

# KIC 003342970

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003342970-01	OBS	0800.01	2.711510	132.072055	798.1	3.154	48.7	56.0	1.08	6214	3.48	962.29
003342970-02	OBS	0800.02	7.212039	136.758613	957.6	4.164	40.0	45.1	1.08	6214	3.65	261.12

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003342970-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
003342970-02	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.

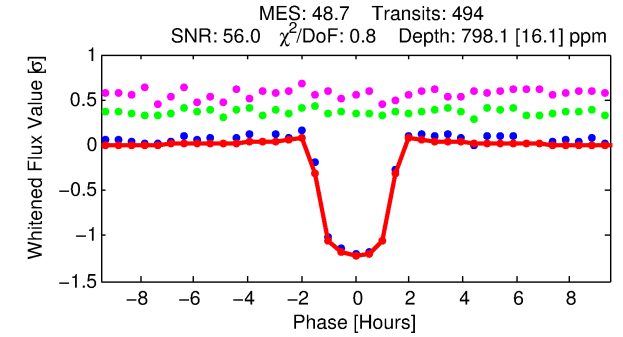
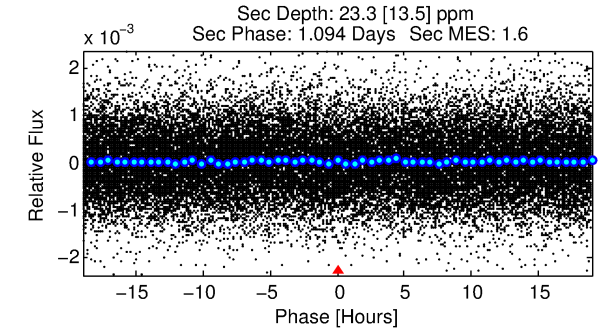
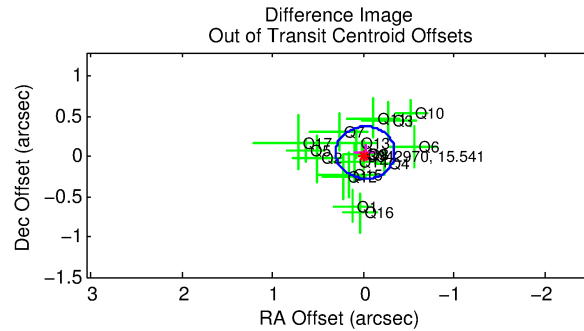
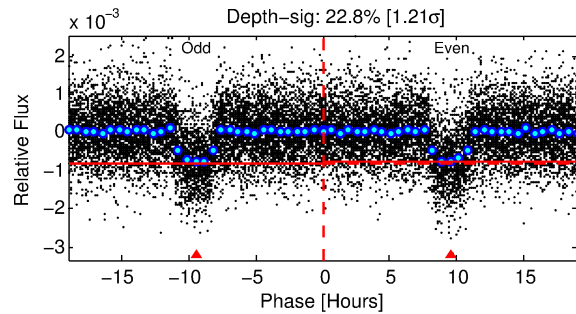
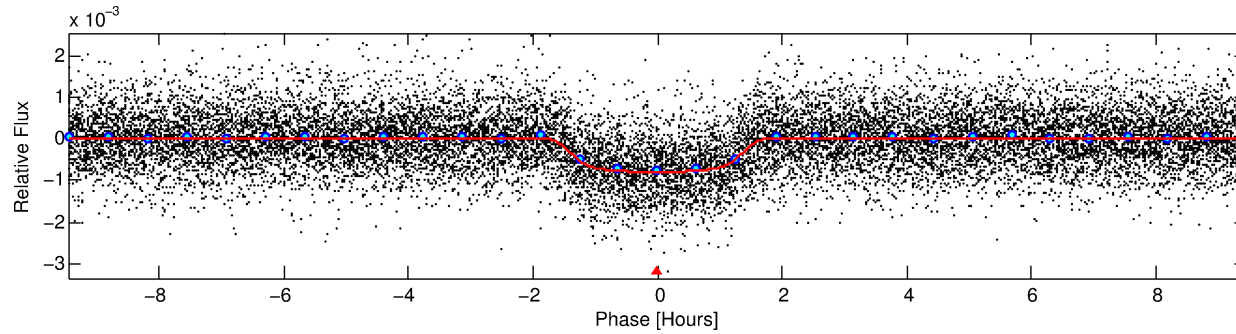
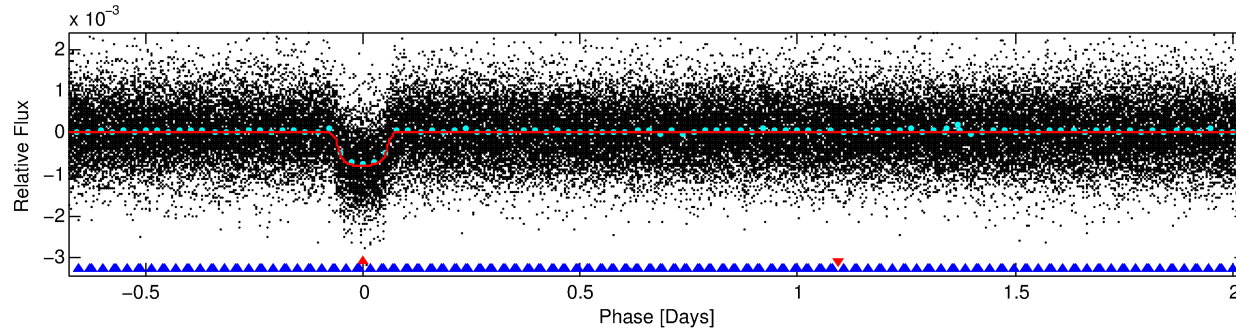
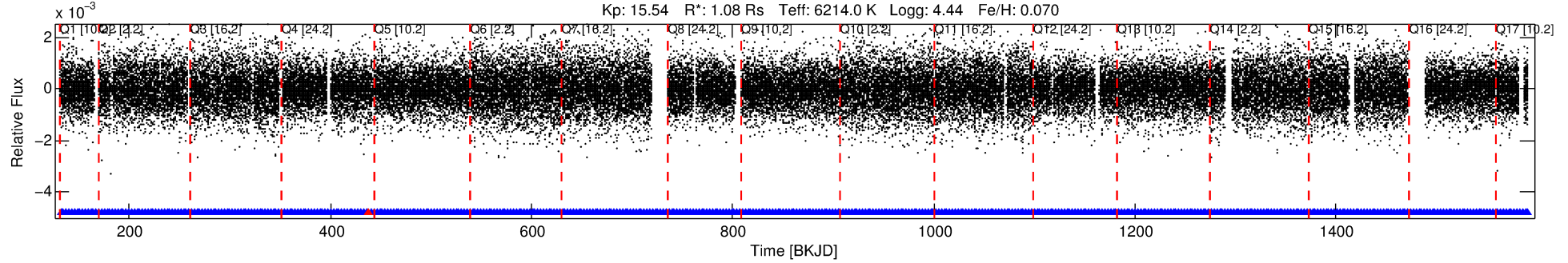
## Ephemeris Match Information For 003342970-01

No Significant Match Found

# DV One-Page Summary

KIC: 3342970 Candidate: 1 of 2 Period: 2.712 d  
KOI: K00800.01 Name: Kepler-234b Corr: 0.992

Kp: 15.54 R\*: 1.08 Rs Teff: 6214.0 K Logg: 4.44 Fe/H: 0.070



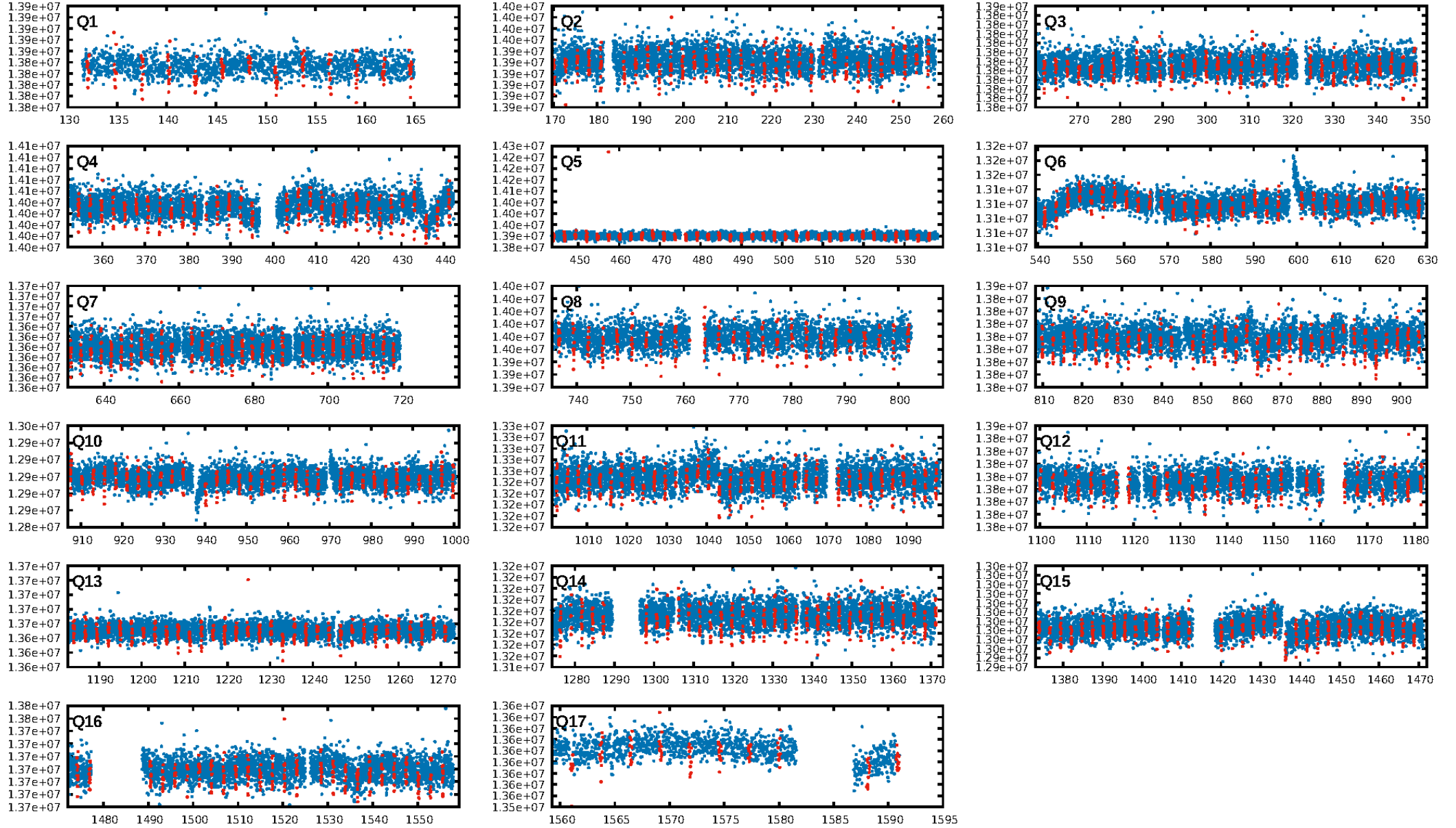
## DV Fit Results:

Period = 2.71151 [0.00000] d  
Epoch = 132.0721 [0.0008] BKJD  
Rp/R\* = 0.0296 [0.0017]  
a/R\* = 3.81 [1.03]  
b = 0.86 [0.09]  
Seff = 962.29 [409.90]  
Teff = 1420 [151] K  
Rp = 3.48 [1.16] Re  
a = 0.0401 [0.0110] AU  
Ag = 1.70 [1.21] [0.58σ]  
Teffp = 2507 [384] K [2.63σ]

## DV Diagnostic Results:

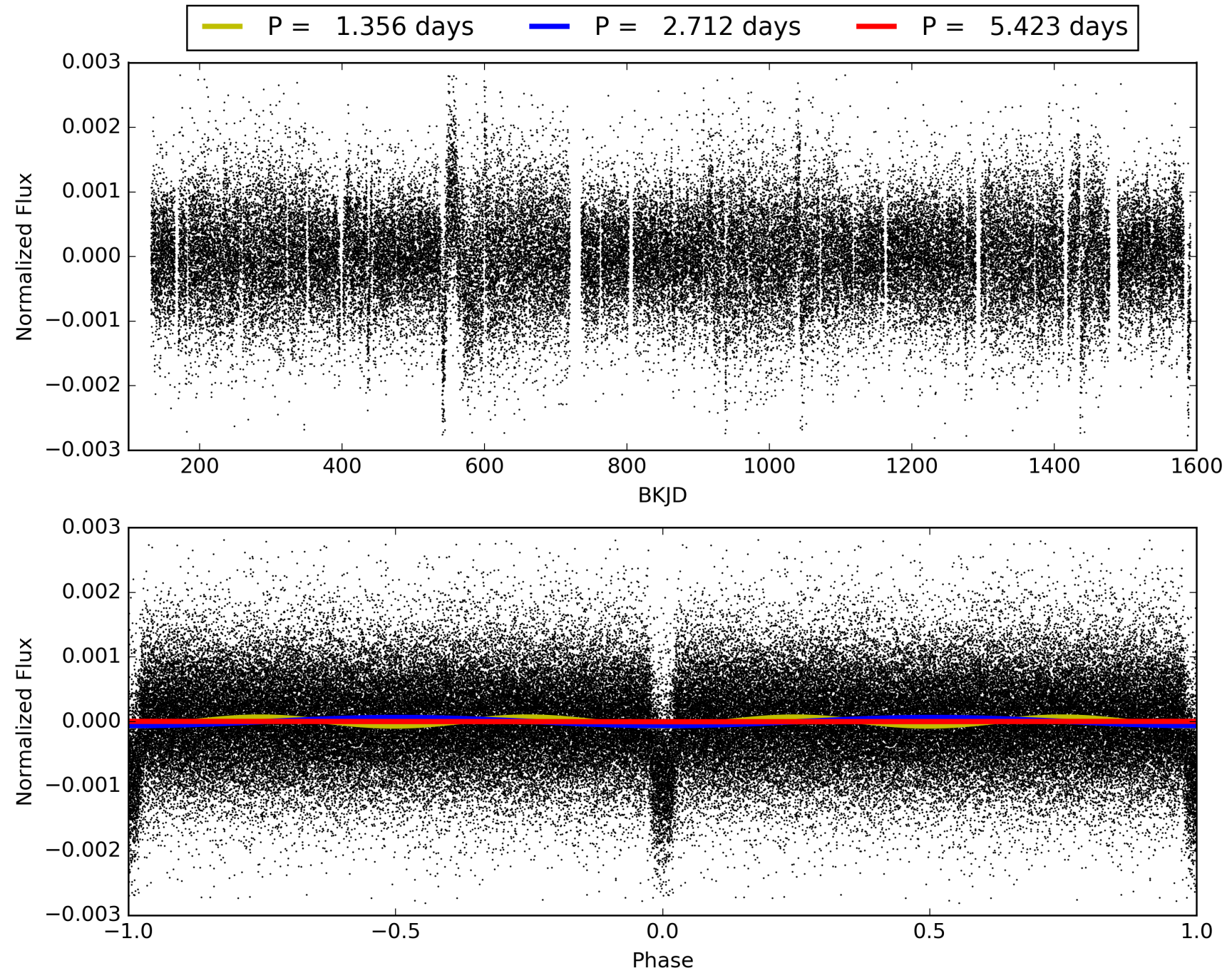
ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [20.68σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 1.00 [470/471]  
GhostDiagnostic-chr: 2.614  
Centroid-sig: 0.0%  
Centroid-so: 0.525 arcsec [2.02σ]  
OotOffset-rm: 0.055 arcsec [0.51σ]  
KicOffset-rm: 0.104 arcsec [1.05σ]  
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 003342970-01, PDC Light Curves



