

# KIC 005428626

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005428626-01	OBS	No	269.686442	280.787021	1367.3	3.102	18.2	5.2	4.29	4914	15.79	15.86
005428626-02	OBS	No	355.562599	411.341991	2761.9	9.225	16.1	7.2	4.29	4914	22.03	10.97
005428626-03	OBS	No	312.104420	374.915321	2422.4	4.421	23.5	8.1	4.29	4914	22.52	13.05
005428626-04	OBS	No	299.023200	379.408217	2309.6	10.502	15.5	6.7	4.29	4914	22.56	13.82
005428626-05	OBS	No	344.454802	371.815203	2494.0	5.811	13.9	7.7	4.29	4914	21.08	11.44
005428626-06	OBS	No	248.603897	203.333097	2404.3	7.664	16.7	7.4	4.29	4914	20.38	17.68

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005428626-01	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
005428626-02	OBS	FP	0.00	1	0	0	0	LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
005428626-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
005428626-04	OBS	FP	0.00	1	0	0	0	LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005428626-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
005428626-06	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS

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

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

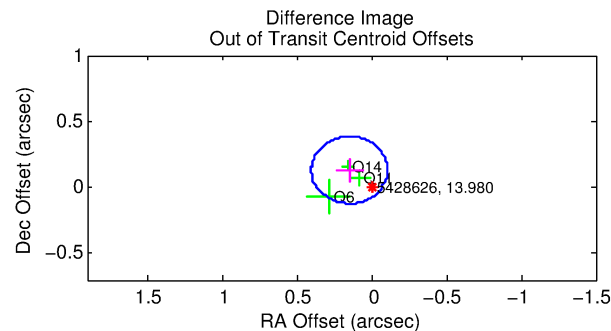
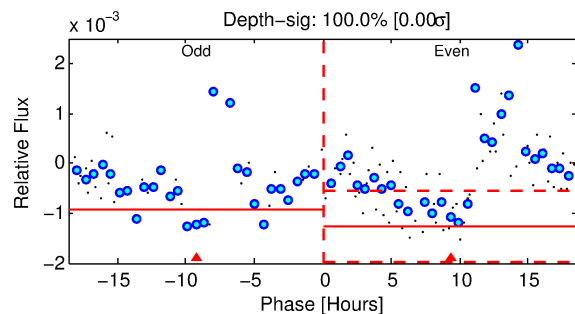
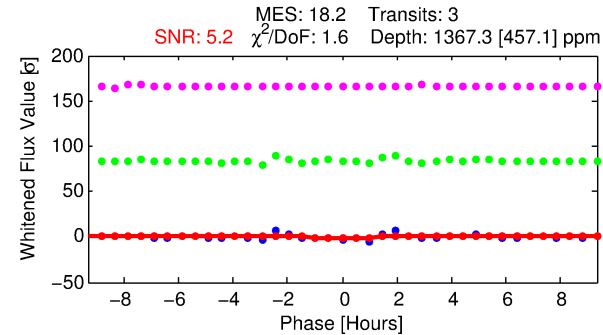
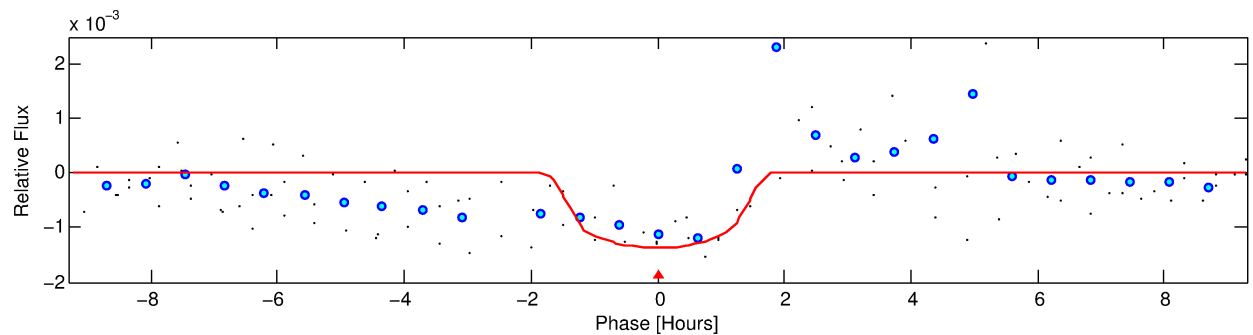
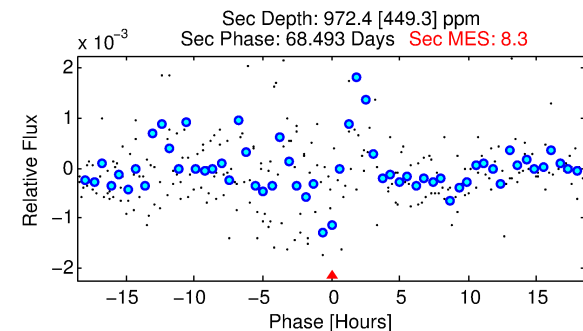
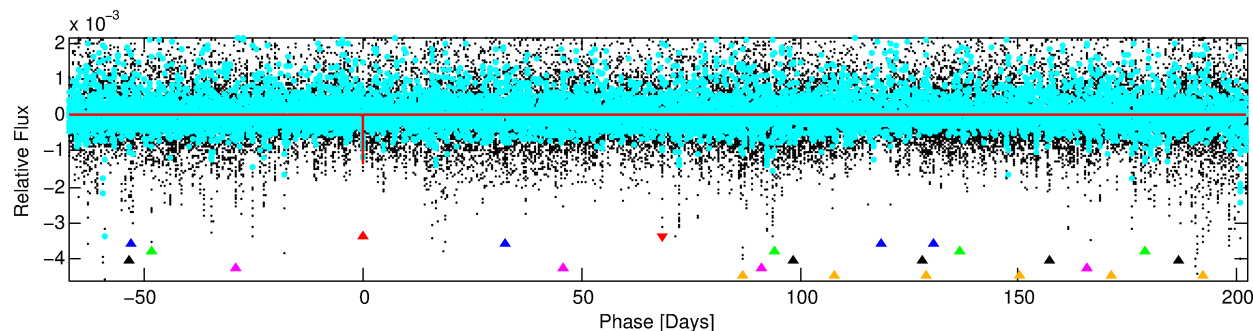
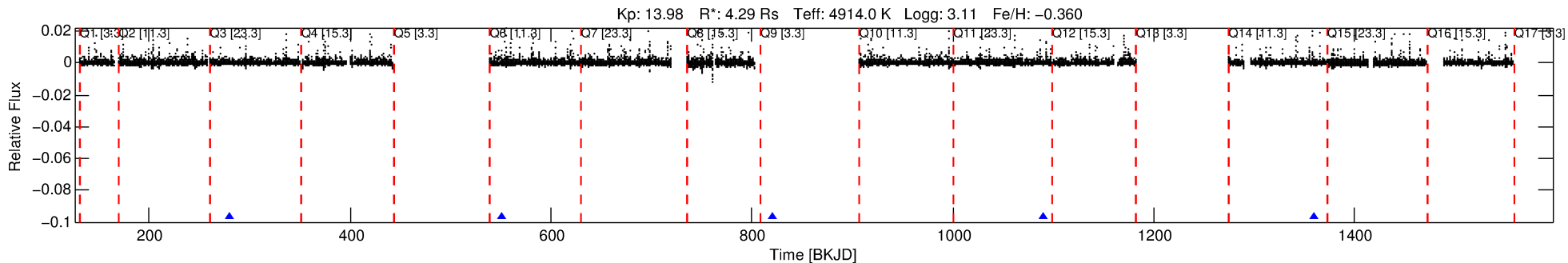
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 005428626-01

No Significant Match Found

# DV One-Page Summary

KIC: 5428626 Candidate: 1 of 6 Period: 269.686 d



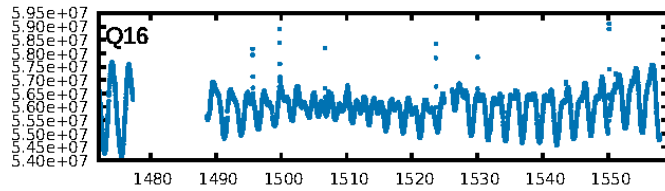
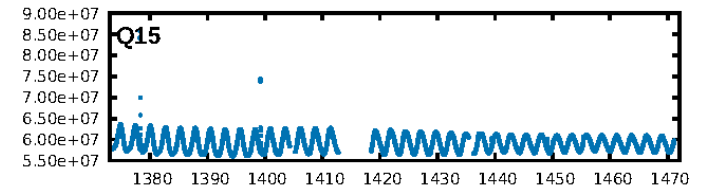
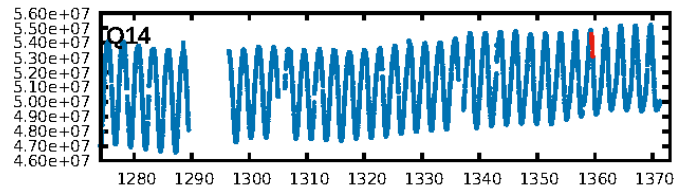
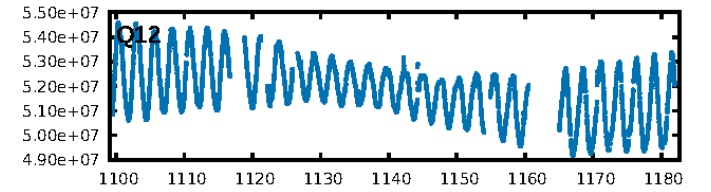
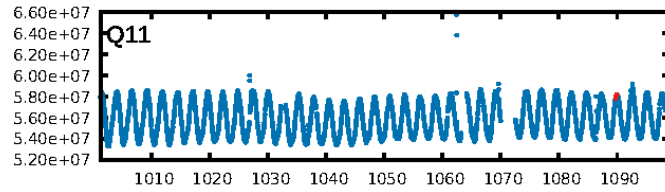
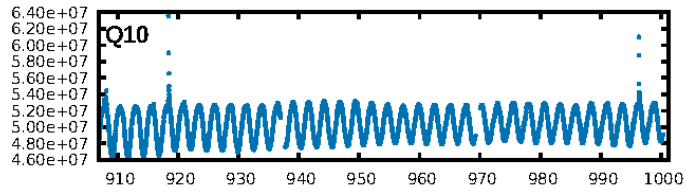
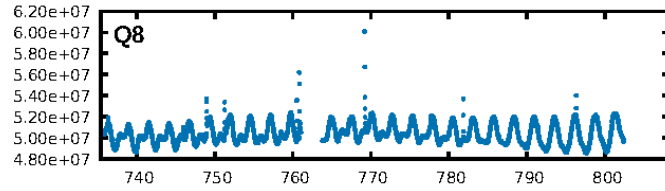
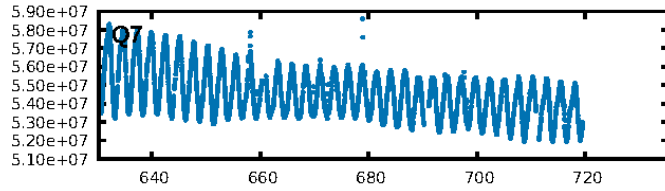
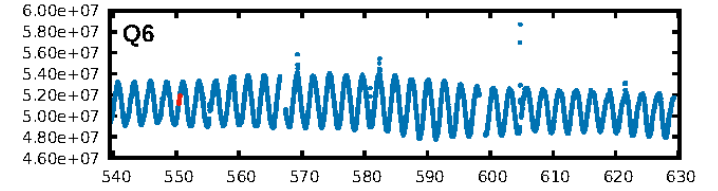
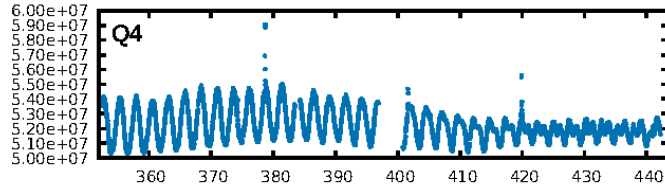
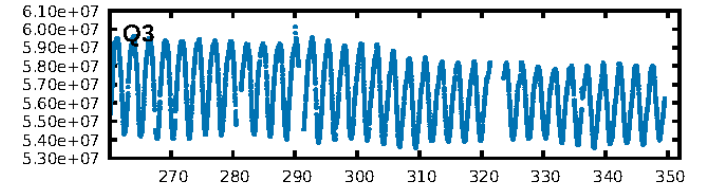
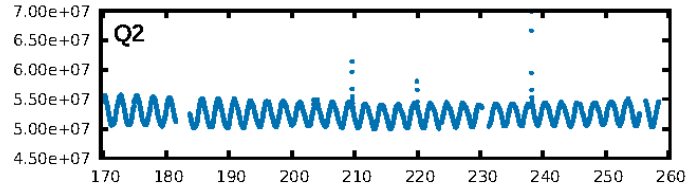
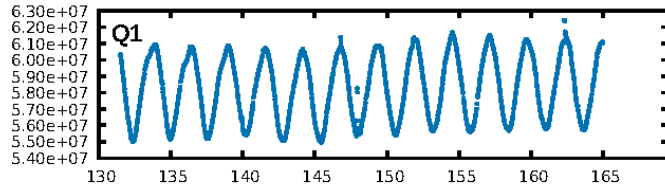
## DV Fit Results:

Period = 269.68644 [0.00481] d  
Epoch = 280.7870 [0.0165] BKJD  
Rp/R\* = 0.0337 [0.1051]  
a/R\* = 630.70 [6772.33]  
b = 0.41 [22.26]  
Seff = 15.86 [11.60]  
Teq = 509 [93] K  
Rp = 15.79 [50.10] Re  
a = 0.7781 [0.3904] AU  
Ag = 1299.68 [8175.23] [0.16σ]  
Teffp = 4724 [7381] K [0.57σ]

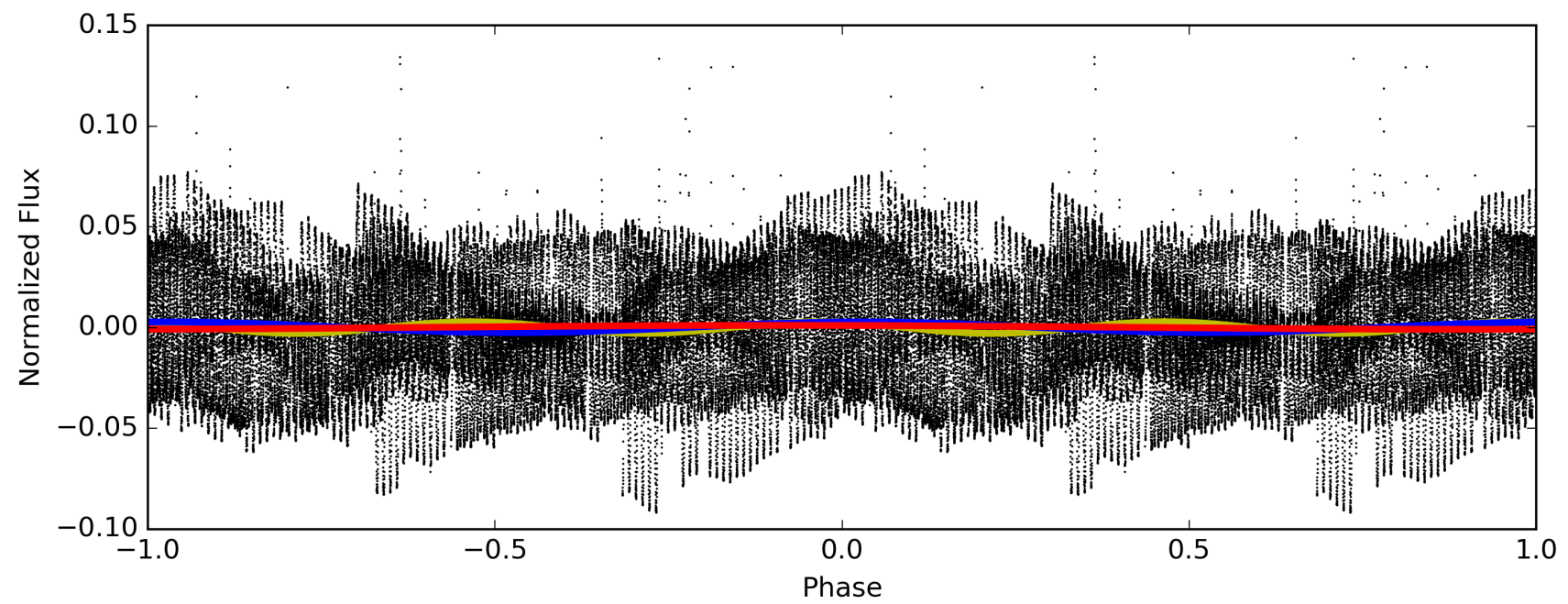
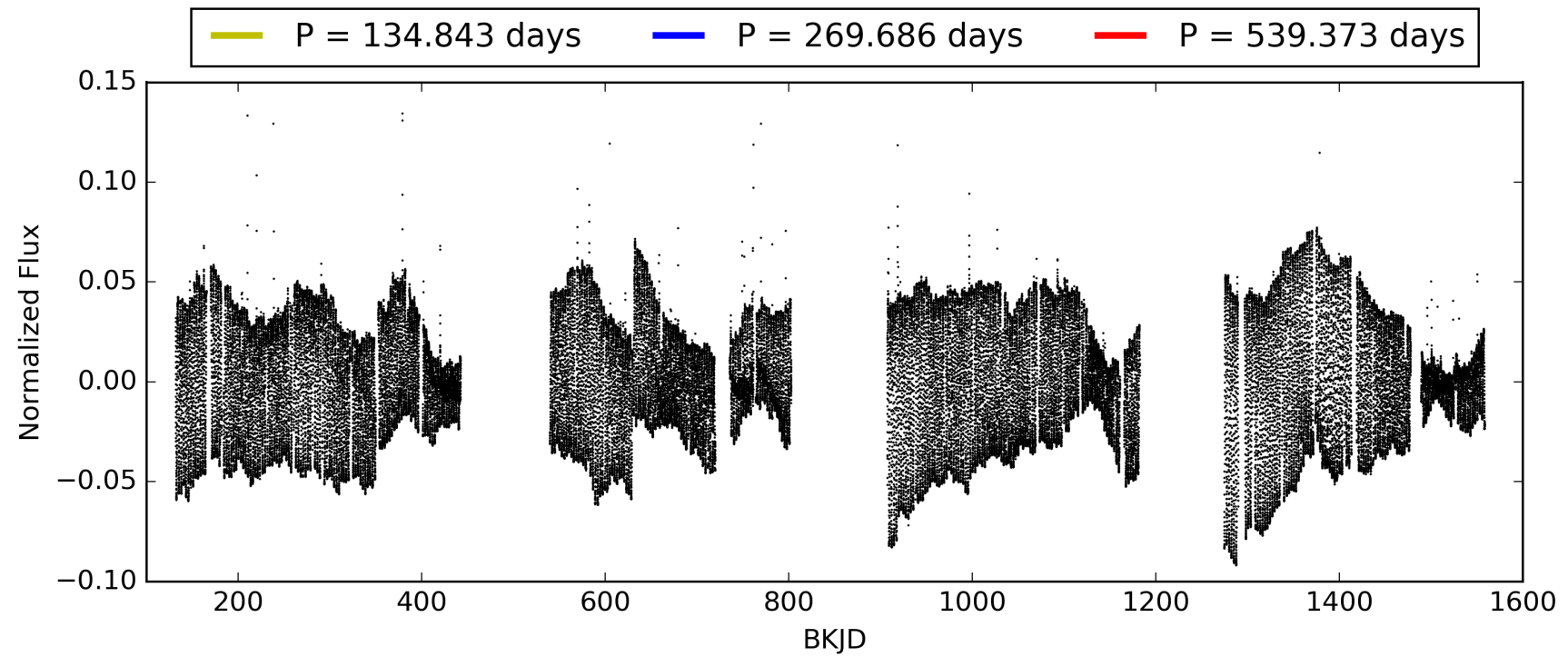
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [61.20σ]  
LongPeriod-sig: 100.0% [64.30σ]  
ModelChiSquare2-sig: 16.1%  
ModelChiSquareGof-sig: 58.5%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
**GhostDiagnostic-chr: 0.205**  
Centroid-sig: 23.7%  
Centroid-so: 0.959 arcsec [1.33σ]  
OotOffset-rm: 0.198 arcsec [2.34σ]  
OotOffset-st: 2/1/0/0 [3]  
KicOffset-rm: 0.127 arcsec [1.50σ]  
KicOffset-st: 2/1/0/0 [3]  
DiffImageQuality-fgm: 0.33 [1/3]  
DiffImageOverlap-fno: 1.00 [3/3]

# TCE 005428626-01, PDC Light Curves



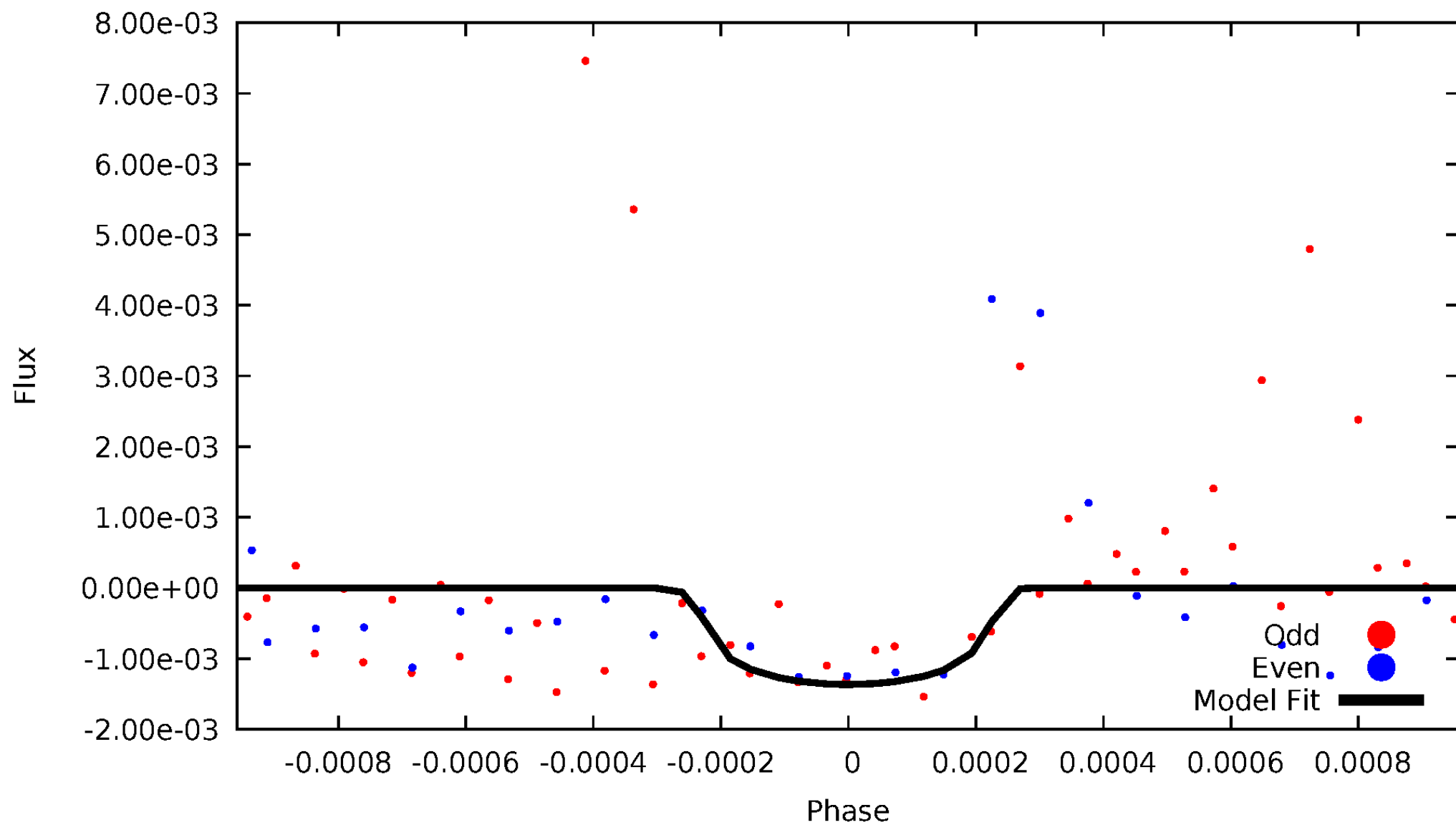
TCE 005428626-01





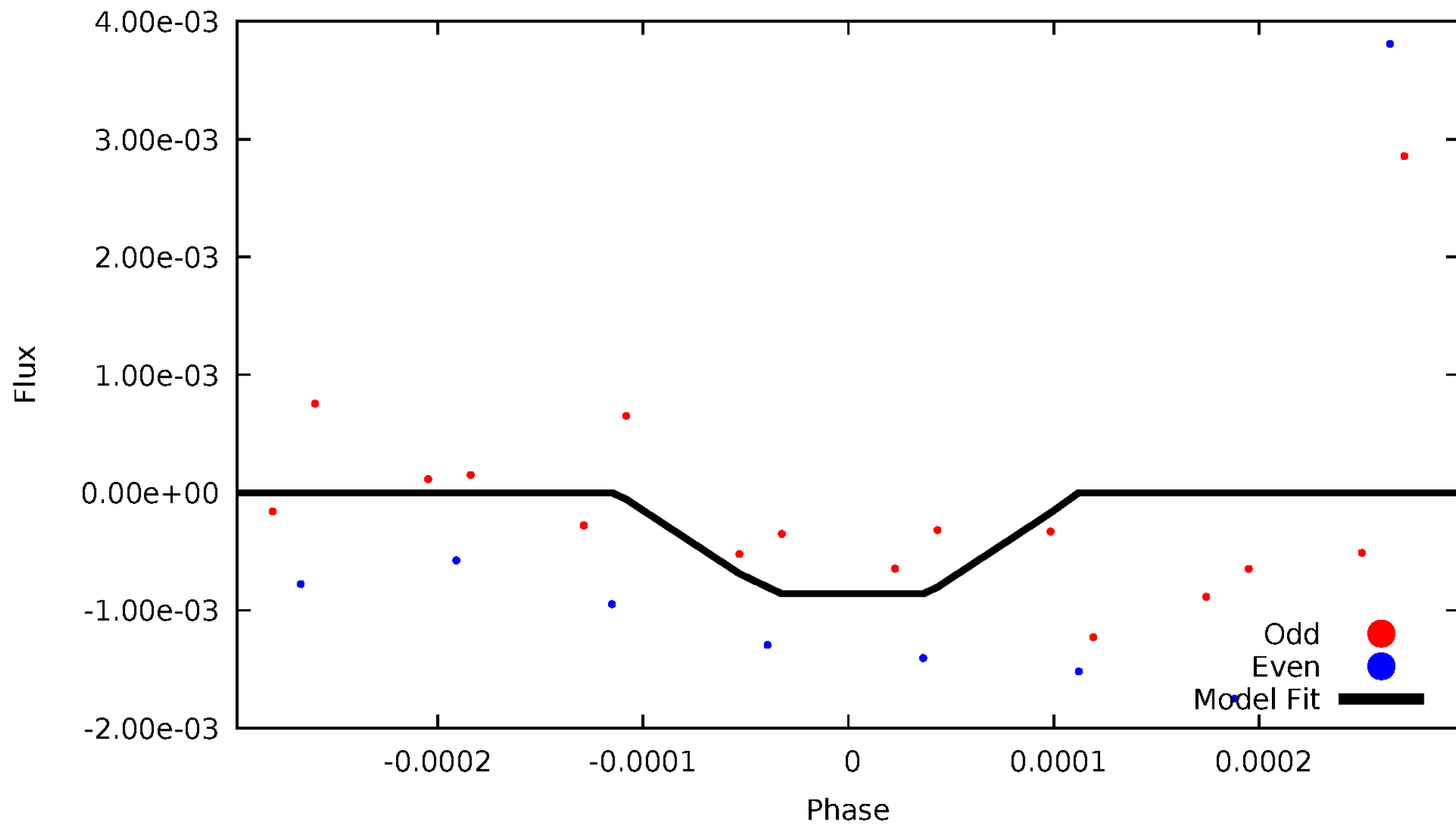
# DV Odd/Even

TCE 005428626-01



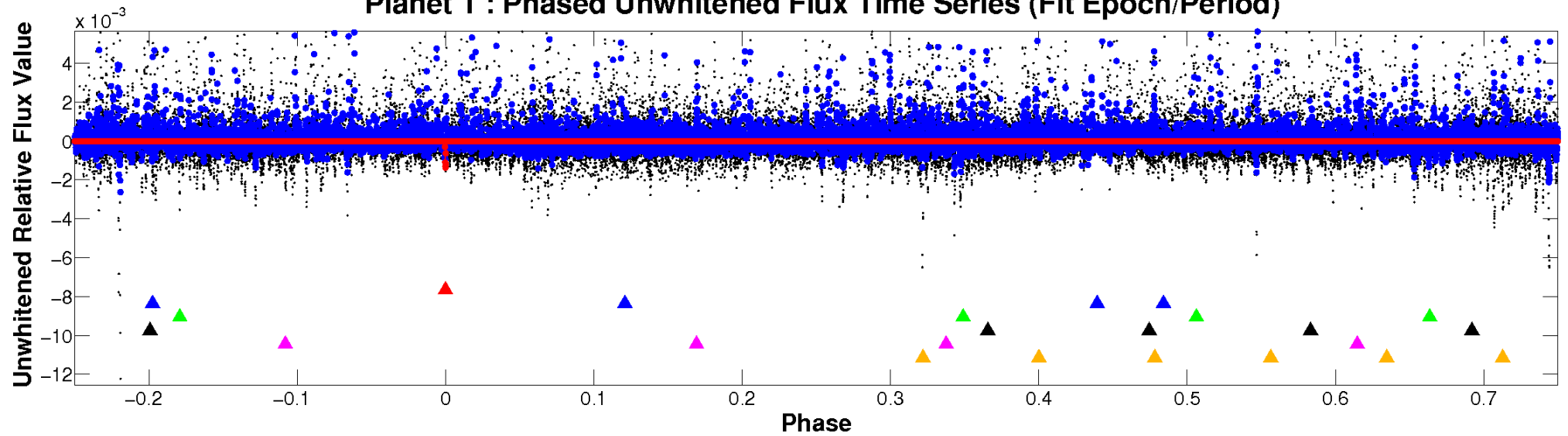
# ALT Odd/Even

TCE 005428626-01

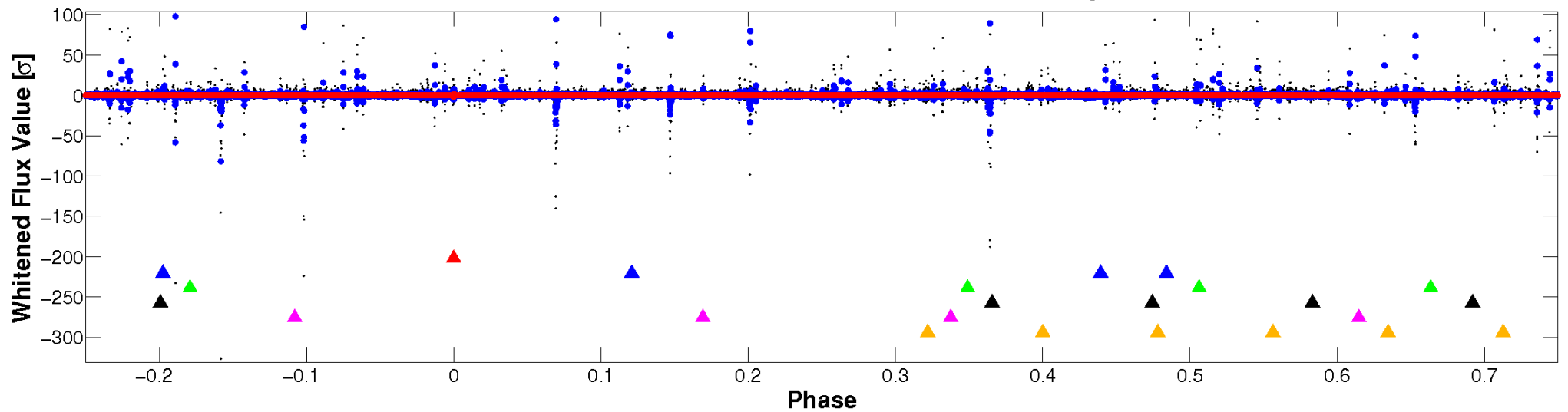


# Non-Whitened Vs. Whitened Light Curve

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

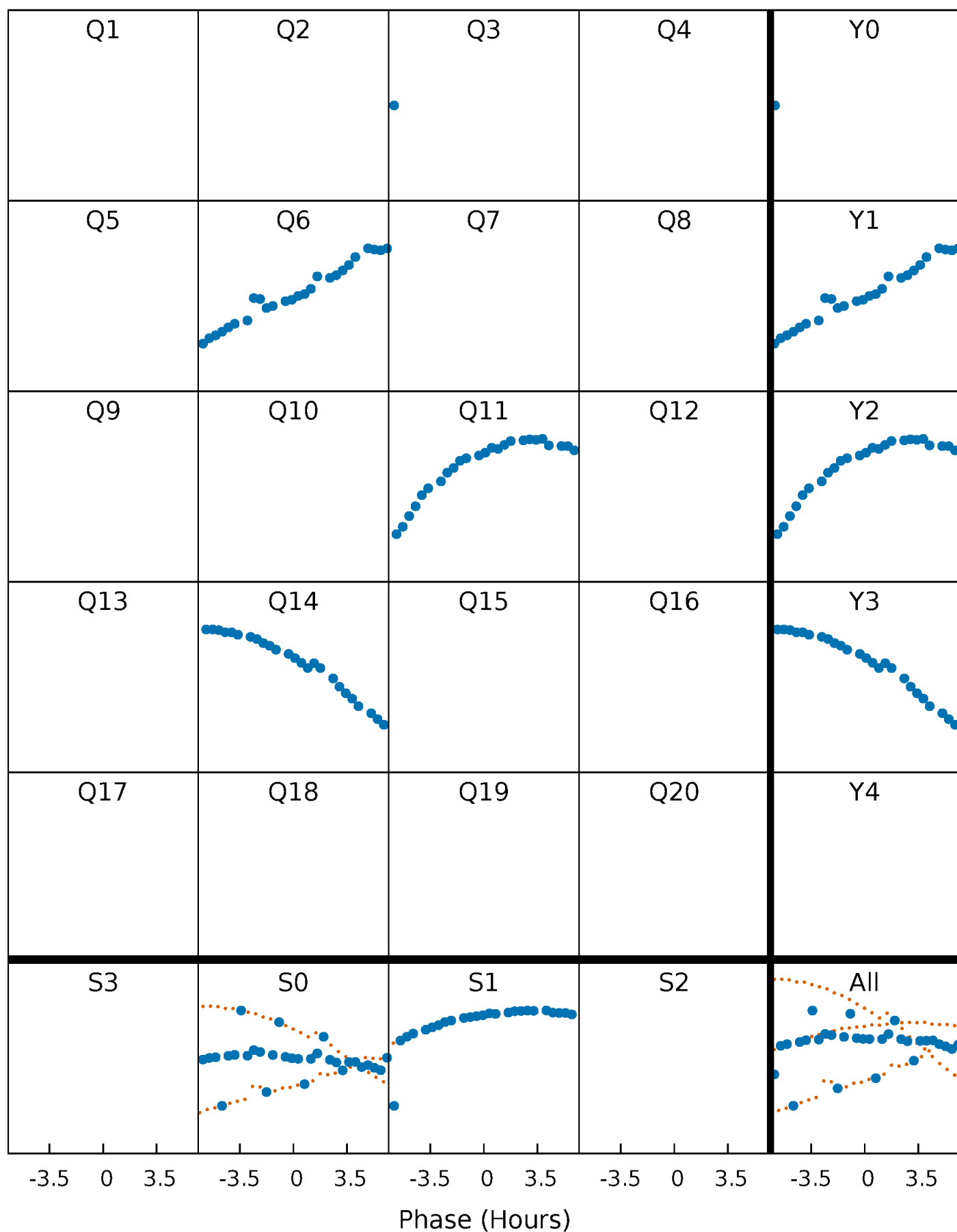


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



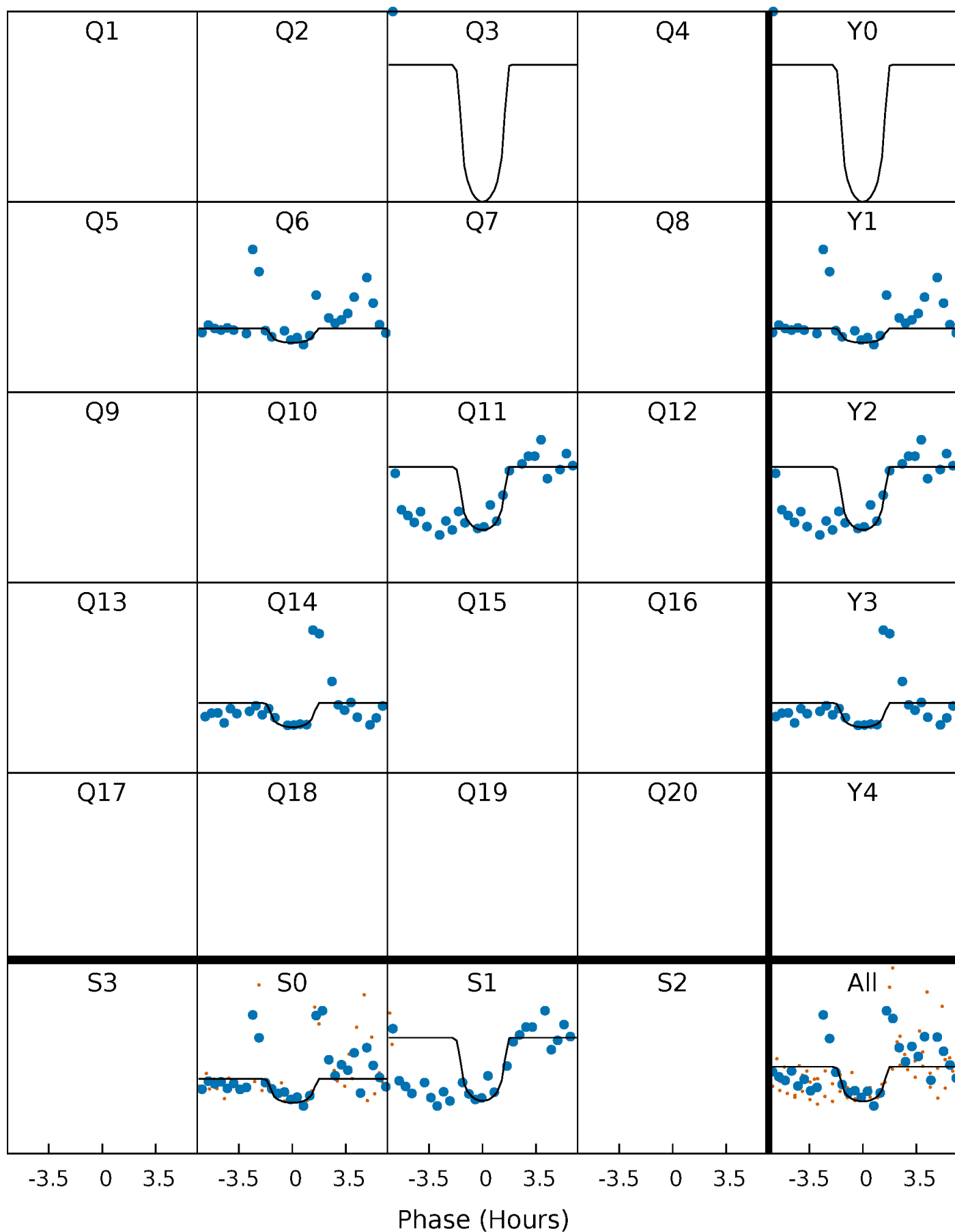
# PDC Quarter-Phased Transit Curves

TCE 005428626-01 P=269.686442 Days  $T_0=280.787021$  (BKJD)



# DV Quarter-Phased Transit Curves

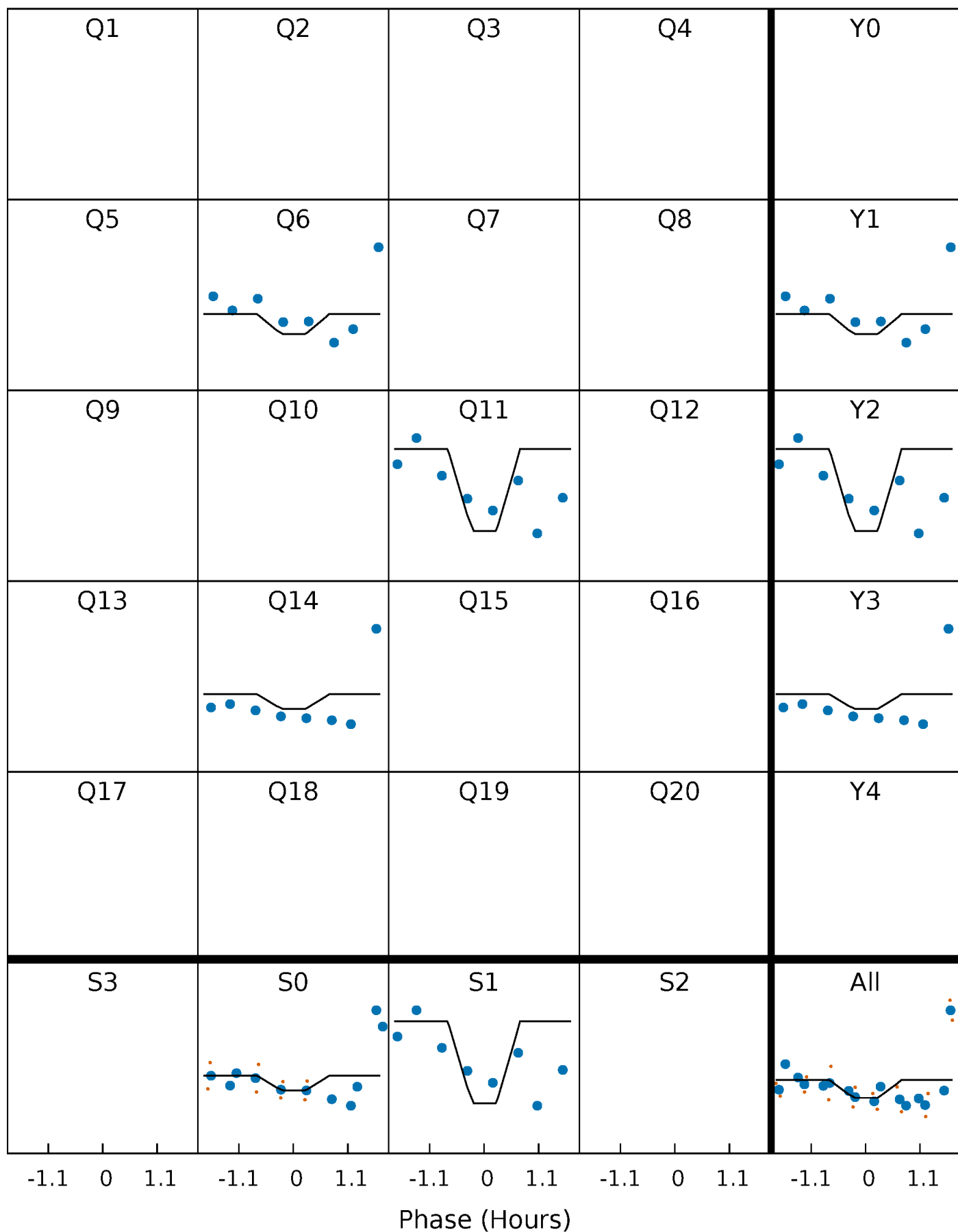
TCE 005428626-01 P=269.686442 Days  $T_0=280.787021$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

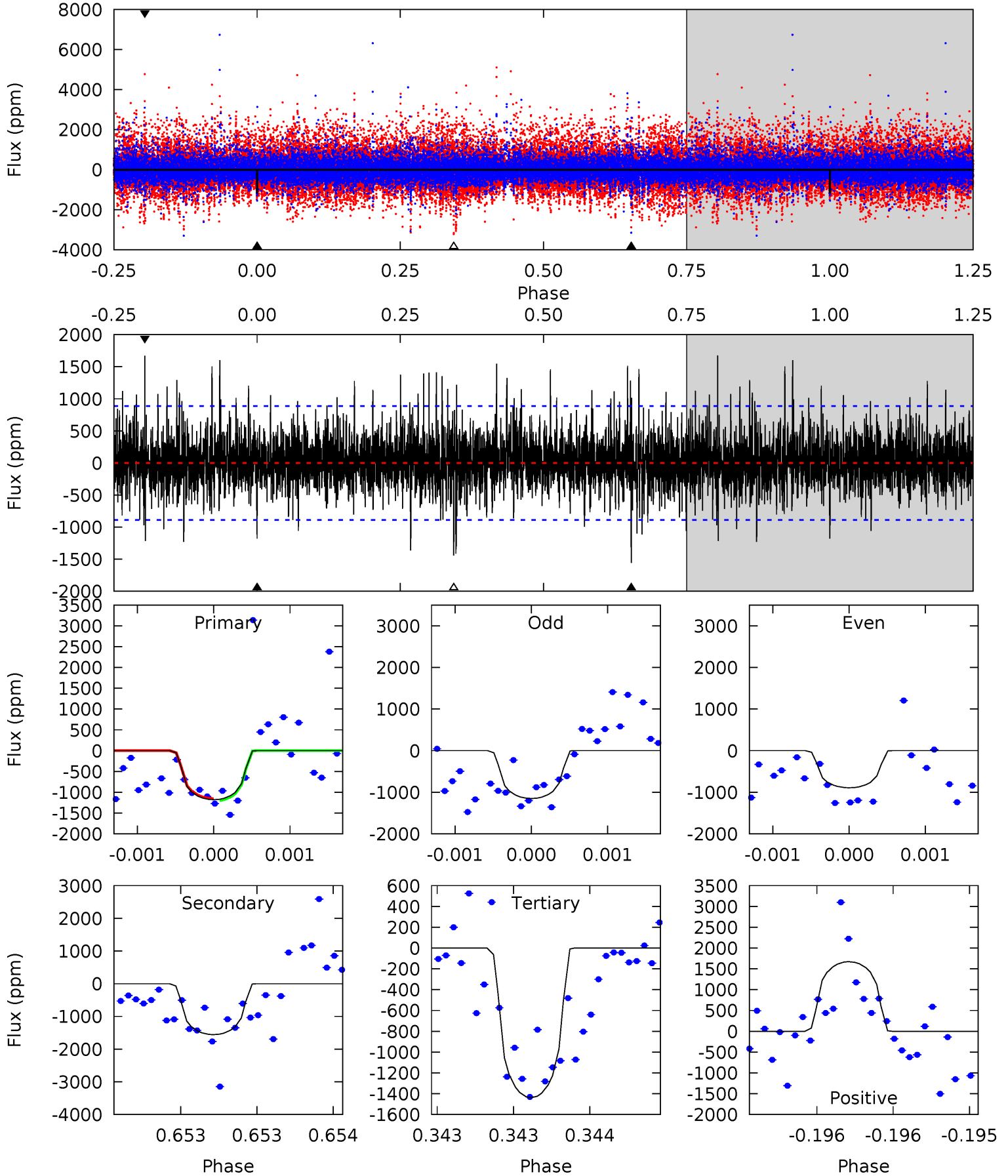
TCE 005428626-01 P=269.683085 Days  $T_0=280.790058$  (BKJD)



# DV Model-Shift Uniqueness Test

005428626-01, P = 269.686442 Days, E = 11.100579 Days

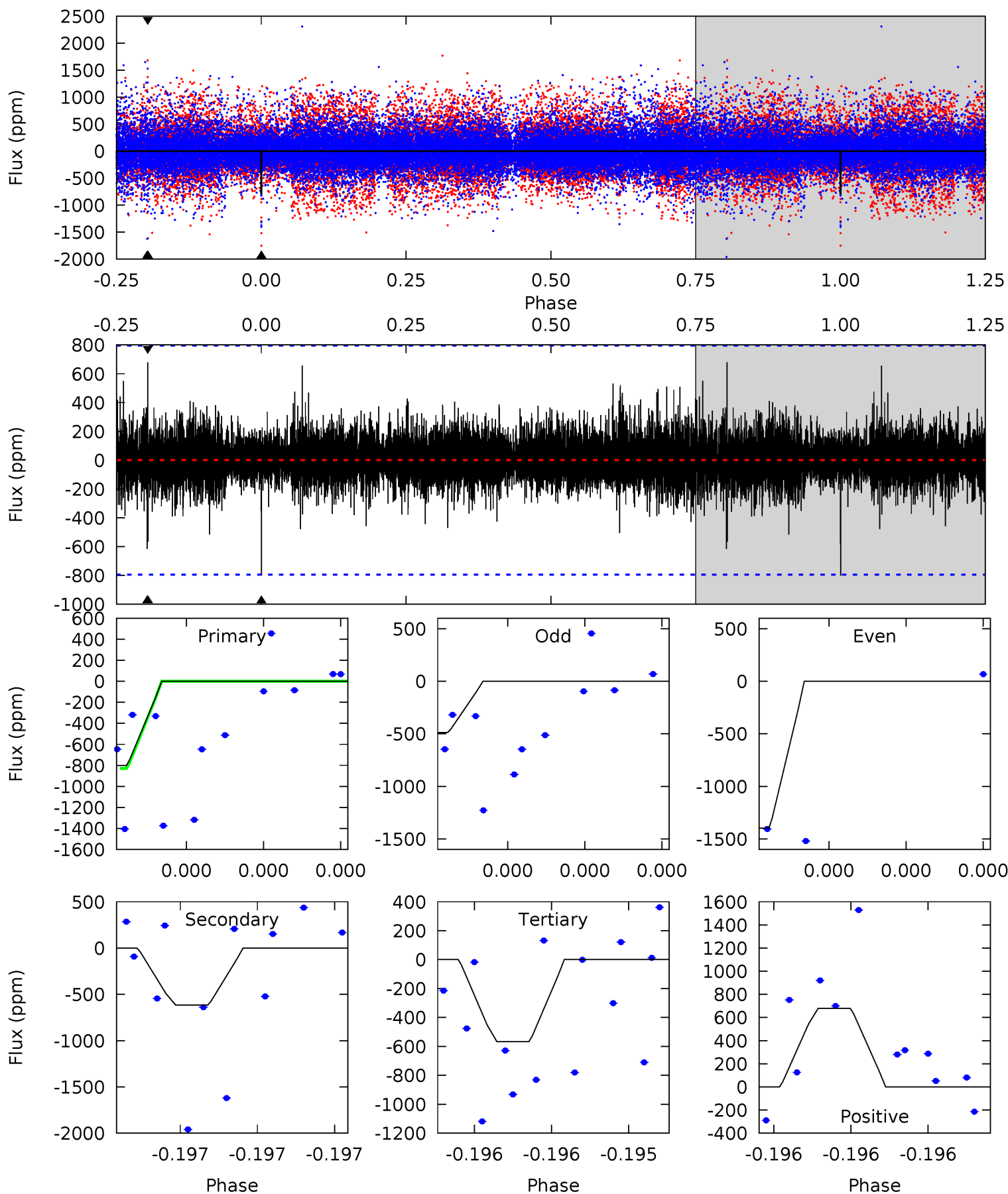
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.39	9.77	9.02	10.5	5.56	3.46	2.02	-1.63	-3.09	0.74	-0.71	0.44	1.07	0.52	0.15



# Alt Model-Shift Uniqueness Test

005428626-01, P = 269.683085 Days, E = 11.106973 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
5.81	4.47	4.11	4.93	5.76	3.77	0.78	1.70	0.89	0.36	-0.46	2.91	1.19	0.46	0.21



### Stellar Parameters For KIC 005428626

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4914^{+149}_{-112}$	$3.110^{+0.390}_{-0.319}$	$-0.360^{+0.250}_{-0.250}$	$4.287^{+2.589}_{-1.394}$	$0.862^{+0.316}_{-0.097}$	$0.015^{+0.037}_{-0.011}$
	+3%/-2%	+13%/-10%	+69%/-69%	+60%/-33%	+37%/-11%	+243%/-70%
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 005428626-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-1558 \pm 160$	$40.03^{+43.75}_{-26.40}$	$707^{+112}_{-72}$	$3720^{+1972}_{-718}$	$347^{+2721}_{-270}$
Alt.	$-615 \pm 138$	$40.43^{+41.94}_{-28.61}$	$705^{+99}_{-78}$	$3150^{+1617}_{-524}$	$126^{+1334}_{-96}$

$T_{max}$  = 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

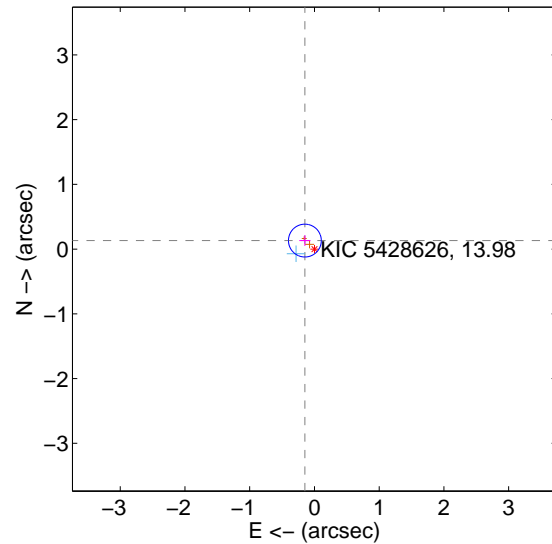
Supplemental centroid analysis for 005428626-01. Kepler magnitude: 13.98. Transit SNR 5.22

There are 1 quarters with good PRF difference image offsets

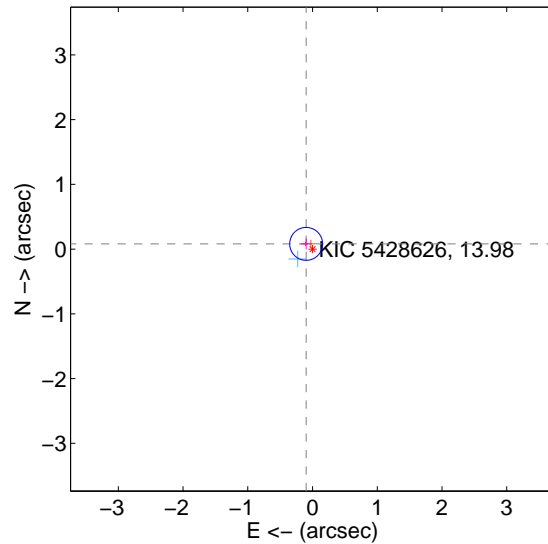
The direct PRF centroid is offset from the target star catalog position by about 0.10 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.198 \pm 0.085$	2.34	$0.148 \pm 0.086$	$0.132 \pm 0.083$
PRF-fit source offset from KIC position	$0.127 \pm 0.085$	1.50	$0.098 \pm 0.086$	$0.080 \pm 0.083$
photometric centroid source offset	$0.96 \pm 0.72$	1.33	$-0.81 \pm 0.68$	$-0.52 \pm 0.80$

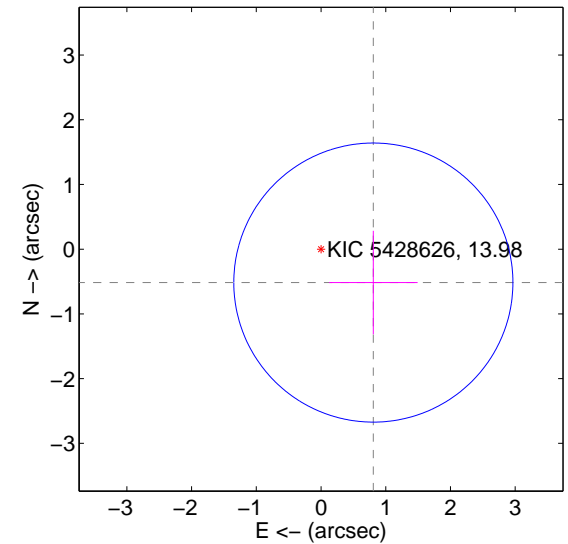
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



offset from photometric centroids



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



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



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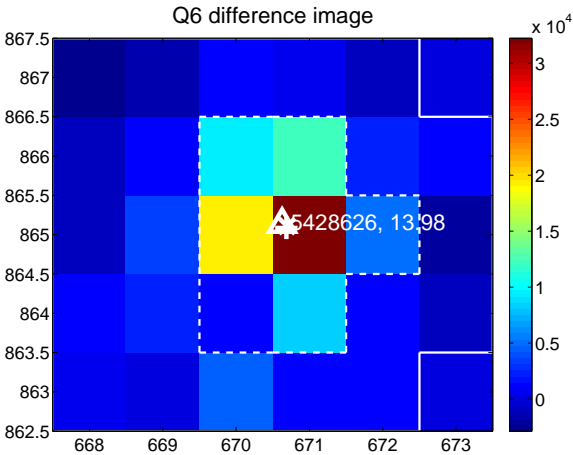
Q5 no difference image



