

# KIC 003324644

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003324644-01	OBS	3781.01	2.882421	131.646904	5136.8	7.704	112.9	96.6	8.06	4705	61.42	17019.28
003324644-02	OBS	No	0.960766	132.026438	253.4	4.315	20.0	13.3	8.06	4705	12.32	0.00
003324644-03	OBS	No	128.315547	218.845277	1034.7	2.667	14.5	1.6	8.06	4705	48.54	107.87
003324644-04	OBS	No	88.172974	195.668967	398.1	6.000	12.6	-1.0	8.06	4705	15.46	177.90
003324644-05	OBS	No	103.095671	214.989087	779.7	2.827	10.9	2.5	8.06	4705	25.02	144.42

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003324644-01	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV
003324644-02	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD
003324644-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_ZUMA_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV— MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
003324644-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—CENT_NOFITS—HALO_GHOST
003324644-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_SKYE_TRACKER—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT— MOD_POS_ALT—HALO_GHOST

**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.

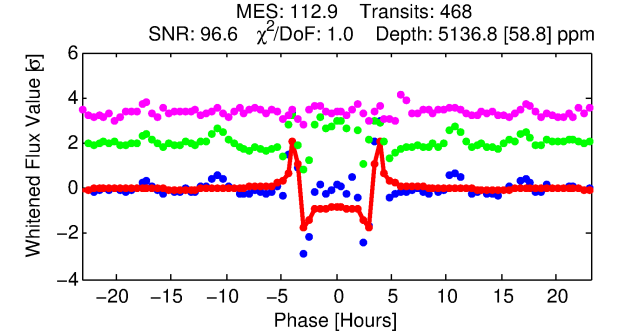
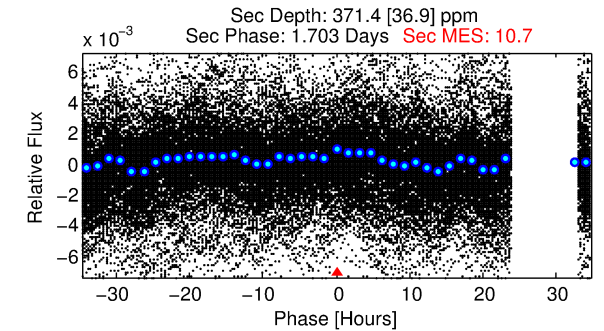
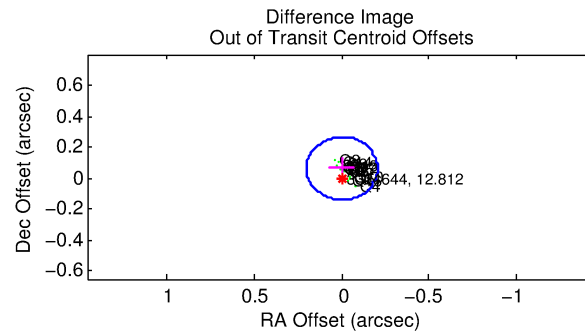
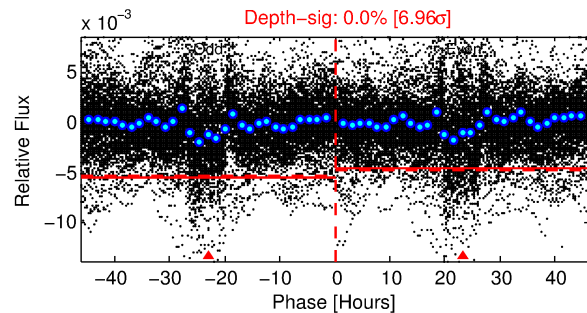
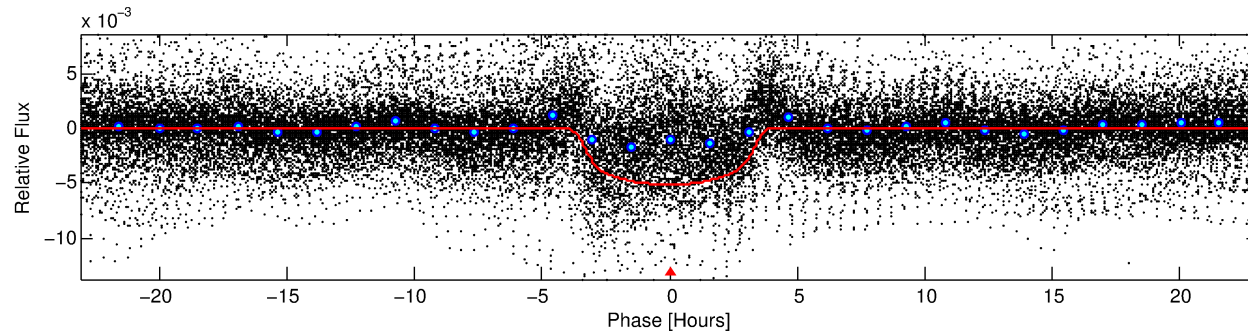
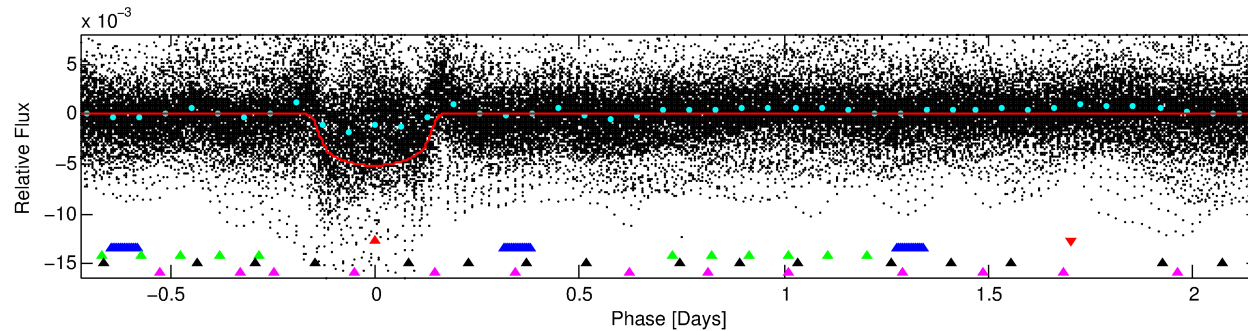
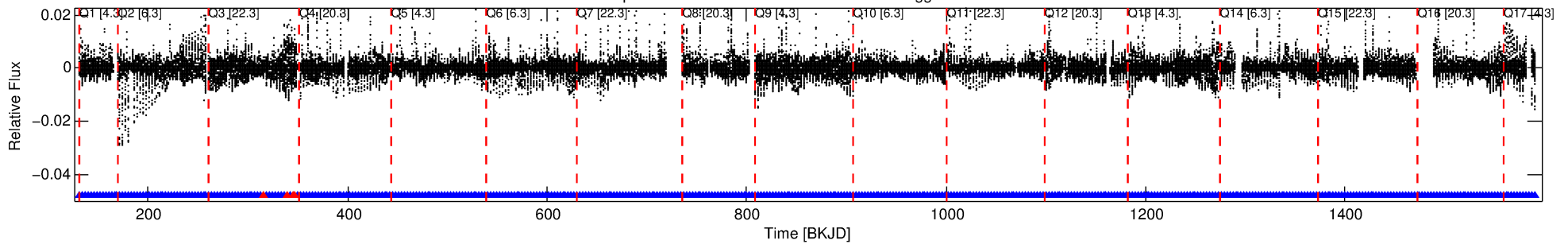
Ephemeris Match Information For 003324644-01

No Significant Match Found

# DV One-Page Summary

KIC: 3324644 Candidate: 1 of 5 Period: 2.882 d  
KOI: K03781 Corr: No Ephemeris Match

Kp: 12.81 R\*: 8.06 Rs Teff: 4705.0 K Logg: 2.67 Fe/H: -0.120



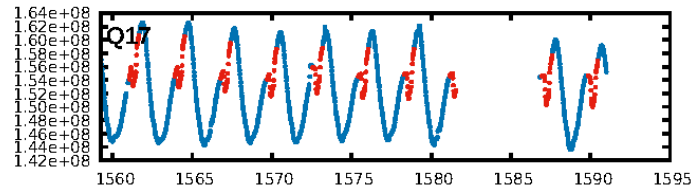
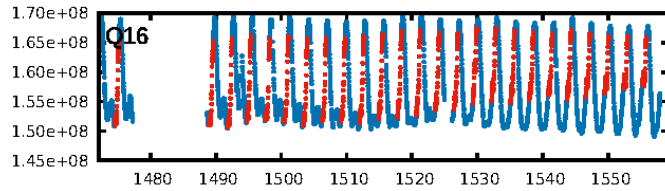
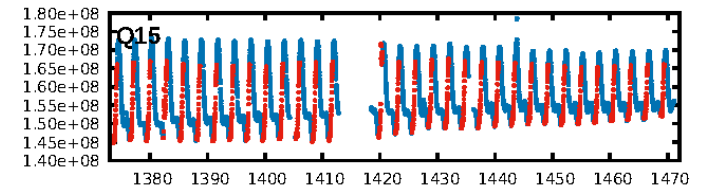
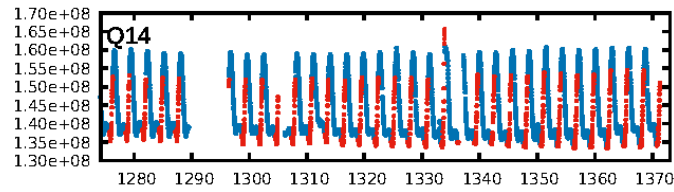
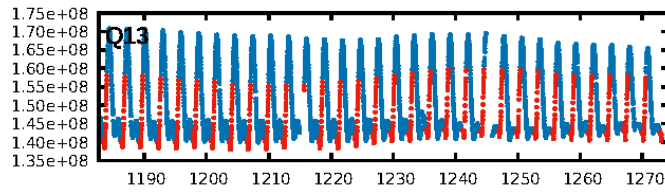
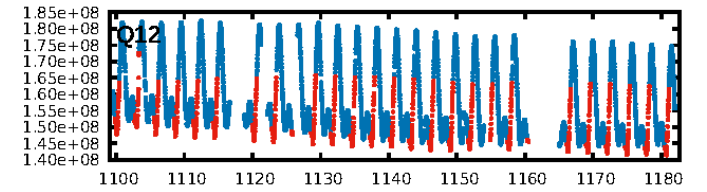
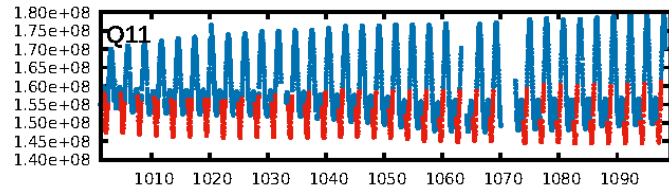
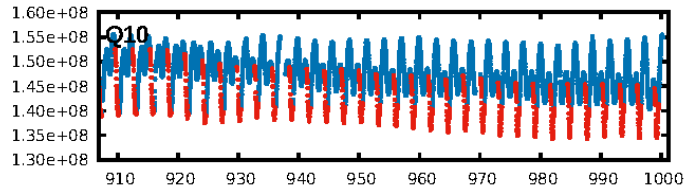
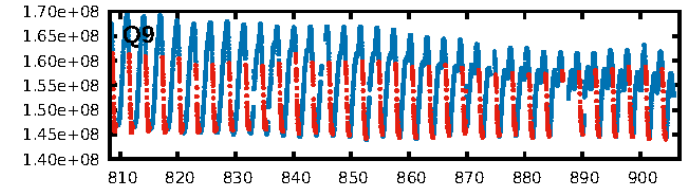
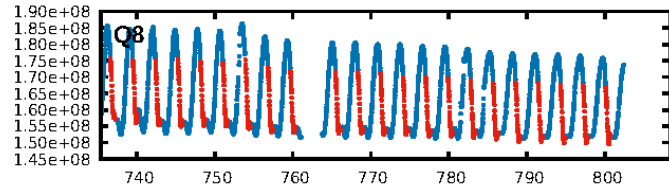
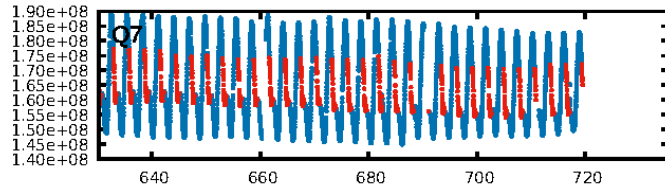
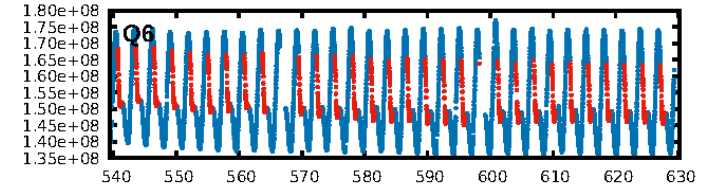
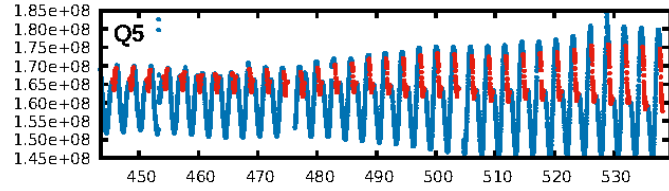
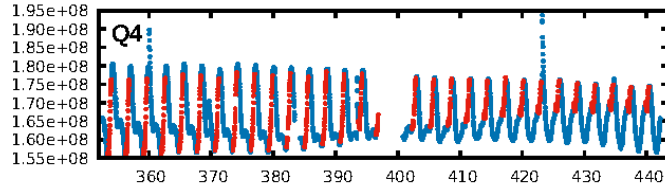
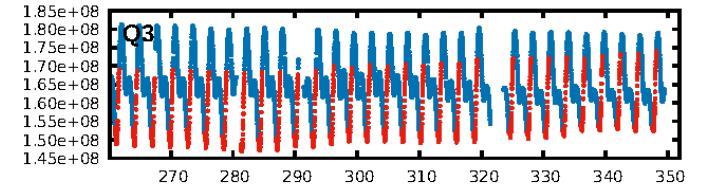
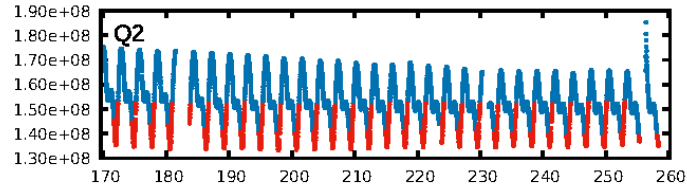
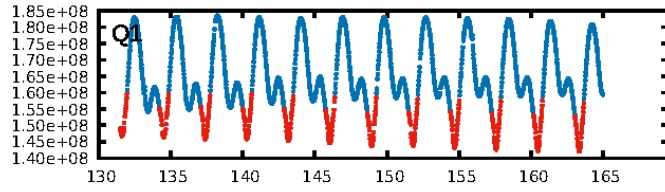
## DV Fit Results:

Period = 2.88242 [0.00000] d  
Epoch = 131.6469 [0.0002] BKJD  
Rp/R\* = 0.0698 [0.0004]  
a/R\* = 2.48 [0.02]  
b = 0.69 [0.01]  
Seff = 17019.28 [11887.04]  
Teff = 2912 [509] K  
Rp = 61.42 [28.42] Re  
a = 0.0409 [0.0179] AU  
Ag = 0.09 [0.06] [-14.37 $\sigma$ ]  
Teffp = 2471 [91] K [-0.85 $\sigma$ ]

## DV Diagnostic Results:

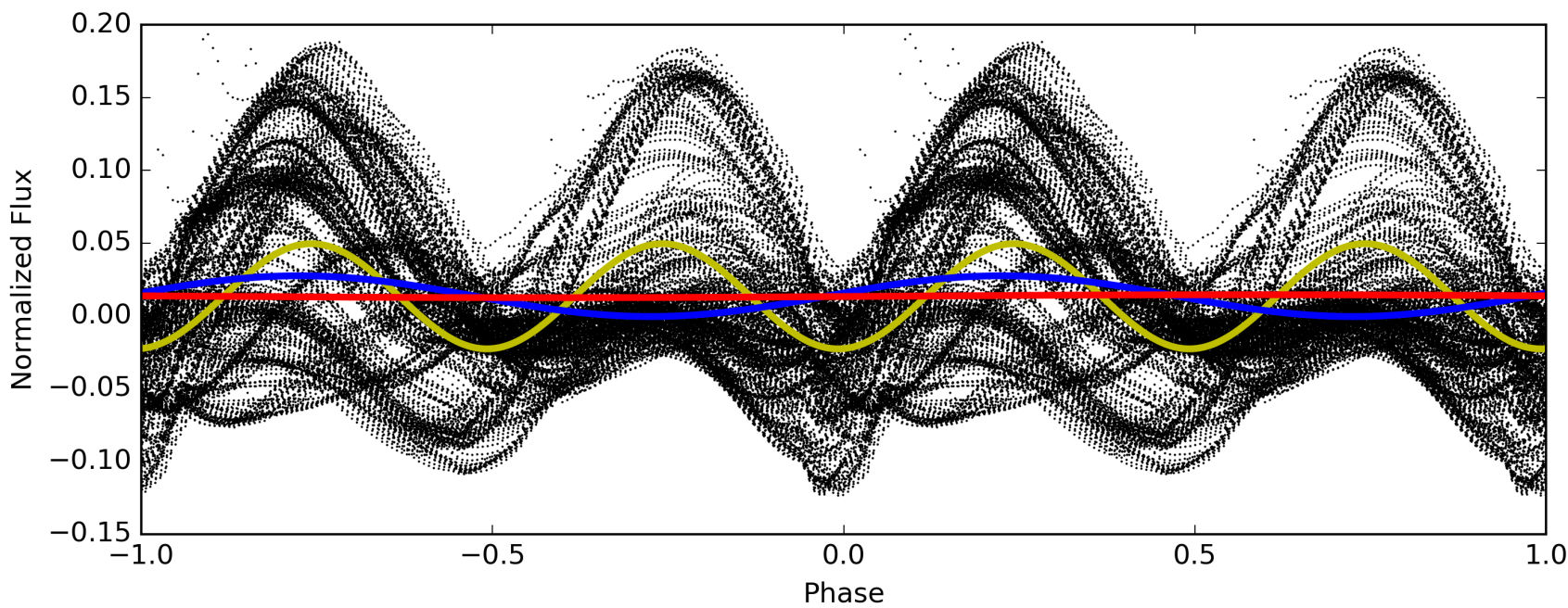
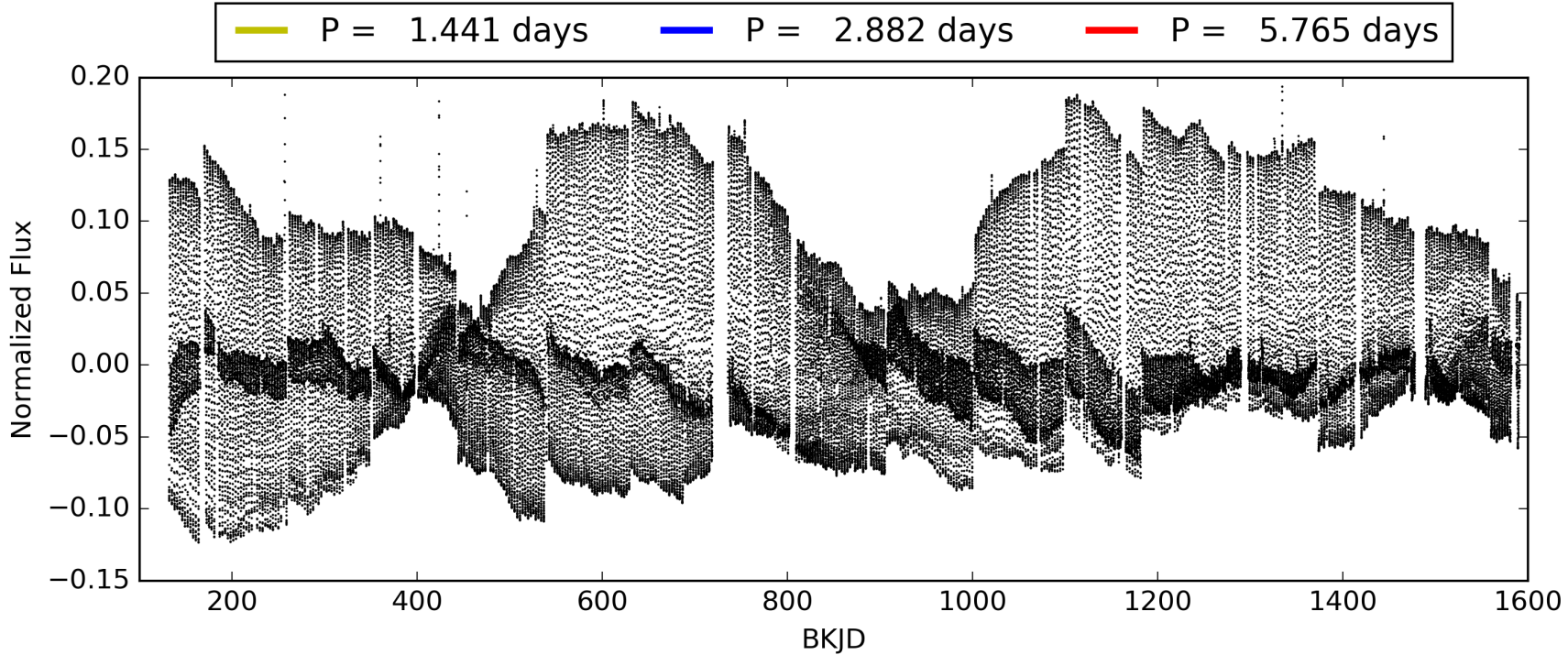
ShortPeriod-sig: 100.0% [5.22 $\sigma$ ]  
LongPeriod-sig: 100.0% [209.63 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 0.99 [442/446]  
GhostDiagnostic-chr: 0.9066  
Centroid-sig: 0.0%  
Centroid-so: 0.315 arcsec [29.96 $\sigma$ ]  
OotOffset-rm: 0.063 arcsec [0.94 $\sigma$ ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-rm: 0.220 arcsec [3.06 $\sigma$ ]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 1.00 [17/17]  
DiffImageOverlap-fno: 0.00 [0/17]

# TCE 003324644-01, PDC Light Curves





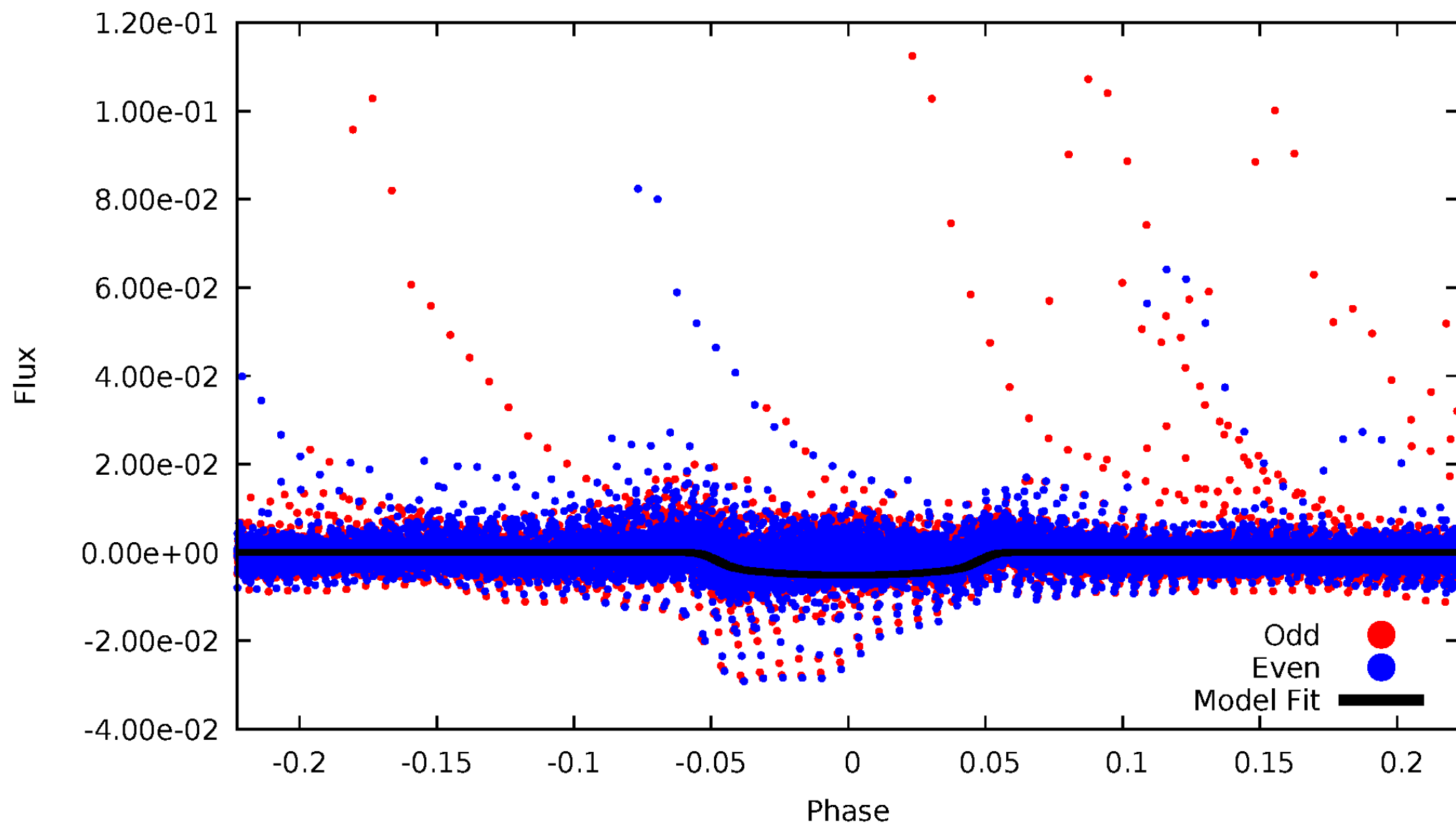
TCE 003324644-01





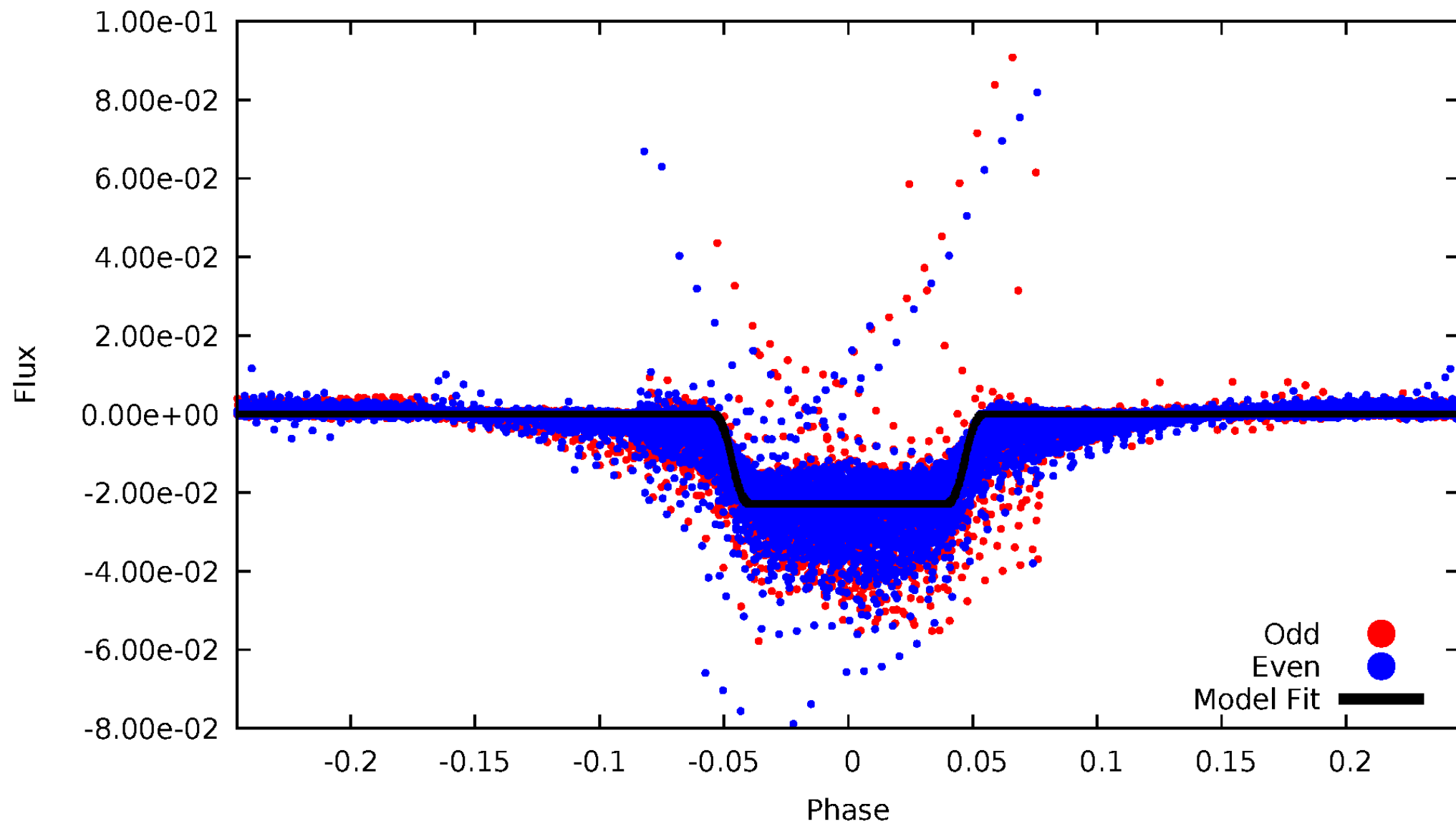
# DV Odd/Even

TCE 003324644-01



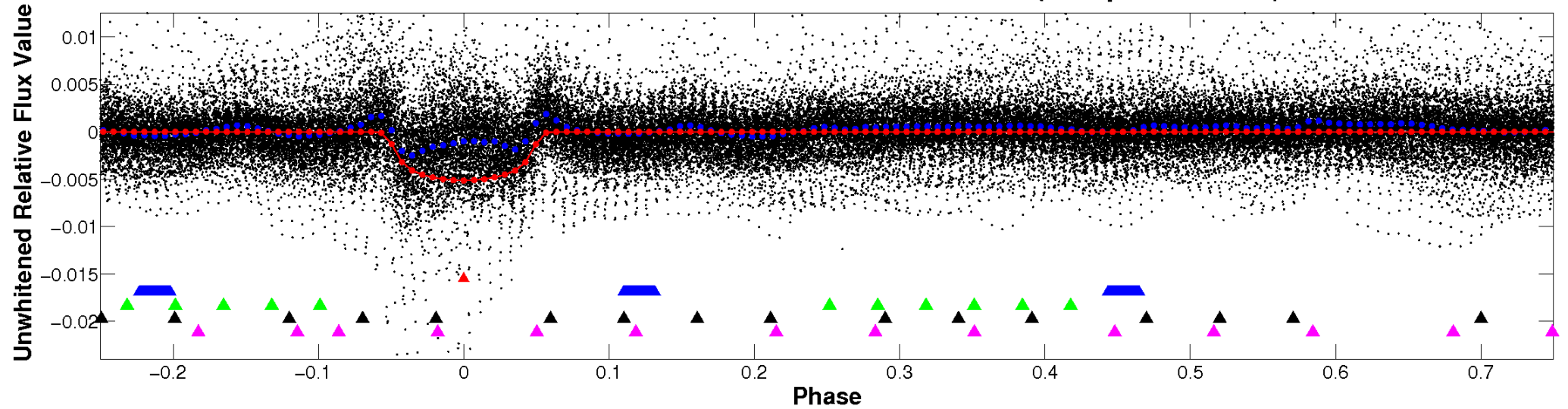
# ALT Odd/Even

TCE 003324644-01

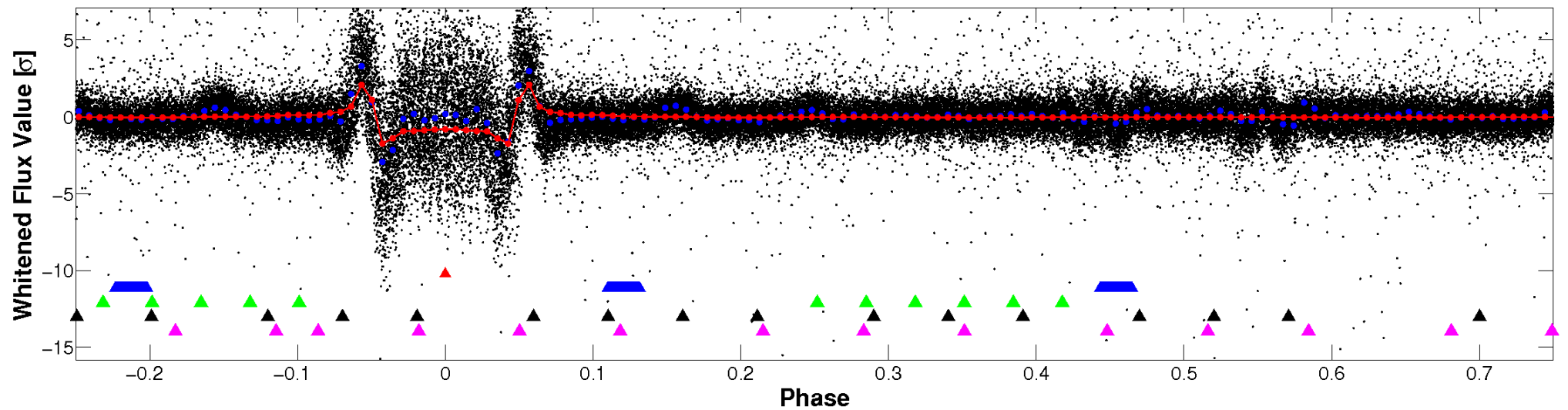


# Non-Whitened Vs. Whitened Light Curve

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



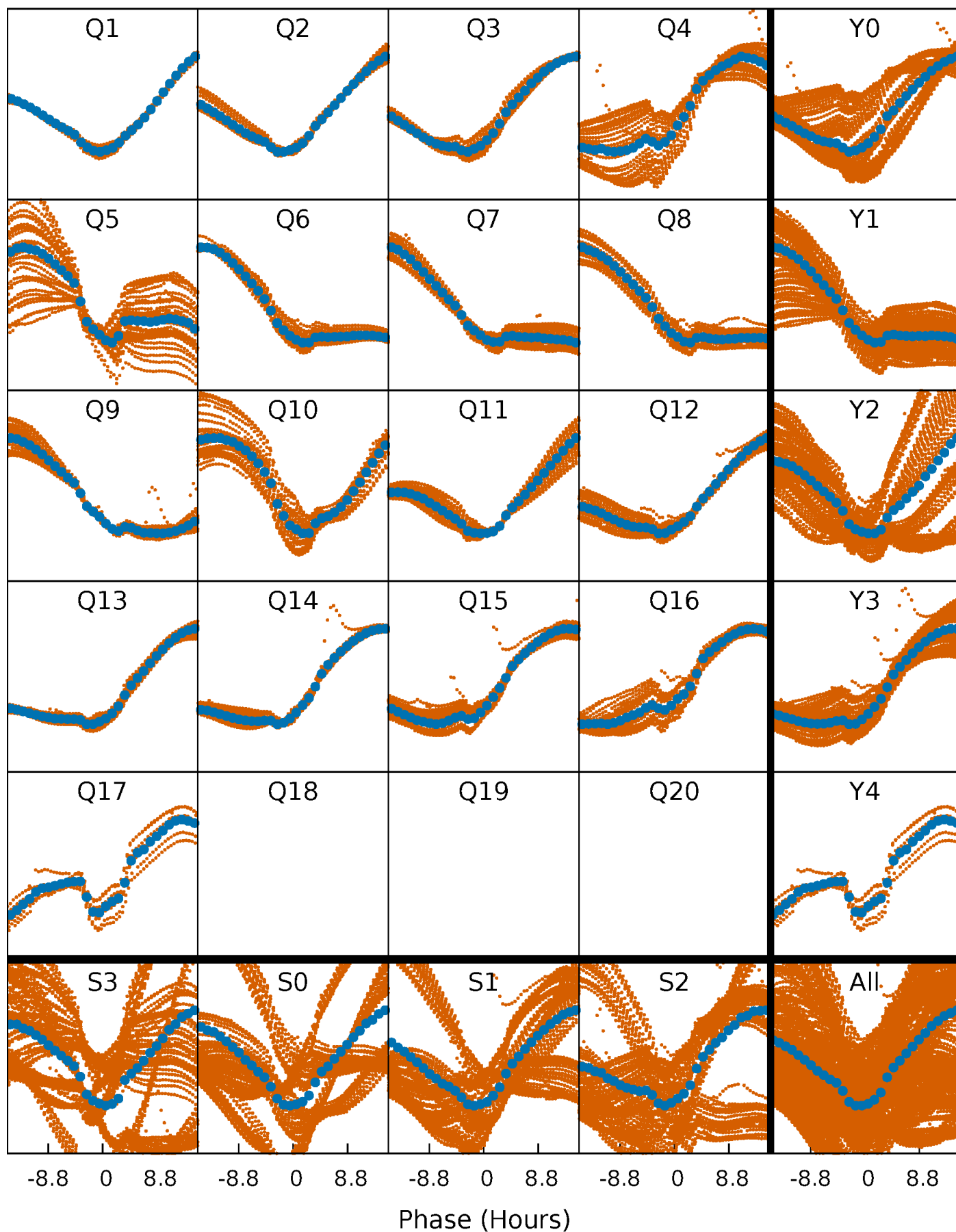
**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**





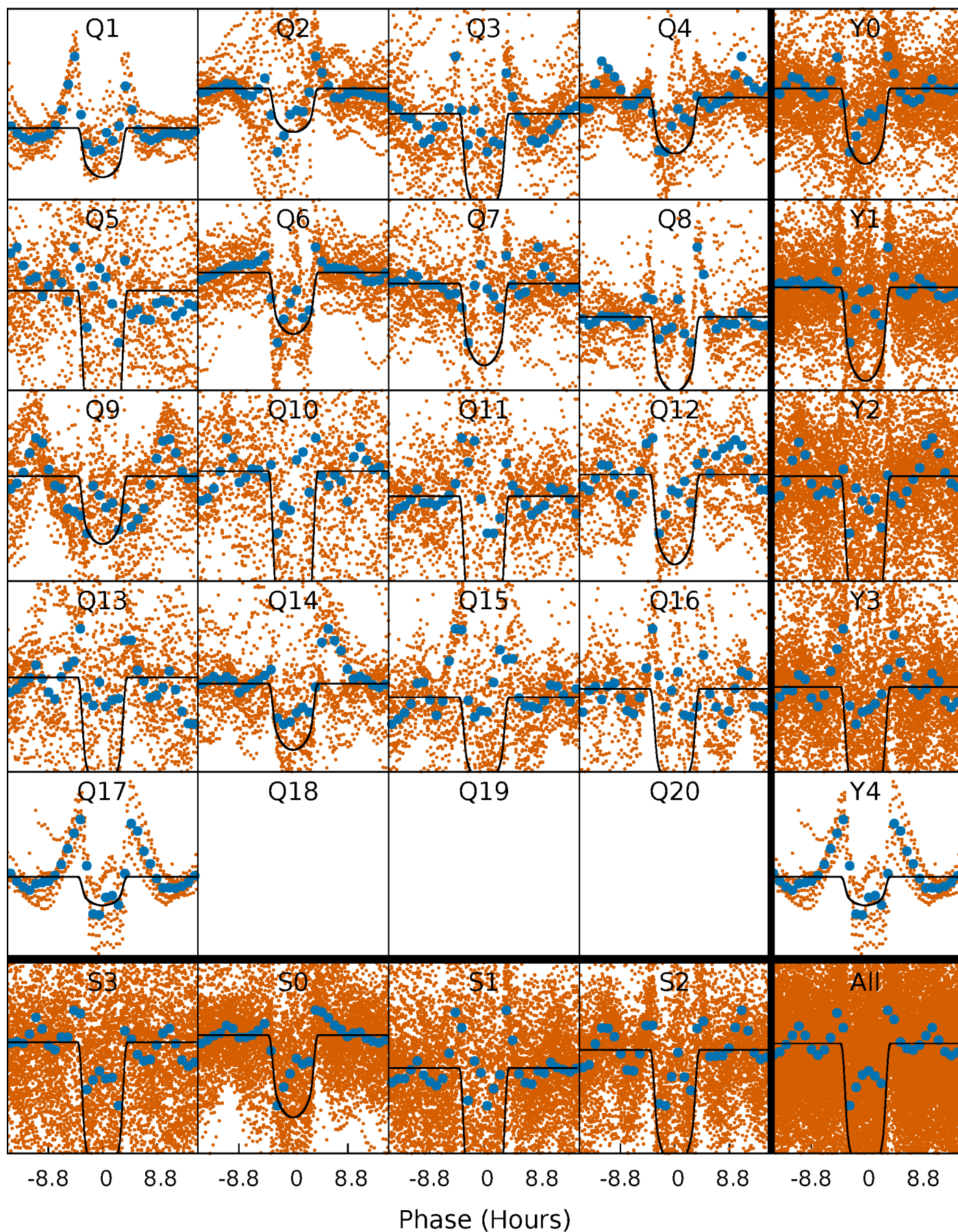
# PDC Quarter-Phased Transit Curves

TCE 003324644-01 P= 2.882421 Days  $T_0=131.646904$  (BKJD)



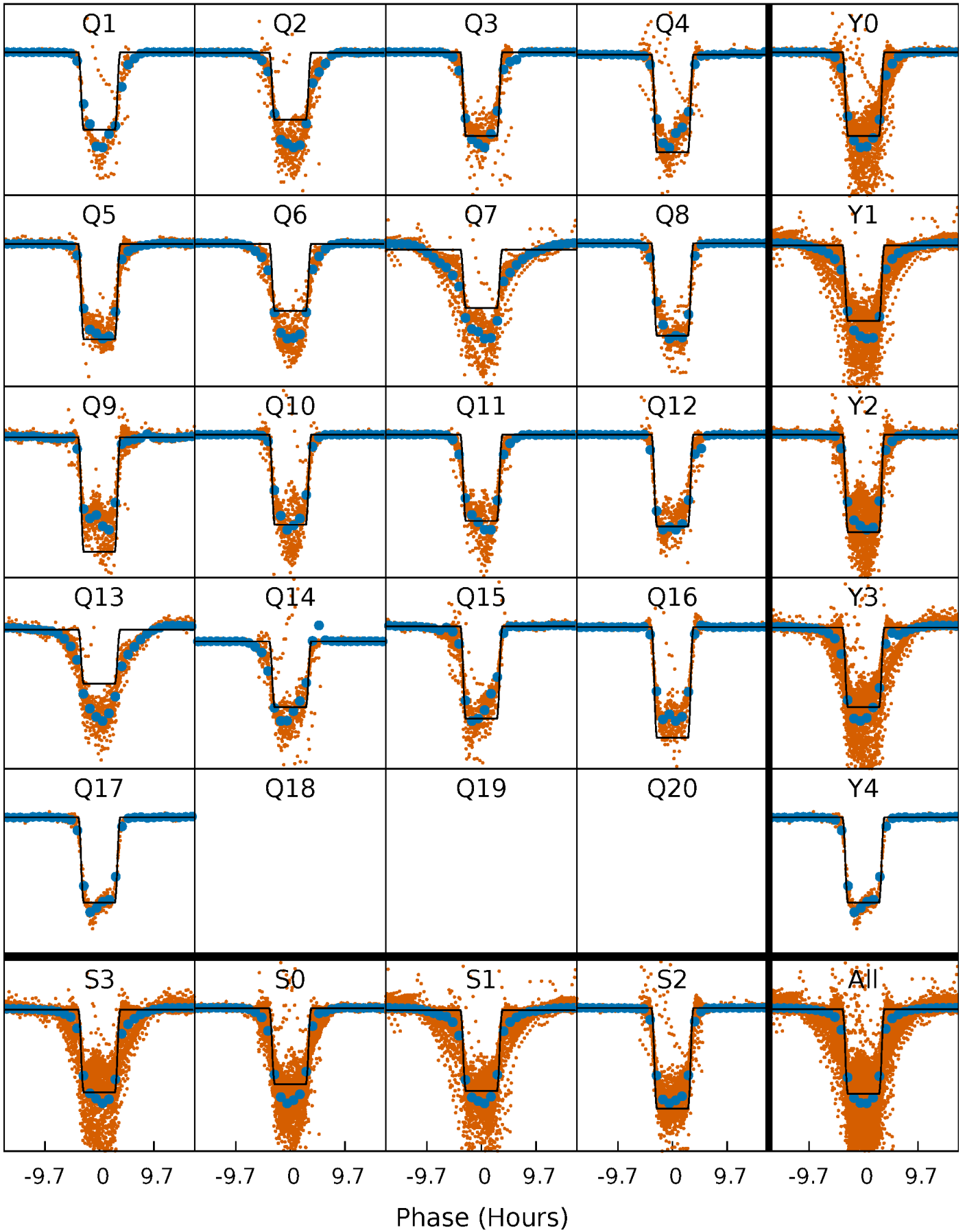
# DV Quarter-Phased Transit Curves

TCE 003324644-01 P= 2.882421 Days  $T_0=131.646904$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 003324644-01 P= 2.882511 Days  $T_0=131.623422$  (BKJD)

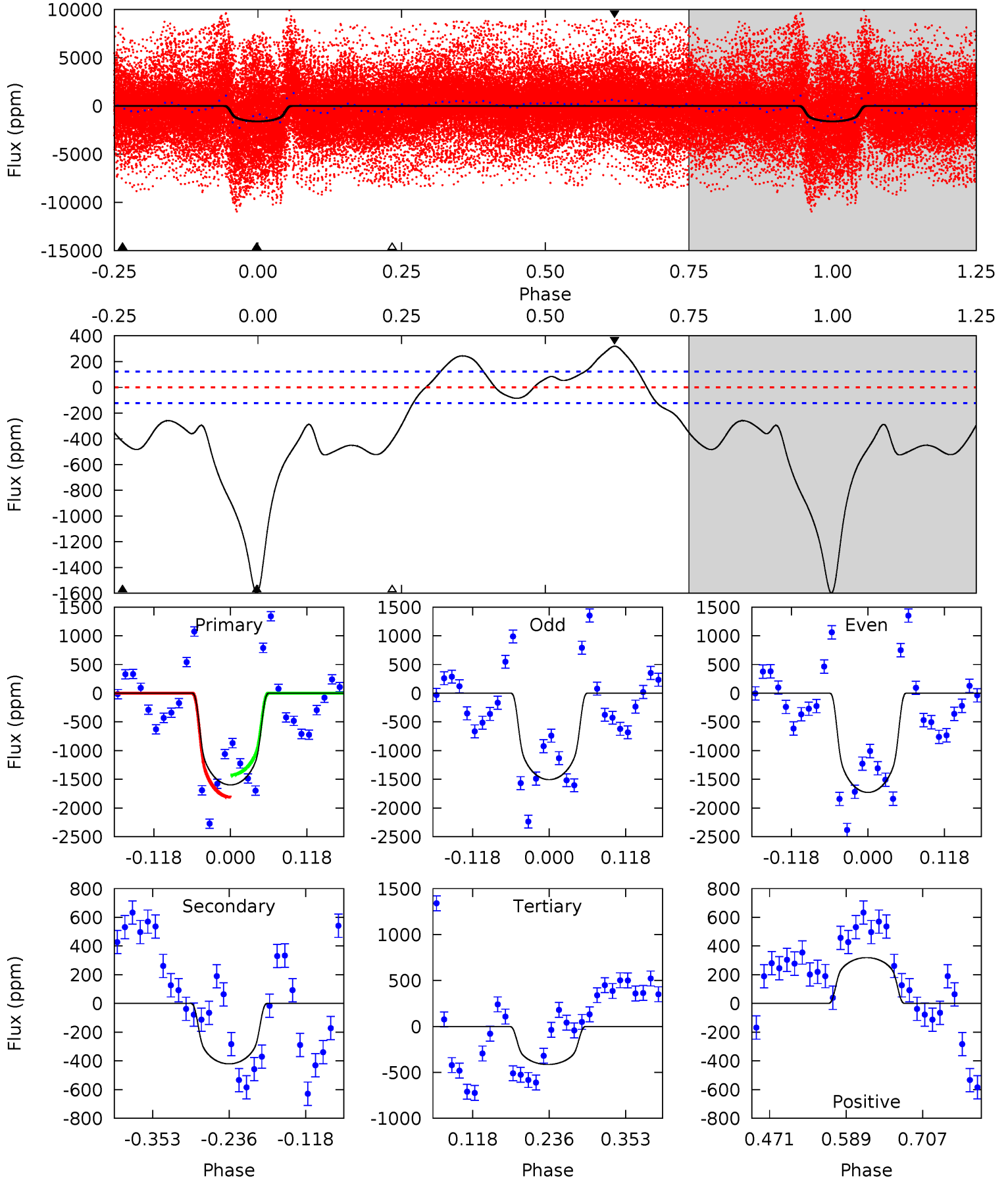




# DV Model-Shift Uniqueness Test

003324644-01, P = 2.882421 Days, E = 128.764483 Days

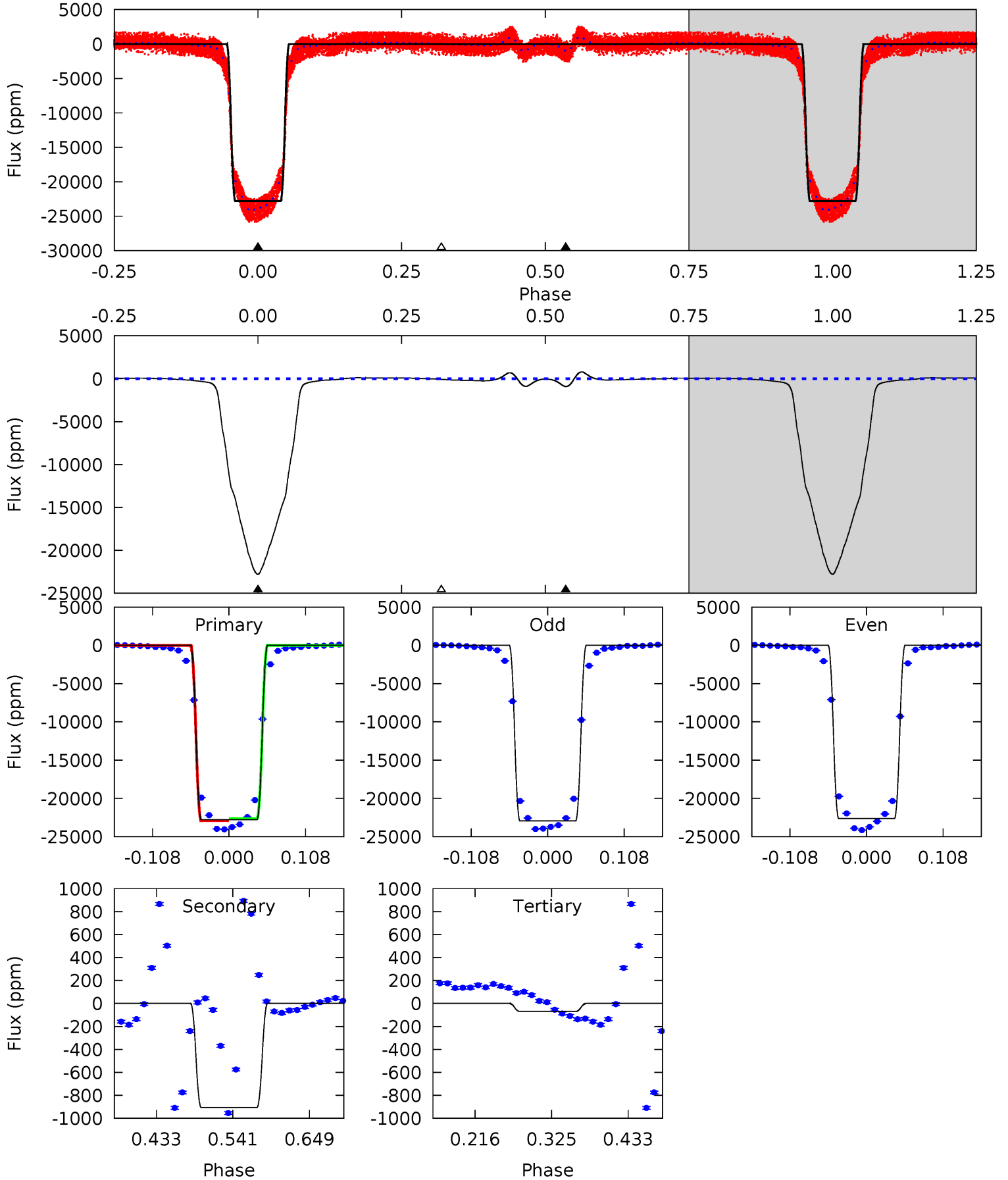
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
59.0	15.5	15.3	11.8	4.53	1.56	9.37	43.7	47.2	0.23	3.75	4.14	0.95	0.17	7.07