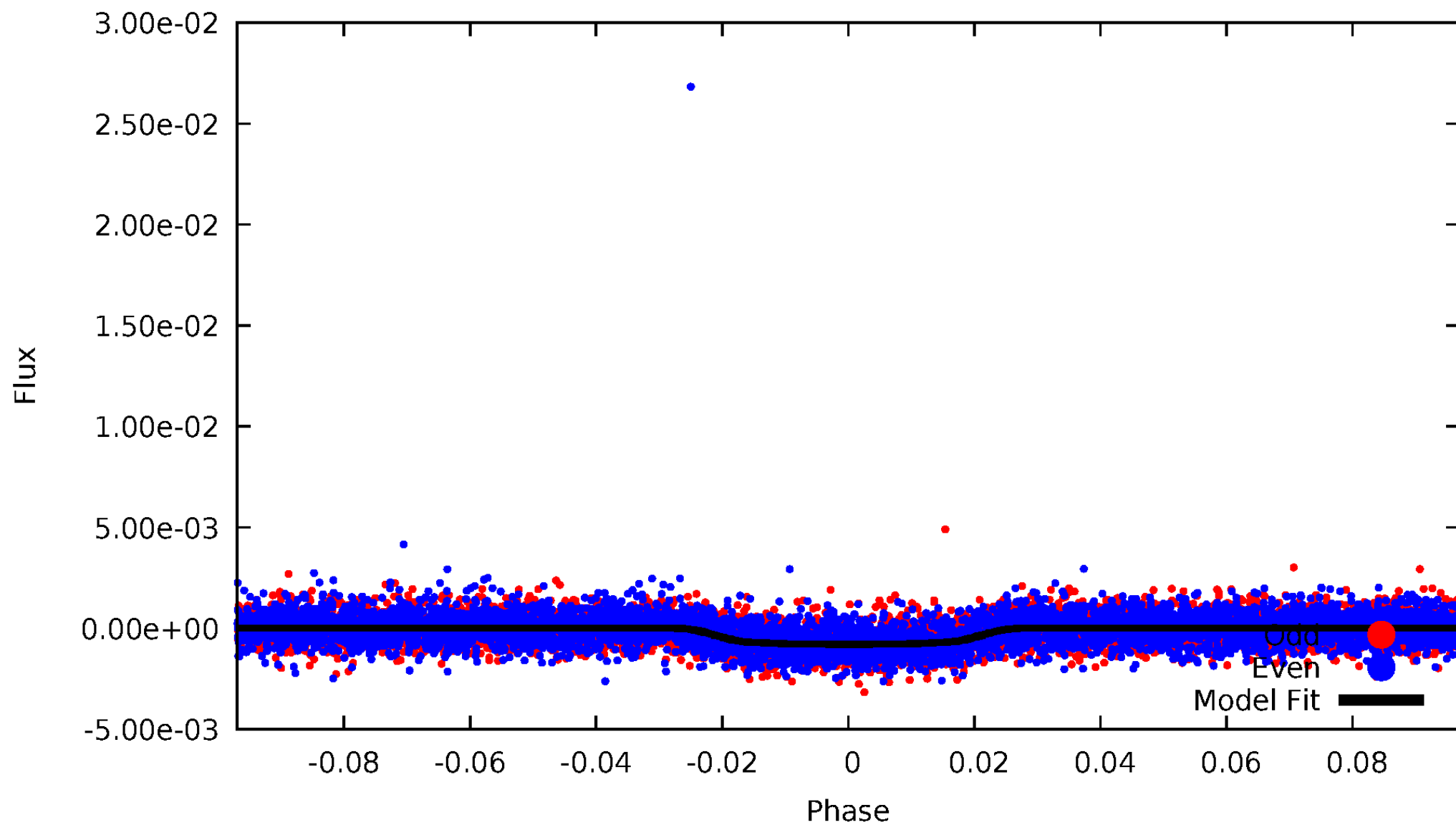


TCE 003342970-01



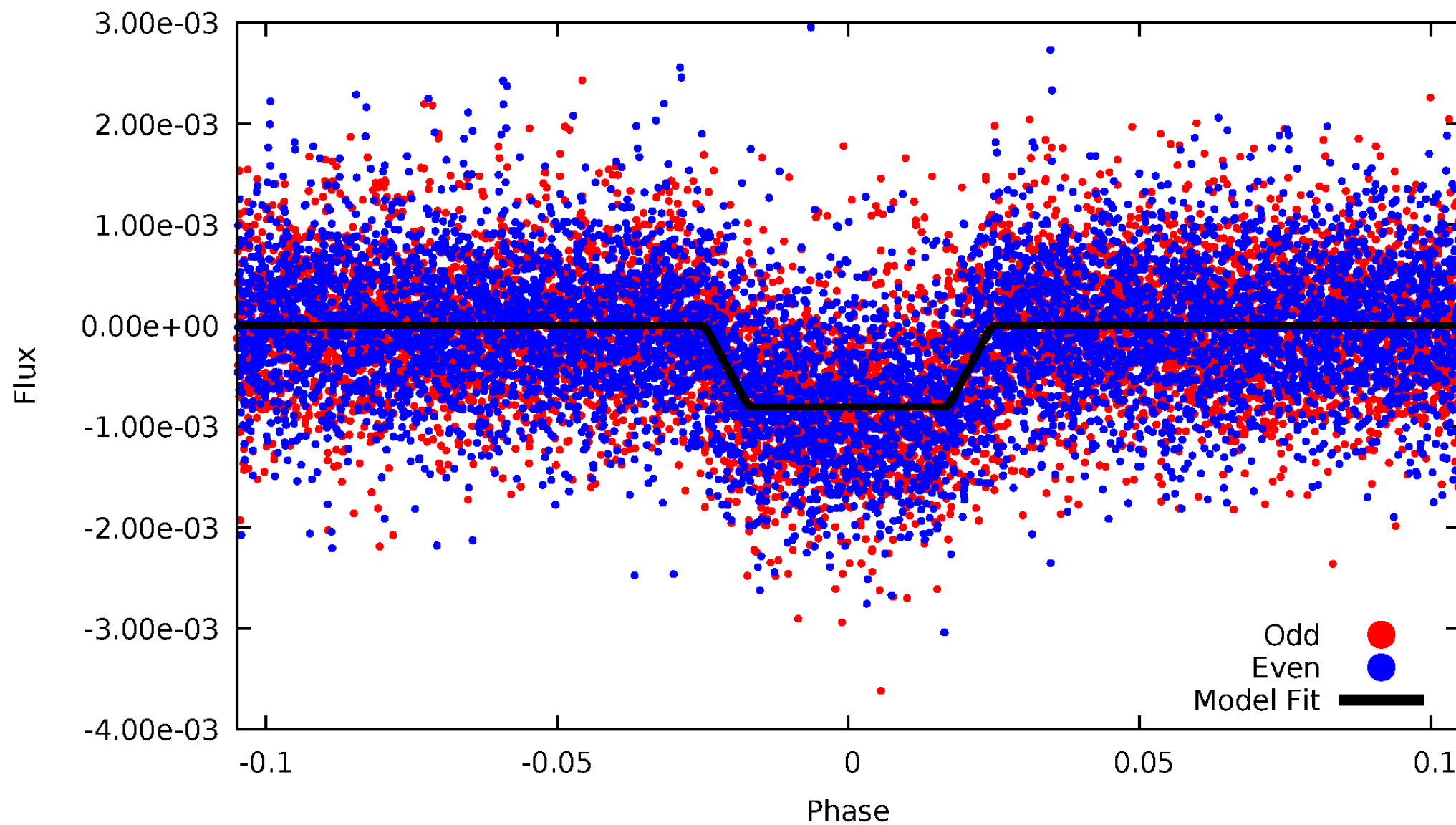
# DV Odd/Even

TCE 003342970-01



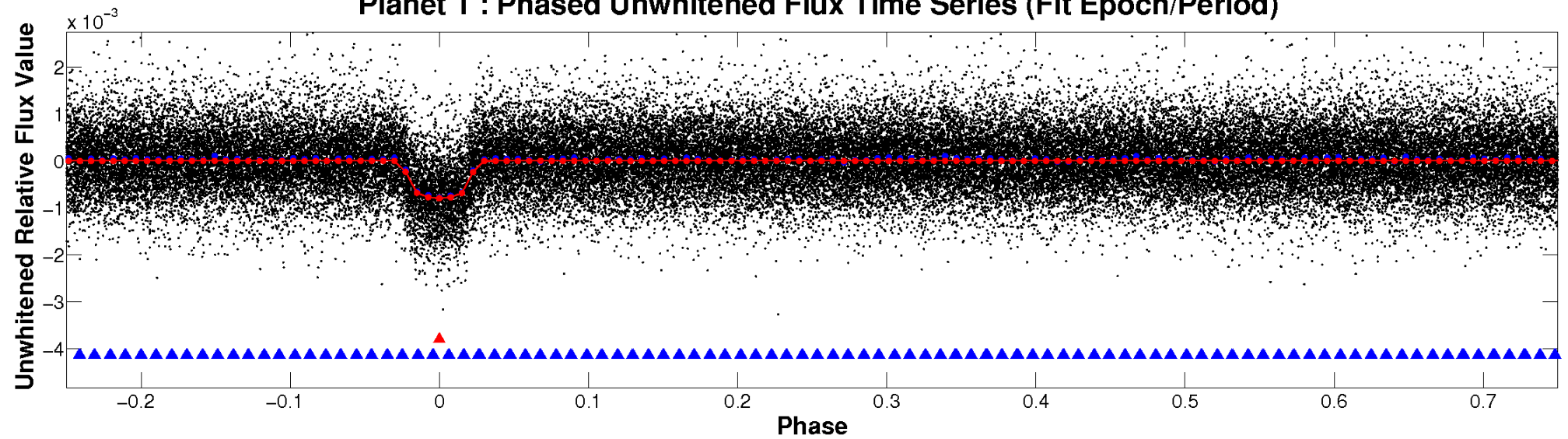
# ALT Odd/Even

TCE 003342970-01

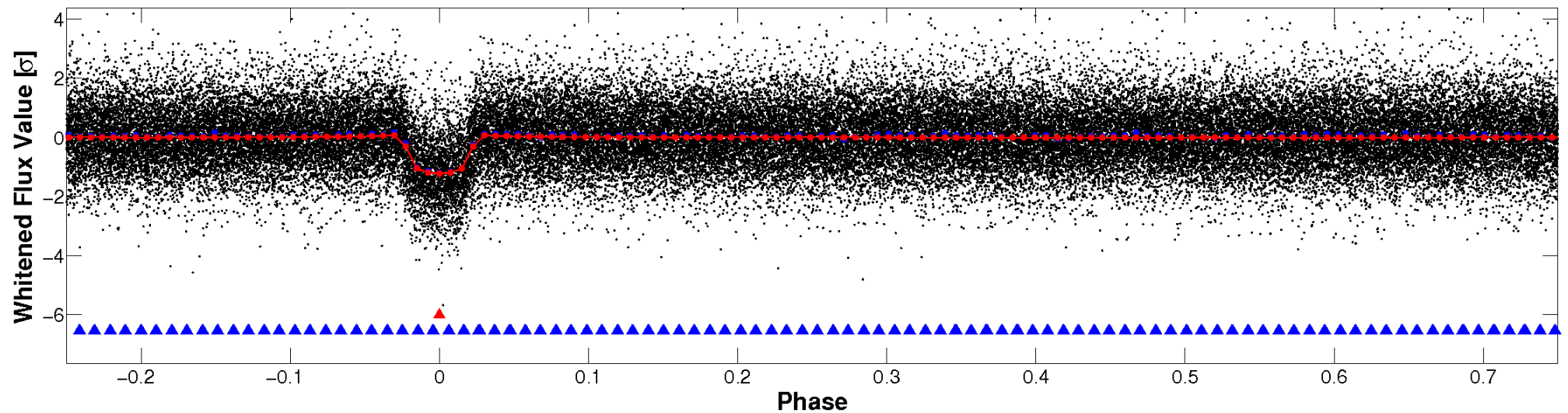


# Non-Whitened Vs. Whitened Light Curve

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



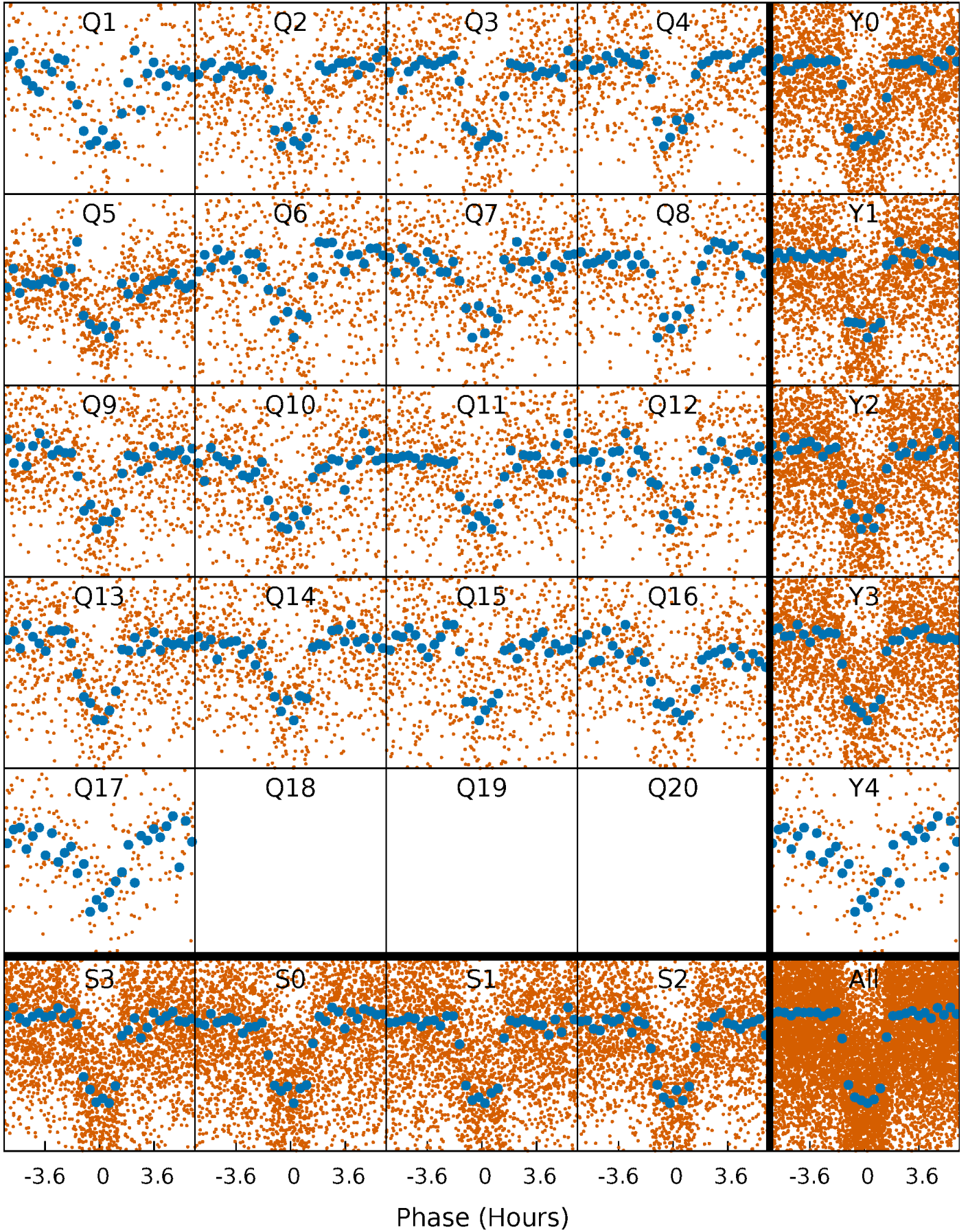
Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)





# PDC Quarter-Phased Transit Curves

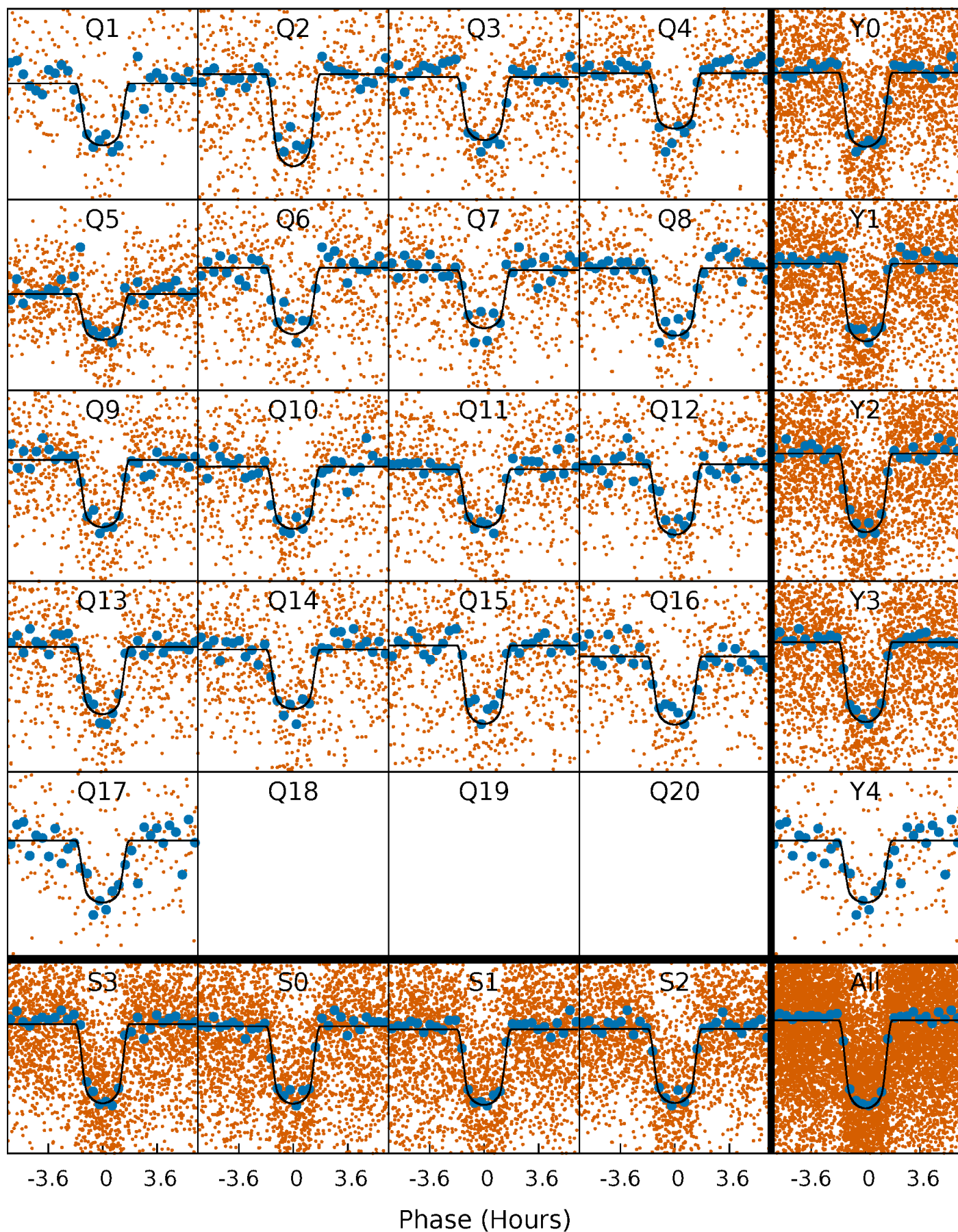
TCE 003342970-01   P= 2.711510 Days    $T_0=132.072056$  (BKJD)





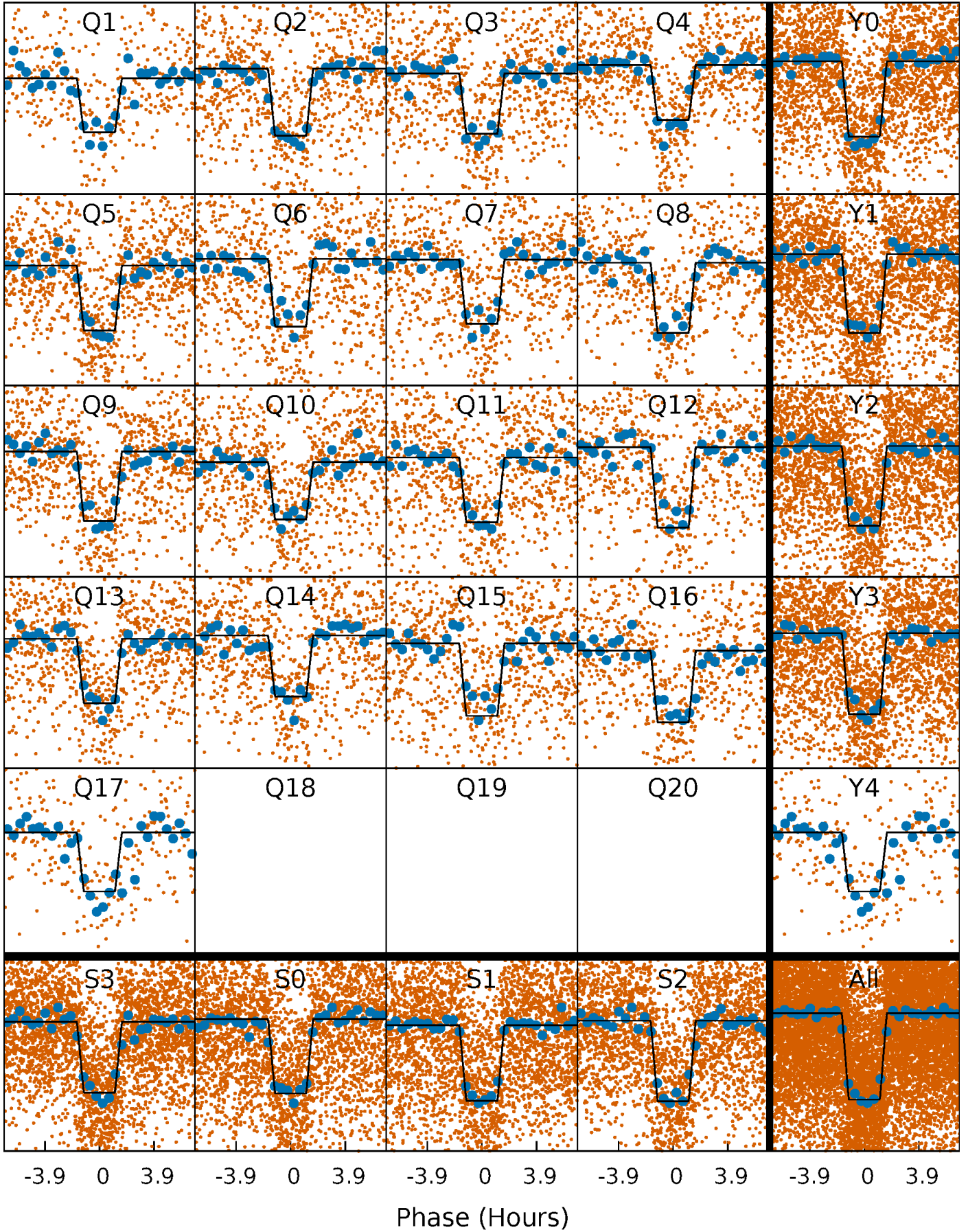
# DV Quarter-Phased Transit Curves

TCE 003342970-01 P= 2.711510 Days  $T_0=132.072056$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

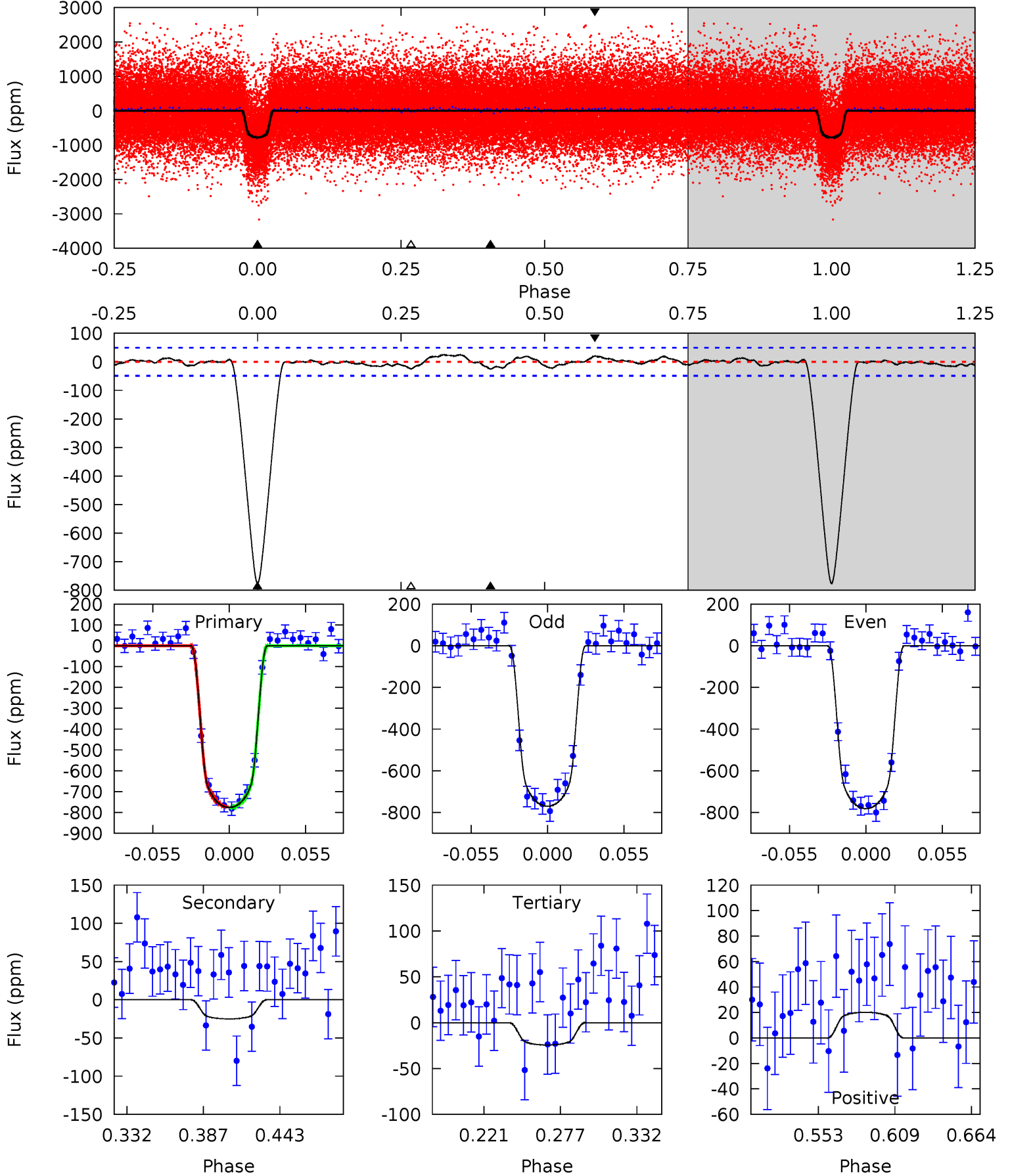
TCE 003342970-01 P= 2.711479 Days  $T_0=132.080047$  (BKJD)



# DV Model-Shift Uniqueness Test

003342970-01, P = 2.711510 Days, E = 129.360546 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
74.2	2.40	2.33	1.93	4.69	1.92	1.01	71.8	72.2	0.07	0.47	0.54	0.98	0.03	0.17

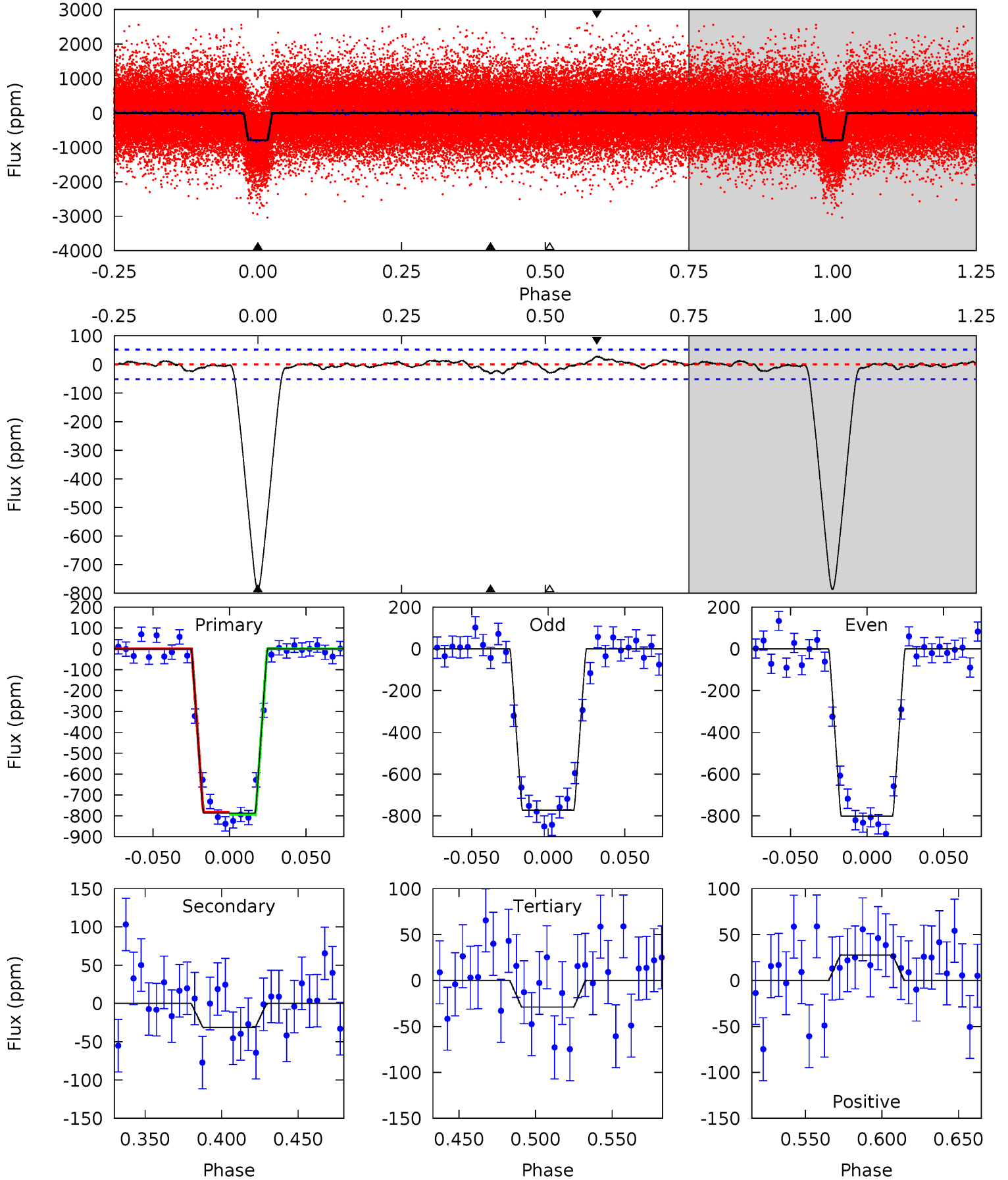




# Alt Model-Shift Uniqueness Test

003342970-01, P = 2.711479 Days, E = 129.368568 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
71.6	2.85	2.64	2.51	4.71	1.96	0.93	68.9	69.0	0.21	0.33	1.28	0.99	0.03	0.48





