

# KIC 011152159

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
011152159-01	OBS	0761.01	2.701300	132.874231	826.2	3.297	39.7	47.0	0.91	5550	4.21	528.85
011152159-02	OBS	No	2.701192	131.550693	123.3	2.780	8.0	8.2	0.91	5550	1.16	528.88

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
011152159-01	OBS	FP	0.00	0	1	1	0	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE—CENT_RESOLVED_OFFSET
011152159-02	OBS	FP	0.00	1	1	1	0	IS_SEC_TCE—CENT_RESOLVED_OFFSET

**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 011152159-01

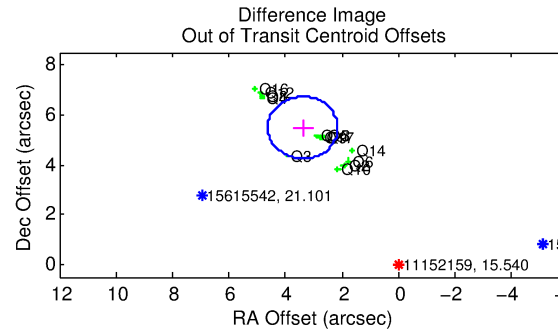
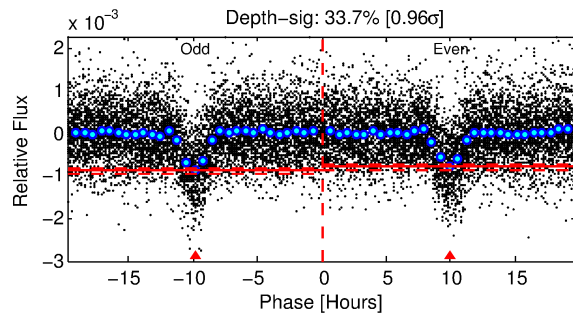
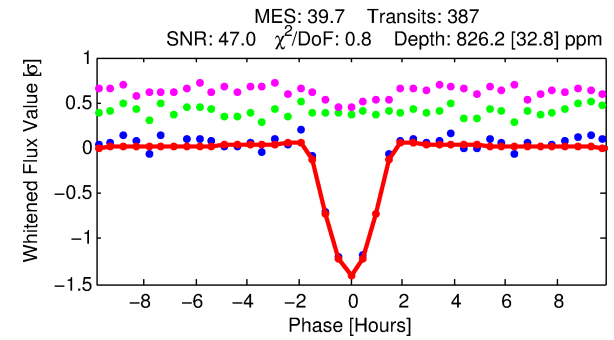
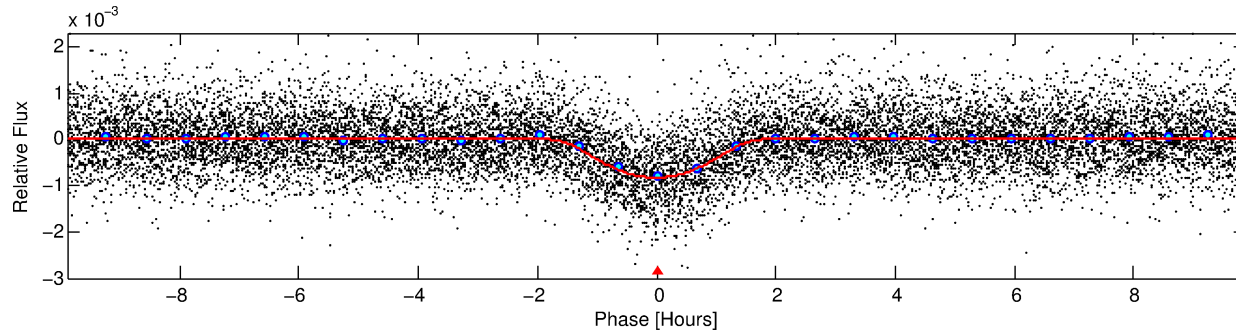
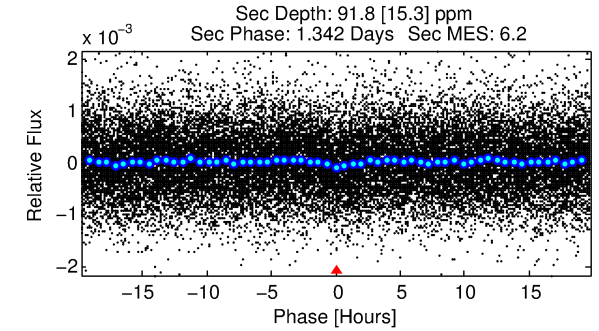
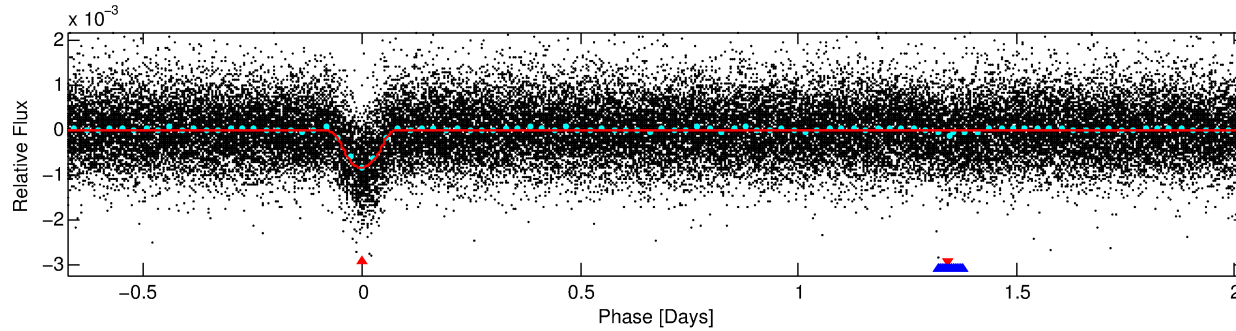
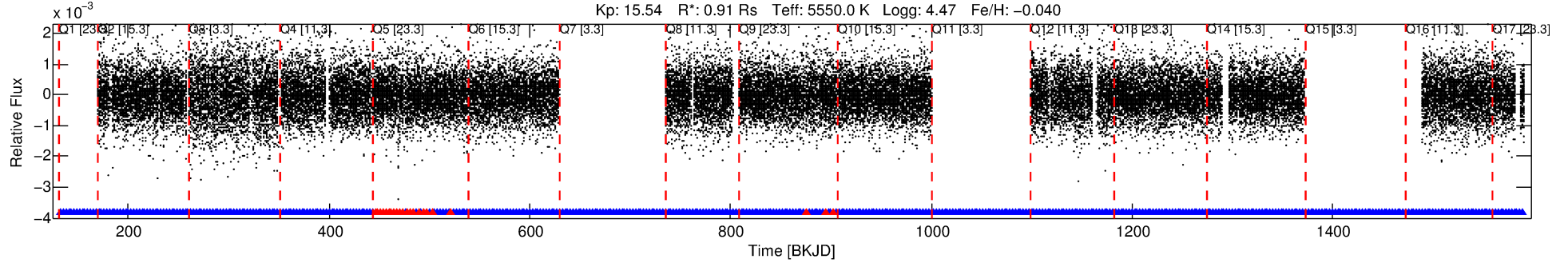
No Significant Match Found

# DV One-Page Summary

KIC: 11152159 Candidate: 1 of 2 Period: 2.701 d

KOI: K00761.01 Corr: 0.979

Kp: 15.54 R\*: 0.91 Rs Teff: 5550.0 K Logg: 4.47 Fe/H: -0.040



## DV Fit Results:

Period = 2.70130 [0.00001] d  
Epoch = 132.8742 [0.0013] BKJD  
Rp/R\* = 0.0424 [0.0168]  
a/R\* = 2.39 [0.28]  
b = 0.98 [0.03]  
Seff = 528.85 [177.31]  
Teq = 1223 [102] K  
Rp = 4.21 [1.97] Re  
a = 0.0365 [0.0077] AU  
Ag = 3.80 [3.29] [0.85σ]  
Teffp = 2639 [541] K [2.57σ]

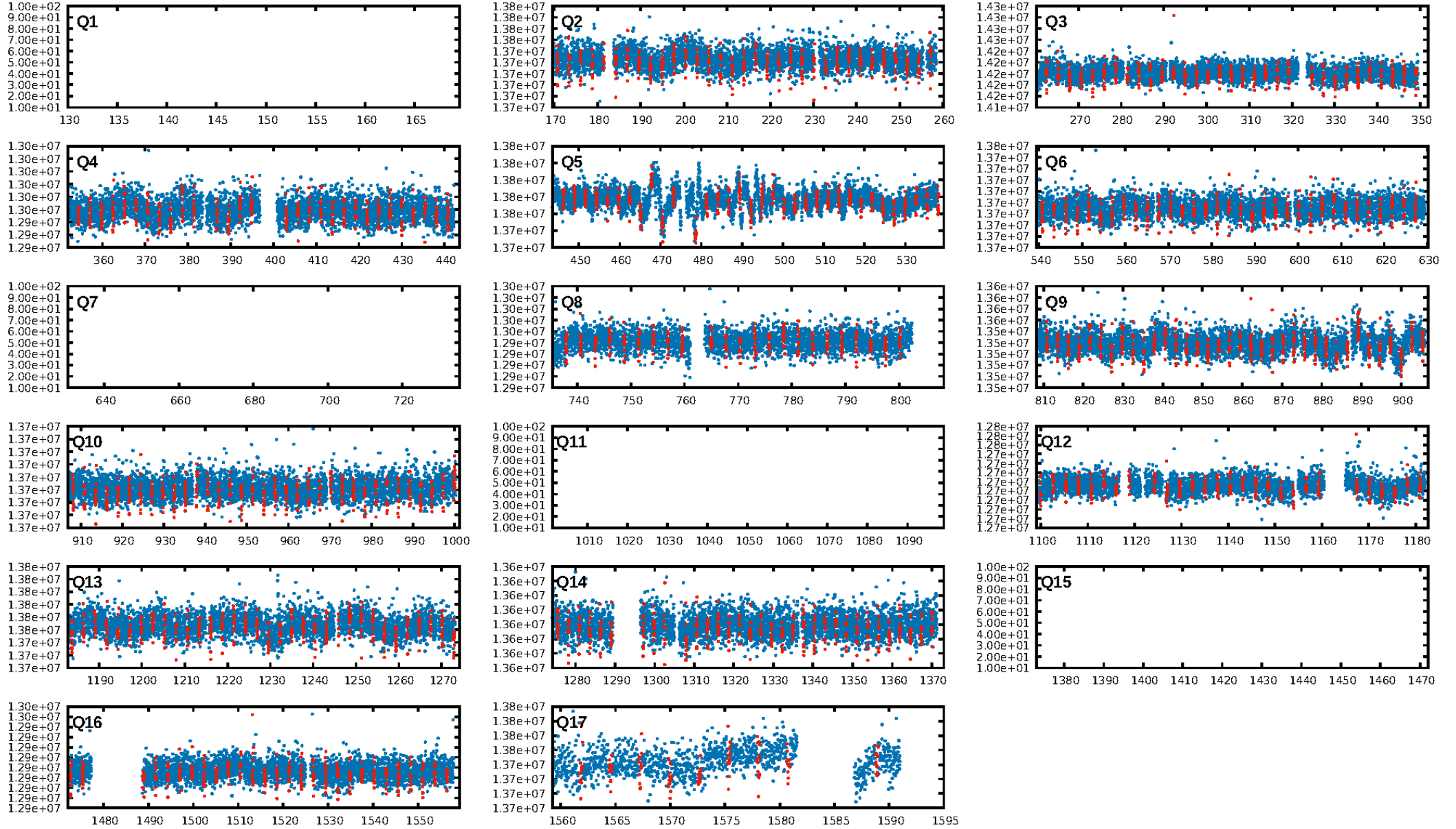
## DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 0.94 [356/378]  
GhostDiagnostic-chr: -0.2652  
Centroid-sig: 0.0%  
Centroid-so: 17.000 arcsec [51.28σ]  
OotOffset-rm: 6.445 arcsec [15.58σ]  
KicOffset-rm: 6.513 arcsec [14.08σ]  
OotOffset-st: 4/1/4/4 [13]  
KicOffset-st: 4/1/4/4 [13]  
DiffImageQuality-fgm: 1.00 [13/13]  
DiffImageOverlap-fno: 1.00 [13/13]

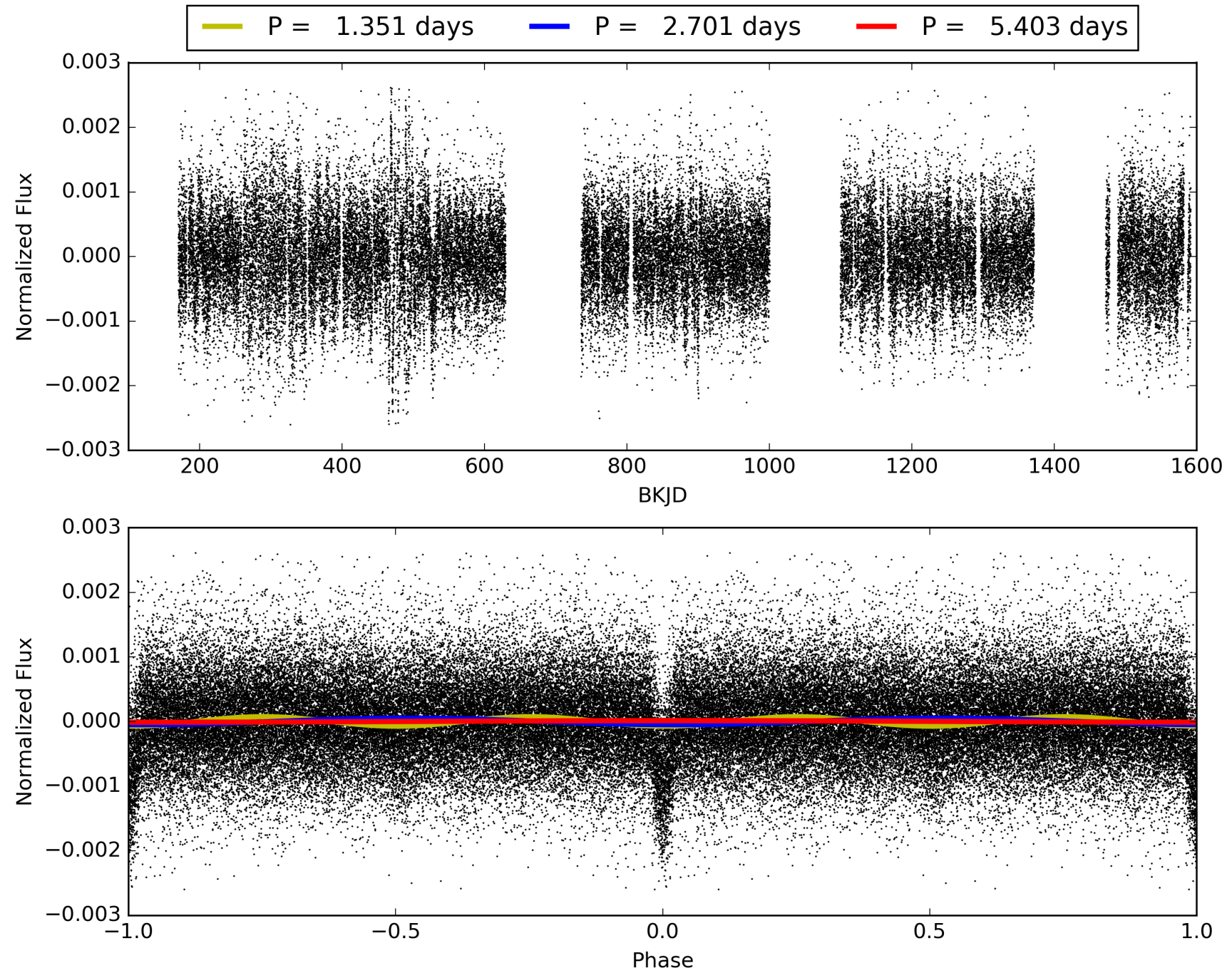
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 13:13:55 Z

