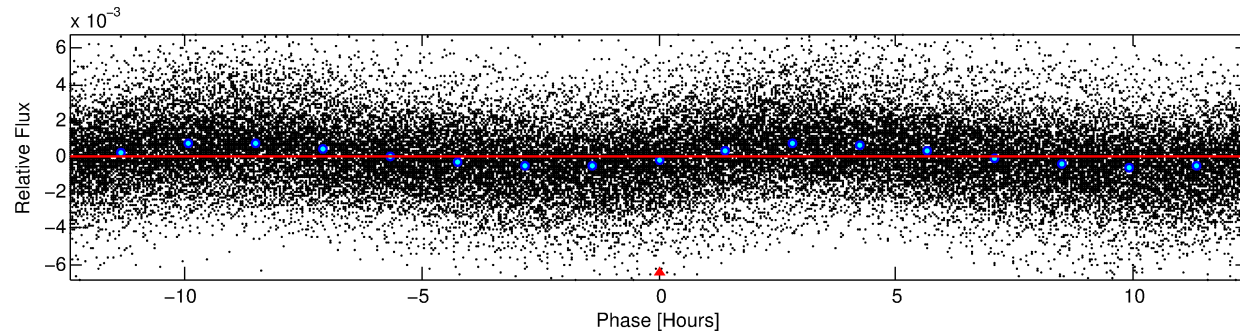
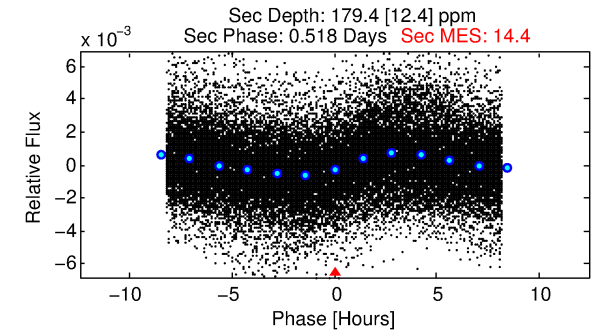
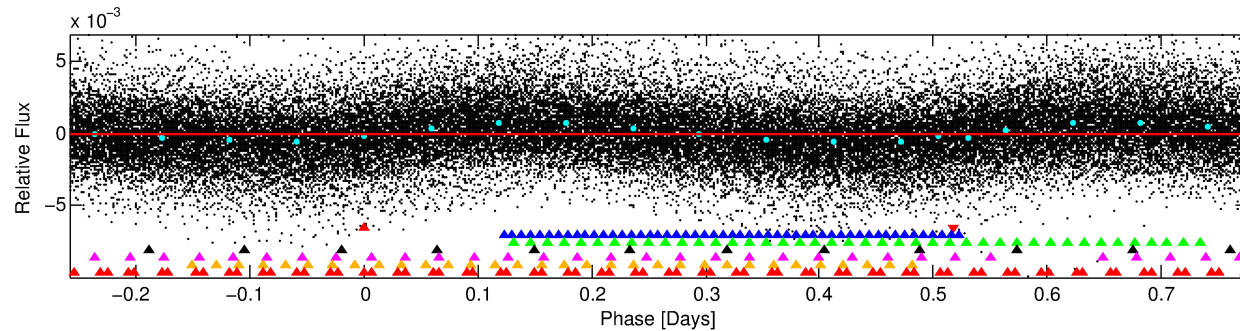
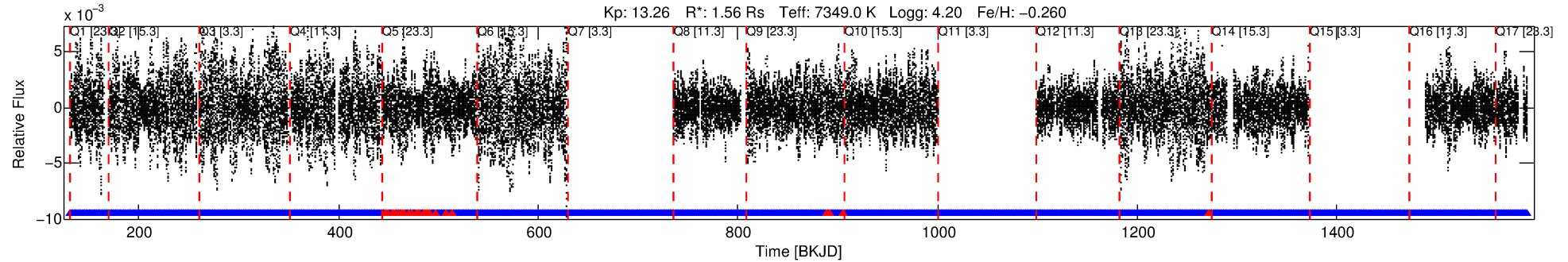
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 010812657-01

No Significant Match Found

# DV One-Page Summary

KIC: 10812657 Candidate: 1 of 7 Period: 1.035 d



## DV Fit Results:

Period = 1.03515 [0.16776] d  
Epoch = 131.6735 [22.1701] BKJD  
Rp/R\* = 0.0001 [0.0779]  
a/R\* = 1.15 [23.47]  
b = 0.71 [74.76]  
Seff = 12704.67 [5688.64]  
Teq = 2707 [303] K  
Rp = 0.01 [13.29] Re  
a = 0.0224 [0.0062] AU  
Ag = 302389.88 [627039251.38] [0.00σ]  
Teffp = 98152 [50885550] K [0.00σ]

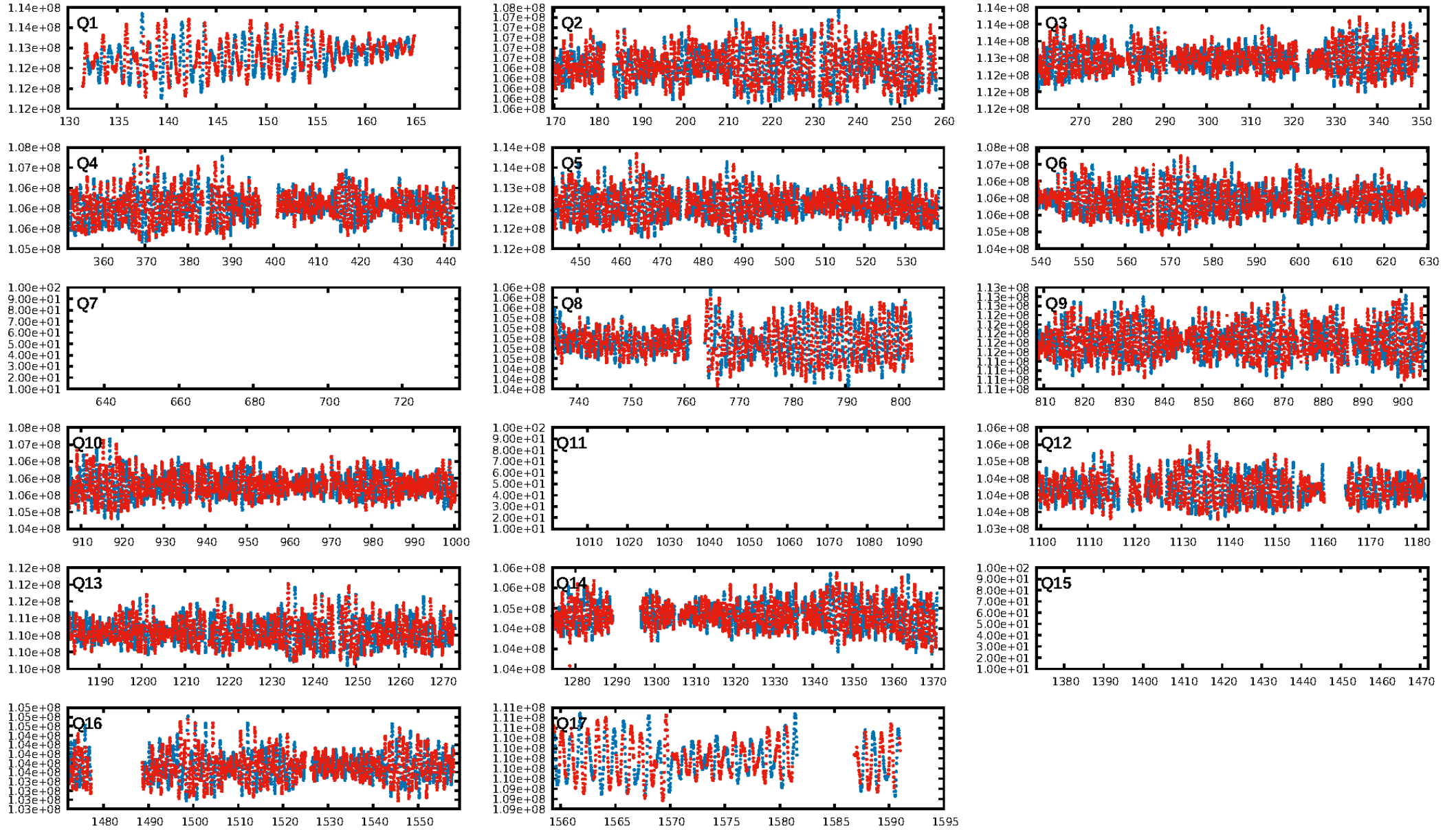
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [54.40σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 0.97 [950/981]  
GhostDiagnostic-chr: N/A  
Centroid-sig: N/A  
Centroid-so: N/A  
OotOffset-rm: 0.087 arcsec [0.48σ]  
KicOffset-rm: 0.234 arcsec [1.26σ]  
OotOffset-st: 3/1/4/5 [13]  
KicOffset-st: 3/1/4/5 [13]  
DiffImageQuality-fgm: 0.69 [9/13]  
DiffImageOverlap-fno: 1.00 [14/14]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 10:23:59 Z

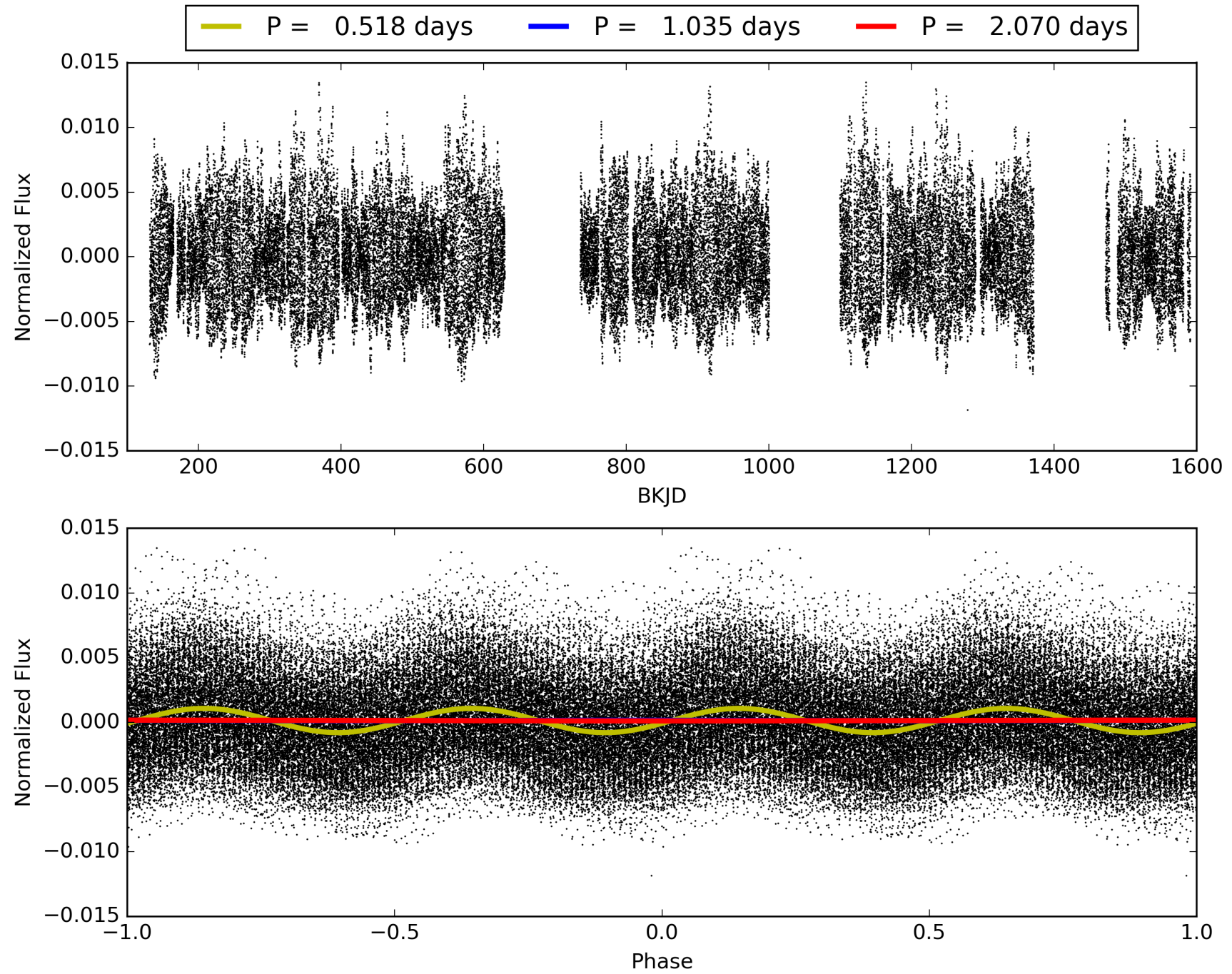
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 010812657-01, PDC Light Curves





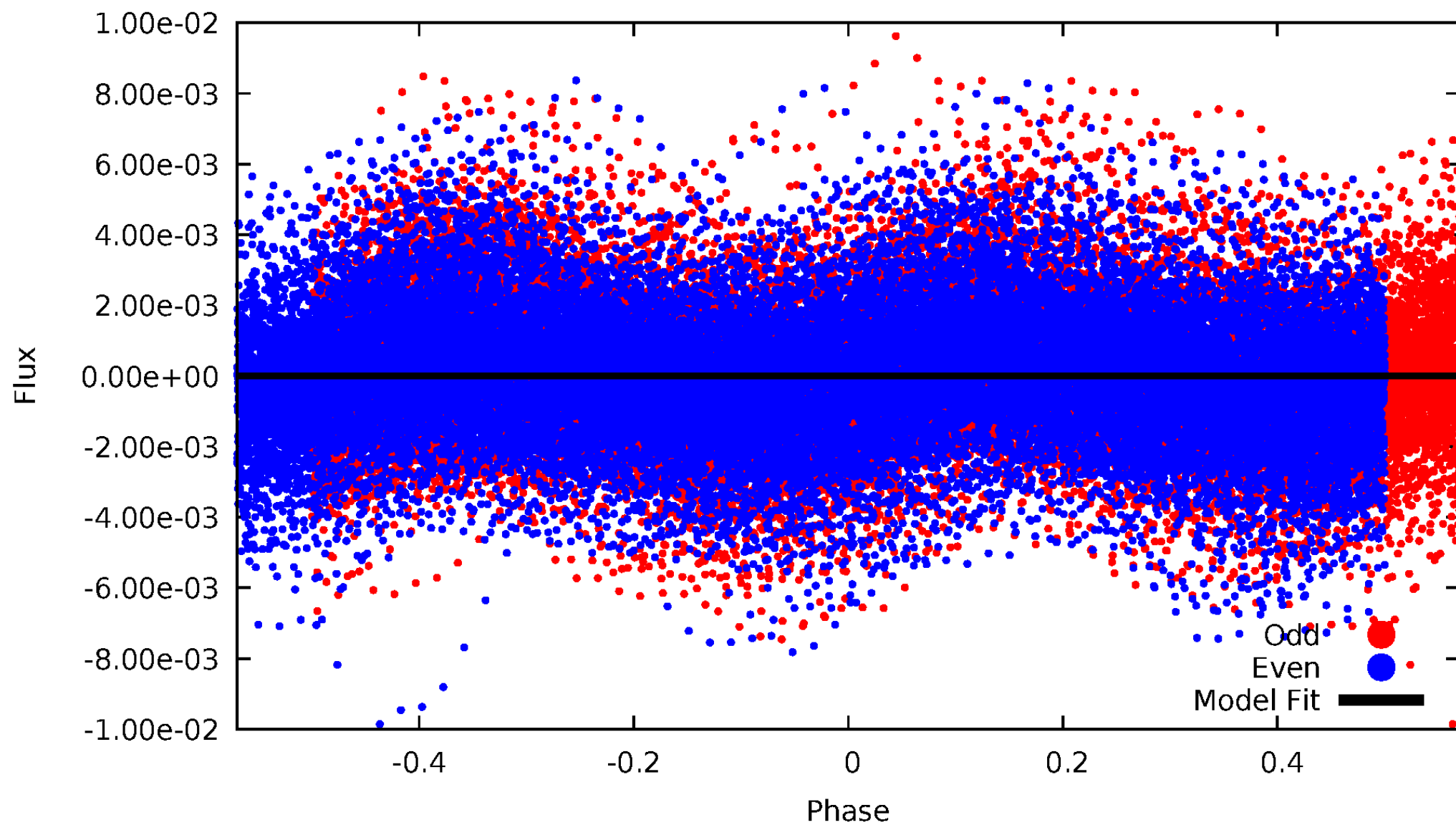
TCE 010812657-01





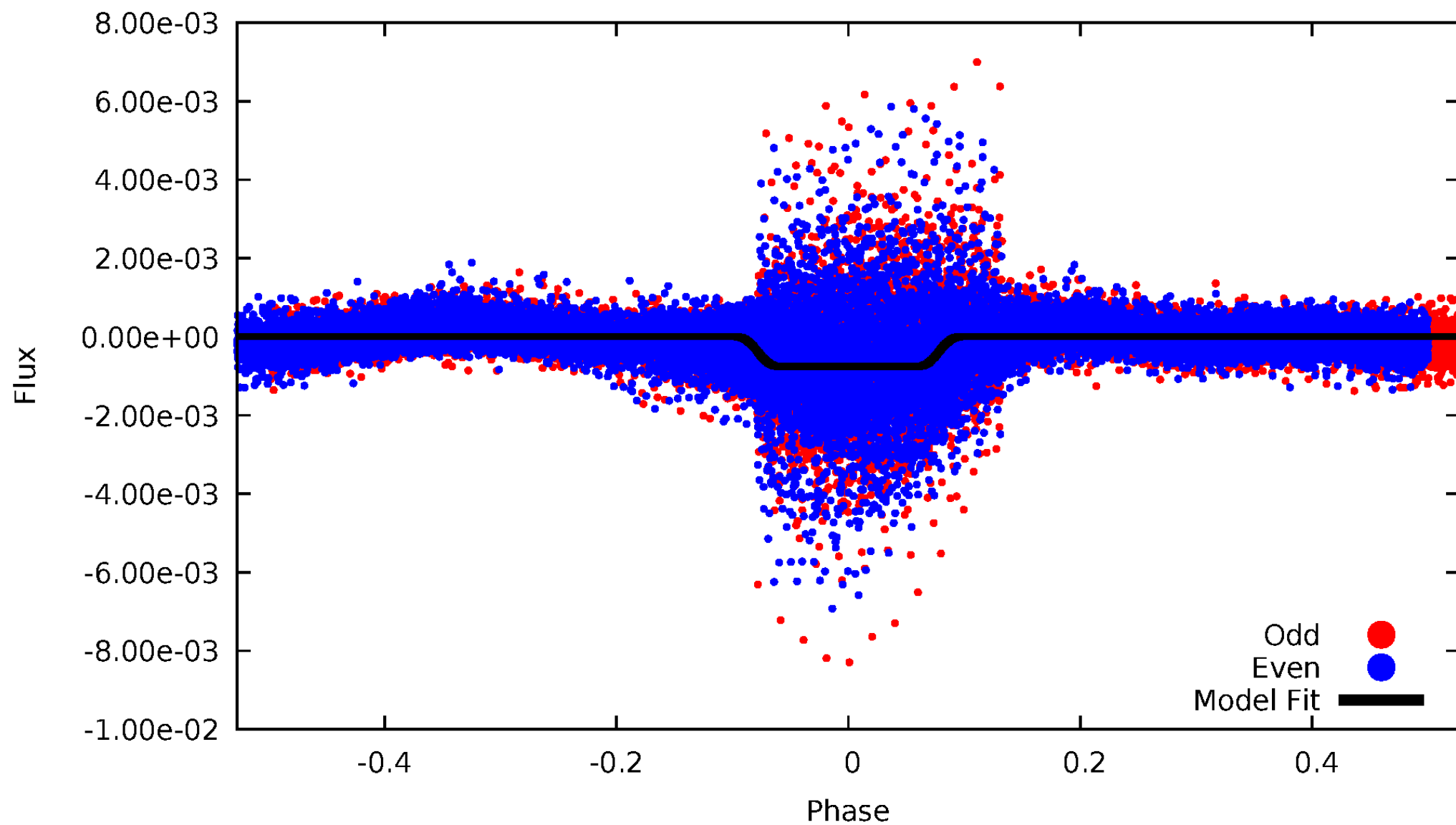
# DV Odd/Even

TCE 010812657-01

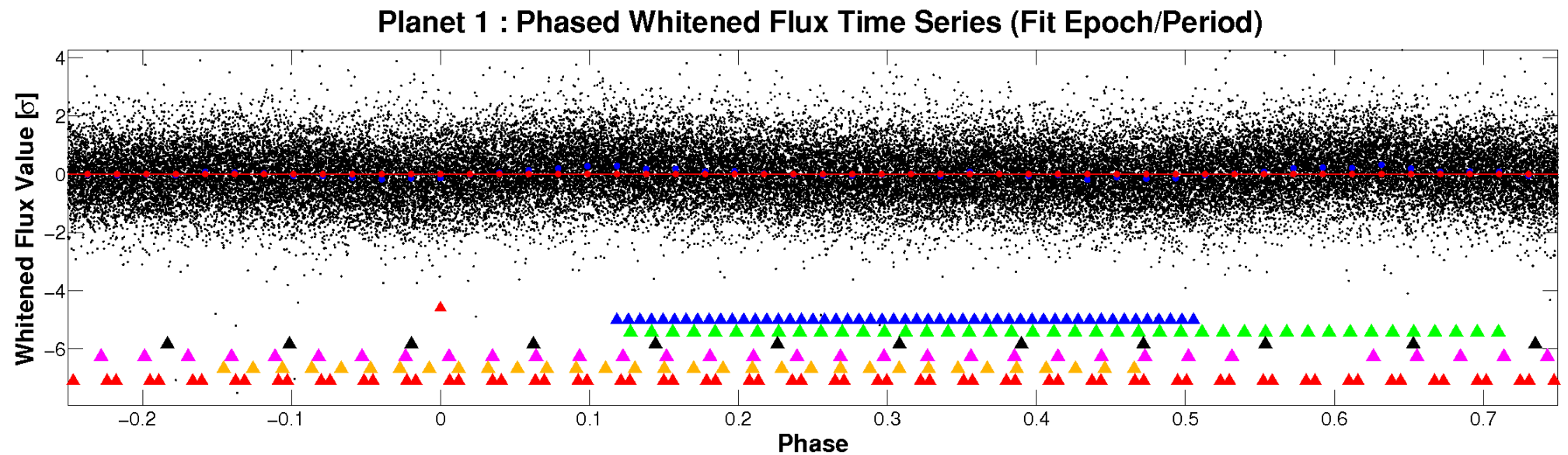
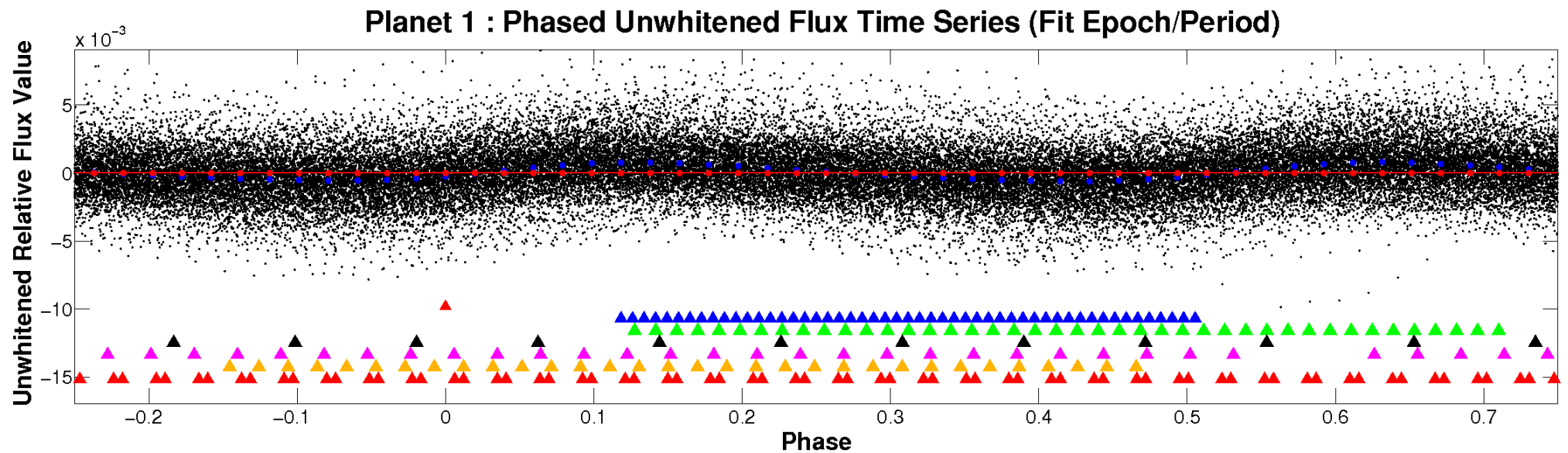


# ALT Odd/Even

TCE 010812657-01



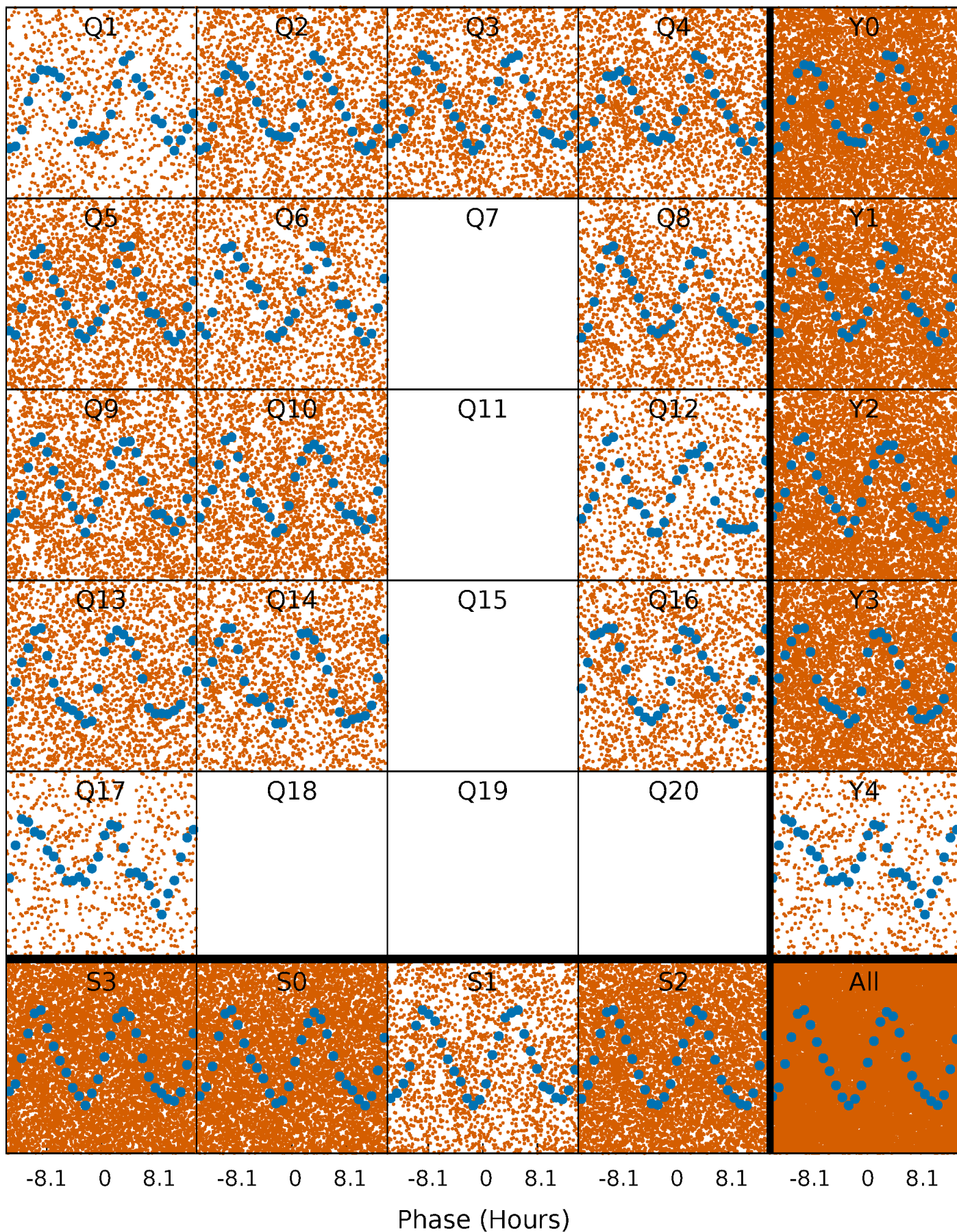
# Non-Whitened Vs. Whitened Light Curve





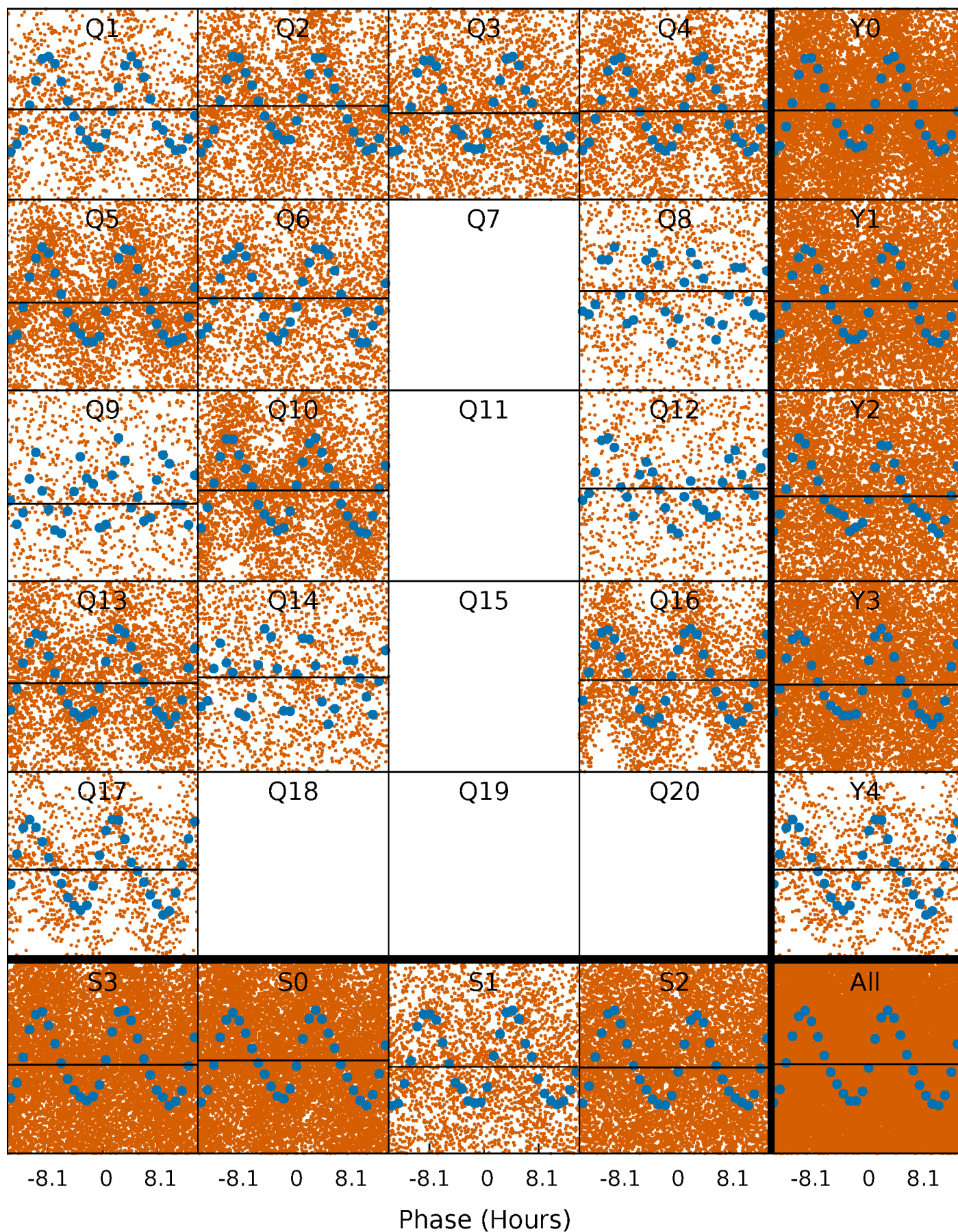
# PDC Quarter-Phased Transit Curves

TCE 010812657-01 P= 1.035145 Days  $T_0=131.673492$  (BKJD)



# DV Quarter-Phased Transit Curves

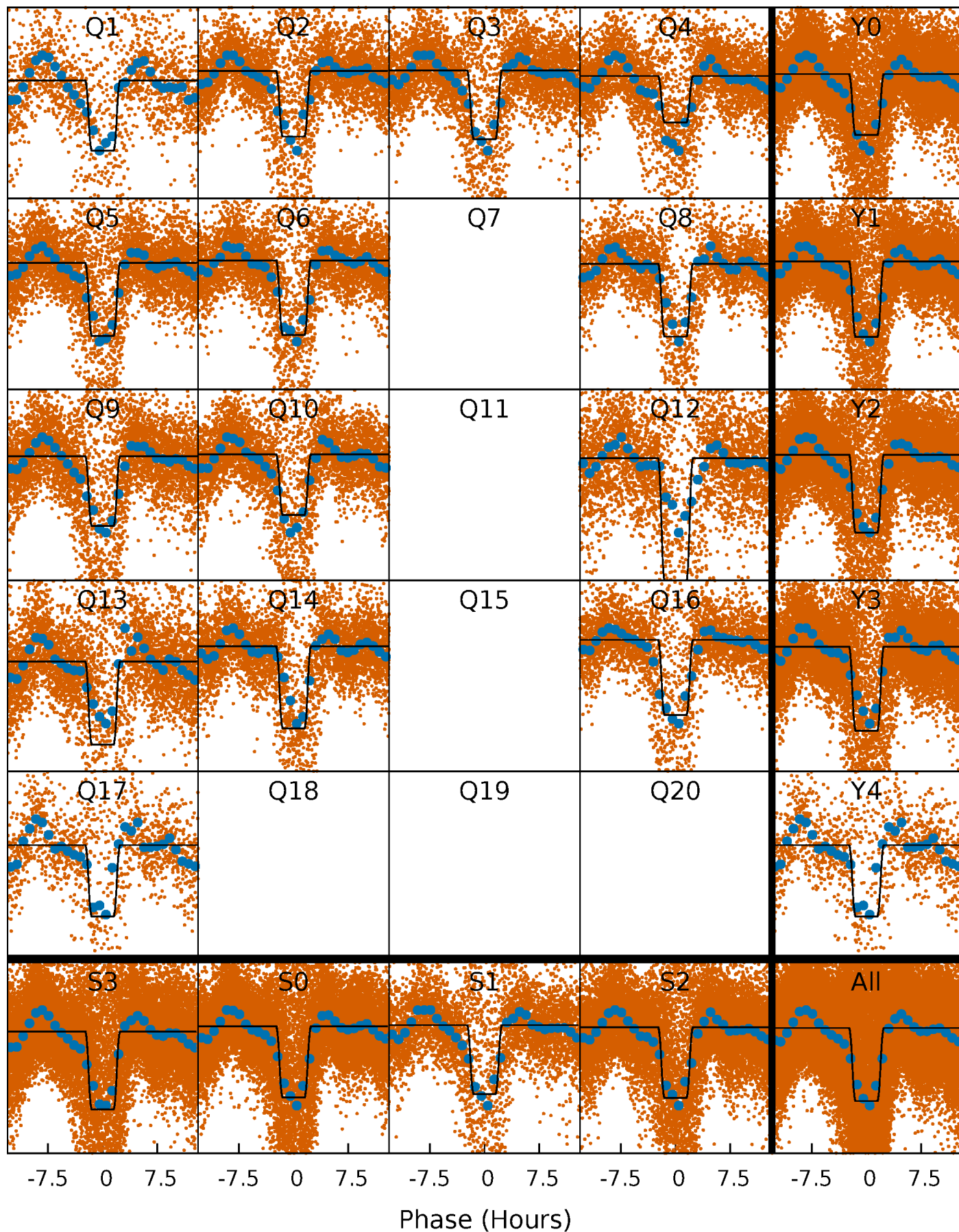
TCE 010812657-01 P= 1.035145 Days  $T_0=131.673492$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

TCE 010812657-01 P= 1.035086 Days  $T_0=131.667705$  (BKJD)

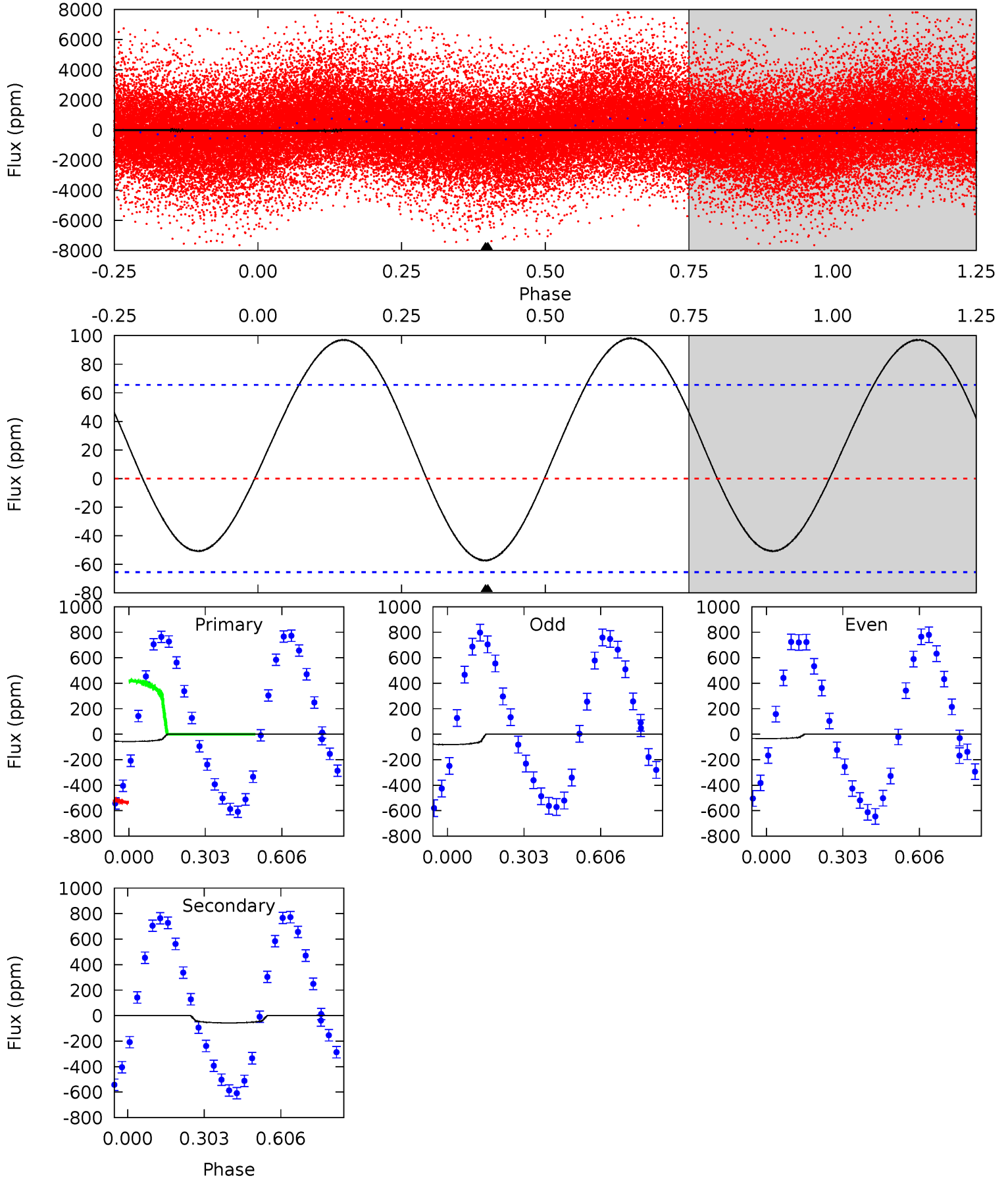




# DV Model-Shift Uniqueness Test

010812657-01, P = 1.035145 Days, E = 130.638347 Days

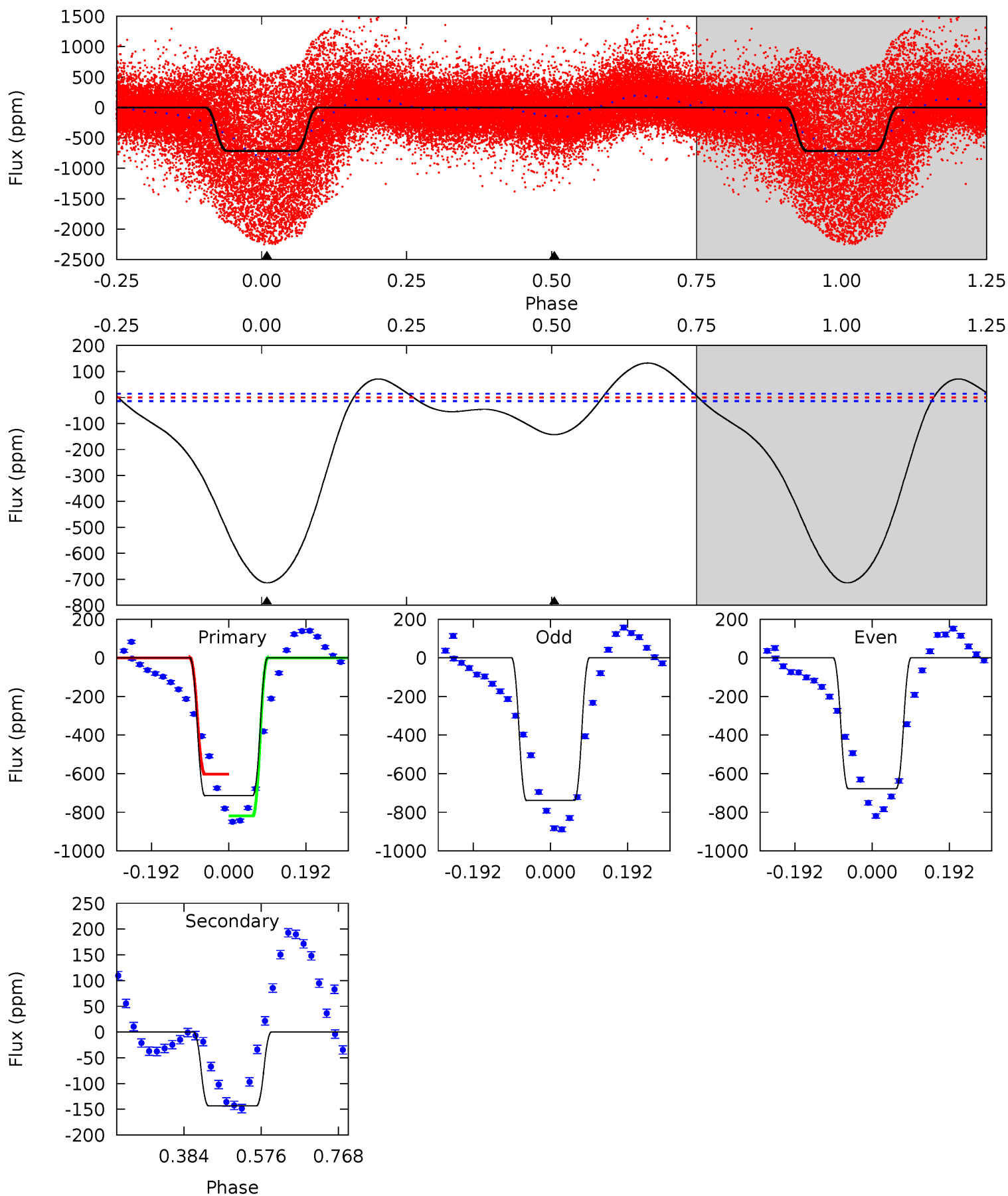
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
3.78	3.77	0	0	4.33	1.03	2.83	3.78	3.78	3.77	3.77	1.54	3.42	0.63	3.92



# Alt Model-Shift Uniqueness Test

010812657-01, P = 1.035086 Days, E = 130.632619 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
222.9	44.7	0	0	4.43	1.30	17.3	222.9	222.9	44.7	44.7	9.39	0.94	0.16	32.9



### Stellar Parameters For KIC 010812657

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7349^{+206}_{-310}$	$4.197^{+0.124}_{-0.186}$	$-0.260^{+0.250}_{-0.350}$	$1.564^{+0.491}_{-0.302}$	$1.408^{+0.216}_{-0.216}$	$0.518^{+0.319}_{-0.266}$
	+3%/-4%	+3%/-4%	+96%/-135%	+31%/-19%	+15%/-15%	+61%/-51%
Source	KIC0	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 010812657-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-57 \pm 15$	$8.97^{+10.51}_{-6.52}$	$3812^{+329}_{-321}$	$-3015^{+8129}_{-512}$	$0.188^{+2.482}_{-0.149}$
Alt.	$-143 \pm 3$	$11.10^{+10.96}_{-7.83}$	$3813^{+368}_{-343}$	$2539^{+3152}_{-5953}$	$0.326^{+3.419}_{-0.246}$

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



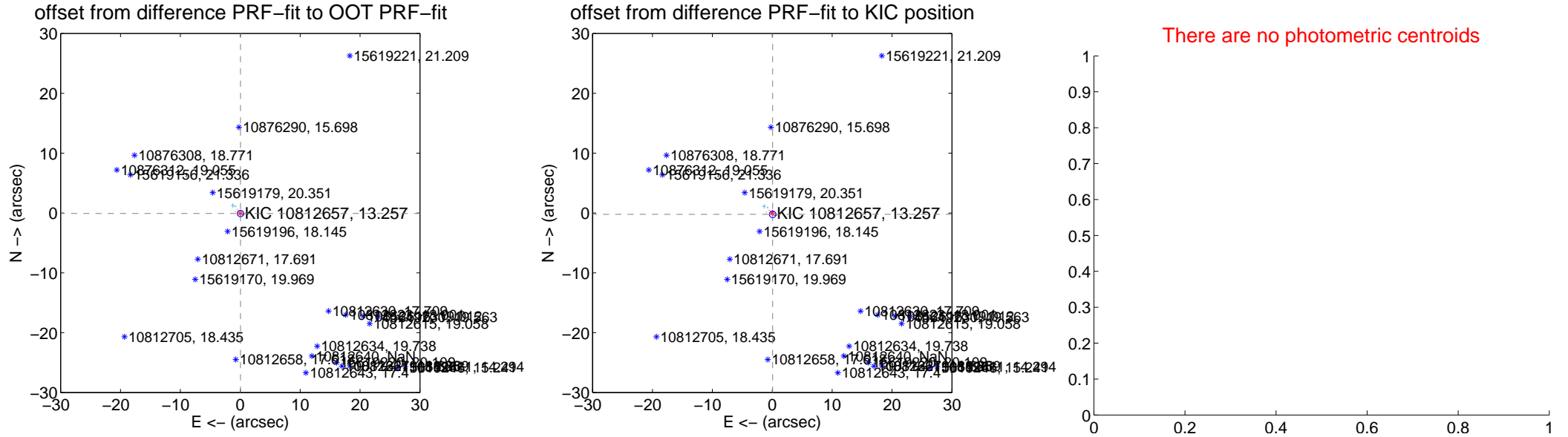
## DV Centroid Data

Supplemental centroid analysis for 010812657-01. Kepler magnitude: 13.26. Transit SNR 0.00

There are 9 quarters with good PRF difference image offsets

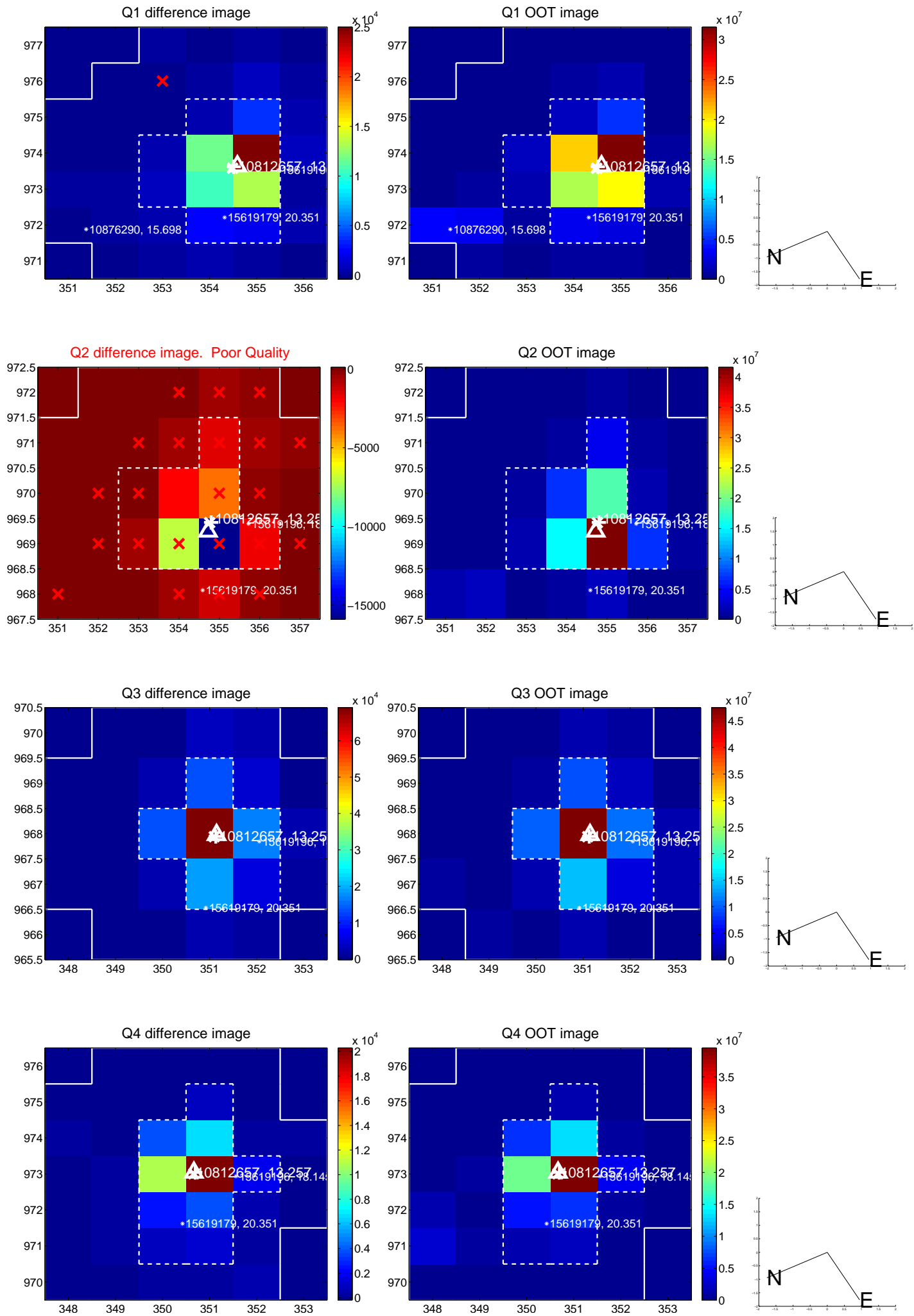
The direct PRF centroid is offset from the target star catalog position by about 0.17 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.087 \pm 0.180$	0.48	$-0.031 \pm 0.151$	$-0.082 \pm 0.147$
PRF-fit source offset from KIC position	$0.234 \pm 0.185$	1.26	$-0.069 \pm 0.167$	$-0.224 \pm 0.153$
photometric centroid source offset	—	—	—	—

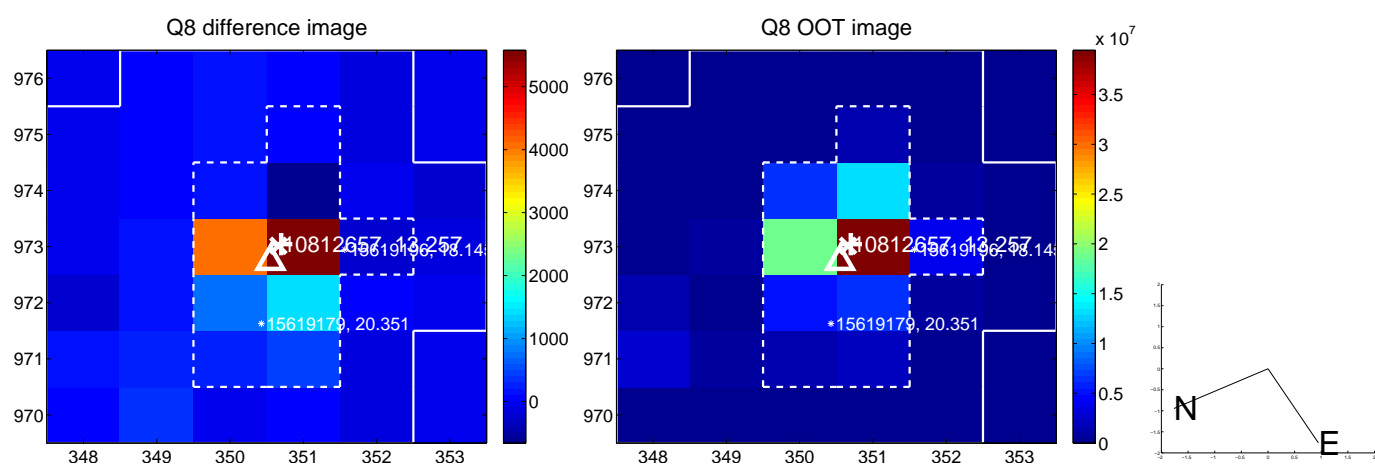
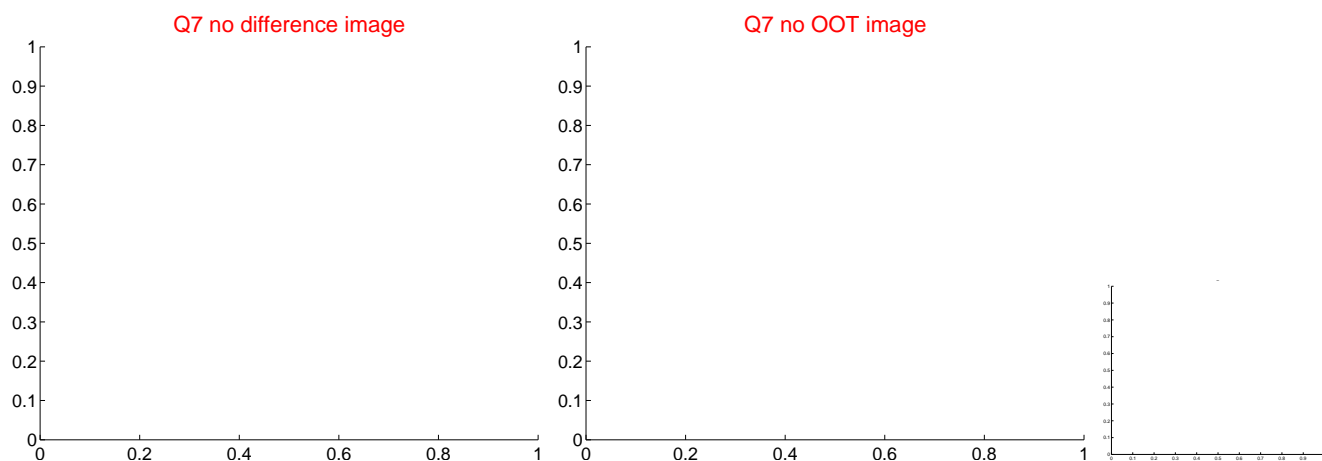
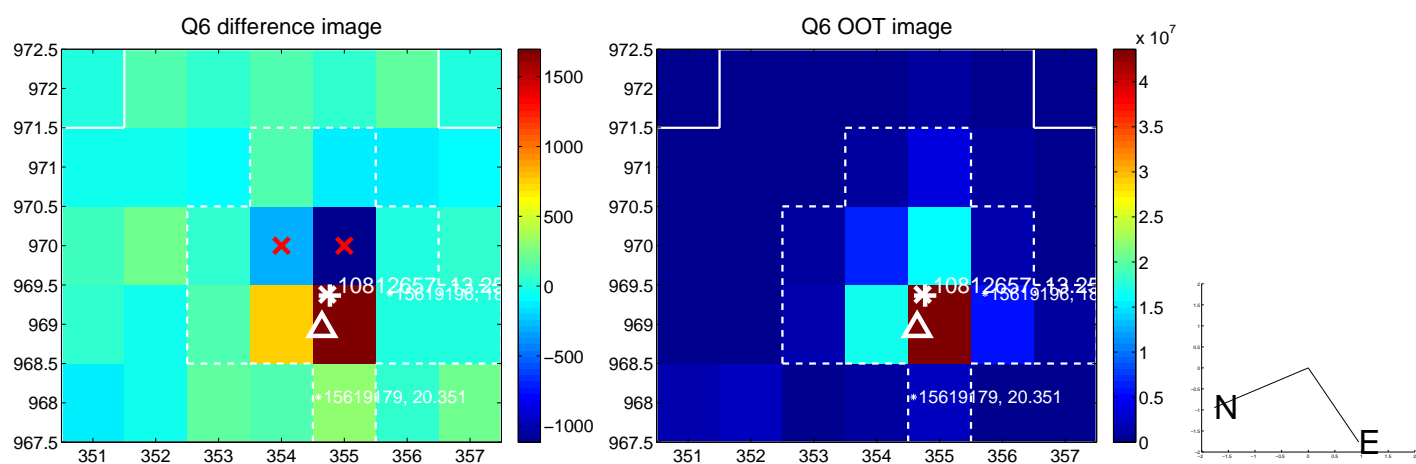
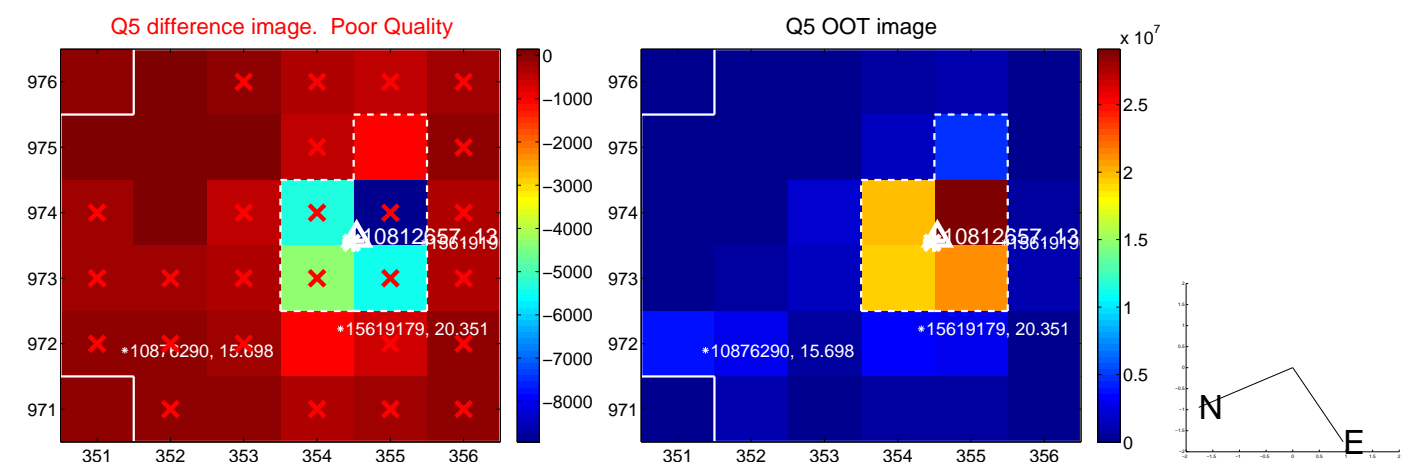


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

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

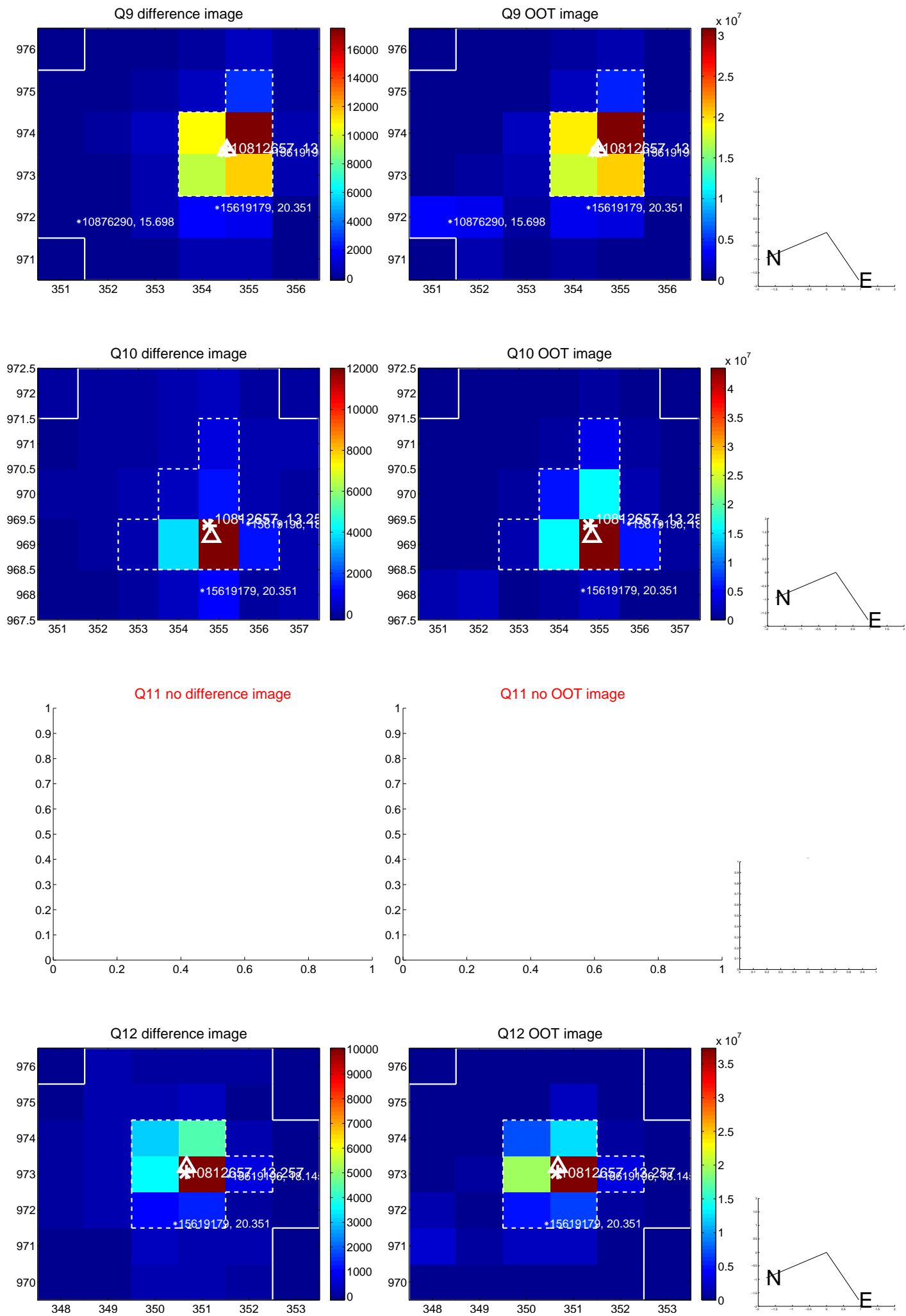


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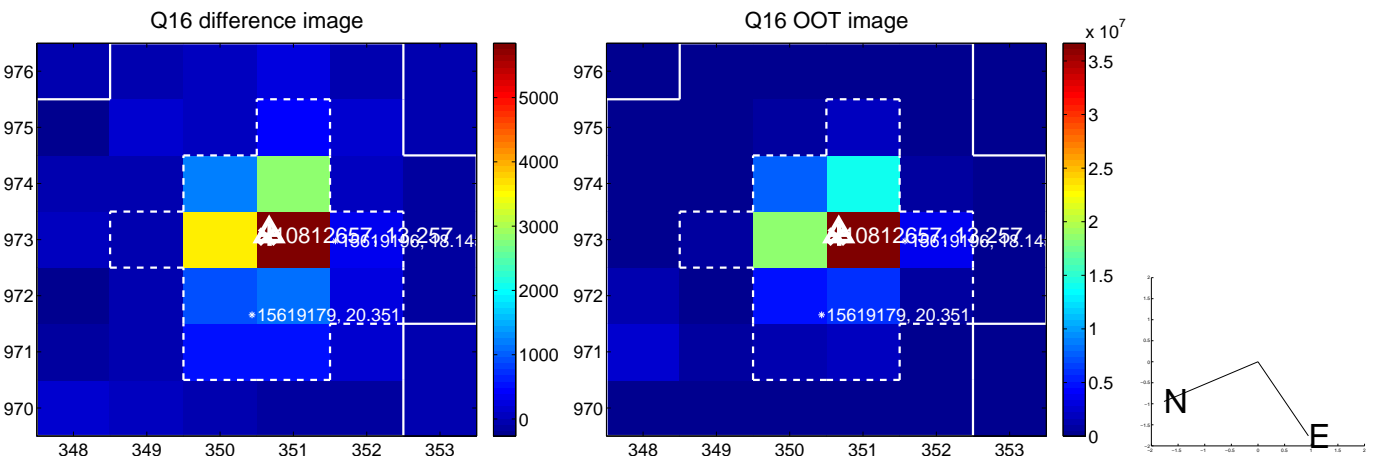
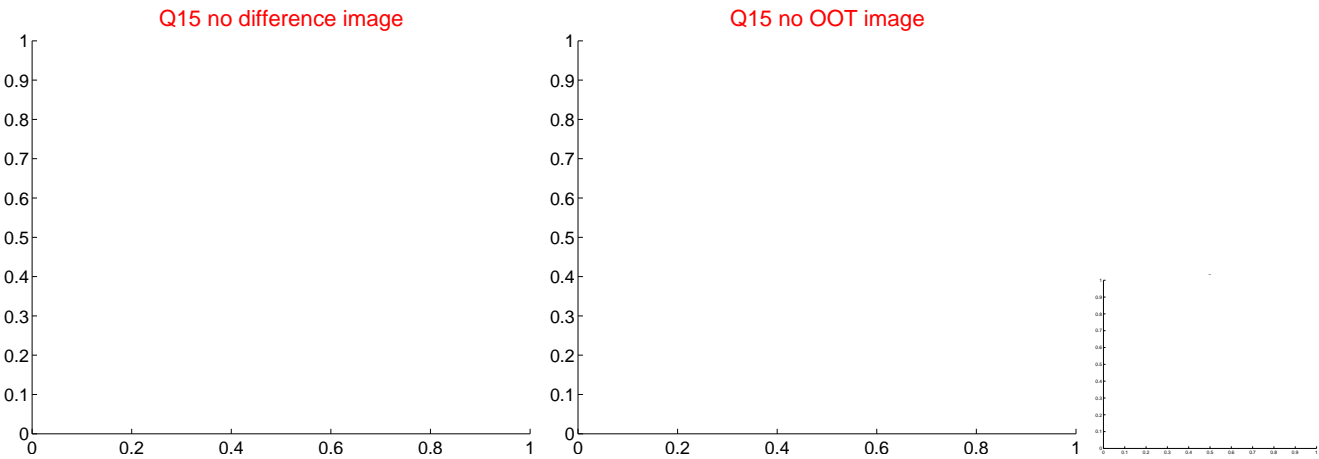
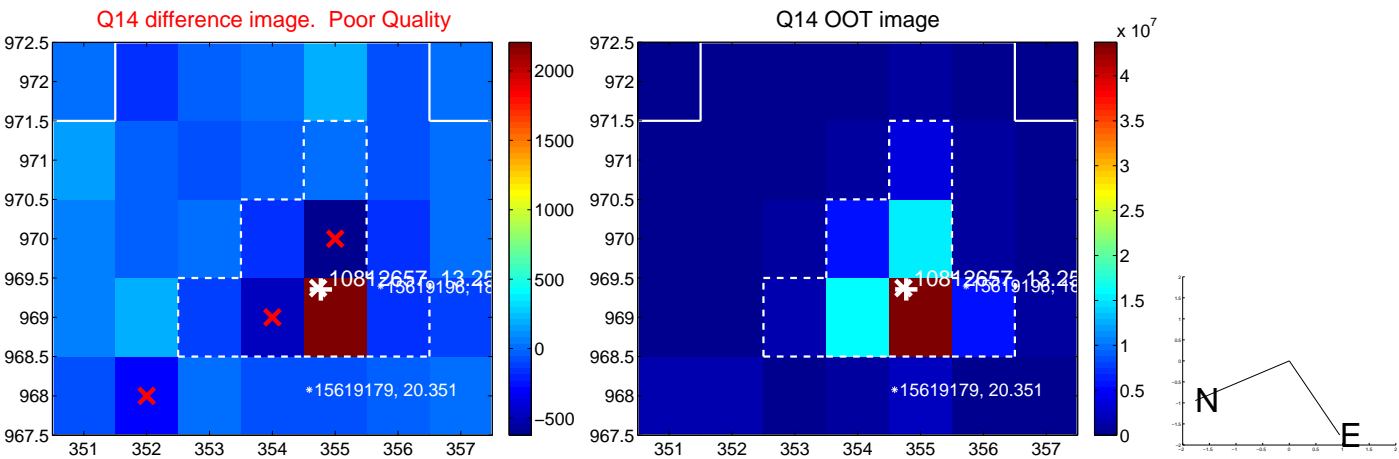
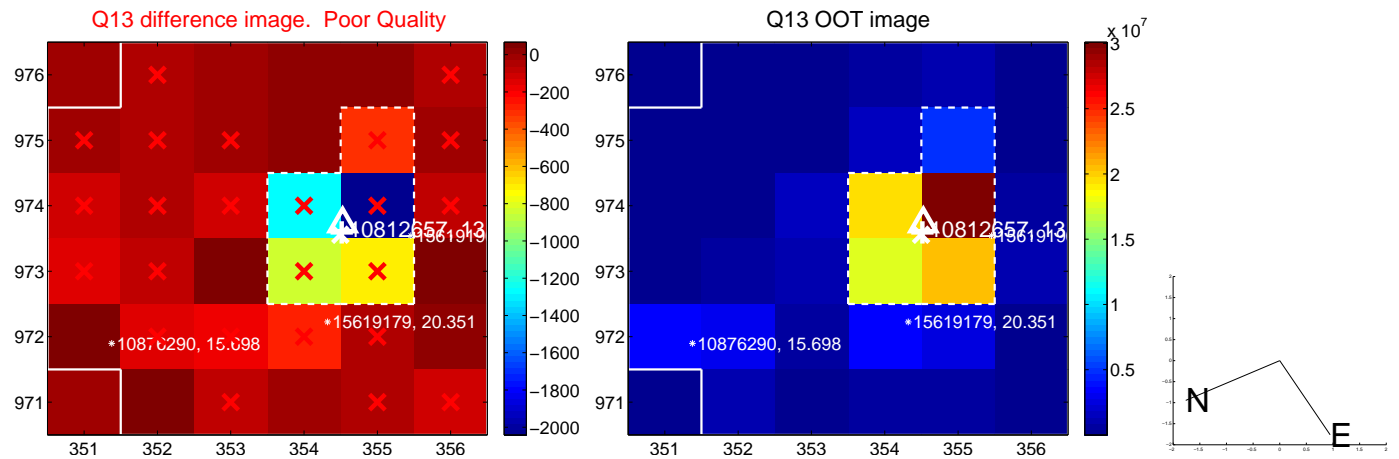




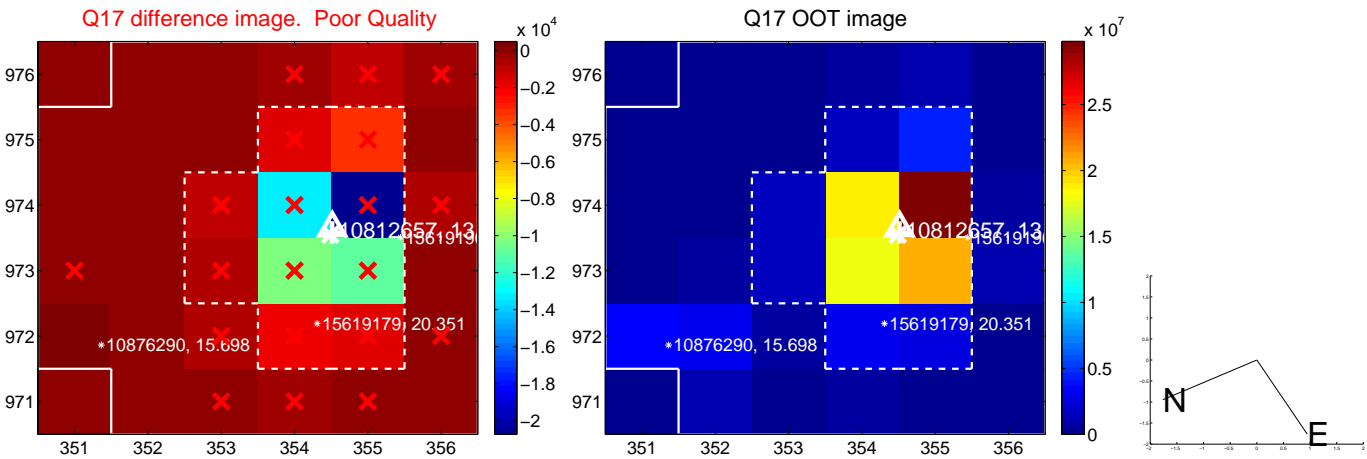
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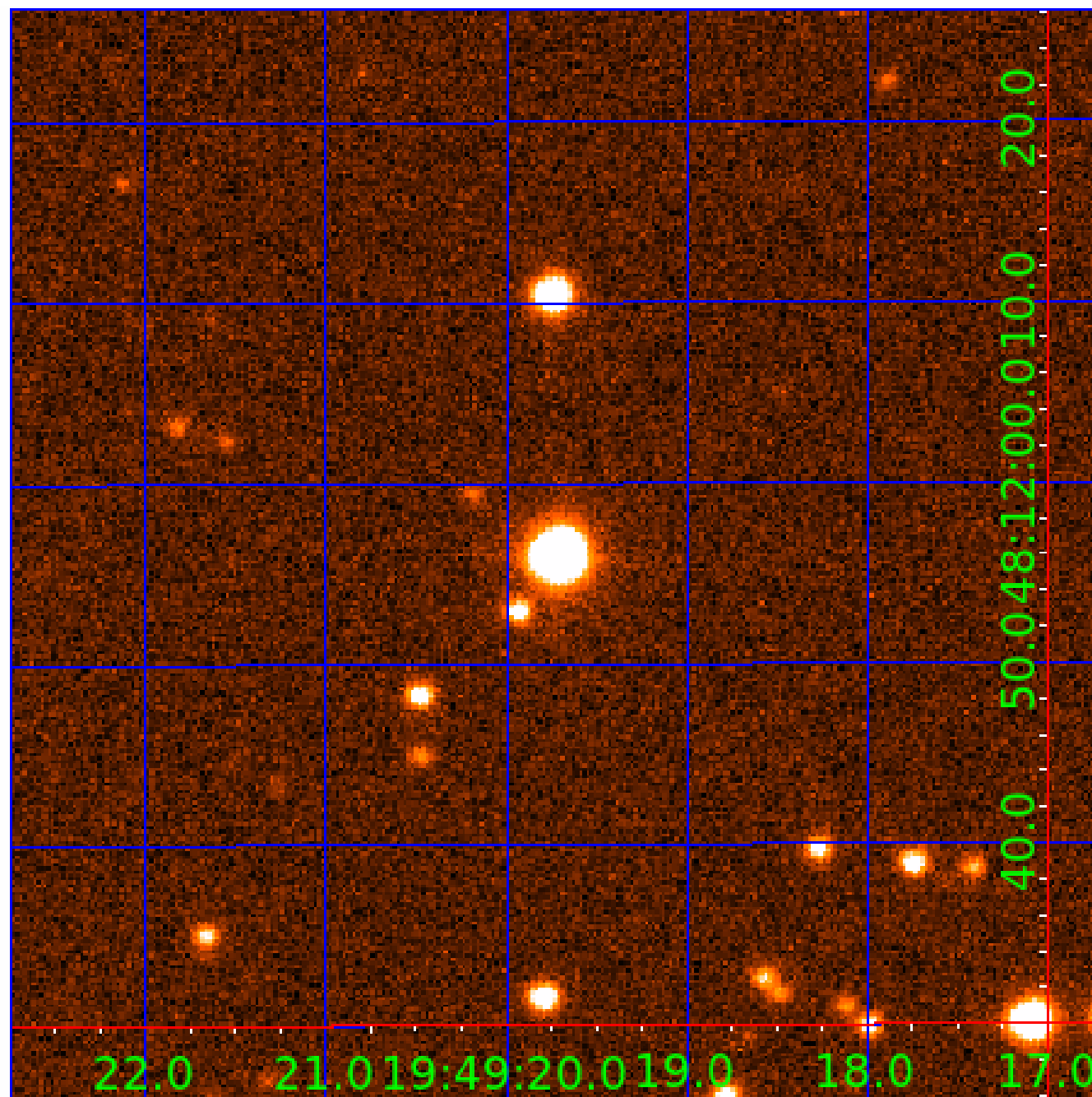
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



folded centroid time series figure for this object.

