

# KIC 006228371

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006228371-01	OBS	No	1.945627	132.146664	44.7	13.115	11.5	6.2	4.59	7810	3.12	42269.19
006228371-02	OBS	No	44.354229	153.726345	1084.4	2.383	16.8	13.4	4.59	7810	16.23	653.92
006228371-03	OBS	No	87.142109	142.860482	953.0	6.176	14.1	14.7	4.59	7810	17.81	265.75
006228371-04	OBS	No	23.181307	148.780900	531.2	3.350	14.2	12.8	4.59	7810	12.15	1553.29
006228371-05	OBS	No	10.097525	138.381023	480.5	2.586	13.8	14.5	4.59	7810	12.24	4704.18
006228371-06	OBS	No	274.253538	267.743426	1339.7	69.177	12.6	9.9	4.59	7810	16.93	57.62
006228371-07	OBS	No	11.997651	136.206884	292.4	6.758	12.3	10.9	4.59	7810	8.74	3738.02

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006228371-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT
006228371-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
006228371-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
006228371-04	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
006228371-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
006228371-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
006228371-07	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—HALO_GHOST

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

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

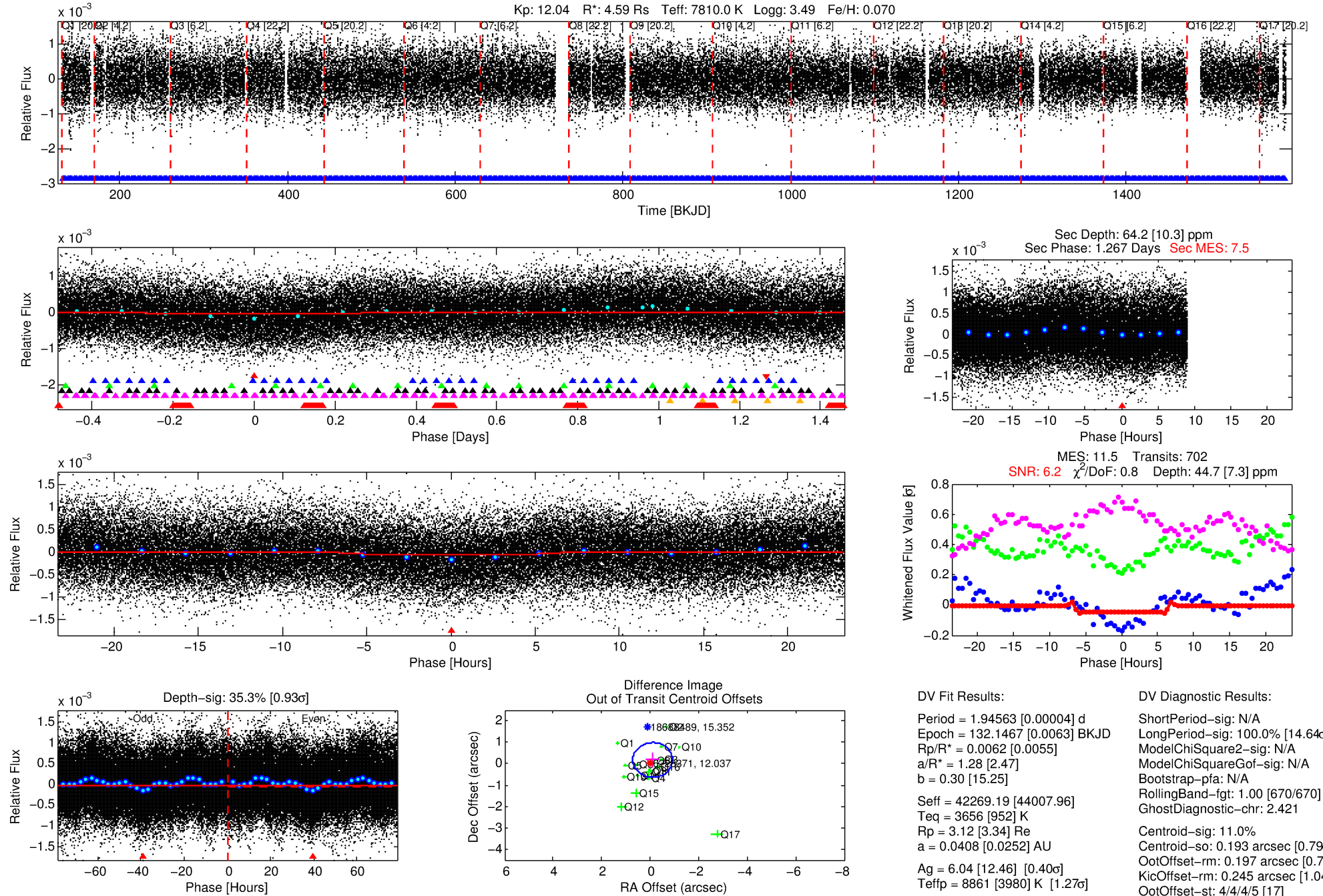
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 006228371-01

No Significant Match Found

# DV One-Page Summary

KIC: 6228371 Candidate: 1 of 7 Period: 1.946 d



## DV Fit Results:

Period = 1.94563 [0.00004] d  
Epoch = 132.1467 [0.0063] BKJD  
Rp/R\* = 0.0062 [0.0055]  
a/R\* = 1.28 [2.47]  
b = 0.30 [15.25]  
Seff = 42269.19 [44007.96]  
Teff = 3656 [952] K  
Rp = 3.12 [3.34] Re  
a = 0.0408 [0.0252] AU  
Ag = 6.04 [12.46] [0.40 $\sigma$ ]  
Teffp = 8861 [3980] K [1.27 $\sigma$ ]

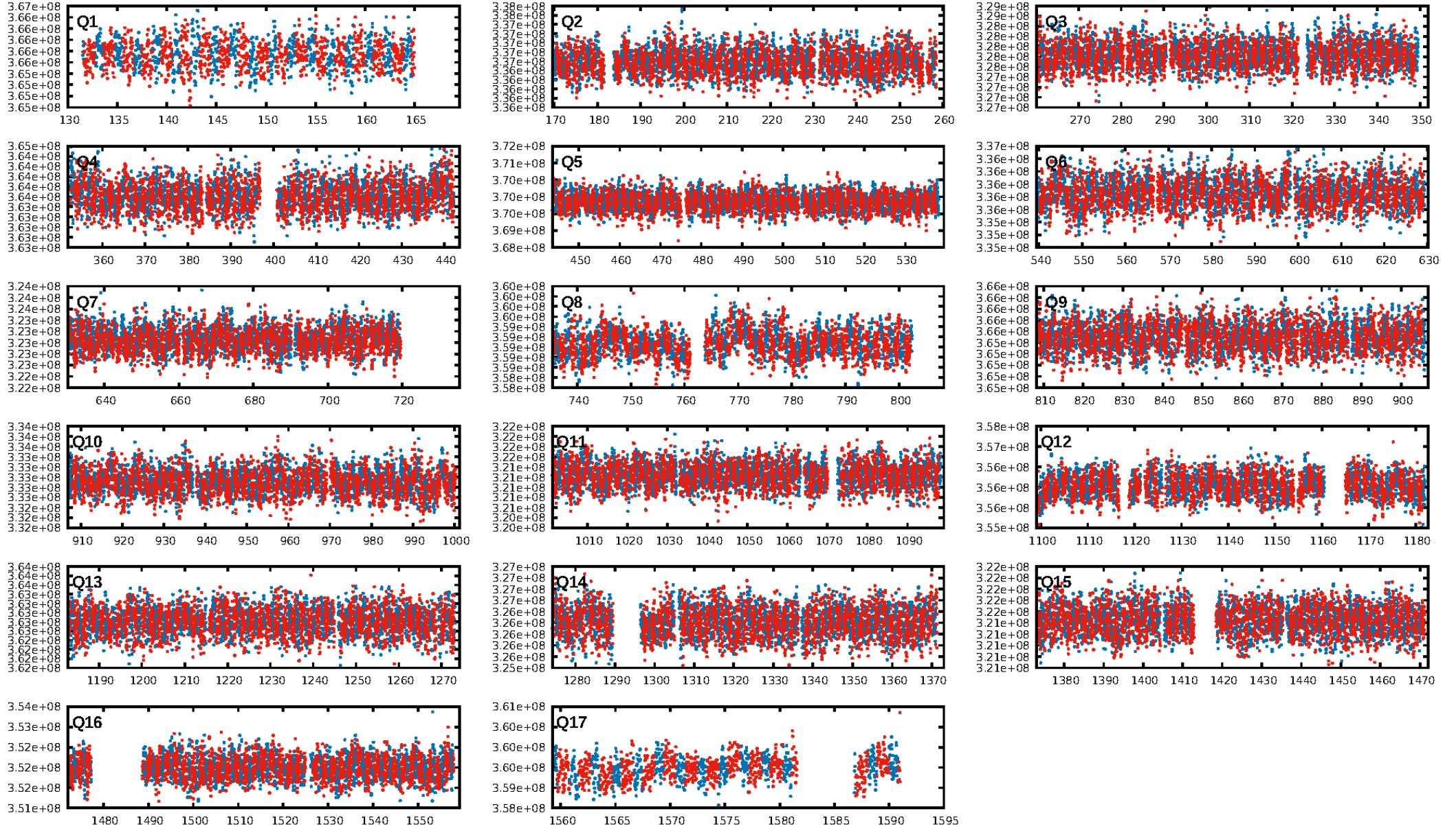
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [14.64 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [670/670]  
GhostDiagnostic-chr: 2.421  
Centroid-sig: 11.0%  
Centroid-so: 0.193 arcsec [0.79 $\sigma$ ]  
OotOffset-rm: 0.197 arcsec [0.73 $\sigma$ ]  
KicOffset-rm: 0.245 arcsec [1.04 $\sigma$ ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 0.94 [16/17]  
DiffImageOverlap-fno: 1.00 [17/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 06:04:05 Z

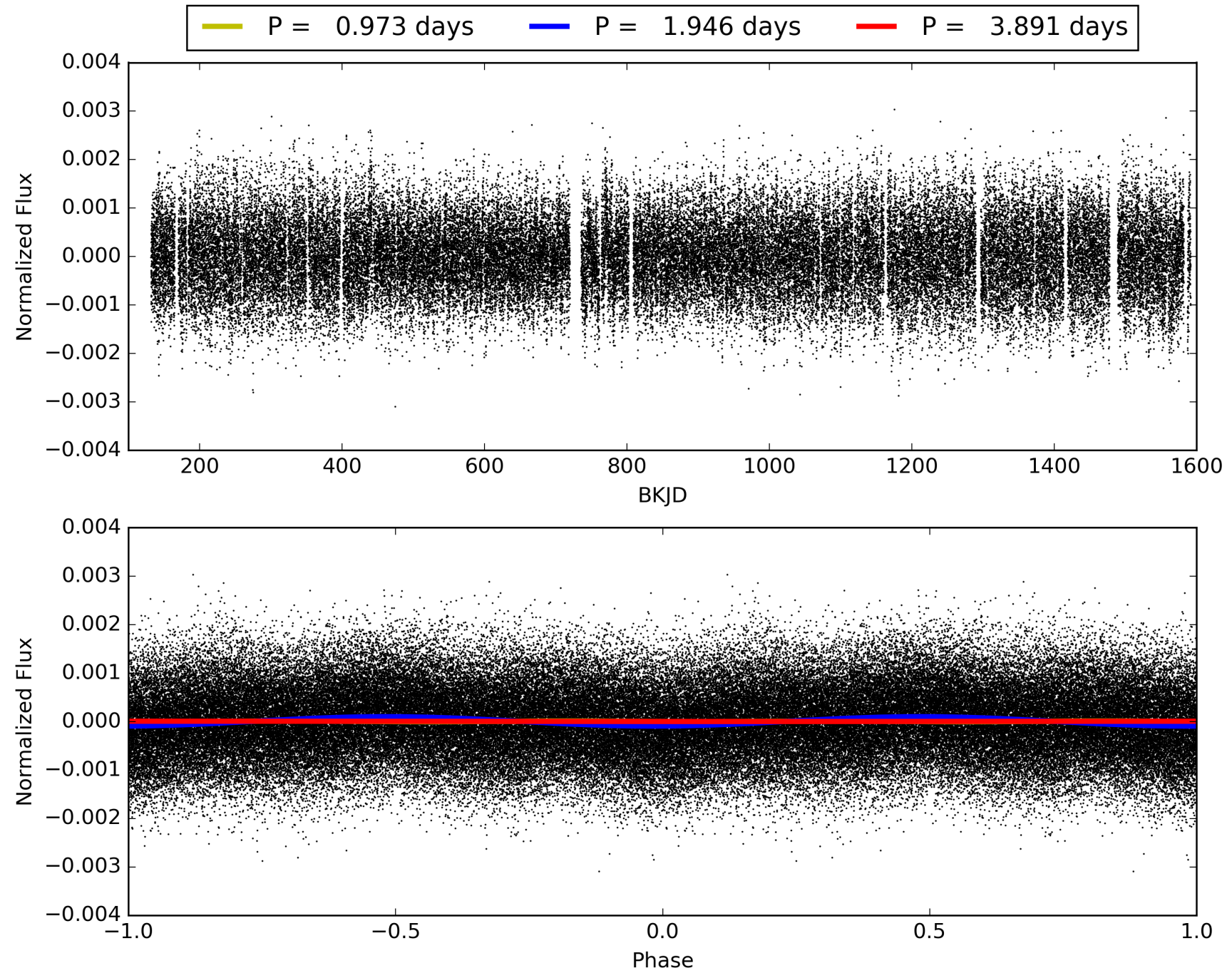
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 006228371-01, PDC Light Curves





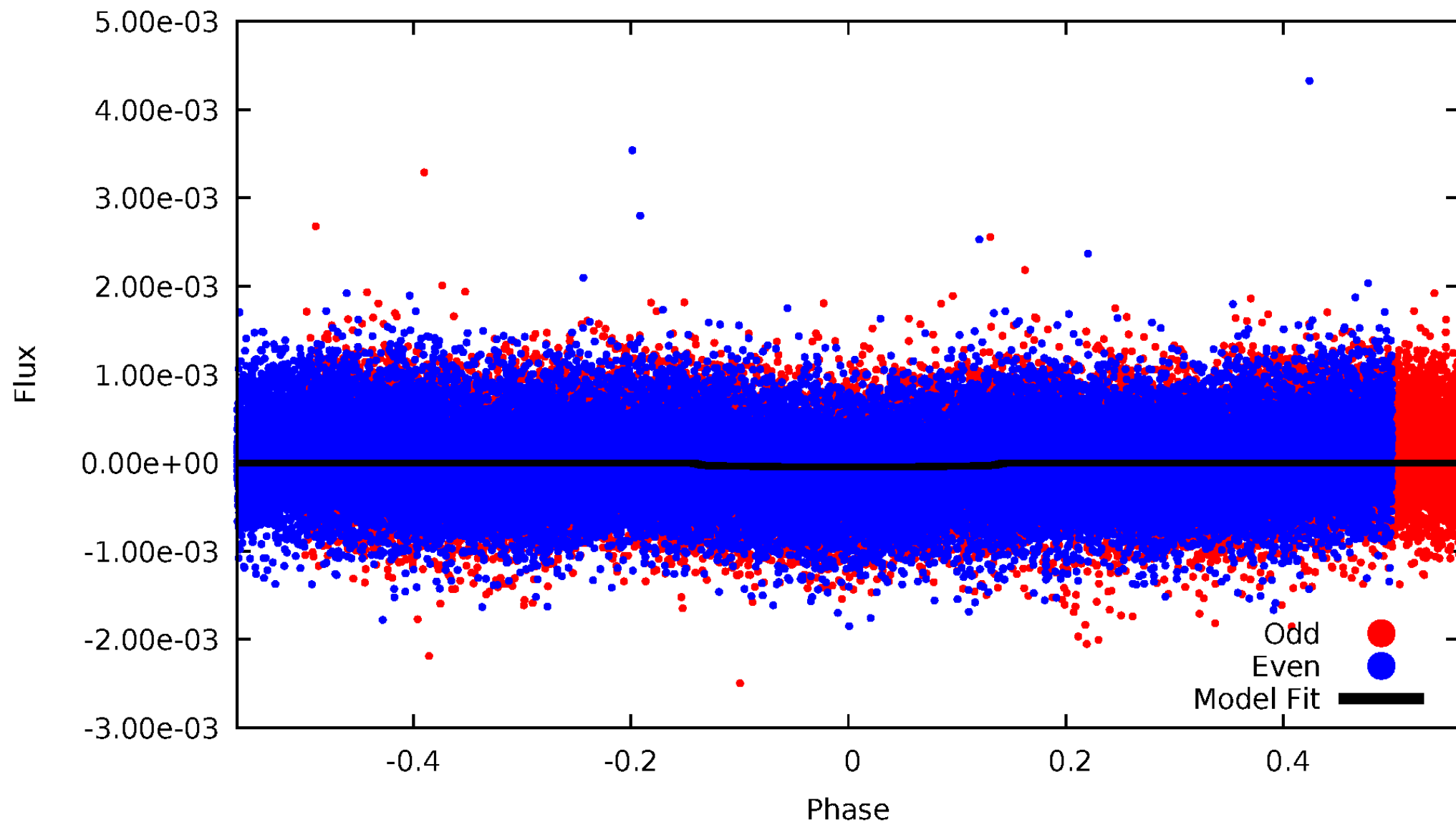
TCE 006228371-01





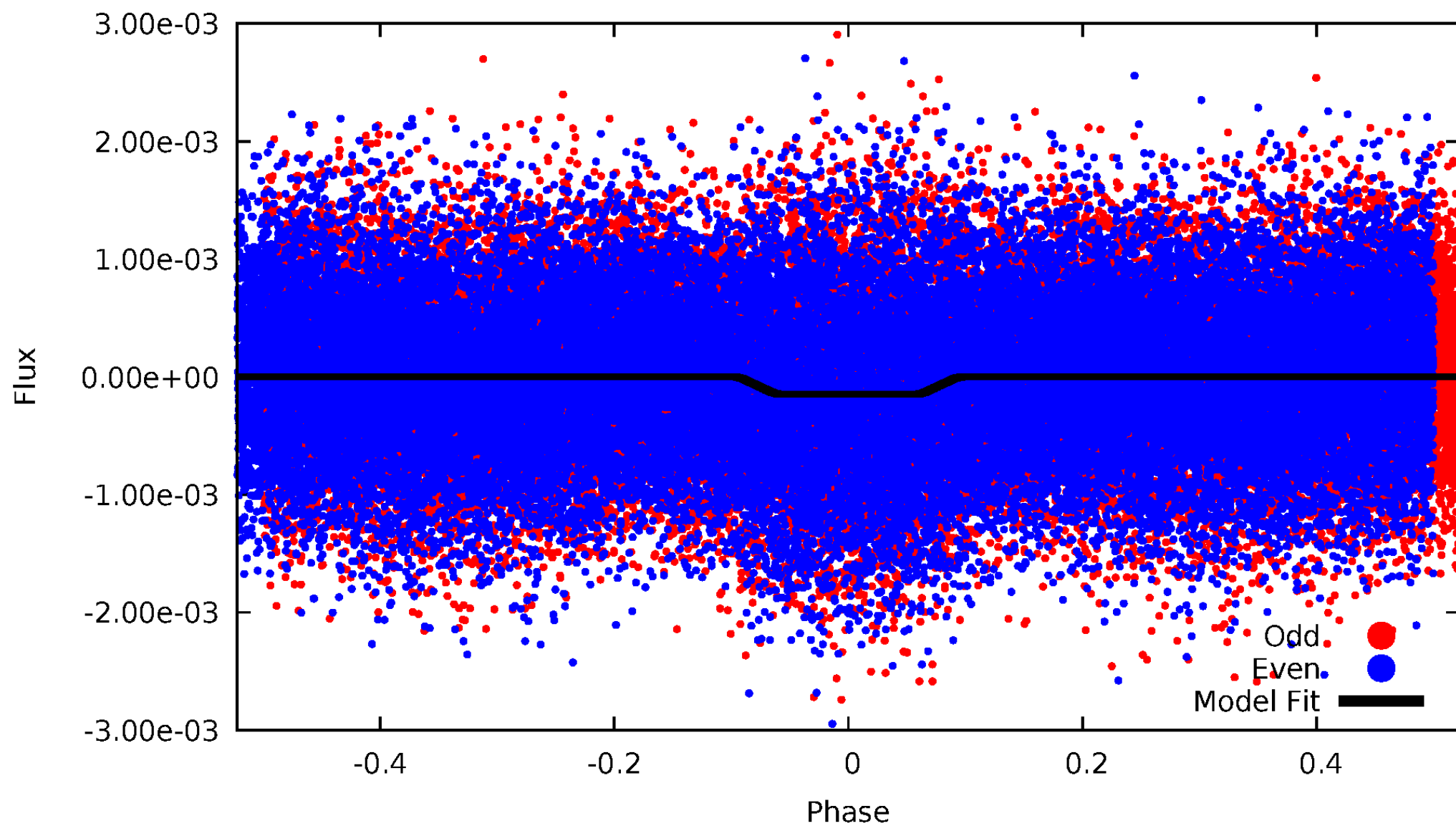
# DV Odd/Even

TCE 006228371-01



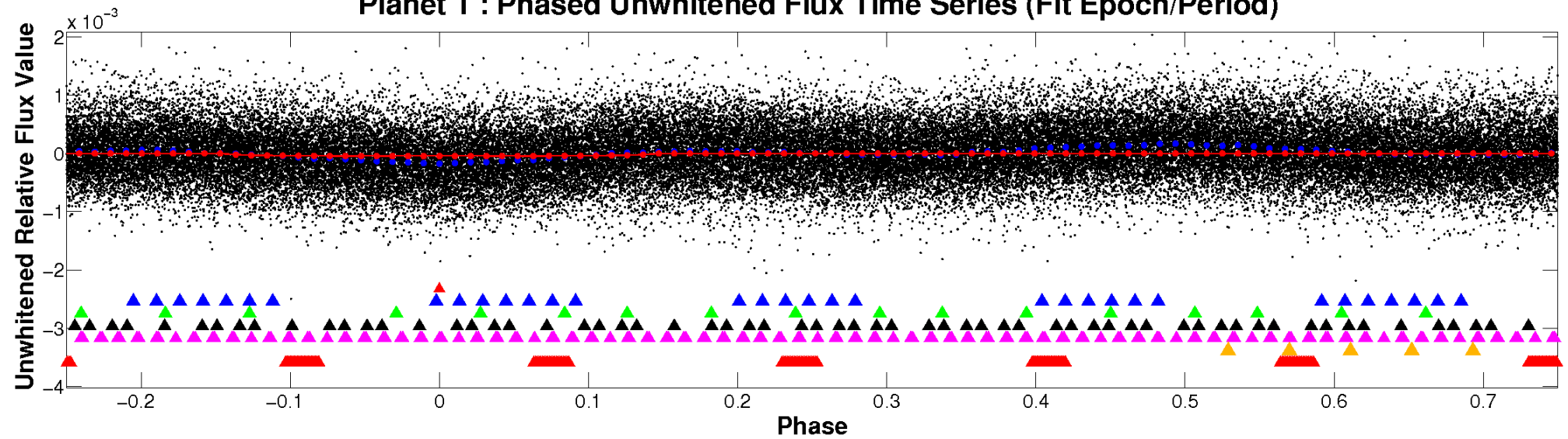
# ALT Odd/Even

TCE 006228371-01

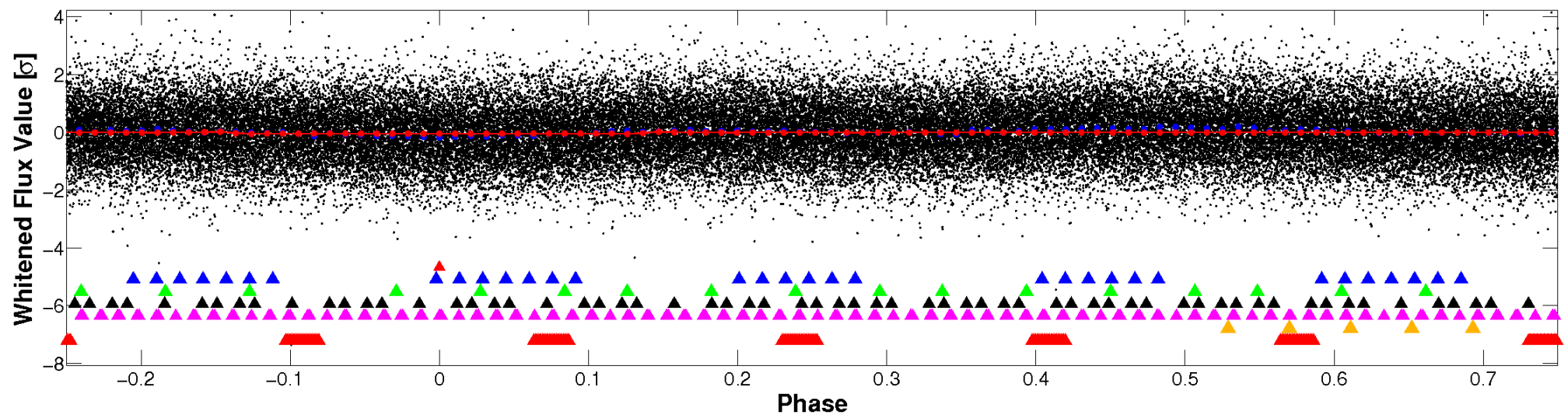


# Non-Whitened Vs. Whitened Light Curve

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



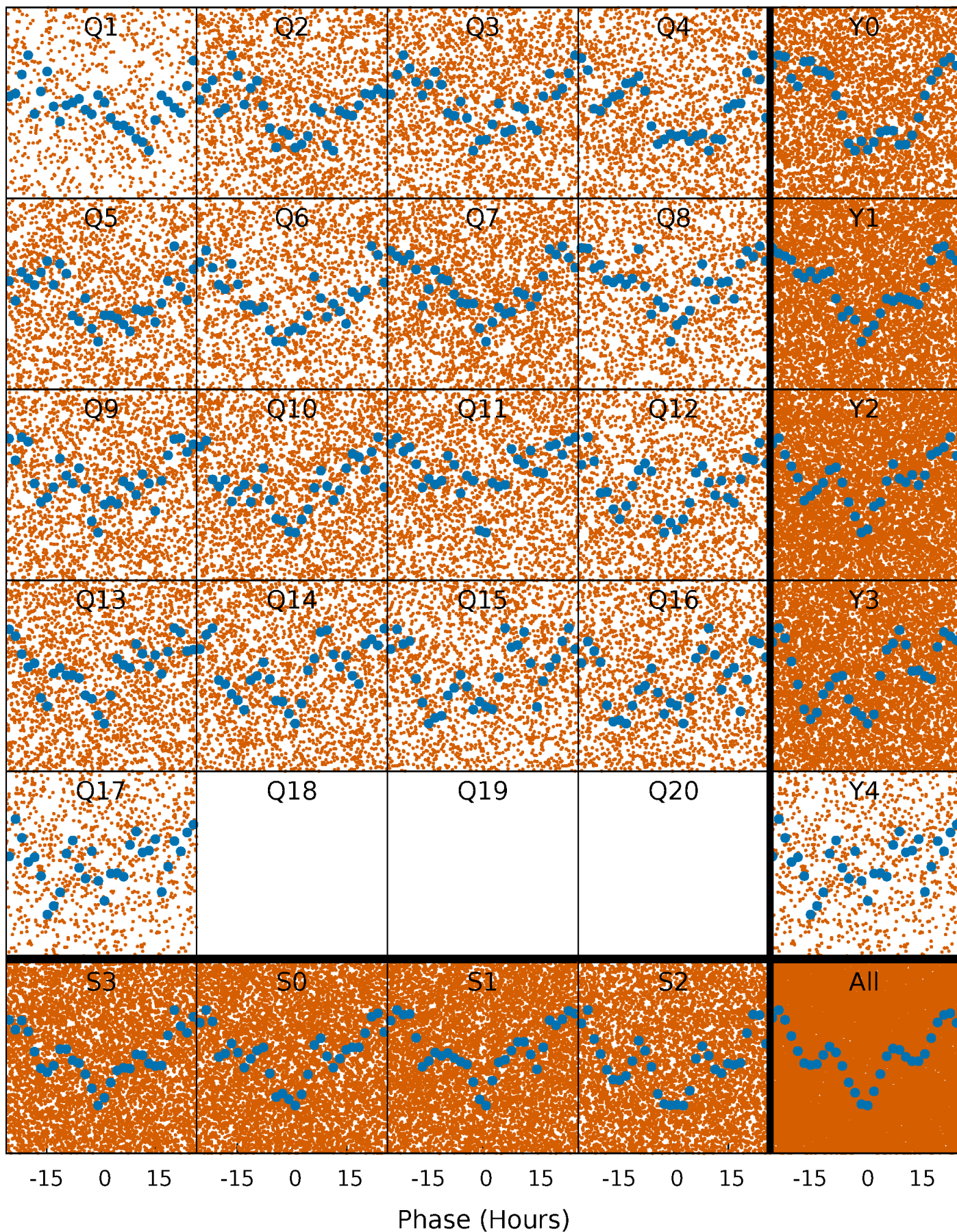
Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)





# PDC Quarter-Phased Transit Curves

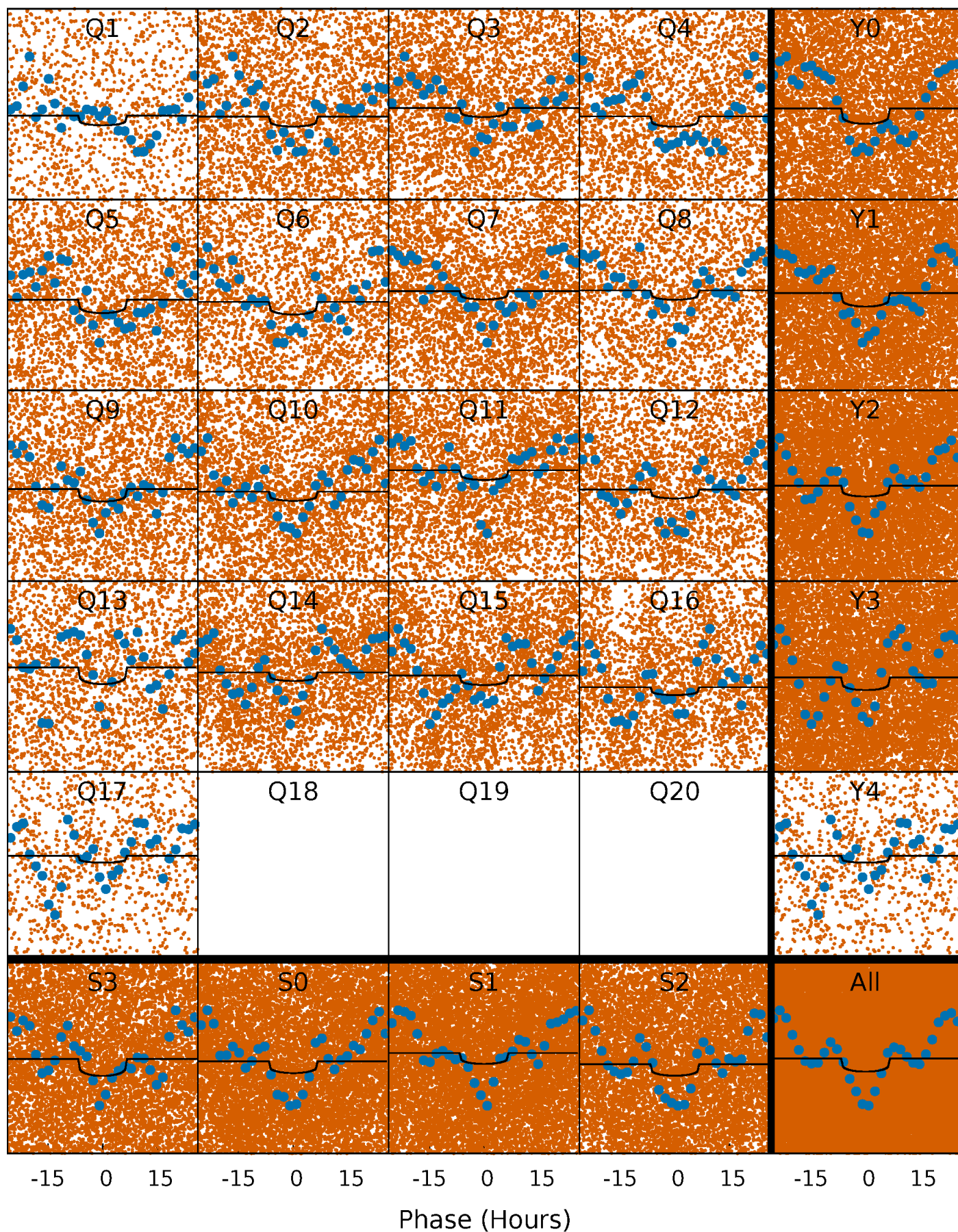
TCE 006228371-01 P= 1.945627 Days  $T_0=132.146664$  (BKJD)





# DV Quarter-Phased Transit Curves

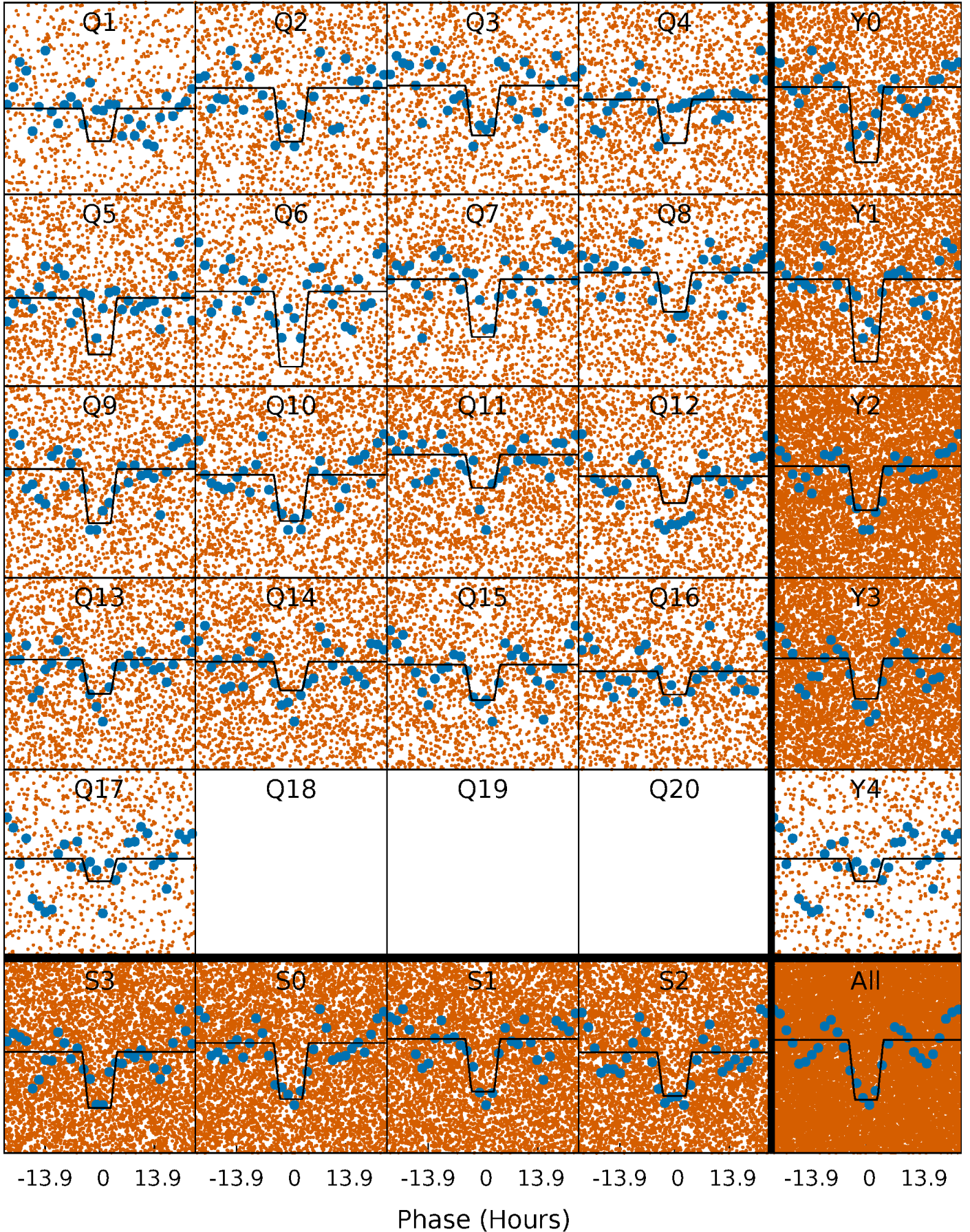
TCE 006228371-01   P= 1.945627 Days    $T_0=132.146664$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

TCE 006228371-01 P= 1.945676 Days  $T_0=132.117357$  (BKJD)

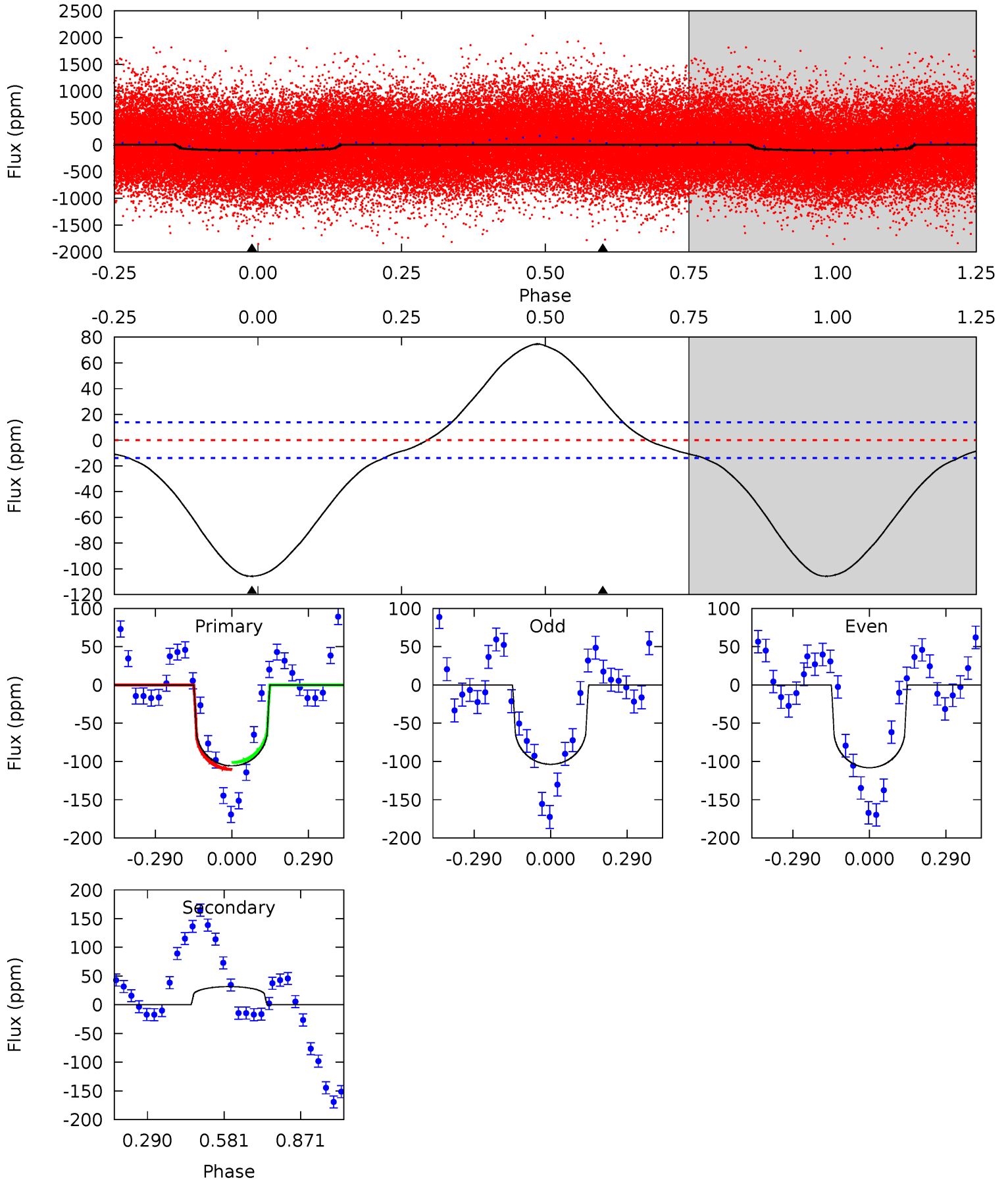




# DV Model-Shift Uniqueness Test

006228371-01, P = 1.945627 Days, E = 130.201037 Days

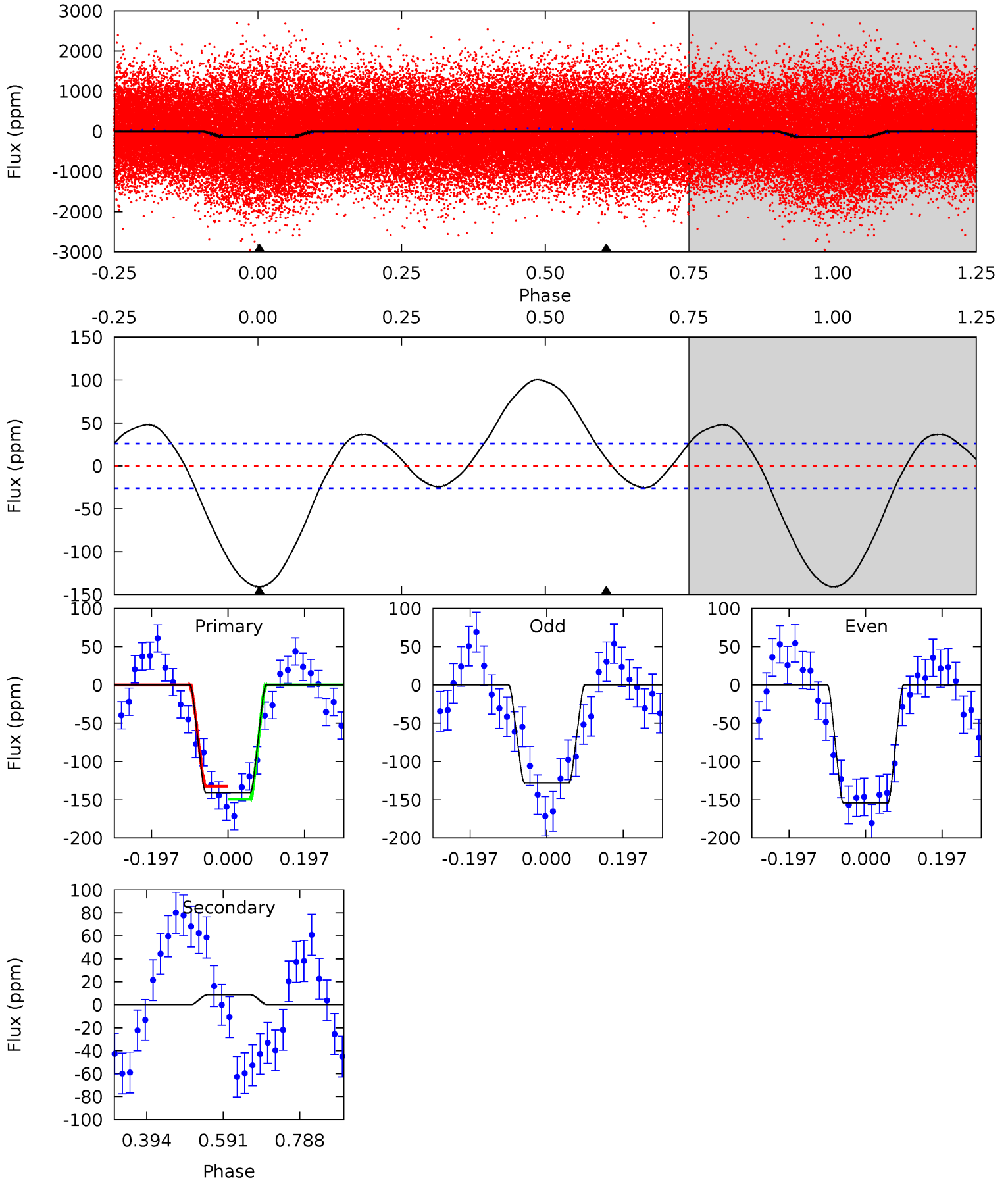
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
33.0	-9.89	0	0	4.34	1.06	2.43	33.0	33.0	-9.89	-9.89	0.69	0.99	0.41	1.36



# Alt Model-Shift Uniqueness Test

006228371-01, P = 1.945676 Days, E = 130.171681 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
23.9	-1.46	0	0	4.42	1.29	3.48	23.9	23.9	-1.46	-1.46	2.22	0.99	0.42	1.42



### Stellar Parameters For KIC 006228371

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7810^{+217}_{-326}$	$3.492^{+0.618}_{-0.195}$	$0.070^{+0.200}_{-0.400}$	$4.591^{+0.302}_{-2.721}$	$2.386^{+0.249}_{-0.796}$	$0.035^{+0.286}_{-0.004}$
	+3%/-4%	+18%/-6%	+286%/-571%	+7%/-59%	+10%/-33%	+822%/-11%
Source	KIC0	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 006228371-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$32 \pm 3$	$3.22^{+2.53}_{-1.98}$	$5033^{+326}_{-597}$	$-6986^{+1379}_{-6016}$	$-2.695^{+1.844}_{-14.909}$
Alt.	$9 \pm 6$	$5.75^{+2.66}_{-2.75}$	$5050^{+306}_{-667}$	$-4727^{+414}_{-668}$	$-0.214^{+0.159}_{-0.651}$

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



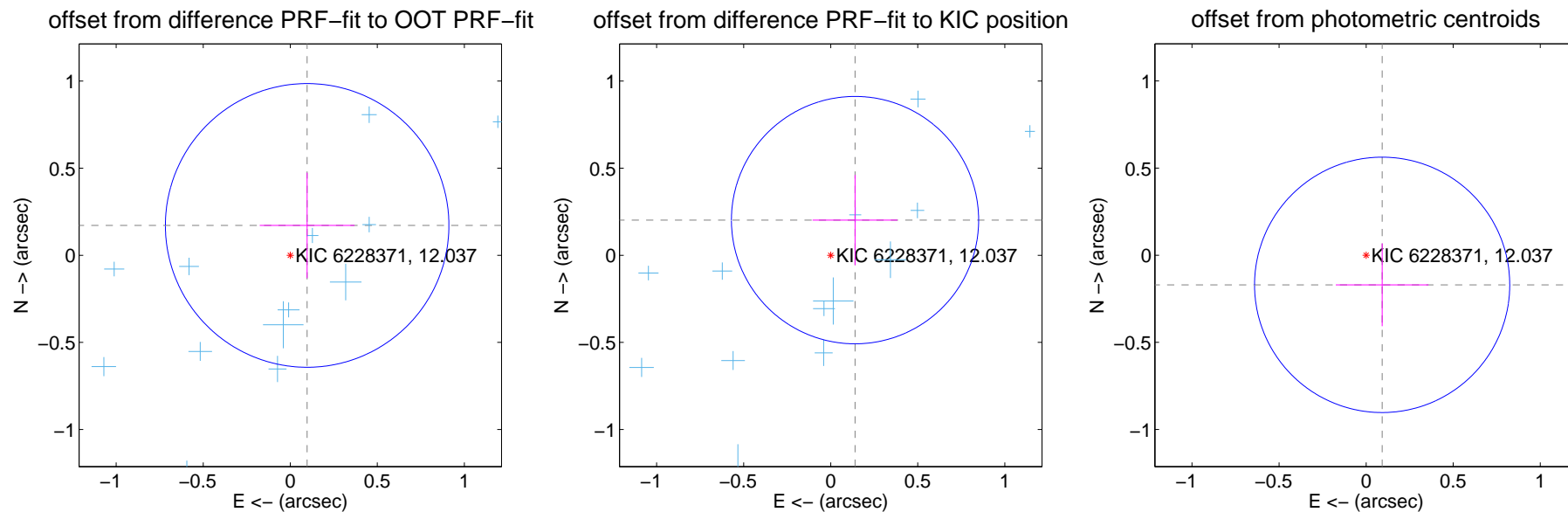
## DV Centroid Data

Supplemental centroid analysis for 006228371-01. Kepler magnitude: 12.04. Transit SNR 6.20

There are 16 quarters with good PRF difference image offsets

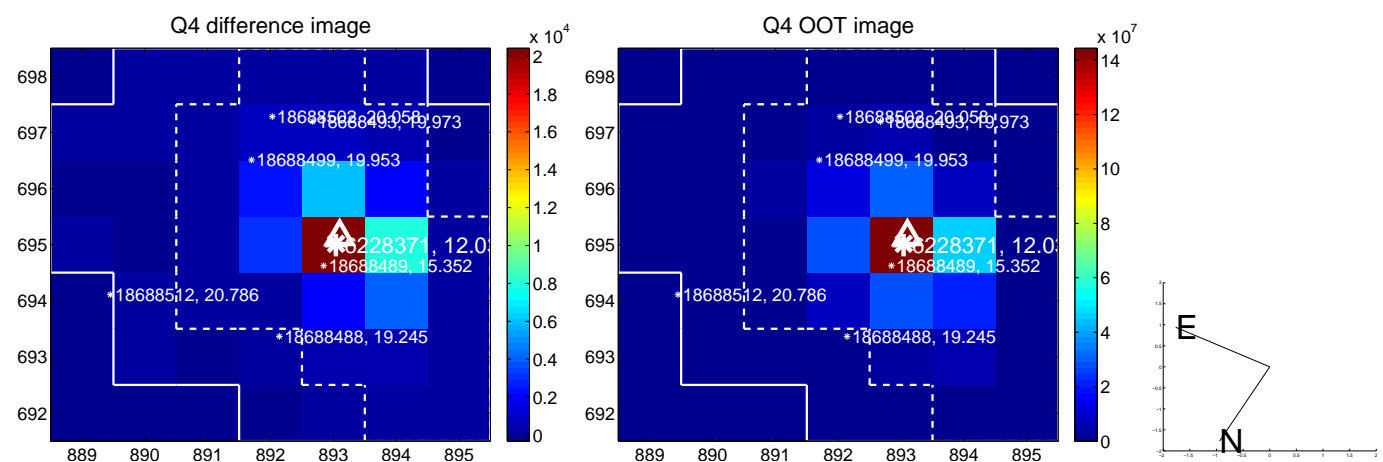
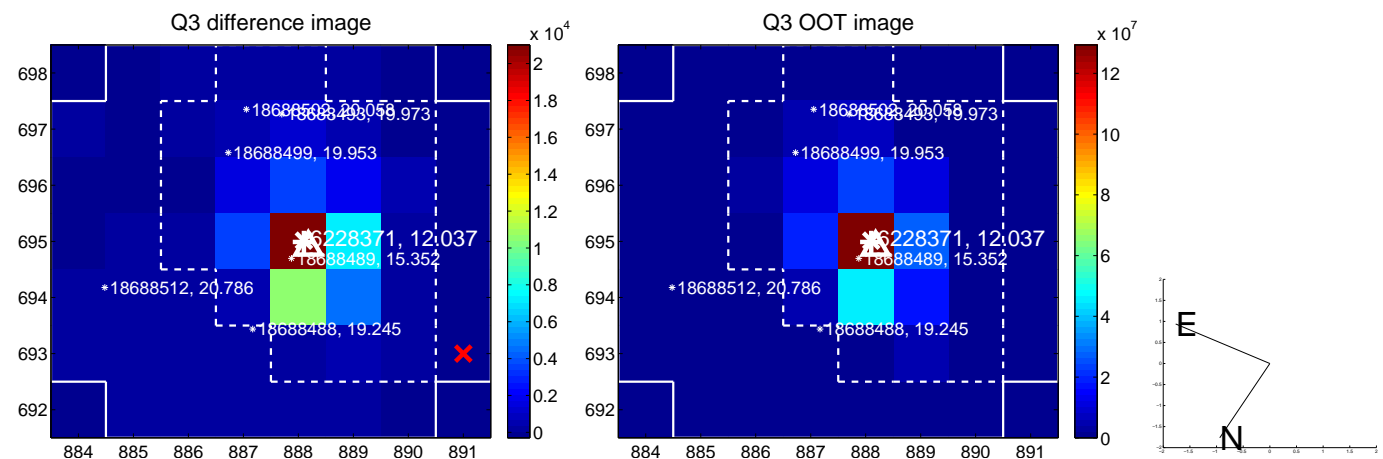
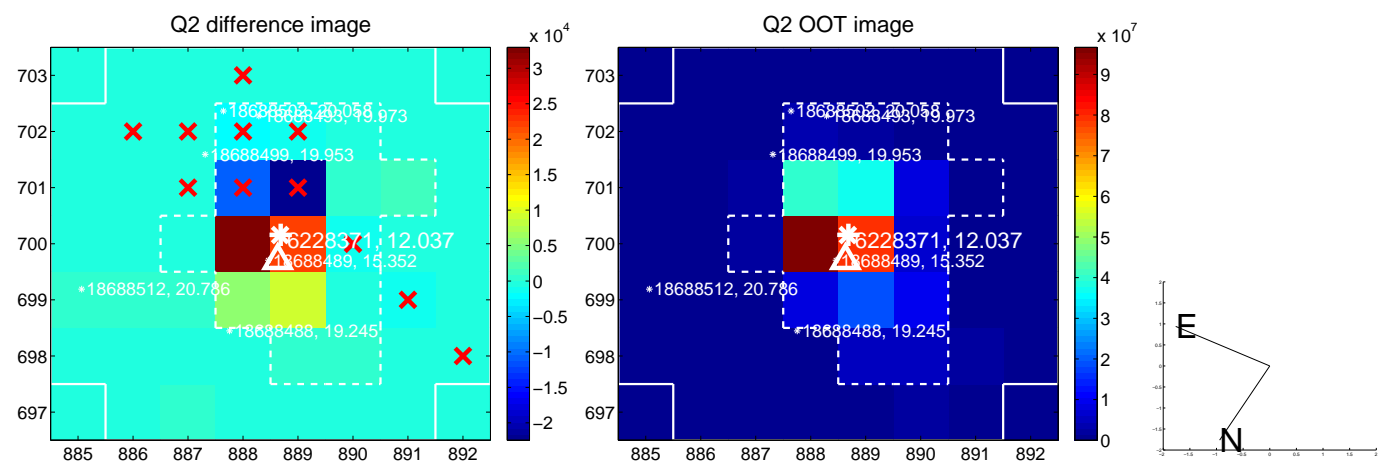
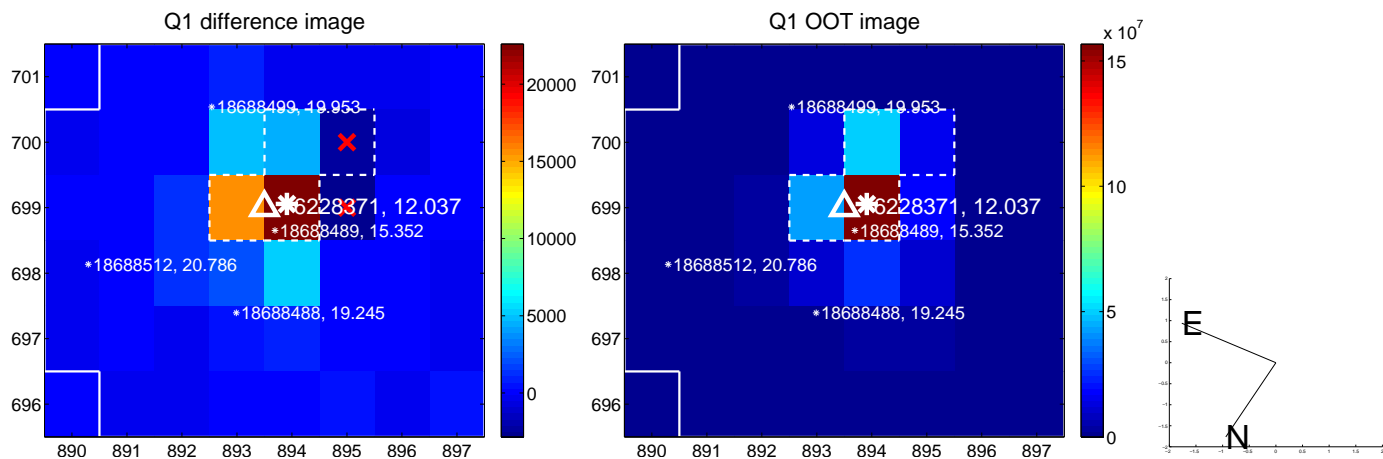
The direct PRF centroid is offset from the target star catalog position by about 0.02 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.197 \pm 0.271$	0.73	$-0.097 \pm 0.272$	$0.171 \pm 0.302$
PRF-fit source offset from KIC position	$0.245 \pm 0.237$	1.04	$-0.140 \pm 0.244$	$0.202 \pm 0.259$
photometric centroid source offset	$0.19 \pm 0.24$	0.79	$-0.09 \pm 0.27$	$-0.17 \pm 0.24$

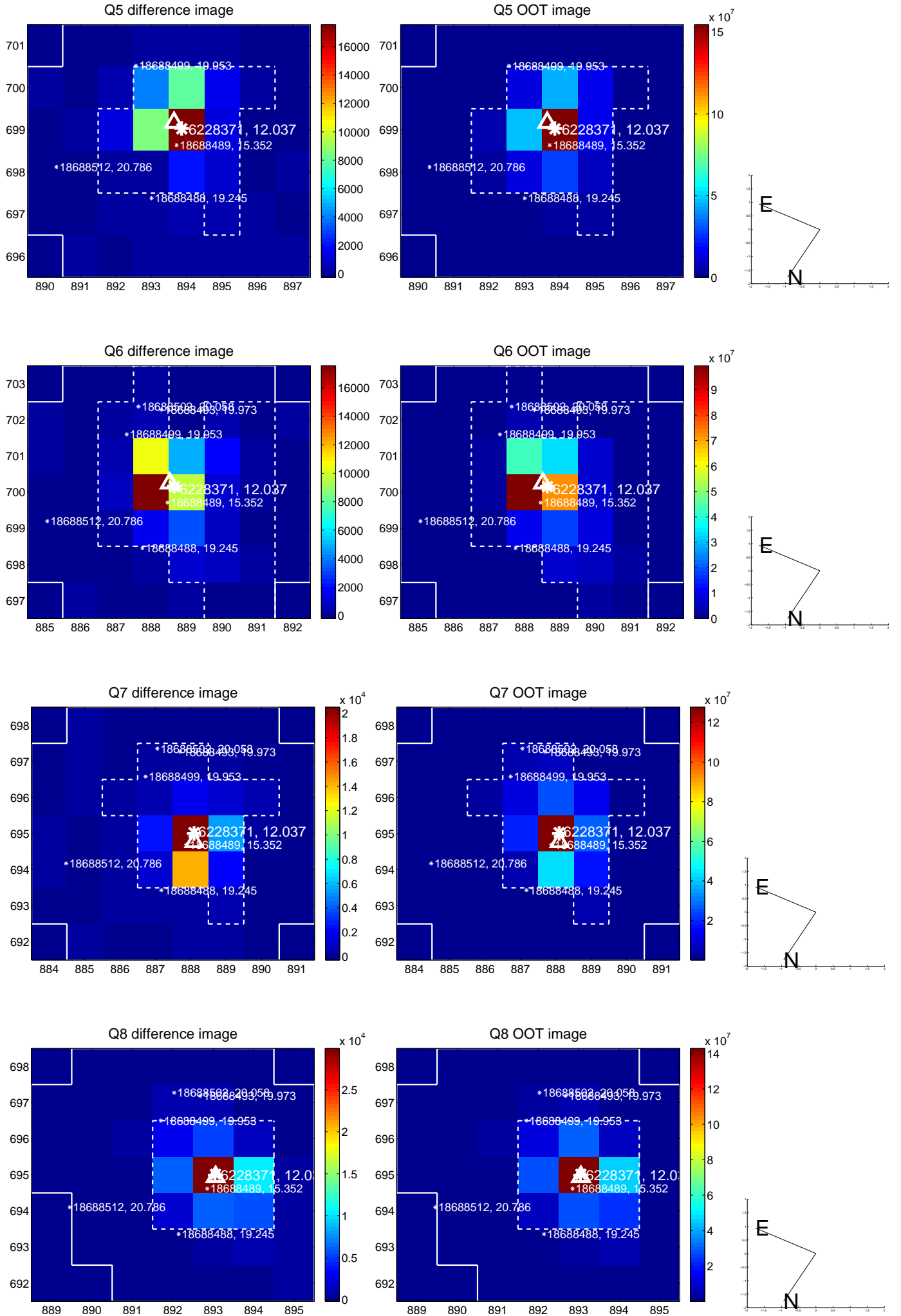


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

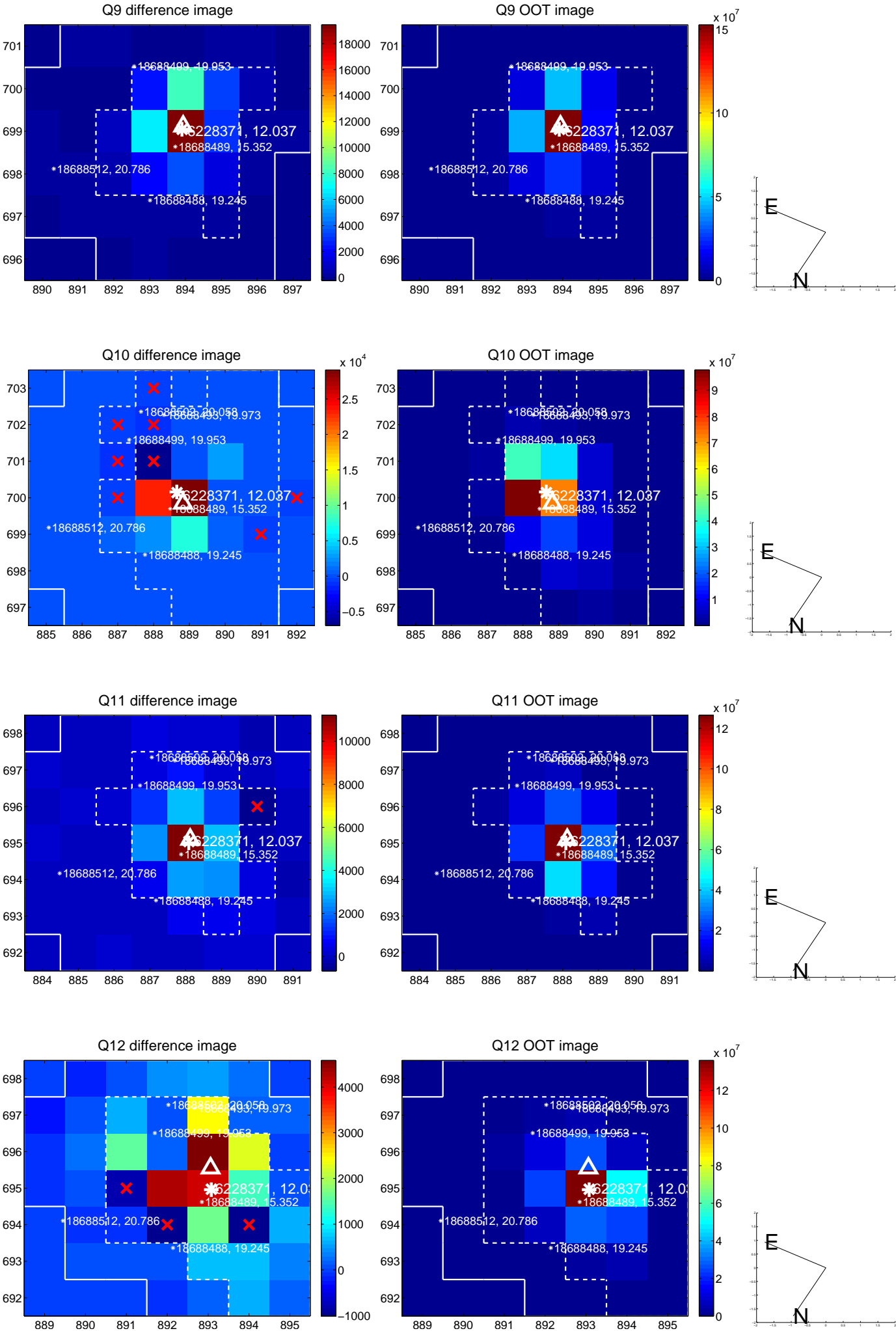


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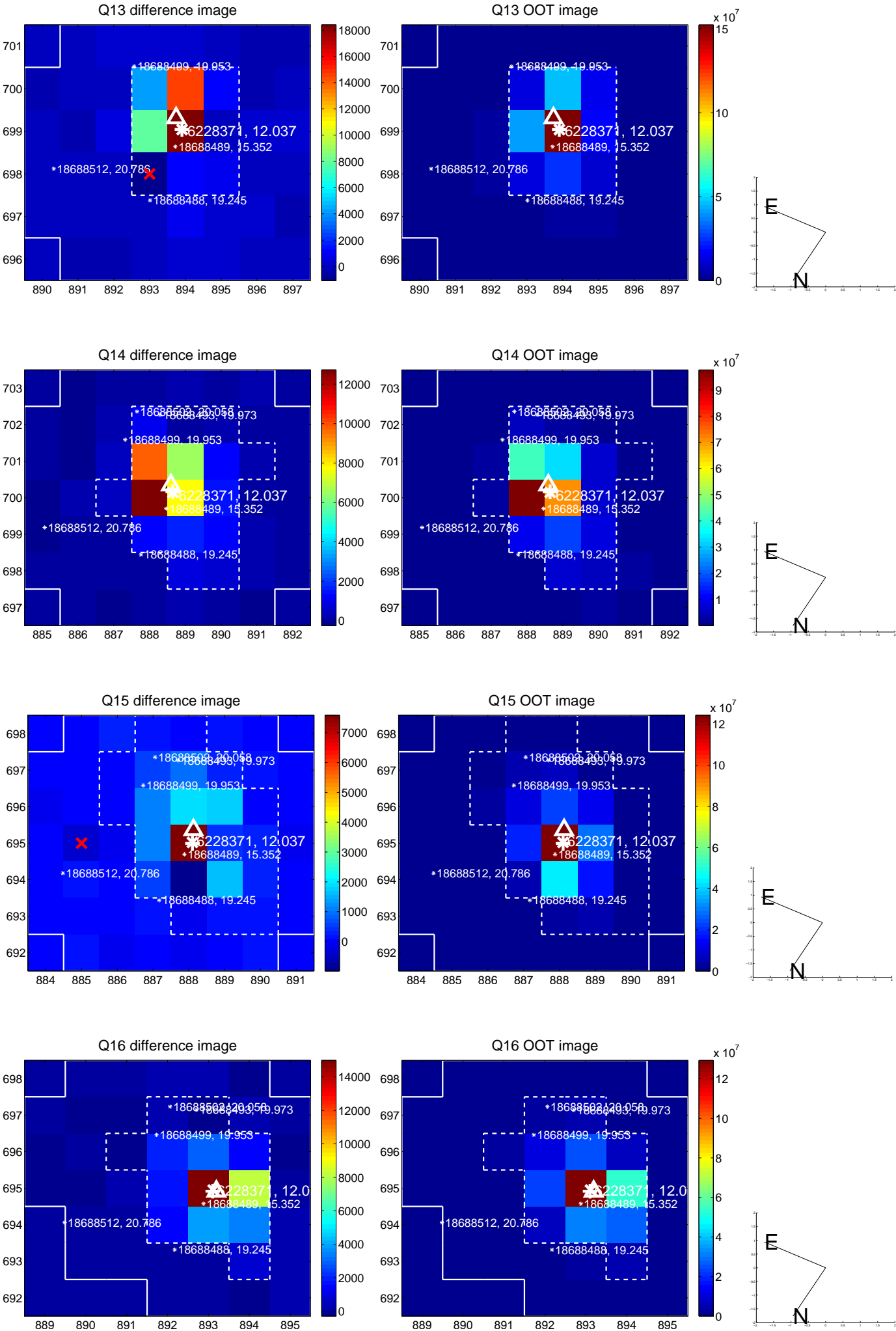