# Alt Model-Shift Uniqueness Test

003324644-01, P = 2.882511 Days, E = 128.740911 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
2367	94.1	7.22	0	4.55	1.61	11.0	2359	2367	86.9	94.1	15.5	1.09	0.03	0



### Stellar Parameters For KIC 003324644

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4705^{+128}_{-105}$	$2.667^{+0.402}_{-0.268}$	$-0.120^{+0.300}_{-0.200}$	$8.058^{+3.729}_{-3.051}$	$1.101^{+0.395}_{-0.158}$	$0.003^{+0.010}_{-0.002}$
	+3%/-2%	+15%/-10%	+250%/-167%	+46%/-38%	+36%/-14%	+322%/-63%
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 003324644-01 / KOI 3781.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-421 \pm 27$	$61.98^{+17.35}_{-13.32}$	$4028^{+504}_{-431}$	$-3390^{+404}_{-385}$	$0.106^{+0.065}_{-0.039}$
Alt.	$-907 \pm 10$	$131.54^{+35.44}_{-26.86}$	$4020^{+457}_{-441}$	$-3526^{+306}_{-309}$	$0.050^{+0.028}_{-0.018}$

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



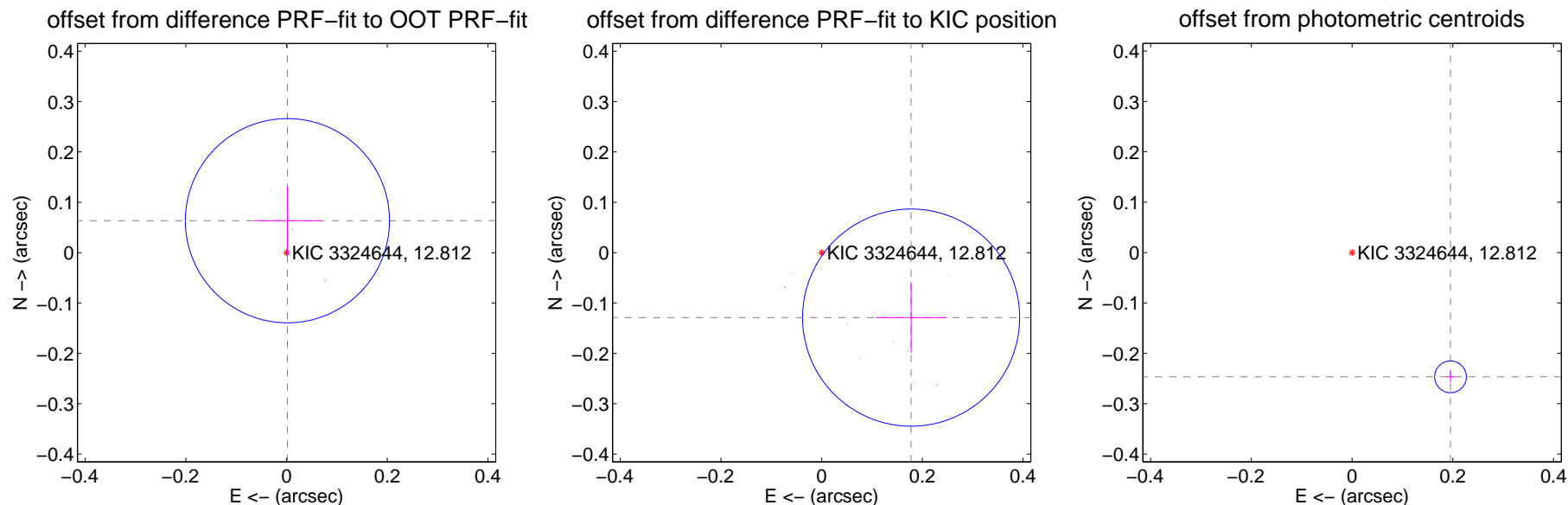
## DV Centroid Data

Supplemental centroid analysis for 003324644-01. Kepler magnitude: 12.81. Transit SNR 96.64

There are 17 quarters with good PRF difference image offsets

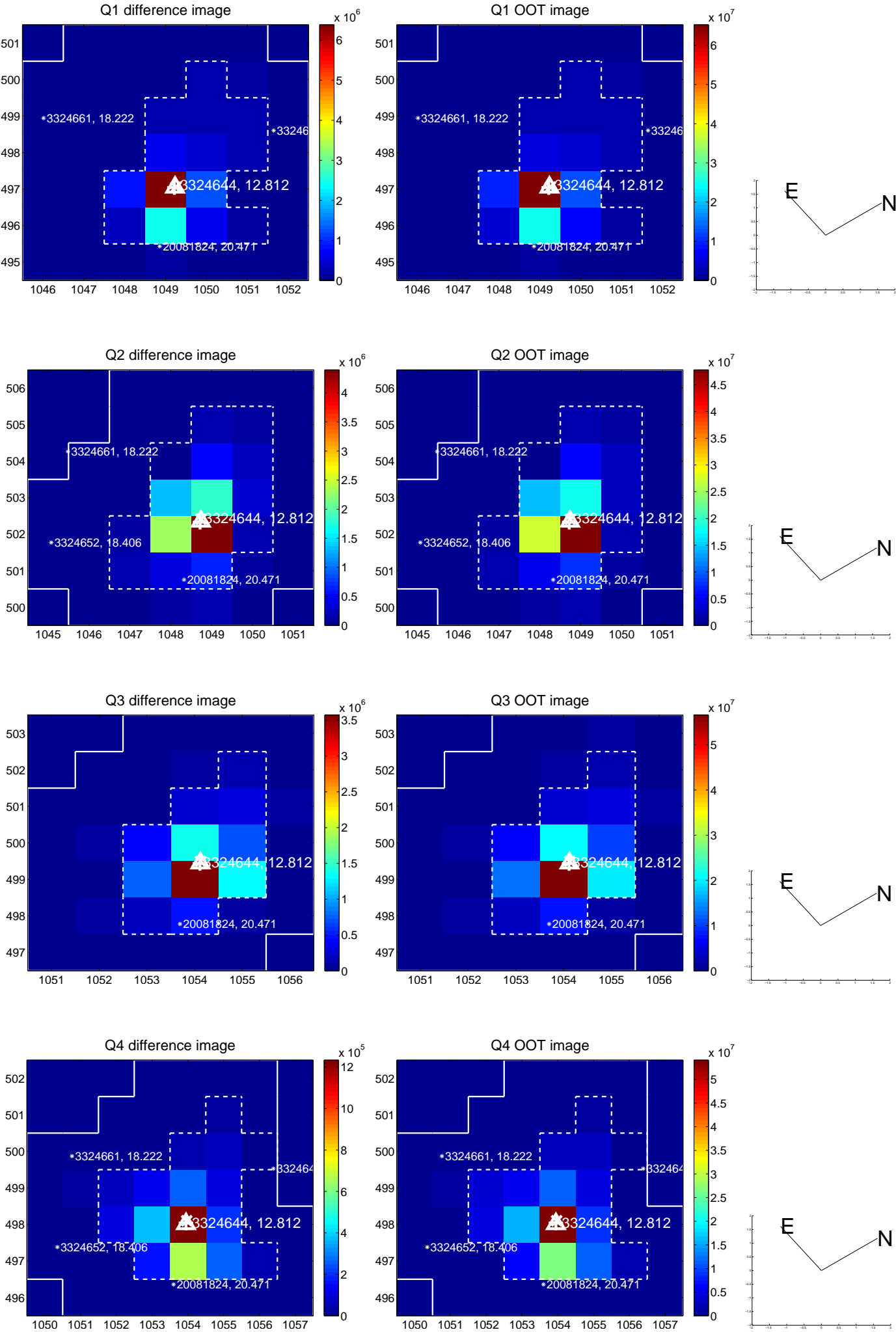
The direct PRF centroid is offset from the target star catalog position by about 0.16 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.063 \pm 0.068$	0.94	$-0.002 \pm 0.067$	$0.063 \pm 0.068$
PRF-fit source offset from KIC position	$0.220 \pm 0.072$	3.06	$-0.178 \pm 0.071$	$-0.129 \pm 0.070$
photometric centroid source offset	$0.31 \pm 0.01$	29.96	$-0.20 \pm 0.01$	$-0.25 \pm 0.01$

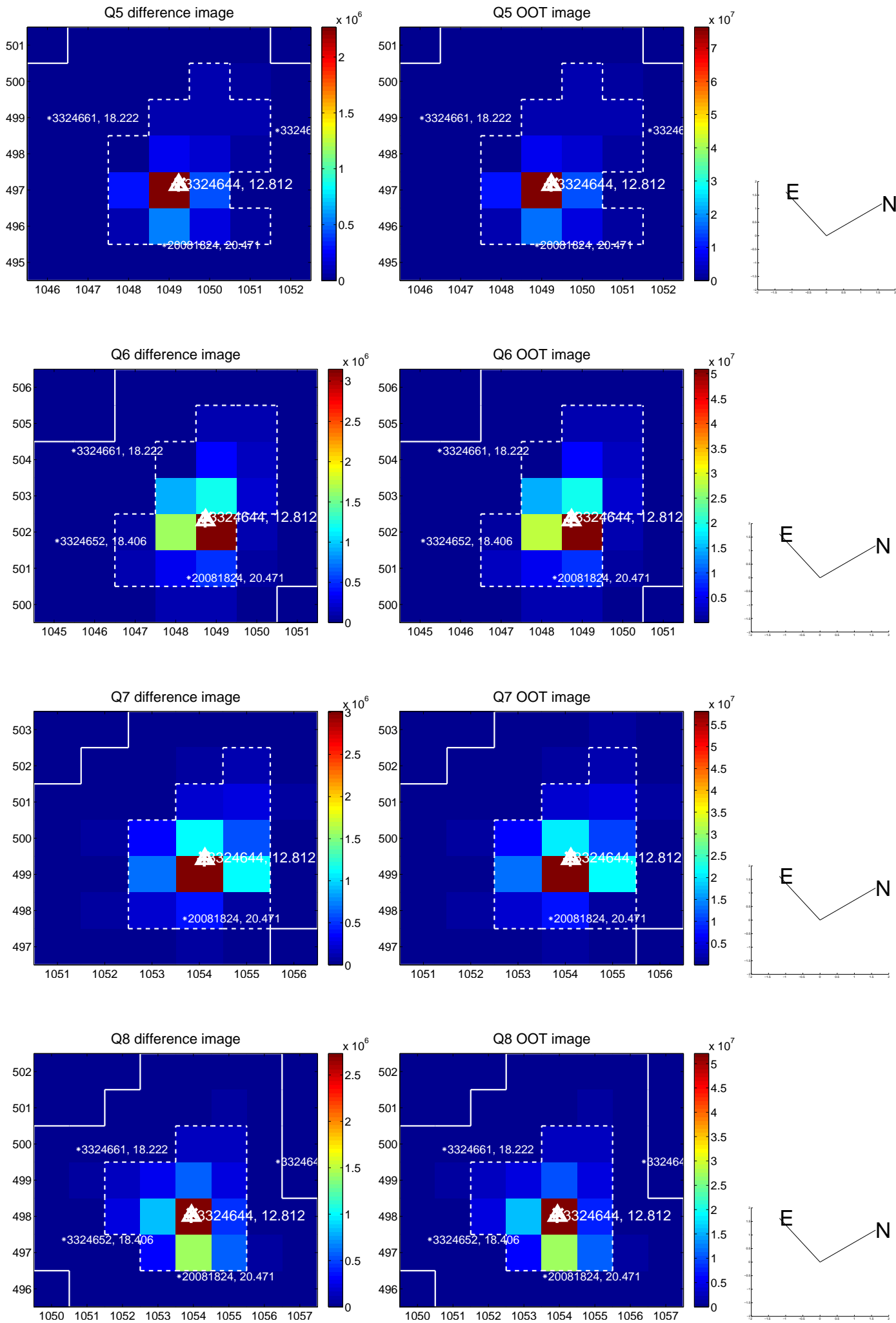


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

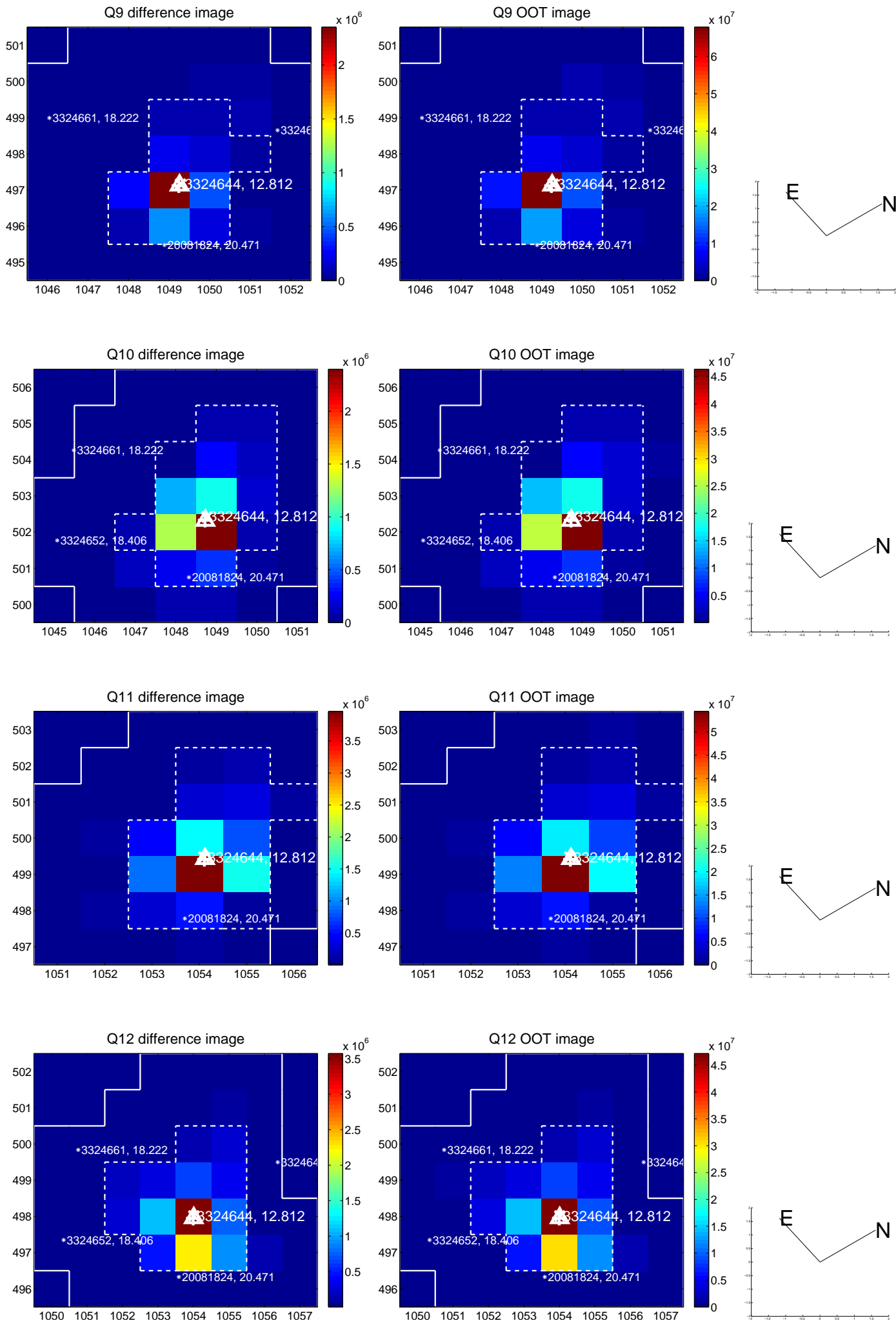


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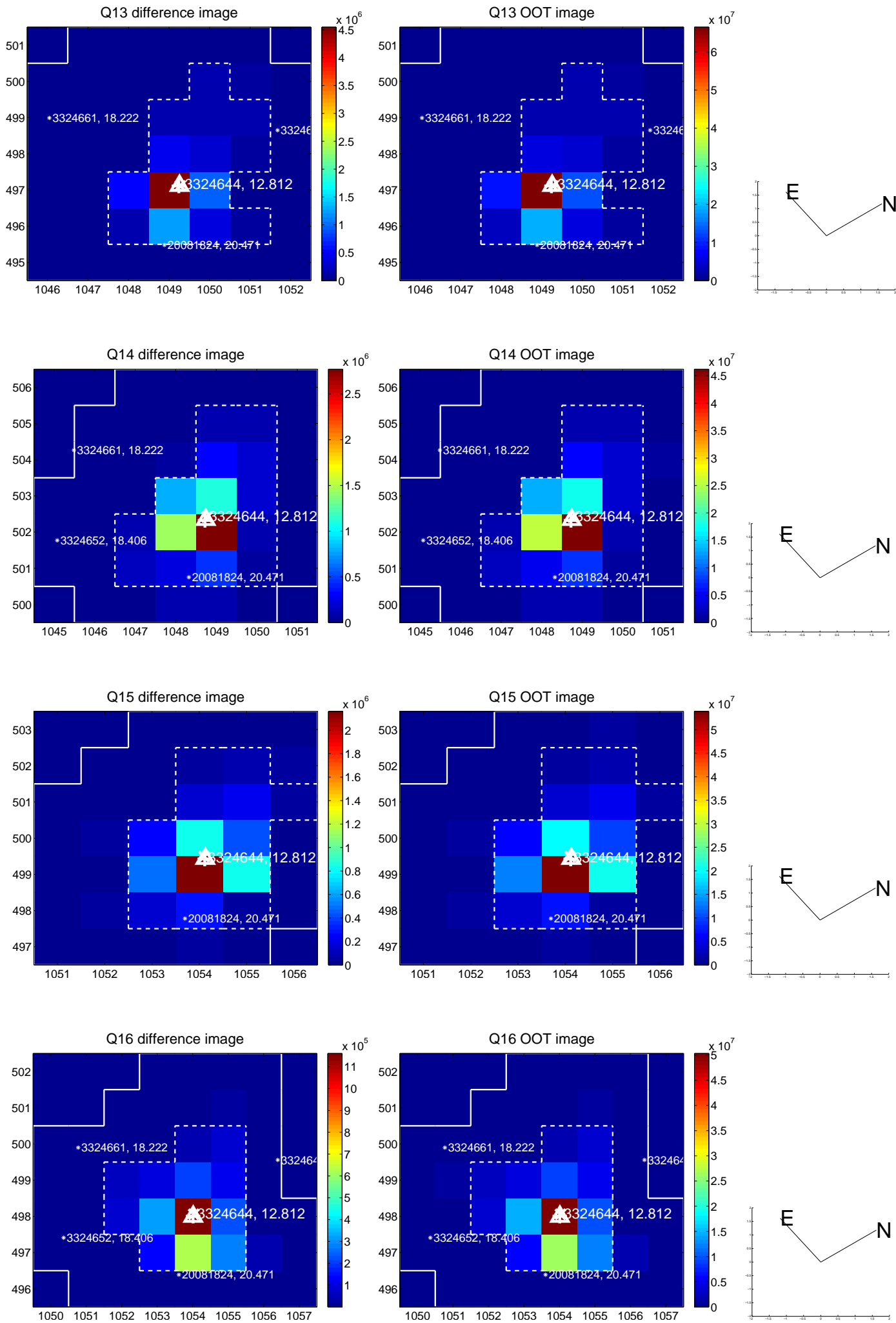




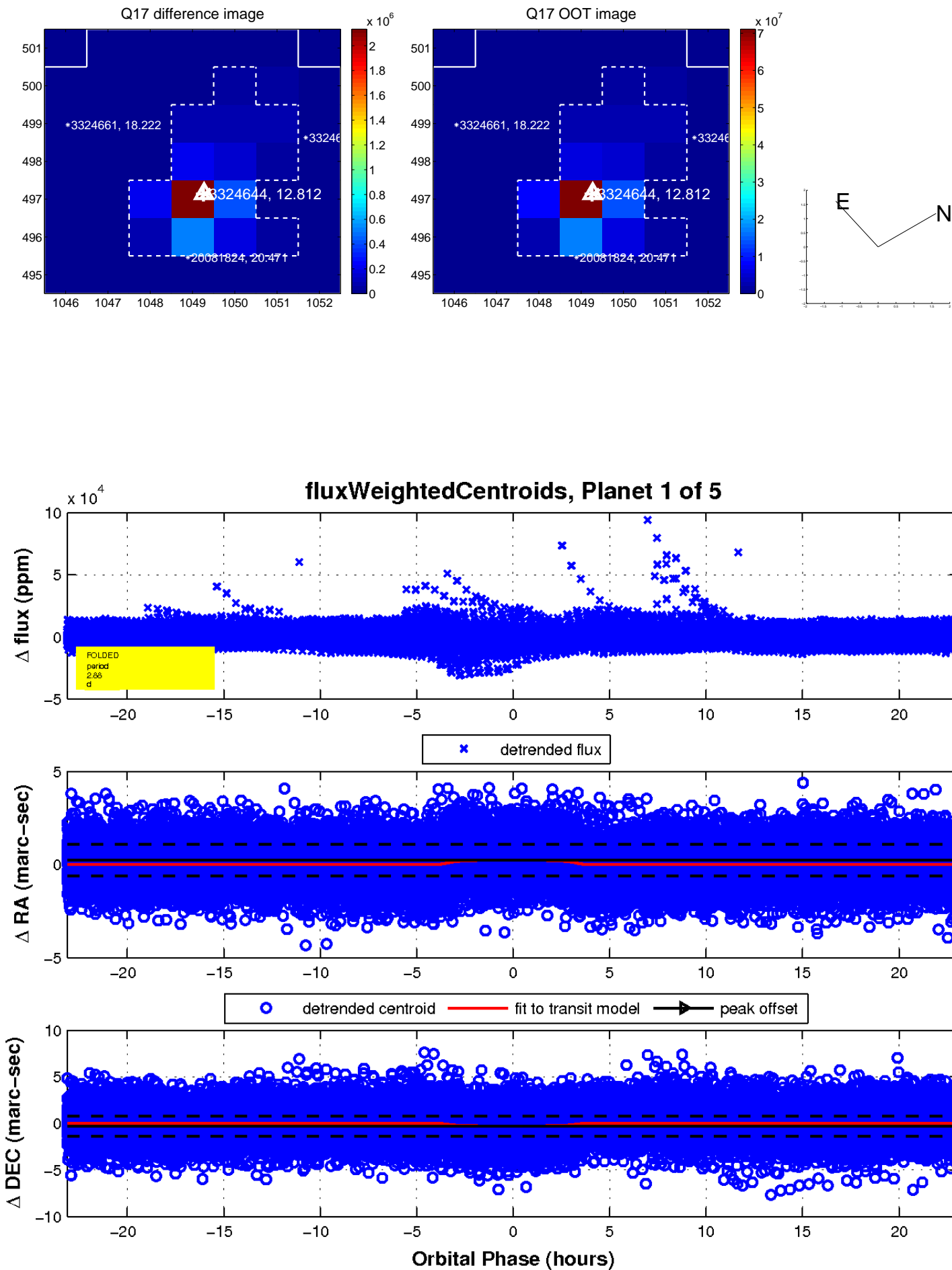
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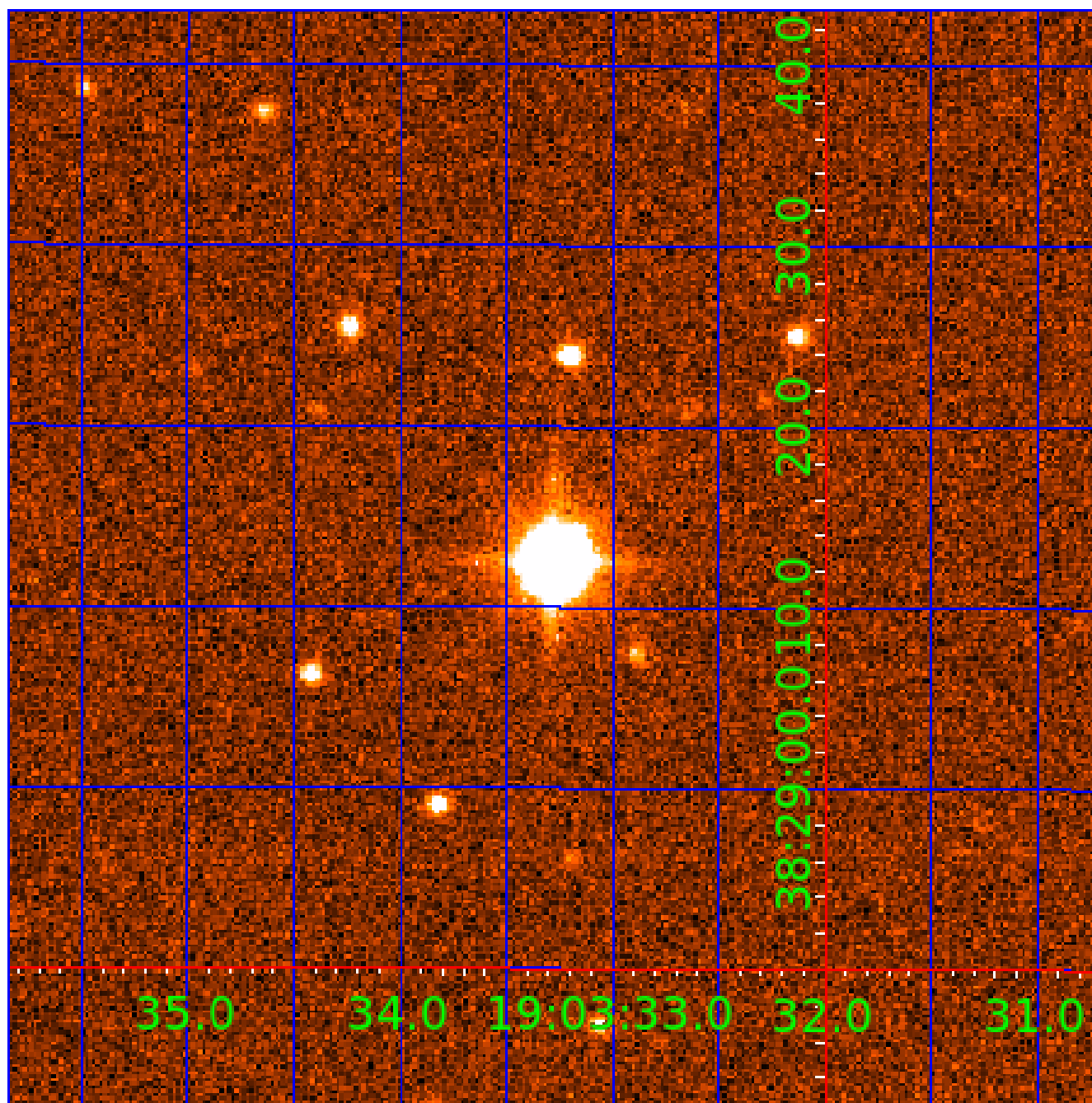


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UKIRT Image

Declination



# KIC 003324644

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
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## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003324644-01	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV
003324644-02	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD
003324644-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_ZUMA_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV— MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
003324644-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—CENT_NOFITS—HALO_GHOST
003324644-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_SKYE_TRACKER—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT— MOD_POS_ALT—HALO_GHOST

**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.

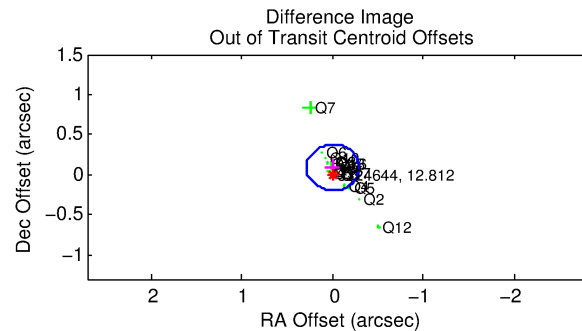
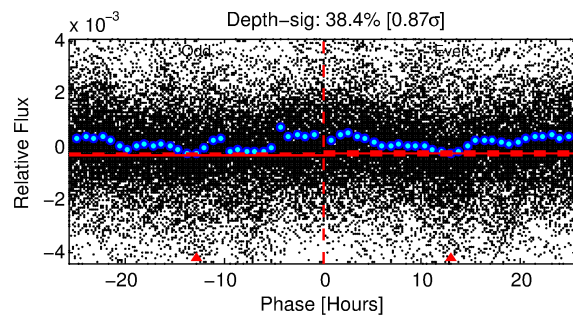
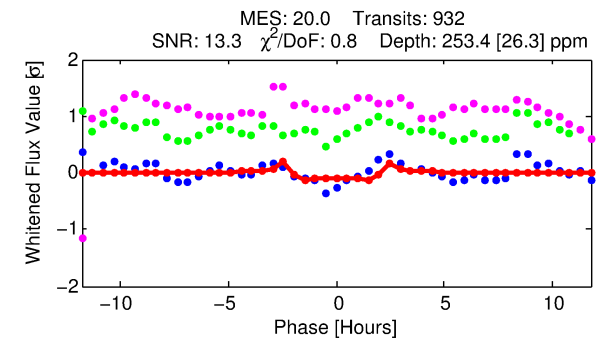
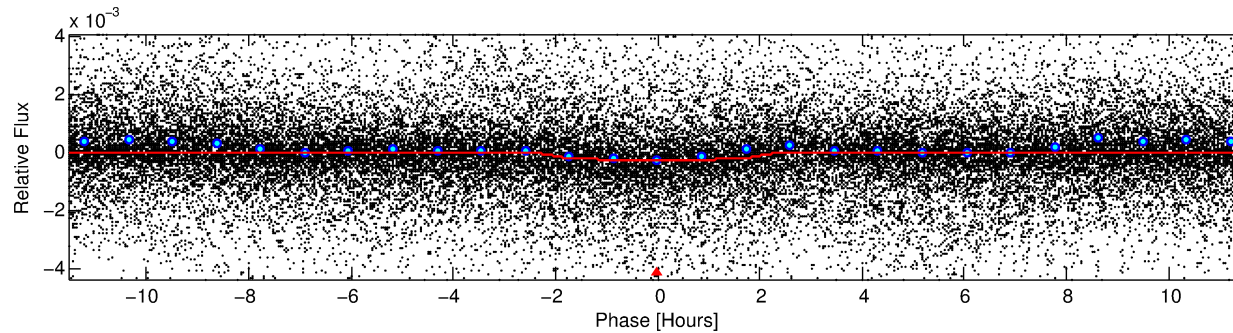
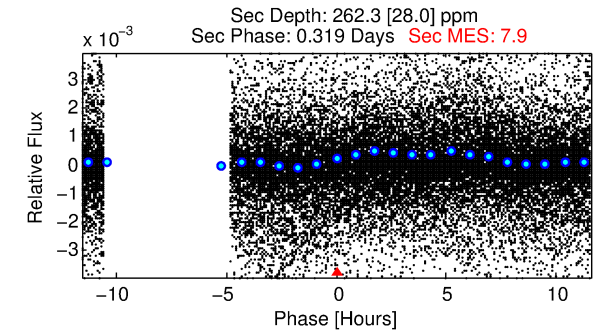
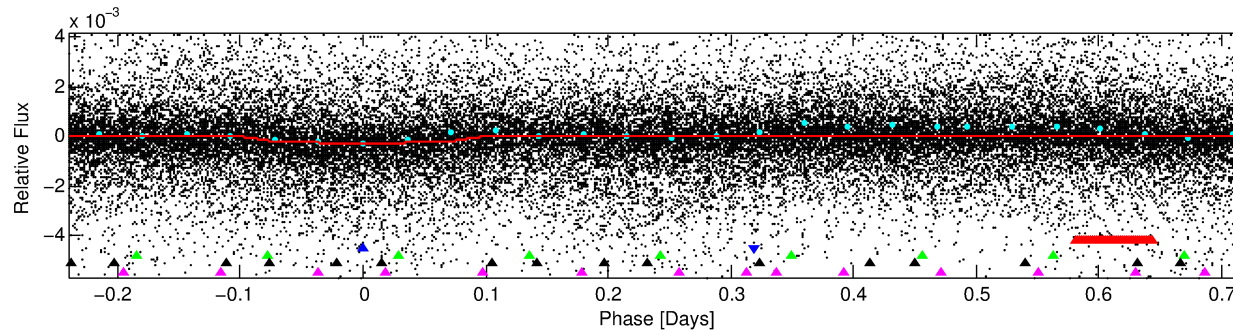
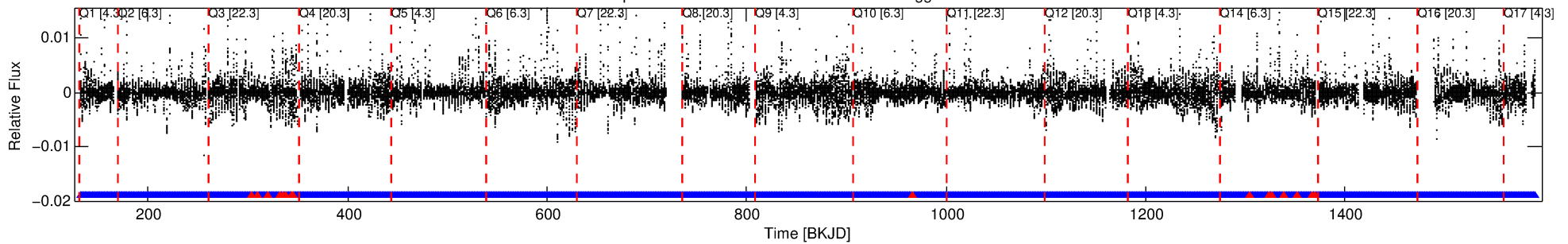
## Ephemeris Match Information For 003324644-02

No Significant Match Found

# DV One-Page Summary

KIC: 3324644 Candidate: 2 of 5 Period: 0.961 d  
KOI: K03781 Corr: No Ephemeris Match

Kp: 12.81 R\*: 8.06 Rs Teff: 4705.0 K Logg: 2.67 Fe/H: -0.120



## DV Fit Results:

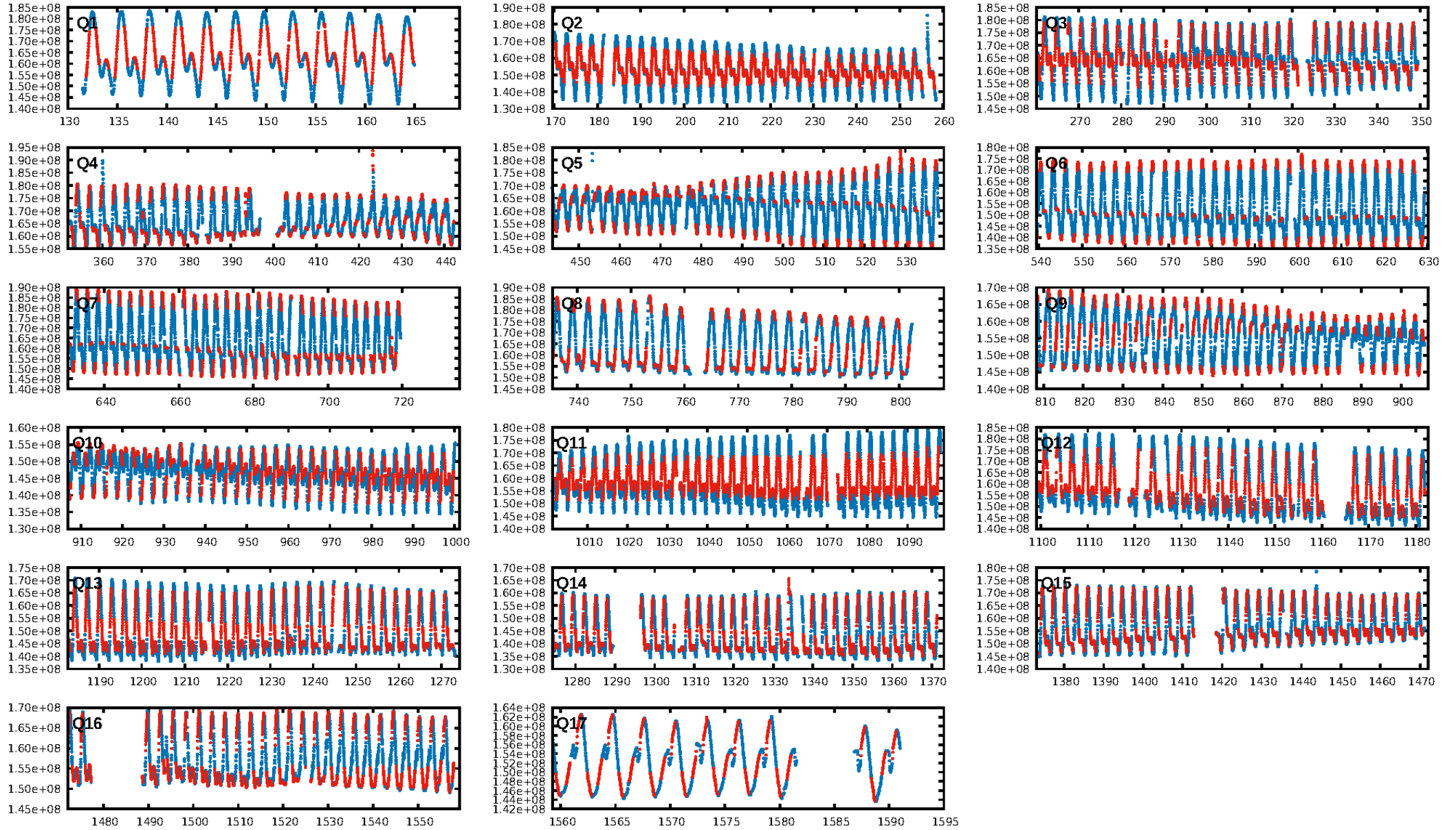
Period = 0.96077 [0.00001] d  
Epoch = 132.0264 [0.0012] BKJD  
Rp/R\* = 0.0140 [0.0045]  
a/R\* = 1.83 [1.35]  
b = 0.03 [39.29]  
Seff = N/A  
Teq = N/A  
Rp = 12.32 [6.95] Re  
a = N/A  
Ag = N/A  
Teffp = N/A

## DV Diagnostic Results:

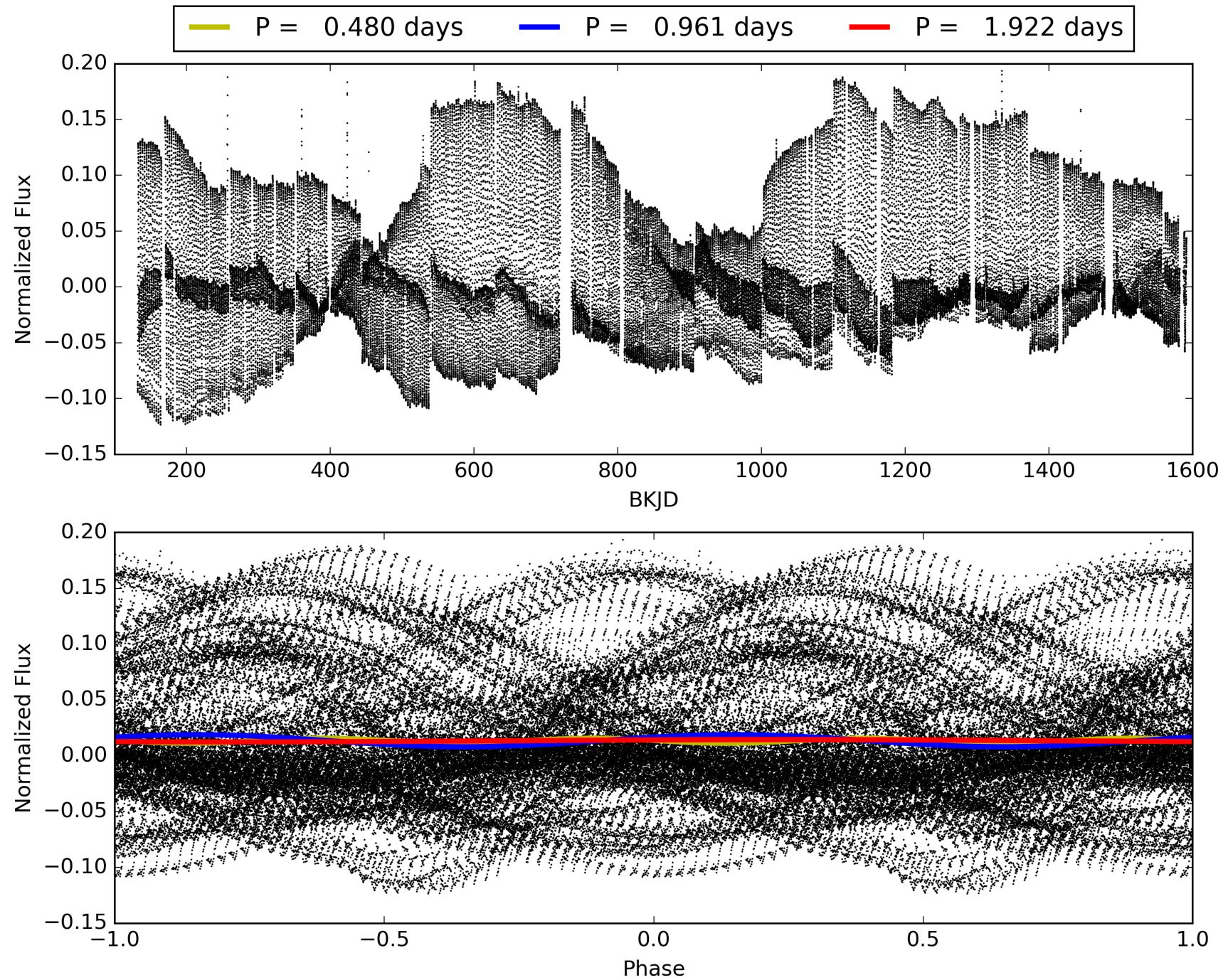
ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [5.2σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 0.98 [872/891]  
GhostDiagnostic-chr: 1.324  
Centroid-sig: 0.0%  
Centroid-so: 0.275 arcsec [2.57σ]  
OotOffset-rm: 0.089 arcsec [0.93σ]  
KicOffset-rm: 0.163 arcsec [1.60σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 0.47 [8/17]  
DiffImageOverlap-fno: 1.00 [17/17]



