

# KIC 005456359

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005456359-01	OBS	No	7.458907	138.217659	37.1	22.785	10.6	13.6	1.65	5892	1.17	525.06
005456359-02	OBS	No	7.462029	133.499638	26.3	16.059	8.0	9.0	1.65	5892	0.84	524.77

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005456359-01	OBS	FP	0.00	1	0	0	0	LPP_DV
005456359-02	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—SAME_NTL_PERIOD—CENT_FEW_DIFFS

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

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

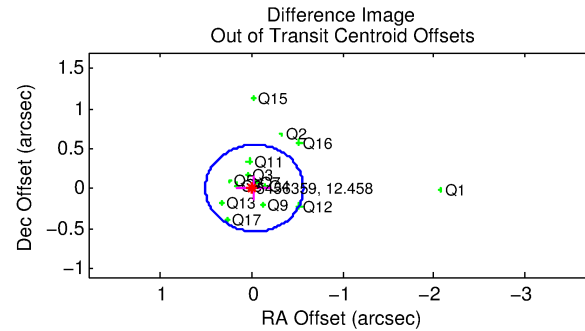
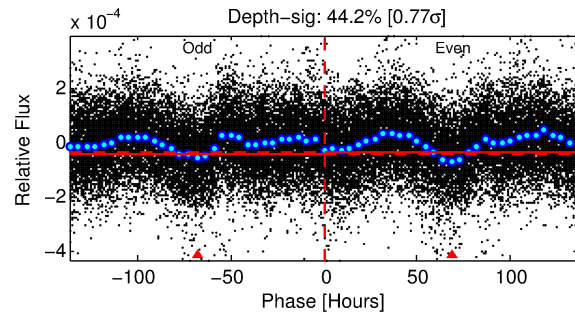
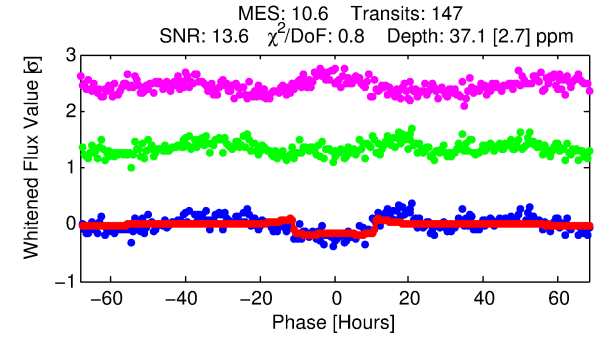
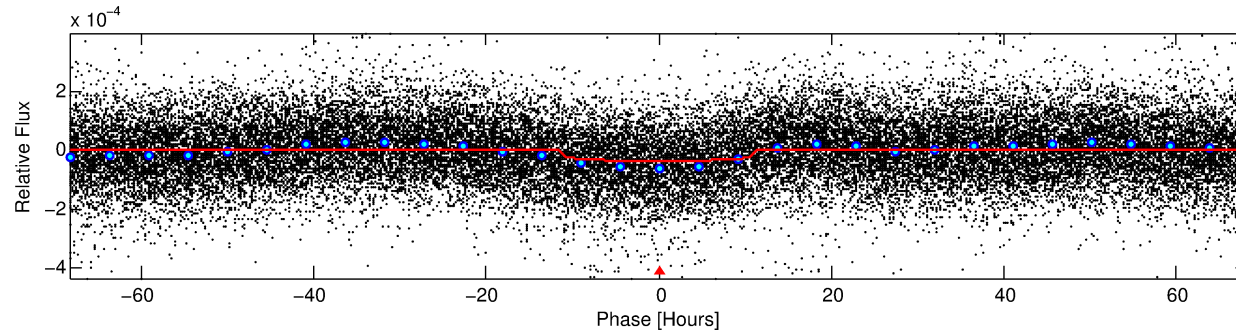
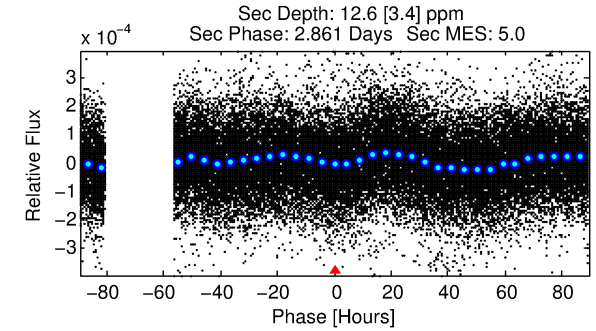
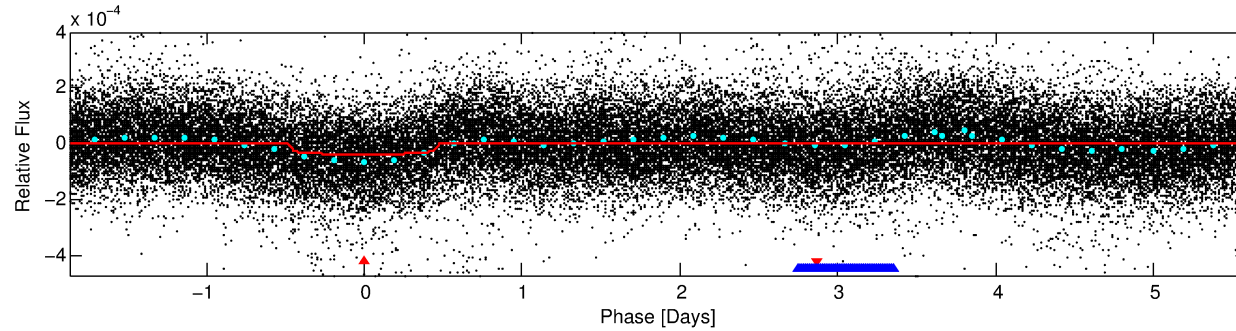
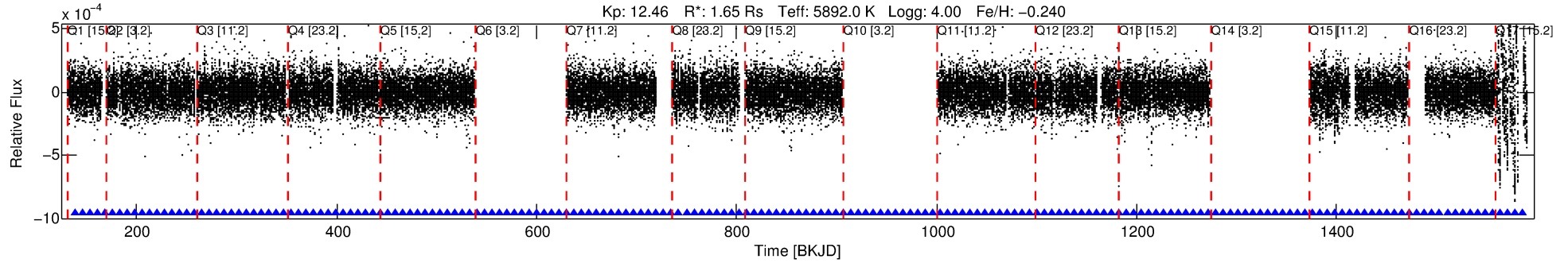
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 005456359-01

No Significant Match Found

# DV One-Page Summary

KIC: 5456359 Candidate: 1 of 2 Period: 7.459 d



## DV Fit Results:

Period = 7.45891 [0.00011] d  
Epoch = 138.2177 [0.0112] BKJD  
Rp/R\* = 0.0065 [0.0005]  
a/R\* = 1.53 [0.32]  
b = 0.88 [0.09]  
Seff = 525.06 [270.52]  
Teff = 1221 [157] K  
Rp = 1.17 [0.38] Re  
a = 0.0749 [0.0233] AU  
Ag = 28.50 [17.01] [1.62σ]  
Teffp = 4360 [362] K [7.95σ]

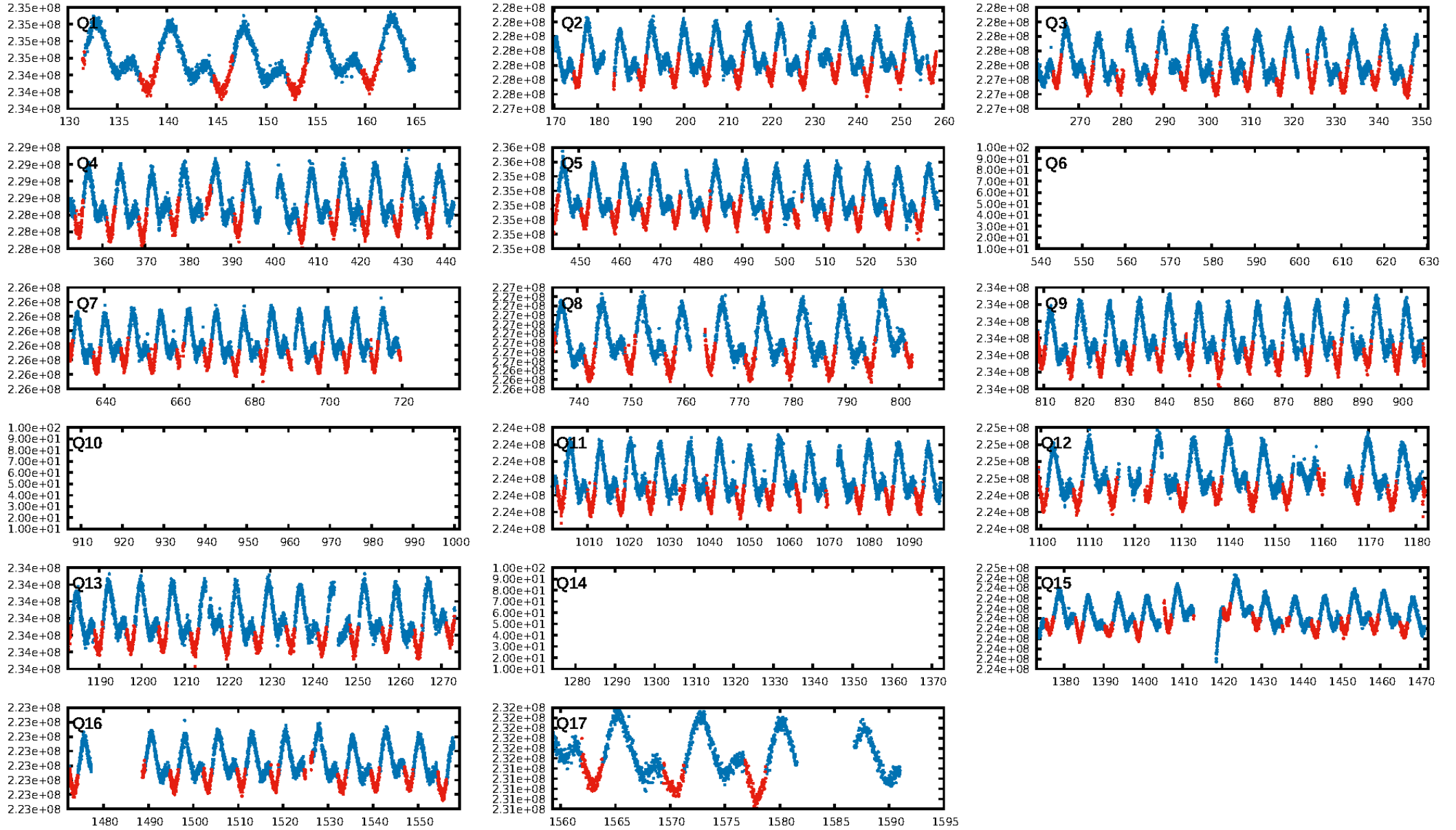
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.2% [0.00σ]  
ModelChiSquare2-sig: 99.8%  
ModelChiSquareGoF-sig: 100.0%  
Bootstrap-pfa: 3.94e-21  
RollingBand-fgt: 1.00 [140/140]  
GhostDiagnostic-chr: 0.7106  
Centroid-sig: 0.0%  
Centroid-so: 1.951 arcsec [3.32σ]  
OotOffset-rm: 0.030 arcsec [0.16σ]  
KicOffset-rm: 0.020 arcsec [0.14σ]  
OotOffset-st: 1/4/4/5 [14]  
KicOffset-st: 1/4/4/5 [14]  
DiffImageQuality-fgm: 1.00 [14/14]  
DiffImageOverlap-fno: 1.00 [14/14]

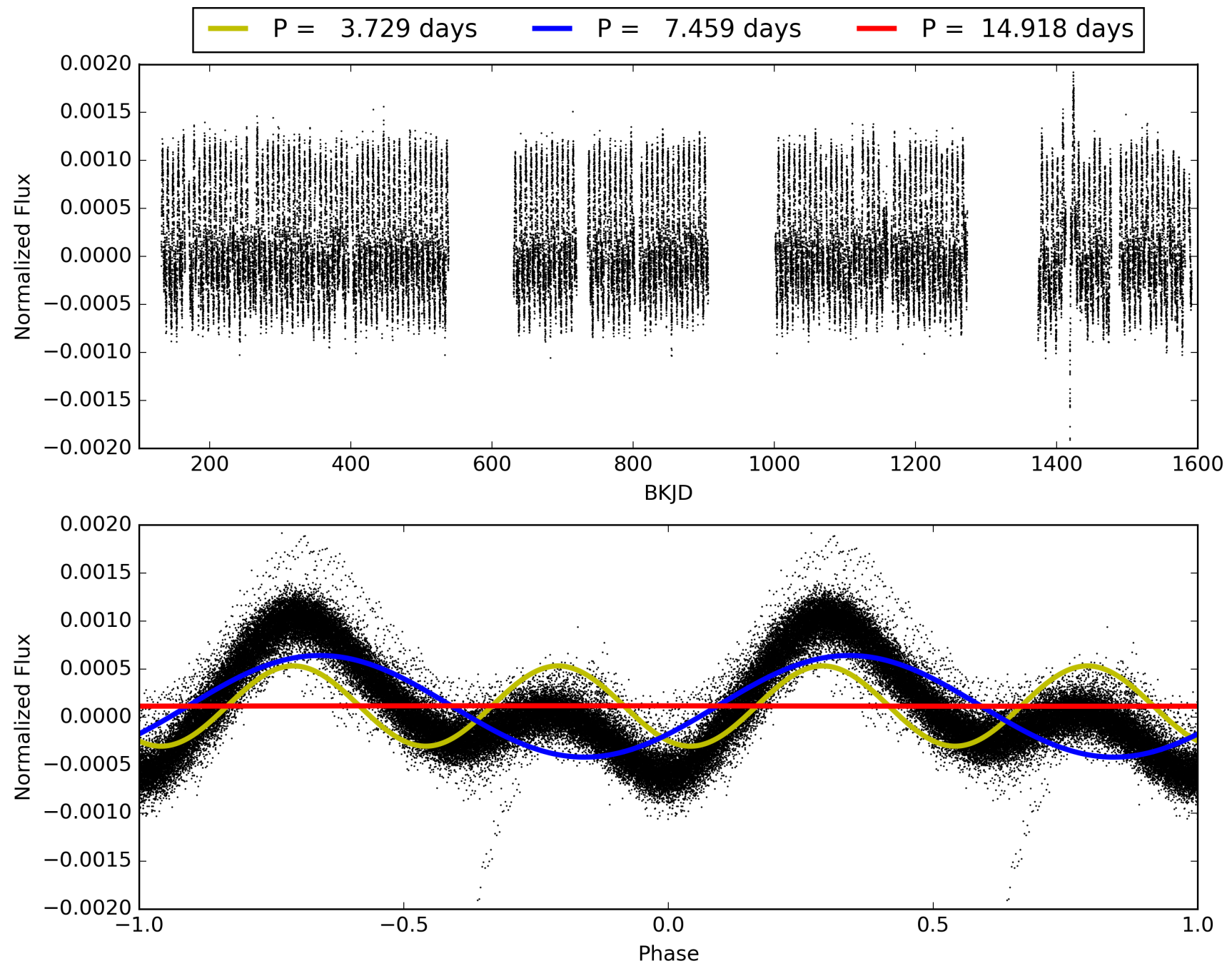
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 01:42:10 Z