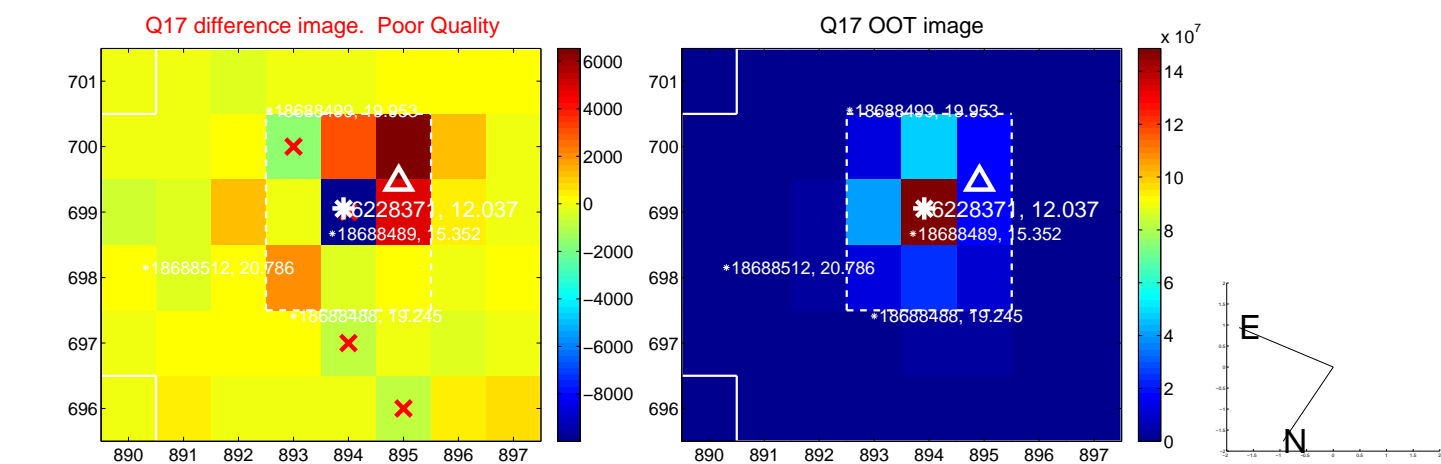
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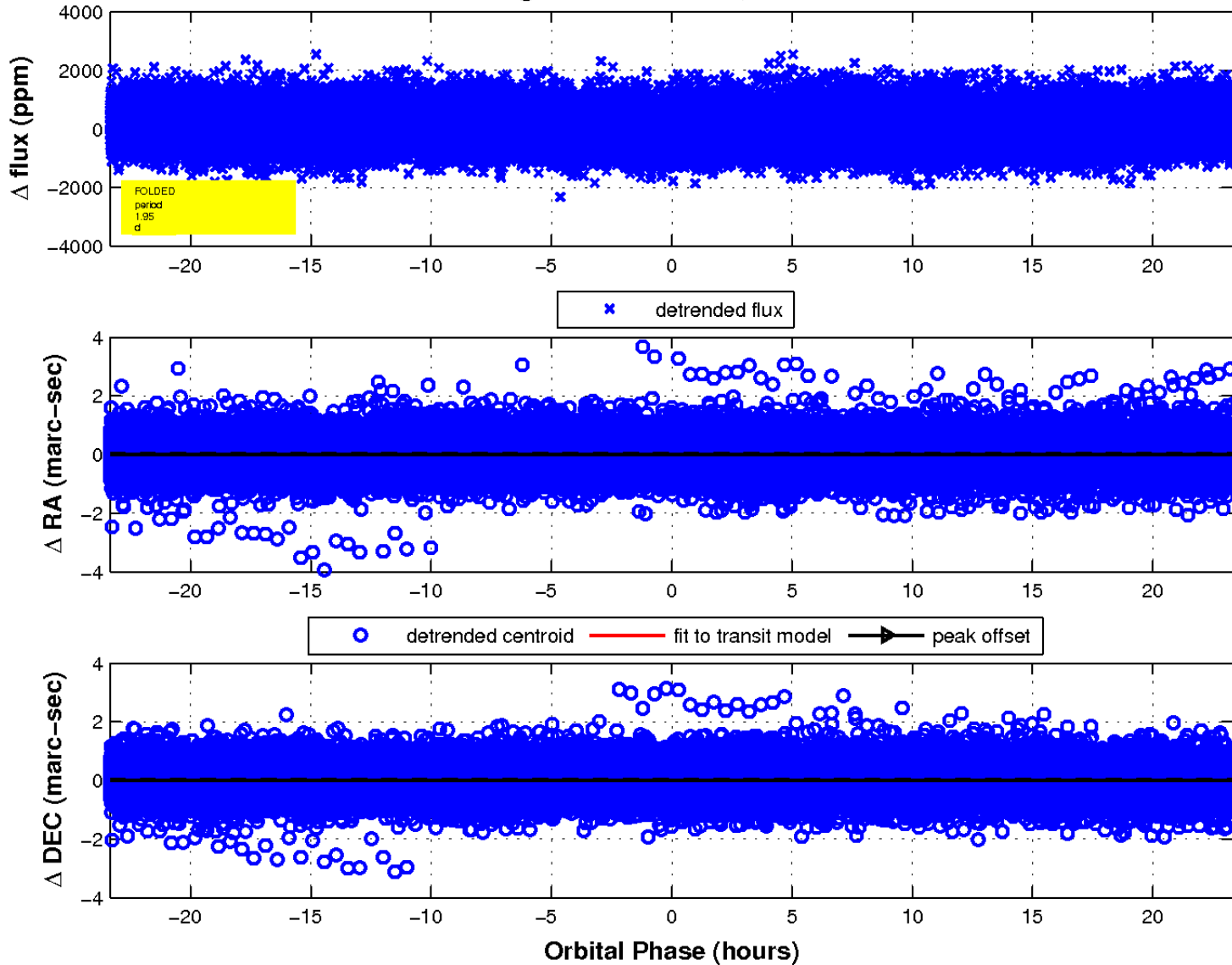
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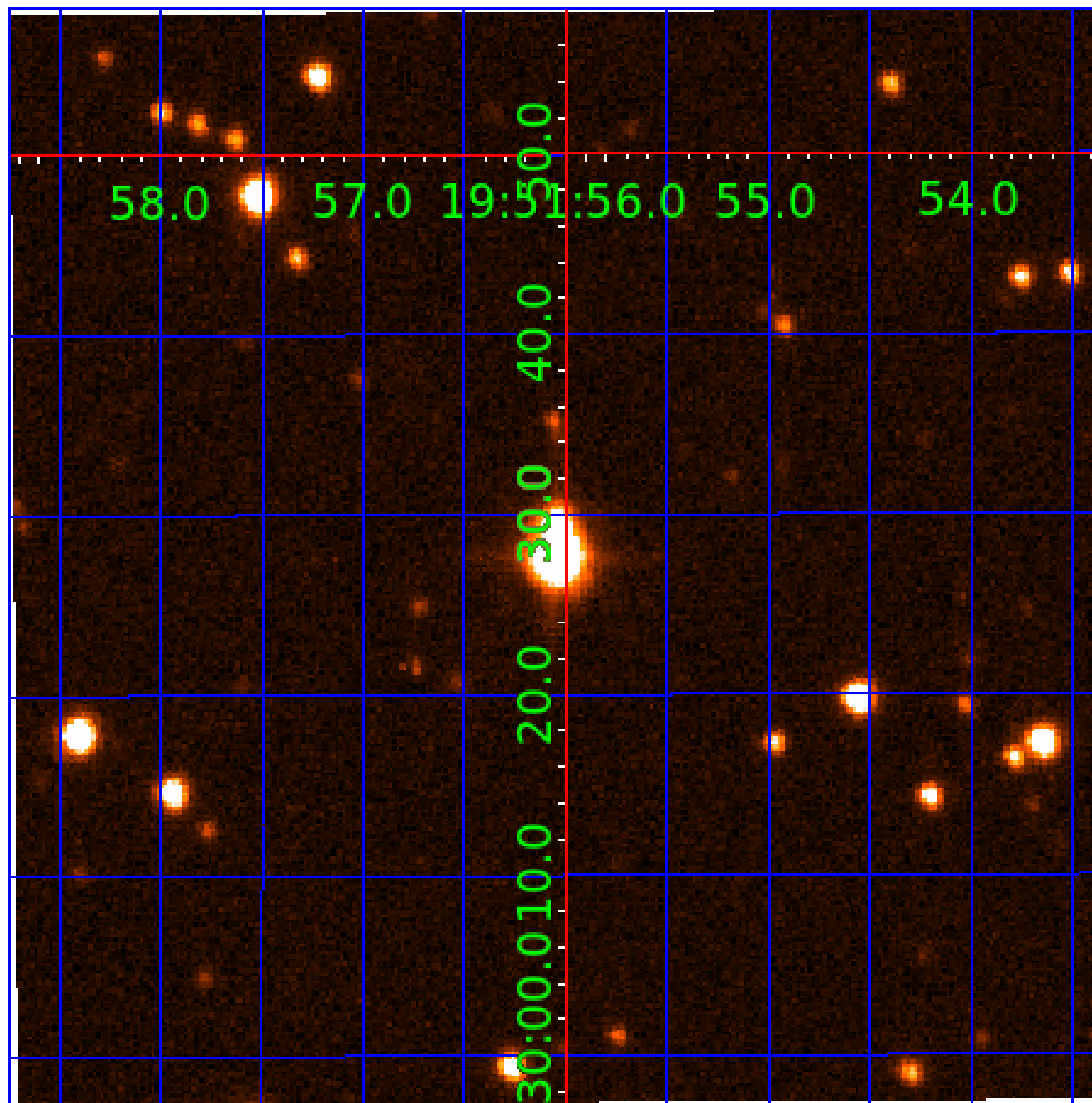


fluxWeightedCentroids, Planet 1 of 7



UKIRT Image

Declination



# KIC 006228371

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006228371-01	OBS	No	1.945627	132.146664	44.7	13.115	11.5	6.2	4.59	7810	3.12	42269.19
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## Robovetter Results

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006228371-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
006228371-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
006228371-04	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
006228371-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
006228371-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
006228371-07	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—HALO_GHOST

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

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

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

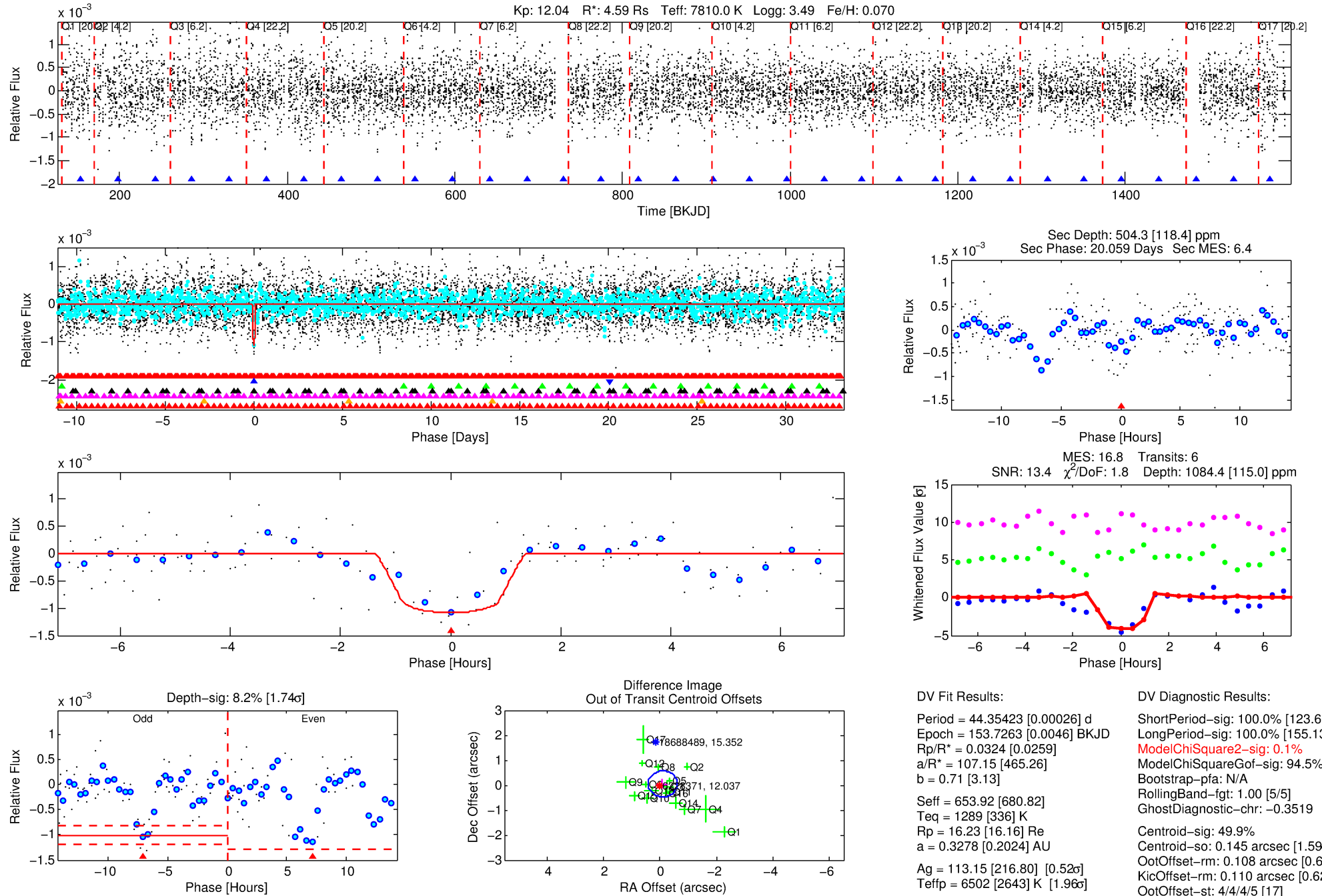
## Ephemeris Match Information For 006228371-02

No Significant Match Found



# DV One-Page Summary

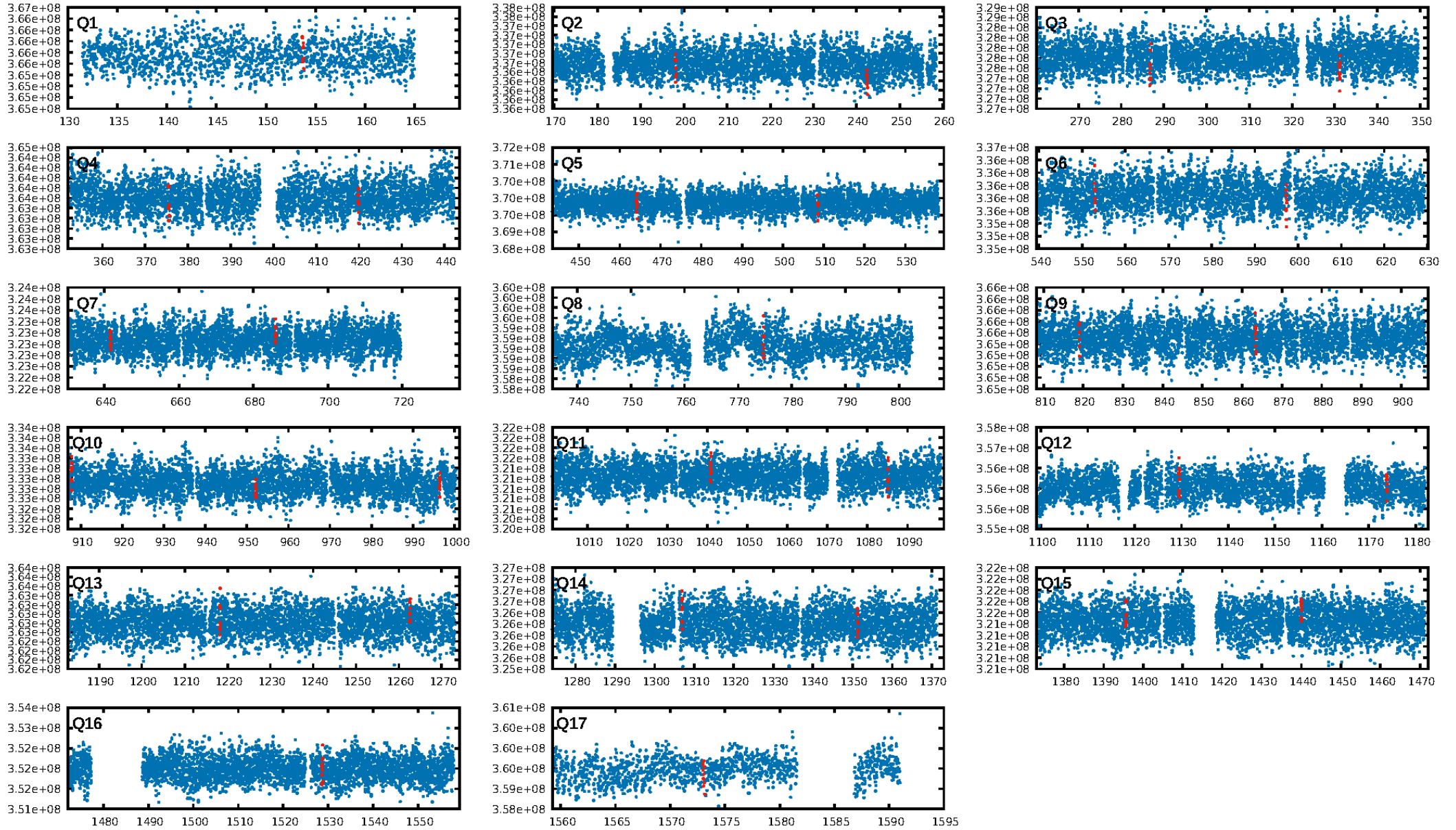
KIC: 6228371 Candidate: 2 of 7 Period: 44.354 d



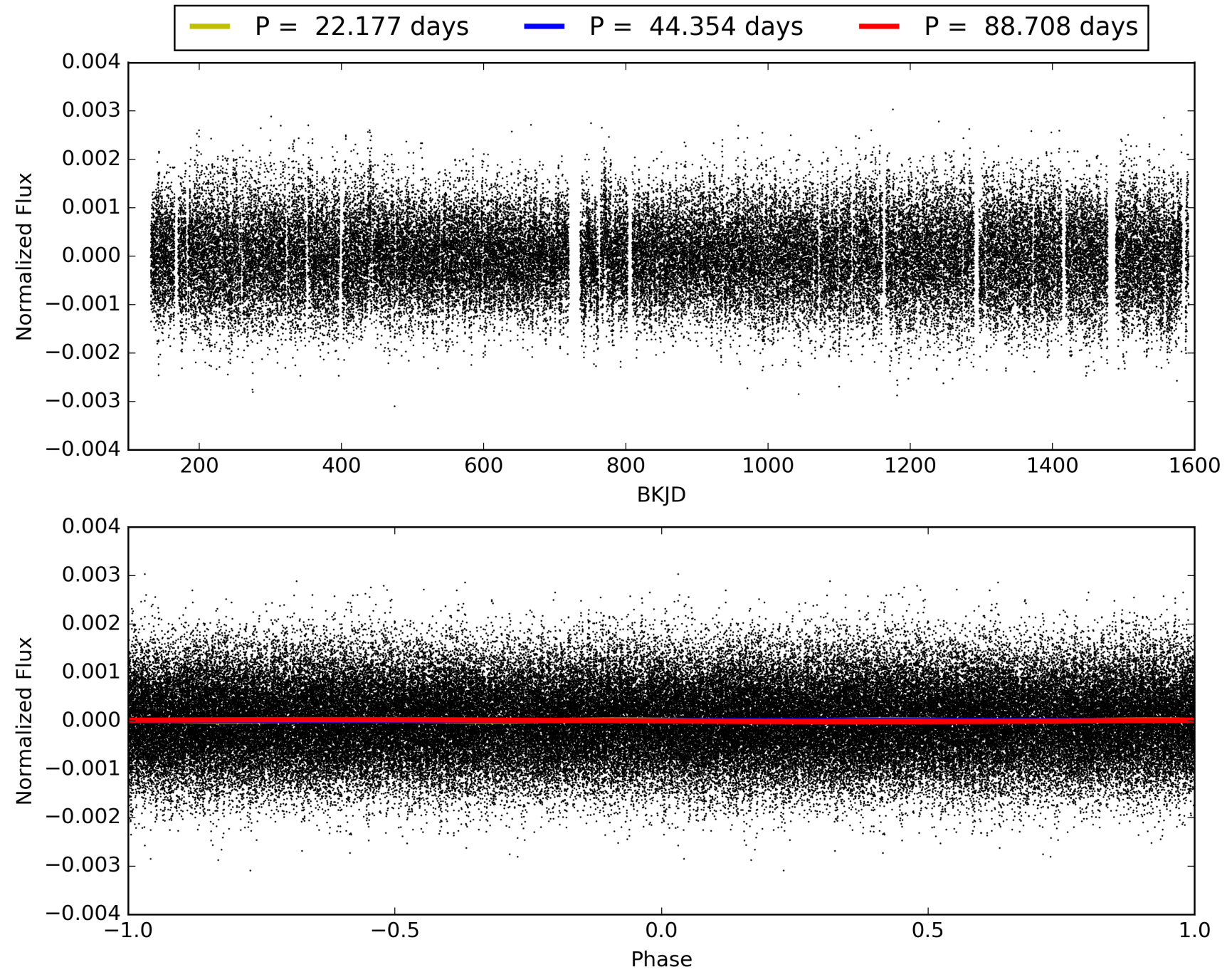
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 006228371-02, PDC Light Curves

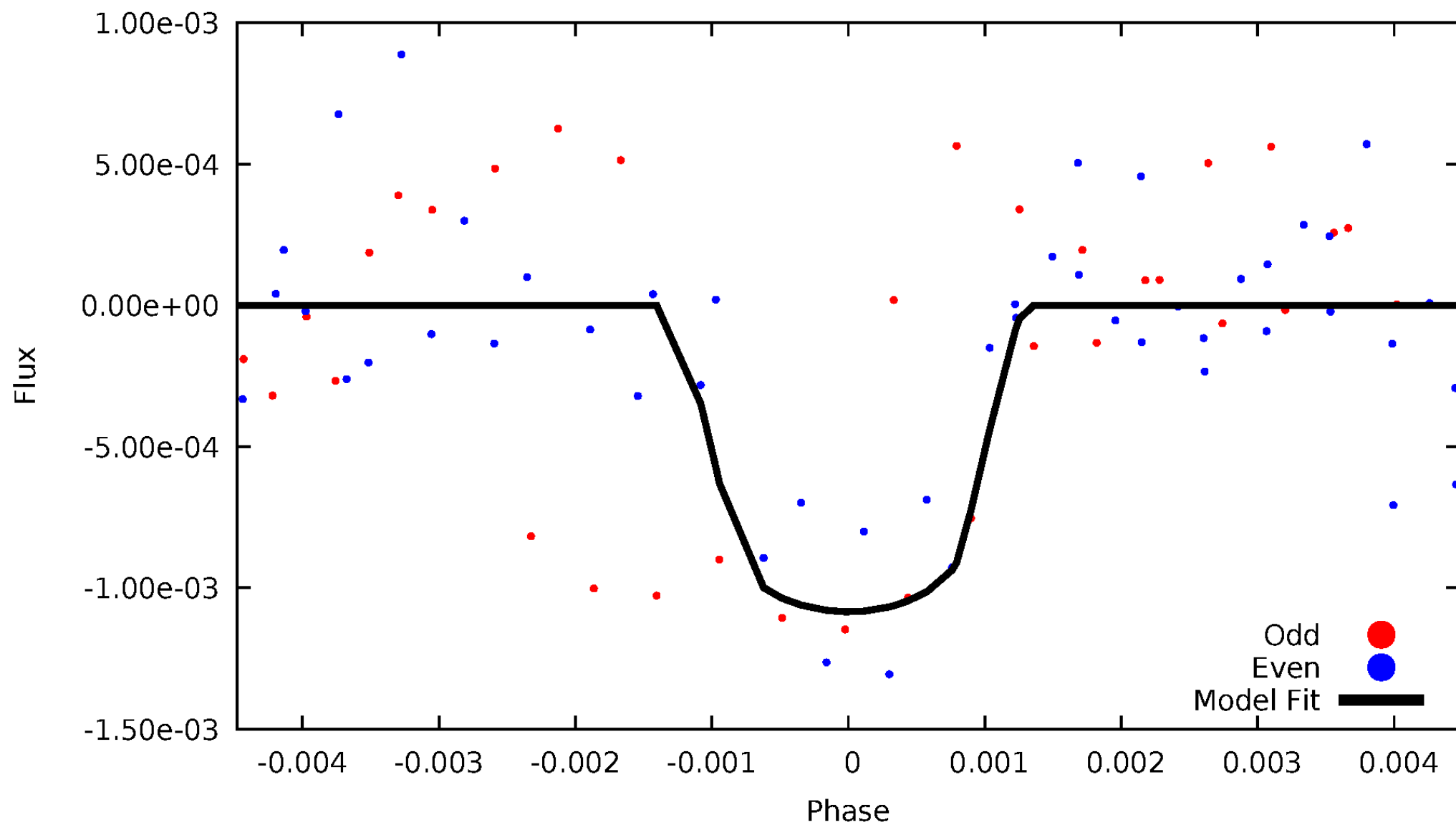


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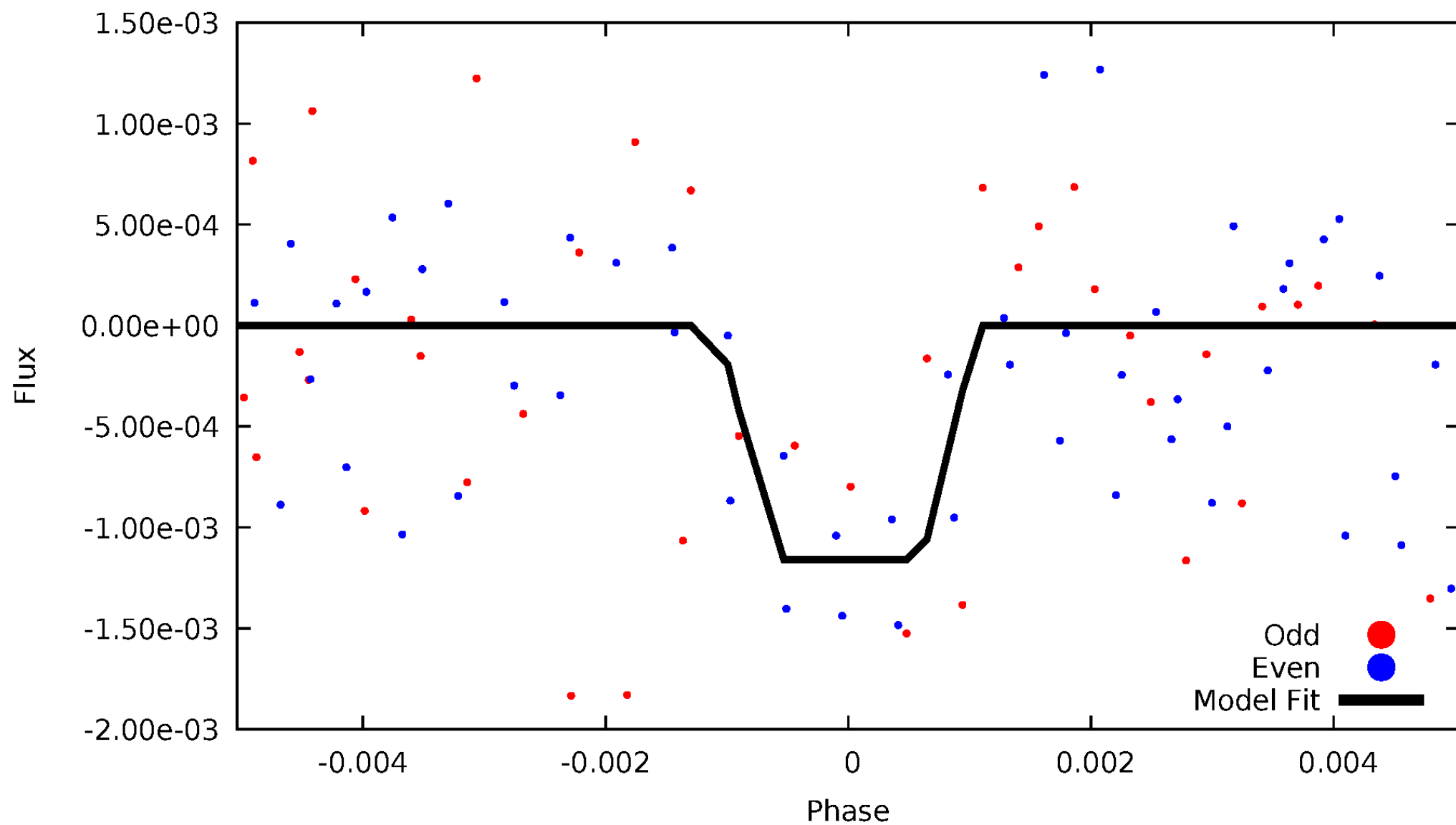
# DV Odd/Even

TCE 006228371-02



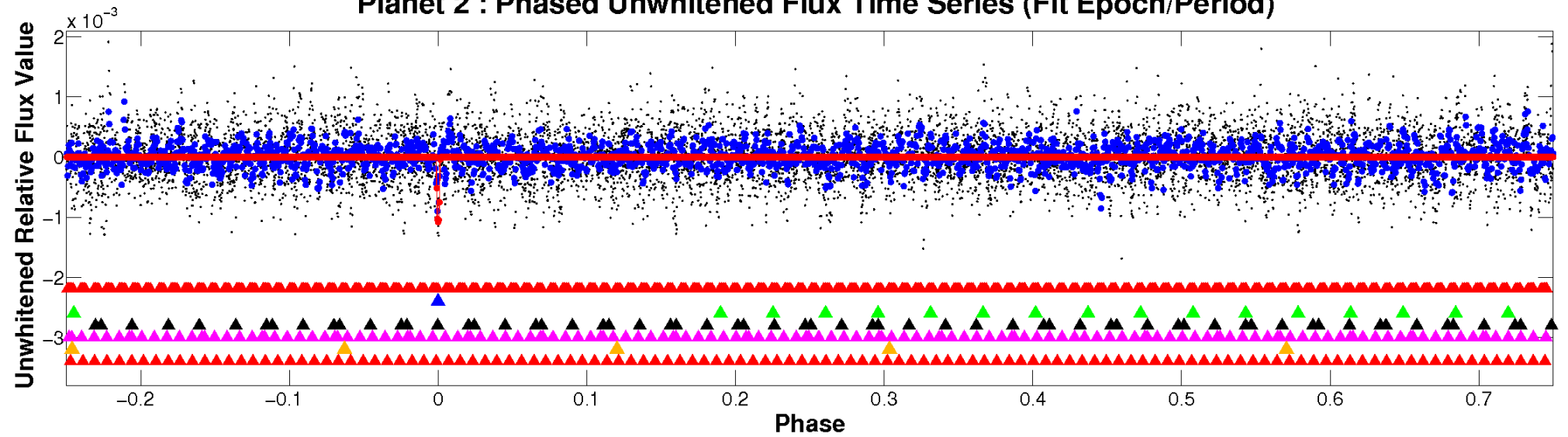
# ALT Odd/Even

TCE 006228371-02

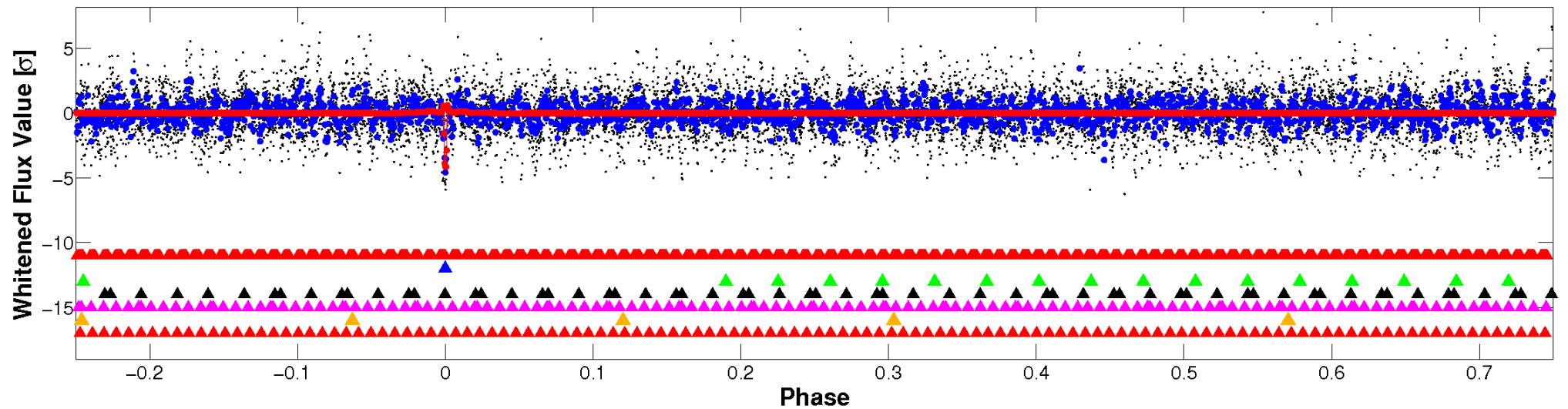


# Non-Whitened Vs. Whitened Light Curve

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



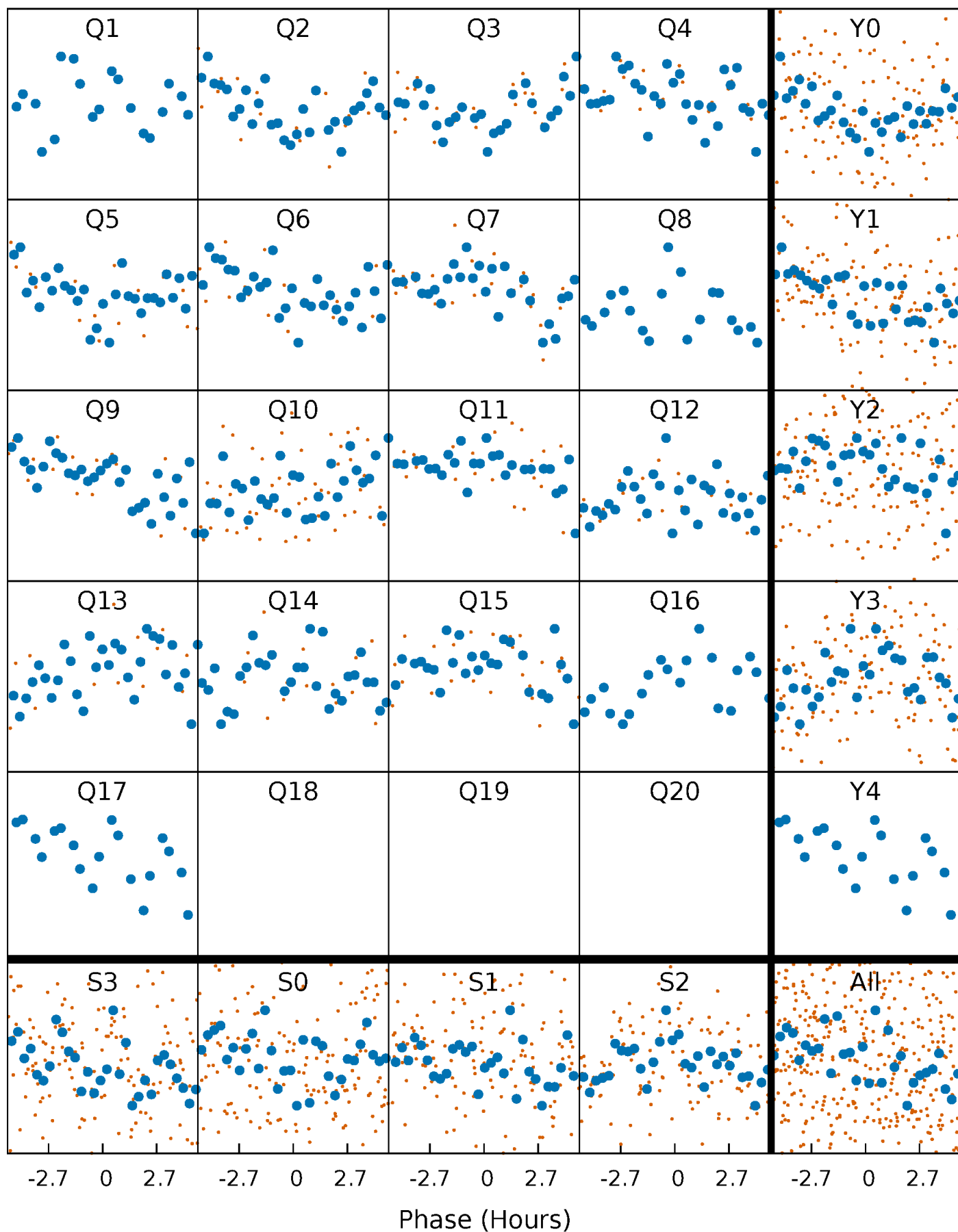
## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)





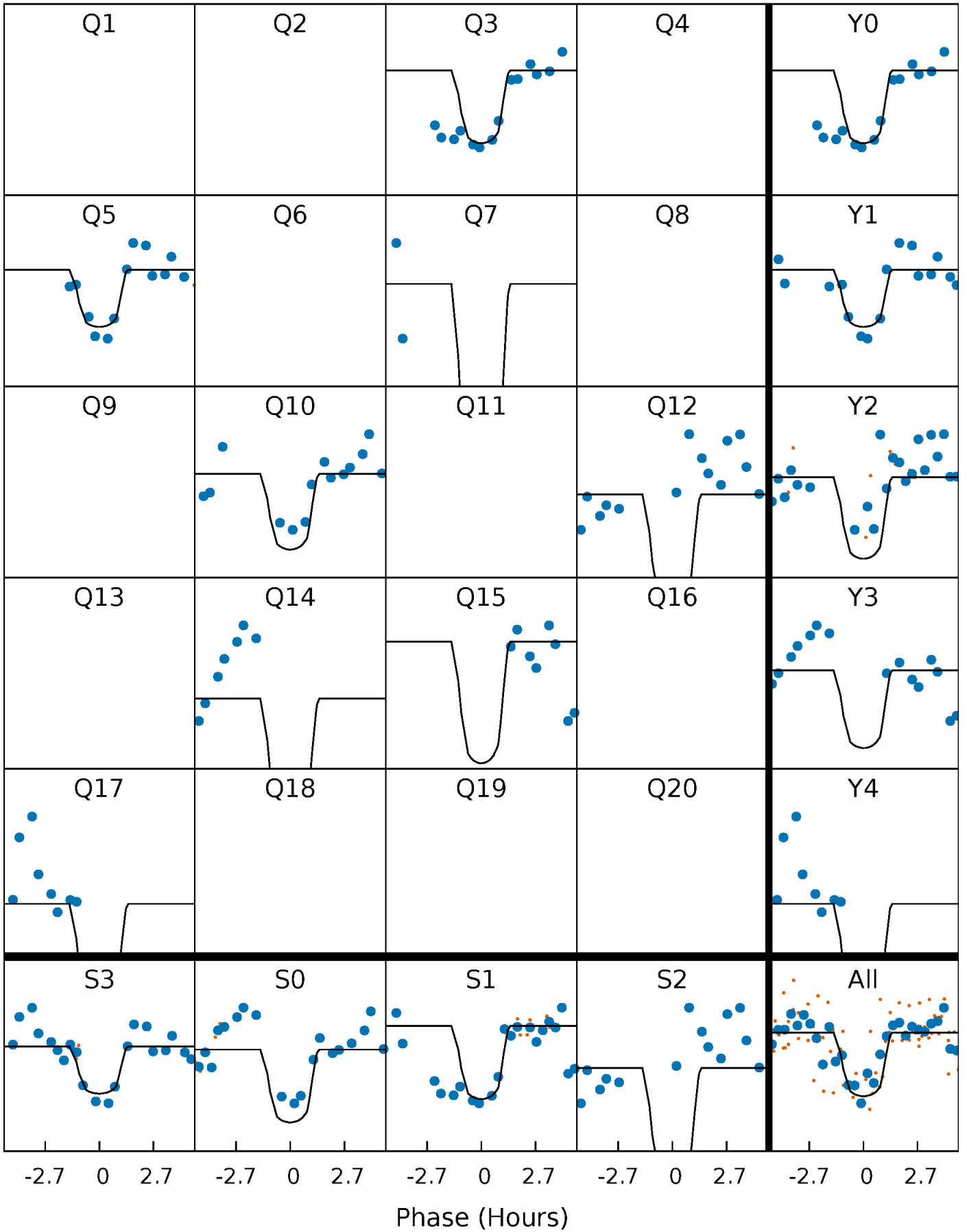
# PDC Quarter-Phased Transit Curves

TCE 006228371-02   P= 44.354229 Days    $T_0=153.726345$  (BKJD)



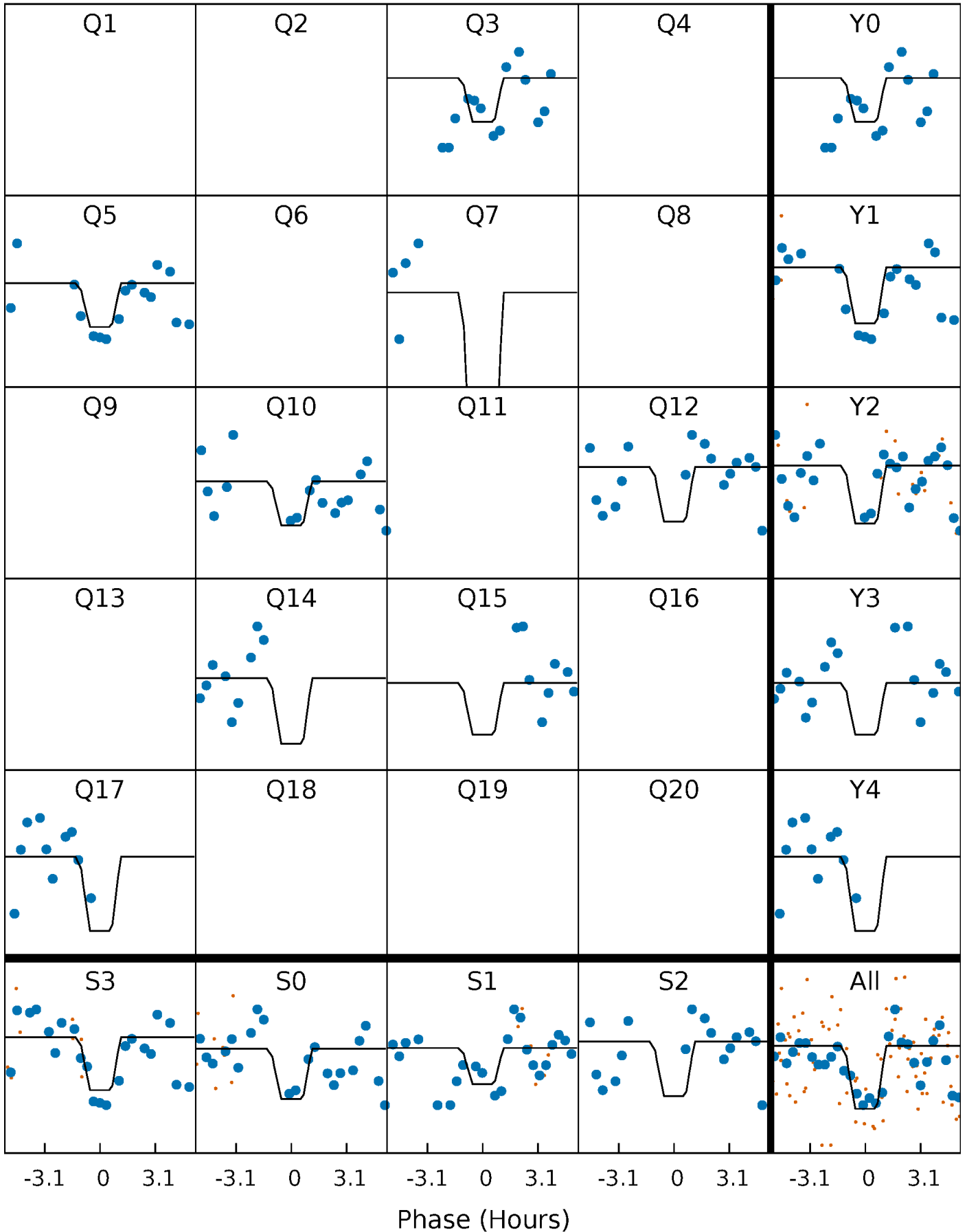
# DV Quarter-Phased Transit Curves

TCE 006228371-02   P= 44.354229 Days    $T_0=153.726345$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

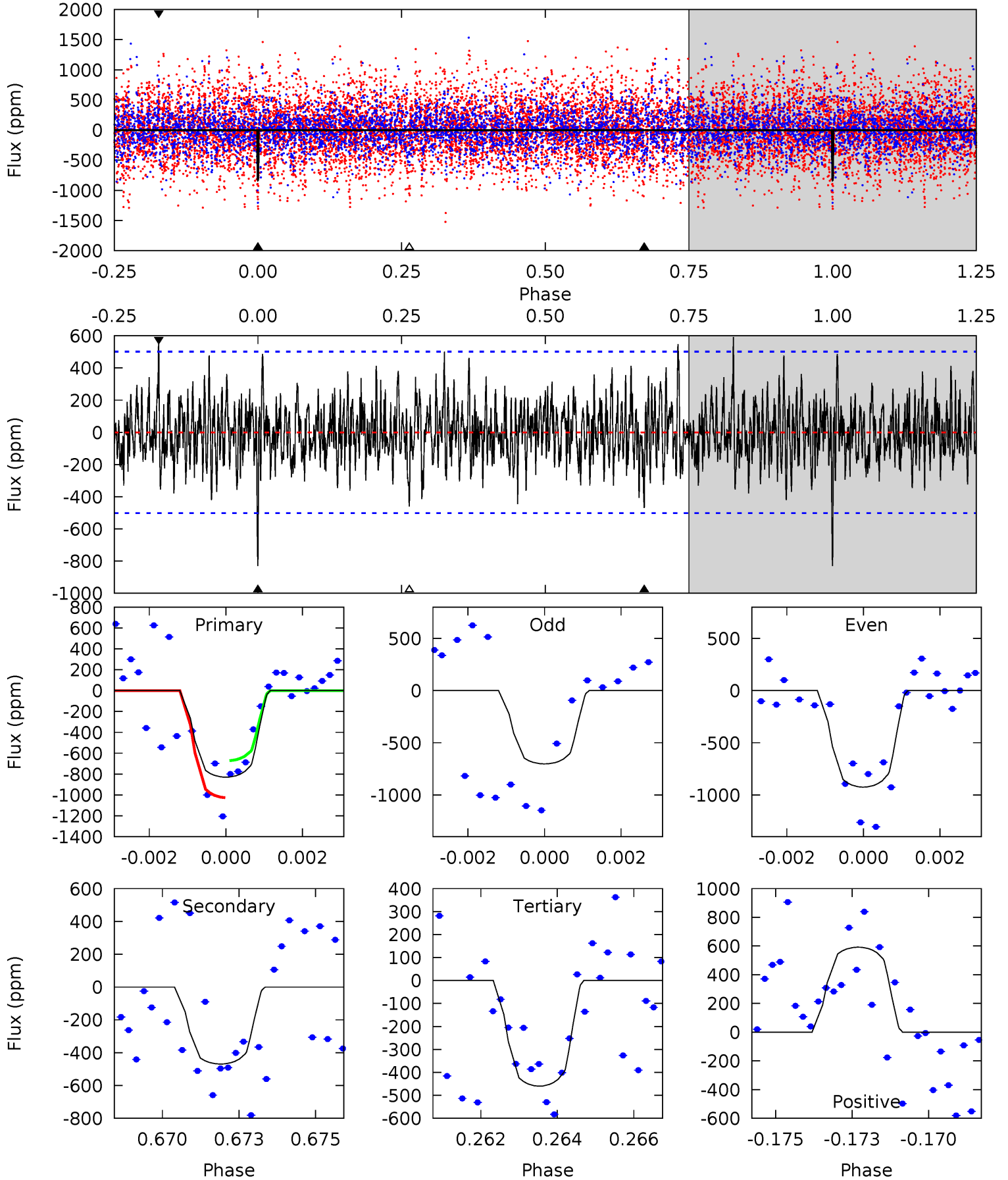
TCE 006228371-02   P= 44.353621 Days    $T_0=153.726323$  (BKJD)



# DV Model-Shift Uniqueness Test

006228371-02, P = 44.354229 Days, E = 109.372116 Days

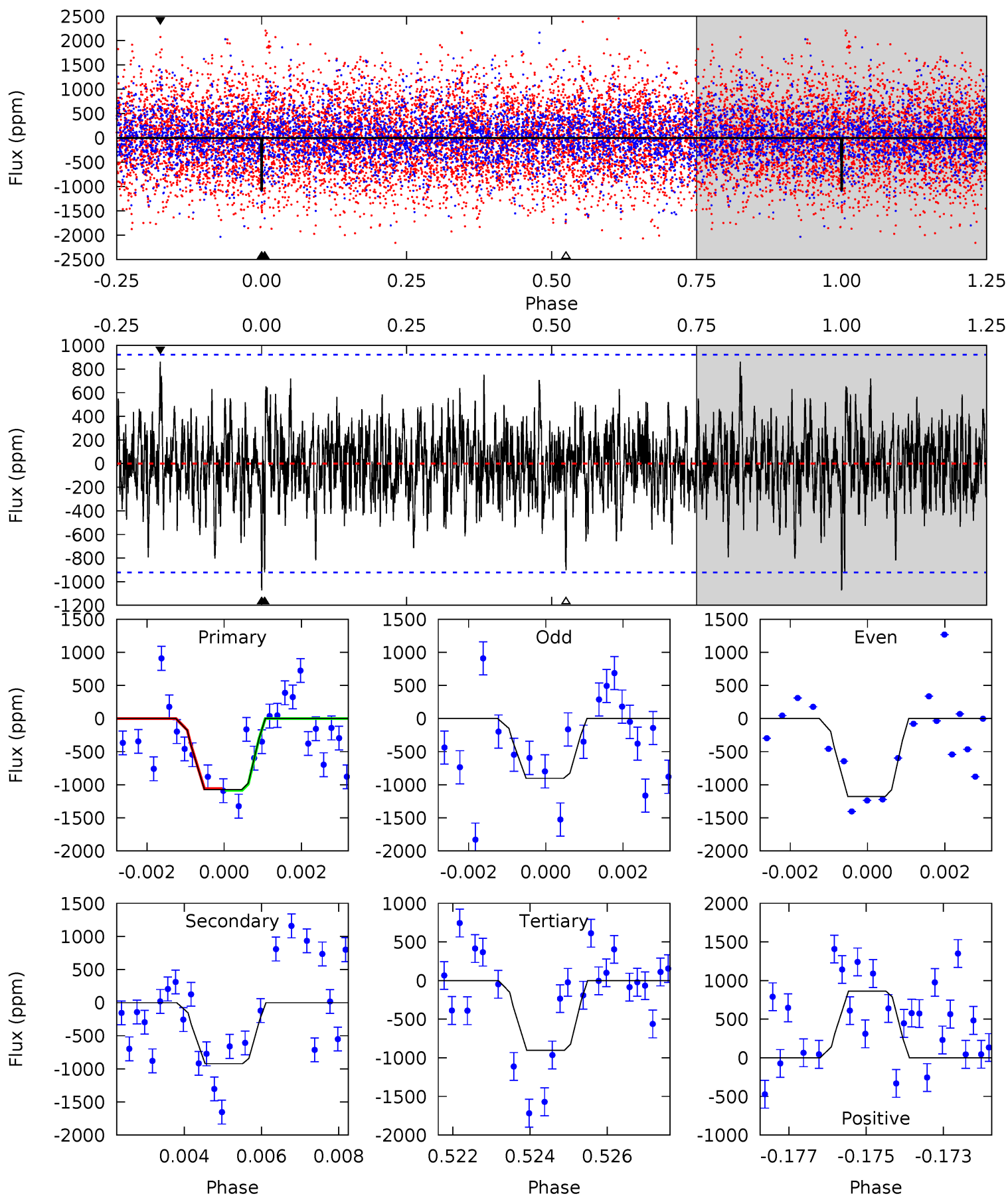
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.77	4.96	4.86	6.25	5.30	3.04	1.59	3.91	2.51	0.10	-1.30	1.16	0.73	0.42	1.82



# Alt Model-Shift Uniqueness Test

006228371-02, P = 44.353621 Days, E = 109.372702 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
6.19	5.32	5.21	4.97	5.32	3.08	1.35	0.98	1.22	0.11	0.35	0.78	1.03	0.45	0.07



### Stellar Parameters For KIC 006228371

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7810^{+217}_{-326}$	$3.492^{+0.618}_{-0.195}$	$0.070^{+0.200}_{-0.400}$	$4.591^{+0.302}_{-2.721}$	$2.386^{+0.249}_{-0.796}$	$0.035^{+0.286}_{-0.004}$
	+3%/-4%	+18%/-6%	+286%/-571%	+7%/-59%	+10%/-33%	+822%/-11%
Source	KIC0	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 006228371-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-469 \pm 95$	$15.74^{+12.28}_{-9.88}$	$1769^{+117}_{-246}$	$5956^{+4616}_{-1284}$	$116^{+663}_{-84}$
Alt.	$-922 \pm 173$	$16.58^{+13.37}_{-9.62}$	$1788^{+99}_{-216}$	$6929^{+4885}_{-1549}$	$193^{+762}_{-134}$

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



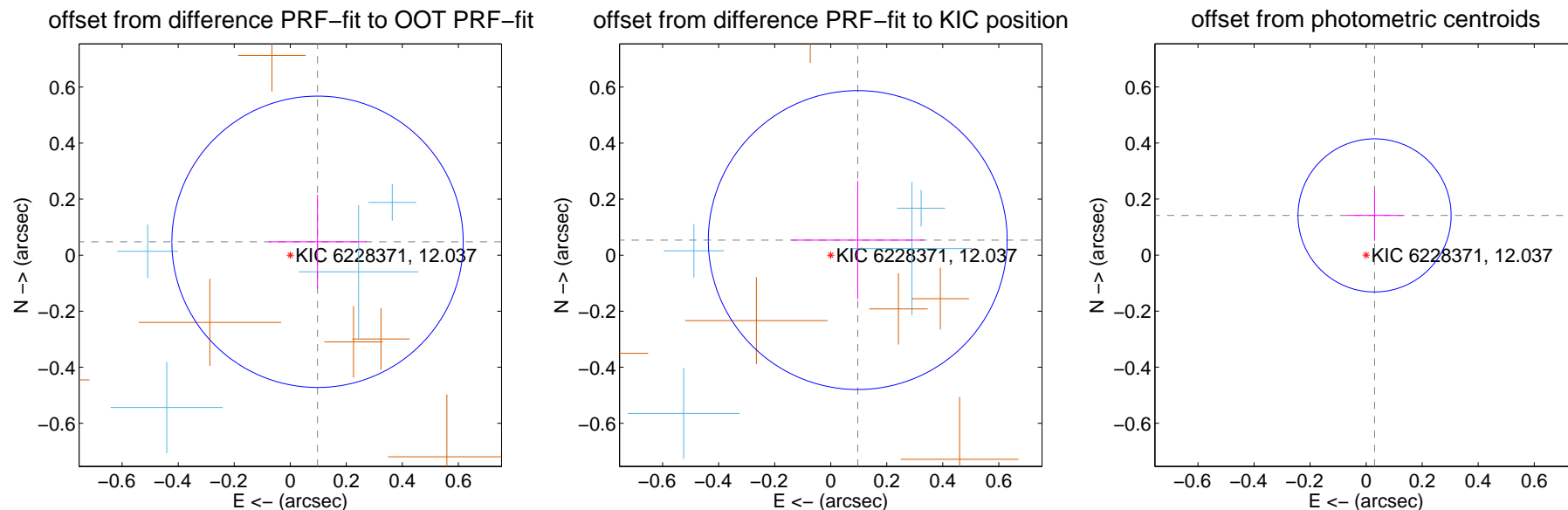
## DV Centroid Data

Supplemental centroid analysis for 006228371-02. Kepler magnitude: 12.04. Transit SNR 13.39

There are 5 quarters with good PRF difference image offsets

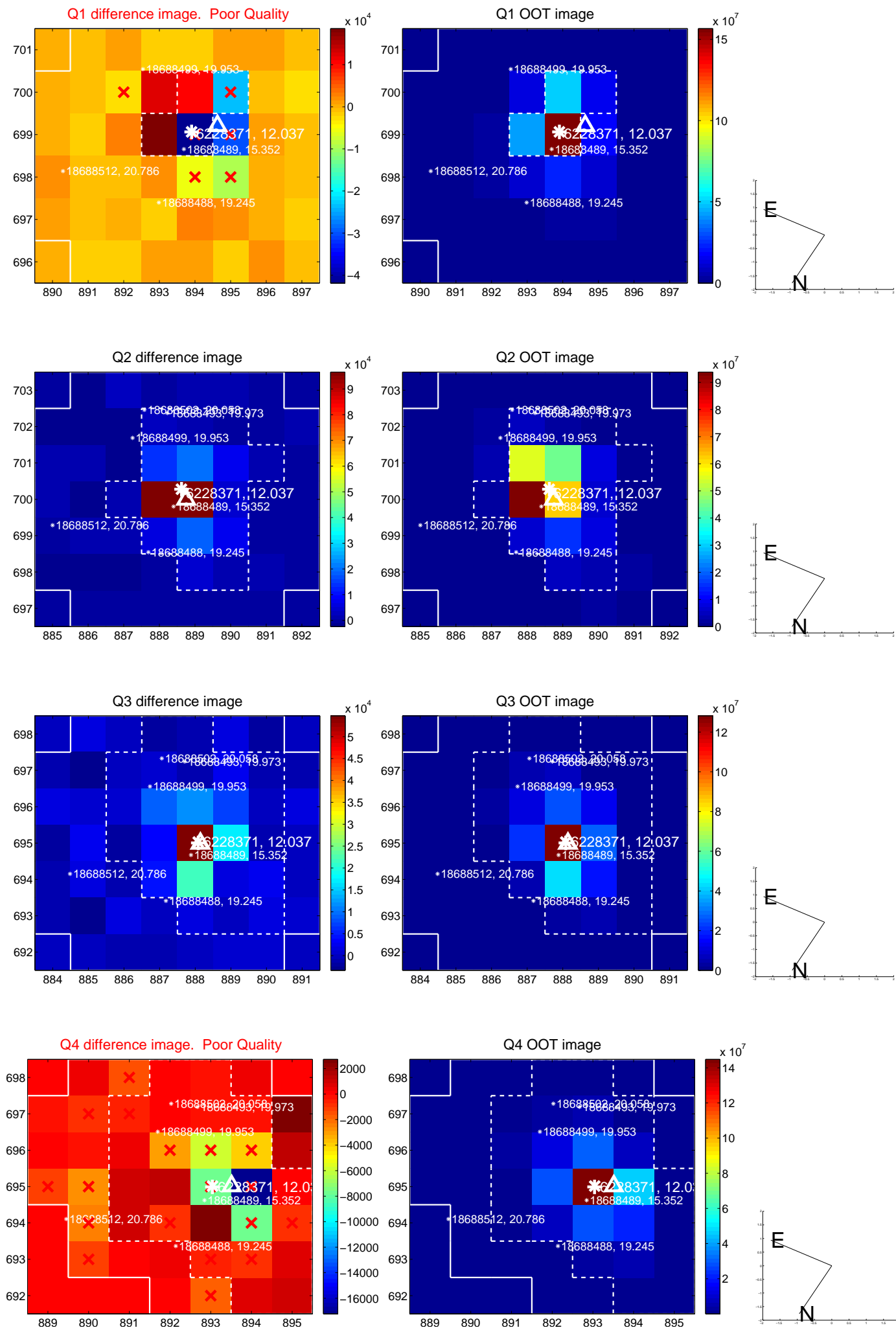
The direct PRF centroid is offset from the target star catalog position by about 0.02 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.108 \pm 0.173$	0.63	$-0.097 \pm 0.175$	$0.048 \pm 0.168$
PRF-fit source offset from KIC position	$0.110 \pm 0.178$	0.62	$-0.096 \pm 0.236$	$0.054 \pm 0.211$
photometric centroid source offset	$0.14 \pm 0.09$	1.59	$-0.03 \pm 0.10$	$0.14 \pm 0.09$

