

# KIC 008150320

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008150320-01	OBS	0904.01	2.211125	132.558926	594.1	1.866	32.7	37.8	0.65	4500	1.95	178.00
008150320-02	OBS	0904.04	4.617487	135.051165	460.3	2.664	18.4	20.6	0.65	4500	1.93	66.69
008150320-03	OBS	0904.02	27.972111	150.411357	920.7	3.916	15.3	17.2	0.65	4500	2.68	6.04
008150320-04	OBS	0904.05	10.198517	137.919927	533.7	2.465	15.0	16.5	0.65	4500	1.65	23.18
008150320-05	OBS	0904.03	42.114180	139.438439	769.8	5.363	13.0	14.0	0.65	4500	1.76	3.50

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008150320-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
008150320-02	OBS	PC	1.00	0	0	0	0	NO_COMMENT
008150320-03	OBS	PC	1.00	0	0	0	0	NO_COMMENT
008150320-04	OBS	PC	1.00	0	0	0	0	NO_COMMENT
008150320-05	OBS	PC	1.00	0	0	0	0	NO_COMMENT

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

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

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

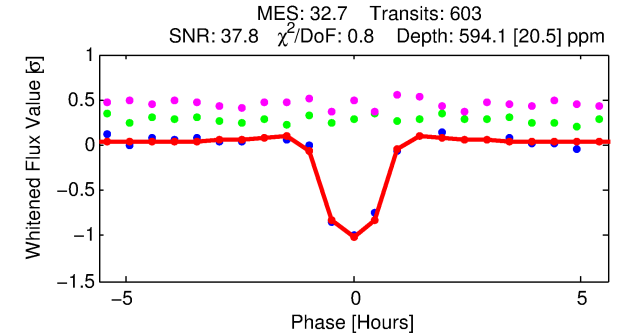
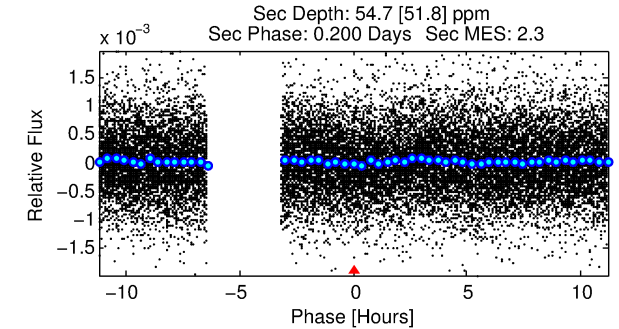
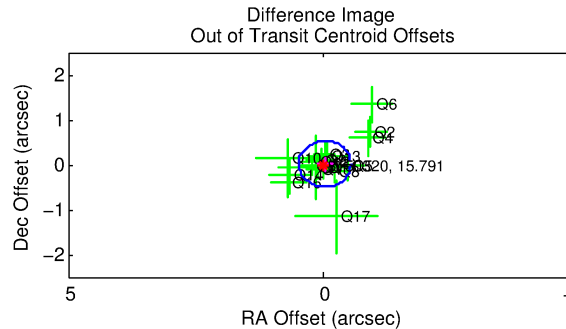
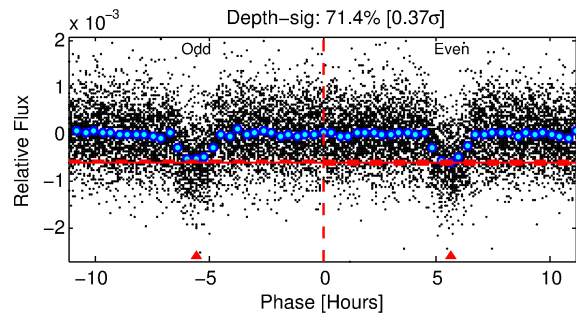
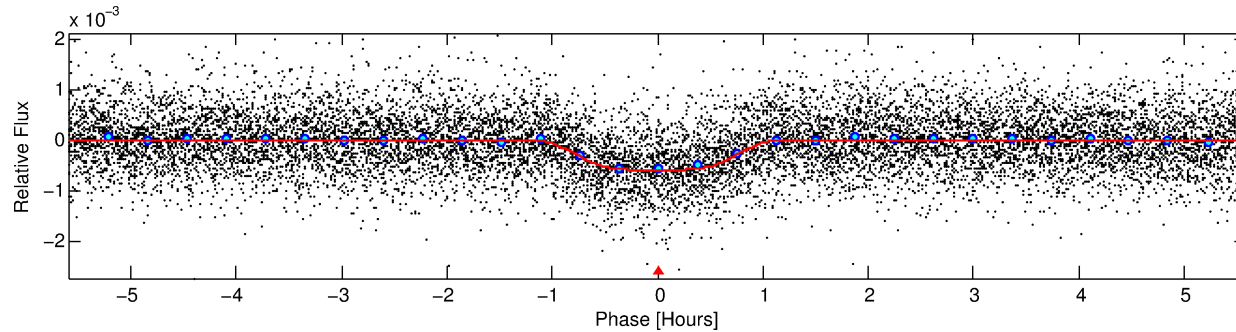
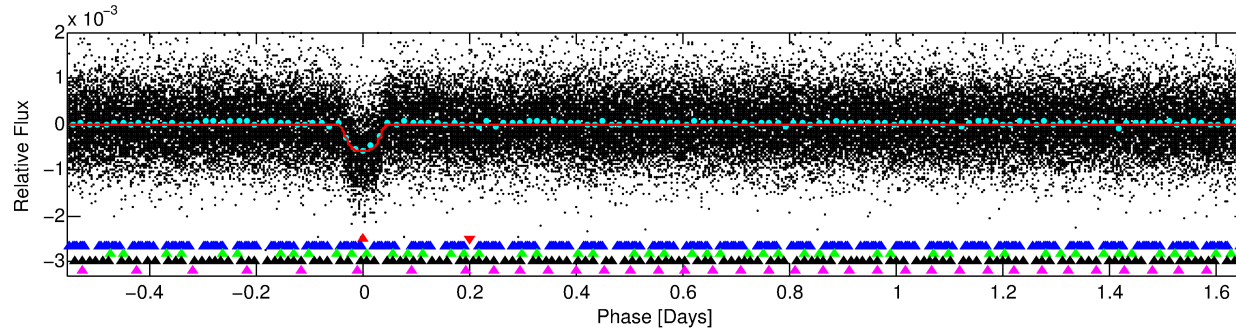
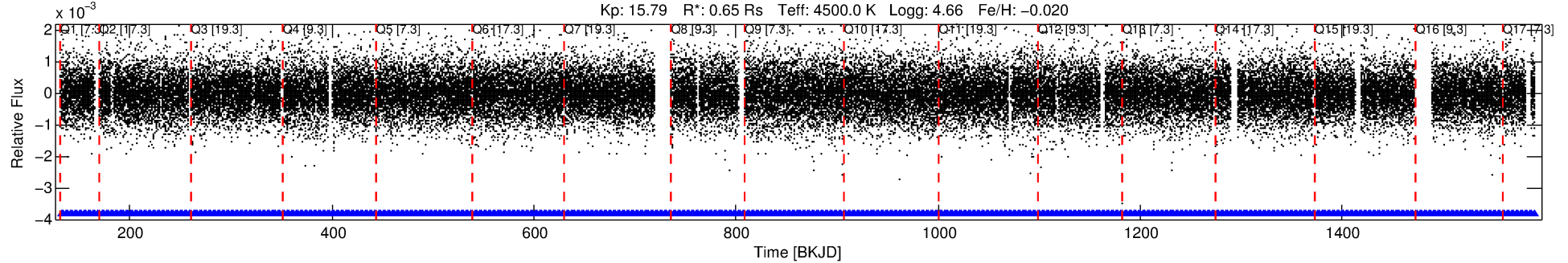
## Ephemeris Match Information For 008150320-01

No Significant Match Found

# DV One-Page Summary

KIC: 8150320 Candidate: 1 of 5 Period: 2.211 d  
KOI: K00904.01 Name: Kepler-55d Corr: 0.967

Kp: 15.79 R\*: 0.65 Rs Teff: 4500.0 K Logg: 4.66 Fe/H: -0.020



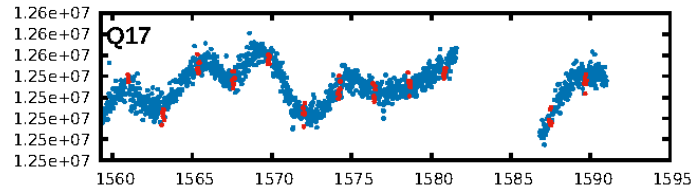
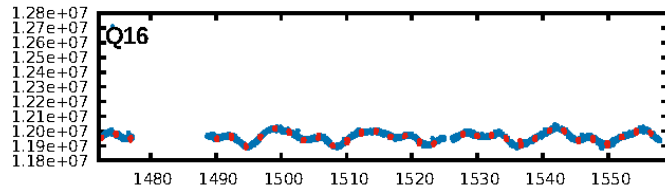
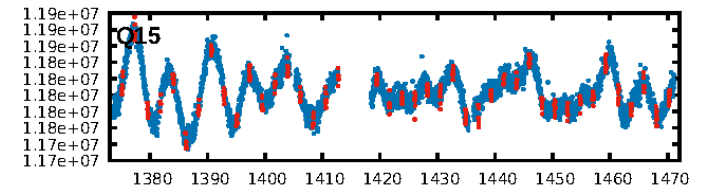
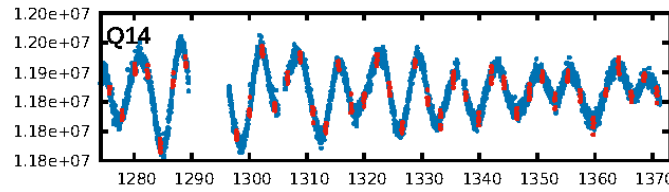
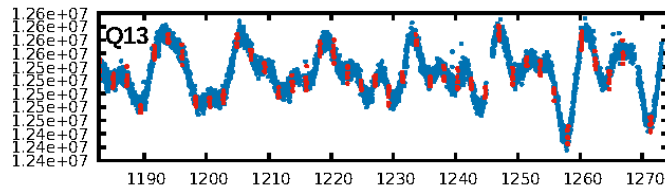
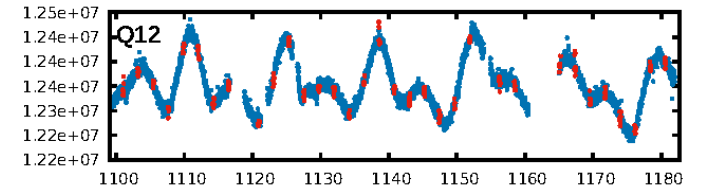
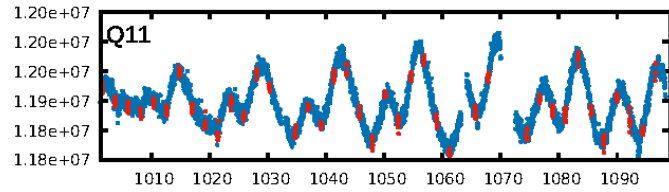
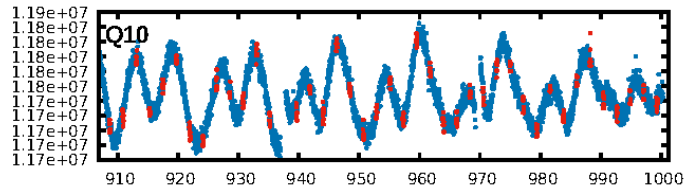
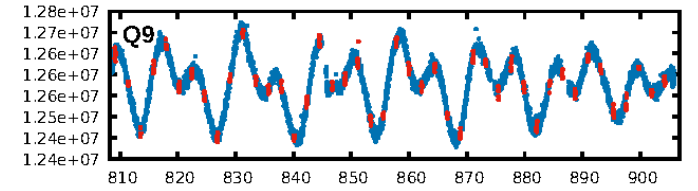
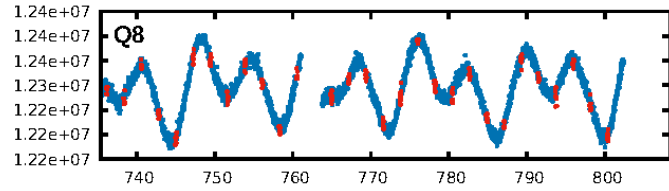
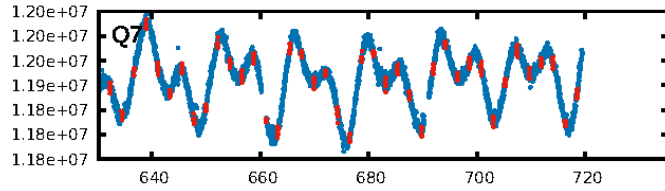
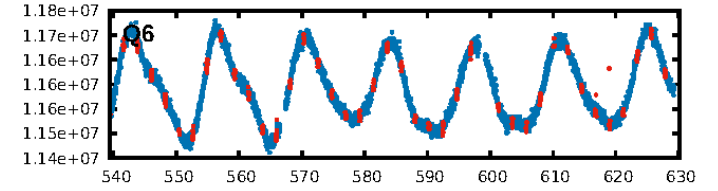
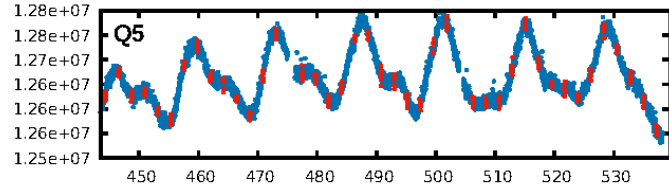
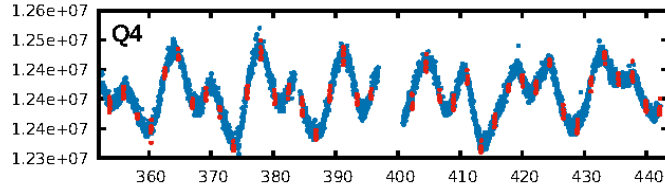
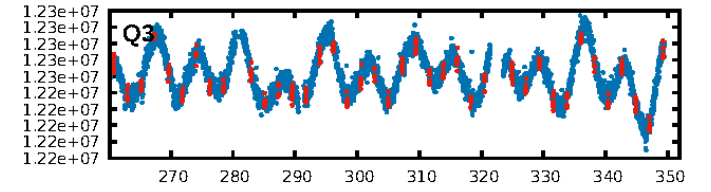
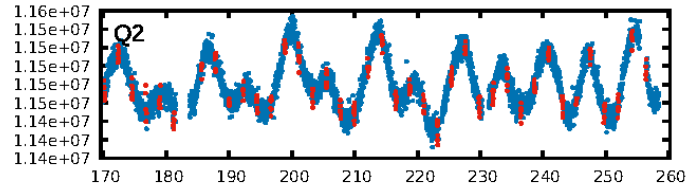
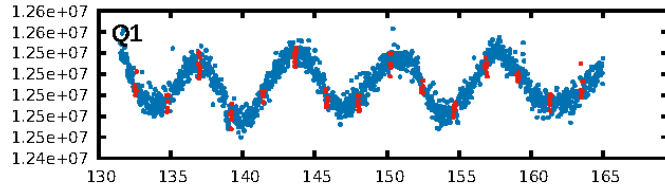
## DV Fit Results:

Period = 2.21113 [0.00000] d  
Epoch = 132.5589 [0.0007] BKJD  
Rp/R\* = 0.0276 [0.0044]  
a/R\* = 4.60 [2.49]  
b = 0.90 [0.13]  
Seff = 178.00 [20.08]  
Teff = 931 [26] K  
Rp = 1.95 [0.34] Re  
a = 0.0293 [0.0016] AU  
Ag = 6.82 [6.85] [0.85σ]  
Teffp = 2327 [584] K [2.39σ]

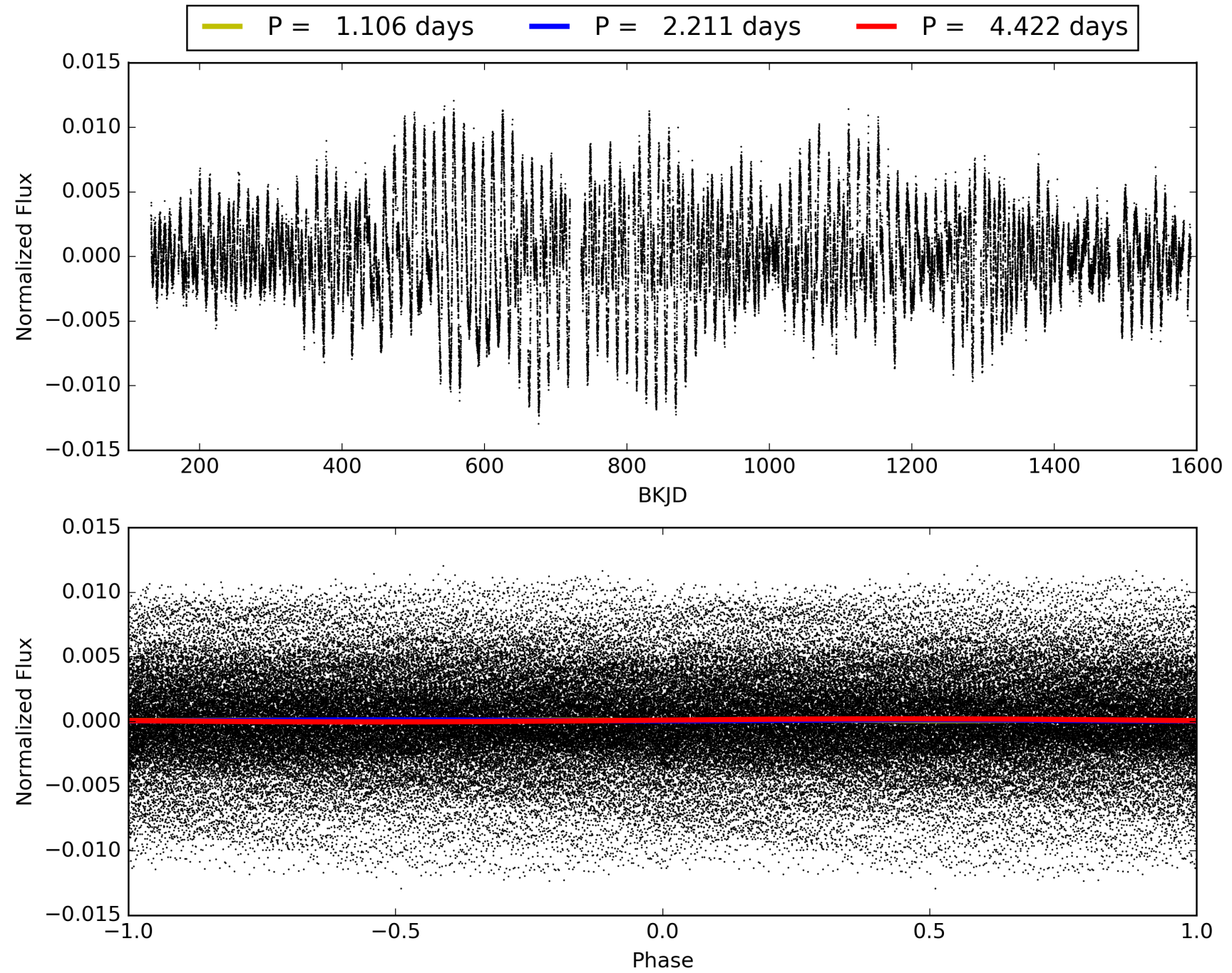
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [17.76σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 2.92e-221  
RollingBand-fgt: 1.00 [576/576]  
GhostDiagnostic-chr: 4.453  
Centroid-sig: 21.2%  
Centroid-so: 0.509 arcsec [1.56σ]  
OotOffset-rm: 0.045 arcsec [0.26σ]  
KicOffset-rm: 0.129 arcsec [0.81σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 1.00 [17/17]  
DiffImageOverlap-fno: 1.00 [17/17]

# TCE 008150320-01, PDC Light Curves



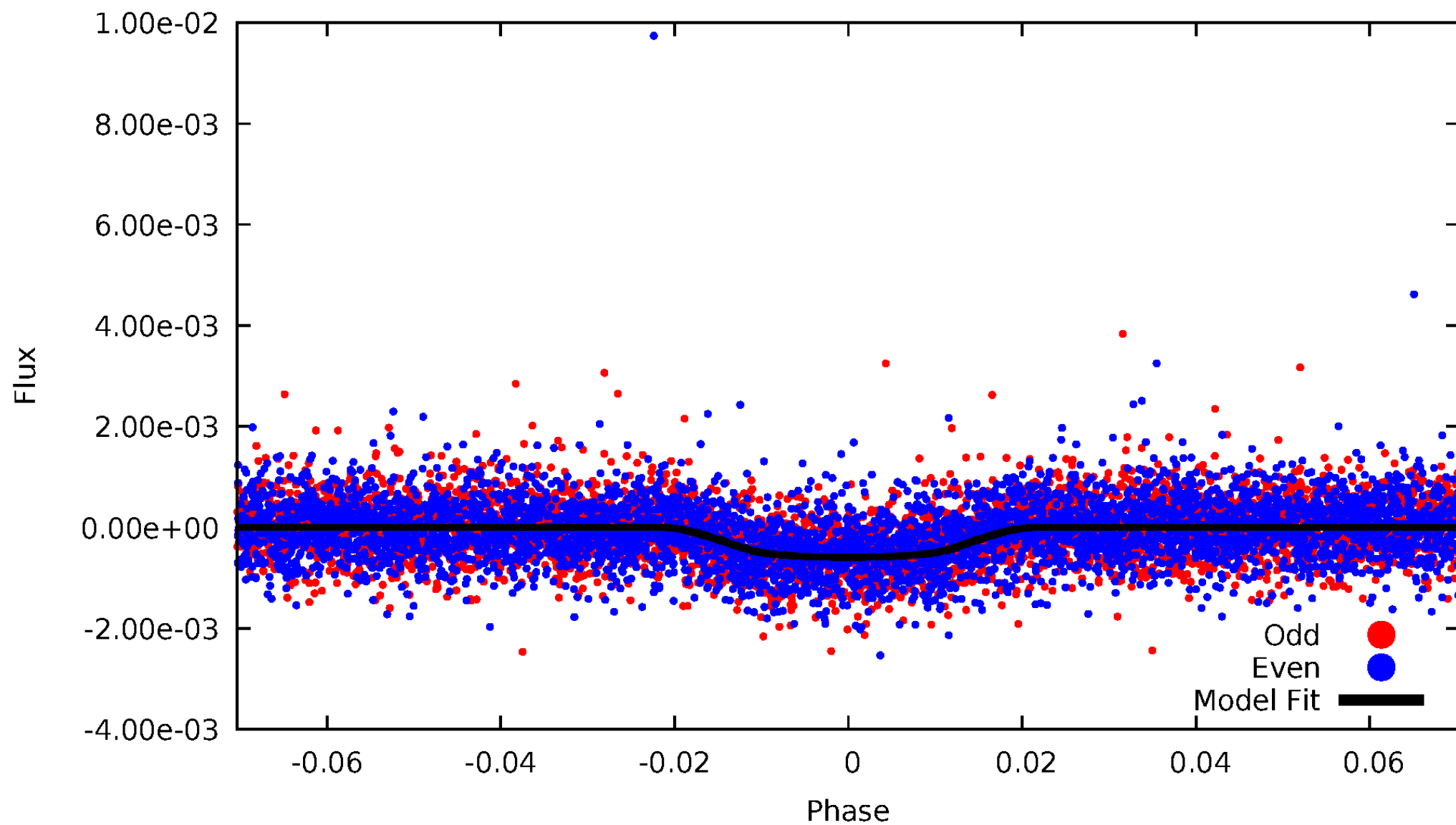
TCE 008150320-01





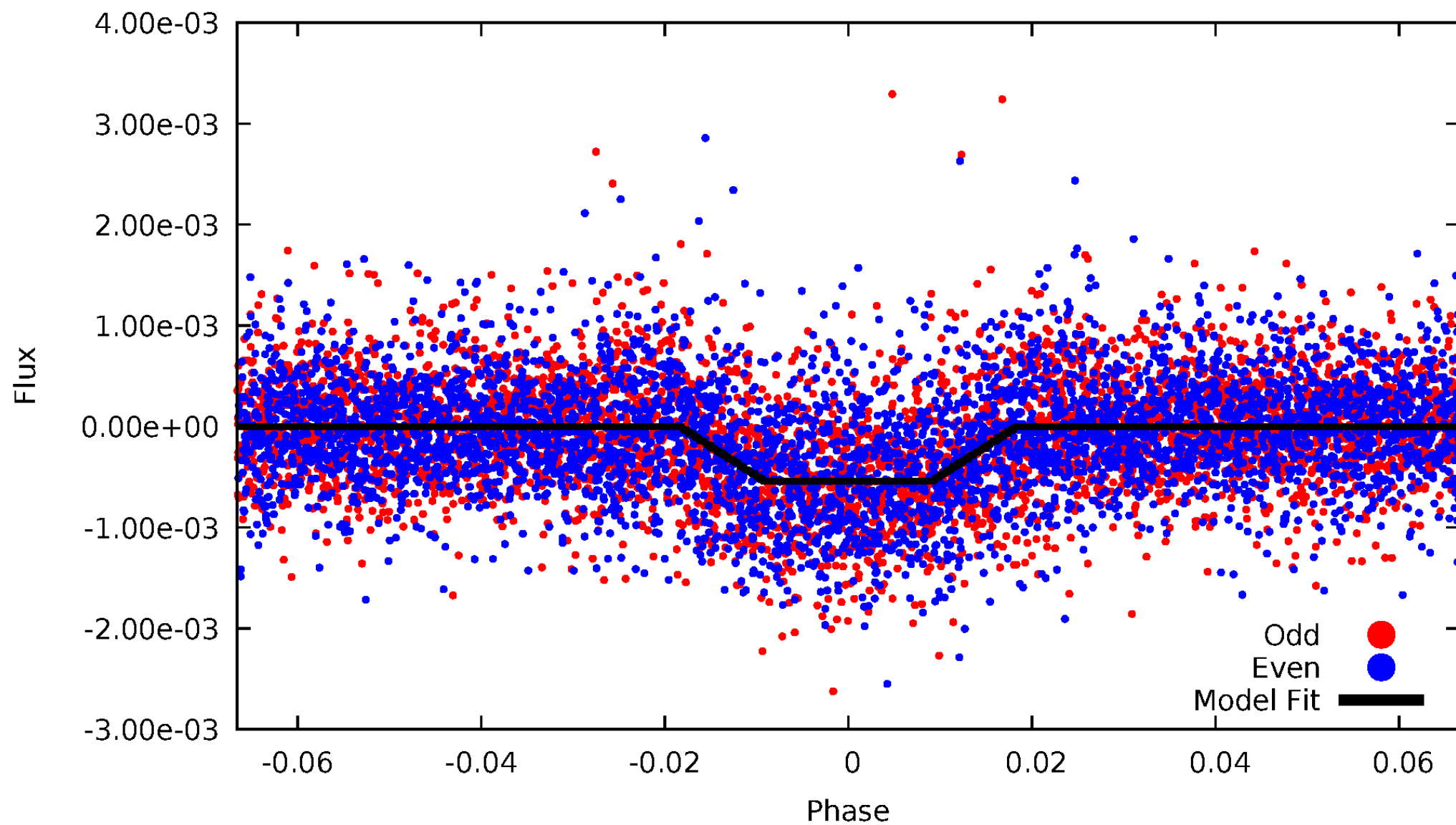
# DV Odd/Even

TCE 008150320-01



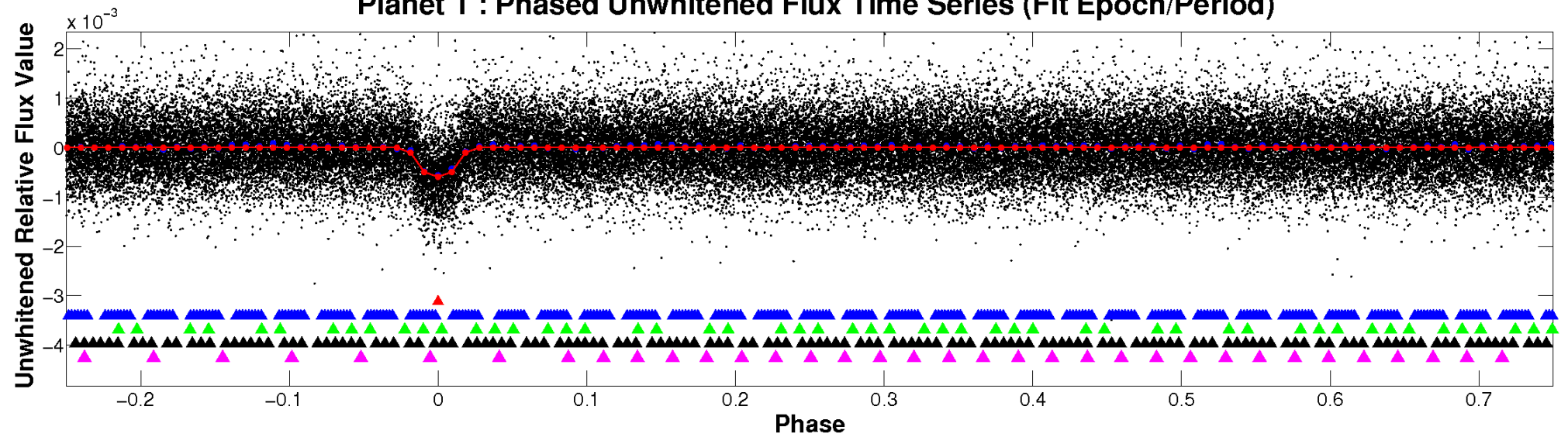
# ALT Odd/Even

TCE 008150320-01

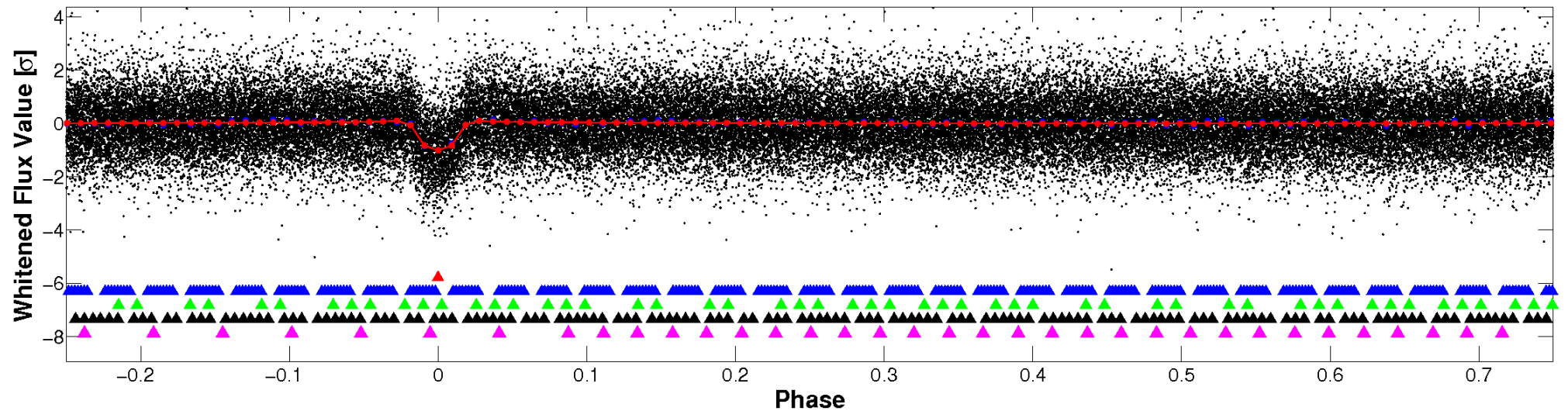


# Non-Whitened Vs. Whitened Light Curve

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

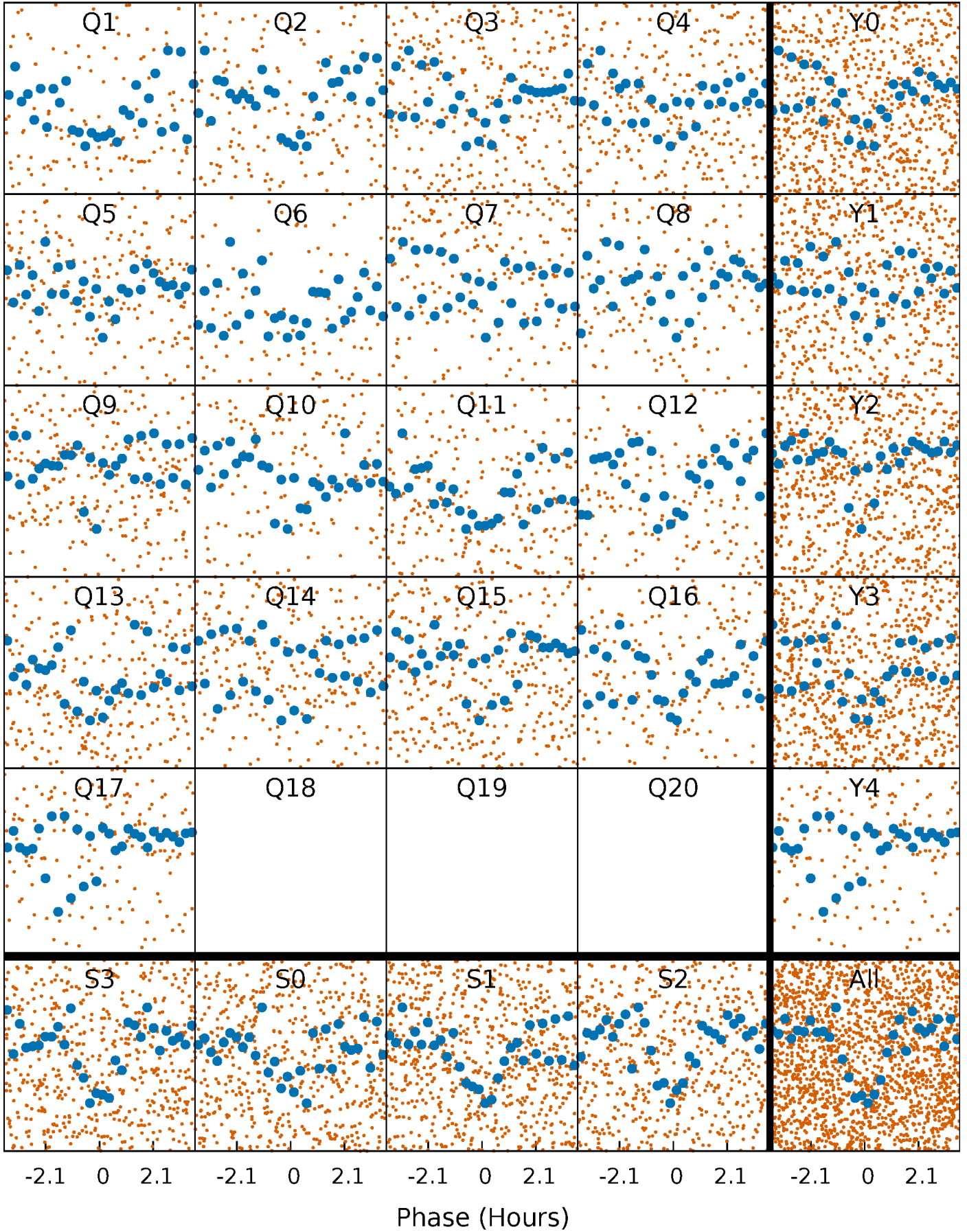


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

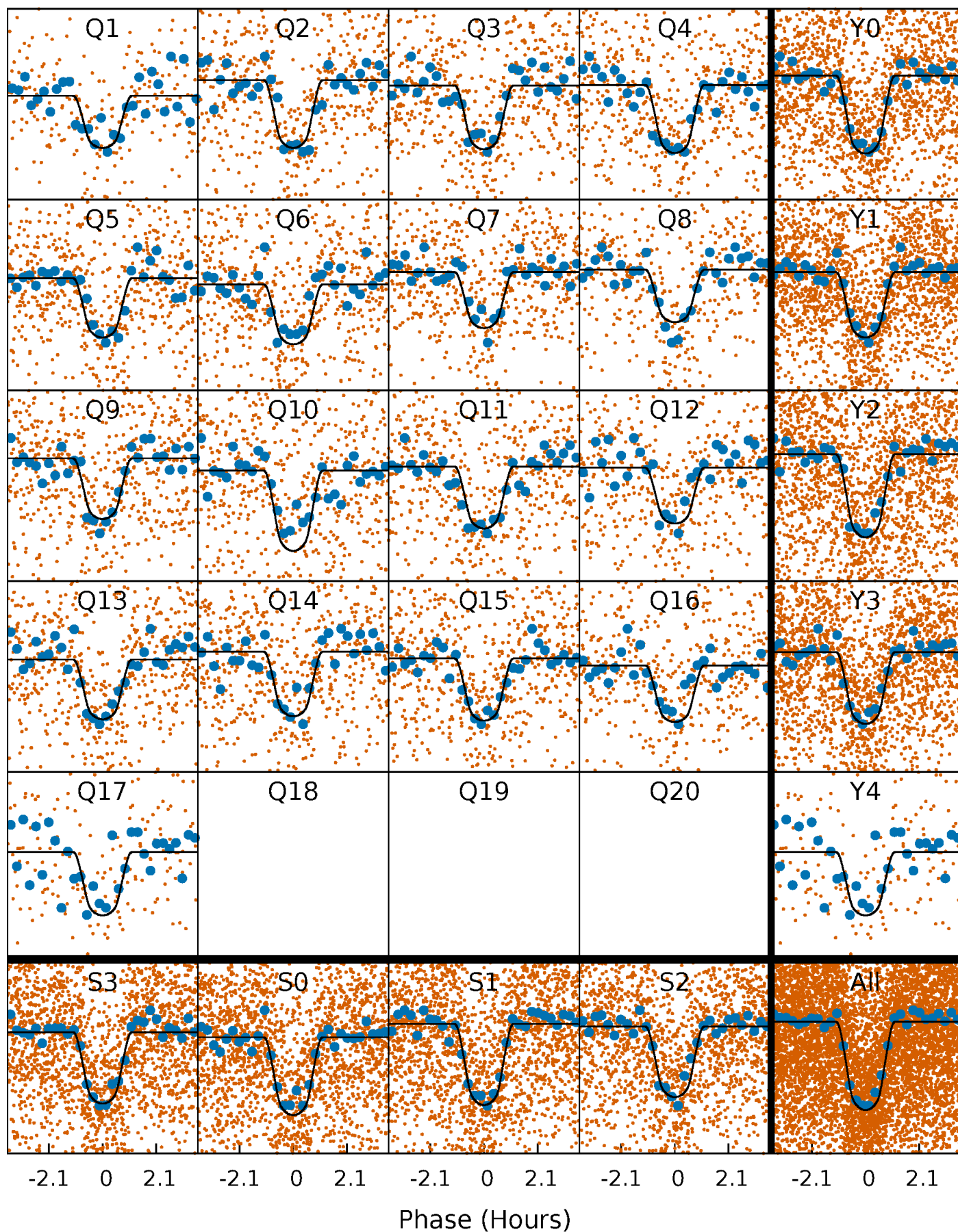
TCE 008150320-01 P= 2.211125 Days  $T_0=132.558926$  (BKJD)





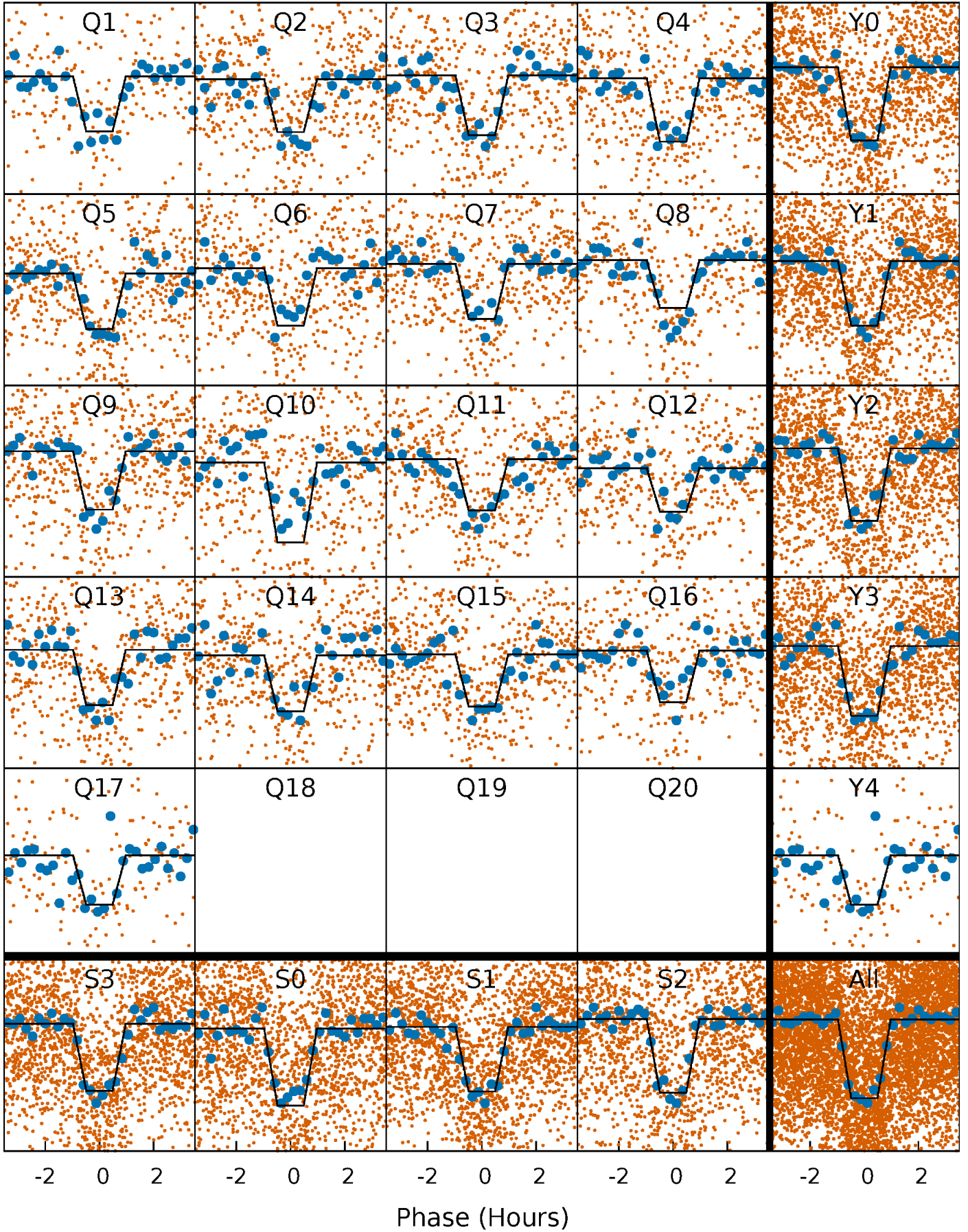
# DV Quarter-Phased Transit Curves

TCE 008150320-01 P= 2.211125 Days  $T_0=132.558926$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

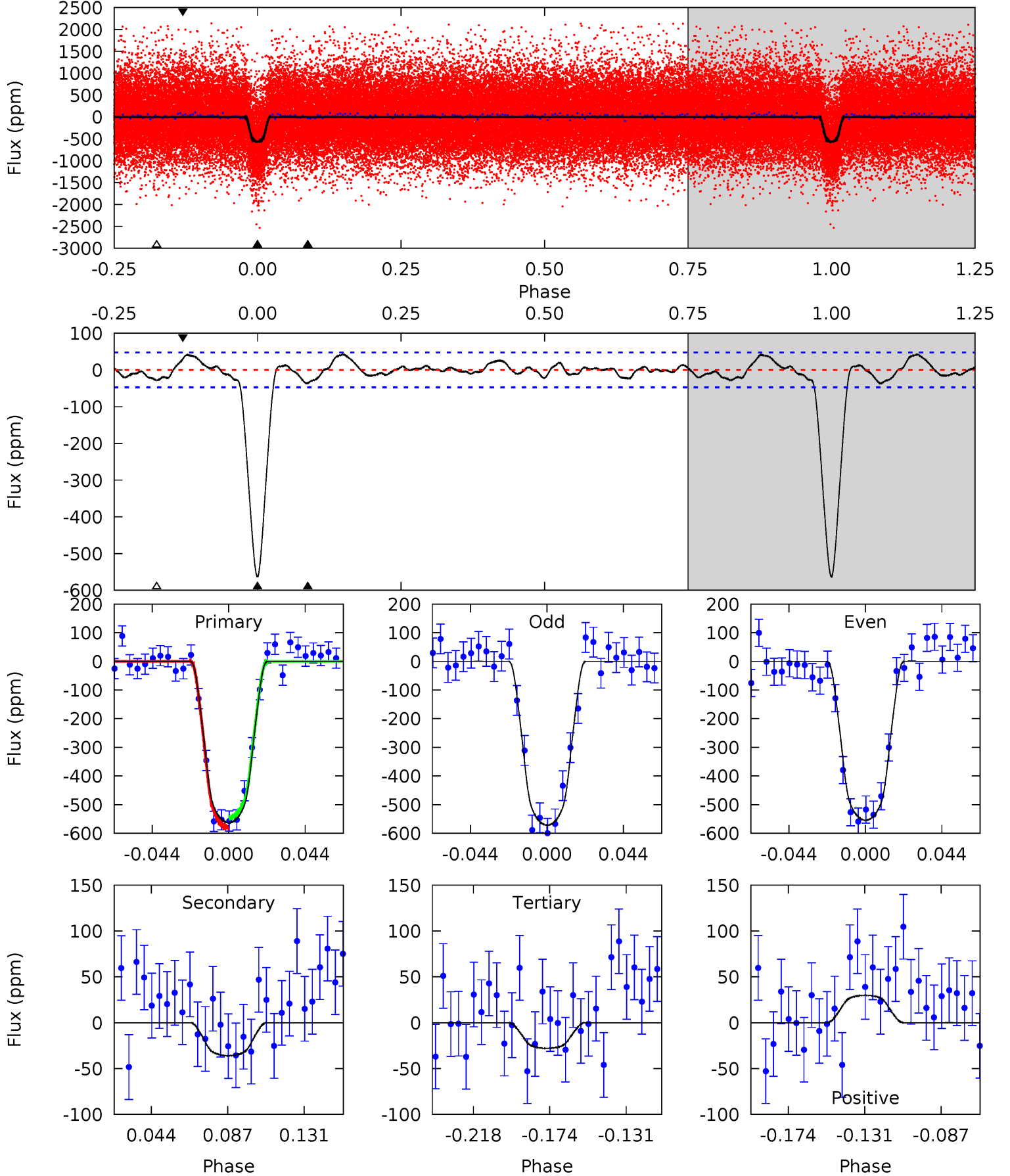
TCE 008150320-01 P= 2.211122 Days  $T_0=132.559195$  (BKJD)



# DV Model-Shift Uniqueness Test

008150320-01, P = 2.211125 Days, E = 130.347801 Days

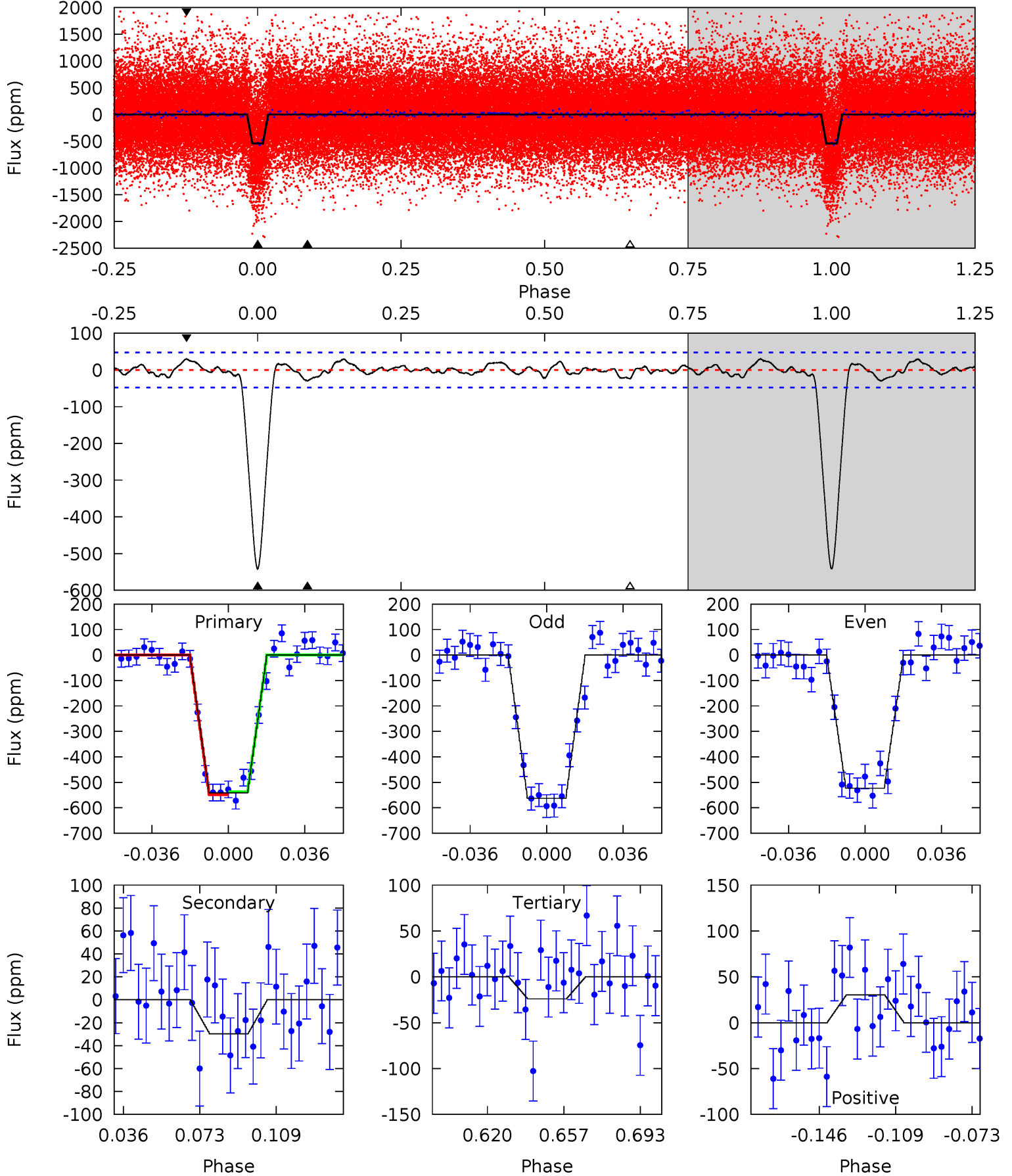
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
56.1	3.59	2.79	2.98	4.74	2.02	1.50	53.3	53.1	0.79	0.61	0.87	1.00	0.07	1.77



# Alt Model-Shift Uniqueness Test

008150320-01, P = 2.211122 Days, E = 130.348073 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
54.2	2.97	2.42	3.03	4.77	2.09	1.13	51.8	51.2	0.56	-0.05	2.01	0.97	0.05	0.57





### Stellar Parameters For KIC 008150320

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$4500^{+90}_{-90}$	$4.656^{+0.013}_{-0.043}$	$-0.020^{+0.150}_{-0.150}$	$0.646^{+0.043}_{-0.020}$	$0.710^{+0.029}_{-0.043}$	$3.719^{+0.220}_{-0.623}$
	+2%/-2%	+0%/-1%	+750%/-750%	+7%/-3%	+4%/-6%	+6%/-17%
Source	SPE58	SPE58	SPE58	DSEP		

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

### Secondary Eclipse Parameters for KIC 008150320-01 / KOI 0904.01

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-36 \pm 10$	$1.99^{+0.33}_{-0.32}$	$1313^{+29}_{-31}$	$2735^{+186}_{-161}$	$4.224^{+2.406}_{-1.447}$
Alt.	$-30 \pm 10$	$1.68^{+0.33}_{-0.32}$	$1313^{+32}_{-32}$	$2796^{+242}_{-201}$	$5.063^{+3.490}_{-2.157}$

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

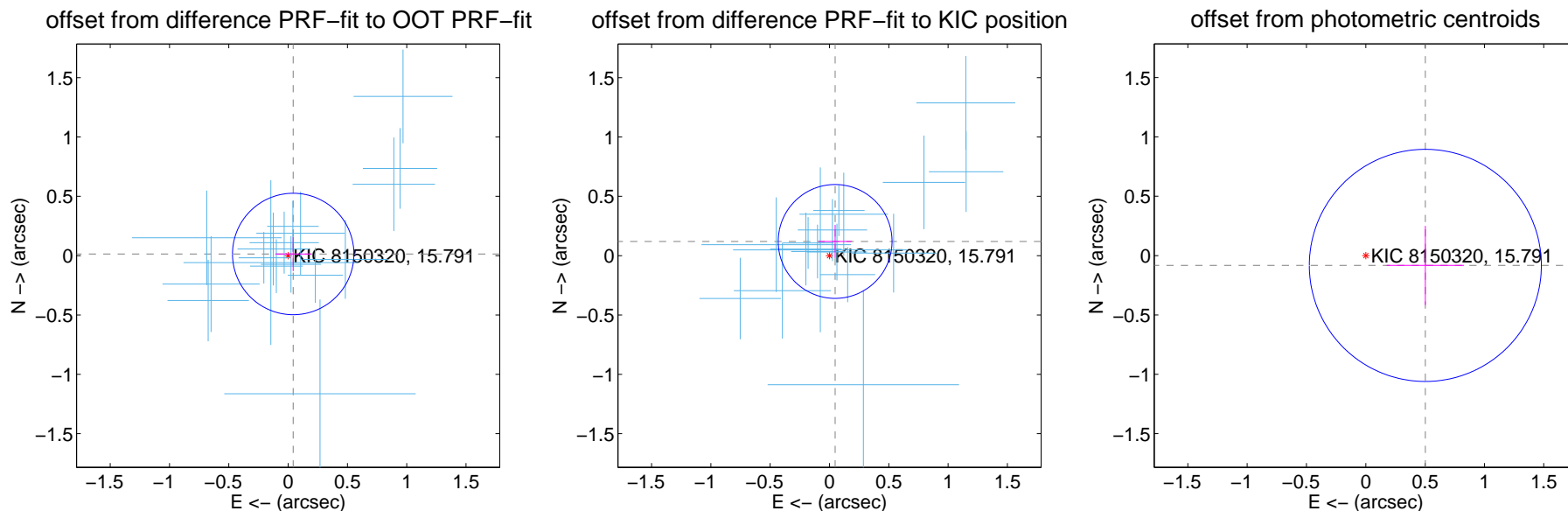
## DV Centroid Data

Supplemental centroid analysis for 008150320-01. Kepler magnitude: 15.79. Transit SNR 37.76

There are 17 quarters with good PRF difference image offsets

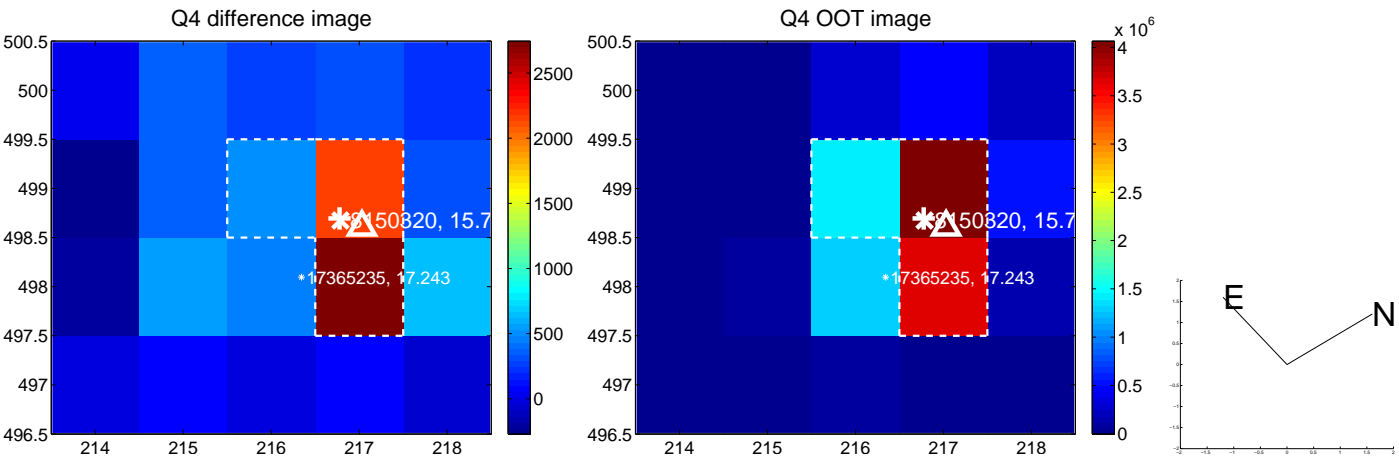
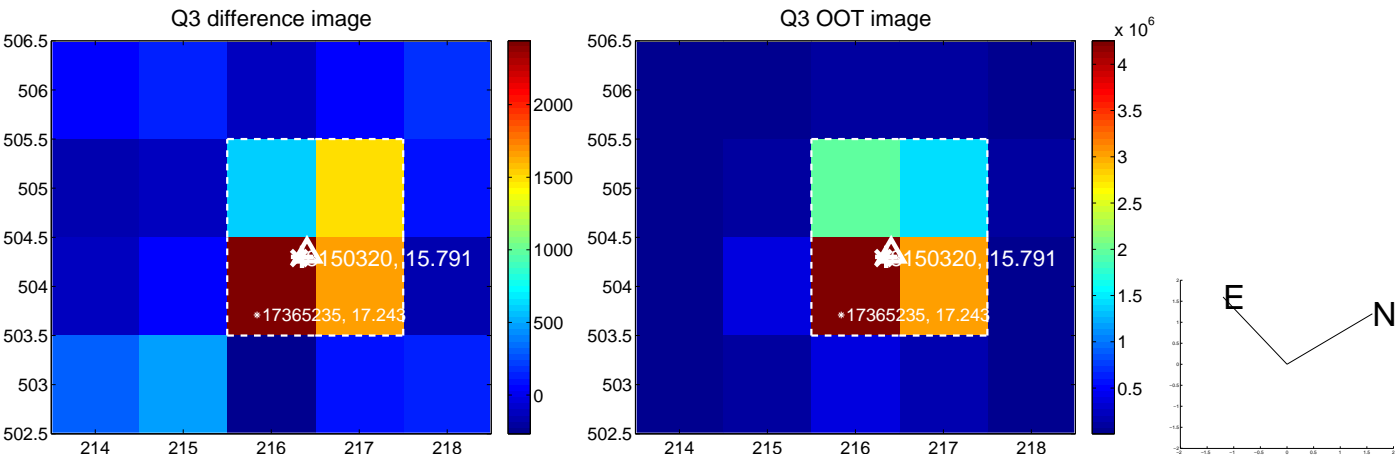
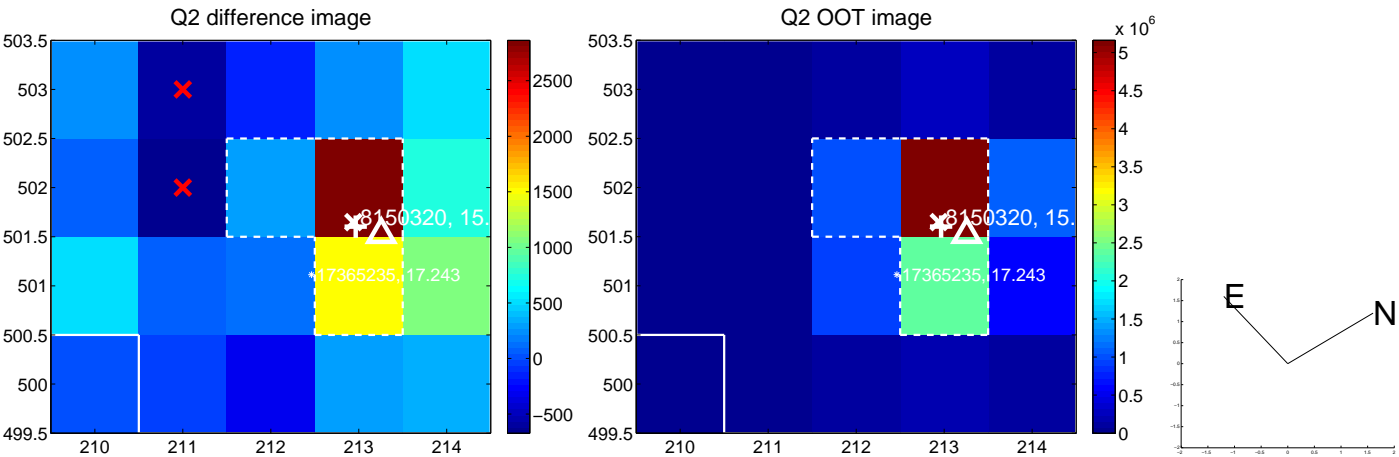
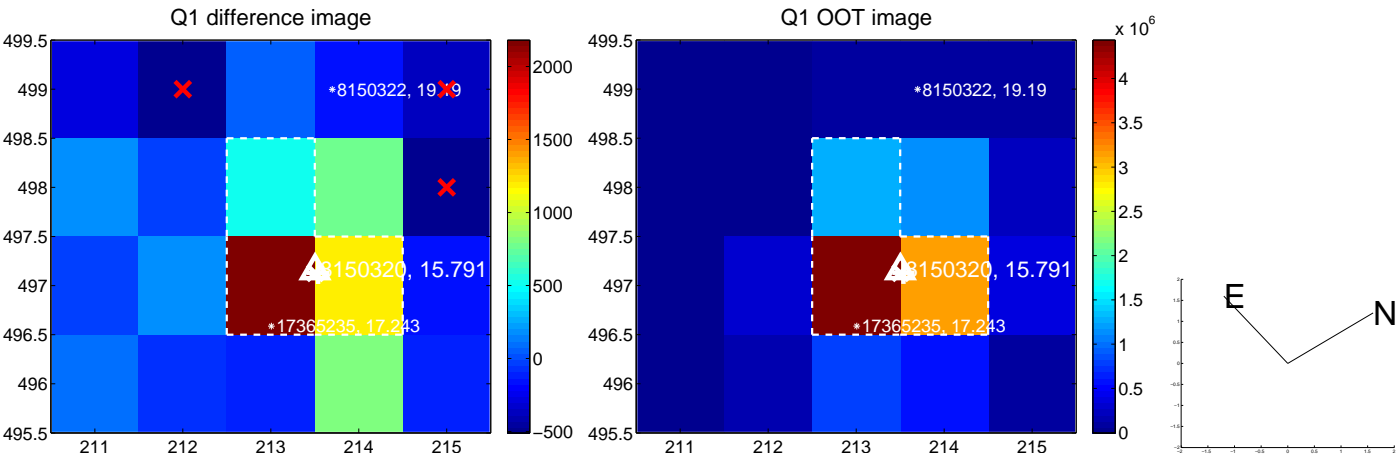
The direct PRF centroid is offset from the target star catalog position by about 0.08 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.045 \pm 0.171$	0.26	$-0.043 \pm 0.152$	$0.014 \pm 0.144$
PRF-fit source offset from KIC position	$0.129 \pm 0.160$	0.81	$-0.048 \pm 0.140$	$0.120 \pm 0.140$
photometric centroid source offset	$0.51 \pm 0.33$	1.56	$-0.50 \pm 0.33$	$-0.08 \pm 0.33$

