

# KIC 010910878

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010910878-01	OBS	0757.01	16.068637	141.485072	4895.0	3.694	137.4	133.2	0.85	5031	6.21	30.79
010910878-02	OBS	0757.02	41.196983	165.007264	2171.4	5.698	37.9	38.7	0.85	5031	4.95	8.78
010910878-03	OBS	0757.03	6.252962	133.782538	938.5	2.693	36.0	38.0	0.85	5031	2.87	108.39

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010910878-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
010910878-02	OBS	PC	0.99	0	0	0	0	NO_COMMENT
010910878-03	OBS	PC	1.00	0	0	0	0	NO_COMMENT

**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.

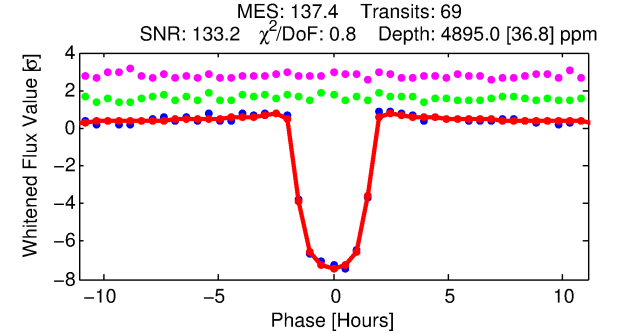
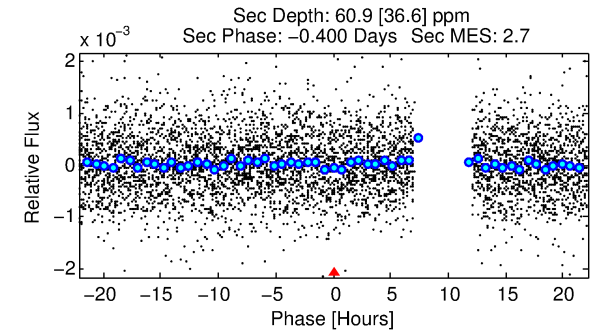
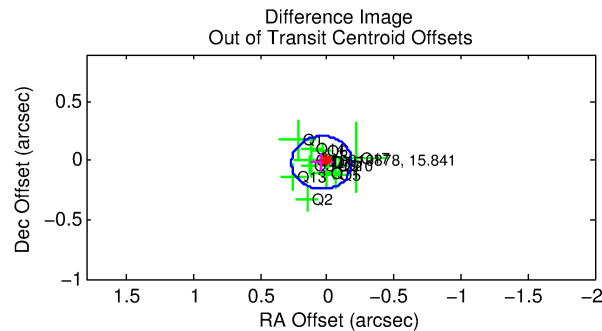
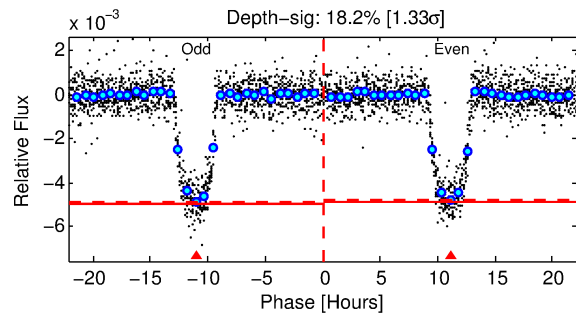
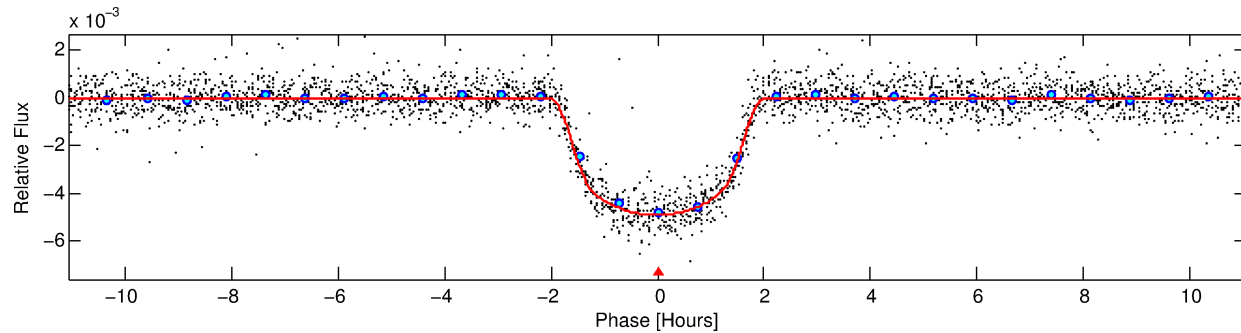
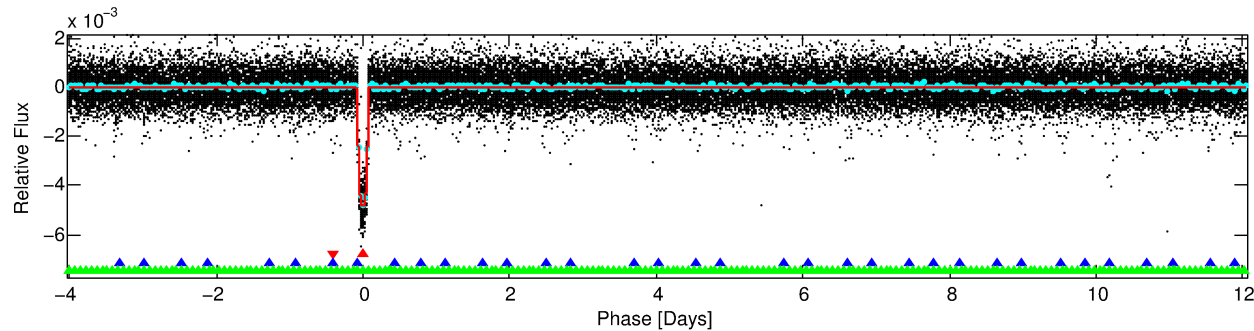
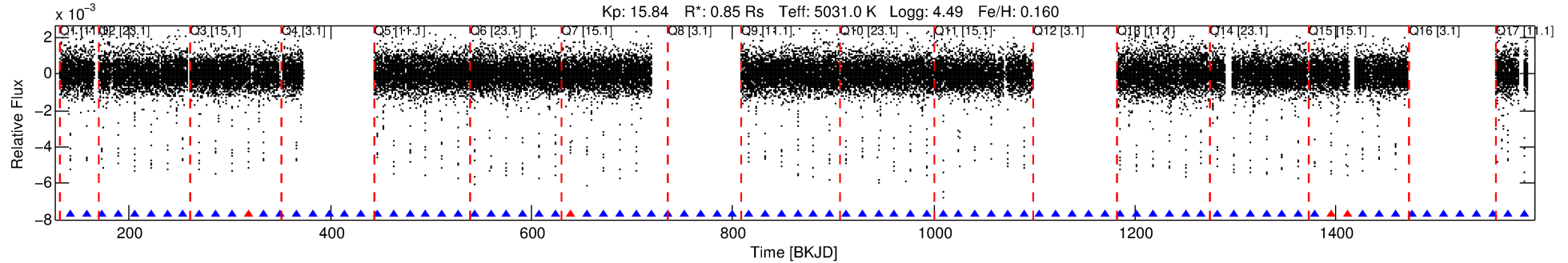
Ephemeris Match Information For 010910878-01

No Significant Match Found

# DV One-Page Summary

KIC: 10910878 Candidate: 1 of 3 Period: 16.069 d  
KOI: K00757.01 Name: Kepler-229c Corr: 0.980

Kp: 15.84 R\*: 0.85 Rs Teff: 5031.0 K Logg: 4.49 Fe/H: 0.160



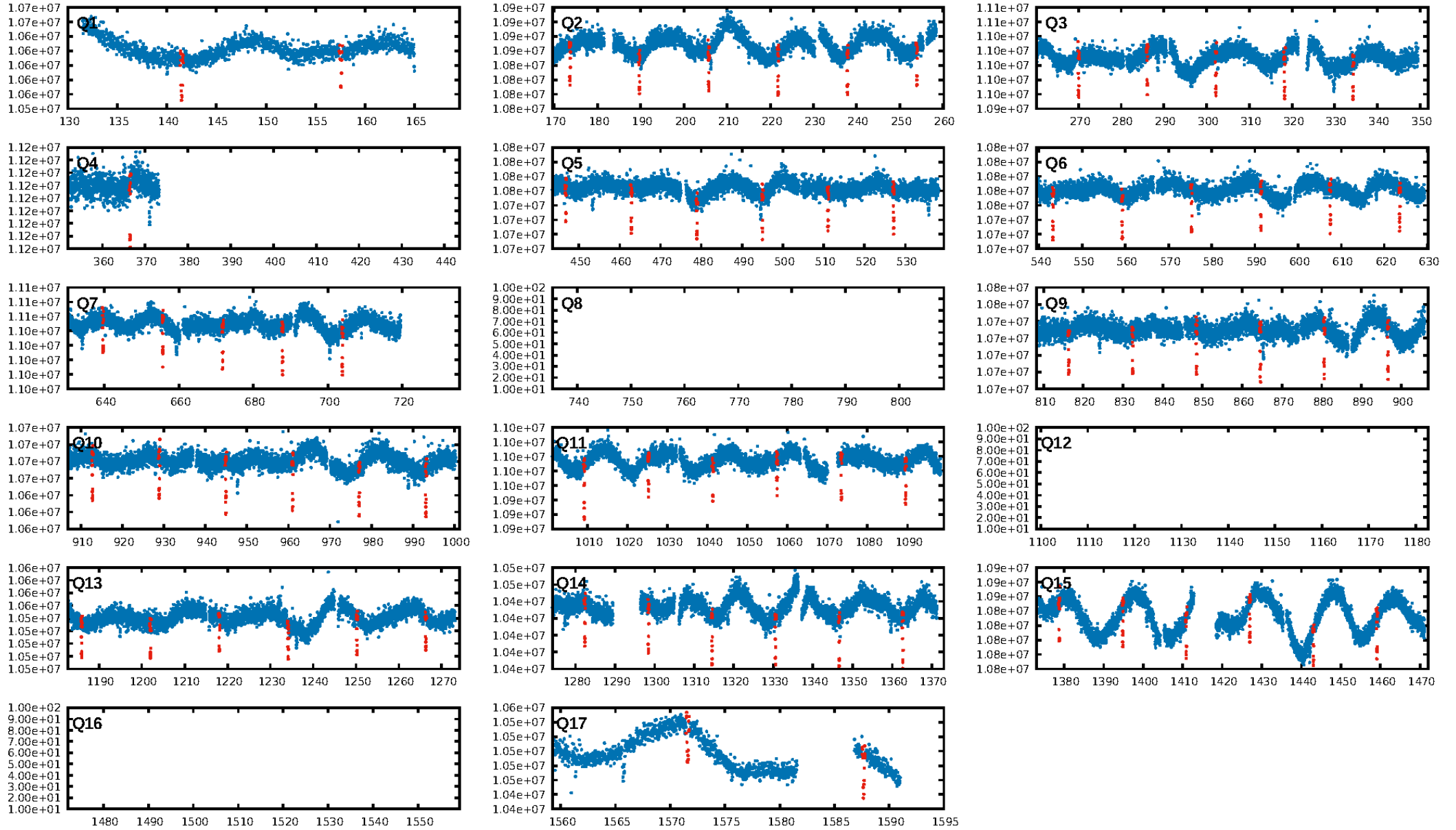
## DV Fit Results:

Period = 16.06864 [0.00001] d  
Epoch = 141.4851 [0.0006] BKJD  
Rp/R\* = 0.0671 [0.0026]  
a/R\* = 28.30 [3.56]  
b = 0.64 [0.12]  
Seff = 30.79 [4.75]  
Teq = 601 [23] K  
Rp = 6.21 [0.58] Re  
a = 0.1158 [0.0099] AU  
Ag = 11.65 [7.23] [1.47σ]  
Teffp = 1716 [261] K [4.26σ]

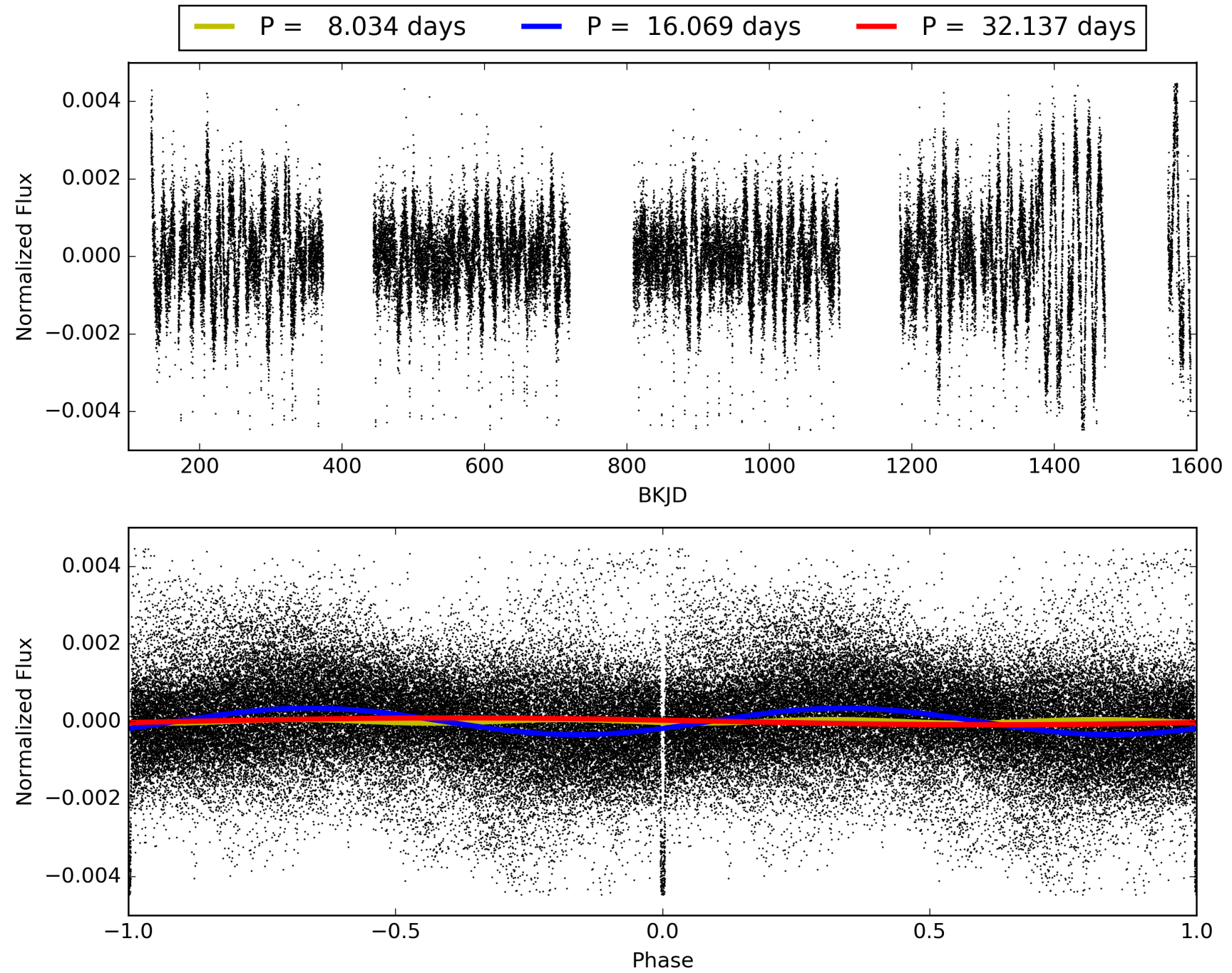
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [51.53σ]  
LongPeriod-sig: 100.0% [88.82σ]  
ModelChiSquare2-sig: 94.9%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 0.94 [60/64]  
GhostDiagnostic-chr: 3.289  
Centroid-sig: 6.3%  
Centroid-so: 0.055 arcsec [0.62σ]  
OotOffset-rm: 0.044 arcsec [0.58σ]  
KicOffset-rm: 0.031 arcsec [0.38σ]  
OotOffset-st: 4/4/1/5 [14]  
KicOffset-st: 4/4/1/5 [14]  
DiffImageQuality-fgm: 1.00 [14/14]  
DiffImageOverlap-fno: 0.93 [13/14]

# TCE 010910878-01, PDC Light Curves

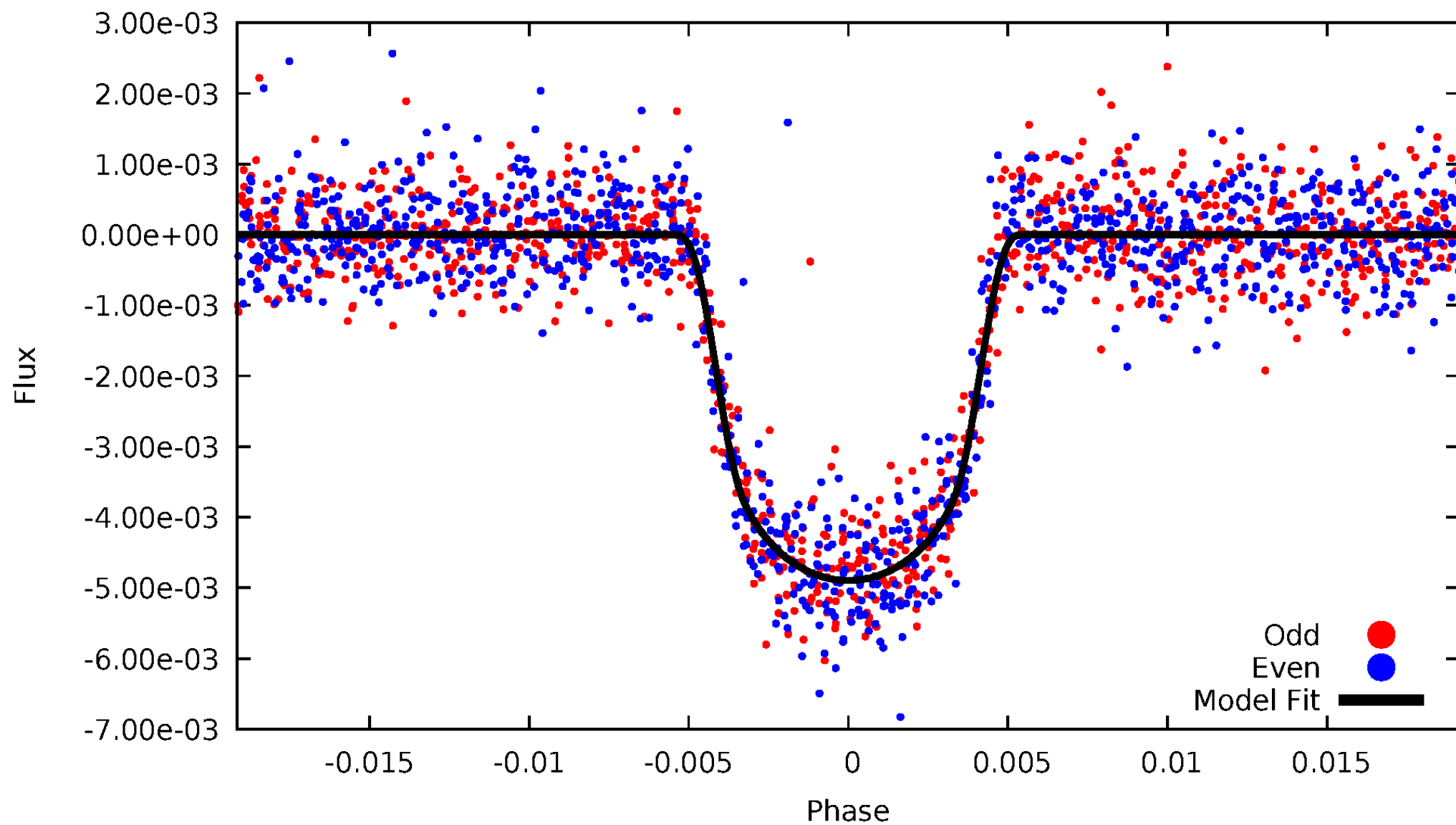


TCE 010910878-01



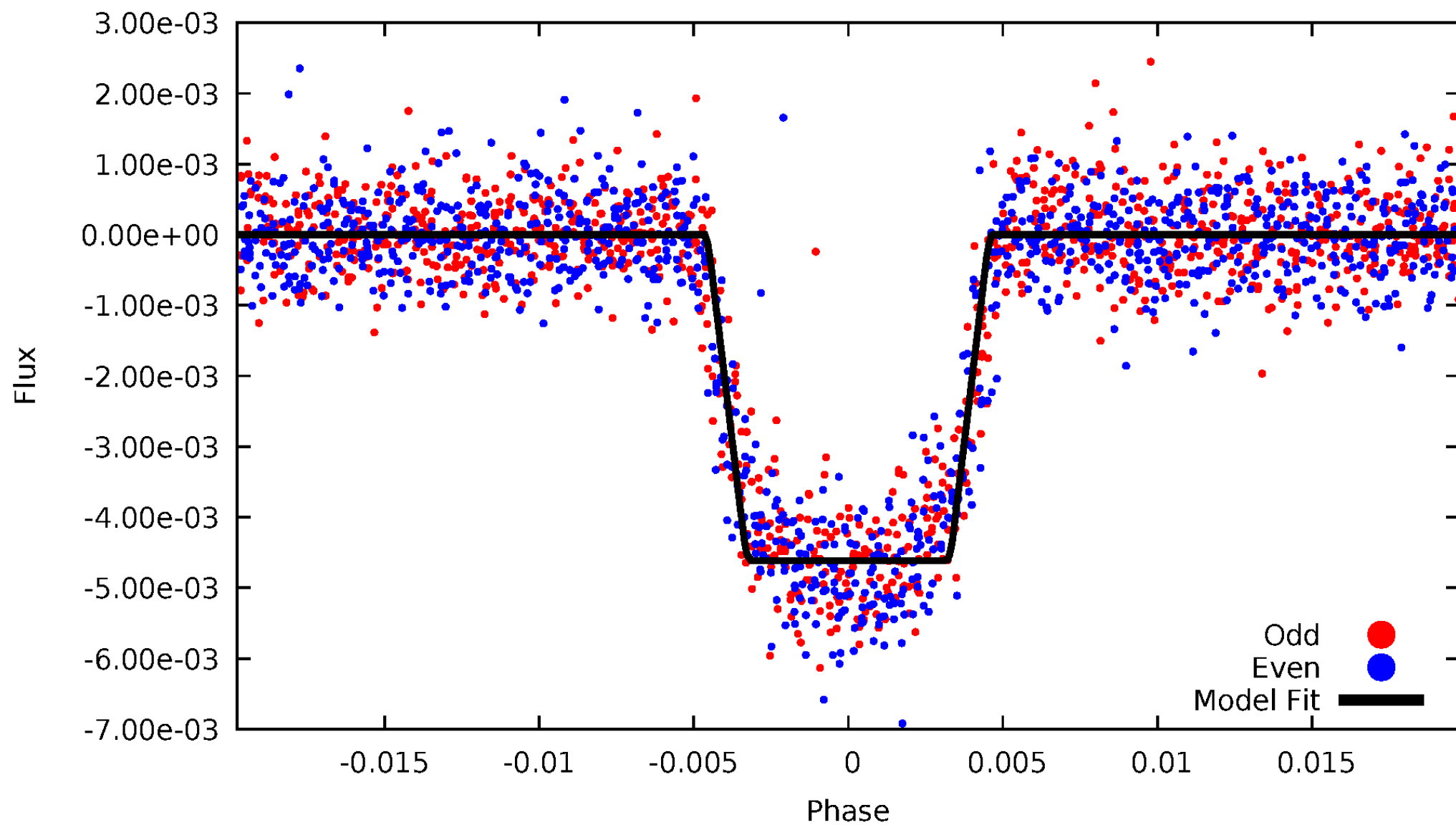
# DV Odd/Even

TCE 010910878-01



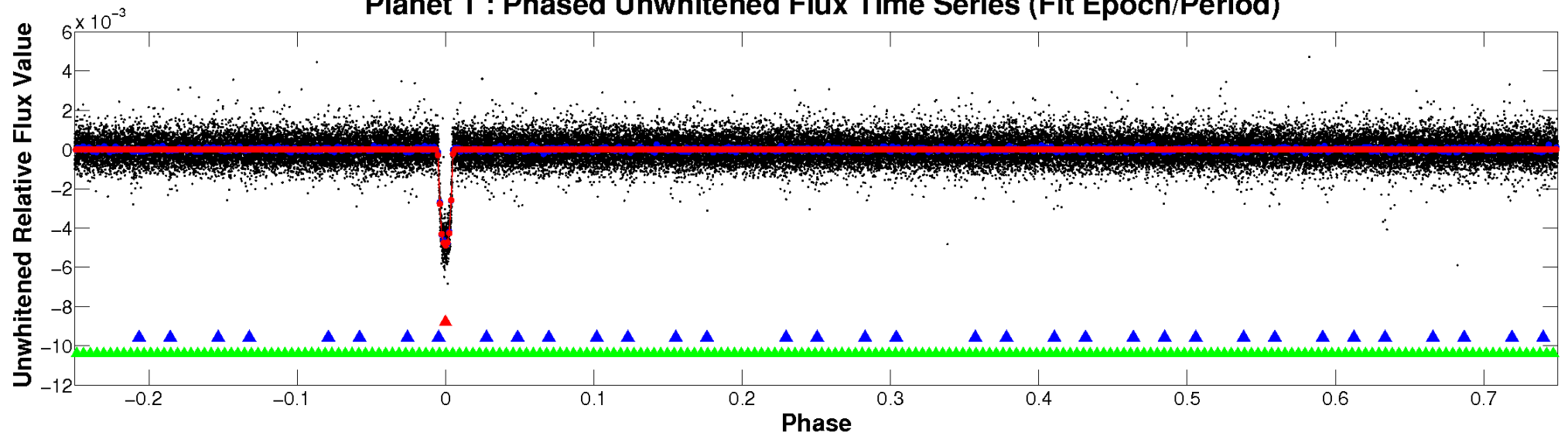
# ALT Odd/Even

TCE 010910878-01

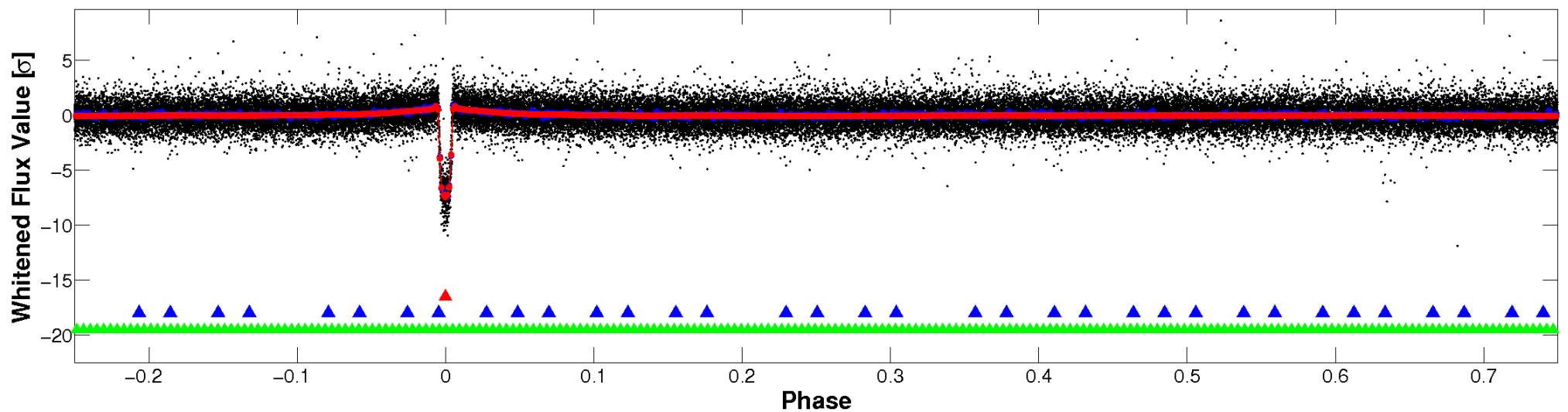


# Non-Whitened Vs. Whitened Light Curve

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



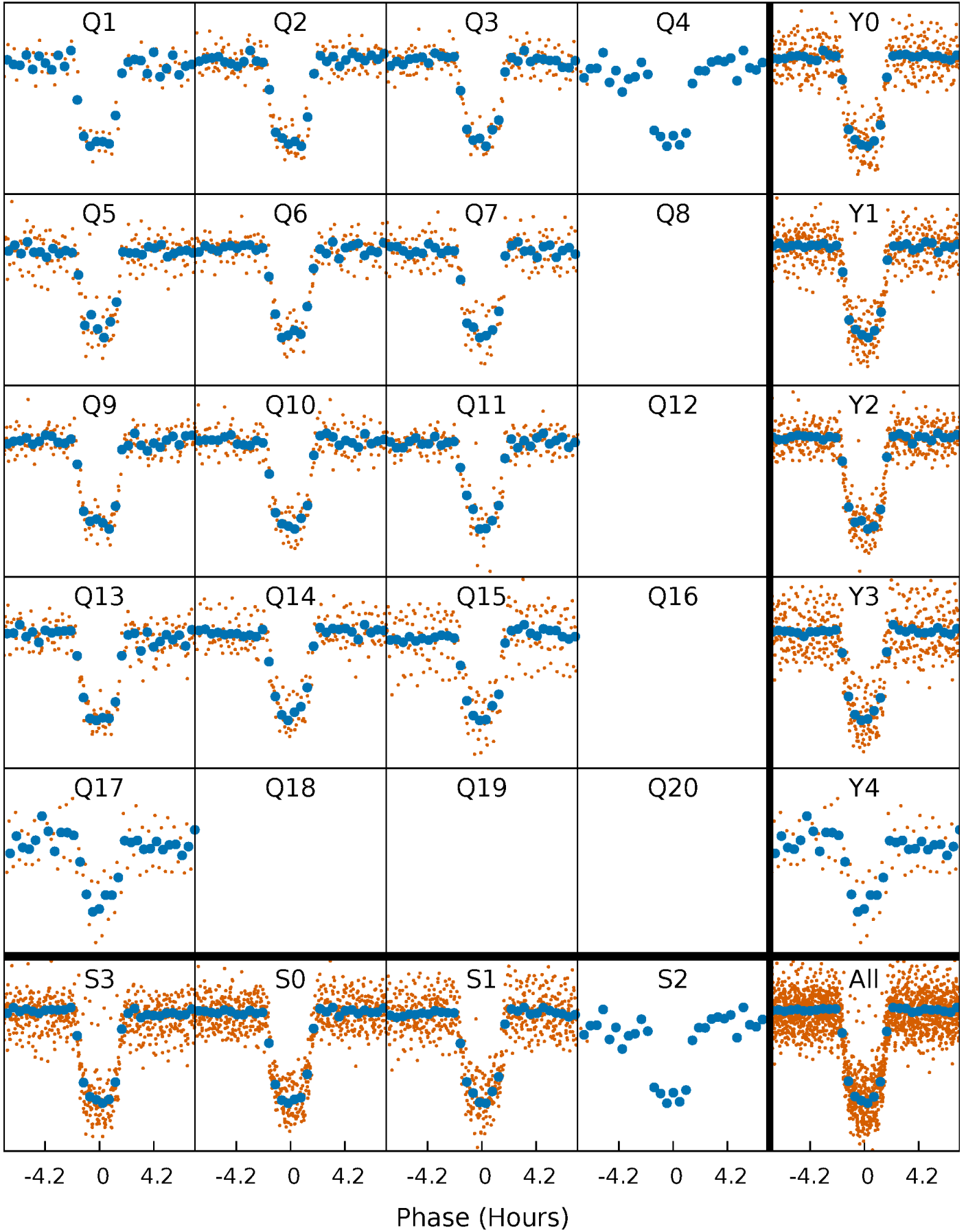
Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)