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

# TCE 005456359-01, PDC Light Curves

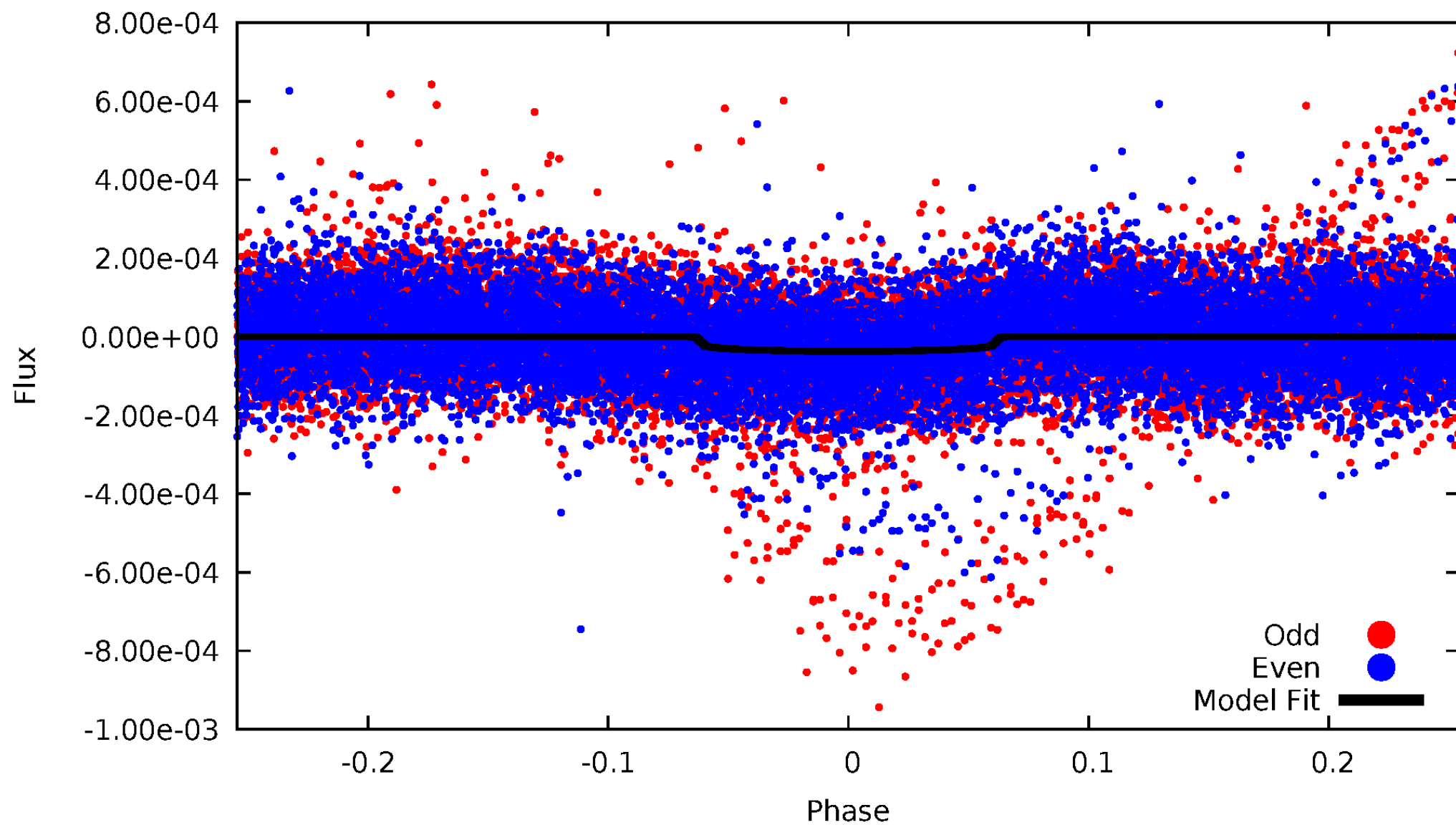


TCE 005456359-01



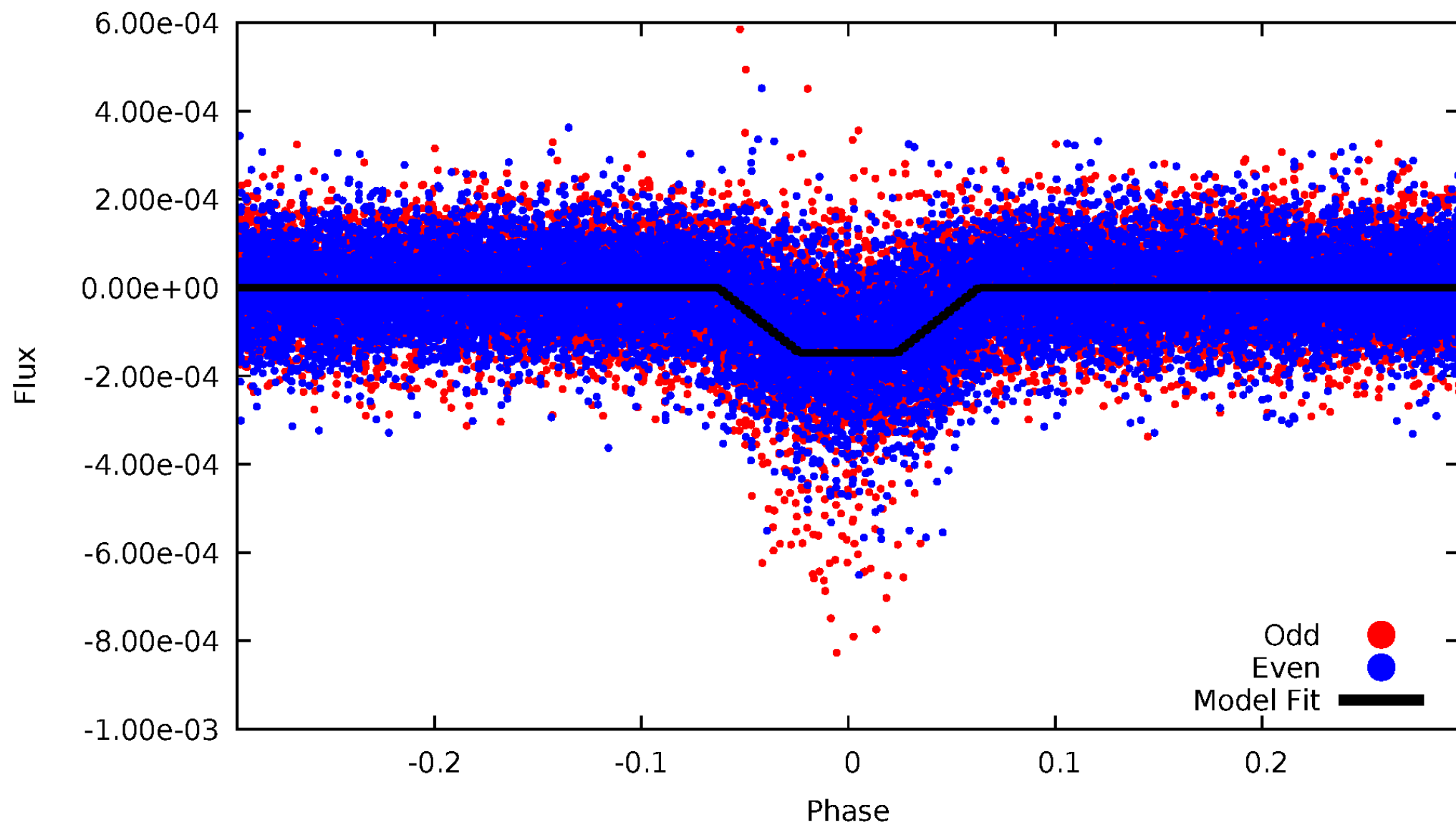
# DV Odd/Even

TCE 005456359-01



# ALT Odd/Even

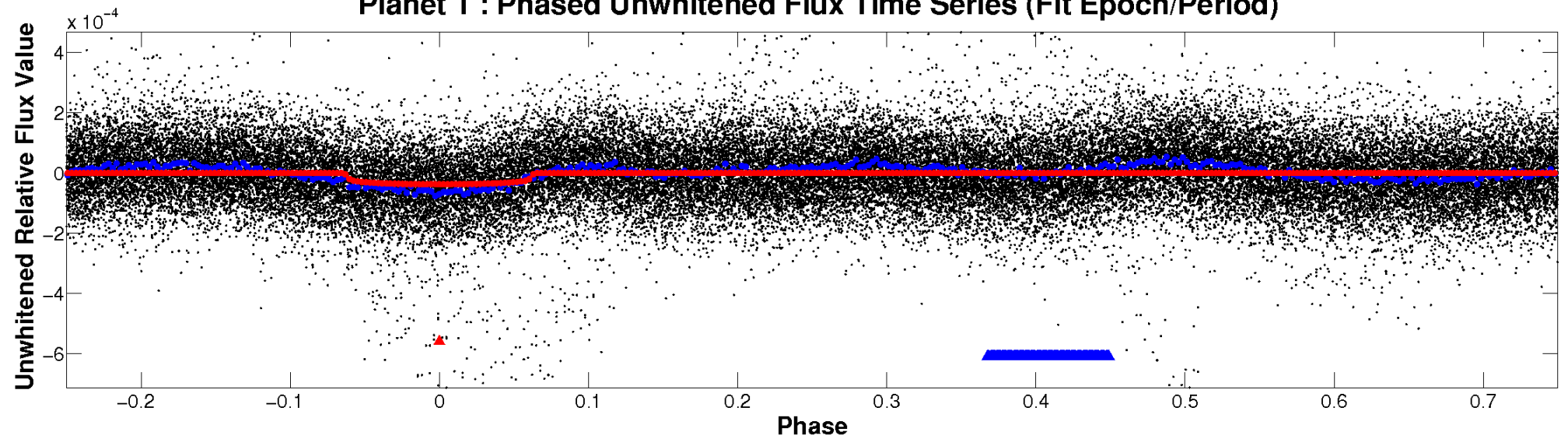
TCE 005456359-01



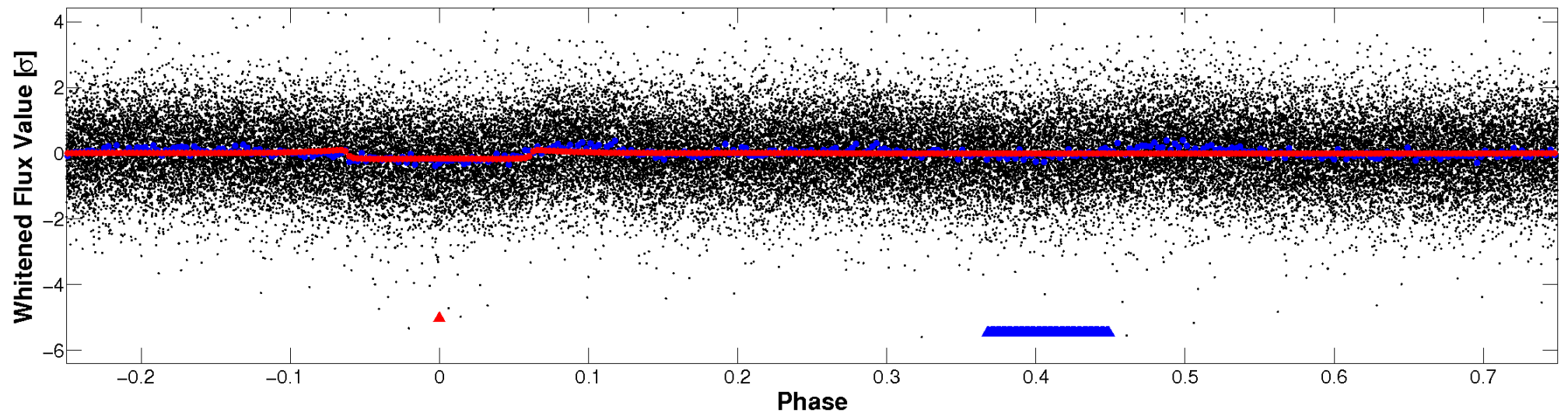


# Non-Whitened Vs. Whitened Light Curve

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

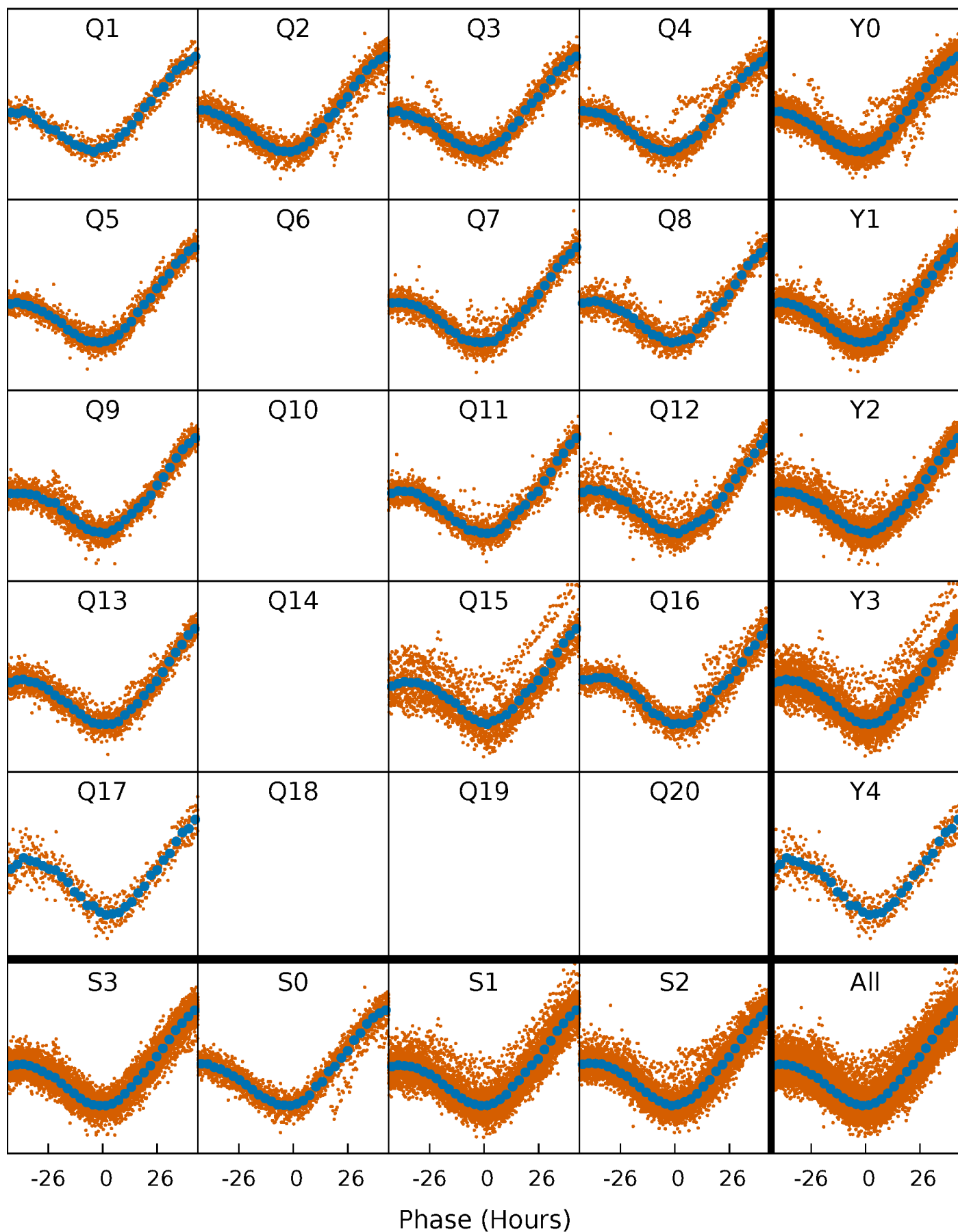


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

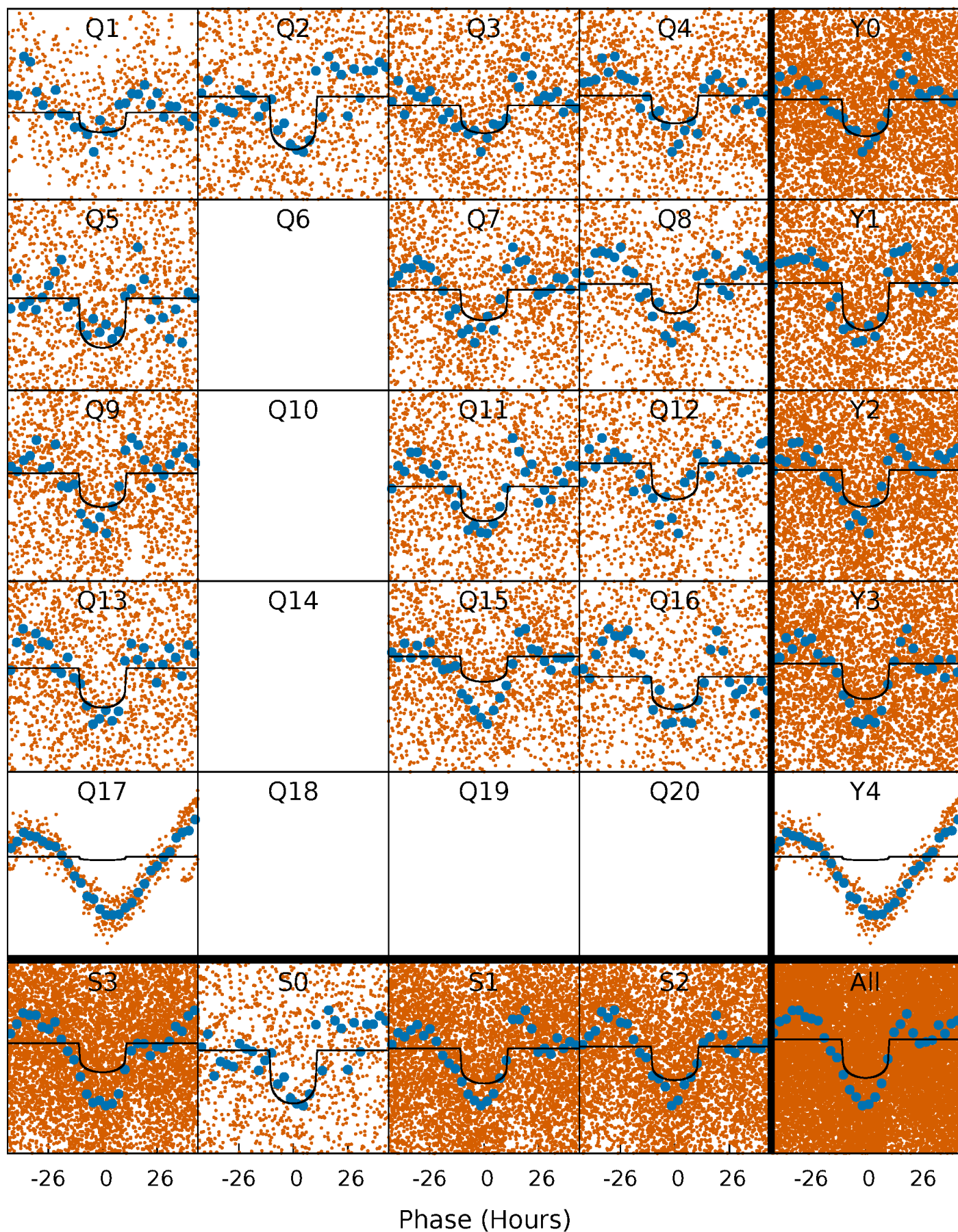
TCE 005456359-01 P= 7.458907 Days  $T_0=138.217659$  (BKJD)





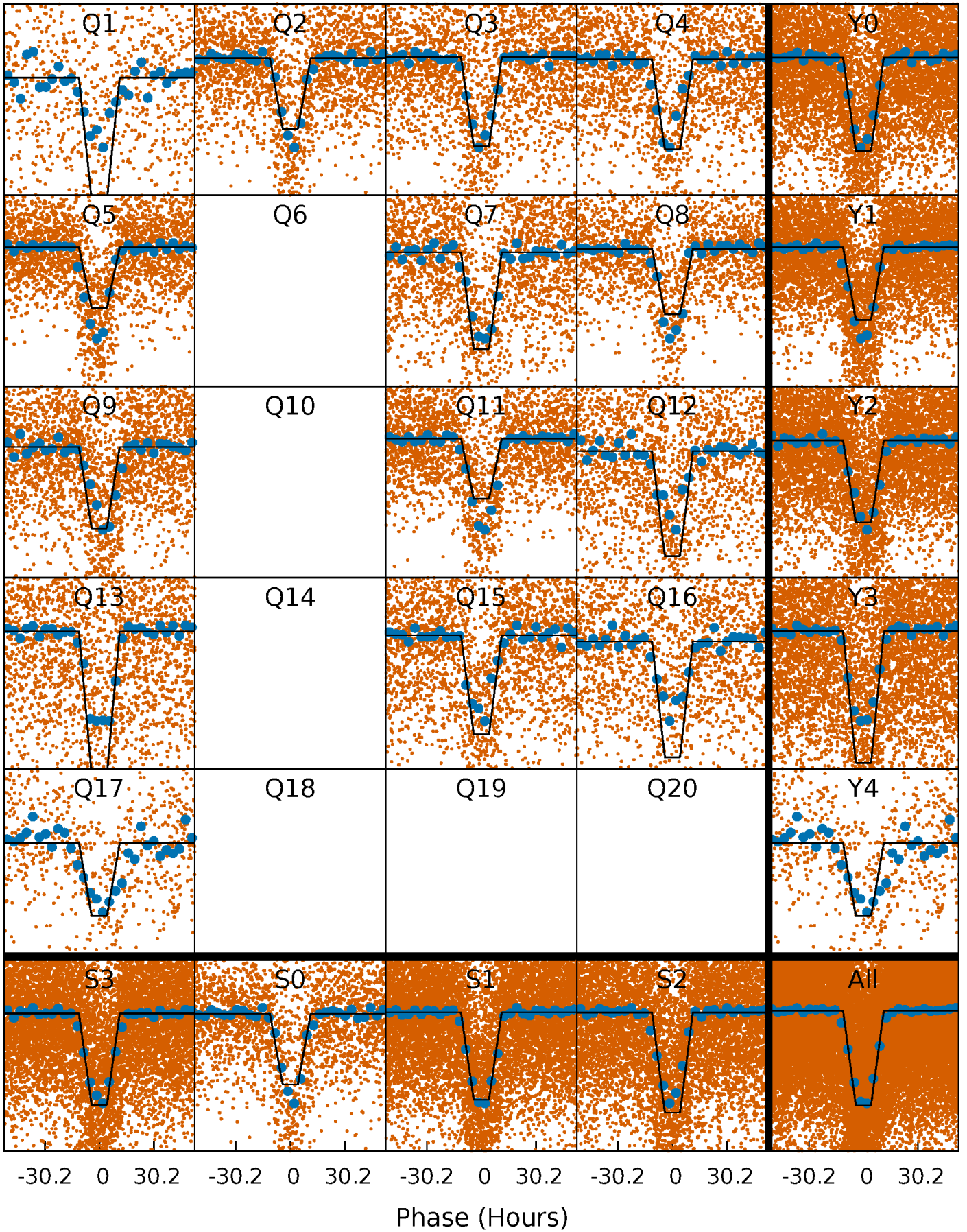
# DV Quarter-Phased Transit Curves

TCE 005456359-01 P= 7.458907 Days  $T_0=138.217659$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

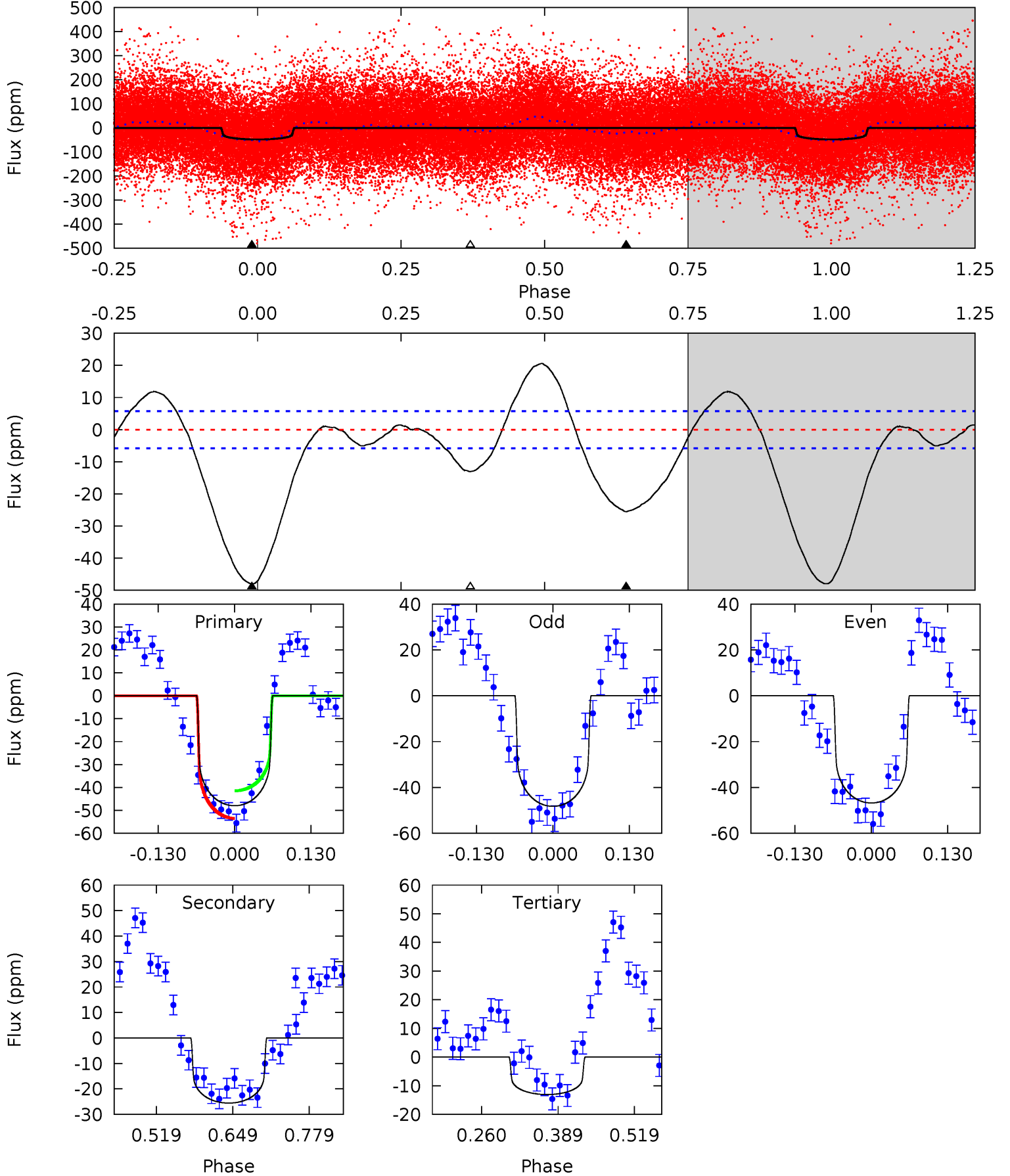
TCE 005456359-01 P= 7.458296 Days  $T_0=138.296335$  (BKJD)