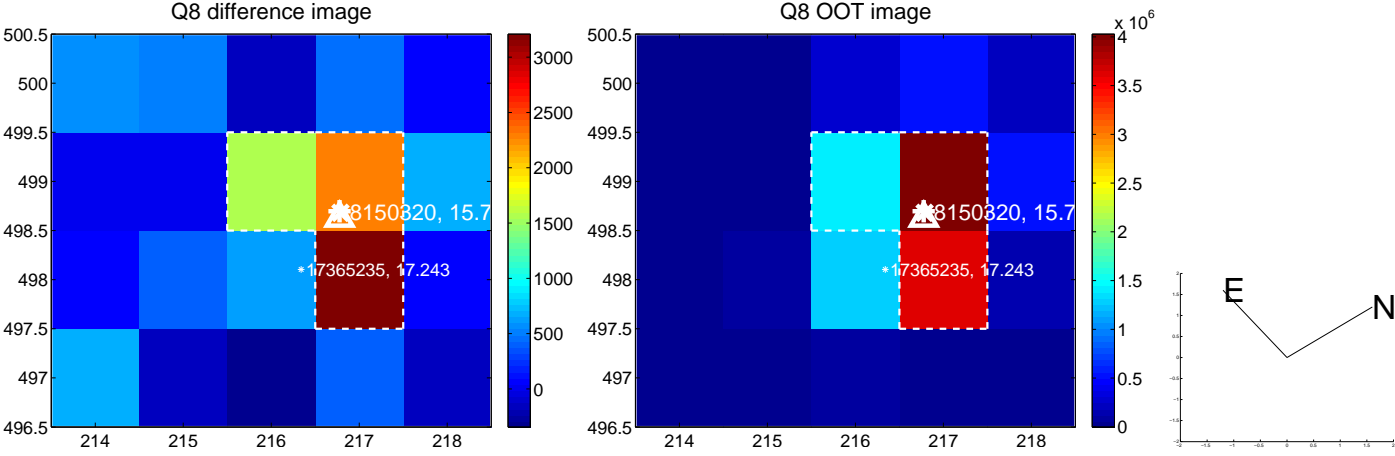
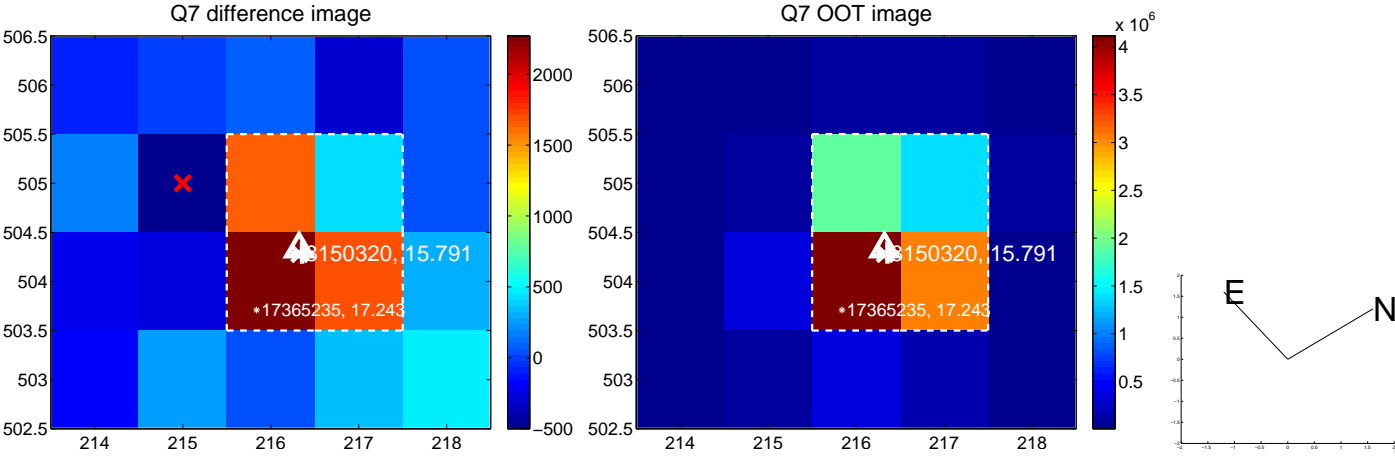
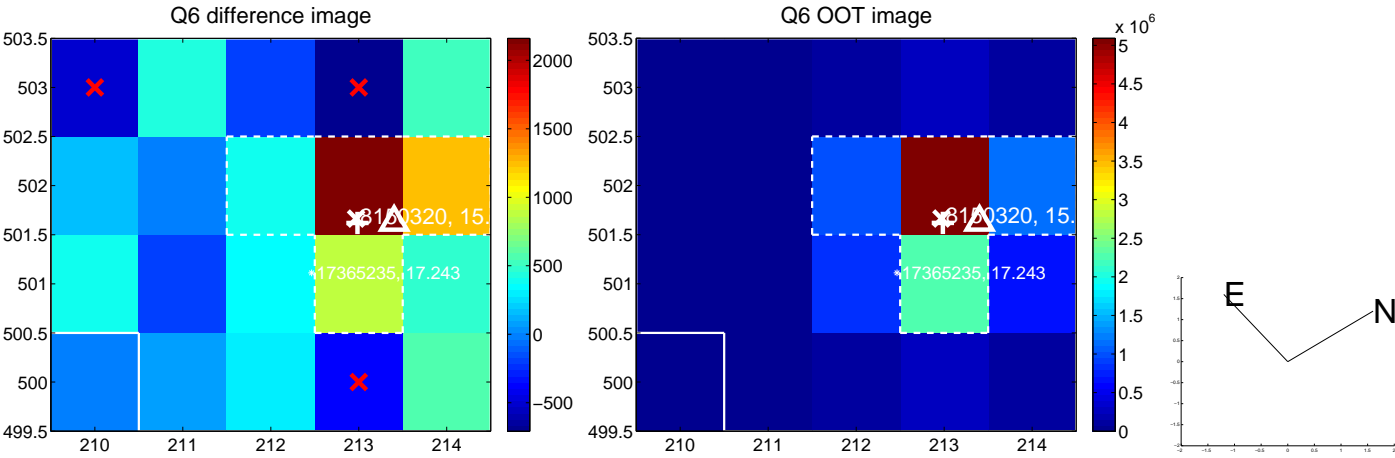
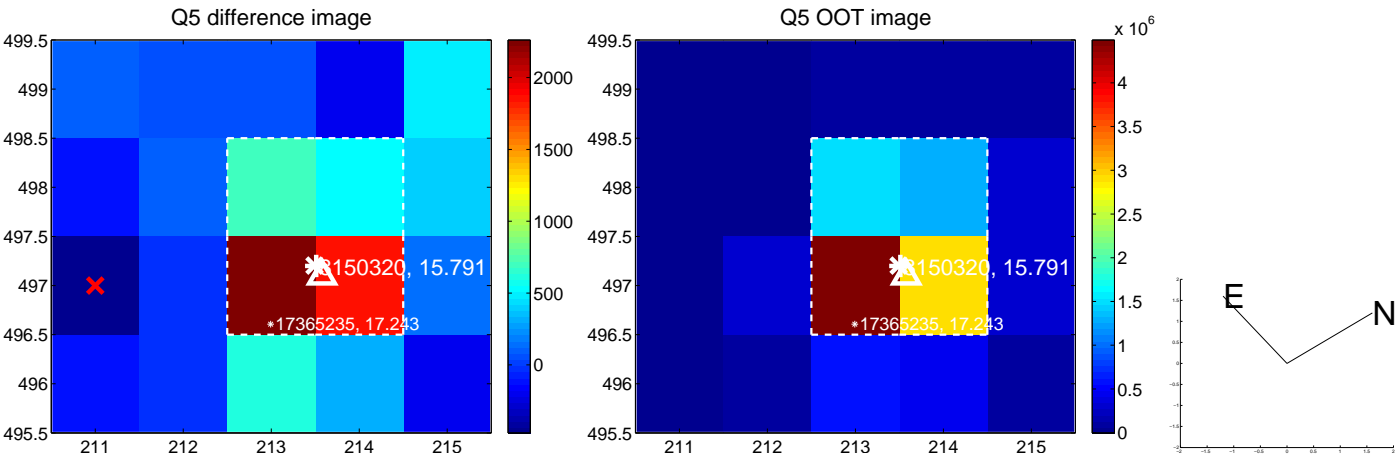


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

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

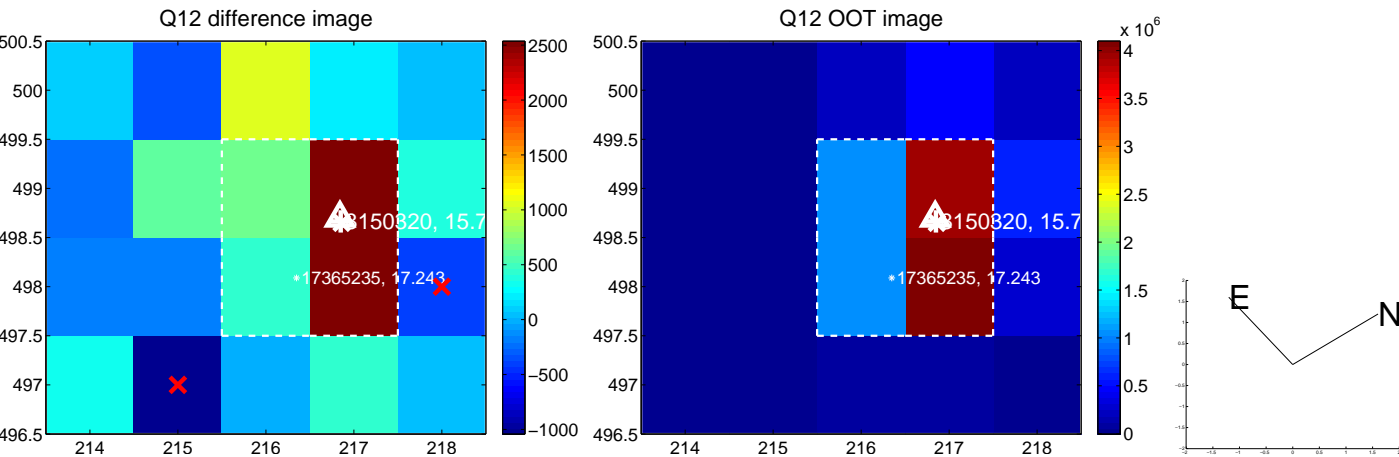
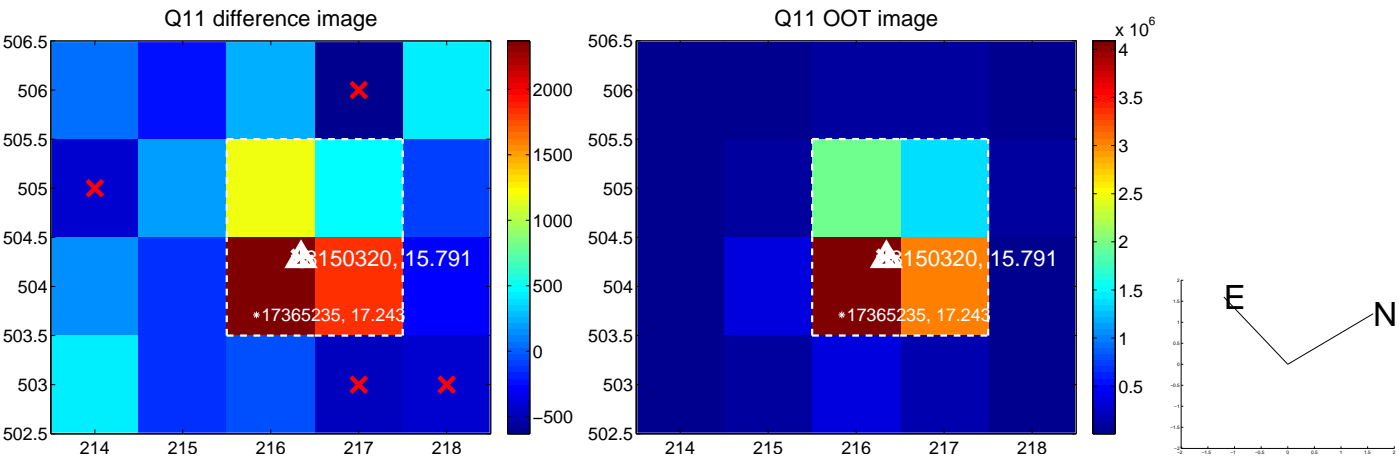
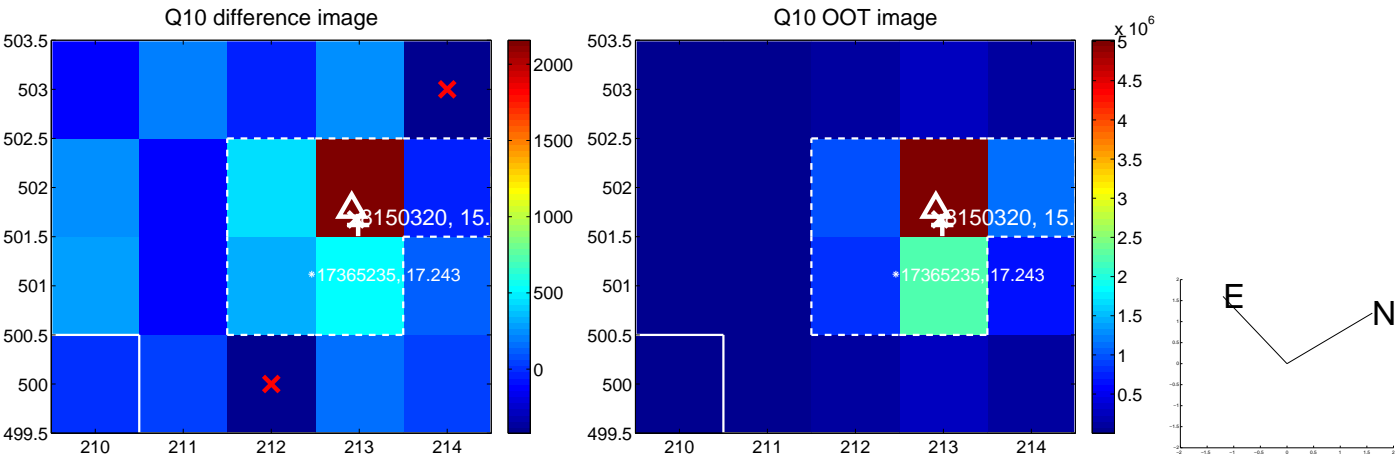
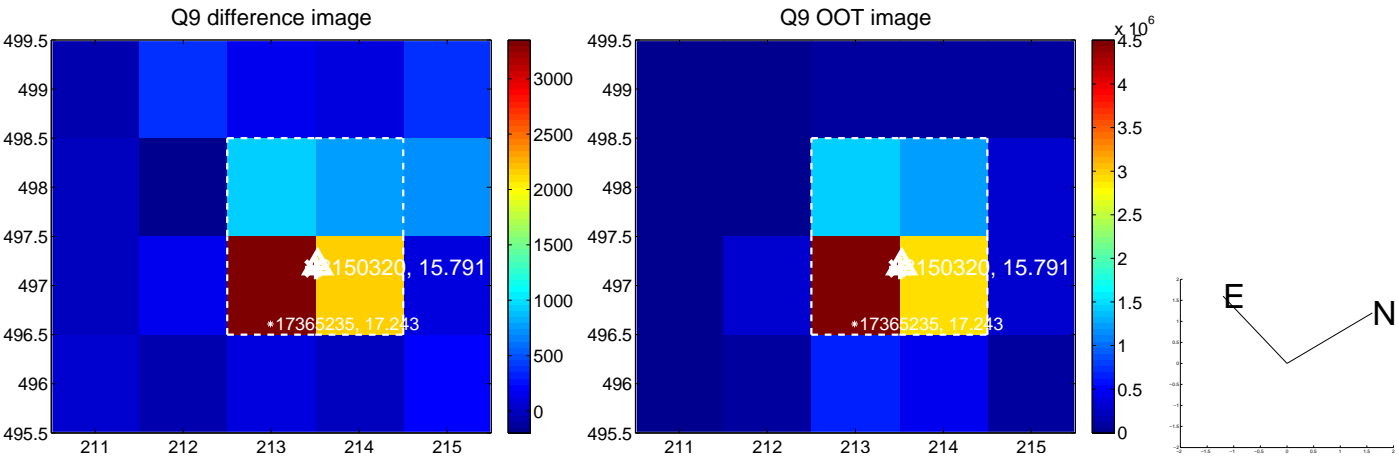


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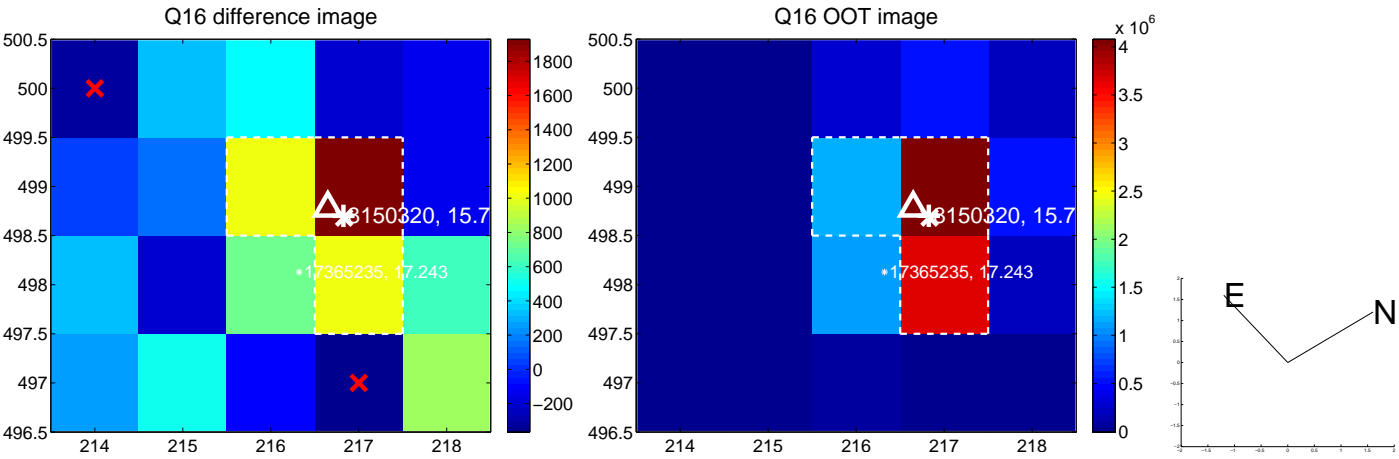
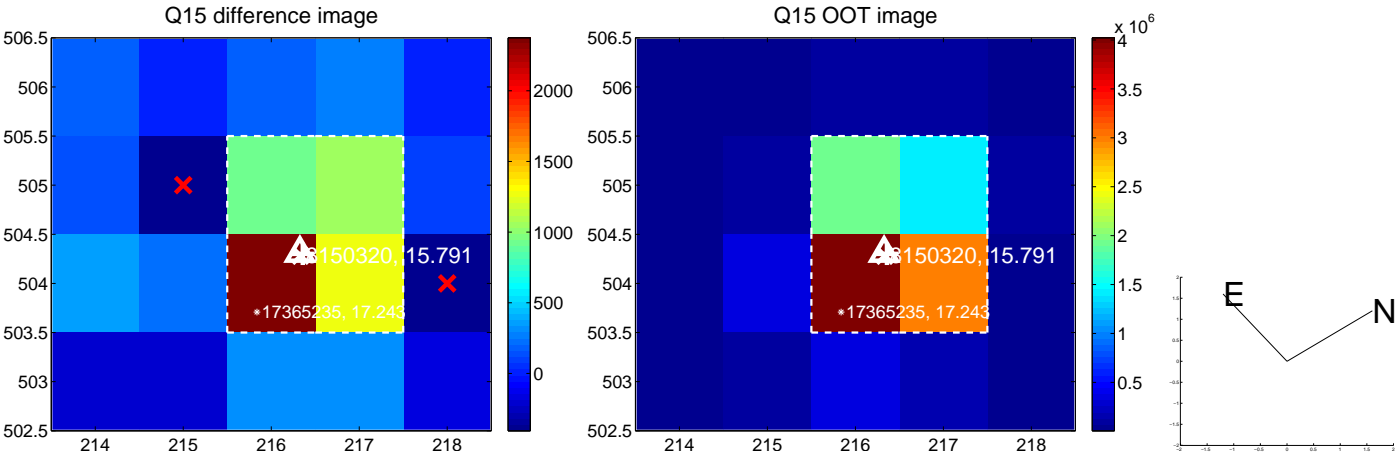
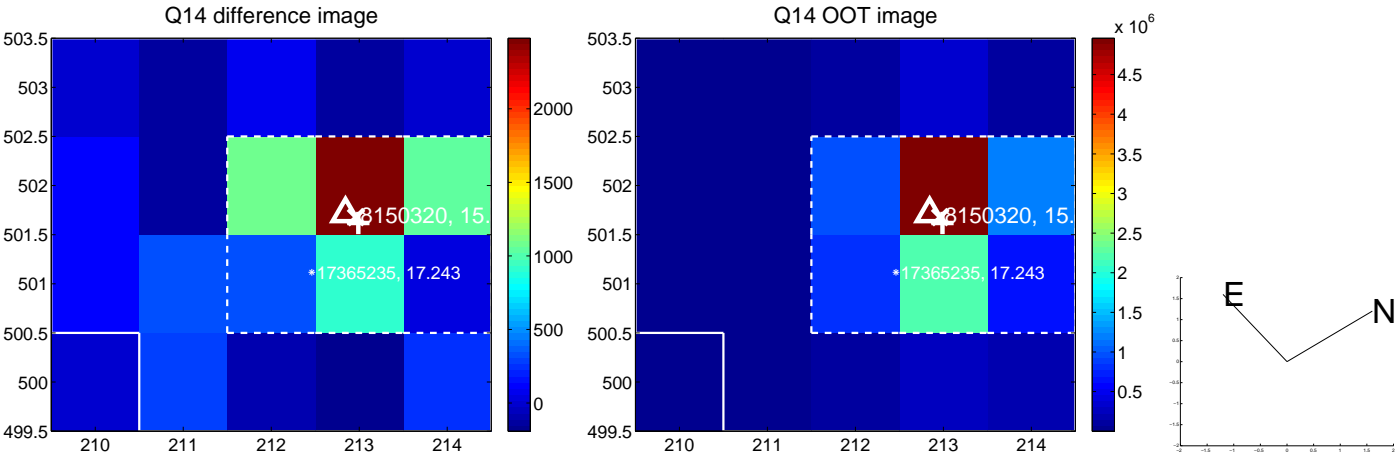
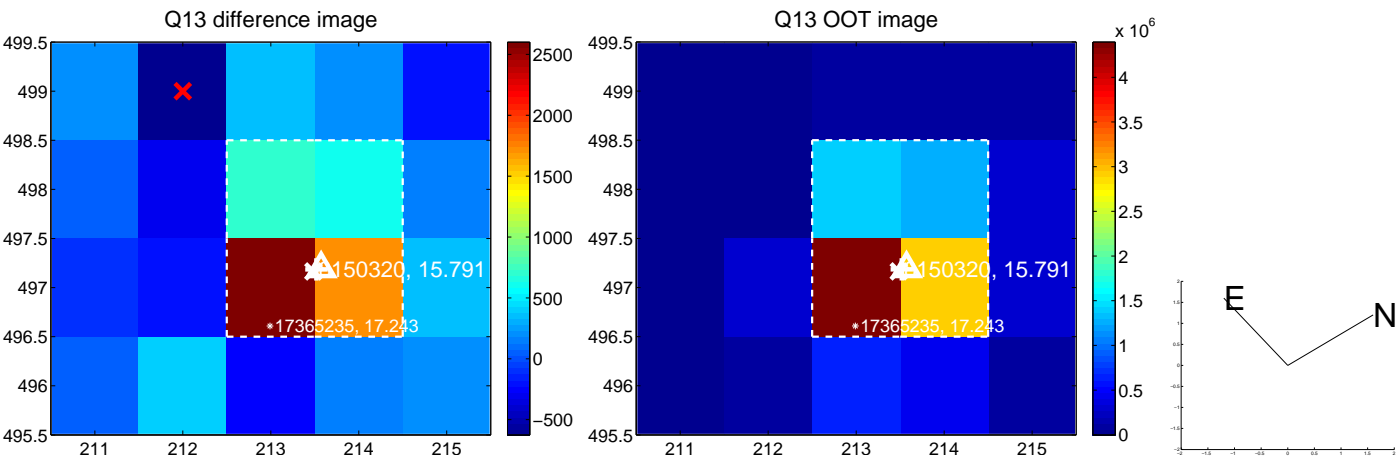




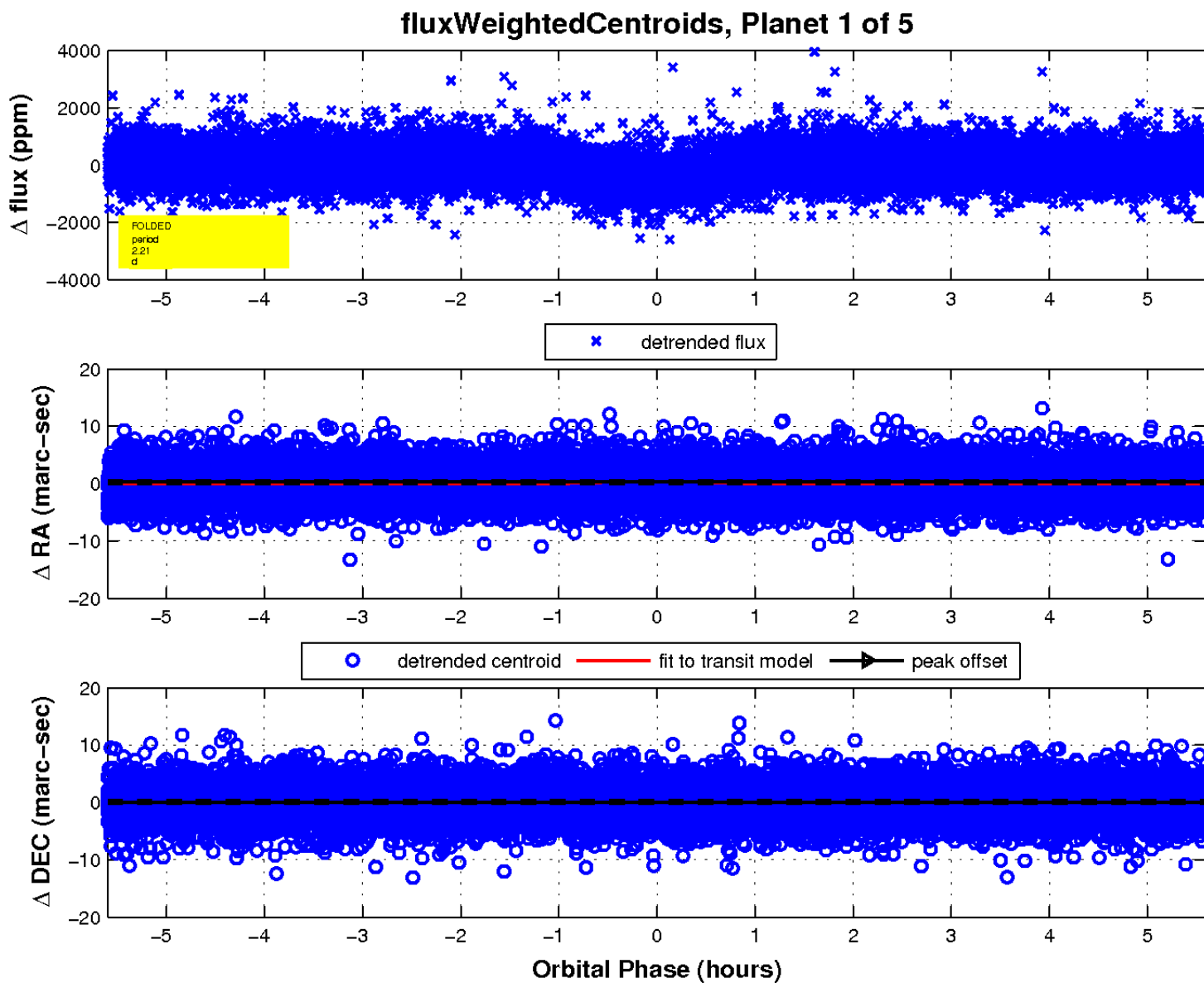
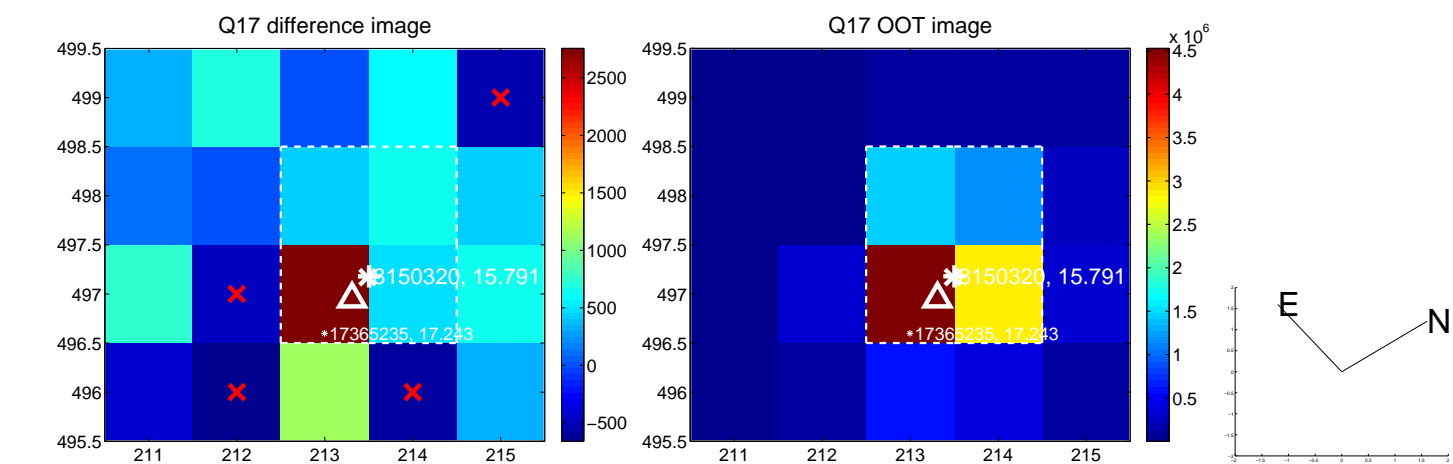
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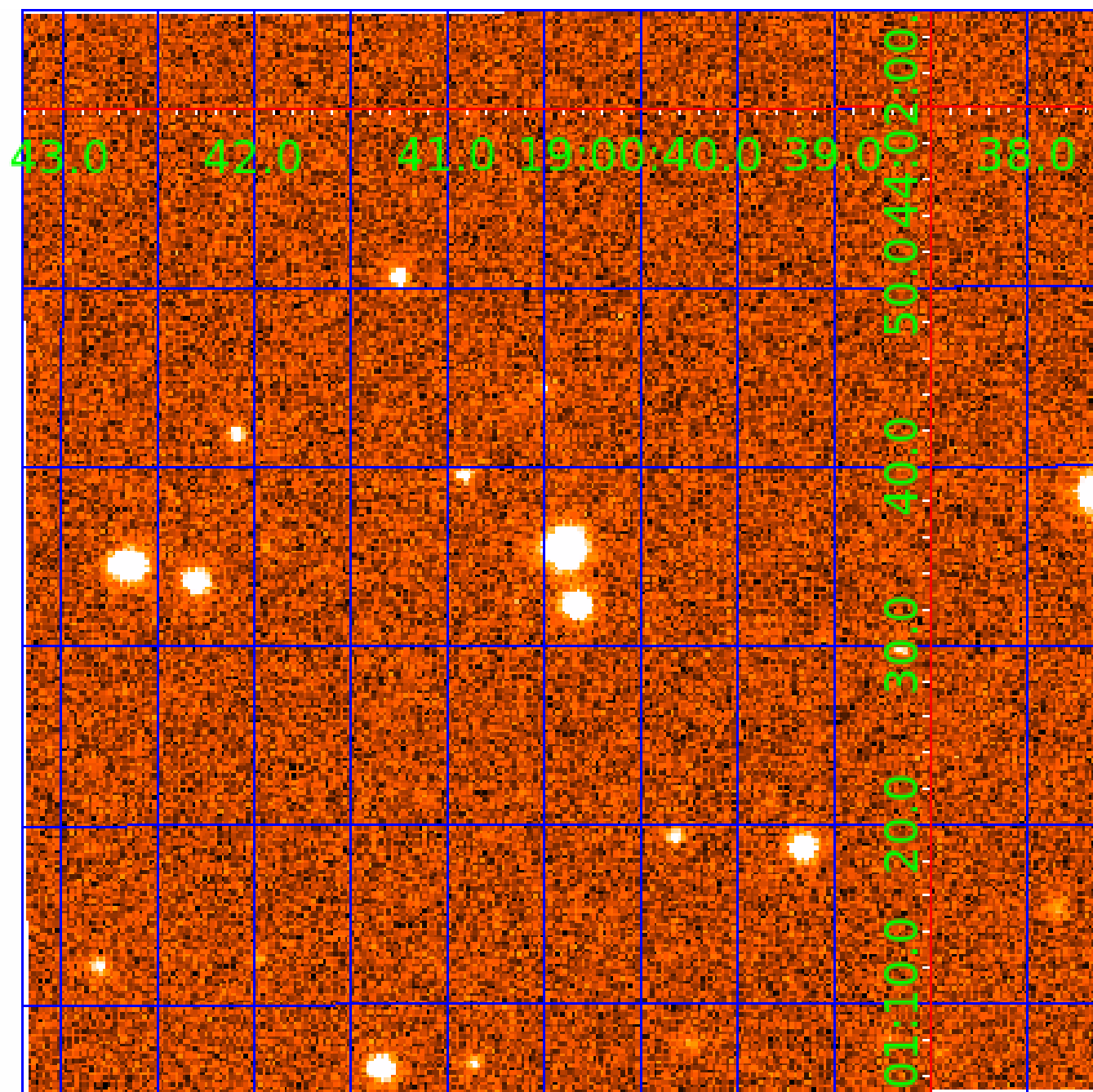


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# UKIRT Image

Declination





# KIC 008150320

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008150320-04	OBS	PC	1.00	0	0	0	0	NO_COMMENT
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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.

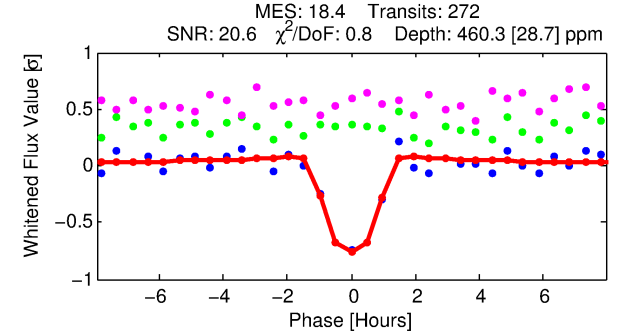
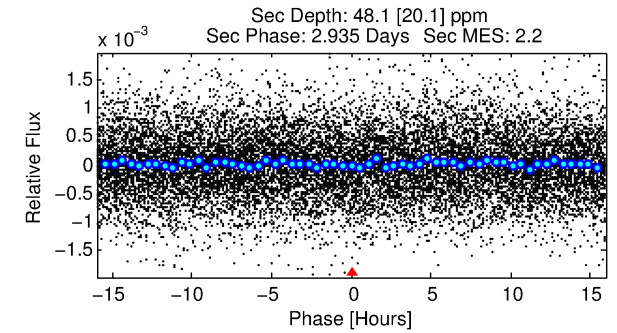
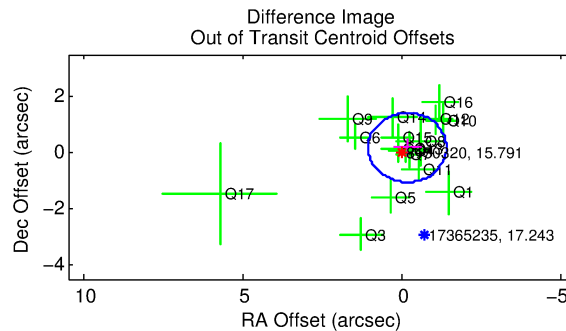
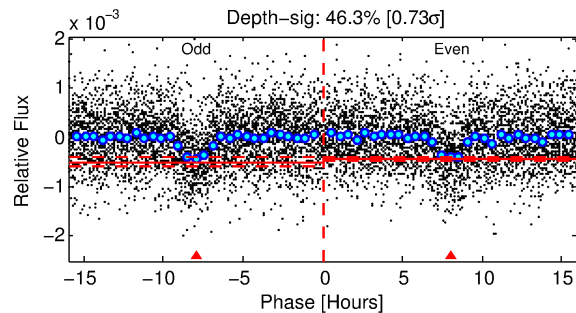
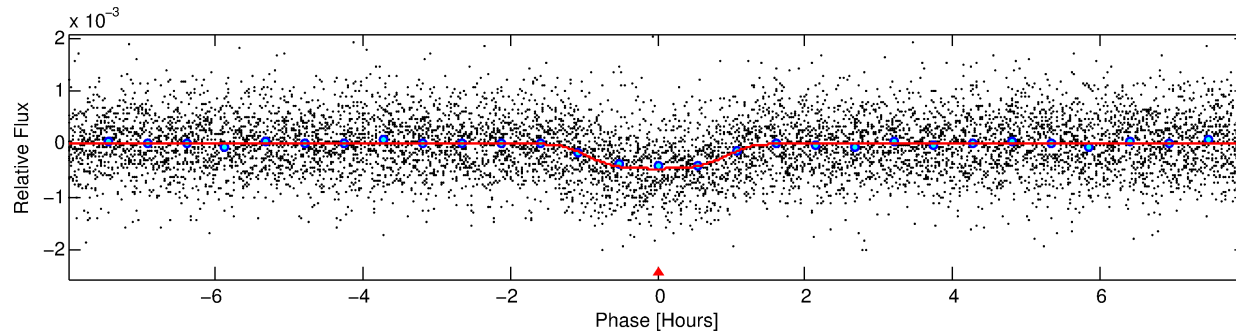
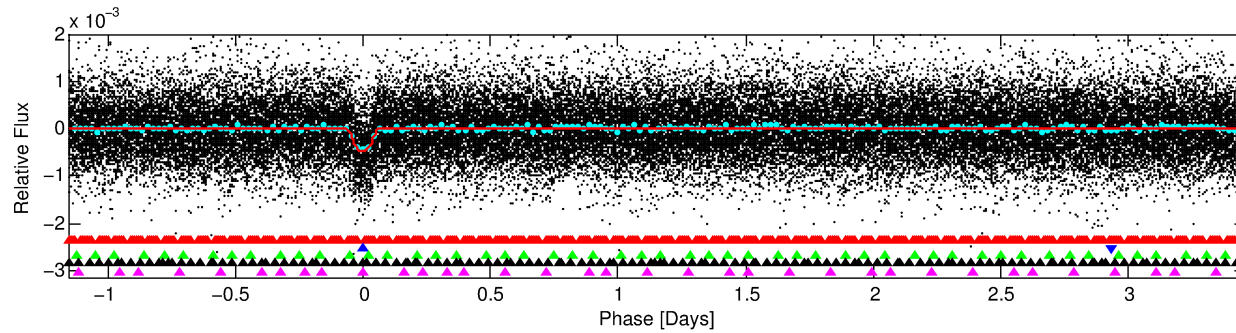
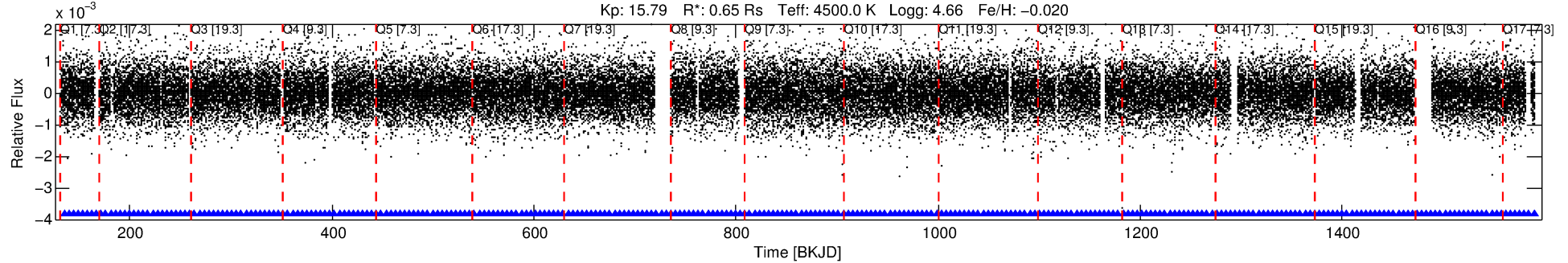
## Ephemeris Match Information For 008150320-02

No Significant Match Found

# DV One-Page Summary

KIC: 8150320 Candidate: 2 of 5 Period: 4.617 d  
KOI: K00904.04 Name: Kepler-55e Corr: 0.909

Kp: 15.79 R\*: 0.65 Rs Teff: 4500.0 K Logg: 4.66 Fe/H: -0.020



## DV Fit Results:

Period = 4.61749 [0.00002] d  
Epoch = 135.0512 [0.0024] BKJD  
Rp/R\* = 0.0274 [0.0016]  
a/R\* = 4.84 [0.73]  
b = 0.96 [0.01]  
Seff = 66.68 [7.52]  
Teq = 729 [21] K  
Rp = 1.93 [0.17] Re  
a = 0.0480 [0.0027] AU  
Ag = 16.35 [7.21] [2.13σ]  
Teffp = 2266 [250] K [6.13σ]

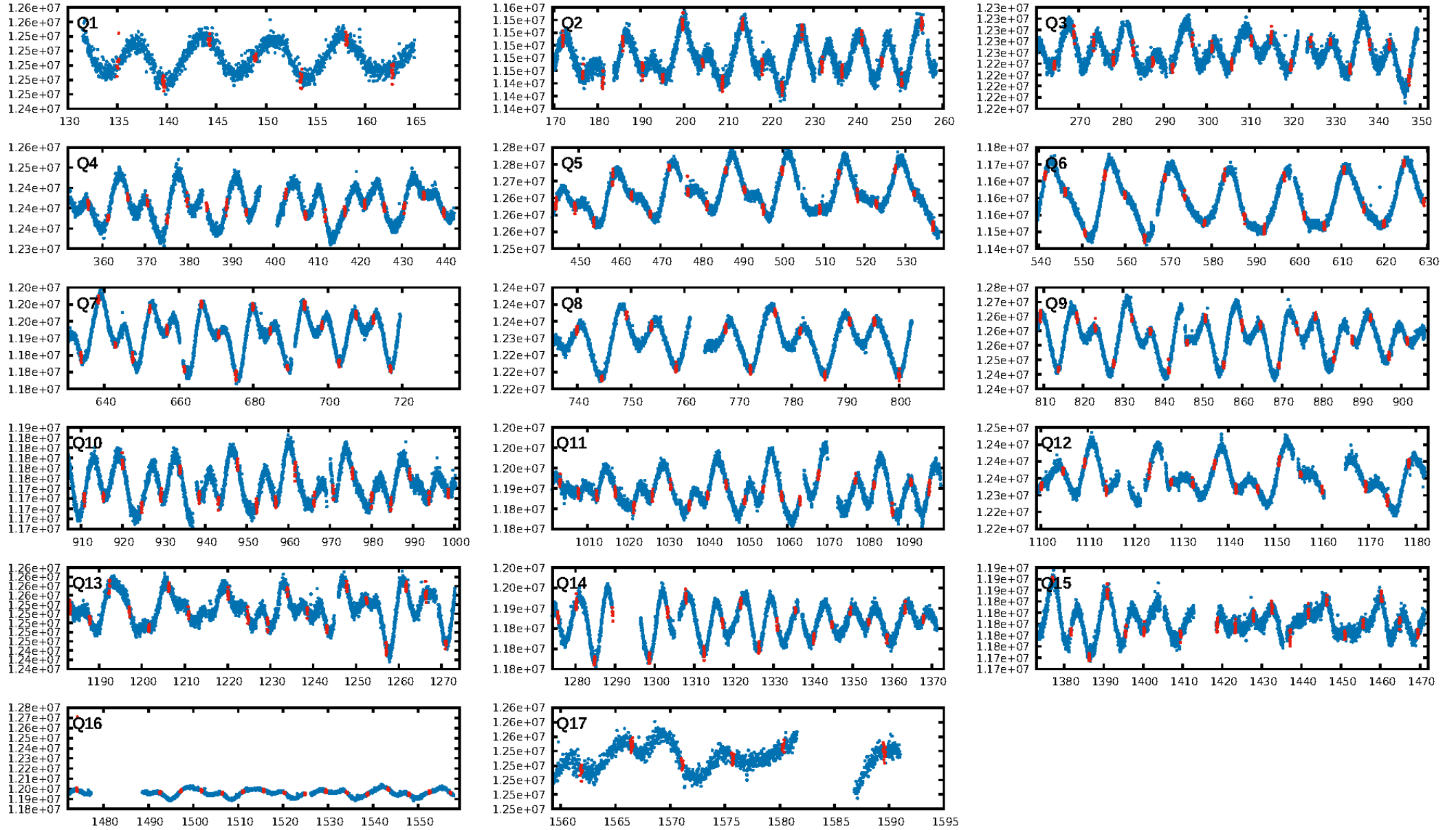
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [17.76σ]  
LongPeriod-sig: 100.0% [36.90σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 3.22e-72  
RollingBand-fgt: 1.00 [259/259]  
GhostDiagnostic-chr: 2.773  
Centroid-sig: 72.6%  
Centroid-so: 0.287 arcsec [0.52σ]  
OotOffset-rm: 0.241 arcsec [0.59σ]  
KicOffset-rm: 0.295 arcsec [0.69σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 0.82 [14/17]  
DiffImageOverlap-fno: 1.00 [17/17]

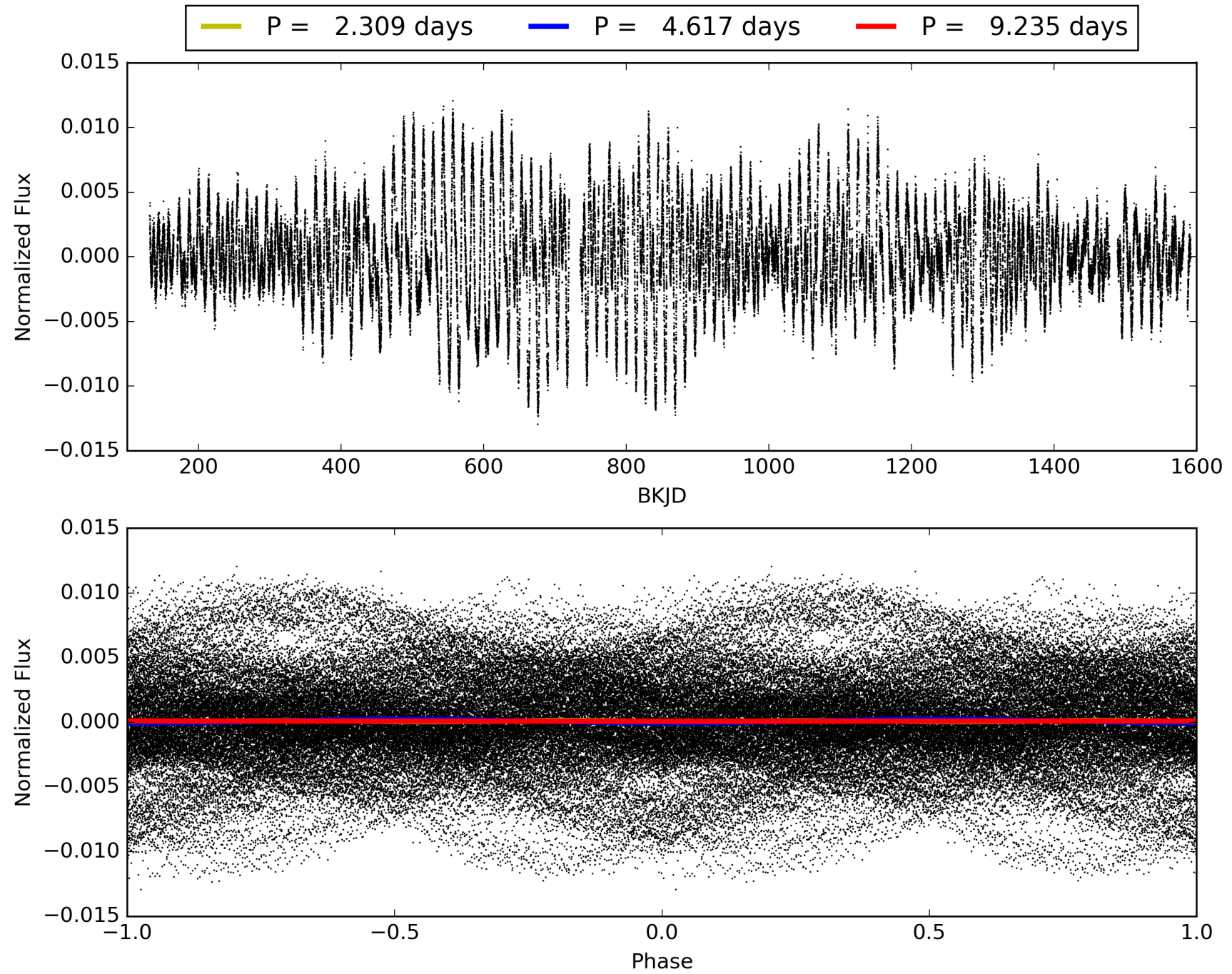
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 19:46:33 Z