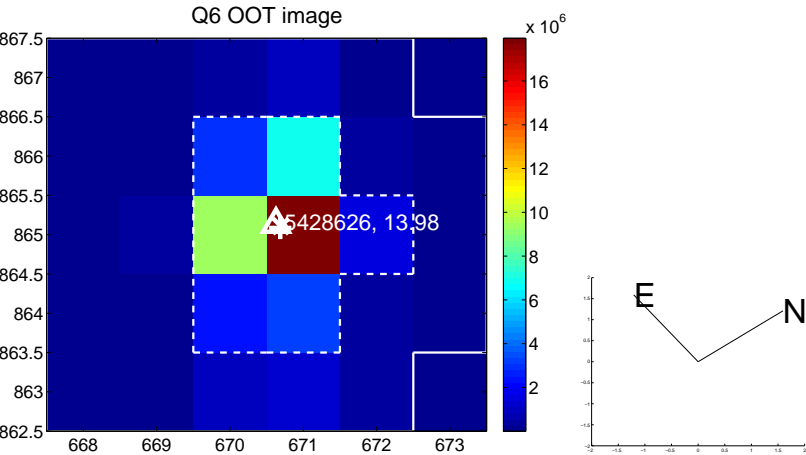
Q5 no OOT image



Q6 difference image



Q6 OOT image



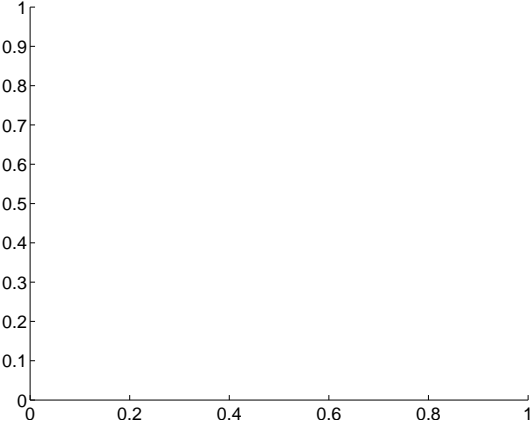
Q7 no difference image



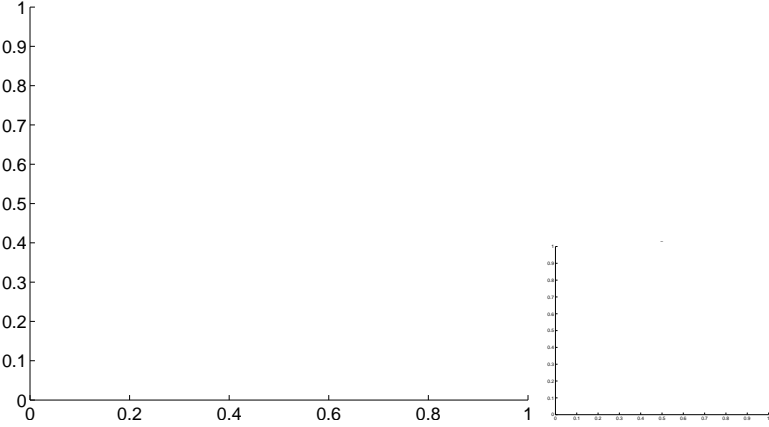
Q7 no OOT image



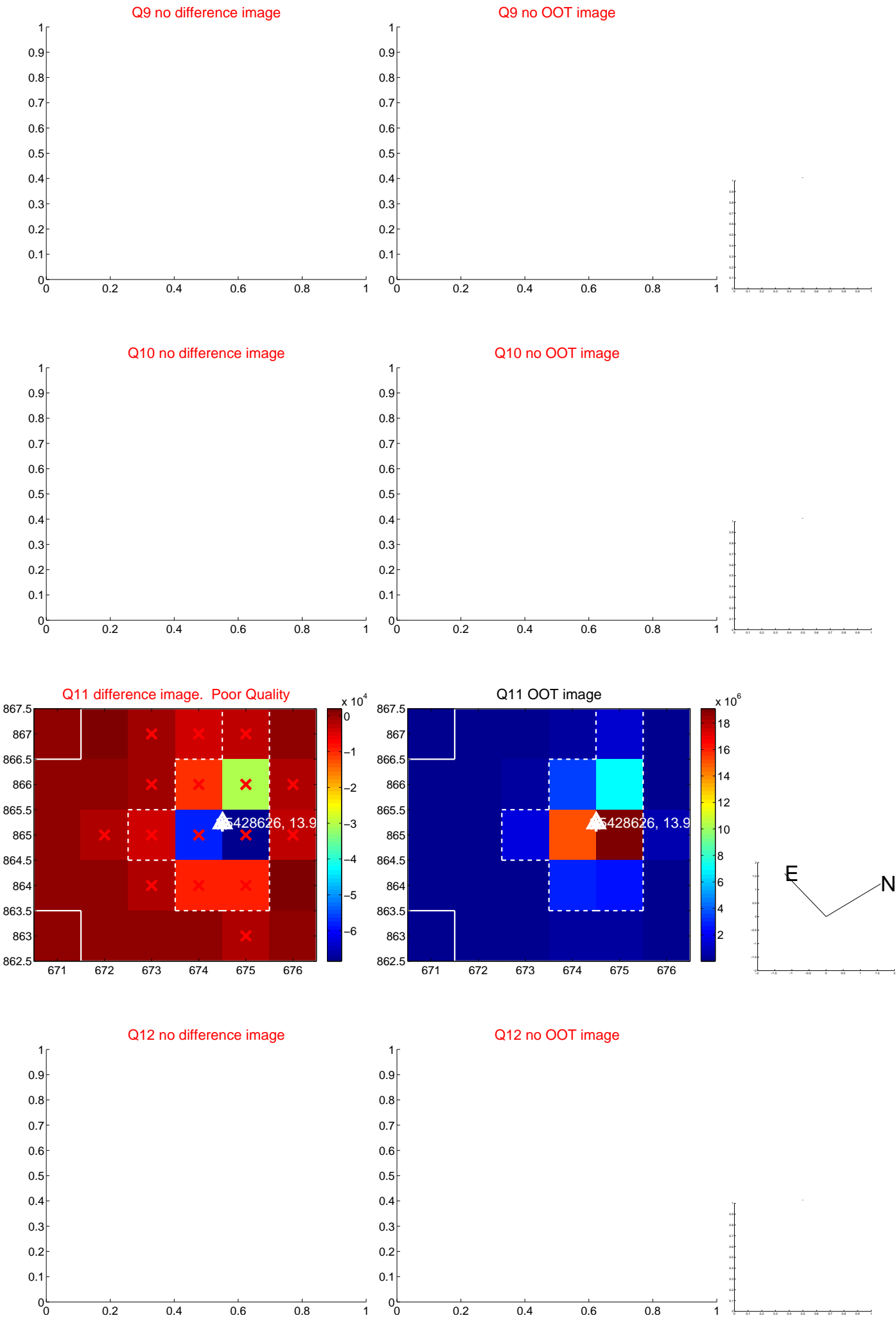
Q8 no difference image



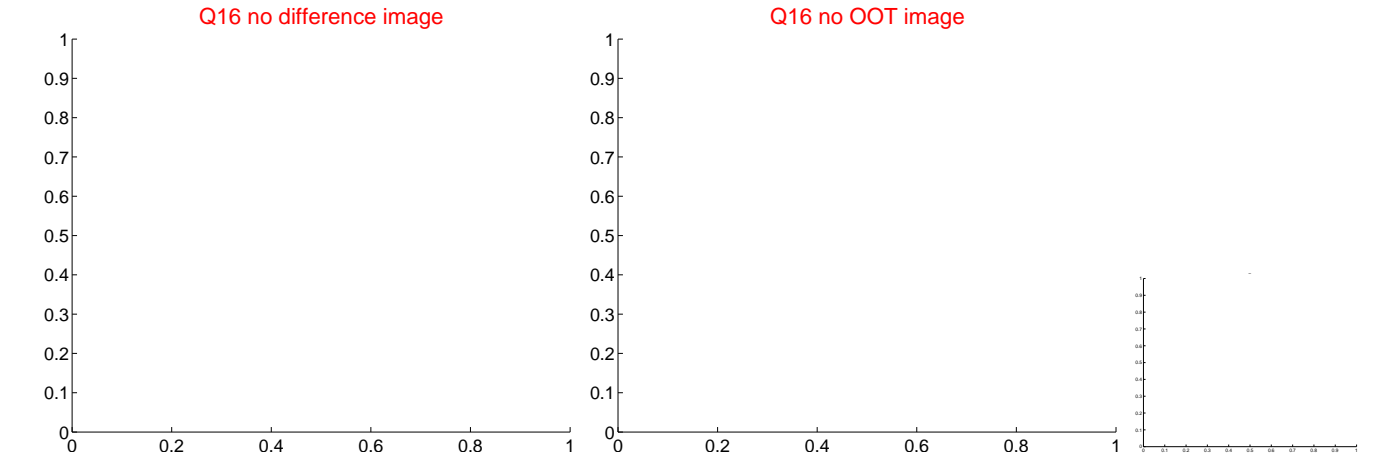
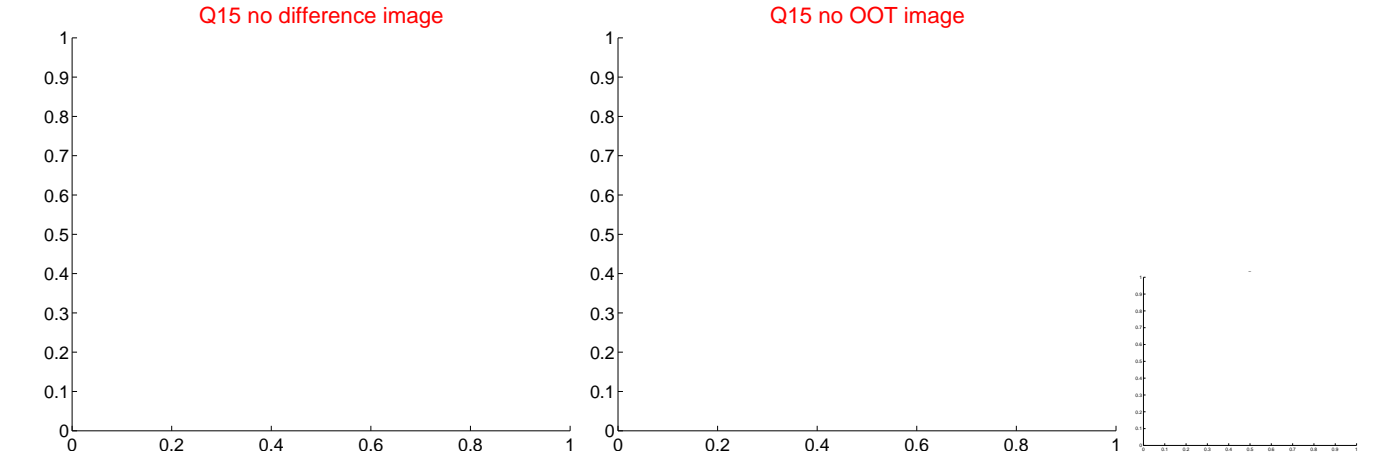
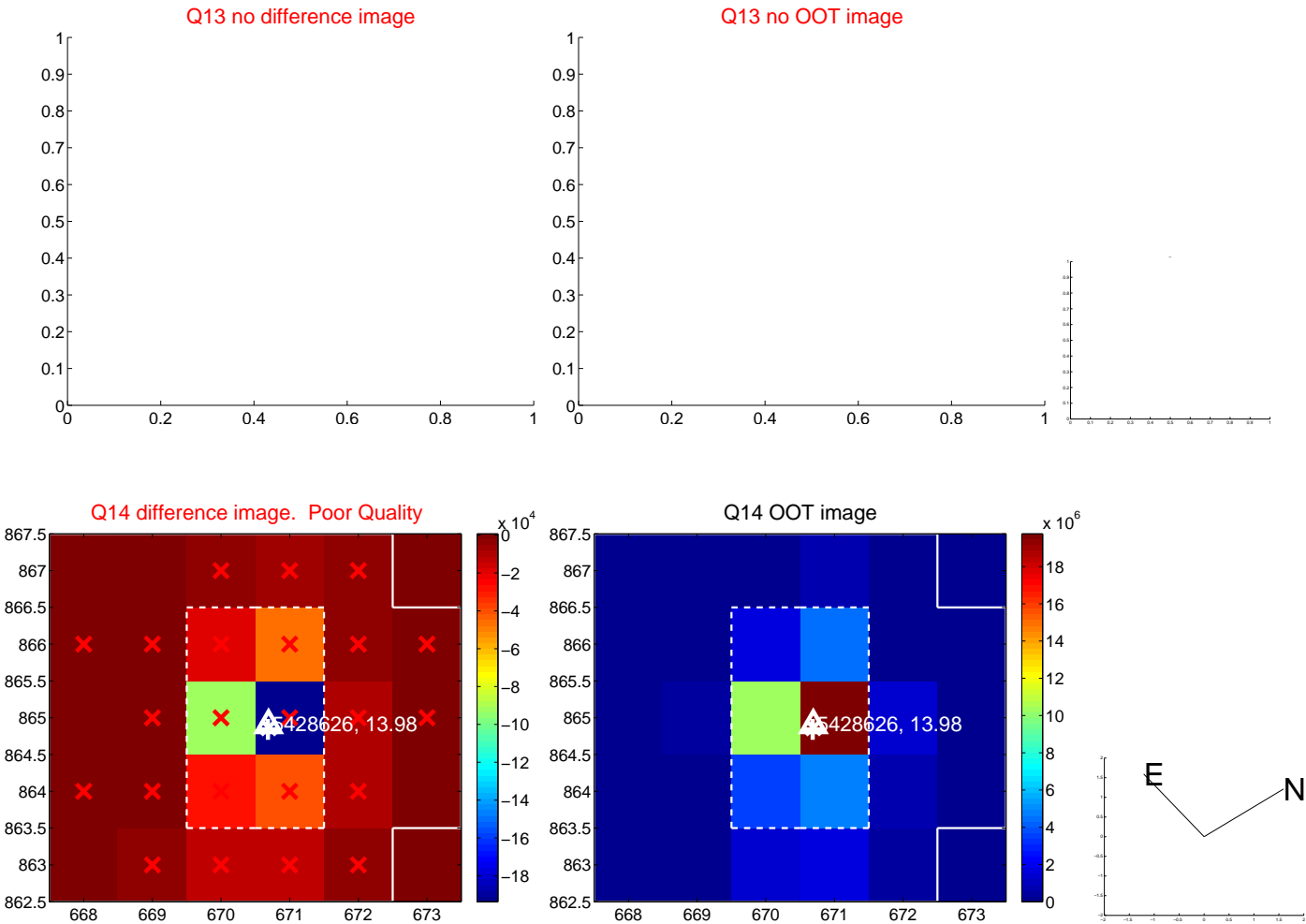
Q8 no OOT image



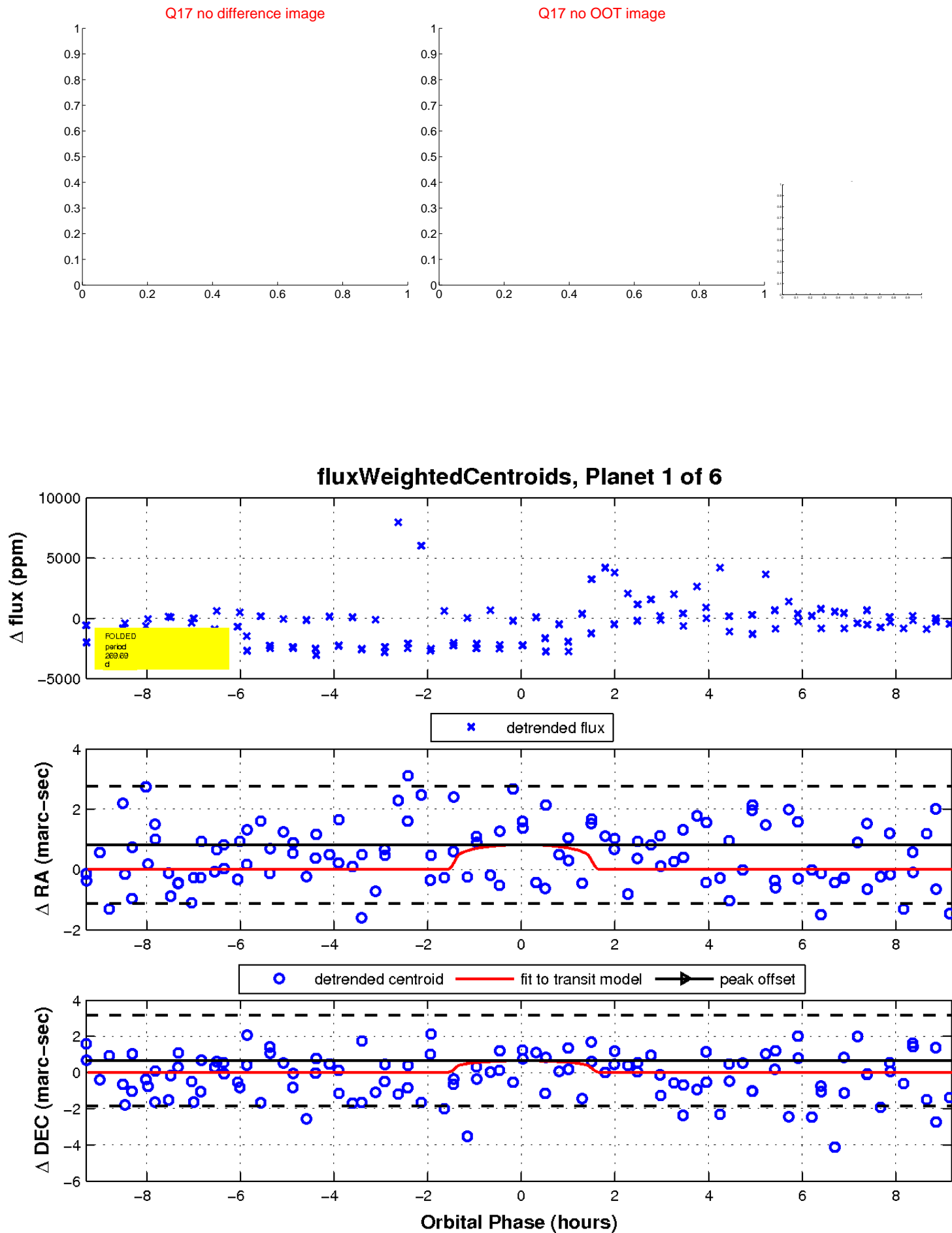
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white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.

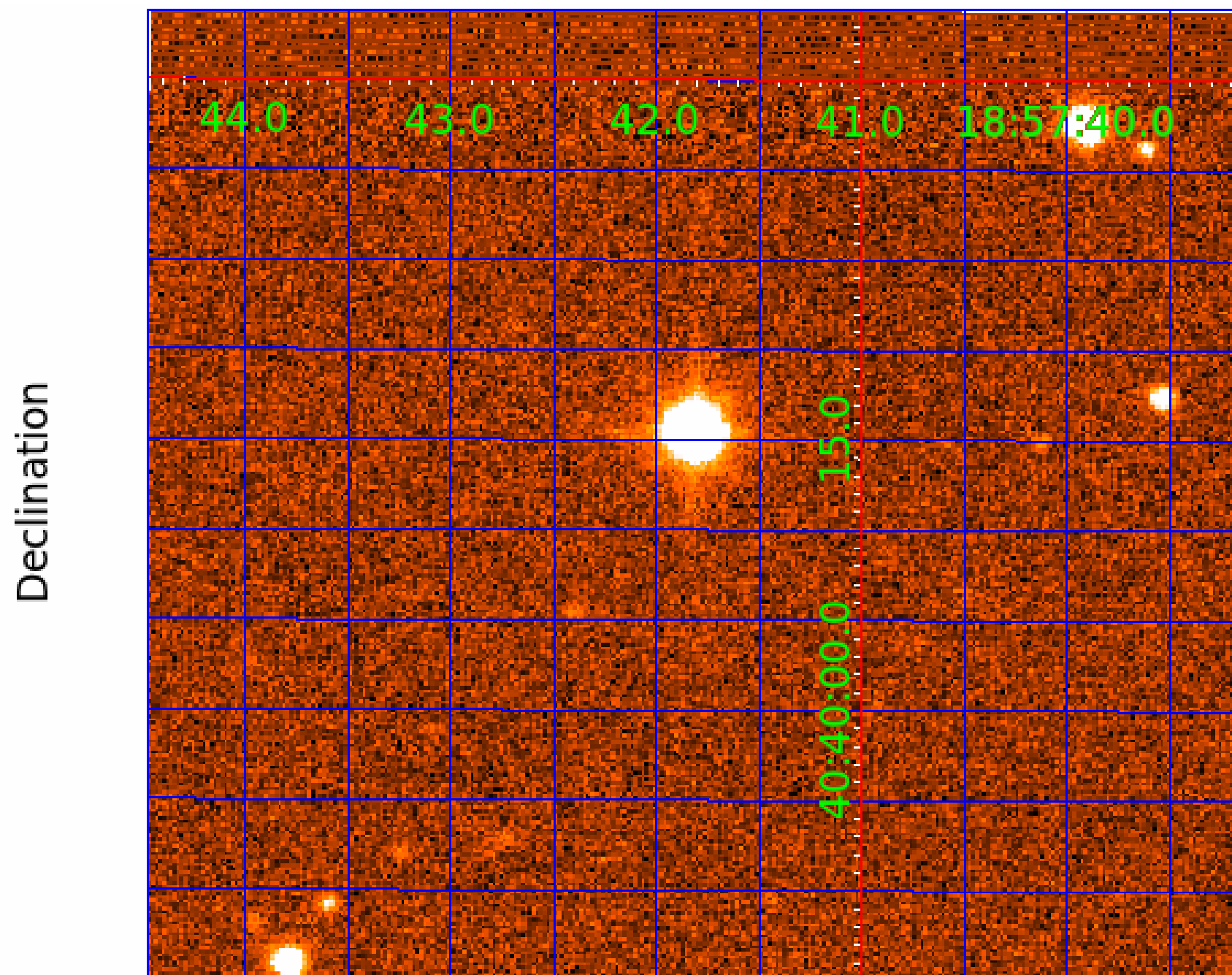


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UKIRT Image



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005428626-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
005428626-04	OBS	FP	0.00	1	0	0	0	LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005428626-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
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N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

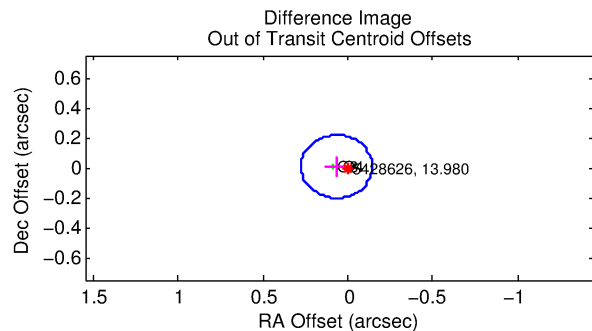
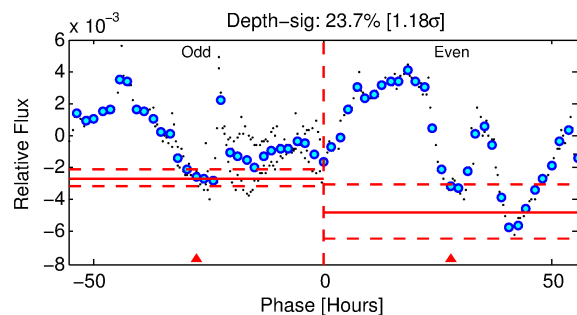
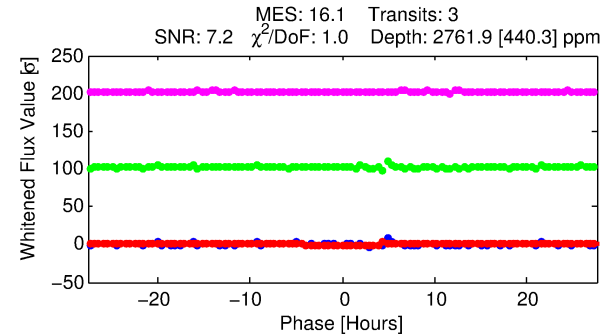
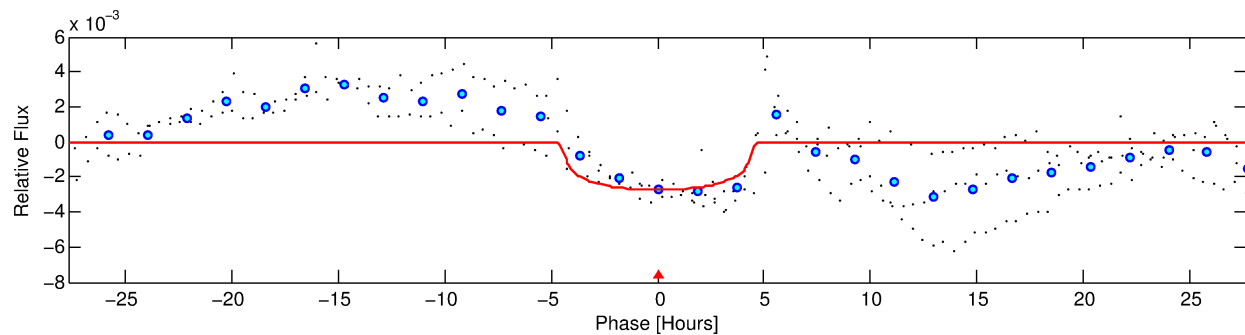
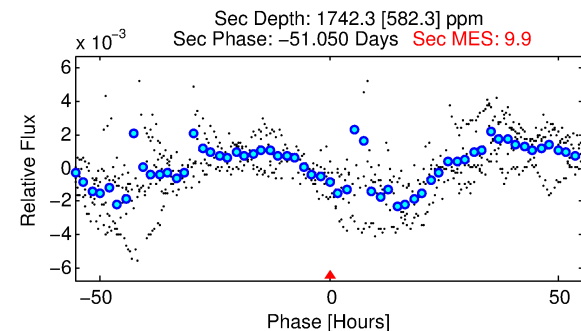
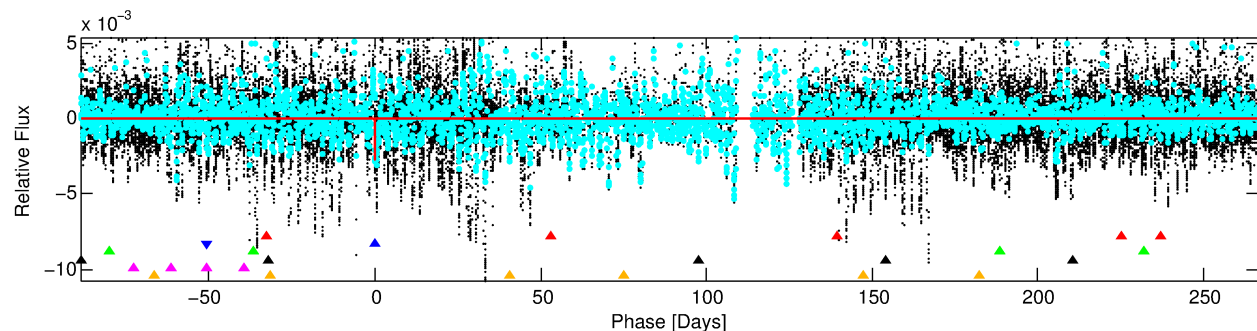
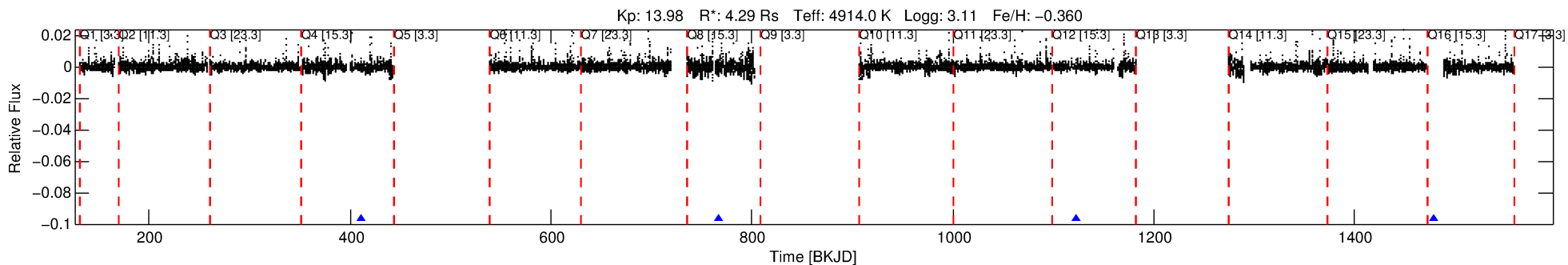
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 005428626-02

No Significant Match Found

# DV One-Page Summary

KIC: 5428626 Candidate: 2 of 6 Period: 355.563 d



## DV Fit Results:

Period = 355.56260 [0.00393] d  
Epoch = 411.3420 [0.0047] BKJD  
Rp/R\* = 0.0471 [0.0112]  
a/R\* = 300.23 [207.70]  
b = 0.24 [2.76]  
Seff = 10.97 [8.03]  
Teff = 464 [85] K  
Rp = 22.03 [14.29] Re  
a = 0.9356 [0.4694] AU  
Ag = 1729.17 [1600.92] [1.08σ]  
Teffp = 4627 [686] K [6.03σ]

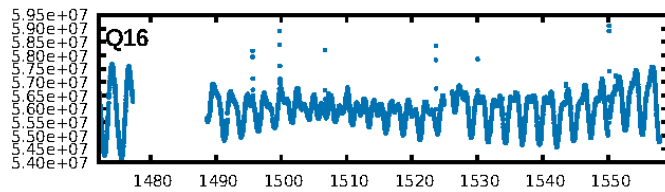
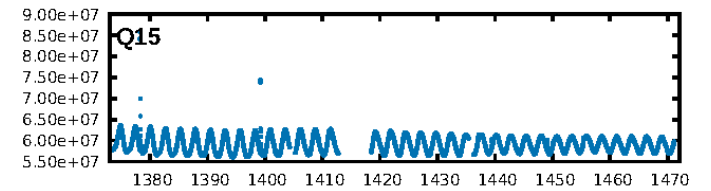
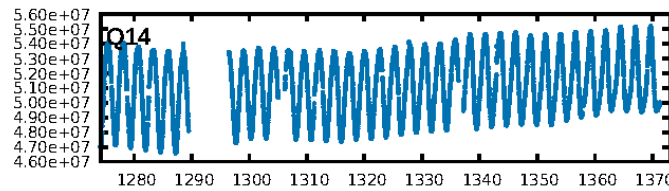
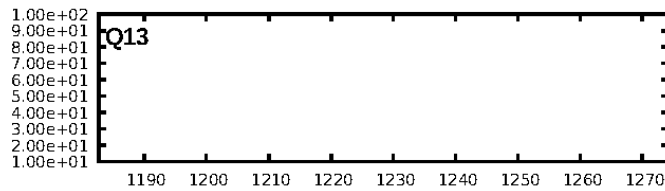
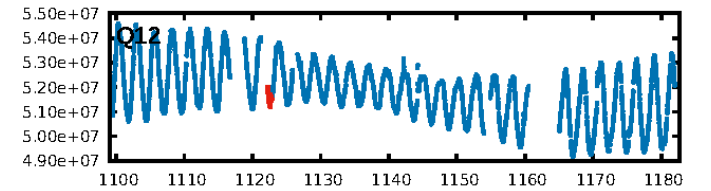
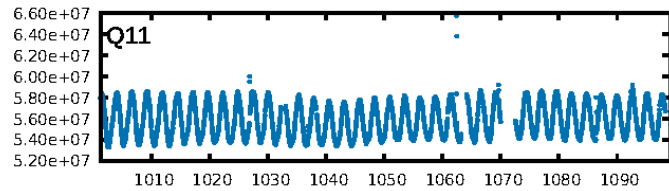
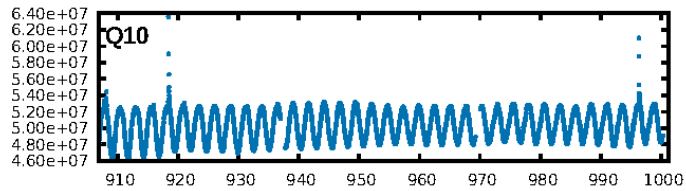
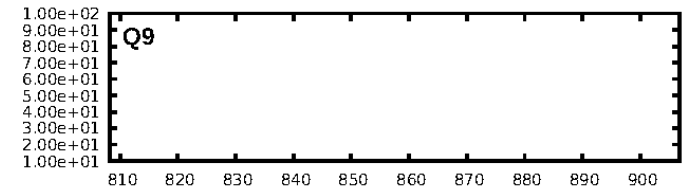
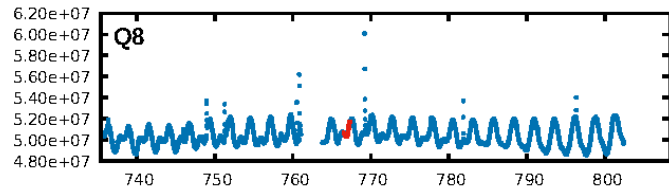
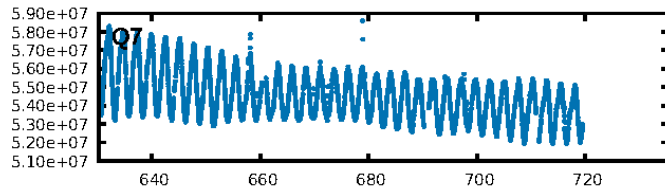
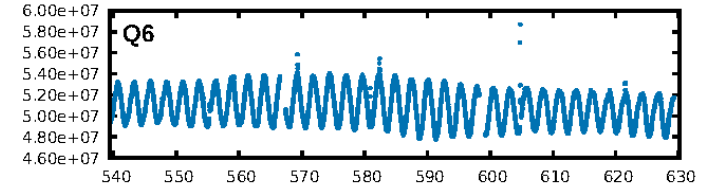
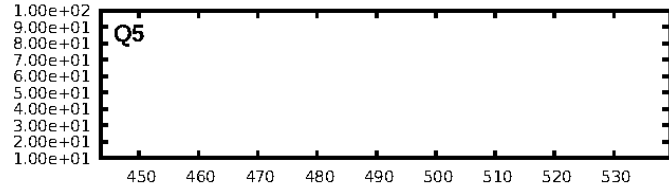
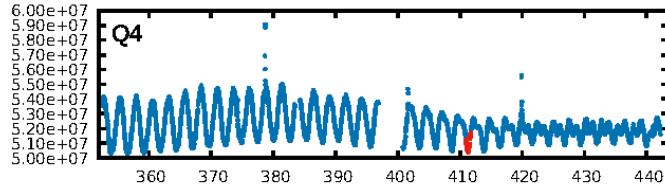
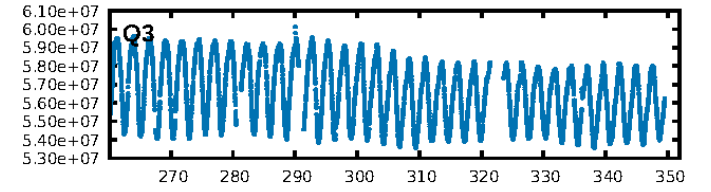
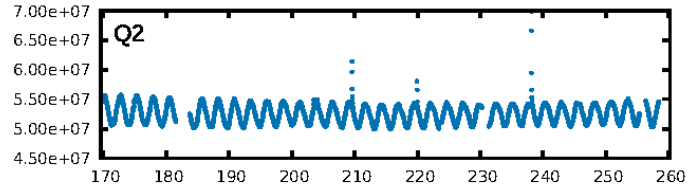
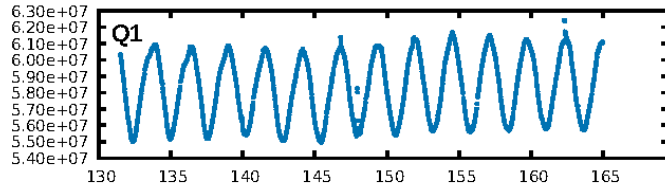
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [24.45σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 29.8%  
ModelChiSquareGof-sig: 97.1%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 7.24  
Centroid-sig: 6.9%  
Centroid-so: 0.672 arcsec [2.64σ]  
OotOffset-rm: 0.068 arcsec [0.97σ]  
OotOffset-st: 0/0/2/0 [2]  
KicOffset-rm: 0.107 arcsec [1.39σ]  
KicOffset-st: 0/0/2/0 [2]  
DiffImageQuality-fgm: 1.00 [2/2]  
DiffImageOverlap-fno: 1.00 [2/2]

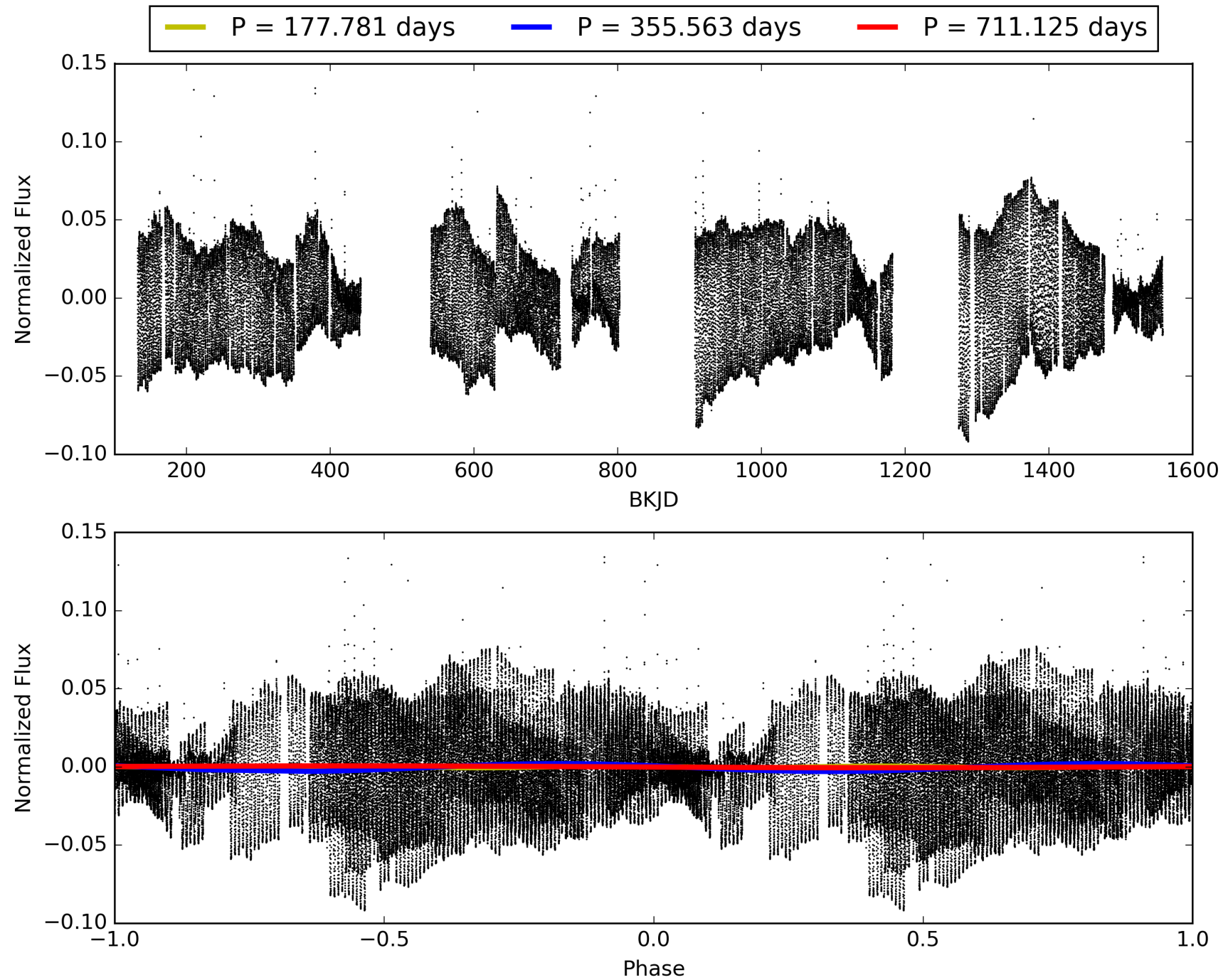
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 07:18:41 Z

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

# TCE 005428626-02, PDC Light Curves



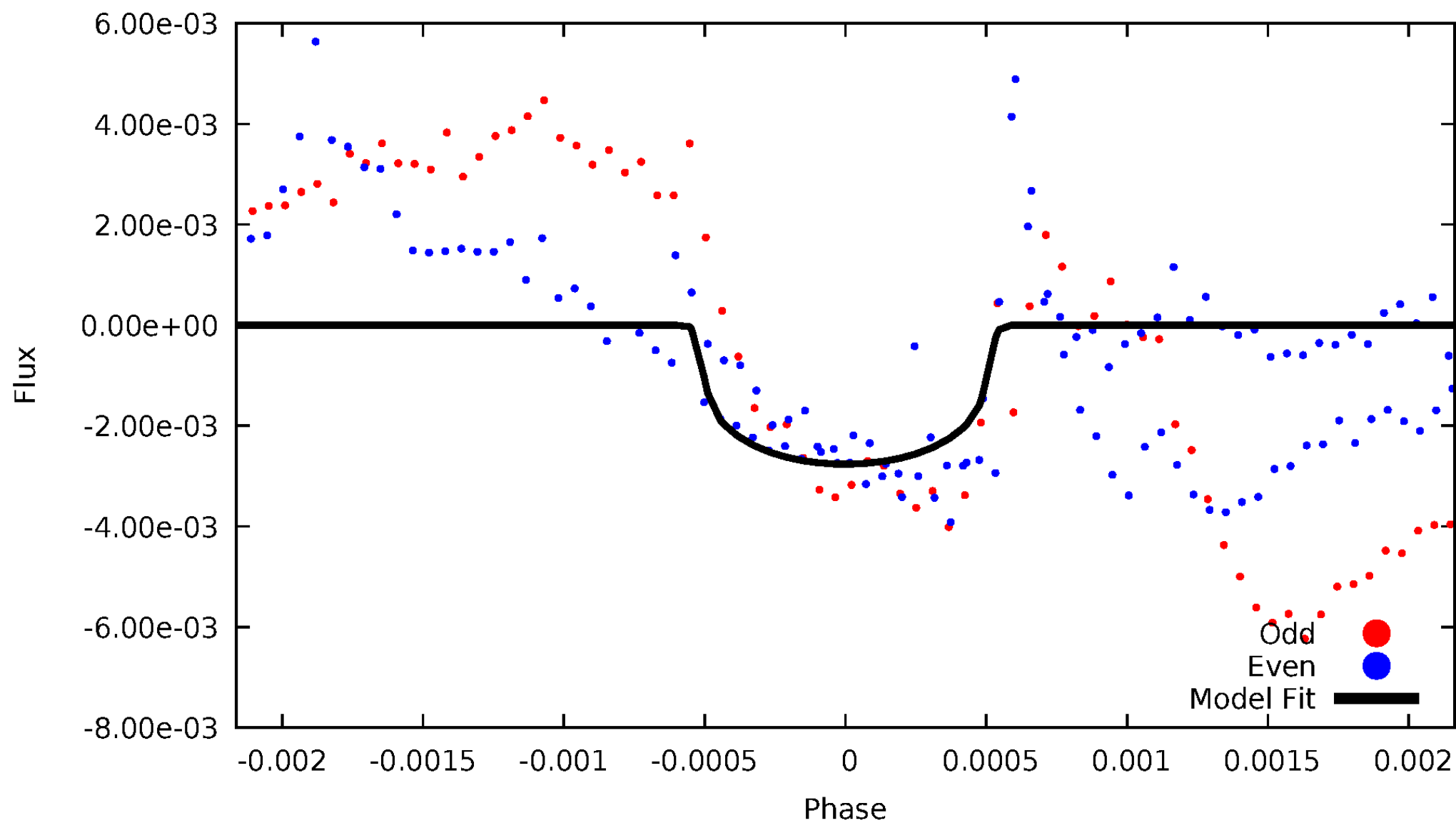
TCE 005428626-02





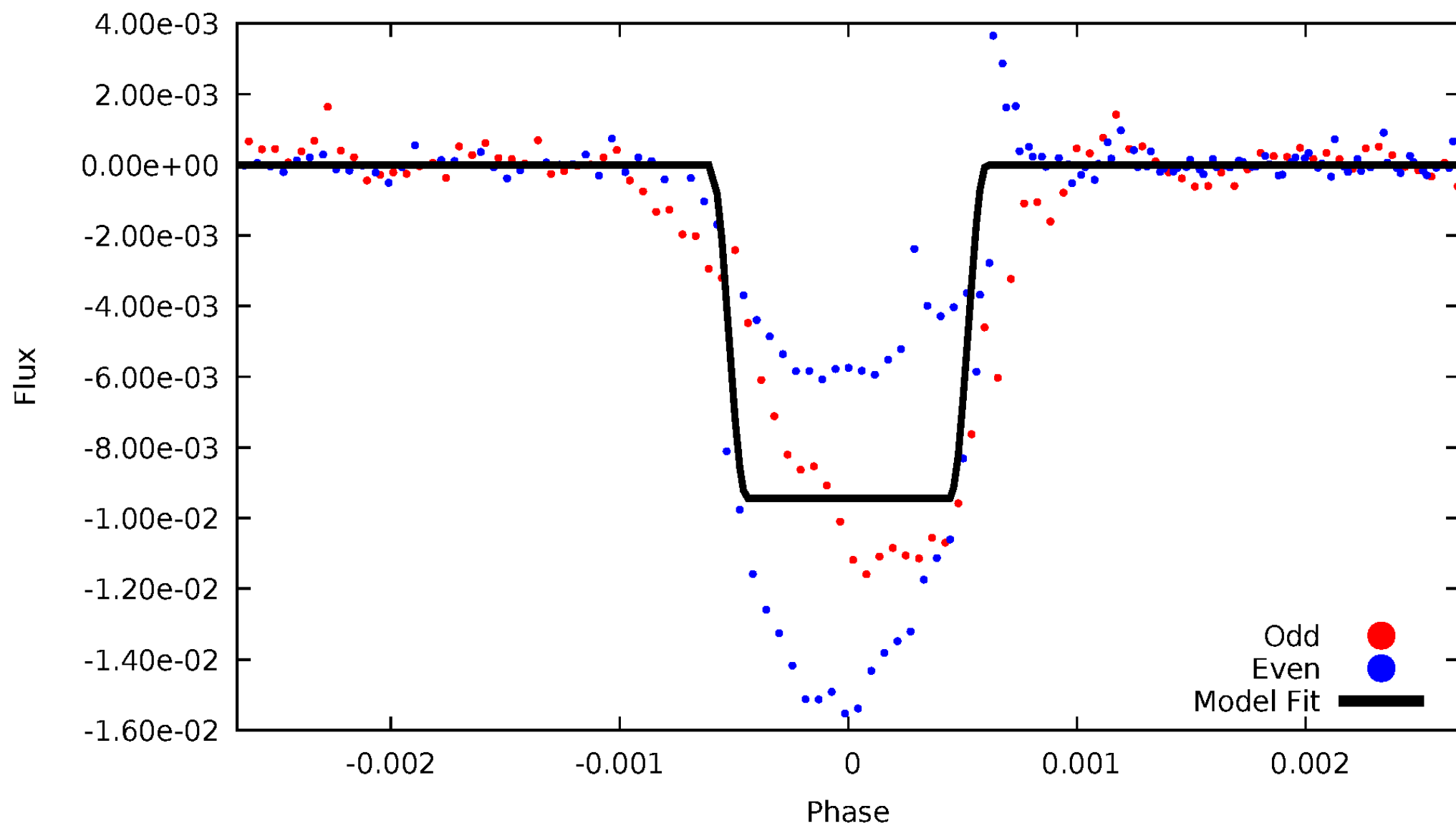
# DV Odd/Even

TCE 005428626-02



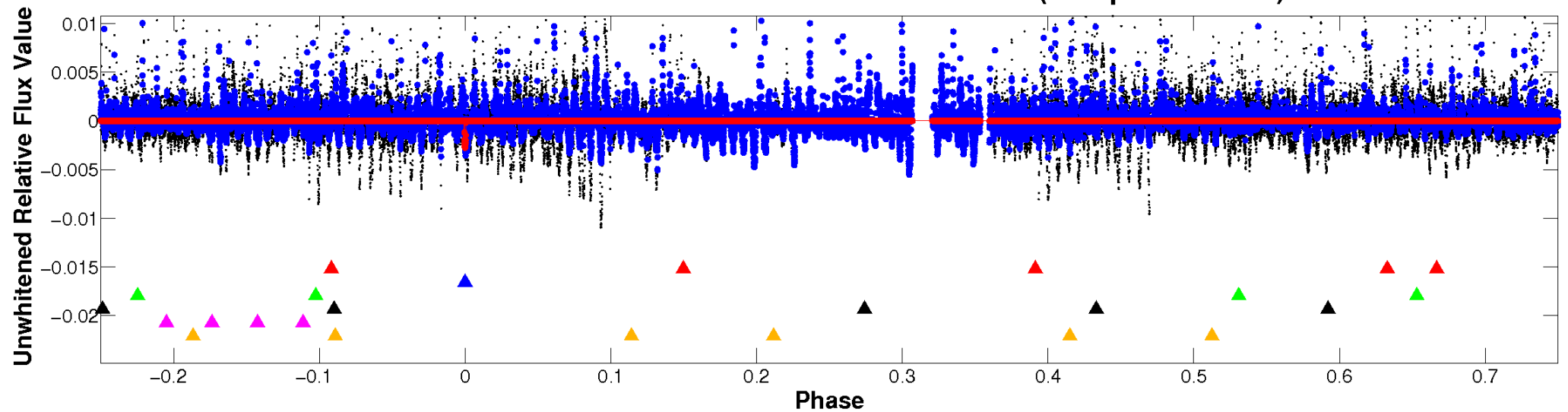
# ALT Odd/Even

TCE 005428626-02

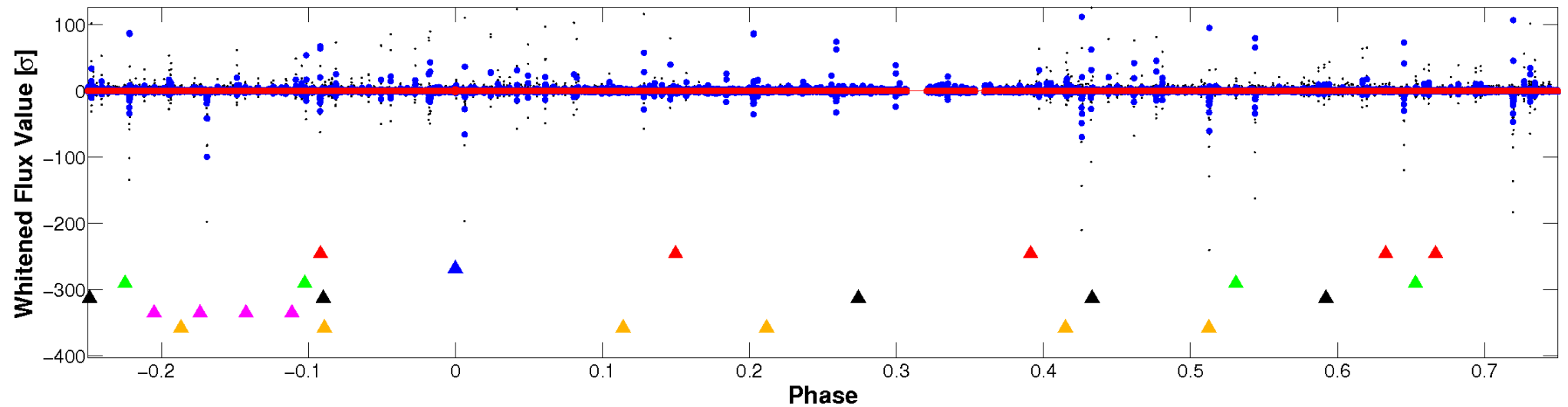


# Non-Whitened Vs. Whitened Light Curve

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

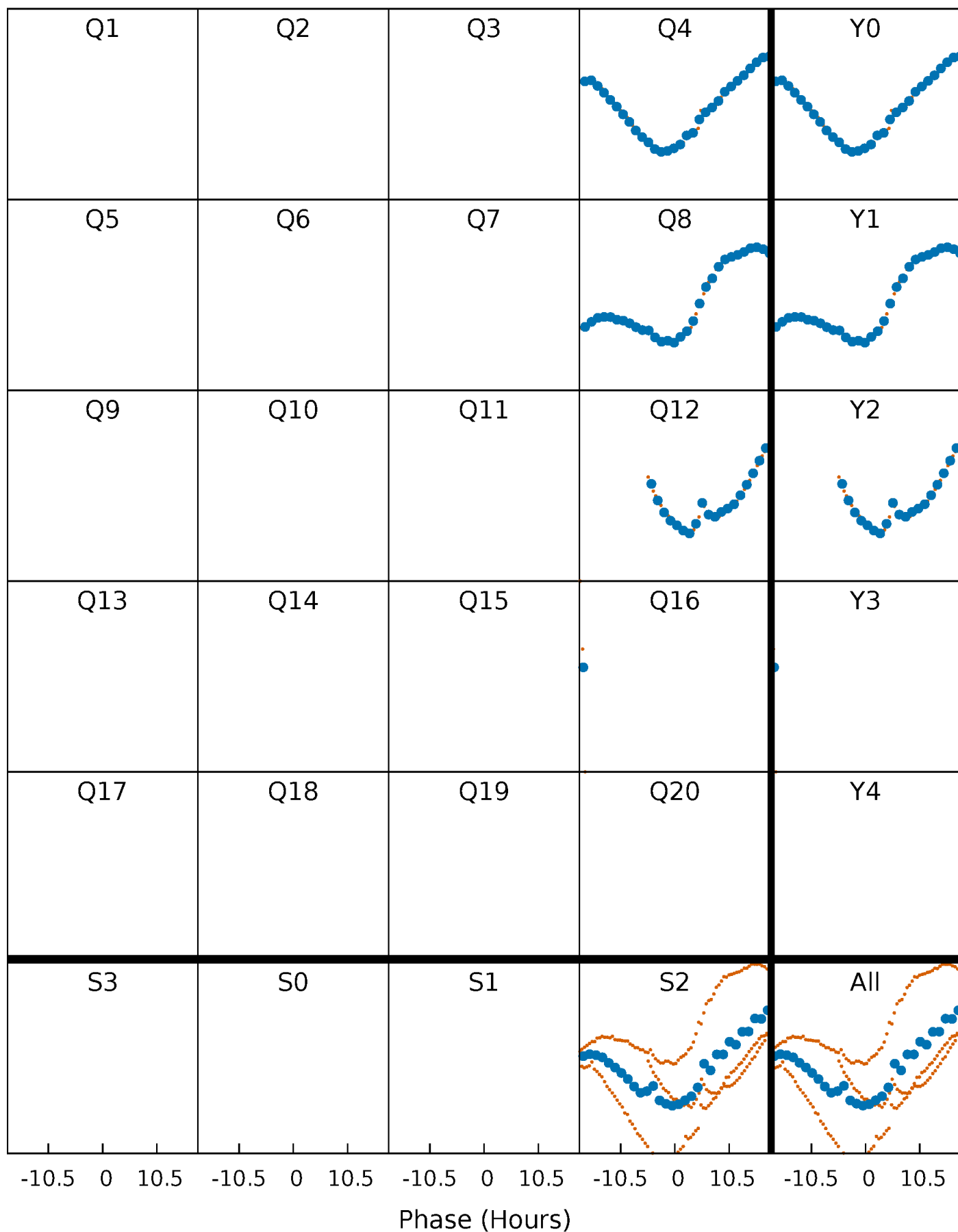


**Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



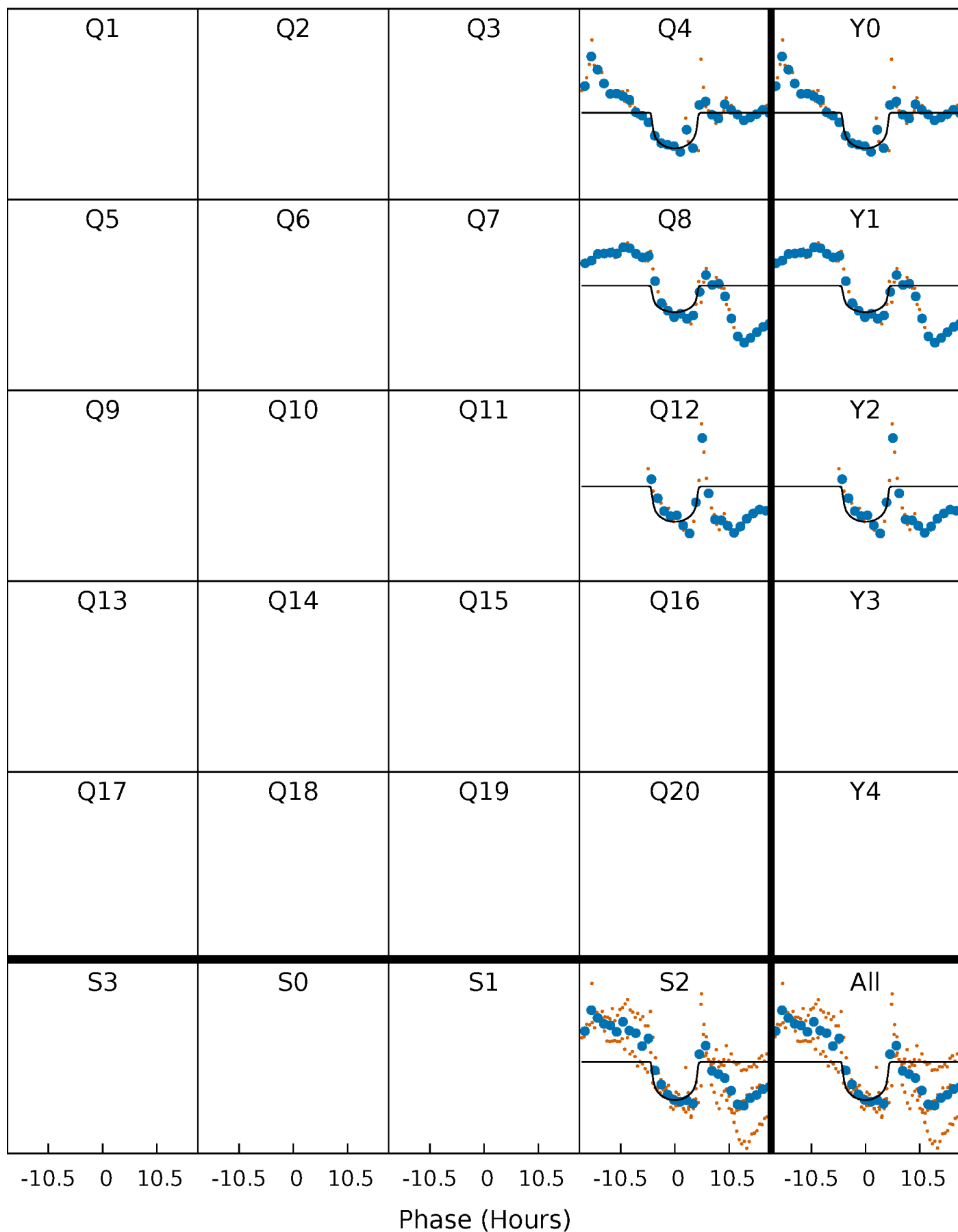
# PDC Quarter-Phased Transit Curves

TCE 005428626-02     $P=355.562599$  Days     $T_0=411.341991$  (BKJD)



