

# KIC 005256372

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005256372-01	OBS	No	0.584011	132.093983	20.6	1.544	8.2	7.5	9.21	7022	4.89	0.00
005256372-02	OBS	No	0.860472	132.175193	50.1	4.631	8.1	8.4	9.21	7022	8.80	0.00
005256372-03	OBS	No	59.688269	147.552951	578.5	5.642	7.8	8.2	9.21	7022	42.09	976.83
005256372-04	OBS	No	592.901315	359.048961	498.9	12.267	7.7	7.3	9.21	7022	23.26	45.75

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005256372-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
005256372-02	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—CENT_SATURATED
005256372-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
005256372-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—CENT_SATURATED

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

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

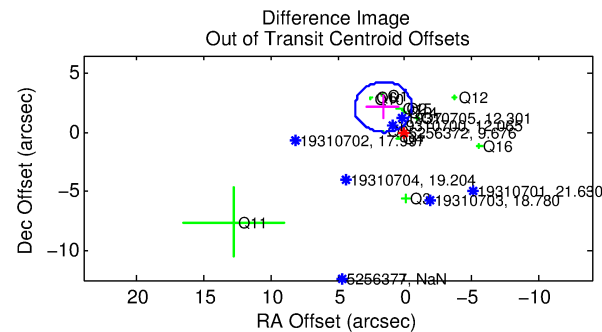
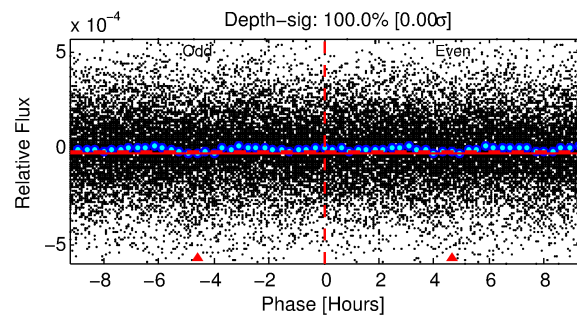
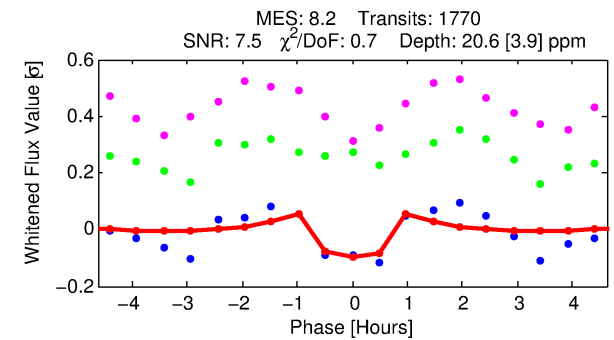
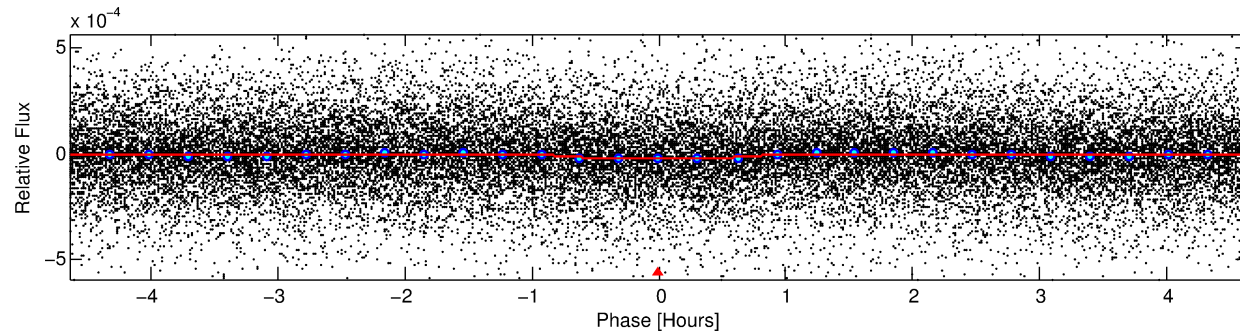
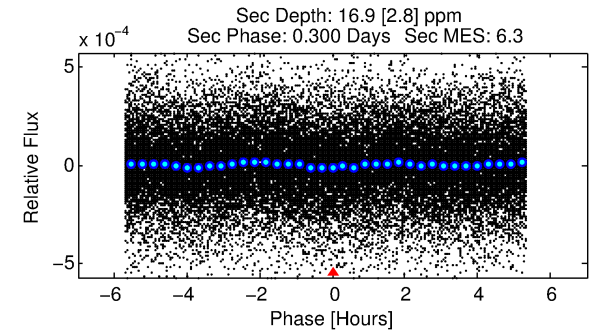
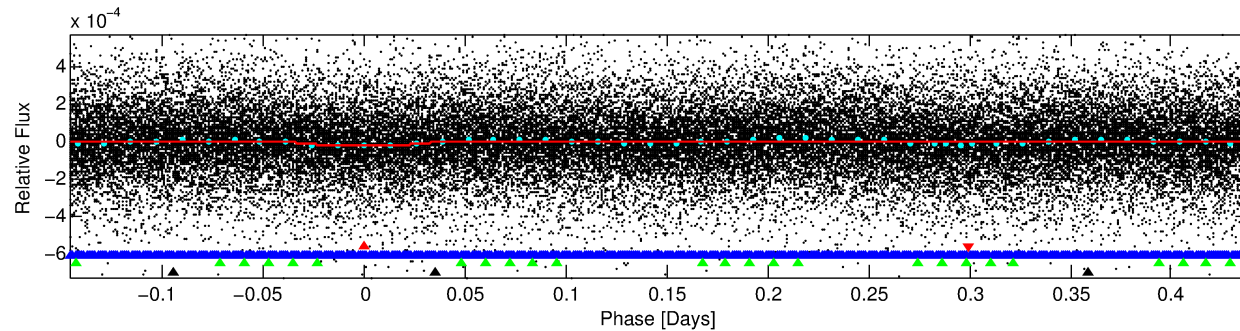
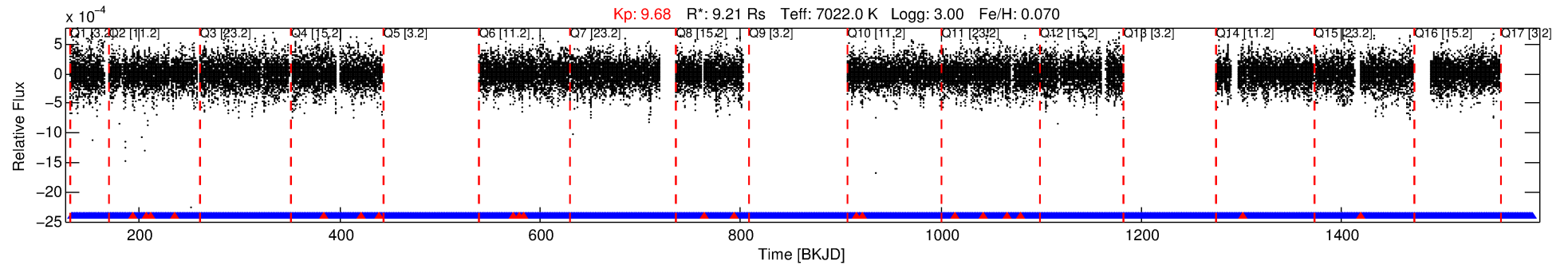
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 005256372-01

No Significant Match Found

# DV One-Page Summary

KIC: 5256372 Candidate: 1 of 4 Period: 0.584 d



## DV Fit Results:

Period = 0.58401 [0.00001] d  
Epoch = 132.0940 [0.0018] BKJD  
Rp/R\* = 0.0049 [0.0008]  
a/R\* = 1.60 [0.88]  
b = 0.90 [0.19]  
Seff = N/A  
Teq = N/A  
Rp = 4.89 [3.05] Re  
a = N/A  
Ag = N/A  
Teffp = N/A

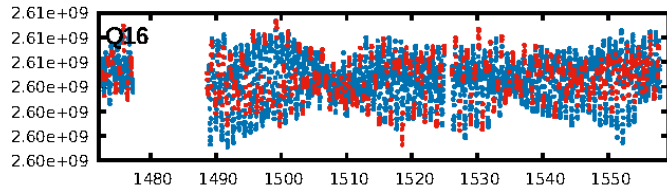
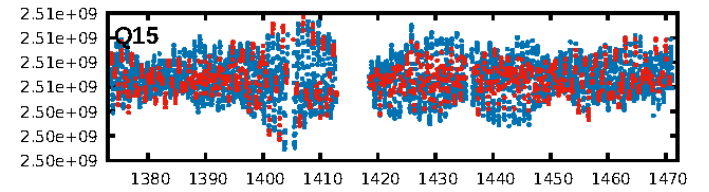
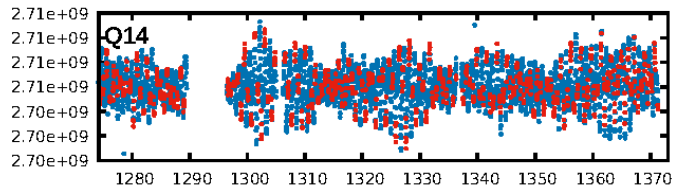
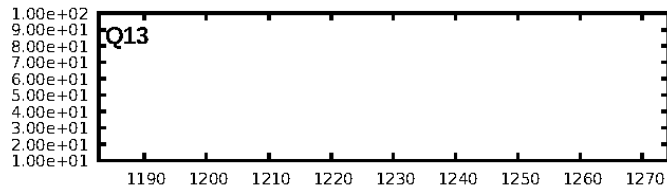
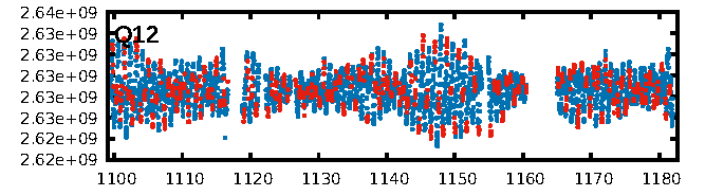
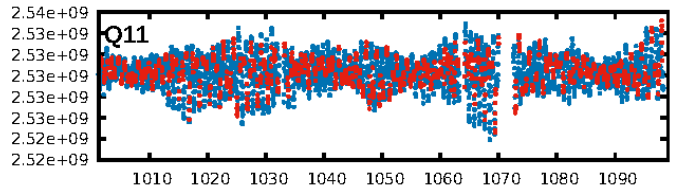
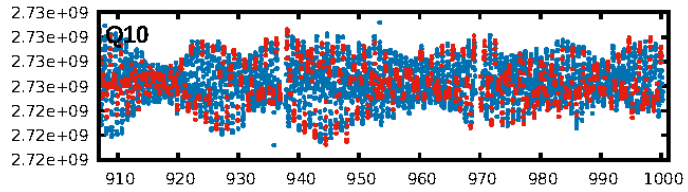
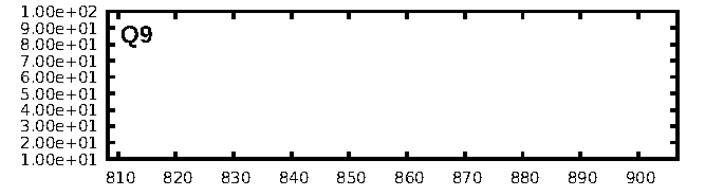
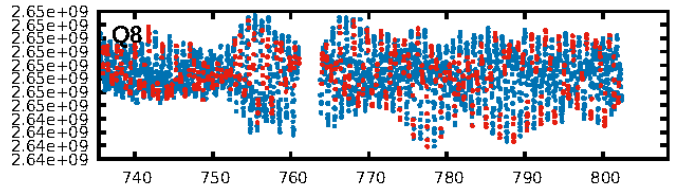
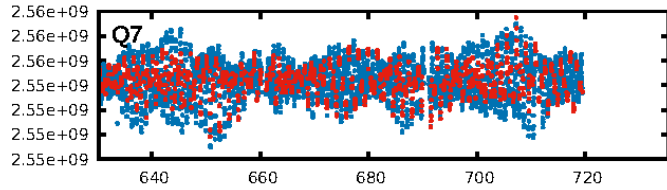
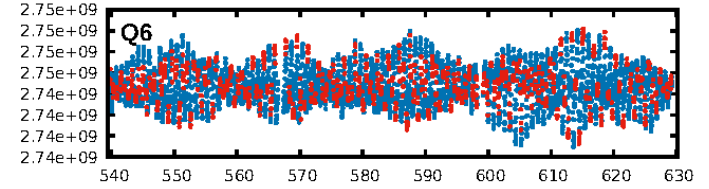
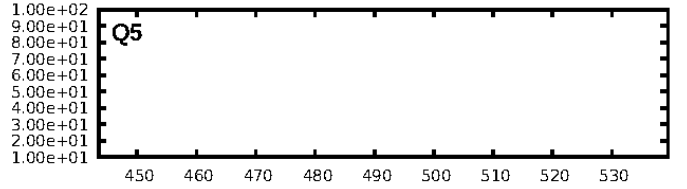
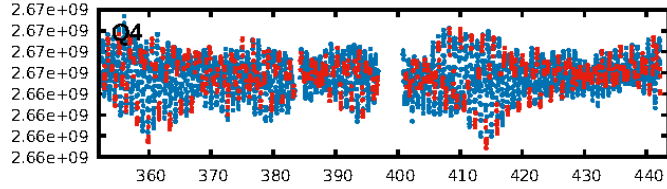
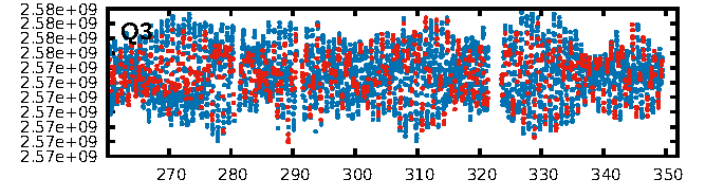
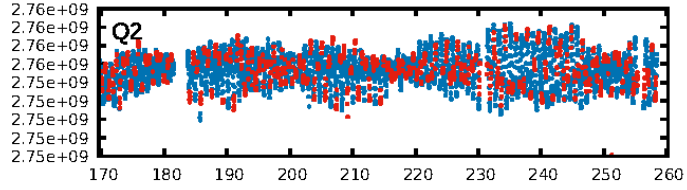
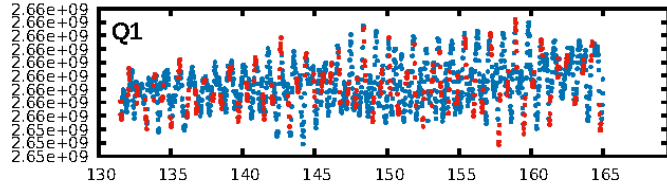
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 82.6% [1.36σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 1.36e-12  
RollingBand-fgt: 0.99 [1691/1712]  
GhostDiagnostic-chr: N/A  
Centroid-sig: 0.0%  
Centroid-so: 2.234 arcsec [3.23σ]  
OotOffset-rm: 2.660 arcsec [3.75σ]  
KicOffset-rm: 4.040 arcsec [5.68σ]  
OotOffset-st: 4/4/4/1 [13]  
KicOffset-st: 4/4/4/1 [13]  
DiffImageQuality-fgm: 0.00 [0/13]  
DiffImageOverlap-fno: 1.00 [13/13]

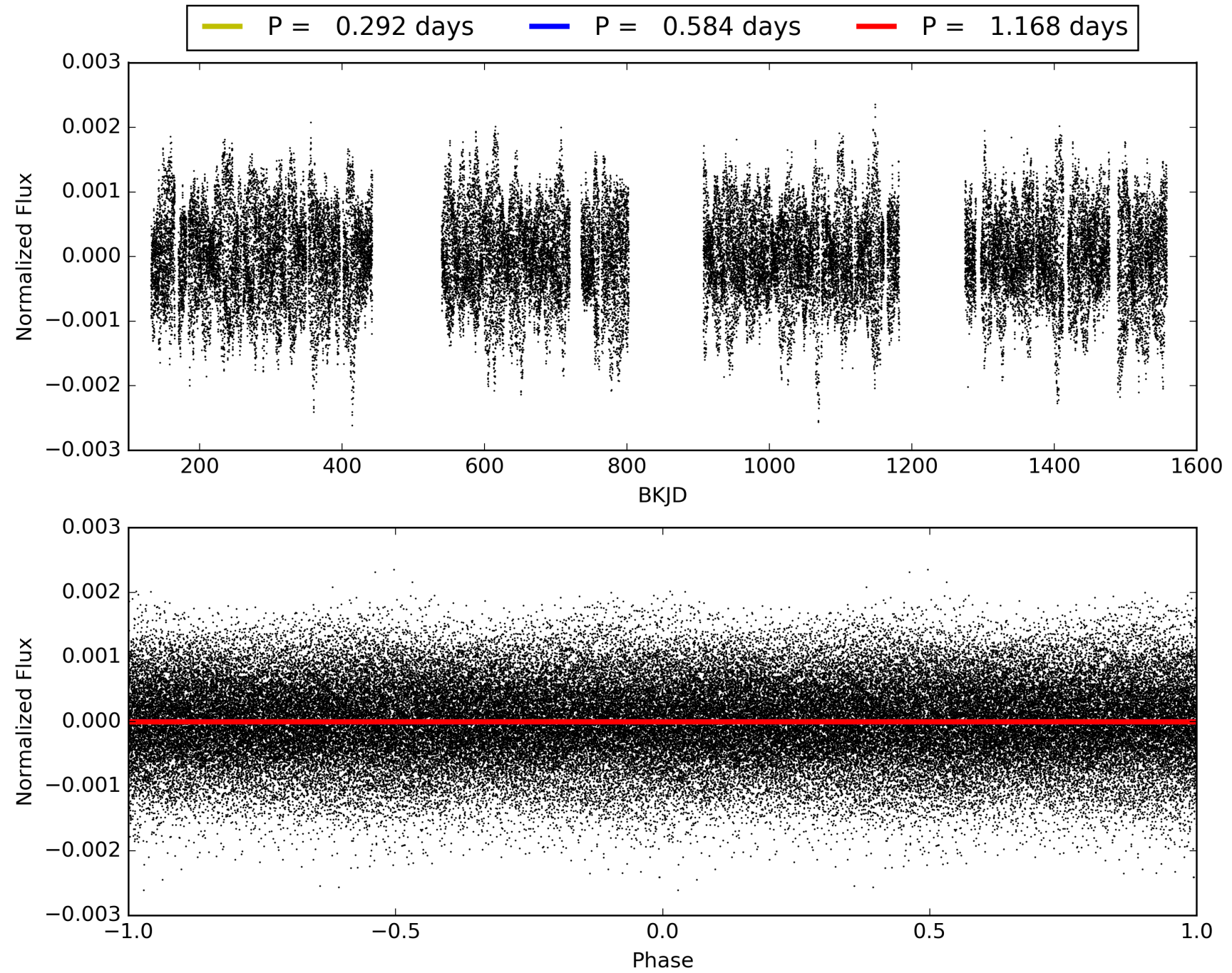
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 21:19:13 Z

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

## TCE 005256372-01, PDC Light Curves



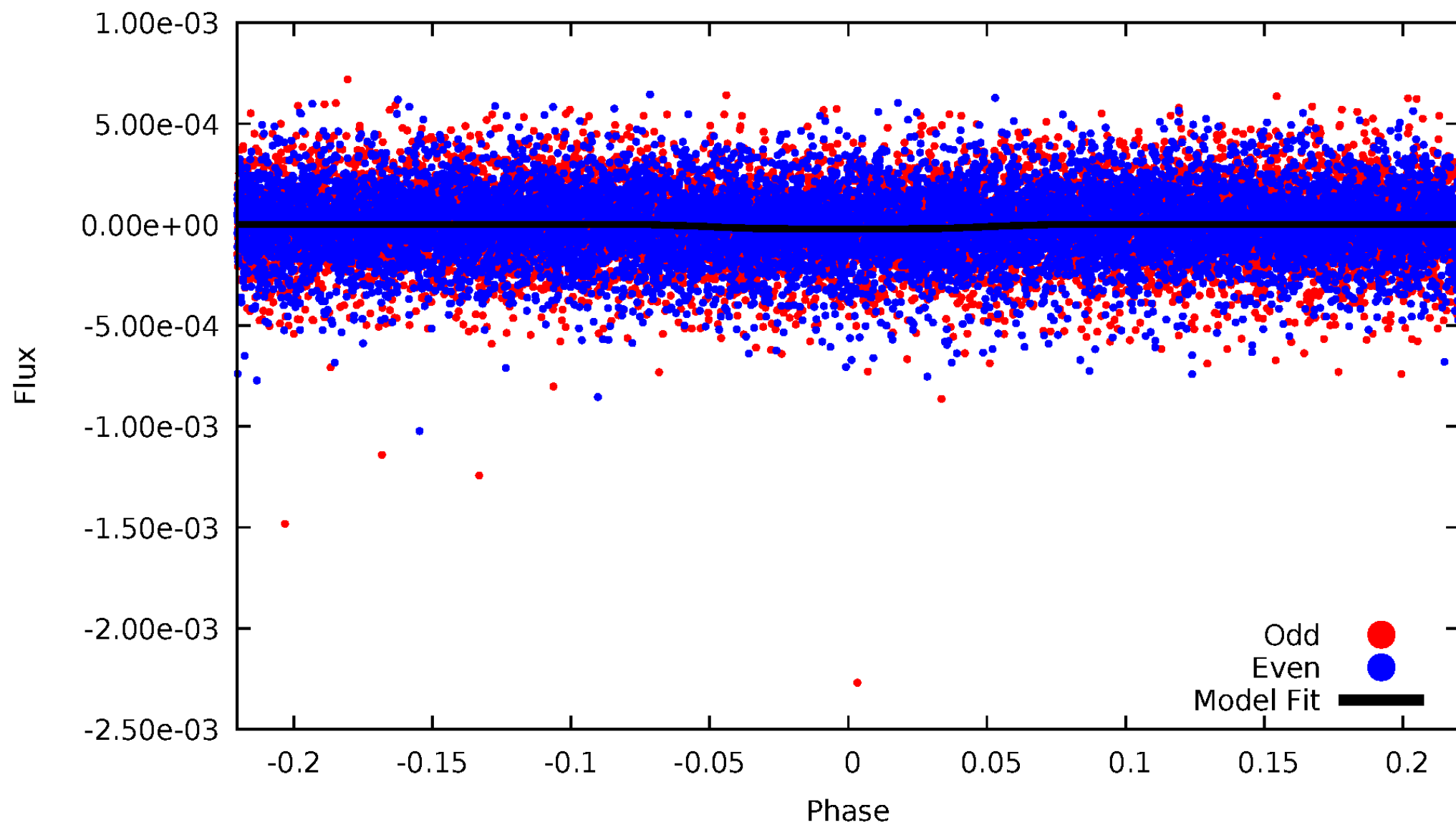
TCE 005256372-01





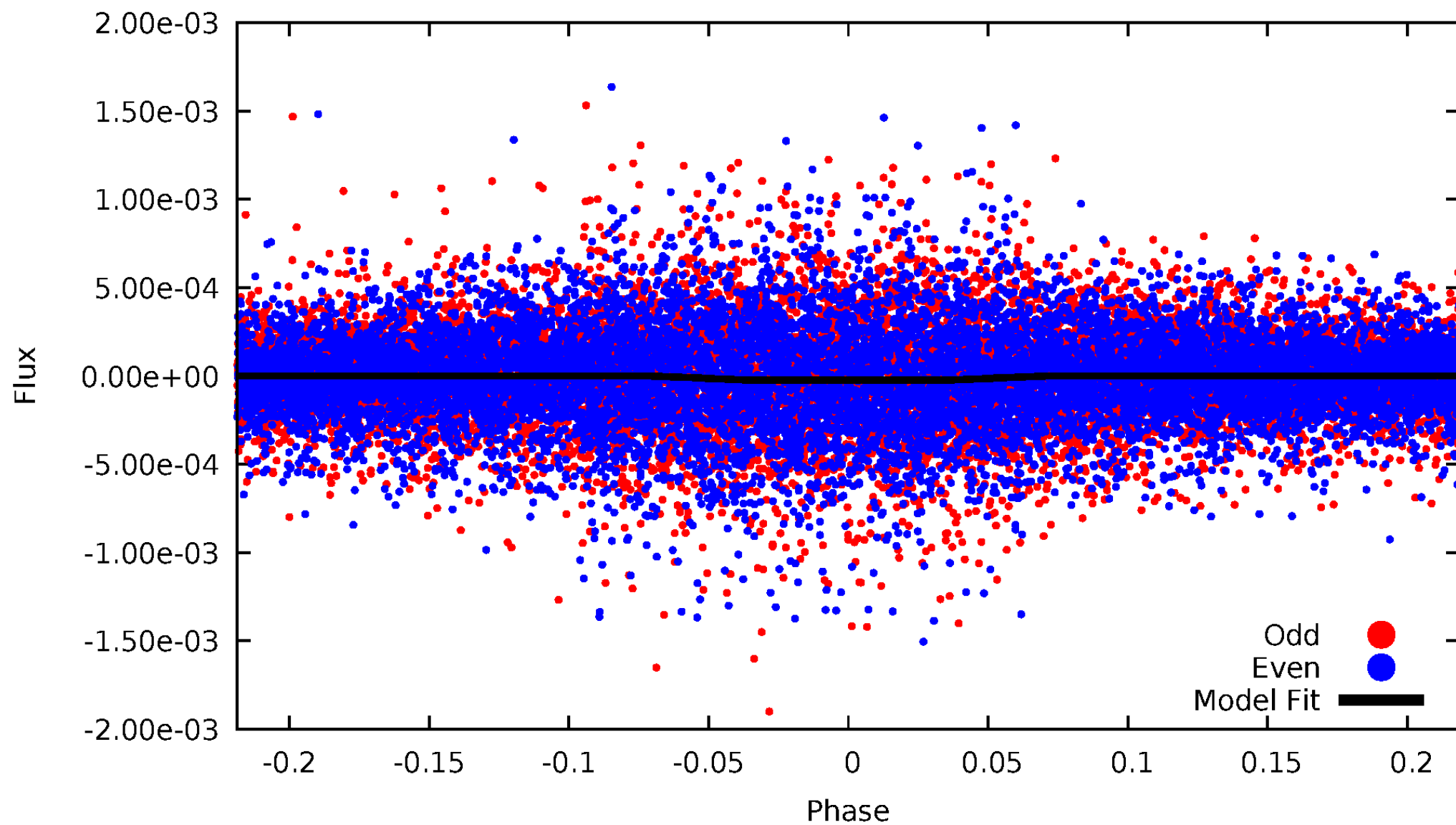
# DV Odd/Even

TCE 005256372-01

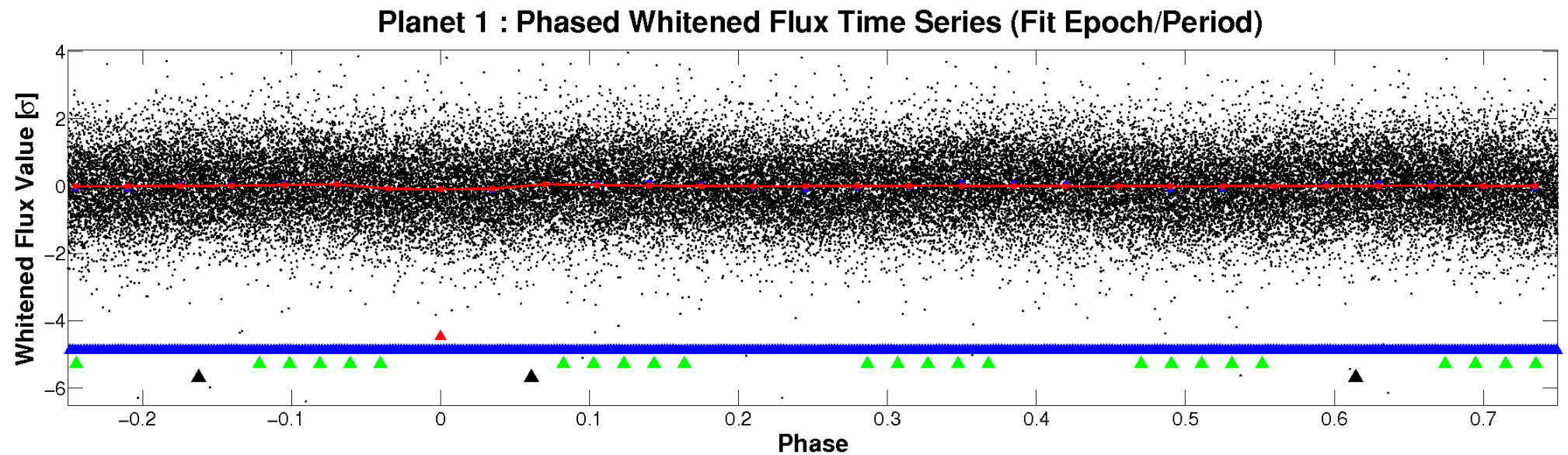
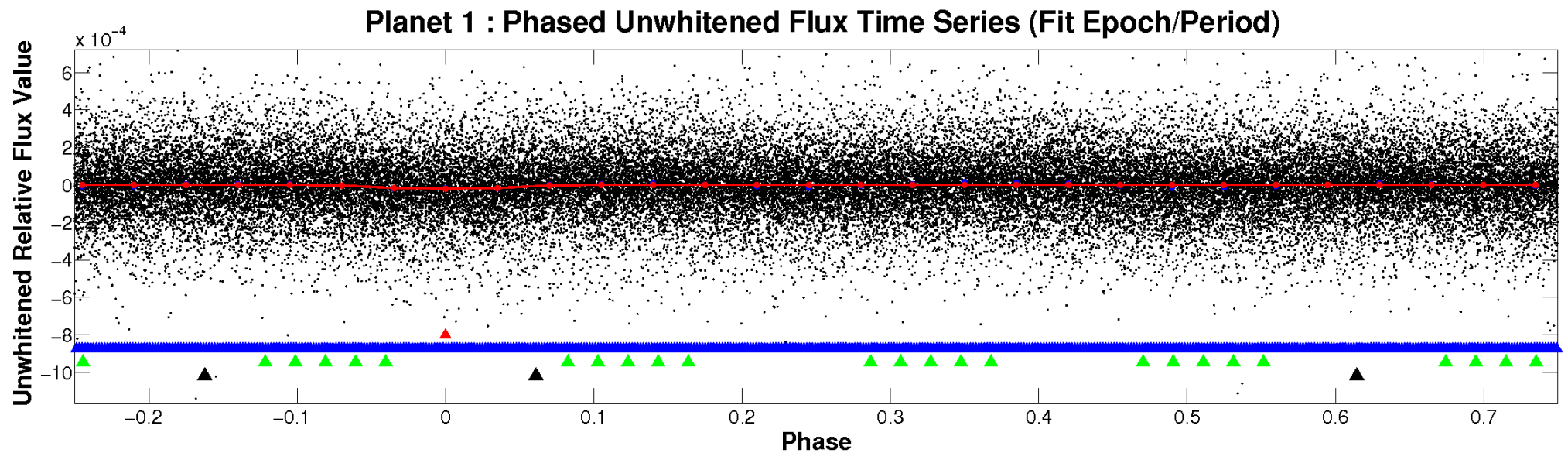


# ALT Odd/Even

TCE 005256372-01

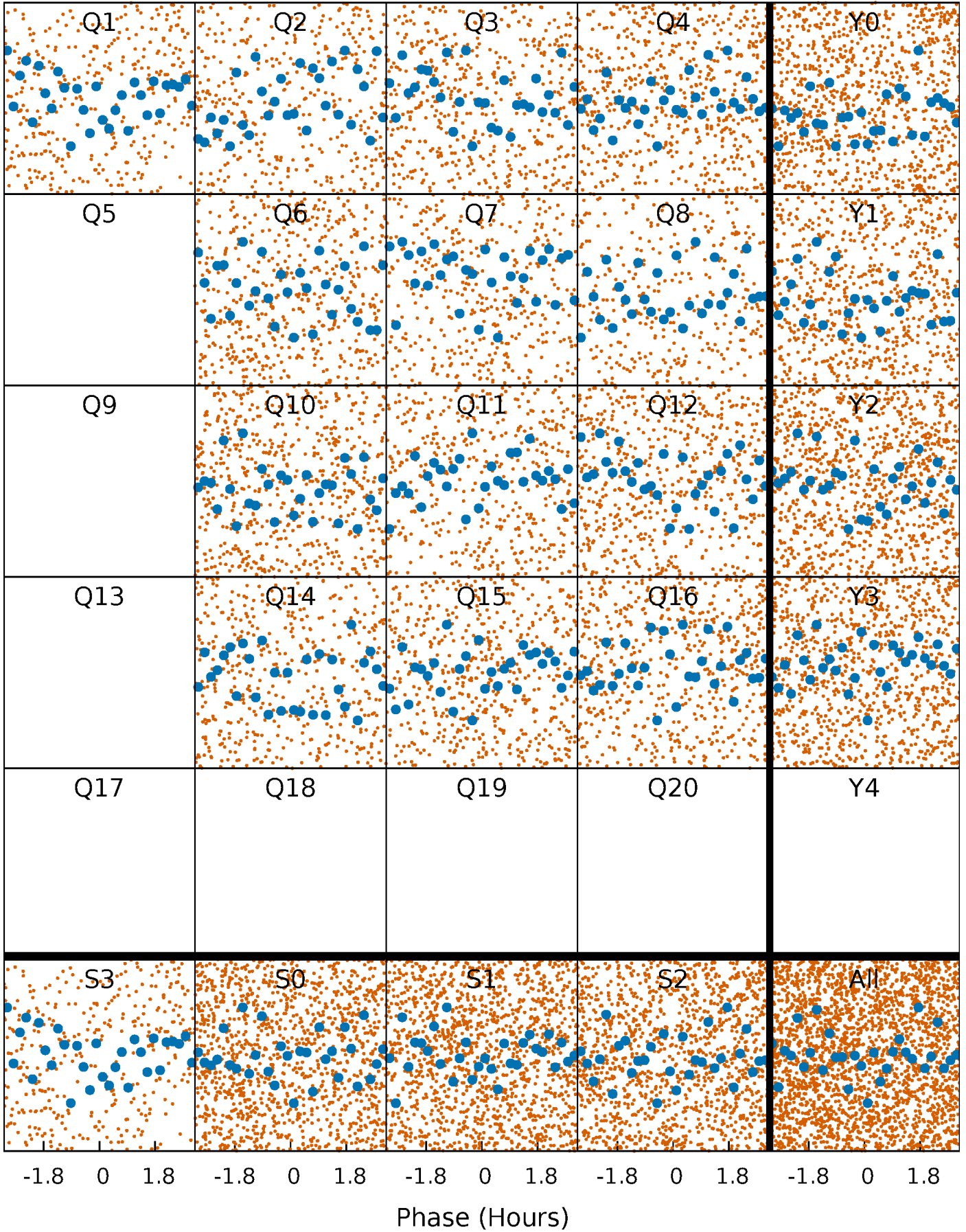


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

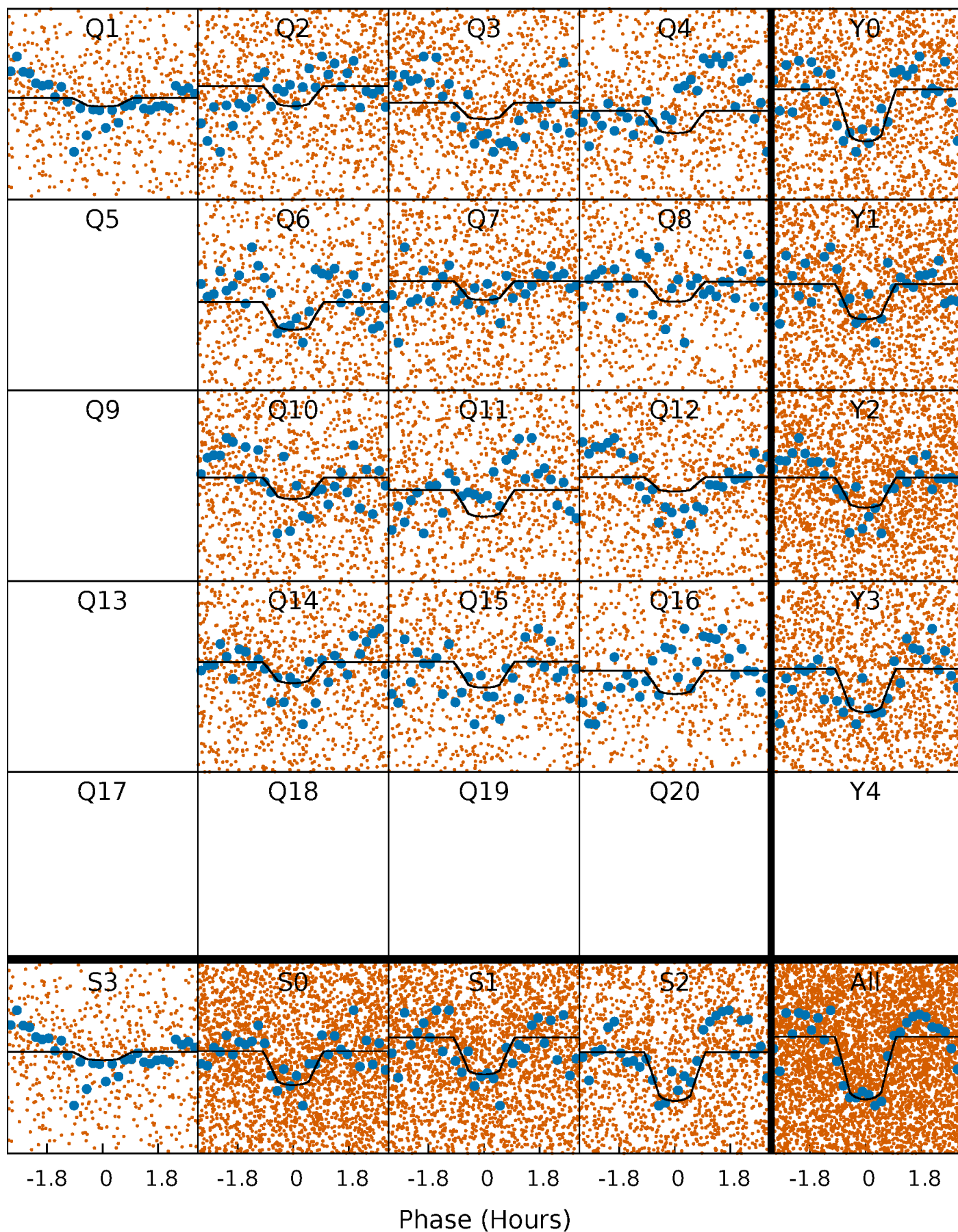
TCE 005256372-01 P= 0.584011 Days  $T_0=132.093983$  (BKJD)