# PDC Quarter-Phased Transit Curves

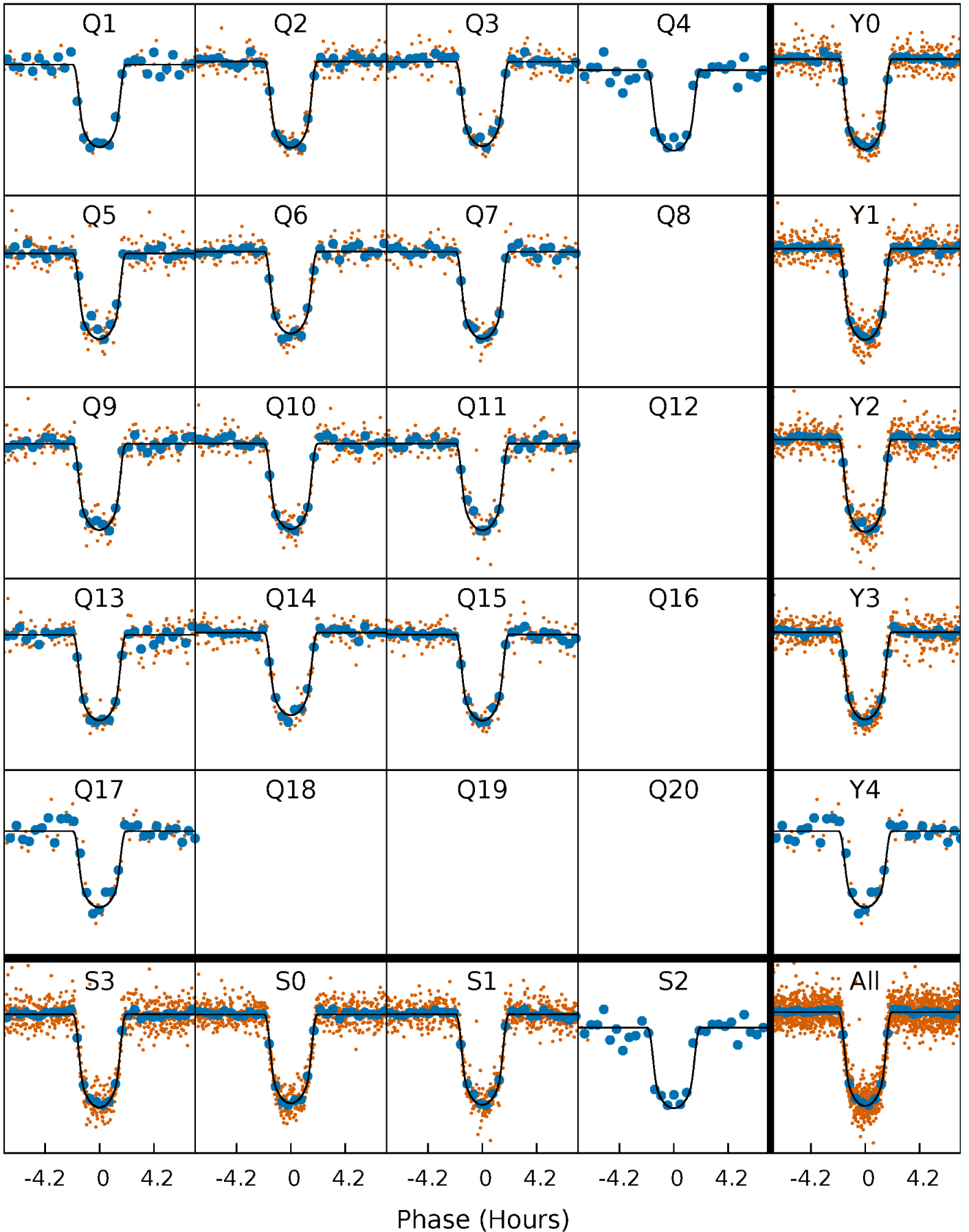
TCE 010910878-01 P= 16.068637 Days  $T_0=141.485072$  (BKJD)





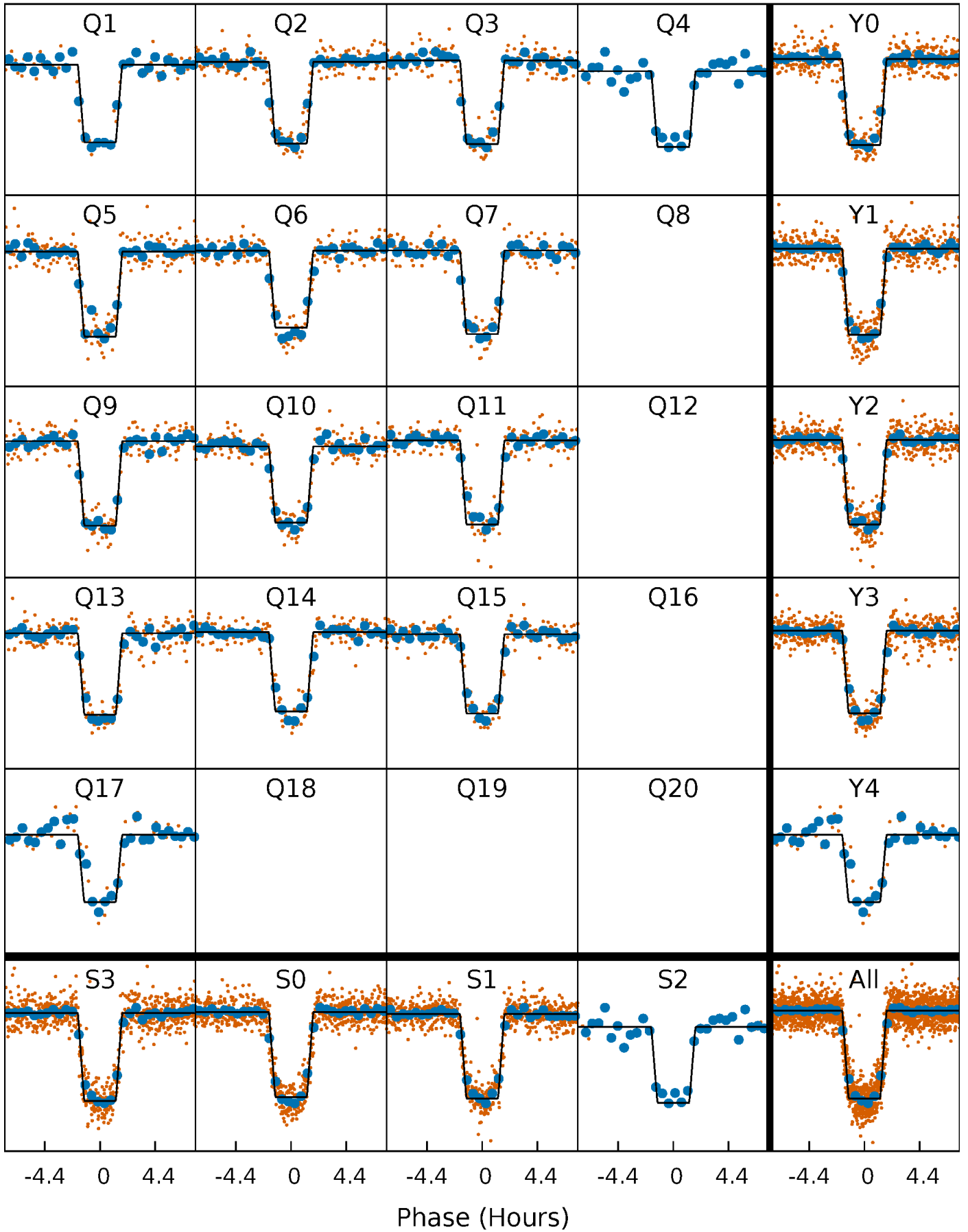
# DV Quarter-Phased Transit Curves

TCE 010910878-01 P= 16.068637 Days  $T_0=141.485072$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

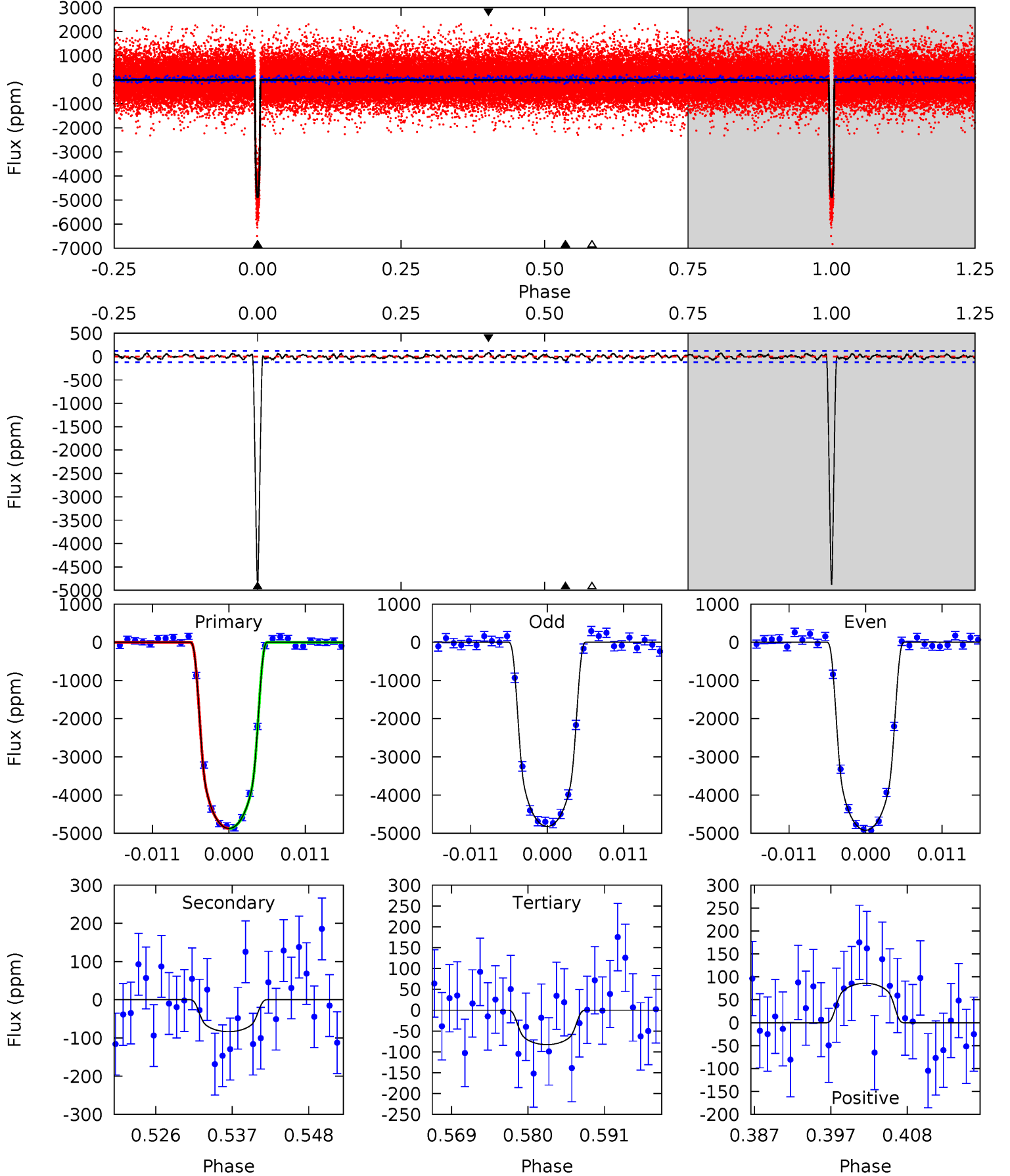
TCE 010910878-01 P= 16.068480 Days  $T_0=141.491803$  (BKJD)



# DV Model-Shift Uniqueness Test

010910878-01, P = 16.068637 Days, E = 125.416435 Days

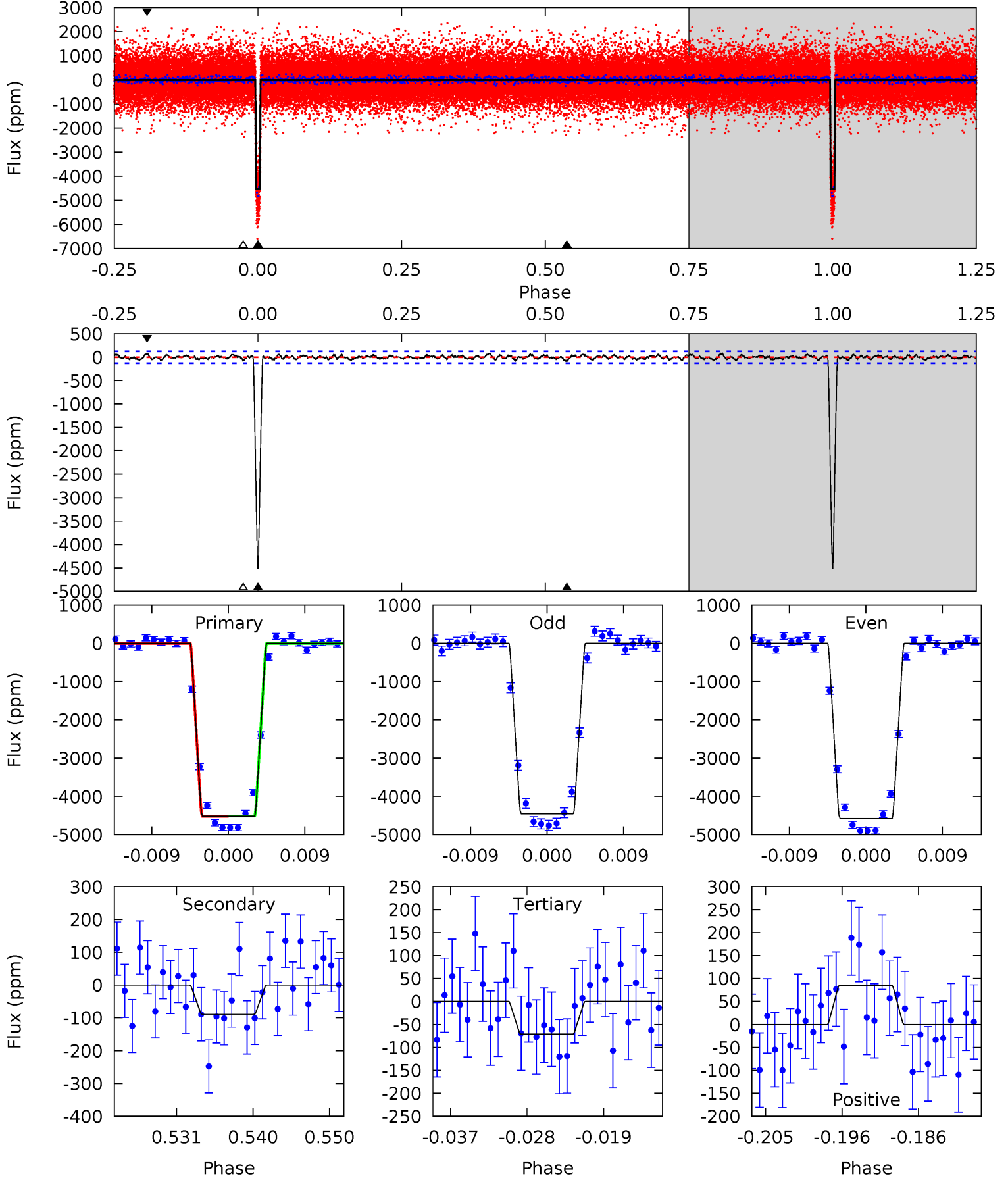
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
204.0	3.49	3.46	3.60	5.01	2.55	1.27	200.6	200.4	0.04	-0.10	2.13	1.00	0.02	0.09



# Alt Model-Shift Uniqueness Test

010910878-01,  $P = 16.068480$  Days,  $E = 125.423323$  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
179.1	3.53	2.81	3.37	5.04	2.60	1.09	176.3	175.7	0.72	0.16	2.39	1.00	0.02	0.19



### Stellar Parameters For KIC 010910878

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5031^{+75}_{-83}$	$4.485^{+0.083}_{-0.028}$	$0.160^{+0.150}_{-0.150}$	$0.848^{+0.033}_{-0.072}$	$0.801^{+0.052}_{-0.030}$	$1.852^{+0.592}_{-0.164}$
	+1%/-2%	+2%/-1%	+94%/-94%	+4%/-8%	+6%/-4%	+32%/-9%
Source	SPE90	SPE90	SPE90	DSEP		

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

### Secondary Eclipse Parameters for KIC 010910878-01 / KOI 0757.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-83 \pm 24$	$6.16^{+0.32}_{-0.37}$	$834^{+18}_{-22}$	$2628^{+91}_{-116}$	$16^{+5}_{-5}$
Alt.	$-89 \pm 25$	$6.26^{+0.32}_{-0.38}$	$834^{+18}_{-23}$	$2637^{+101}_{-113}$	$17^{+6}_{-5}$

$T_{\text{max}}$  = Theoretical Maximum Planetary Temperature

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

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

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

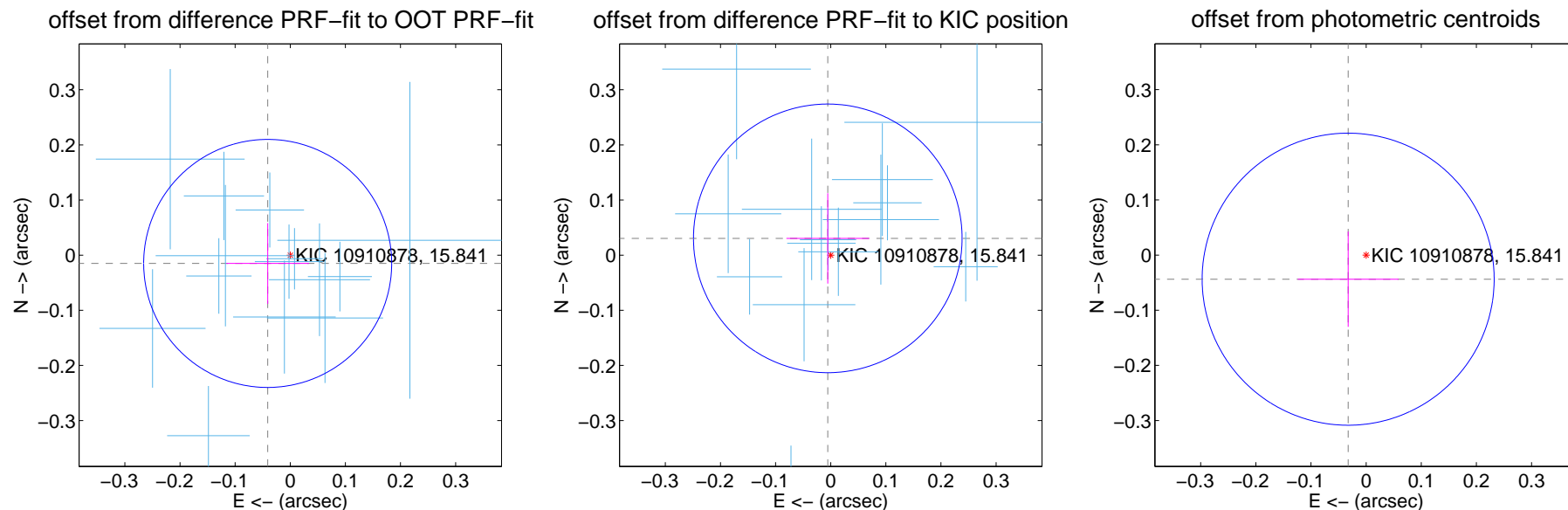
## DV Centroid Data

Supplemental centroid analysis for 010910878-01. Kepler magnitude: 15.84. Transit SNR 133.21

There are 14 quarters with good PRF difference image offsets

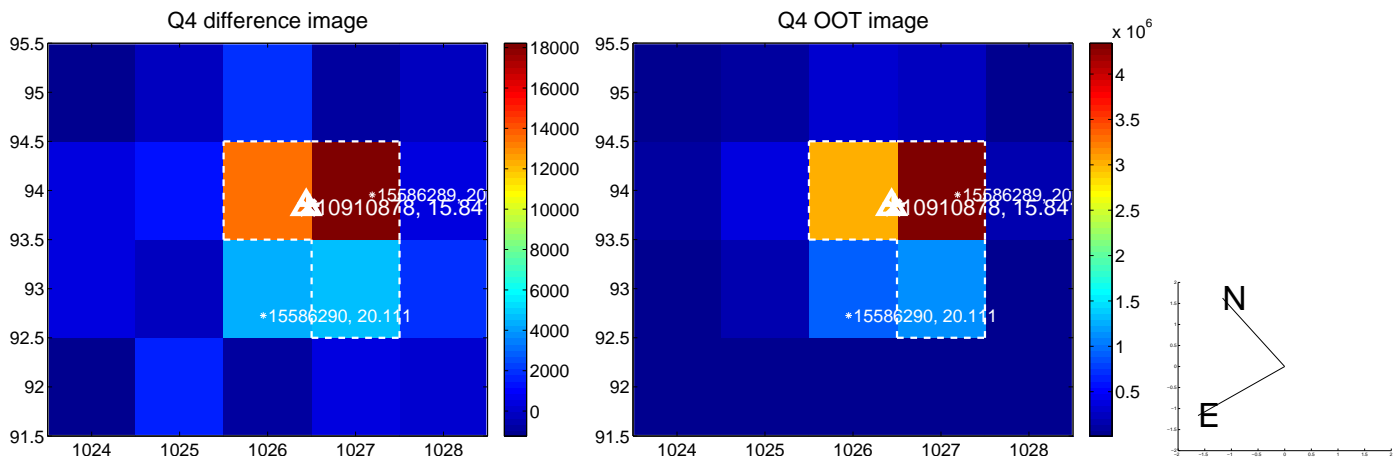
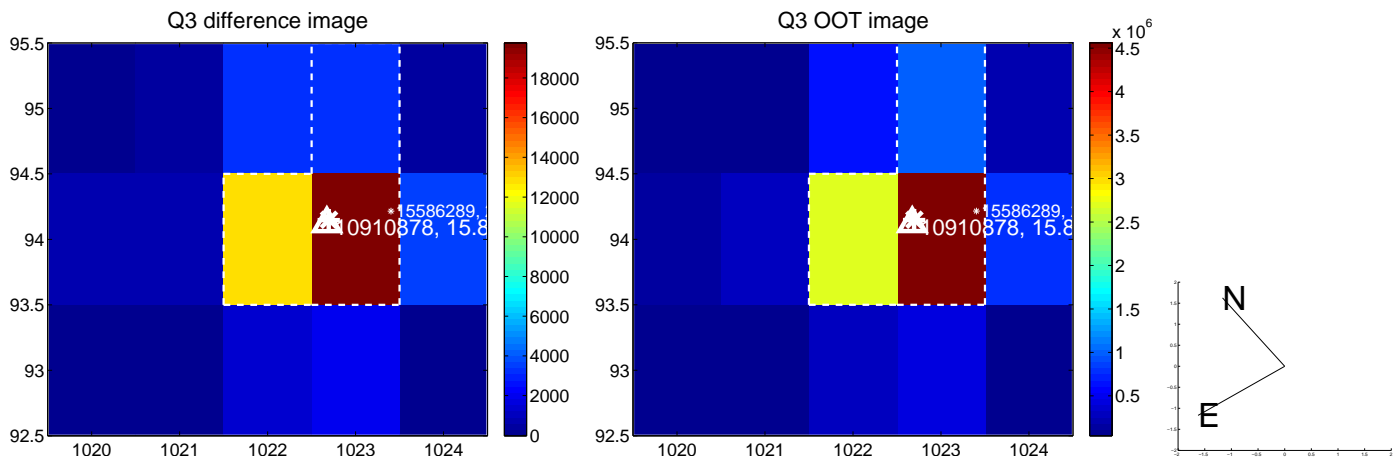
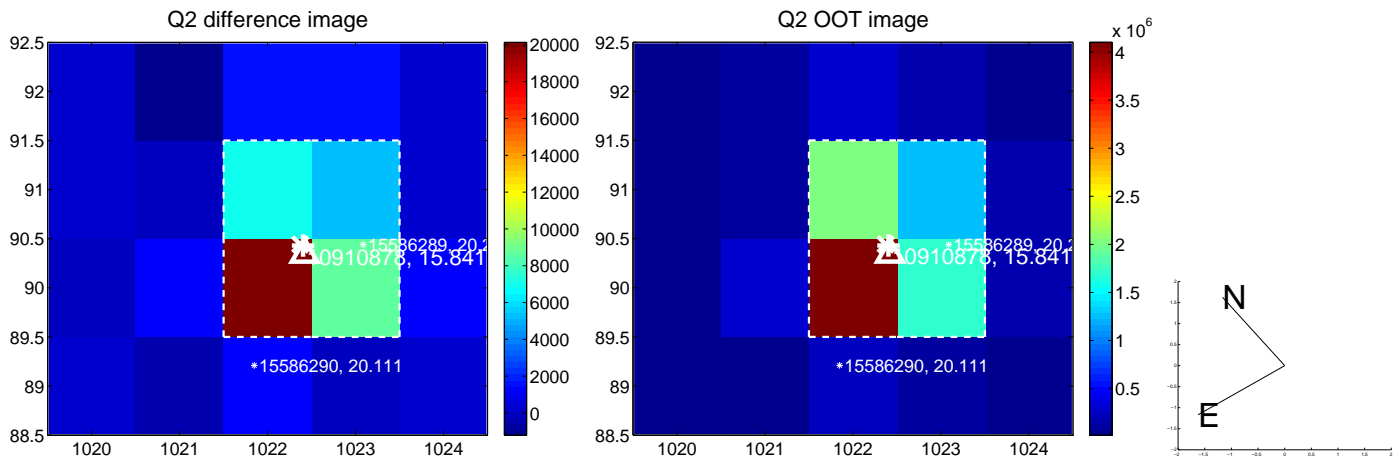
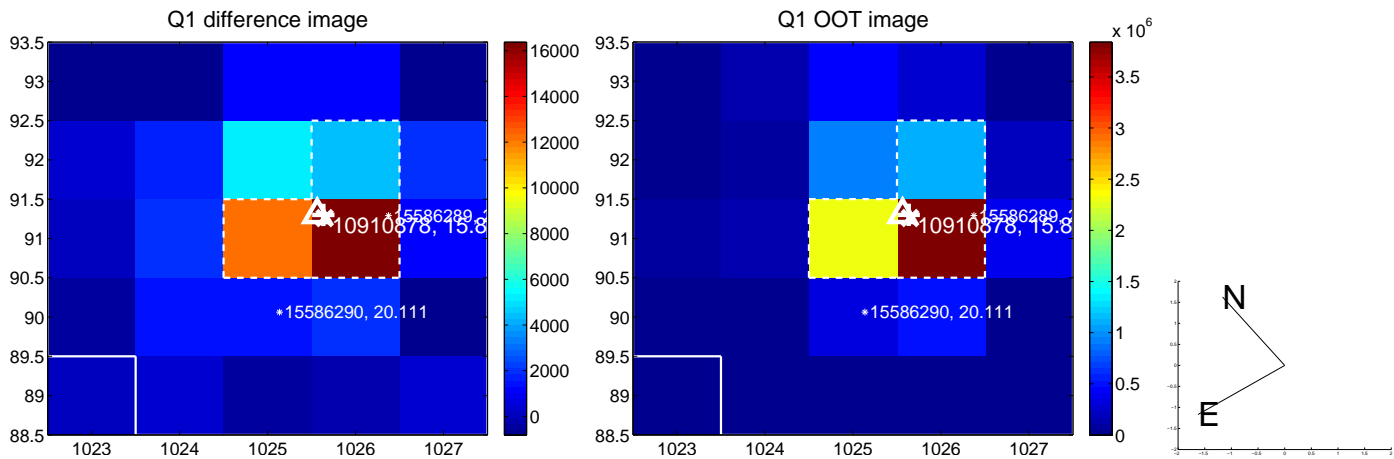
The direct PRF centroid is offset from the target star catalog position by about 0.22 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.044 \pm 0.075$	0.58	$0.041 \pm 0.075$	$-0.015 \pm 0.073$
PRF-fit source offset from KIC position	$0.031 \pm 0.081$	0.38	$0.005 \pm 0.075$	$0.030 \pm 0.082$
photometric centroid source offset	$0.05 \pm 0.09$	0.62	$0.03 \pm 0.09$	$-0.04 \pm 0.09$



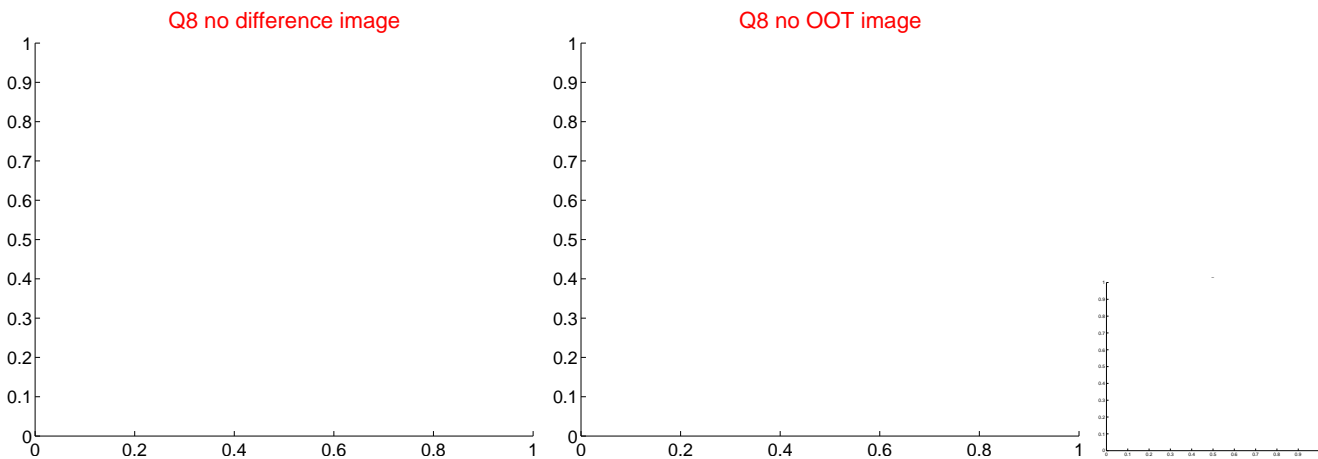
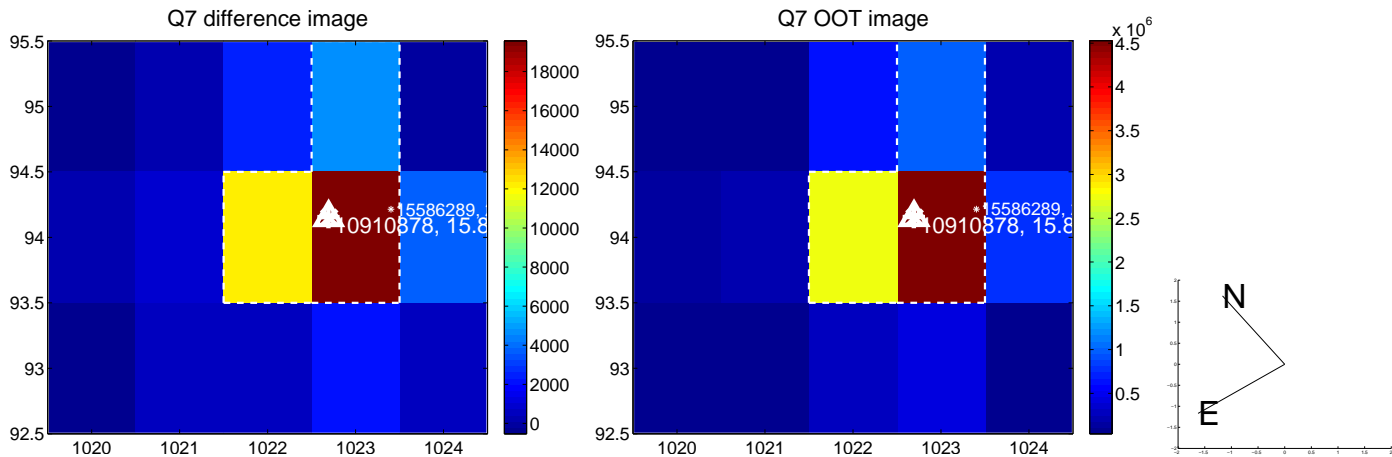
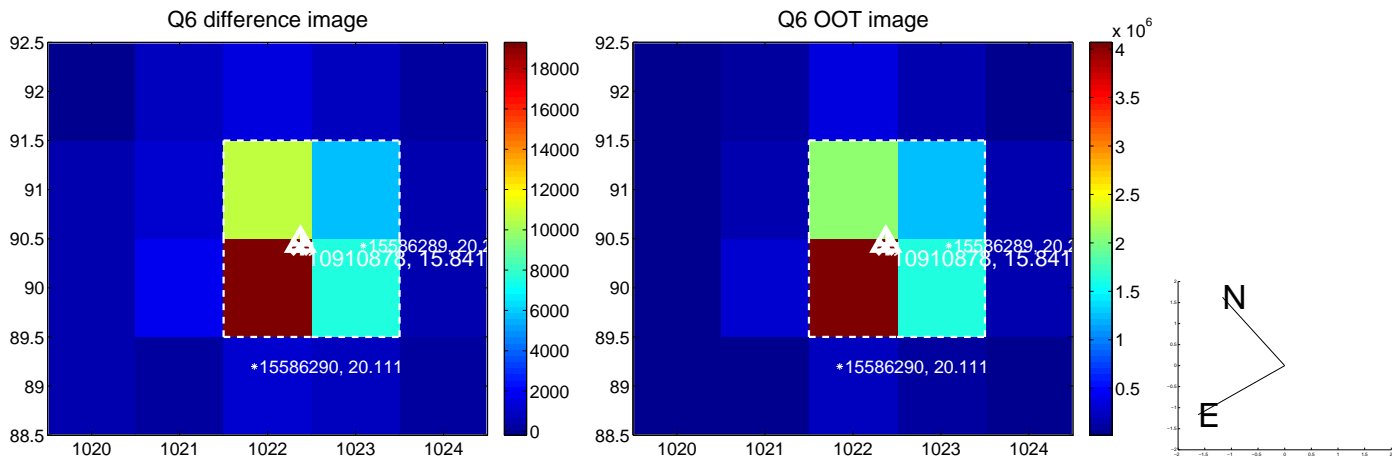
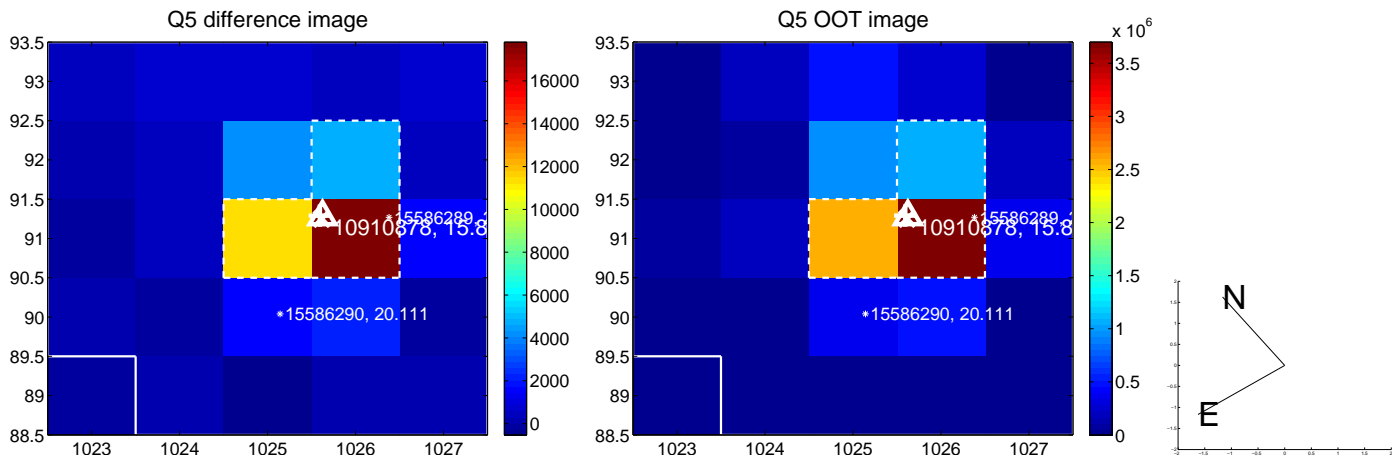
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