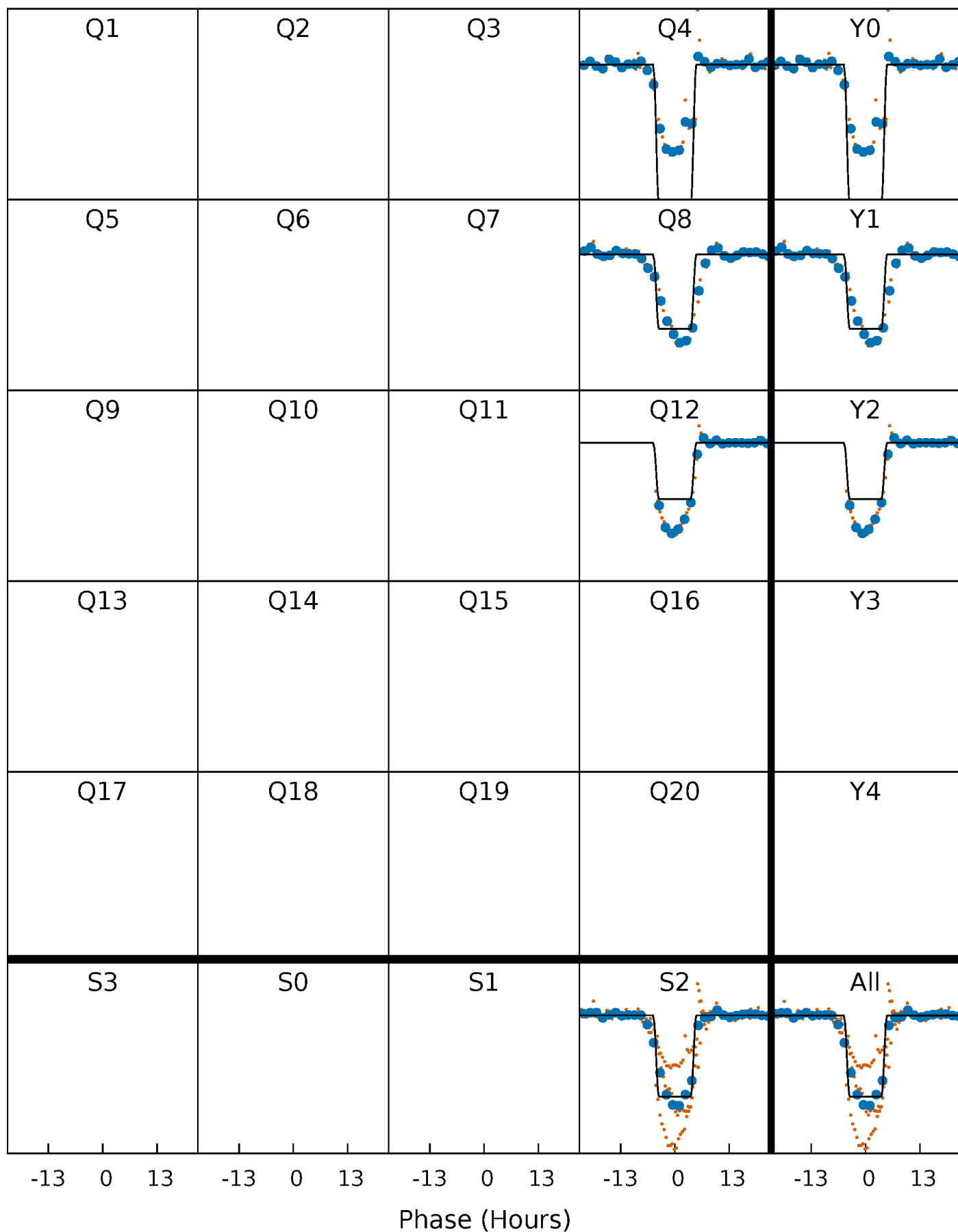
# DV Quarter-Phased Transit Curves

TCE 005428626-02     $P=355.562599$  Days     $T_0=411.341991$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

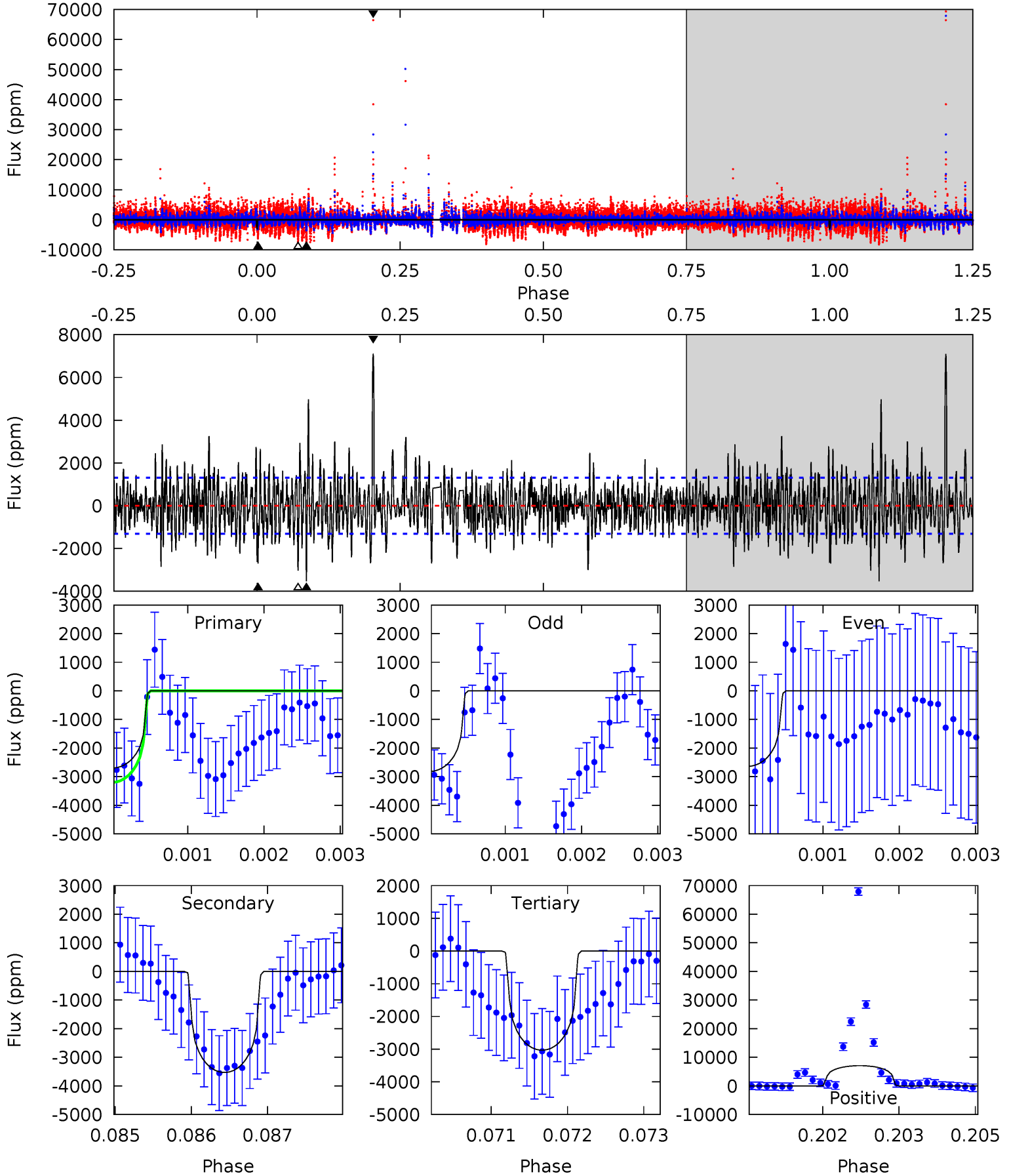
TCE 005428626-02 P=355.557566 Days  $T_0=411.326686$  (BKJD)



# DV Model-Shift Uniqueness Test

005428626-02,  $P = 355.562599$  Days,  $E = 55.779392$  Days

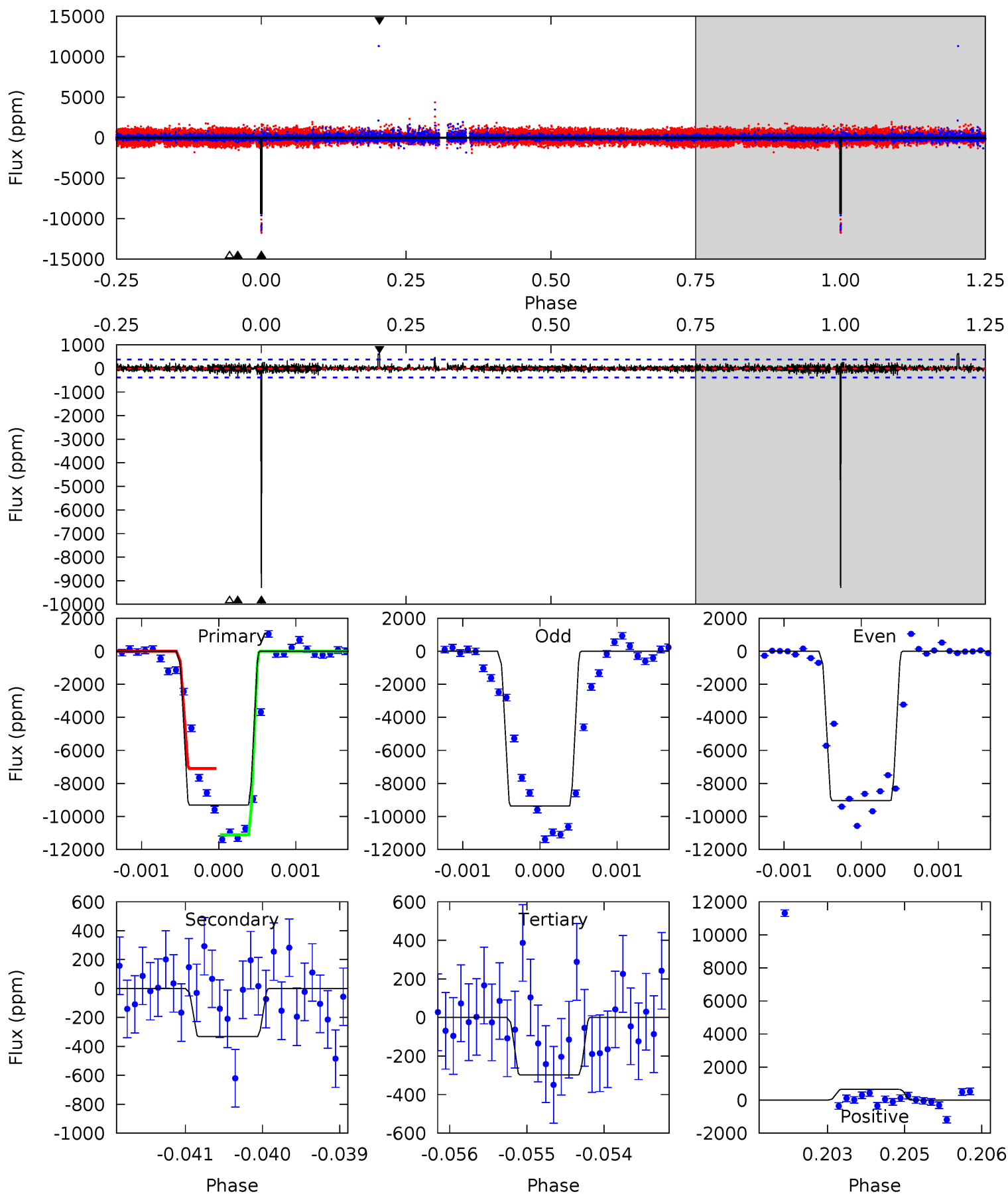
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.2	14.6	12.5	29.3	5.43	3.25	3.79	-1.36	-18.1	2.06	-14.7	0.25	0.99	0.67	2.04



# Alt Model-Shift Uniqueness Test

005428626-02, P = 355.557566 Days, E = 55.769120 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
132.3	4.72	4.23	9.15	5.43	3.25	0.90	128.1	123.2	0.49	-4.43	2.91	0.99	0.06	0





### Stellar Parameters For KIC 005428626

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4914^{+149}_{-112}$	$3.110^{+0.390}_{-0.319}$	$-0.360^{+0.250}_{-0.250}$	$4.287^{+2.589}_{-1.394}$	$0.862^{+0.316}_{-0.097}$	$0.015^{+0.037}_{-0.011}$
	+3%/-2%	+13%/-10%	+69%/-69%	+60%/-33%	+37%/-11%	+243%/-70%
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 005428626-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-3530 \pm 242$	$21.89^{+9.40}_{-7.34}$	$647^{+89}_{-76}$	$5464^{+779}_{-535}$	$3643^{+4384}_{-1813}$
Alt.	$-332 \pm 70$	$45.19^{+15.91}_{-10.60}$	$642^{+83}_{-71}$	$2815^{+133}_{-124}$	$79^{+63}_{-36}$

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

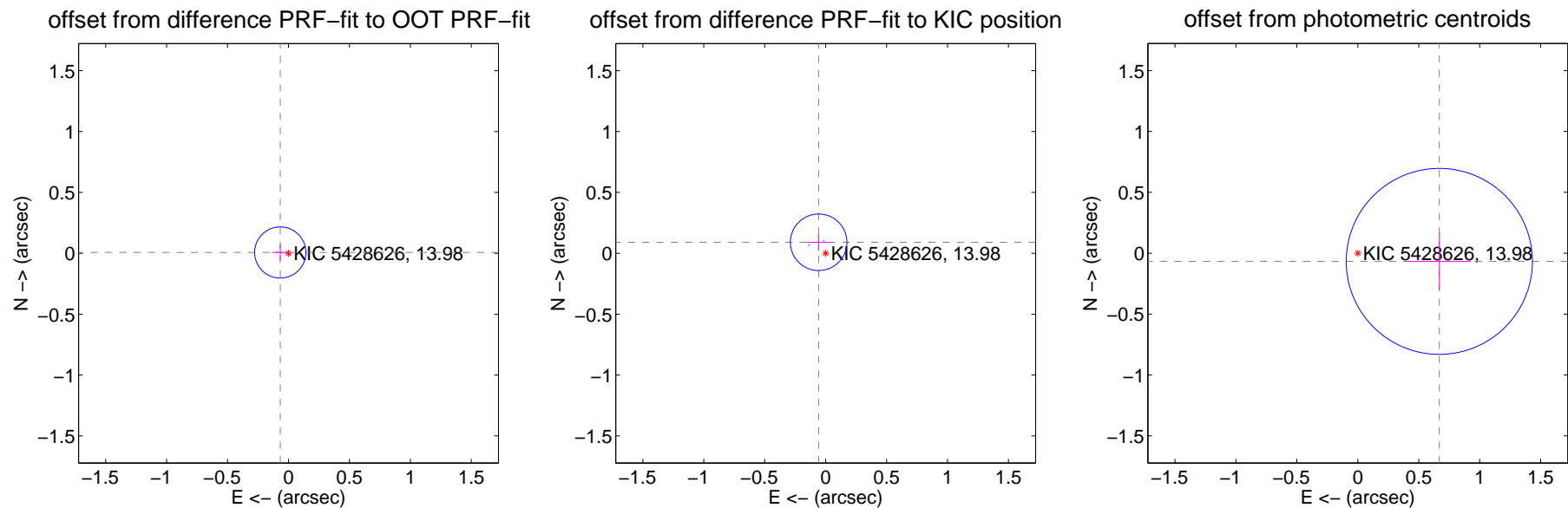
## DV Centroid Data

Supplemental centroid analysis for 005428626-02. Kepler magnitude: 13.98. Transit SNR 7.22

There are 2 quarters with good PRF difference image offsets

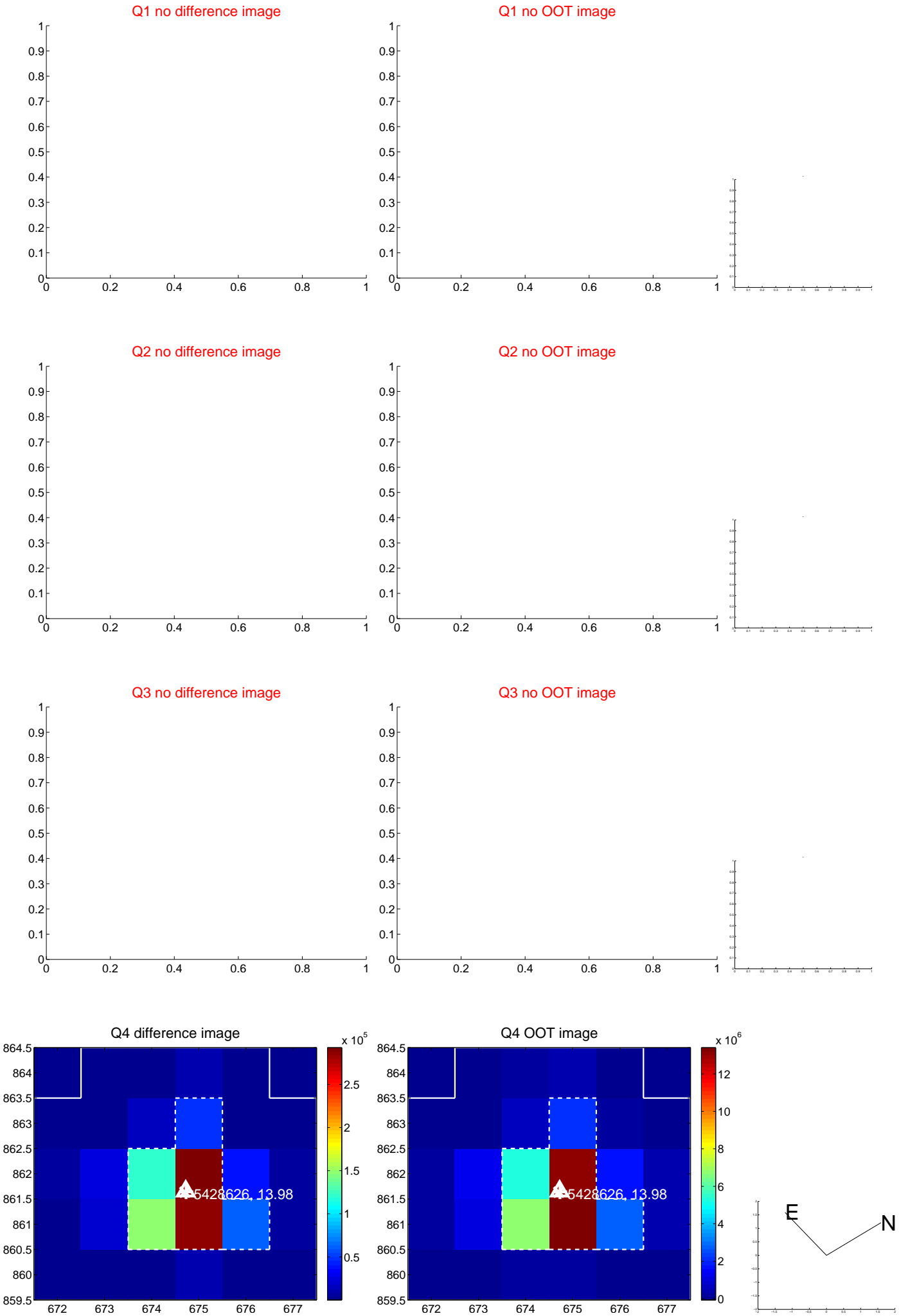
The direct PRF centroid is offset from the target star catalog position by about 0.07 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.068 \pm 0.070$	0.97	$0.068 \pm 0.070$	$0.007 \pm 0.067$
PRF-fit source offset from KIC position	$0.107 \pm 0.077$	1.39	$0.058 \pm 0.094$	$0.090 \pm 0.069$
photometric centroid source offset	$0.67 \pm 0.25$	2.64	$-0.67 \pm 0.25$	$-0.07 \pm 0.24$

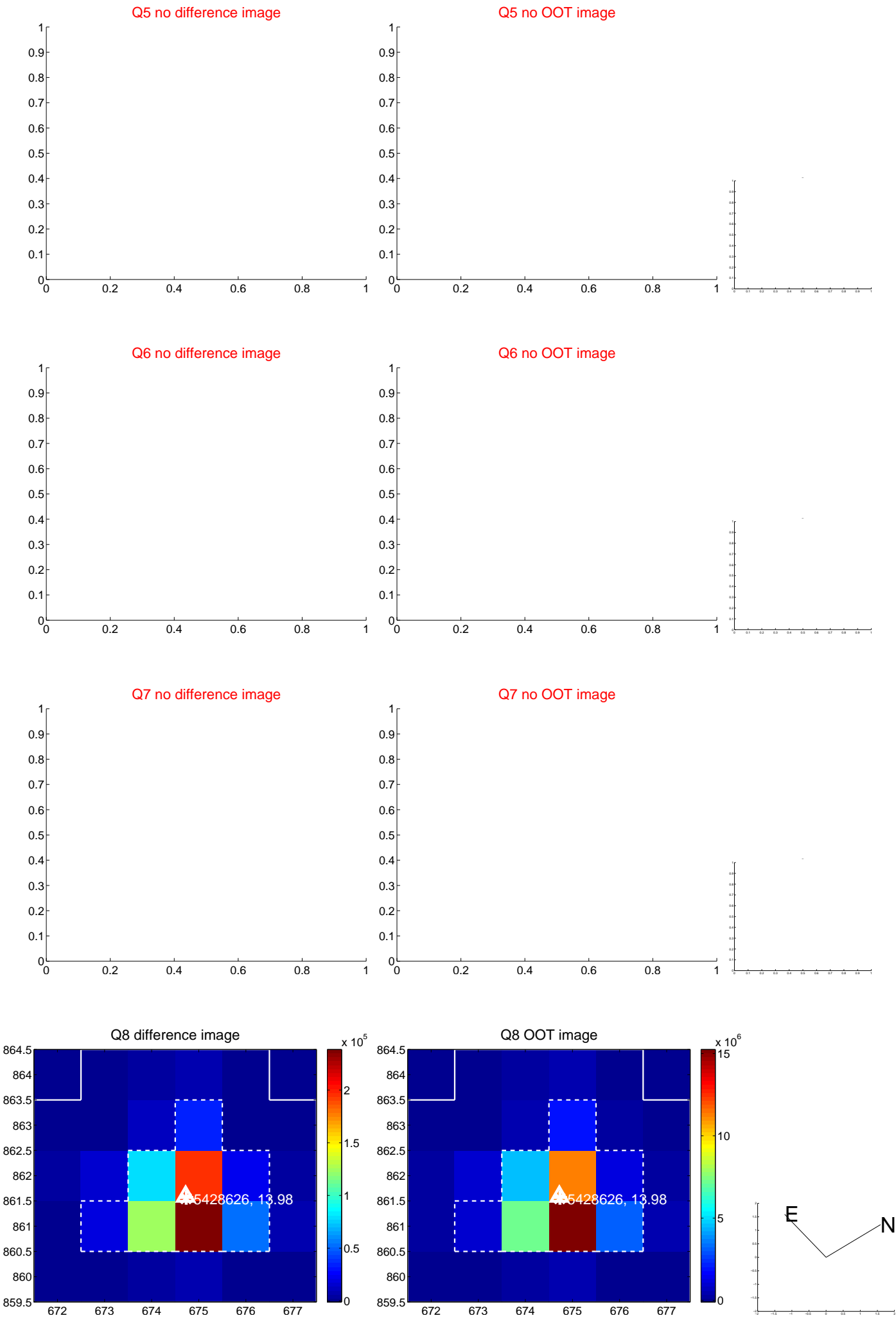


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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



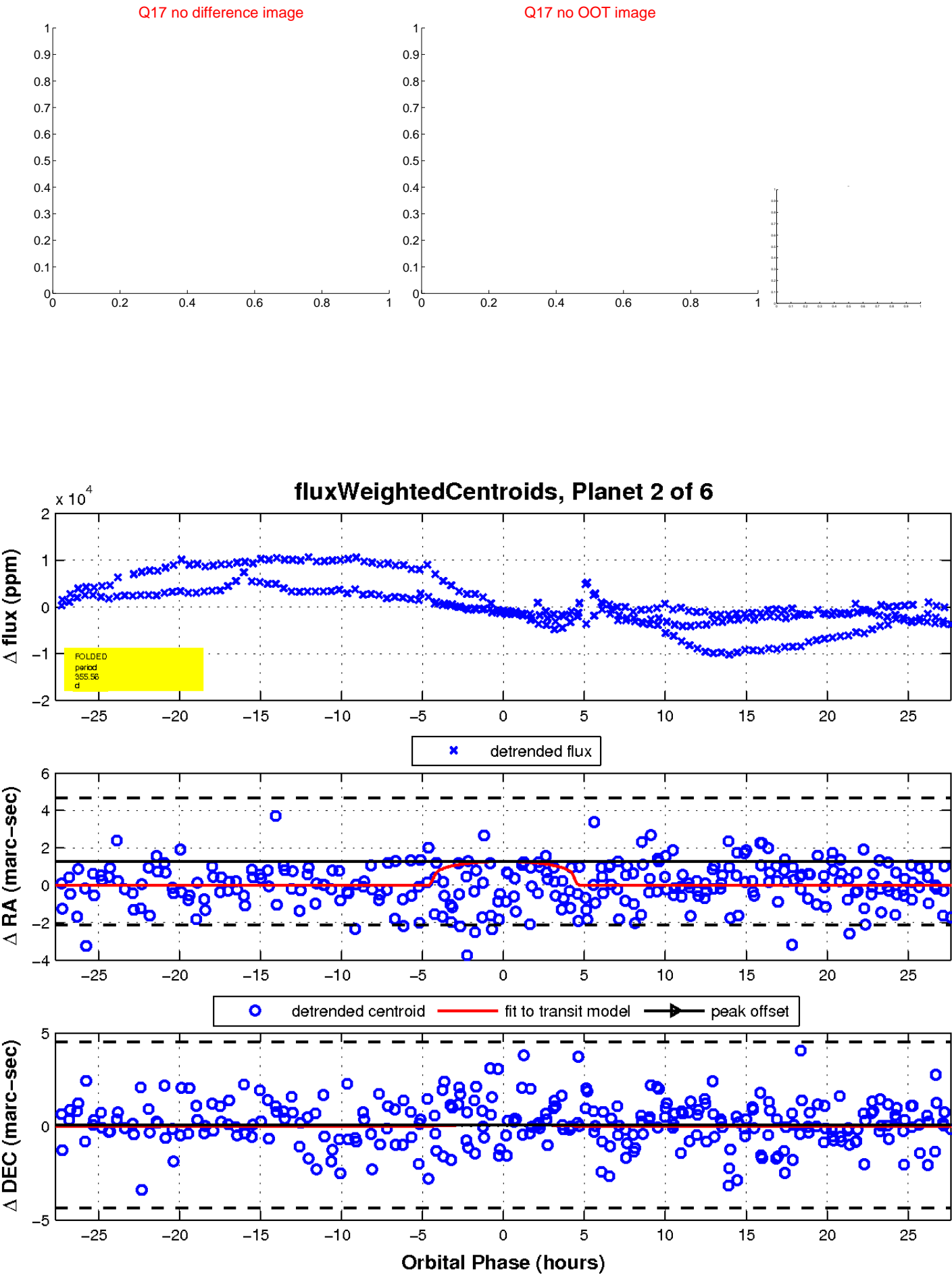
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



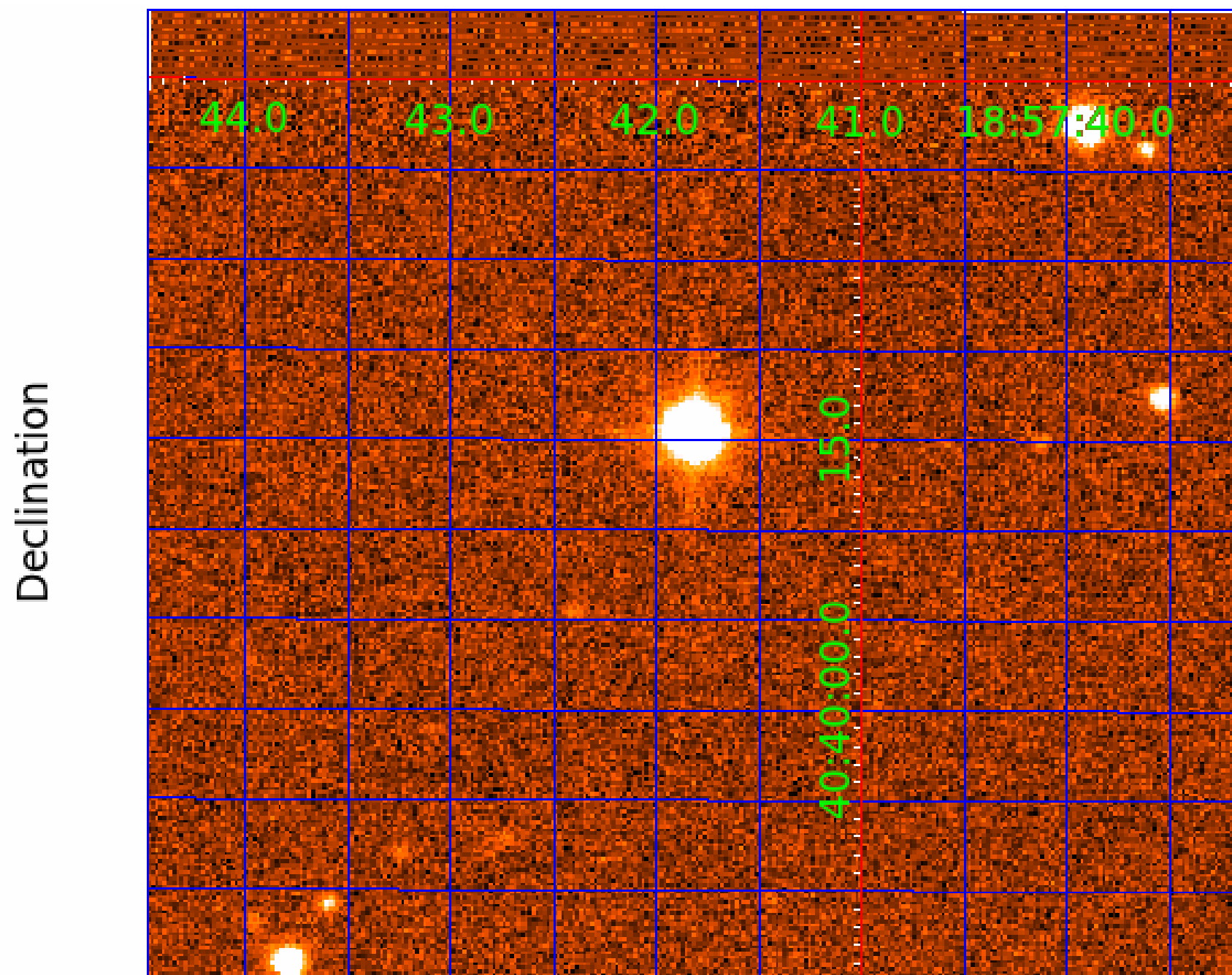
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image





# KIC 005428626

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005428626-01	OBS	No	269.686442	280.787021	1367.3	3.102	18.2	5.2	4.29	4914	15.79	15.86
005428626-02	OBS	No	355.562599	411.341991	2761.9	9.225	16.1	7.2	4.29	4914	22.03	10.97
005428626-03	OBS	No	312.104420	374.915321	2422.4	4.421	23.5	8.1	4.29	4914	22.52	13.05
005428626-04	OBS	No	299.023200	379.408217	2309.6	10.502	15.5	6.7	4.29	4914	22.56	13.82
005428626-05	OBS	No	344.454802	371.815203	2494.0	5.811	13.9	7.7	4.29	4914	21.08	11.44
005428626-06	OBS	No	248.603897	203.333097	2404.3	7.664	16.7	7.4	4.29	4914	20.38	17.68

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005428626-01	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
005428626-02	OBS	FP	0.00	1	0	0	0	LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
005428626-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
005428626-04	OBS	FP	0.00	1	0	0	0	LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005428626-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
005428626-06	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS

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

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

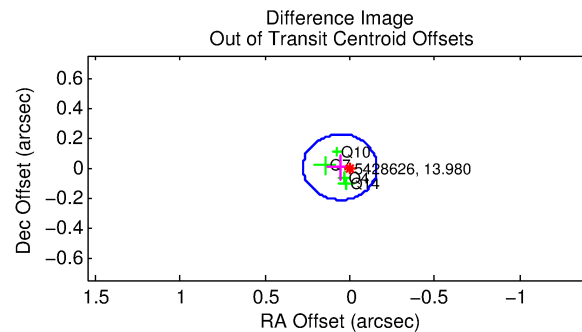
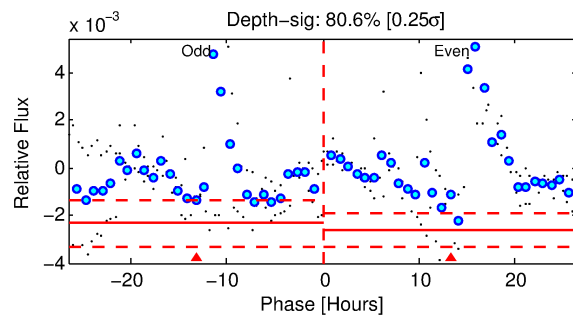
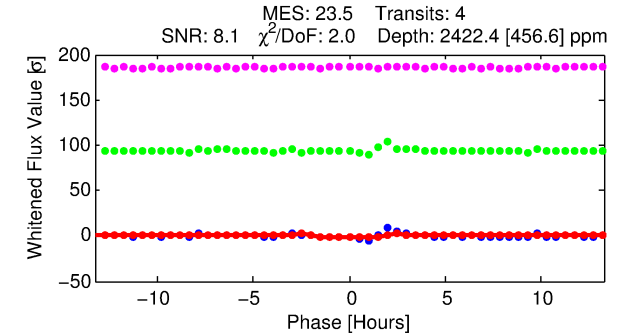
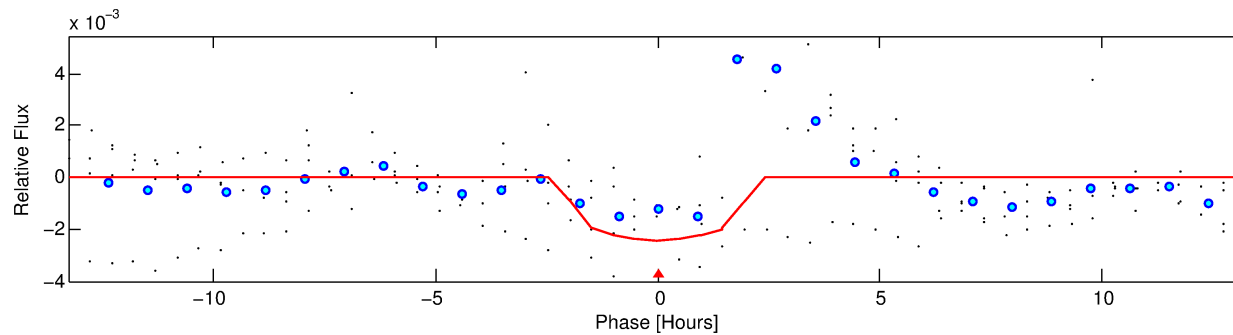
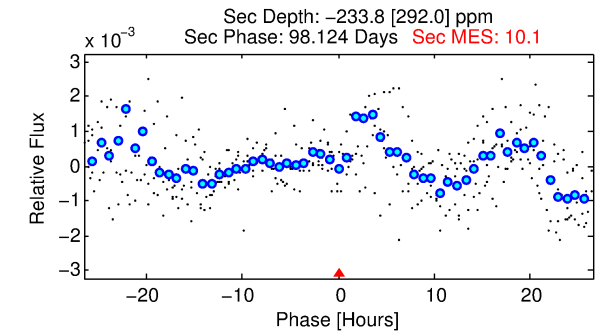
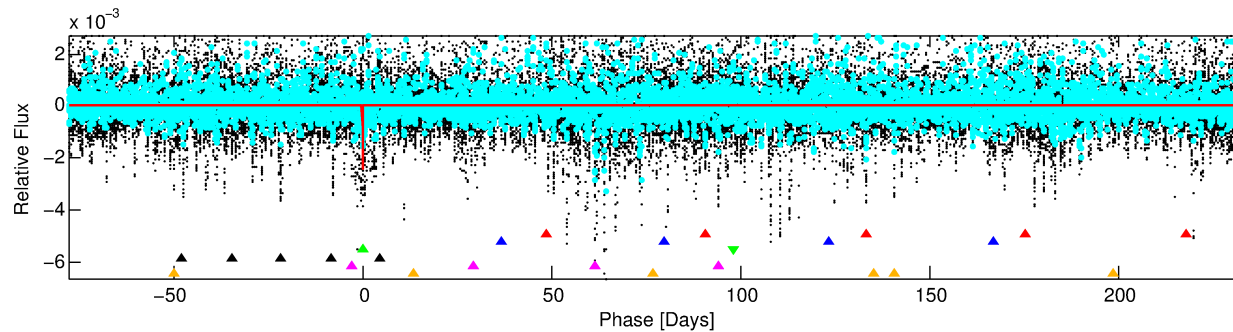
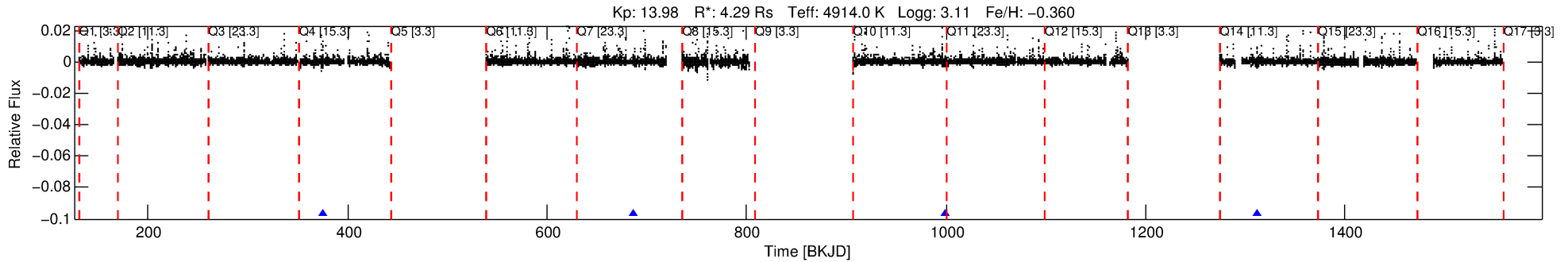
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 005428626-03

No Significant Match Found

# DV One-Page Summary

KIC: 5428626 Candidate: 3 of 6 Period: 312.104 d



## DV Fit Results:

Period = 312.10442 [0.00329] d  
Epoch = 374.9153 [0.0062] BKJD  
Rp/R\* = 0.0481 [0.0801]  
a/R\* = 420.24 [2477.31]  
b = 0.70 [4.37]  
Seff = 13.05 [9.55]  
Teff = 485 [89] K  
Rp = 22.52 [39.84] Re  
a = 0.8577 [0.4303] AU  
Ag = N/A  
Teffp = N/A

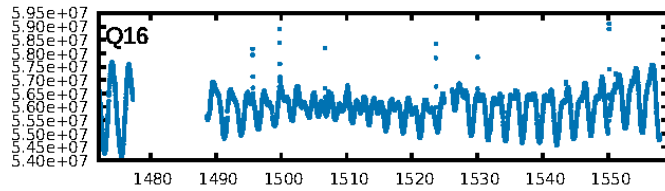
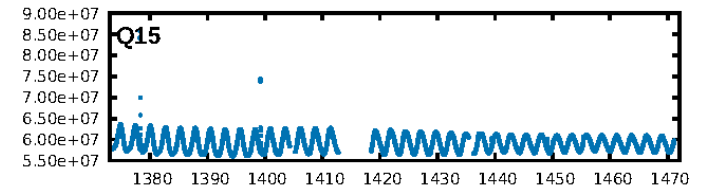
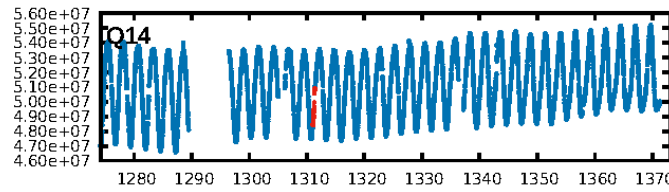
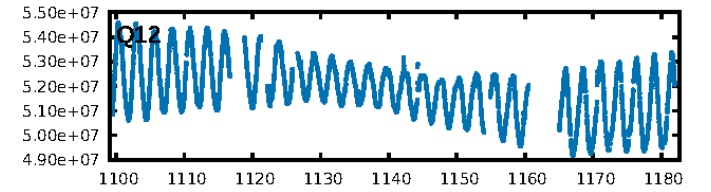
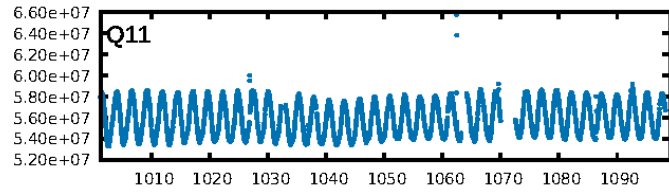
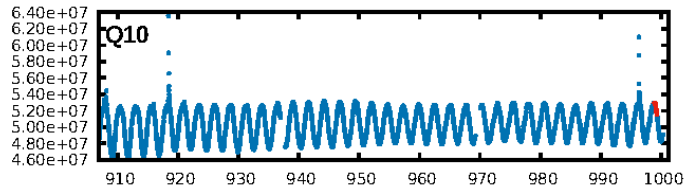
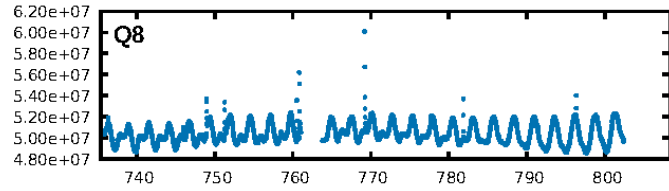
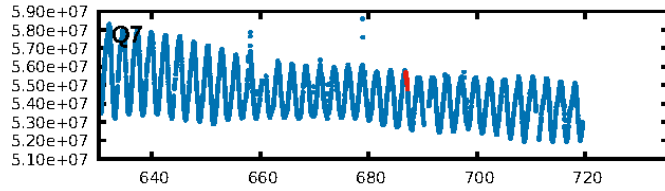
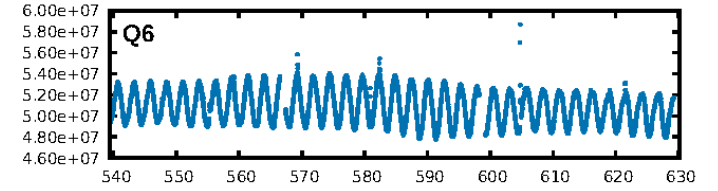
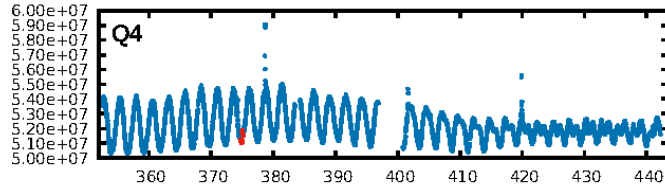
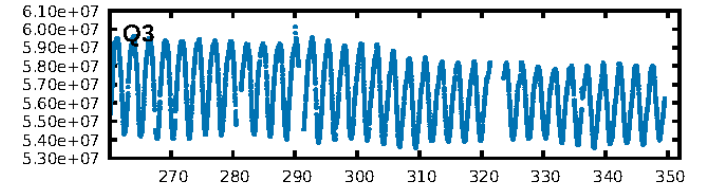
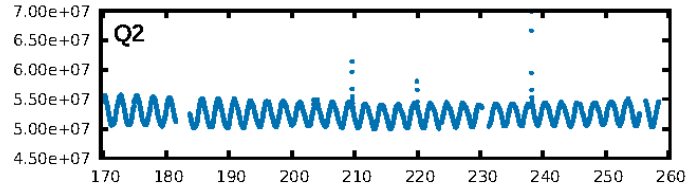
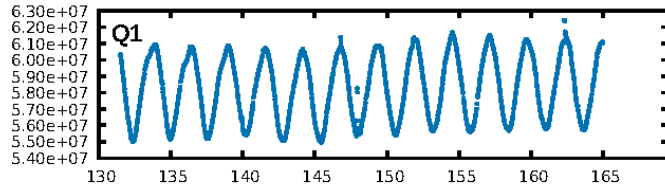
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [27.55σ]  
LongPeriod-sig: 100.0% [106.33σ]  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 3.6%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: 0.7765  
Centroid-sig: 21.5%  
Centroid-so: 0.244 arcsec [0.73σ]  
OotOffset-rm: 0.059 arcsec [0.81σ]  
OotOffset-st: 2/1/1/0 [4]  
KicOffset-rm: 0.025 arcsec [0.31σ]  
KicOffset-st: 2/1/1/0 [4]  
DiffImageQuality-fgm: 0.50 [2/4]  
DiffImageOverlap-fno: 1.00 [4/4]

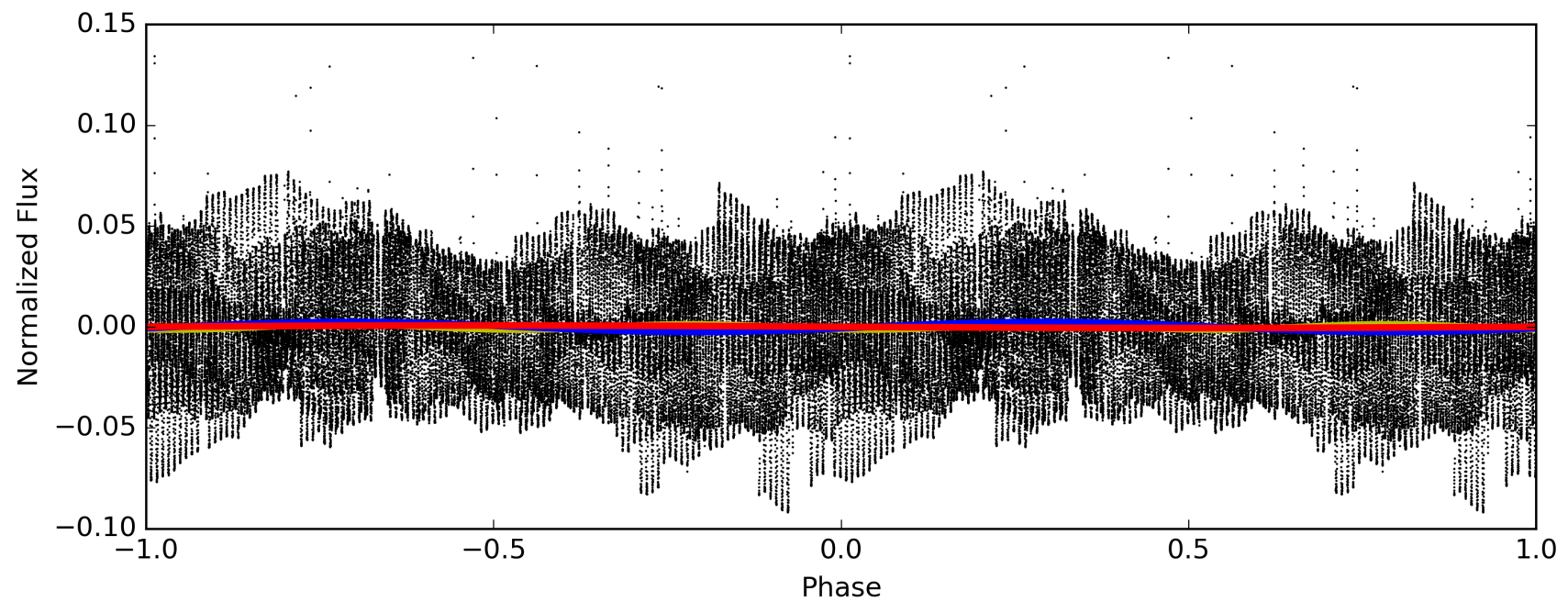
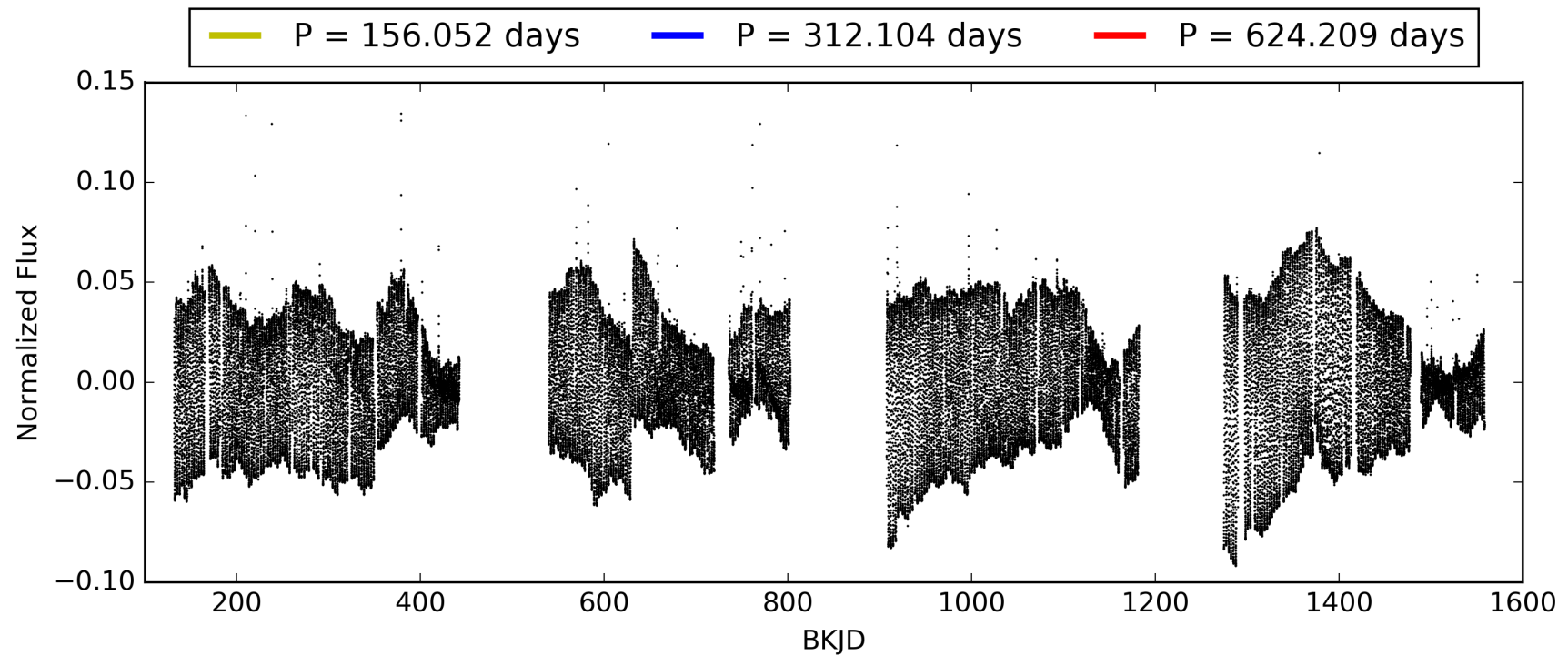
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 07:18:51 Z