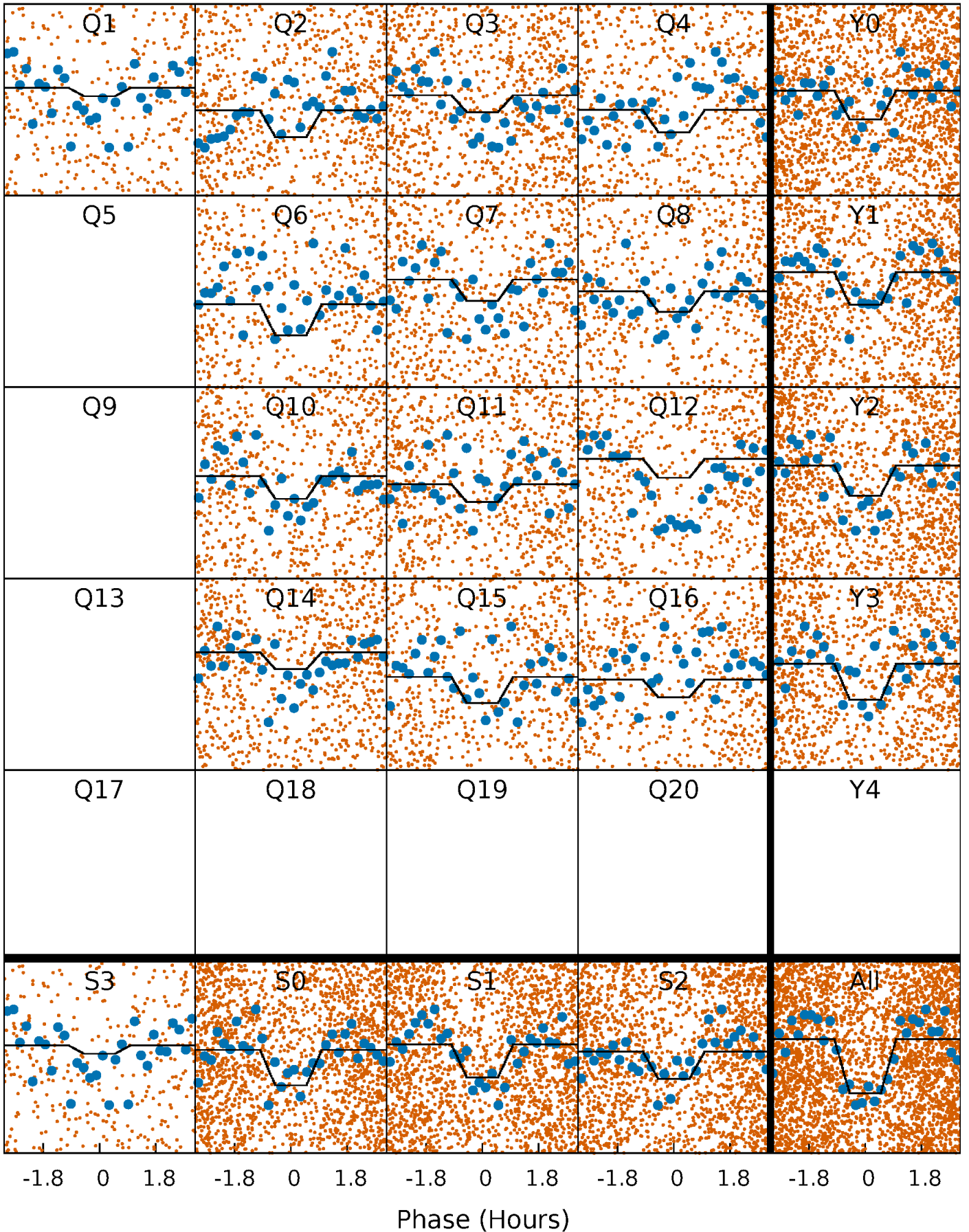
# DV Quarter-Phased Transit Curves

TCE 005256372-01 P= 0.584011 Days  $T_0=132.093983$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

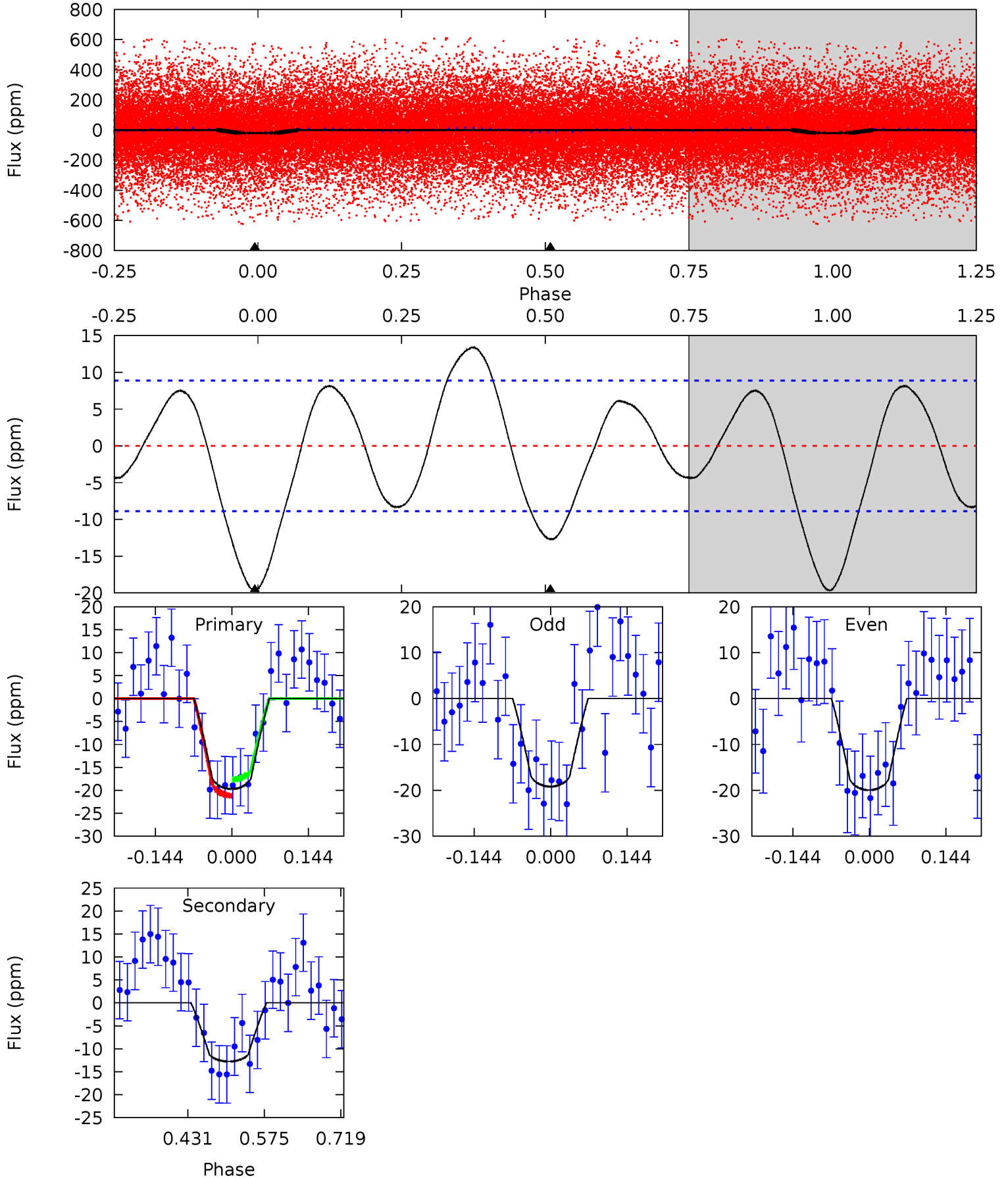
TCE 005256372-01 P= 0.584012 Days  $T_0=132.094163$  (BKJD)



# DV Model-Shift Uniqueness Test

005256372-01, P = 0.584011 Days, E = 131.509972 Days

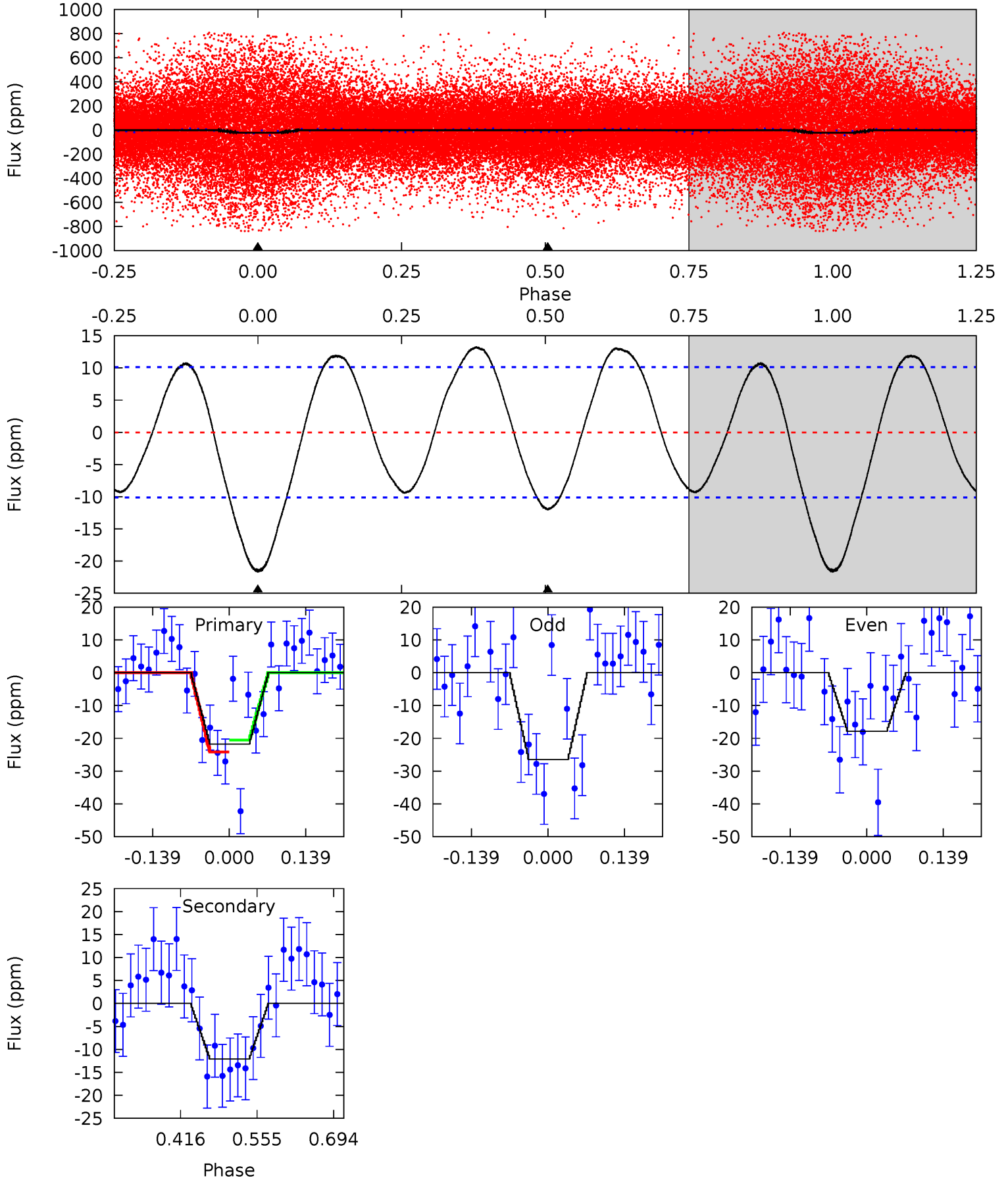
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.97	6.45	0	0	4.49	1.46	2.84	9.97	9.97	6.45	6.45	0.19	1.14	0.41	0.90



# Alt Model-Shift Uniqueness Test

005256372-01, P = 0.584012 Days, E = 131.510151 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.66	5.37	0	0	4.50	1.48	3.22	9.66	9.66	5.37	5.37	1.90	0.88	0.38	0.81





### Stellar Parameters For KIC 005256372

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7022^{+157}_{-244}$	$2.998^{+0.666}_{-0.074}$	$0.070^{+0.150}_{-0.400}$	$9.213^{+1.036}_{-5.528}$	$3.080^{+0.211}_{-1.198}$	$0.006^{+0.062}_{-0.002}$
	+2%/-3%	+22%/-2%	+214%/-571%	+11%/-60%	+7%/-39%	+1123%/-35%
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 005256372-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-13 \pm 2$	$4.25^{+1.32}_{-1.47}$	$8929^{+653}_{-1410}$	$-6068^{+8992}_{-987}$	$0.151^{+0.155}_{-0.061}$
Alt.	$-12 \pm 2$	$4.18^{+1.23}_{-1.42}$	$8956^{+595}_{-1451}$	$-6111^{+8334}_{-967}$	$0.144^{+0.157}_{-0.058}$

$T_{max}$  = 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

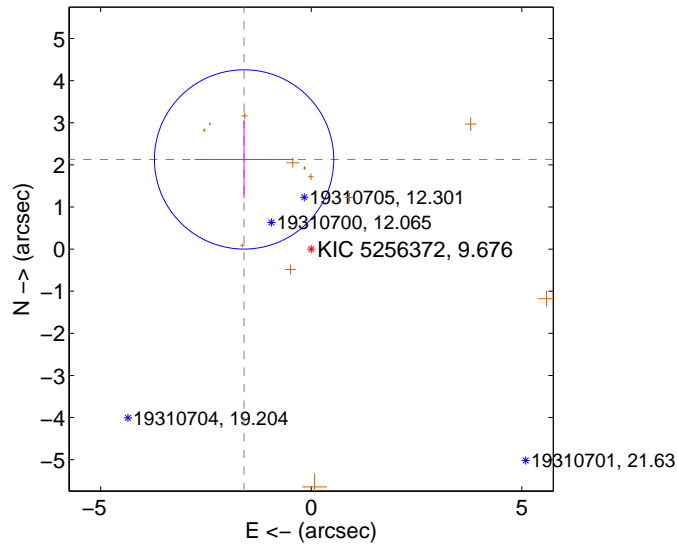
Supplemental centroid analysis for 005256372-01. **Kepler magnitude: 9.68.** Transit SNR 7.50

There are 0 quarters with good PRF difference image offsets

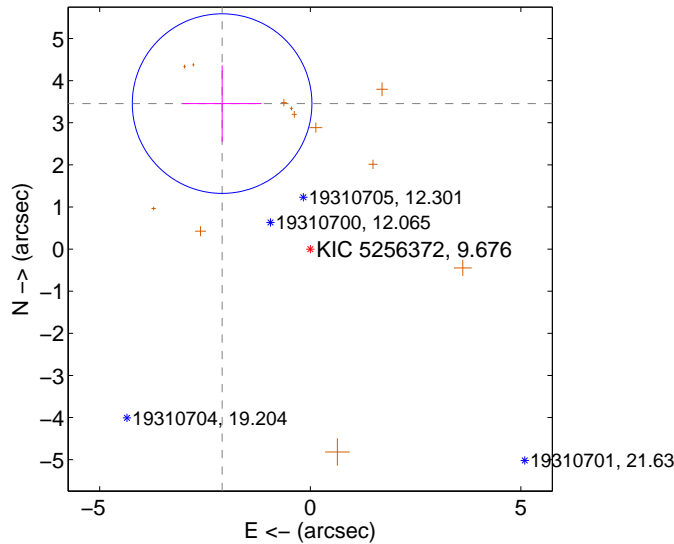
The OOT PRF centroid is offset from the target star catalog position by about 2.10 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b><math>2.660 \pm 0.709</math></b>	<b>3.75</b>	$1.594 \pm 1.173$	$2.129 \pm 0.917$
PRF-fit source offset from KIC position	<b><math>4.040 \pm 0.711</math></b>	<b>5.68</b>	$2.094 \pm 0.939$	$3.455 \pm 0.907$
photometric centroid source offset	<b><math>2.23 \pm 0.69</math></b>	<b>3.23</b>	$0.90 \pm 0.84$	$2.04 \pm 0.66$

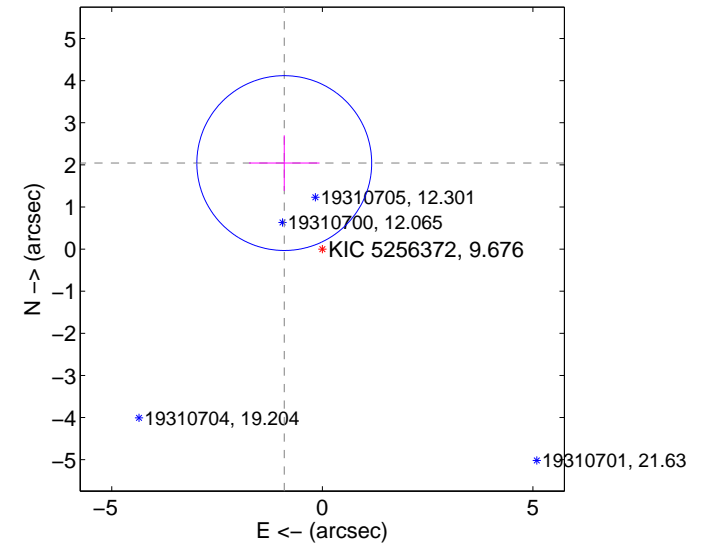
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



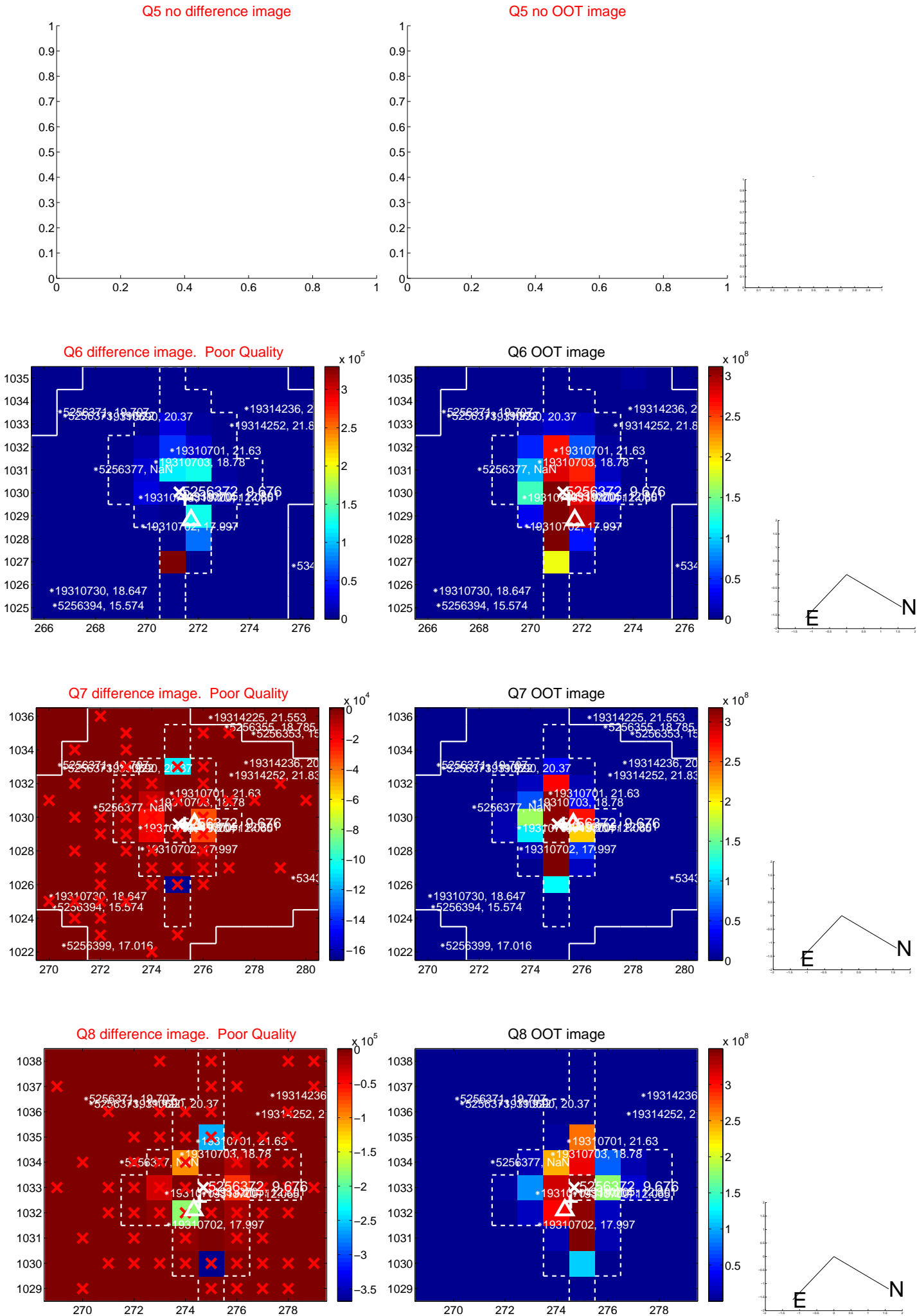
offset from photometric centroids



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



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



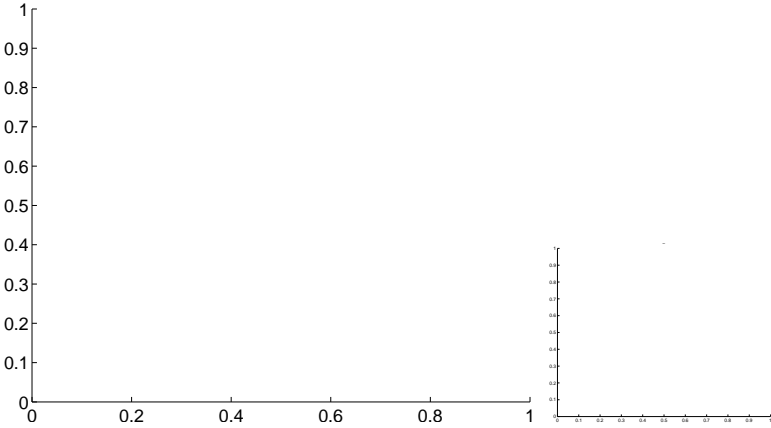


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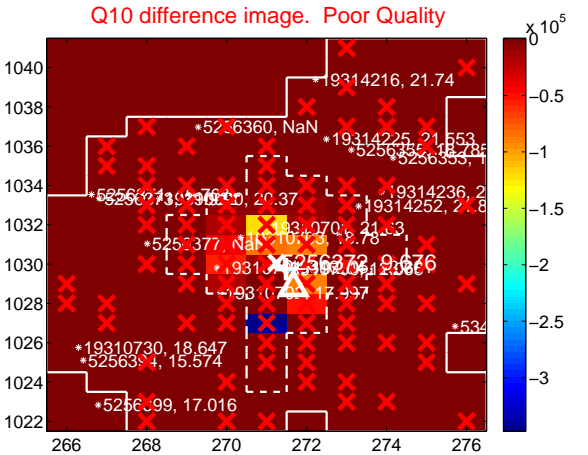
Q9 no difference image



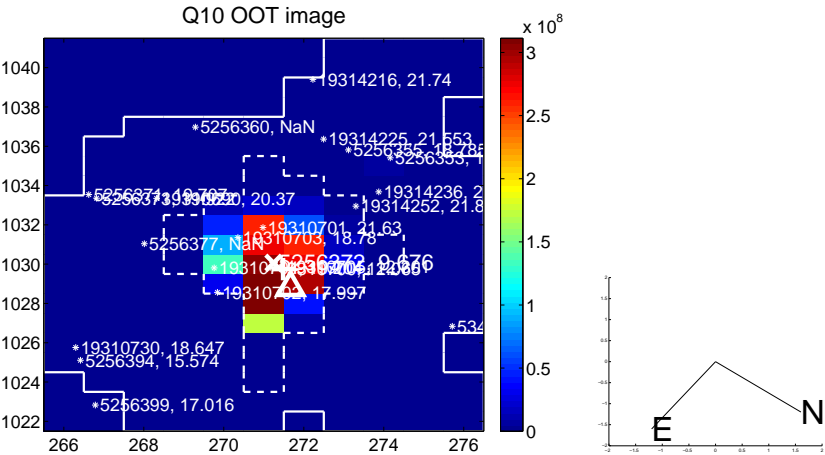
Q9 no OOT image



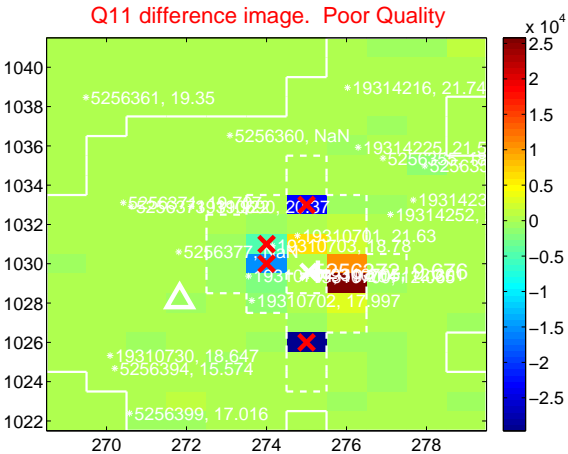
Q10 difference image. Poor Quality



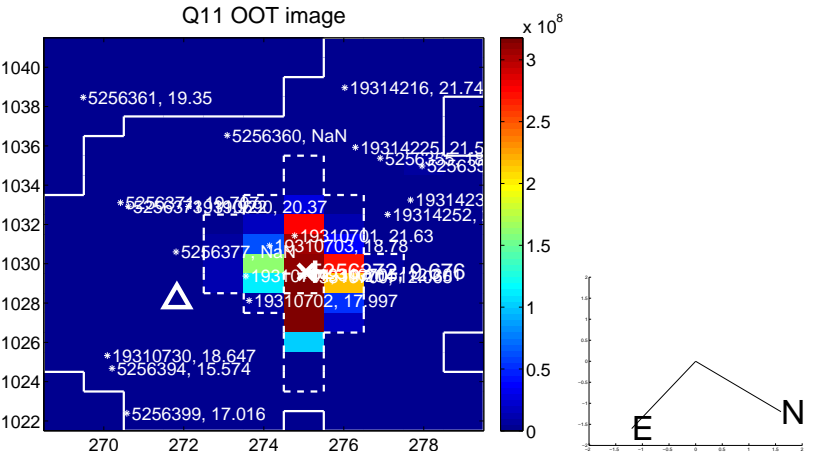
Q10 OOT image



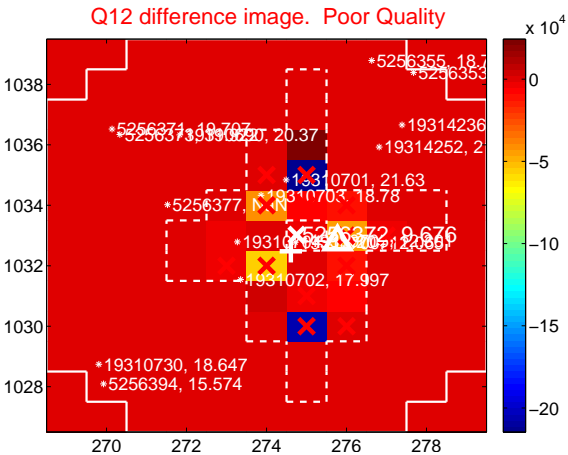
Q11 difference image. Poor Quality



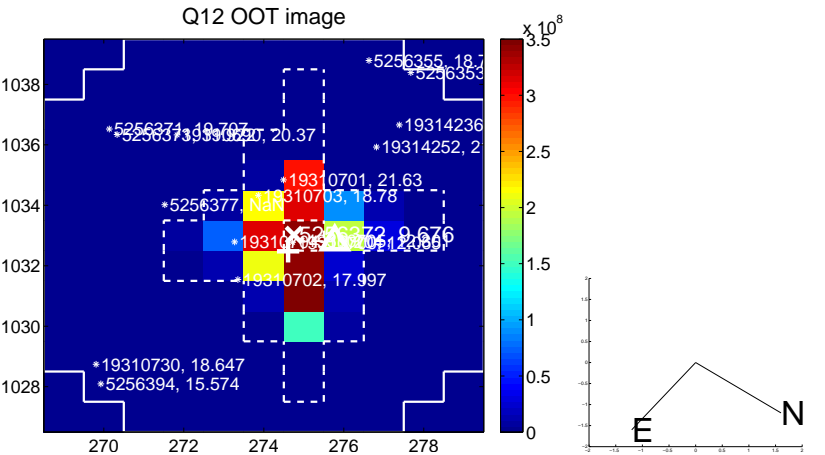
Q11 OOT image



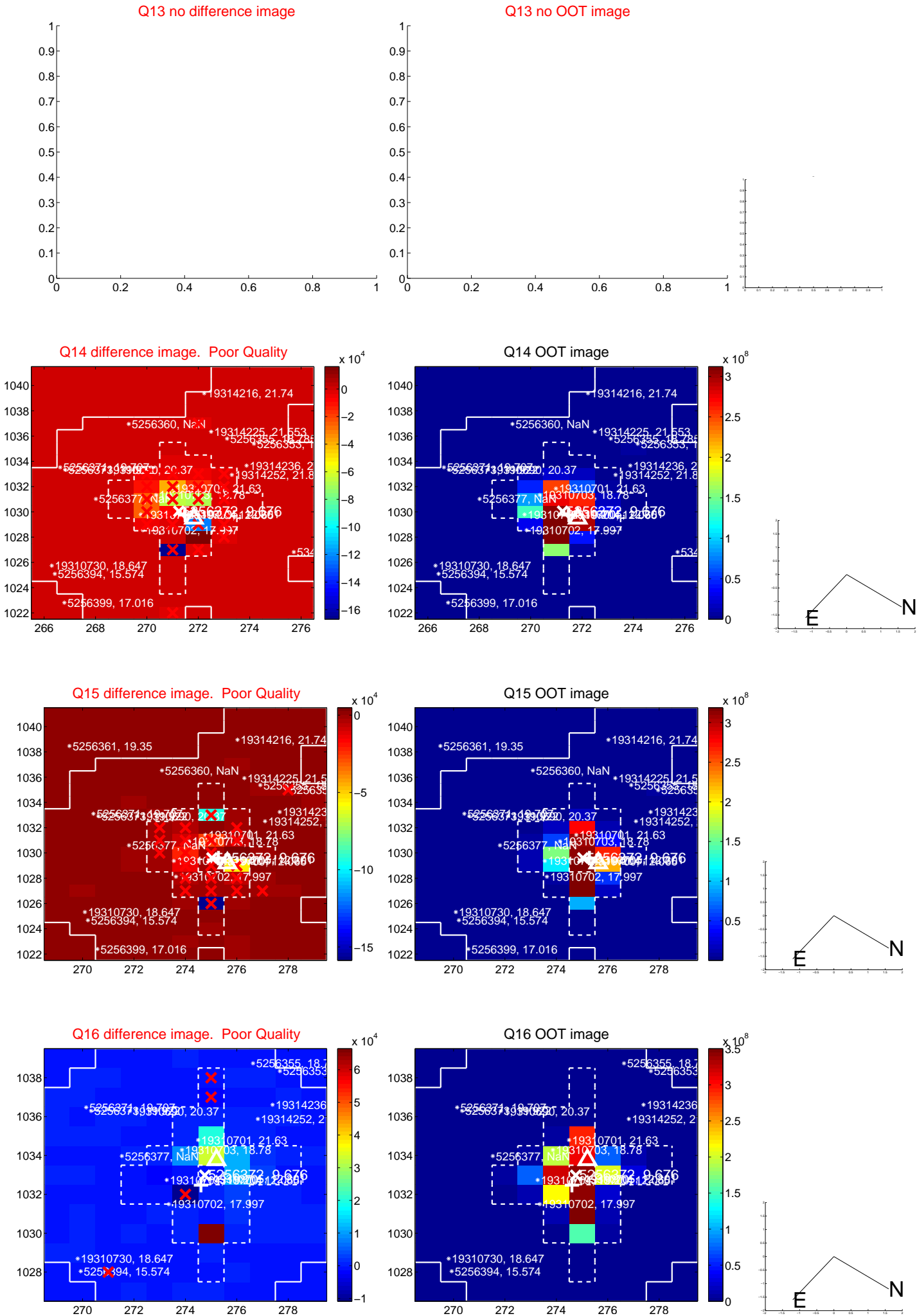
Q12 difference image. Poor Quality



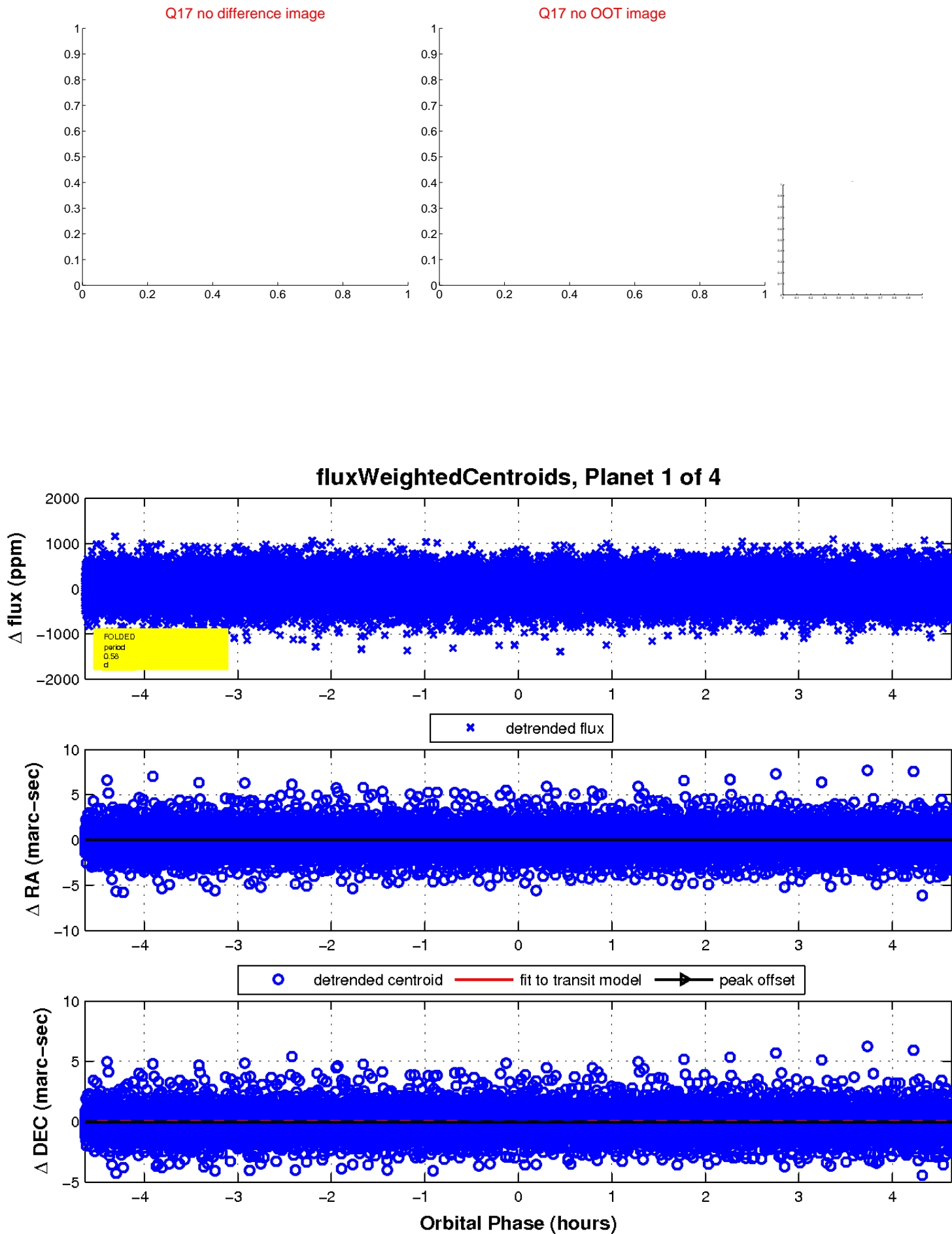
Q12 OOT image



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

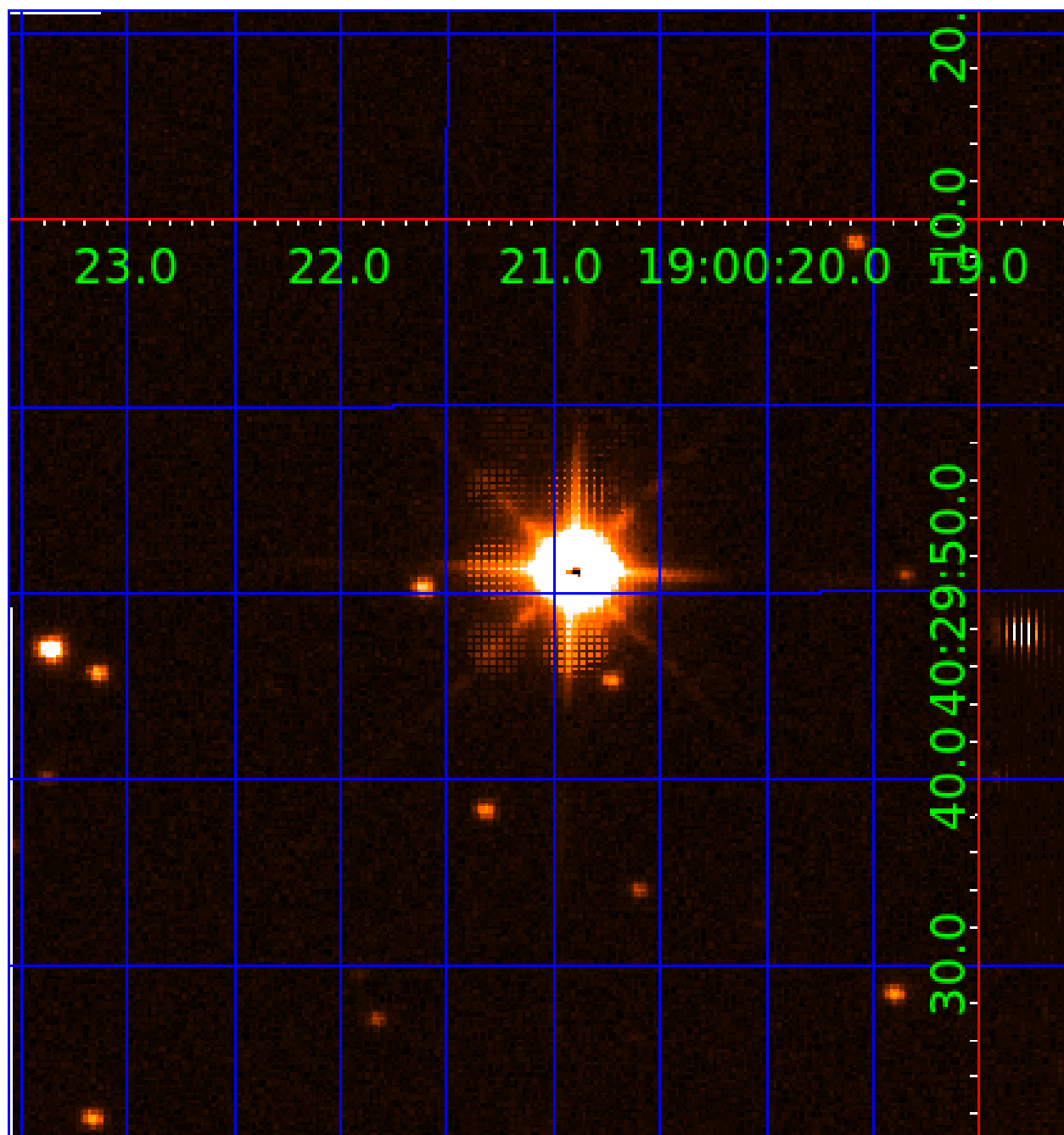


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UKIRT Image

Declination





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005256372-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
005256372-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—CENT_SATURATED