### Stellar Parameters For KIC 003342970

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6214^{+174}_{-239}$	$4.442^{+0.054}_{-0.216}$	$0.070^{+0.250}_{-0.300}$	$1.076^{+0.353}_{-0.118}$	$1.169^{+0.141}_{-0.173}$	$1.321^{+0.369}_{-0.689}$
	+3%/-4%	+1%/-5%	+357%/-429%	+33%/-11%	+12%/-15%	+28%/-52%
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 003342970-01 / KOI 0800.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-25 \pm 10$	$3.60^{+0.63}_{-0.39}$	$2028^{+156}_{-112}$	$3048^{+224}_{-271}$	$1.582^{+0.853}_{-0.705}$
Alt.	$-31 \pm 11$	$3.45^{+0.59}_{-0.36}$	$2024^{+146}_{-102}$	$3221^{+207}_{-235}$	$2.198^{+0.982}_{-0.874}$

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

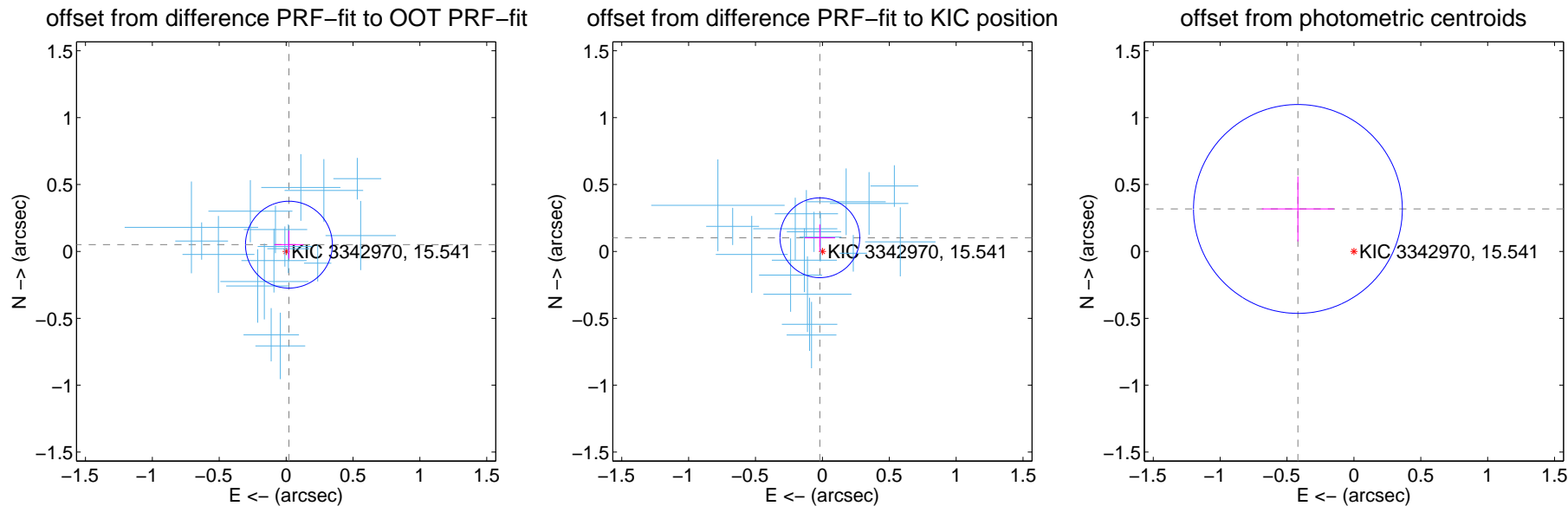
## DV Centroid Data

Supplemental centroid analysis for 003342970-01. Kepler magnitude: 15.54. Transit SNR 56.03

There are 17 quarters with good PRF difference image offsets

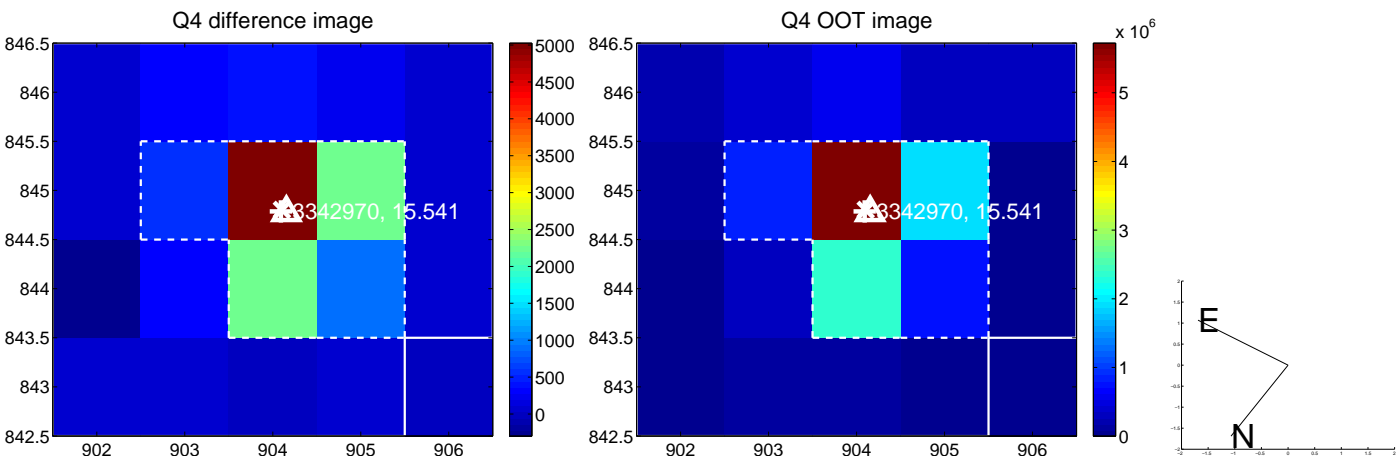
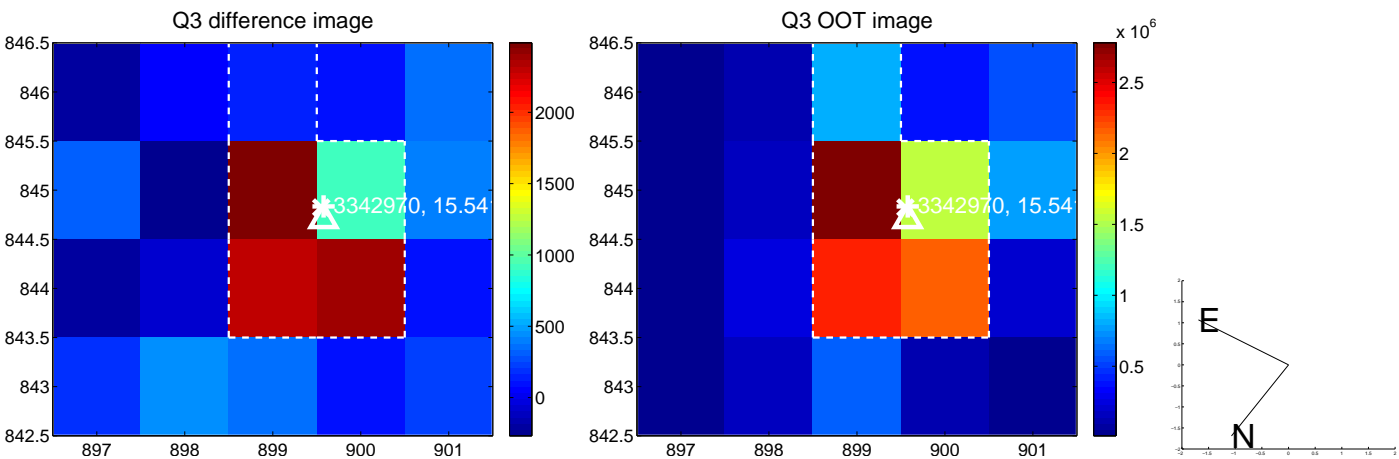
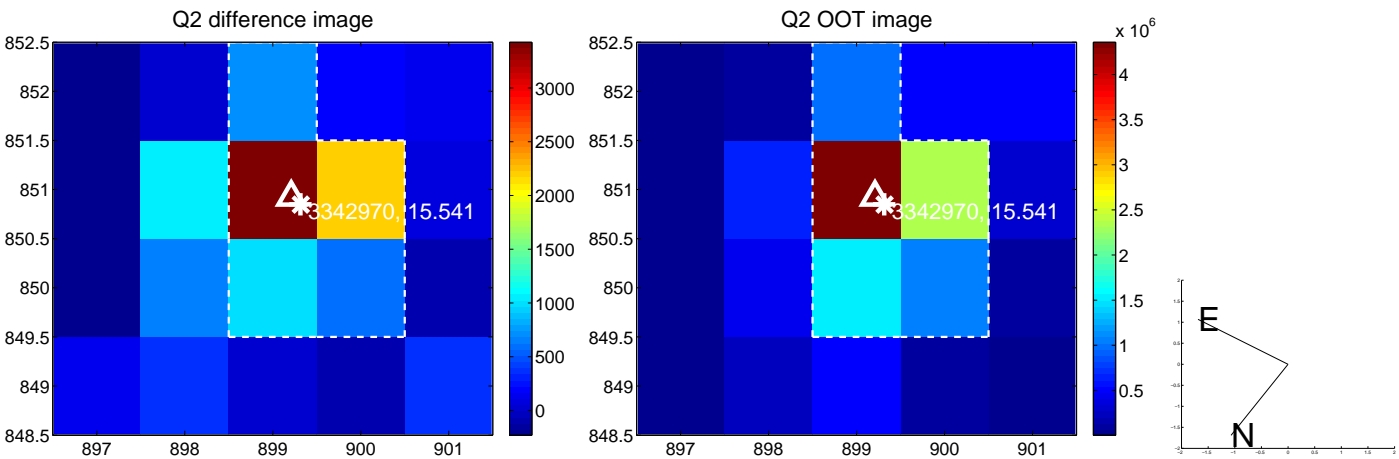
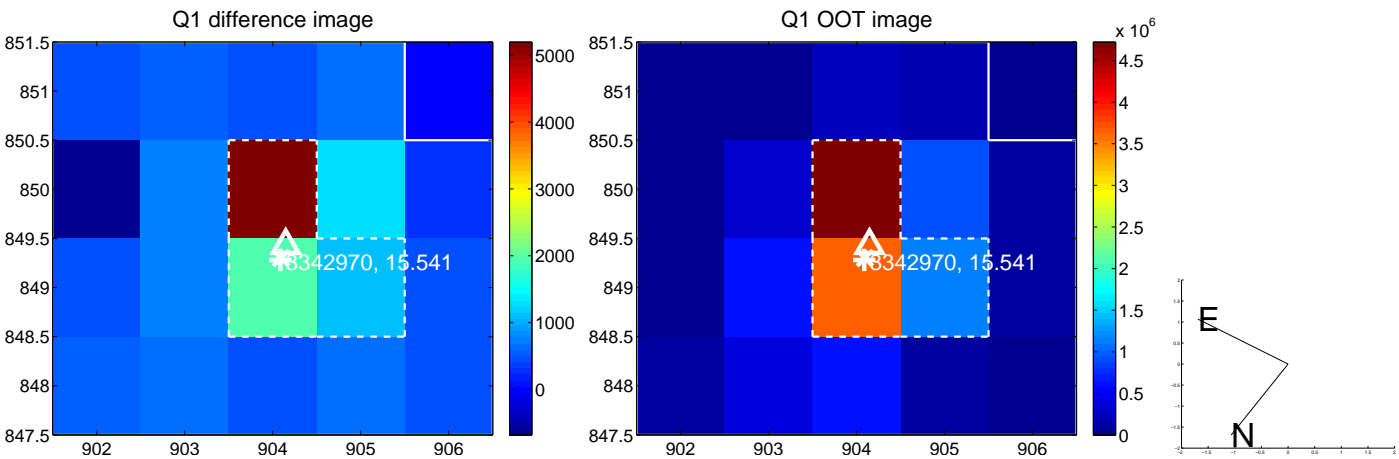
The direct PRF centroid is offset from the target star catalog position by about 0.18 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.055 \pm 0.108$	0.51	$-0.021 \pm 0.108$	$0.050 \pm 0.103$
PRF-fit source offset from KIC position	$0.104 \pm 0.099$	1.05	$0.019 \pm 0.114$	$0.102 \pm 0.101$
photometric centroid source offset	$0.53 \pm 0.26$	2.02	$0.42 \pm 0.27$	$0.32 \pm 0.24$

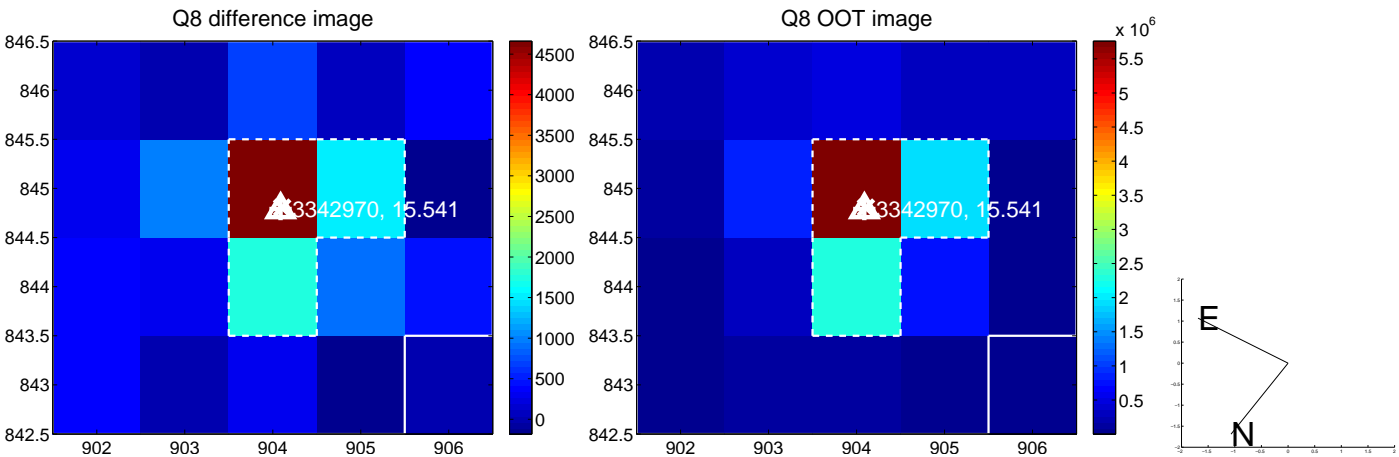
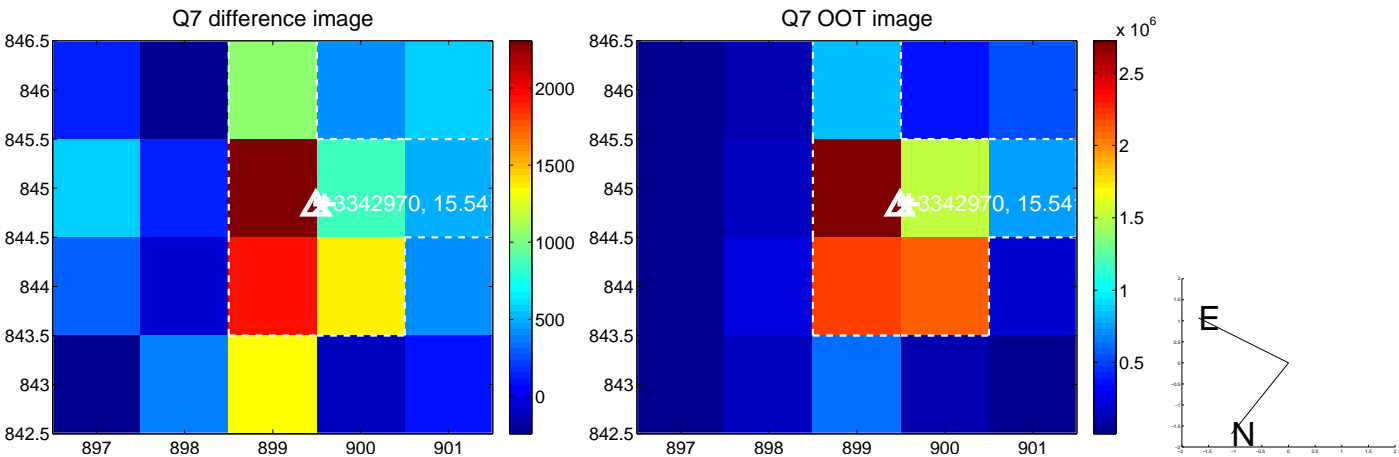
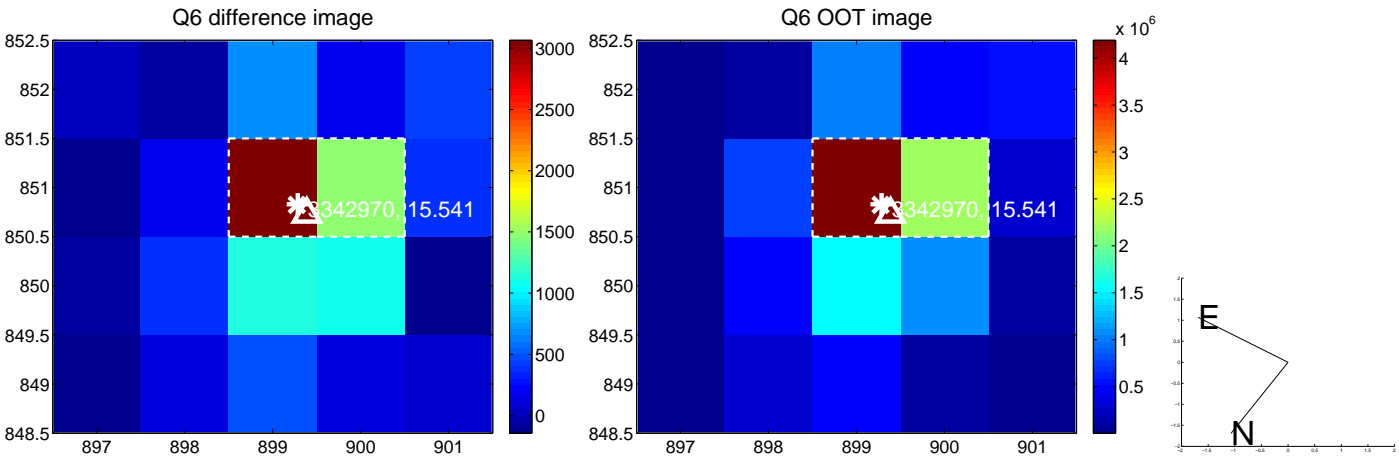
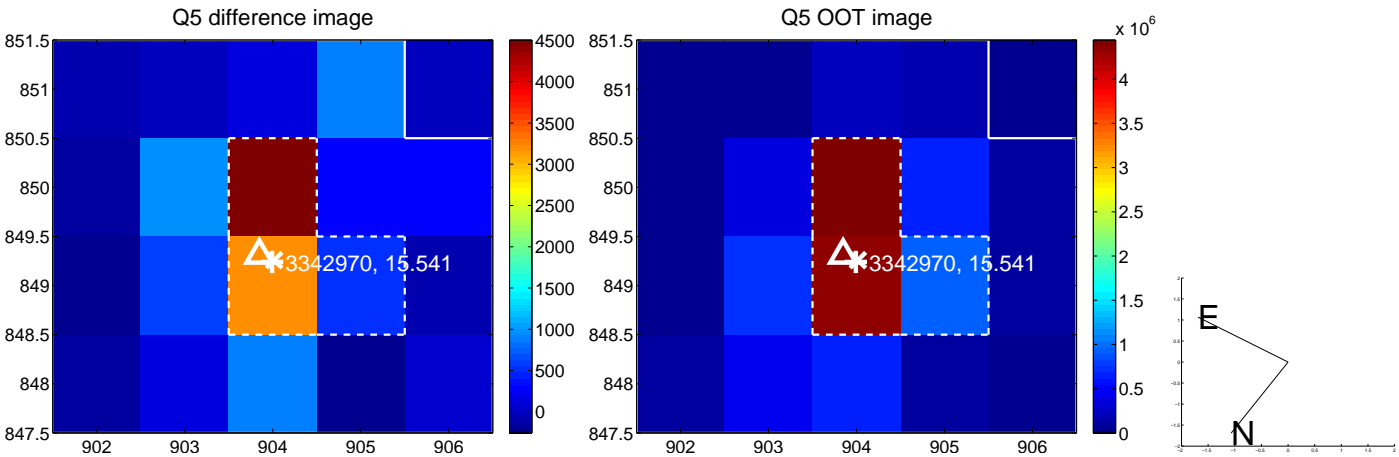