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

# TCE 011152159-01, PDC Light Curves



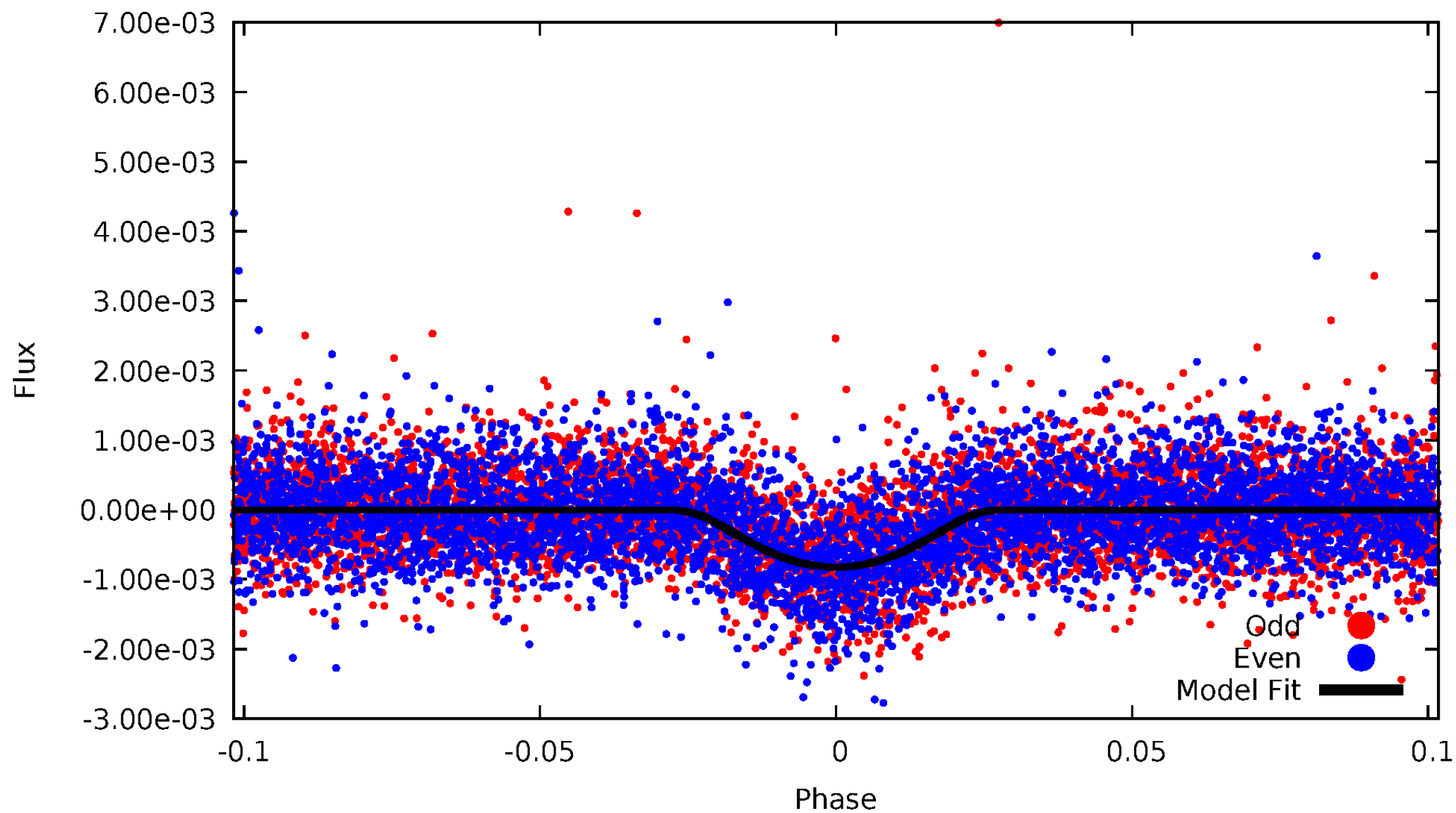
TCE 011152159-01





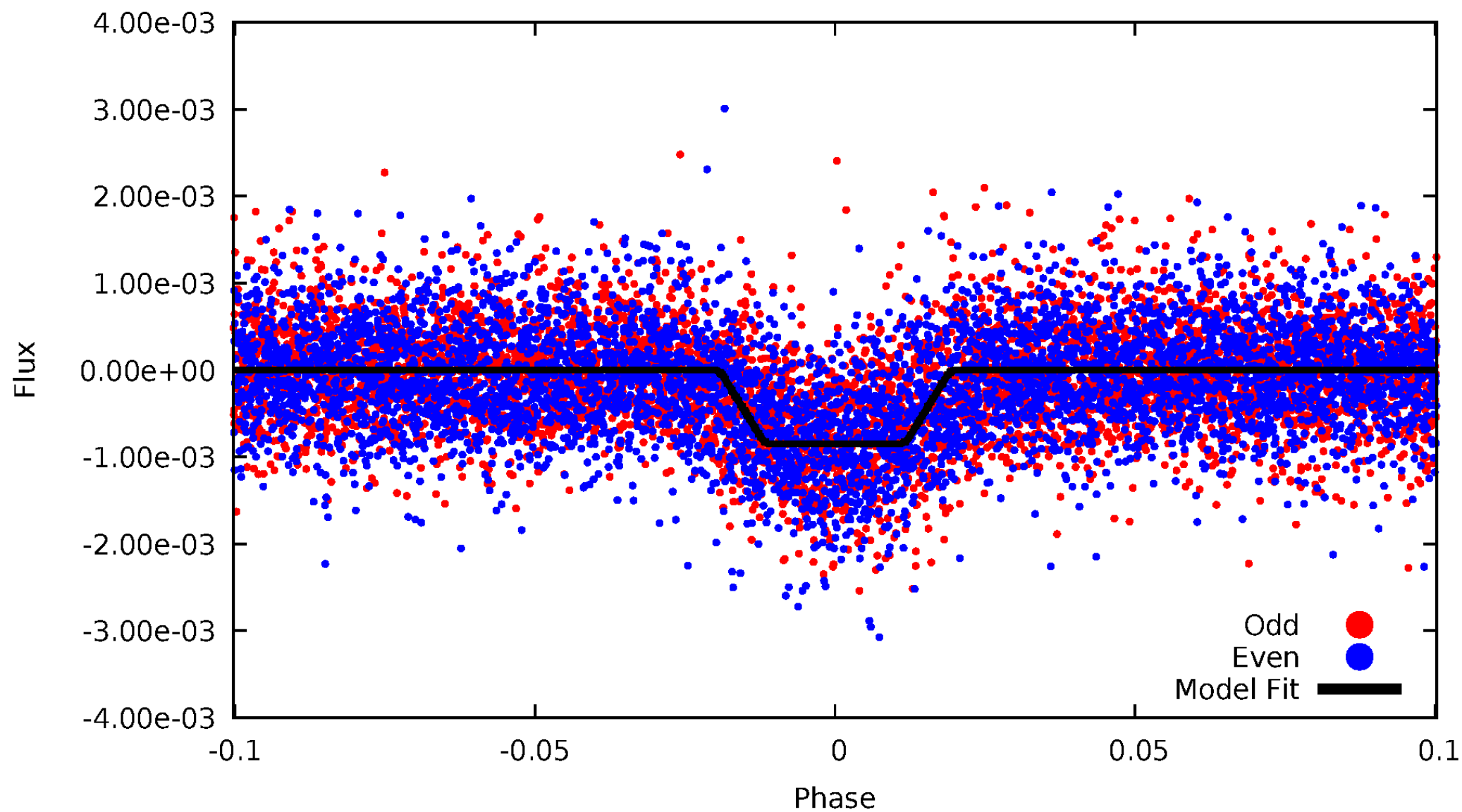
# DV Odd/Even

TCE 011152159-01

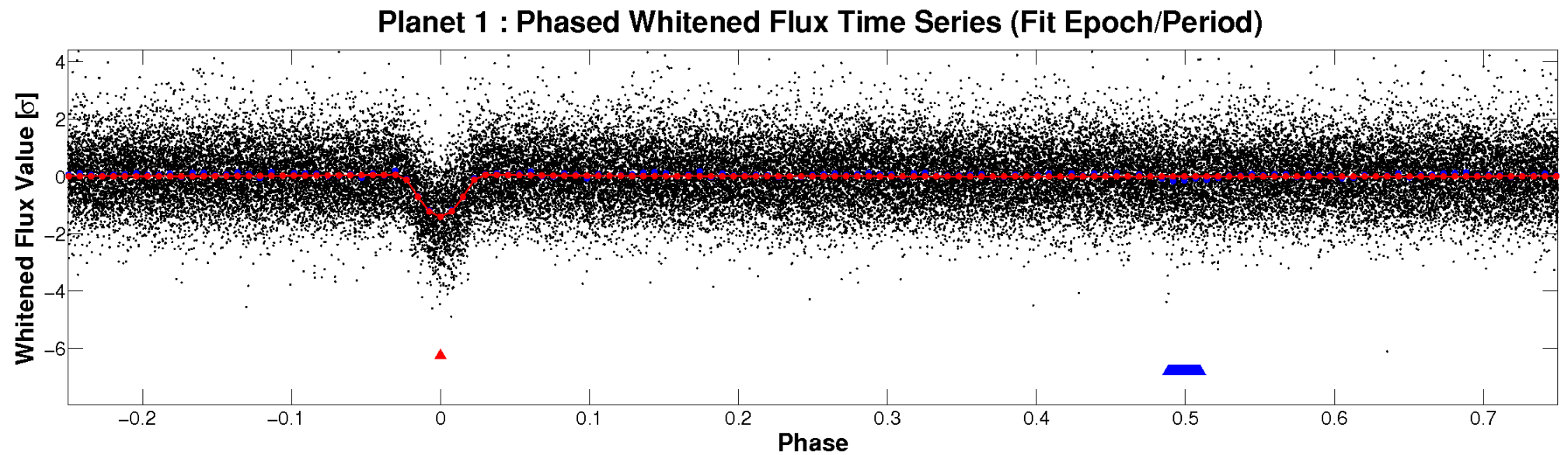
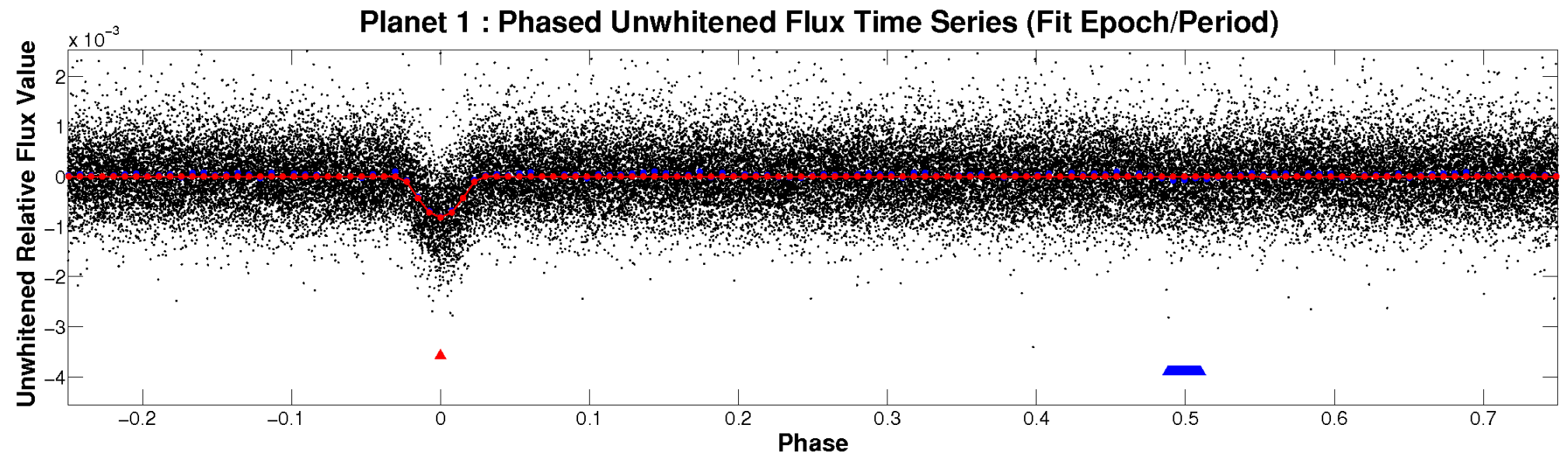


# ALT Odd/Even

TCE 011152159-01

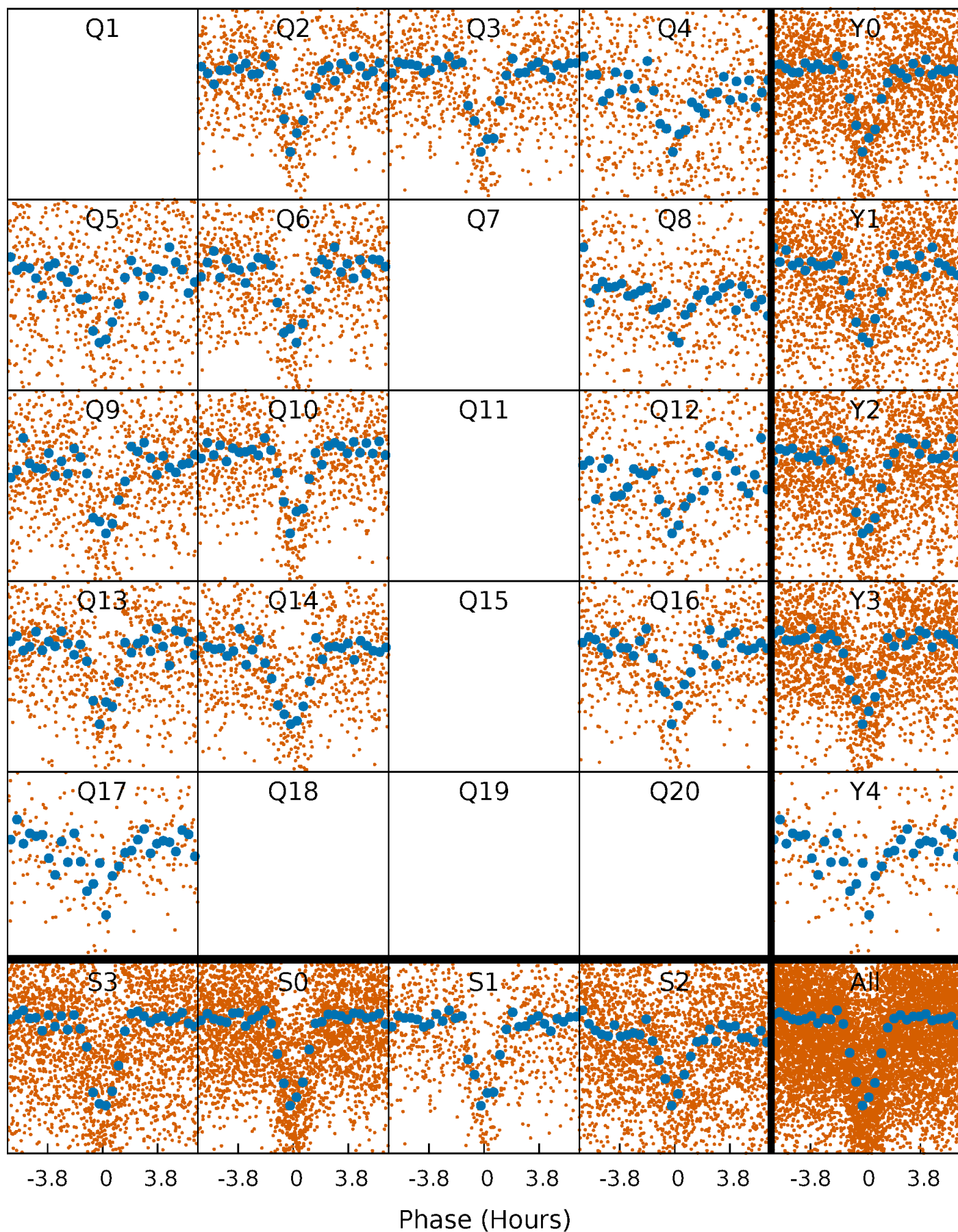


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

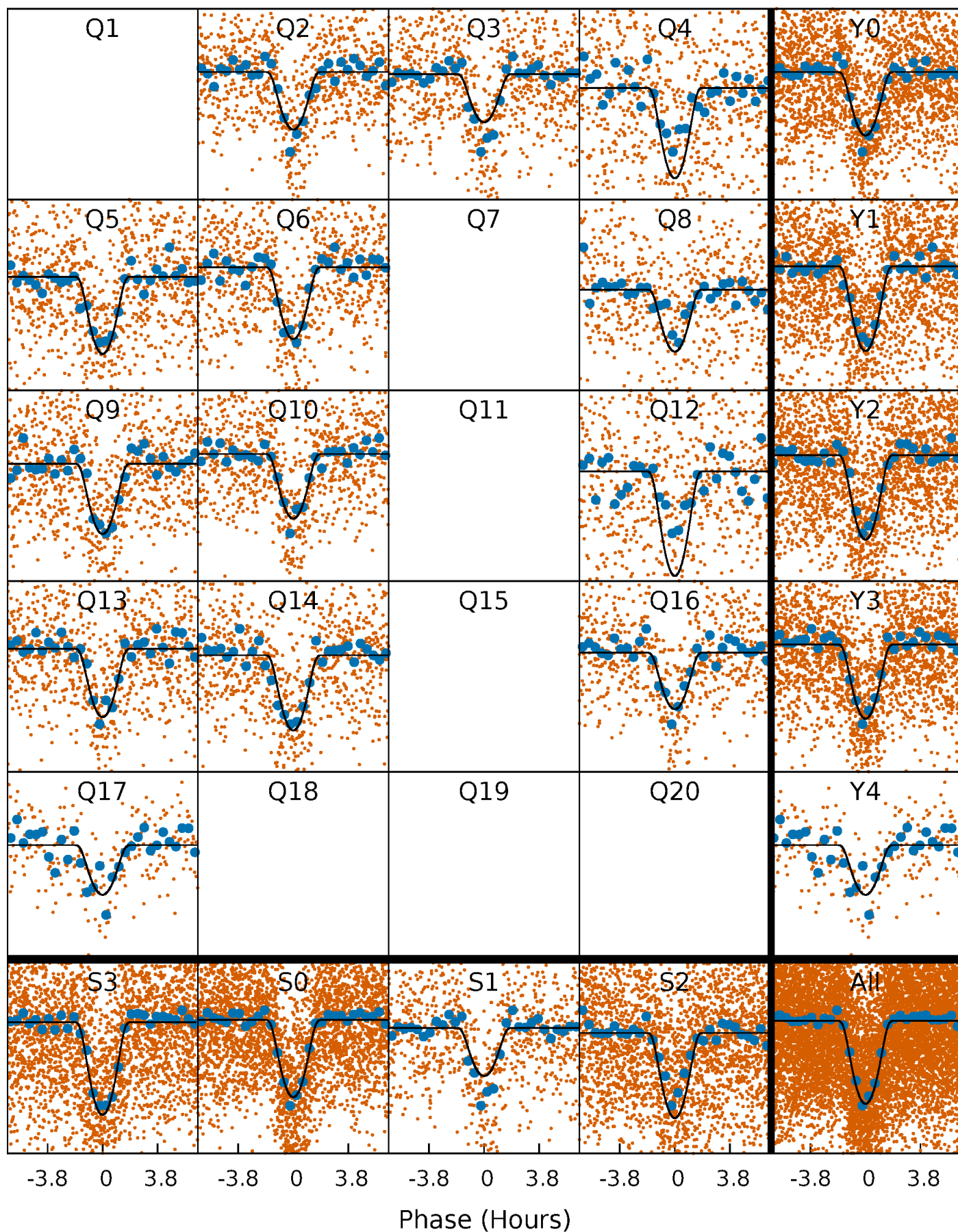
TCE 011152159-01 P= 2.701300 Days  $T_0=132.874231$  (BKJD)





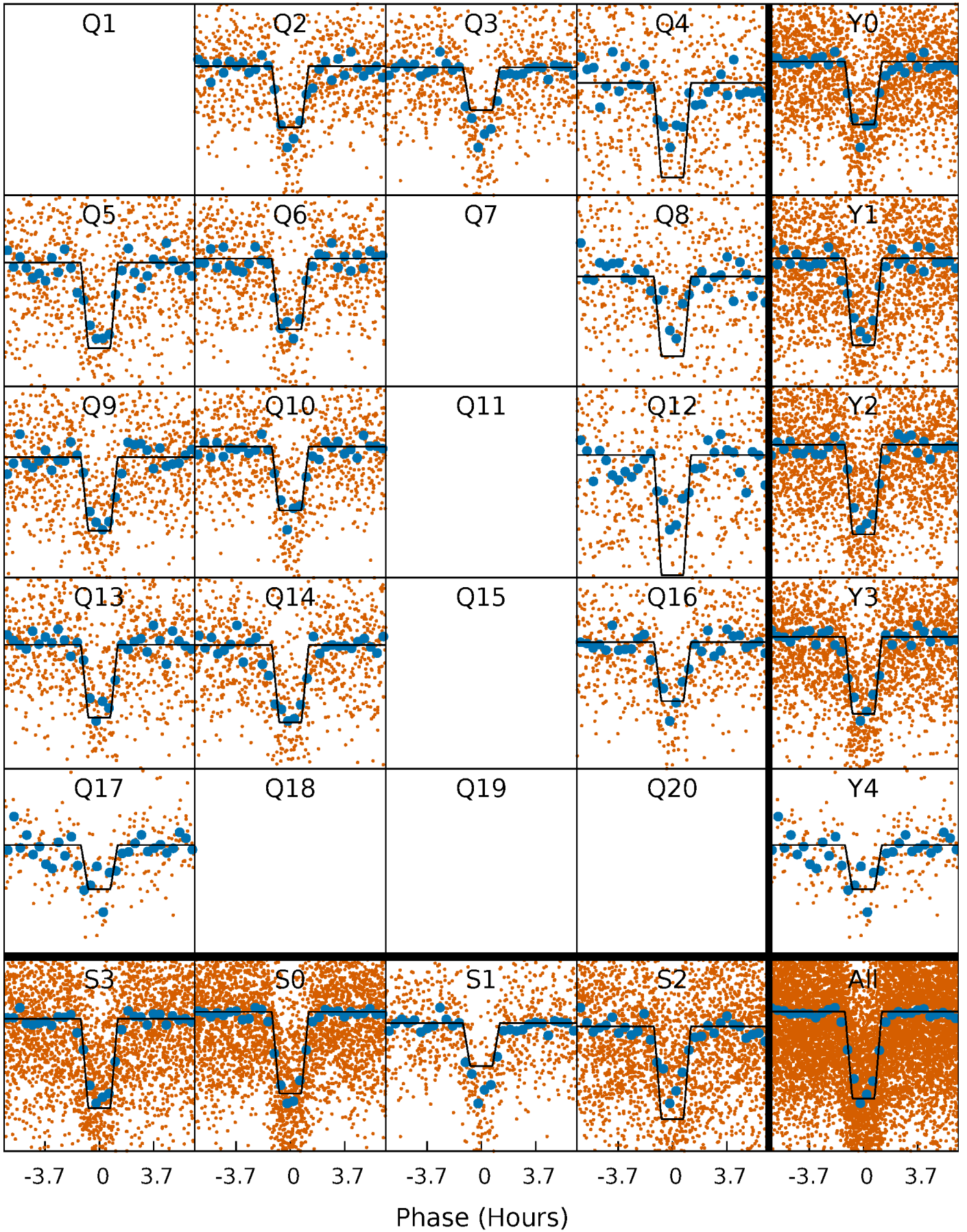
# DV Quarter-Phased Transit Curves

TCE 011152159-01 P= 2.701300 Days  $T_0=132.874231$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

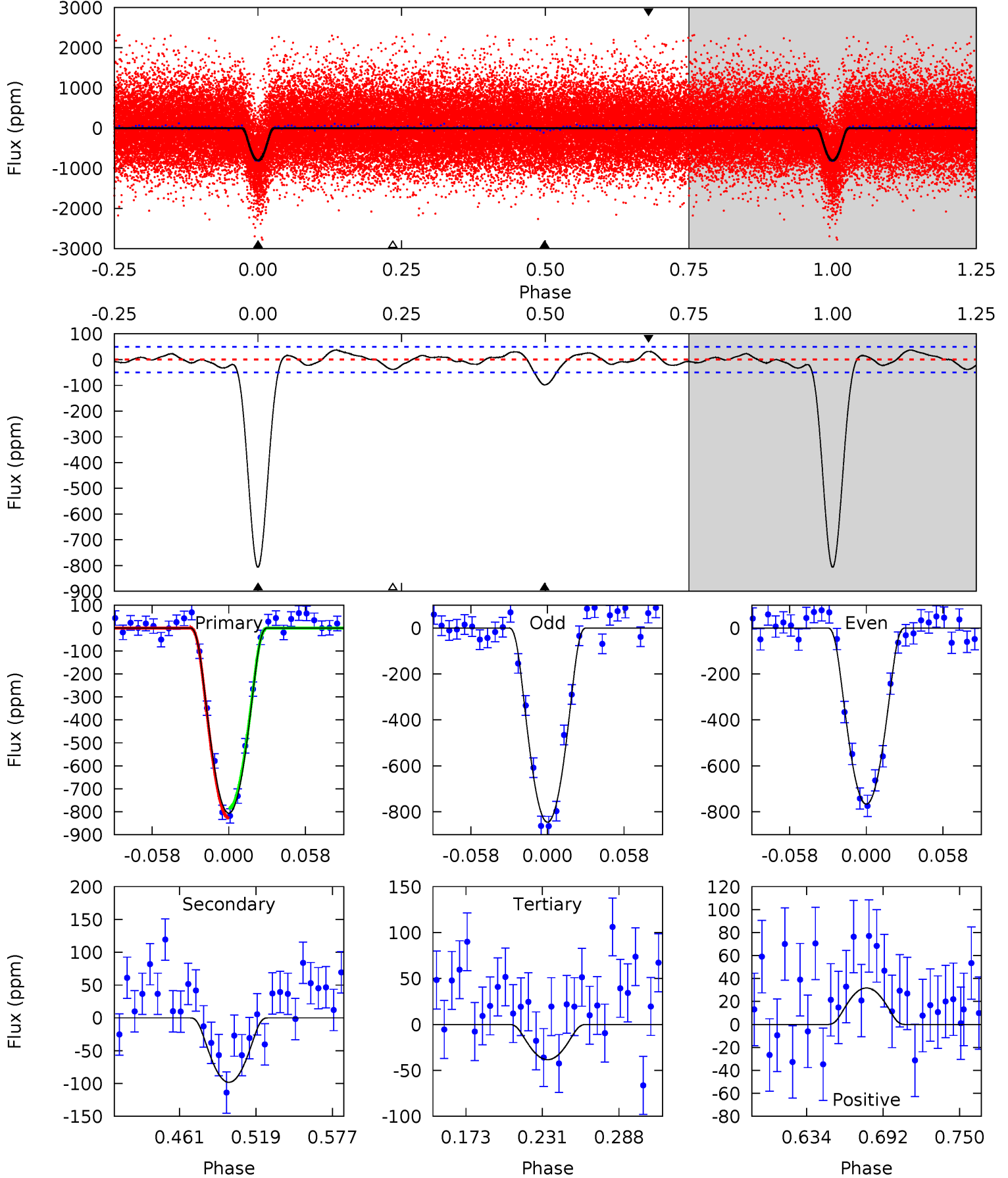
TCE 011152159-01 P= 2.701295 Days  $T_0=132.876075$  (BKJD)