# TCE 003324644-02, PDC Light Curves

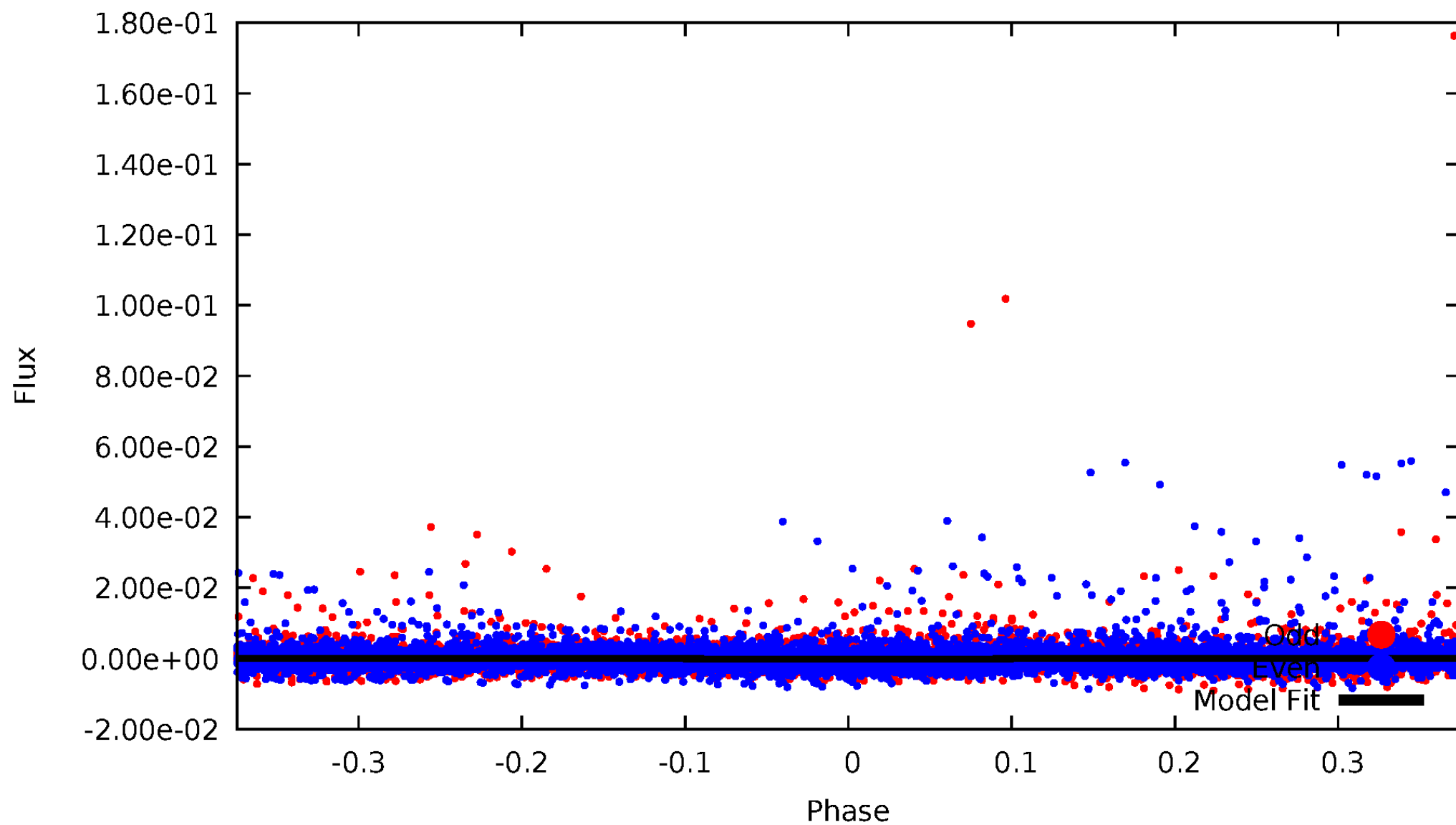


TCE 003324644-02



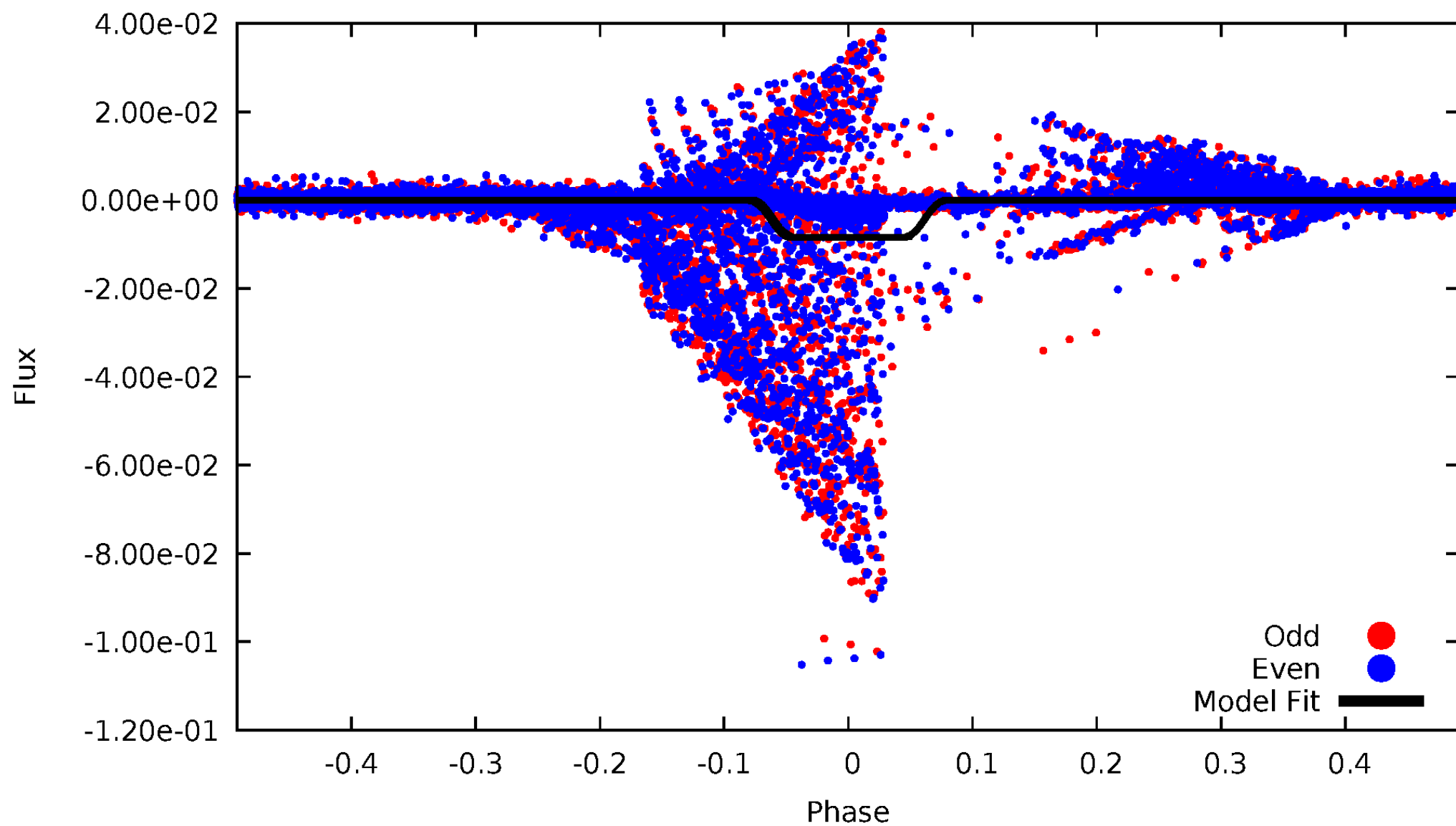
# DV Odd/Even

TCE 003324644-02



# ALT Odd/Even

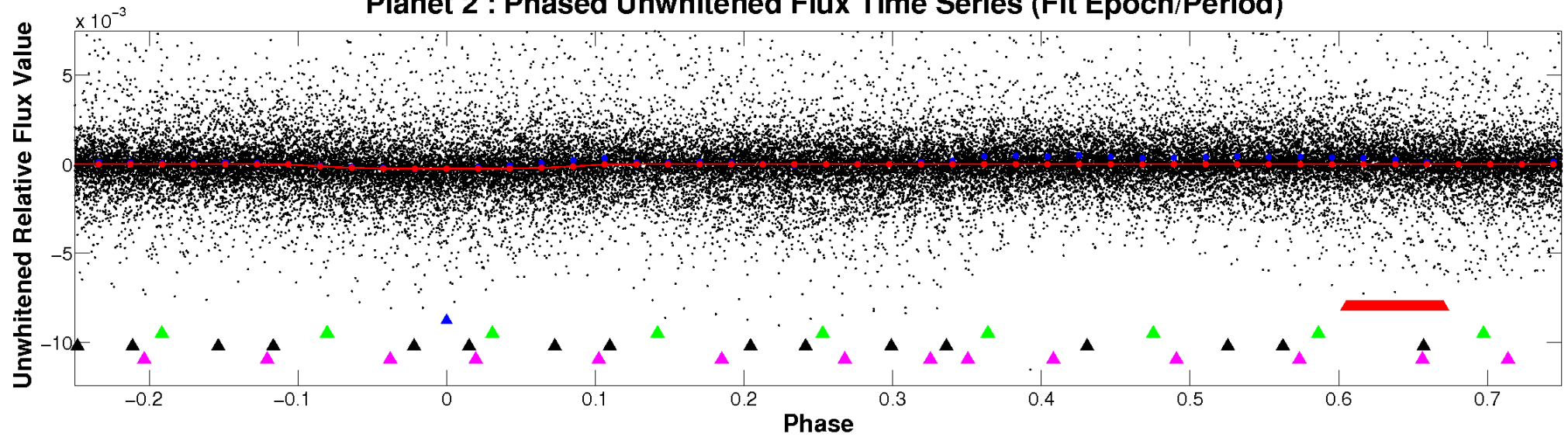
TCE 003324644-02



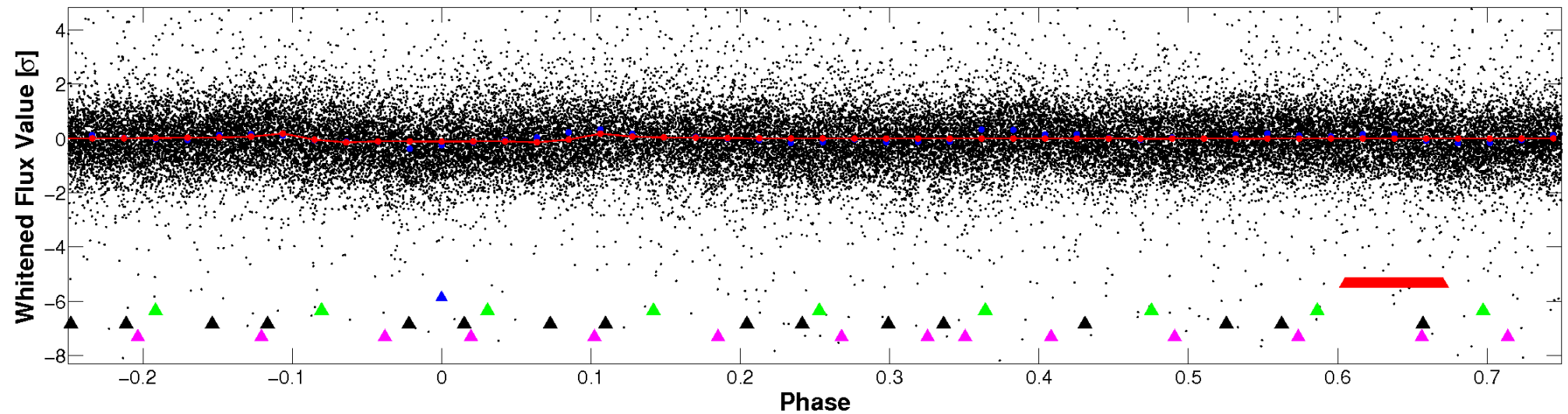


# Non-Whitened Vs. Whitened Light Curve

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

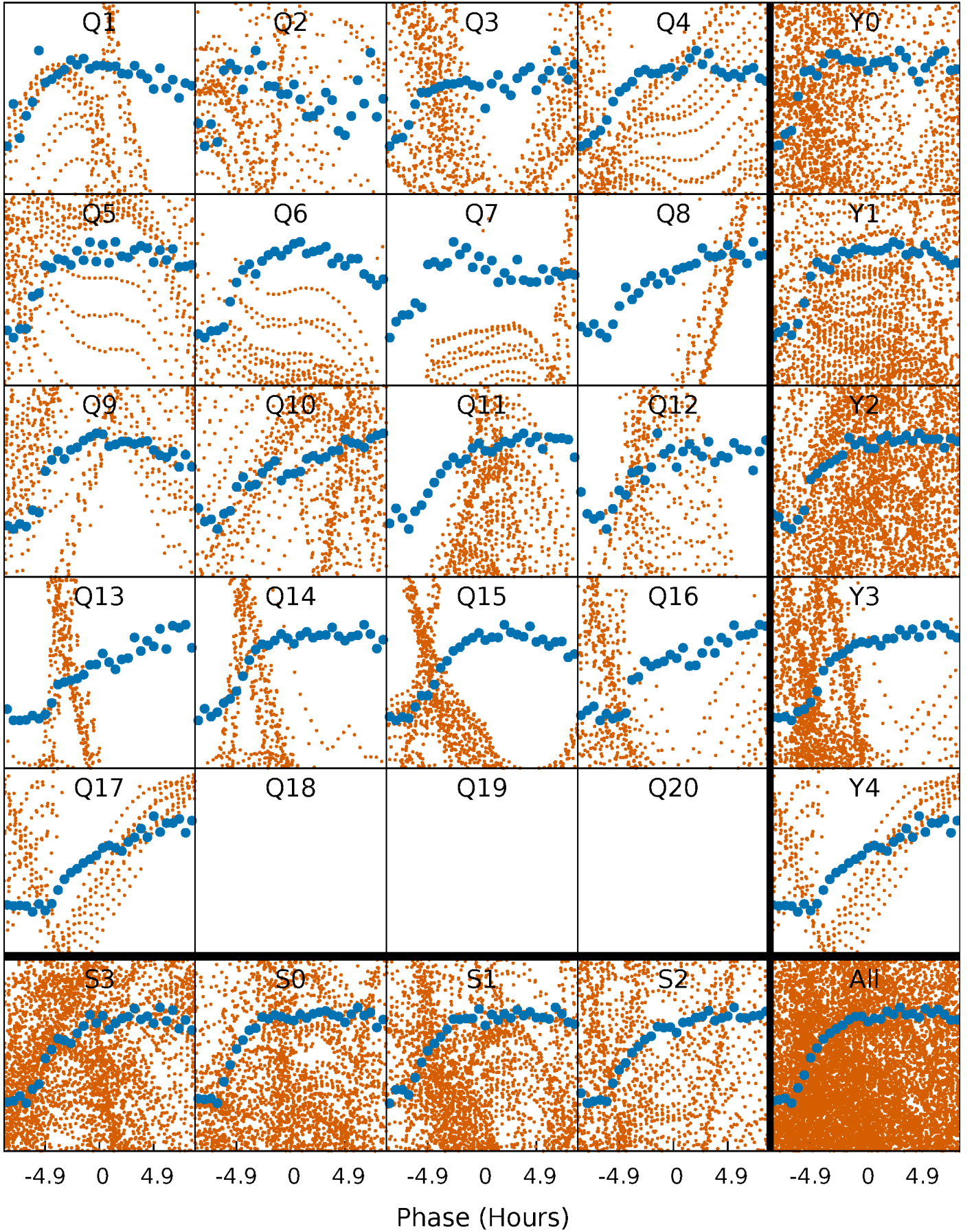


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

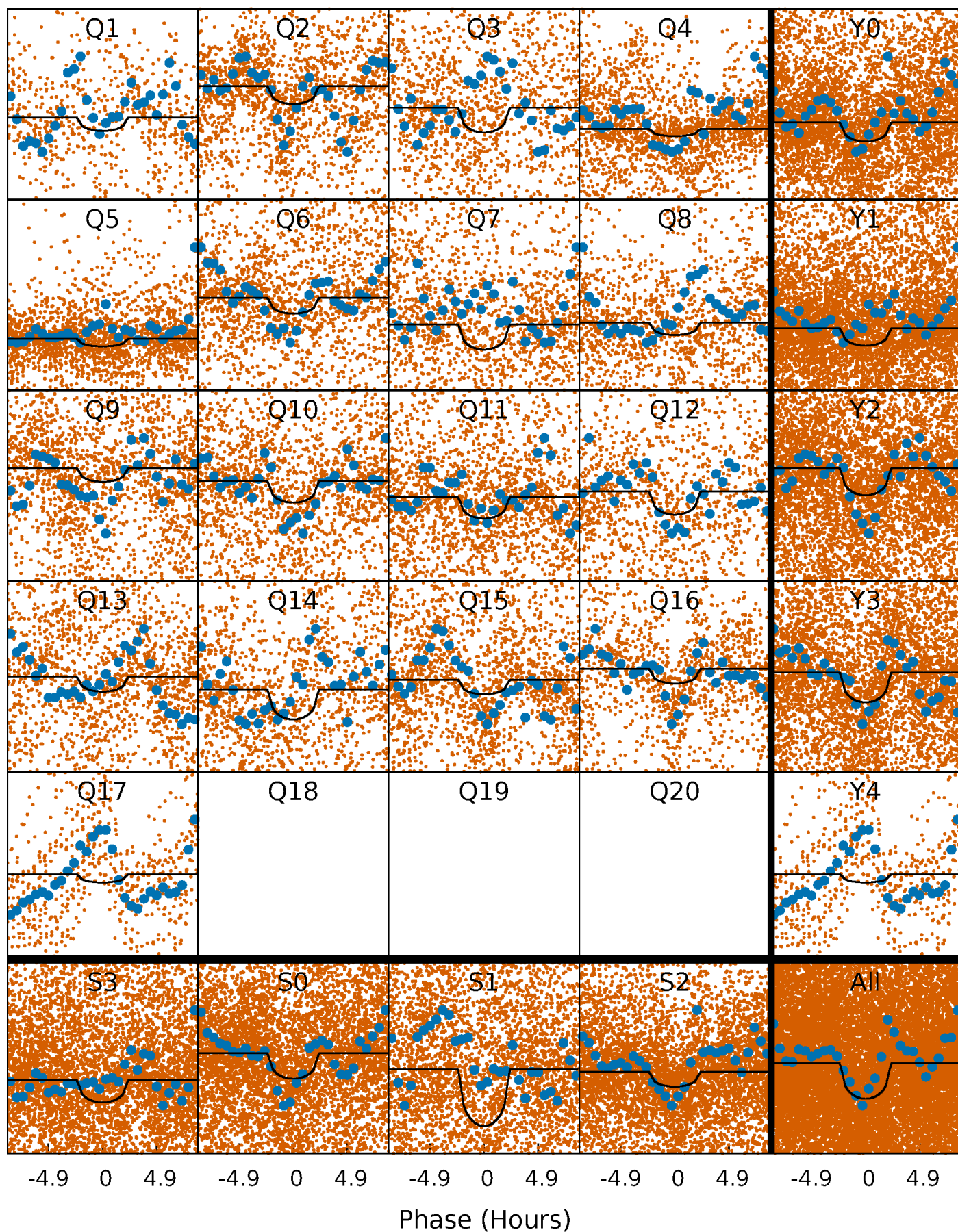
TCE 003324644-02 P= 0.960766 Days  $T_0=132.026438$  (BKJD)





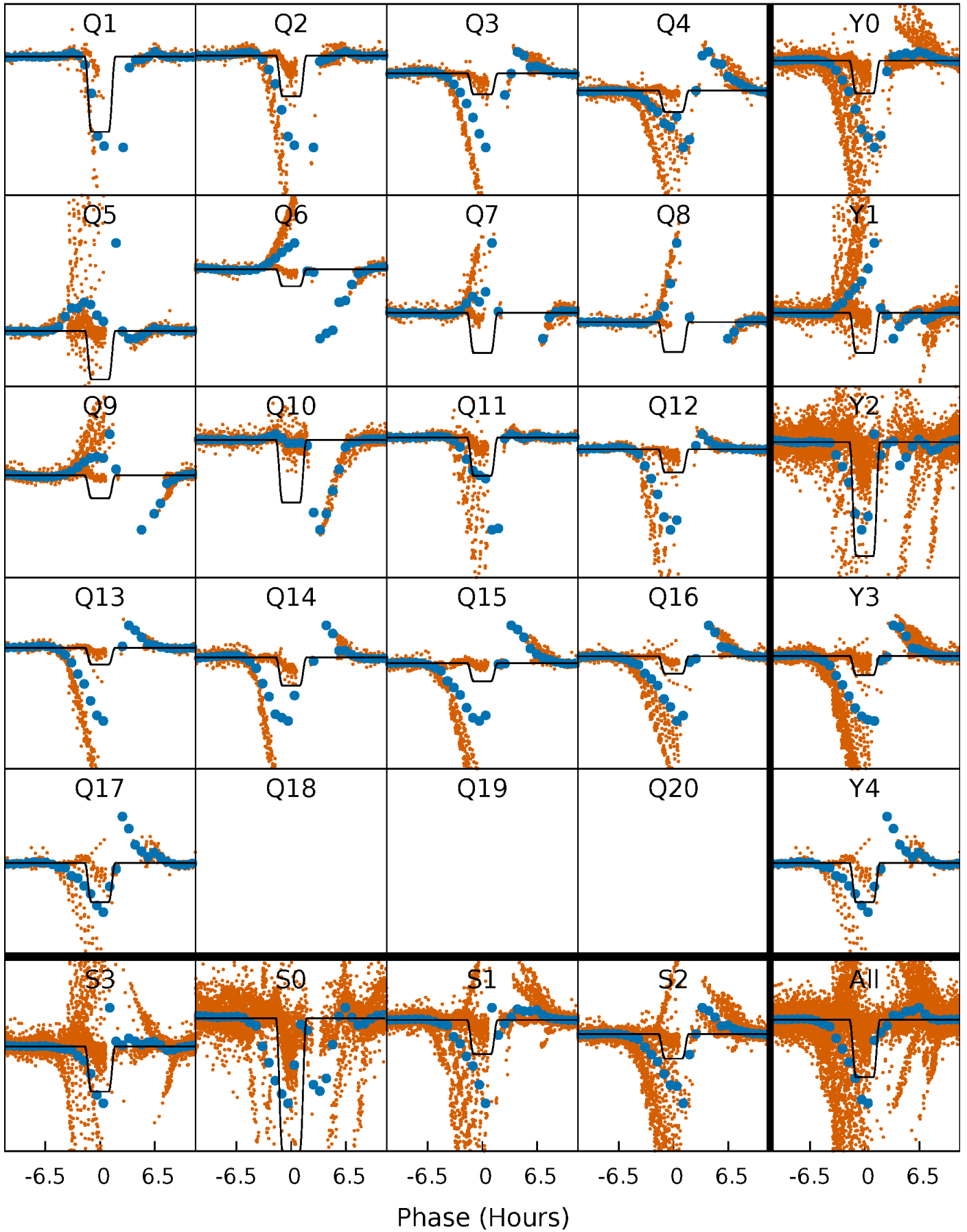
# DV Quarter-Phased Transit Curves

TCE 003324644-02   P= 0.960766 Days    $T_0=132.026438$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

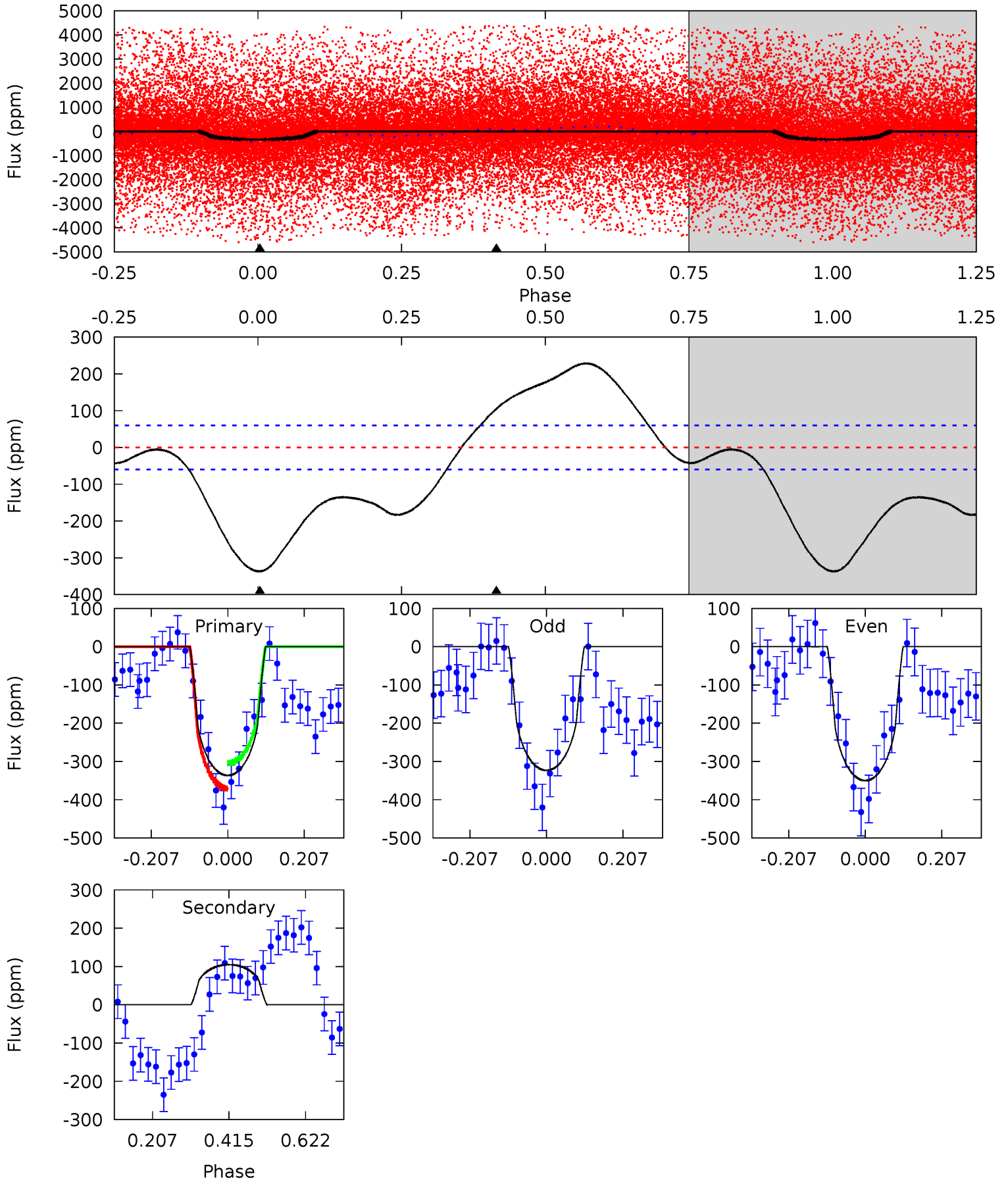
TCE 003324644-02 P= 0.960835 Days  $T_0=132.008200$  (BKJD)



# DV Model-Shift Uniqueness Test

003324644-02, P = 0.960766 Days, E = 132.026438 Days

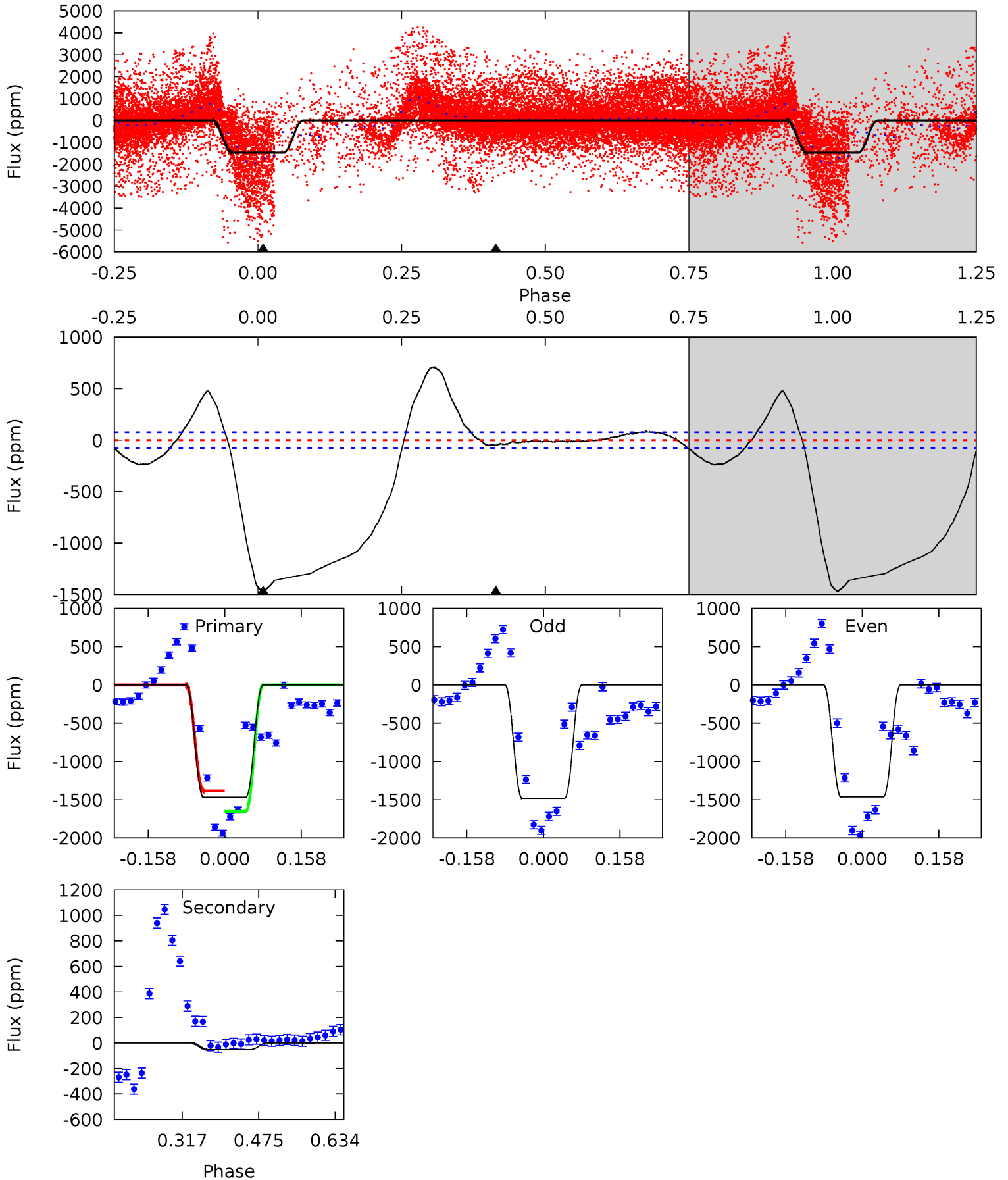
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
24.8	-7.72	0	0	4.41	1.26	5.20	24.8	24.8	-7.72	-7.72	0.99	0.47	0.40	2.38



# Alt Model-Shift Uniqueness Test

003324644-02, P = 0.960835 Days, E = 132.008200 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
86.1	3.03	0	0	4.47	1.41	11.3	86.1	86.1	3.03	3.03	0.58	6.85	0.33	5.58



### Stellar Parameters For KIC 003324644

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$4705^{+128}_{-105}$	$2.667^{+0.402}_{-0.268}$	$-0.120^{+0.300}_{-0.200}$	$8.058^{+3.729}_{-3.051}$	$1.101^{+0.395}_{-0.158}$	$0.003^{+0.010}_{-0.002}$
	+3%/-2%	+15%/-10%	+250%/-167%	+46%/-38%	+36%/-14%	+322%/-63%
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 003324644-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$105 \pm 14$	$12.17^{+5.64}_{-4.79}$	$5848^{+691}_{-655}$	$-5288^{+423}_{-635}$	$-0.156^{+0.084}_{-0.261}$
Alt.	$-52 \pm 17$	$80.31^{+20.51}_{-16.48}$	$5831^{+667}_{-635}$	$-4753^{+415}_{-483}$	$0.002^{+0.001}_{-0.001}$

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



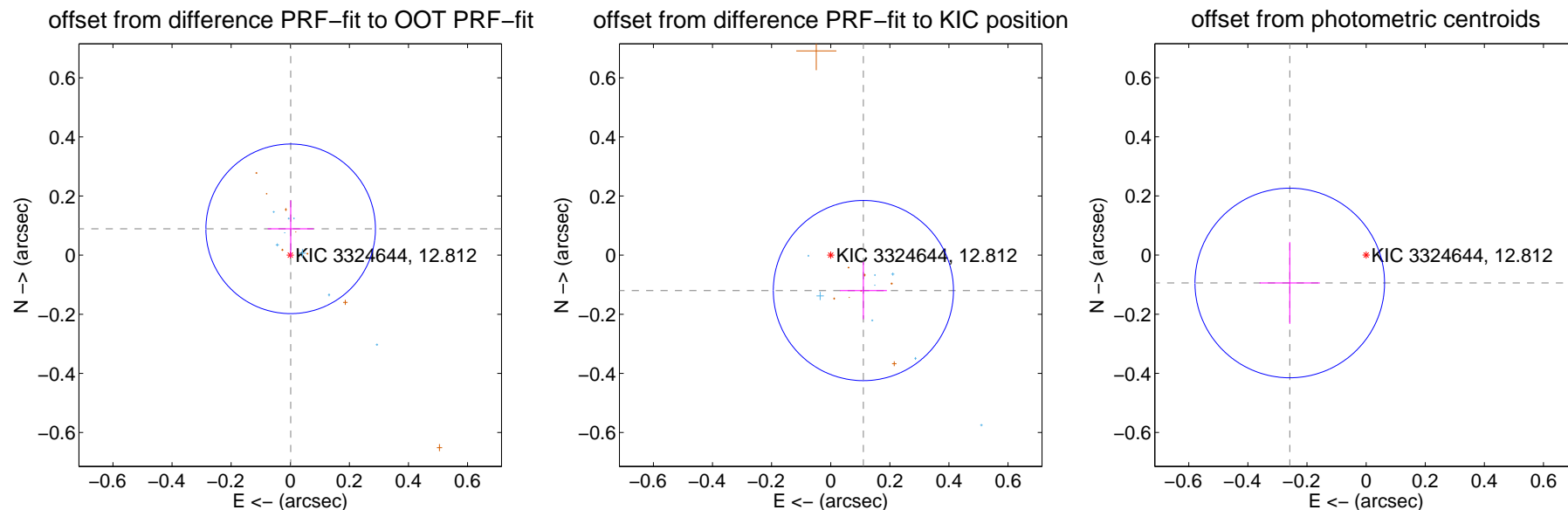
## DV Centroid Data

Supplemental centroid analysis for 003324644-02. Kepler magnitude: 12.81. Transit SNR 13.26

There are 8 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.16 arcsec

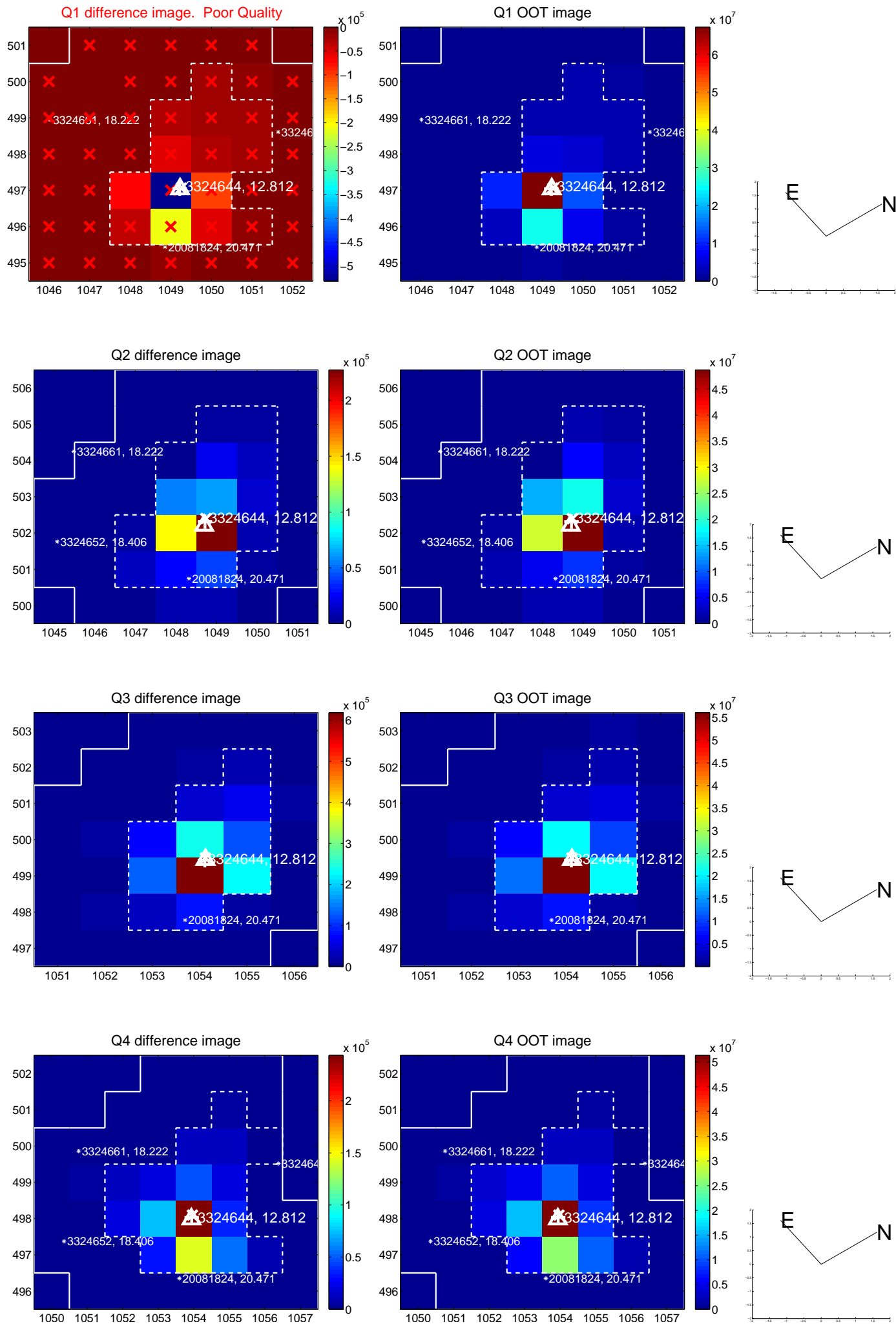
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.089 \pm 0.096$	0.93	$-0.001 \pm 0.078$	$0.089 \pm 0.096$
PRF-fit source offset from KIC position	$0.163 \pm 0.102$	1.60	$-0.111 \pm 0.079$	$-0.120 \pm 0.097$
photometric centroid source offset	$0.28 \pm 0.11$	2.57	$0.26 \pm 0.10$	$-0.09 \pm 0.14$



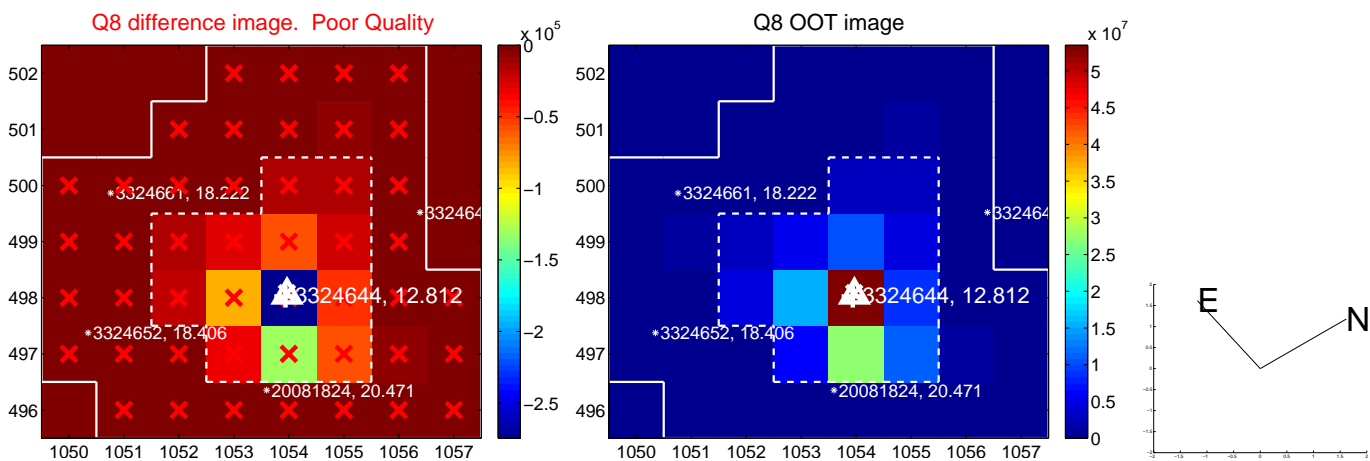
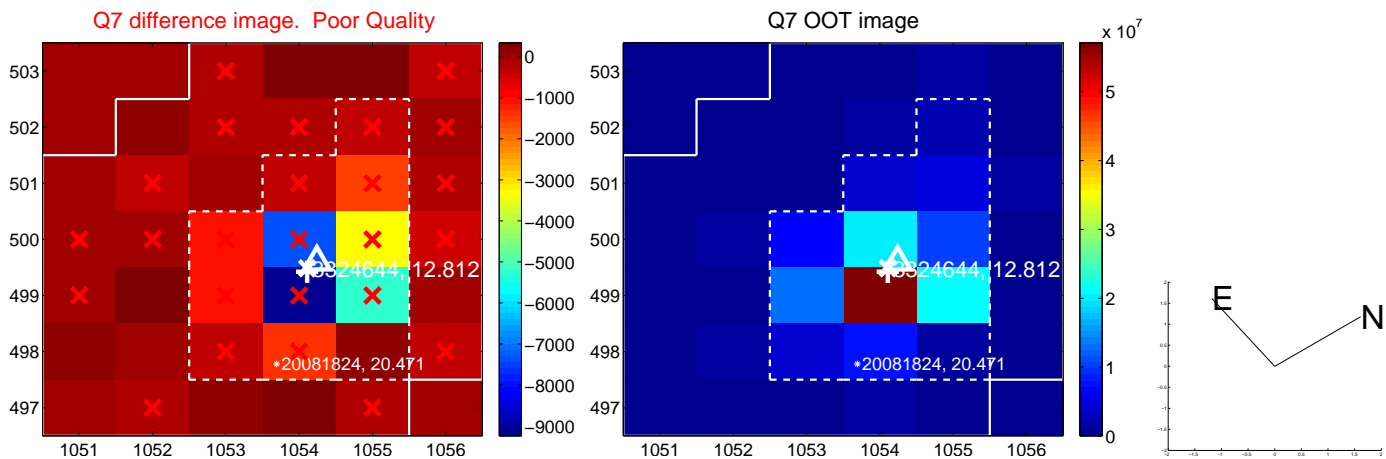
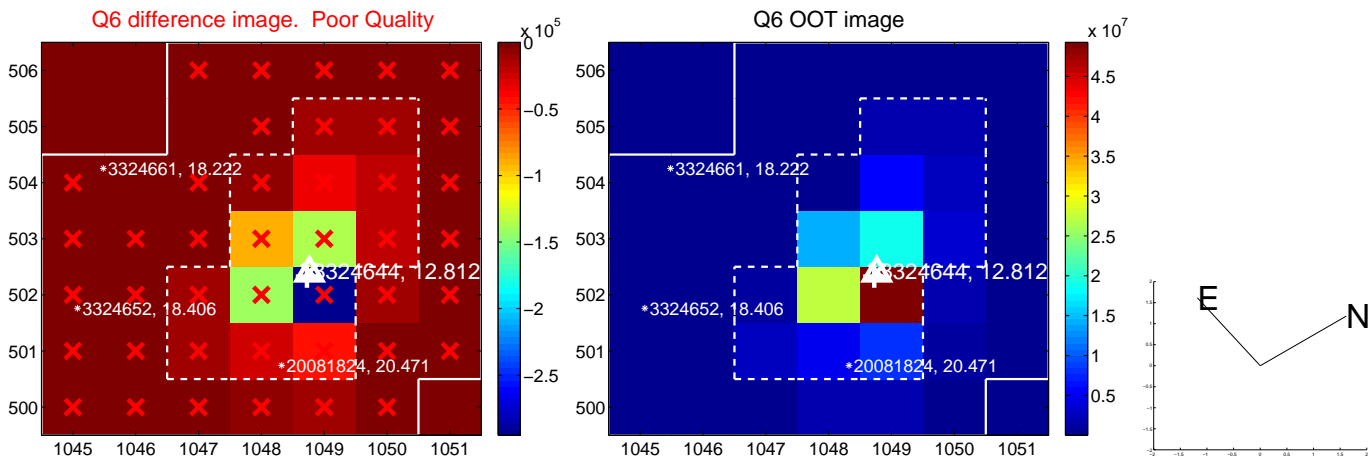
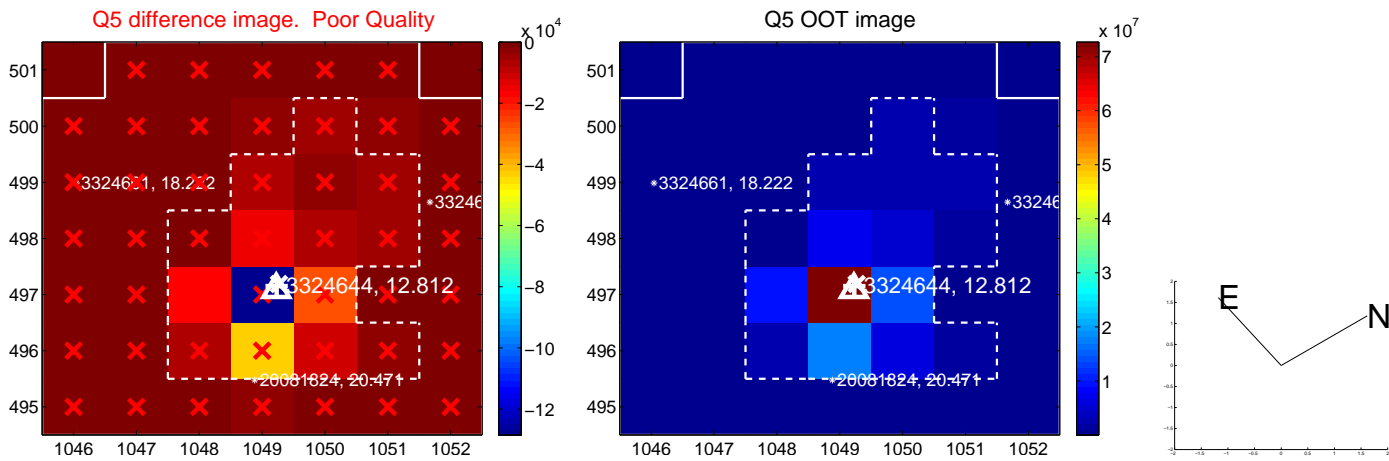
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



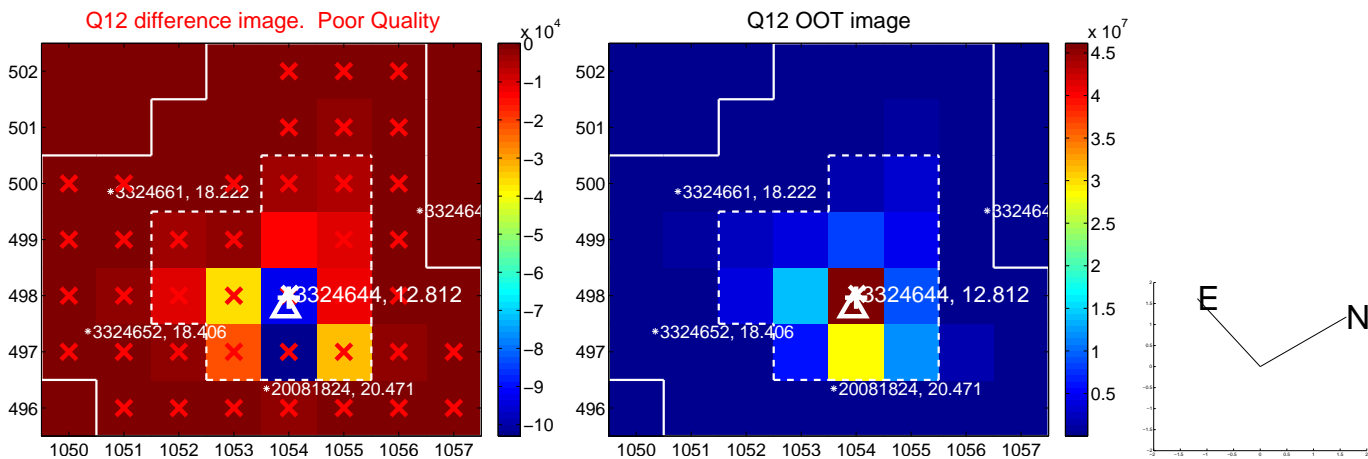
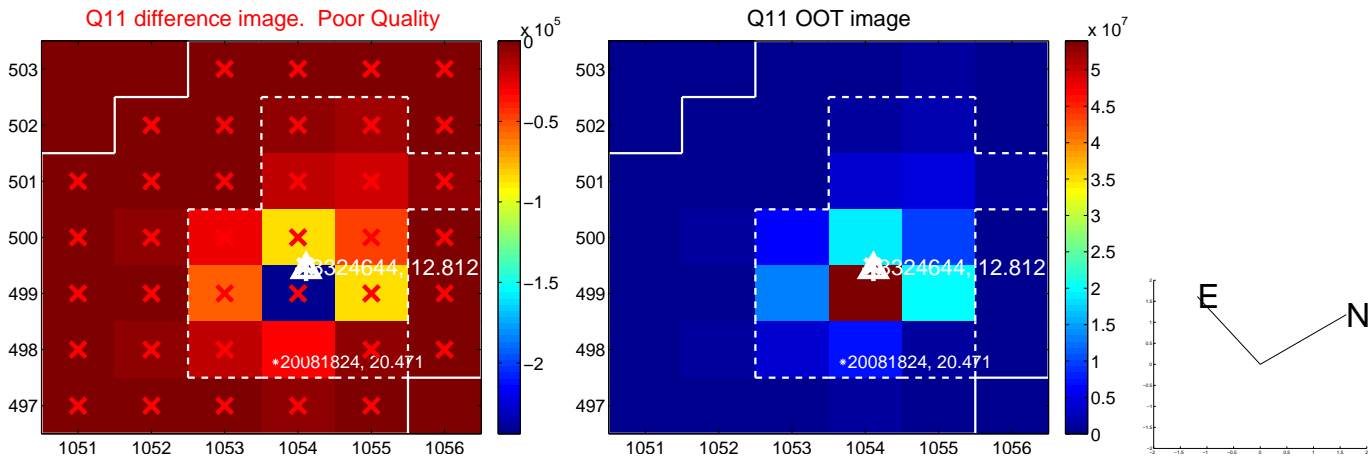
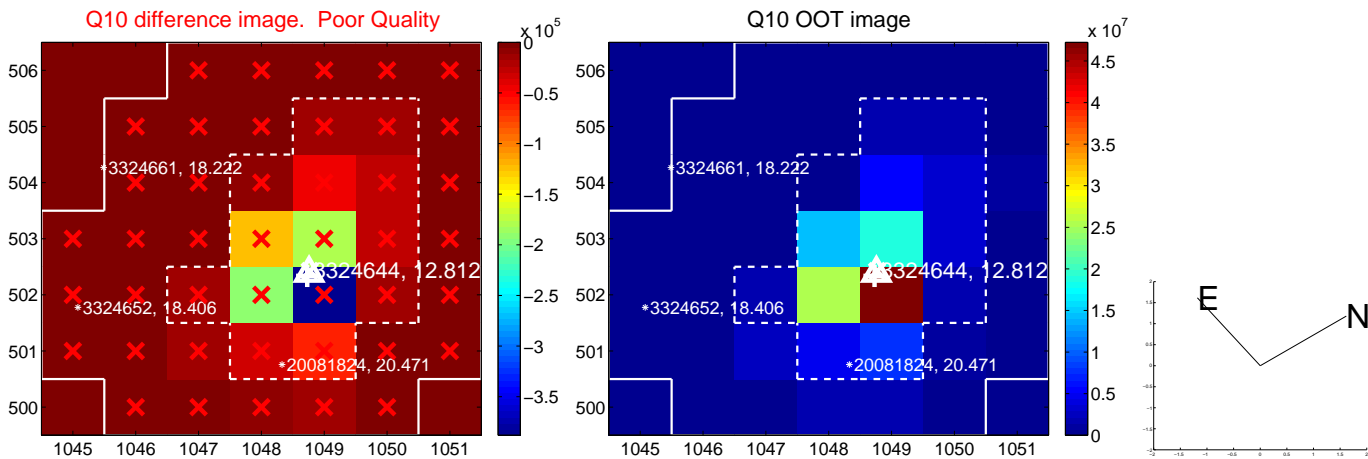
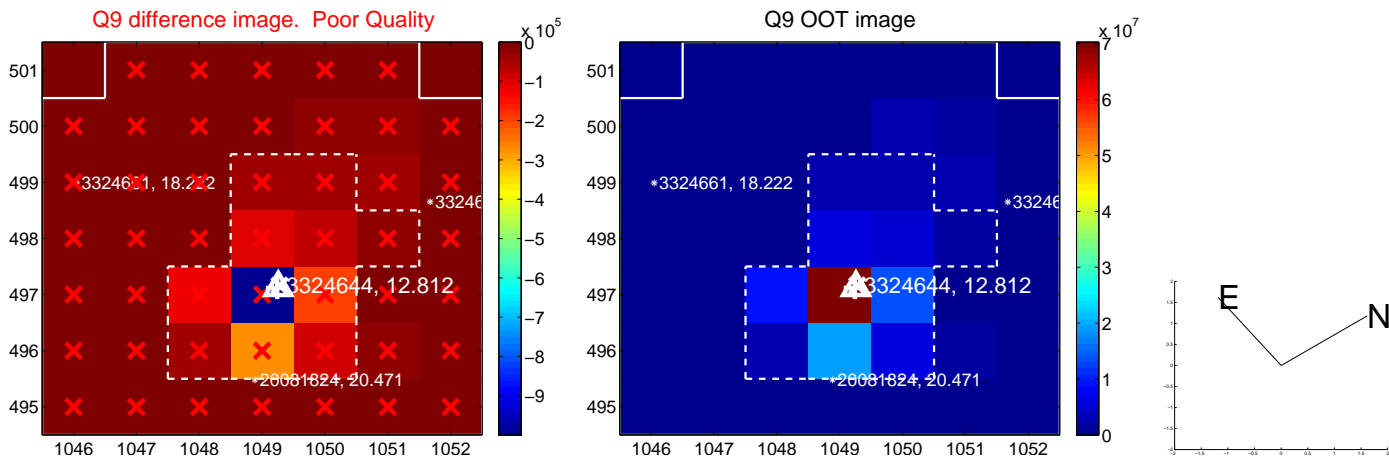
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