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

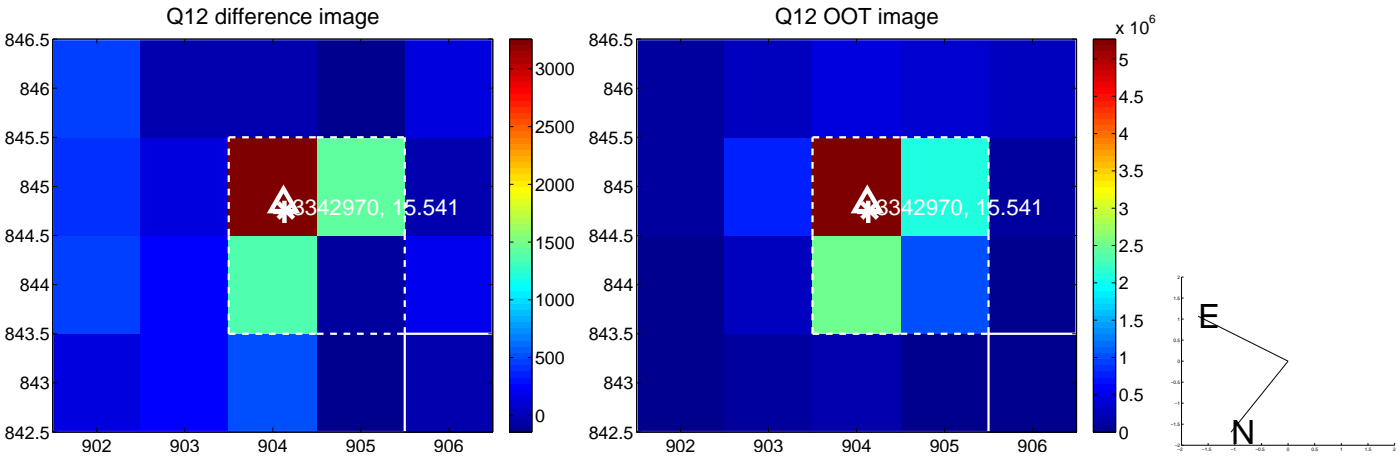
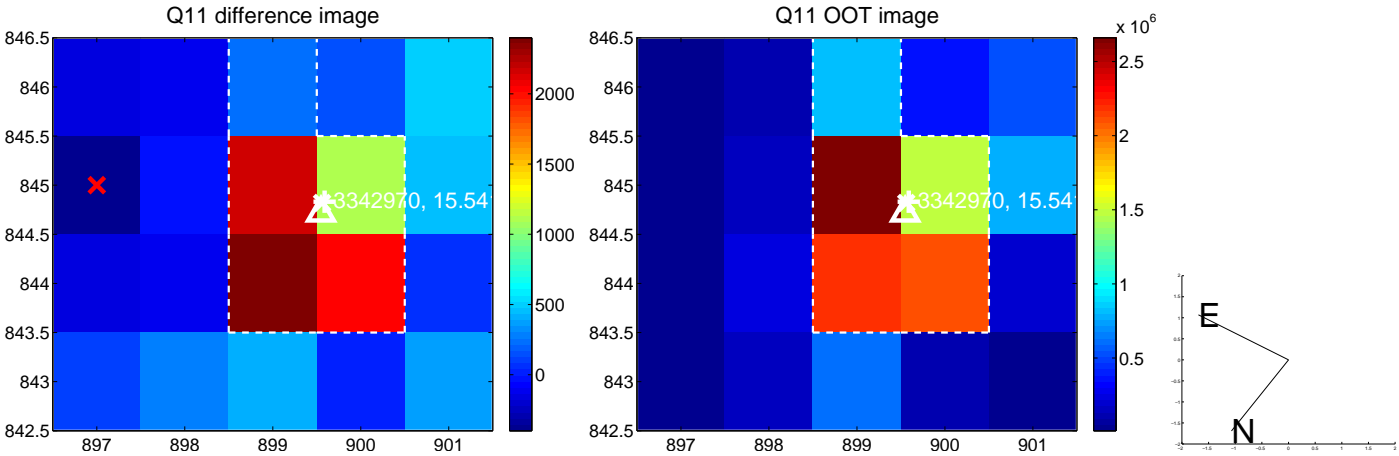
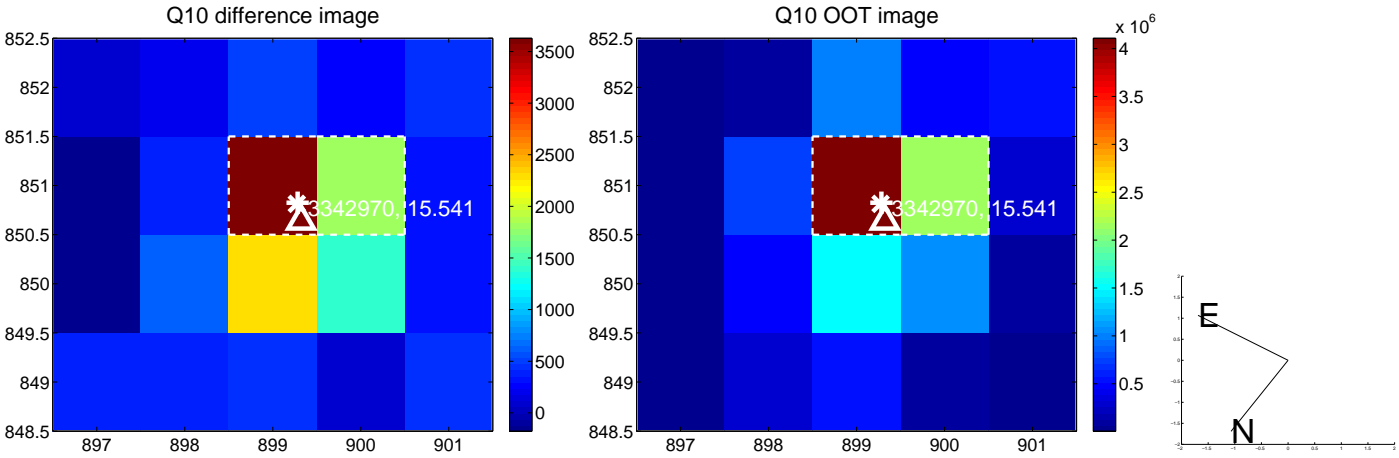
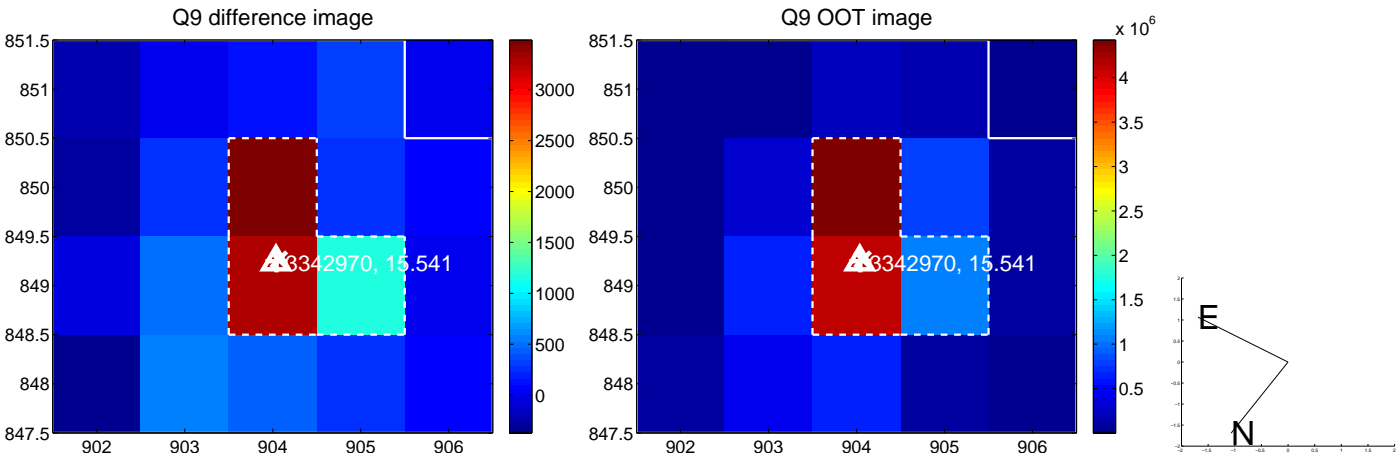


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

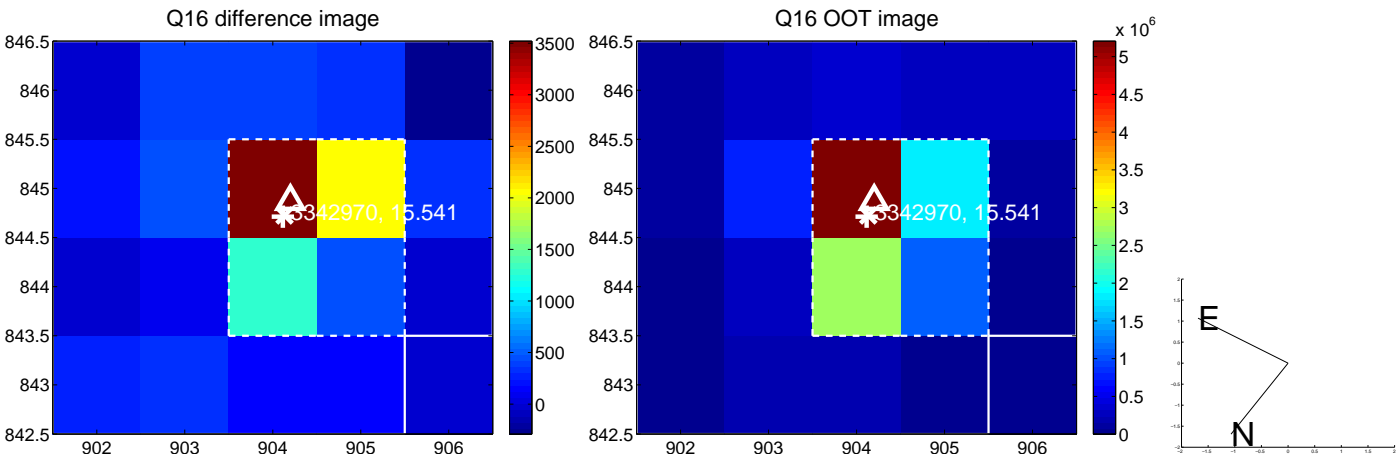
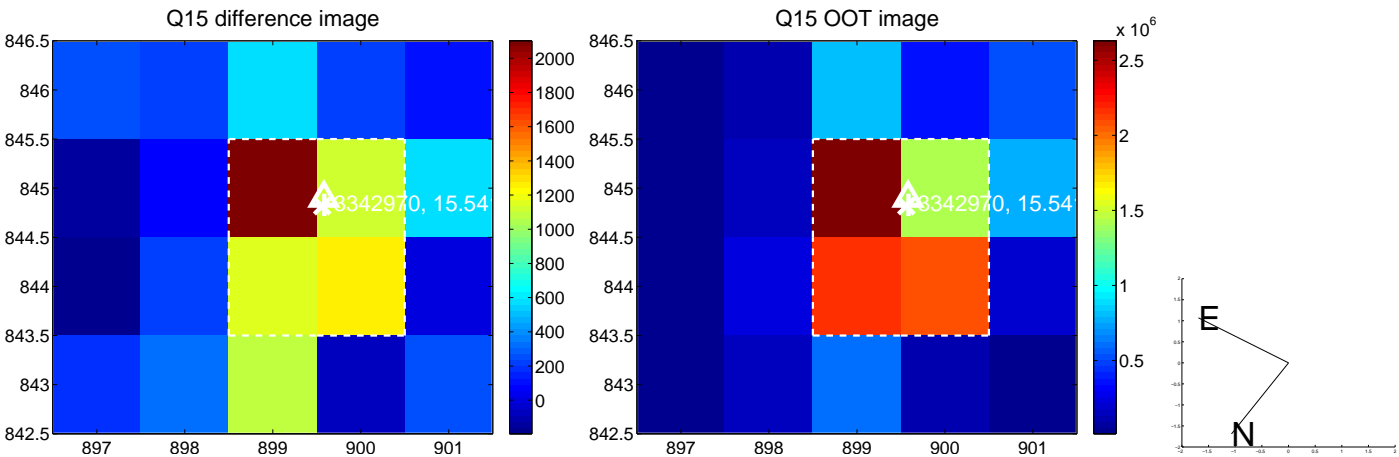
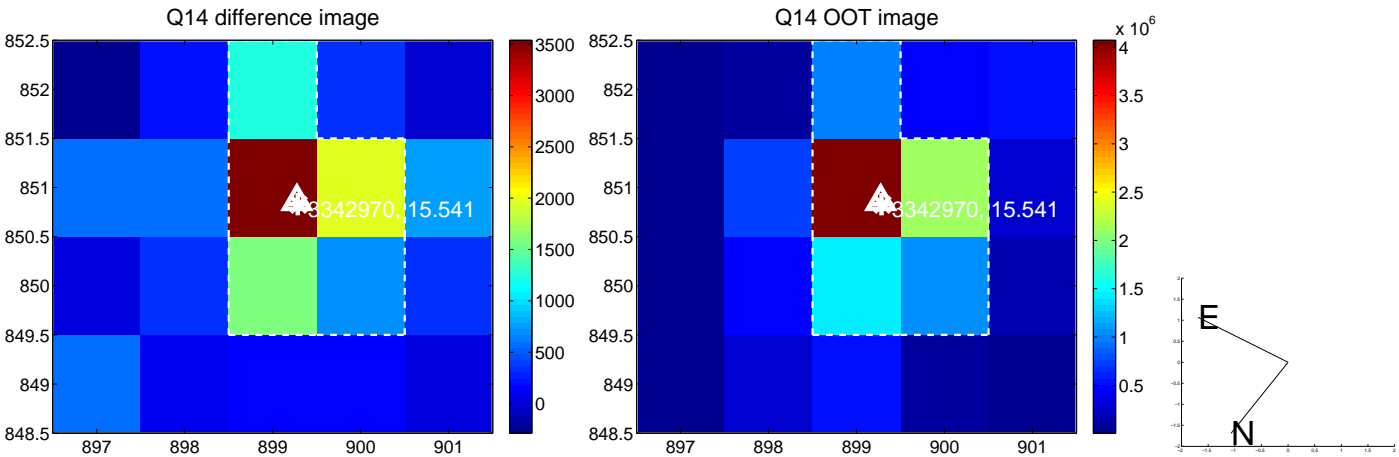
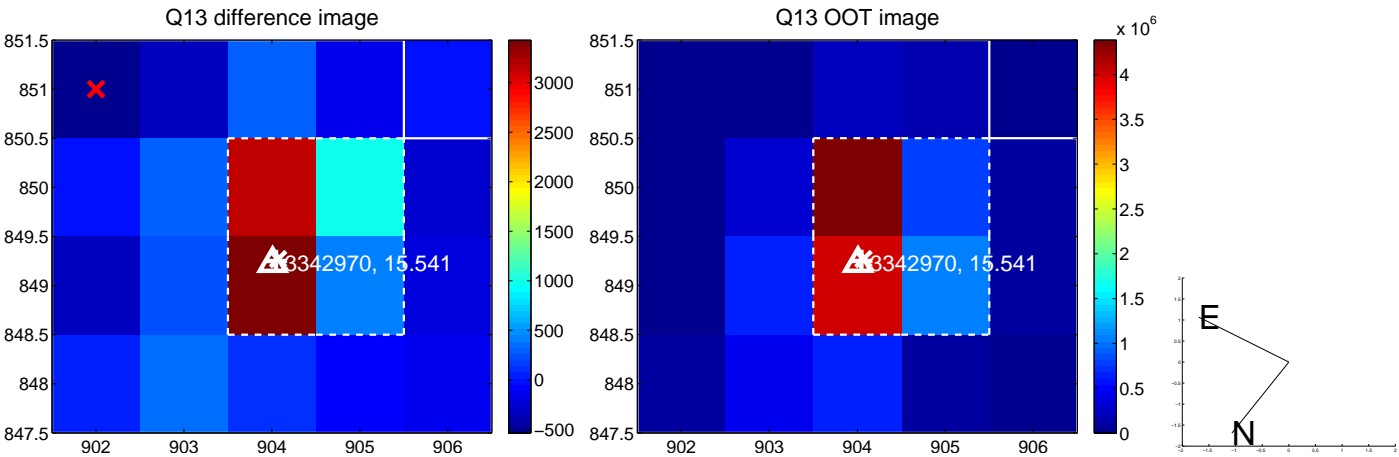




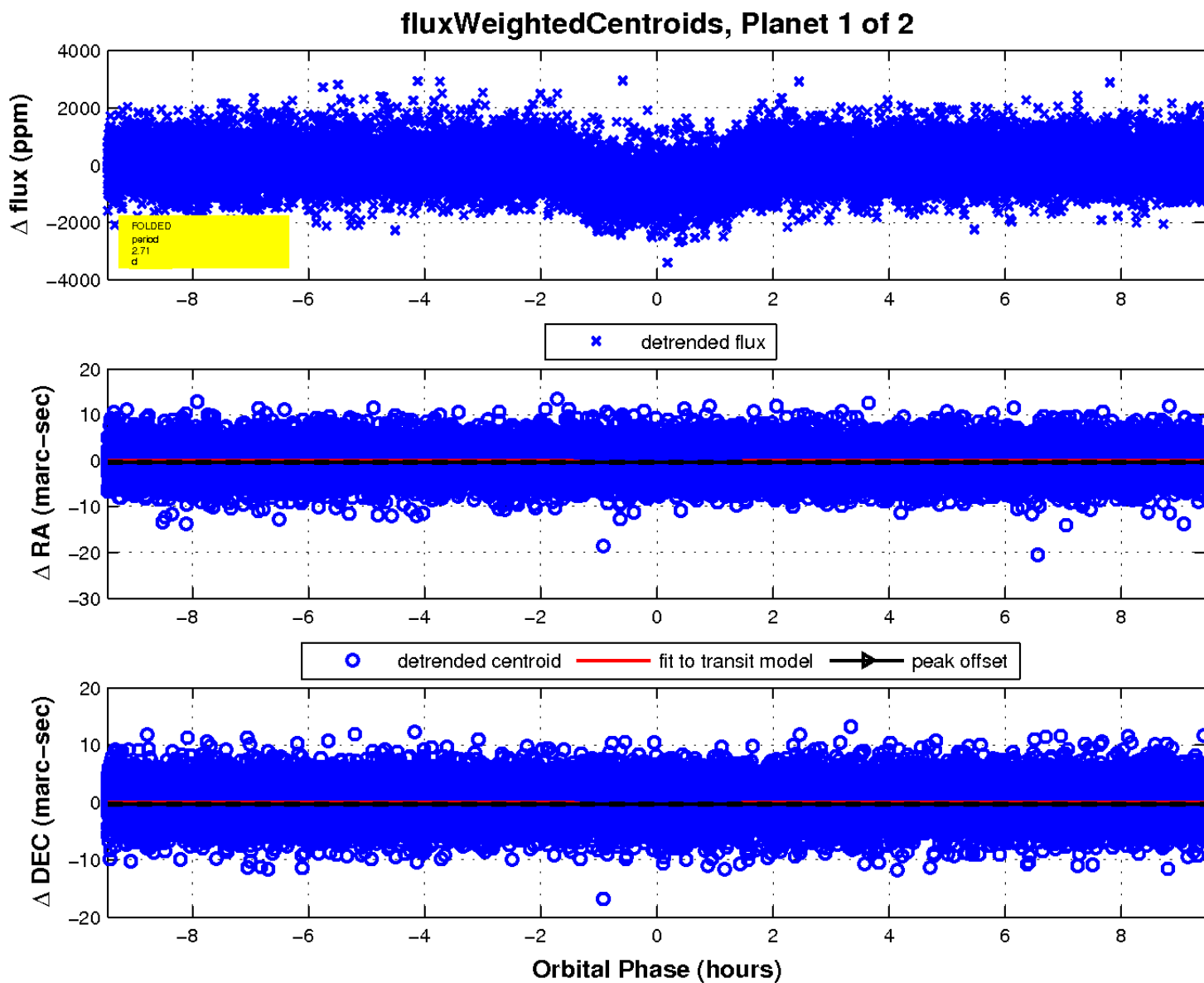
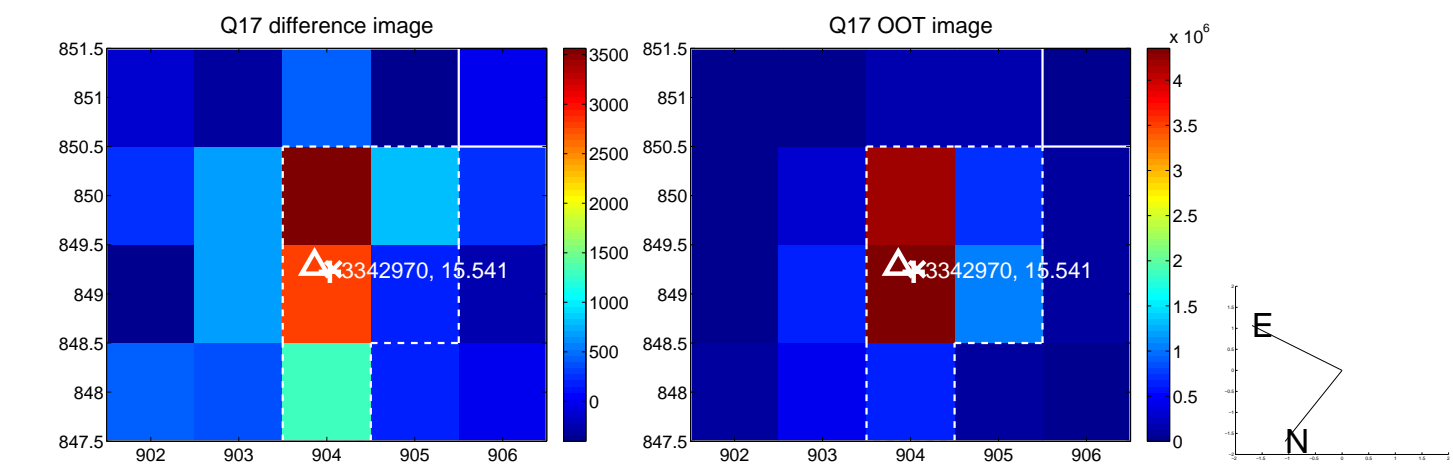
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

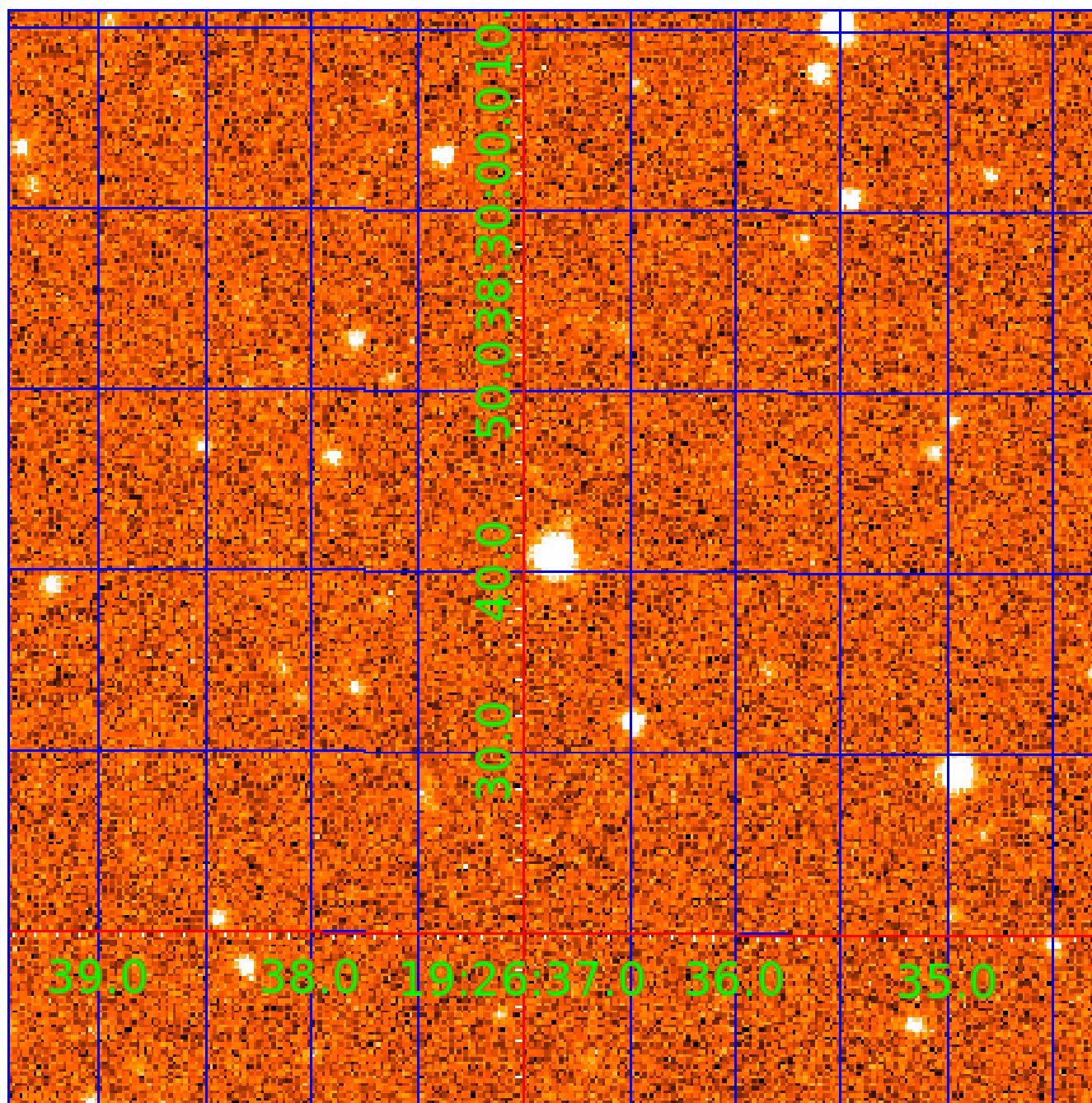


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



# UKIRT Image

Declination





# KIC 003342970

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003342970-01	OBS	0800.01	2.711510	132.072055	798.1	3.154	48.7	56.0	1.08	6214	3.48	962.29
003342970-02	OBS	0800.02	7.212039	136.758613	957.6	4.164	40.0	45.1	1.08	6214	3.65	261.12

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003342970-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
003342970-02	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.