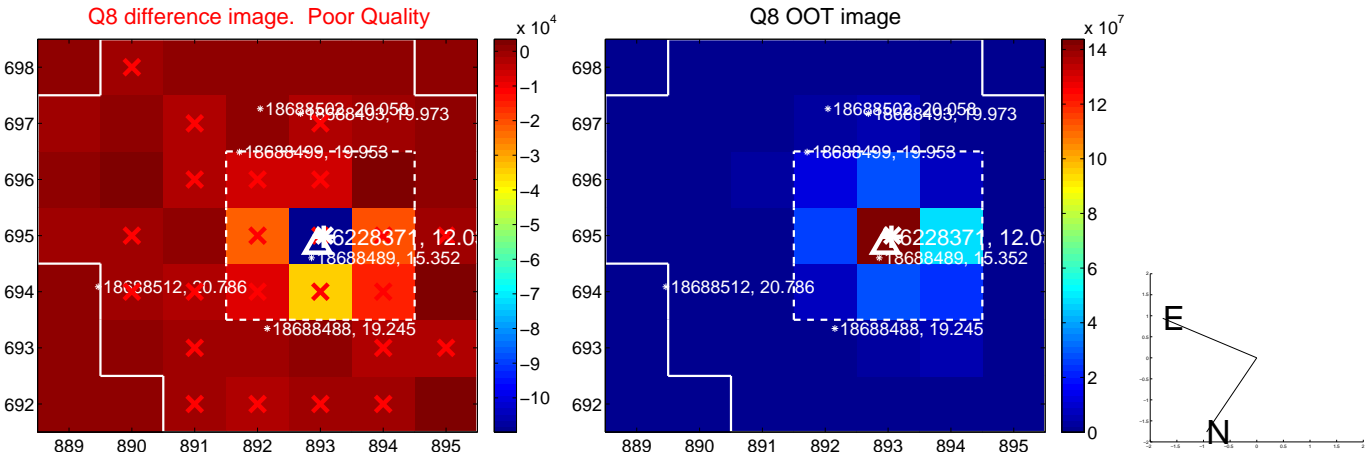
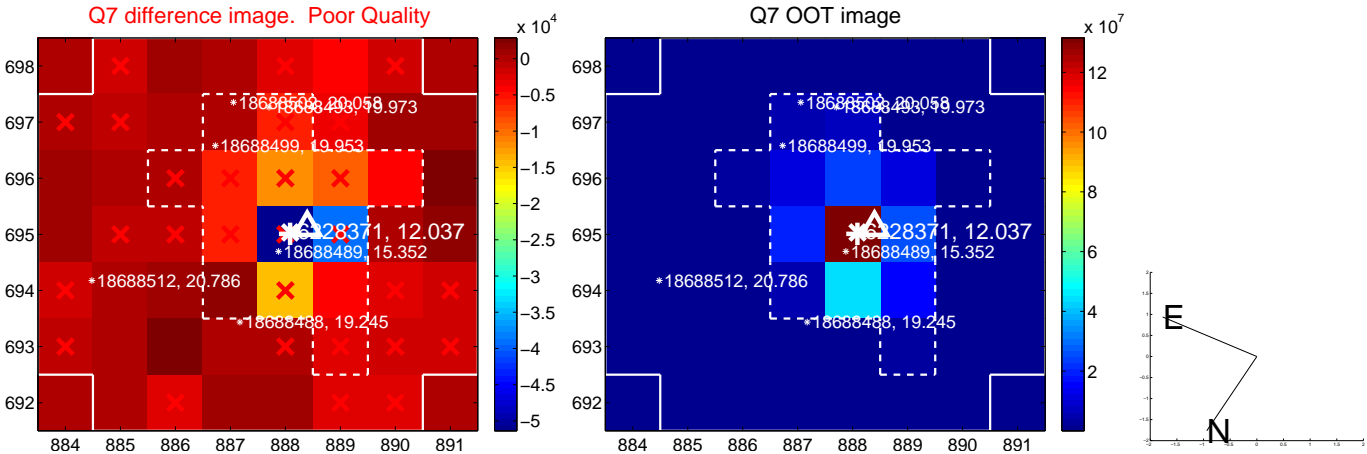
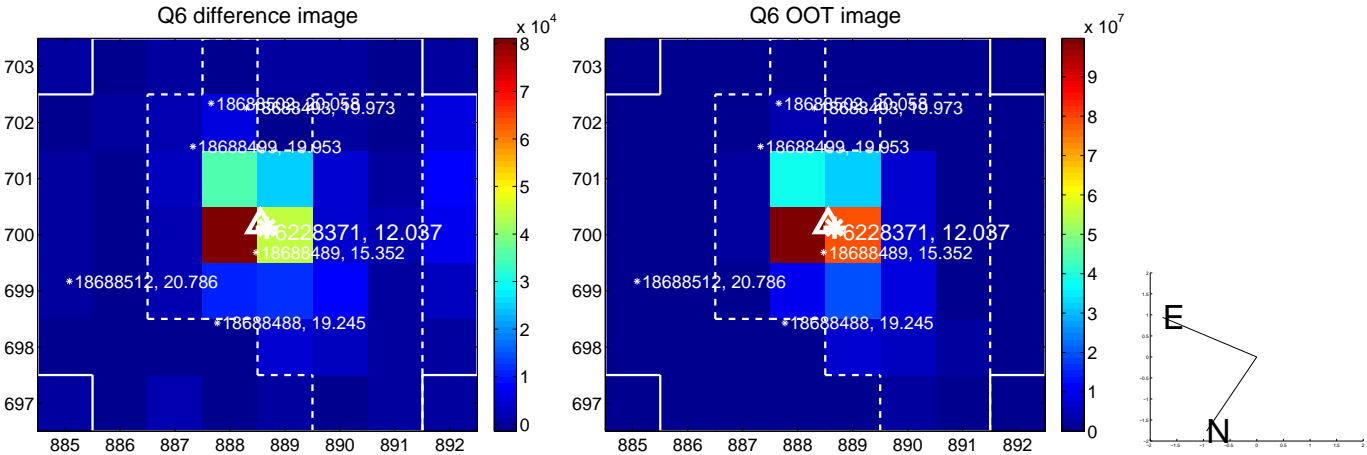
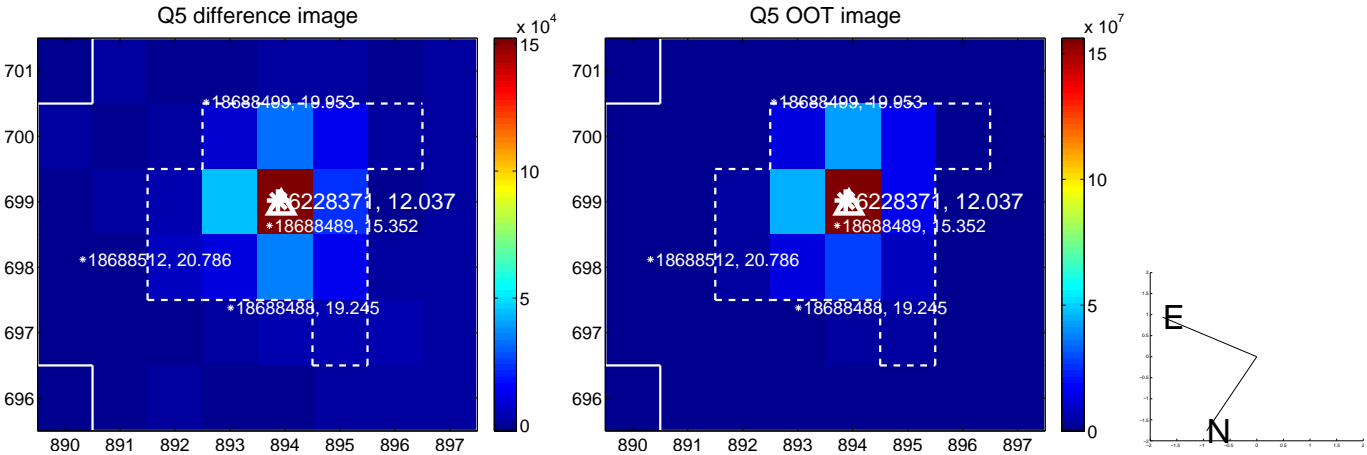


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

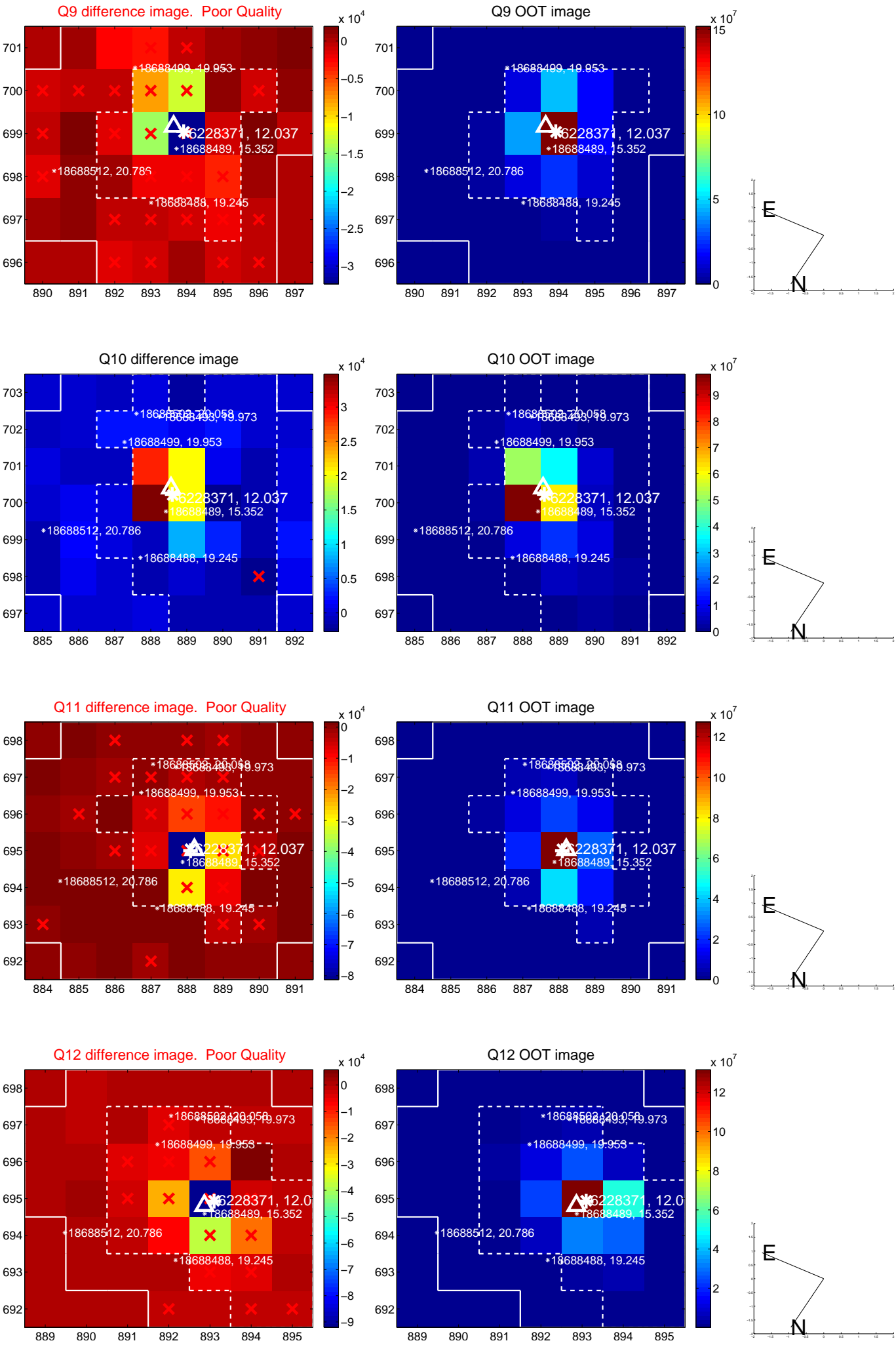
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

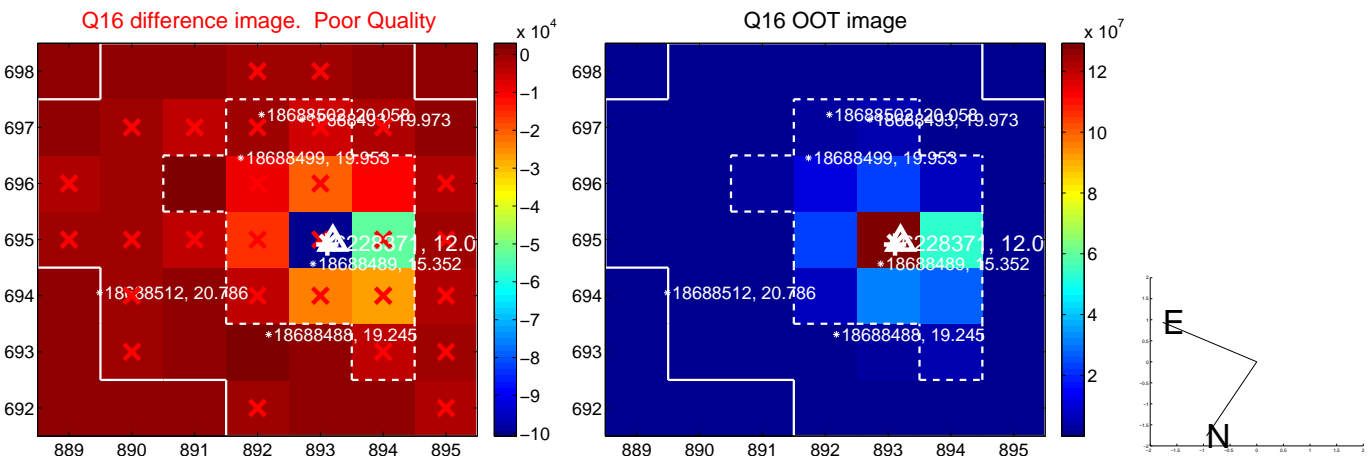
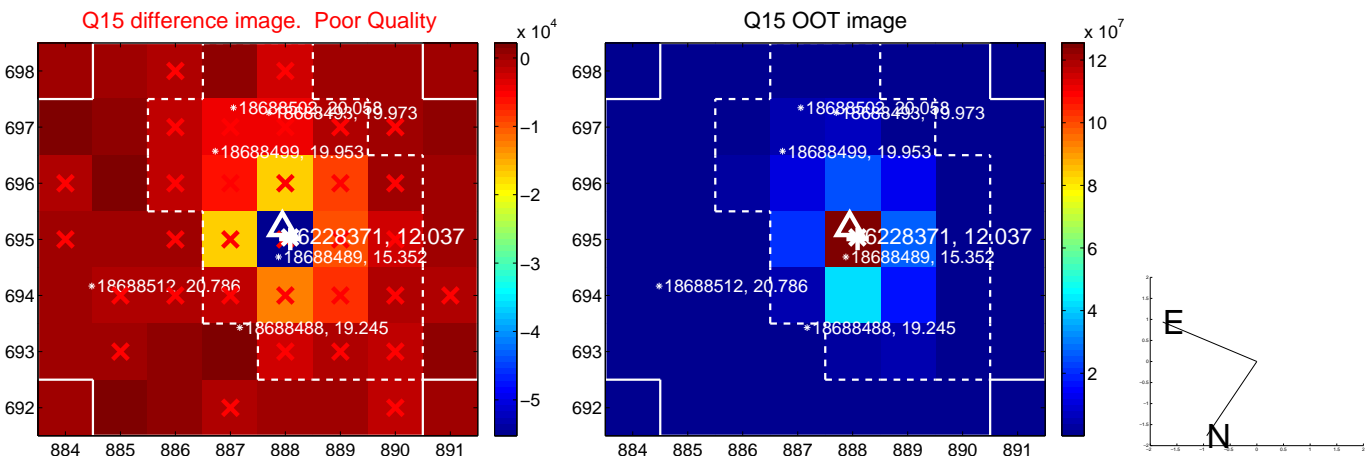
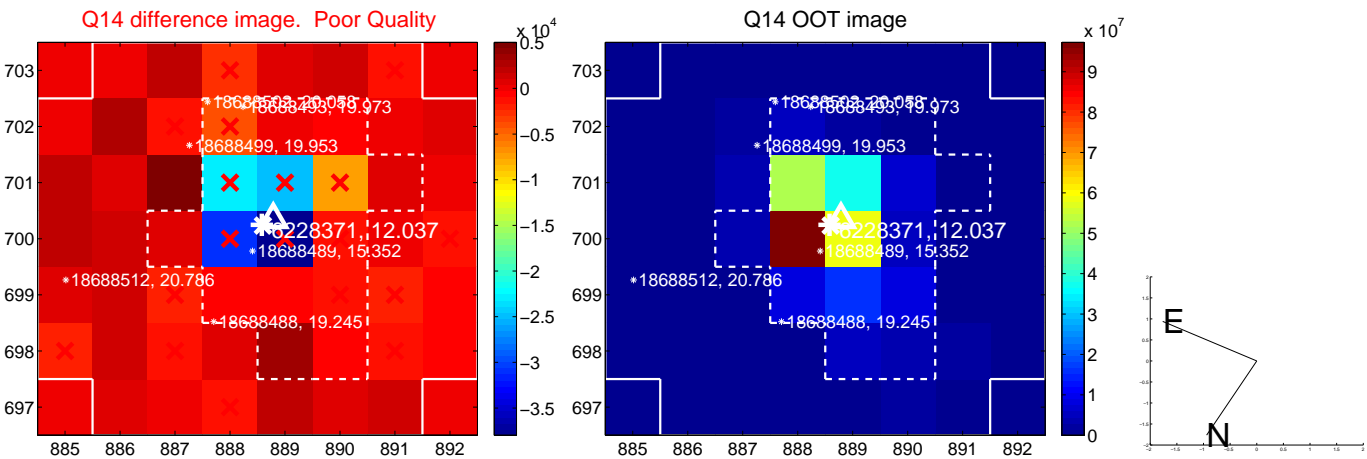
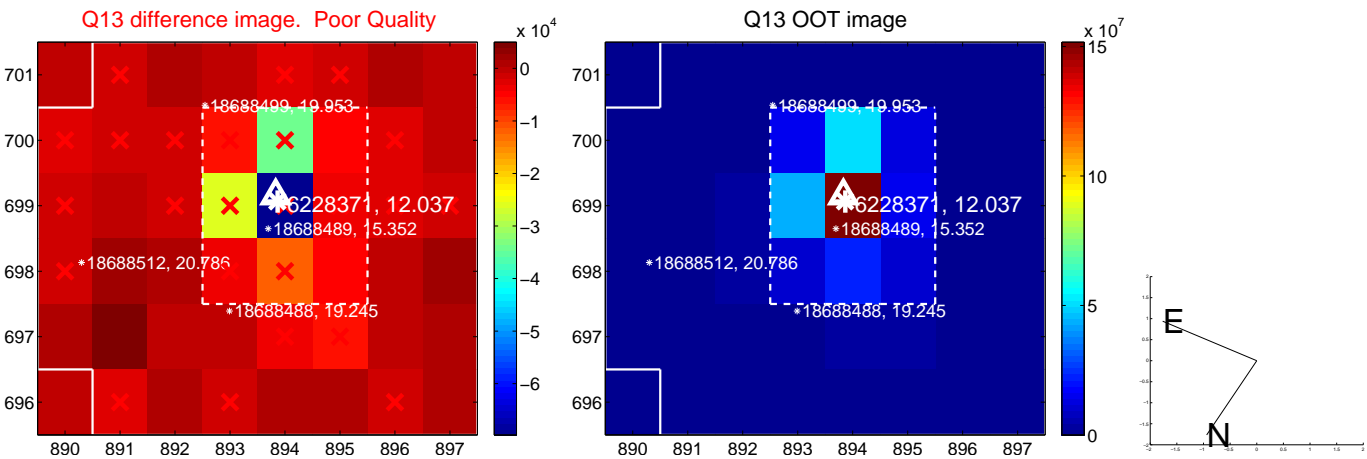


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

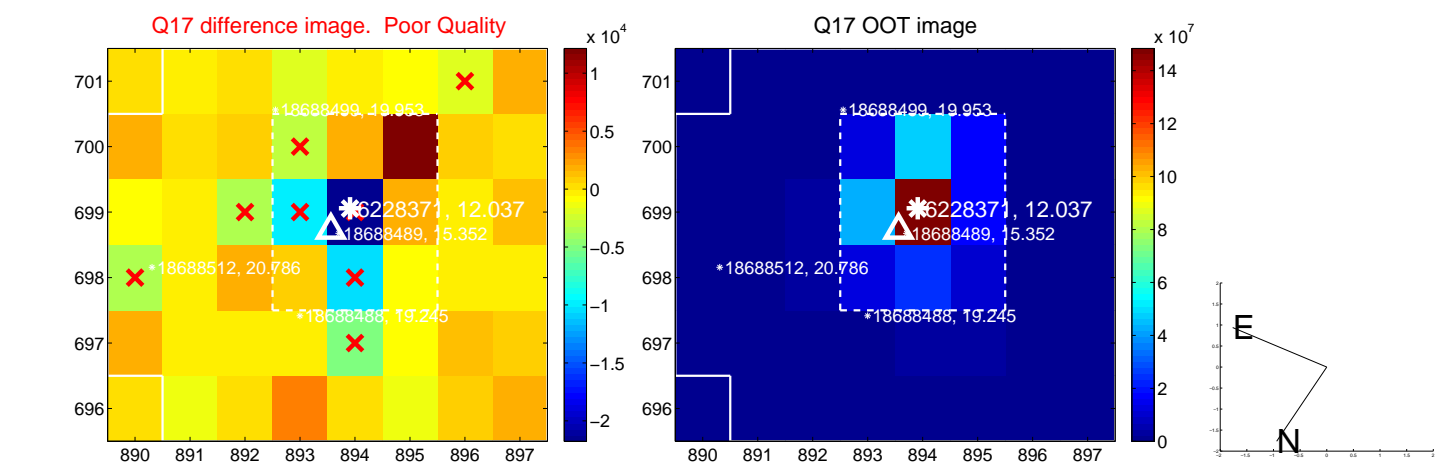




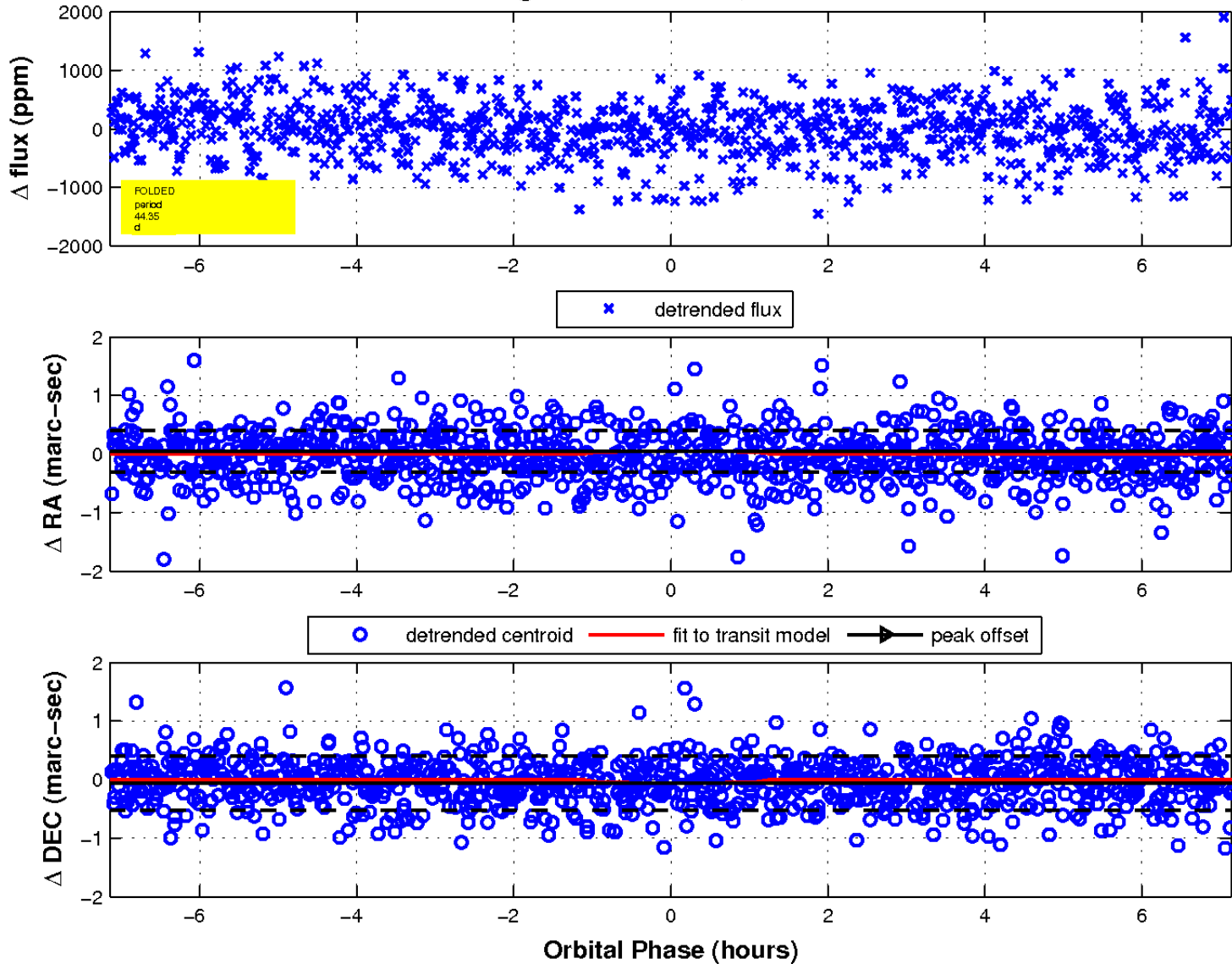
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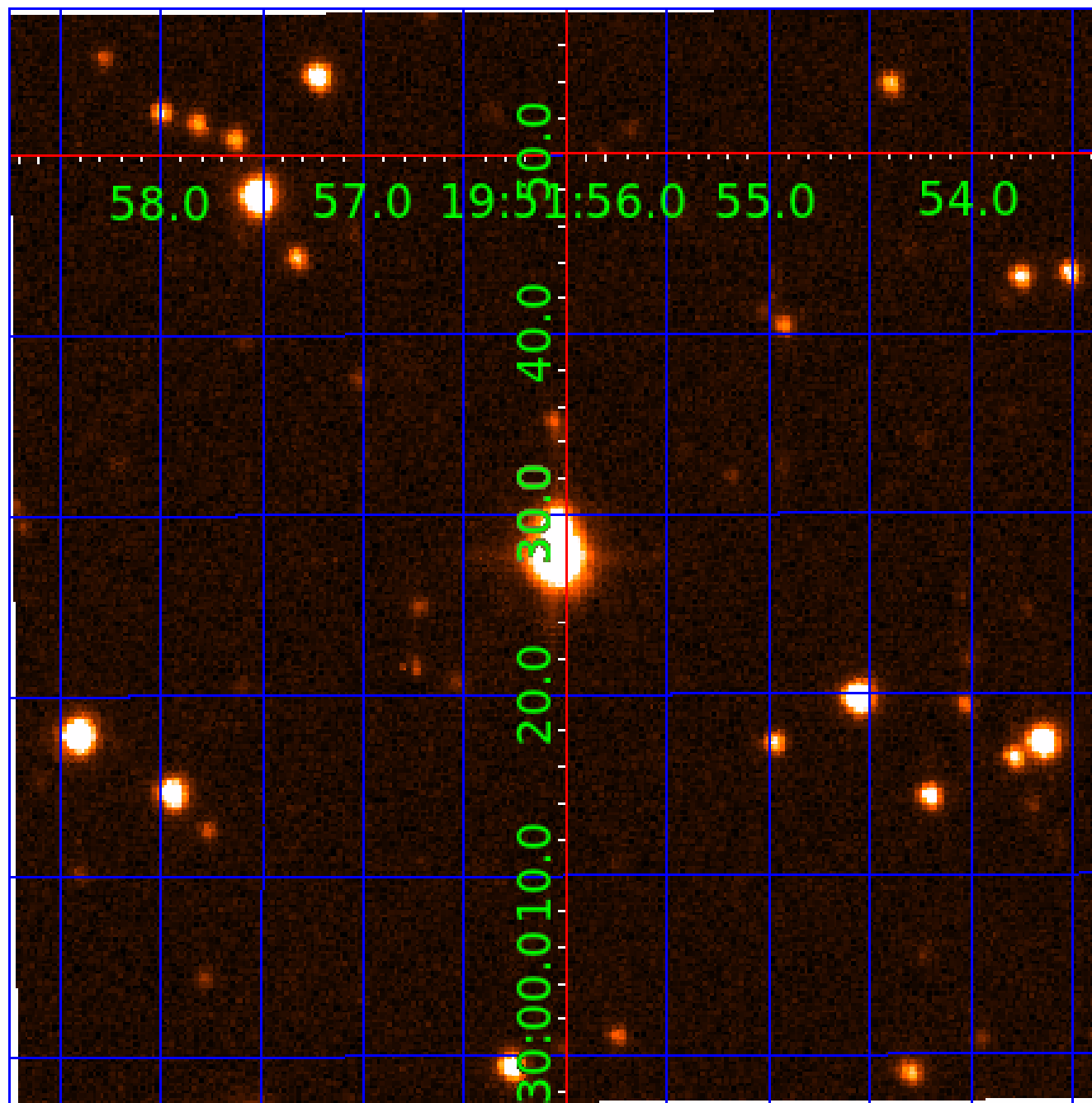


fluxWeightedCentroids, Planet 2 of 7



UKIRT Image

Declination



# KIC 006228371

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006228371-01	OBS	No	1.945627	132.146664	44.7	13.115	11.5	6.2	4.59	7810	3.12	42269.19
006228371-02	OBS	No	44.354229	153.726345	1084.4	2.383	16.8	13.4	4.59	7810	16.23	653.92
006228371-03	OBS	No	87.142109	142.860482	953.0	6.176	14.1	14.7	4.59	7810	17.81	265.75
006228371-04	OBS	No	23.181307	148.780900	531.2	3.350	14.2	12.8	4.59	7810	12.15	1553.29
006228371-05	OBS	No	10.097525	138.381023	480.5	2.586	13.8	14.5	4.59	7810	12.24	4704.18
006228371-06	OBS	No	274.253538	267.743426	1339.7	69.177	12.6	9.9	4.59	7810	16.93	57.62
006228371-07	OBS	No	11.997651	136.206884	292.4	6.758	12.3	10.9	4.59	7810	8.74	3738.02

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006228371-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT
006228371-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
006228371-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
006228371-04	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
006228371-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
006228371-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
006228371-07	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—HALO_GHOST

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

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

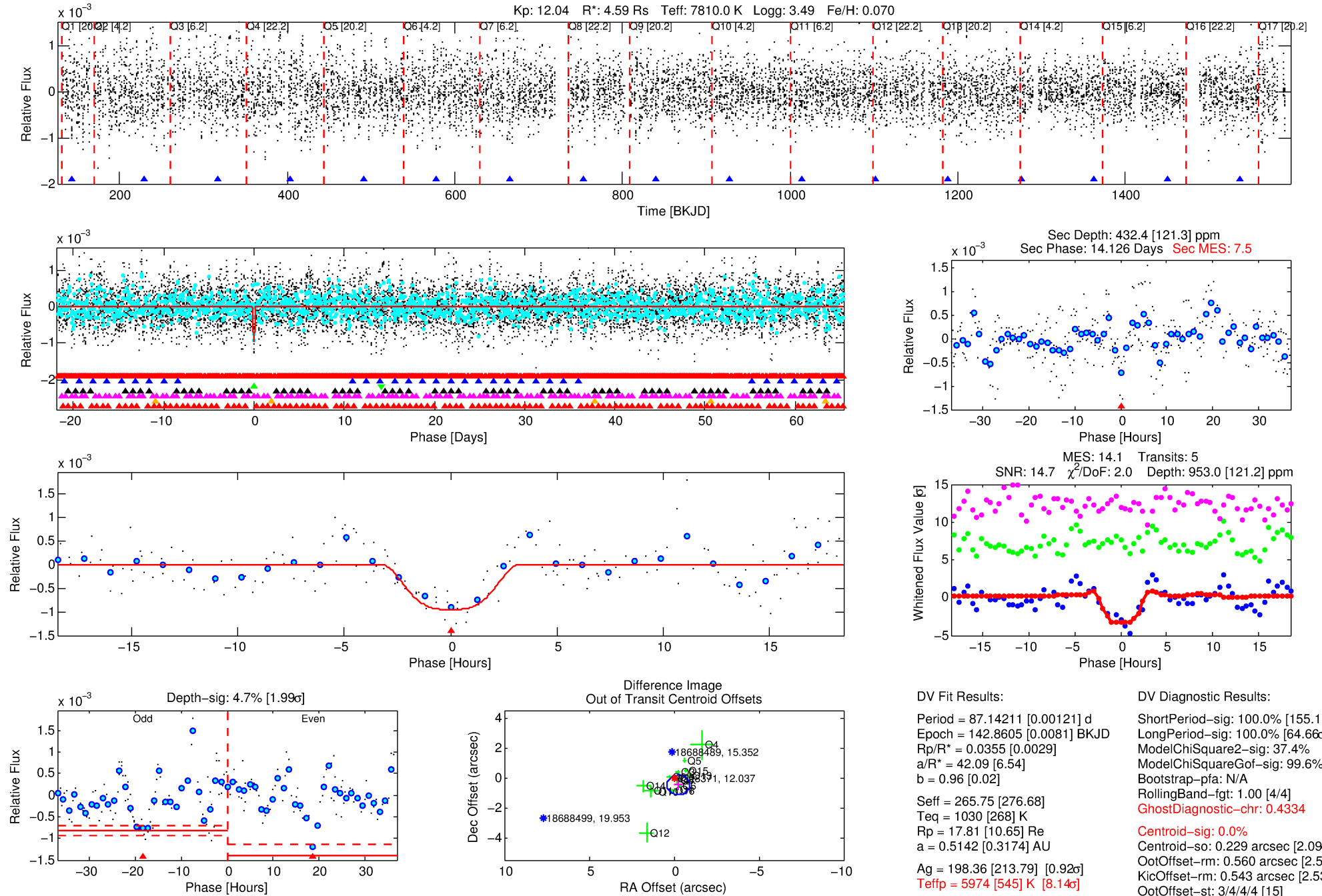
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 006228371-03

No Significant Match Found

# DV One-Page Summary

KIC: 6228371 Candidate: 3 of 7 Period: 87.142 d

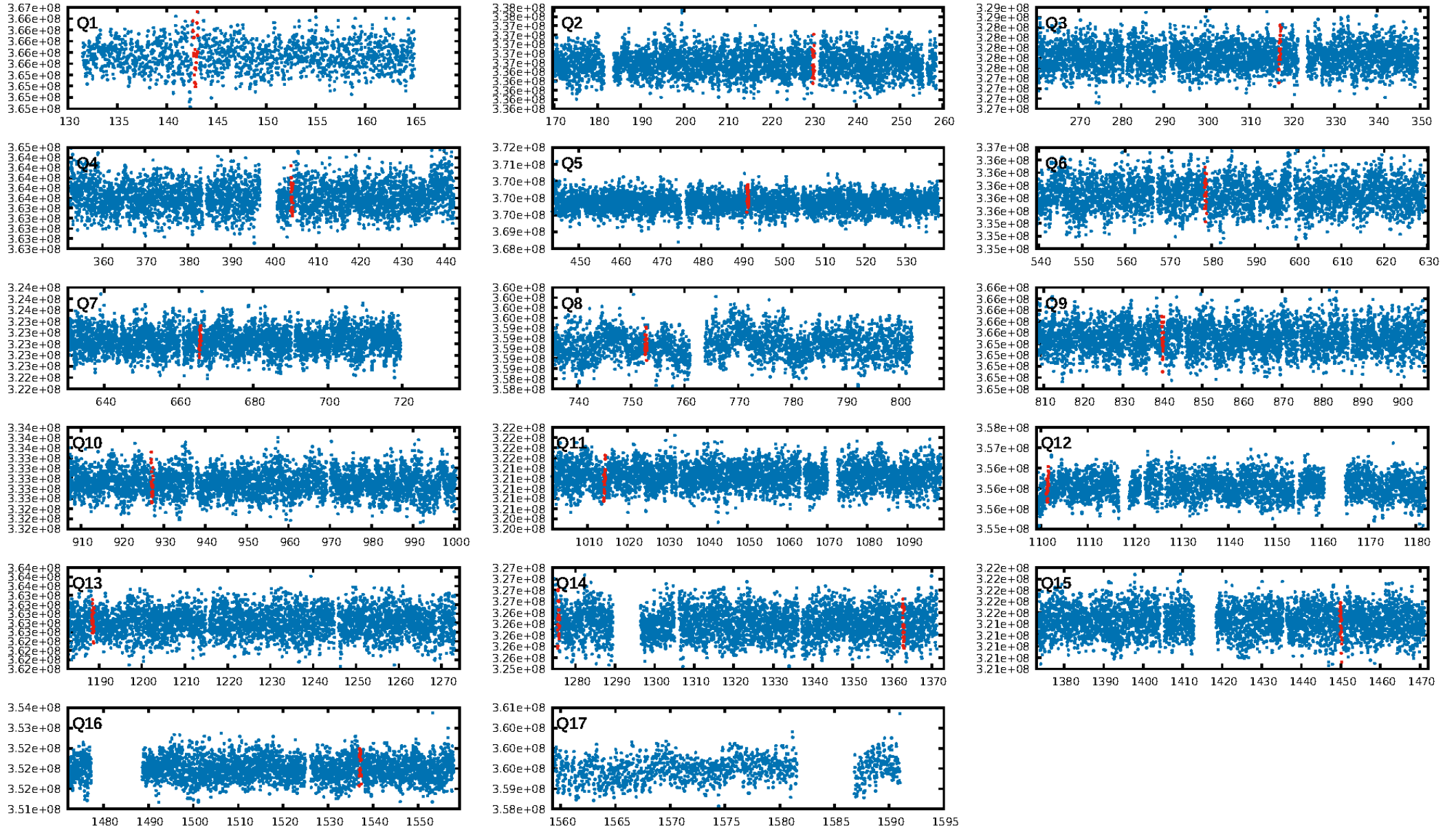


Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 06:04:19 Z

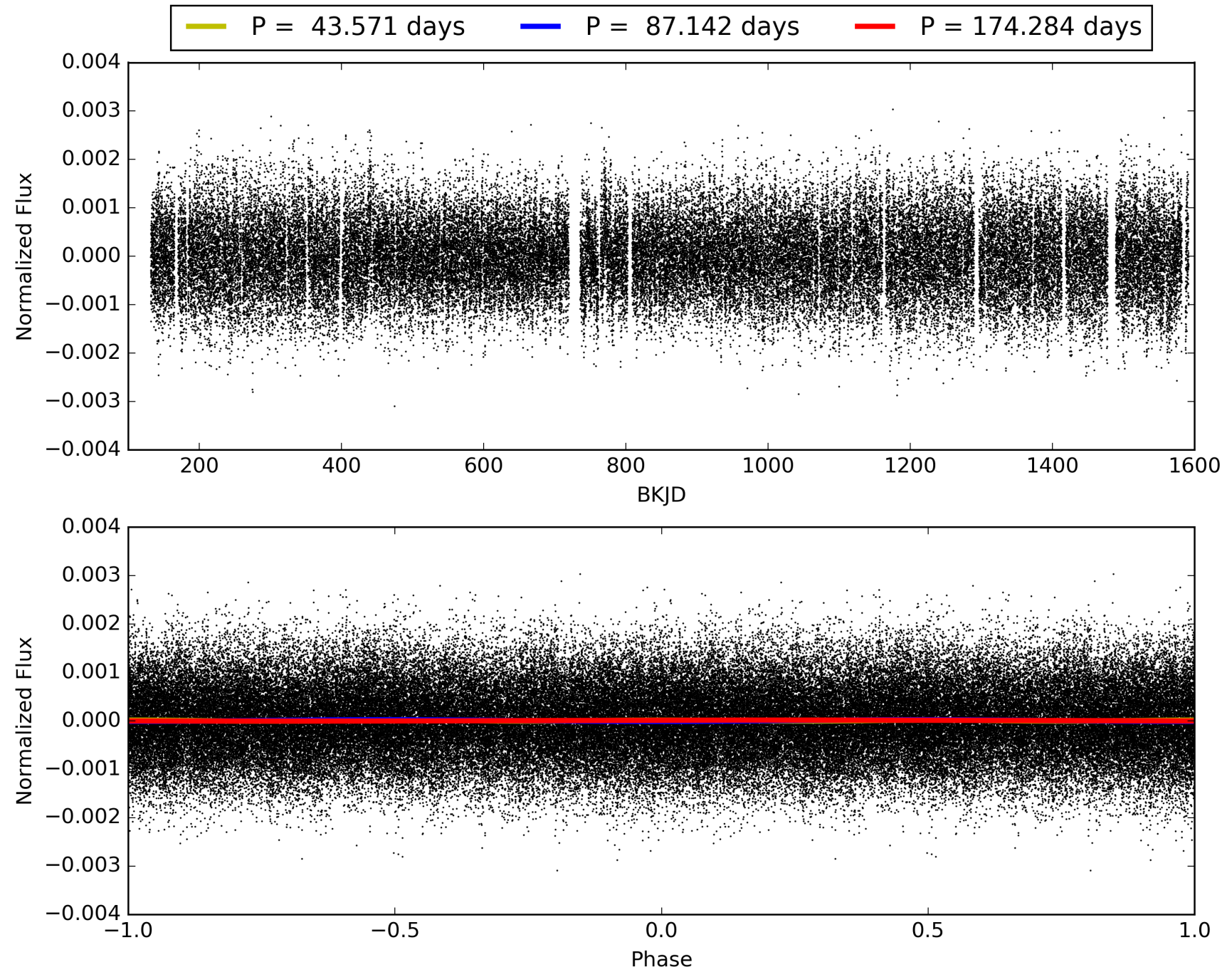
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 006228371-03, PDC Light Curves

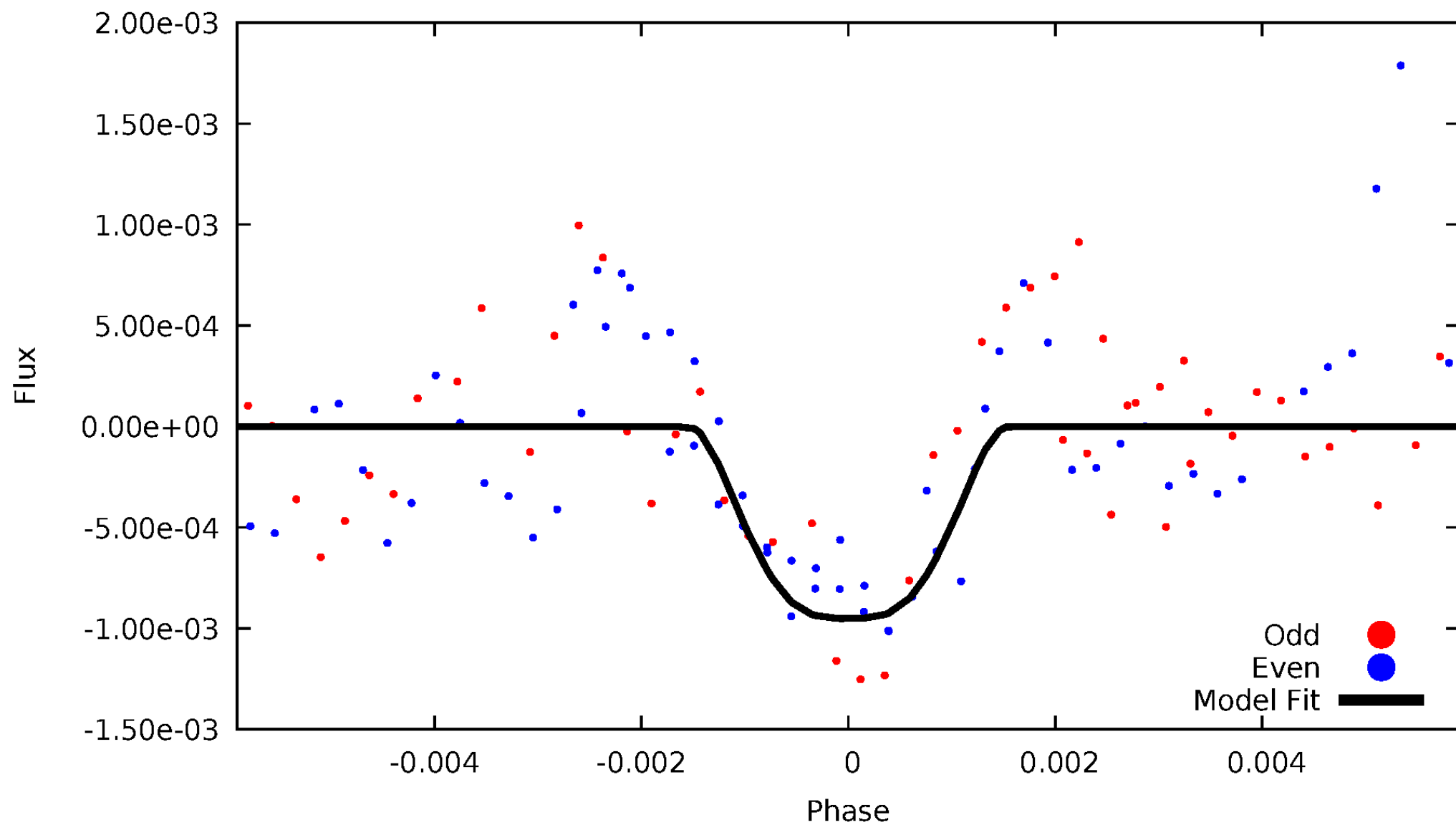


# TCE 006228371-03



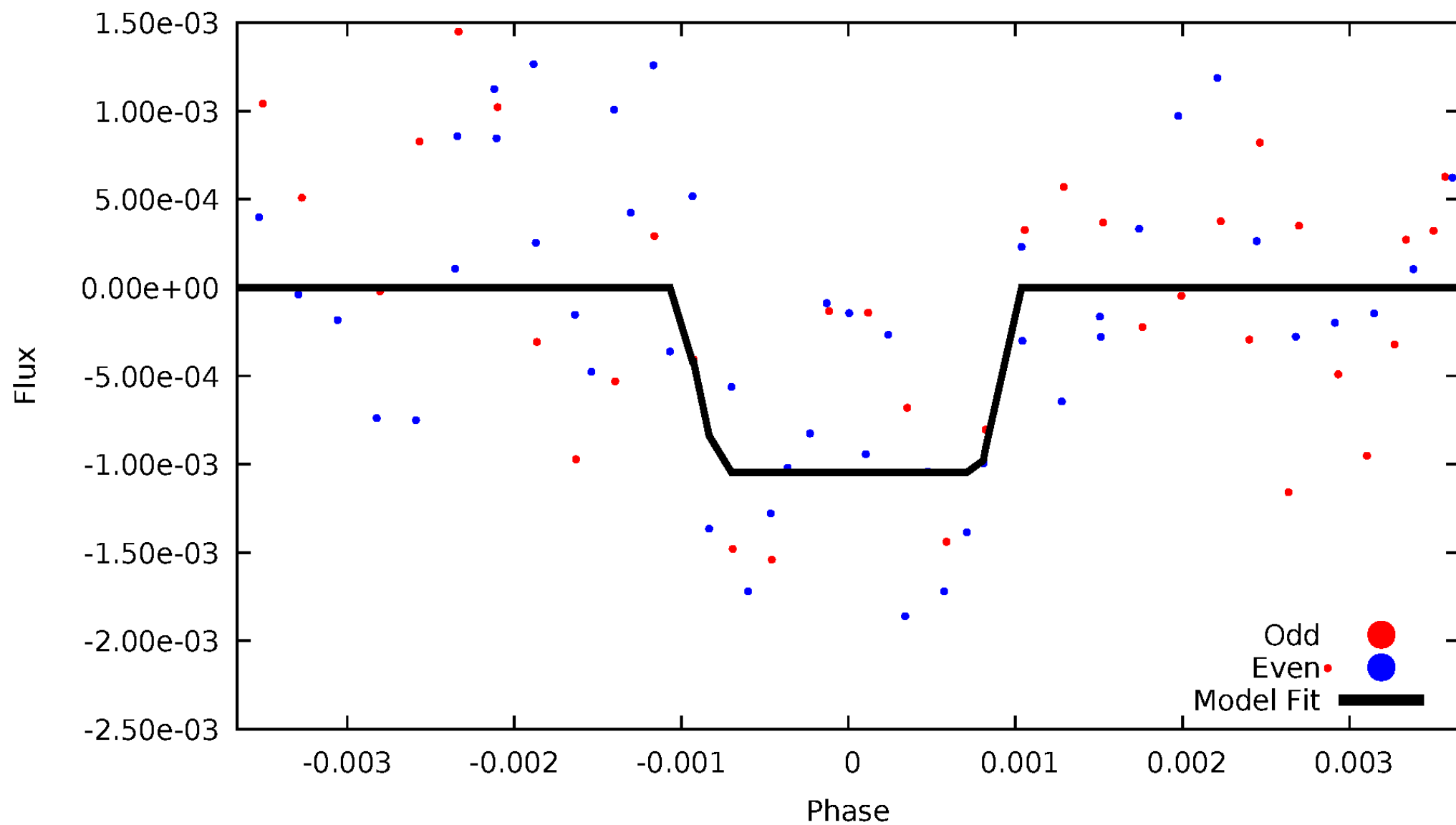
# DV Odd/Even

TCE 006228371-03



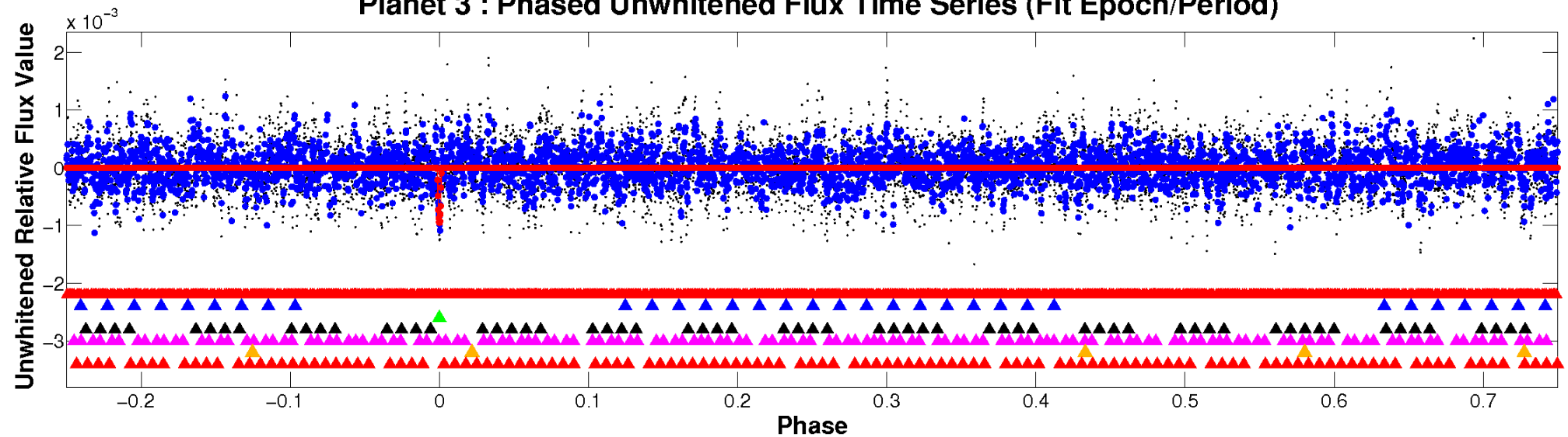
# ALT Odd/Even

TCE 006228371-03

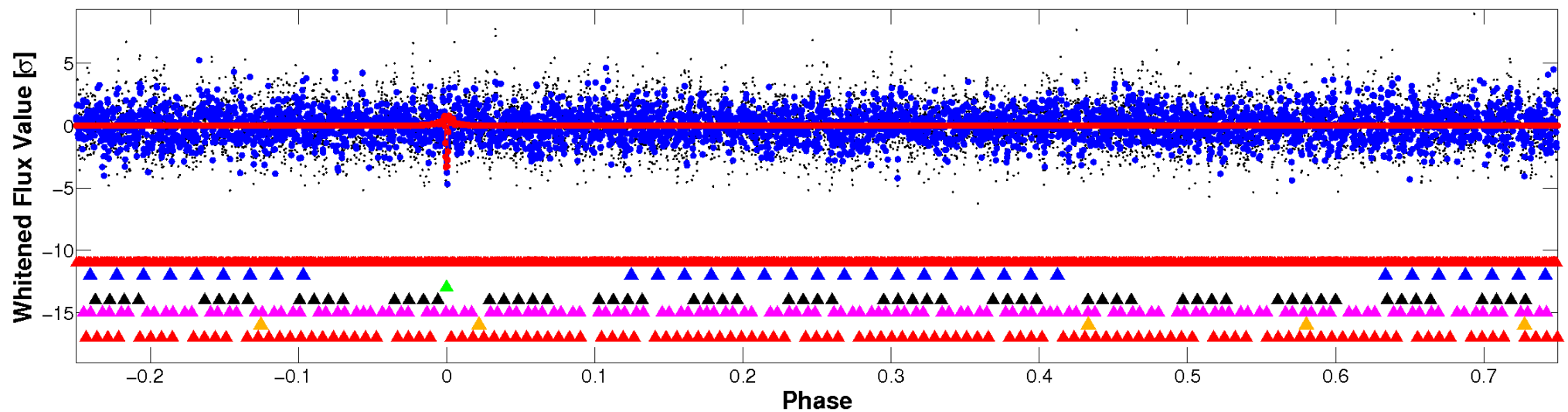


# Non-Whitened Vs. Whitened Light Curve

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

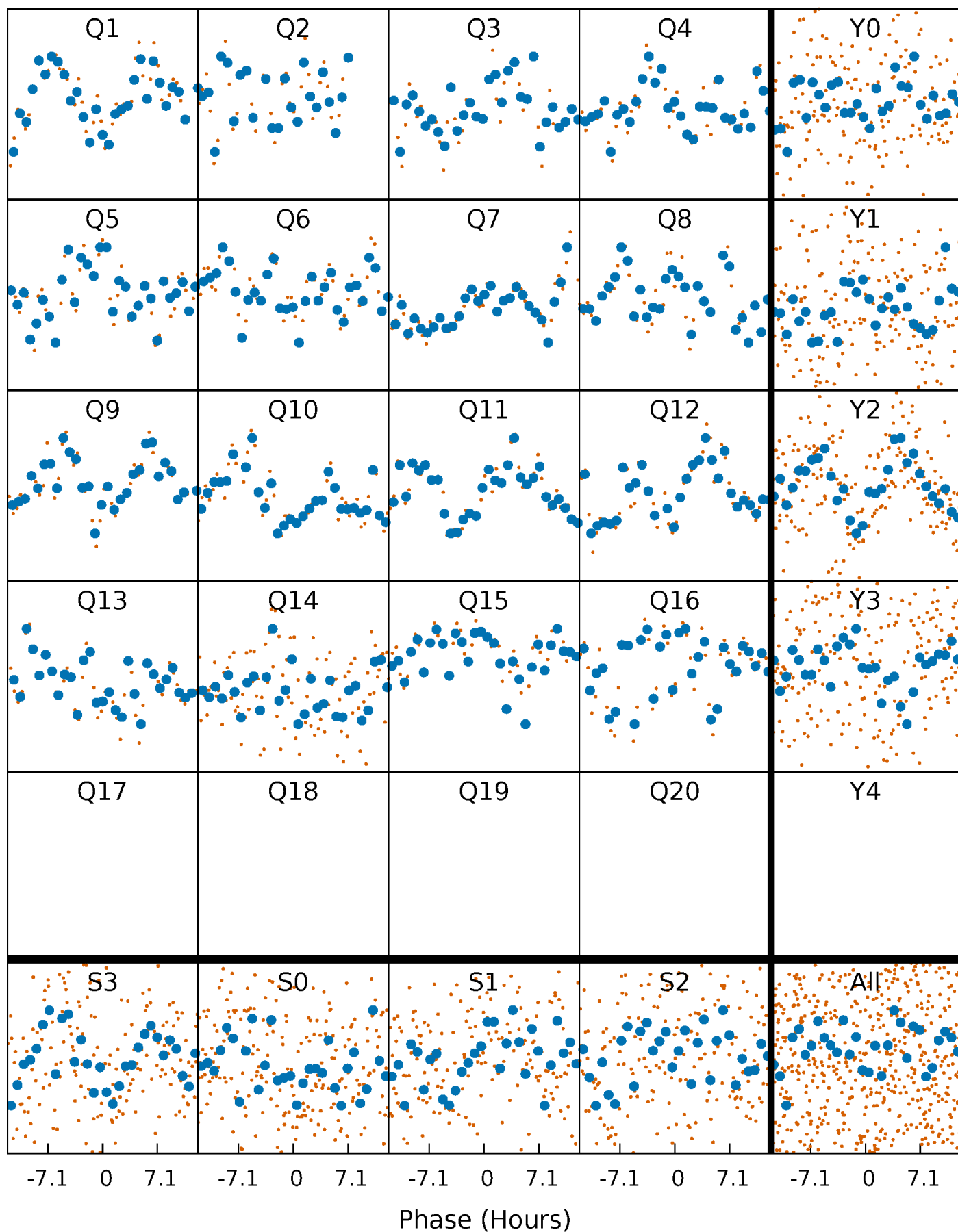


## Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

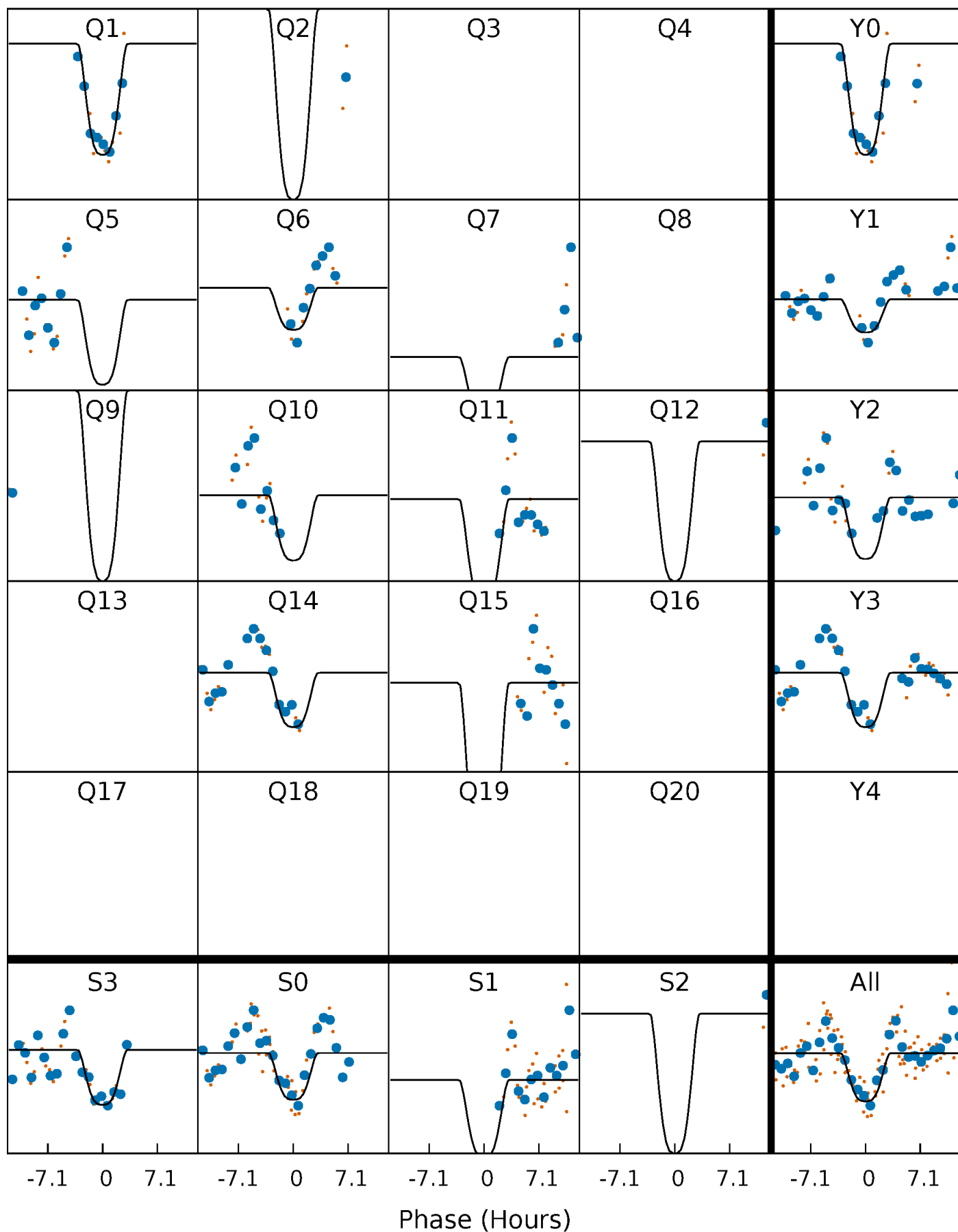
TCE 006228371-03     $P = 87.142109$  Days     $T_0 = 142.860481$  (BKJD)





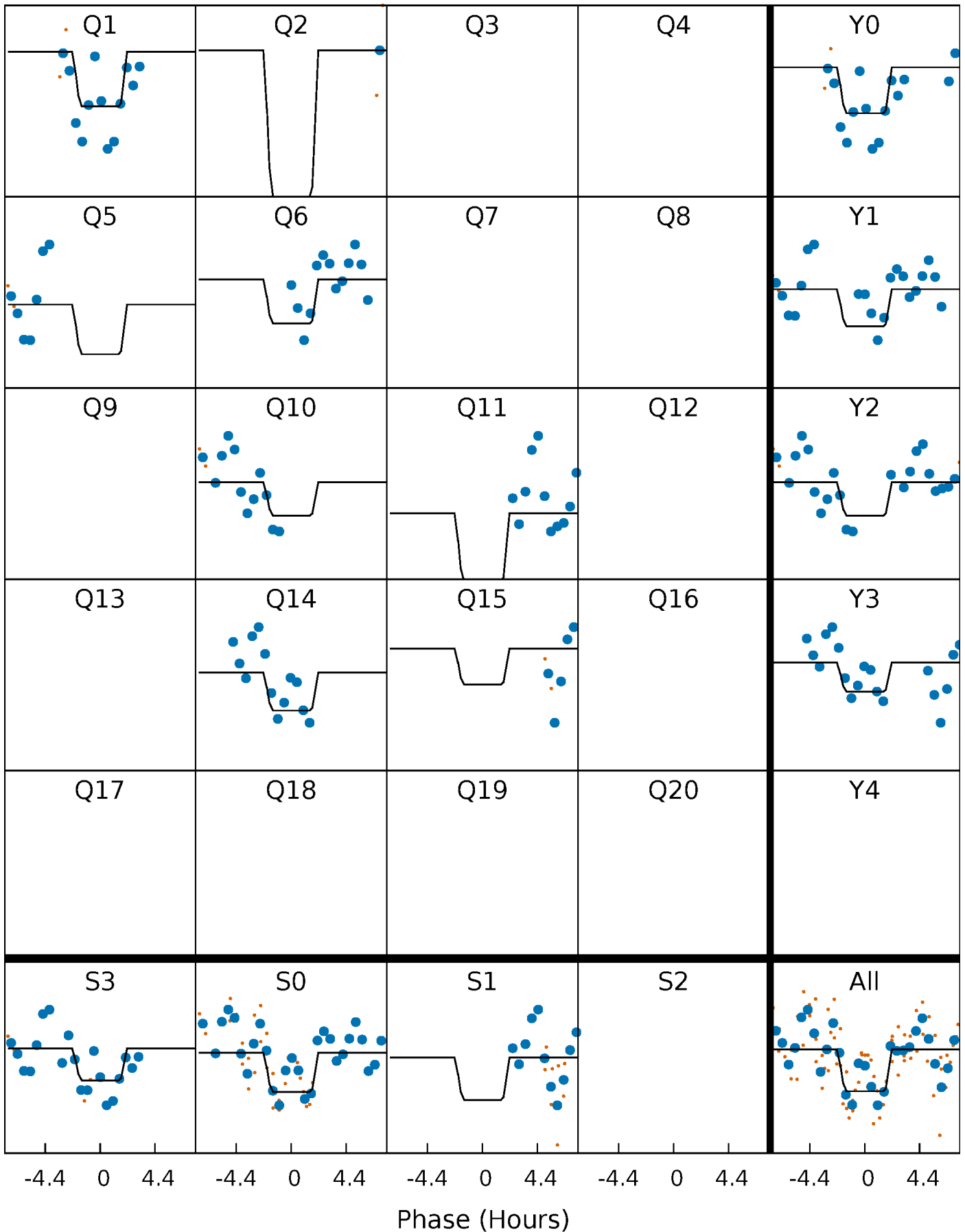
# DV Quarter-Phased Transit Curves

TCE 006228371-03 P= 87.142109 Days  $T_0=142.860481$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

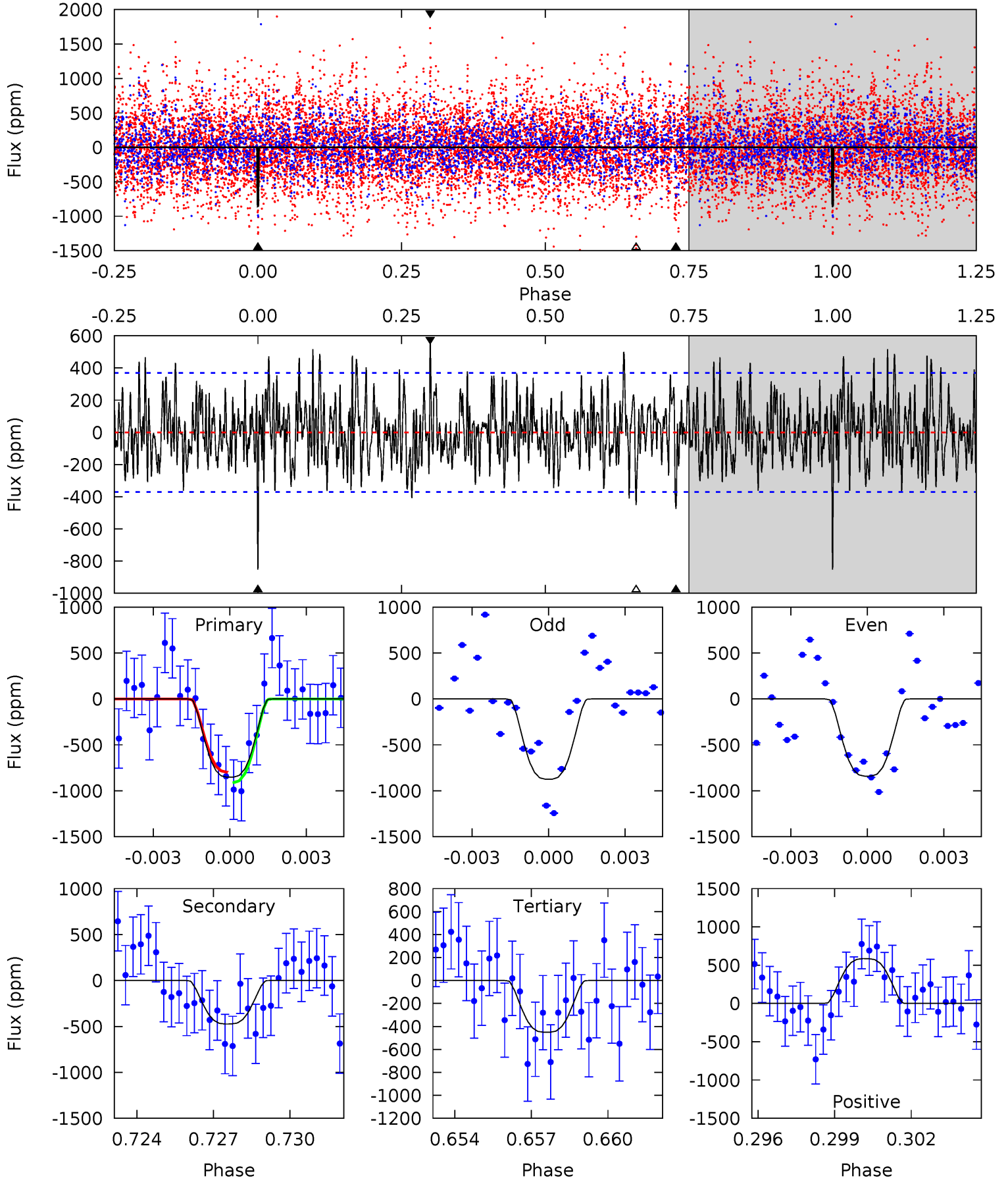
TCE 006228371-03 P= 87.141297 Days  $T_0=142.844051$  (BKJD)