UKIRT Image

Declination



# KIC 010812657

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010812657-01	OBS	No	1.035145	131.673492	0.0	7.075	10.4	0.0	1.56	7349	0.01	12704.67
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## Robovetter Results

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010812657-02	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—HALO_GHOST
010812657-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_TER_ALT—MOD_POS_ALT
010812657-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
010812657-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
010812657-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
010812657-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_NOFITS

**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.

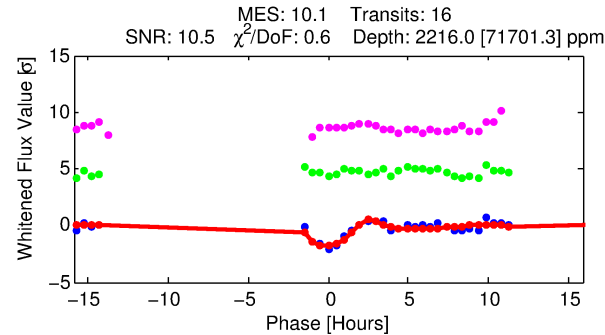
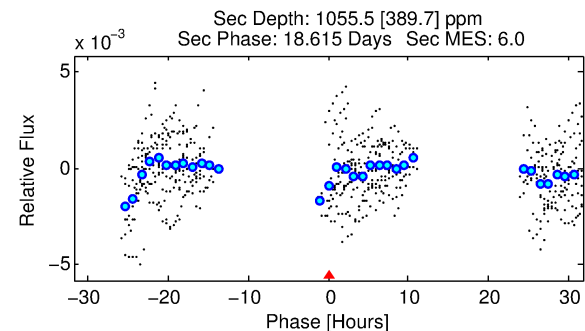
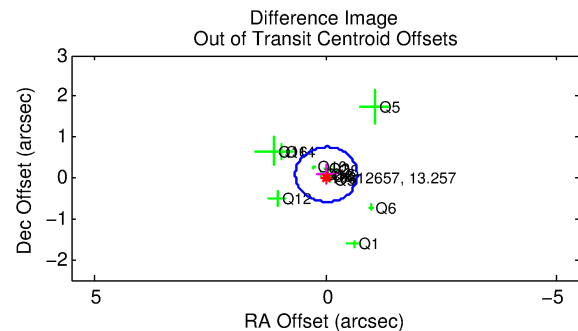
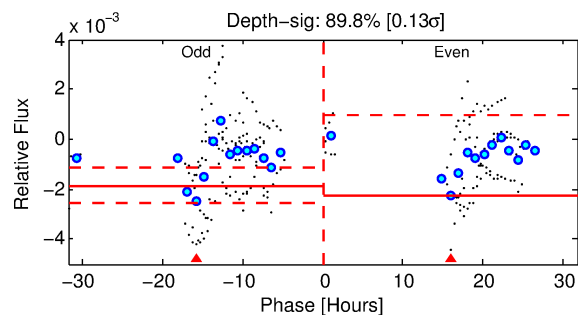
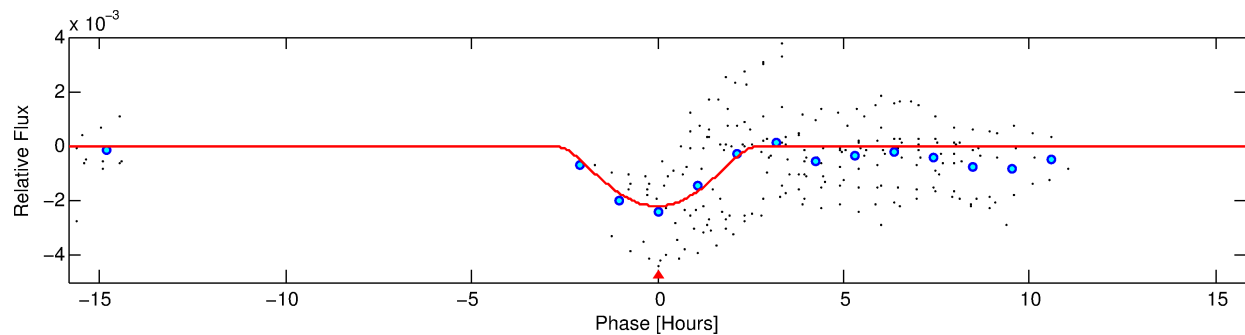
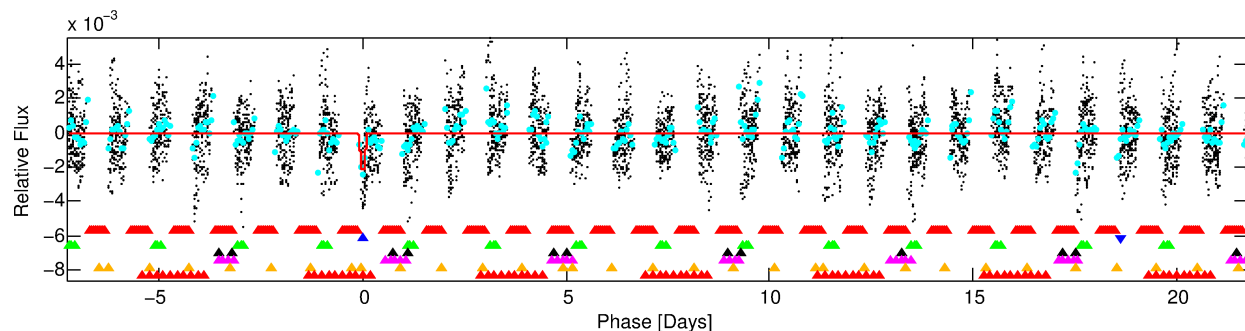
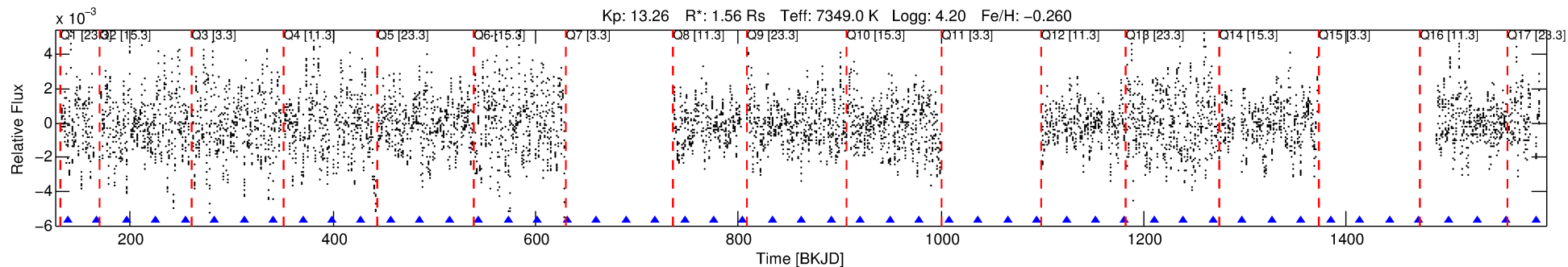
## Ephemeris Match Information For 010812657-02

No Significant Match Found



# DV One-Page Summary

KIC: 10812657 Candidate: 2 of 7 Period: 28.976 d



## DV Fit Results:

Period = 28.97605 [0.00058] d  
Epoch = 138.4076 [0.0066] BKJD  
Rp/R\* = 0.0784 [0.1232]  
a/R\* = 16.96 [6.21]  
b = 1.00 [1.91]  
Seff = 149.48 [58.62]  
Teq = 892 [87] K  
Rp = 13.37 [21.44] Re  
a = 0.2068 [0.0524] AU  
Ag = 138.86 [442.40] [0.31 $\sigma$ ]  
Teffp = 4732 [3751] K [1.02 $\sigma$ ]

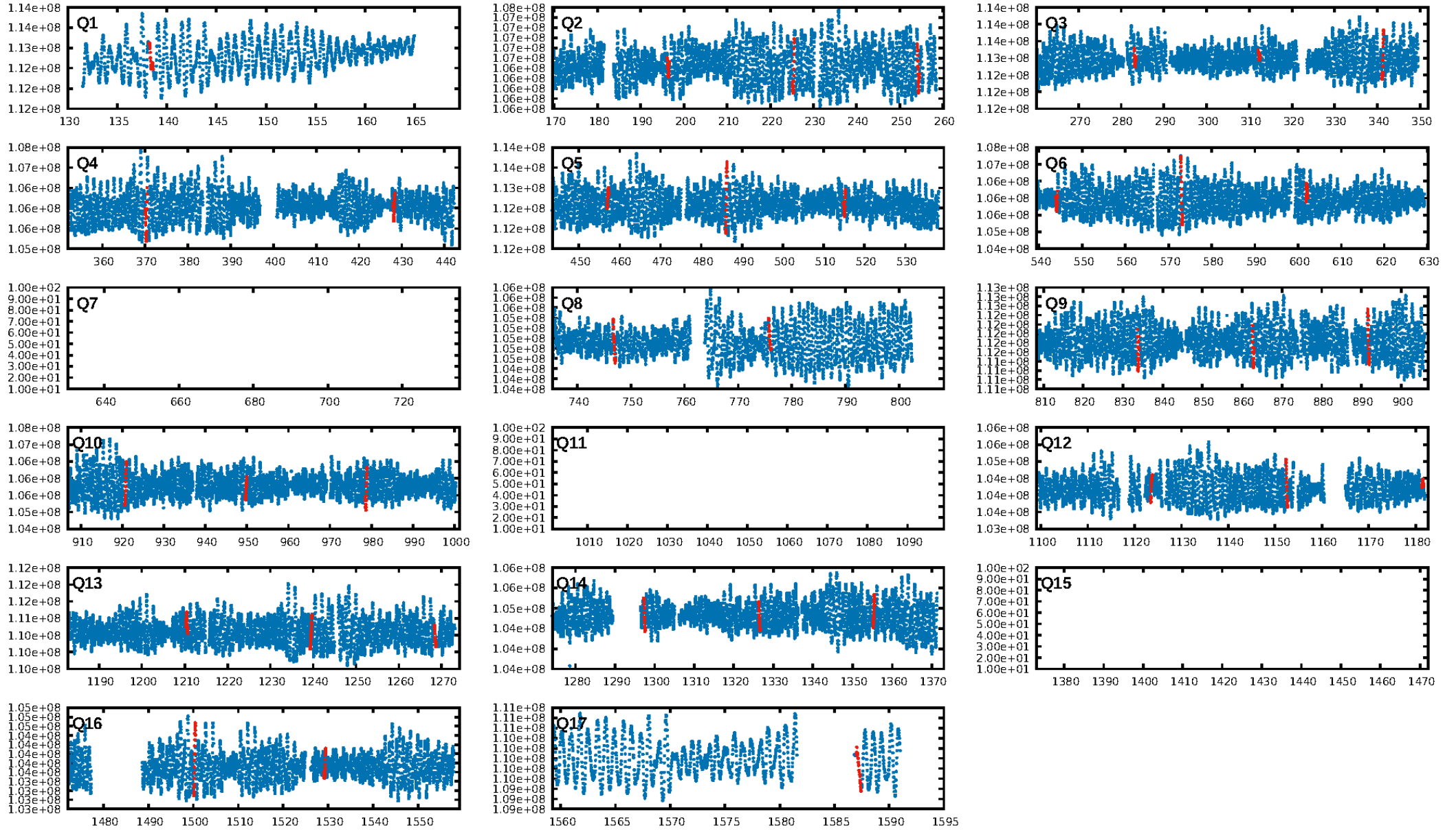
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [27.41 $\sigma$ ]  
LongPeriod-sig: 100.0% [27.56 $\sigma$ ]  
ModelChiSquare2-sig: 18.7%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [15/15]  
**GhostDiagnostic-chr: -0.1988**  
Centroid-sig: 0.4%  
**Centroid-so: 0.294 arcsec [3.21 $\sigma$ ]**  
OotOffset-rm: 0.085 arcsec [0.38 $\sigma$ ]  
KicOffset-rm: 0.120 arcsec [0.56 $\sigma$ ]  
OotOffset-st: 4/1/4/4 [13]  
KicOffset-st: 4/1/4/4 [13]  
DiffImageQuality-fgm: 0.69 [9/13]  
DiffImageOverlap-fno: 0.00 [0/13]

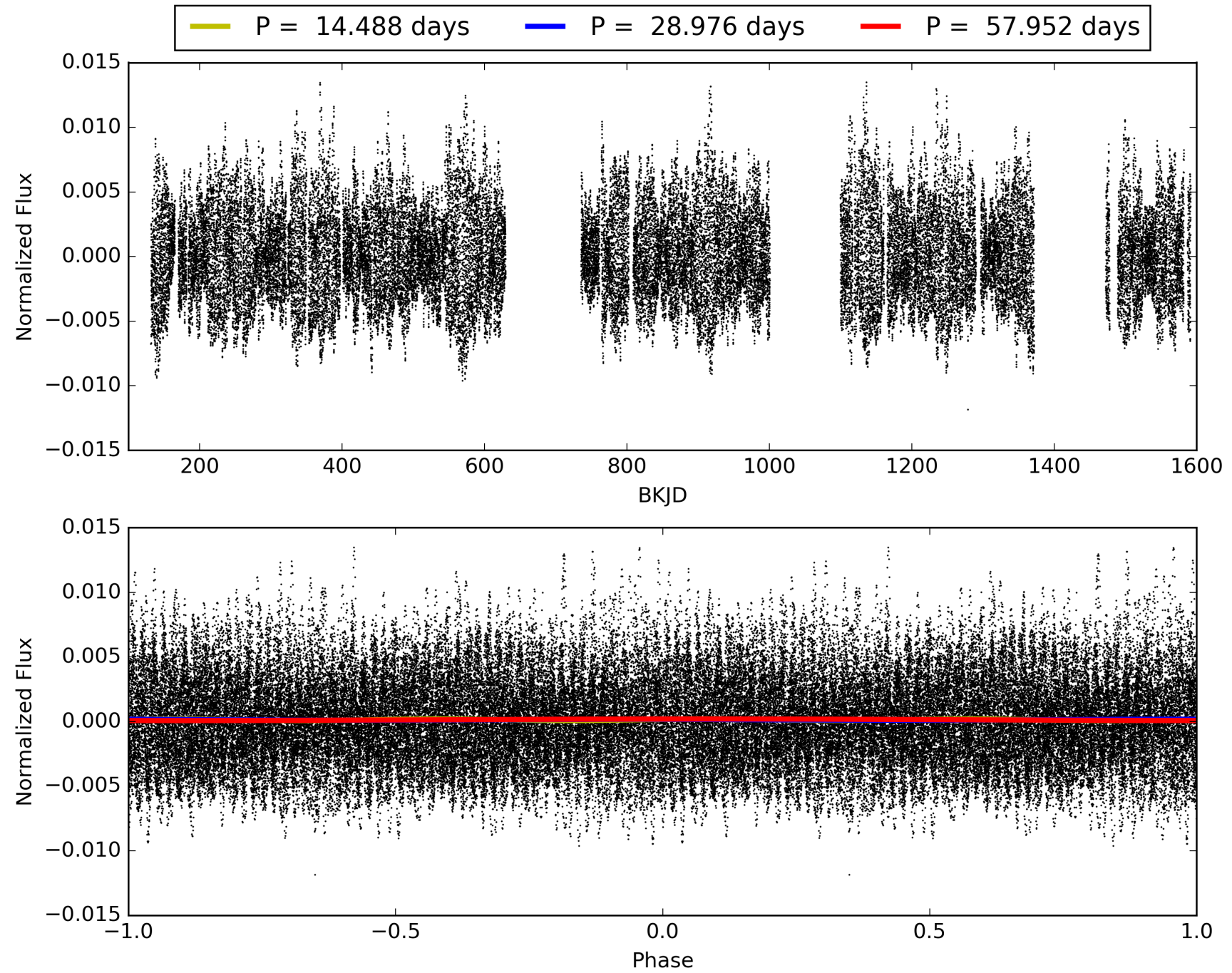
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 10:24:09 Z

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

# TCE 010812657-02, PDC Light Curves

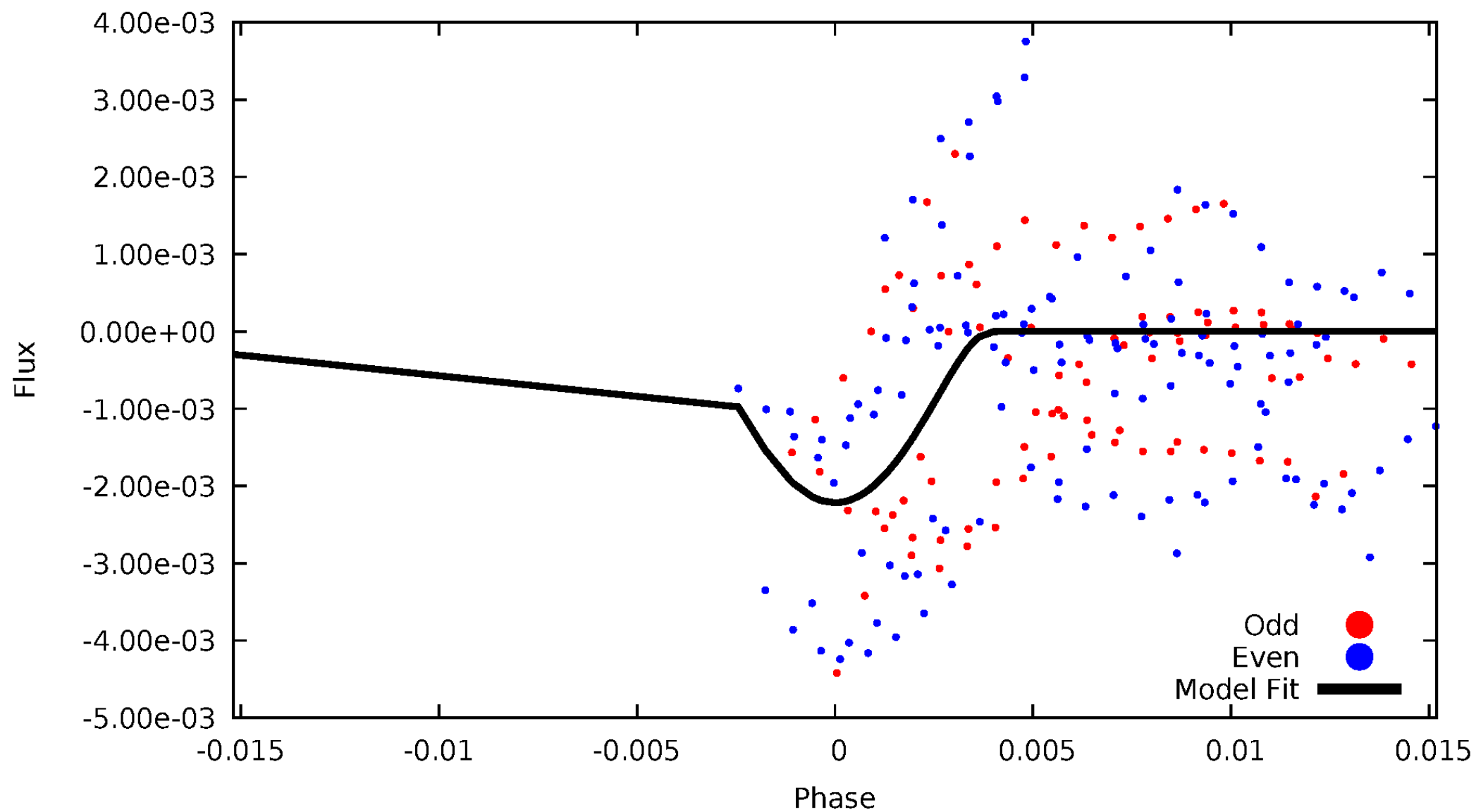


TCE 010812657-02



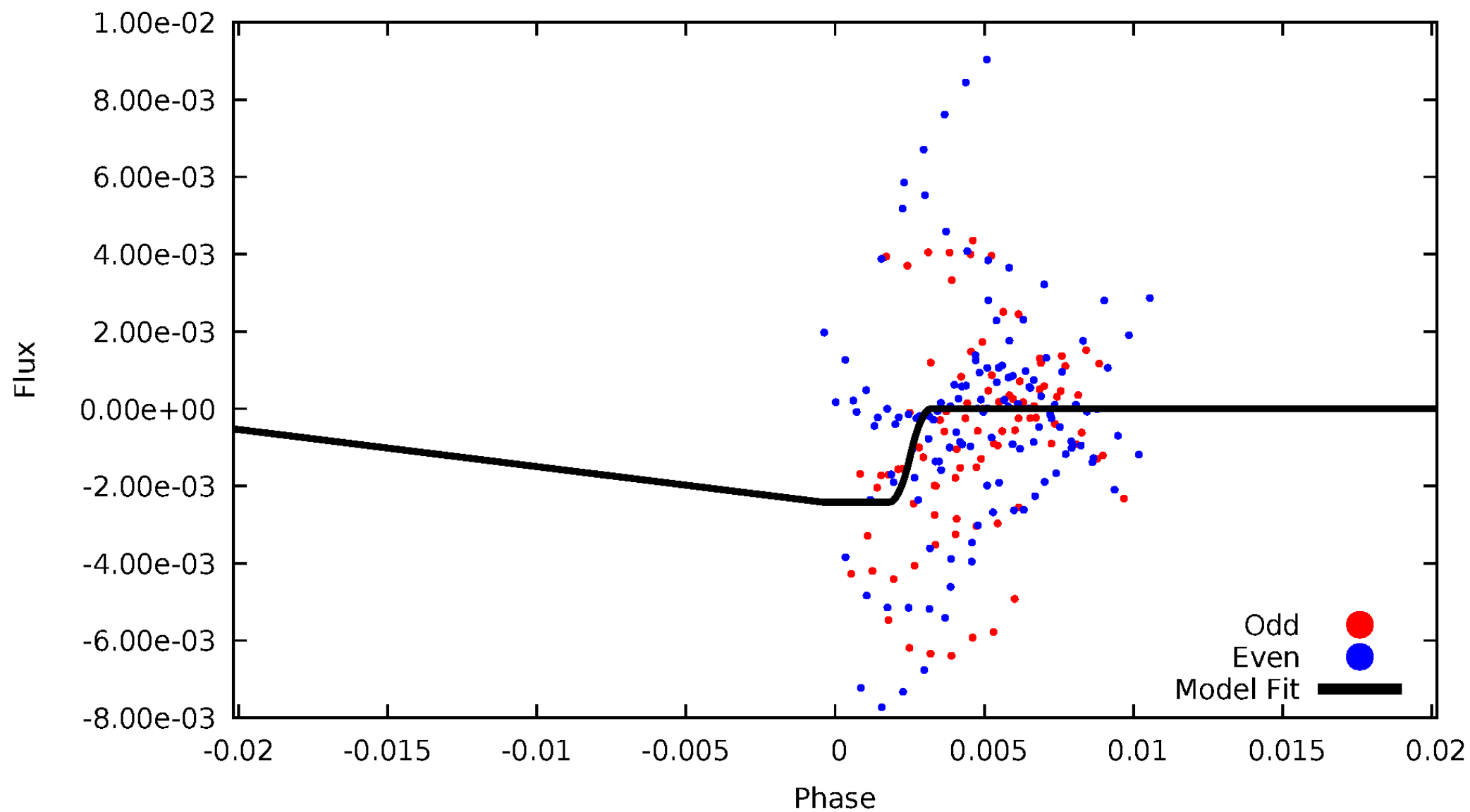
# DV Odd/Even

TCE 010812657-02



# ALT Odd/Even

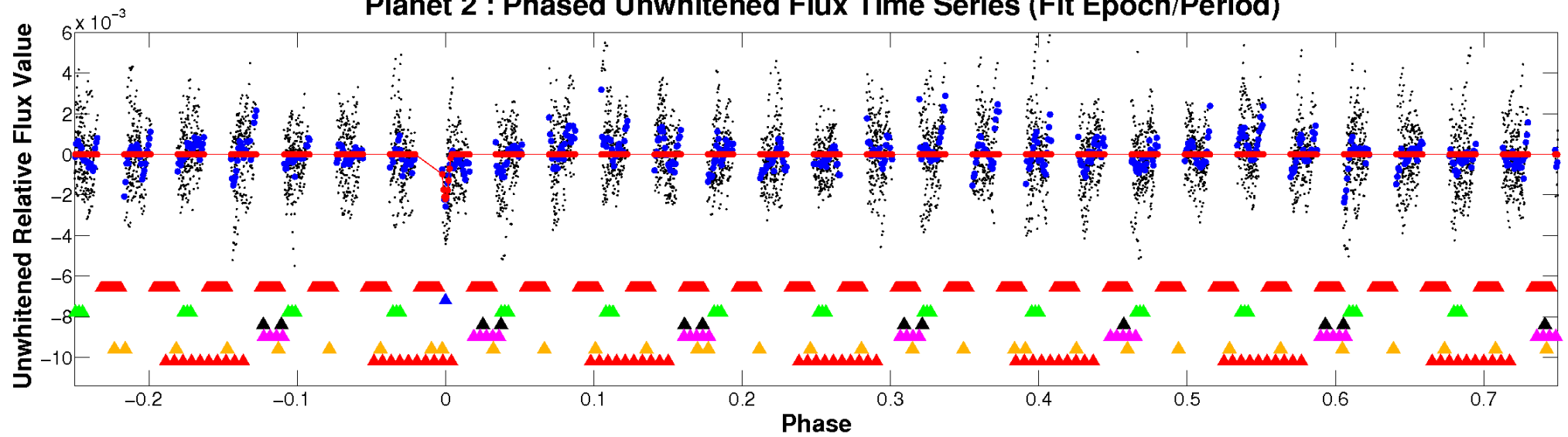
TCE 010812657-02



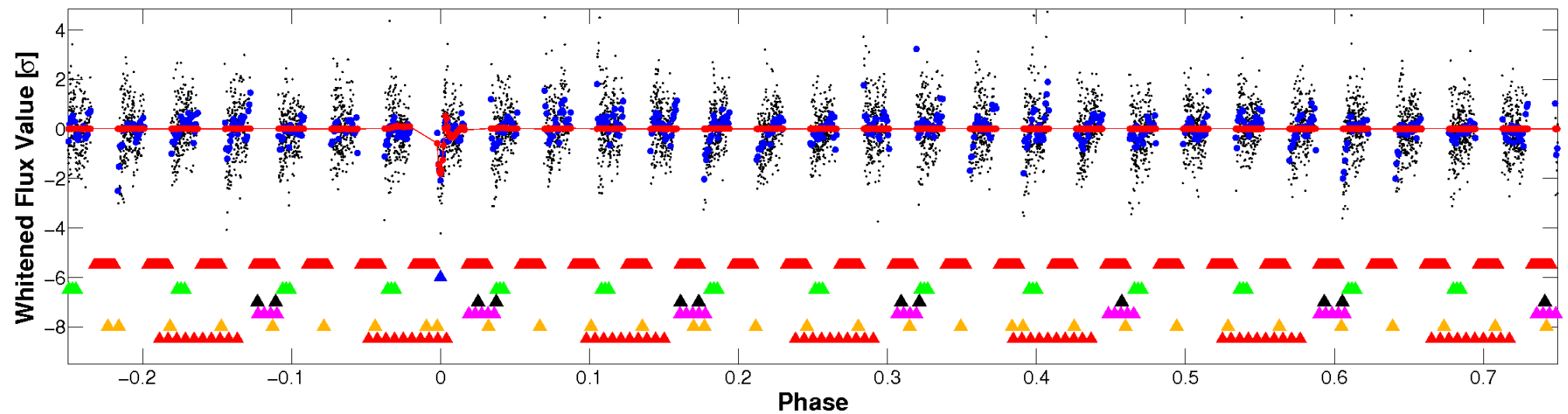


# Non-Whitened Vs. Whitened Light Curve

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

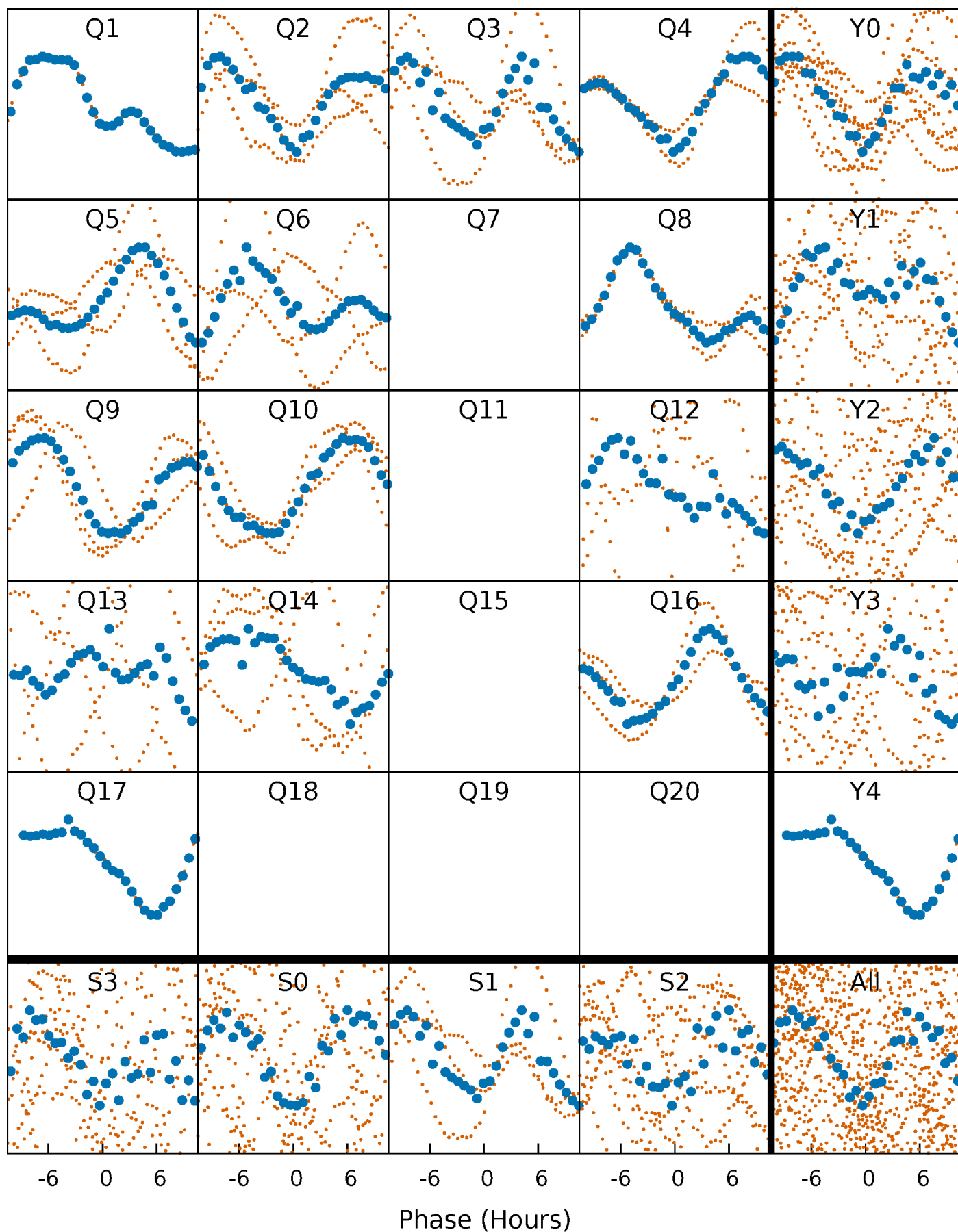


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



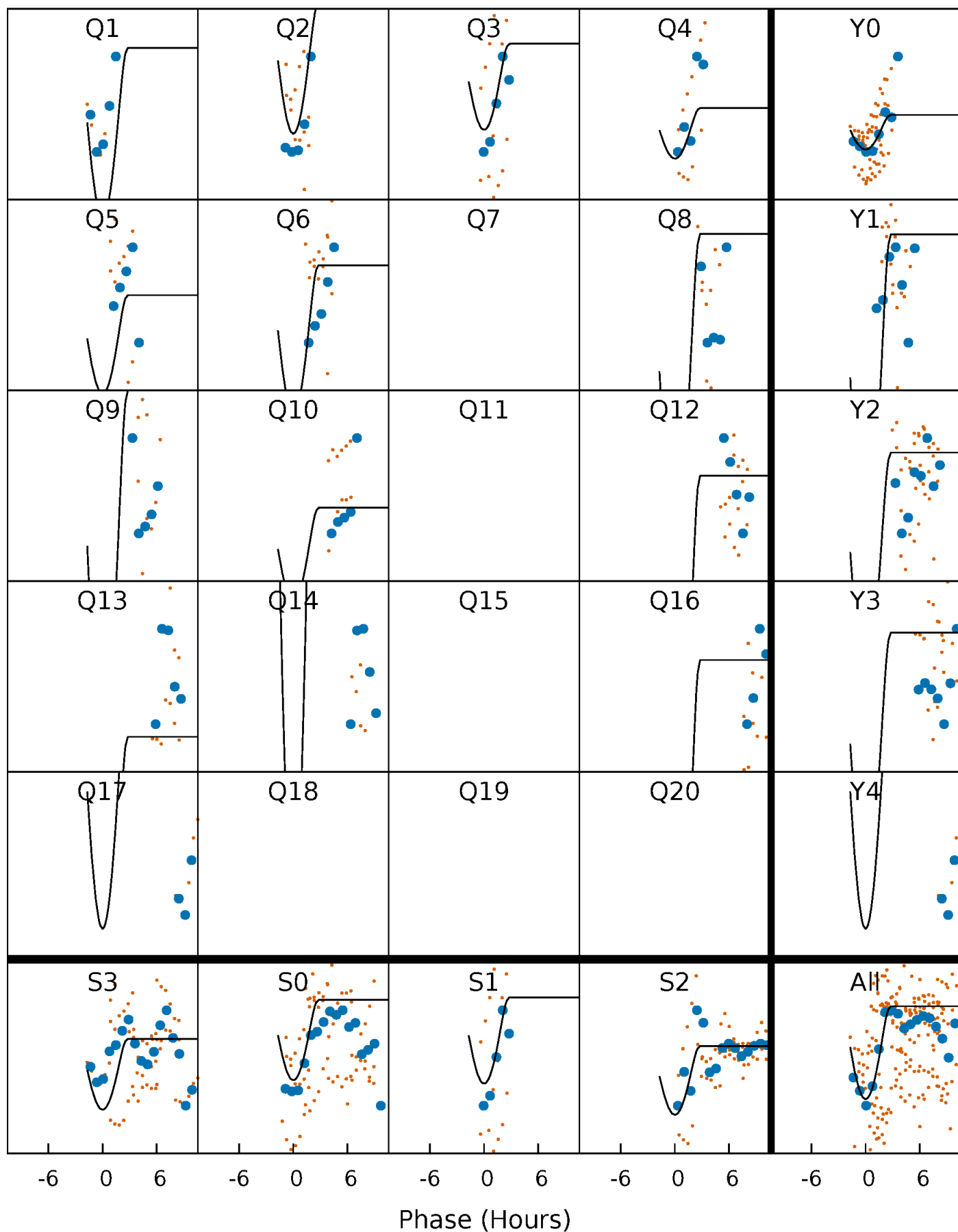
# PDC Quarter-Phased Transit Curves

TCE 010812657-02 P= 28.976055 Days  $T_0=138.407555$  (BKJD)



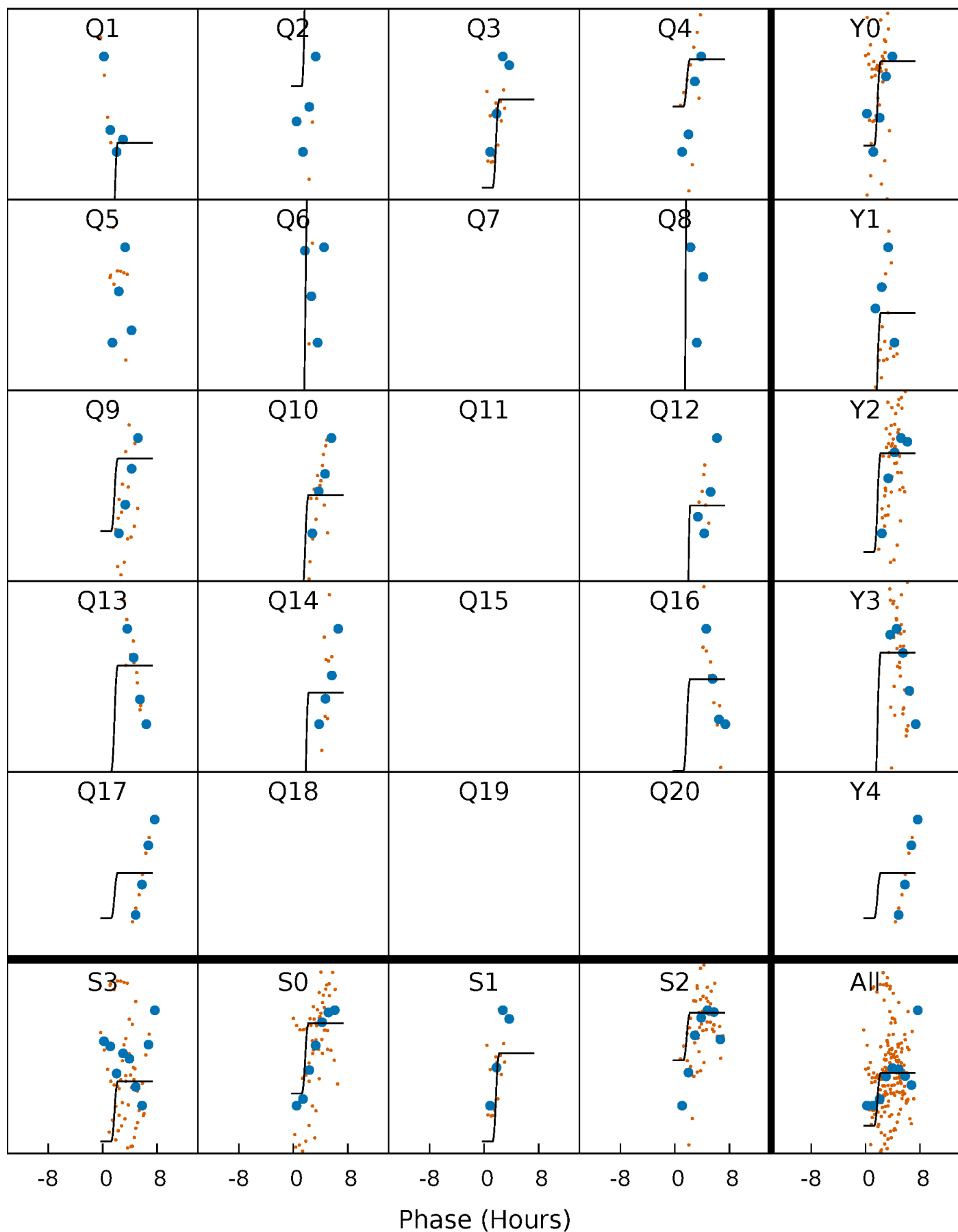
# DV Quarter-Phased Transit Curves

TCE 010812657-02 P= 28.976055 Days  $T_0=138.407555$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 010812657-02 P= 28.980339 Days  $T_0=138.347483$  (BKJD)

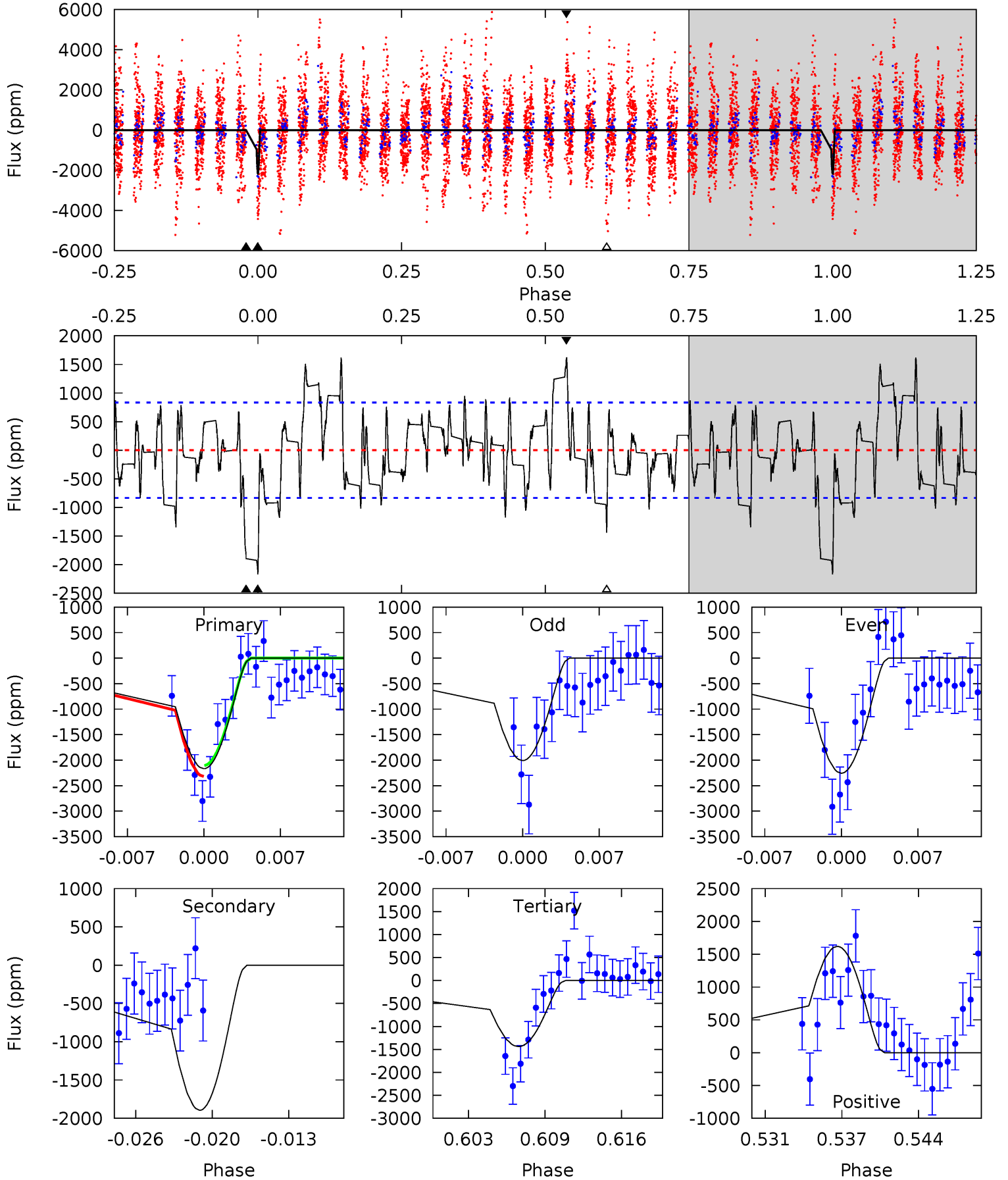




# DV Model-Shift Uniqueness Test

010812657-02, P = 28.976055 Days, E = 109.431500 Days

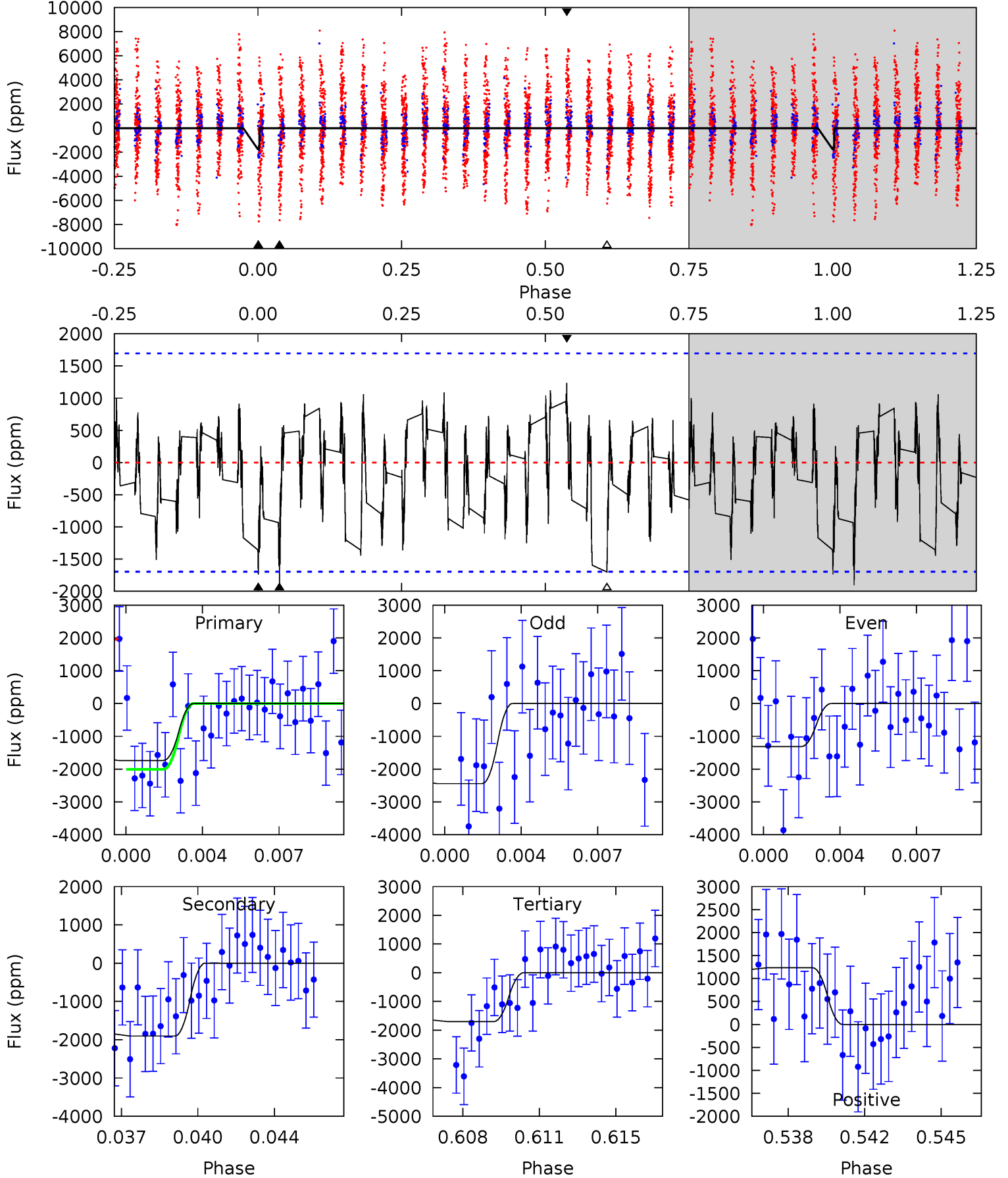
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.3	11.6	8.80	9.91	5.11	2.72	3.31	4.46	3.35	2.80	1.69	0.75	1.44	0.43	0.49



# Alt Model-Shift Uniqueness Test

010812657-02,  $P = 28.980339$  Days,  $E = 109.367144$  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
5.34	5.86	5.23	3.80	5.22	2.91	1.54	0.11	1.54	0.62	2.06	1.73	0.56	0.39	0.00



### Stellar Parameters For KIC 010812657

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7349^{+206}_{-310}$	$4.197^{+0.124}_{-0.186}$	$-0.260^{+0.250}_{-0.350}$	$1.564^{+0.491}_{-0.302}$	$1.408^{+0.216}_{-0.216}$	$0.518^{+0.319}_{-0.266}$
	+3%/-4%	+3%/-4%	+96%/-135%	+31%/-19%	+15%/-15%	+61%/-51%
Source	KIC0	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 010812657-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-1895 \pm 163$	$20.69^{+19.58}_{-13.62}$	$1250^{+94}_{-85}$	$4548^{+3108}_{-977}$	$104^{+801}_{-76}$
Alt.	$-1904 \pm 325$	$17.23^{+18.90}_{-11.04}$	$1251^{+92}_{-77}$	$4864^{+3449}_{-1105}$	$145^{+1034}_{-111}$

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

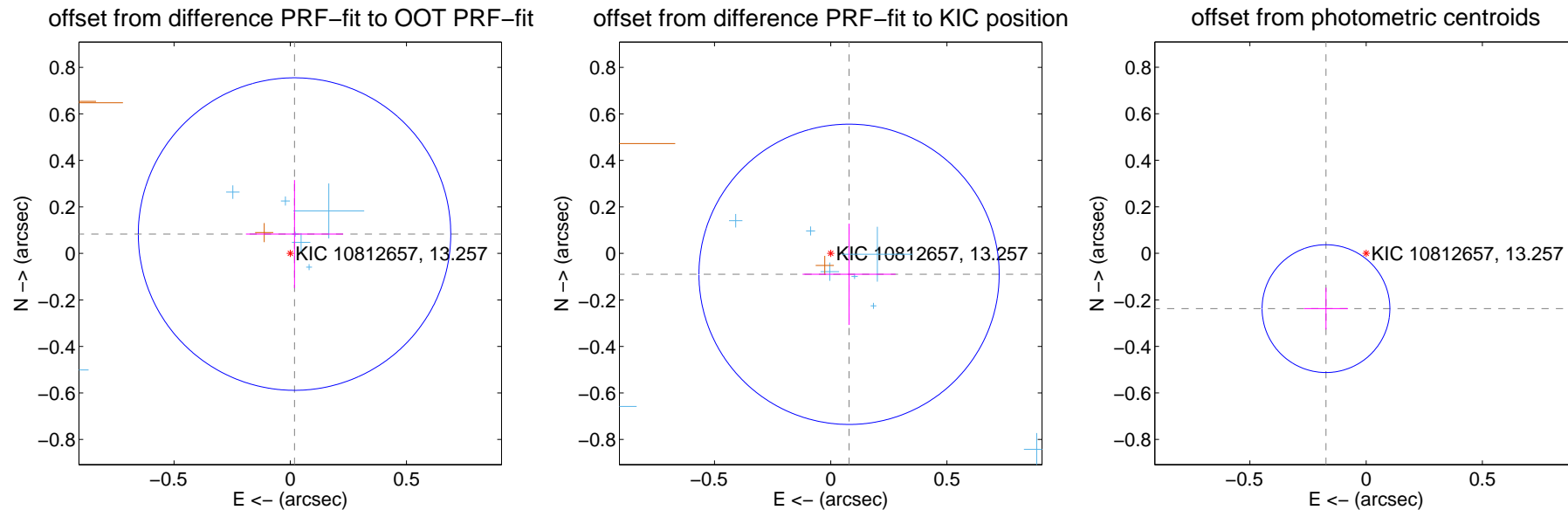
## DV Centroid Data

Supplemental centroid analysis for 010812657-02. Kepler magnitude: 13.26. Transit SNR 10.51

There are 9 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.18 arcsec

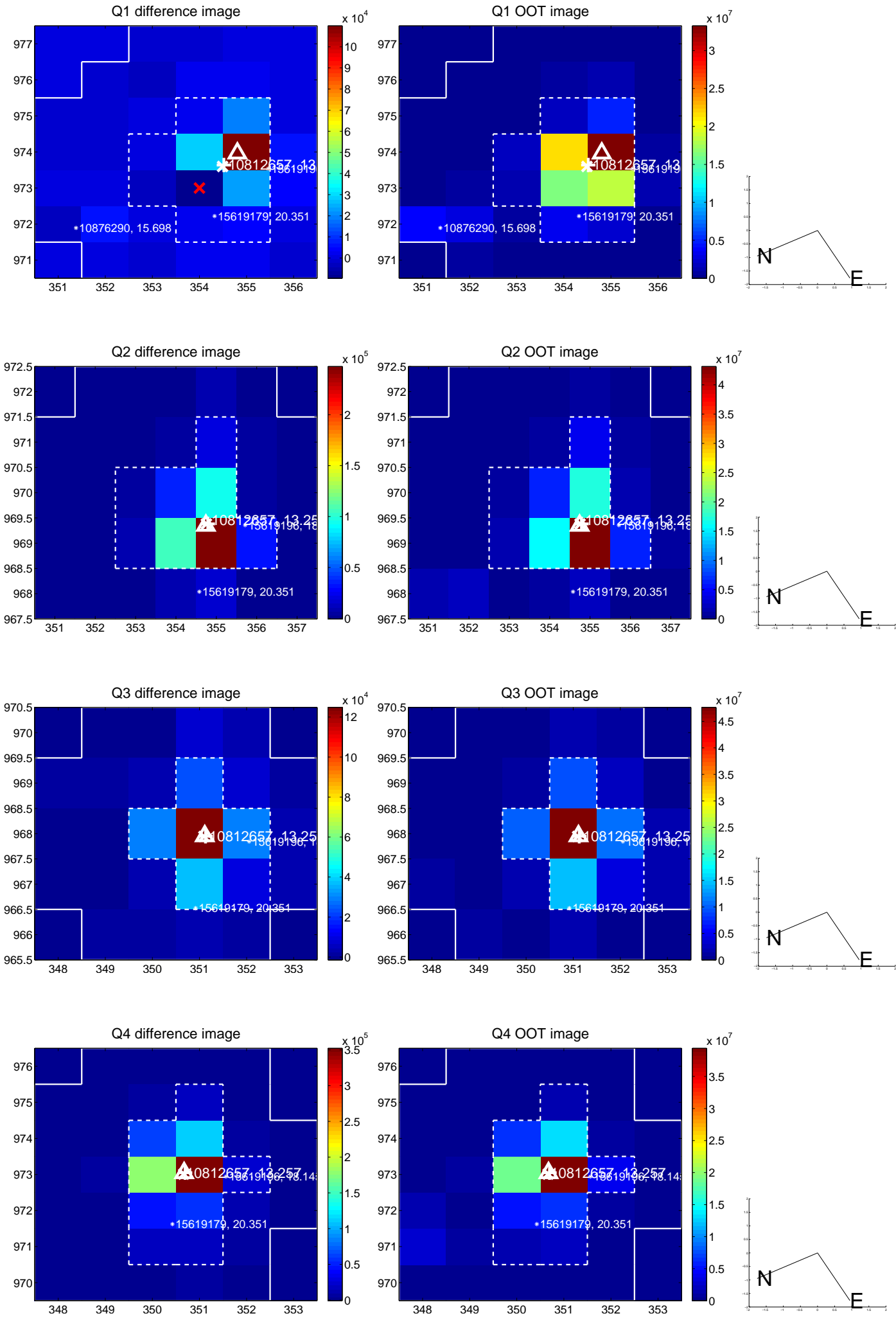
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.085 \pm 0.224$	0.38	$-0.018 \pm 0.209$	$0.083 \pm 0.232$
PRF-fit source offset from KIC position	$0.120 \pm 0.215$	0.56	$-0.079 \pm 0.200$	$-0.090 \pm 0.218$
photometric centroid source offset	$0.29 \pm 0.09$	3.21	$0.17 \pm 0.09$	$-0.24 \pm 0.09$



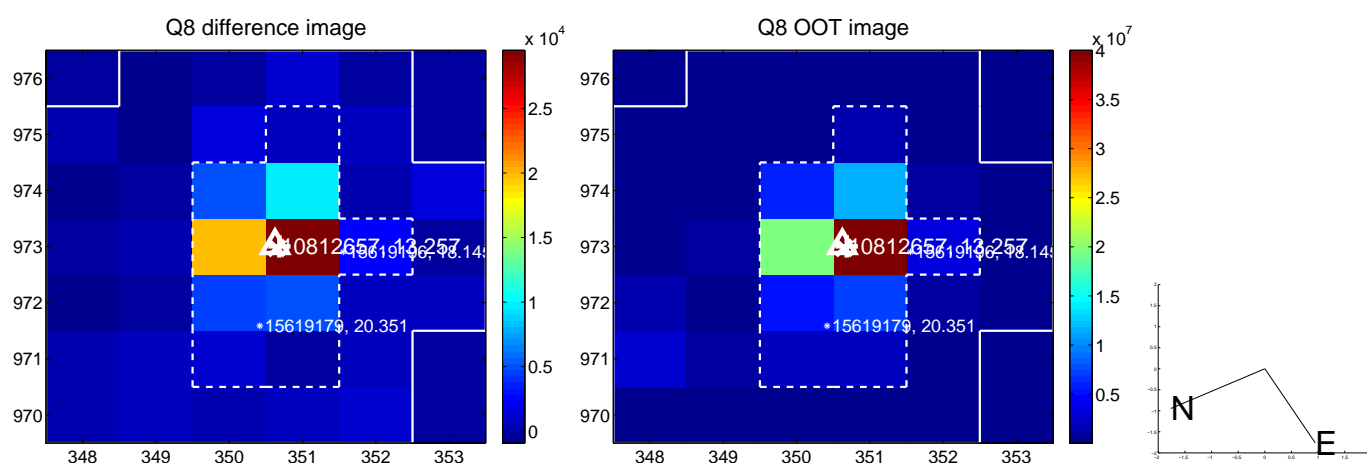
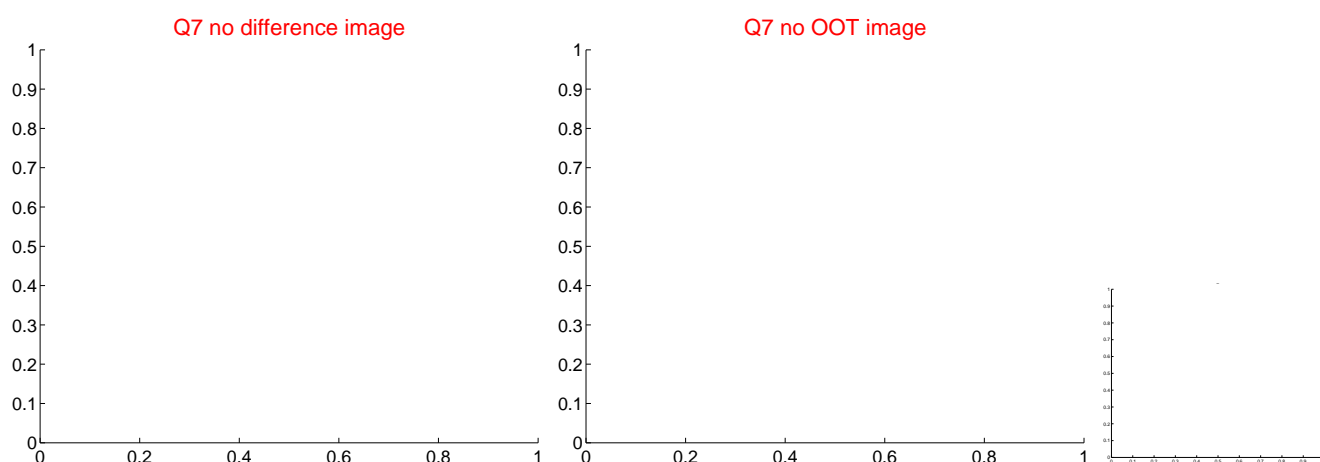
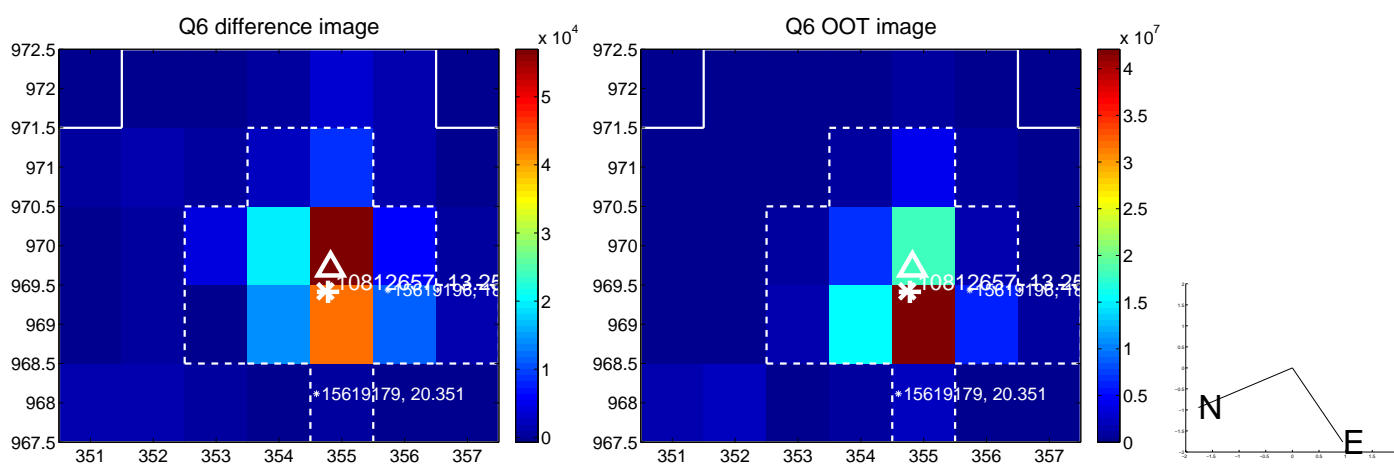
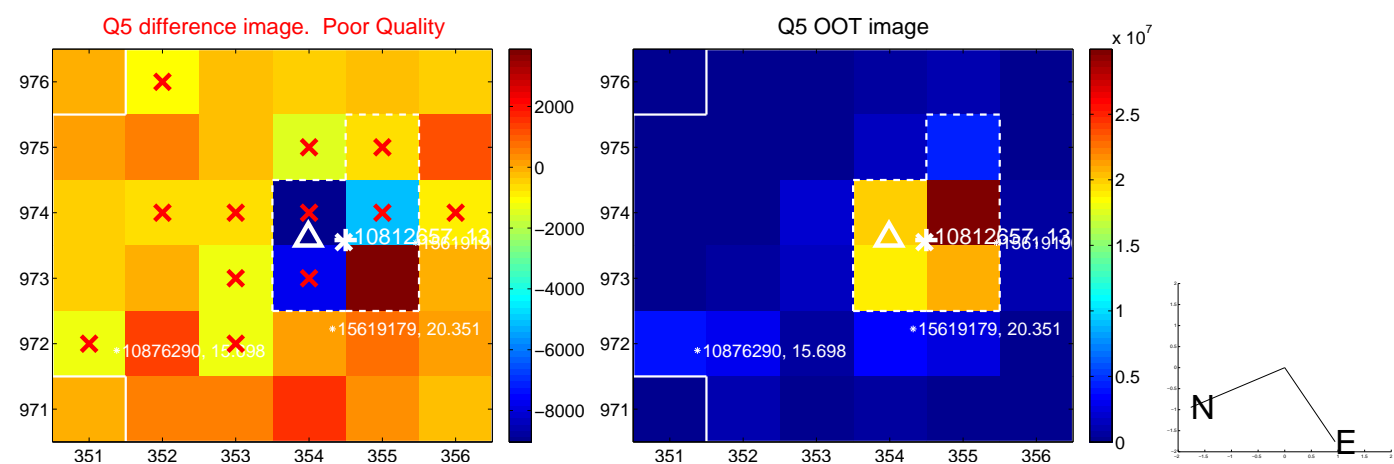
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



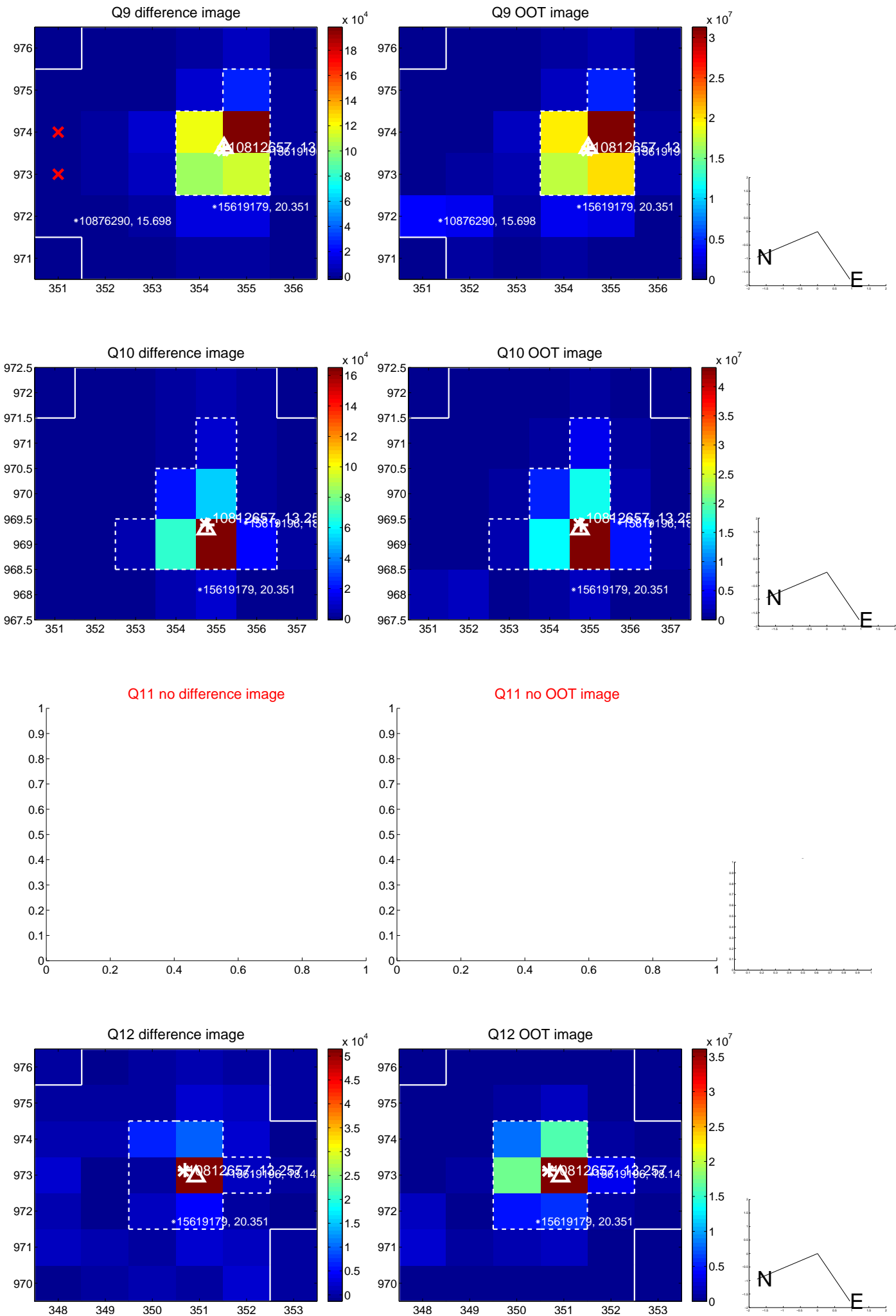
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