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

# TCE 008150320-02, PDC Light Curves



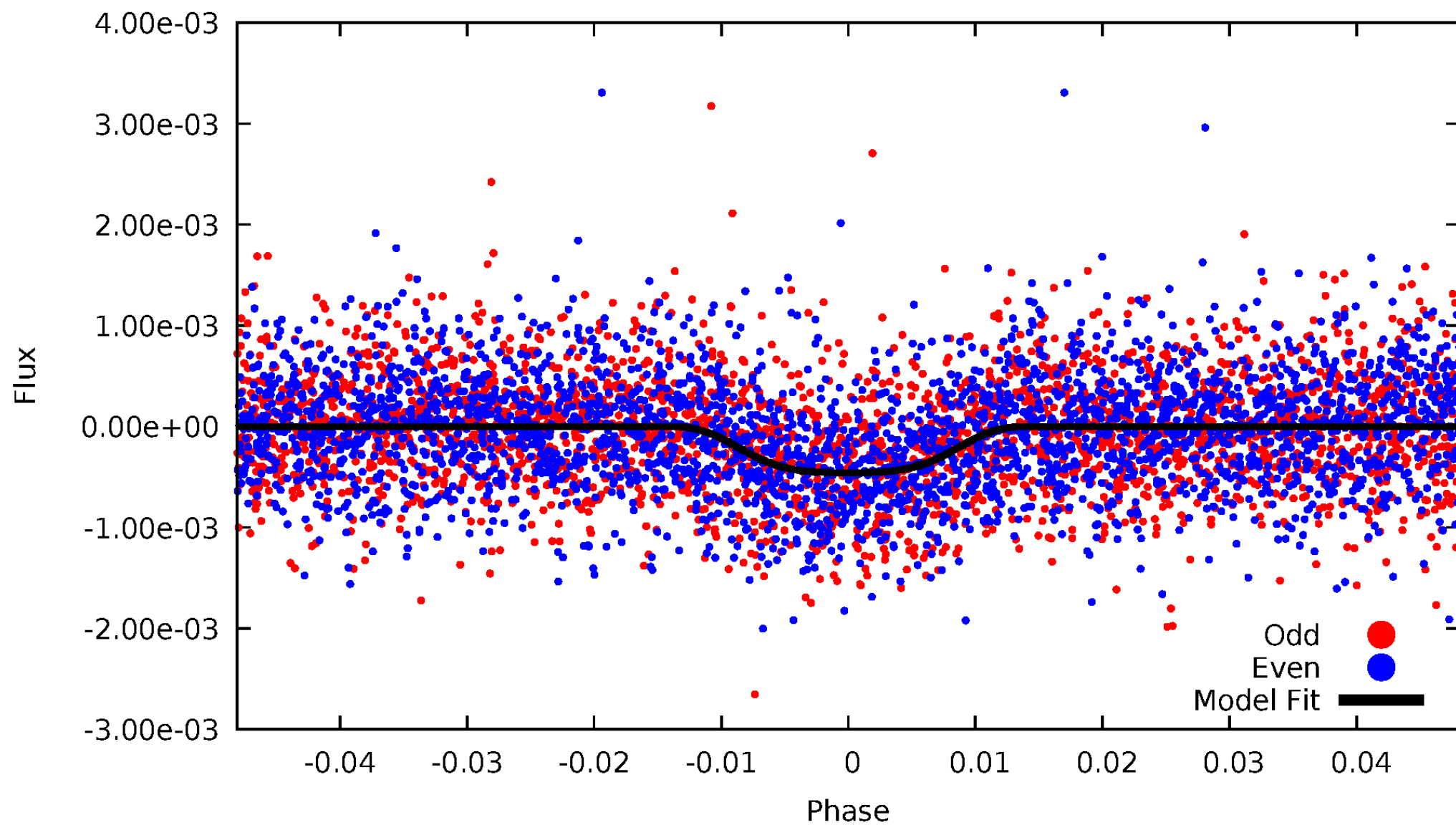
TCE 008150320-02





DV Odd/Even

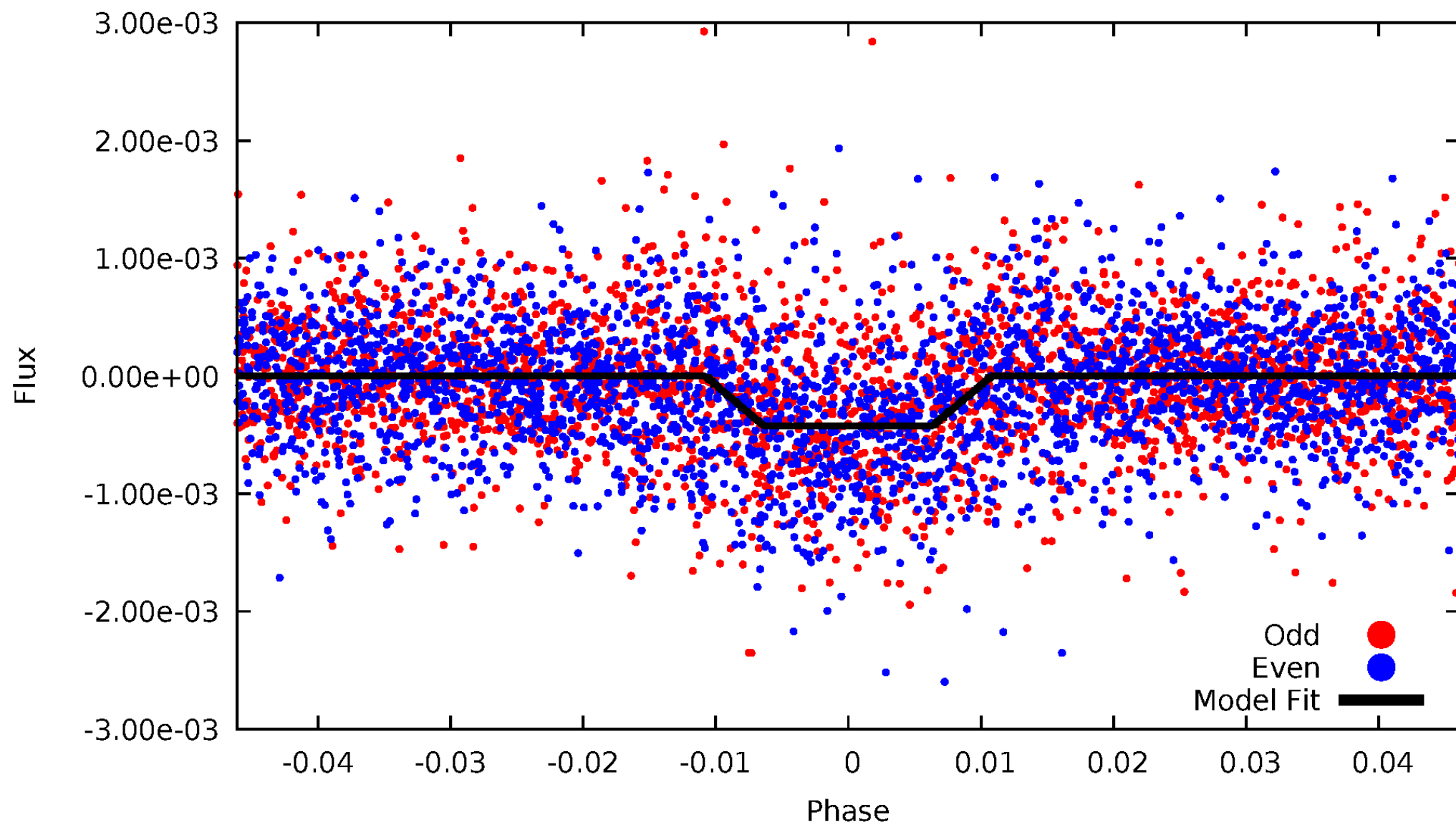
TCE 008150320-02





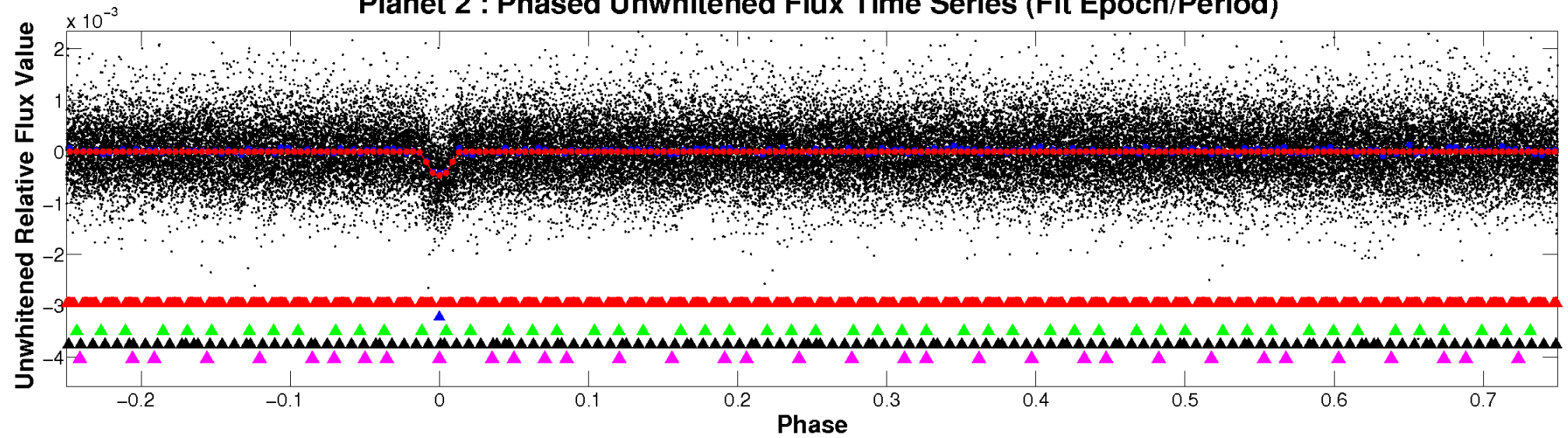
# ALT Odd/Even

TCE 008150320-02

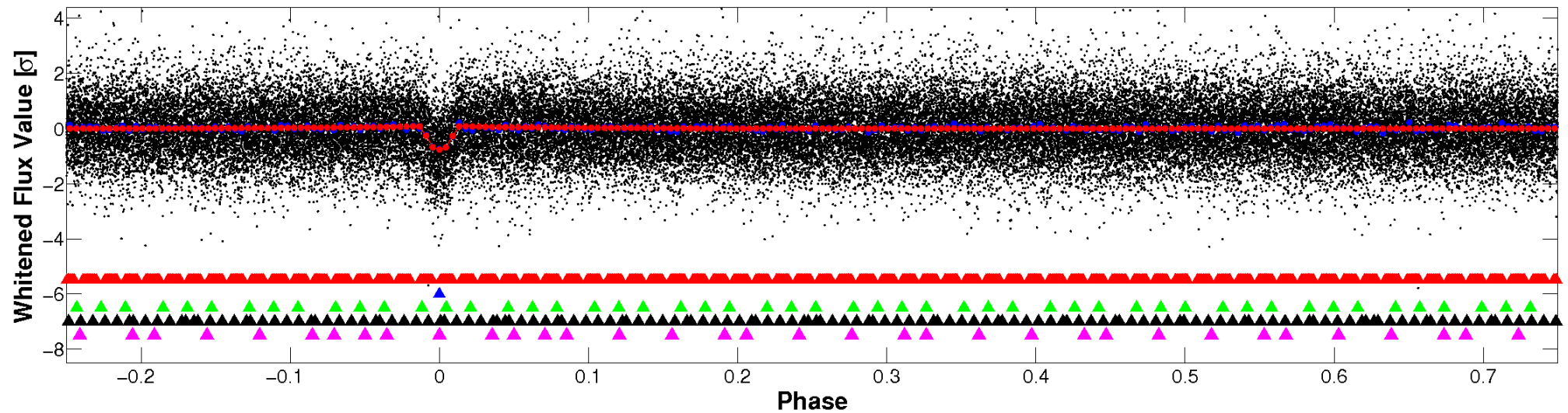


# Non-Whitened Vs. Whitened Light Curve

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

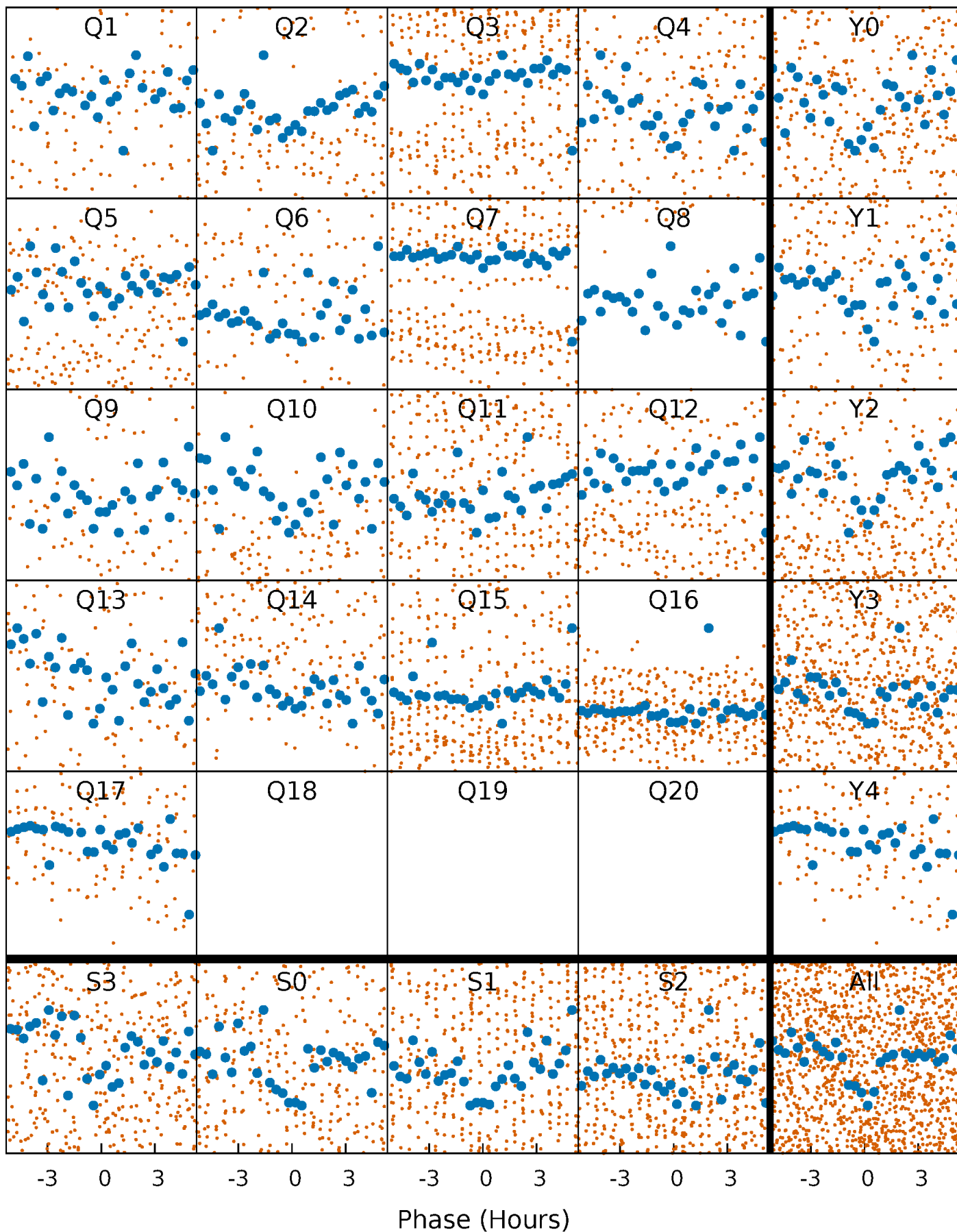


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



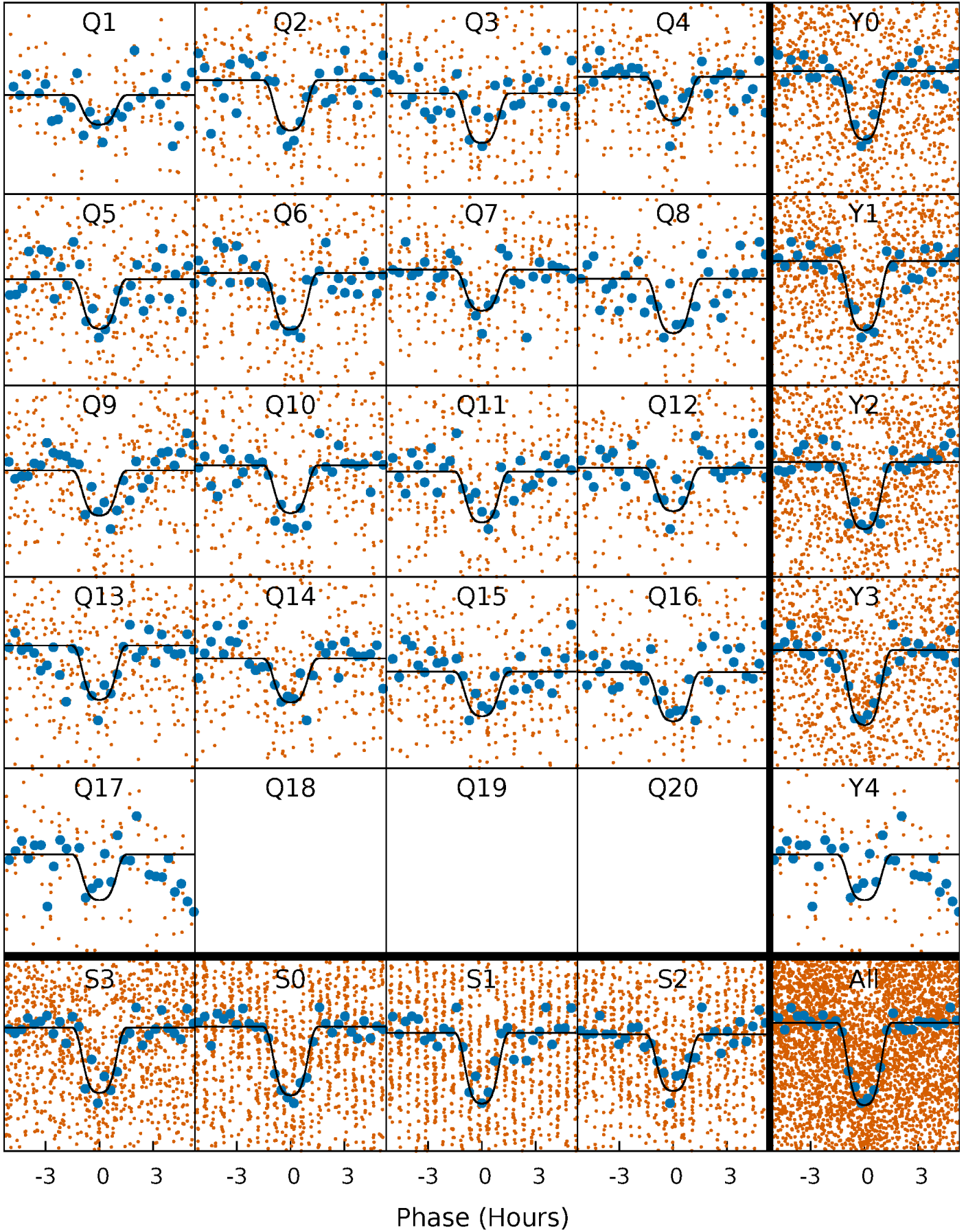
# PDC Quarter-Phased Transit Curves

TCE 008150320-02 P= 4.617487 Days  $T_0=135.051165$  (BKJD)



# DV Quarter-Phased Transit Curves

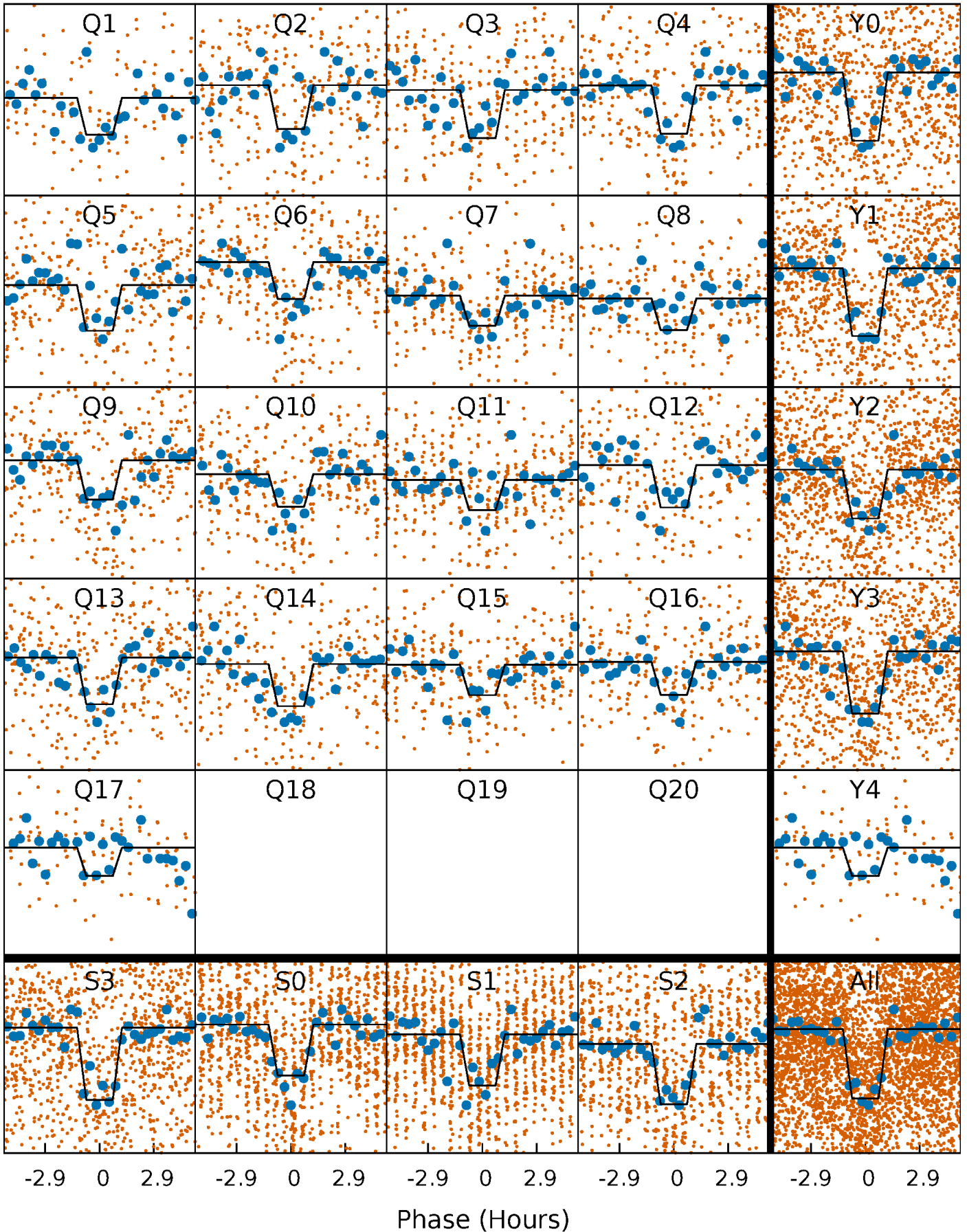
TCE 008150320-02   P= 4.617487 Days    $T_0=135.051165$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

TCE 008150320-02   P= 4.617496 Days    $T_0=135.050265$  (BKJD)

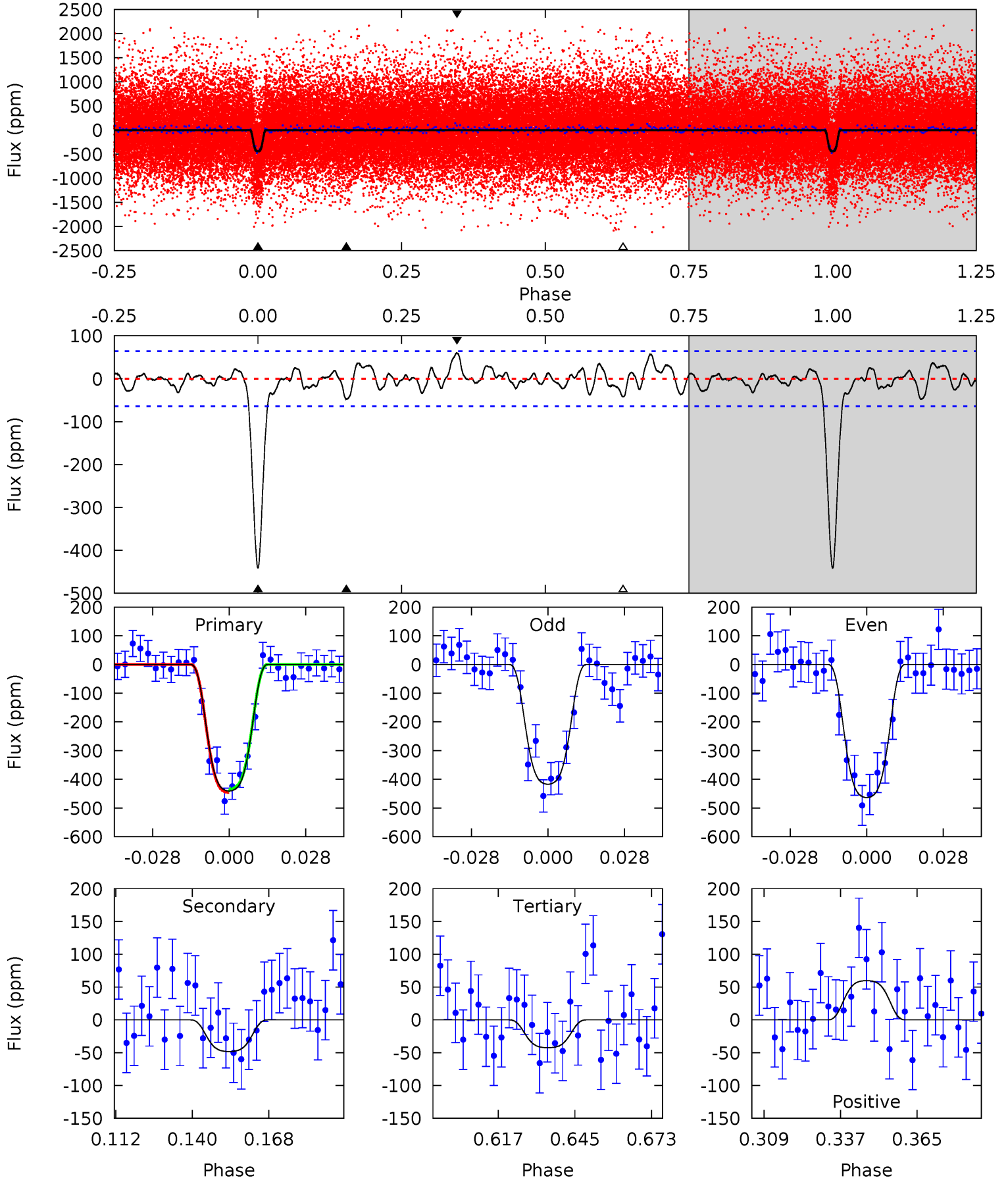




# DV Model-Shift Uniqueness Test

008150320-02, P = 4.617487 Days, E = 130.433678 Days

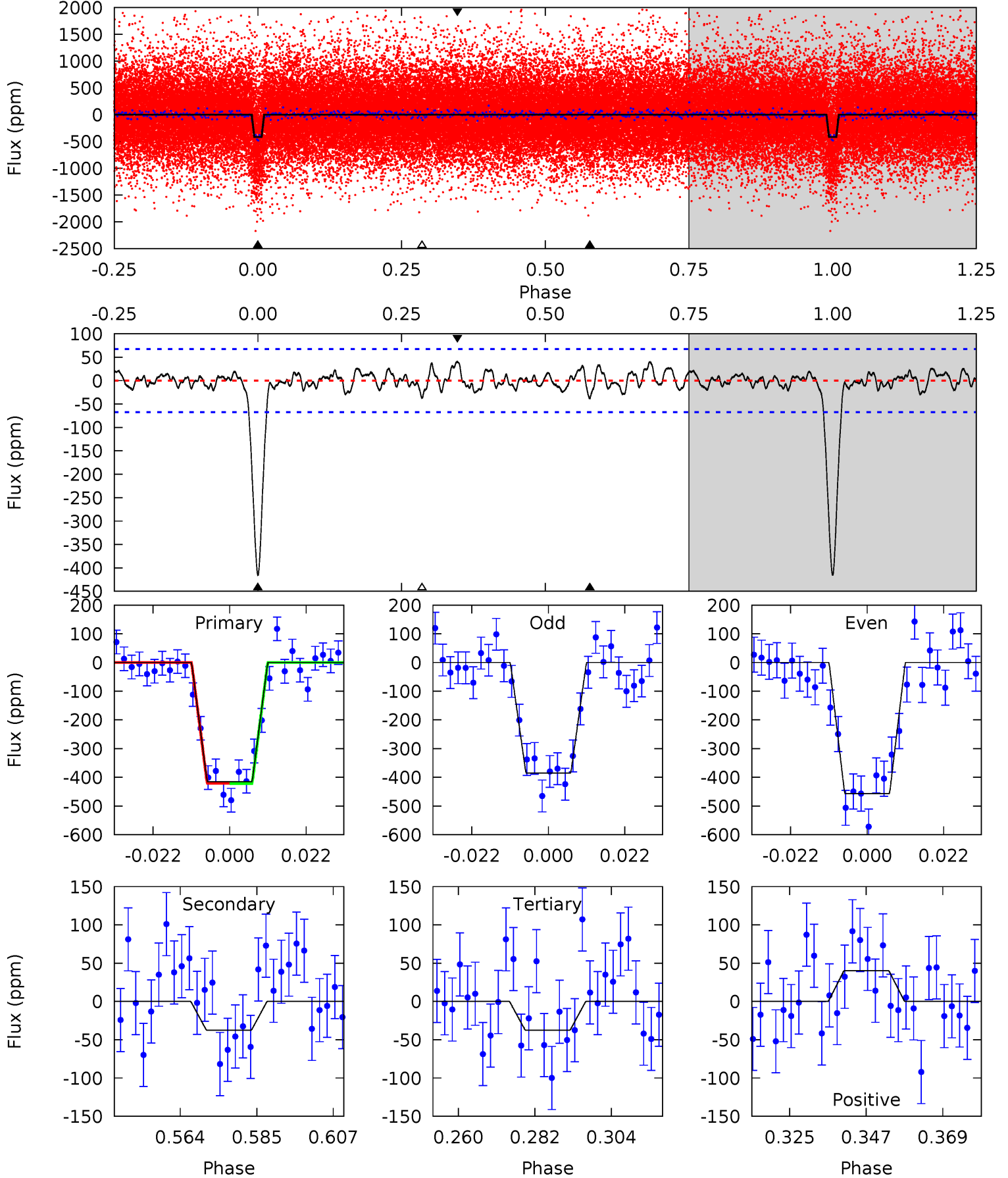
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
33.2	3.63	3.19	4.50	4.82	2.20	1.38	30.0	28.7	0.44	-0.86	1.75	0.97	0.12	0.37



# Alt Model-Shift Uniqueness Test

008150320-02, P = 4.617496 Days, E = 130.432769 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
30.1	2.73	2.72	2.91	4.88	2.30	1.03	27.4	27.2	0.01	-0.18	2.59	0.99	0.09	0.04



### Stellar Parameters For KIC 008150320

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4500^{+90}_{-90}$	$4.656^{+0.013}_{-0.043}$	$-0.020^{+0.150}_{-0.150}$	$0.646^{+0.043}_{-0.020}$	$0.710^{+0.029}_{-0.043}$	$3.719^{+0.220}_{-0.623}$
	+2%/-2%	+0%/-1%	+750%/-750%	+7%/-3%	+4%/-6%	+6%/-17%
Source	SPE58	SPE58	SPE58	DSEP		

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

### Secondary Eclipse Parameters for KIC 008150320-02 / KOI 0904.04

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-48 \pm 13$	$1.97^{+0.13}_{-0.13}$	$1026^{+24}_{-24}$	$2873^{+123}_{-137}$	$16^{+5}_{-4}$
Alt.	$-38 \pm 14$	$1.48^{+0.12}_{-0.12}$	$1027^{+23}_{-24}$	$3007^{+171}_{-184}$	$22^{+9}_{-8}$

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

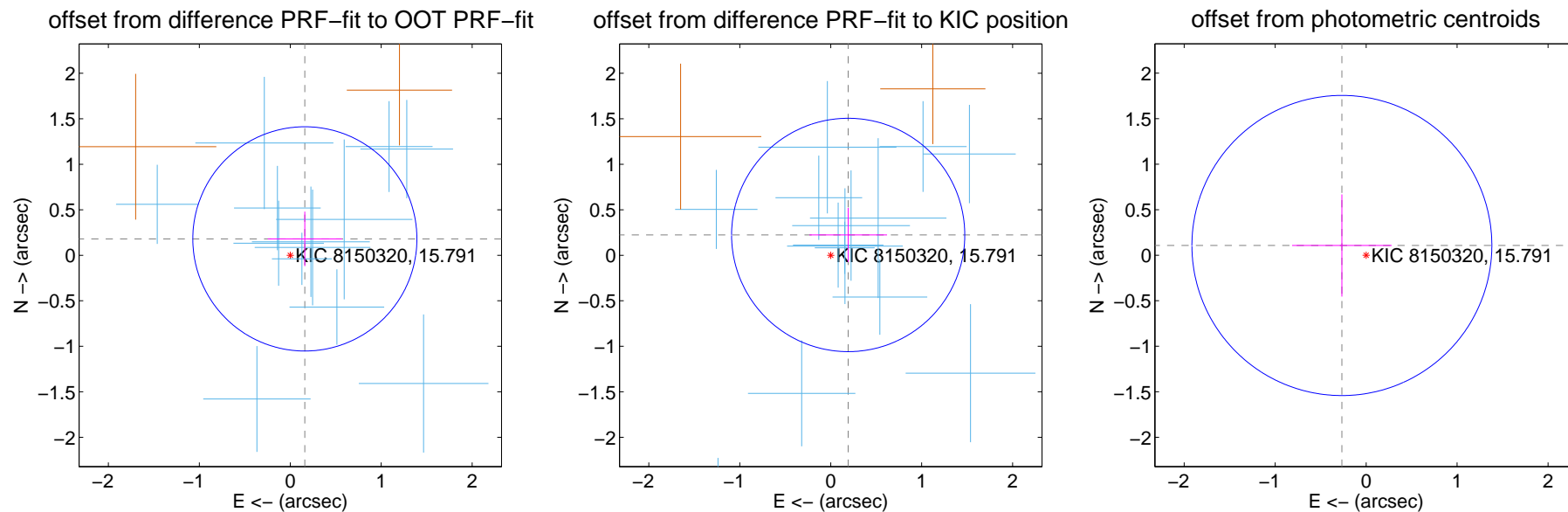
## DV Centroid Data

Supplemental centroid analysis for 008150320-02. Kepler magnitude: 15.79. Transit SNR 20.64

There are 14 quarters with good PRF difference image offsets

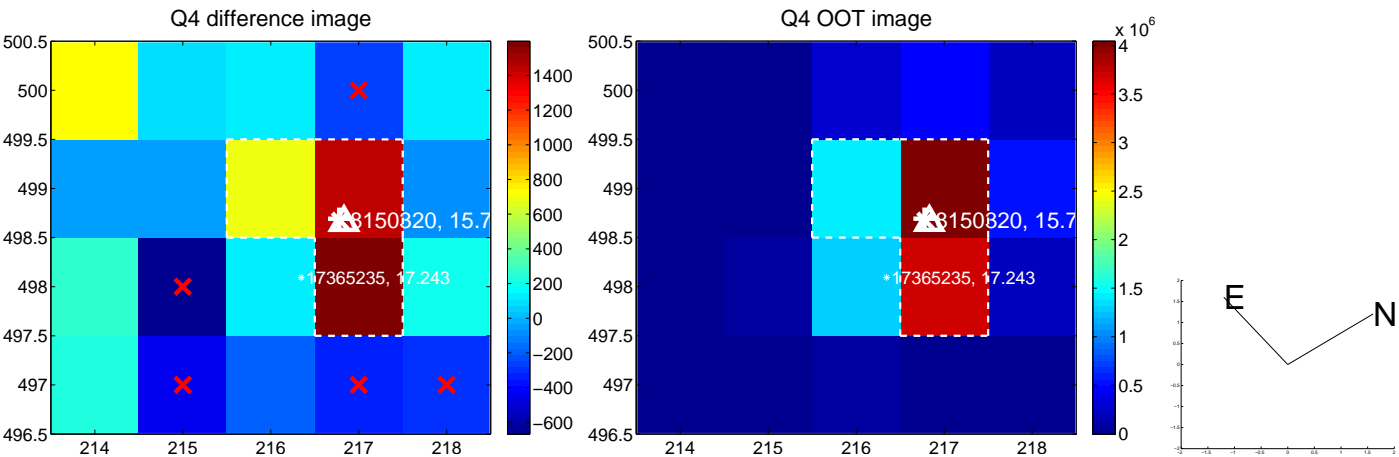
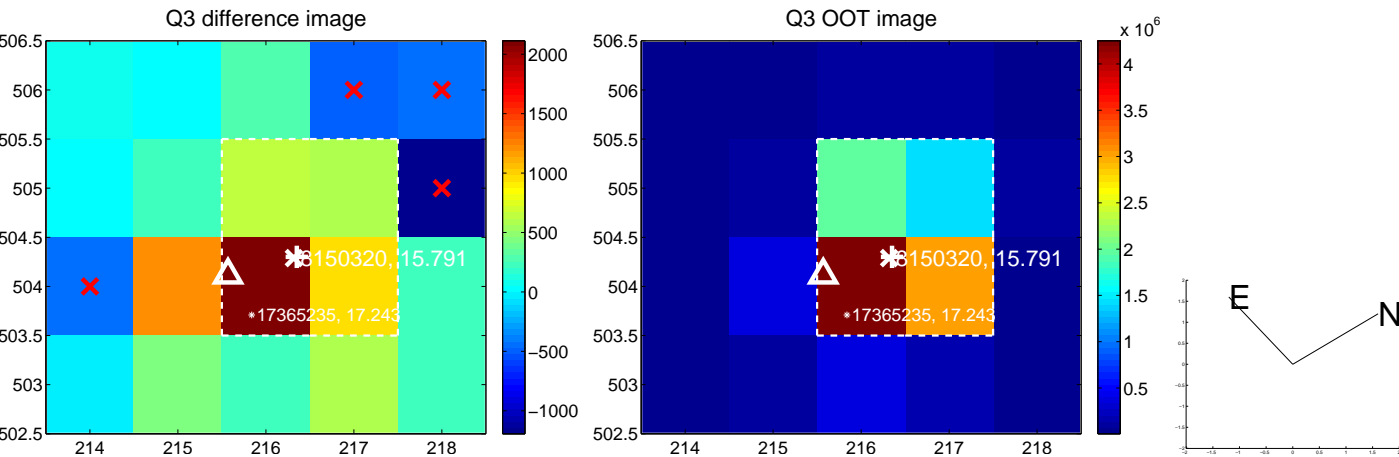
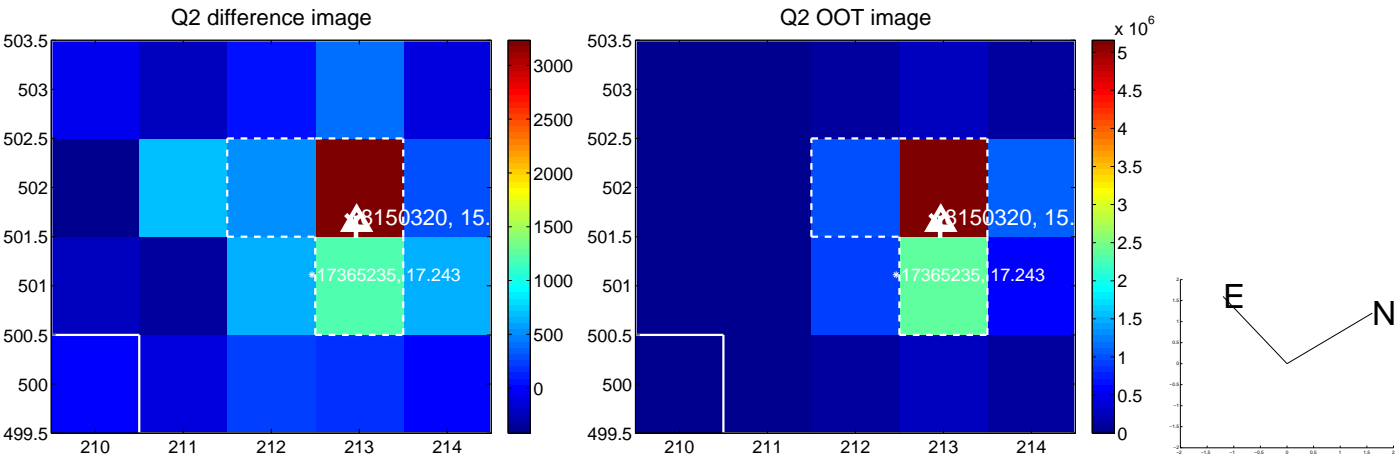
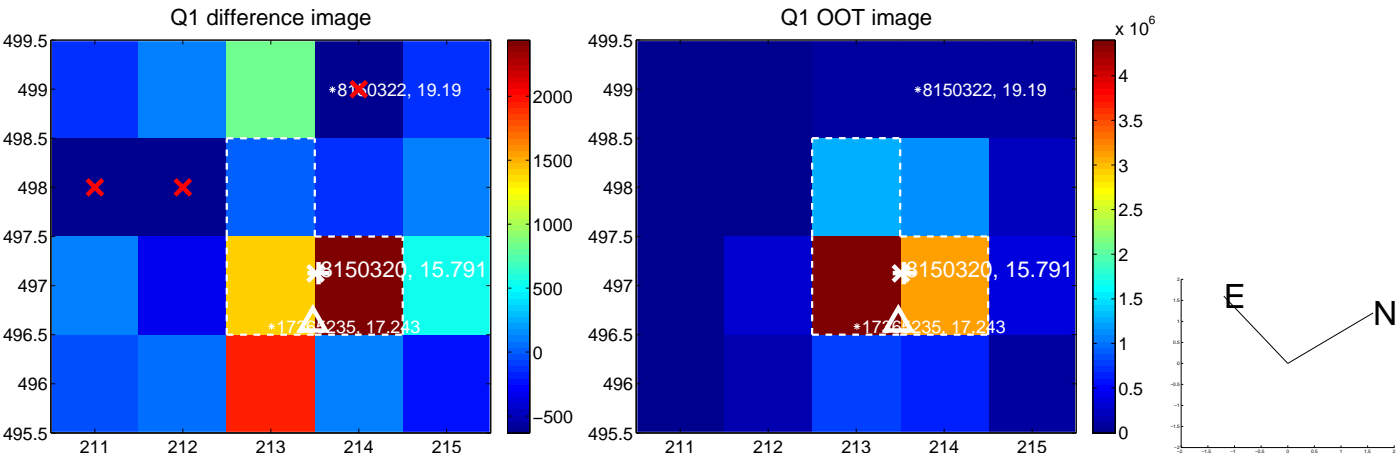
The direct PRF centroid is offset from the target star catalog position by about 0.08 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.241 \pm 0.411$	0.59	$-0.160 \pm 0.408$	$0.180 \pm 0.300$
PRF-fit source offset from KIC position	$0.295 \pm 0.427$	0.69	$-0.192 \pm 0.427$	$0.223 \pm 0.297$
photometric centroid source offset	$0.29 \pm 0.55$	0.52	$0.27 \pm 0.55$	$0.11 \pm 0.56$

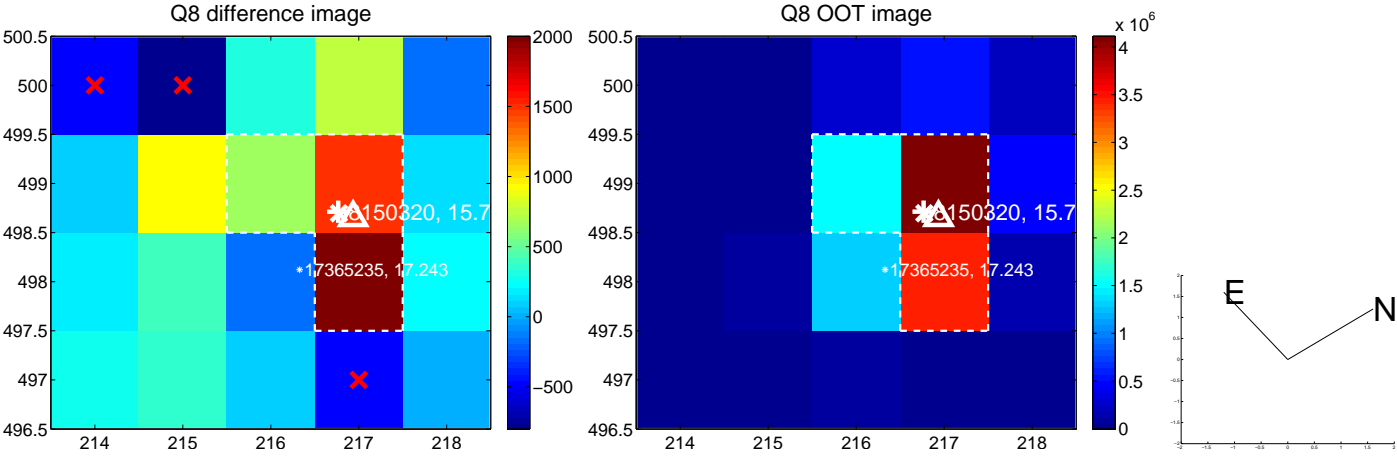
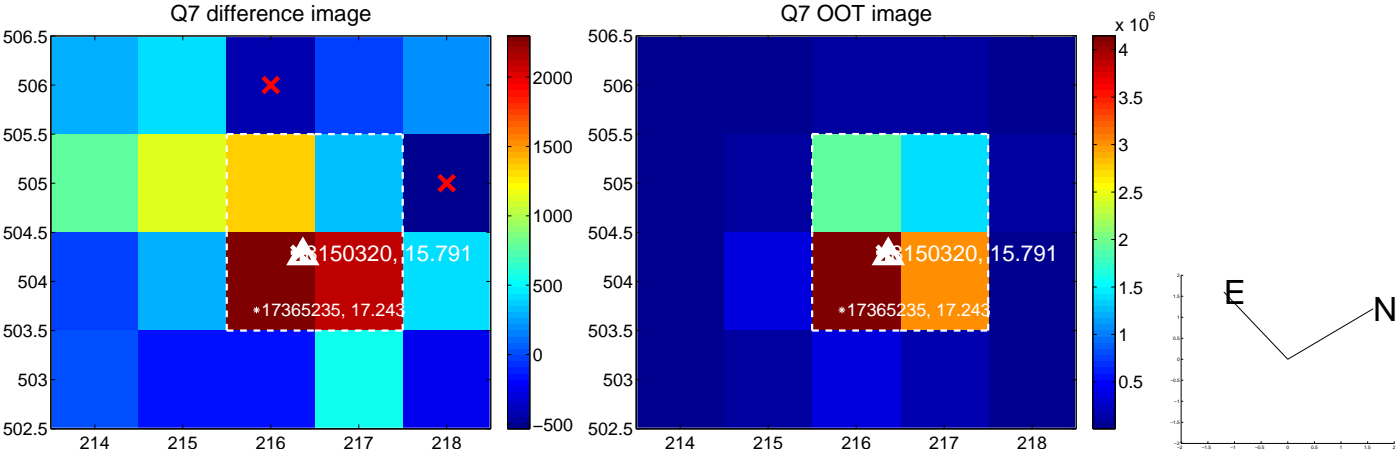
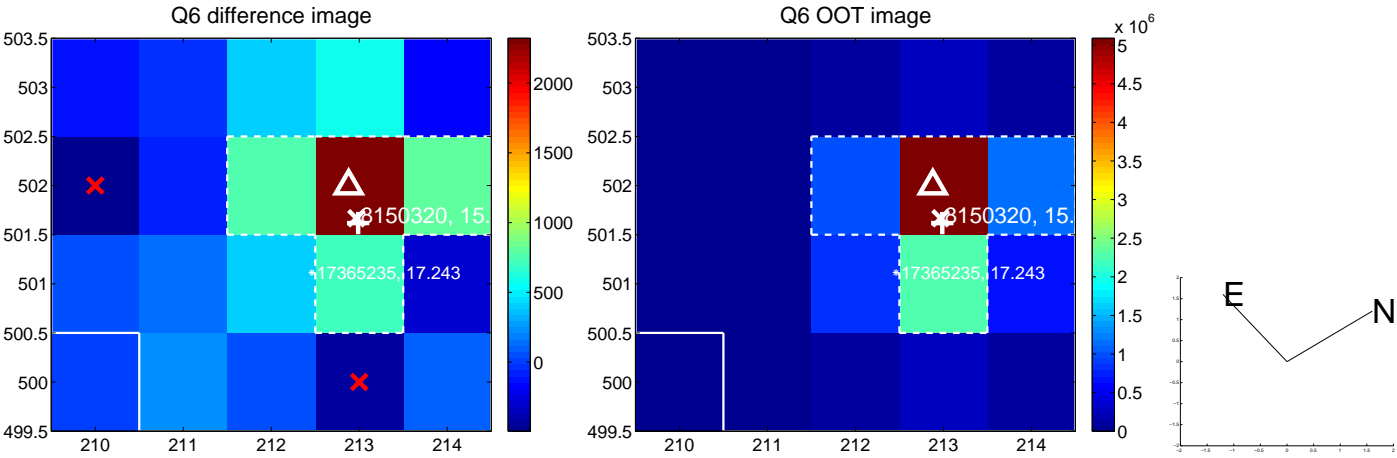
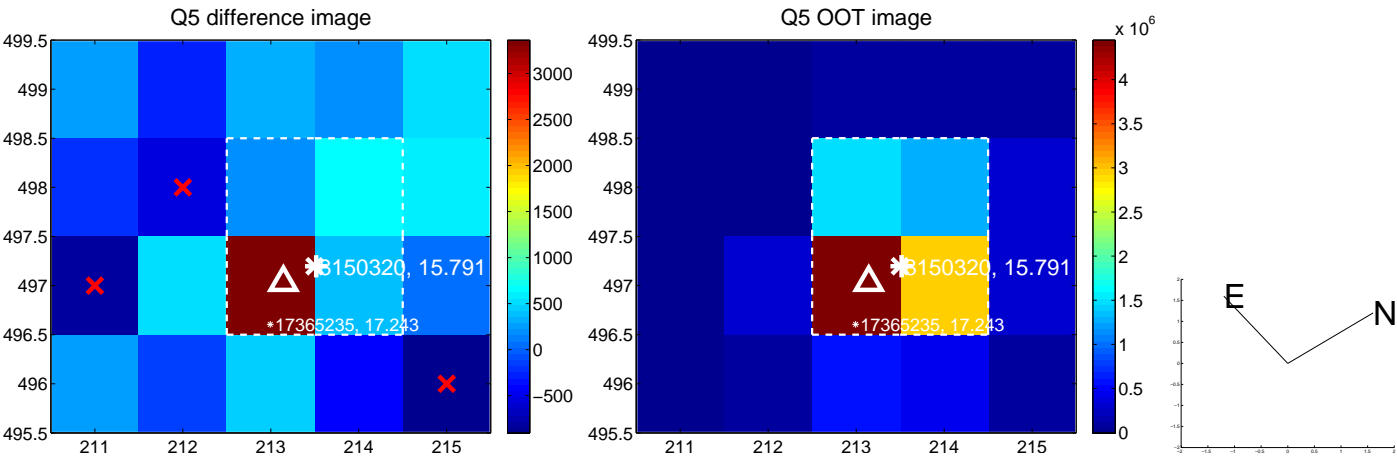


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

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

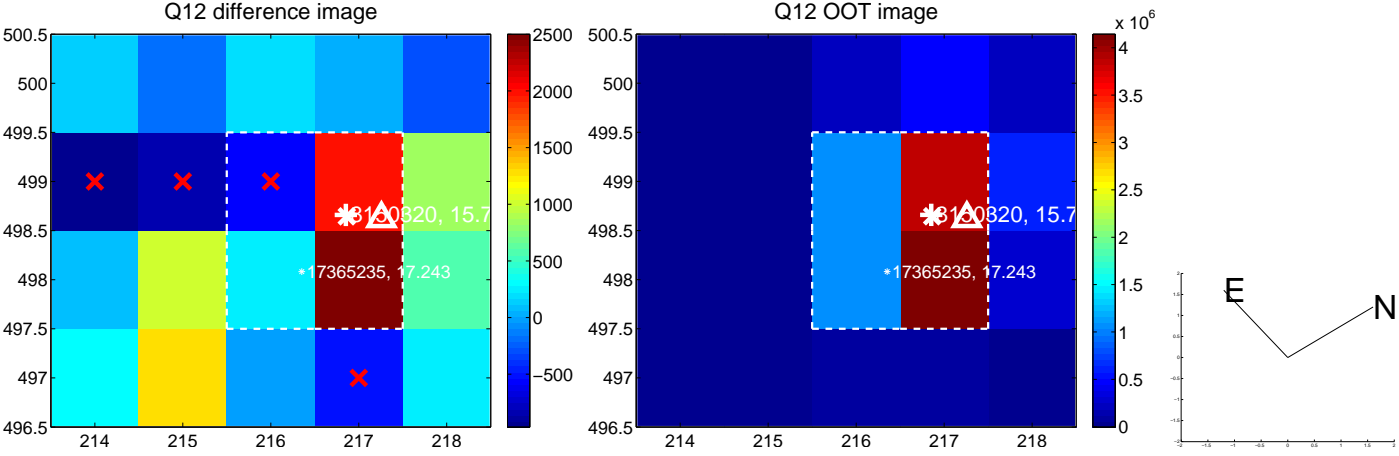
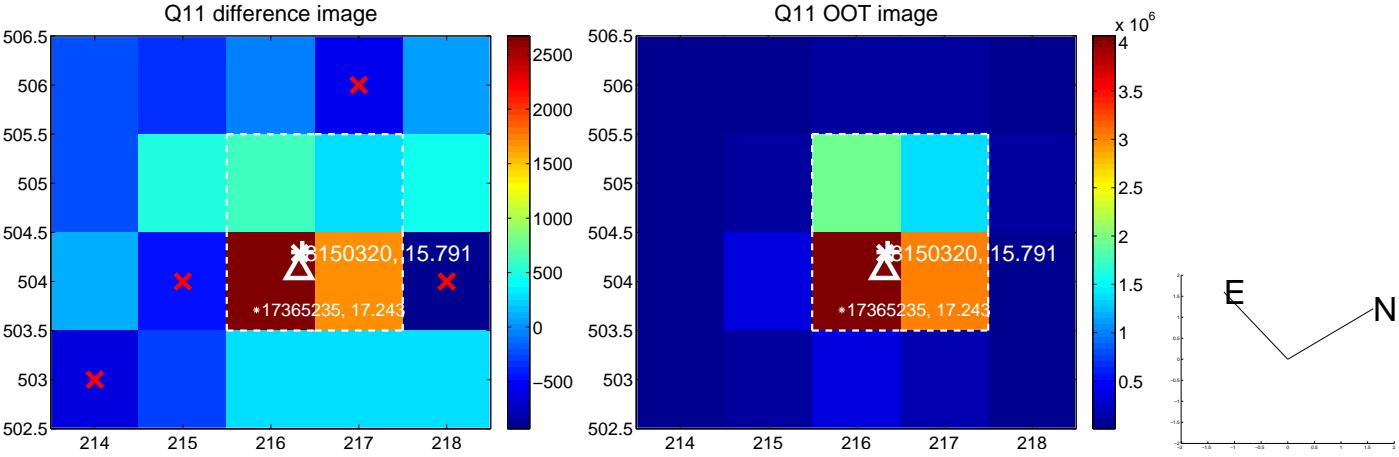
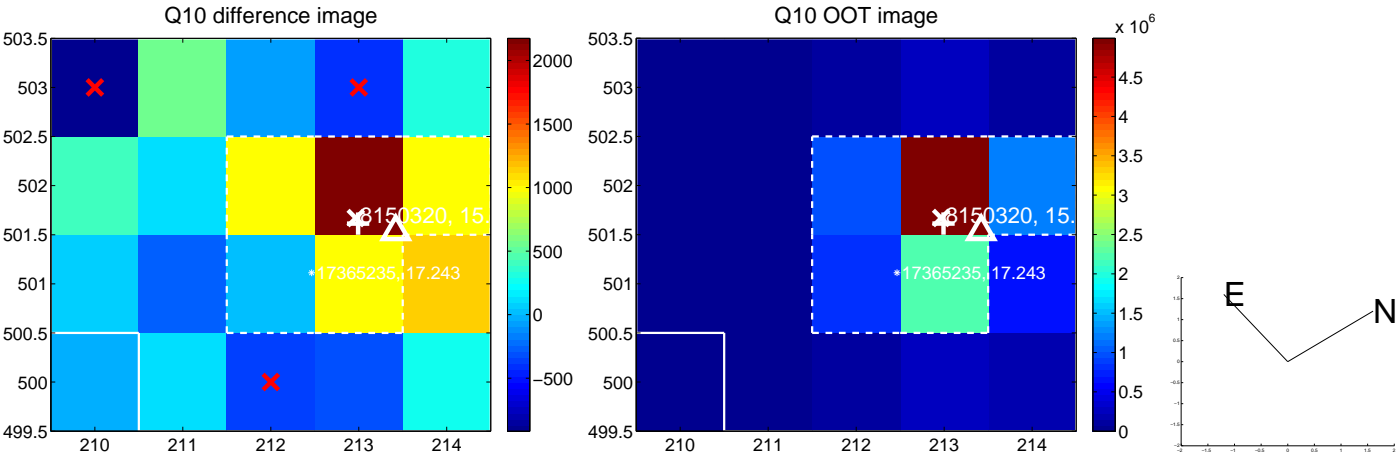
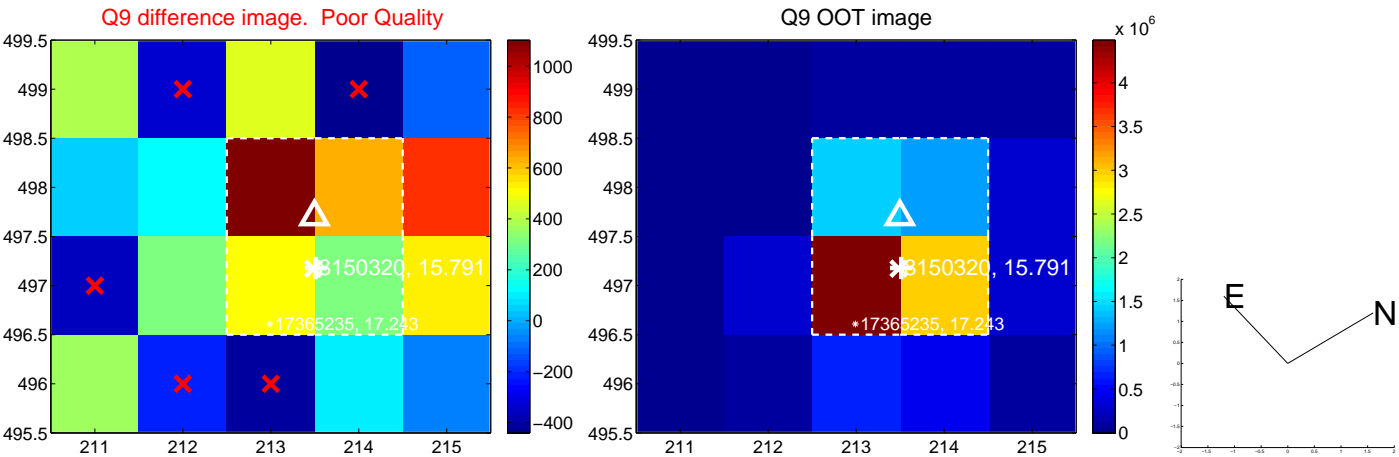


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

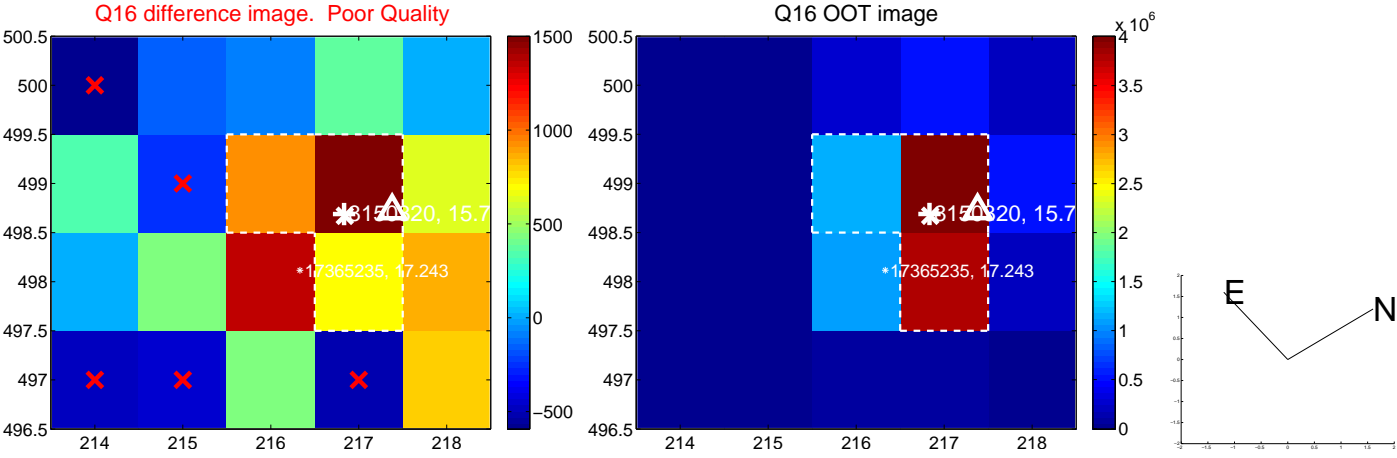
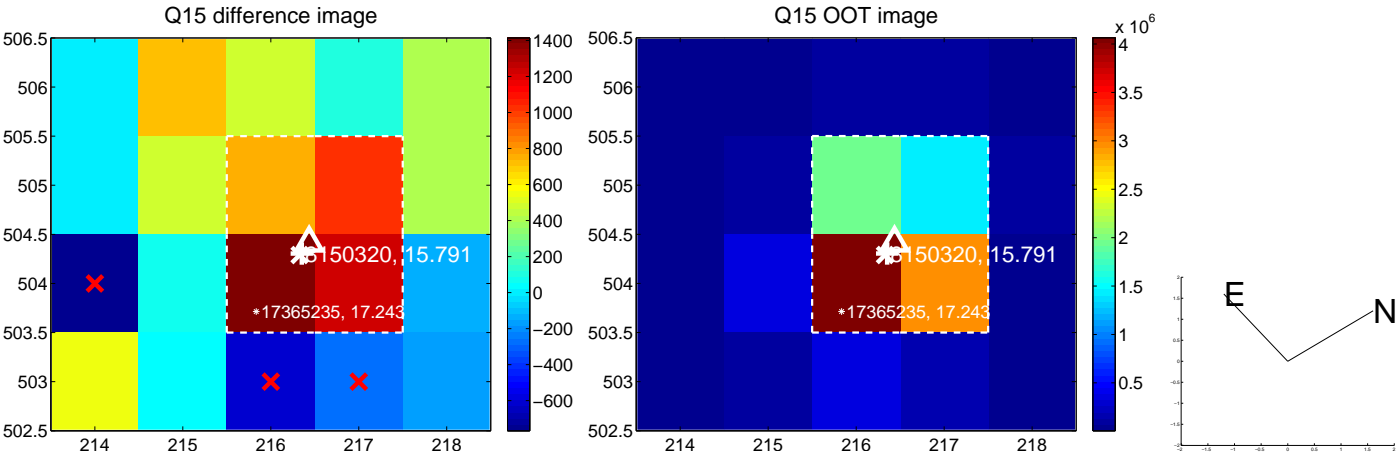
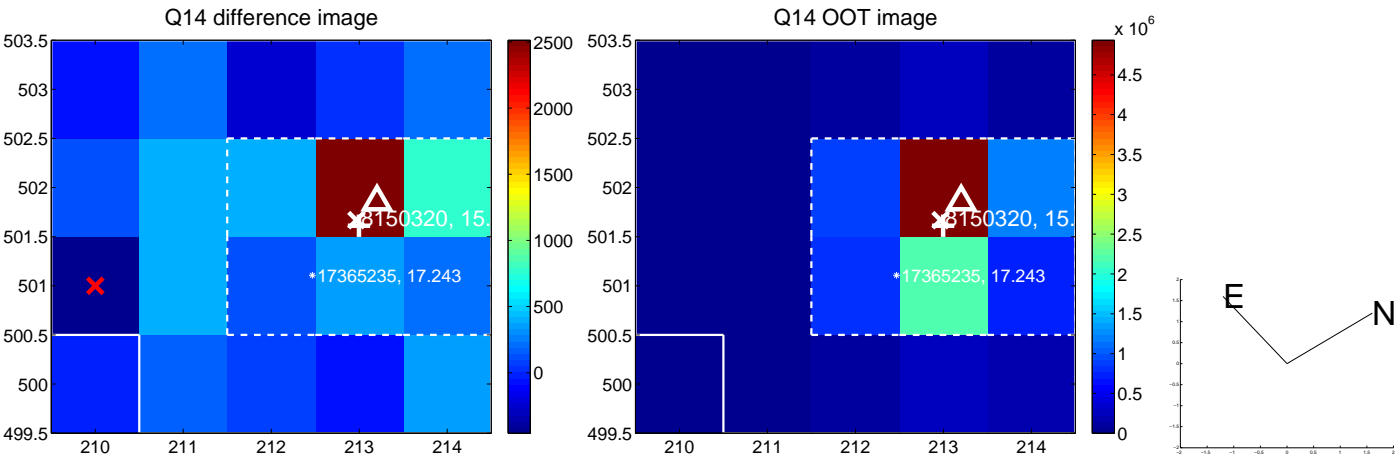
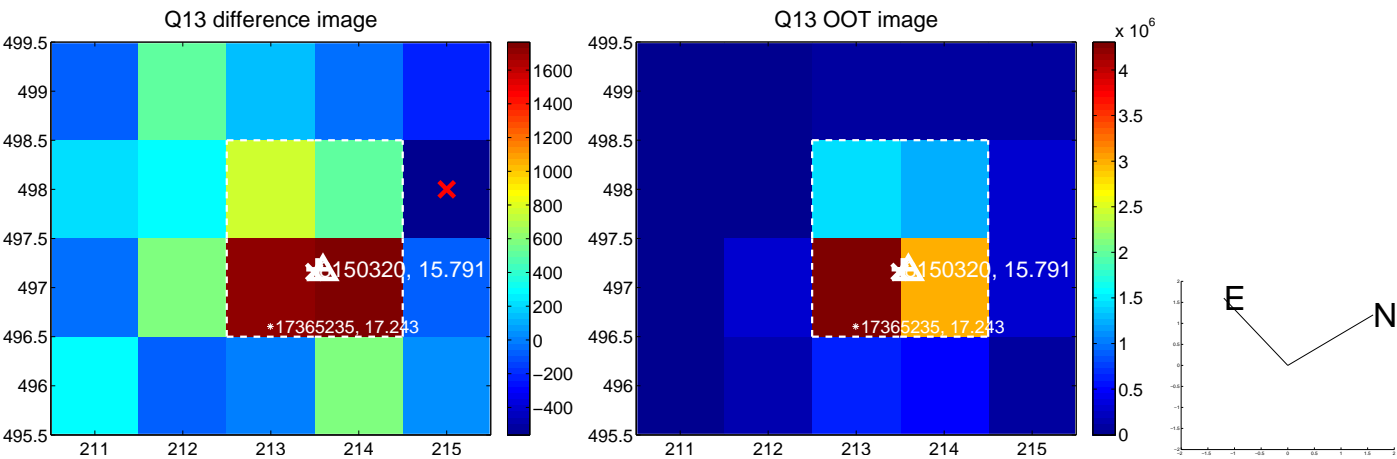