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

# TCE 005428626-03, PDC Light Curves

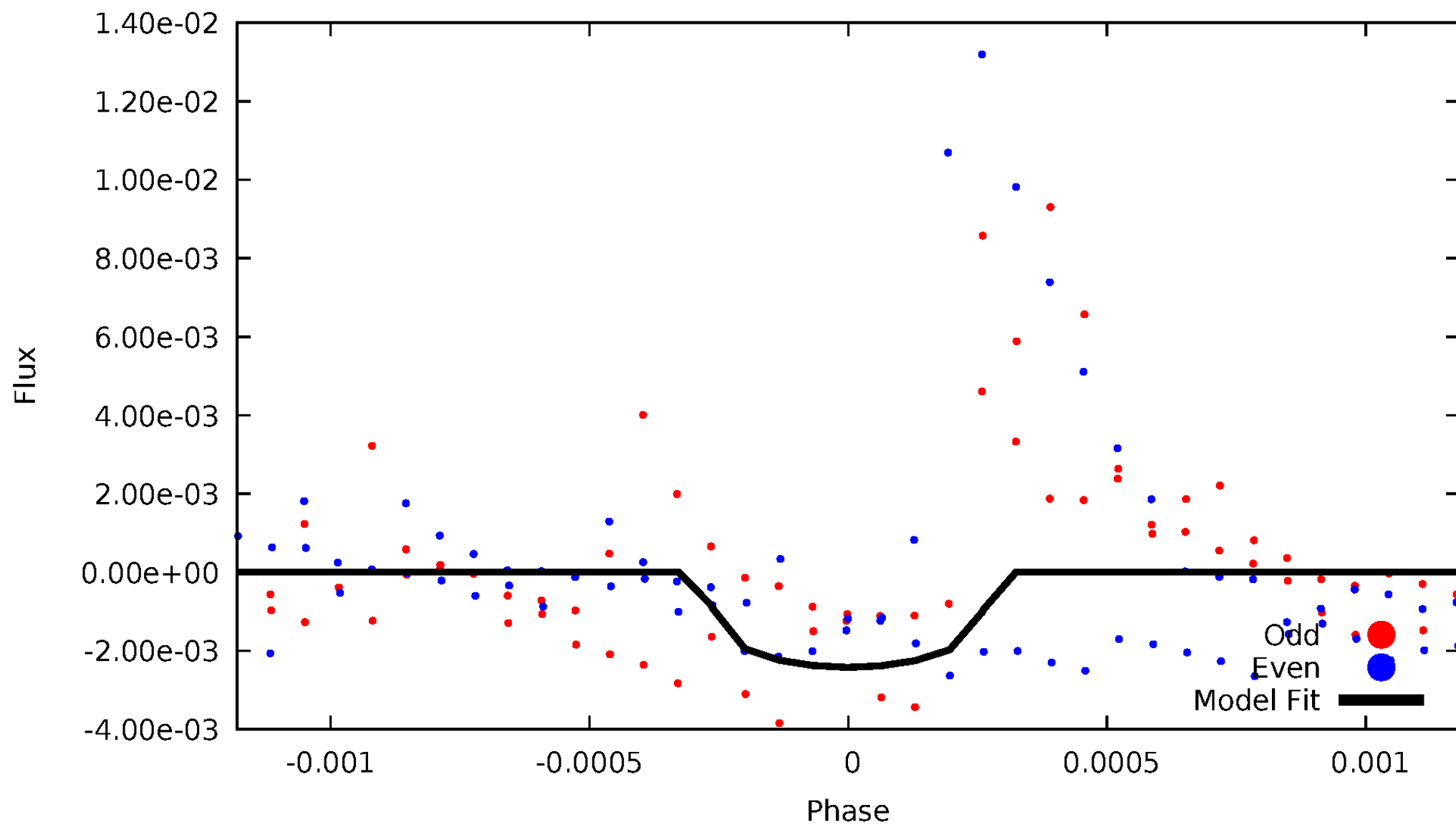


TCE 005428626-03



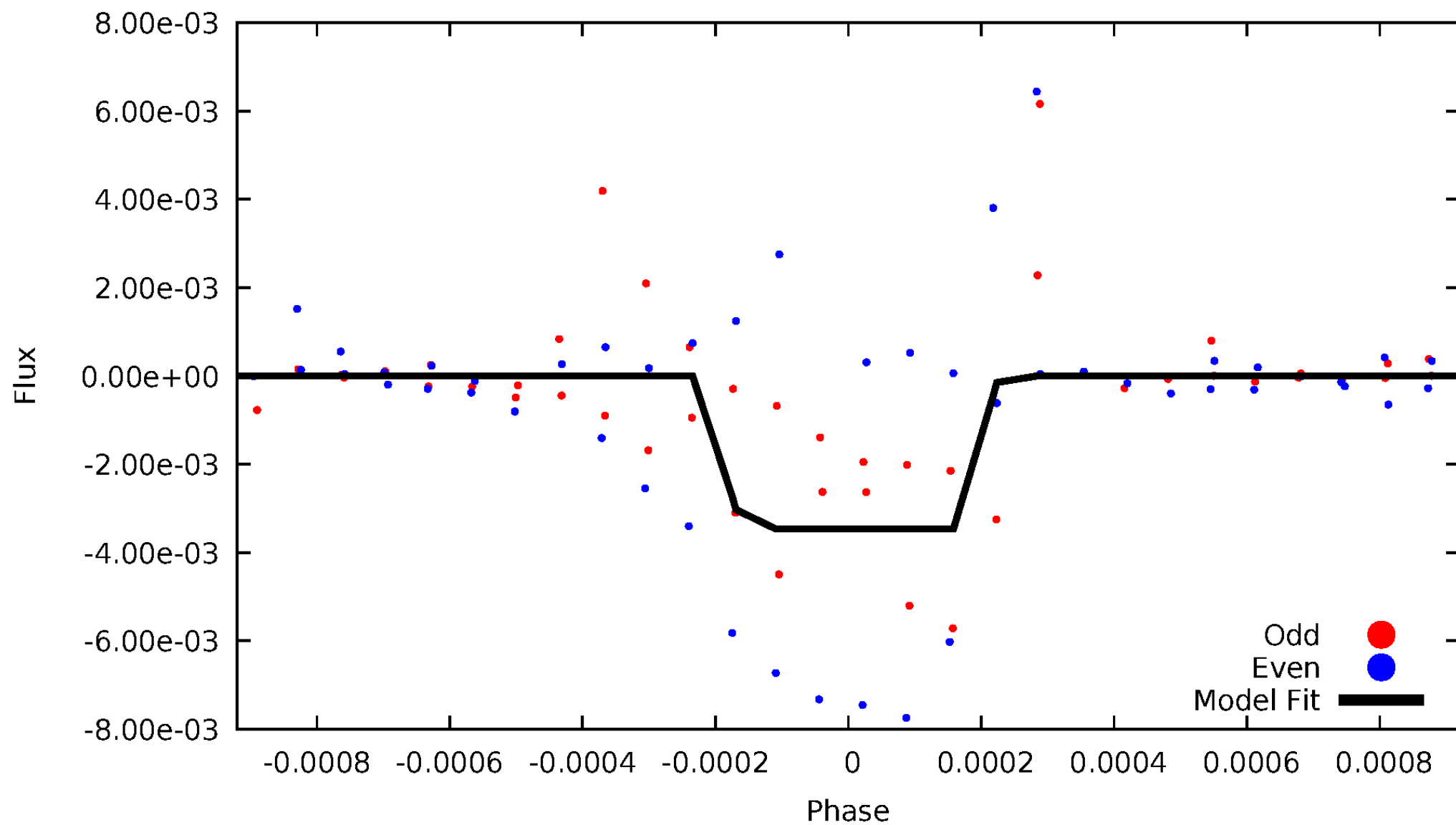
# DV Odd/Even

TCE 005428626-03



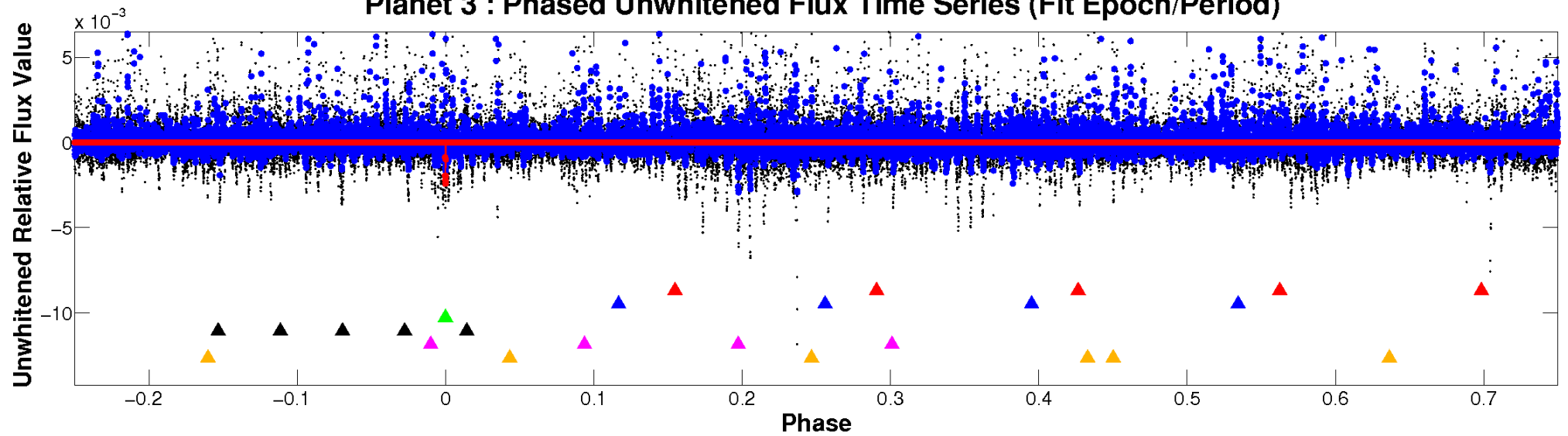
# ALT Odd/Even

TCE 005428626-03

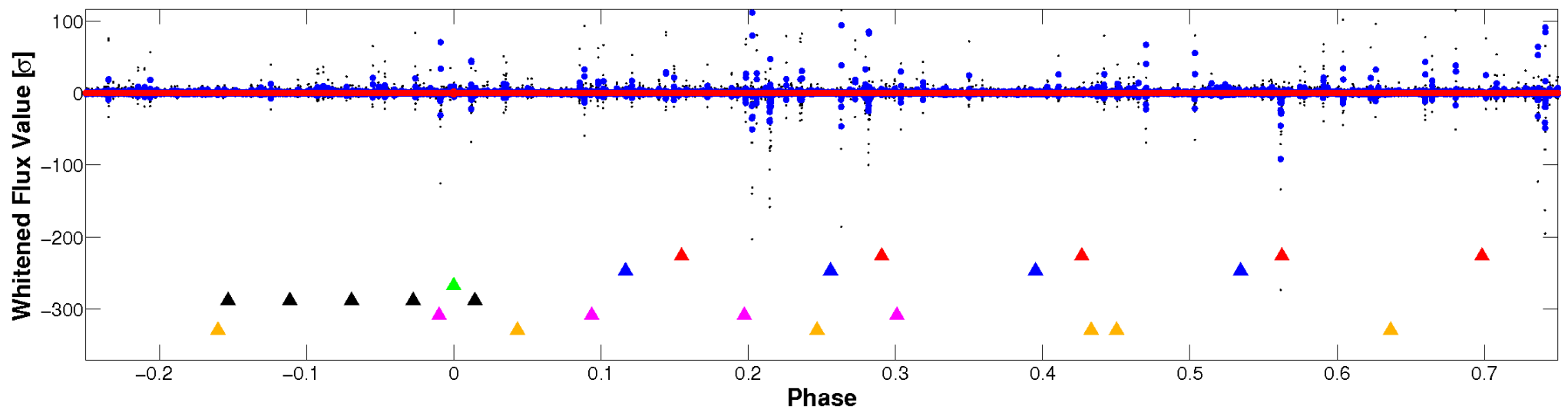


# Non-Whitened Vs. Whitened Light Curve

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

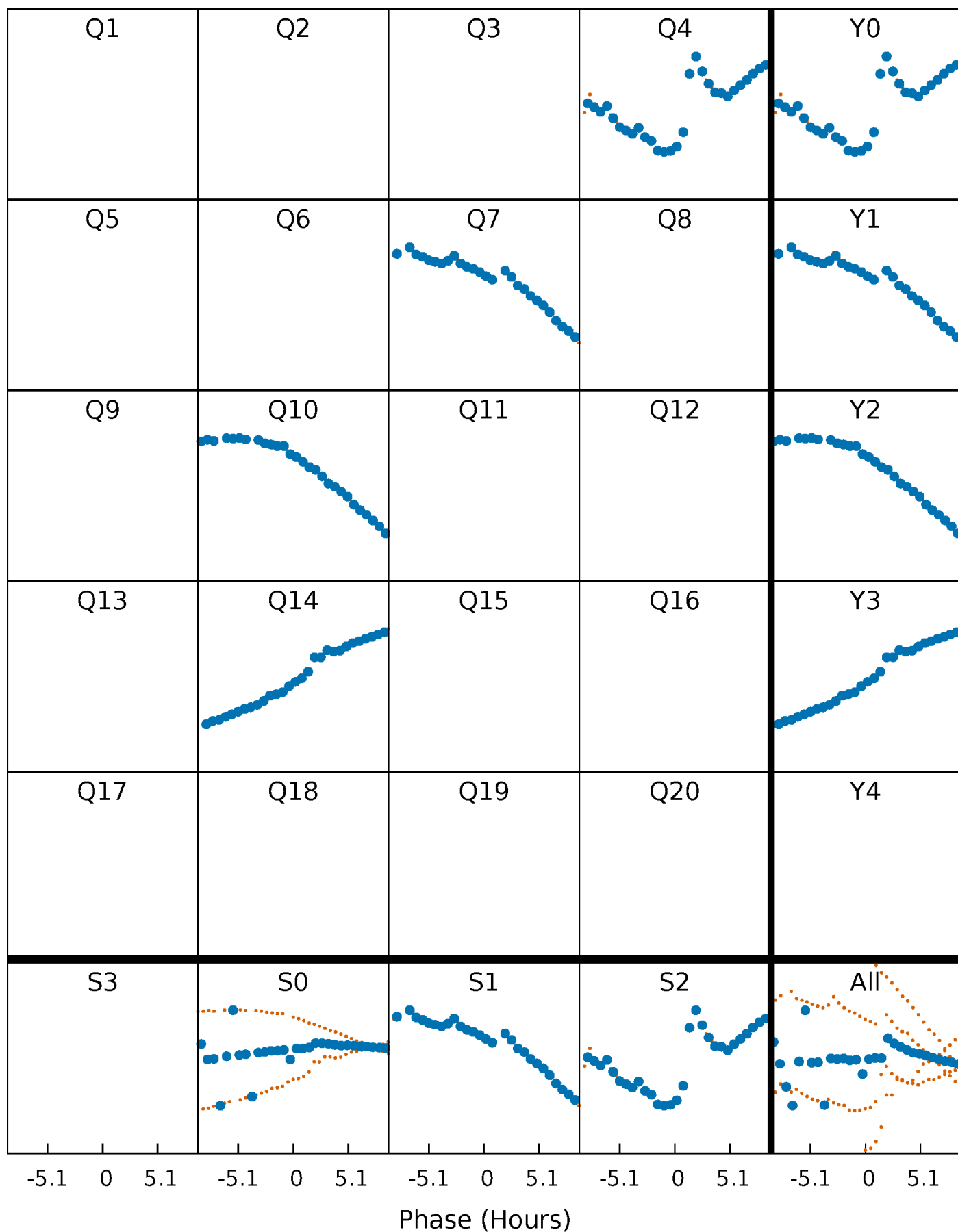


## Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

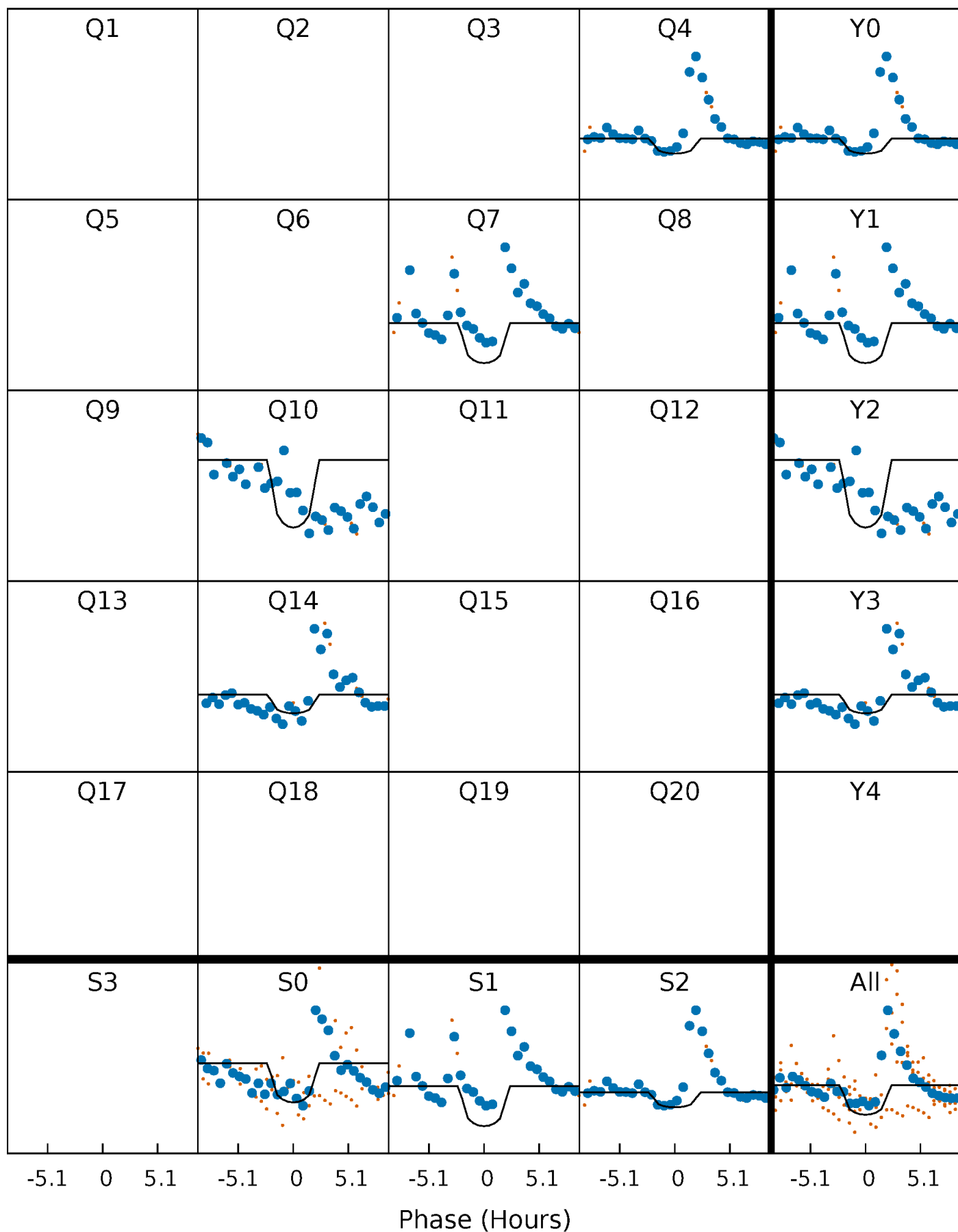
TCE 005428626-03 P=312.104420 Days  $T_0=374.915321$  (BKJD)





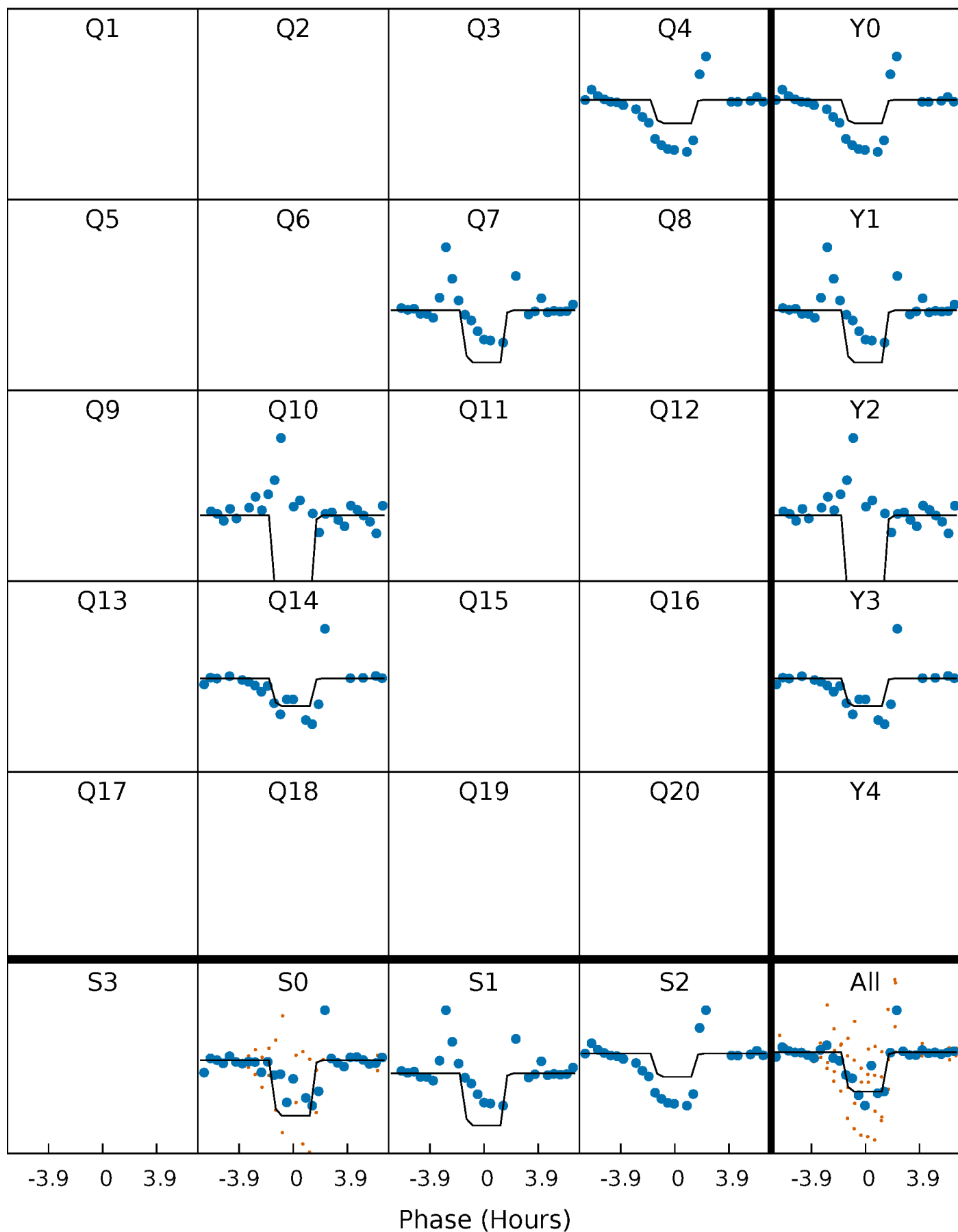
# DV Quarter-Phased Transit Curves

TCE 005428626-03 P=312.104420 Days  $T_0=374.915321$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

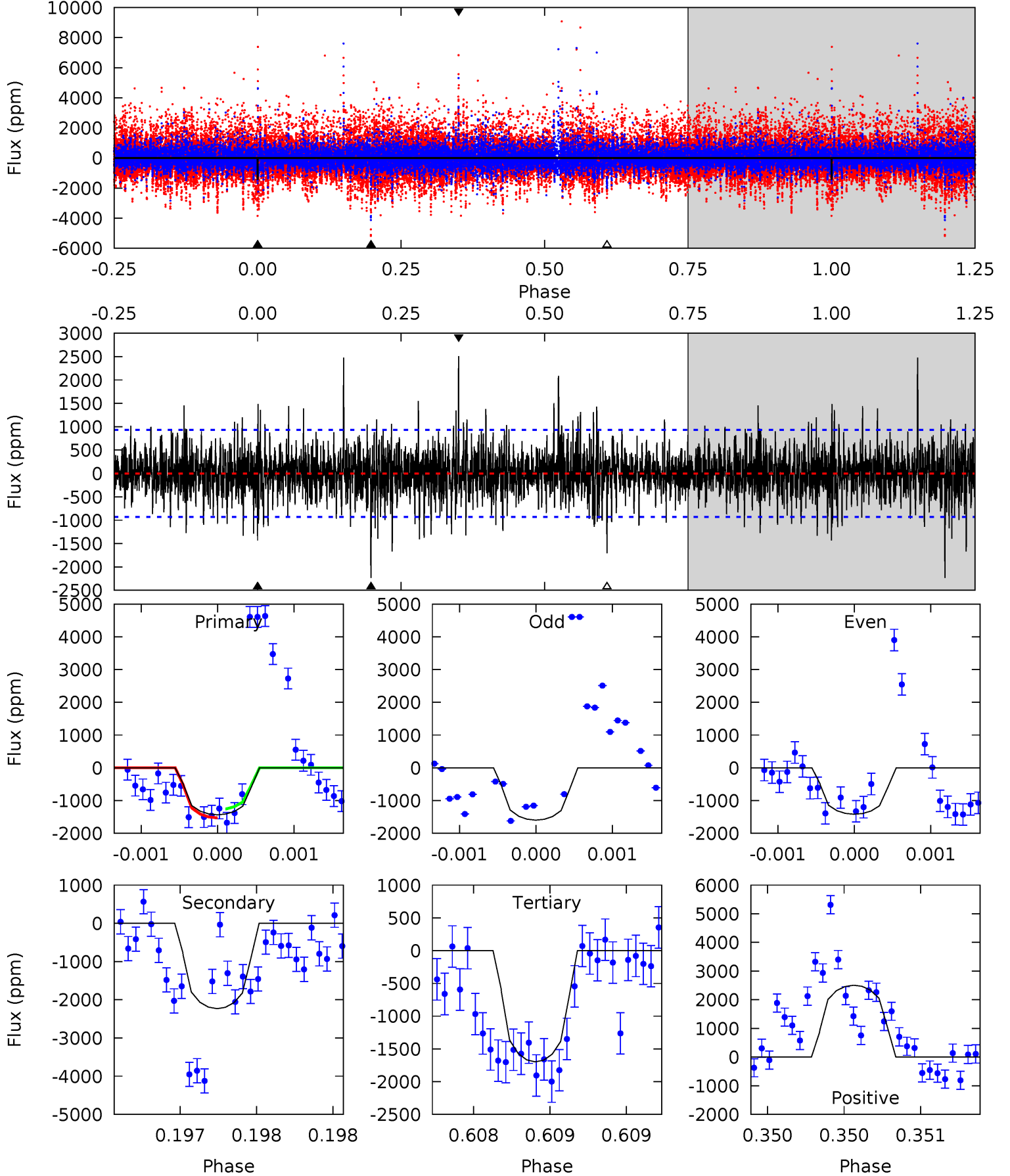
TCE 005428626-03 P=312.104067 Days  $T_0=374.907412$  (BKJD)



# DV Model-Shift Uniqueness Test

005428626-03, P = 312.104420 Days, E = 62.810901 Days

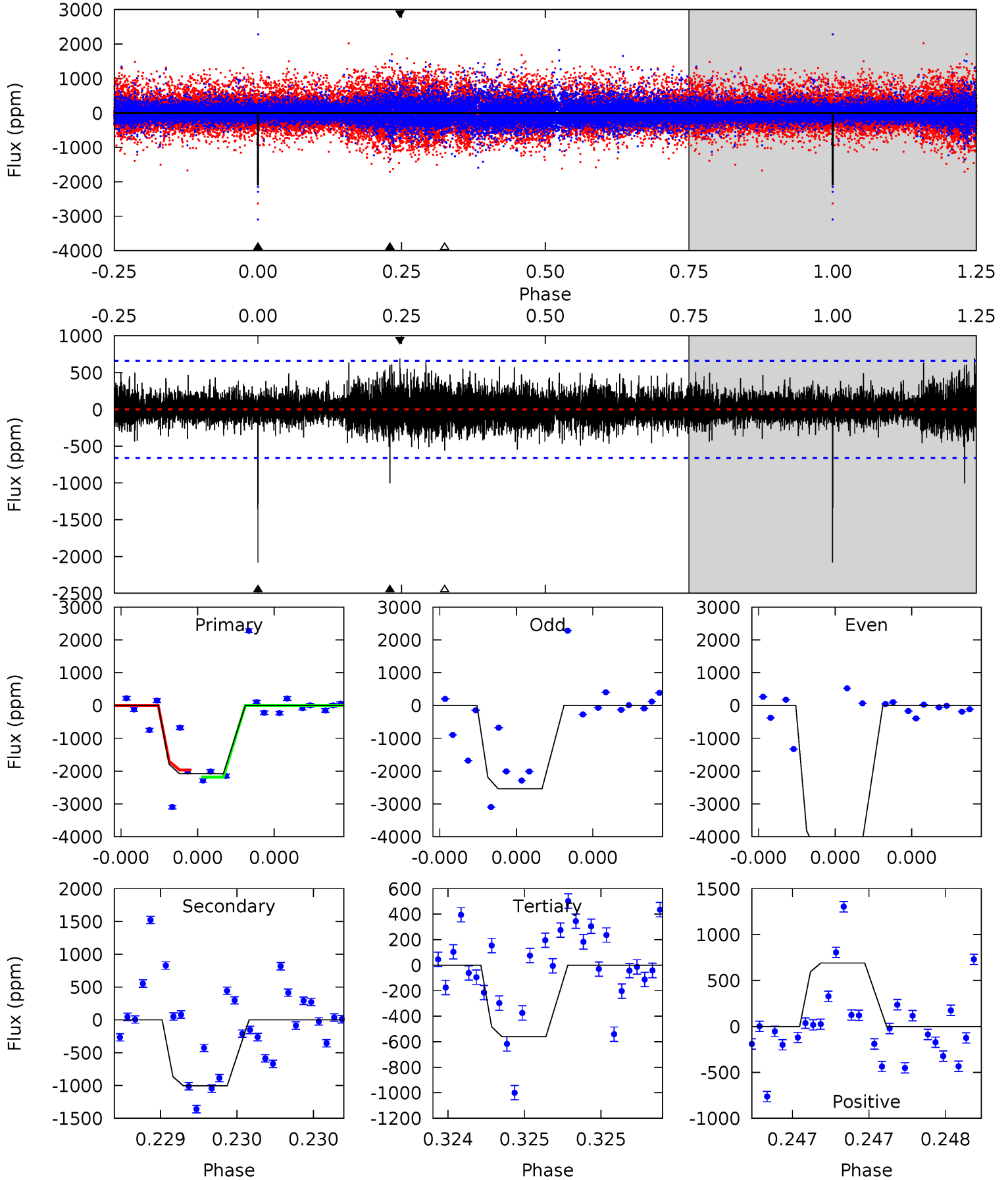
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.54	13.3	10.1	14.9	5.54	3.44	2.34	-1.57	-6.39	3.18	-1.64	0.26	0.75	0.53	0.79



# Alt Model-Shift Uniqueness Test

005428626-03, P = 312.104067 Days, E = 62.803345 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
17.6	8.50	4.75	5.85	5.59	3.50	1.07	12.9	11.8	3.75	2.65	9.54	1.04	0.25	0.92



### Stellar Parameters For KIC 005428626

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4914^{+149}_{-112}$	$3.110^{+0.390}_{-0.319}$	$-0.360^{+0.250}_{-0.250}$	$4.287^{+2.589}_{-1.394}$	$0.862^{+0.316}_{-0.097}$	$0.015^{+0.037}_{-0.011}$
	+3%/-2%	+13%/-10%	+69%/-69%	+60%/-33%	+37%/-11%	+243%/-70%
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 005428626-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-2232 \pm 168$	$34.91^{+35.58}_{-23.38}$	$670^{+92}_{-74}$	$4061^{+2501}_{-779}$	$771^{+6067}_{-581}$
Alt.	$-1003 \pm 118$	$39.90^{+39.97}_{-26.23}$	$670^{+96}_{-71}$	$3411^{+1676}_{-514}$	$265^{+2237}_{-197}$

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

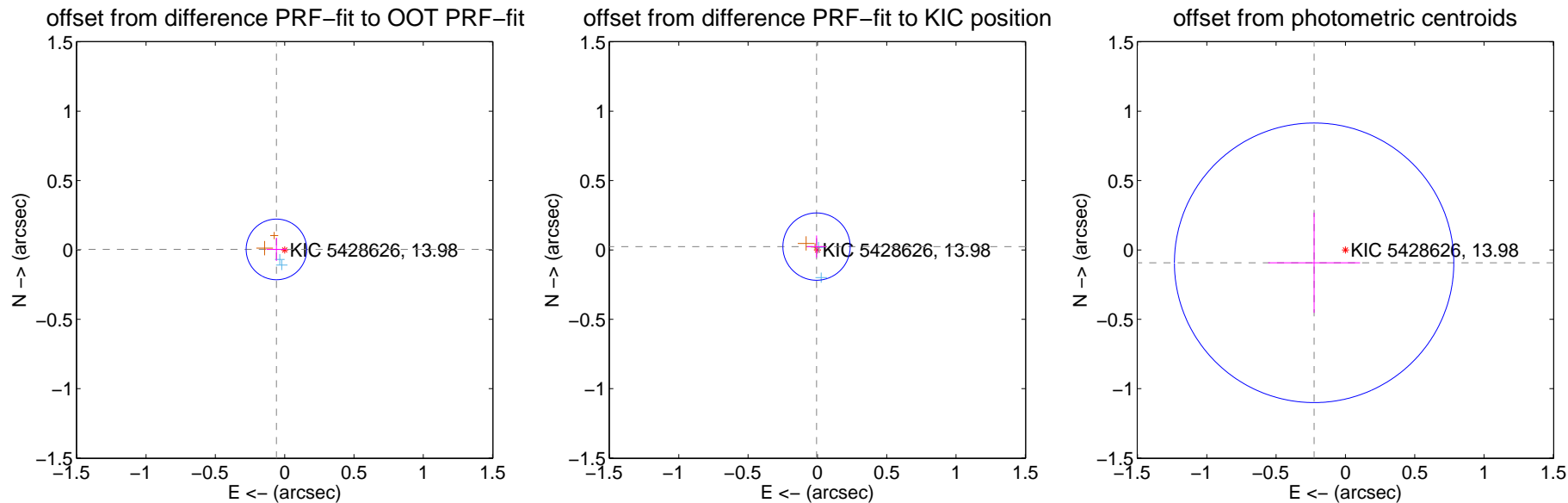
## DV Centroid Data

Supplemental centroid analysis for 005428626-03. Kepler magnitude: 13.98. Transit SNR 8.13

There are 2 quarters with good PRF difference image offsets

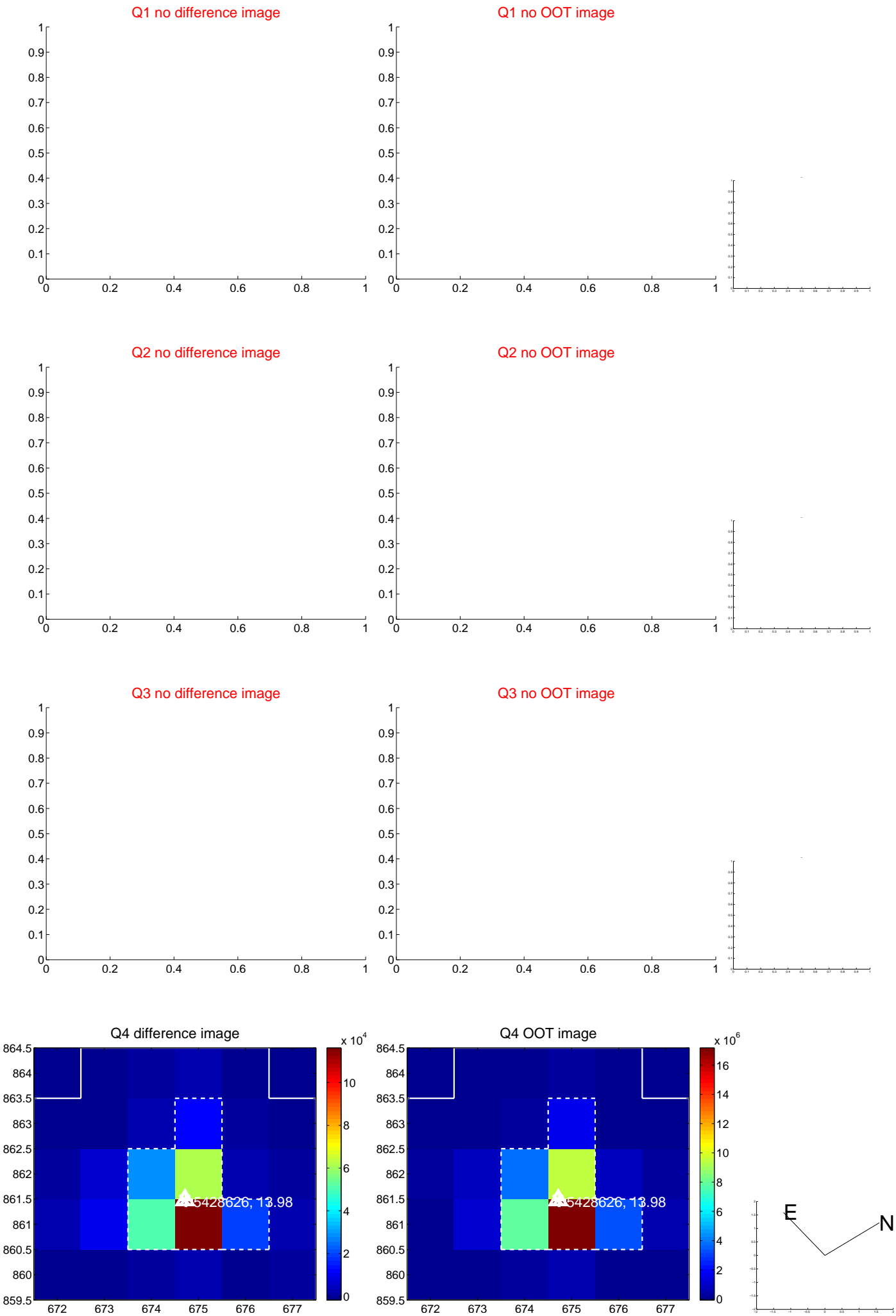
The direct PRF centroid is offset from the target star catalog position by about 0.10 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.059 \pm 0.073$	0.81	$0.059 \pm 0.072$	$0.004 \pm 0.083$
PRF-fit source offset from KIC position	$0.025 \pm 0.081$	0.31	$0.006 \pm 0.069$	$0.024 \pm 0.080$
photometric centroid source offset	$0.24 \pm 0.34$	0.73	$0.23 \pm 0.33$	$-0.09 \pm 0.36$

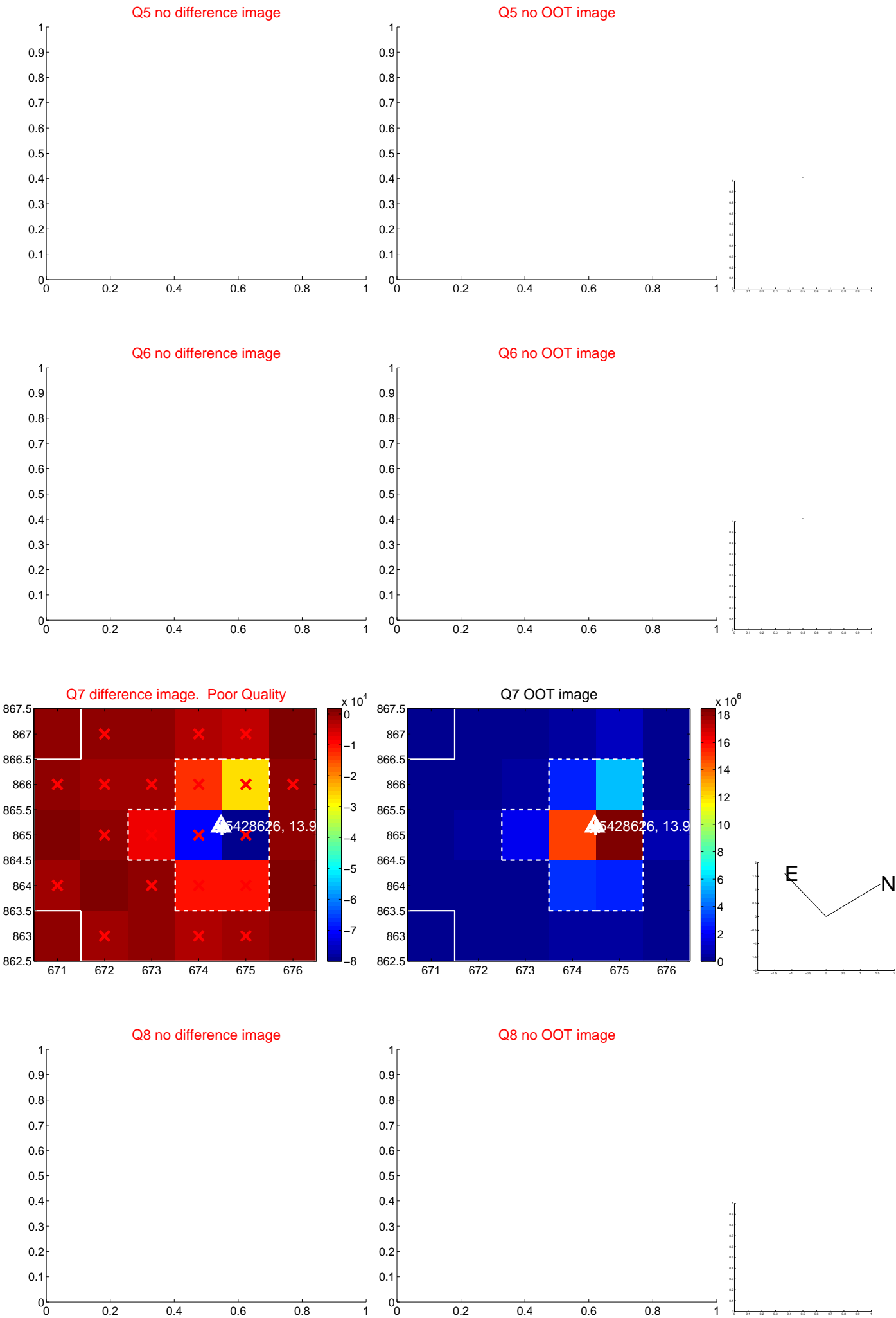


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

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

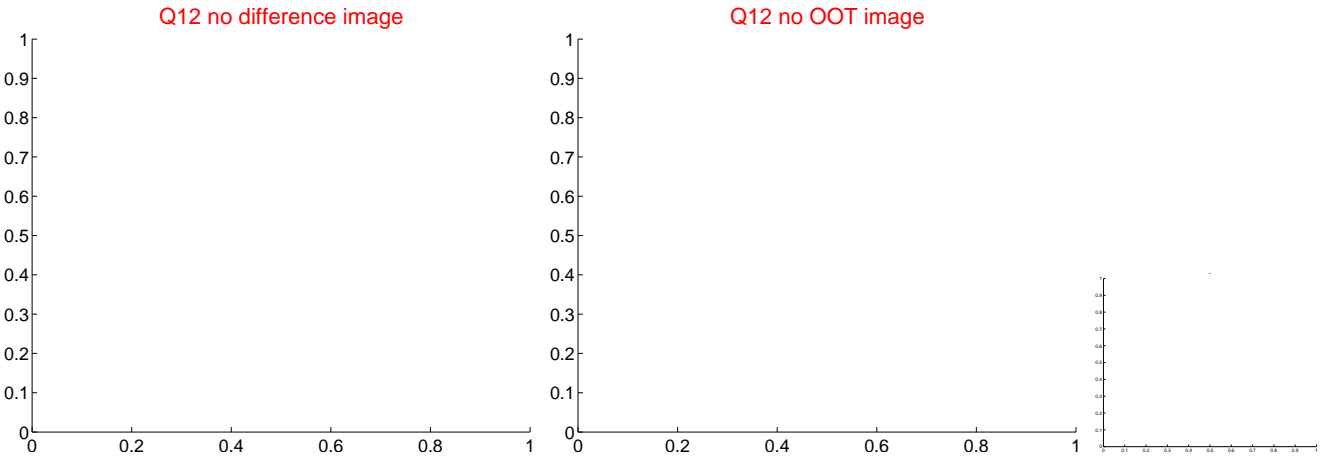
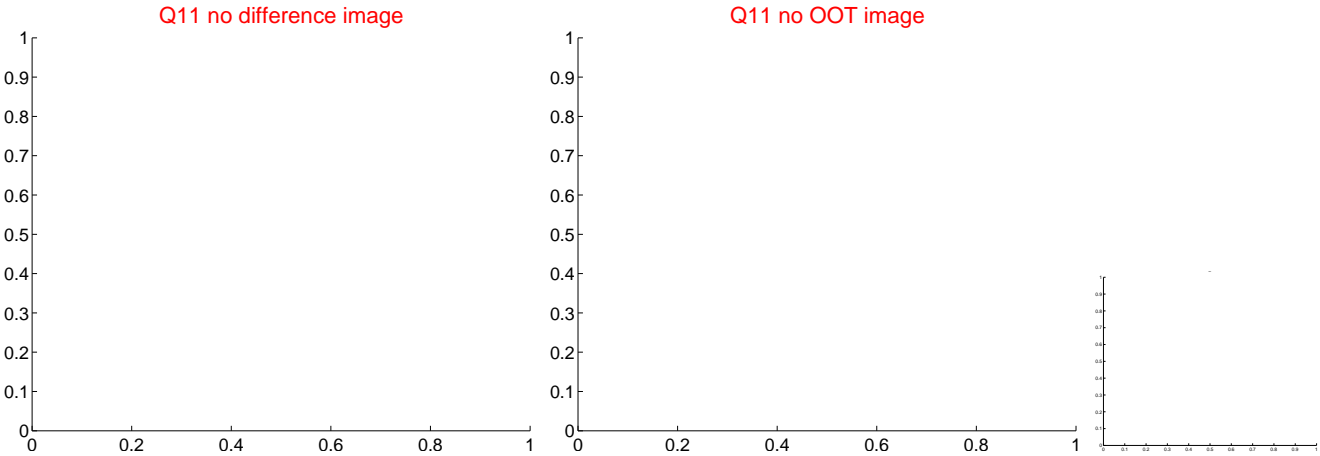
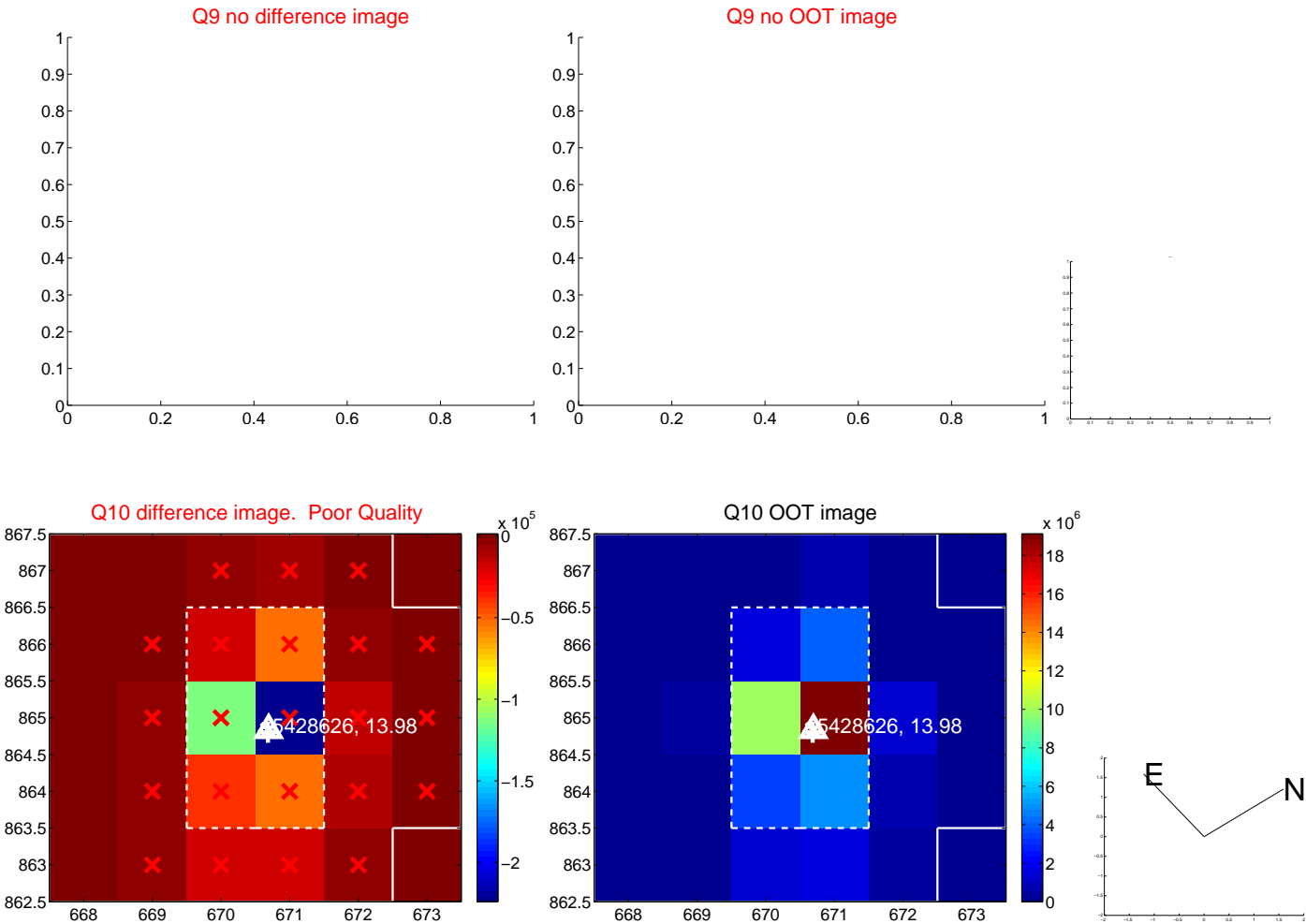


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.