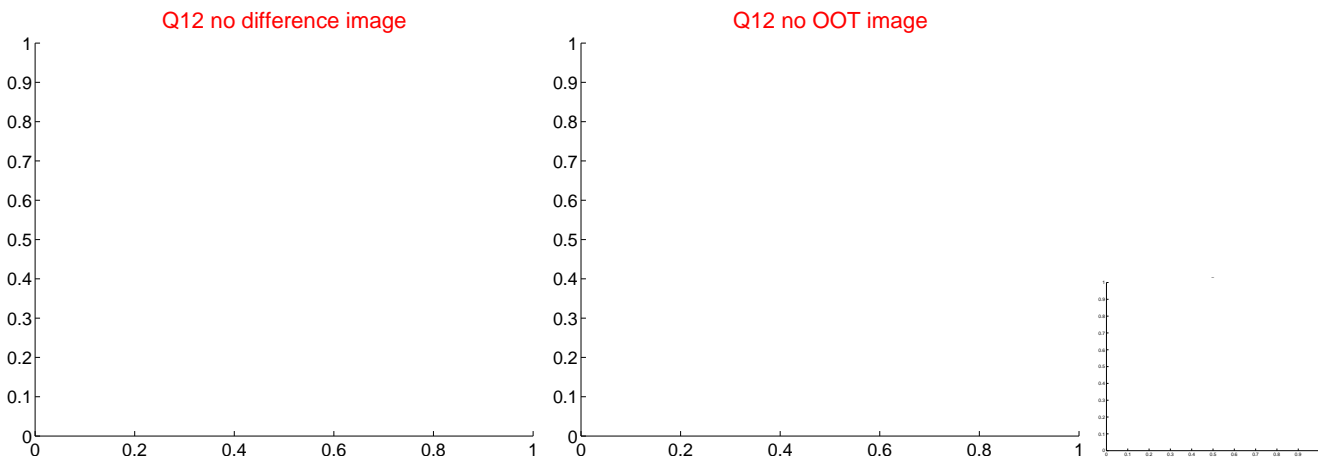
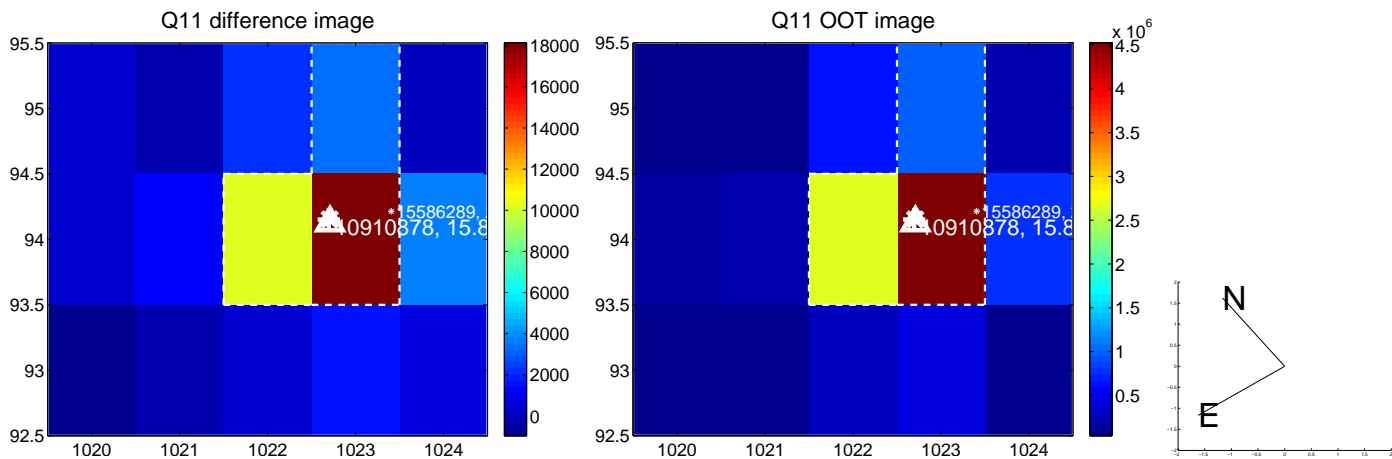
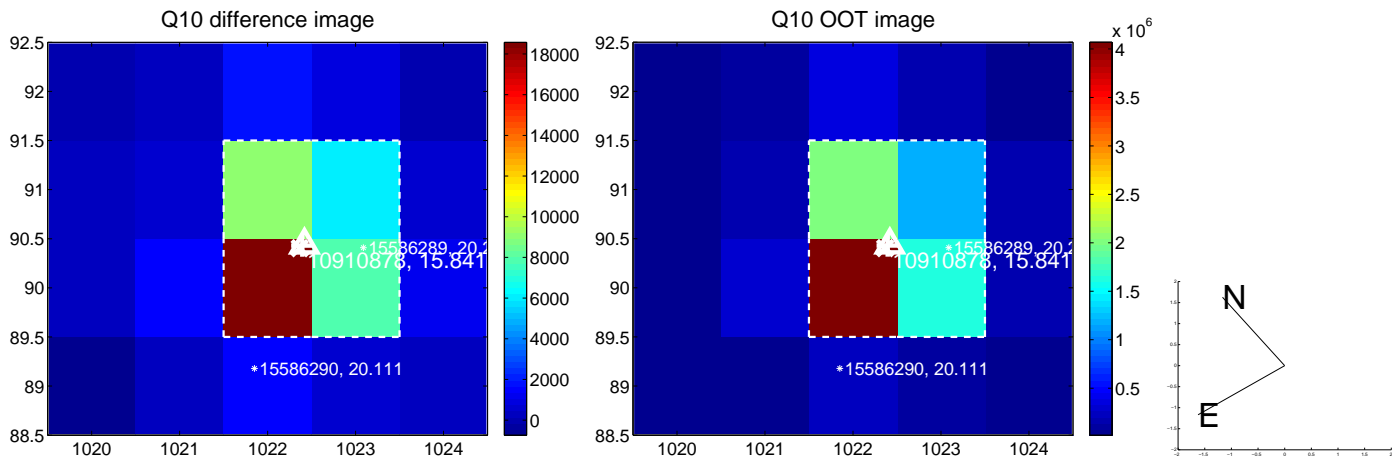
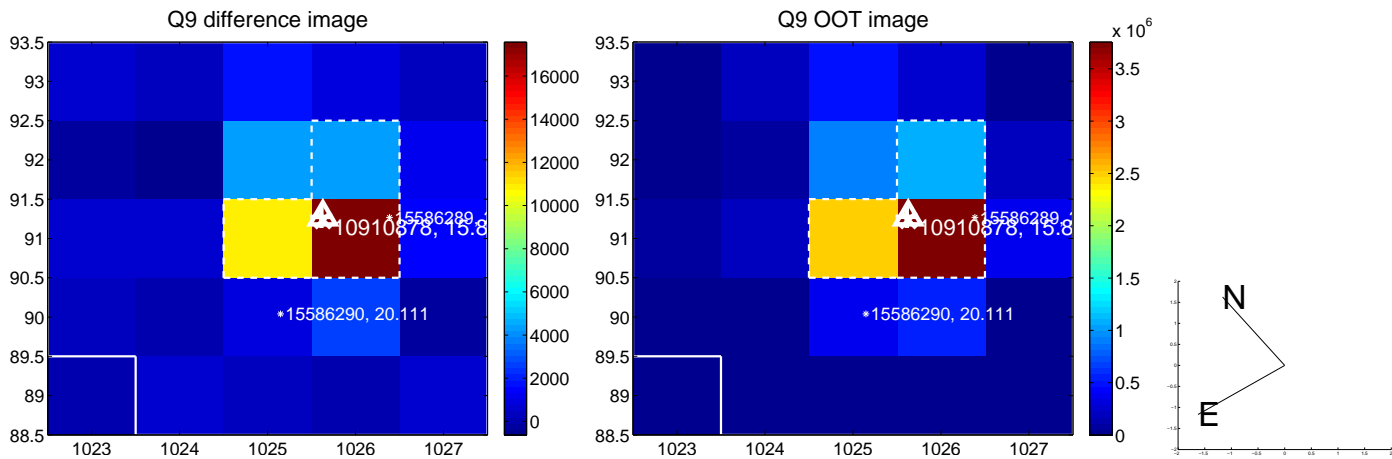




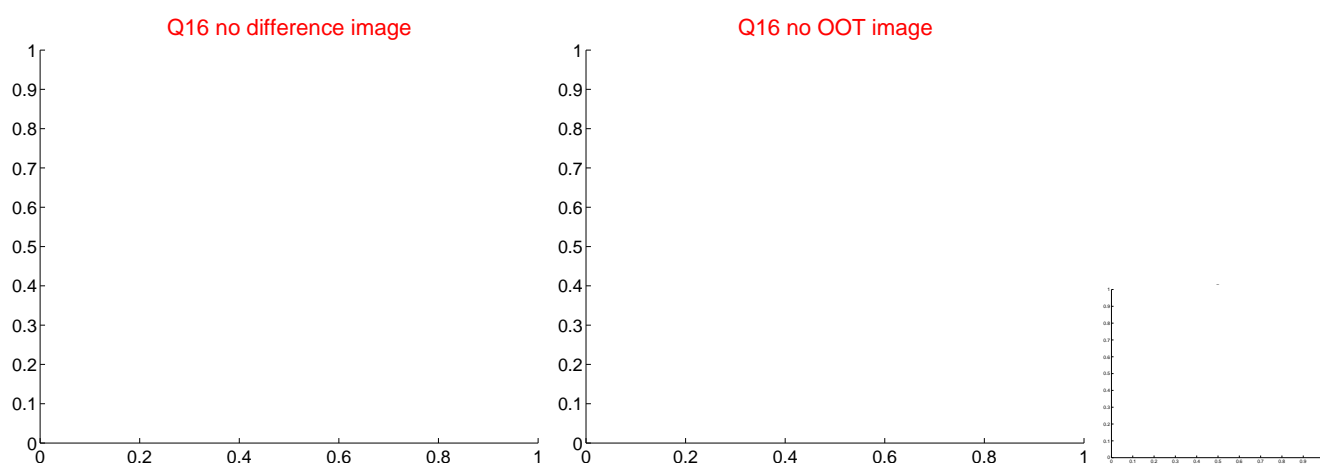
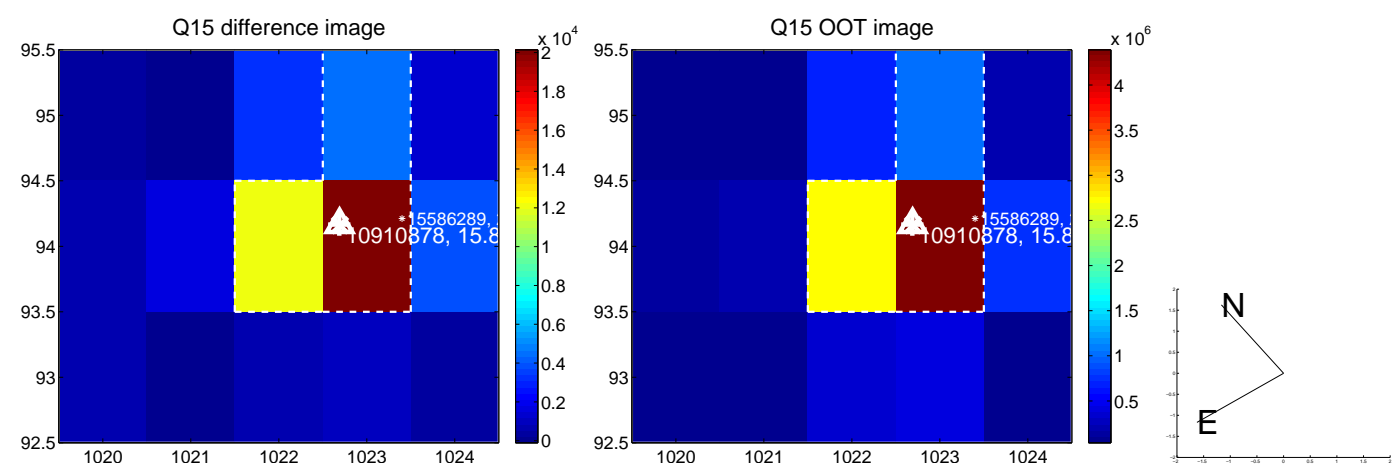
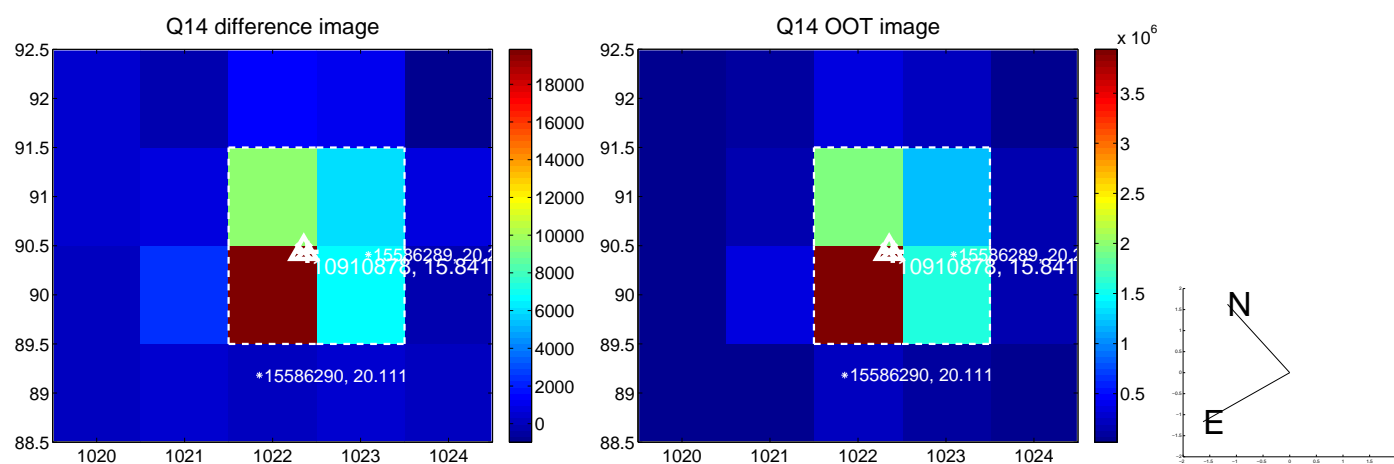
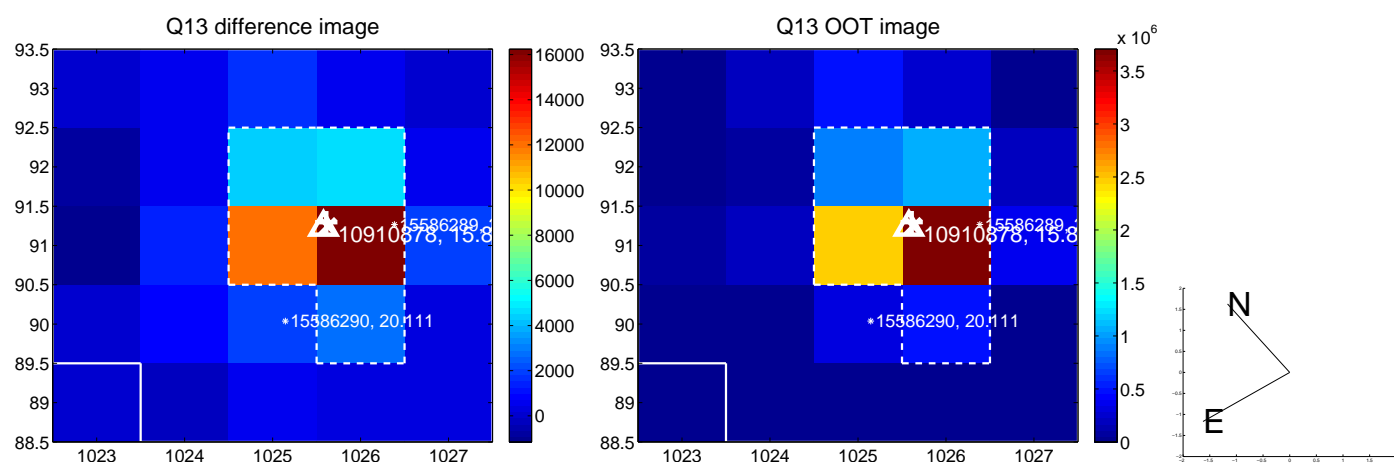
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



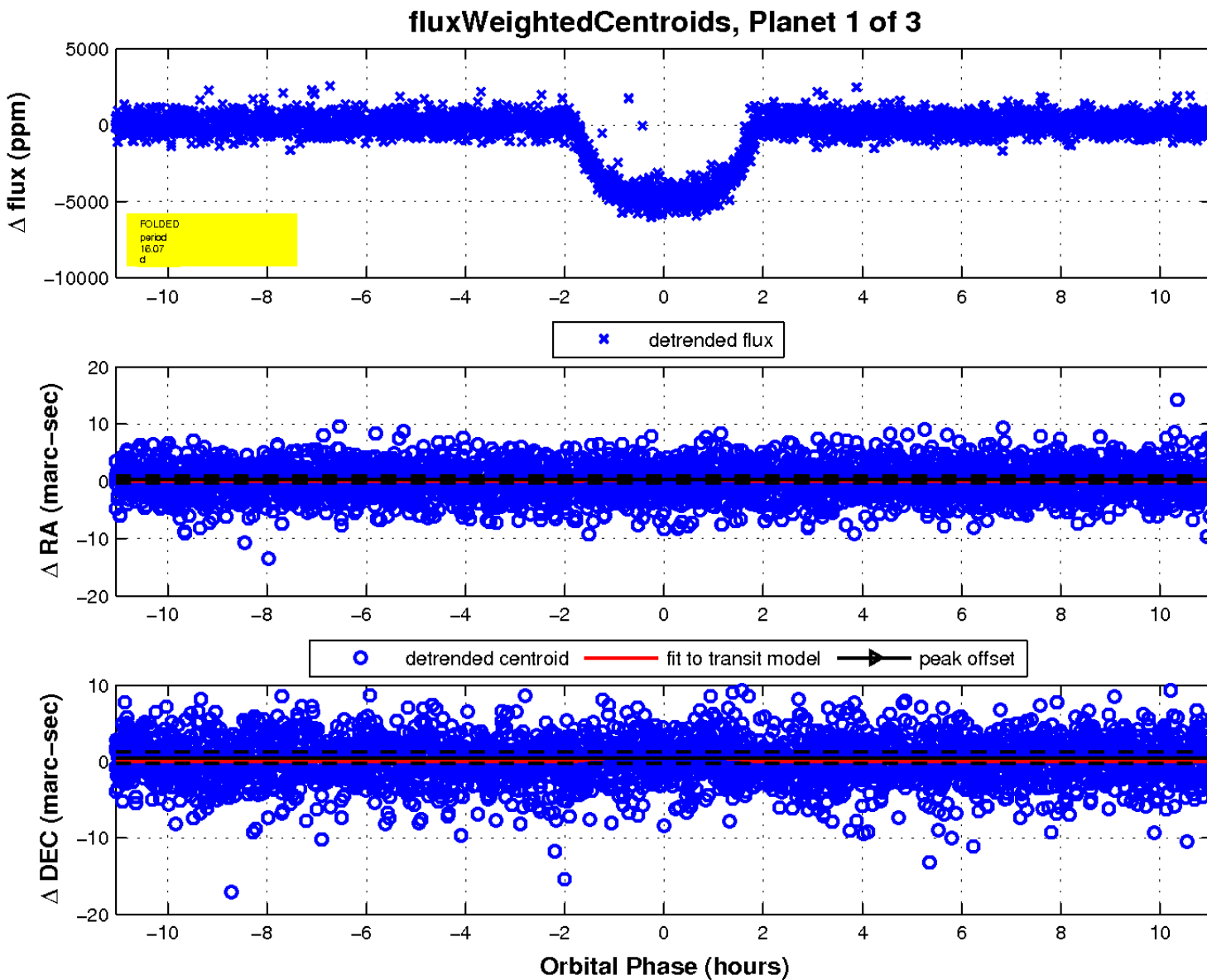
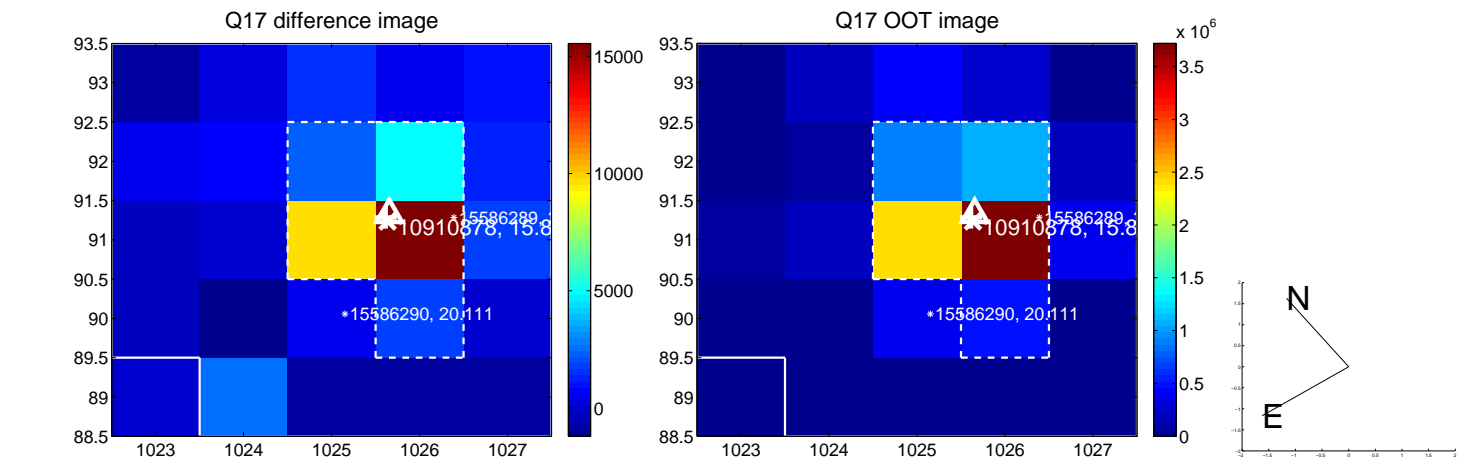
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

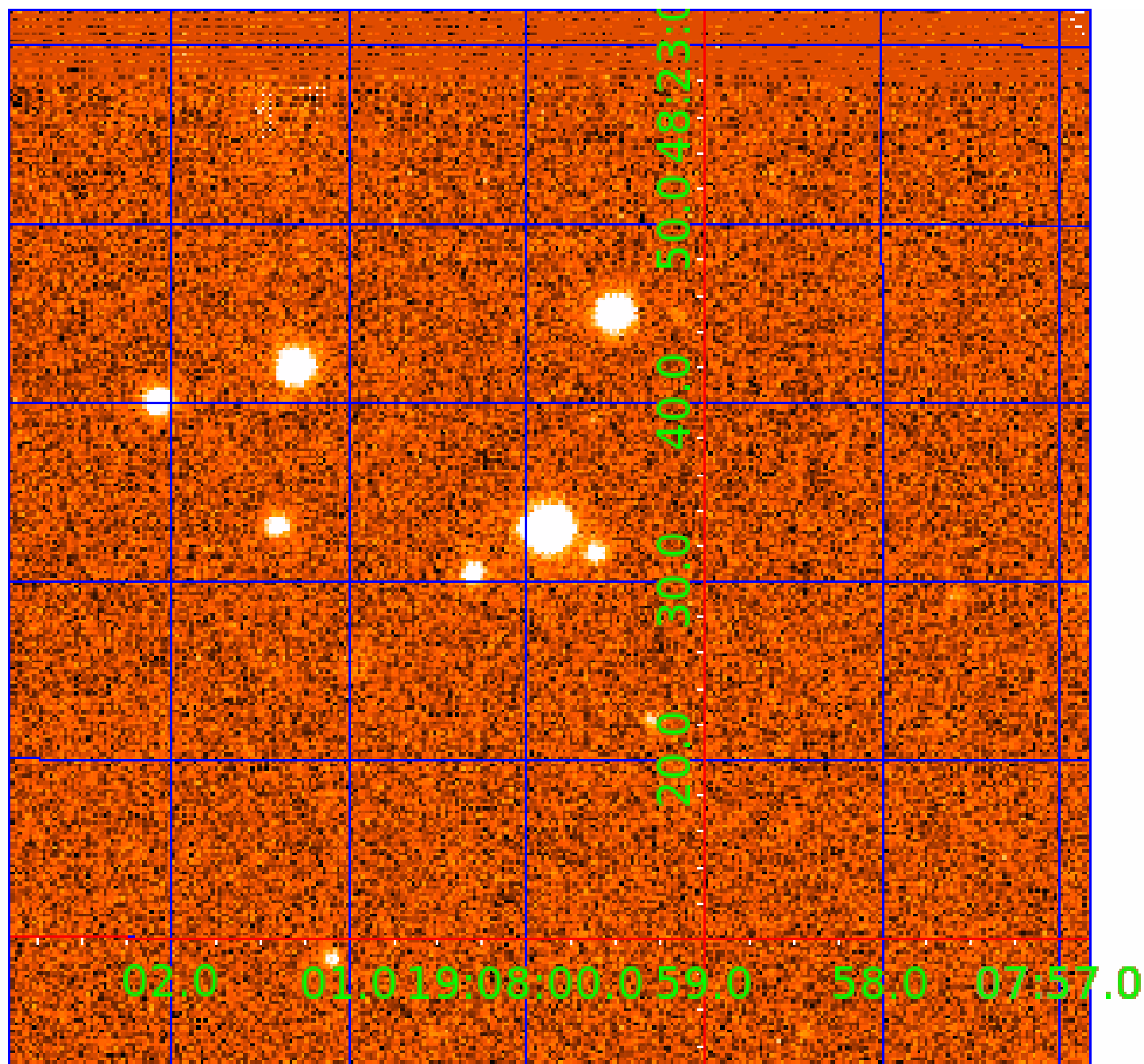


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



# UKIRT Image

Declination



# KIC 010910878

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010910878-01	OBS	0757.01	16.068637	141.485072	4895.0	3.694	137.4	133.2	0.85	5031	6.21	30.79
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010910878-03	OBS	0757.03	6.252962	133.782538	938.5	2.693	36.0	38.0	0.85	5031	2.87	108.39

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010910878-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
010910878-02	OBS	PC	0.99	0	0	0	0	NO_COMMENT
010910878-03	OBS	PC	1.00	0	0	0	0	NO_COMMENT

**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.

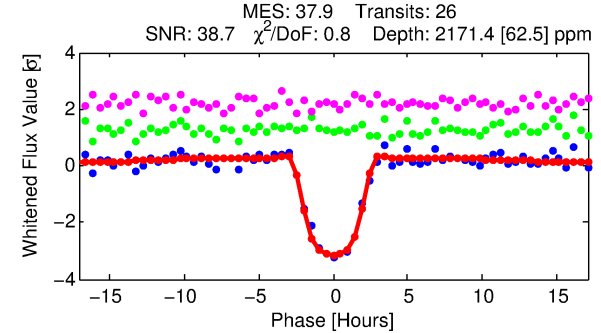
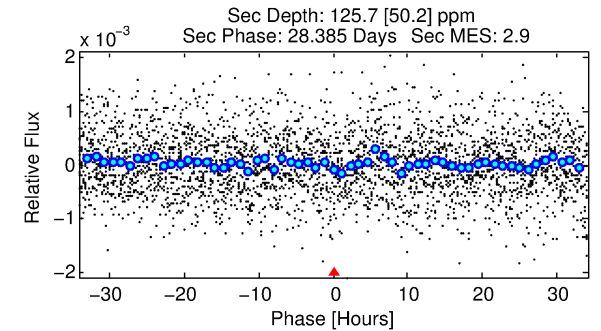
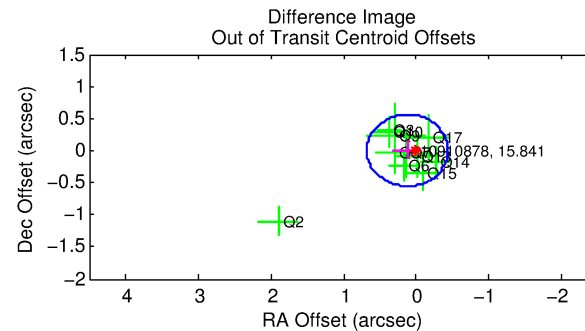
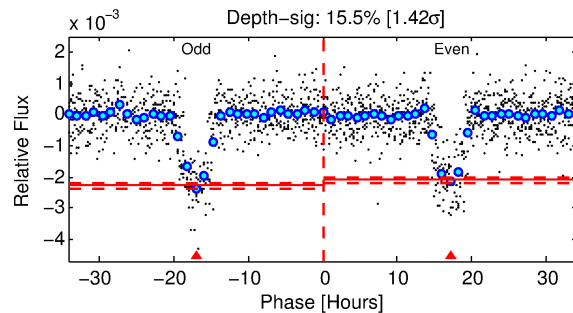
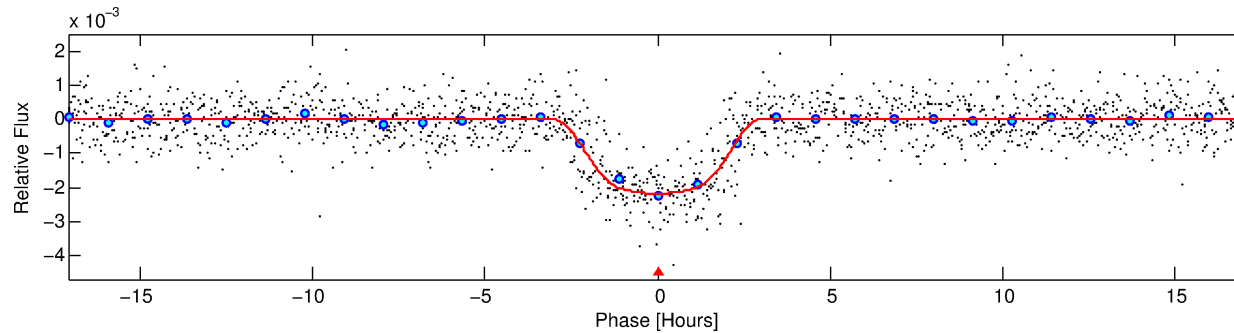
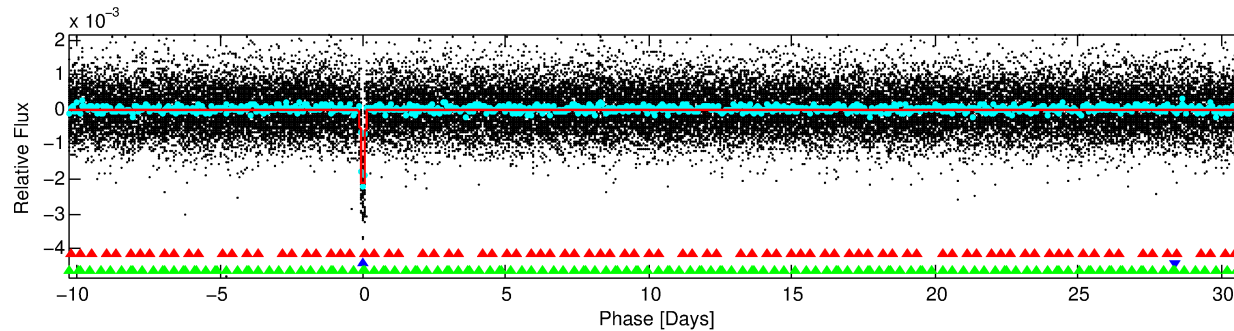
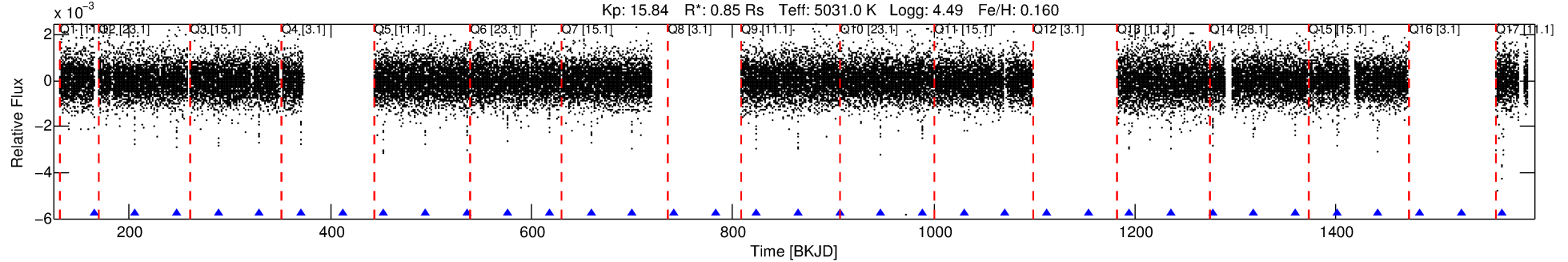
Ephemeris Match Information For 010910878-02