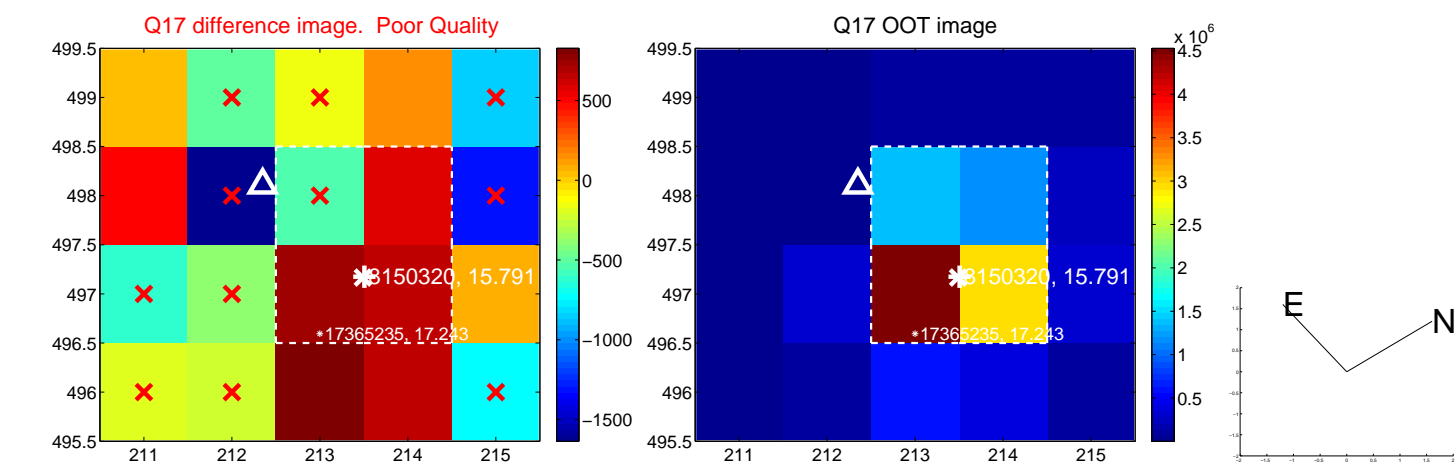
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



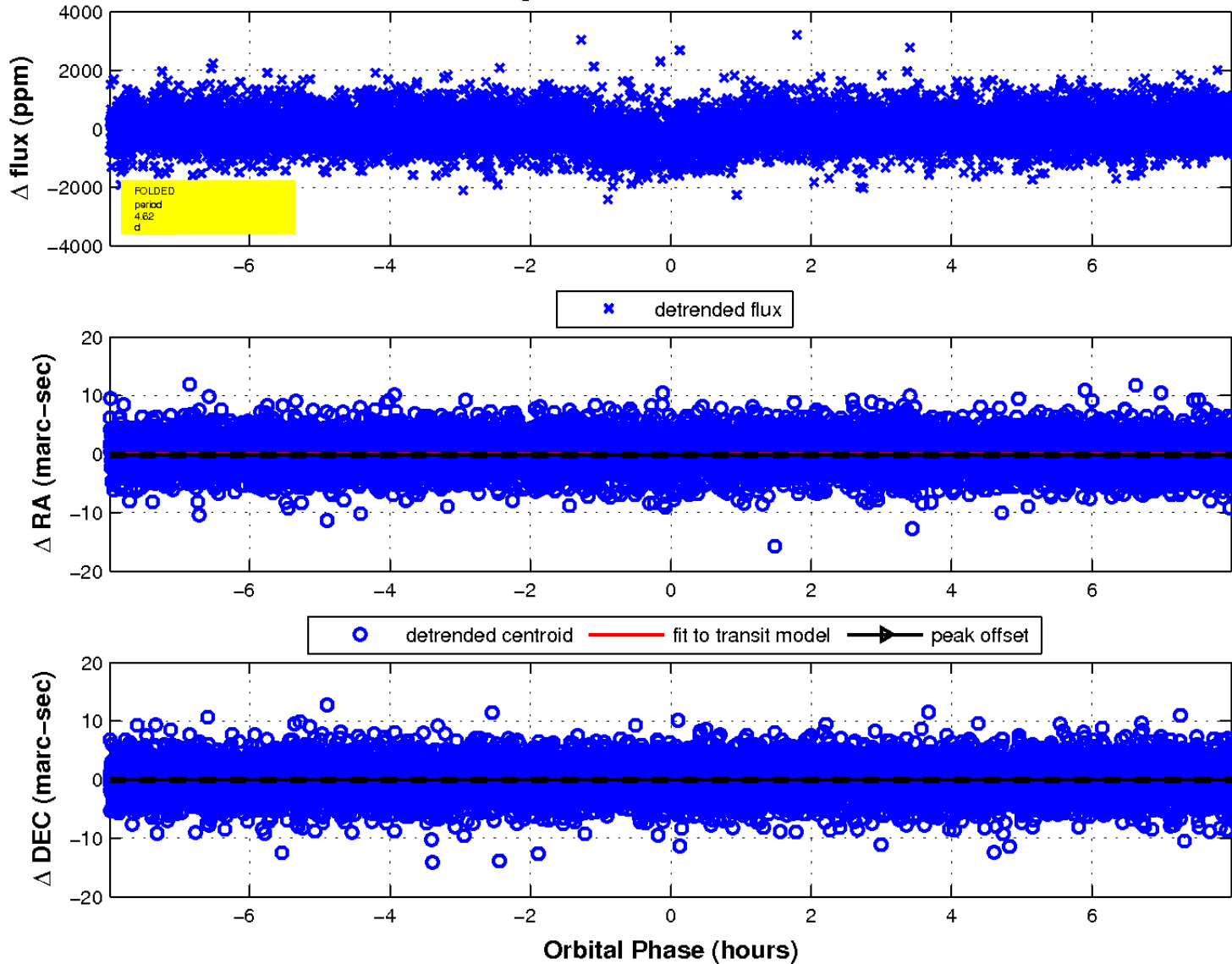
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

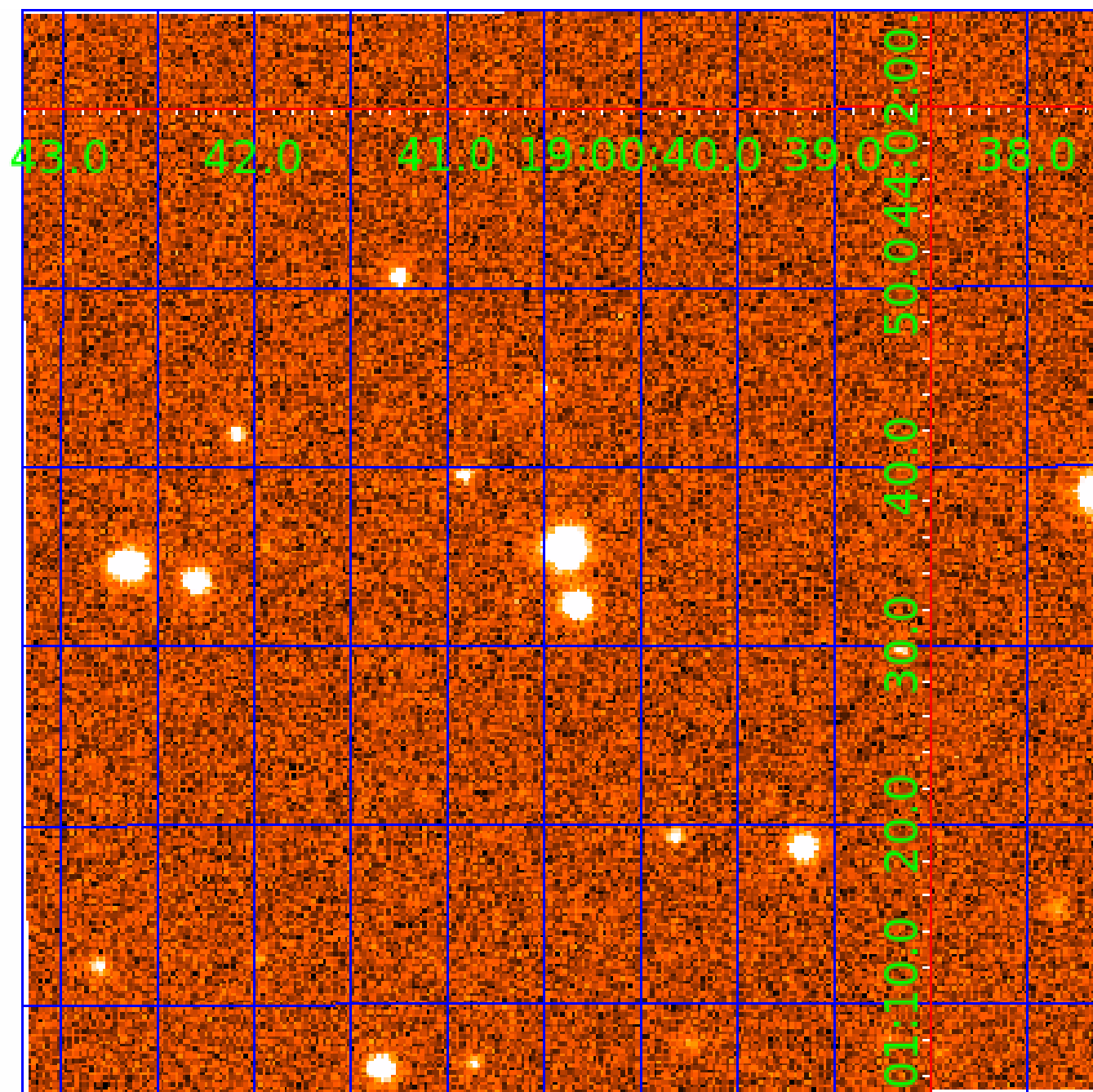


fluxWeightedCentroids, Planet 2 of 5



# UKIRT Image

Declination



# KIC 008150320

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008150320-01	OBS	0904.01	2.211125	132.558926	594.1	1.866	32.7	37.8	0.65	4500	1.95	178.00
008150320-02	OBS	0904.04	4.617487	135.051165	460.3	2.664	18.4	20.6	0.65	4500	1.93	66.69
008150320-03	OBS	0904.02	27.972111	150.411357	920.7	3.916	15.3	17.2	0.65	4500	2.68	6.04
008150320-04	OBS	0904.05	10.198517	137.919927	533.7	2.465	15.0	16.5	0.65	4500	1.65	23.18
008150320-05	OBS	0904.03	42.114180	139.438439	769.8	5.363	13.0	14.0	0.65	4500	1.76	3.50

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008150320-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
008150320-02	OBS	PC	1.00	0	0	0	0	NO_COMMENT
008150320-03	OBS	PC	1.00	0	0	0	0	NO_COMMENT
008150320-04	OBS	PC	1.00	0	0	0	0	NO_COMMENT
008150320-05	OBS	PC	1.00	0	0	0	0	NO_COMMENT

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

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

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

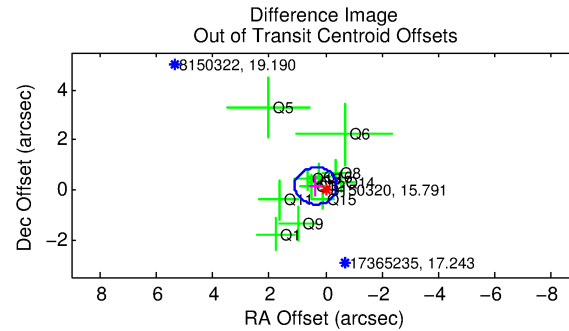
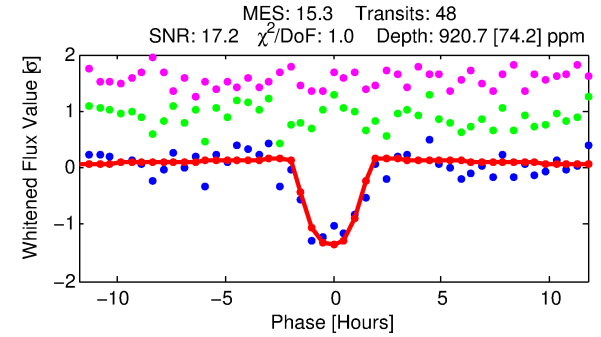
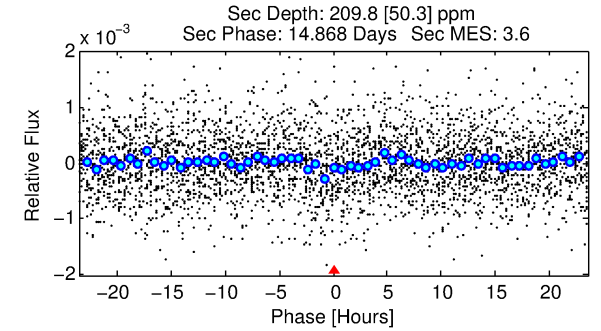
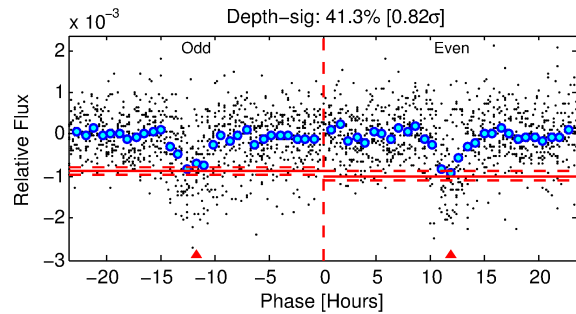
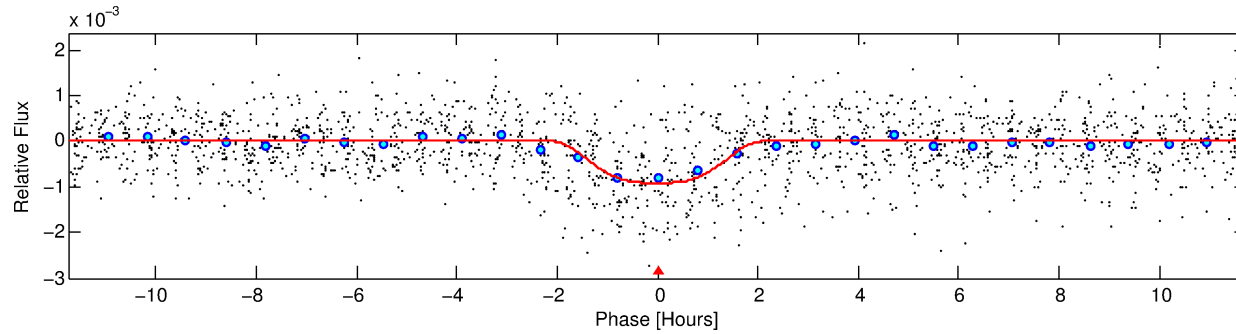
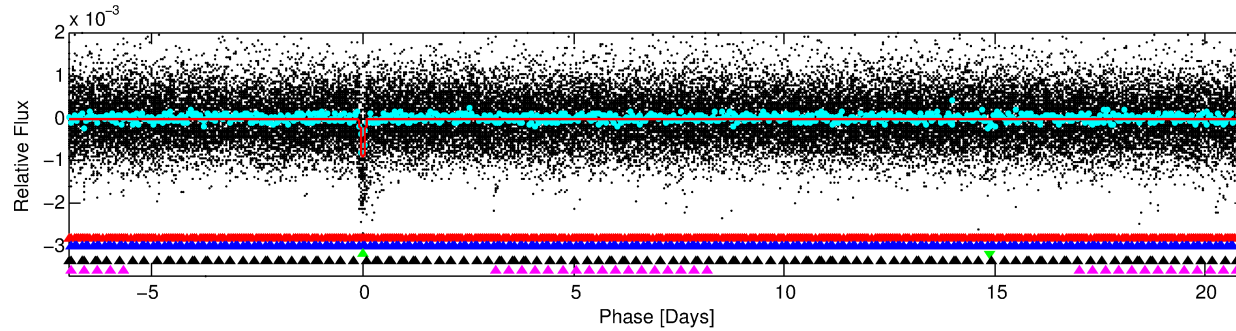
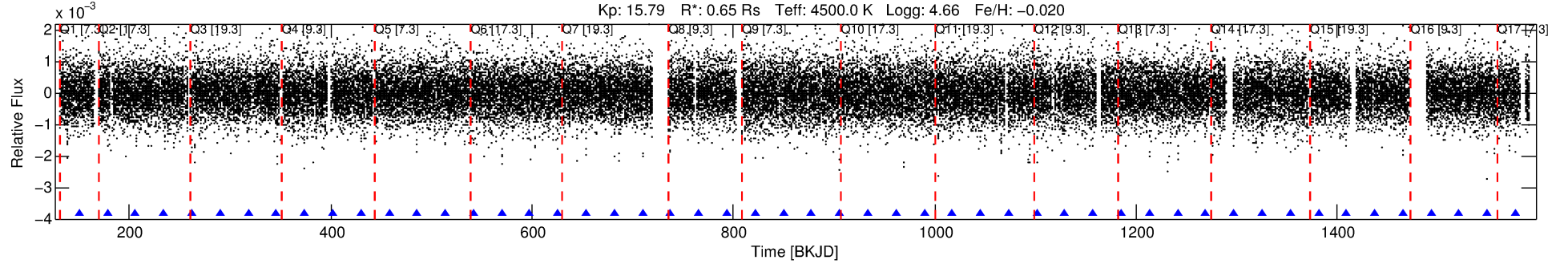
## Ephemeris Match Information For 008150320-03

No Significant Match Found

# DV One-Page Summary

KIC: 8150320 Candidate: 3 of 5 Period: 27.972 d  
KOI: K00904 Name: Kepler-55 Corr: No Ephemeris Match

Kp: 15.79 R\*: 0.65 Rs Teff: 4500.0 K Logg: 4.66 Fe/H: -0.020



## DV Fit Results:

Period = 27.97211 [0.00018] d  
Epoch = 150.4114 [0.0054] BKJD  
Rp/R\* = 0.0380 [0.0027]  
a/R\* = 22.19 [2.97]  
b = 0.96 [0.01]  
Seff = 6.04 [0.68]  
Teq = 400 [11] K  
Rp = 2.68 [0.26] Re  
a = 0.1593 [0.0088] AU  
Ag = 409.24 [118.25] [3.45σ]  
Teffp = 2780 [201] K [11.83σ]

## DV Diagnostic Results:

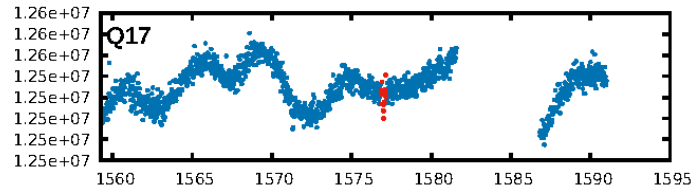
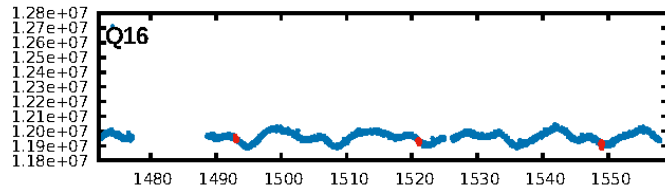
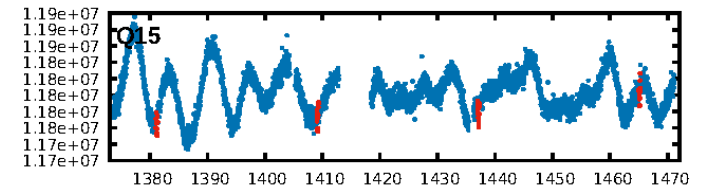
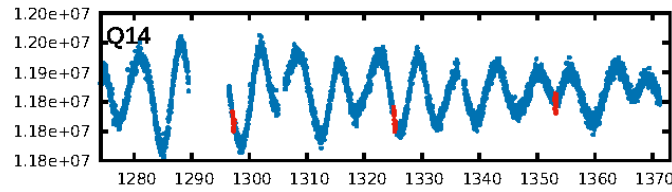
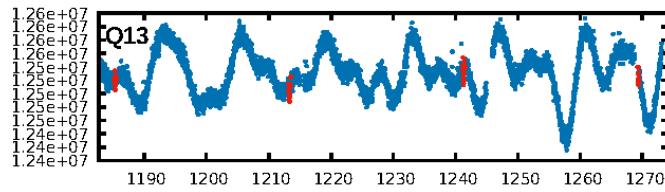
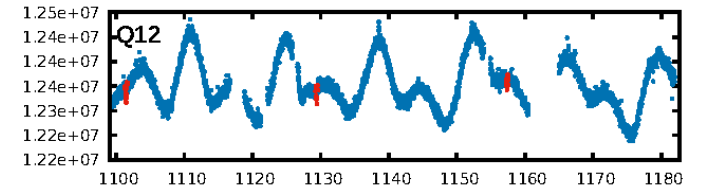
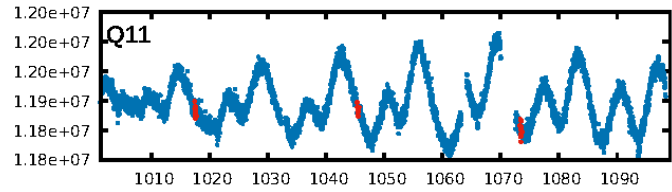
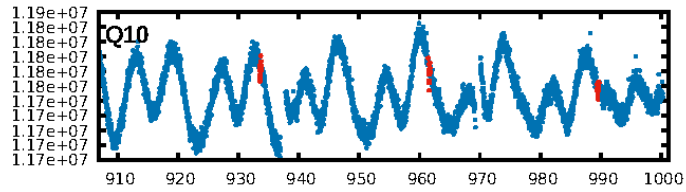
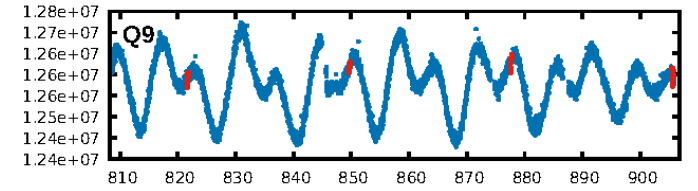
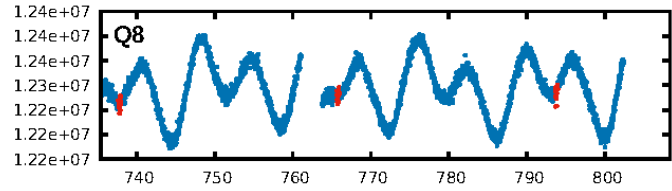
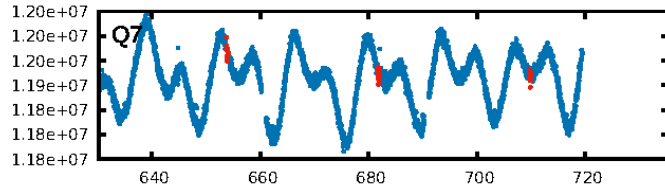
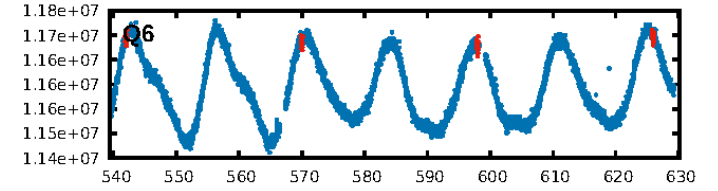
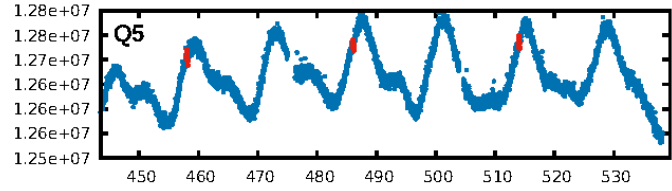
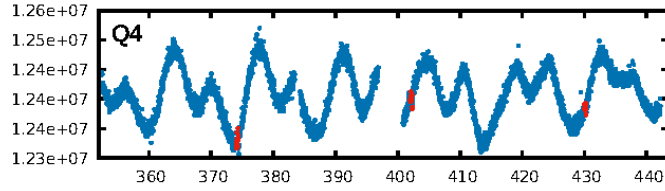
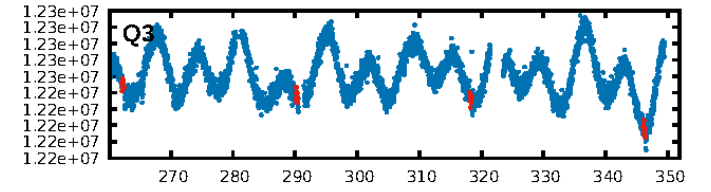
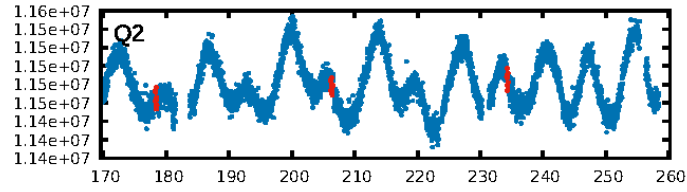
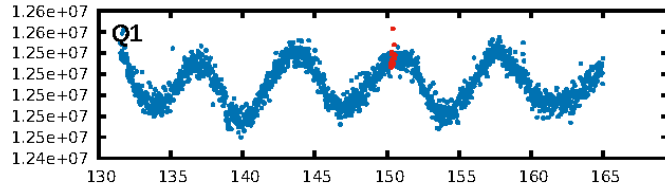
ShortPeriod-sig: 100.0% [92.19σ]  
LongPeriod-sig: 100.0% [51.12σ]  
**ModelChiSquare2-sig: 0.0%**  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 1.32e-48  
RollingBand-fgt: 1.00 [46/46]  
GhostDiagnostic-chr: -19.57  
Centroid-sig: 3.5%  
Centroid-so: 0.849 arcsec [1.49σ]  
OotOffset-rm: 0.379 arcsec [1.54σ]  
KicOffset-rm: 0.431 arcsec [1.48σ]  
OotOffset-st: 2/3/3/4 [12]  
KicOffset-st: 2/3/3/4 [12]  
DiffImageQuality-fgm: 0.83 [10/12]  
DiffImageOverlap-fno: 0.82 [14/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 19:46:41 Z

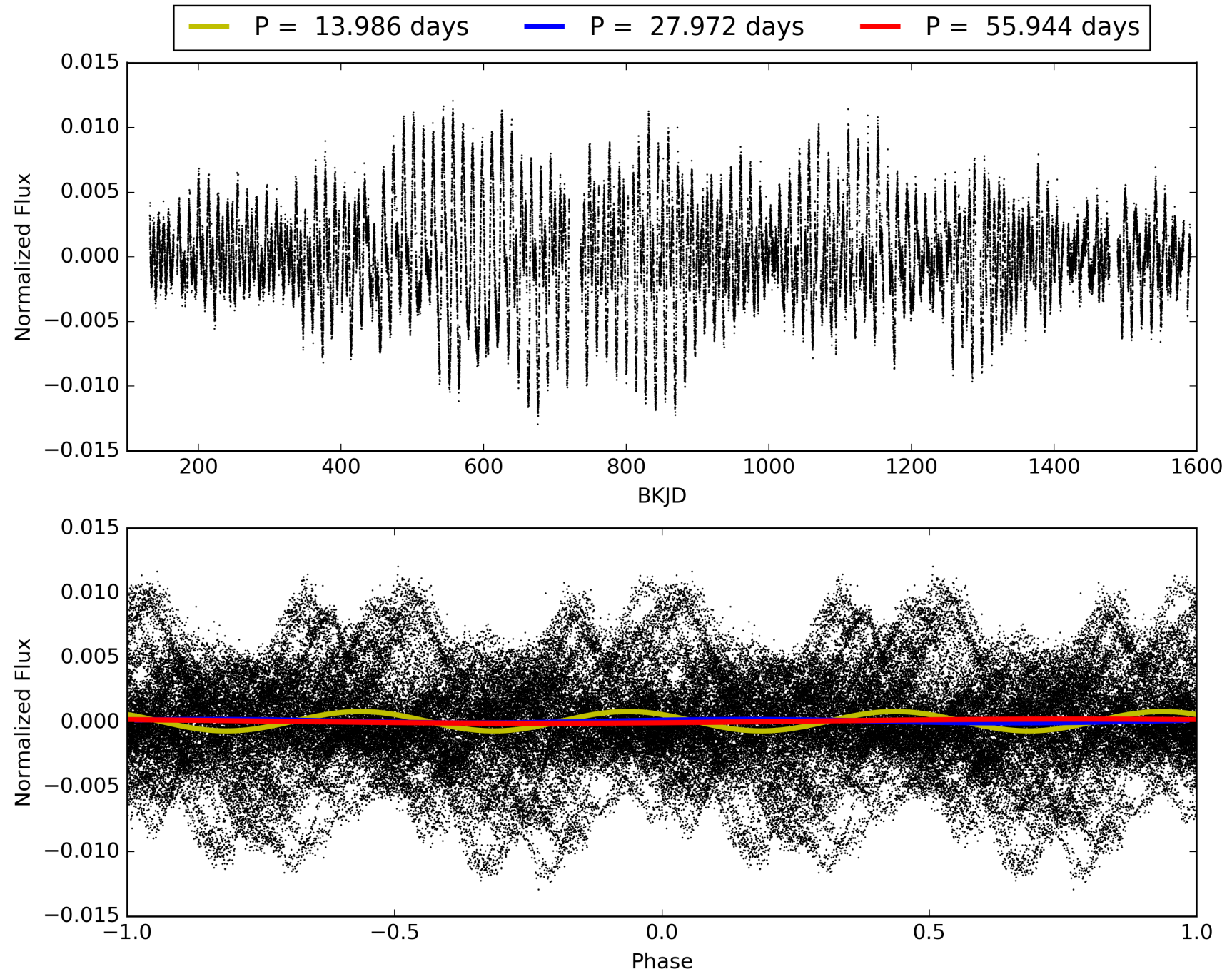
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 008150320-03, PDC Light Curves

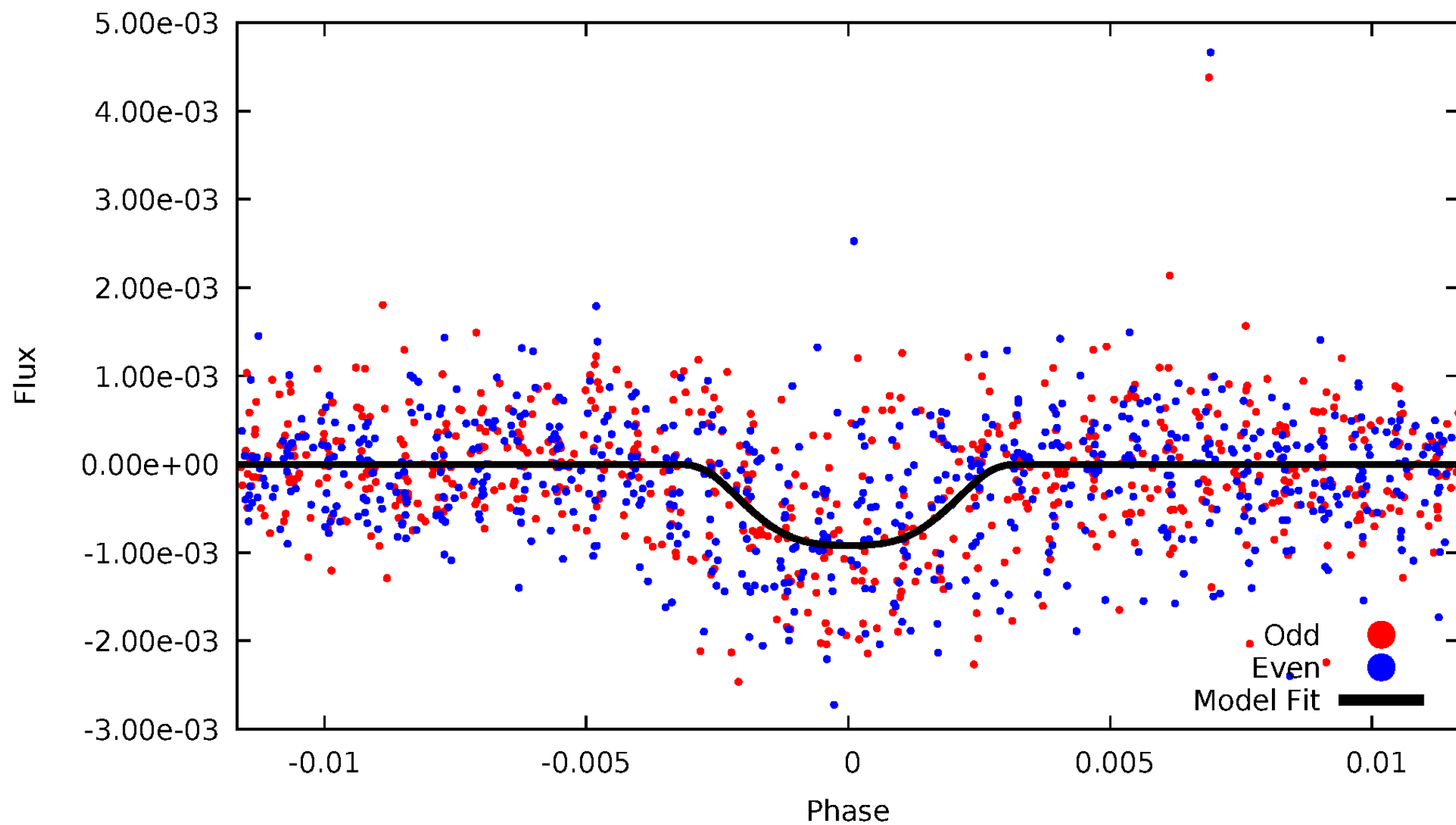


TCE 008150320-03



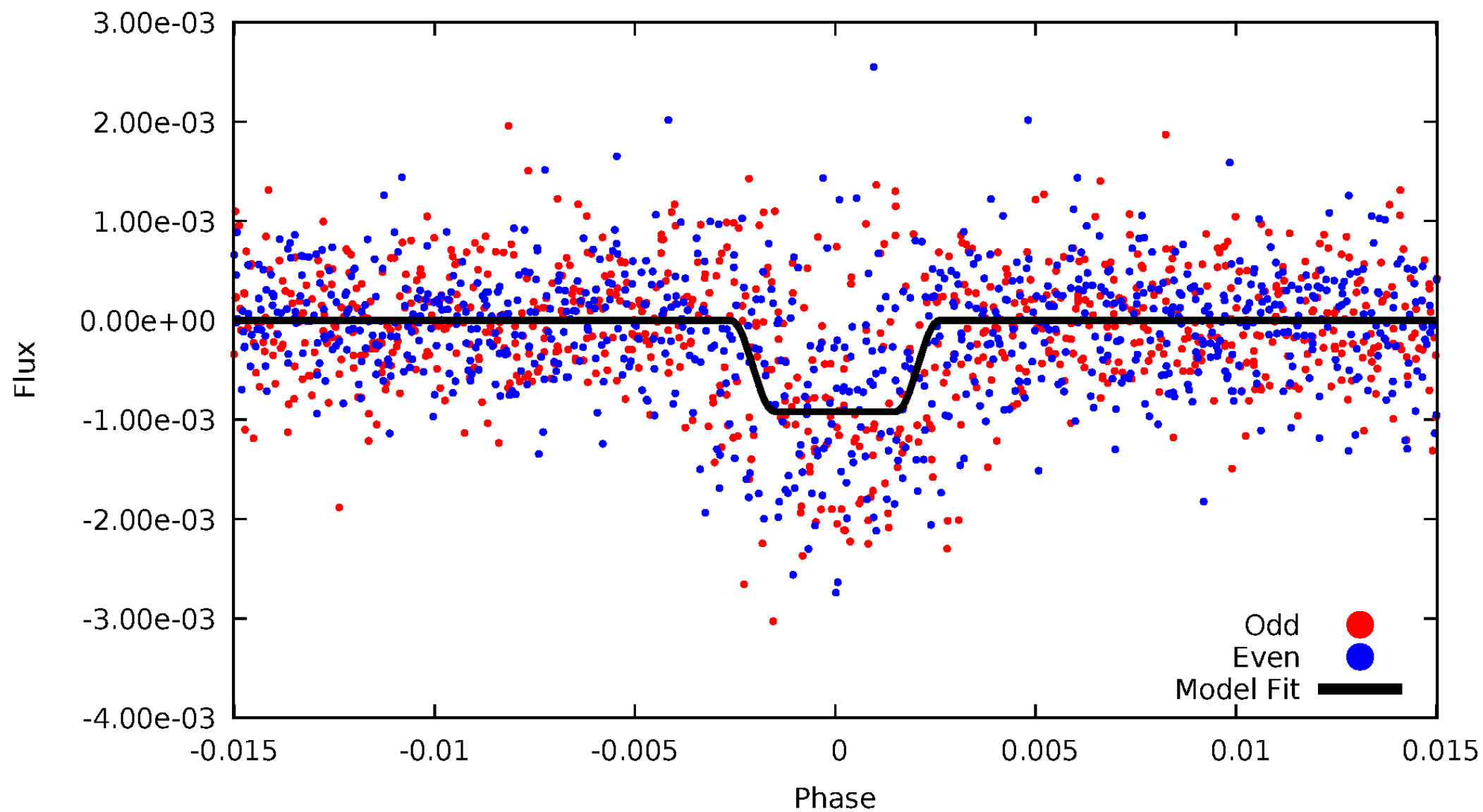
# DV Odd/Even

TCE 008150320-03



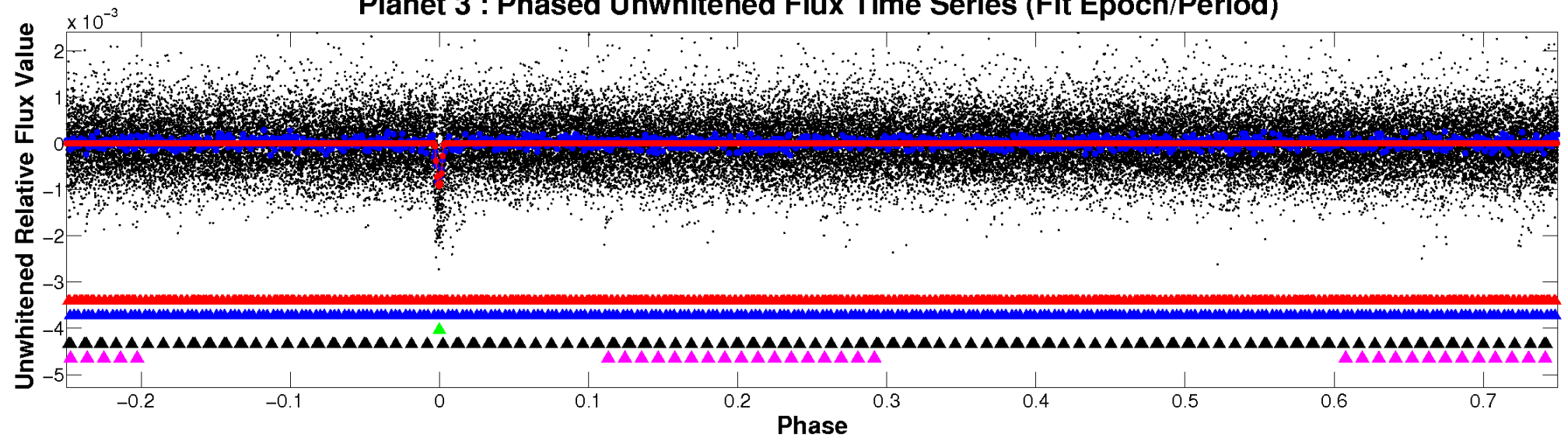
# ALT Odd/Even

TCE 008150320-03

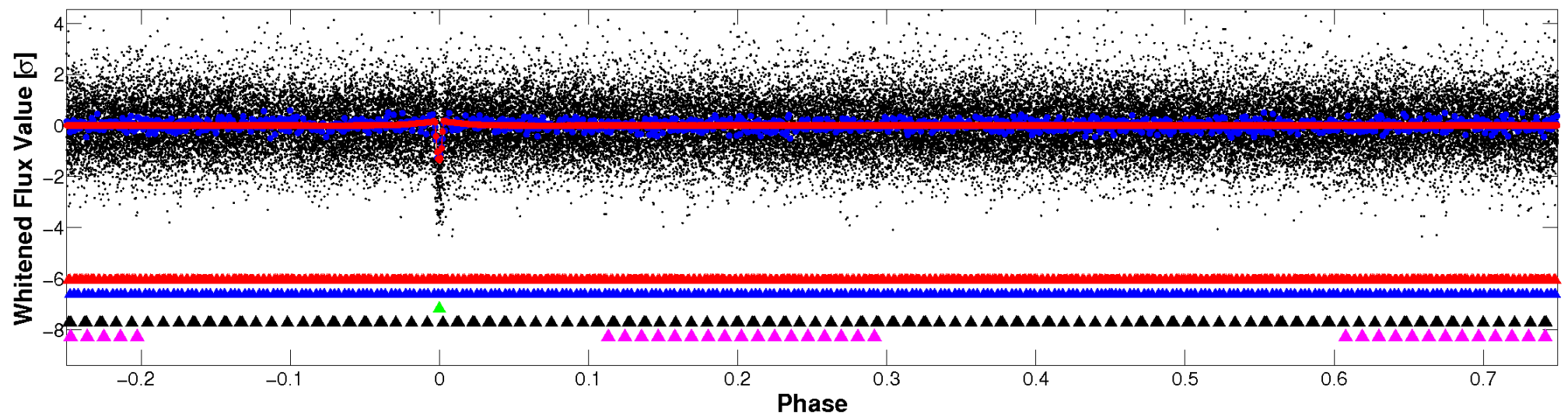


# Non-Whitened Vs. Whitened Light Curve

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

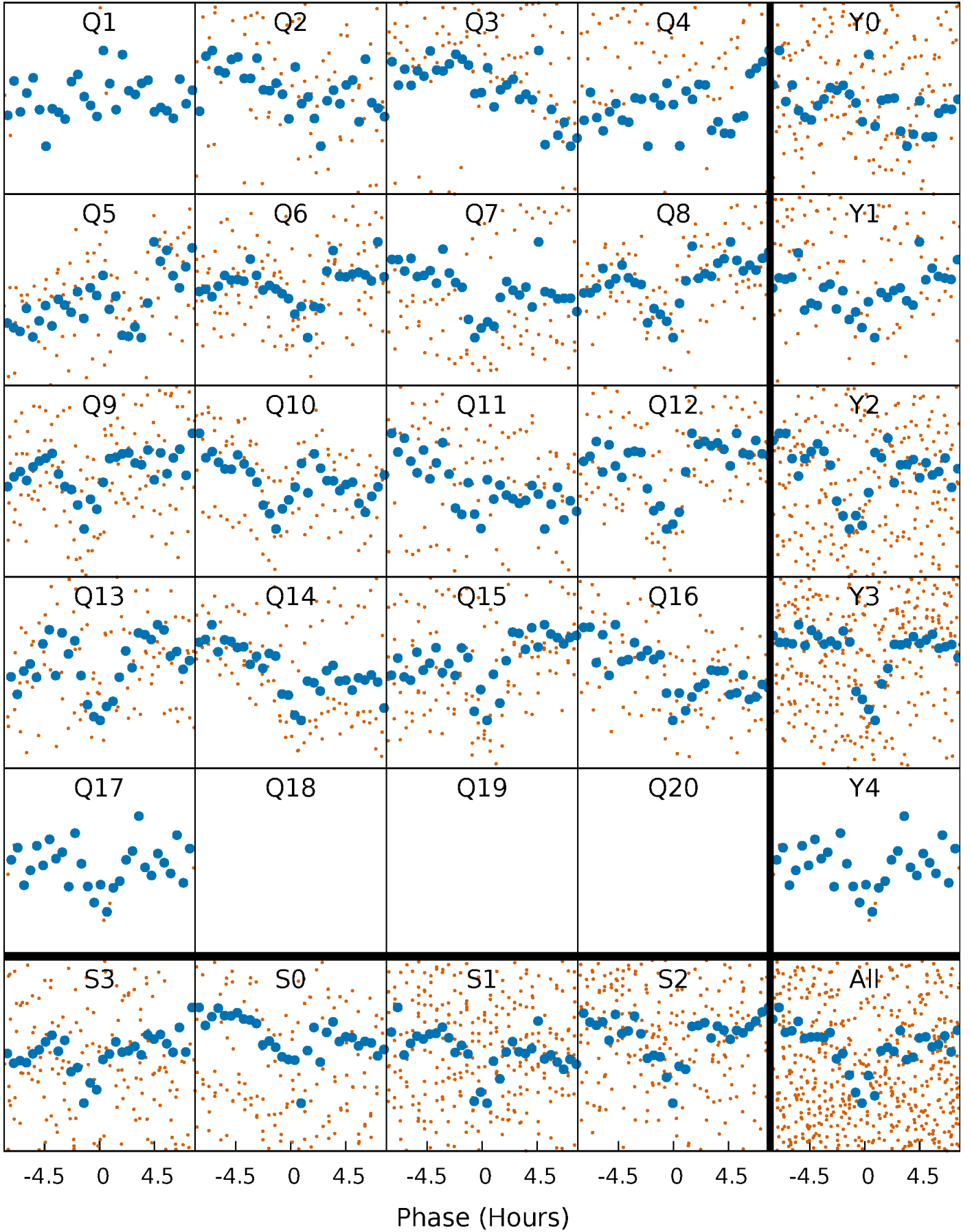


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

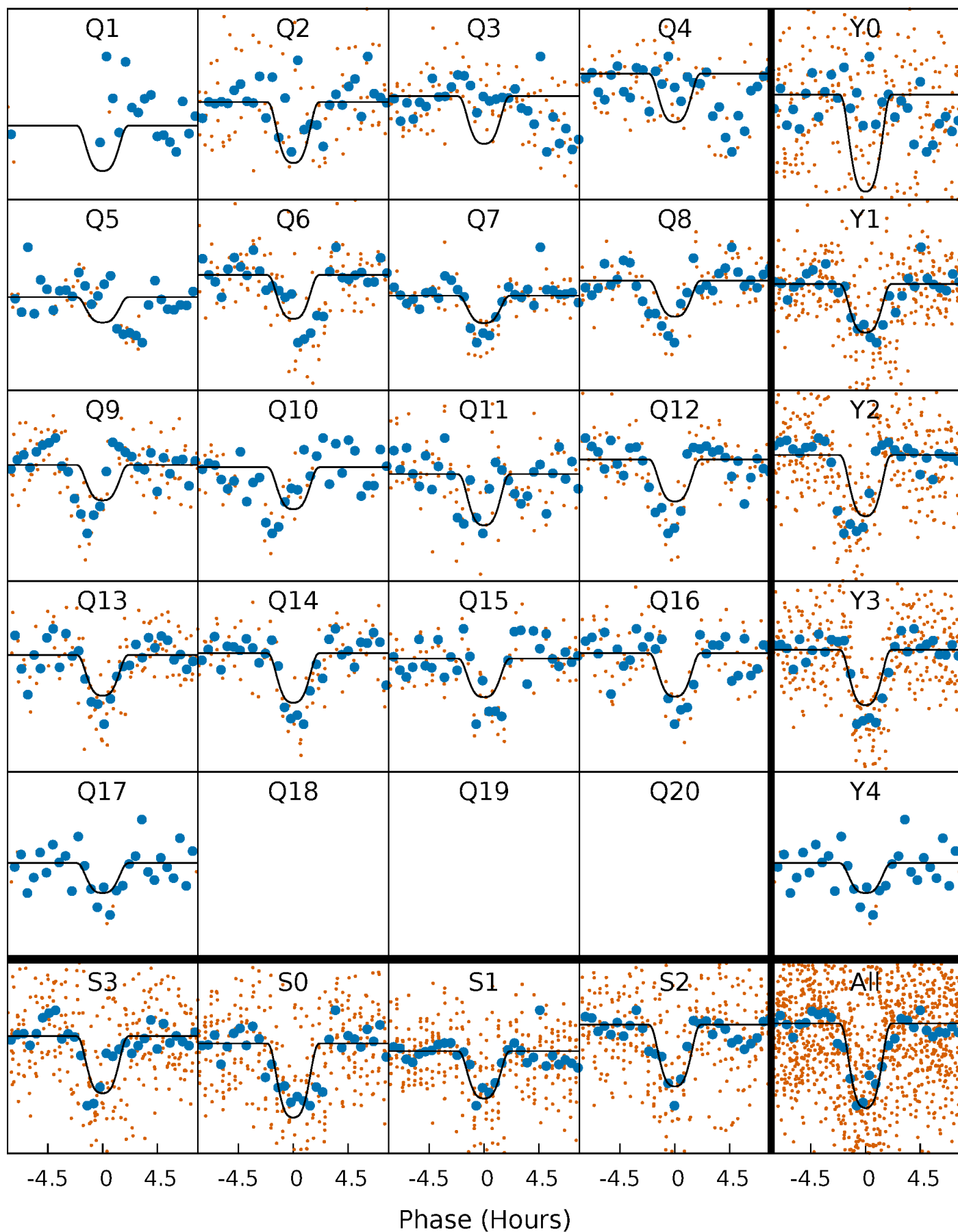
TCE 008150320-03   P= 27.972111 Days    $T_0=150.411357$  (BKJD)





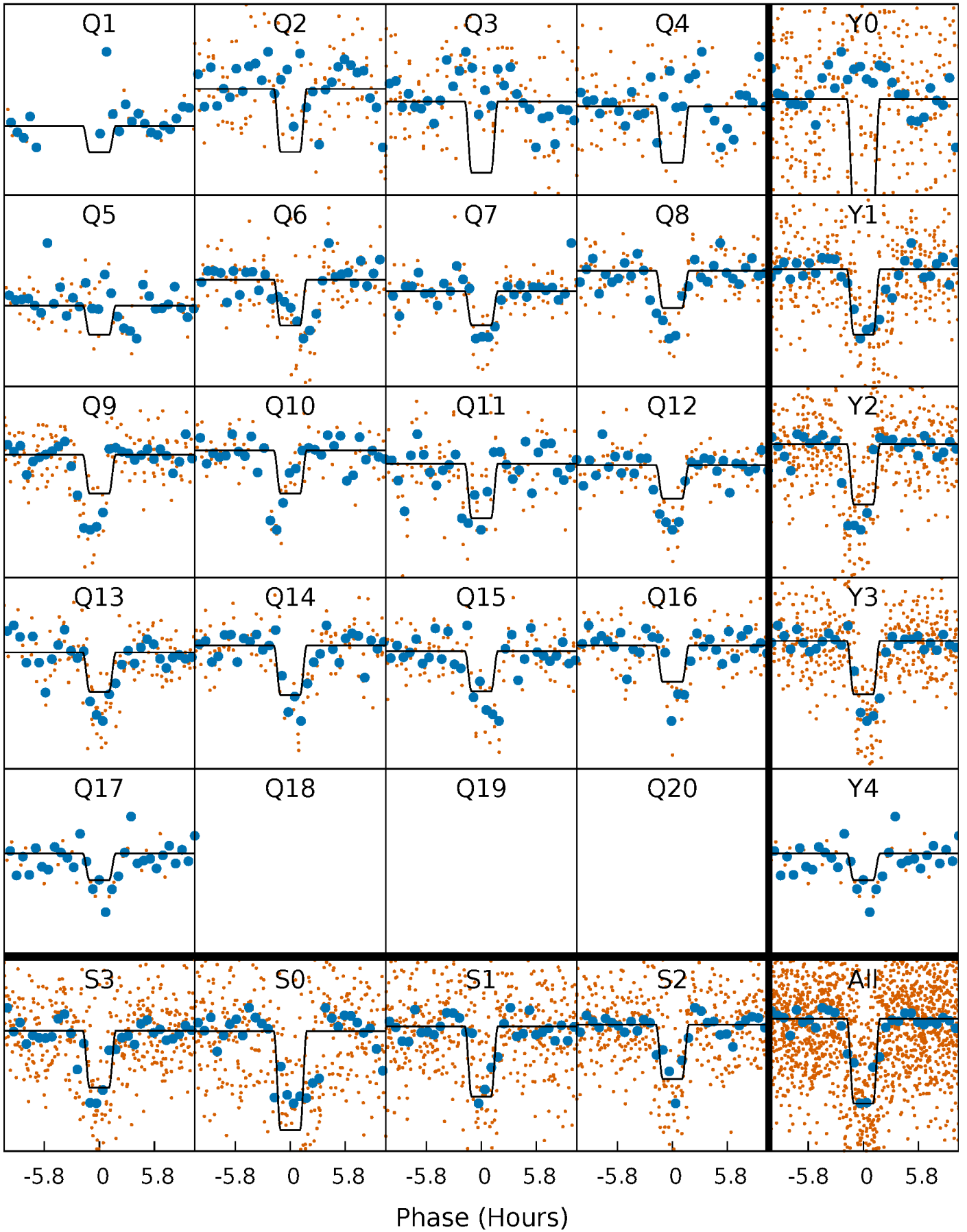
# DV Quarter-Phased Transit Curves

TCE 008150320-03 P= 27.972111 Days  $T_0=150.411357$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

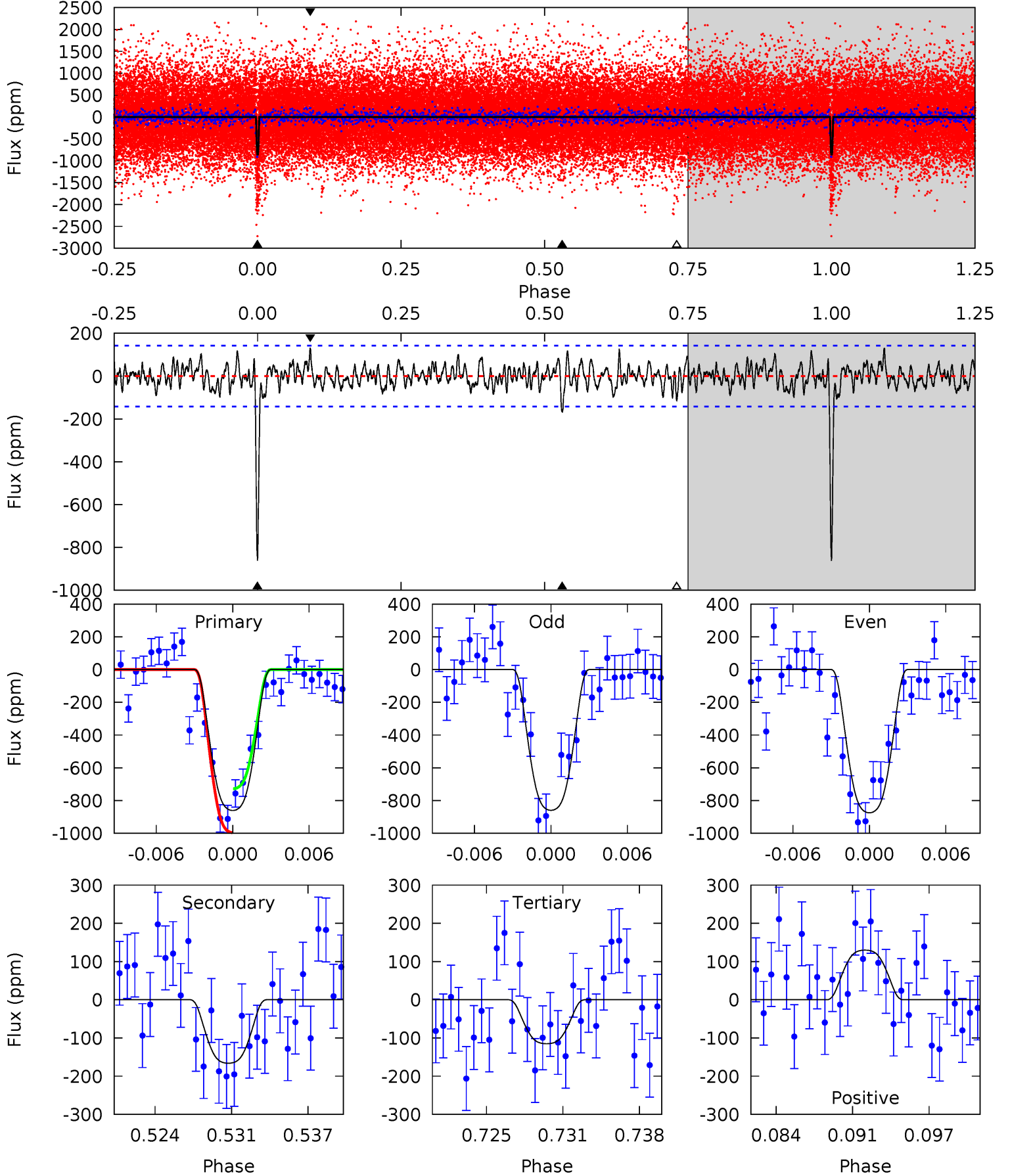
TCE 008150320-03   P= 27.972426 Days    $T_0=150.387545$  (BKJD)