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



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

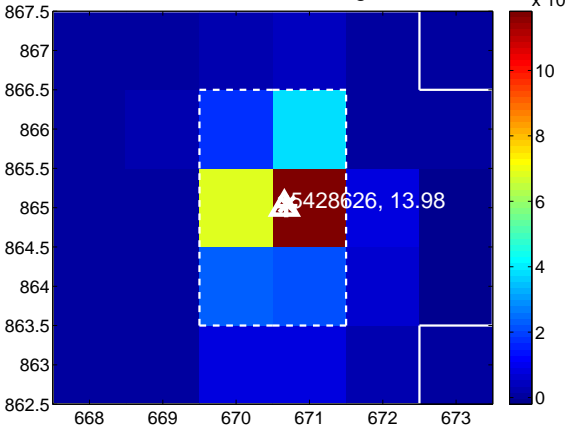
Q13 no difference image



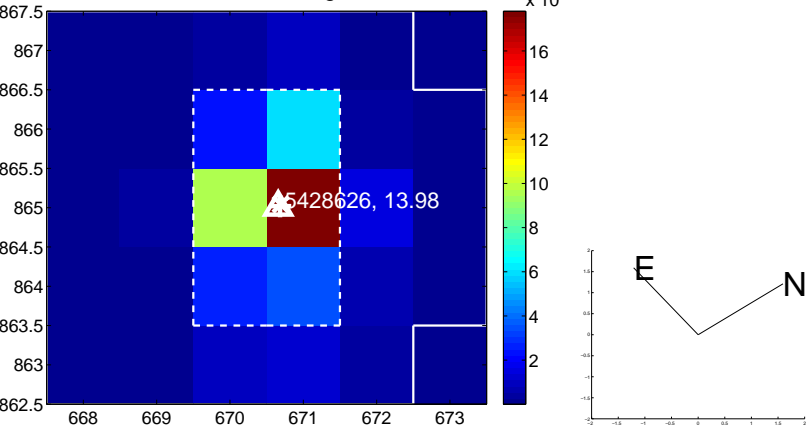
Q13 no OOT image



Q14 difference image



Q14 OOT image



Q15 no difference image



Q15 no OOT image



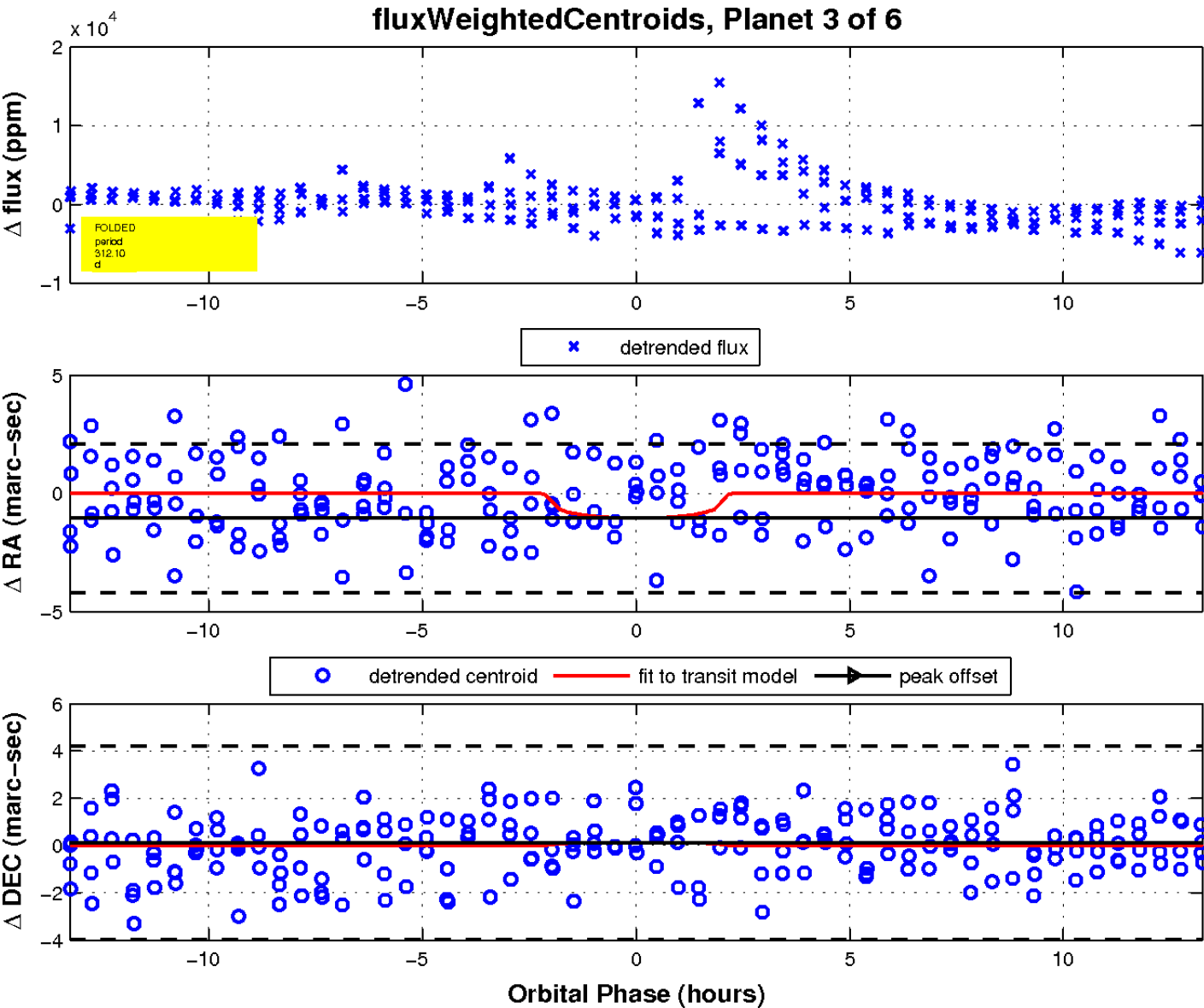
Q16 no difference image



Q16 no OOT image

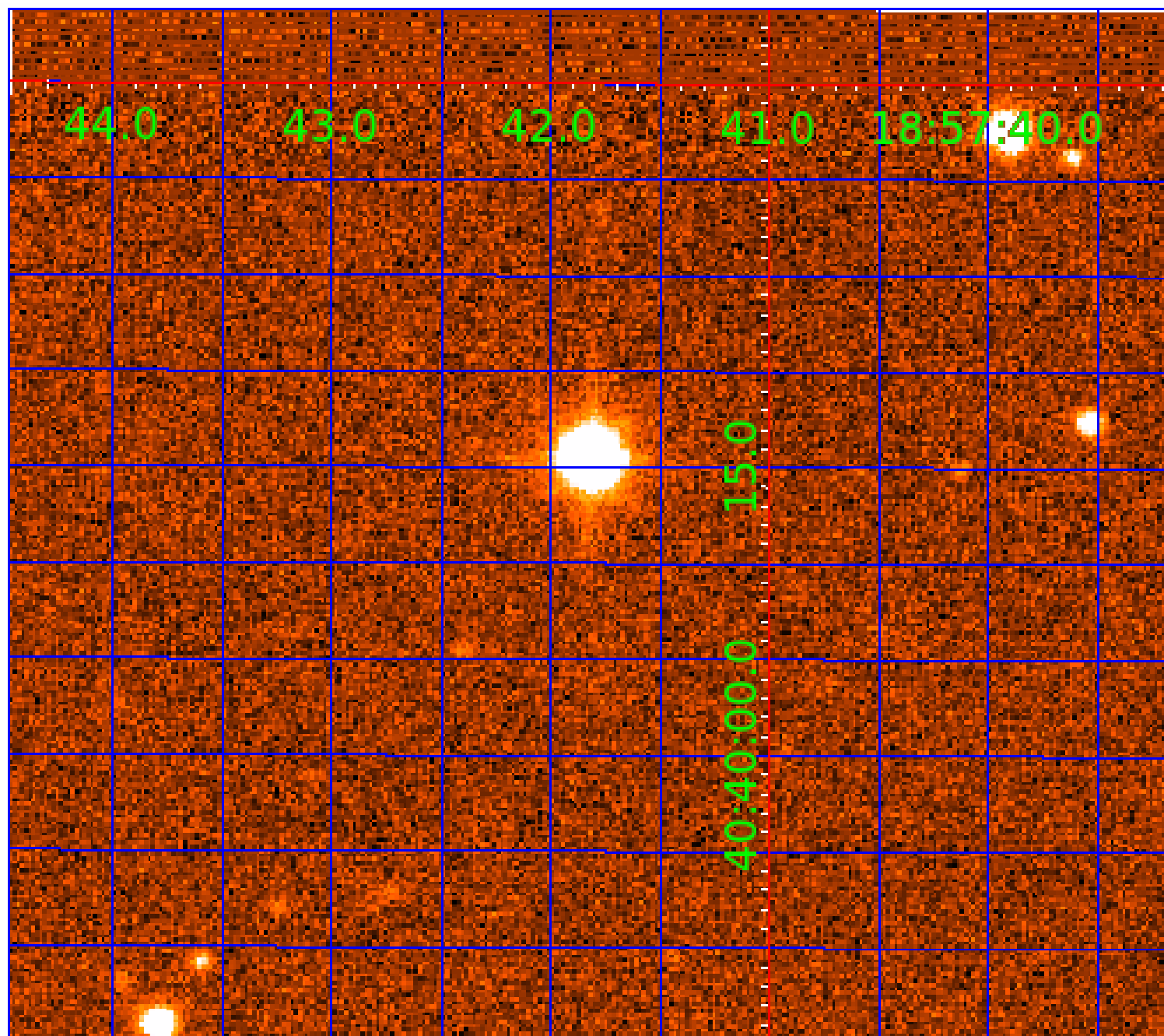


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



# UKIRT Image

Declination



# KIC 005428626

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005428626-01	OBS	No	269.686442	280.787021	1367.3	3.102	18.2	5.2	4.29	4914	15.79	15.86
005428626-02	OBS	No	355.562599	411.341991	2761.9	9.225	16.1	7.2	4.29	4914	22.03	10.97
005428626-03	OBS	No	312.104420	374.915321	2422.4	4.421	23.5	8.1	4.29	4914	22.52	13.05
005428626-04	OBS	No	299.023200	379.408217	2309.6	10.502	15.5	6.7	4.29	4914	22.56	13.82
005428626-05	OBS	No	344.454802	371.815203	2494.0	5.811	13.9	7.7	4.29	4914	21.08	11.44
005428626-06	OBS	No	248.603897	203.333097	2404.3	7.664	16.7	7.4	4.29	4914	20.38	17.68

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005428626-01	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
005428626-02	OBS	FP	0.00	1	0	0	0	LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
005428626-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
005428626-04	OBS	FP	0.00	1	0	0	0	LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005428626-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
005428626-06	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS

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

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

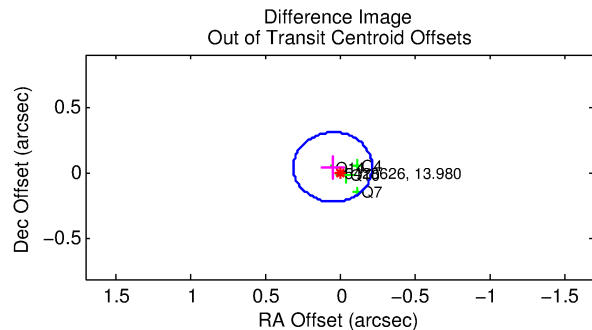
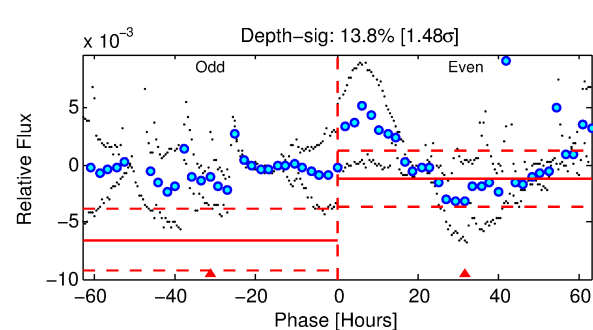
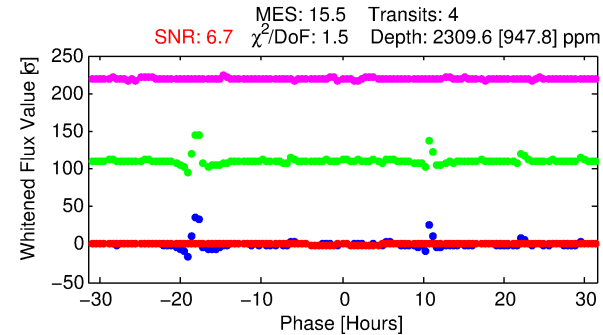
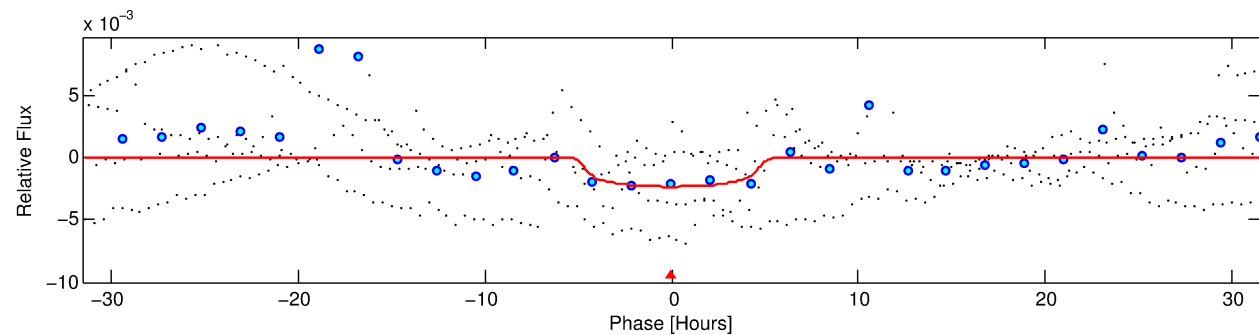
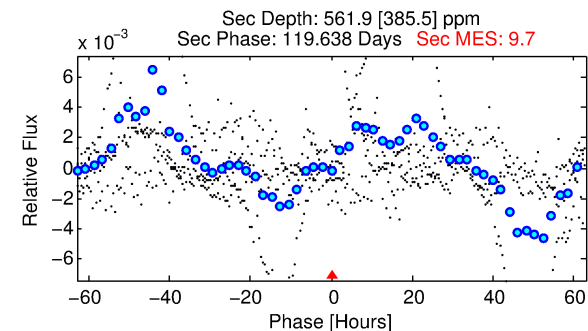
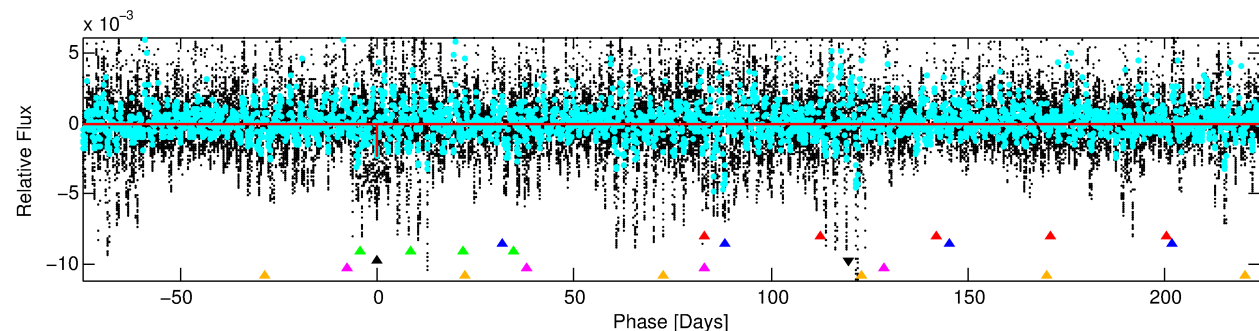
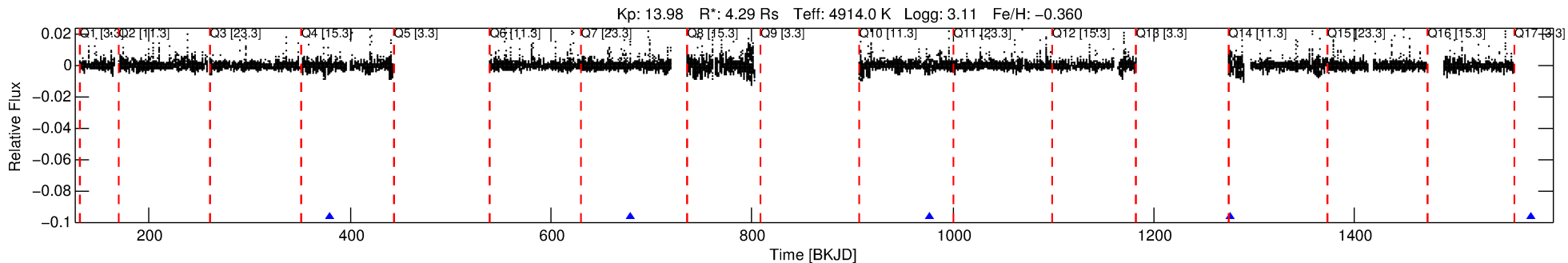
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 005428626-04

No Significant Match Found

# DV One-Page Summary

KIC: 5428626 Candidate: 4 of 6 Period: 299.023 d



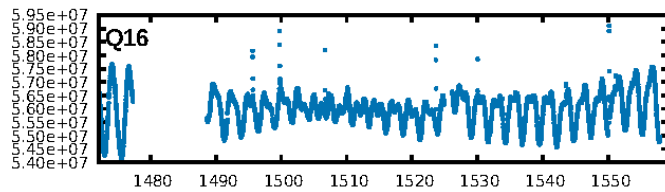
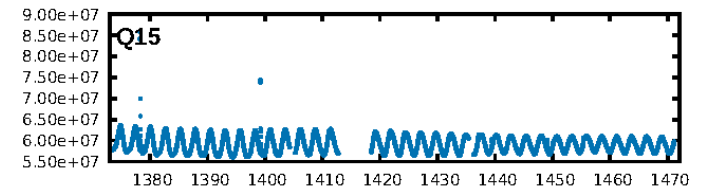
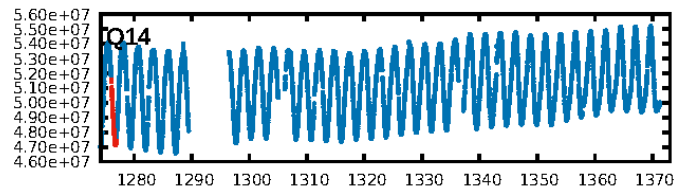
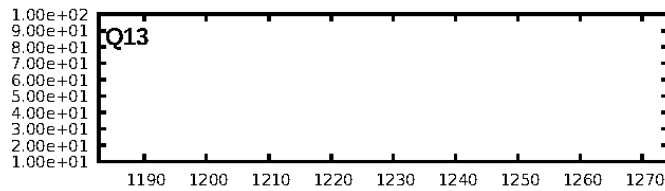
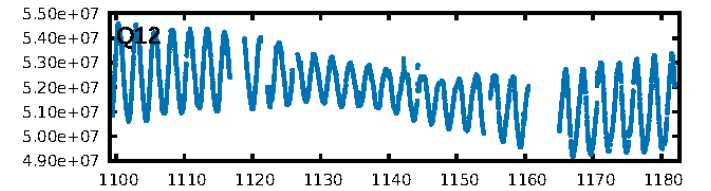
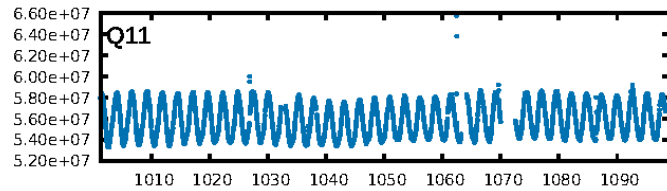
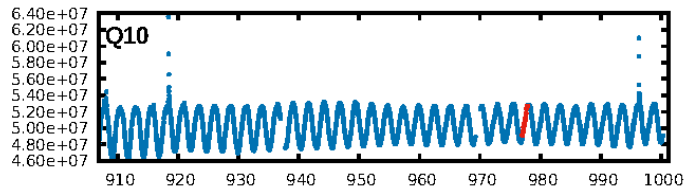
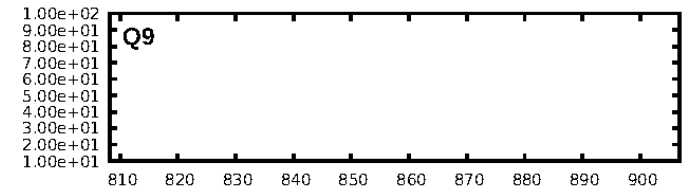
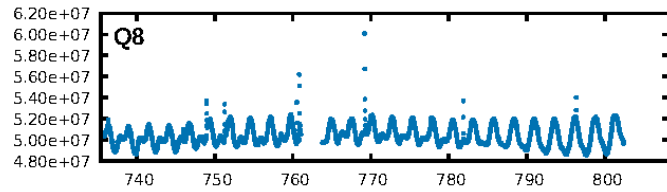
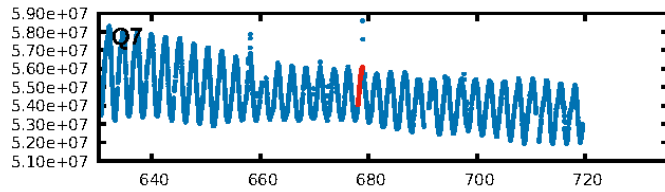
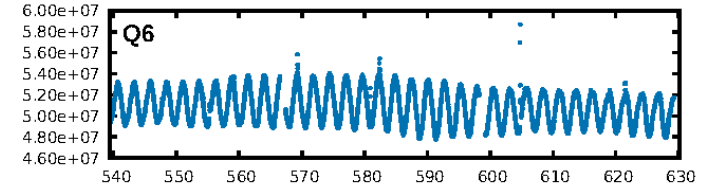
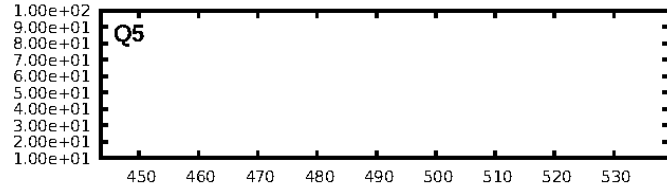
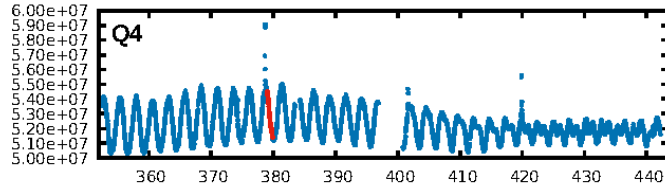
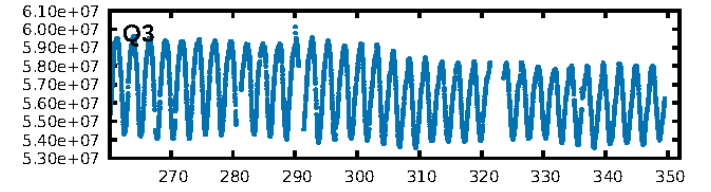
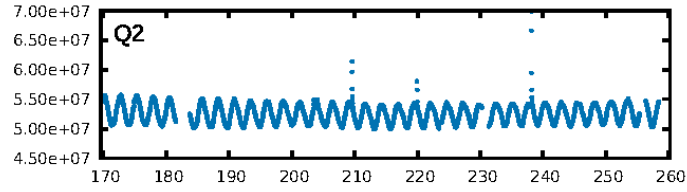
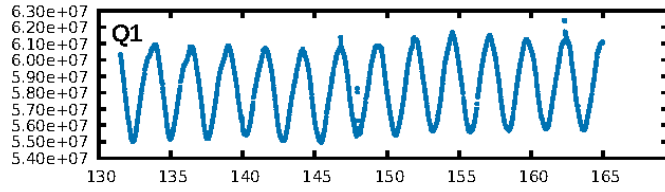
## DV Fit Results:

Period = 299.02320 [0.00899] d  
Epoch = 379.4082 [0.0166] BKJD  
Rp/R\* = 0.0482 [0.0127]  
a/R\* = 156.81 [71.95]  
b = 0.76 [0.26]  
Seff = 13.82 [10.11]  
Teq = 492 [90] K  
**Rp = 22.56 [14.87] Re**  
a = 0.8336 [0.4182] AU  
Ag = 421.91 [475.25] [0.89σ]  
**Teffp = 3445 [752] K [3.90σ]**

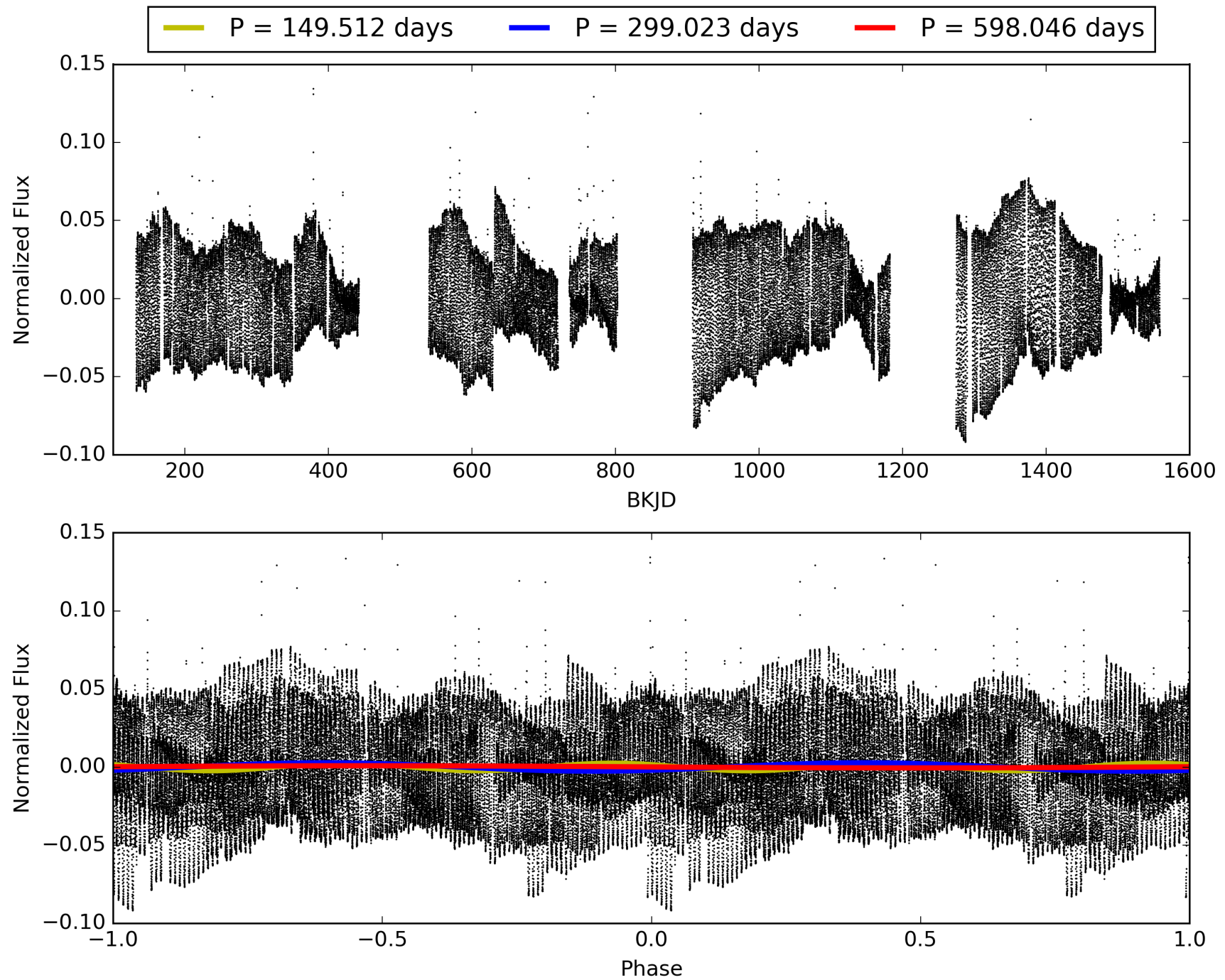
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [64.30σ]  
LongPeriod-sig: 100.0% [27.55σ]  
ModelChiSquare2-sig: 7.2%  
ModelChiSquareGof-sig: 58.9%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: 8.807  
Centroid-sig: 2.0%  
Centroid-so: 0.448 arcsec [1.34σ]  
OotOffset-rm: 0.064 arcsec [0.73σ]  
OotOffset-st: 2/1/1/0 [4]  
KicOffset-rm: 0.026 arcsec [0.33σ]  
KicOffset-st: 2/1/1/0 [4]  
DiffImageQuality-fgm: 0.50 [2/4]  
DiffImageOverlap-fno: 1.00 [4/4]

# TCE 005428626-04, PDC Light Curves



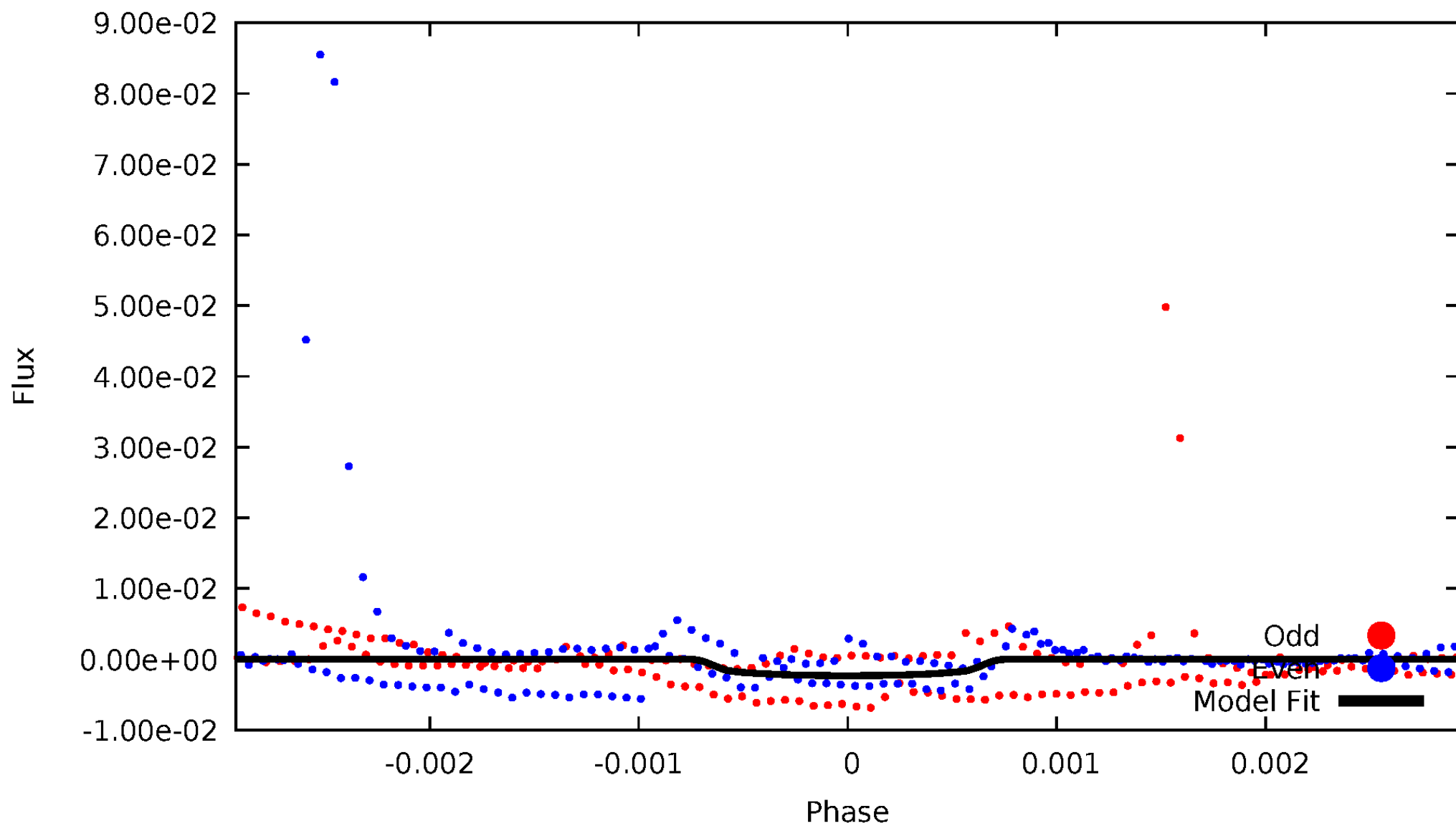
TCE 005428626-04





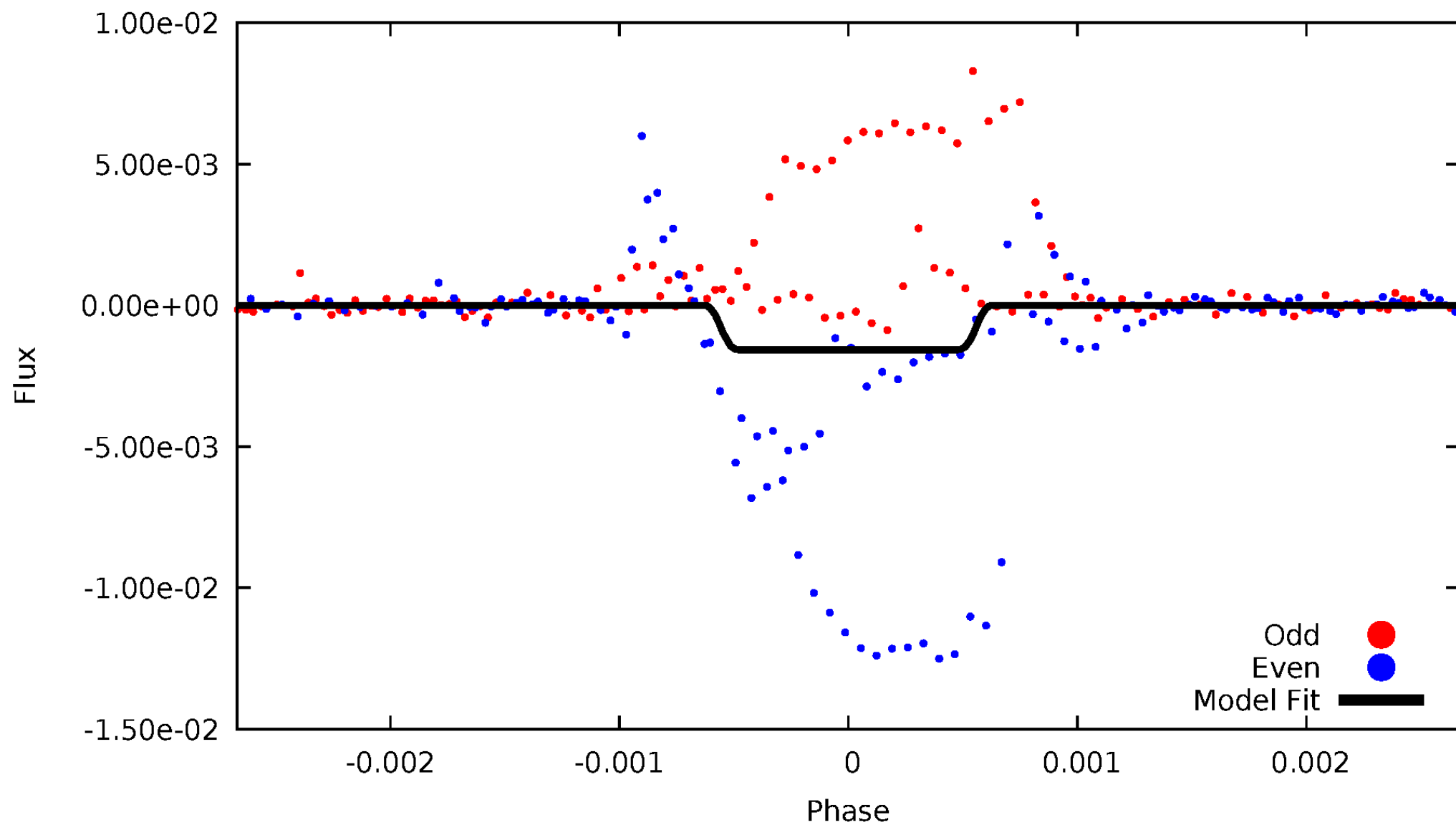
# DV Odd/Even

TCE 005428626-04



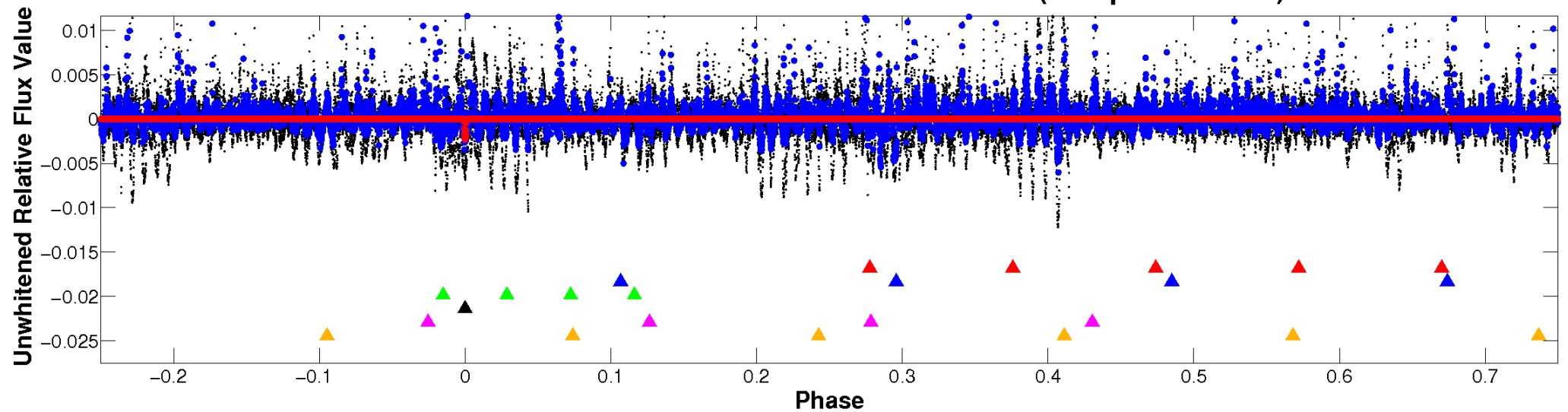
# ALT Odd/Even

TCE 005428626-04

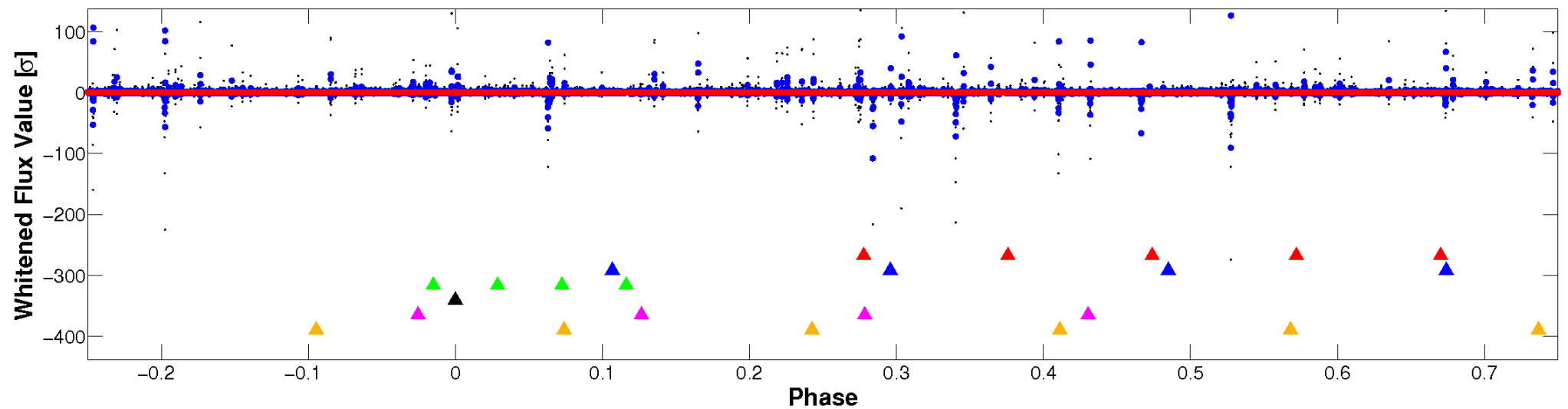


# Non-Whitened Vs. Whitened Light Curve

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

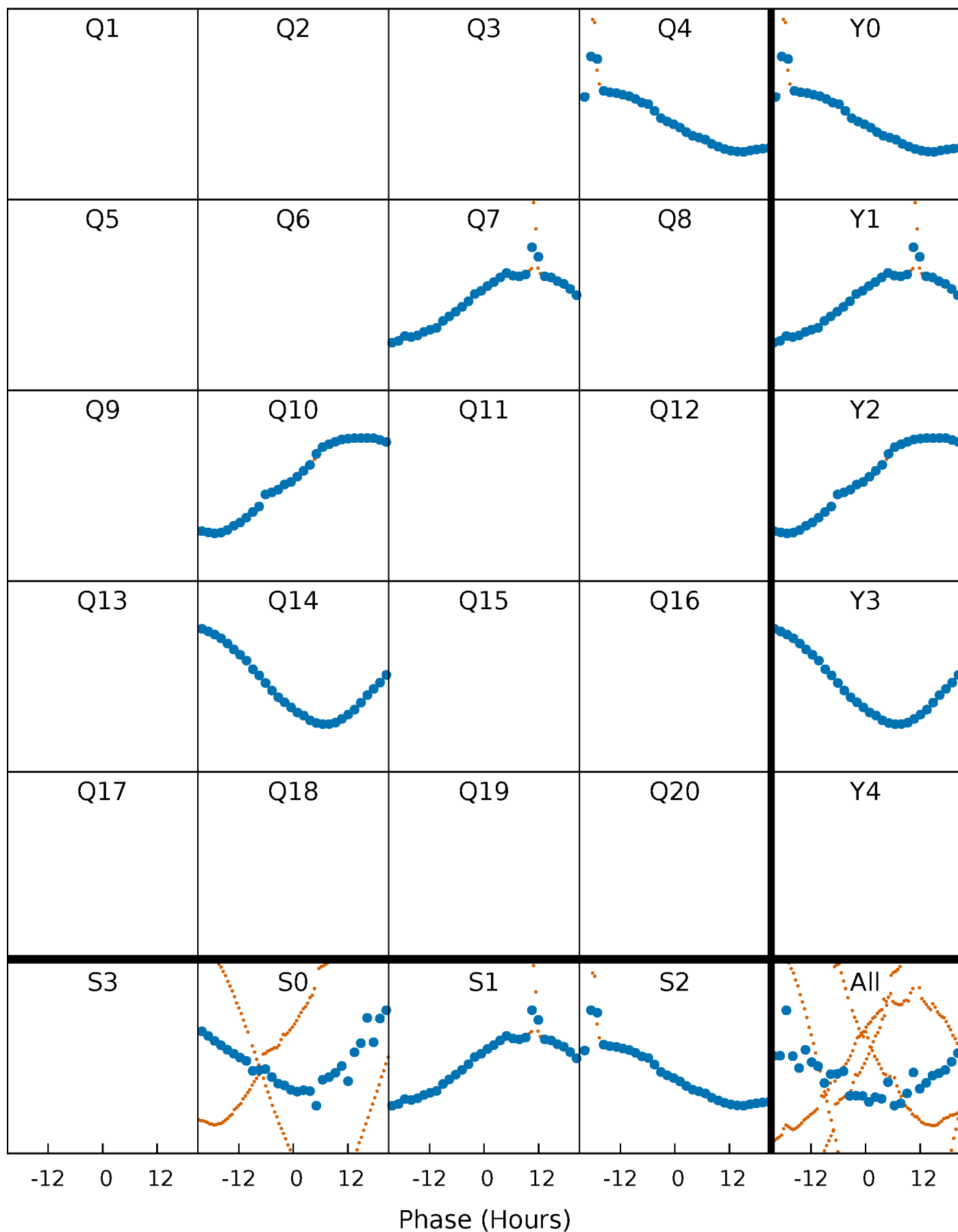


## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



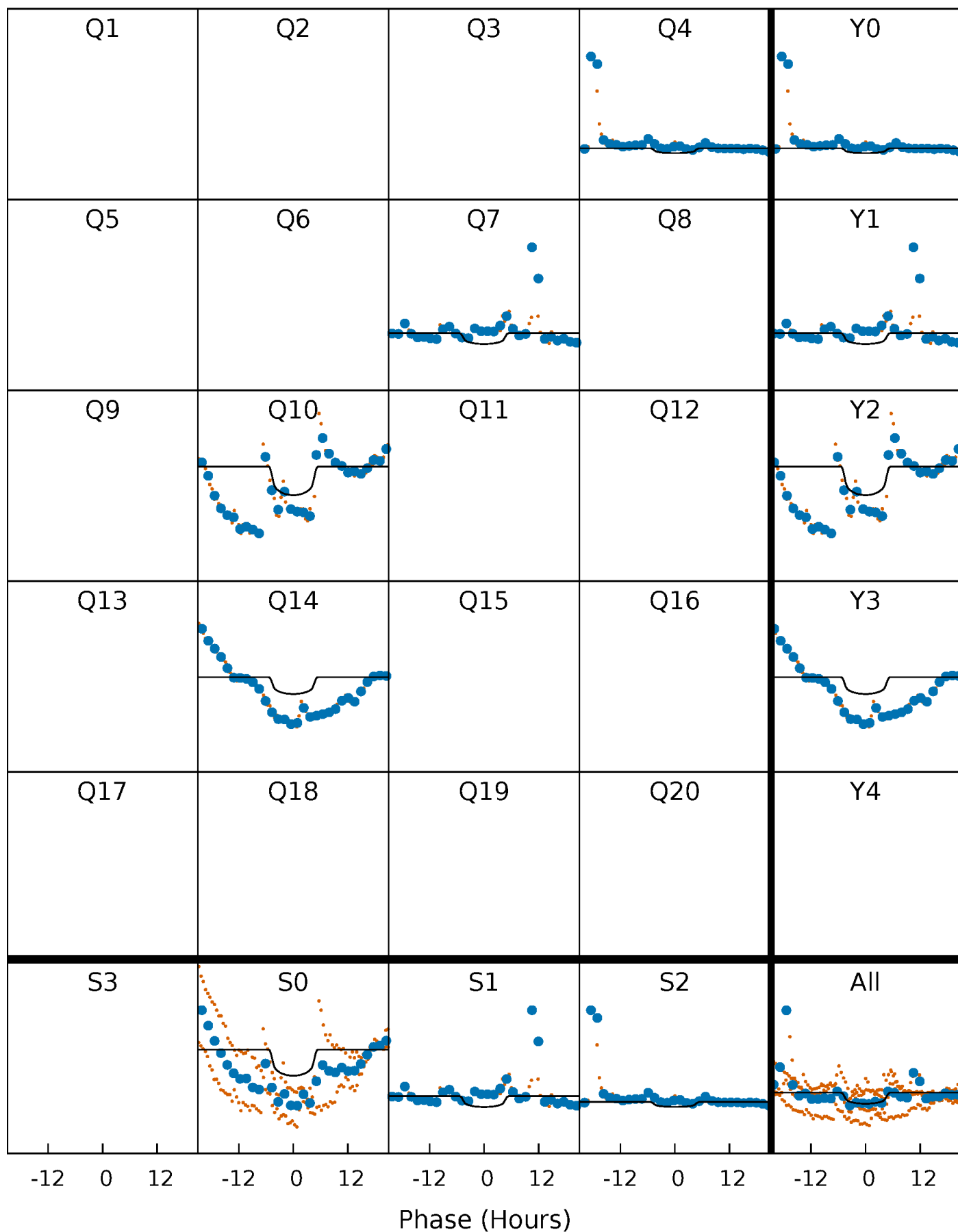
# PDC Quarter-Phased Transit Curves

TCE 005428626-04     $P=299.023200$  Days     $T_0=379.408217$  (BKJD)



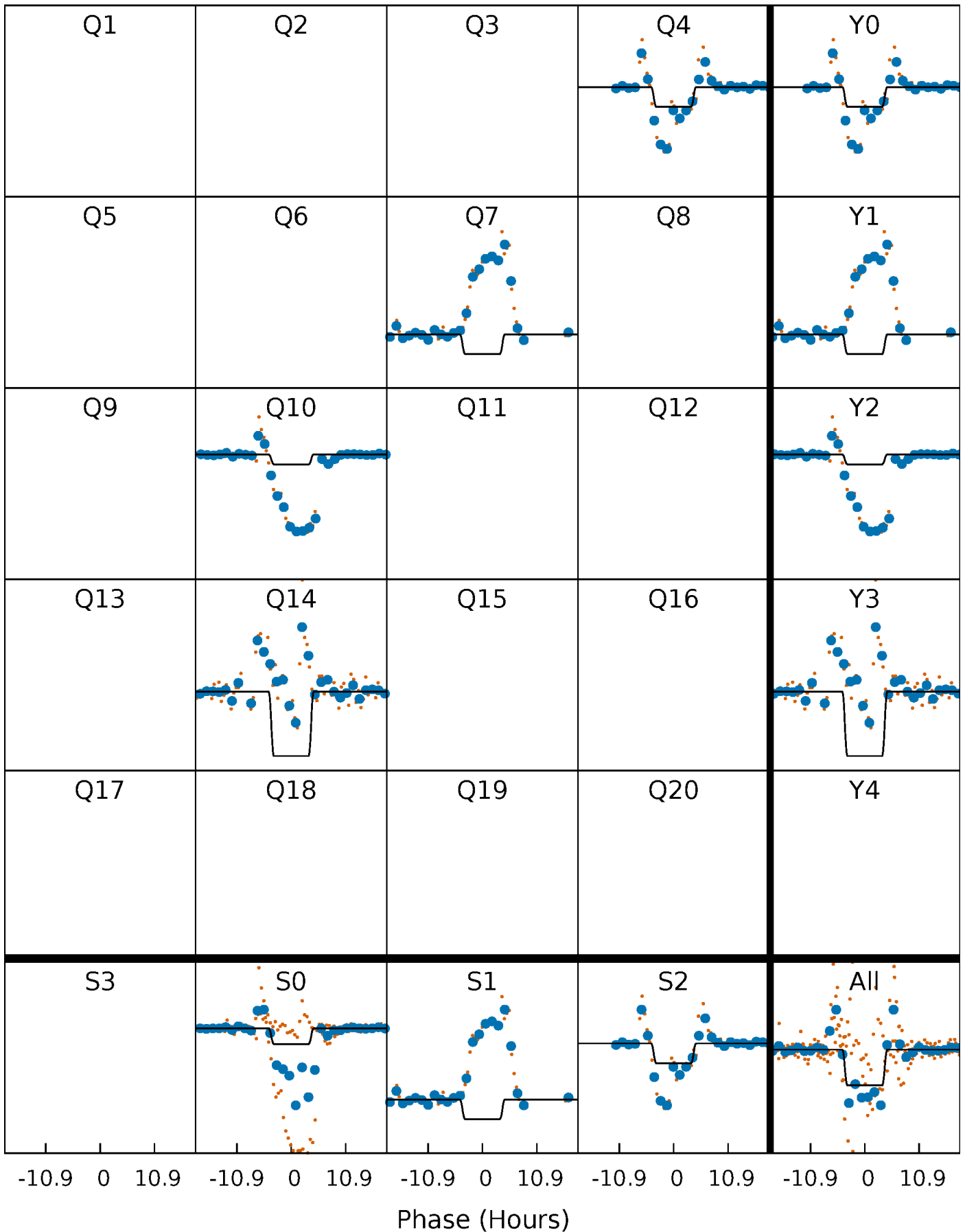
# DV Quarter-Phased Transit Curves

TCE 005428626-04 P=299.023200 Days  $T_0=379.408217$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

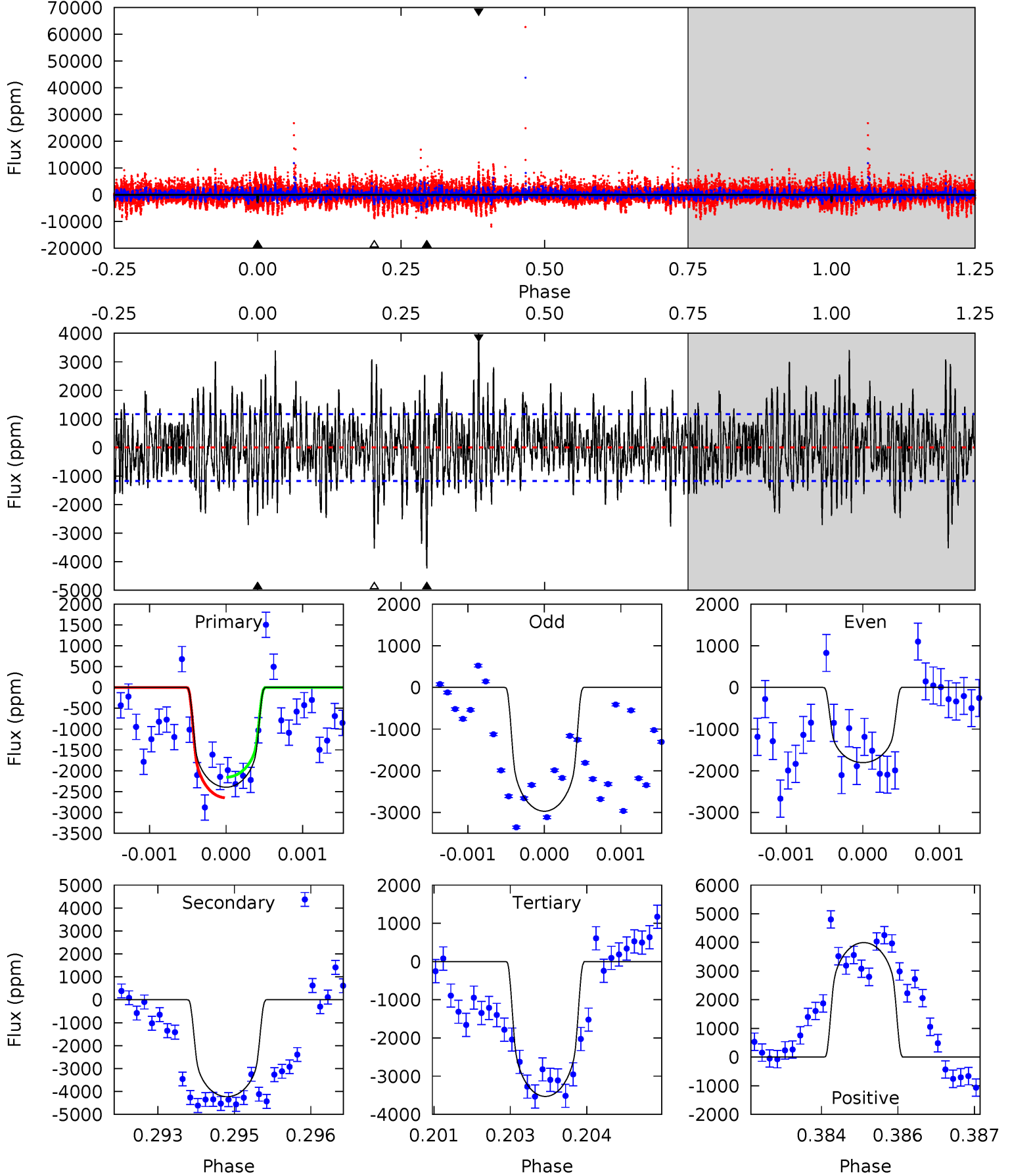
TCE 005428626-04 P=299.011095 Days  $T_0=379.426522$  (BKJD)



# DV Model-Shift Uniqueness Test

005428626-04, P = 299.023200 Days, E = 80.385017 Days

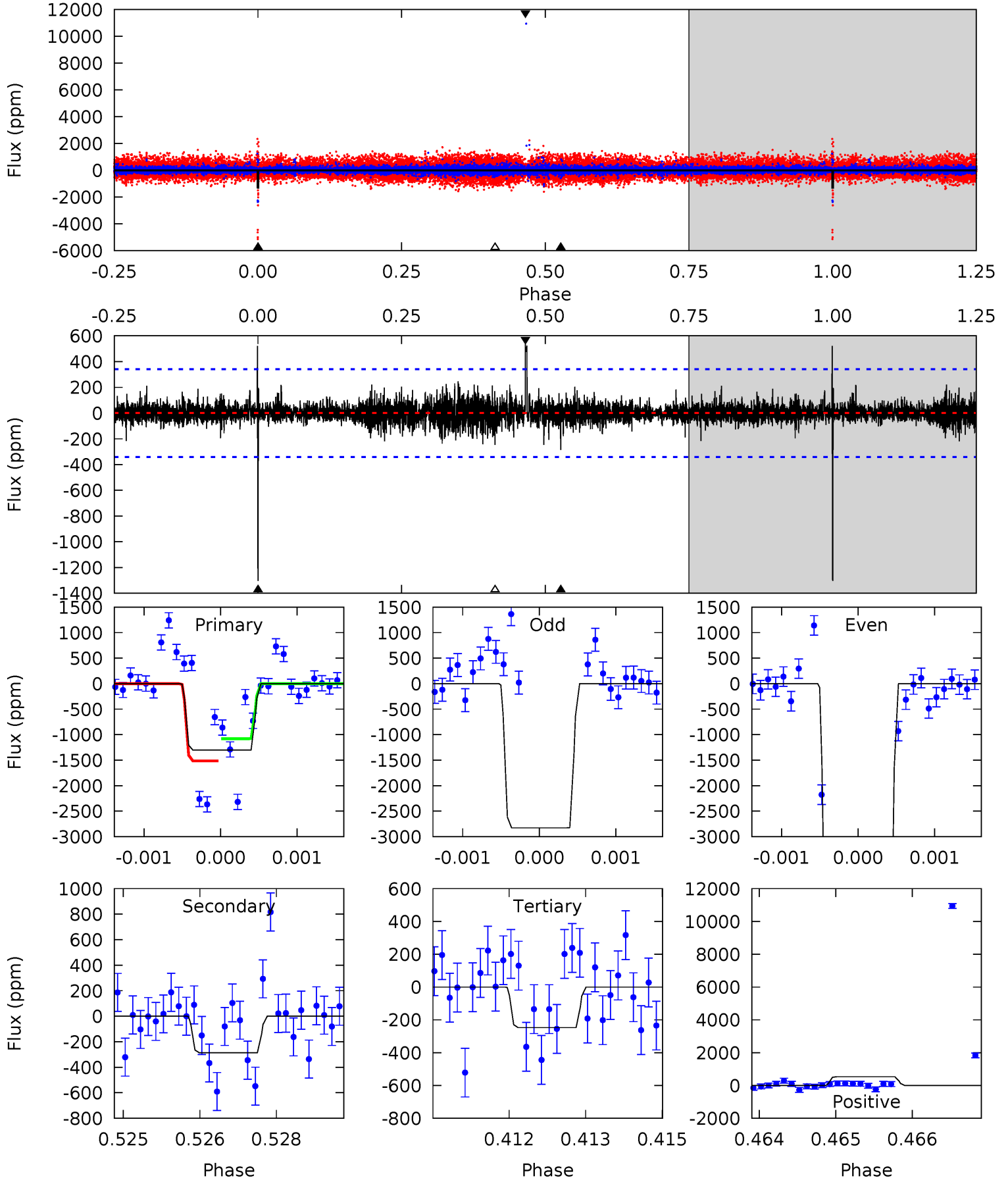
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.0	19.4	16.2	18.4	5.38	3.18	4.34	-5.22	-7.36	3.21	1.07	2.12	1.35	0.49	1.14



# Alt Model-Shift Uniqueness Test

005428626-04, P = 299.011095 Days, E = 80.415427 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
20.7	4.53	3.92	8.52	5.41	3.23	0.86	16.7	12.1	0.61	-3.99	44.8	1.46	0.29	0





### Stellar Parameters For KIC 005428626

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4914^{+149}_{-112}$	$3.110^{+0.390}_{-0.319}$	$-0.360^{+0.250}_{-0.250}$	$4.287^{+2.589}_{-1.394}$	$0.862^{+0.316}_{-0.097}$	$0.015^{+0.037}_{-0.011}$
	+3%/-2%	+13%/-10%	+69%/-69%	+60%/-33%	+37%/-11%	+243%/-70%
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 005428626-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-4228 \pm 218$	$22.76^{+9.33}_{-7.52}$	$681^{+102}_{-70}$	$5588^{+983}_{-559}$	$3286^{+4077}_{-1585}$
Alt.	$-286 \pm 63$	$18.90^{+9.21}_{-6.96}$	$683^{+99}_{-77}$	$3583^{+539}_{-330}$	$315^{+521}_{-169}$

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

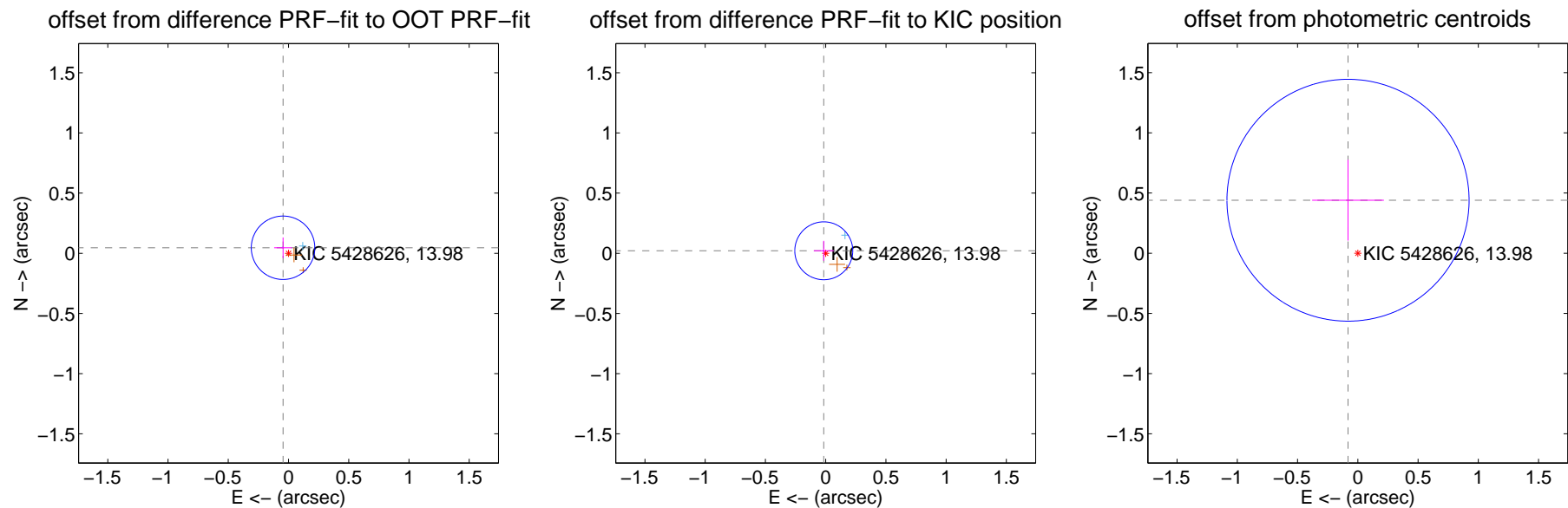
## DV Centroid Data

Supplemental centroid analysis for 005428626-04. Kepler magnitude: 13.98. Transit SNR 6.72