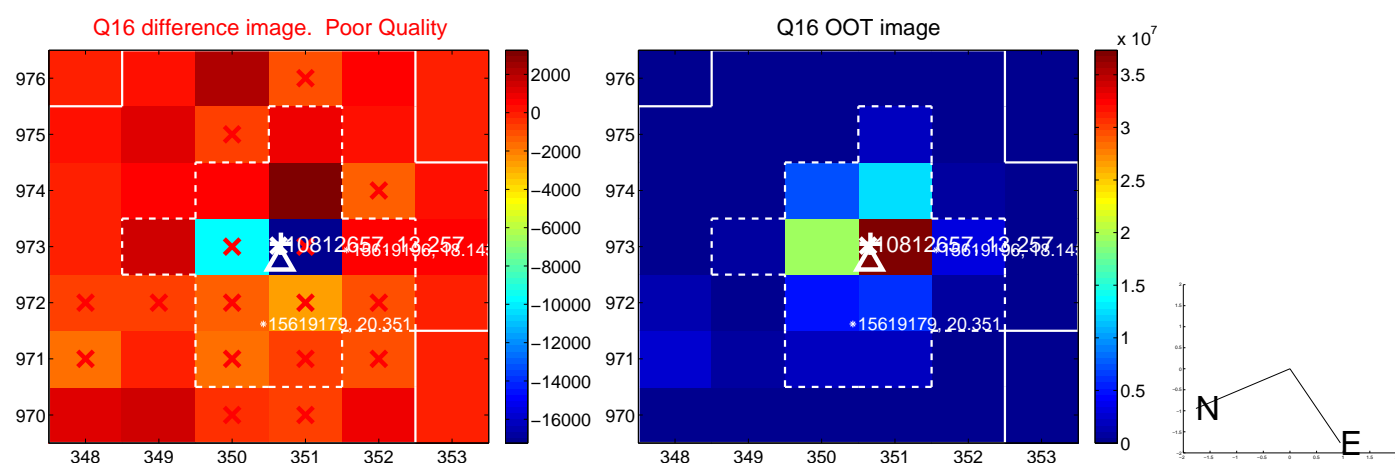
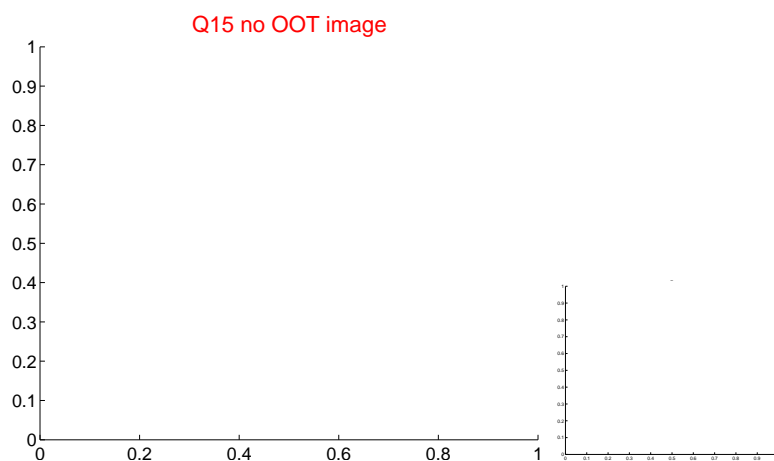
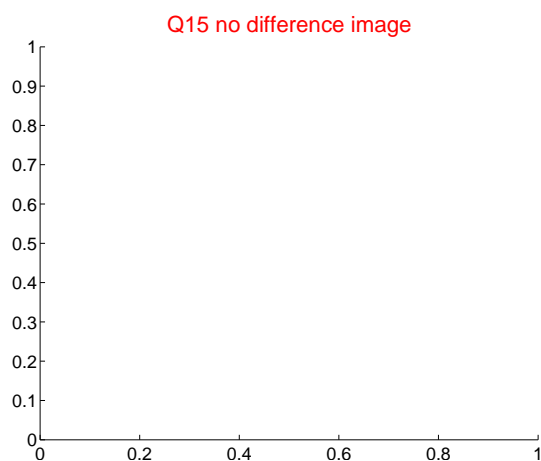
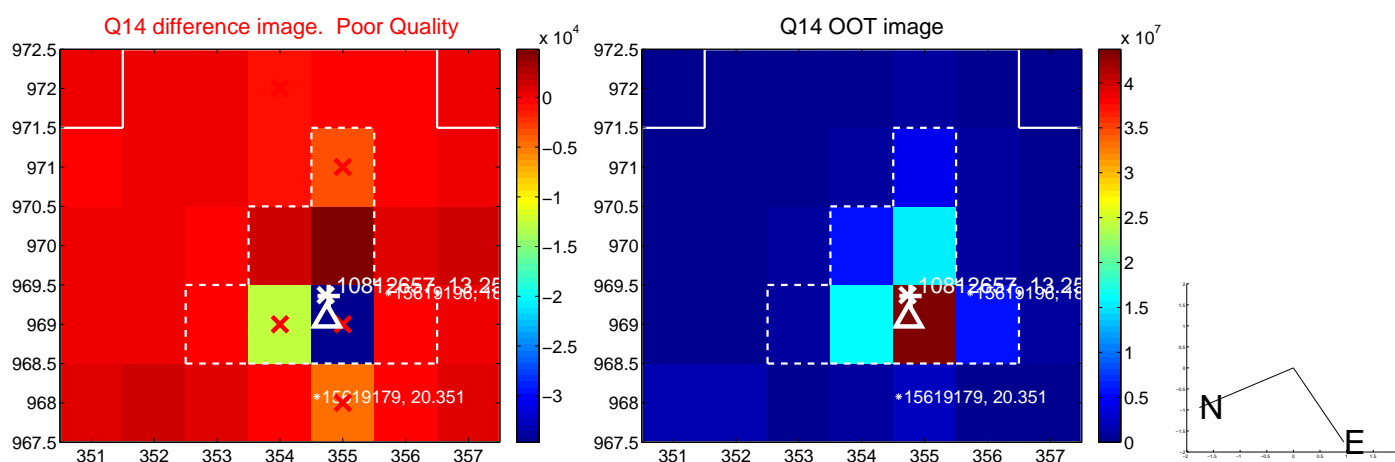
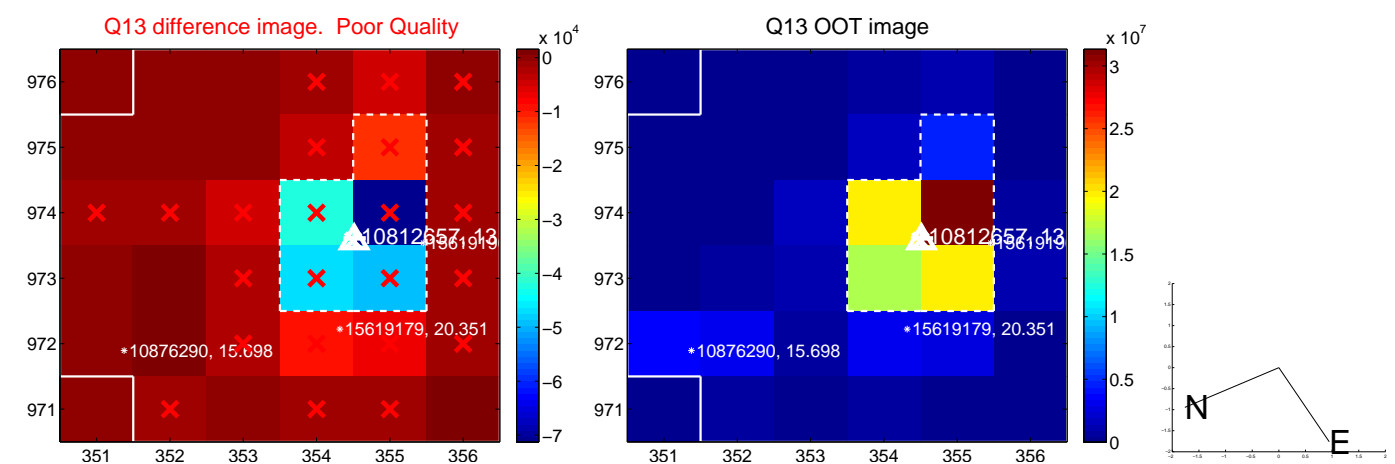
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



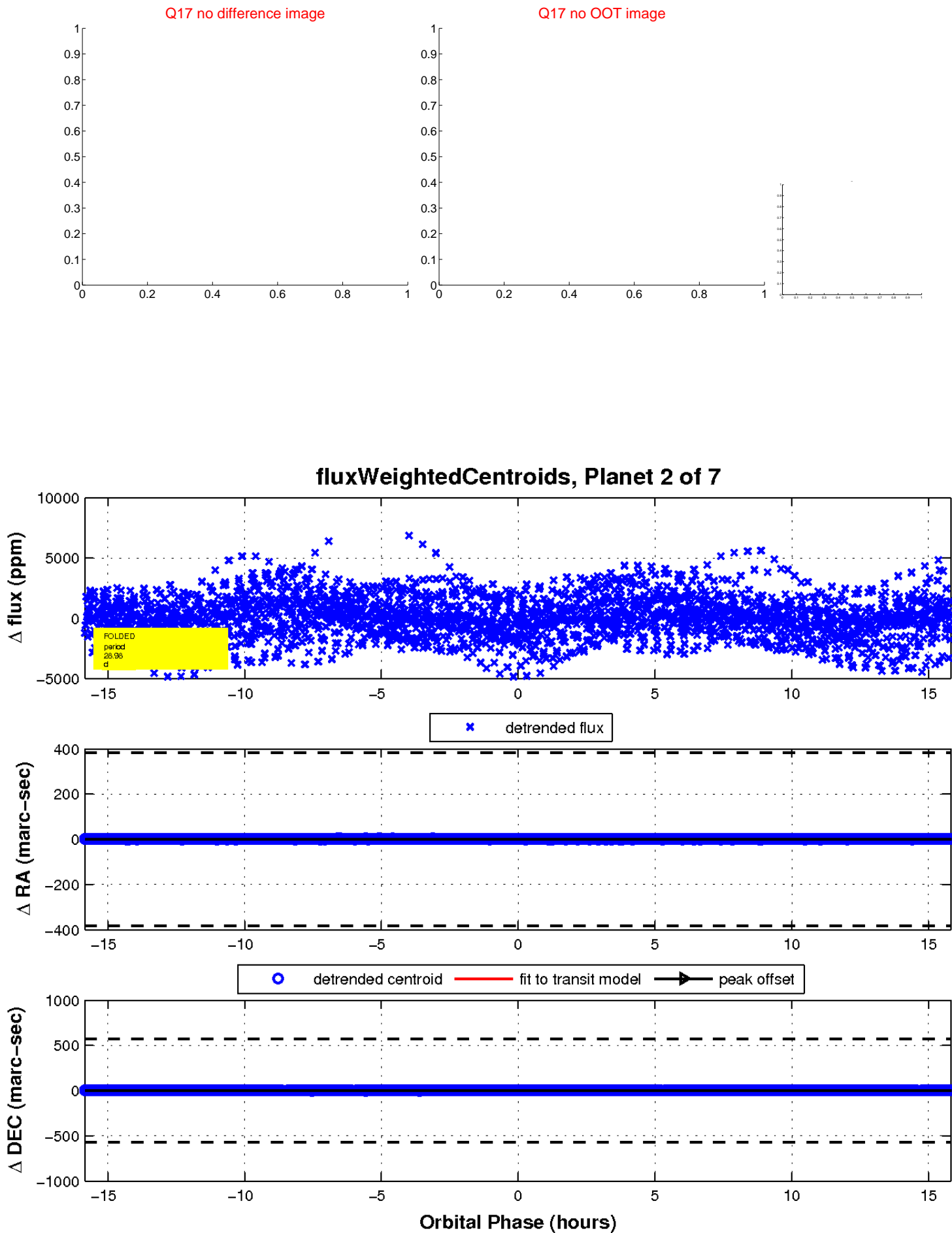
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



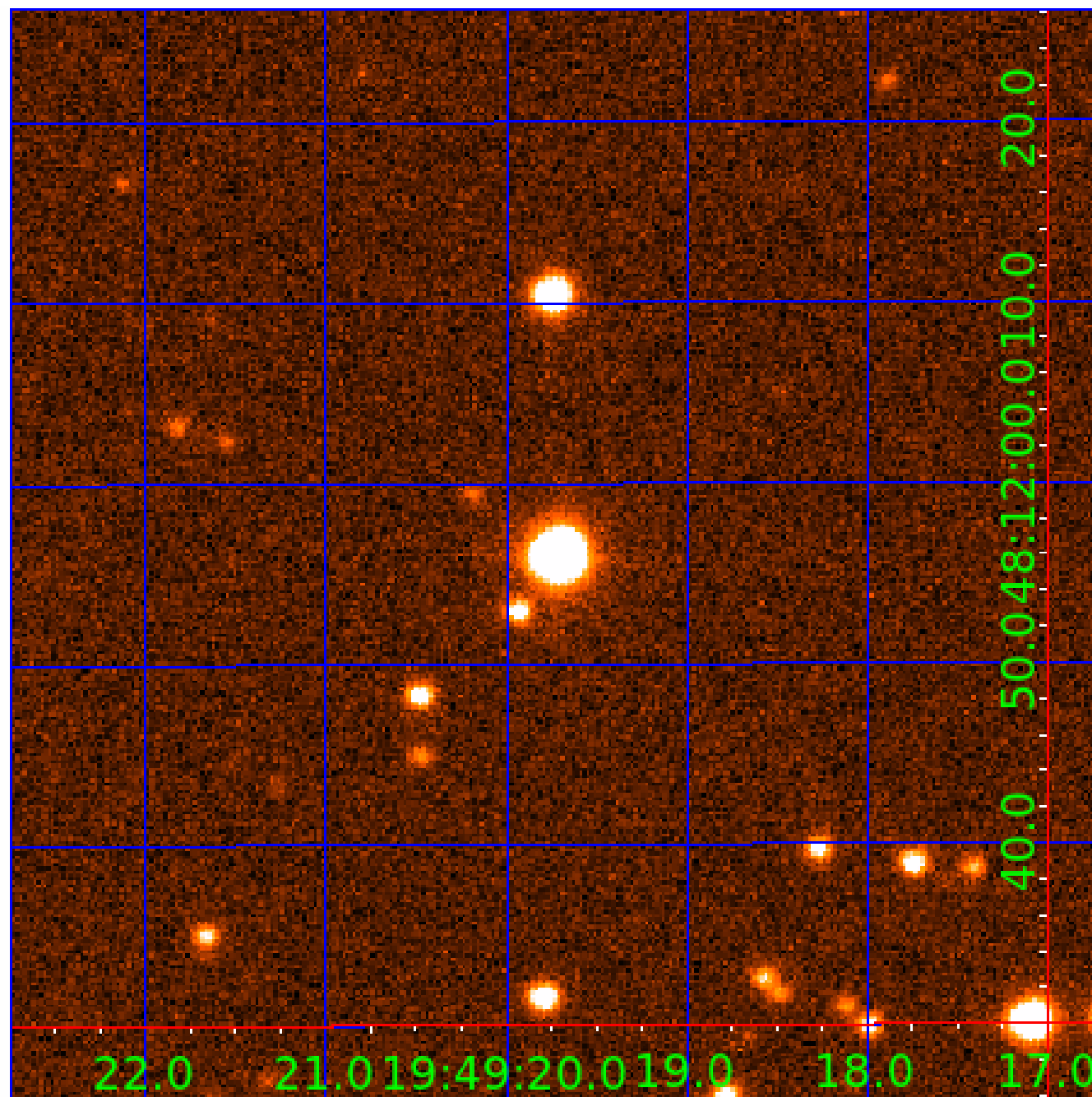
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





UKIRT Image

Declination



# KIC 010812657

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010812657-01	OBS	No	1.035145	131.673492	0.0	7.075	10.4	0.0	1.56	7349	0.01	12704.67
010812657-02	OBS	No	28.976055	138.407555	2216.0	5.278	10.1	10.5	1.56	7349	13.37	149.48
010812657-03	OBS	No	35.180230	143.795173	300.1	1.153	8.7	1.6	1.56	7349	3.14	115.41
010812657-04	OBS	No	124.132671	139.492680	3660.5	6.477	8.7	9.4	1.56	7349	10.89	21.48
010812657-05	OBS	No	45.516172	151.891165	2053.9	3.772	8.5	7.3	1.56	7349	8.46	81.86
010812657-06	OBS	No	46.561129	143.542107	2902.8	7.319	8.5	8.7	1.56	7349	15.18	79.42
010812657-07	OBS	No	20.673153	151.062505	209.9	5.000	8.2	-1.0	1.56	7349	2.30	234.47

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010812657-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV
010812657-02	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—HALO_GHOST
010812657-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_TER_ALT—MOD_POS_ALT
010812657-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
010812657-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
010812657-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
010812657-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_NOFITS

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

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

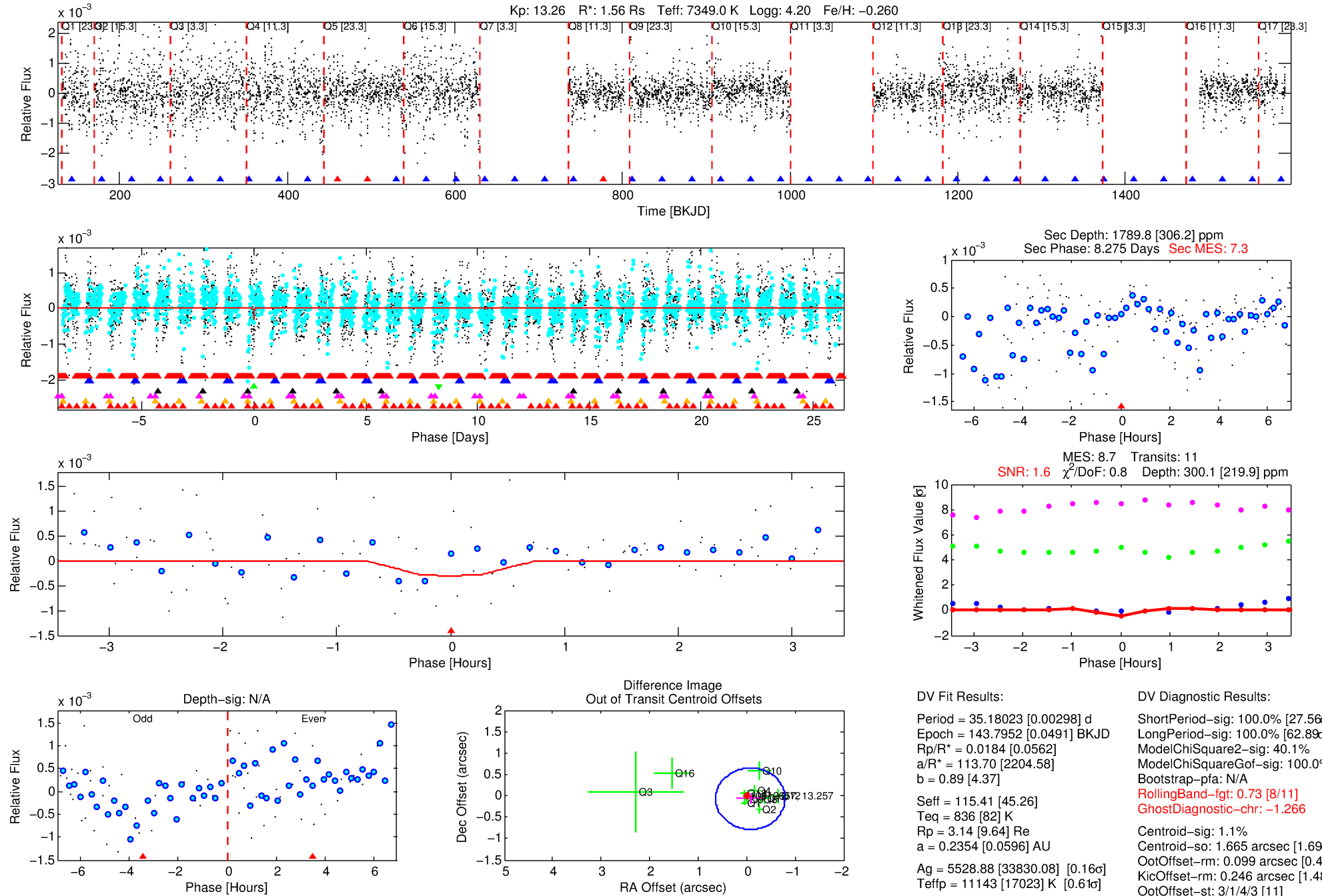
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 010812657-03

No Significant Match Found

# DV One-Page Summary

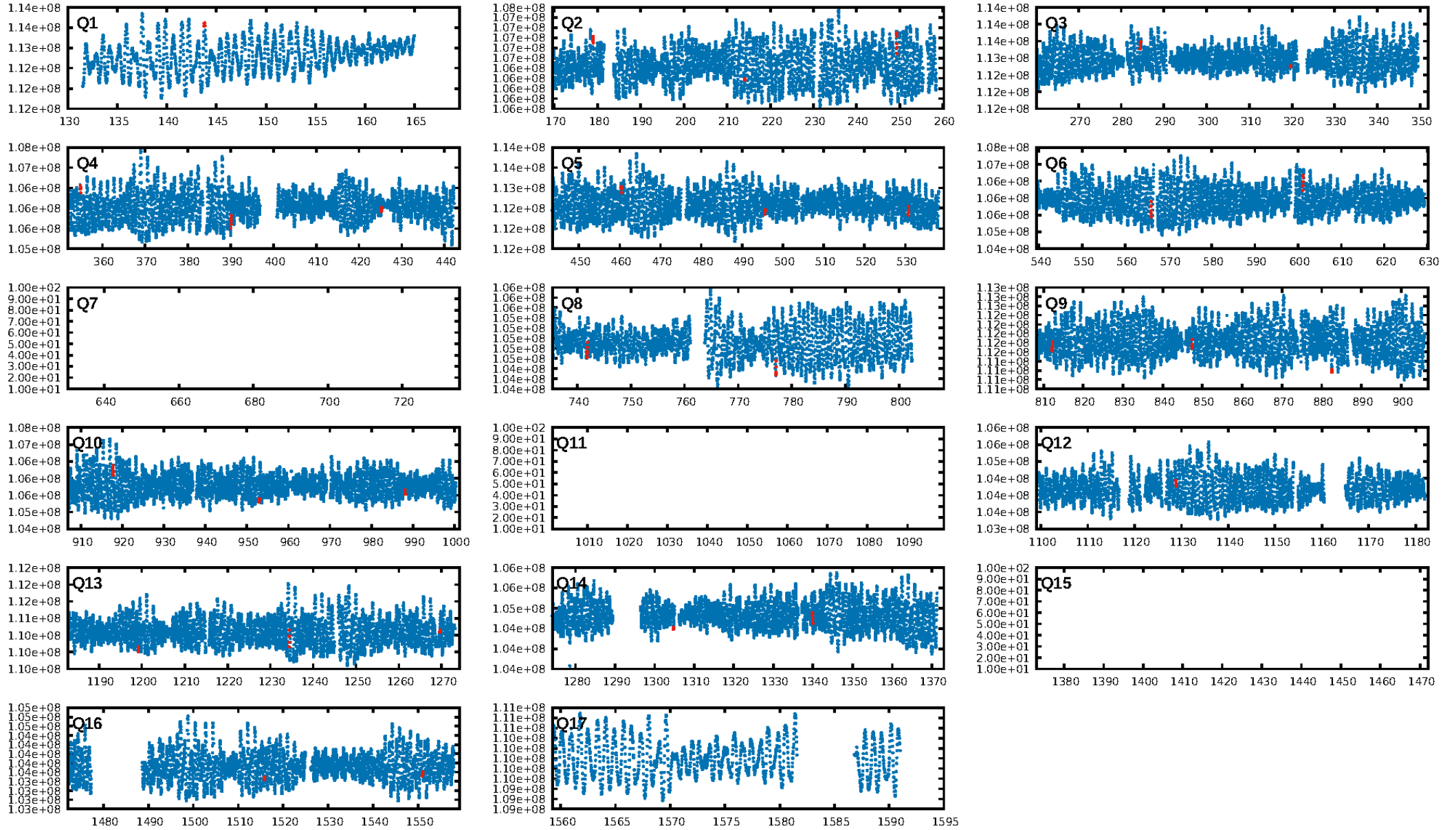
KIC: 10812657 Candidate: 3 of 7 Period: 35.180 d



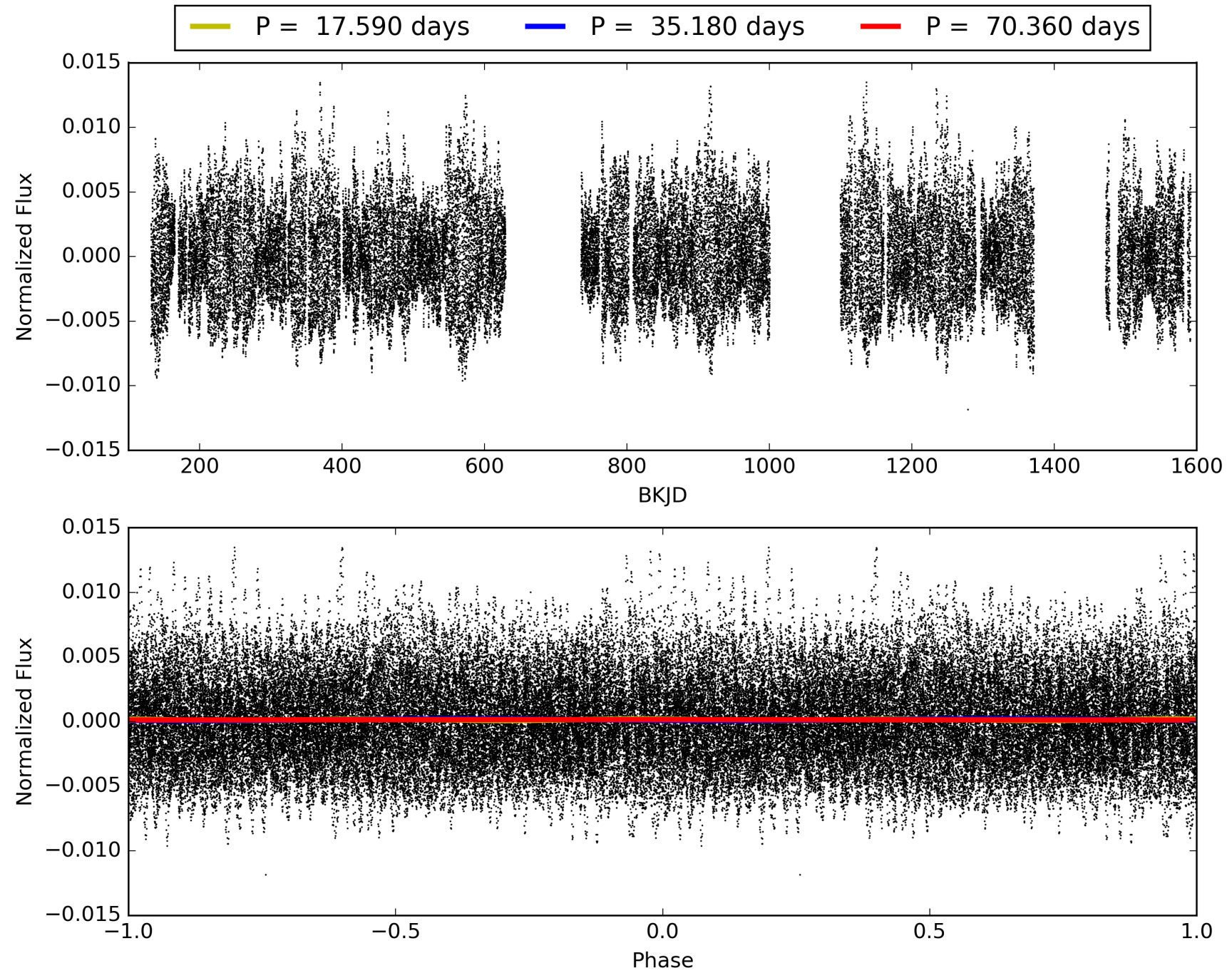
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 10:24:13 Z

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

# TCE 010812657-03, PDC Light Curves

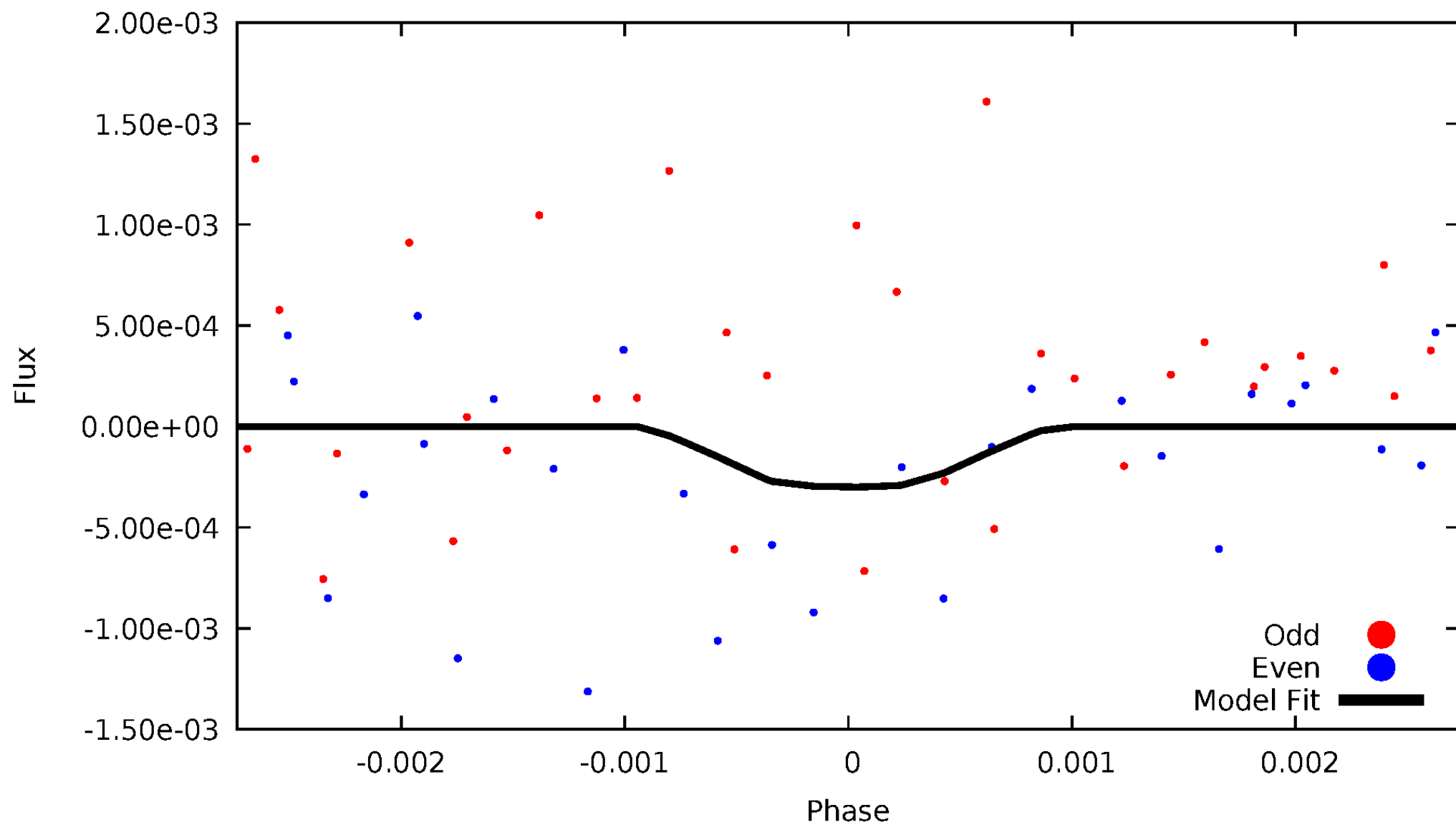


TCE 010812657-03



# DV Odd/Even

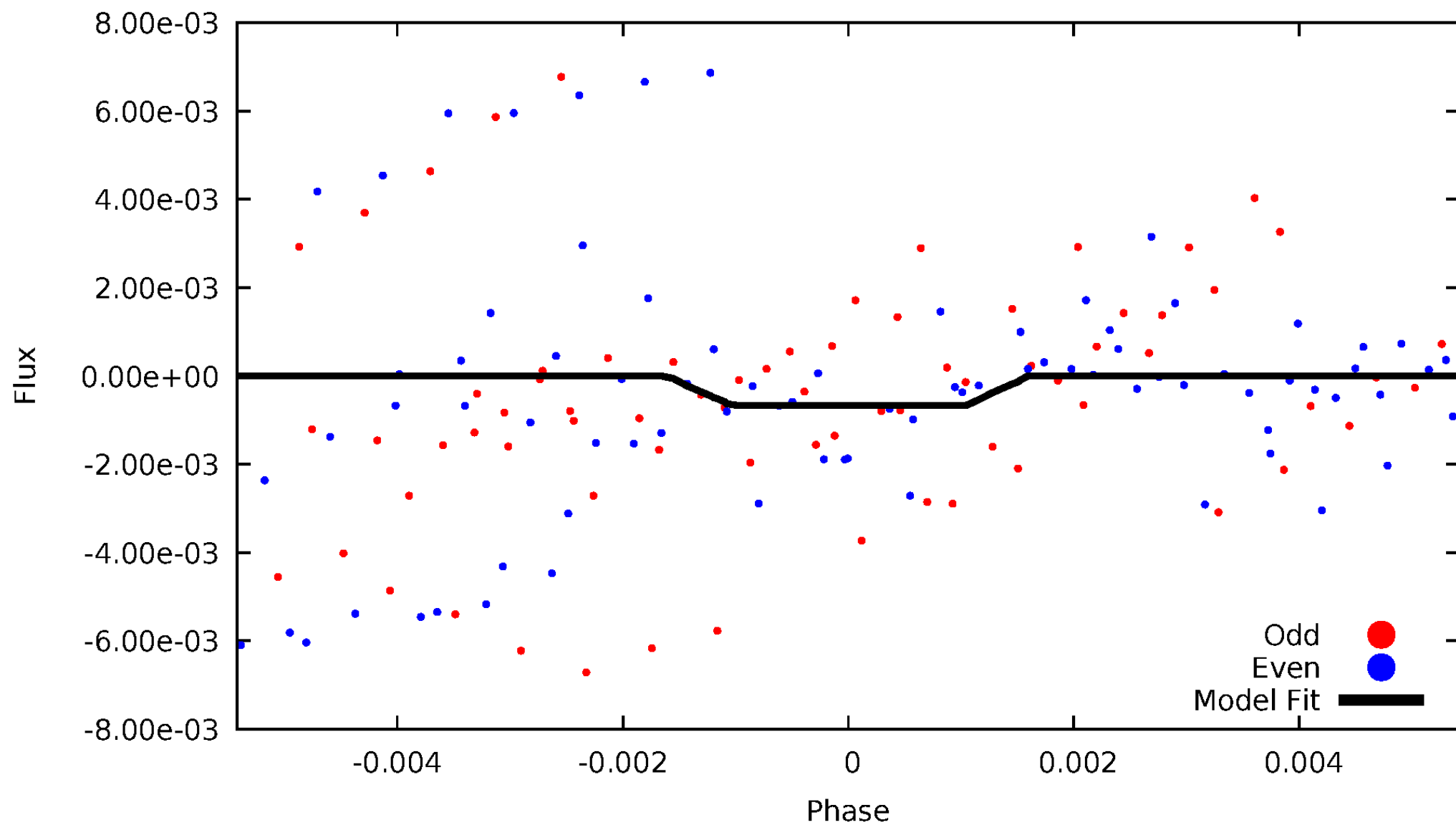
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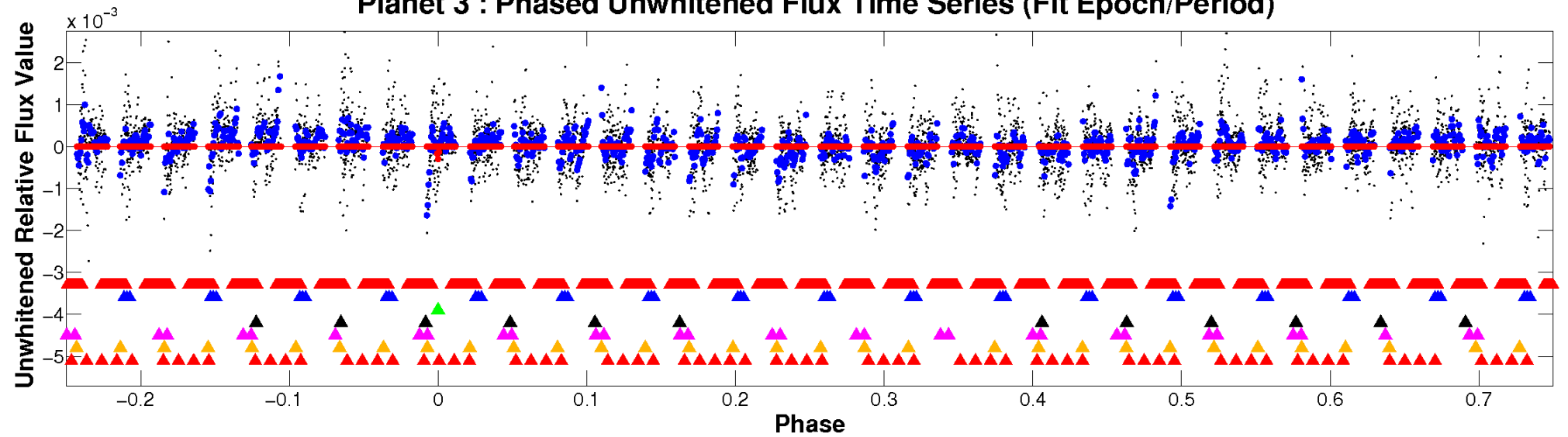
# ALT Odd/Even

TCE 010812657-03

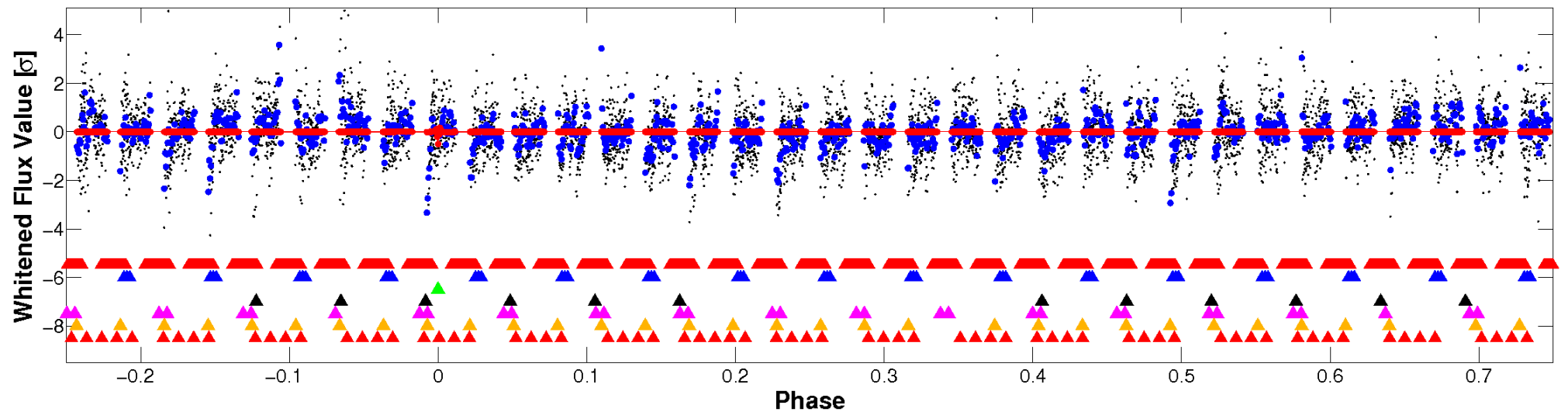


# Non-Whitened Vs. Whitened Light Curve

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

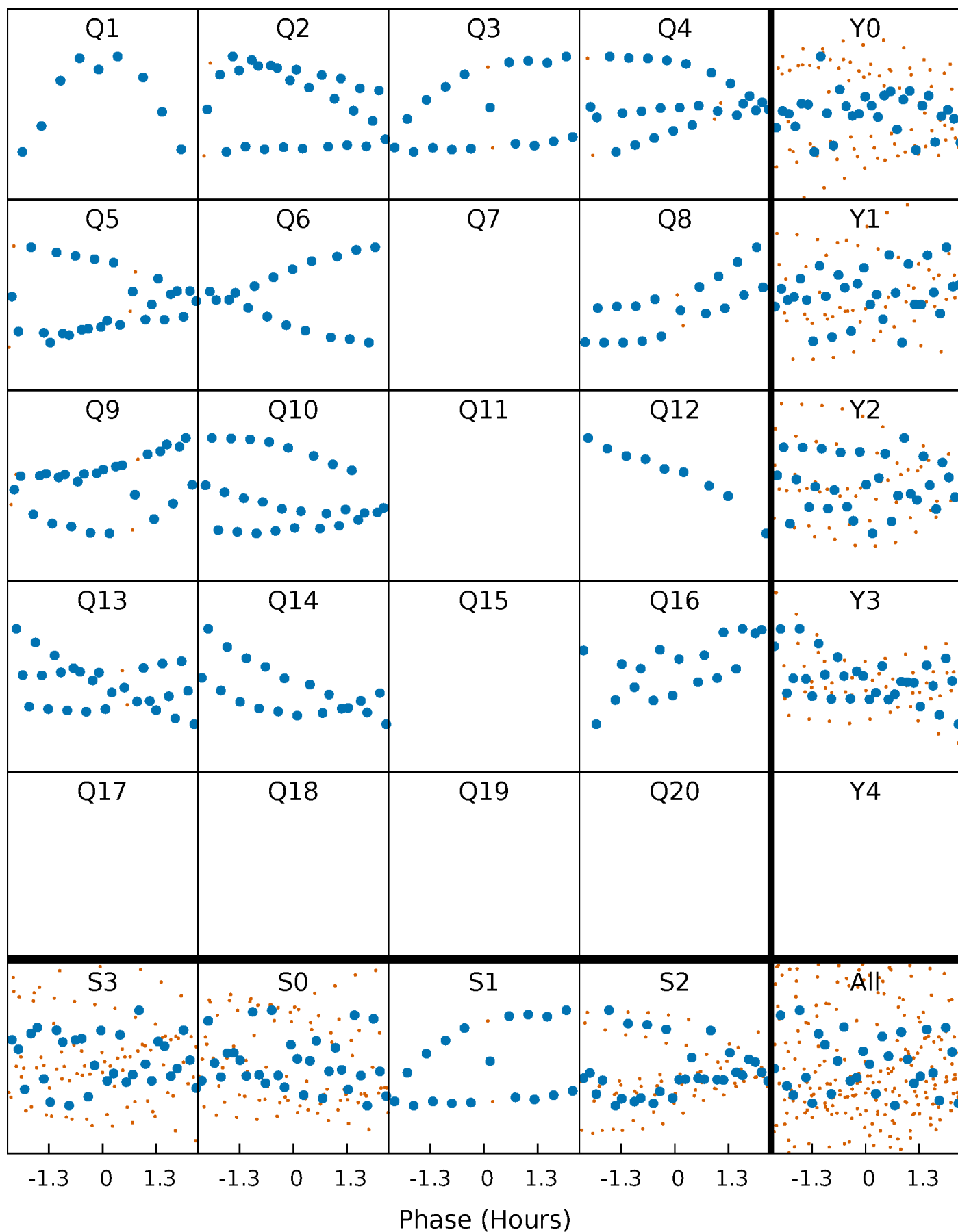


## Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



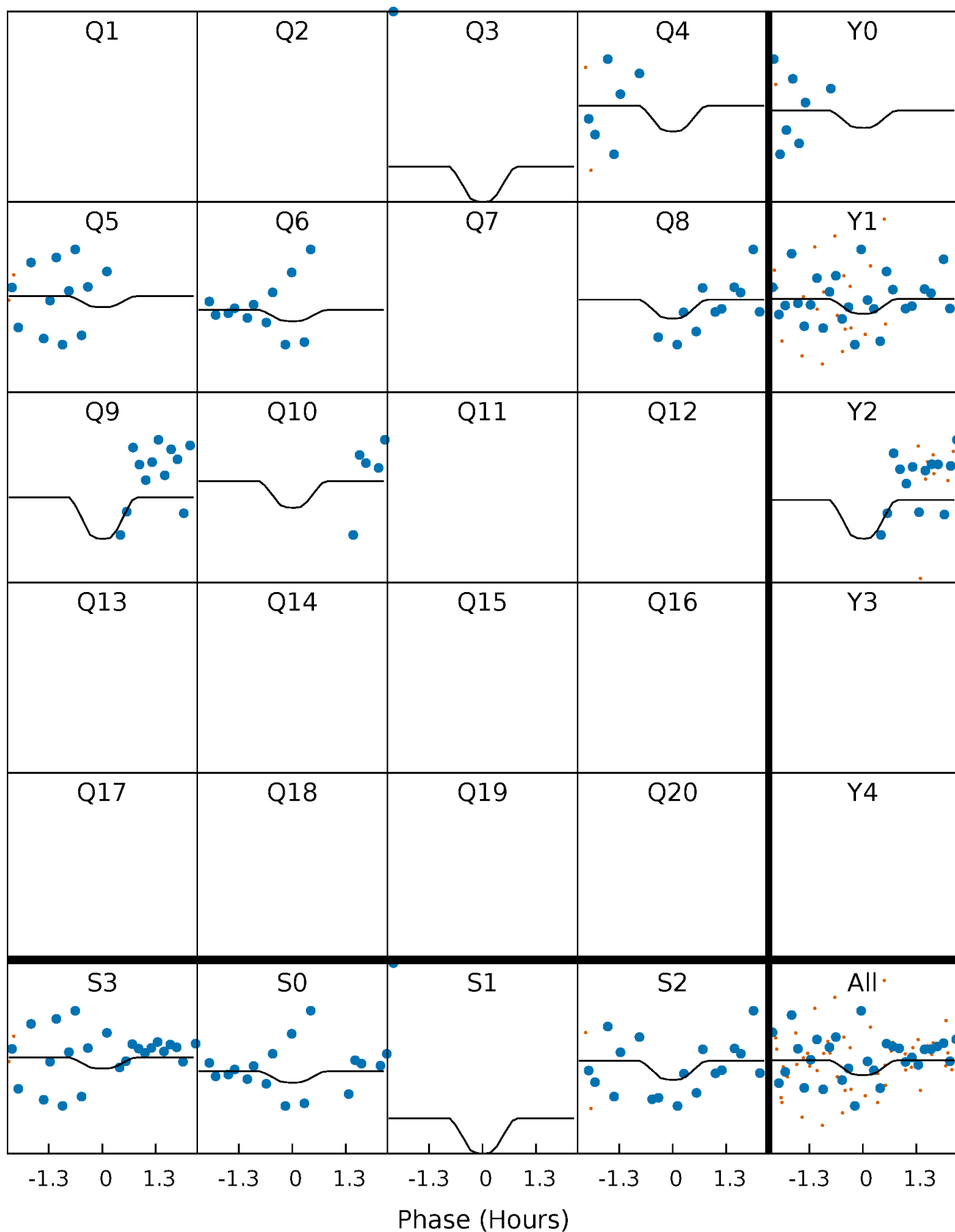
# PDC Quarter-Phased Transit Curves

TCE 010812657-03     $P = 35.180230$  Days     $T_0 = 143.795173$  (BKJD)



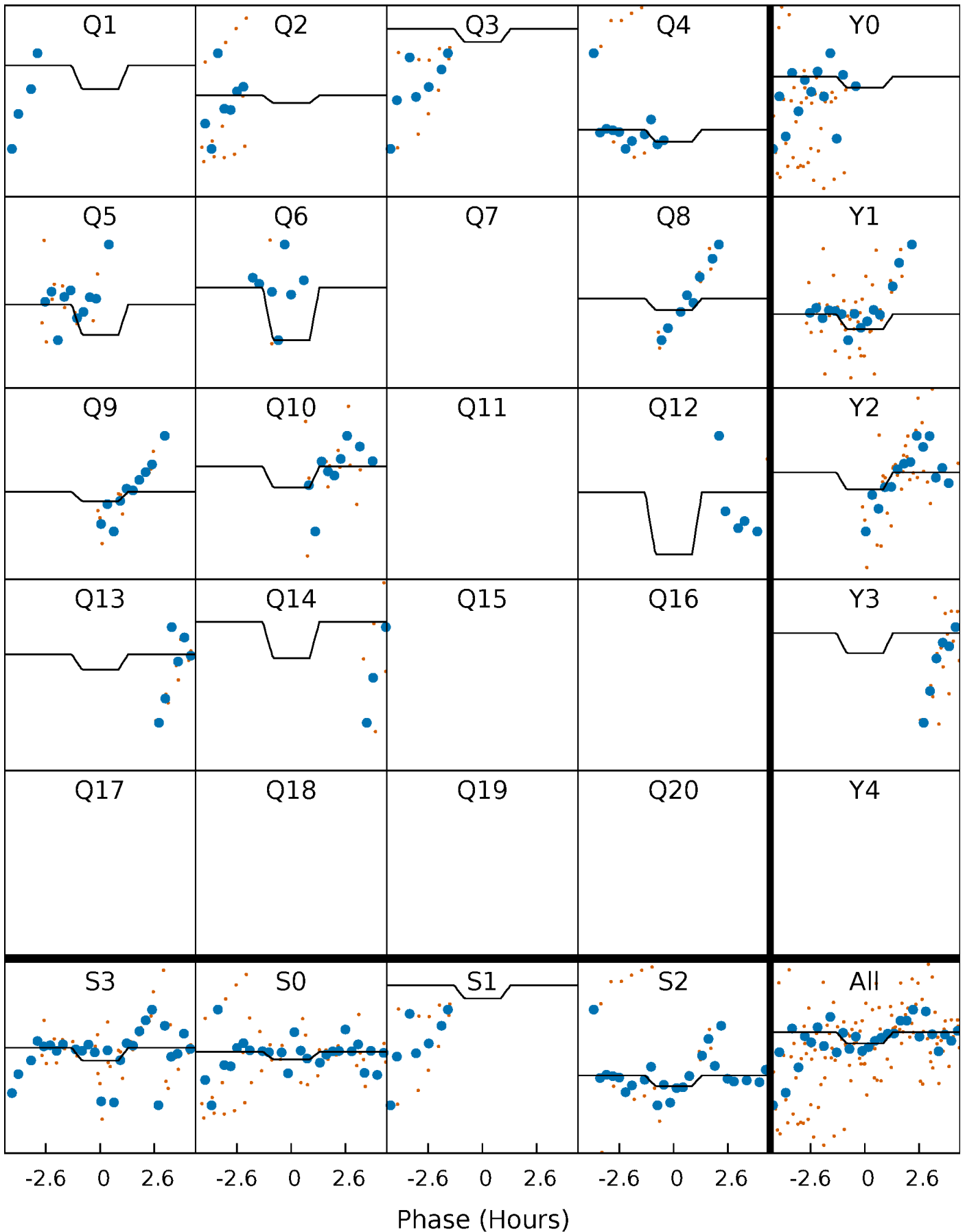
# DV Quarter-Phased Transit Curves

TCE 010812657-03 P= 35.180230 Days  $T_0=143.795173$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

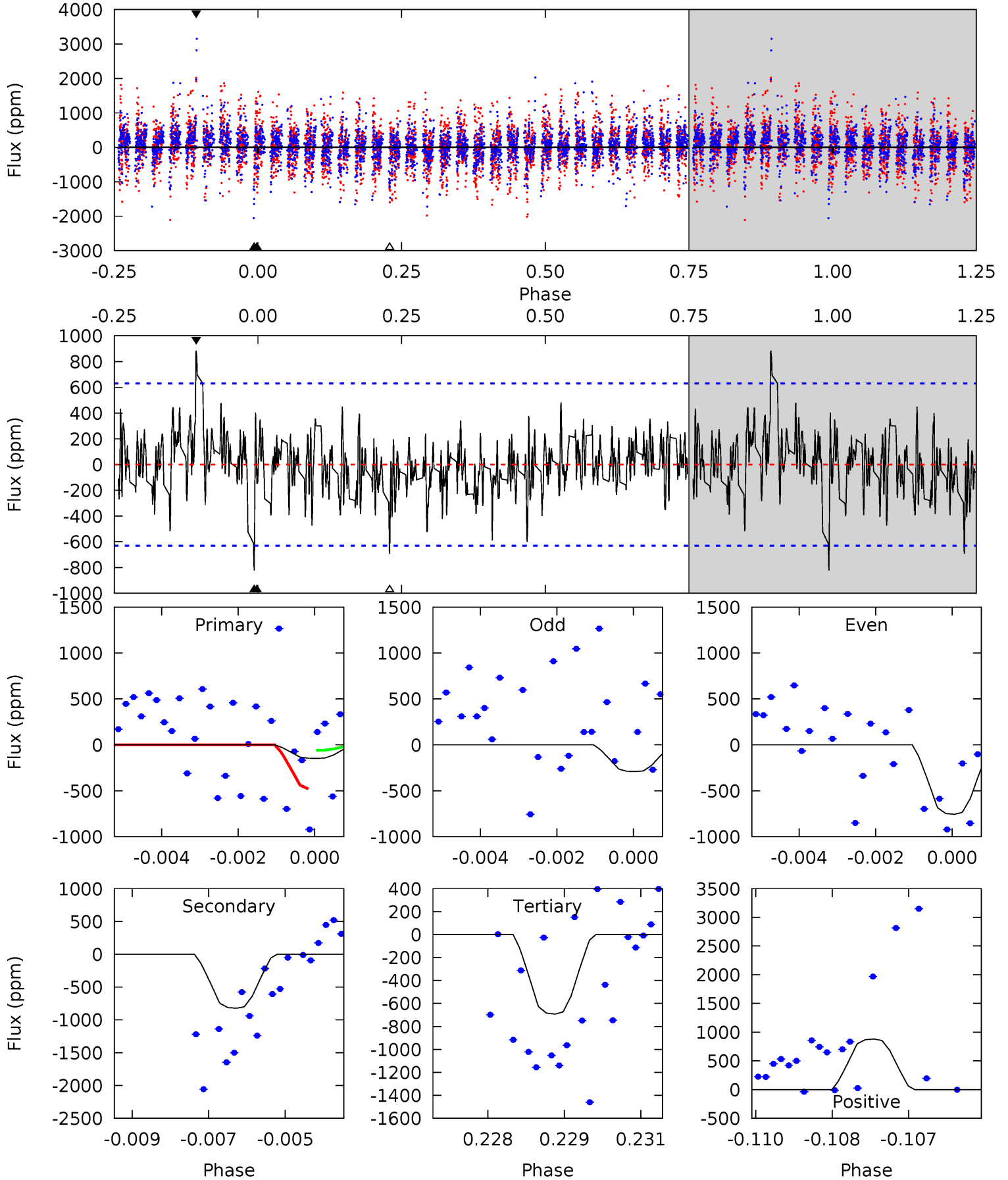
TCE 010812657-03 P= 35.183620 Days  $T_0=143.750164$  (BKJD)



# DV Model-Shift Uniqueness Test

010812657-03, P = 35.180230 Days, E = 108.614943 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
1.25	6.97	5.87	7.46	5.35	3.12	1.55	-4.62	-6.21	1.10	-0.48	1.96	0.22	0.52	1.76

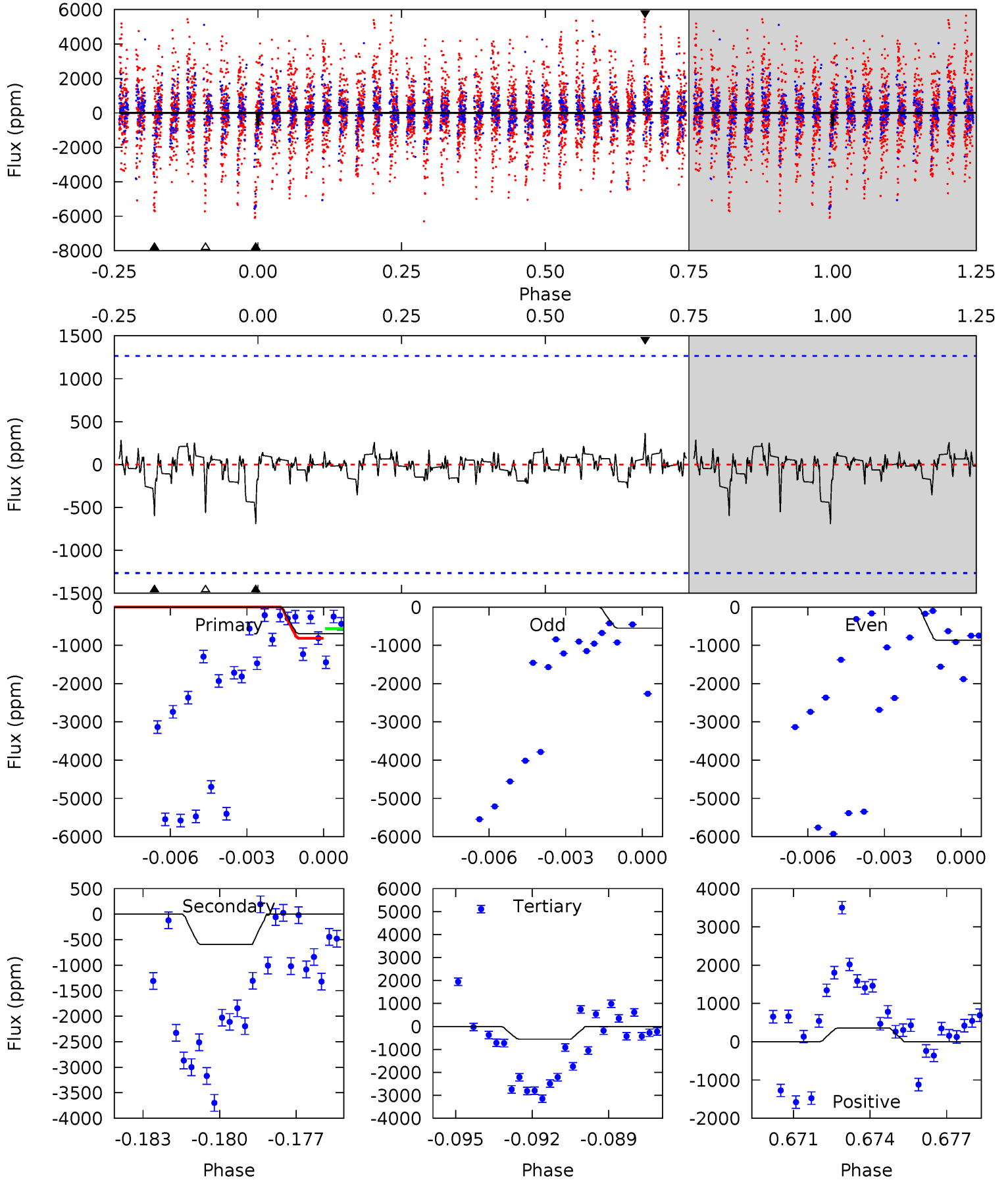




# Alt Model-Shift Uniqueness Test

010812657-03, P = 35.183620 Days, E = 108.566544 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2.88	2.47	2.30	1.49	5.26	2.97	0.41	0.58	1.38	0.17	0.98	0.62	1.12	0.34	0.53



### Stellar Parameters For KIC 010812657

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7349^{+206}_{-310}$	$4.197^{+0.124}_{-0.186}$	$-0.260^{+0.250}_{-0.350}$	$1.564^{+0.491}_{-0.302}$	$1.408^{+0.216}_{-0.216}$	$0.518^{+0.319}_{-0.266}$
	+3%/-4%	+3%/-4%	+96%/-135%	+31%/-19%	+15%/-15%	+61%/-51%
Source	KIC0	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 010812657-03 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-822 \pm 118$	$8.13^{+8.27}_{-5.46}$	$1168^{+87}_{-78}$	$5632^{+5430}_{-1394}$	$370^{+3157}_{-280}$
Alt.	$-595 \pm 241$	$8.54^{+8.63}_{-5.98}$	$1176^{+85}_{-82}$	$5124^{+5061}_{-1264}$	$236^{+2422}_{-184}$

$T_{max}$  = 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

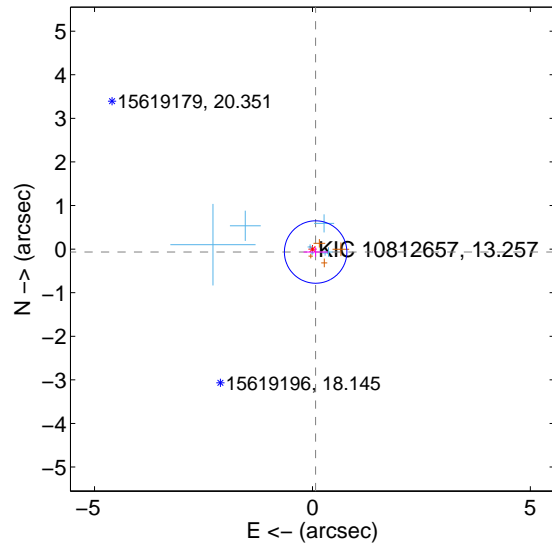
Supplemental centroid analysis for 010812657-03. Kepler magnitude: 13.26. Transit SNR 1.59

There are 7 quarters with good PRF difference image offsets

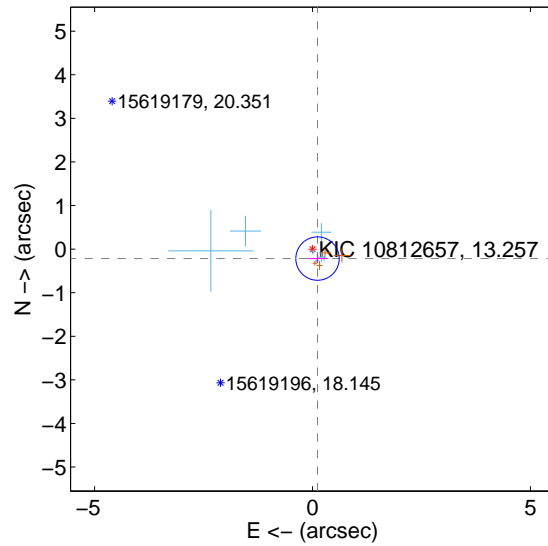
The direct PRF centroid is offset from the target star catalog position by about 0.12 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.099 \pm 0.239$	0.42	$-0.073 \pm 0.278$	$-0.067 \pm 0.108$
PRF-fit source offset from KIC position	$0.246 \pm 0.166$	1.48	$-0.114 \pm 0.240$	$-0.217 \pm 0.103$
photometric centroid source offset	$1.66 \pm 0.99$	1.69	$-1.01 \pm 1.04$	$1.32 \pm 0.95$

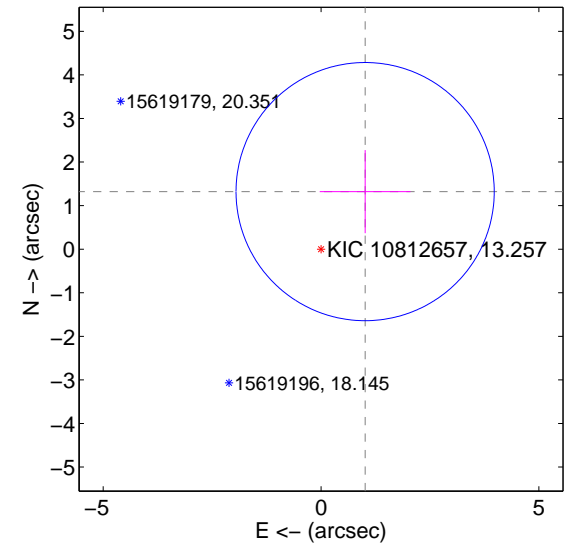
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

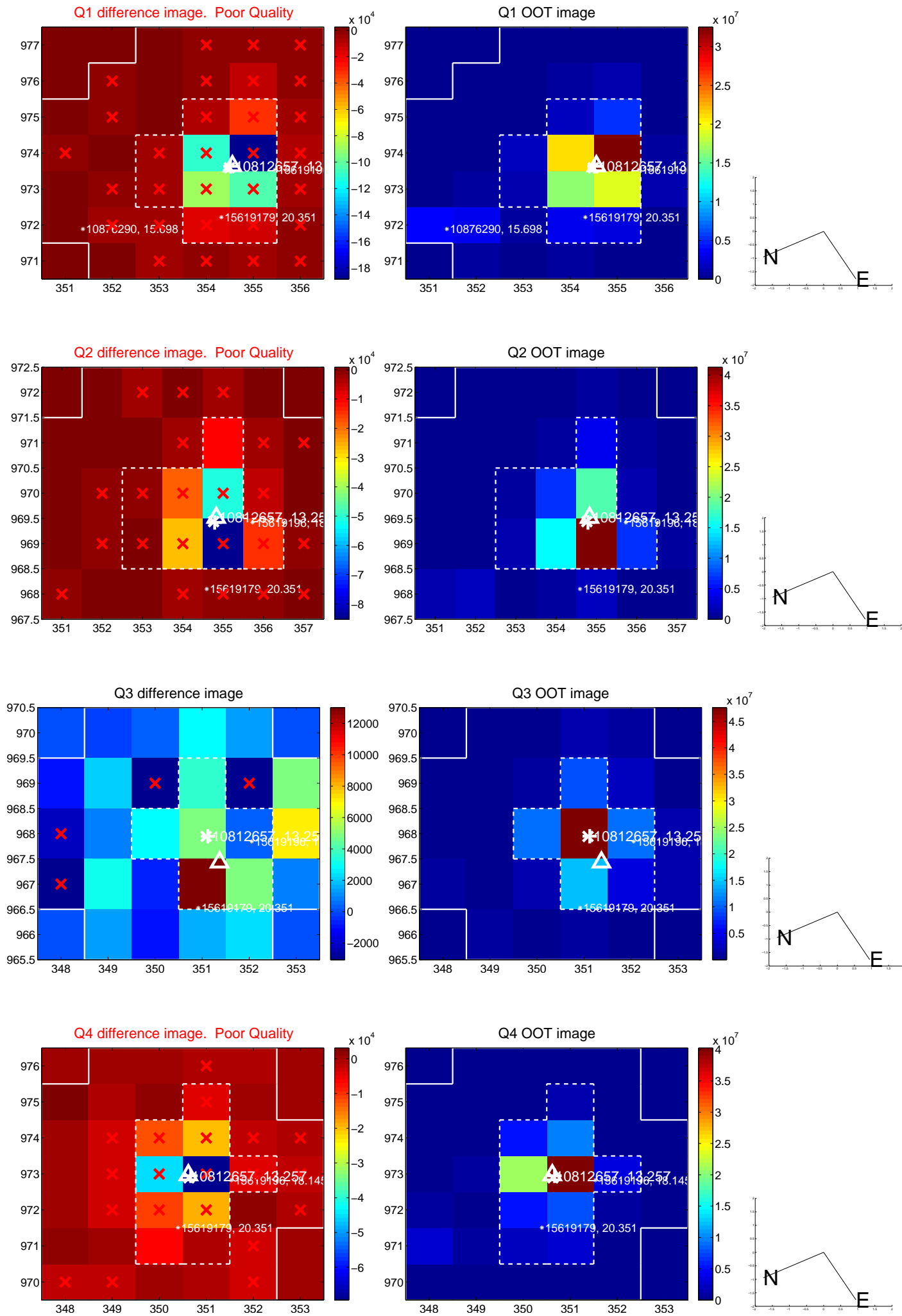


offset from photometric centroids

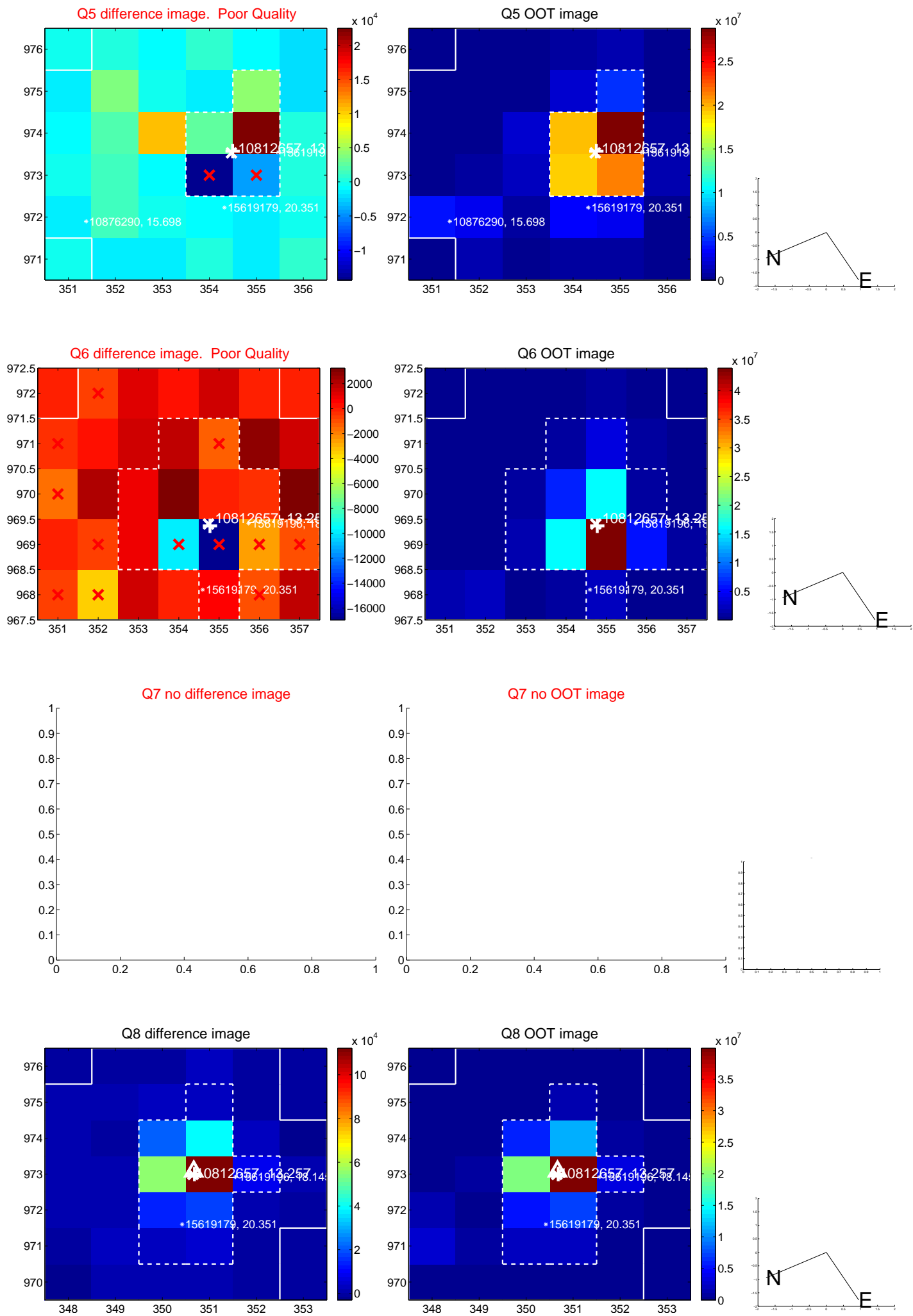


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

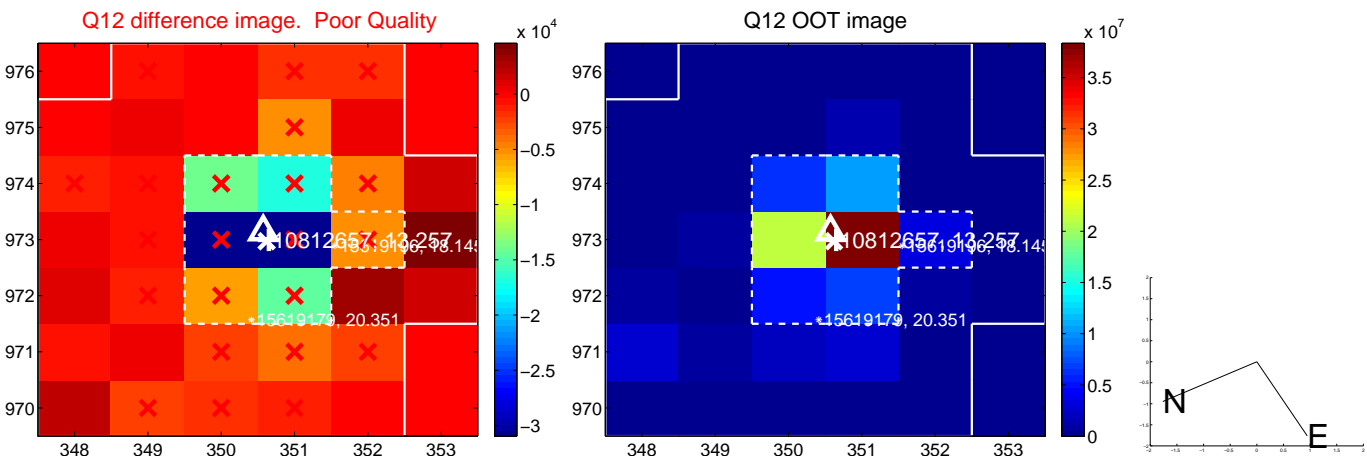
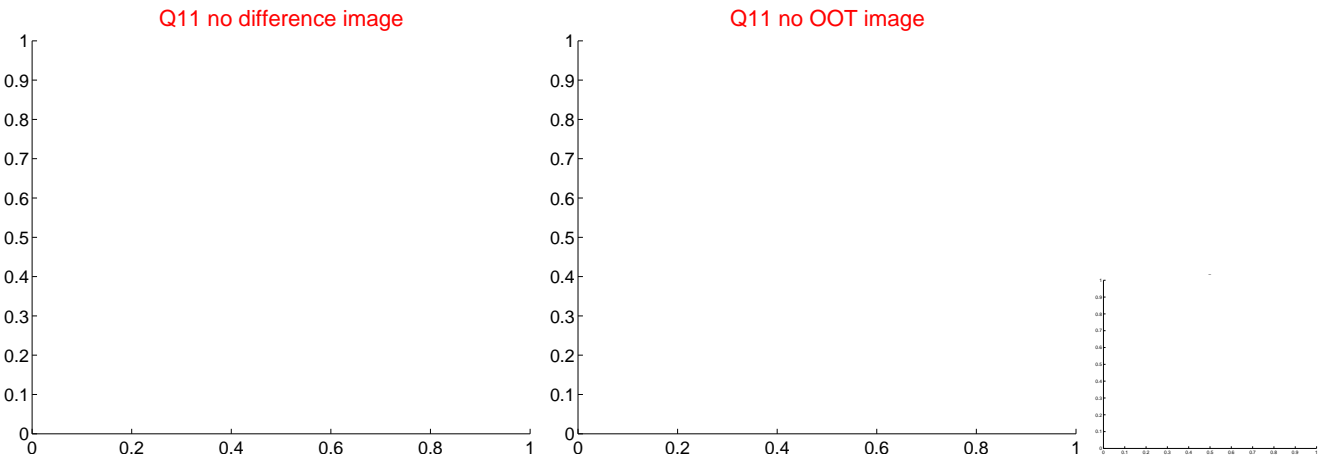
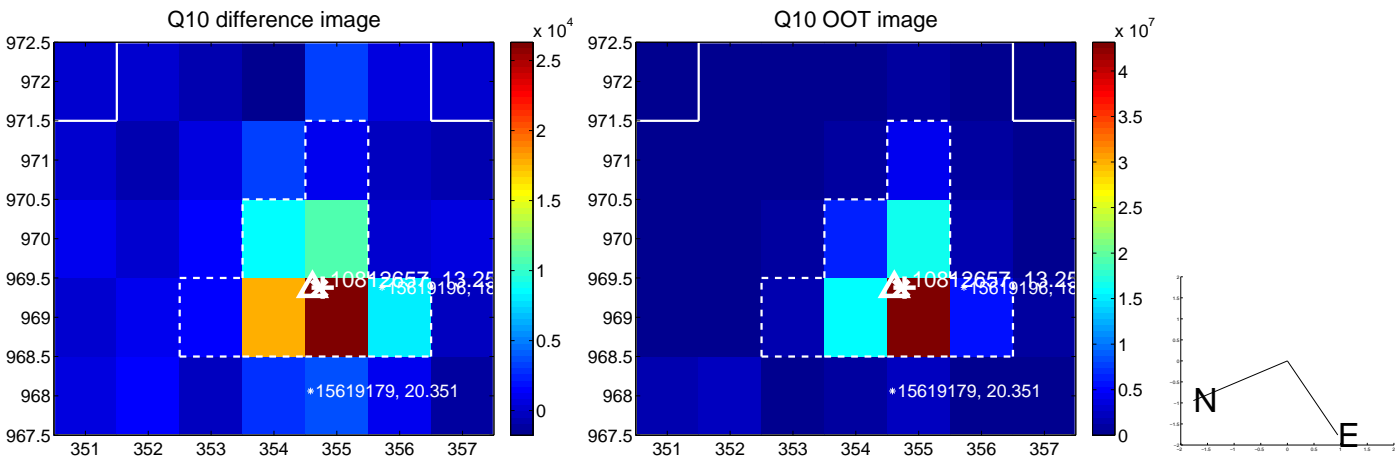
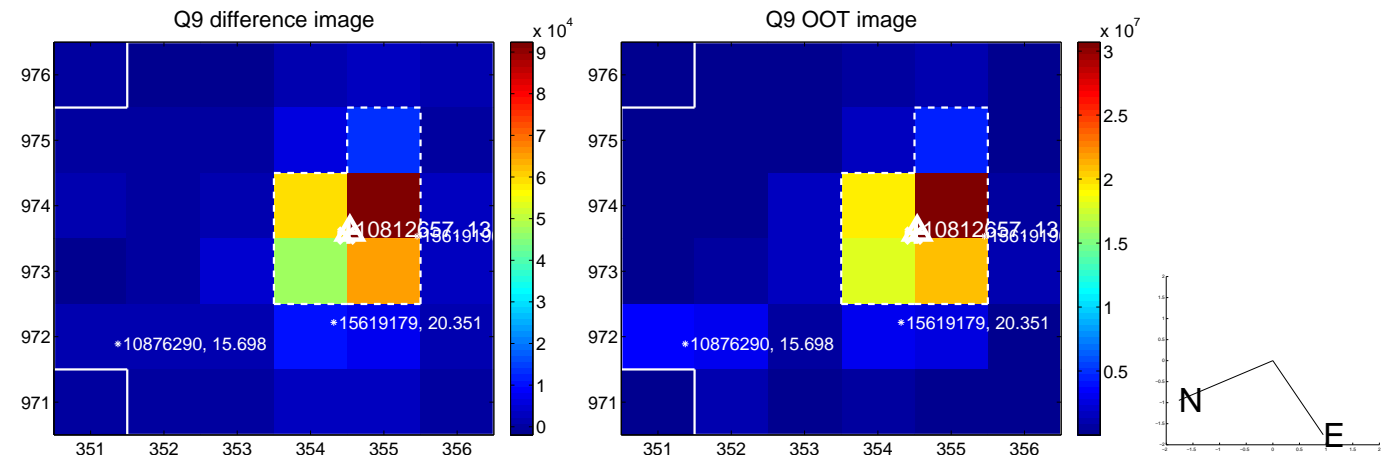
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