No Significant Match Found

# DV One-Page Summary

KIC: 10910878 Candidate: 2 of 3 Period: 41.197 d  
KOI: K00757.02 Name: Kepler-229d Corr: 0.894

Kp: 15.84 R\*: 0.85 Rs Teff: 5031.0 K Logg: 4.49 Fe/H: 0.160



## DV Fit Results:

Period = 41.19698 [0.00015] d  
Epoch = 165.0073 [0.0030] BKJD  
Rp/R\* = 0.0535 [0.0014]  
a/R\* = 28.57 [1.87]  
b = 0.92 [0.01]  
Seff = 8.78 [1.35]  
Teq = 439 [17] K  
Rp = 4.95 [0.44] Re  
a = 0.2169 [0.0185] AU  
Ag = 132.91 [56.71] [2.33σ]  
Teffp = 2304 [235] K [7.90σ]

## DV Diagnostic Results:

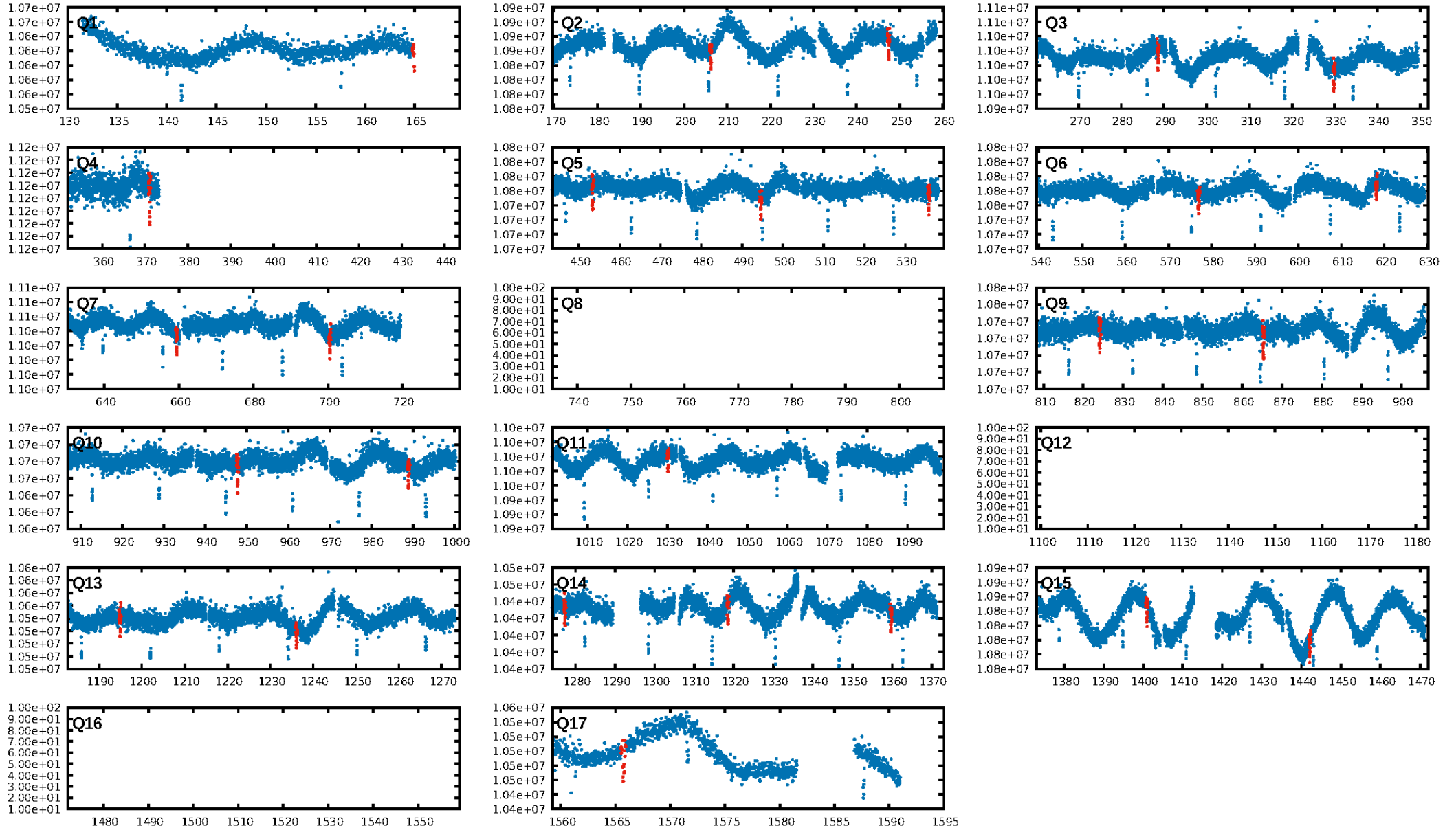
ShortPeriod-sig: 100.0% [88.82σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 52.3%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 2.11e-278  
RollingBand-fgt: 1.00 [23/23]  
GhostDiagnostic-chr: 5.864  
Centroid-sig: 12.3%  
Centroid-so: 0.426 arcsec [1.41σ]  
OotOffset-rm: 0.124 arcsec [0.66σ]  
KicOffset-rm: 0.079 arcsec [0.50σ]  
OotOffset-st: 4/3/0/4 [11]  
KicOffset-st: 4/3/0/4 [11]  
DiffImageQuality-fgm: 1.00 [11/11]  
DiffImageOverlap-fno: 0.91 [10/11]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 03:41:26 Z

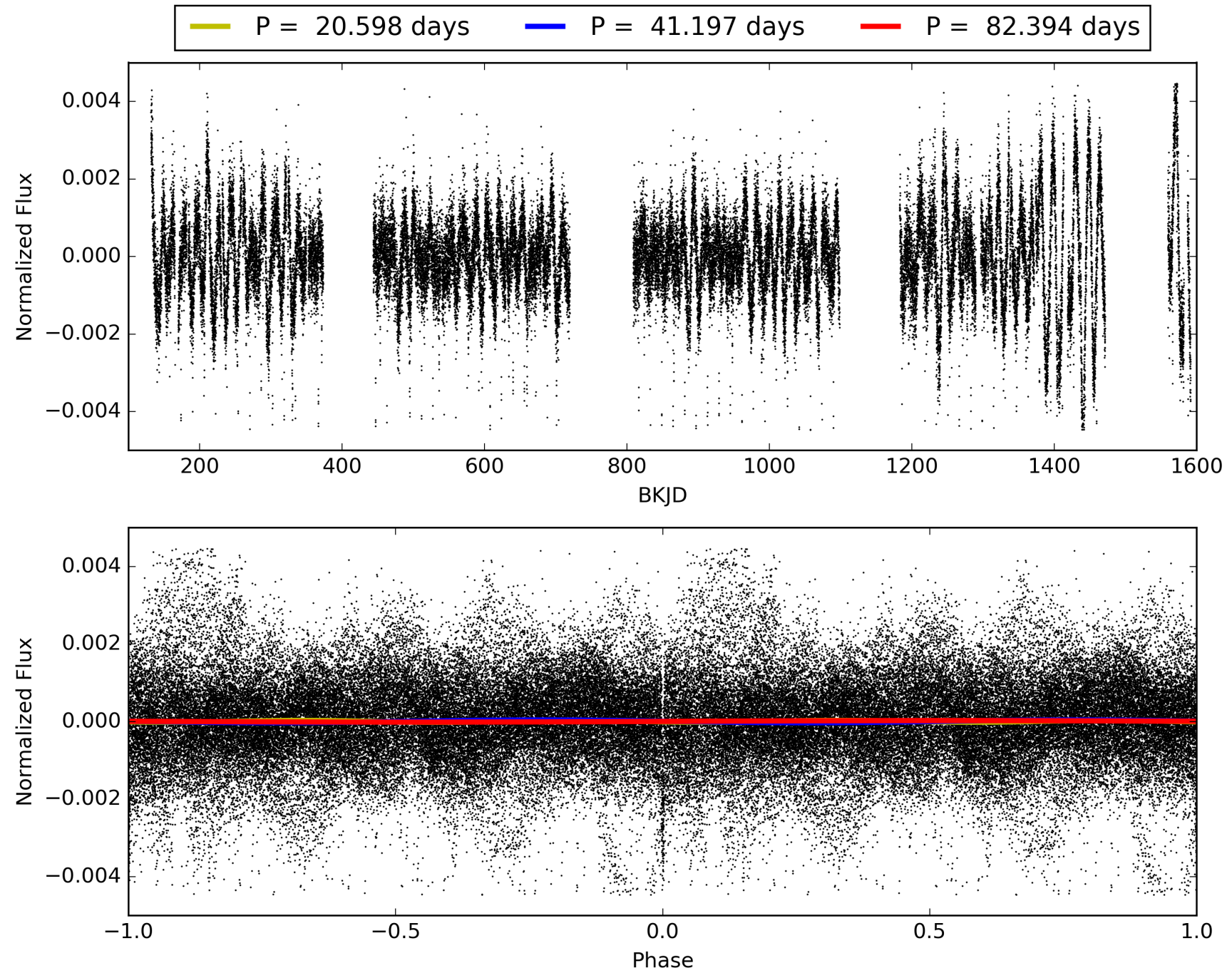
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 010910878-02, PDC Light Curves

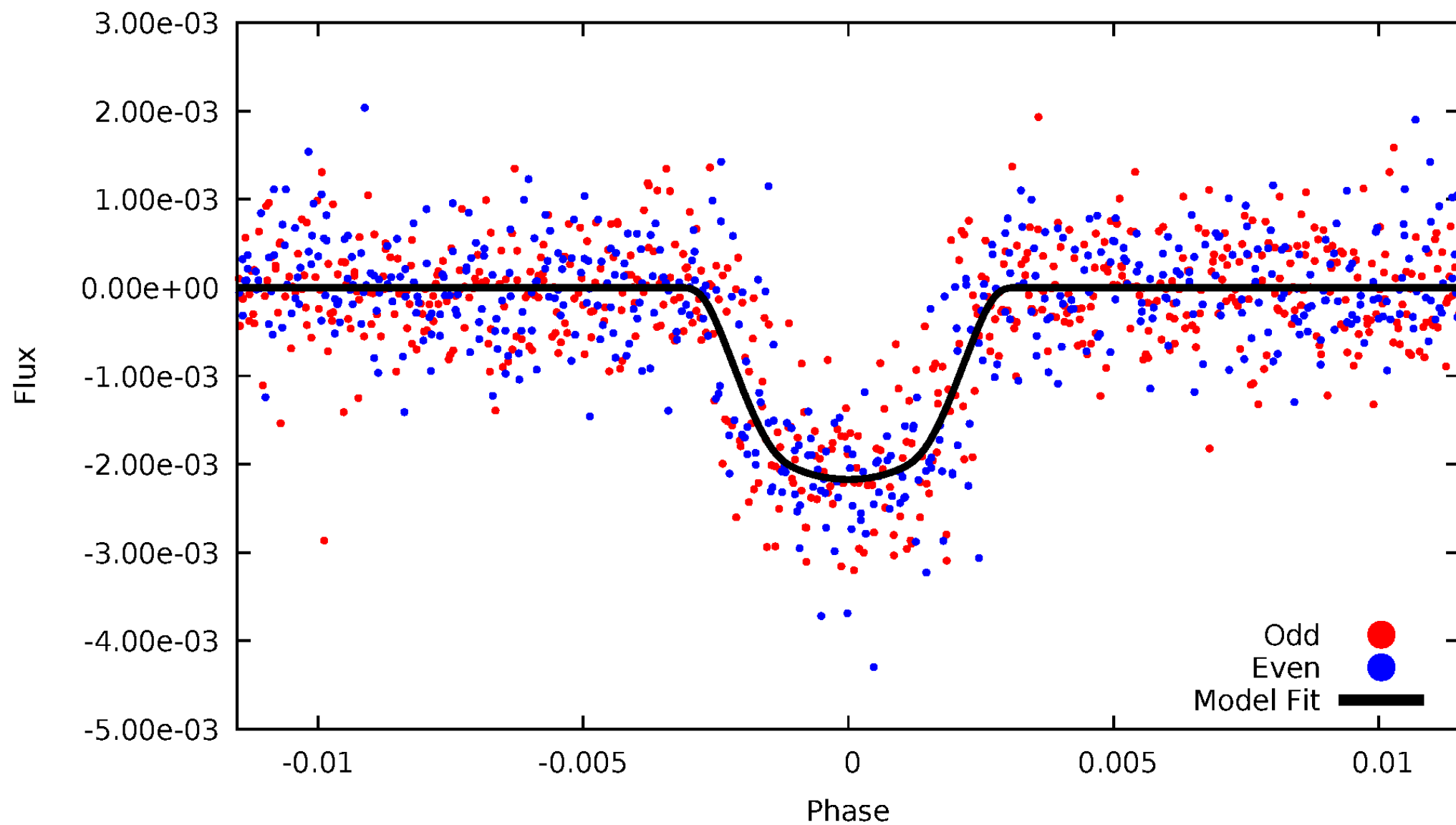


# TCE 010910878-02



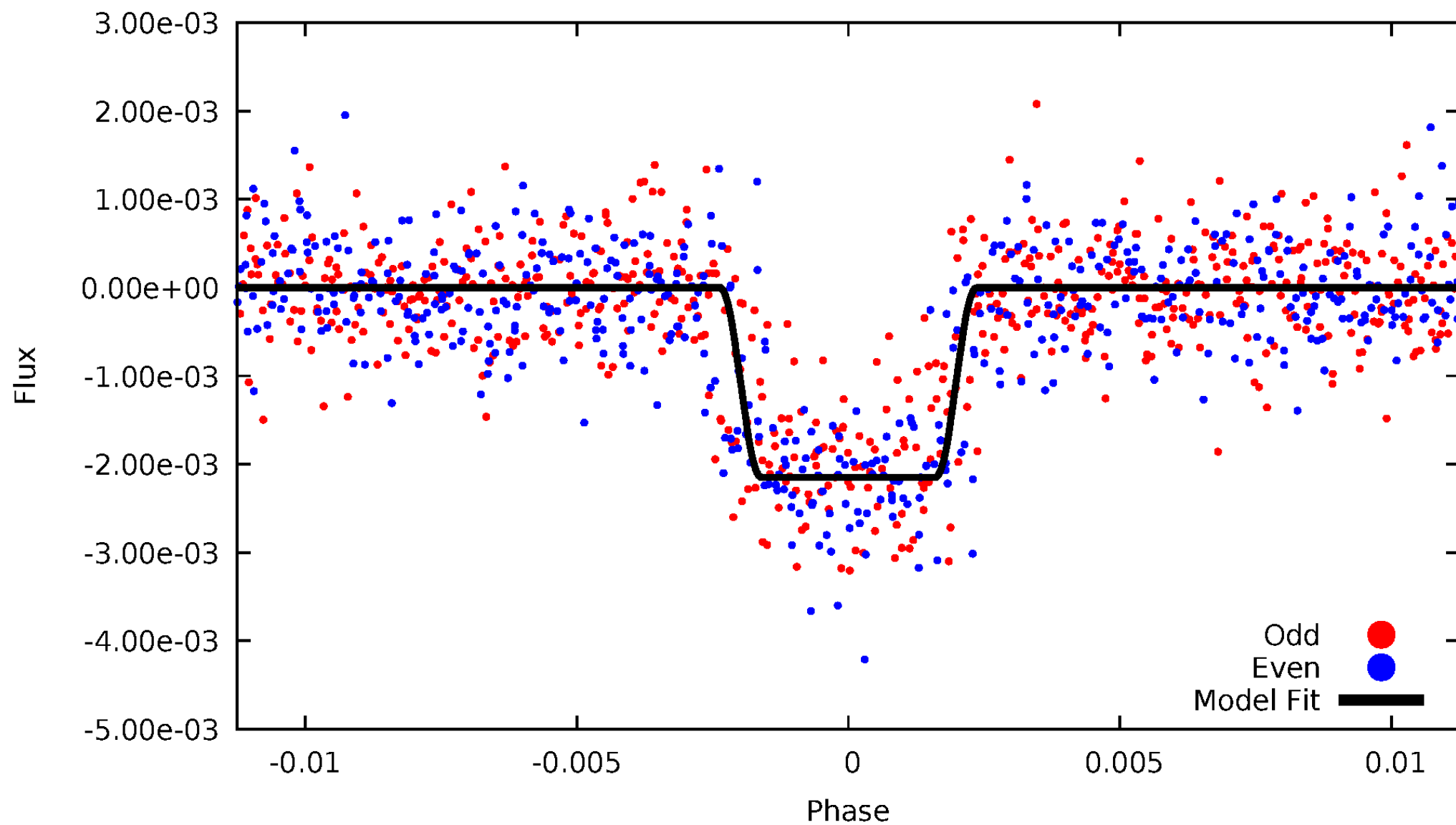
# DV Odd/Even

TCE 010910878-02



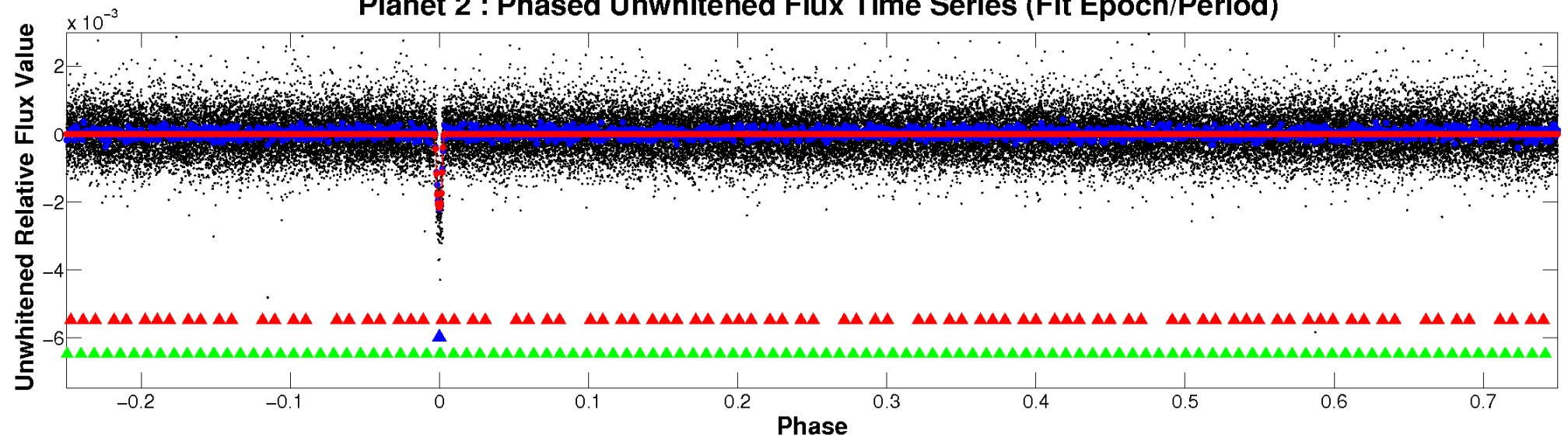
# ALT Odd/Even

TCE 010910878-02

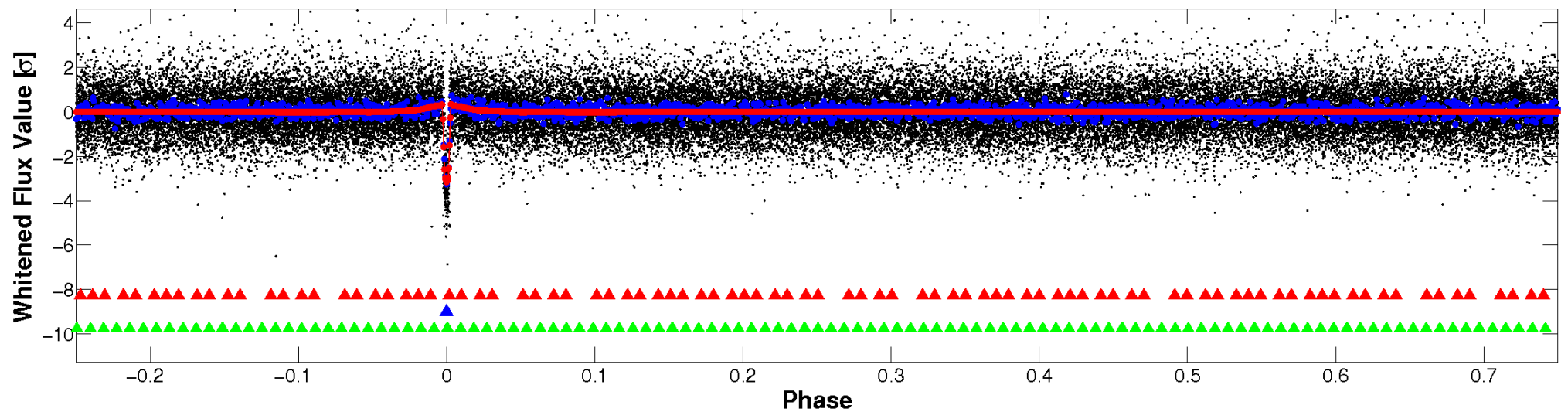


# Non-Whitened Vs. Whitened Light Curve

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

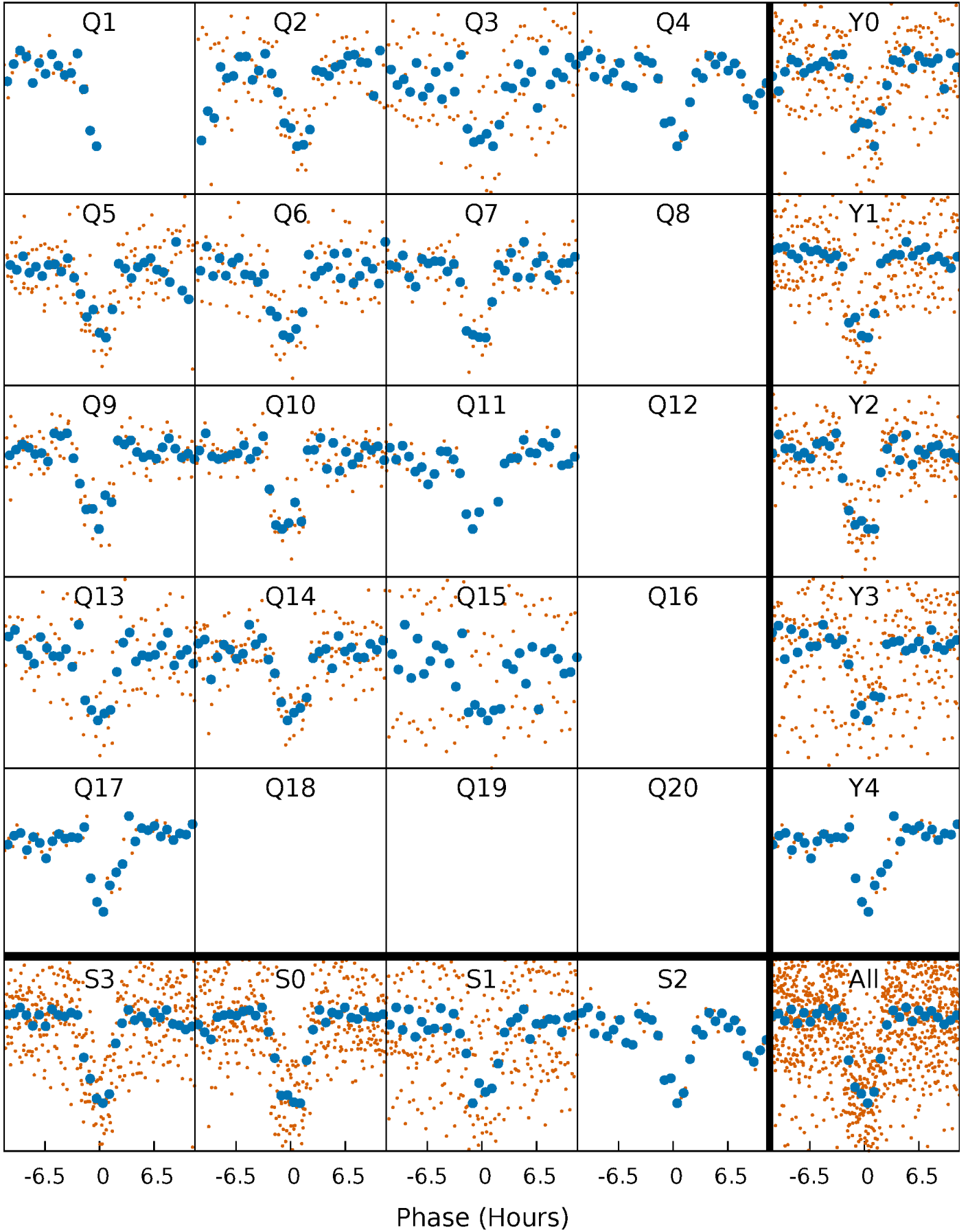


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

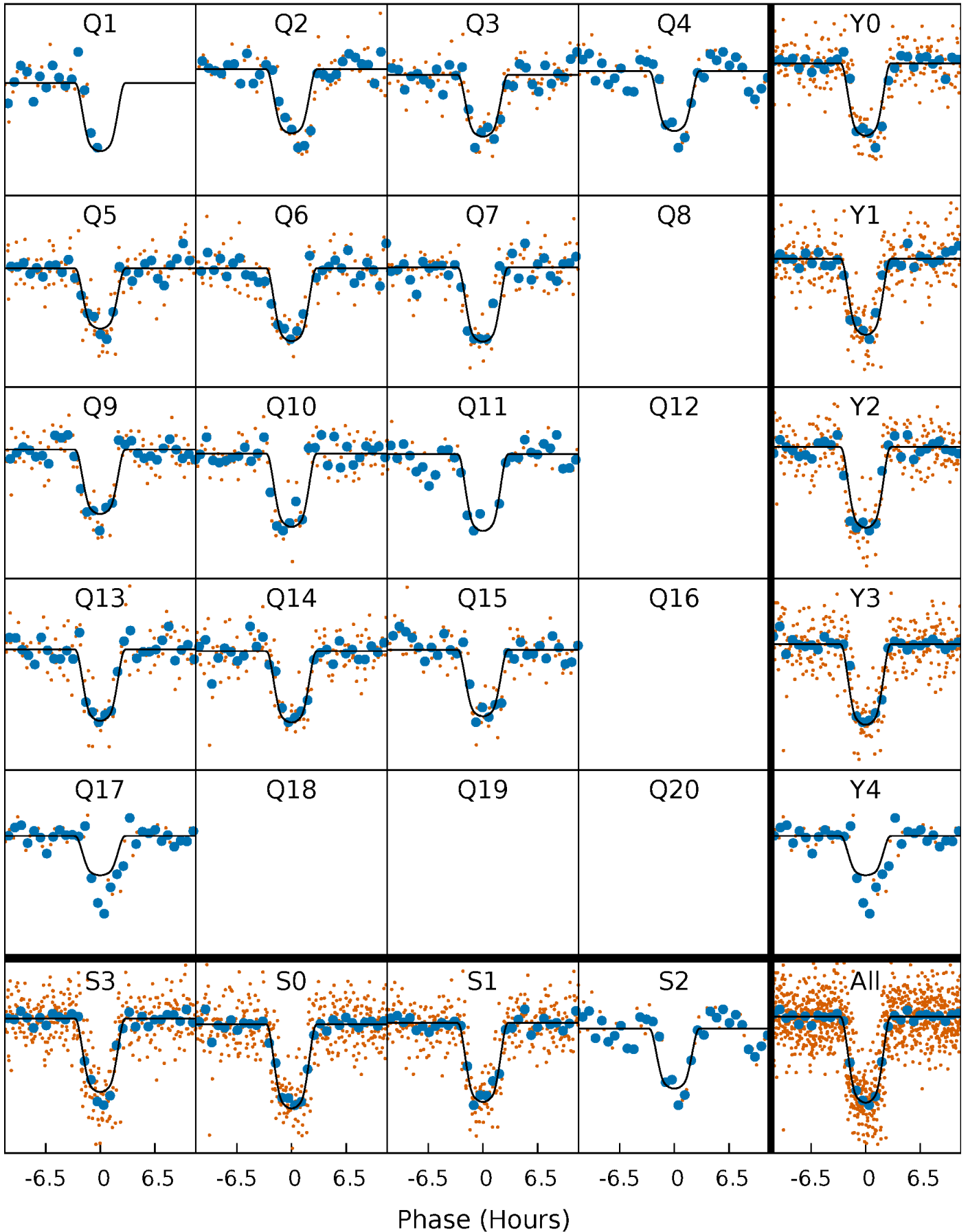
TCE 010910878-02   P= 41.196983 Days    $T_0=165.007264$  (BKJD)





# DV Quarter-Phased Transit Curves

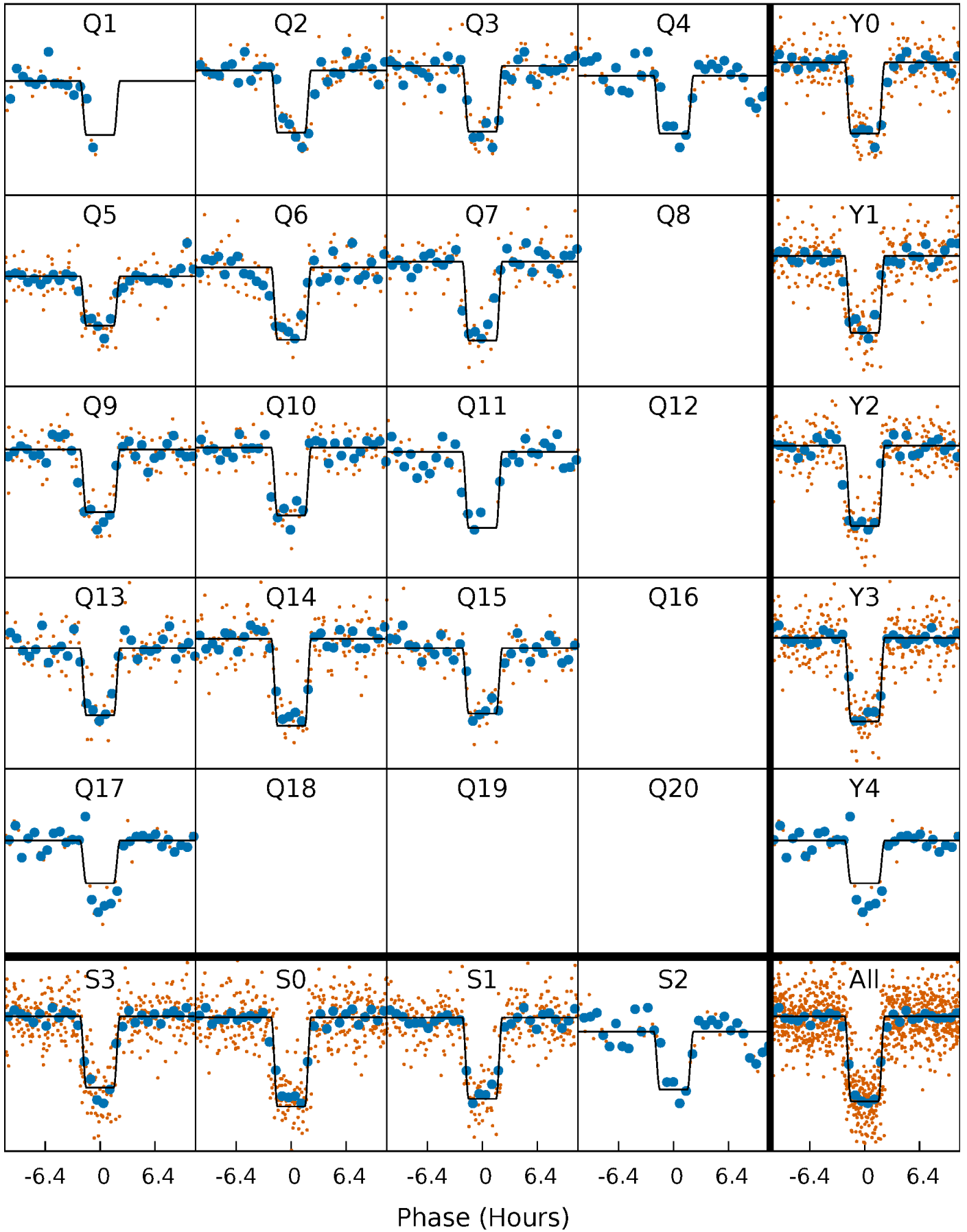
TCE 010910878-02 P= 41.196983 Days  $T_0=165.007264$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