# DV Model-Shift Uniqueness Test

005456359-01, P = 7.458907 Days, E = 130.758752 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
37.4	19.9	10.2	0	4.51	1.52	6.97	27.2	37.4	9.75	19.9	0.57	1.27	0.30	4.80

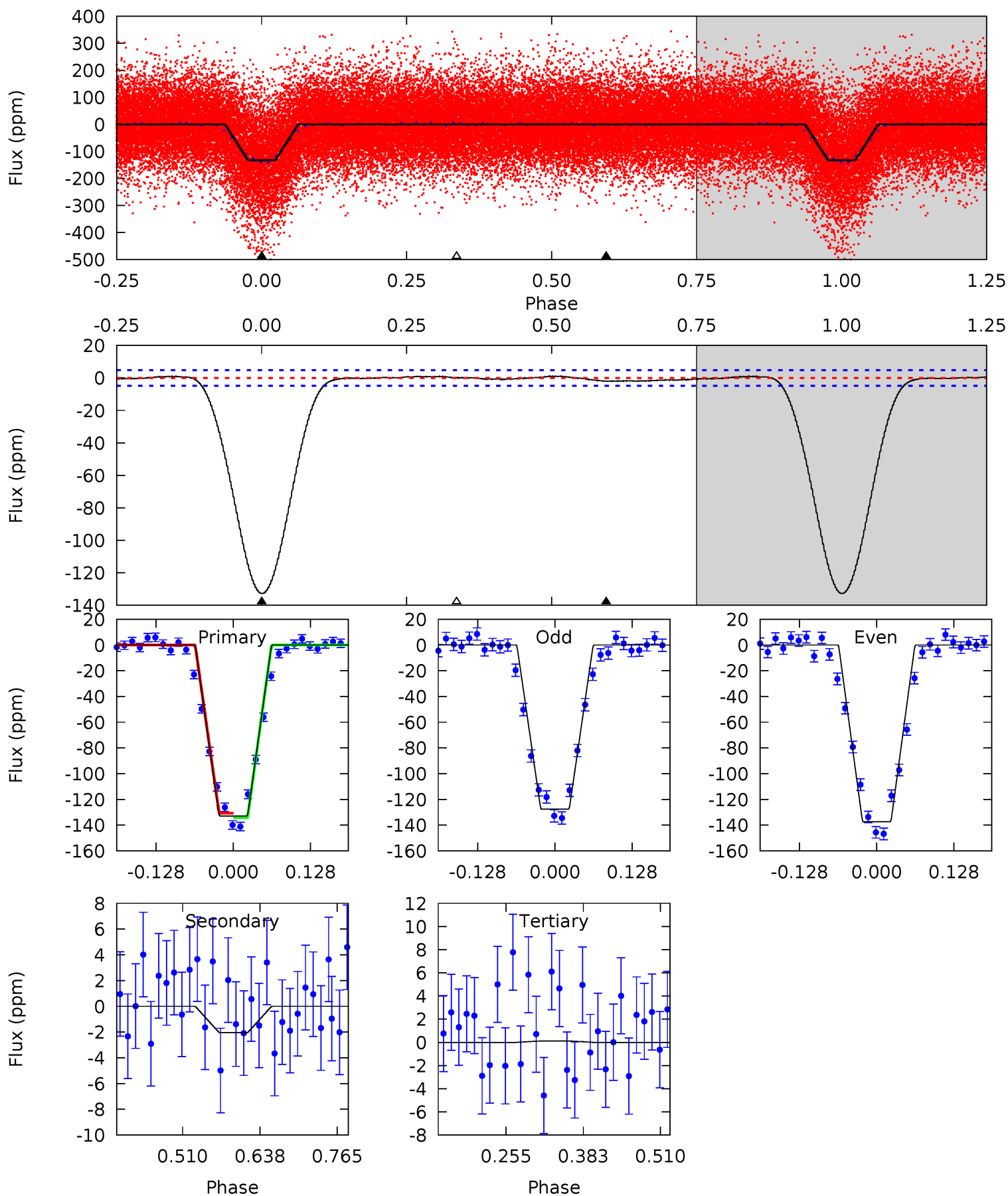




# Alt Model-Shift Uniqueness Test

005456359-01, P = 7.458296 Days, E = 130.838039 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
124.2	1.91	-0.11	0	4.51	1.52	0.54	124.3	124.2	2.03	1.91	4.59	1.00	0.01	1.66



### Stellar Parameters For KIC 005456359

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$\rho_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5892^{+147}_{-147}$	$4.005^{+0.300}_{-0.120}$	$-0.240^{+0.350}_{-0.250}$	$1.651^{+0.344}_{-0.516}$	$1.005^{+0.158}_{-0.130}$	$0.314^{+0.592}_{-0.116}$
	+2%/-2%	+7%/-3%	+146%/-104%	+21%/-31%	+16%/-13%	+188%/-37%
Source	PHO1	FLK73	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 005456359-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-26 \pm 1$	$1.14^{+0.18}_{-0.22}$	$1686^{+109}_{-149}$	$5258^{+242}_{-200}$	$61^{+30}_{-15}$
Alt.	$-2 \pm 1$	$2.14^{+0.30}_{-0.39}$	$1673^{+115}_{-147}$	$2697^{+176}_{-320}$	$1.414^{+1.028}_{-0.714}$

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

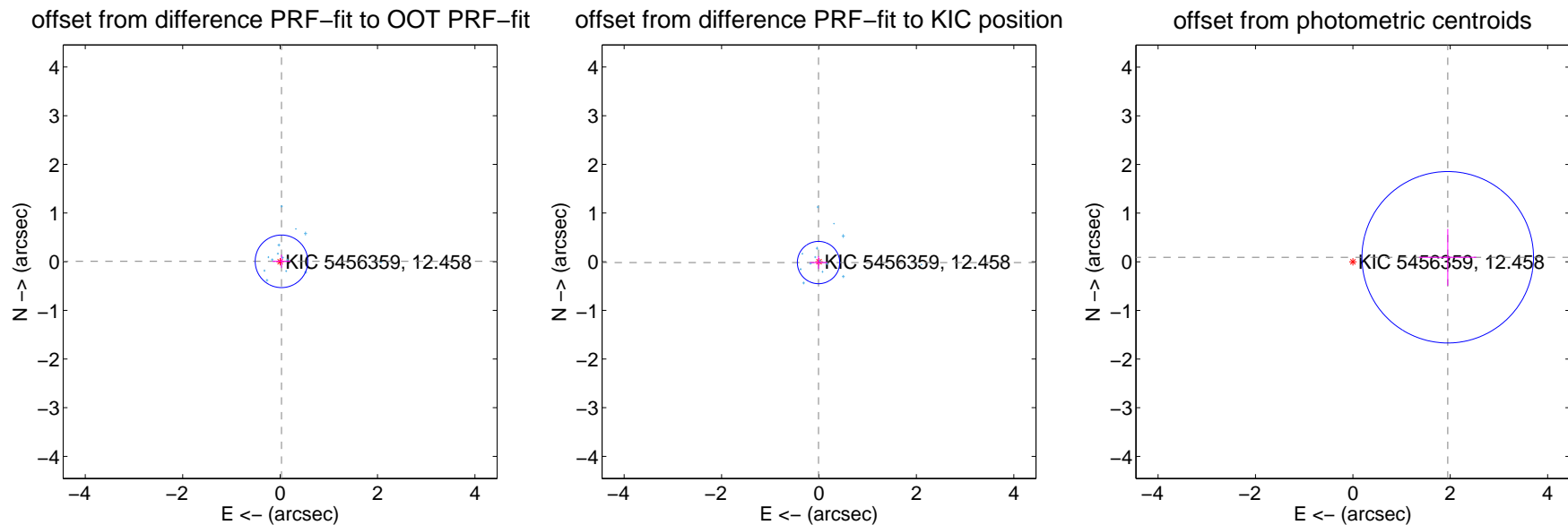
## DV Centroid Data

Supplemental centroid analysis for 005456359-01. Kepler magnitude: 12.46. Transit SNR 13.57

There are 14 quarters with good PRF difference image offsets

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

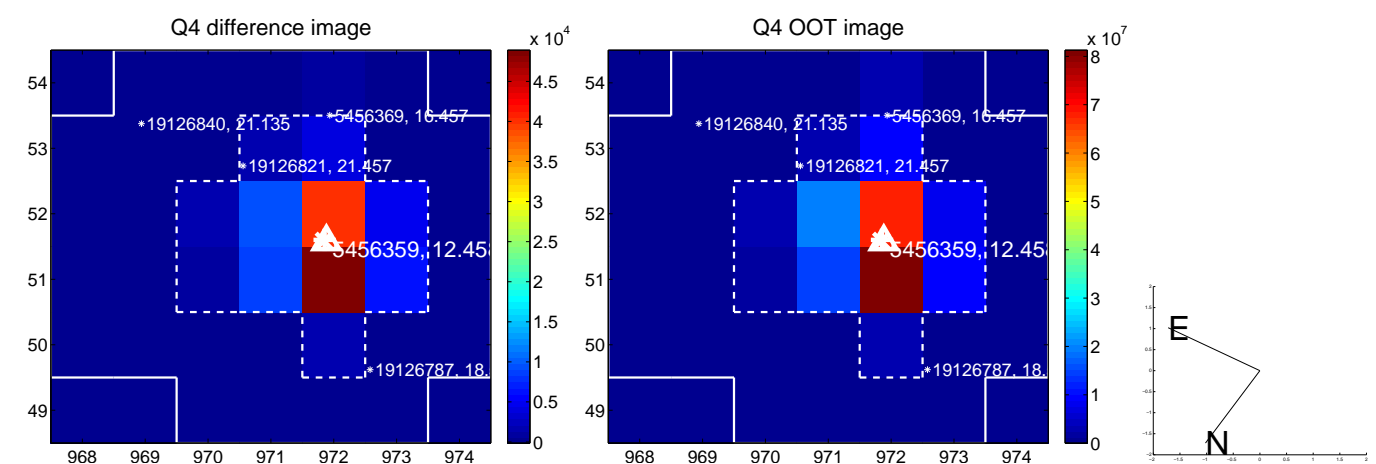
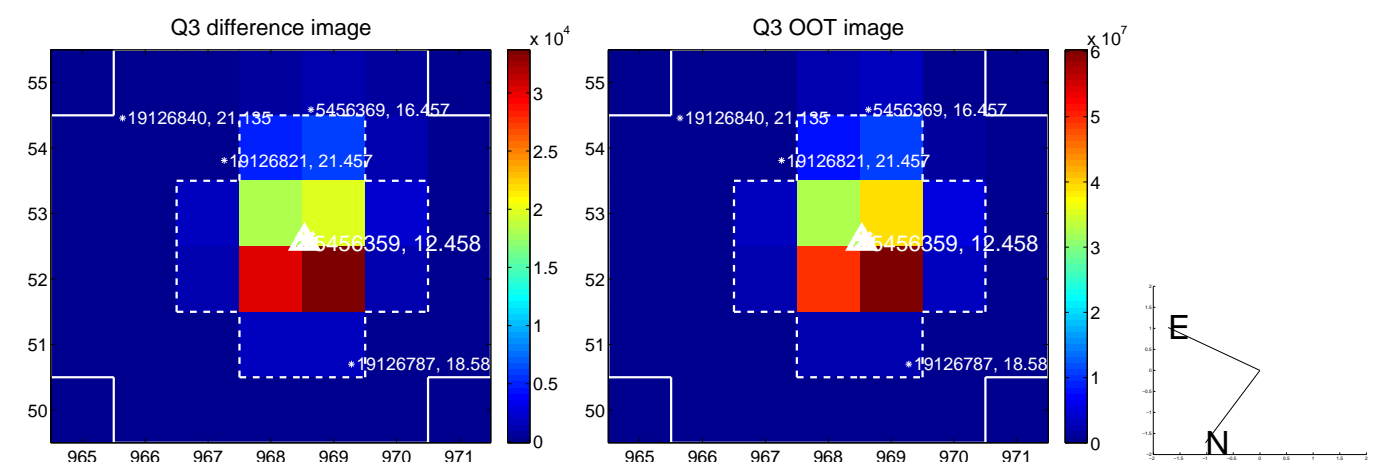
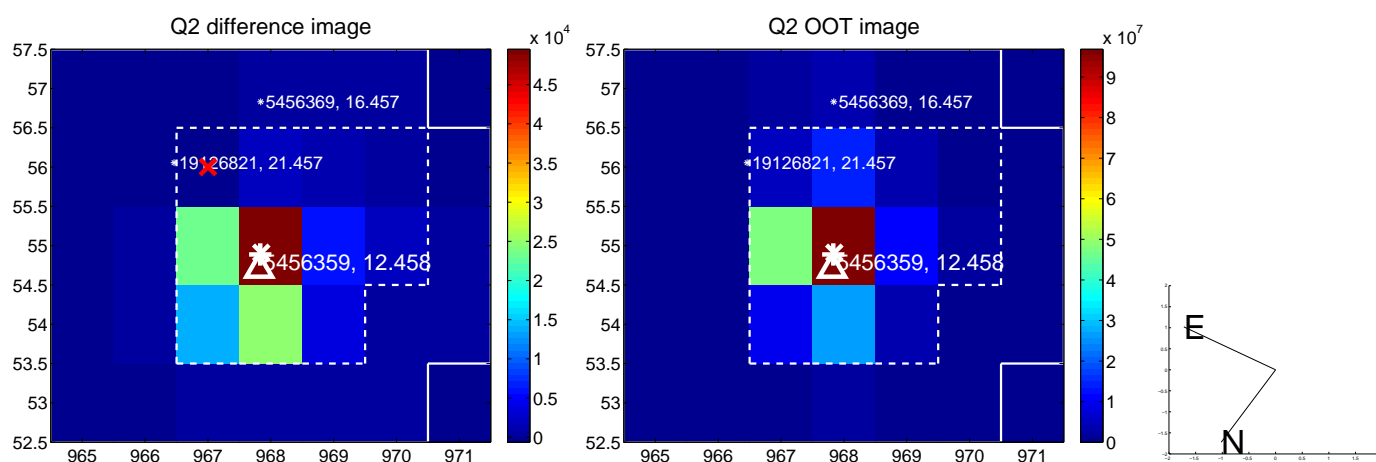
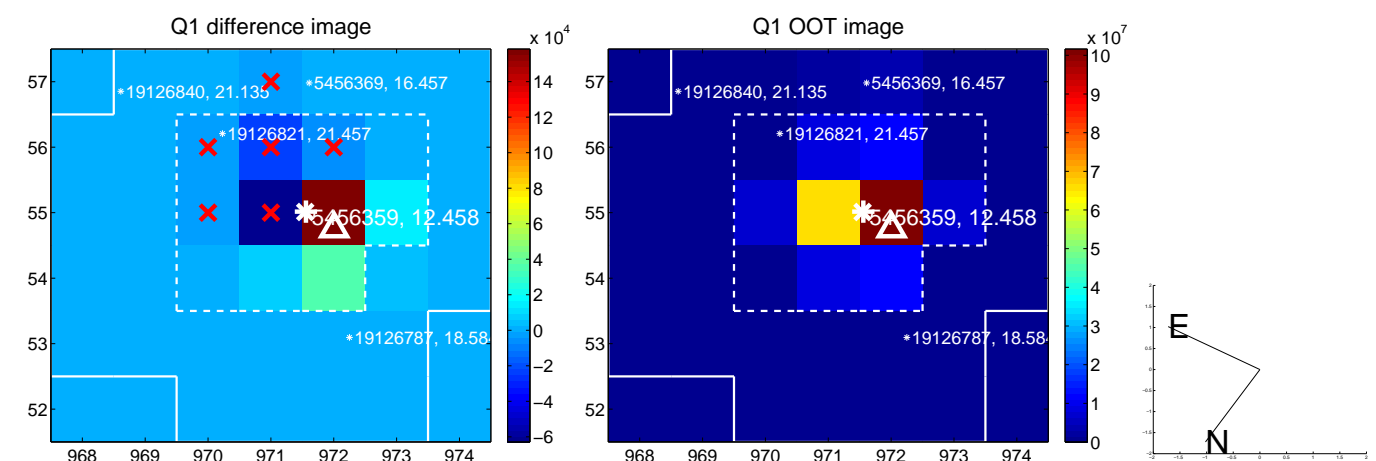
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.030 \pm 0.180$	0.16	$-0.029 \pm 0.183$	$0.008 \pm 0.134$
PRF-fit source offset from KIC position	$0.020 \pm 0.145$	0.14	$0.010 \pm 0.178$	$-0.018 \pm 0.131$
photometric centroid source offset	$1.95 \pm 0.59$	3.32	$-1.95 \pm 0.59$	$0.09 \pm 0.58$