There are 2 quarters with good PRF difference image offsets

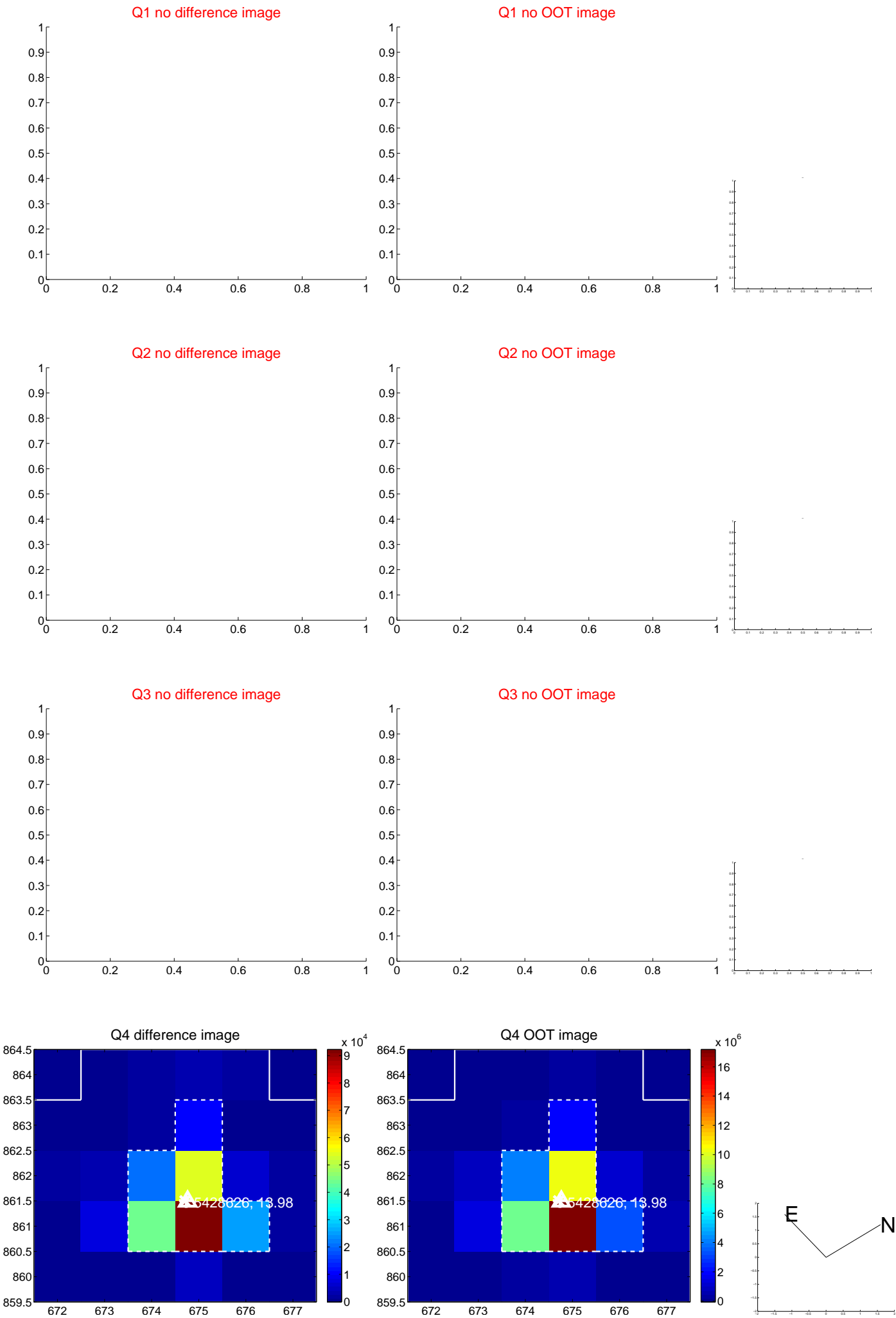
The direct PRF centroid is offset from the target star catalog position by about 0.04 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.064 \pm 0.088$	0.73	$0.045 \pm 0.074$	$0.046 \pm 0.086$
PRF-fit source offset from KIC position	$0.026 \pm 0.080$	0.33	$0.016 \pm 0.083$	$0.021 \pm 0.083$
photometric centroid source offset	$0.45 \pm 0.33$	1.34	$0.08 \pm 0.30$	$0.44 \pm 0.34$

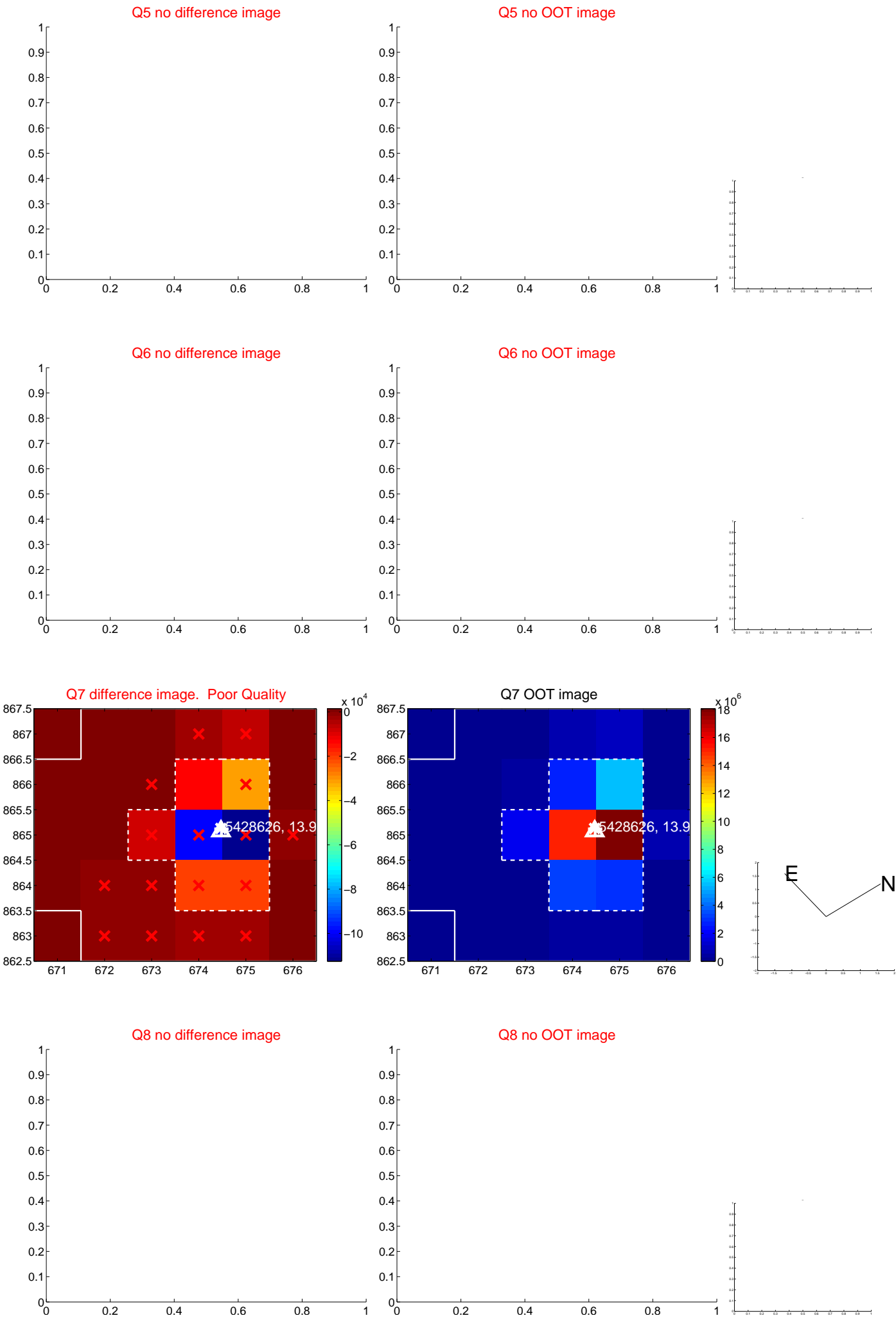


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

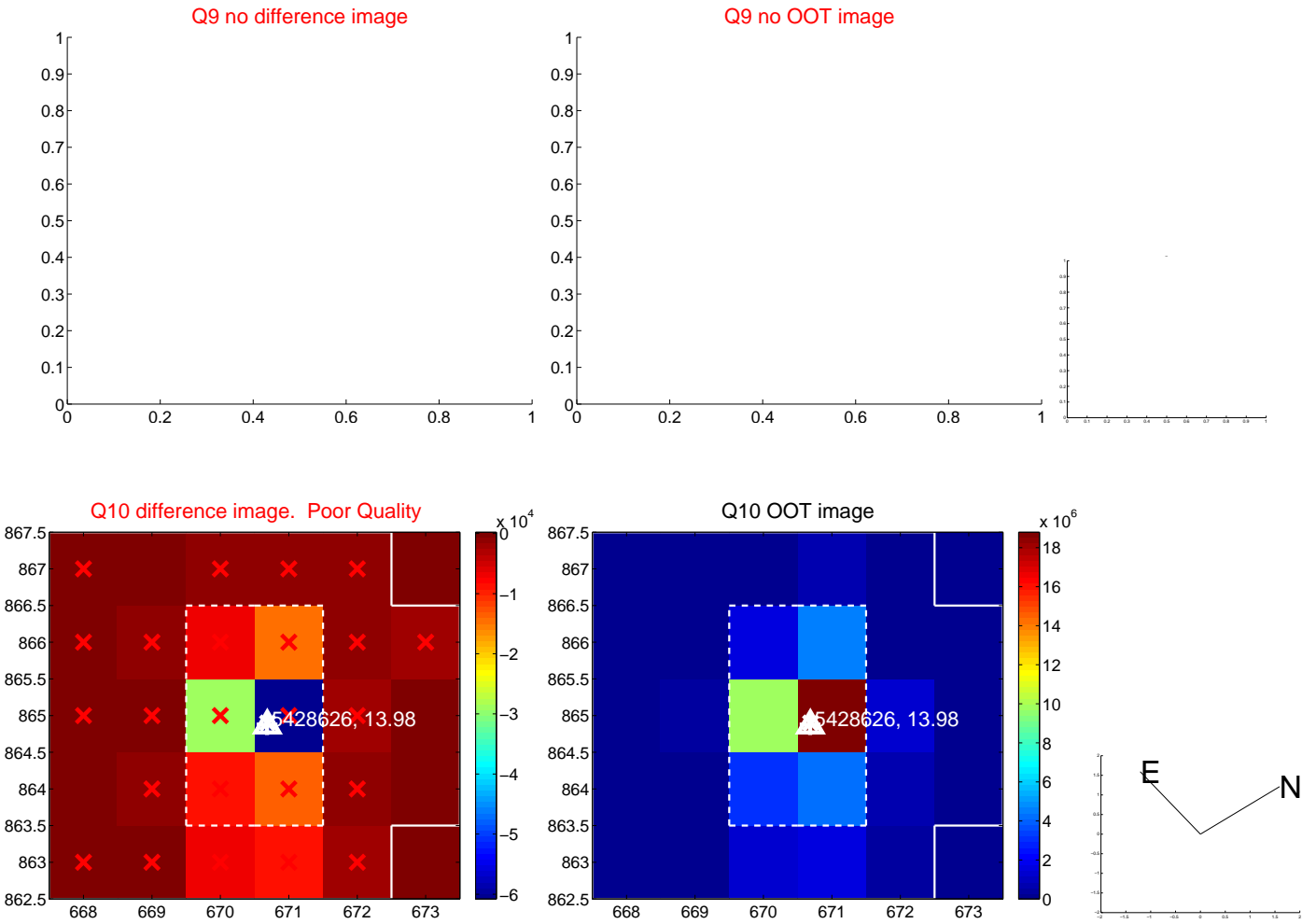
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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.

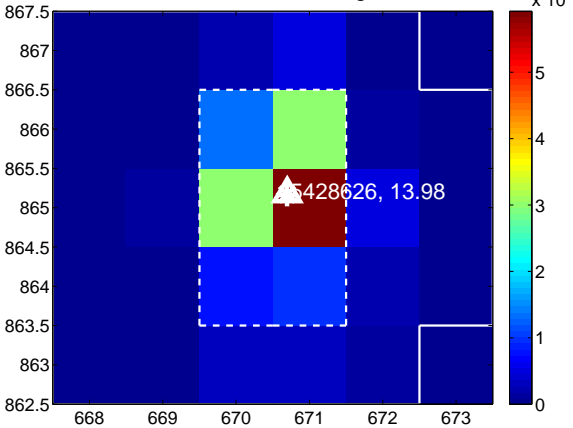
Q13 no difference image



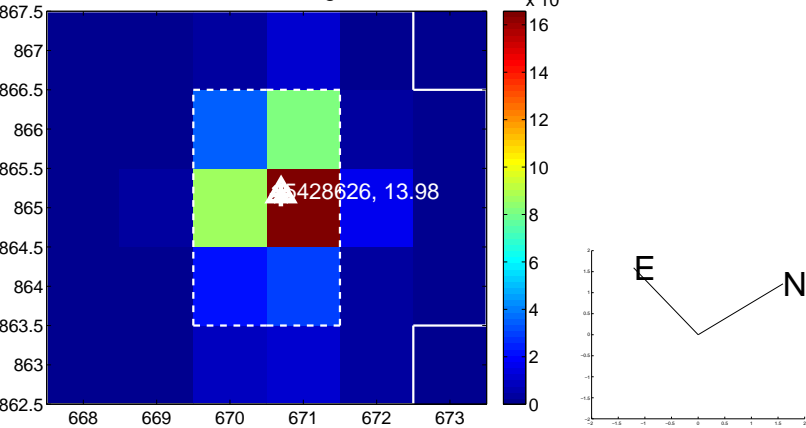
Q13 no OOT image



Q14 difference image



Q14 OOT image



Q15 no difference image



Q15 no OOT image



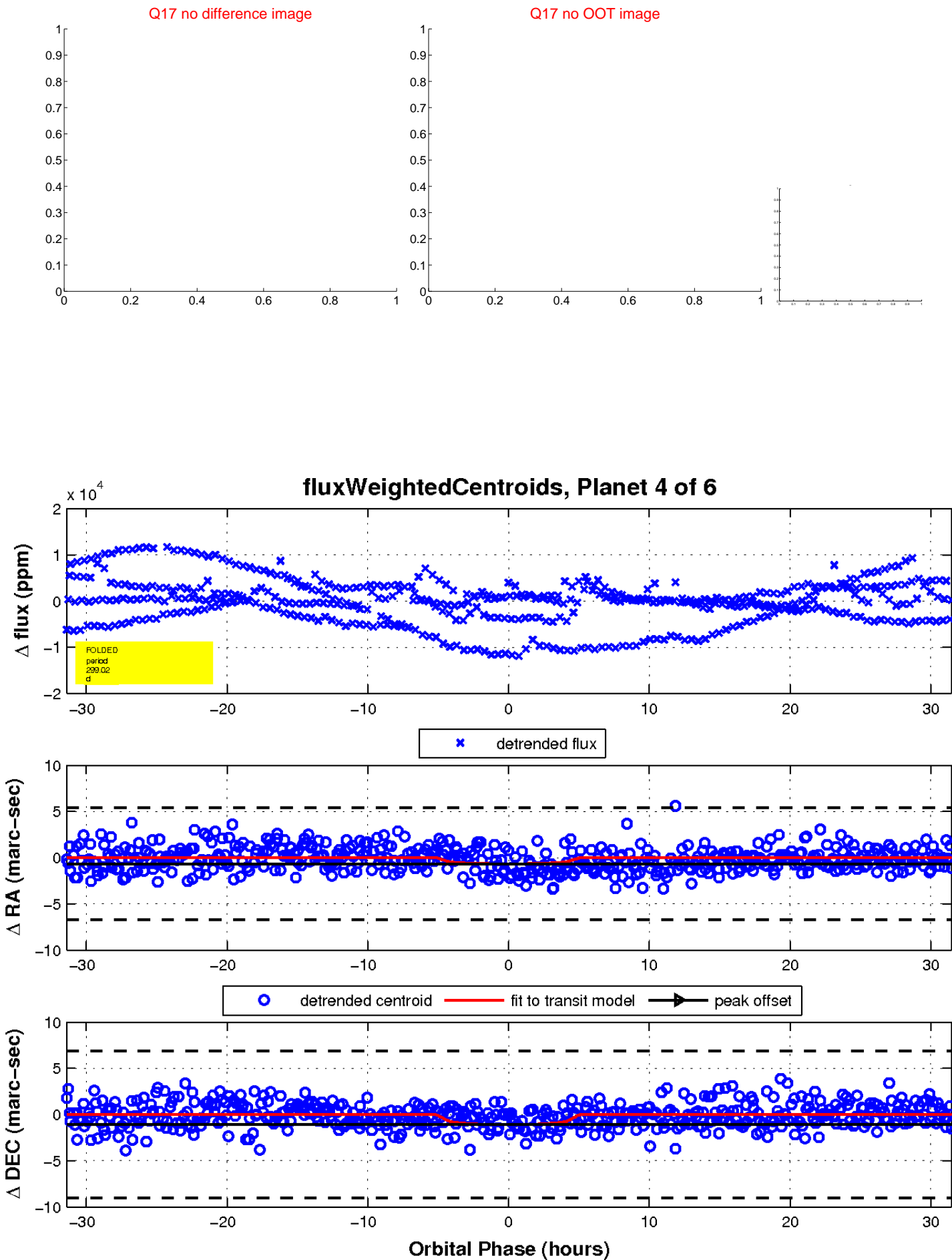
Q16 no difference image



Q16 no OOT image

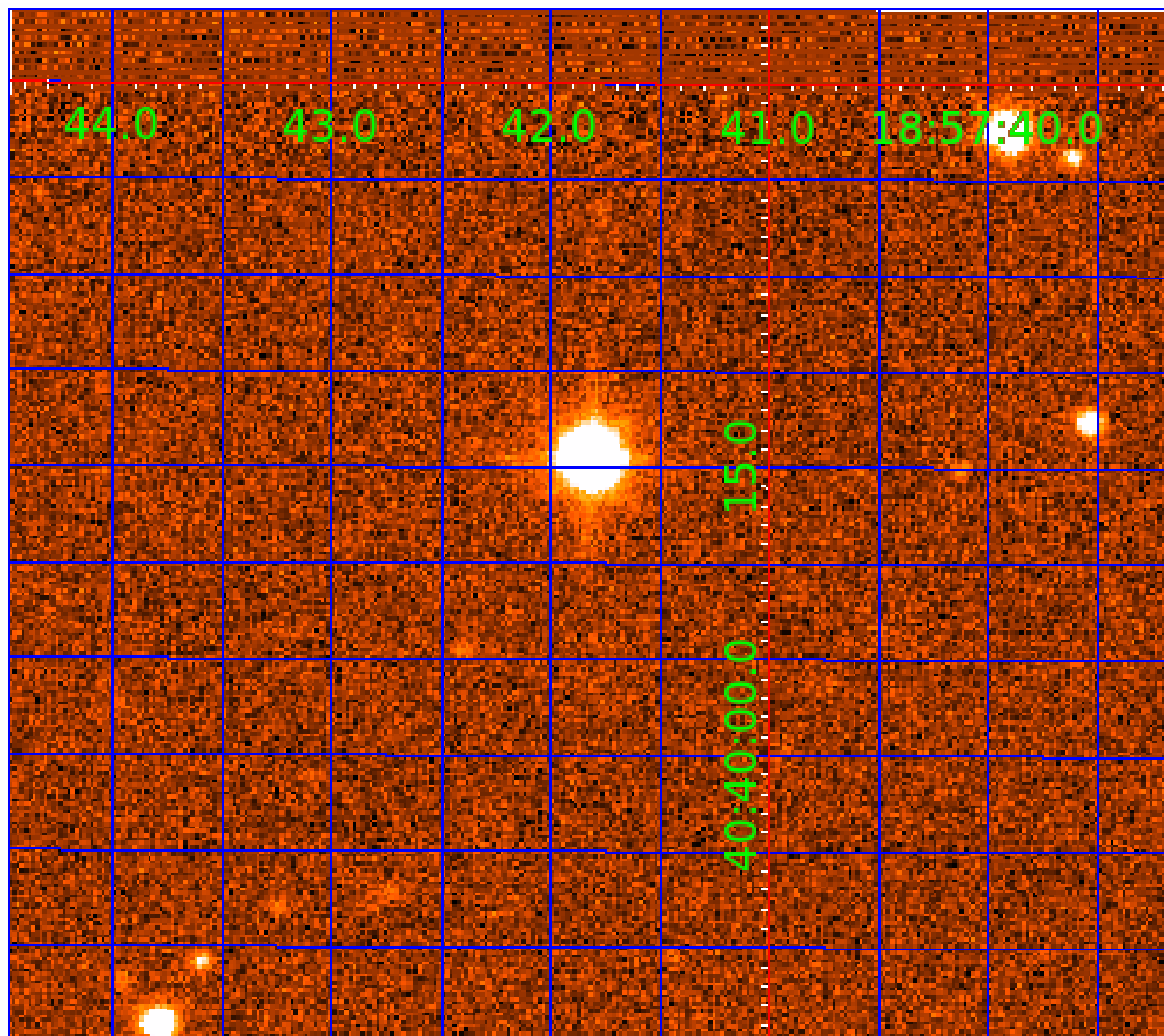


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



# UKIRT Image

Declination





# KIC 005428626

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005428626-01	OBS	No	269.686442	280.787021	1367.3	3.102	18.2	5.2	4.29	4914	15.79	15.86
005428626-02	OBS	No	355.562599	411.341991	2761.9	9.225	16.1	7.2	4.29	4914	22.03	10.97
005428626-03	OBS	No	312.104420	374.915321	2422.4	4.421	23.5	8.1	4.29	4914	22.52	13.05
005428626-04	OBS	No	299.023200	379.408217	2309.6	10.502	15.5	6.7	4.29	4914	22.56	13.82
005428626-05	OBS	No	344.454802	371.815203	2494.0	5.811	13.9	7.7	4.29	4914	21.08	11.44
005428626-06	OBS	No	248.603897	203.333097	2404.3	7.664	16.7	7.4	4.29	4914	20.38	17.68

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005428626-01	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
005428626-02	OBS	FP	0.00	1	0	0	0	LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
005428626-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
005428626-04	OBS	FP	0.00	1	0	0	0	LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005428626-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
005428626-06	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS

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

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

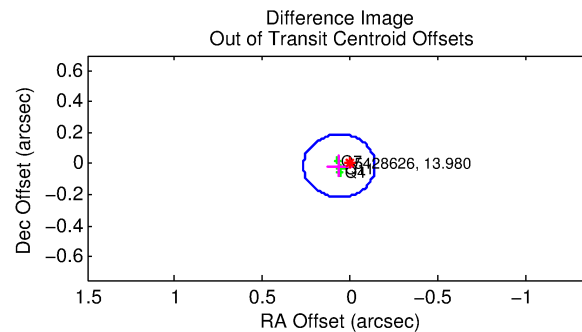
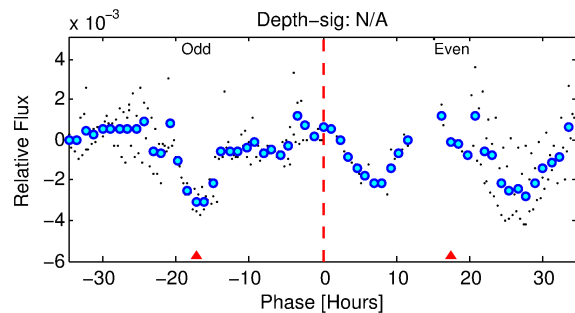
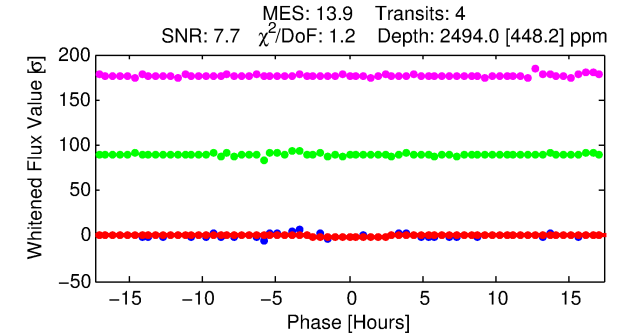
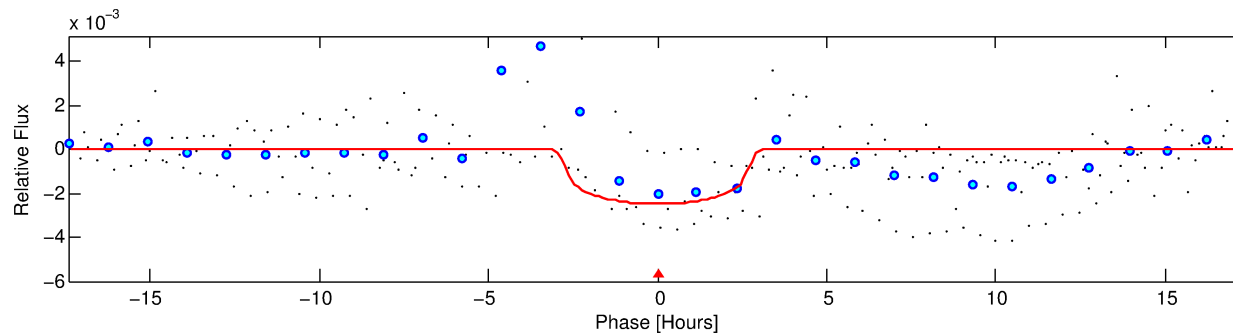
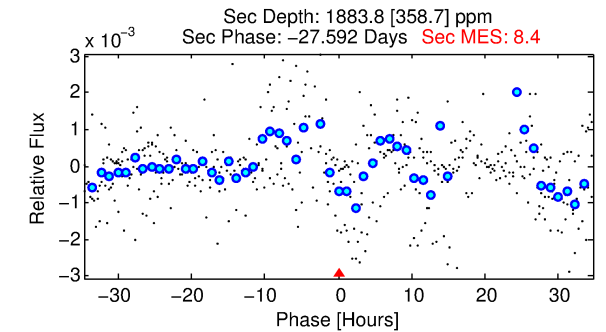
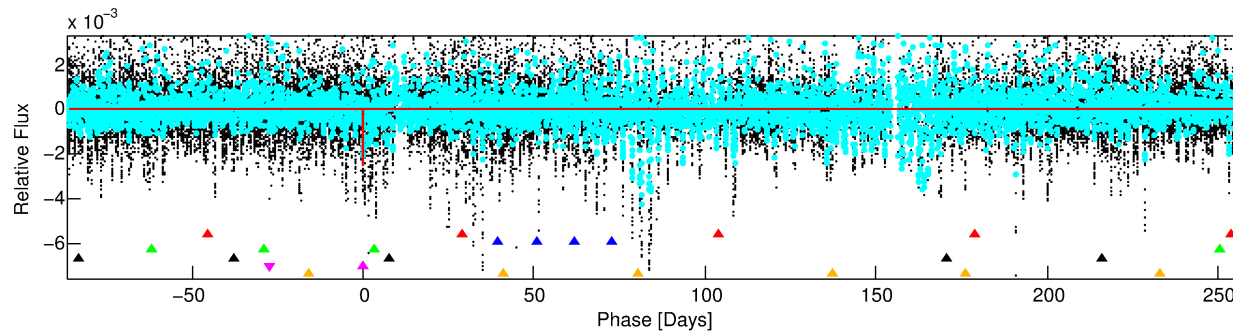
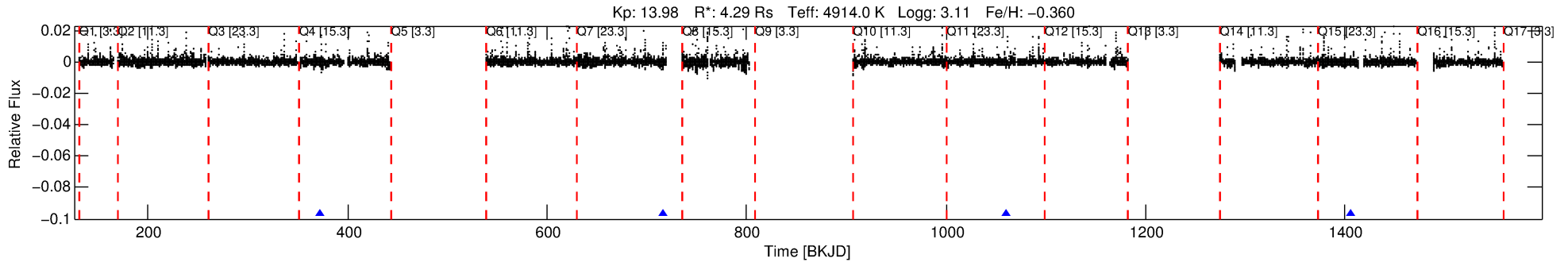
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 005428626-05

No Significant Match Found

# DV One-Page Summary

KIC: 5428626 Candidate: 5 of 6 Period: 344.455 d



## DV Fit Results:

Period = 344.45480 [0.00394] d  
Epoch = 371.8152 [0.0052] BKJD  
Rp/R\* = 0.0451 [0.0349]  
a/R\* = 450.29 [1185.72]  
b = 0.32 [7.44]  
Seff = 11.44 [8.37]  
Teq = 469 [86] K  
**Rp = 21.08 [20.69] Re**  
a = 0.9160 [0.4595] AU  
Ag = 1956.28 [3360.10] [0.58σ]  
Teffp = 4822 [1885] K [2.31σ]

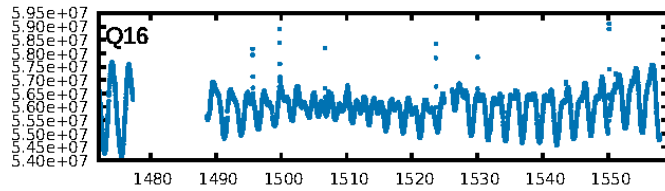
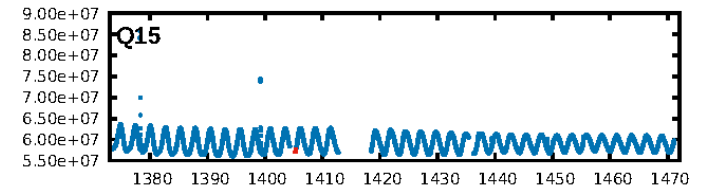
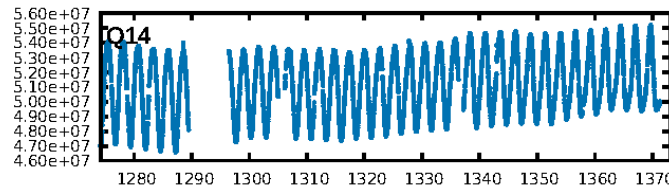
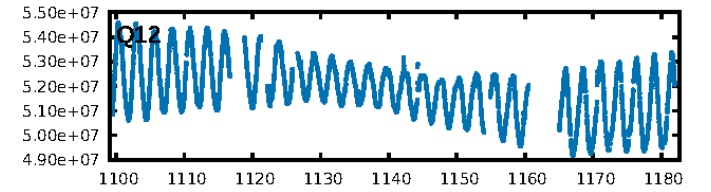
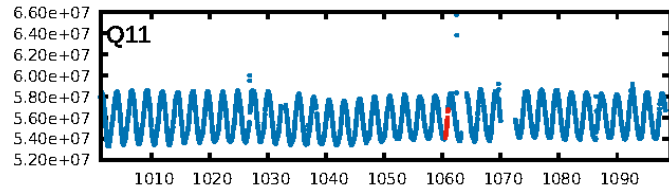
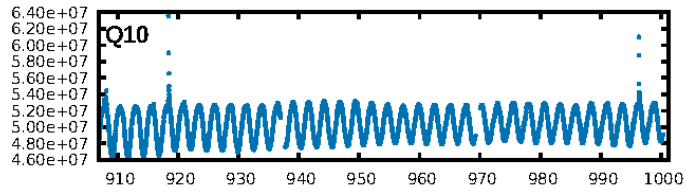
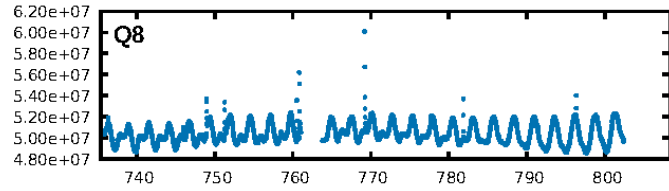
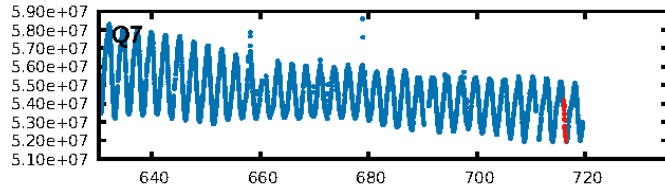
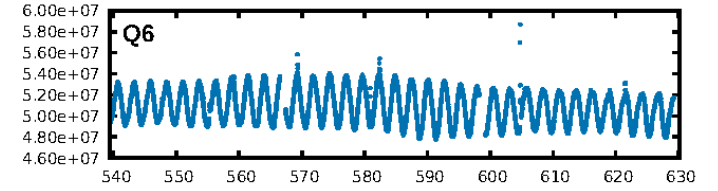
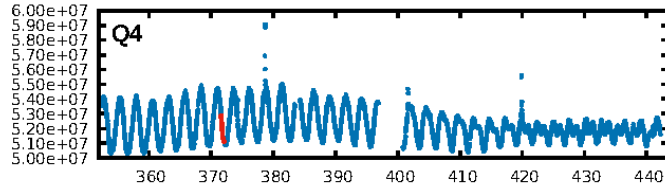
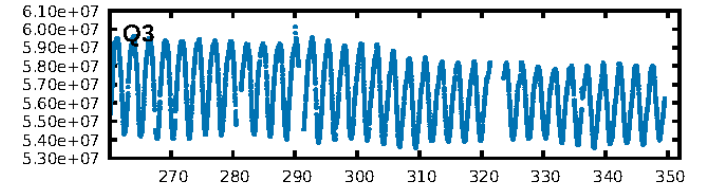
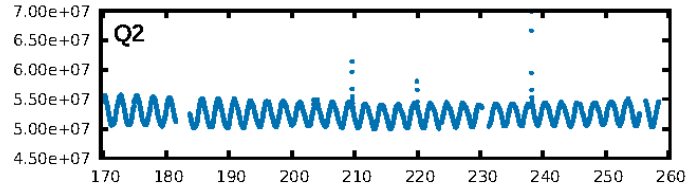
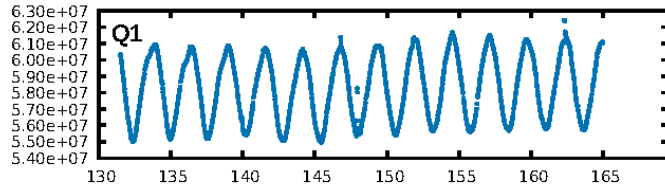
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [106.33σ]  
LongPeriod-sig: 100.0% [24.45σ]  
ModelChiSquare2-sig: 10.9%  
ModelChiSquareGof-sig: 99.5%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: -1.672  
Centroid-sig: 3.5%  
Centroid-so: 0.355 arcsec [1.09σ]  
OotOffset-rm: 0.064 arcsec [0.94σ]  
OotOffset-st: 0/2/1/0 [3]  
KicOffset-rm: 0.026 arcsec [0.37σ]  
KicOffset-st: 0/2/1/0 [3]  
DiffImageQuality-fgm: 1.00 [3/3]  
DiffImageOverlap-fno: 1.00 [3/3]

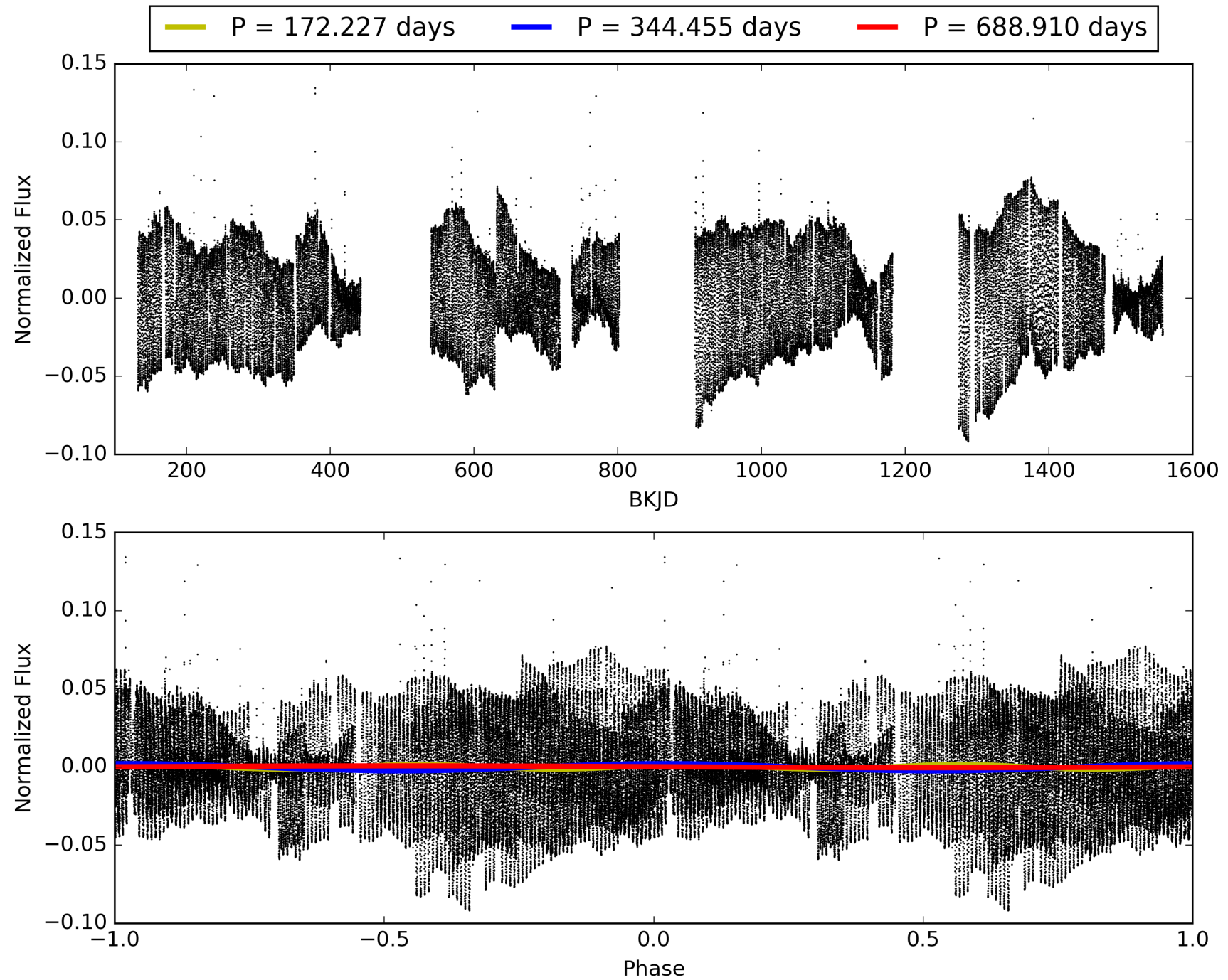
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 07:19:07 Z

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

# TCE 005428626-05, PDC Light Curves

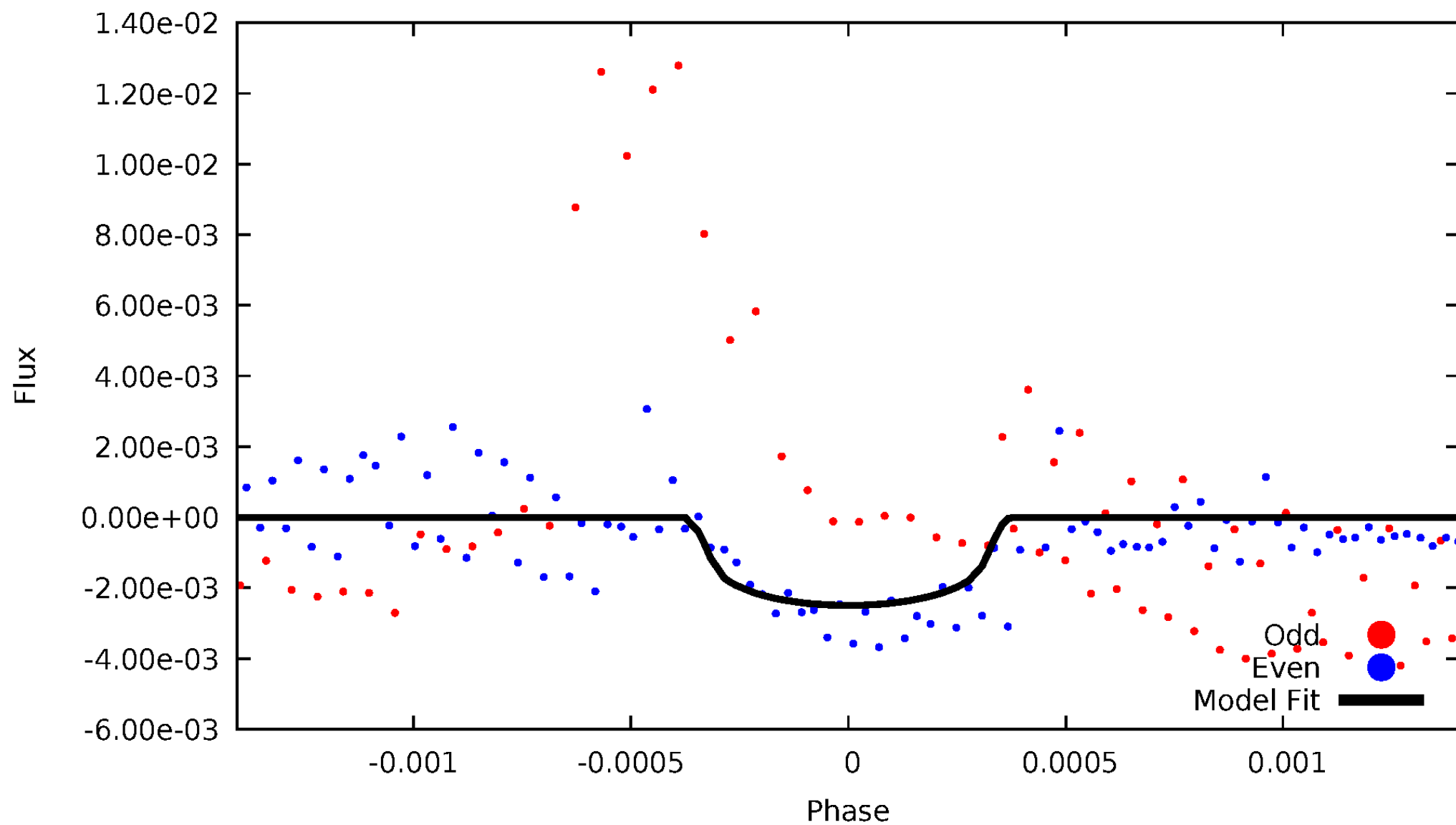


TCE 005428626-05



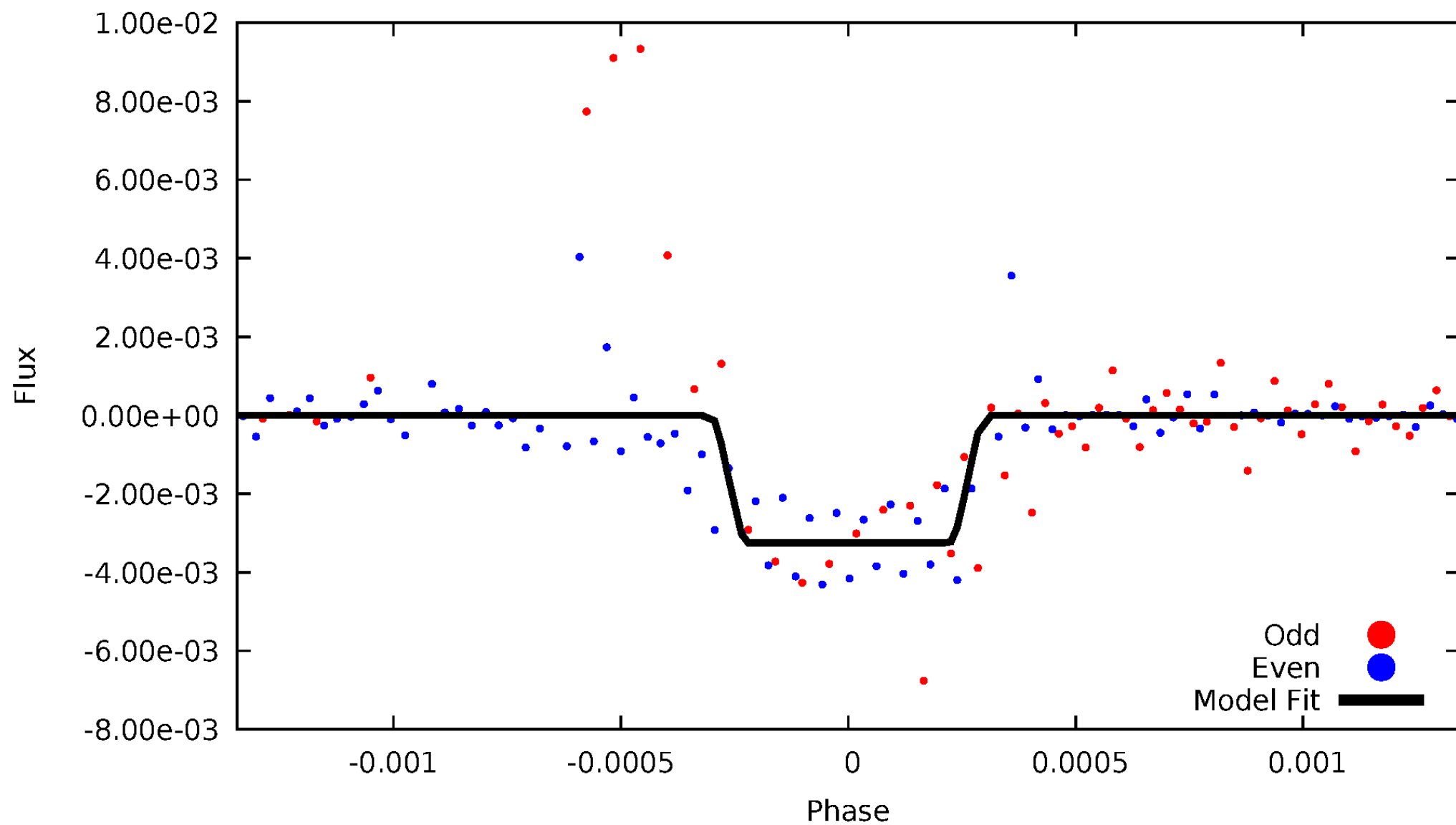
# DV Odd/Even

TCE 005428626-05



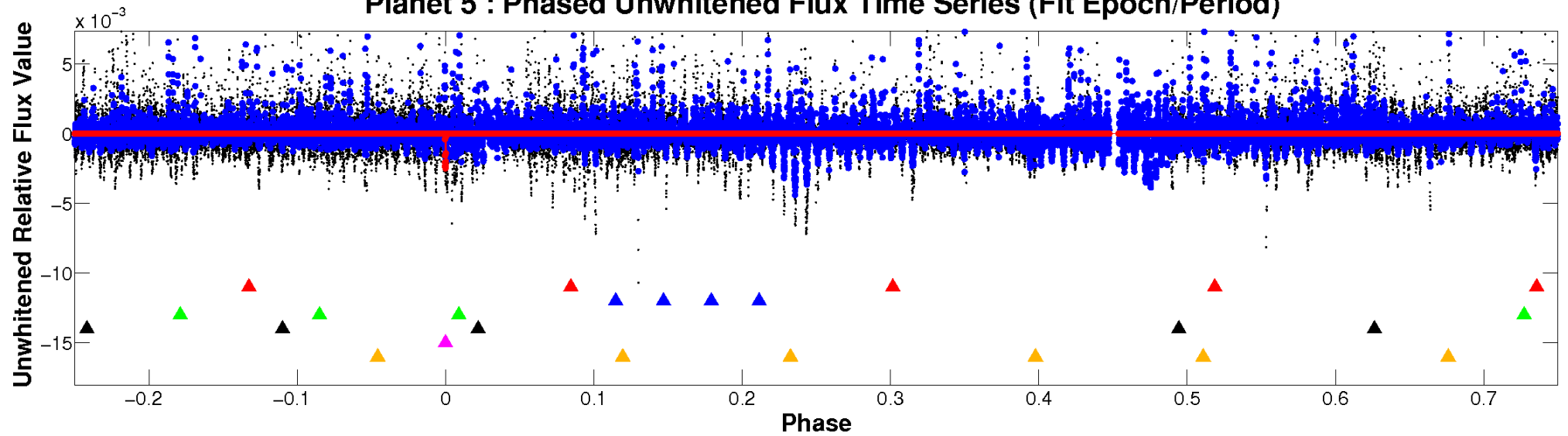
# ALT Odd/Even

TCE 005428626-05

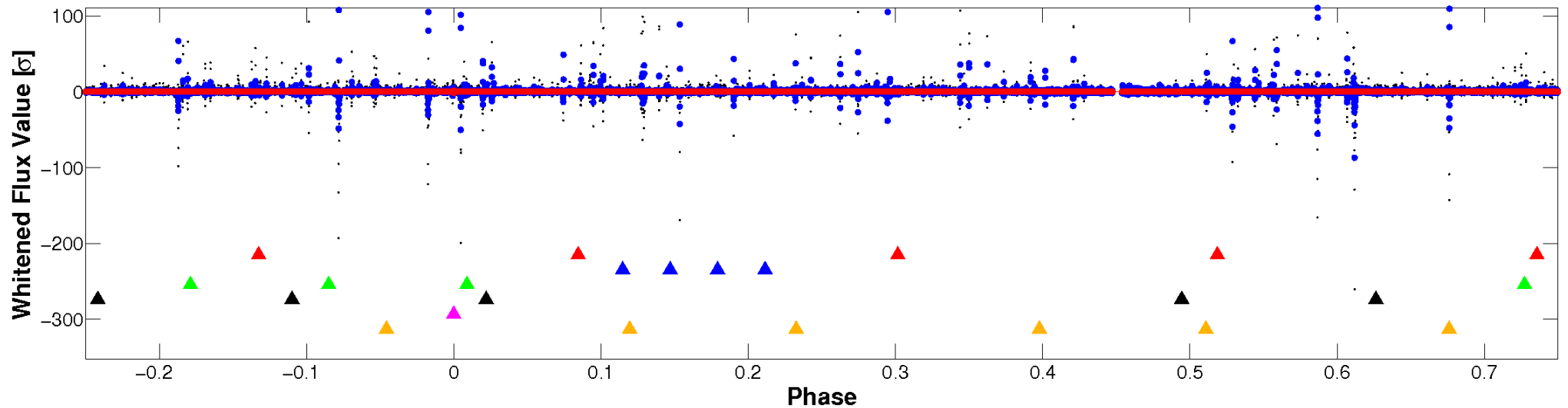


# Non-Whitened Vs. Whitened Light Curve

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

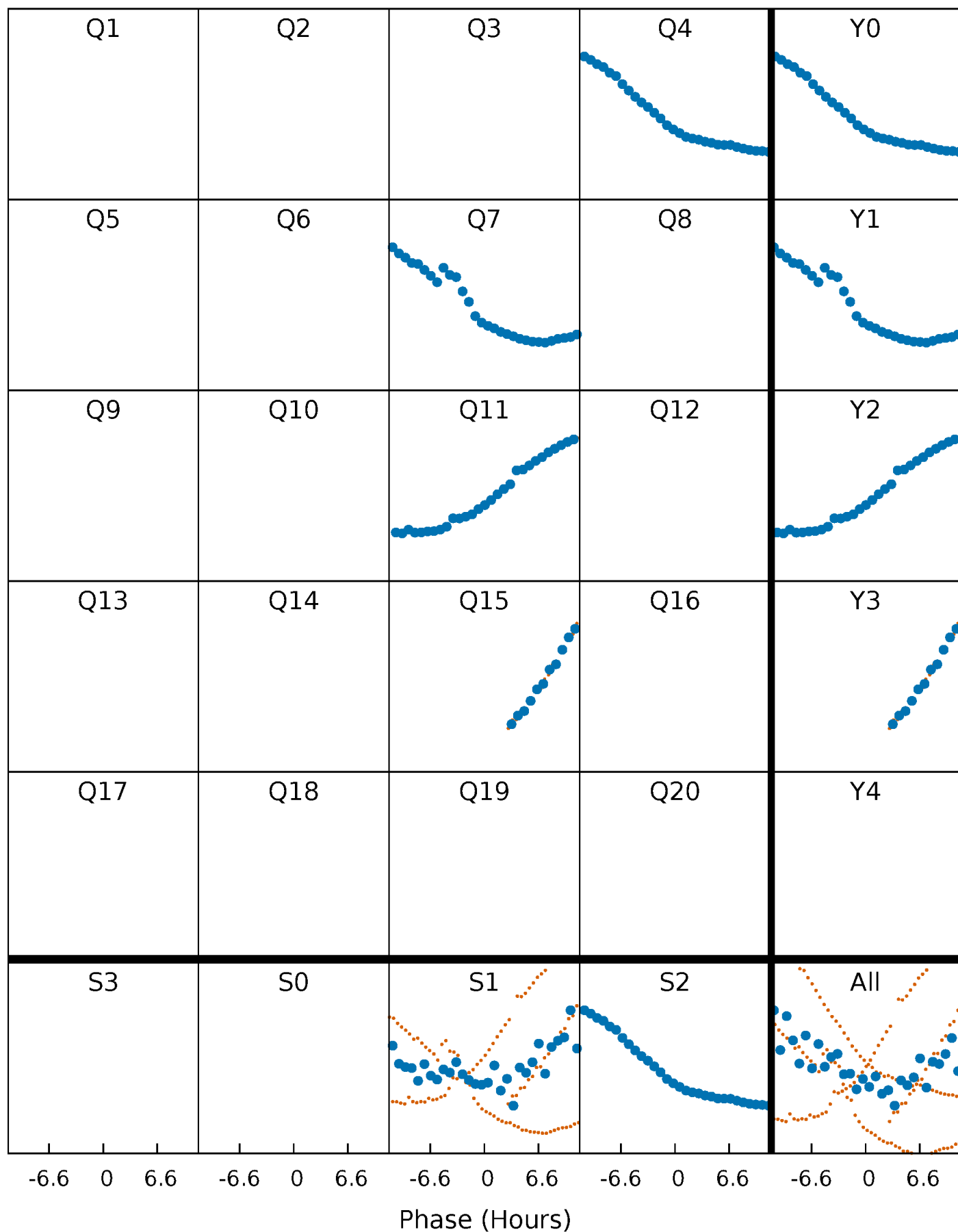


Planet 5 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

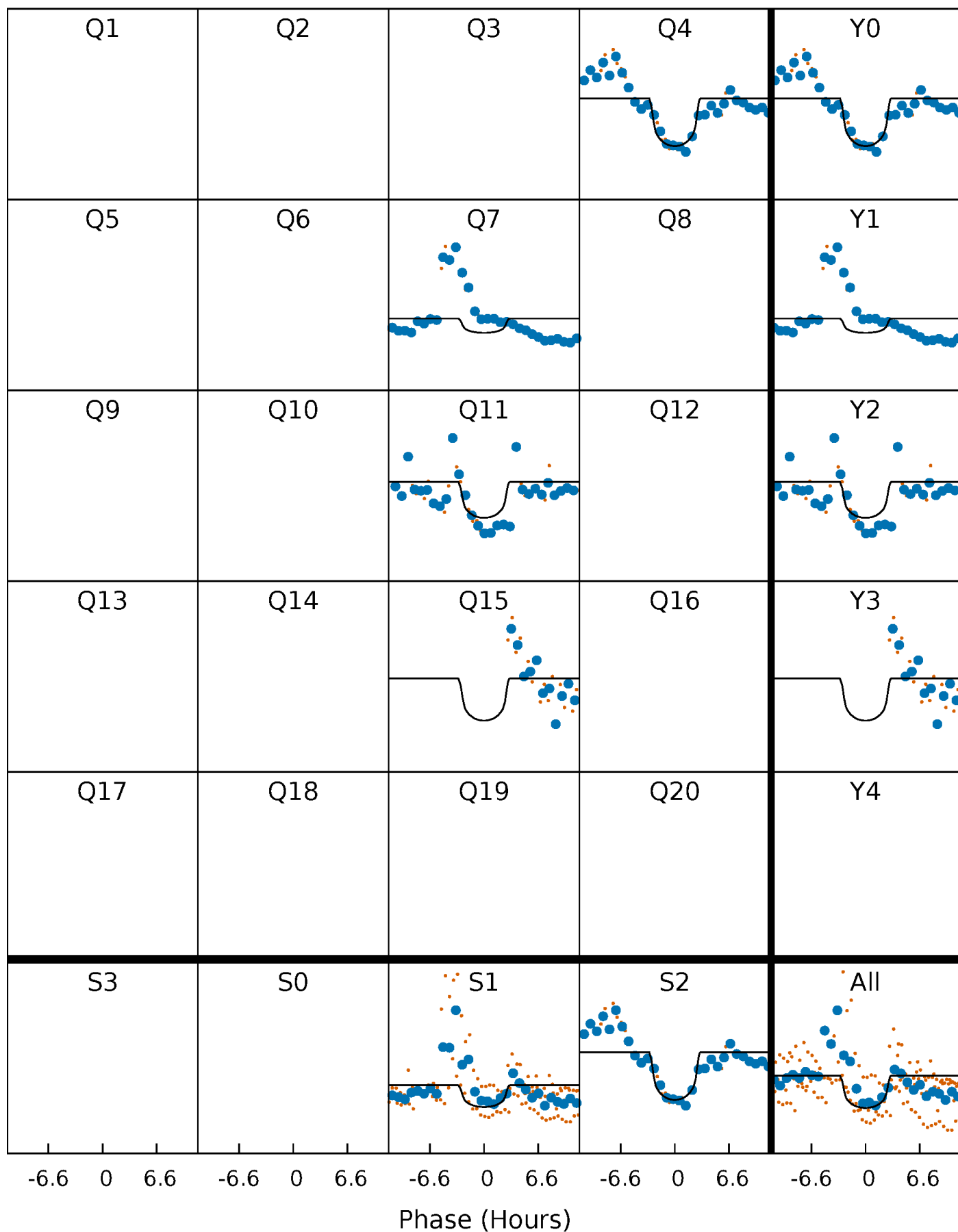
TCE 005428626-05     $P=344.454802$  Days     $T_0=371.815203$  (BKJD)