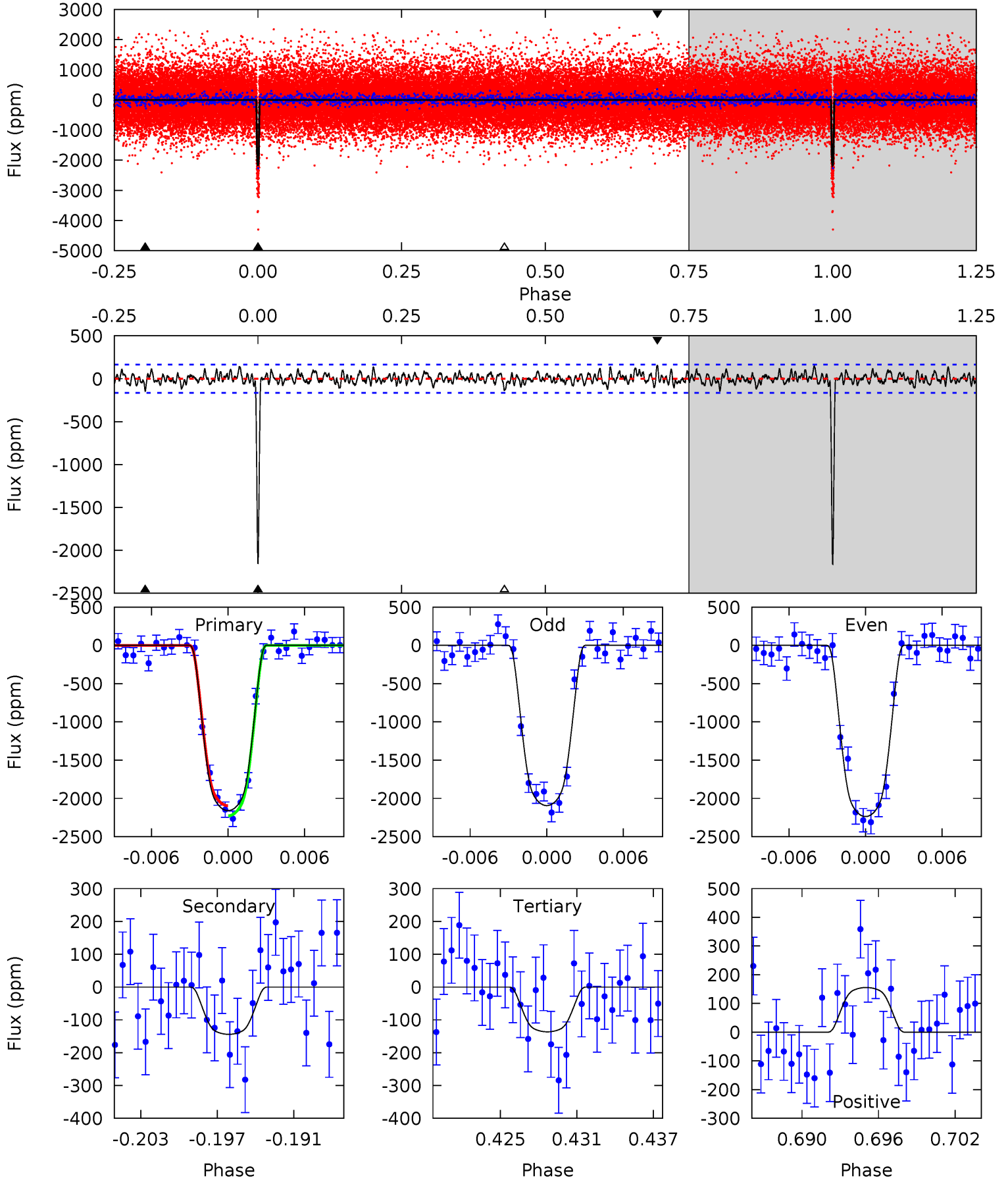
TCE 010910878-02 P= 41.197247 Days  $T_0=165.005553$  (BKJD)



# DV Model-Shift Uniqueness Test

010910878-02,  $P = 41.196983$  Days,  $E = 123.810281$  Days

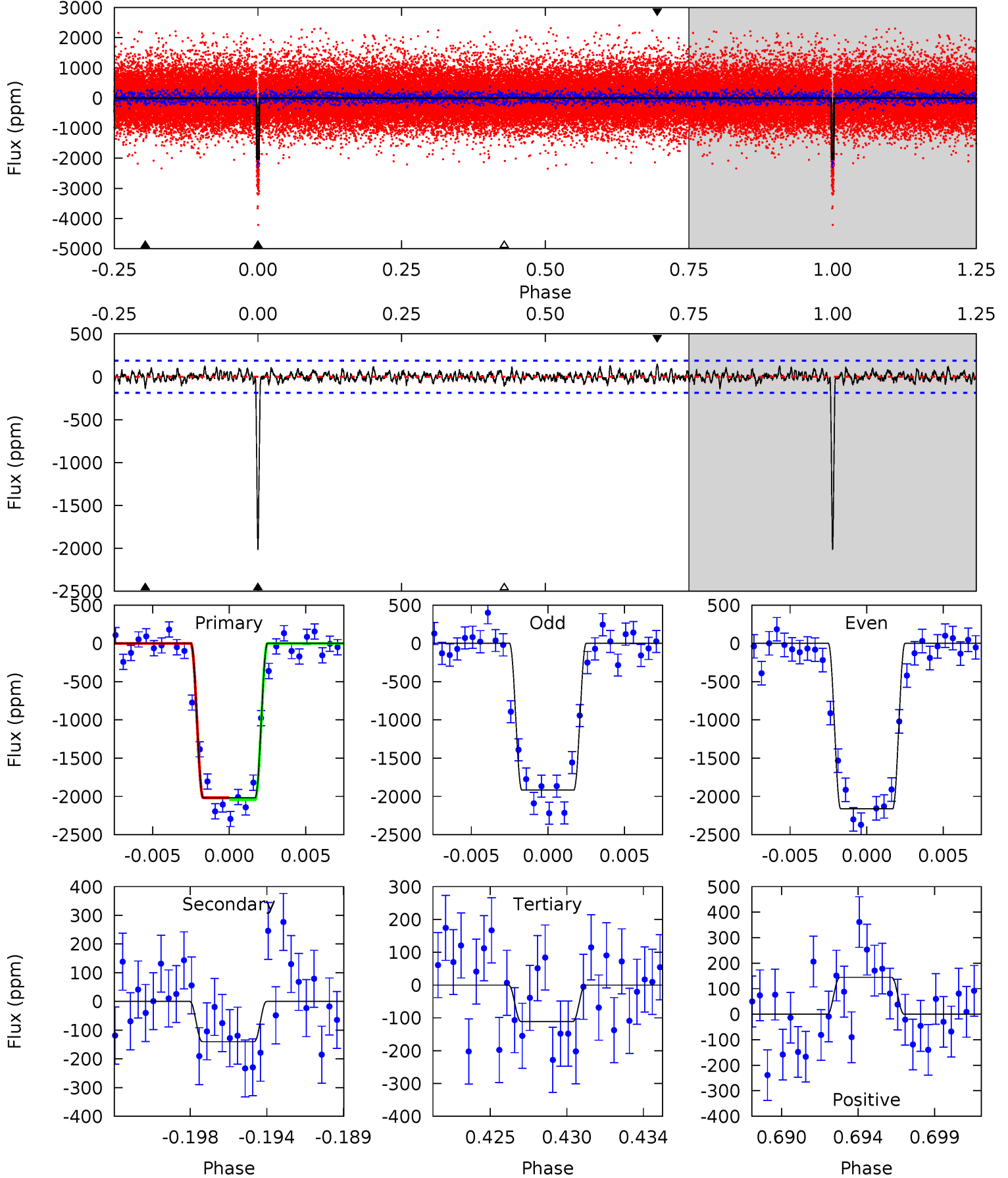
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
67.1	4.48	4.24	4.83	5.12	2.74	1.47	62.9	62.3	0.24	-0.35	2.23	1.01	0.07	2.07



# Alt Model-Shift Uniqueness Test

010910878-02, P = 41.197247 Days, E = 123.808306 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
55.8	3.87	3.08	3.99	5.17	2.83	1.08	52.8	51.9	0.79	-0.12	3.37	1.01	0.07	0.33



### Stellar Parameters For KIC 010910878

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5031^{+75}_{-83}$	$4.485^{+0.083}_{-0.028}$	$0.160^{+0.150}_{-0.150}$	$0.848^{+0.033}_{-0.072}$	$0.801^{+0.052}_{-0.030}$	$1.852^{+0.592}_{-0.164}$
	+1%/-2%	+2%/-1%	+94%/-94%	+4%/-8%	+6%/-4%	+32%/-9%
Source	SPE90	SPE90	SPE90	DSEP		

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

### Secondary Eclipse Parameters for KIC 010910878-02 / KOI 0757.02

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-144 \pm 32$	$4.93^{+0.20}_{-0.26}$	$610^{+13}_{-16}$	$3015^{+96}_{-123}$	$158^{+41}_{-39}$
Alt.	$-140 \pm 36$	$4.25^{+0.21}_{-0.23}$	$609^{+14}_{-17}$	$3119^{+121}_{-142}$	$202^{+58}_{-55}$

$T_{\text{max}}$  = Theoretical Maximum Planetary Temperature

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

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

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

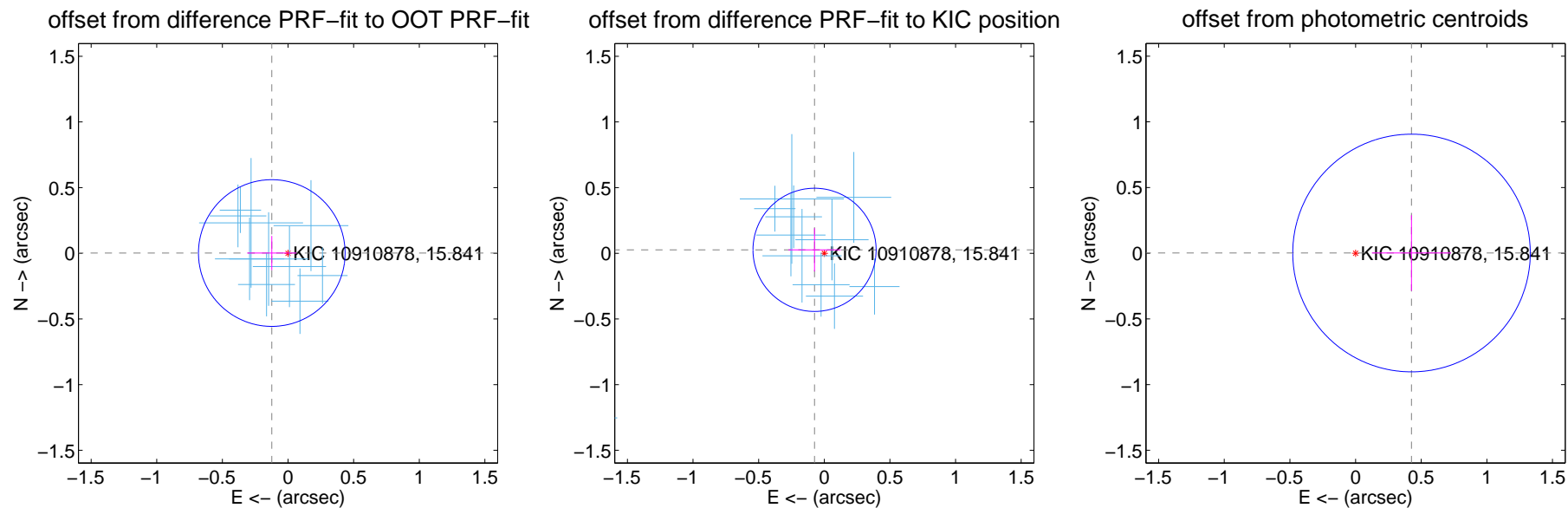
## DV Centroid Data

Supplemental centroid analysis for 010910878-02. Kepler magnitude: 15.84. Transit SNR 38.71

There are 11 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.22 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.124 \pm 0.186$	0.66	$0.124 \pm 0.187$	$0.002 \pm 0.130$
PRF-fit source offset from KIC position	$0.079 \pm 0.156$	0.50	$0.074 \pm 0.199$	$0.026 \pm 0.165$
photometric centroid source offset	$0.43 \pm 0.30$	1.41	$-0.43 \pm 0.30$	$0.00 \pm 0.29$



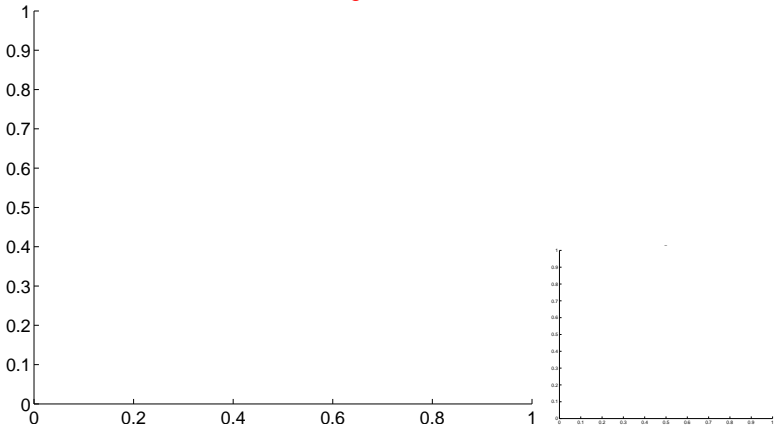
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

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

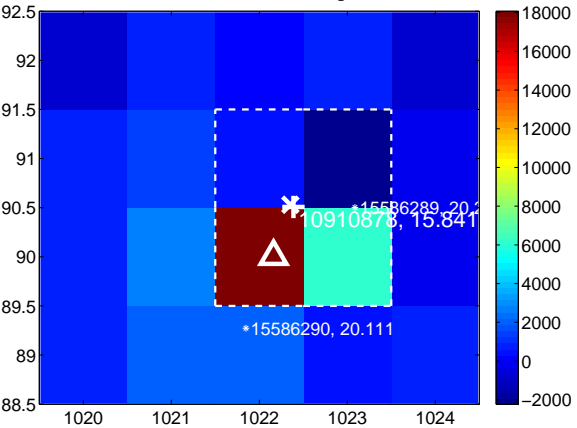
Q1 no difference image



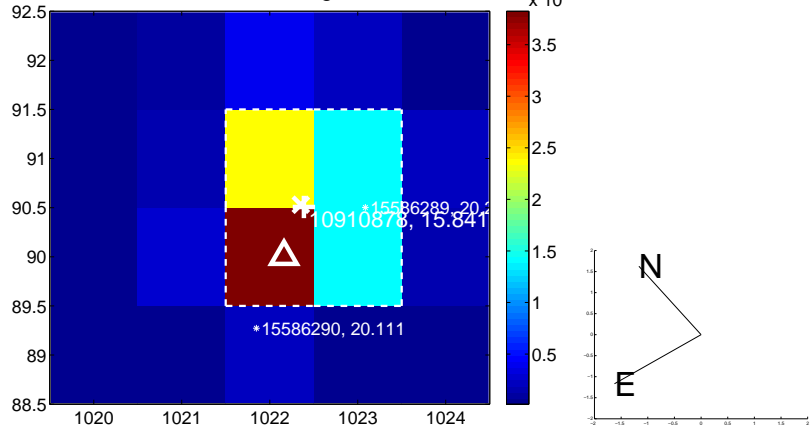
Q1 no OOT image



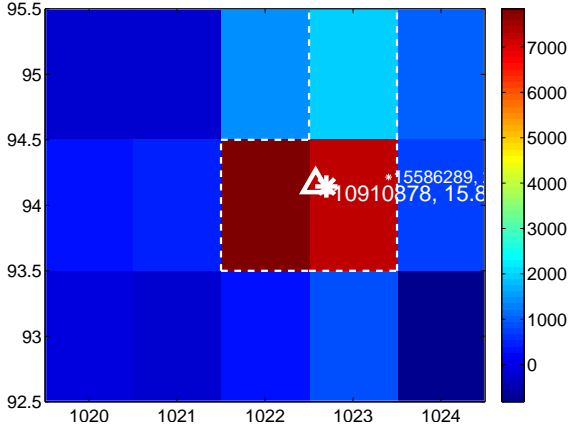
Q2 difference image



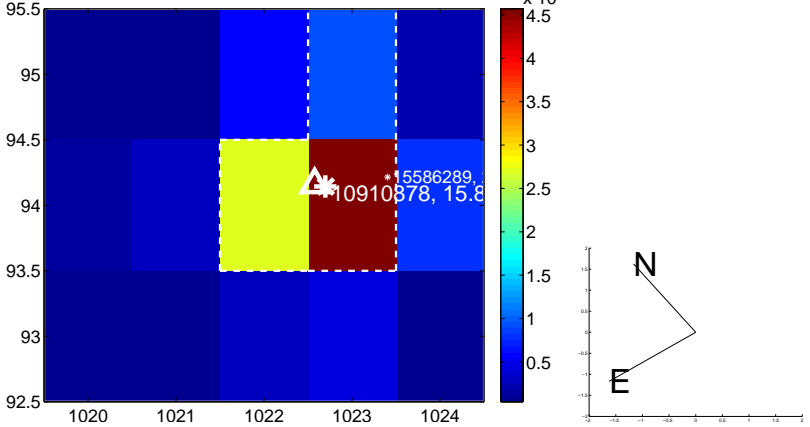
Q2 OOT image



Q3 difference image



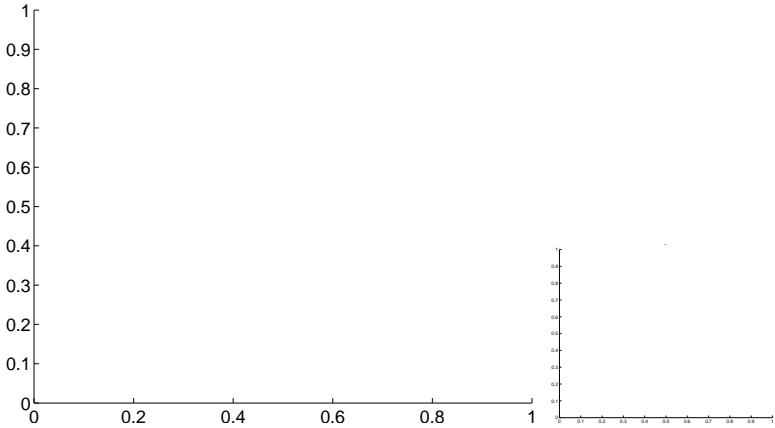
Q3 OOT image



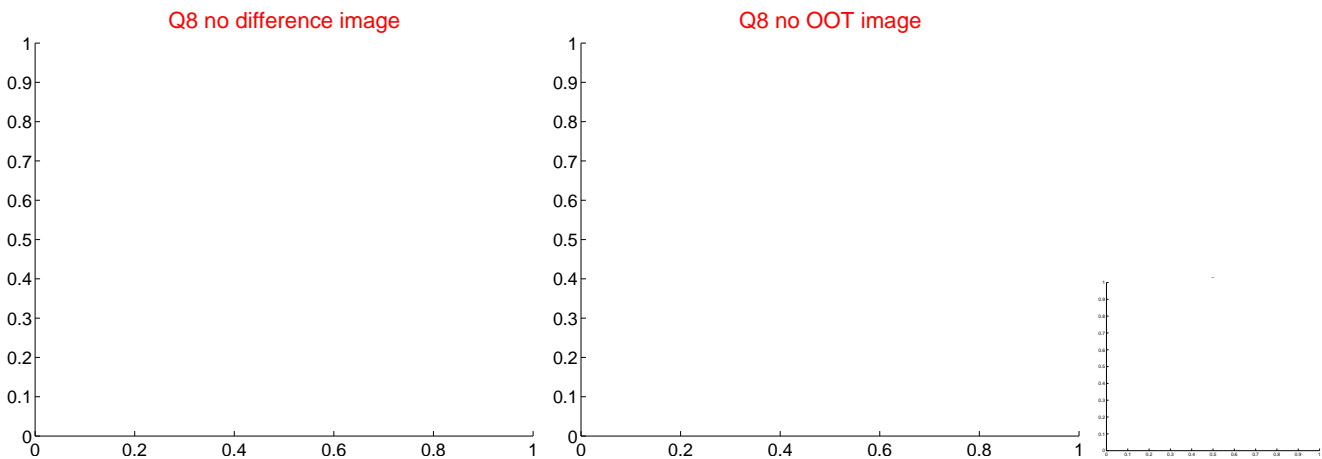
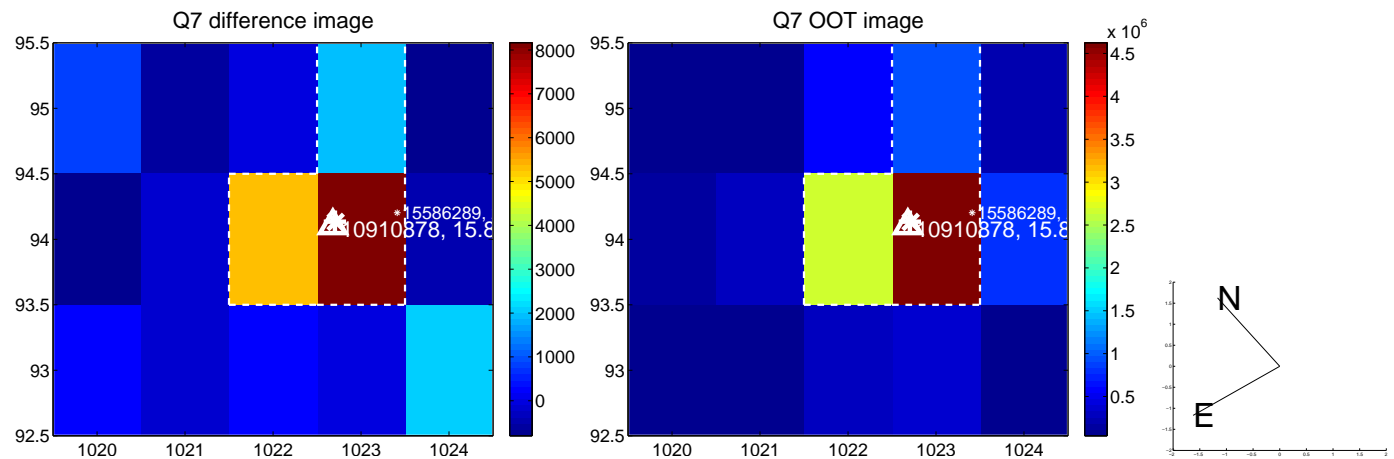
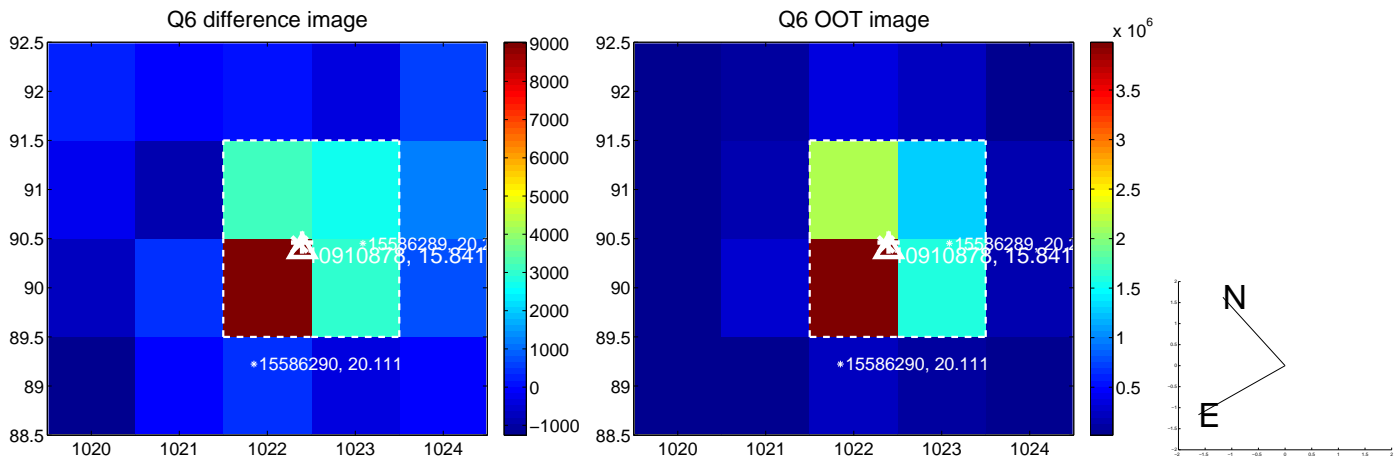
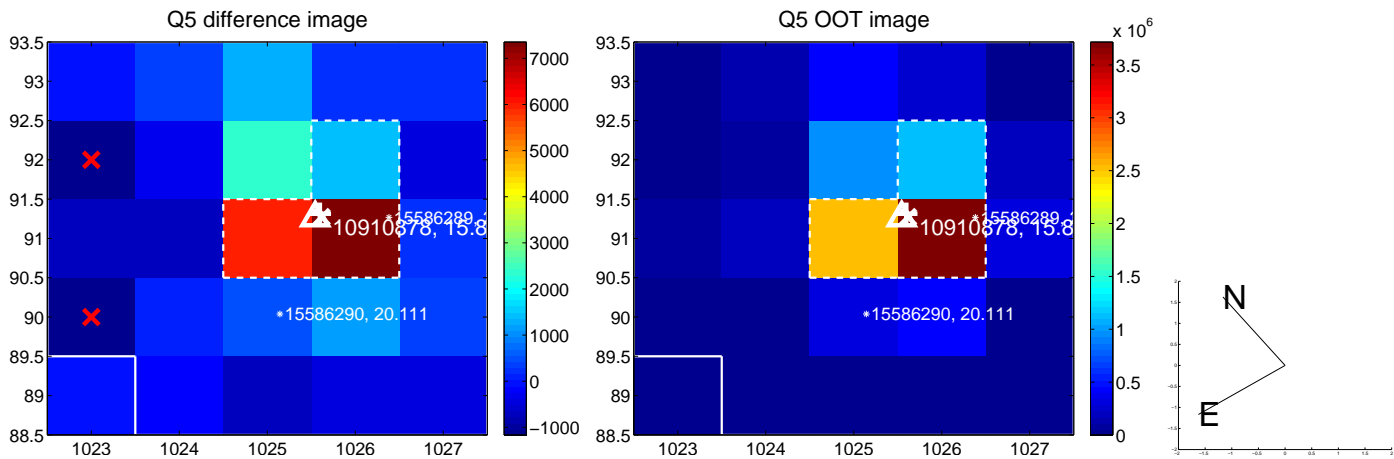
Q4 no difference image



Q4 no OOT image

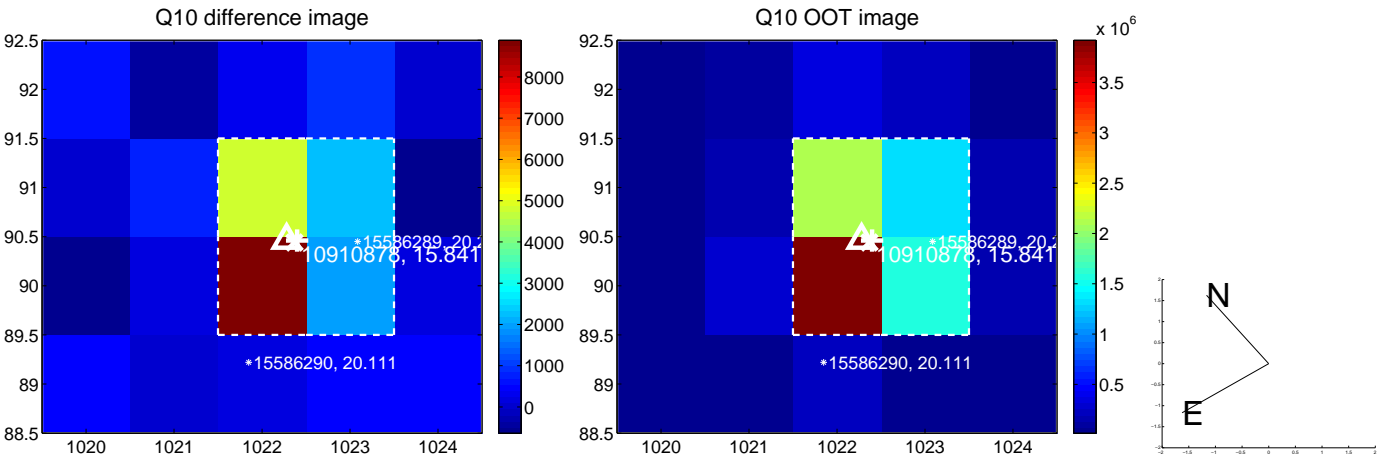
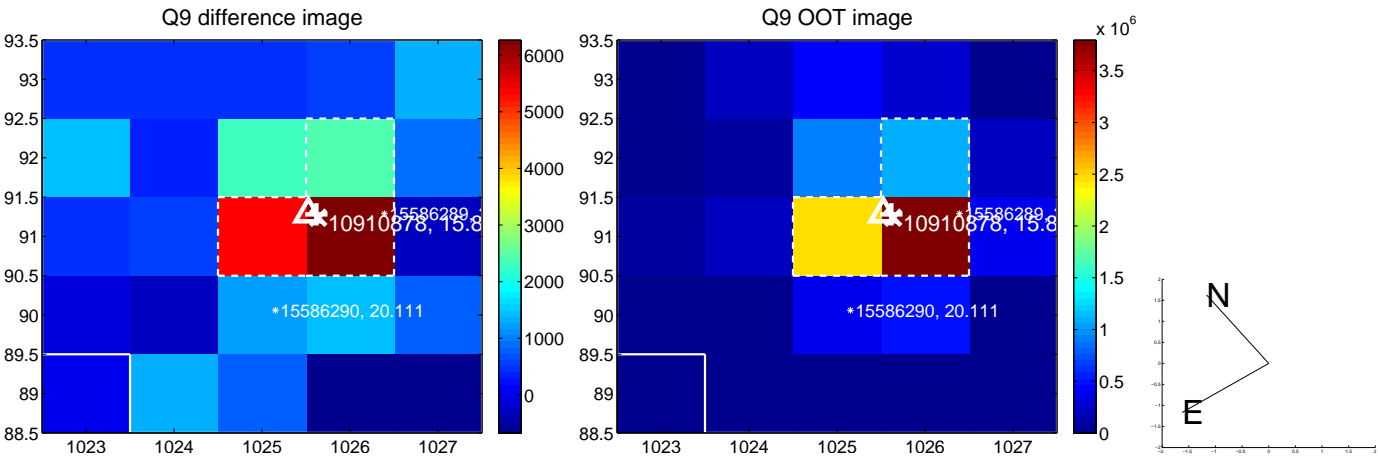