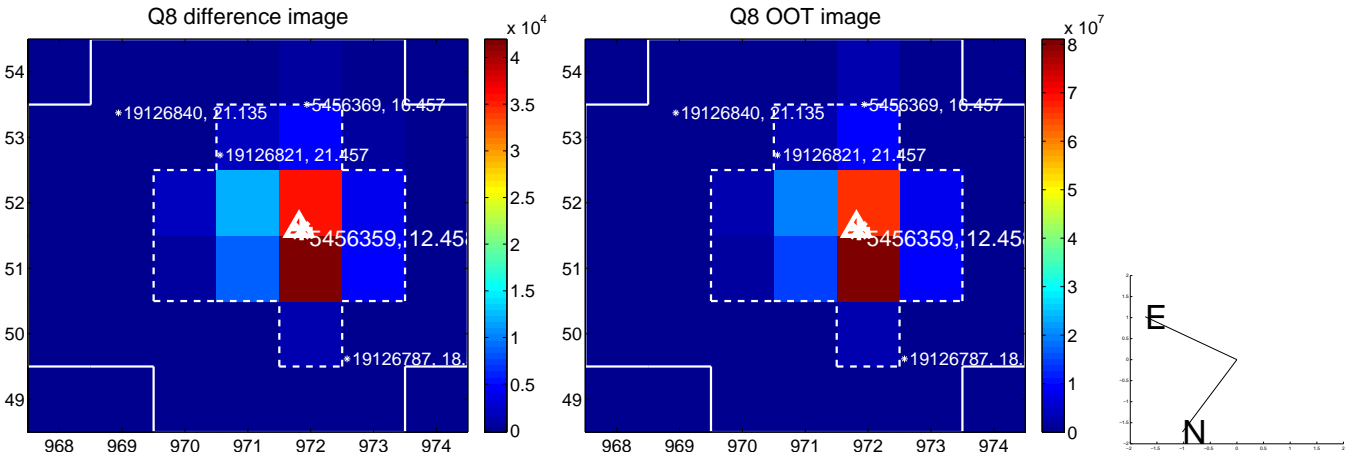
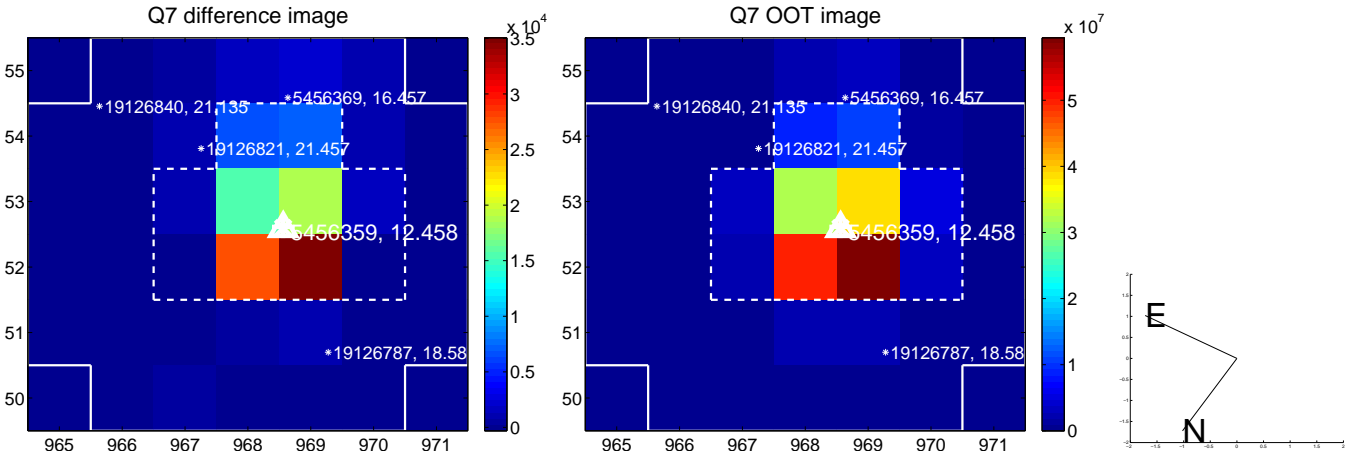
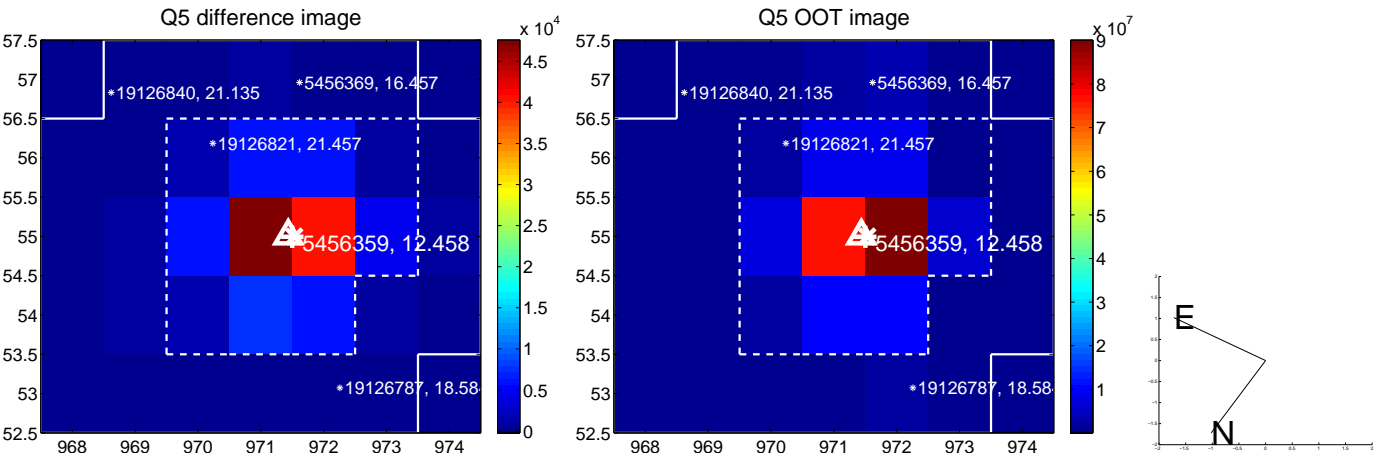
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



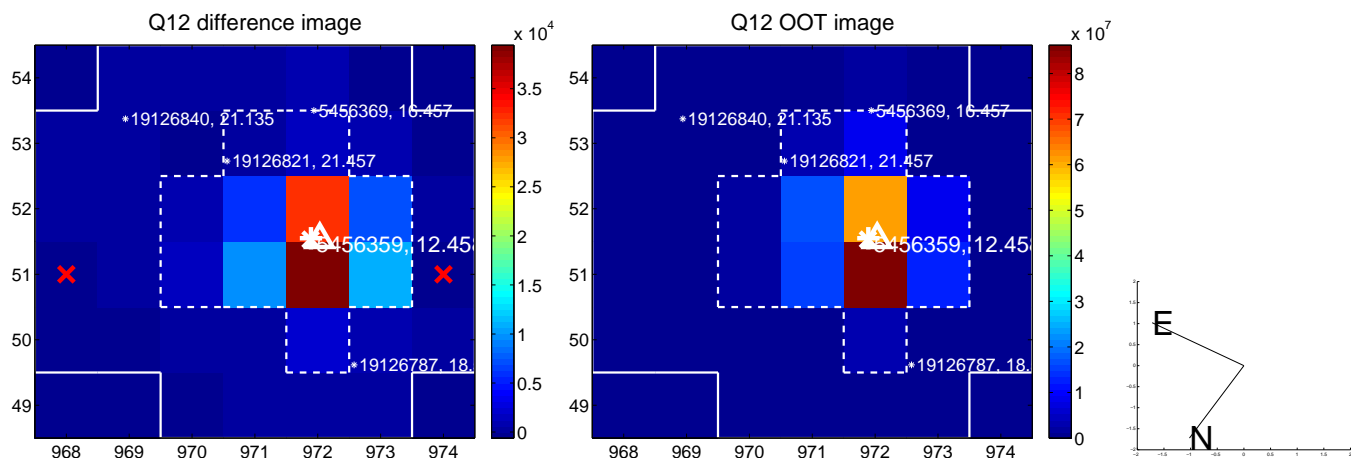
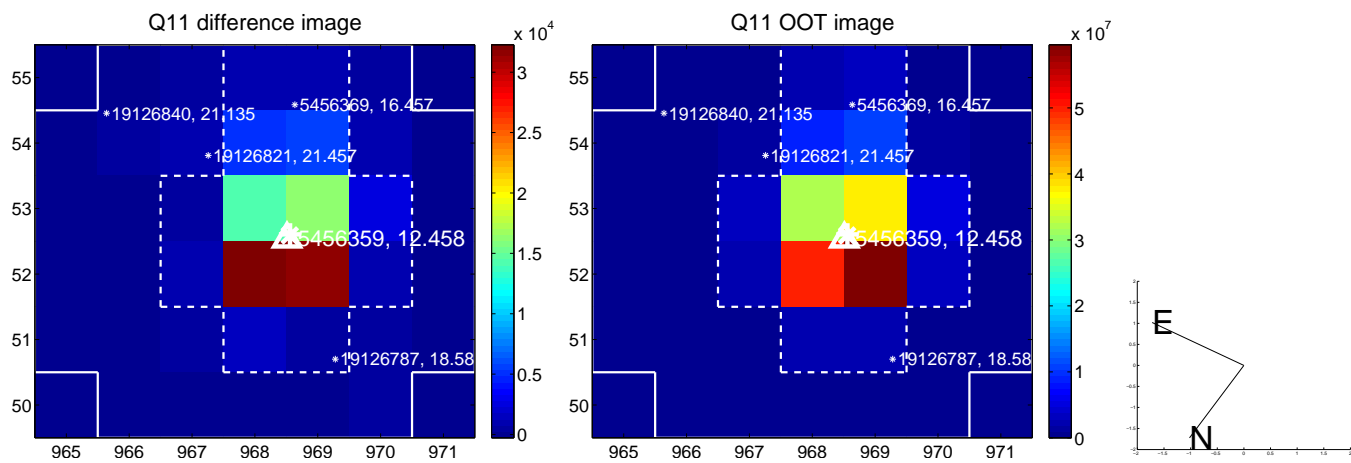
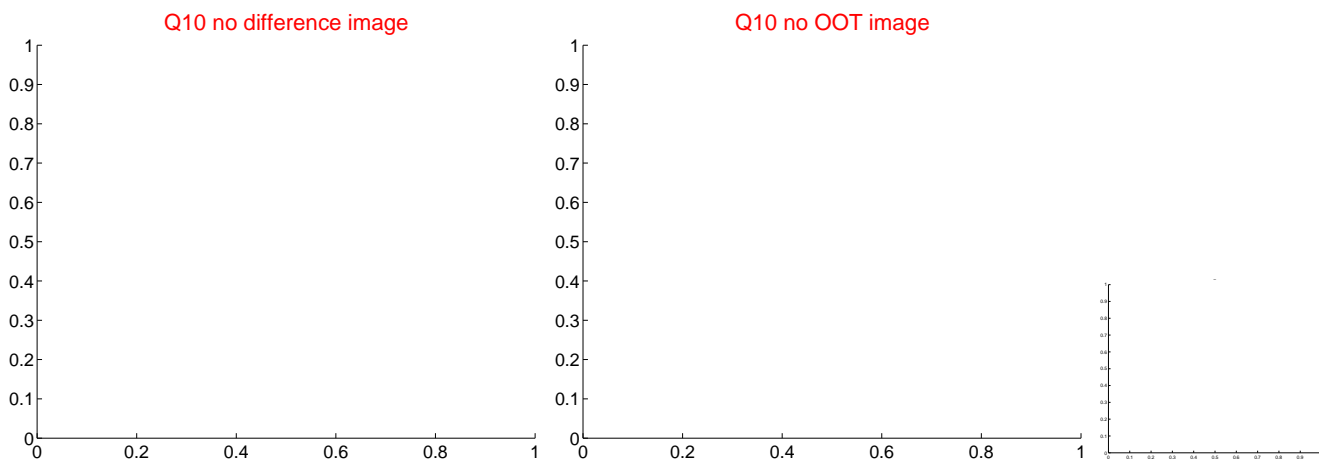
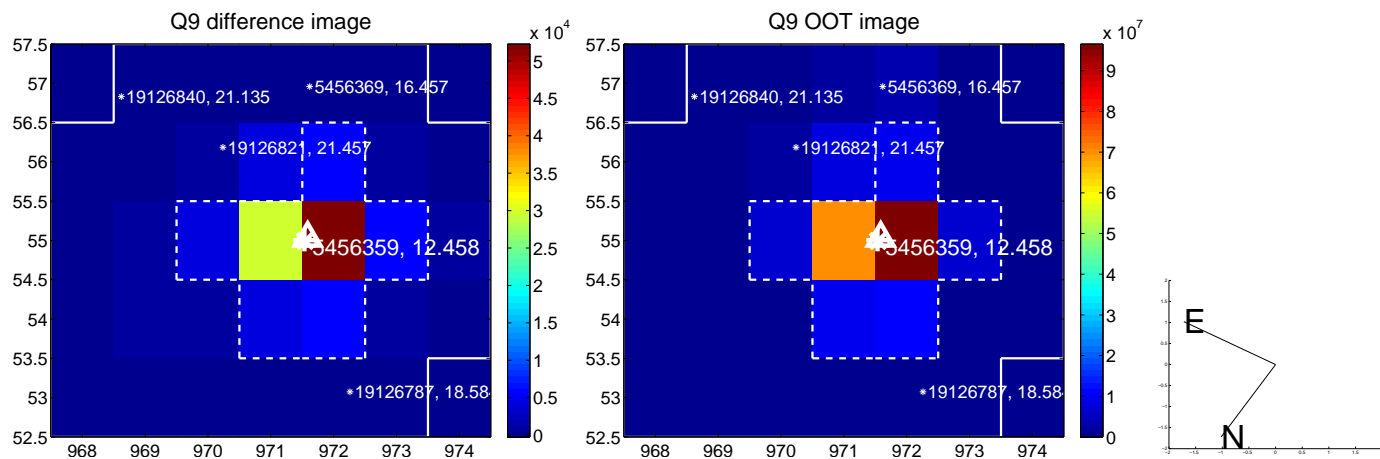
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



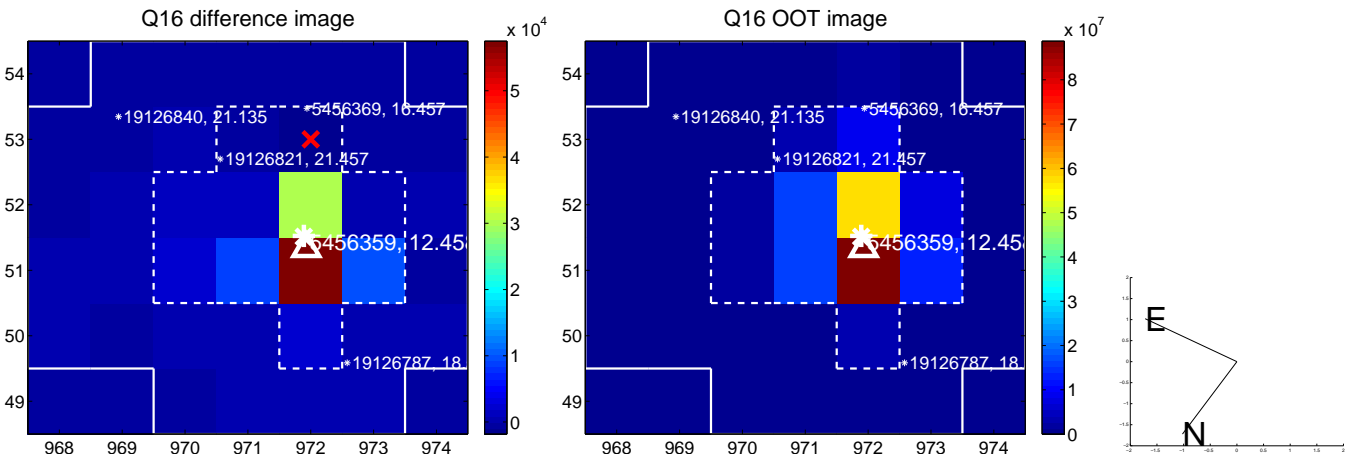
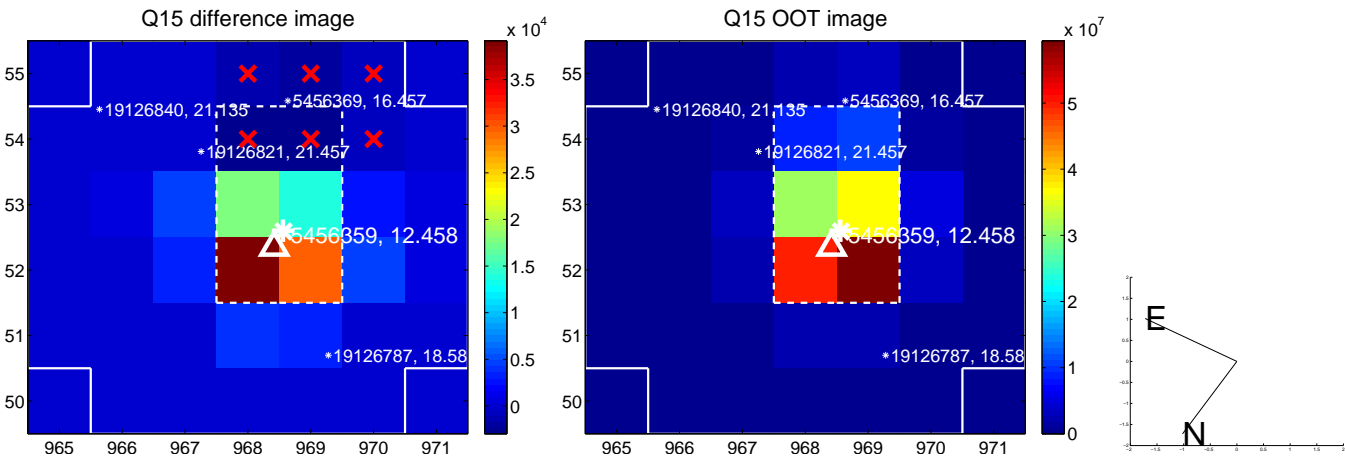
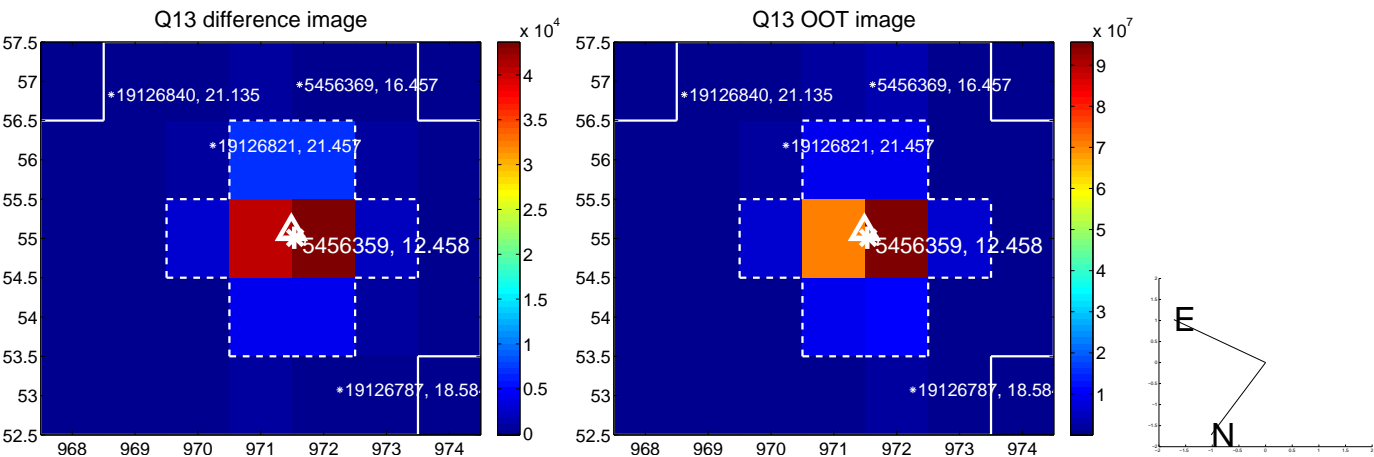
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



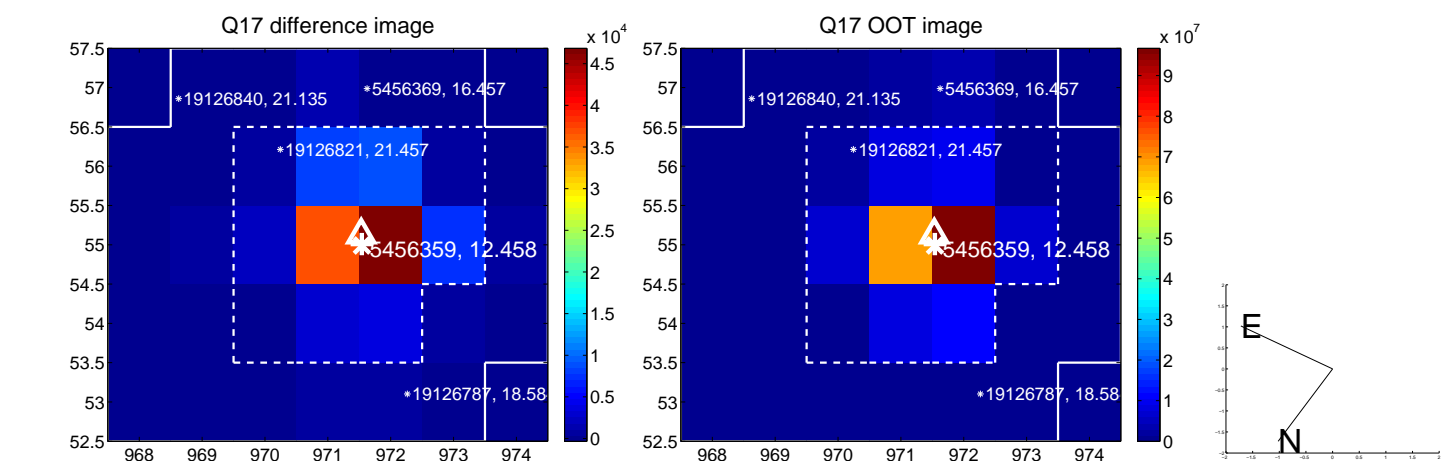
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