# DV Model-Shift Uniqueness Test

011152159-01, P = 2.701300 Days, E = 132.874231 Days

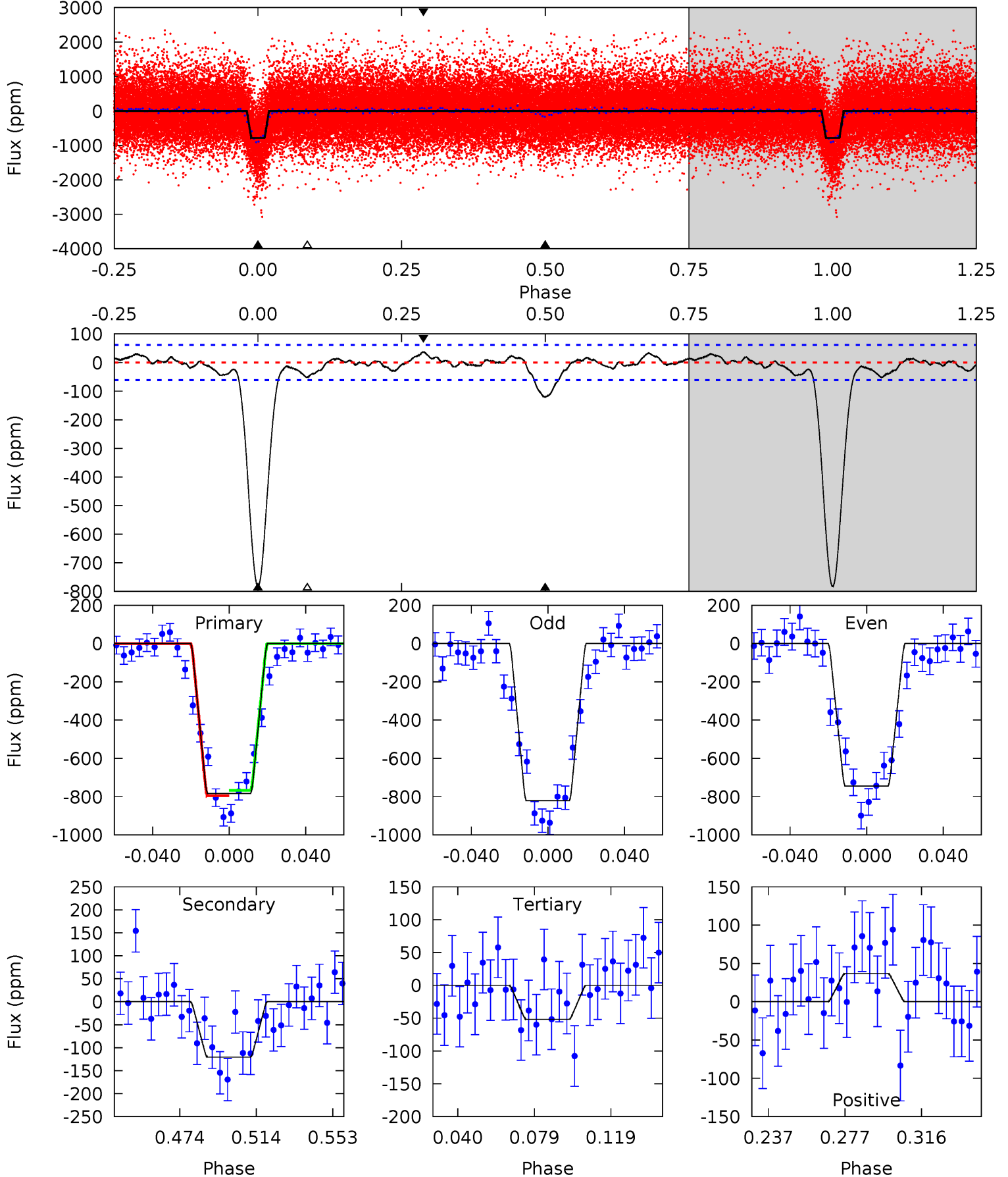
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
76.0	9.26	3.61	3.00	4.68	1.90	1.55	72.4	73.0	5.65	6.27	3.71	1.01	0.04	1.98



# Alt Model-Shift Uniqueness Test

011152159-01, P = 2.701295 Days, E = 132.876075 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
60.7	9.35	4.01	2.86	4.76	2.06	1.35	56.7	57.8	5.33	6.49	3.00	0.98	0.04	1.06





### Stellar Parameters For KIC 011152159

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5550^{+182}_{-182}$	$4.468^{+0.091}_{-0.169}$	$-0.040^{+0.300}_{-0.300}$	$0.910^{+0.228}_{-0.105}$	$0.889^{+0.102}_{-0.083}$	$1.659^{+0.660}_{-0.773}$
	+3%/-3%	+2%/-4%	+750%/-750%	+25%/-12%	+11%/-9%	+40%/-47%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 011152159-01 / KOI 0761.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-98 \pm 11$	$4.40^{+1.66}_{-1.73}$	$1722^{+113}_{-90}$	$3185^{+592}_{-315}$	$3.728^{+6.430}_{-1.790}$
Alt.	$-121 \pm 13$	$2.91^{+1.90}_{-1.51}$	$1723^{+116}_{-88}$	$3774^{+1169}_{-556}$	$10^{+35}_{-6}$

$T_{max}$  = 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

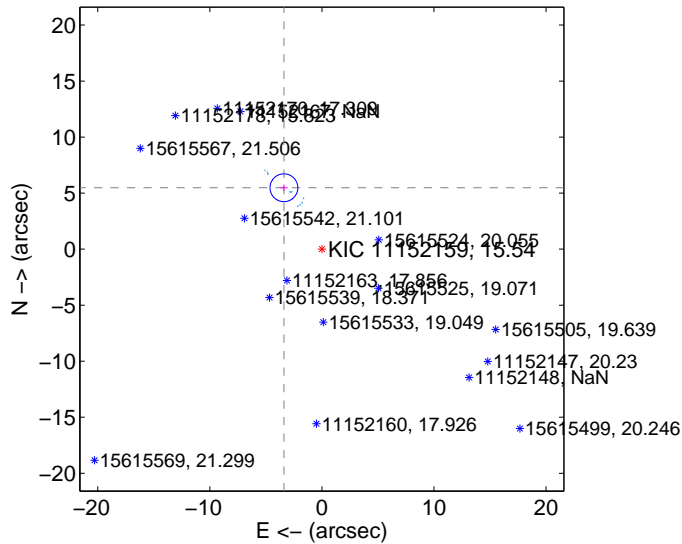
Supplemental centroid analysis for 011152159-01. Kepler magnitude: 15.54. Transit SNR 47.01

There are 13 quarters with good PRF difference image offsets

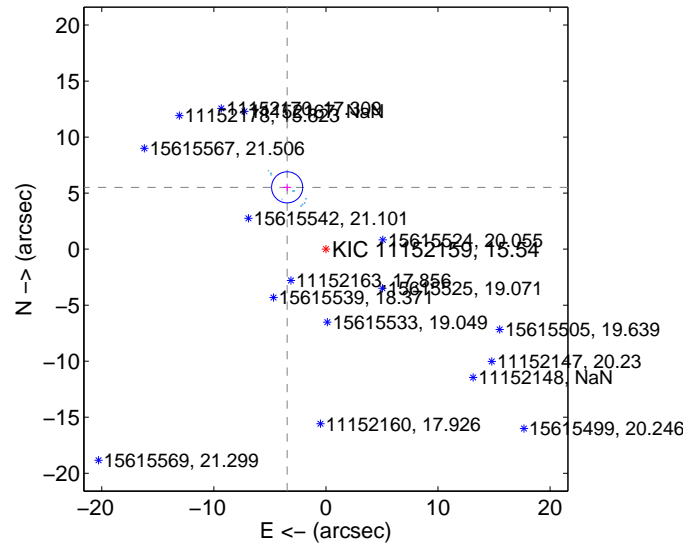
The direct PRF centroid is offset from the target star catalog position by about 0.11 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b>6.445 <math>\pm</math> 0.414</b>	<b>15.58</b>	3.390 $\pm$ 0.335	5.482 $\pm$ 0.300
PRF-fit source offset from KIC position	<b>6.513 <math>\pm</math> 0.463</b>	<b>14.08</b>	3.462 $\pm$ 0.373	5.517 $\pm$ 0.327
photometric centroid source offset	<b>17.00 <math>\pm</math> 0.33</b>	<b>51.28</b>	7.84 $\pm$ 0.33	15.08 $\pm$ 0.33

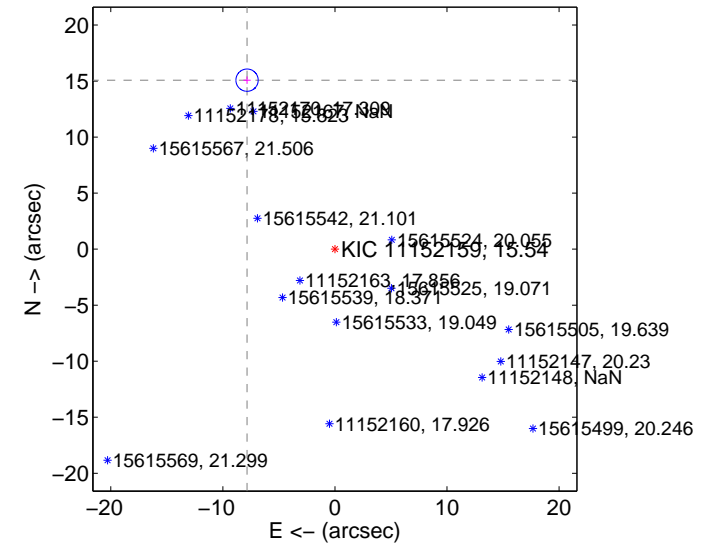
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

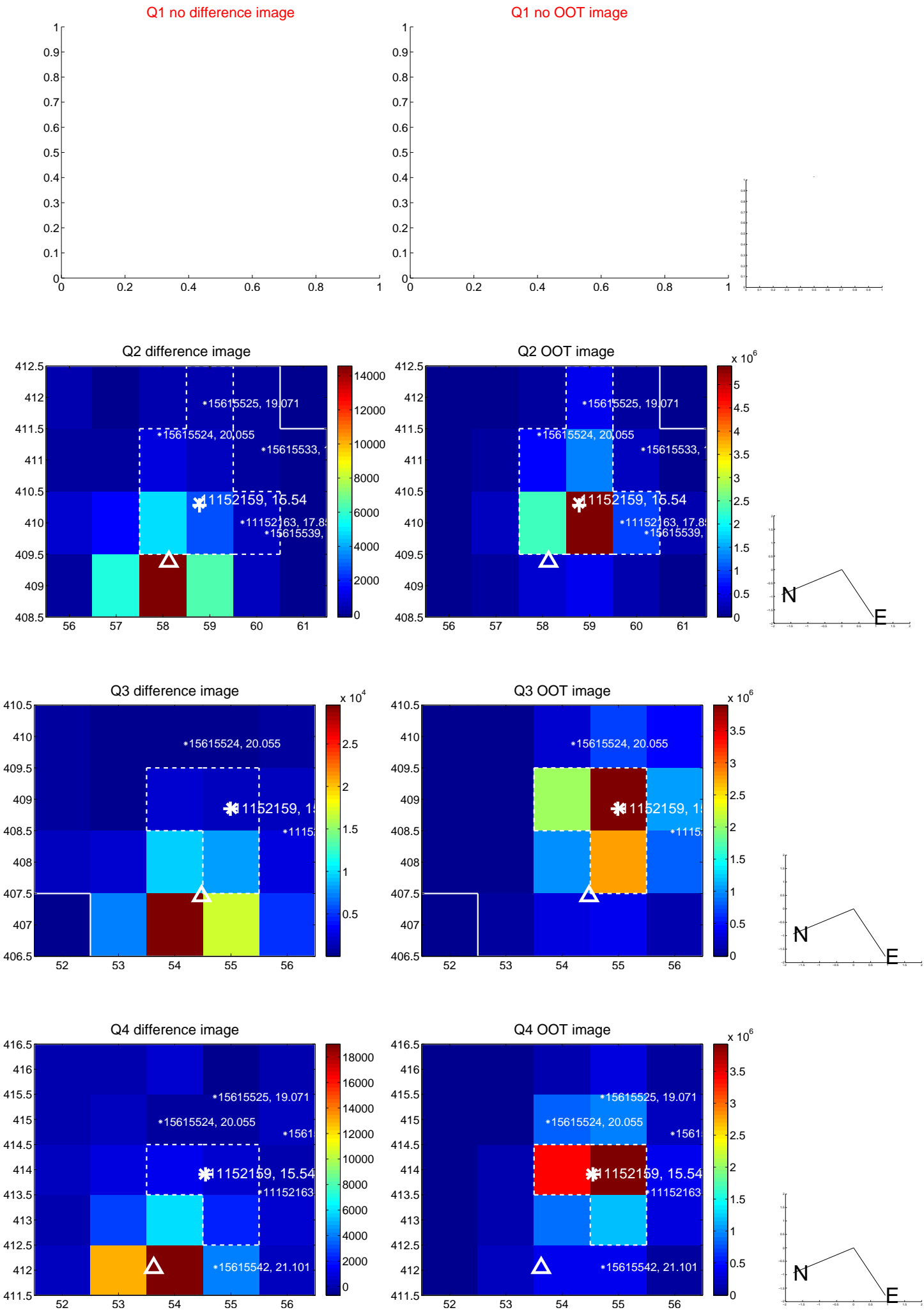


offset from photometric centroids

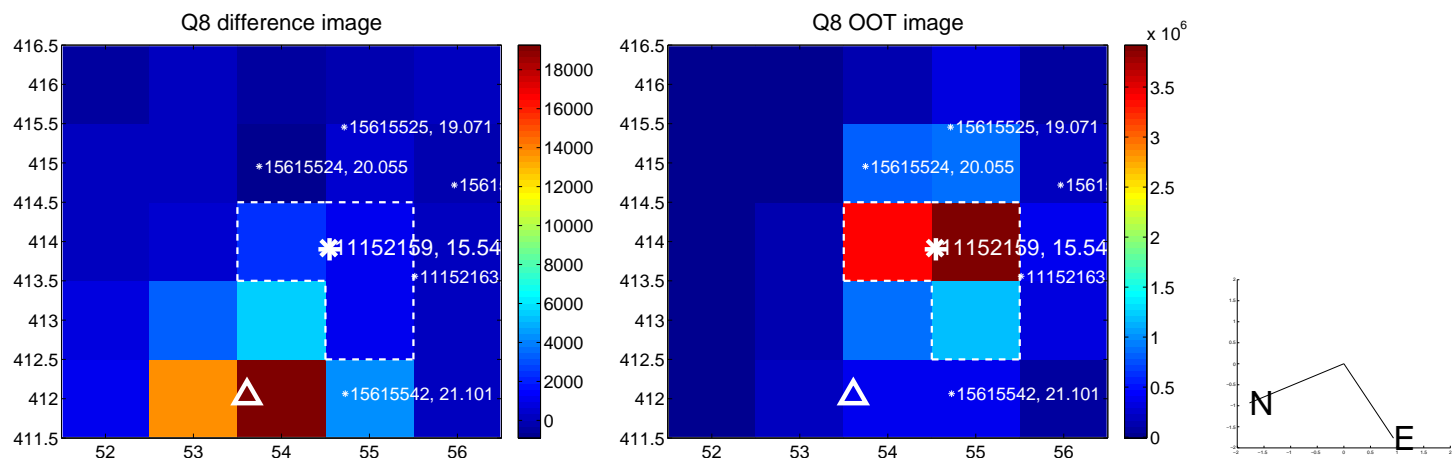
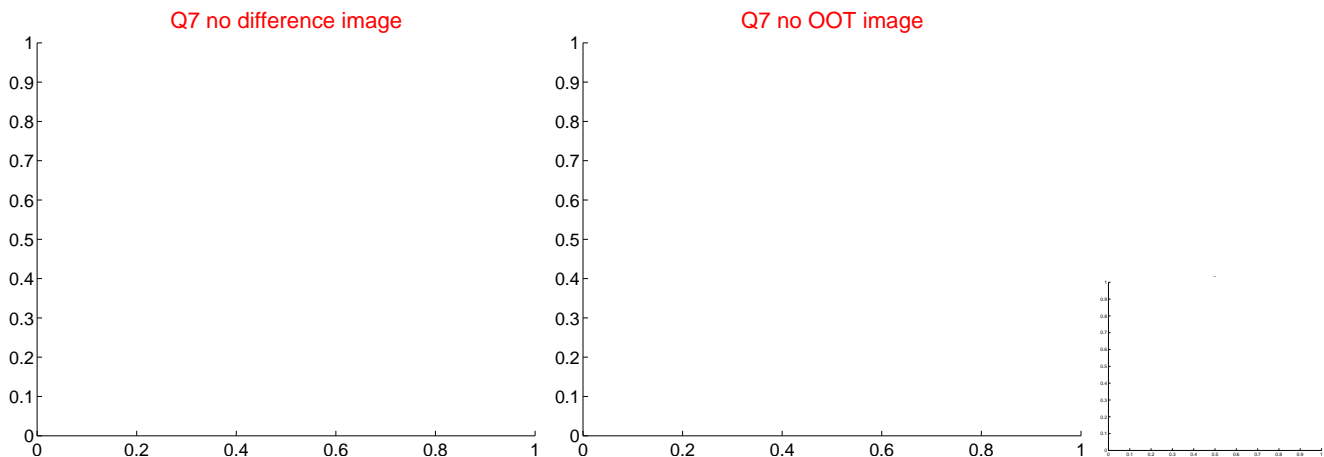
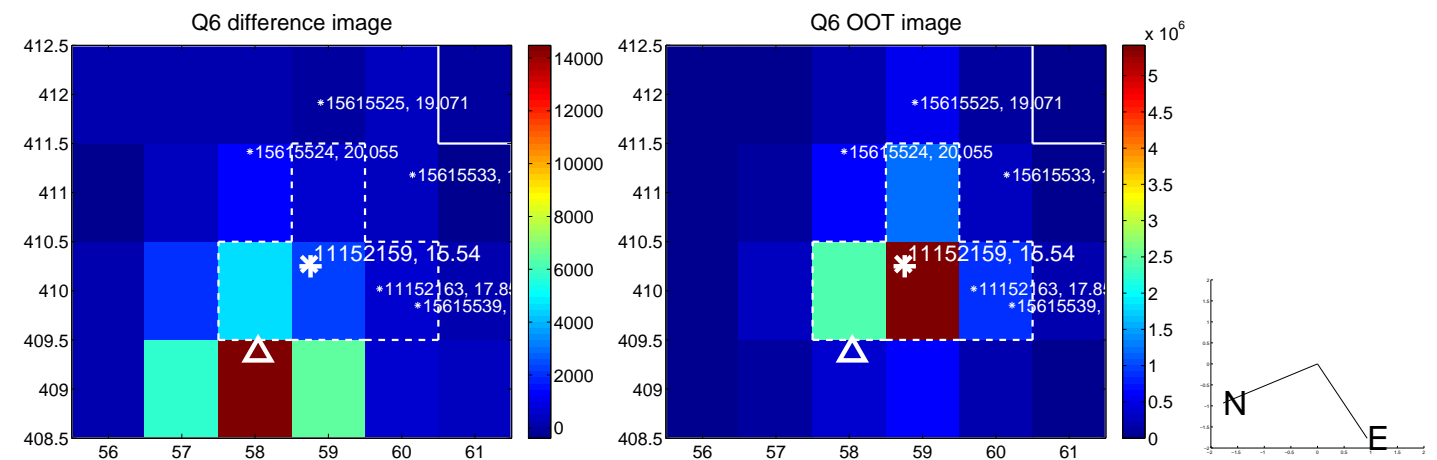
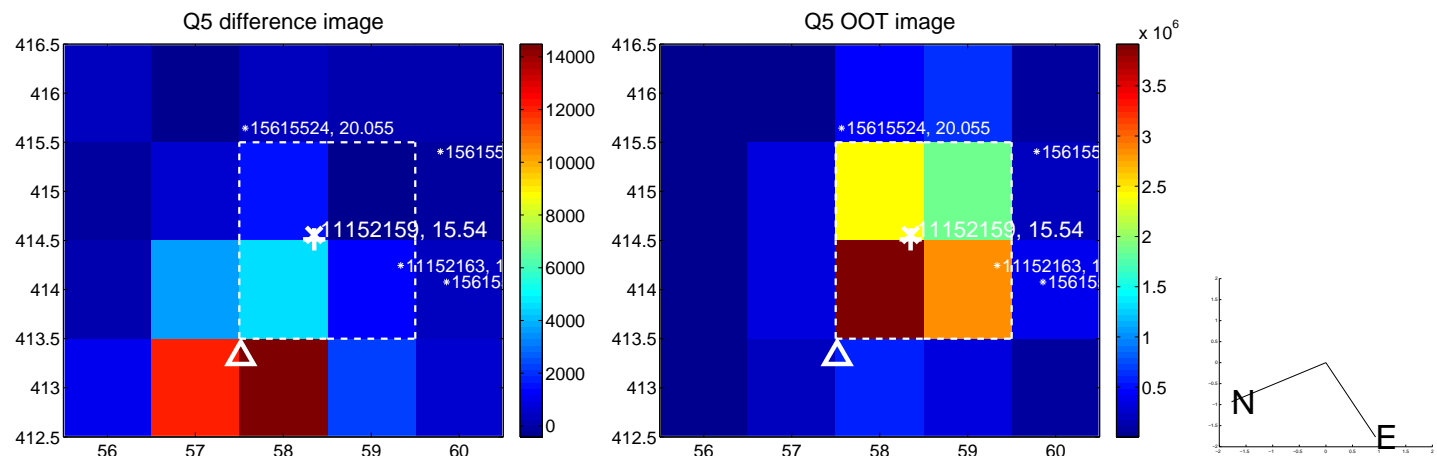