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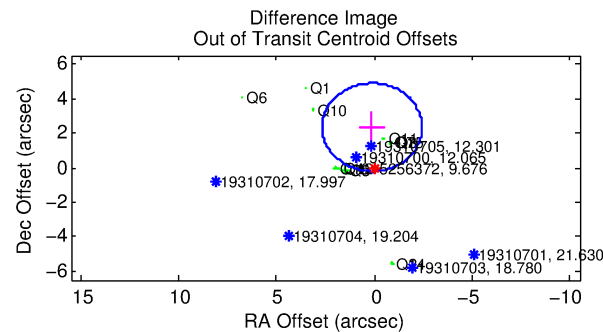
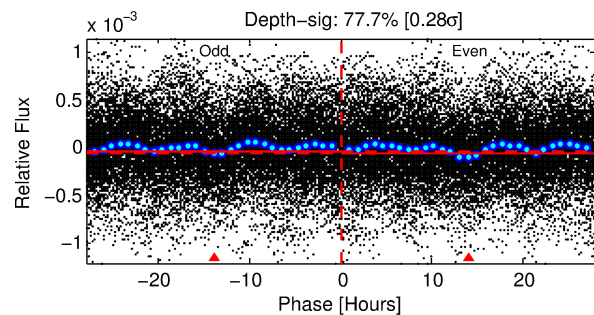
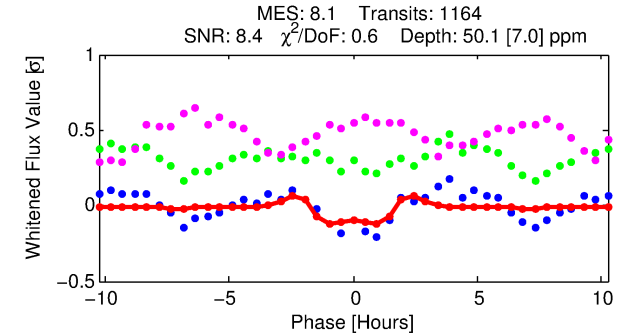
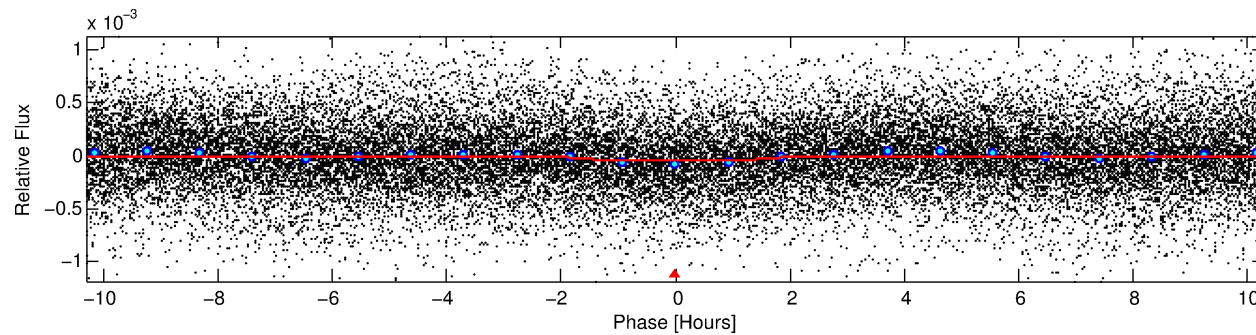
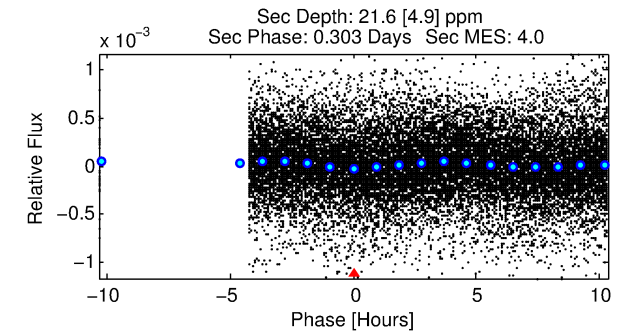
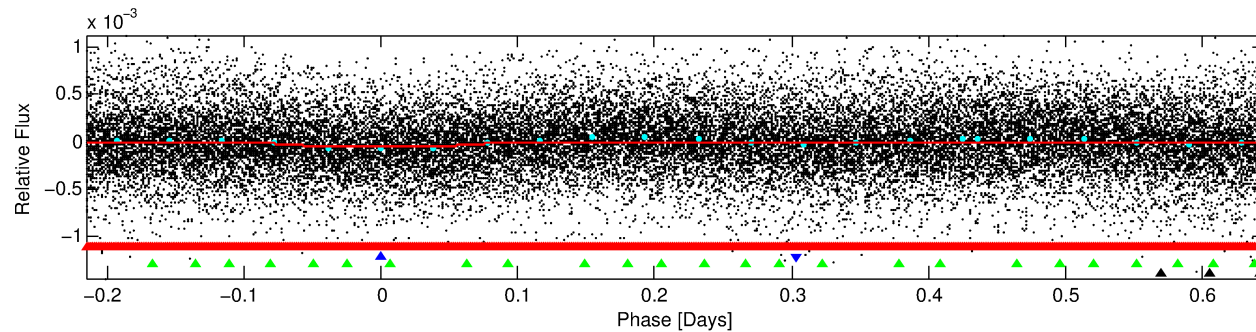
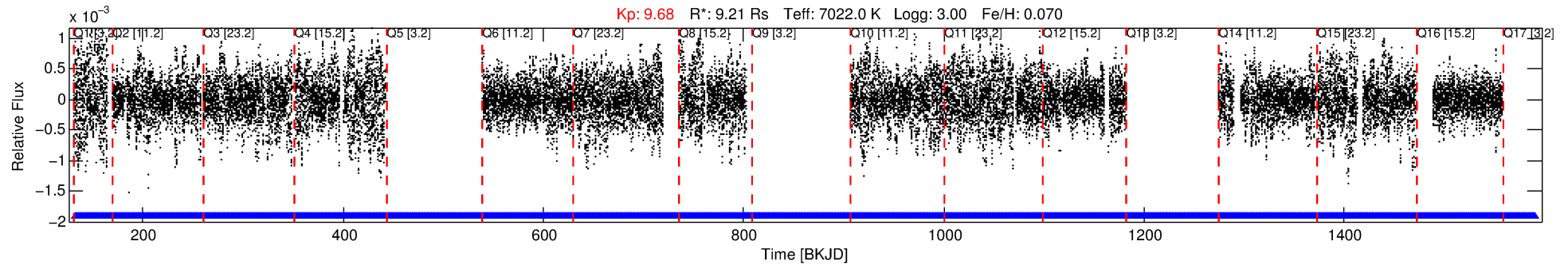
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 005256372-02

No Significant Match Found

# DV One-Page Summary

KIC: 5256372 Candidate: 2 of 4 Period: 0.860 d



## DV Fit Results:

Period = 0.86047 [0.00001] d  
Epoch = 132.1752 [0.0031] BKJD  
Rp/R\* = 0.0088 [0.0006]  
a/R\* = 1.04 [0.01]  
b = 0.99 [0.00]  
Seff = N/A  
Teq = N/A  
Rp = 8.80 [5.32] Re  
a = N/A  
Ag = N/A  
Teffp = N/A

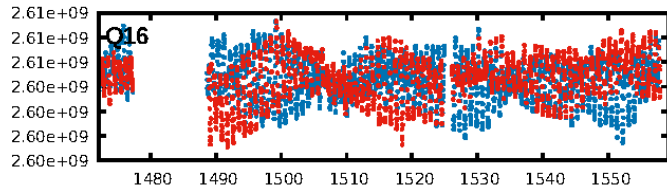
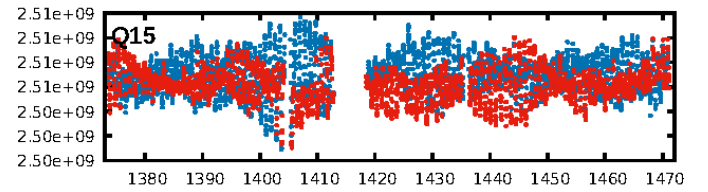
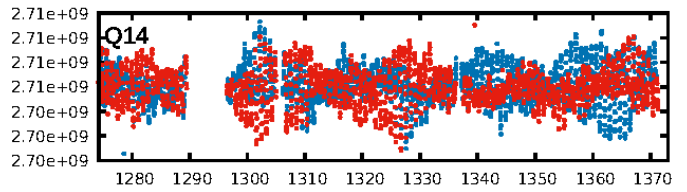
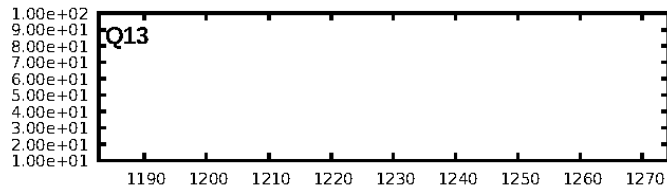
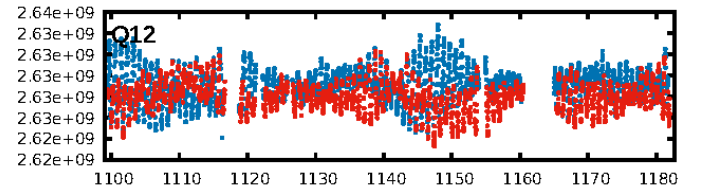
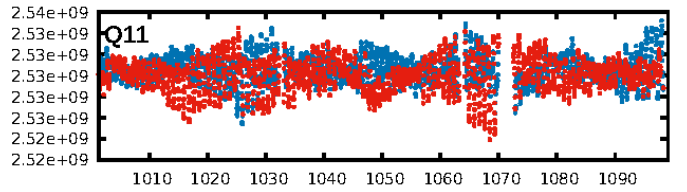
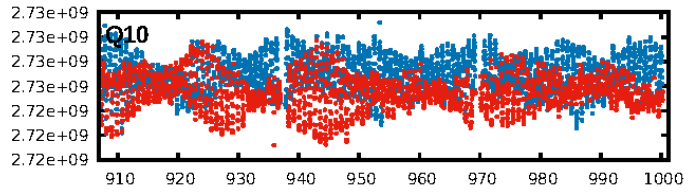
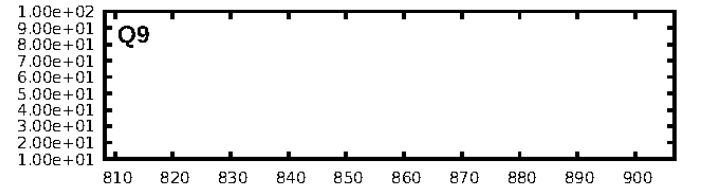
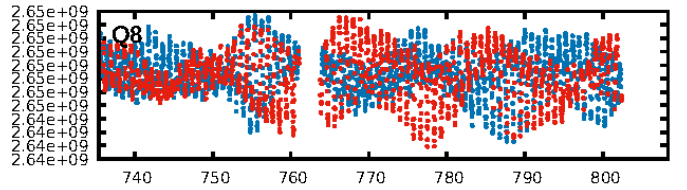
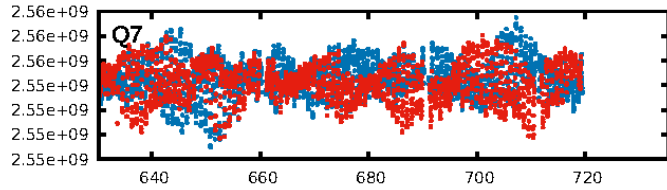
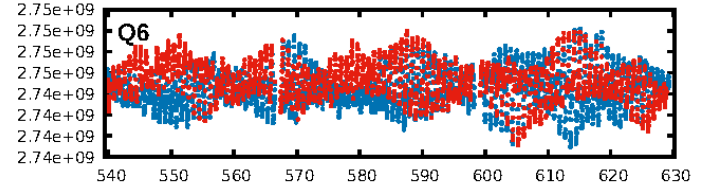
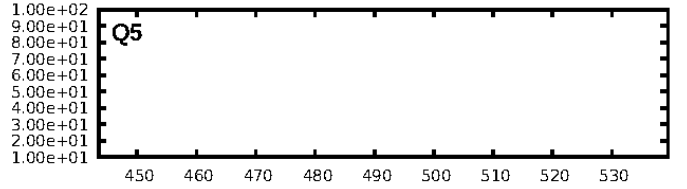
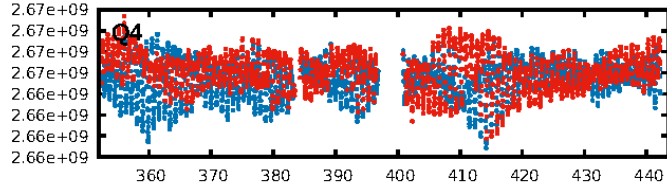
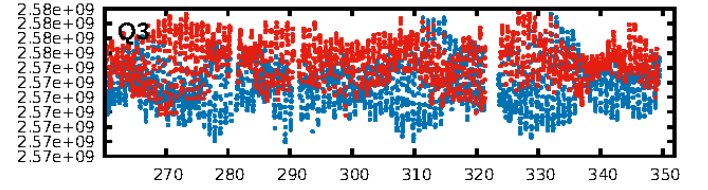
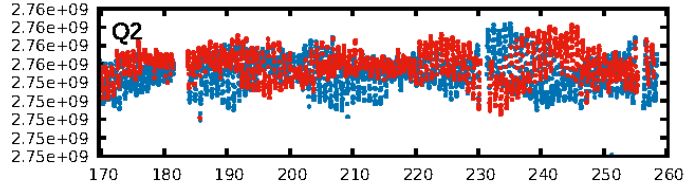
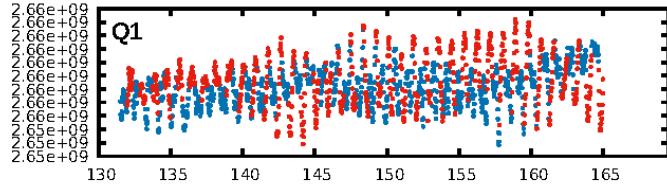
## DV Diagnostic Results:

ShortPeriod-sig: 82.6% [1.36σ]  
LongPeriod-sig: 100.0% [193.43σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
**Bootstrap-pfa: 7.14e-12**  
RollingBand-fgt: 1.00 [1125/1125]  
GhostDiagnostic-chr: N/A  
**Centroid-sig: 0.0%**  
**Centroid-so: 1.996 arcsec [4.67σ]**  
OotOffset-rm: 2.335 arcsec [2.74σ]  
KicOffset-rm: 2.434 arcsec [2.94σ]  
OotOffset-st: 4/4/4/1 [13]  
KicOffset-st: 4/4/4/1 [13]  
DiffImageQuality-fgm: 0.00 [0/13]  
DiffImageOverlap-fno: 0.00 [0/13]

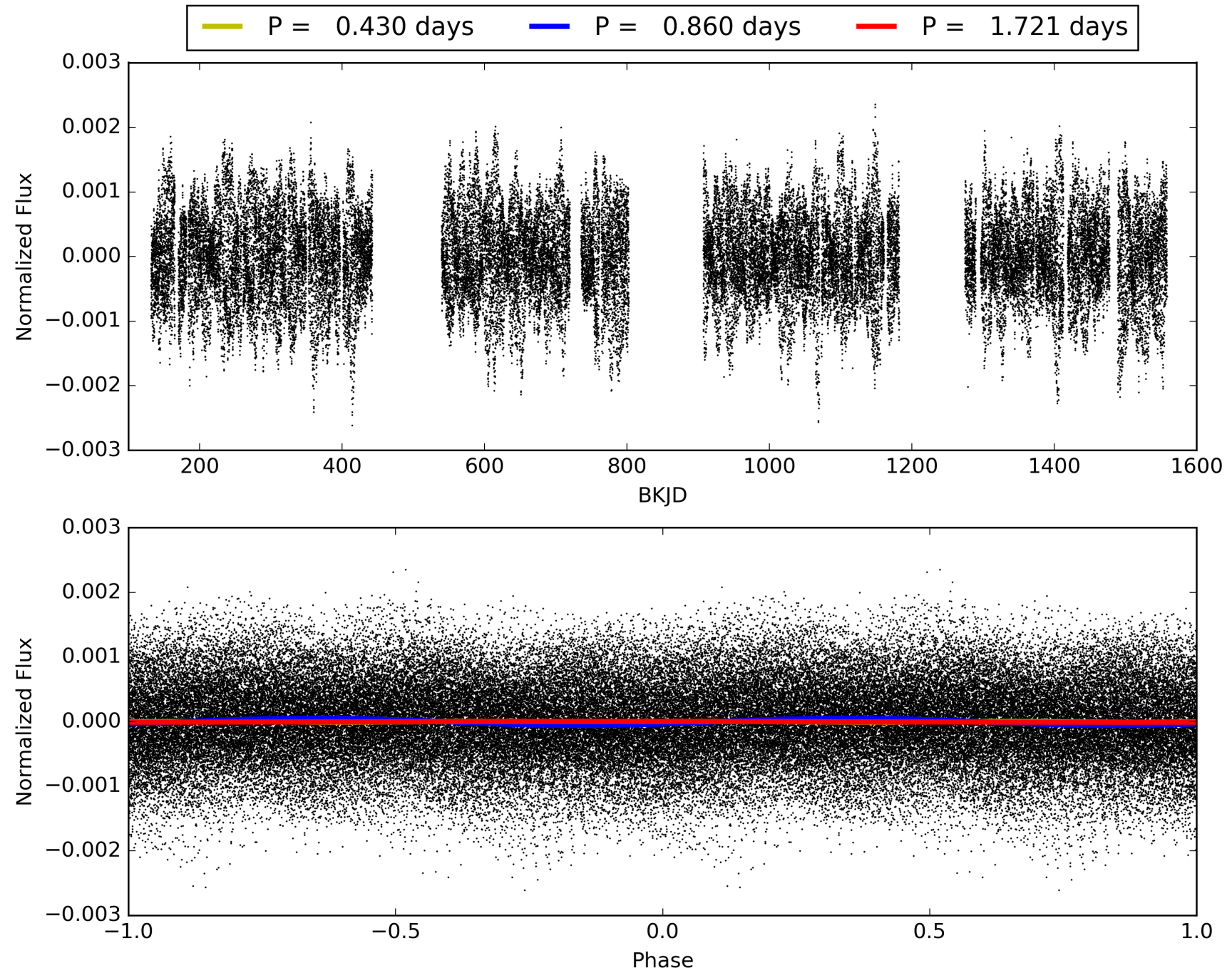
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 21:19:24 Z

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

## TCE 005256372-02, PDC Light Curves



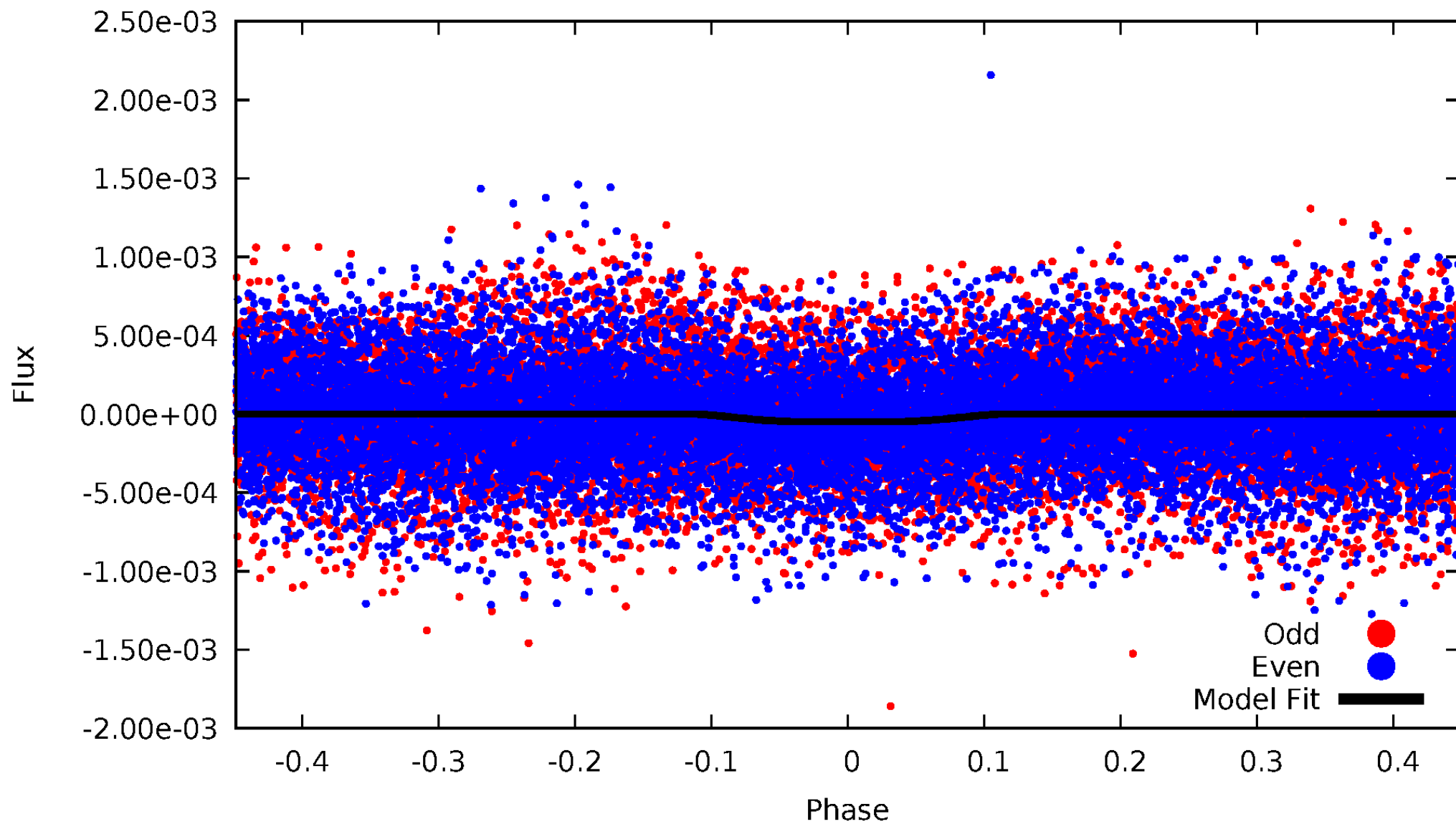
TCE 005256372-02





# DV Odd/Even

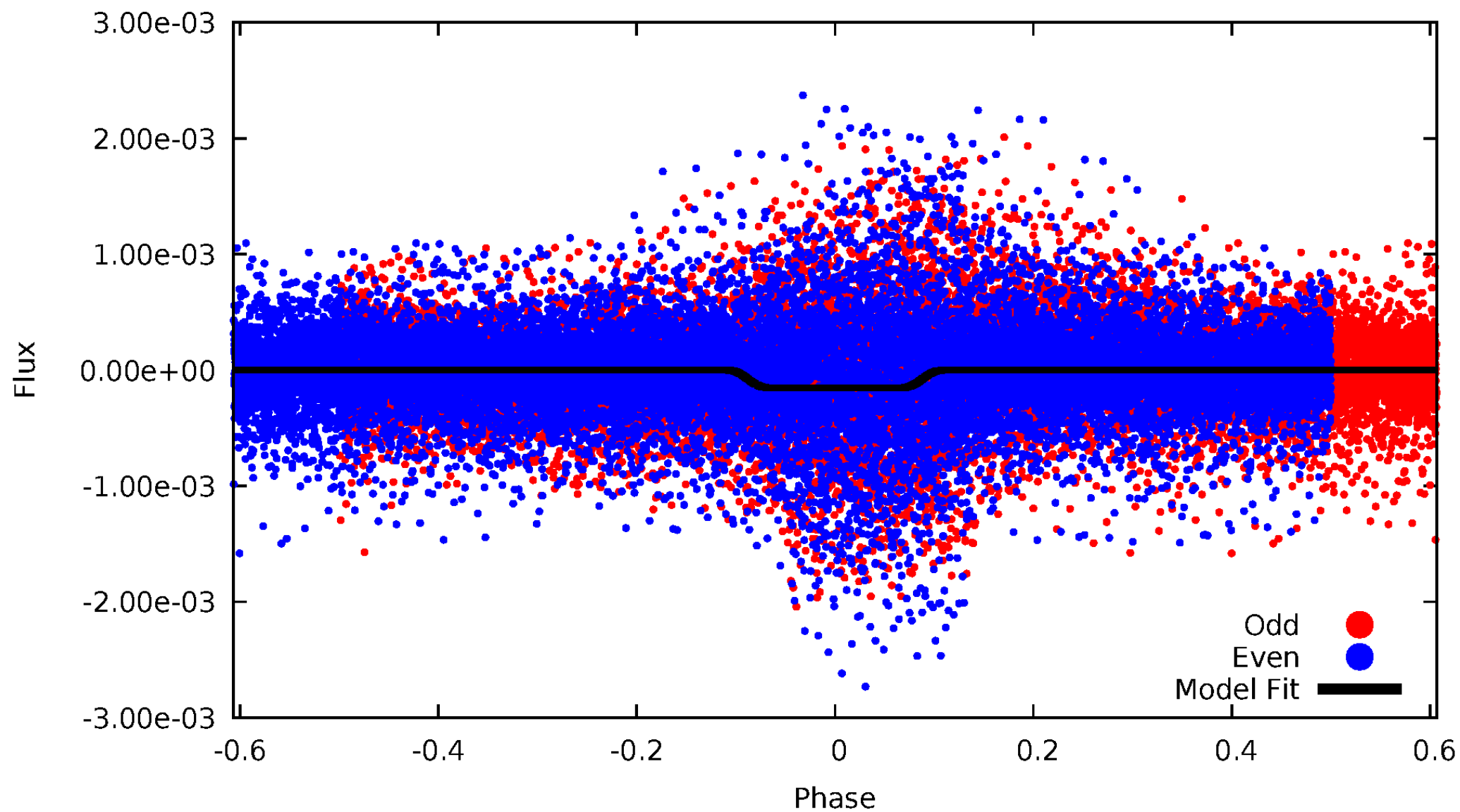
TCE 005256372-02





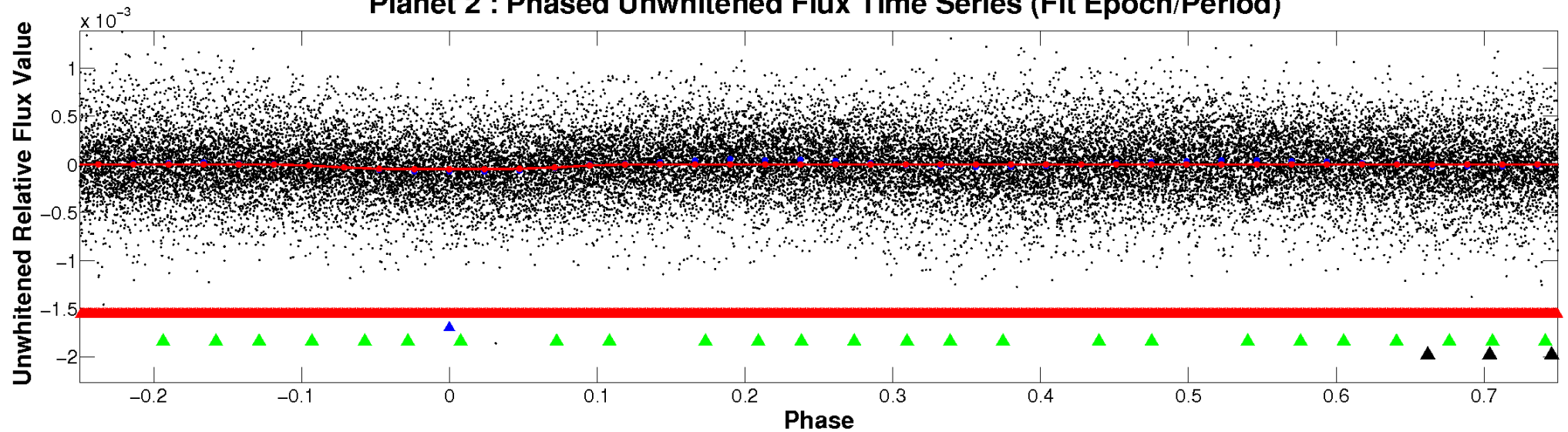
# ALT Odd/Even

TCE 005256372-02

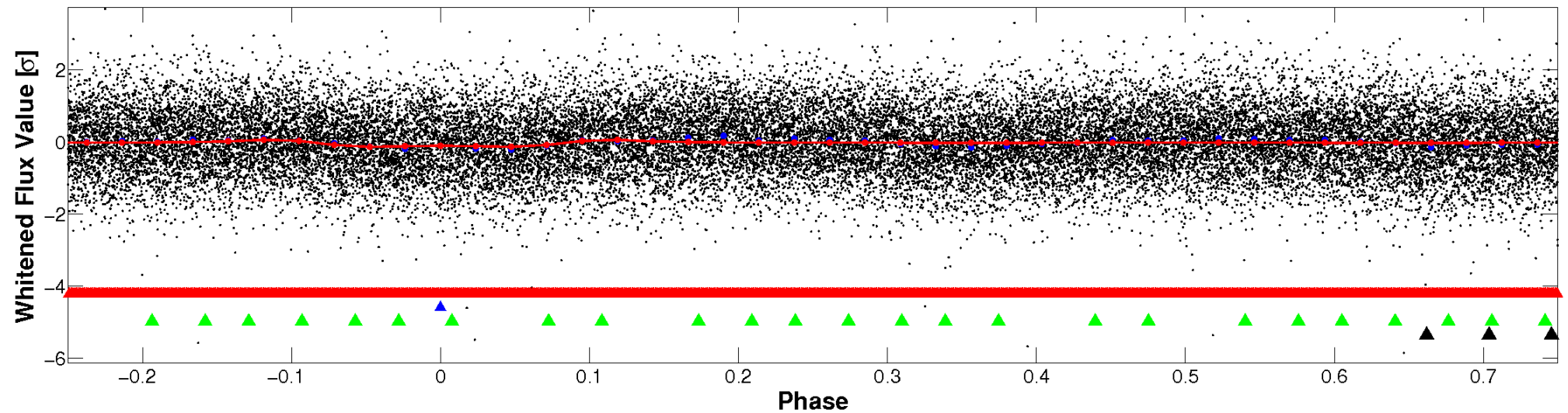


# Non-Whitened Vs. Whitened Light Curve

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

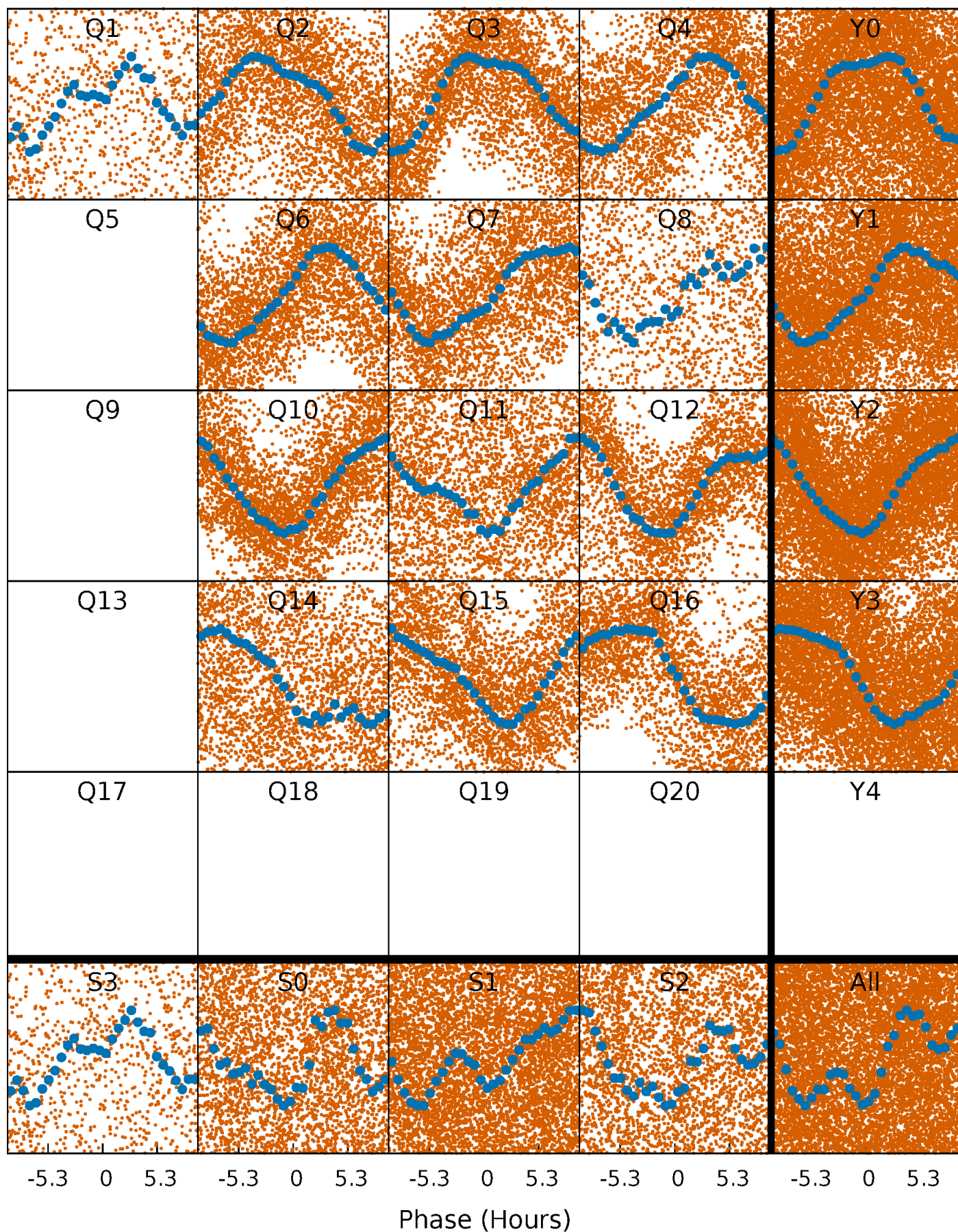


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

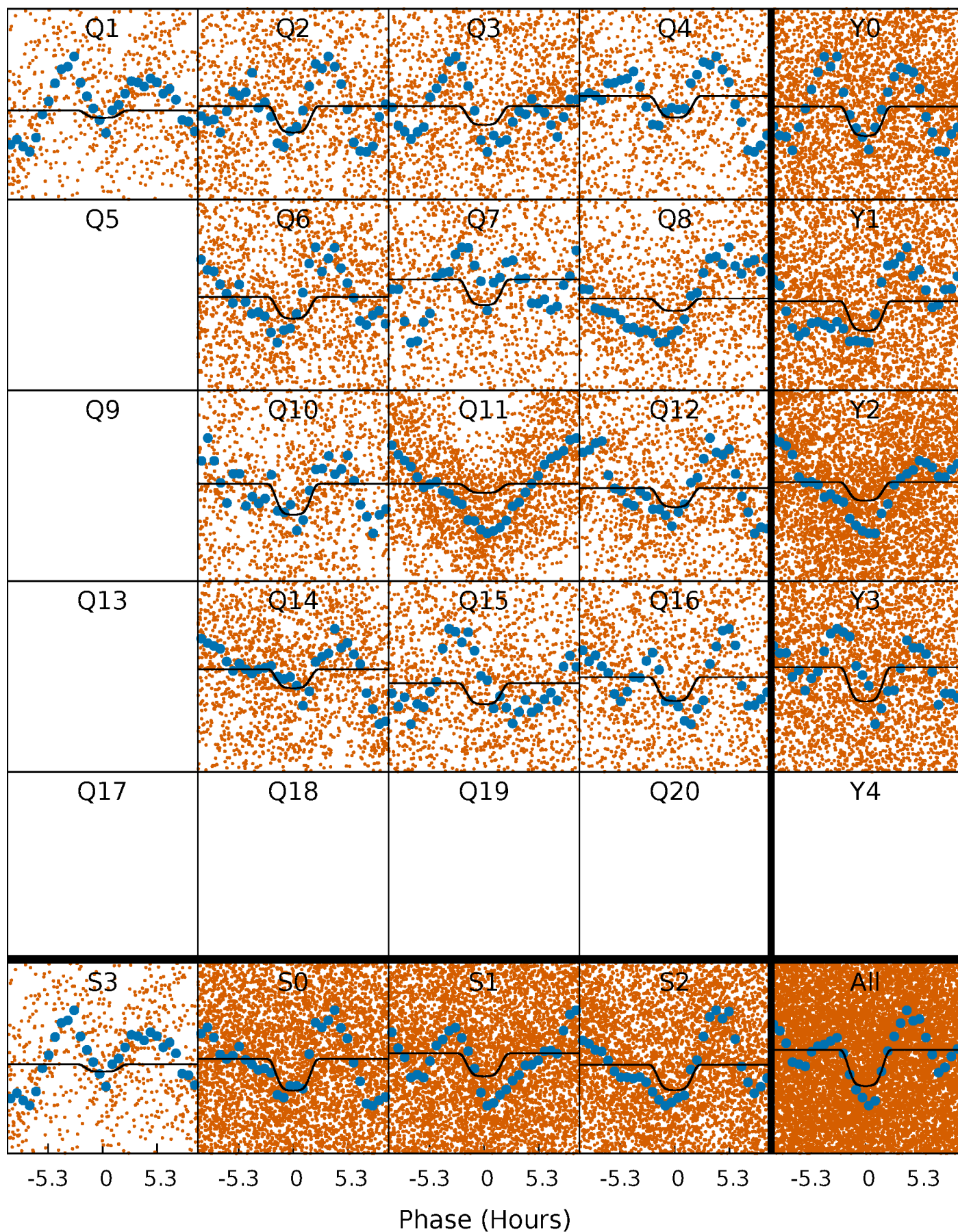
TCE 005256372-02     $P = 0.860472$  Days     $T_0 = 132.175193$  (BKJD)





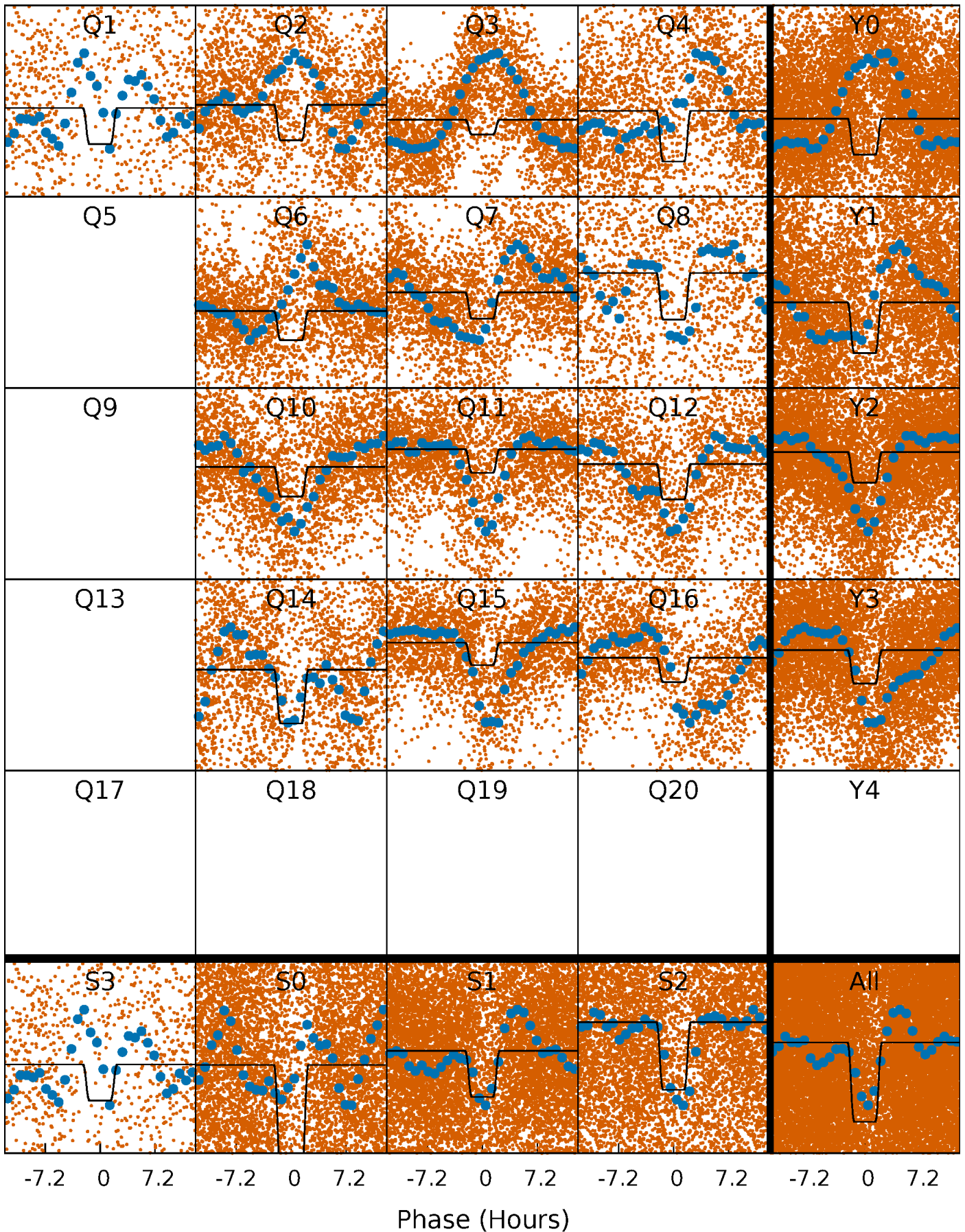
# DV Quarter-Phased Transit Curves

TCE 005256372-02   P= 0.860472 Days    $T_0=132.175193$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 005256372-02 P= 0.860516 Days  $T_0=132.129967$  (BKJD)