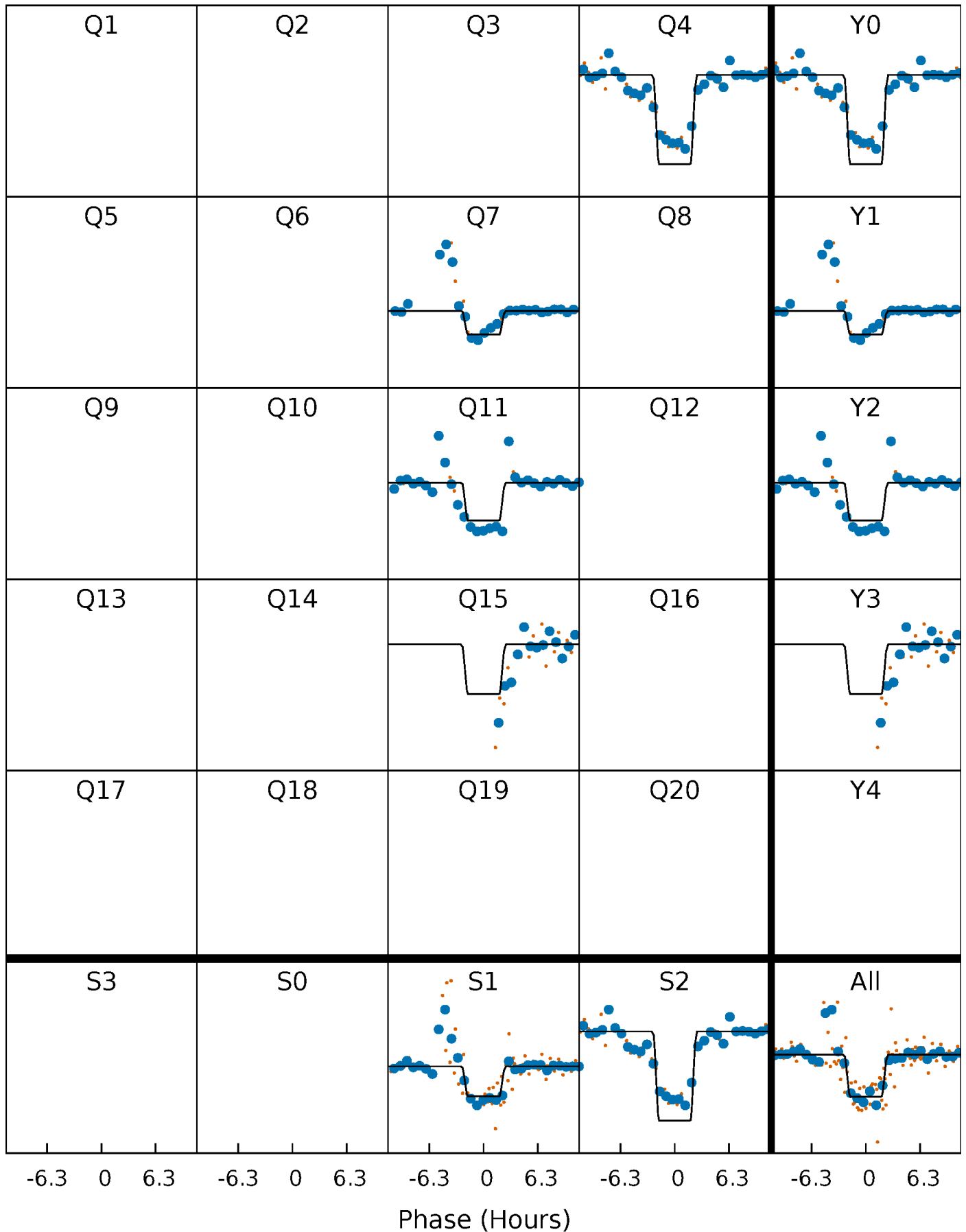
# DV Quarter-Phased Transit Curves

TCE 005428626-05     $P=344.454802$  Days     $T_0=371.815203$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

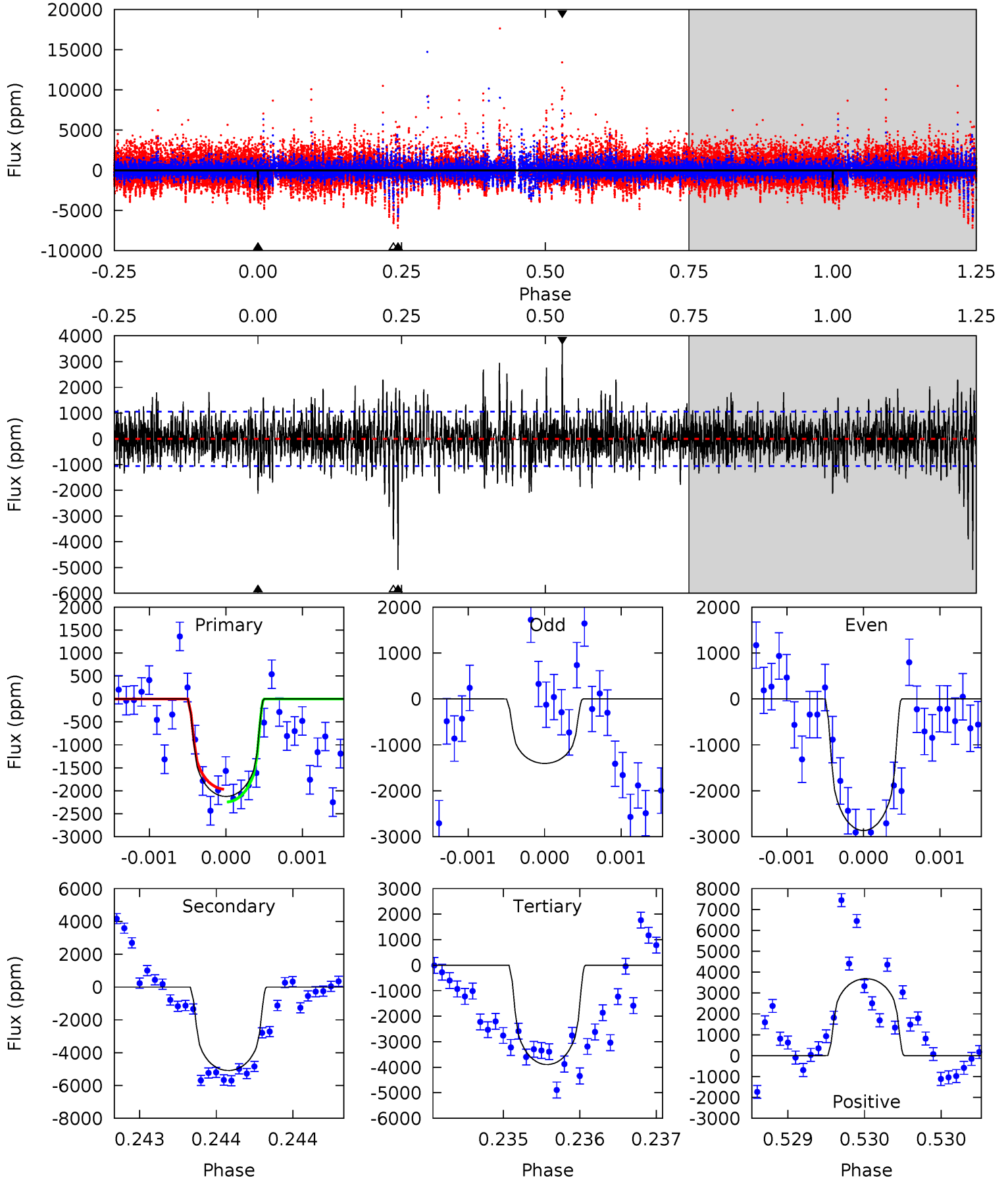
TCE 005428626-05     $P=344.475766$  Days     $T_0=371.817142$  (BKJD)



# DV Model-Shift Uniqueness Test

005428626-05, P = 344.454802 Days, E = 27.360401 Days

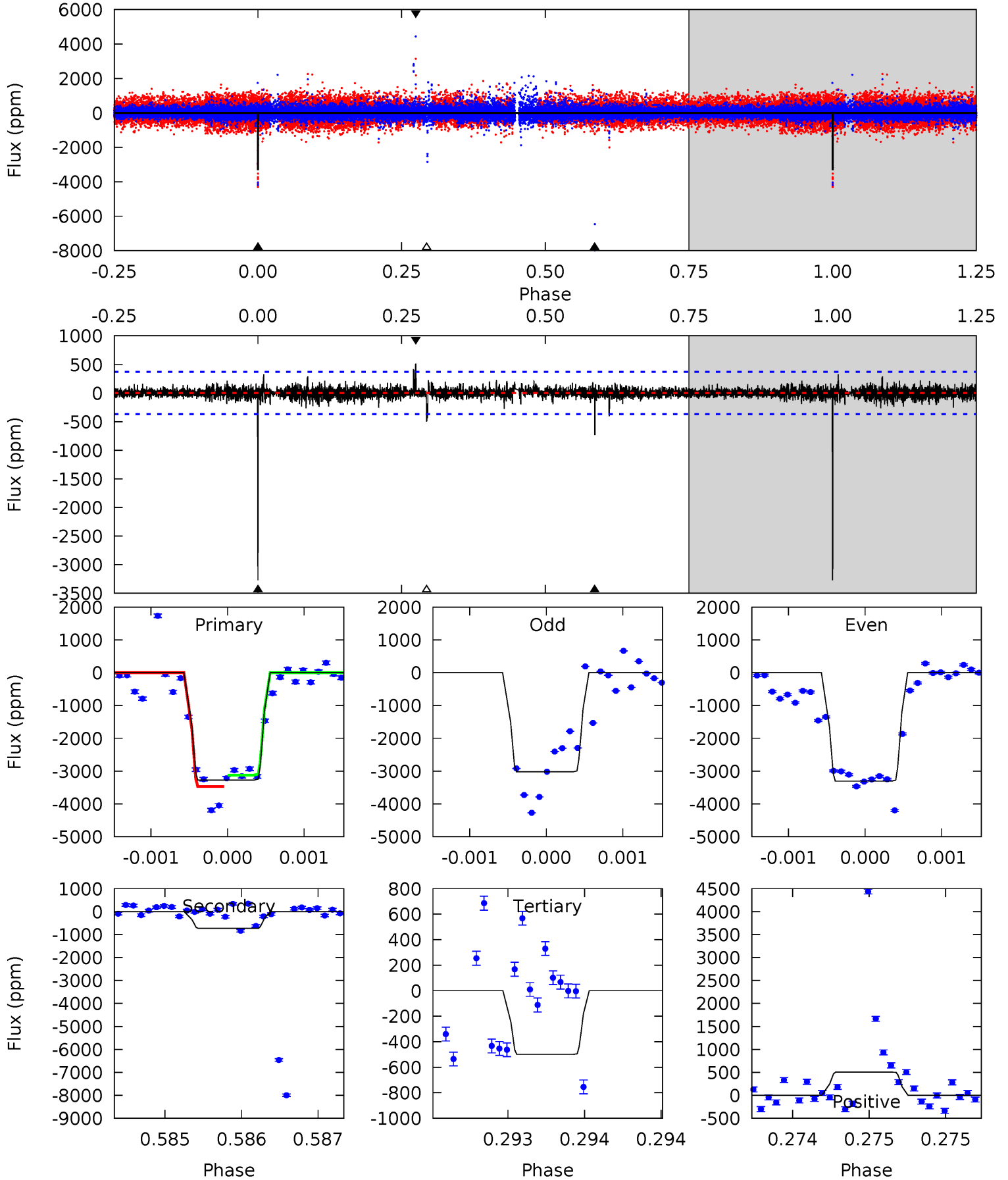
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.0	26.5	20.3	19.2	5.50	3.37	3.14	-9.21	-8.13	6.21	7.29	2.63	0.58	0.42	0.72



# Alt Model-Shift Uniqueness Test

005428626-05, P = 344.475766 Days, E = 27.341376 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
49.2	11.0	7.50	7.59	5.55	3.45	0.87	41.7	41.6	3.51	3.42	1.87	1.06	0.13	2.56



### Stellar Parameters For KIC 005428626

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4914^{+149}_{-112}$	$3.110^{+0.390}_{-0.319}$	$-0.360^{+0.250}_{-0.250}$	$4.287^{+2.589}_{-1.394}$	$0.862^{+0.316}_{-0.097}$	$0.015^{+0.037}_{-0.011}$
	+3%/-2%	+13%/-10%	+69%/-69%	+60%/-33%	+37%/-11%	+243%/-70%
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 005428626-05 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-5086 \pm 192$	$23.28^{+19.62}_{-14.44}$	$648^{+97}_{-72}$	$5771^{+3999}_{-1132}$	$4670^{+26461}_{-3331}$
Alt.	$-733 \pm 67$	$27.70^{+19.27}_{-15.39}$	$650^{+88}_{-71}$	$3674^{+1209}_{-512}$	$464^{+1915}_{-311}$

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

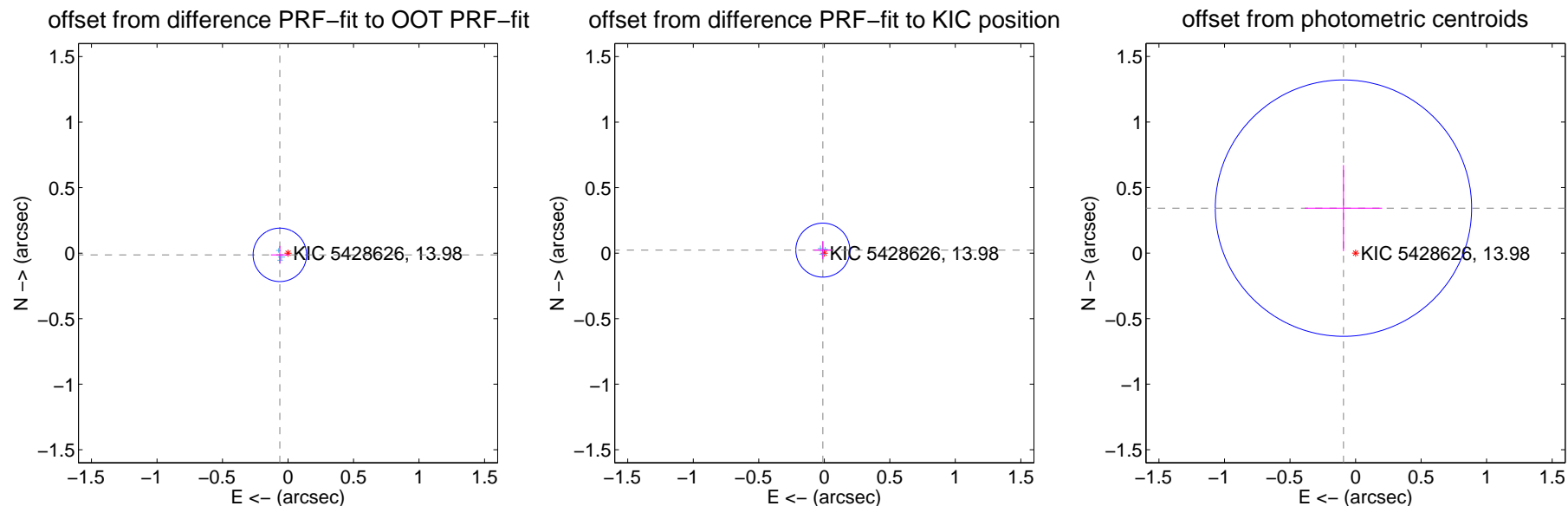
## DV Centroid Data

Supplemental centroid analysis for 005428626-05. Kepler magnitude: 13.98. Transit SNR 7.69

There are 3 quarters with good PRF difference image offsets

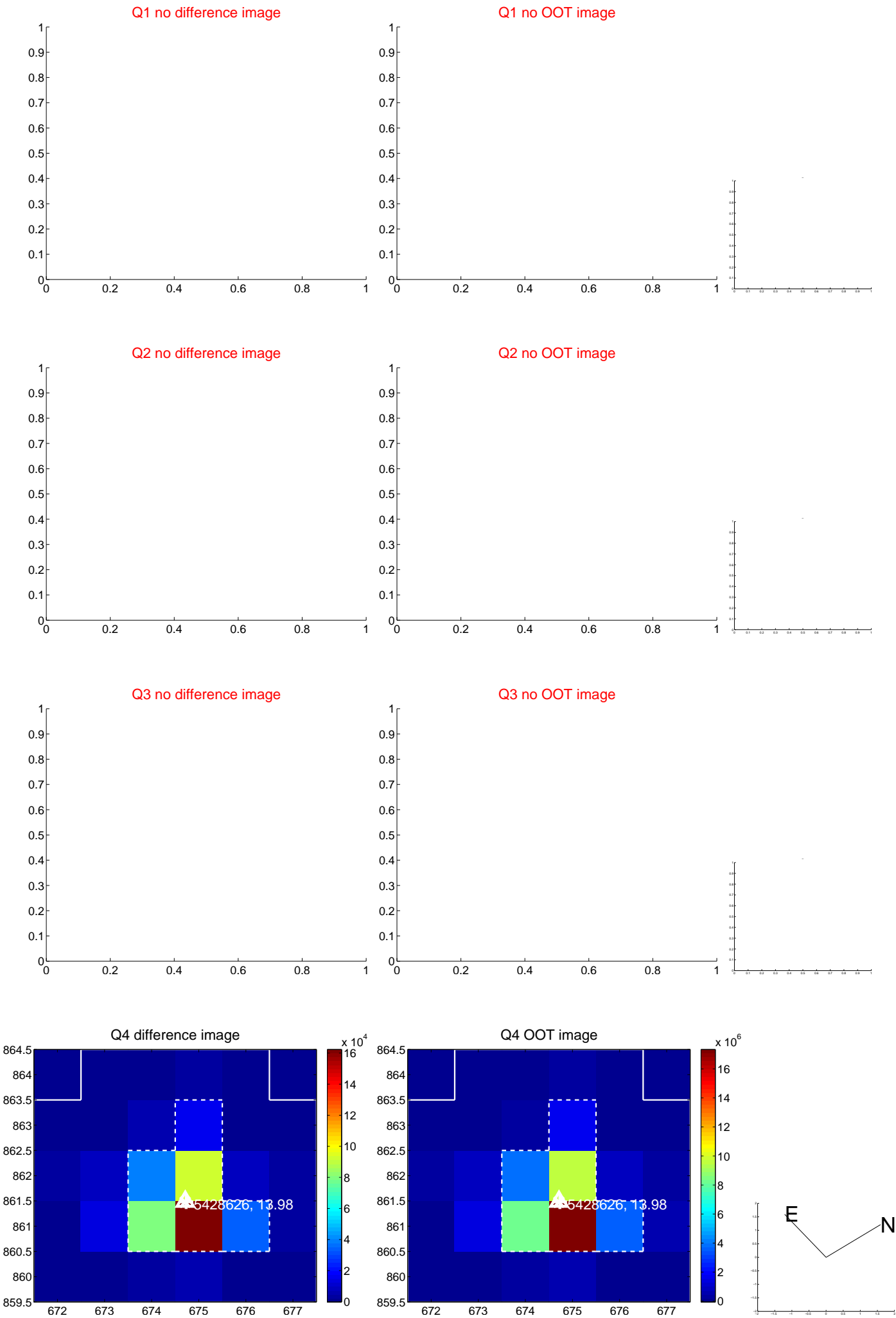
The direct PRF centroid is offset from the target star catalog position by about 0.04 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.064 \pm 0.068$	0.94	$0.062 \pm 0.068$	$-0.013 \pm 0.068$
PRF-fit source offset from KIC position	$0.026 \pm 0.069$	0.37	$0.011 \pm 0.068$	$0.023 \pm 0.069$
photometric centroid source offset	$0.36 \pm 0.33$	1.09	$0.09 \pm 0.29$	$0.34 \pm 0.33$

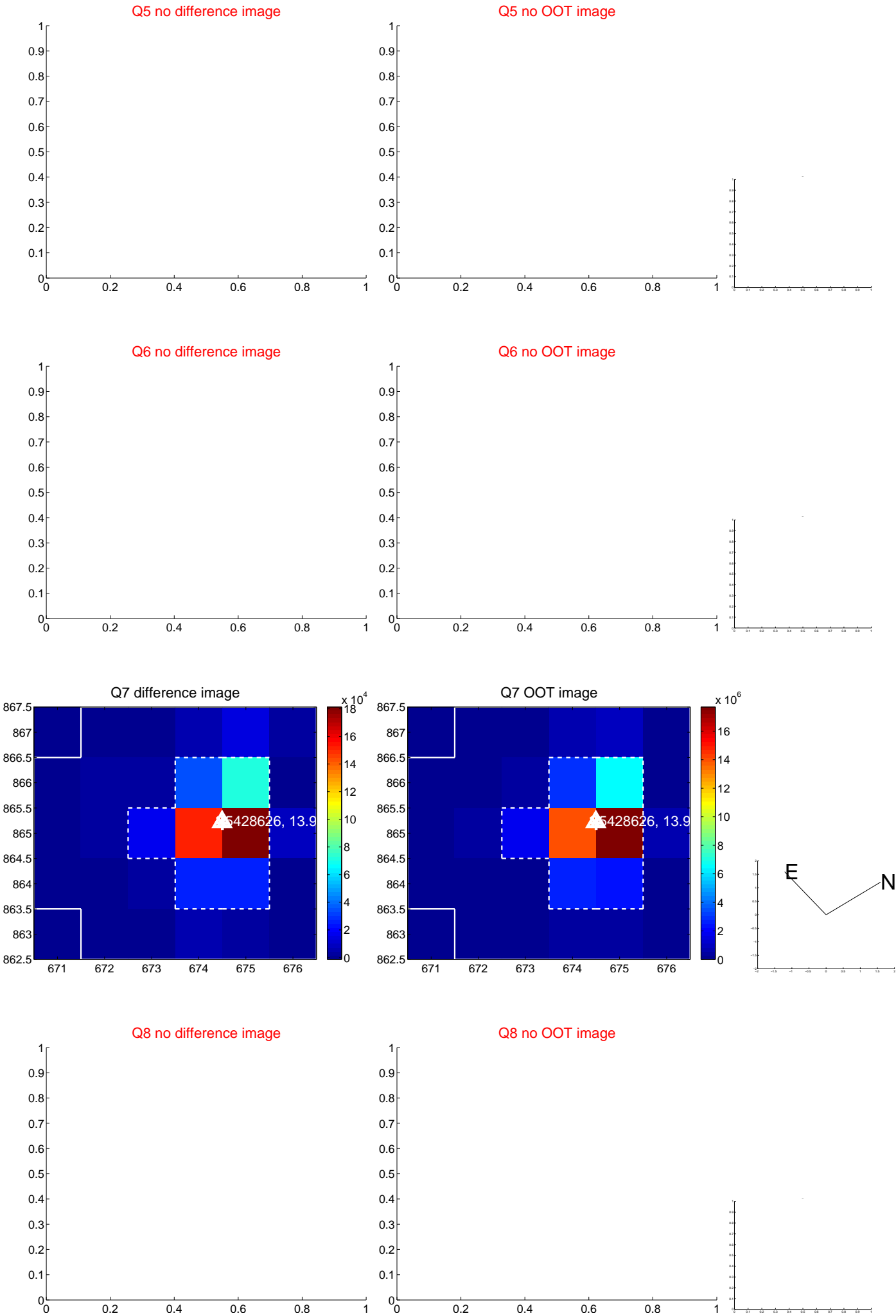


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

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



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





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

Q9 no difference image



Q9 no OOT image



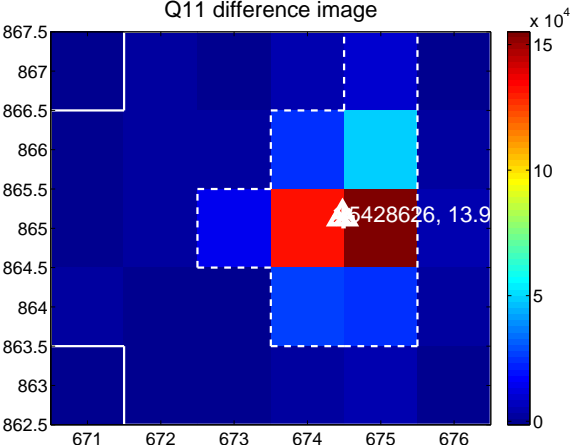
Q10 no difference image



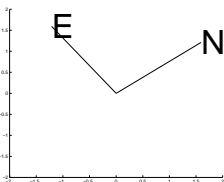
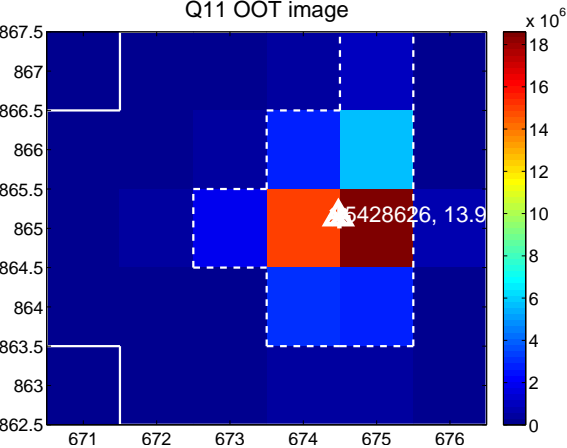
Q10 no OOT image



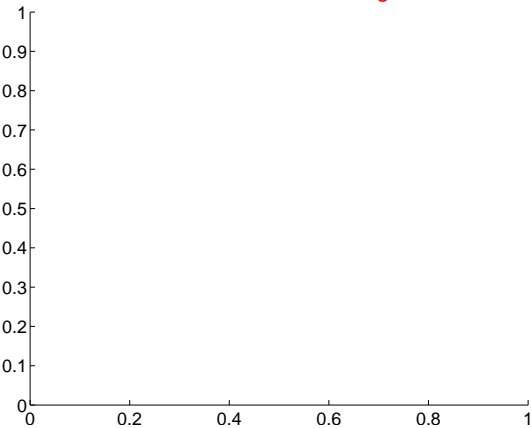
Q11 difference image



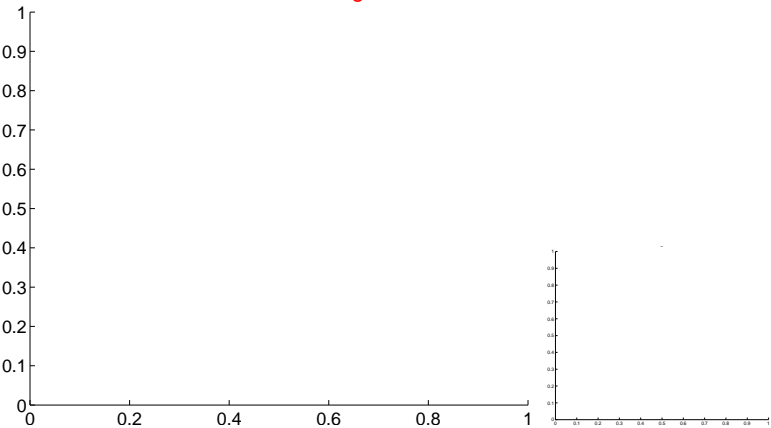
Q11 OOT image



Q12 no difference image



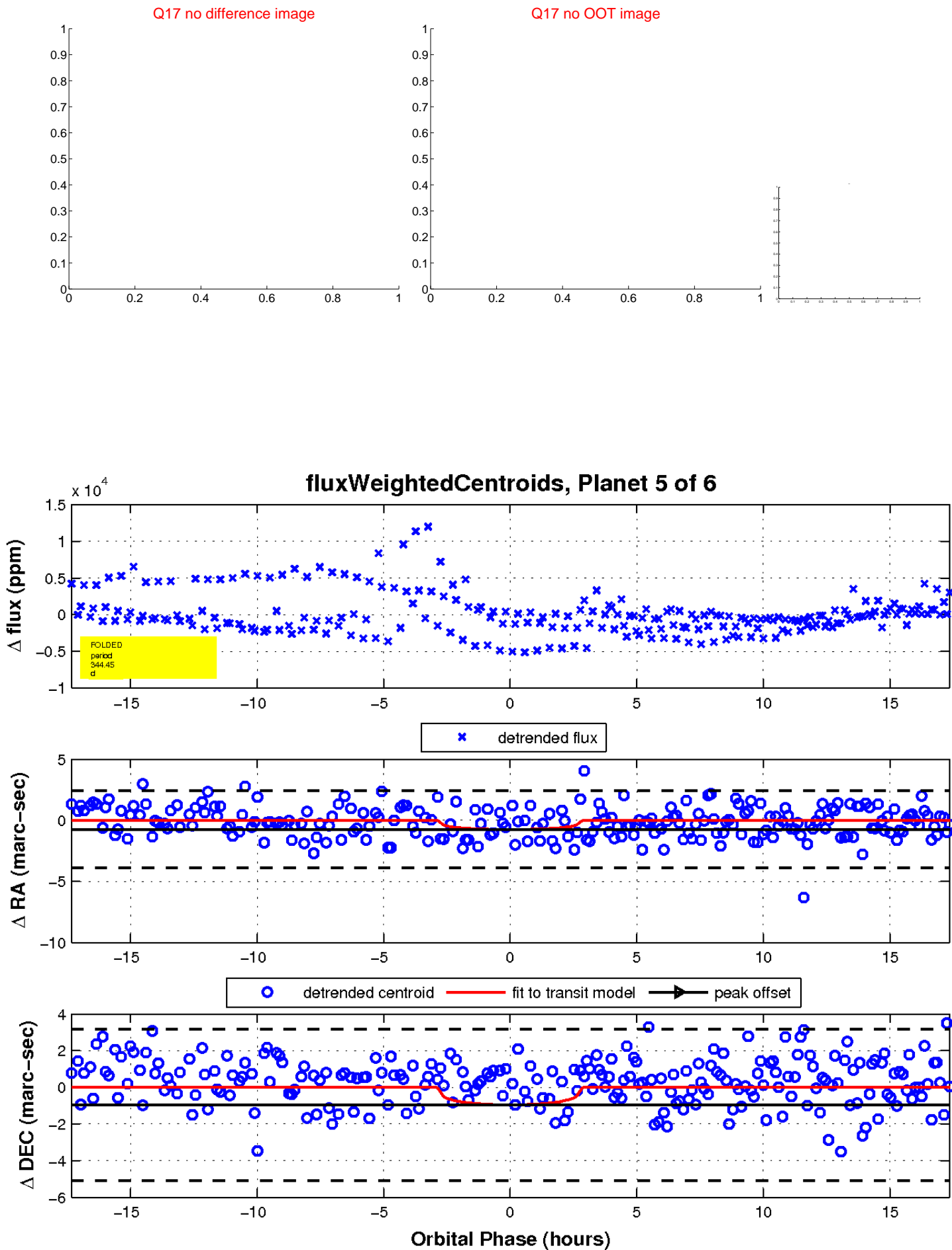
Q12 no OOT image



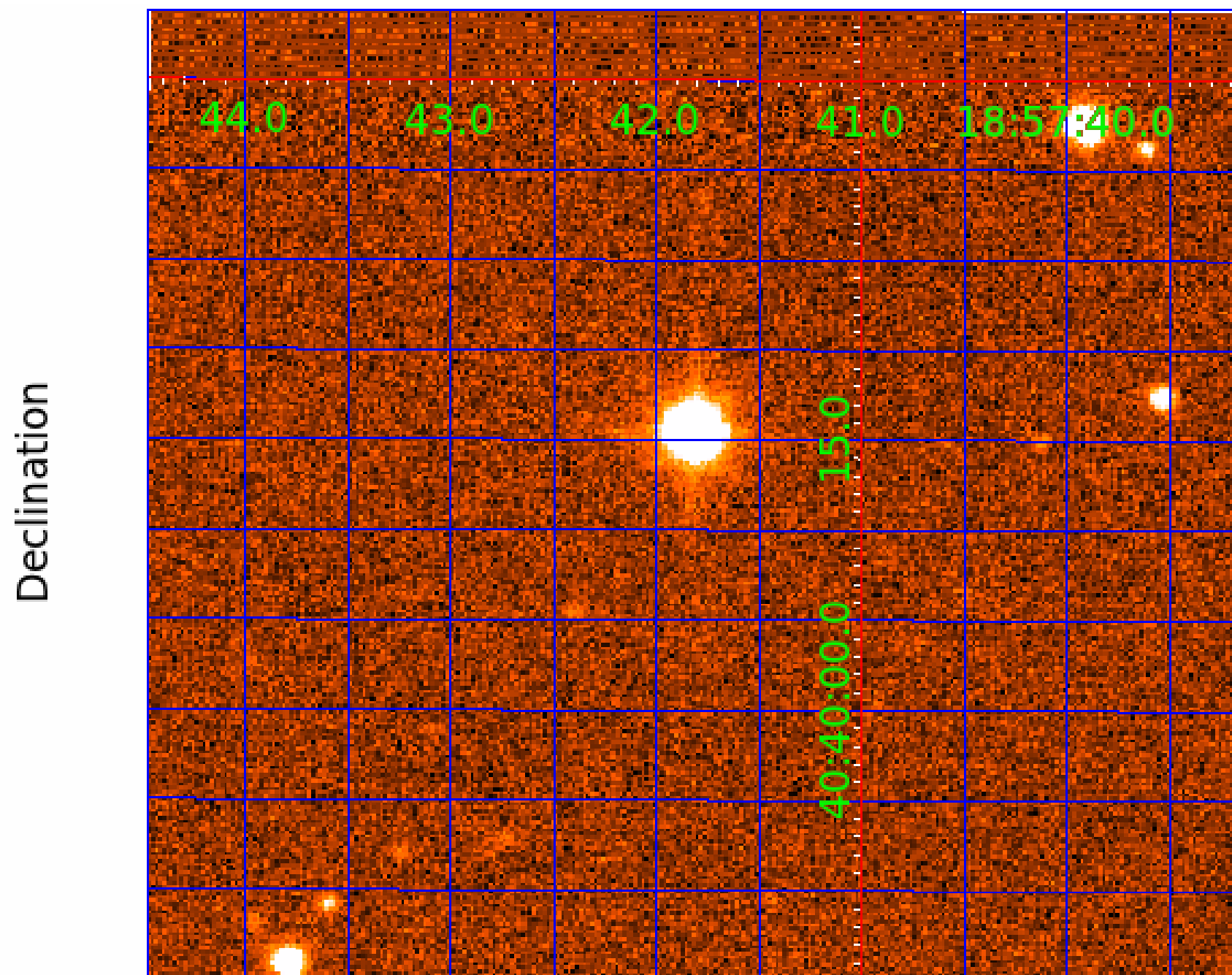
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image



# KIC 005428626

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005428626-01	OBS	No	269.686442	280.787021	1367.3	3.102	18.2	5.2	4.29	4914	15.79	15.86
005428626-02	OBS	No	355.562599	411.341991	2761.9	9.225	16.1	7.2	4.29	4914	22.03	10.97
005428626-03	OBS	No	312.104420	374.915321	2422.4	4.421	23.5	8.1	4.29	4914	22.52	13.05
005428626-04	OBS	No	299.023200	379.408217	2309.6	10.502	15.5	6.7	4.29	4914	22.56	13.82
005428626-05	OBS	No	344.454802	371.815203	2494.0	5.811	13.9	7.7	4.29	4914	21.08	11.44
005428626-06	OBS	No	248.603897	203.333097	2404.3	7.664	16.7	7.4	4.29	4914	20.38	17.68

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005428626-01	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
005428626-02	OBS	FP	0.00	1	0	0	0	LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
005428626-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
005428626-04	OBS	FP	0.00	1	0	0	0	LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005428626-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
005428626-06	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS

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

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

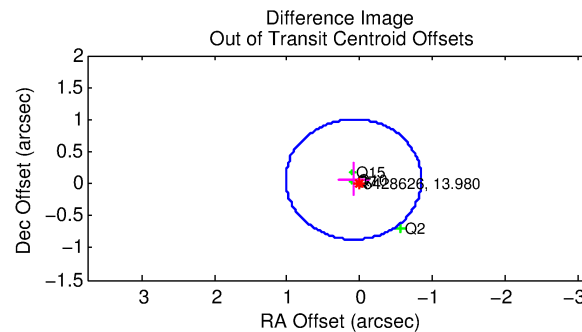
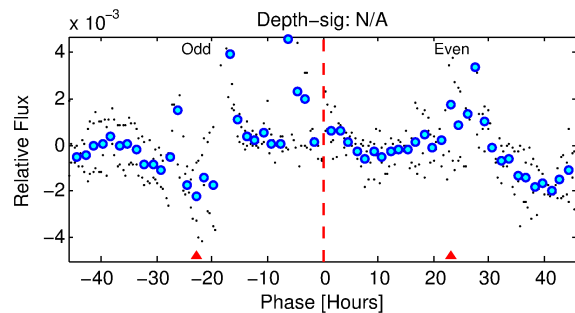
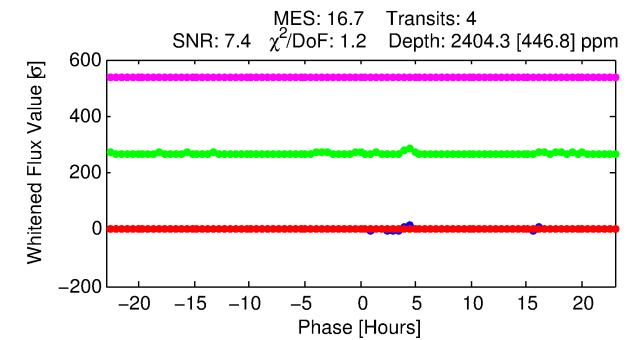
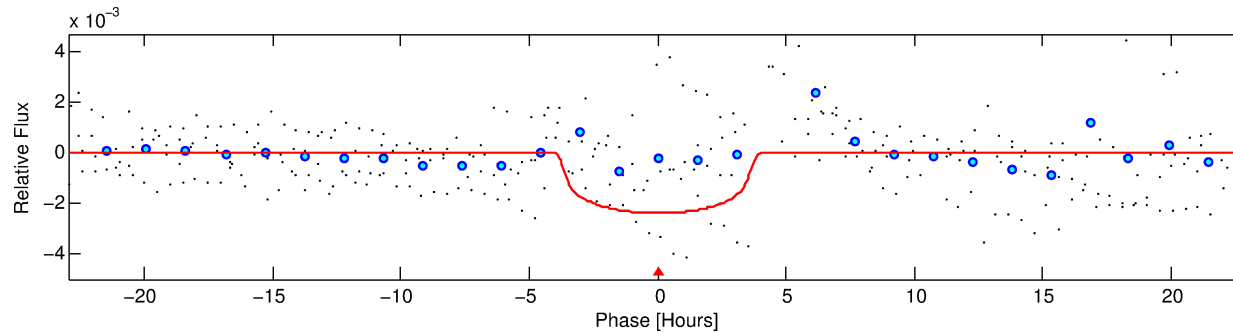
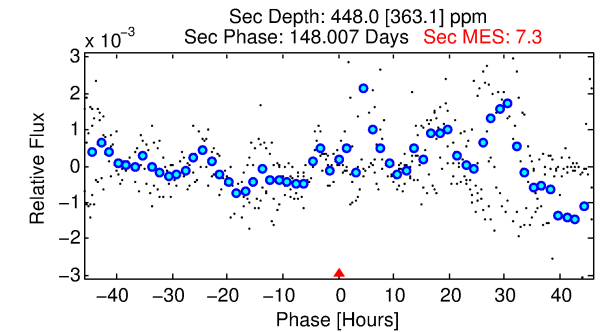
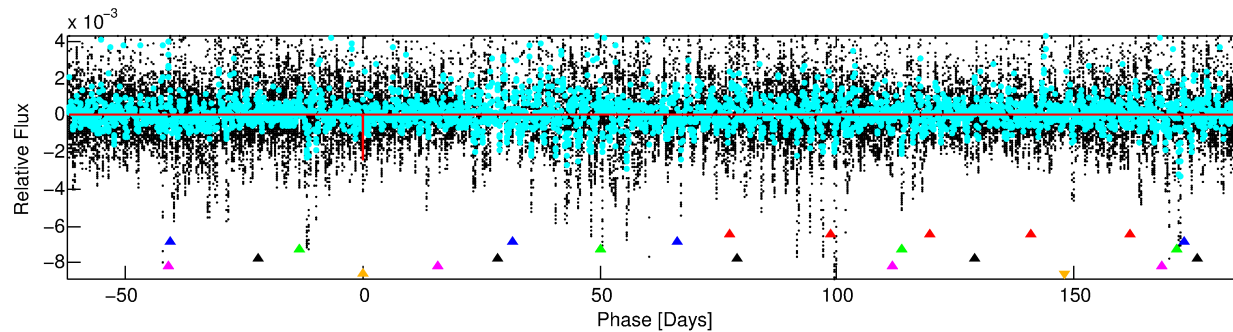
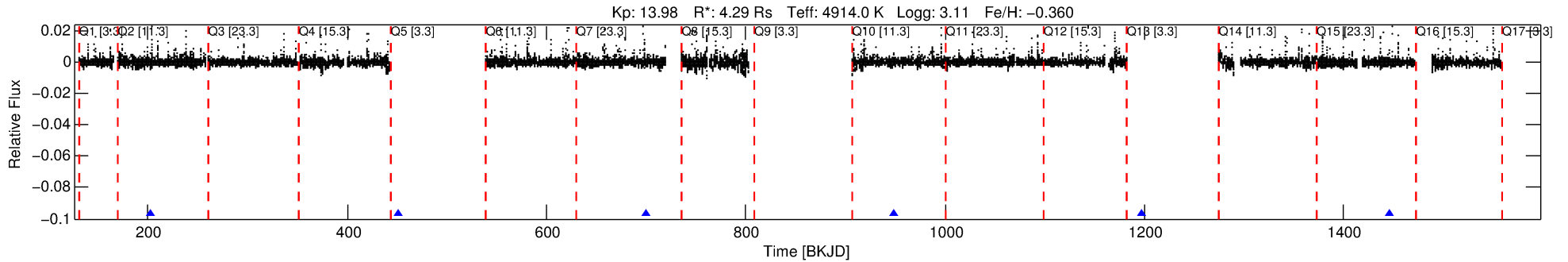
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 005428626-06

No Significant Match Found

# DV One-Page Summary

KIC: 5428626 Candidate: 6 of 6 Period: 248.604 d



## DV Fit Results:

Period = 248.60390 [0.00251] d  
Epoch = 203.3331 [0.0073] BKJD  
Rp/R\* = 0.0436 [0.0236]  
a/R\* = 258.61 [457.67]  
b = 0.00 [1244.55]  
Seff = 17.68 [12.93]  
Teq = 523 [96] K  
**Rp = 20.38 [16.53] Re**  
a = 0.7370 [0.3698] AU  
Ag = 322.26 [494.17] [0.65]  
Teffp = 3425 [1163] K [2.49]

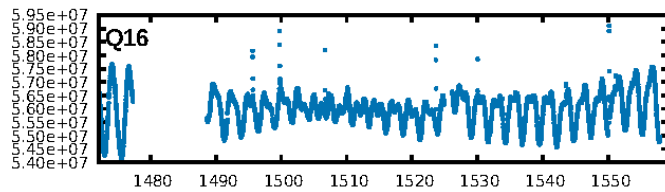
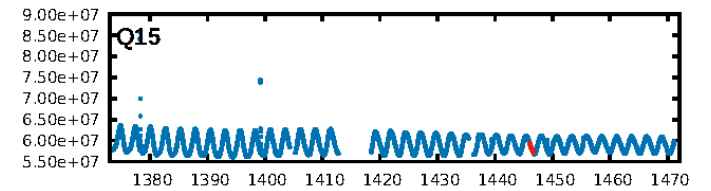
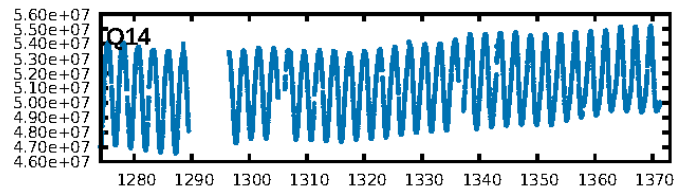
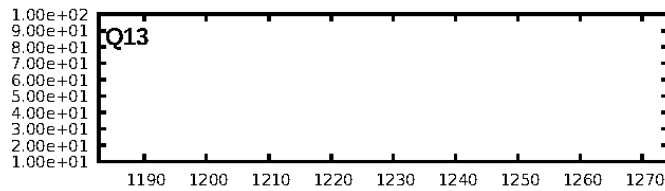
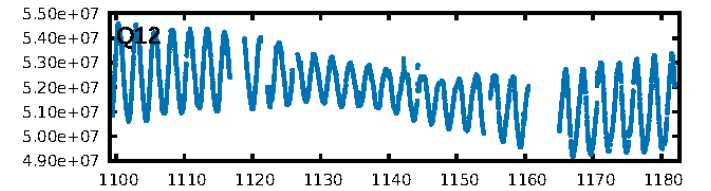
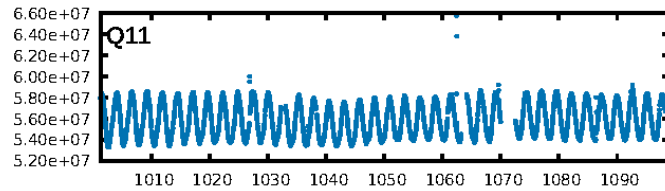
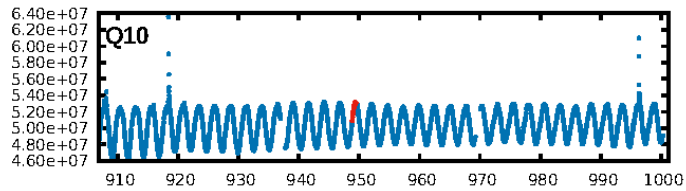
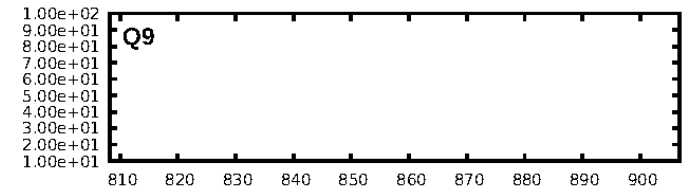
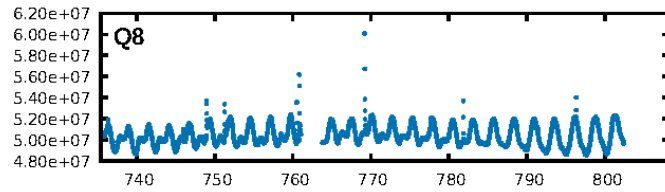
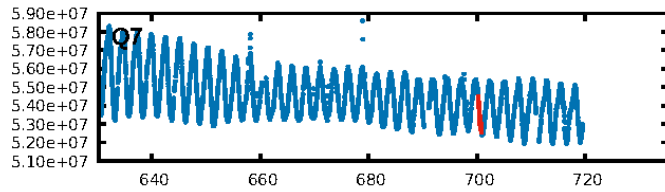
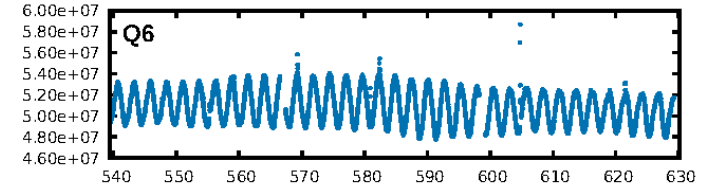
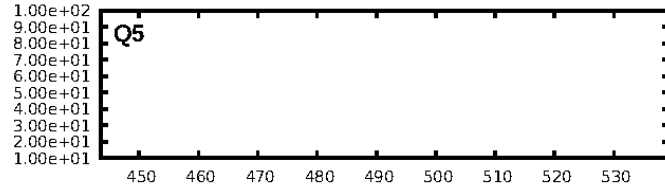
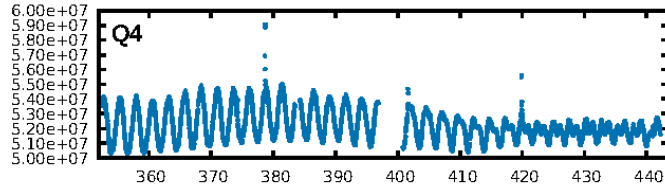
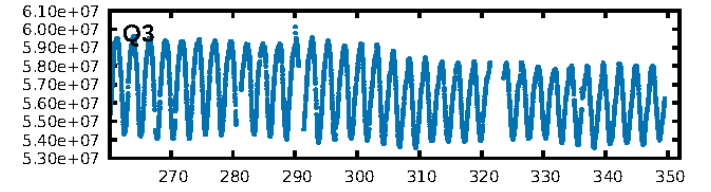
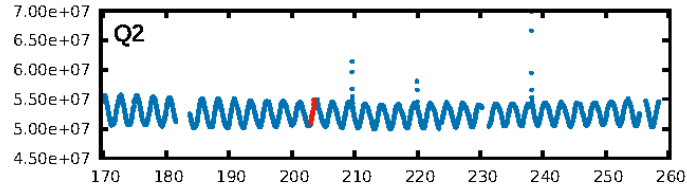
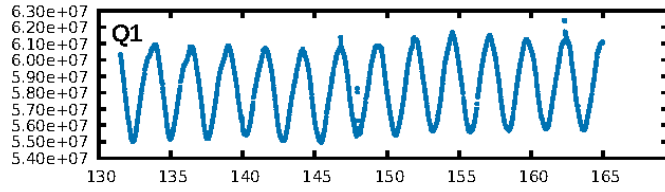
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [61.20]  
ModelChiSquare2-sig: 15.7%  
ModelChiSquareGof-sig: 90.5%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [4/4]  
**GhostDiagnostic-chr: 0.297**  
Centroid-sig: 34.4%  
Centroid-so: 0.096 arcsec [0.33]  
OotOffset-rm: 0.107 arcsec [0.34]  
OotOffset-st: 2/2/0/0 [4]  
KicOffset-rm: 0.018 arcsec [0.10]  
KicOffset-st: 2/2/0/0 [4]  
DiffImageQuality-fgm: 0.50 [2/4]  
DiffImageOverlap-fno: 1.00 [4/4]

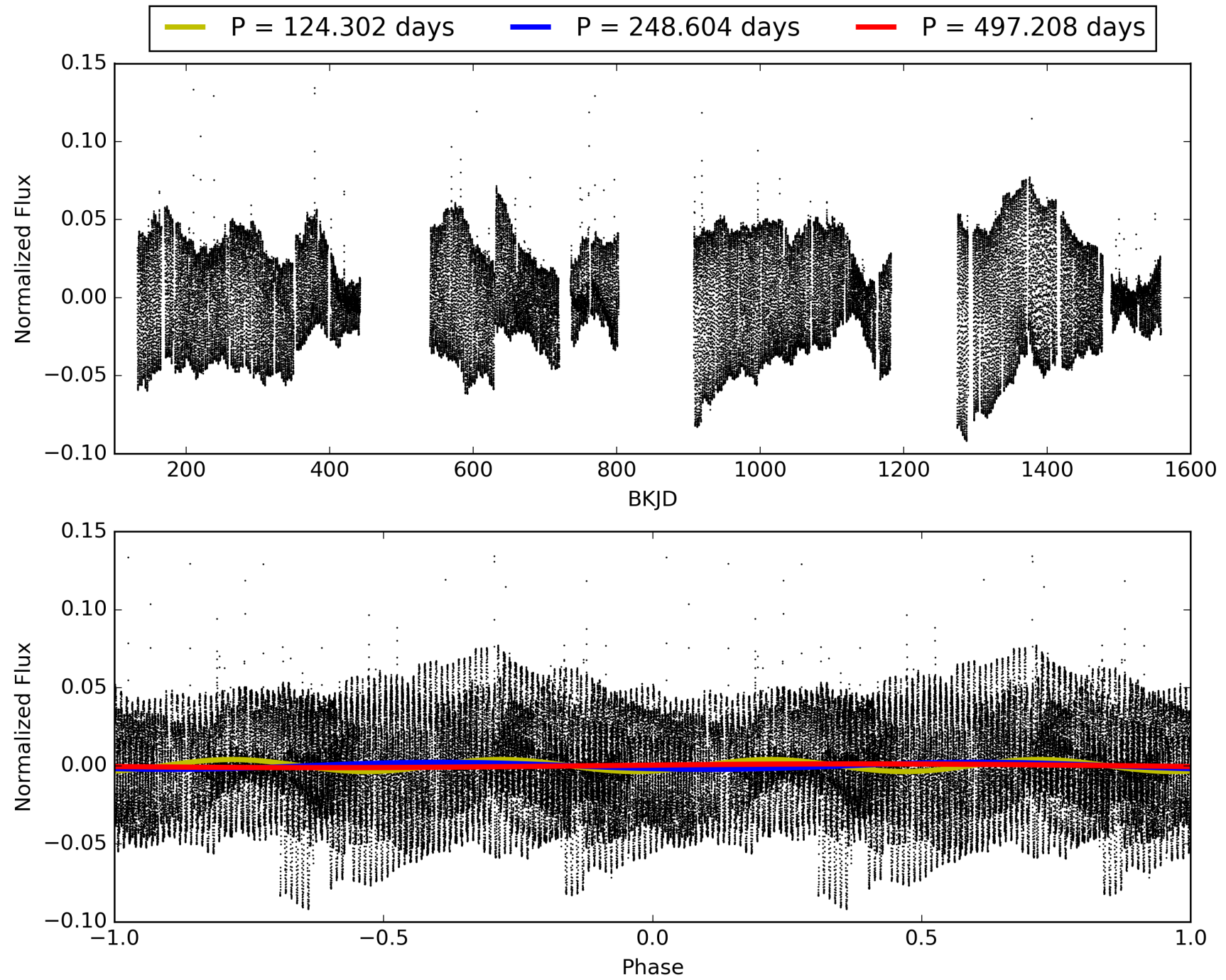
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 07:19:14 Z