# DV Model-Shift Uniqueness Test

006228371-03, P = 87.142109 Days, E = 55.718372 Days

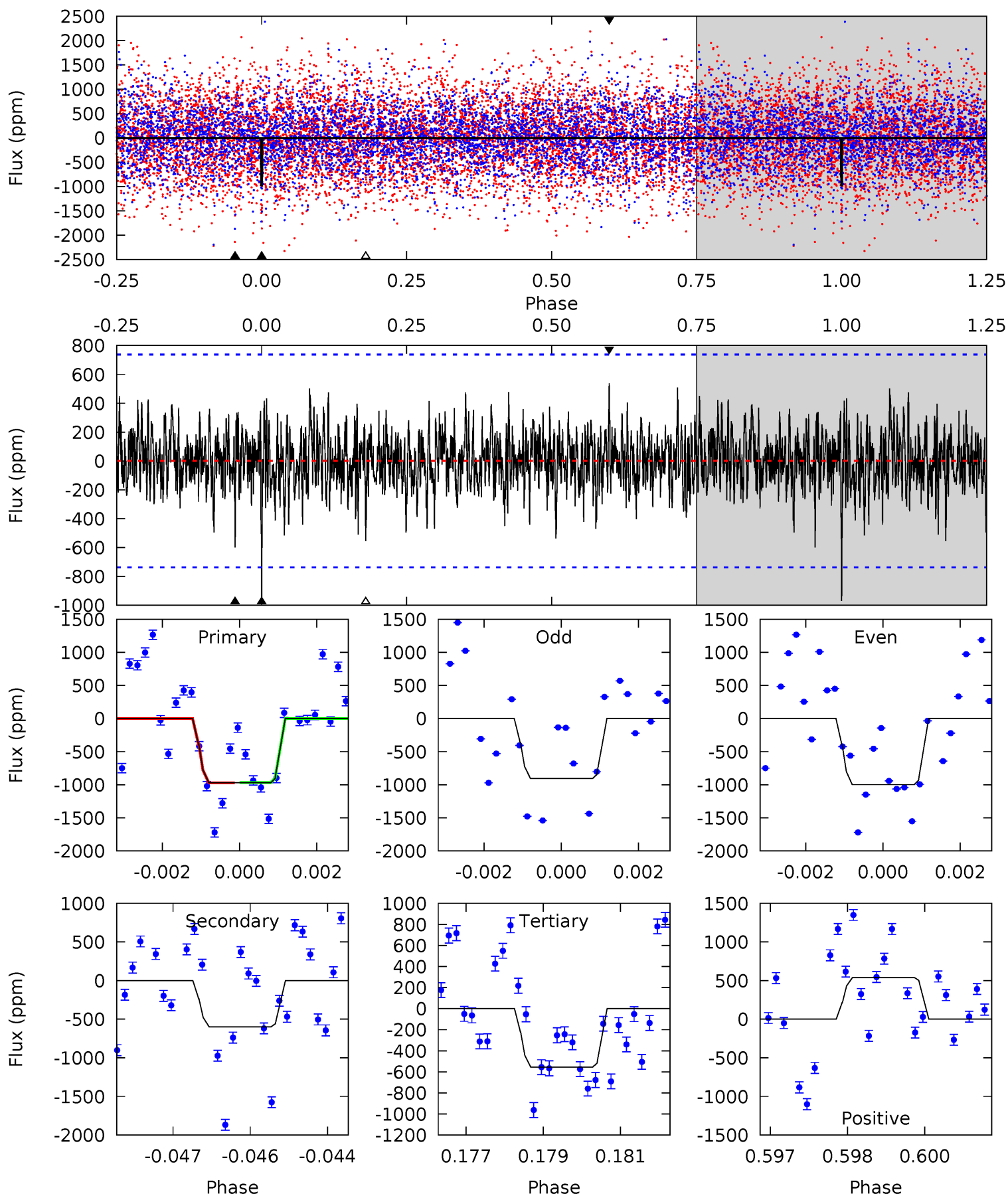
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.1	6.73	6.41	8.32	5.25	2.97	2.29	5.70	3.79	0.32	-1.59	0.23	0.92	0.41	0.80



# Alt Model-Shift Uniqueness Test

006228371-03, P = 87.141297 Days, E = 55.702754 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
7.04	4.34	4.02	3.91	5.35	3.13	1.17	3.02	3.13	0.32	0.43	0.31	1.03	0.36	0.02



### Stellar Parameters For KIC 006228371

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7810^{+217}_{-326}$	$3.492^{+0.618}_{-0.195}$	$0.070^{+0.200}_{-0.400}$	$4.591^{+0.302}_{-2.721}$	$2.386^{+0.249}_{-0.796}$	$0.035^{+0.286}_{-0.004}$
	+3%/-4%	+18%/-6%	+286%/-571%	+7%/-59%	+10%/-33%	+822%/-11%
Source	KIC0	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 006228371-03 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-474 \pm 70$	$17.35^{+2.38}_{-4.34}$	$1419^{+84}_{-174}$	$5929^{+423}_{-313}$	$230^{+151}_{-66}$
Alt.	$-598 \pm 138$	$15.79^{+1.99}_{-4.43}$	$1425^{+81}_{-193}$	$6630^{+529}_{-552}$	$357^{+248}_{-114}$

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

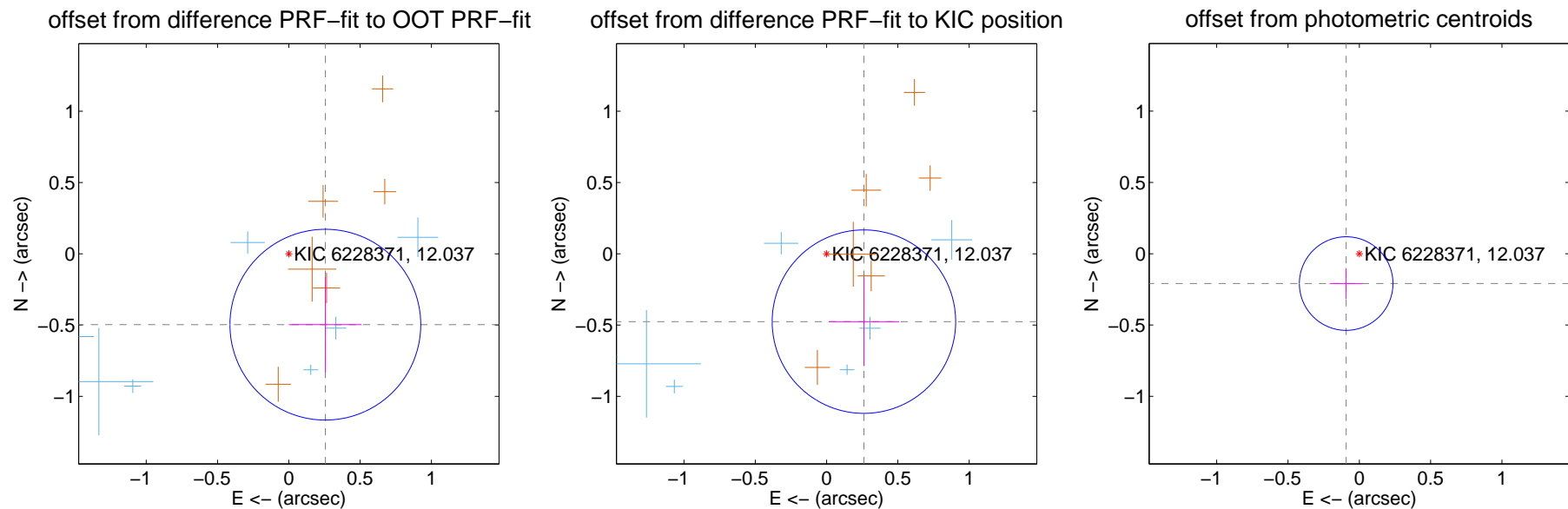
## DV Centroid Data

Supplemental centroid analysis for 006228371-03. Kepler magnitude: 12.04. Transit SNR 14.71

There are 7 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.12 arcsec

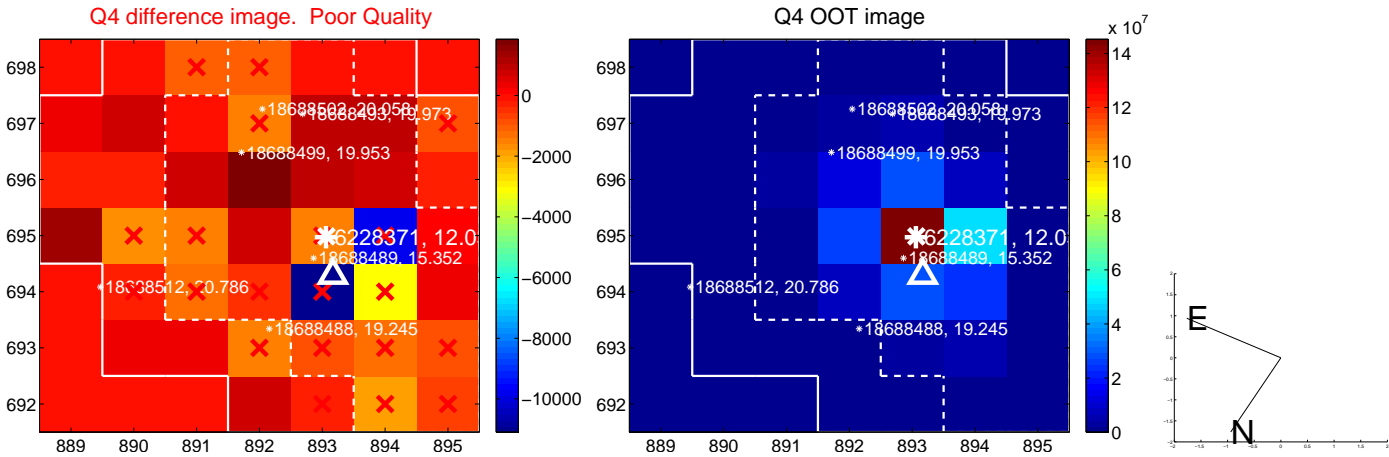
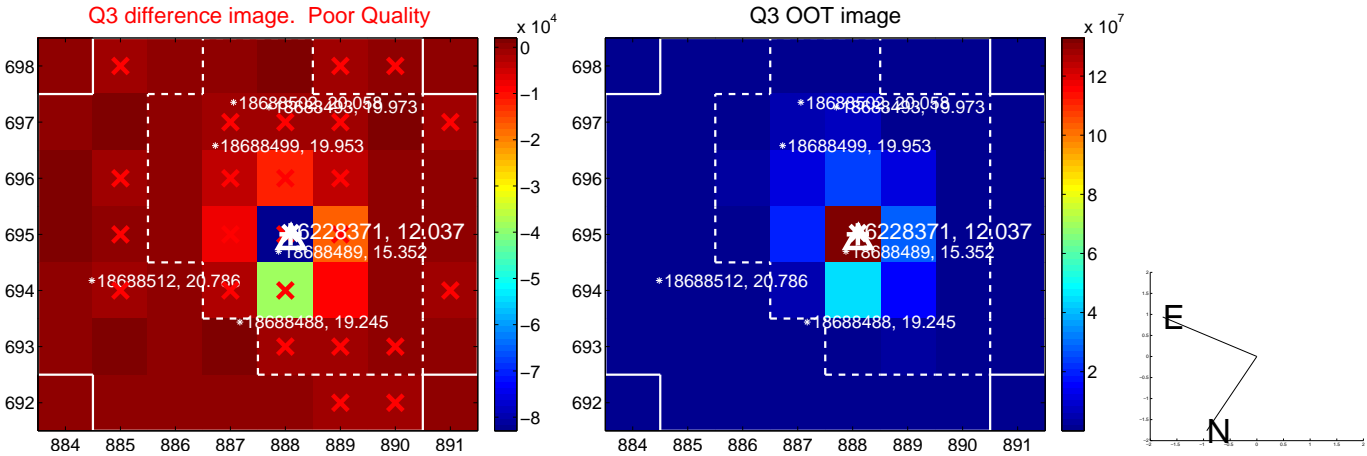
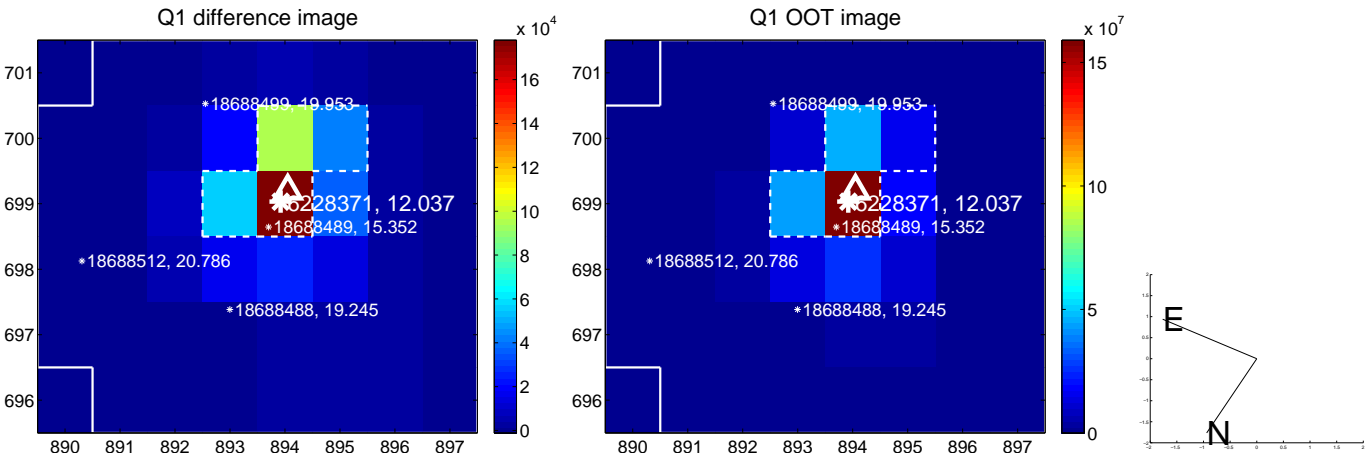
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.560 \pm 0.223$	2.51	$-0.256 \pm 0.255$	$-0.497 \pm 0.334$
PRF-fit source offset from KIC position	$0.543 \pm 0.215$	2.53	$-0.262 \pm 0.247$	$-0.476 \pm 0.312$
photometric centroid source offset	$0.23 \pm 0.11$	2.09	$0.09 \pm 0.12$	$-0.21 \pm 0.11$



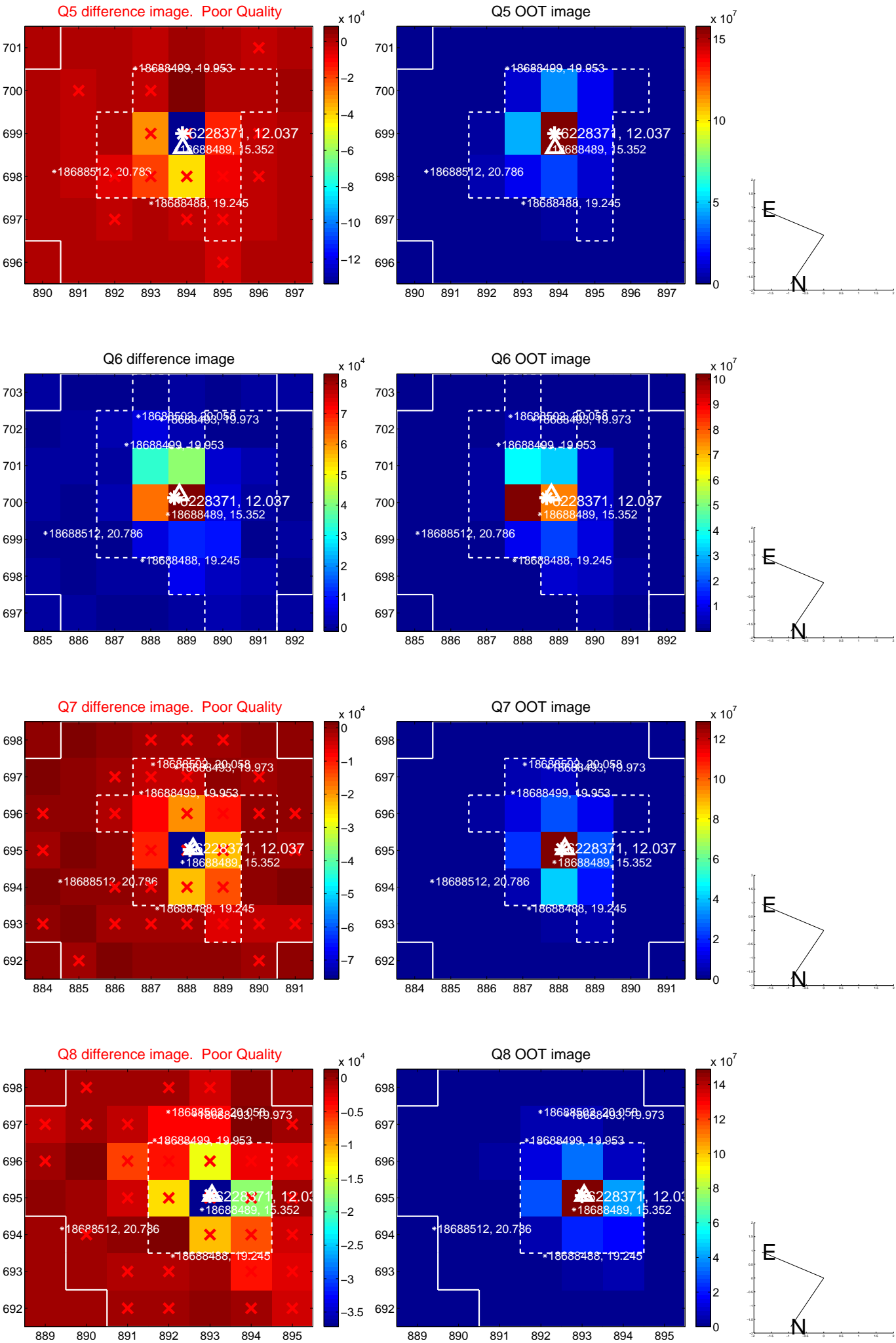
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



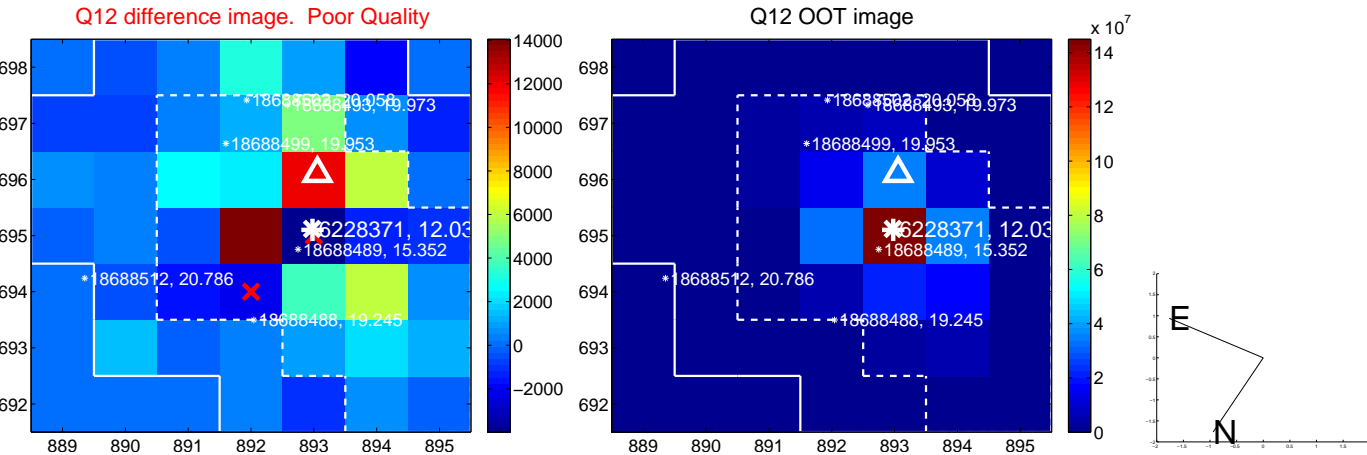
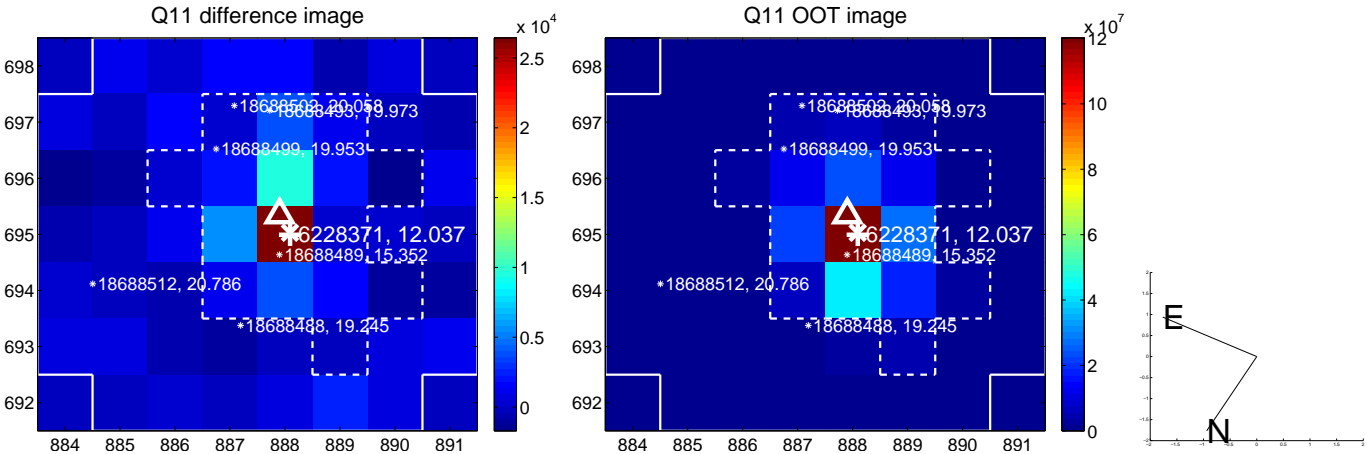
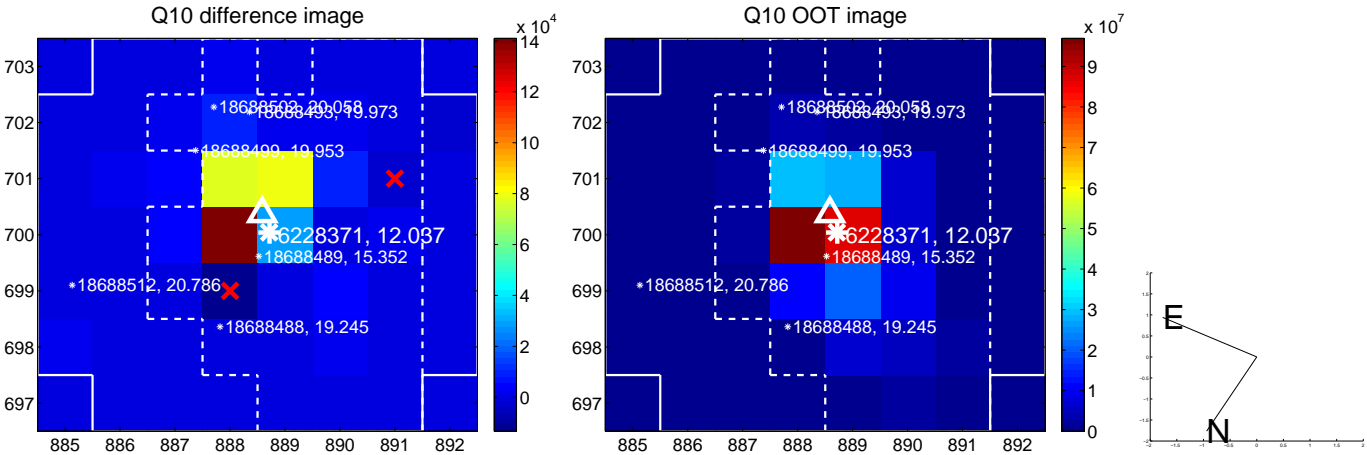
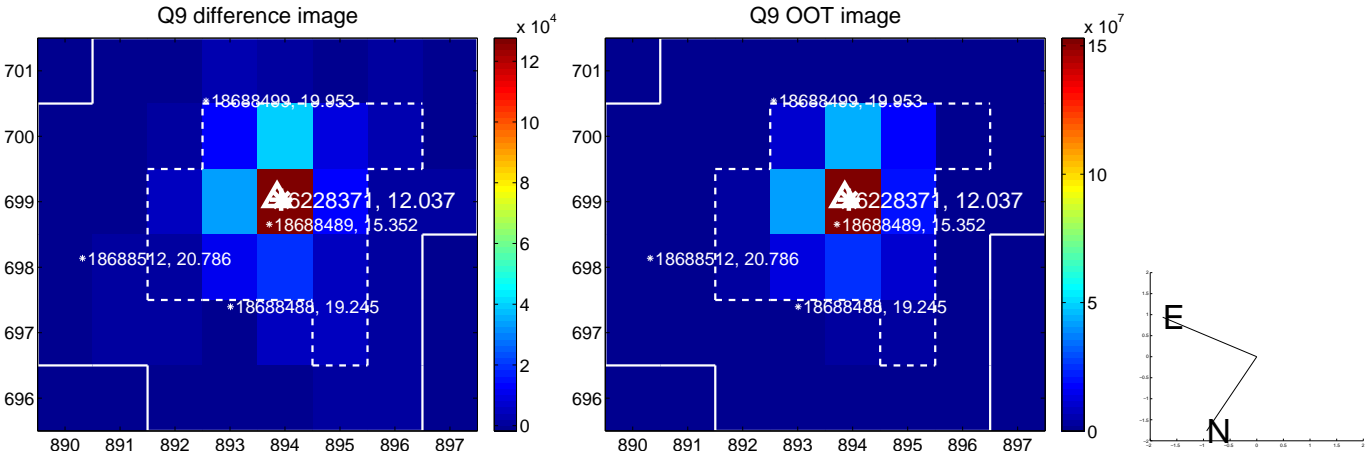
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



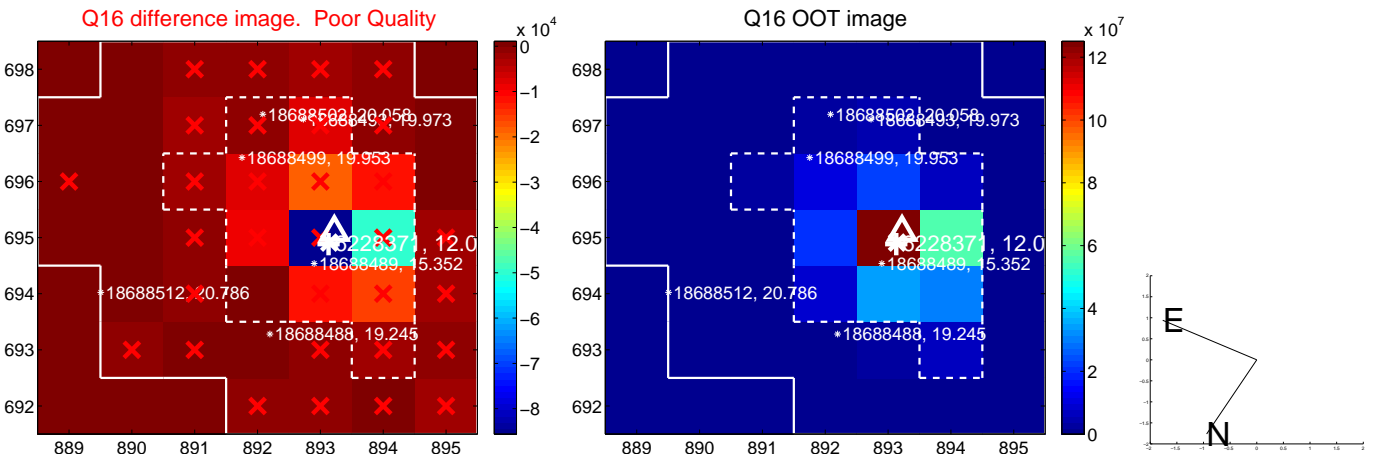
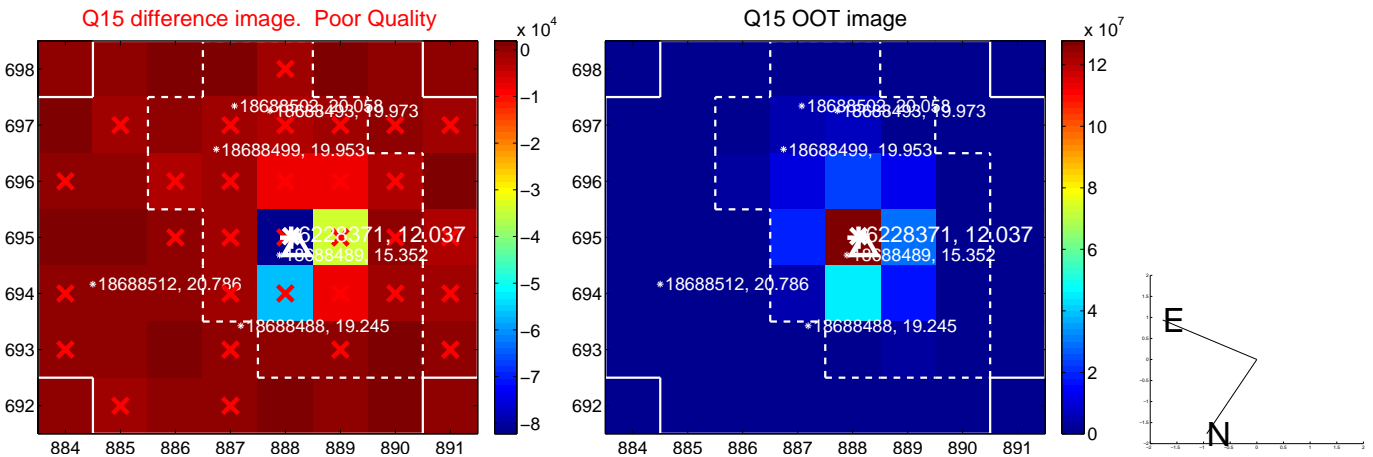
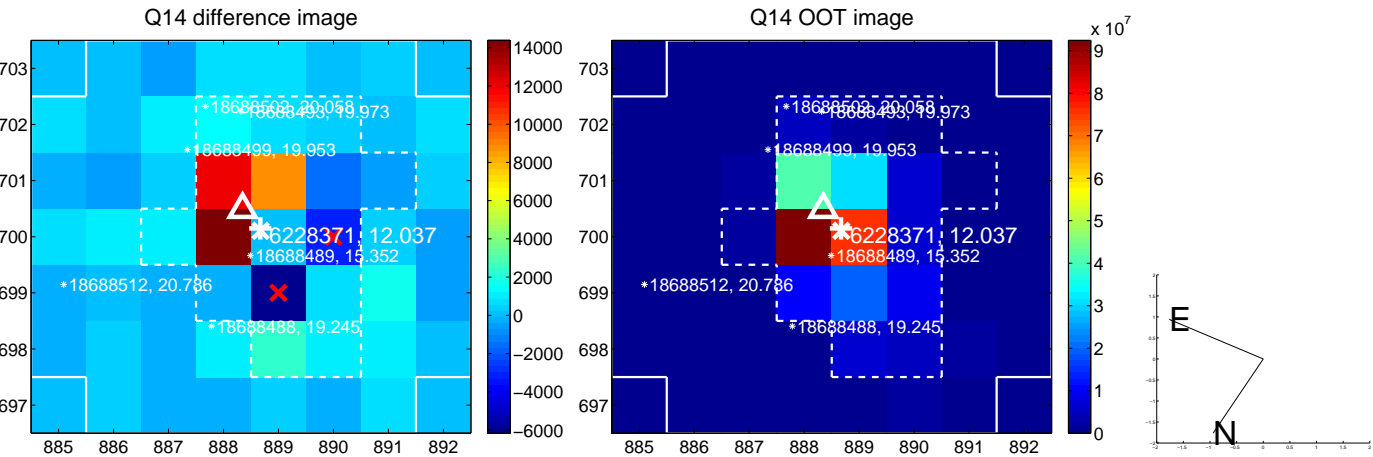
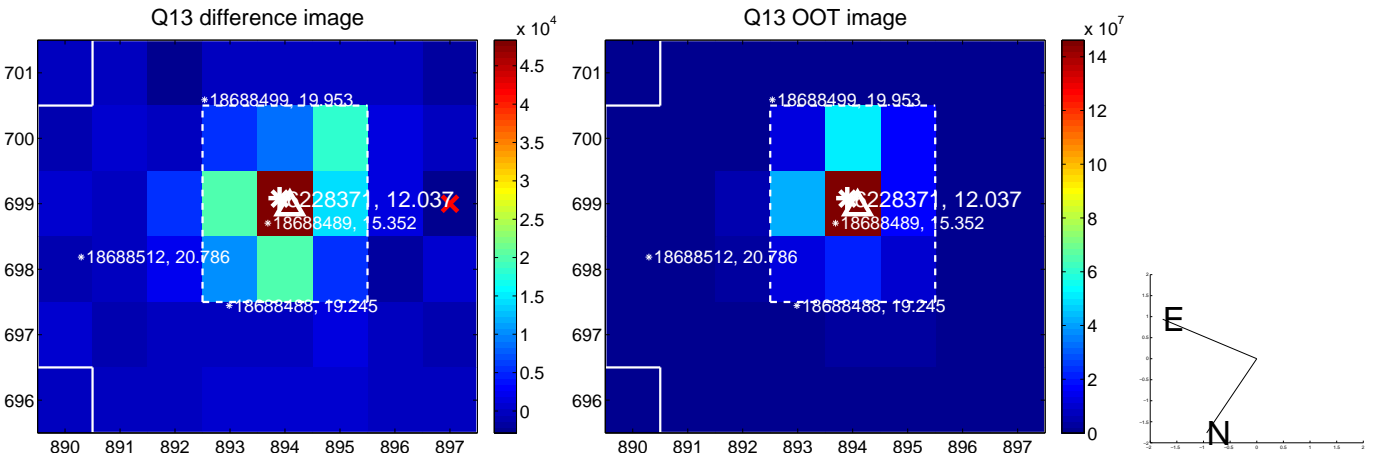
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



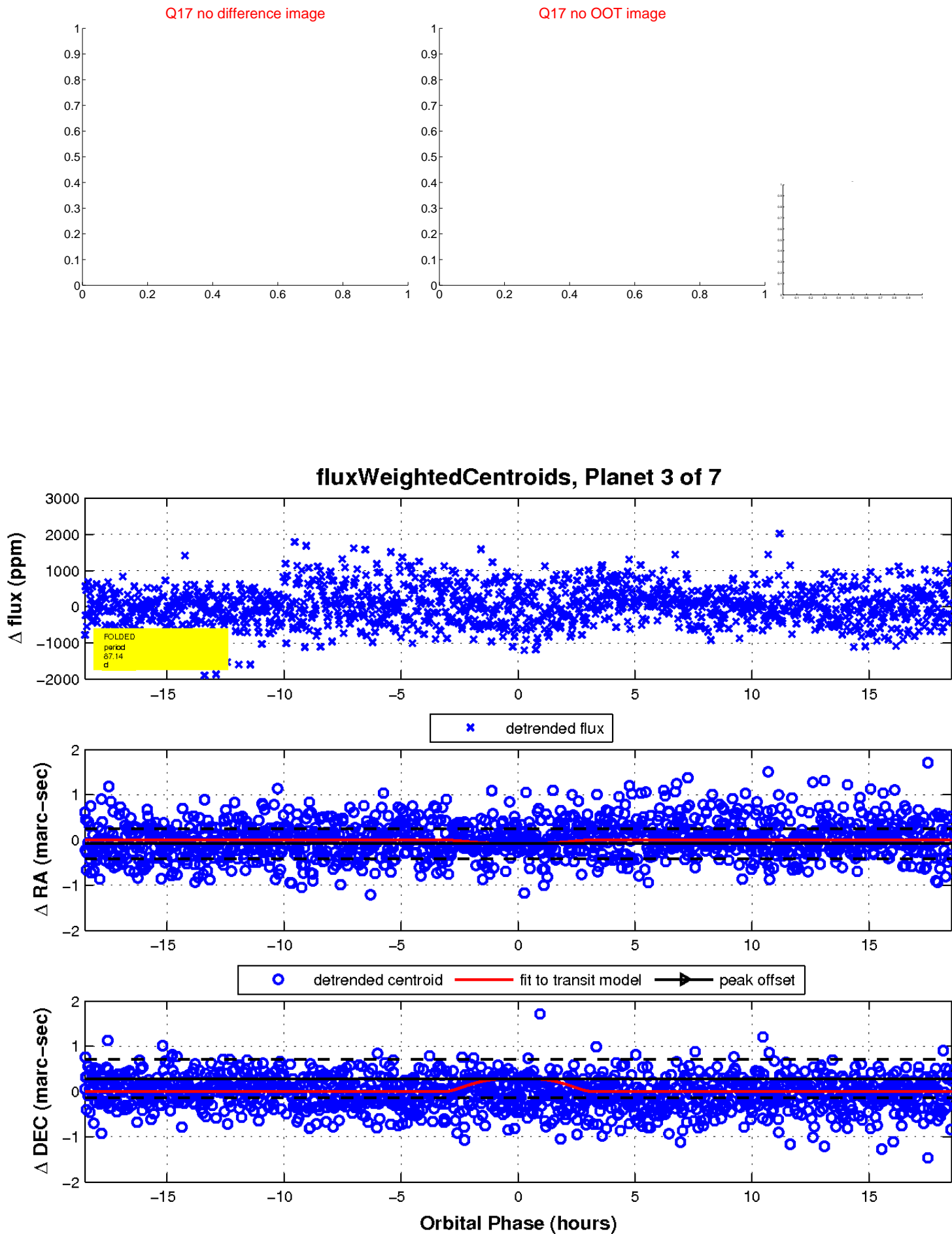
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

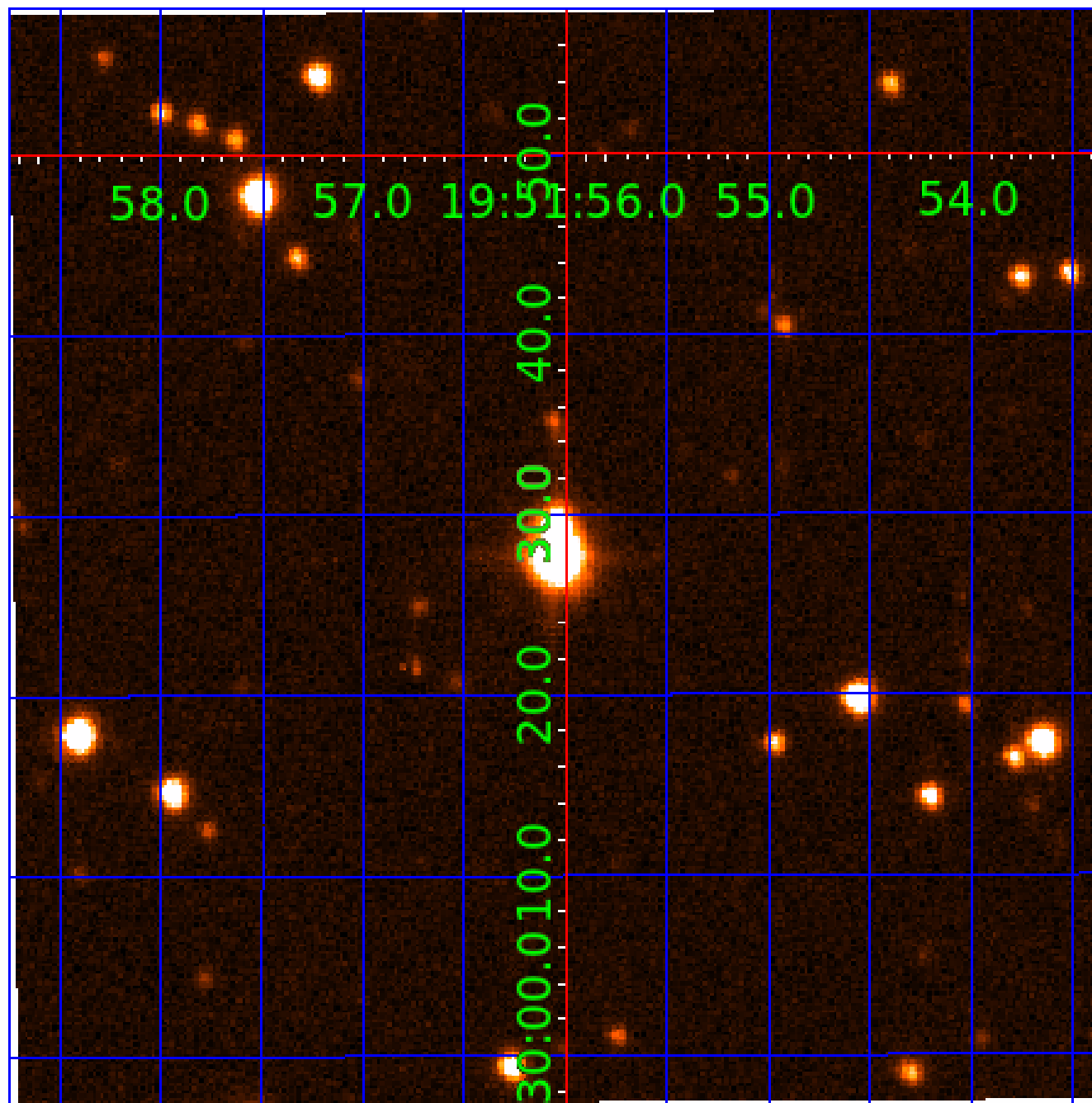


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 006228371

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006228371-01	OBS	No	1.945627	132.146664	44.7	13.115	11.5	6.2	4.59	7810	3.12	42269.19
006228371-02	OBS	No	44.354229	153.726345	1084.4	2.383	16.8	13.4	4.59	7810	16.23	653.92
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006228371-04	OBS	No	23.181307	148.780900	531.2	3.350	14.2	12.8	4.59	7810	12.15	1553.29
006228371-05	OBS	No	10.097525	138.381023	480.5	2.586	13.8	14.5	4.59	7810	12.24	4704.18
006228371-06	OBS	No	274.253538	267.743426	1339.7	69.177	12.6	9.9	4.59	7810	16.93	57.62
006228371-07	OBS	No	11.997651	136.206884	292.4	6.758	12.3	10.9	4.59	7810	8.74	3738.02

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006228371-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT
006228371-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
006228371-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
006228371-04	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
006228371-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
006228371-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
006228371-07	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—HALO_GHOST

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

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

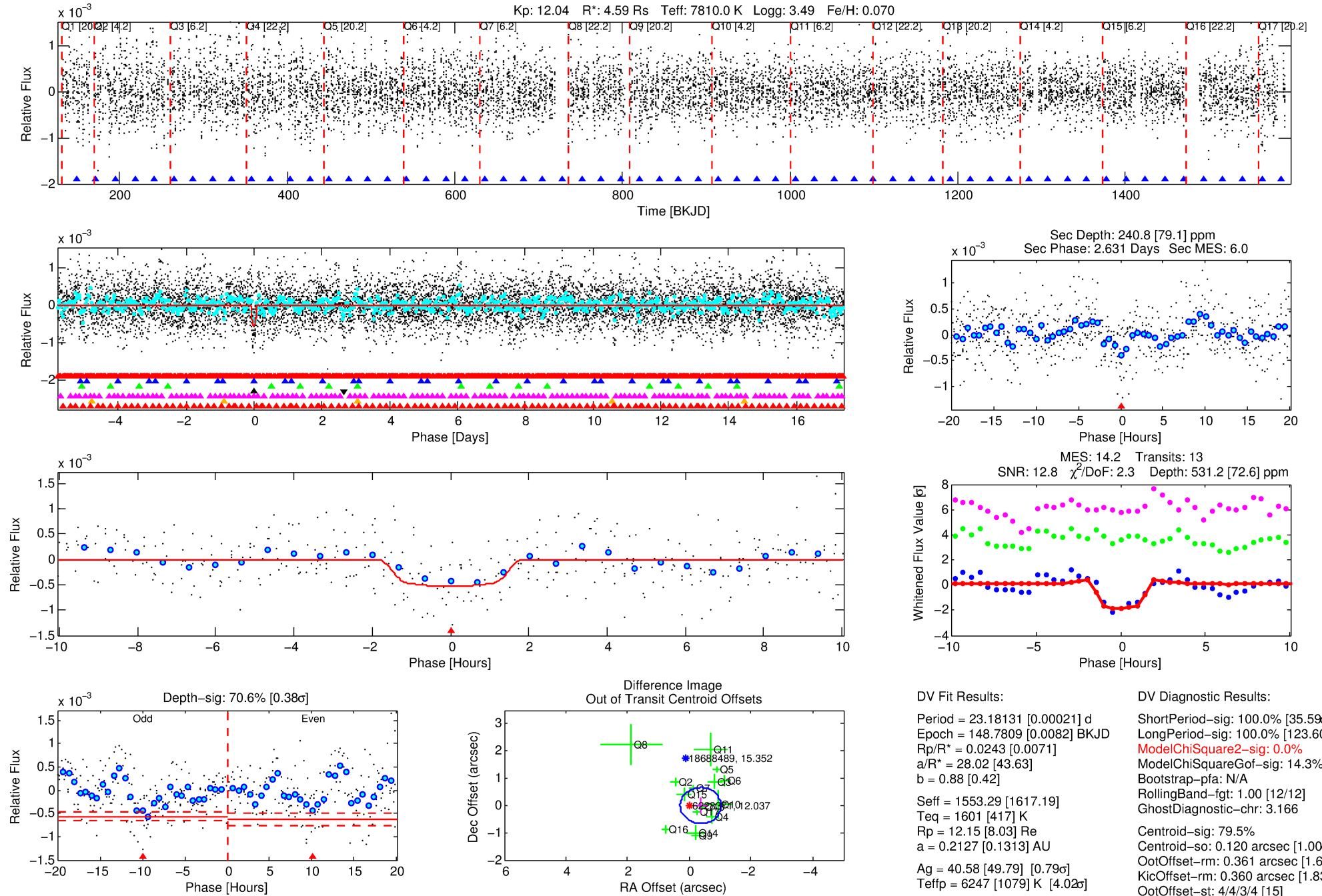
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 006228371-04

No Significant Match Found

# DV One-Page Summary

KIC: 6228371 Candidate: 4 of 7 Period: 23.181 d



## DV Fit Results:

Period = 23.18131 [0.00021] d  
Epoch = 148.7809 [0.0082] BKJD  
Rp/R\* = 0.0243 [0.0071]  
a/R\* = 28.02 [43.63]  
b = 0.88 [0.42]  
Seff = 1553.29 [1617.19]  
Teff = 1601 [417] K  
Rp = 12.15 [8.03] Re  
a = 0.2127 [0.1313] AU  
Ag = 40.58 [49.79] [0.79 $\sigma$ ]  
Teffp = 6247 [1079] K [4.02 $\sigma$ ]

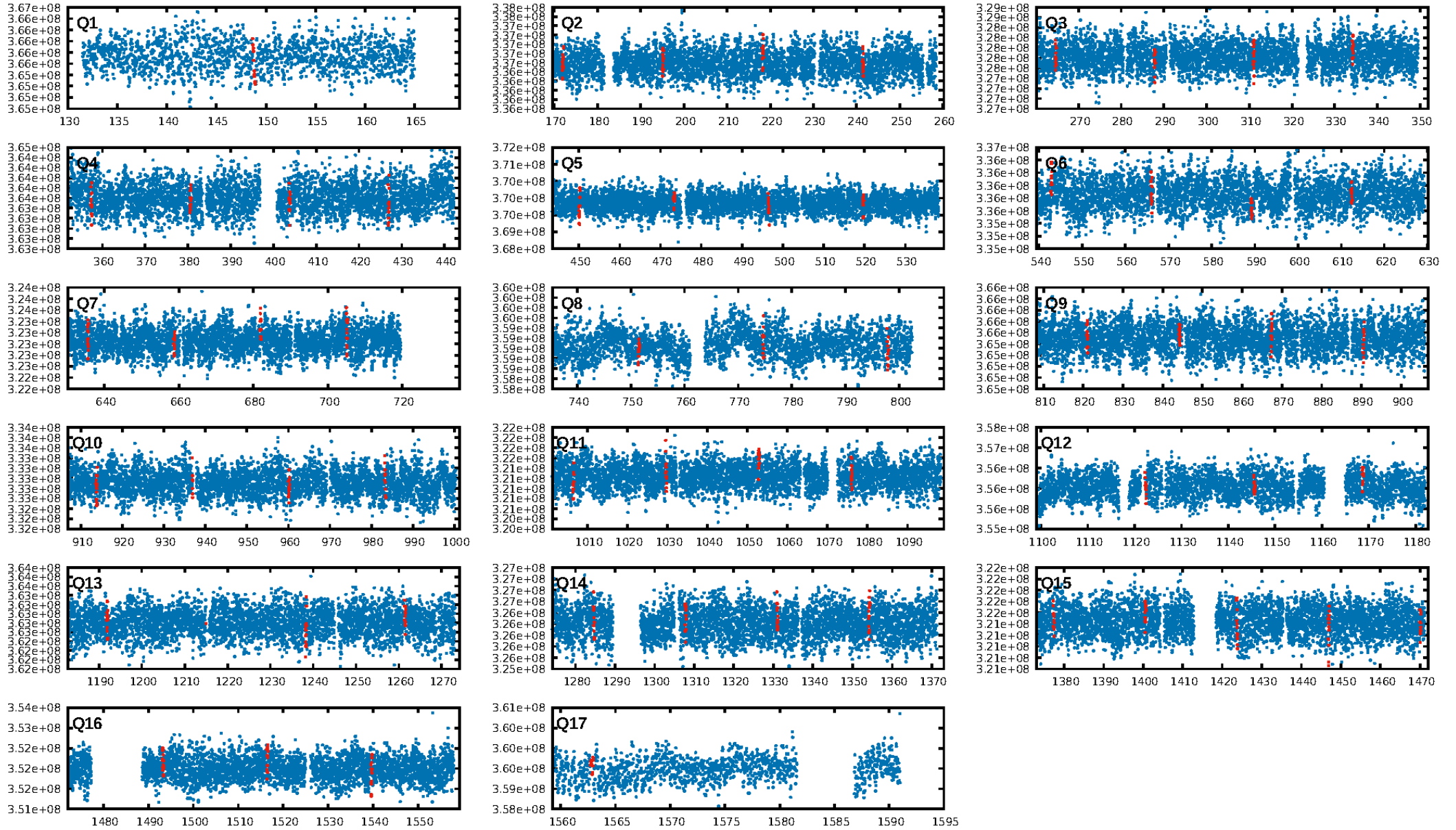
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [35.59 $\sigma$ ]  
LongPeriod-sig: 100.0% [123.60 $\sigma$ ]  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 14.3%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [12/12]  
GhostDiagnostic-chr: 3.166  
Centroid-sig: 79.5%  
Centroid-so: 0.120 arcsec [1.00 $\sigma$ ]  
OotOffset-rm: 0.361 arcsec [1.64 $\sigma$ ]  
KicOffset-rm: 0.360 arcsec [1.83 $\sigma$ ]  
OotOffset-st: 4/4/3/4 [15]  
KicOffset-st: 4/4/3/4 [15]  
DiffImageQuality-fgm: 0.40 [6/15]  
DiffImageOverlap-fno: 0.65 [11/17]

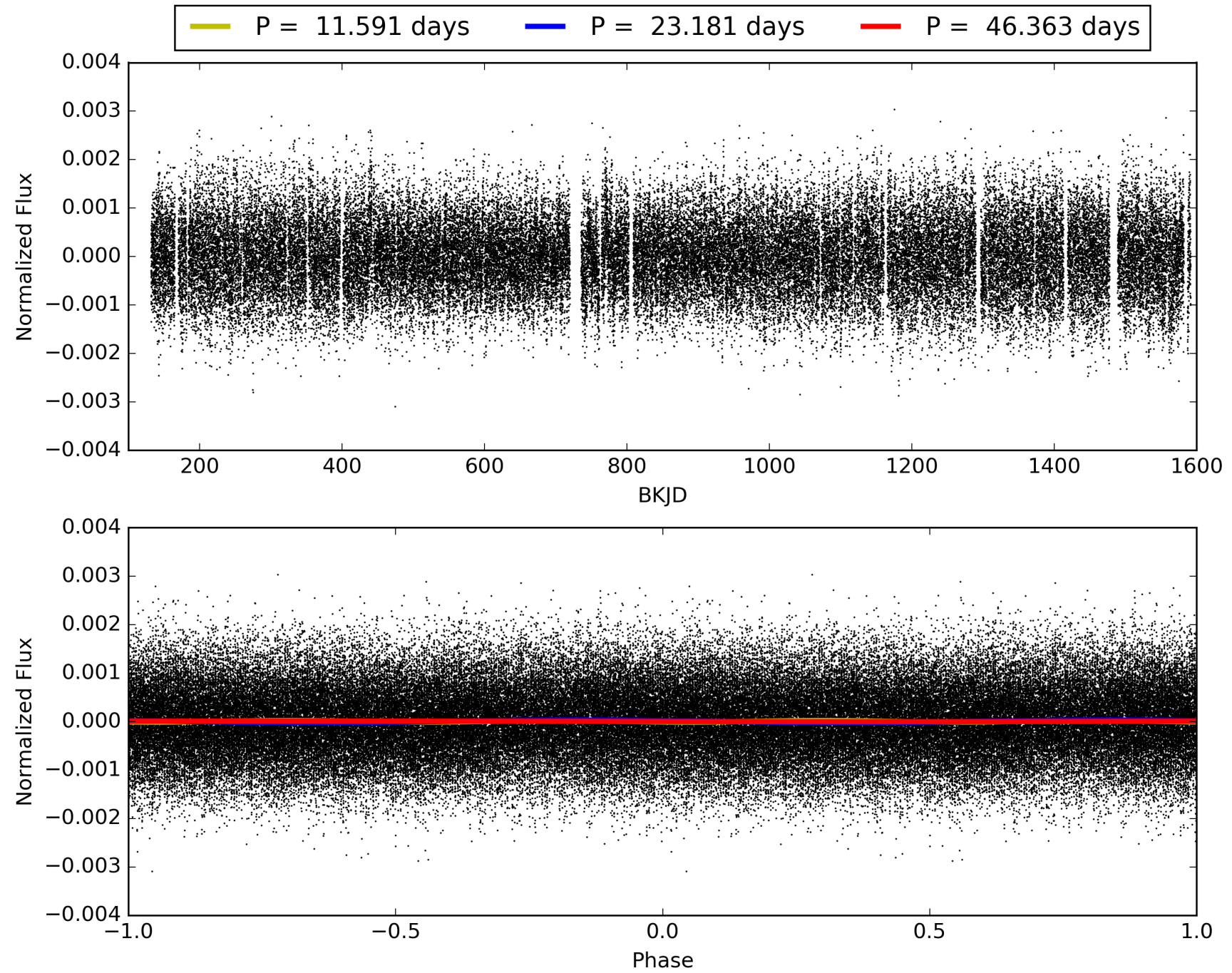
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 06:04:23 Z