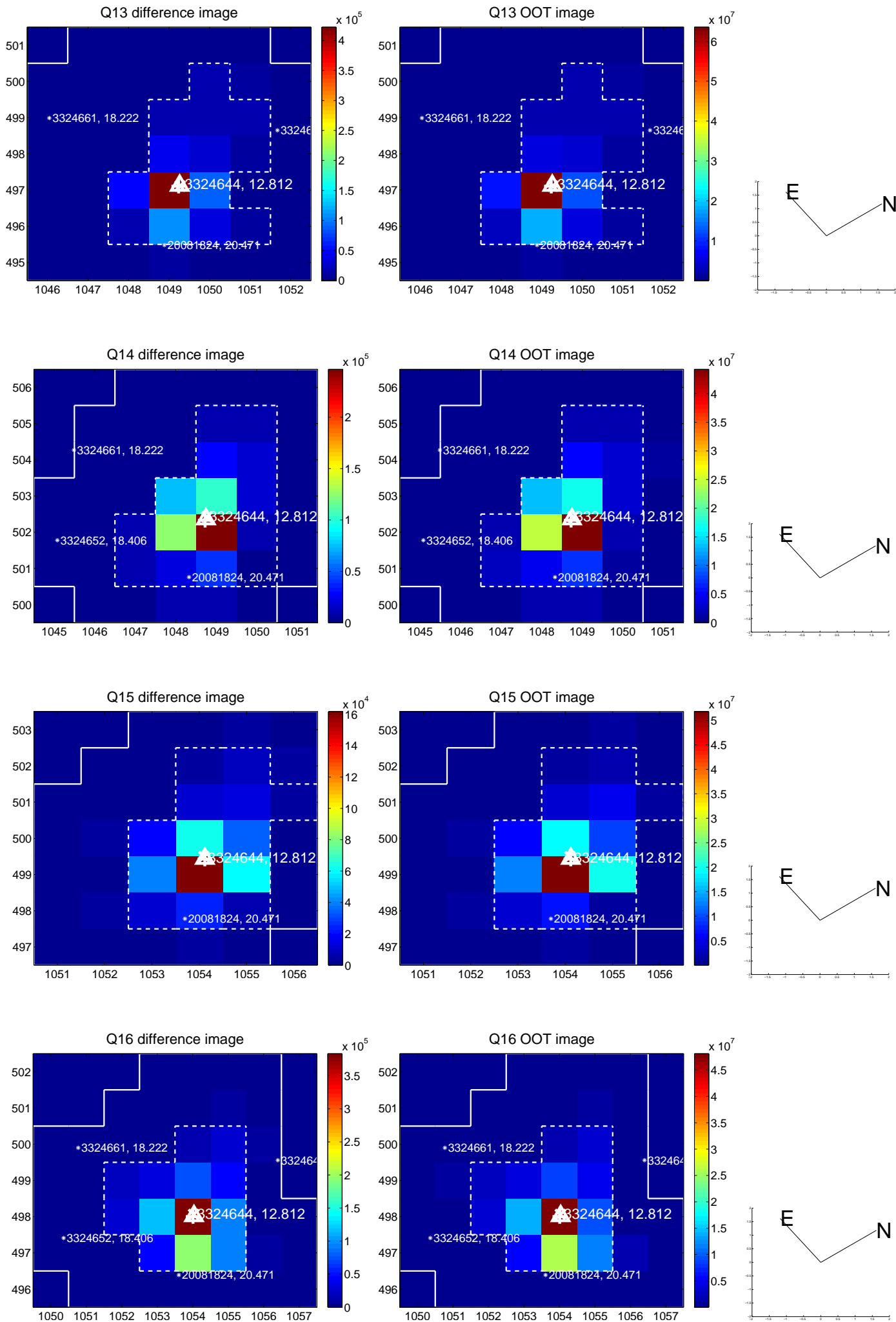
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



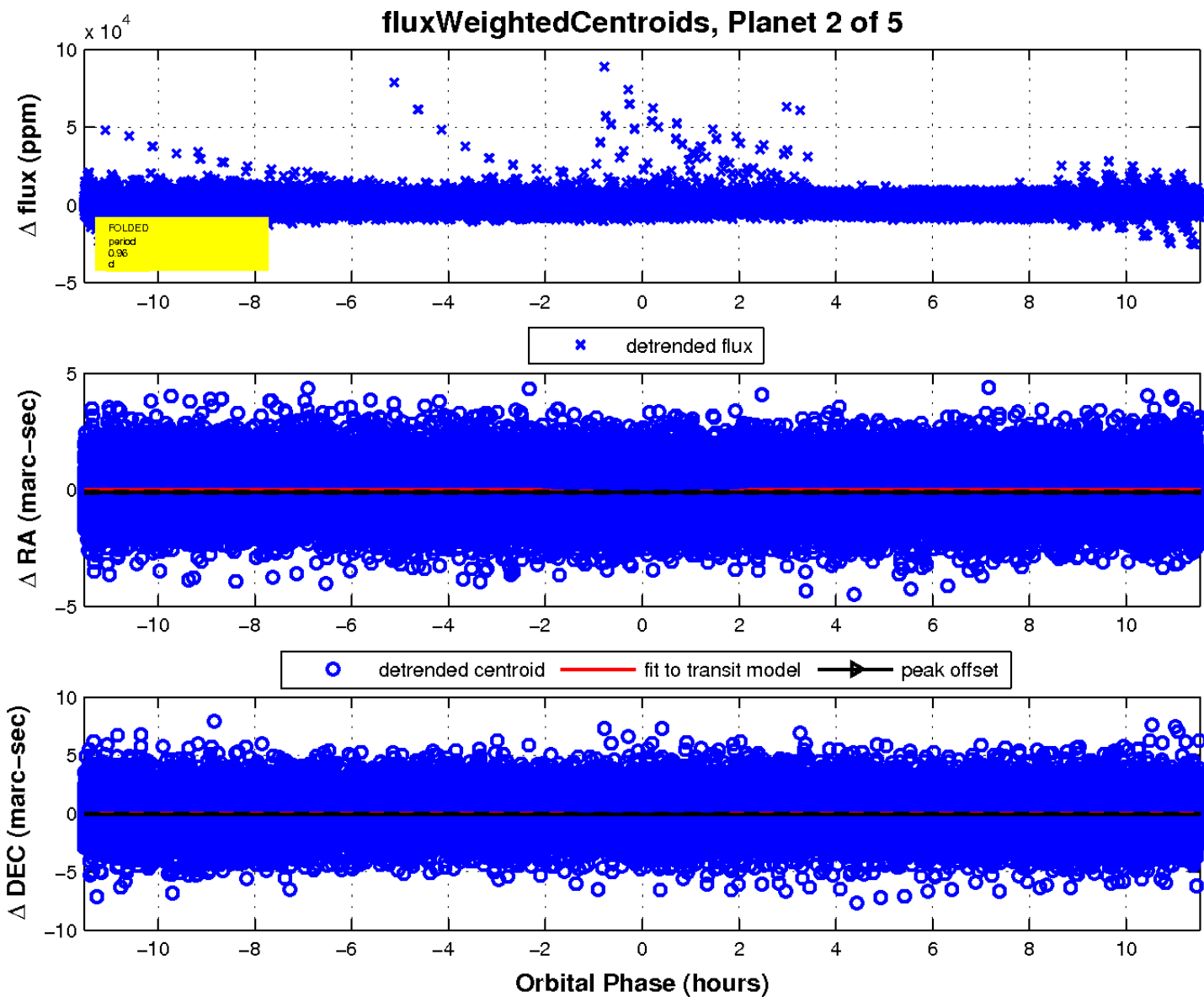
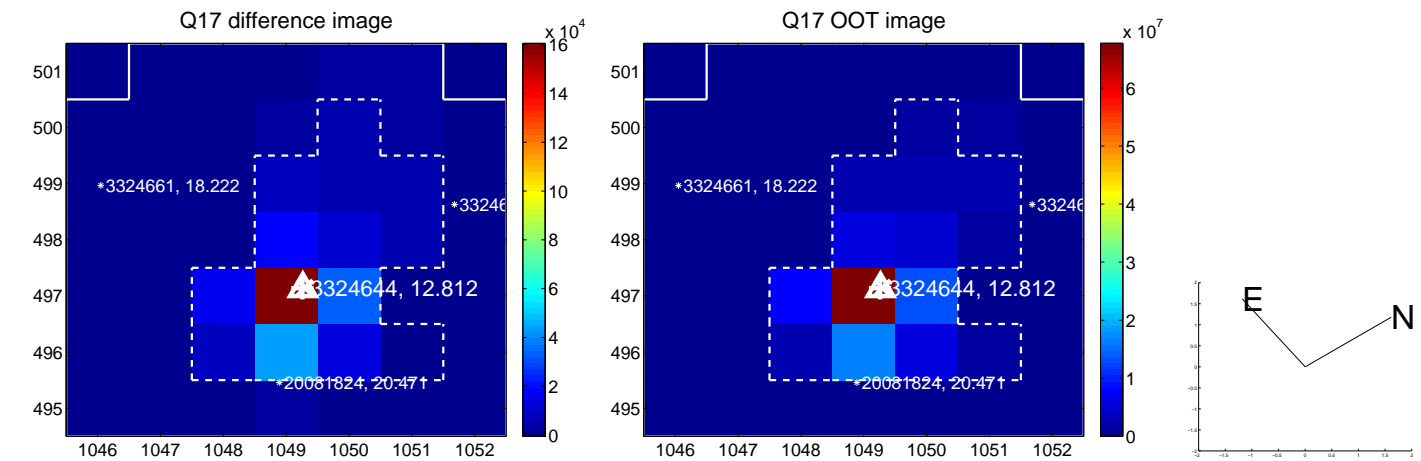
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

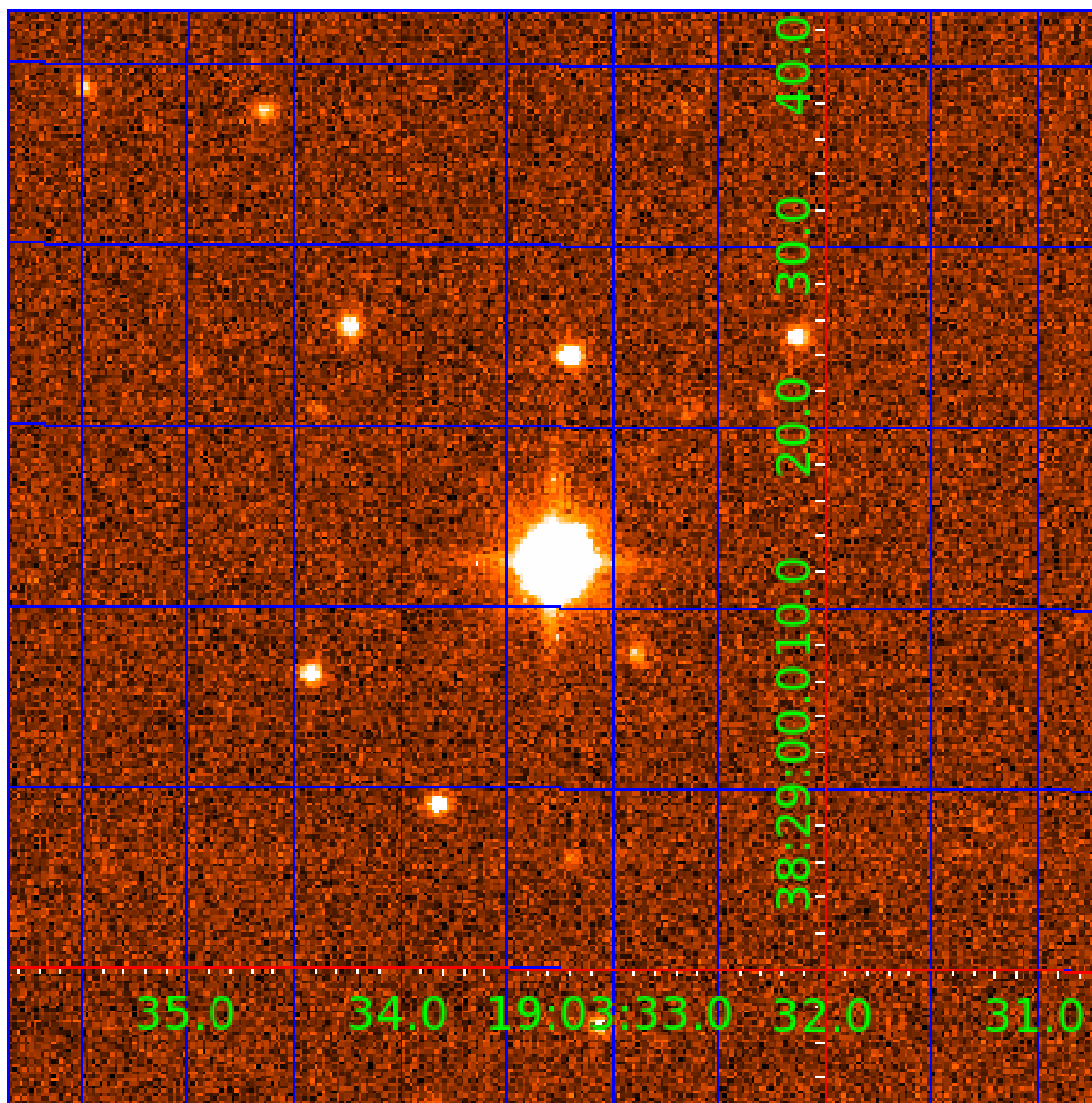


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 003324644

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003324644-01	OBS	3781.01	2.882421	131.646904	5136.8	7.704	112.9	96.6	8.06	4705	61.42	17019.28
003324644-02	OBS	No	0.960766	132.026438	253.4	4.315	20.0	13.3	8.06	4705	12.32	0.00
003324644-03	OBS	No	128.315547	218.845277	1034.7	2.667	14.5	1.6	8.06	4705	48.54	107.87
003324644-04	OBS	No	88.172974	195.668967	398.1	6.000	12.6	-1.0	8.06	4705	15.46	177.90
003324644-05	OBS	No	103.095671	214.989087	779.7	2.827	10.9	2.5	8.06	4705	25.02	144.42

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003324644-01	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV
003324644-02	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD
003324644-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_ZUMA_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV— MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
003324644-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—CENT_NOFITS—HALO_GHOST
003324644-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_SKYE_TRACKER—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT— MOD_POS_ALT—HALO_GHOST

**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.

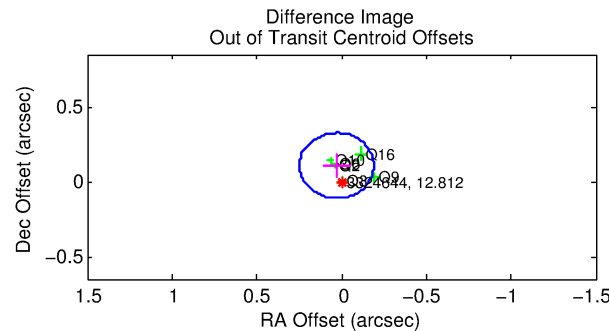
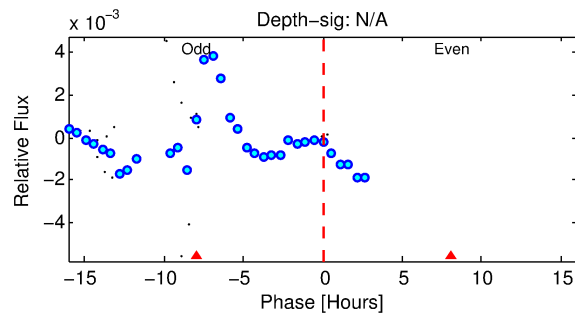
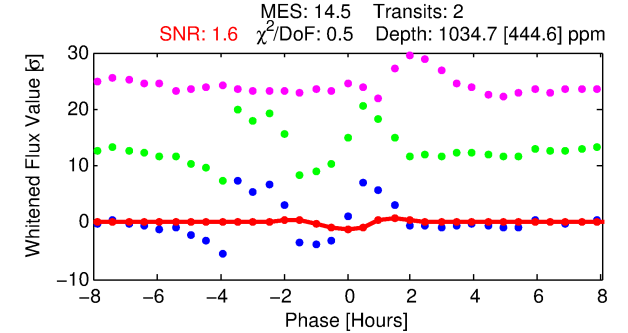
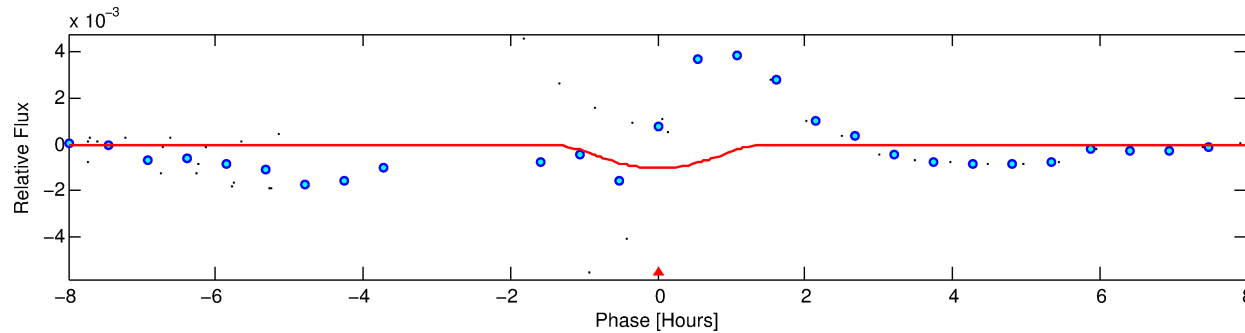
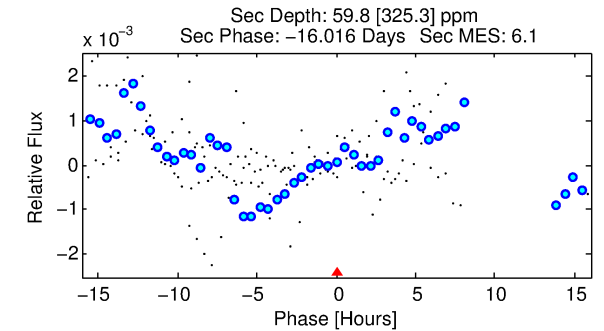
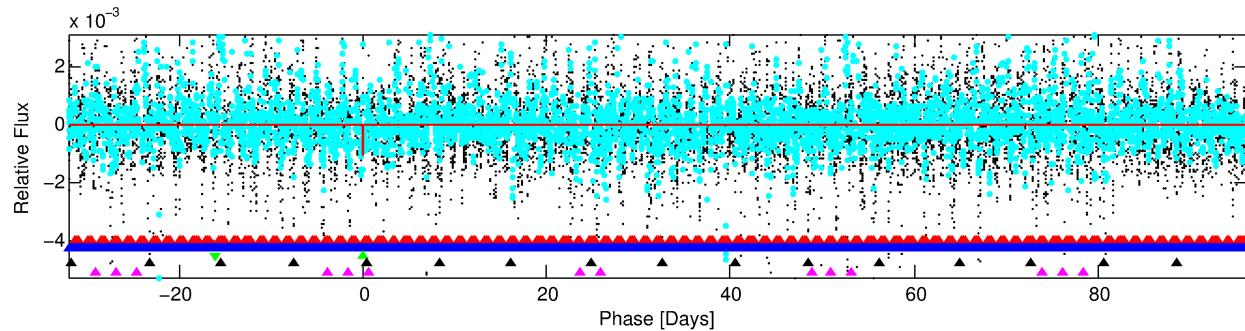
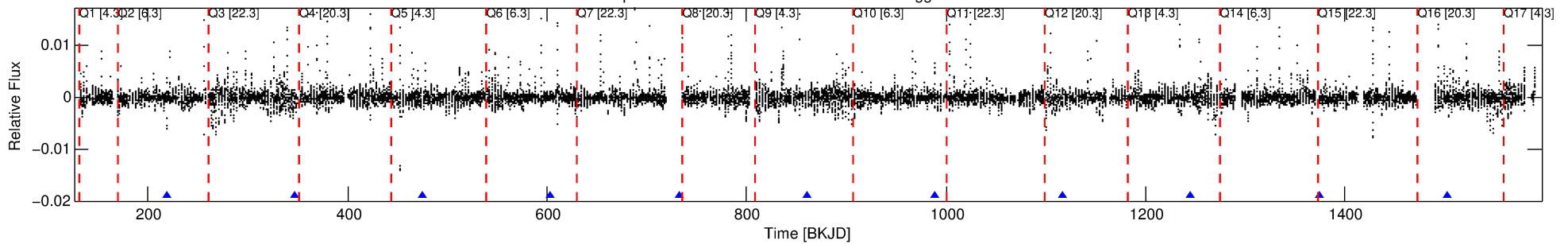
## Ephemeris Match Information For 003324644-03

No Significant Match Found

# DV One-Page Summary

KIC: 3324644 Candidate: 3 of 5 Period: 128.316 d  
KOI: K03781 Corr: No Ephemeris Match

Kp: 12.81 R\*: 8.06 Rs Teff: 4705.0 K Logg: 2.67 Fe/H: -0.120



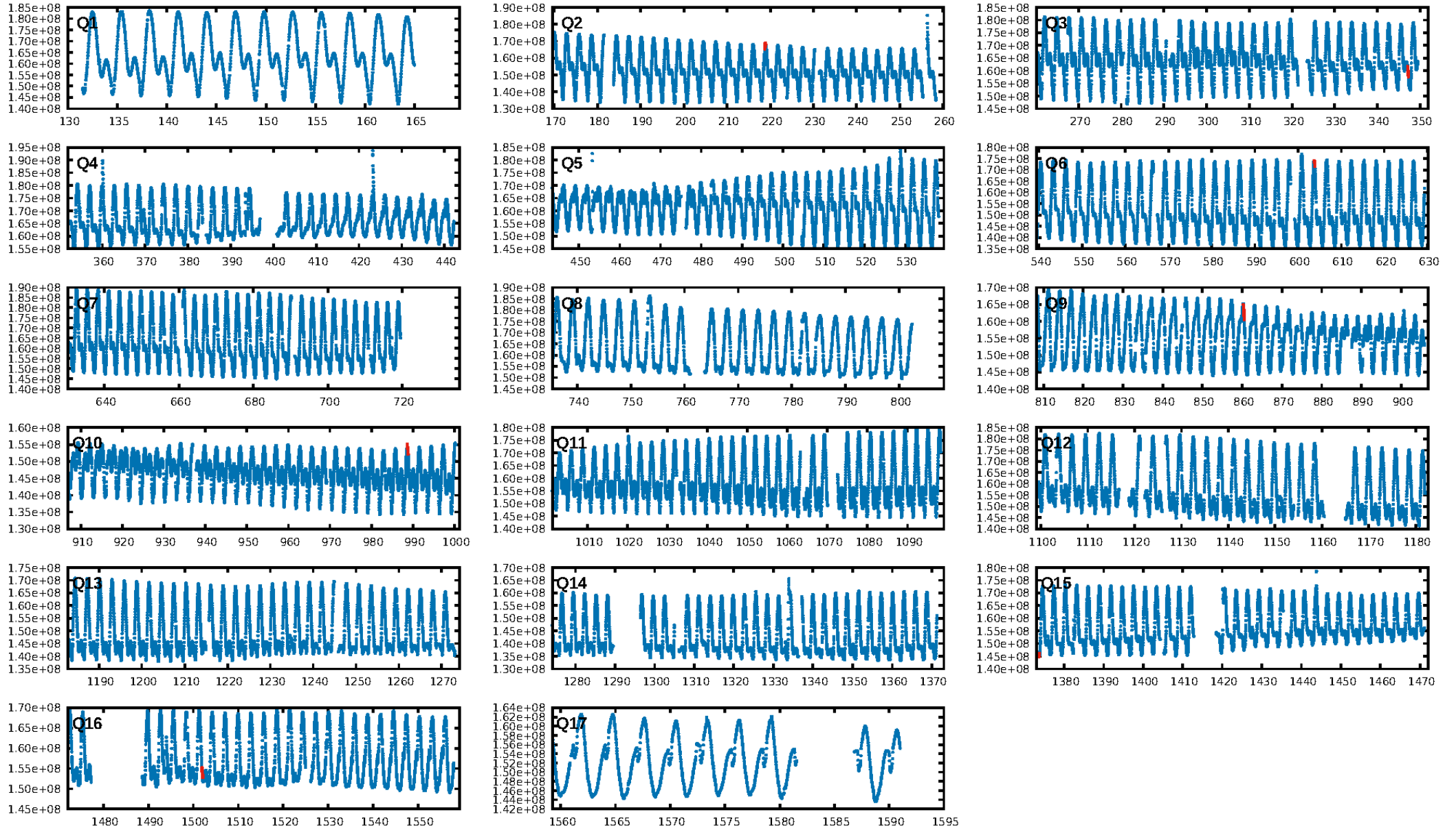
## DV Fit Results:

Period = 128.31555 [0.00369] d  
Epoch = 218.8453 [0.0101] BKJD  
Rp/R\* = 0.0552 [0.5140]  
a/R\* = 133.09 [334.98]  
b = 0.99 [0.81]  
Seff = 107.87 [75.34]  
Teq = 822 [143] K  
Rp = 48.54 [452.53] Re  
a = 0.5141 [0.2243] AU  
Ag = 3.69 [71.63] [0.04σ]  
Teffp = 1761 [8541] K [0.11σ]

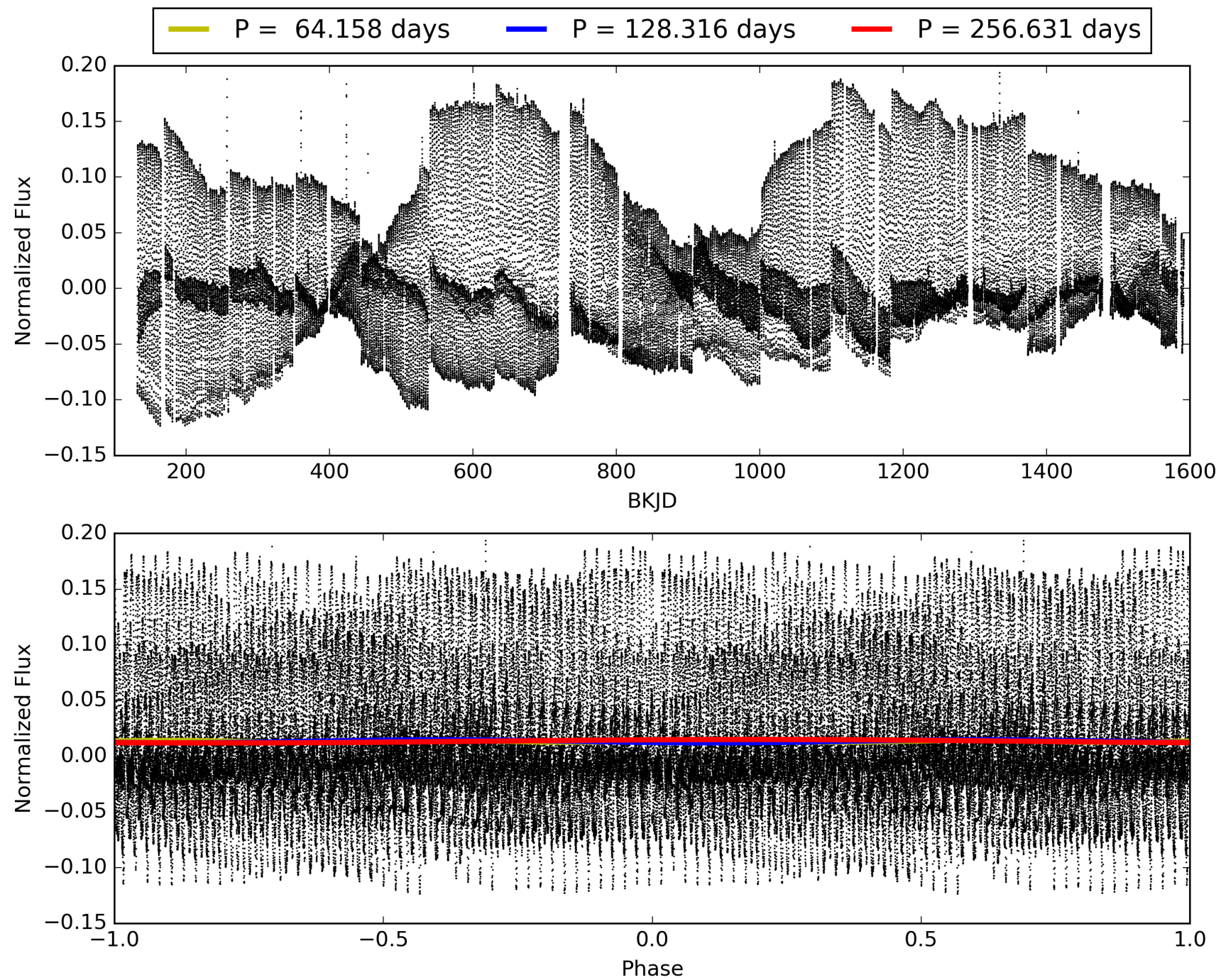
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [155.72σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 15.3%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [2/2]  
GhostDiagnostic-chr: 2.901  
Centroid-sig: 0.6%  
Centroid-so: 1.194 arcsec [1.98σ]  
OotOffset-rm: 0.111 arcsec [1.52σ]  
OotOffset-st: 3/1/1/1 [6]  
KicOffset-rm: 0.307 arcsec [4.27σ]  
KicOffset-st: 3/1/1/1 [6]  
DiffImageQuality-fgm: 0.17 [1/6]  
DiffImageOverlap-fno: 0.00 [0/6]

# TCE 003324644-03, PDC Light Curves

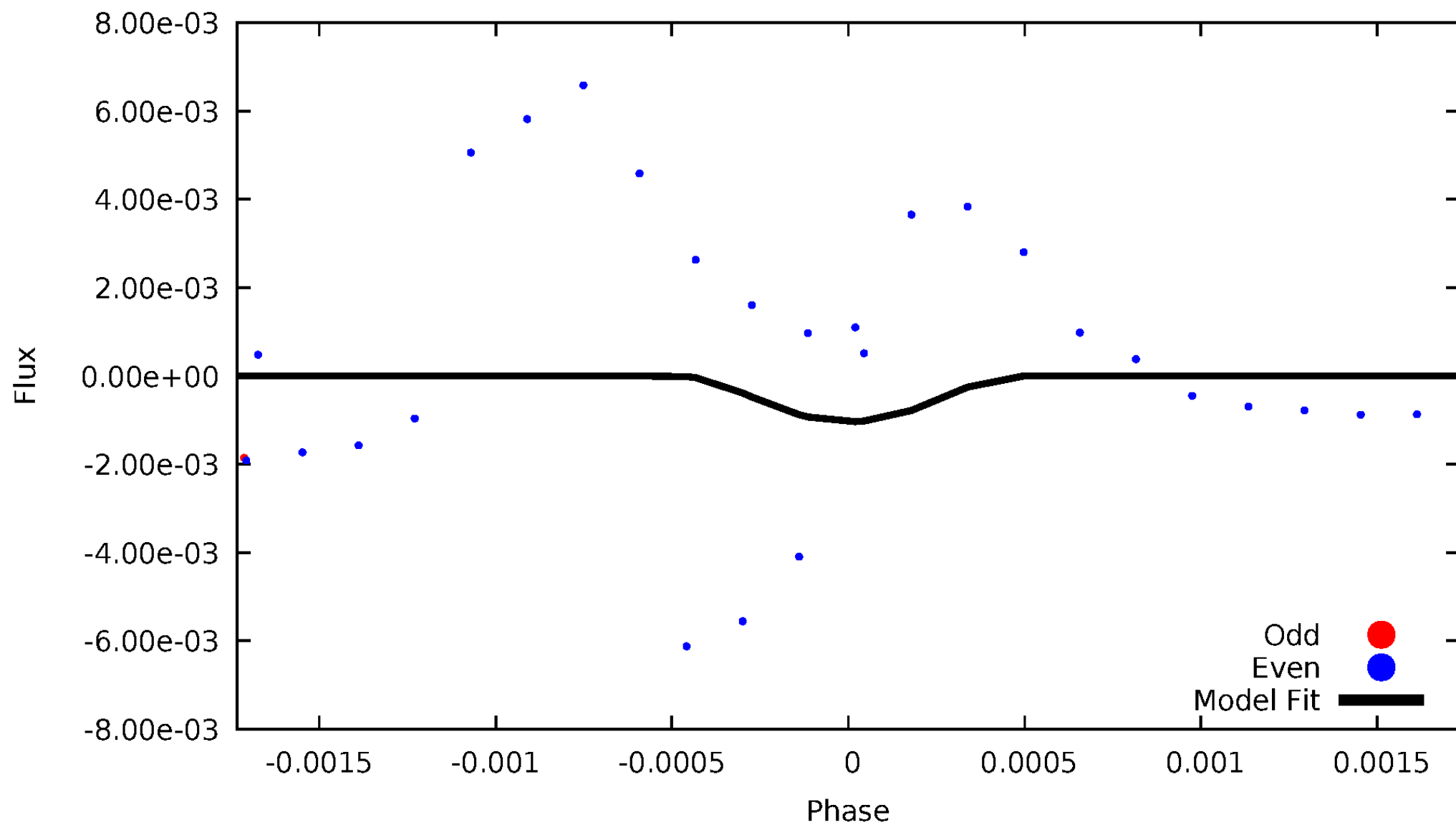


TCE 003324644-03



# DV Odd/Even

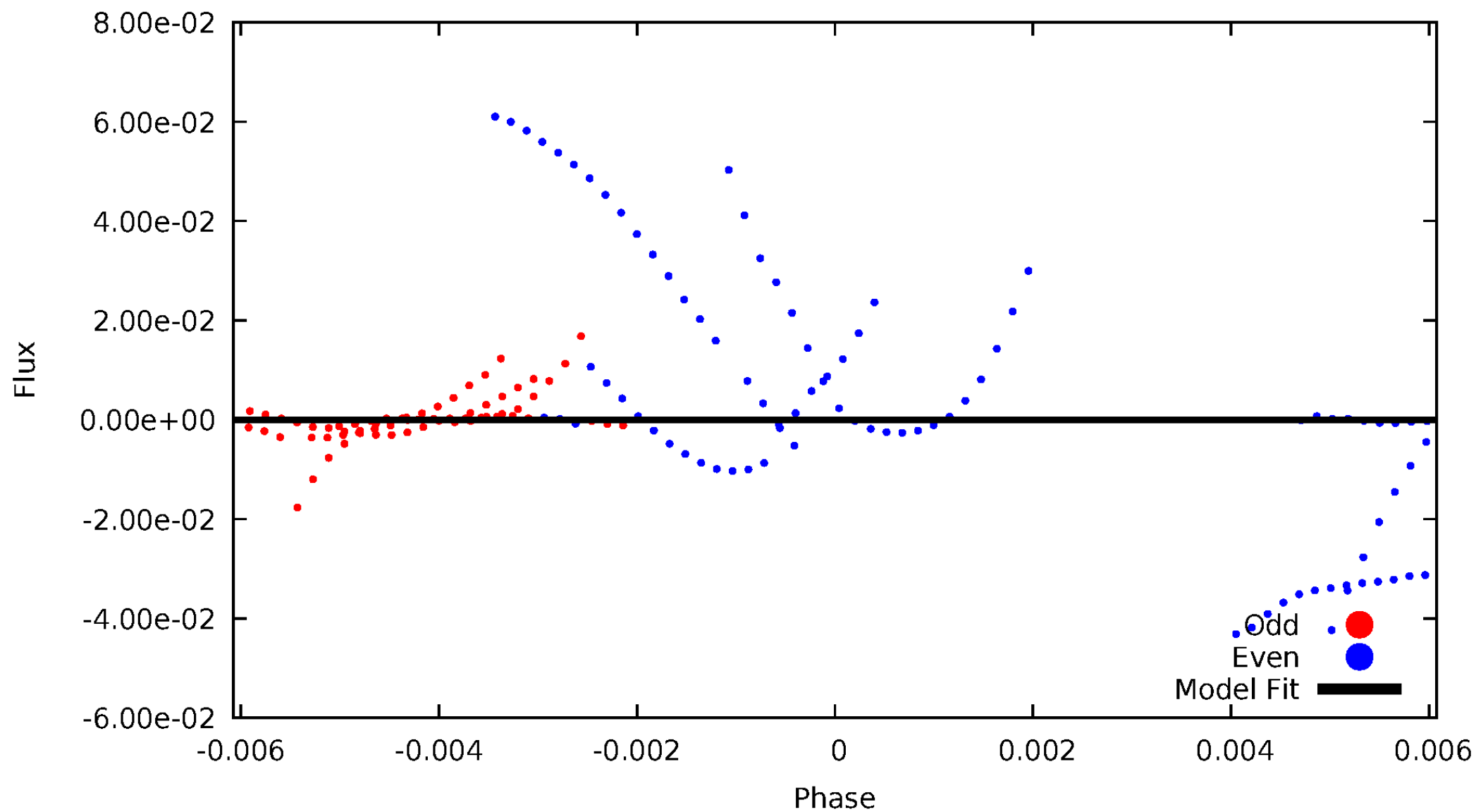
TCE 003324644-03





# ALT Odd/Even

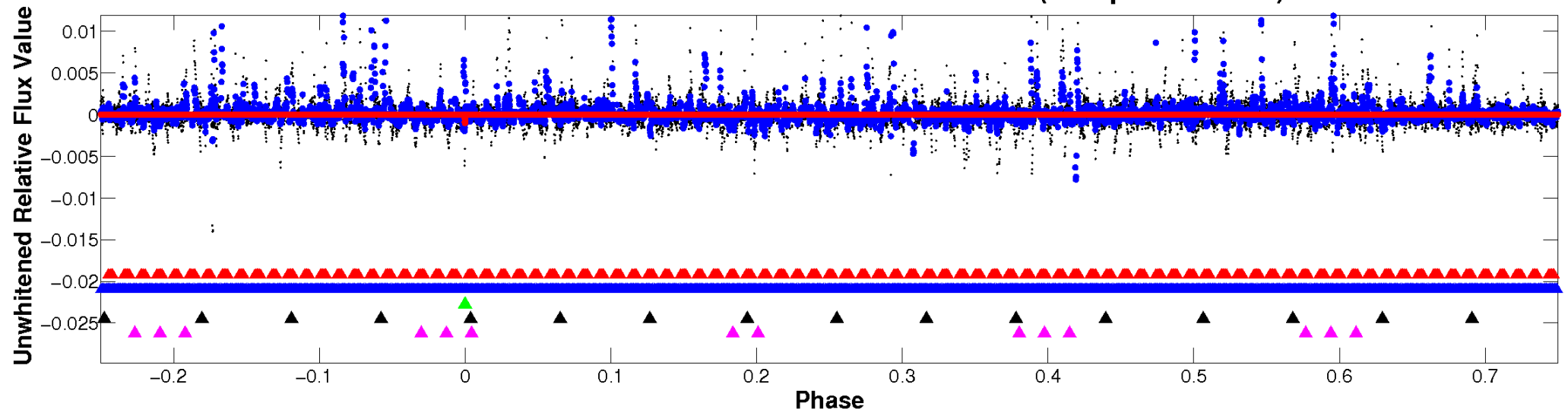
TCE 003324644-03



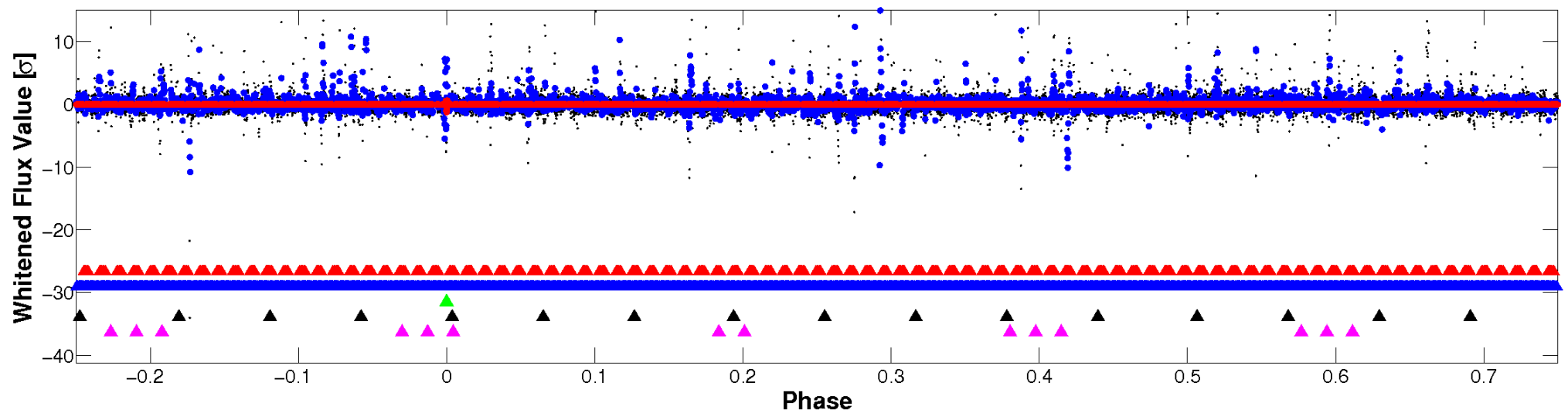


# Non-Whitened Vs. Whitened Light Curve

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

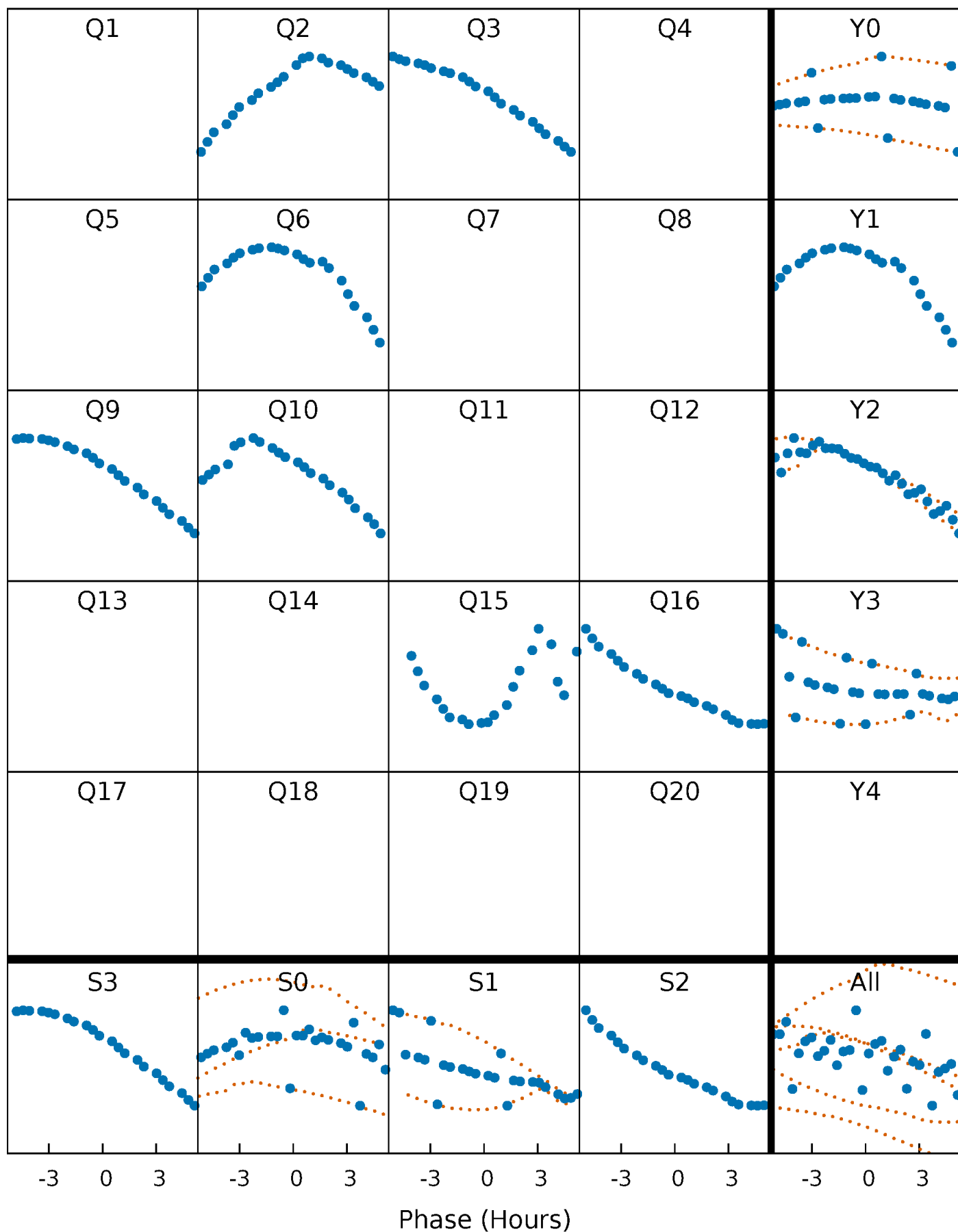


## Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



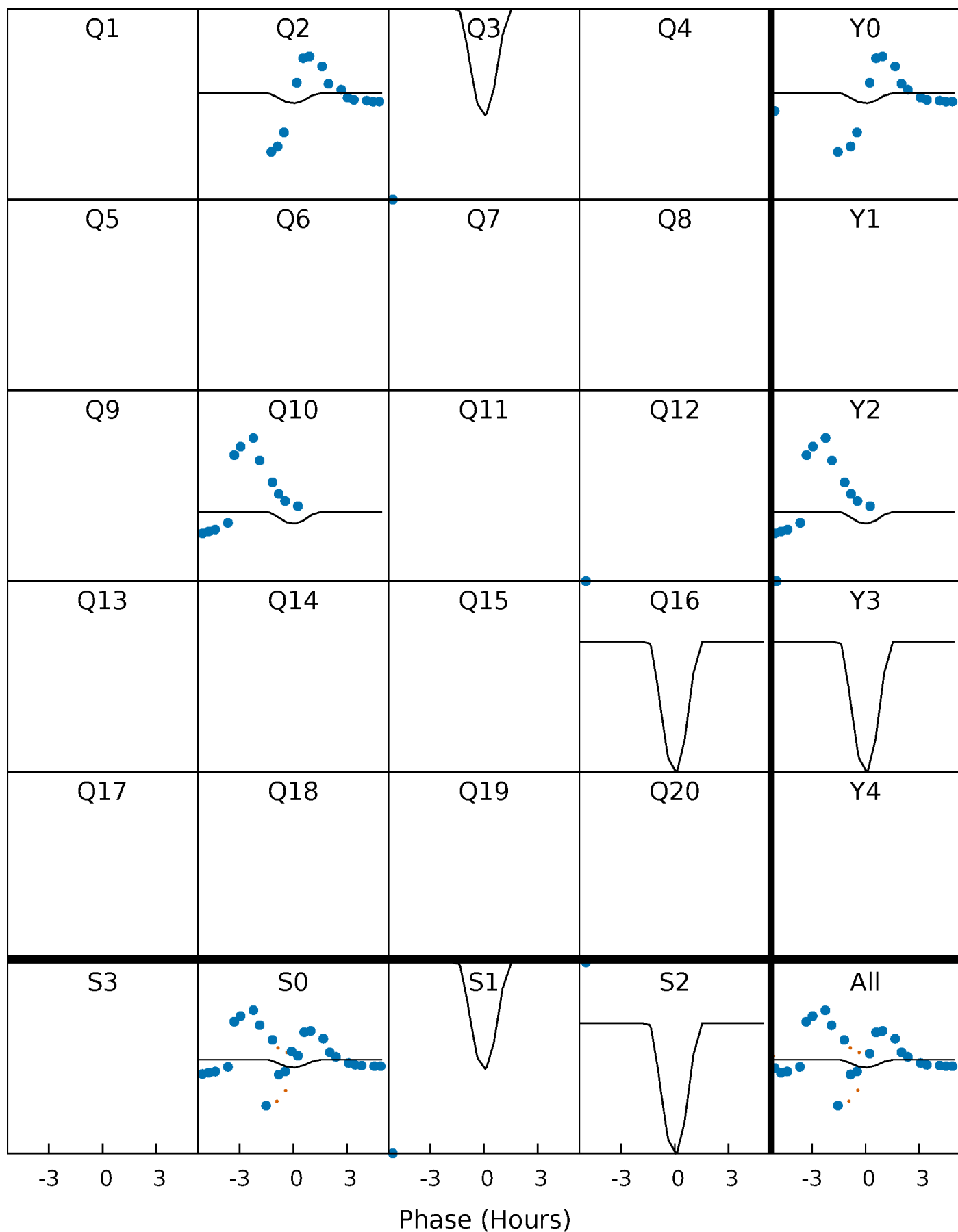
# PDC Quarter-Phased Transit Curves

TCE 003324644-03 P=128.315547 Days  $T_0=218.845277$  (BKJD)



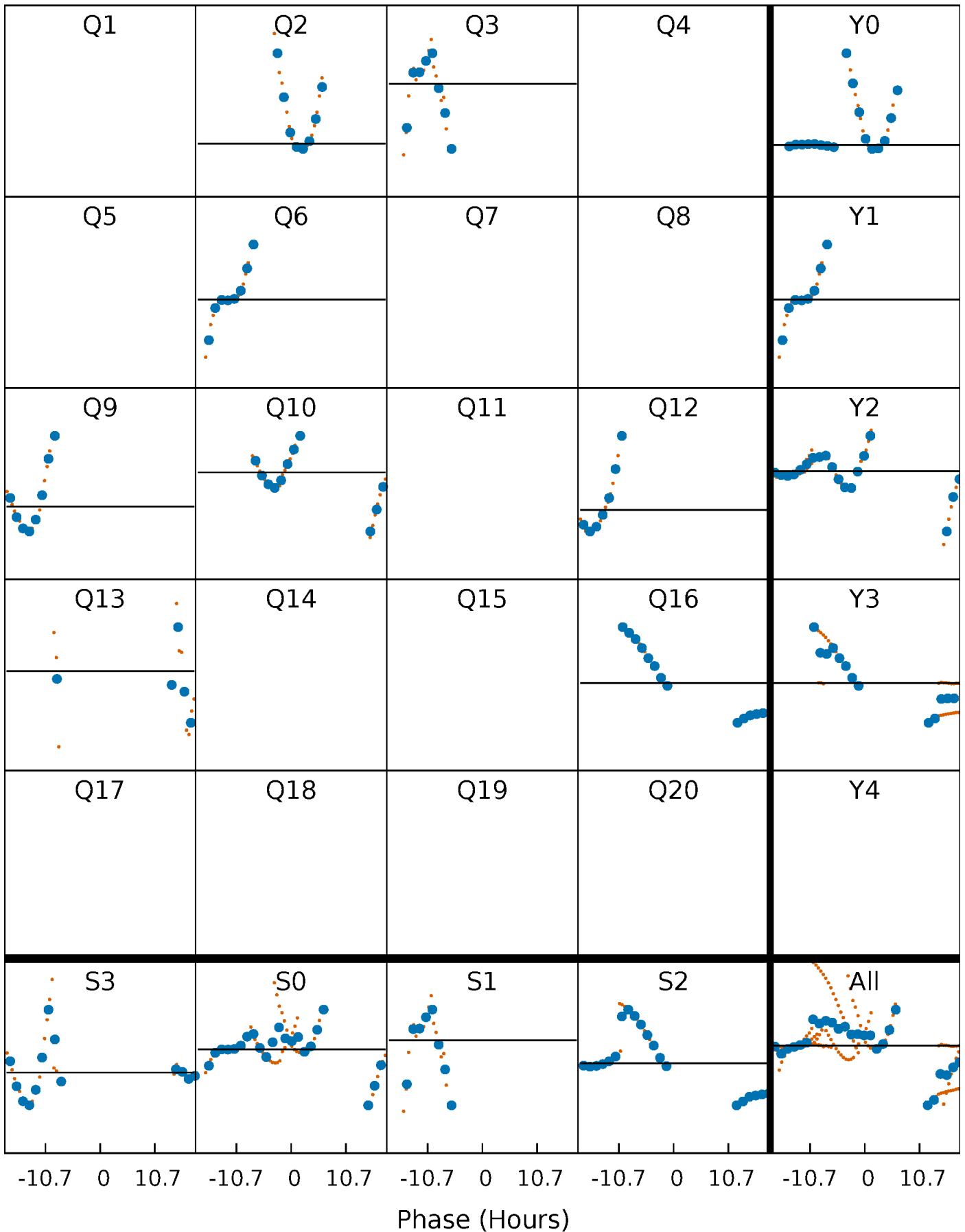
# DV Quarter-Phased Transit Curves

TCE 003324644-03 P=128.315547 Days  $T_0=218.845277$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