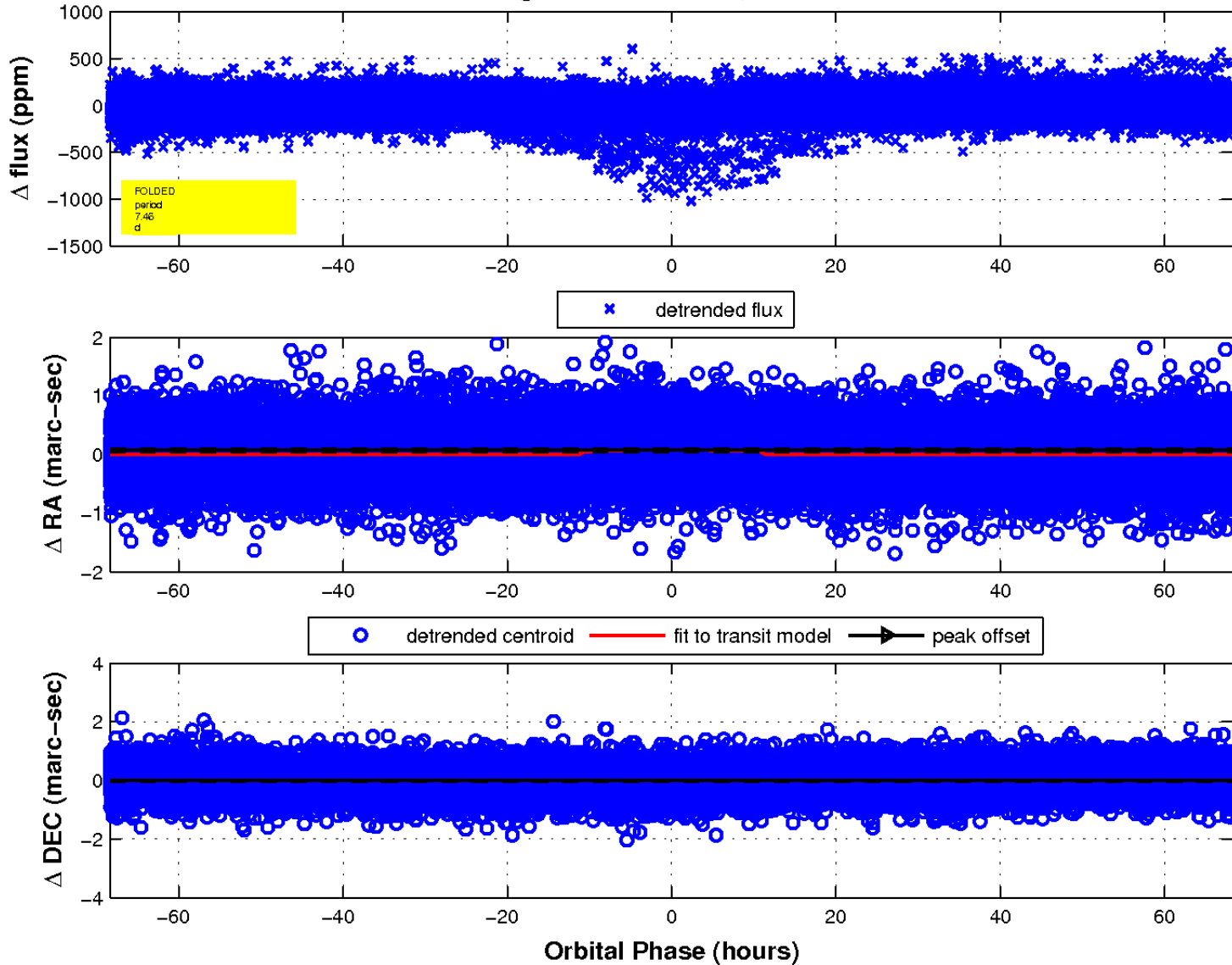
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

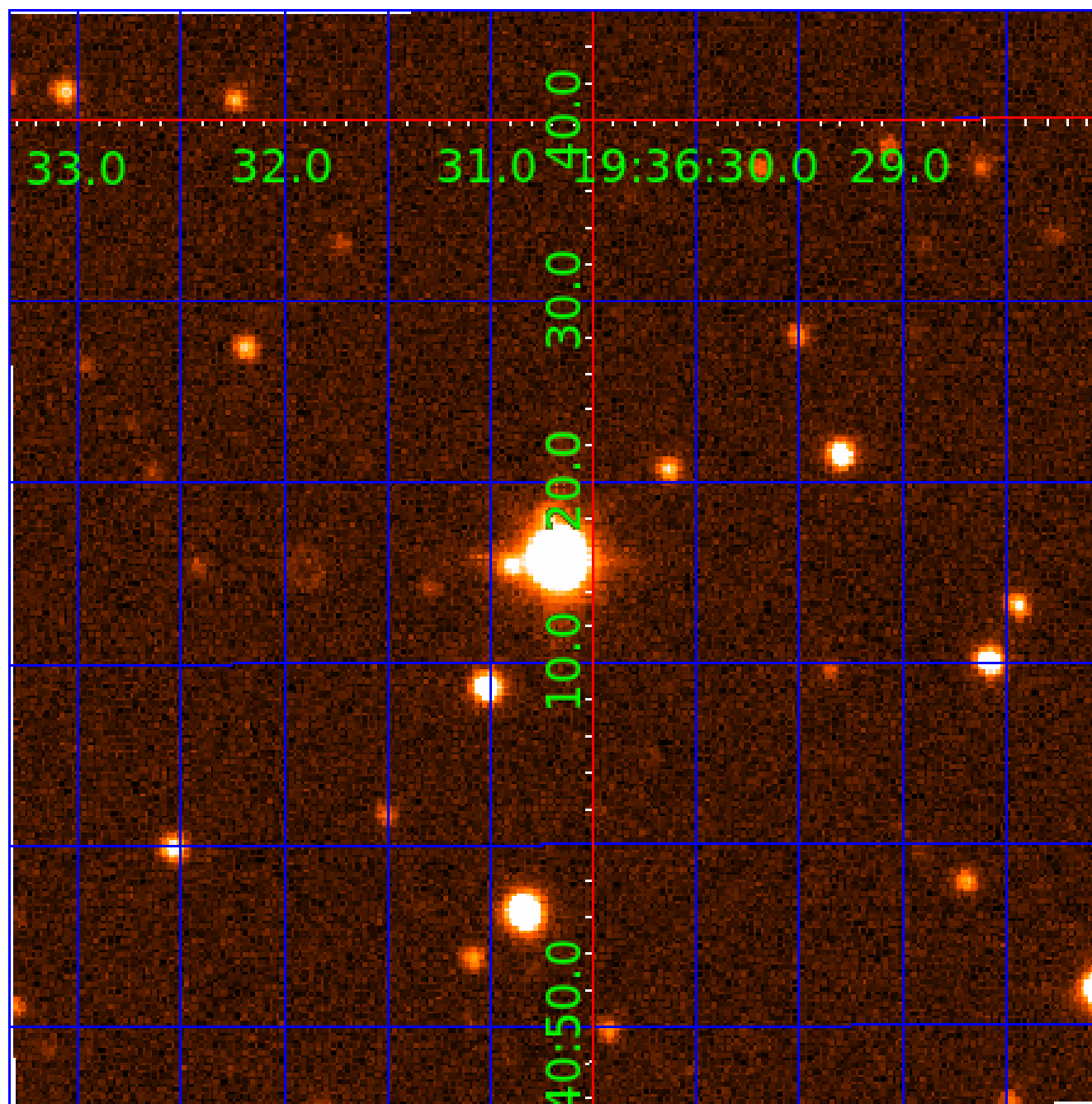


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination





# KIC 005456359

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005456359-01	OBS	No	7.458907	138.217659	37.1	22.785	10.6	13.6	1.65	5892	1.17	525.06
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## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005456359-01	OBS	FP	0.00	1	0	0	0	LPP_DV
005456359-02	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—SAME_NTL_PERIOD—CENT_FEW_DIFFS

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

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

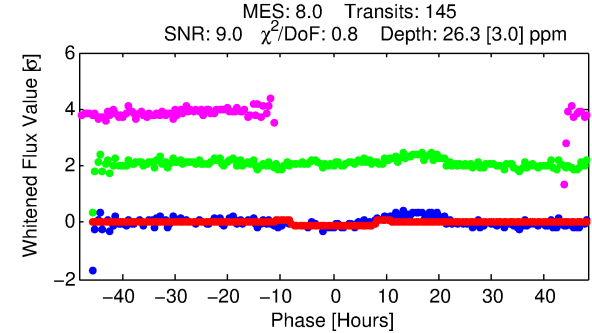
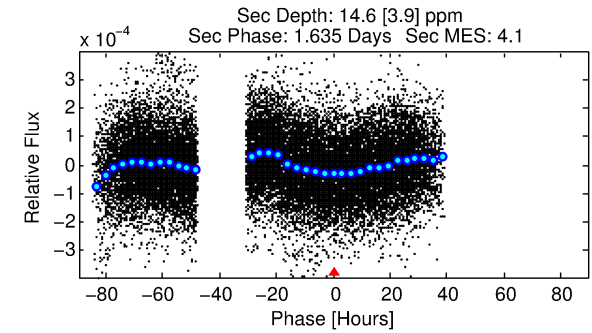
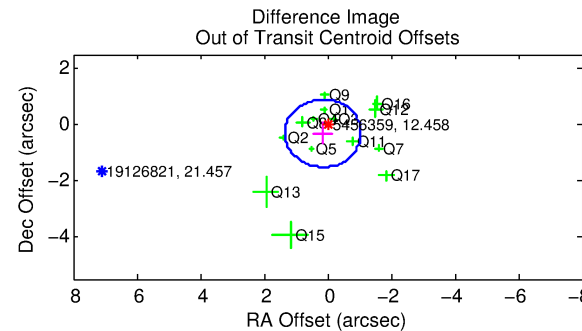
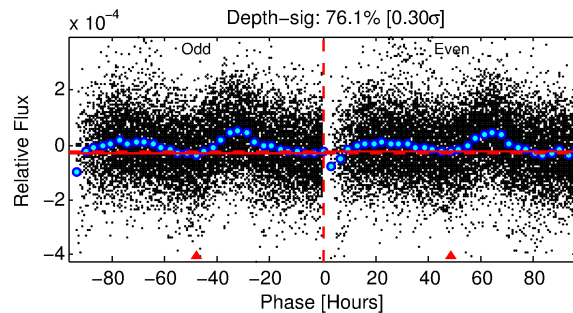
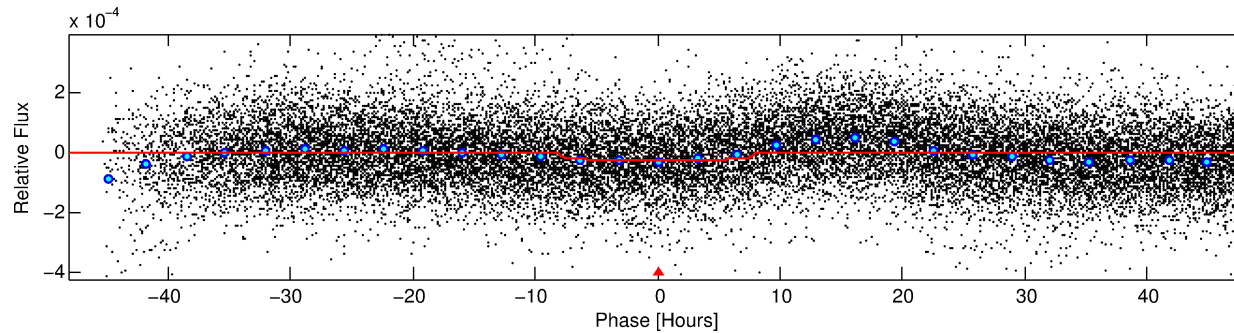
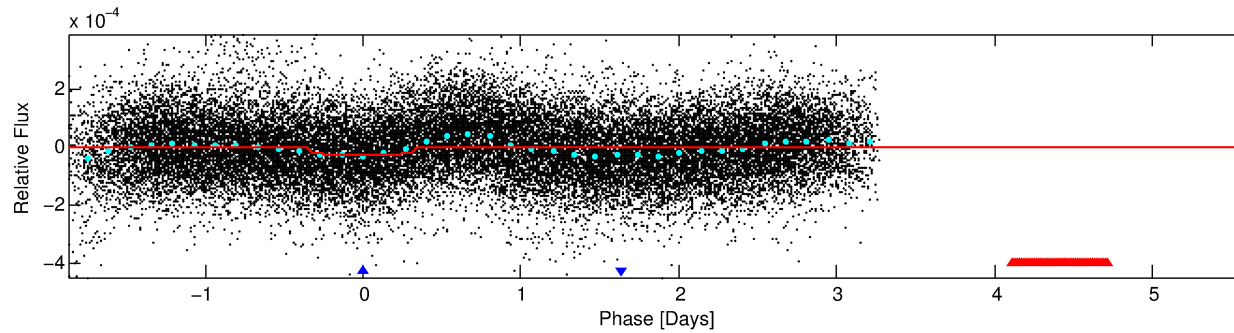
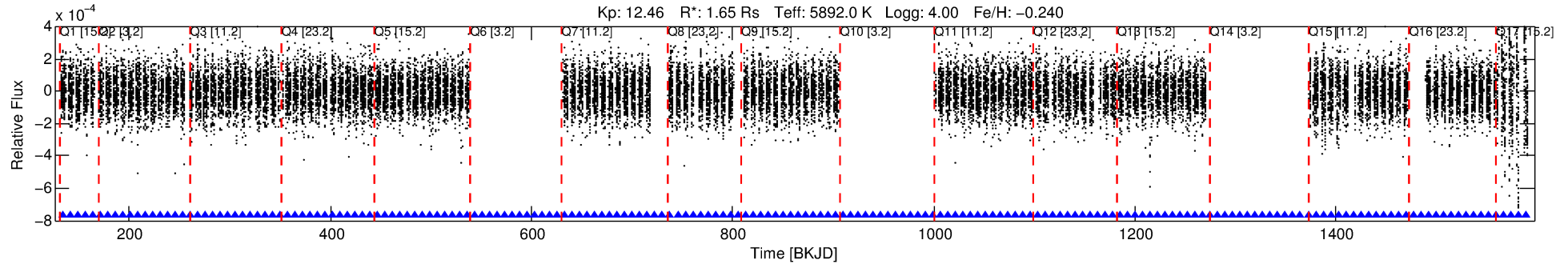
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## Ephemeris Match Information For 005456359-02

No Significant Match Found

# DV One-Page Summary

KIC: 5456359 Candidate: 2 of 2 Period: 7.462 d



## DV Fit Results:

Period = 7.46203 [0.00013] d  
Epoch = 133.4996 [0.0126] BKJD  
Rp/R\* = 0.0047 [0.0057]  
a/R\* = 3.60 [19.01]  
b = 0.10 [56.94]  
Seff = 524.77 [270.37]  
Teq = 1220 [157] K  
Rp = 0.84 [1.05] Re  
a = 0.0749 [0.0233] AU  
Ag = 63.40 [157.32] [0.40 $\sigma$ ]  
Teffp = 5325 [3236] K [1.27 $\sigma$ ]

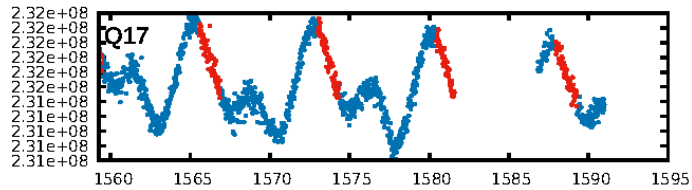
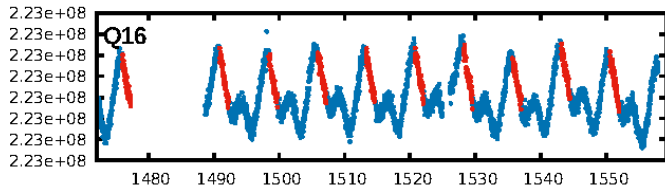
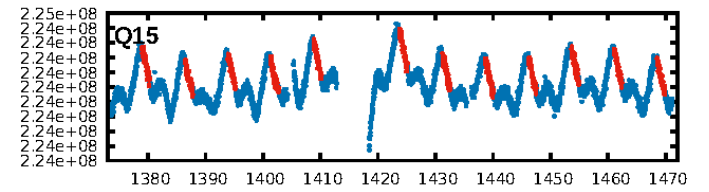
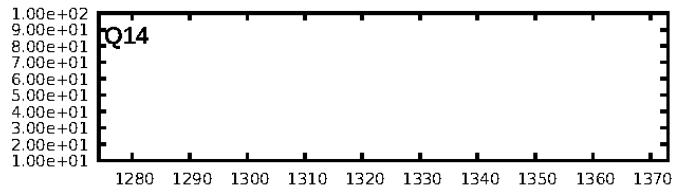
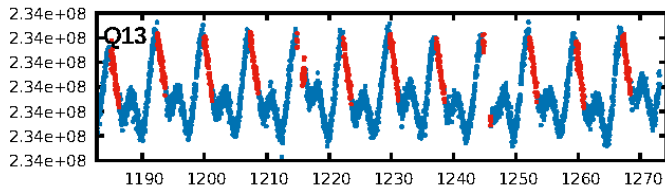
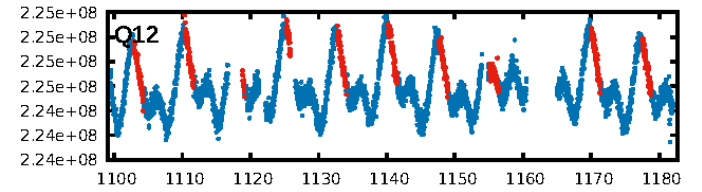
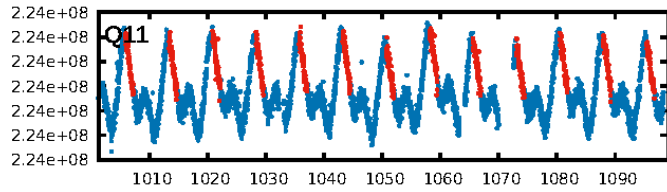
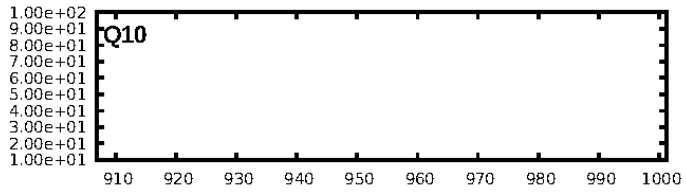
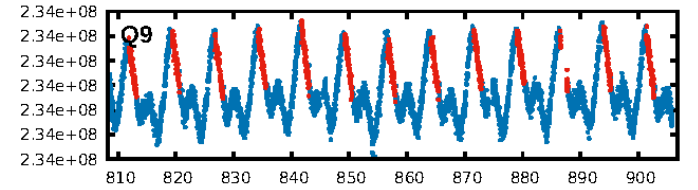
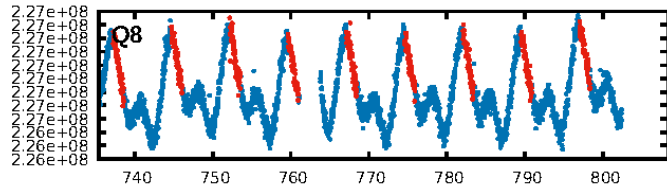
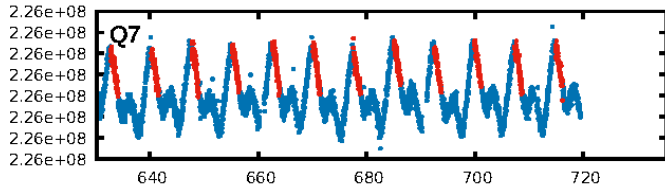
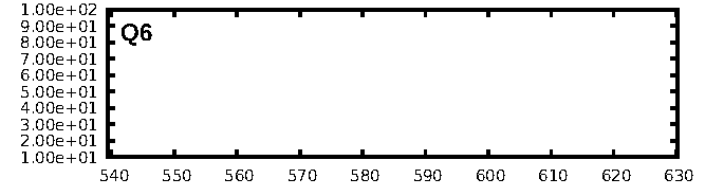
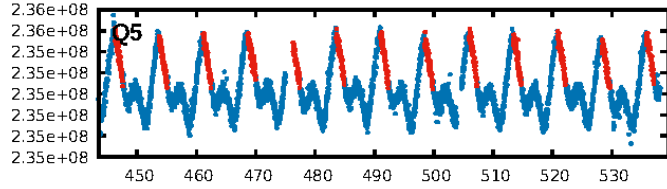
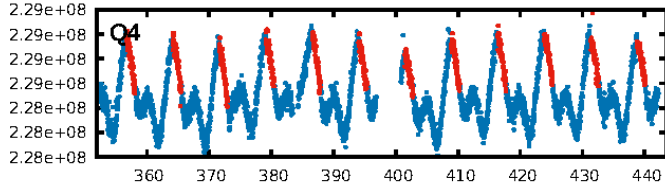
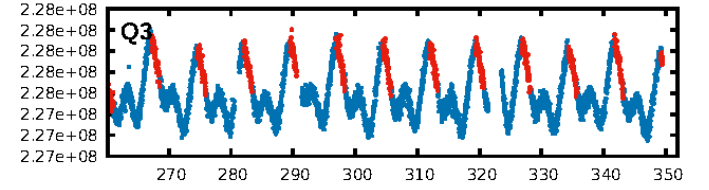
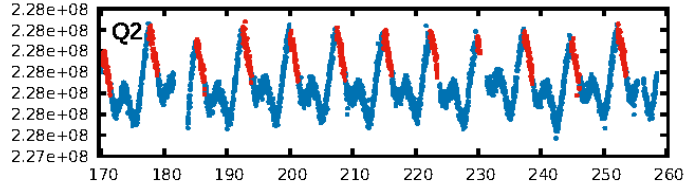
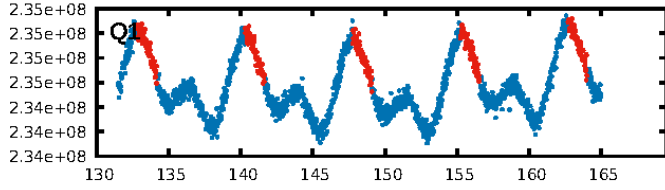
## DV Diagnostic Results:

ShortPeriod-sig: 0.2% [0.00 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 99.0%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 1.05e-12  
RollingBand-fgt: 1.00 [136/136]  
GhostDiagnostic-chr: 1.105  
Centroid-sig: 3.3%  
Centroid-so: 1.446 arcsec [1.58 $\sigma$ ]  
OotOffset-rm: 0.347 arcsec [0.86 $\sigma$ ]  
KicOffset-rm: 0.373 arcsec [0.97 $\sigma$ ]  
OotOffset-st: 1/4/4/5 [14]  
KicOffset-st: 1/4/4/5 [14]  
DiffImageQuality-fgm: 0.00 [0/14]  
DiffImageOverlap-fno: 1.00 [14/14]

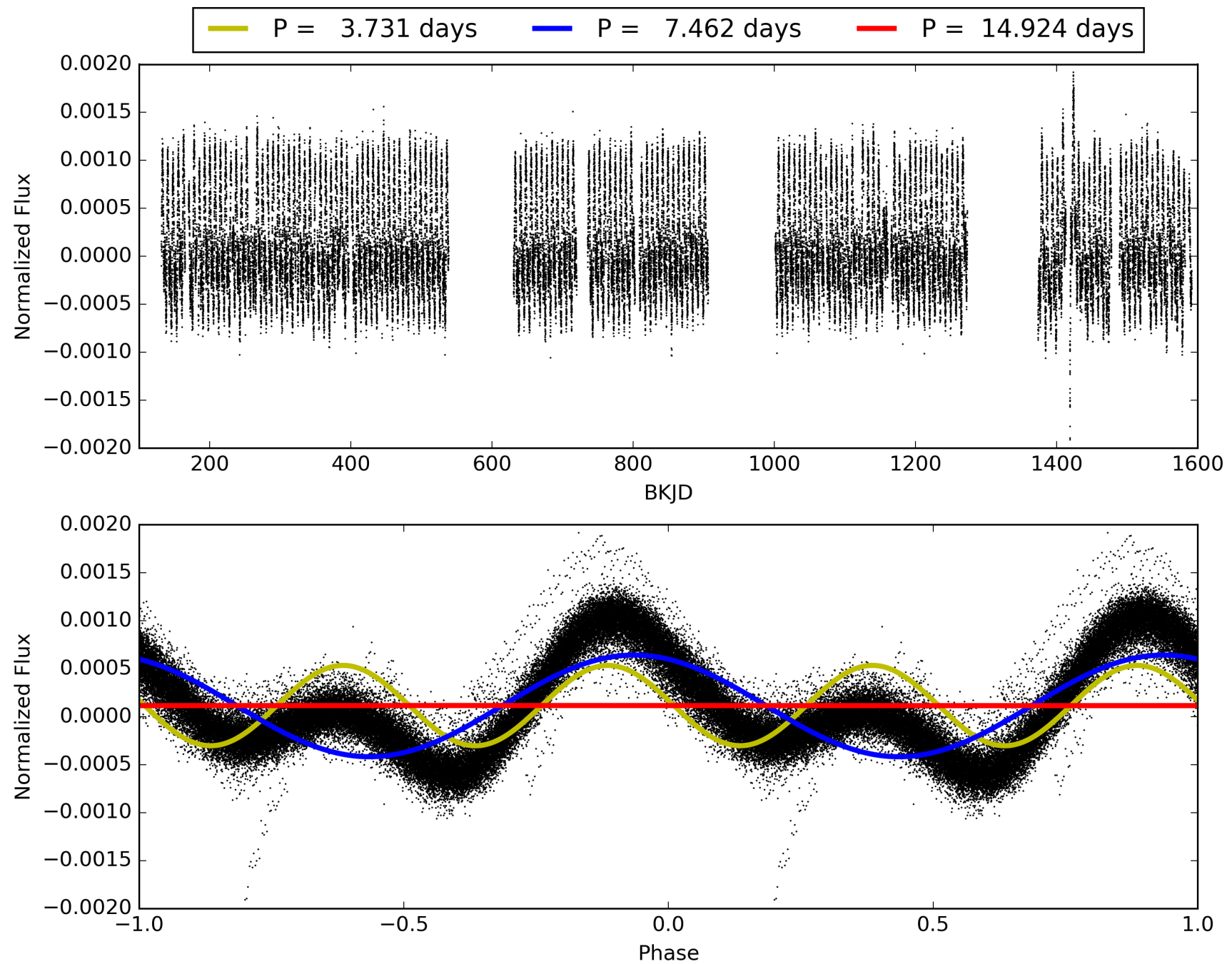
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 01:42:20 Z

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

## TCE 005456359-02, PDC Light Curves

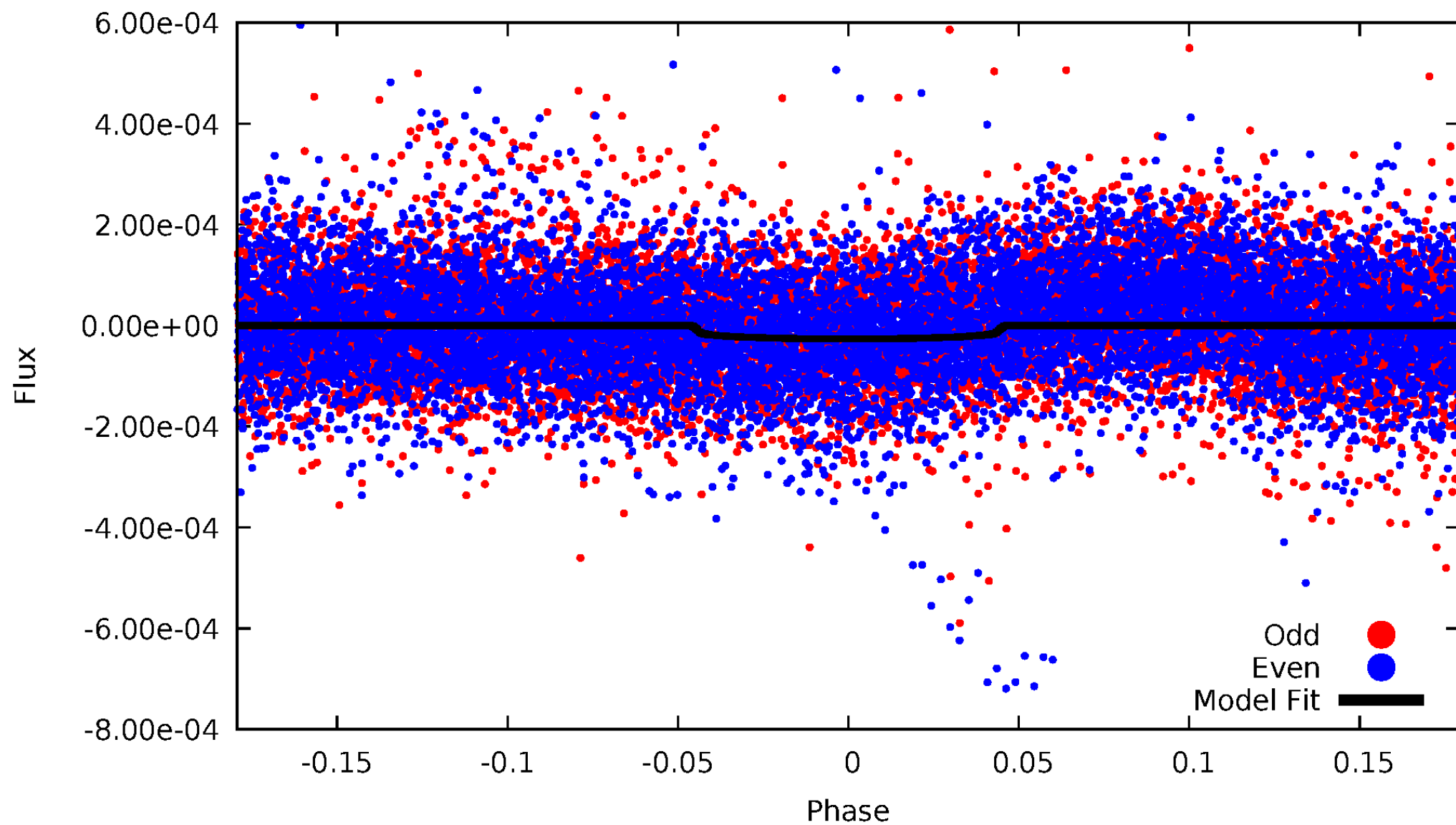


TCE 005456359-02



DV Odd/Even

TCE 005456359-02





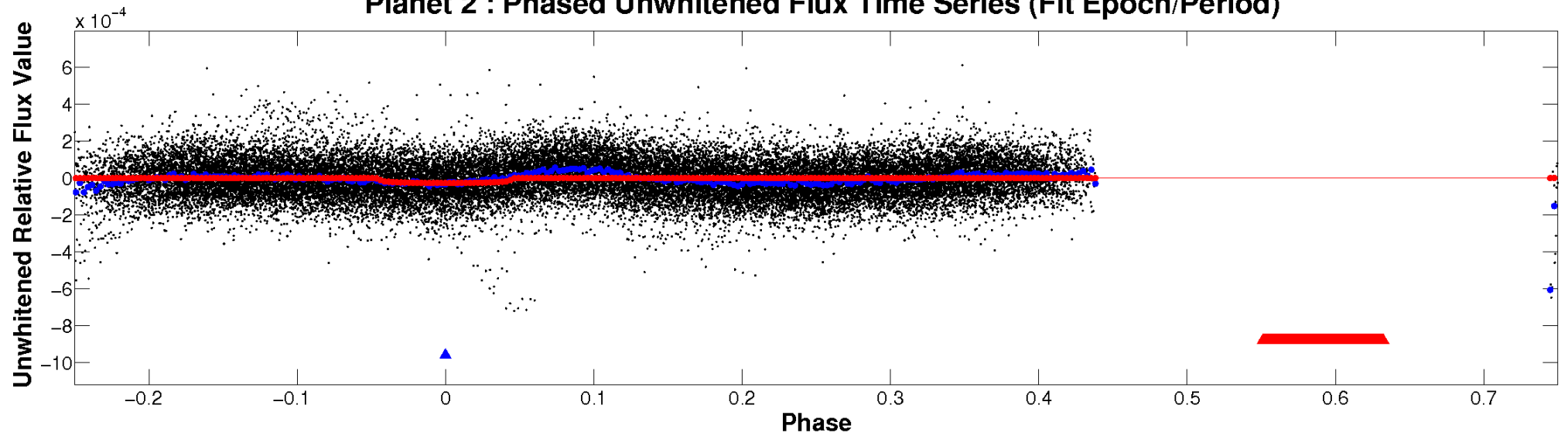


ALT Odd/Even

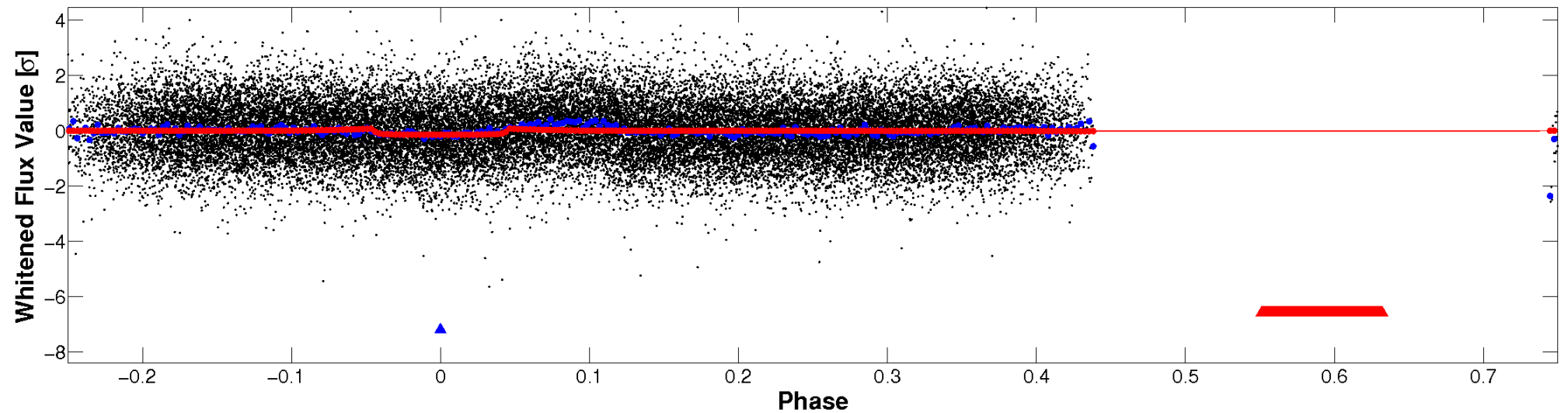
This plot does not exist for this TCE.

# Non-Whitened Vs. Whitened Light Curve

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

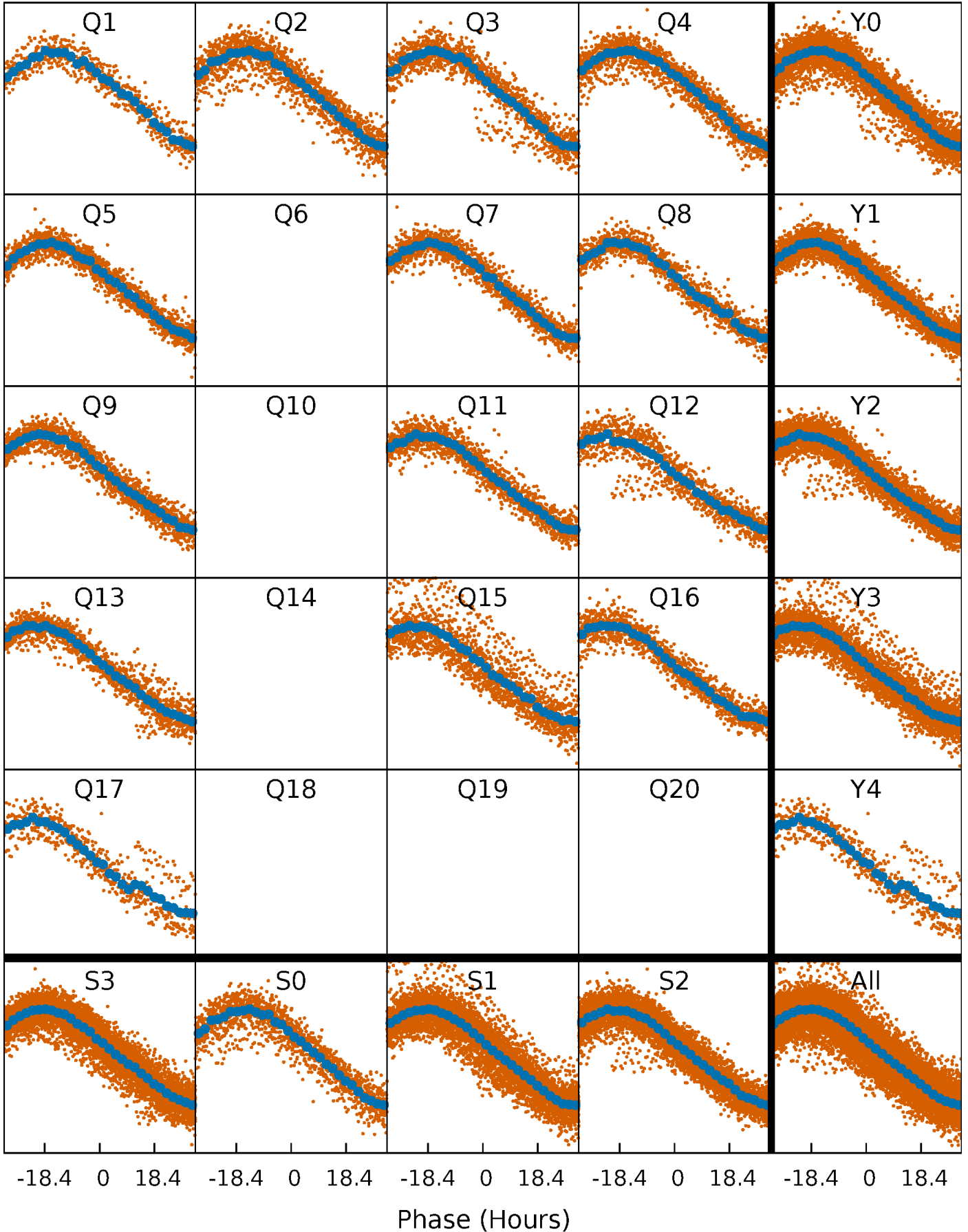


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



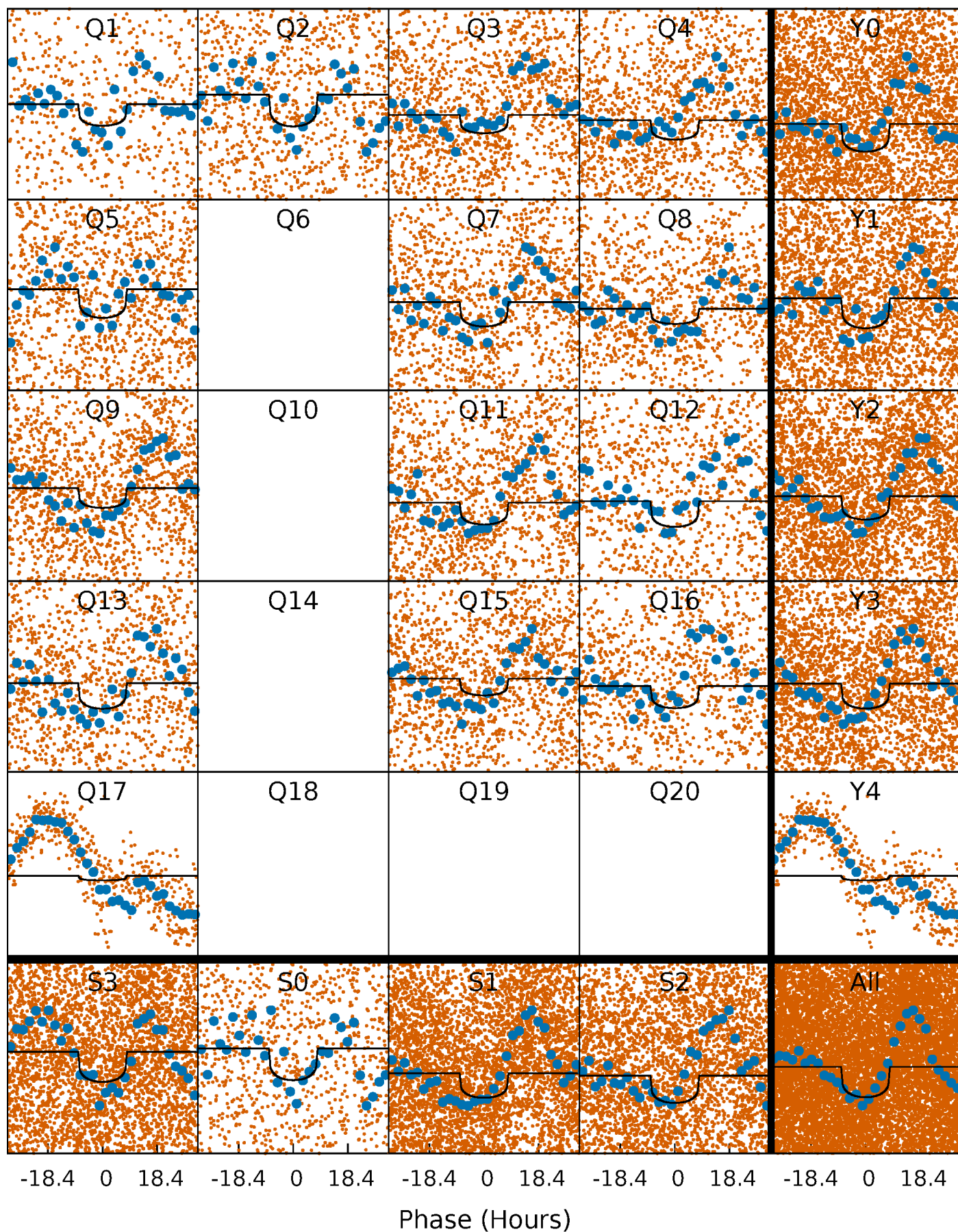
# PDC Quarter-Phased Transit Curves

TCE 005456359-02   P= 7.462029 Days    $T_0=133.499638$  (BKJD)