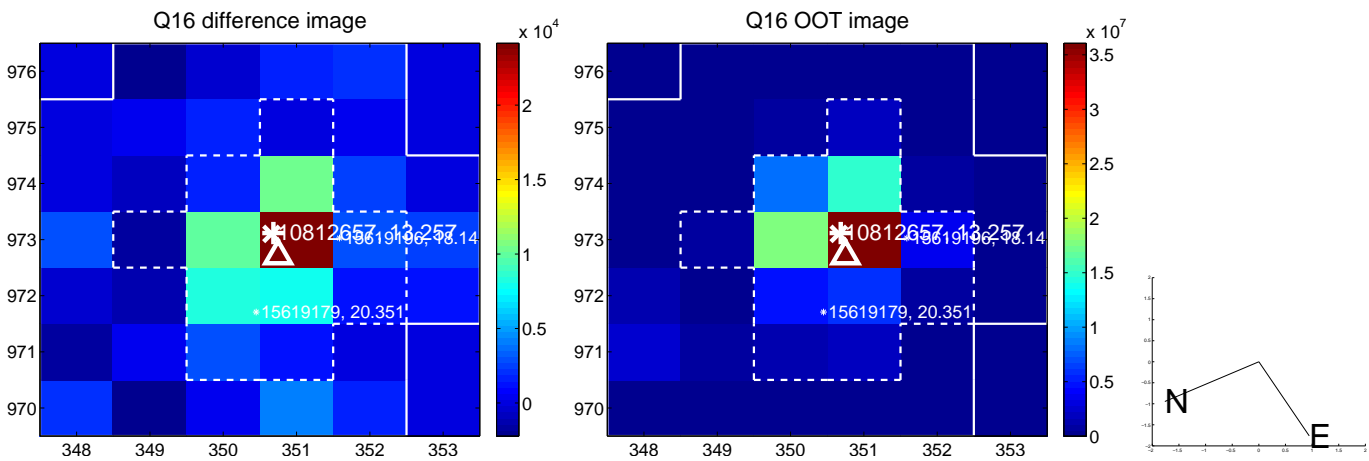
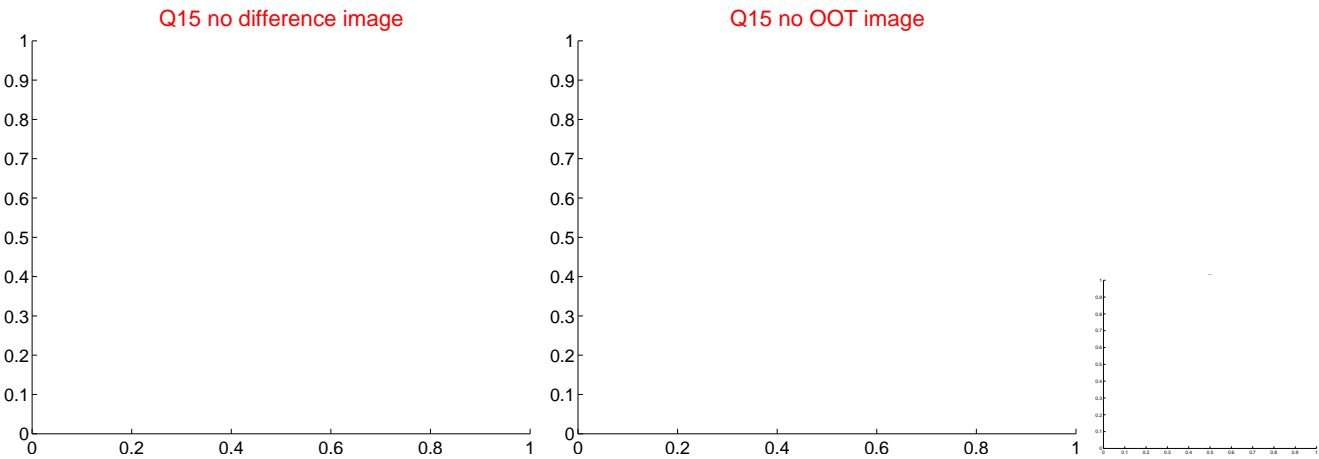
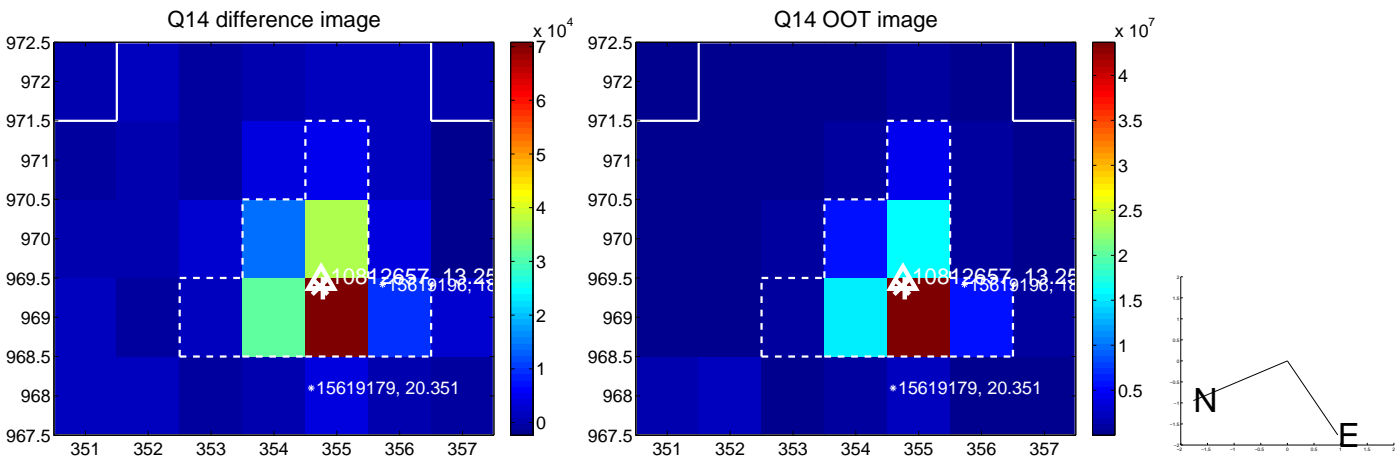
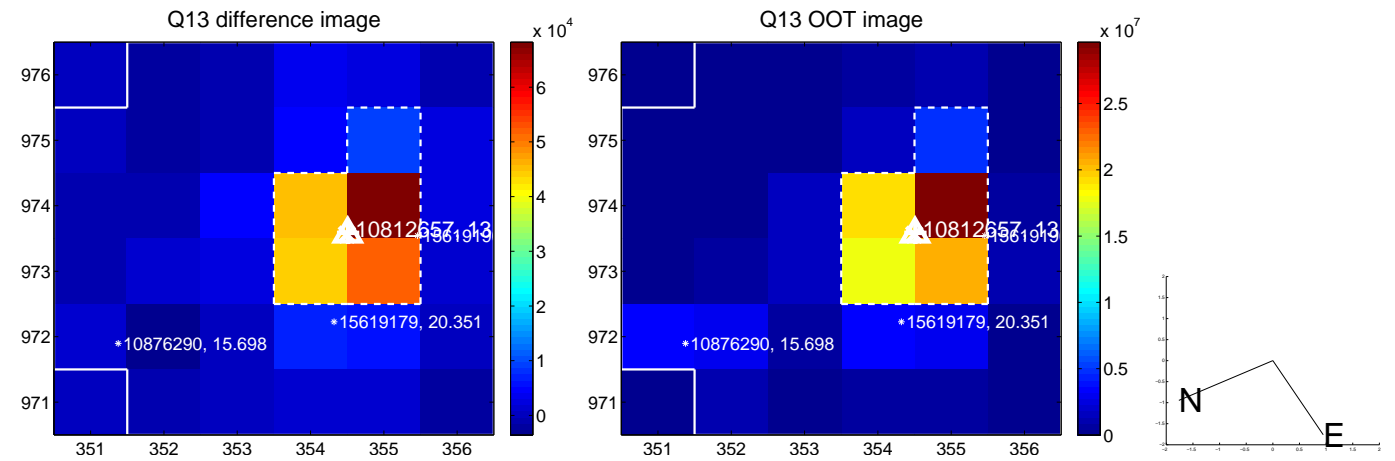


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

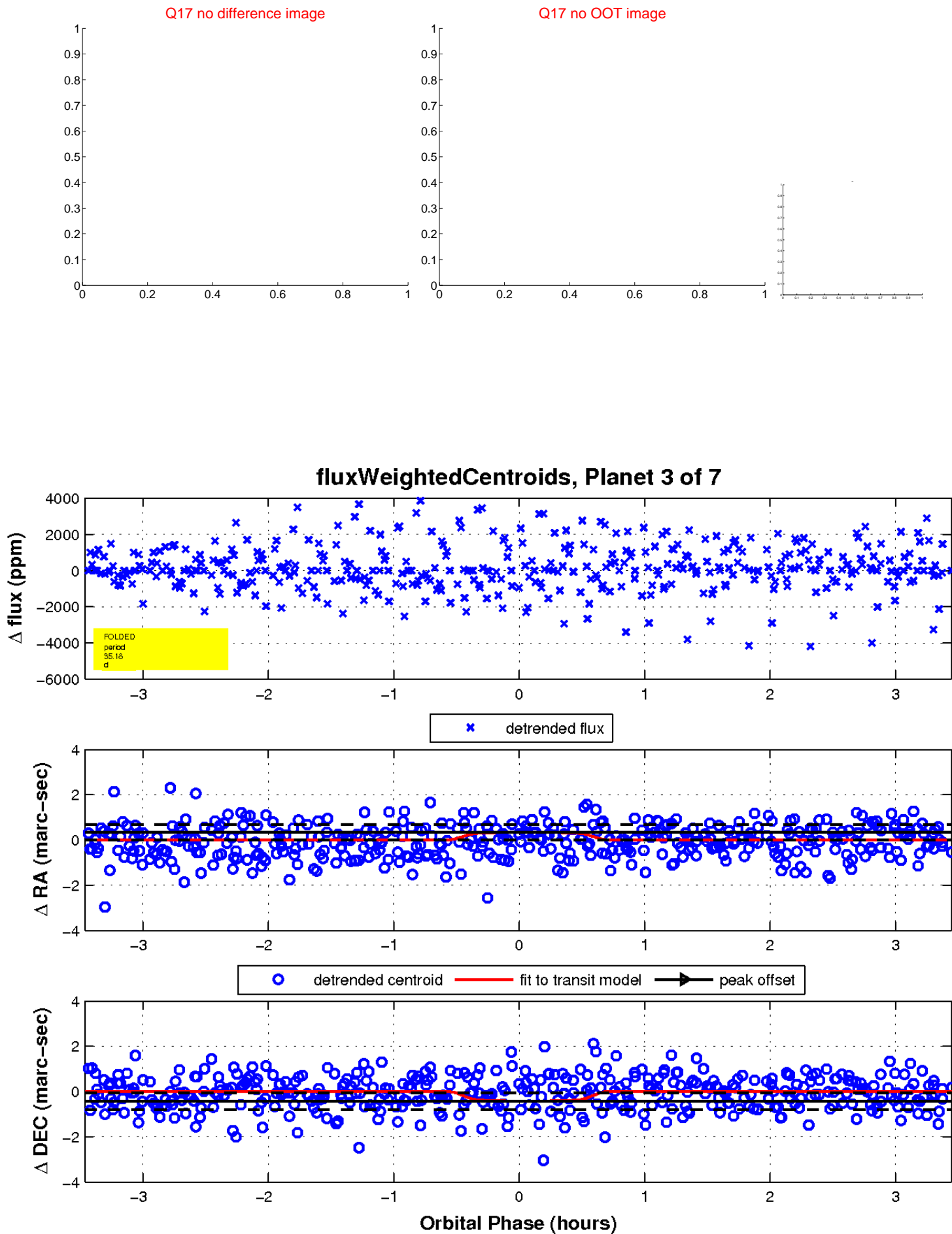




white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

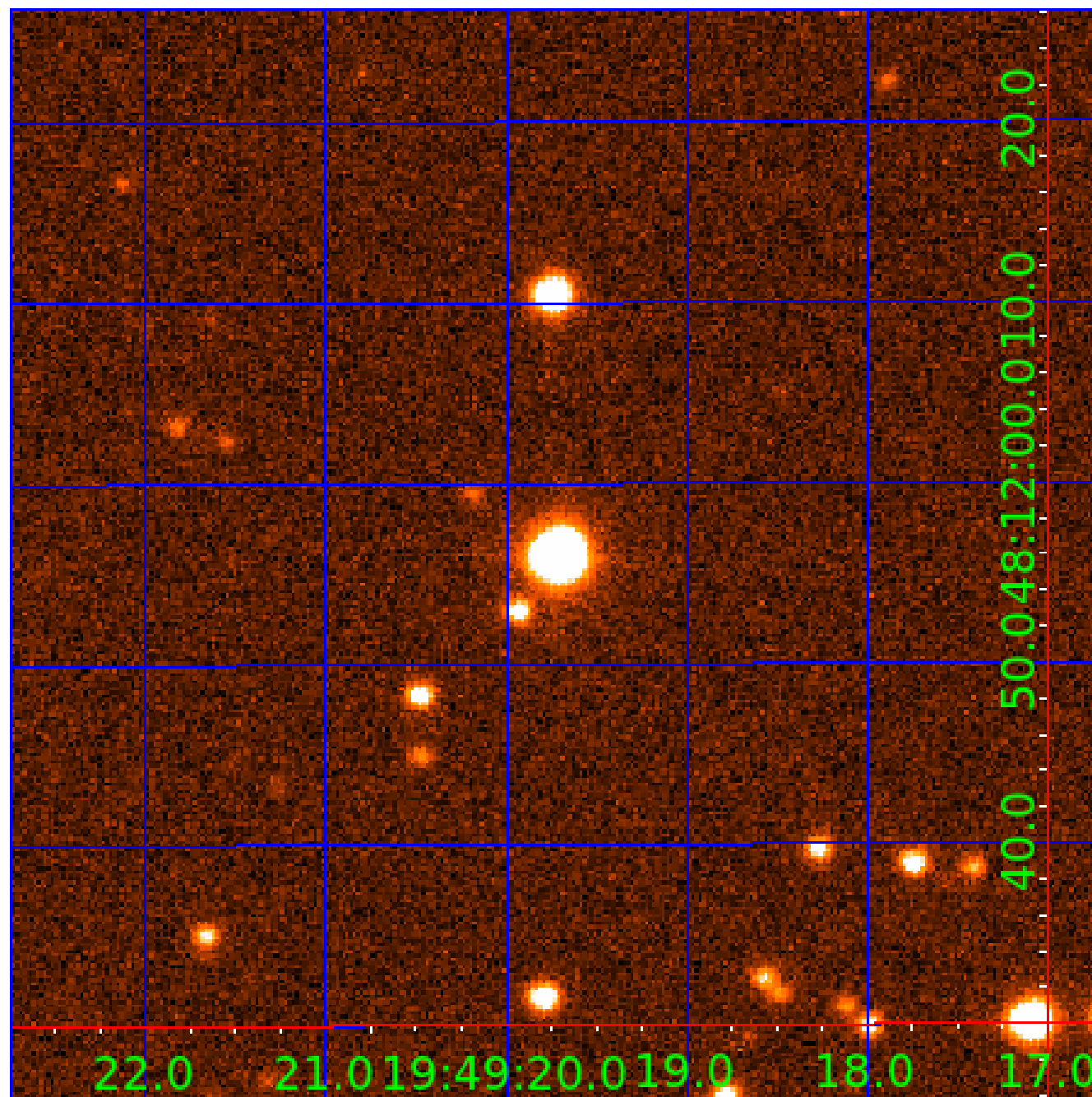


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 010812657

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010812657-01	OBS	No	1.035145	131.673492	0.0	7.075	10.4	0.0	1.56	7349	0.01	12704.67
010812657-02	OBS	No	28.976055	138.407555	2216.0	5.278	10.1	10.5	1.56	7349	13.37	149.48
010812657-03	OBS	No	35.180230	143.795173	300.1	1.153	8.7	1.6	1.56	7349	3.14	115.41
010812657-04	OBS	No	124.132671	139.492680	3660.5	6.477	8.7	9.4	1.56	7349	10.89	21.48
010812657-05	OBS	No	45.516172	151.891165	2053.9	3.772	8.5	7.3	1.56	7349	8.46	81.86
010812657-06	OBS	No	46.561129	143.542107	2902.8	7.319	8.5	8.7	1.56	7349	15.18	79.42
010812657-07	OBS	No	20.673153	151.062505	209.9	5.000	8.2	-1.0	1.56	7349	2.30	234.47

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010812657-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV
010812657-02	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—HALO_GHOST
010812657-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_TER_ALT—MOD_POS_ALT
010812657-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
010812657-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
010812657-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
010812657-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_NOFITS

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

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

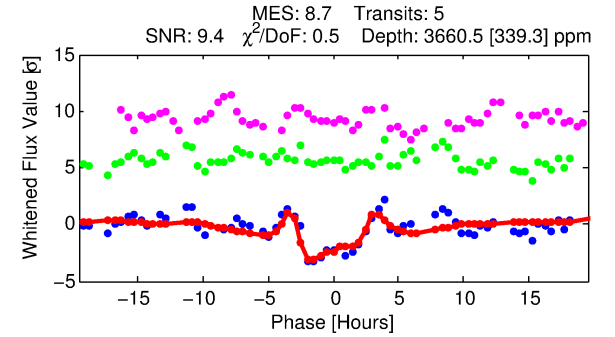
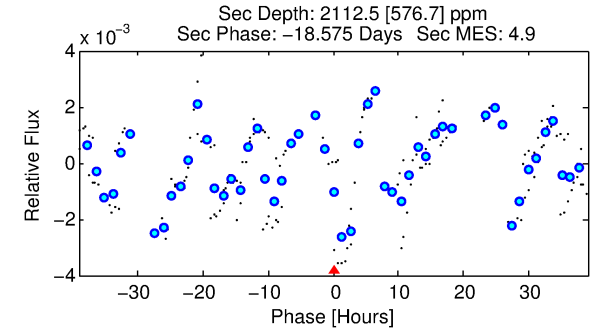
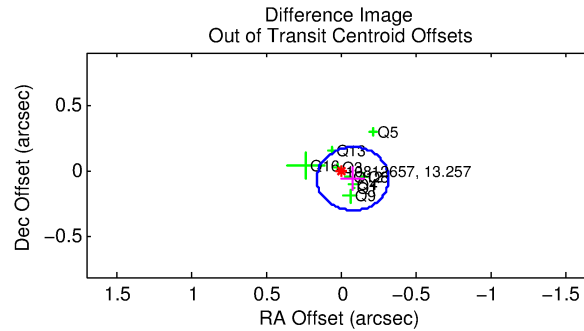
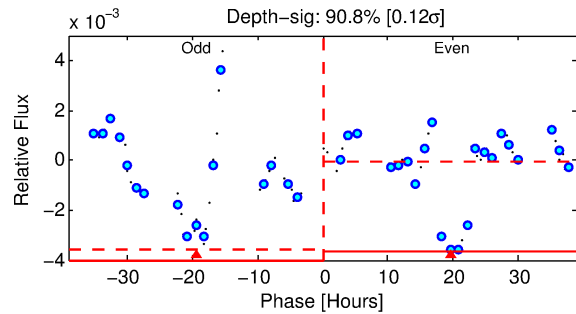
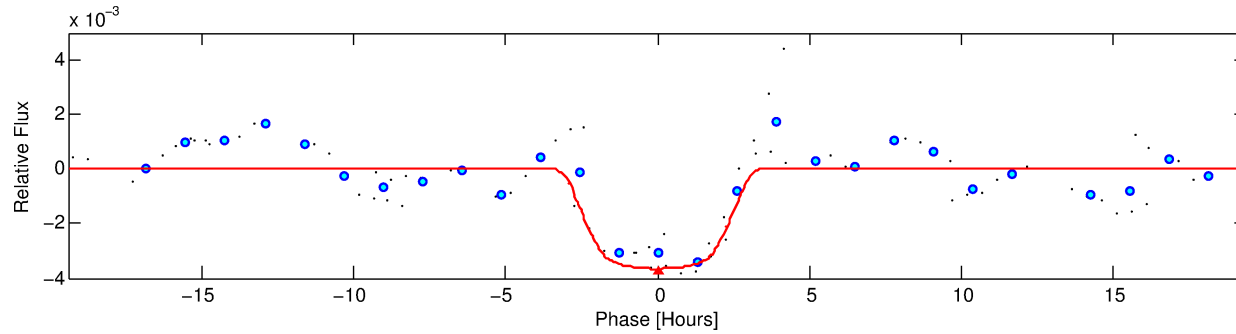
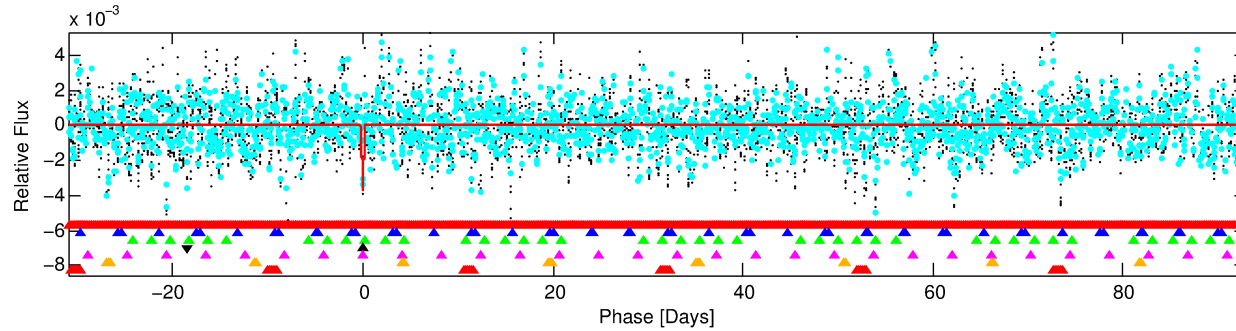
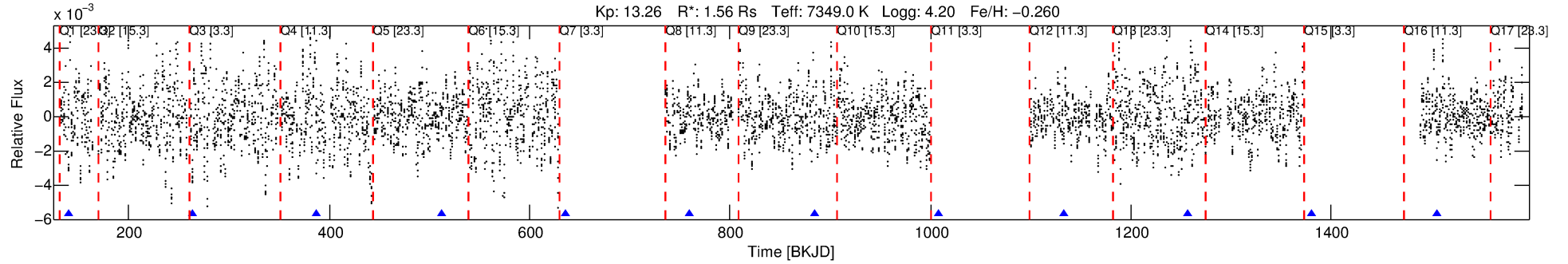
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 010812657-04

No Significant Match Found

# DV One-Page Summary

KIC: 10812657 Candidate: 4 of 7 Period: 124.133 d



## DV Fit Results:

Period = 124.13267 [0.00075] d  
Epoch = 139.4927 [0.0049] BKJD  
Rp/R\* = 0.0638 [0.0034]  
a/R\* = 85.91 [9.51]  
b = 0.89 [0.03]  
Seff = 21.48 [8.43]  
Teq = 549 [54] K  
Rp = 10.89 [3.47] Re  
a = 0.5455 [0.1382] AU  
Ag = 2913.98 [1339.93] [2.17σ]  
Teffp = 6236 [528] K [10.72σ]

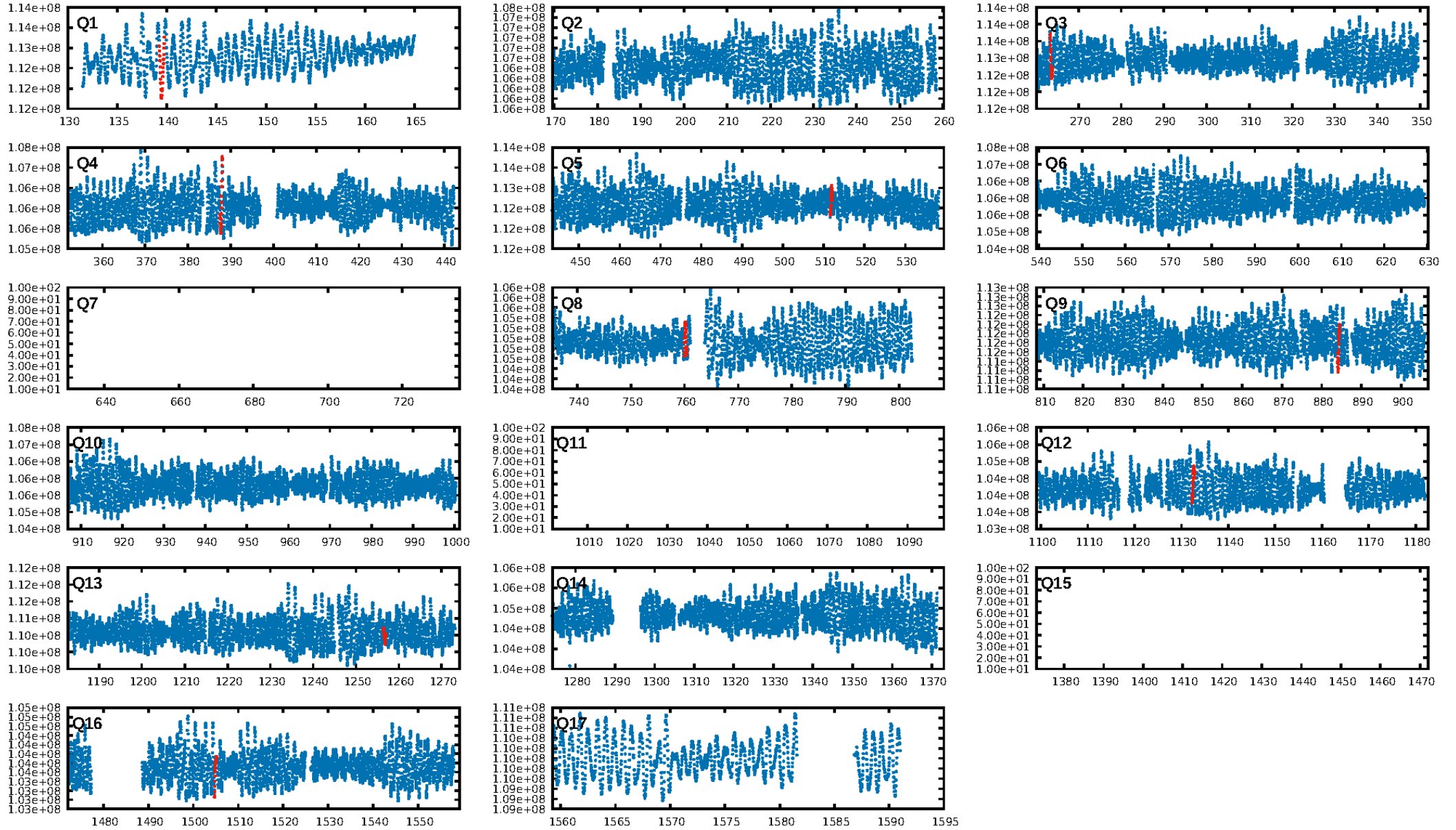
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [190.49σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 82.1%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: 0.7687  
Centroid-sig: 16.0%  
Centroid-so: 0.094 arcsec [1.00σ]  
OotOffset-rm: 0.099 arcsec [1.24σ]  
OotOffset-st: 0/1/4/4 [9]  
KicOffset-rm: 0.213 arcsec [2.47σ]  
KicOffset-st: 0/1/4/4 [9]  
DiffImageQuality-fgm: 0.56 [5/9]  
DiffImageOverlap-fno: 0.00 [0/9]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 10:24:16 Z

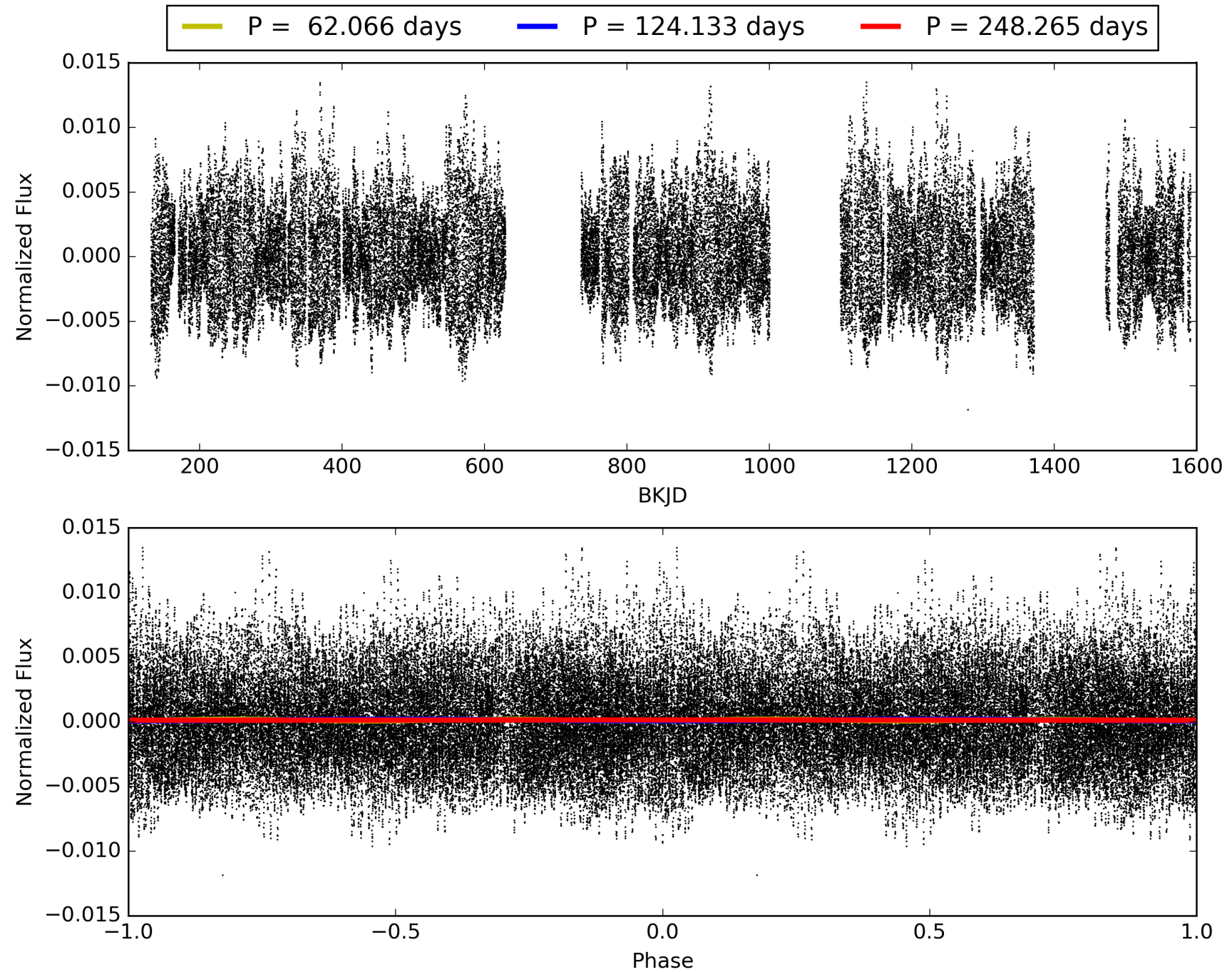
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 010812657-04, PDC Light Curves





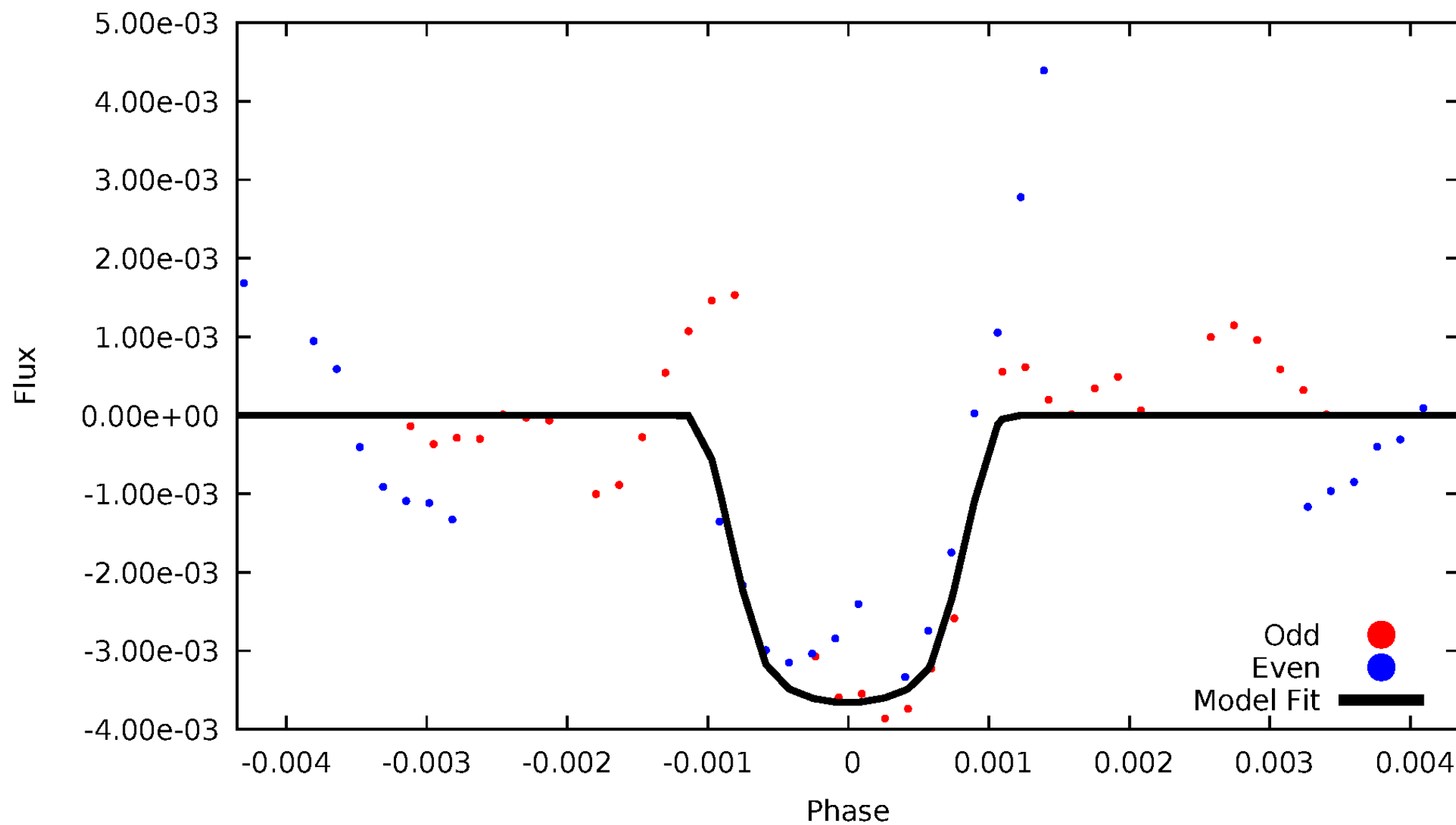
# TCE 010812657-04





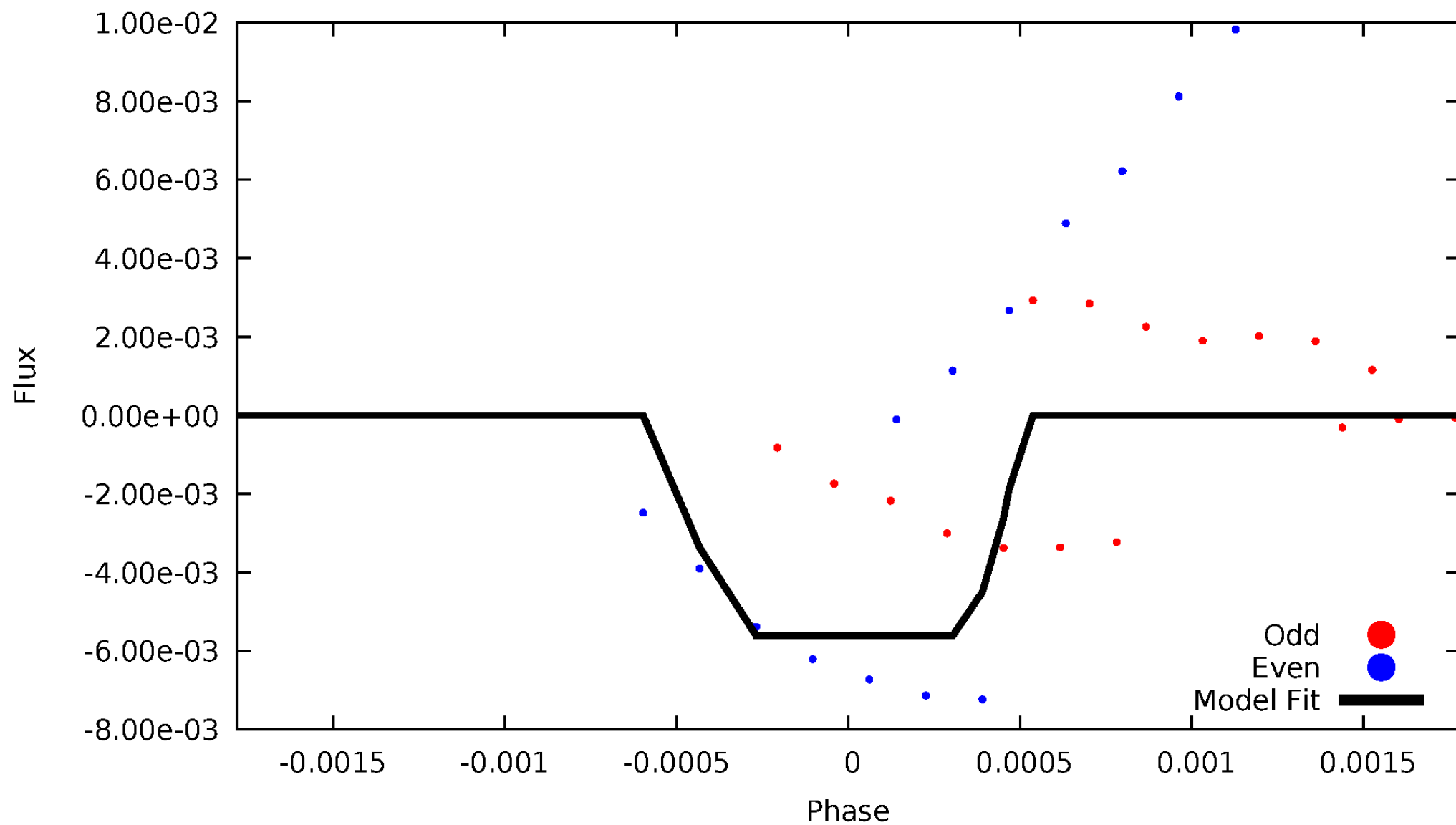
# DV Odd/Even

TCE 010812657-04



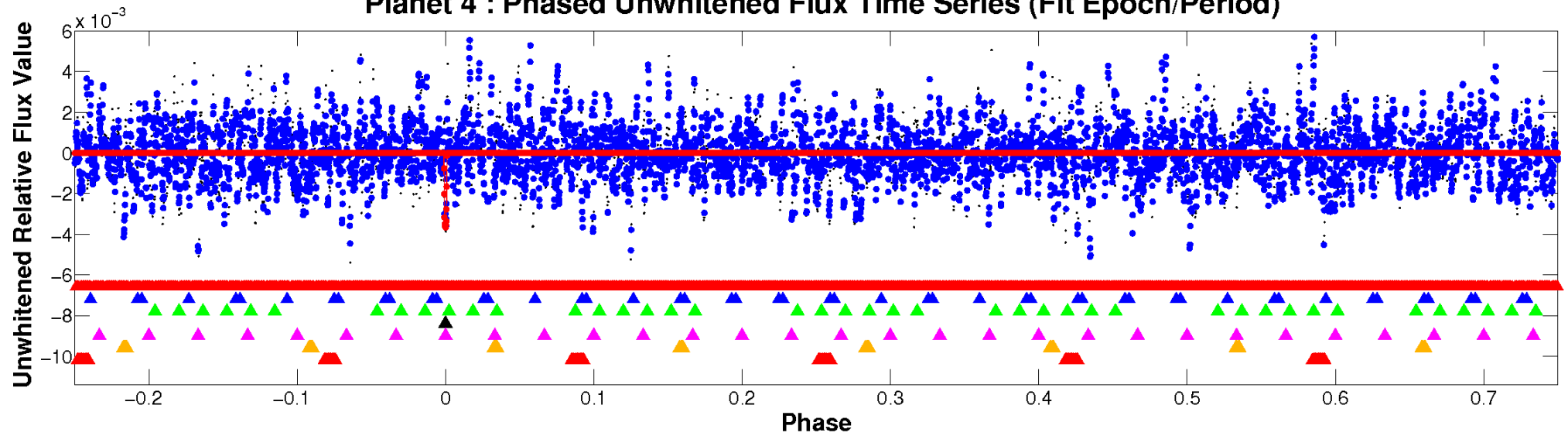
# ALT Odd/Even

TCE 010812657-04

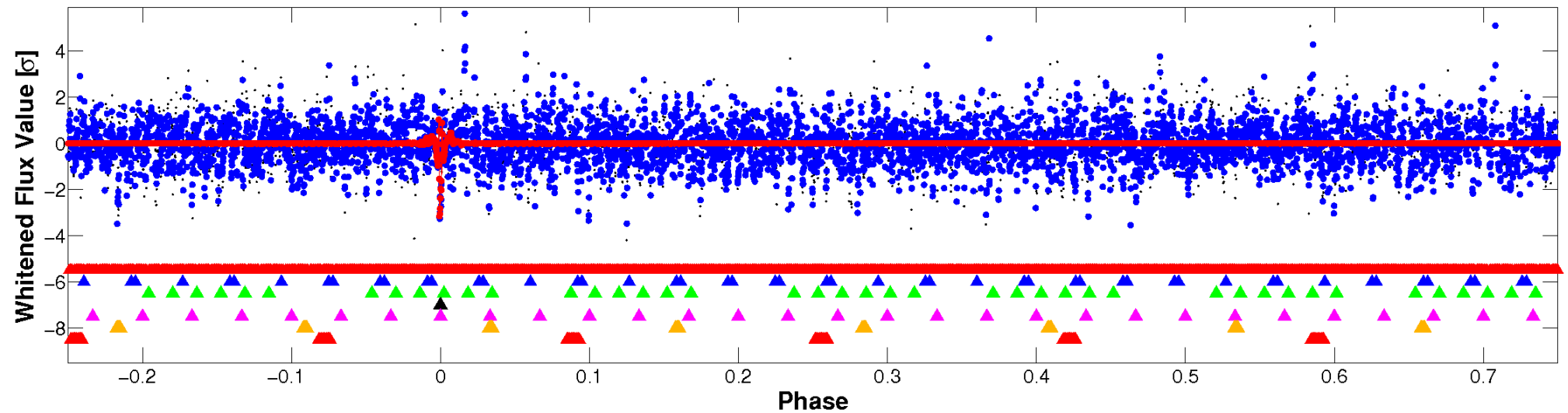


# Non-Whitened Vs. Whitened Light Curve

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

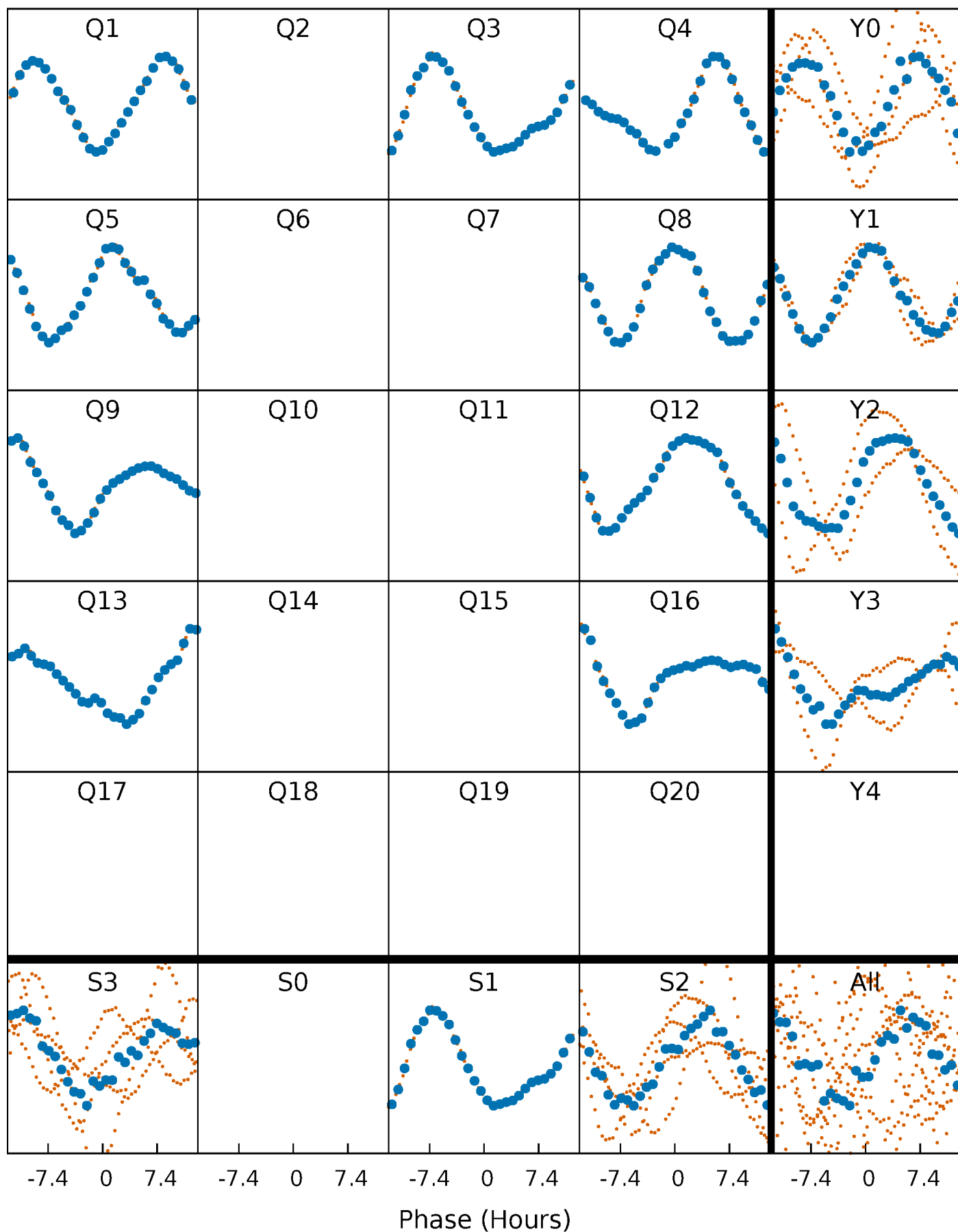


Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



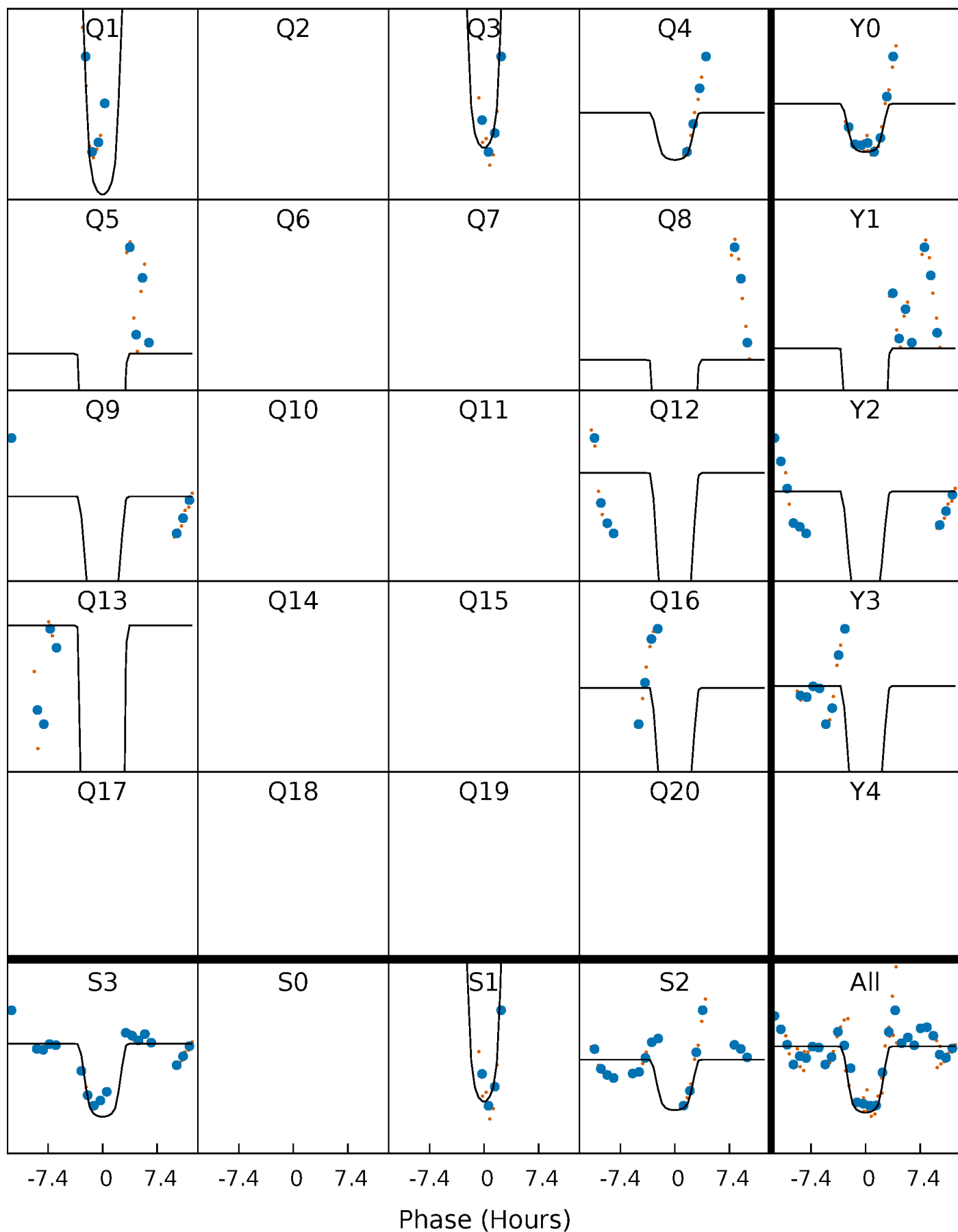
# PDC Quarter-Phased Transit Curves

TCE 010812657-04     $P=124.132671$  Days     $T_0=139.492680$  (BKJD)



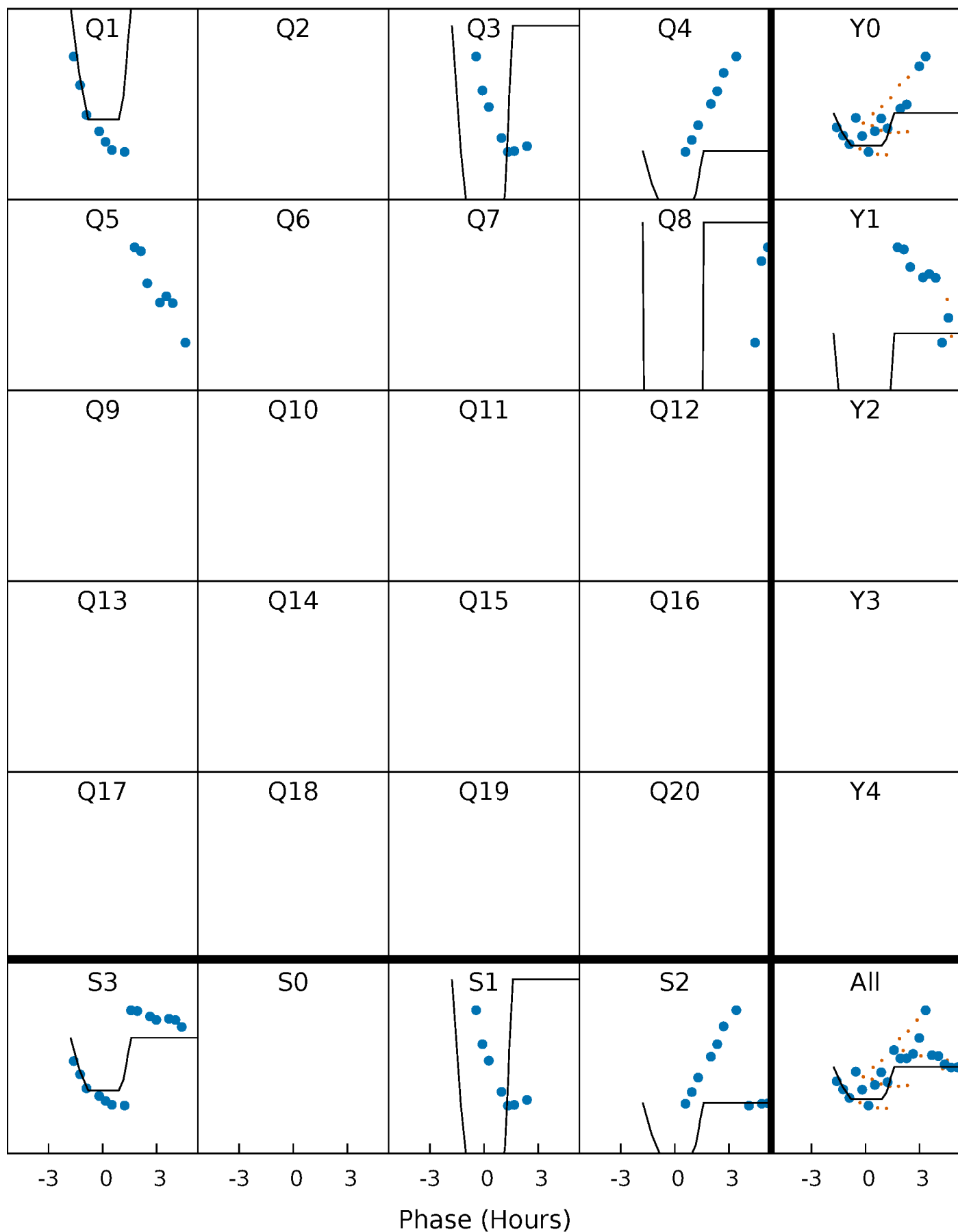
# DV Quarter-Phased Transit Curves

TCE 010812657-04     $P=124.132671$  Days     $T_0=139.492680$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

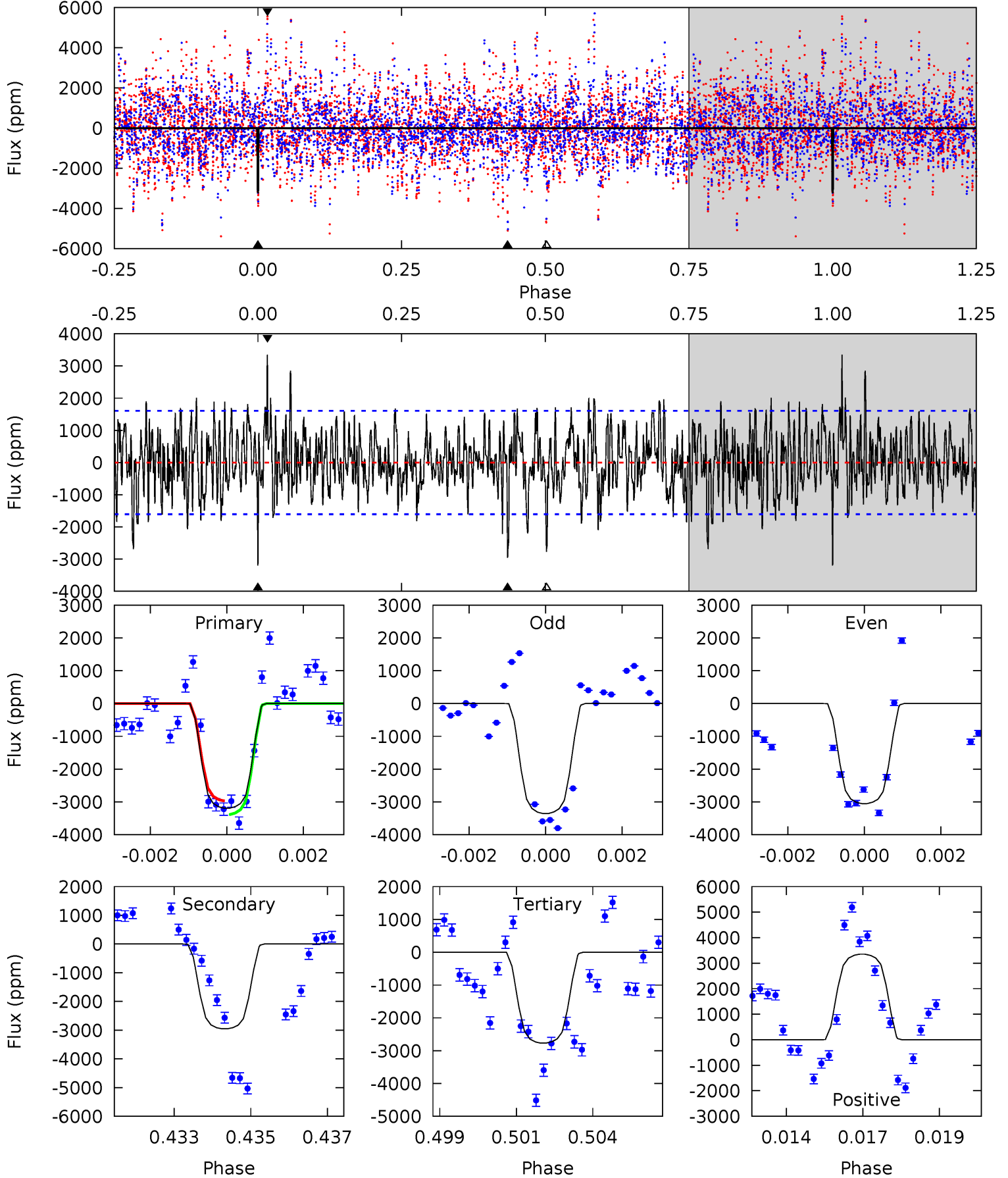
TCE 010812657-04 P=124.168908 Days  $T_0=139.453139$  (BKJD)



# DV Model-Shift Uniqueness Test

010812657-04, P = 124.132671 Days, E = 15.360009 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	9.72	9.11	11.0	5.30	3.04	2.67	1.40	-0.53	0.61	-1.31	0.50	0.50	0.51	0.69

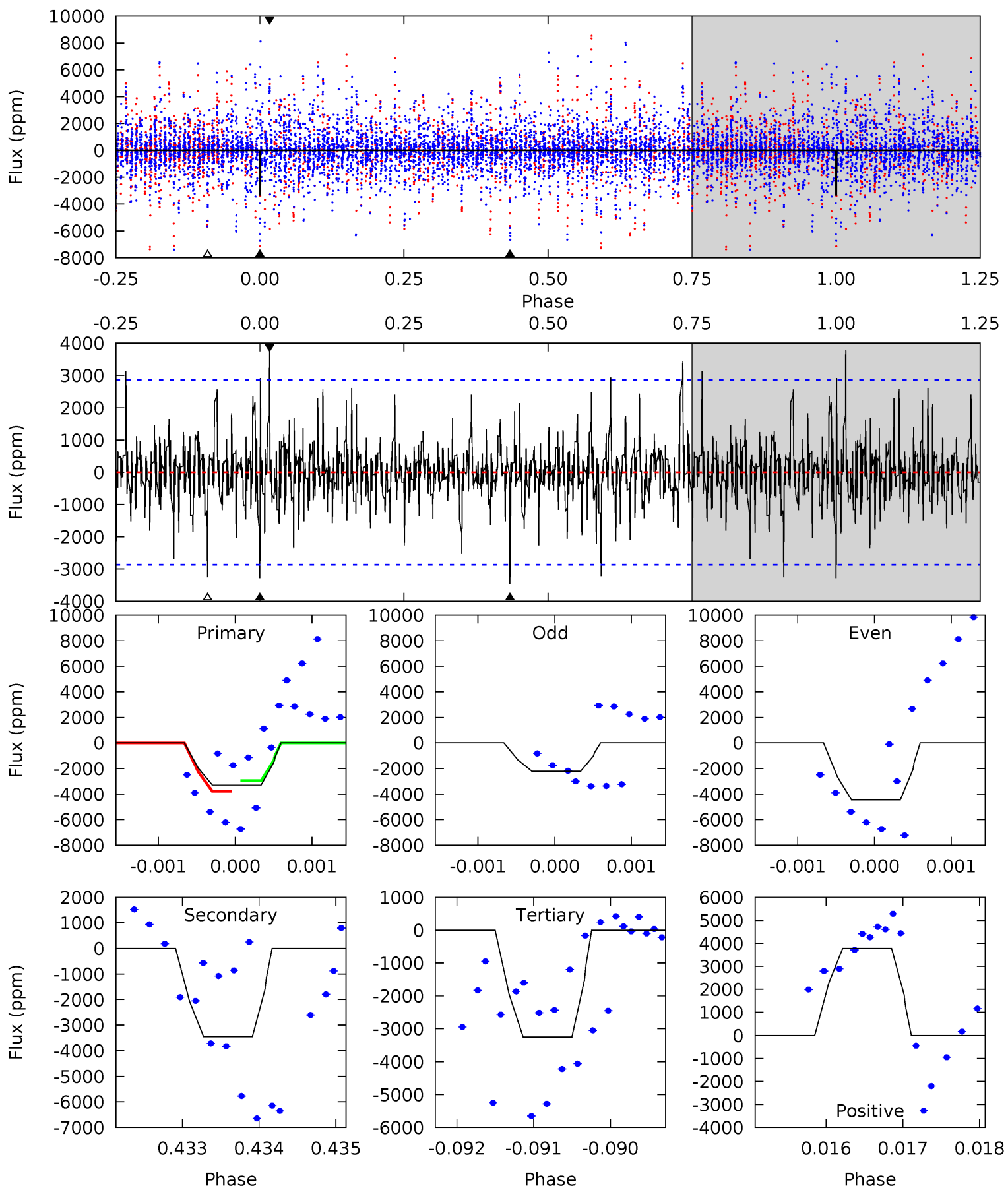




# Alt Model-Shift Uniqueness Test

010812657-04, P = 124.168908 Days, E = 15.284231 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
6.29	6.59	6.20	7.22	5.47	3.32	1.45	0.09	-0.93	0.39	-0.63	2.22	1.21	0.52	0.77



### Stellar Parameters For KIC 010812657

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7349^{+206}_{-310}$	$4.197^{+0.124}_{-0.186}$	$-0.260^{+0.250}_{-0.350}$	$1.564^{+0.491}_{-0.302}$	$1.408^{+0.216}_{-0.216}$	$0.518^{+0.319}_{-0.266}$
	+3%/-4%	+3%/-4%	+96%/-135%	+31%/-19%	+15%/-15%	+61%/-51%
Source	KIC0	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 010812657-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-2954 \pm 304$	$11.04^{+1.94}_{-1.40}$	$773^{+55}_{-49}$	$6699^{+346}_{-342}$	$3962^{+1183}_{-1094}$
Alt.	$-3454 \pm 524$	$13.06^{+2.12}_{-1.56}$	$773^{+54}_{-49}$	$6394^{+369}_{-363}$	$3259^{+1002}_{-833}$

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

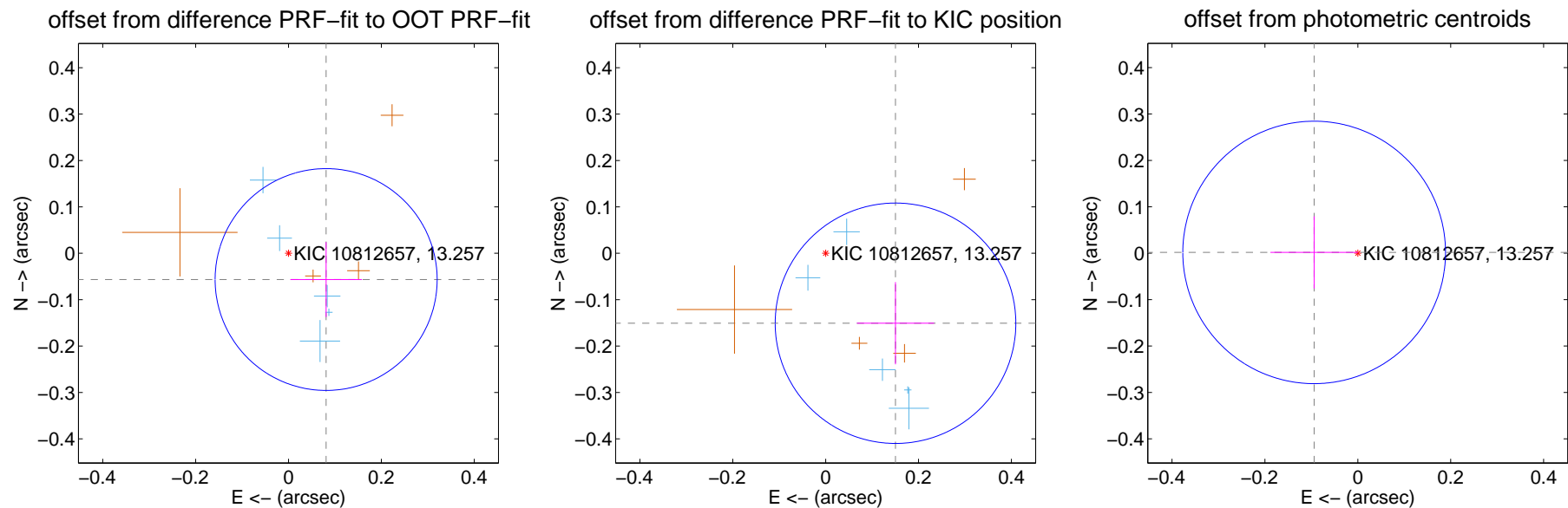
## DV Centroid Data

Supplemental centroid analysis for 010812657-04. Kepler magnitude: 13.26. Transit SNR 9.43