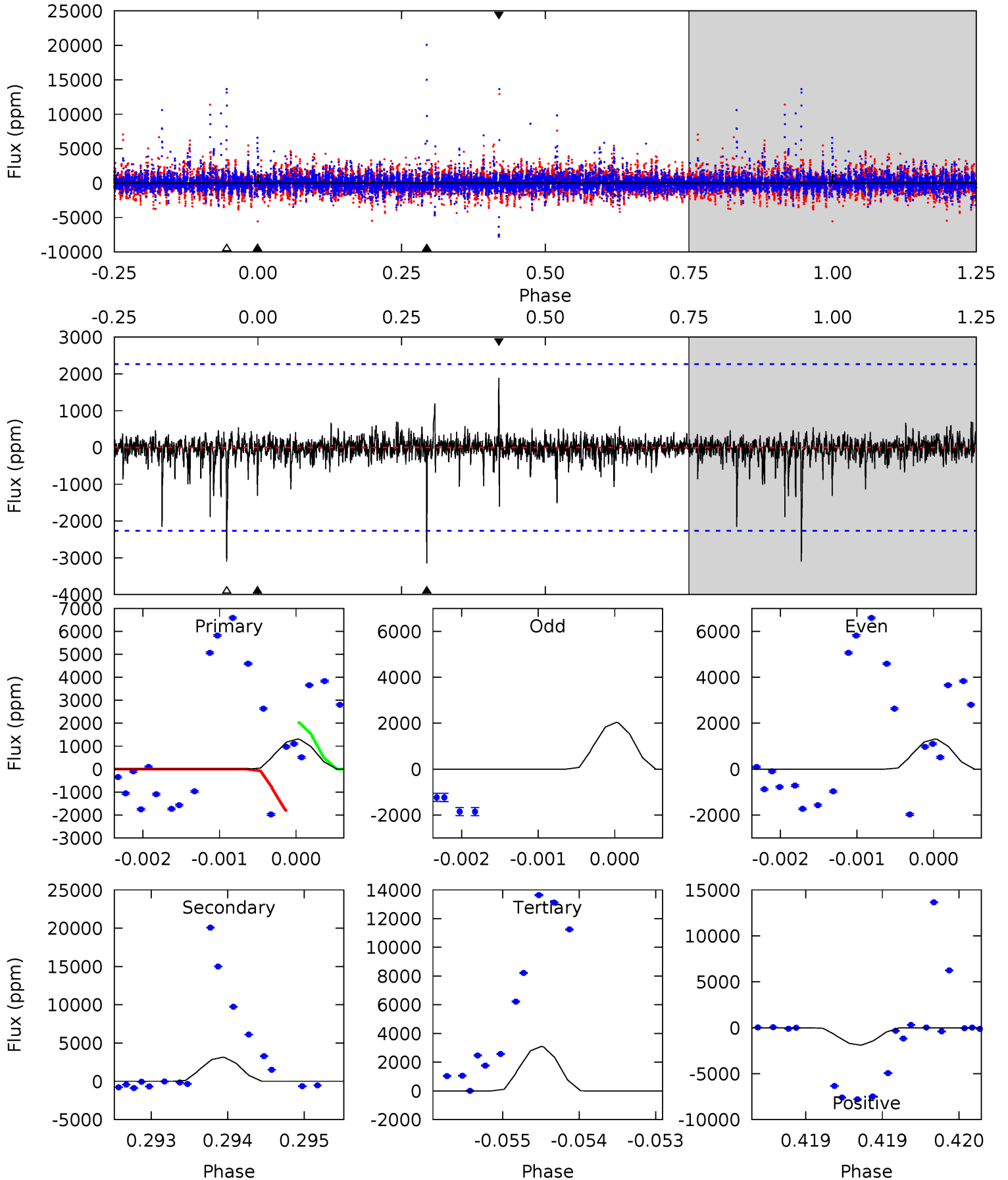
TCE 003324644-03 P=128.291422 Days  $T_0=218.924050$  (BKJD)



# DV Model-Shift Uniqueness Test

003324644-03, P = 128.315547 Days, E = 90.529730 Days

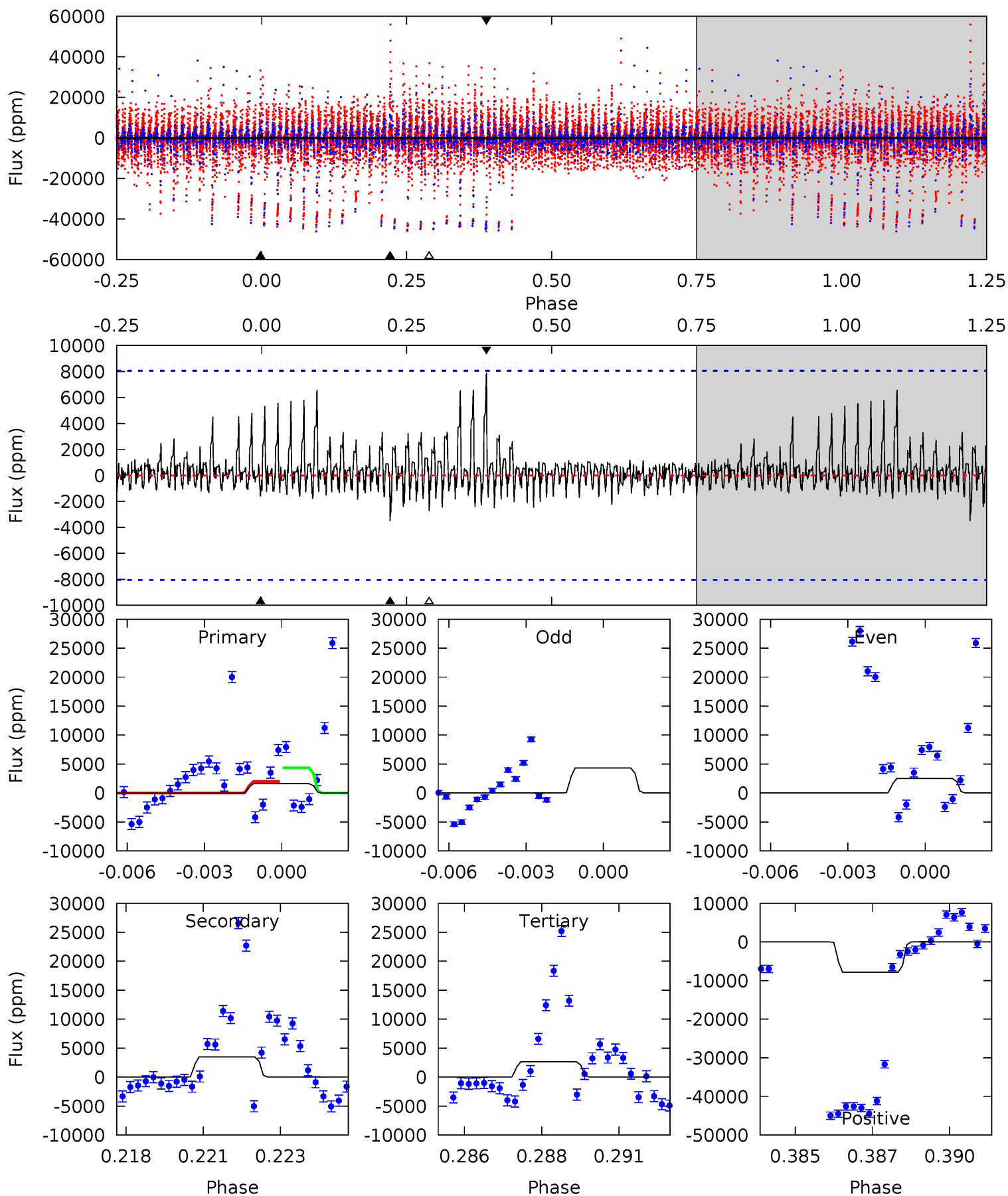
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
3.16	7.61	7.49	4.55	5.46	3.31	0.49	-4.32	-1.39	0.12	3.05	1.08	1.00	0.37	0.27



# Alt Model-Shift Uniqueness Test

003324644-03, P = 128.291422 Days, E = 90.632628 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
1.05	2.29	1.74	5.14	5.26	2.99	0.67	-0.69	-4.09	0.55	-2.85	0.51	1.93	0.69	0.75





### Stellar Parameters For KIC 003324644

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$4705^{+128}_{-105}$	$2.667^{+0.402}_{-0.268}$	$-0.120^{+0.300}_{-0.200}$	$8.058^{+3.729}_{-3.051}$	$1.101^{+0.395}_{-0.158}$	$0.003^{+0.010}_{-0.002}$
	+3%/-2%	+15%/-10%	+250%/-167%	+46%/-38%	+36%/-14%	+322%/-63%
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 003324644-03 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-3155 \pm 415$	$348.03^{+362.90}_{-245.22}$	$1140^{+131}_{-128}$	$2512^{+1040}_{-424}$	$4.028^{+39.539}_{-3.074}$
Alt.	$-3510 \pm 1530$	$314.66^{+343.85}_{-226.06}$	$1143^{+138}_{-136}$	$2596^{+1151}_{-508}$	$5.085^{+55.168}_{-4.147}$

$T_{max}$  = 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

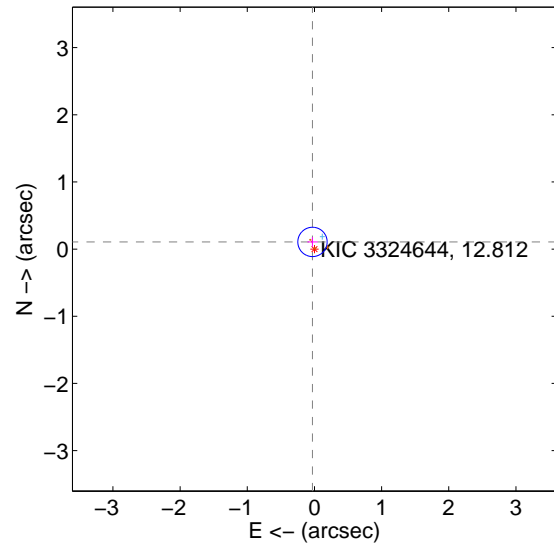
Supplemental centroid analysis for 003324644-03. Kepler magnitude: 12.81. Transit SNR 1.65

There are 1 quarters with good PRF difference image offsets

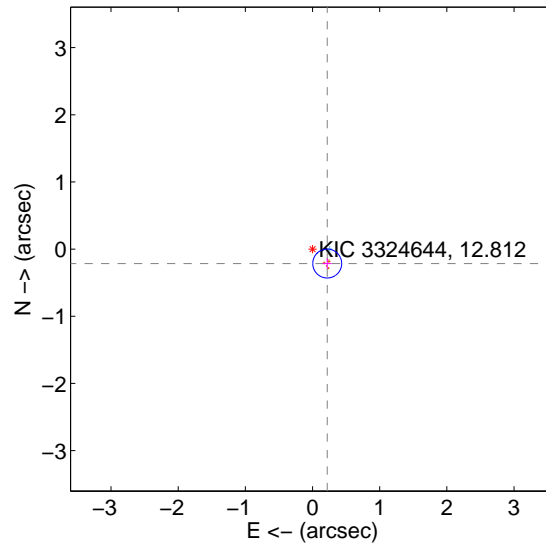
The direct PRF centroid is offset from the target star catalog position by about 0.23 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.111 \pm 0.073$	1.52	$0.029 \pm 0.076$	$0.107 \pm 0.072$
PRF-fit source offset from KIC position	$0.307 \pm 0.072$	4.27	$-0.219 \pm 0.068$	$-0.215 \pm 0.080$
photometric centroid source offset	$1.19 \pm 0.60$	1.98	$-0.54 \pm 0.48$	$1.06 \pm 0.63$

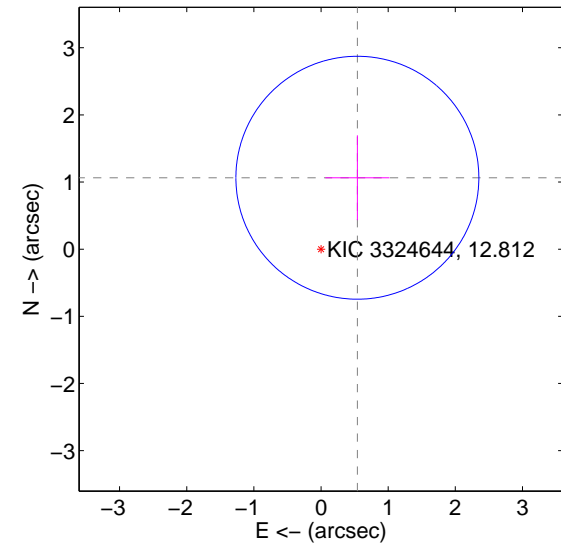
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

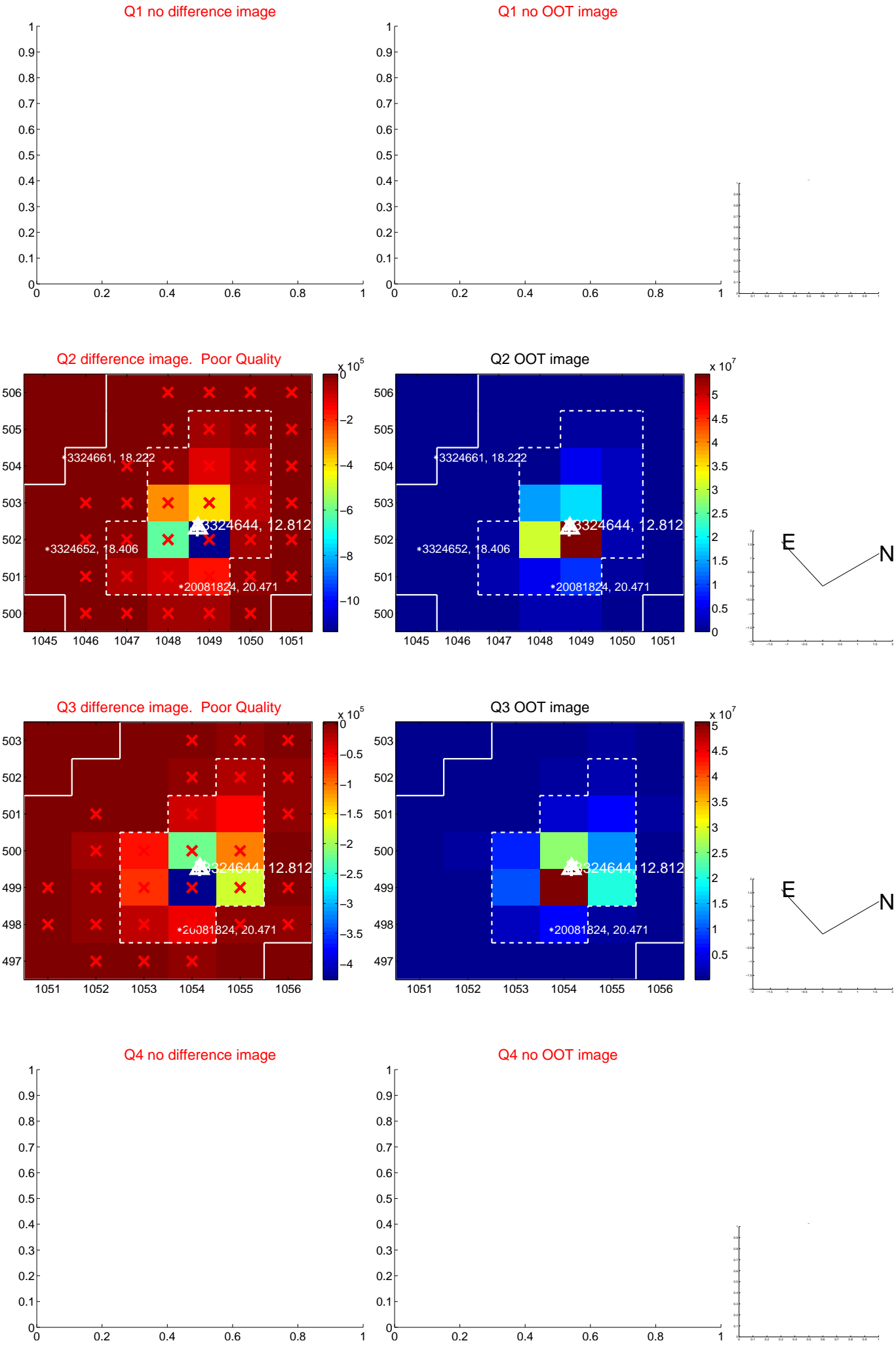


offset from photometric centroids

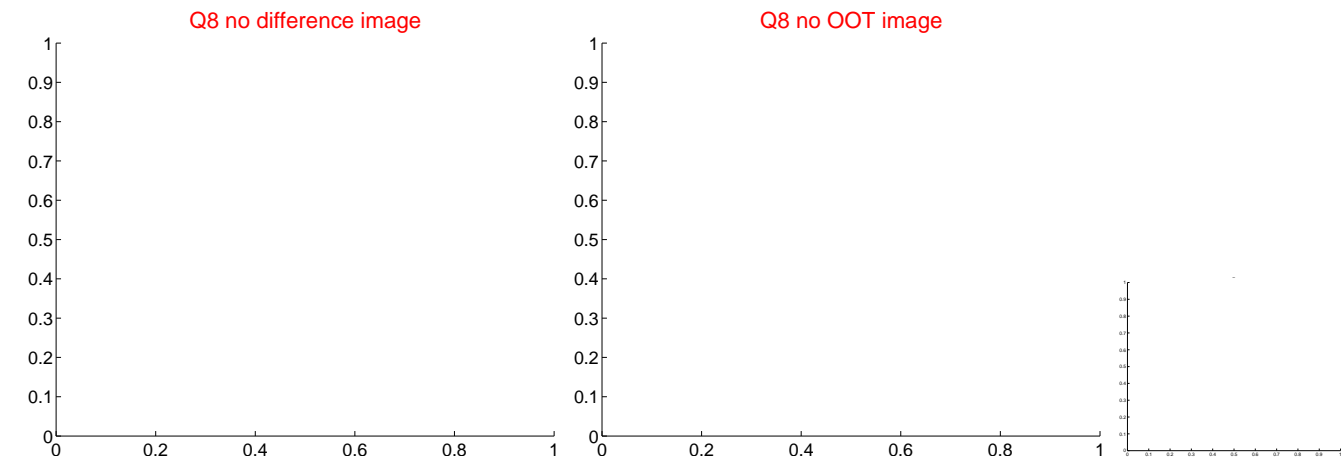
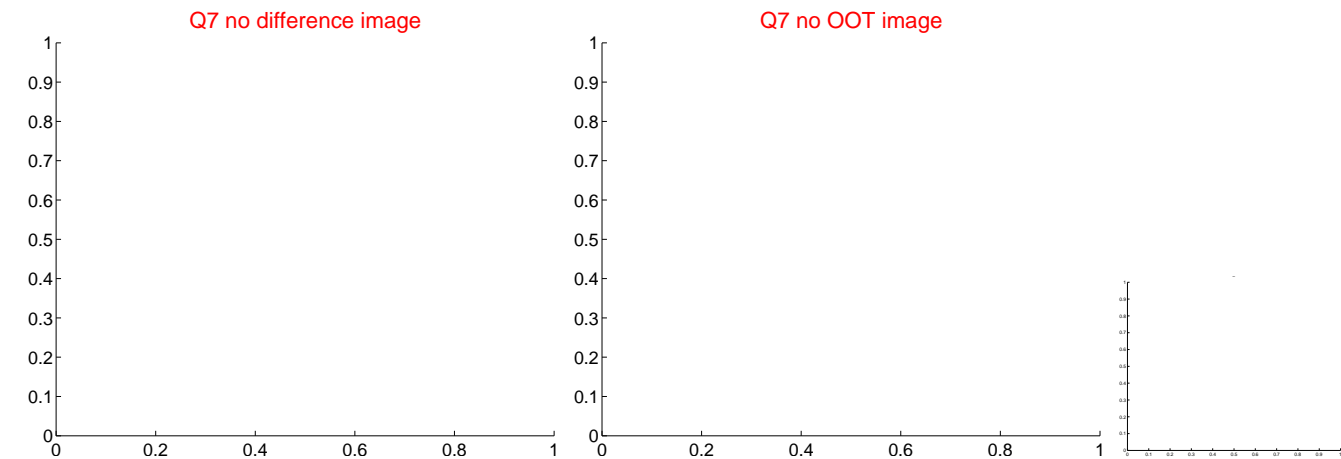
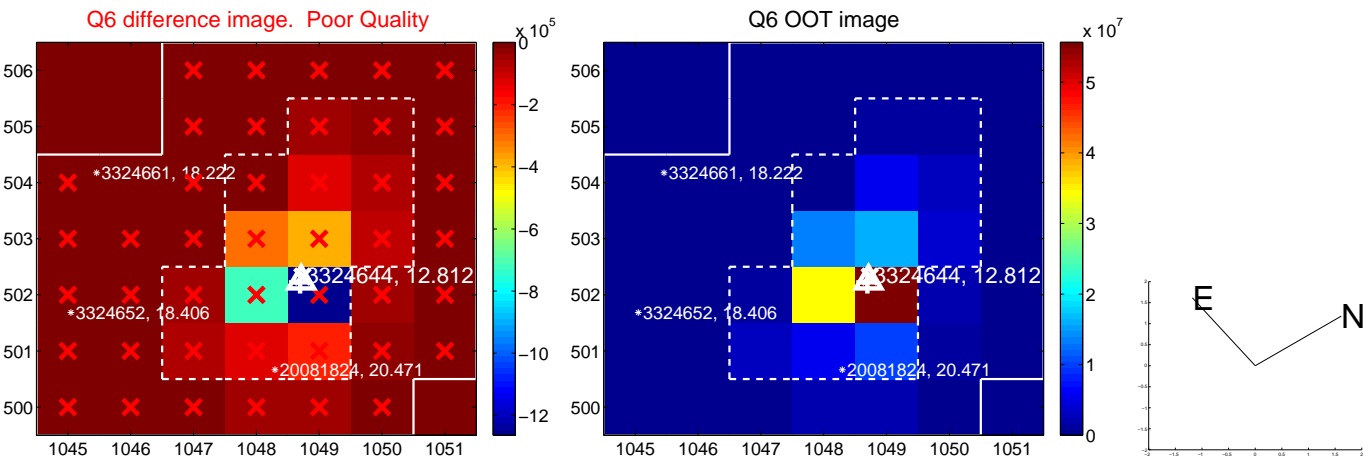


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

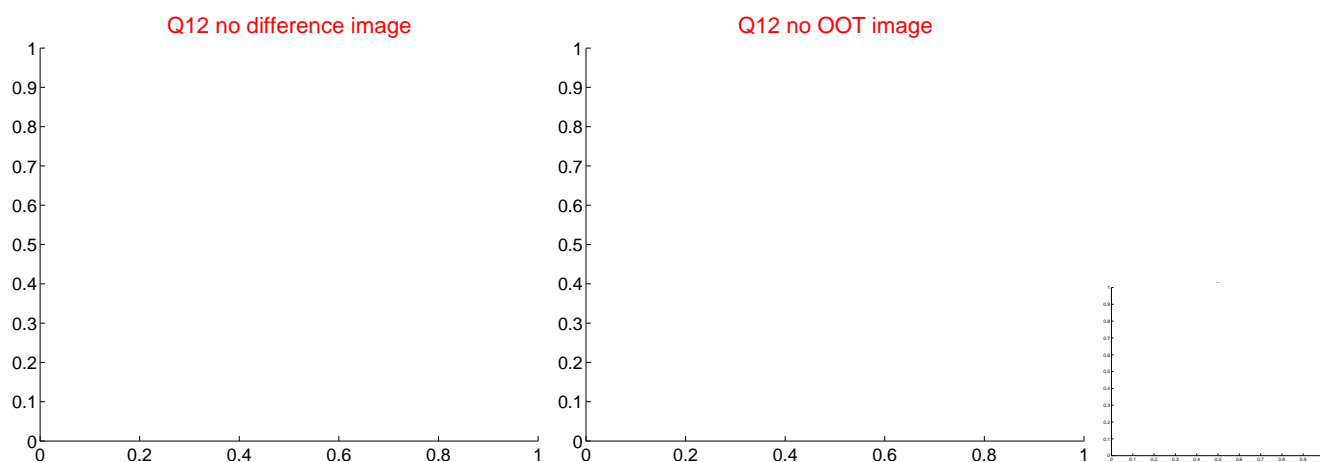
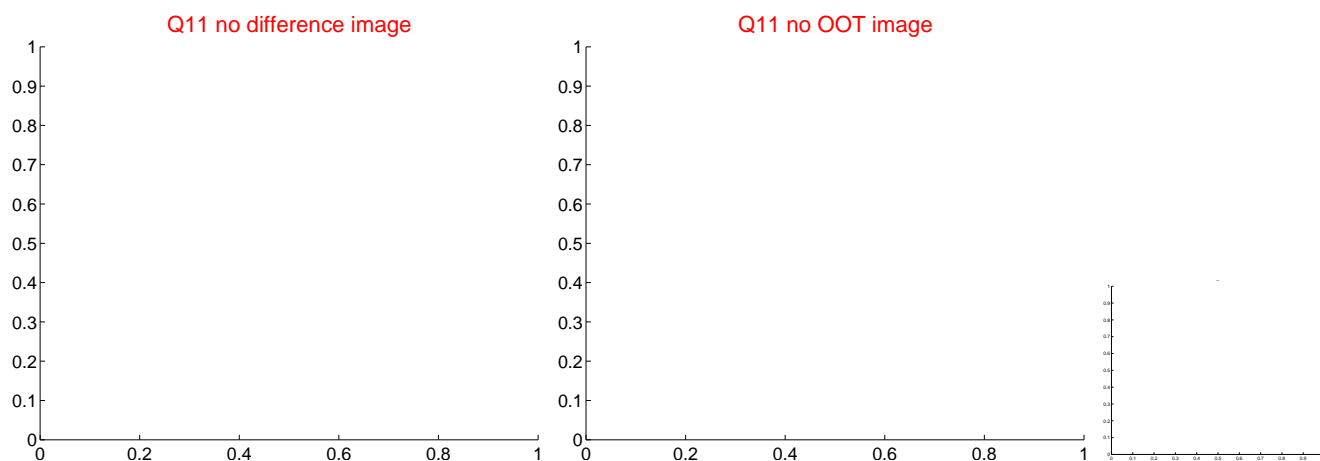
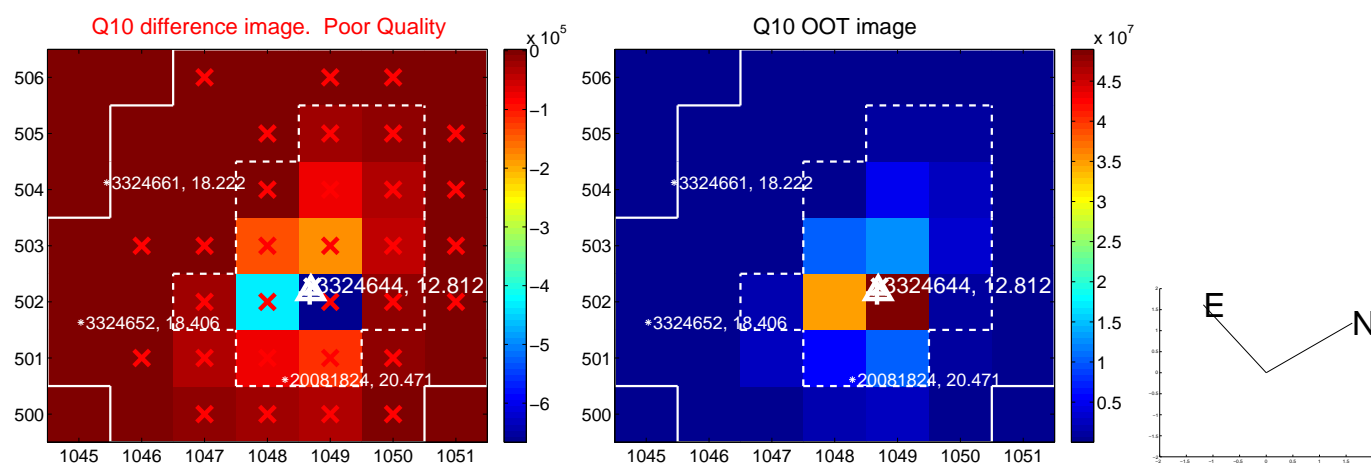
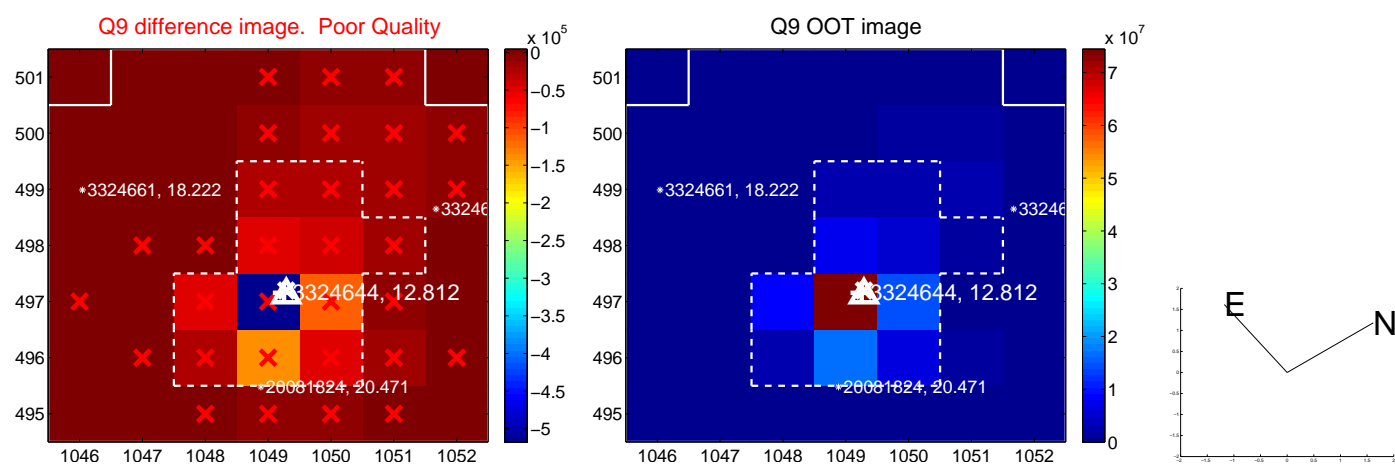
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



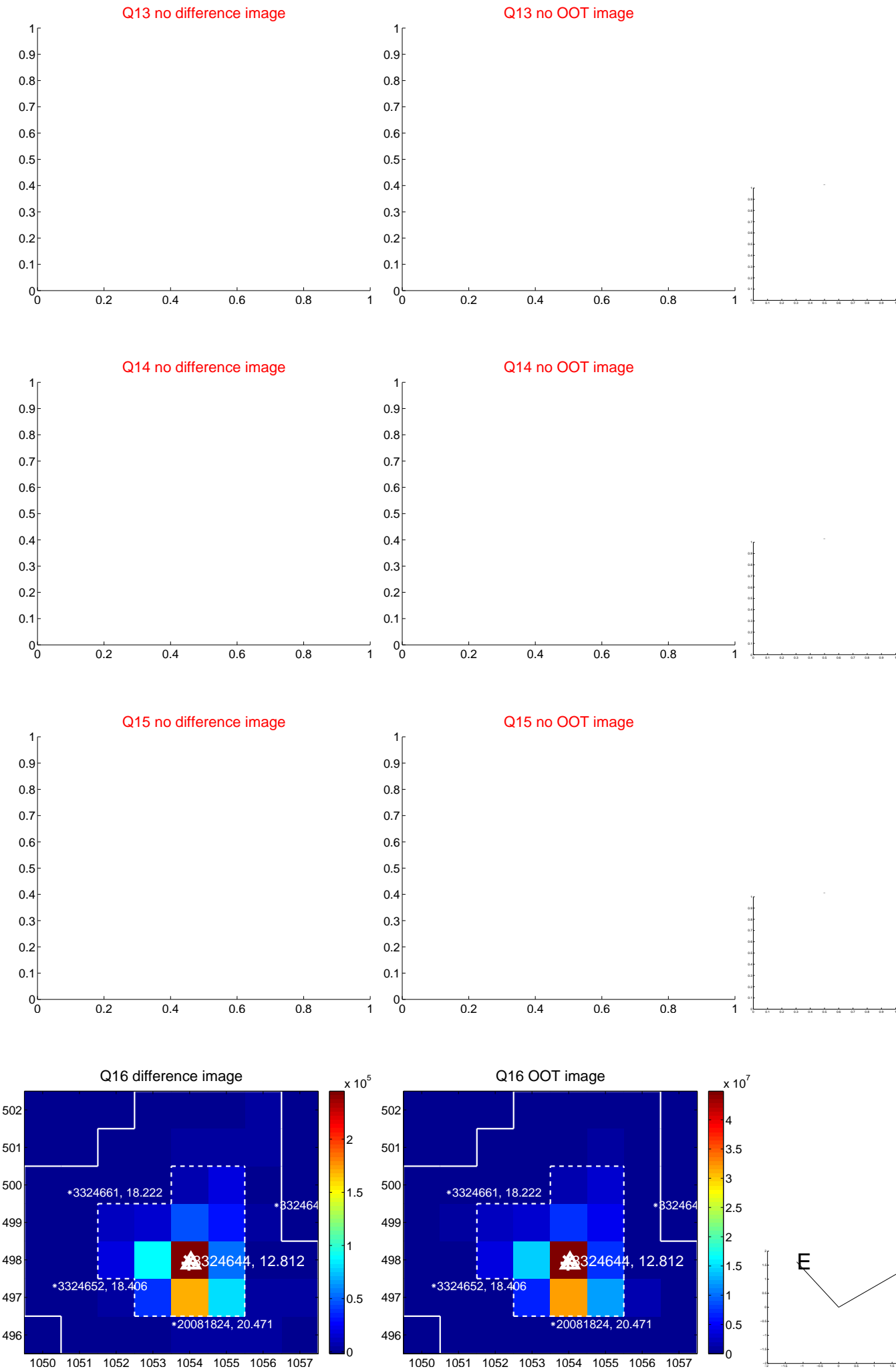
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

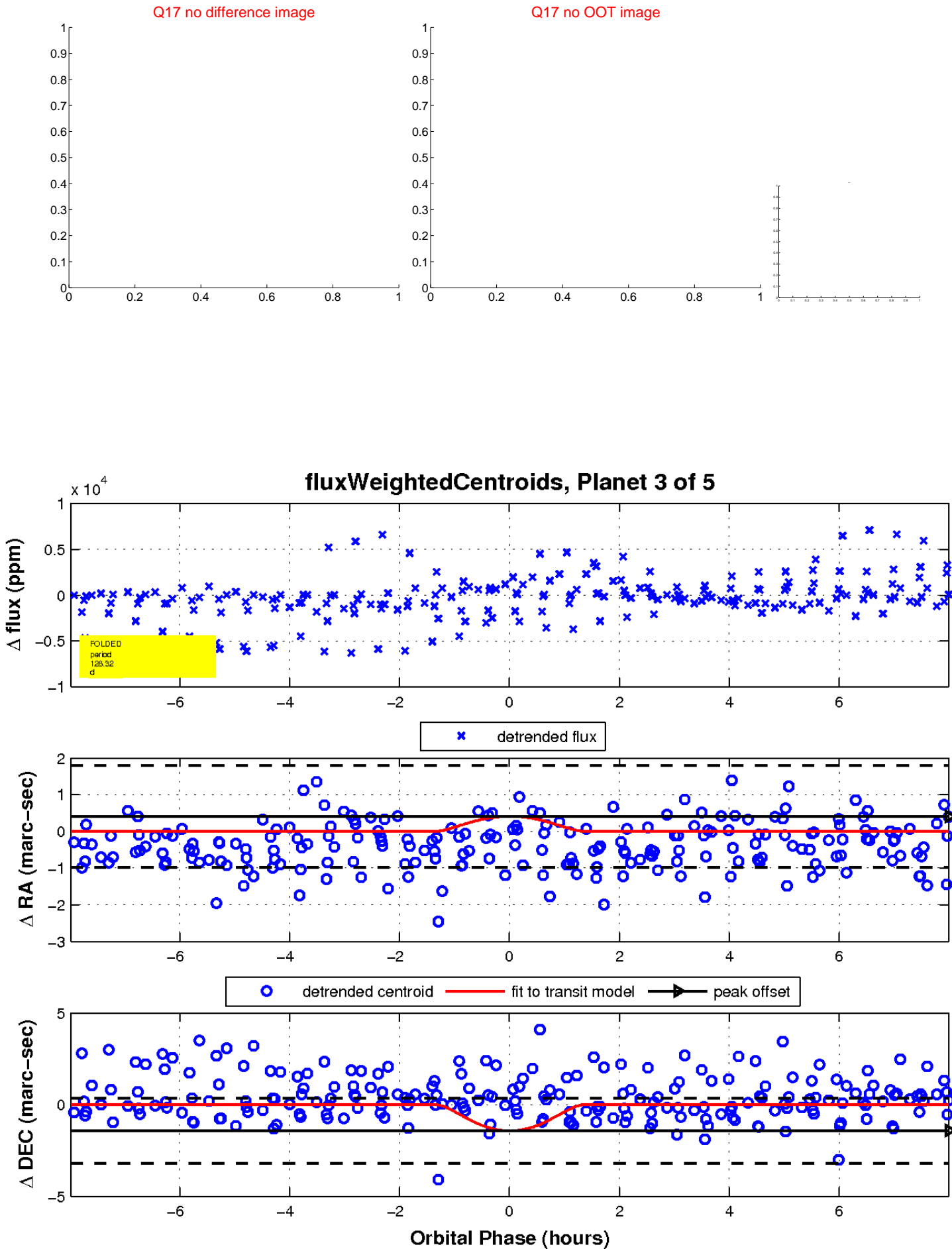


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



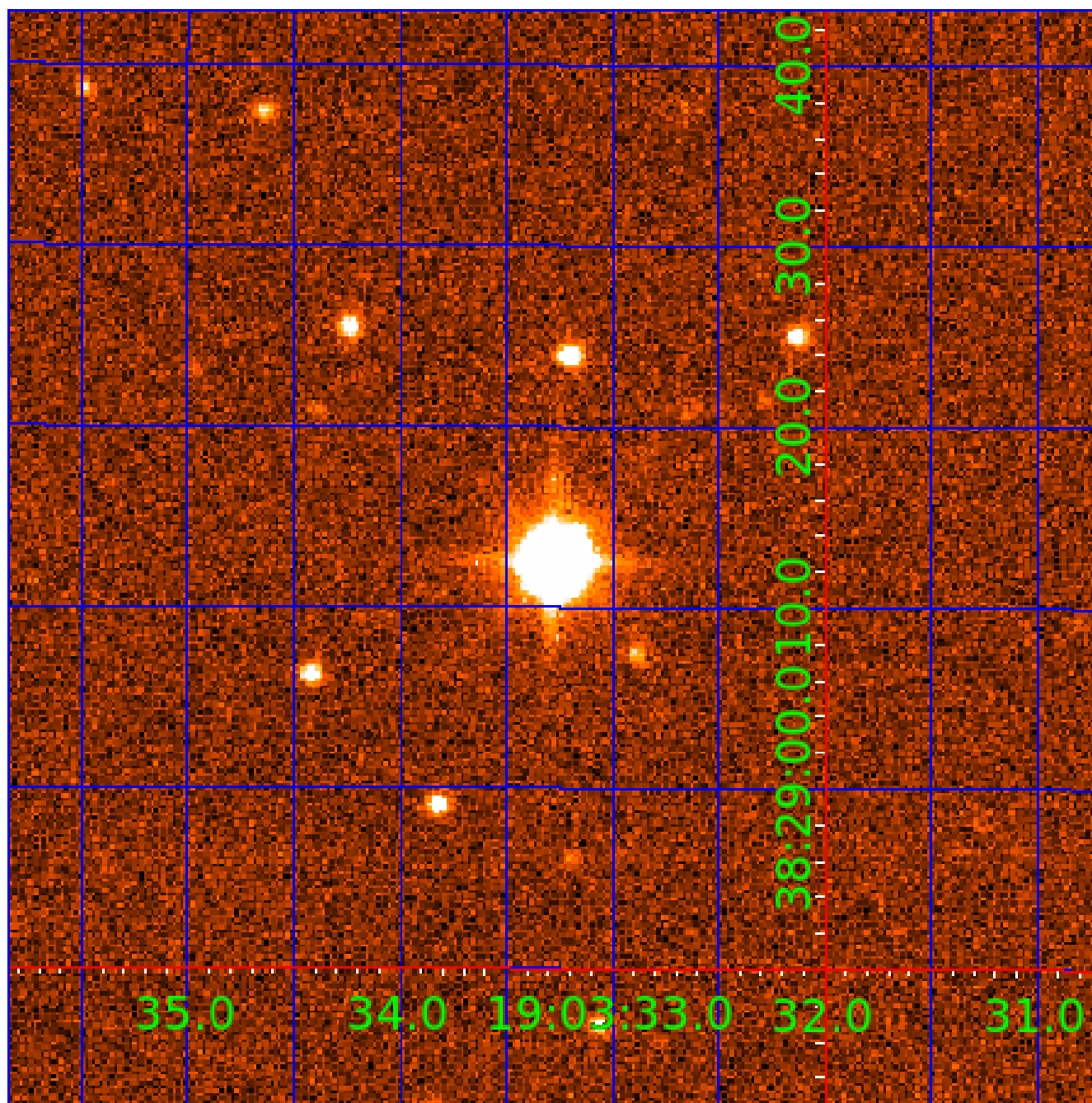


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 003324644

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003324644-01	OBS	3781.01	2.882421	131.646904	5136.8	7.704	112.9	96.6	8.06	4705	61.42	17019.28
003324644-02	OBS	No	0.960766	132.026438	253.4	4.315	20.0	13.3	8.06	4705	12.32	0.00
003324644-03	OBS	No	128.315547	218.845277	1034.7	2.667	14.5	1.6	8.06	4705	48.54	107.87
003324644-04	OBS	No	88.172974	195.668967	398.1	6.000	12.6	-1.0	8.06	4705	15.46	177.90
003324644-05	OBS	No	103.095671	214.989087	779.7	2.827	10.9	2.5	8.06	4705	25.02	144.42

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003324644-01	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV
003324644-02	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD
003324644-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_ZUMA_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV— MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
003324644-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—CENT_NOFITS—HALO_GHOST
003324644-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_SKYE_TRACKER—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT— MOD_POS_ALT—HALO_GHOST

**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 003324644-04

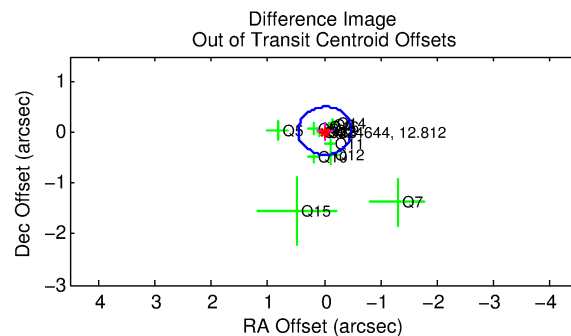
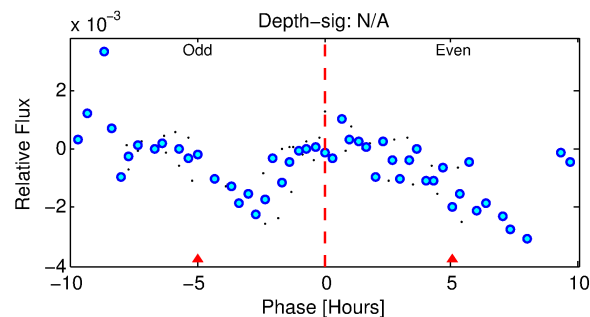
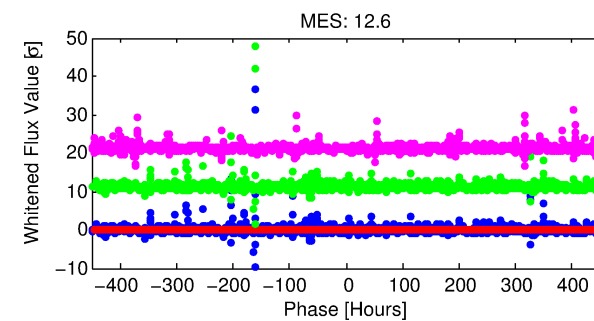
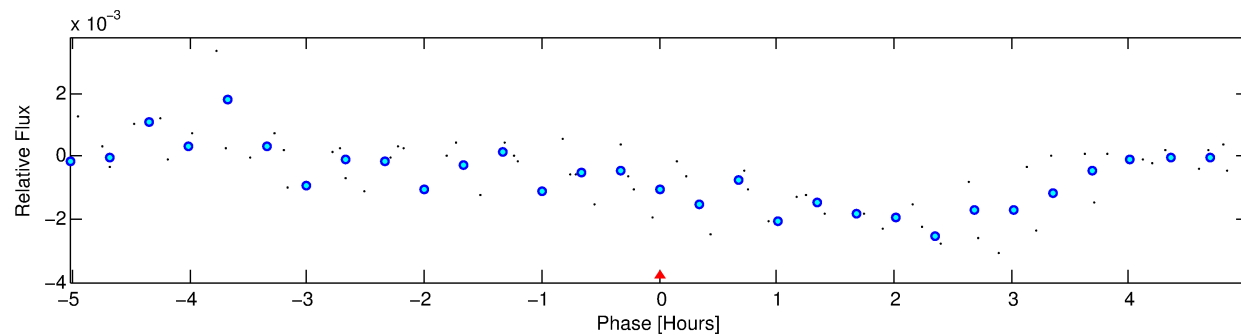
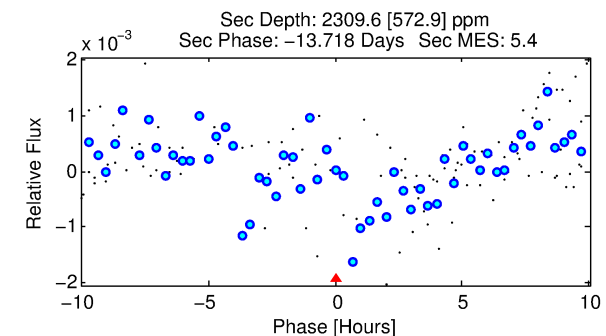
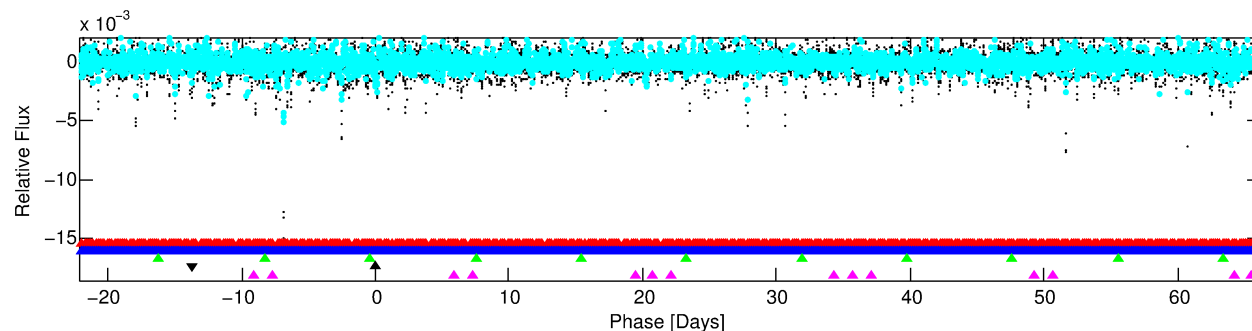
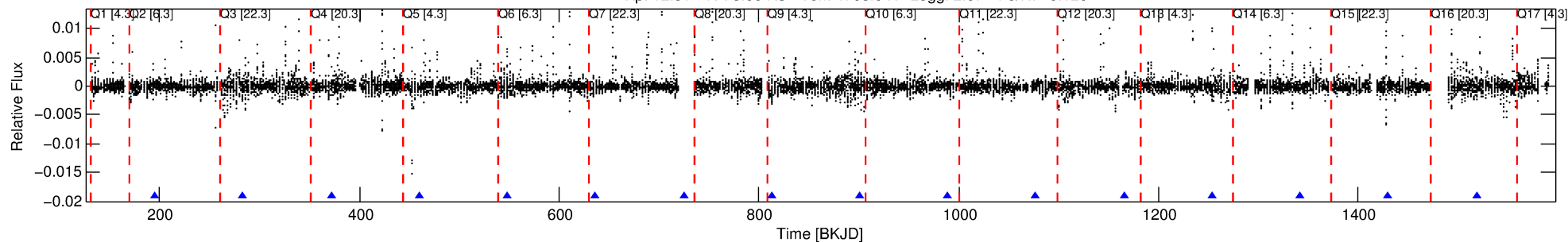
No Significant Match Found