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

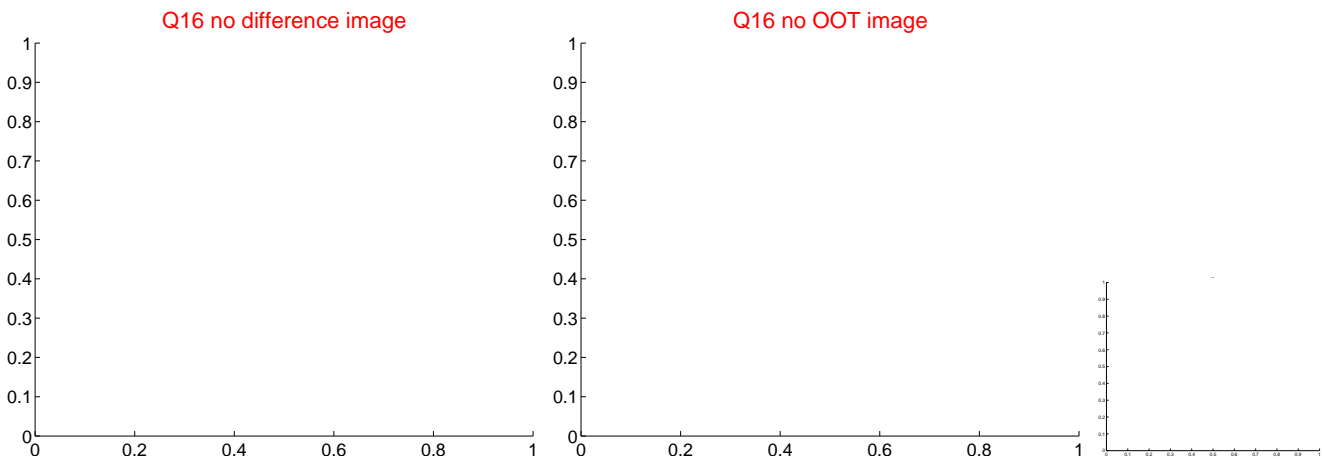
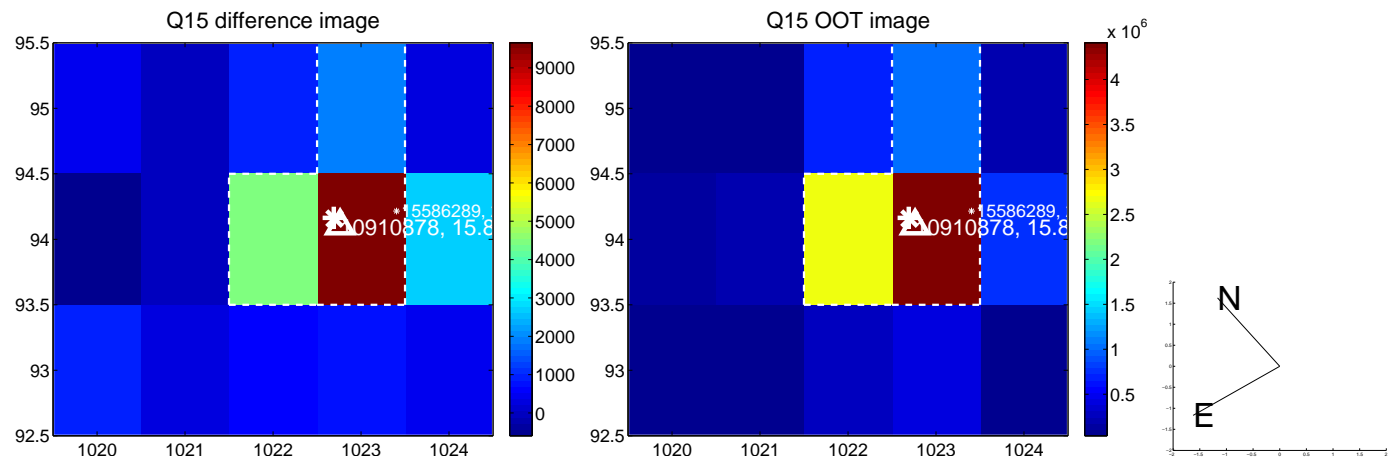
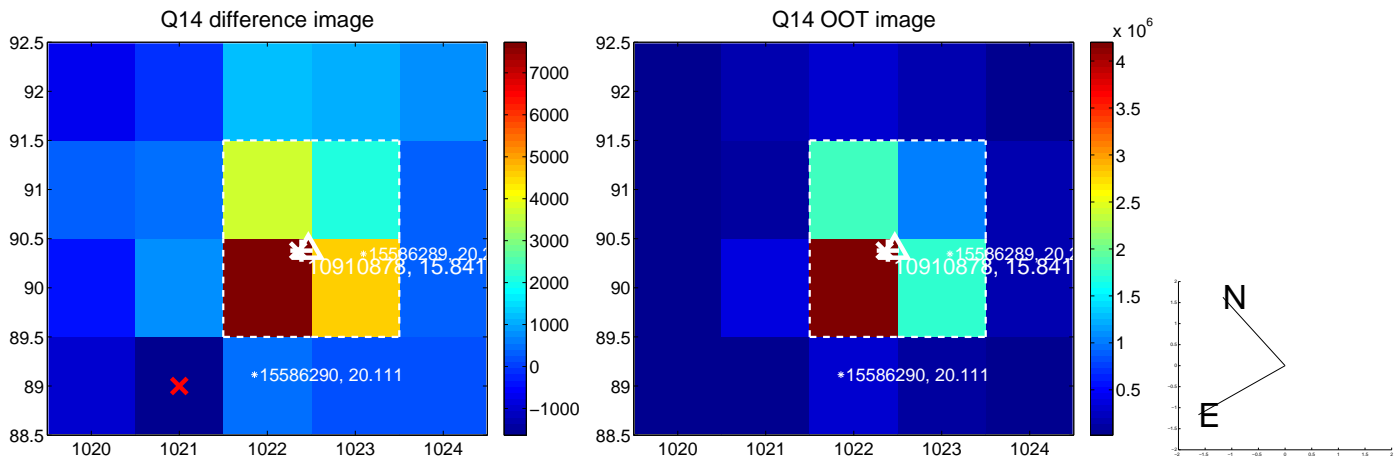
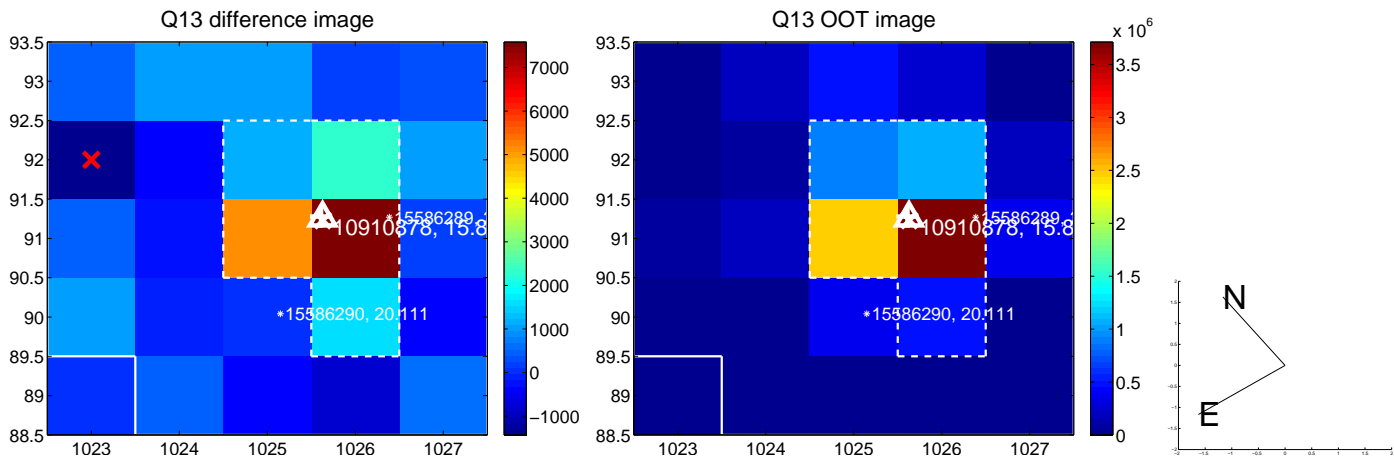




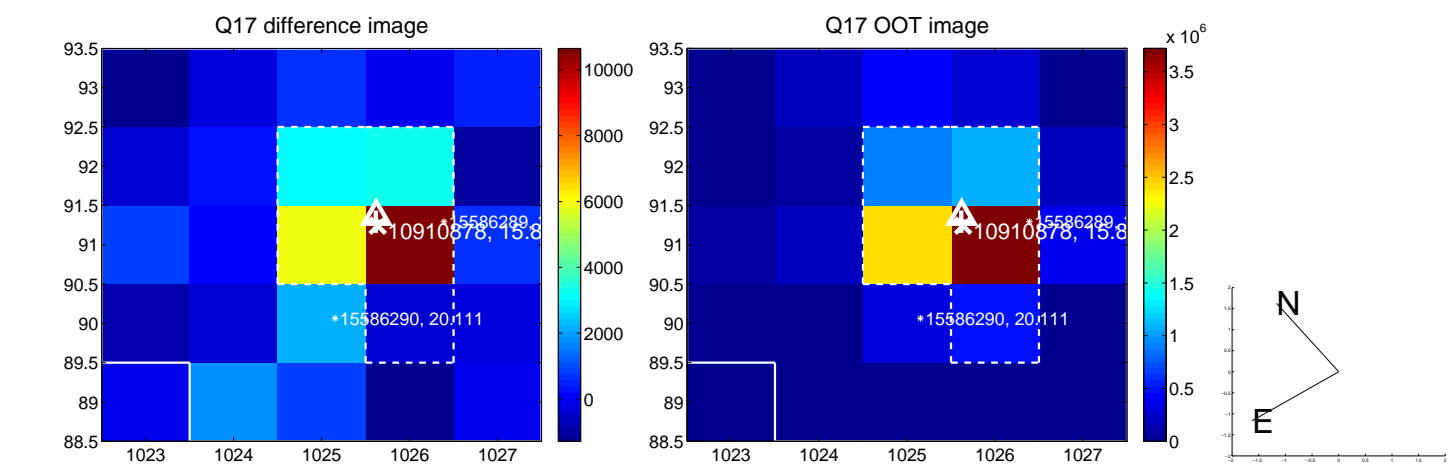
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



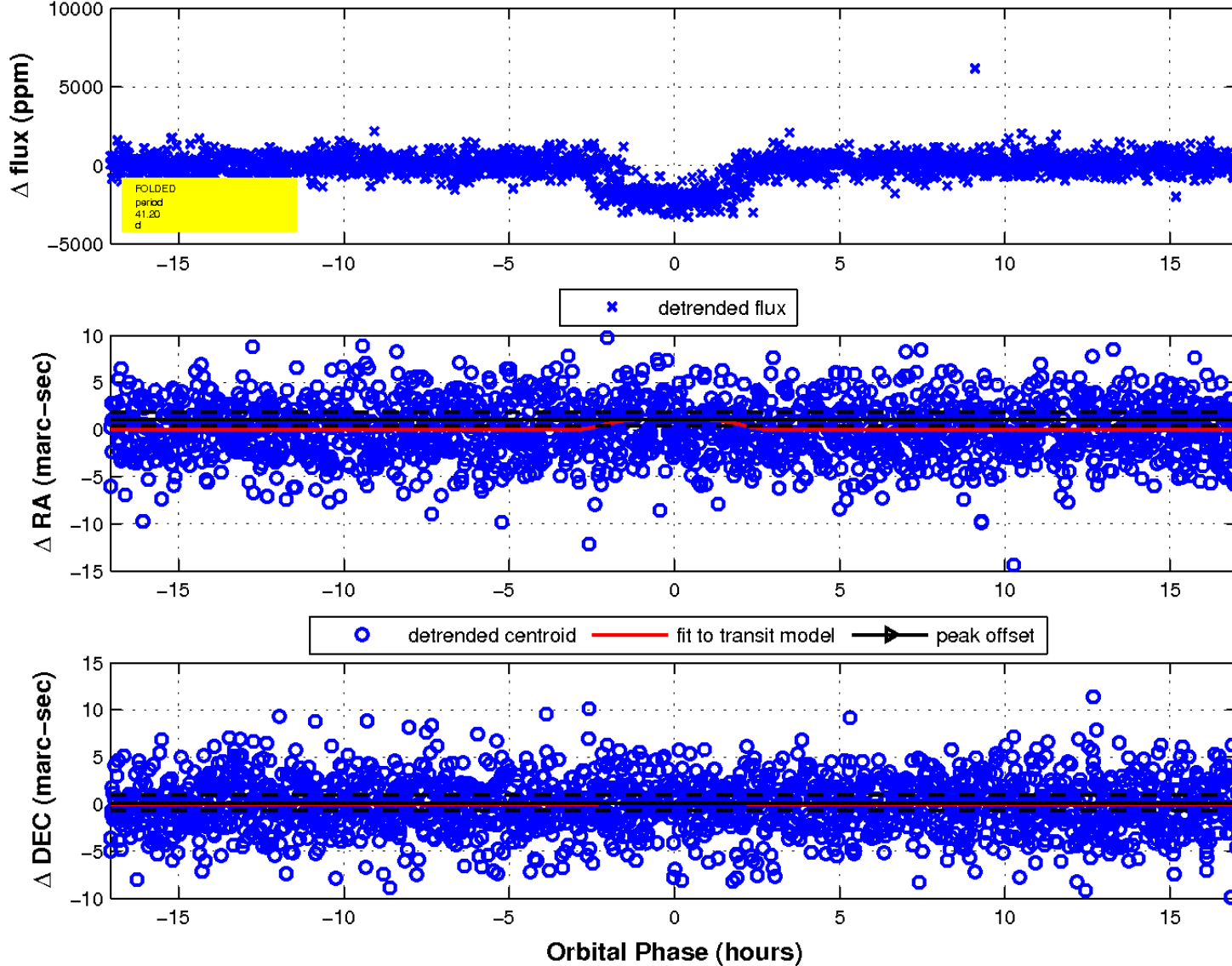
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

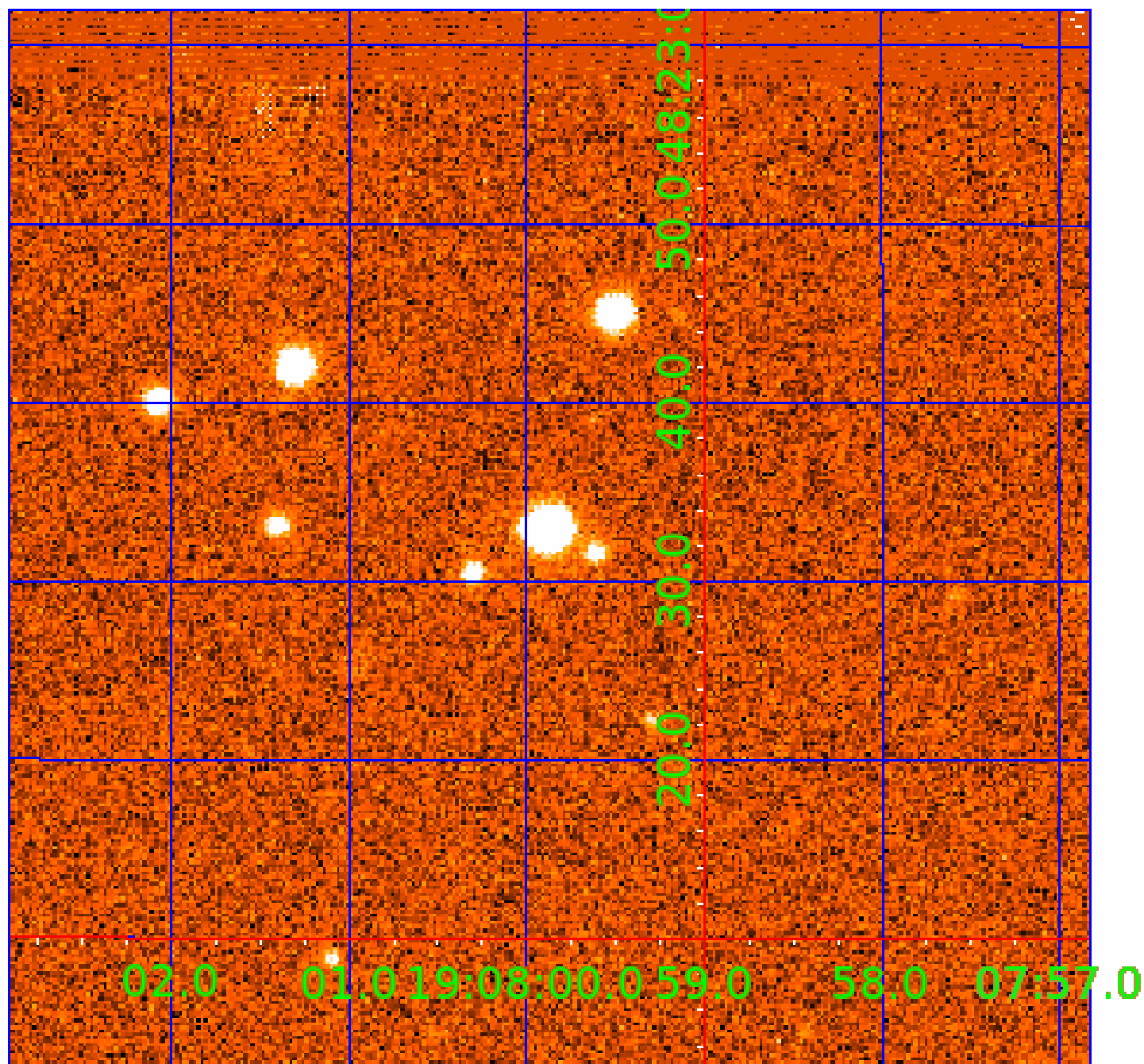


fluxWeightedCentroids, Planet 2 of 3



# UKIRT Image

Declination



# KIC 010910878

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010910878-01	OBS	0757.01	16.068637	141.485072	4895.0	3.694	137.4	133.2	0.85	5031	6.21	30.79
010910878-02	OBS	0757.02	41.196983	165.007264	2171.4	5.698	37.9	38.7	0.85	5031	4.95	8.78
010910878-03	OBS	0757.03	6.252962	133.782538	938.5	2.693	36.0	38.0	0.85	5031	2.87	108.39

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010910878-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
010910878-02	OBS	PC	0.99	0	0	0	0	NO_COMMENT
010910878-03	OBS	PC	1.00	0	0	0	0	NO_COMMENT

**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.

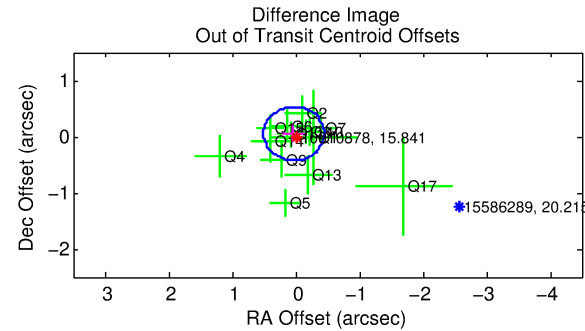
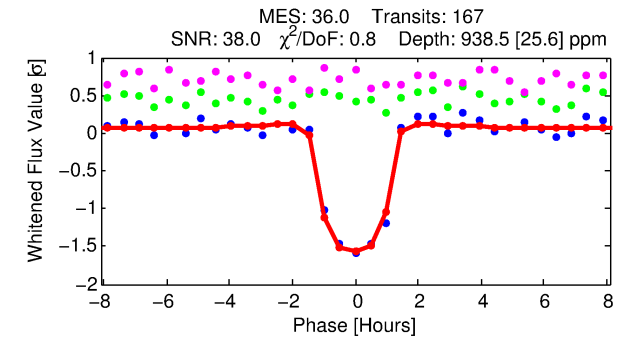
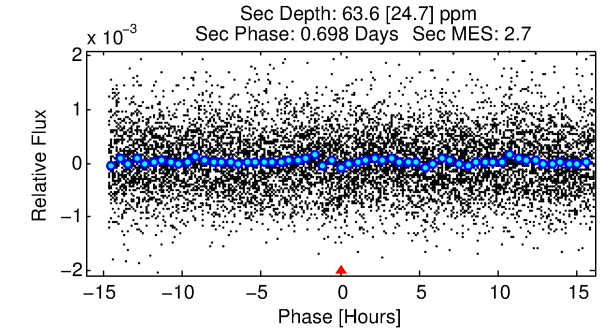
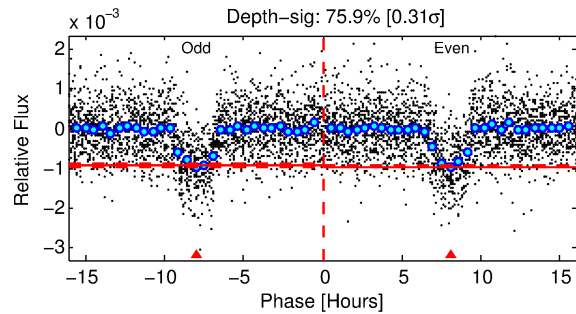
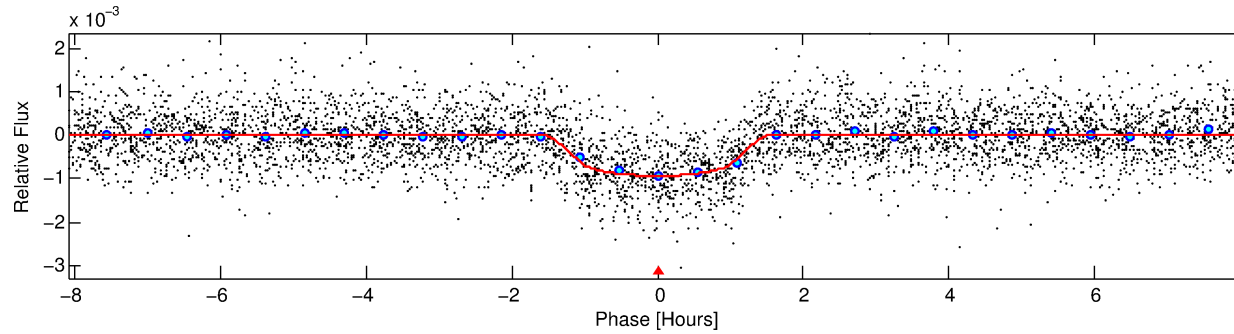
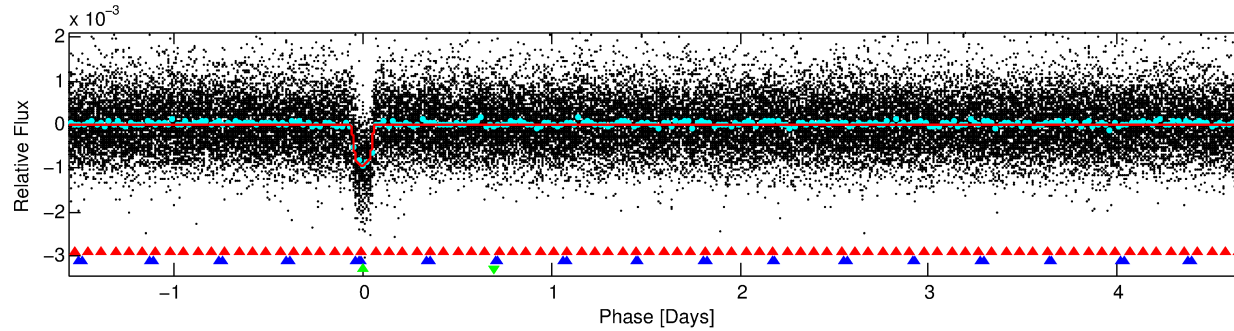
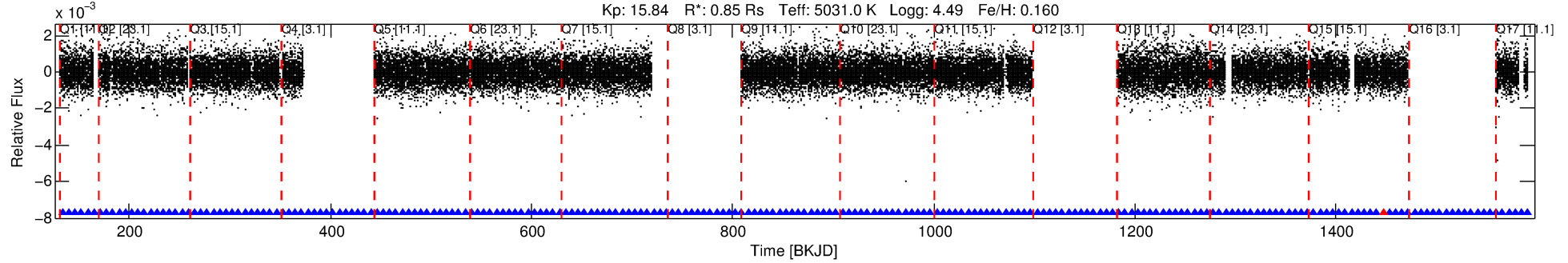
## Ephemeris Match Information For 010910878-03

No Significant Match Found

# DV One-Page Summary

KIC: 10910878 Candidate: 3 of 3 Period: 6.253 d  
KOI: K00757.03 Name: Kepler-229b Corr: 0.981

Kp: 15.84 R\*: 0.85 Rs Teff: 5031.0 K Logg: 4.49 Fe/H: 0.160



## DV Fit Results:

Period = 6.25296 [0.00001] d  
Epoch = 133.7825 [0.0013] BKJD  
Rp/R\* = 0.0310 [0.0089]  
a/R\* = 12.19 [12.09]  
b = 0.77 [0.54]  
Seff = 108.39 [16.72]  
Teq = 823 [32] K  
Rp = 2.87 [0.85] Re  
a = 0.0617 [0.0053] AU  
Ag = 16.24 [11.45] [1.33σ]  
Teffp = 2554 [443] K [3.89σ]

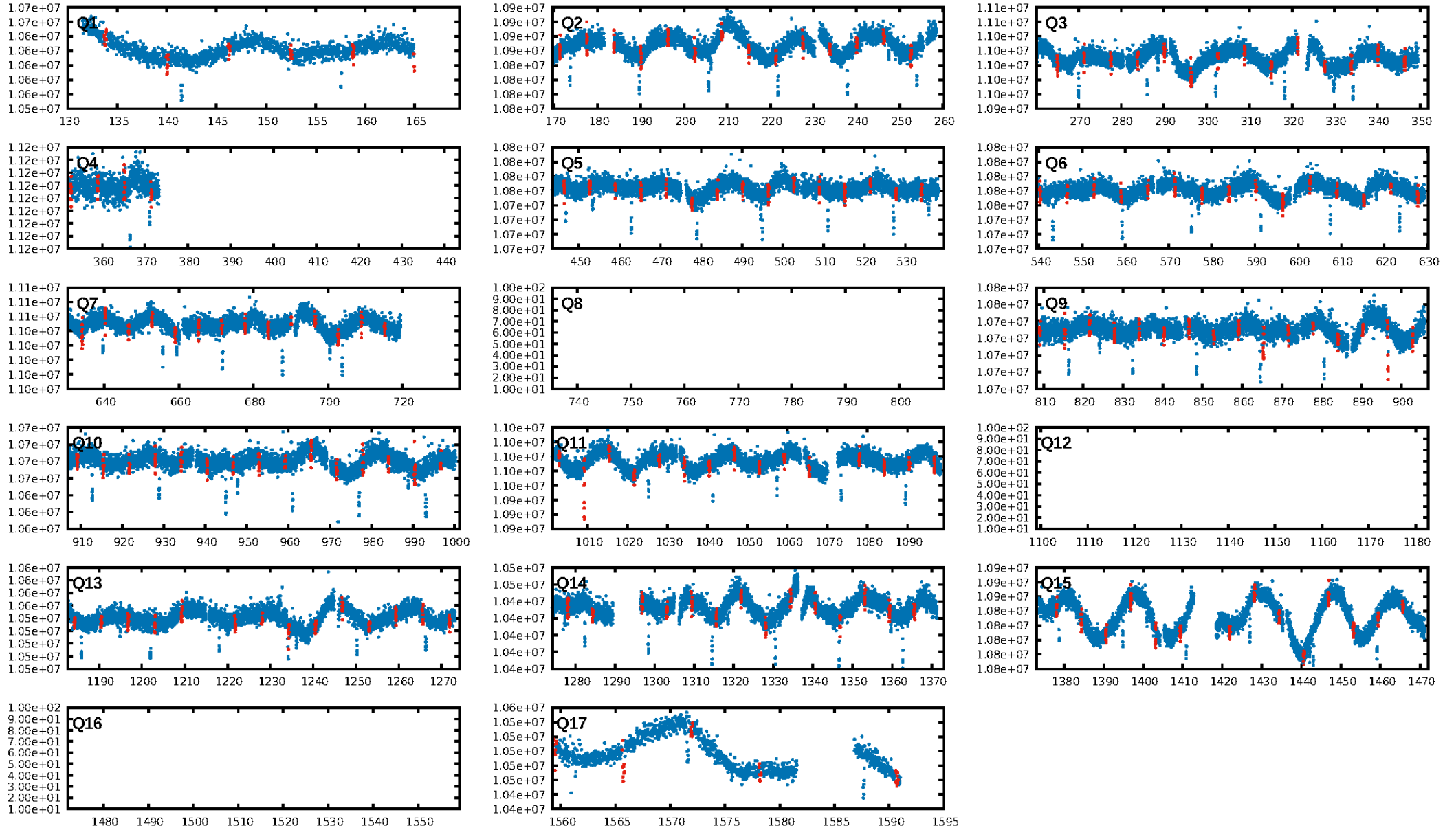
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [51.53σ]  
ModelChiSquare2-sig: 100.0%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 1.01e-271  
RollingBand-fgt: 0.99 [153/154]  
GhostDiagnostic-chr: 3.911  
Centroid-sig: 23.6%  
Centroid-so: 0.395 arcsec [1.16σ]  
OotOffset-rm: 0.059 arcsec [0.37σ]  
KicOffset-rm: 0.054 arcsec [0.42σ]  
OotOffset-st: 4/4/1/5 [14]  
KicOffset-st: 4/4/1/5 [14]  
DiffImageQuality-fgm: 1.00 [14/14]  
DiffImageOverlap-fno: 1.00 [14/14]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 03:41:32 Z

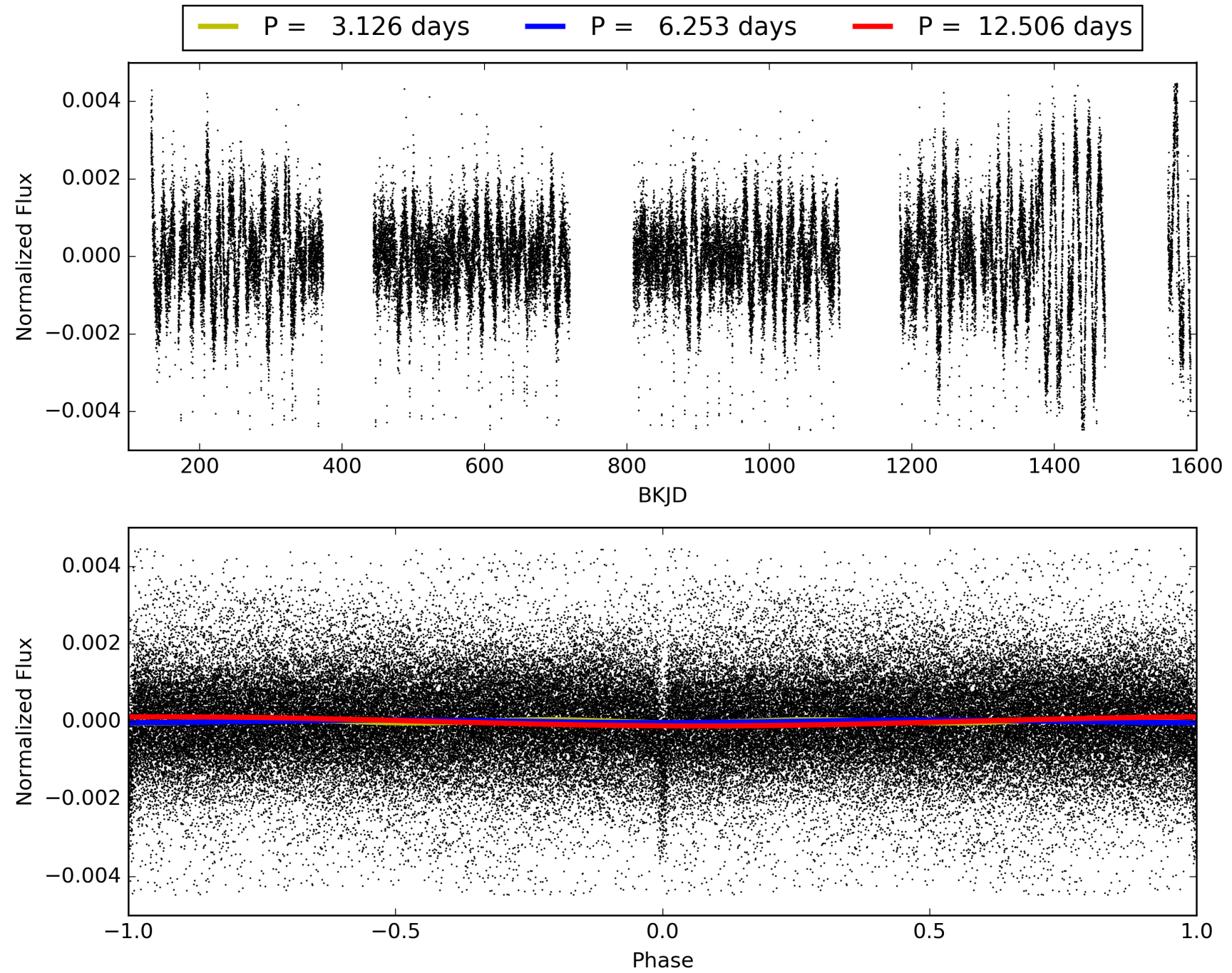
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 010910878-03, PDC Light Curves