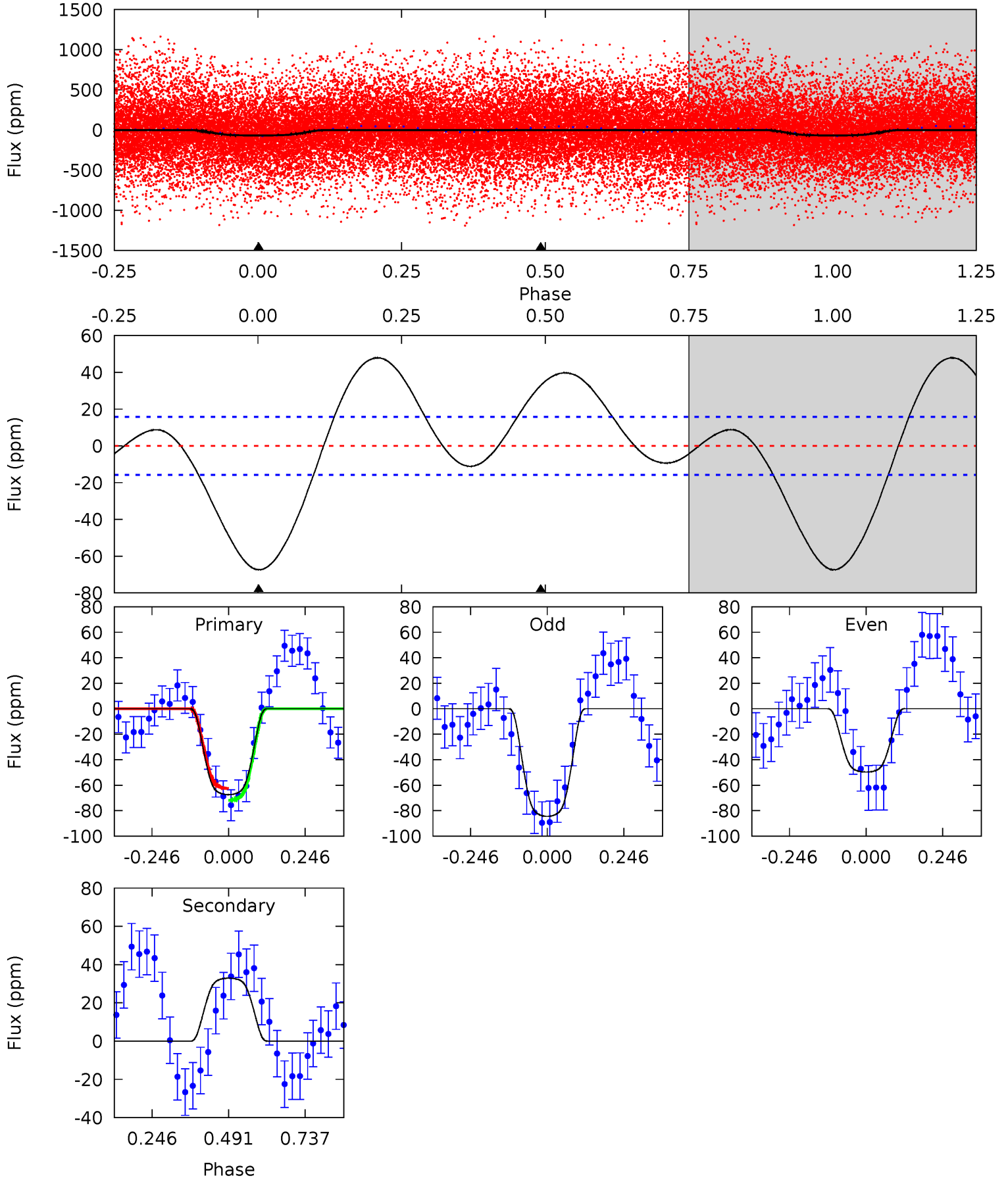




# DV Model-Shift Uniqueness Test

005256372-02, P = 0.860472 Days, E = 131.314721 Days

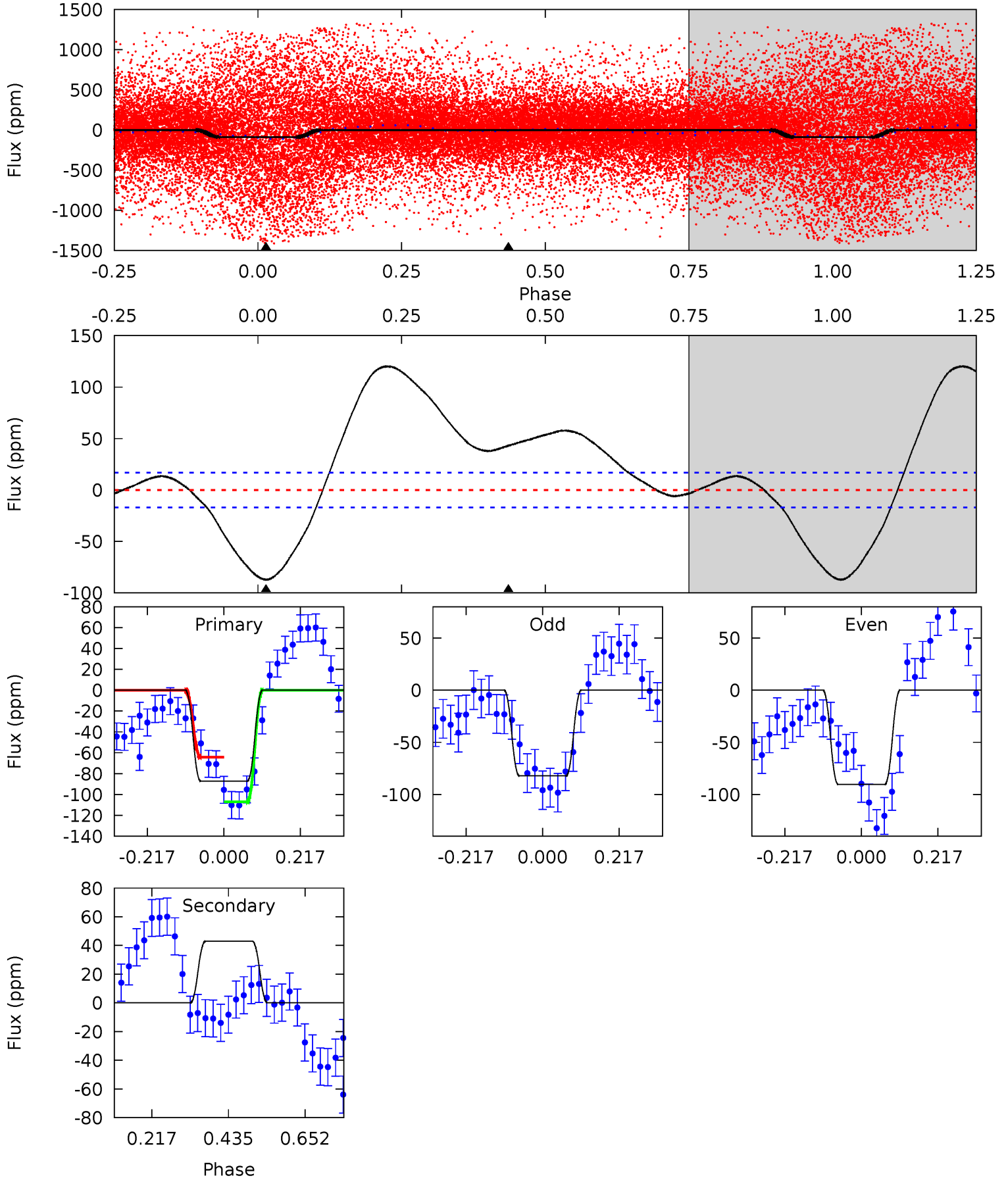
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
18.6	-9.10	0	0	4.37	1.16	5.99	18.6	18.6	-9.10	-9.10	4.80	0.81	0.42	1.30



# Alt Model-Shift Uniqueness Test

005256372-02, P = 0.860516 Days, E = 131.269451 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
22.7	-11.2	0	0	4.40	1.23	1.39	22.7	22.7	-11.2	-11.2	1.02	0.89	0.58	5.15



### Stellar Parameters For KIC 005256372

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7022^{+157}_{-244}$	$2.998^{+0.666}_{-0.074}$	$0.070^{+0.150}_{-0.400}$	$9.213^{+1.036}_{-5.528}$	$3.080^{+0.211}_{-1.198}$	$0.006^{+0.062}_{-0.002}$
	+2%/-3%	+22%/-2%	+214%/-571%	+11%/-60%	+7%/-39%	+1123%/-35%
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 005256372-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$33 \pm 4$	$7.86^{+1.57}_{-2.51}$	$7782^{+618}_{-1249}$	$-7209^{+698}_{-483}$	$-0.189^{+0.057}_{-0.188}$
Alt.	$43 \pm 4$	$11.70^{+1.68}_{-3.78}$	$7871^{+536}_{-1325}$	$-6996^{+814}_{-415}$	$-0.116^{+0.028}_{-0.117}$

$T_{max}$  = 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

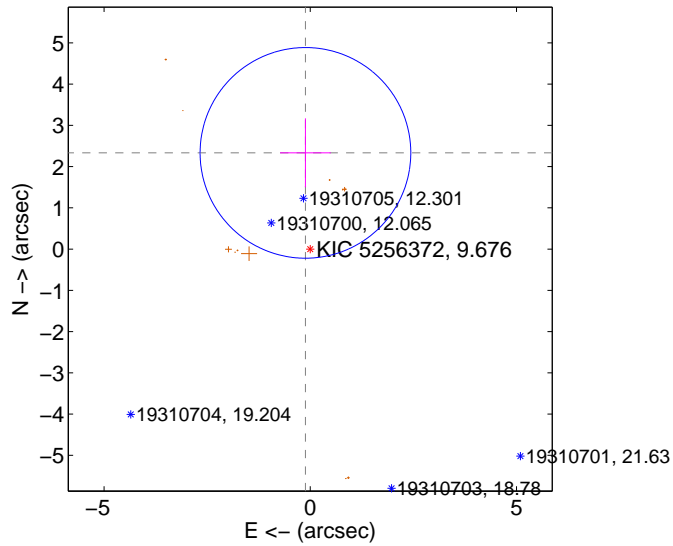
Supplemental centroid analysis for 005256372-02. **Kepler magnitude: 9.68.** Transit SNR 8.40

There are 0 quarters with good PRF difference image offsets

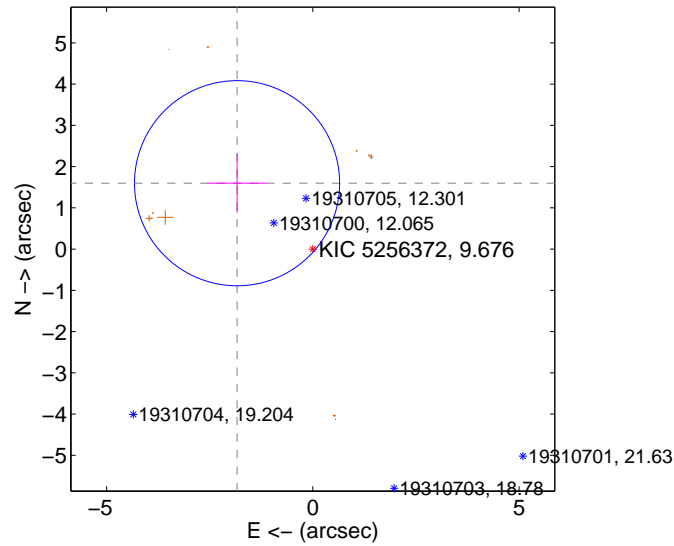
The OOT PRF centroid is offset from the target star catalog position by about 2.12 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.335 \pm 0.851$	2.74	$0.118 \pm 0.617$	$2.332 \pm 0.836$
PRF-fit source offset from KIC position	$2.434 \pm 0.829$	2.94	$1.837 \pm 0.720$	$1.597 \pm 0.719$
photometric centroid source offset	$2.00 \pm 0.43$	4.67	$1.67 \pm 0.46$	$1.09 \pm 0.35$

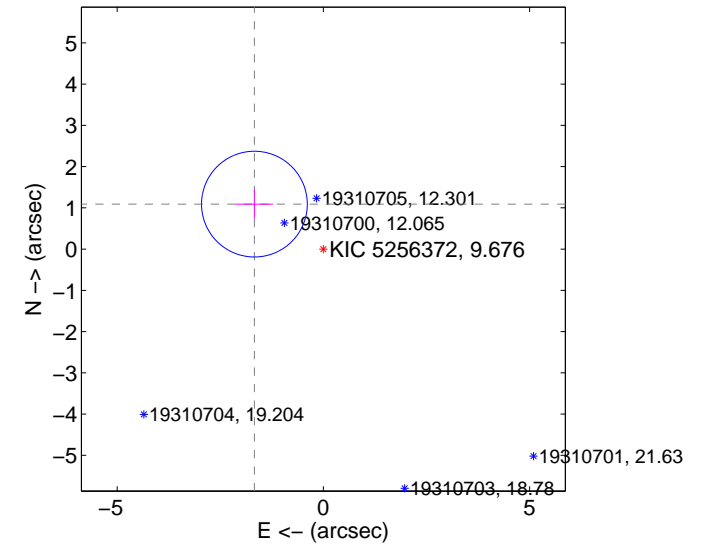
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

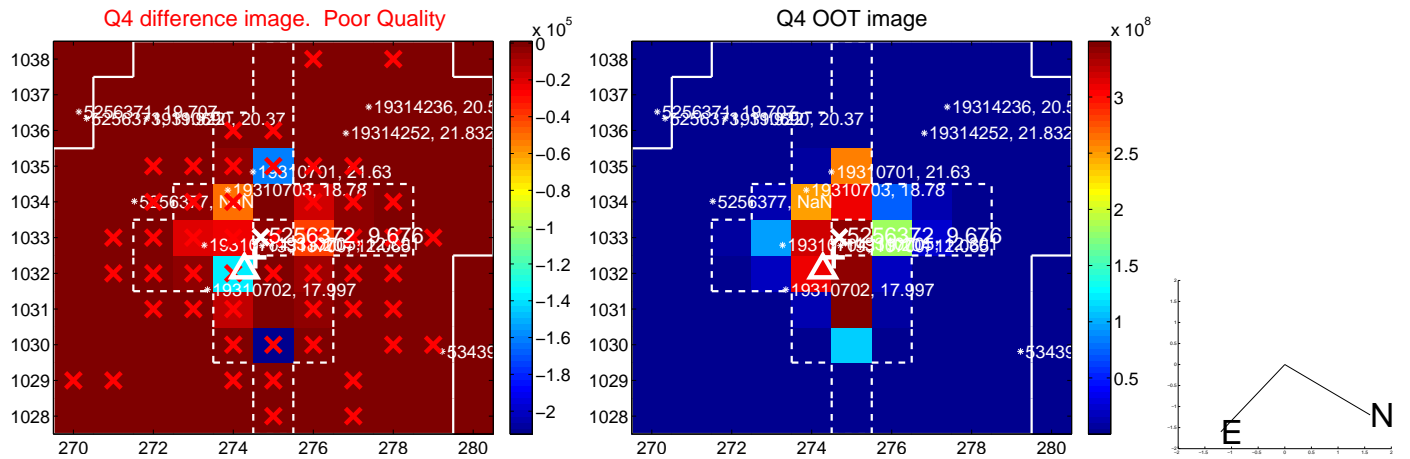
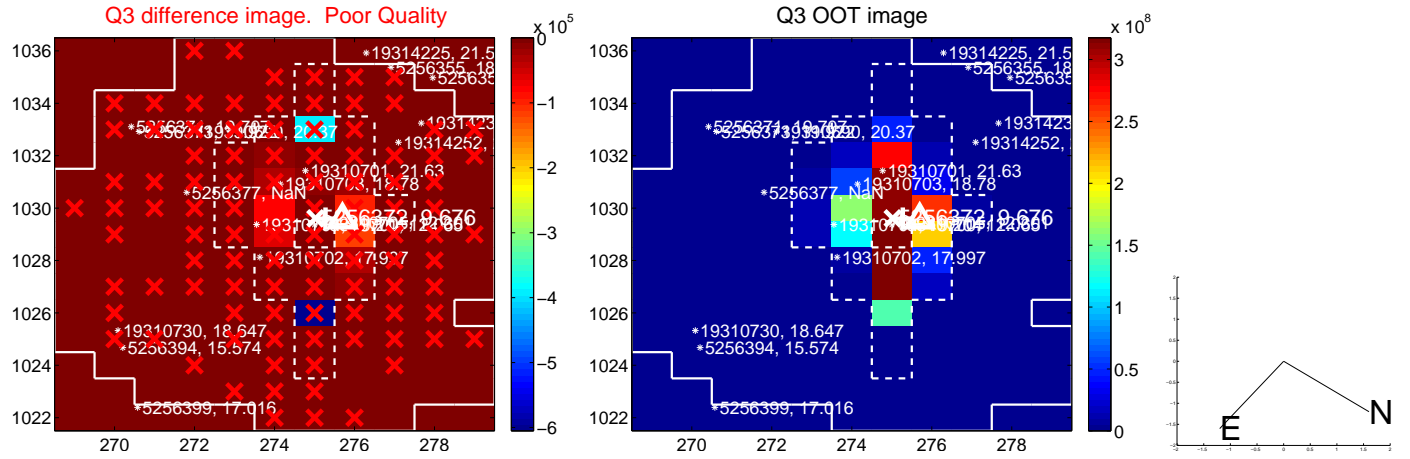
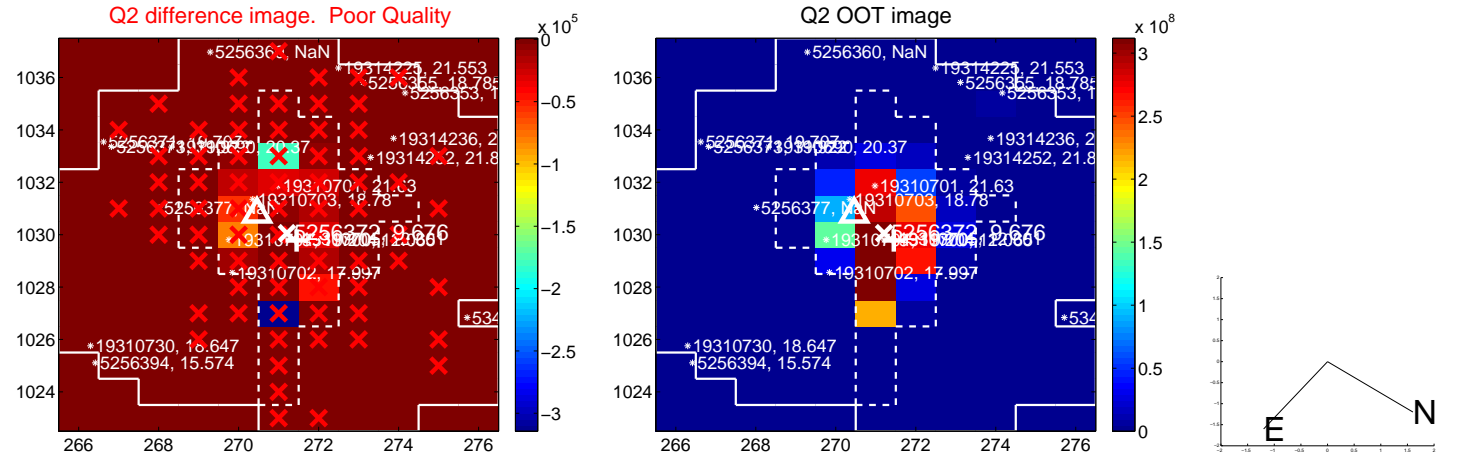
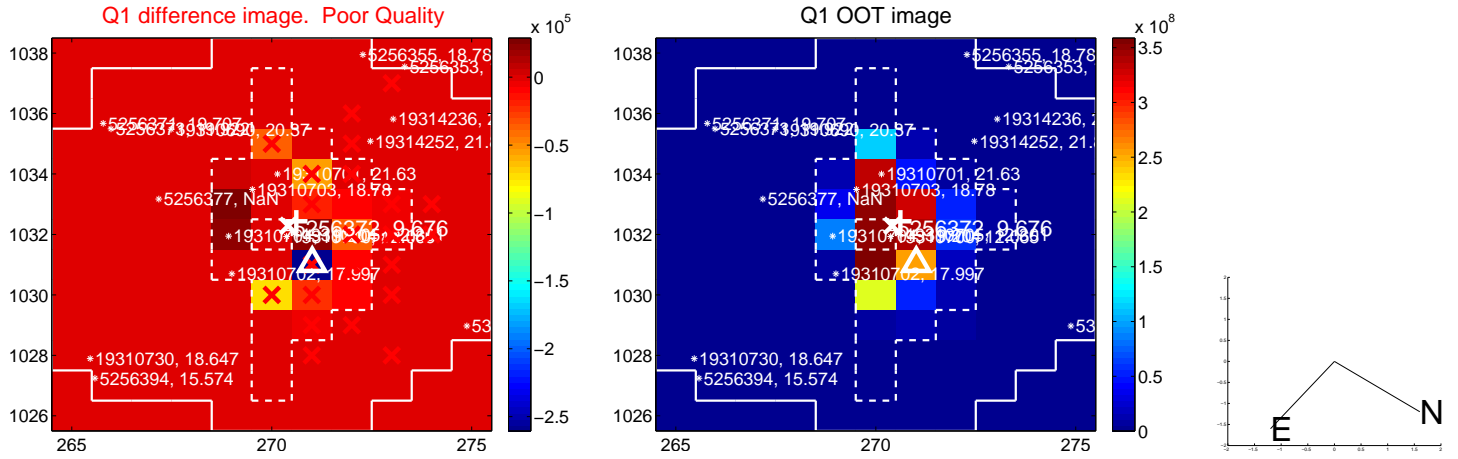


offset from photometric centroids



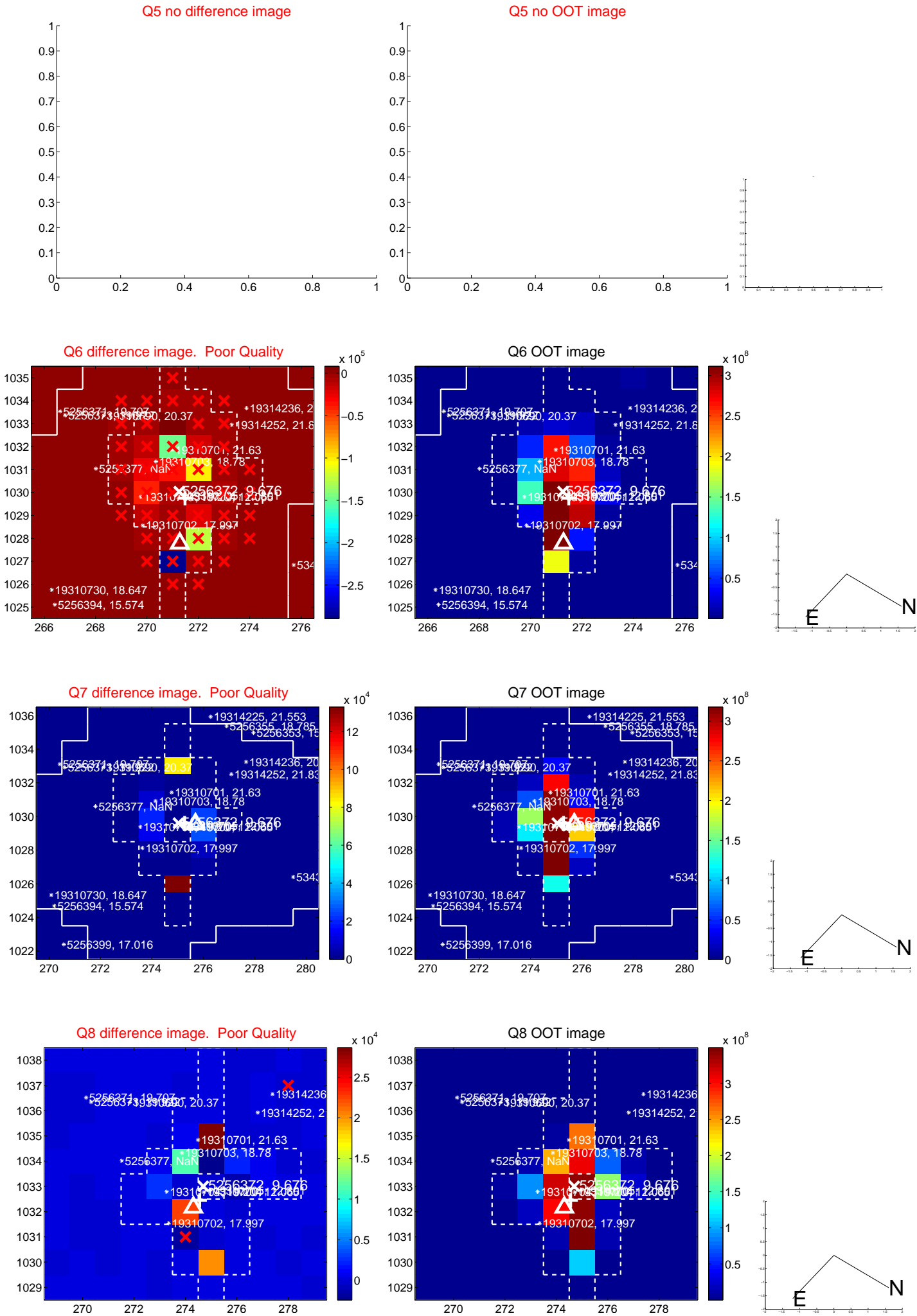
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

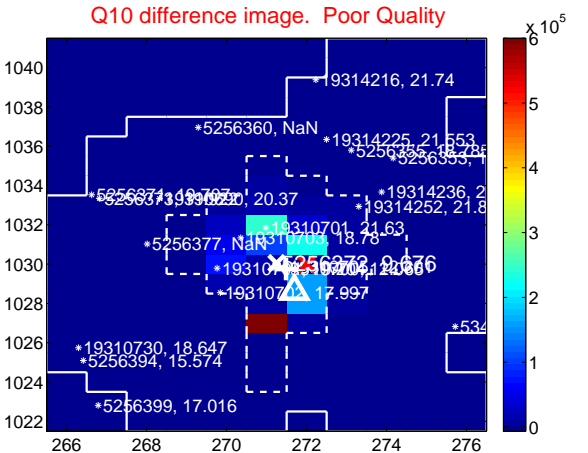
Q9 no difference image



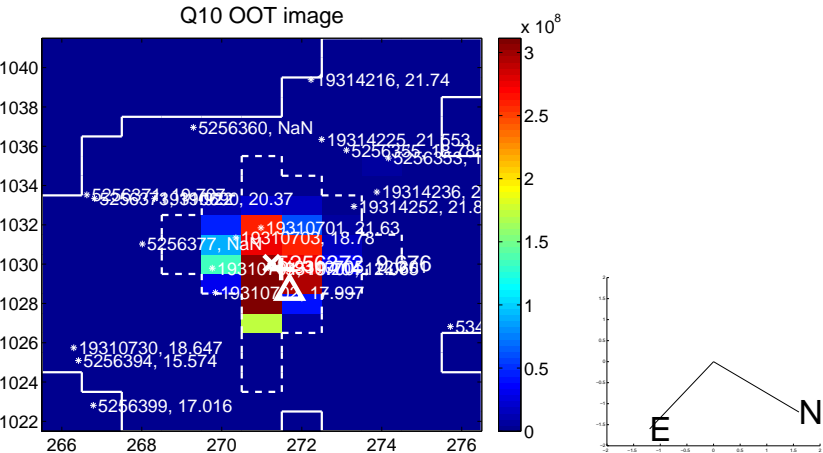
Q9 no OOT image



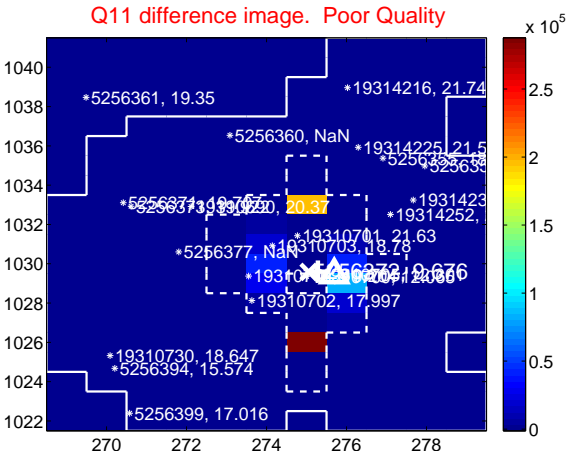
Q10 difference image. Poor Quality



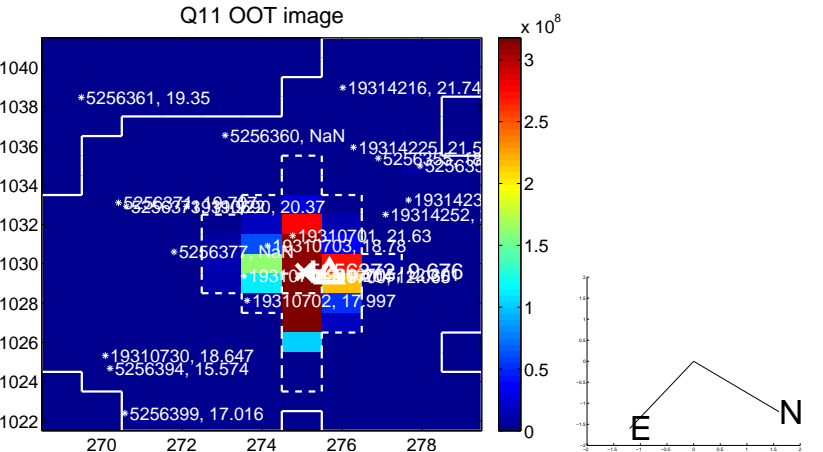
Q10 OOT image



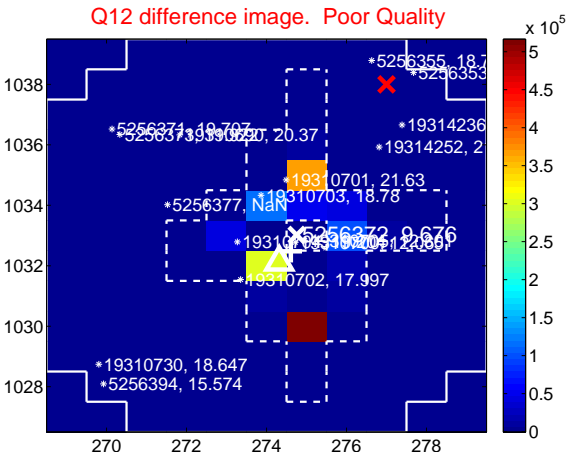
Q11 difference image. Poor Quality



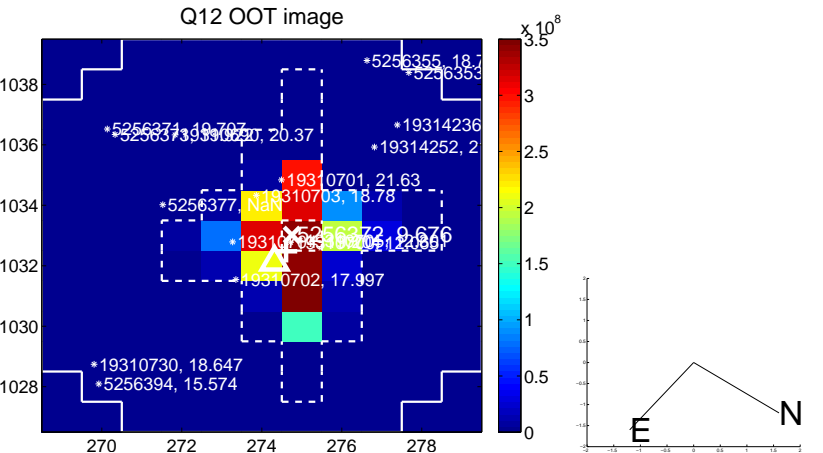
Q11 OOT image



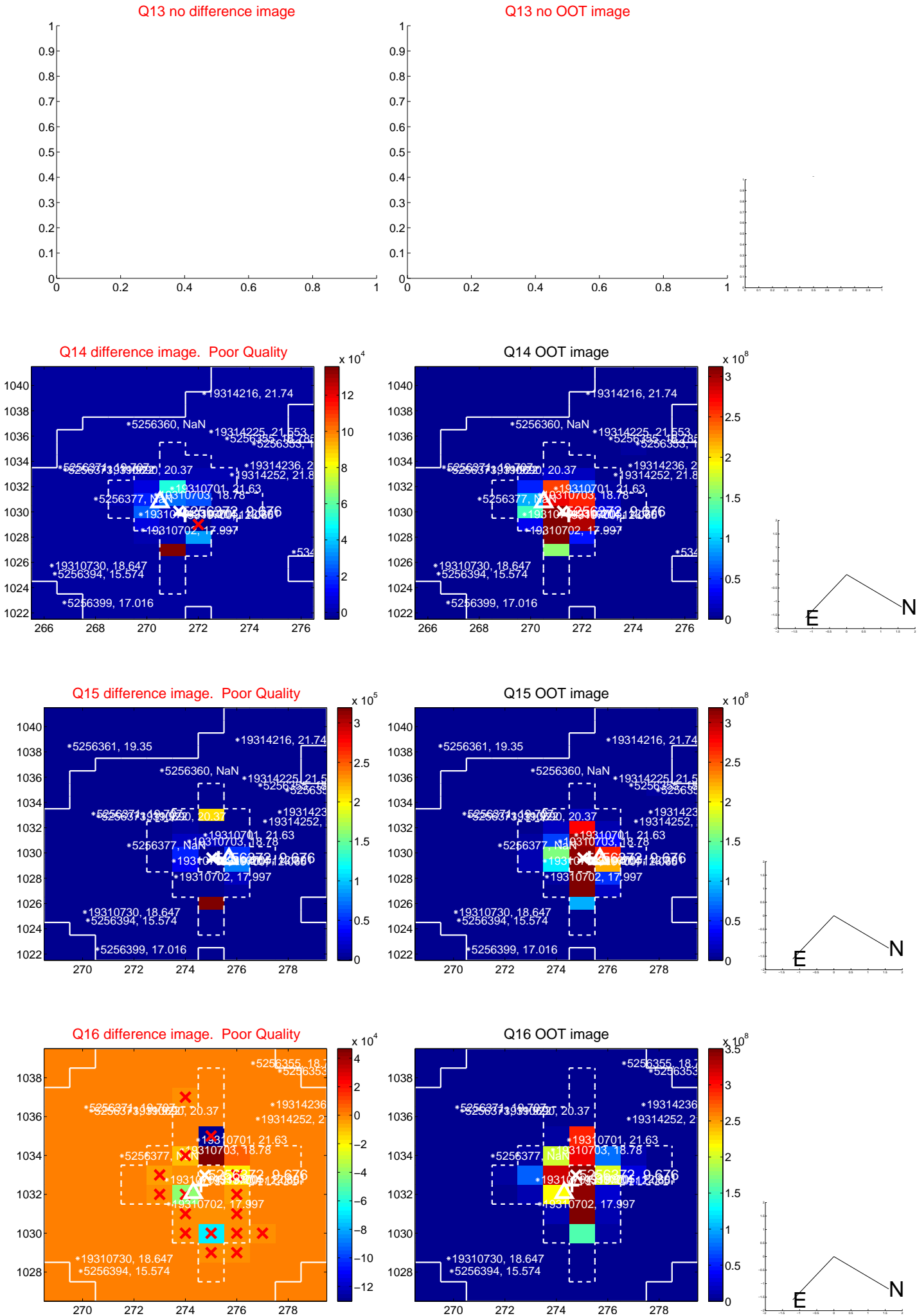
Q12 difference image. Poor Quality



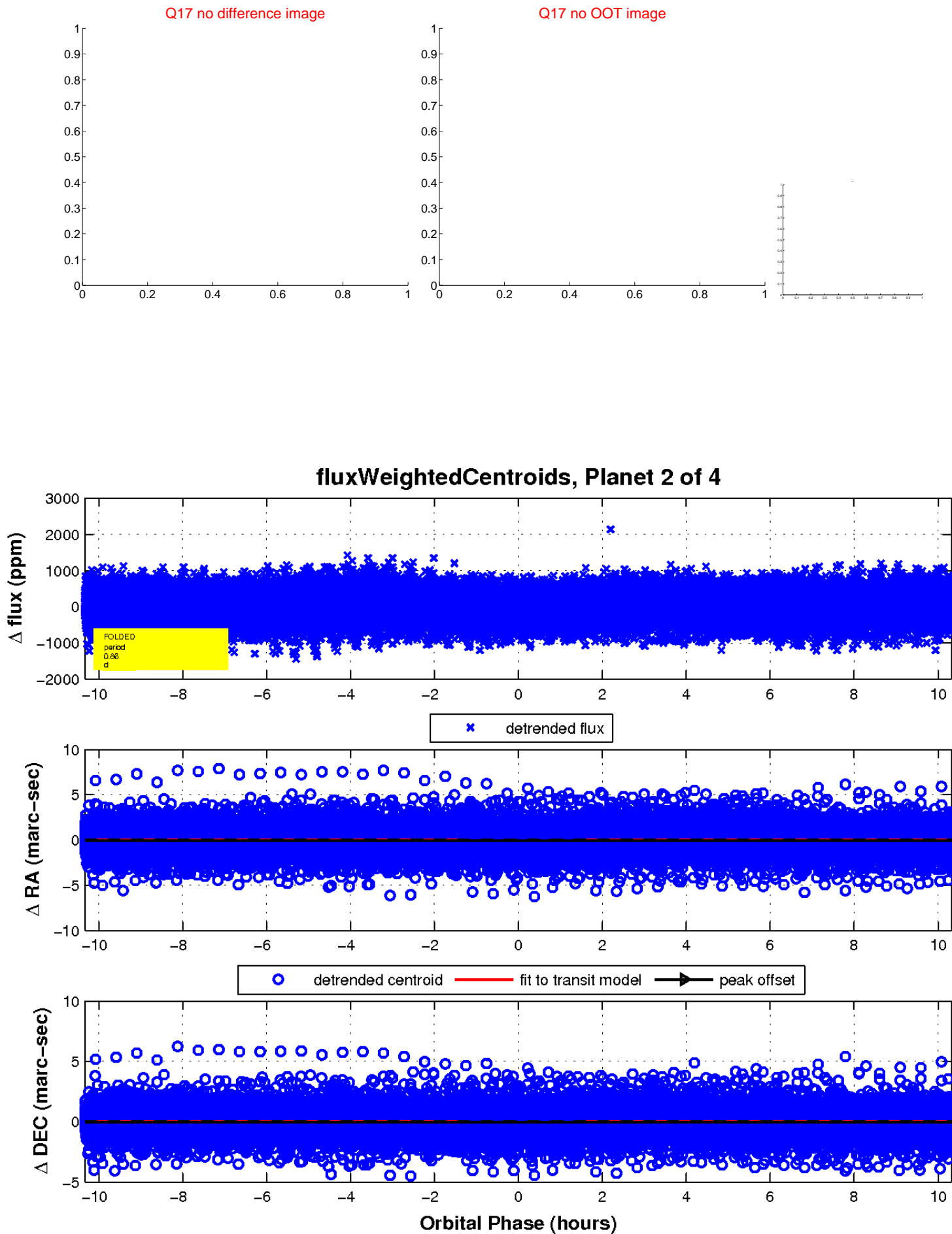
Q12 OOT image



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

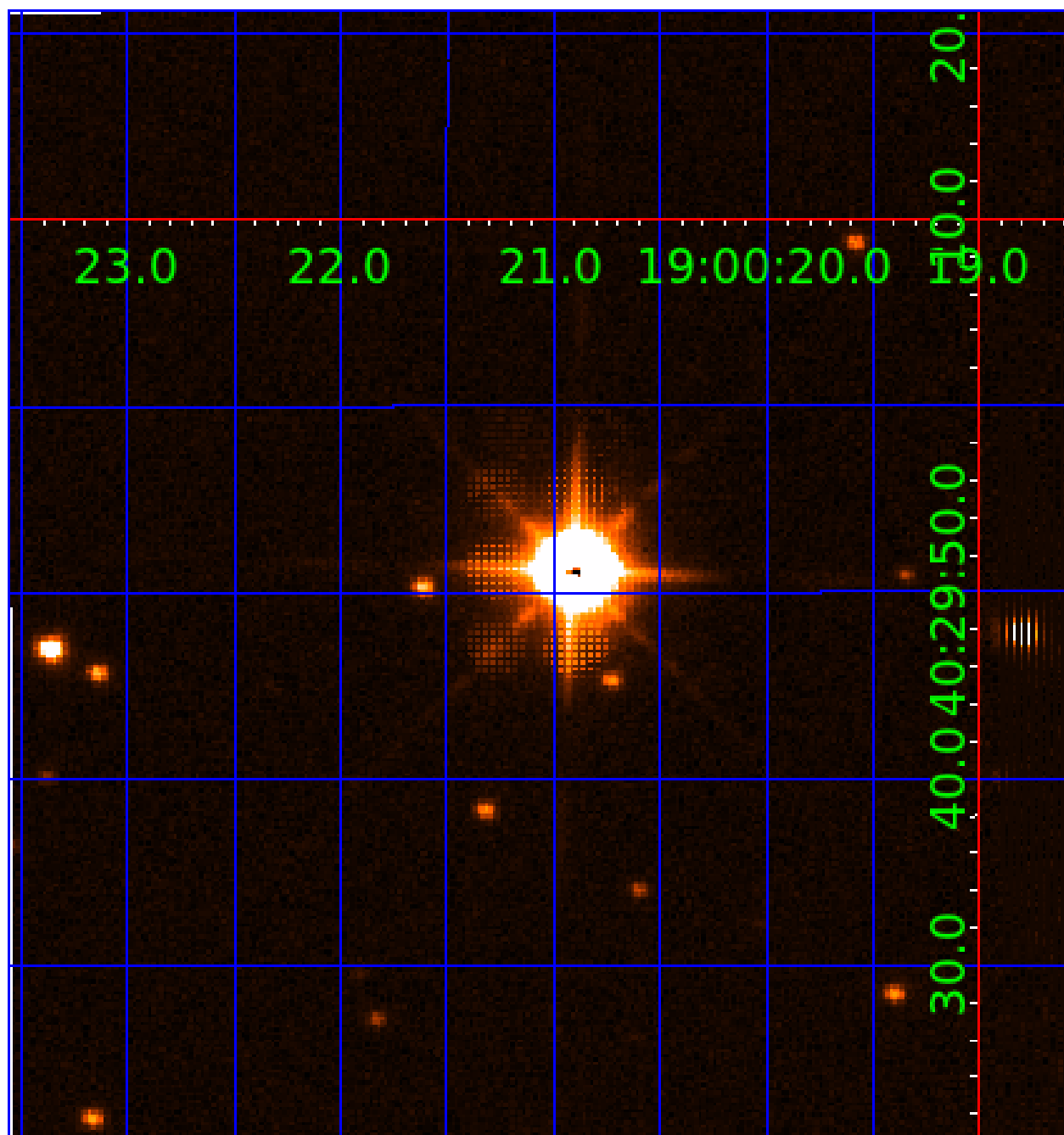


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 005256372

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005256372-01	OBS	No	0.584011	132.093983	20.6	1.544	8.2	7.5	9.21	7022	4.89	0.00
005256372-02	OBS	No	0.860472	132.175193	50.1	4.631	8.1	8.4	9.21	7022	8.80	0.00
005256372-03	OBS	No	59.688269	147.552951	578.5	5.642	7.8	8.2	9.21	7022	42.09	976.83
005256372-04	OBS	No	592.901315	359.048961	498.9	12.267	7.7	7.3	9.21	7022	23.26	45.75