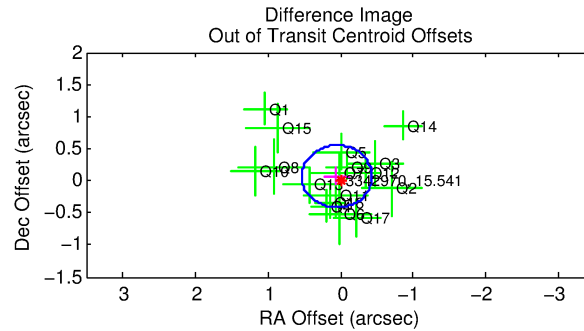
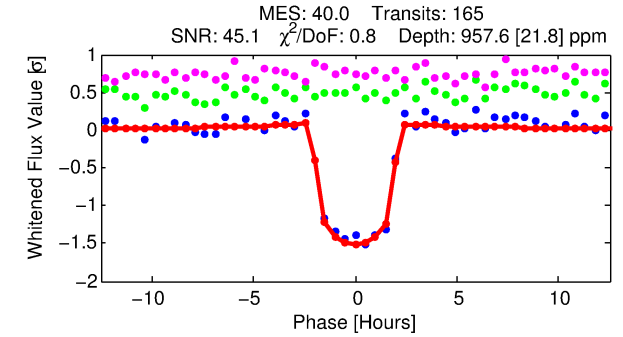
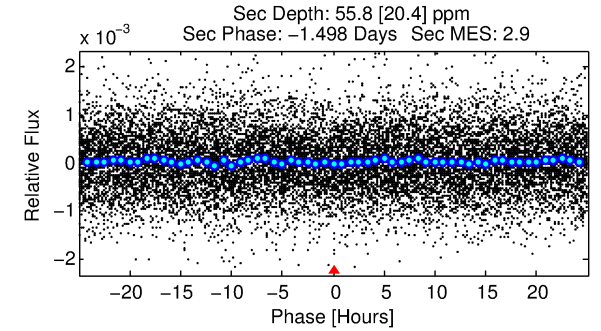
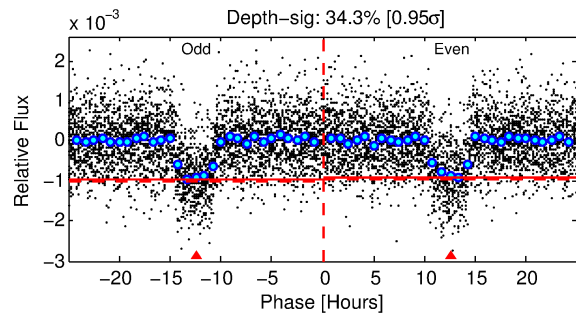
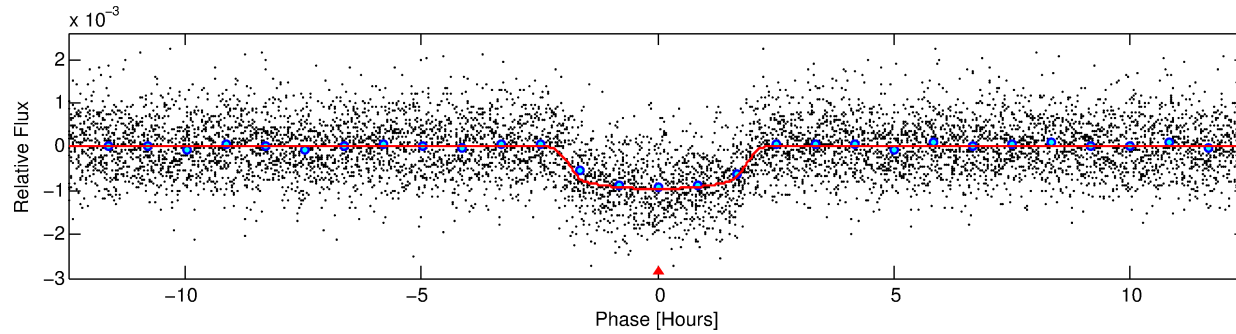
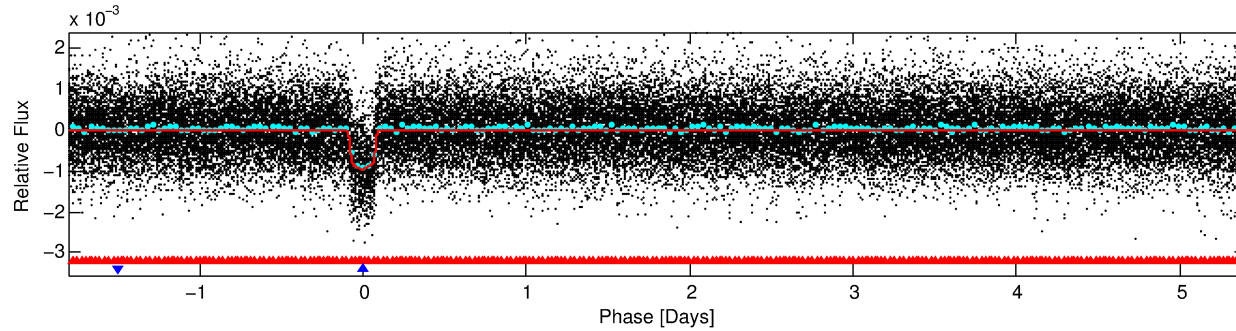
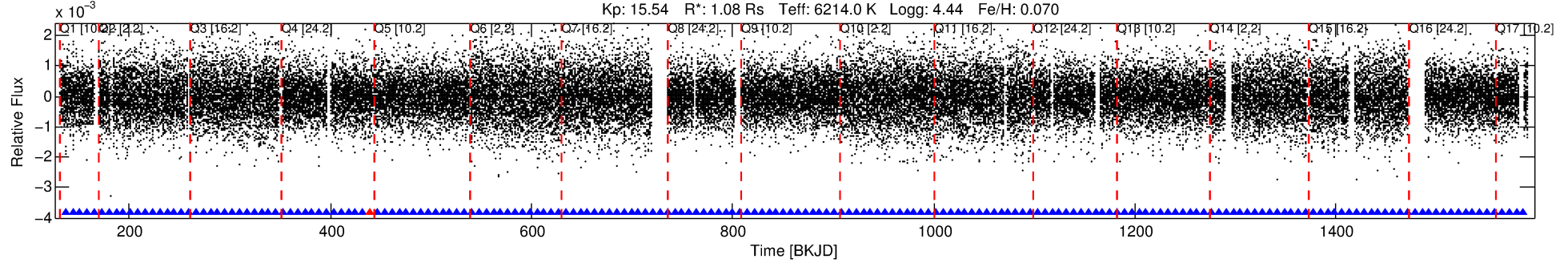
## Ephemeris Match Information For 003342970-02

No Significant Match Found

# DV One-Page Summary

KIC: 3342970 Candidate: 2 of 2 Period: 7.212 d  
KOI: K00800.02 Name: Kepler-234c Corr: 0.987

Kp: 15.54 R\*: 1.08 Rs Teff: 6214.0 K Logg: 4.44 Fe/H: 0.070



## DV Fit Results:

Period = 7.21204 [0.00002] d  
Epoch = 136.7586 [0.0017] BKJD  
Rp/R\* = 0.0311 [0.0033]  
a/R\* = 8.99 [4.63]  
b = 0.78 [0.27]  
Seff = 261.12 [111.23]  
Teq = 1025 [109] K  
Rp = 3.65 [1.26] Re  
a = 0.0770 [0.0211] AU  
Ag = 13.63 [7.91] [1.60σ]  
Teffp = 3045 [343] K [5.62σ]

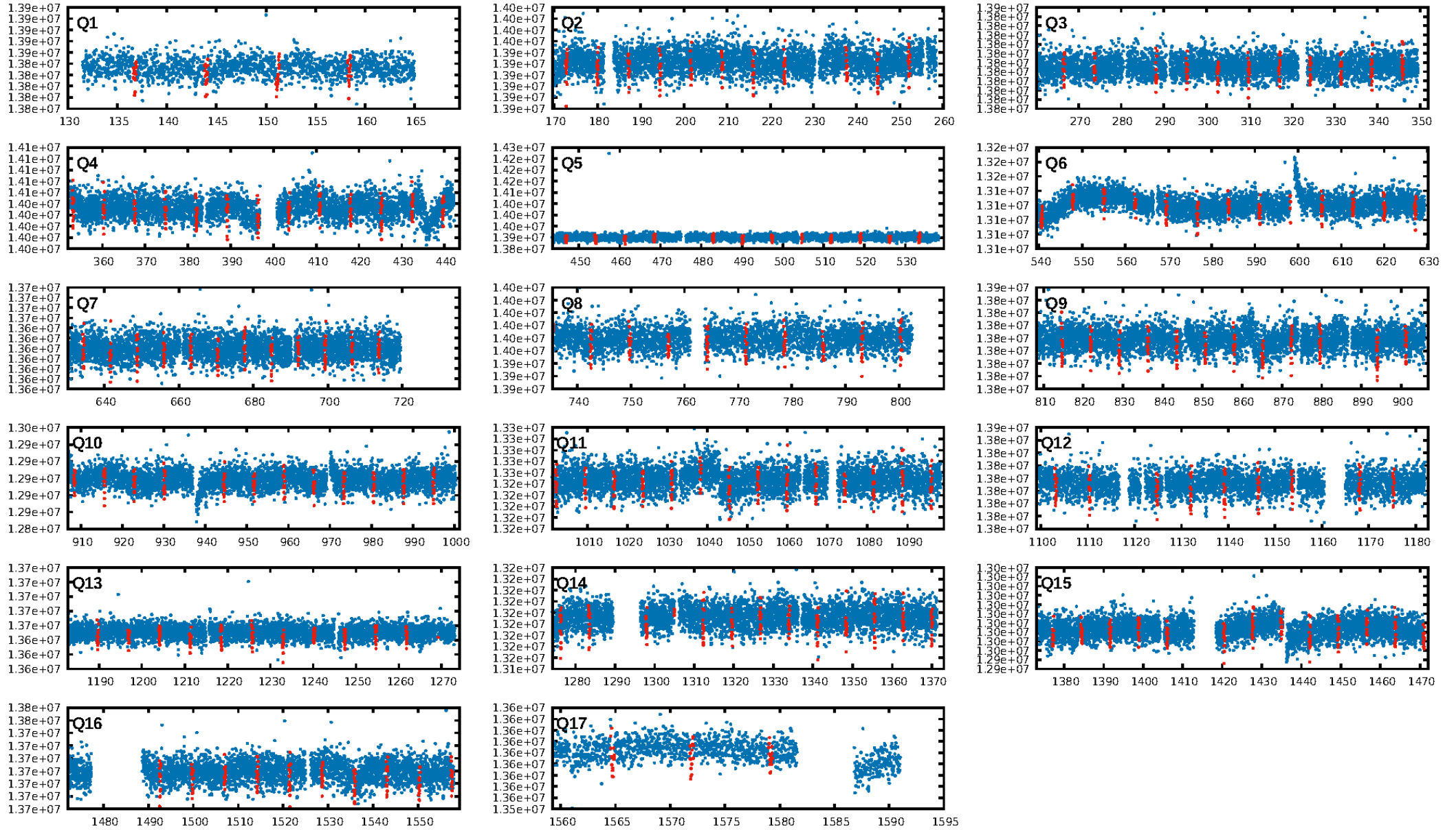
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [20.68σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 100.0%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 0.99 [158/159]  
GhostDiagnostic-chr: 2.809  
Centroid-sig: 0.0%  
Centroid-so: 0.817 arcsec [2.80σ]  
OotOffset-rm: 0.086 arcsec [0.53σ]  
KicOffset-rm: 0.202 arcsec [1.43σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
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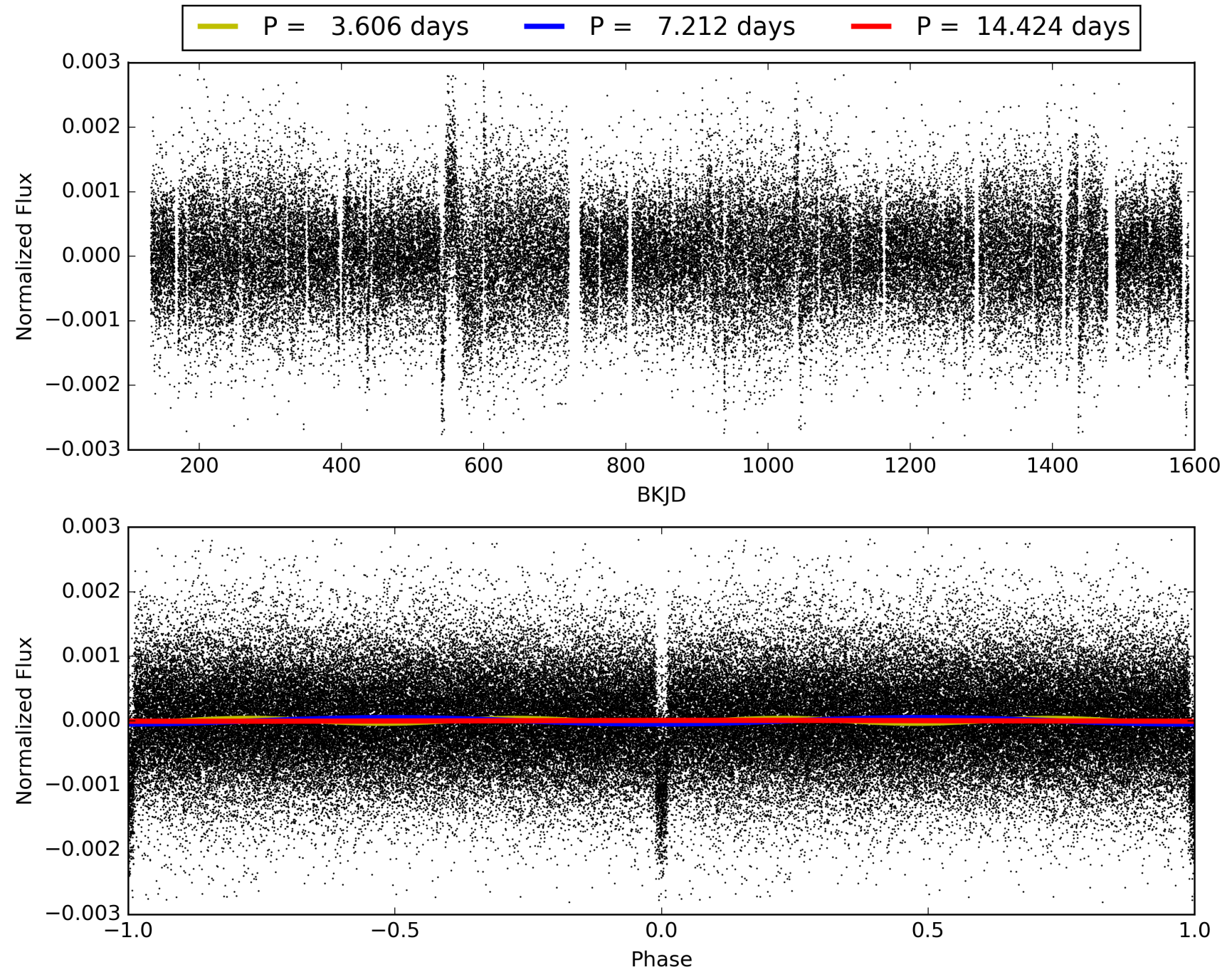
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 06:54:26 Z