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

# TCE 006228371-04, PDC Light Curves

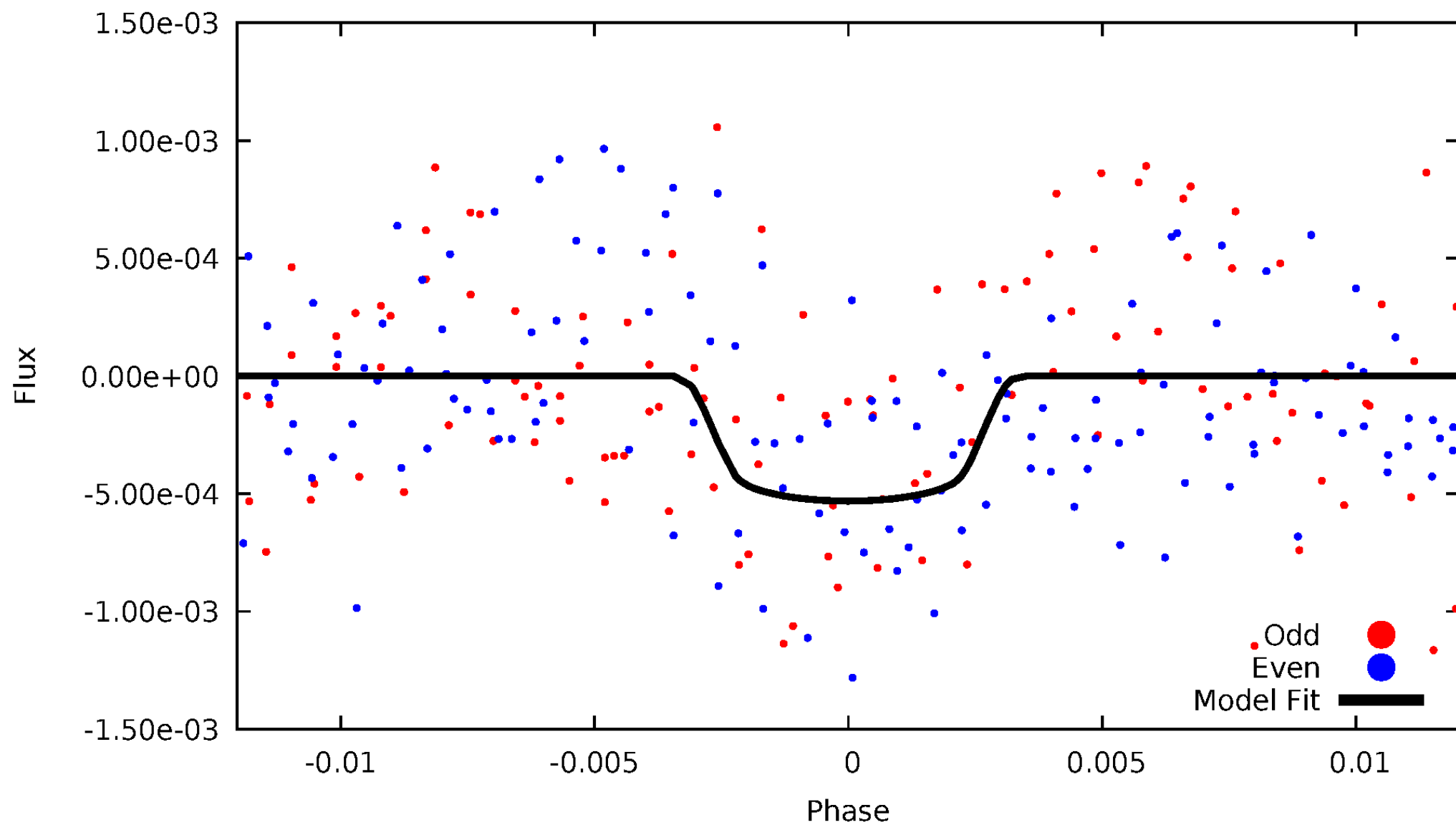


TCE 006228371-04



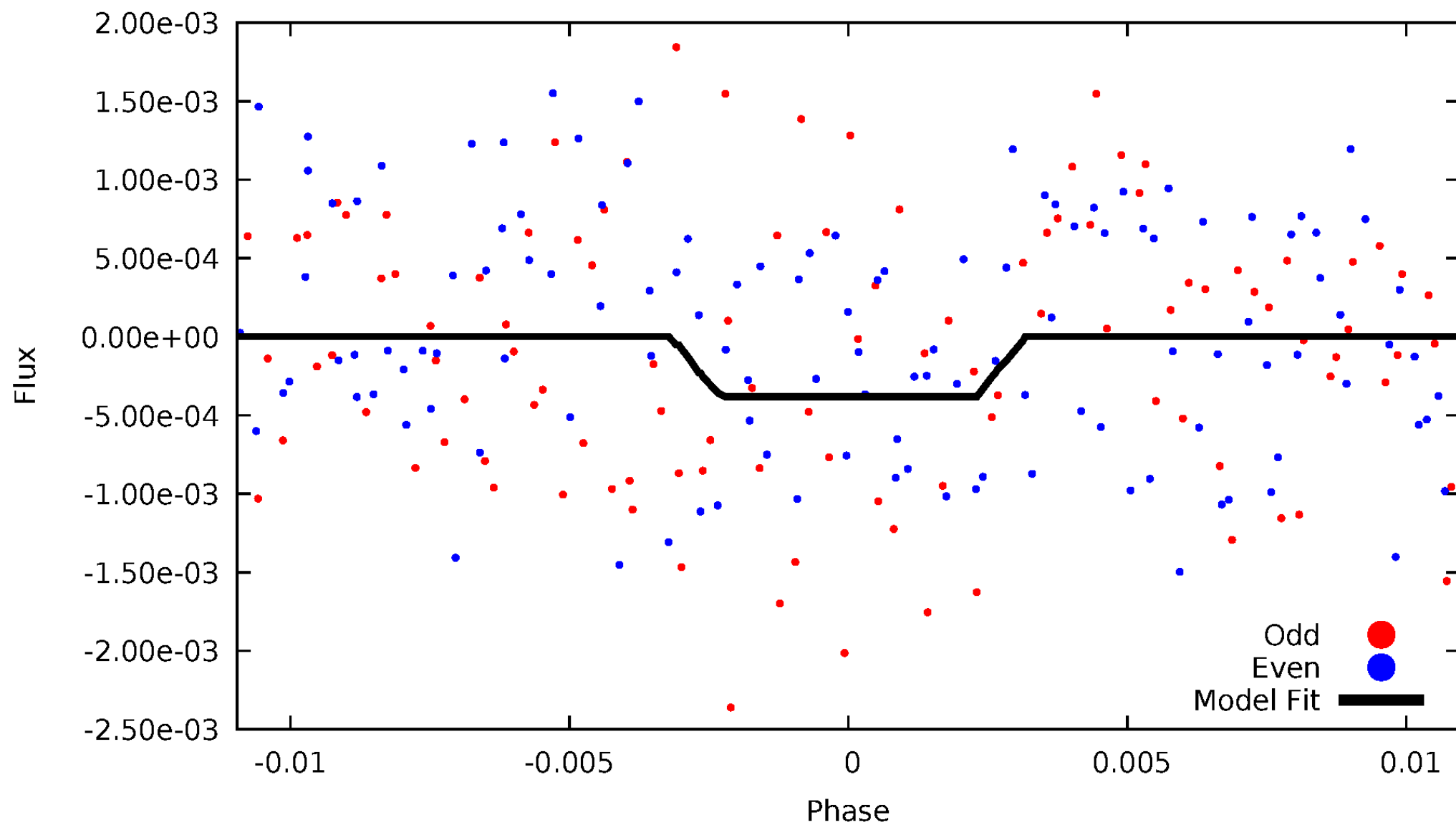
# DV Odd/Even

TCE 006228371-04



# ALT Odd/Even

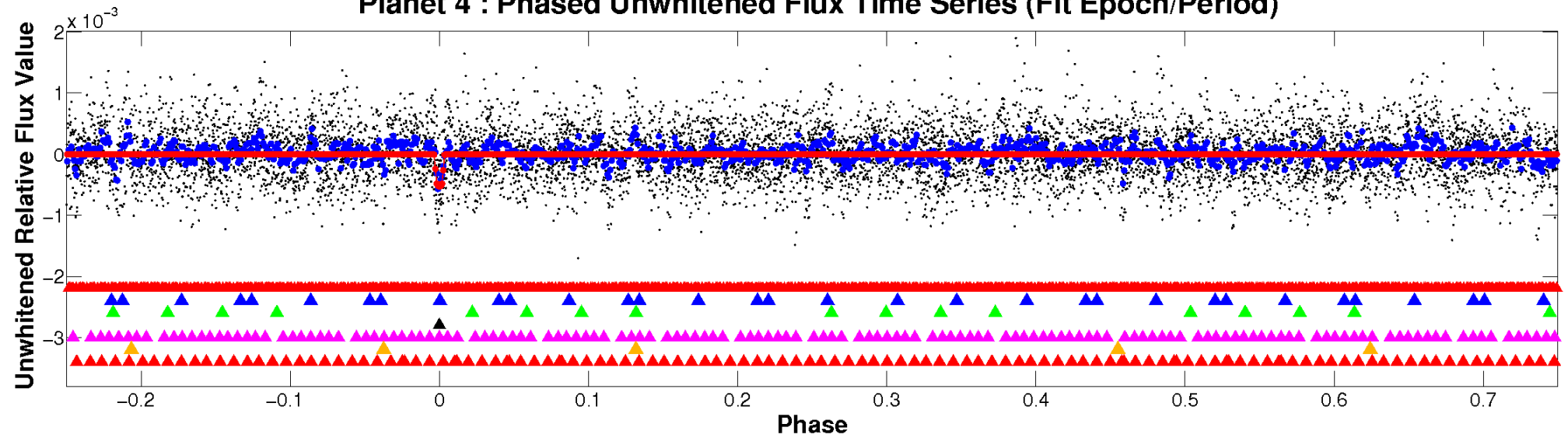
TCE 006228371-04



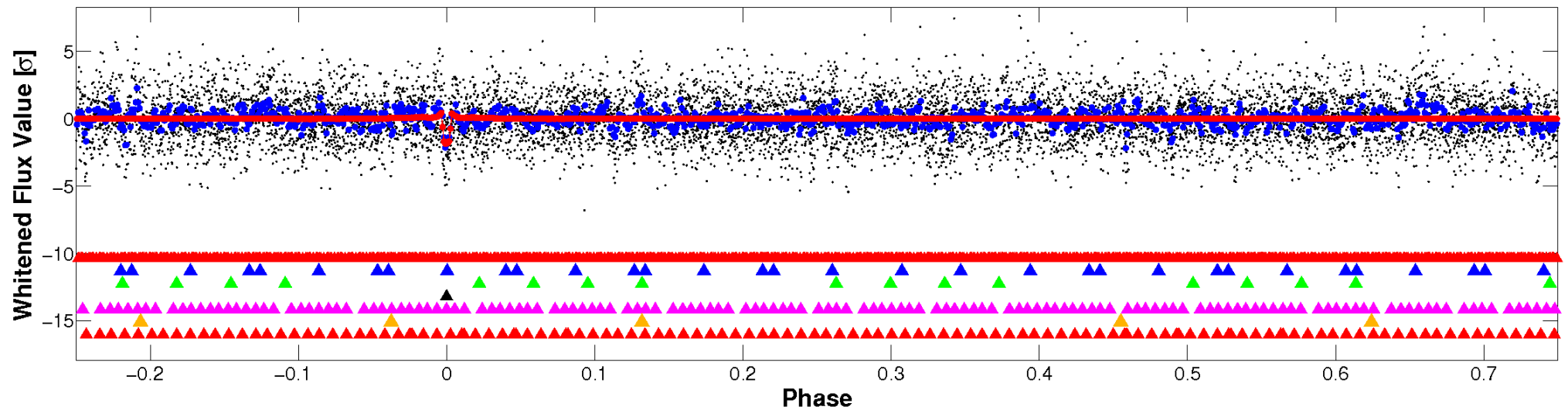


# Non-Whitened Vs. Whitened Light Curve

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

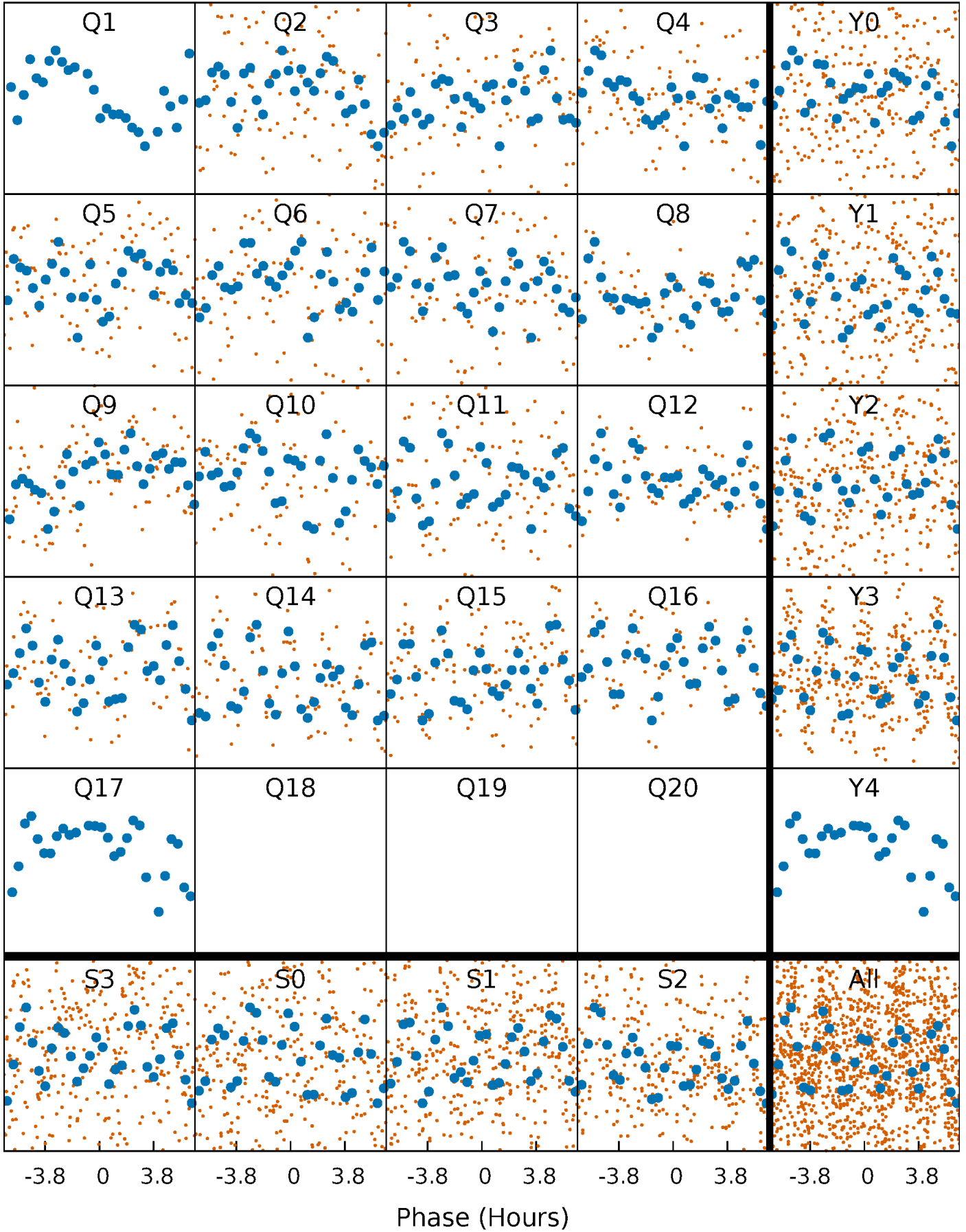


## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



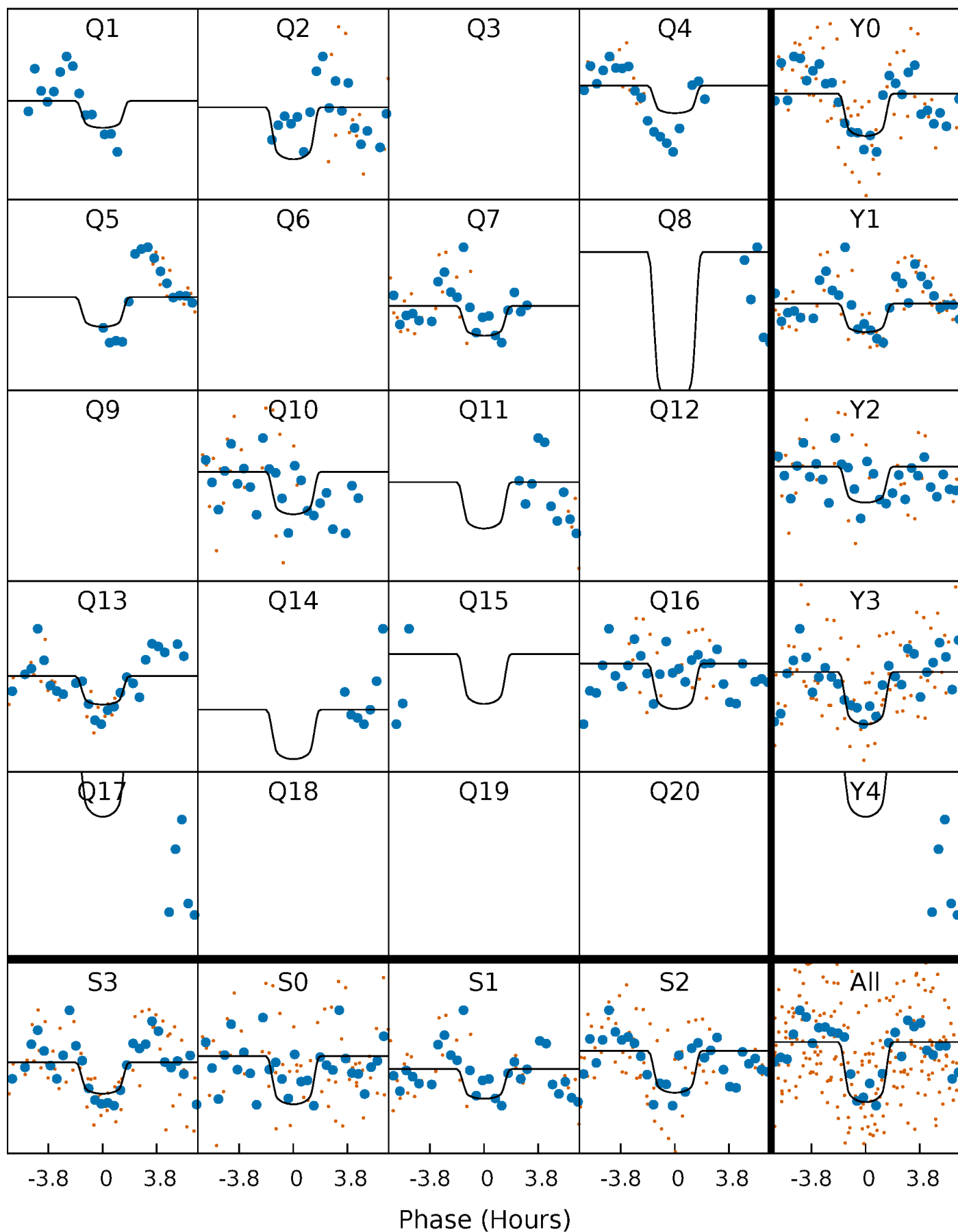
# PDC Quarter-Phased Transit Curves

TCE 006228371-04   P= 23.181307 Days    $T_0=148.780900$  (BKJD)



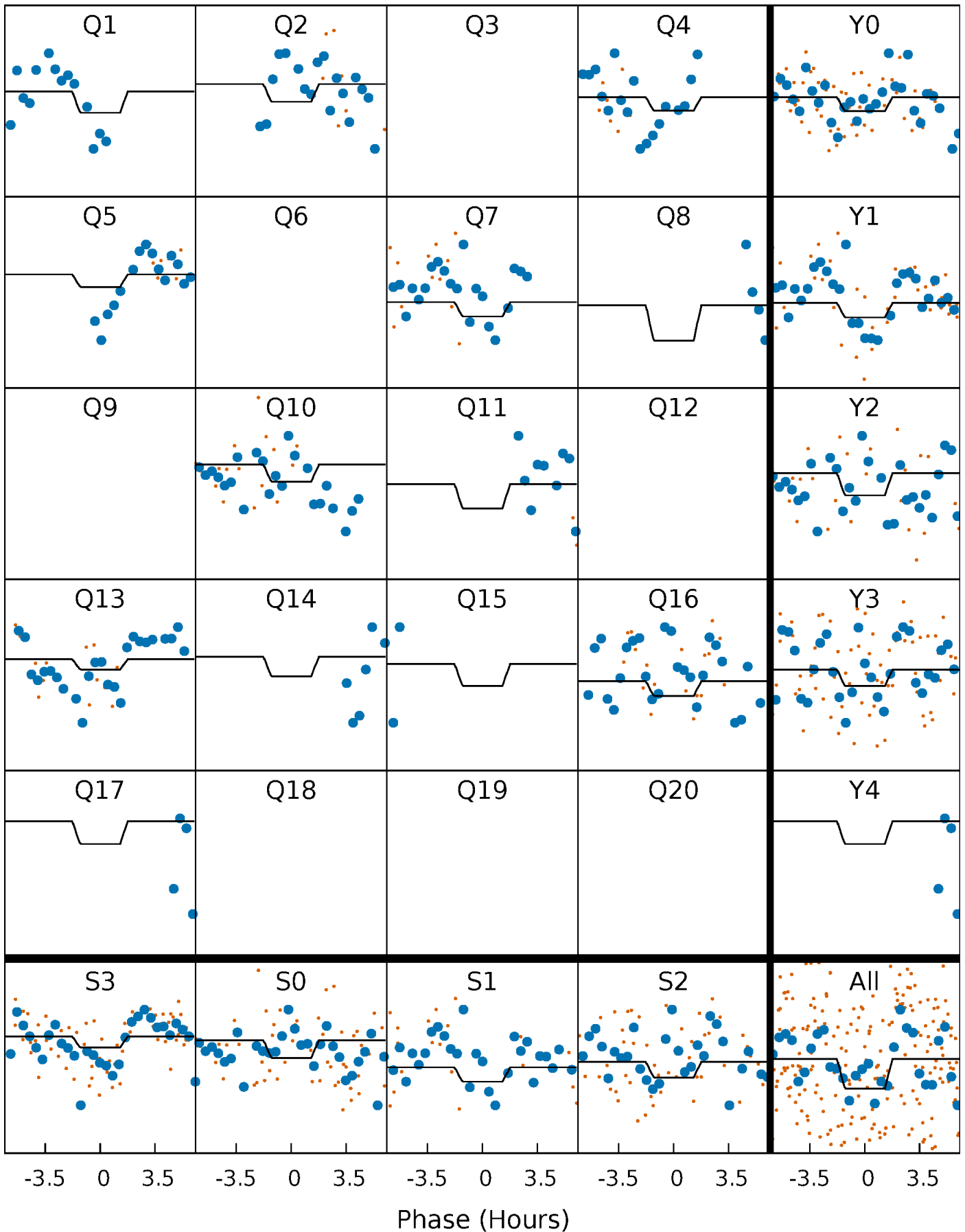
# DV Quarter-Phased Transit Curves

TCE 006228371-04 P= 23.181307 Days  $T_0=148.780900$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

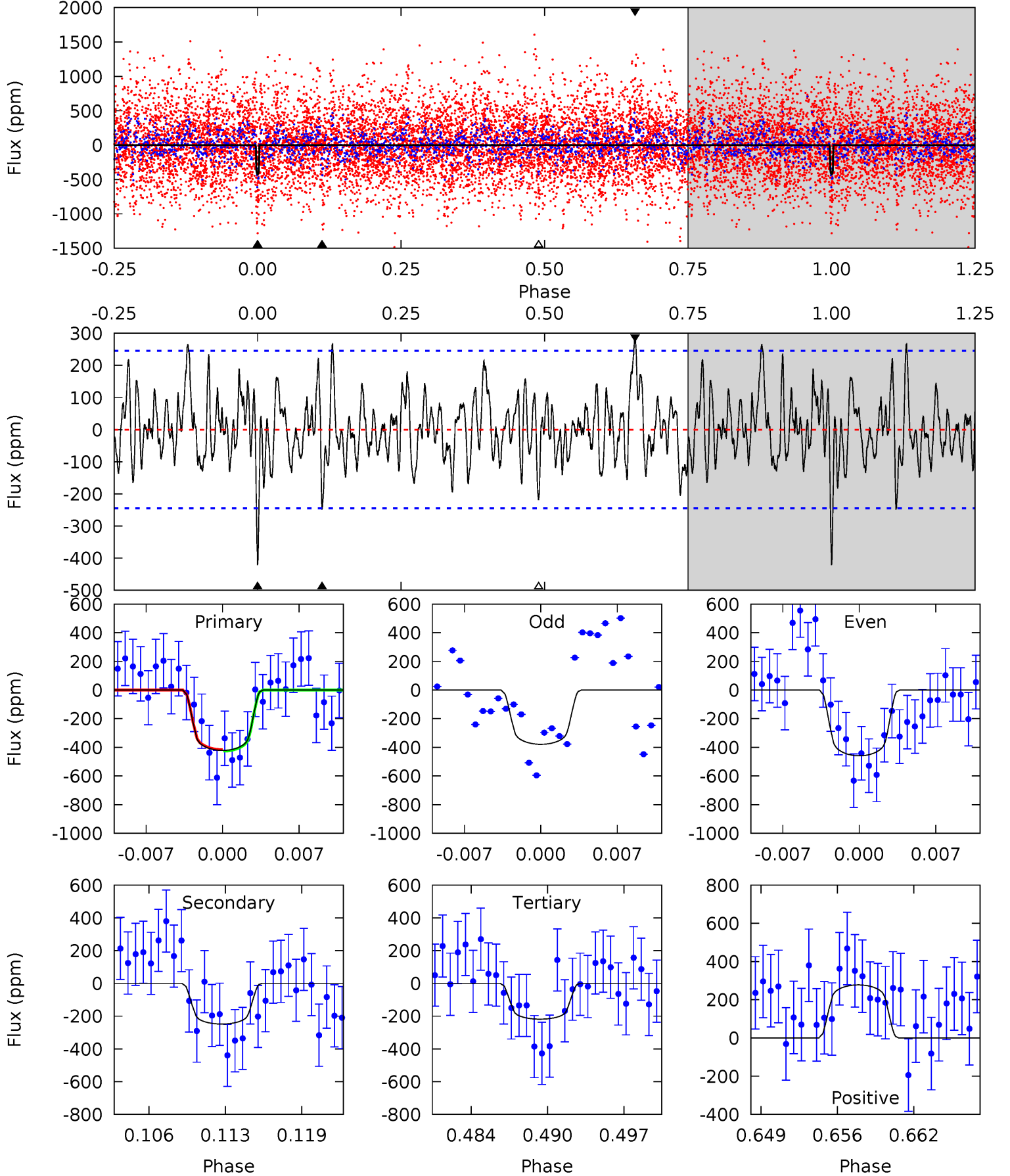
TCE 006228371-04     $P = 23.180958$  Days     $T_0 = 148.800420$  (BKJD)



# DV Model-Shift Uniqueness Test

006228371-04,  $P = 23.181307$  Days,  $E = 125.599593$  Days

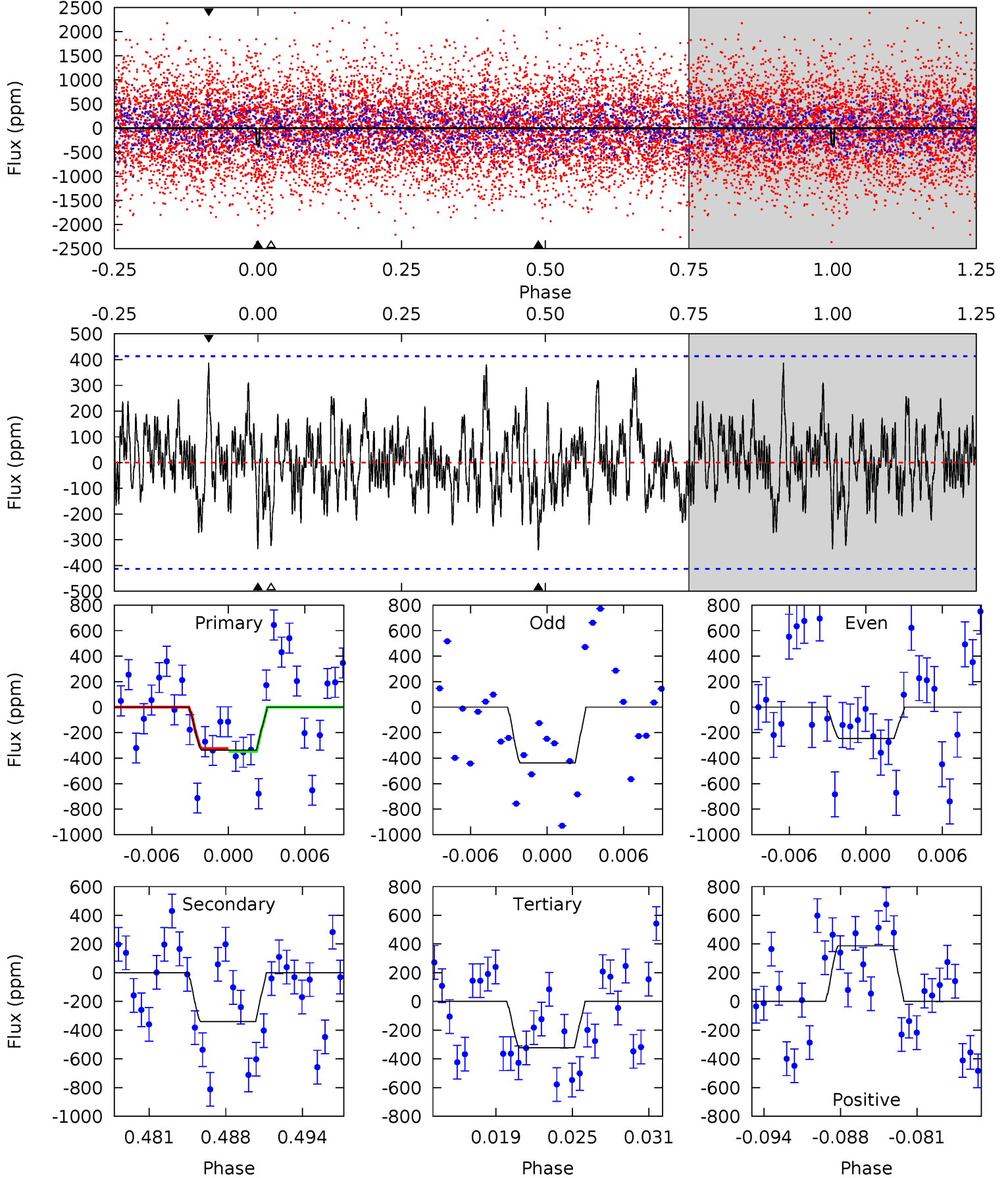
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.79	5.17	4.56	5.78	5.10	2.72	1.84	4.24	3.01	0.62	-0.61	0.84	0.63	0.40	0.11



# Alt Model-Shift Uniqueness Test

006228371-04, P = 23.180958 Days, E = 125.619462 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
4.16	4.22	4.00	4.80	5.12	2.73	1.42	0.16	-0.64	0.22	-0.58	1.19	0.70	0.53	0.14





### Stellar Parameters For KIC 006228371

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7810^{+217}_{-326}$	$3.492^{+0.618}_{-0.195}$	$0.070^{+0.200}_{-0.400}$	$4.591^{+0.302}_{-2.721}$	$2.386^{+0.249}_{-0.796}$	$0.035^{+0.286}_{-0.004}$
	+3%/-4%	+18%/-6%	+286%/-571%	+7%/-59%	+10%/-33%	+822%/-11%
Source	KIC0	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 006228371-04 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-248 \pm 48$	$11.47^{+4.12}_{-4.22}$	$2222^{+131}_{-284}$	$6110^{+1267}_{-810}$	$45^{+68}_{-22}$
Alt.	$-341 \pm 81$	$9.02^{+4.04}_{-3.93}$	$2208^{+130}_{-304}$	$7417^{+2762}_{-1251}$	$101^{+225}_{-54}$

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

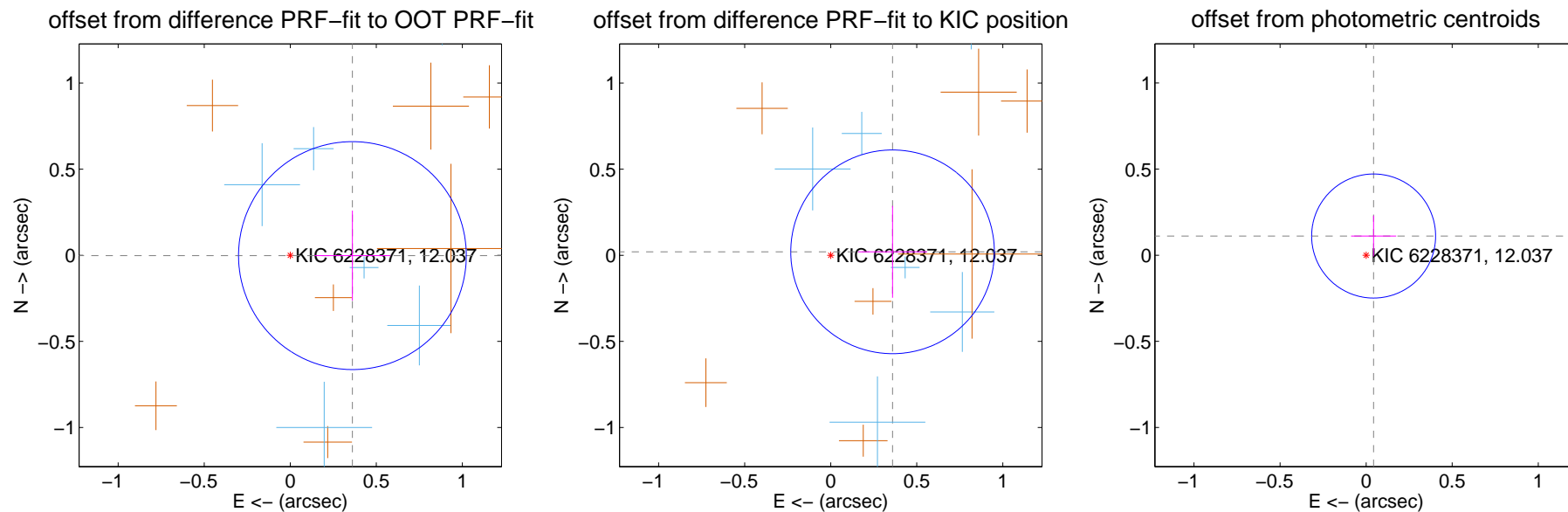
## DV Centroid Data

Supplemental centroid analysis for 006228371-04. Kepler magnitude: 12.04. Transit SNR 12.81

There are 6 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.02 arcsec

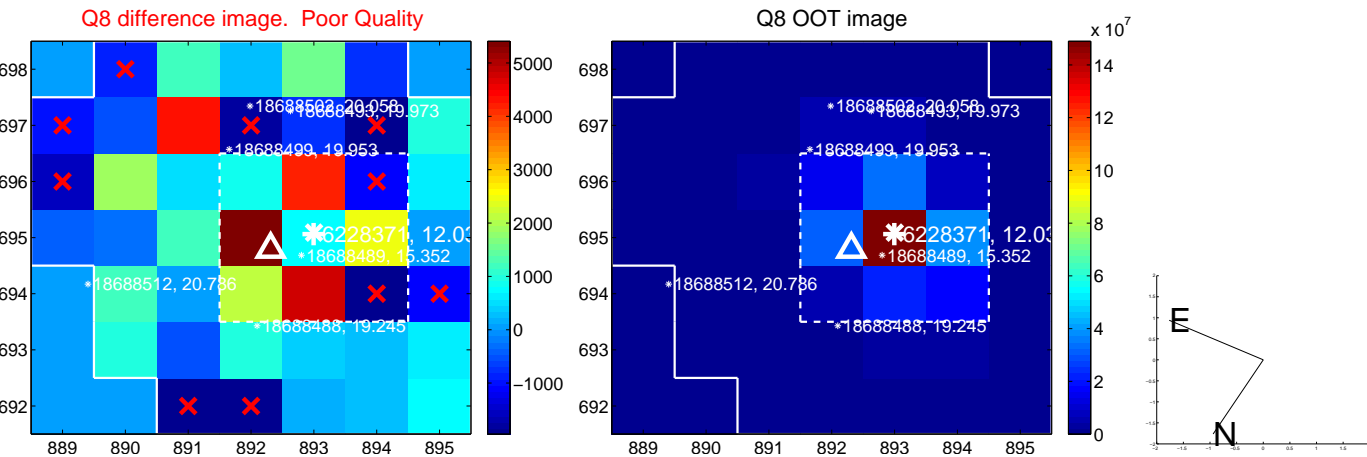
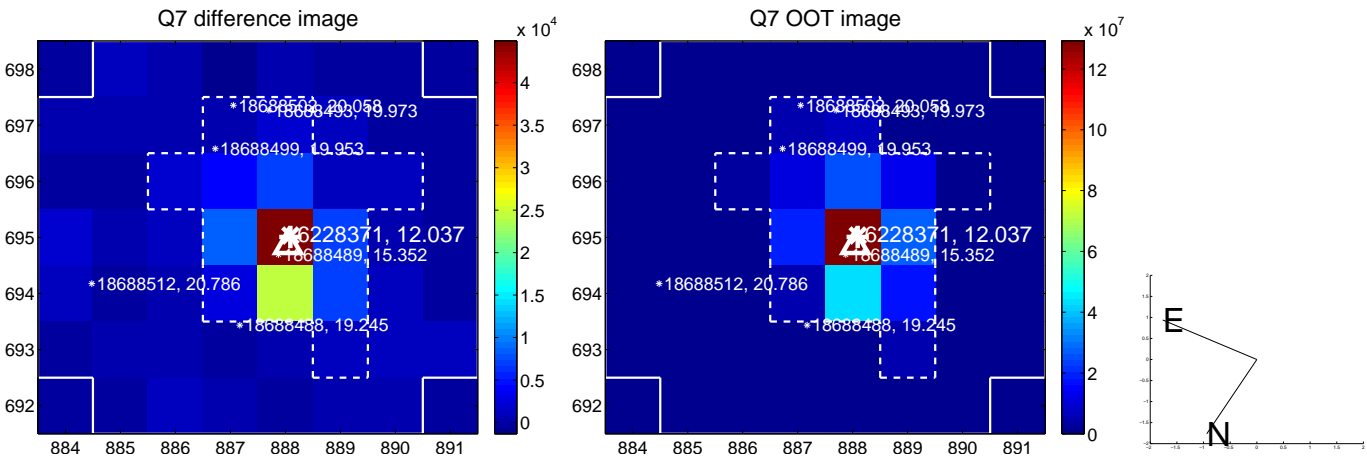
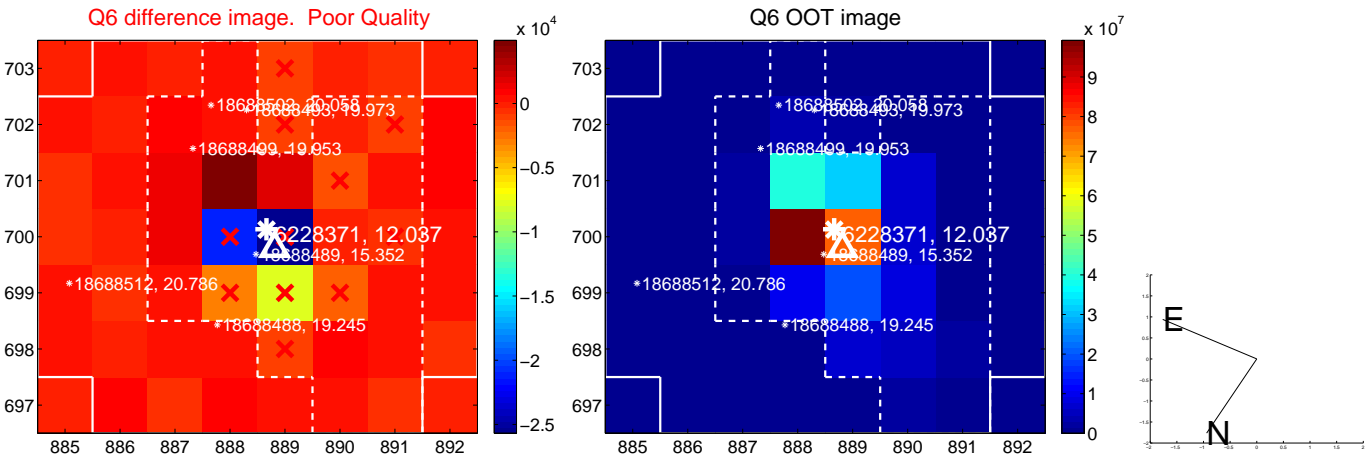
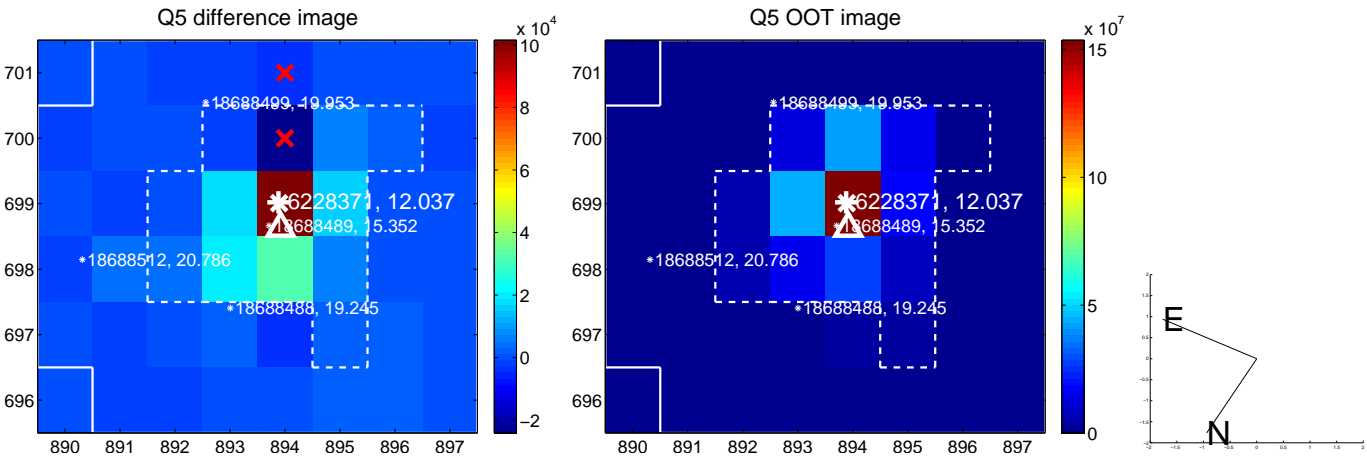
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.361 \pm 0.221$	1.64	$-0.361 \pm 0.220$	$-0.002 \pm 0.261$
PRF-fit source offset from KIC position	$0.360 \pm 0.197$	1.83	$-0.359 \pm 0.201$	$0.020 \pm 0.267$
photometric centroid source offset	$0.12 \pm 0.12$	1.00	$-0.04 \pm 0.13$	$0.11 \pm 0.12$



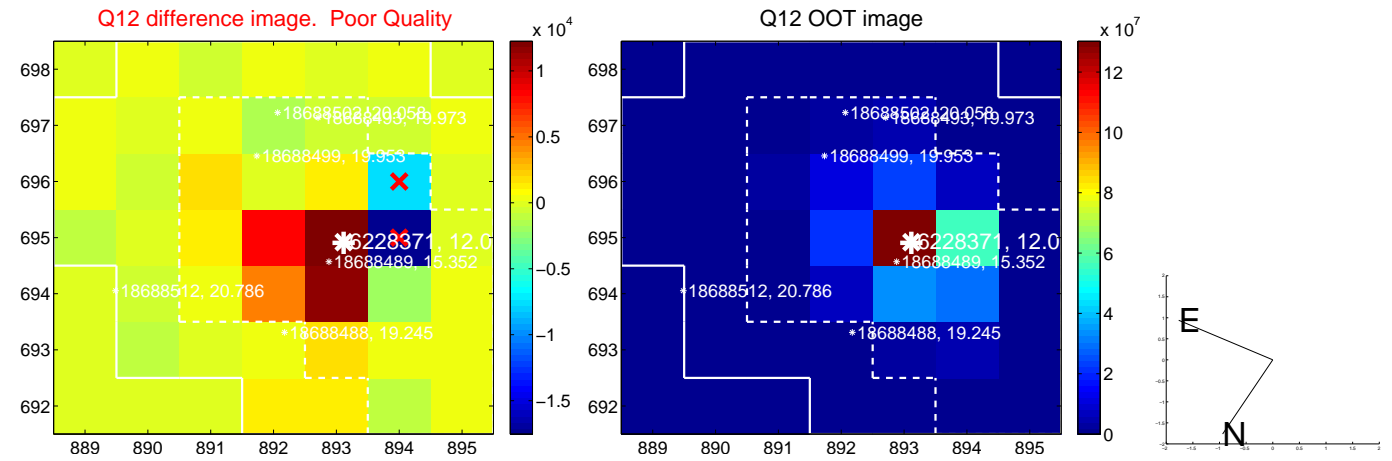
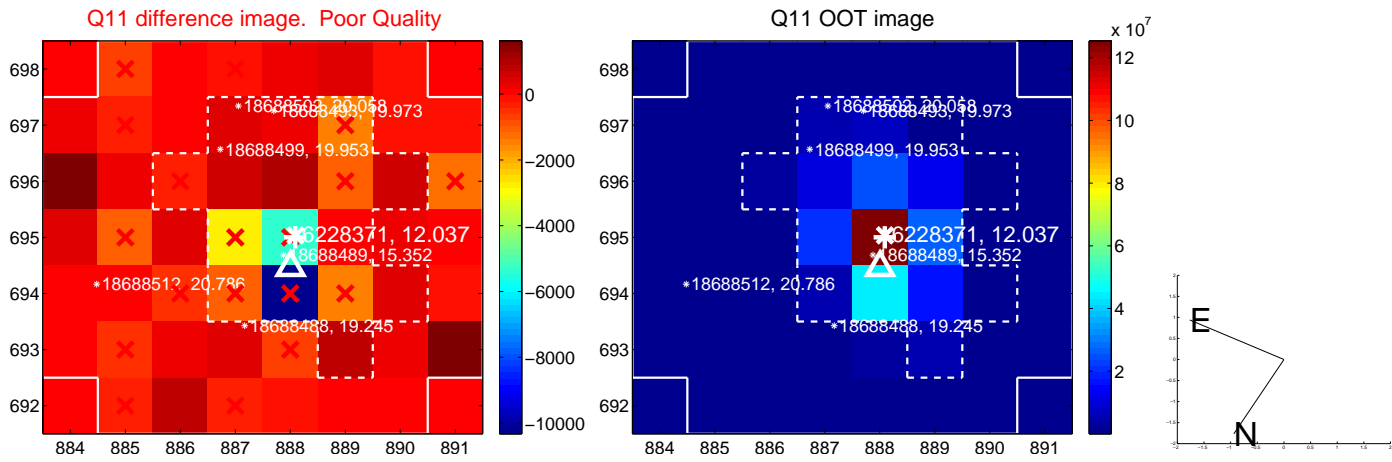
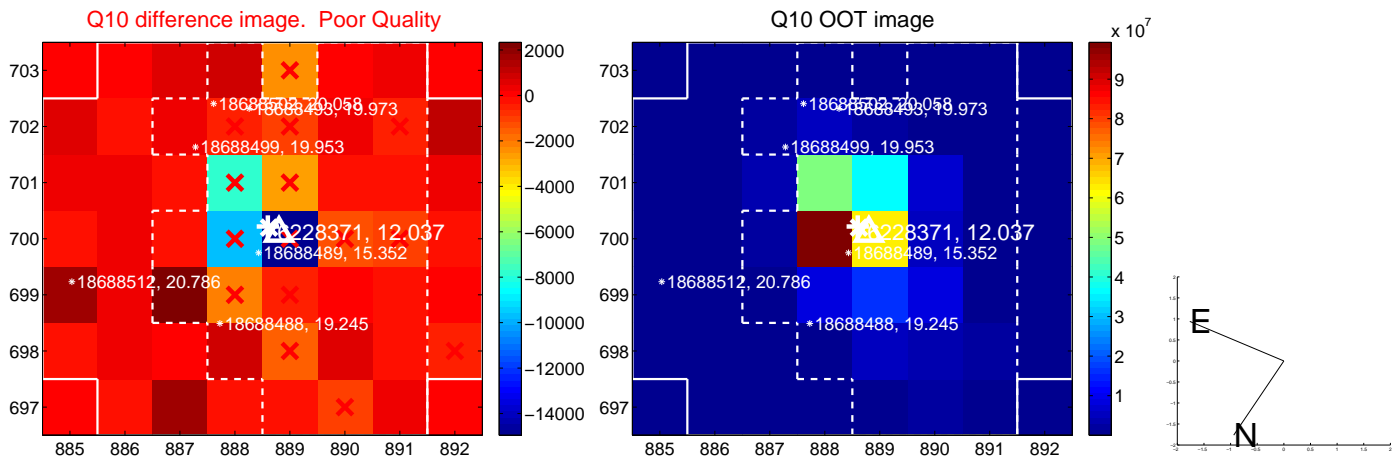
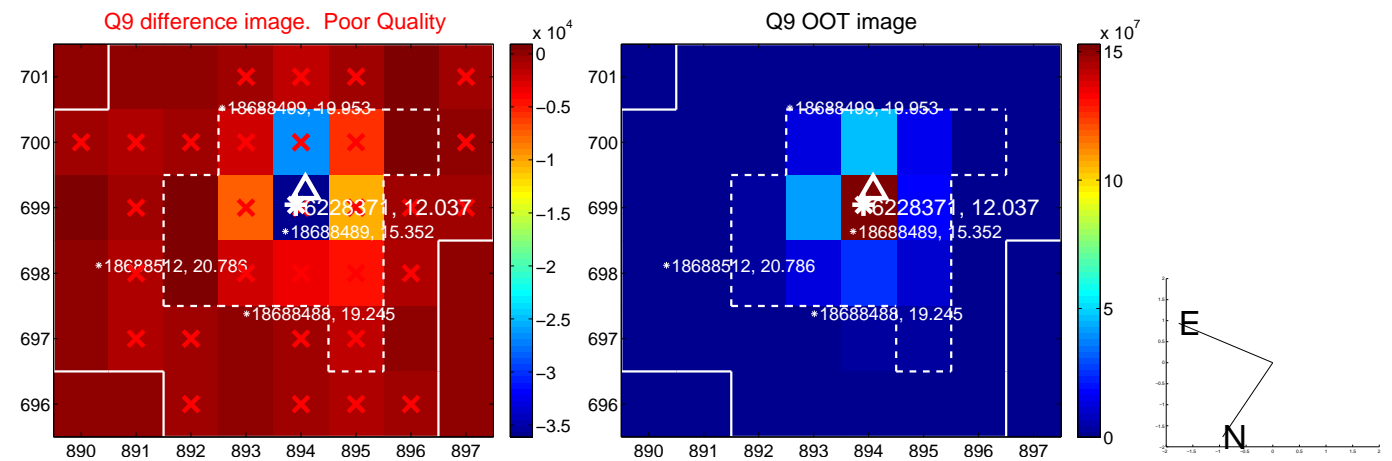
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



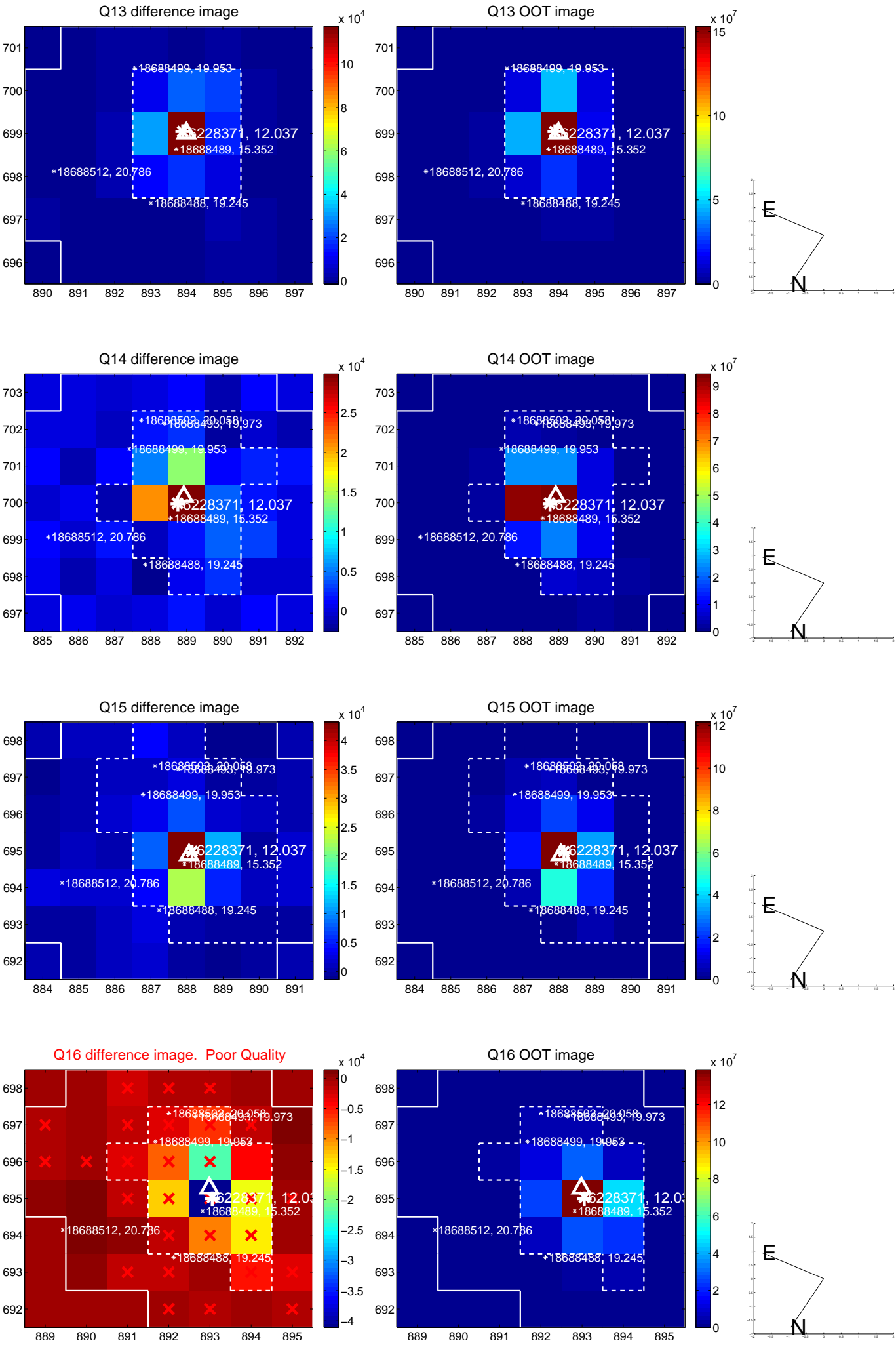
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

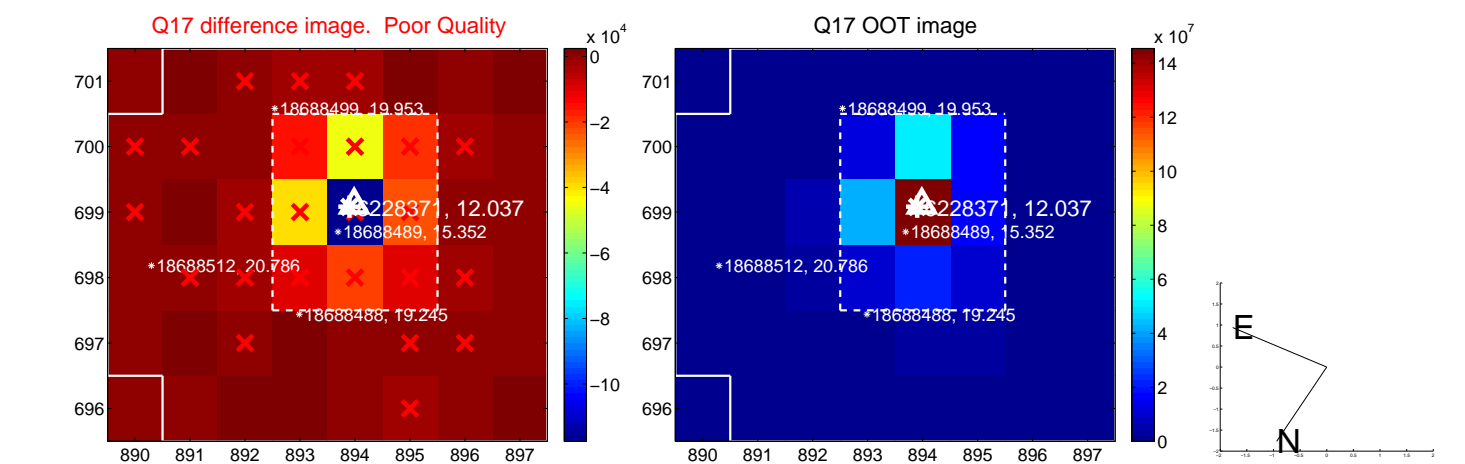


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

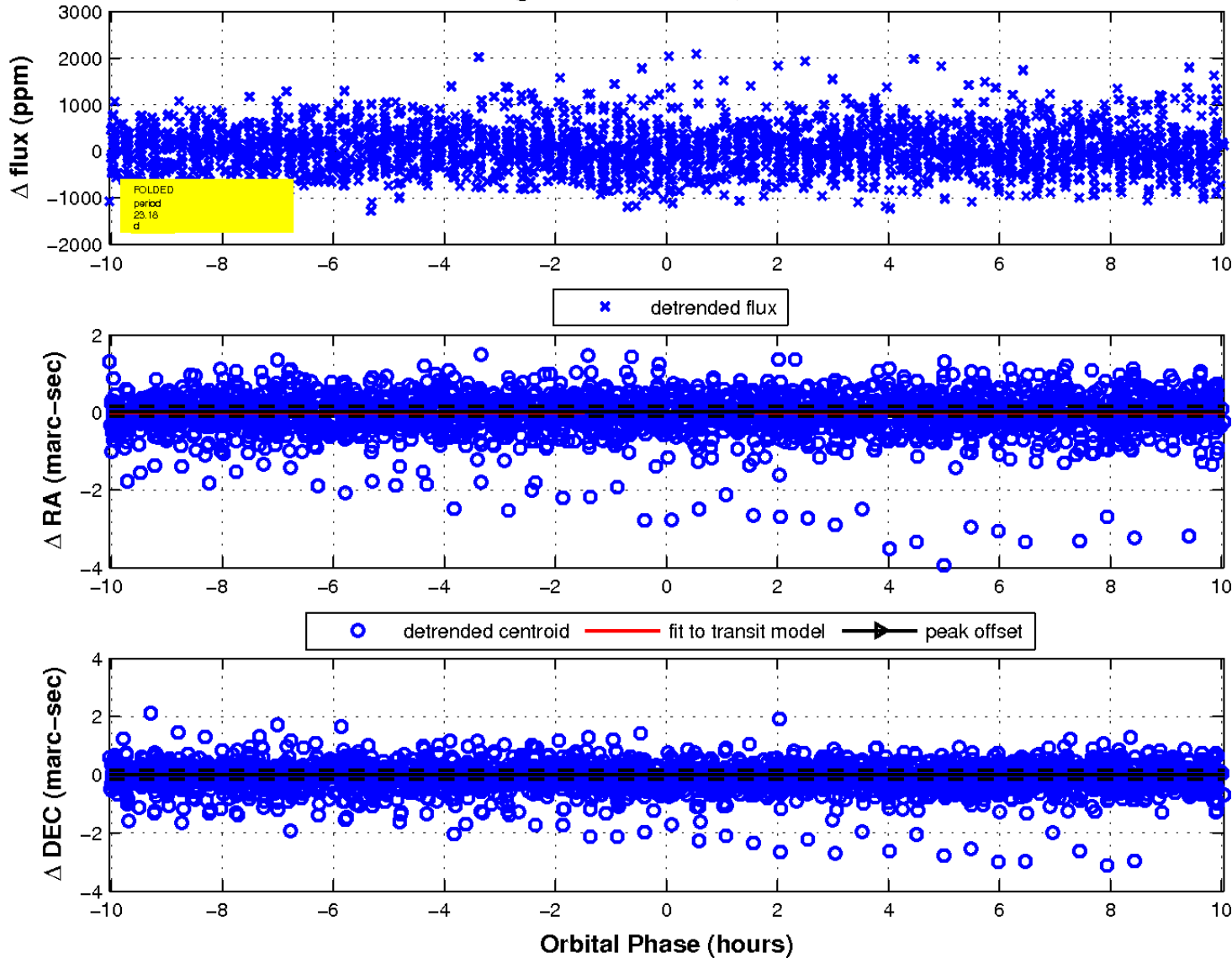




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

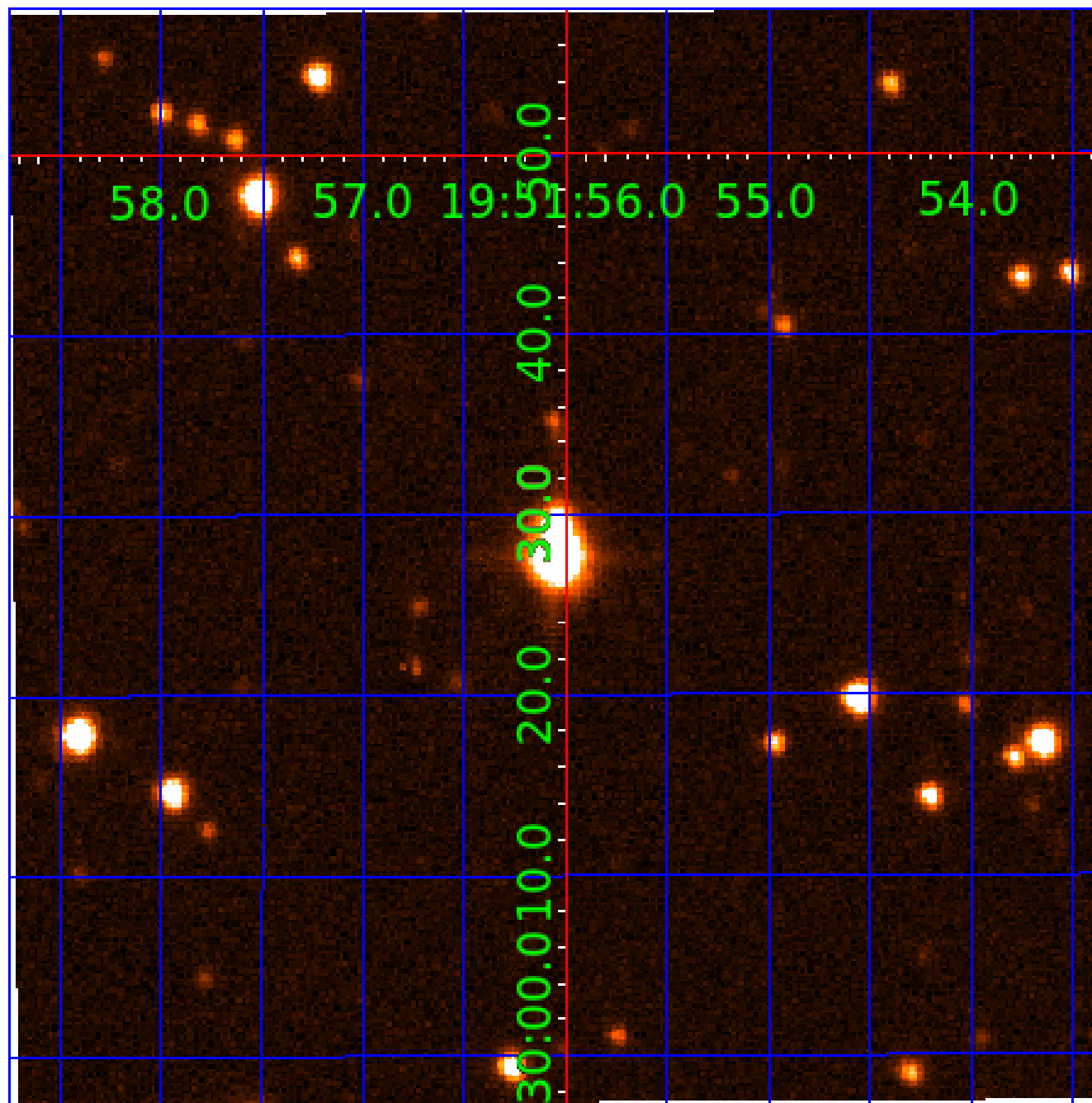


fluxWeightedCentroids, Planet 4 of 7



UKIRT Image

Declination



# KIC 006228371

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006228371-01	OBS	No	1.945627	132.146664	44.7	13.115	11.5	6.2	4.59	7810	3.12	42269.19
006228371-02	OBS	No	44.354229	153.726345	1084.4	2.383	16.8	13.4	4.59	7810	16.23	653.92
006228371-03	OBS	No	87.142109	142.860482	953.0	6.176	14.1	14.7	4.59	7810	17.81	265.75
006228371-04	OBS	No	23.181307	148.780900	531.2	3.350	14.2	12.8	4.59	7810	12.15	1553.29
006228371-05	OBS	No	10.097525	138.381023	480.5	2.586	13.8	14.5	4.59	7810	12.24	4704.18
006228371-06	OBS	No	274.253538	267.743426	1339.7	69.177	12.6	9.9	4.59	7810	16.93	57.62
006228371-07	OBS	No	11.997651	136.206884	292.4	6.758	12.3	10.9	4.59	7810	8.74	3738.02

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006228371-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT
006228371-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
006228371-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
006228371-04	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
006228371-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
006228371-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
006228371-07	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—HALO_GHOST

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

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

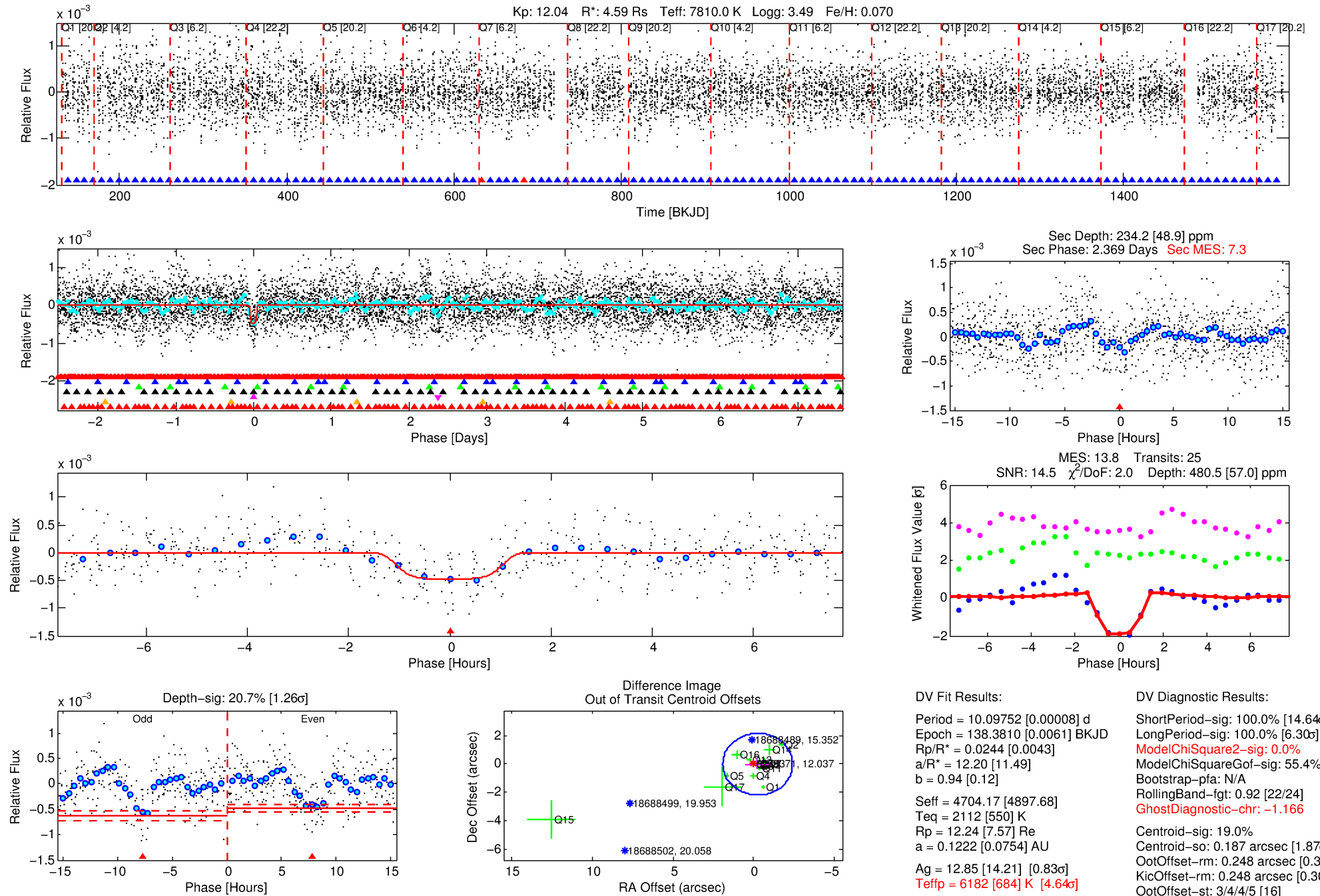
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 006228371-05