There are 5 quarters with good PRF difference image offsets

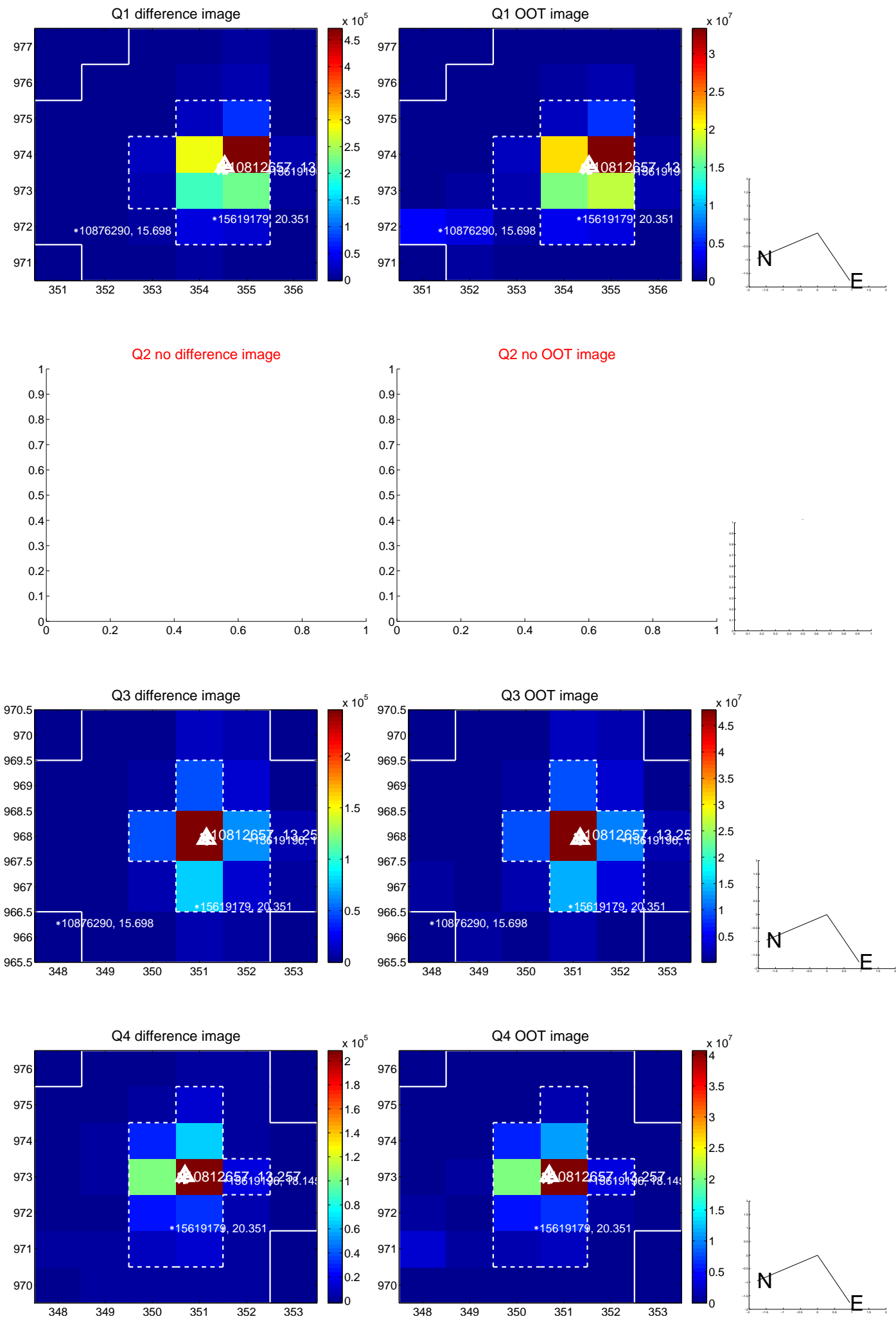
The direct PRF centroid is offset from the target star catalog position by about 0.17 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.099 \pm 0.080$	1.24	$-0.081 \pm 0.077$	$-0.057 \pm 0.081$
PRF-fit source offset from KIC position	$0.213 \pm 0.086$	2.47	$-0.150 \pm 0.083$	$-0.151 \pm 0.089$
photometric centroid source offset	$0.09 \pm 0.09$	1.00	$0.09 \pm 0.09$	$0.00 \pm 0.08$

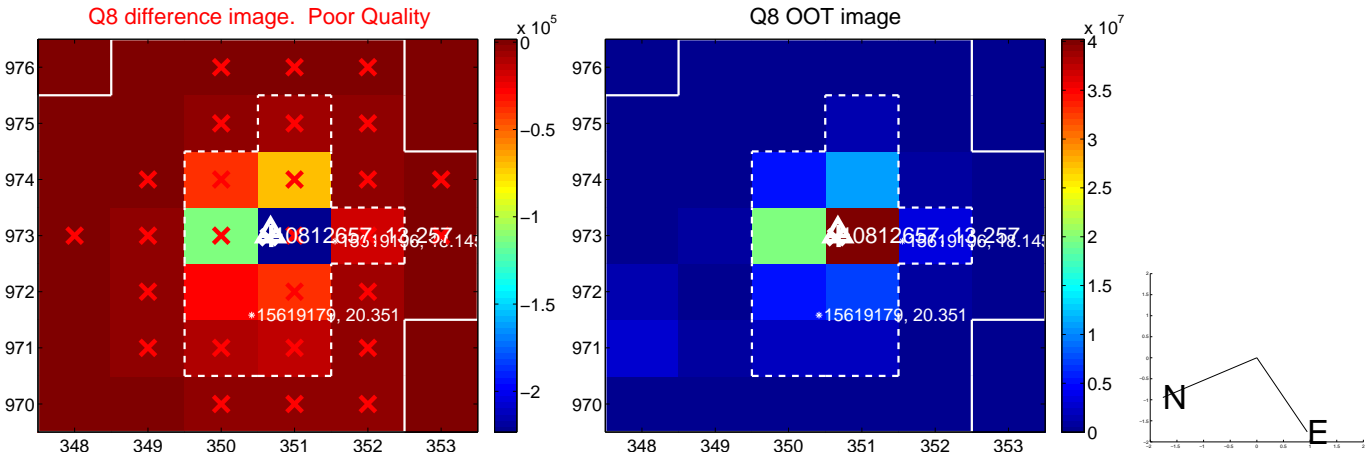
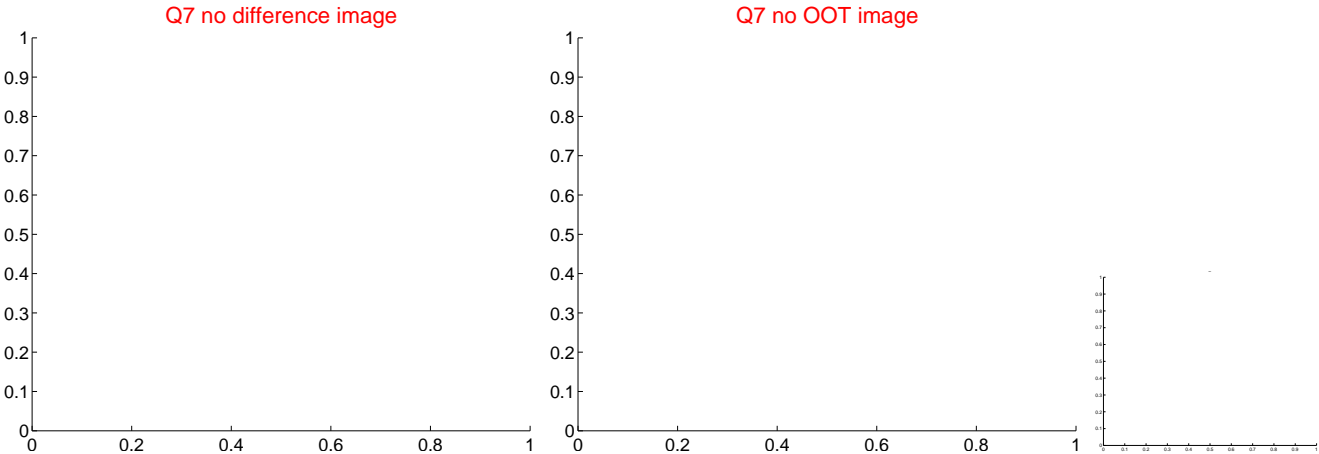
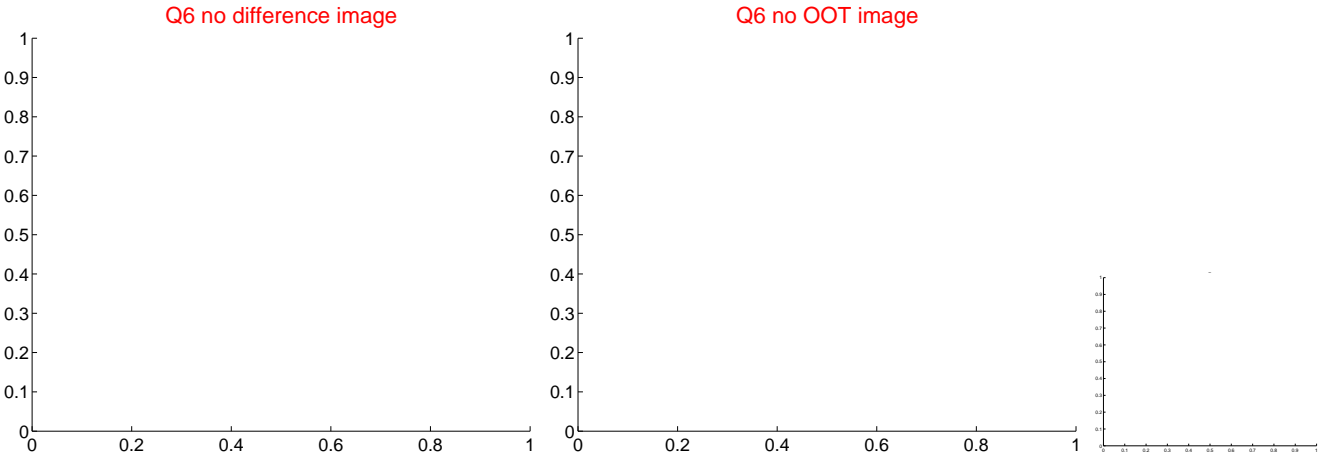
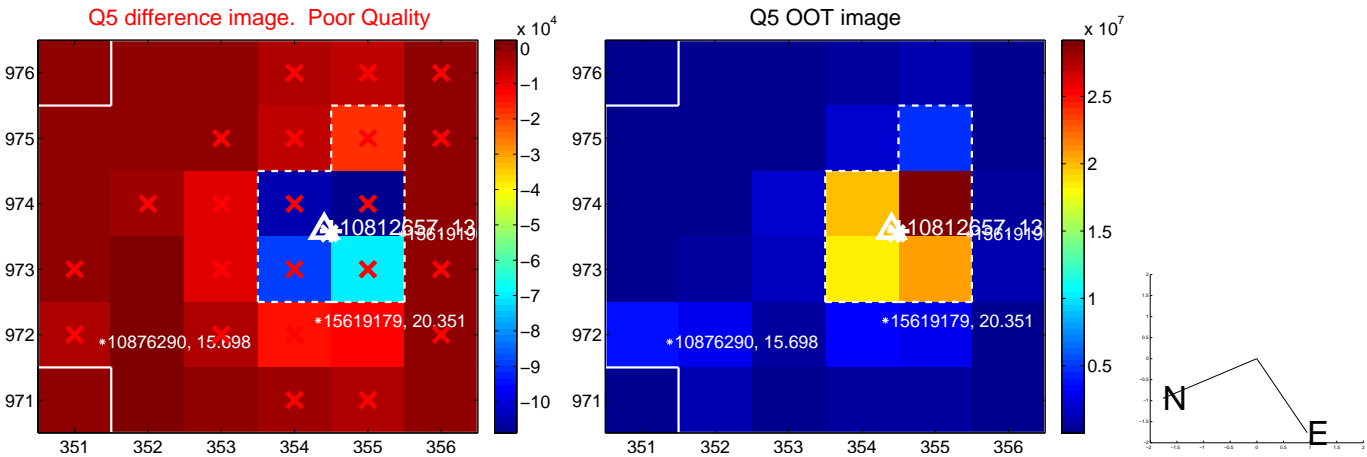


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

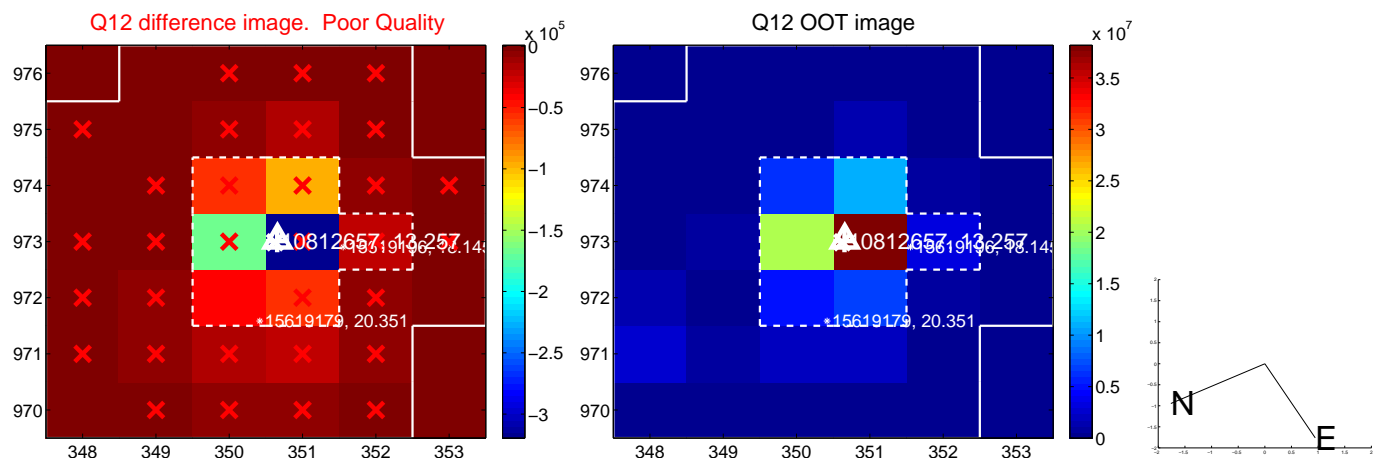
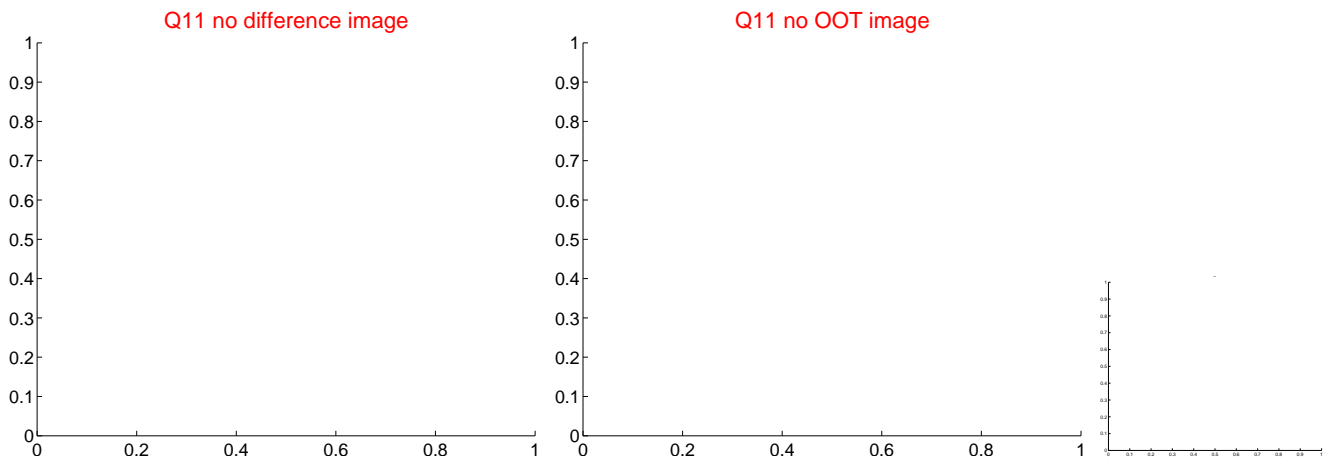
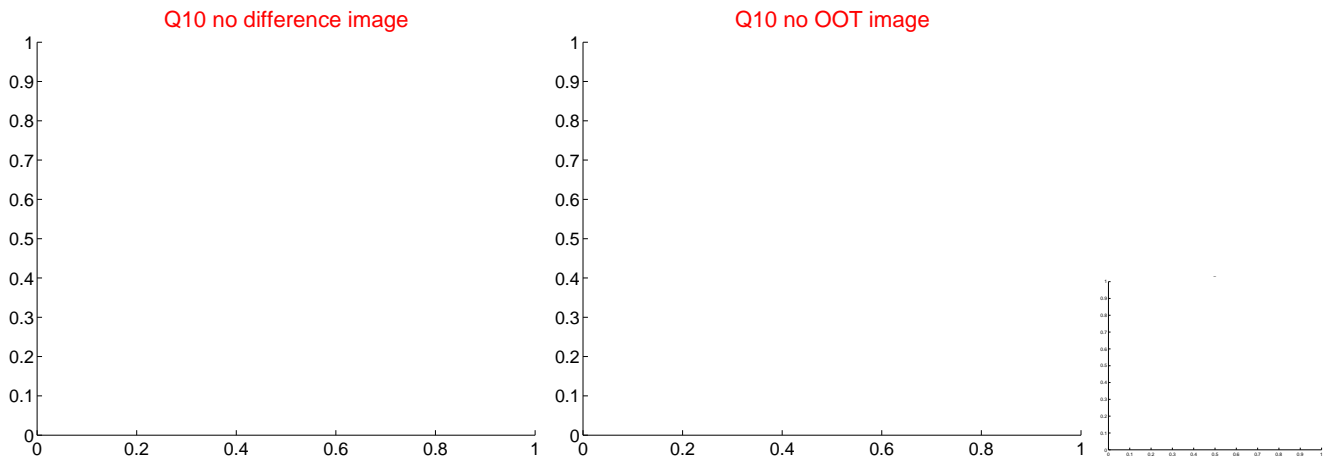
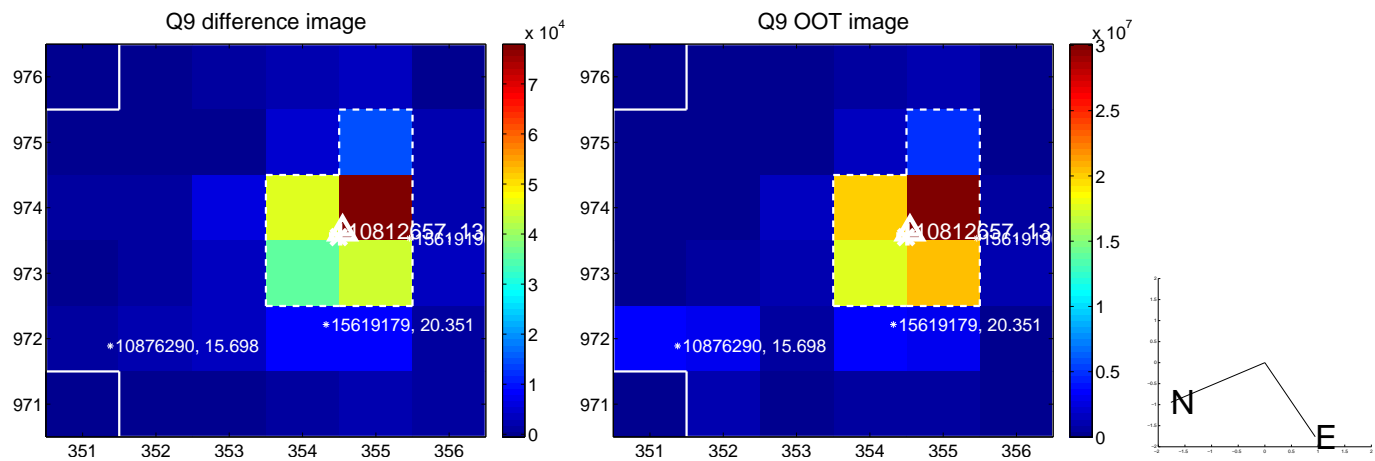
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



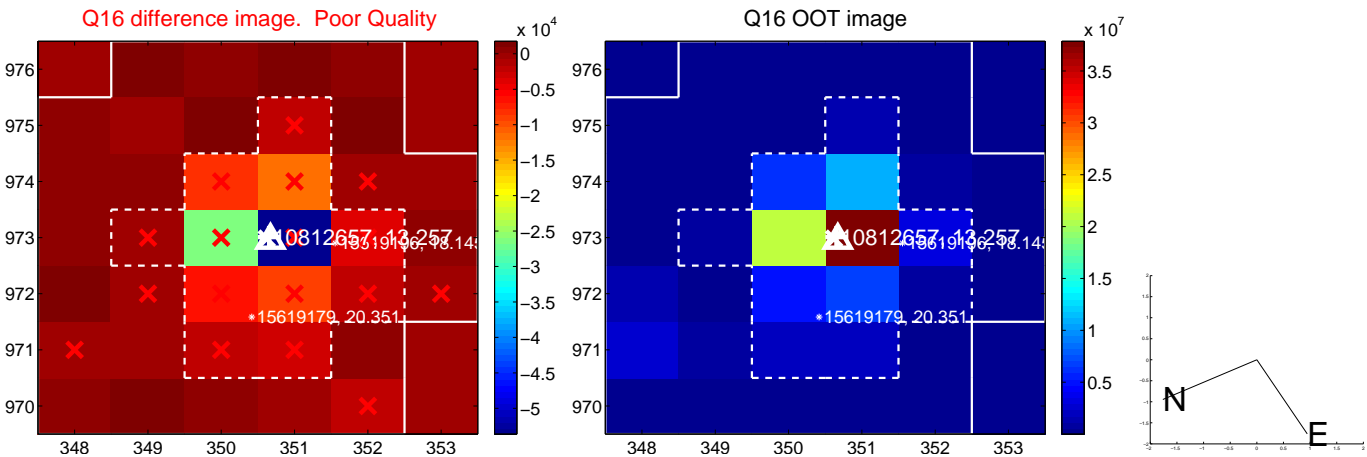
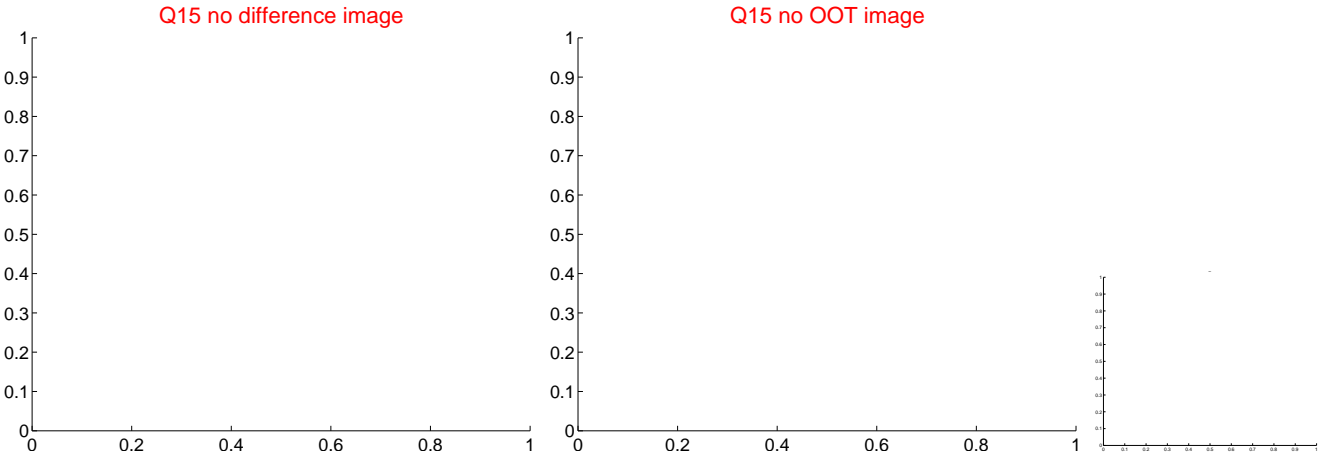
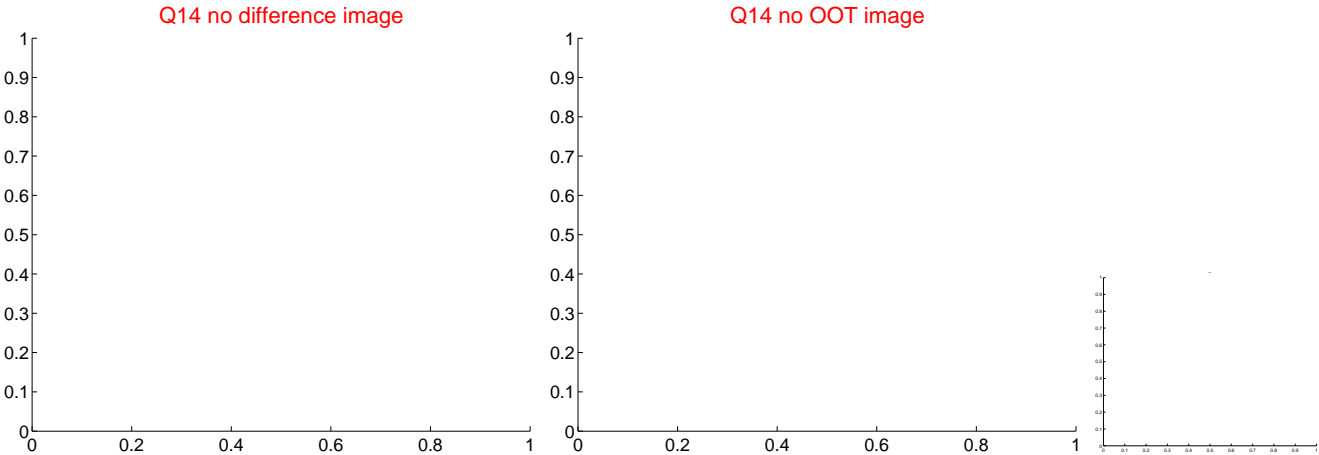
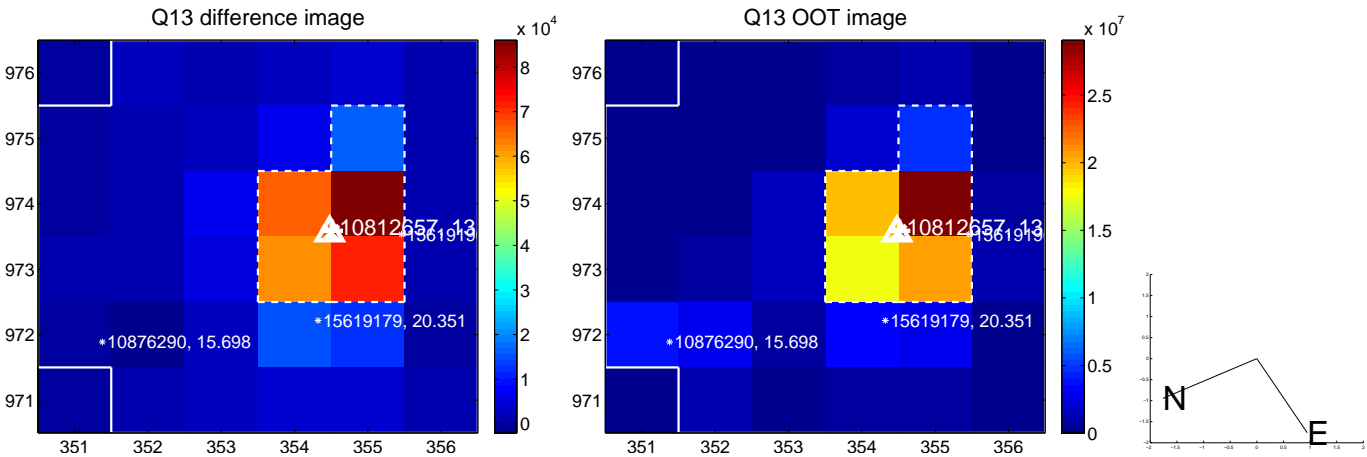
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

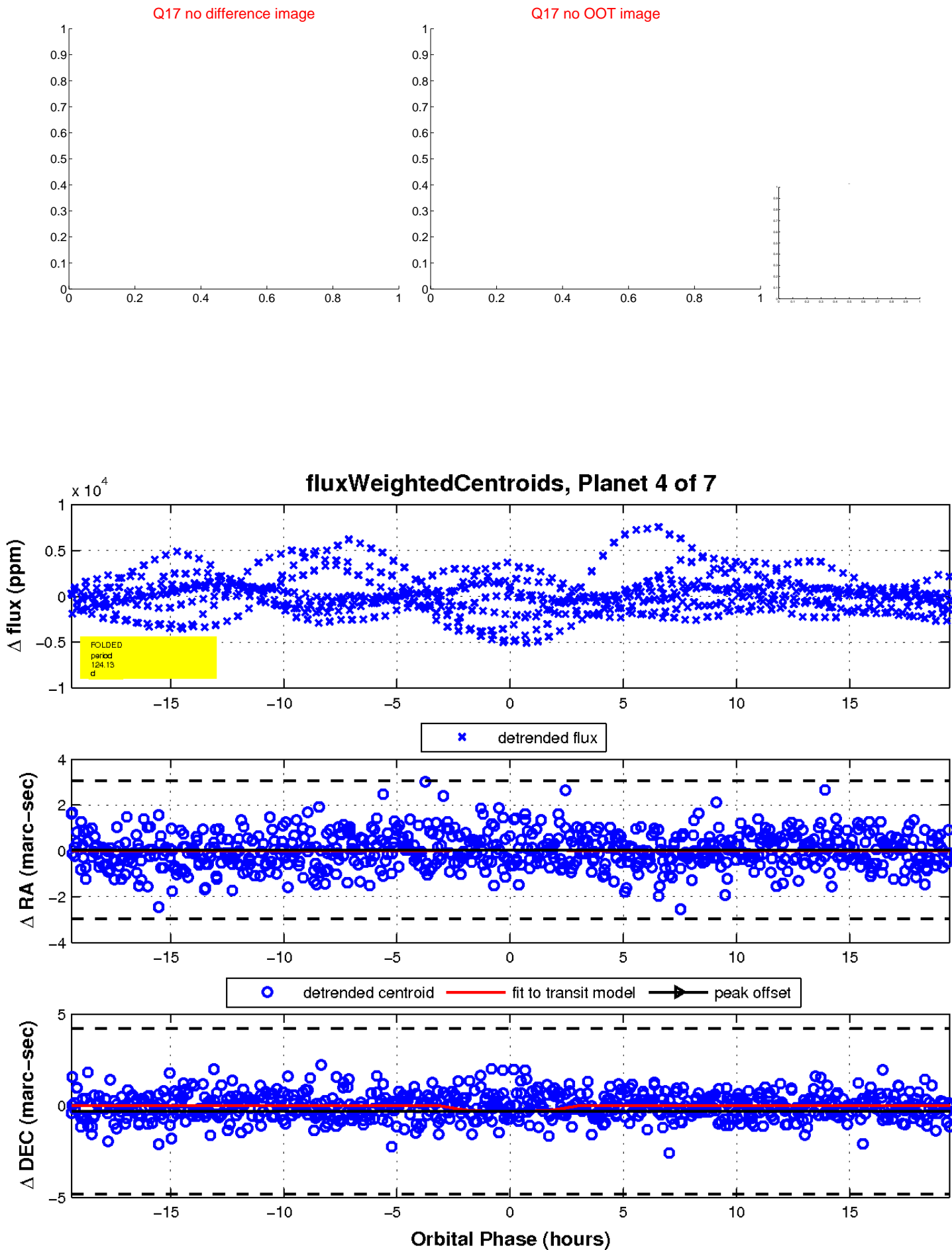


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



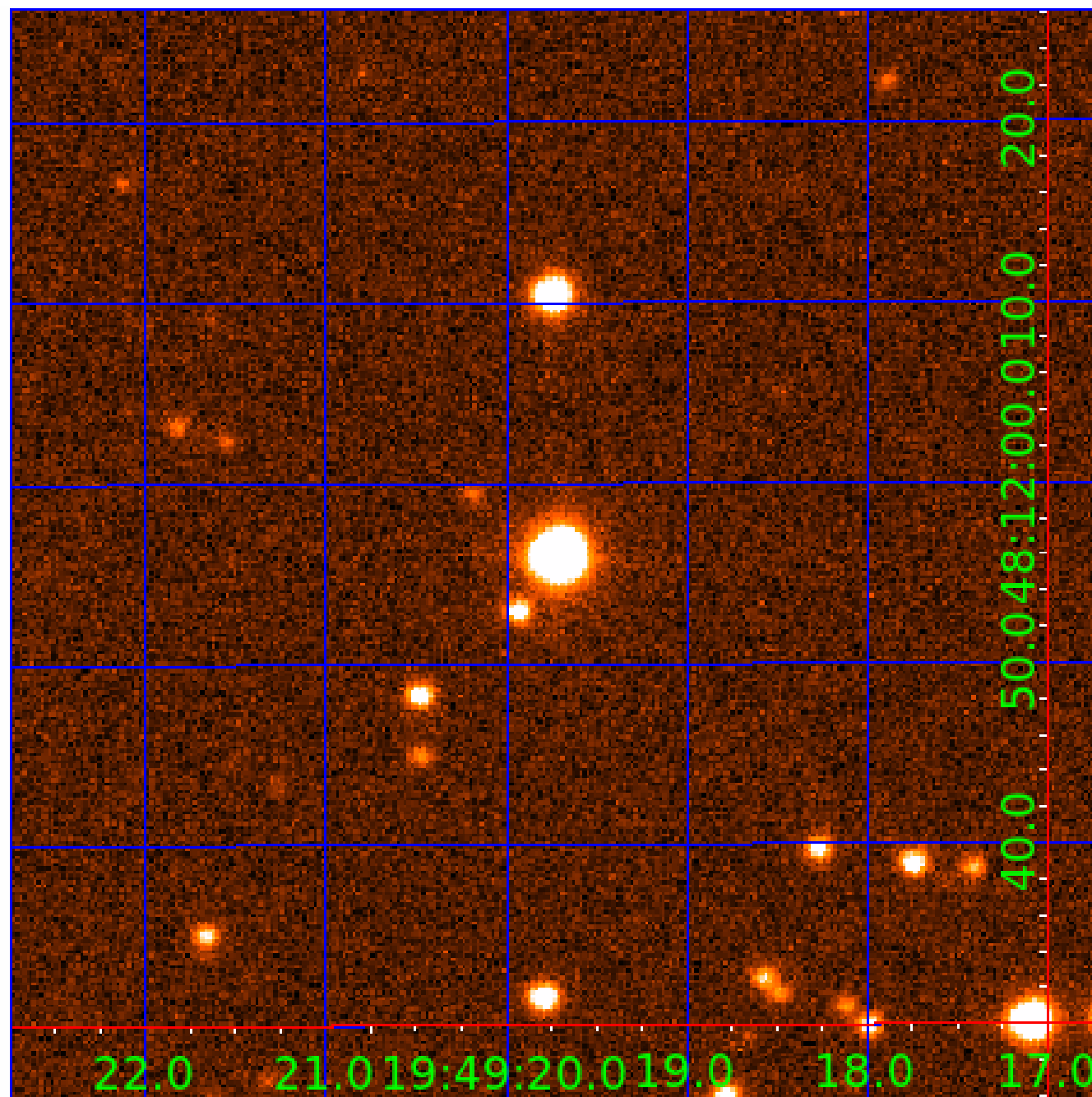


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 010812657

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010812657-01	OBS	No	1.035145	131.673492	0.0	7.075	10.4	0.0	1.56	7349	0.01	12704.67
010812657-02	OBS	No	28.976055	138.407555	2216.0	5.278	10.1	10.5	1.56	7349	13.37	149.48
010812657-03	OBS	No	35.180230	143.795173	300.1	1.153	8.7	1.6	1.56	7349	3.14	115.41
010812657-04	OBS	No	124.132671	139.492680	3660.5	6.477	8.7	9.4	1.56	7349	10.89	21.48
010812657-05	OBS	No	45.516172	151.891165	2053.9	3.772	8.5	7.3	1.56	7349	8.46	81.86
010812657-06	OBS	No	46.561129	143.542107	2902.8	7.319	8.5	8.7	1.56	7349	15.18	79.42
010812657-07	OBS	No	20.673153	151.062505	209.9	5.000	8.2	-1.0	1.56	7349	2.30	234.47

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010812657-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV
010812657-02	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—HALO_GHOST
010812657-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_TER_ALT—MOD_POS_ALT
010812657-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
010812657-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
010812657-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
010812657-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_NOFITS

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

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

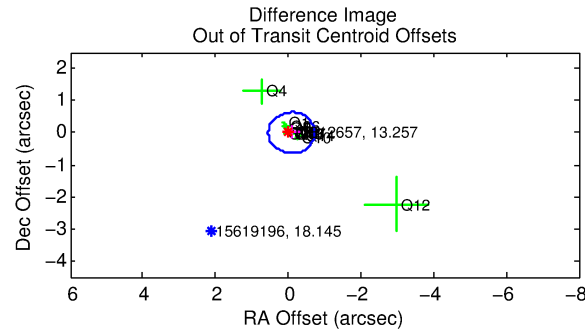
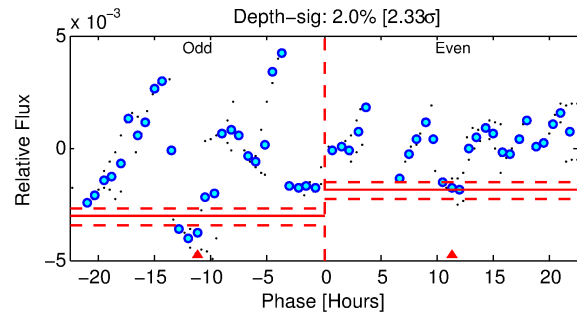
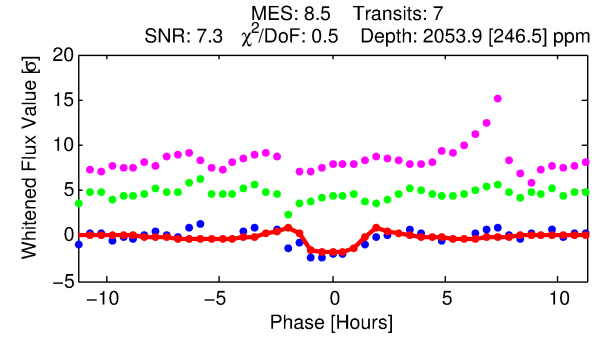
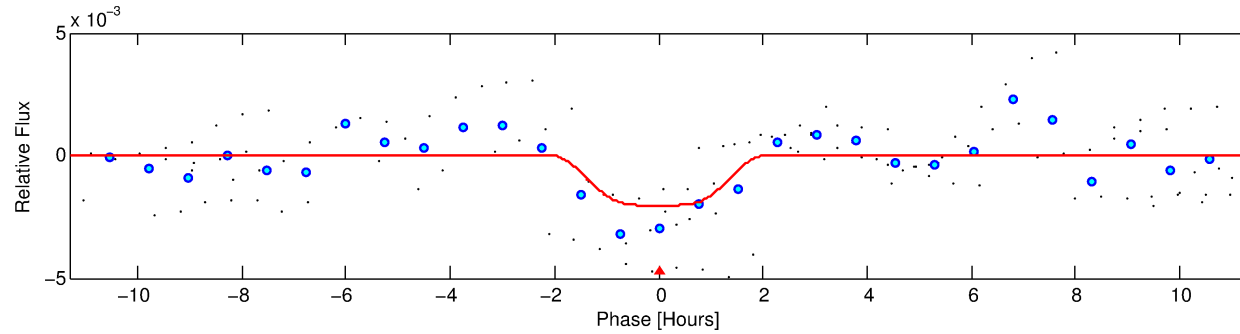
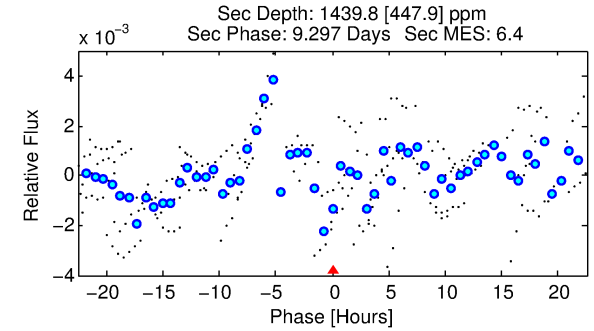
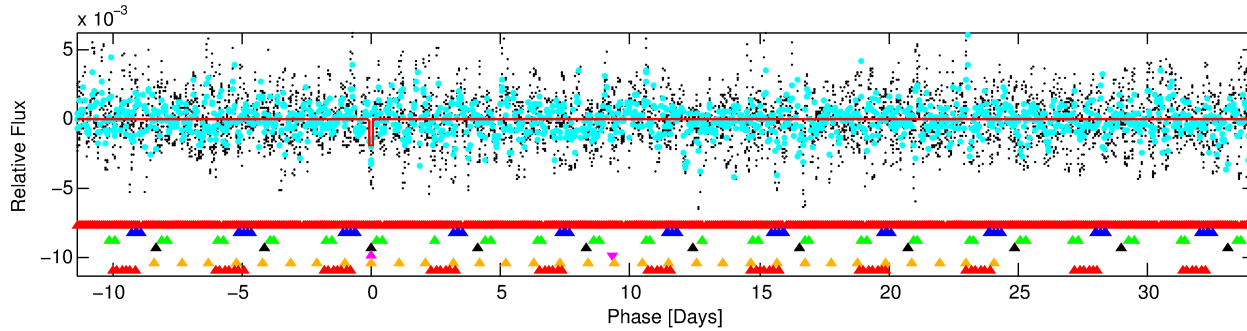
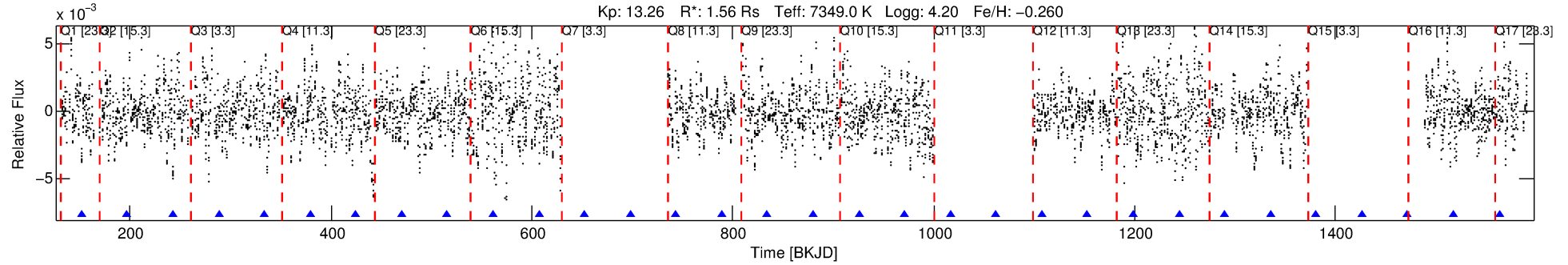
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 010812657-05

No Significant Match Found

# DV One-Page Summary

KIC: 10812657 Candidate: 5 of 7 Period: 45.516 d



## DV Fit Results:

Period = 45.51617 [0.00043] d  
Epoch = 151.8912 [0.0042] BKJD  
Rp/R\* = 0.0496 [0.0038]  
a/R\* = 44.84 [8.18]  
b = 0.93 [0.03]  
Seff = 81.86 [32.10]  
Teq = 767 [75] K  
Rp = 8.46 [2.73] Re  
a = 0.2794 [0.0708] AU  
Ag = 863.54 [427.85] [2.02σ]  
Teffp = 6428 [620] K [9.07σ]

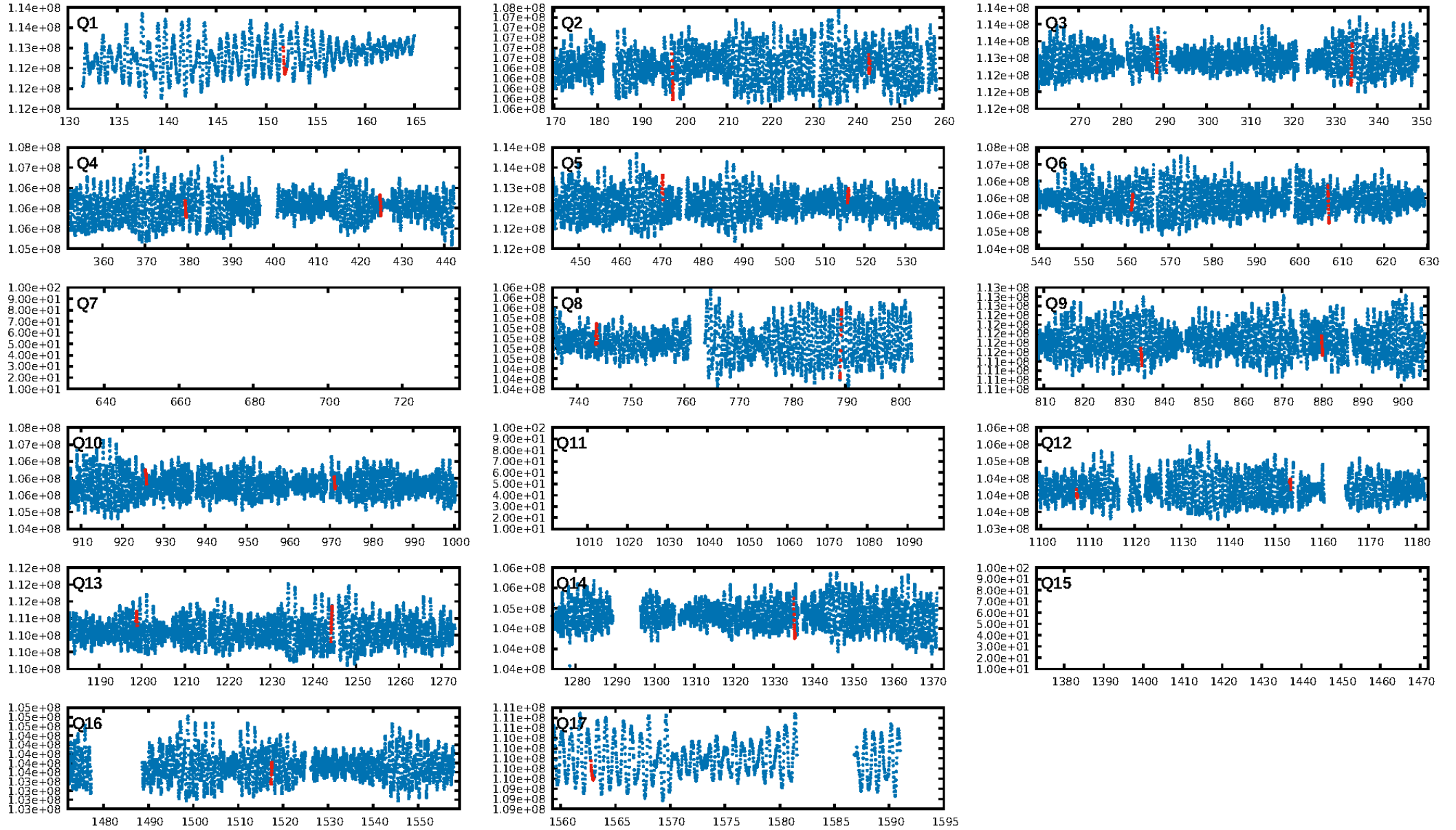
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [62.89σ]  
LongPeriod-sig: 99.8% [3.05σ]  
ModelChiSquare2-sig: 47.5%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [5/5]  
GhostDiagnostic-chr: -2.639  
Centroid-sig: 6.5%  
Centroid-so: 0.087 arcsec [0.75σ]  
OotOffset-rm: 0.091 arcsec [0.43σ]  
KicOffset-rm: 0.201 arcsec [0.77σ]  
OotOffset-st: 4/1/4/5 [14]  
KicOffset-st: 4/1/4/5 [14]  
DiffImageQuality-fgm: 0.64 [9/14]  
DiffImageOverlap-fno: 0.00 [0/14]

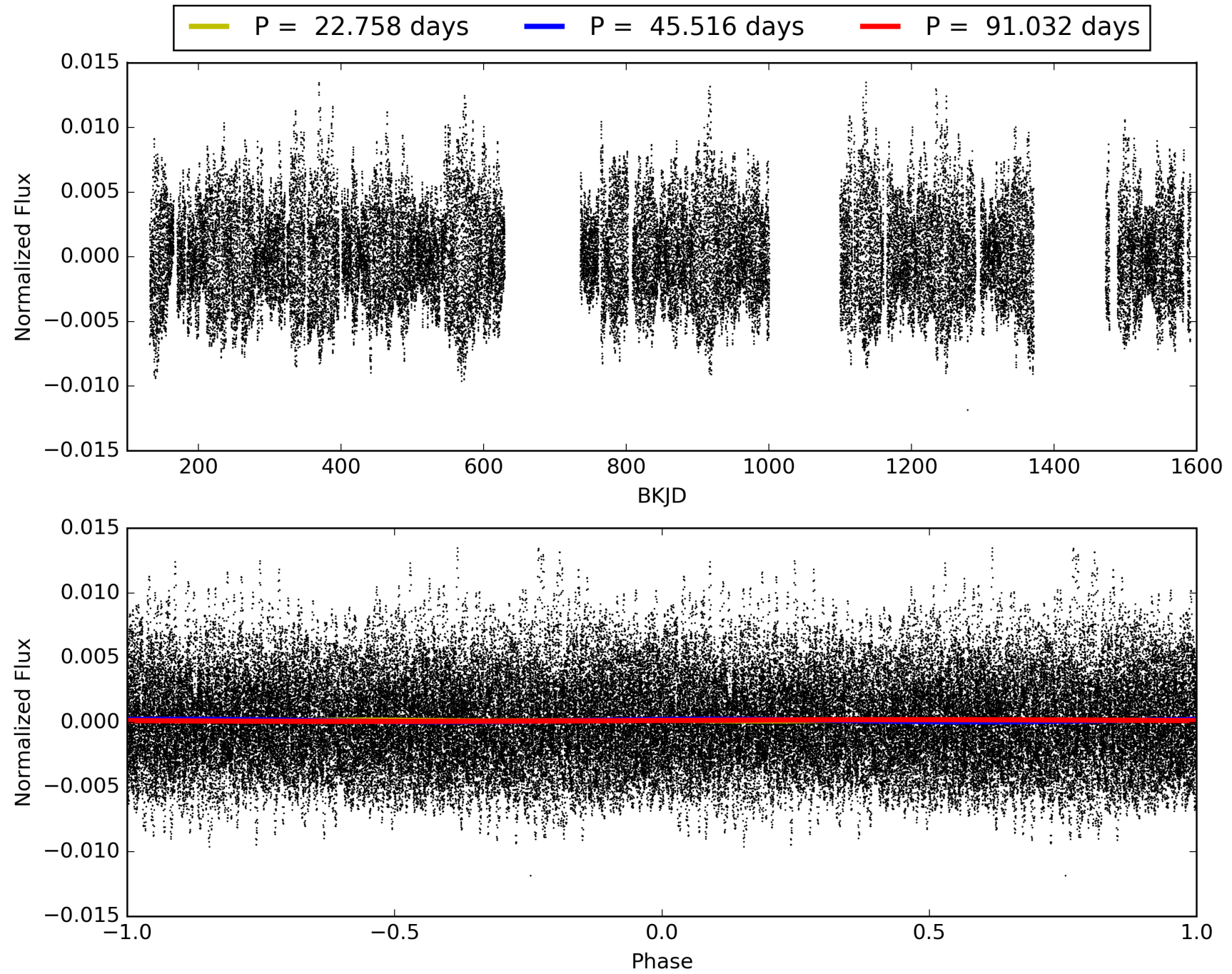
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 10:24:20 Z

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

# TCE 010812657-05, PDC Light Curves



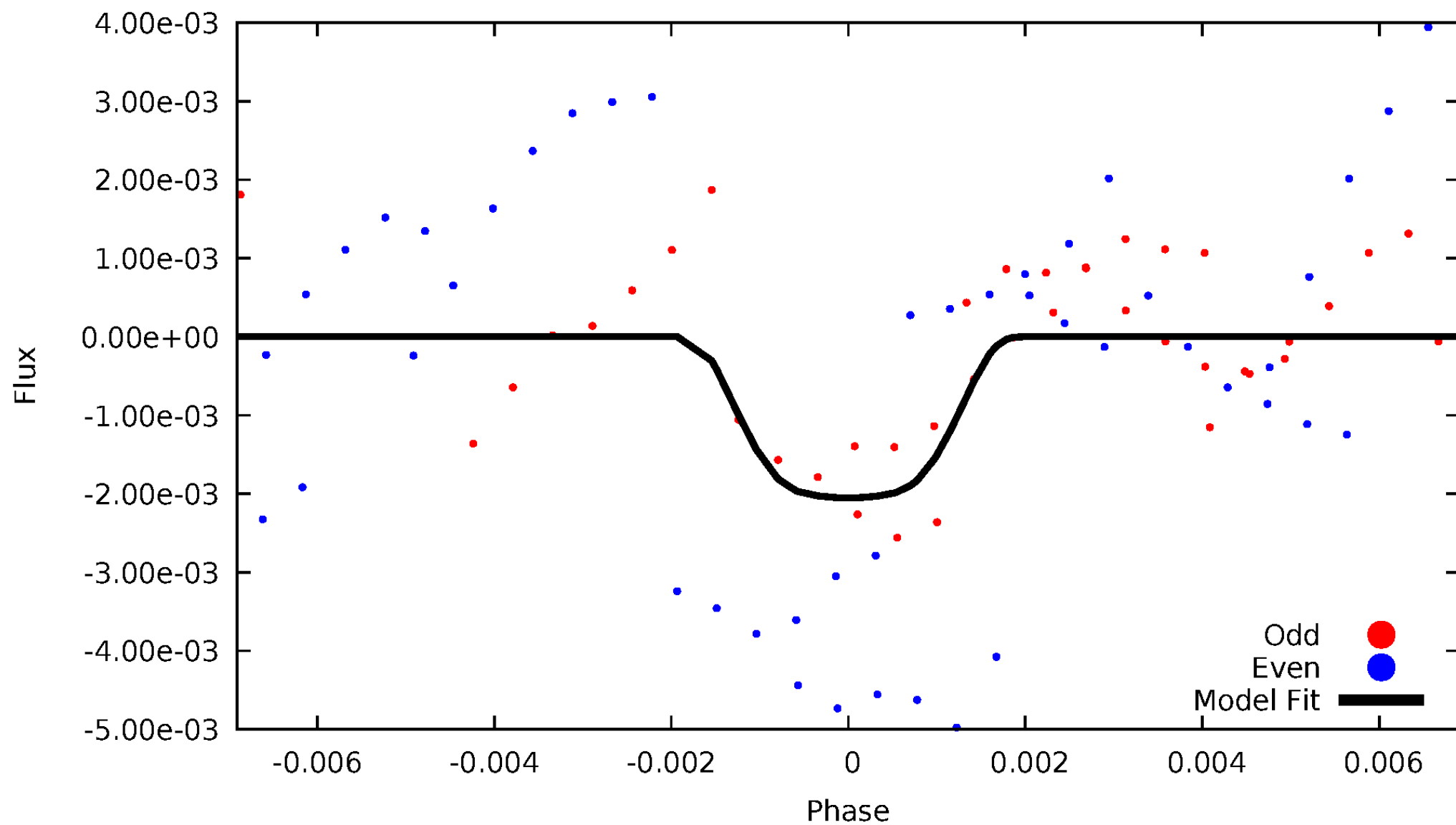
TCE 010812657-05





# DV Odd/Even

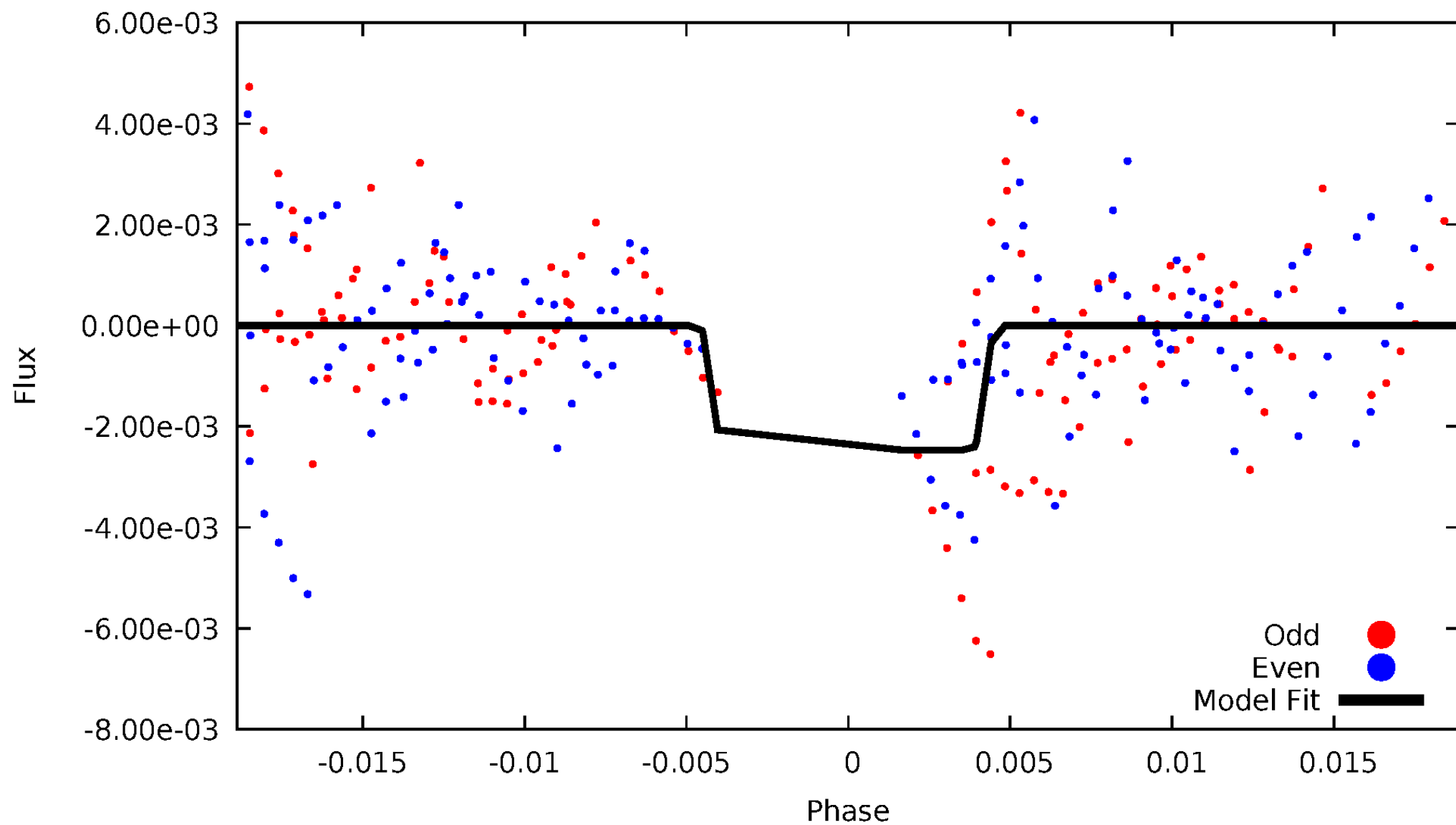
TCE 010812657-05





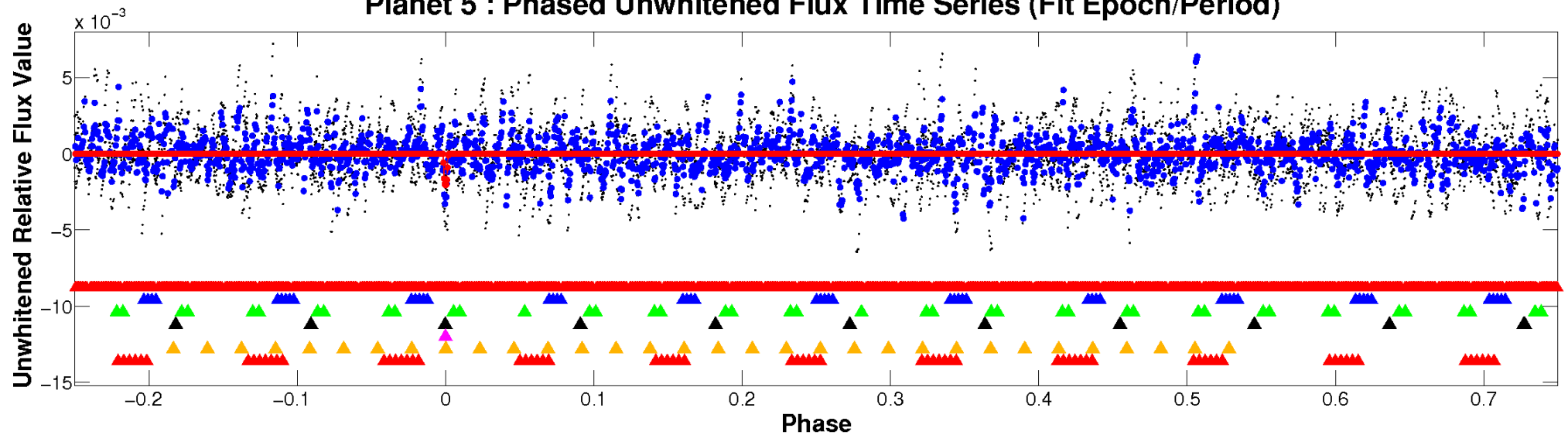
# ALT Odd/Even

TCE 010812657-05

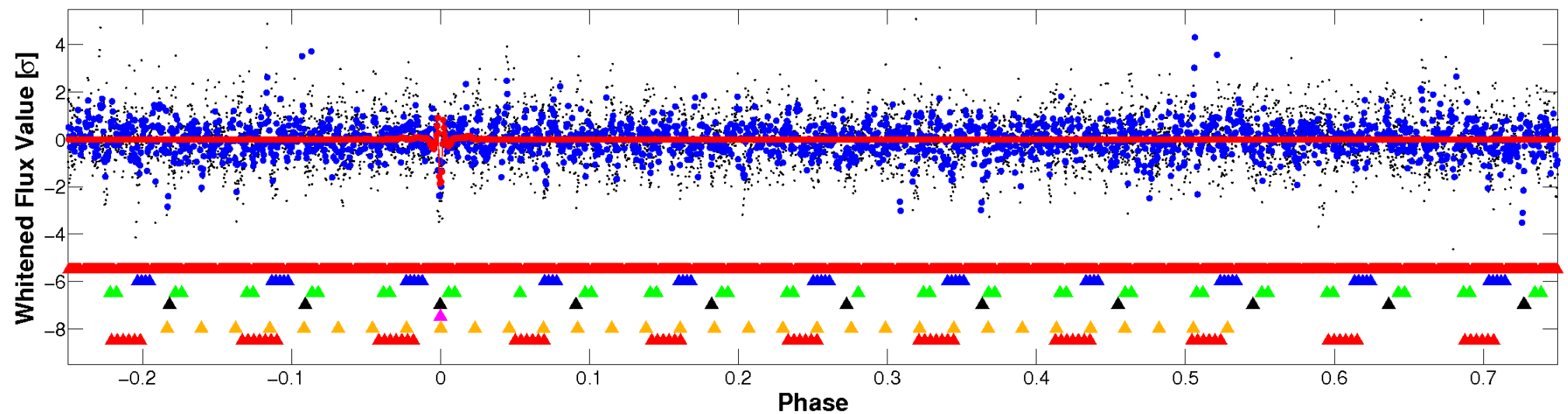


# Non-Whitened Vs. Whitened Light Curve

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

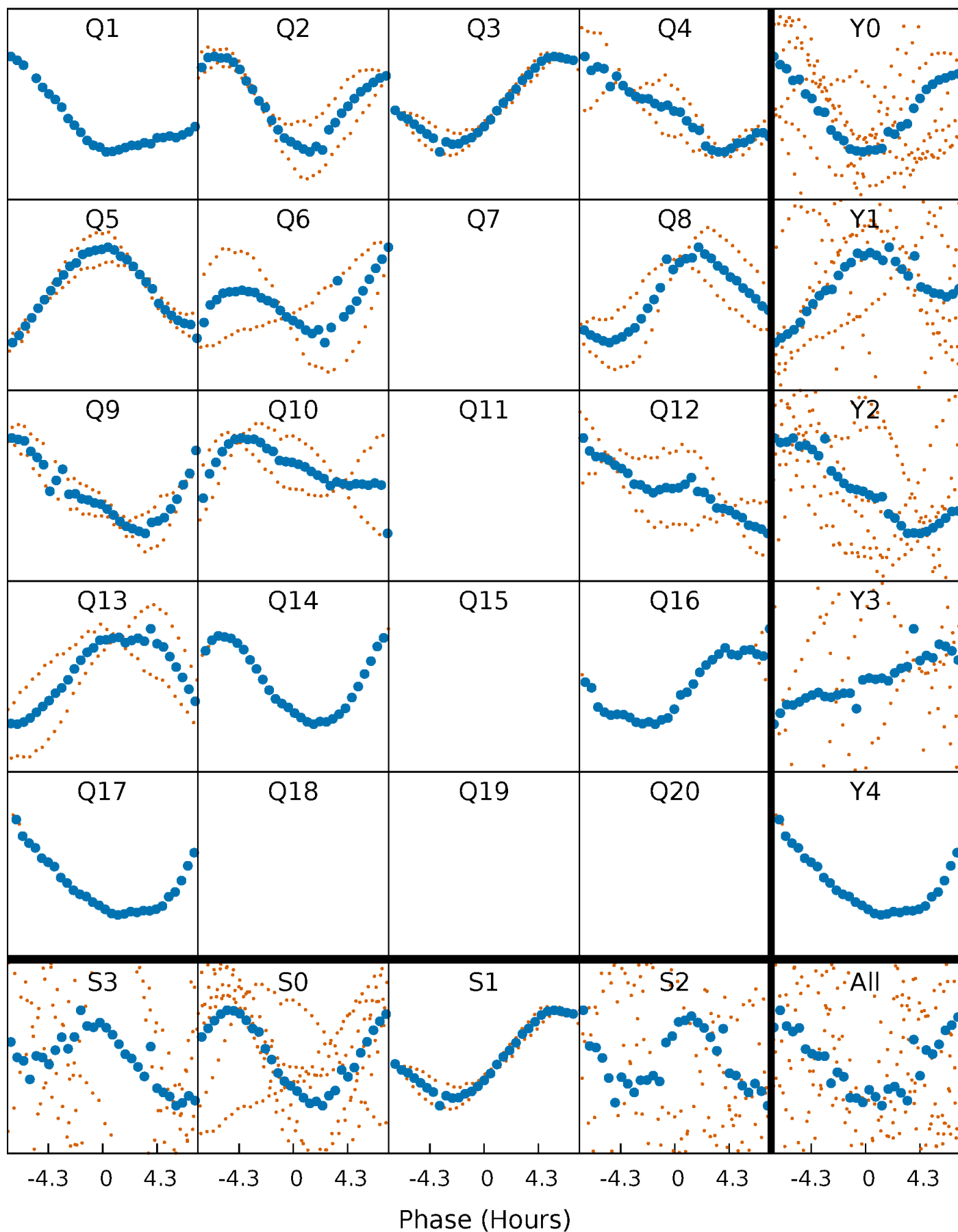


## Planet 5 : Phased Whitened Flux Time Series (Fit Epoch/Period)



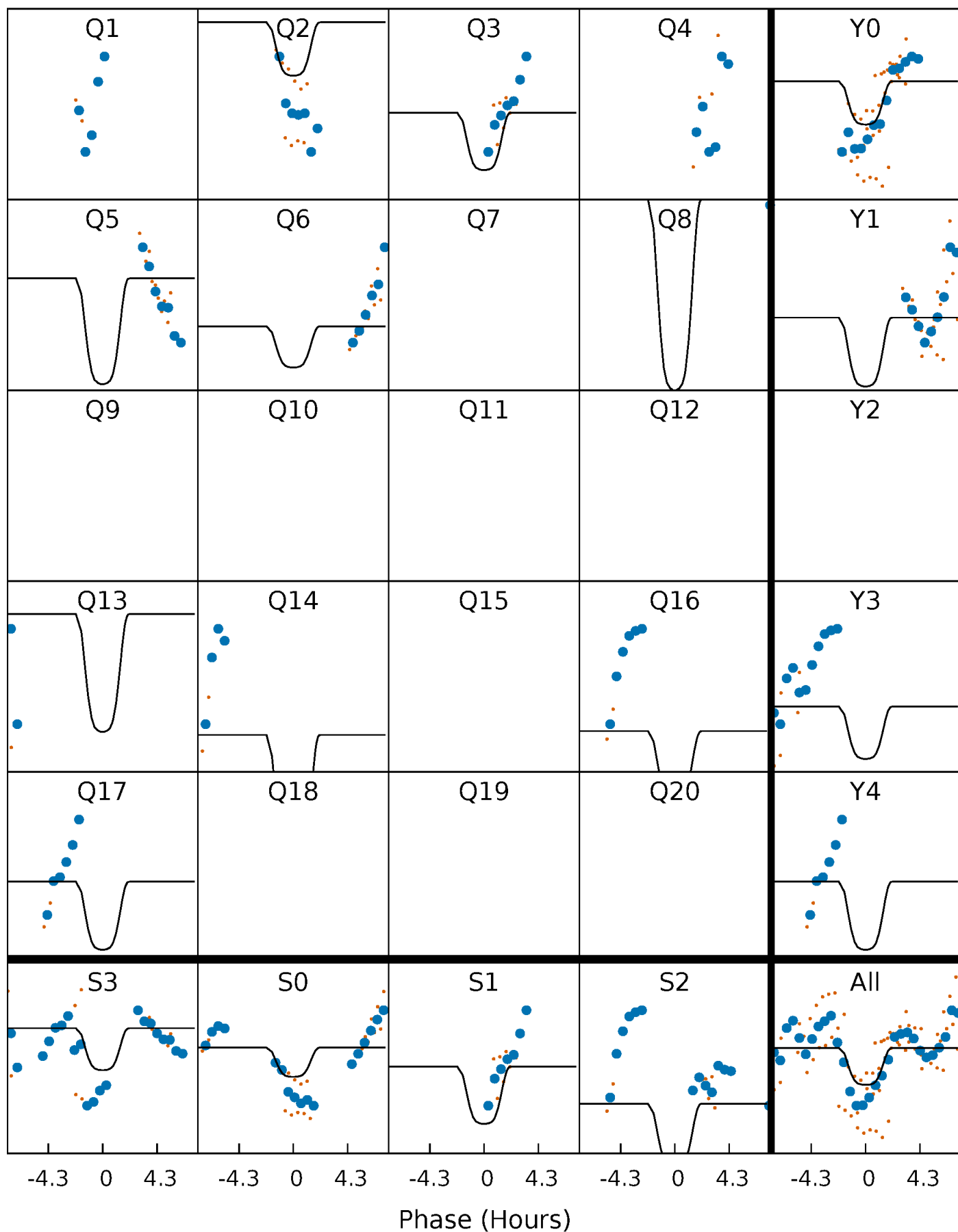
# PDC Quarter-Phased Transit Curves

TCE 010812657-05   P= 45.516172 Days    $T_0=151.891165$  (BKJD)