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

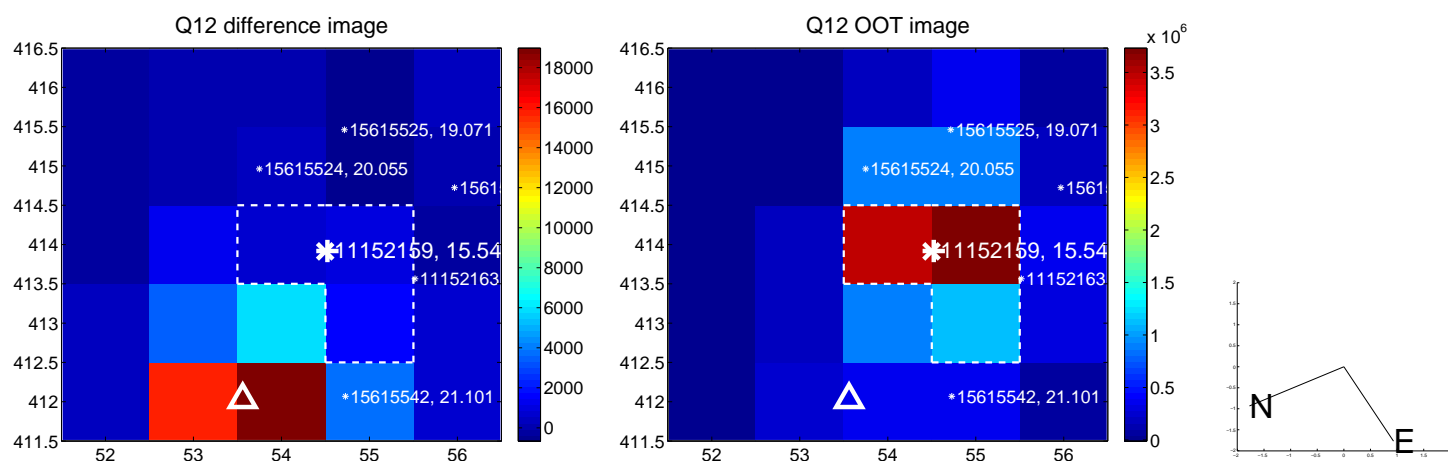
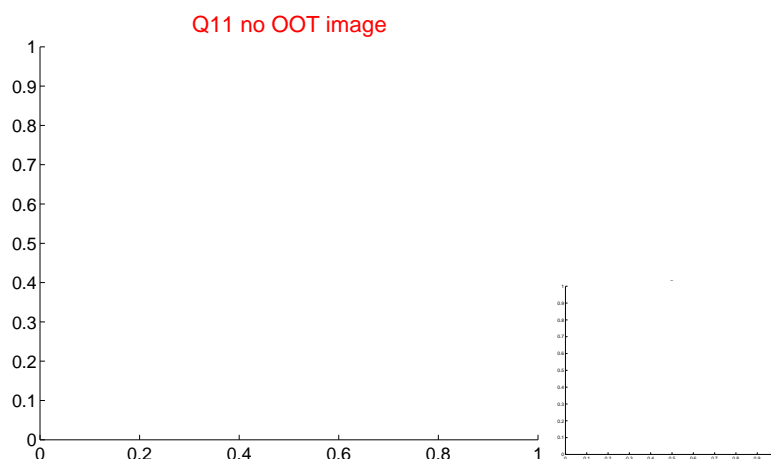
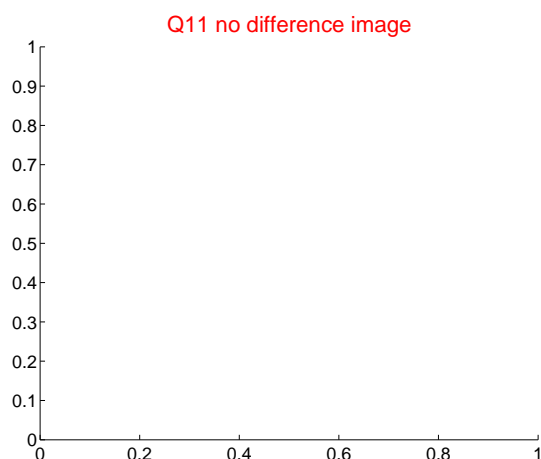
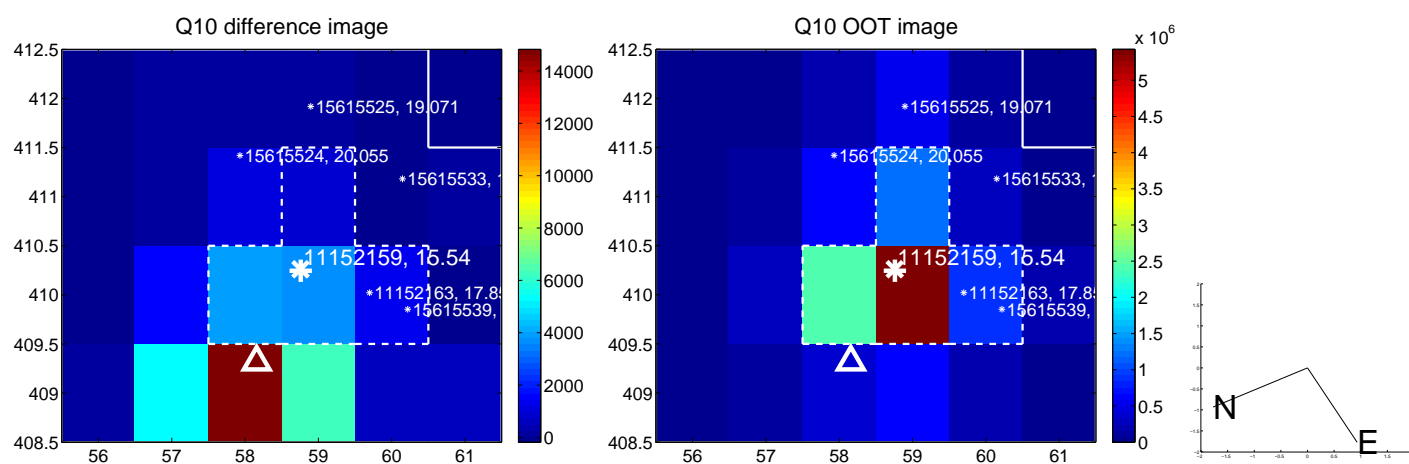
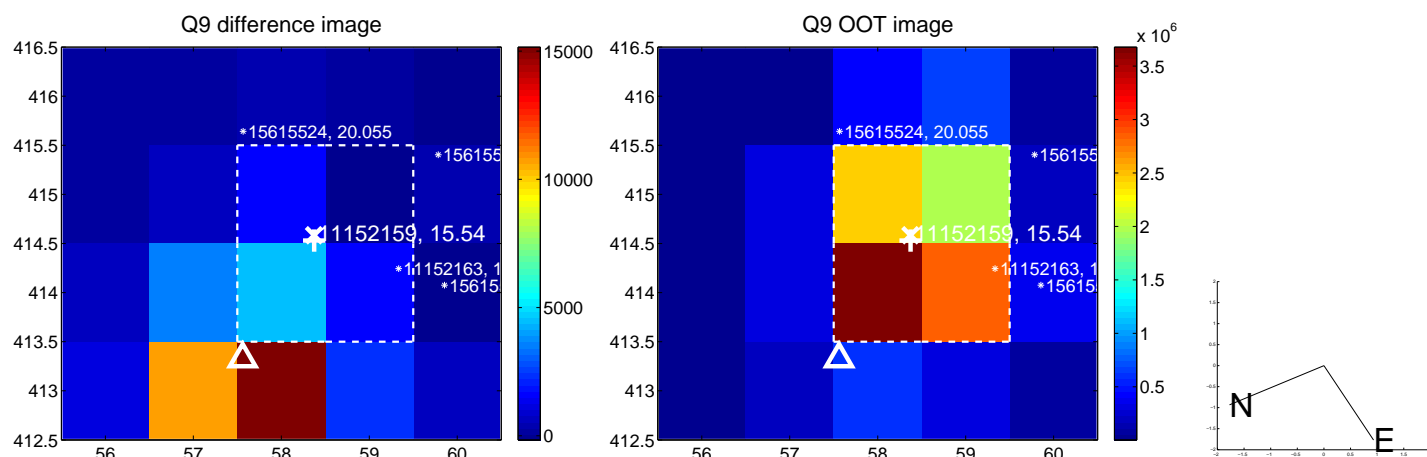


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.

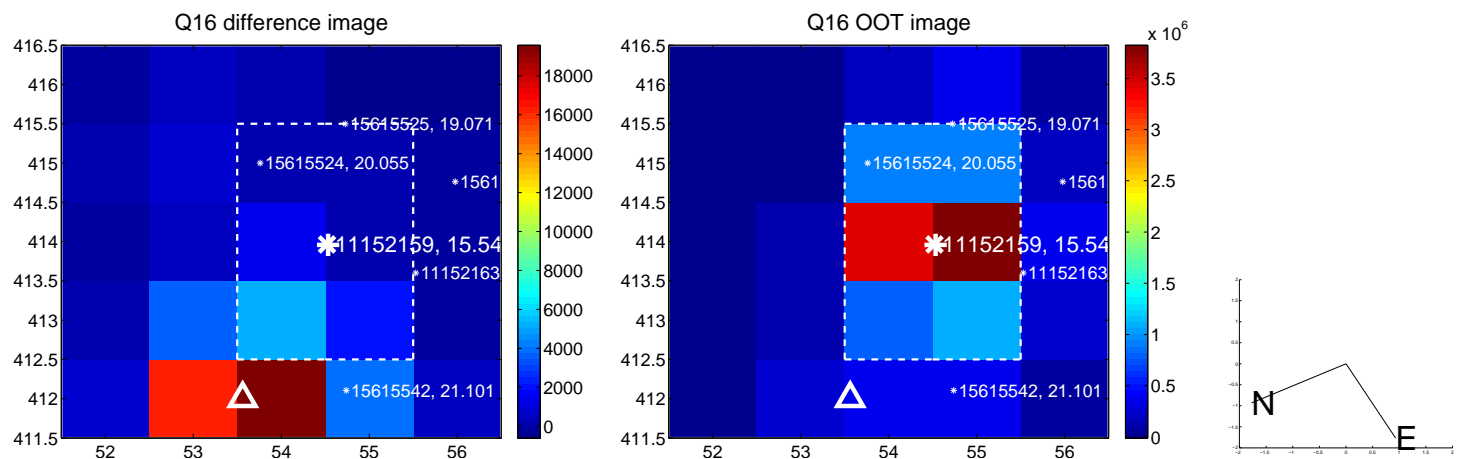
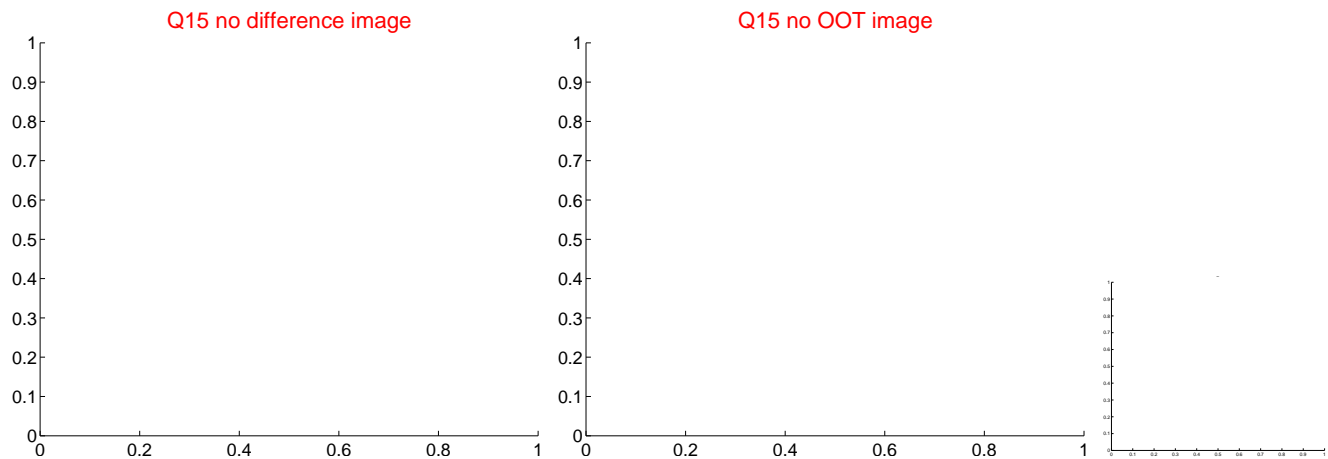
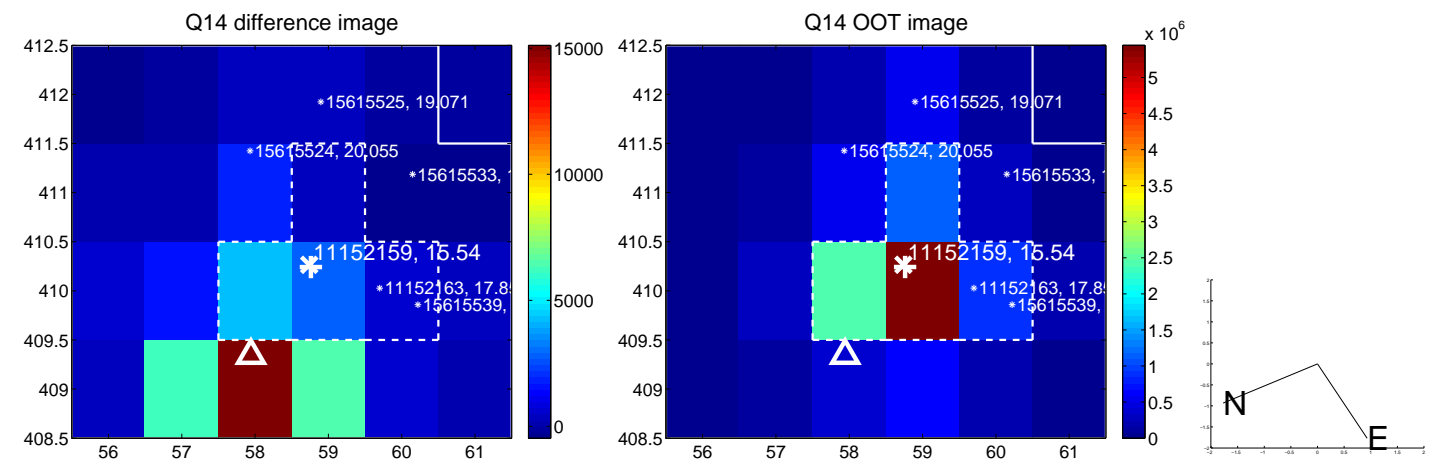
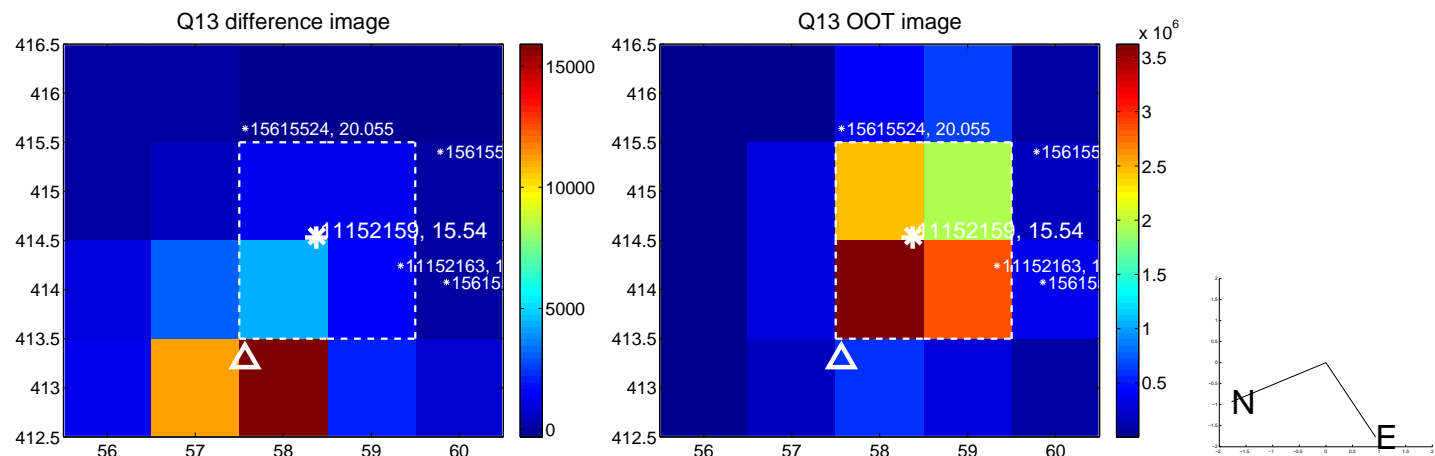




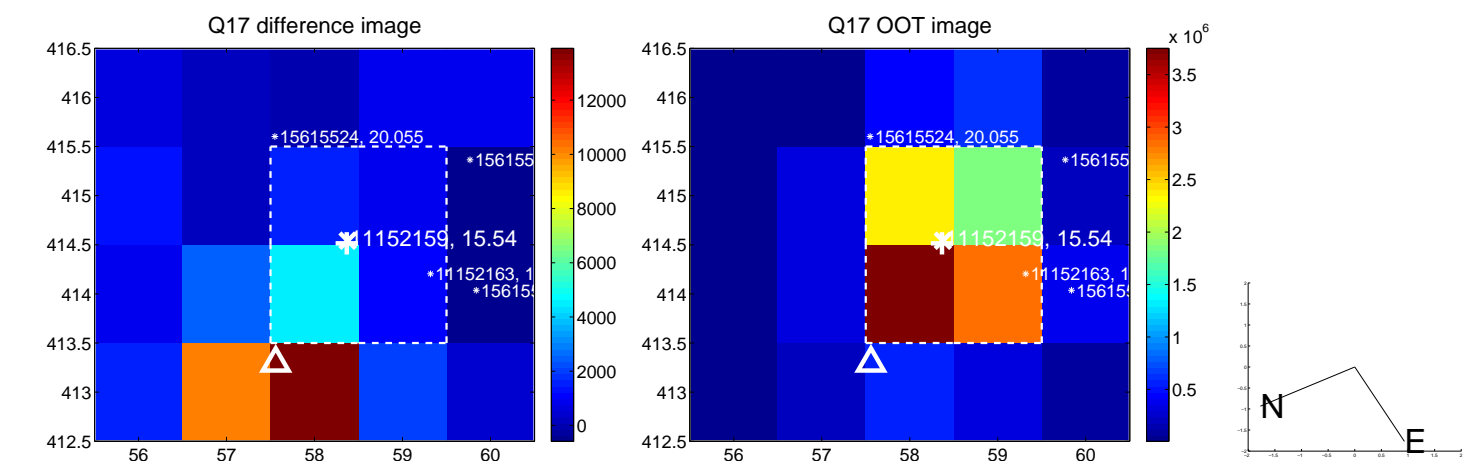
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value



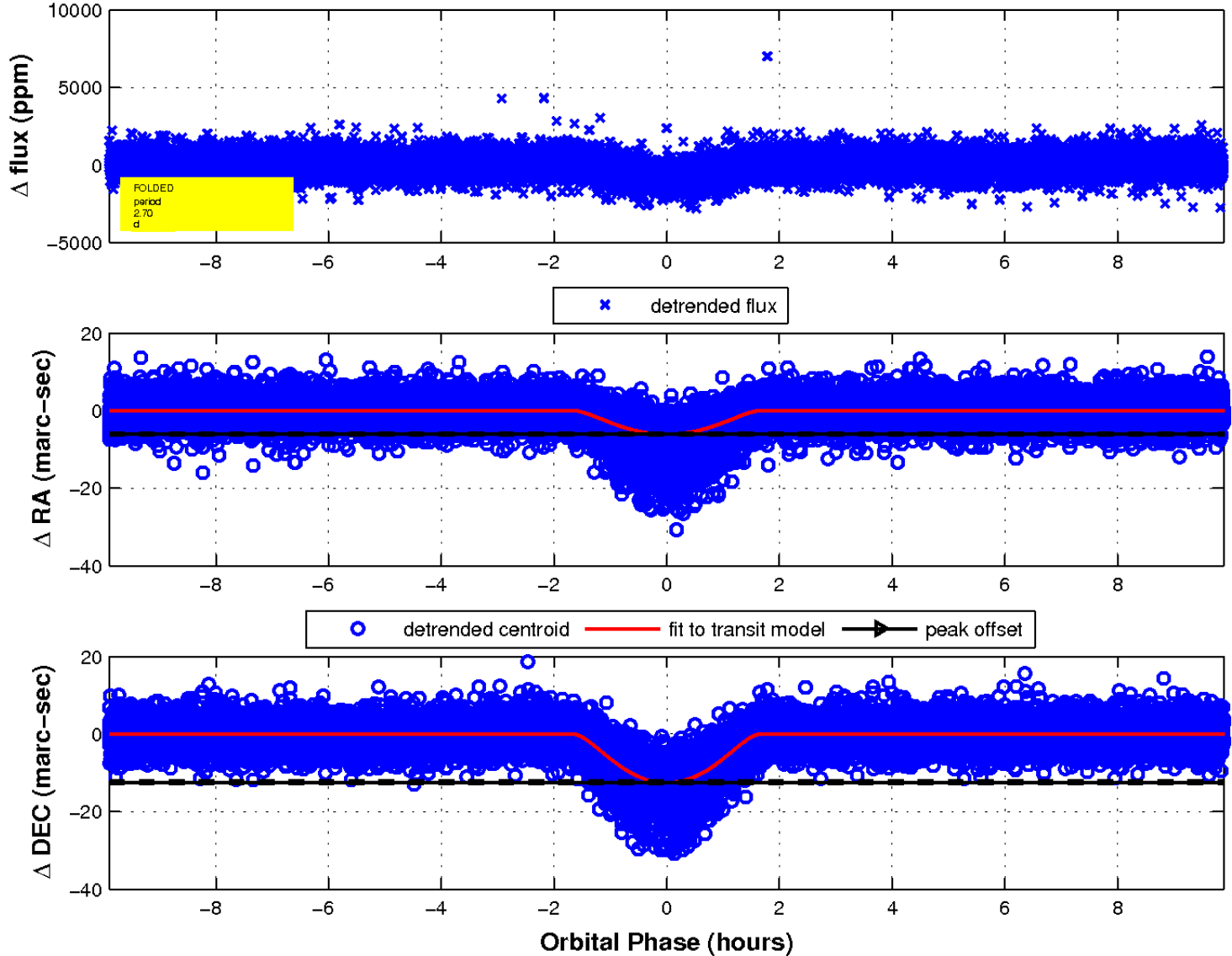
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