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005256372-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
005256372-02	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—CENT_SATURATED
005256372-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
005256372-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—CENT_SATURATED

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

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

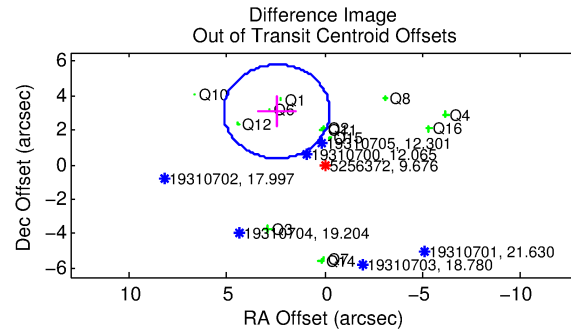
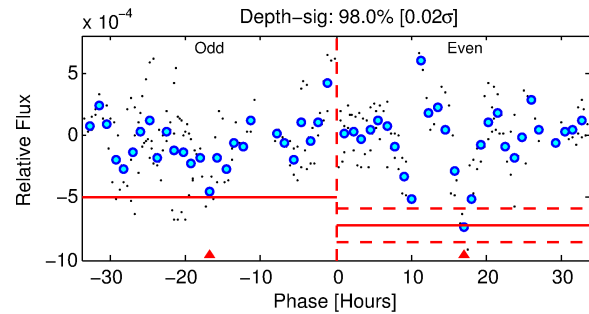
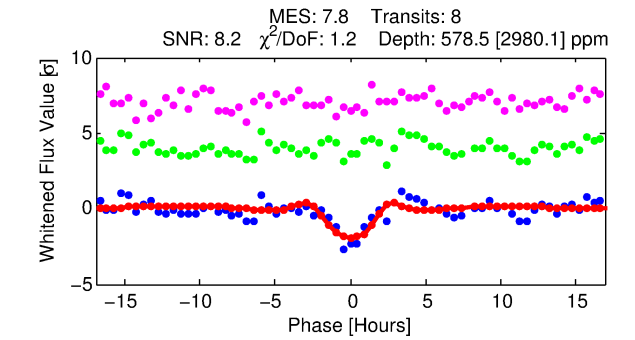
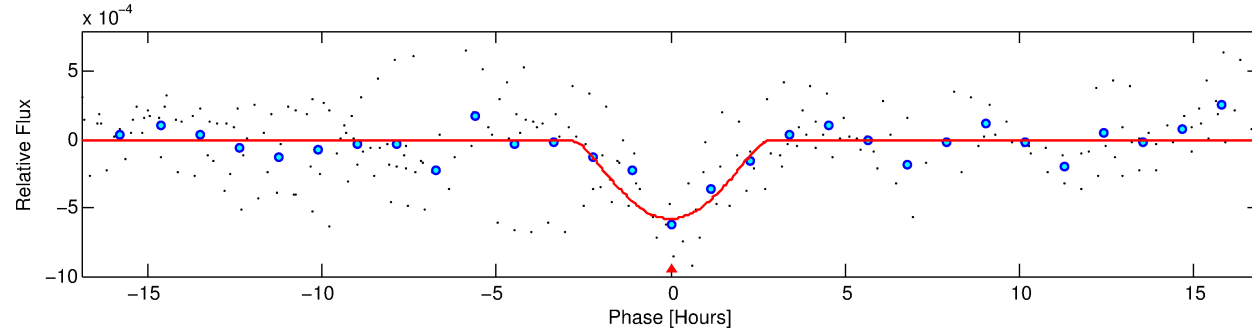
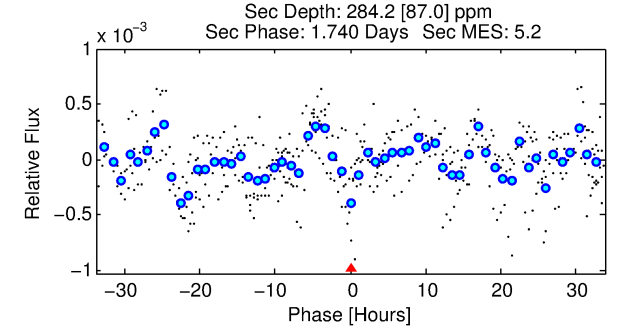
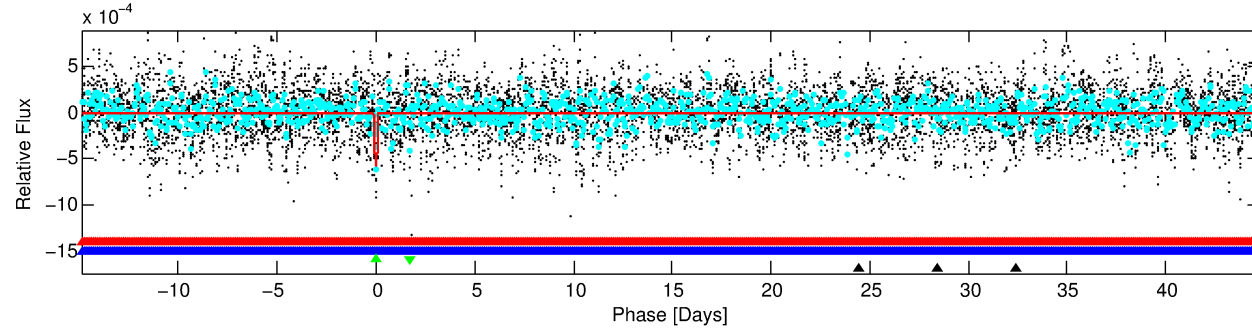
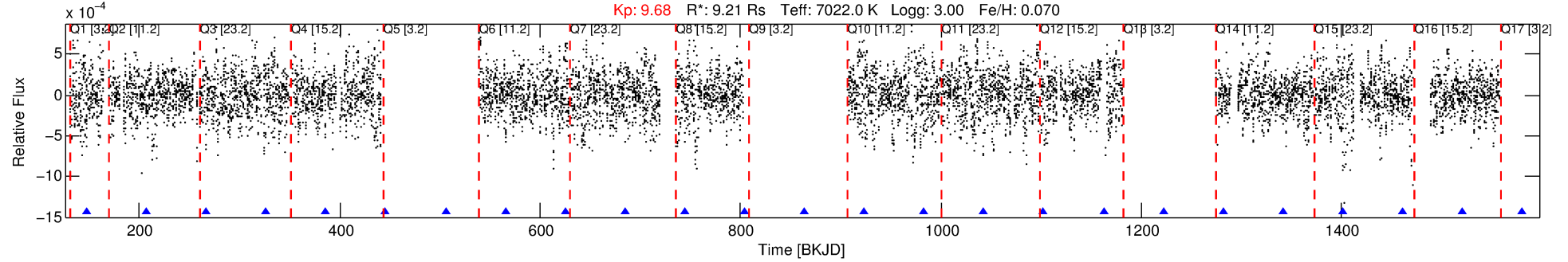
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 005256372-03

No Significant Match Found

# DV One-Page Summary

KIC: 5256372 Candidate: 3 of 4 Period: 59.688 d



## DV Fit Results:

Period = 59.68827 [0.00111] d  
Epoch = 147.5530 [0.0153] BKJD  
Rp/R\* = 0.0419 [0.1164]  
a/R\* = 23.65 [16.60]  
b = 1.00 [0.02]  
Seff = 976.83 [1080.94]  
Teq = 1426 [394] K  
Rp = 42.09 [119.70] Re  
a = 0.4351 [0.2824] AU  
Ag = 16.71 [94.83] [0.17σ]  
Teffp = 4456 [6205] K [0.49σ]

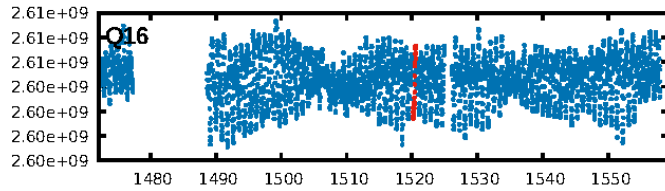
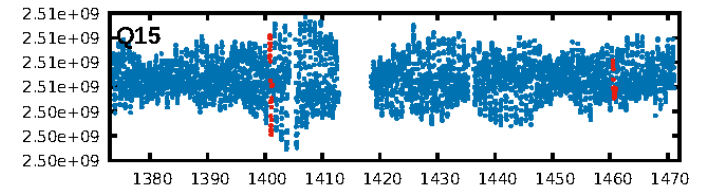
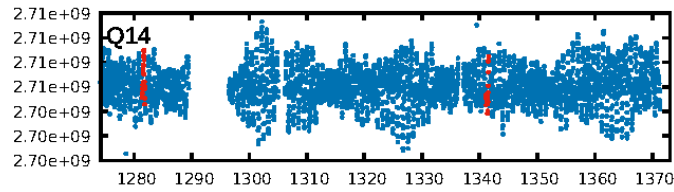
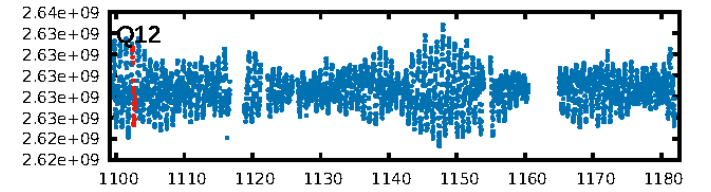
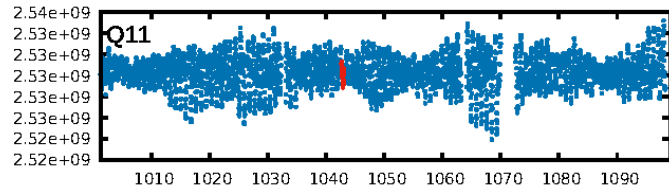
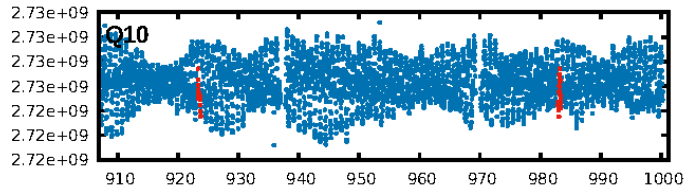
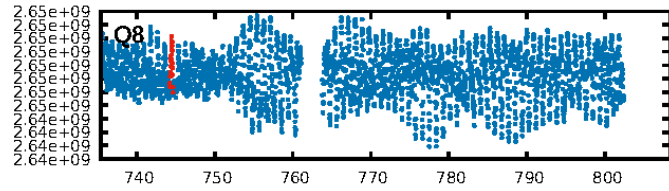
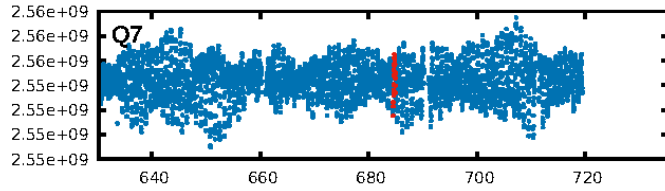
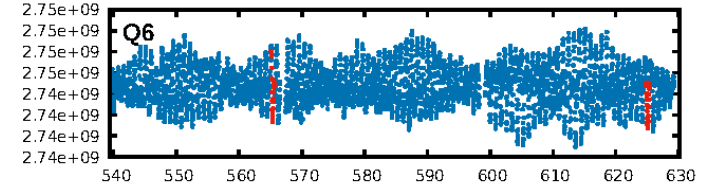
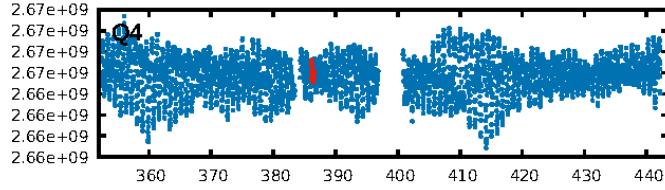
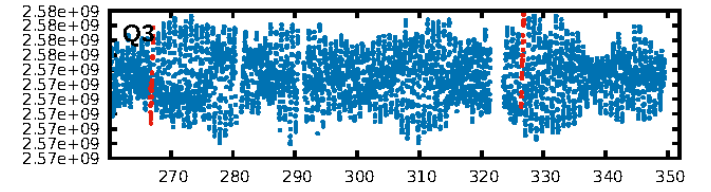
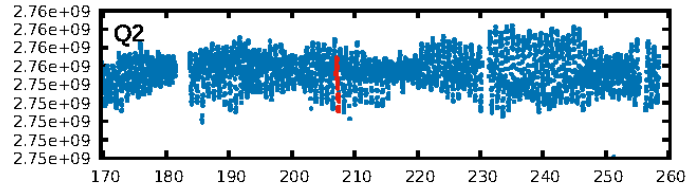
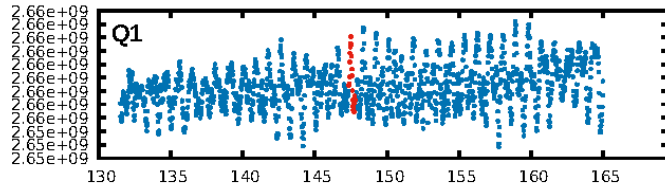
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [193.43σ]  
LongPeriod-sig: 100.0% [947.76σ]  
ModelChiSquare2-sig: 18.4%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 2.70e-09  
RollingBand-fgt: 1.00 [8/8]  
GhostDiagnostic-chr: N/A  
Centroid-sig: 88.7%  
Centroid-so: 0.754 arcsec [2.15σ]  
OotOffset-rm: 3.932 arcsec [4.35σ]  
KicOffset-rm: 4.628 arcsec [5.23σ]  
OotOffset-st: 4/4/4/1 [13]  
KicOffset-st: 4/4/4/1 [13]  
DiffImageQuality-fgm: 0.00 [0/13]  
DiffImageOverlap-fno: 0.00 [0/13]

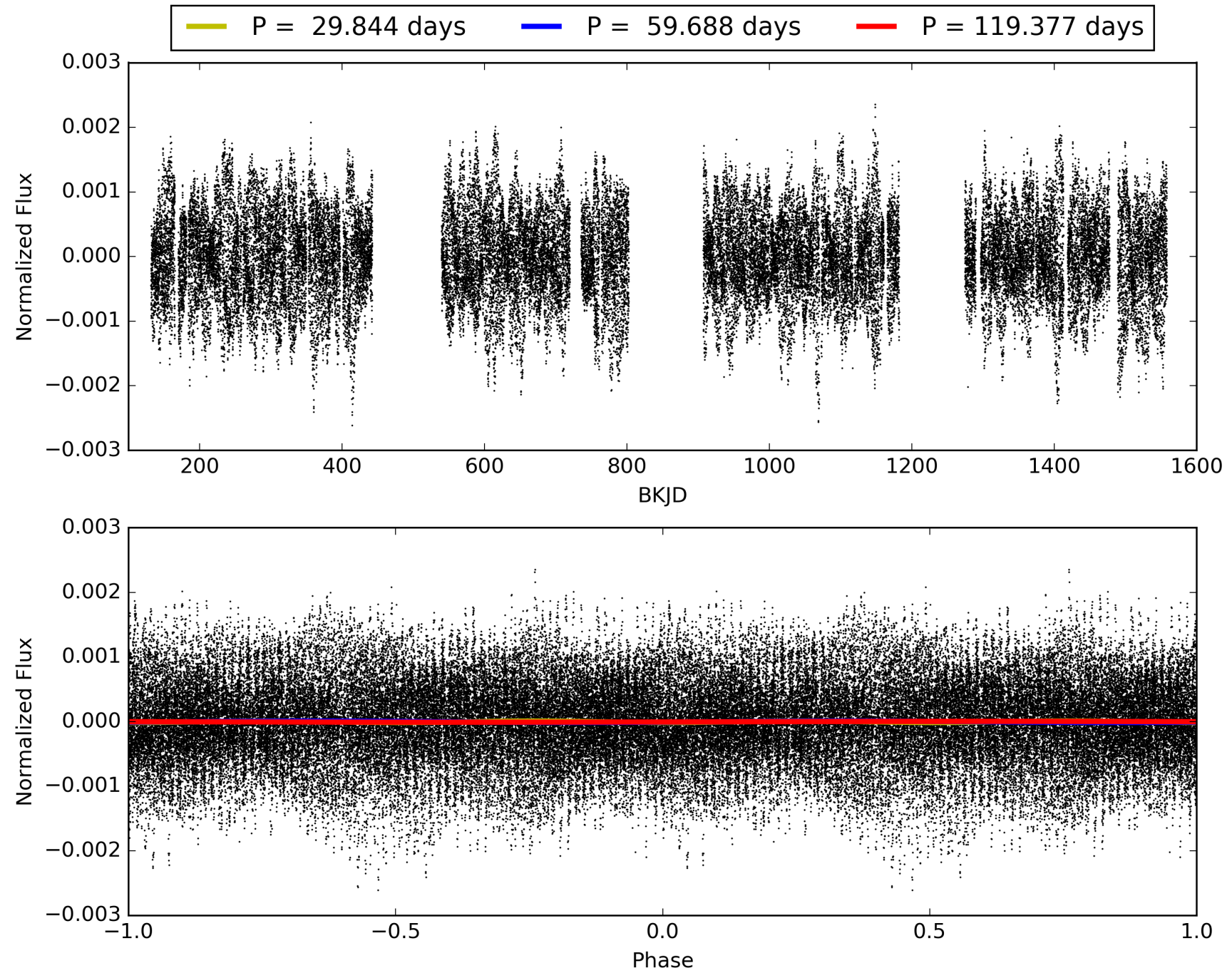
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 21:19:31 Z

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

# TCE 005256372-03, PDC Light Curves

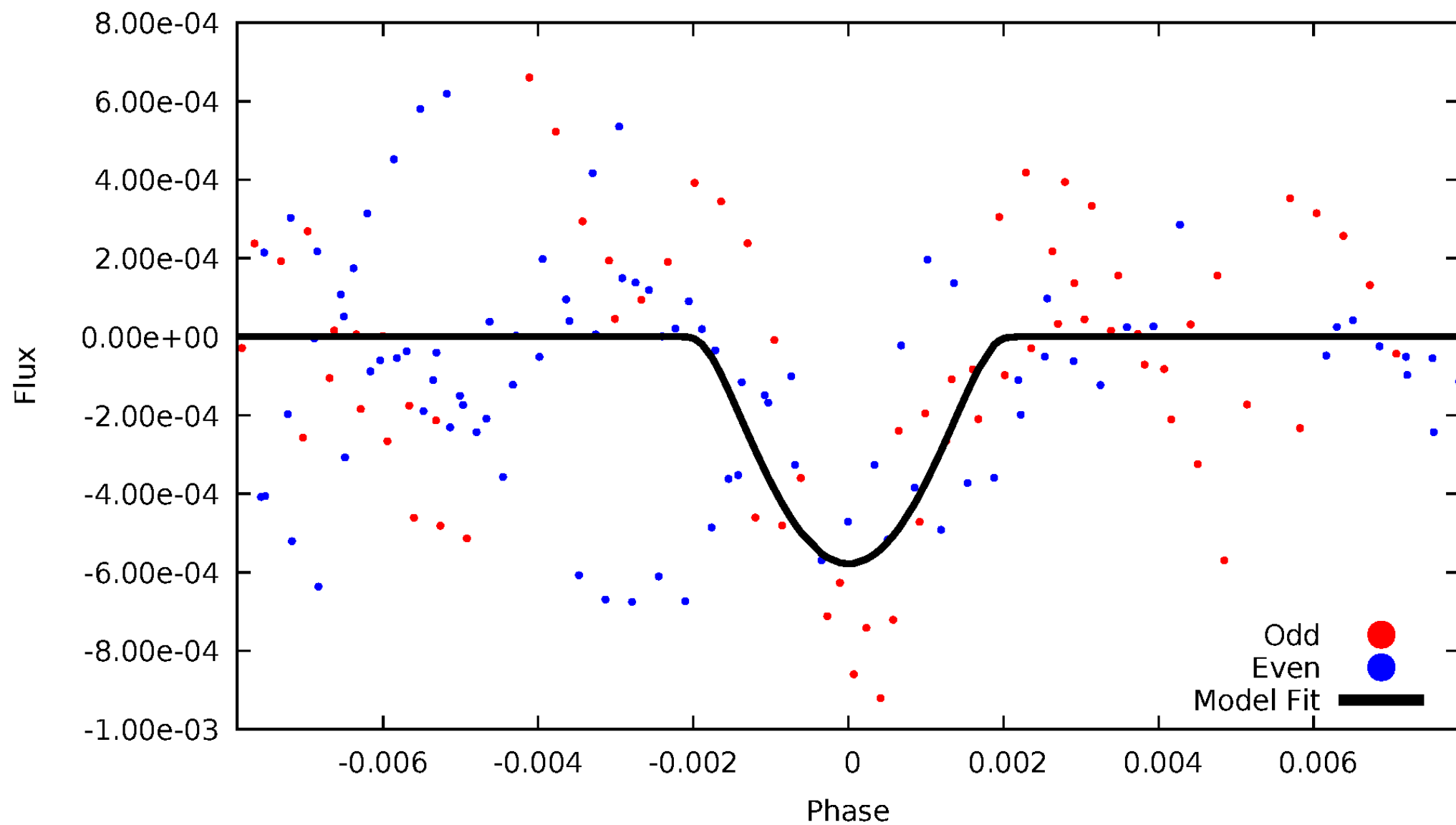


TCE 005256372-03



# DV Odd/Even

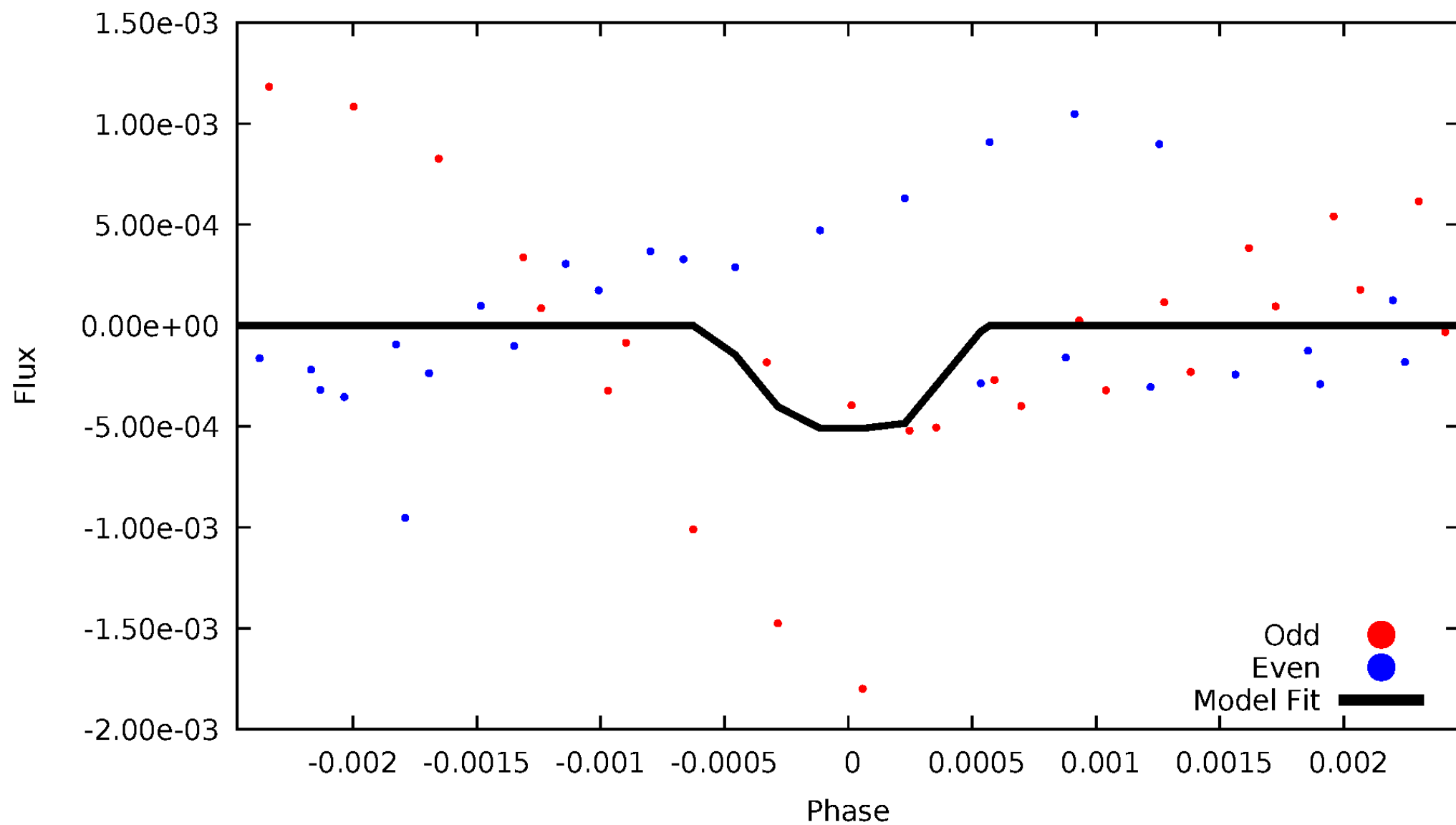
TCE 005256372-03





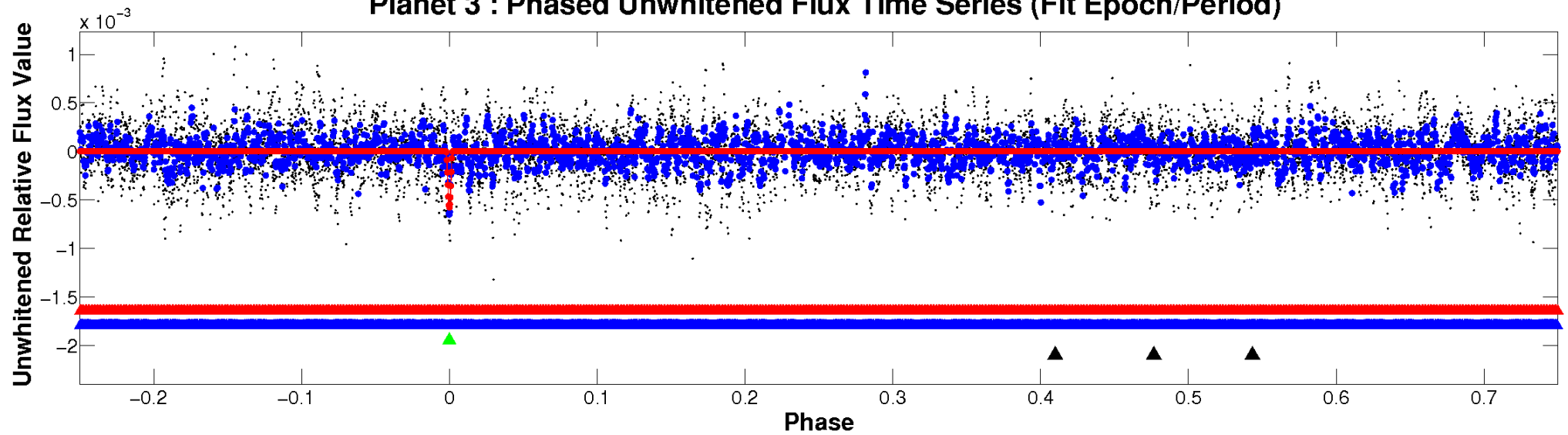
# ALT Odd/Even

TCE 005256372-03

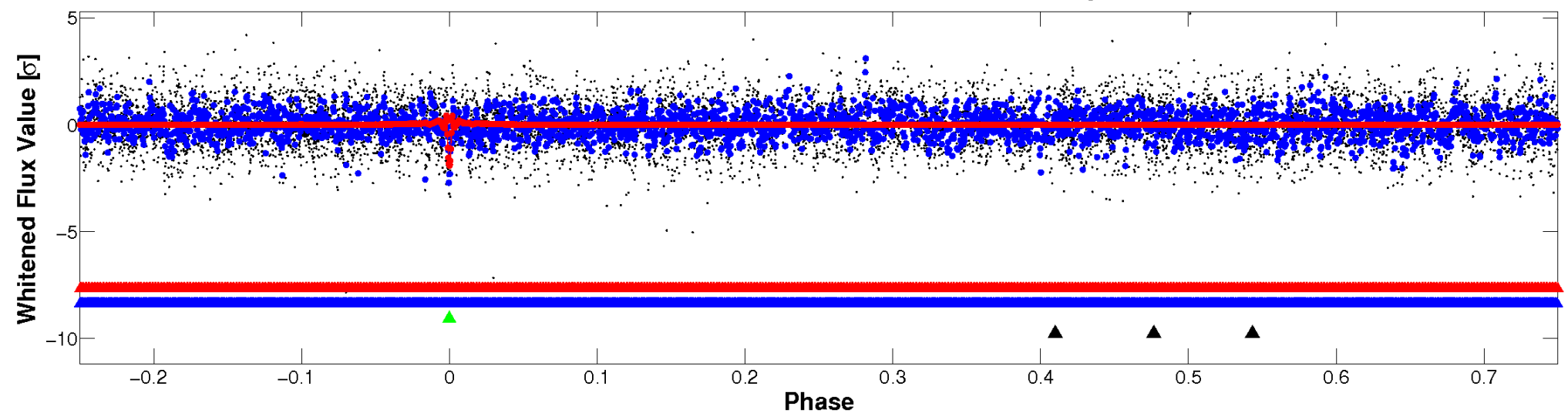


# Non-Whitened Vs. Whitened Light Curve

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

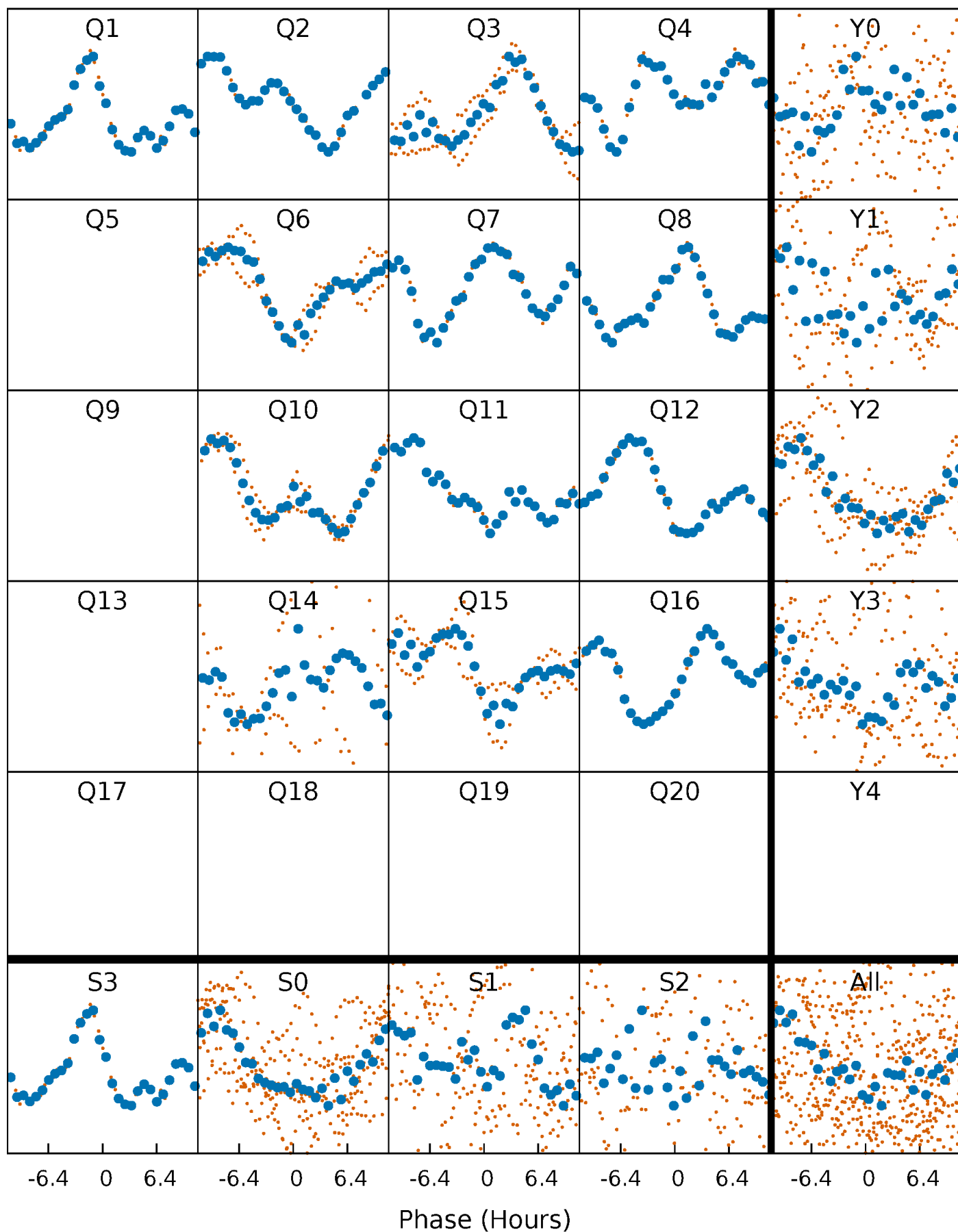


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



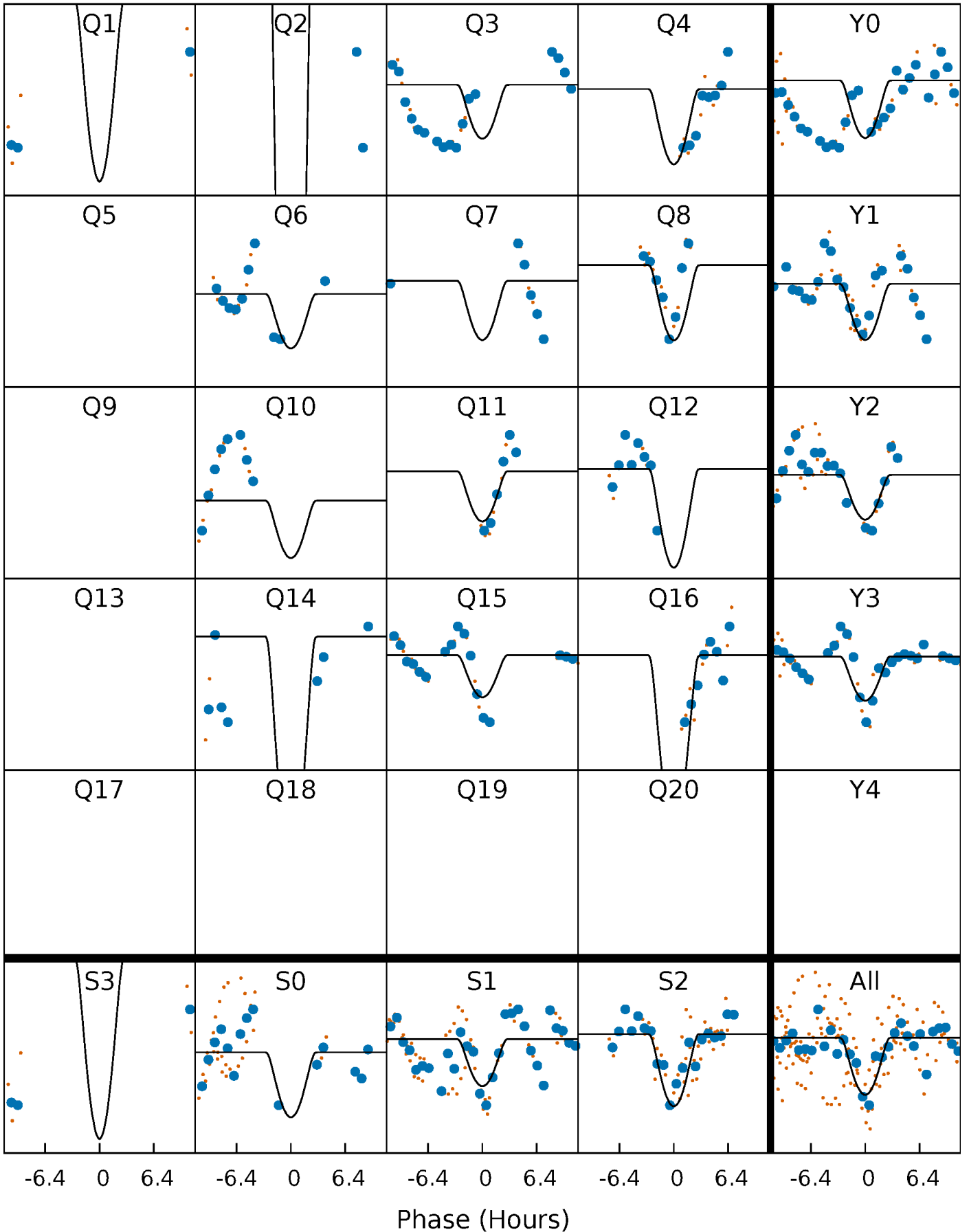
# PDC Quarter-Phased Transit Curves

TCE 005256372-03   P= 59.688269 Days    $T_0=147.552951$  (BKJD)