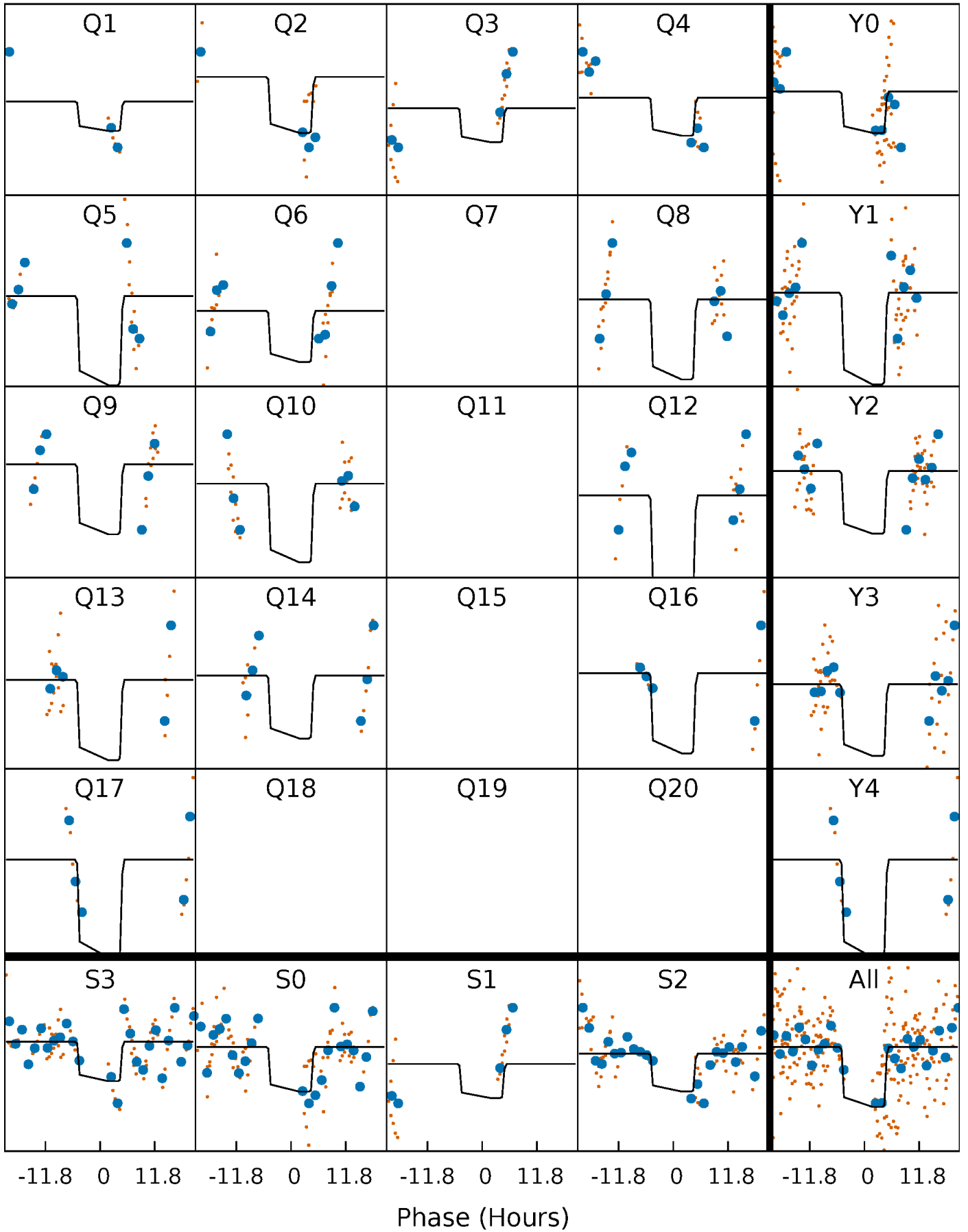
# DV Quarter-Phased Transit Curves

TCE 010812657-05   P= 45.516172 Days    $T_0=151.891165$  (BKJD)



## Alt. Detrend Quarter-Phased Transit Curves

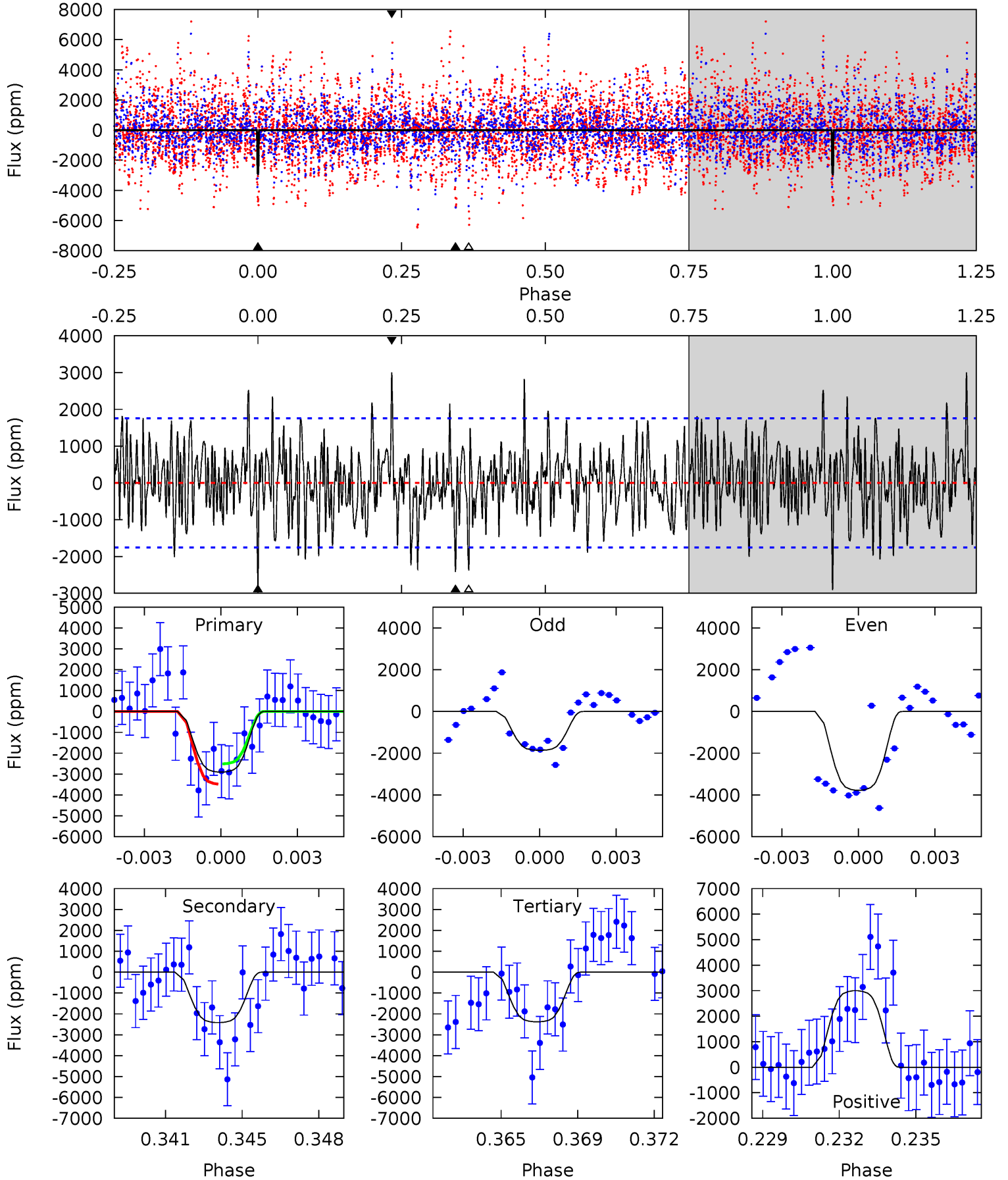
TCE 010812657-05   P= 45.525098 Days    $T_0=151.727946$  (BKJD)



# DV Model-Shift Uniqueness Test

010812657-05,  $P = 45.516172$  Days,  $E = 106.374993$  Days

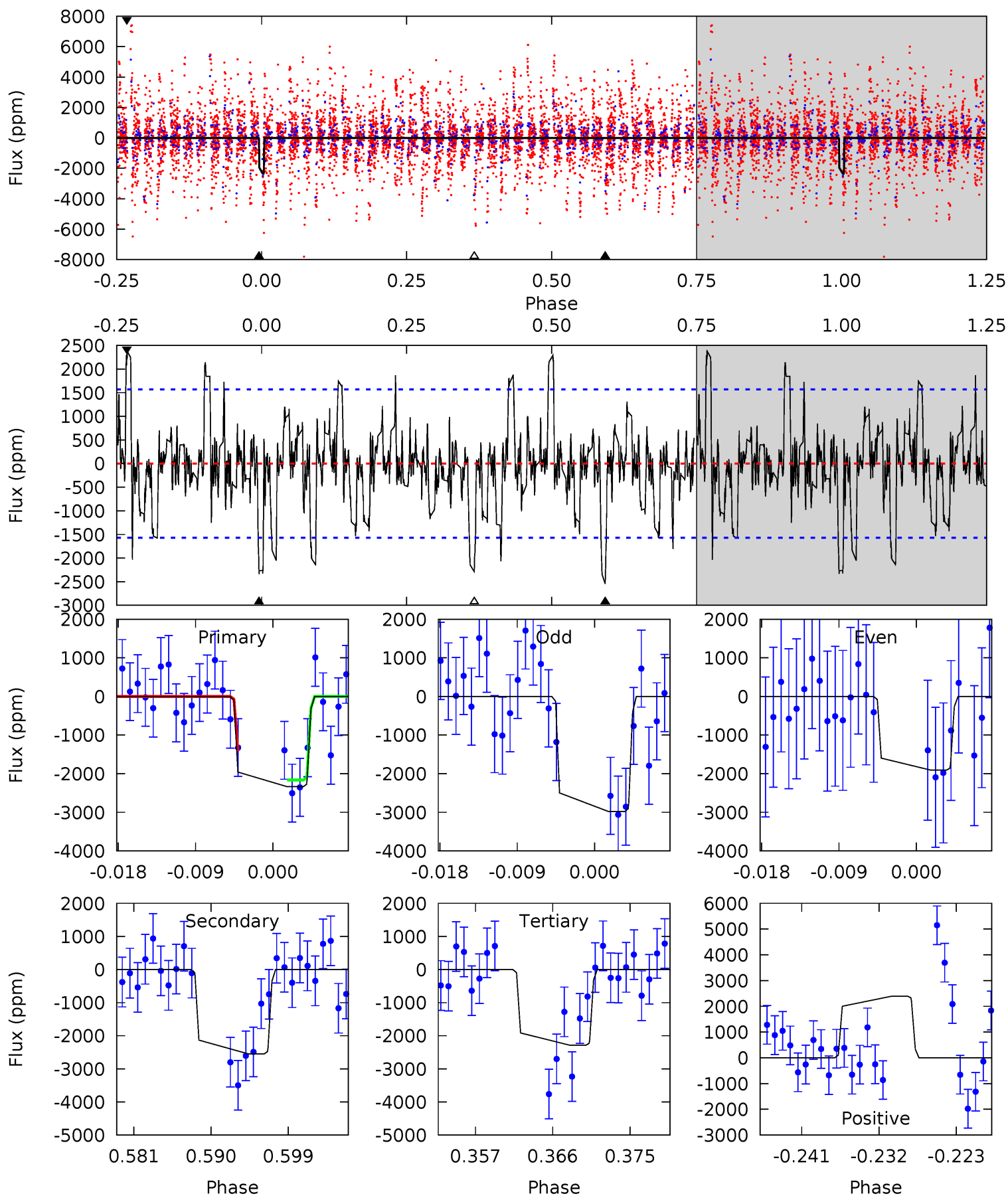
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.66	7.20	7.09	8.94	5.23	2.93	2.30	1.57	-0.28	0.11	-1.74	2.87	0.97	0.51	1.37



# Alt Model-Shift Uniqueness Test

010812657-05, P = 45.525098 Days, E = 106.202848 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.50	8.18	7.35	7.68	5.05	2.61	1.76	0.16	-0.18	0.83	0.50	1.68	1.23	0.48	0.64





### Stellar Parameters For KIC 010812657

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7349^{+206}_{-310}$	$4.197^{+0.124}_{-0.186}$	$-0.260^{+0.250}_{-0.350}$	$1.564^{+0.491}_{-0.302}$	$1.408^{+0.216}_{-0.216}$	$0.518^{+0.319}_{-0.266}$
	+3%/-4%	+3%/-4%	+96%/-135%	+31%/-19%	+15%/-15%	+61%/-51%
Source	KIC0	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 010812657-05 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-2416 \pm 336$	$8.55^{+1.54}_{-1.24}$	$1077^{+80}_{-72}$	$7283^{+518}_{-446}$	$1400^{+550}_{-404}$
Alt.	$-2545 \pm 311$	$8.67^{+1.43}_{-1.25}$	$1076^{+72}_{-67}$	$7369^{+505}_{-486}$	$1464^{+511}_{-402}$

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

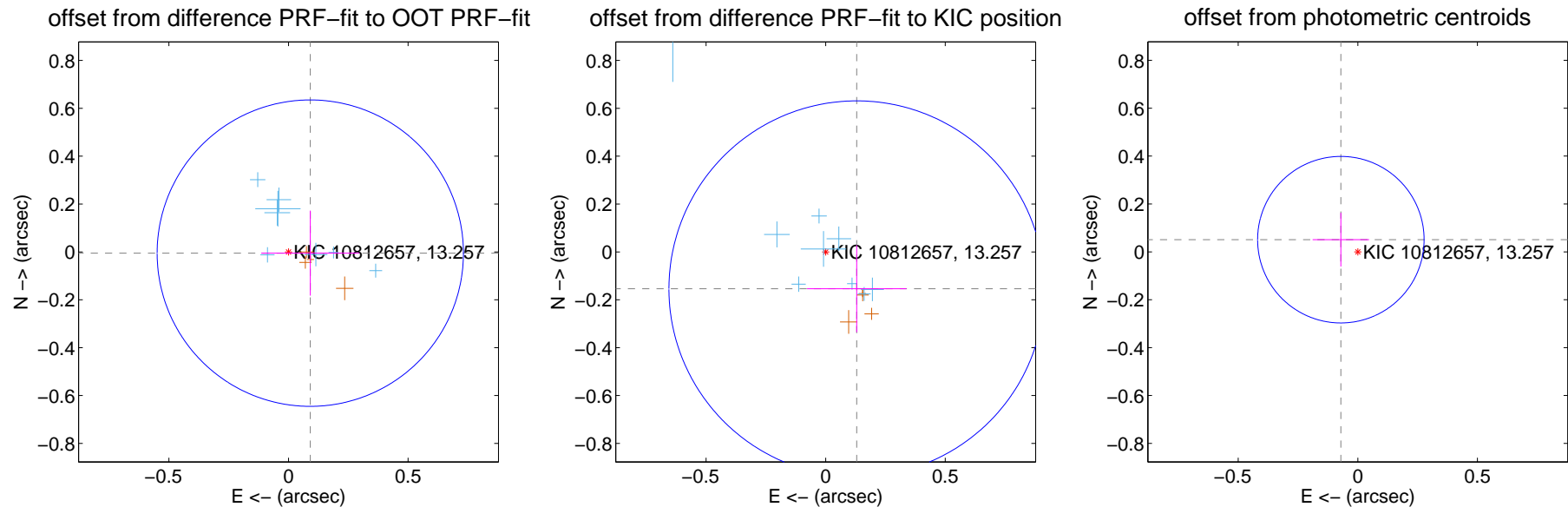
## DV Centroid Data

Supplemental centroid analysis for 010812657-05. Kepler magnitude: 13.26. Transit SNR 7.27

There are 9 quarters with good PRF difference image offsets

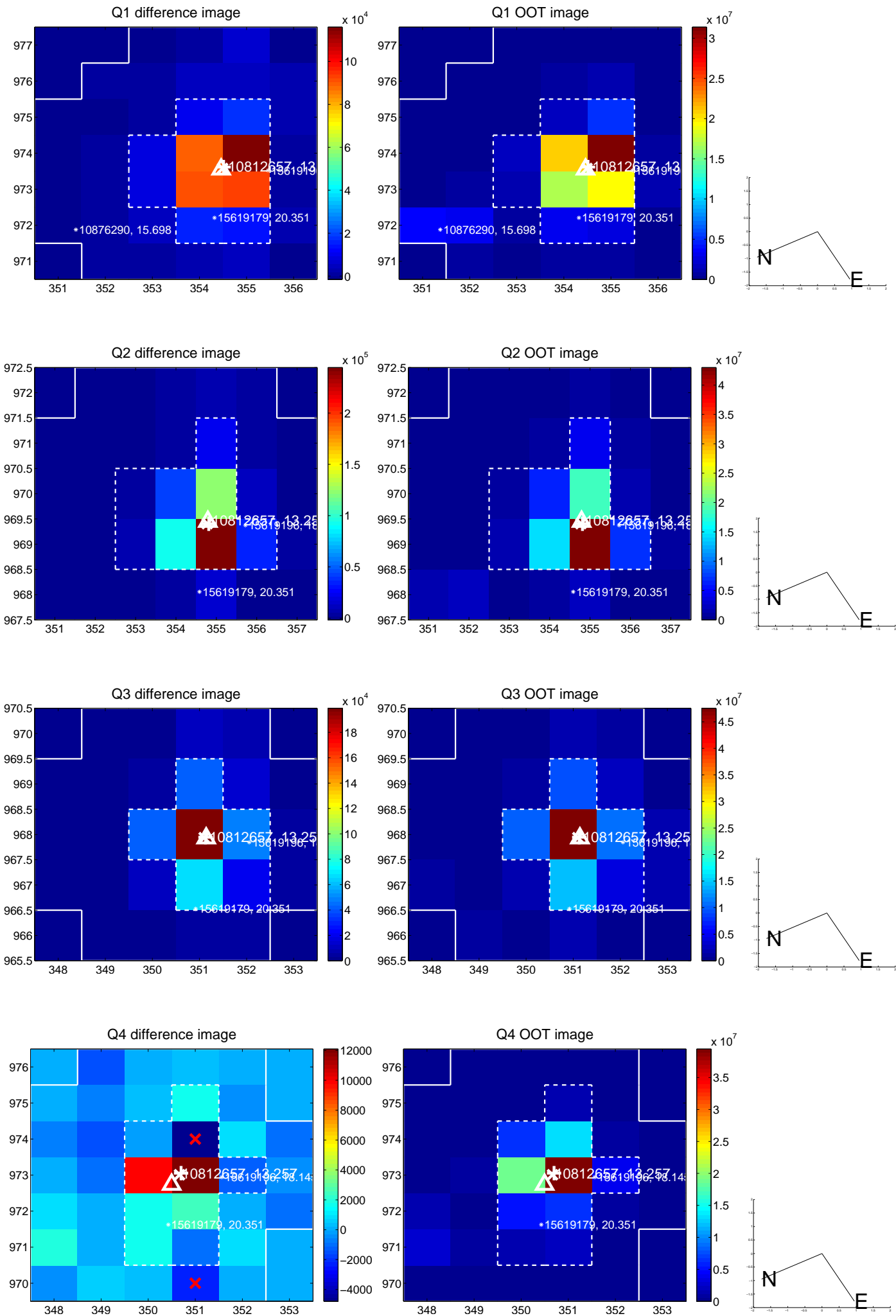
The direct PRF centroid is offset from the target star catalog position by about 0.17 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.091 \pm 0.213$	0.43	$-0.091 \pm 0.205$	$-0.005 \pm 0.178$
PRF-fit source offset from KIC position	$0.201 \pm 0.262$	0.77	$-0.130 \pm 0.208$	$-0.154 \pm 0.182$
photometric centroid source offset	$0.09 \pm 0.12$	0.75	$0.07 \pm 0.12$	$0.05 \pm 0.11$

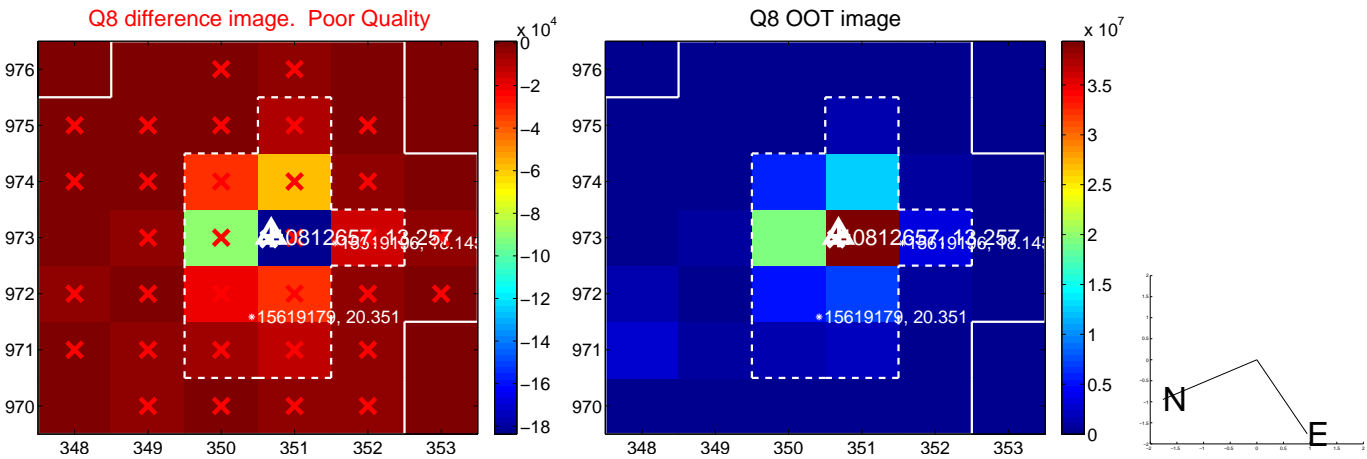
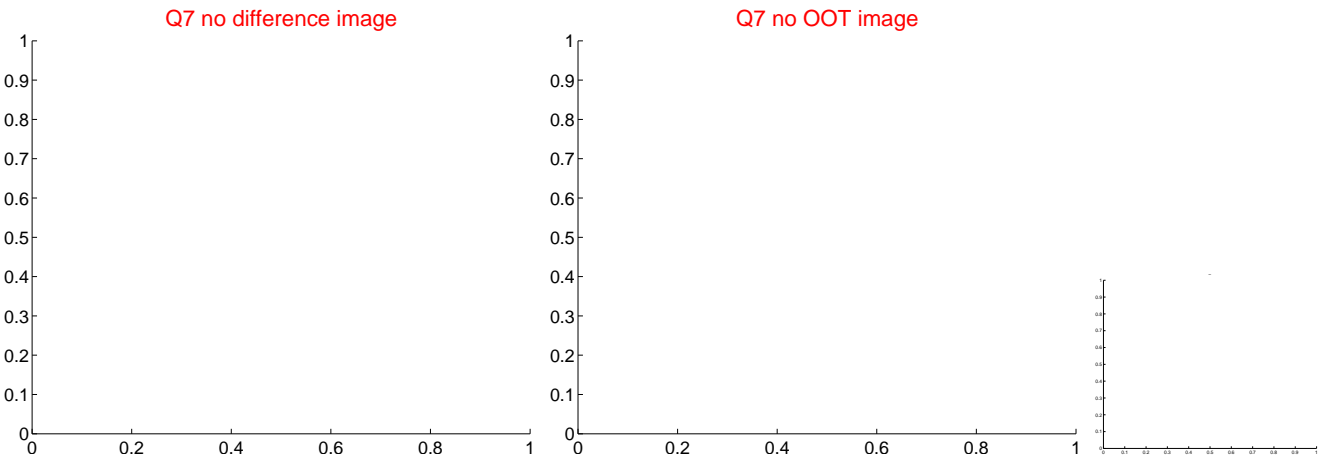
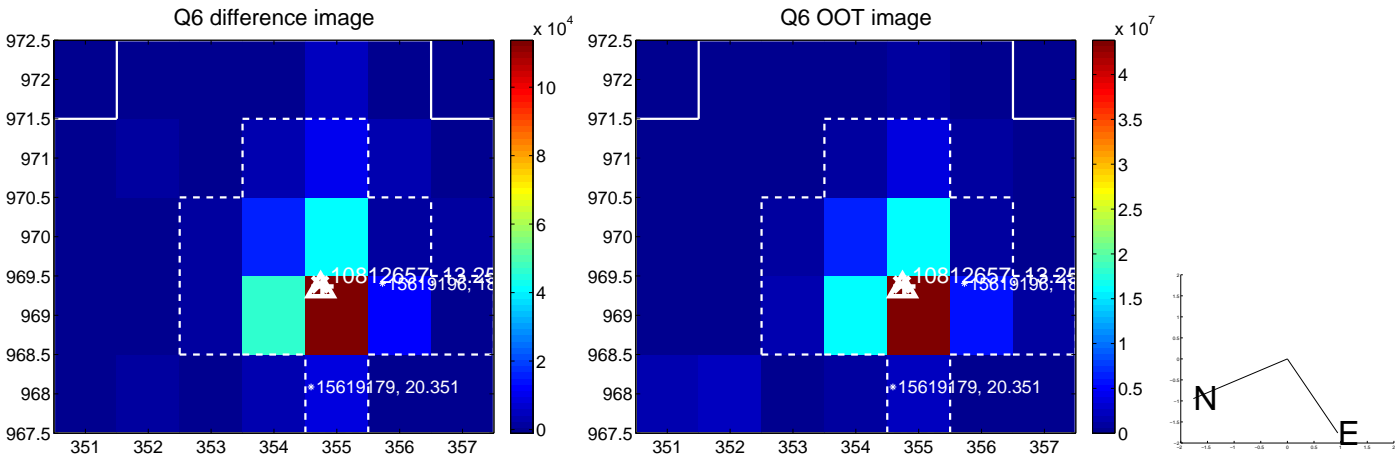
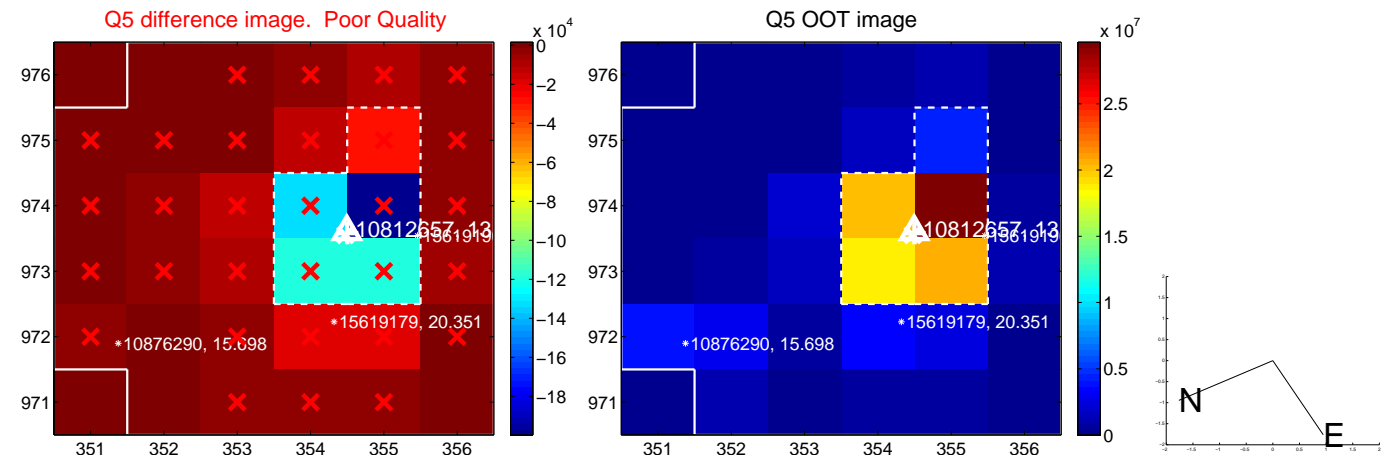


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

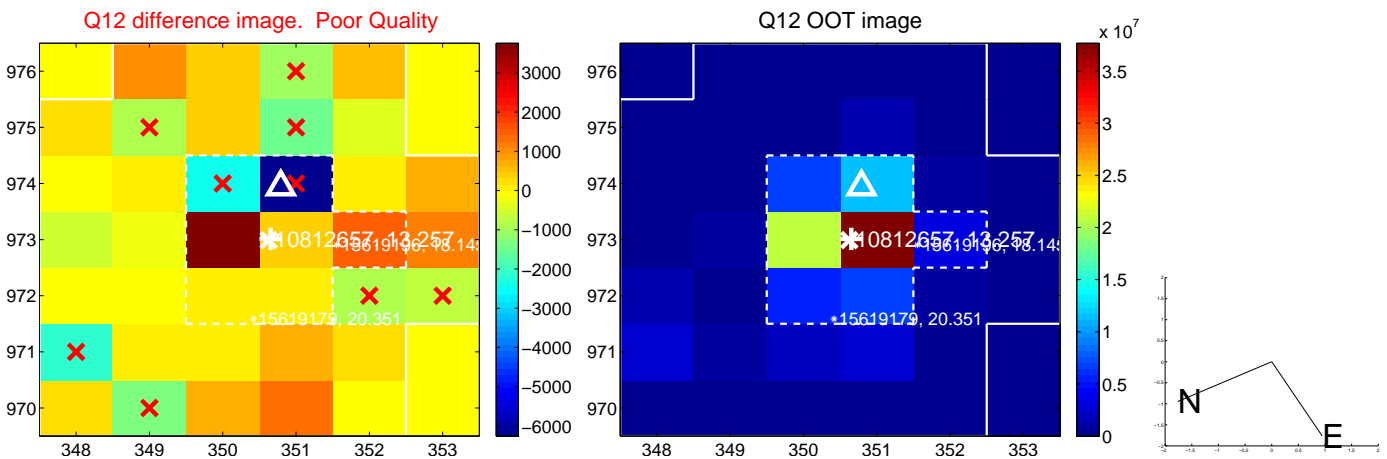
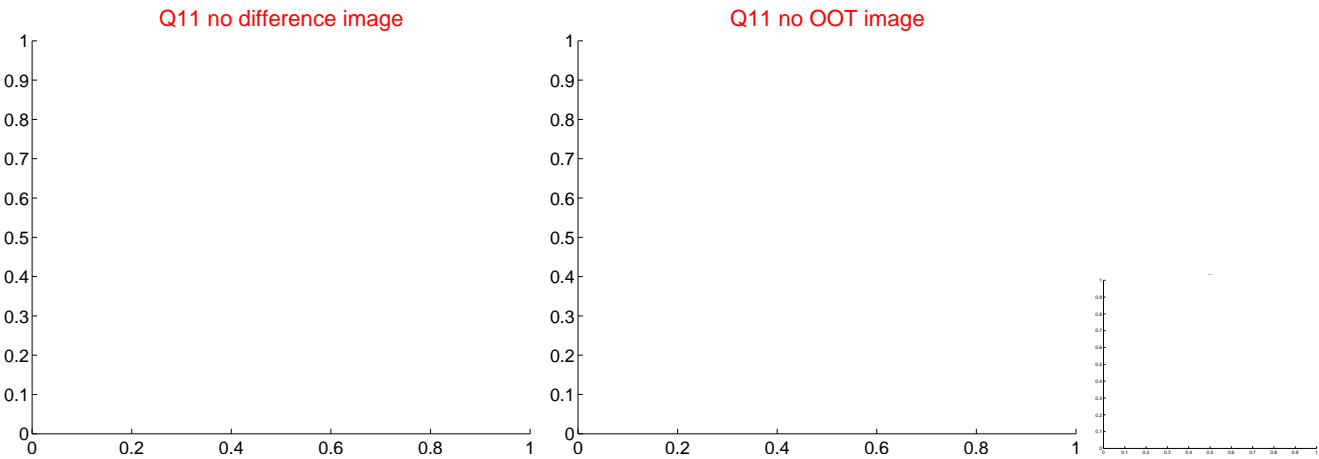
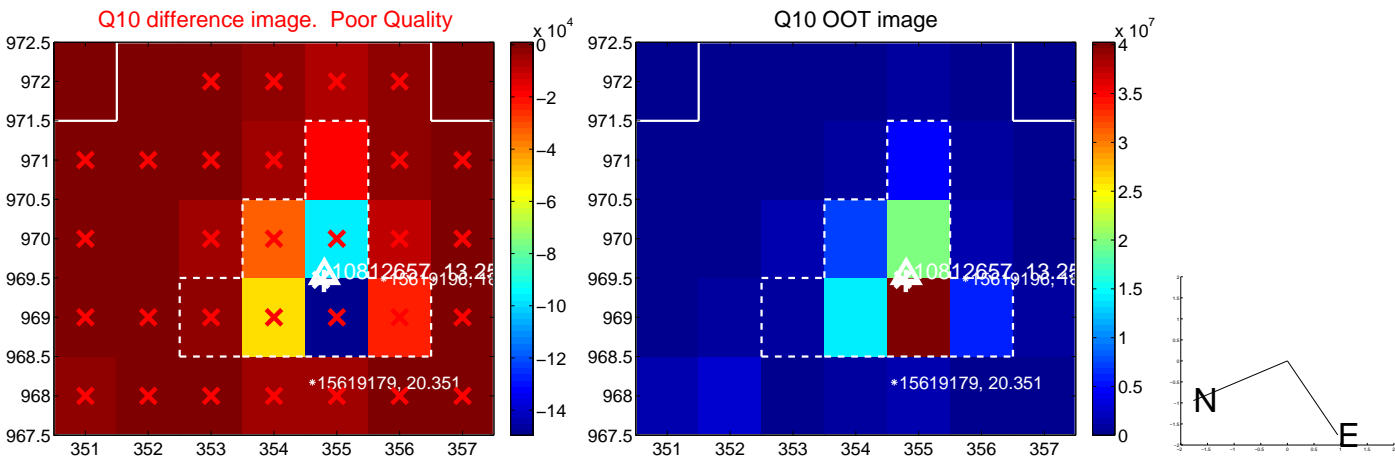
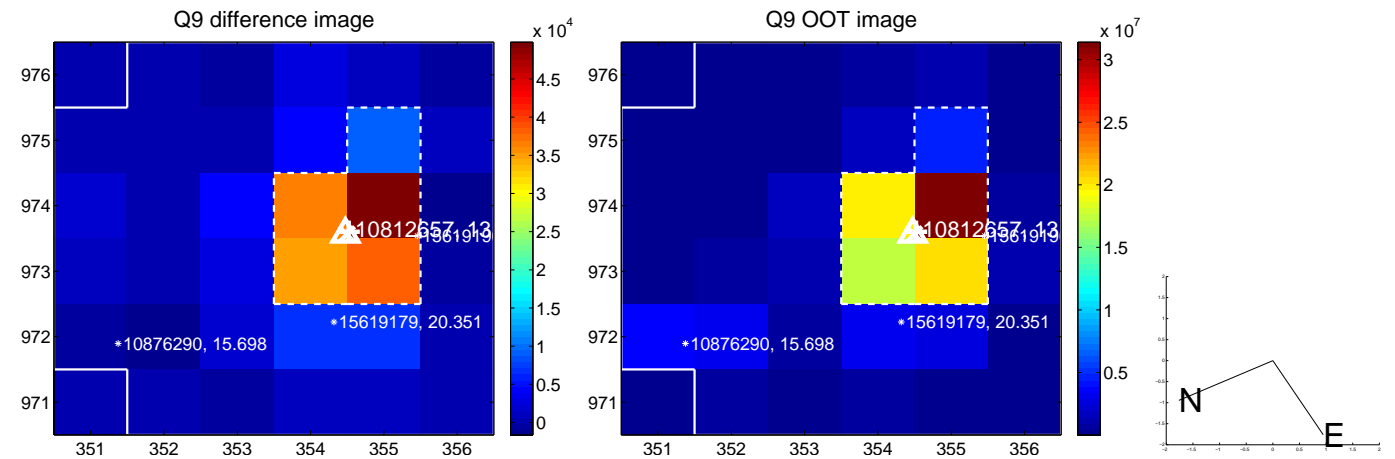
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



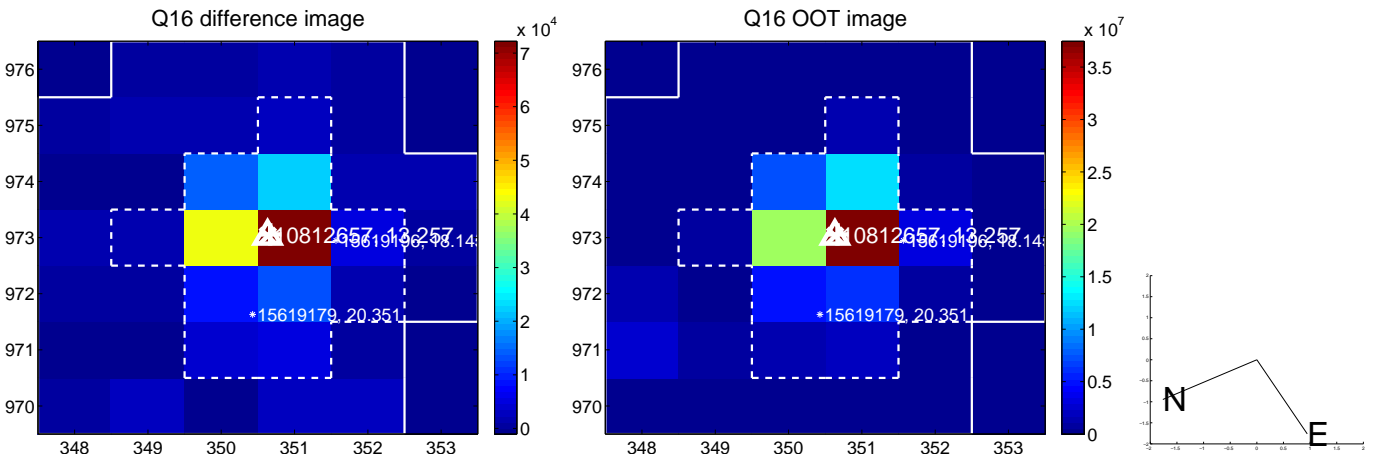
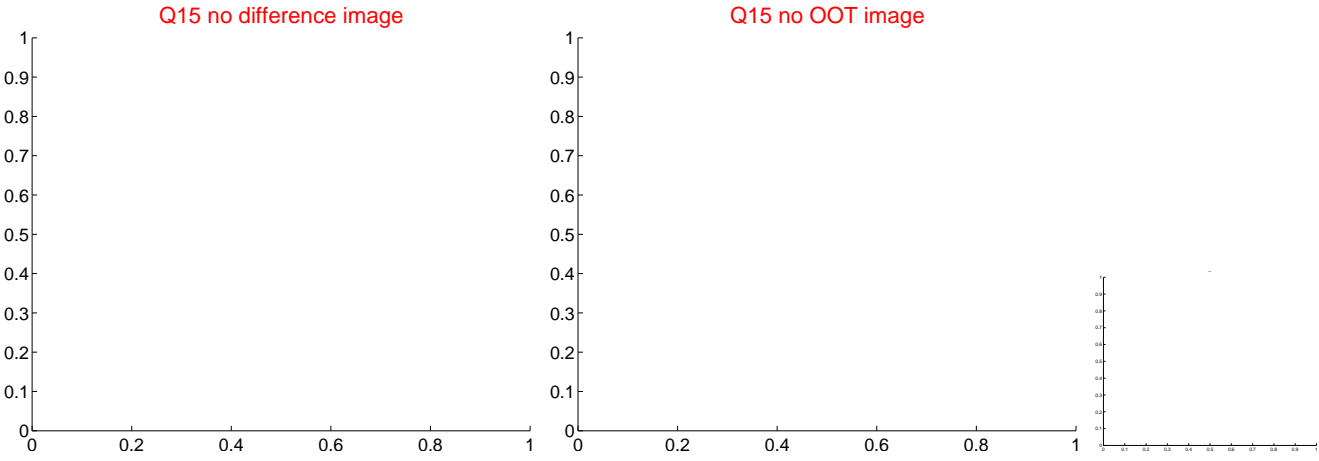
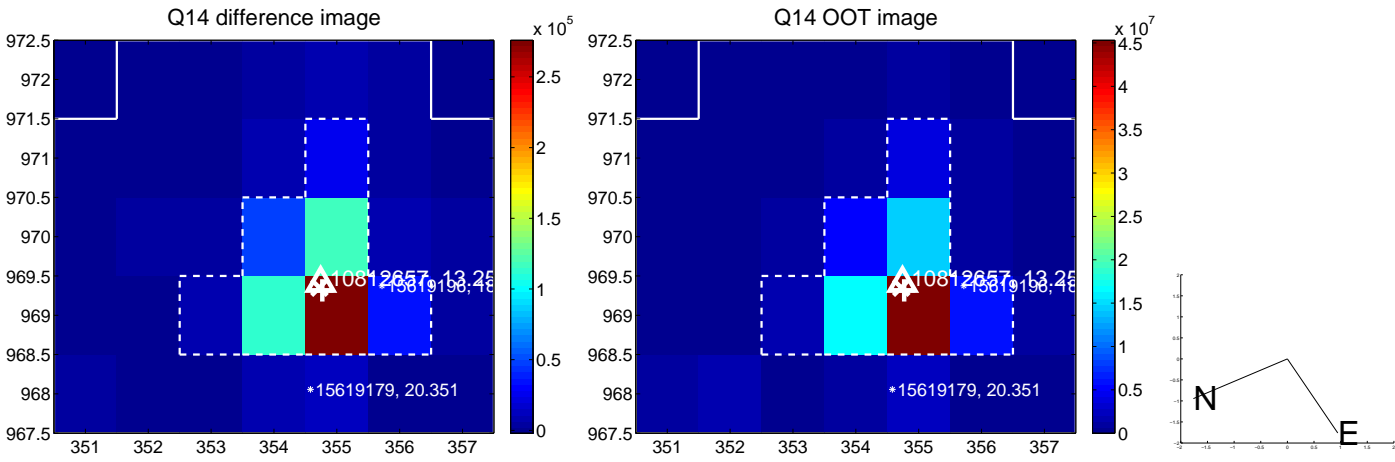
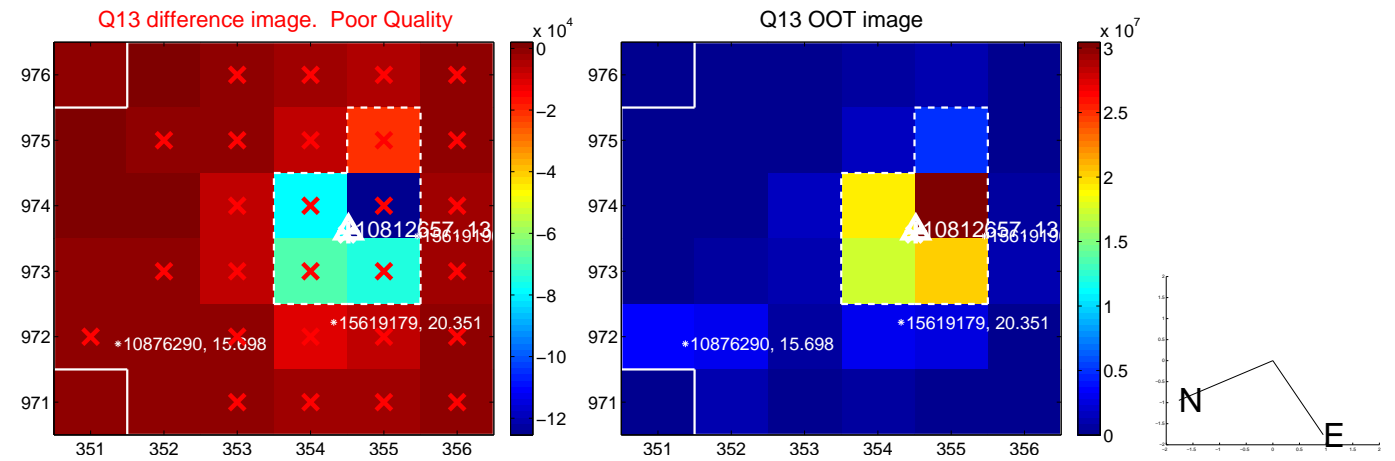
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



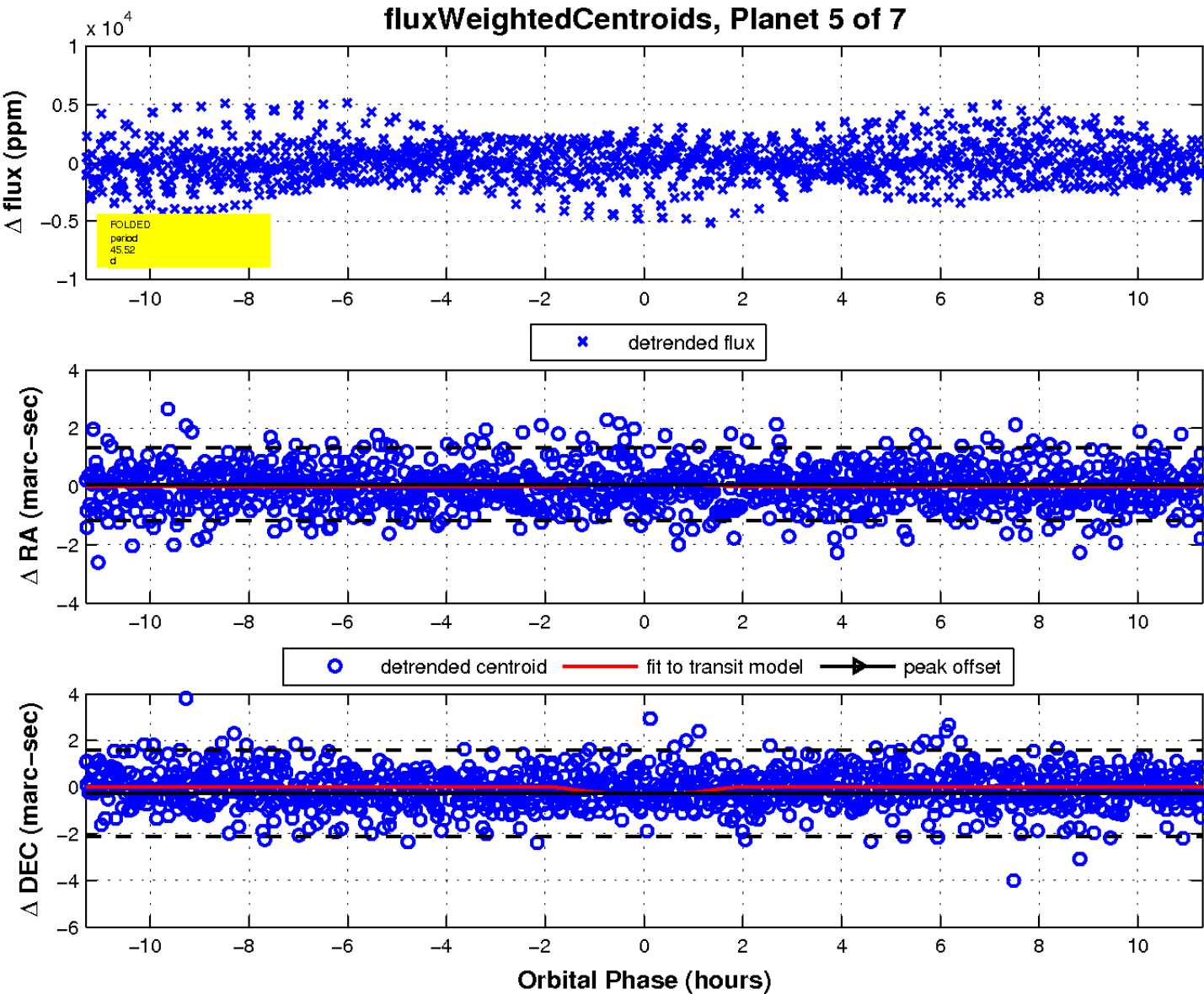
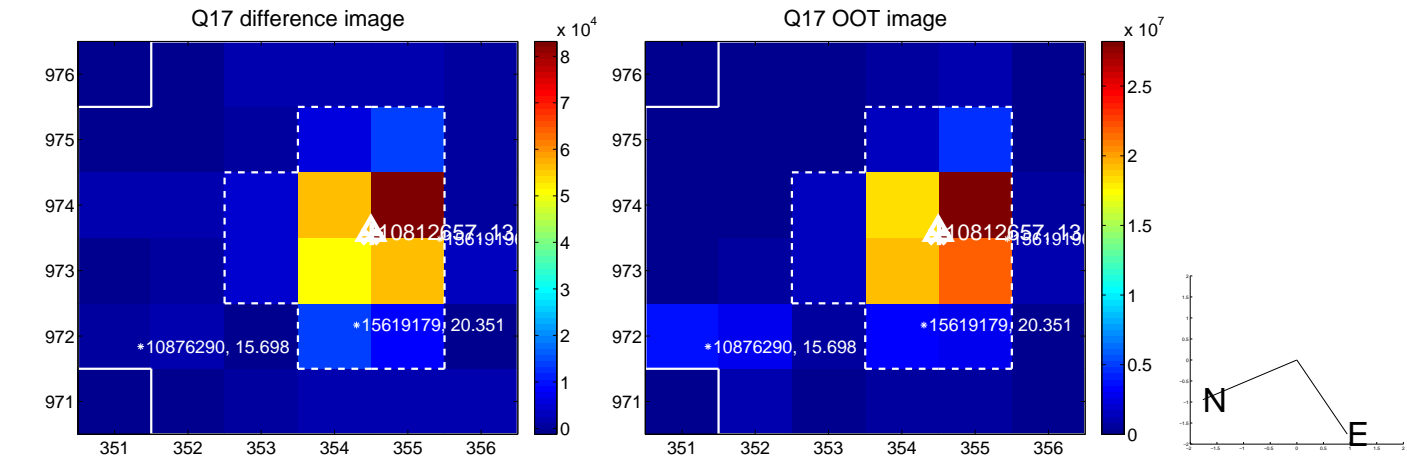
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

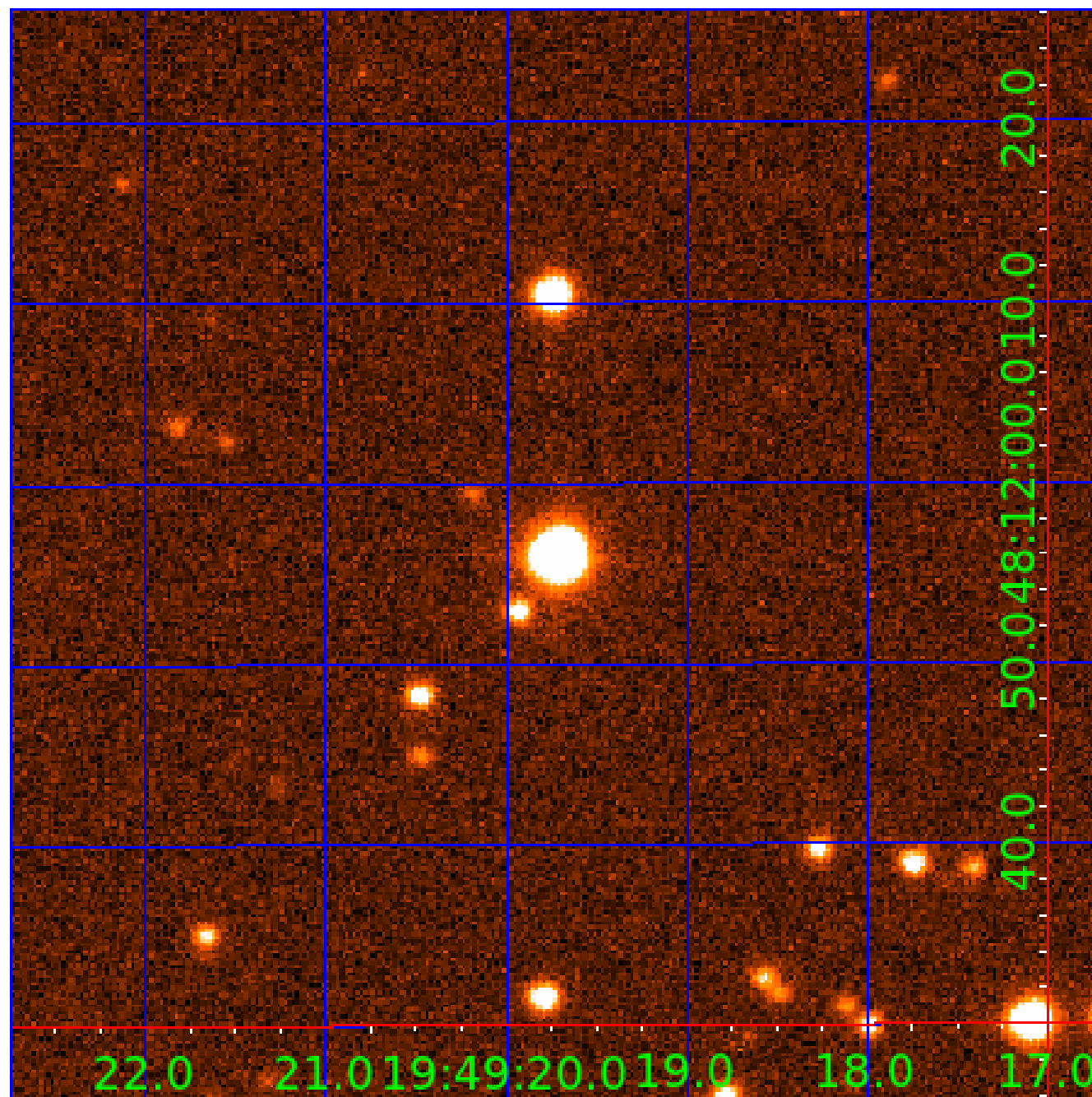


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 010812657

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010812657-01	OBS	No	1.035145	131.673492	0.0	7.075	10.4	0.0	1.56	7349	0.01	12704.67
010812657-02	OBS	No	28.976055	138.407555	2216.0	5.278	10.1	10.5	1.56	7349	13.37	149.48
010812657-03	OBS	No	35.180230	143.795173	300.1	1.153	8.7	1.6	1.56	7349	3.14	115.41
010812657-04	OBS	No	124.132671	139.492680	3660.5	6.477	8.7	9.4	1.56	7349	10.89	21.48
010812657-05	OBS	No	45.516172	151.891165	2053.9	3.772	8.5	7.3	1.56	7349	8.46	81.86
010812657-06	OBS	No	46.561129	143.542107	2902.8	7.319	8.5	8.7	1.56	7349	15.18	79.42
010812657-07	OBS	No	20.673153	151.062505	209.9	5.000	8.2	-1.0	1.56	7349	2.30	234.47

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010812657-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV
010812657-02	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—HALO_GHOST
010812657-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_TER_ALT—MOD_POS_ALT
010812657-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
010812657-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
010812657-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
010812657-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_NOFITS

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

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

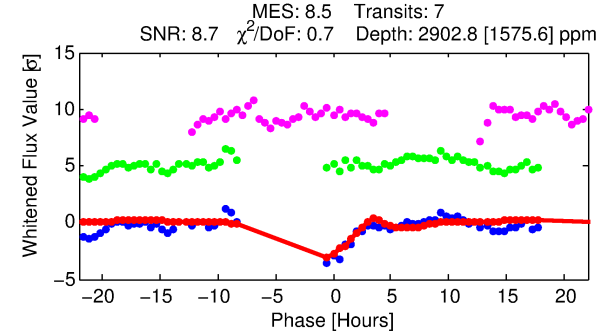
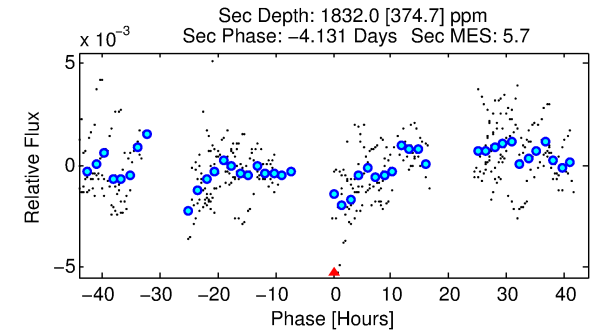
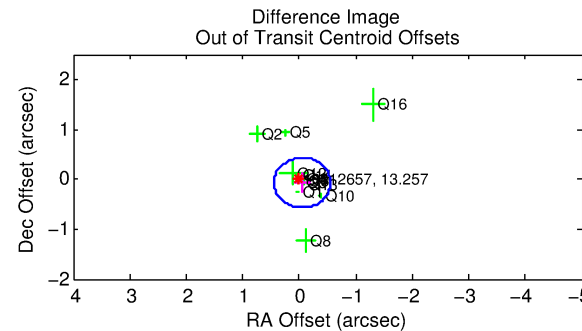
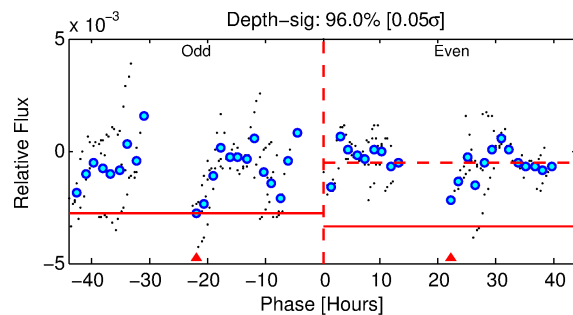
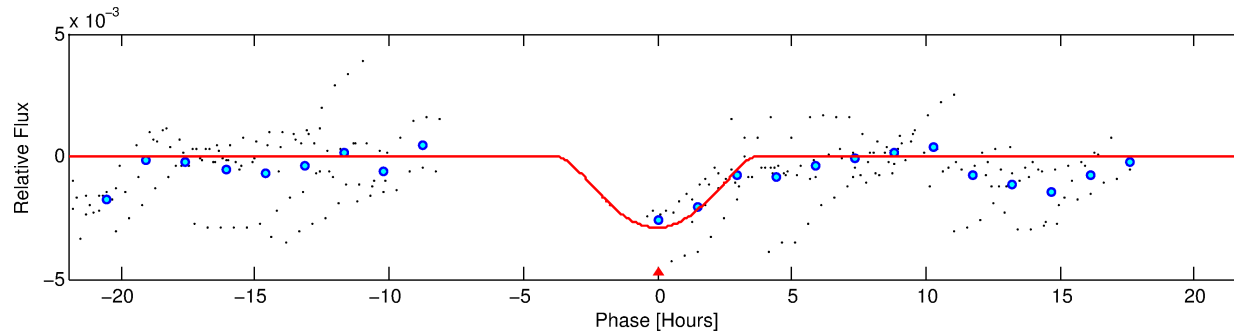
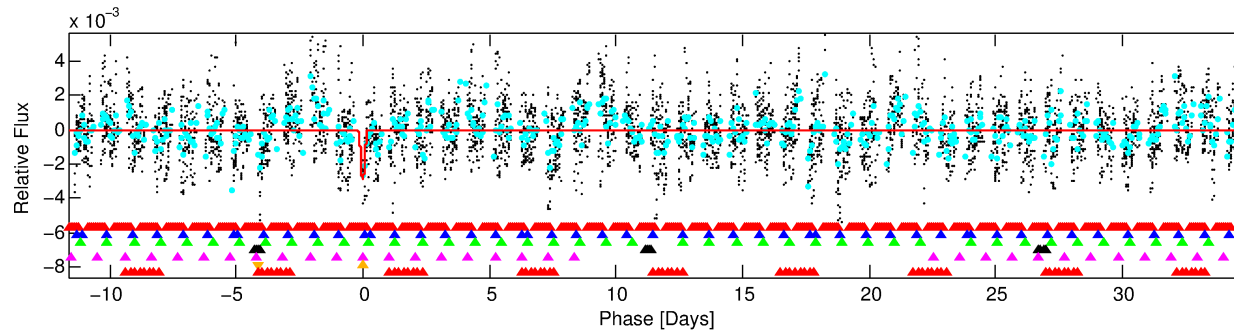
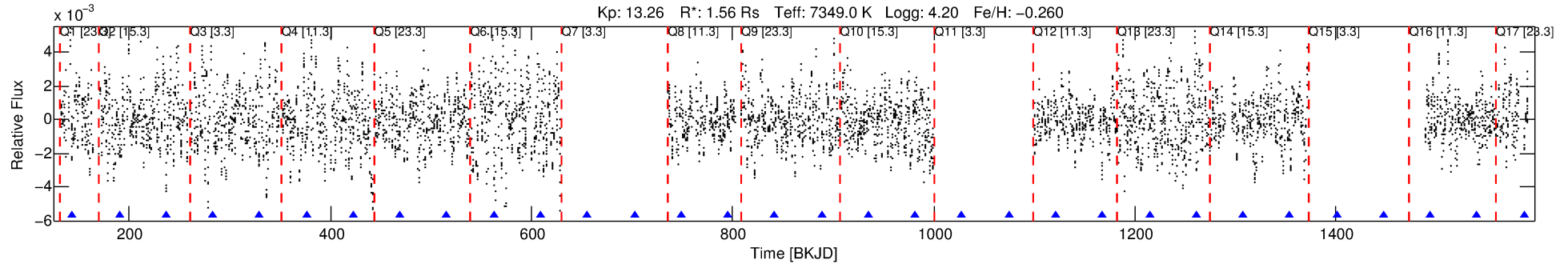
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 010812657-06

No Significant Match Found

# DV One-Page Summary

KIC: 10812657 Candidate: 6 of 7 Period: 46.561 d



## DV Fit Results:

Period = 46.56113 [0.00205] d  
Epoch = 143.5421 [0.0282] BKJD  
Rp/R\* = 0.0889 [0.2115]  
a/R\* = 20.98 [9.92]  
b = 1.00 [0.27]  
Seff = 79.42 [31.15]  
Teq = 761 [75] K  
Rp = 15.18 [36.41] Re  
a = 0.2837 [0.0719] AU  
Ag = 352.10 [1680.84] [0.21 $\sigma$ ]  
Teffp = 5098 [6071] K [0.71 $\sigma$ ]

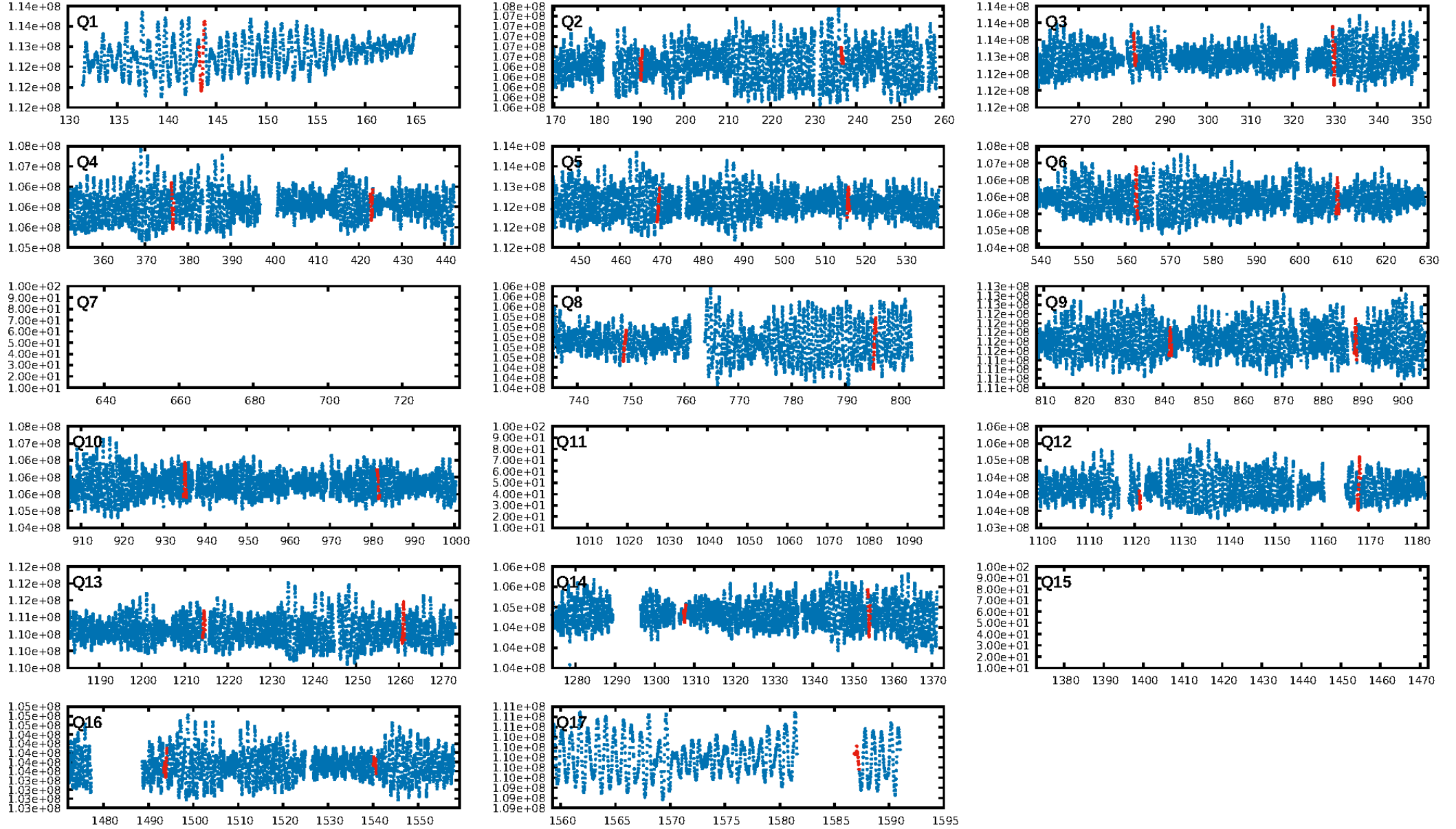
## DV Diagnostic Results:

ShortPeriod-sig: 99.8% [3.05 $\sigma$ ]  
LongPeriod-sig: 100.0% [190.49 $\sigma$ ]  
ModelChiSquare2-sig: 6.8%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [6/6]  
**GhostDiagnostic-chr: 0.5026**  
Centroid-sig: 30.7%  
Centroid-so: 0.098 arcsec [1.33 $\sigma$ ]  
OotOffset-rm: 0.088 arcsec [0.53 $\sigma$ ]  
KicOffset-rm: 0.218 arcsec [1.19 $\sigma$ ]  
OotOffset-st: 4/1/4/4 [13]  
KicOffset-st: 4/1/4/4 [13]  
DiffImageQuality-fgm: 0.38 [5/13]  
DiffImageOverlap-fno: 0.00 [0/13]

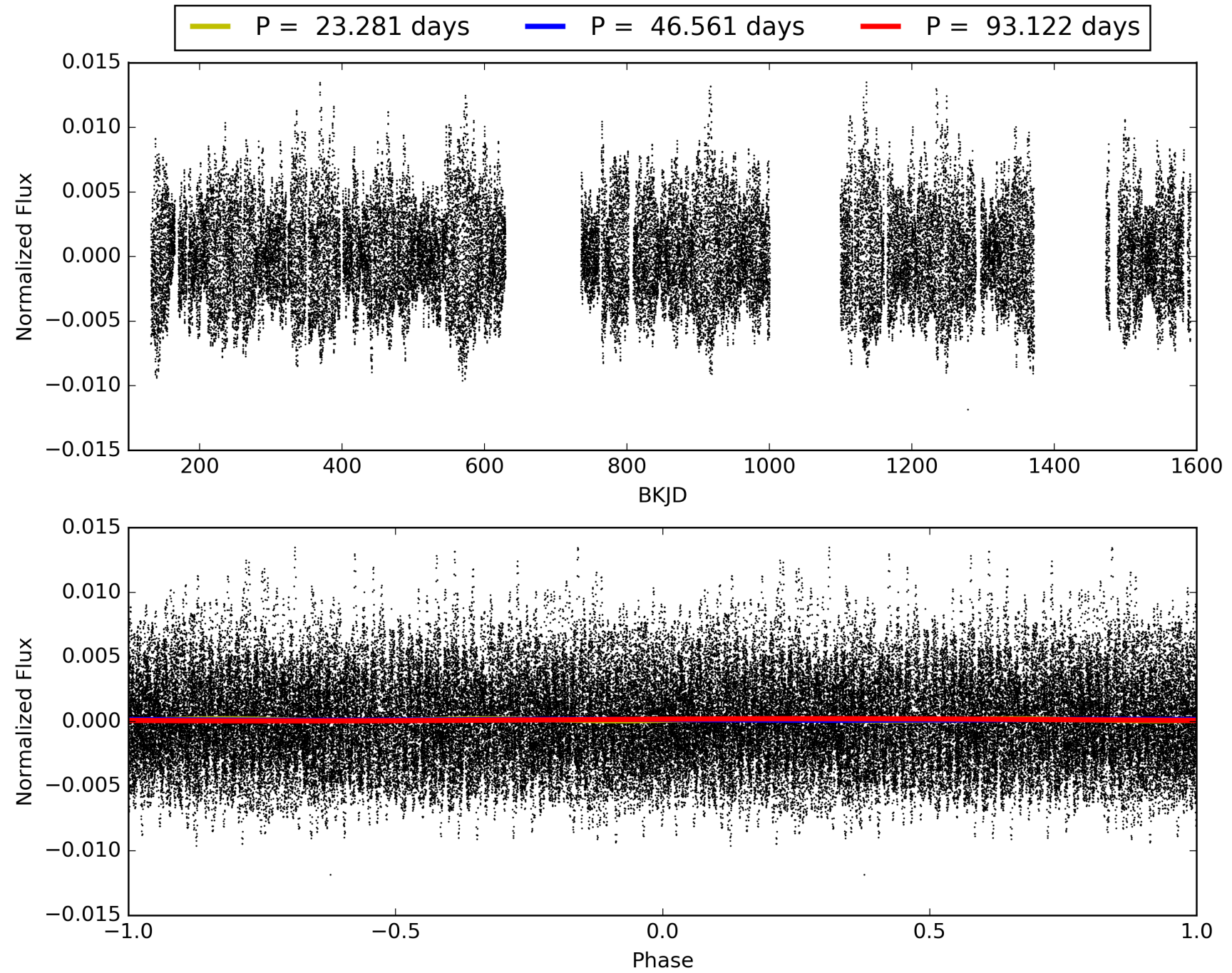
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 10:24:23 Z