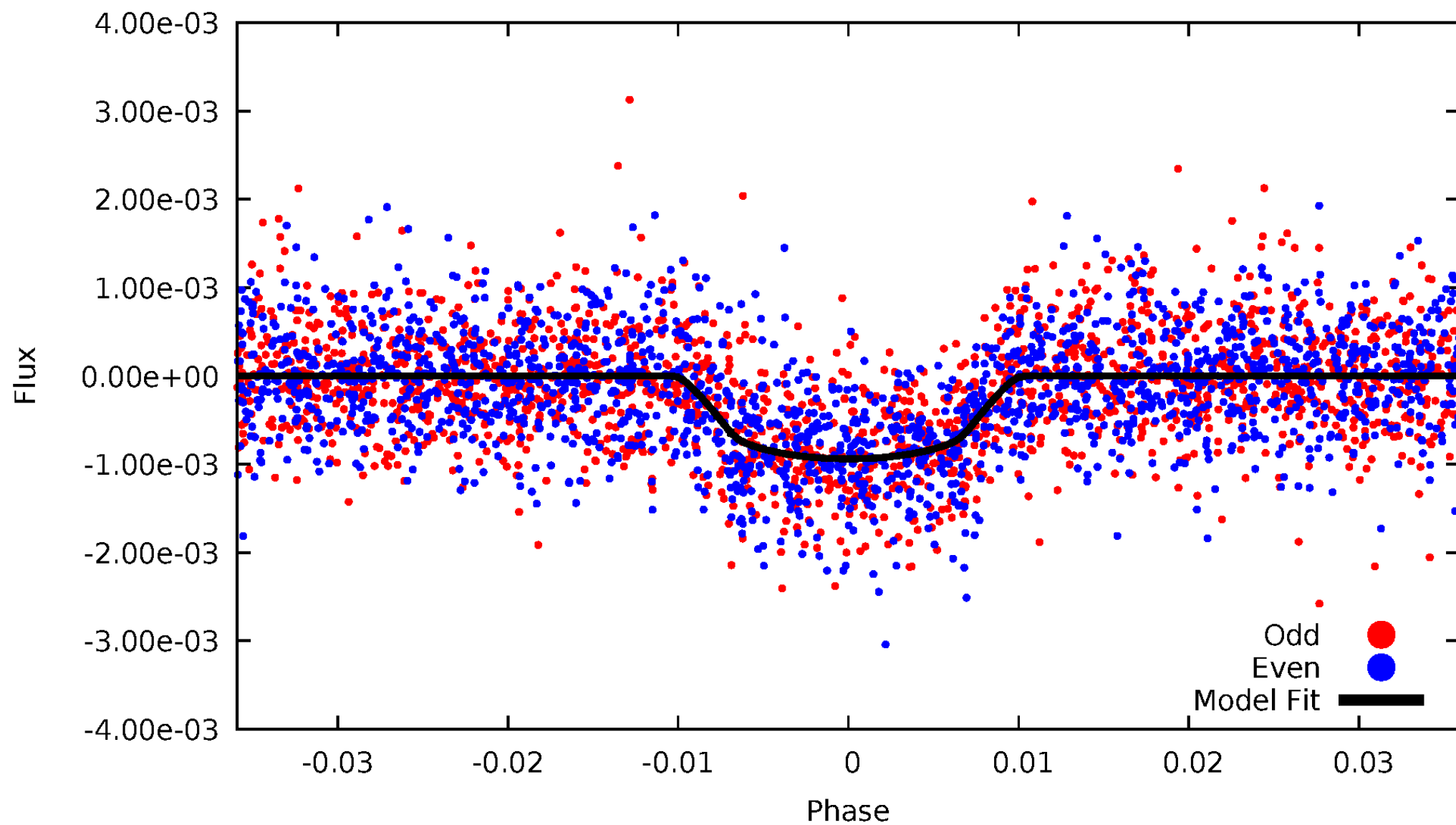
# TCE 010910878-03





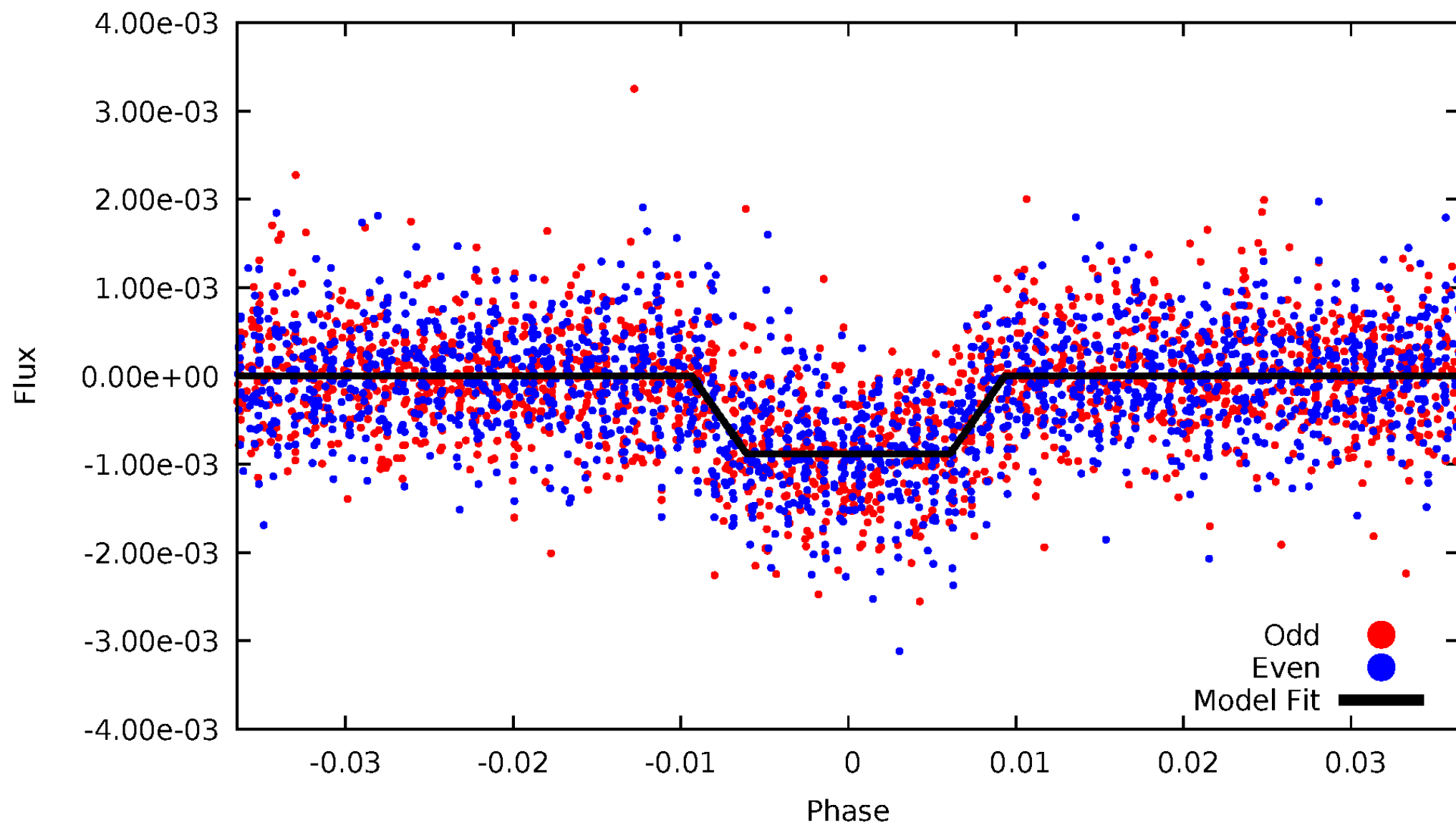
DV Odd/Even

TCE 010910878-03



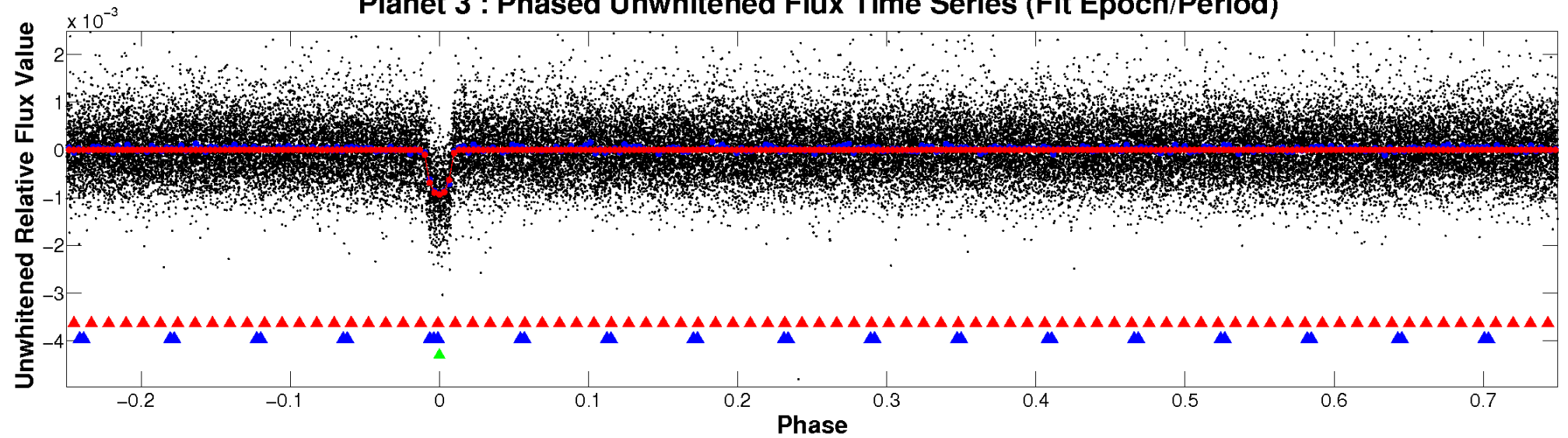
# ALT Odd/Even

TCE 010910878-03

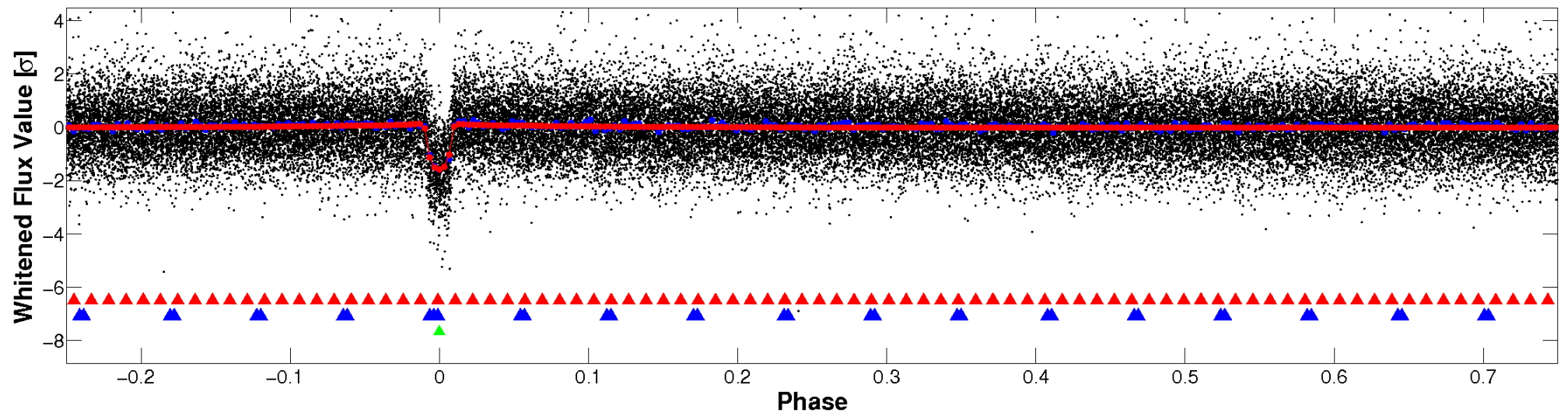


# Non-Whitened Vs. Whitened Light Curve

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

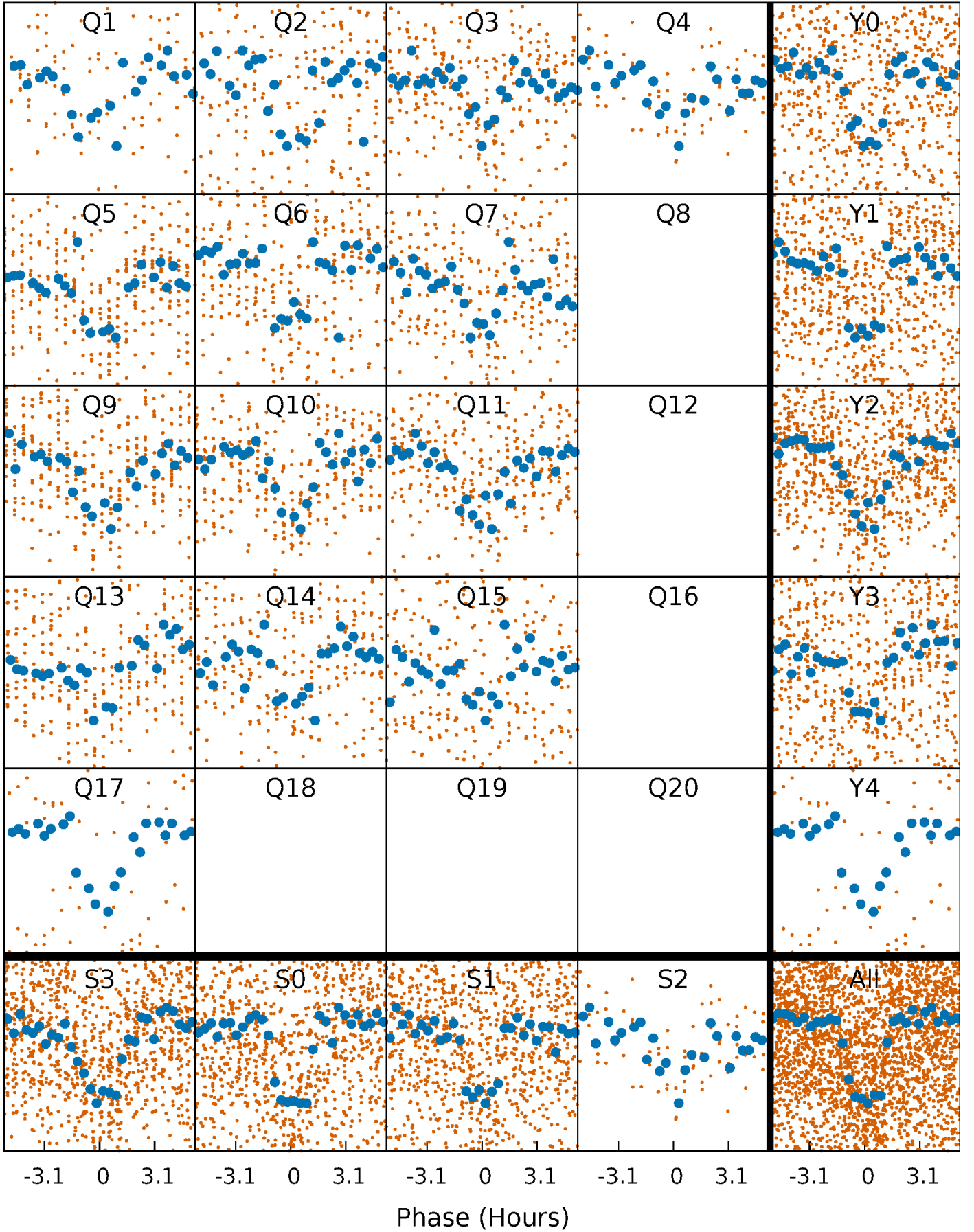


**Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



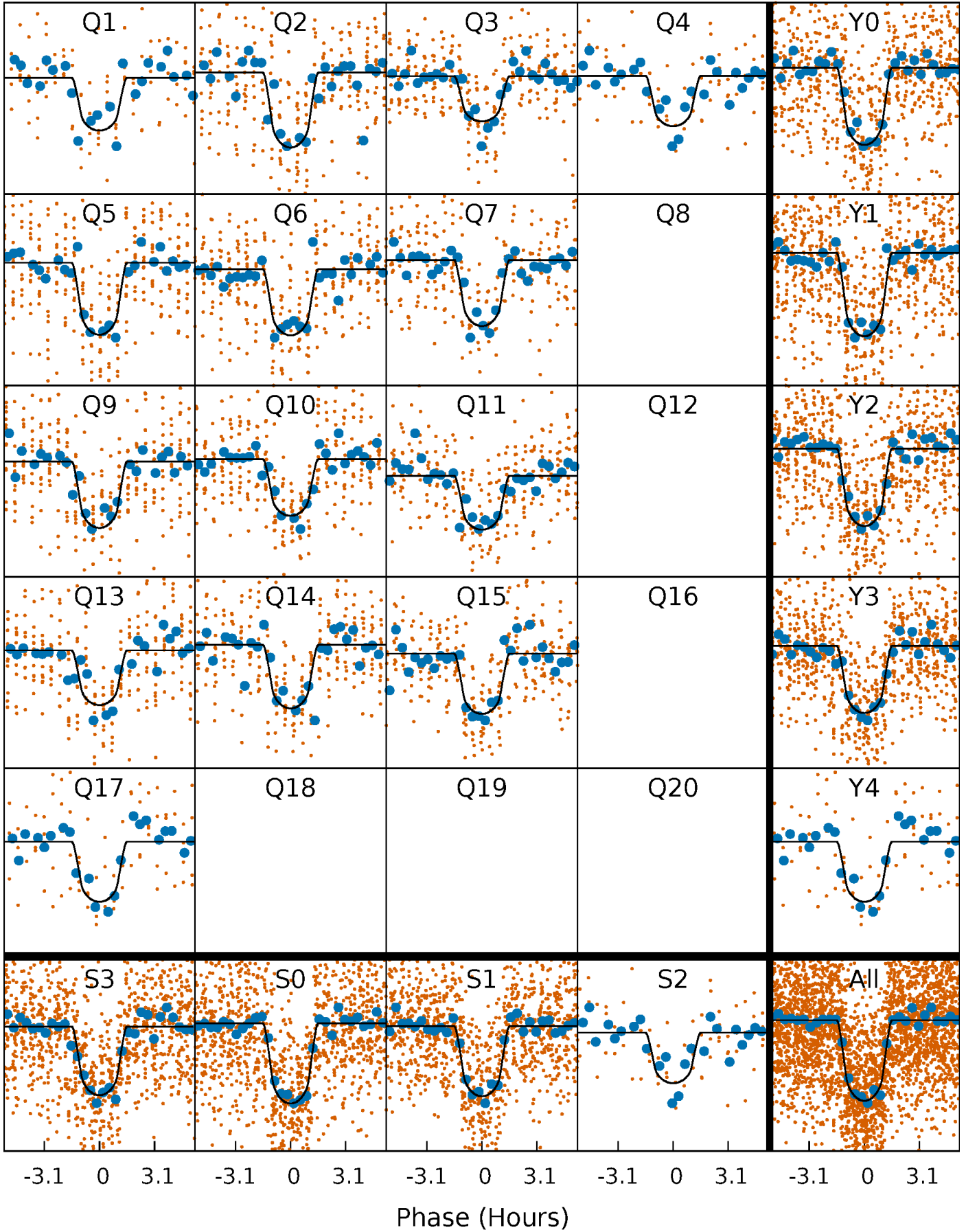
# PDC Quarter-Phased Transit Curves

TCE 010910878-03   P= 6.252962 Days    $T_0=133.782538$  (BKJD)



# DV Quarter-Phased Transit Curves

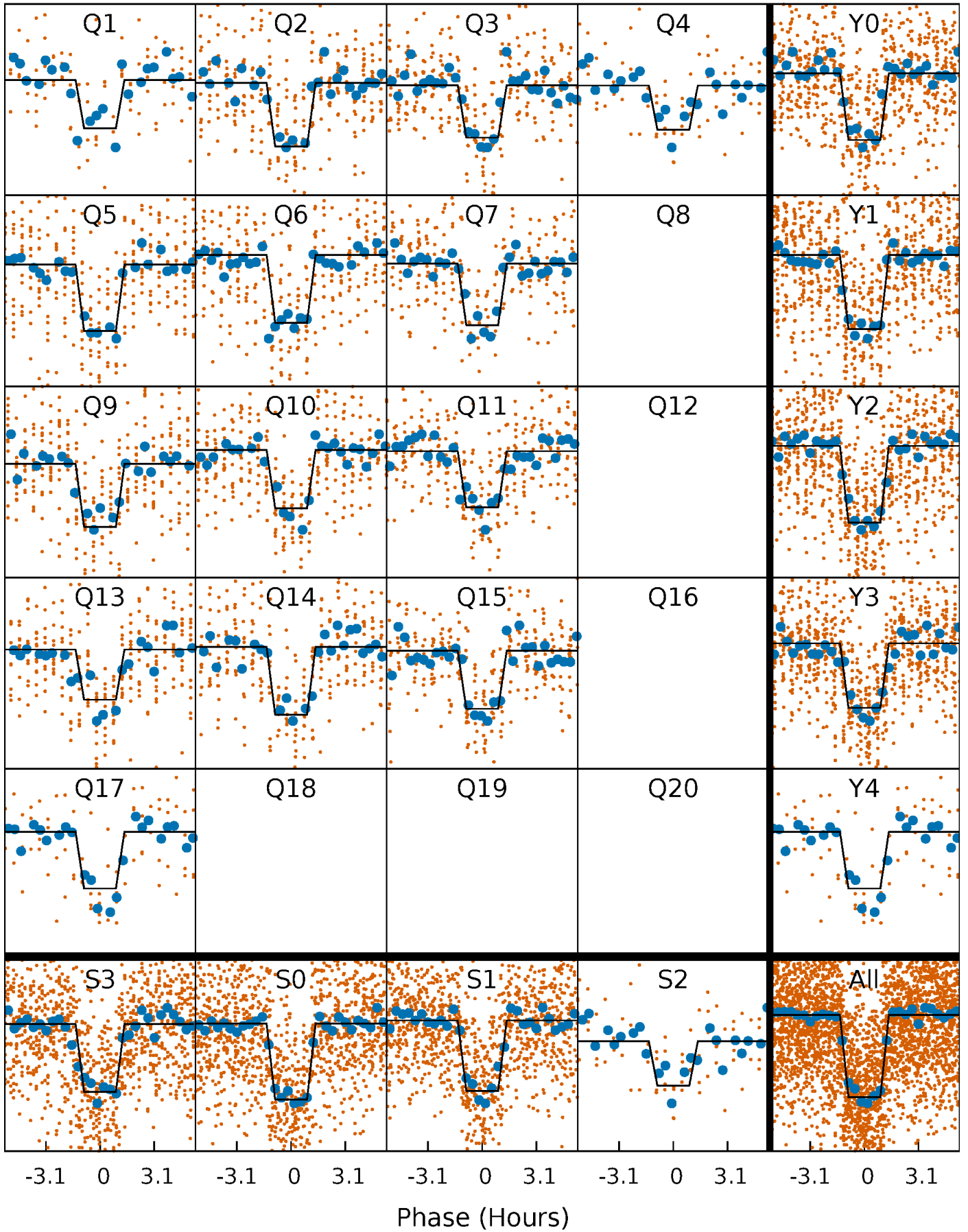
TCE 010910878-03 P= 6.252962 Days  $T_0=133.782538$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

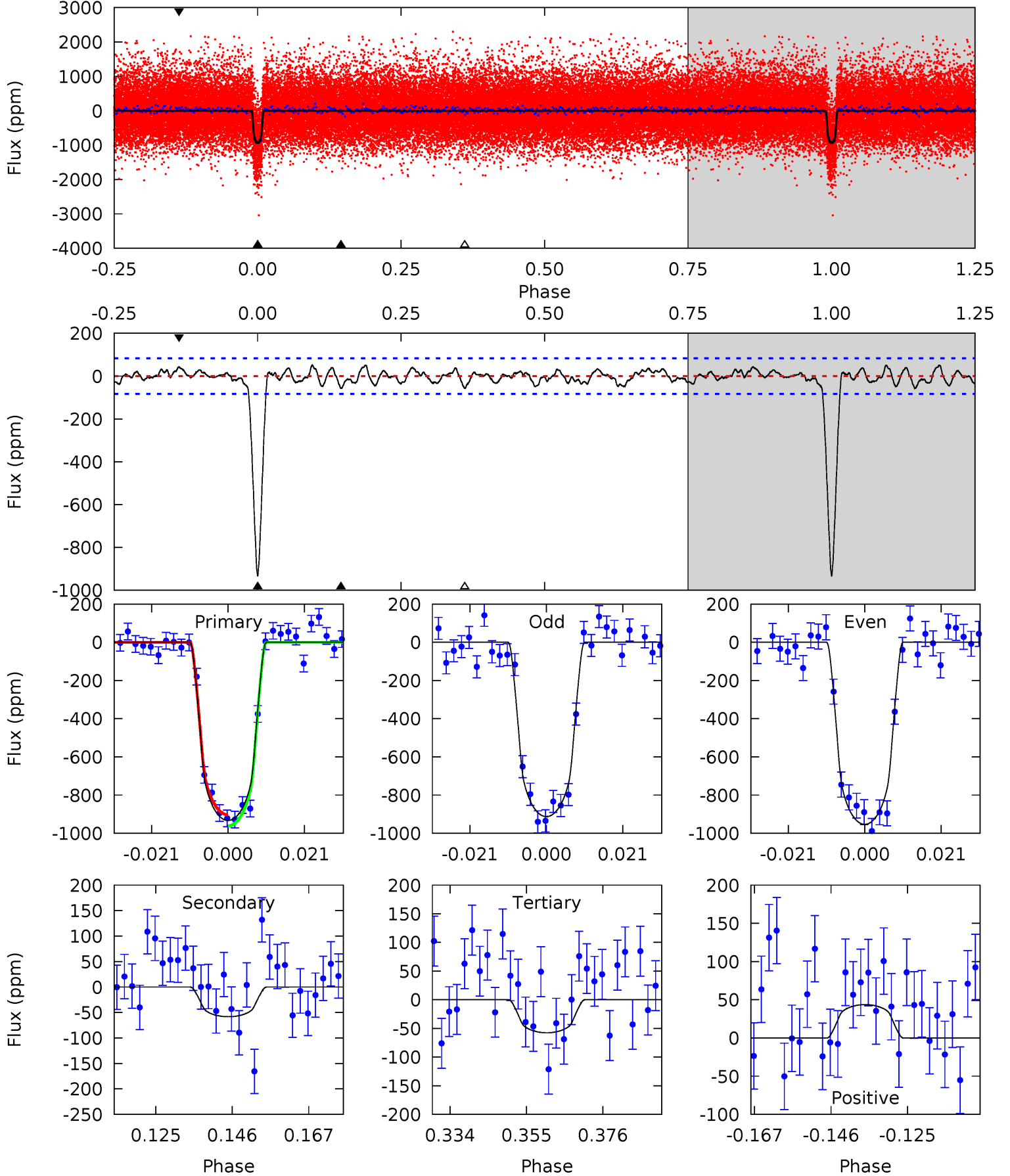
TCE 010910878-03 P= 6.252907 Days  $T_0=133.789582$  (BKJD)



# DV Model-Shift Uniqueness Test

010910878-03, P = 6.252962 Days, E = 127.529576 Days

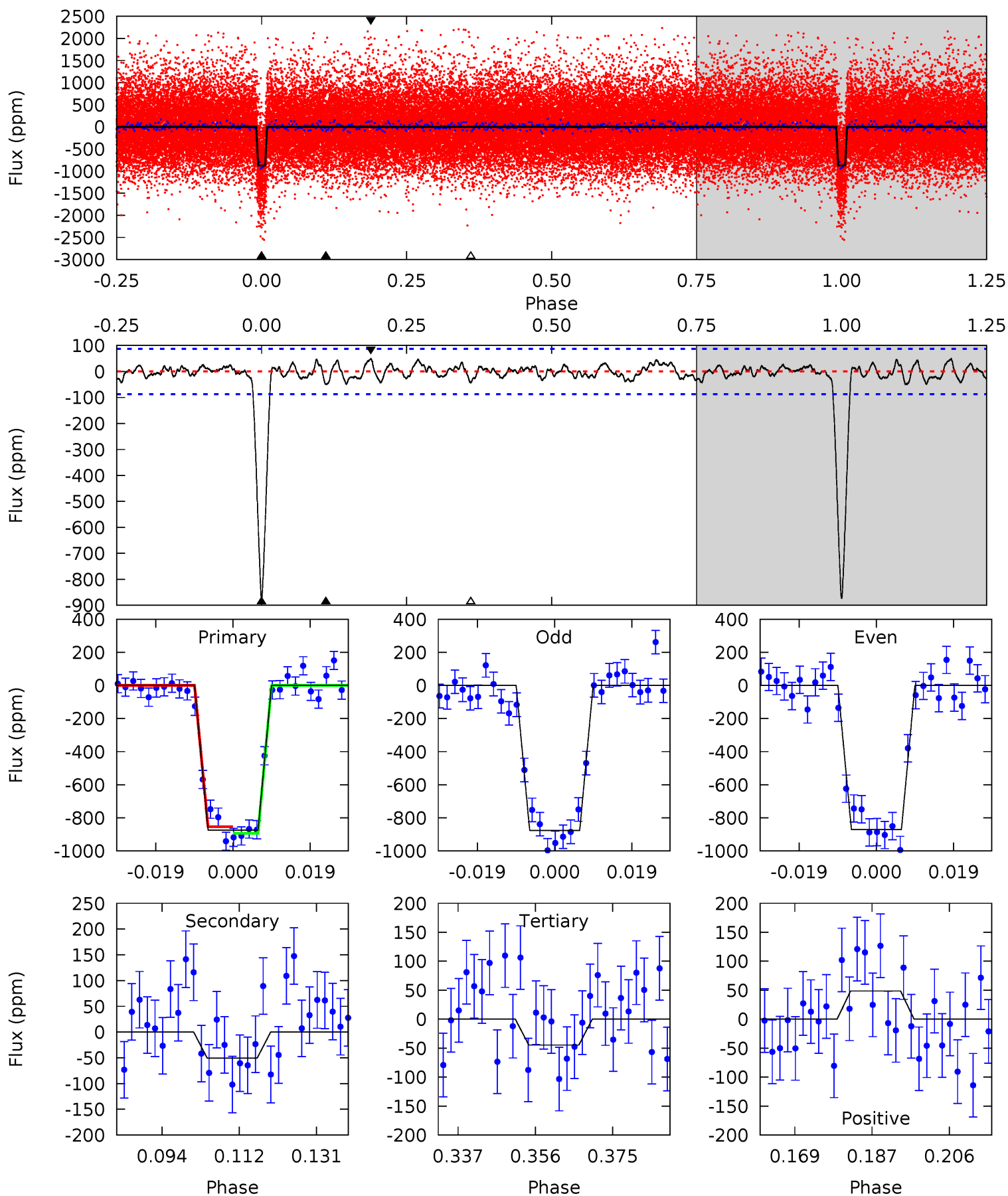
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
54.8	3.42	3.38	2.56	4.88	2.31	1.27	51.4	52.2	0.04	0.86	1.19	1.00	0.05	1.71



# Alt Model-Shift Uniqueness Test

010910878-03, P = 6.252907 Days, E = 127.536675 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
49.1	2.83	2.51	2.73	4.90	2.35	1.08	46.6	46.4	0.33	0.10	0.14	0.98	0.05	1.14





### Stellar Parameters For KIC 010910878

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5031^{+75}_{-83}$	$4.485^{+0.083}_{-0.028}$	$0.160^{+0.150}_{-0.150}$	$0.848^{+0.033}_{-0.072}$	$0.801^{+0.052}_{-0.030}$	$1.852^{+0.592}_{-0.164}$
	+1%/-2%	+2%/-1%	+94%/-94%	+4%/-8%	+6%/-4%	+32%/-9%
Source	SPE90	SPE90	SPE90	DSEP		

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

### Secondary Eclipse Parameters for KIC 010910878-03 / KOI 0757.03

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-58 \pm 17$	$2.84^{+0.90}_{-0.77}$	$1143^{+26}_{-33}$	$3069^{+368}_{-263}$	$15^{+16}_{-7}$
Alt.	$-50 \pm 18$	$2.76^{+0.81}_{-0.75}$	$1140^{+26}_{-30}$	$3026^{+339}_{-279}$	$14^{+14}_{-7}$

$T_{\text{max}}$  = Theoretical Maximum Planetary Temperature

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

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

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

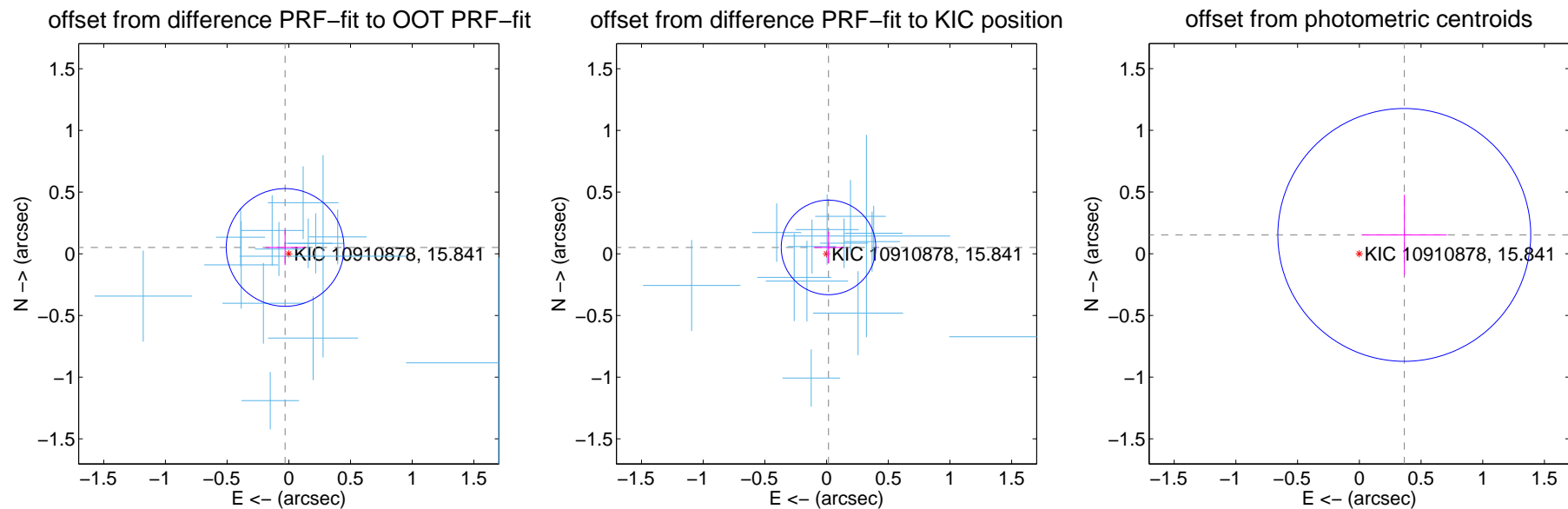
## DV Centroid Data

Supplemental centroid analysis for 010910878-03. Kepler magnitude: 15.84. Transit SNR 37.99