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

# TCE 003342970-02, PDC Light Curves



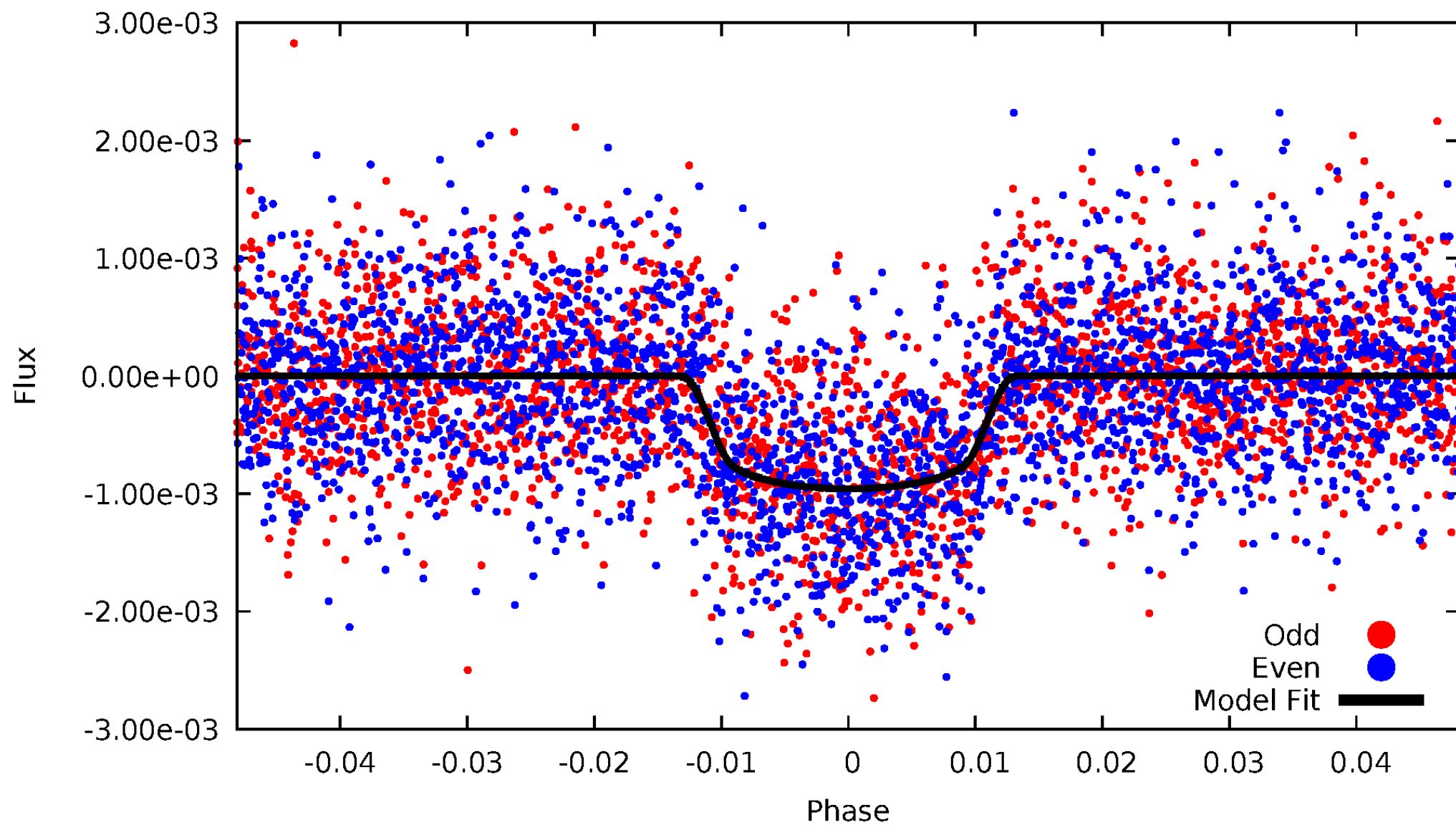
# TCE 003342970-02





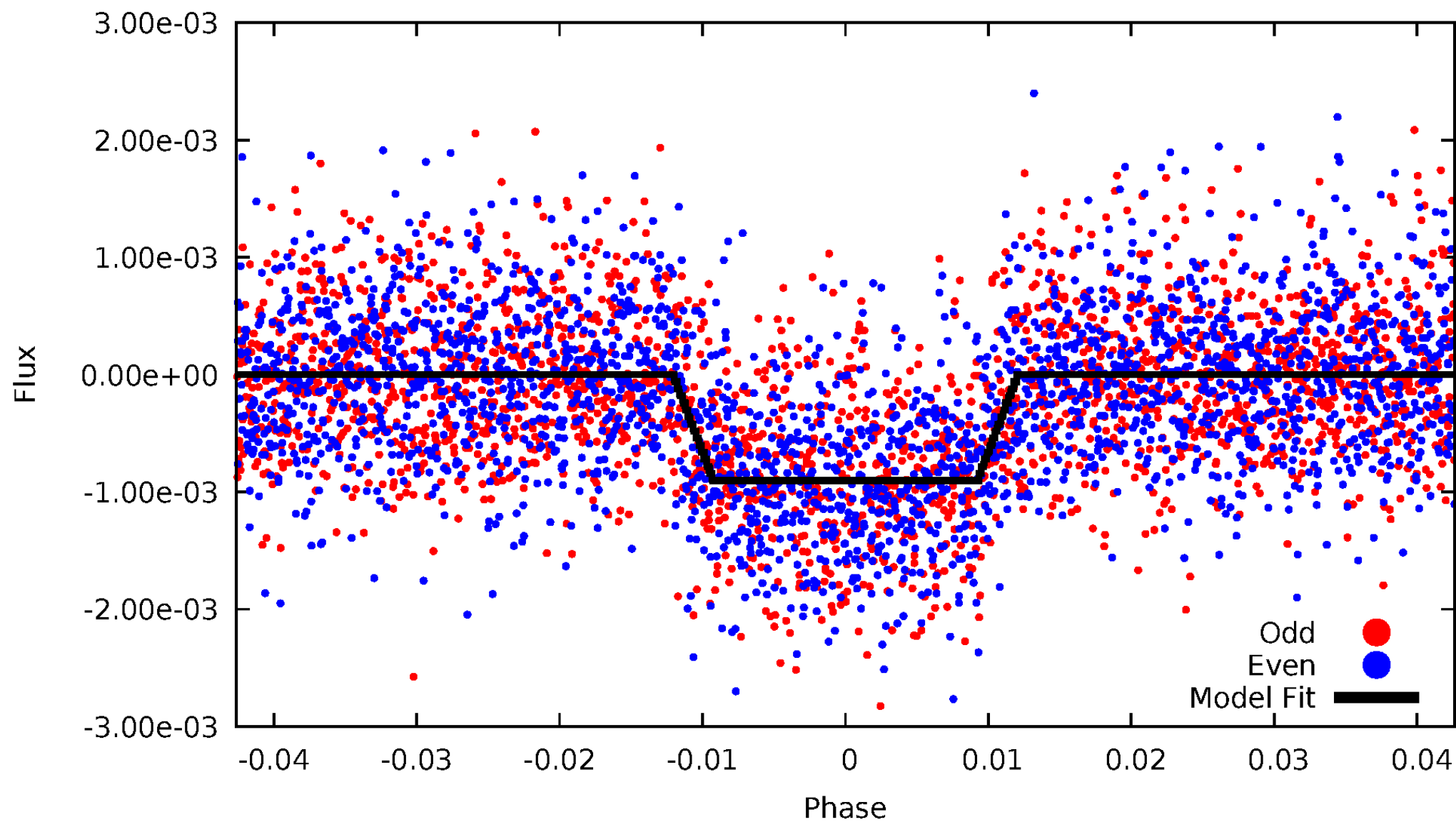
# DV Odd/Even

TCE 003342970-02



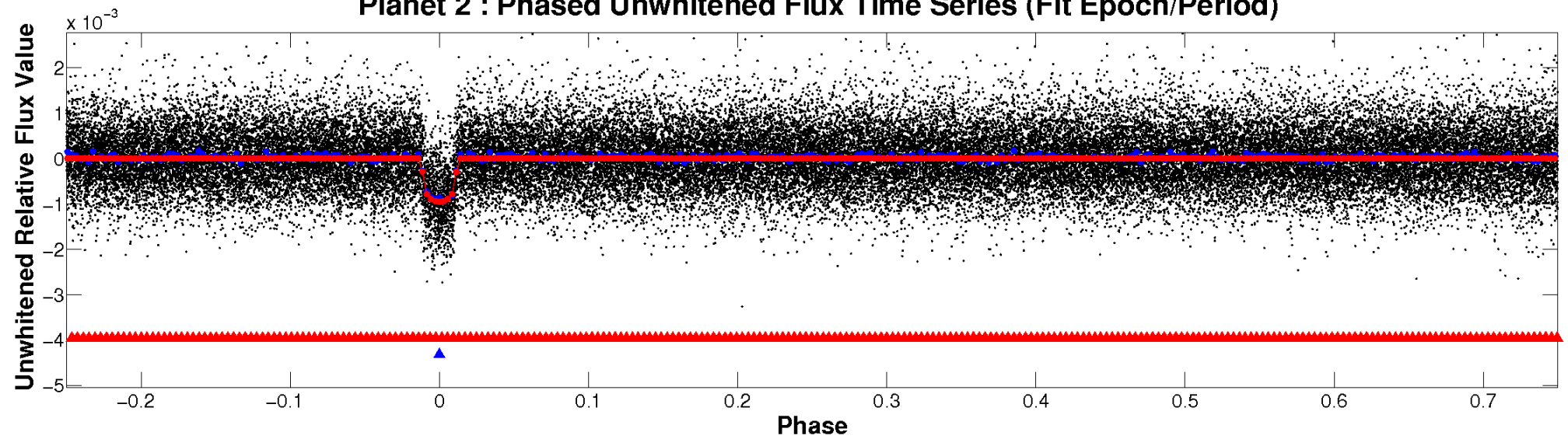
# ALT Odd/Even

TCE 003342970-02

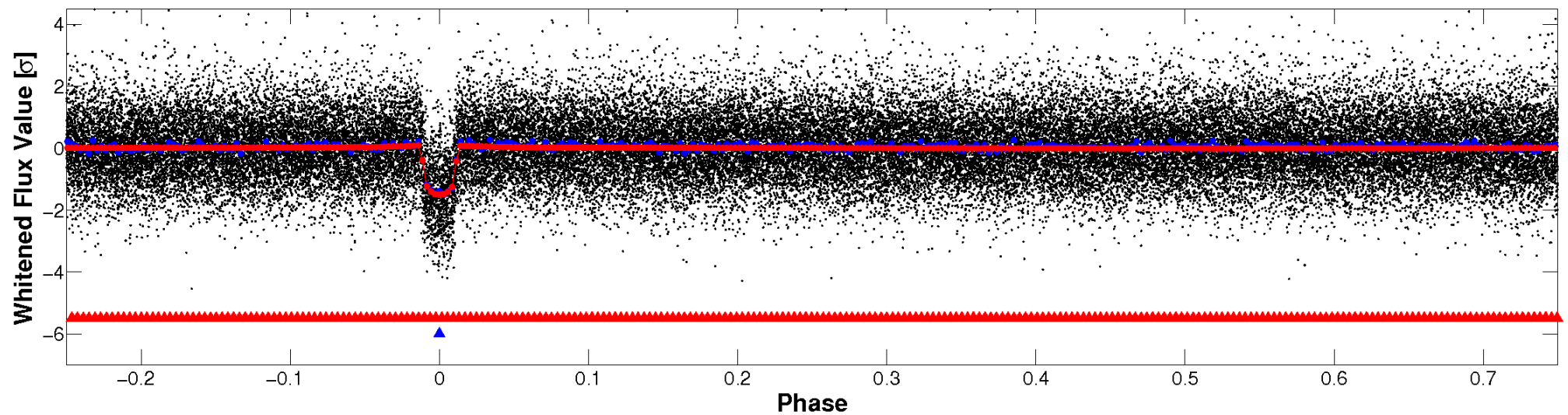


# Non-Whitened Vs. Whitened Light Curve

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

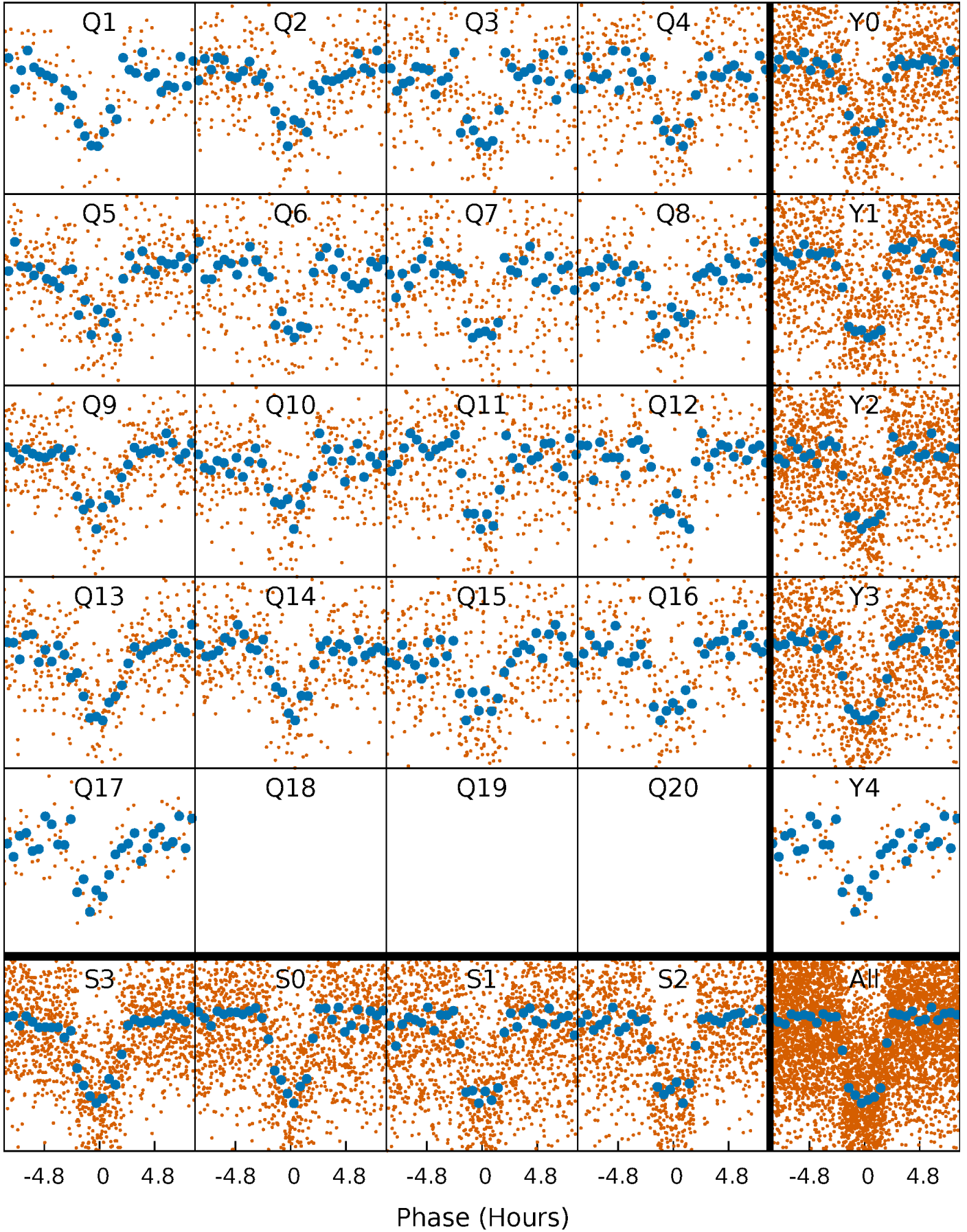


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

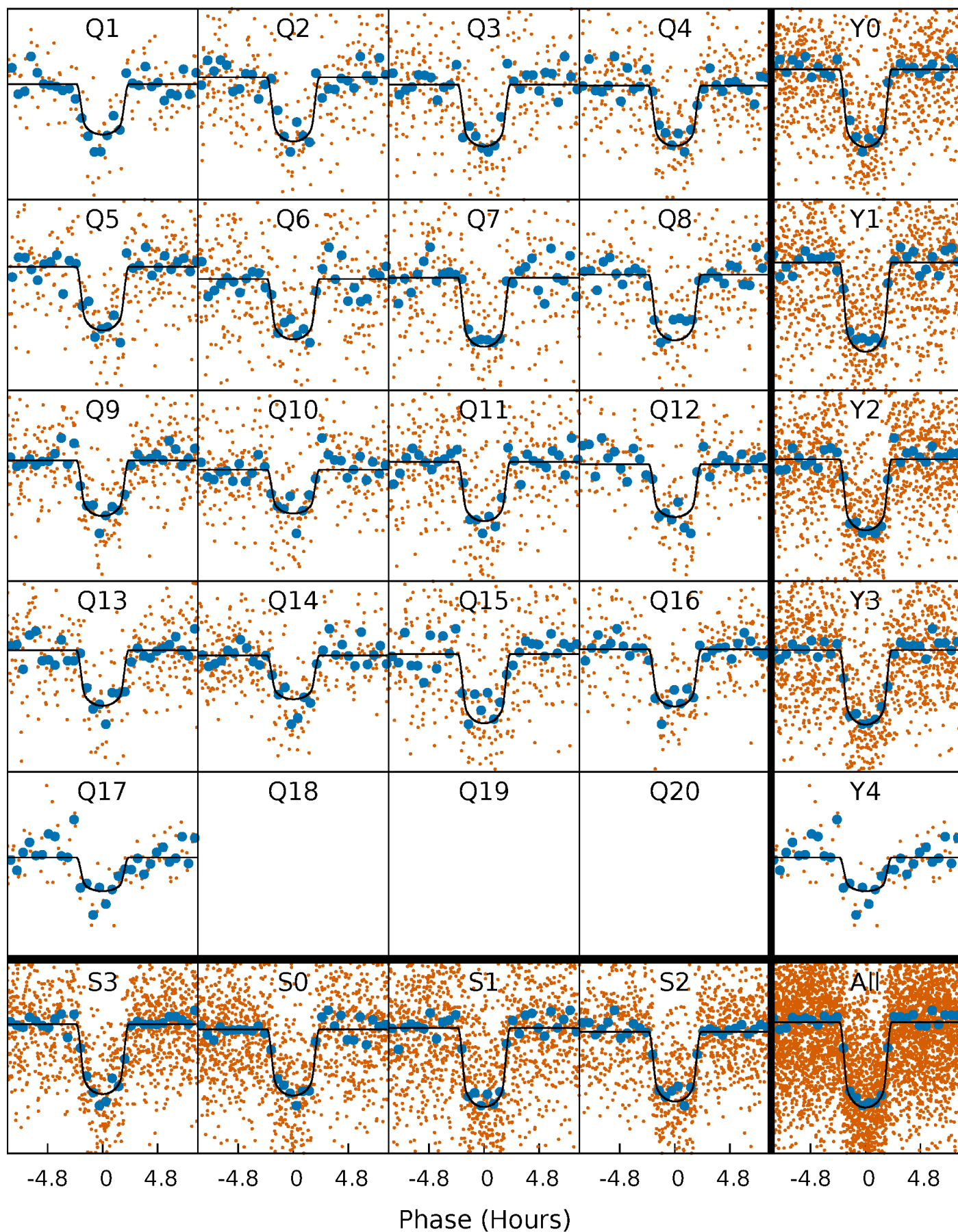
TCE 003342970-02   P= 7.212039 Days    $T_0=136.758613$  (BKJD)





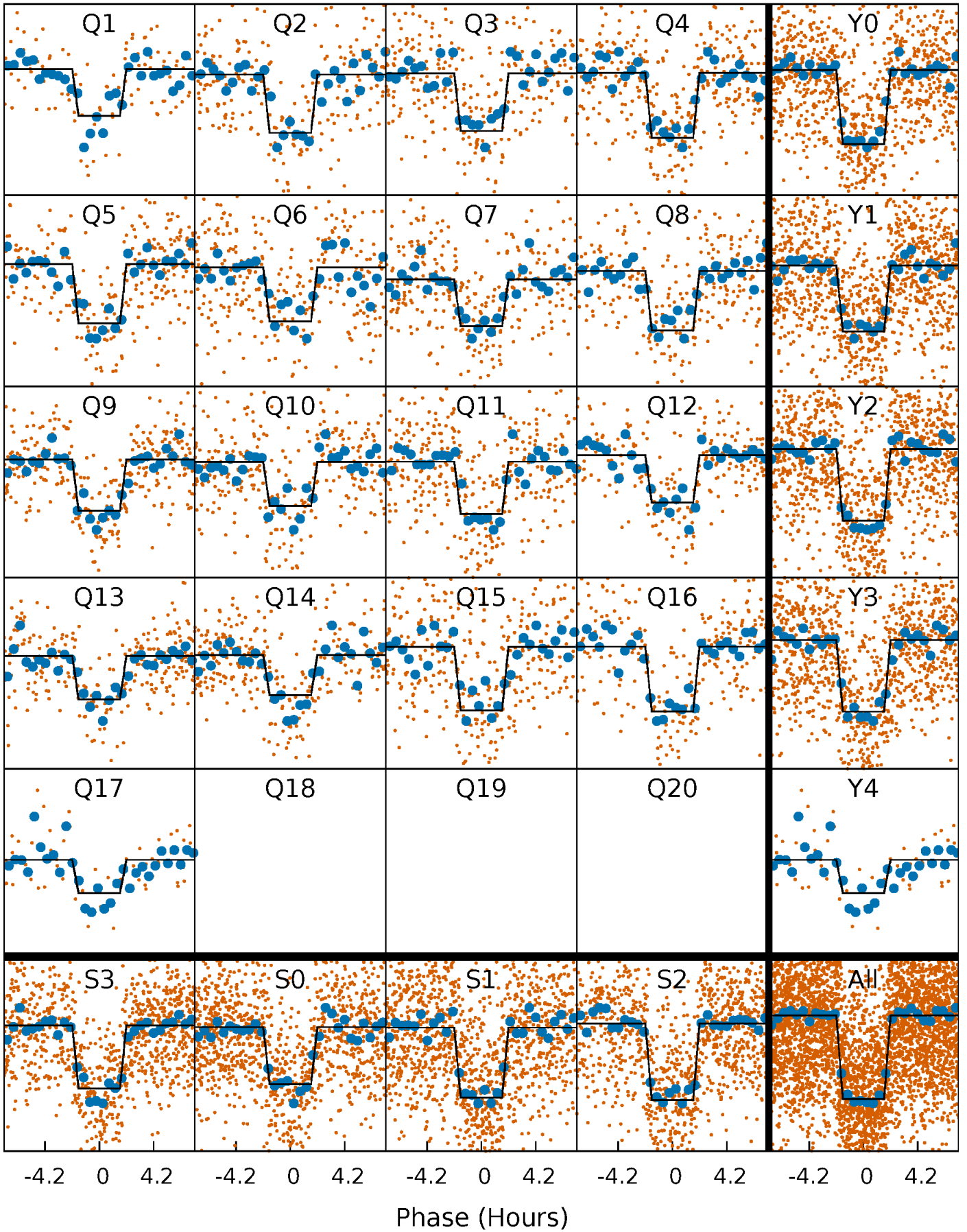
# DV Quarter-Phased Transit Curves

TCE 003342970-02   P= 7.212039 Days    $T_0=136.758613$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 003342970-02 P= 7.211995 Days  $T_0=136.762975$  (BKJD)

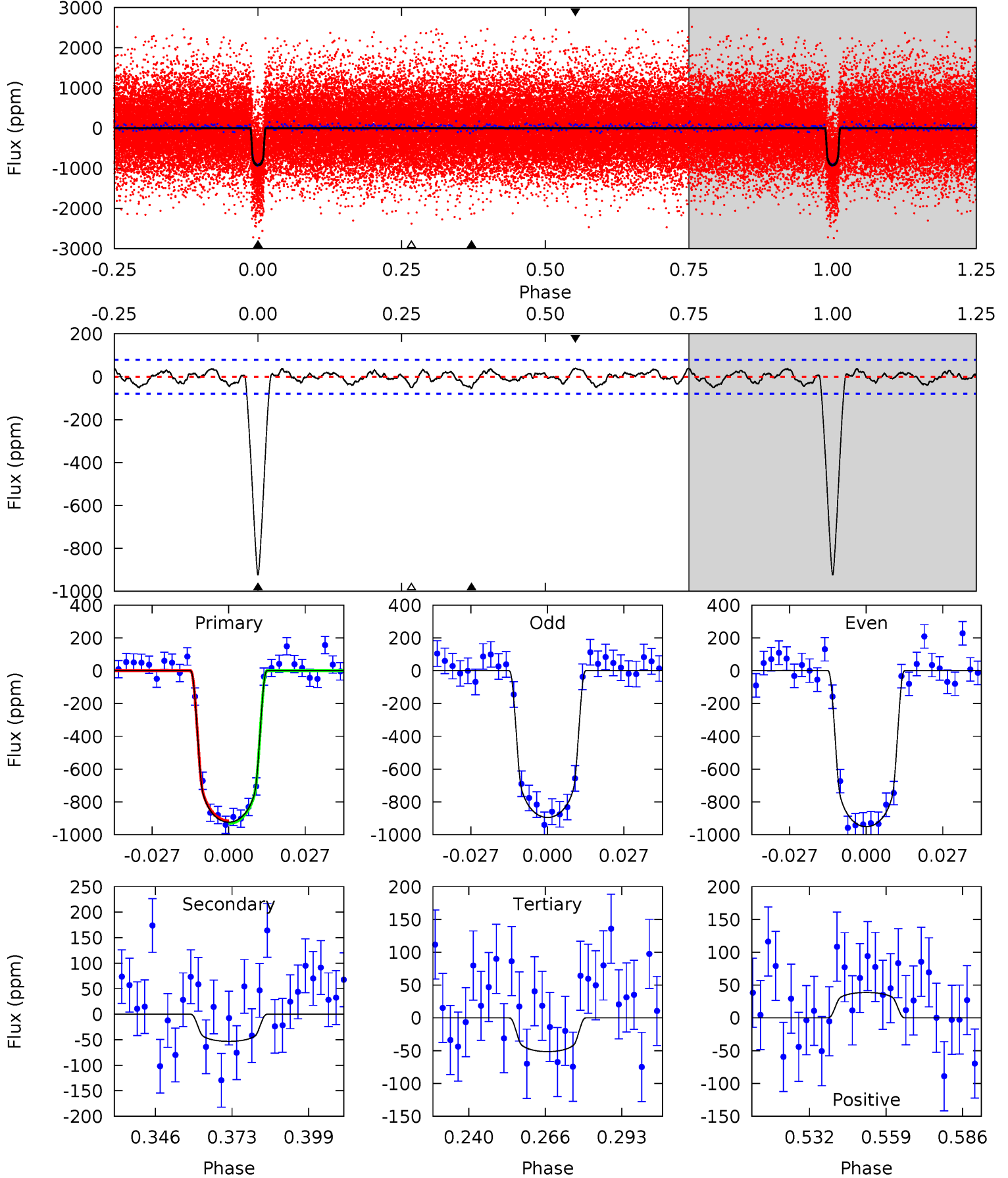




# DV Model-Shift Uniqueness Test

003342970-02, P = 7.212039 Days, E = 129.546574 Days

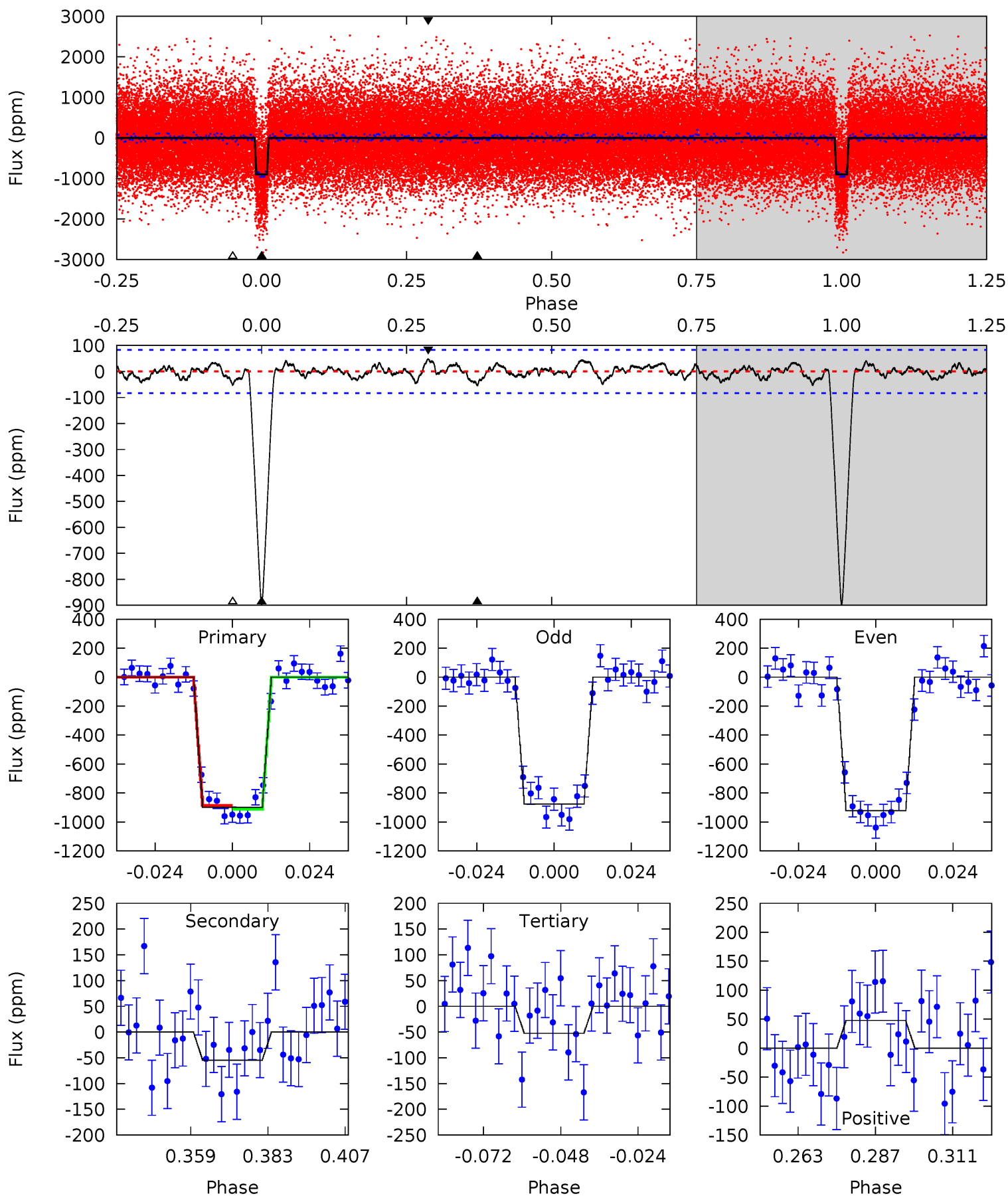
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
56.4	3.25	3.14	2.36	4.84	2.22	1.24	53.3	54.1	0.11	0.89	1.71	0.99	0.04	0.44