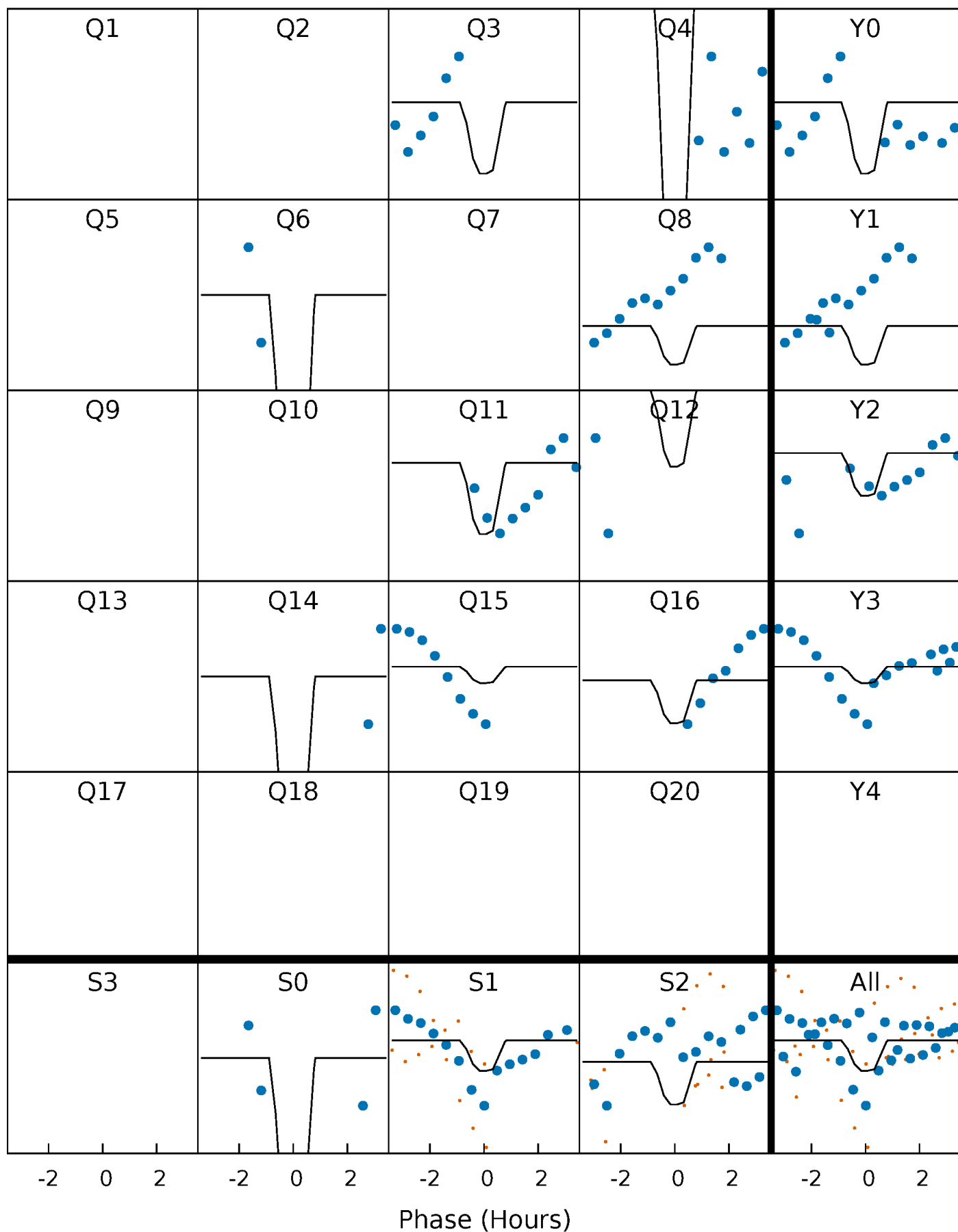
# DV Quarter-Phased Transit Curves

TCE 005256372-03   P= 59.688269 Days    $T_0=147.552951$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 005256372-03   P= 59.689605 Days    $T_0=147.546127$  (BKJD)

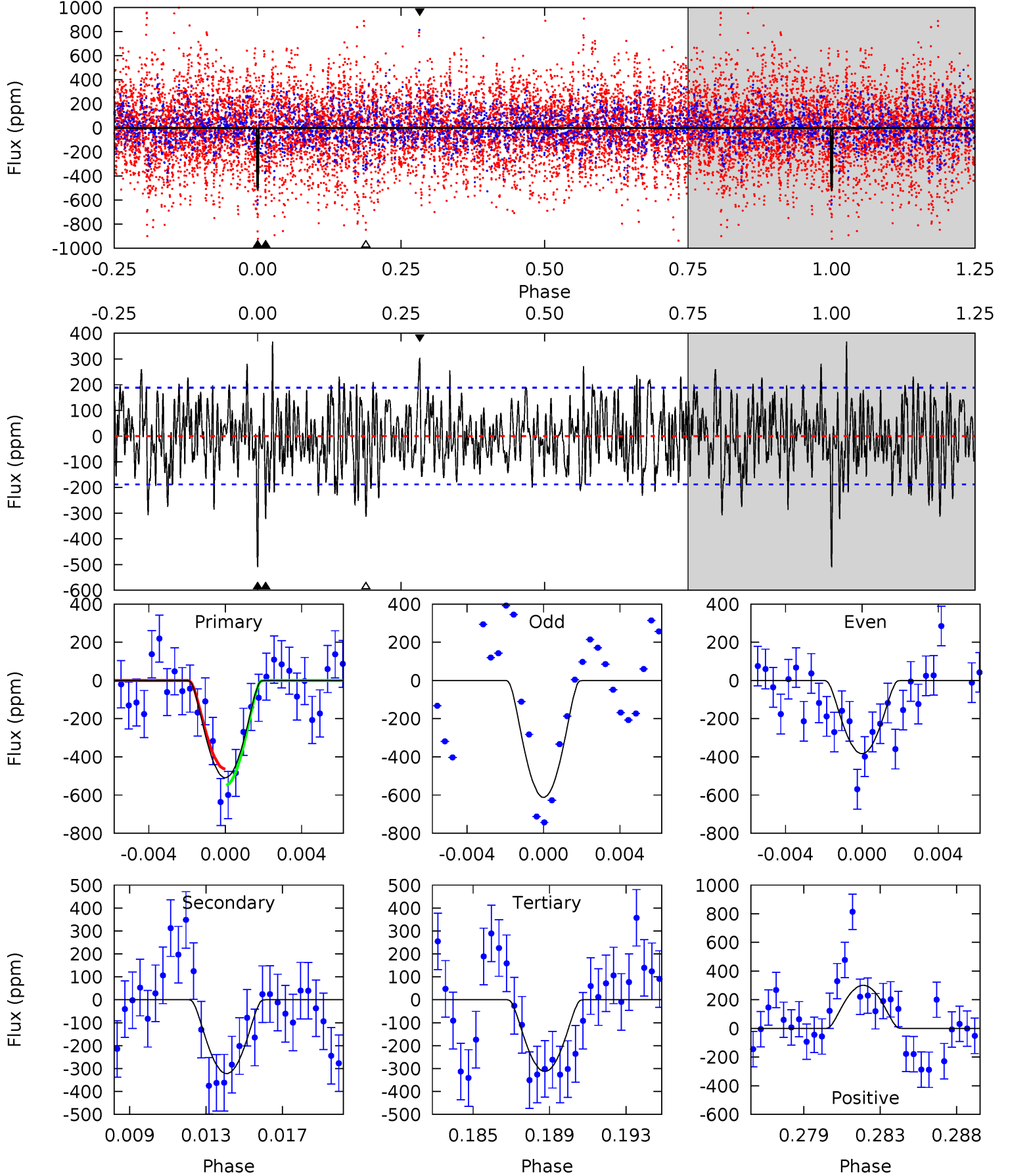




# DV Model-Shift Uniqueness Test

005256372-03, P = 59.688269 Days, E = 87.864682 Days

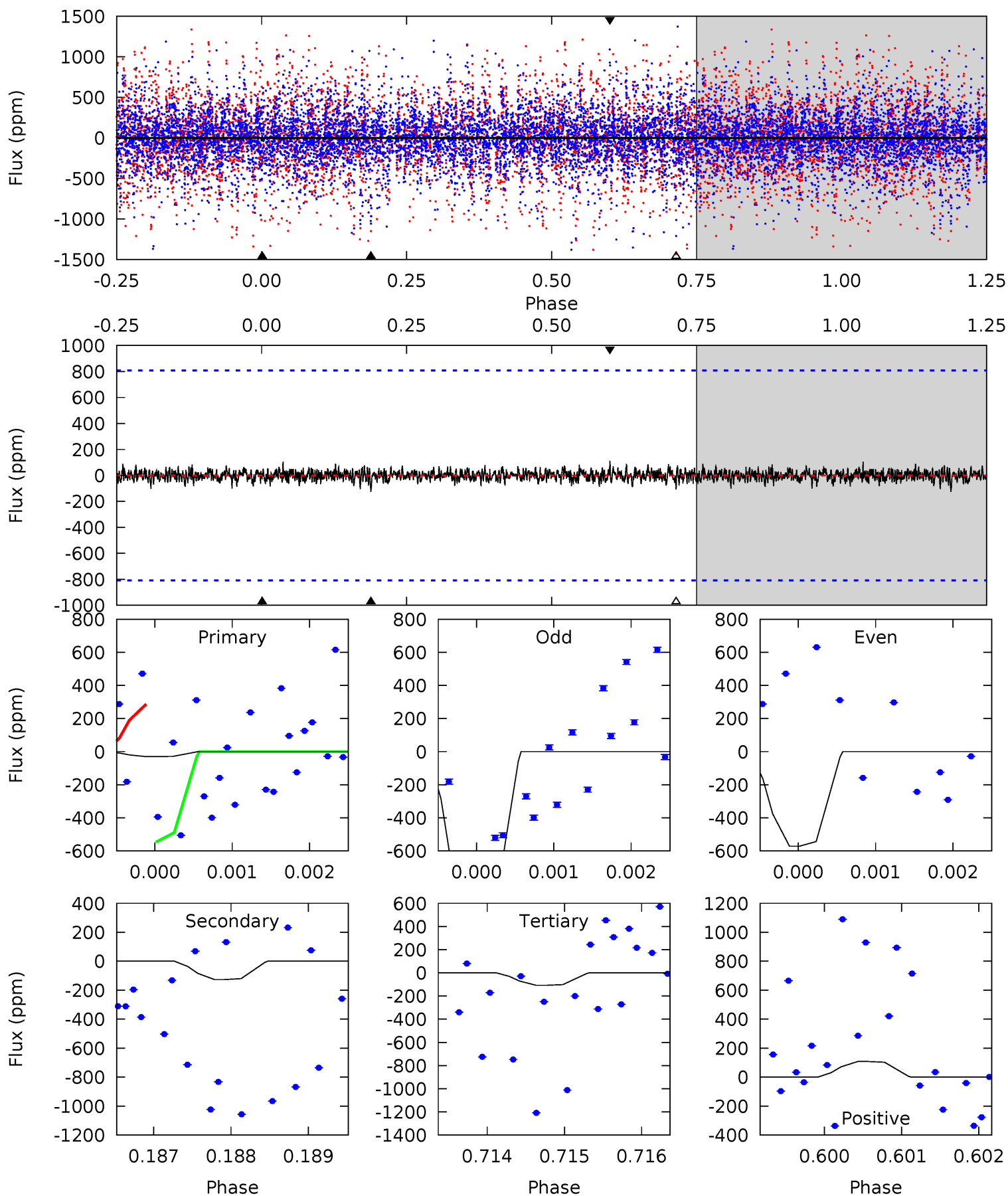
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
14.0	8.89	8.63	8.31	5.19	2.86	2.85	5.41	5.74	0.26	0.58	3.16	1.01	0.42	1.18



# Alt Model-Shift Uniqueness Test

005256372-03, P = 59.689605 Days, E = 87.856522 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
0.20	0.85	0.73	0.73	5.45	3.29	0.20	-0.52	-0.52	0.13	0.12	1.44	1.24	0.46	0.79



### Stellar Parameters For KIC 005256372

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7022^{+157}_{-244}$	$2.998^{+0.666}_{-0.074}$	$0.070^{+0.150}_{-0.400}$	$9.213^{+1.036}_{-5.528}$	$3.080^{+0.211}_{-1.198}$	$0.006^{+0.062}_{-0.002}$
	+2%/-3%	+22%/-2%	+214%/-571%	+11%/-60%	+7%/-39%	+1123%/-35%
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 005256372-03 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-322 \pm 36$	$84.81^{+85.80}_{-57.52}$	$1916^{+133}_{-283}$	$3414^{+1727}_{-682}$	$4.507^{+39.572}_{-3.404}$
Alt.	$-126 \pm 148$	$75.15^{+90.23}_{-51.88}$	$1906^{+137}_{-266}$	$2815^{+1605}_{-5284}$	$1.411^{+15.973}_{-1.474}$

$T_{\text{max}}$  = 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

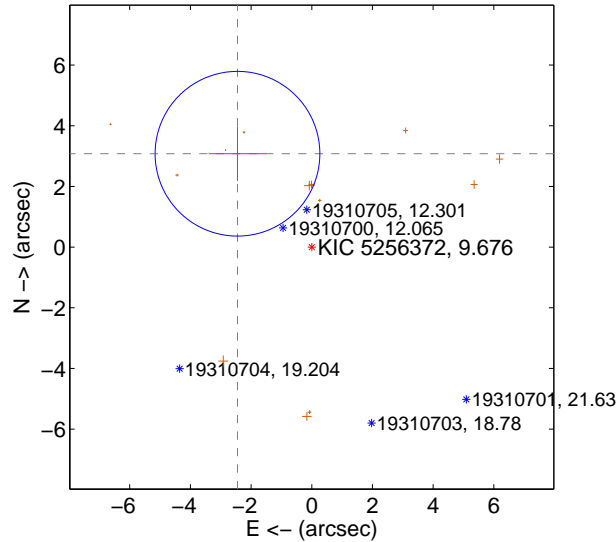
Supplemental centroid analysis for 005256372-03. **Kepler magnitude: 9.68.** Transit SNR 8.16

There are 0 quarters with good PRF difference image offsets

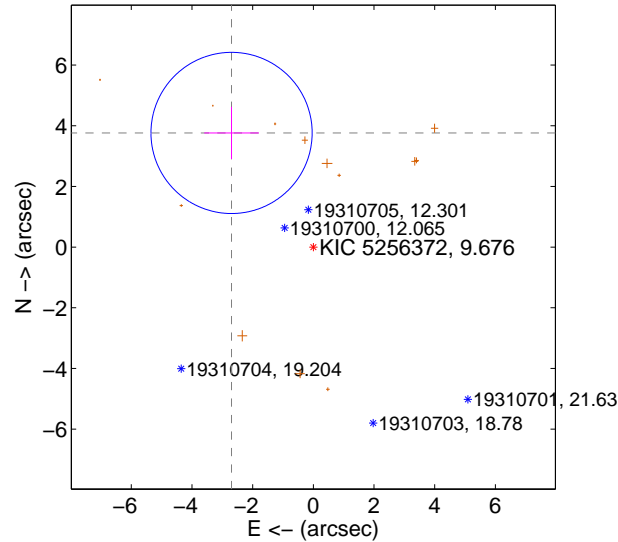
The OOT PRF centroid is offset from the target star catalog position by about 2.15 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b><math>3.932 \pm 0.905</math></b>	<b>4.35</b>	$2.448 \pm 0.944$	$3.077 \pm 0.899$
PRF-fit source offset from KIC position	<b><math>4.628 \pm 0.885</math></b>	<b>5.23</b>	$2.695 \pm 0.900$	$3.762 \pm 0.862$
photometric centroid source offset	$0.75 \pm 0.35$	2.15	$0.59 \pm 0.39$	$0.47 \pm 0.29$

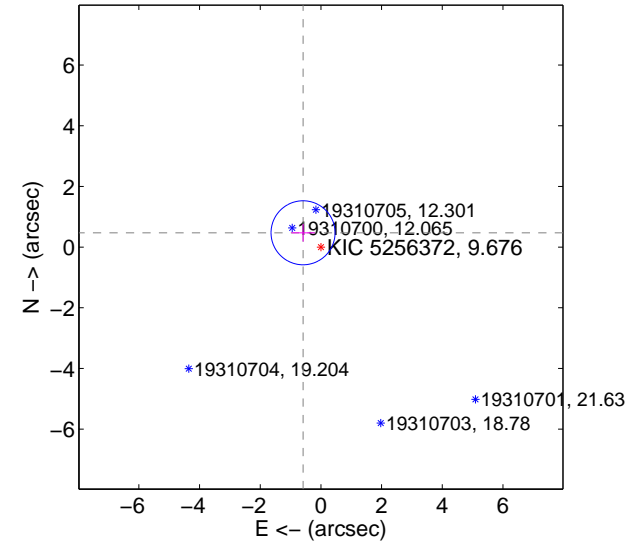
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



offset from photometric centroids

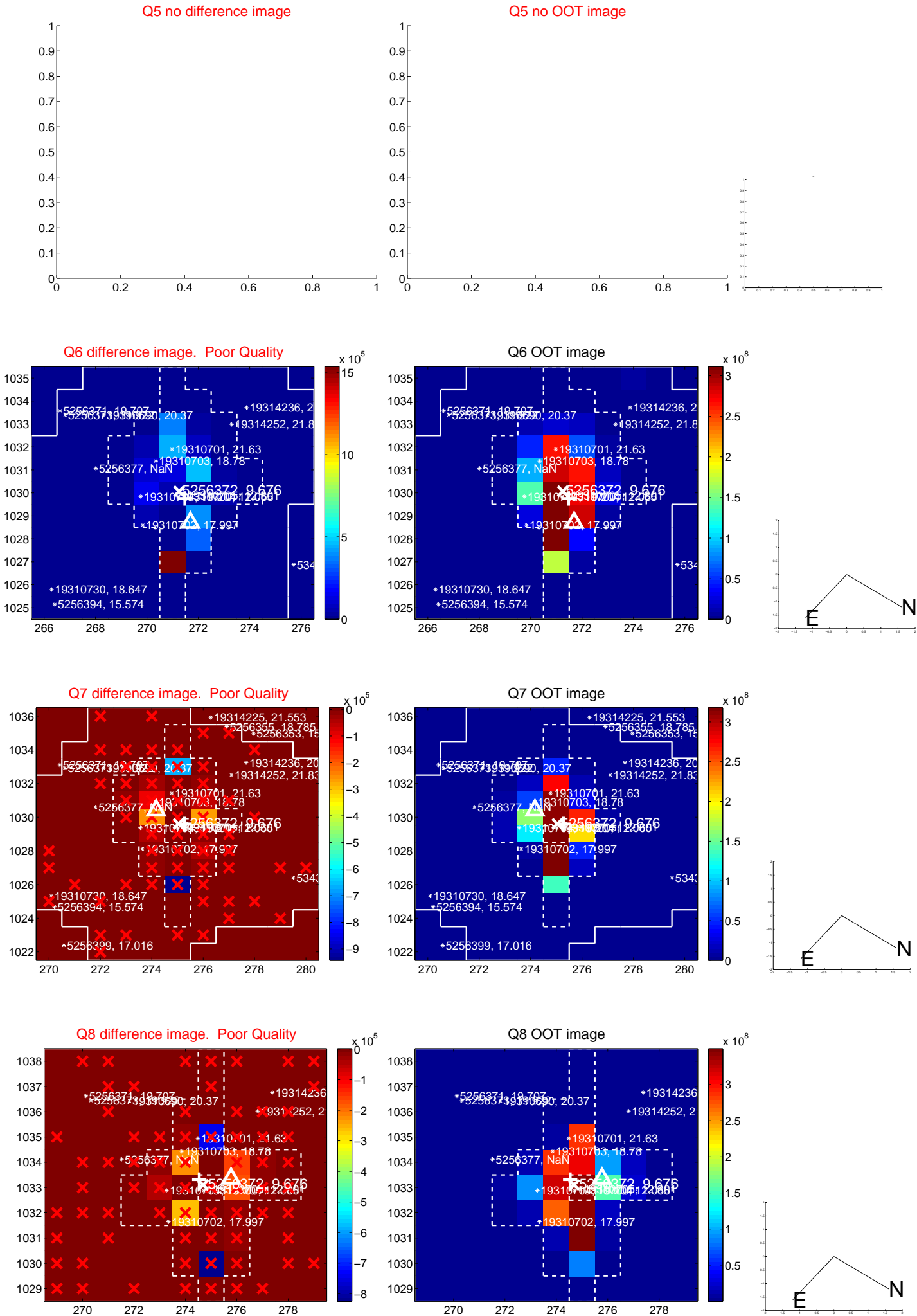


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

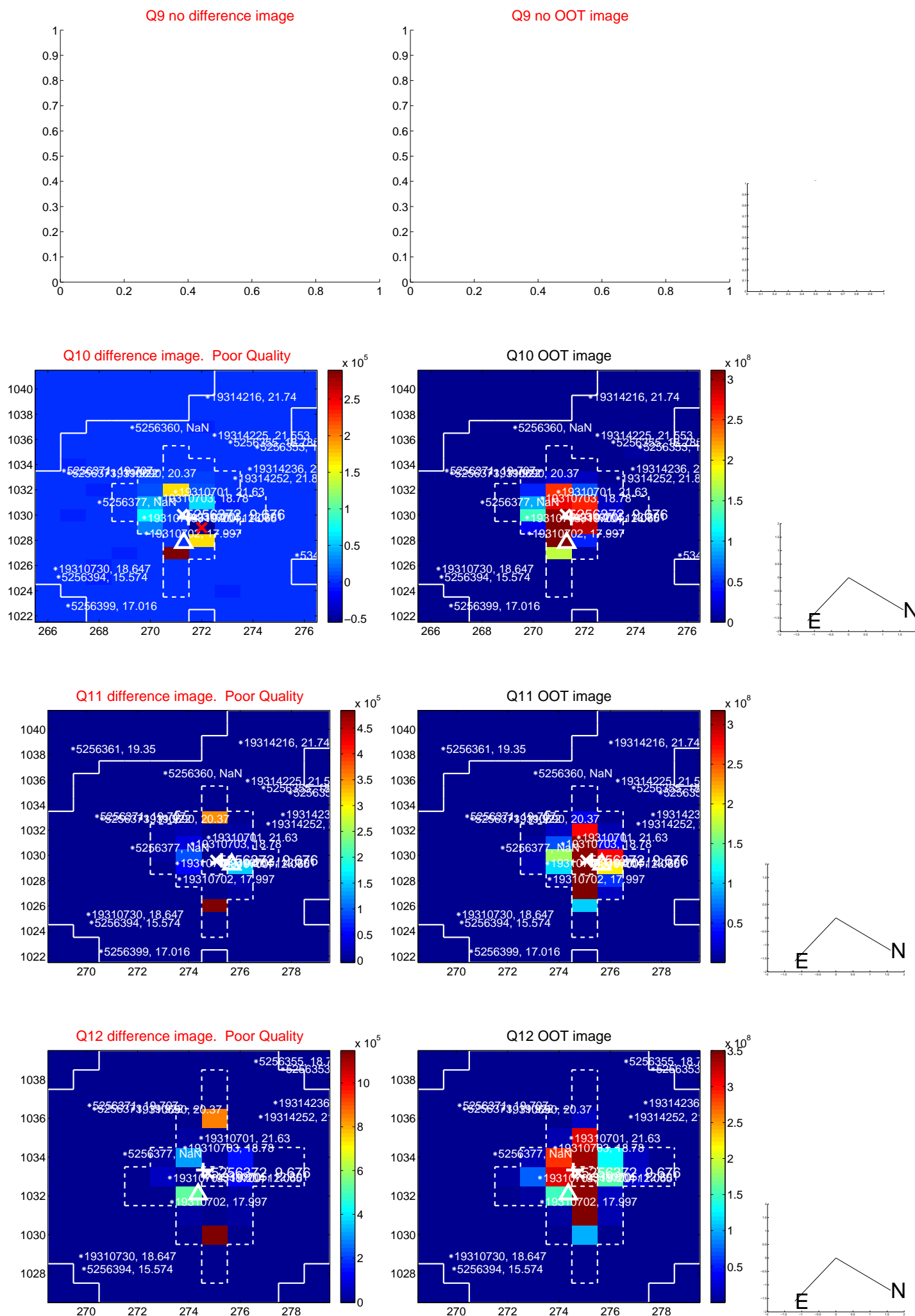




white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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.

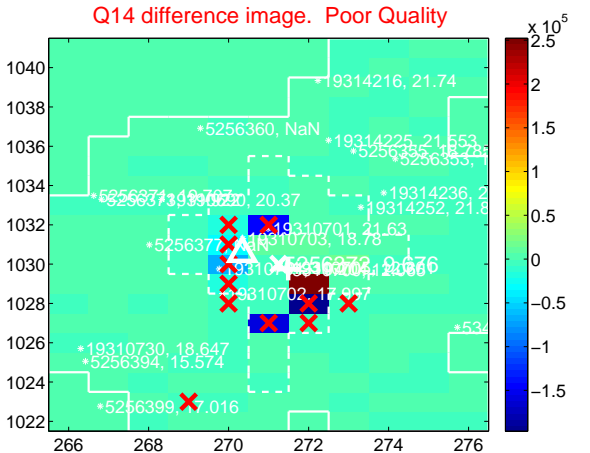
Q13 no difference image



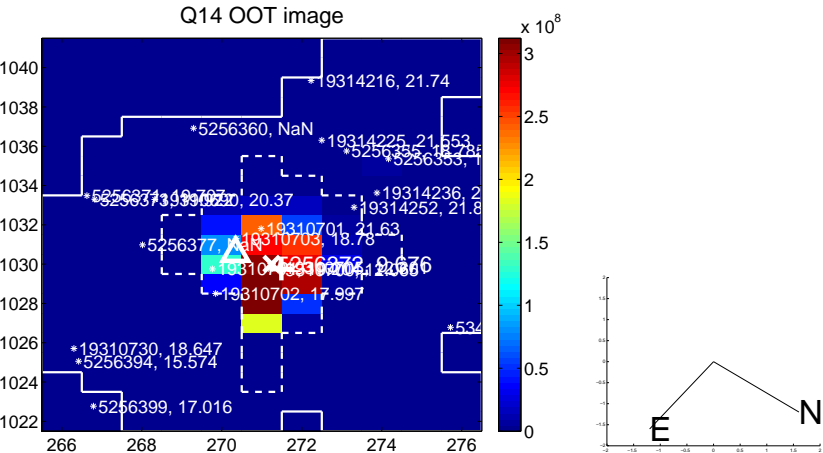
Q13 no OOT image



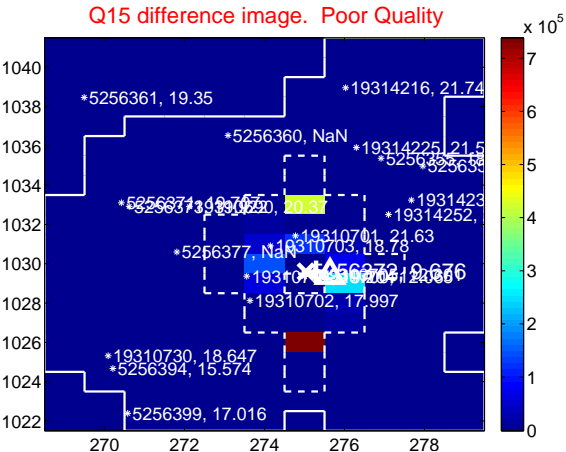
Q14 difference image. Poor Quality



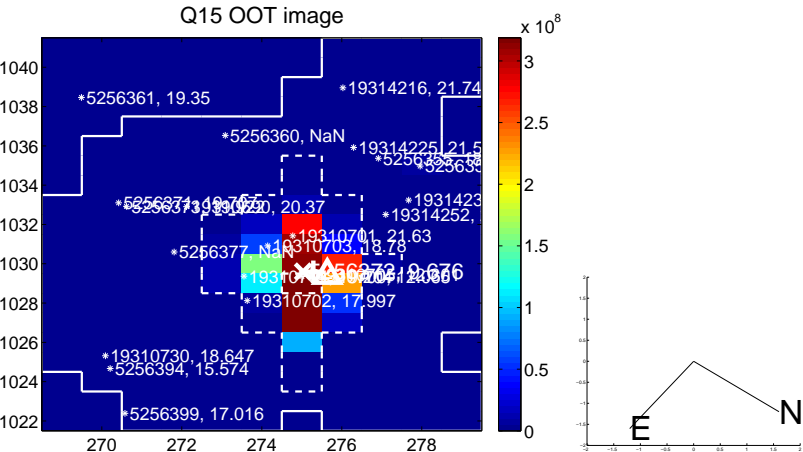
Q14 OOT image



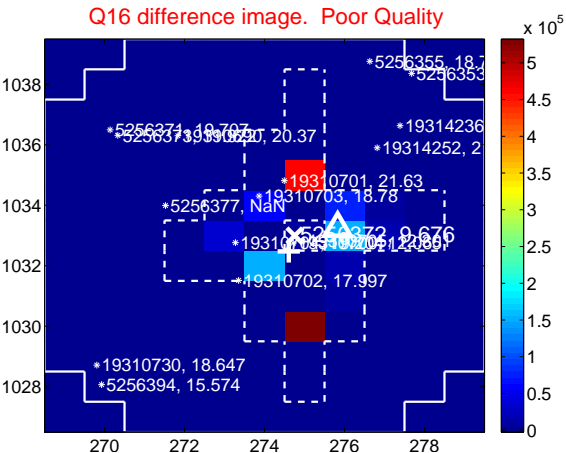
Q15 difference image. Poor Quality



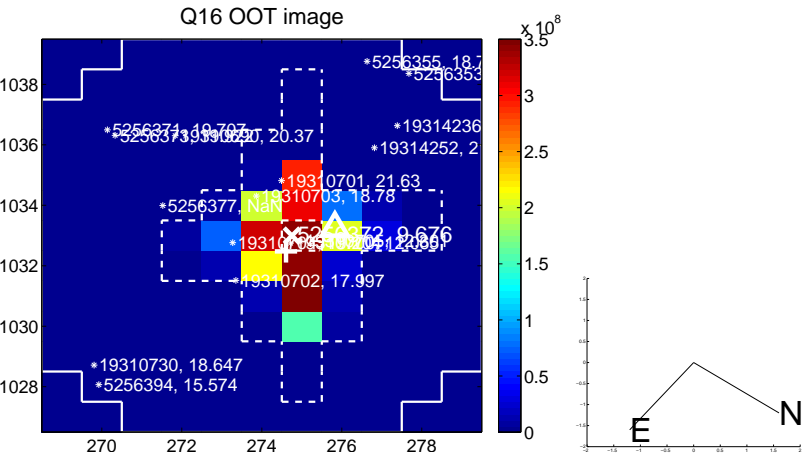
Q15 OOT image



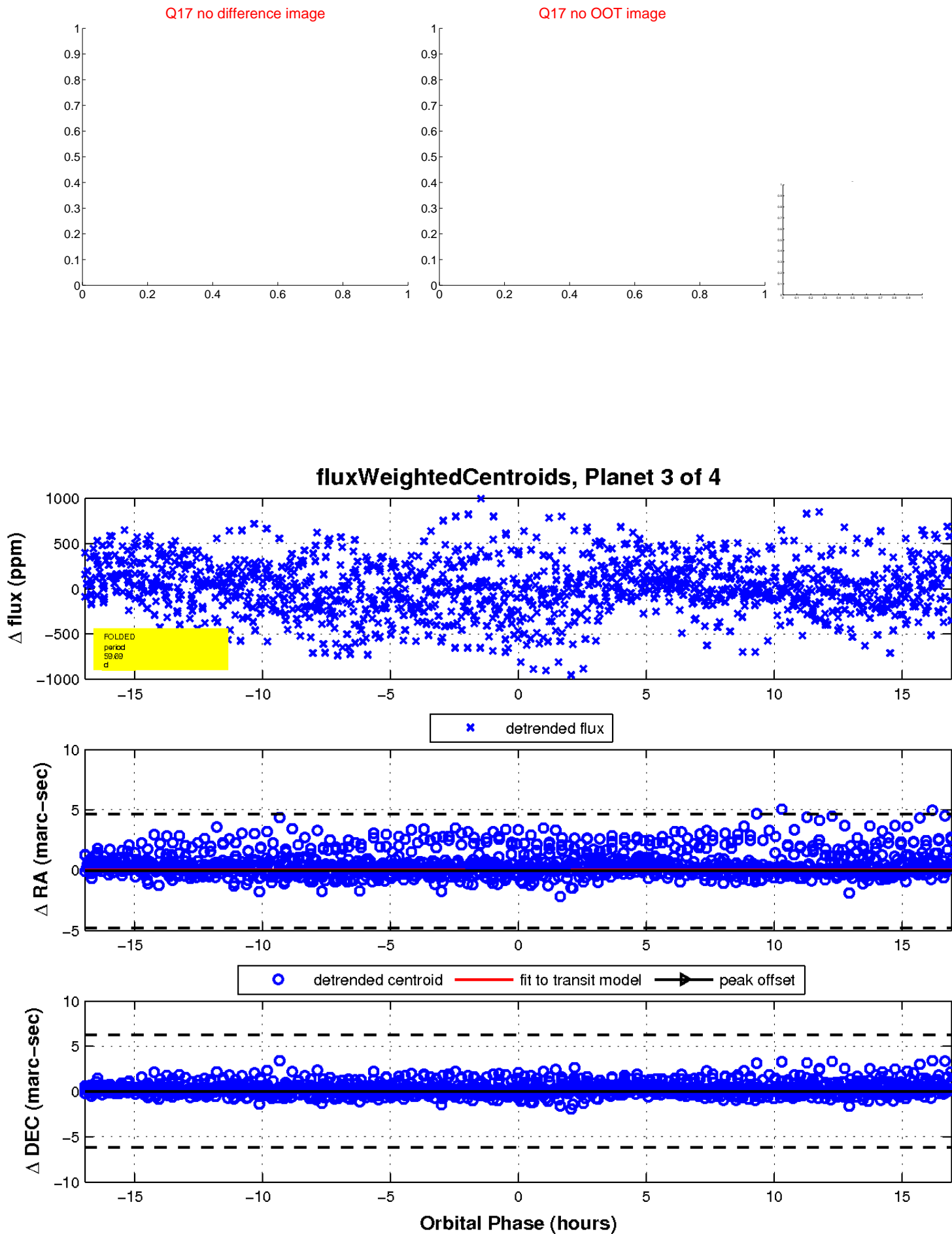
Q16 difference image. Poor Quality



Q16 OOT image

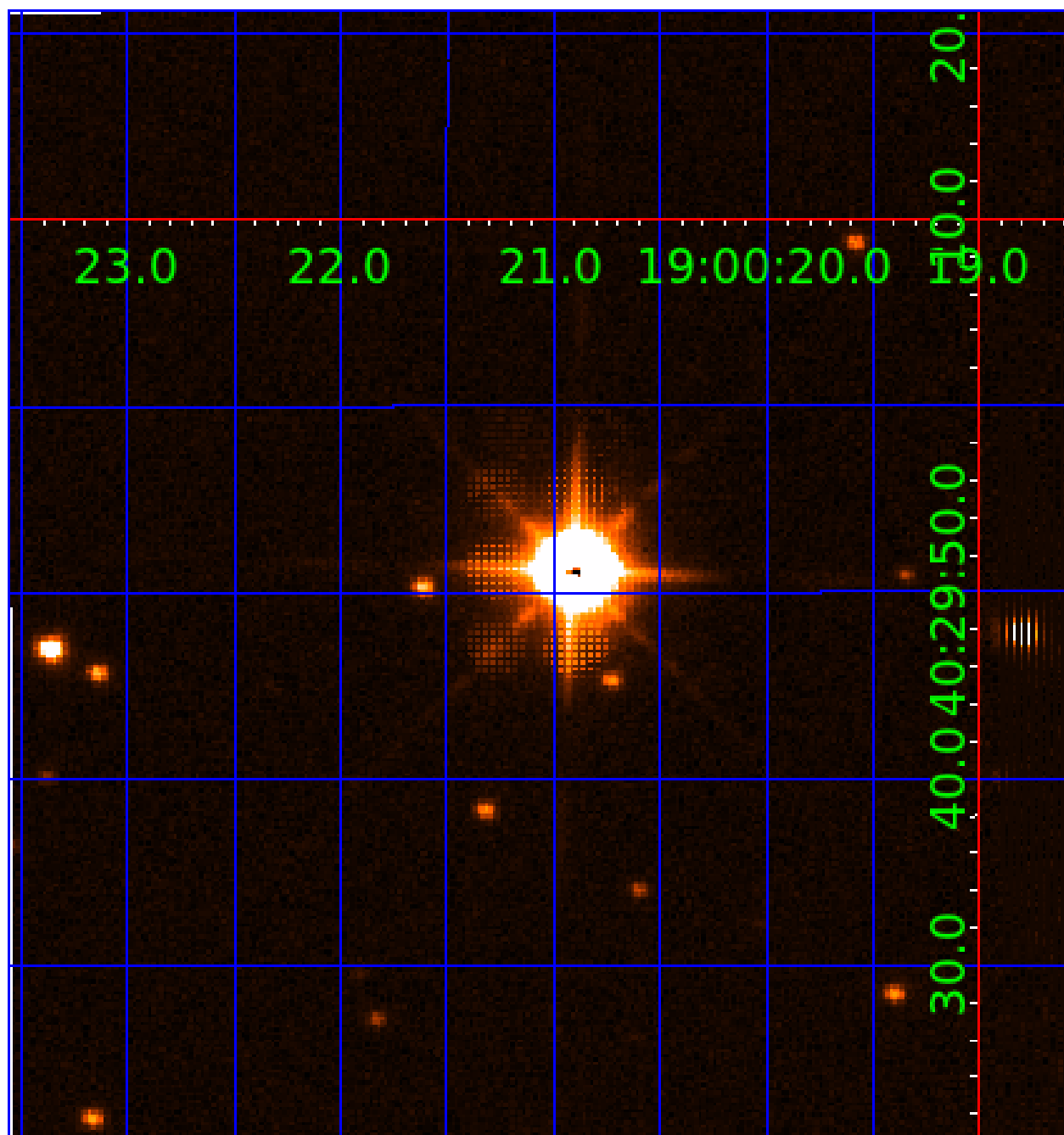


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 005256372

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005256372-01	OBS	No	0.584011	132.093983	20.6	1.544	8.2	7.5	9.21	7022	4.89	0.00
005256372-02	OBS	No	0.860472	132.175193	50.1	4.631	8.1	8.4	9.21	7022	8.80	0.00
005256372-03	OBS	No	59.688269	147.552951	578.5	5.642	7.8	8.2	9.21	7022	42.09	976.83
005256372-04	OBS	No	592.901315	359.048961	498.9	12.267	7.7	7.3	9.21	7022	23.26	45.75