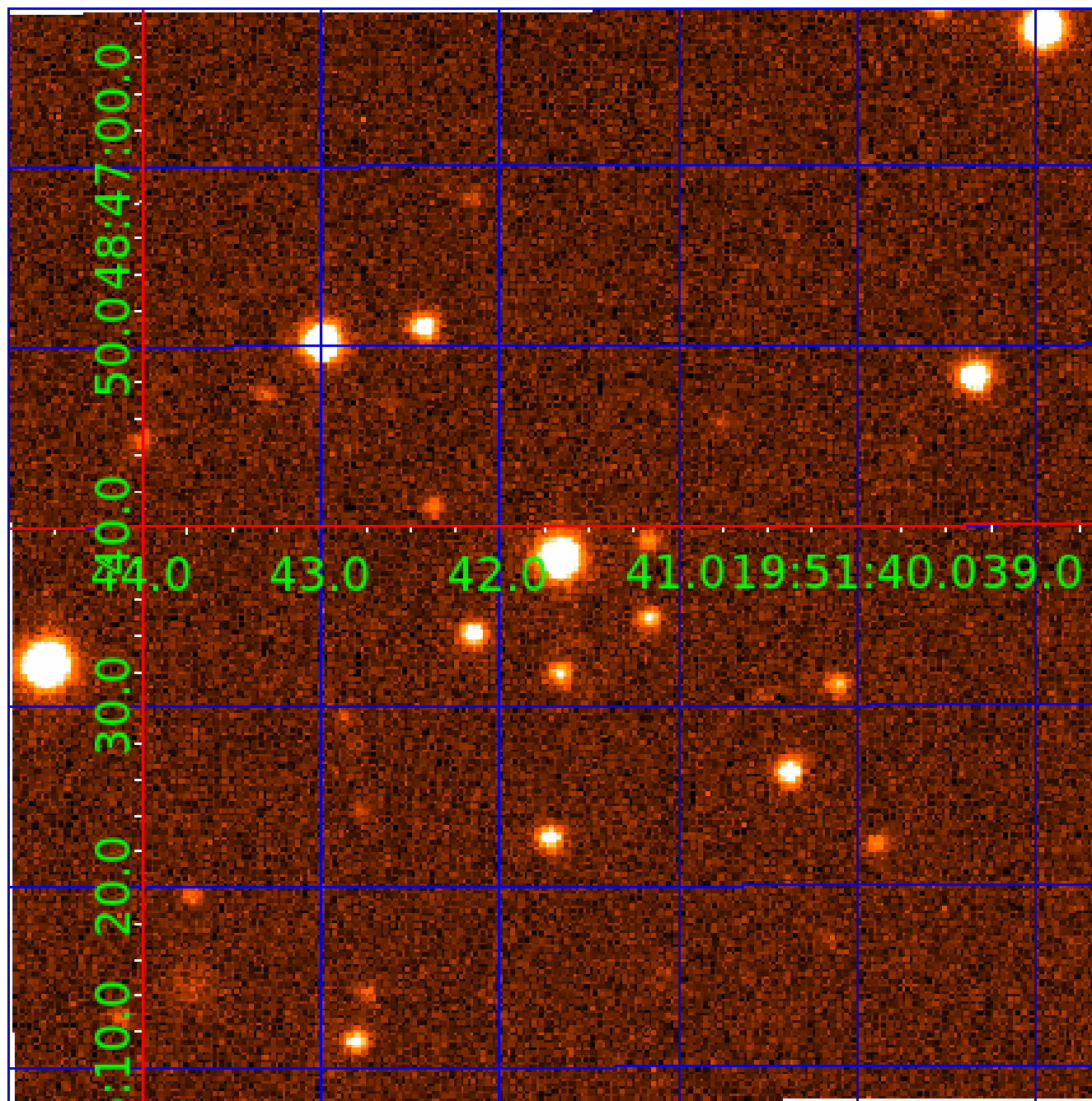


fluxWeightedCentroids, Planet 1 of 2



# UKIRT Image

Declination





# KIC 011152159

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
011152159-01	OBS	0761.01	2.701300	132.874231	826.2	3.297	39.7	47.0	0.91	5550	4.21	528.85
011152159-02	OBS	No	2.701192	131.550693	123.3	2.780	8.0	8.2	0.91	5550	1.16	528.88

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
011152159-01	OBS	FP	0.00	0	1	1	0	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE—CENT_RESOLVED_OFFSET
011152159-02	OBS	FP	0.00	1	1	1	0	IS_SEC_TCE—CENT_RESOLVED_OFFSET

**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.

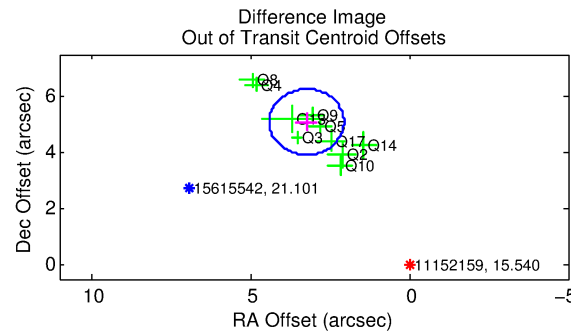
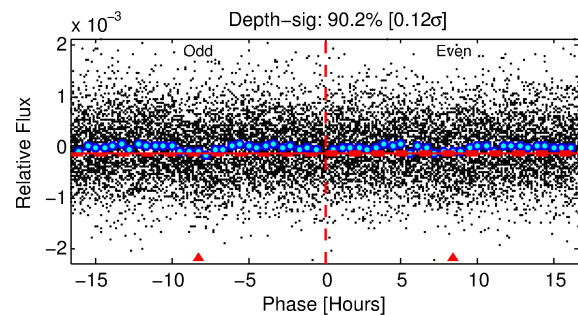
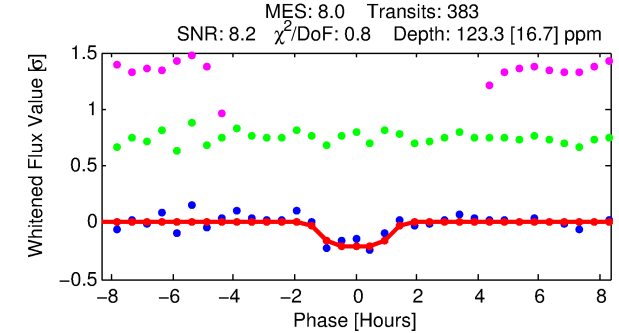
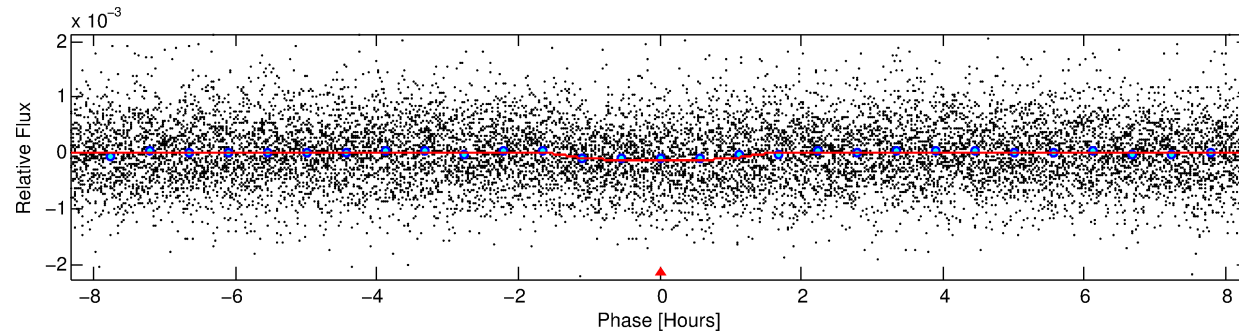
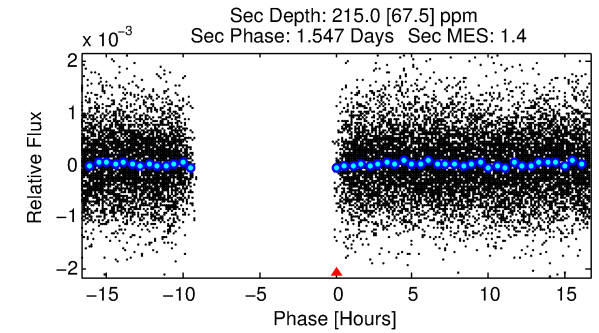
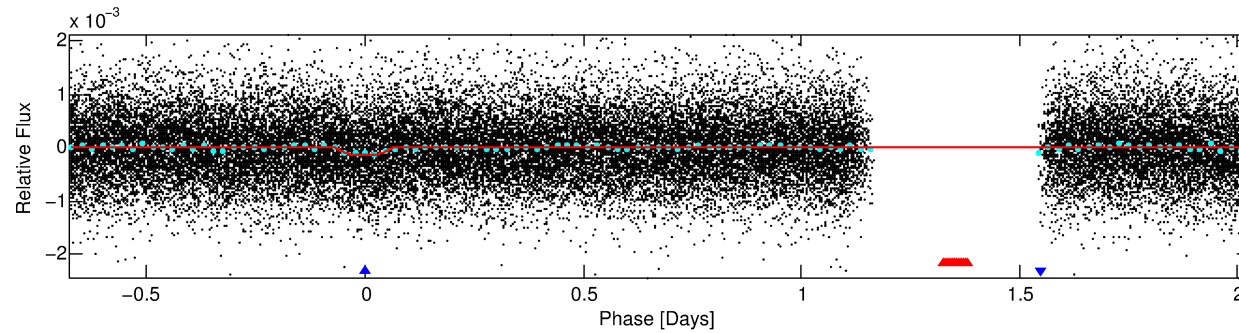
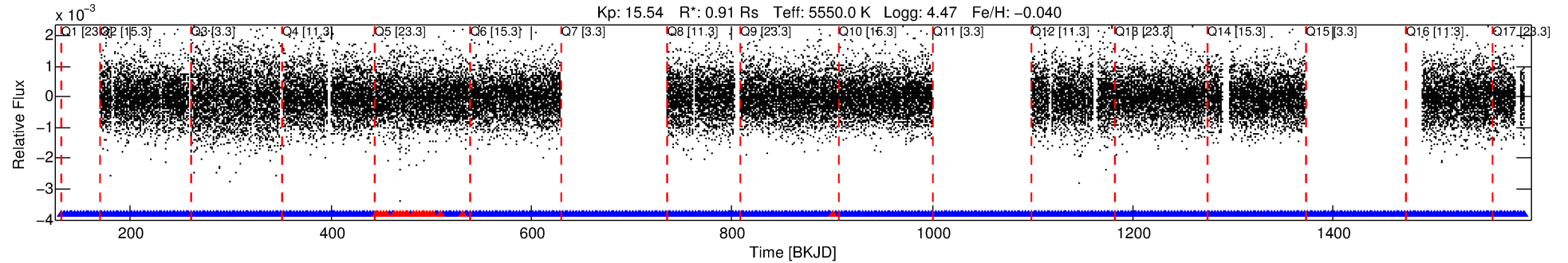
## Ephemeris Match Information For 011152159-02

No Significant Match Found

# DV One-Page Summary

KIC: 11152159 Candidate: 2 of 2 Period: 2.701 d  
KOI: K00761 Corr: No Ephemeris Match

Kp: 15.54 R\*: 0.91 Rs Teff: 5550.0 K Logg: 4.47 Fe/H: -0.040



## DV Fit Results:

Period = 2.70119 [0.00002] d  
Epoch = 131.5507 [0.0054] BKJD  
Rp/R\* = 0.0117 [0.0123]  
a/R\* = 4.11 [17.85]  
b = 0.86 [1.47]  
Seff = 528.88 [177.32]  
Teq = 1223 [102] K  
Rp = 1.16 [1.26] Re  
a = 0.0365 [0.0077] AU  
Ag = 116.10 [249.41] [0.46σ]  
Teff = 6206 [3305] K [1.51σ]

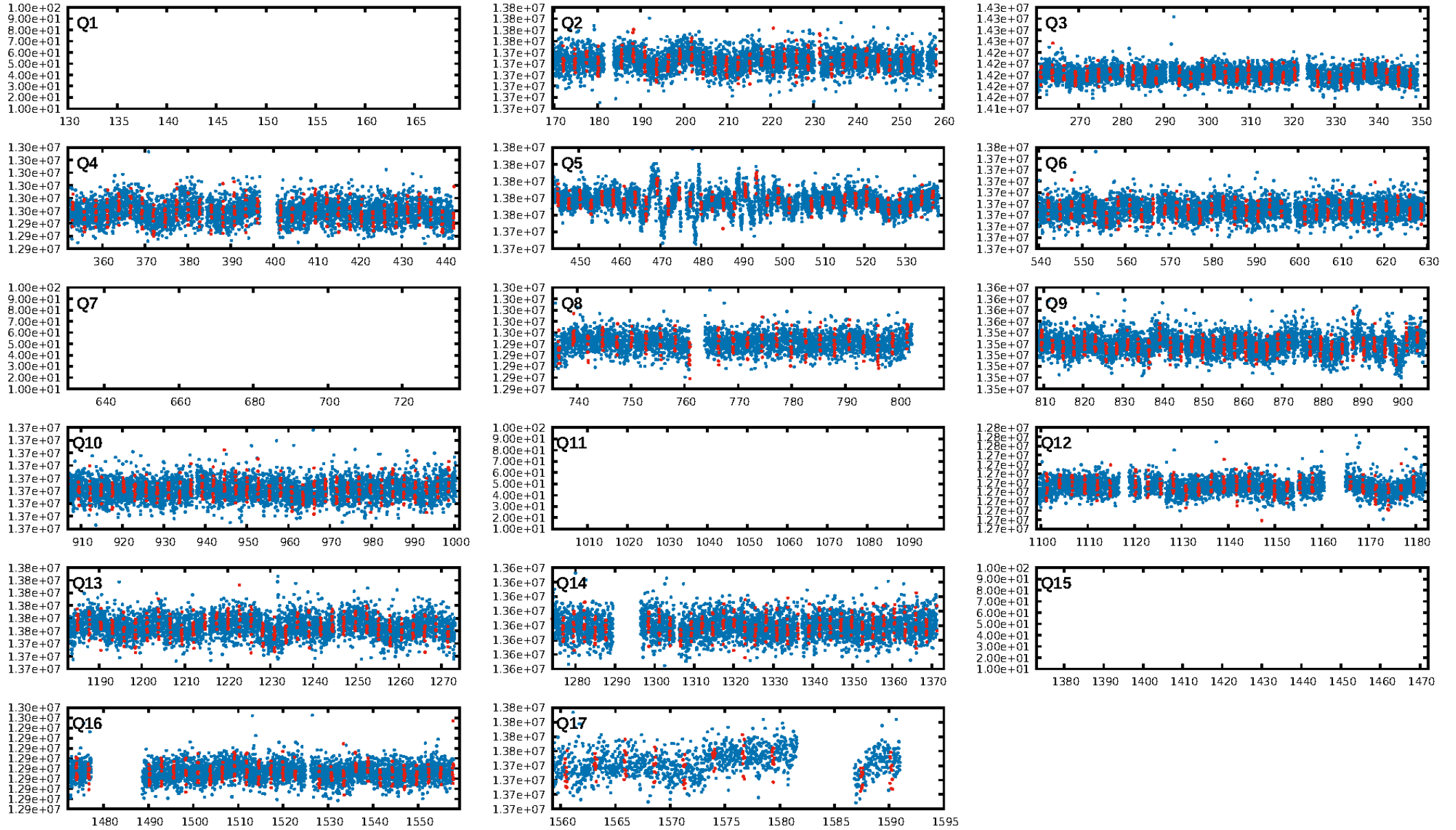
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.0% [0.00σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 2.27e-16  
RollingBand-fgt: 0.94 [351/373]  
GhostDiagnostic-chr: -0.7011  
Centroid-sig: 0.0%  
Centroid-so: 13.529 arcsec [7.02σ]  
OotOffset-rm: 6.027 arcsec [15.40σ]  
KicOffset-rm: 6.114 arcsec [13.41σ]  
OotOffset-st: 3/1/2/4 [10]  
KicOffset-st: 3/1/2/4 [10]  
DiffImageQuality-fgm: 1.00 [10/10]  
DiffImageOverlap-fno: 1.00 [13/13]

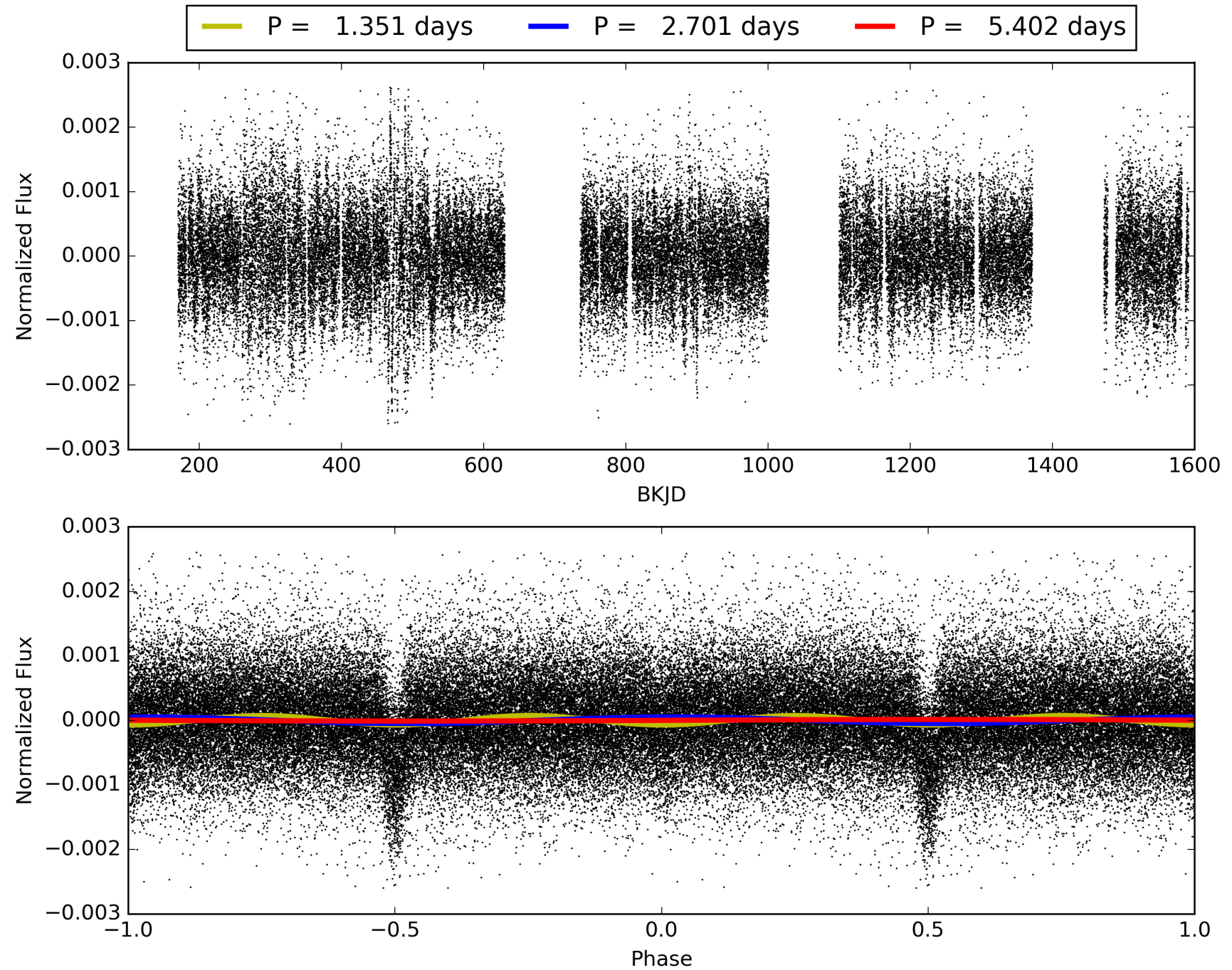
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 13:14:02 Z