# Alt Model-Shift Uniqueness Test

003342970-02, P = 7.211995 Days, E = 129.550980 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
52.3	3.18	3.06	2.78	4.86	2.26	1.11	49.2	49.5	0.12	0.40	1.32	1.01	0.05	0.73



### Stellar Parameters For KIC 003342970

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6214^{+174}_{-239}$	$4.442^{+0.054}_{-0.216}$	$0.070^{+0.250}_{-0.300}$	$1.076^{+0.353}_{-0.118}$	$1.169^{+0.141}_{-0.173}$	$1.321^{+0.369}_{-0.689}$
	+3%/-4%	+1%/-5%	+357%/-429%	+33%/-11%	+12%/-15%	+28%/-52%
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 003342970-02 / KOI 0800.02

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-53 \pm 16$	$3.80^{+0.76}_{-0.56}$	$1468^{+115}_{-75}$	$3471^{+226}_{-236}$	$11^{+6}_{-4}$
Alt.	$-55 \pm 17$	$3.69^{+0.68}_{-0.50}$	$1470^{+115}_{-80}$	$3536^{+225}_{-215}$	$13^{+6}_{-5}$

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

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

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

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

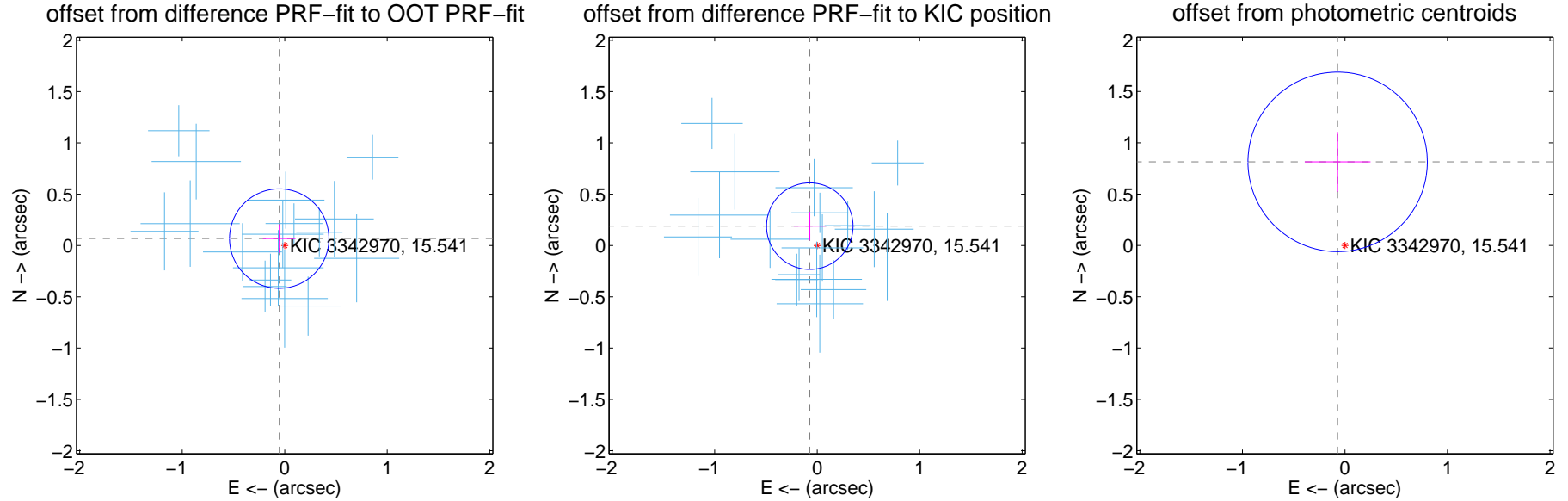
## DV Centroid Data

Supplemental centroid analysis for 003342970-02. Kepler magnitude: 15.54. Transit SNR 45.06

There are 17 quarters with good PRF difference image offsets

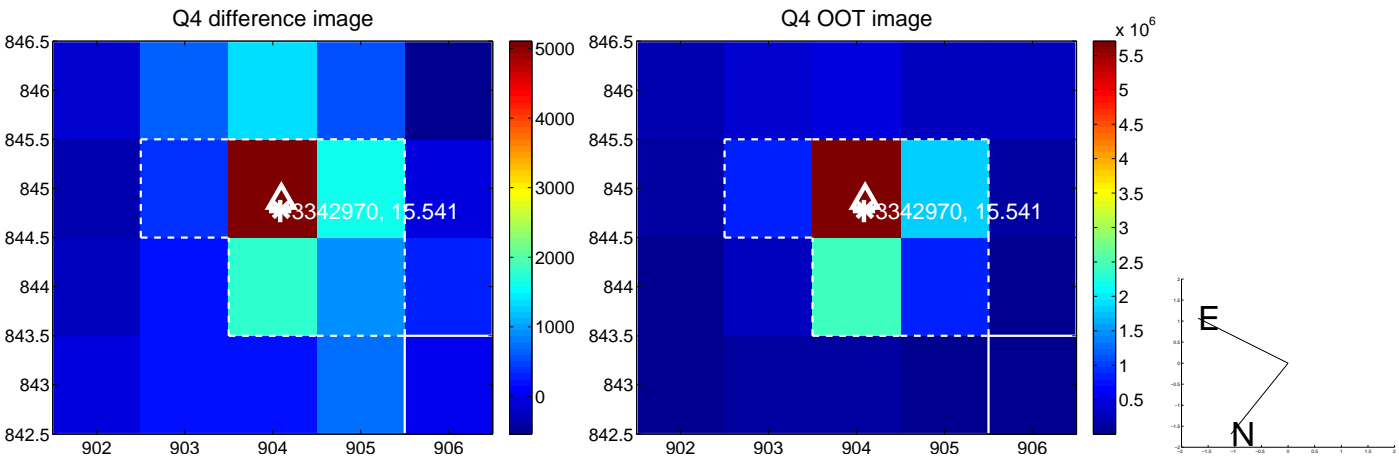
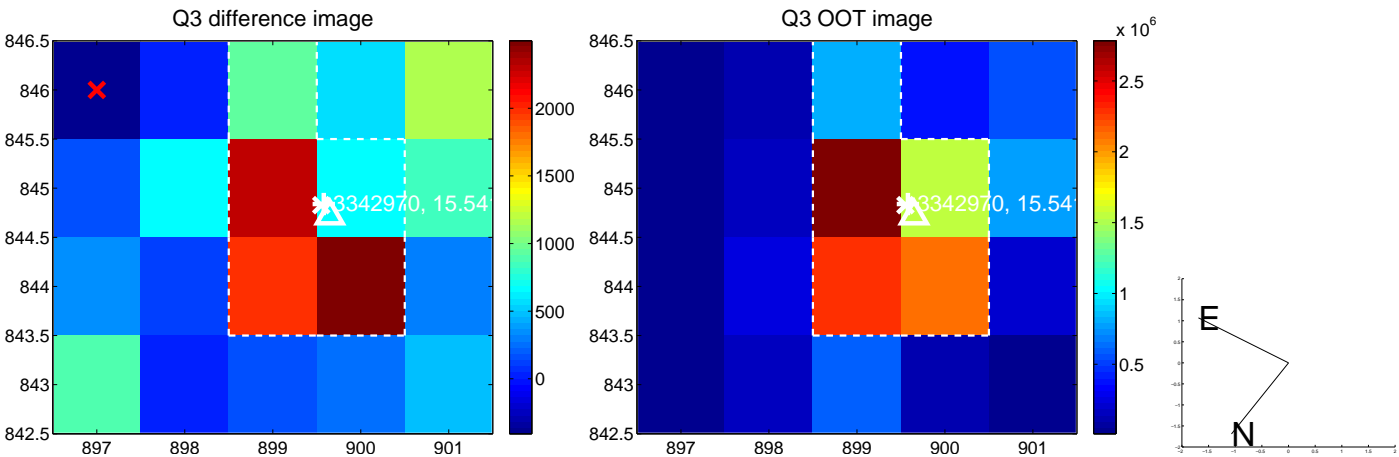
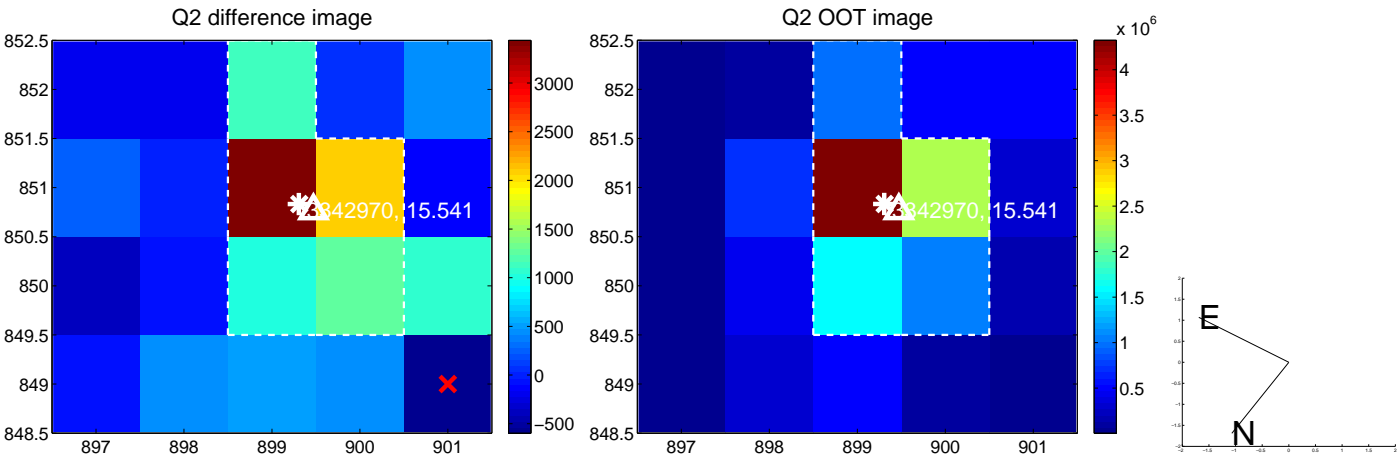
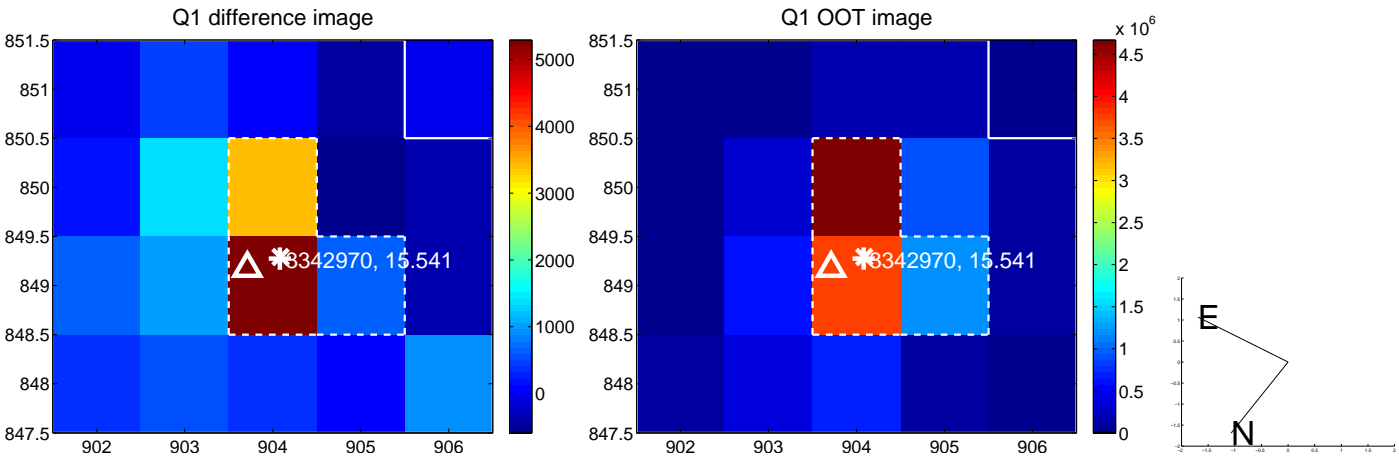
The direct PRF centroid is offset from the target star catalog position by about 0.18 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.086 \pm 0.162$	0.53	$0.054 \pm 0.159$	$0.067 \pm 0.138$
PRF-fit source offset from KIC position	$0.202 \pm 0.141$	1.43	$0.072 \pm 0.156$	$0.188 \pm 0.138$
photometric centroid source offset	$0.82 \pm 0.29$	2.80	$0.07 \pm 0.32$	$0.81 \pm 0.29$

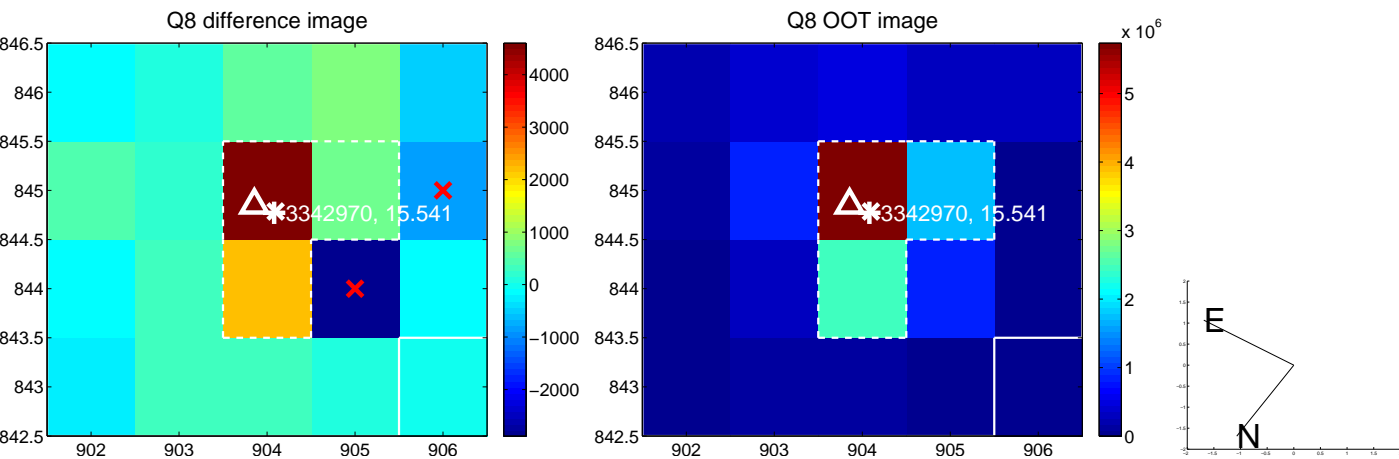
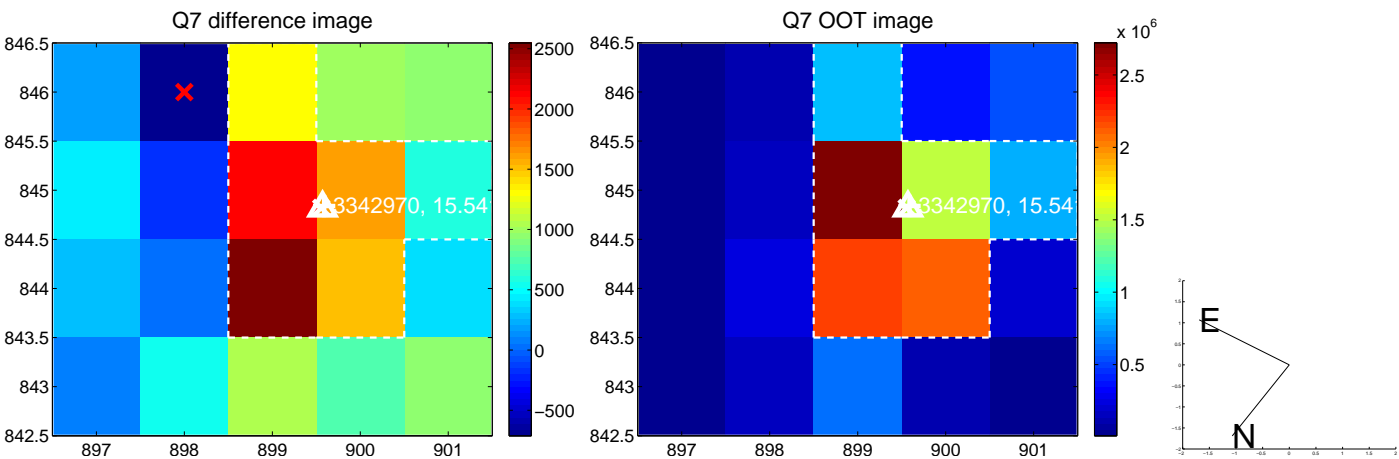
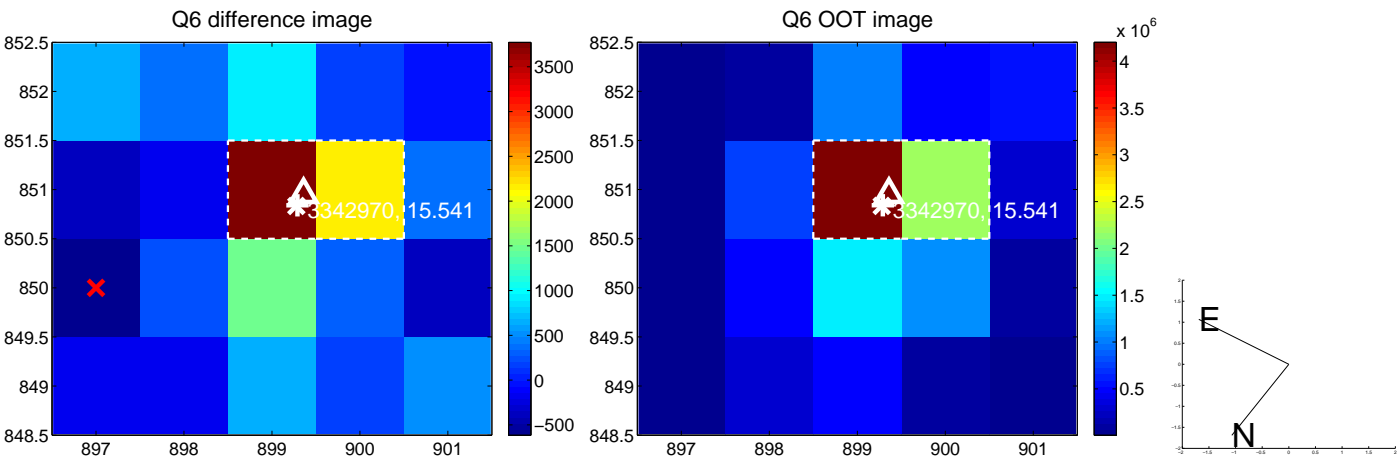
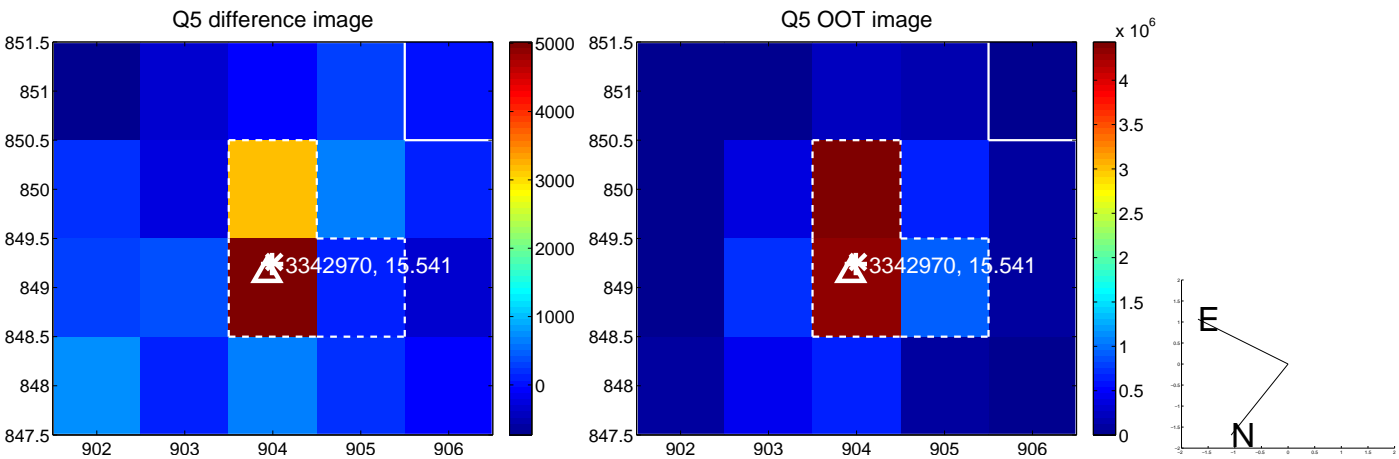