There are 14 quarters with good PRF difference image offsets

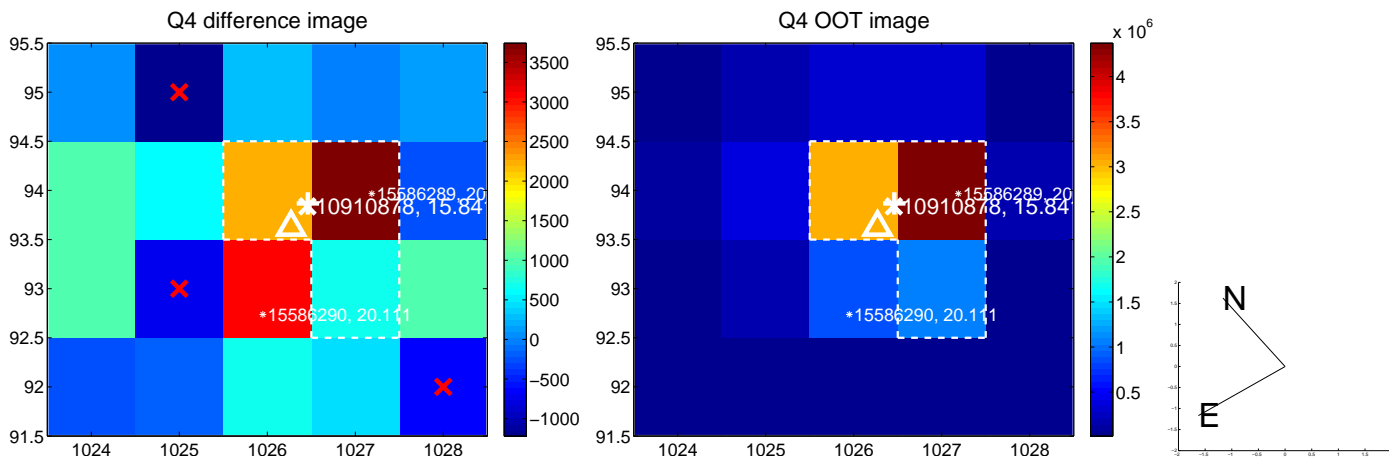
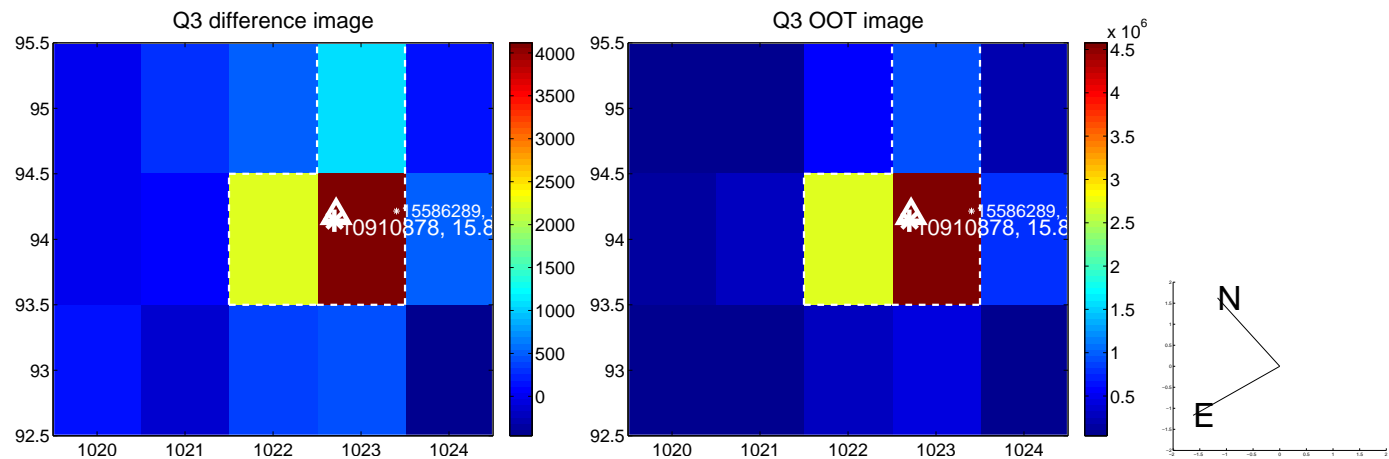
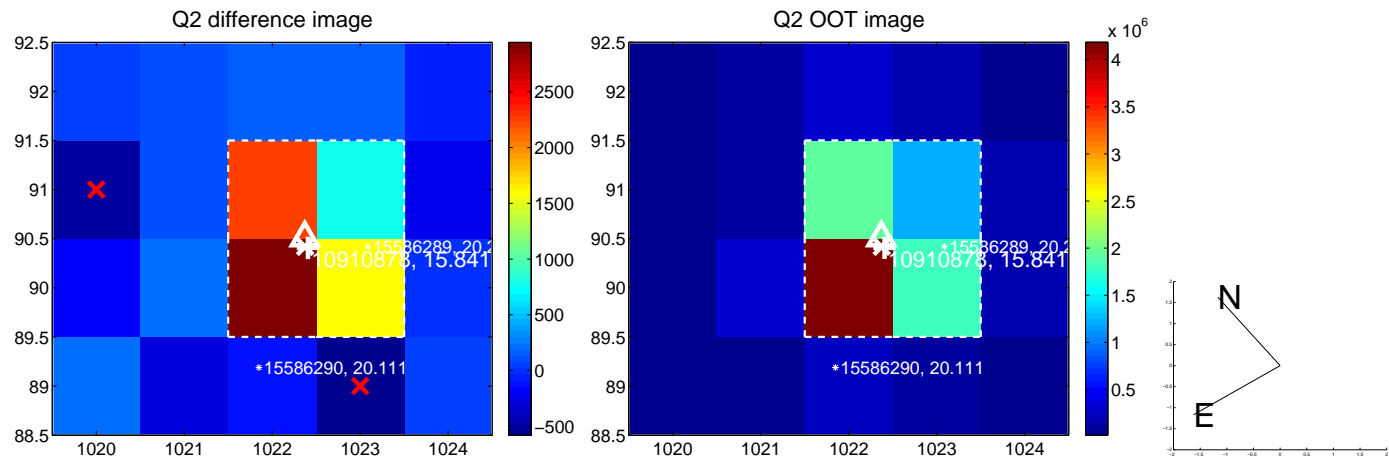
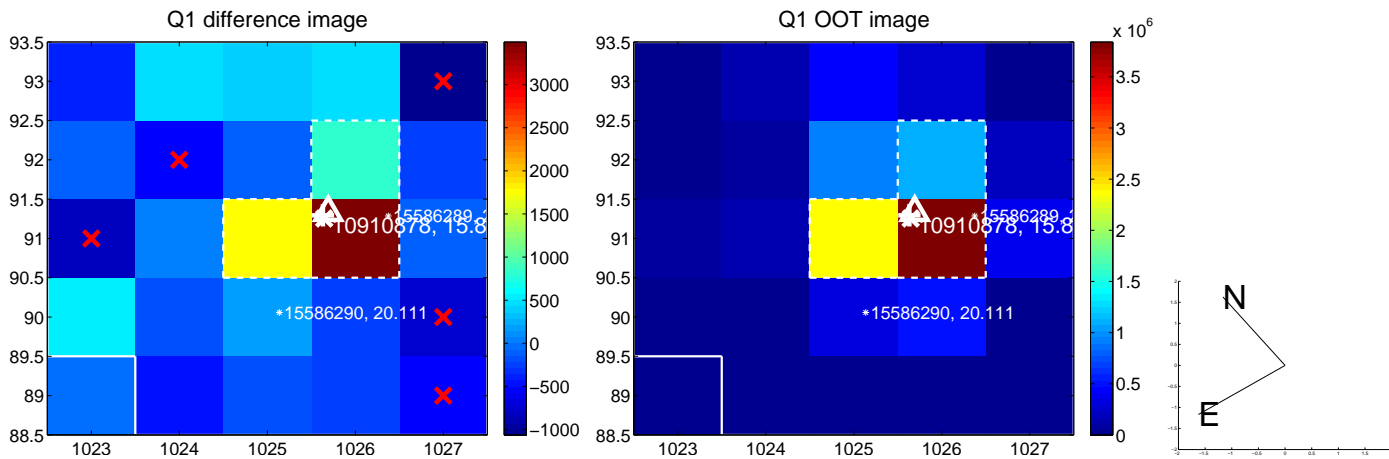
The direct PRF centroid is offset from the target star catalog position by about 0.22 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.059 \pm 0.159$	0.37	$0.030 \pm 0.160$	$0.051 \pm 0.143$
PRF-fit source offset from KIC position	$0.054 \pm 0.128$	0.42	$-0.016 \pm 0.120$	$0.052 \pm 0.128$
photometric centroid source offset	$0.40 \pm 0.34$	1.16	$-0.36 \pm 0.34$	$0.15 \pm 0.33$

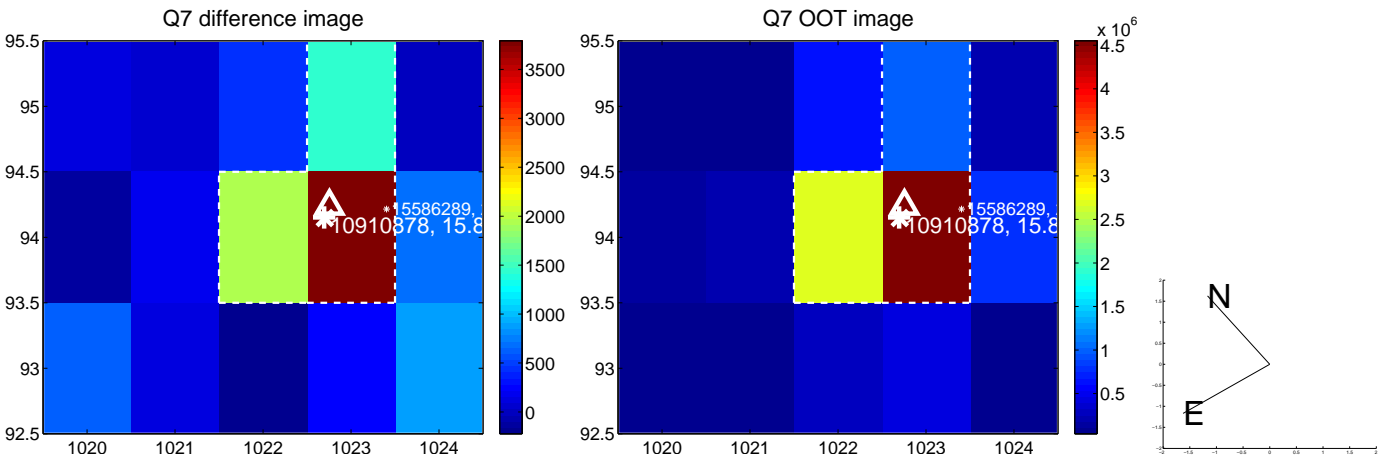
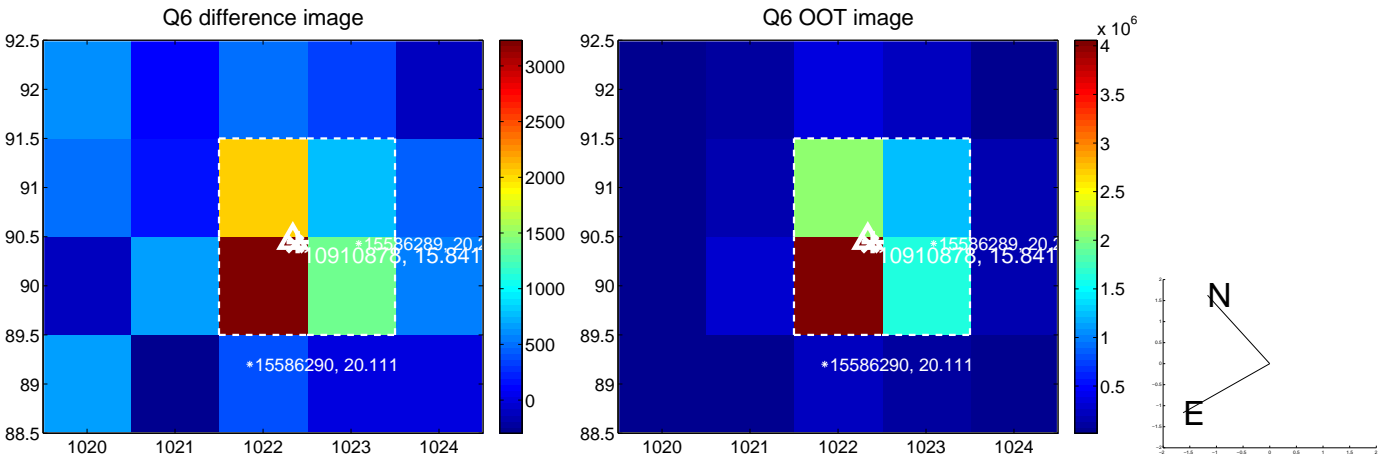
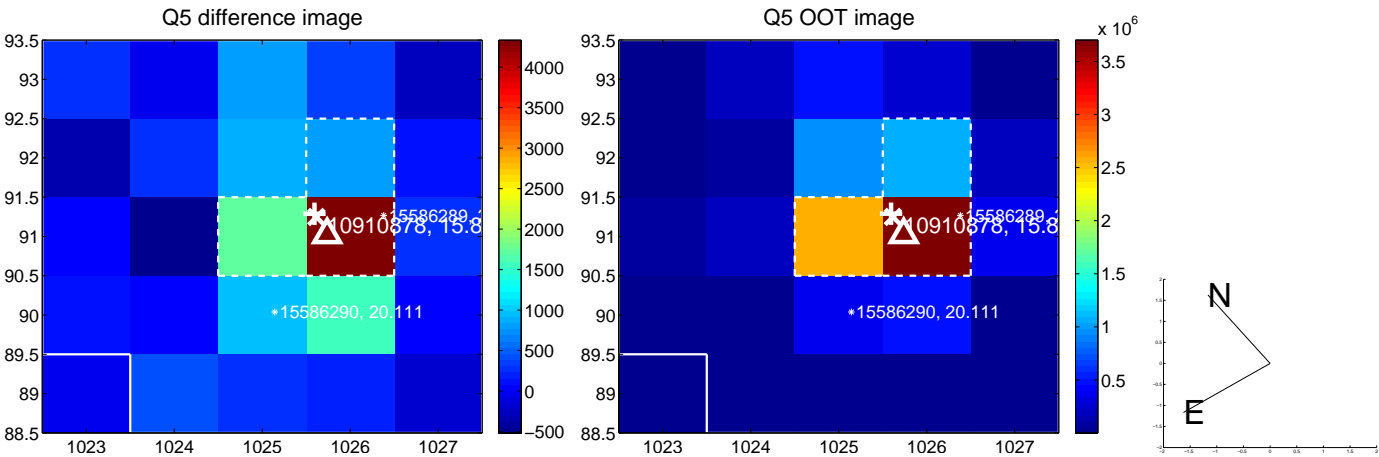


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

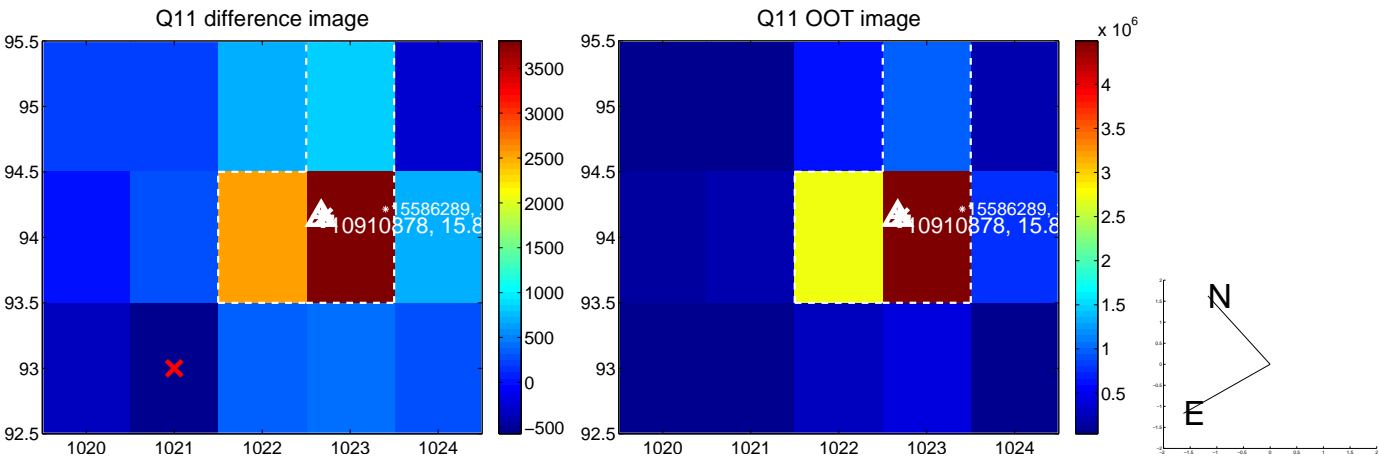
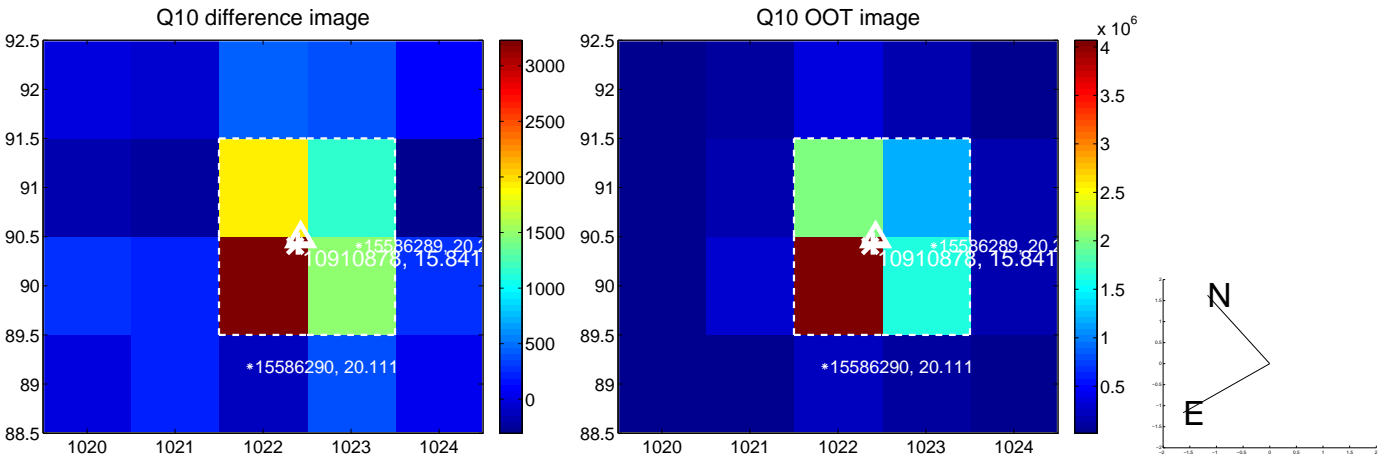
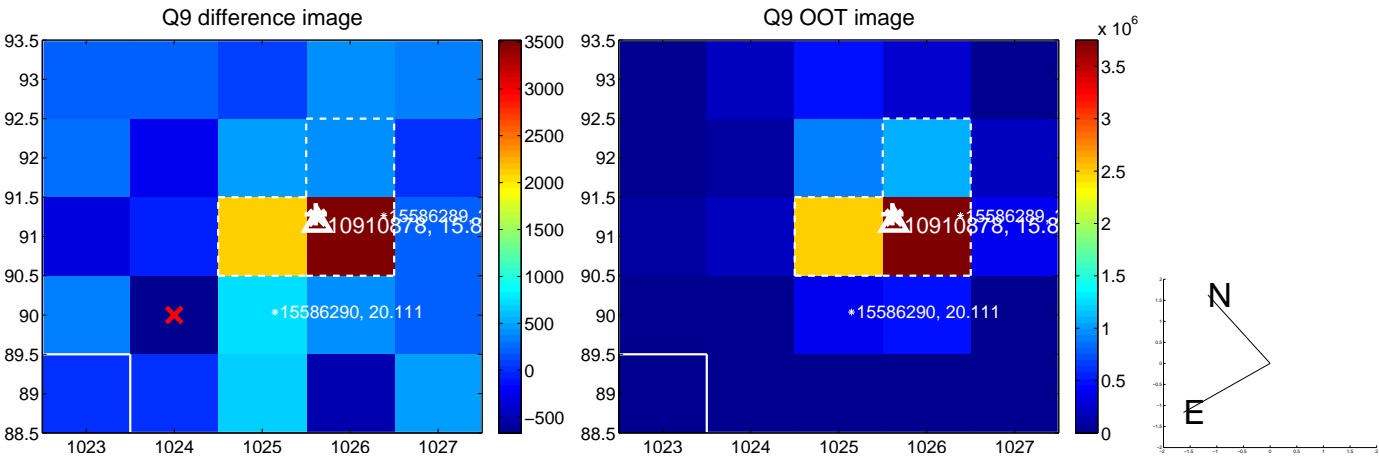
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



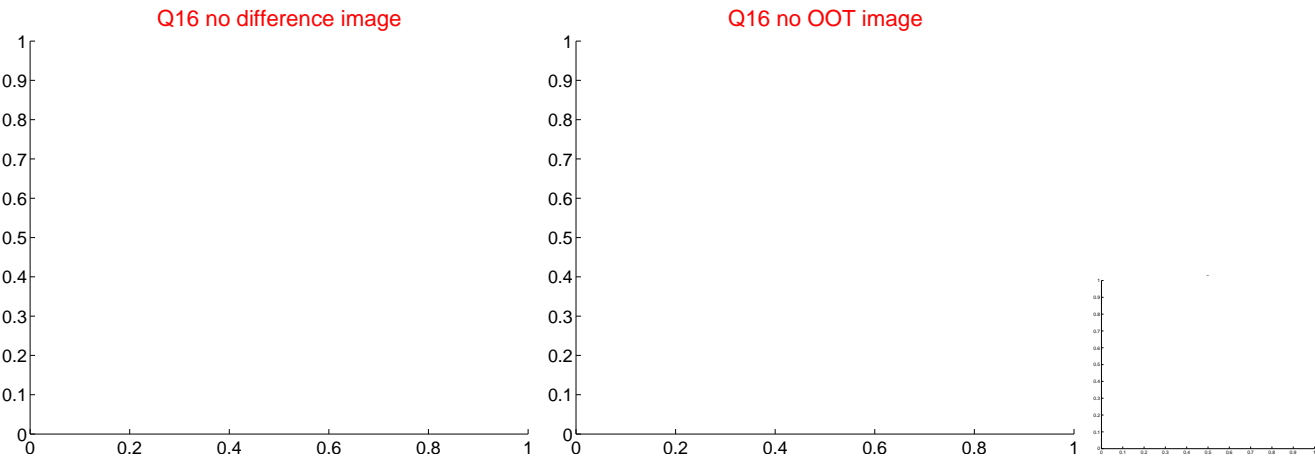
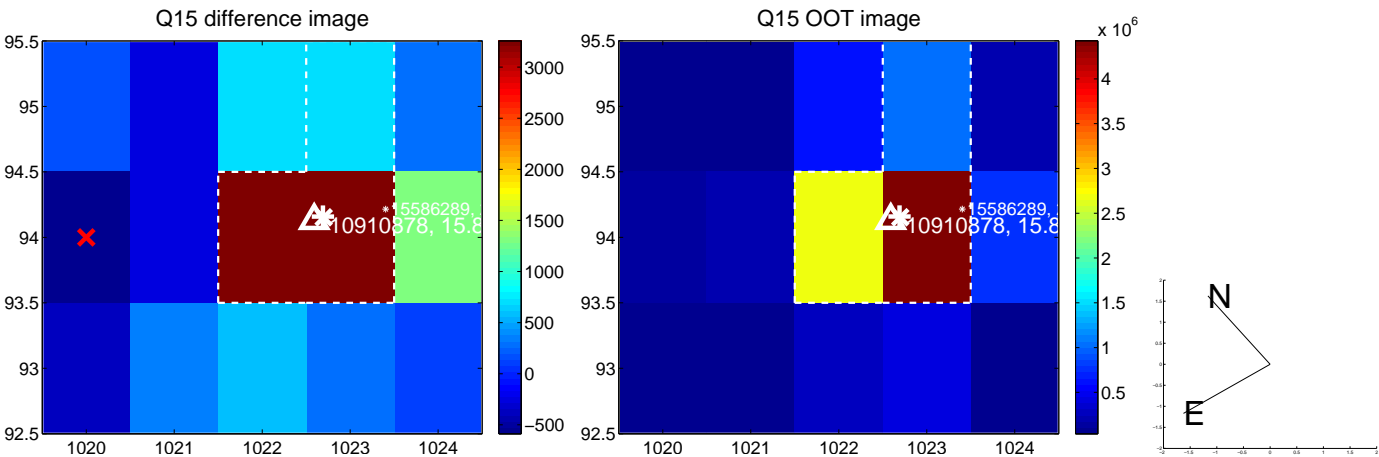
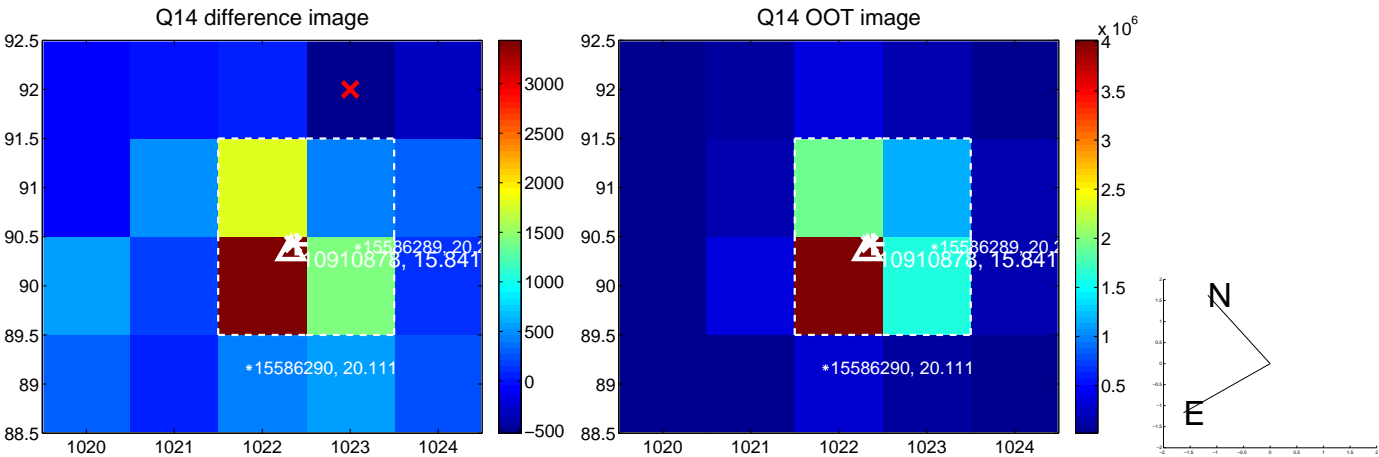
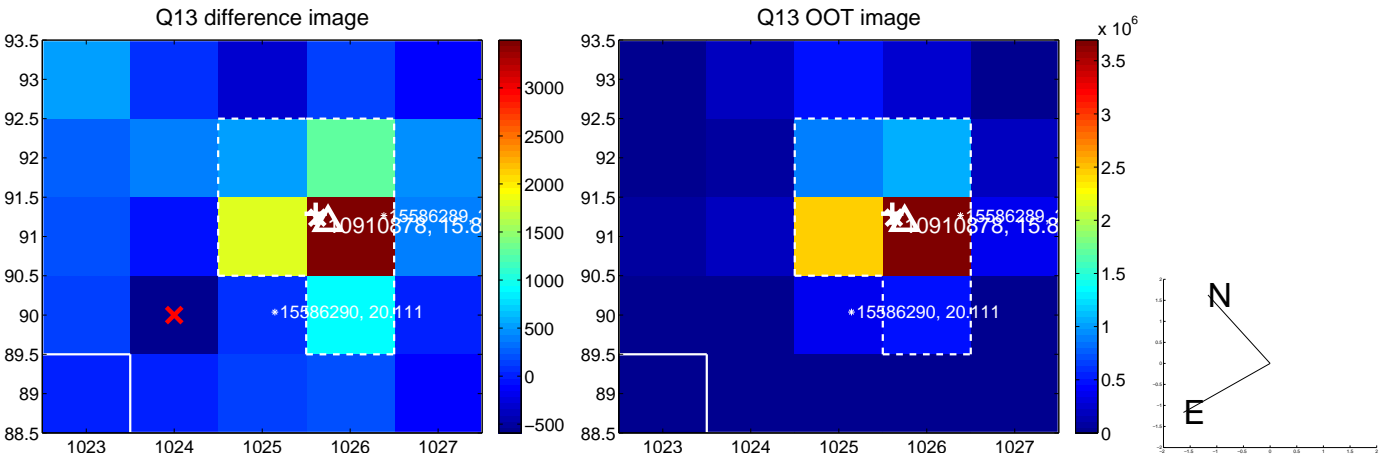
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



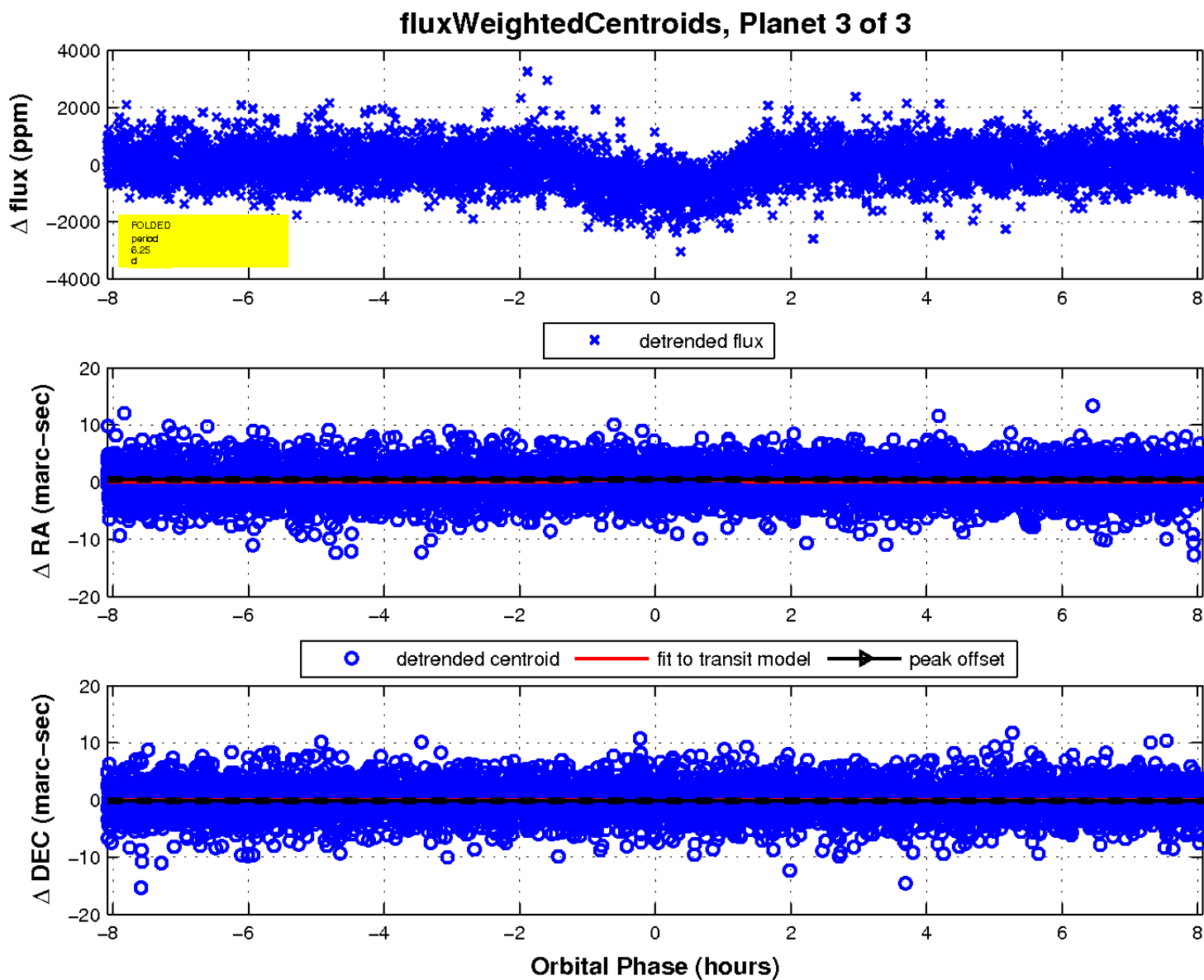
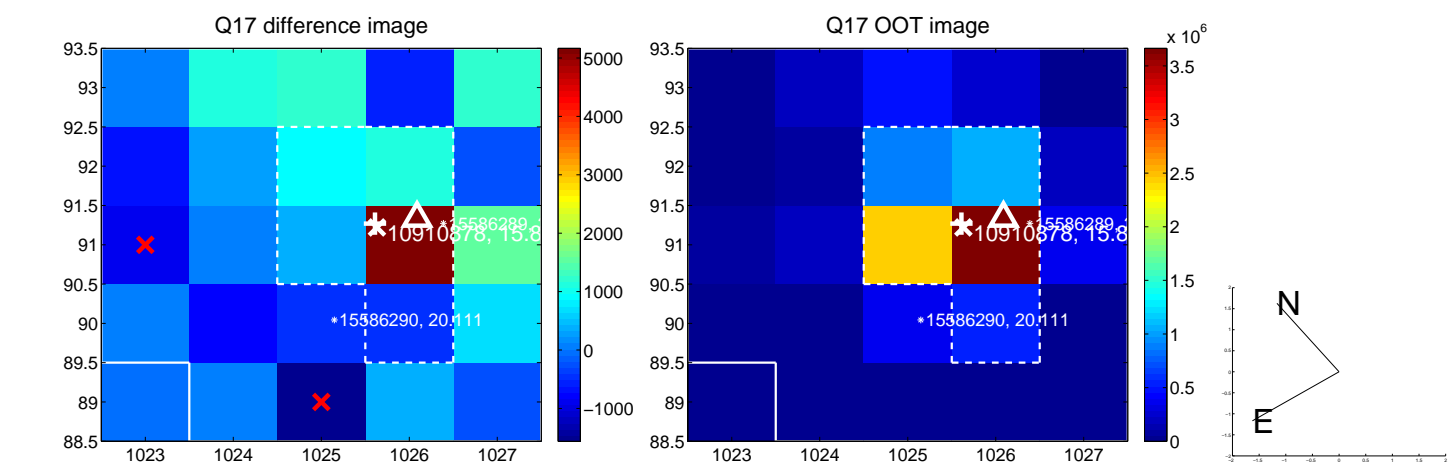
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



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



UKIRT Image

Declination