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

# TCE 011152159-02, PDC Light Curves



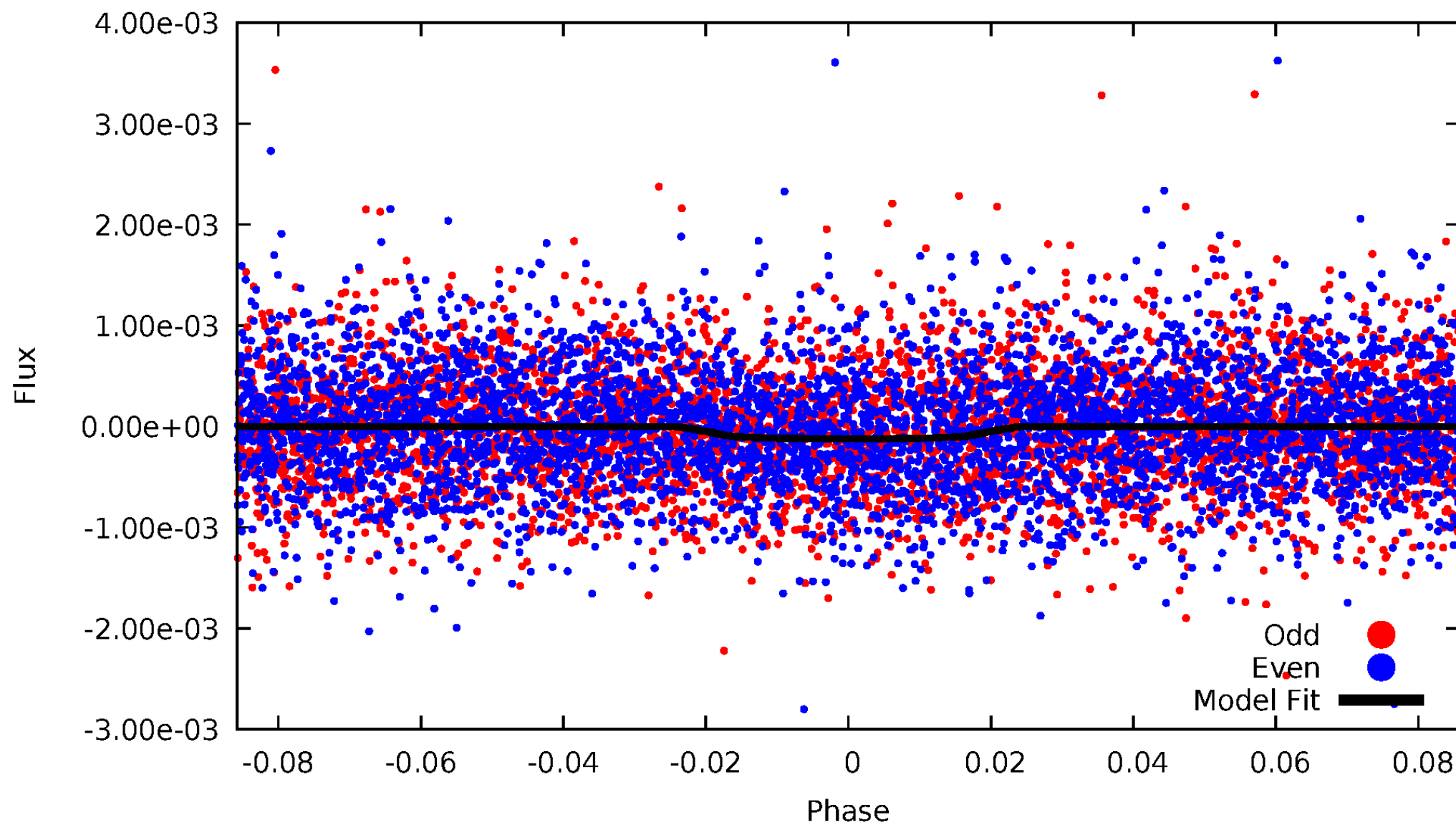
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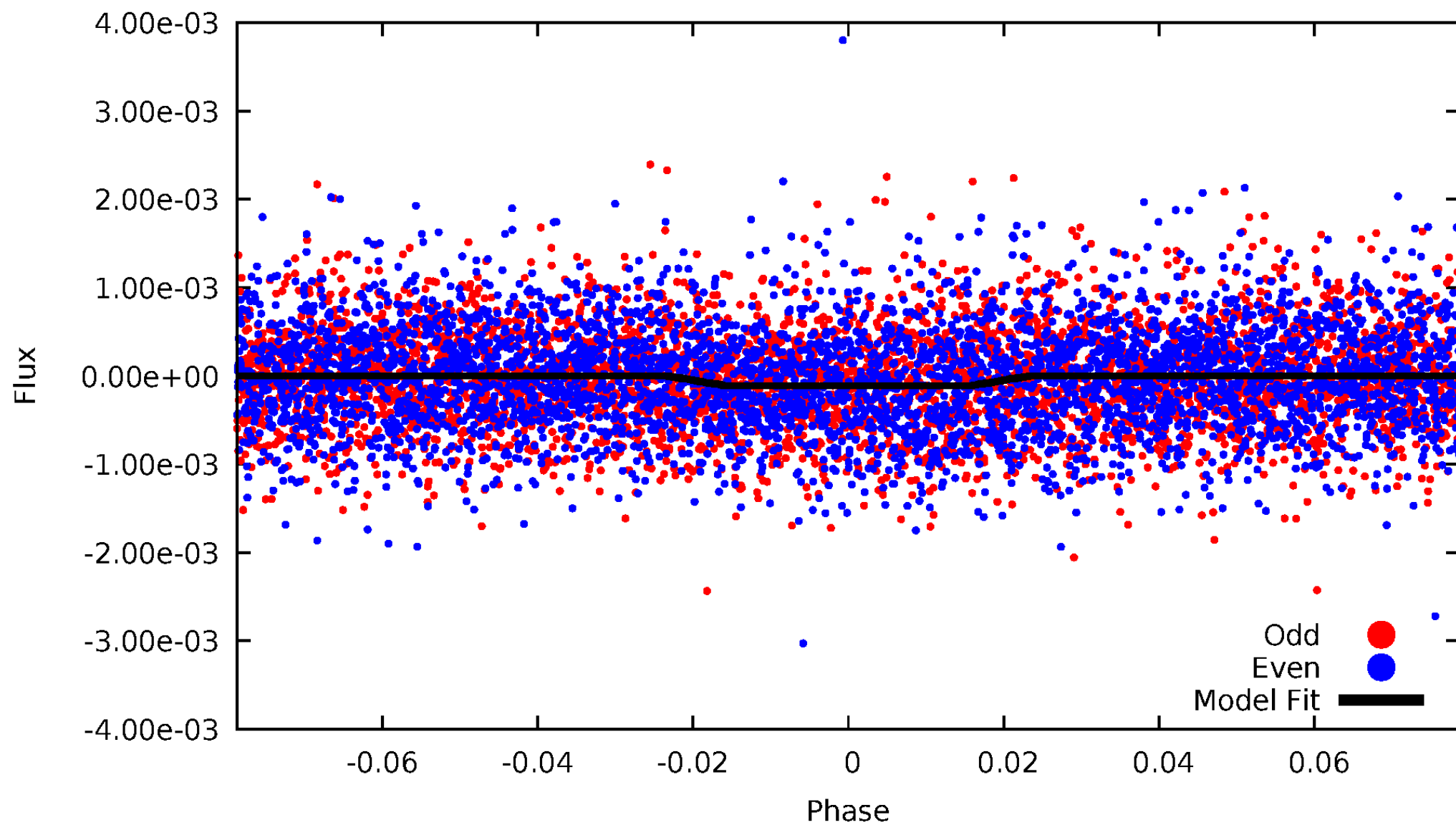
# DV Odd/Even

TCE 011152159-02



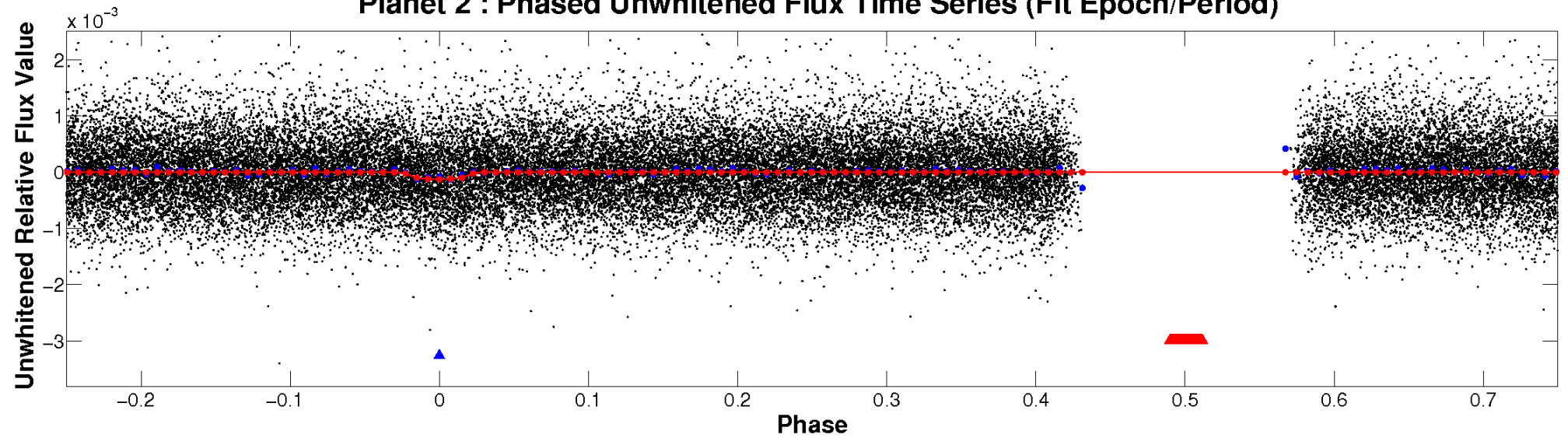
# ALT Odd/Even

TCE 011152159-02

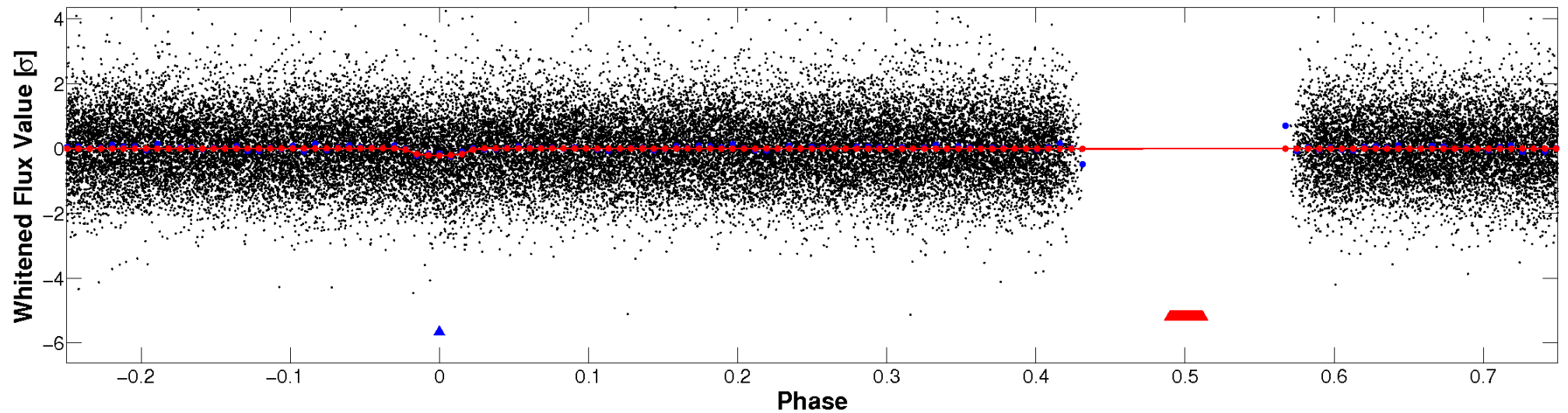


# Non-Whitened Vs. Whitened Light Curve

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

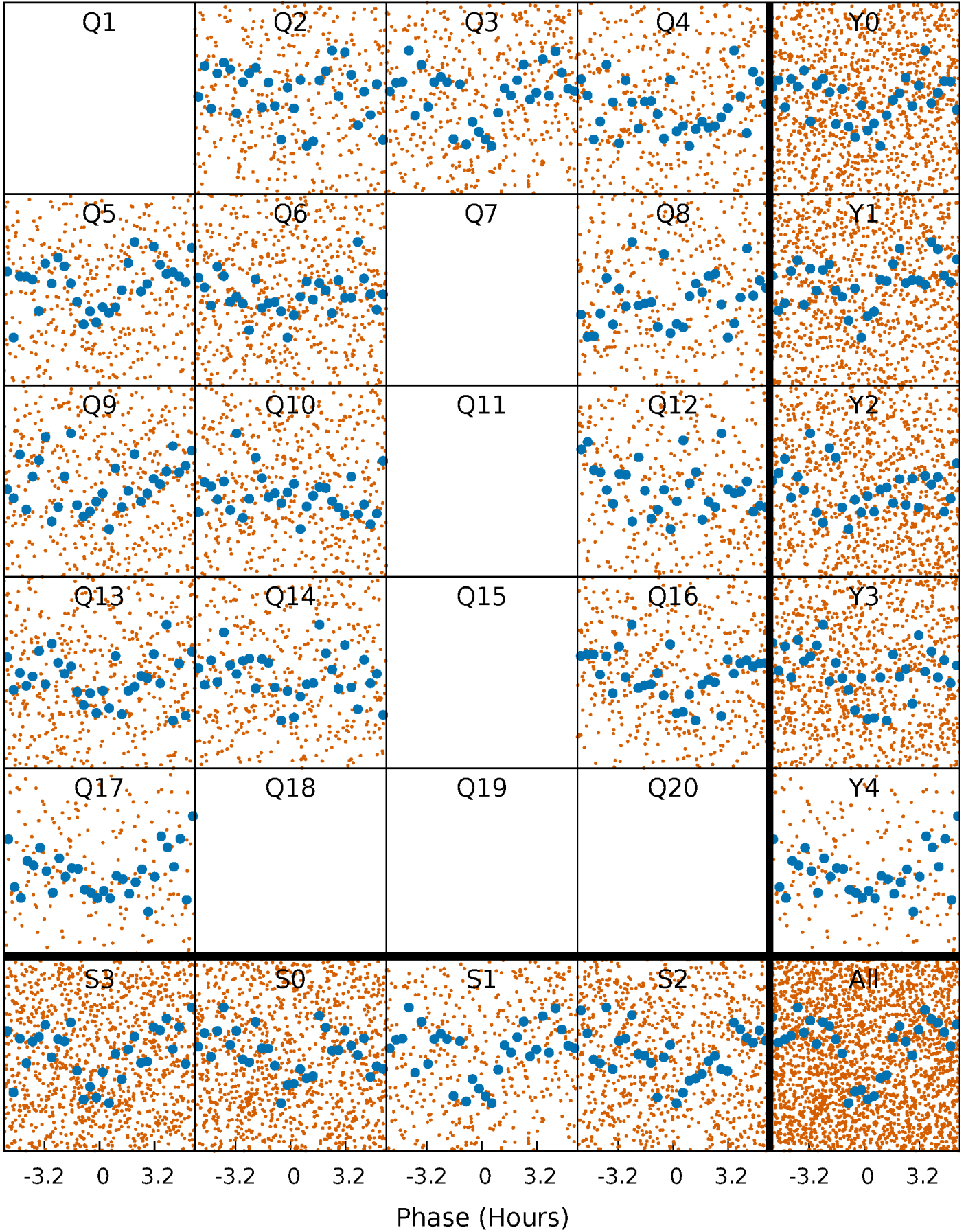


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



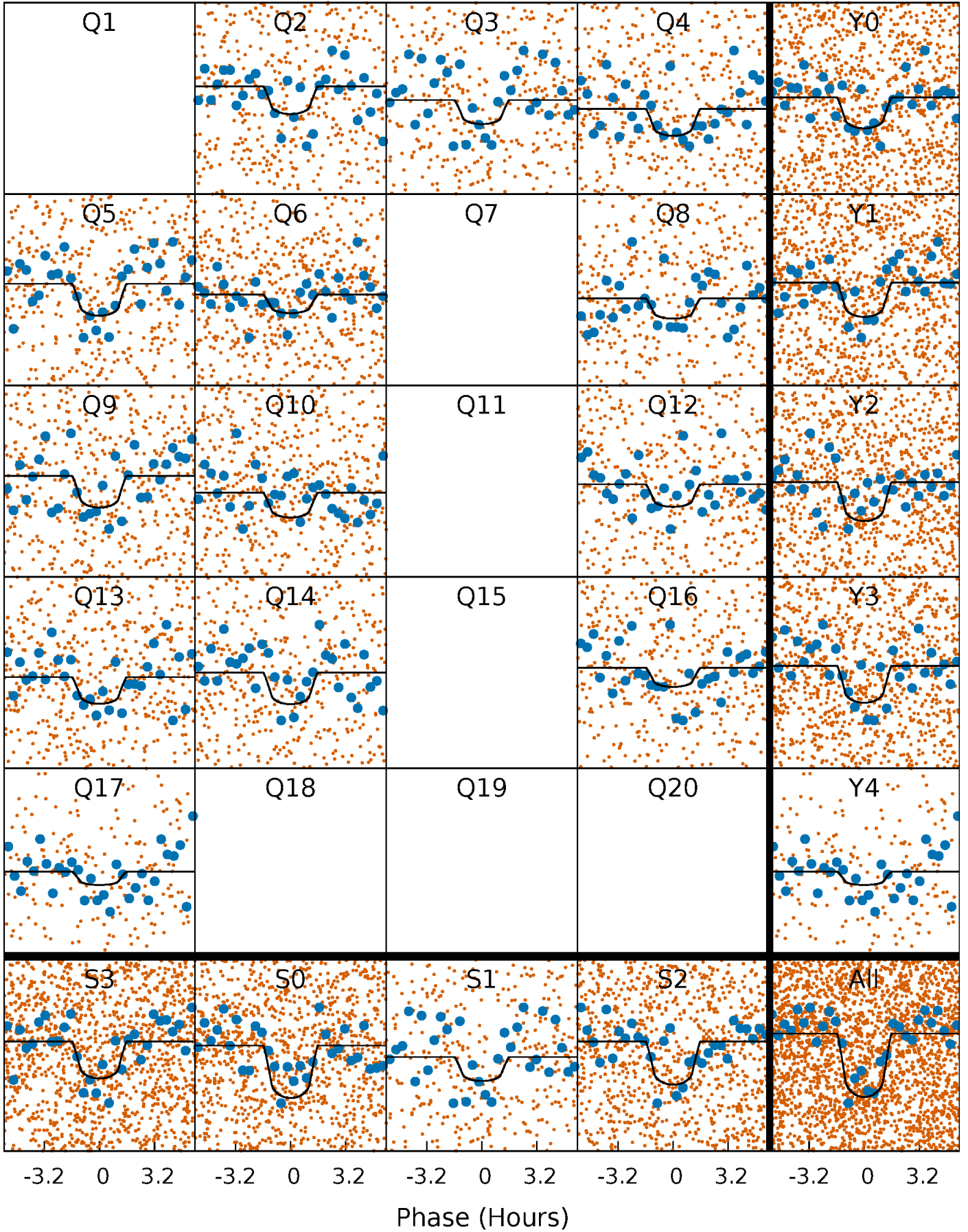
# PDC Quarter-Phased Transit Curves

TCE 011152159-02 P= 2.701192 Days  $T_0=131.550693$  (BKJD)



# DV Quarter-Phased Transit Curves

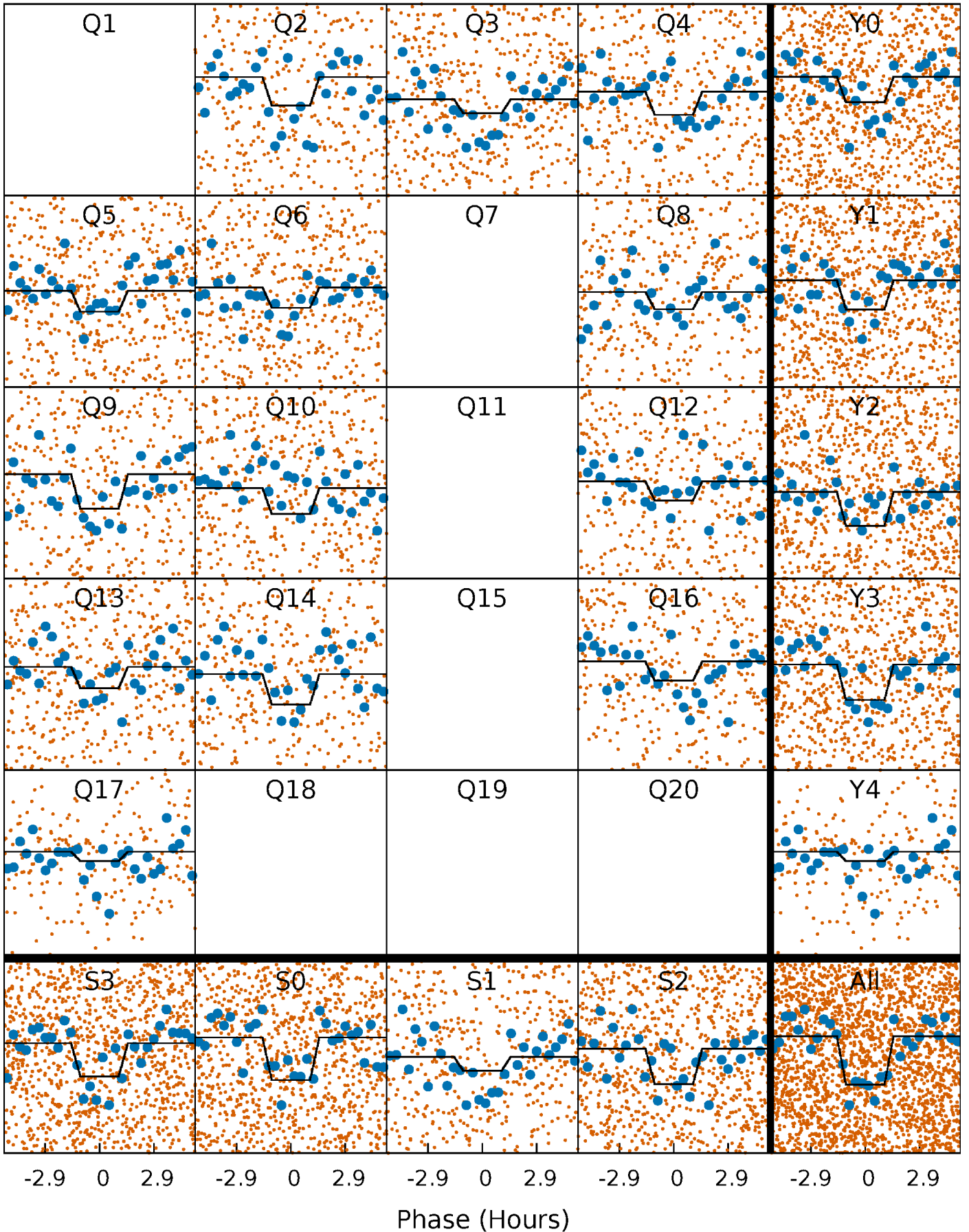
TCE 011152159-02 P= 2.701192 Days  $T_0=131.550693$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

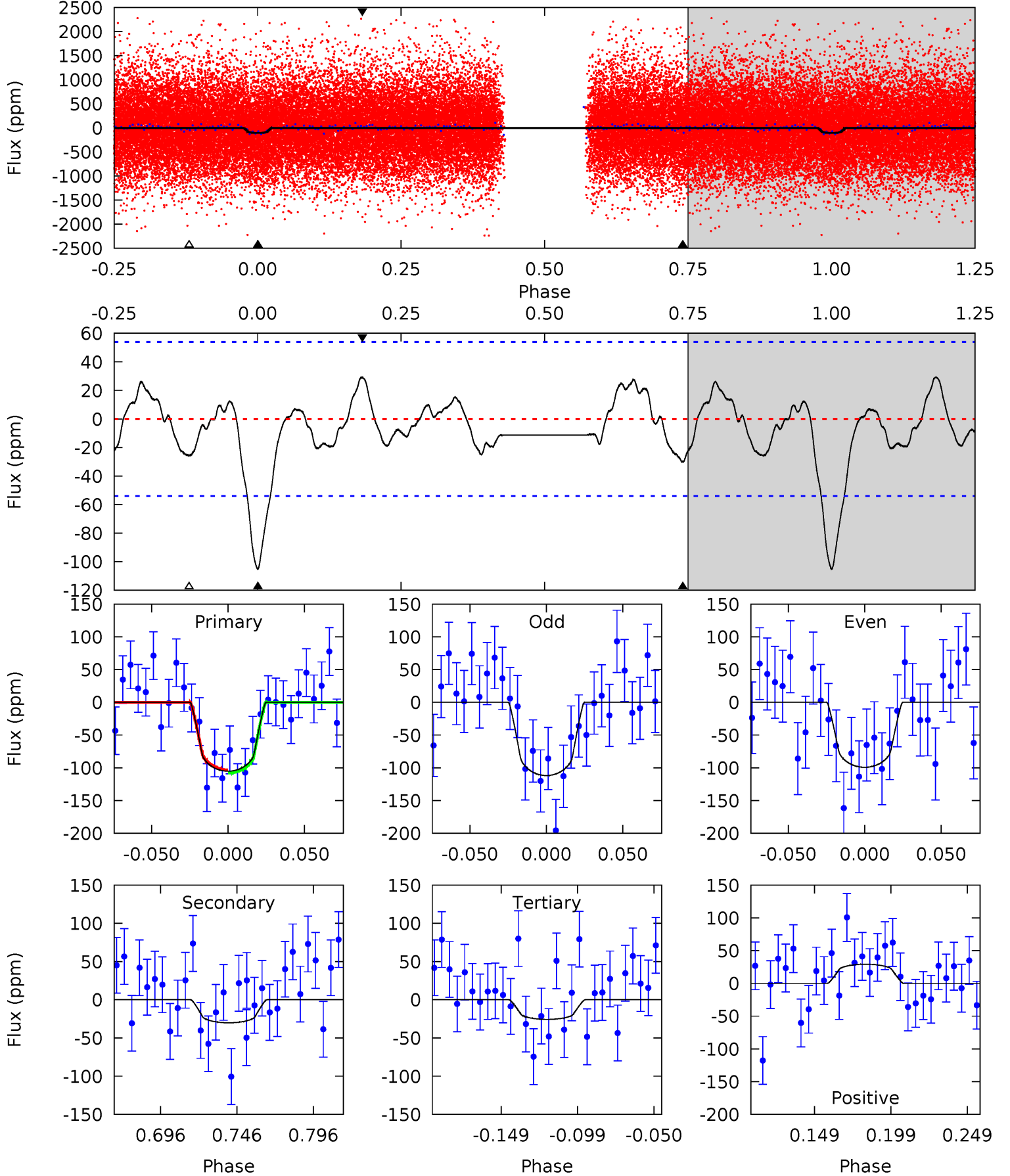
TCE 011152159-02 P= 2.701179 Days  $T_0=131.554389$  (BKJD)