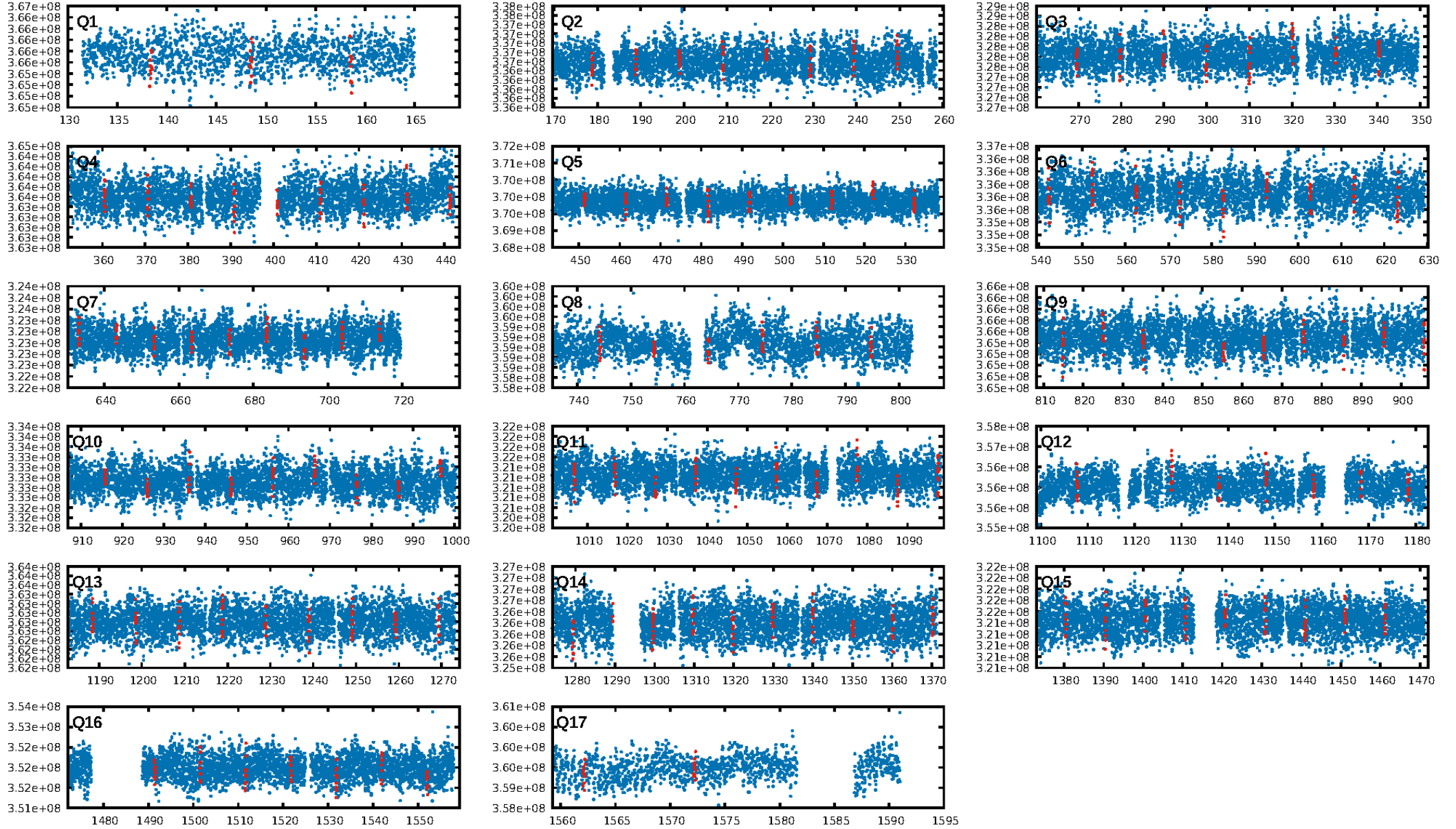
No Significant Match Found

# DV One-Page Summary

KIC: 6228371 Candidate: 5 of 7 Period: 10.098 d

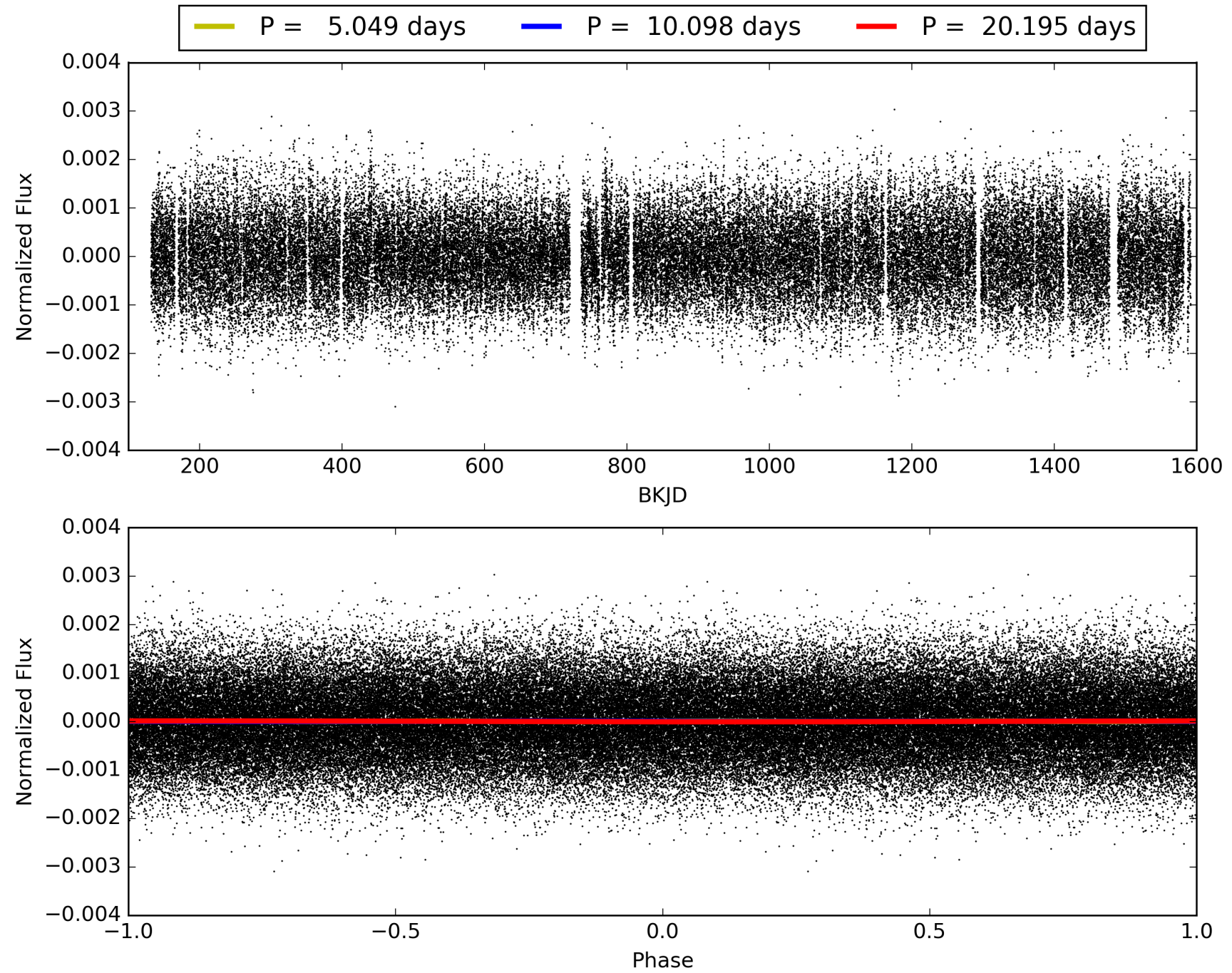


# TCE 006228371-05, PDC Light Curves





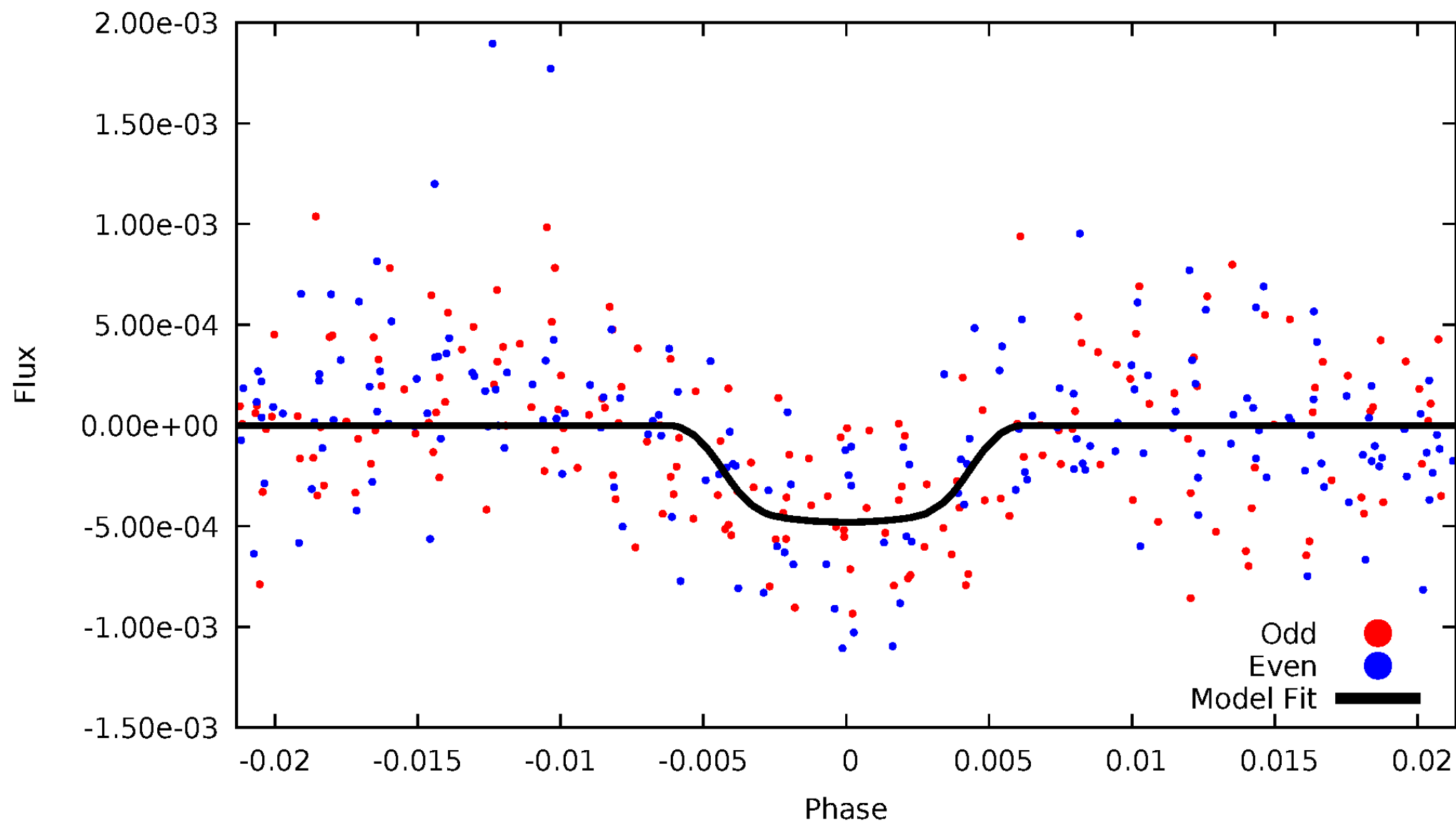
TCE 006228371-05





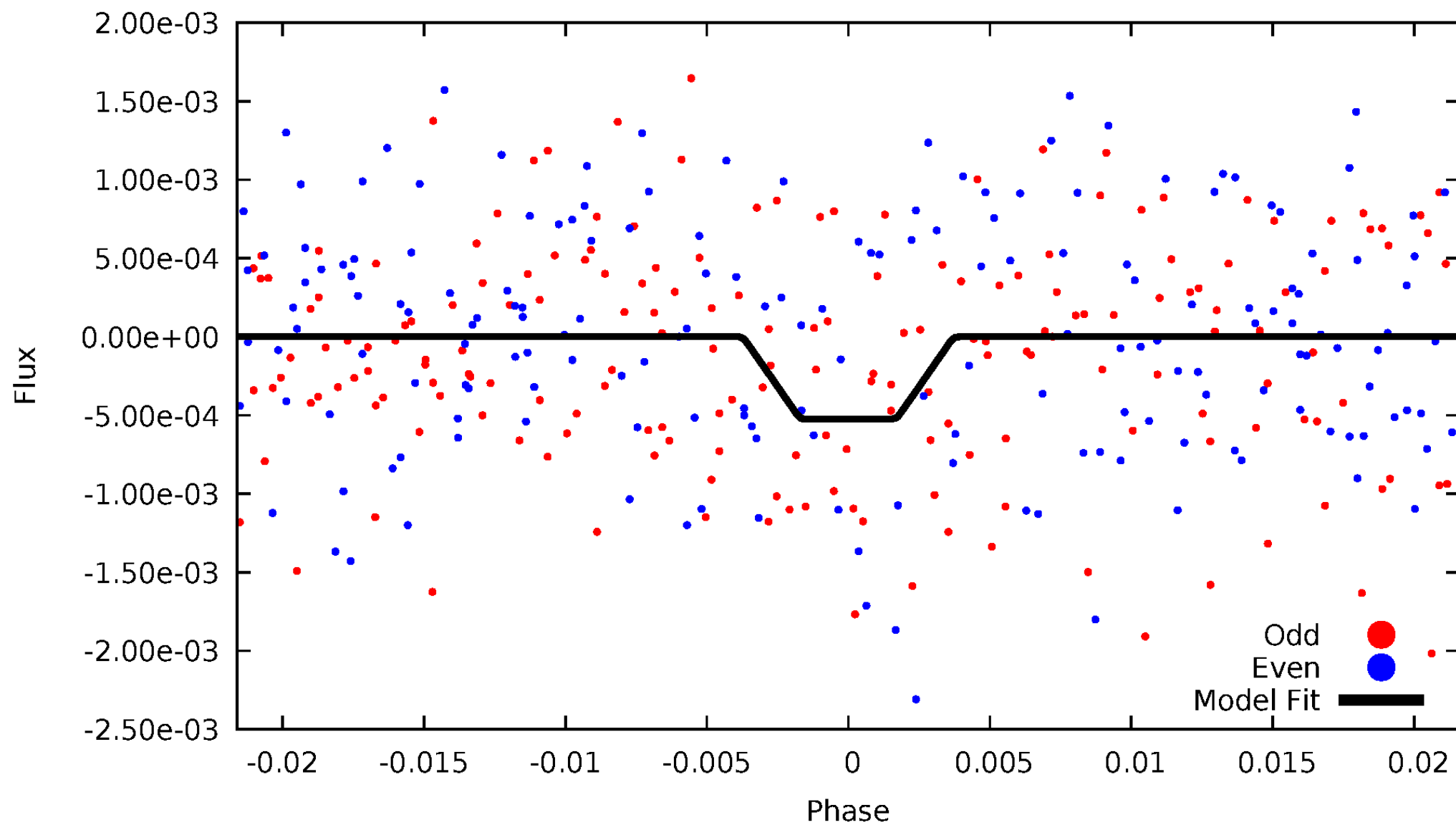
# DV Odd/Even

TCE 006228371-05



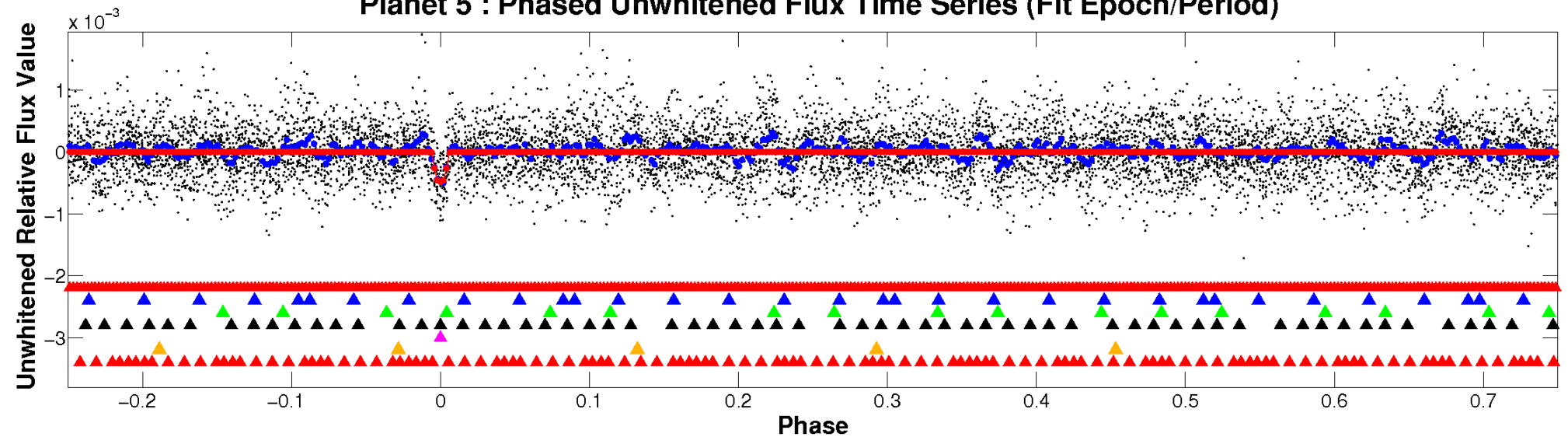
# ALT Odd/Even

TCE 006228371-05

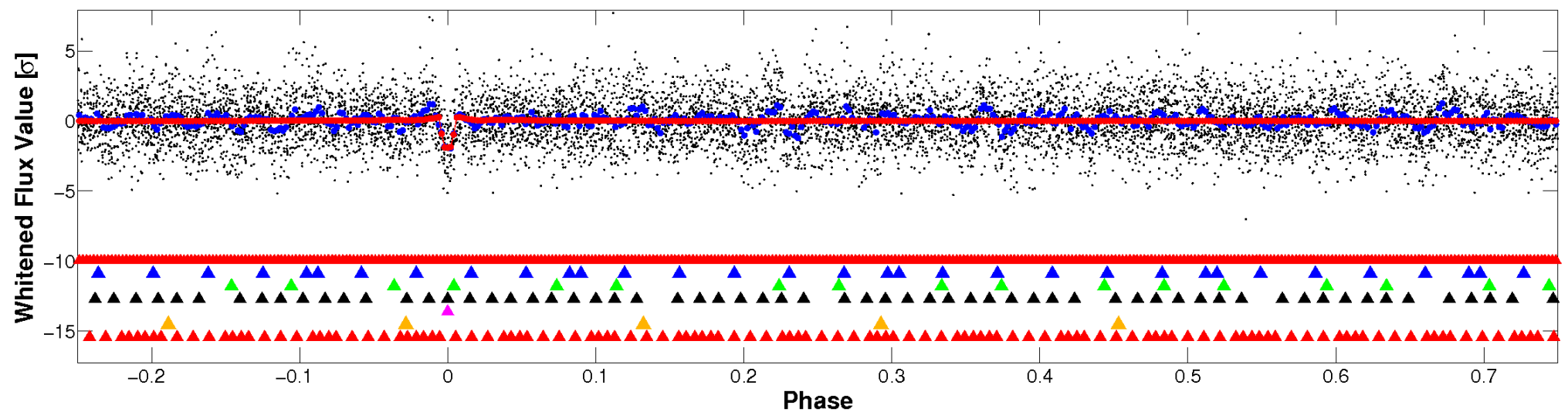


# Non-Whitened Vs. Whitened Light Curve

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

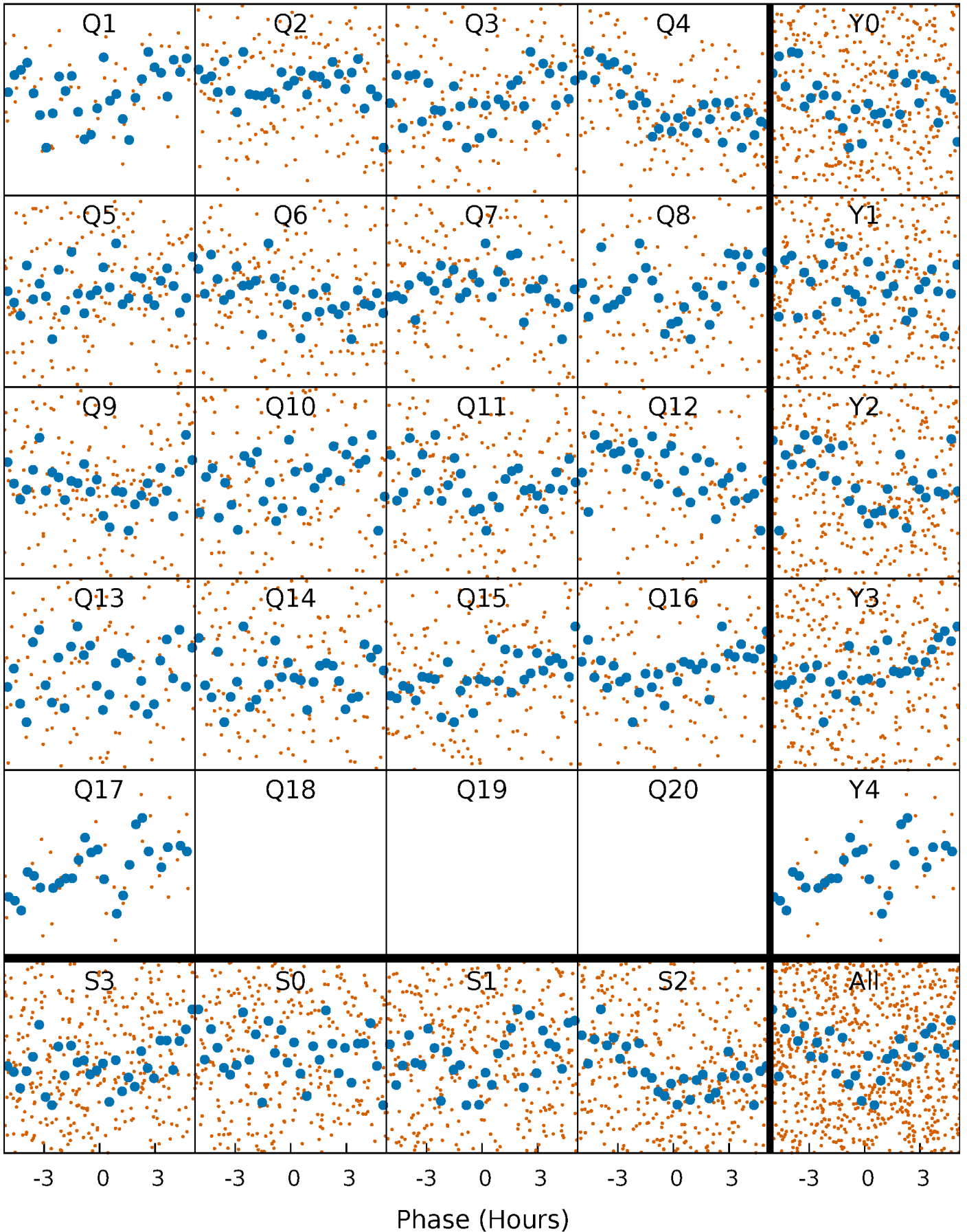


## Planet 5 : Phased Whitened Flux Time Series (Fit Epoch/Period)



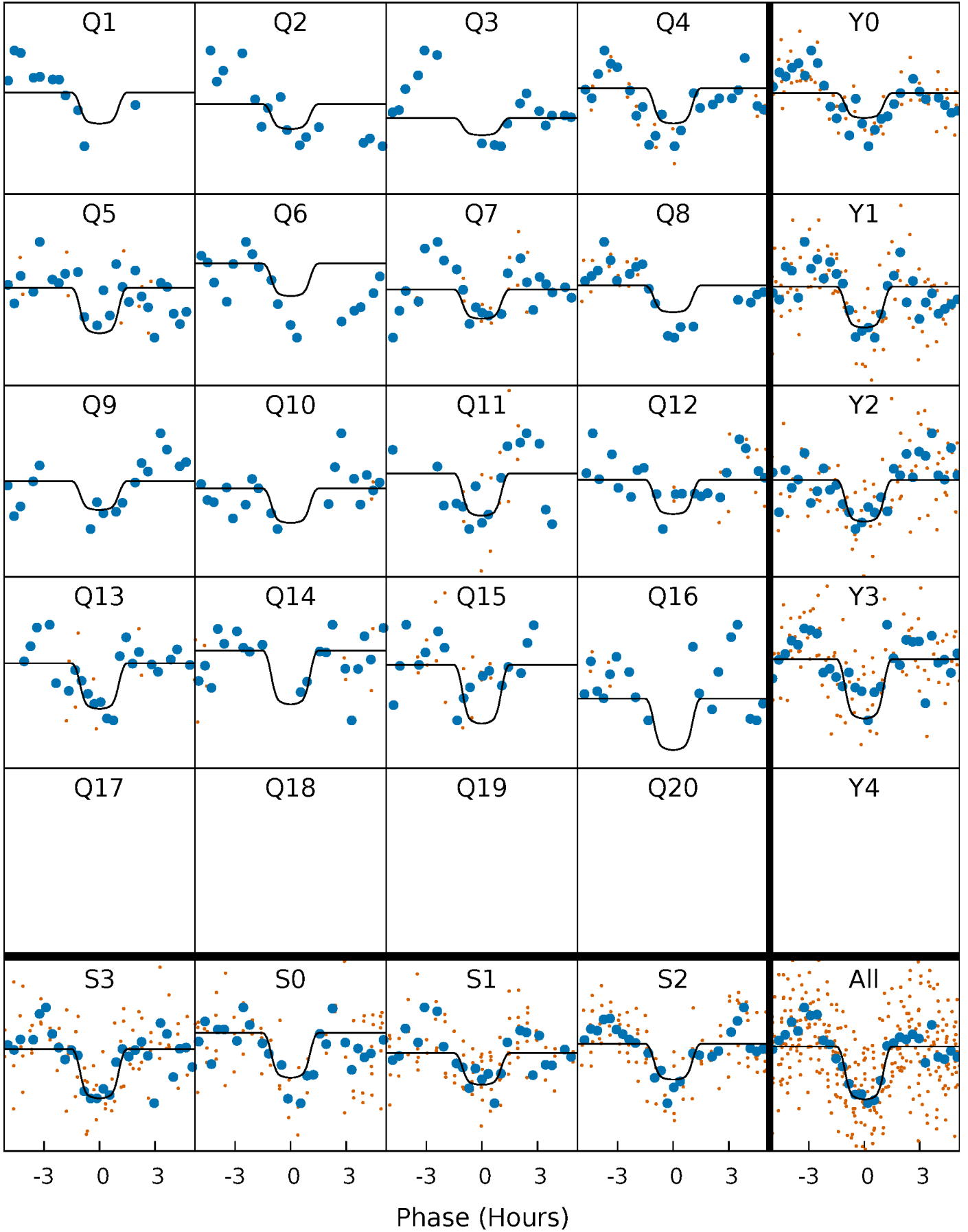
# PDC Quarter-Phased Transit Curves

TCE 006228371-05     $P = 10.097525$  Days     $T_0 = 138.381023$  (BKJD)



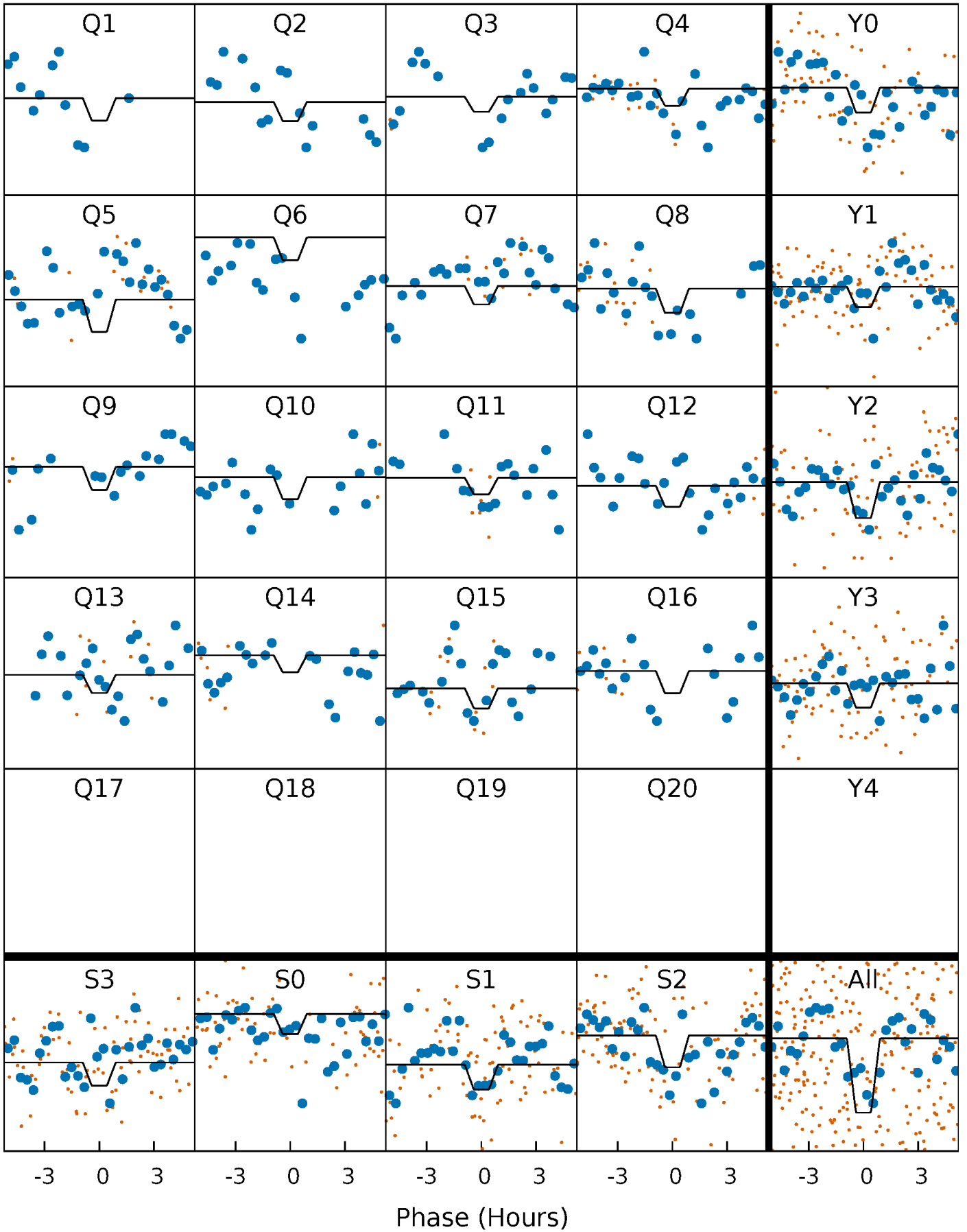
# DV Quarter-Phased Transit Curves

TCE 006228371-05   P= 10.097525 Days    $T_0=138.381023$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 006228371-05     $P = 10.097274$  Days     $T_0 = 138.384279$  (BKJD)

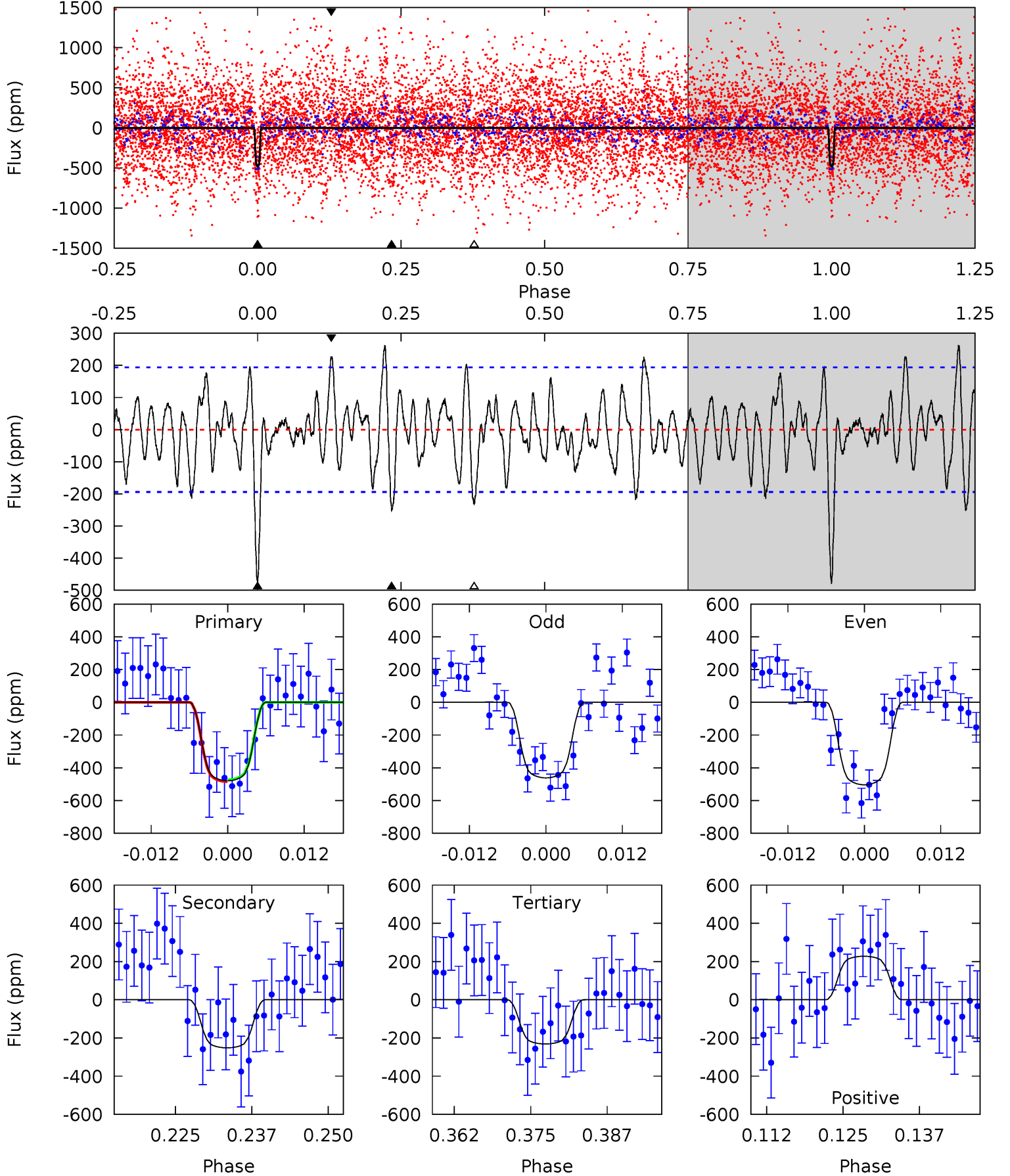




# DV Model-Shift Uniqueness Test

006228371-05,  $P = 10.097525$  Days,  $E = 128.283498$  Days

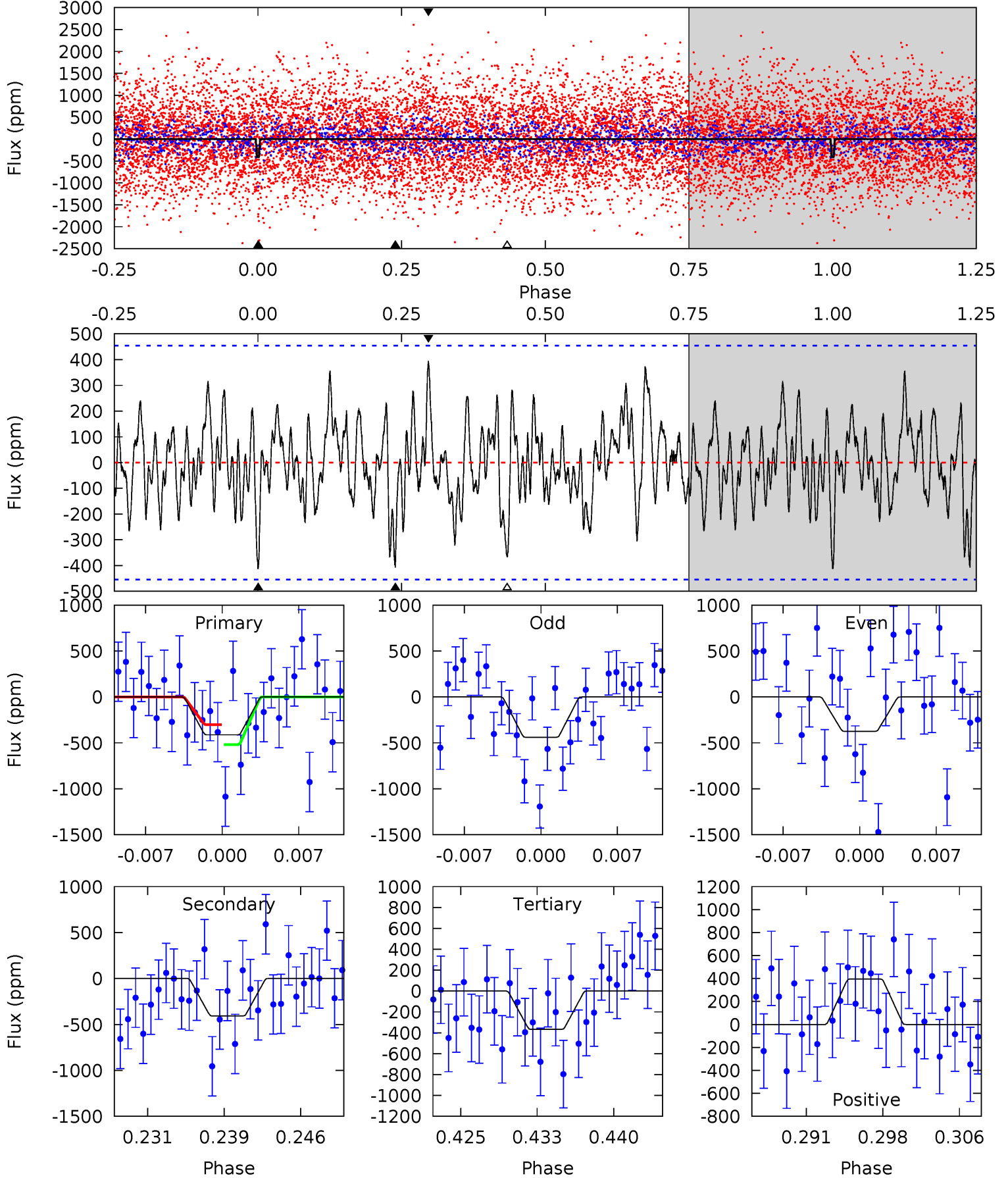
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.3	6.46	5.94	5.85	4.98	2.50	2.14	6.37	6.46	0.52	0.62	0.54	1.03	0.35	0.14



# Alt Model-Shift Uniqueness Test

006228371-05, P = 10.097274 Days, E = 128.287005 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
4.62	4.56	4.11	4.42	5.08	2.68	1.49	0.51	0.20	0.46	0.15	0.36	1.12	0.49	1.21



### Stellar Parameters For KIC 006228371

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7810^{+217}_{-326}$	$3.492^{+0.618}_{-0.195}$	$0.070^{+0.200}_{-0.400}$	$4.591^{+0.302}_{-2.721}$	$2.386^{+0.249}_{-0.796}$	$0.035^{+0.286}_{-0.004}$
	+3%/-4%	+18%/-6%	+286%/-571%	+7%/-59%	+10%/-33%	+822%/-11%
Source	KIC0	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 006228371-05 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-252 \pm 39$	$11.58^{+3.04}_{-3.32}$	$2908^{+173}_{-377}$	$6030^{+817}_{-533}$	$15^{+14}_{-6}$
Alt.	$-408 \pm 89$	$10.91^{+2.68}_{-3.38}$	$2912^{+169}_{-382}$	$7173^{+1088}_{-813}$	$28^{+27}_{-11}$

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

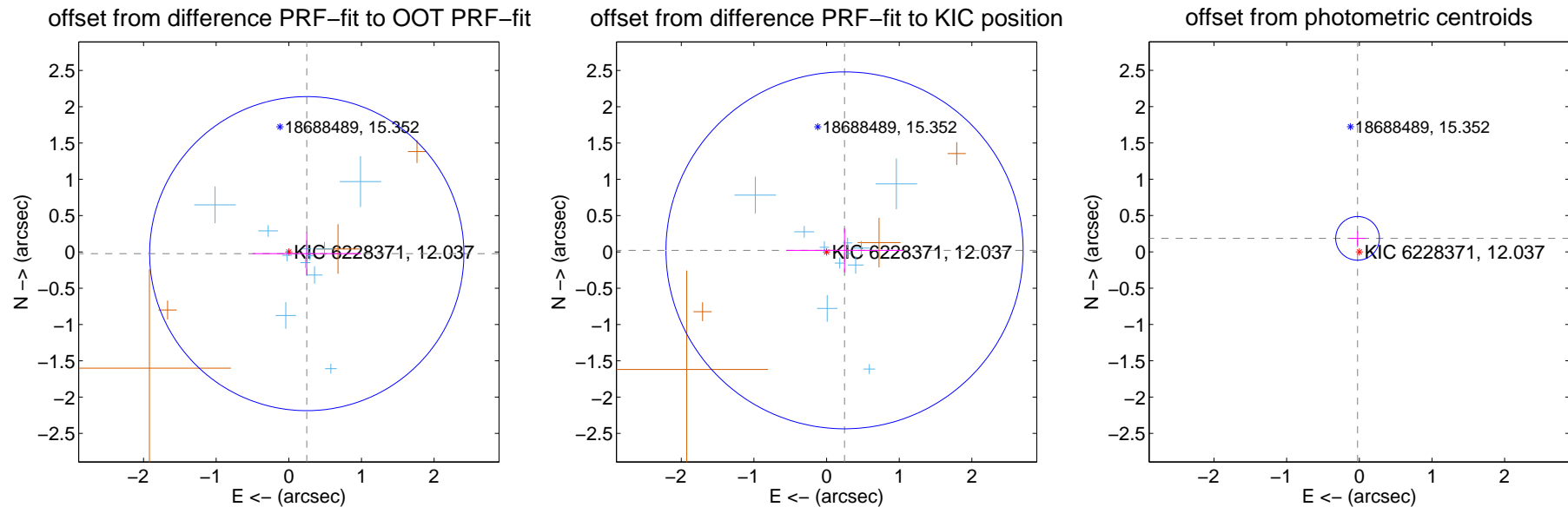
## DV Centroid Data

Supplemental centroid analysis for 006228371-05. Kepler magnitude: 12.04. Transit SNR 14.54

There are 11 quarters with good PRF difference image offsets

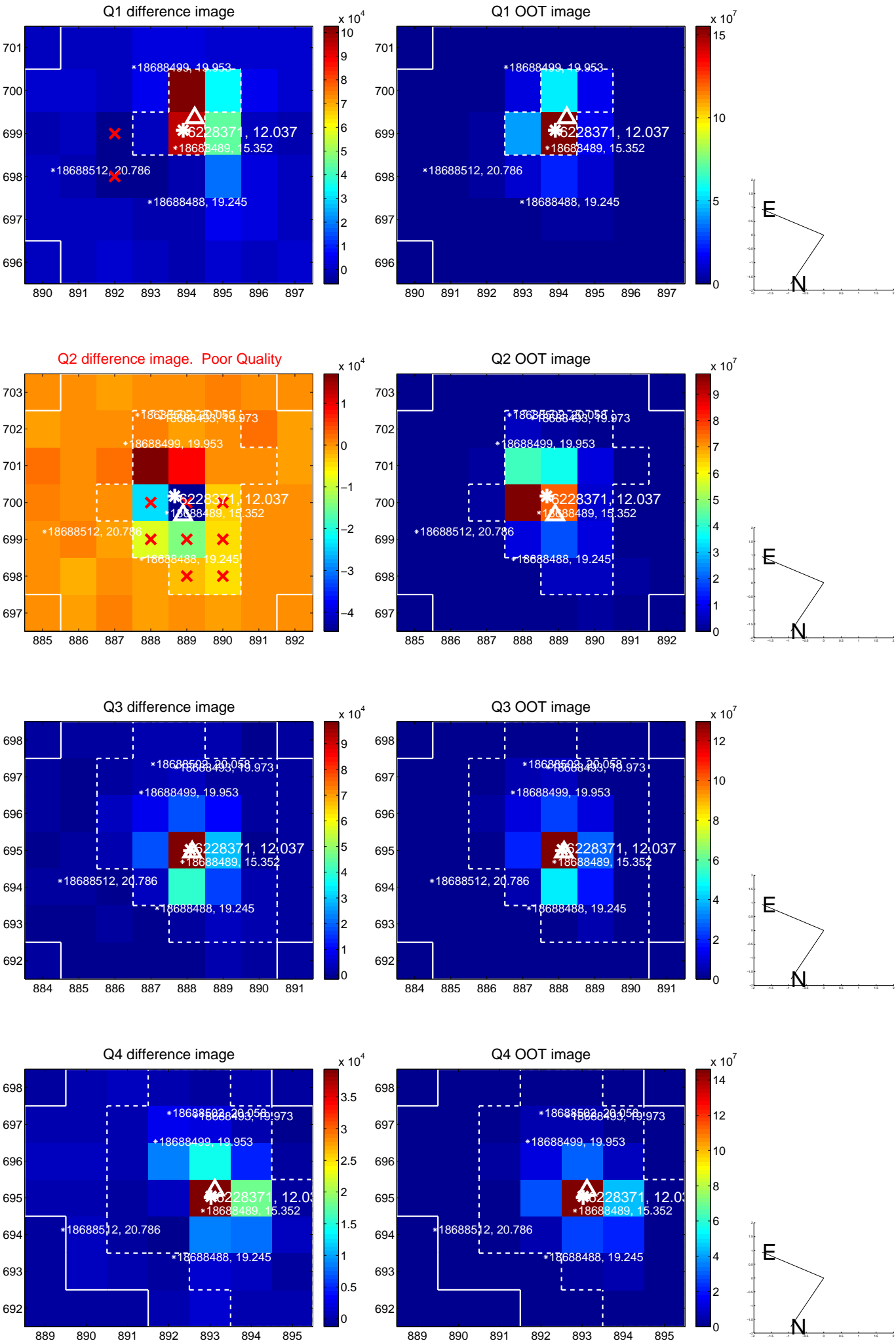
The direct PRF centroid is offset from the target star catalog position by about 0.02 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.248 \pm 0.721$	0.34	$-0.247 \pm 0.747$	$-0.024 \pm 0.295$
PRF-fit source offset from KIC position	$0.248 \pm 0.820$	0.30	$-0.247 \pm 0.802$	$0.022 \pm 0.302$
photometric centroid source offset	$0.19 \pm 0.10$	1.87	$0.02 \pm 0.11$	$0.19 \pm 0.10$

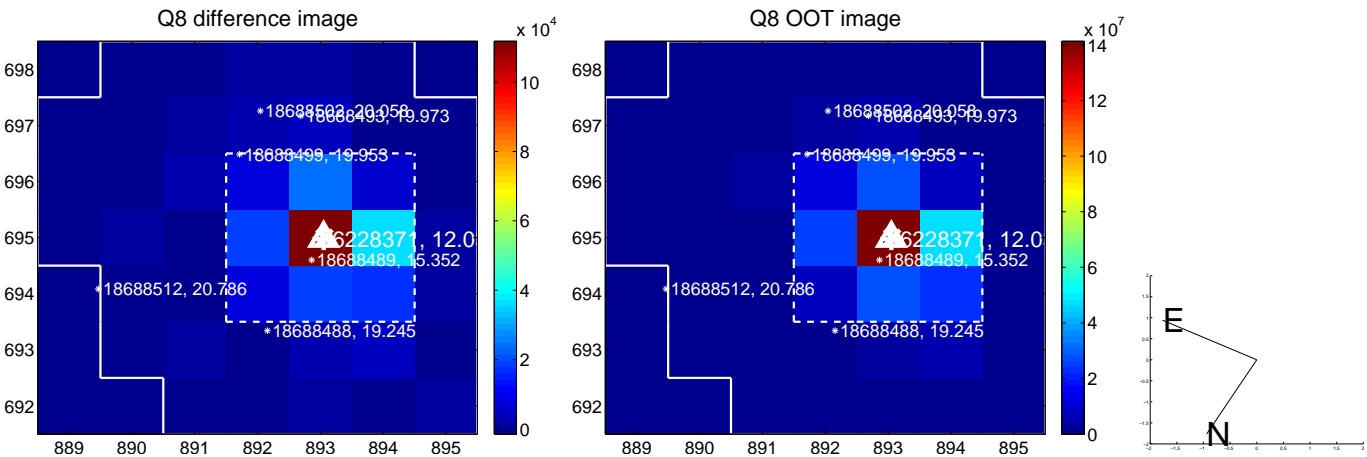
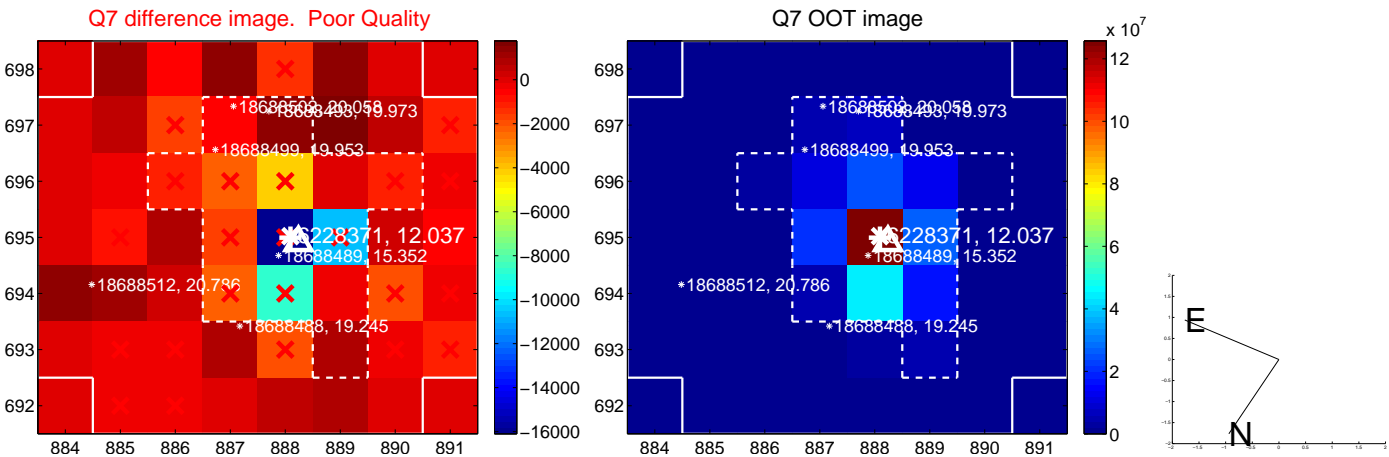
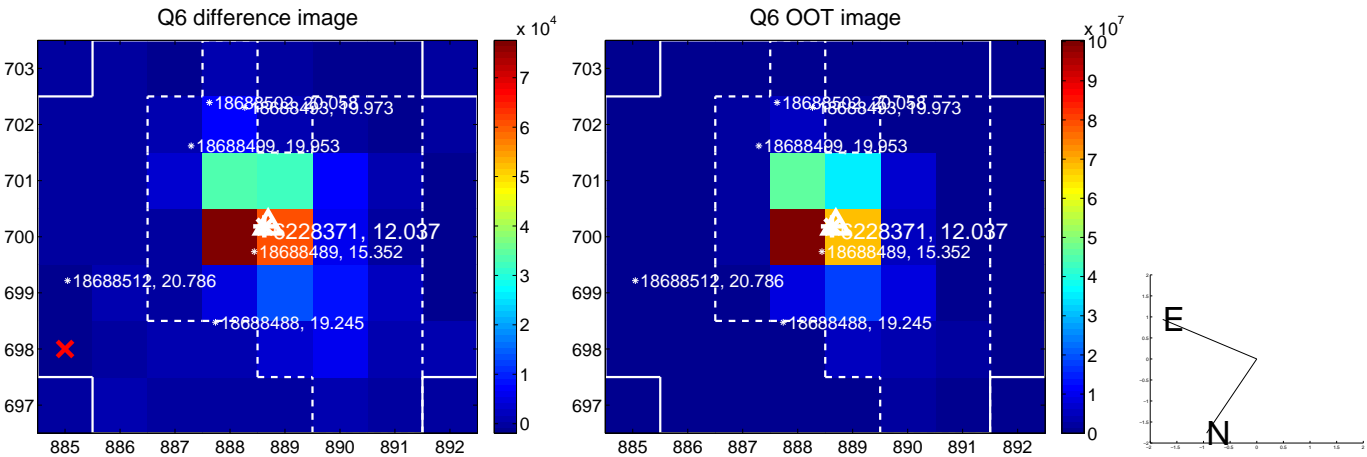
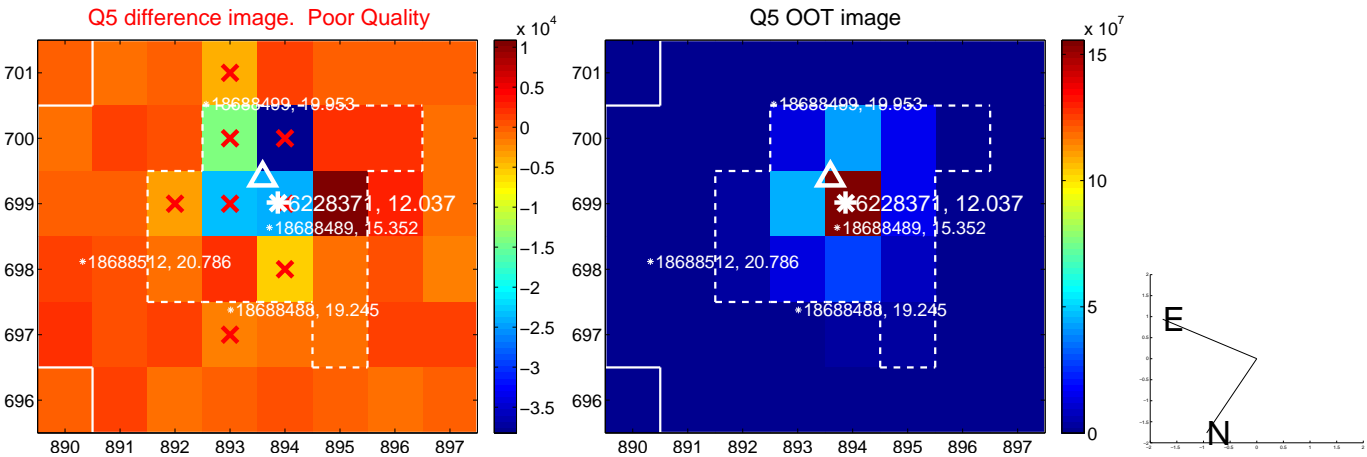


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

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

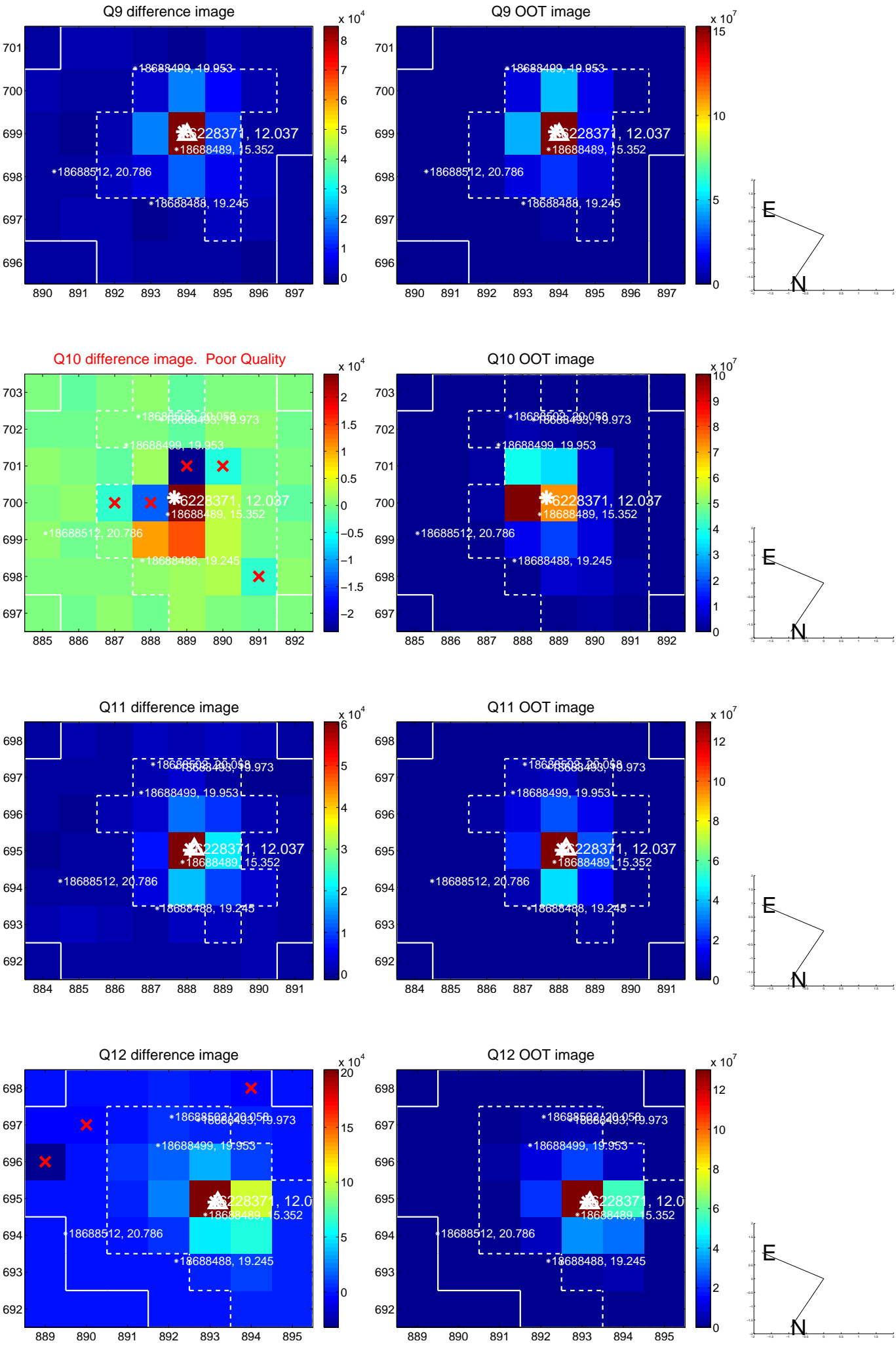


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

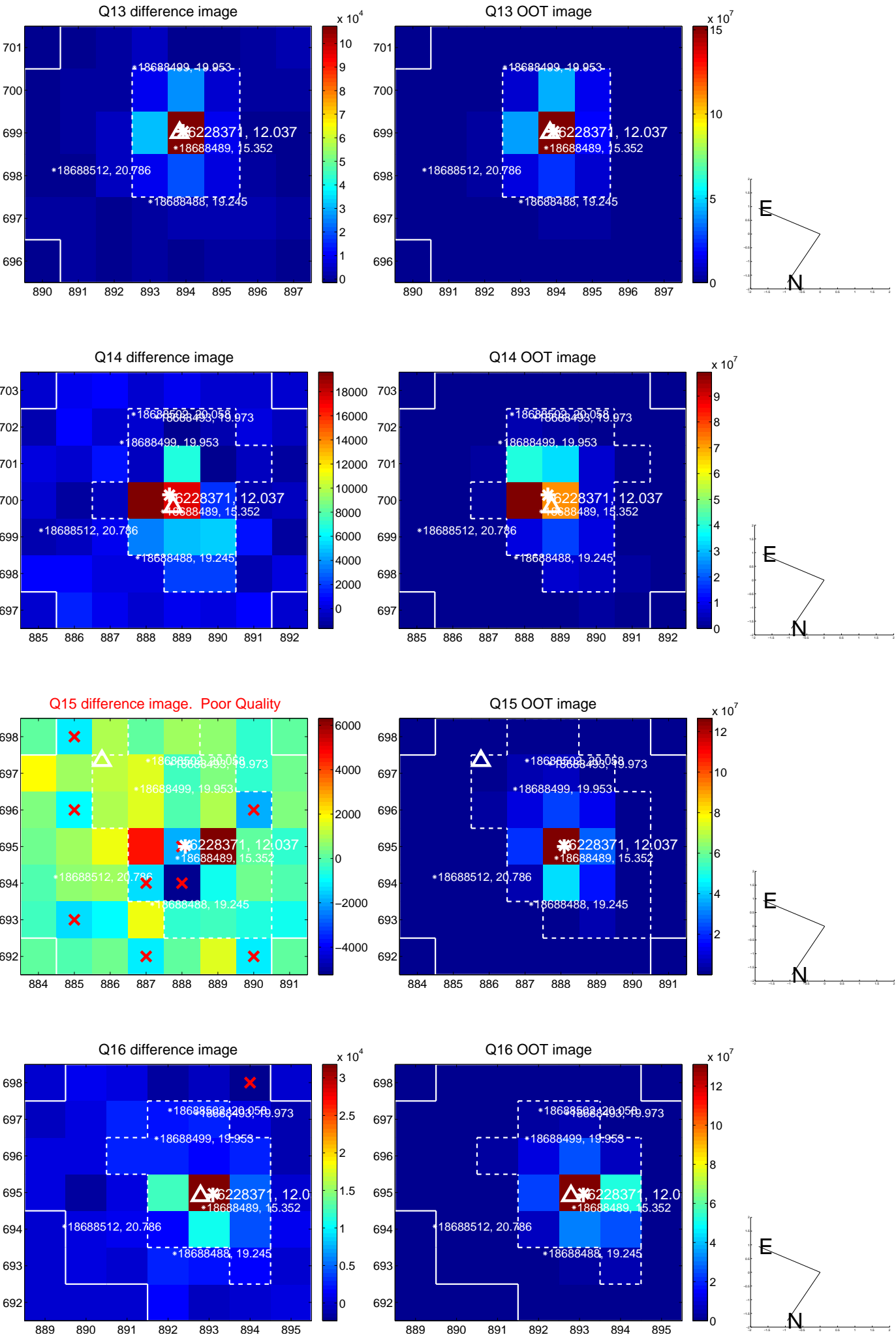




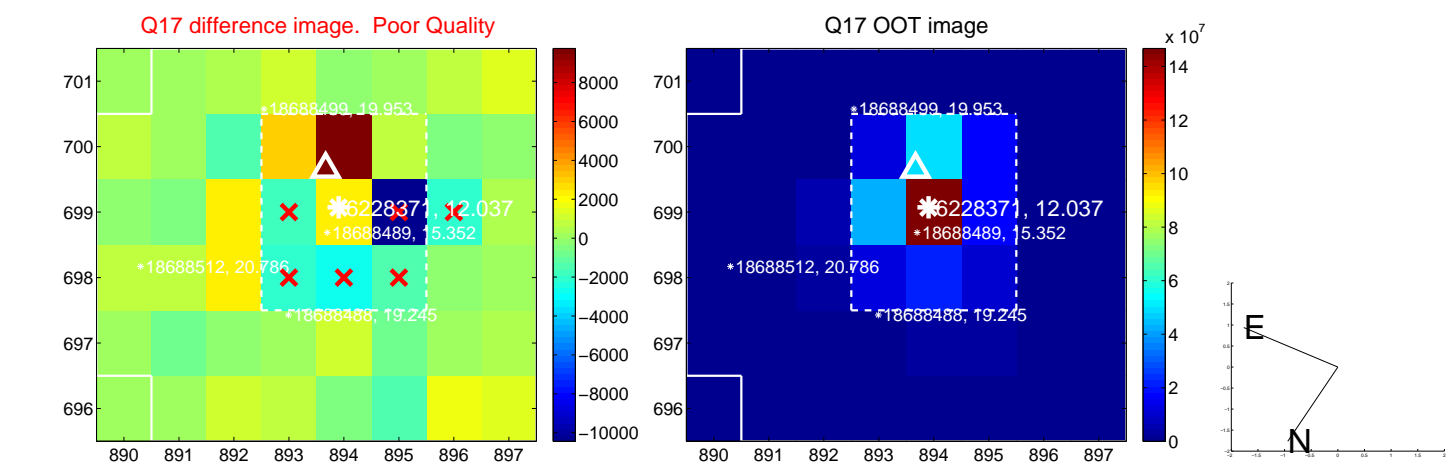
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



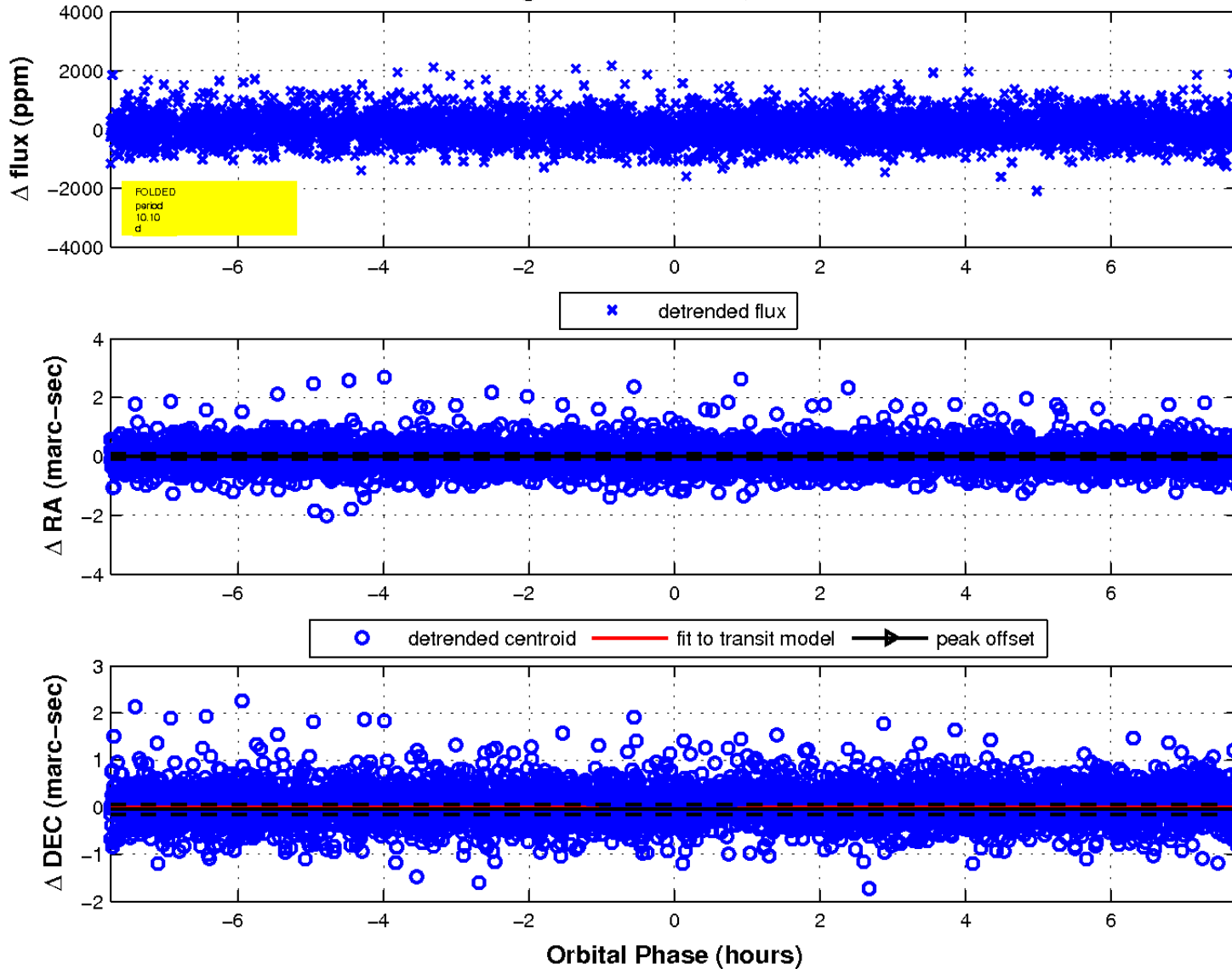
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