# DV One-Page Summary

KIC: 3324644 Candidate: 4 of 5 Period: 88.173 d

KOI: K03781 Corr: No Ephemeris Match

Kp: 12.81 R\*: 8.06 Rs Teff: 4705.0 K Logg: 2.67 Fe/H: -0.120



TPS TCE Results:

Period = 88.17297 d  
Epoch = 195.6690 BKJD

DV fit results are unavailable

DV Diagnostic Results:

ShortPeriod-sig: 100.0% [209.63σ]  
LongPeriod-sig: 100.0% [54.00σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGoF-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: 0.001997

Centroid-sig: 74.7%

Centroid-so: 0.333 arcsec [8.59σ]

OotOffset-rm: 0.040 arcsec [0.25σ]

KicOffset-rm: 0.211 arcsec [1.30σ]

OotOffset-st: 4/4/3/3 [14]

KicOffset-st: 4/4/3/3 [14]

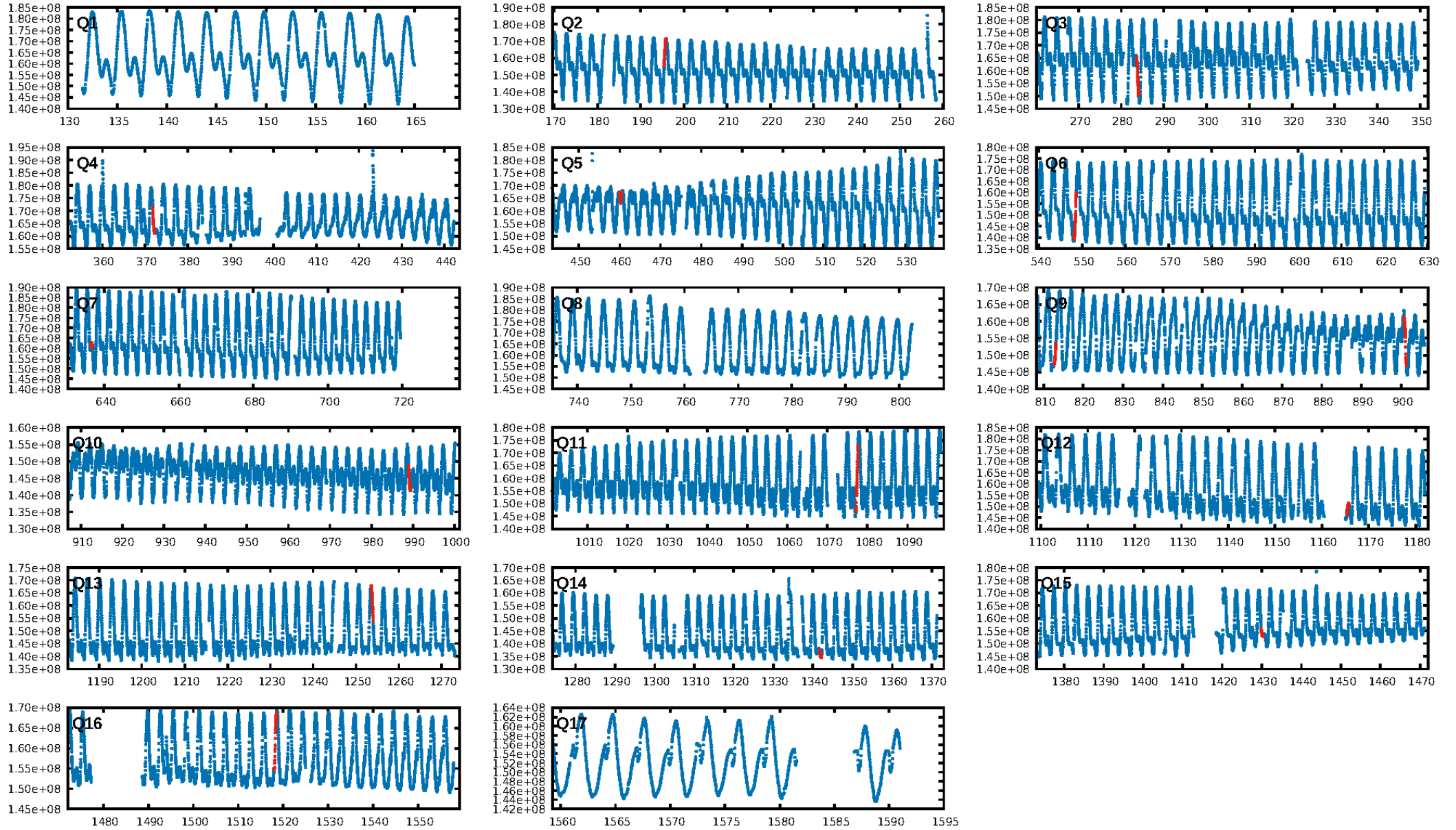
DiffImageQuality-fgm: 0.50 [7/14]

DiffImageOverlap-fno: 0.14 [2/14]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 01:36:06 Z

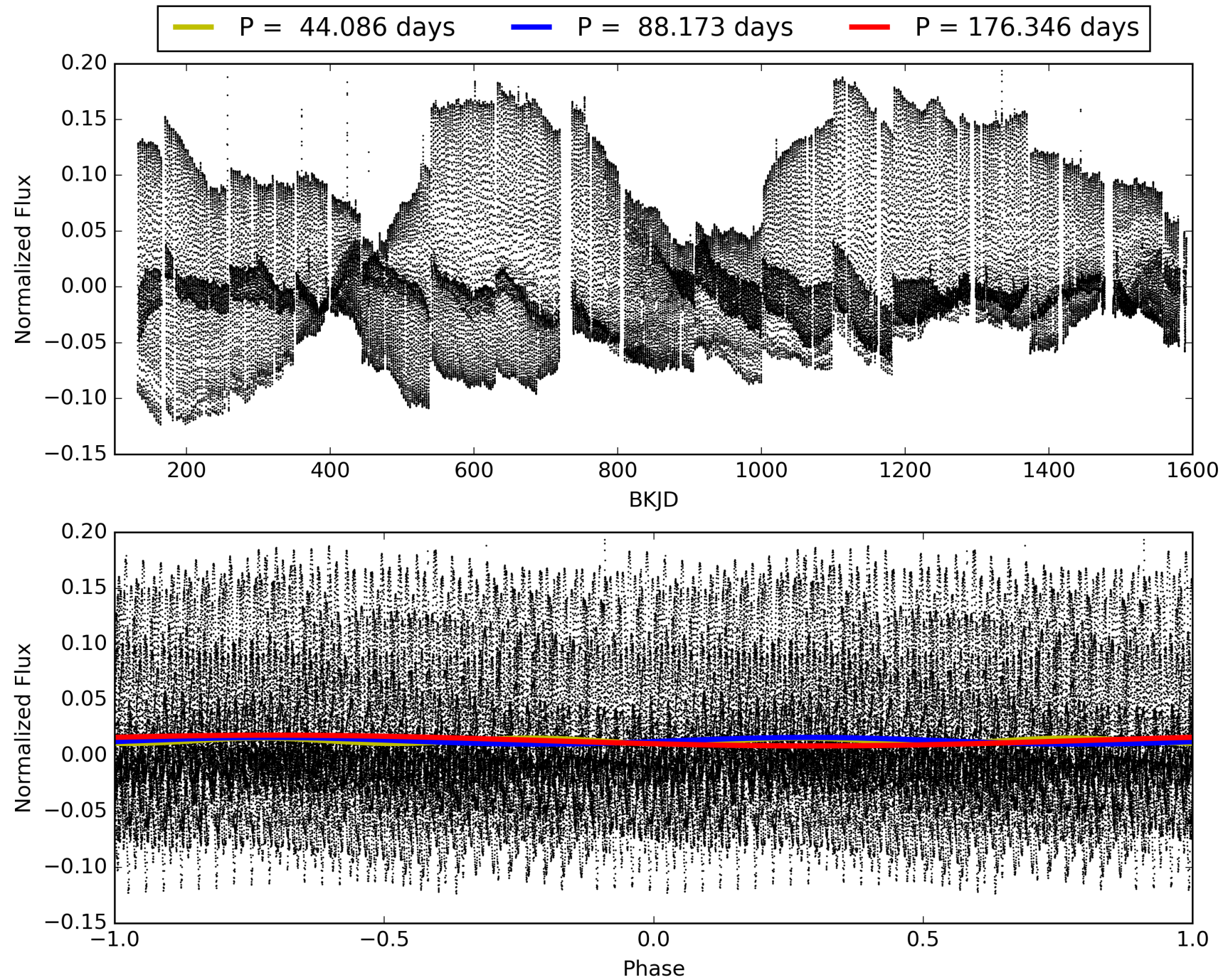
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 003324644-04, PDC Light Curves





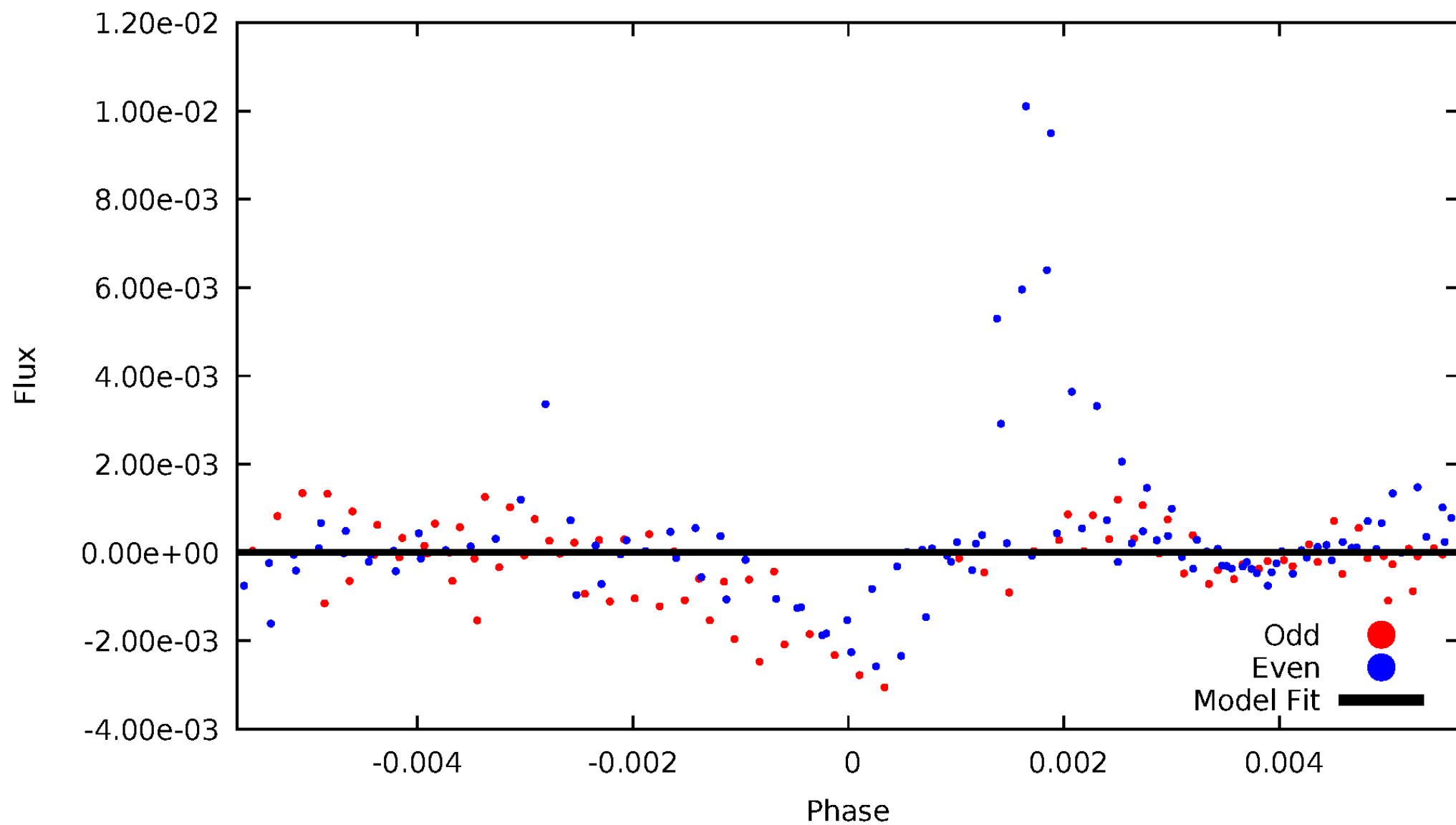
TCE 003324644-04





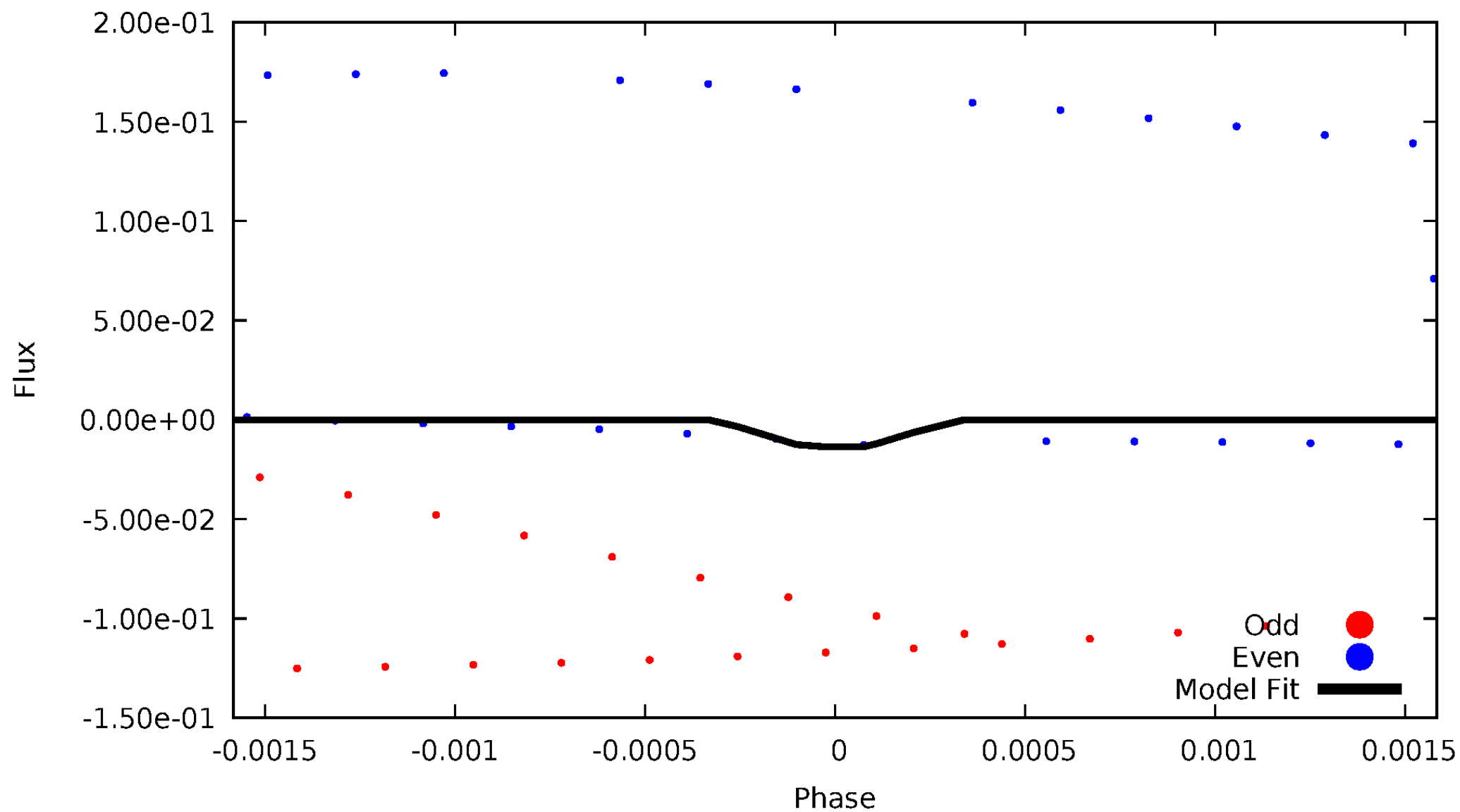
# DV Odd/Even

TCE 003324644-04



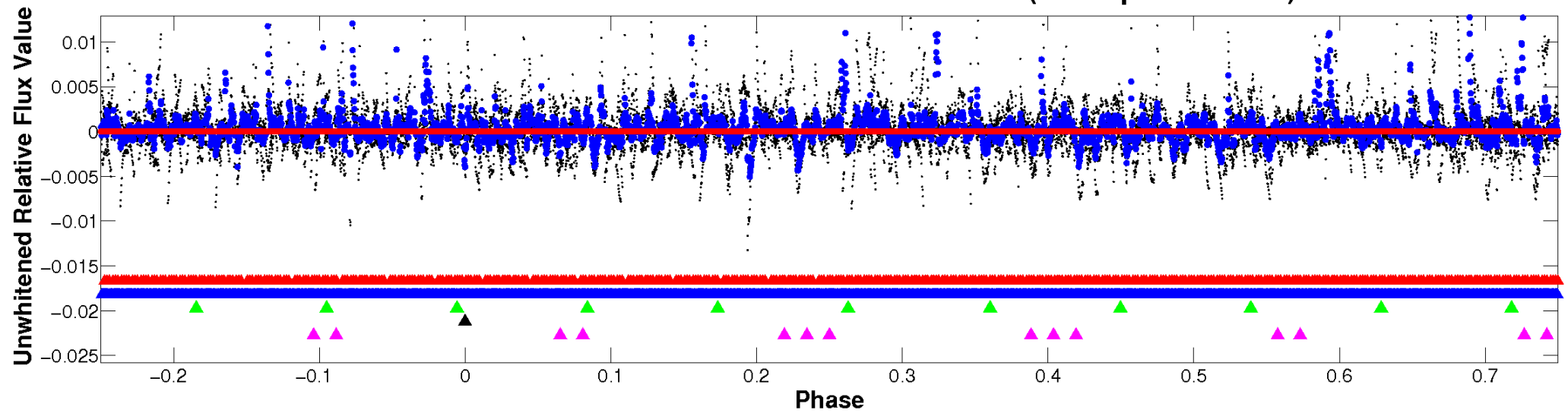
# ALT Odd/Even

TCE 003324644-04



# Non-Whitened Vs. Whitened Light Curve

**Planet 4 : Phased Unwhitened Flux Time Series (TPS Epoch/Period)**

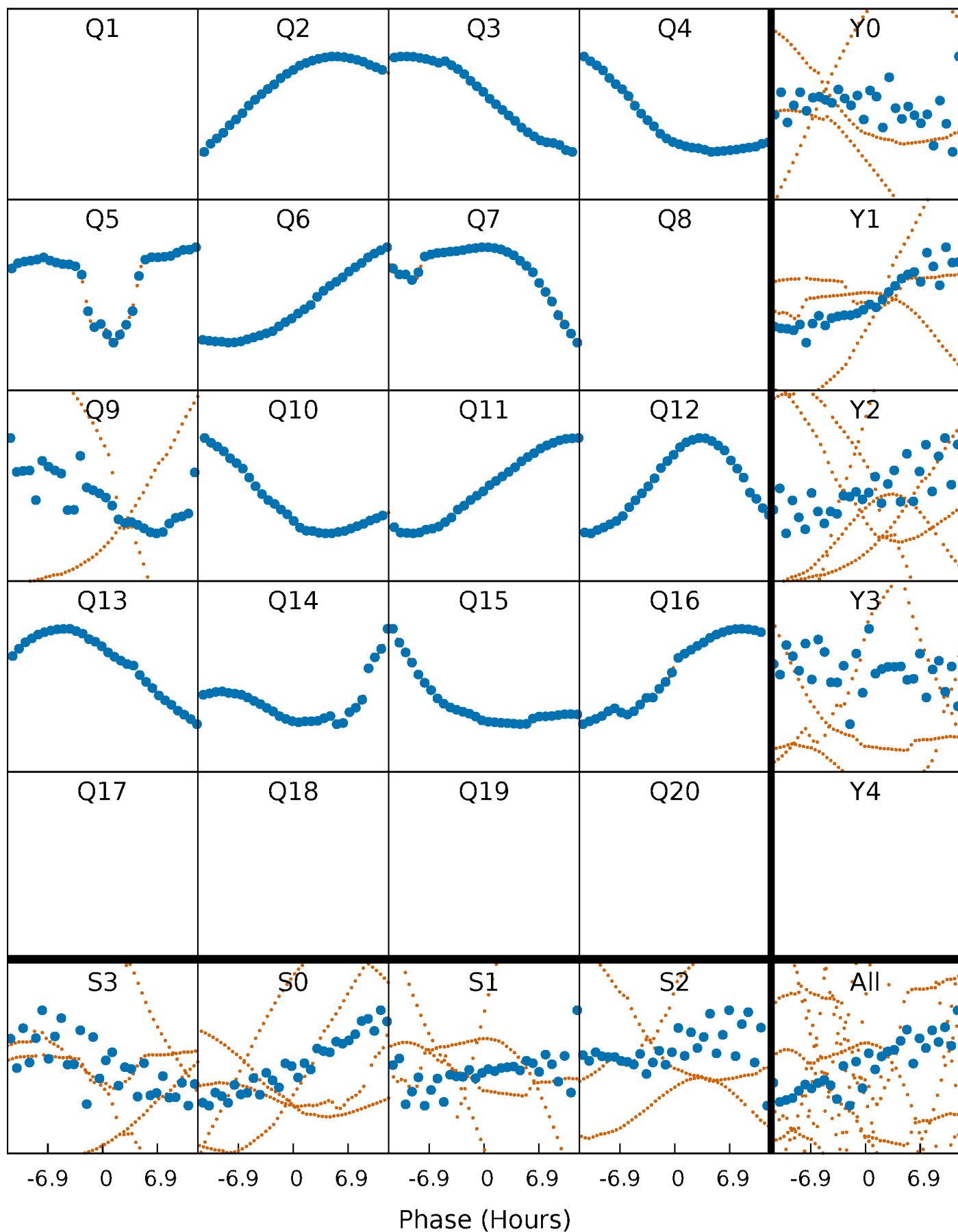


**Planet 4 : Phased Whitened Flux Time Series (TPS Epoch/Period)**



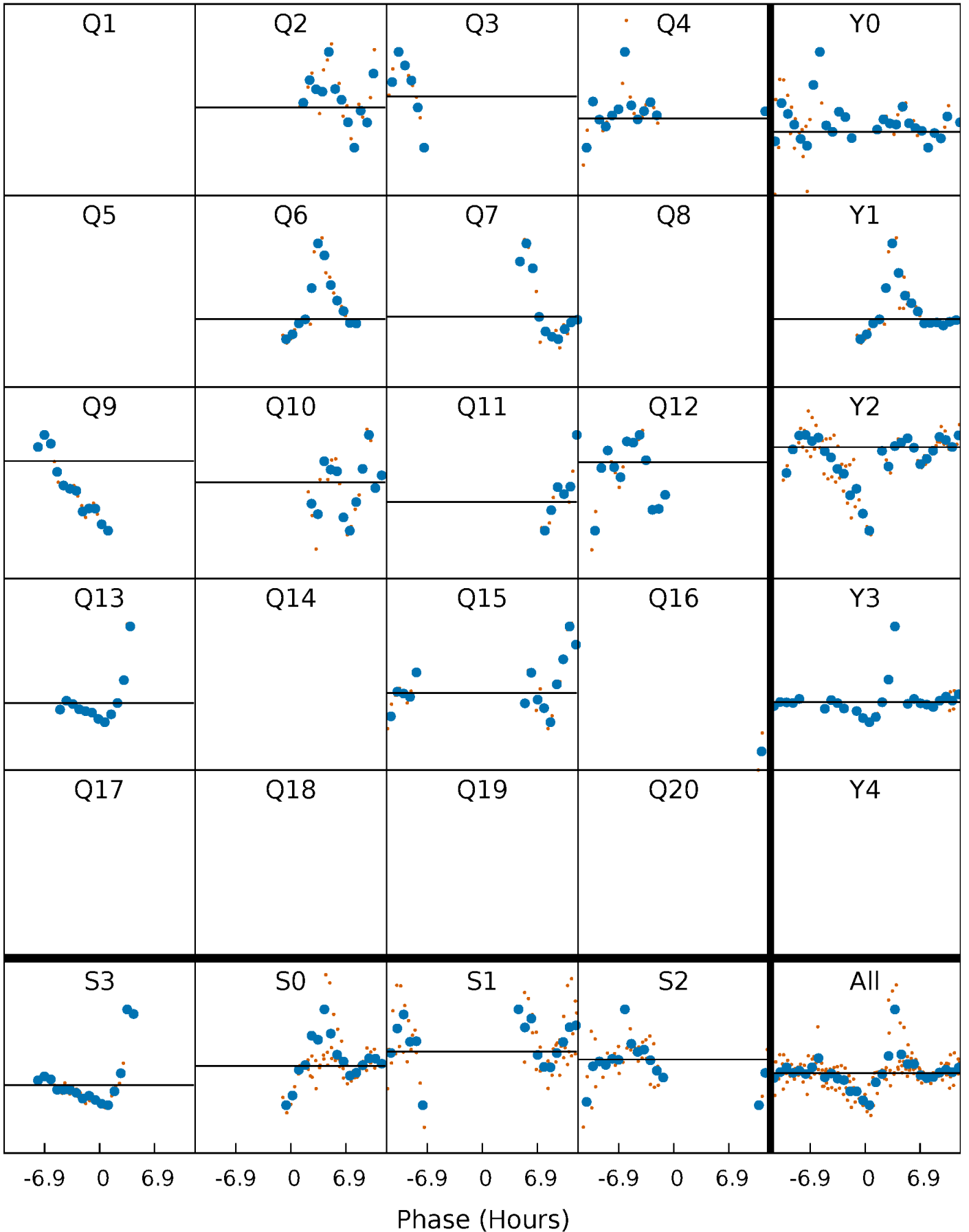
# PDC Quarter-Phased Transit Curves

TCE 003324644-04 P= 88.172974 Days  $T_0=195.668967$  (BKJD)



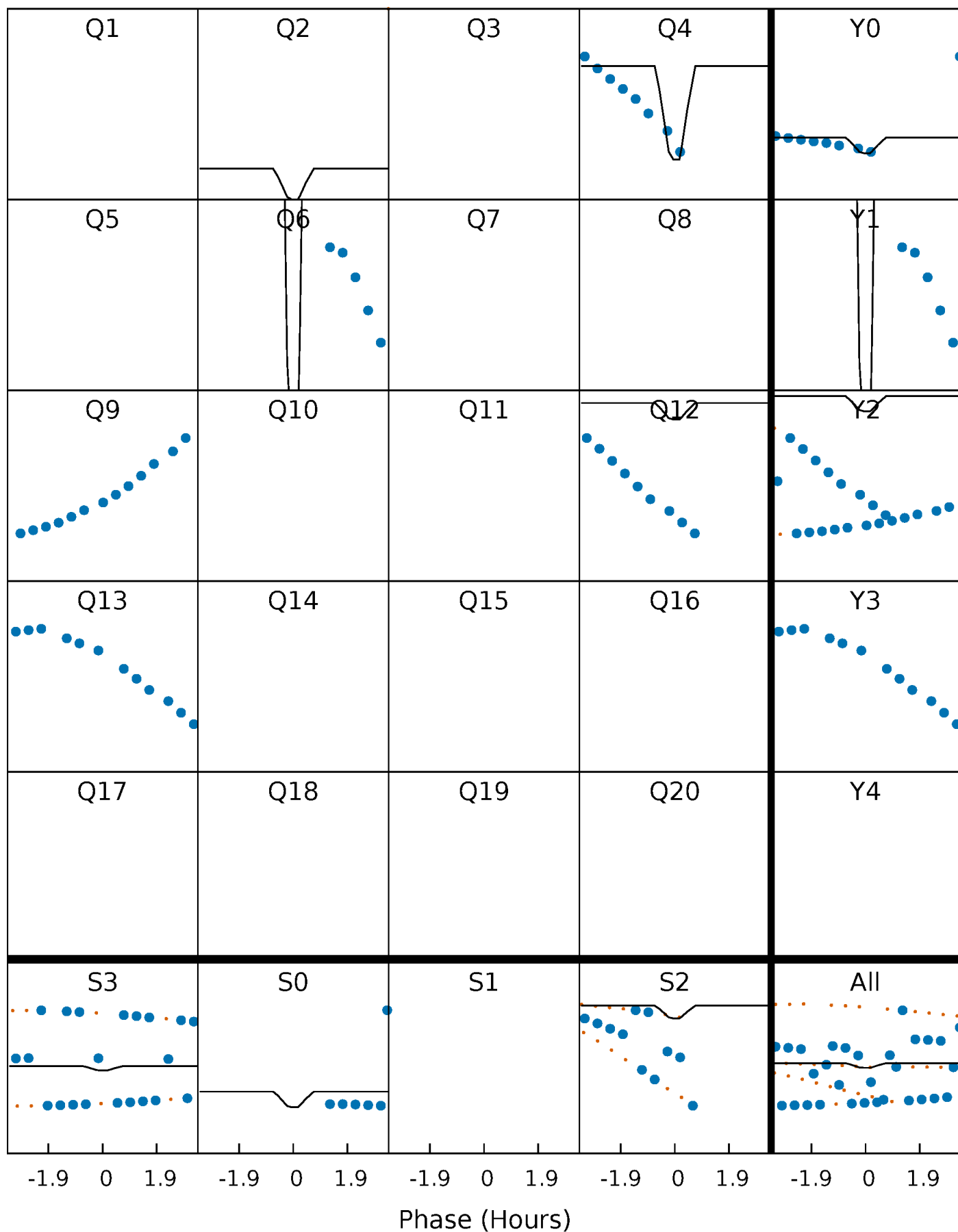
# DV Quarter-Phased Transit Curves

TCE 003324644-04   P= 88.172974 Days    $T_0=195.668967$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

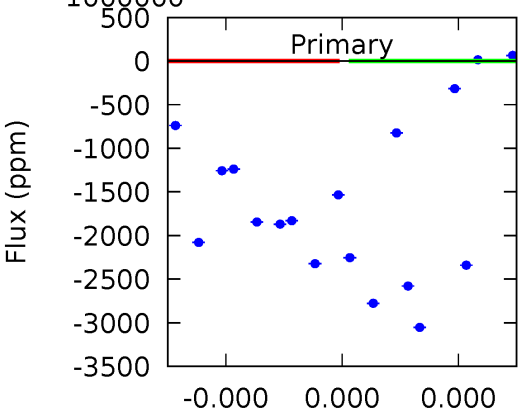
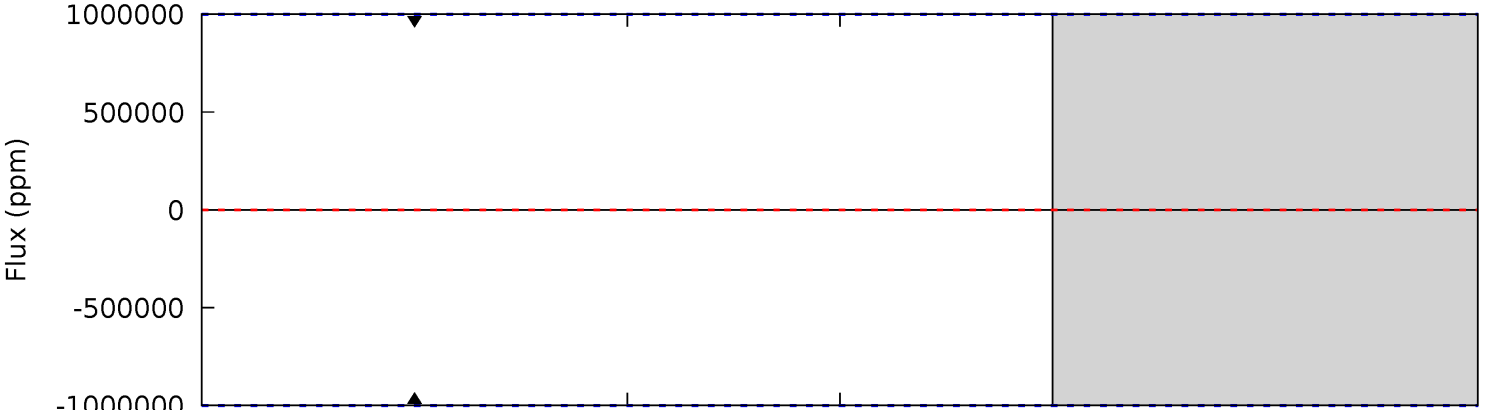
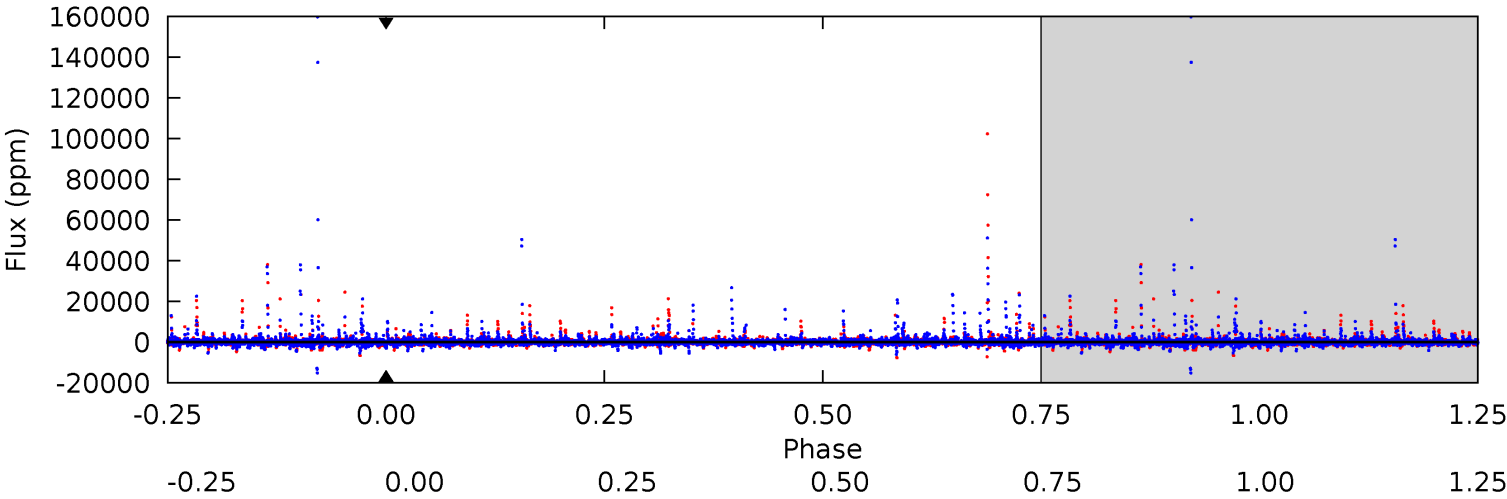
TCE 003324644-04 P= 88.172974 Days  $T_0=195.578143$  (BKJD)



# DV Model-Shift Uniqueness Test

003324644-04, P = 88.172974 Days, E = 107.495993 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0

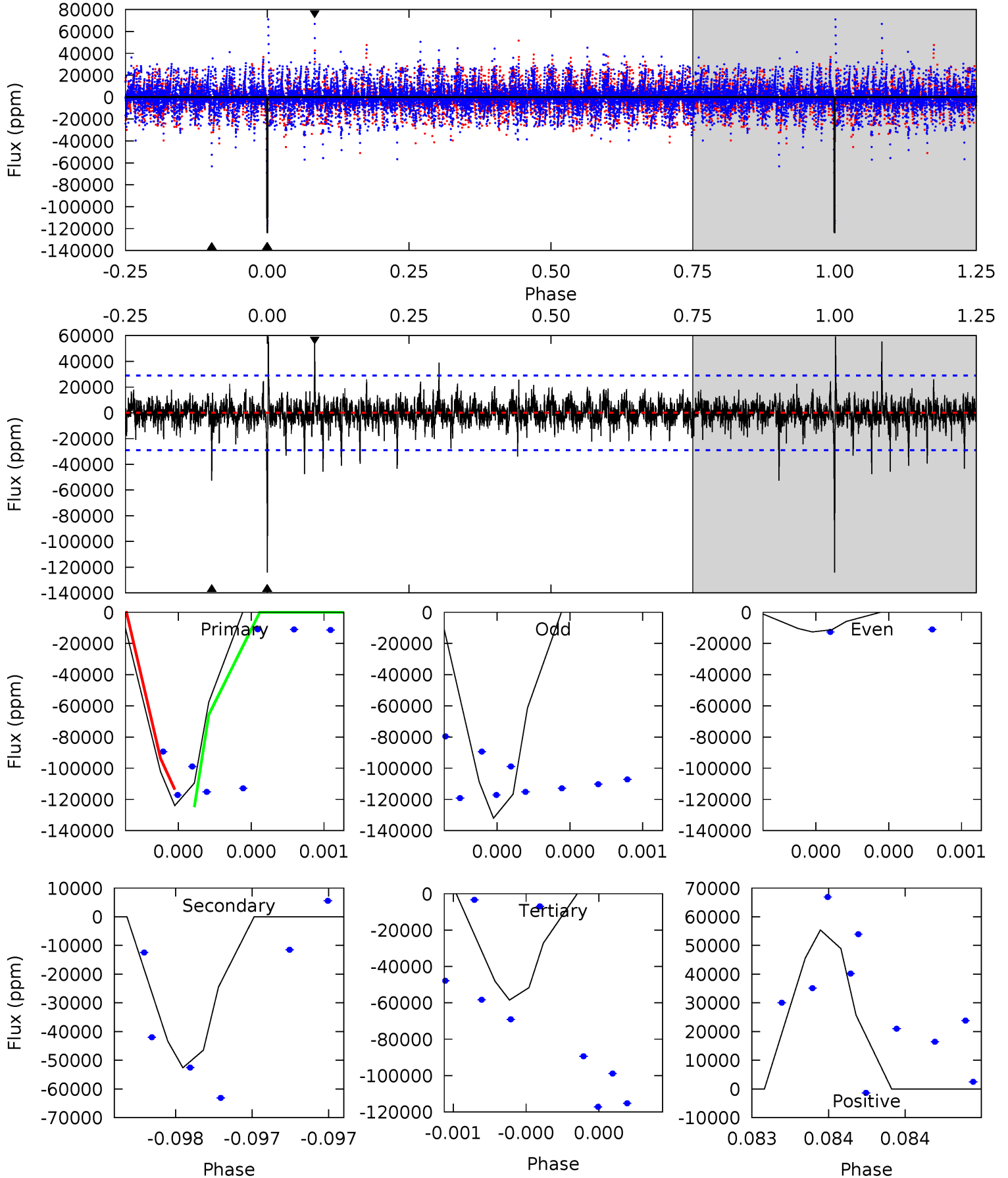




# Alt Model-Shift Uniqueness Test

003324644-04, P = 88.172974 Days, E = 107.405169 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
23.8	10.1	11.2	10.6	5.57	3.48	1.29	12.6	13.2	-1.12	-0.53	8.08	0.85	0.32	1.10



### Stellar Parameters For KIC 003324644

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$4705^{+128}_{-105}$	$2.667^{+0.402}_{-0.268}$	$-0.120^{+0.300}_{-0.200}$	$8.058^{+3.729}_{-3.051}$	$1.101^{+0.395}_{-0.158}$	$0.003^{+0.010}_{-0.002}$
	+3%/-2%	+15%/-10%	+250%/-167%	+46%/-38%	+36%/-14%	+322%/-63%
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 003324644-04 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$0 \pm 1000000$	$63.67^{+78.71}_{-43.44}$	$1288^{+141}_{-141}$	$3371^{+10330}_{-15446}$	$18^{+4469}_{-3303}$
Alt.	$-52607 \pm 5212$	$117.69^{+89.60}_{-73.08}$	$1287^{+157}_{-148}$	$5978^{+4363}_{-1199}$	$378^{+2032}_{-263}$

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

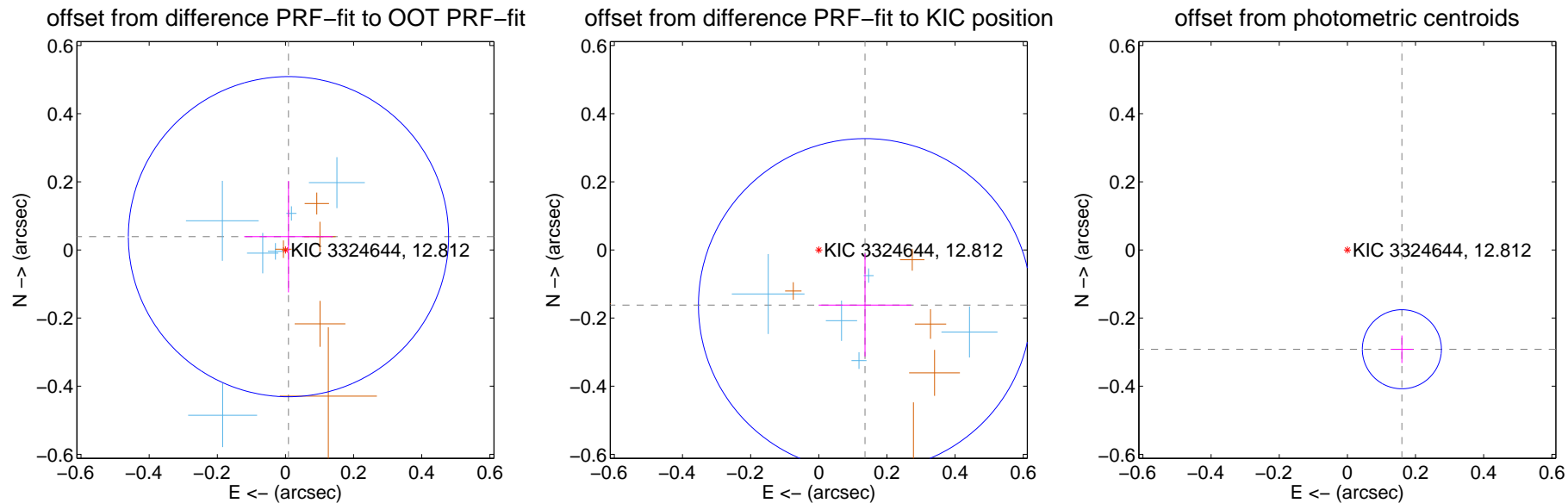
## DV Centroid Data

Supplemental centroid analysis for 003324644-04. Kepler magnitude: 12.81. Transit SNR -1.00

There are 7 quarters with good PRF difference image offsets

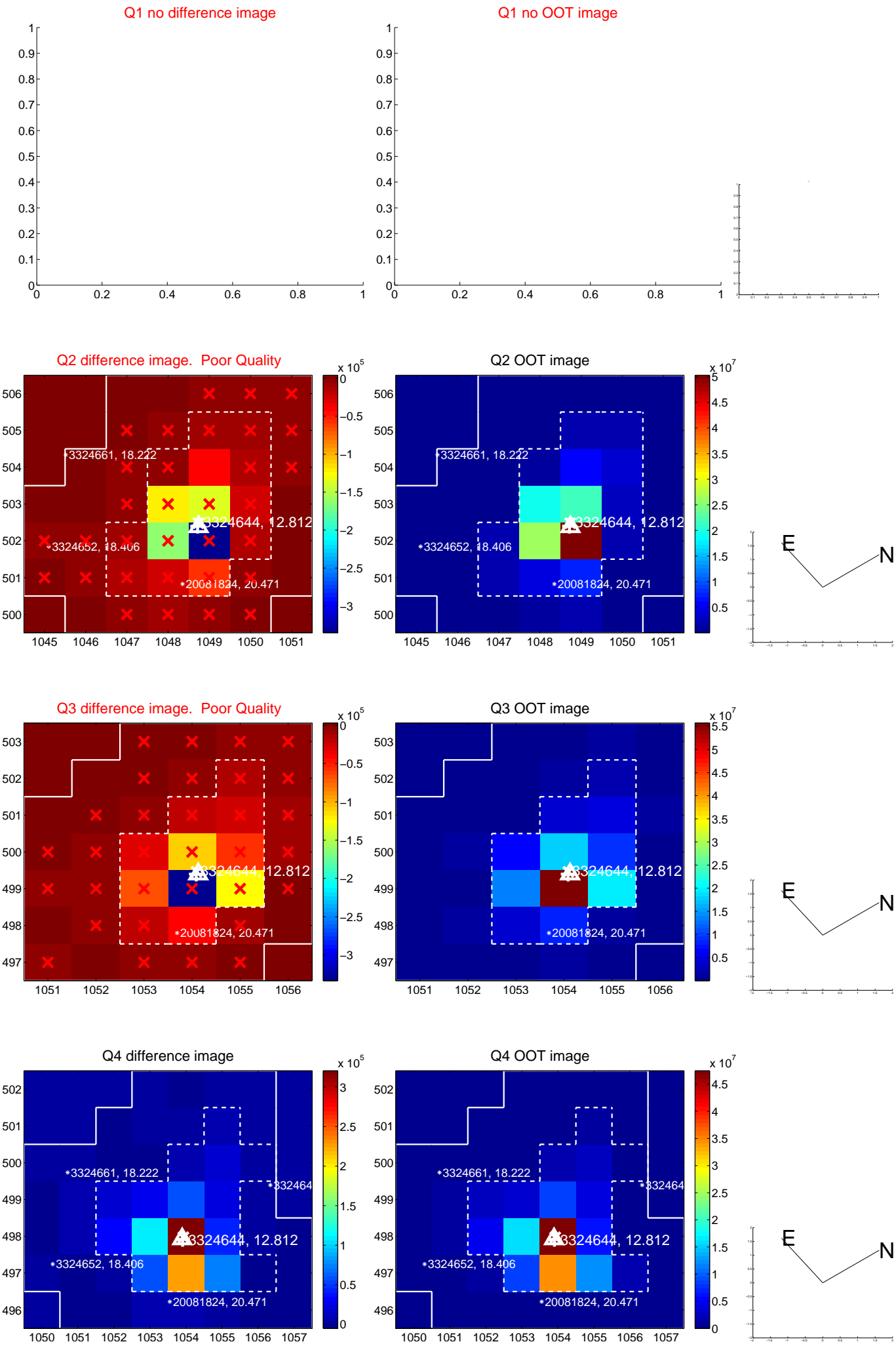
The direct PRF centroid is offset from the target star catalog position by about 0.22 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.040 \pm 0.157$	0.25	$-0.009 \pm 0.130$	$0.039 \pm 0.164$
PRF-fit source offset from KIC position	$0.211 \pm 0.163$	1.30	$-0.136 \pm 0.136$	$-0.162 \pm 0.151$
photometric centroid source offset	$0.33 \pm 0.04$	8.59	$-0.16 \pm 0.03$	$-0.29 \pm 0.04$