# DV Model-Shift Uniqueness Test

008150320-03,  $P = 27.972111$  Days,  $E = 122.439246$  Days

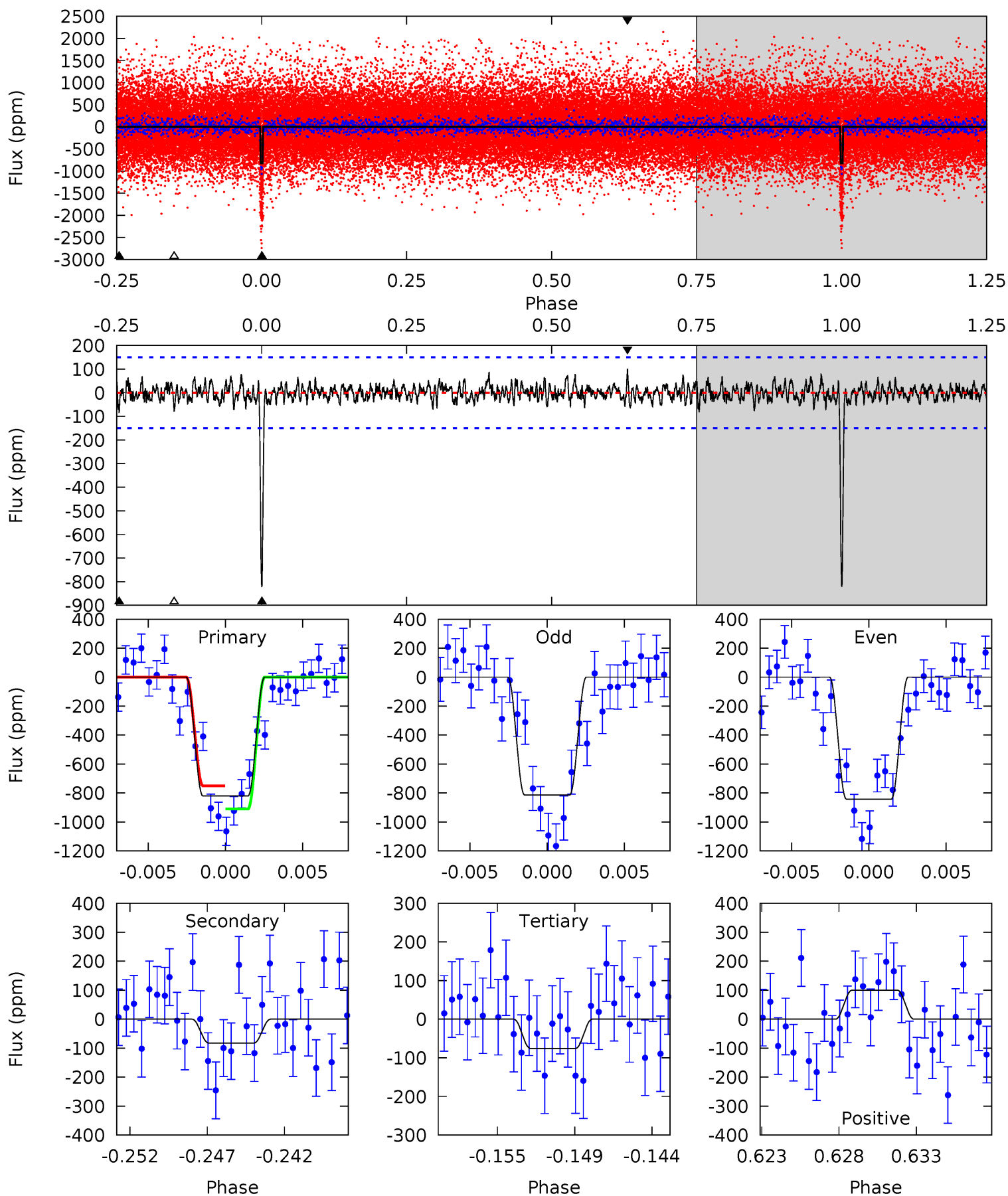
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
30.9	5.96	4.13	4.66	5.11	2.72	1.48	26.8	26.2	1.83	1.30	0.27	0.88	0.13	4.81



# Alt Model-Shift Uniqueness Test

008150320-03,  $P = 27.972426$  Days,  $E = 122.415119$  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
28.2	2.83	2.60	3.44	5.15	2.80	0.91	25.6	24.8	0.23	-0.62	0.48	0.85	0.11	2.75



### Stellar Parameters For KIC 008150320

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$4500^{+90}_{-90}$	$4.656^{+0.013}_{-0.043}$	$-0.020^{+0.150}_{-0.150}$	$0.646^{+0.043}_{-0.020}$	$0.710^{+0.029}_{-0.043}$	$3.719^{+0.220}_{-0.623}$
	+2%/-2%	+0%/-1%	+750%/-750%	+7%/-3%	+4%/-6%	+6%/-17%
Source	SPE58	SPE58	SPE58	DSEP		

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

### Secondary Eclipse Parameters for KIC 008150320-03 / KOI 0904.02

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-166 \pm 28$	$2.73^{+0.20}_{-0.22}$	$561^{+13}_{-12}$	$3124^{+113}_{-104}$	$313^{+75}_{-66}$
Alt.	$-82 \pm 29$	$2.19^{+0.18}_{-0.19}$	$563^{+13}_{-13}$	$3021^{+168}_{-189}$	$242^{+102}_{-86}$

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

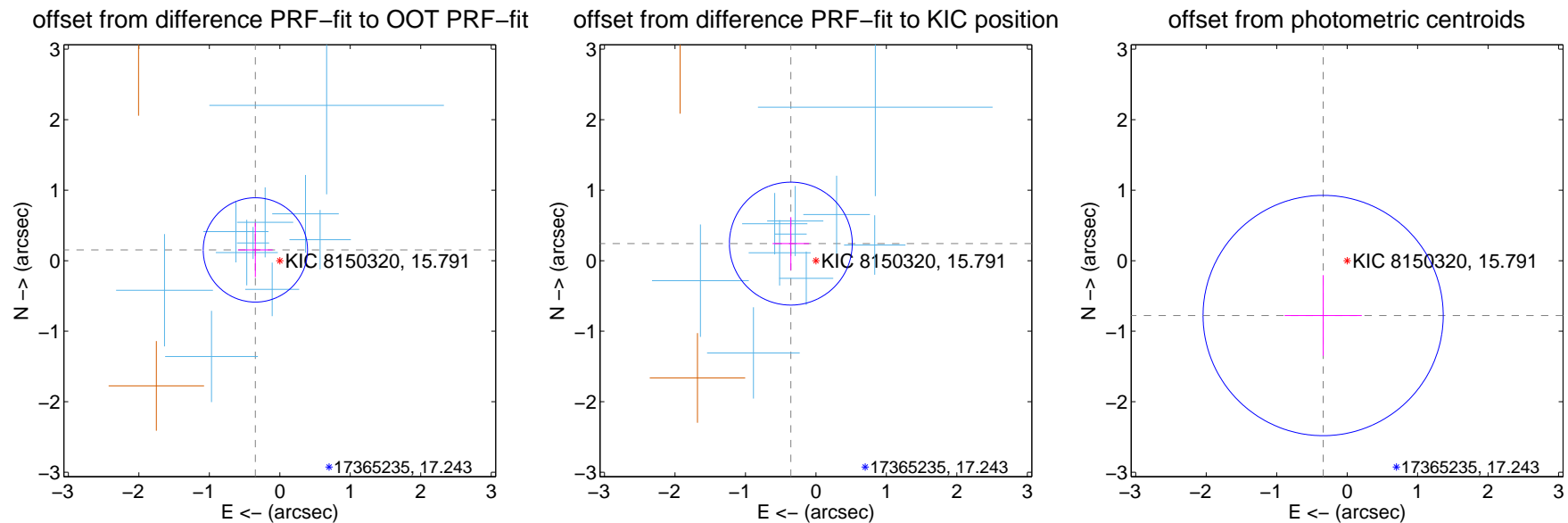
## DV Centroid Data

Supplemental centroid analysis for 008150320-03. Kepler magnitude: 15.79. Transit SNR 17.18

There are 10 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.09 arcsec

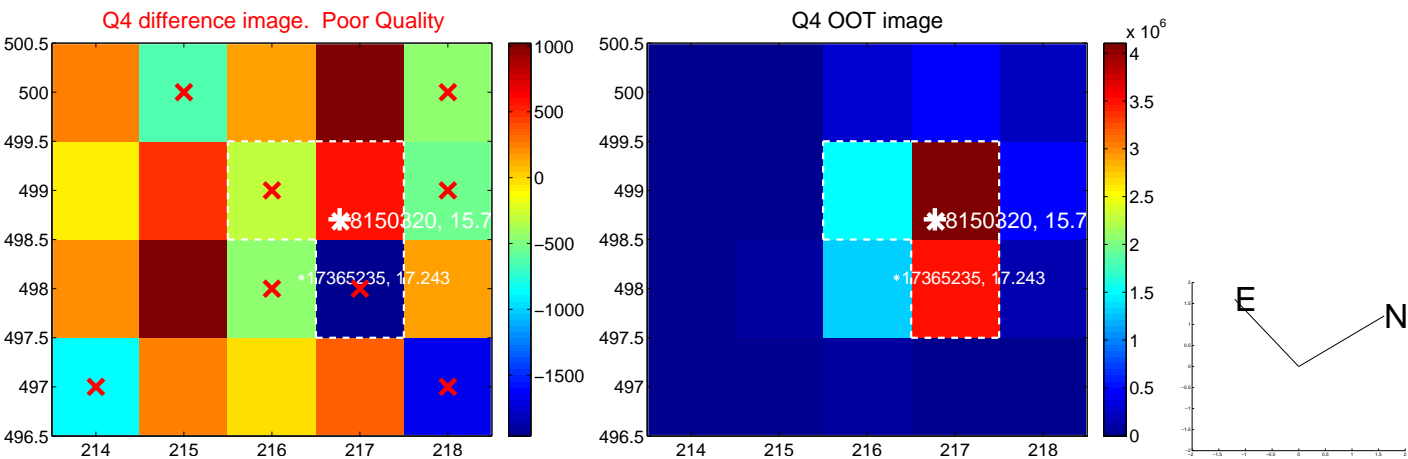
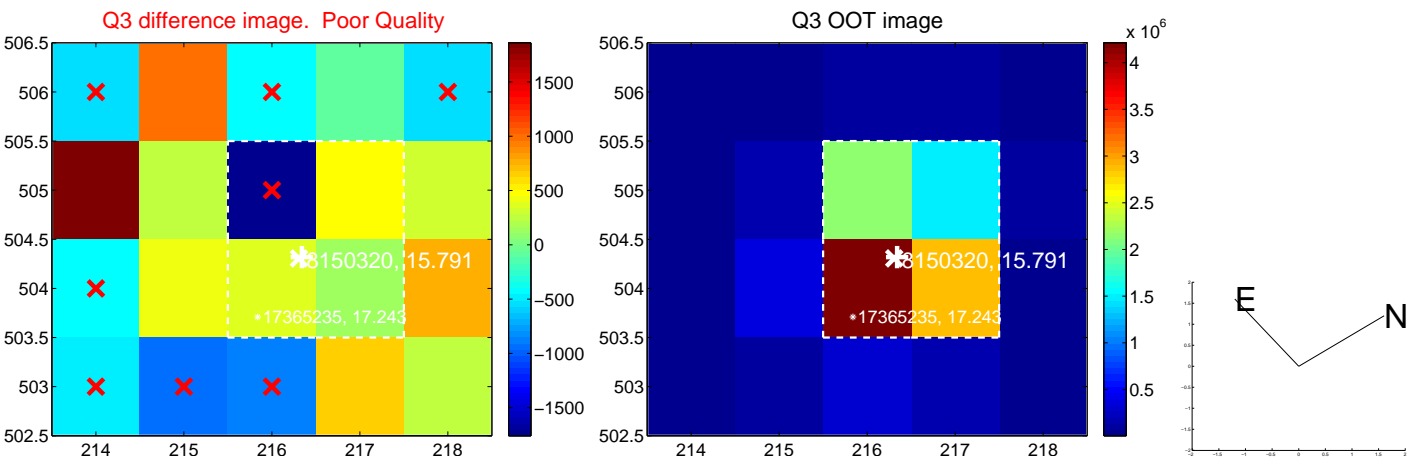
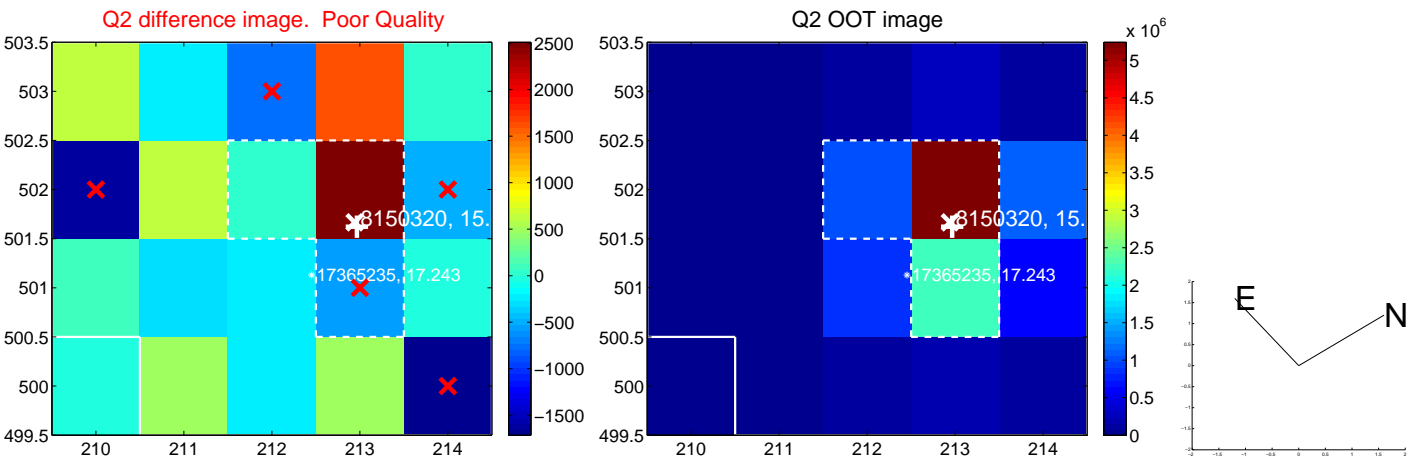
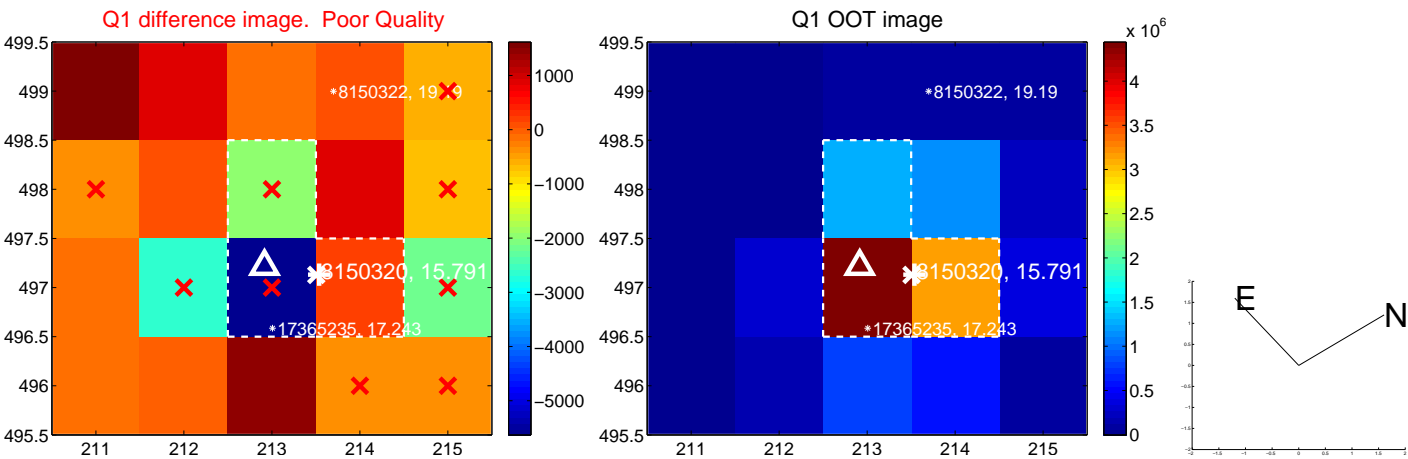
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.379 \pm 0.247$	1.54	$0.347 \pm 0.246$	$0.153 \pm 0.385$
PRF-fit source offset from KIC position	$0.431 \pm 0.291$	1.48	$0.356 \pm 0.259$	$0.242 \pm 0.377$
photometric centroid source offset	$0.85 \pm 0.57$	1.49	$0.34 \pm 0.55$	$-0.78 \pm 0.57$



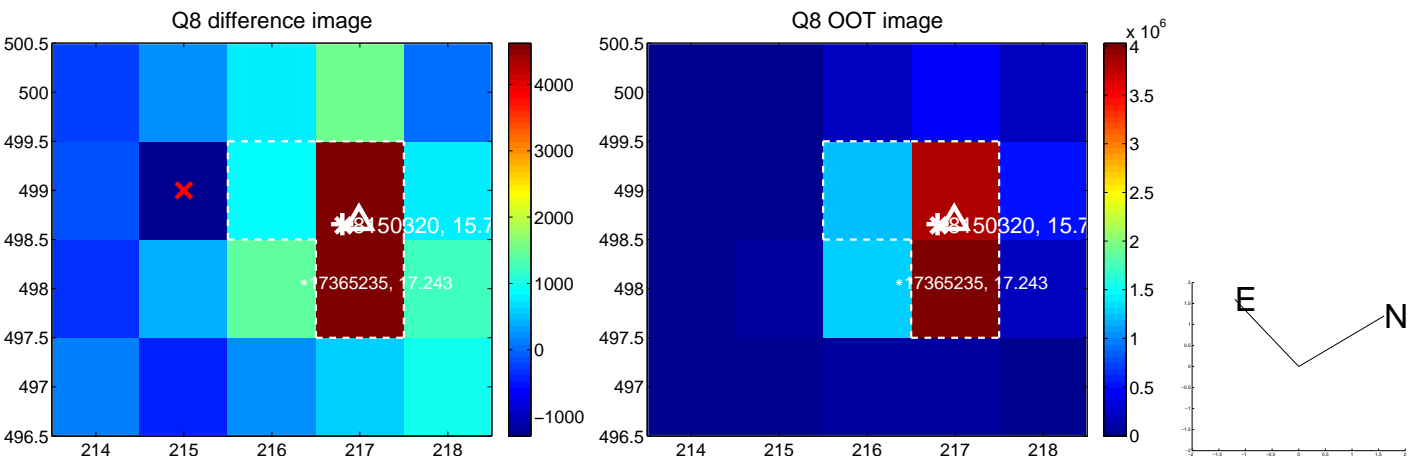
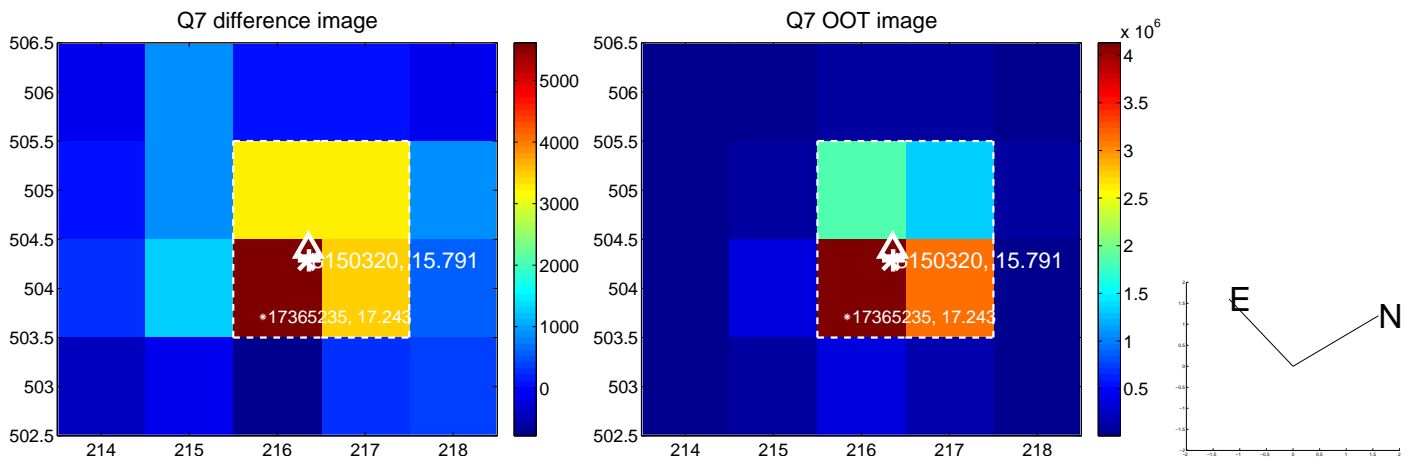
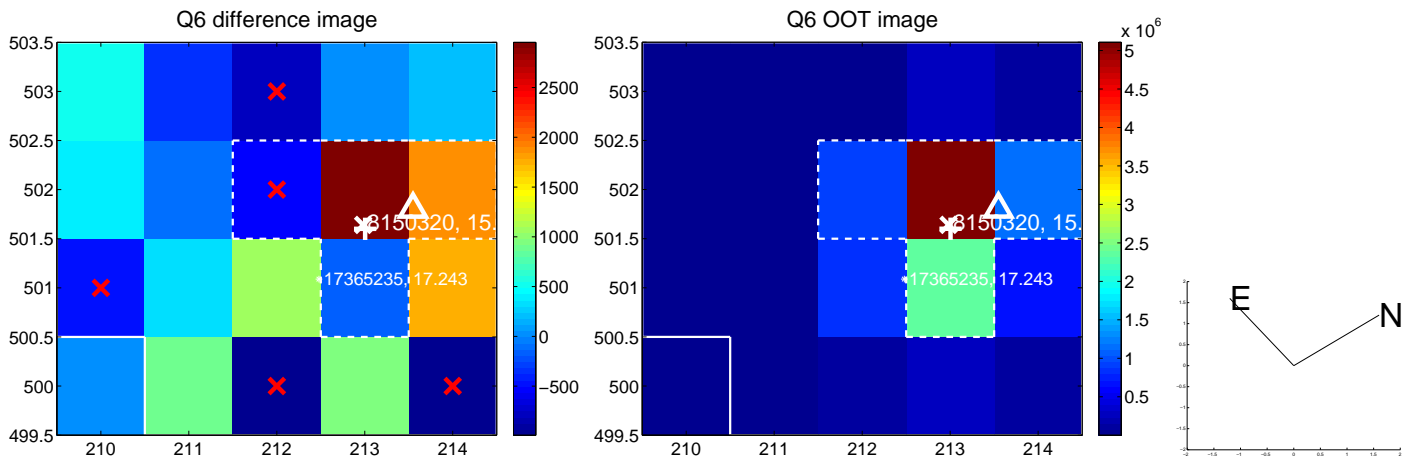
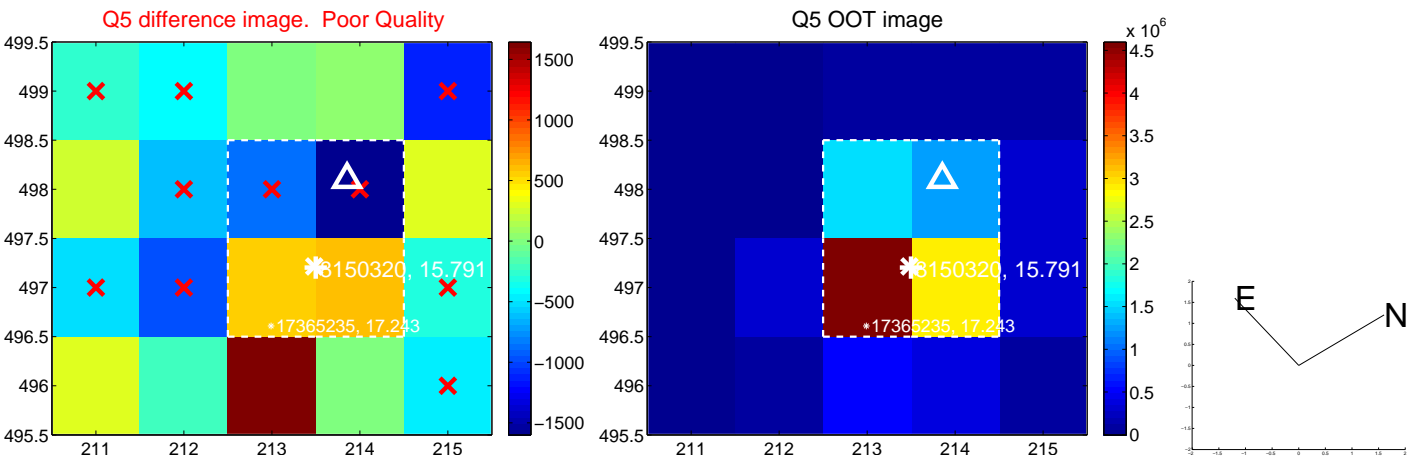
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



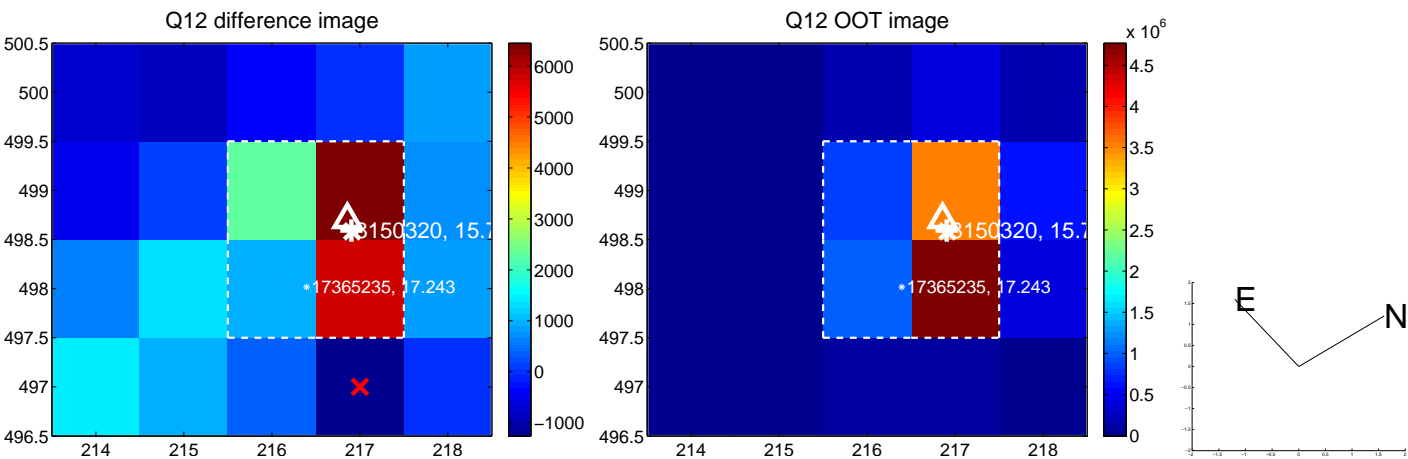
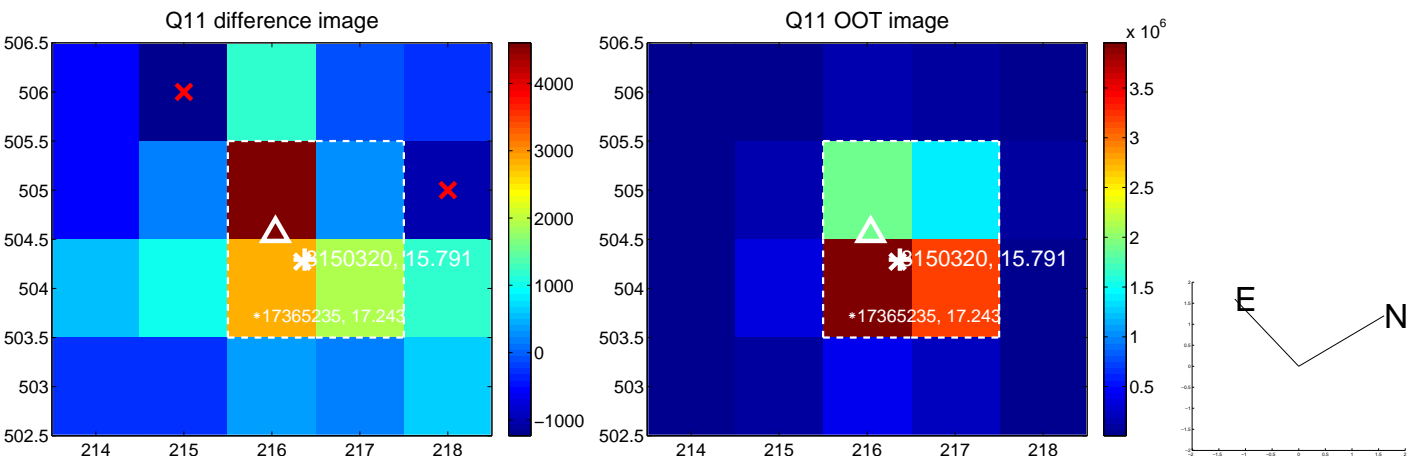
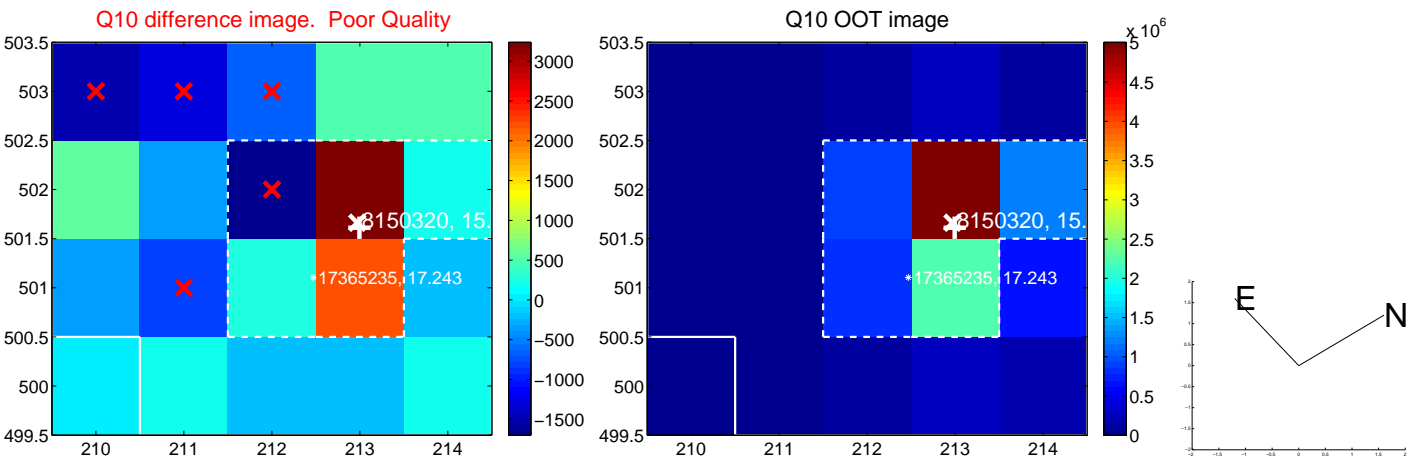
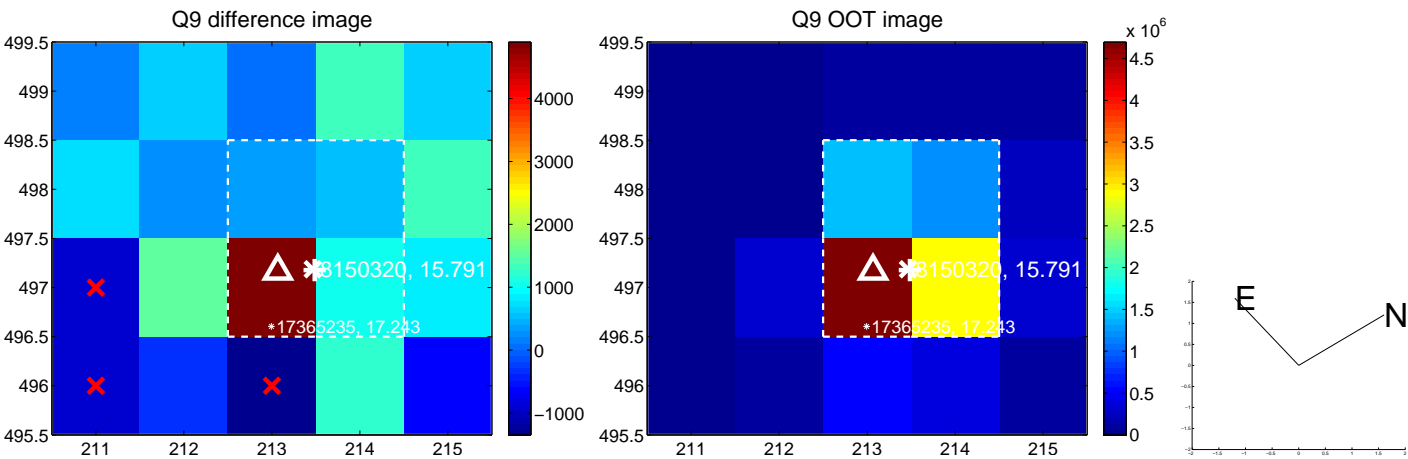
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



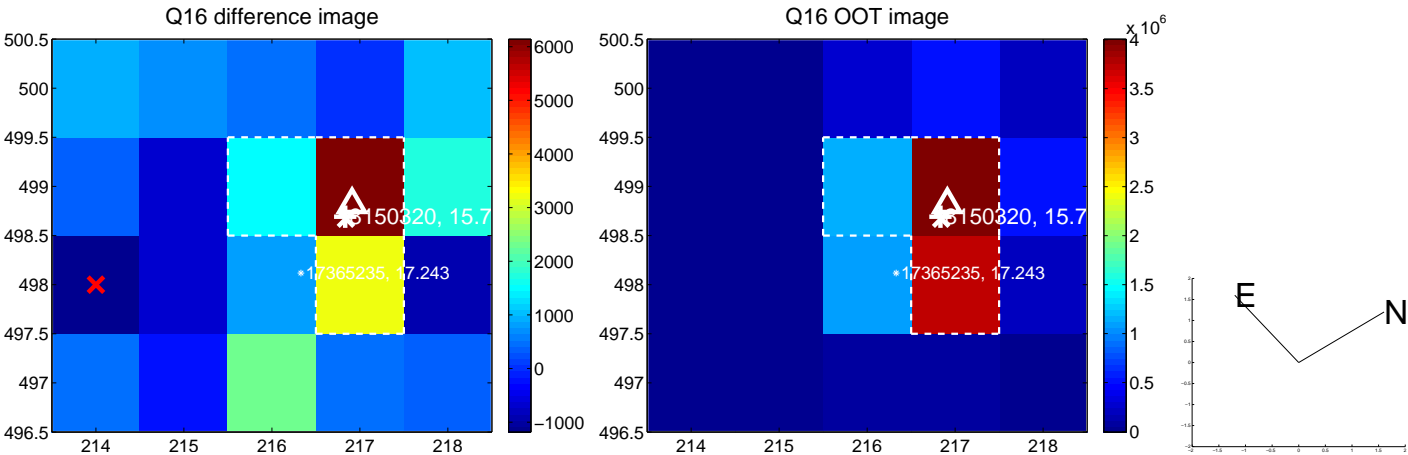
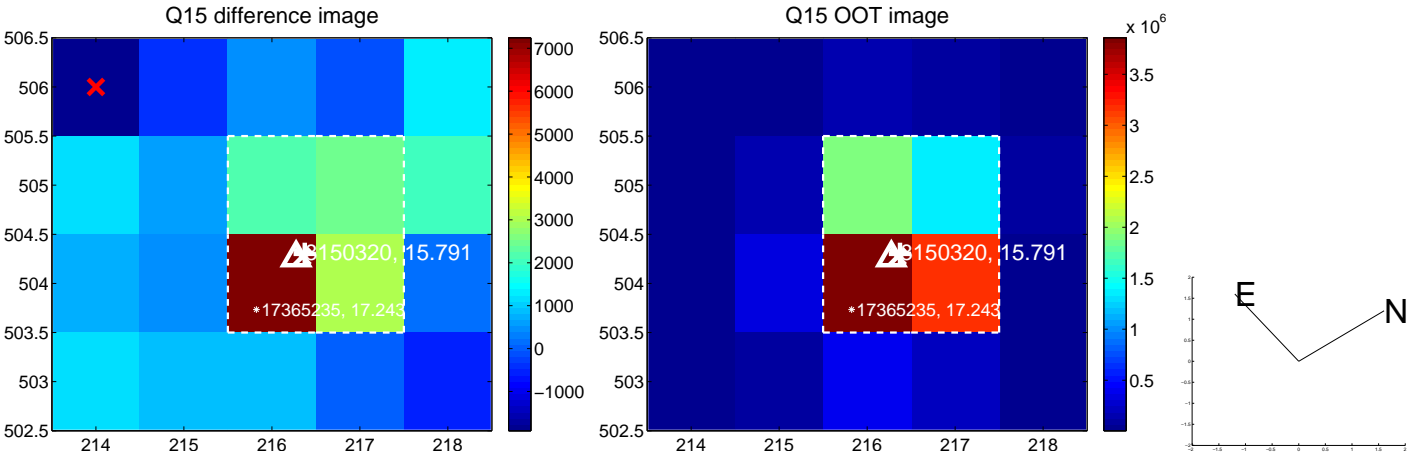
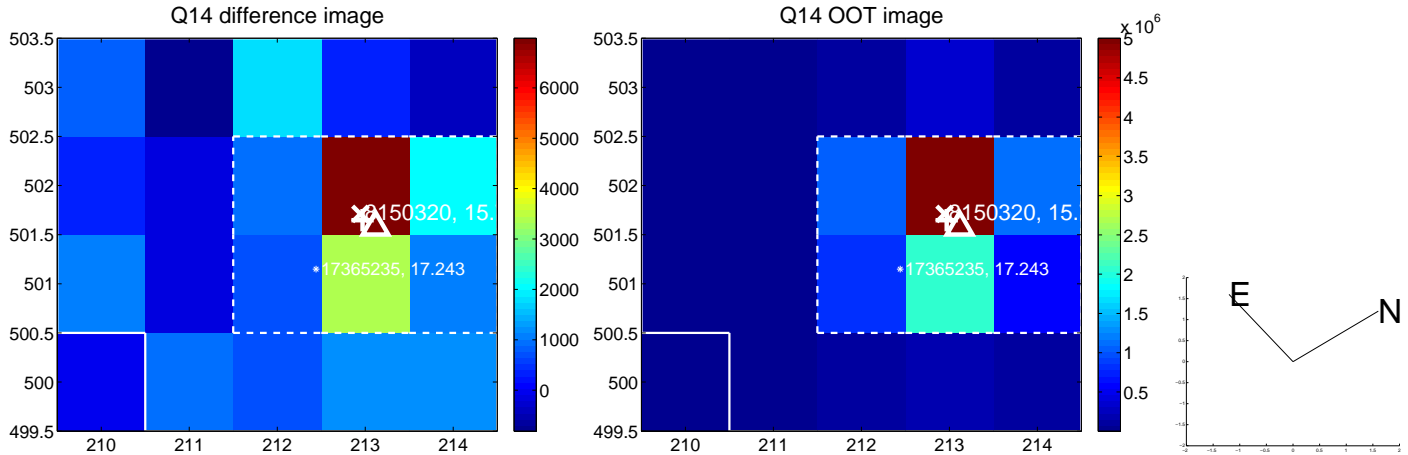
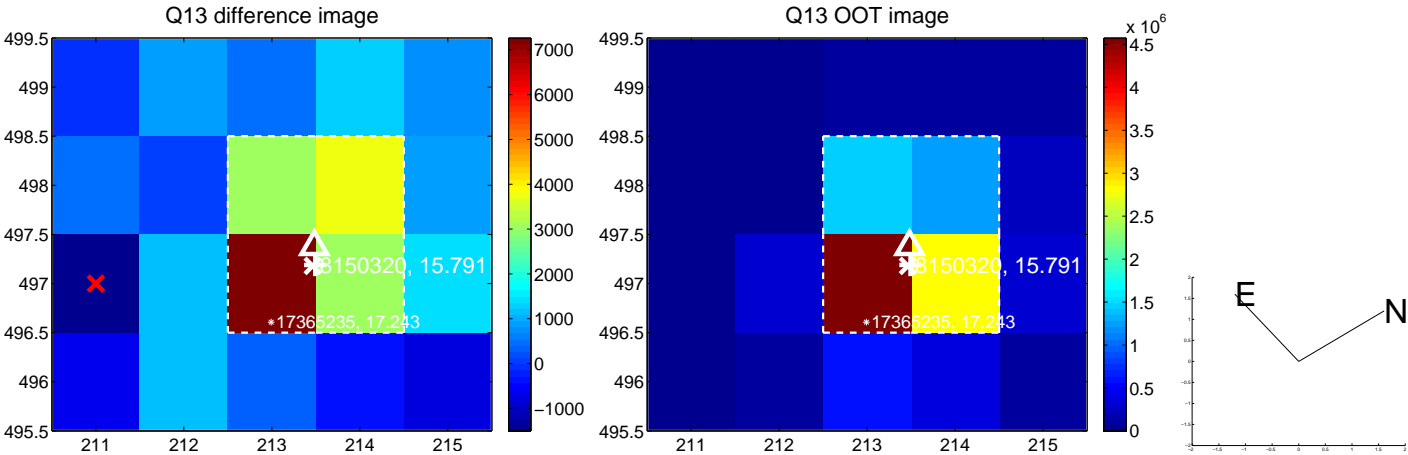
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



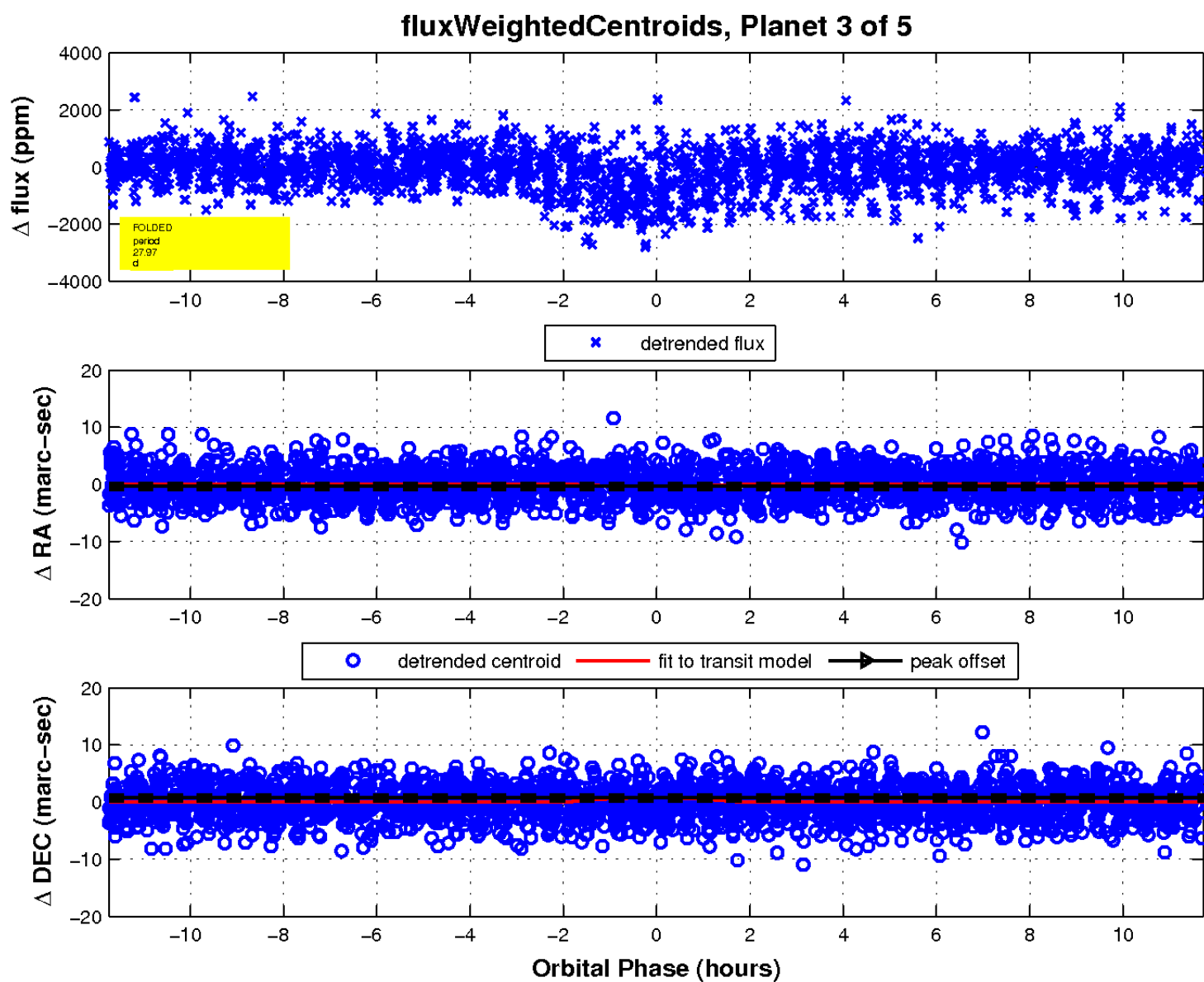
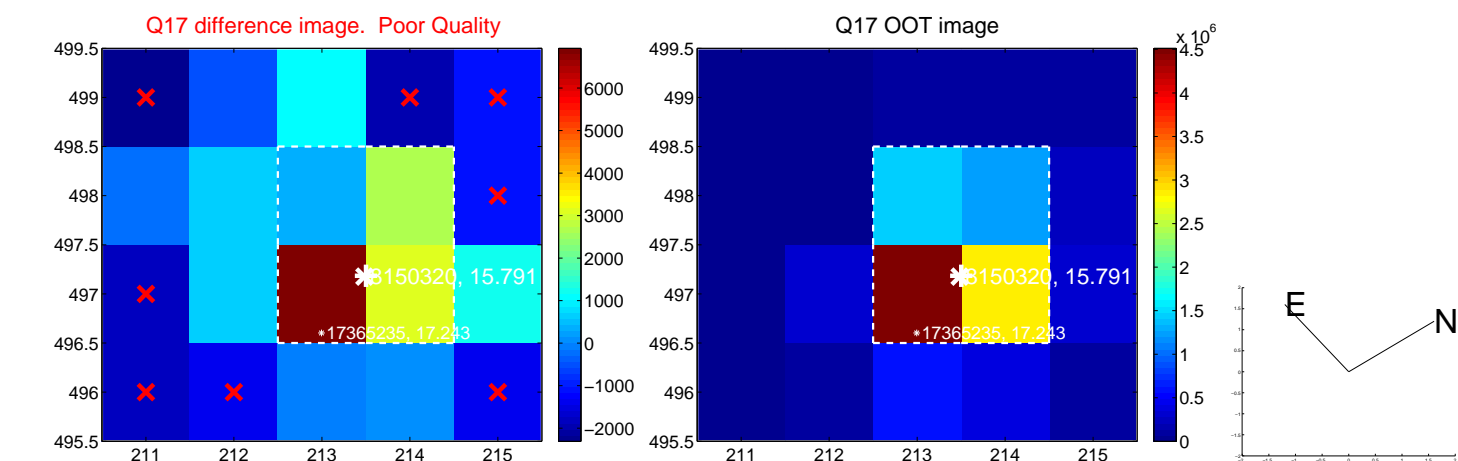
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

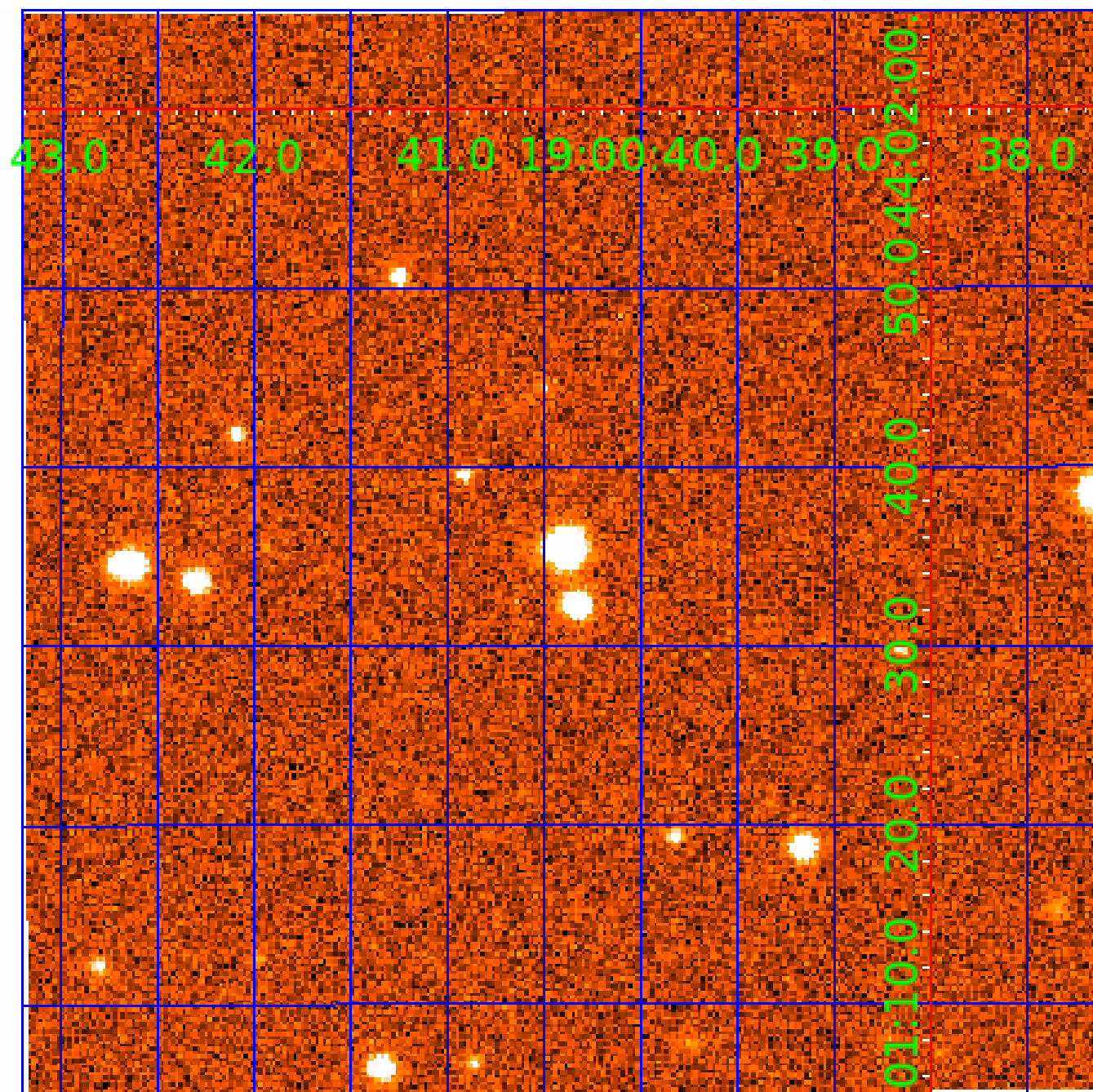


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



# UKIRT Image

Declination





# KIC 008150320

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008150320-01	OBS	0904.01	2.211125	132.558926	594.1	1.866	32.7	37.8	0.65	4500	1.95	178.00
008150320-02	OBS	0904.04	4.617487	135.051165	460.3	2.664	18.4	20.6	0.65	4500	1.93	66.69
008150320-03	OBS	0904.02	27.972111	150.411357	920.7	3.916	15.3	17.2	0.65	4500	2.68	6.04
008150320-04	OBS	0904.05	10.198517	137.919927	533.7	2.465	15.0	16.5	0.65	4500	1.65	23.18
008150320-05	OBS	0904.03	42.114180	139.438439	769.8	5.363	13.0	14.0	0.65	4500	1.76	3.50

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008150320-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
008150320-02	OBS	PC	1.00	0	0	0	0	NO_COMMENT
008150320-03	OBS	PC	1.00	0	0	0	0	NO_COMMENT
008150320-04	OBS	PC	1.00	0	0	0	0	NO_COMMENT
008150320-05	OBS	PC	1.00	0	0	0	0	NO_COMMENT

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

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

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

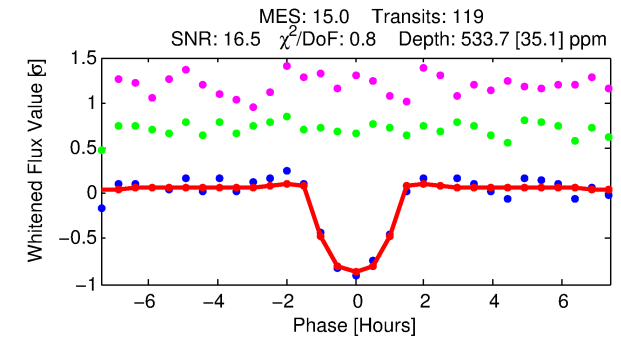
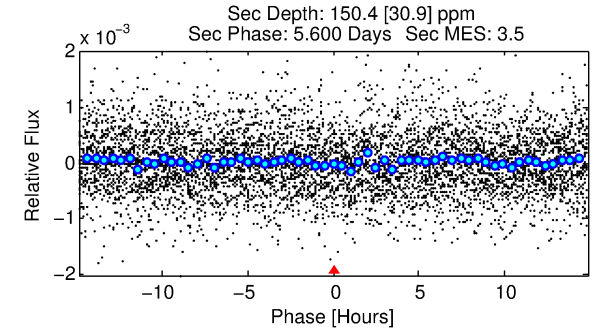
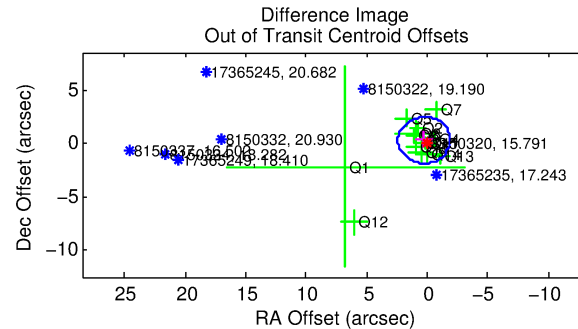
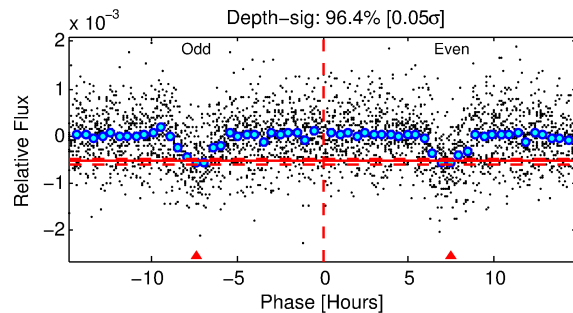
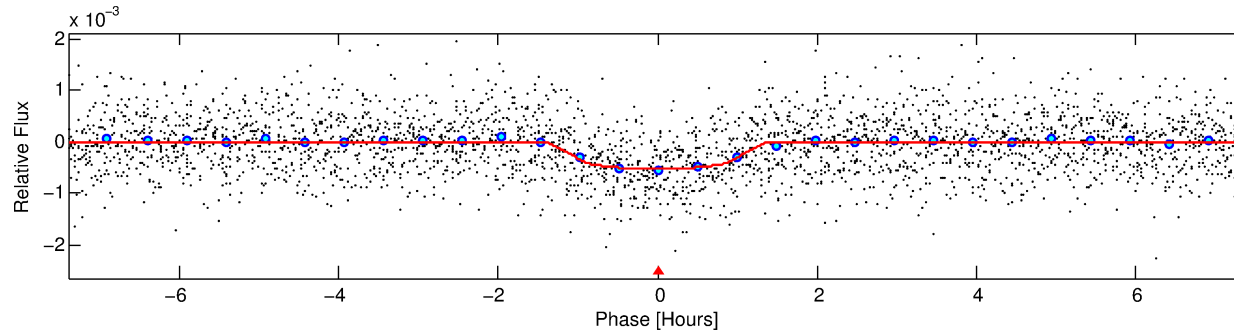
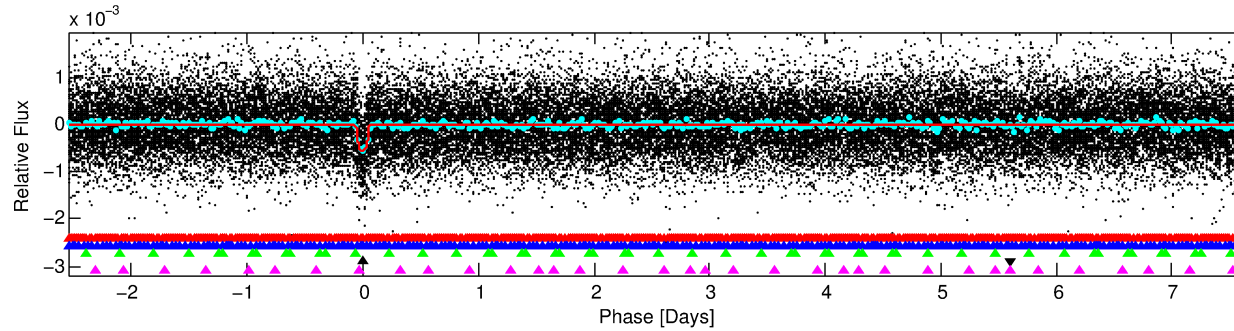
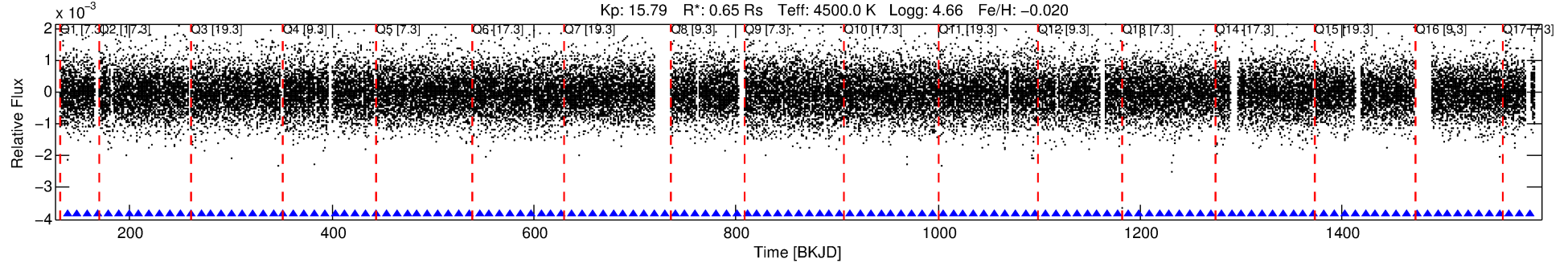
## Ephemeris Match Information For 008150320-04