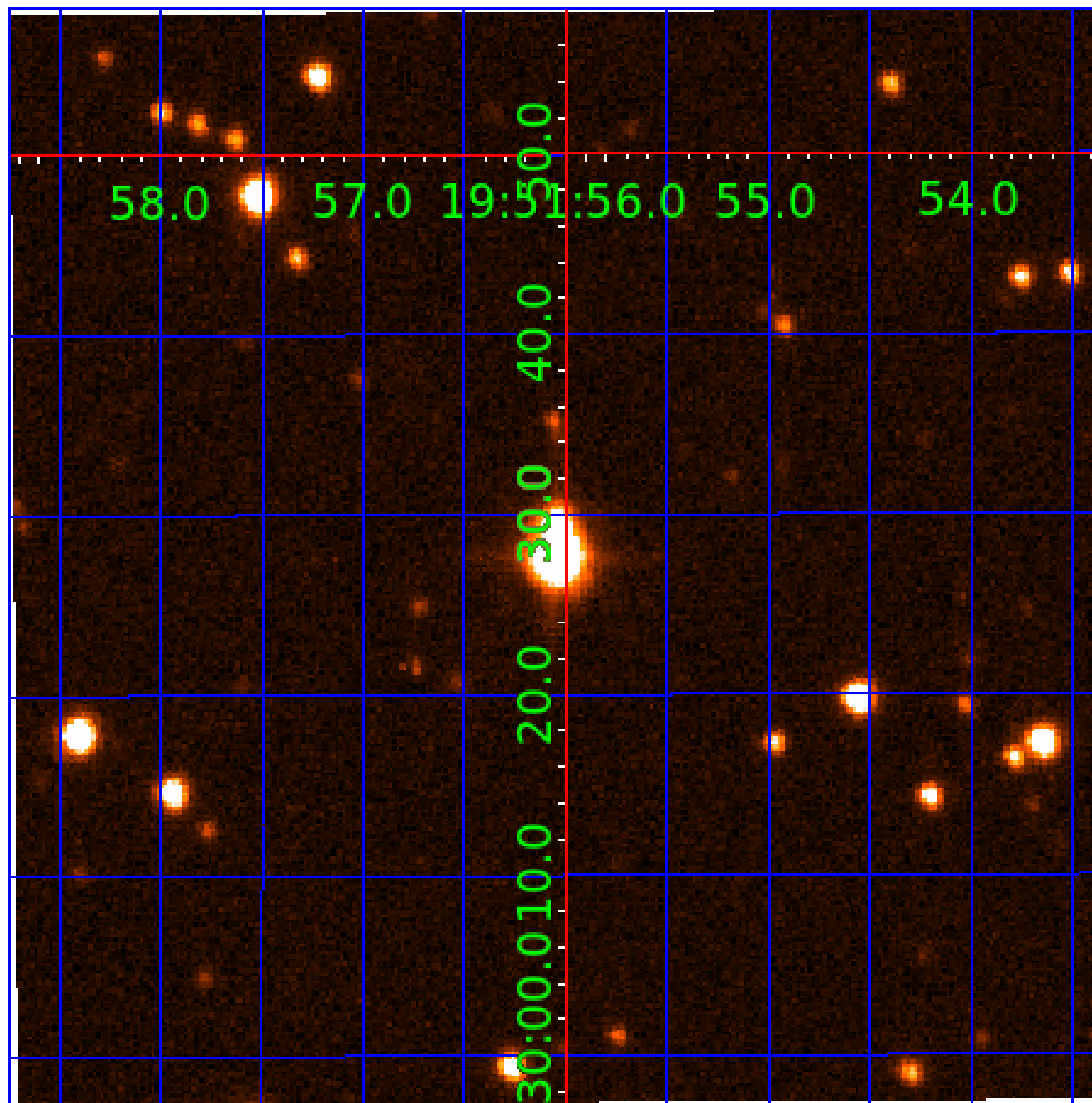


fluxWeightedCentroids, Planet 5 of 7



UKIRT Image

Declination



# KIC 006228371

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006228371-01	OBS	No	1.945627	132.146664	44.7	13.115	11.5	6.2	4.59	7810	3.12	42269.19
006228371-02	OBS	No	44.354229	153.726345	1084.4	2.383	16.8	13.4	4.59	7810	16.23	653.92
006228371-03	OBS	No	87.142109	142.860482	953.0	6.176	14.1	14.7	4.59	7810	17.81	265.75
006228371-04	OBS	No	23.181307	148.780900	531.2	3.350	14.2	12.8	4.59	7810	12.15	1553.29
006228371-05	OBS	No	10.097525	138.381023	480.5	2.586	13.8	14.5	4.59	7810	12.24	4704.18
006228371-06	OBS	No	274.253538	267.743426	1339.7	69.177	12.6	9.9	4.59	7810	16.93	57.62
006228371-07	OBS	No	11.997651	136.206884	292.4	6.758	12.3	10.9	4.59	7810	8.74	3738.02

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006228371-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT
006228371-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
006228371-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
006228371-04	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
006228371-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
006228371-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
006228371-07	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—HALO_GHOST

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

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

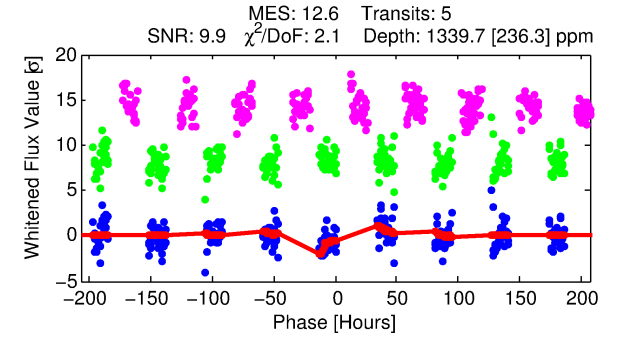
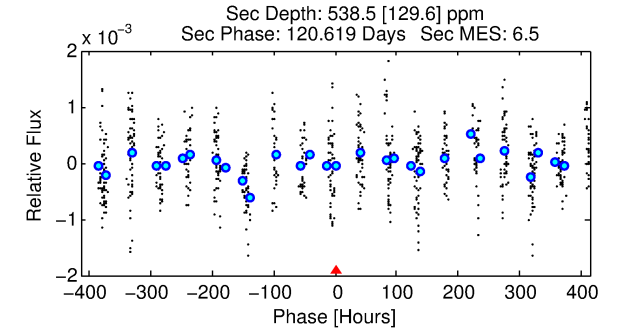
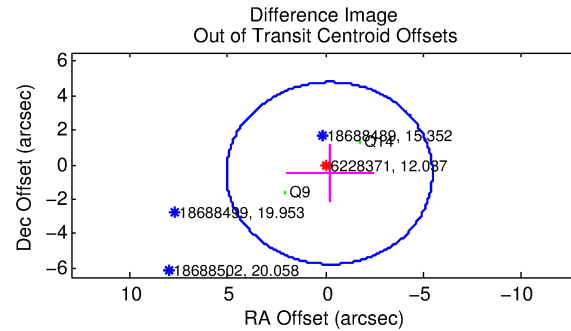
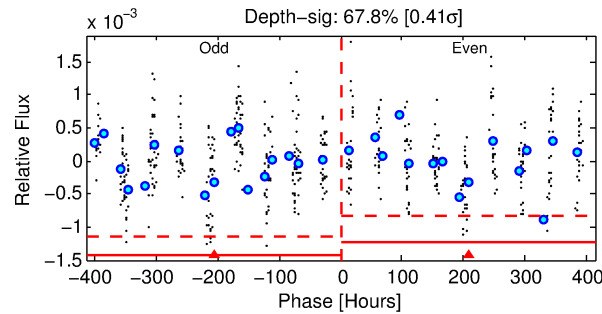
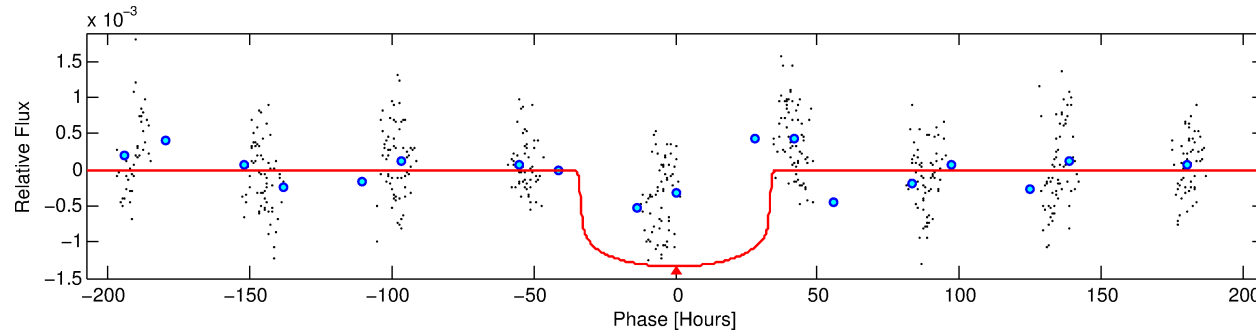
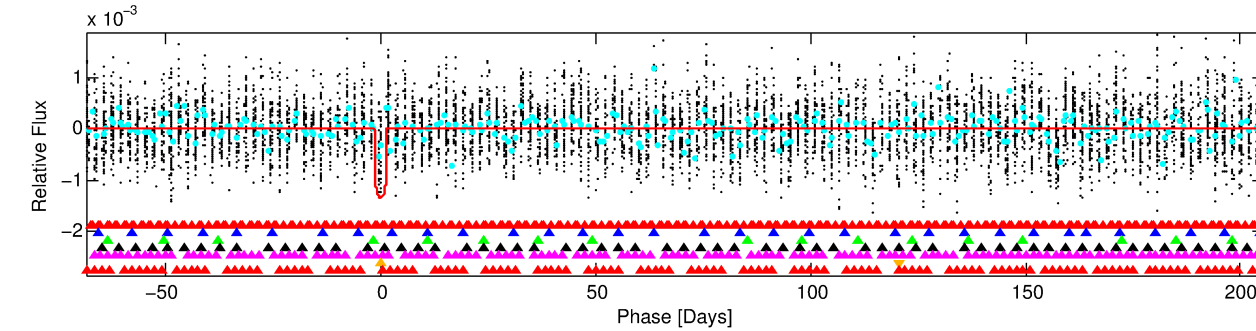
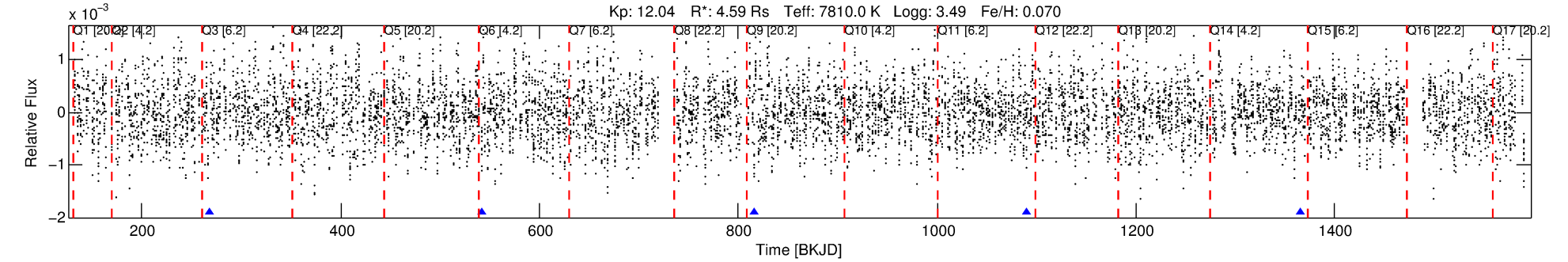
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 006228371-06

No Significant Match Found

# DV One-Page Summary

KIC: 6228371 Candidate: 6 of 7 Period: 274.254 d



## DV Fit Results:

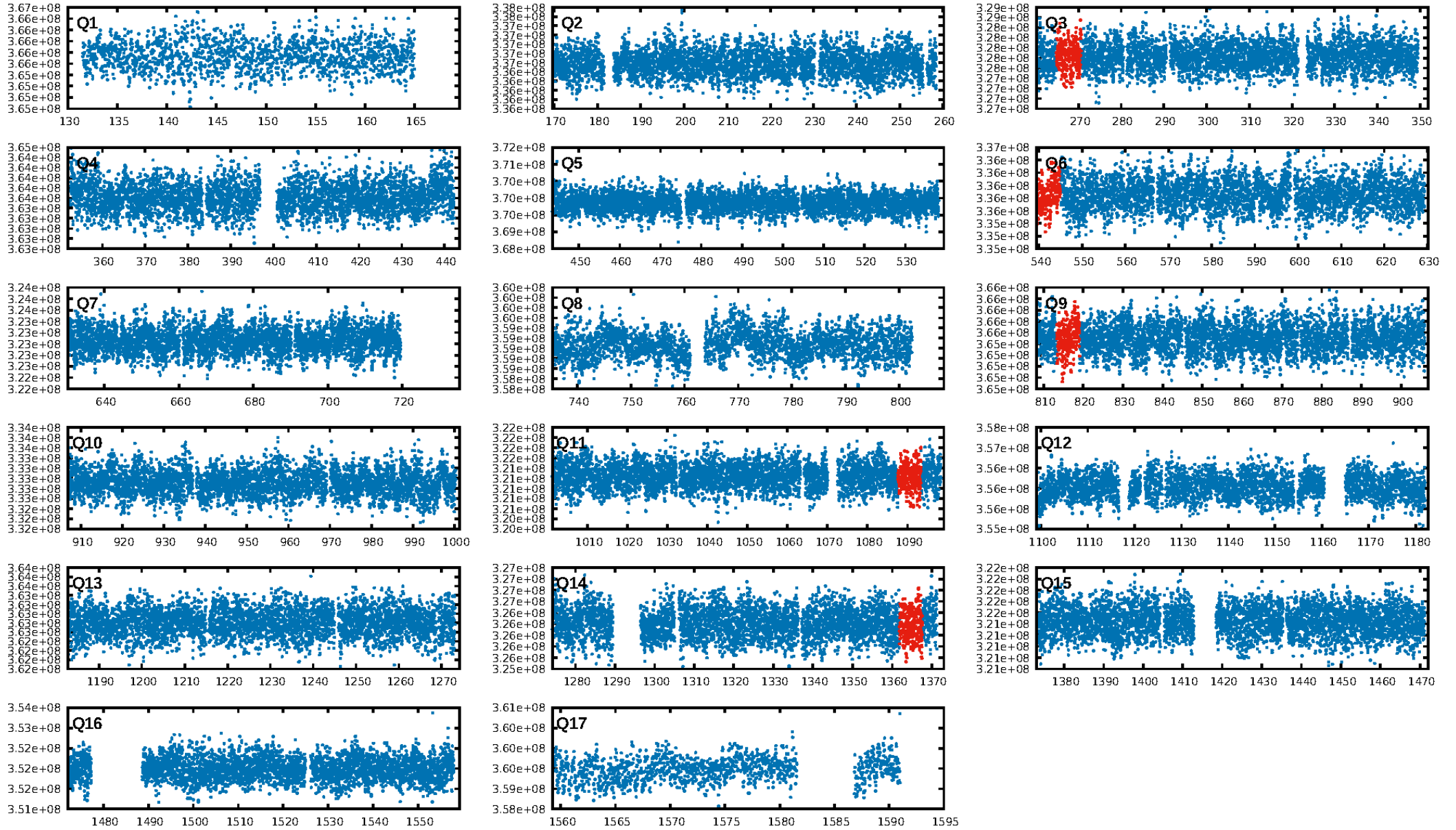
Period = 274.25354 [0.07180] d  
Epoch = 267.7434 [0.2525] BKJD  
Rp/R\* = 0.0338 [0.0161]  
a/R\* = 31.23 [75.50]  
b = 0.08 [31.67]  
Seff = 57.62 [59.99]  
Teq = 703 [183] K  
Rp = 16.93 [12.87] Re  
a = 1.1043 [0.6817] AU  
Ag = 1260.85 [1791.64] [0.70 $\sigma$ ]  
Teffp = 6473 [1611] K [3.56 $\sigma$ ]

## DV Diagnostic Results:

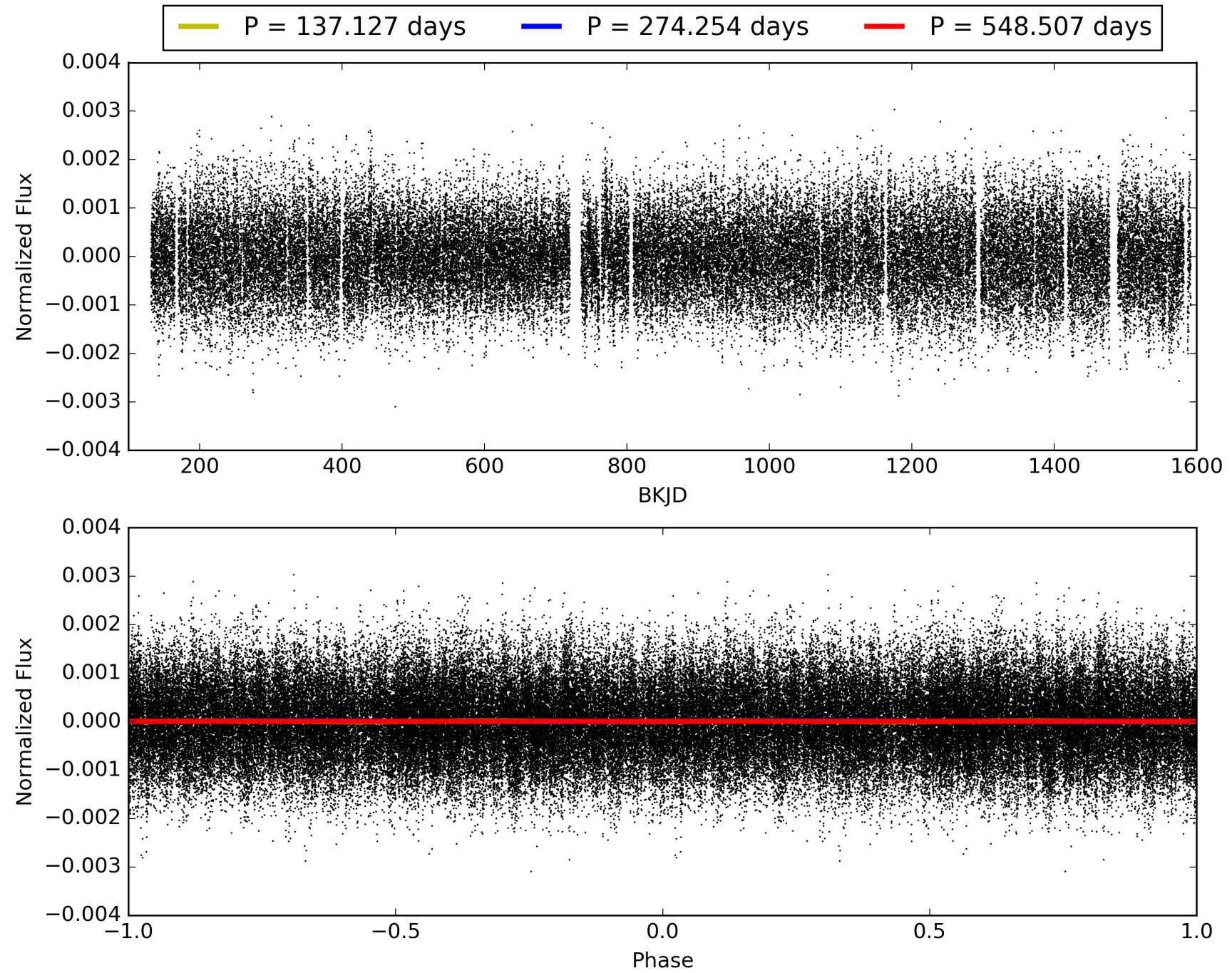
ShortPeriod-sig: 100.0% [64.66 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 3.0%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [5/5]  
GhostDiagnostic-chr: -12.57  
Centroid-sig: 14.7%  
Centroid-so: 0.028 arcsec [0.37 $\sigma$ ]  
OotOffset-rm: 0.536 arcsec [0.31 $\sigma$ ]  
OotOffset-st: 1/0/0/1 [2]  
KicOffset-rm: 0.517 arcsec [0.30 $\sigma$ ]  
KicOffset-st: 1/0/0/1 [2]  
DiffImageQuality-fgm: 1.00 [2/2]  
DiffImageOverlap-fno: 0.00 [0/2]



# TCE 006228371-06, PDC Light Curves

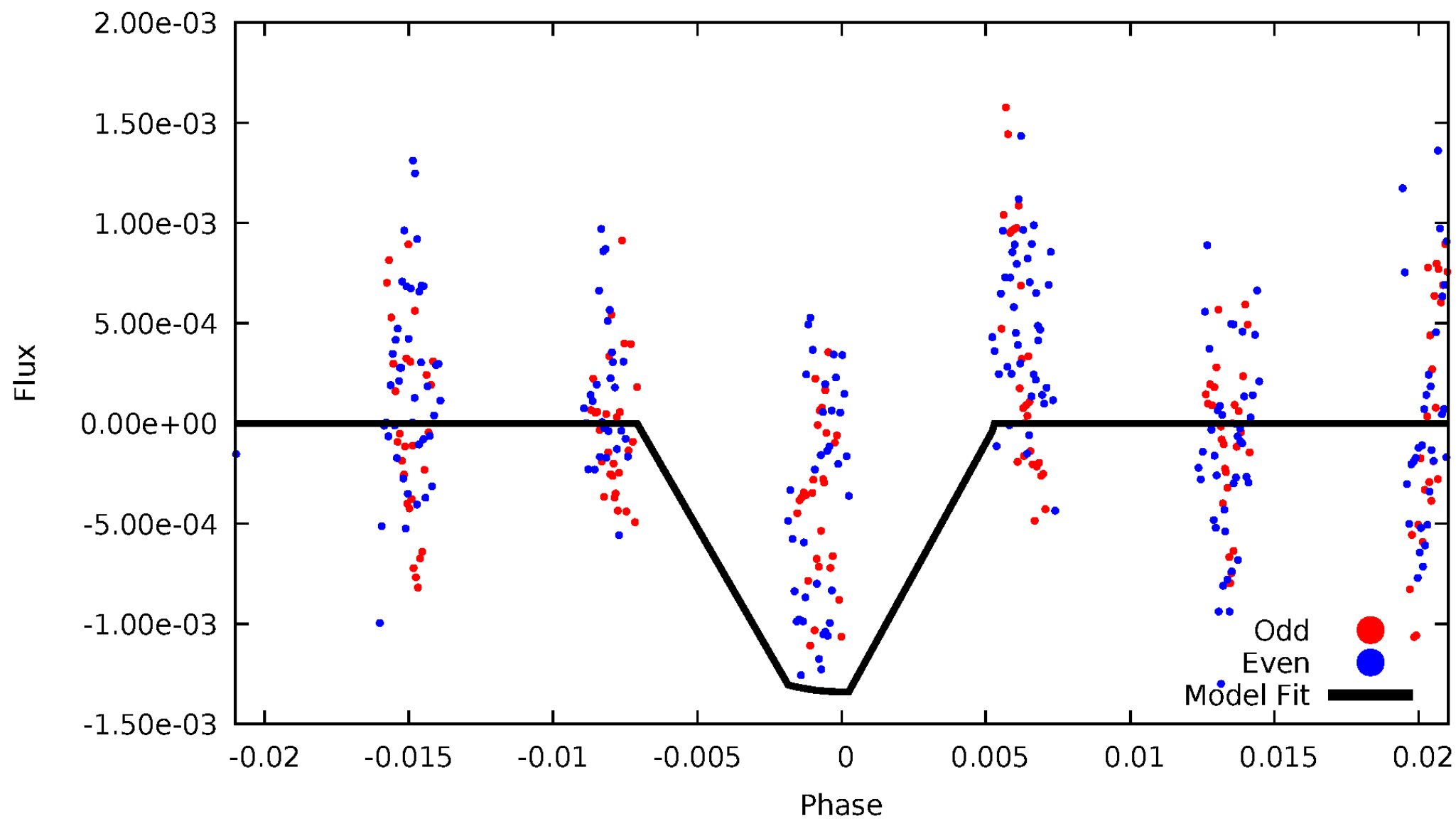


TCE 006228371-06



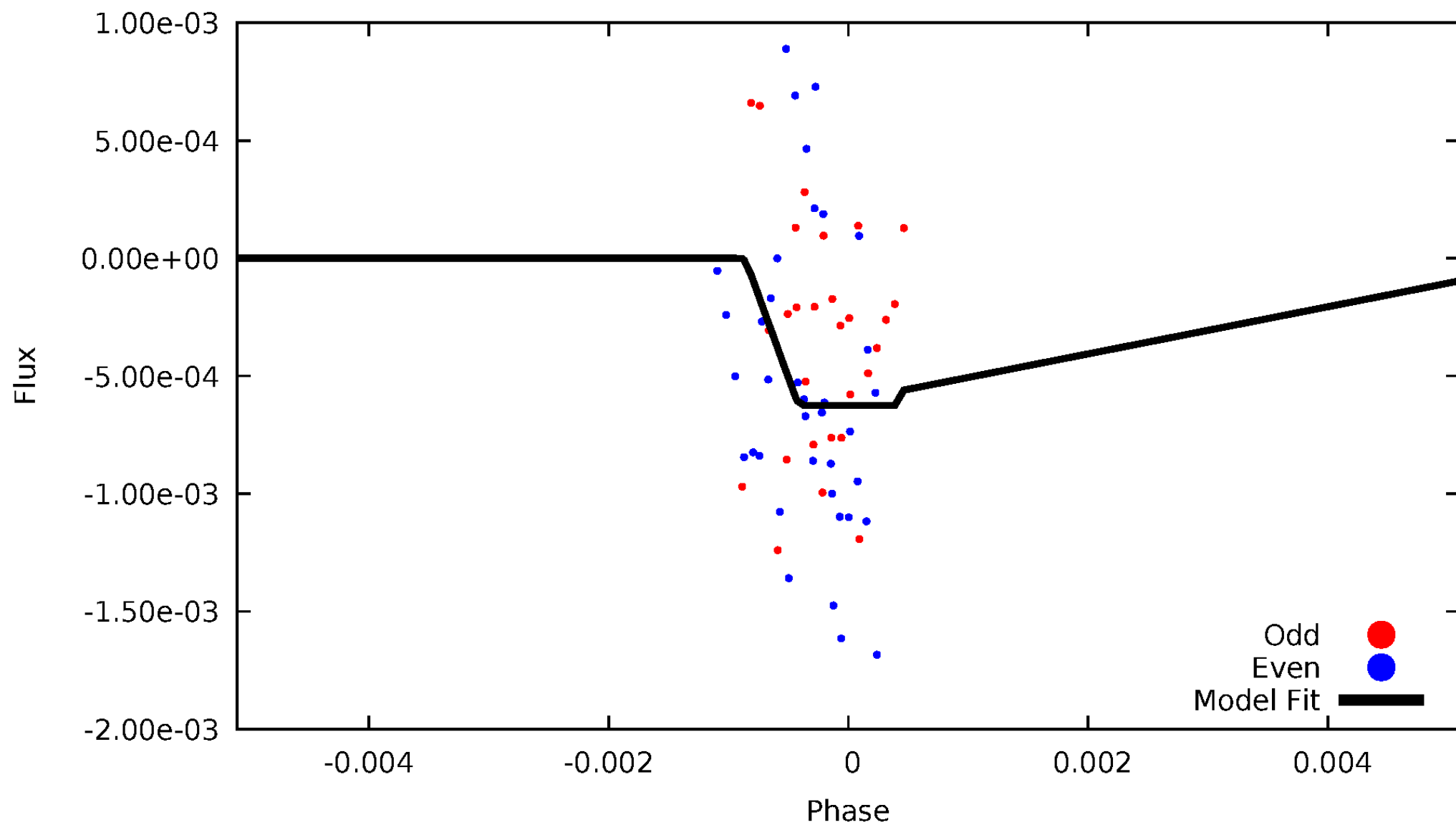
# DV Odd/Even

TCE 006228371-06



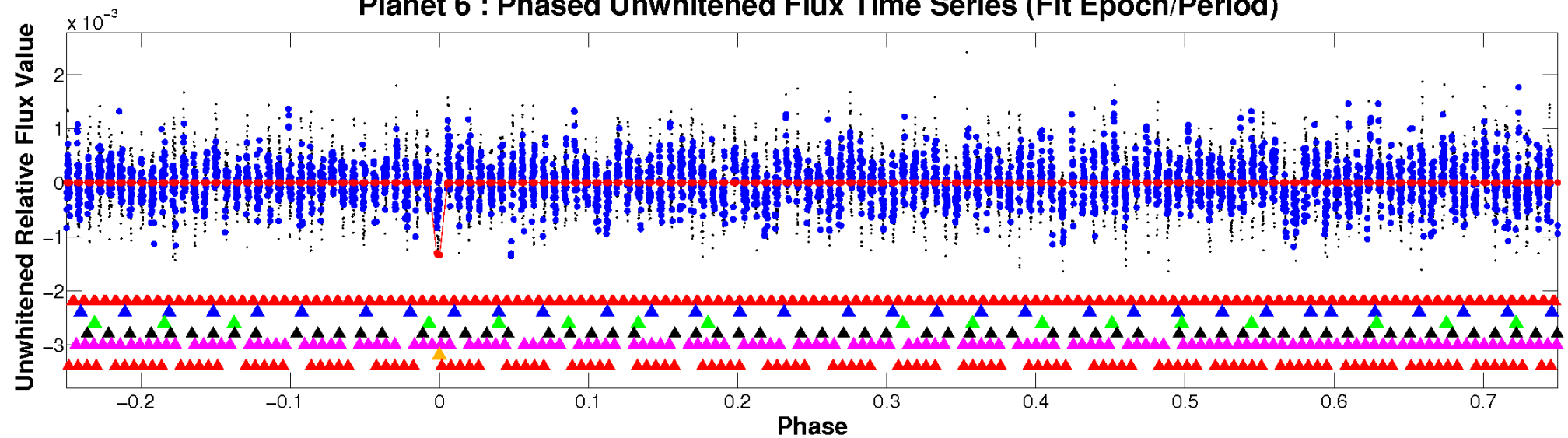
# ALT Odd/Even

TCE 006228371-06

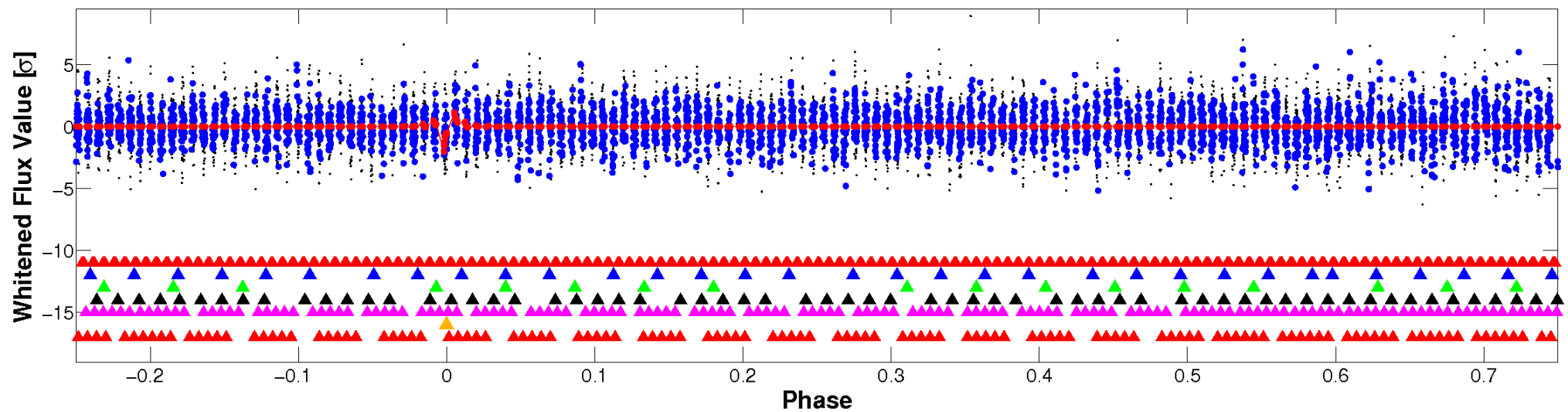


# Non-Whitened Vs. Whitened Light Curve

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

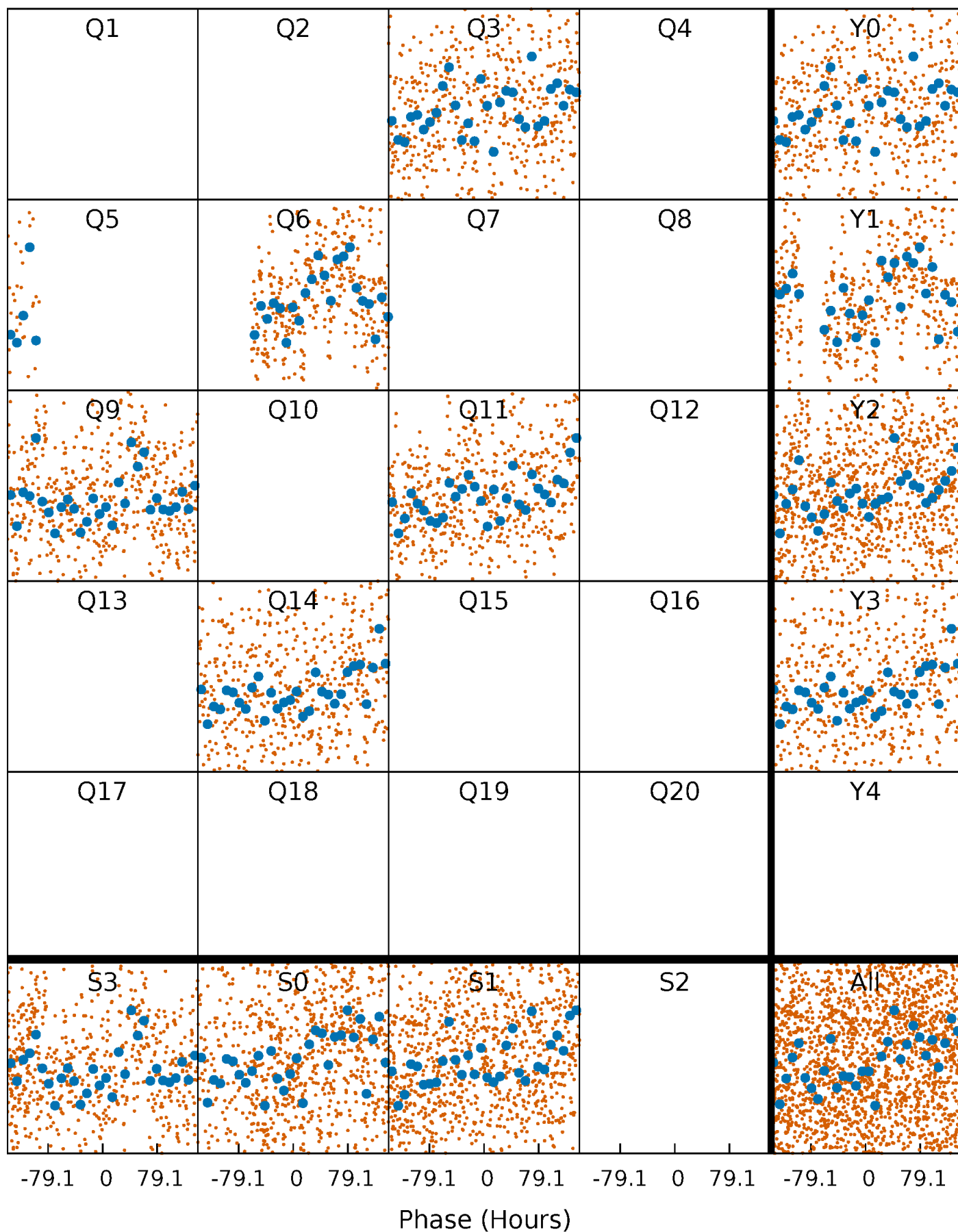


## Planet 6 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

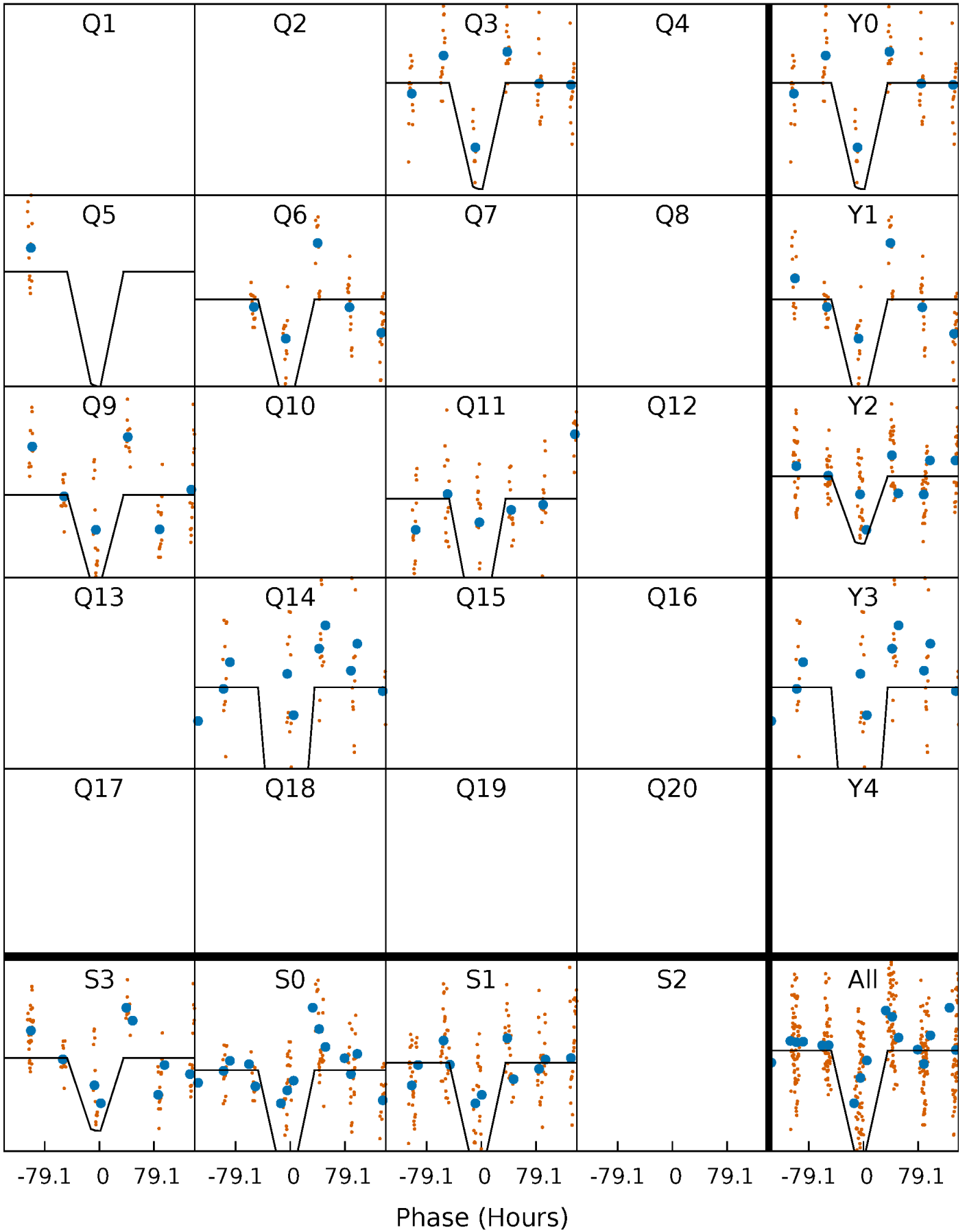
TCE 006228371-06 P=274.253538 Days  $T_0=267.743426$  (BKJD)





# DV Quarter-Phased Transit Curves

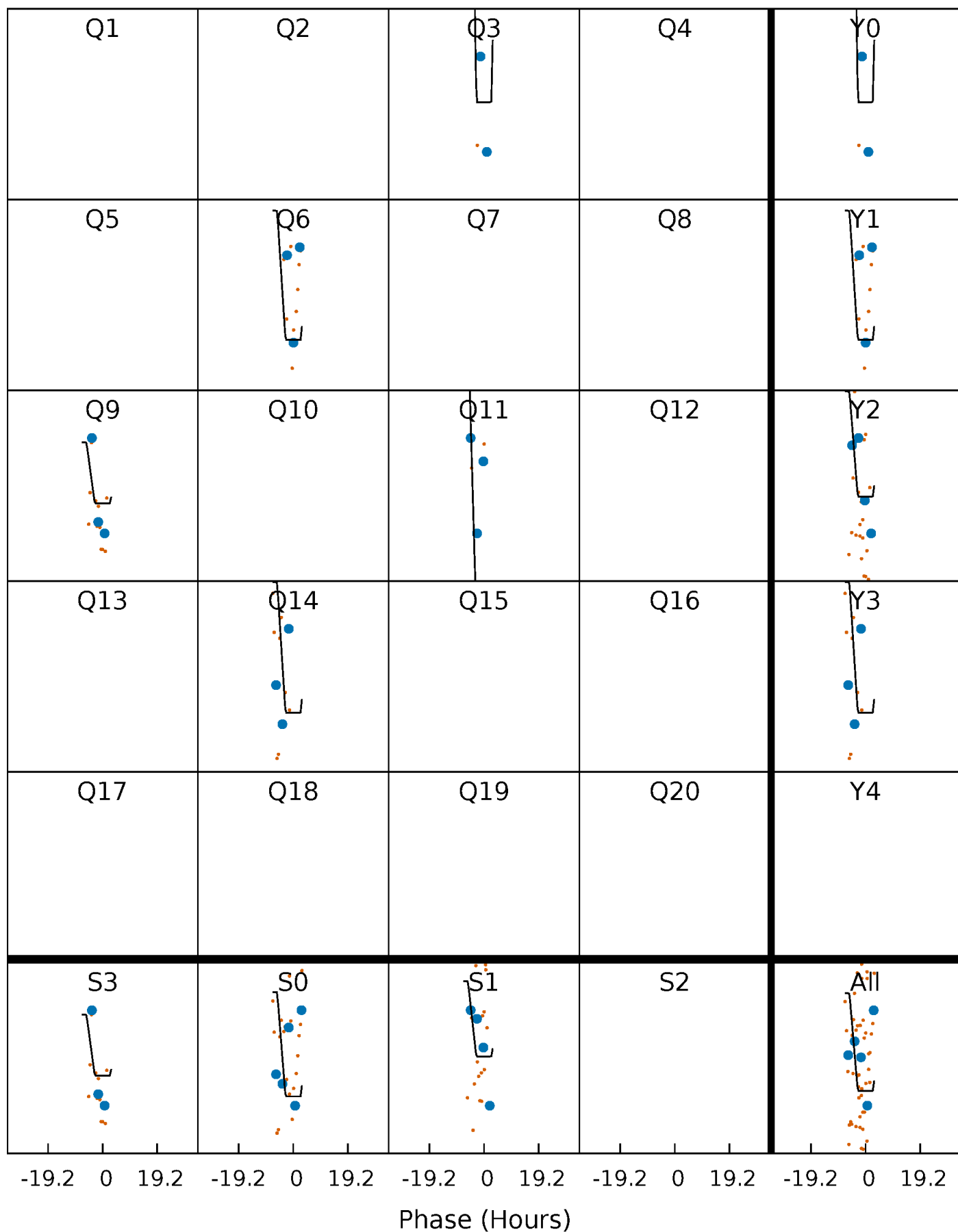
TCE 006228371-06     $P=274.253538$  Days     $T_0=267.743426$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

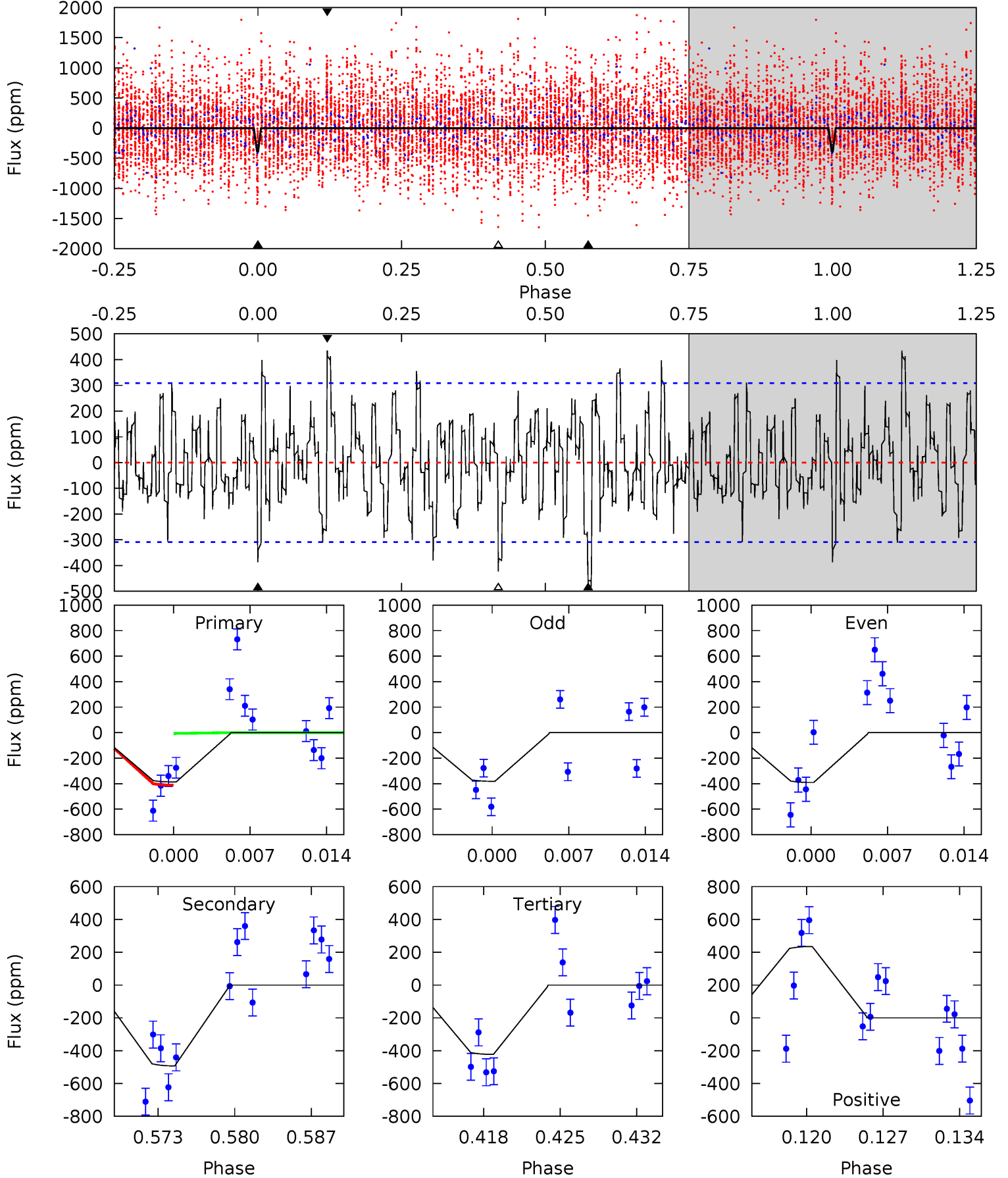
TCE 006228371-06 P=274.381844 Days  $T_0=267.331967$  (BKJD)



# DV Model-Shift Uniqueness Test

006228371-06, P = 274.253538 Days, E = 267.743426 Days

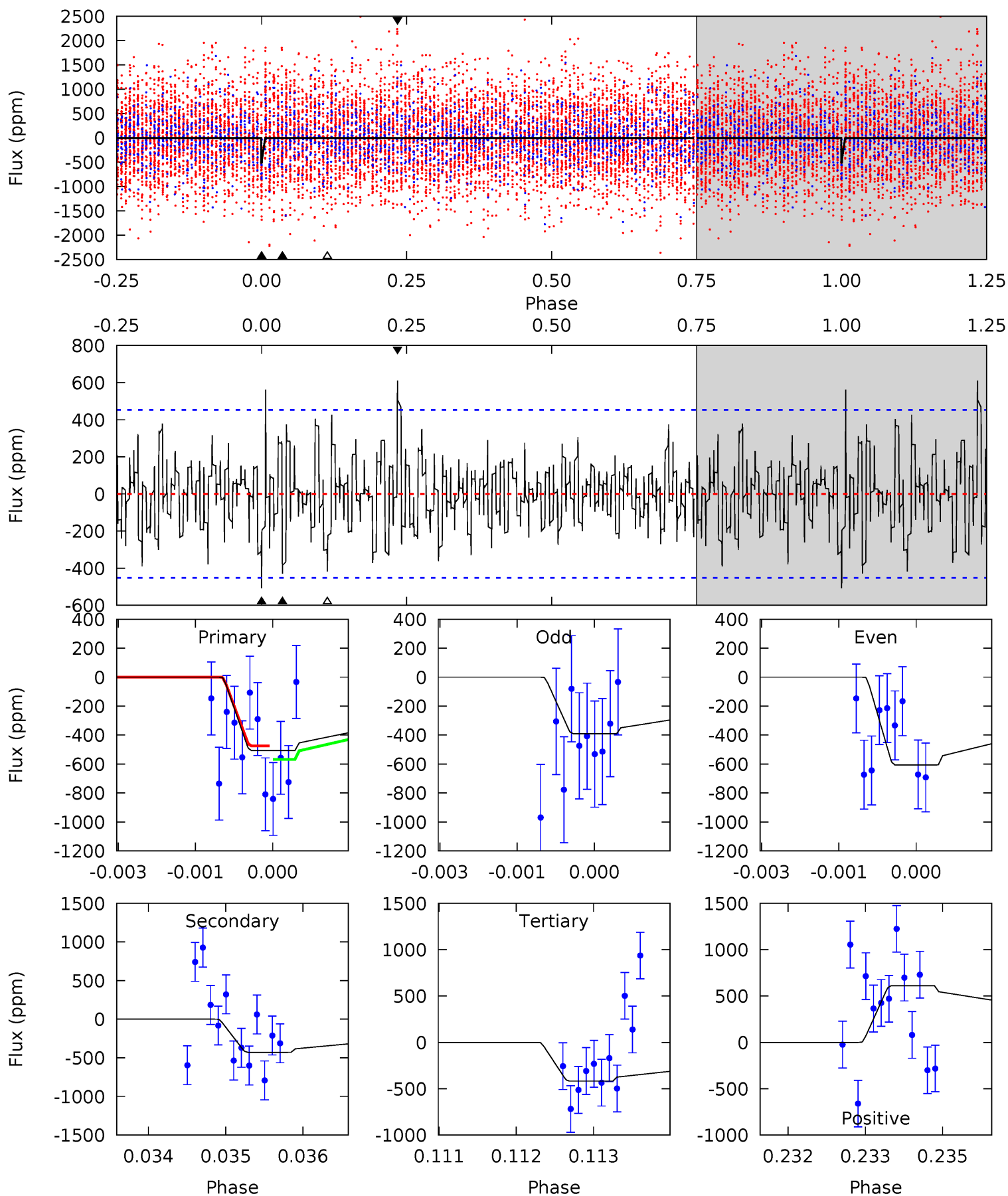
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.38	8.13	6.97	7.17	5.09	2.69	2.23	-0.59	-0.79	1.16	0.96	0.08	0.81	0.47	1.78



# Alt Model-Shift Uniqueness Test

006228371-06, P = 274.381844 Days, E = 267.331967 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
6.05	5.11	4.99	7.28	5.40	3.21	1.72	1.07	-1.23	0.13	-2.17	1.28	0.94	0.55	0.48



### Stellar Parameters For KIC 006228371

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7810^{+217}_{-326}$	$3.492^{+0.618}_{-0.195}$	$0.070^{+0.200}_{-0.400}$	$4.591^{+0.302}_{-2.721}$	$2.386^{+0.249}_{-0.796}$	$0.035^{+0.286}_{-0.004}$
	+3%/-4%	+18%/-6%	+286%/-571%	+7%/-59%	+10%/-33%	+822%/-11%
Source	KIC0	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 006228371-06 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-493 \pm 61$	$15.79^{+8.09}_{-8.45}$	$966^{+62}_{-125}$	$6090^{+2938}_{-960}$	$1286^{+4828}_{-709}$
Alt.	$-429 \pm 84$	$11.99^{+8.33}_{-6.67}$	$969^{+55}_{-115}$	$6665^{+4138}_{-1290}$	$1886^{+7885}_{-1198}$

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

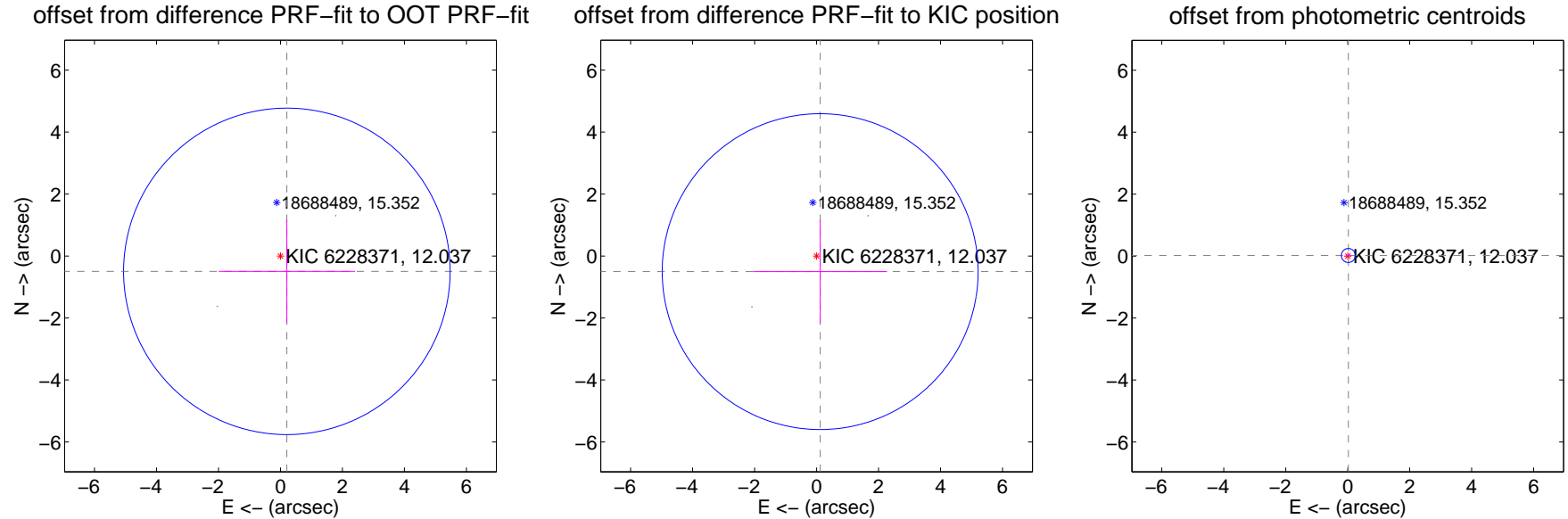
## DV Centroid Data

Supplemental centroid analysis for 006228371-06. Kepler magnitude: 12.04. Transit SNR 9.91

There are 2 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.12 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.536 \pm 1.756$	0.31	$-0.207 \pm 2.199$	$-0.495 \pm 1.667$
PRF-fit source offset from KIC position	$0.517 \pm 1.699$	0.30	$-0.116 \pm 2.158$	$-0.504 \pm 1.671$
photometric centroid source offset	$0.03 \pm 0.08$	0.37	$-0.02 \pm 0.08$	$0.02 \pm 0.07$

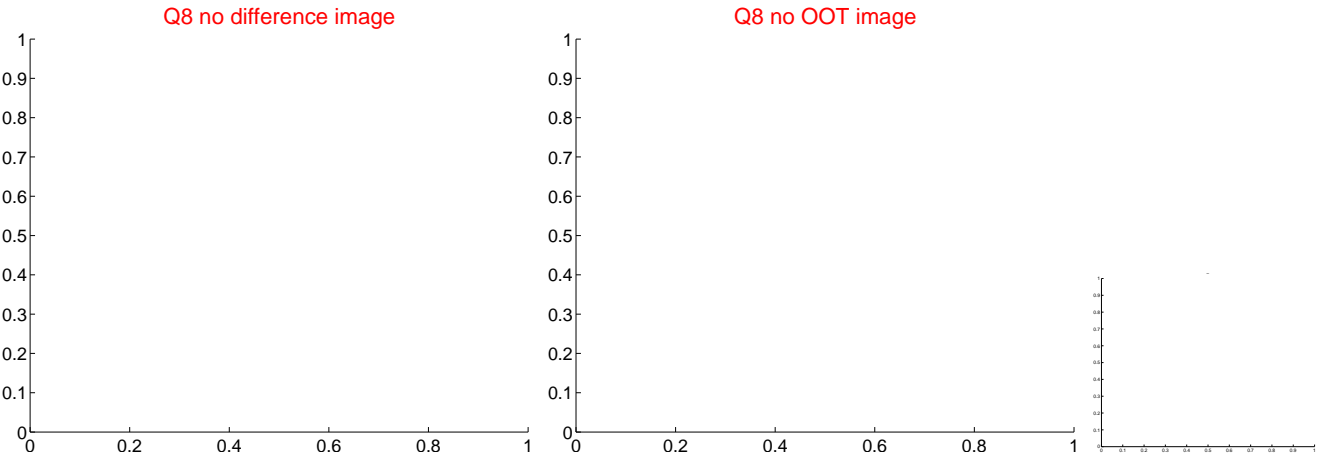
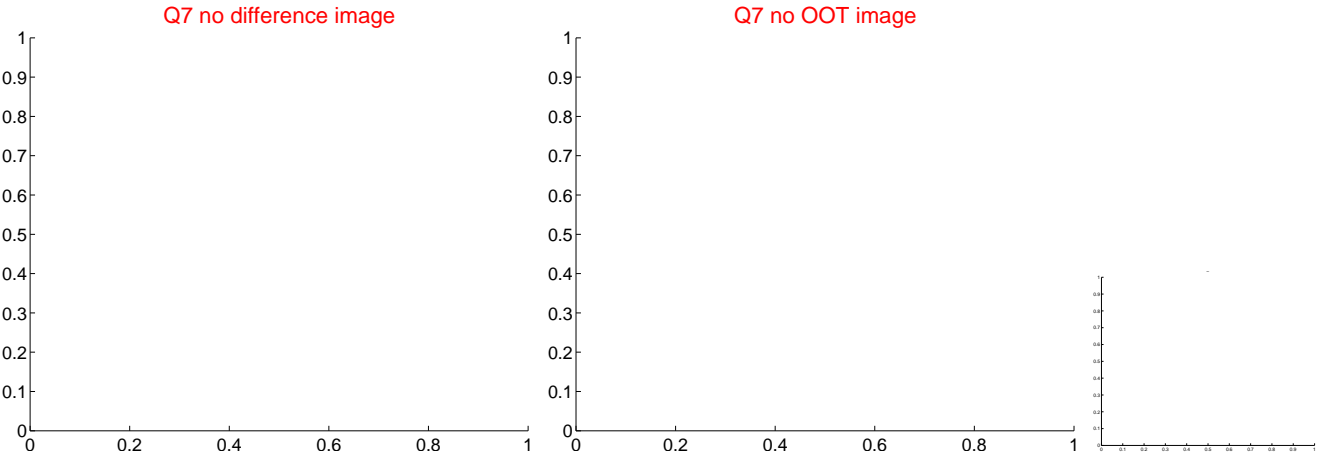
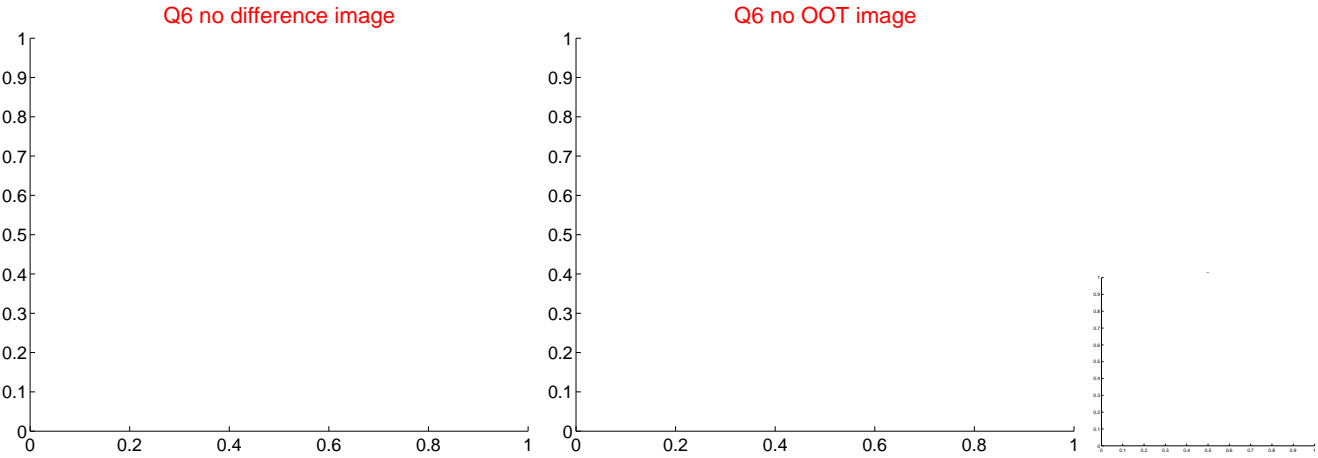
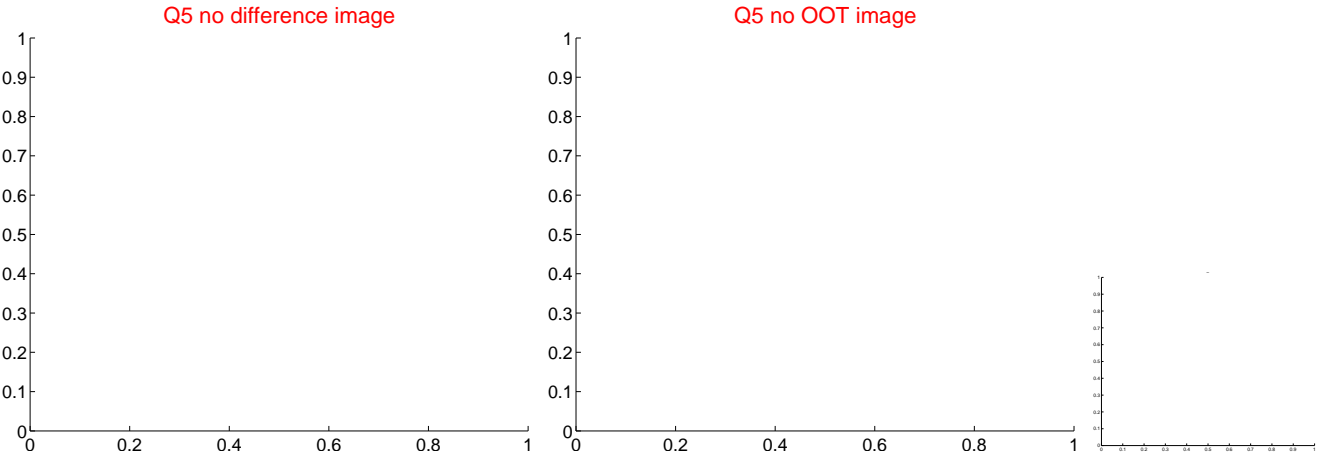