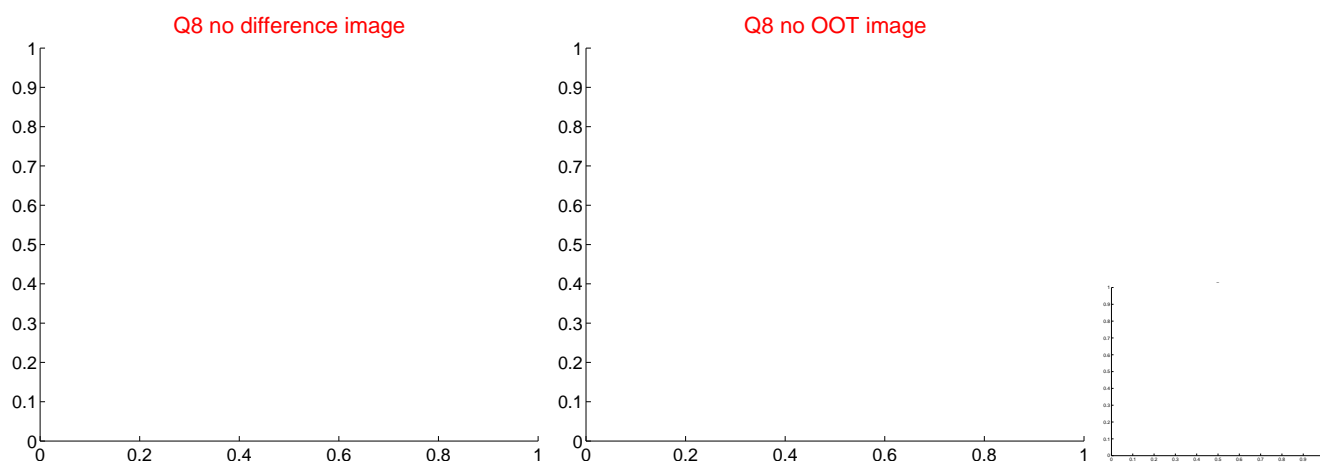
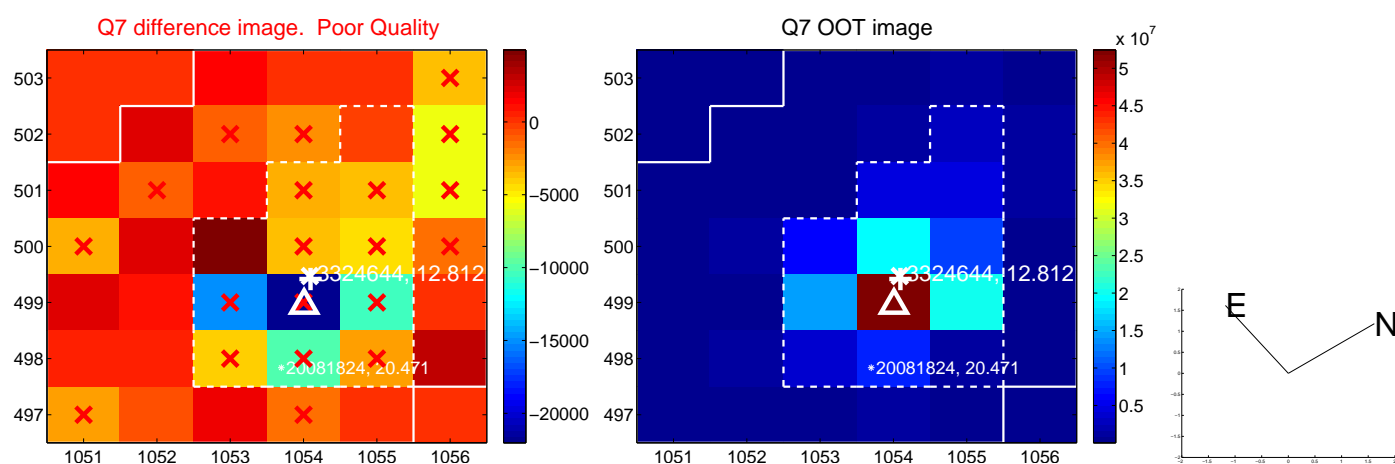
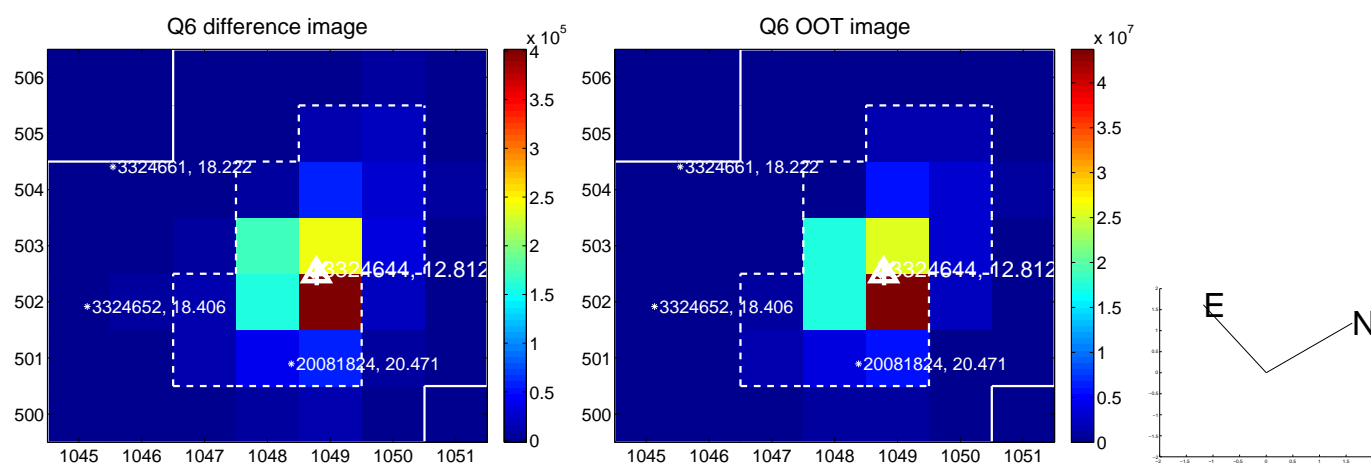
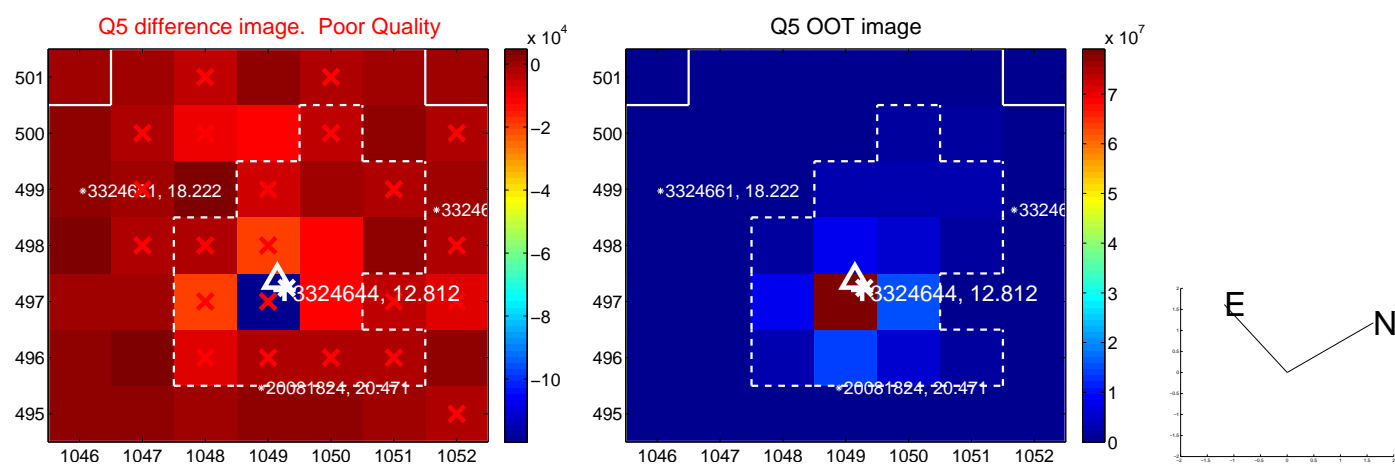


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

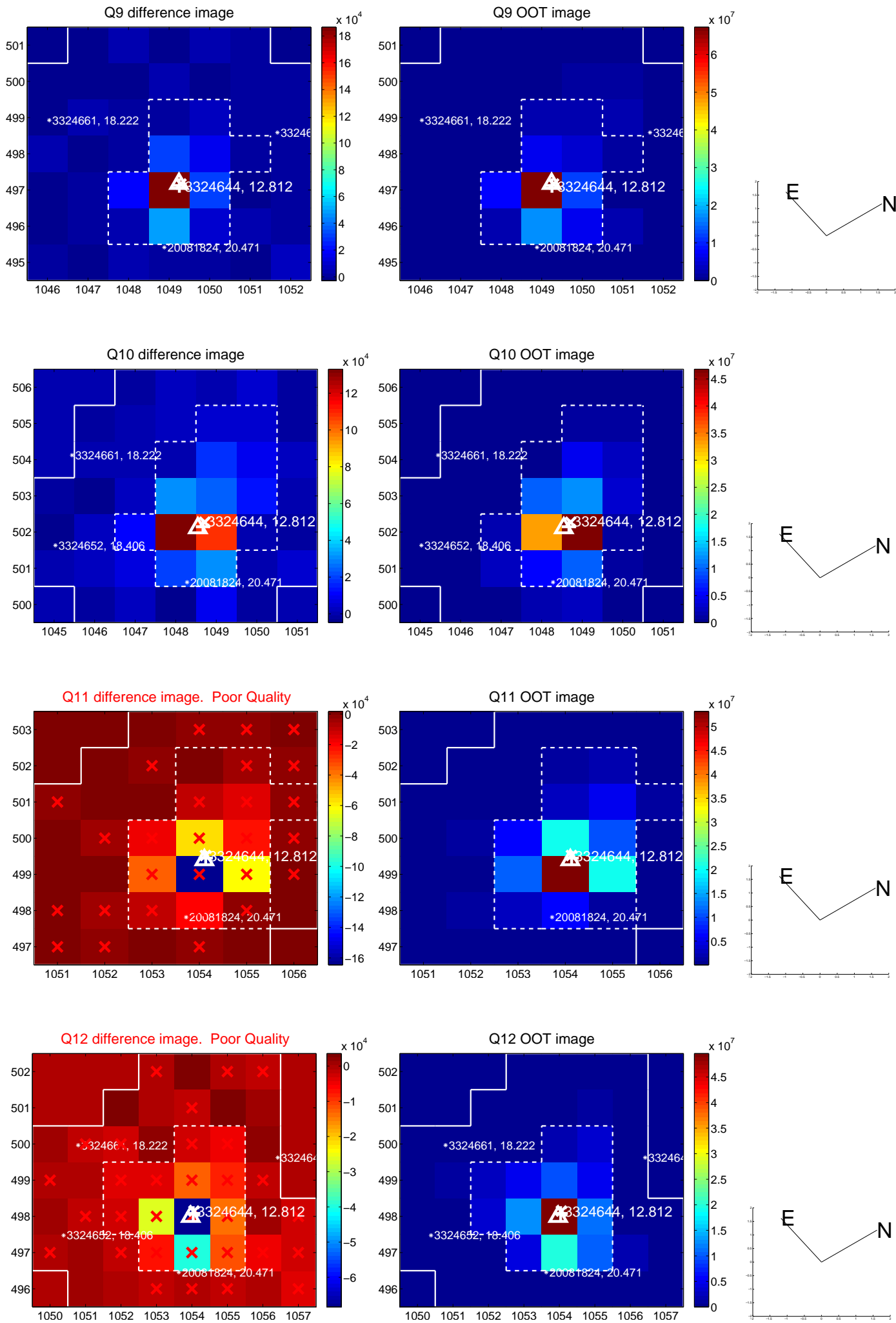
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



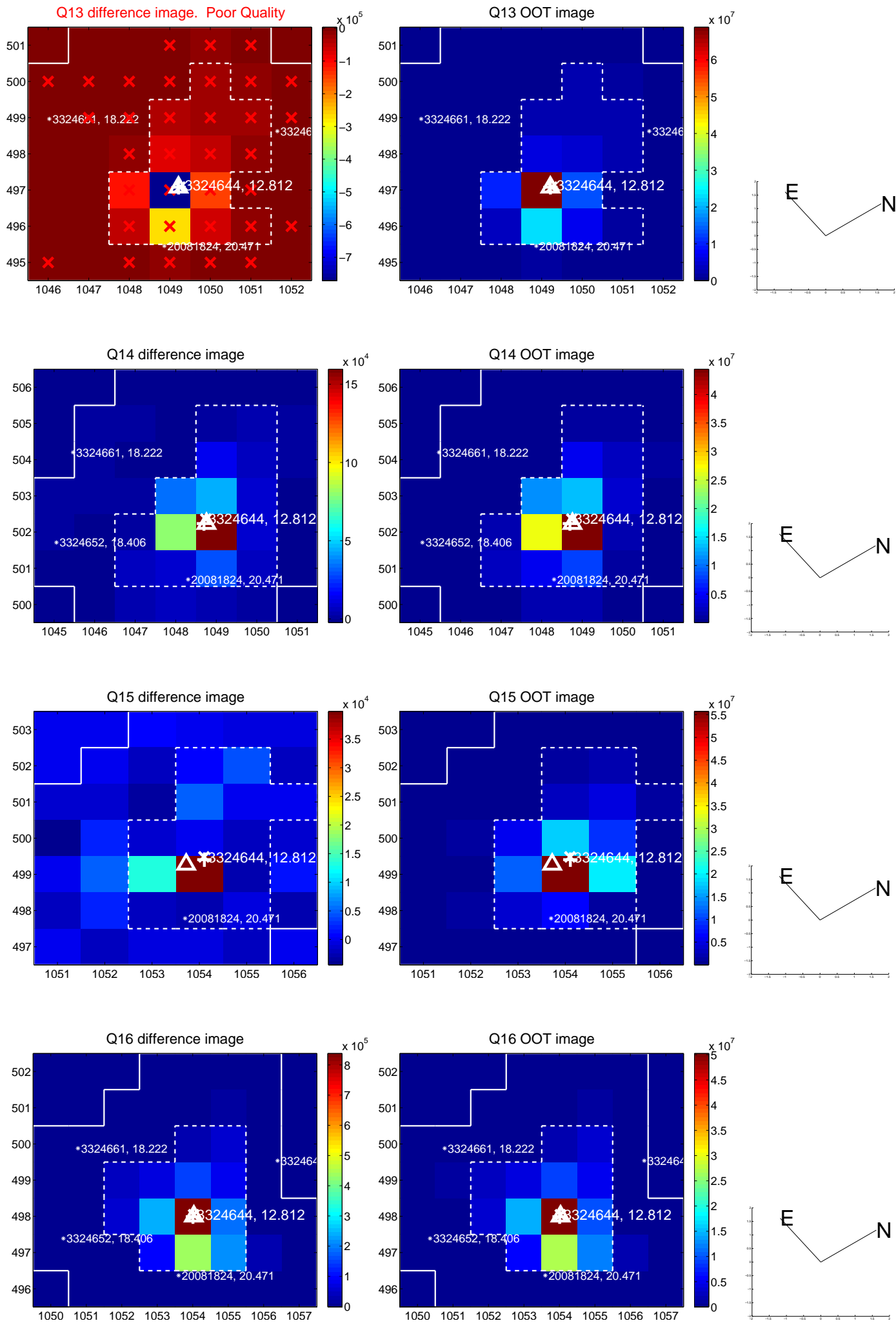
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

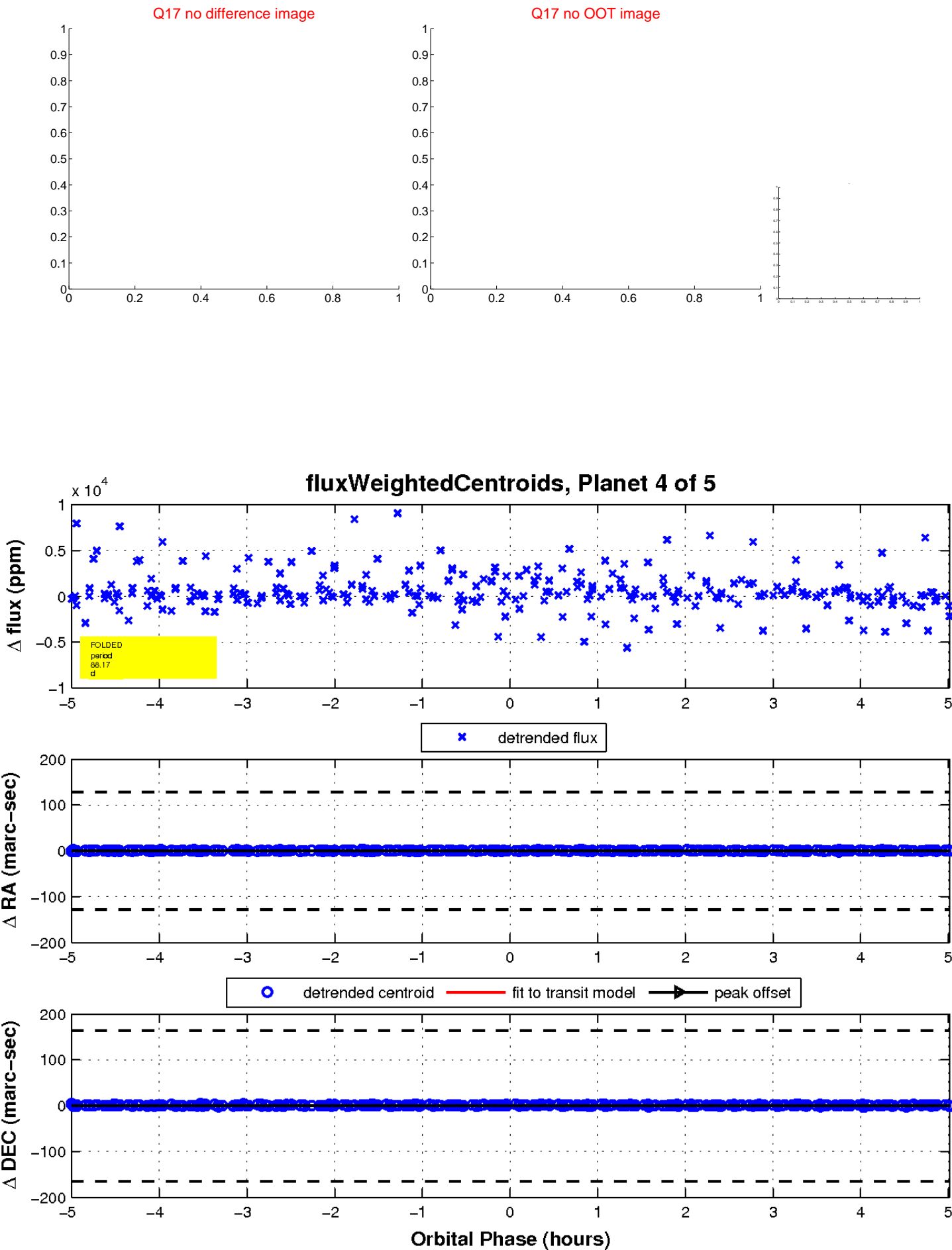


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



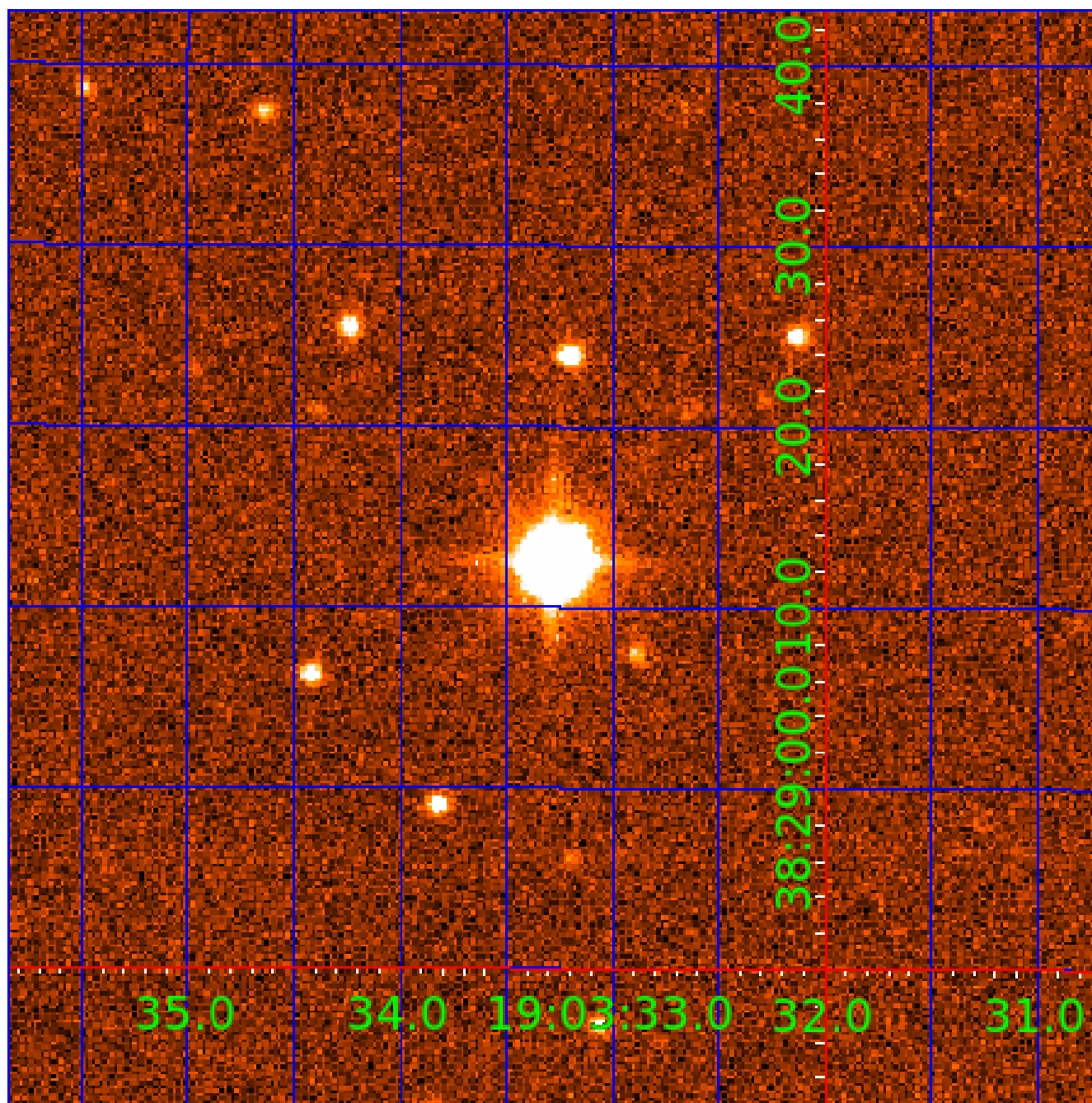


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 003324644

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003324644-01	OBS	3781.01	2.882421	131.646904	5136.8	7.704	112.9	96.6	8.06	4705	61.42	17019.28
003324644-02	OBS	No	0.960766	132.026438	253.4	4.315	20.0	13.3	8.06	4705	12.32	0.00
003324644-03	OBS	No	128.315547	218.845277	1034.7	2.667	14.5	1.6	8.06	4705	48.54	107.87
003324644-04	OBS	No	88.172974	195.668967	398.1	6.000	12.6	-1.0	8.06	4705	15.46	177.90
003324644-05	OBS	No	103.095671	214.989087	779.7	2.827	10.9	2.5	8.06	4705	25.02	144.42

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003324644-01	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV
003324644-02	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD
003324644-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_ZUMA_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV— MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
003324644-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—CENT_NOFITS—HALO_GHOST
003324644-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_SKYE_TRACKER—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT— MOD_POS_ALT—HALO_GHOST

**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.

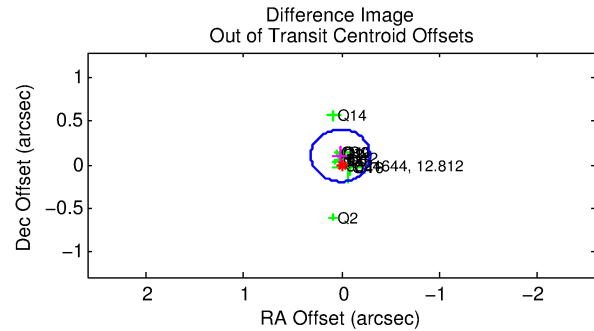
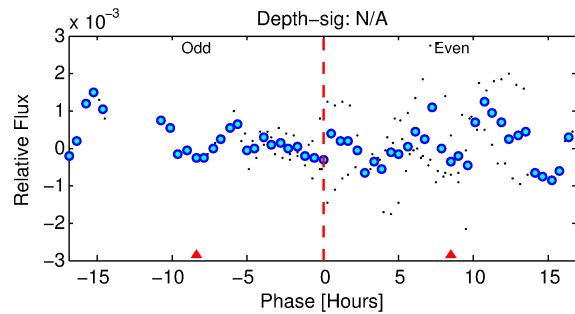
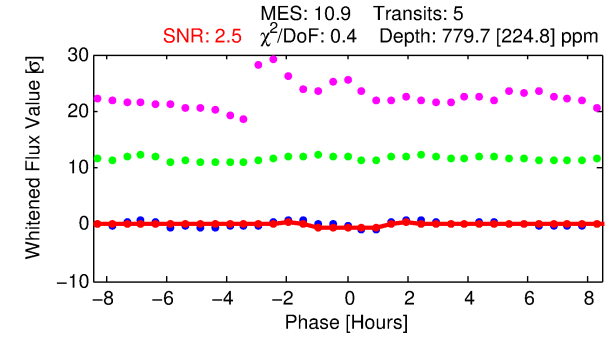
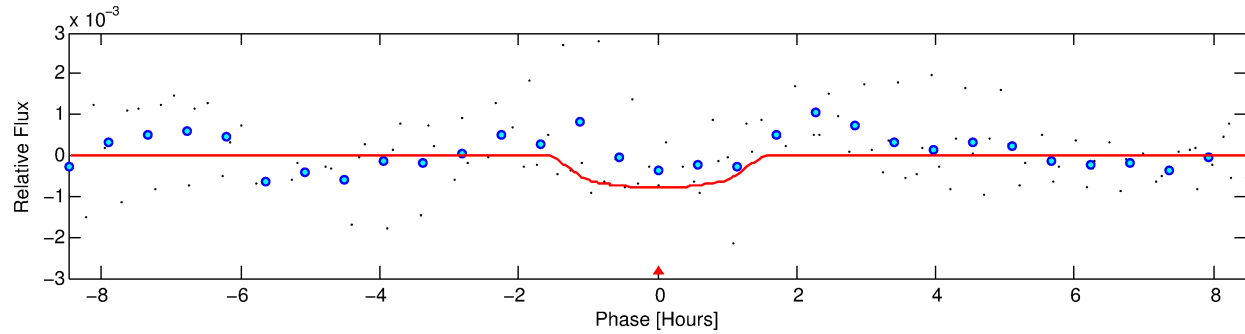
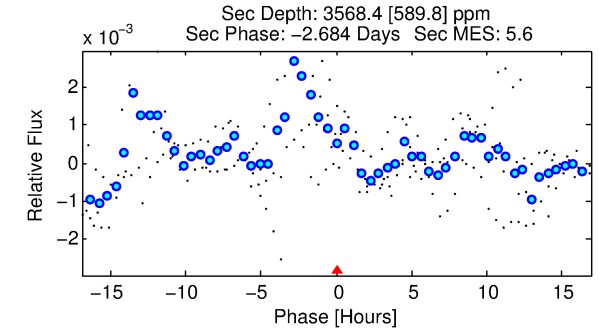
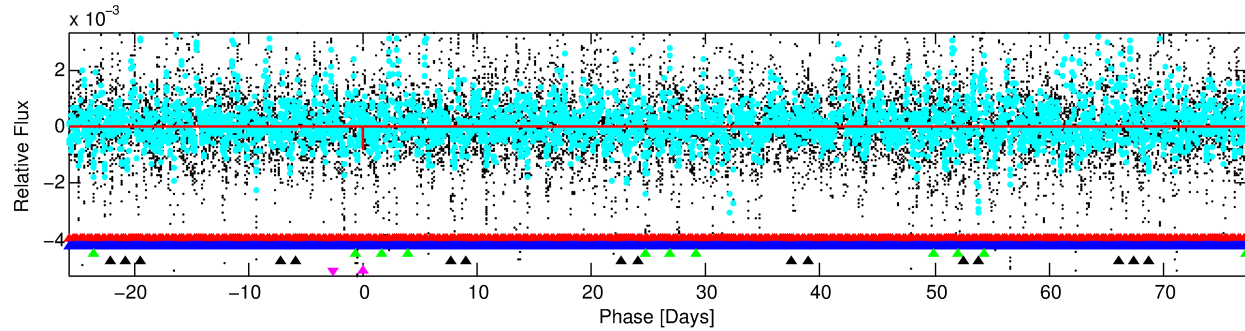
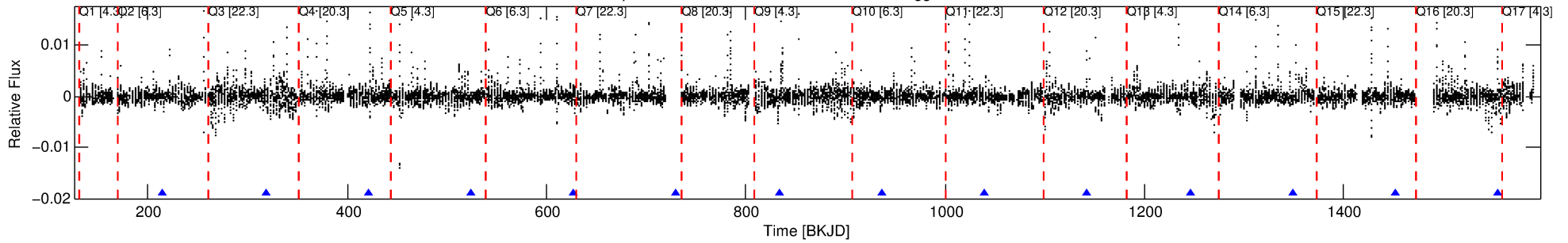
Ephemeris Match Information For 003324644-05

No Significant Match Found

# DV One-Page Summary

KIC: 3324644 Candidate: 5 of 5 Period: 103.096 d  
KOI: K03781 Corr: No Ephemeris Match

Kp: 12.81 R\*: 8.06 Rs Teff: 4705.0 K Logg: 2.67 Fe/H: -0.120



## DV Fit Results:

Period = 103.09567 [0.00188] d  
Epoch = 214.9891 [0.0148] BKJD  
Rp/R\* = 0.0285 [0.0482]  
a/R\* = 186.11 [1051.08]  
b = 0.78 [2.89]  
Seff = 144.42 [100.87]  
Teq = 884 [154] K  
Rp = 25.02 [43.90] Re  
a = 0.4443 [0.1939] AU  
Ag = 619.12 [2141.17] [0.29σ]  
Teffp = 6817 [5779] K [1.03σ]

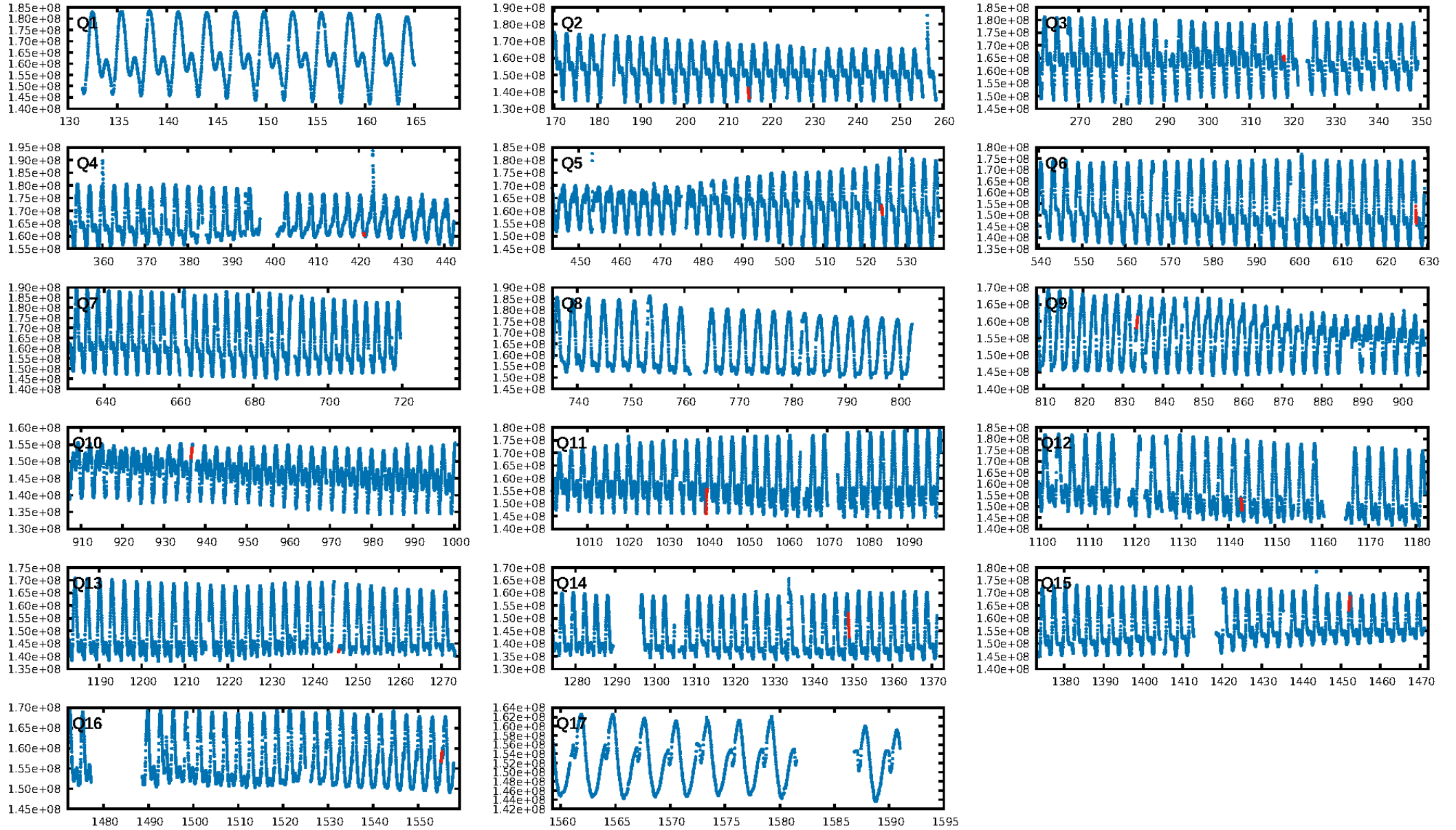
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [54.00σ]  
LongPeriod-sig: 100.0% [155.72σ]  
ModelChiSquare2-sig: 84.1%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [5/5]  
GhostDiagnostic-chr: -0.07563  
Centroid-sig: 1.2%  
Centroid-so: 1.004 arcsec [2.43σ]  
OotOffset-rm: 0.106 arcsec [1.05σ]  
KicOffset-rm: 0.205 arcsec [2.71σ]  
OotOffset-st: 4/3/3/2 [12]  
KicOffset-st: 4/3/3/2 [12]  
DiffImageQuality-fgm: 0.42 [5/12]  
DiffImageOverlap-fno: 0.08 [1/12]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 01:36:10 Z

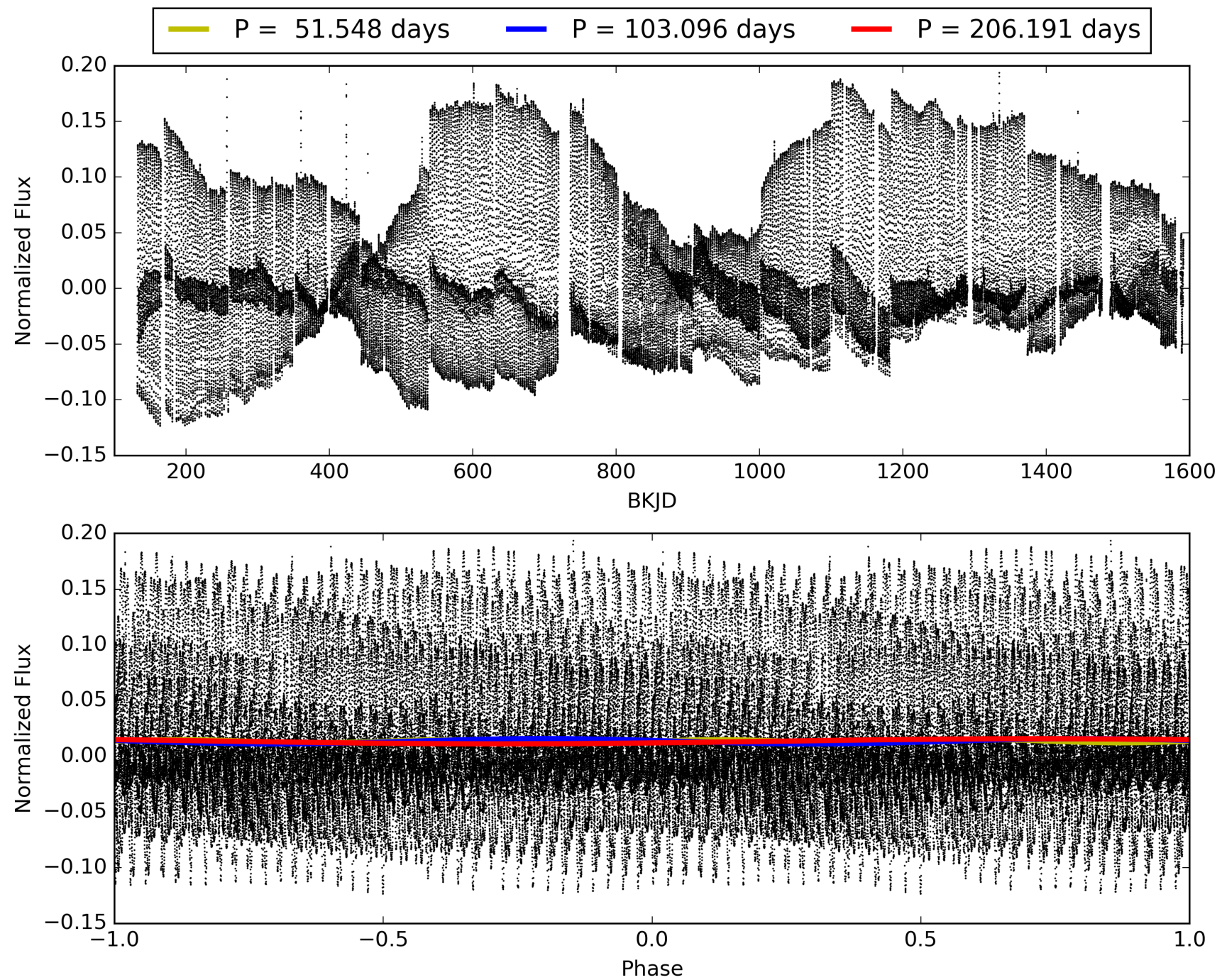
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 003324644-05, PDC Light Curves



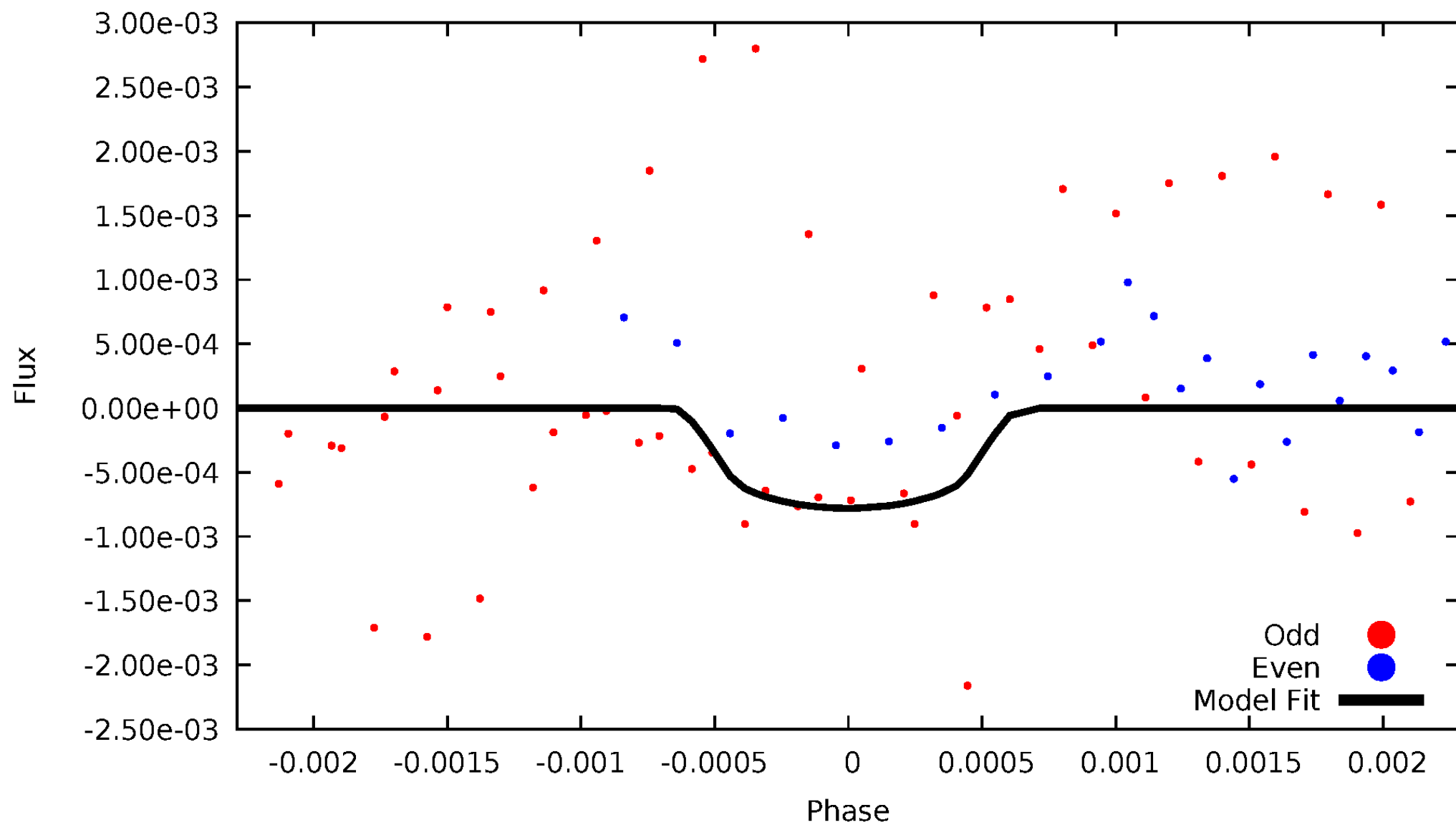


TCE 003324644-05



# DV Odd/Even

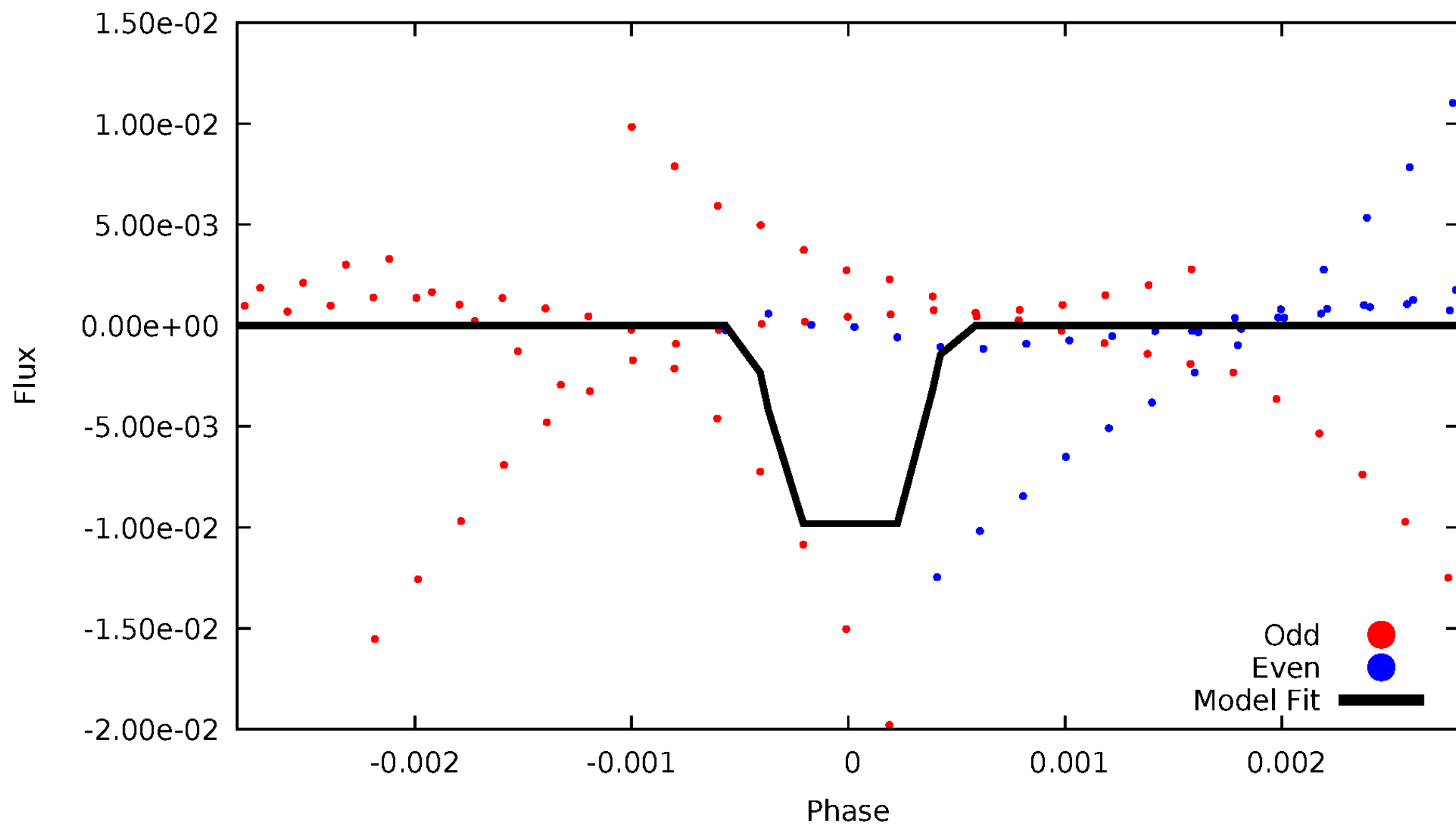
TCE 003324644-05





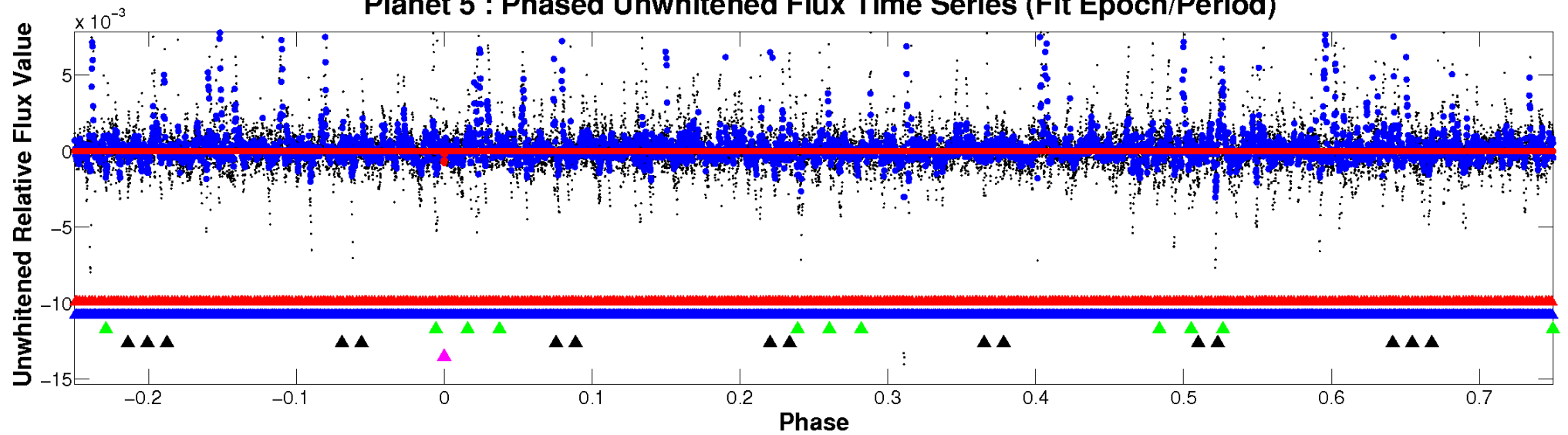
# ALT Odd/Even

TCE 003324644-05

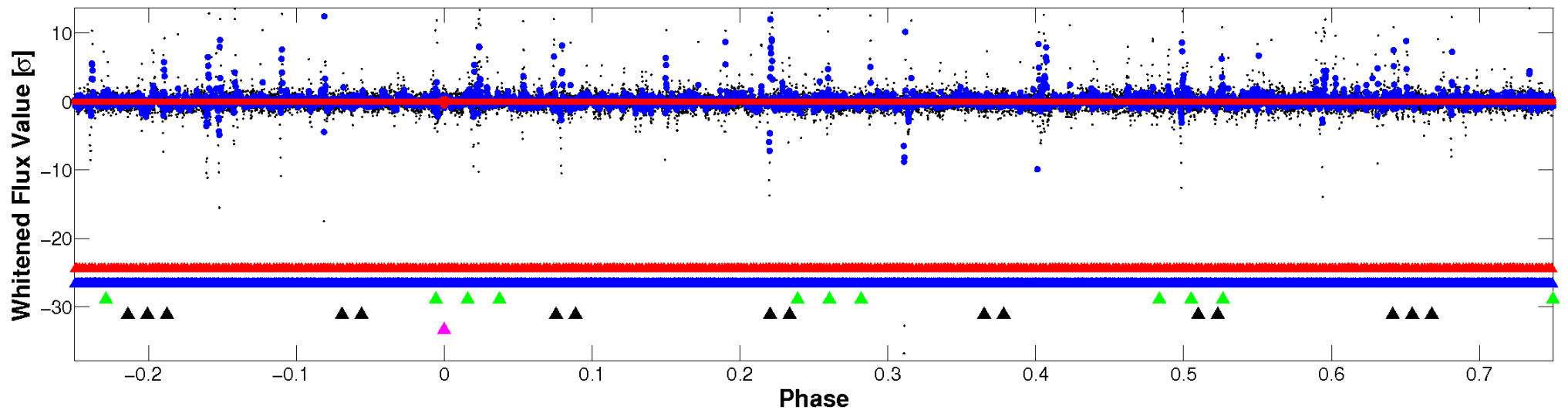


# Non-Whitened Vs. Whitened Light Curve

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

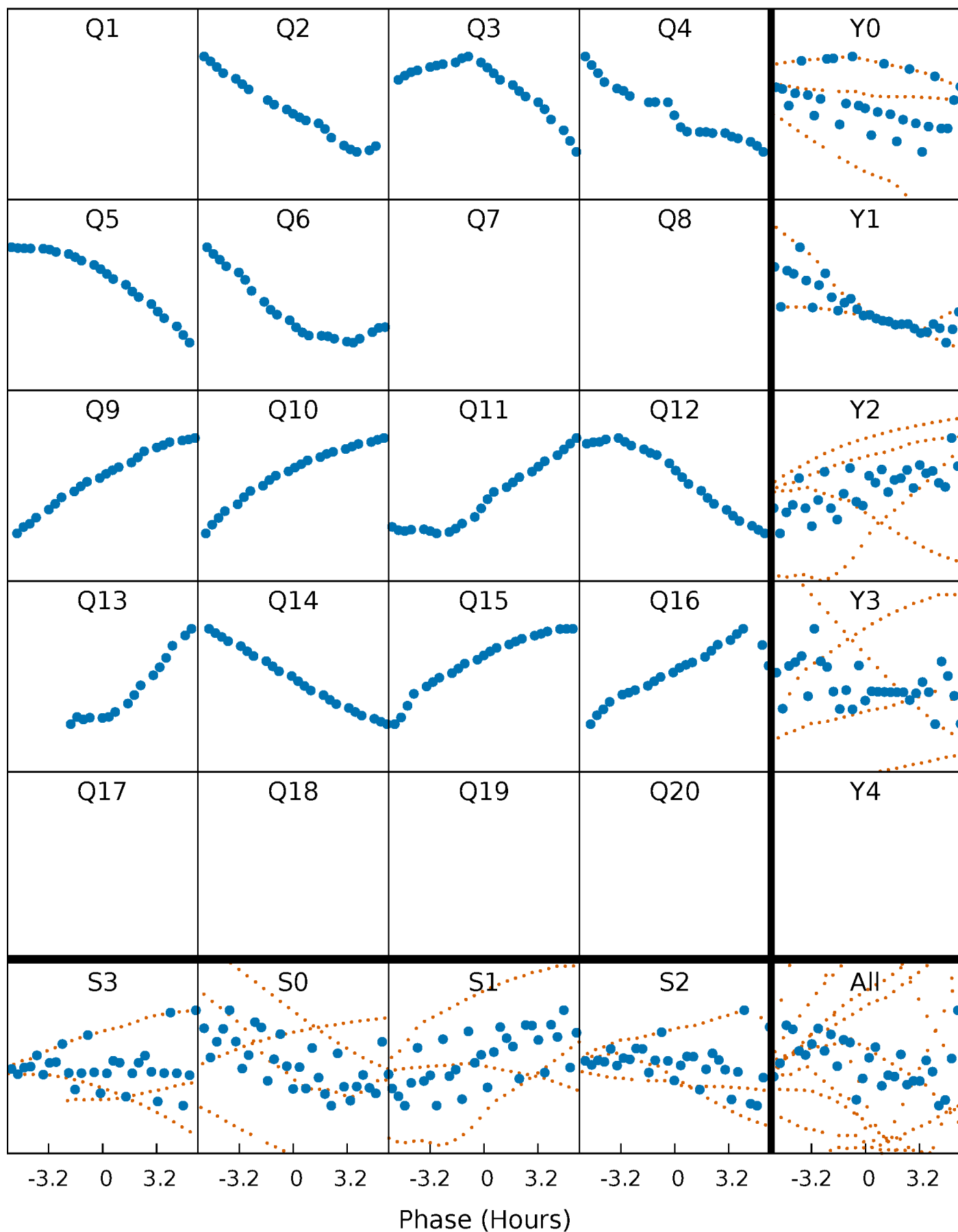


## Planet 5 : Phased Whitened Flux Time Series (Fit Epoch/Period)



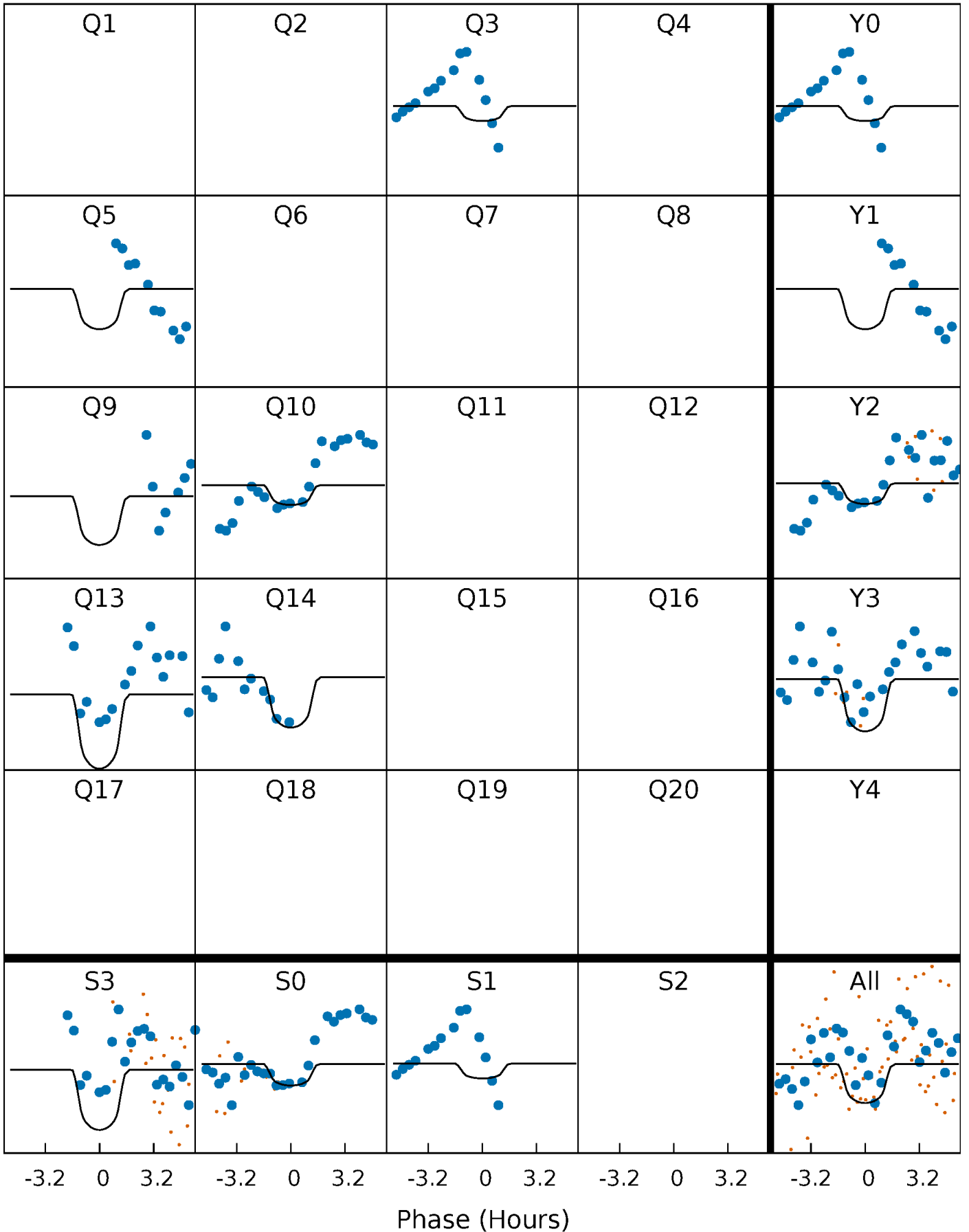
# PDC Quarter-Phased Transit Curves

TCE 003324644-05   P=103.095671 Days    $T_0=214.989087$  (BKJD)