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005256372-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
005256372-02	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—CENT_SATURATED
005256372-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
005256372-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—CENT_SATURATED

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

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

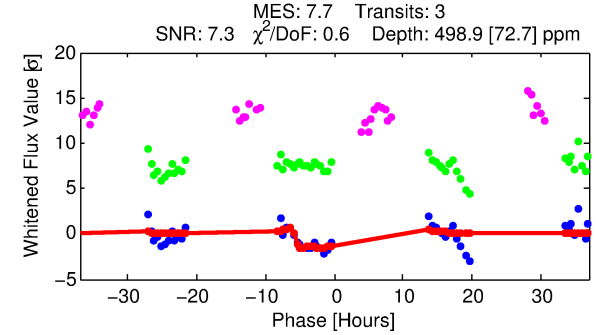
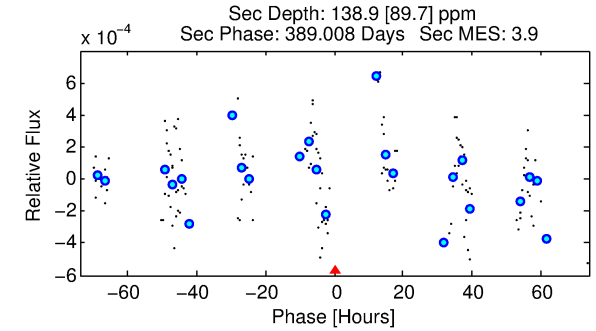
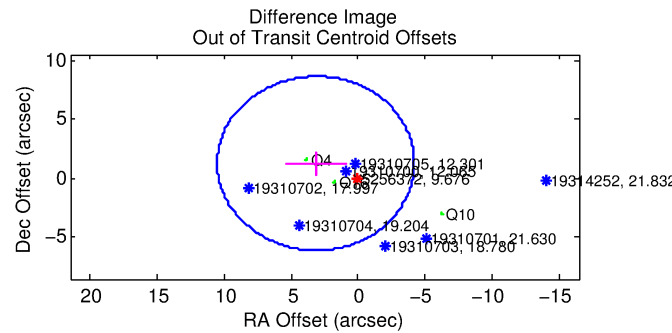
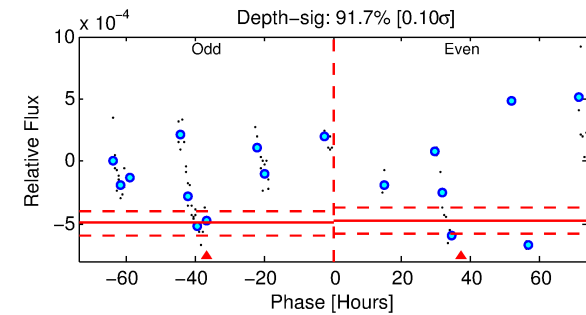
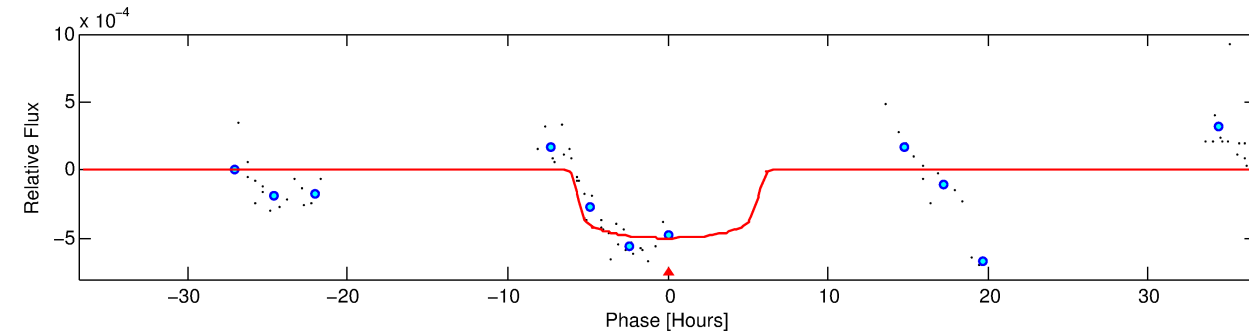
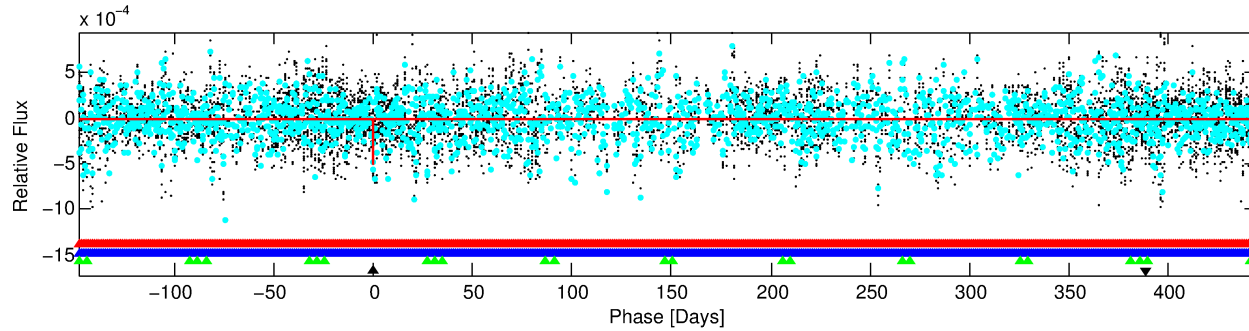
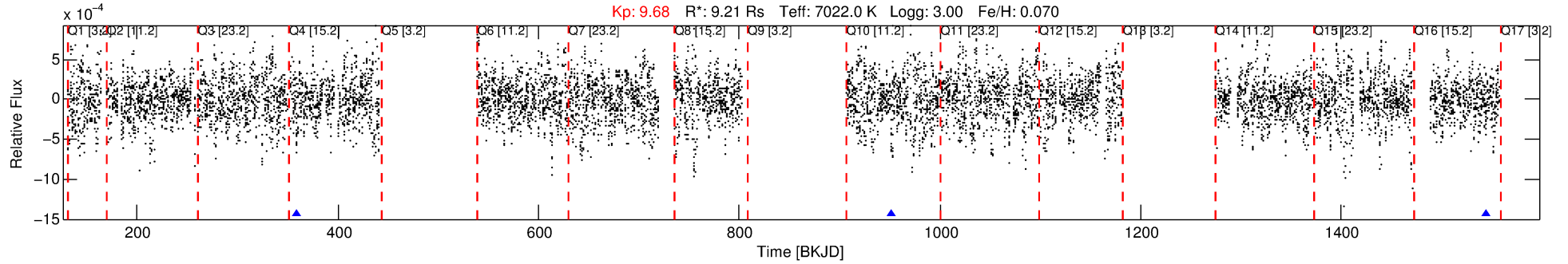
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 005256372-04

No Significant Match Found

# DV One-Page Summary

KIC: 5256372 Candidate: 4 of 4 Period: 592.901 d



## DV Fit Results:

Period = 592.90132 [0.00806] d  
Epoch = 359.0490 [0.0509] BKJD  
Rp/R\* = 0.0231 [0.0025]  
a/R\* = 209.59 [97.86]  
b = 0.85 [0.19]  
Seff = 45.75 [50.62]  
Teq = 663 [183] K  
Rp = 23.26 [14.17] Re  
a = 2.0104 [1.3049] AU  
Ag = 570.67 [737.02] [0.77 $\sigma$ ]  
Teffp = 5011 [870] K [4.89 $\sigma$ ]

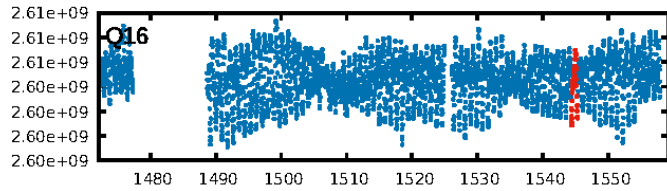
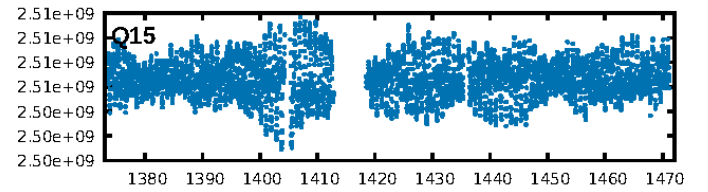
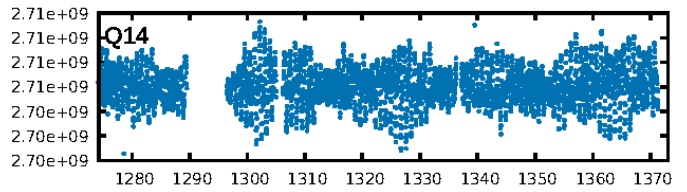
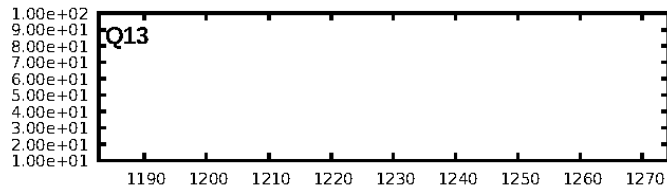
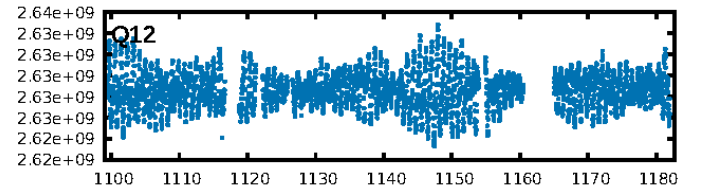
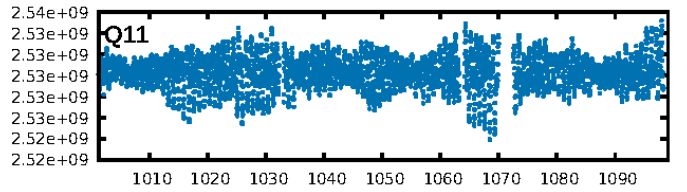
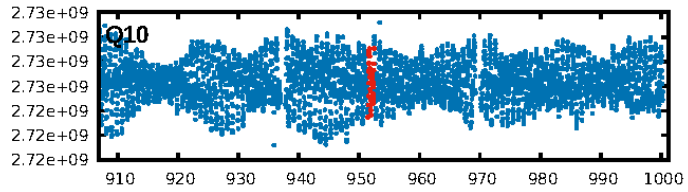
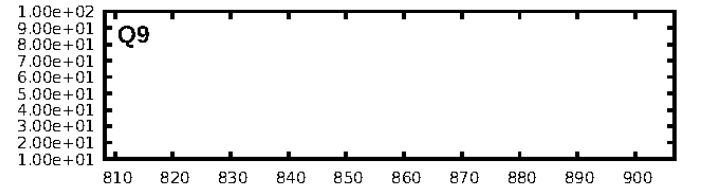
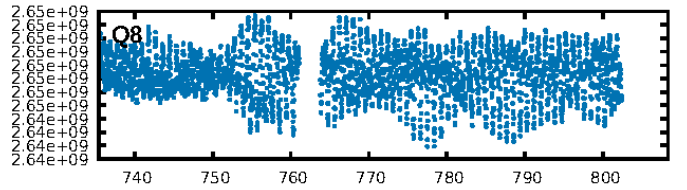
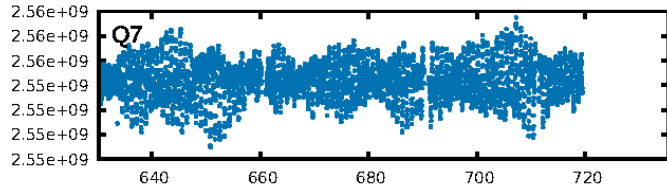
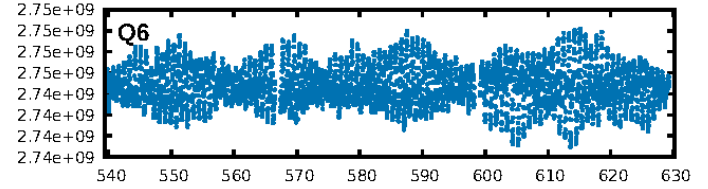
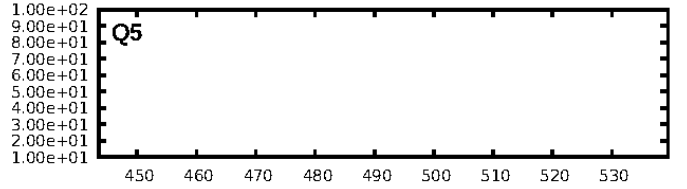
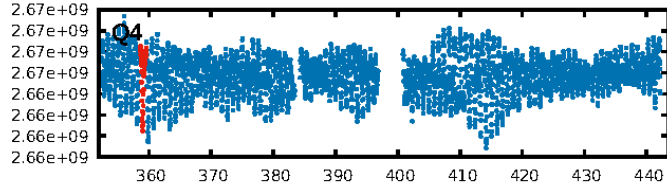
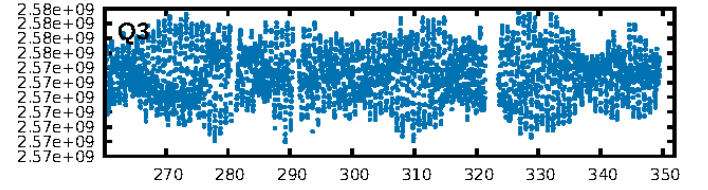
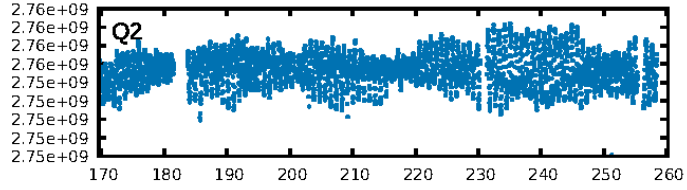
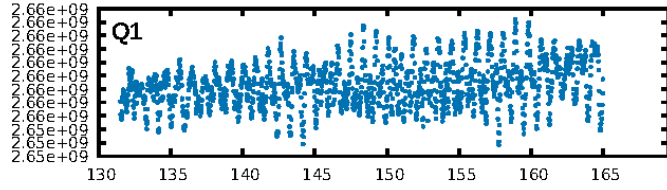
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [947.76 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 99.2%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 3.01e-08  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: N/A  
Centroid-sig: 0.1%  
Centroid-so: 2.908 arcsec [3.27 $\sigma$ ]  
OotOffset-rm: 3.403 arcsec [1.39 $\sigma$ ]  
KicOffset-rm: 3.347 arcsec [1.47 $\sigma$ ]  
OotOffset-st: 1/0/2/0 [3]  
KicOffset-st: 1/0/2/0 [3]  
DiffImageQuality-fgm: 0.00 [0/3]  
DiffImageOverlap-fno: 0.00 [0/3]

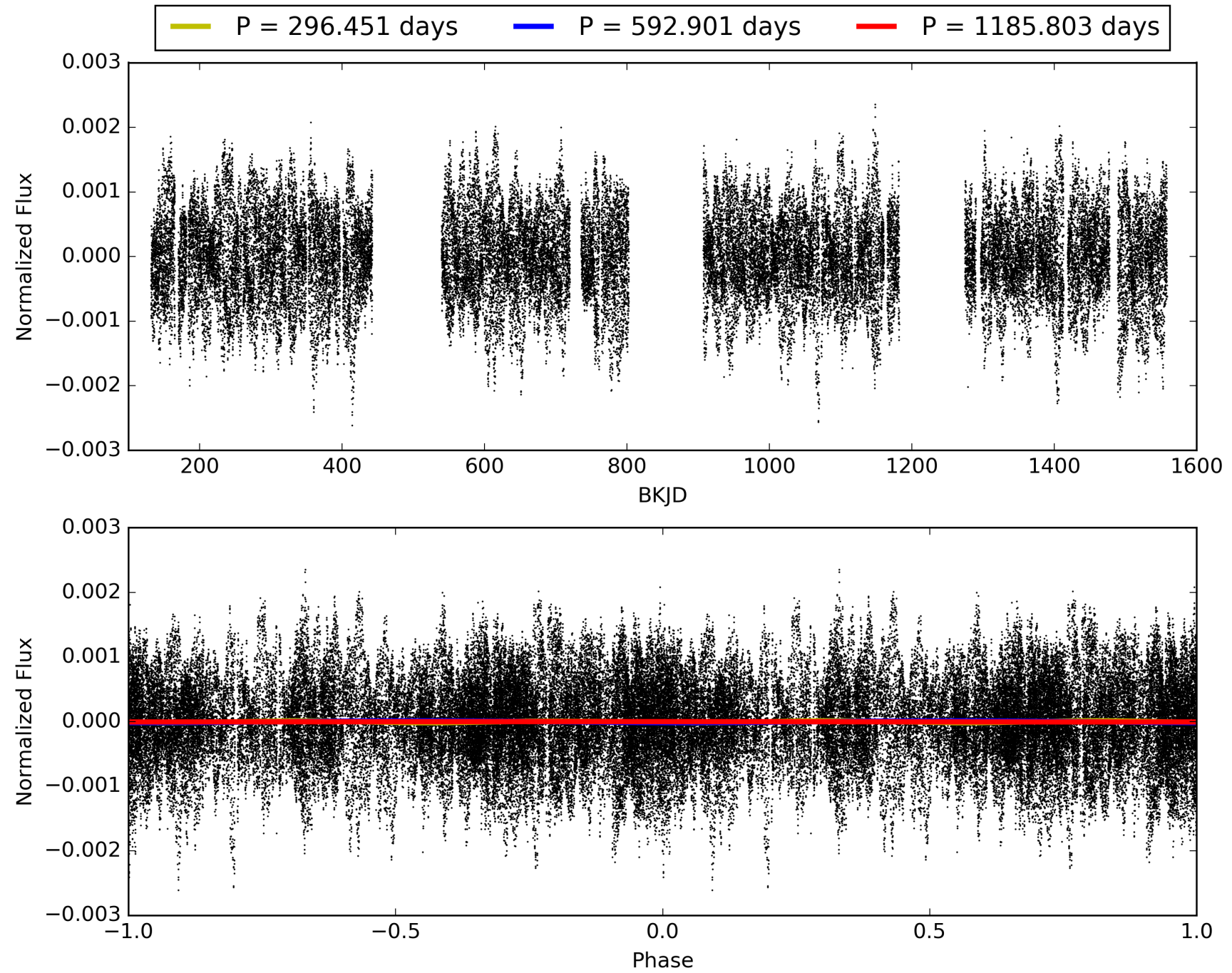
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 21:19:35 Z

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

## TCE 005256372-04, PDC Light Curves

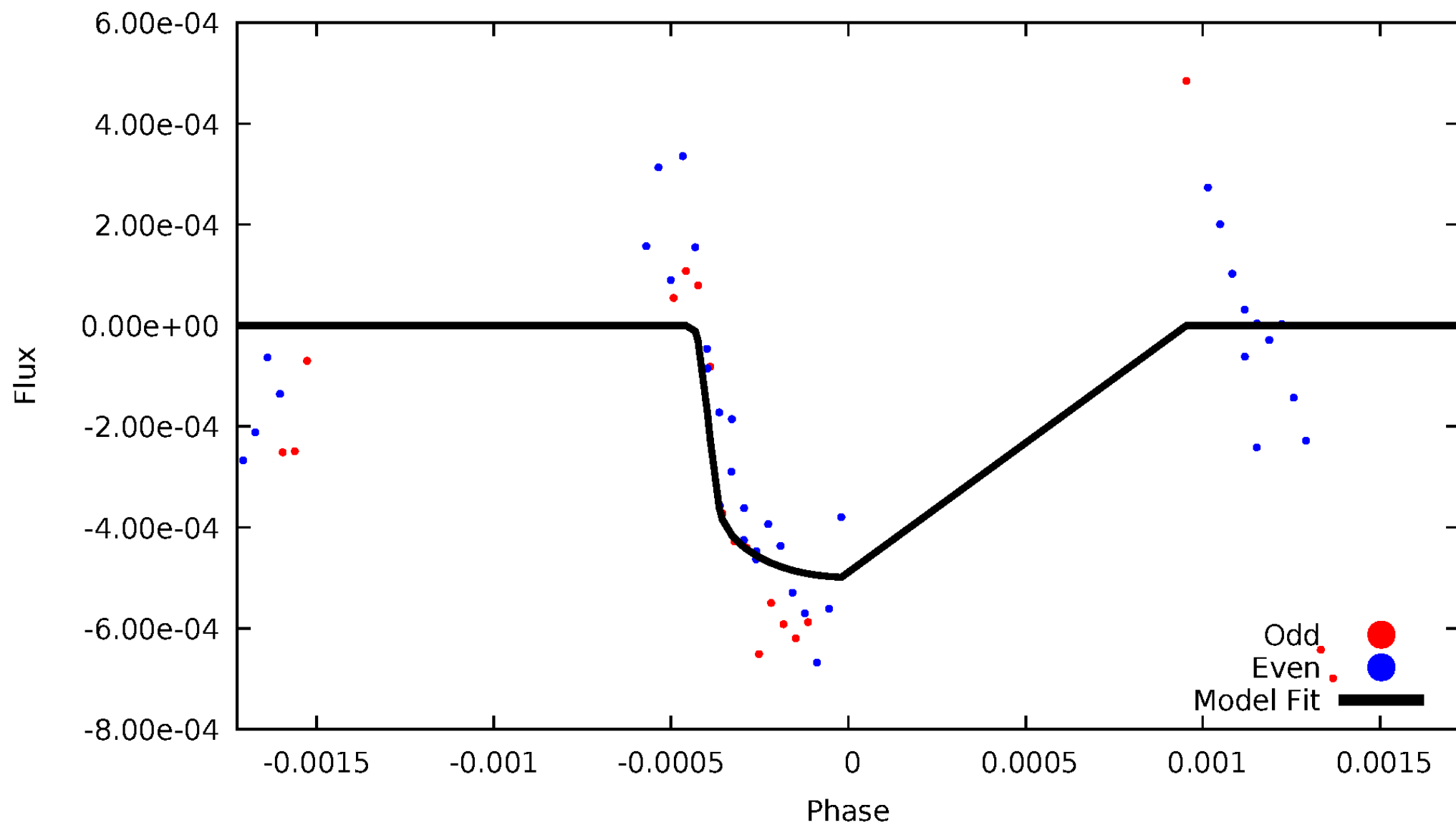


TCE 005256372-04



# DV Odd/Even

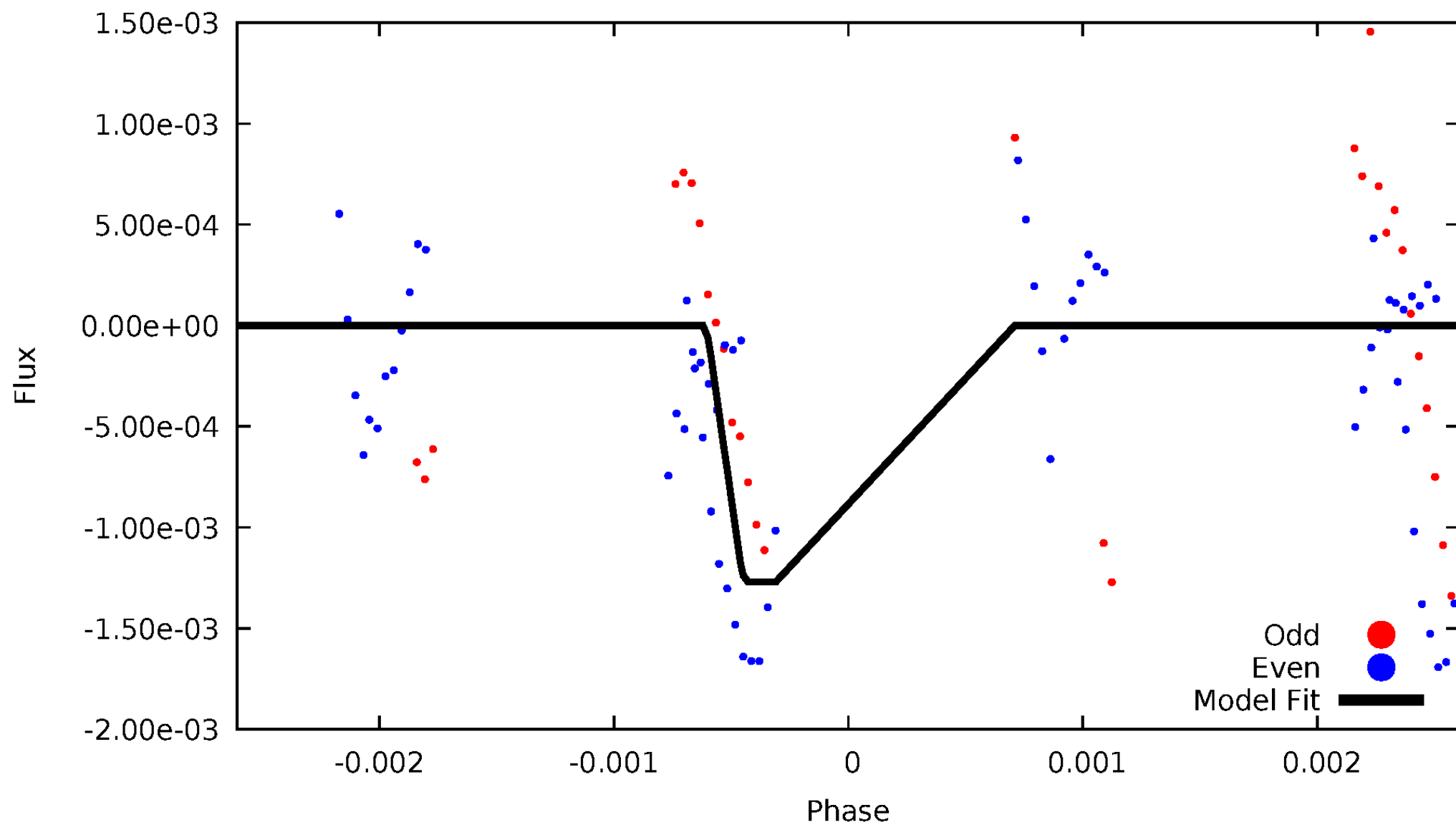
TCE 005256372-04





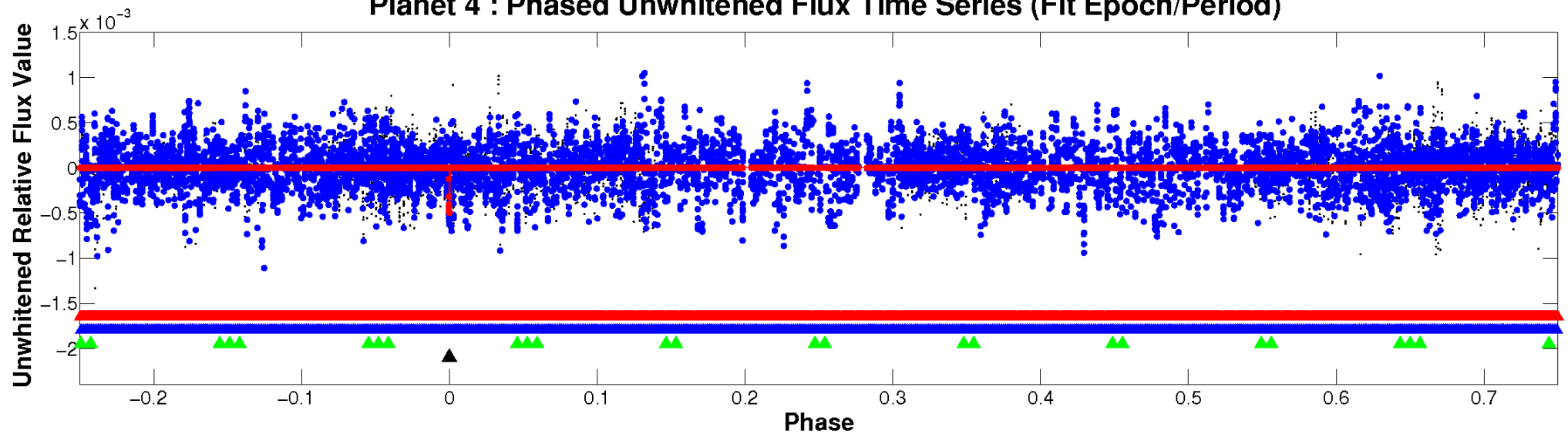
# ALT Odd/Even

TCE 005256372-04

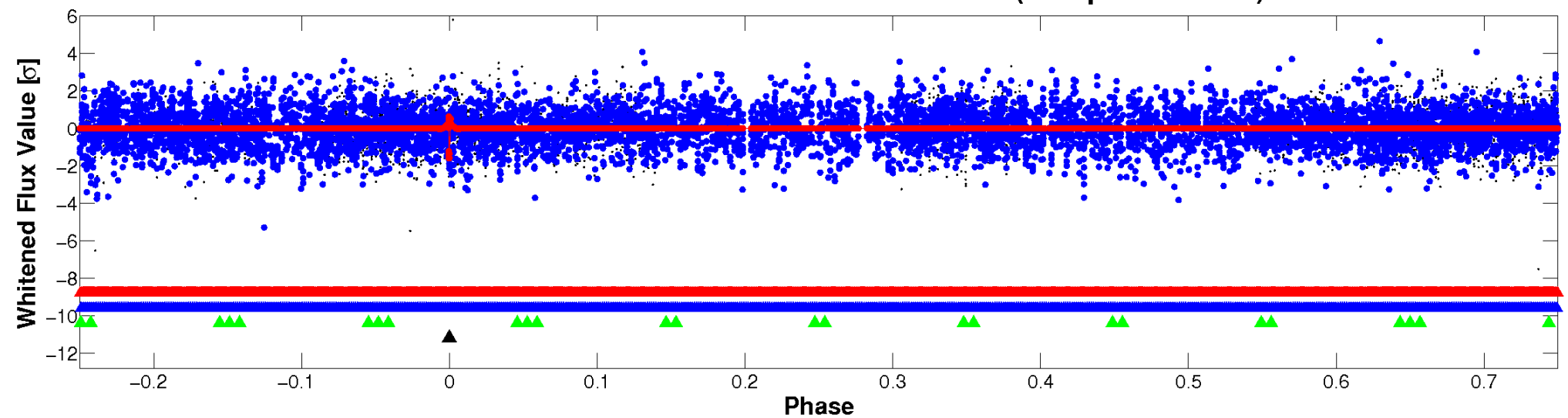


# Non-Whitened Vs. Whitened Light Curve

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

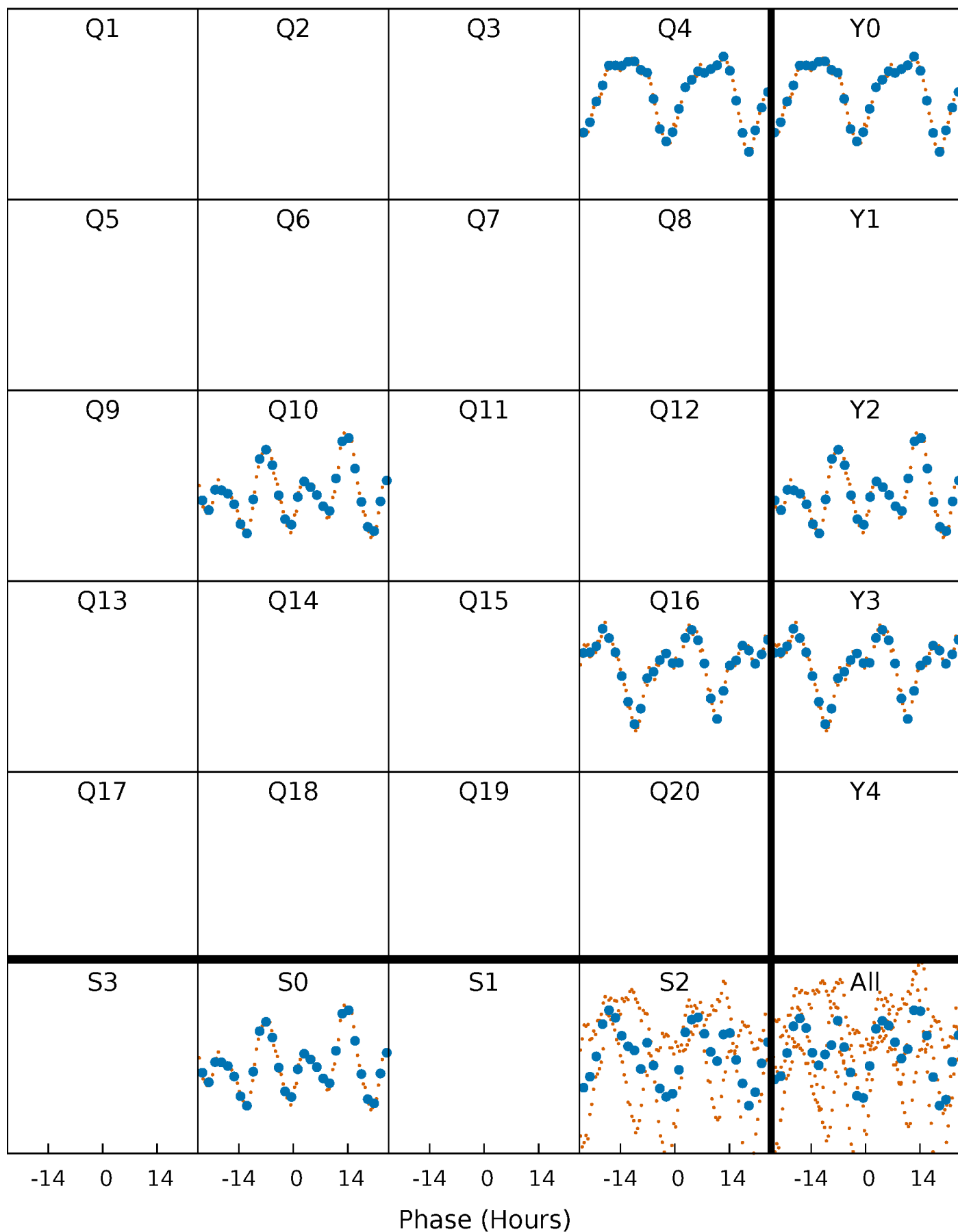


## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



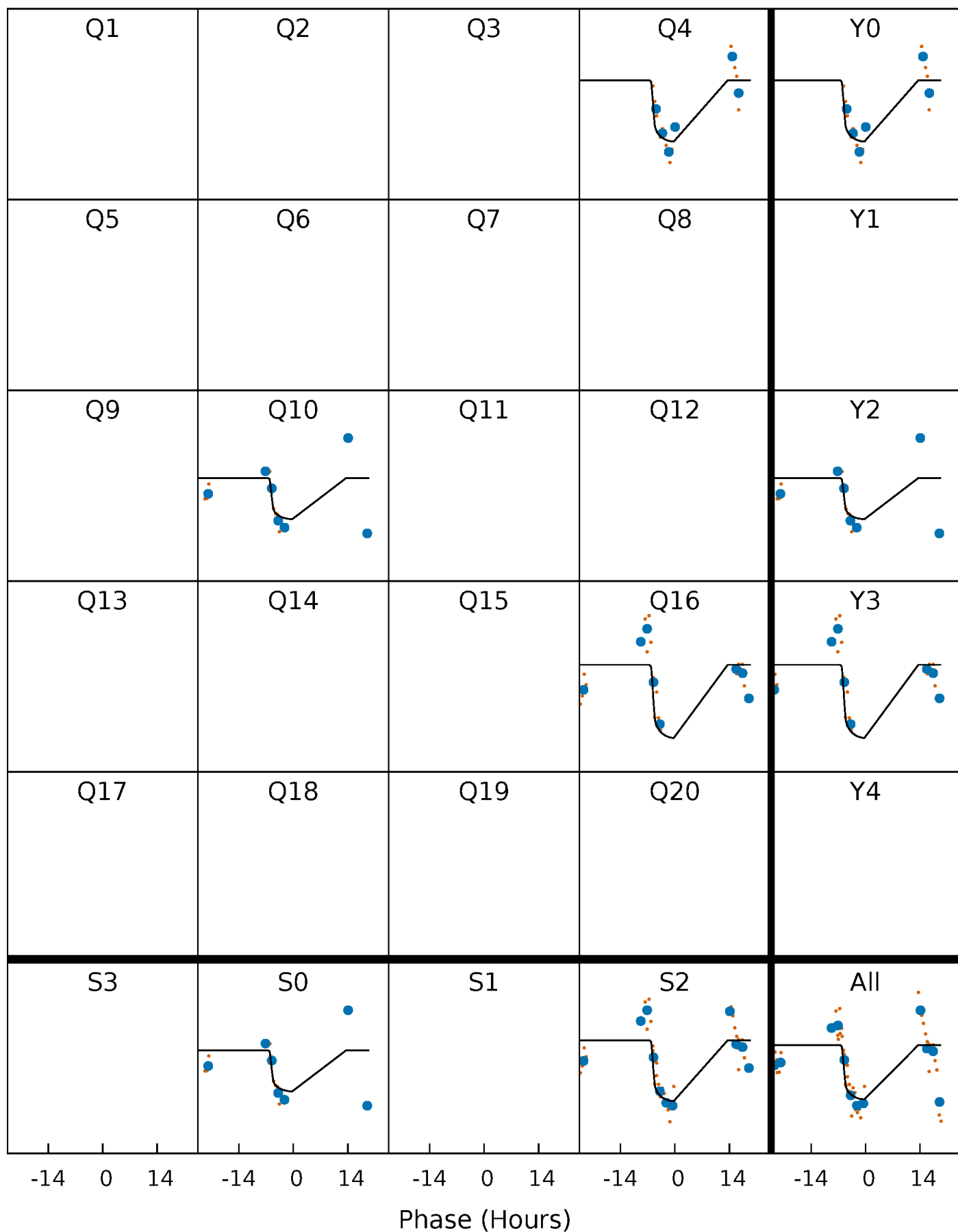
# PDC Quarter-Phased Transit Curves

TCE 005256372-04 P=592.901315 Days  $T_0=359.048961$  (BKJD)