No Significant Match Found

# DV One-Page Summary

KIC: 8150320 Candidate: 4 of 5 Period: 10.199 d  
KOI: K00904.05 Name: Kepler-55f Corr: 0.998

Kp: 15.79 R\*: 0.65 Rs Teff: 4500.0 K Logg: 4.66 Fe/H: -0.020



## DV Fit Results:

Period = 10.19852 [0.00004] d  
Epoch = 137.9199 [0.0033] BKJD  
Rp/R\* = 0.0233 [0.0163]  
a/R\* = 21.59 [48.01]  
b = 0.76 [1.27]  
Seff = 23.18 [2.62]  
Teq = 560 [16] K  
Rp = 1.65 [1.16] Re  
a = 0.0813 [0.0045] AU  
Ag = 202.06 [286.35] [0.70σ]  
Teffp = 3262 [1156] K [2.34σ]

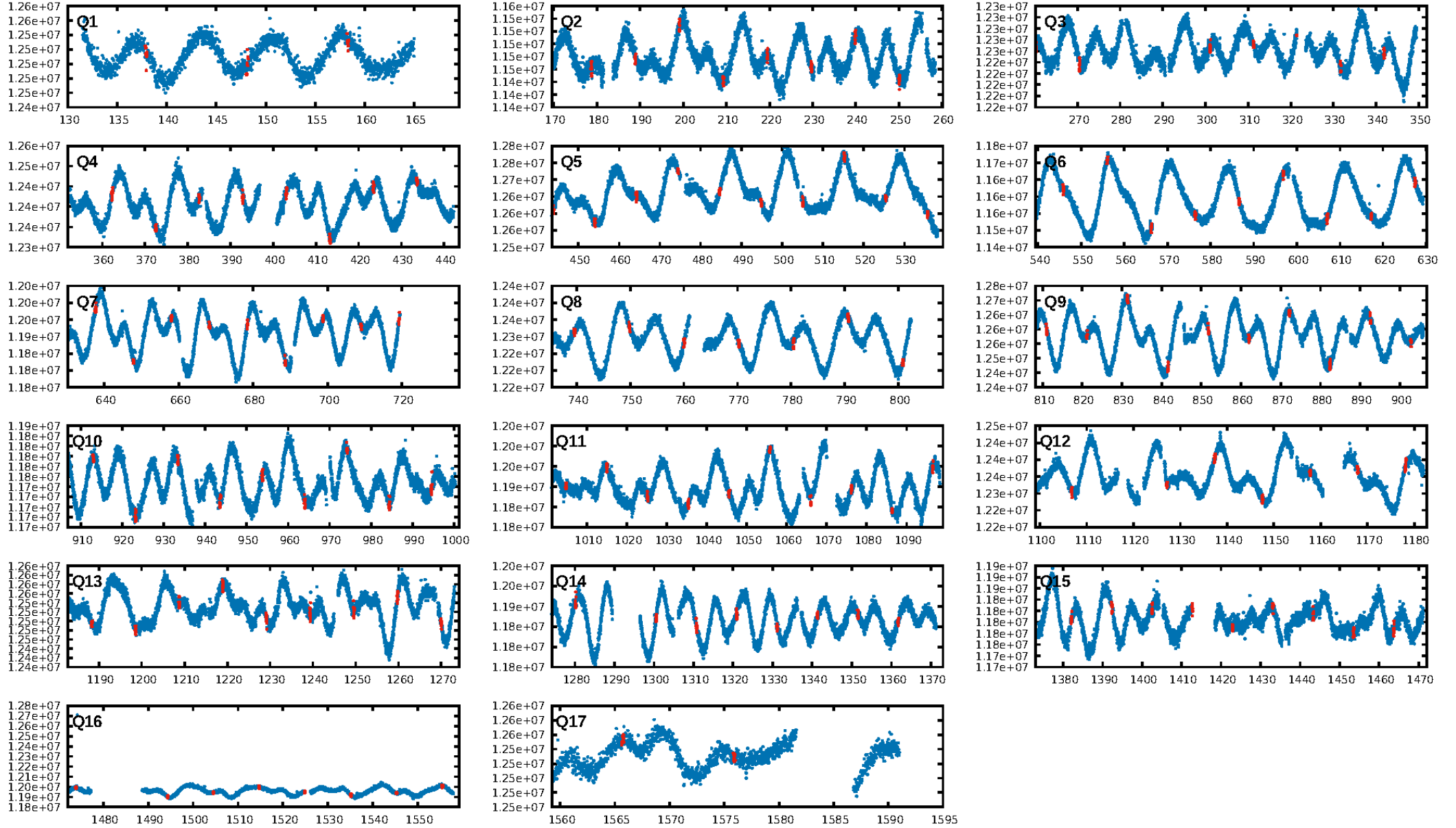
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [36.90σ]  
LongPeriod-sig: 100.0% [92.19σ]  
ModelChiSquare2-sig: 97.7%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 2.41e-48  
RollingBand-fgt: 1.00 [114/114]  
GhostDiagnostic-chr: 1.696  
Centroid-sig: 8.3%  
Centroid-so: 0.859 arcsec [1.27σ]  
OotOffset-rm: 0.394 arcsec [0.55σ]  
OotOffset-st: 3/4/3/4 [14]  
KicOffset-rm: 0.379 arcsec [0.53σ]  
KicOffset-st: 3/4/3/4 [14]  
DiffImageQuality-fgm: 0.64 [9/14]  
DiffImageOverlap-fno: 1.00 [17/17]

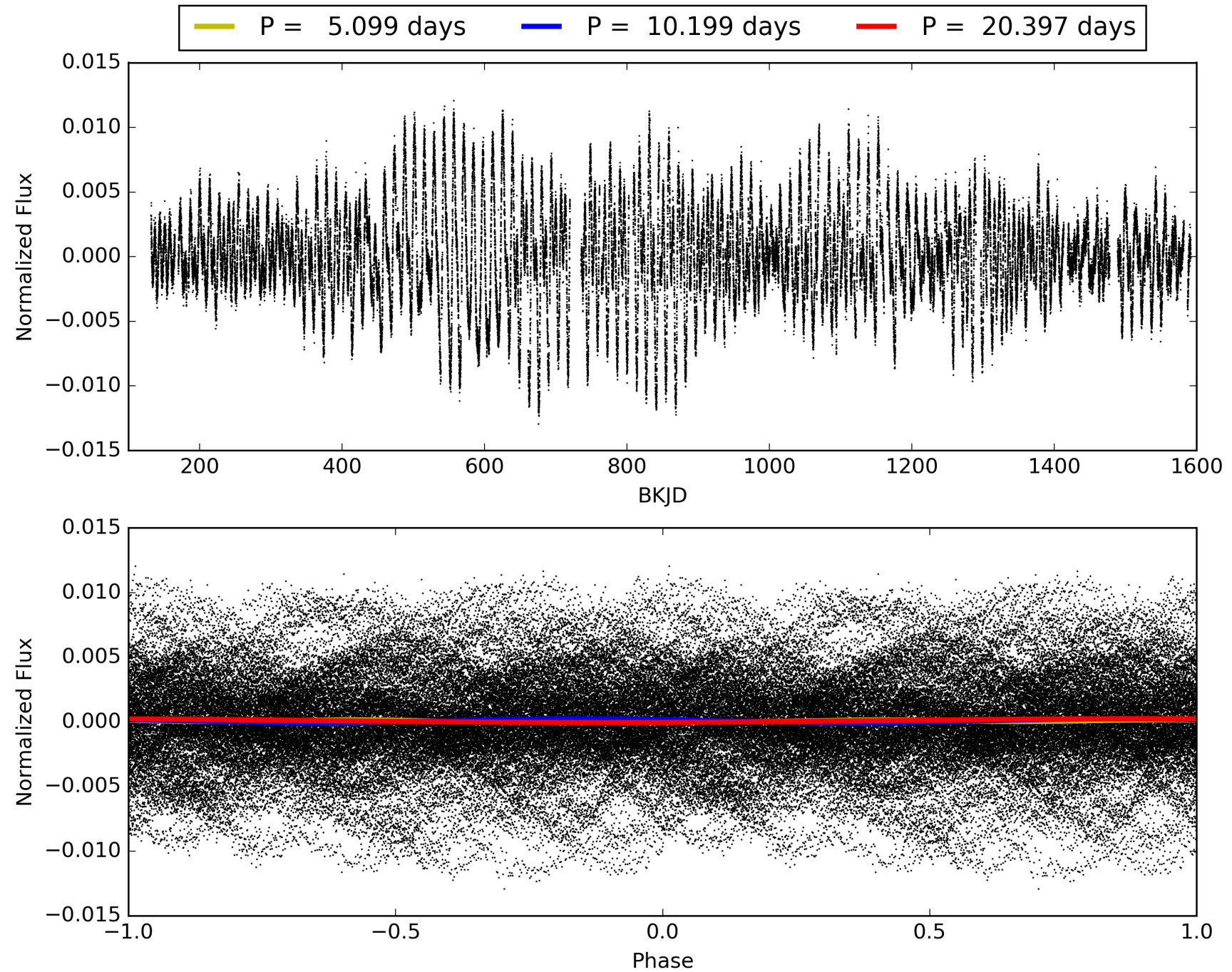
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 19:46:47 Z

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

# TCE 008150320-04, PDC Light Curves

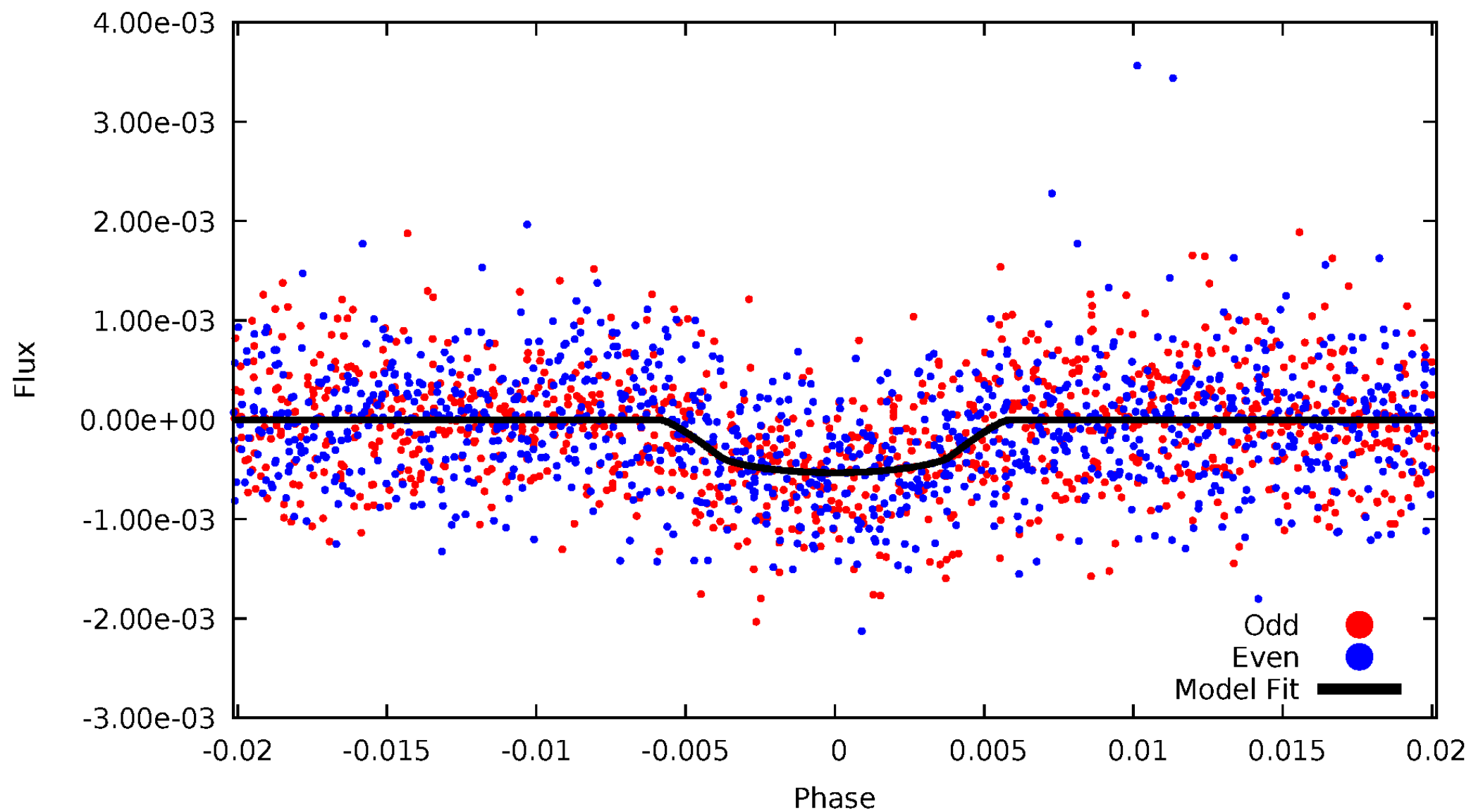


TCE 008150320-04



# DV Odd/Even

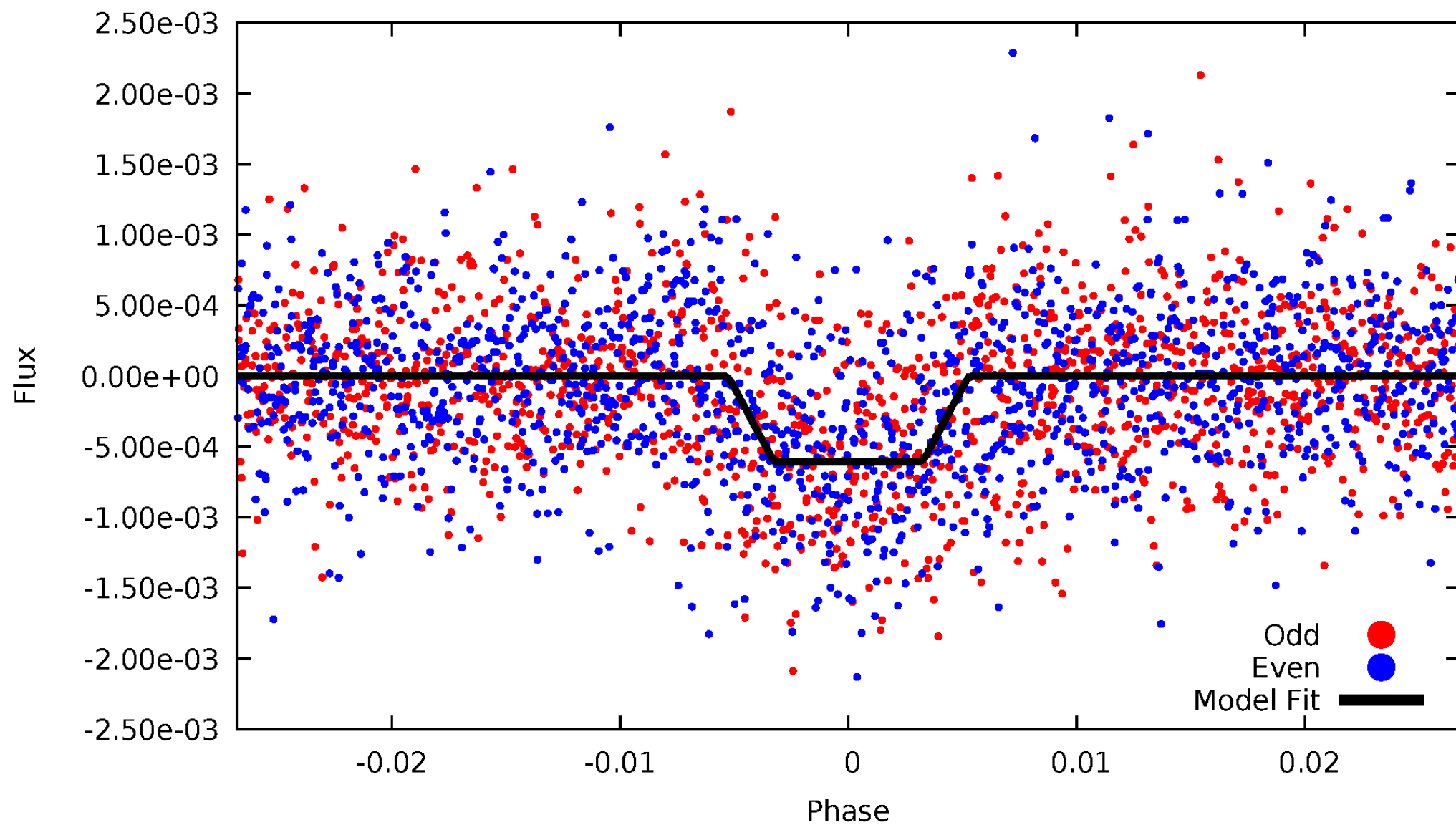
TCE 008150320-04





# ALT Odd/Even

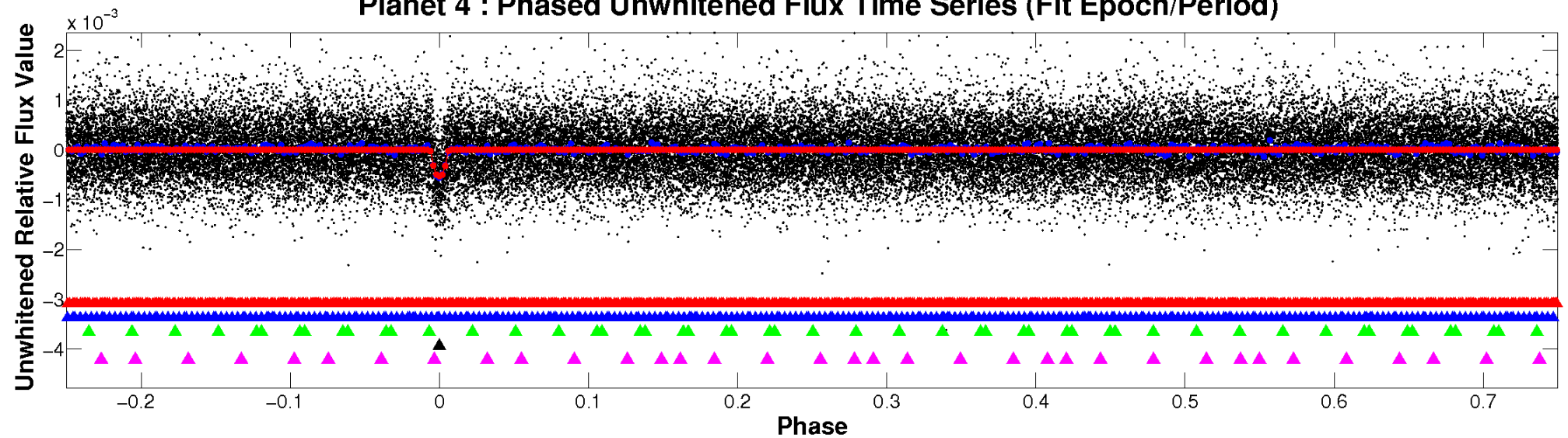
TCE 008150320-04



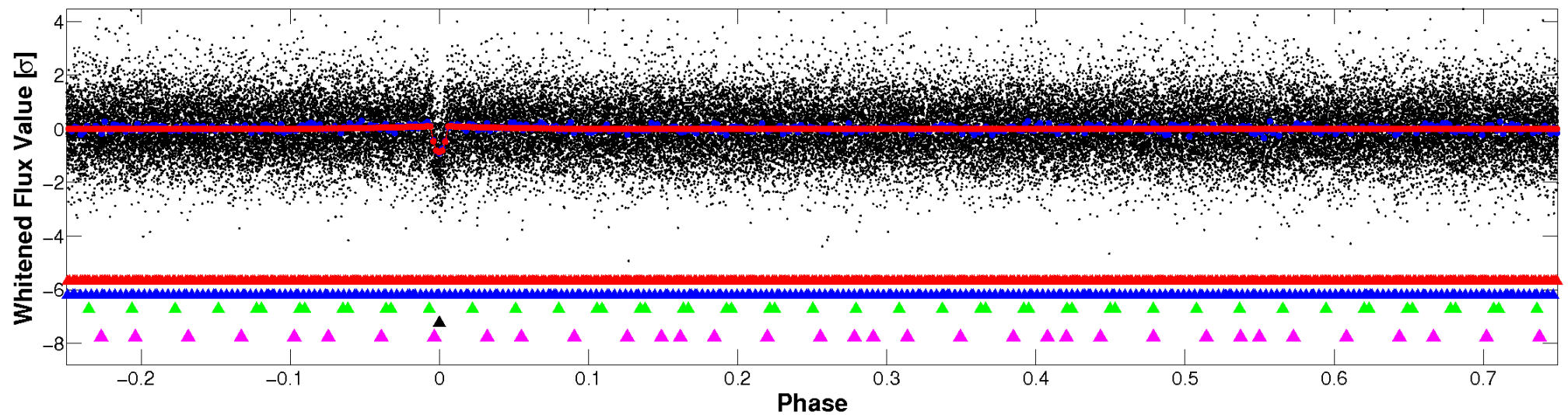


# Non-Whitened Vs. Whitened Light Curve

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

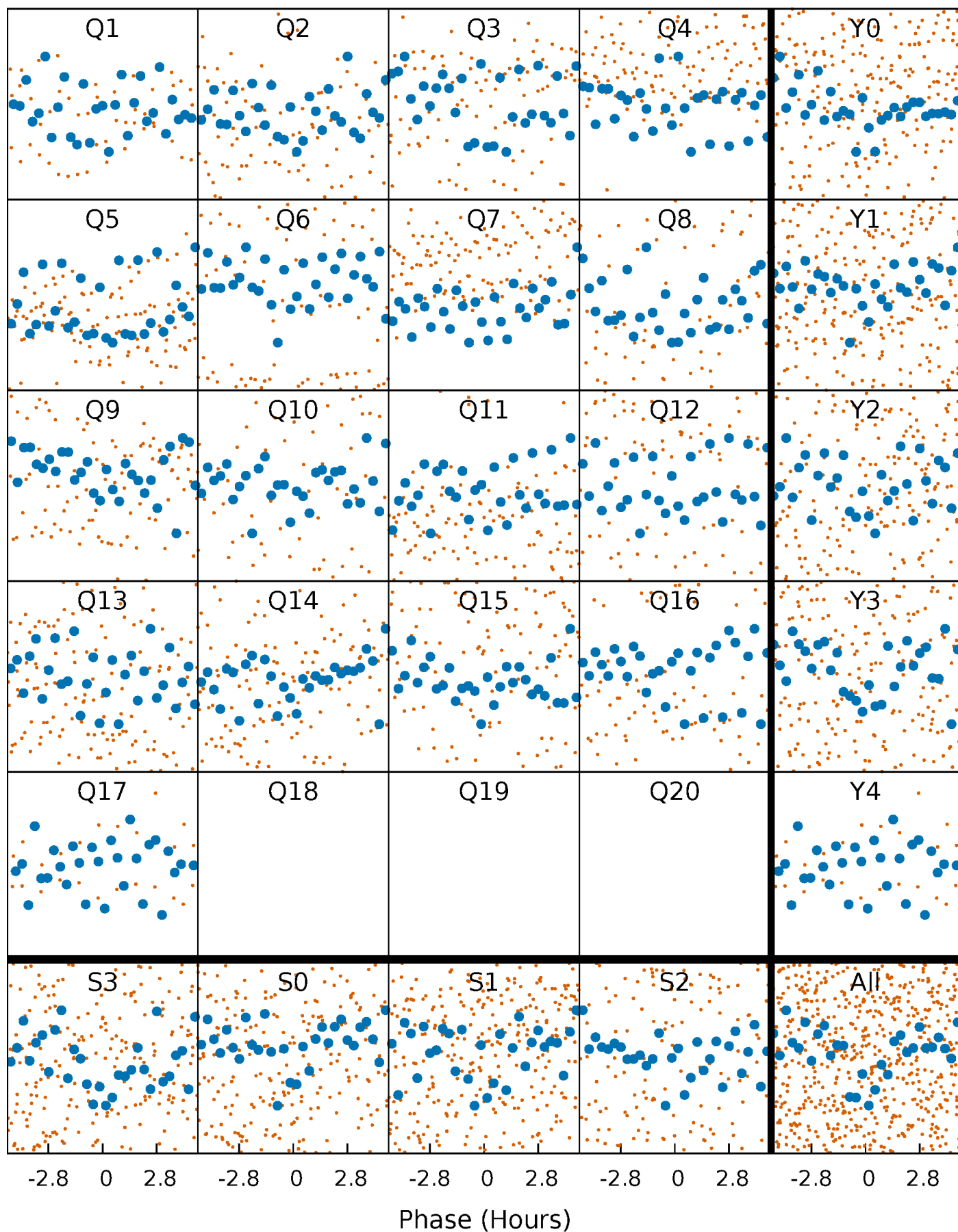


## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



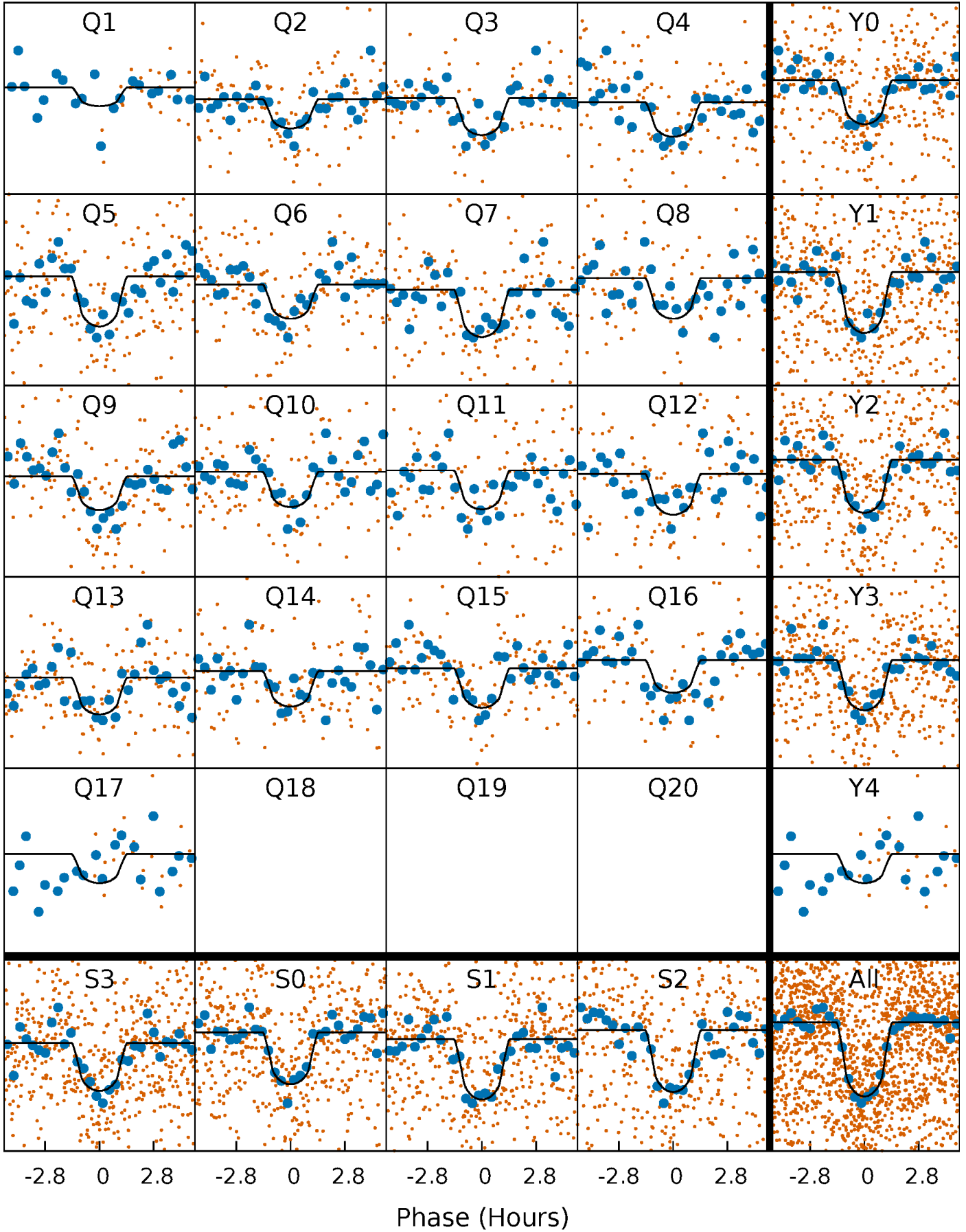
# PDC Quarter-Phased Transit Curves

TCE 008150320-04 P= 10.198517 Days  $T_0=137.919927$  (BKJD)



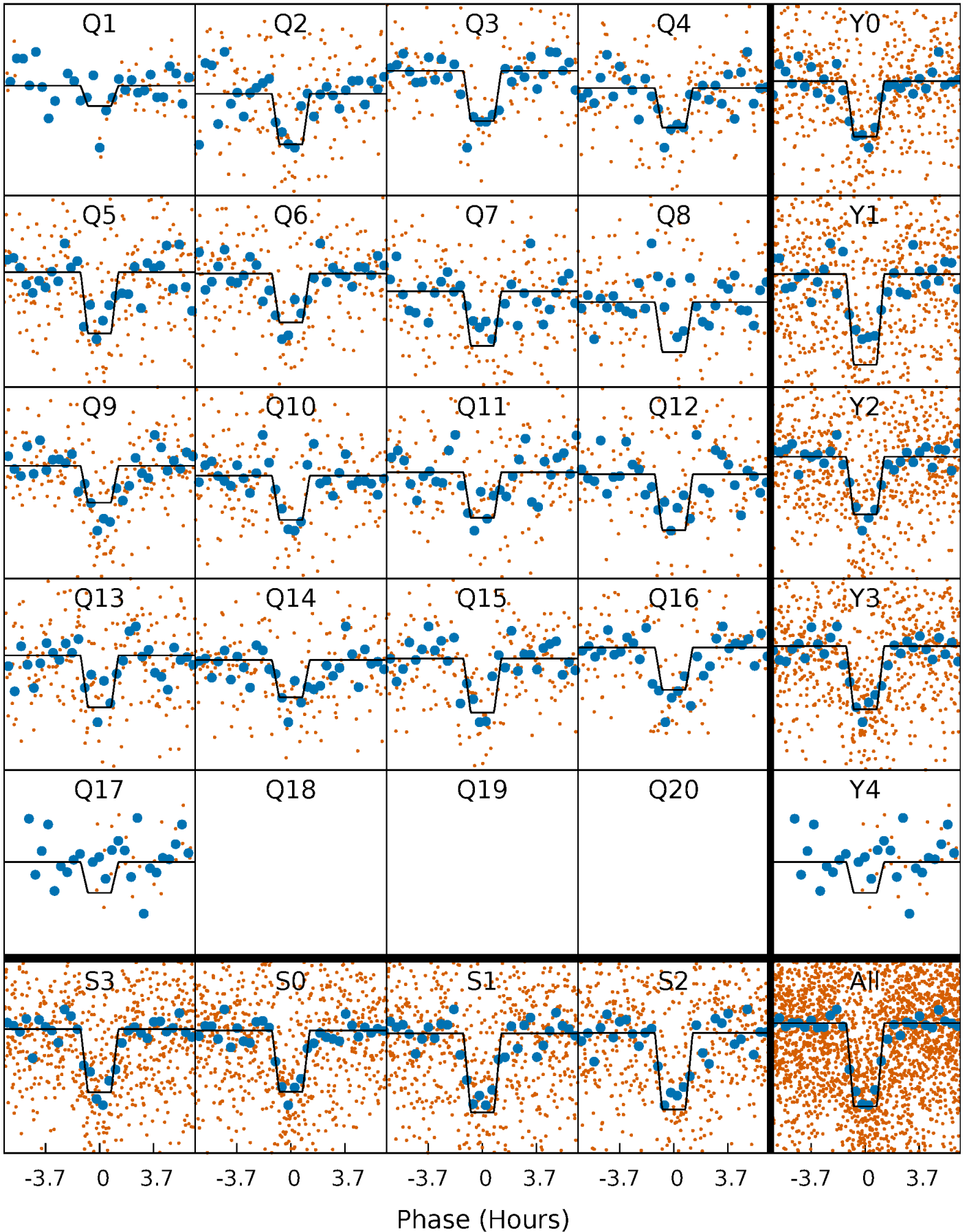
# DV Quarter-Phased Transit Curves

TCE 008150320-04 P= 10.198517 Days  $T_0=137.919927$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

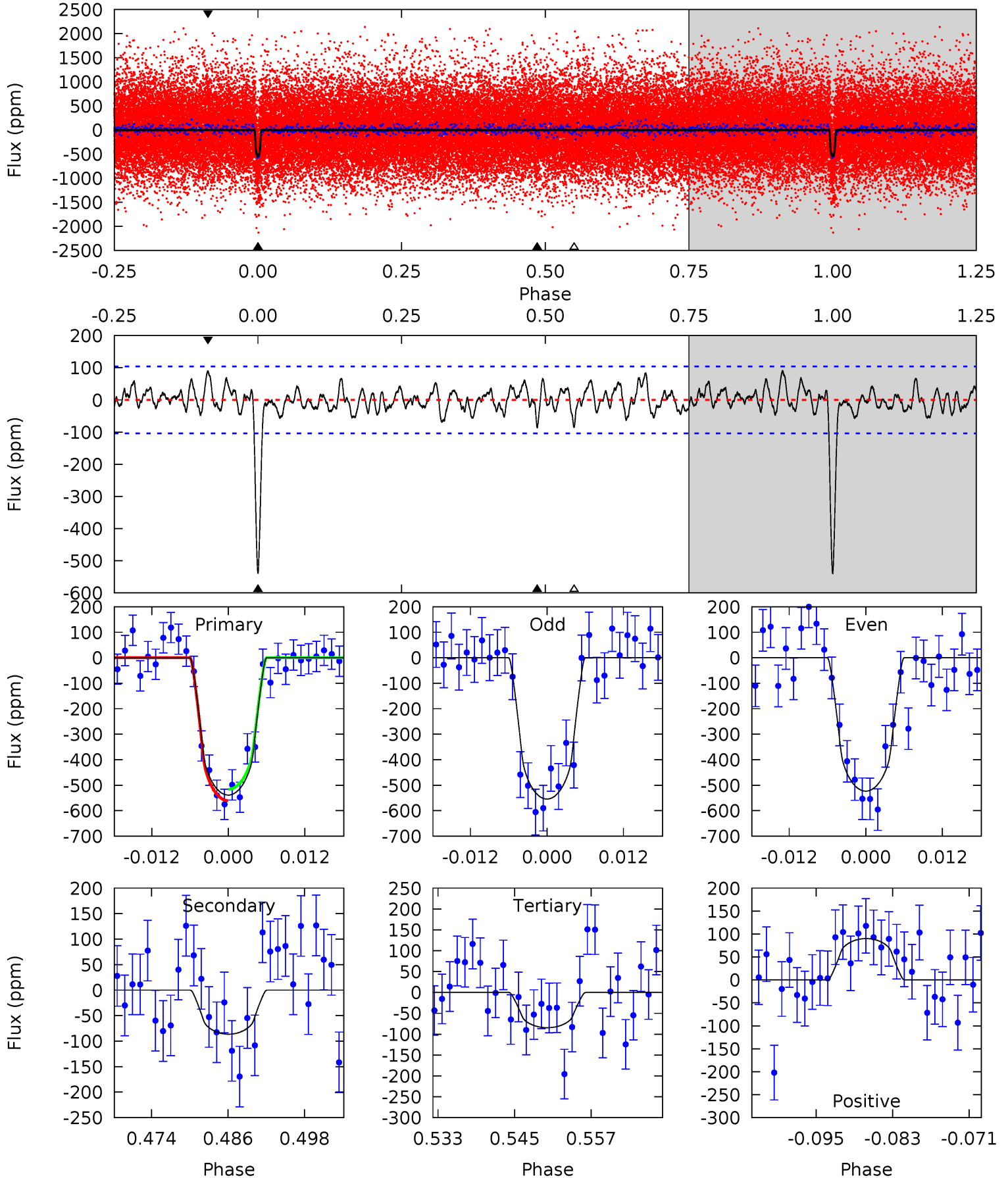
TCE 008150320-04 P= 10.198464 Days  $T_0=137.925121$  (BKJD)



# DV Model-Shift Uniqueness Test

008150320-04, P = 10.198517 Days, E = 127.721410 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
25.9	4.15	4.06	4.33	4.99	2.52	1.41	21.8	21.6	0.09	-0.18	0.75	1.04	0.14	1.08

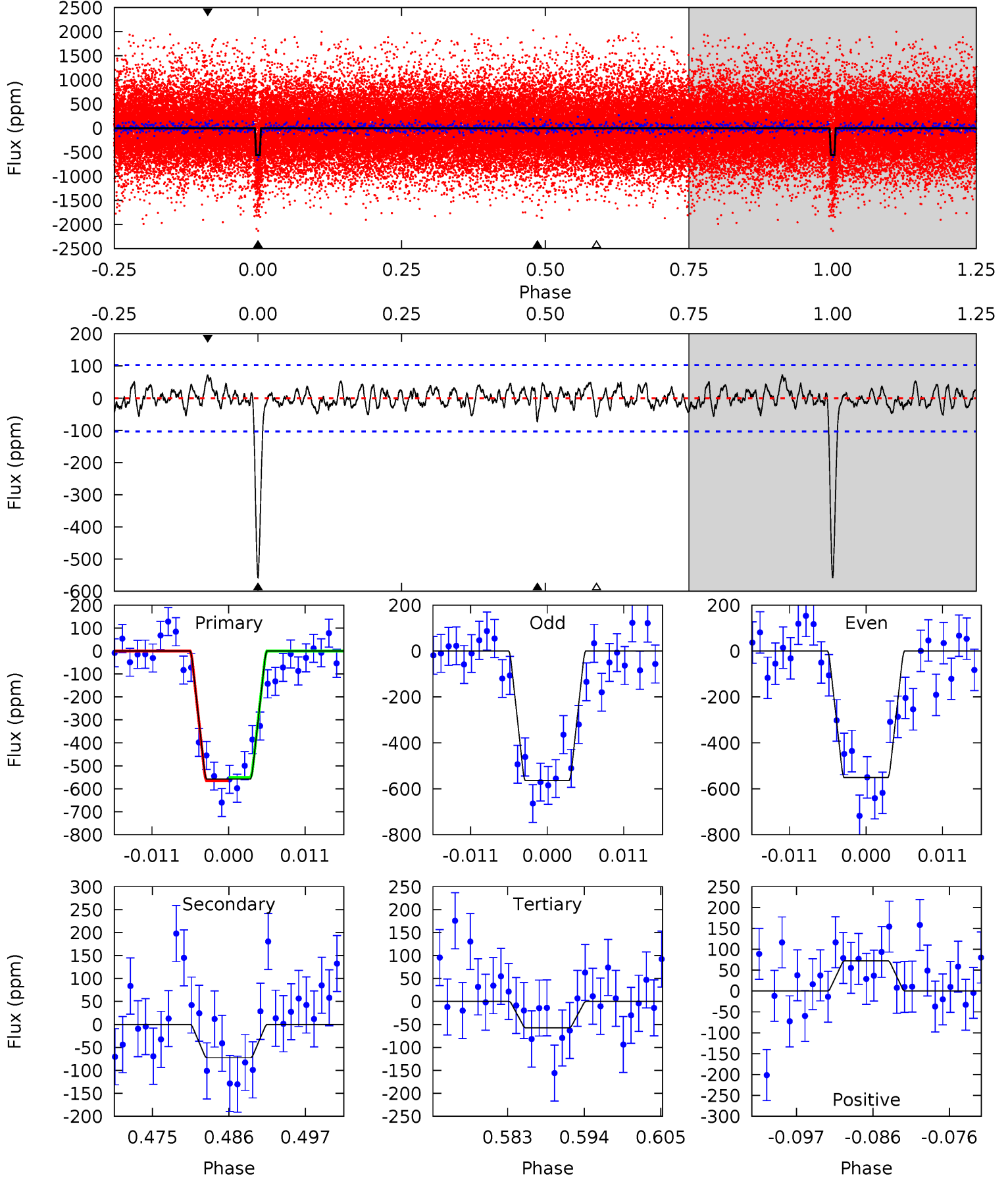




# Alt Model-Shift Uniqueness Test

008150320-04, P = 10.198464 Days, E = 127.726657 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
27.0	3.52	2.77	3.49	5.01	2.55	1.10	24.2	23.5	0.74	0.03	0.33	0.98	0.11	0.35





### Stellar Parameters For KIC 008150320

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4500^{+90}_{-90}$	$4.656^{+0.013}_{-0.043}$	$-0.020^{+0.150}_{-0.150}$	$0.646^{+0.043}_{-0.020}$	$0.710^{+0.029}_{-0.043}$	$3.719^{+0.220}_{-0.623}$
	+2%/-2%	+0%/-1%	+750%/-750%	+7%/-3%	+4%/-6%	+6%/-17%
Source	SPE58	SPE58	SPE58	DSEP		

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

### Secondary Eclipse Parameters for KIC 008150320-04 / KOI 0904.05

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-86 \pm 21$	$1.88^{+1.13}_{-0.98}$	$788^{+19}_{-18}$	$3190^{+875}_{-422}$	$92^{+305}_{-58}$
Alt.	$-73 \pm 21$	$1.88^{+1.23}_{-1.02}$	$788^{+18}_{-18}$	$3069^{+902}_{-395}$	$71^{+300}_{-45}$

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

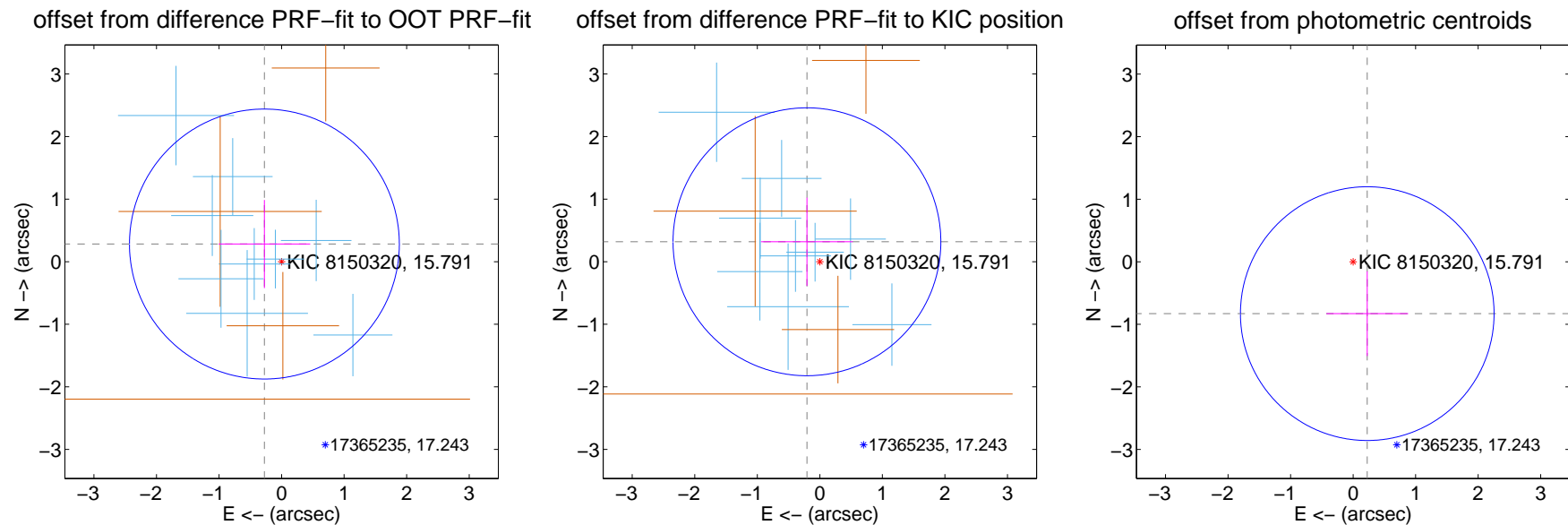
## DV Centroid Data

Supplemental centroid analysis for 008150320-04. Kepler magnitude: 15.79. Transit SNR 16.54

There are 9 quarters with good PRF difference image offsets

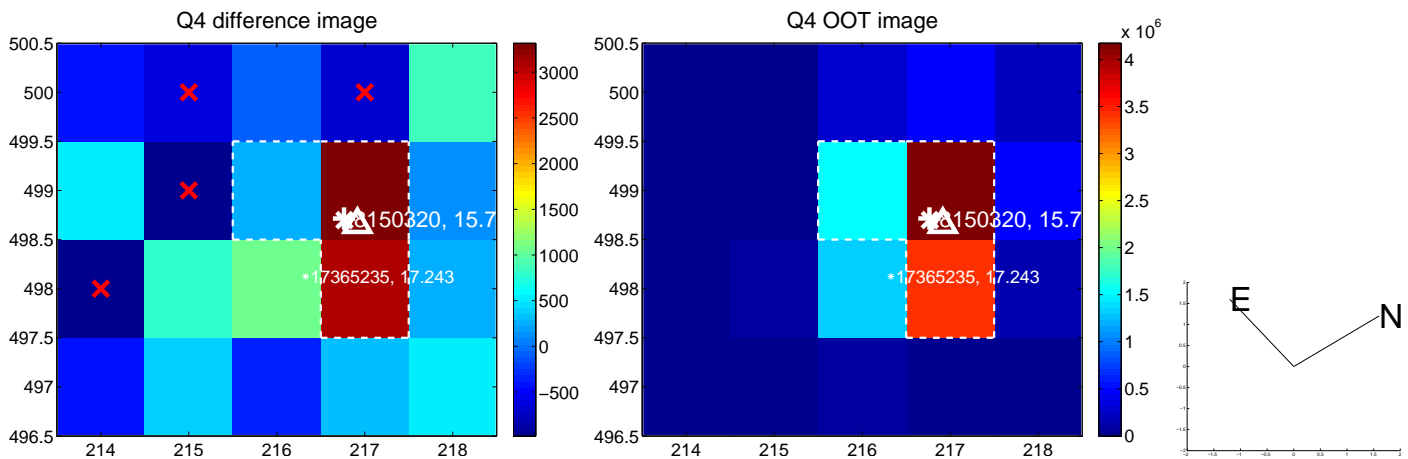
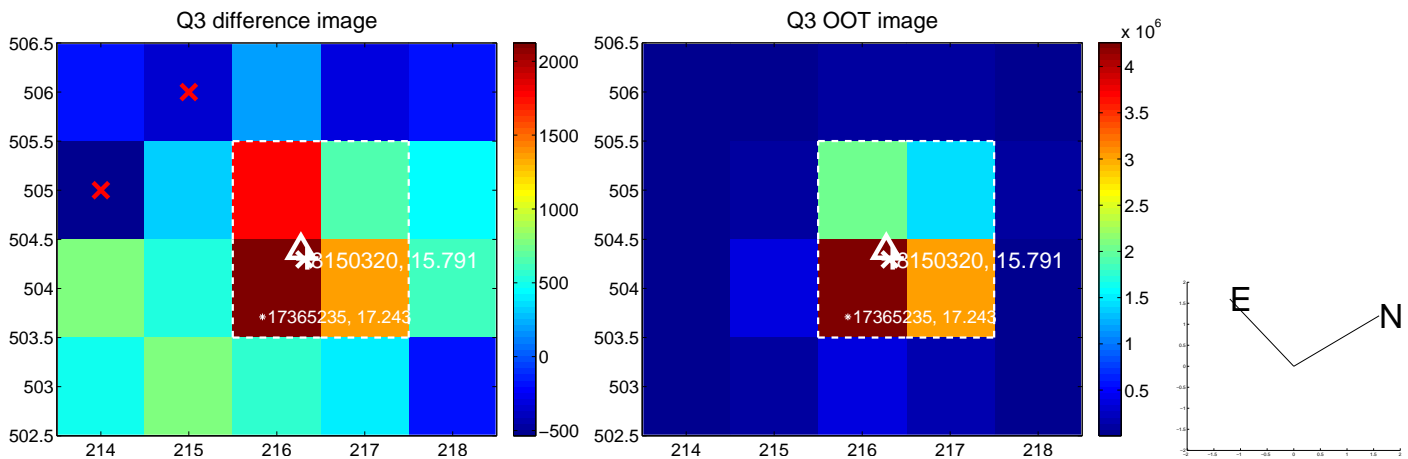
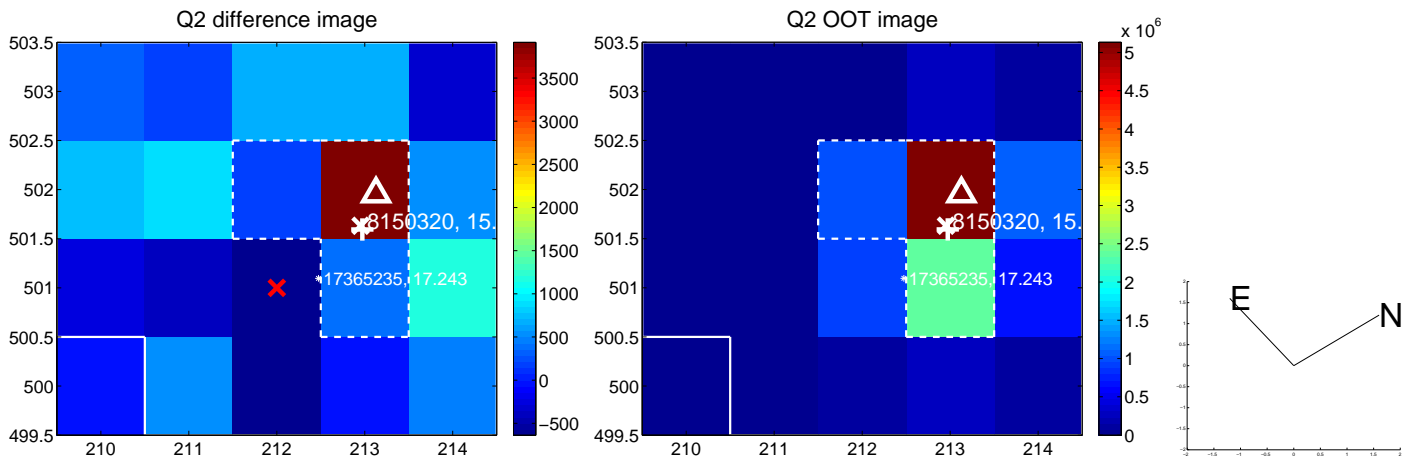
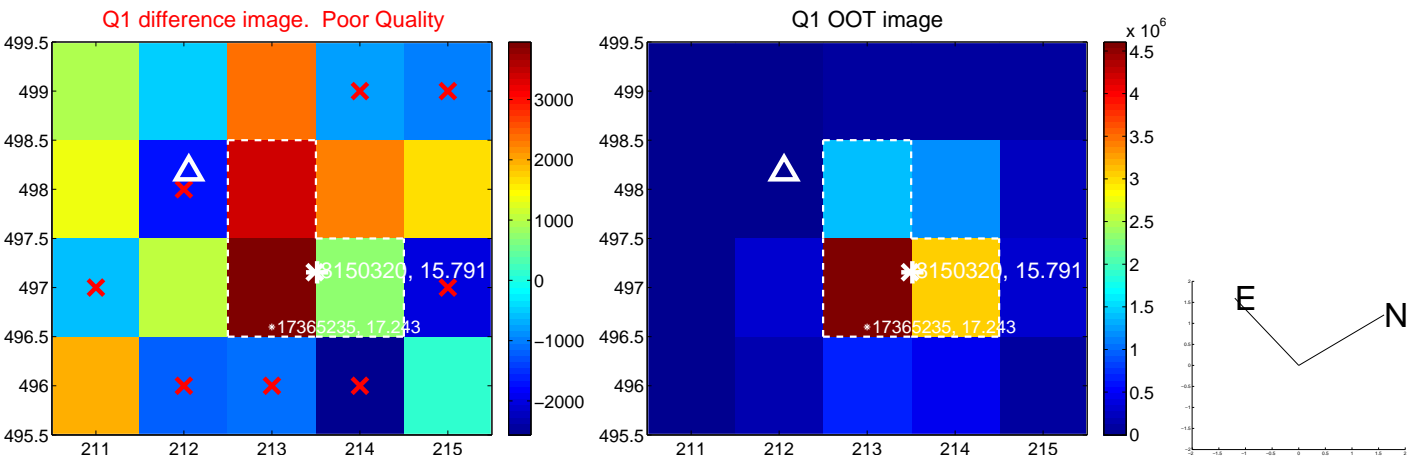
The direct PRF centroid is offset from the target star catalog position by about 0.11 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.394 \pm 0.719$	0.55	$0.275 \pm 0.734$	$0.282 \pm 0.705$
PRF-fit source offset from KIC position	$0.379 \pm 0.714$	0.53	$0.206 \pm 0.734$	$0.318 \pm 0.705$
photometric centroid source offset	$0.86 \pm 0.68$	1.27	$-0.23 \pm 0.65$	$-0.83 \pm 0.68$

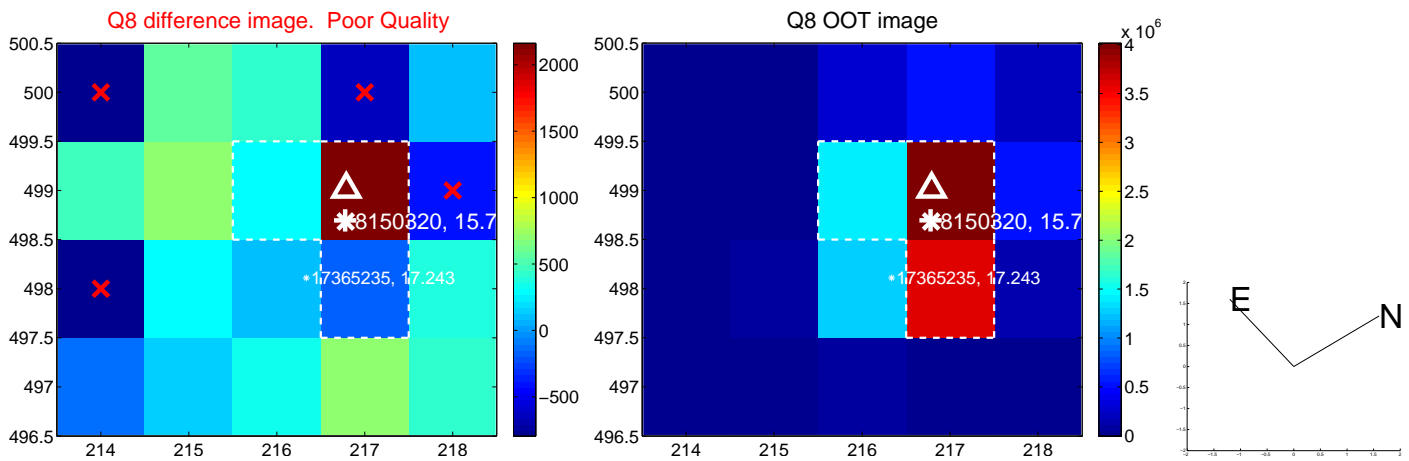
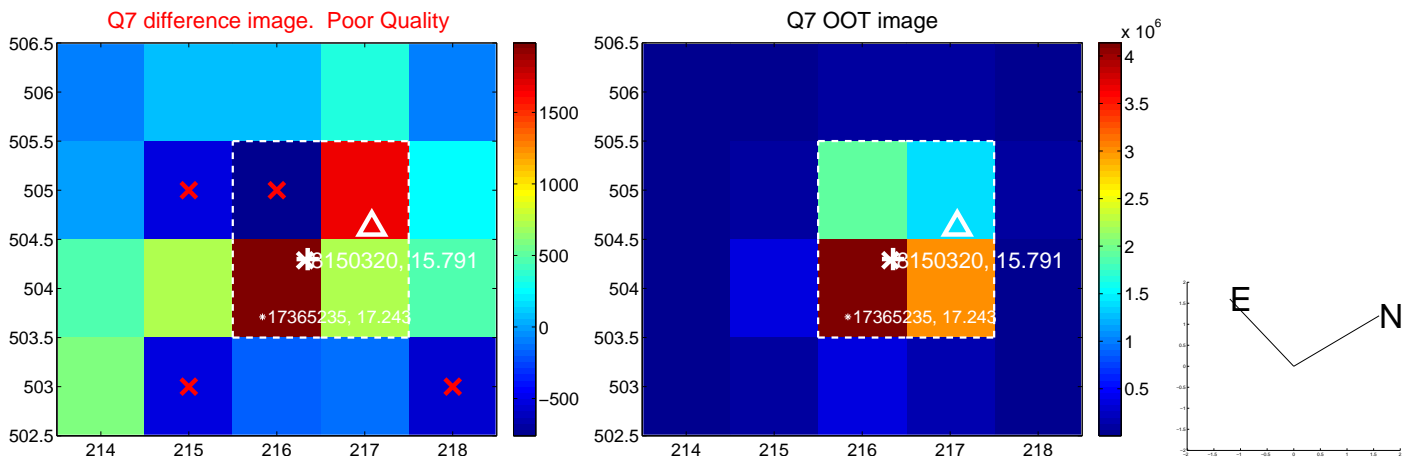
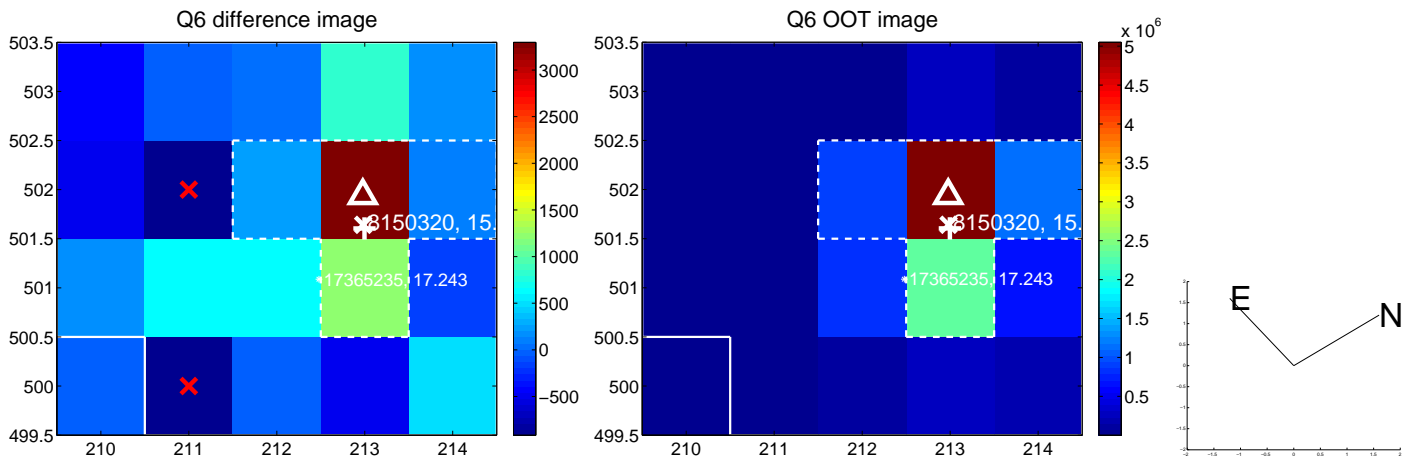
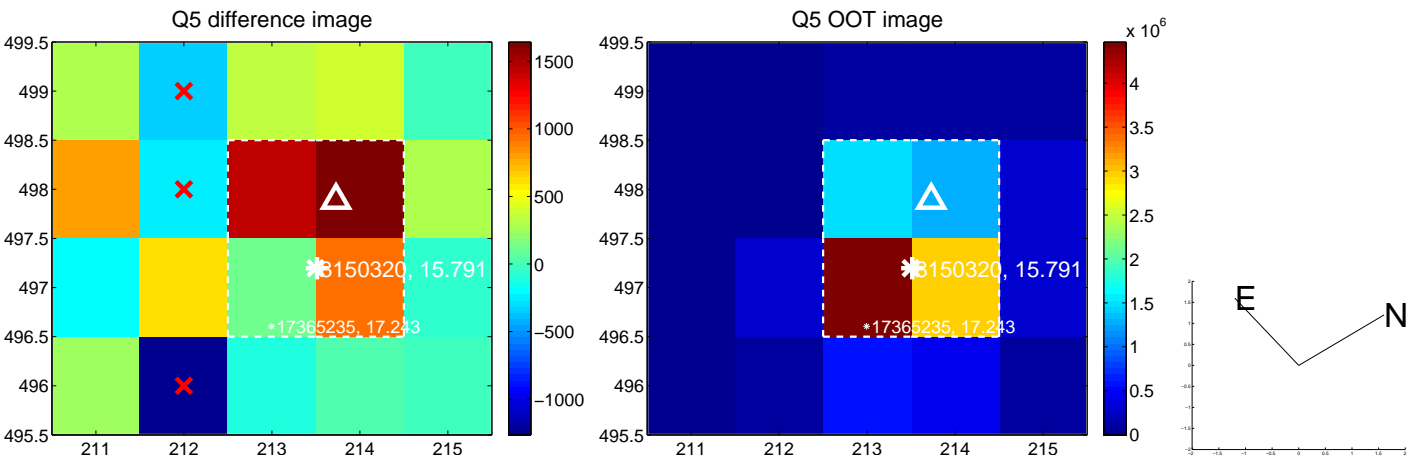