# DV Quarter-Phased Transit Curves

TCE 005456359-02   P= 7.462029 Days    $T_0=133.499638$  (BKJD)

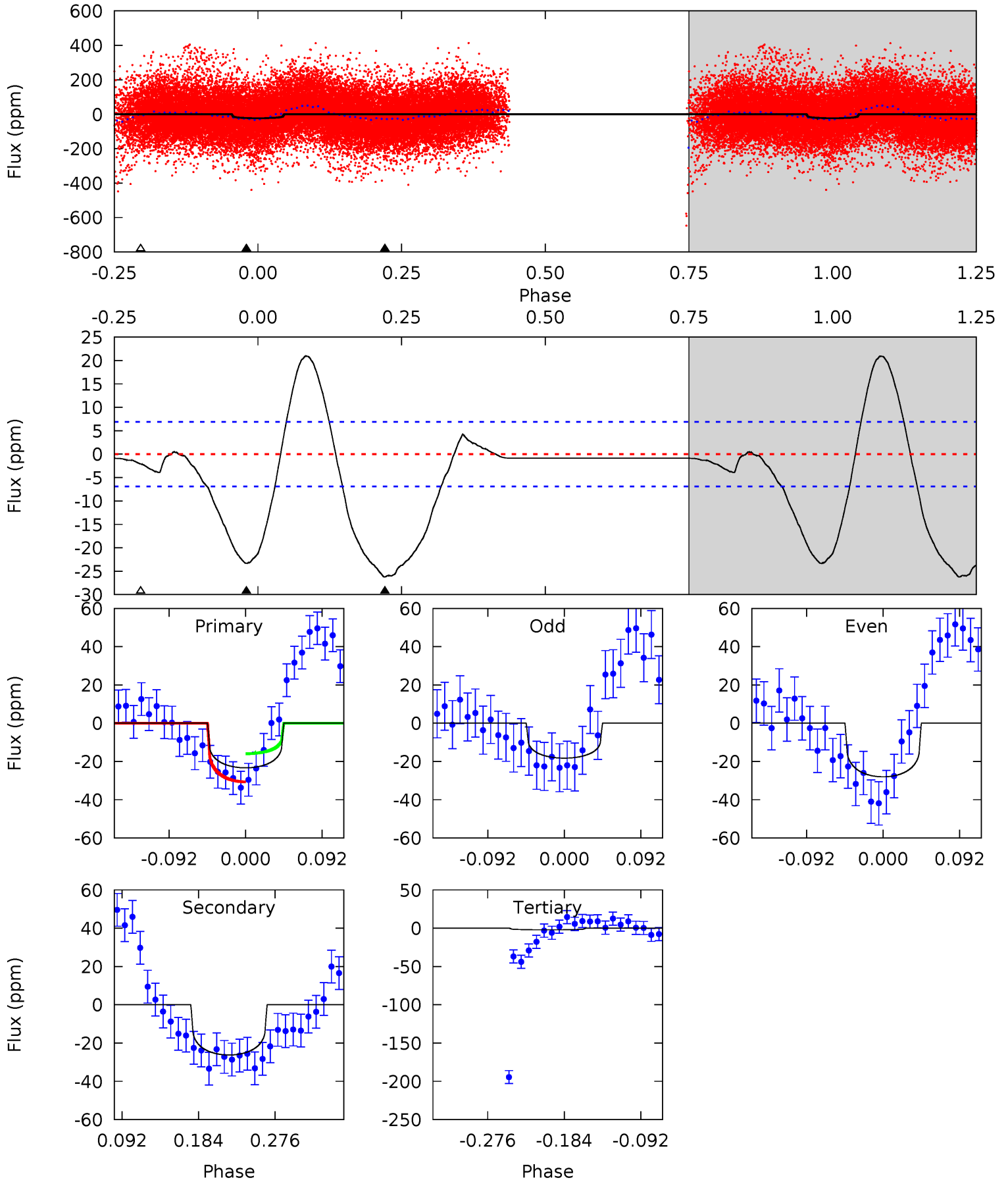


This plot does not exist for this TCE.

# DV Model-Shift Uniqueness Test

005456359-02, P = 7.462029 Days, E = 126.037609 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
15.5	17.4	1.39	0	4.58	1.68	5.20	14.1	15.5	16.0	17.4	3.26	1.28	0.44	4.87





## Alt Model-Shift Uniqueness Test

This plot does not exist for this TCE.

### Stellar Parameters For KIC 005456359

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5892^{+147}_{-147}$	$4.005^{+0.300}_{-0.120}$	$-0.240^{+0.350}_{-0.250}$	$1.651^{+0.344}_{-0.516}$	$1.005^{+0.158}_{-0.130}$	$0.314^{+0.592}_{-0.116}$
	+2%/-2%	+7%/-3%	+146%/-104%	+21%/-31%	+16%/-13%	+188%/-37%
Source	PHO1	FLK73	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 005456359-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-26 \pm 2$	$1.08^{+0.88}_{-0.71}$	$1671^{+112}_{-153}$	$5324^{+4336}_{-1080}$	$71^{+573}_{-49}$
Alt.	N/A	N/A	N/A	N/A	N/A

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

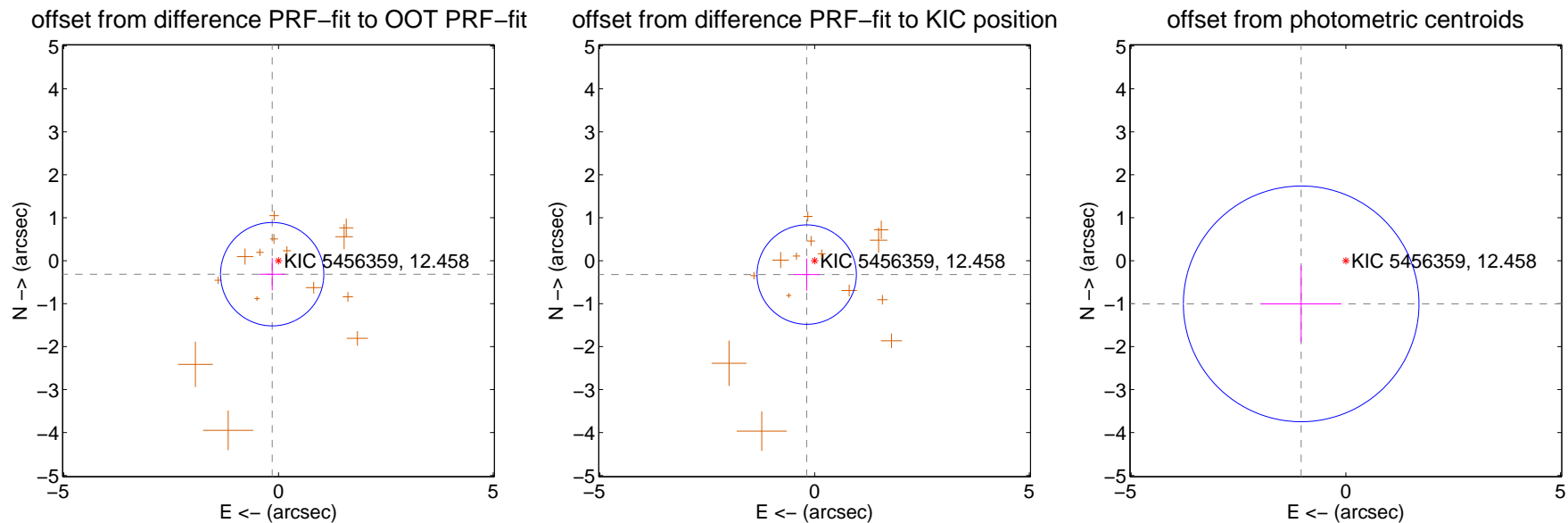
## DV Centroid Data

Supplemental centroid analysis for 005456359-02. Kepler magnitude: 12.46. Transit SNR 9.04

There are 0 quarters with good PRF difference image offsets

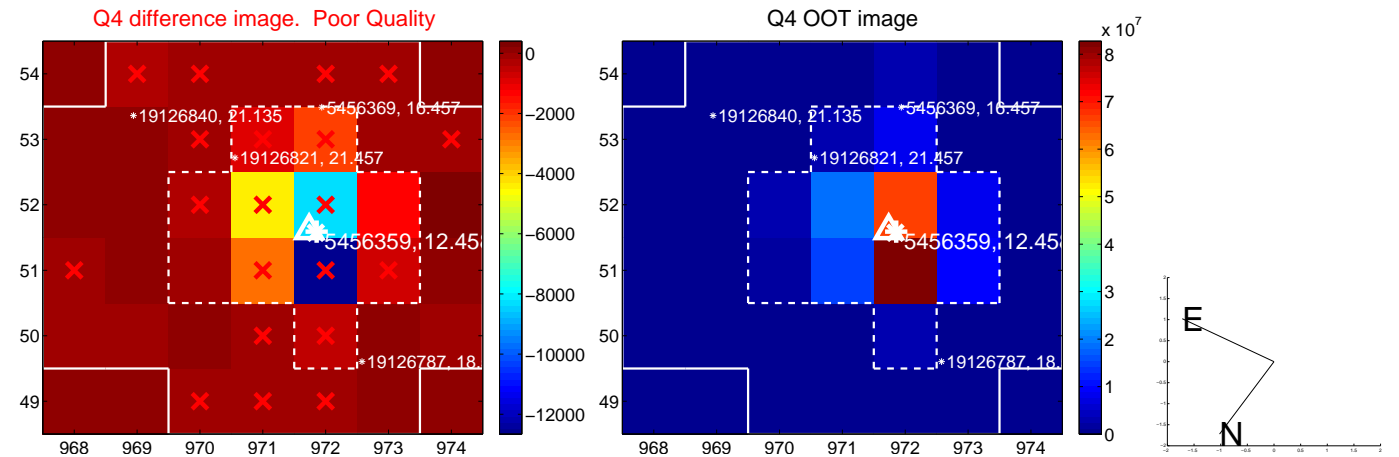
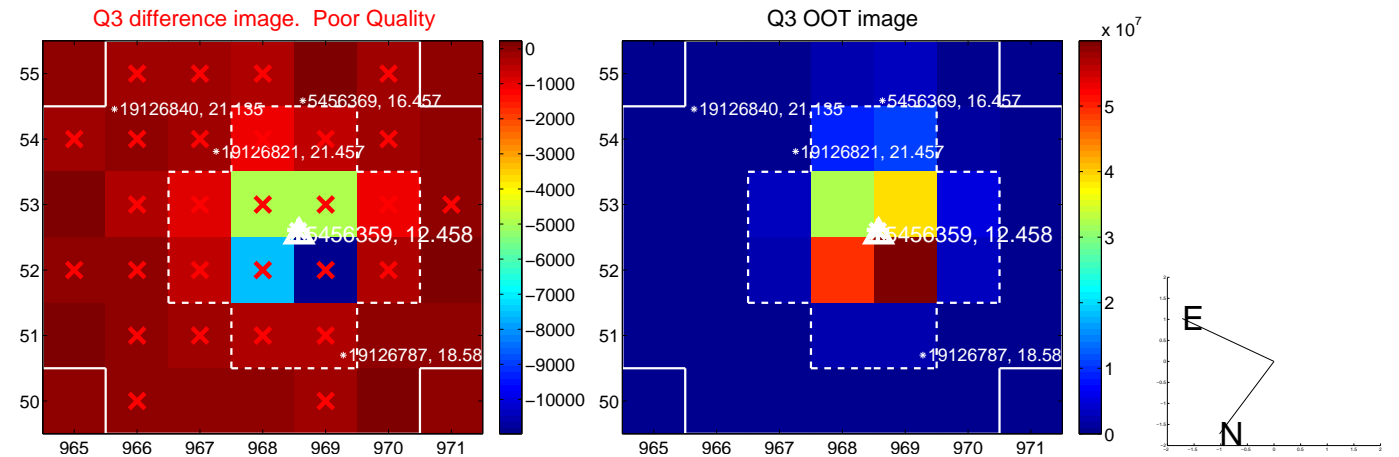
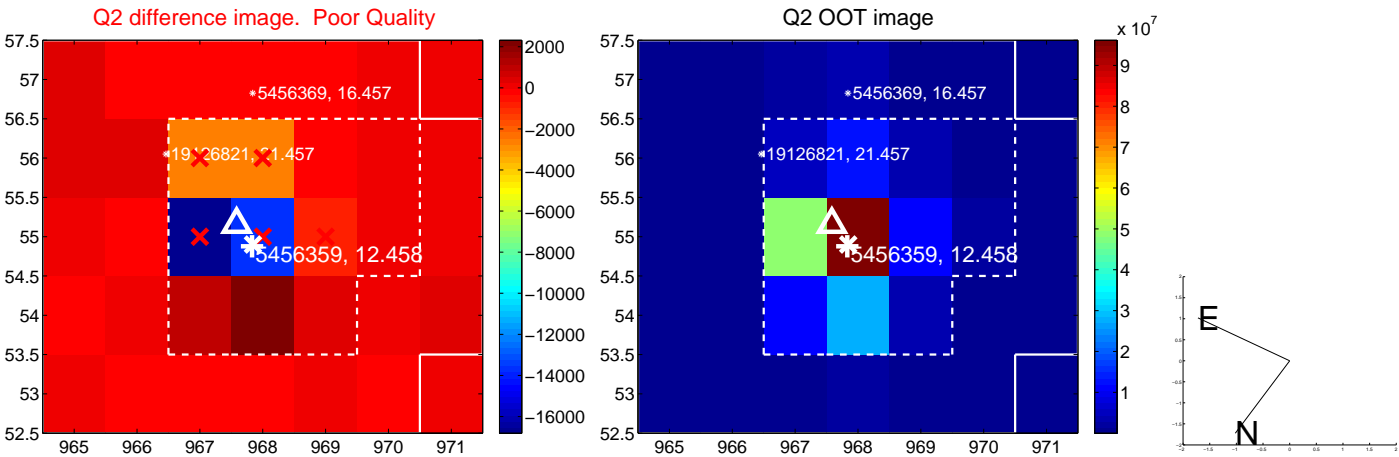
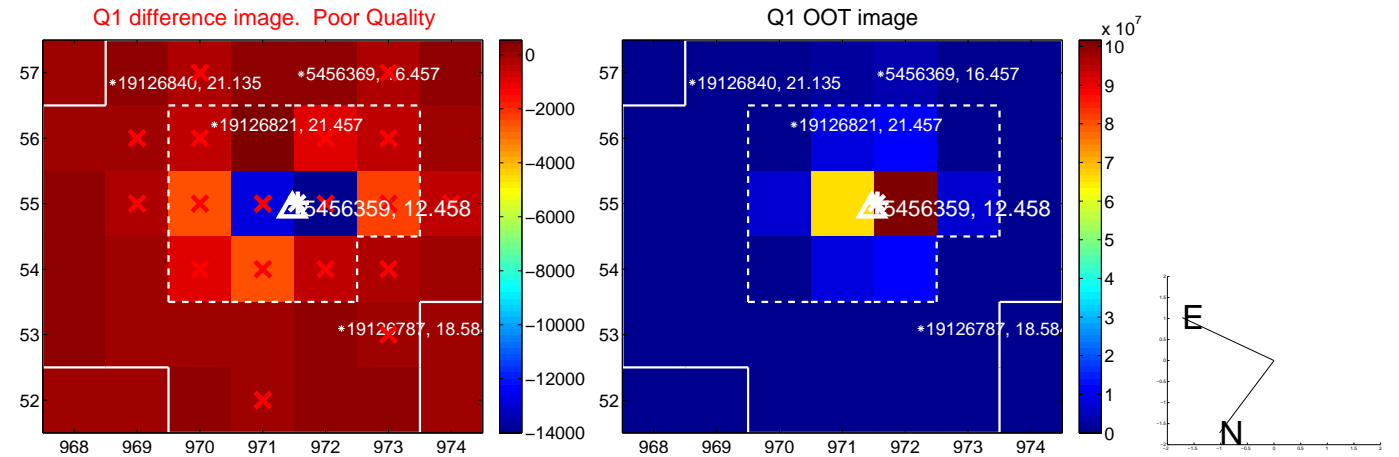
The direct PRF centroid is offset from the target star catalog position by about 0.07 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.347 \pm 0.401$	0.86	$0.147 \pm 0.300$	$-0.314 \pm 0.376$
PRF-fit source offset from KIC position	$0.373 \pm 0.386$	0.97	$0.185 \pm 0.298$	$-0.324 \pm 0.374$
photometric centroid source offset	$1.45 \pm 0.91$	1.58	$1.04 \pm 0.93$	$-1.00 \pm 0.89$