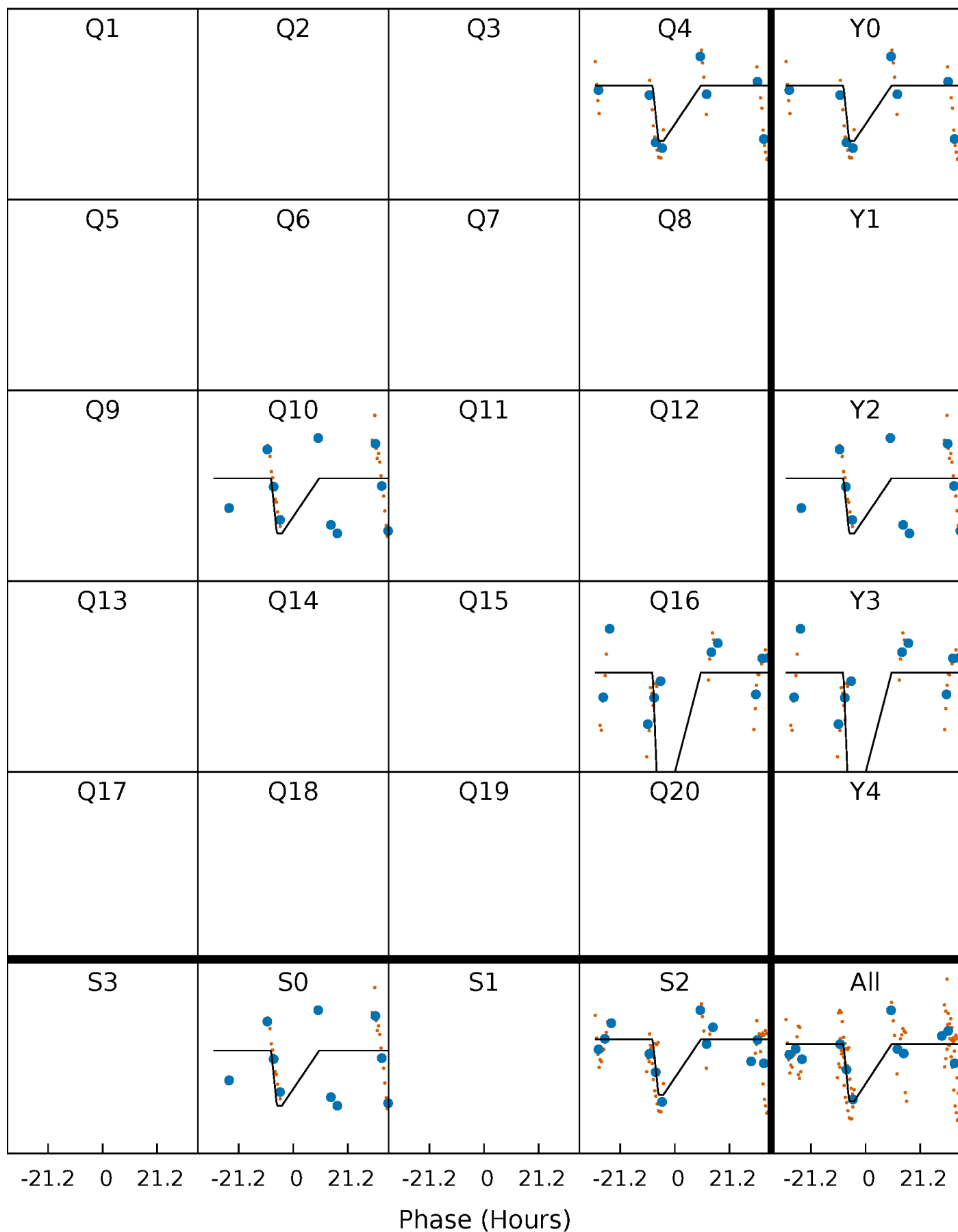
# DV Quarter-Phased Transit Curves

TCE 005256372-04 P=592.901315 Days  $T_0=359.048961$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

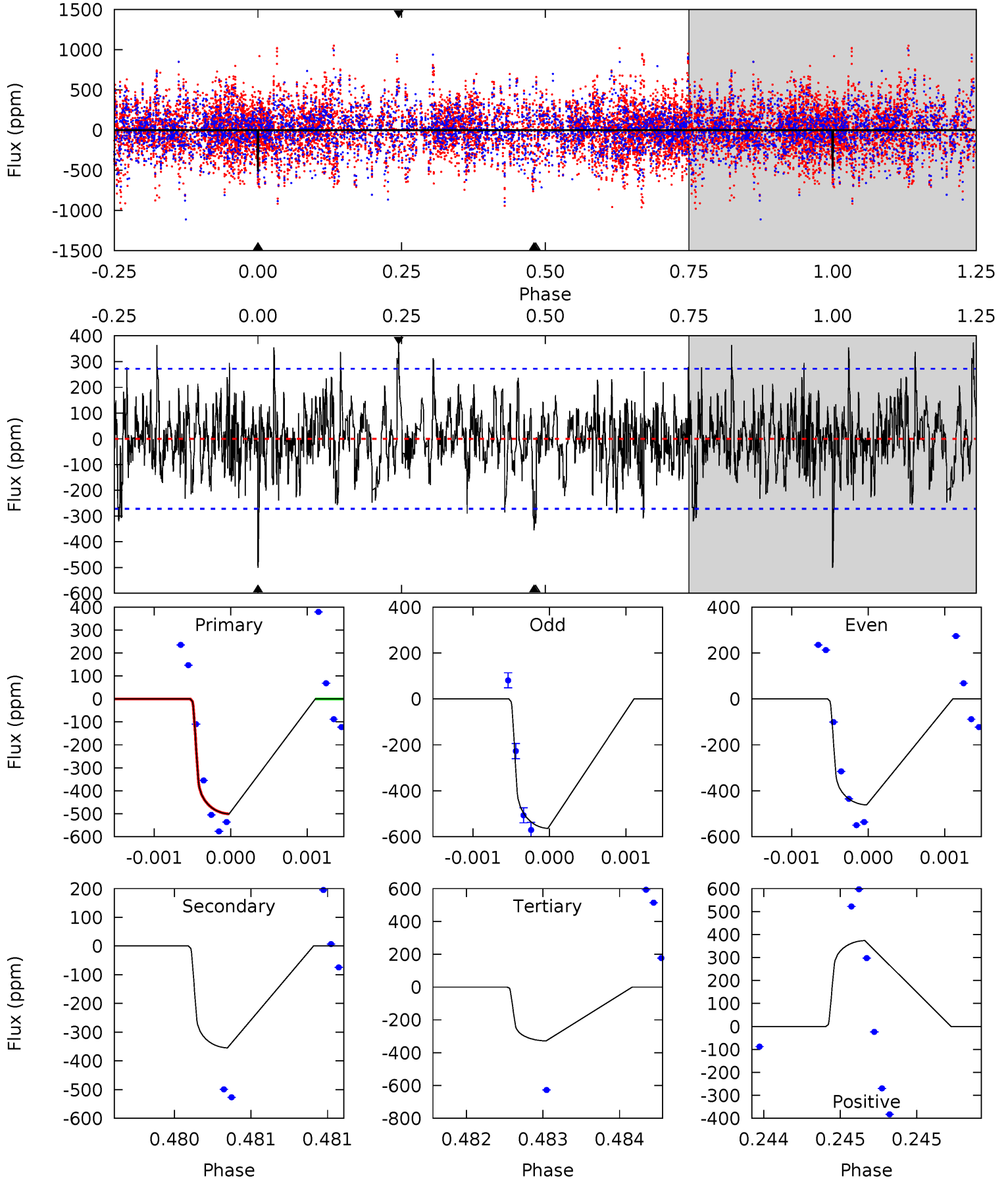
TCE 005256372-04 P=592.873636 Days  $T_0=359.221402$  (BKJD)



# DV Model-Shift Uniqueness Test

005256372-04, P = 592.901315 Days, E = 359.048961 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
10.1	7.15	6.62	7.53	5.48	3.33	1.95	3.47	2.56	0.53	-0.38	0.99	0	0.43	0

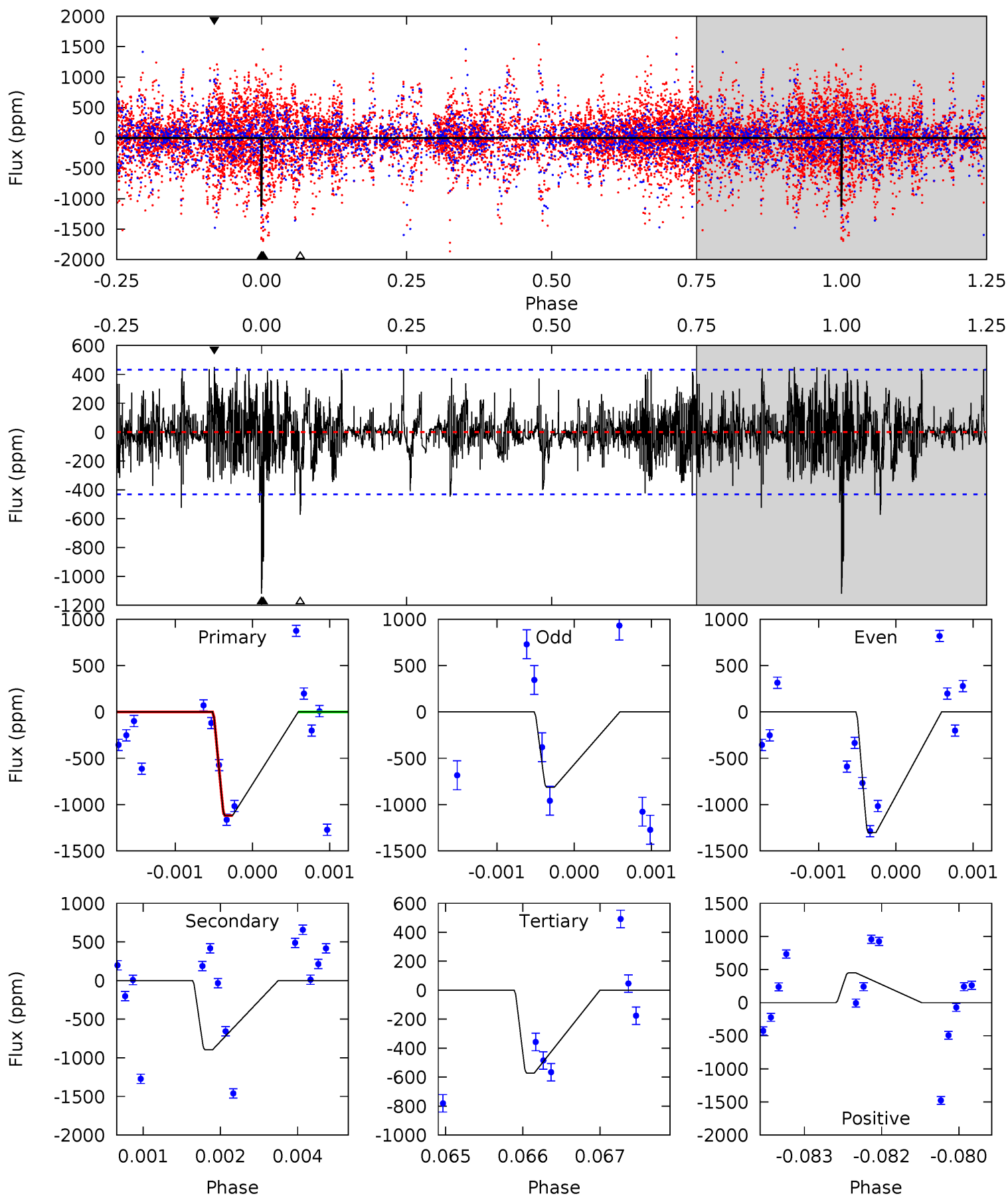




# Alt Model-Shift Uniqueness Test

005256372-04, P = 592.873636 Days, E = 359.221402 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
14.1	11.3	7.18	5.64	5.42	3.24	1.70	6.87	8.42	4.07	5.62	2.96	0	0.29	0



### Stellar Parameters For KIC 005256372

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7022^{+157}_{-244}$	$2.998^{+0.666}_{-0.074}$	$0.070^{+0.150}_{-0.400}$	$9.213^{+1.036}_{-5.528}$	$3.080^{+0.211}_{-1.198}$	$0.006^{+0.062}_{-0.002}$
	+2%/-3%	+22%/-2%	+214%/-571%	+11%/-60%	+7%/-39%	+1123%/-35%
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 005256372-04 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-355 \pm 50$	$20.97^{+4.63}_{-6.74}$	$891^{+58}_{-143}$	$6251^{+471}_{-405}$	$1740^{+1905}_{-547}$
Alt.	$-897 \pm 80$	$32.48^{+6.00}_{-10.58}$	$885^{+65}_{-145}$	$6373^{+340}_{-316}$	$1896^{+1748}_{-527}$

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

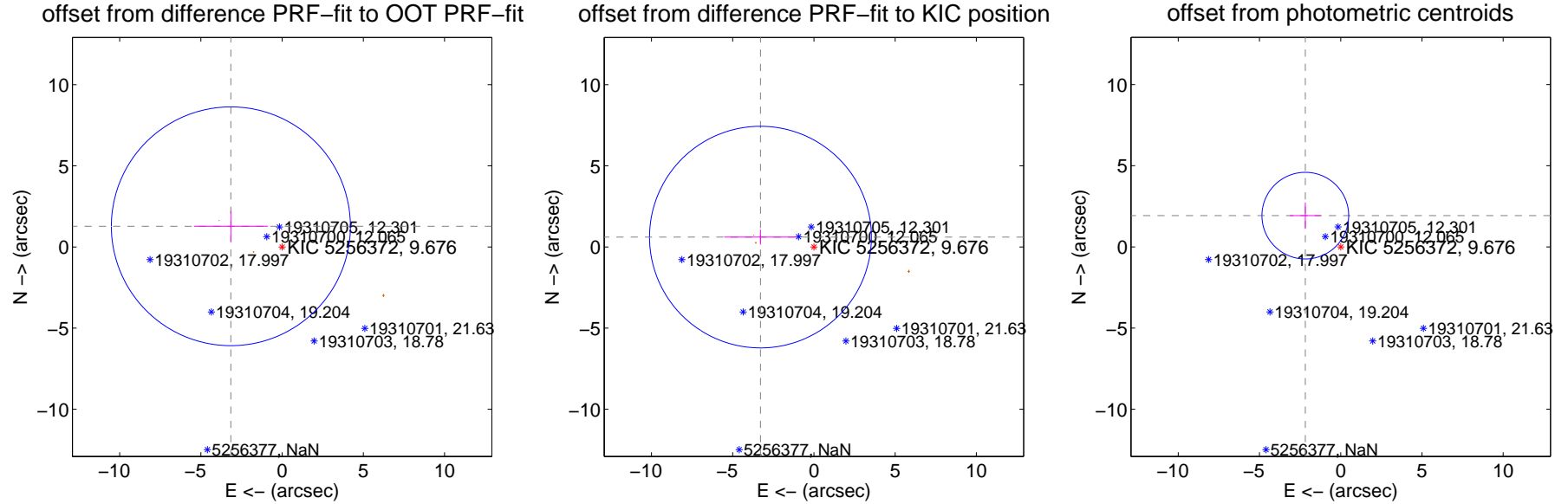
## DV Centroid Data

Supplemental centroid analysis for 005256372-04. **Kepler magnitude: 9.68.** Transit SNR 7.32

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

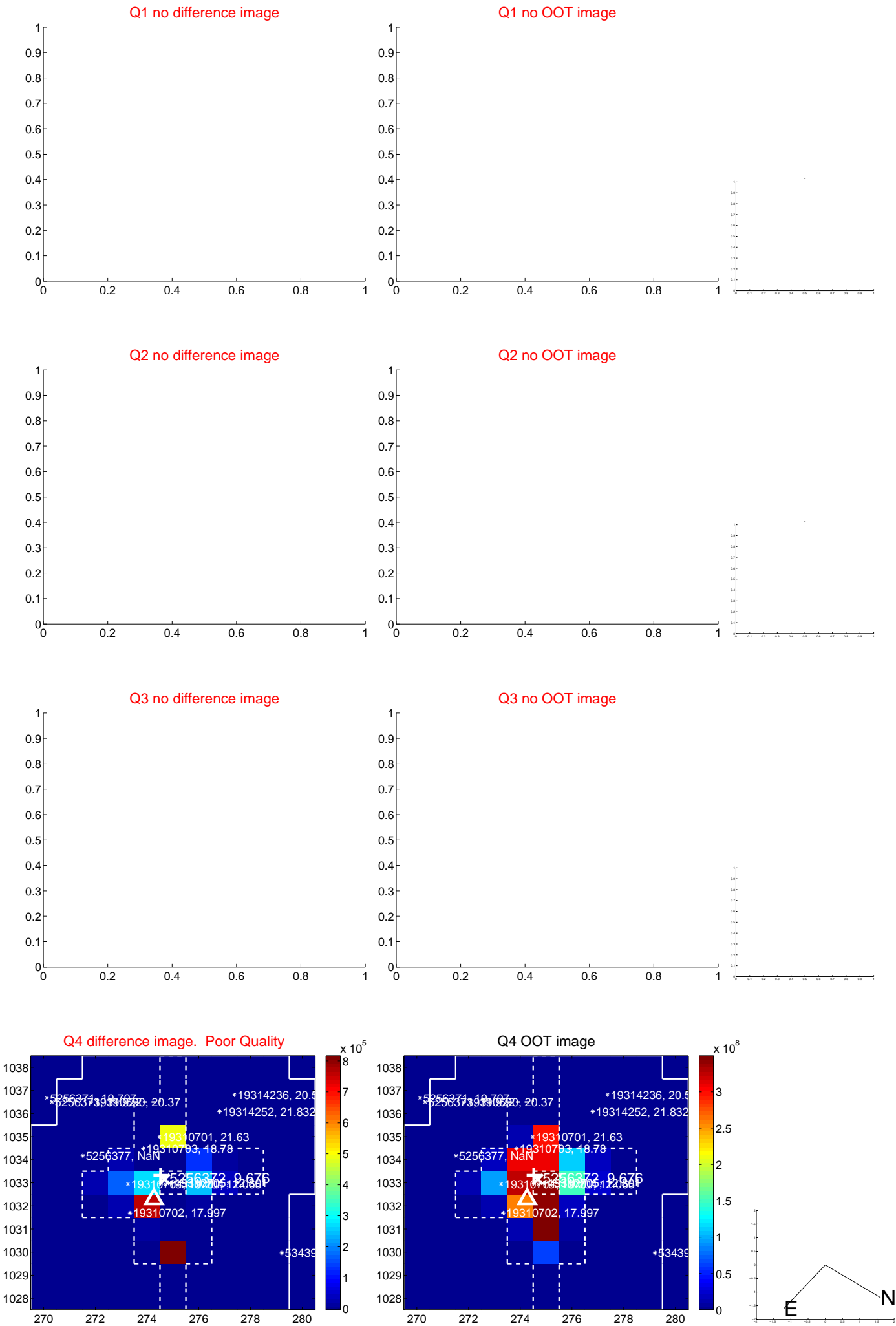
The direct PRF centroid is offset from the target star catalog position by about 1.91 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$3.403 \pm 2.453$	1.39	$3.155 \pm 2.276$	$1.275 \pm 0.954$
PRF-fit source offset from KIC position	$3.347 \pm 2.277$	1.47	$3.292 \pm 2.232$	$0.607 \pm 0.458$
photometric centroid source offset	<b><math>2.91 \pm 0.89</math></b>	<b>3.27</b>	$2.18 \pm 0.95$	$1.93 \pm 0.81$



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.

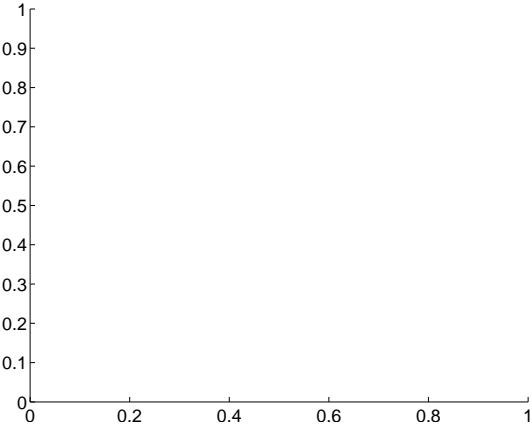


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

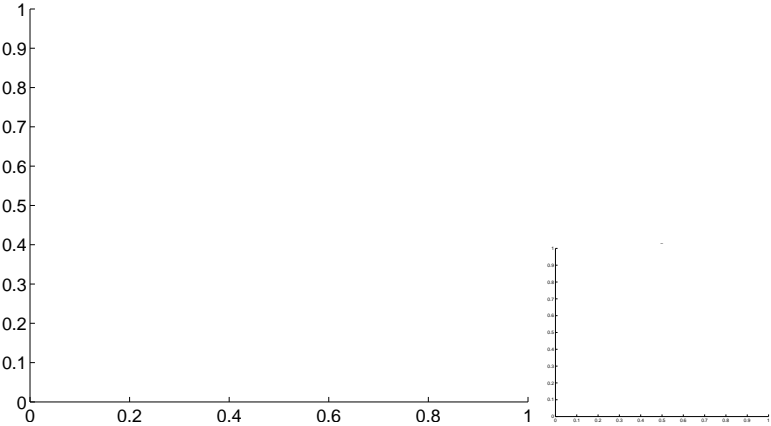


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

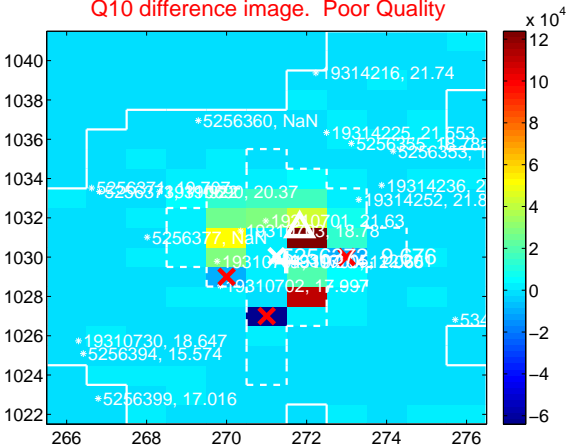
Q9 no difference image



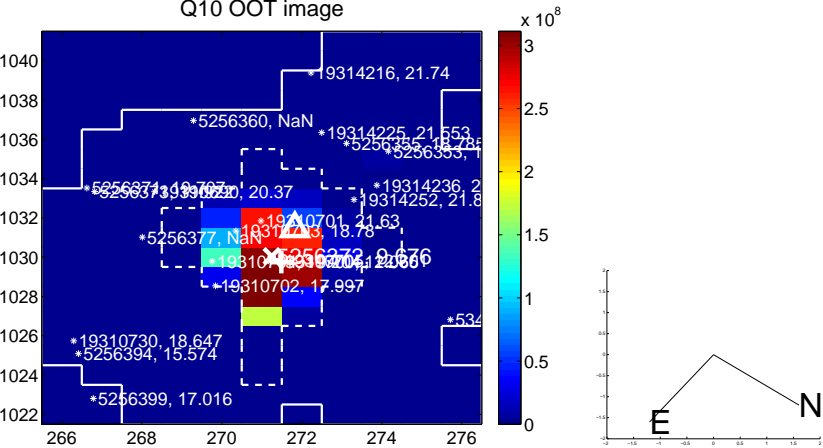
Q9 no OOT image



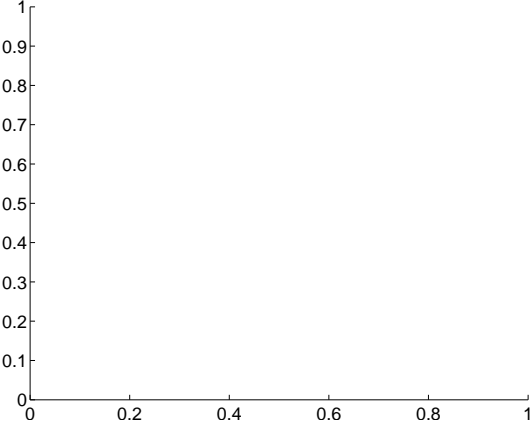
Q10 difference image. Poor Quality



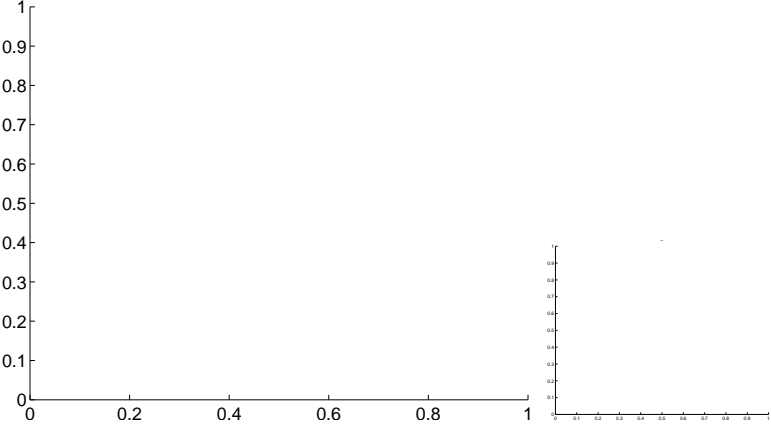
Q10 OOT image



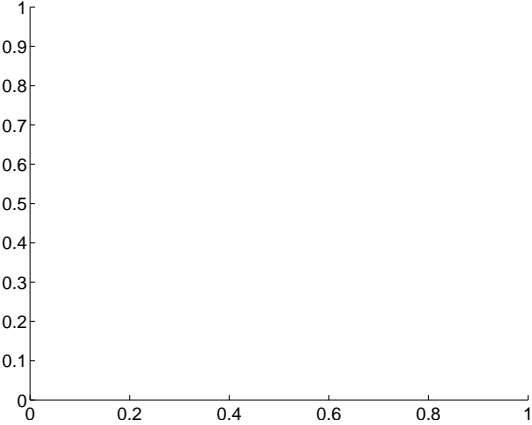
Q11 no difference image



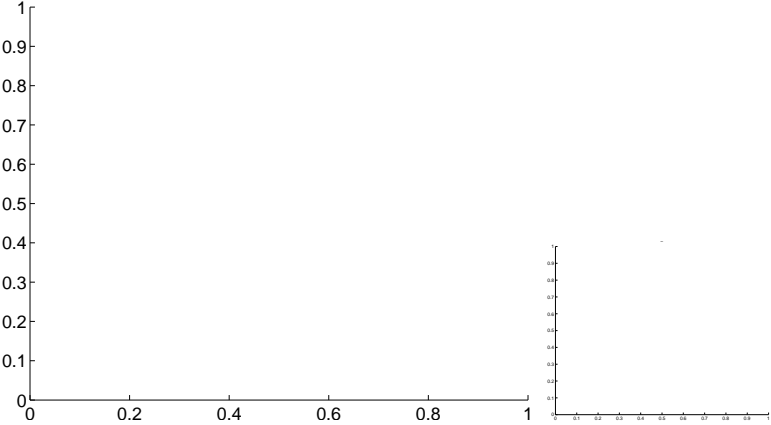
Q11 no OOT image



Q12 no difference image

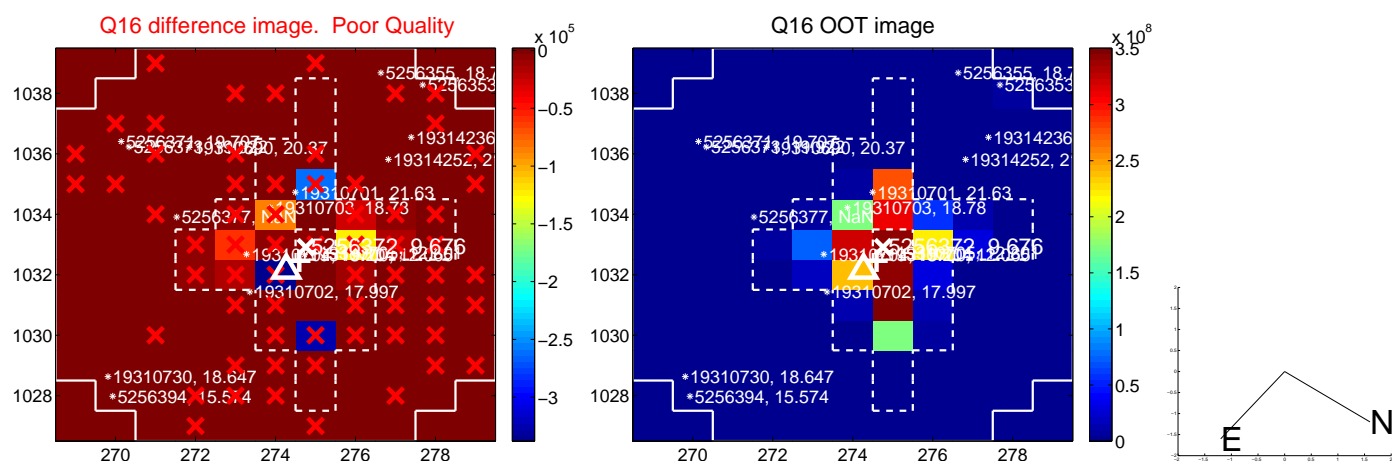
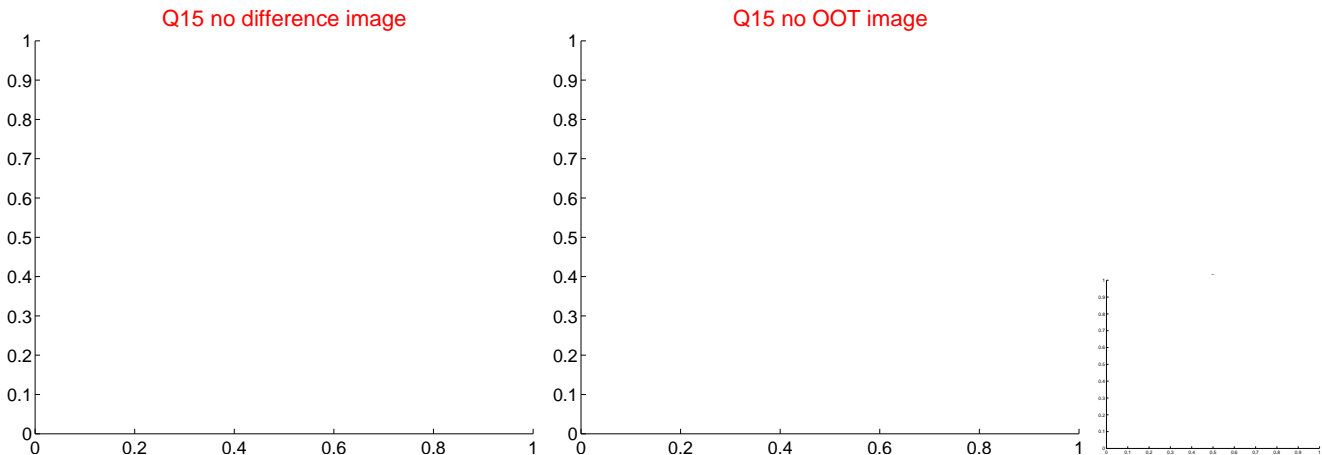
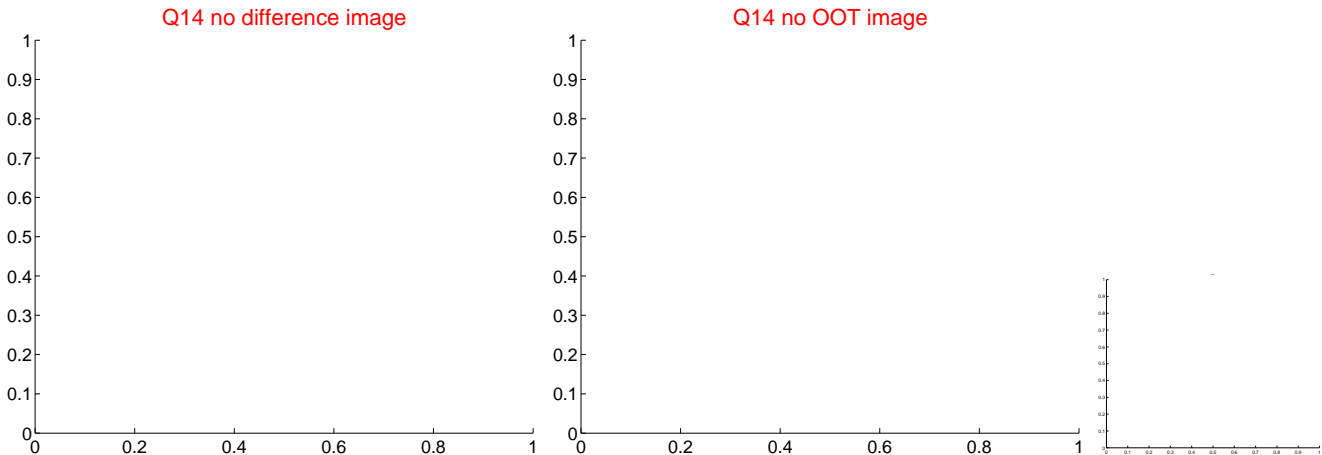
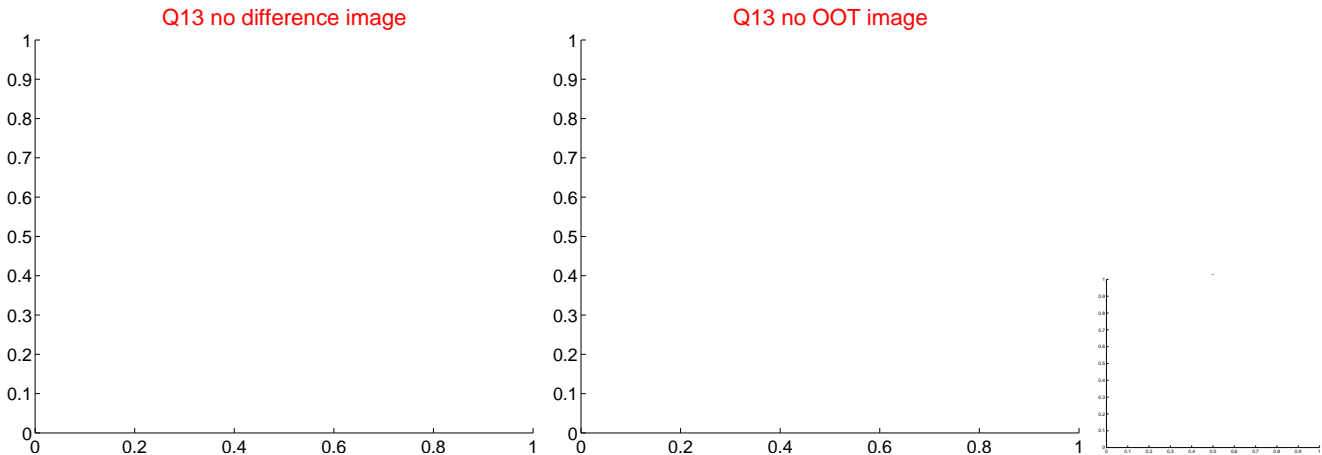


Q12 no OOT image

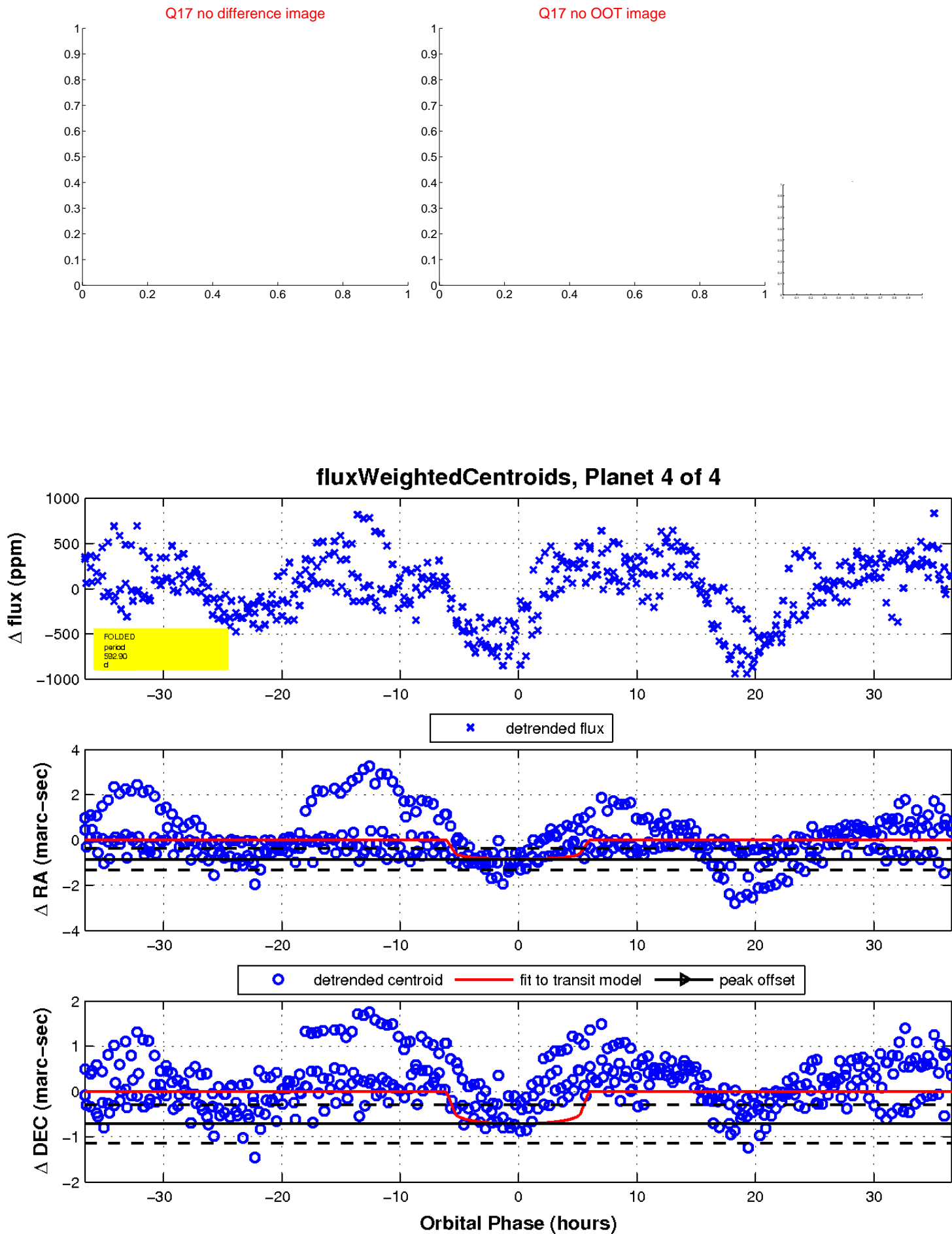




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value



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



UKIRT Image

Declination