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

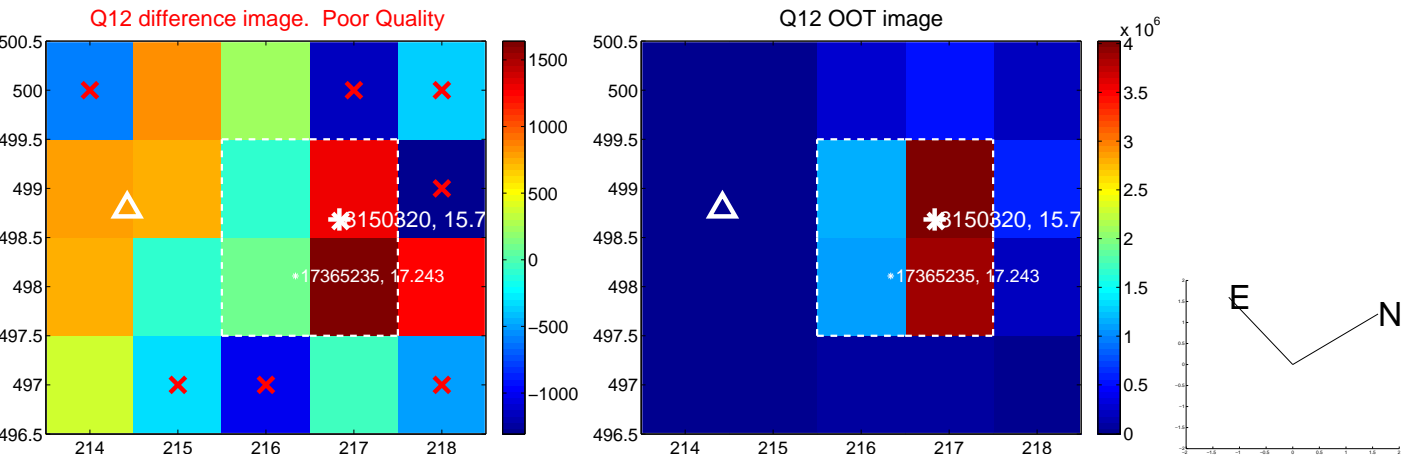
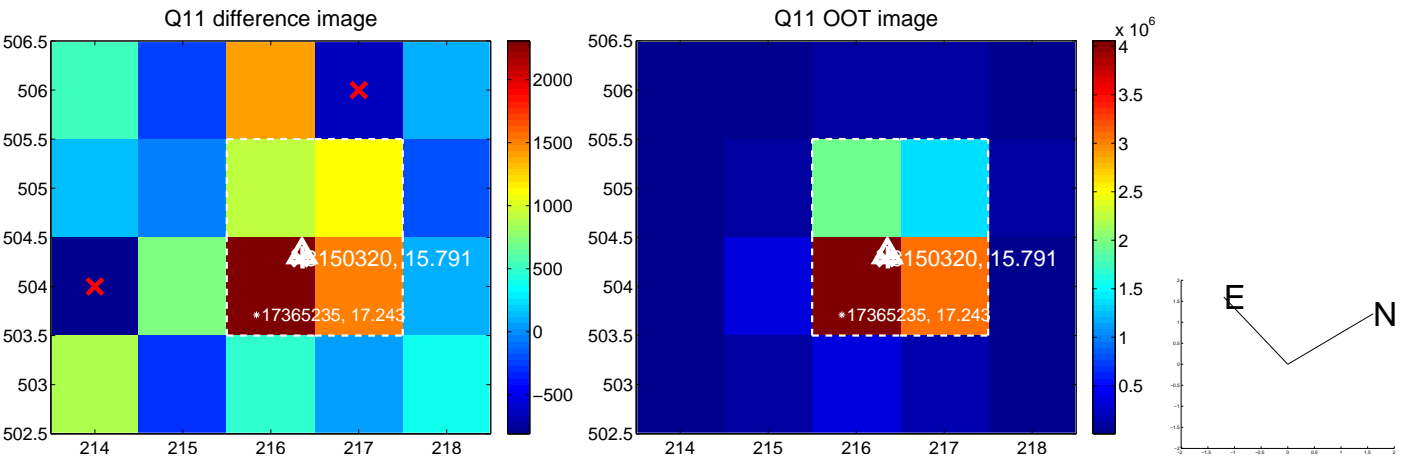
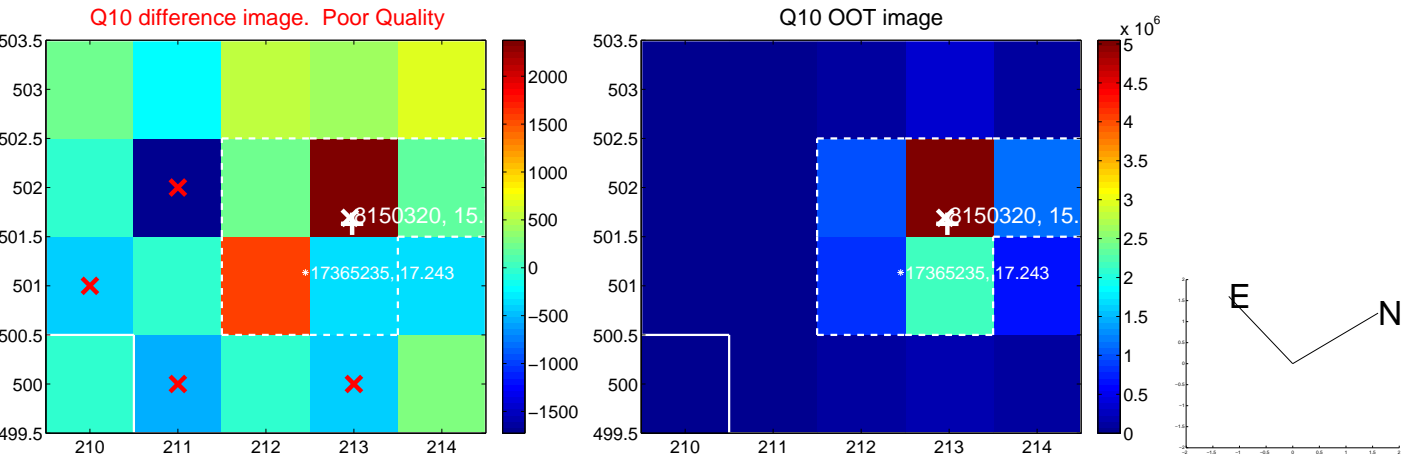
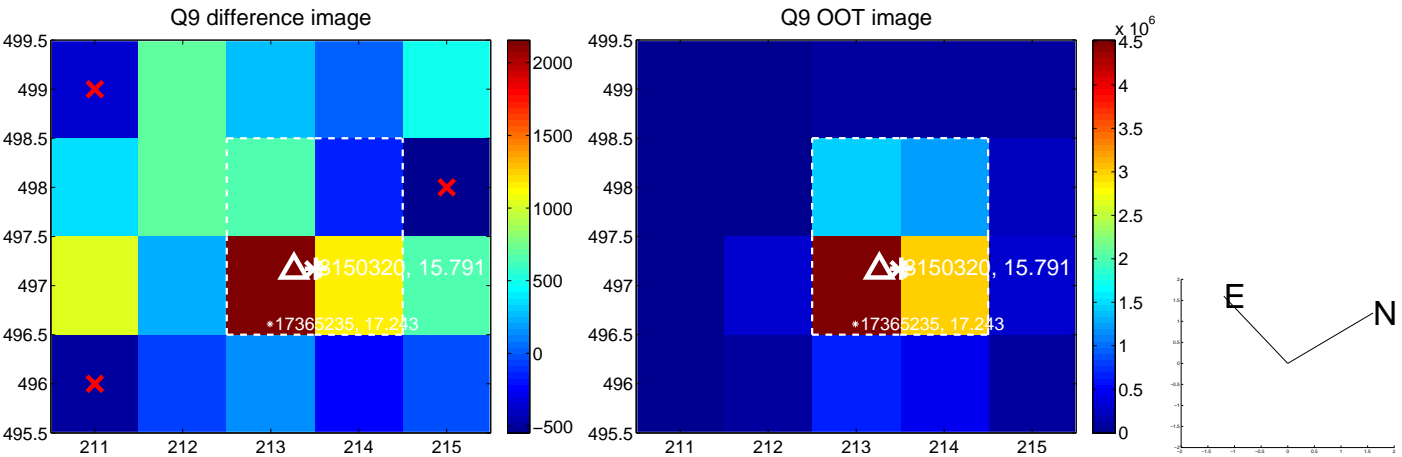
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



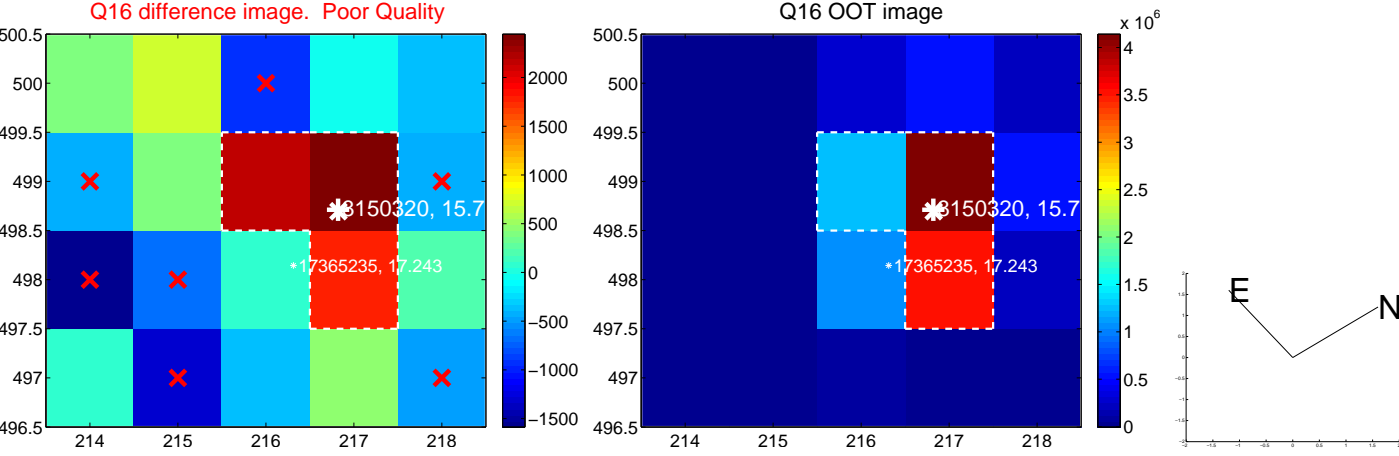
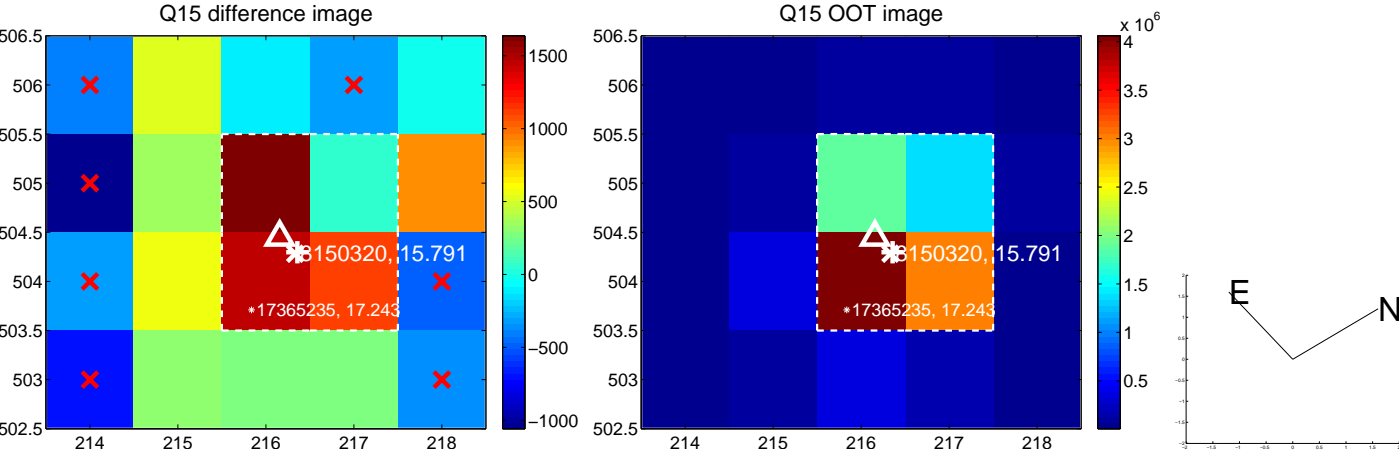
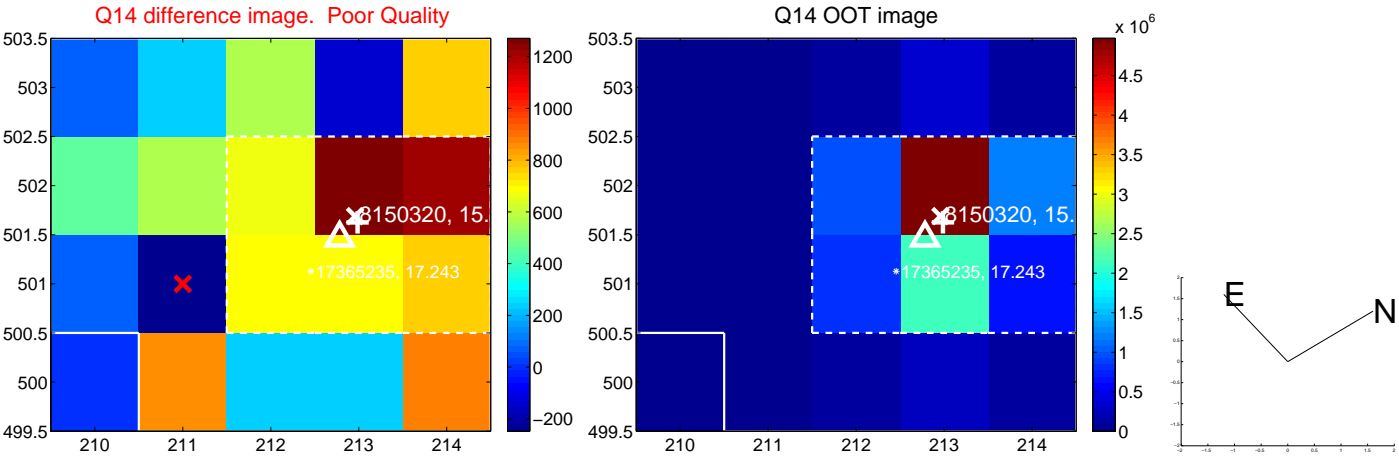
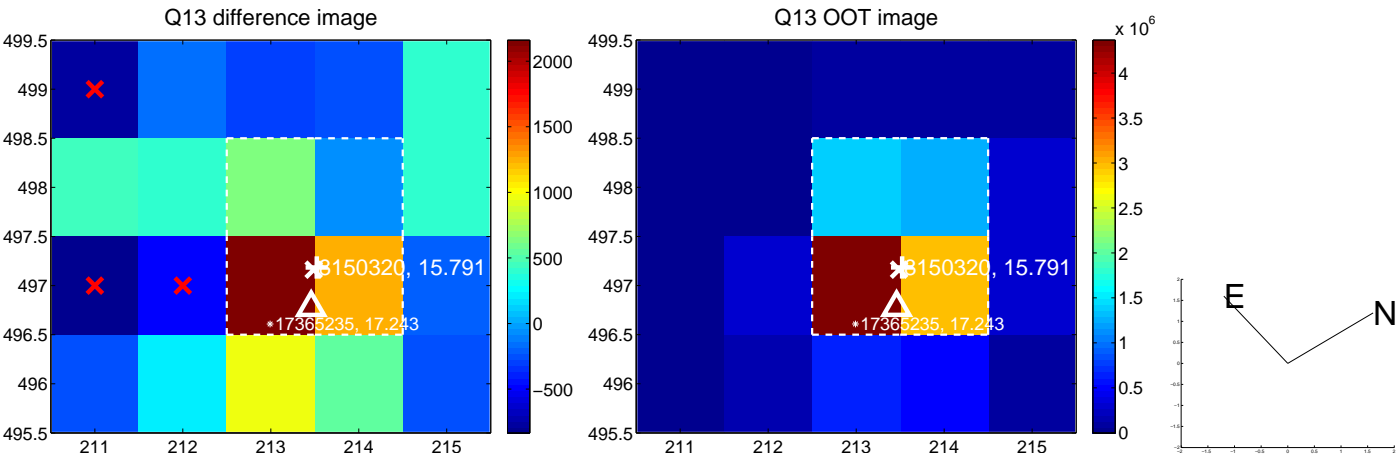
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

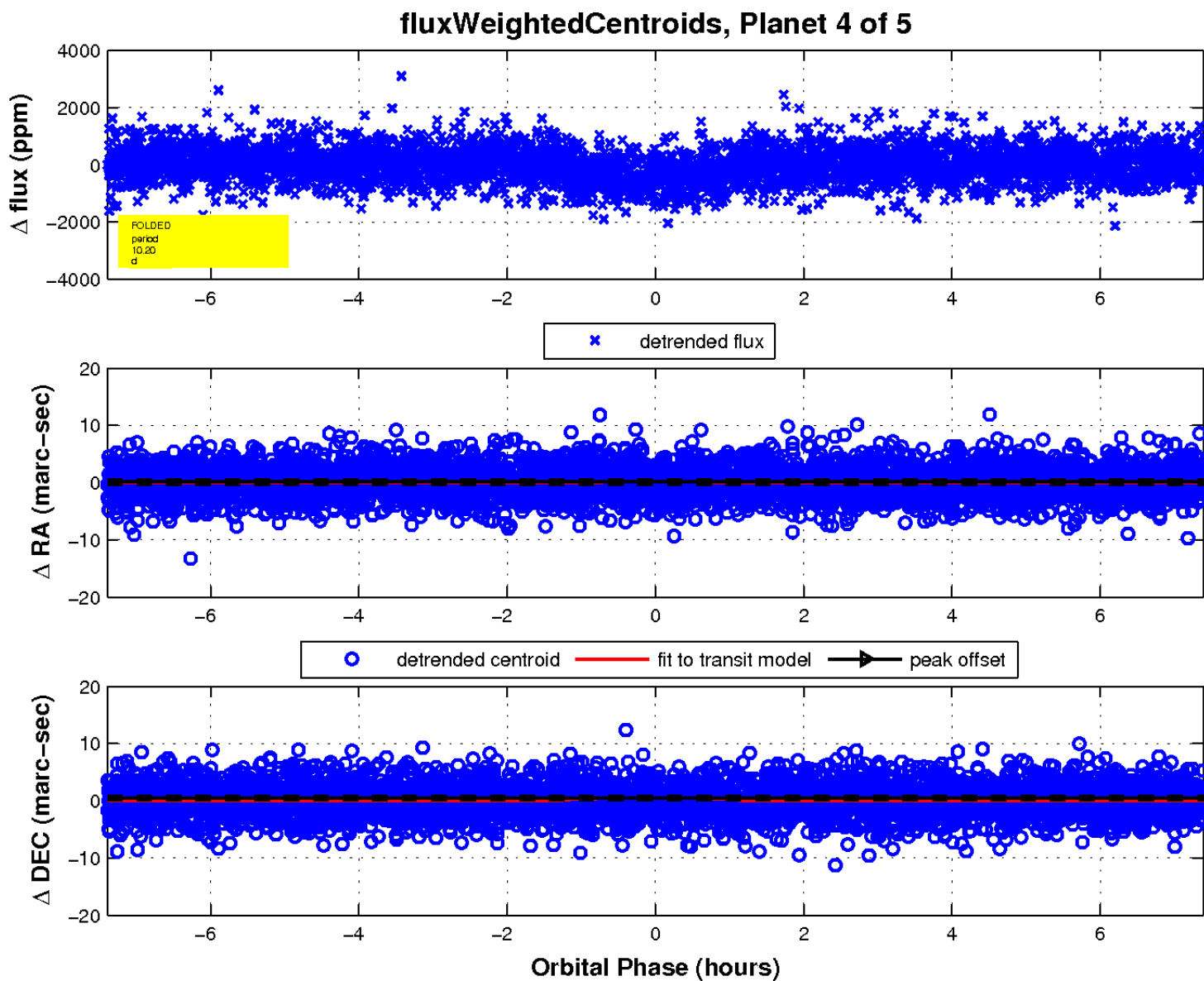
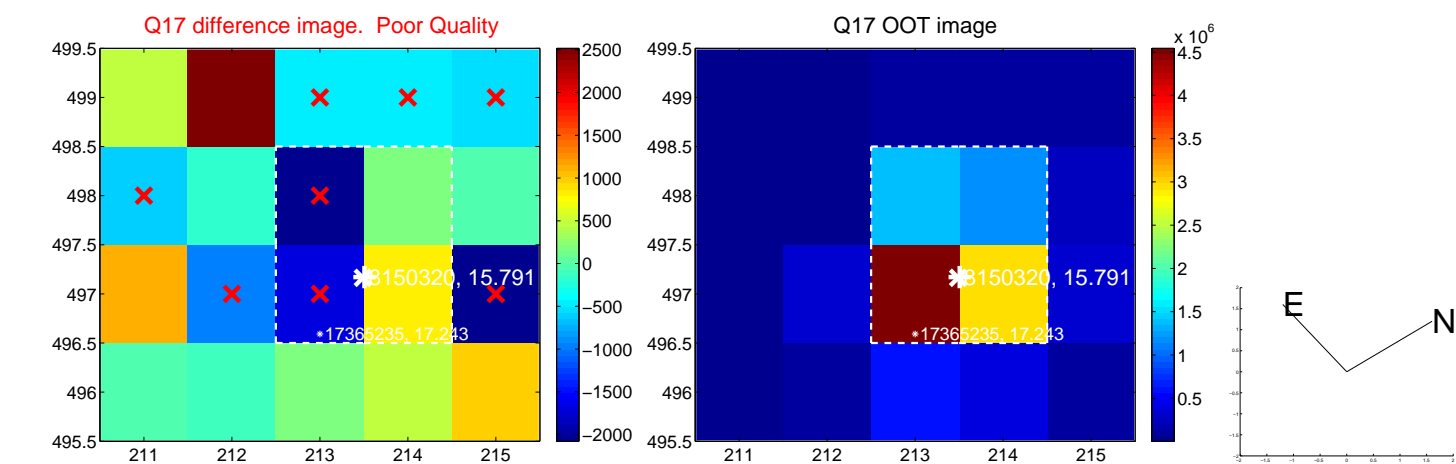


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



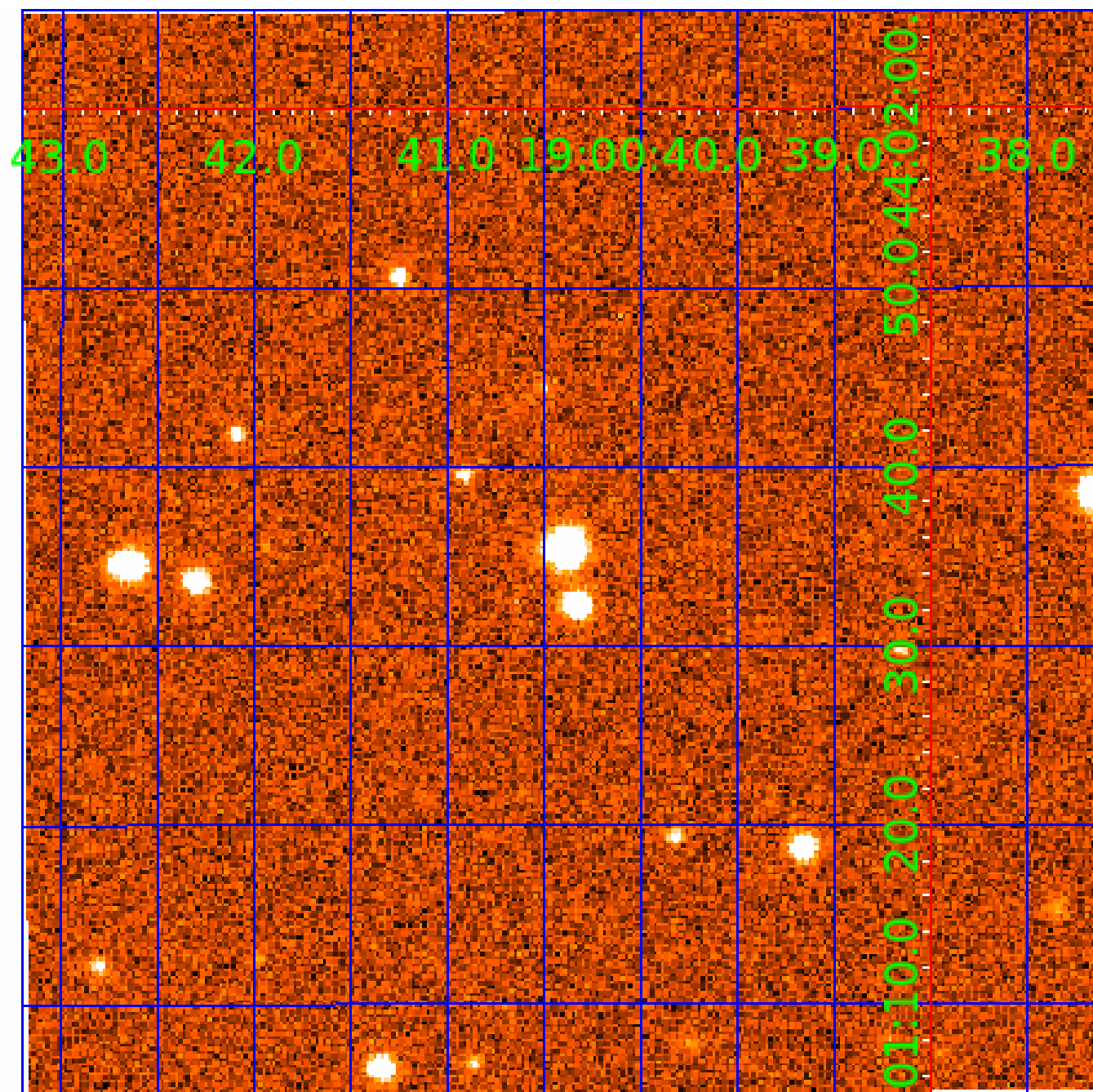


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



# UKIRT Image

Declination



# KIC 008150320

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008150320-01	OBS	0904.01	2.211125	132.558926	594.1	1.866	32.7	37.8	0.65	4500	1.95	178.00
008150320-02	OBS	0904.04	4.617487	135.051165	460.3	2.664	18.4	20.6	0.65	4500	1.93	66.69
008150320-03	OBS	0904.02	27.972111	150.411357	920.7	3.916	15.3	17.2	0.65	4500	2.68	6.04
008150320-04	OBS	0904.05	10.198517	137.919927	533.7	2.465	15.0	16.5	0.65	4500	1.65	23.18
008150320-05	OBS	0904.03	42.114180	139.438439	769.8	5.363	13.0	14.0	0.65	4500	1.76	3.50

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008150320-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
008150320-02	OBS	PC	1.00	0	0	0	0	NO_COMMENT
008150320-03	OBS	PC	1.00	0	0	0	0	NO_COMMENT
008150320-04	OBS	PC	1.00	0	0	0	0	NO_COMMENT
008150320-05	OBS	PC	1.00	0	0	0	0	NO_COMMENT

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

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

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

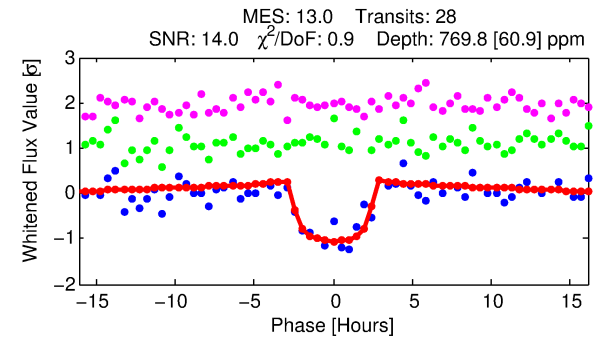
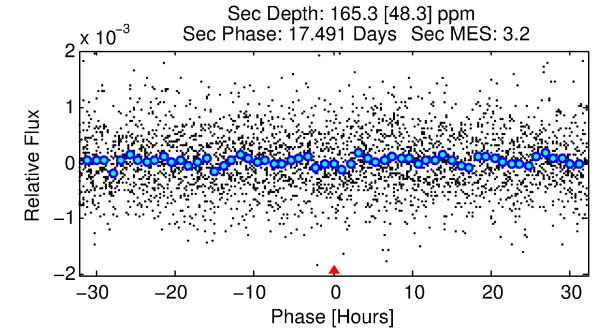
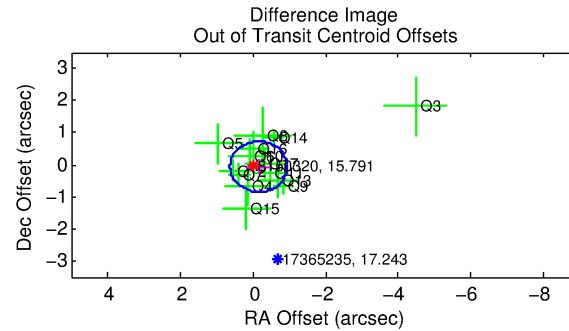
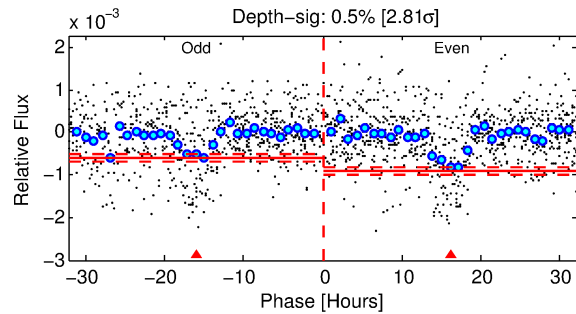
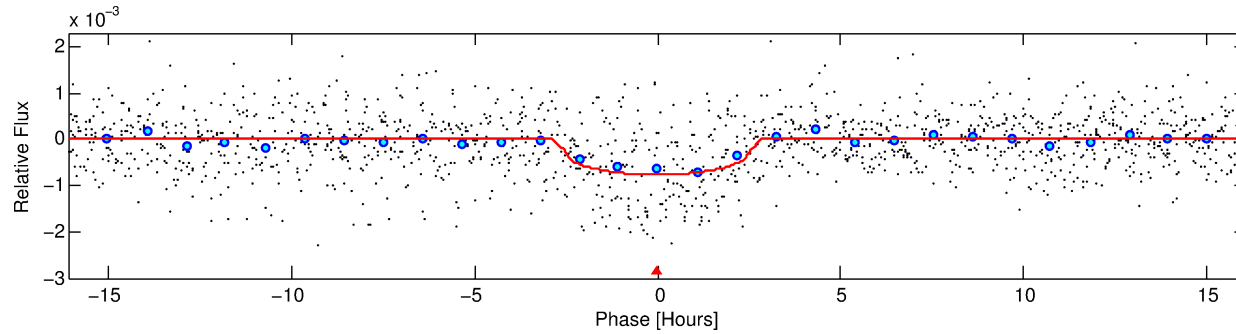
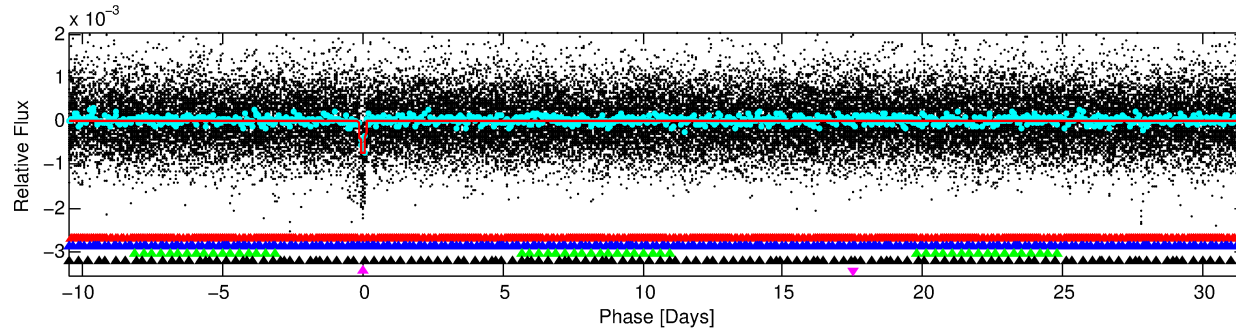
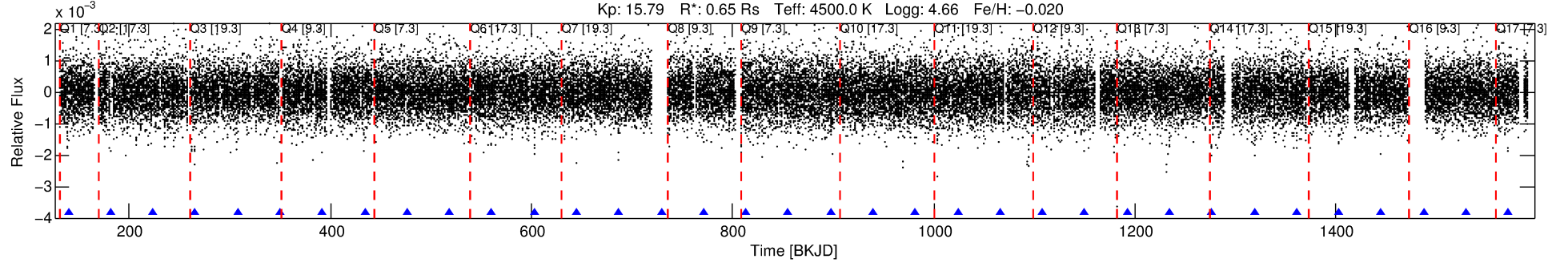
## Ephemeris Match Information For 008150320-05

No Significant Match Found

# DV One-Page Summary

KIC: 8150320 Candidate: 5 of 5 Period: 42.114 d  
KOI: K00904 Name: Kepler-55 Corr: No Ephemeris Match

Kp: 15.79 R\*: 0.65 Rs Teff: 4500.0 K Logg: 4.66 Fe/H: -0.020



## DV Fit Results:

Period = 42.11418 [0.00035] d  
Epoch = 139.4384 [0.0075] BKJD  
Rp/R\* = 0.0250 [0.0195]  
a/R\* = 56.65 [130.12]  
b = 0.40 [4.96]  
Seff = 3.50 [0.39]  
Teq = 349 [10] K  
Rp = 1.76 [1.38] Re  
a = 0.2093 [0.0116] AU  
Ag = 1284.92 [2039.47] [0.63σ]  
Teff = 3228 [1281] K [2.25σ]

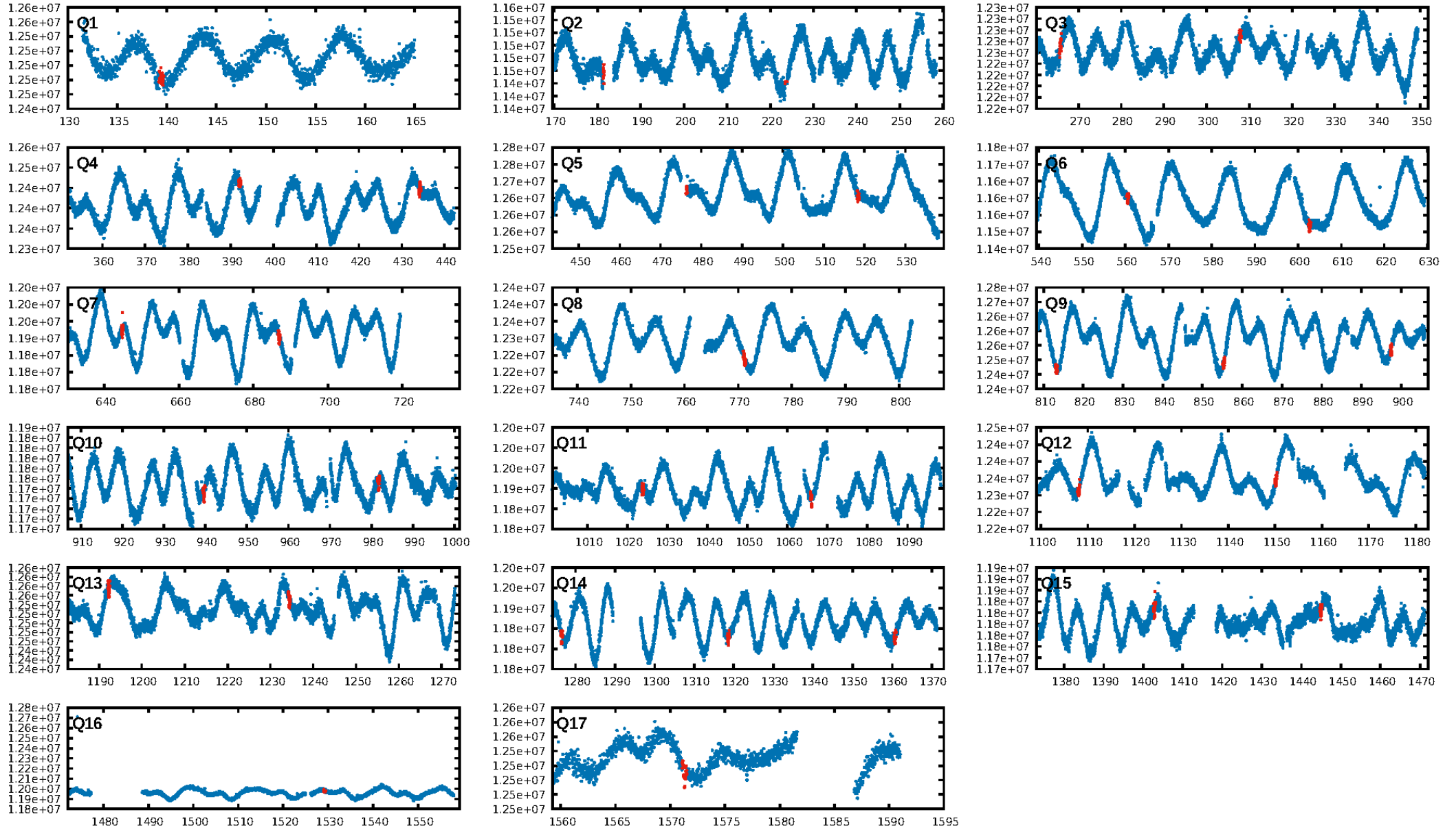
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [51.12σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 4.34e-35  
RollingBand-fgt: 1.00 [26/26]  
GhostDiagnostic-chr: 19.23  
Centroid-sig: 1.5%  
Centroid-so: 1.189 arcsec [1.79σ]  
OotOffset-rm: 0.168 arcsec [0.64σ]  
KicOffset-rm: 0.193 arcsec [0.60σ]  
OotOffset-st: 3/4/4/4 [15]  
KicOffset-st: 3/4/4/4 [15]  
DiffImageQuality-fgm: 0.87 [13/15]  
DiffImageOverlap-fno: 0.38 [6/16]

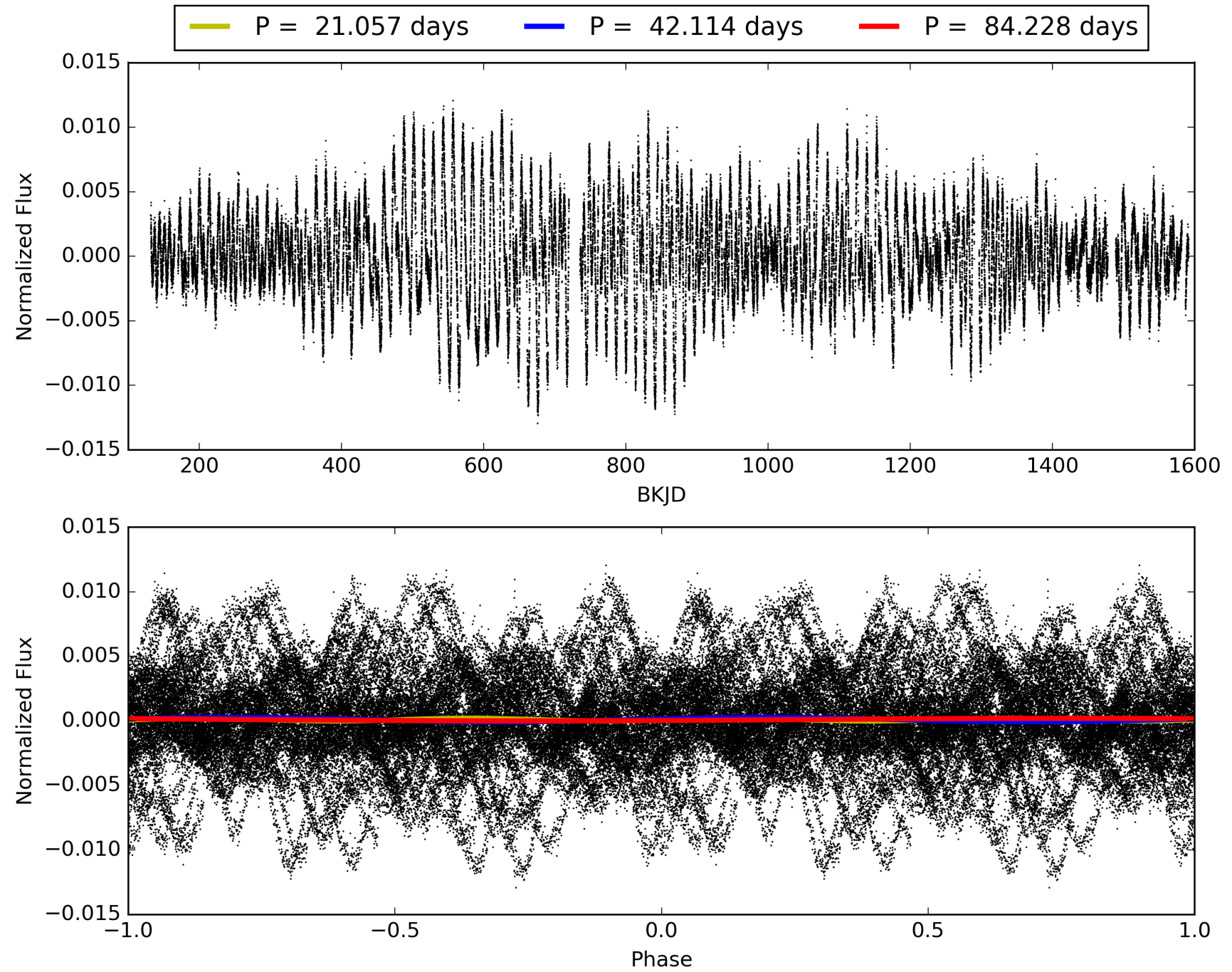
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 19:46:53 Z

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

# TCE 008150320-05, PDC Light Curves



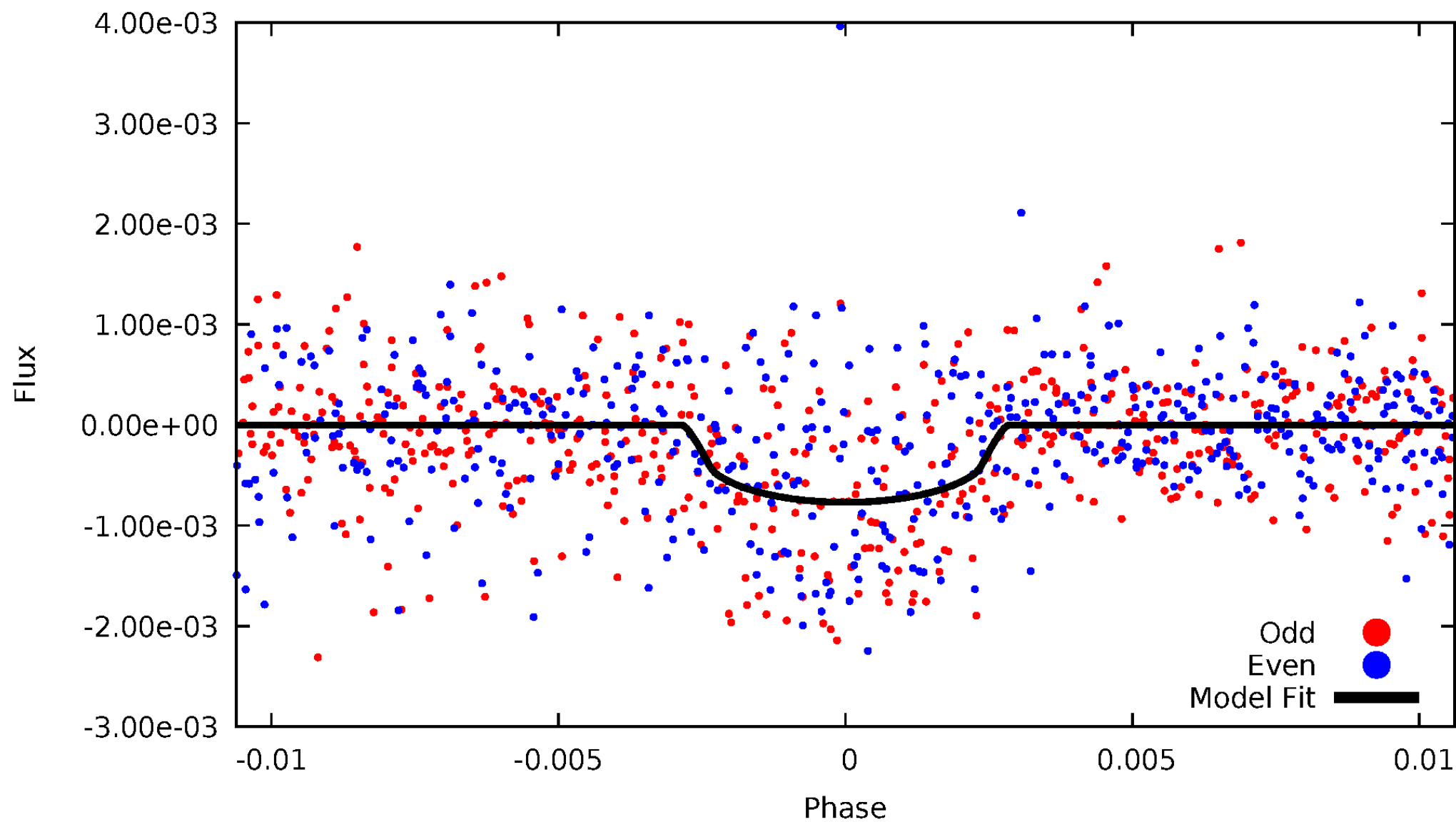
# TCE 008150320-05





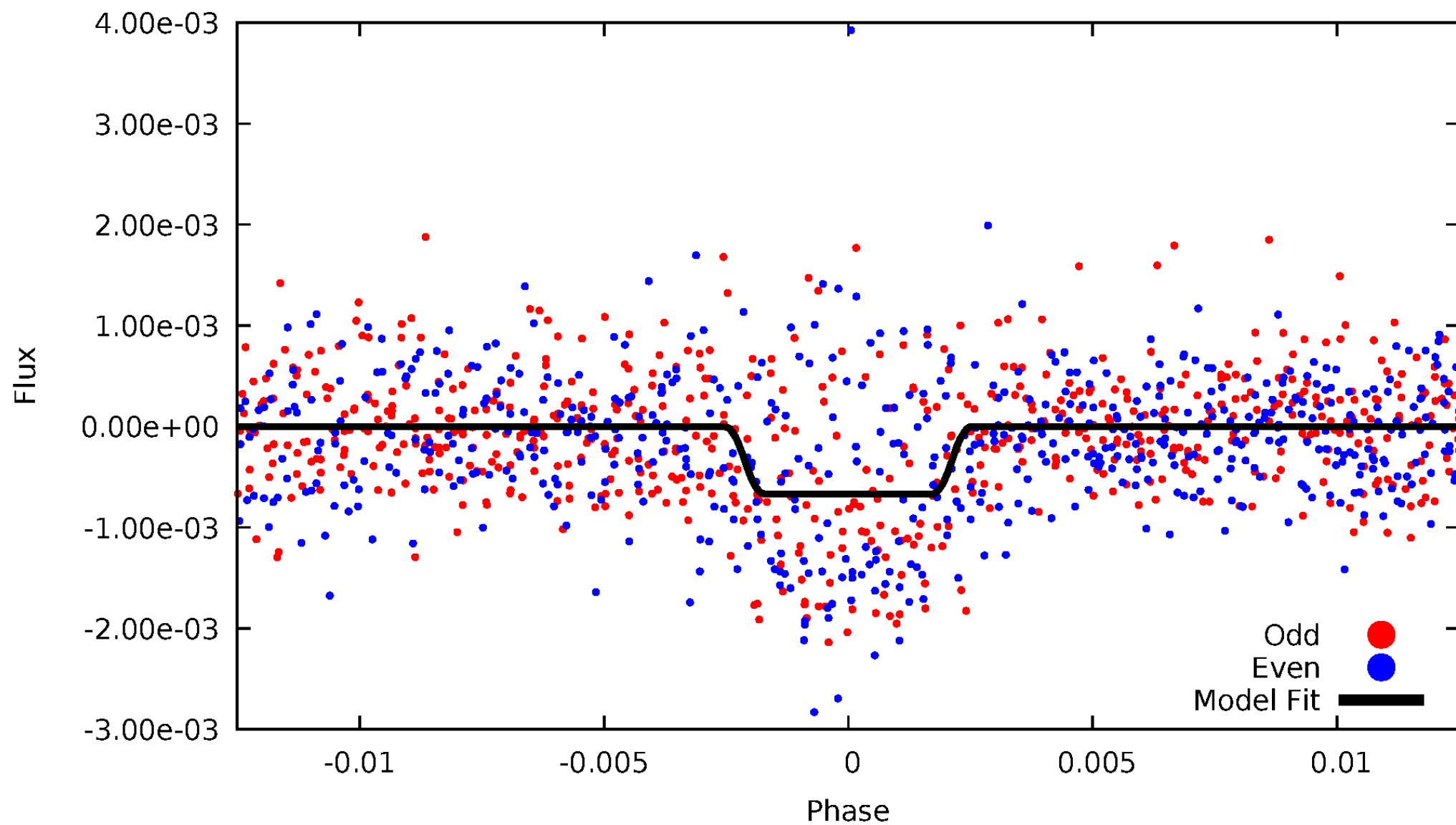
# DV Odd/Even

TCE 008150320-05



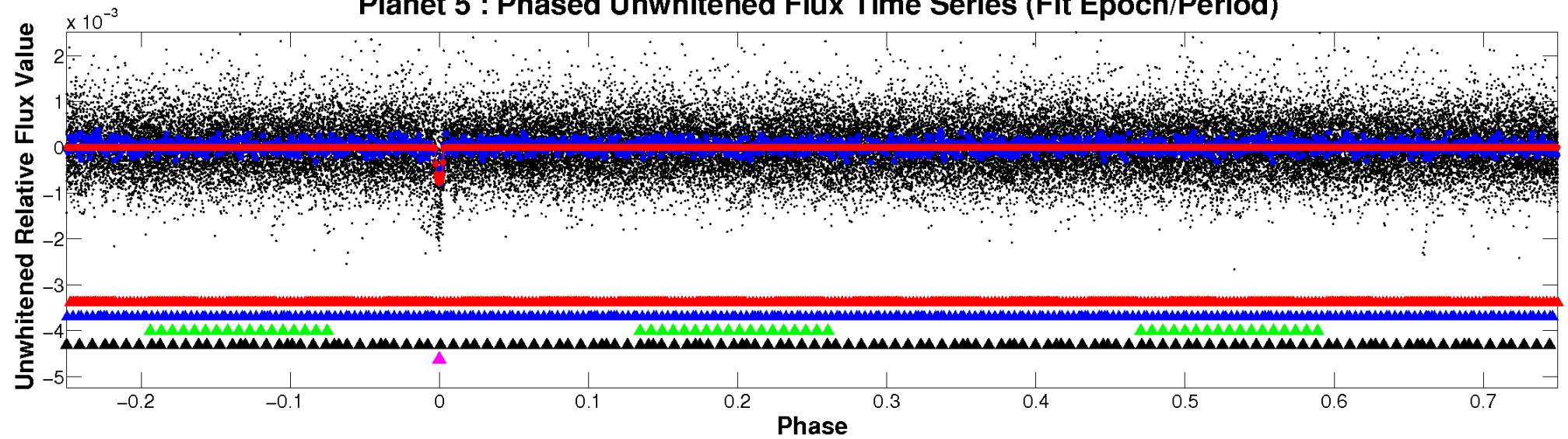
# ALT Odd/Even

TCE 008150320-05

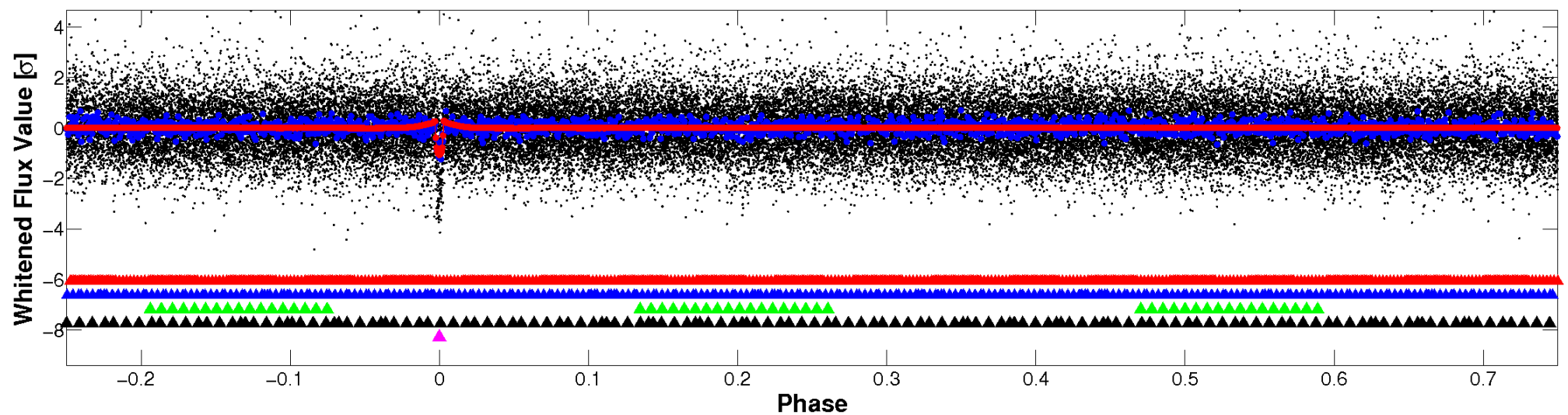


# Non-Whitened Vs. Whitened Light Curve

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

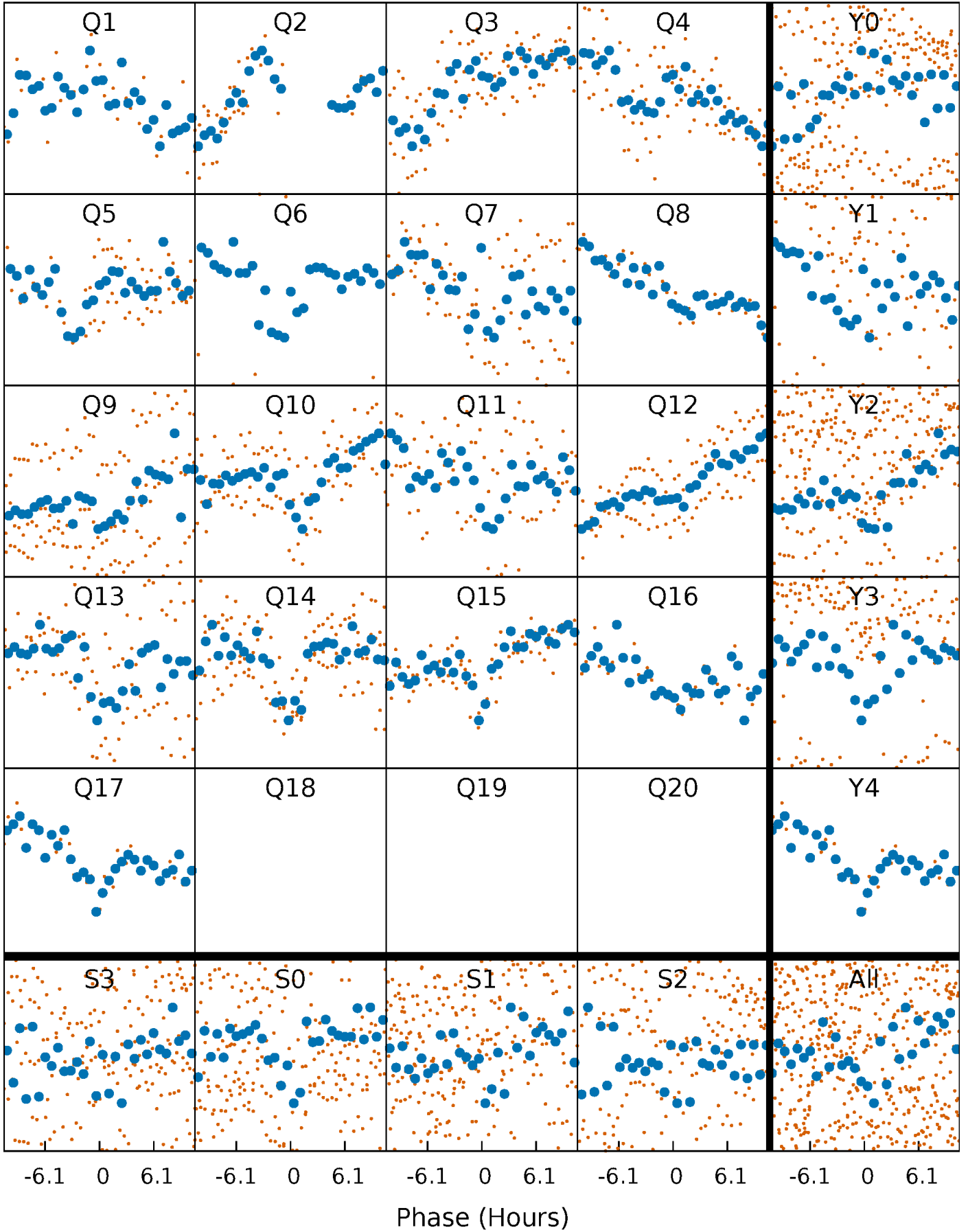


Planet 5 : Phased Whitened Flux Time Series (Fit Epoch/Period)