# DV Model-Shift Uniqueness Test

011152159-02, P = 2.701192 Days, E = 131.550693 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
9.18	2.63	2.24	2.55	4.71	1.96	1.28	6.94	6.64	0.39	0.08	0.55	0.88	0.22	0.20

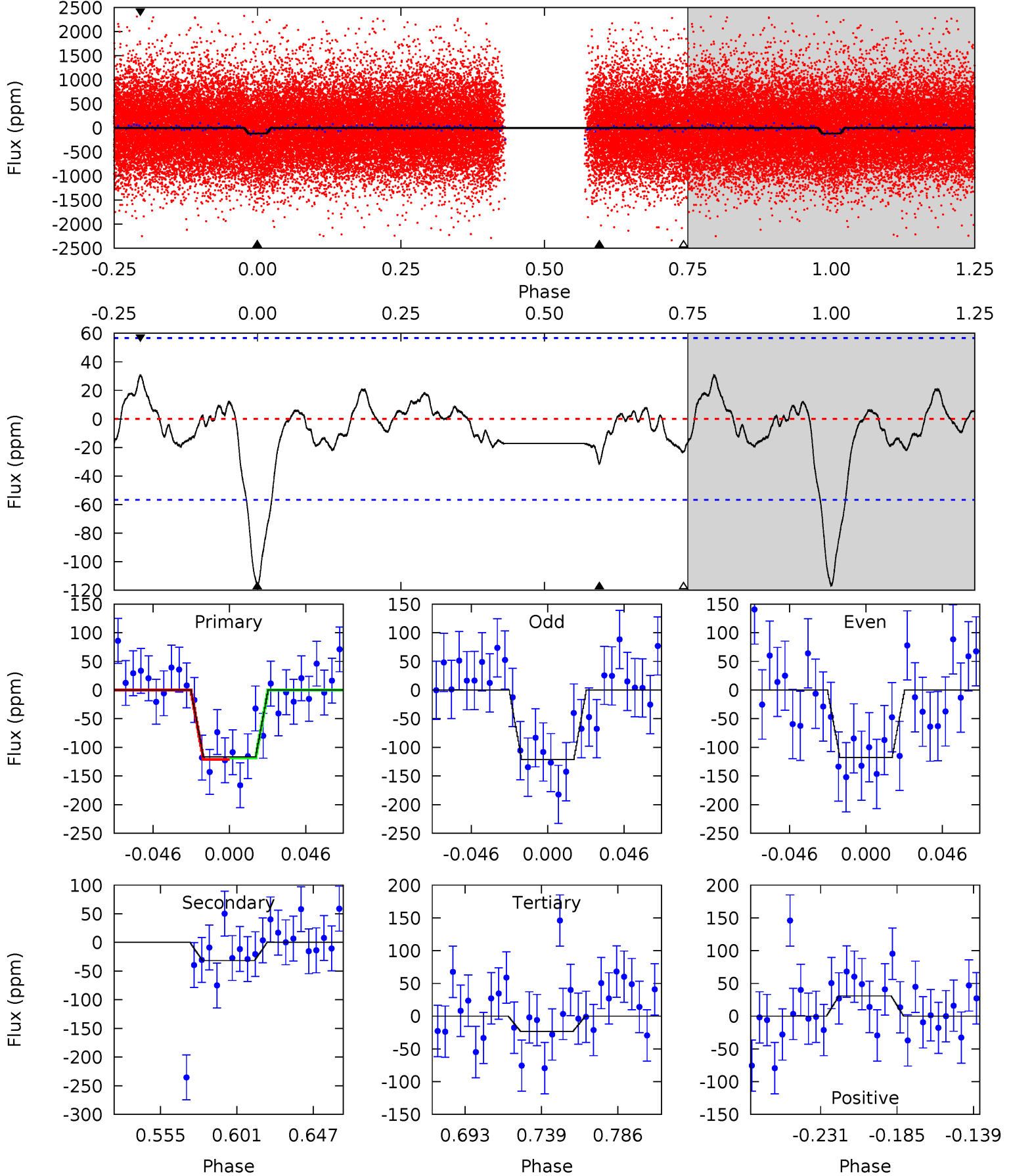




# Alt Model-Shift Uniqueness Test

011152159-02, P = 2.701179 Days, E = 131.554389 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
9.73	2.63	1.96	2.57	4.72	1.99	0.97	7.77	7.16	0.67	0.06	0.15	0.94	0.21	0.12



### Stellar Parameters For KIC 011152159

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5550^{+182}_{-182}$	$4.468^{+0.091}_{-0.169}$	$-0.040^{+0.300}_{-0.300}$	$0.910^{+0.228}_{-0.105}$	$0.889^{+0.102}_{-0.083}$	$1.659^{+0.660}_{-0.773}$
	+3%/-3%	+2%/-4%	+750%/-750%	+25%/-12%	+11%/-9%	+40%/-47%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 011152159-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-30 \pm 11$	$1.44^{+1.17}_{-0.84}$	$1725^{+116}_{-85}$	$3763^{+1557}_{-719}$	$10^{+46}_{-7}$
Alt.	$-32 \pm 12$	$1.45^{+1.20}_{-0.96}$	$1725^{+123}_{-88}$	$3831^{+1987}_{-759}$	$11^{+80}_{-8}$

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

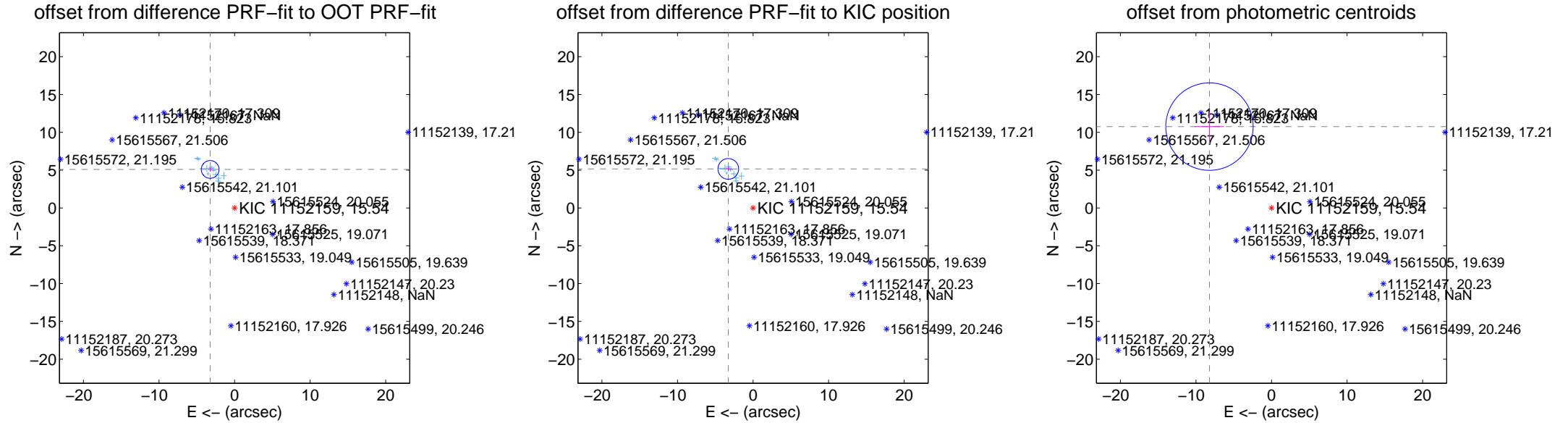
## DV Centroid Data

Supplemental centroid analysis for 011152159-02. Kepler magnitude: 15.54. Transit SNR 8.22

There are 10 quarters with good PRF difference image offsets

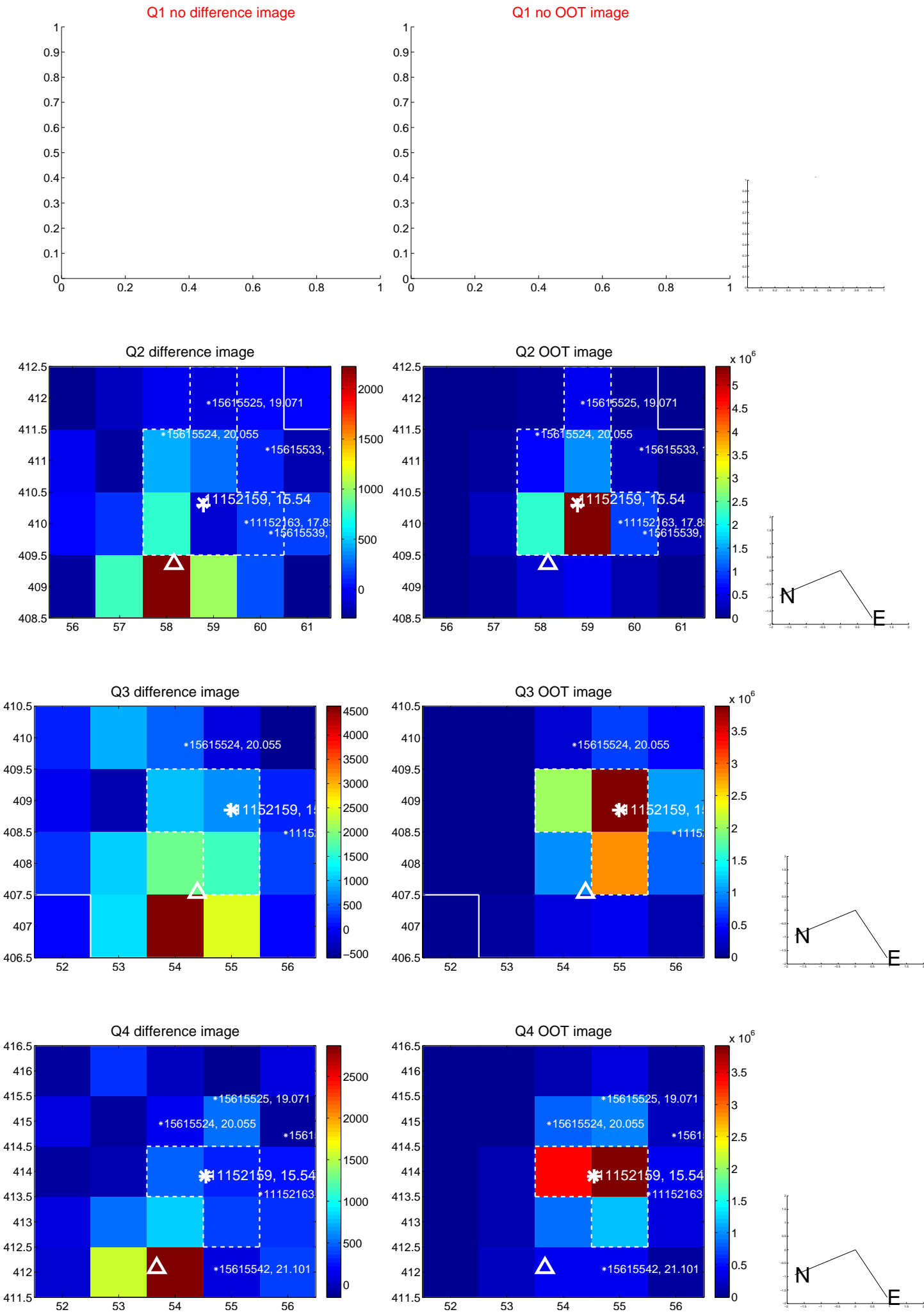
The direct PRF centroid is offset from the target star catalog position by about 0.11 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b>6.027 <math>\pm</math> 0.391</b>	<b>15.40</b>	3.229 $\pm$ 0.321	5.089 $\pm$ 0.280
PRF-fit source offset from KIC position	<b>6.114 <math>\pm</math> 0.456</b>	<b>13.41</b>	3.275 $\pm$ 0.372	5.163 $\pm$ 0.319
photometric centroid source offset	<b>13.53 <math>\pm</math> 1.93</b>	<b>7.02</b>	8.21 $\pm$ 1.93	10.75 $\pm$ 1.93

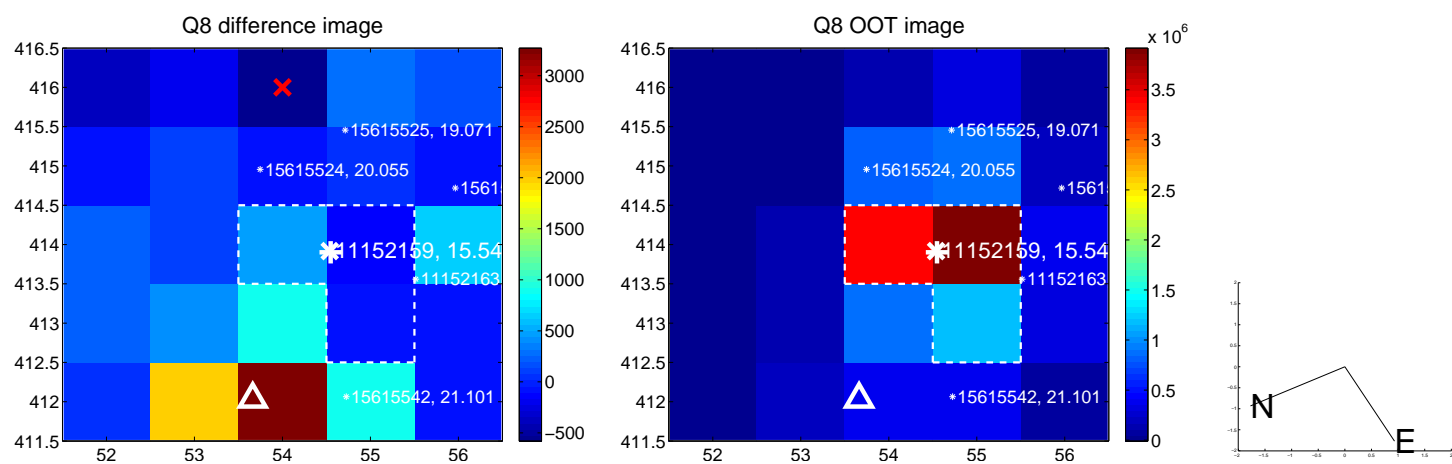
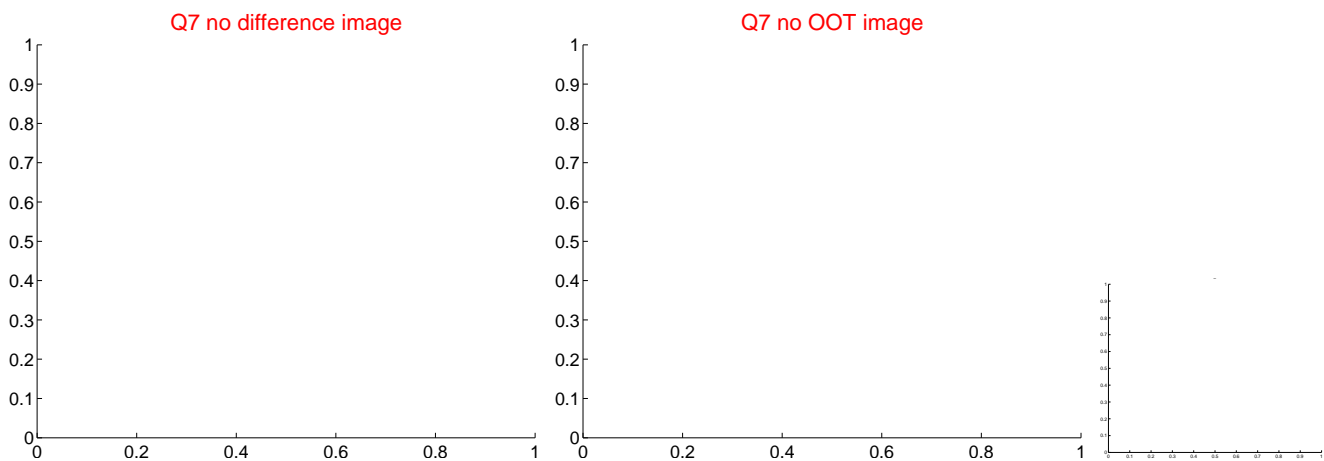
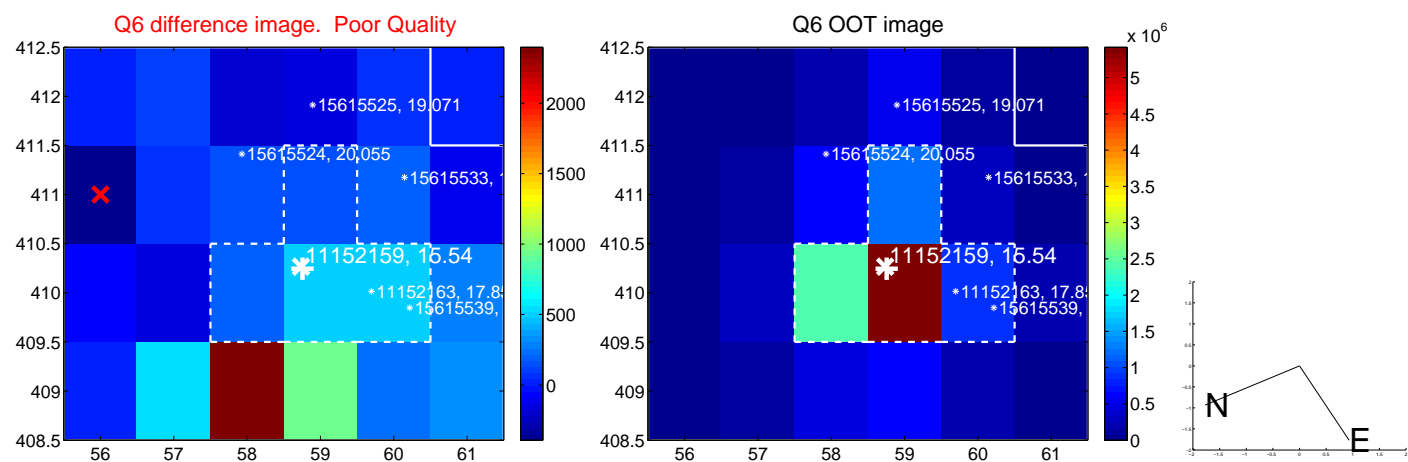
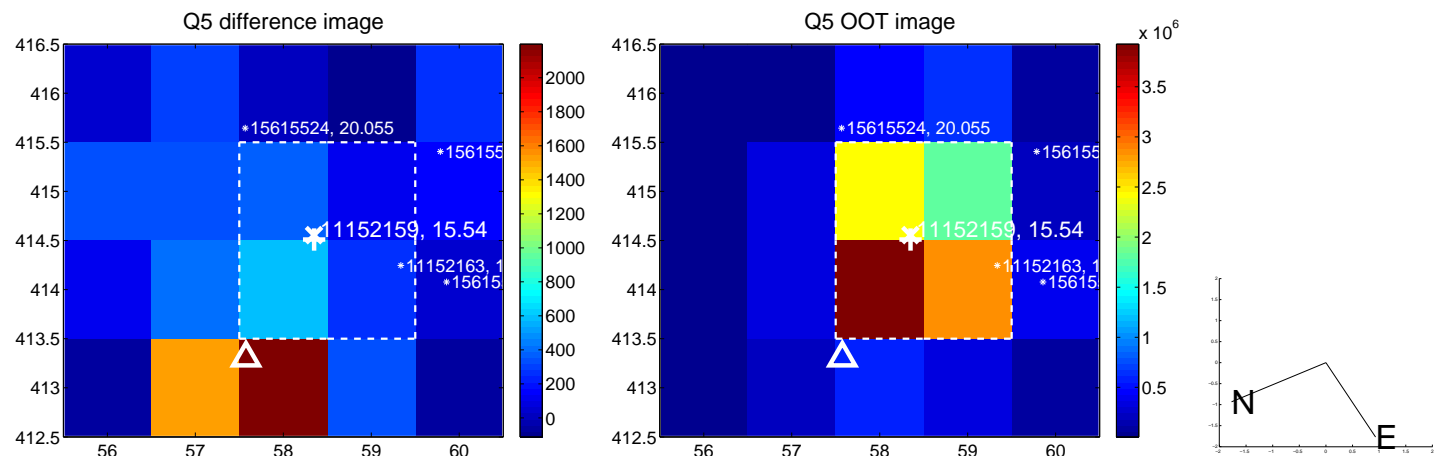