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

# TCE 010812657-06, PDC Light Curves

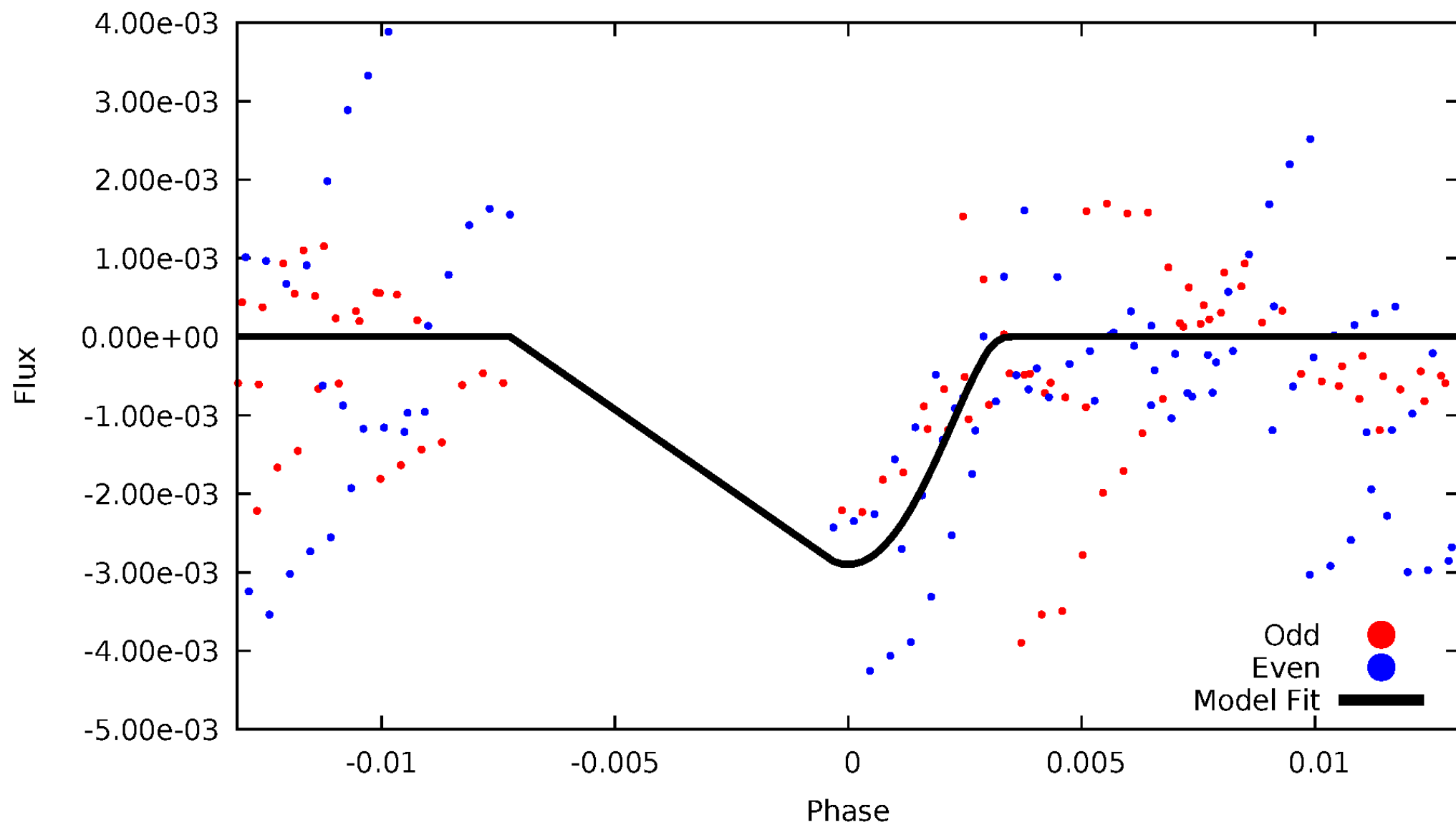


TCE 010812657-06



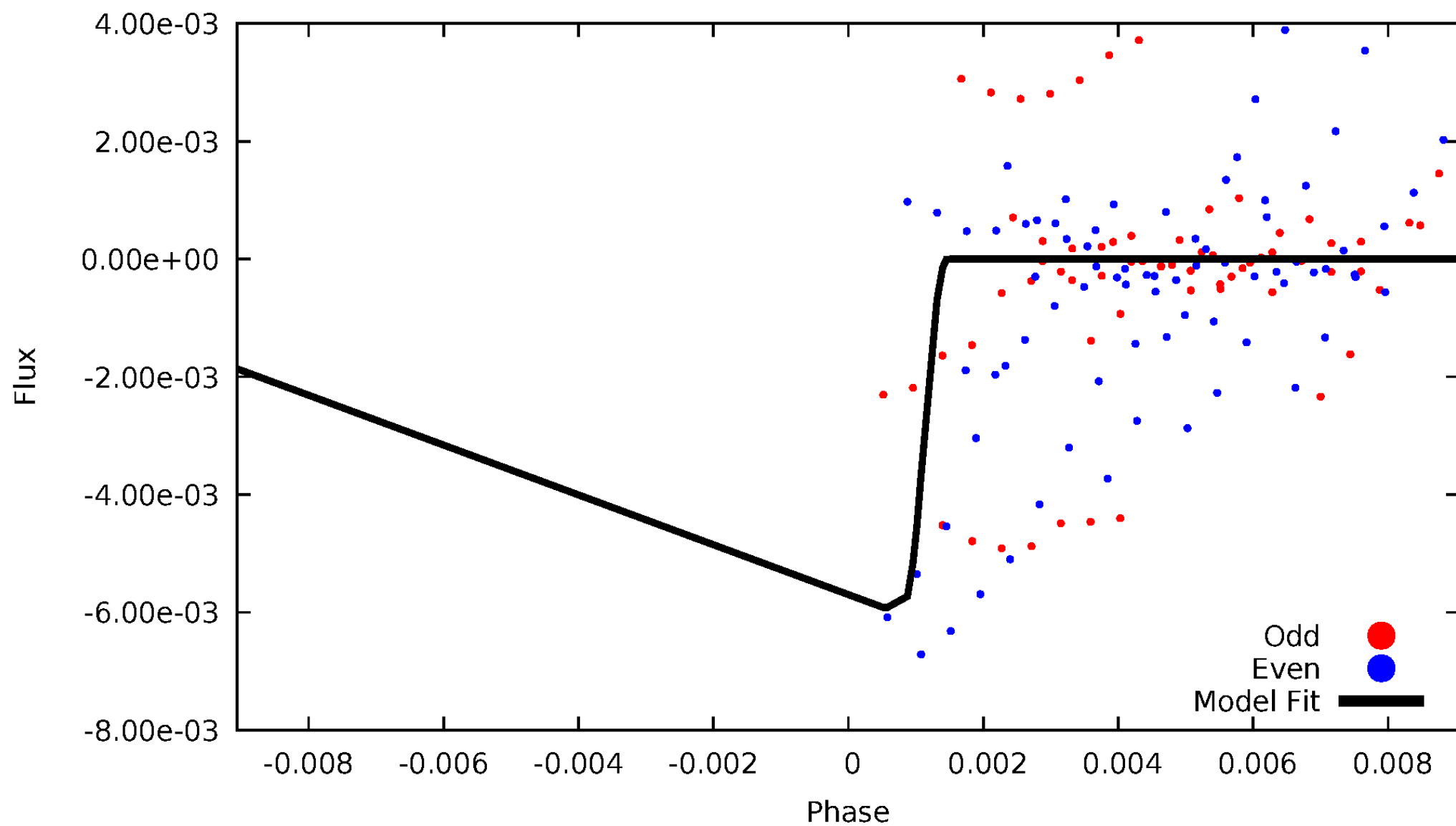
# DV Odd/Even

TCE 010812657-06



# ALT Odd/Even

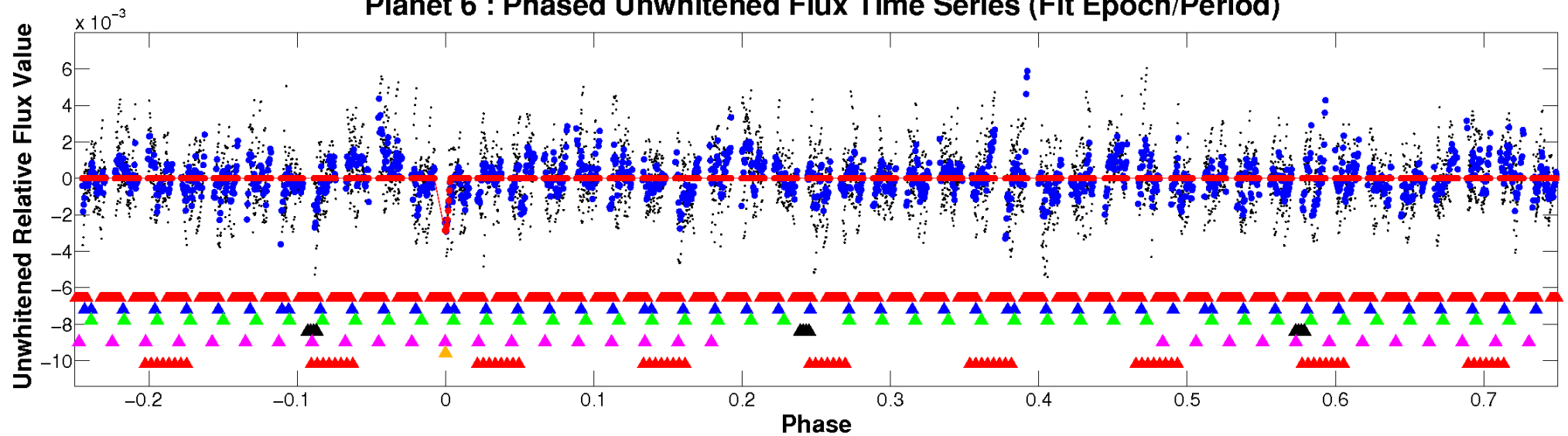
TCE 010812657-06



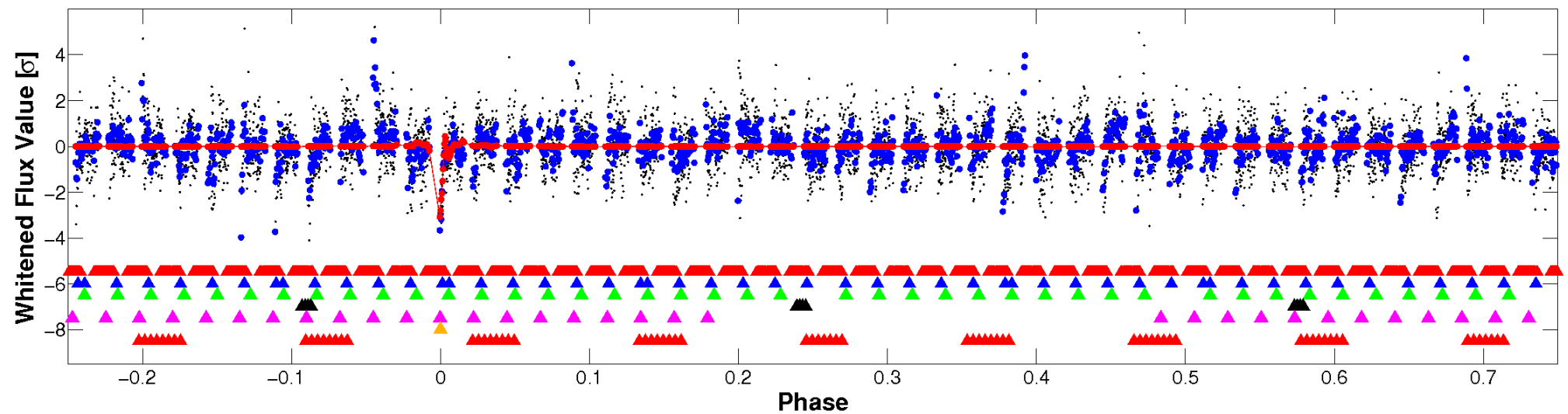


# Non-Whitened Vs. Whitened Light Curve

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

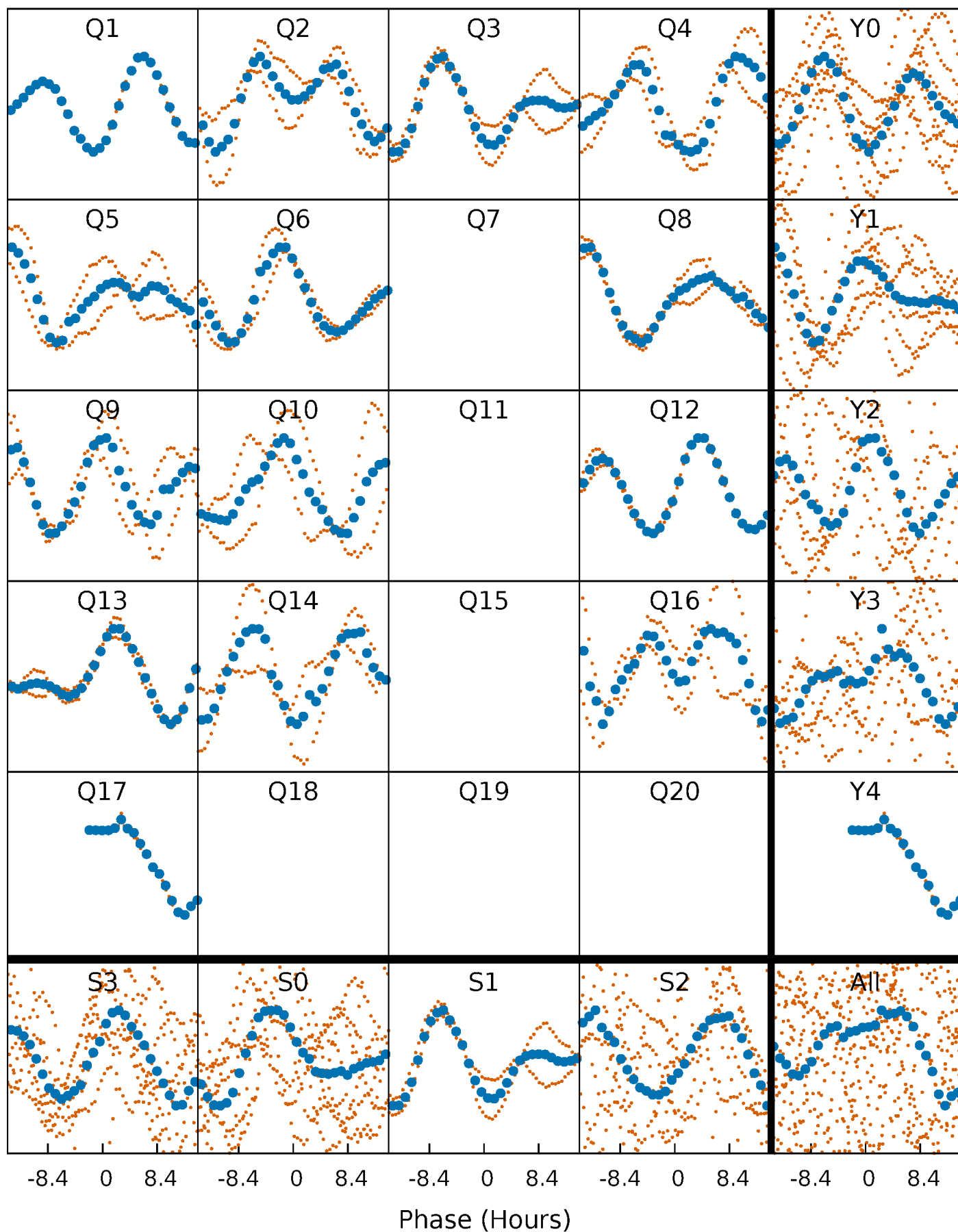


## Planet 6 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

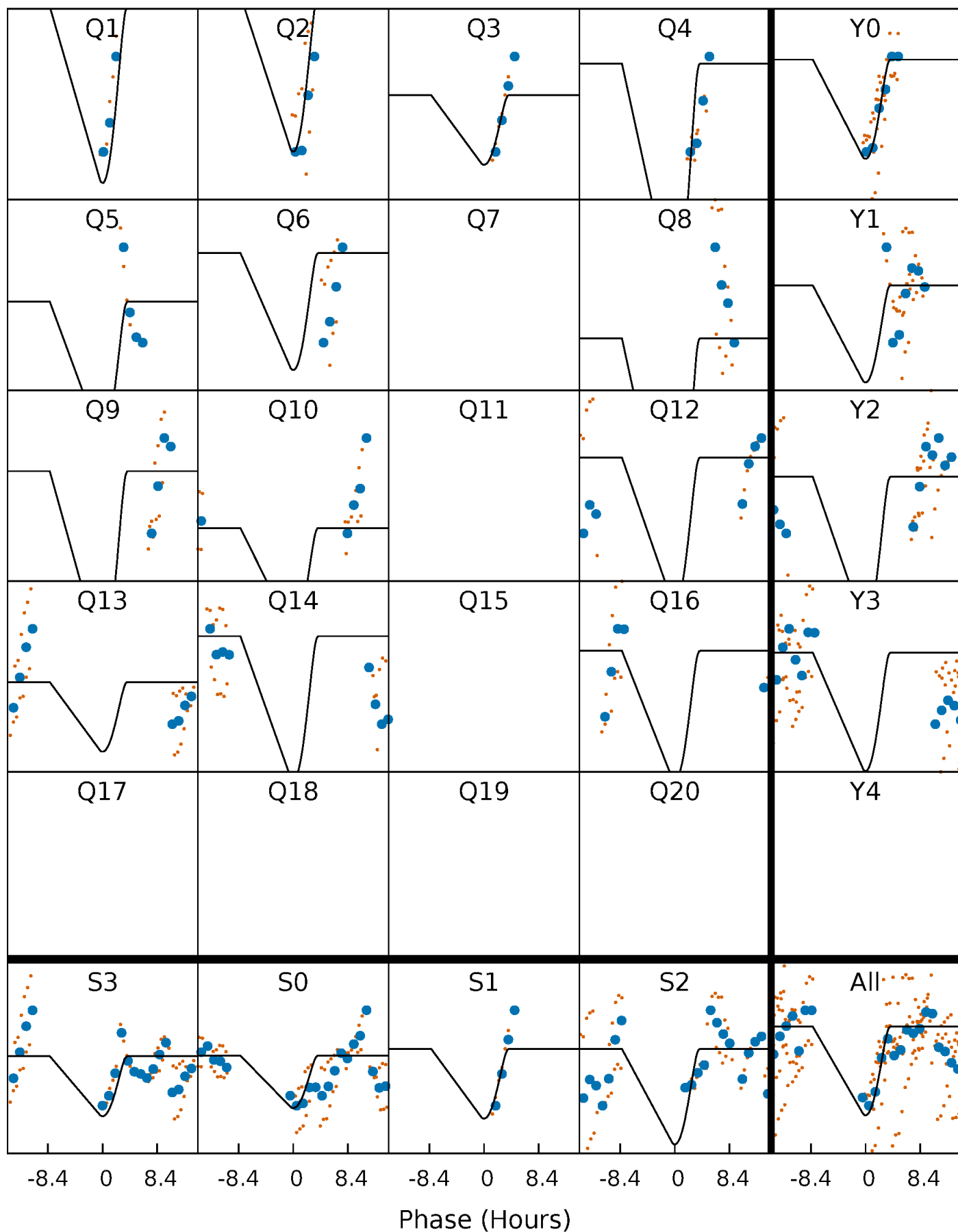
TCE 010812657-06 P= 46.561129 Days  $T_0=143.542107$  (BKJD)





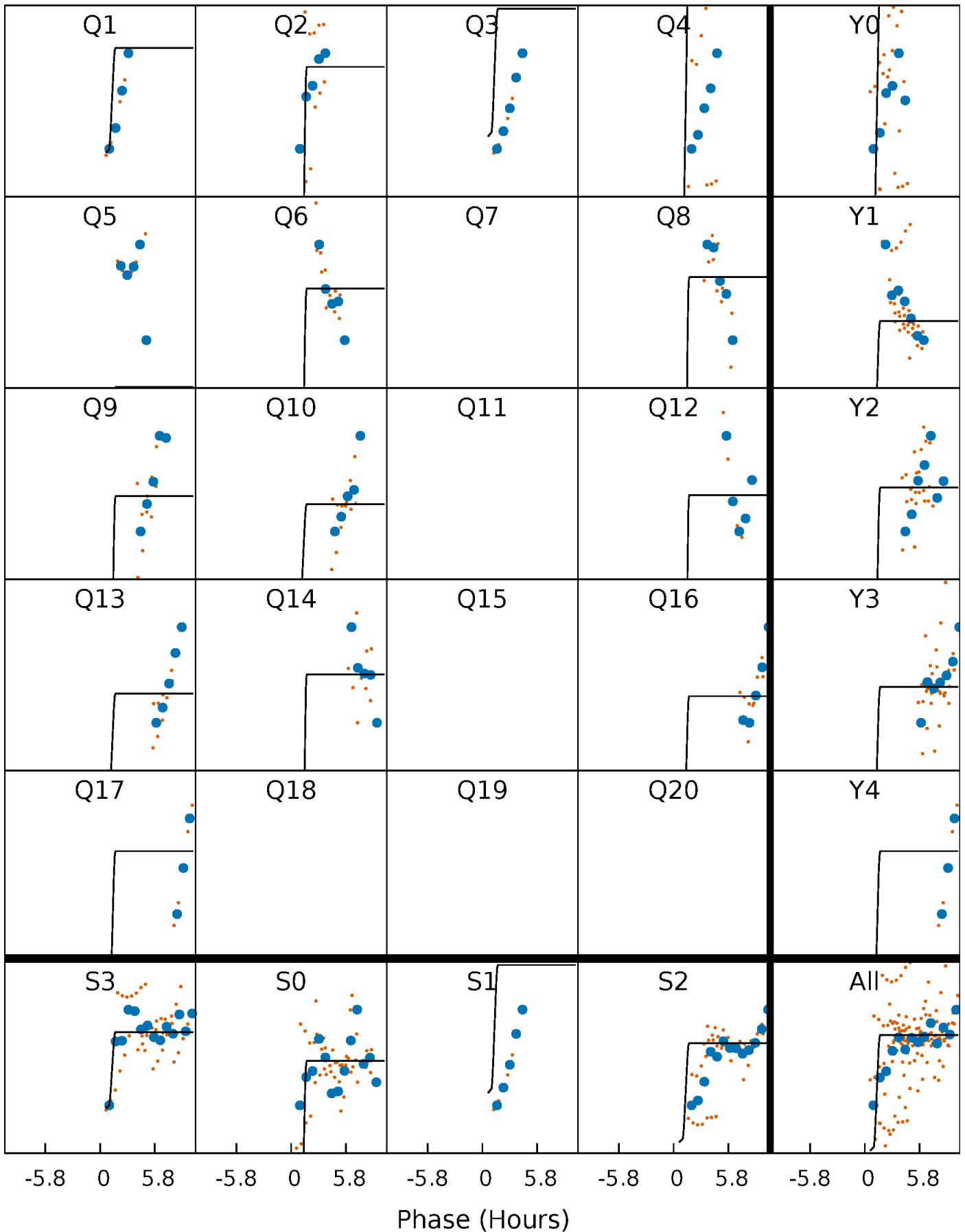
# DV Quarter-Phased Transit Curves

TCE 010812657-06 P= 46.561129 Days  $T_0=143.542107$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

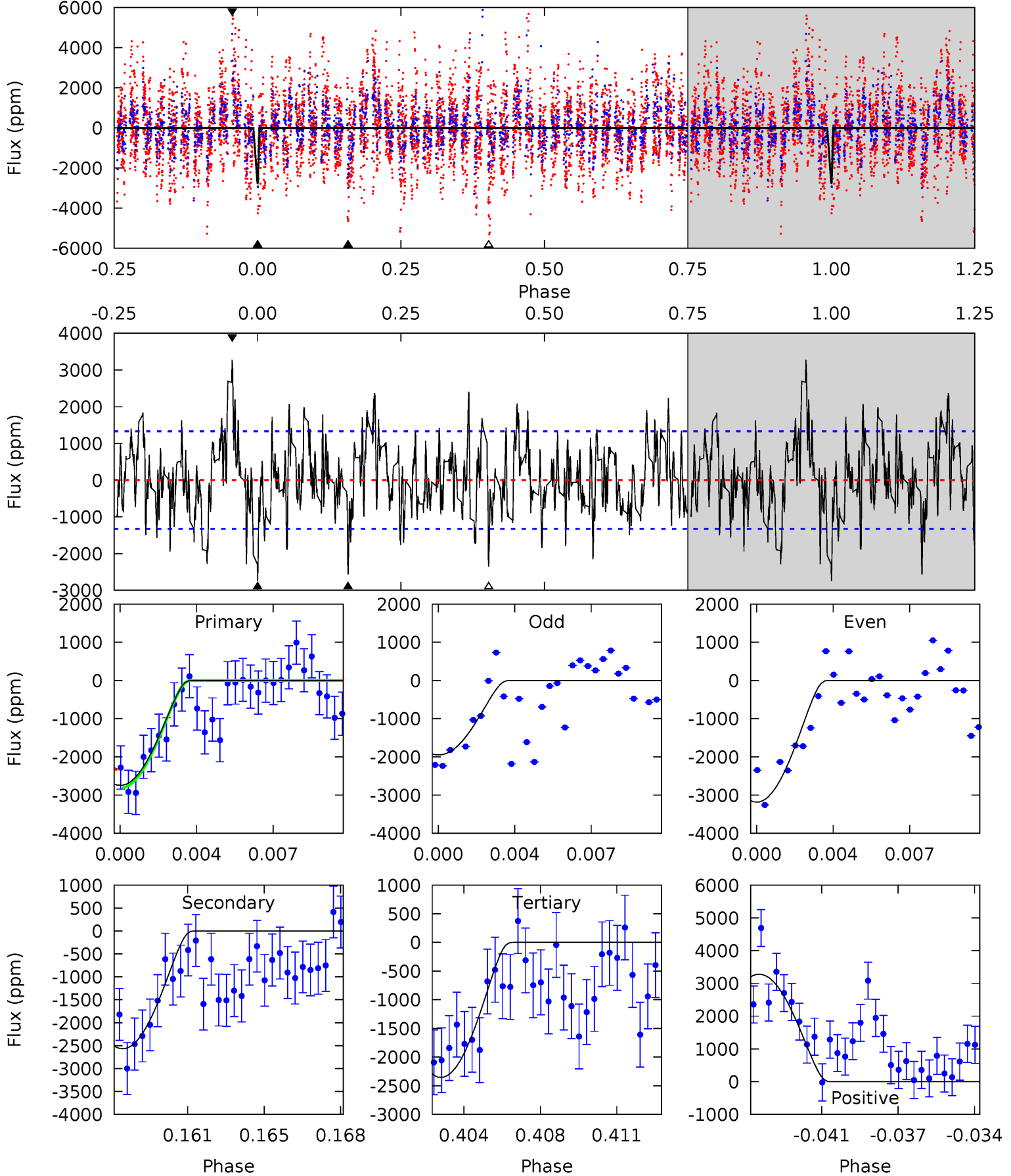
TCE 010812657-06 P= 46.572312 Days  $T_0=143.500336$  (BKJD)



# DV Model-Shift Uniqueness Test

010812657-06, P = 46.561129 Days, E = 96.980978 Days

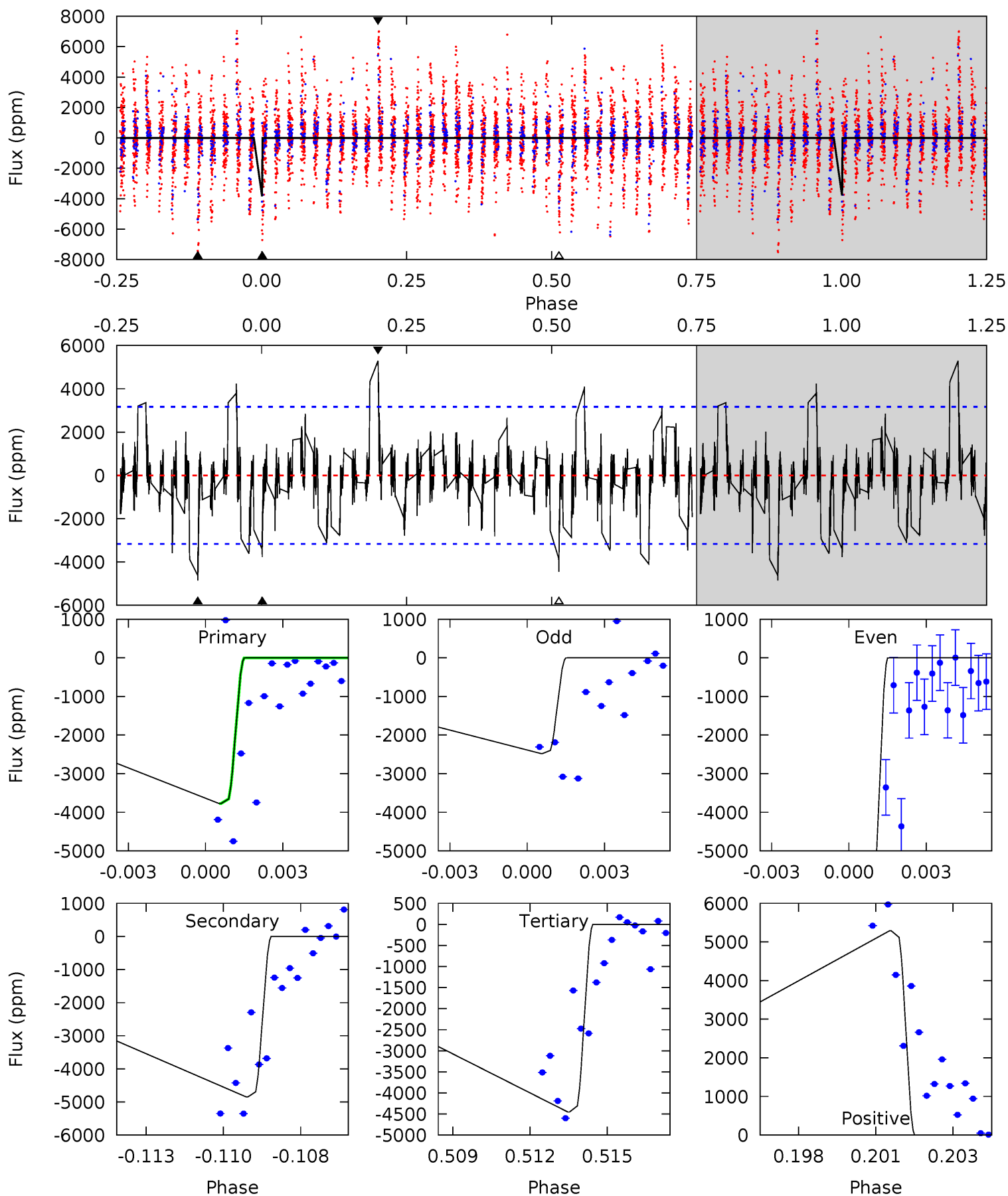
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.7	10.1	9.21	12.8	5.21	2.90	3.25	1.53	-2.08	0.84	-2.77	2.38	0.71	0.54	0.00



# Alt Model-Shift Uniqueness Test

010812657-06, P = 46.572312 Days, E = 96.928024 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
6.26	8.05	7.39	8.78	5.26	2.98	1.47	-1.13	-2.52	0.66	-0.73	3.68	1.07	0.52	0



### Stellar Parameters For KIC 010812657

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7349^{+206}_{-310}$	$4.197^{+0.124}_{-0.186}$	$-0.260^{+0.250}_{-0.350}$	$1.564^{+0.491}_{-0.302}$	$1.408^{+0.216}_{-0.216}$	$0.518^{+0.319}_{-0.266}$
	+3%/-4%	+3%/-4%	+96%/-135%	+31%/-19%	+15%/-15%	+61%/-51%
Source	KIC0	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 010812657-06 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-2566 \pm 255$	$32.67^{+32.33}_{-22.82}$	$1077^{+72}_{-70}$	$4045^{+2758}_{-785}$	$105^{+1059}_{-78}$
Alt.	$-4849 \pm 603$	$31.02^{+31.36}_{-20.79}$	$1064^{+81}_{-71}$	$4602^{+3522}_{-967}$	$214^{+1833}_{-160}$

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

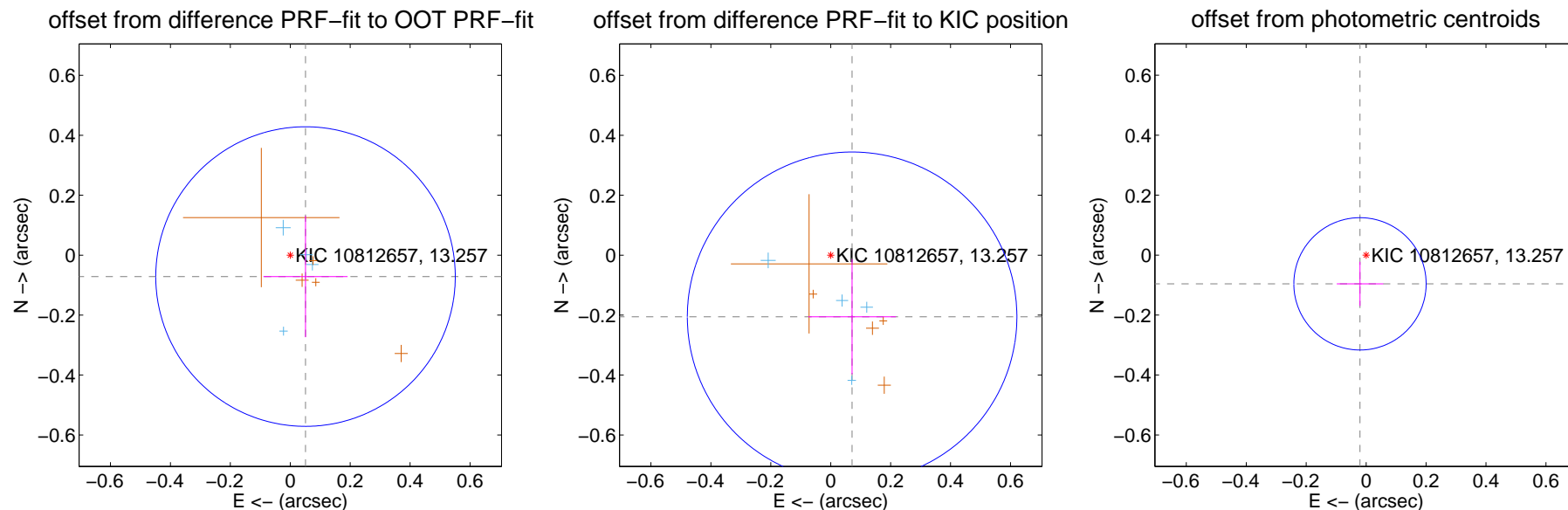
## DV Centroid Data

Supplemental centroid analysis for 010812657-06. Kepler magnitude: 13.26. Transit SNR 8.69

There are 5 quarters with good PRF difference image offsets

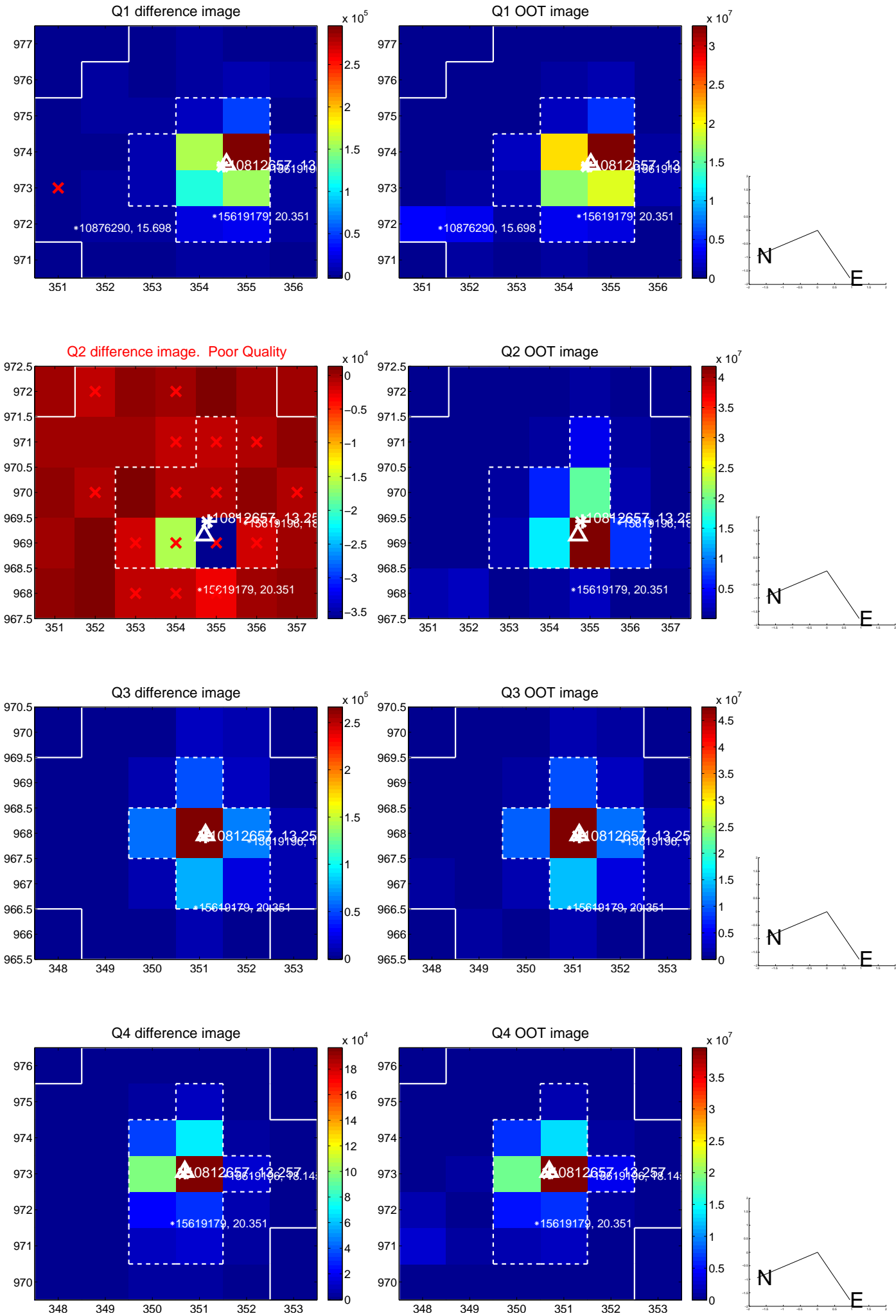
The direct PRF centroid is offset from the target star catalog position by about 0.20 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.088 \pm 0.167$	0.53	$-0.051 \pm 0.140$	$-0.071 \pm 0.202$
PRF-fit source offset from KIC position	$0.218 \pm 0.183$	1.19	$-0.071 \pm 0.146$	$-0.206 \pm 0.192$
photometric centroid source offset	$0.10 \pm 0.07$	1.33	$0.02 \pm 0.08$	$-0.10 \pm 0.07$

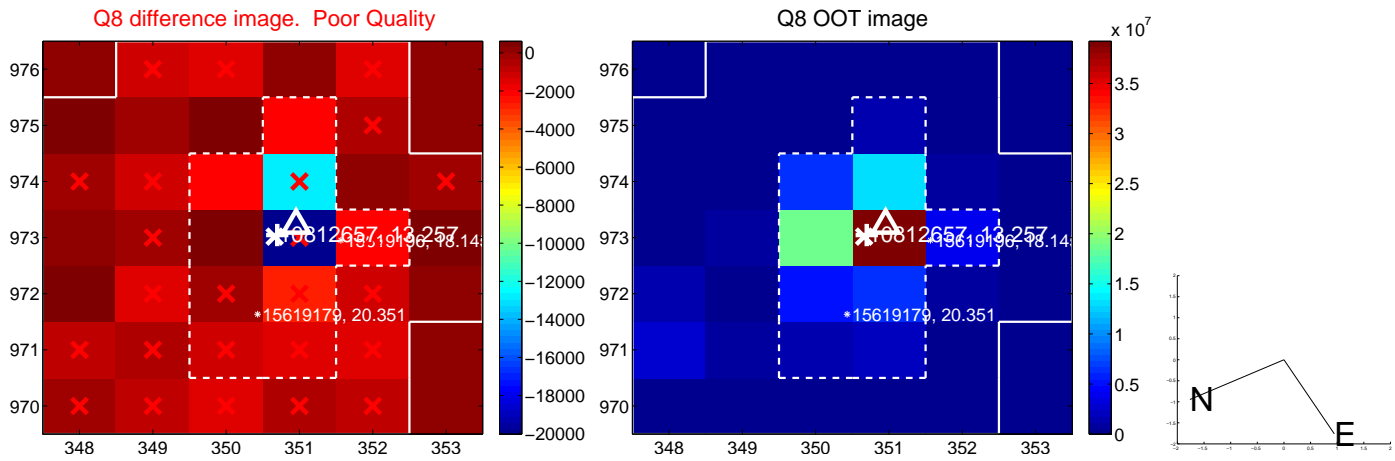
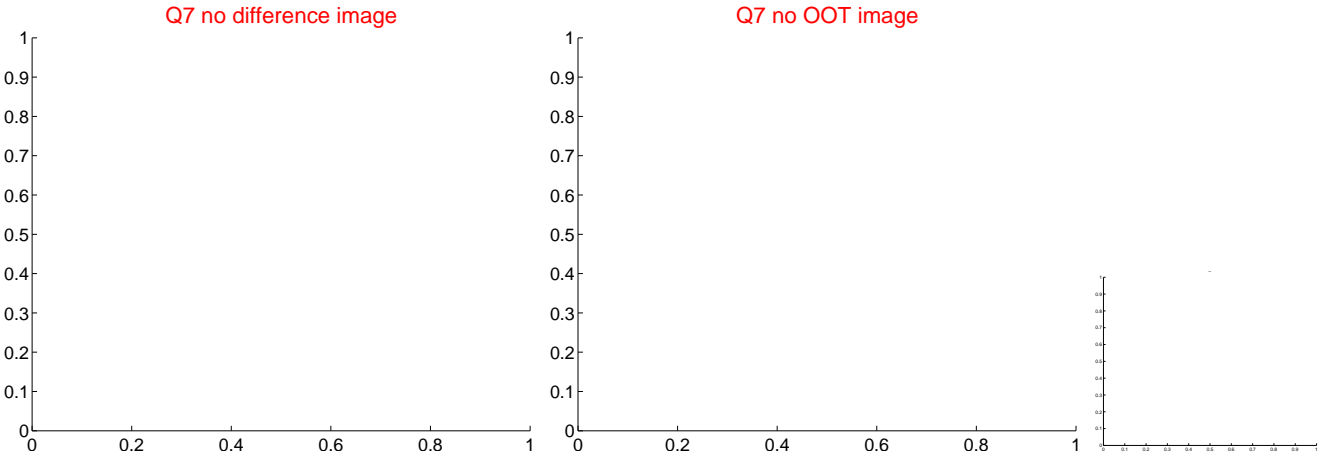
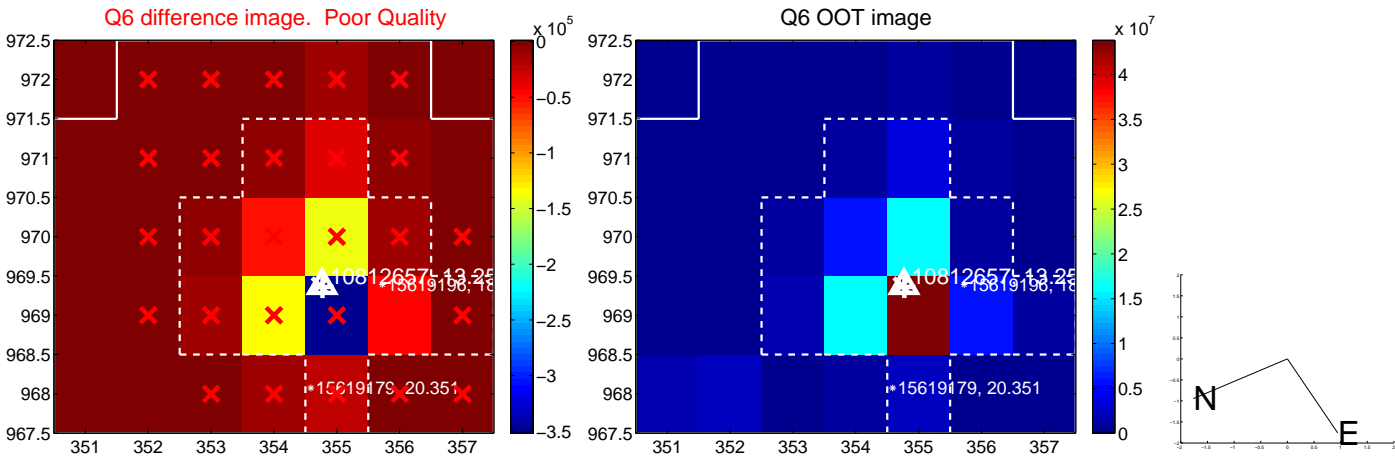
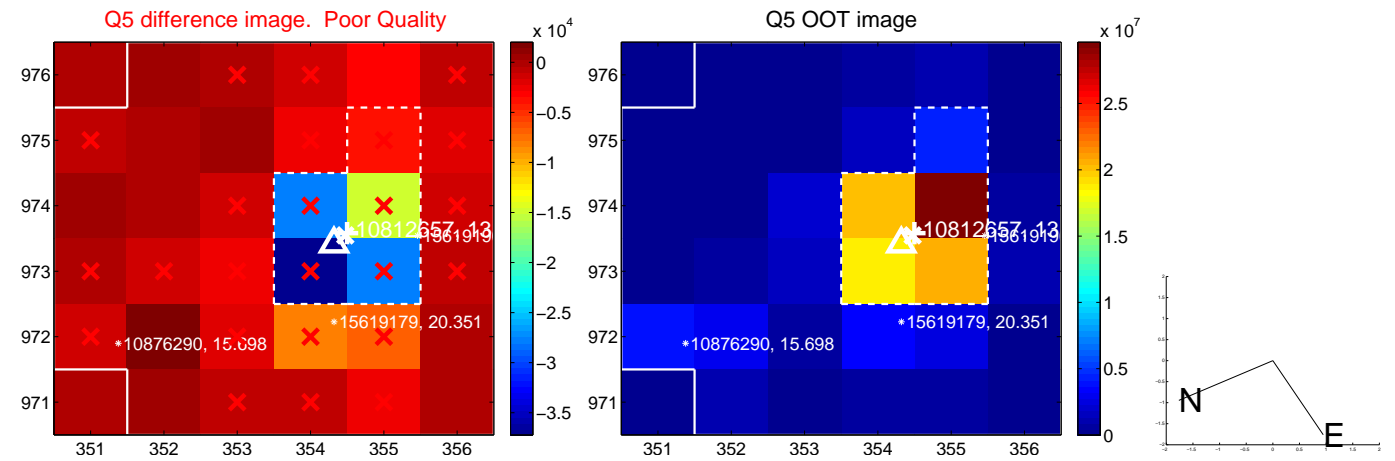


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

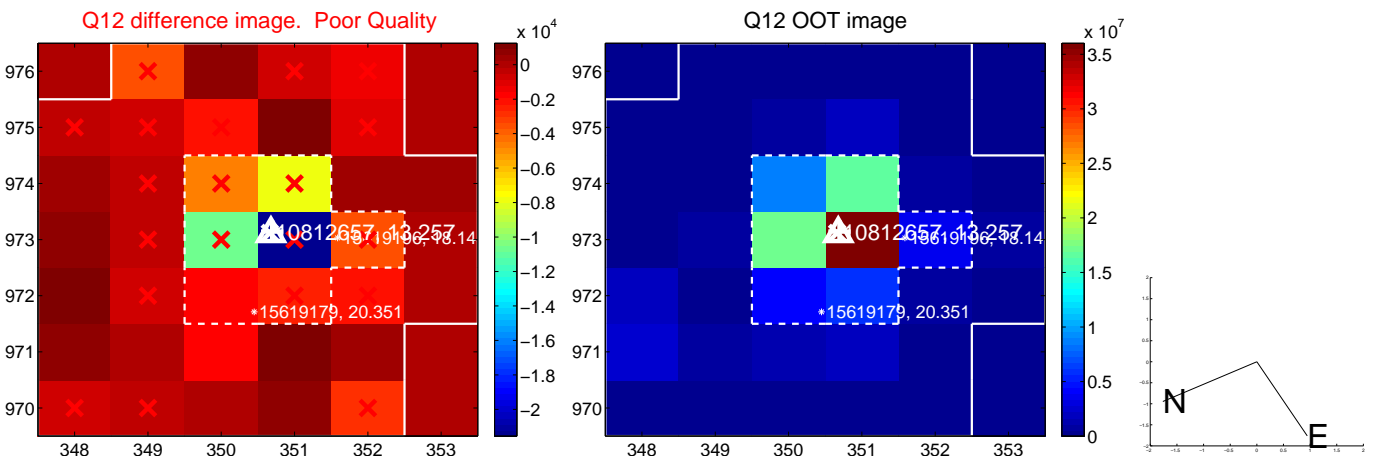
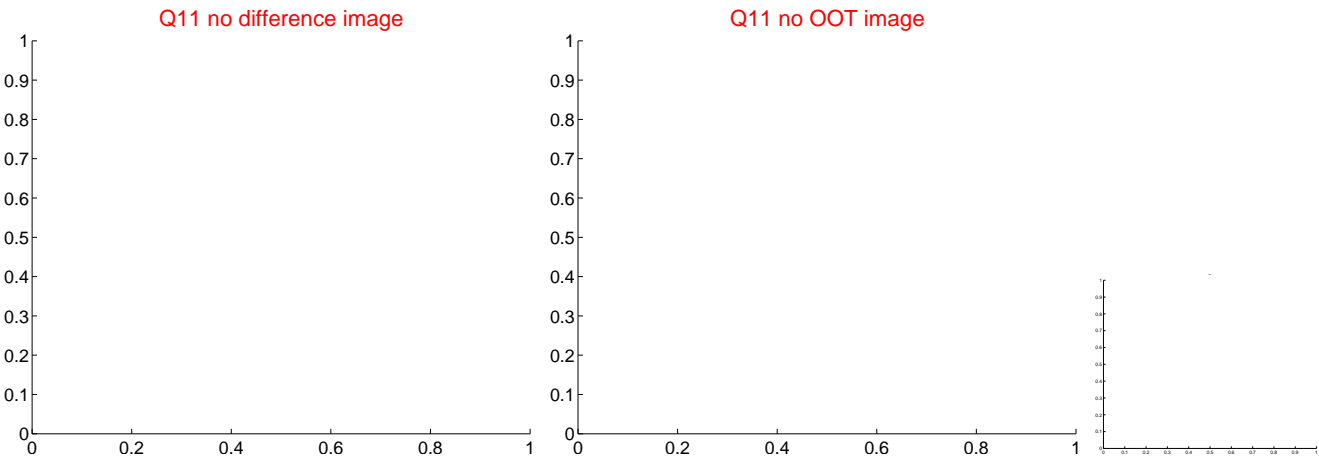
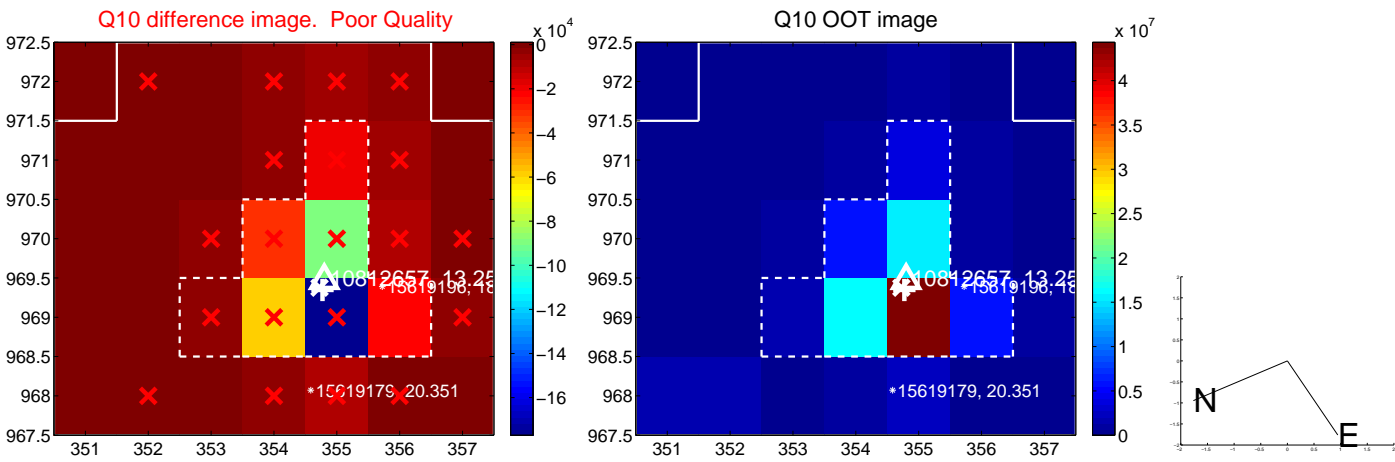
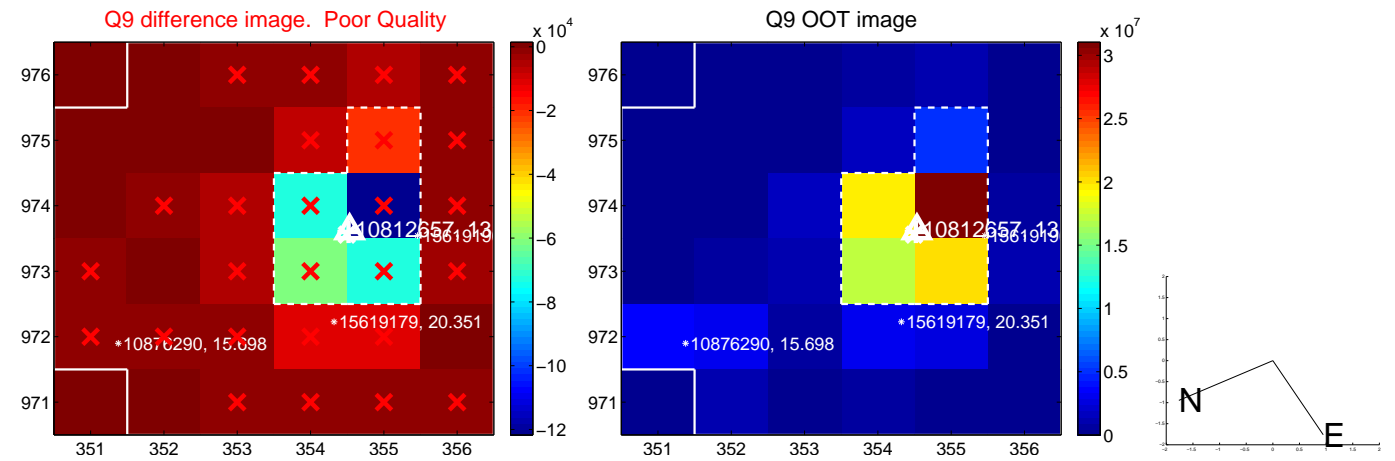


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

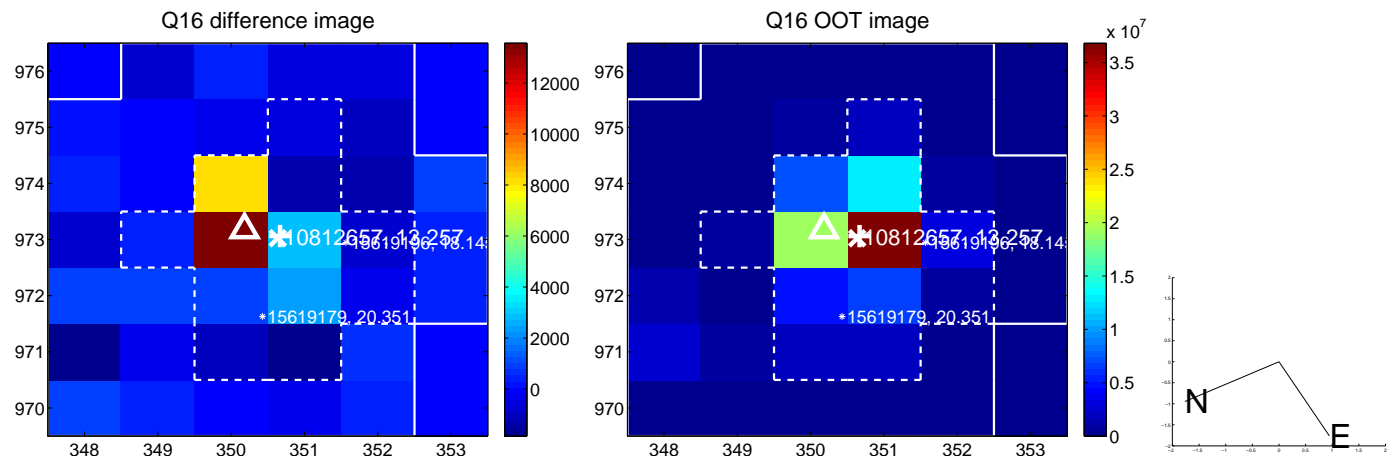
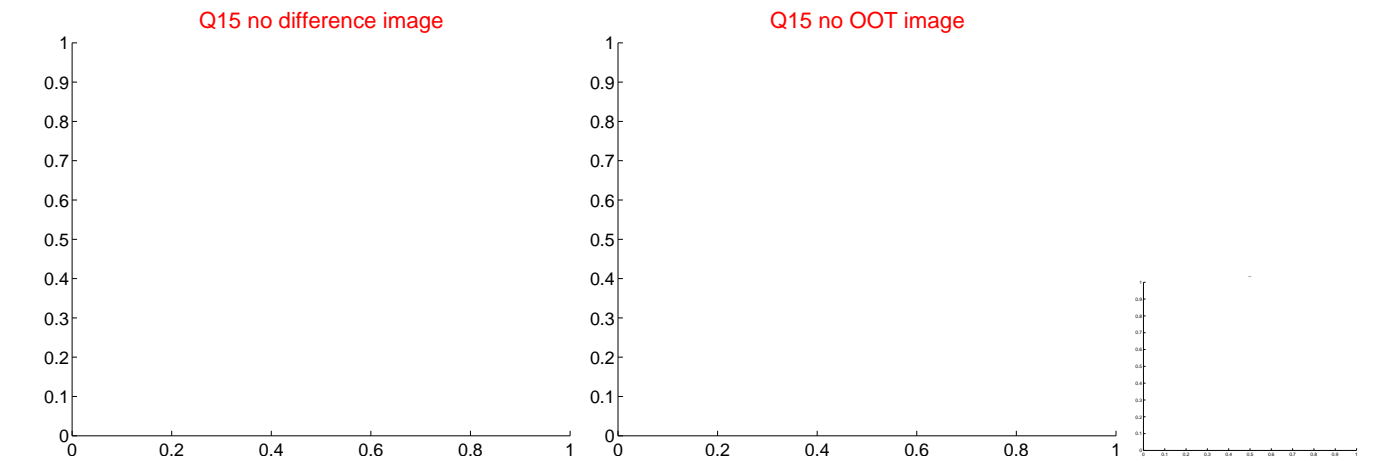
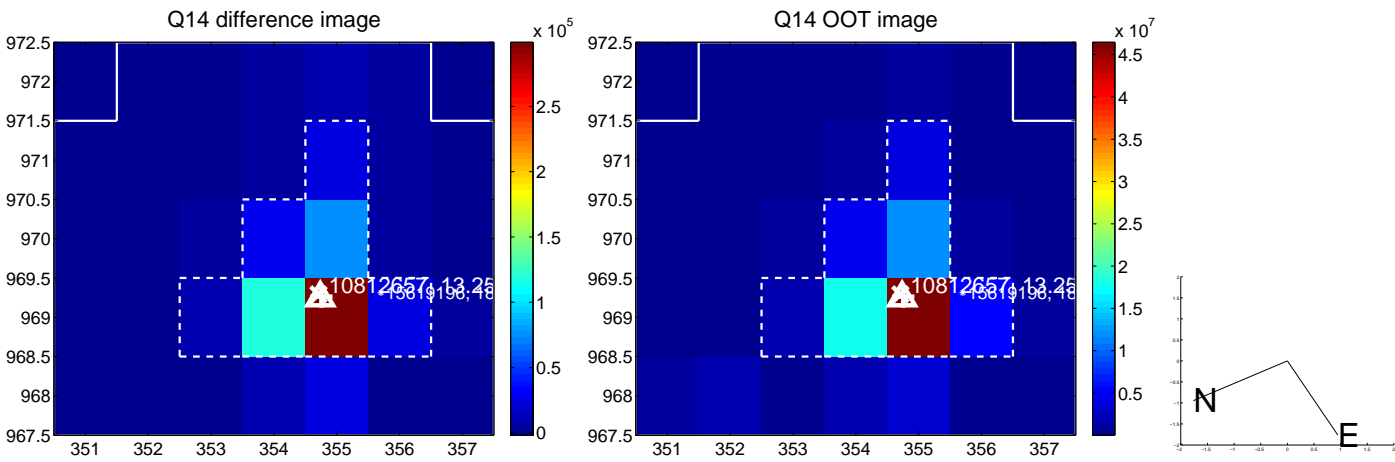
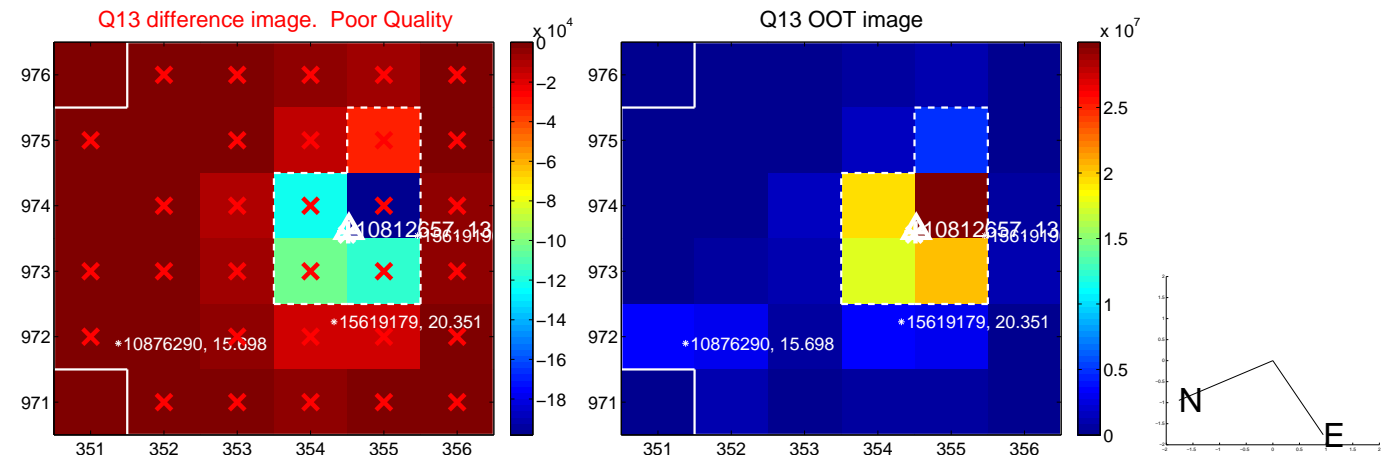




white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



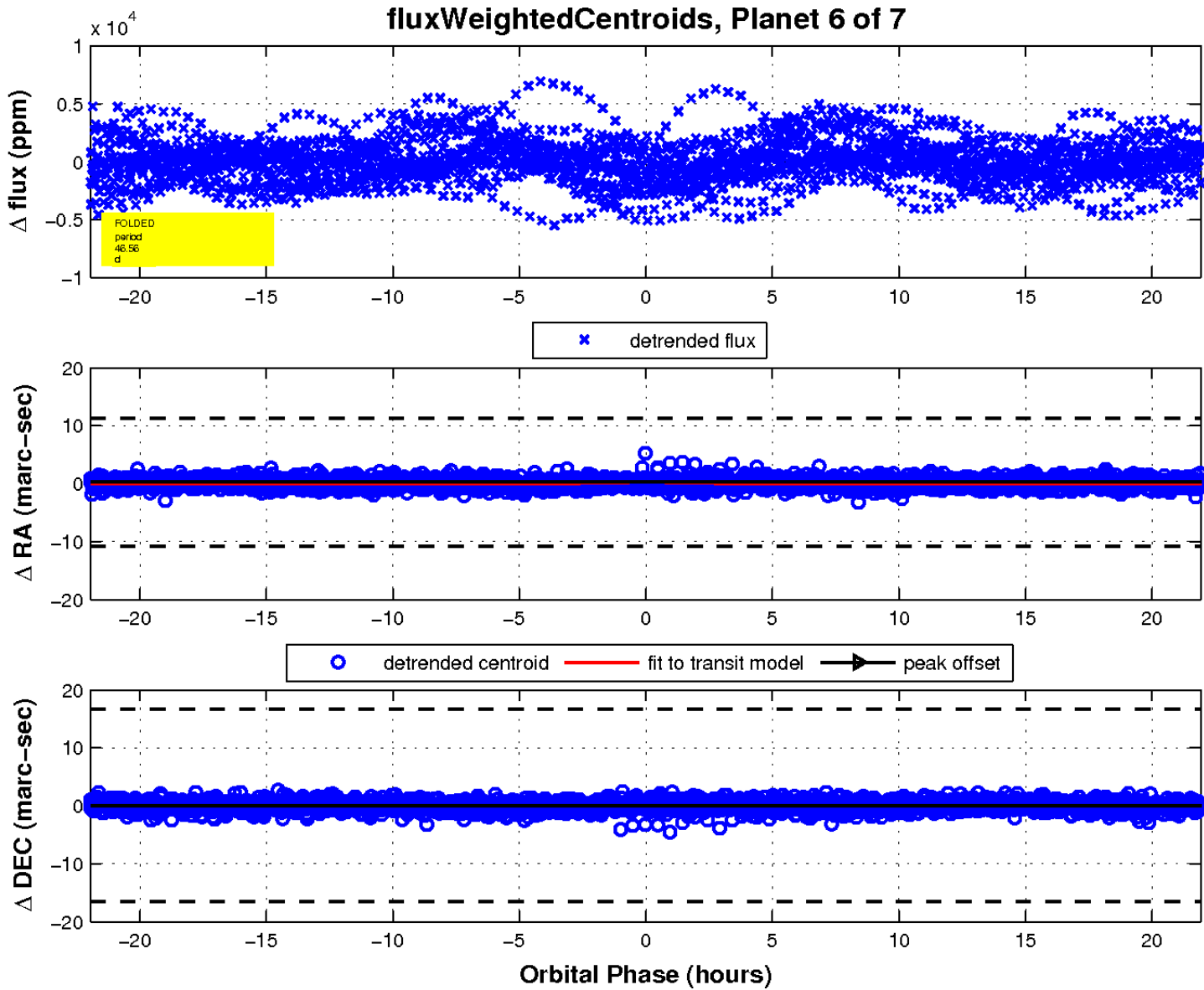
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

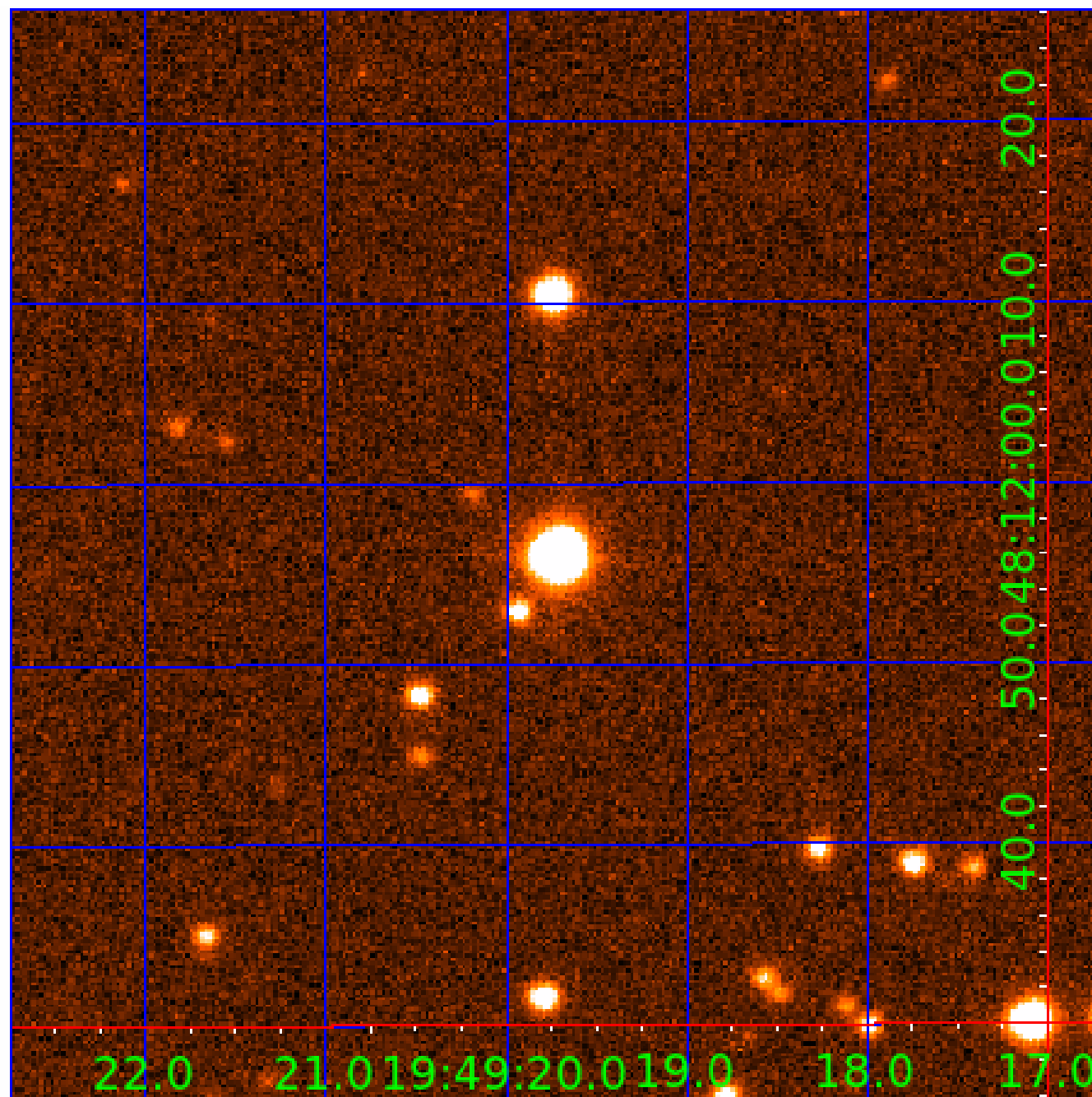
Q17 no difference image

Q17 no OOT image



UKIRT Image

Declination



# KIC 010812657

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010812657-01	OBS	No	1.035145	131.673492	0.0	7.075	10.4	0.0	1.56	7349	0.01	12704.67
010812657-02	OBS	No	28.976055	138.407555	2216.0	5.278	10.1	10.5	1.56	7349	13.37	149.48
010812657-03	OBS	No	35.180230	143.795173	300.1	1.153	8.7	1.6	1.56	7349	3.14	115.41
010812657-04	OBS	No	124.132671	139.492680	3660.5	6.477	8.7	9.4	1.56	7349	10.89	21.48
010812657-05	OBS	No	45.516172	151.891165	2053.9	3.772	8.5	7.3	1.56	7349	8.46	81.86
010812657-06	OBS	No	46.561129	143.542107	2902.8	7.319	8.5	8.7	1.56	7349	15.18	79.42
010812657-07	OBS	No	20.673153	151.062505	209.9	5.000	8.2	-1.0	1.56	7349	2.30	234.47

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010812657-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV
010812657-02	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—HALO_GHOST
010812657-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_TER_ALT—MOD_POS_ALT
010812657-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
010812657-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
010812657-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
010812657-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_NOFITS

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

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

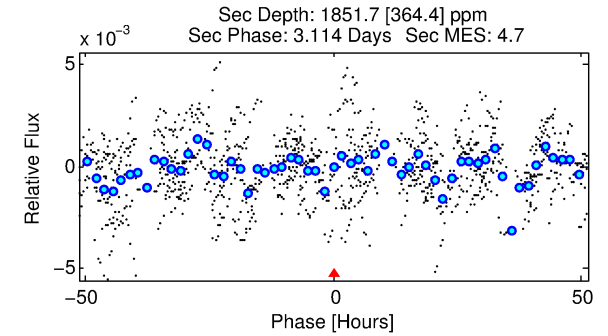
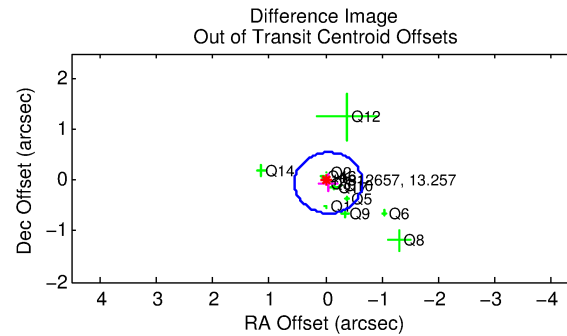
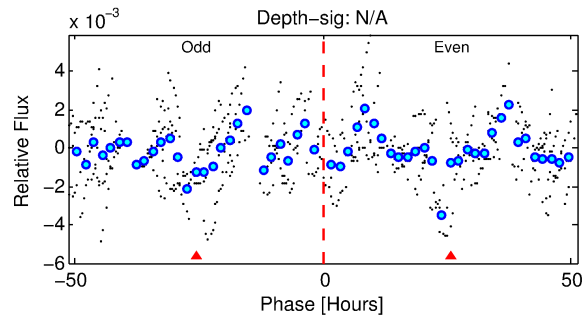
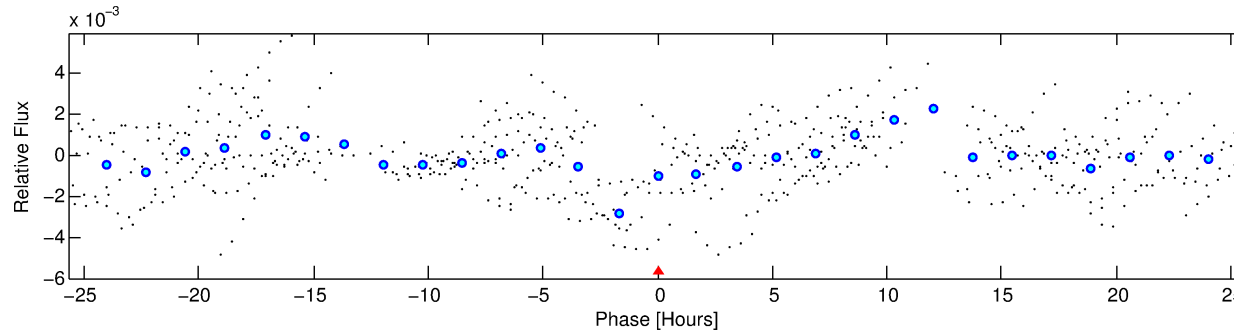
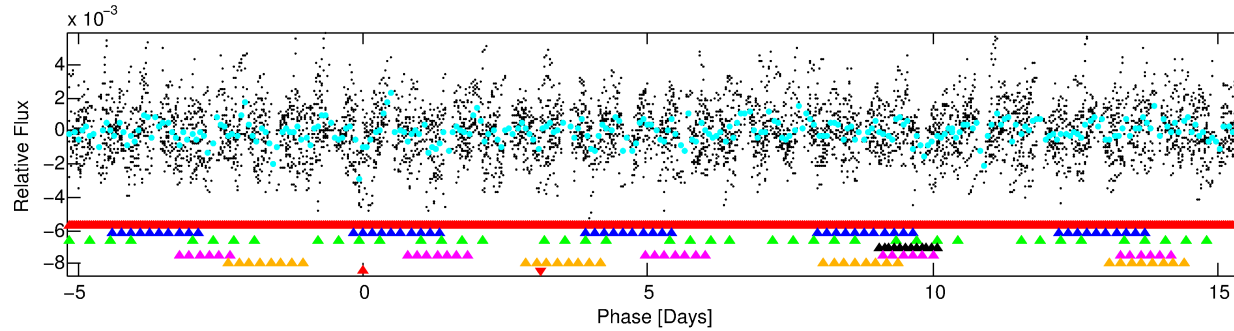
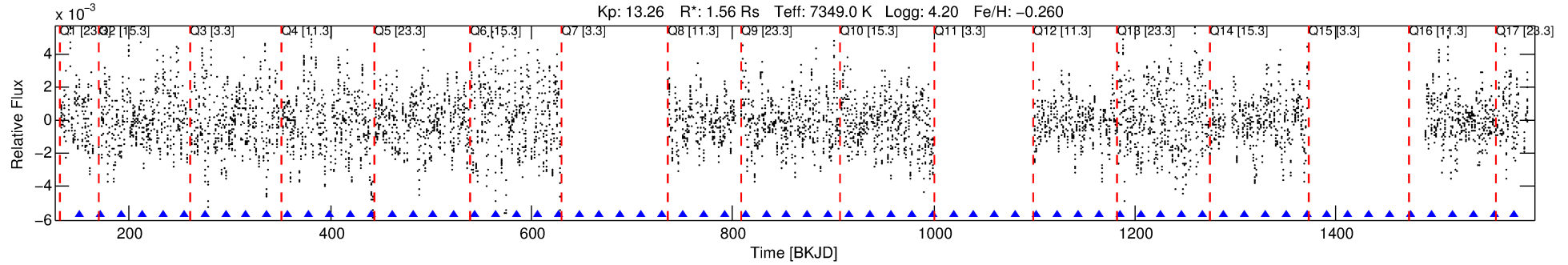
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 010812657-07