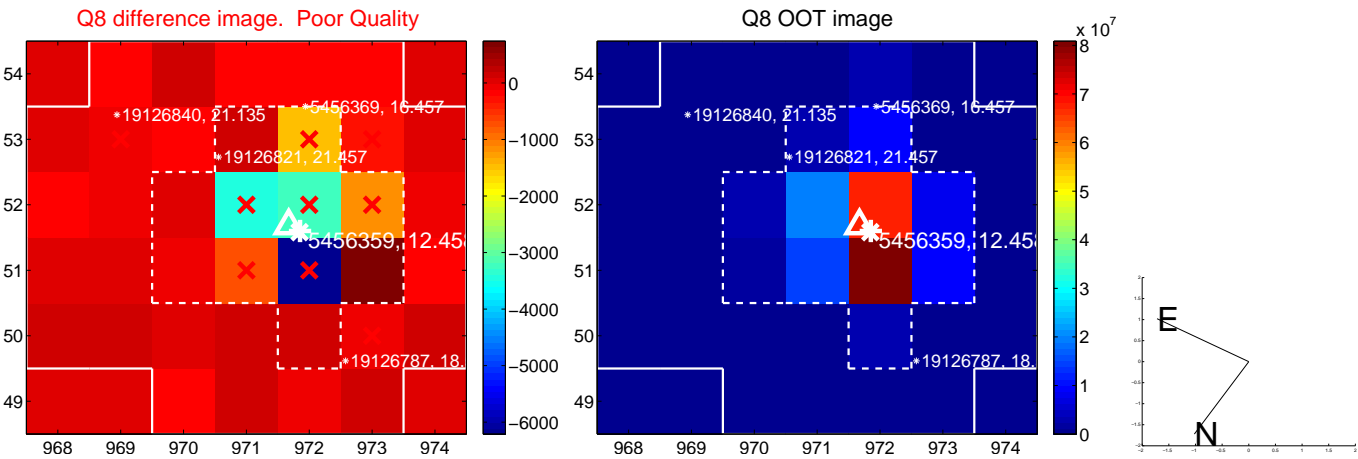
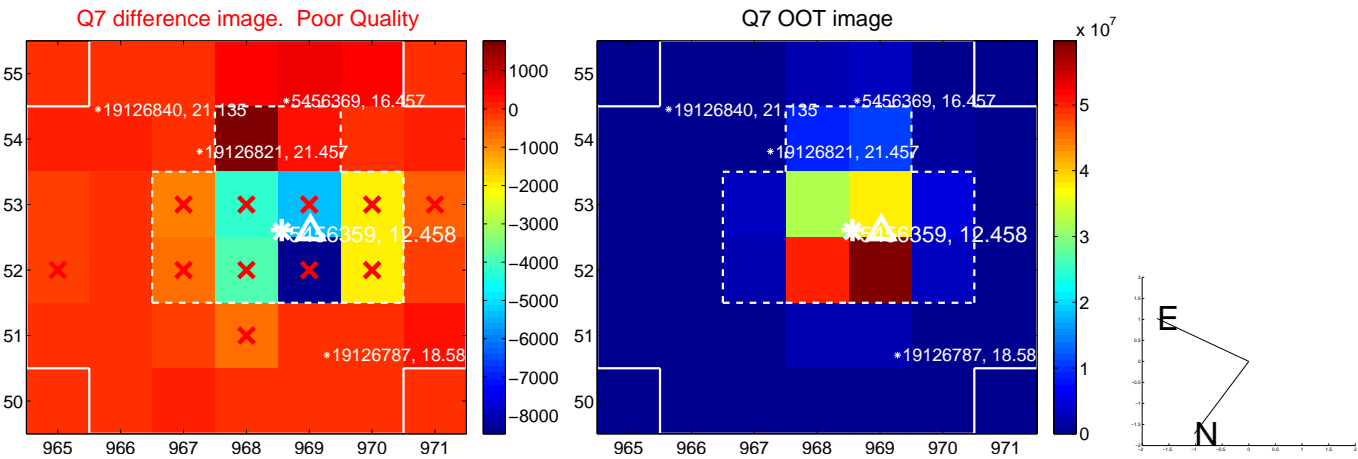
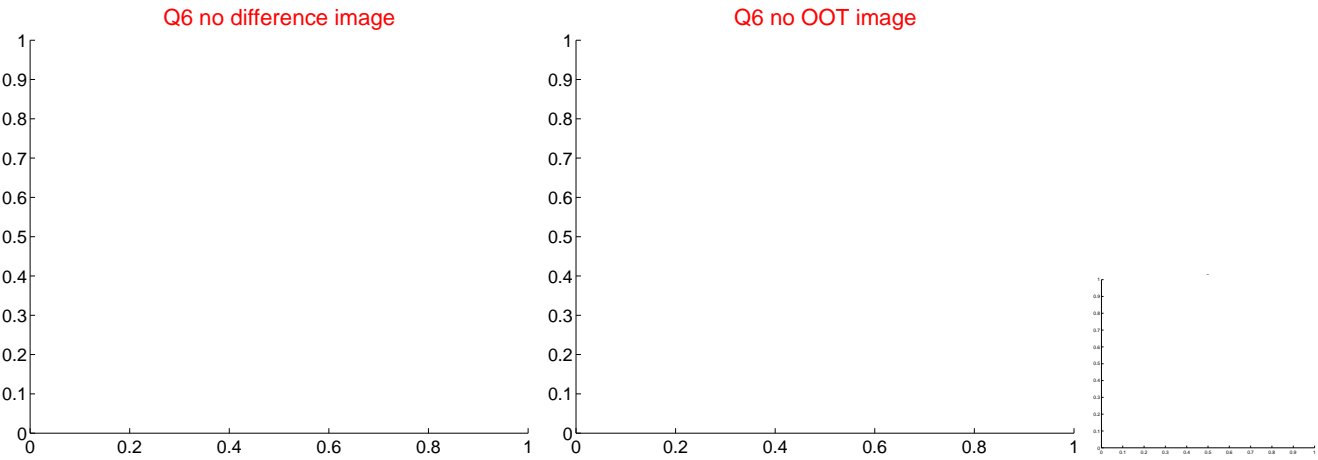
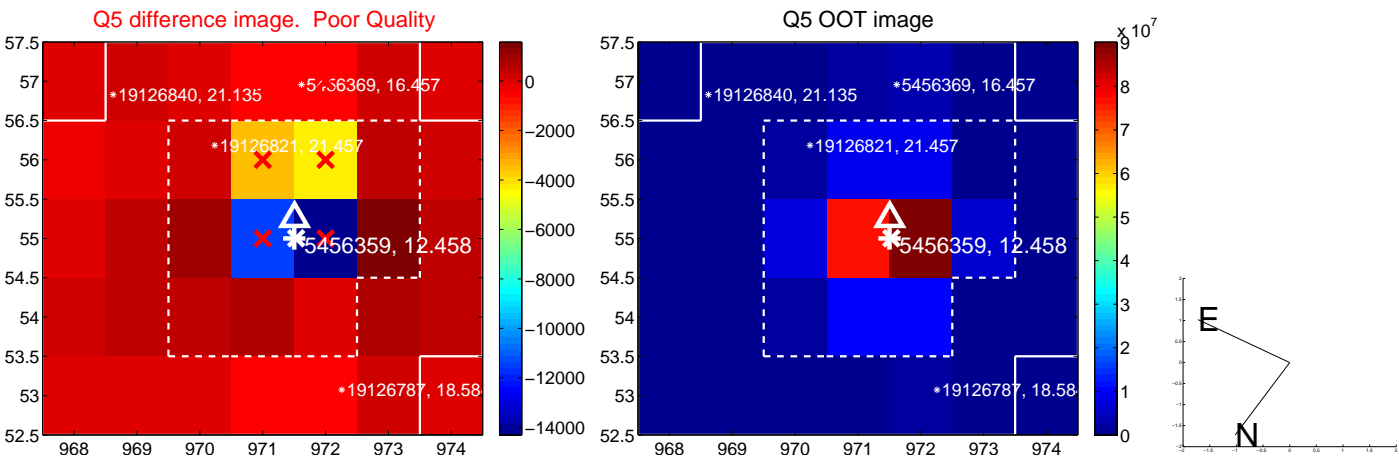


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

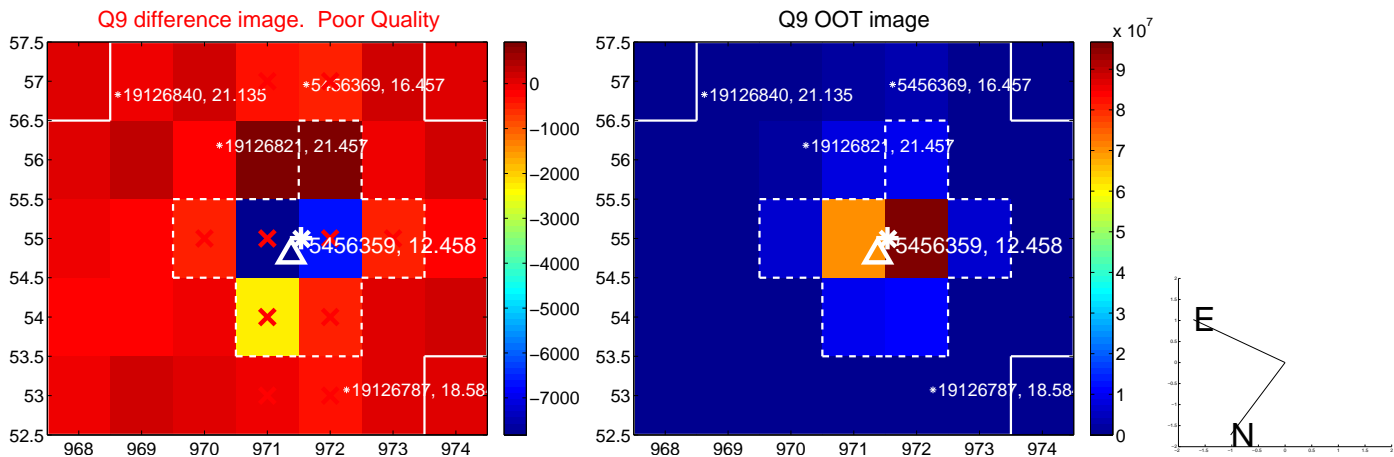
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



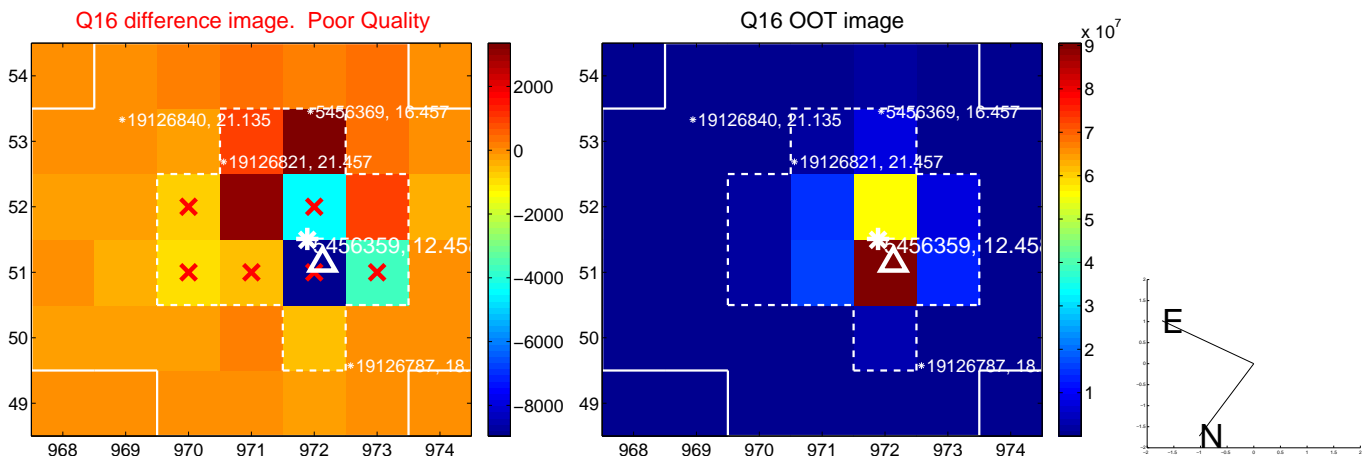
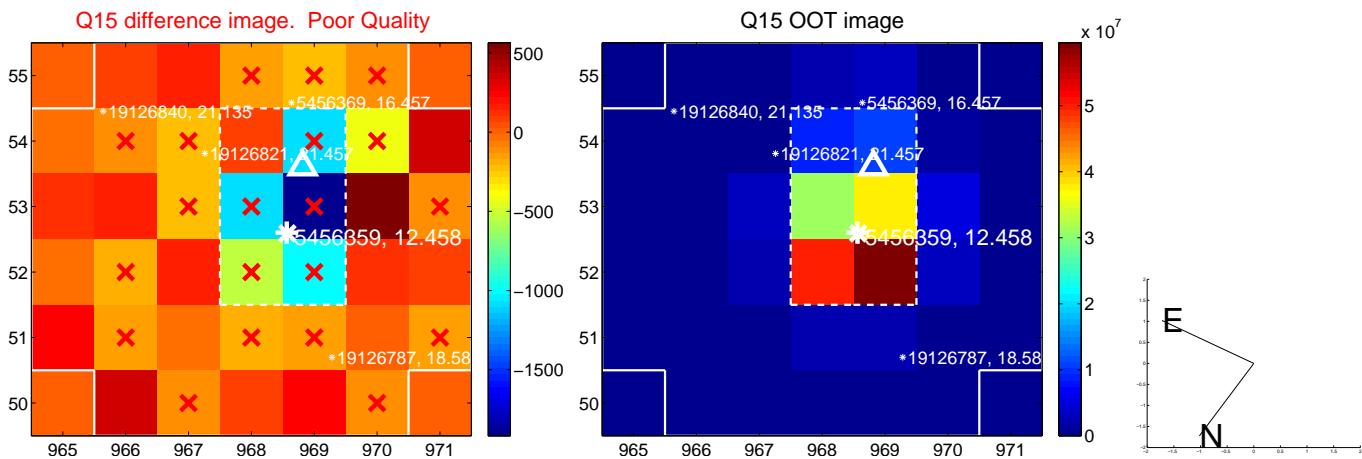
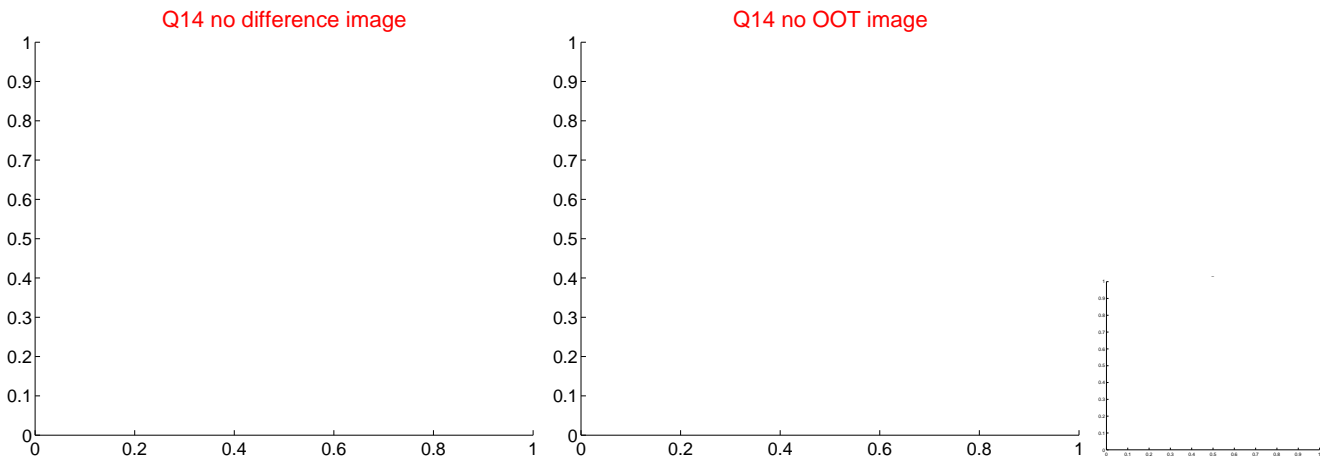
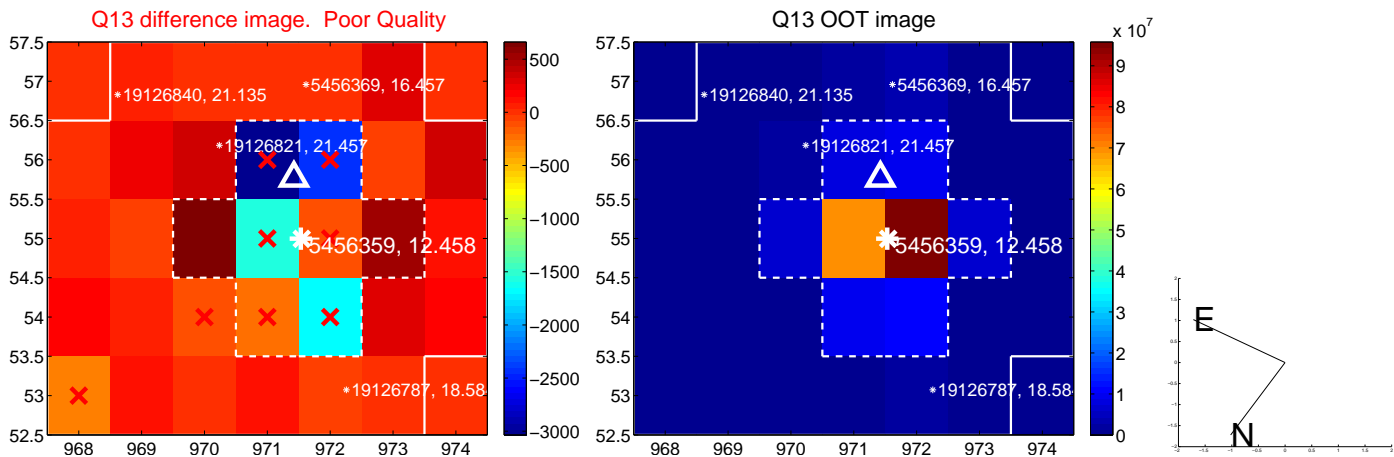
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

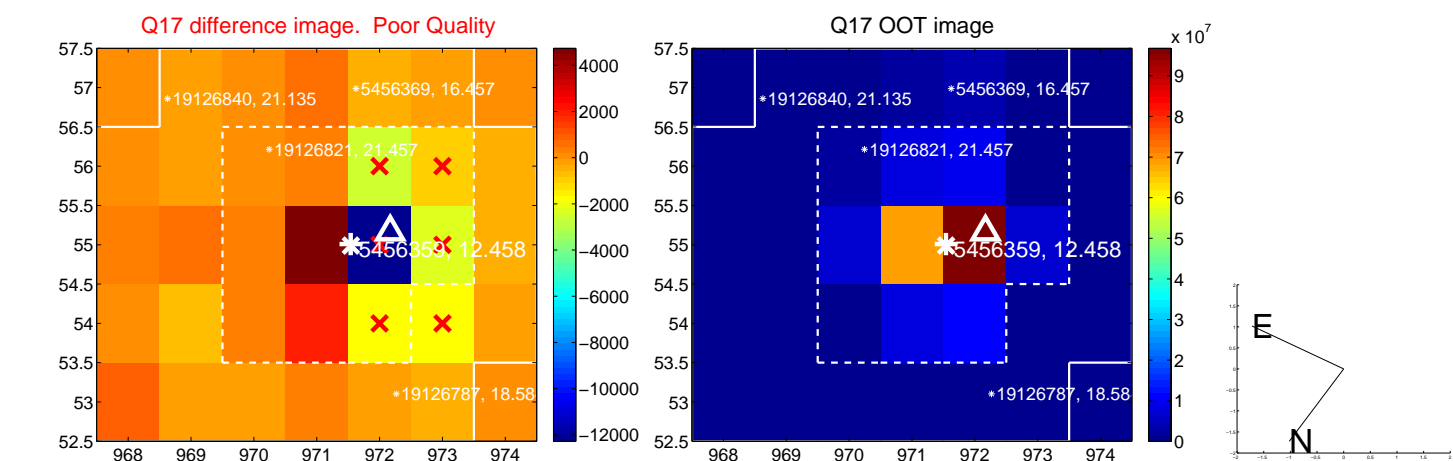


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

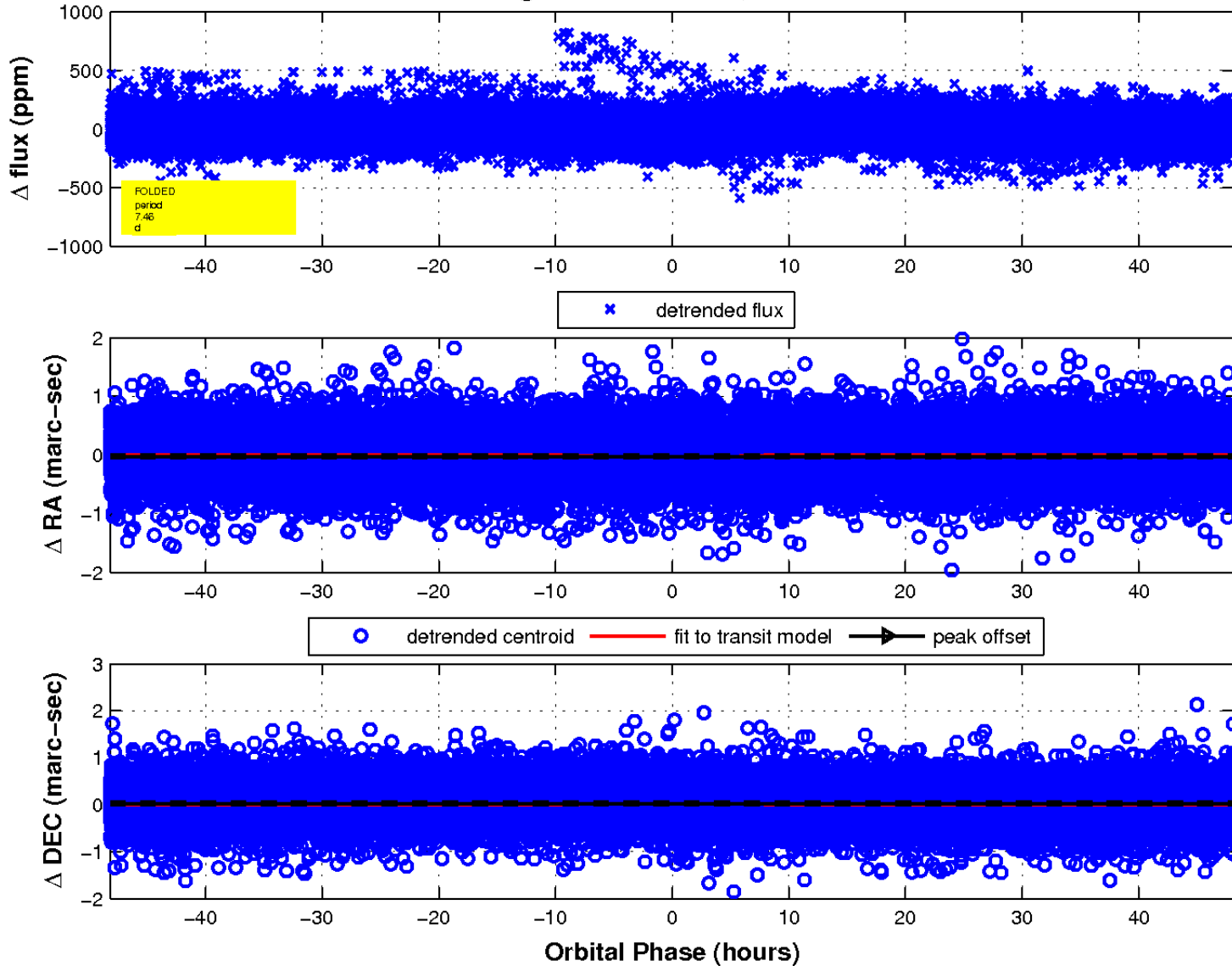




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