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

# TCE 005428626-06, PDC Light Curves



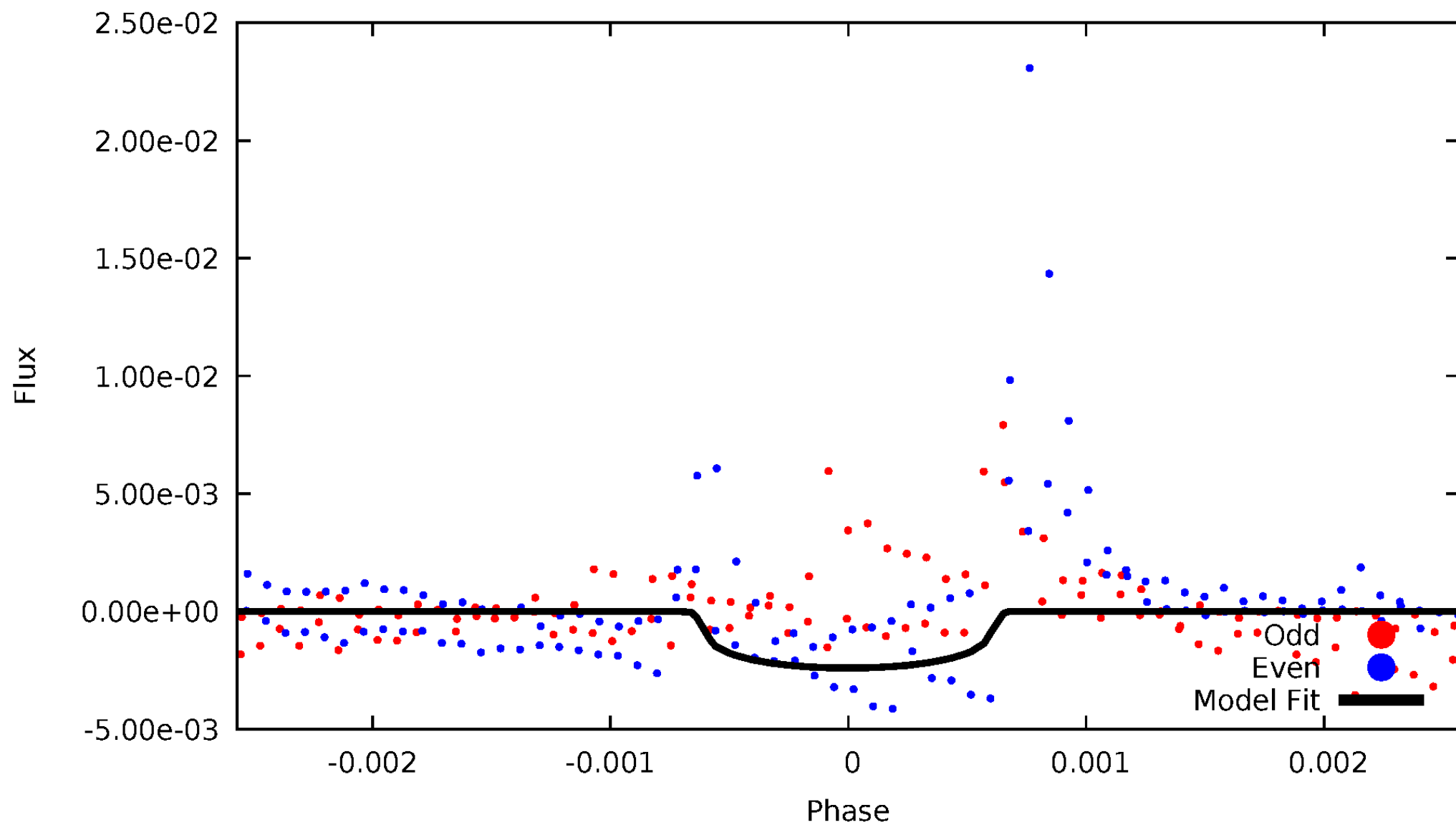
TCE 005428626-06





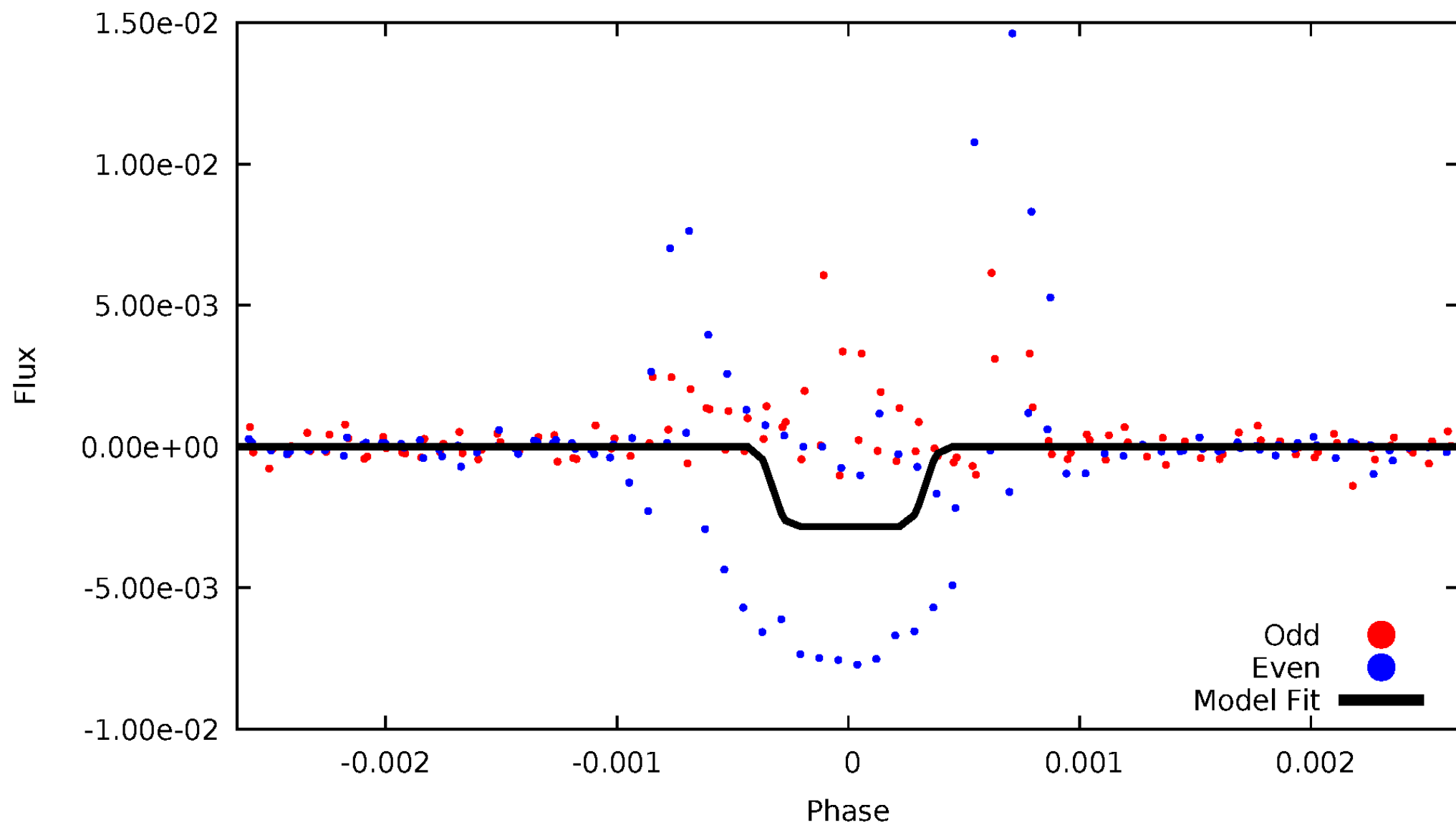
# DV Odd/Even

TCE 005428626-06



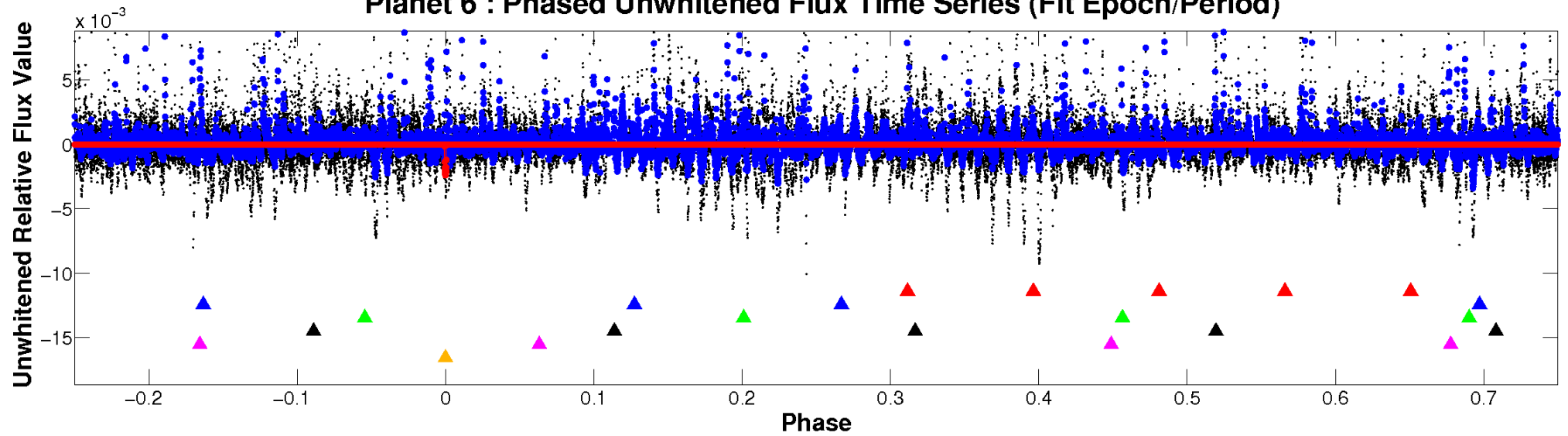
# ALT Odd/Even

TCE 005428626-06

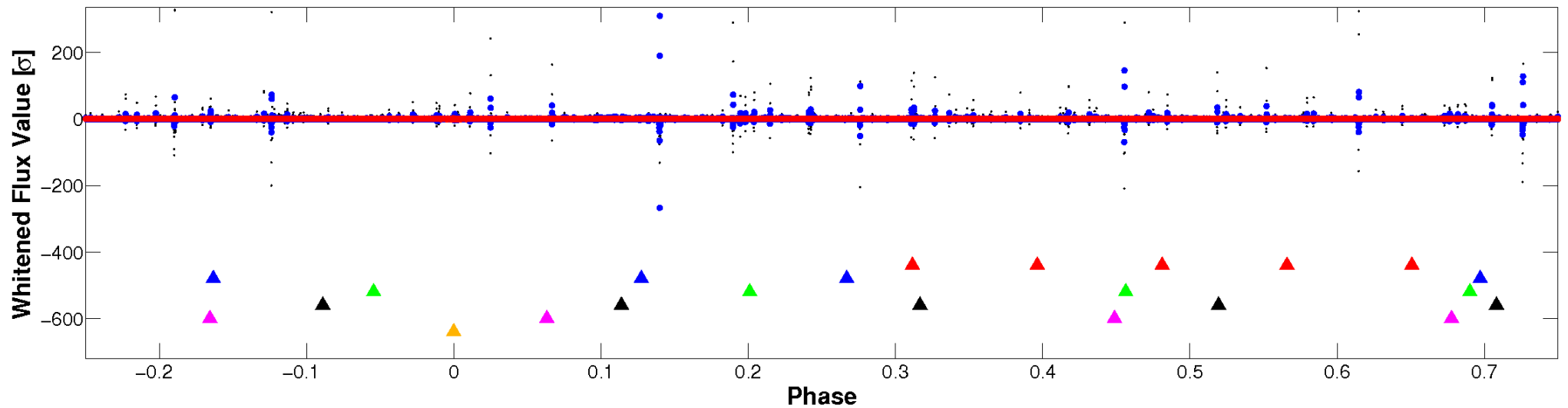


# Non-Whitened Vs. Whitened Light Curve

## Planet 6 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

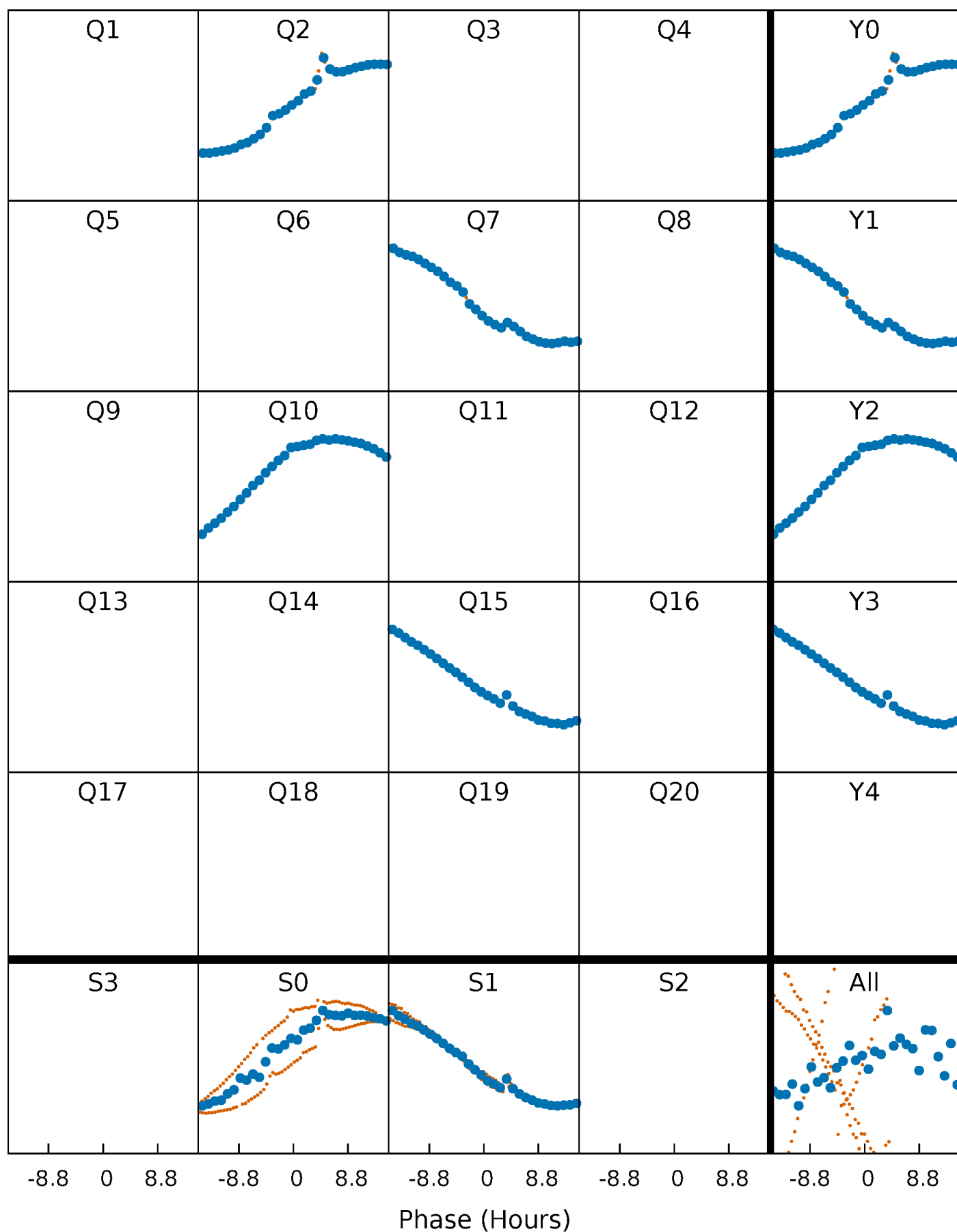


## Planet 6 : Phased Whitened Flux Time Series (Fit Epoch/Period)



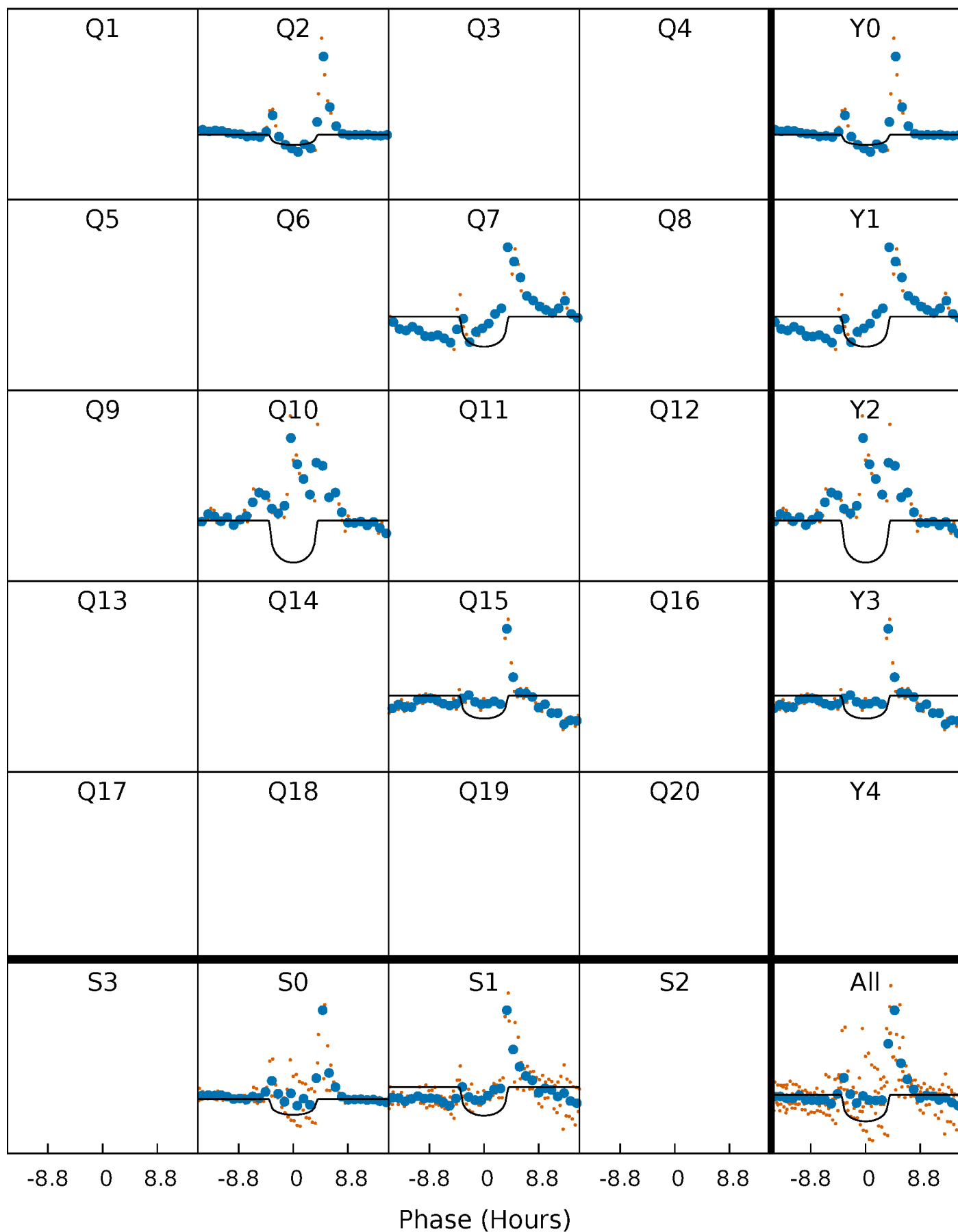
# PDC Quarter-Phased Transit Curves

TCE 005428626-06 P=248.603897 Days  $T_0=203.333097$  (BKJD)



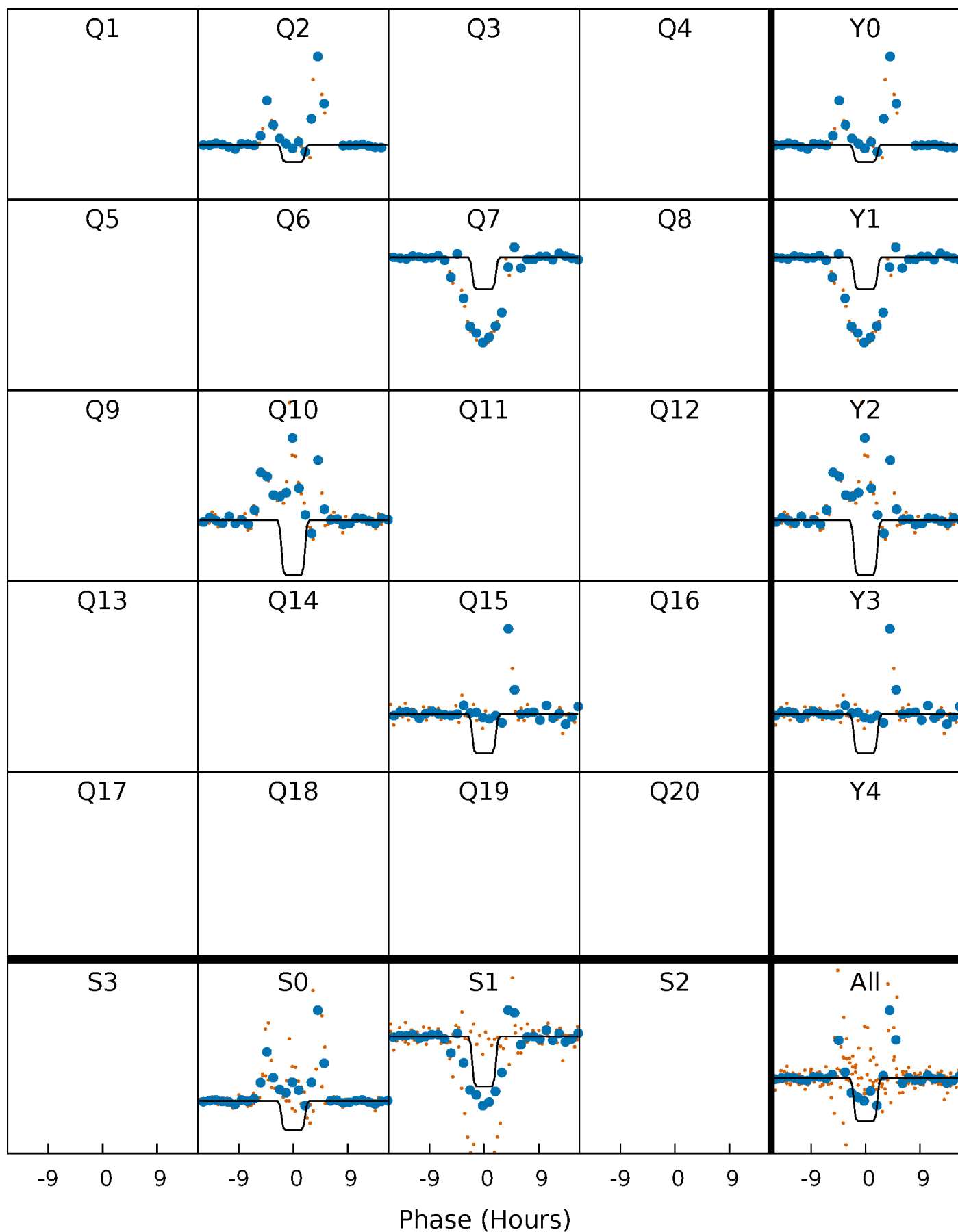
# DV Quarter-Phased Transit Curves

TCE 005428626-06 P=248.603897 Days  $T_0=203.333097$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

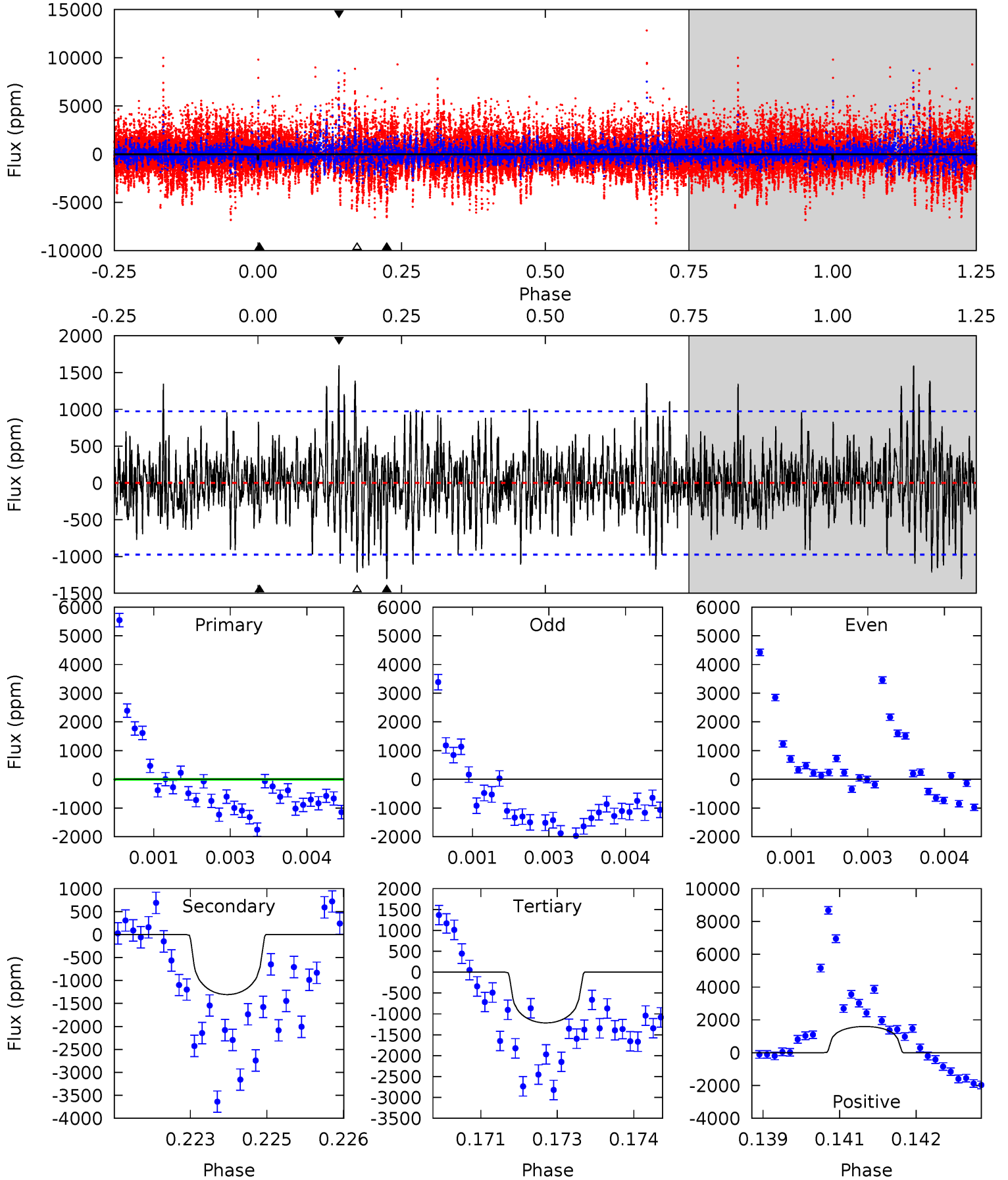
TCE 005428626-06 P=248.594691 Days  $T_0=203.366543$  (BKJD)



# DV Model-Shift Uniqueness Test

005428626-06, P = 248.603897 Days, E = 203.333097 Days

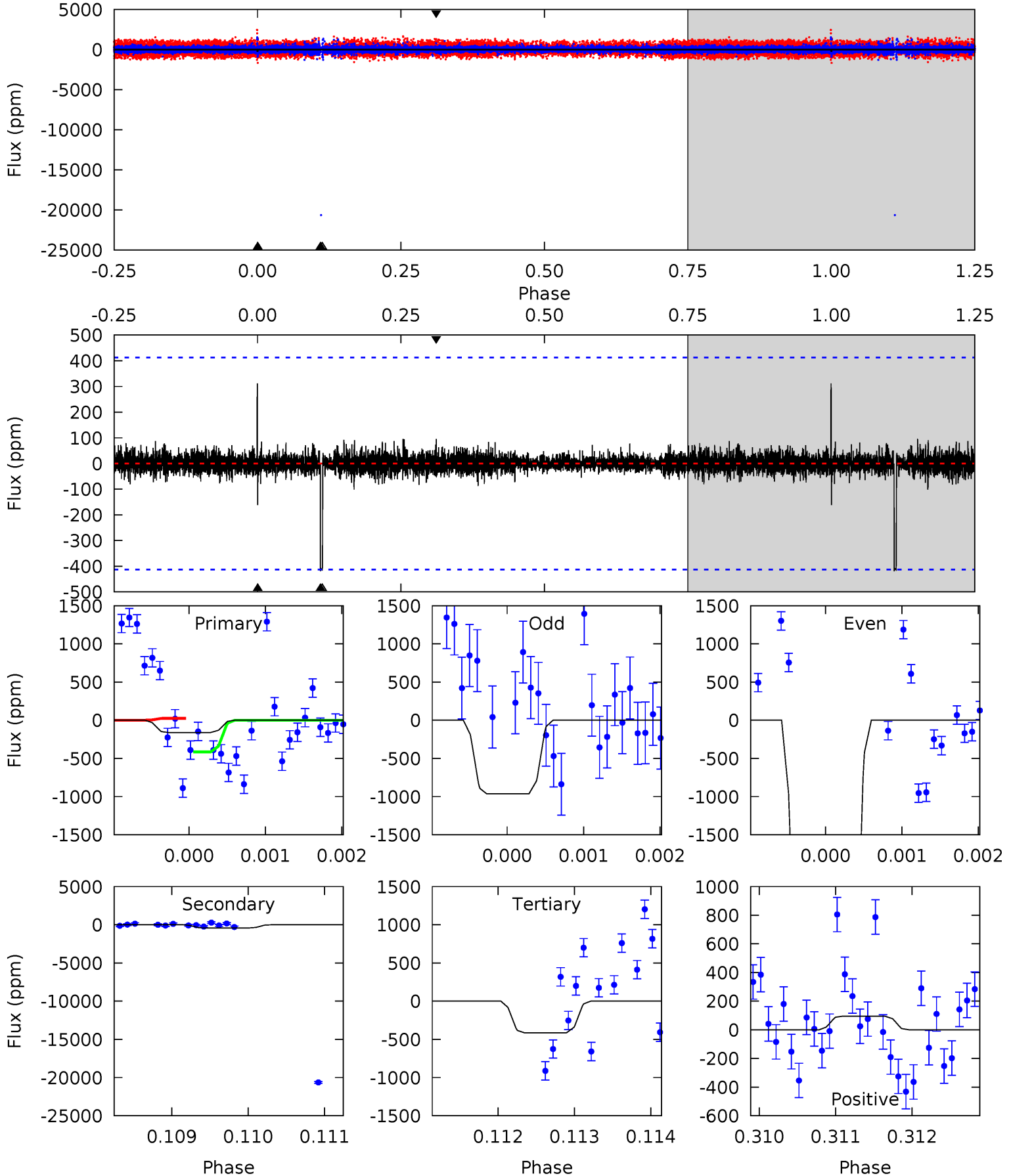
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
3.03	7.25	6.74	8.85	5.40	3.21	1.92	-3.71	-5.82	0.50	-1.60	1.96	0.44	0.55	0.30



# Alt Model-Shift Uniqueness Test

005428626-06, P = 248.594691 Days, E = 203.366543 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
2.15	5.58	5.52	1.27	5.50	3.37	0.30	-3.37	0.88	0.07	4.31	29.4	8.18	0.43	0





### Stellar Parameters For KIC 005428626

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4914^{+149}_{-112}$	$3.110^{+0.390}_{-0.319}$	$-0.360^{+0.250}_{-0.250}$	$4.287^{+2.589}_{-1.394}$	$0.862^{+0.316}_{-0.097}$	$0.015^{+0.037}_{-0.011}$
	+3%/-2%	+13%/-10%	+69%/-69%	+60%/-33%	+37%/-11%	+243%/-70%
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 005428626-06 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-1307 \pm 180$	$19.81^{+13.46}_{-10.19}$	$722^{+109}_{-77}$	$4555^{+1604}_{-659}$	$1027^{+3278}_{-659}$
Alt.	$-419 \pm 75$	$24.53^{+14.76}_{-11.09}$	$721^{+99}_{-79}$	$3474^{+709}_{-394}$	$210^{+531}_{-130}$

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

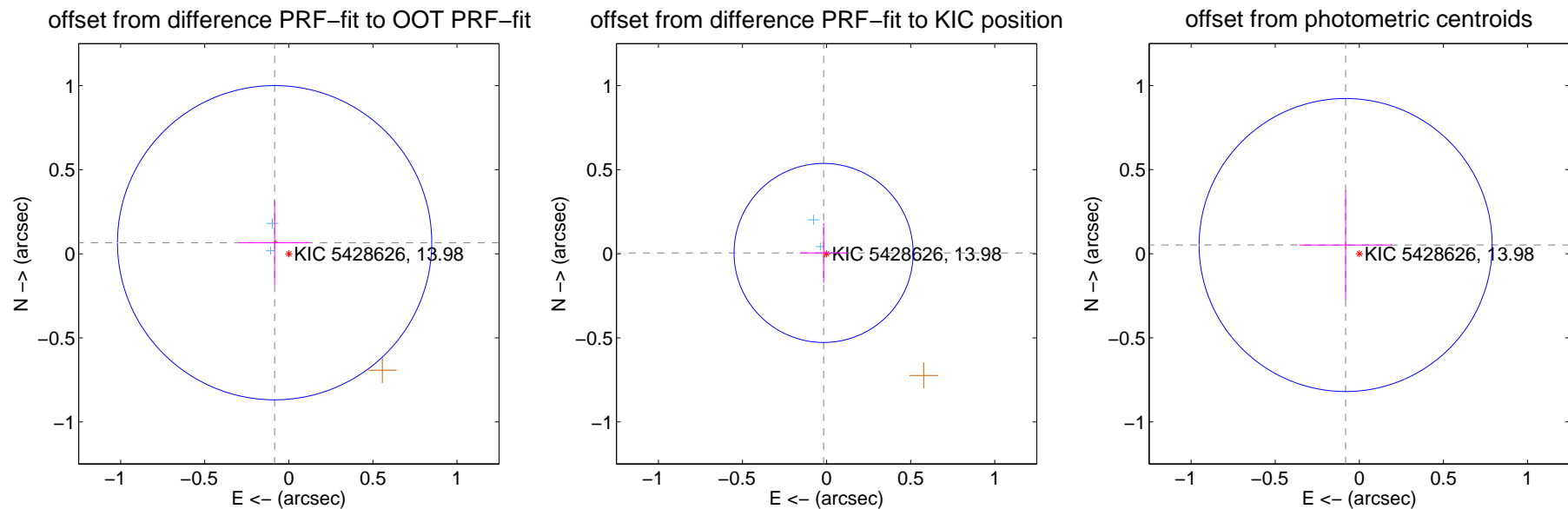
## DV Centroid Data

Supplemental centroid analysis for 005428626-06. Kepler magnitude: 13.98. Transit SNR 7.42

There are 2 quarters with good PRF difference image offsets

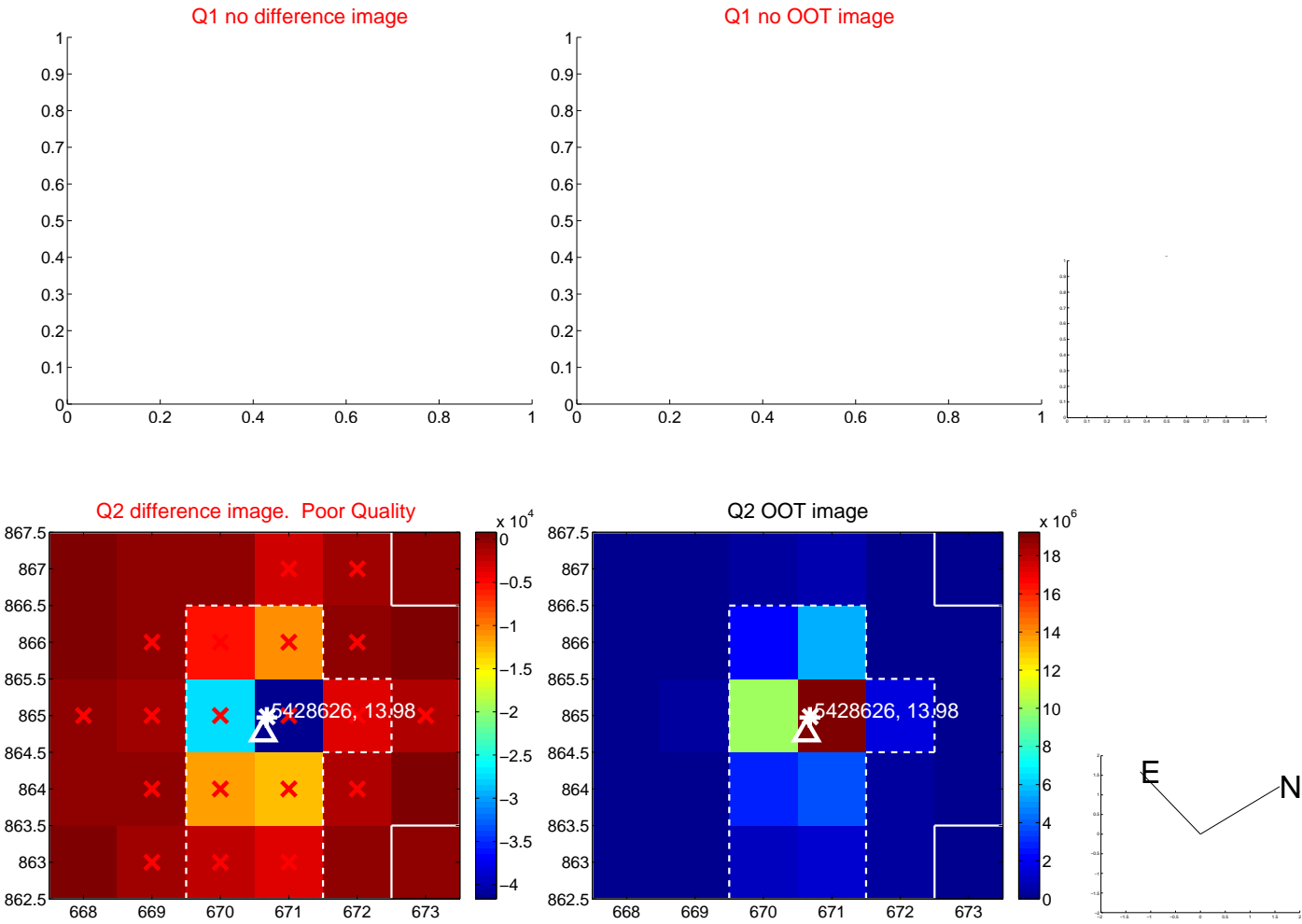
The direct PRF centroid is offset from the target star catalog position by about 0.03 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.107 \pm 0.312$	0.34	$0.084 \pm 0.210$	$0.066 \pm 0.250$
PRF-fit source offset from KIC position	$0.018 \pm 0.178$	0.10	$0.018 \pm 0.142$	$0.005 \pm 0.177$
photometric centroid source offset	$0.10 \pm 0.29$	0.33	$0.08 \pm 0.28$	$0.05 \pm 0.32$

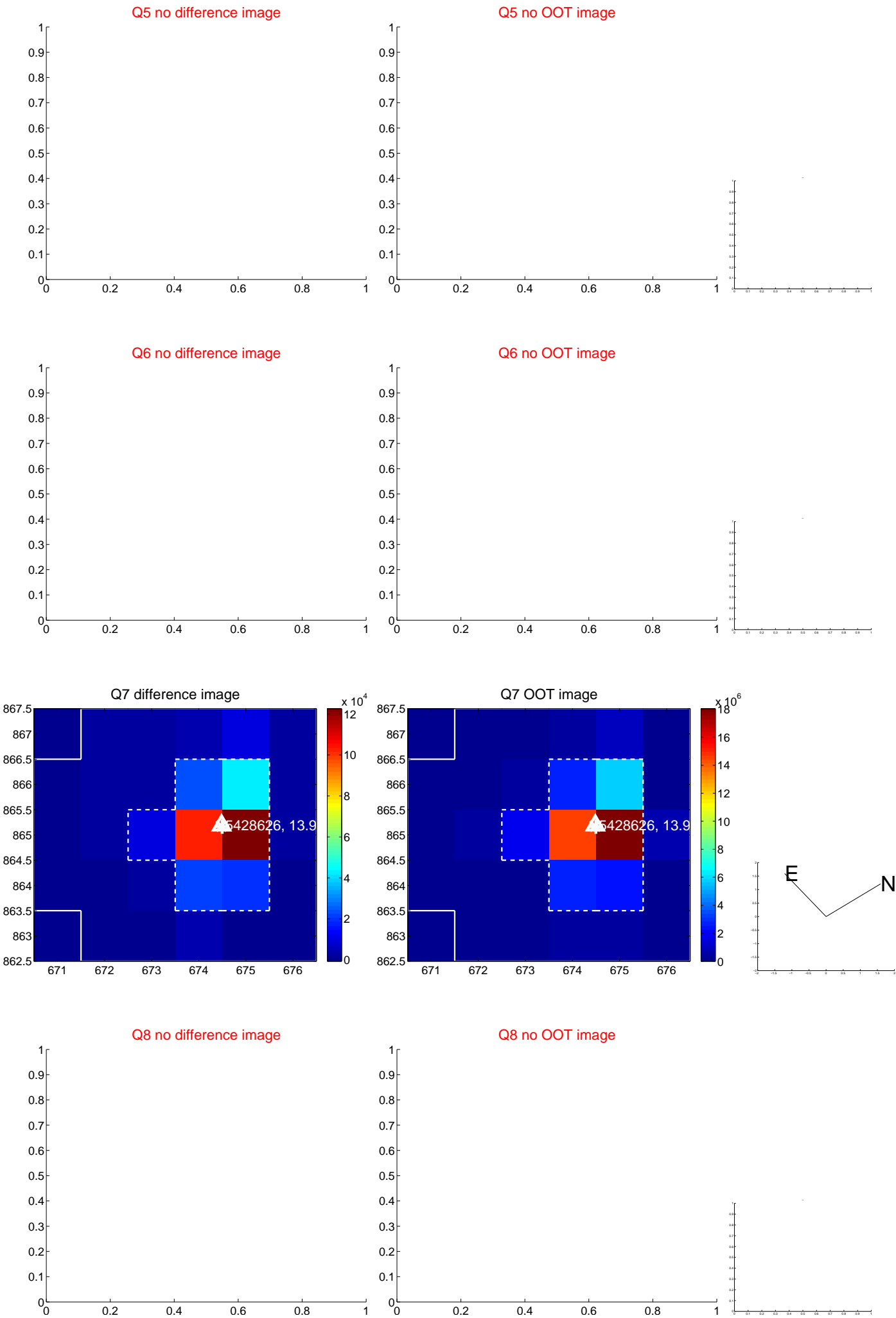


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

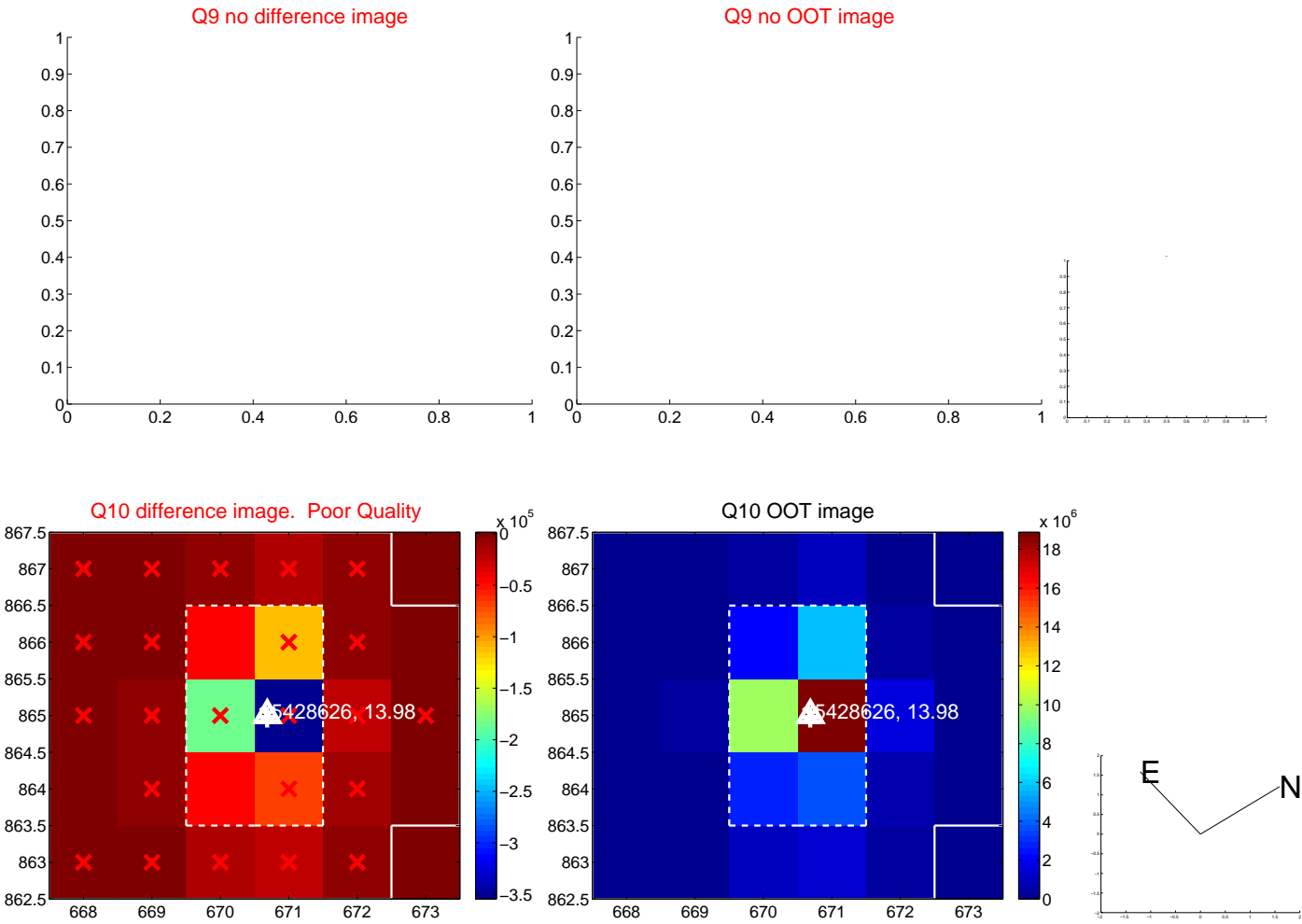
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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.

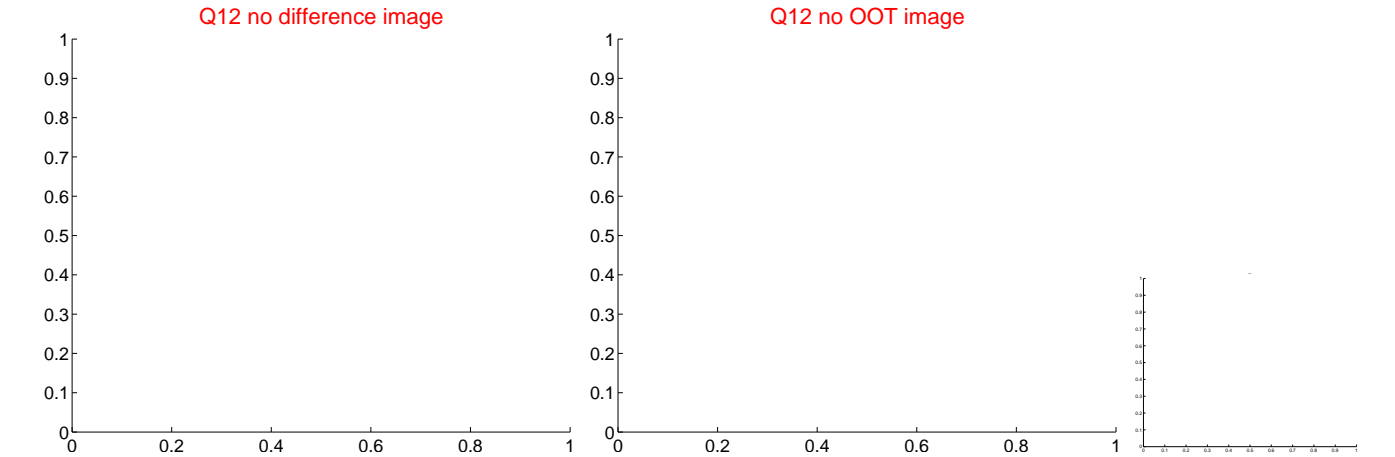
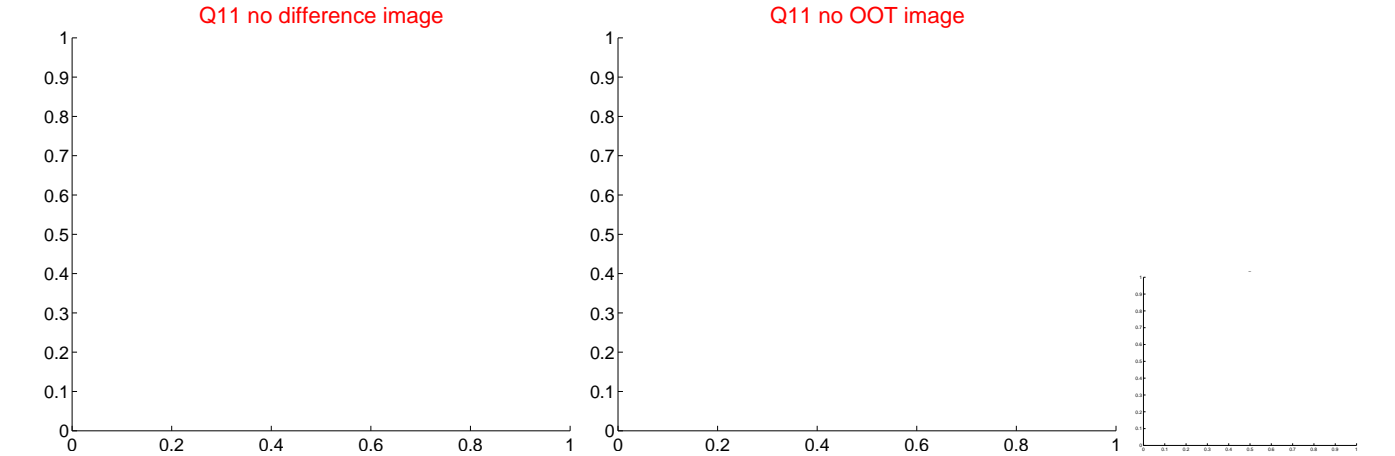


Q10 difference image. Poor Quality

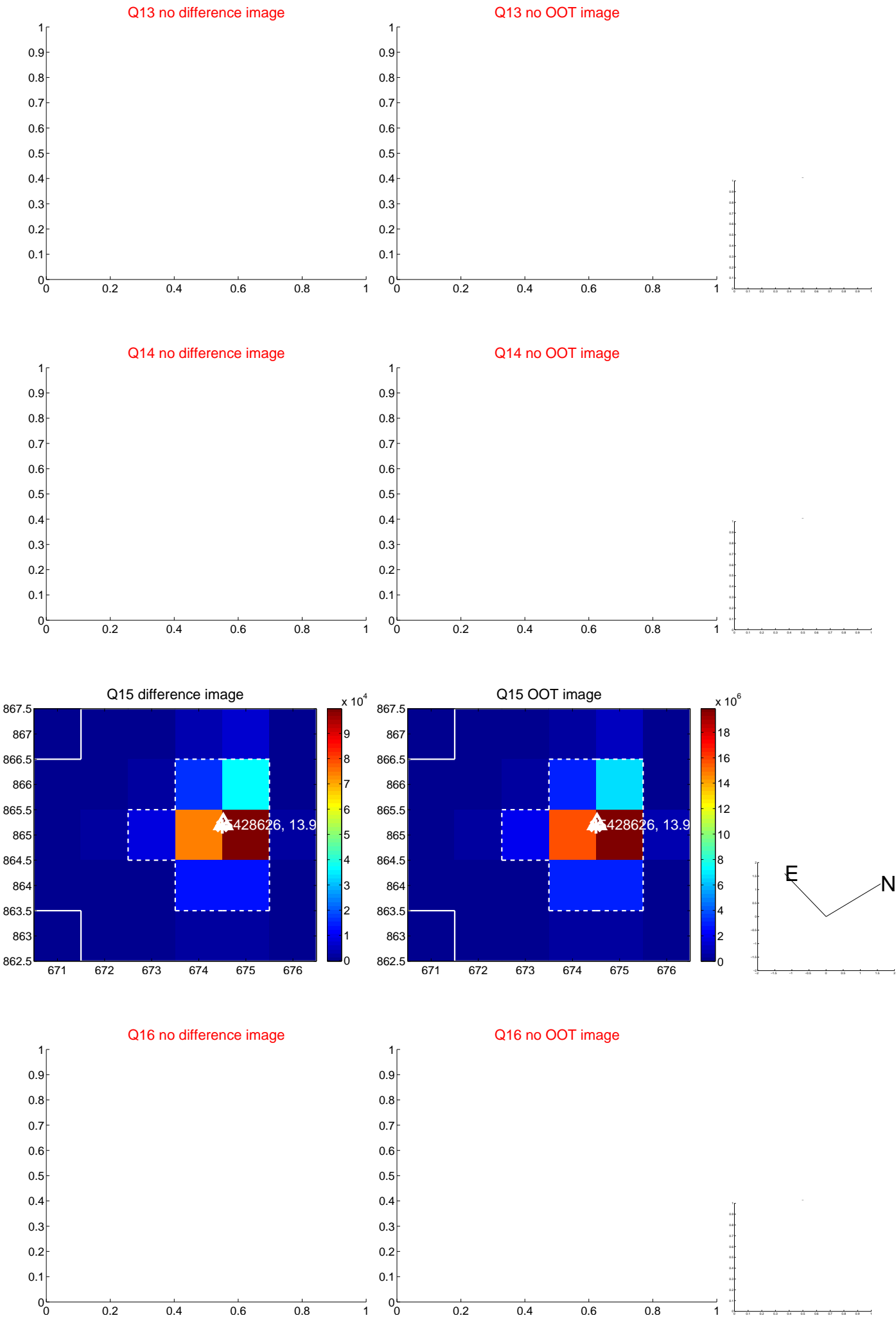
Q10 OOT image

E

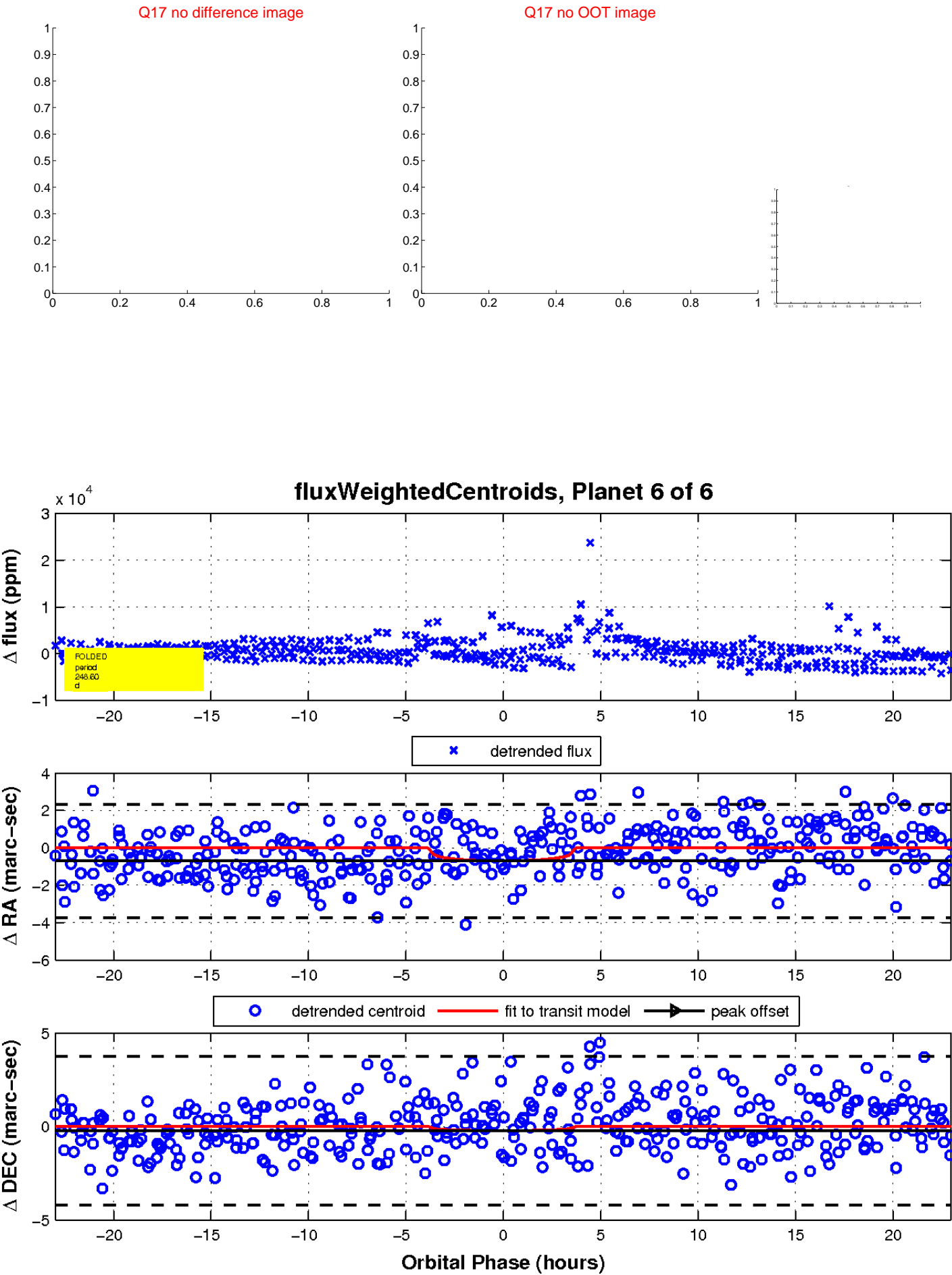
N



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