No Significant Match Found

# DV One-Page Summary

KIC: 10812657 Candidate: 7 of 7 Period: 20.673 d



## TPS TCE Results:

Period = 20.67315 d  
Epoch = 151.0625 BKJD

DV fit results are unavailable

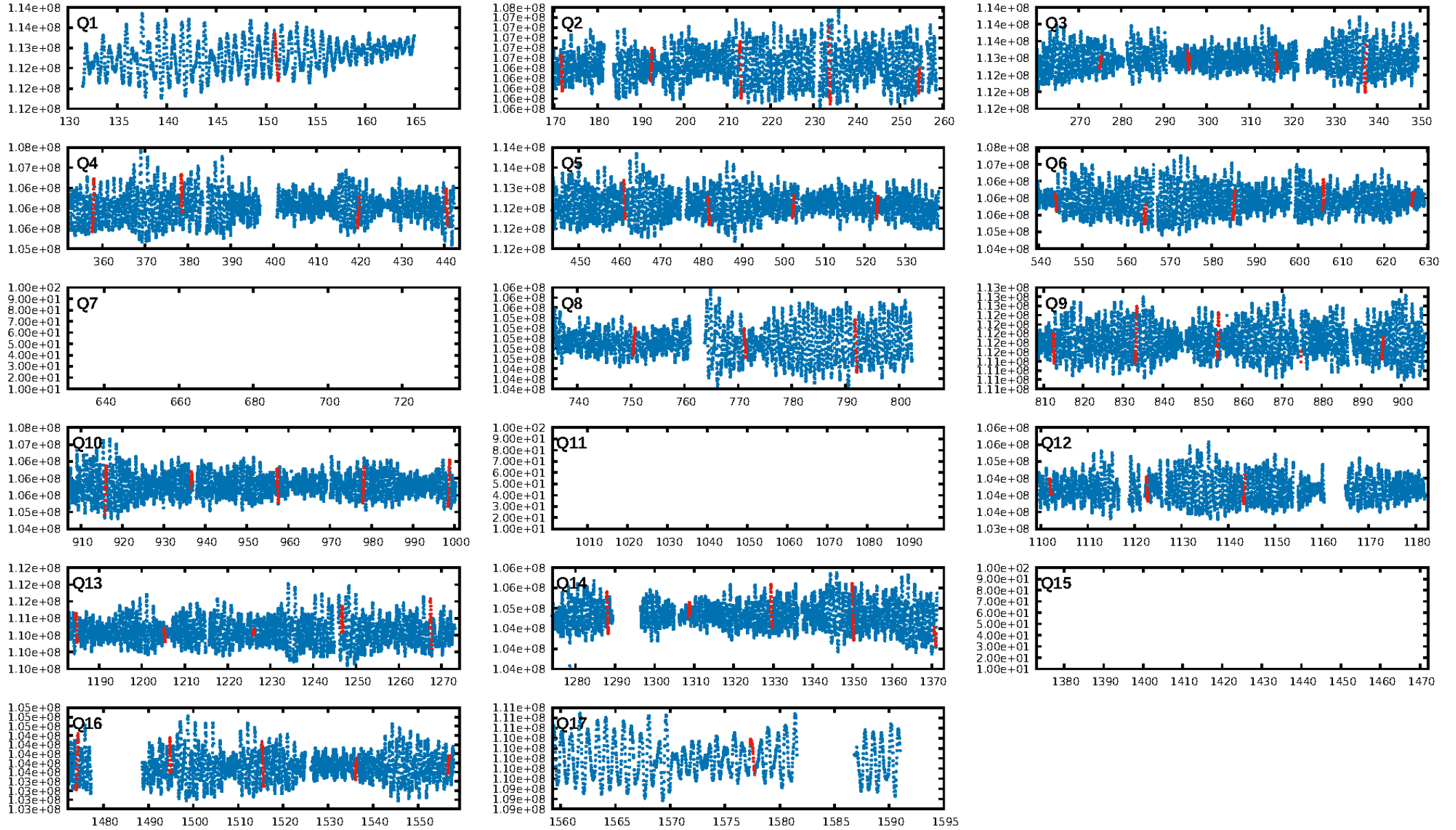
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [54.40 $\sigma$ ]  
LongPeriod-sig: 100.0% [27.41 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [25/25]  
GhostDiagnostic-chr: 2.503  
Centroid-sig: 10.4%  
Centroid-so: 0.206 arcsec [2.39 $\sigma$ ]  
OotOffset-rm: 0.070 arcsec [0.35 $\sigma$ ]  
KicOffset-rm: 0.189 arcsec [0.98 $\sigma$ ]  
OotOffset-st: 4/1/4/4 [13]  
KicOffset-st: 4/1/4/4 [13]  
DiffImageQuality-fgm: 0.46 [6/13]  
DiffImageOverlap-fno: 0.00 [0/13]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 10:24:27 Z

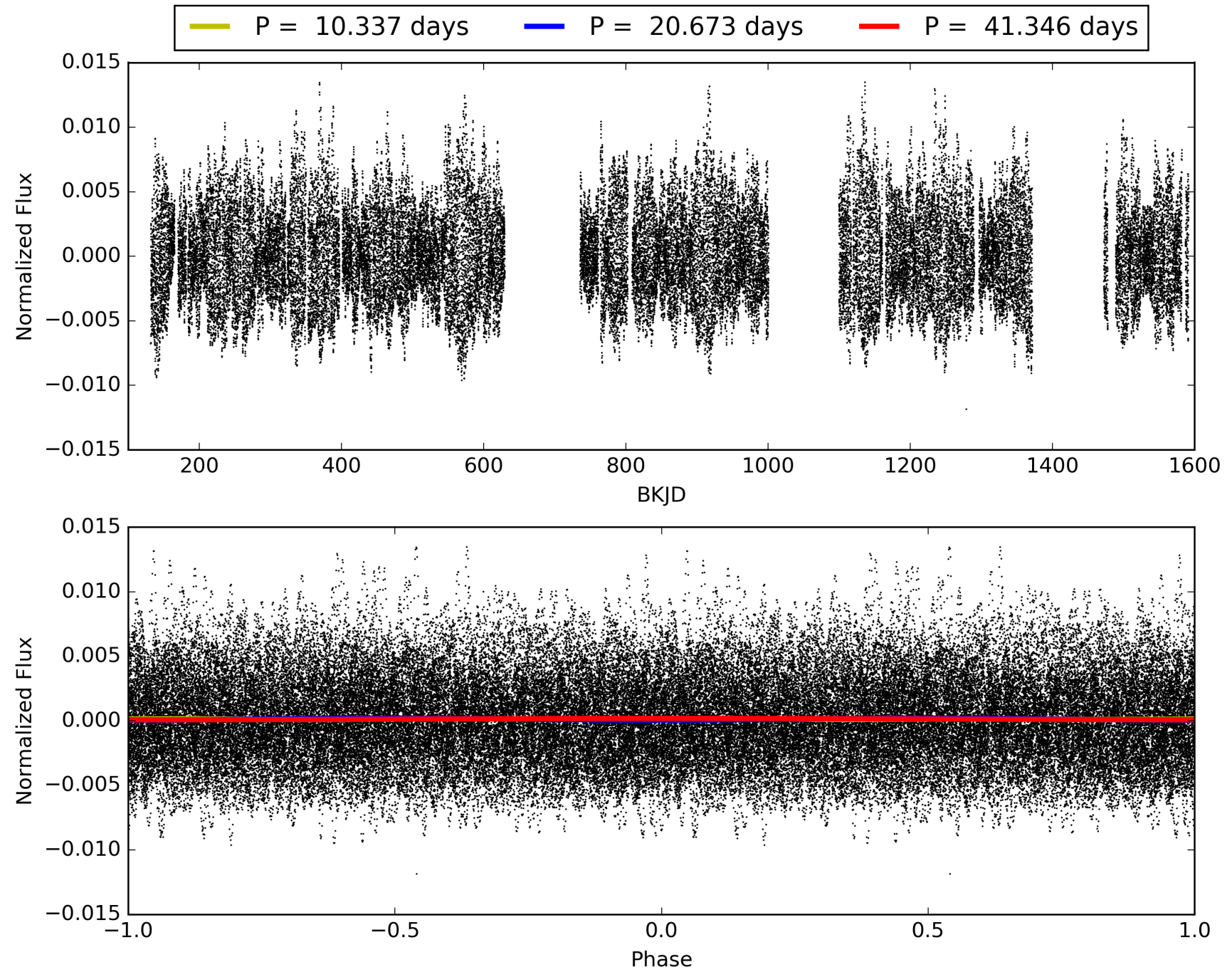
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 010812657-07, PDC Light Curves





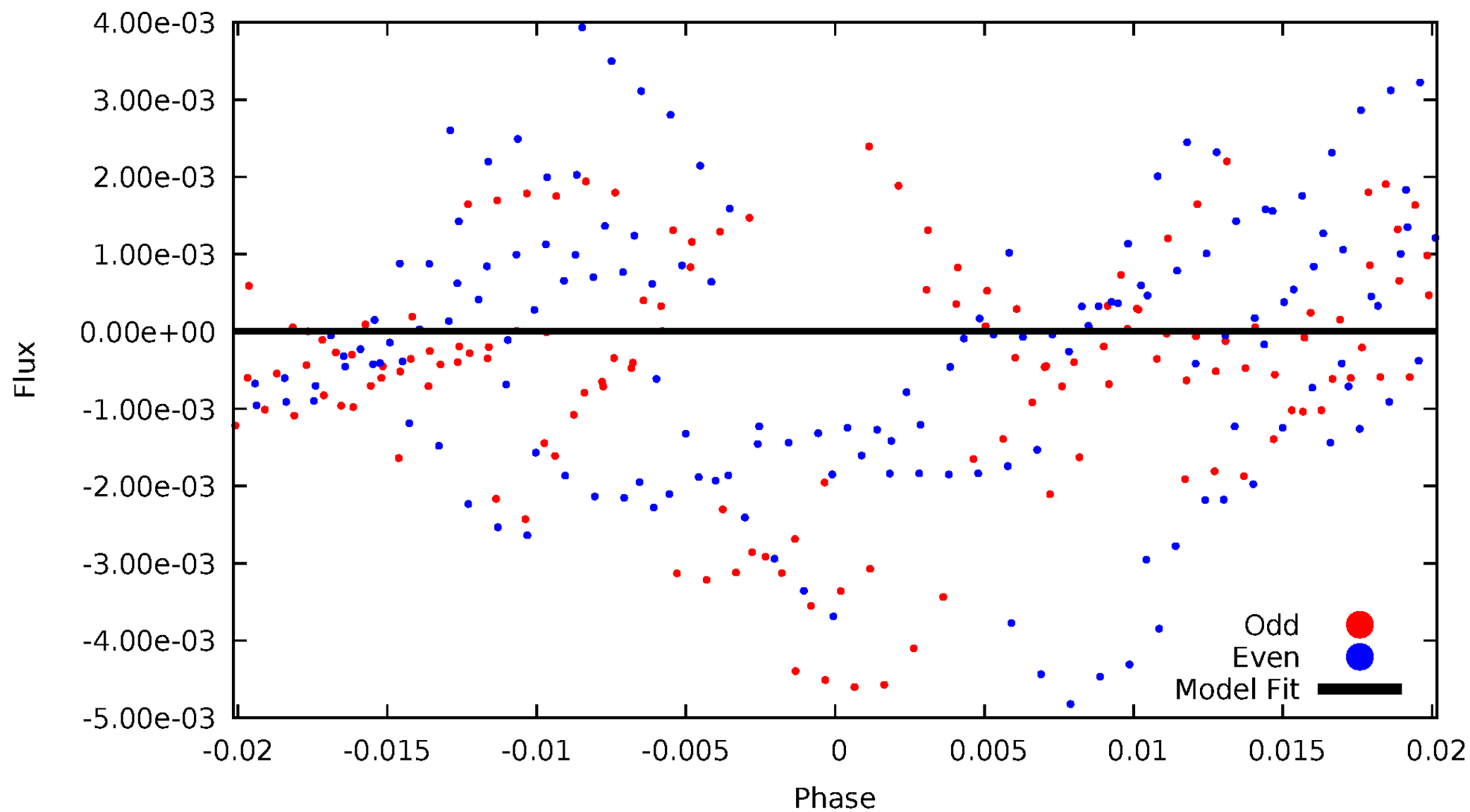
# TCE 010812657-07





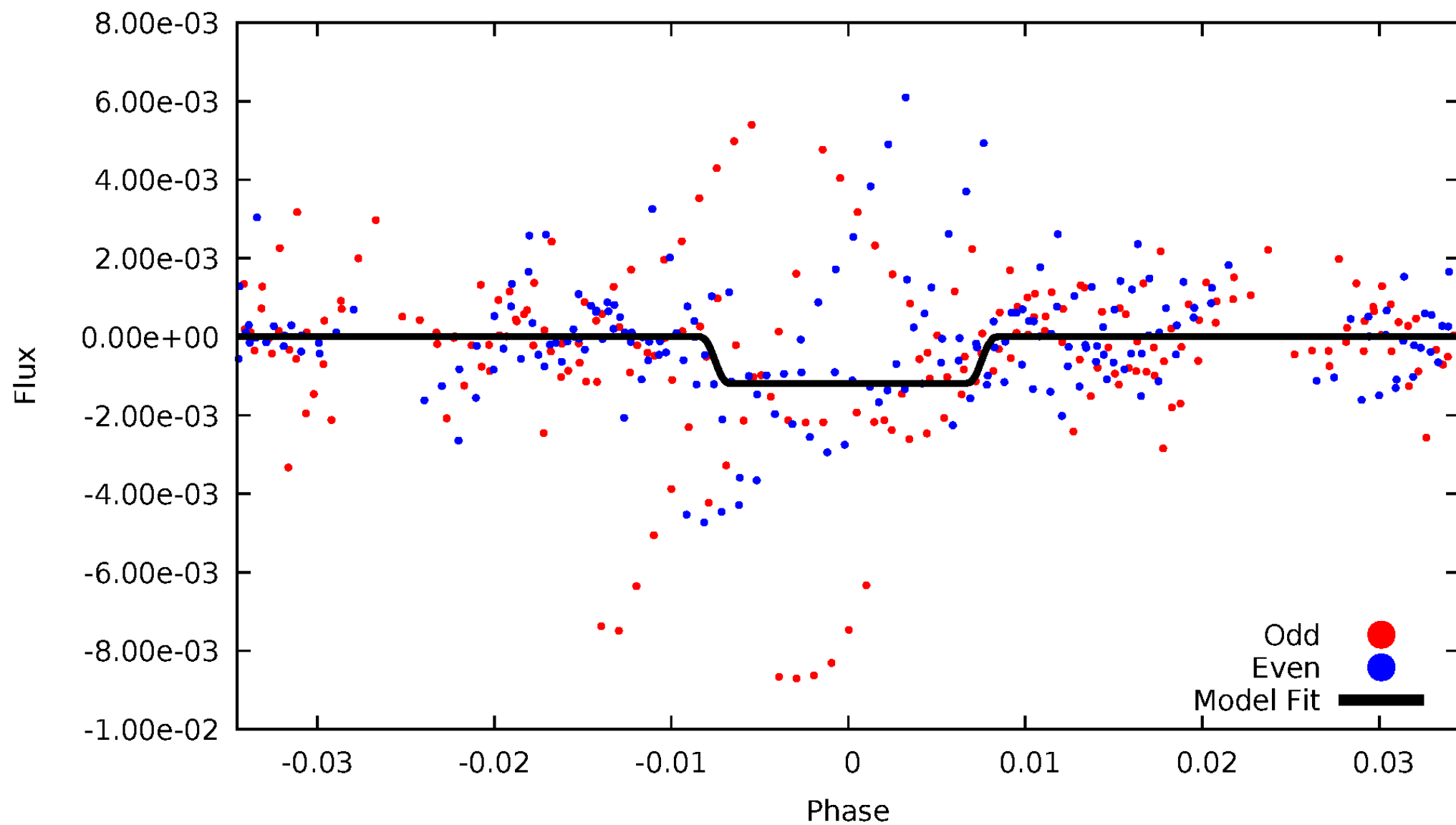
# DV Odd/Even

TCE 010812657-07

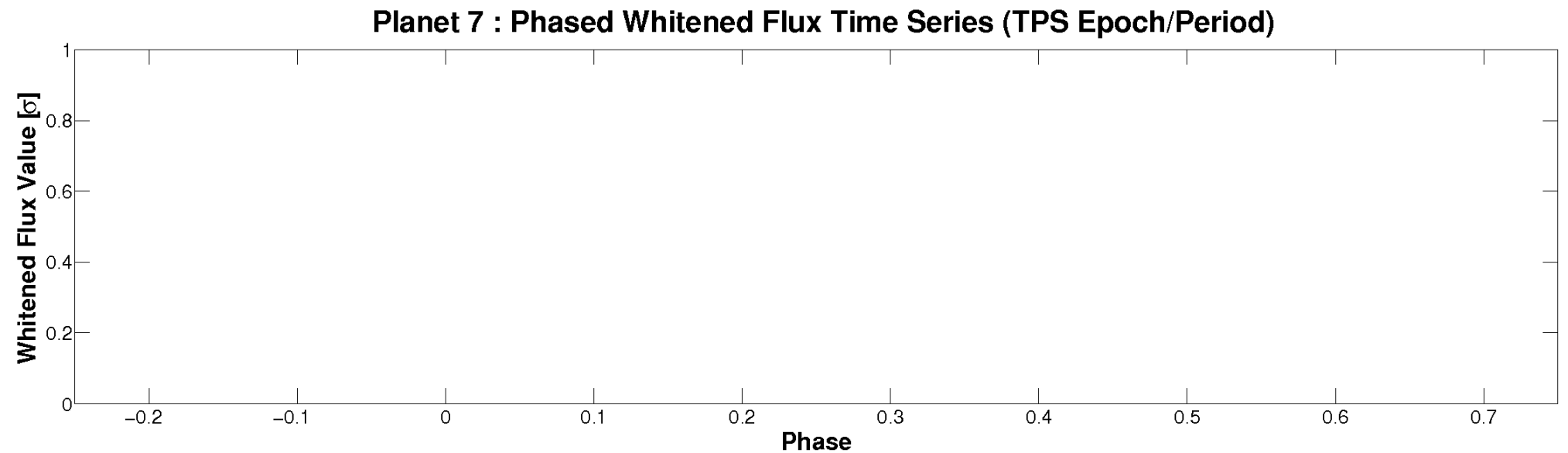
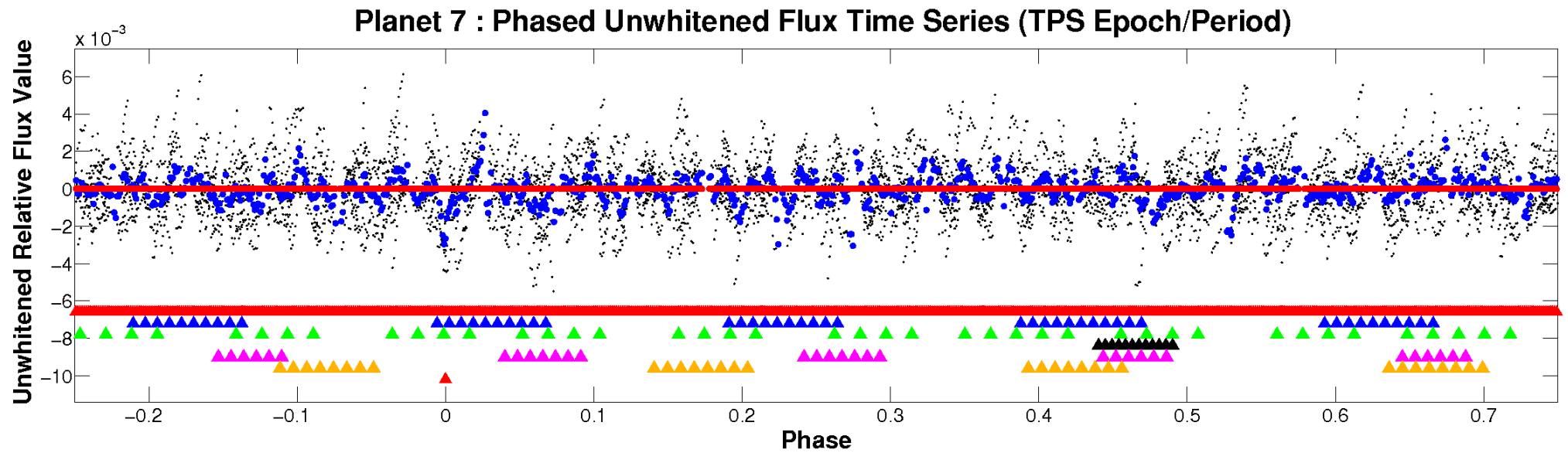


# ALT Odd/Even

TCE 010812657-07

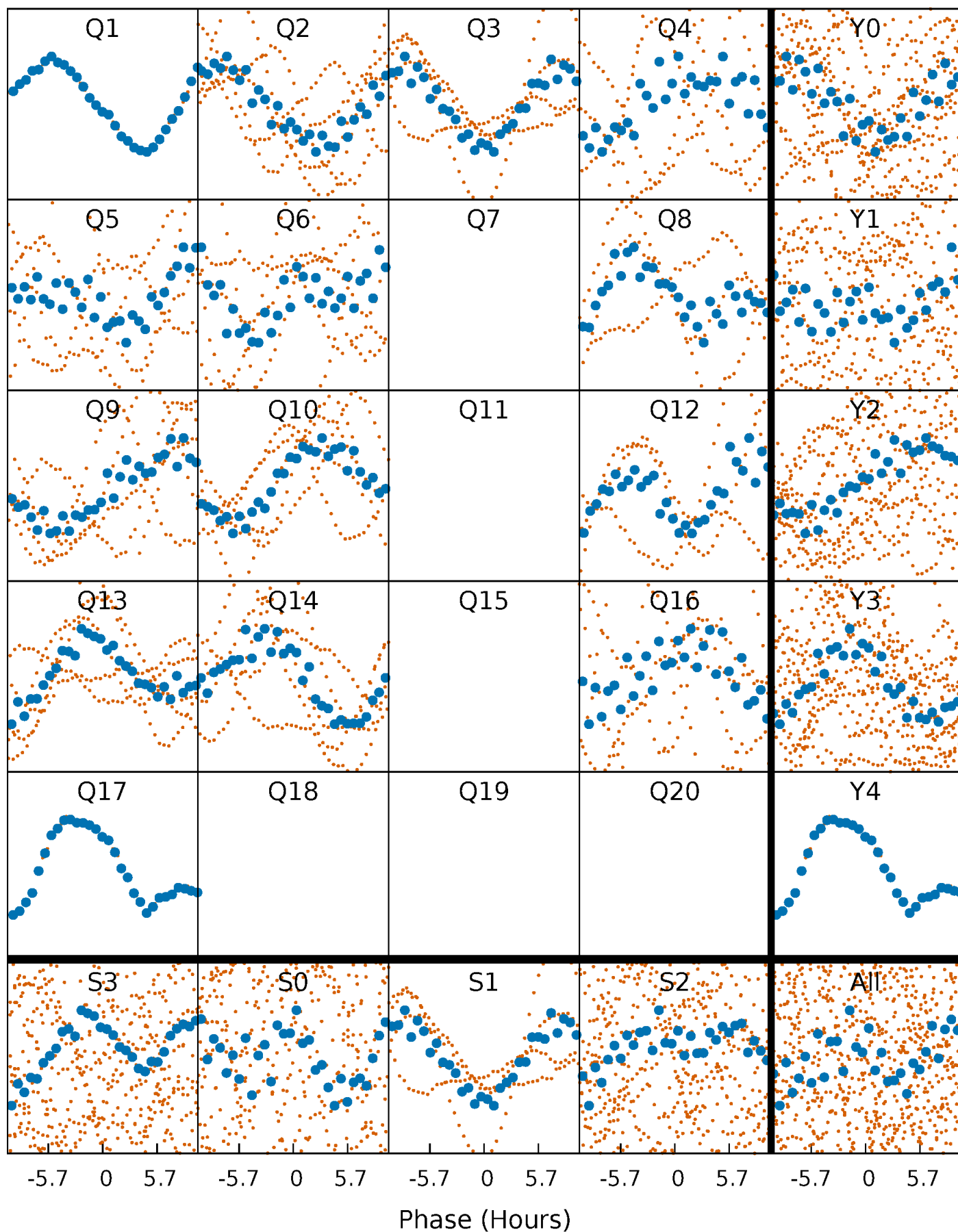


# Non-Whitened Vs. Whitened Light Curve



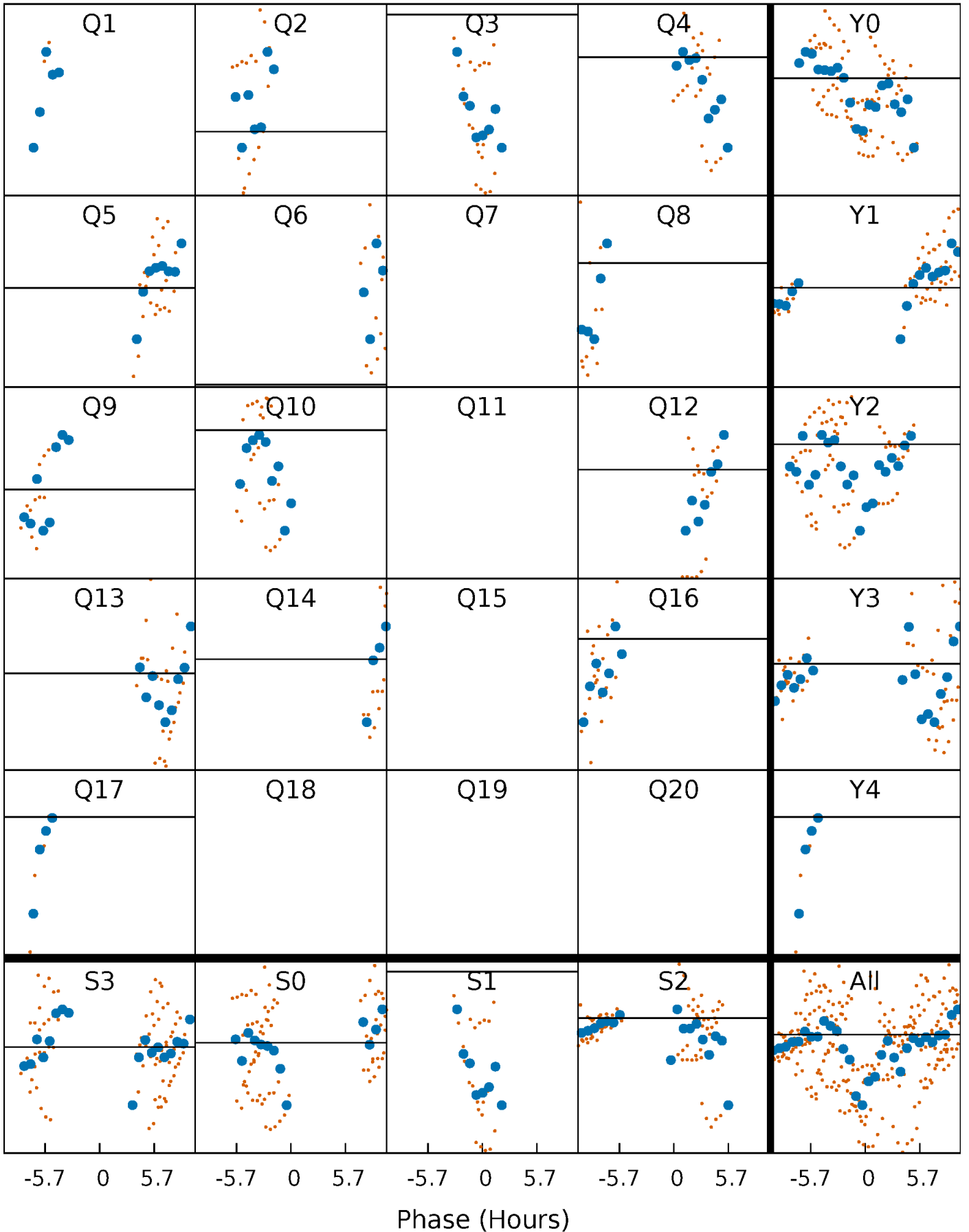
# PDC Quarter-Phased Transit Curves

TCE 010812657-07   P= 20.673153 Days    $T_0=151.062505$  (BKJD)



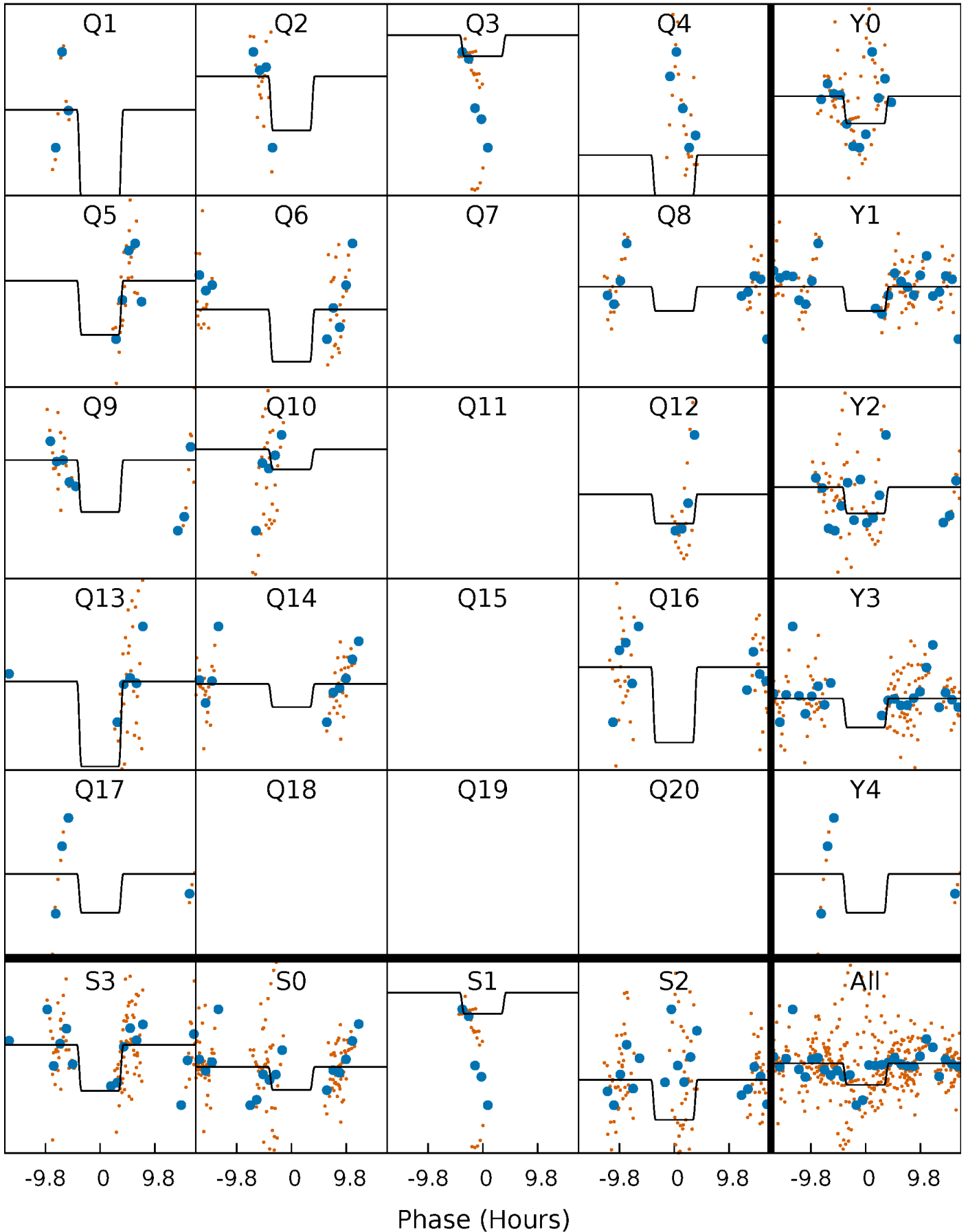
# DV Quarter-Phased Transit Curves

TCE 010812657-07     $P = 20.673153$  Days     $T_0 = 151.062505$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

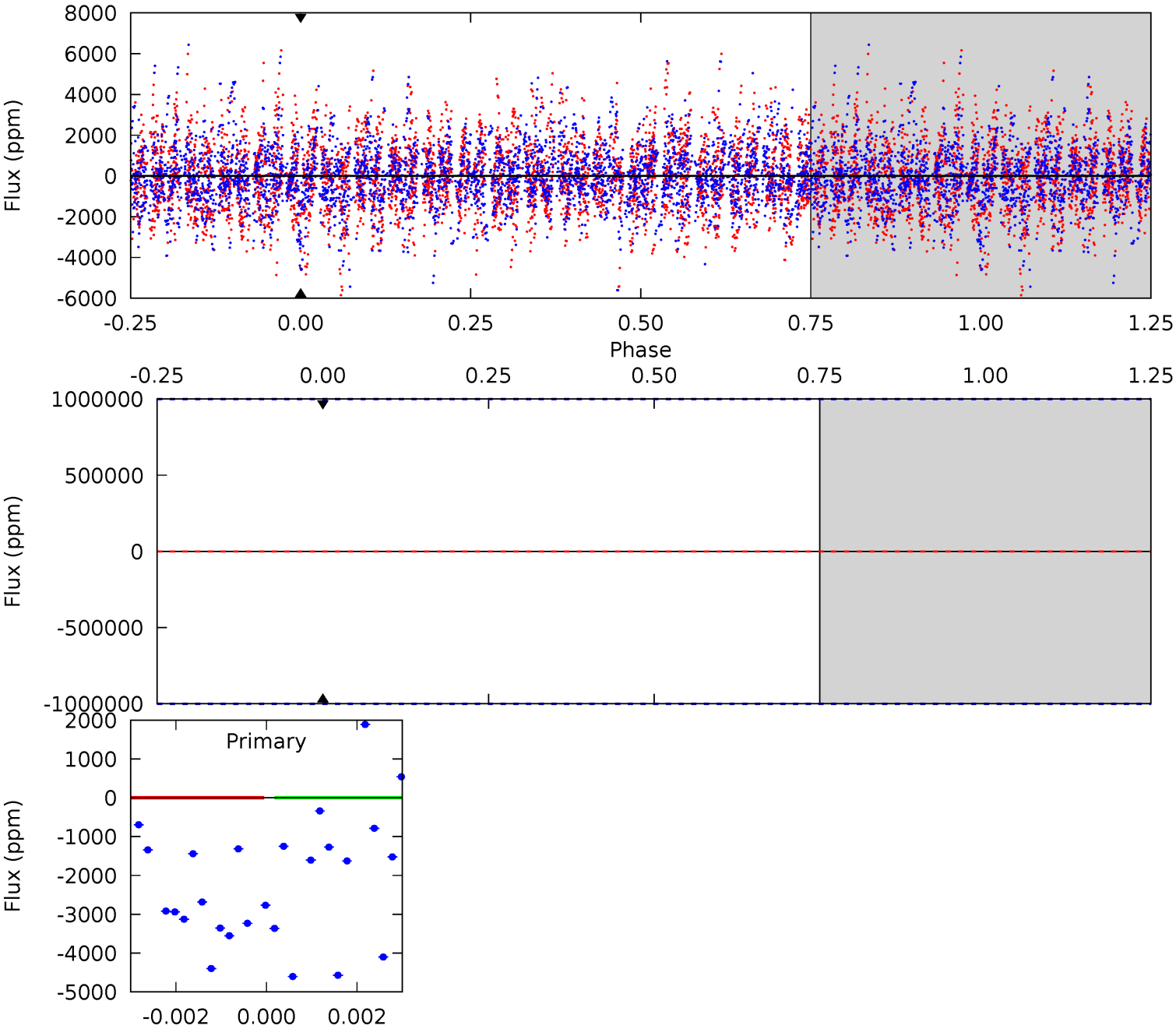
TCE 010812657-07     $P = 20.673153$  Days     $T_0 = 151.116084$  (BKJD)



# DV Model-Shift Uniqueness Test

010812657-07, P = 20.673153 Days, E = 130.389352 Days

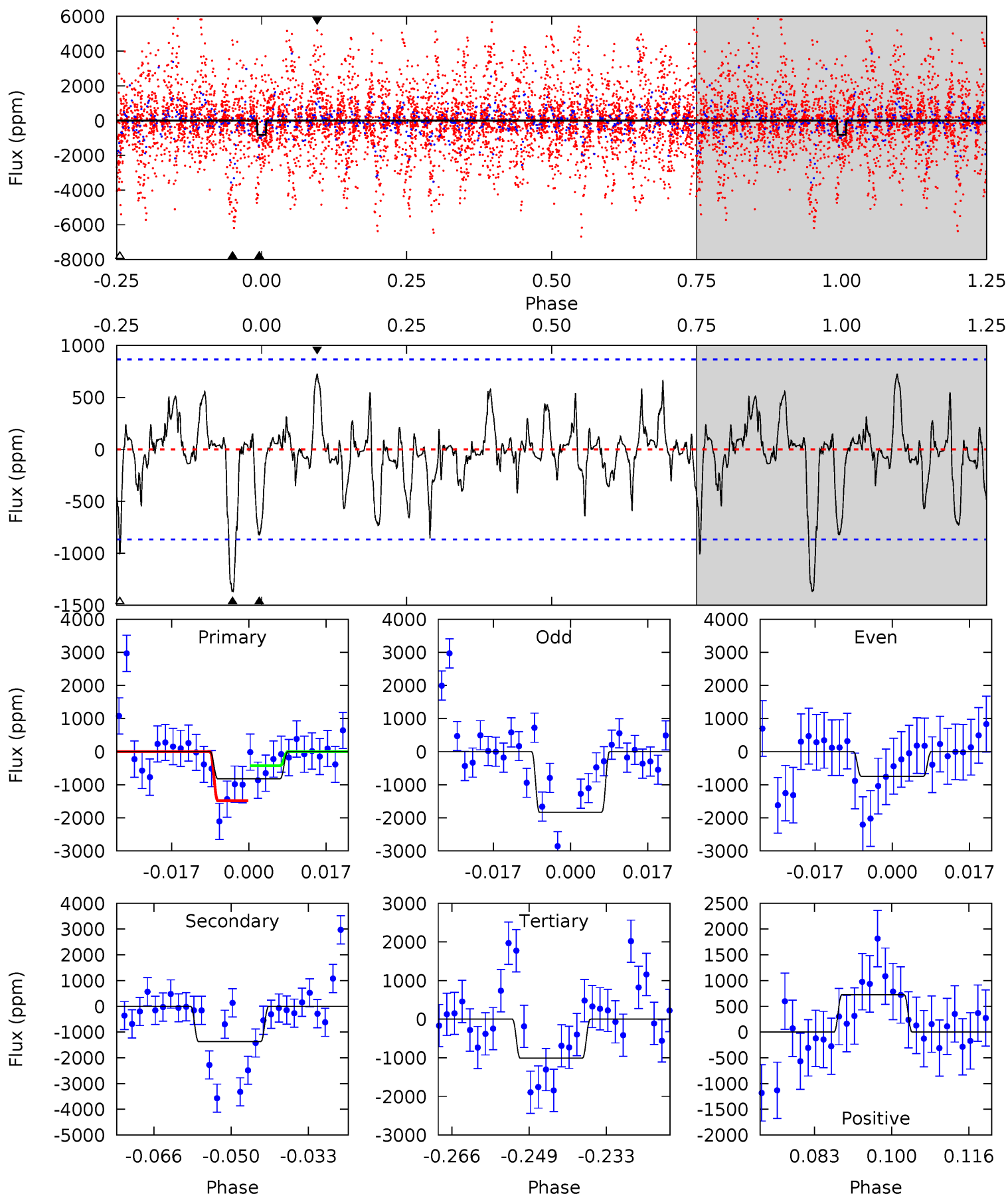
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



# Alt Model-Shift Uniqueness Test

010812657-07, P = 20.673153 Days, E = 130.442931 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
4.68	7.80	5.74	4.13	4.93	2.40	1.43	-1.06	0.55	2.06	3.68	3.02	0.76	0.35	3.03





### Stellar Parameters For KIC 010812657

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7349^{+206}_{-310}$	$4.197^{+0.124}_{-0.186}$	$-0.260^{+0.250}_{-0.350}$	$1.564^{+0.491}_{-0.302}$	$1.408^{+0.216}_{-0.216}$	$0.518^{+0.319}_{-0.266}$
	+3%/-4%	+3%/-4%	+96%/-135%	+31%/-19%	+15%/-15%	+61%/-51%
Source	KIC0	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 010812657-07 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$0 \pm 1000000$	$12.09^{+13.49}_{-8.17}$	$1400^{+102}_{-89}$	$6568^{+47636}_{-35896}$	$305^{+24858}_{-11332}$
Alt.	$-1371 \pm 176$	$13.94^{+14.41}_{-9.21}$	$1400^{+103}_{-88}$	$4967^{+4143}_{-1135}$	$105^{+819}_{-79}$

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

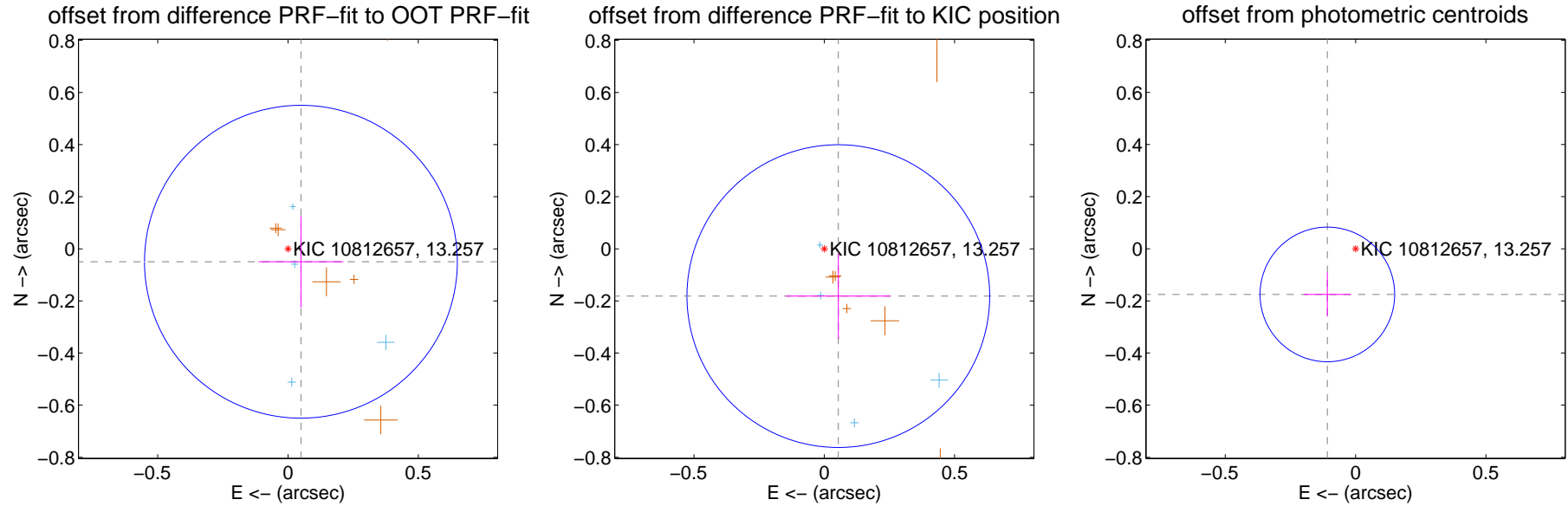
## DV Centroid Data

Supplemental centroid analysis for 010812657-07. Kepler magnitude: 13.26. Transit SNR -1.00

There are 6 quarters with good PRF difference image offsets

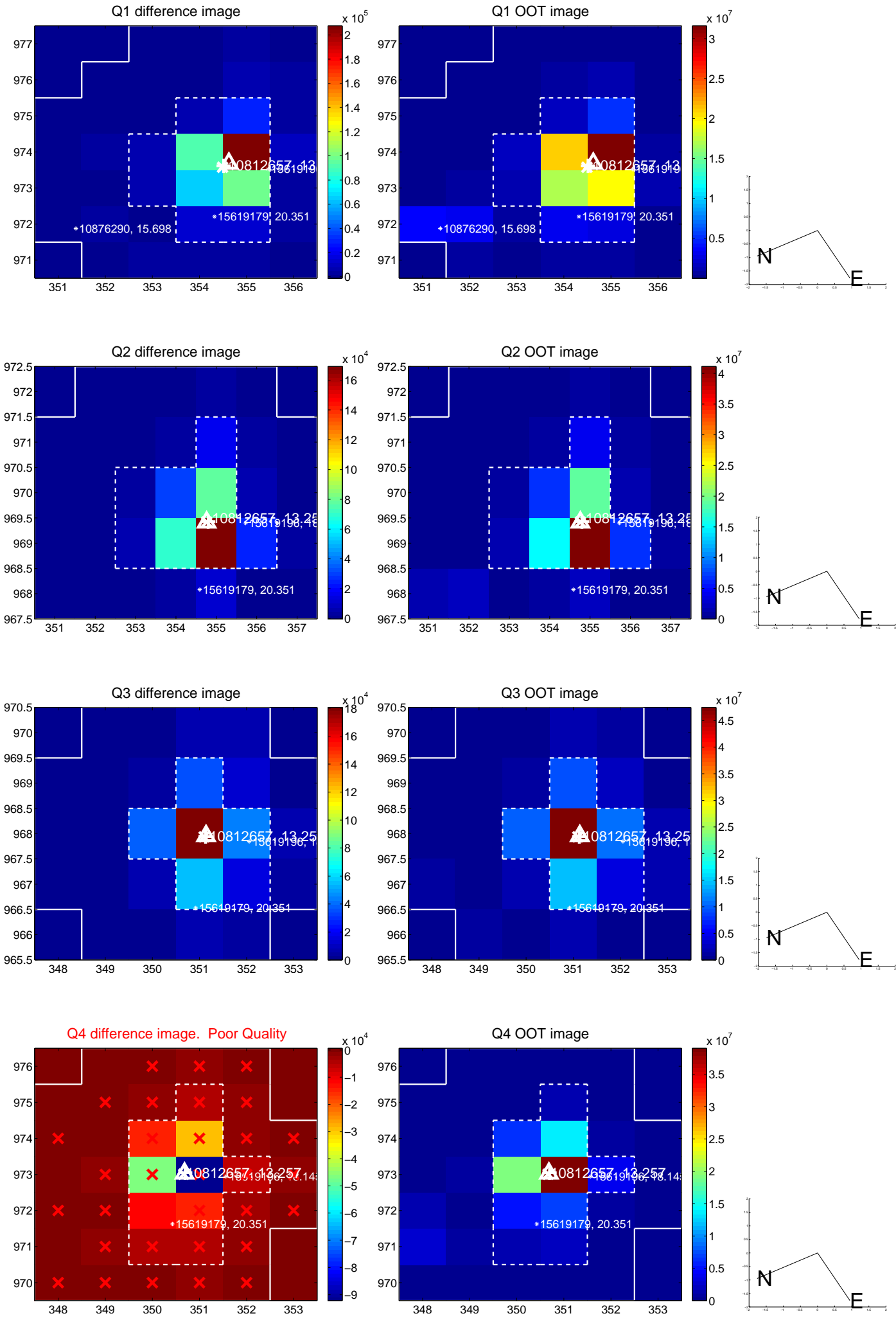
The direct PRF centroid is offset from the target star catalog position by about 0.17 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.070 \pm 0.200$	0.35	$-0.050 \pm 0.163$	$-0.050 \pm 0.176$
PRF-fit source offset from KIC position	$0.189 \pm 0.194$	0.98	$-0.054 \pm 0.201$	$-0.181 \pm 0.165$
photometric centroid source offset	$0.21 \pm 0.09$	2.39	$0.11 \pm 0.09$	$-0.18 \pm 0.08$

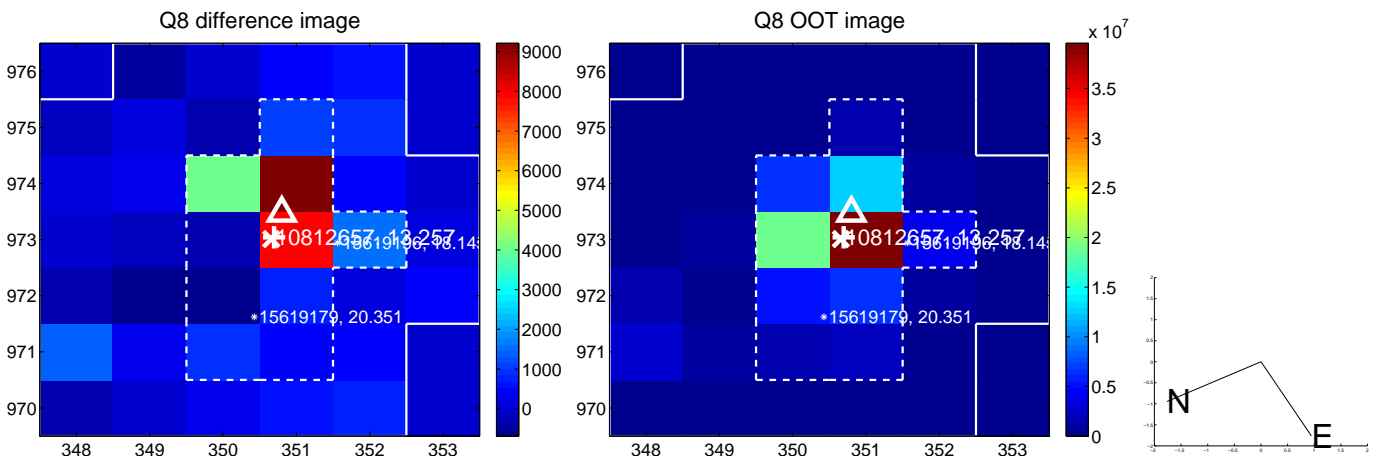
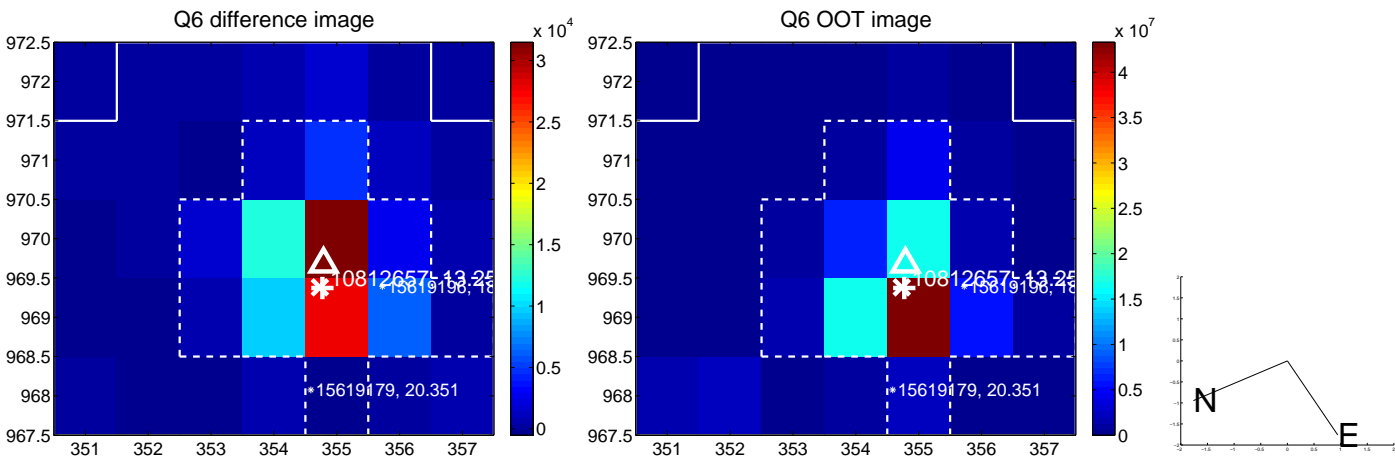
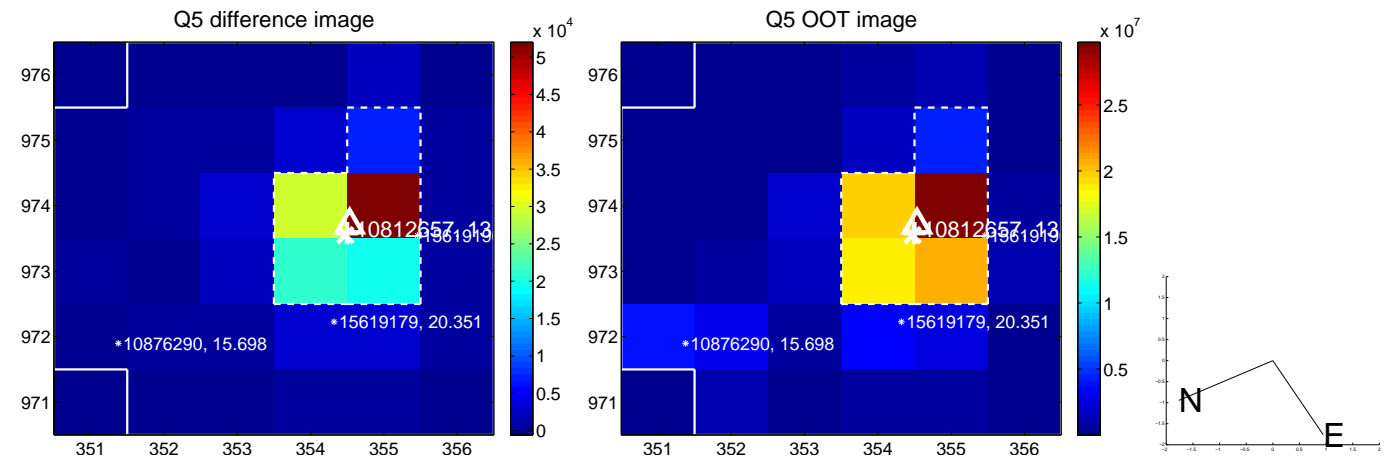


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

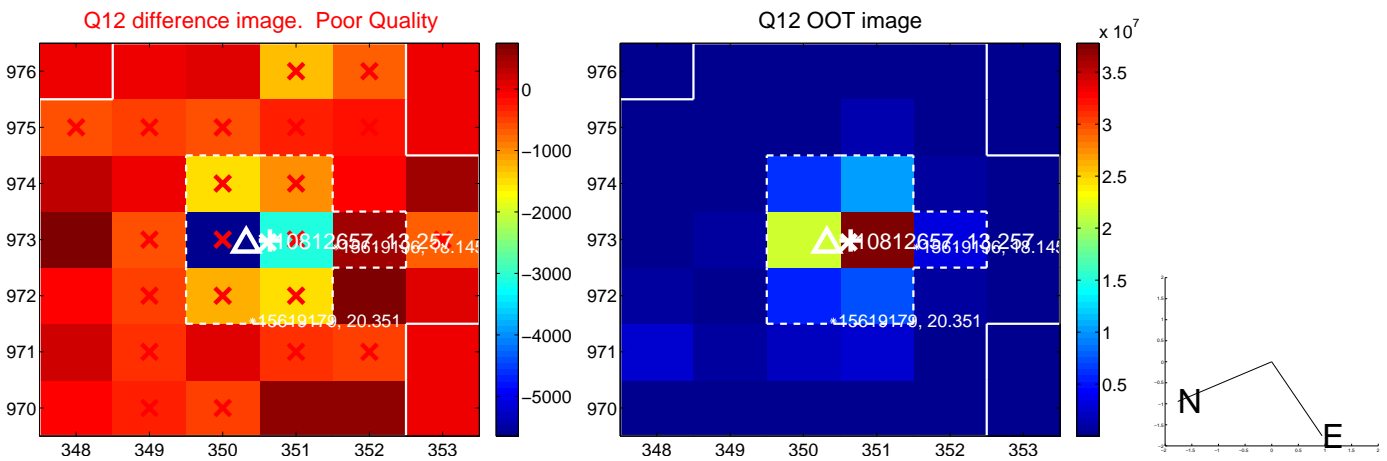
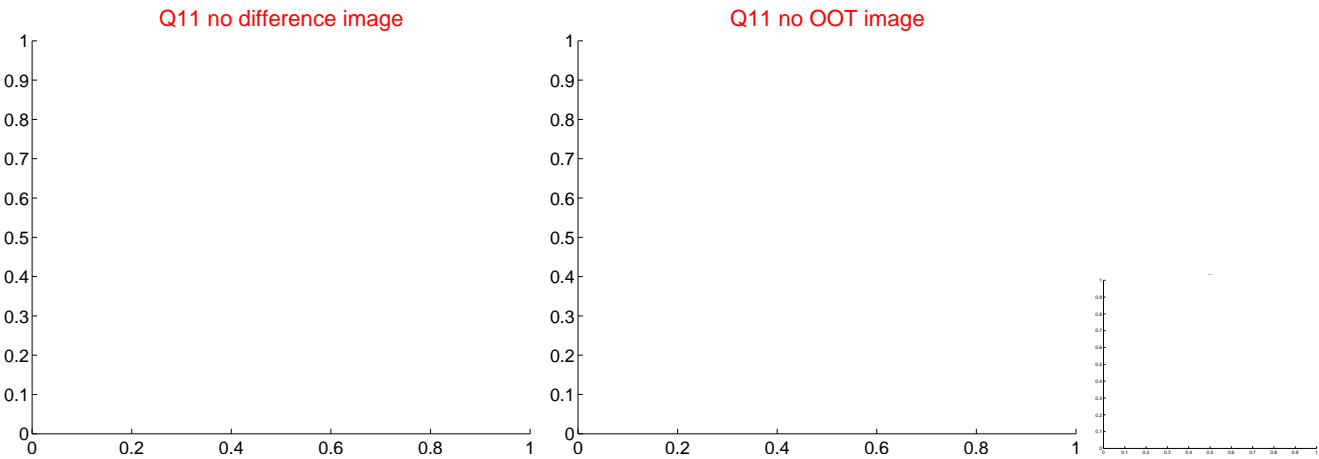
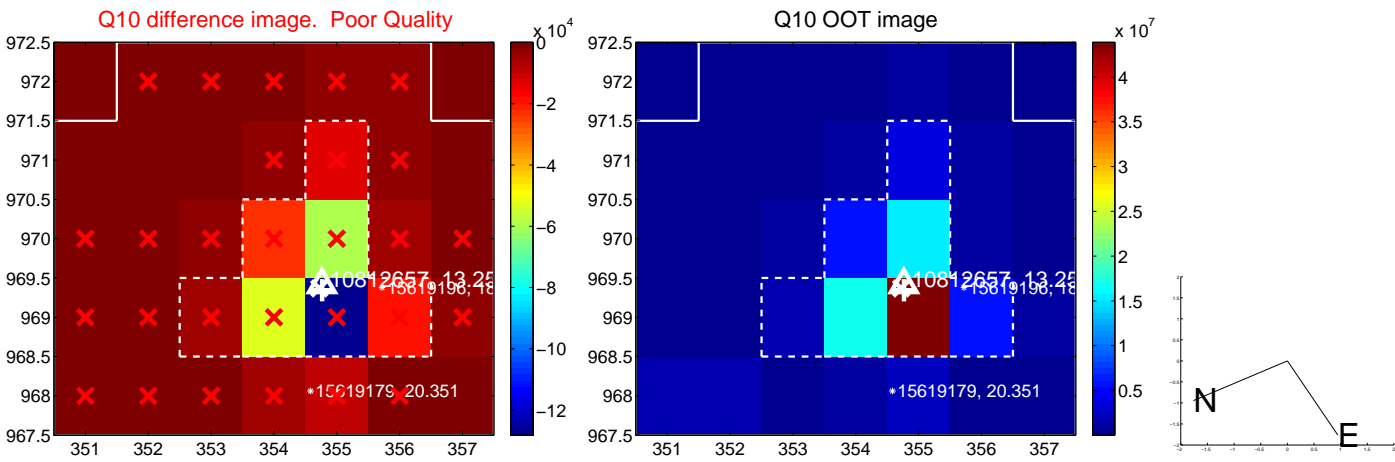
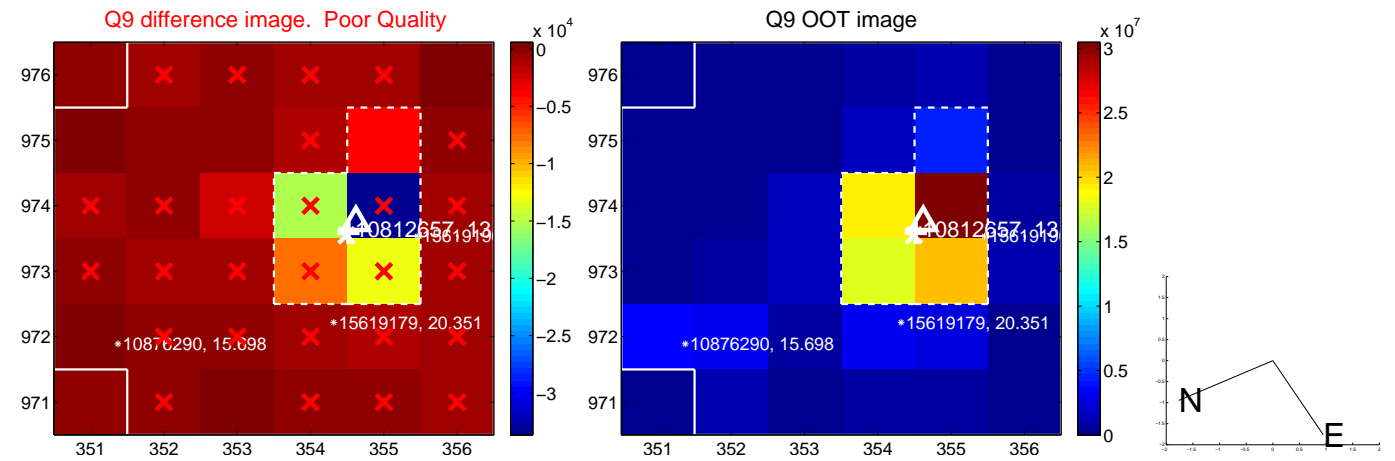
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



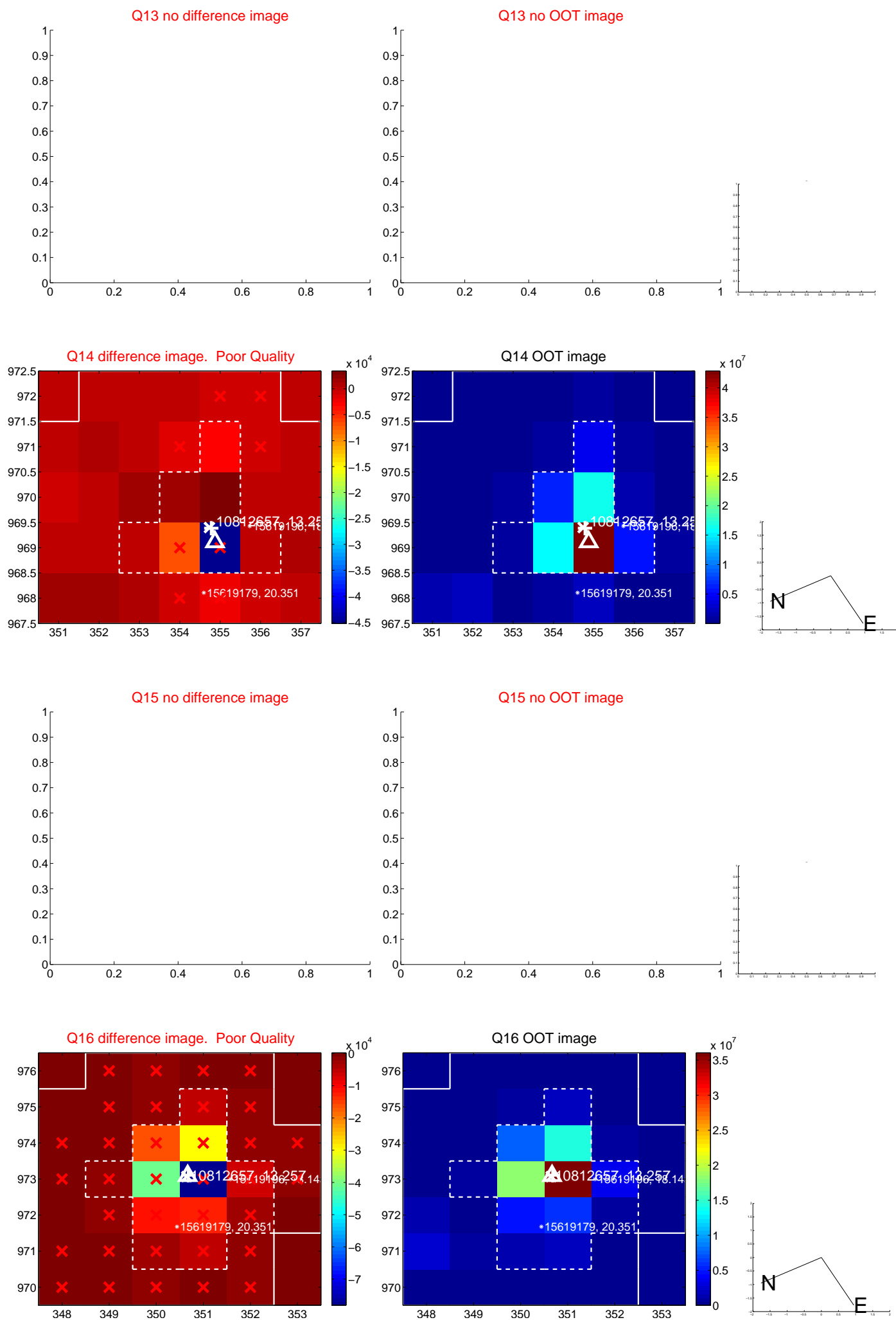
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



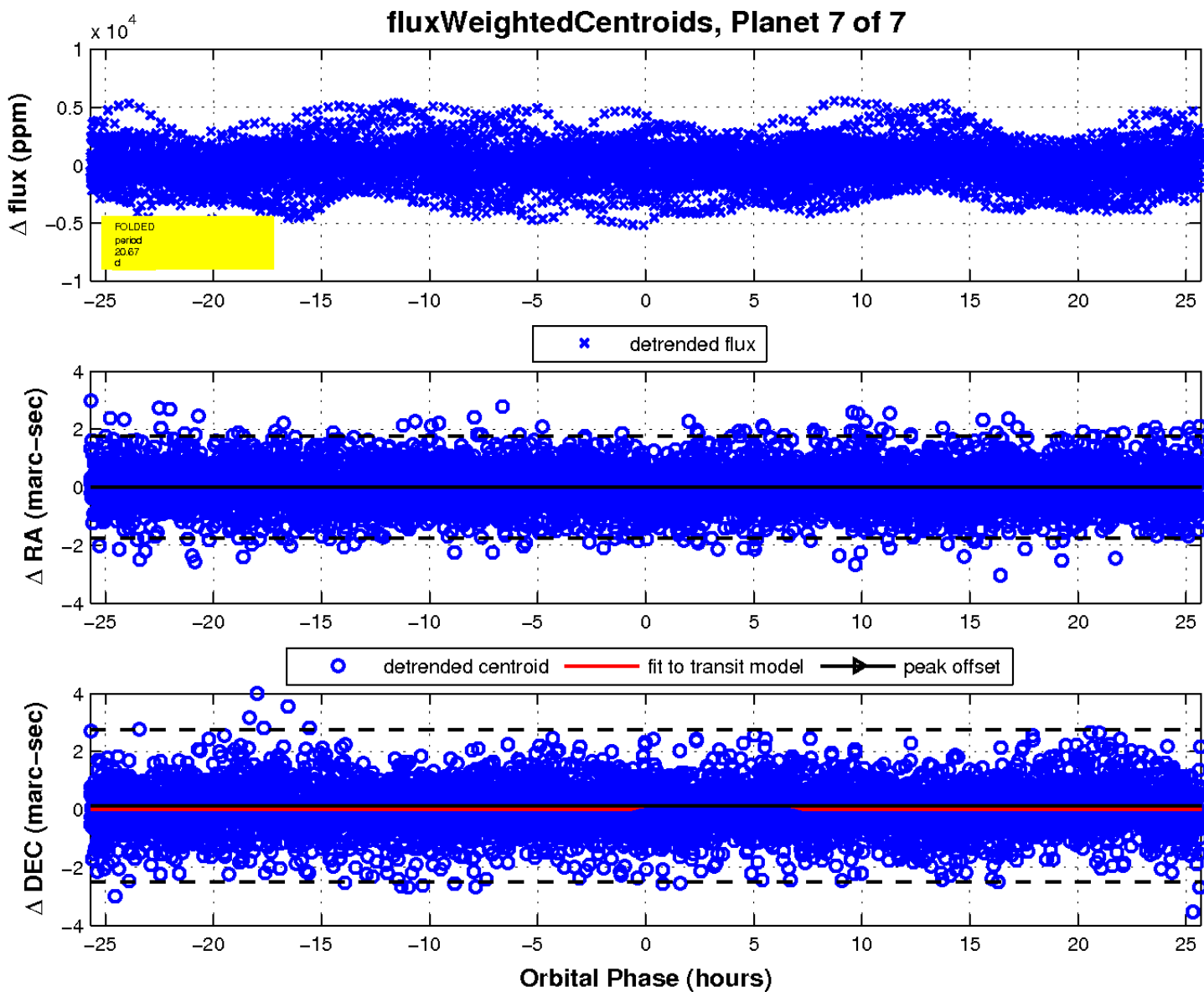
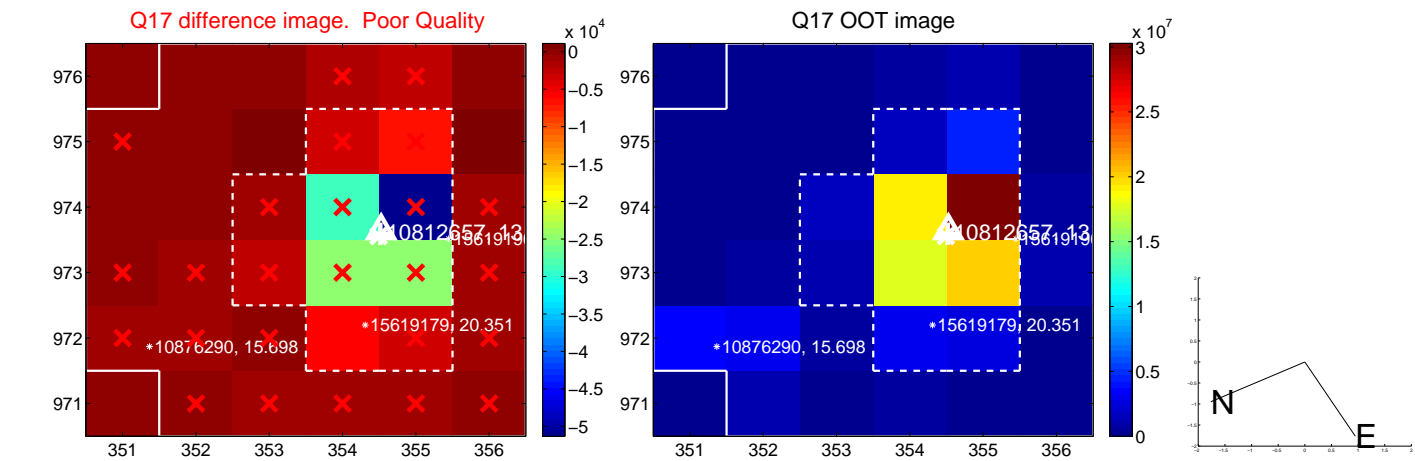
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