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

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

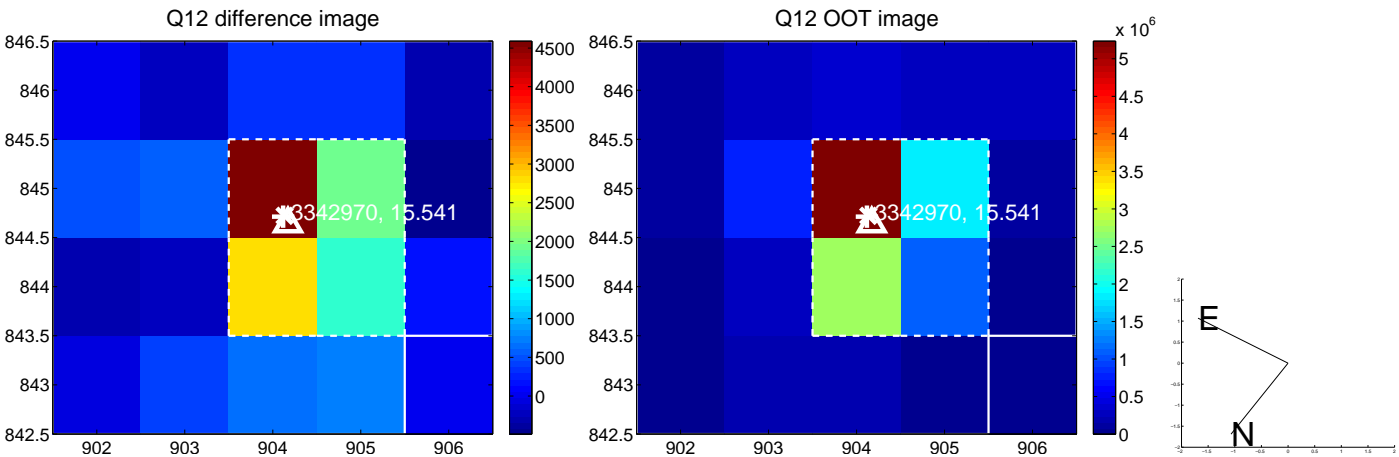
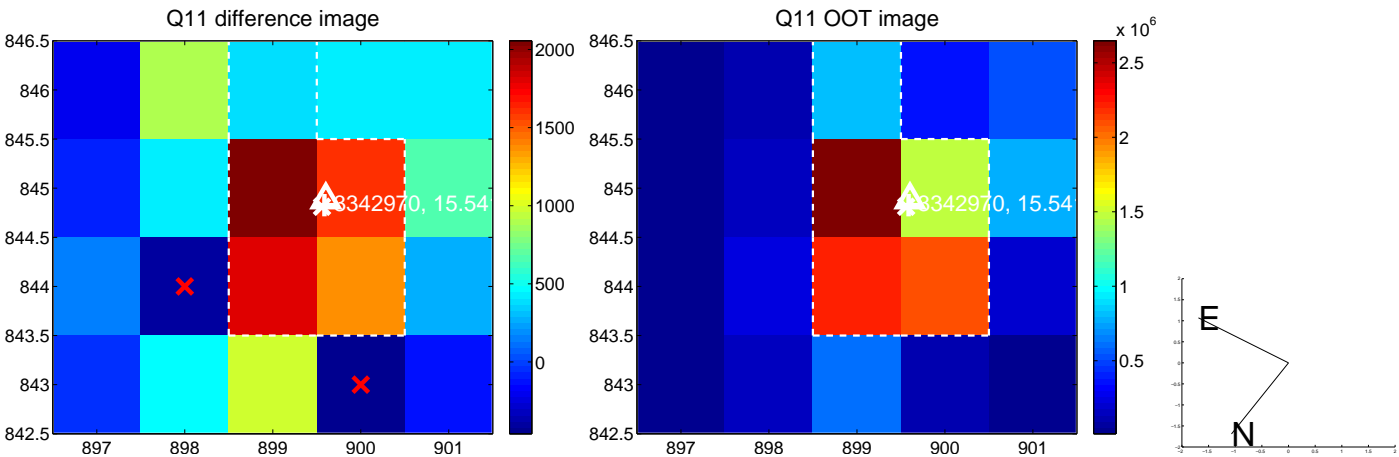
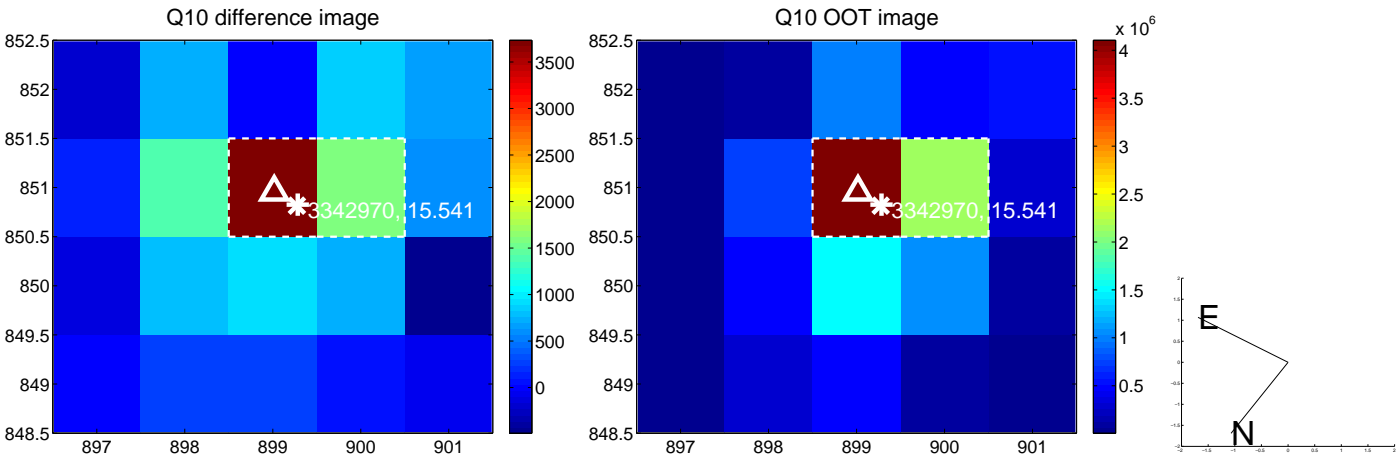
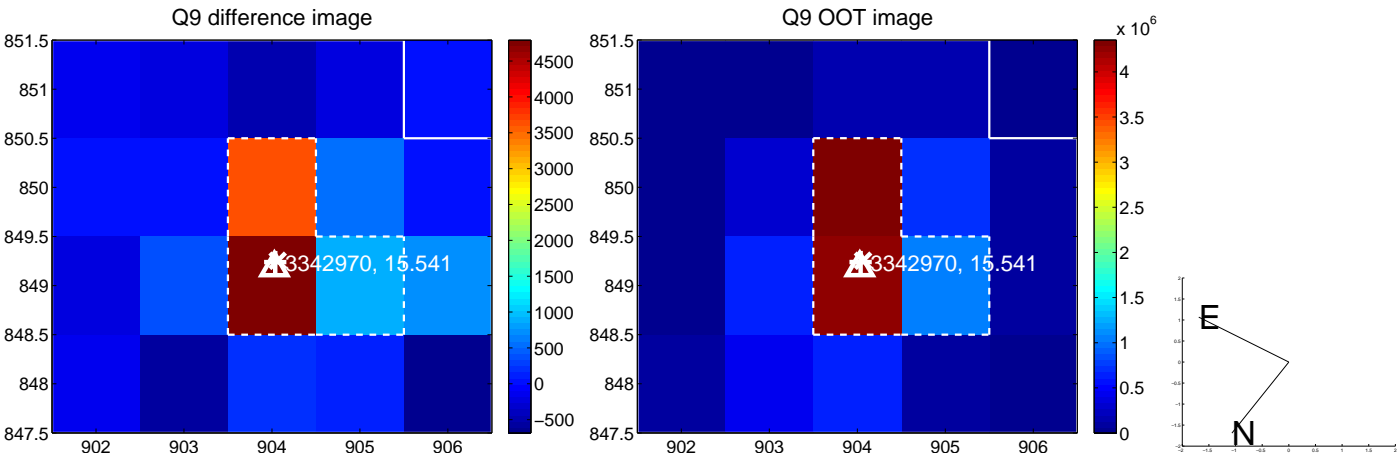


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

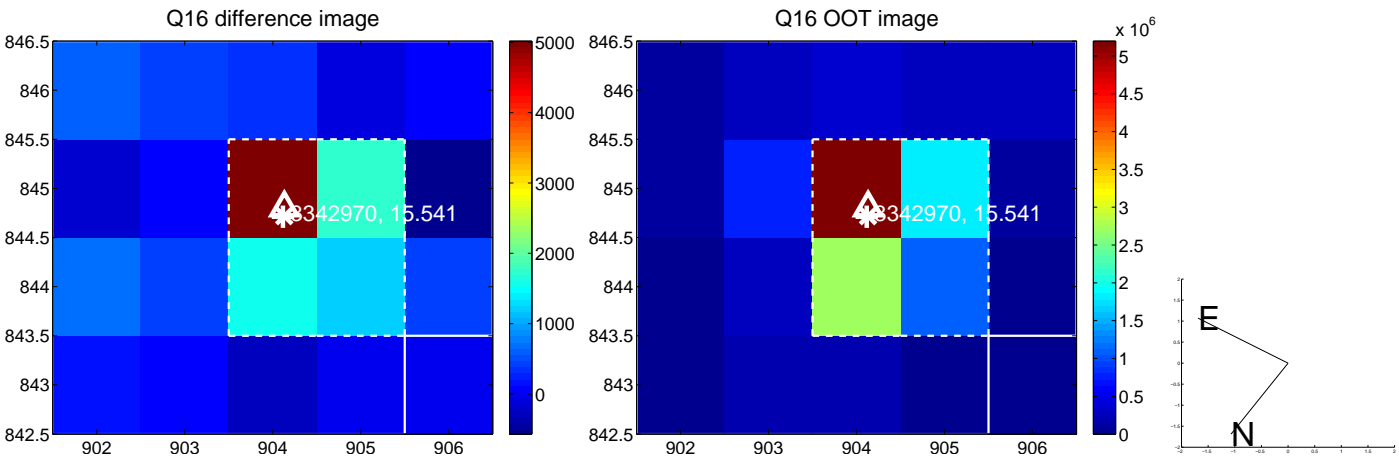
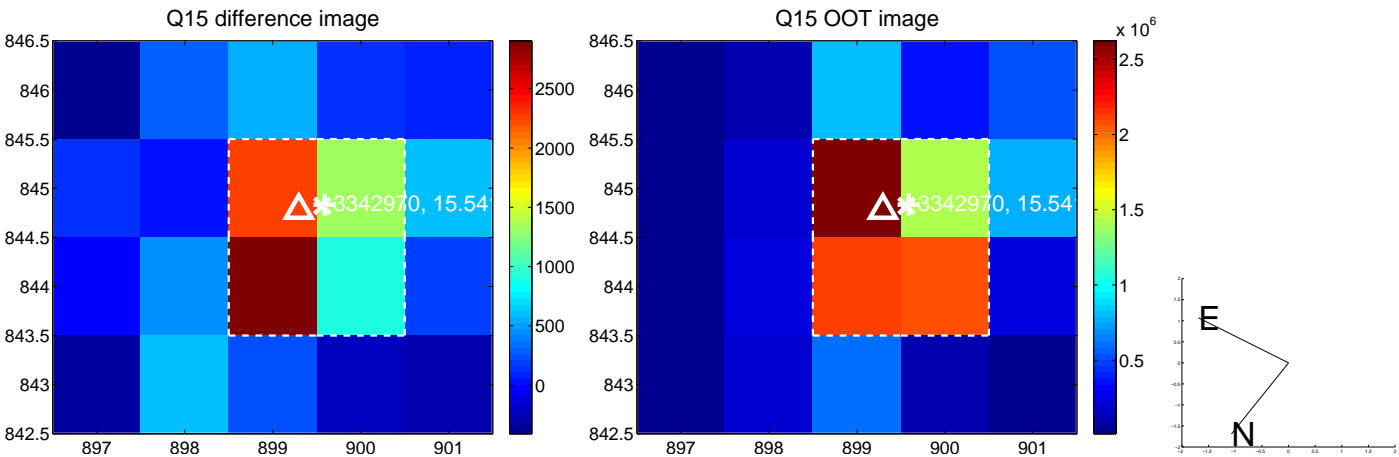
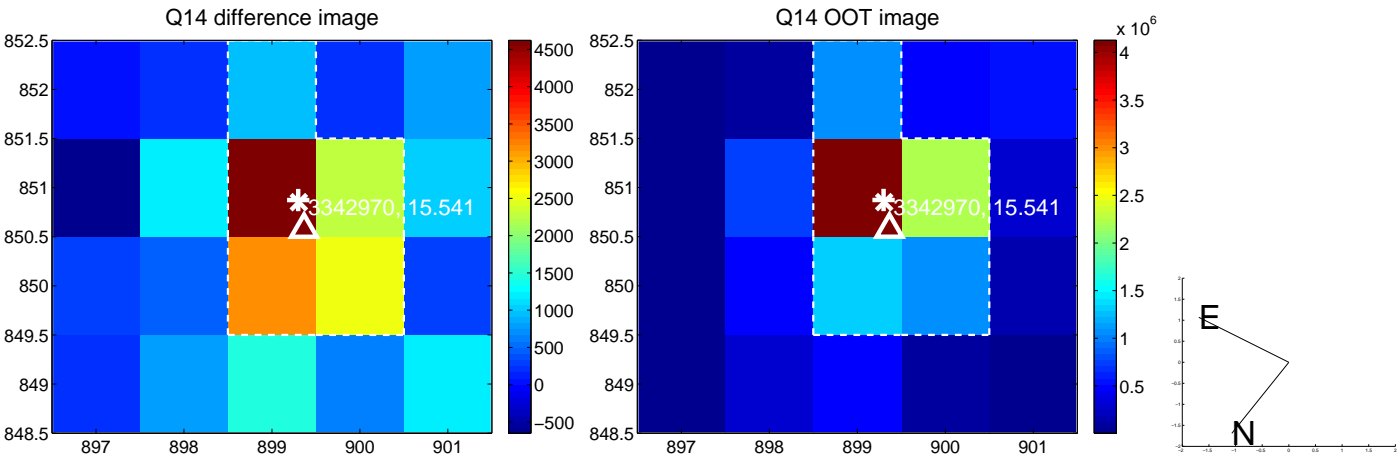
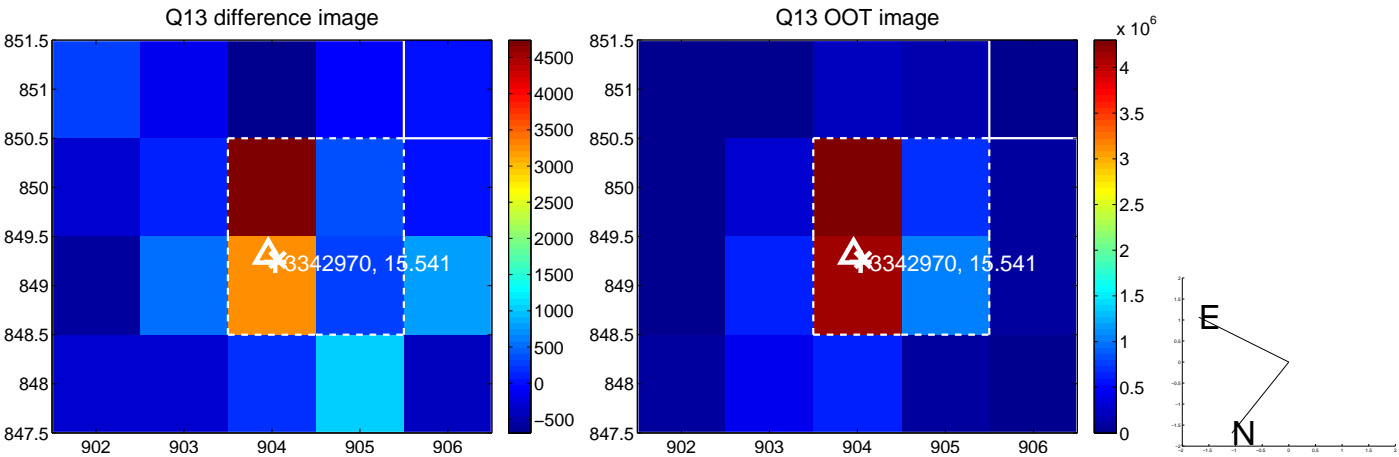




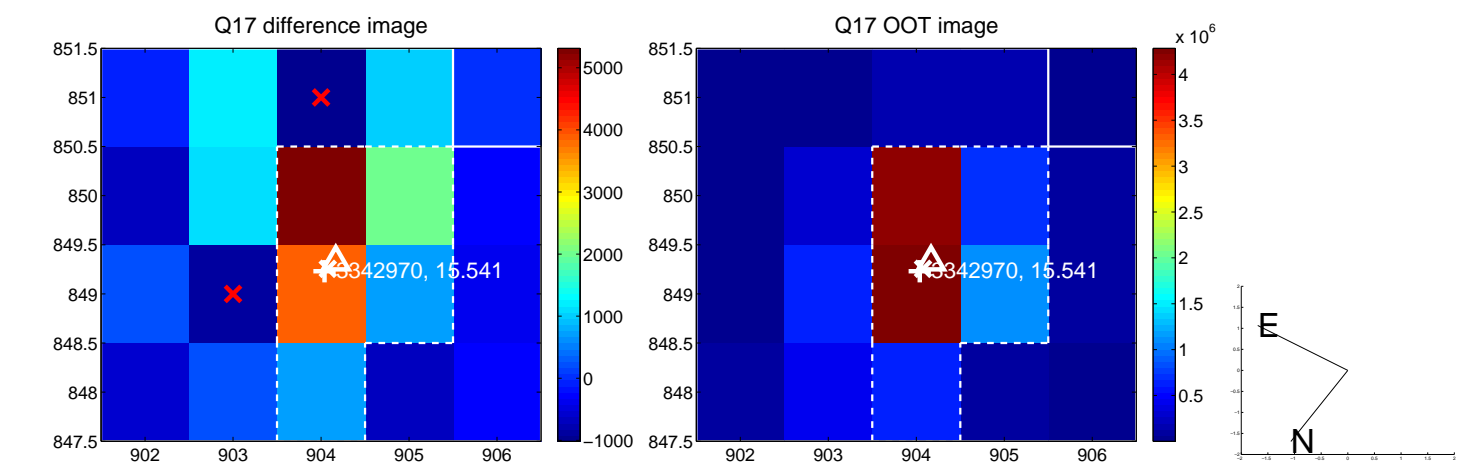
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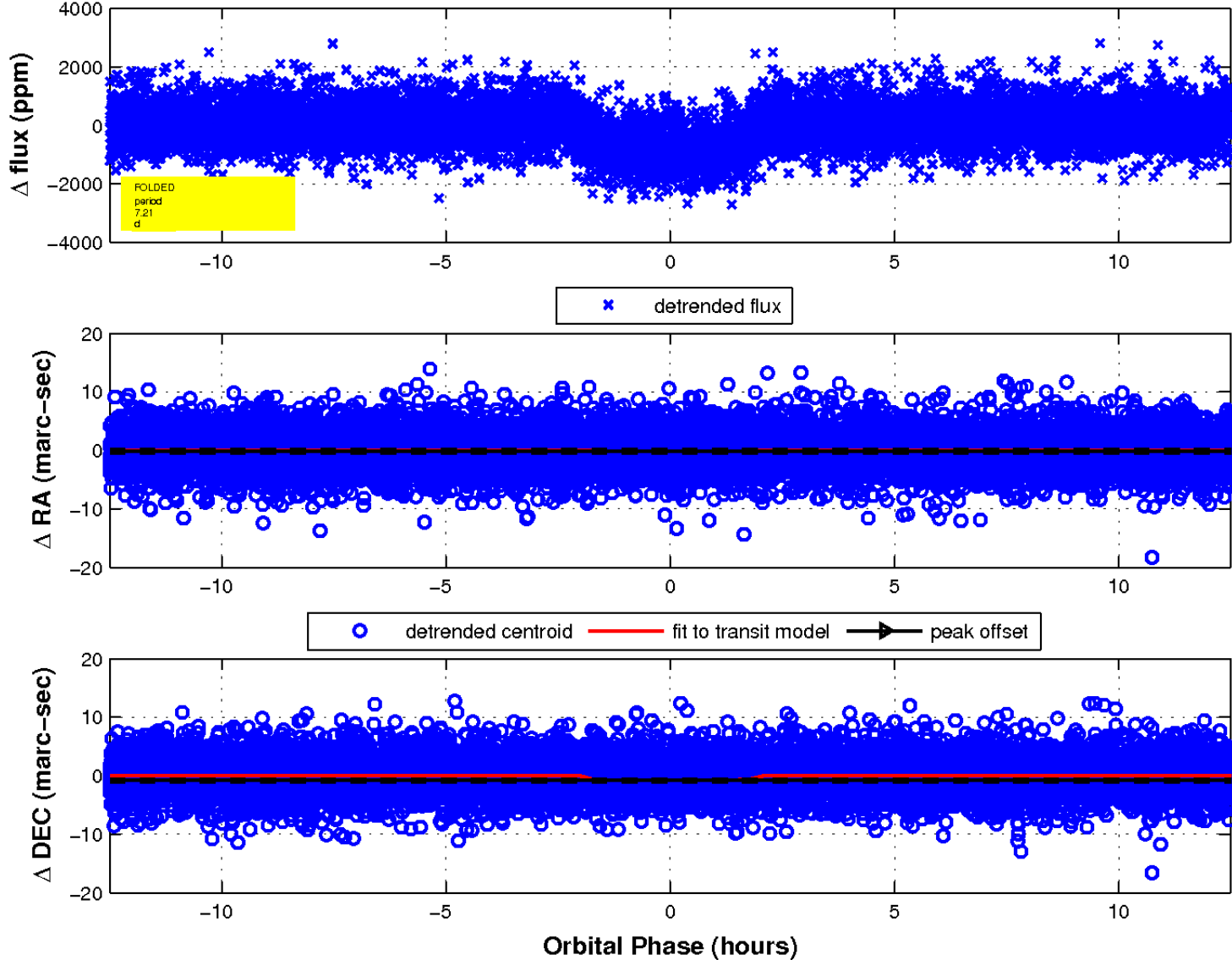
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



# UKIRT Image

Declination