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

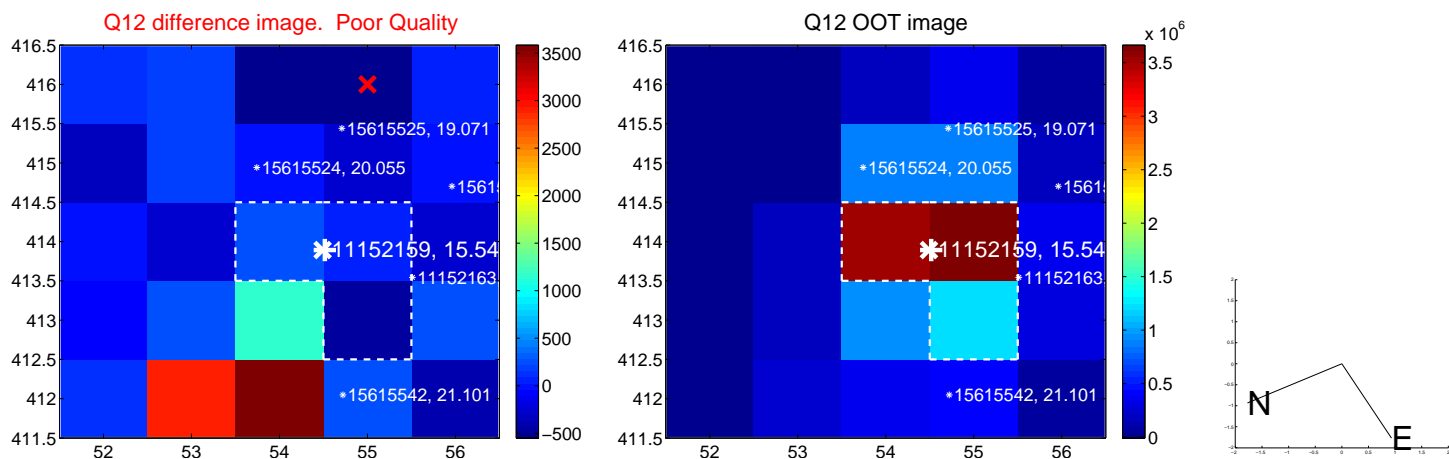
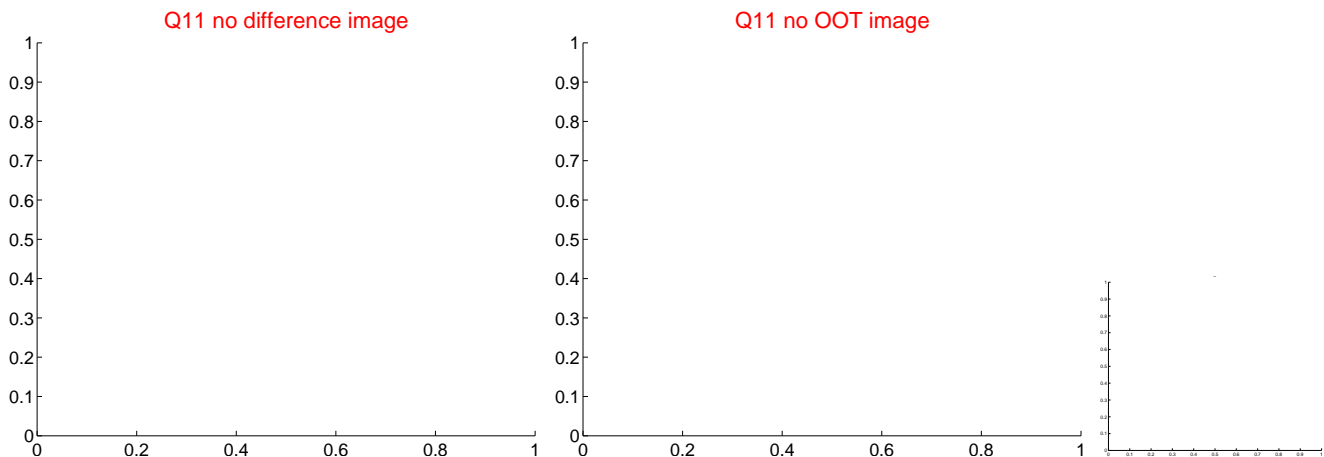
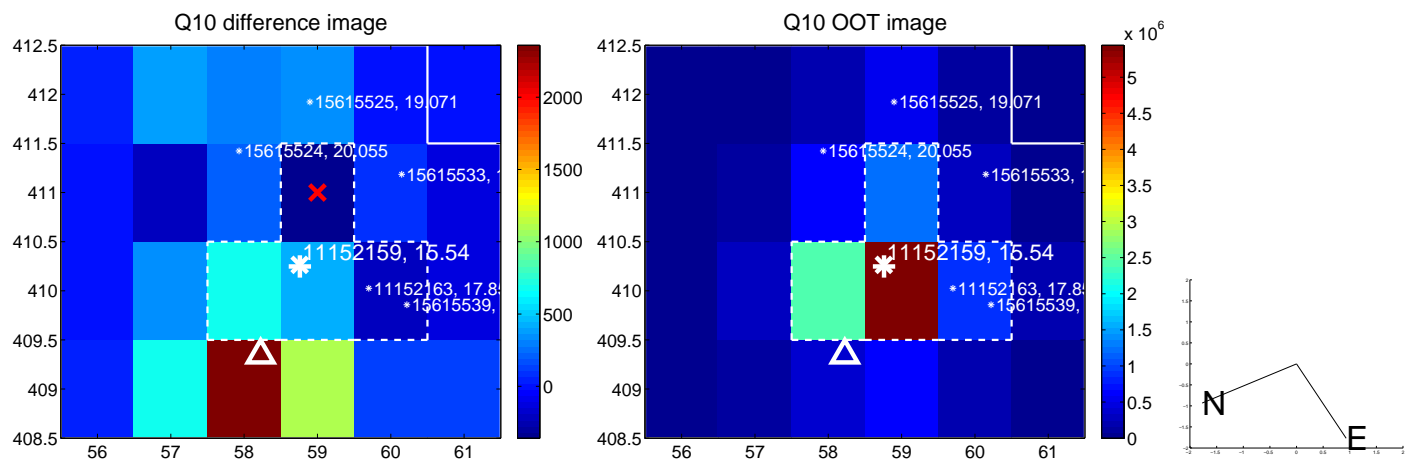
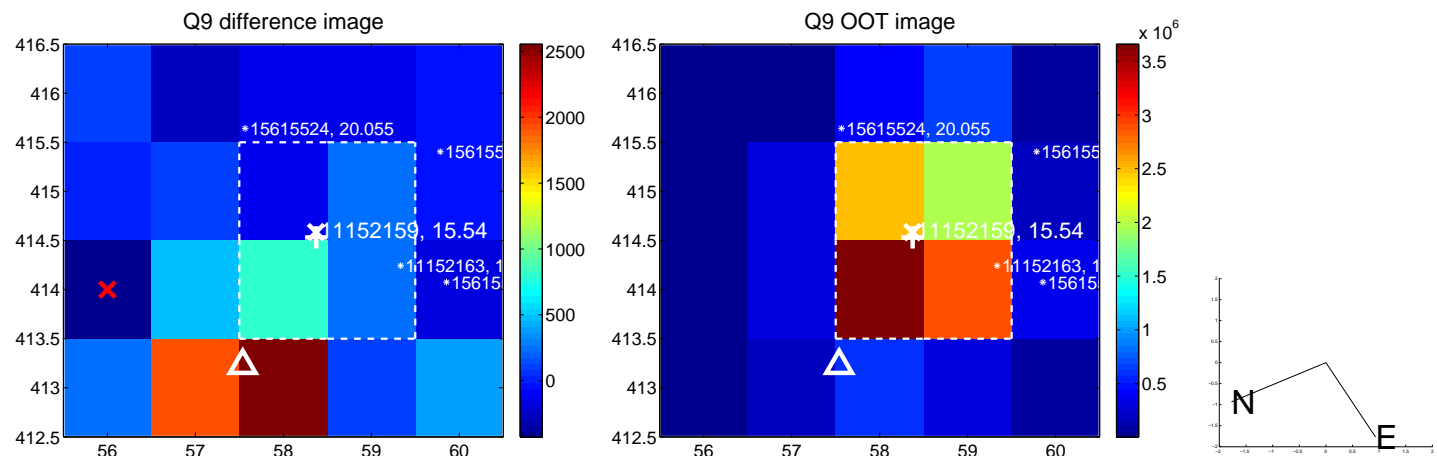
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



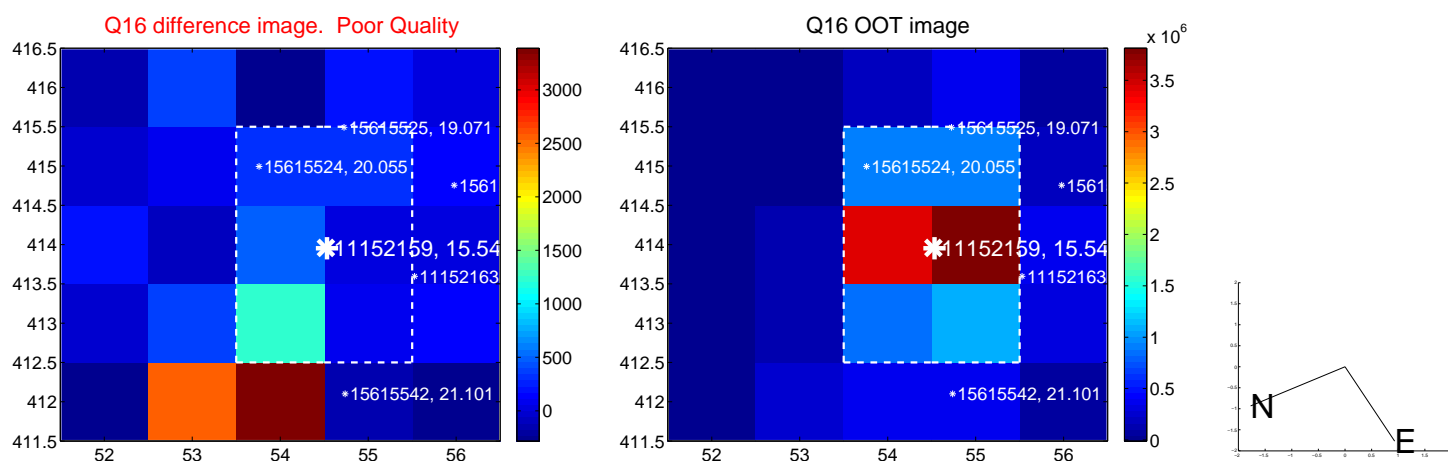
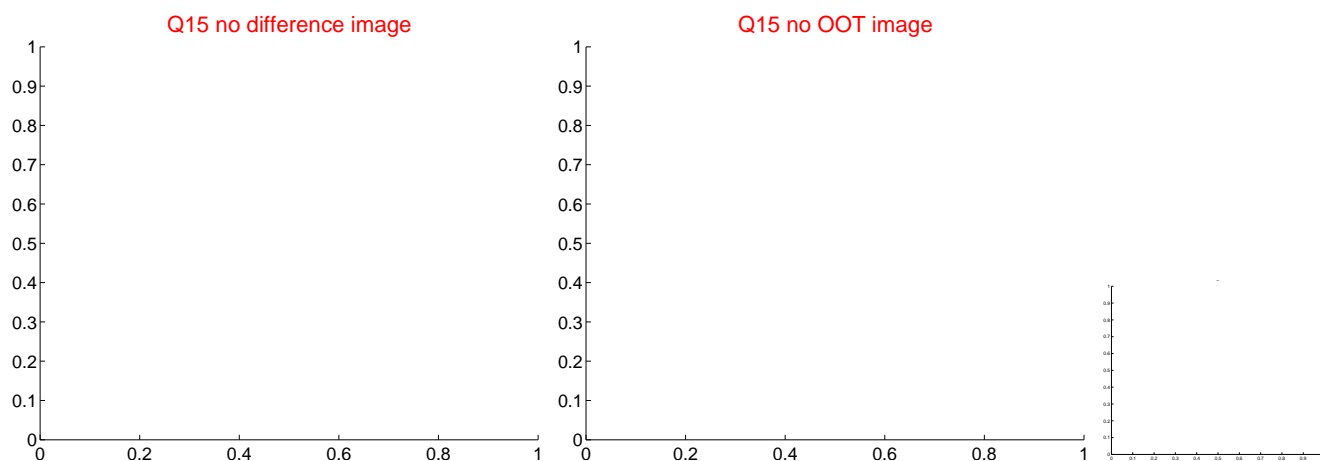
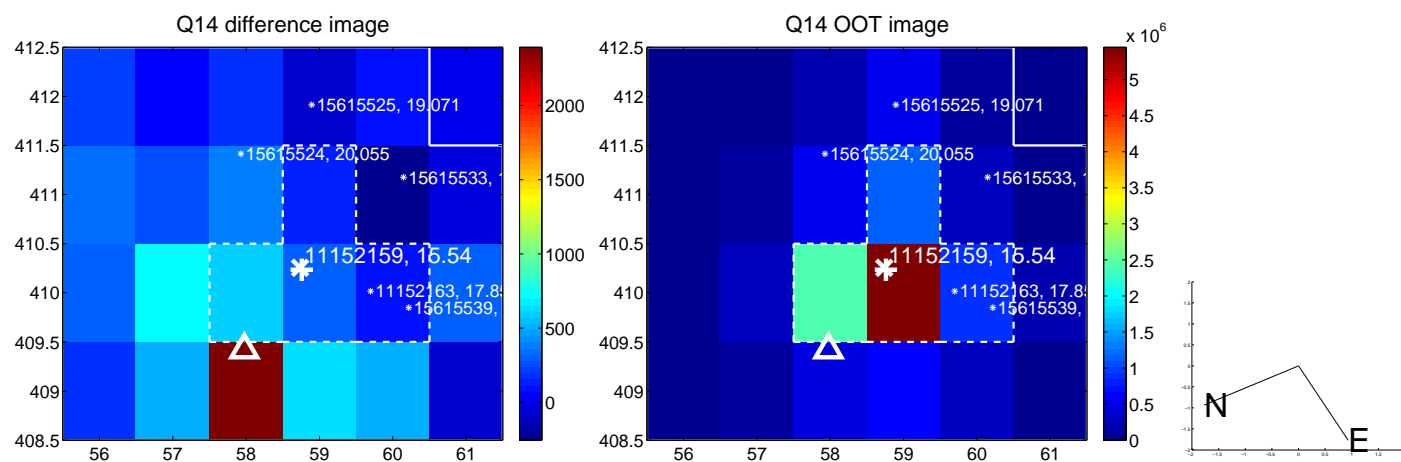
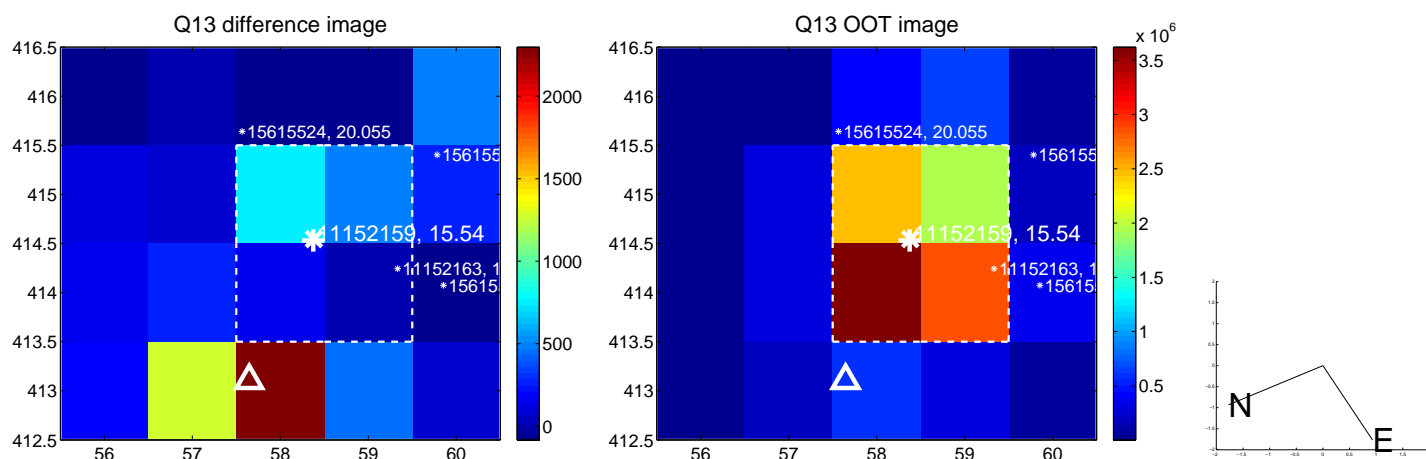
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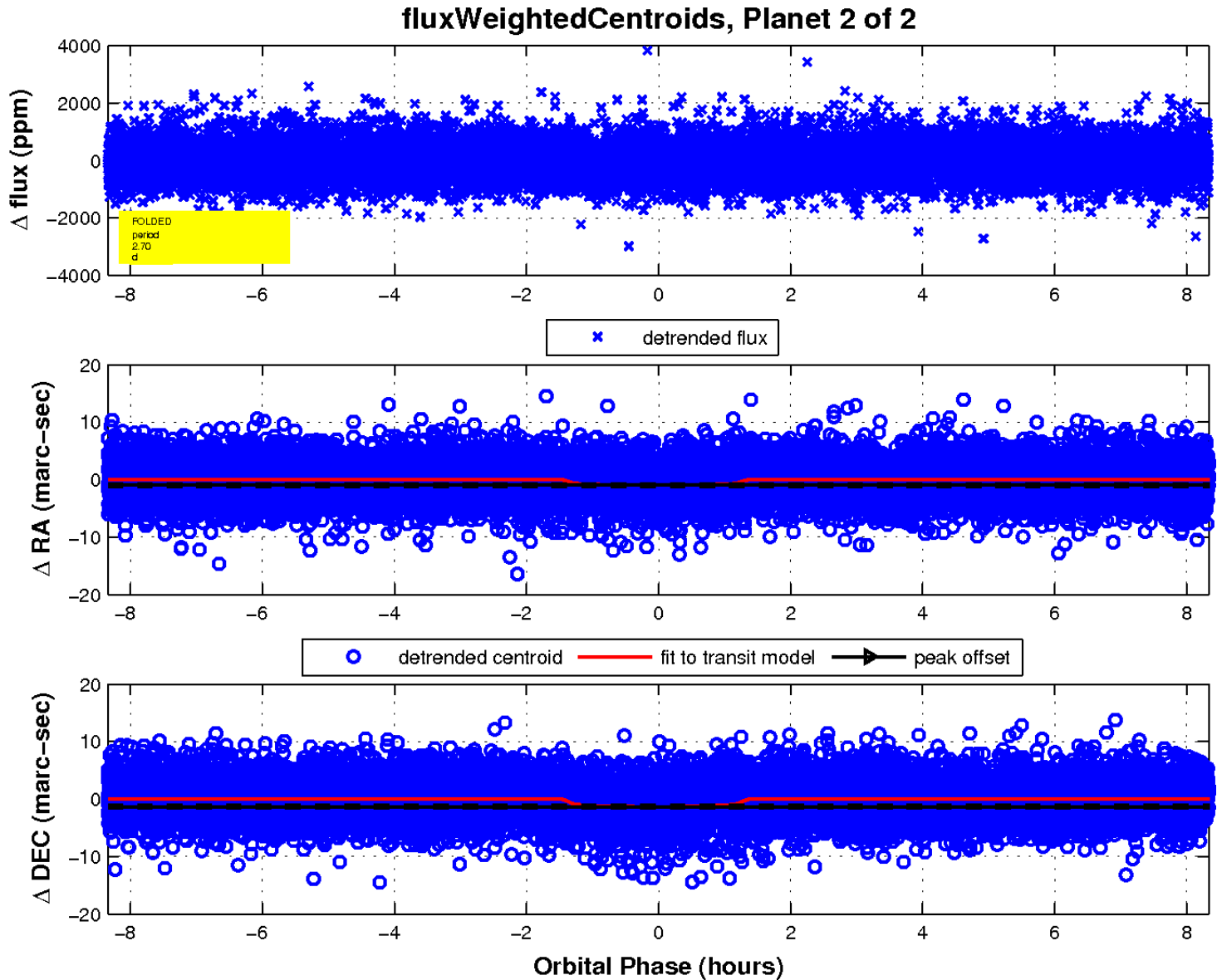
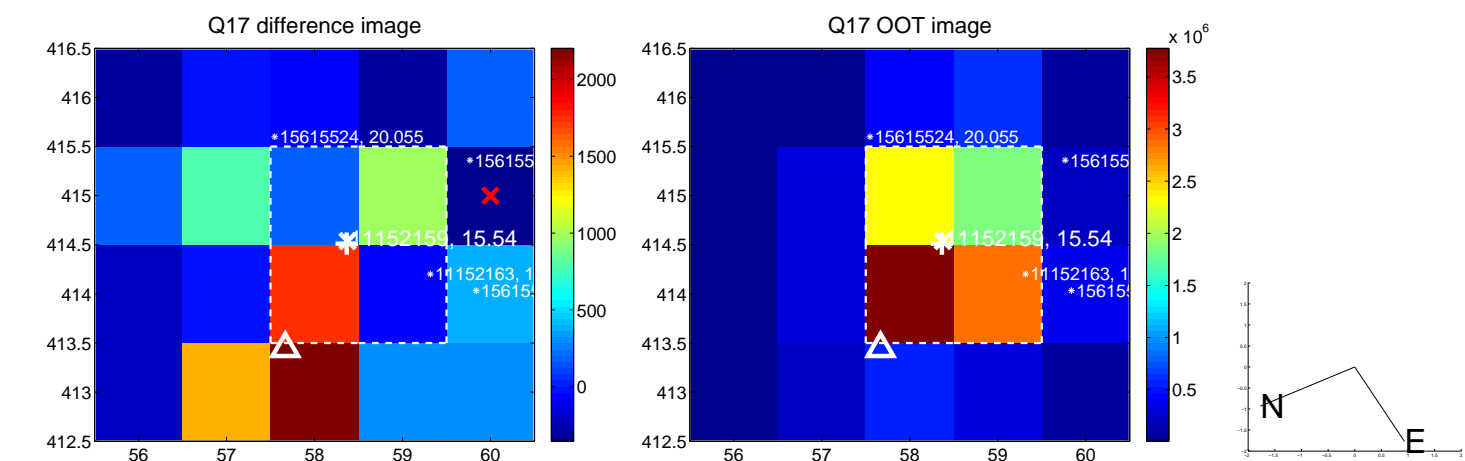


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UKIRT Image

Declination