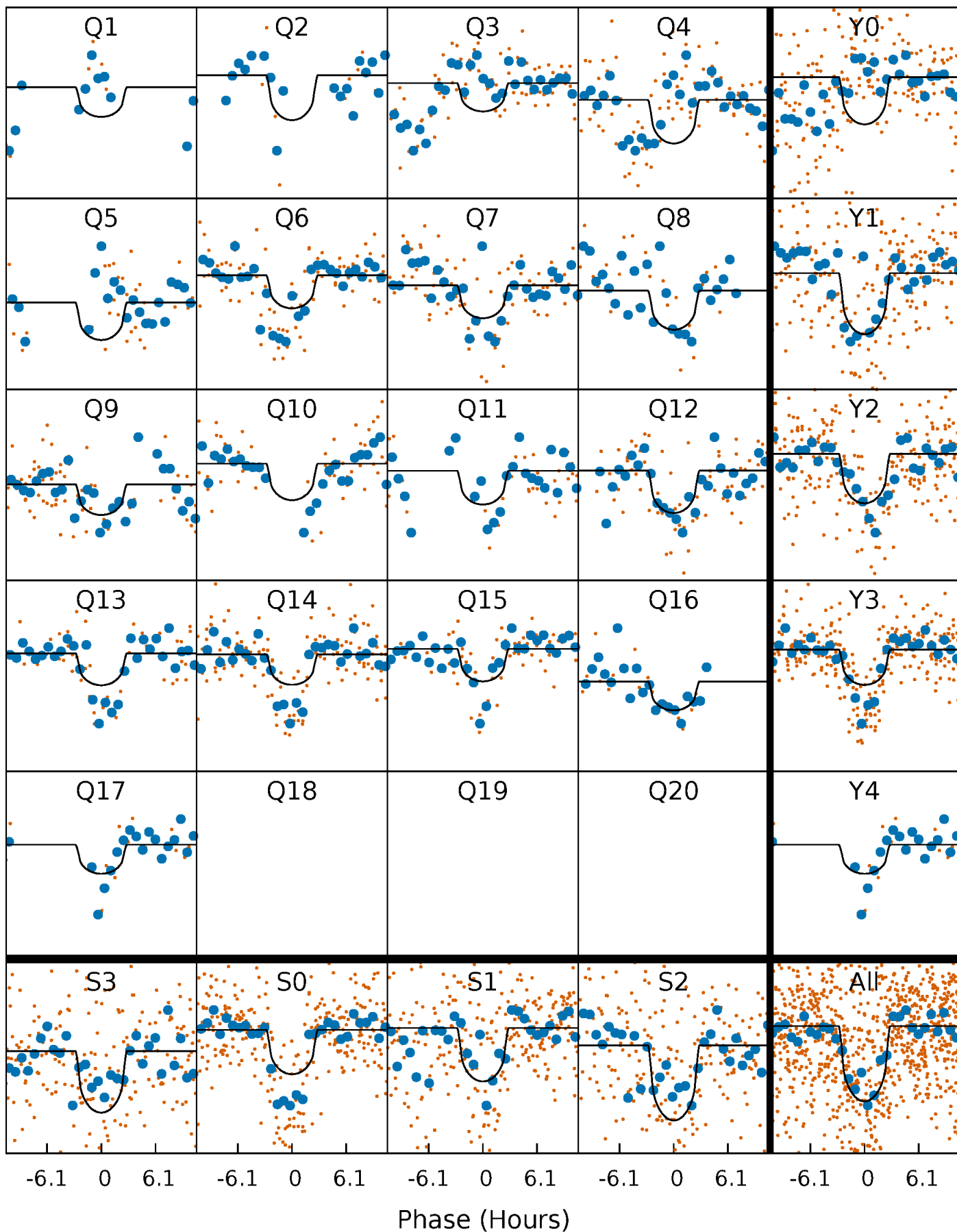
# PDC Quarter-Phased Transit Curves

TCE 008150320-05   P= 42.114180 Days    $T_0=139.438439$  (BKJD)



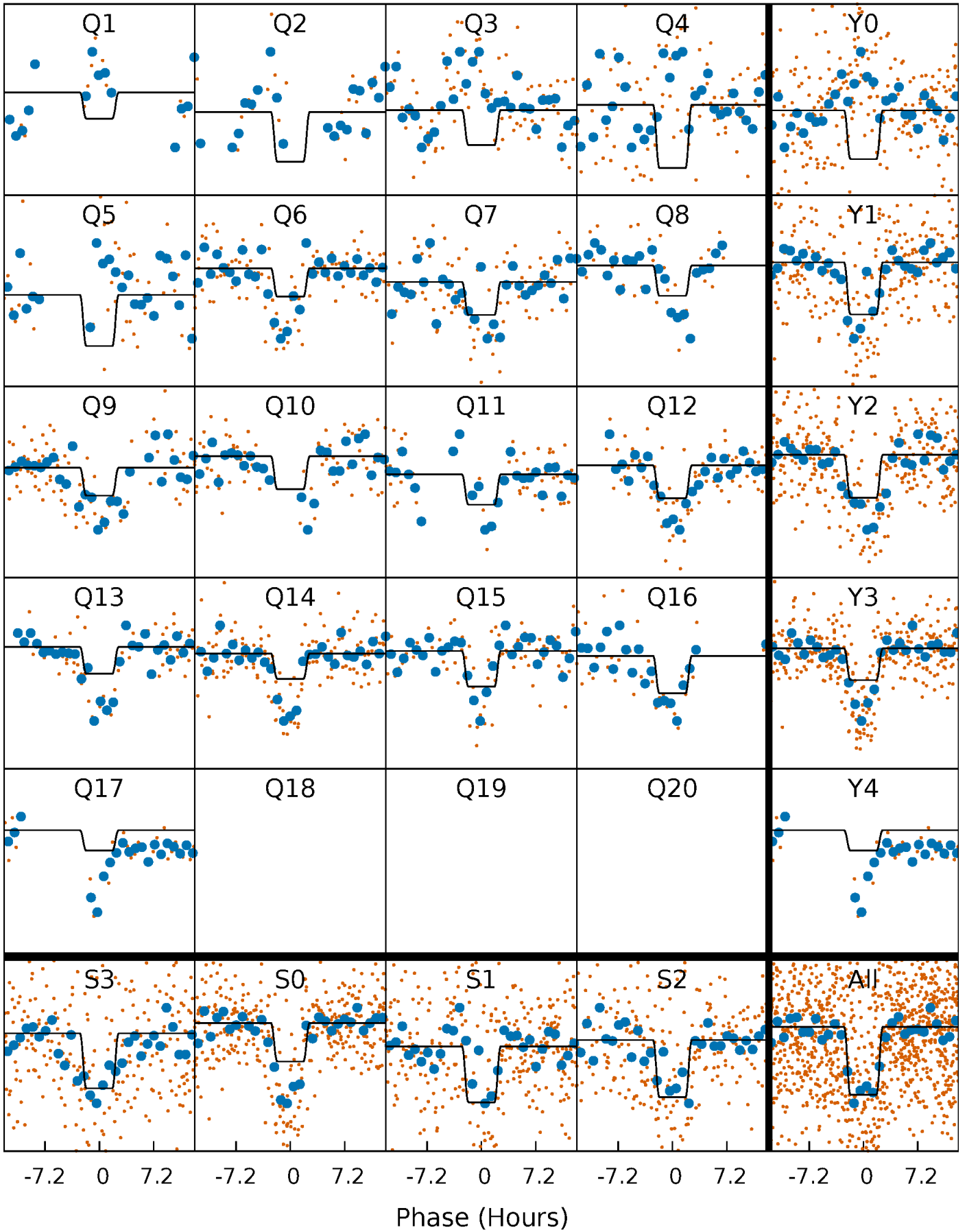
# DV Quarter-Phased Transit Curves

TCE 008150320-05   P= 42.114180 Days    $T_0=139.438439$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 008150320-05   P= 42.115005 Days    $T_0=139.422248$  (BKJD)

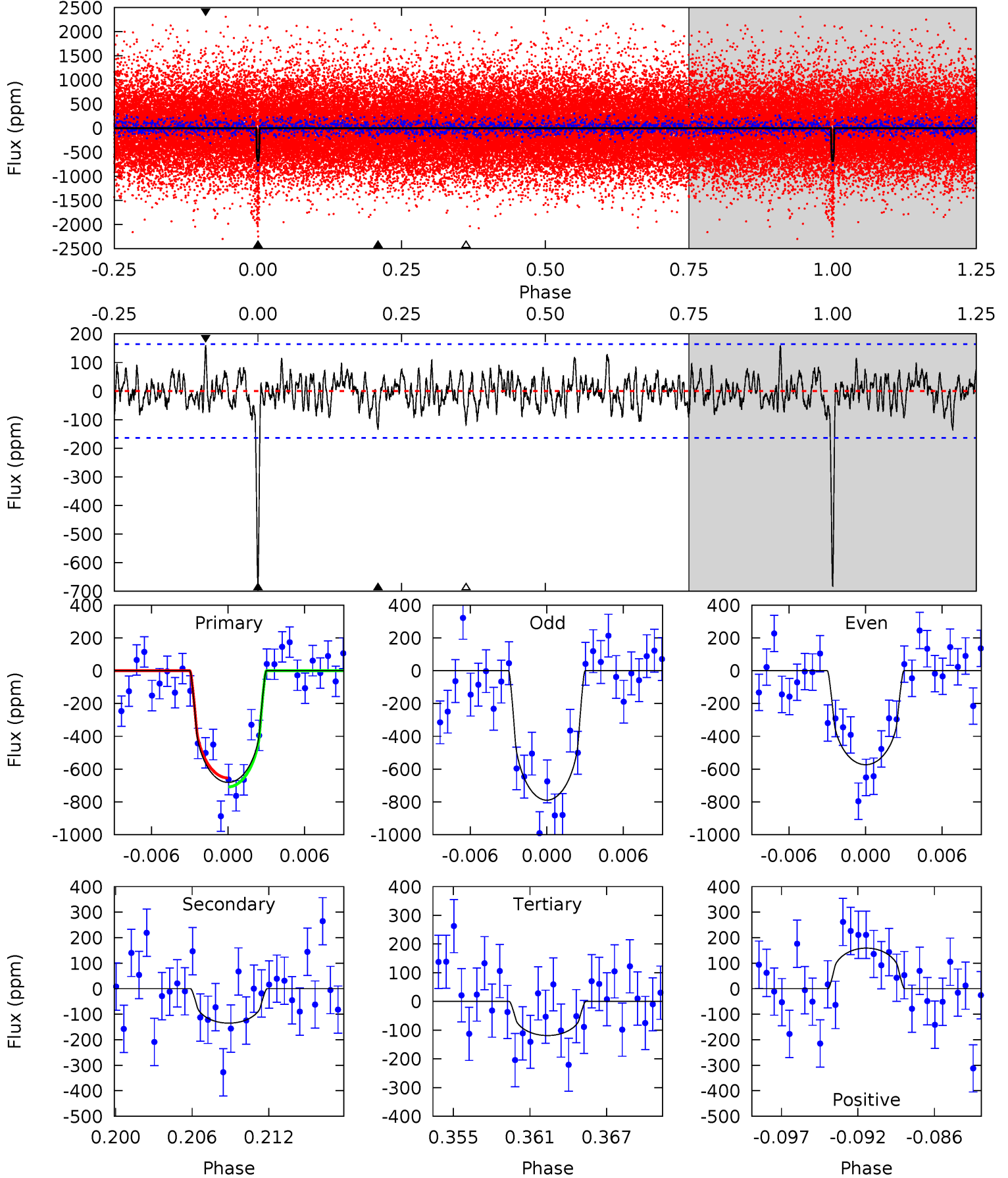




# DV Model-Shift Uniqueness Test

008150320-05, P = 42.114180 Days, E = 97.324259 Days

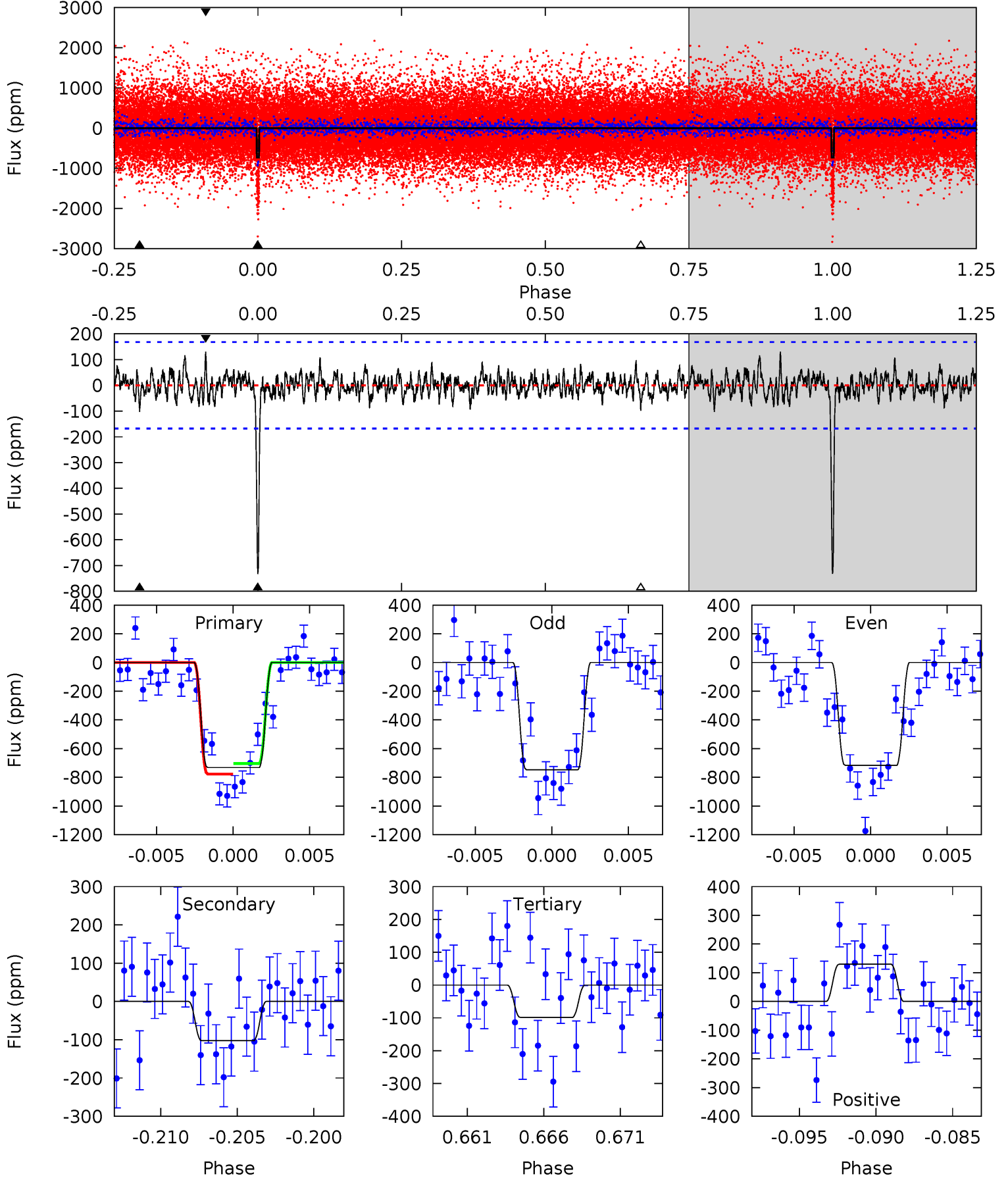
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
21.3	4.23	3.72	4.98	5.13	2.76	1.34	17.6	16.3	0.51	-0.75	3.39	0.78	0.19	0.86



# Alt Model-Shift Uniqueness Test

008150320-05, P = 42.115005 Days, E = 97.307243 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
22.5	3.15	3.04	3.99	5.16	2.81	0.99	19.5	18.5	0.12	-0.84	0.46	0.77	0.15	1.12



### Stellar Parameters For KIC 008150320

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$4500^{+90}_{-90}$	$4.656^{+0.013}_{-0.043}$	$-0.020^{+0.150}_{-0.150}$	$0.646^{+0.043}_{-0.020}$	$0.710^{+0.029}_{-0.043}$	$3.719^{+0.220}_{-0.623}$
	+2%/-2%	+0%/-1%	+750%/-750%	+7%/-3%	+4%/-6%	+6%/-17%
Source	SPE58	SPE58	SPE58	DSEP		

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

### Secondary Eclipse Parameters for KIC 008150320-05 / KOI 0904.03

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-135 \pm 32$	$1.87^{+1.44}_{-1.12}$	$491^{+12}_{-11}$	$3403^{+1326}_{-544}$	$922^{+5348}_{-635}$
Alt.	$-103 \pm 33$	$2.10^{+1.22}_{-1.27}$	$491^{+12}_{-11}$	$3143^{+1097}_{-403}$	$564^{+2789}_{-356}$

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

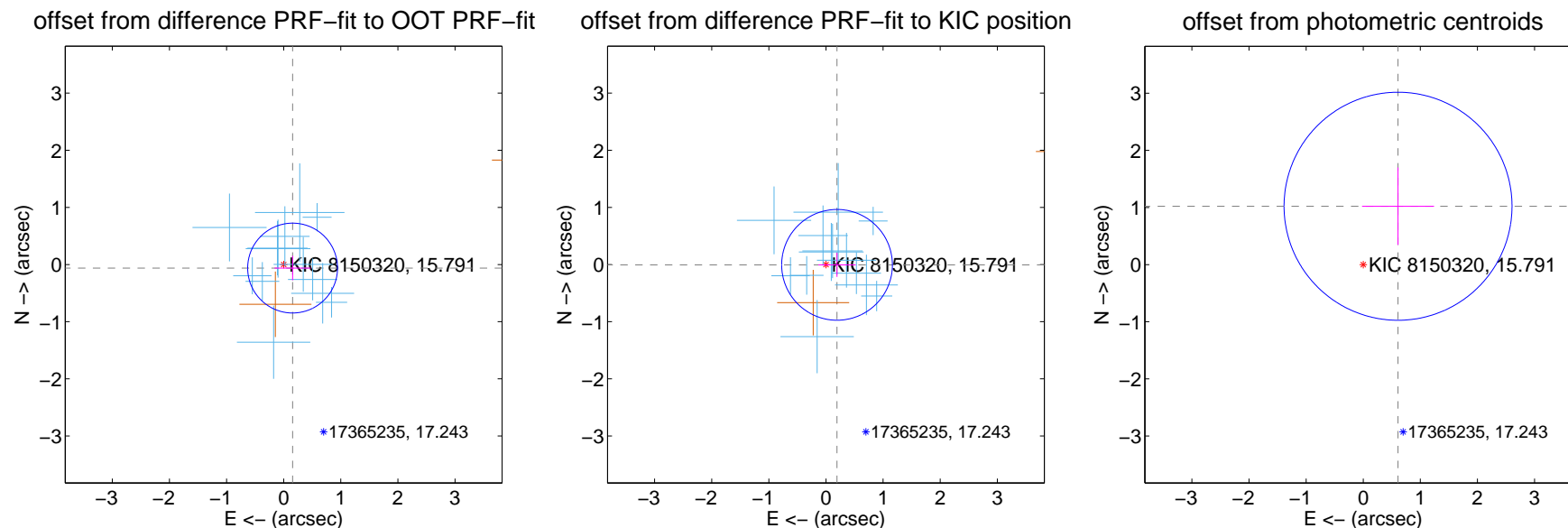
## DV Centroid Data

Supplemental centroid analysis for 008150320-05. Kepler magnitude: 15.79. Transit SNR 14.03

There are 13 quarters with good PRF difference image offsets

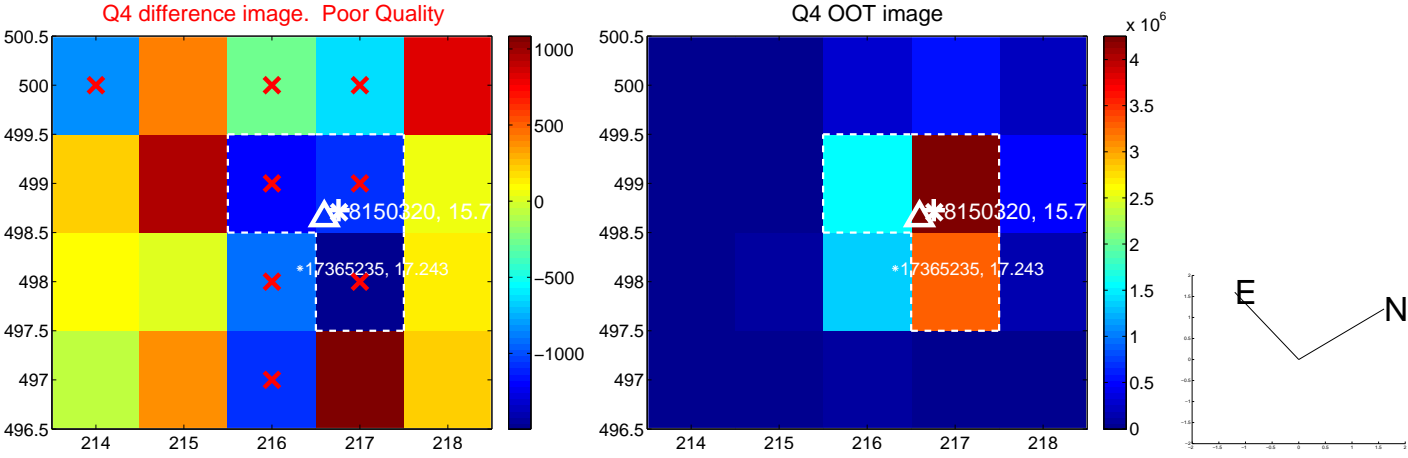
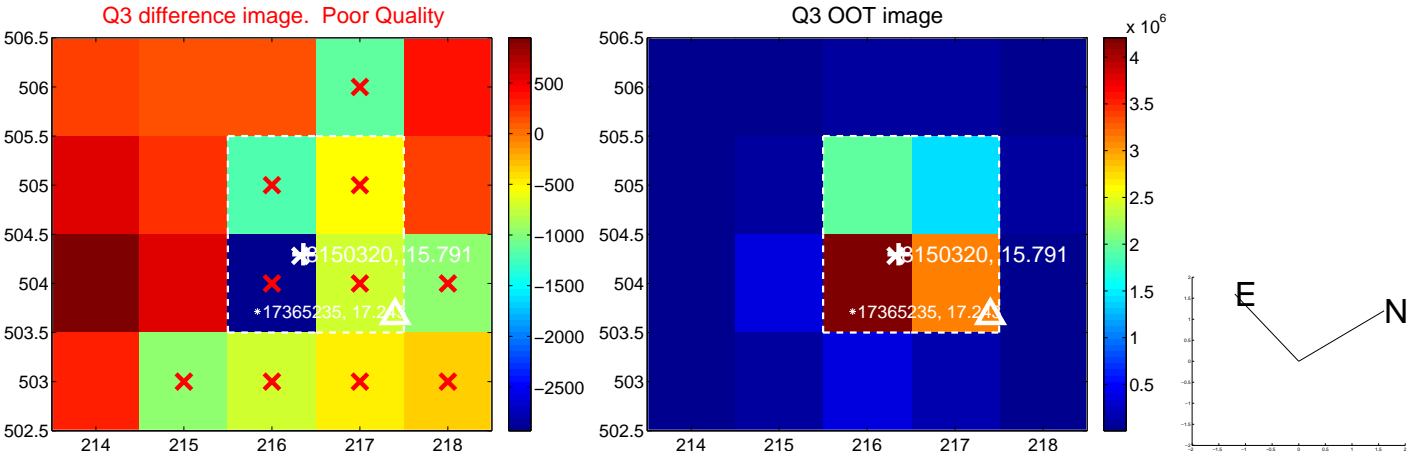
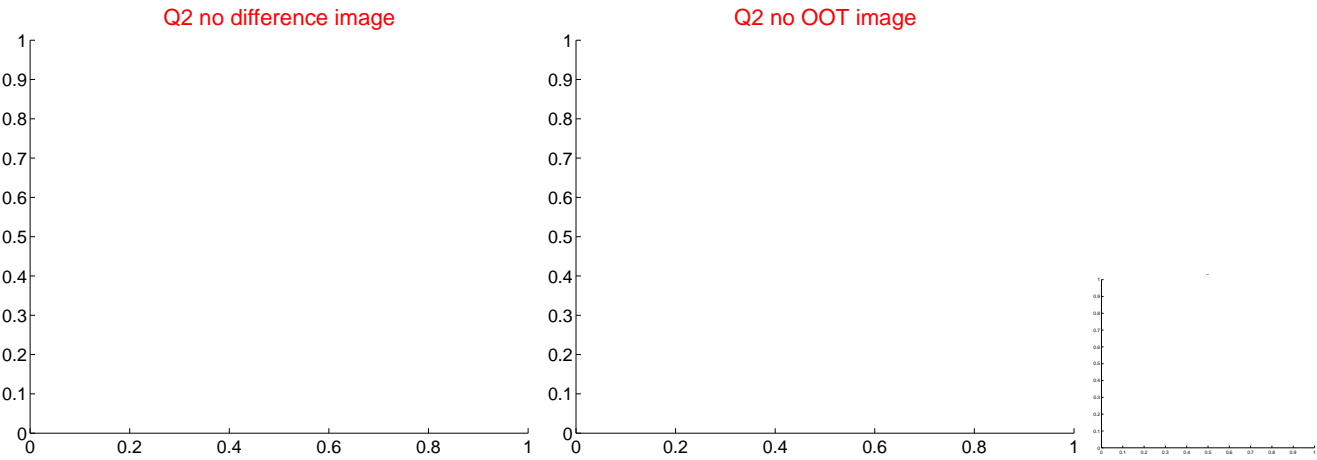
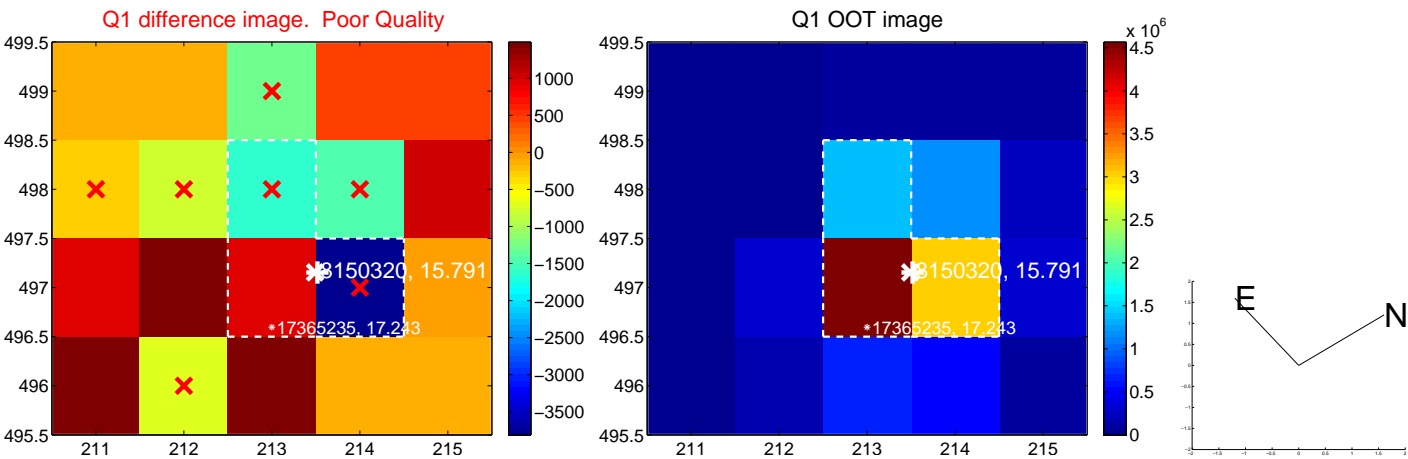
The direct PRF centroid is offset from the target star catalog position by about 0.07 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.168 \pm 0.262$	0.64	$-0.156 \pm 0.317$	$-0.062 \pm 0.214$
PRF-fit source offset from KIC position	$0.193 \pm 0.323$	0.60	$-0.193 \pm 0.327$	$-0.006 \pm 0.210$
photometric centroid source offset	$1.19 \pm 0.67$	1.79	$-0.61 \pm 0.63$	$1.02 \pm 0.68$

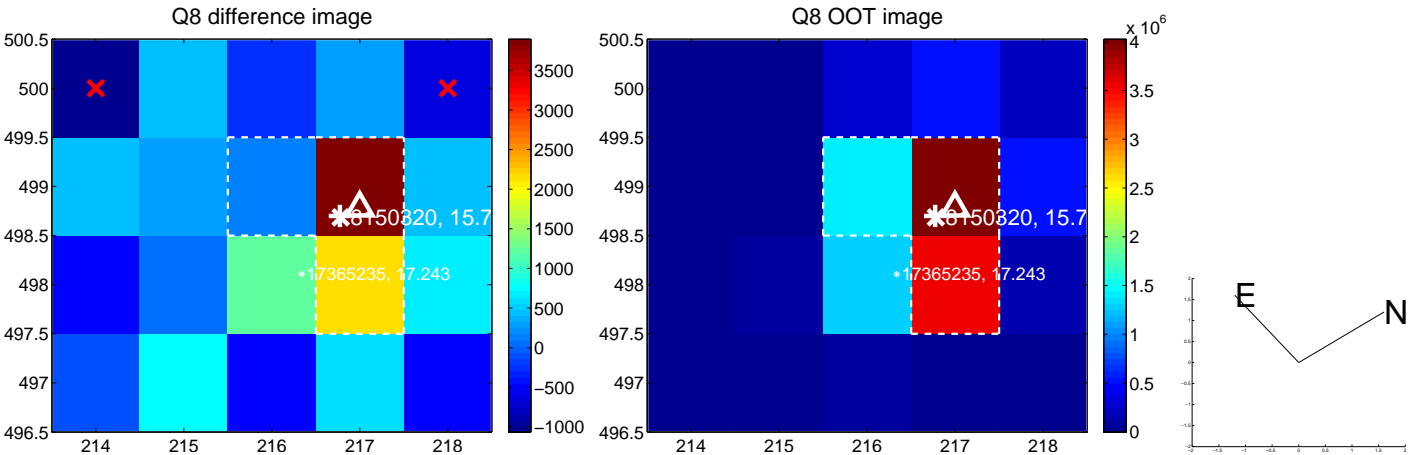
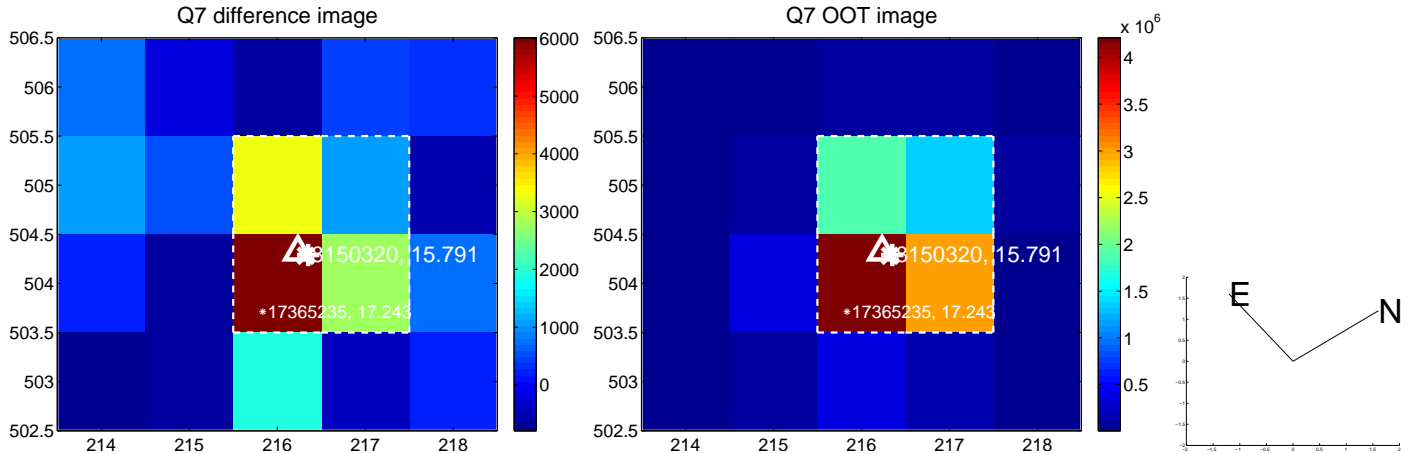
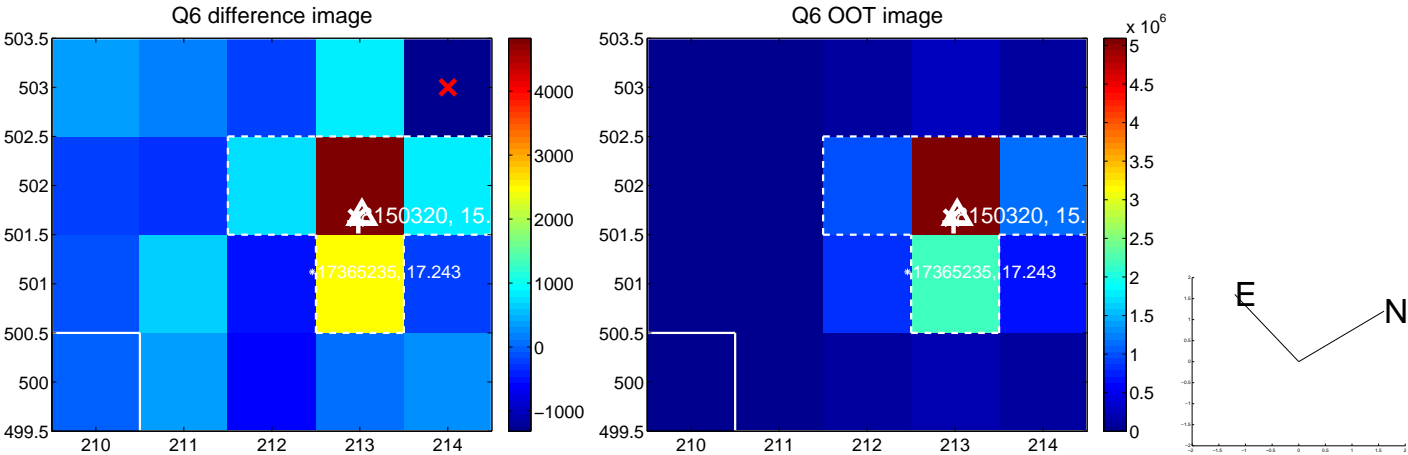
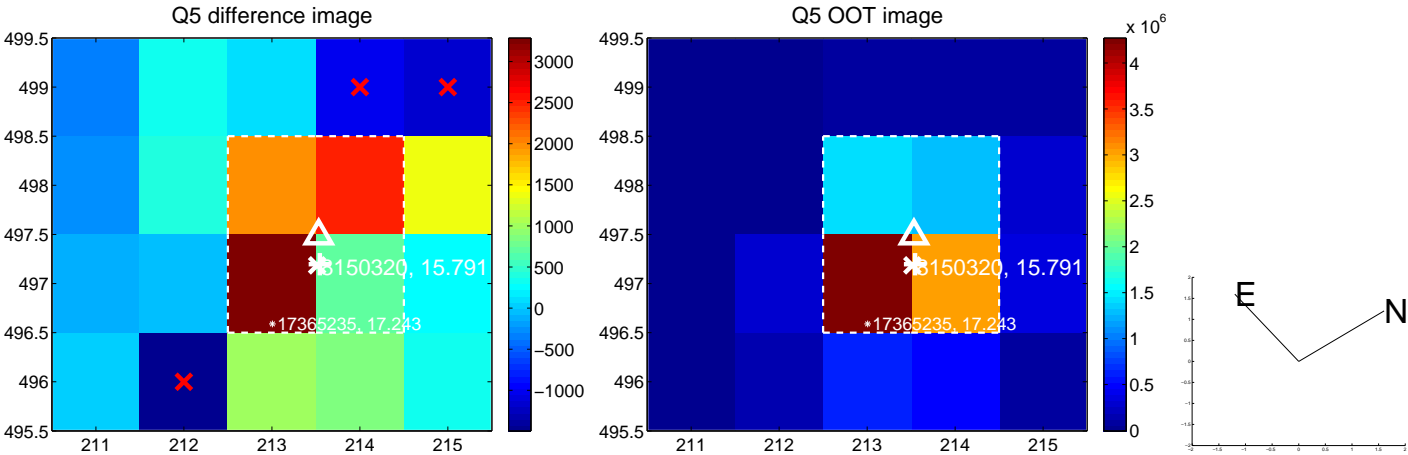


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

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

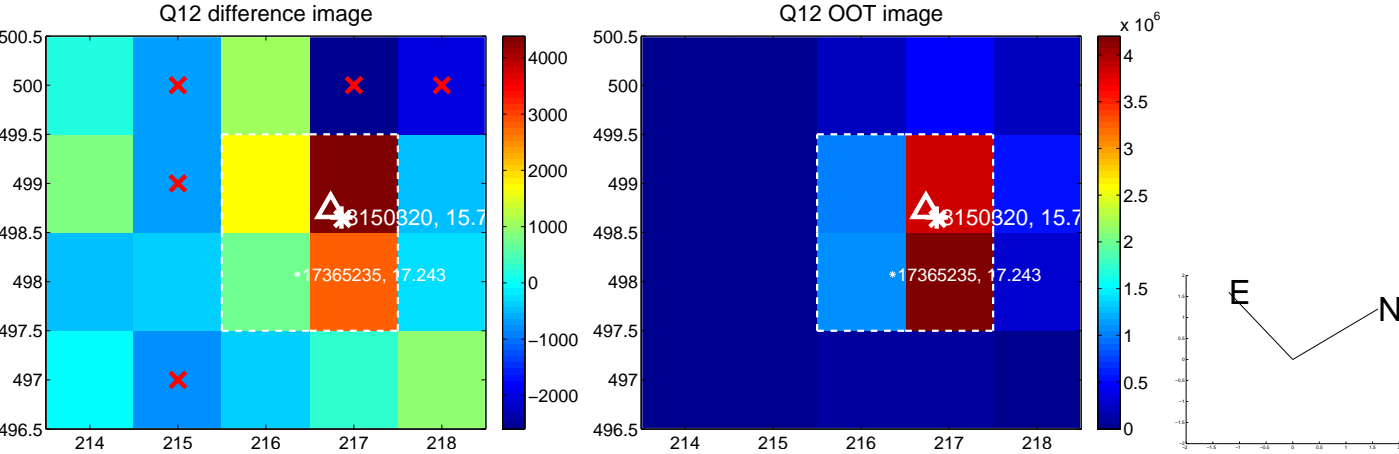
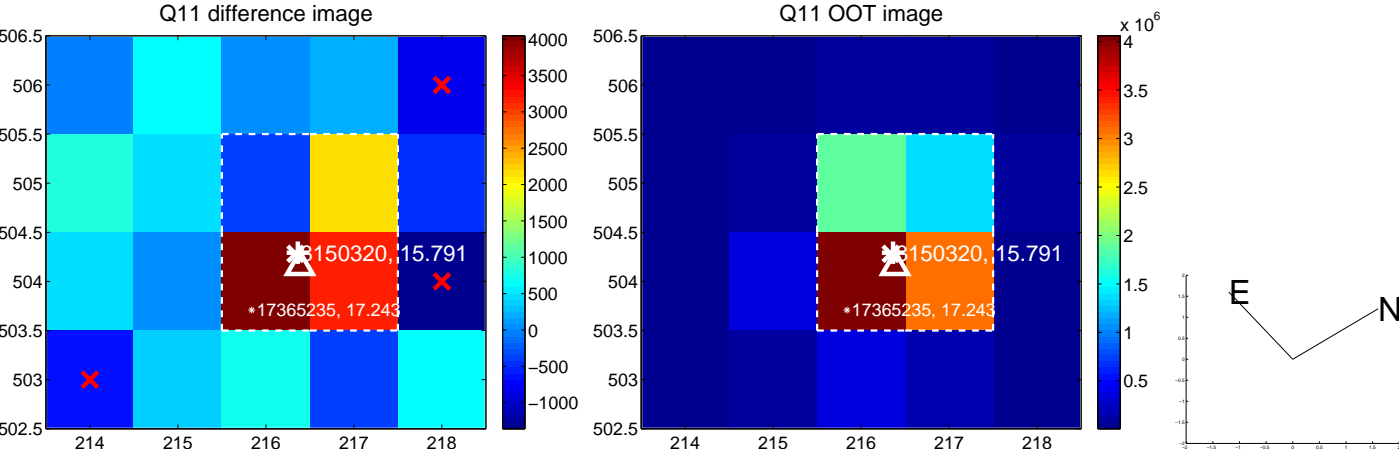
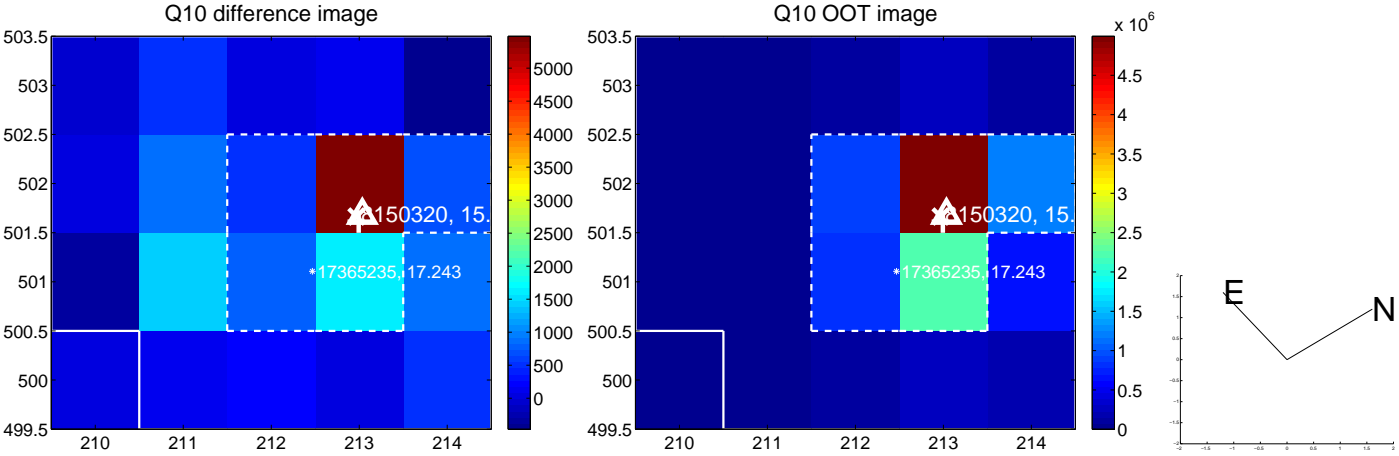
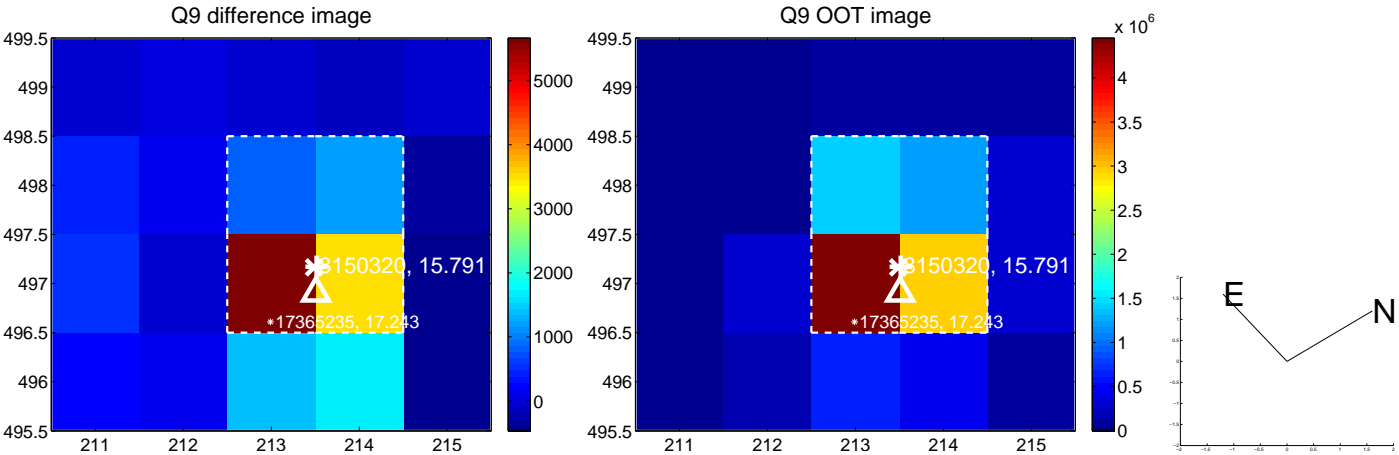


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

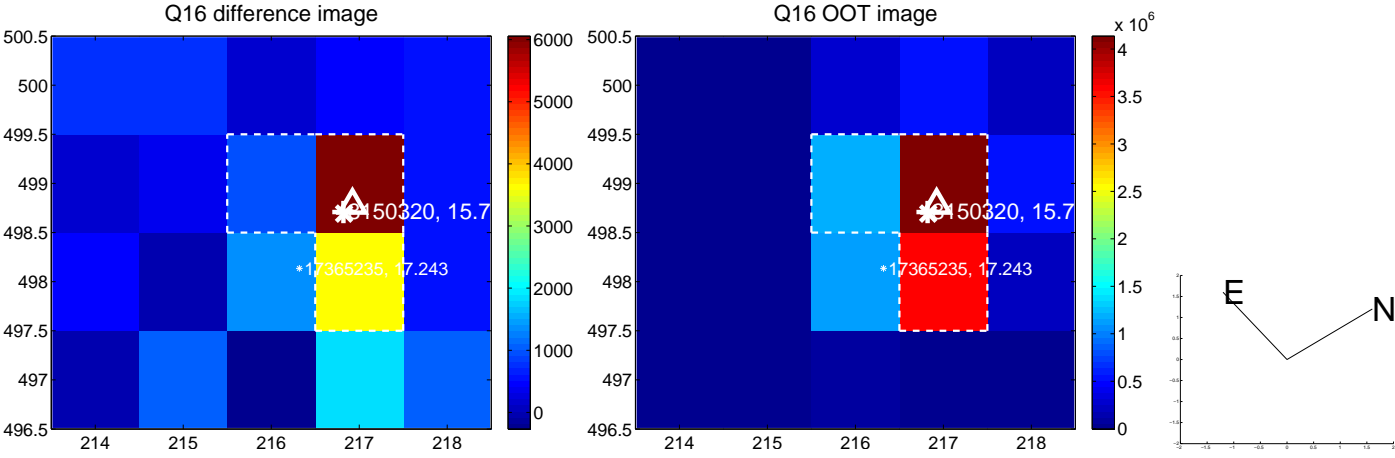
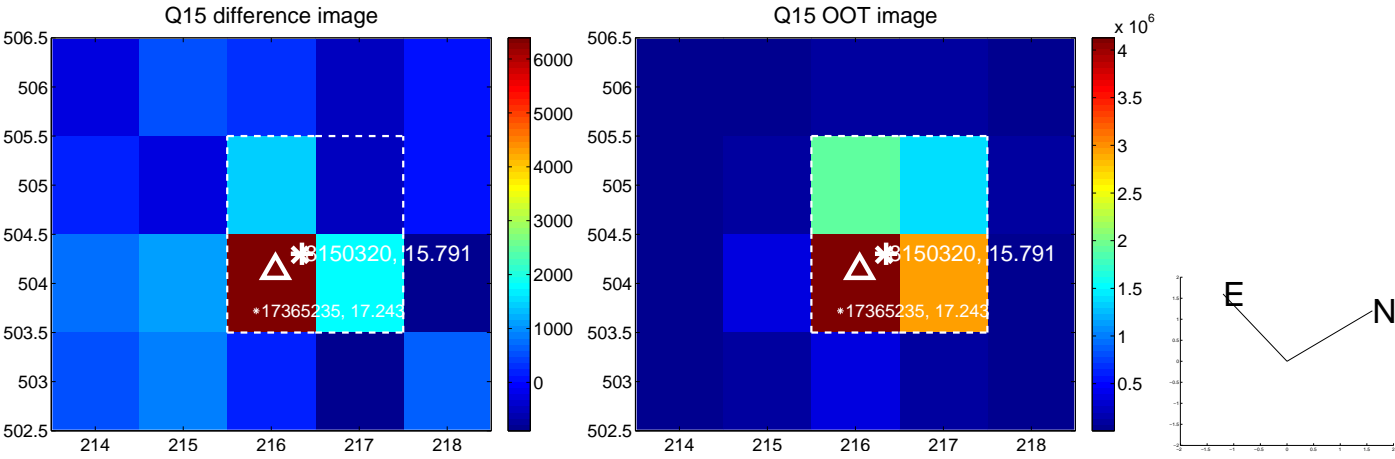
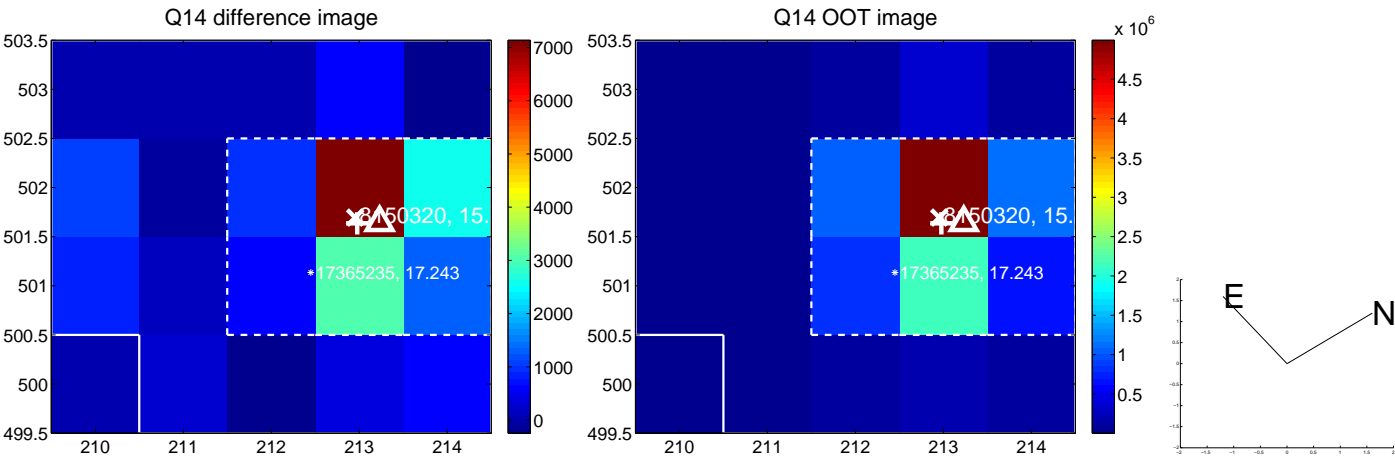
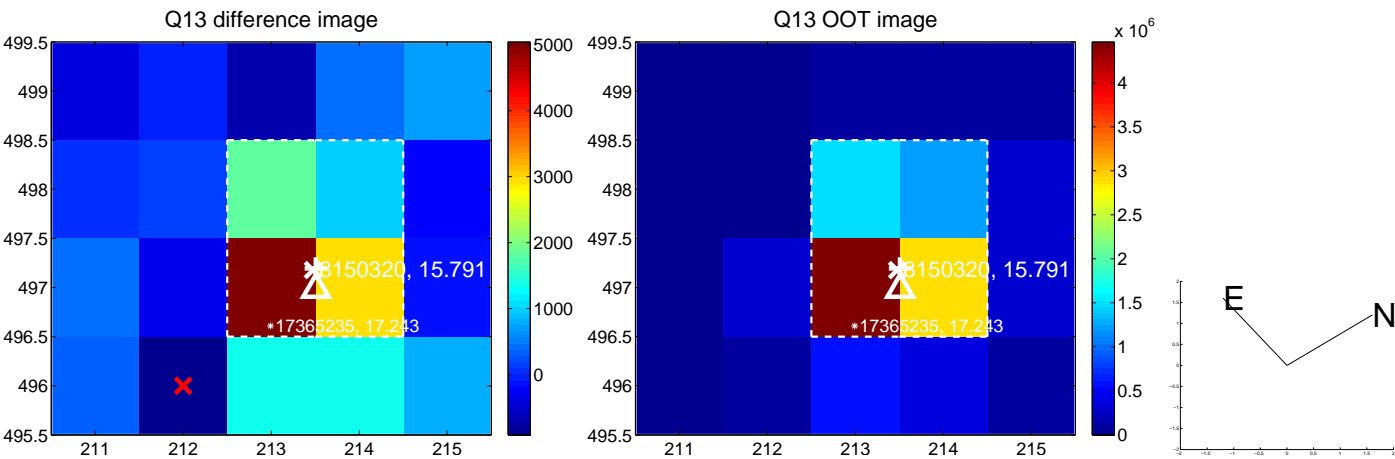




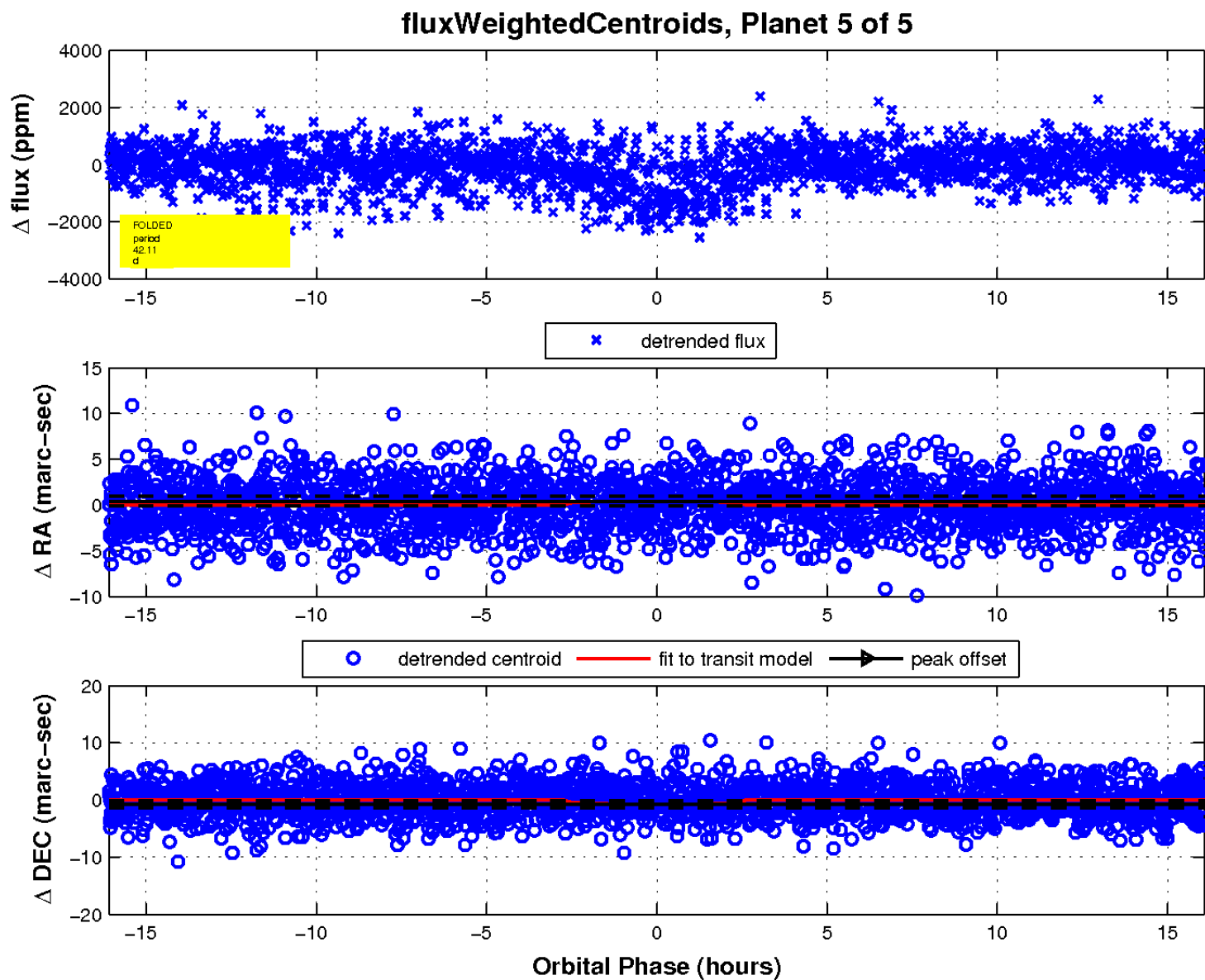
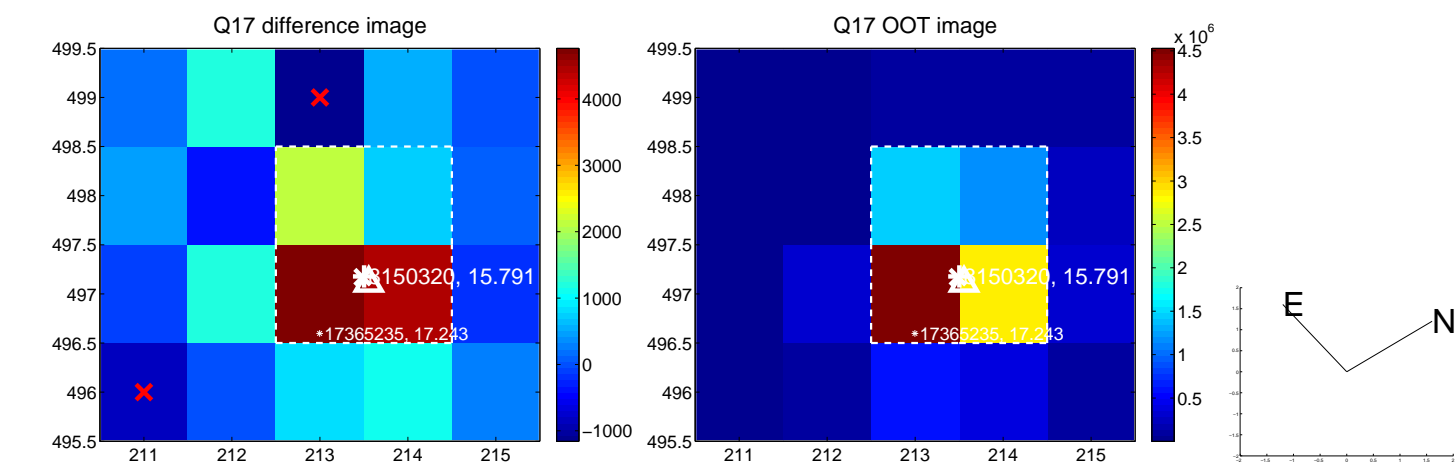
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



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



# UKIRT Image

Declination