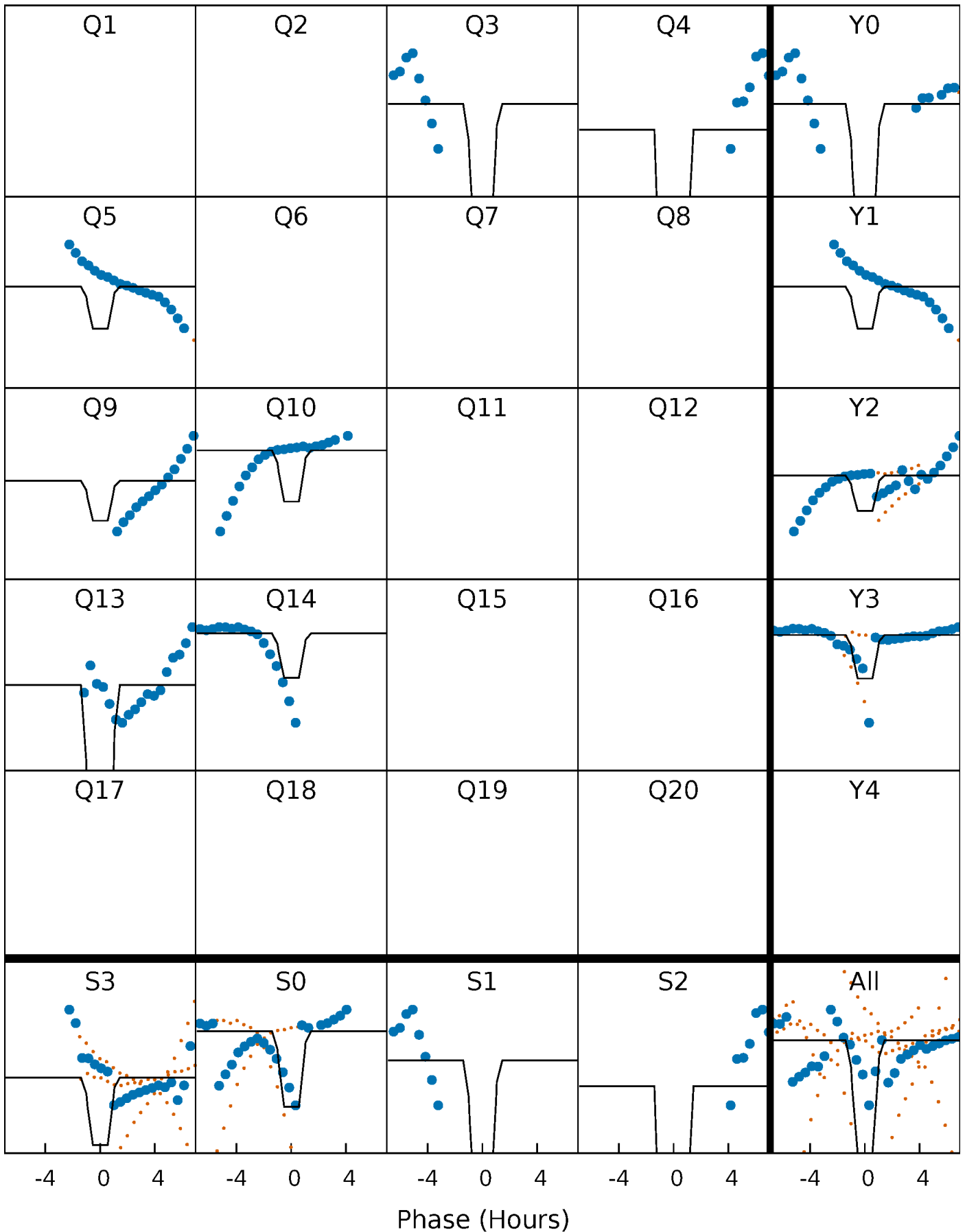
# DV Quarter-Phased Transit Curves

TCE 003324644-05     $P=103.095671$  Days     $T_0=214.989087$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

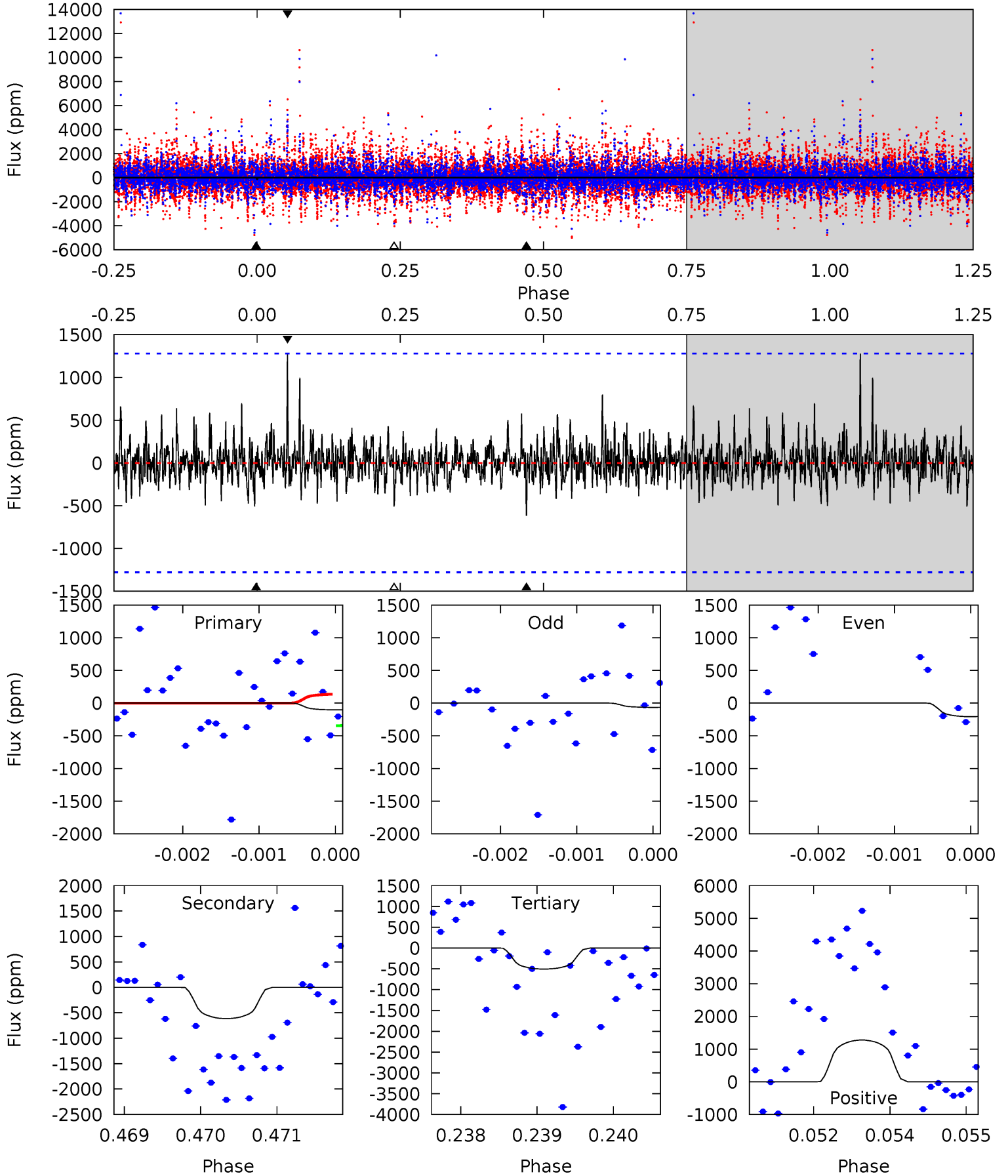
TCE 003324644-05 P=103.072260 Days  $T_0=215.195118$  (BKJD)



# DV Model-Shift Uniqueness Test

003324644-05, P = 103.095671 Days, E = 111.893416 Days

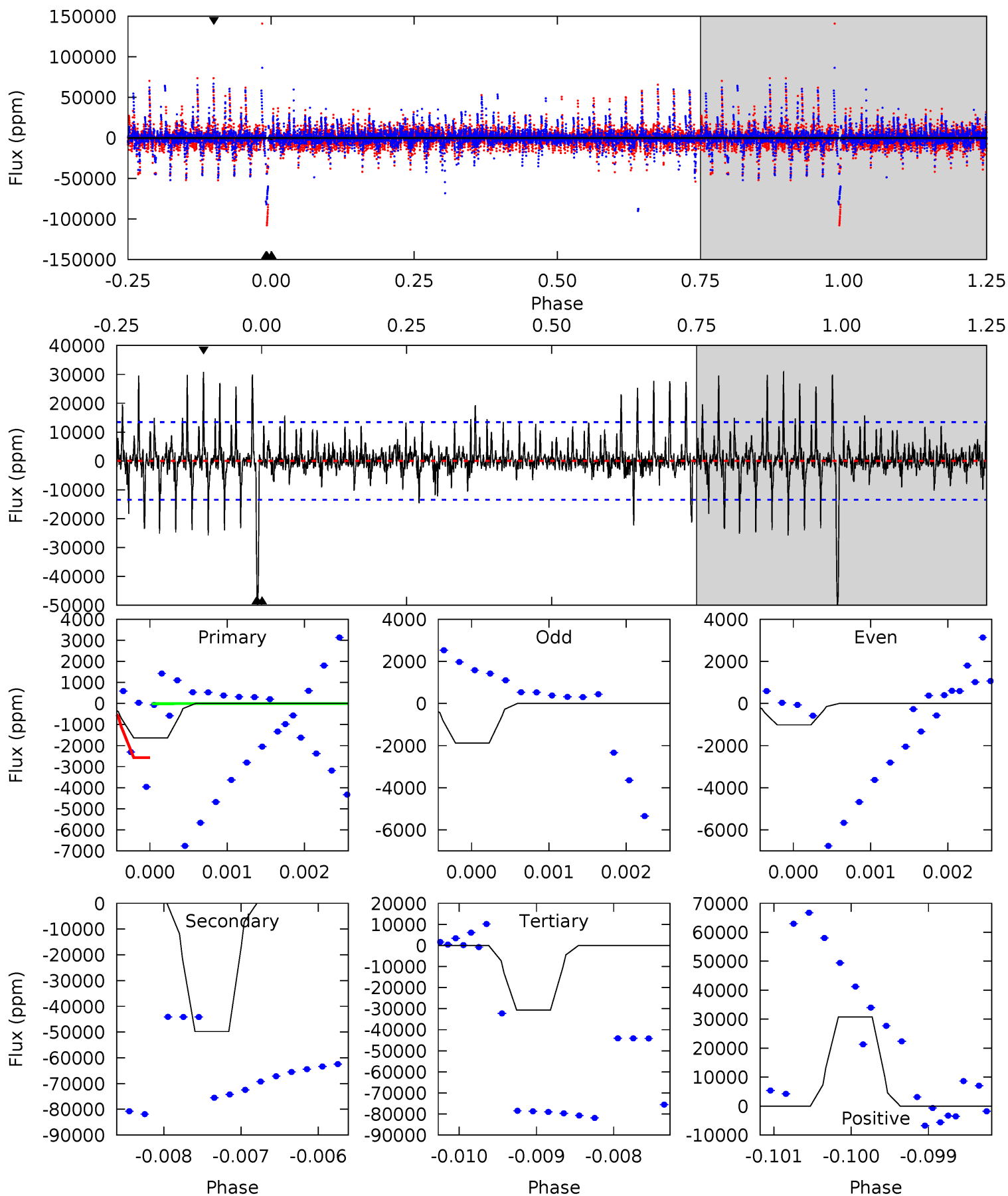
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0.44	2.61	2.15	5.41	5.42	3.24	0.74	-1.71	-4.98	0.46	-2.81	0.19	-0.14	0.67	0.46



# Alt Model-Shift Uniqueness Test

003324644-05, P = 103.072260 Days, E = 112.122858 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0.66	20.2	12.4	12.5	5.45	3.29	1.93	-11.8	-11.8	7.73	7.70	0.14	-20.5	0.38	0.53





### Stellar Parameters For KIC 003324644

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$4705^{+128}_{-105}$	$2.667^{+0.402}_{-0.268}$	$-0.120^{+0.300}_{-0.200}$	$8.058^{+3.729}_{-3.051}$	$1.101^{+0.395}_{-0.158}$	$0.003^{+0.010}_{-0.002}$
	+3%/-2%	+15%/-10%	+250%/-167%	+46%/-38%	+36%/-14%	+322%/-63%
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 003324644-05 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-616 \pm 236$	$38.40^{+40.54}_{-24.68}$	$1213^{+144}_{-129}$	$3694^{+1987}_{-667}$	$46^{+334}_{-36}$
Alt.	$-49785 \pm 2468$	$86.43^{+49.41}_{-43.23}$	$1234^{+148}_{-139}$	$7061^{+3393}_{-1368}$	$812^{+2410}_{-498}$

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

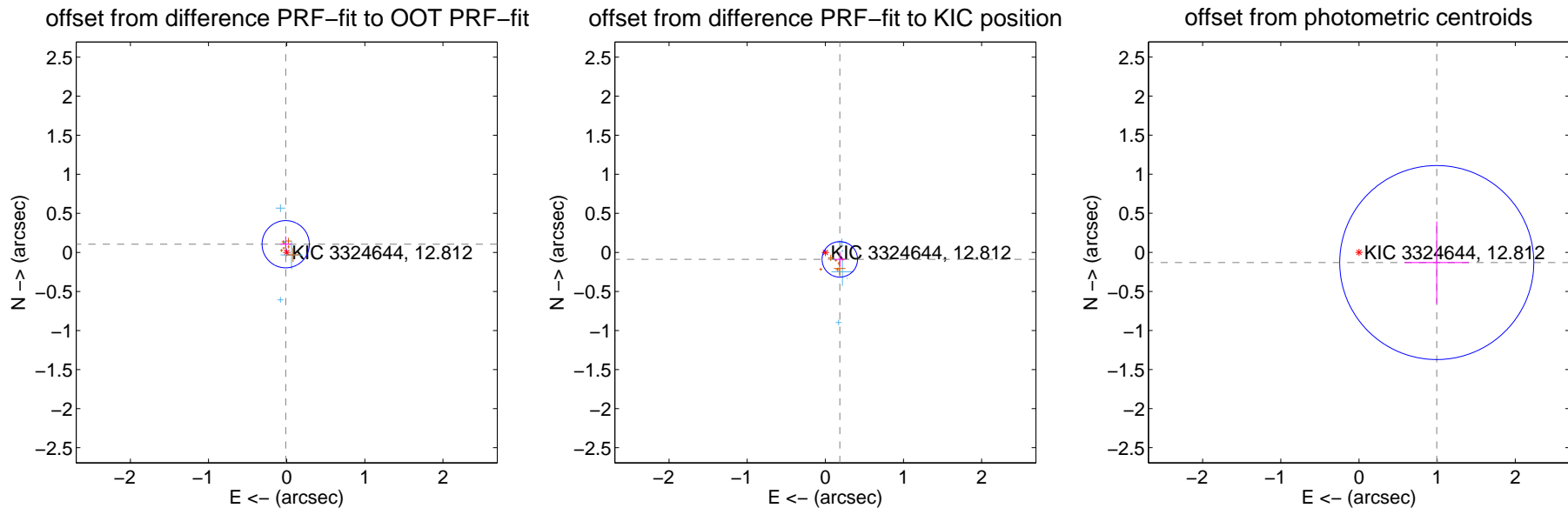
## DV Centroid Data

Supplemental centroid analysis for 003324644-05. Kepler magnitude: 12.81. Transit SNR 2.46

There are 5 quarters with good PRF difference image offsets

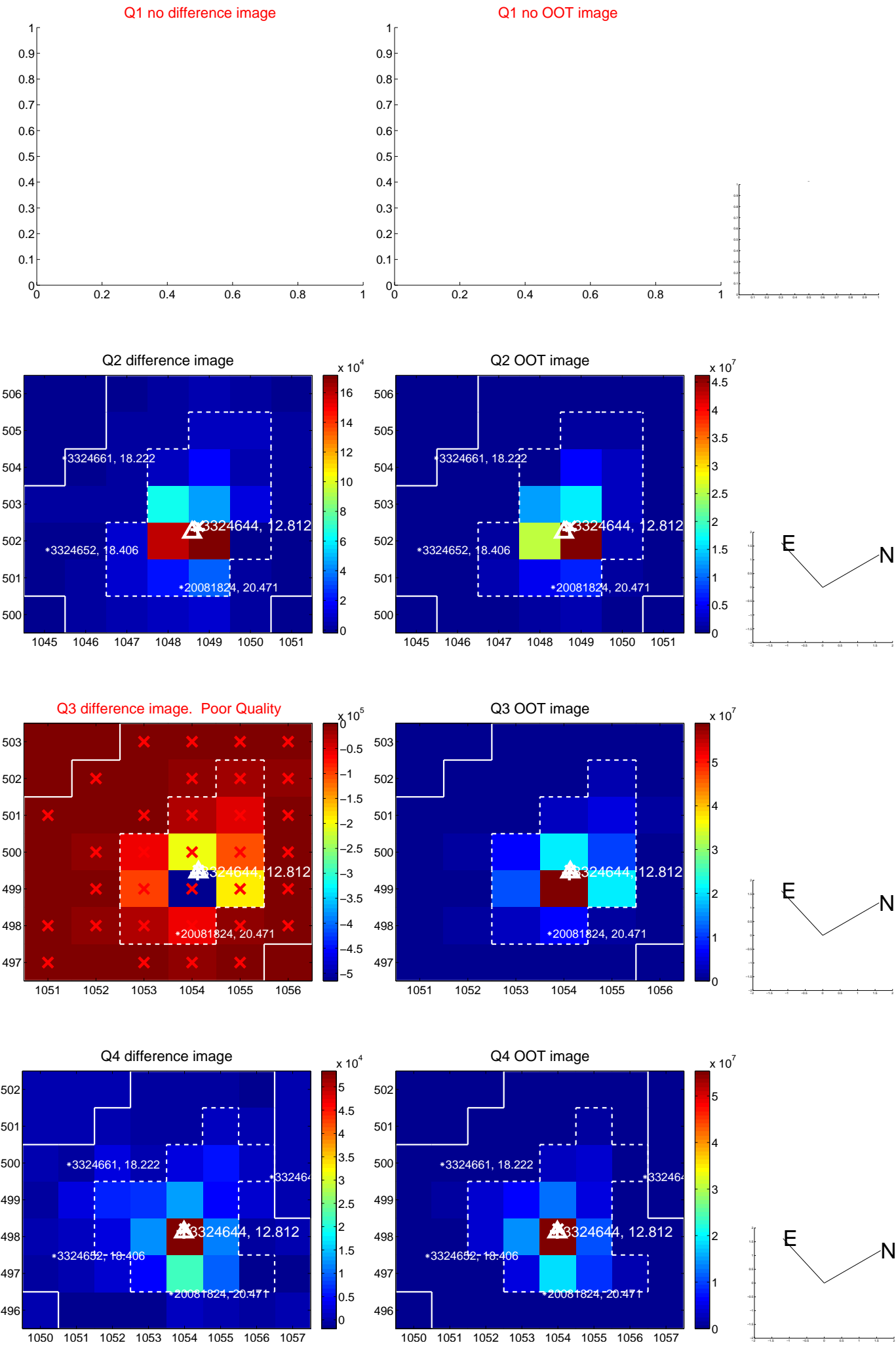
The direct PRF centroid is offset from the target star catalog position by about 0.20 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.106 \pm 0.101$	1.05	$0.013 \pm 0.068$	$0.105 \pm 0.101$
PRF-fit source offset from KIC position	$0.205 \pm 0.076$	2.71	$-0.185 \pm 0.071$	$-0.089 \pm 0.097$
photometric centroid source offset	$1.00 \pm 0.41$	2.43	$-1.00 \pm 0.41$	$-0.13 \pm 0.53$

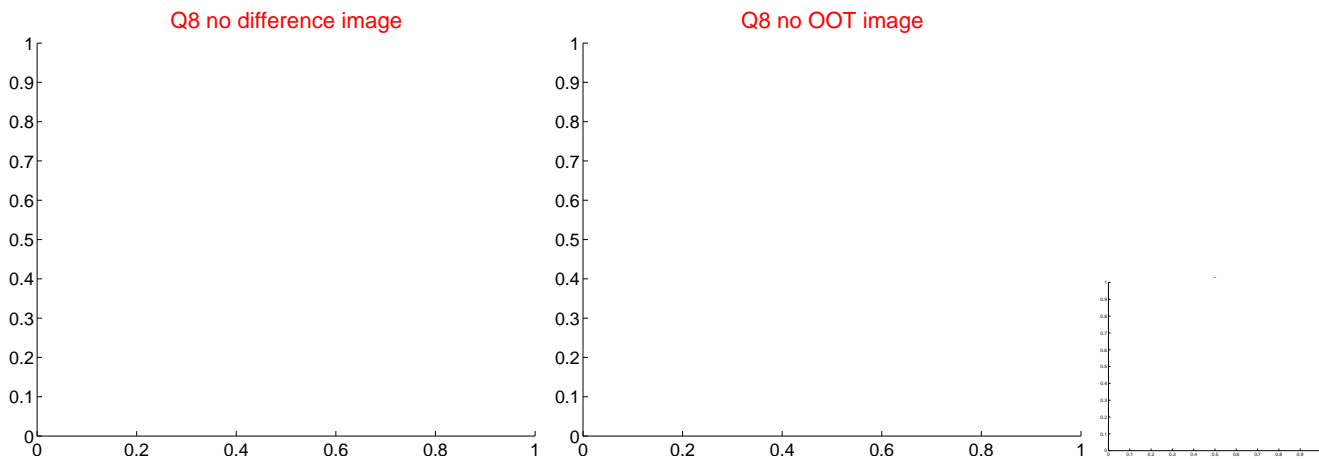
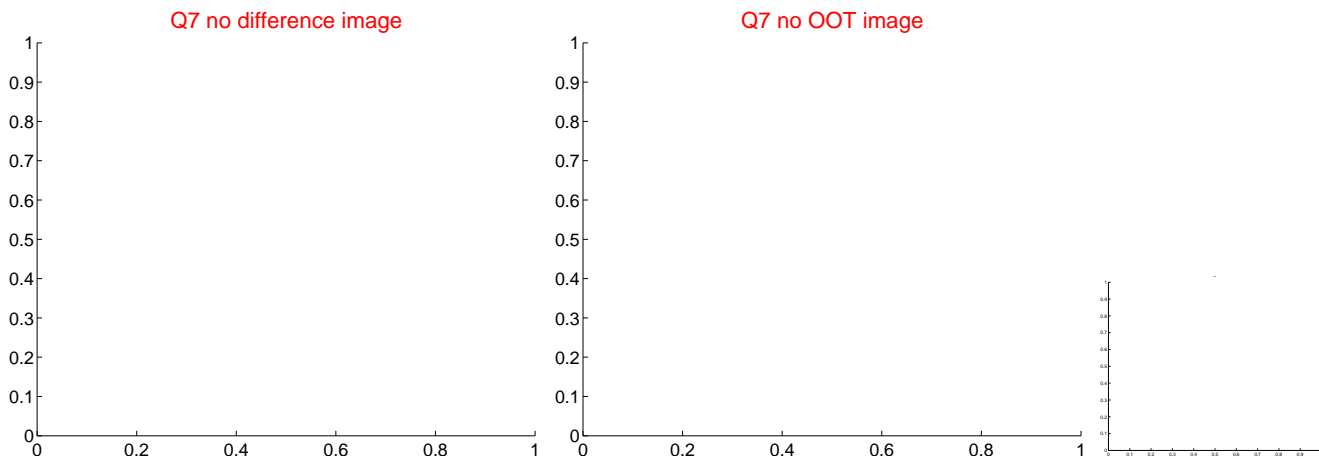
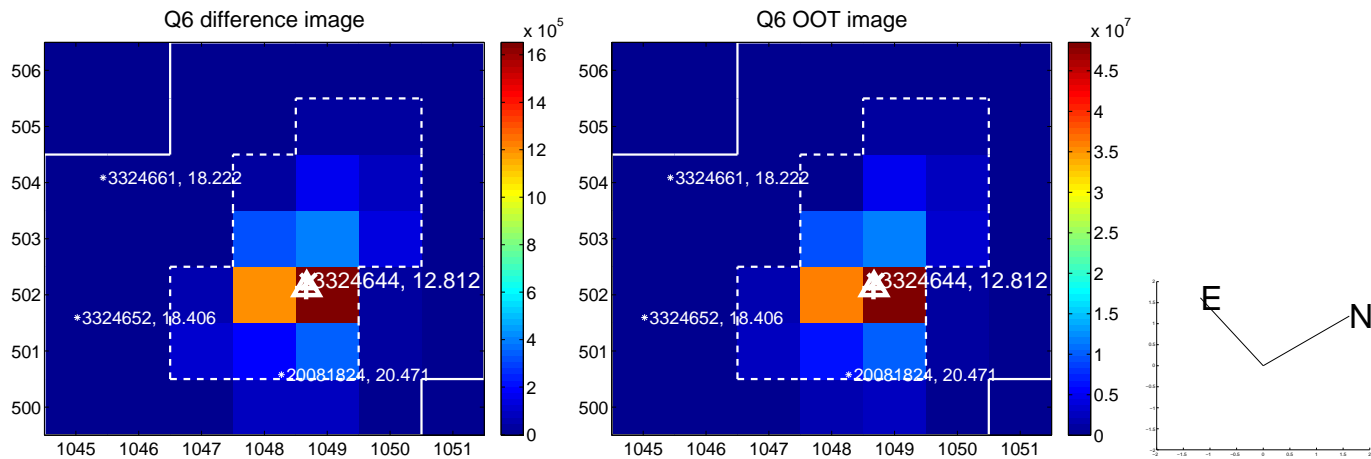
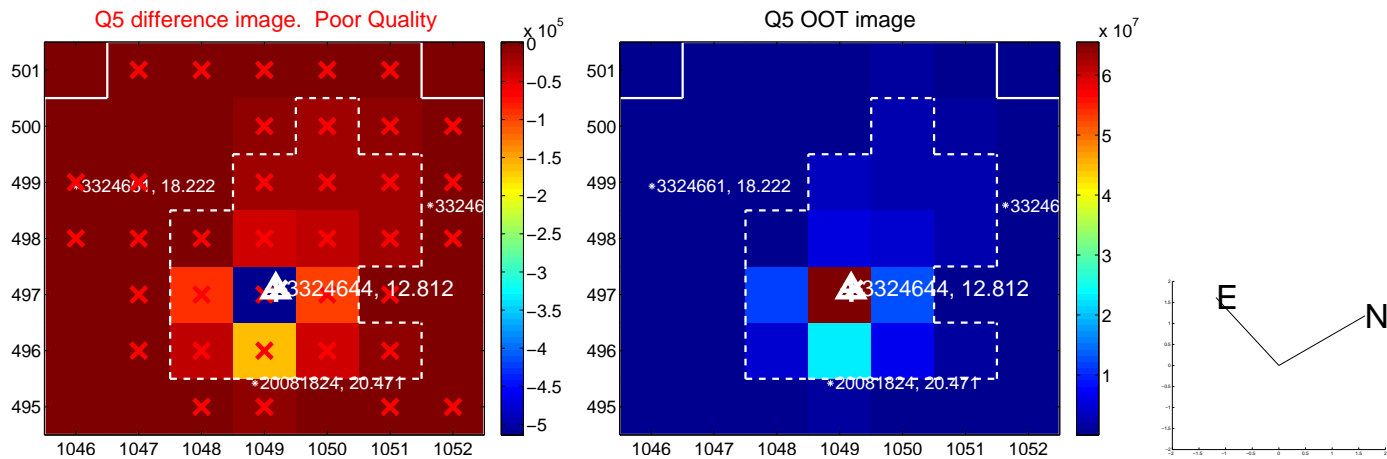


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

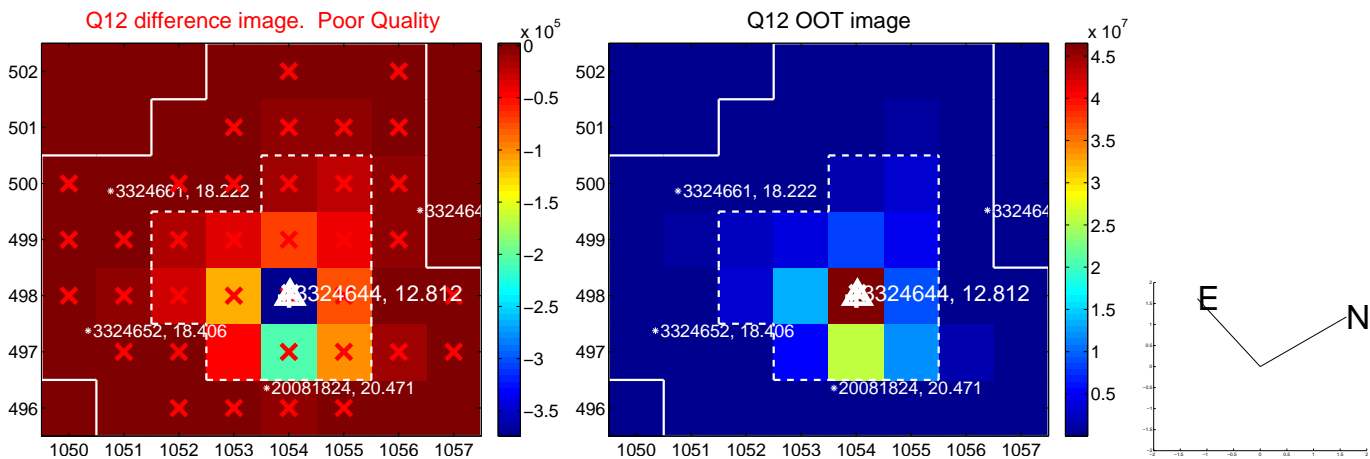
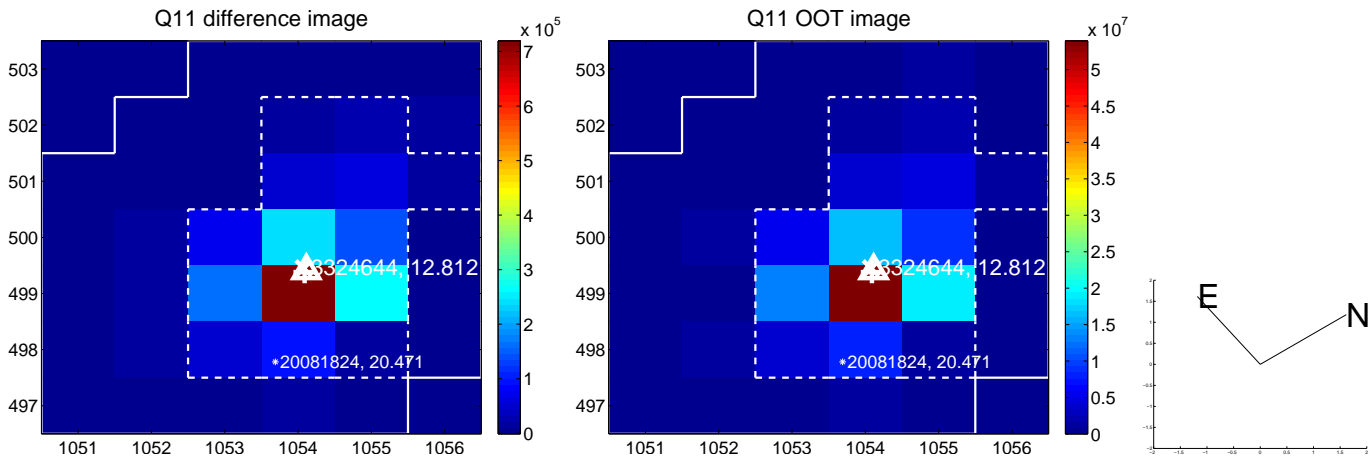
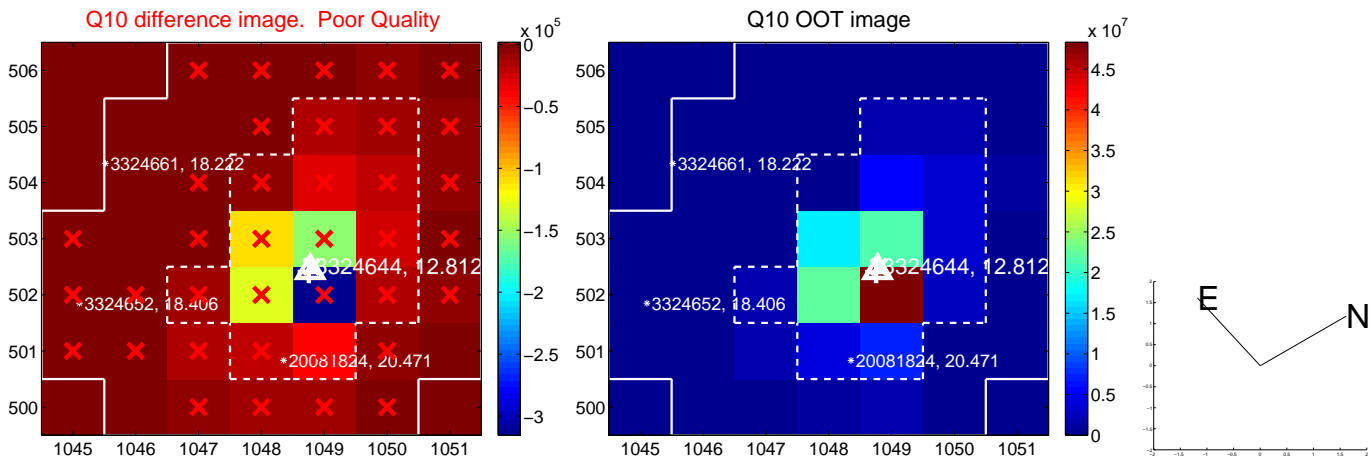
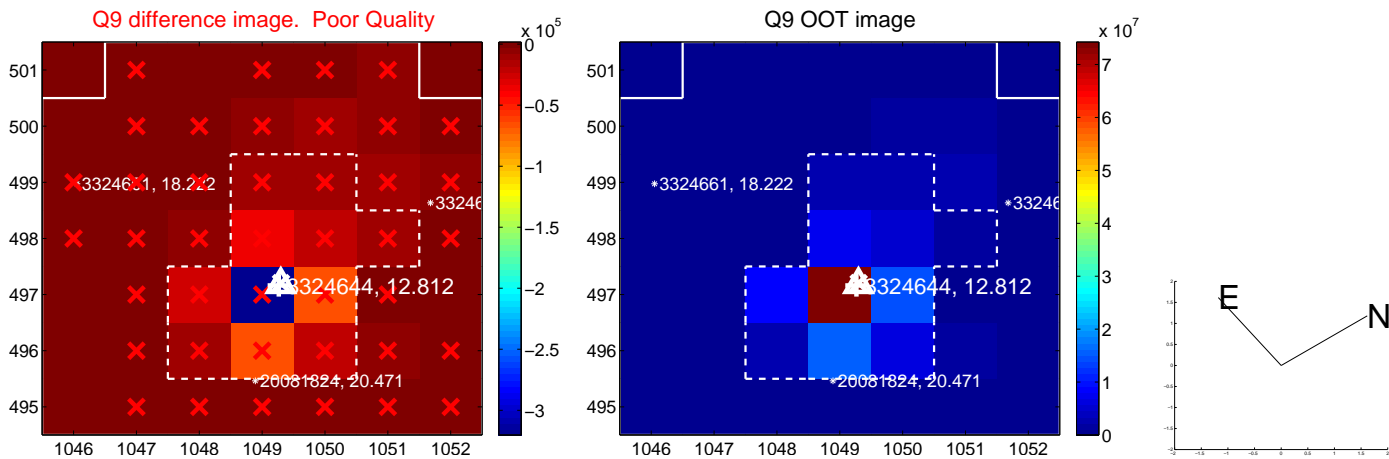
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



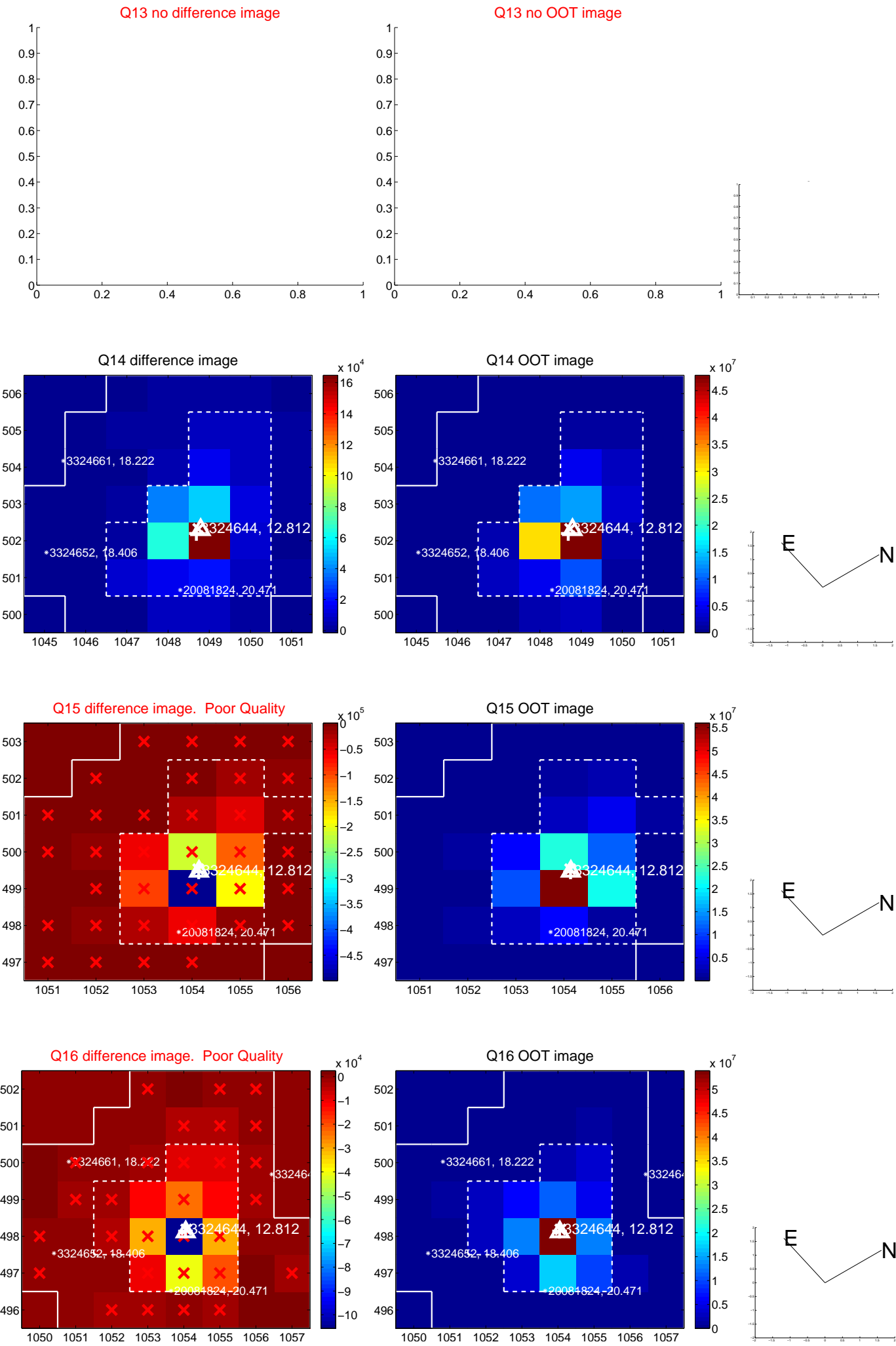
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



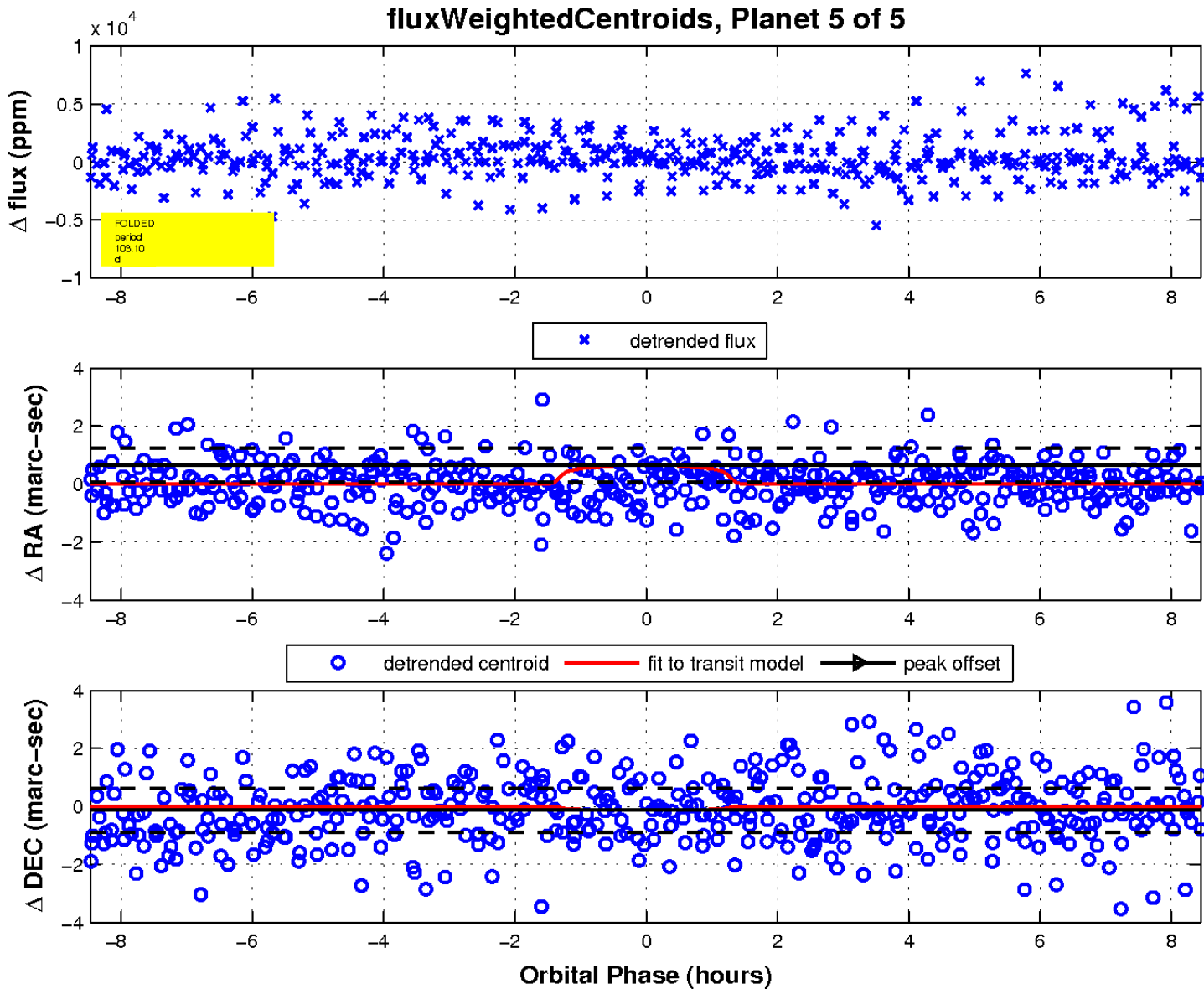
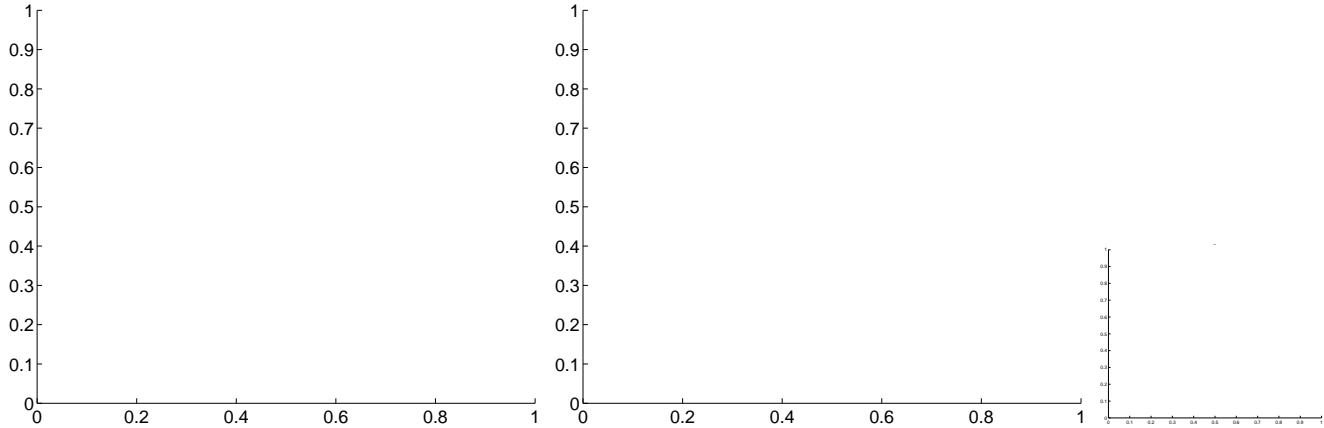
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

Q17 no difference image

Q17 no OOT image





UKIRT Image

Declination