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

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

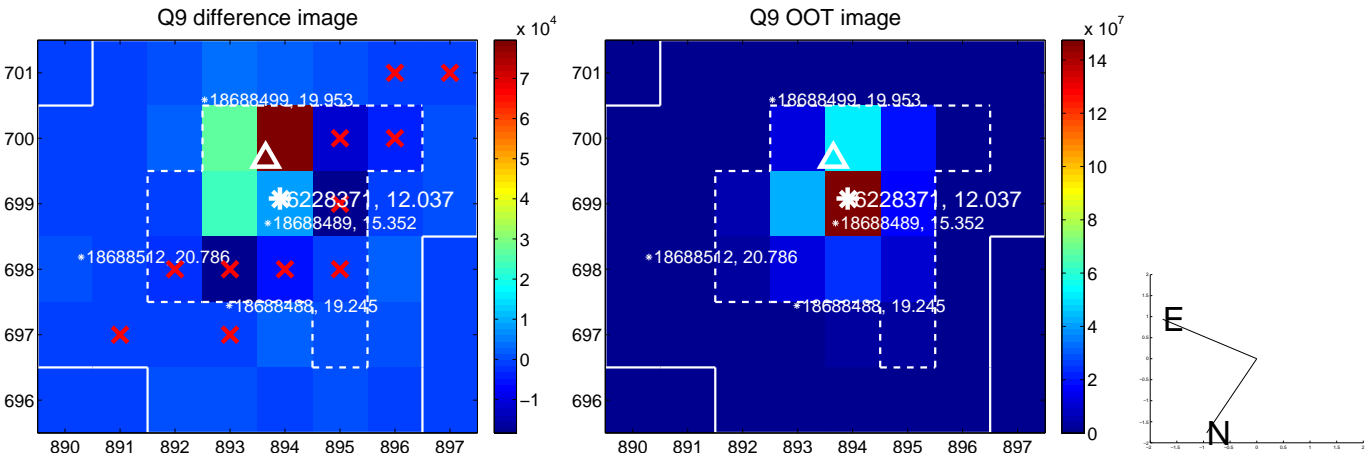


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

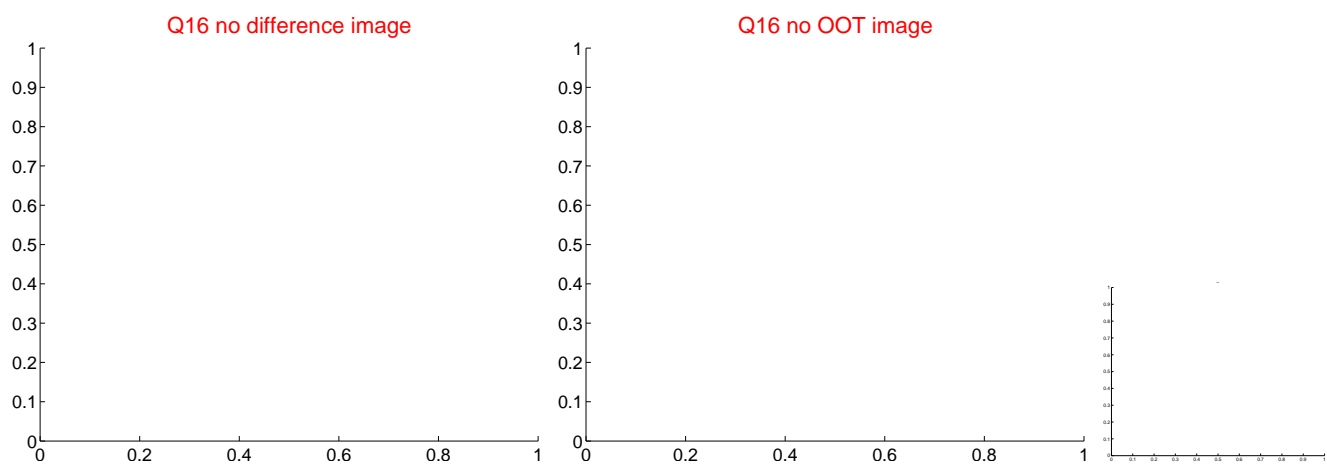
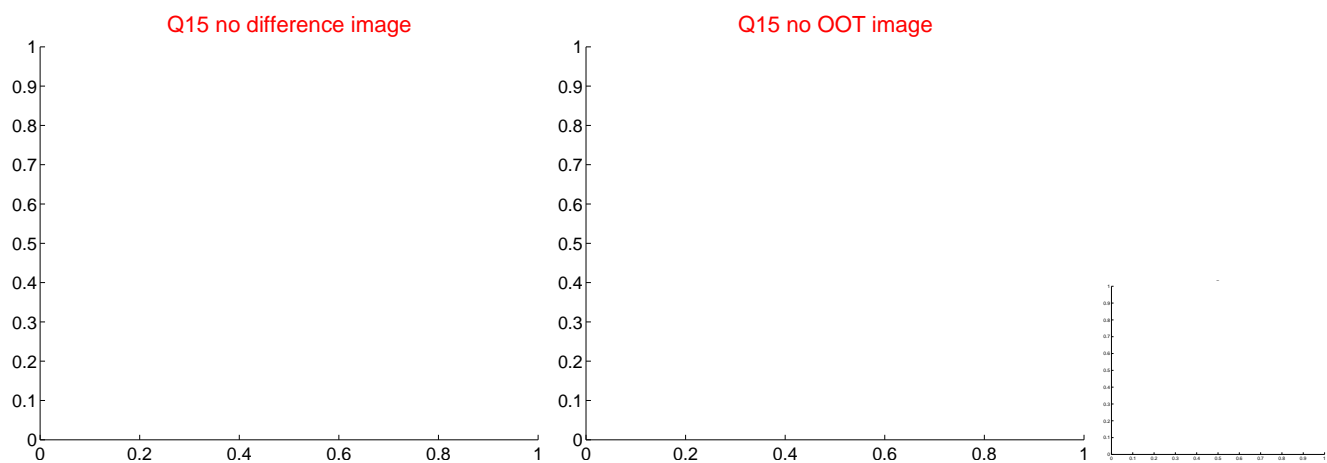
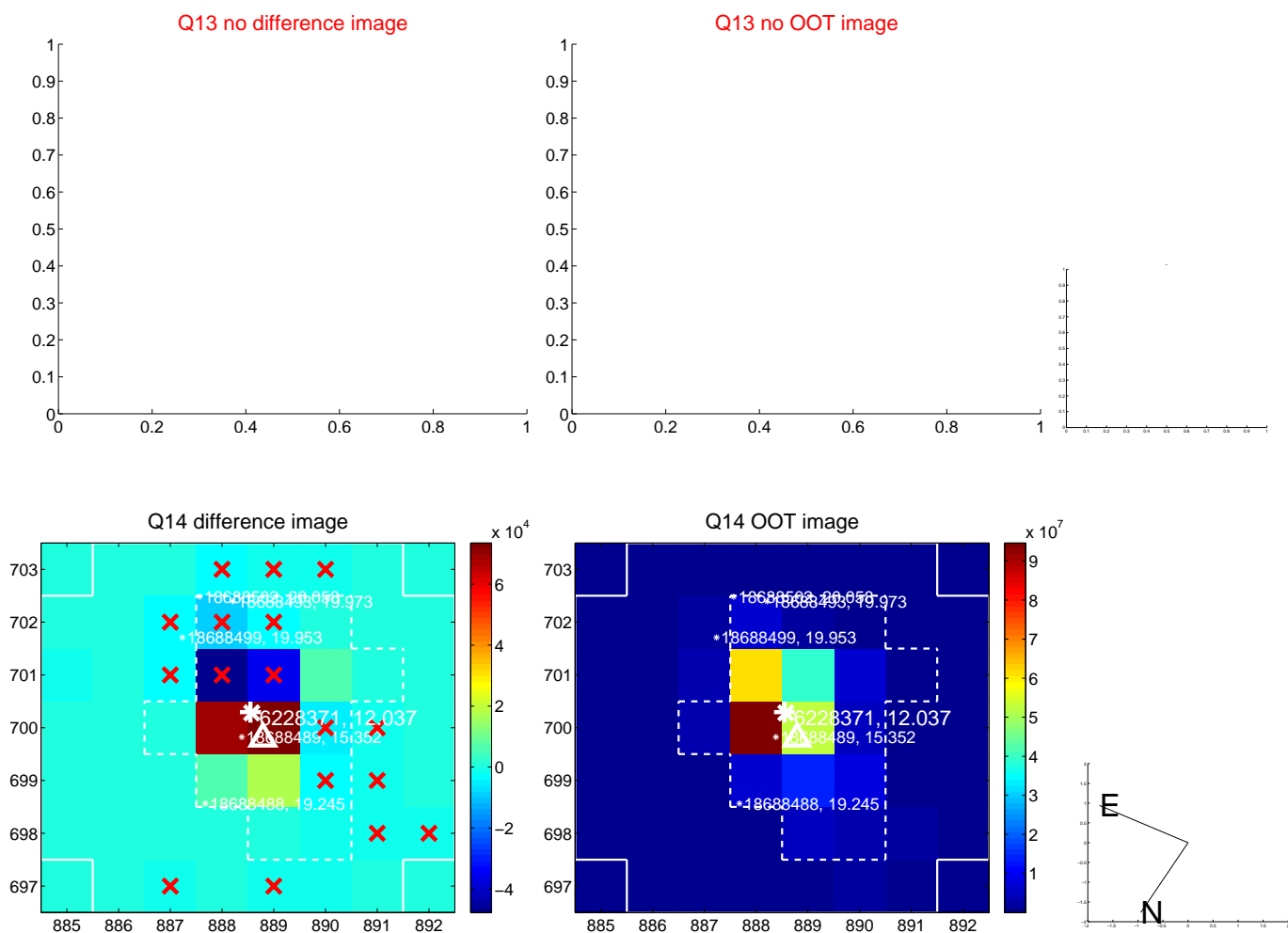




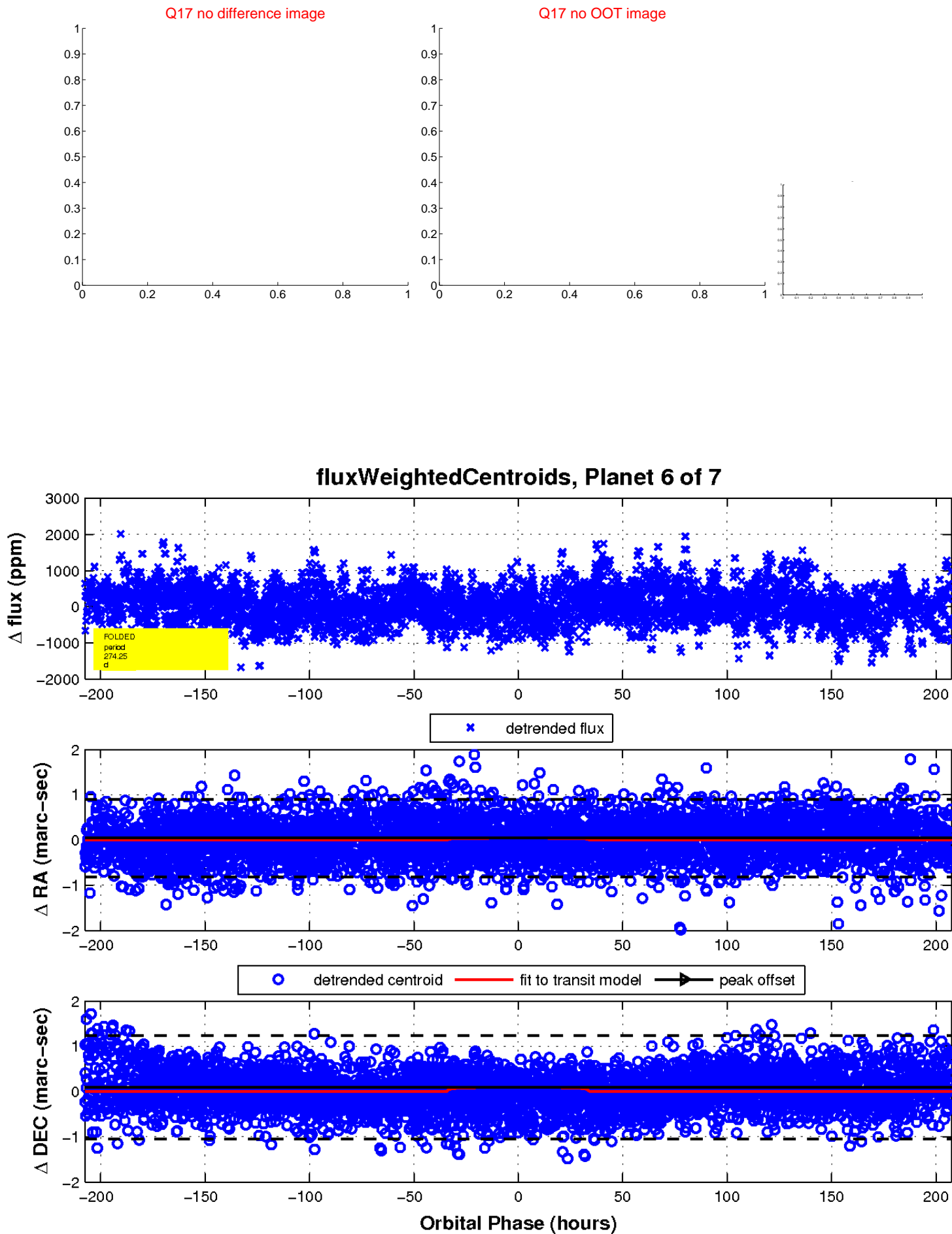
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

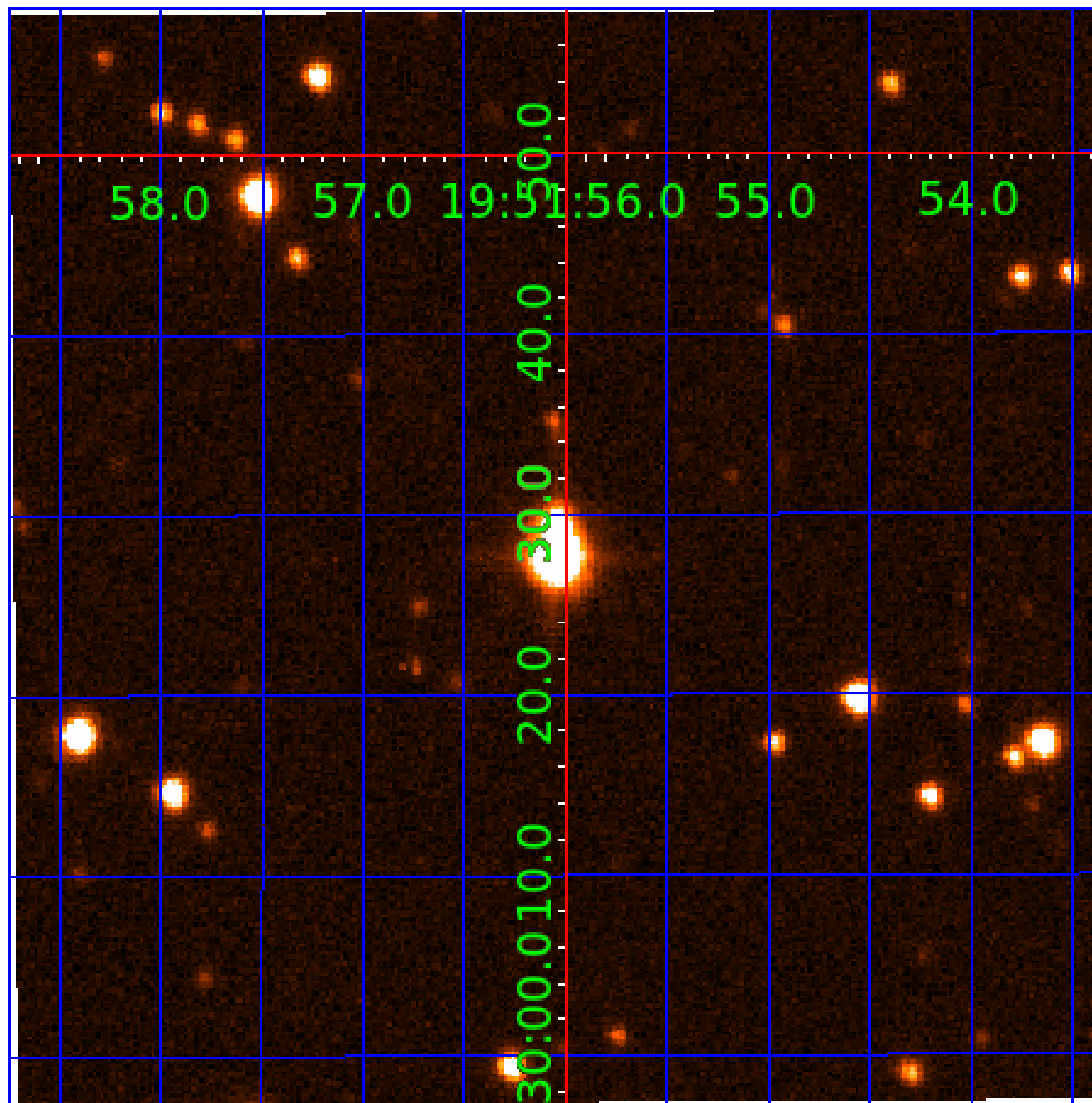


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 006228371

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006228371-01	OBS	No	1.945627	132.146664	44.7	13.115	11.5	6.2	4.59	7810	3.12	42269.19
006228371-02	OBS	No	44.354229	153.726345	1084.4	2.383	16.8	13.4	4.59	7810	16.23	653.92
006228371-03	OBS	No	87.142109	142.860482	953.0	6.176	14.1	14.7	4.59	7810	17.81	265.75
006228371-04	OBS	No	23.181307	148.780900	531.2	3.350	14.2	12.8	4.59	7810	12.15	1553.29
006228371-05	OBS	No	10.097525	138.381023	480.5	2.586	13.8	14.5	4.59	7810	12.24	4704.18
006228371-06	OBS	No	274.253538	267.743426	1339.7	69.177	12.6	9.9	4.59	7810	16.93	57.62
006228371-07	OBS	No	11.997651	136.206884	292.4	6.758	12.3	10.9	4.59	7810	8.74	3738.02

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006228371-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT
006228371-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
006228371-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
006228371-04	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
006228371-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
006228371-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
006228371-07	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—HALO_GHOST

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

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

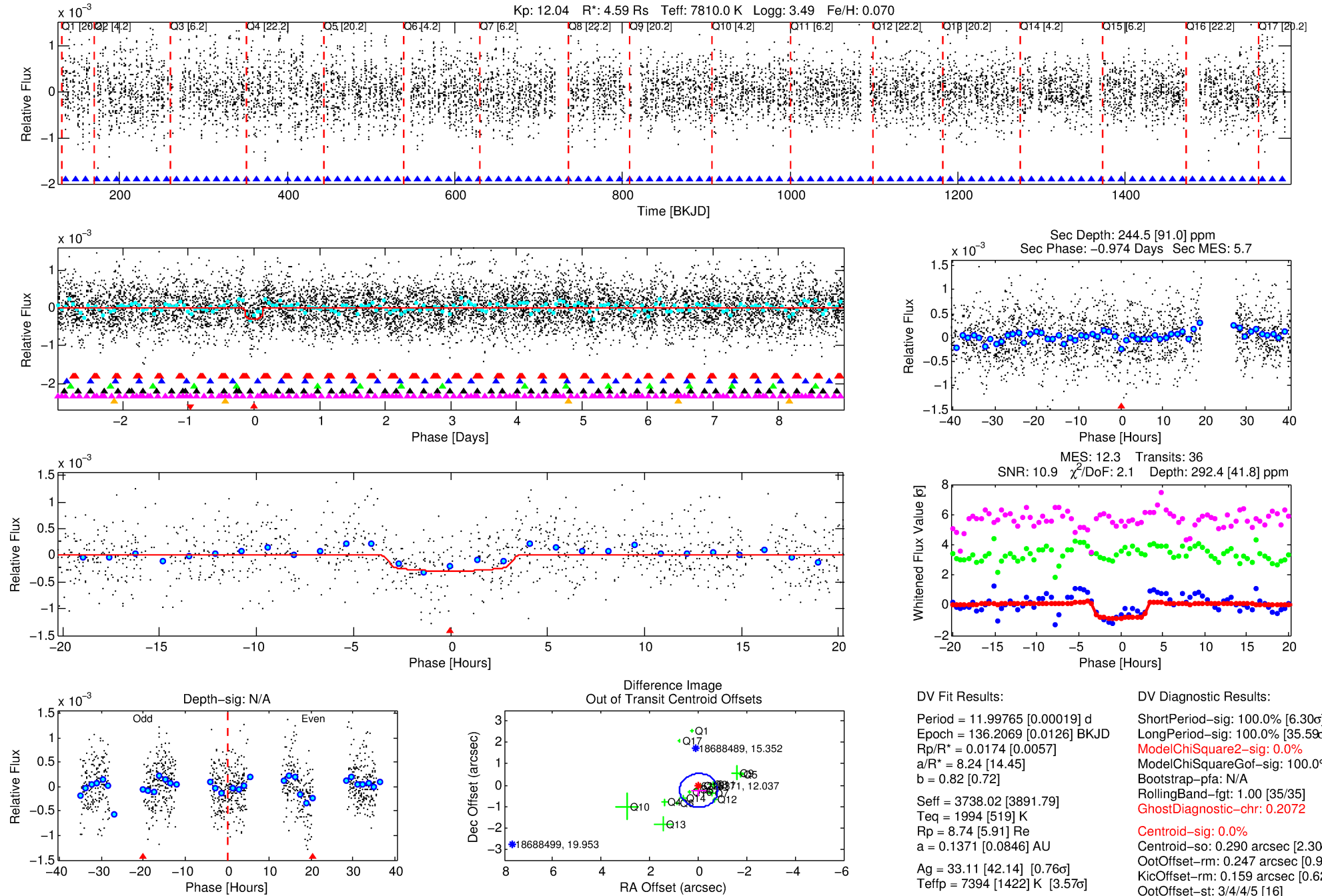
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 006228371-07

No Significant Match Found

# DV One-Page Summary

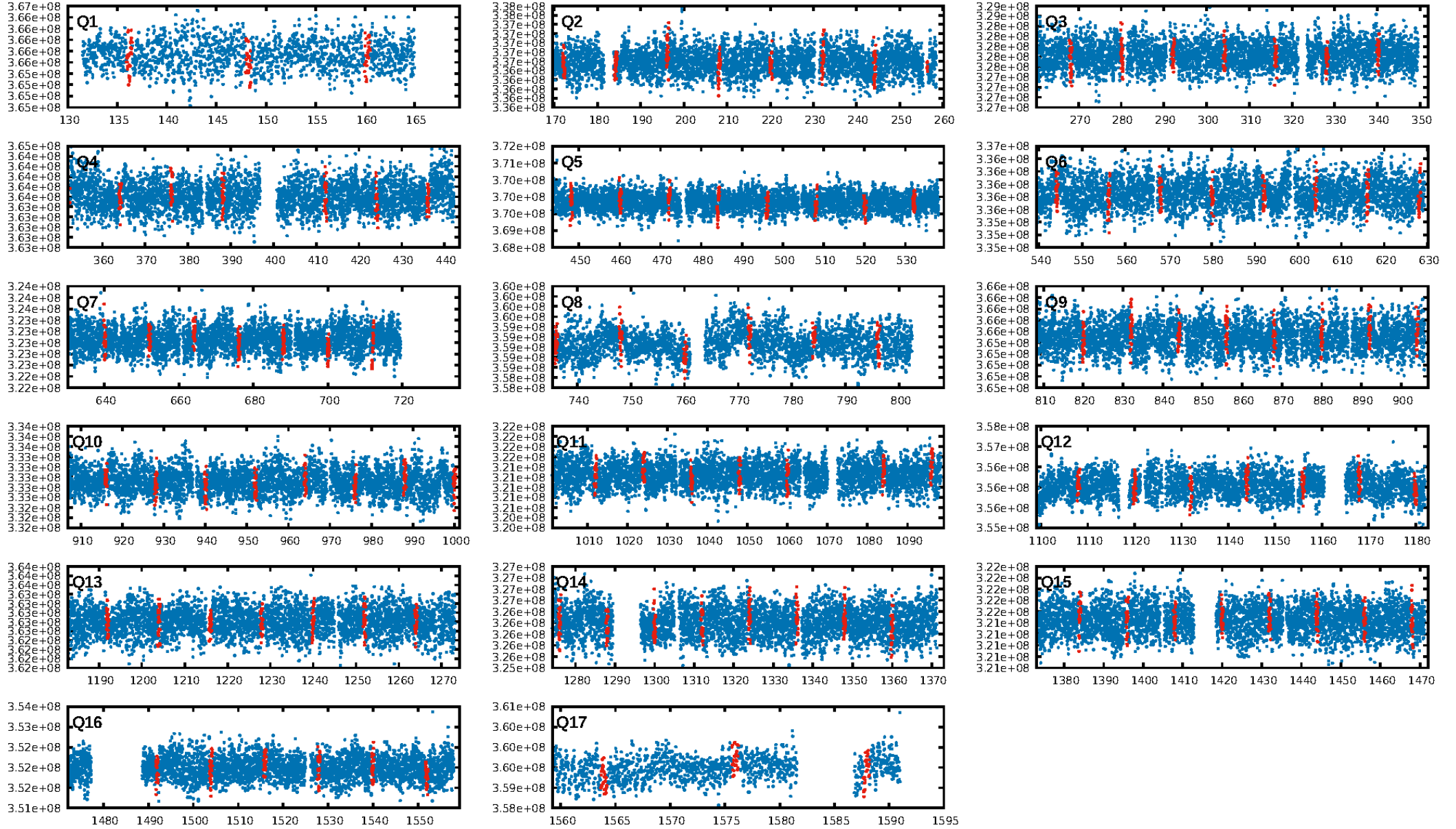
KIC: 6228371 Candidate: 7 of 7 Period: 11.998 d



Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 06:04:36 Z

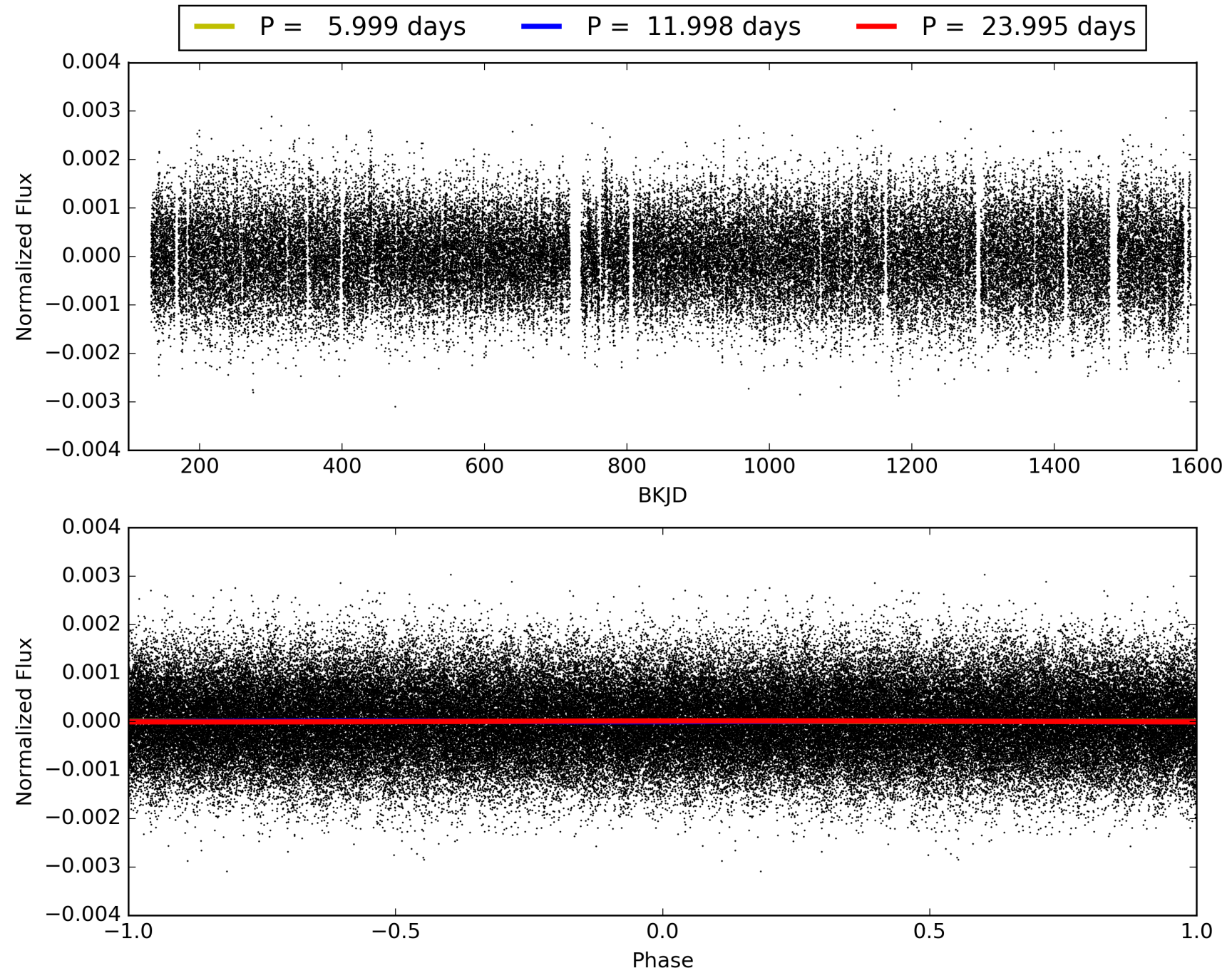
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 006228371-07, PDC Light Curves



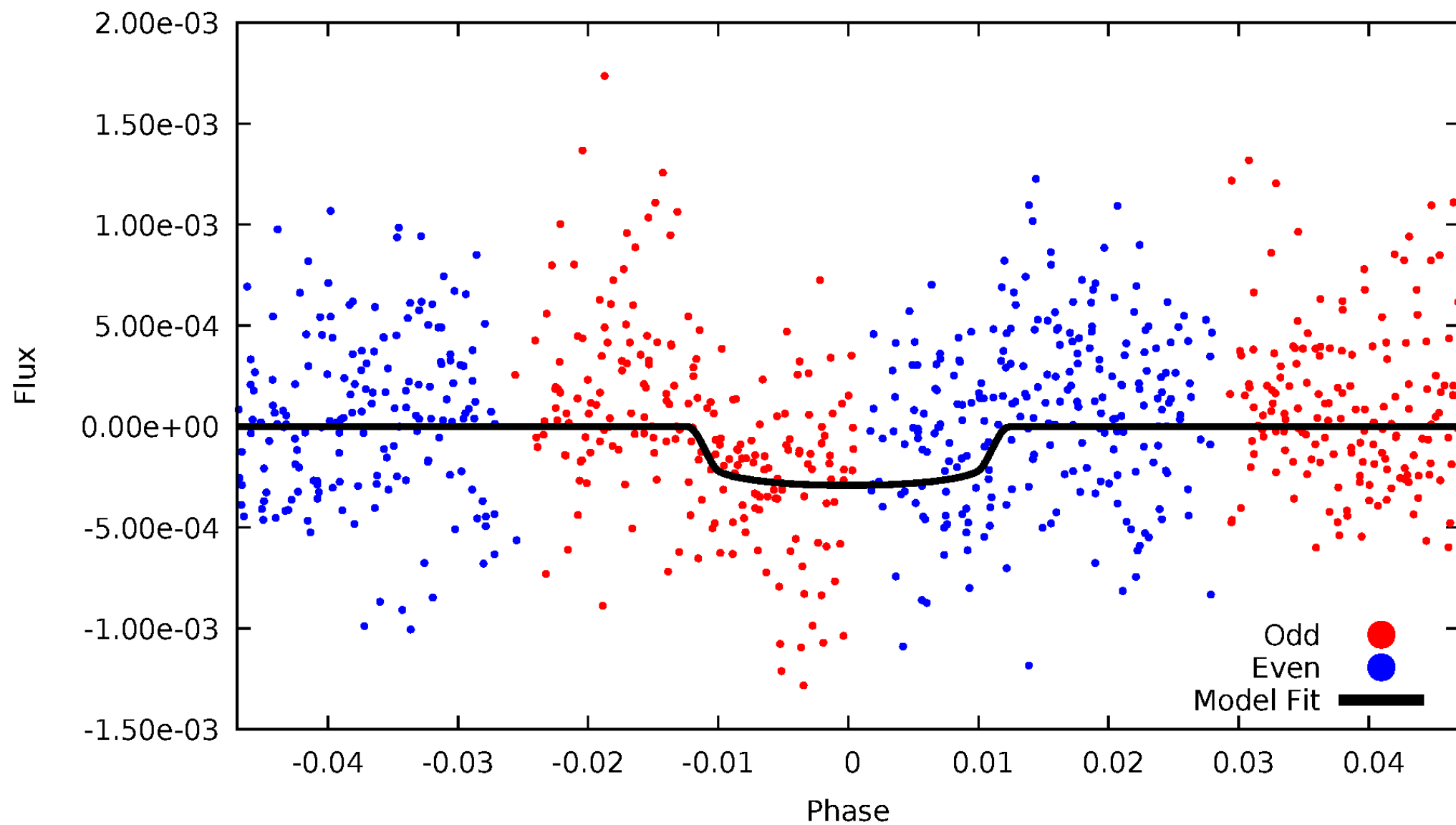


TCE 006228371-07



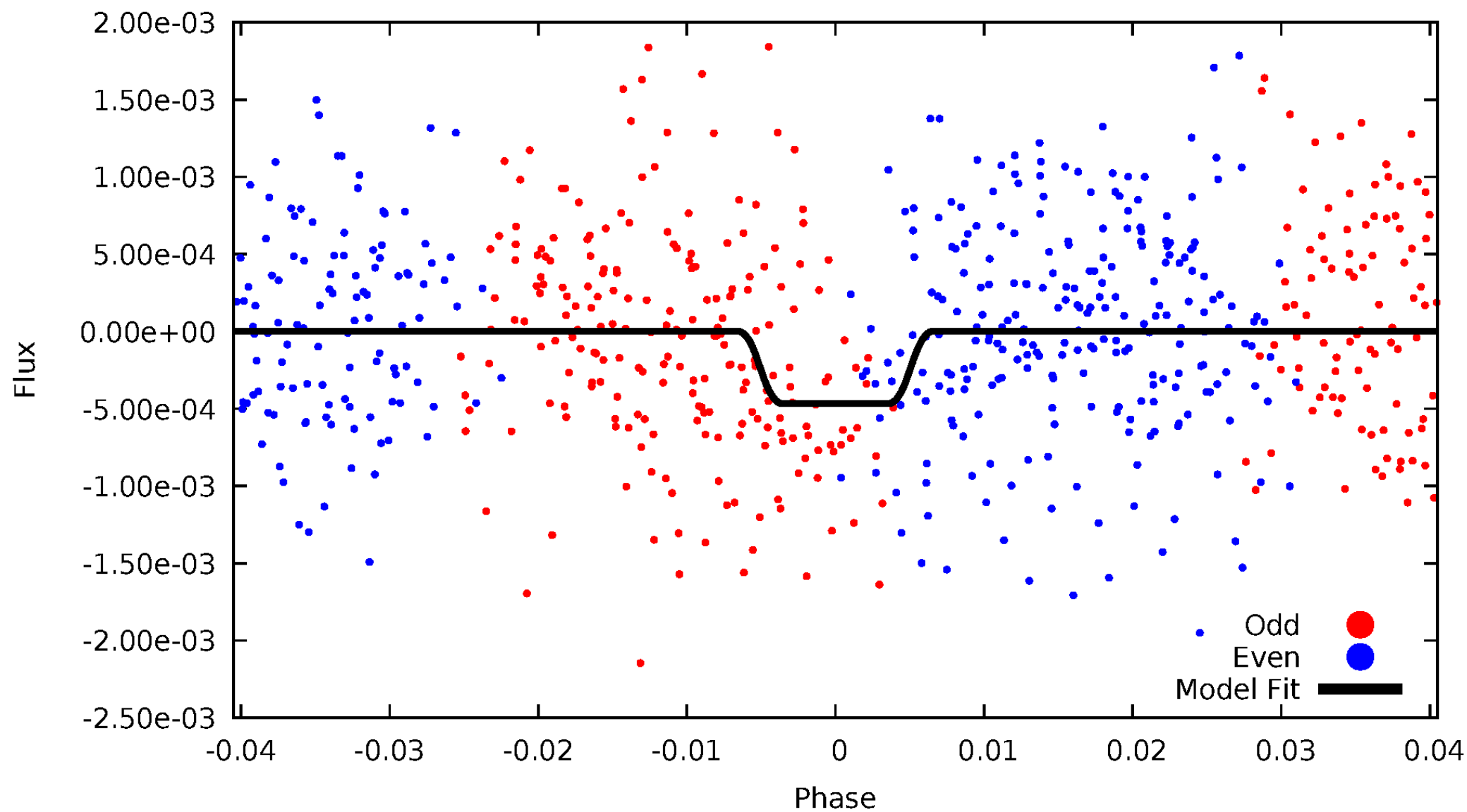
# DV Odd/Even

TCE 006228371-07



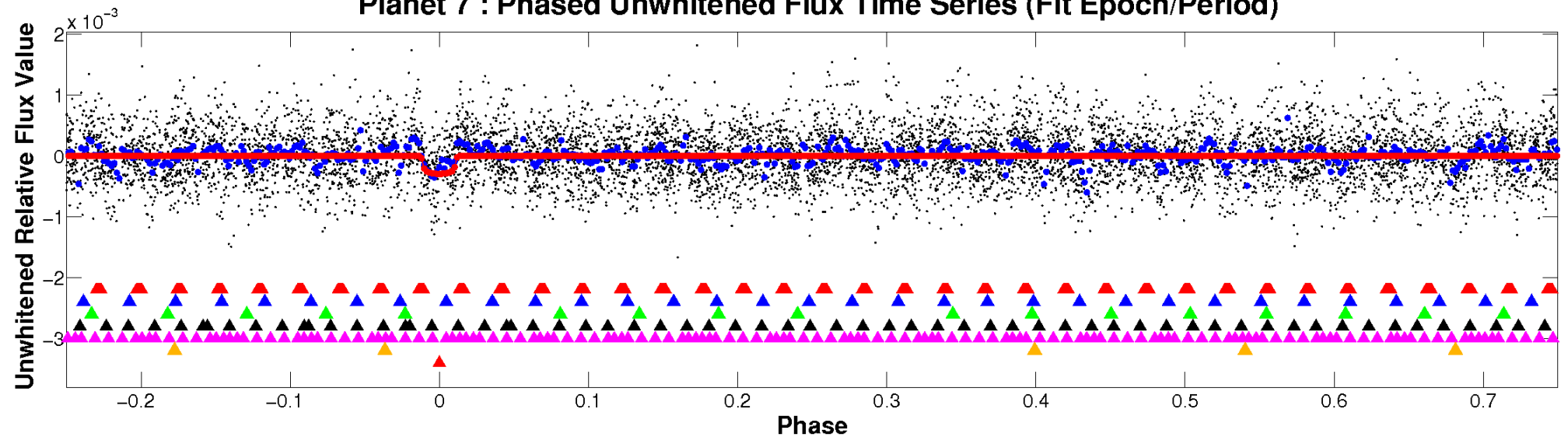
# ALT Odd/Even

TCE 006228371-07

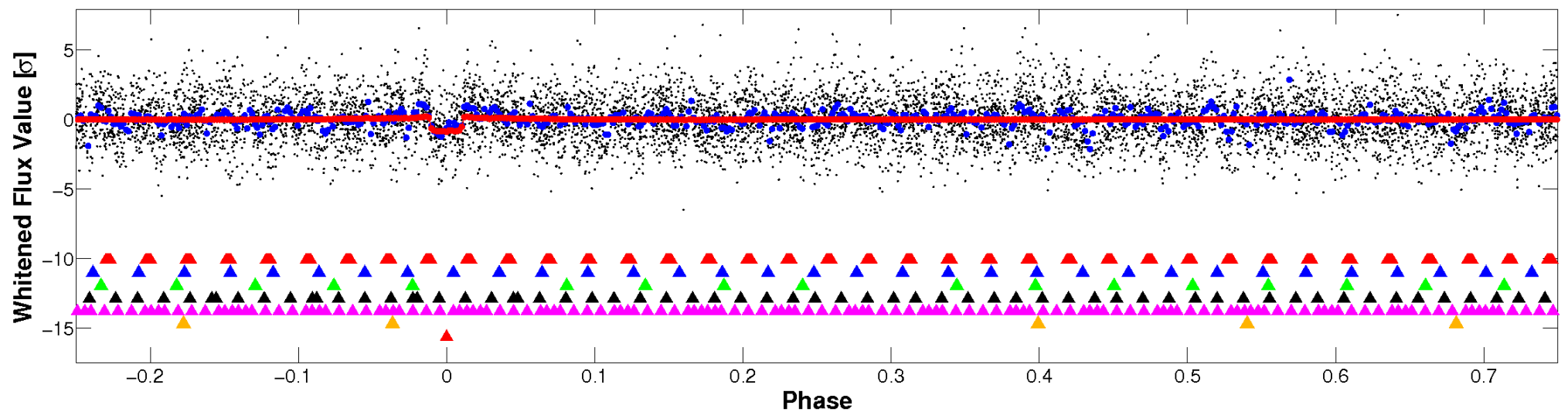


# Non-Whitened Vs. Whitened Light Curve

Planet 7 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

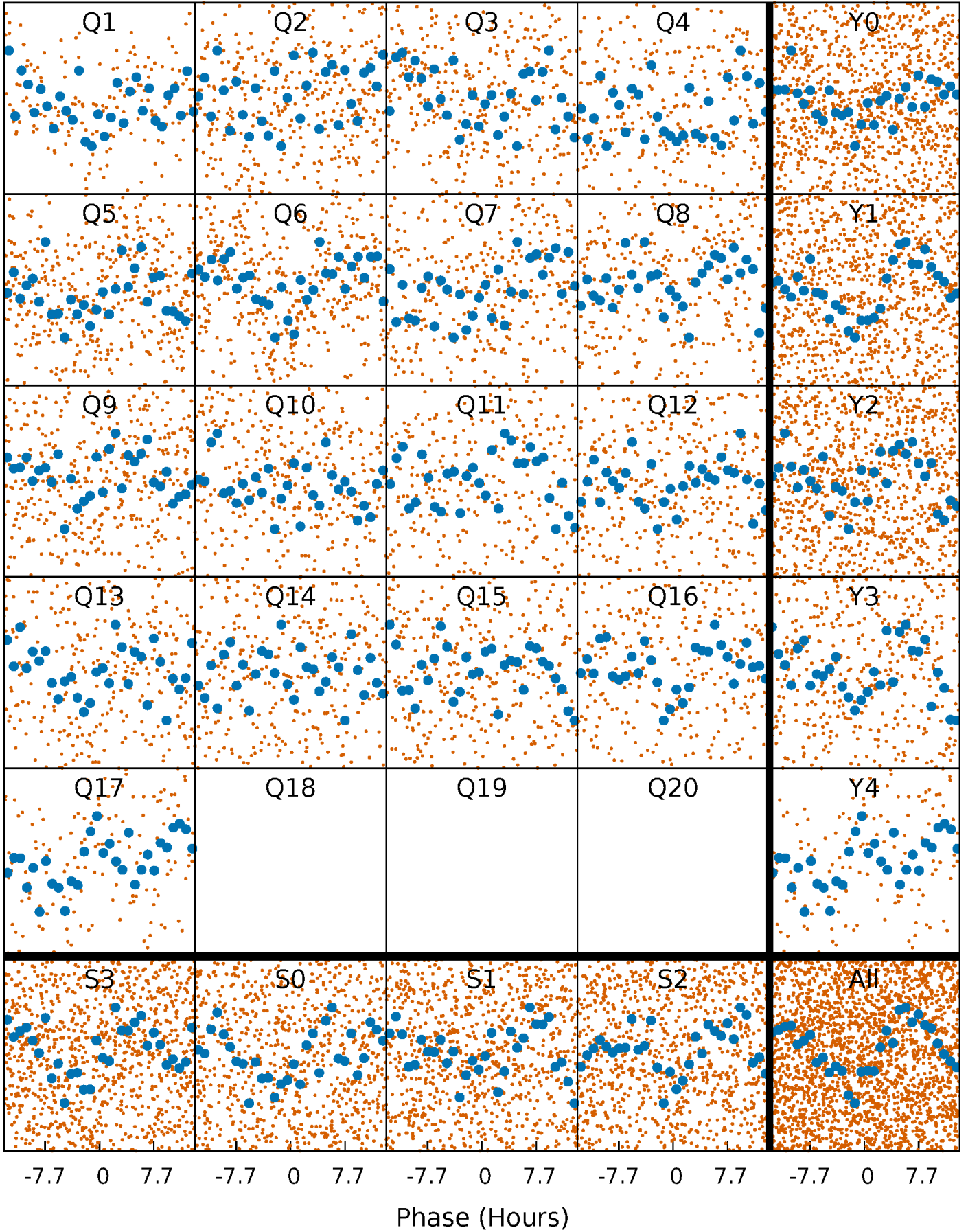


Planet 7 : Phased Whitened Flux Time Series (Fit Epoch/Period)



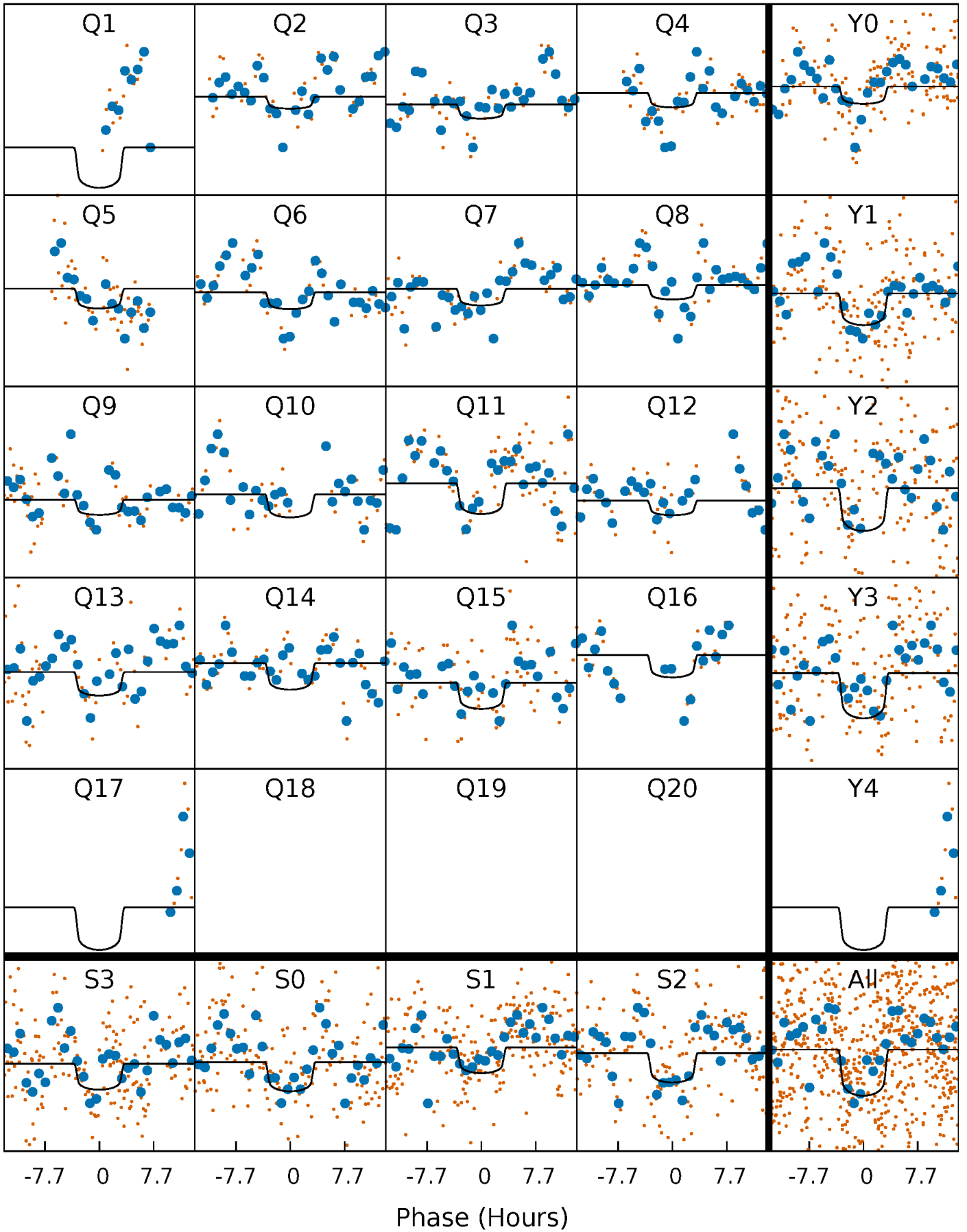
# PDC Quarter-Phased Transit Curves

TCE 006228371-07   P= 11.997651 Days    $T_0=136.206884$  (BKJD)



# DV Quarter-Phased Transit Curves

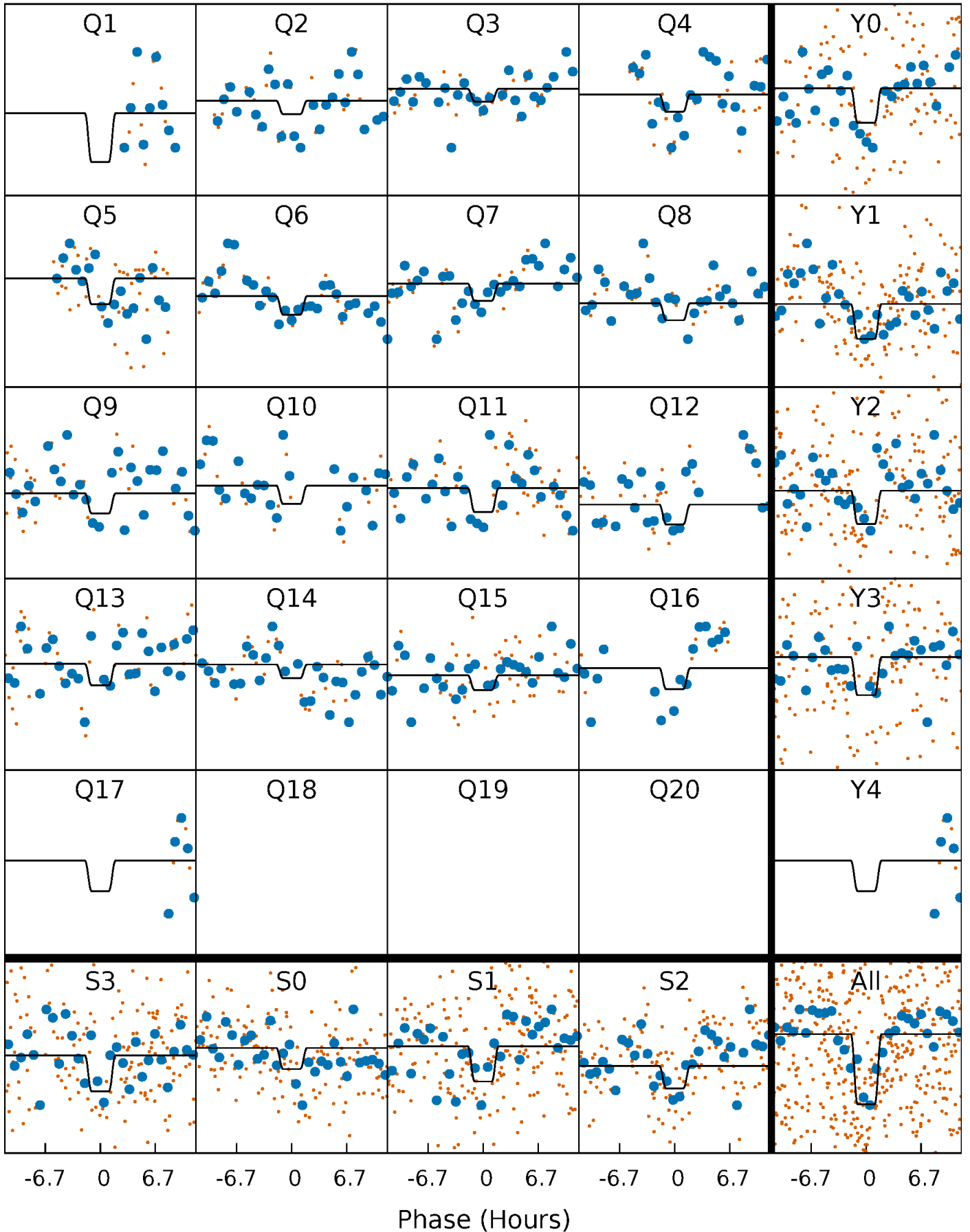
TCE 006228371-07   P= 11.997651 Days    $T_0=136.206884$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

TCE 006228371-07     $P = 11.998960$  Days     $T_0 = 136.118428$  (BKJD)

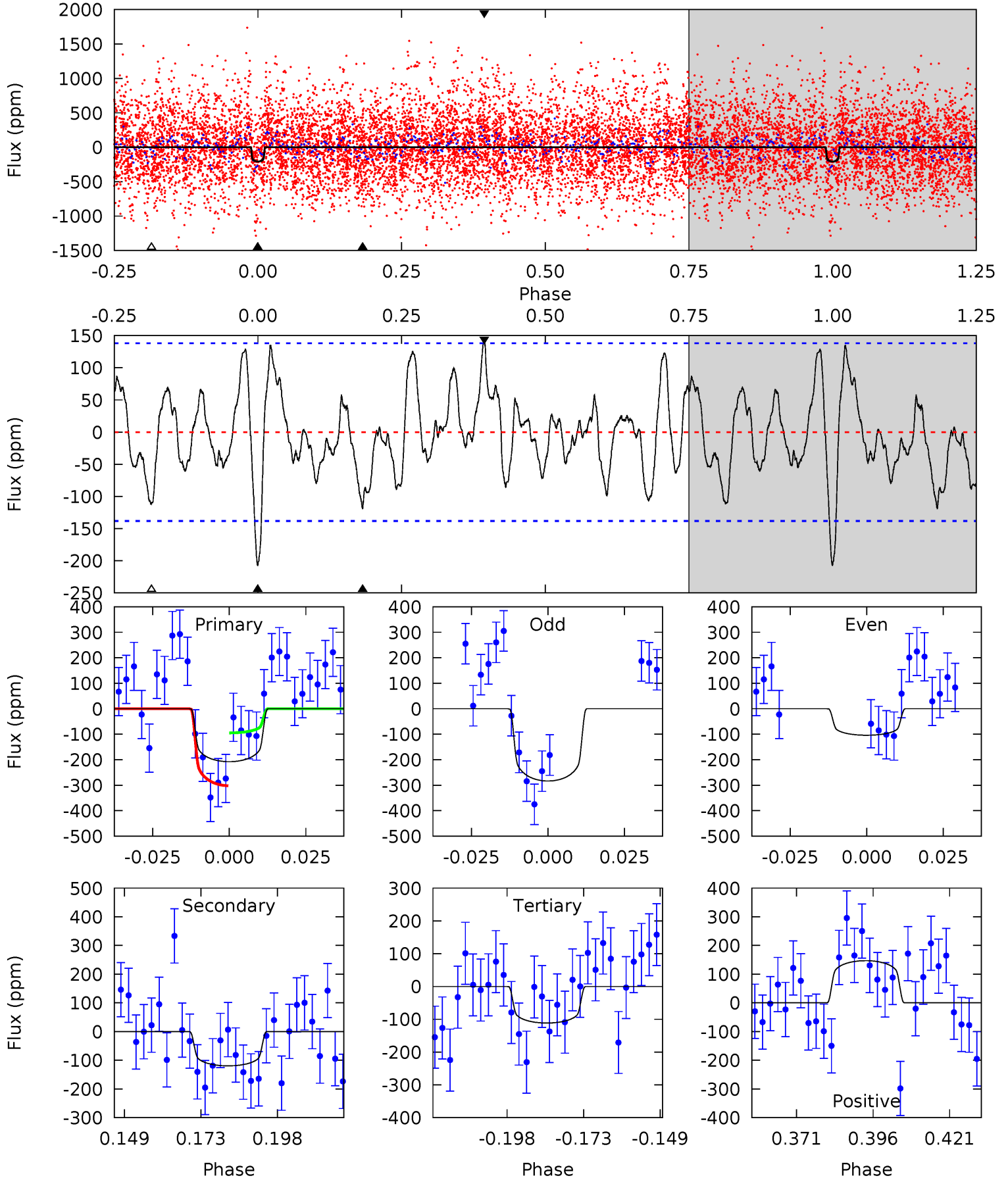




# DV Model-Shift Uniqueness Test

006228371-07, P = 11.997651 Days, E = 124.209233 Days

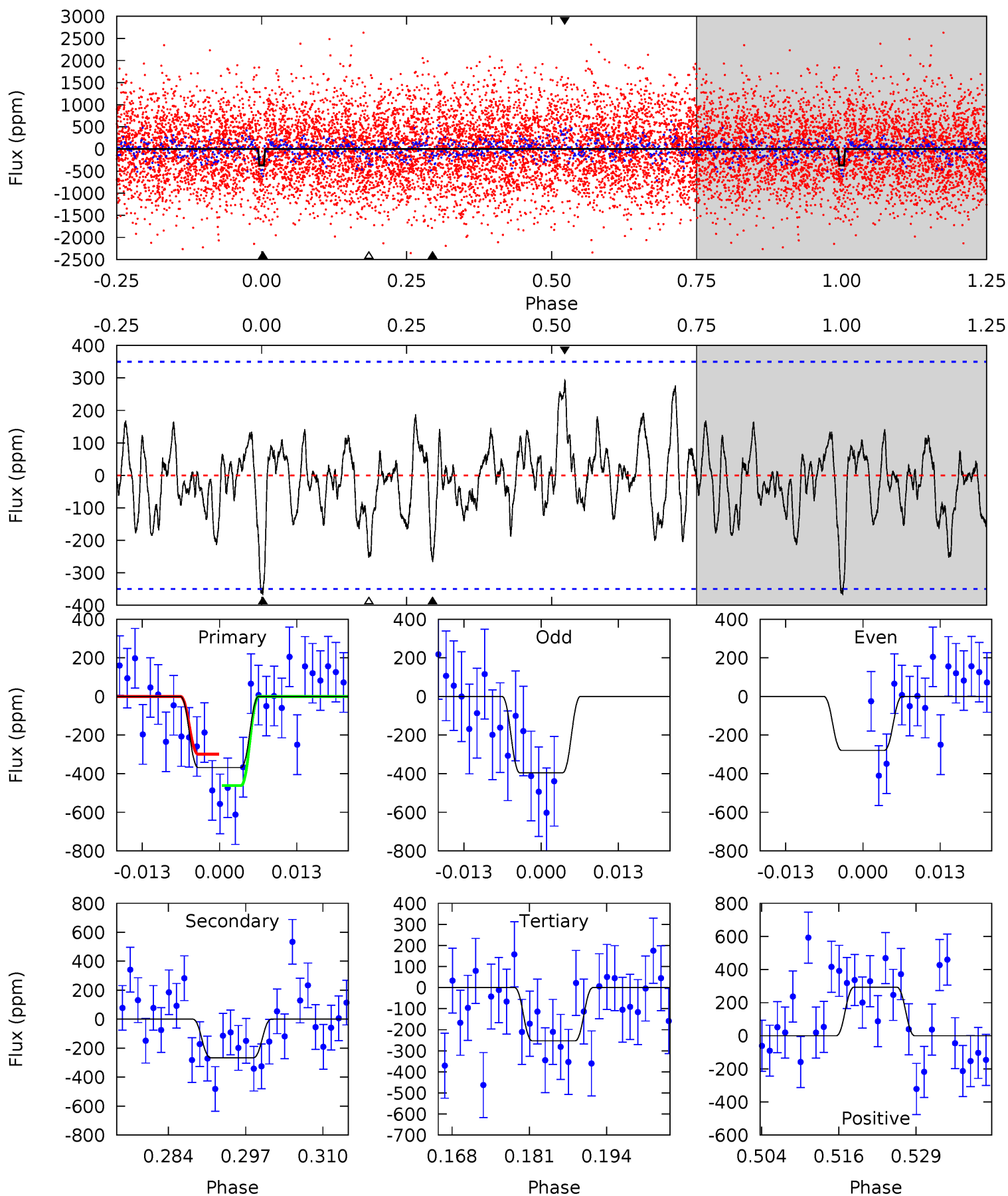
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.29	4.19	3.91	5.16	4.85	2.25	1.82	3.38	2.13	0.28	-0.97	3.15	1.16	0.41	3.68



# Alt Model-Shift Uniqueness Test

006228371-07, P = 11.998960 Days, E = 124.119468 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
5.24	3.79	3.60	4.17	4.98	2.49	1.30	1.64	1.07	0.19	-0.39	0.76	0.39	0.44	1.15



### Stellar Parameters For KIC 006228371

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7810^{+217}_{-326}$	$3.492^{+0.618}_{-0.195}$	$0.070^{+0.200}_{-0.400}$	$4.591^{+0.302}_{-2.721}$	$2.386^{+0.249}_{-0.796}$	$0.035^{+0.286}_{-0.004}$
	+3%/-4%	+18%/-6%	+286%/-571%	+7%/-59%	+10%/-33%	+822%/-11%
Source	KIC0	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 006228371-07 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-119 \pm 28$	$7.95^{+3.48}_{-3.03}$	$2761^{+156}_{-357}$	$5998^{+1484}_{-834}$	$18^{+30}_{-9}$
Alt.	$-266 \pm 70$	$9.88^{+3.68}_{-3.26}$	$2754^{+160}_{-394}$	$6558^{+1423}_{-910}$	$27^{+36}_{-13}$

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

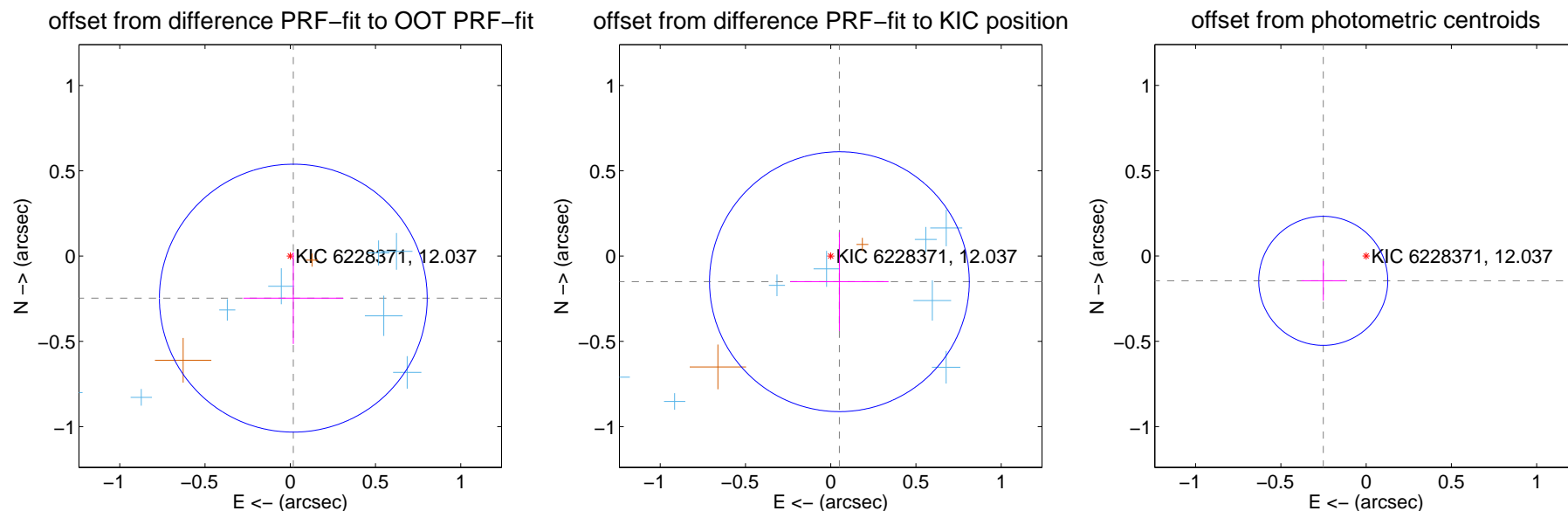
## DV Centroid Data

Supplemental centroid analysis for 006228371-07. Kepler magnitude: 12.04. Transit SNR 10.95

There are 13 quarters with good PRF difference image offsets

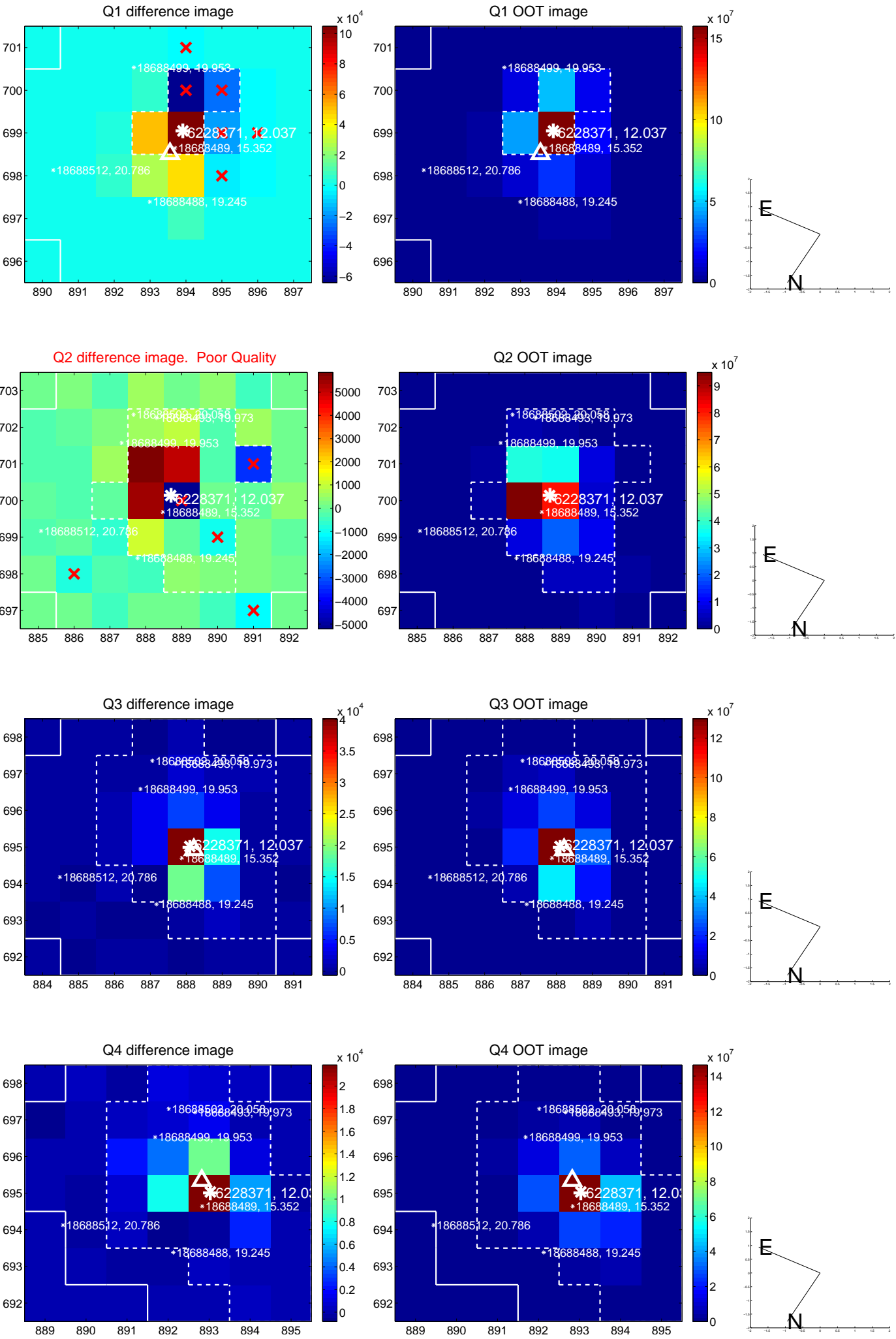
The direct PRF centroid is offset from the target star catalog position by about 0.02 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.247 \pm 0.262$	0.94	$-0.018 \pm 0.293$	$-0.247 \pm 0.269$
PRF-fit source offset from KIC position	$0.159 \pm 0.254$	0.62	$-0.051 \pm 0.288$	$-0.150 \pm 0.289$
photometric centroid source offset	$0.29 \pm 0.13$	2.30	$0.25 \pm 0.13$	$-0.15 \pm 0.12$

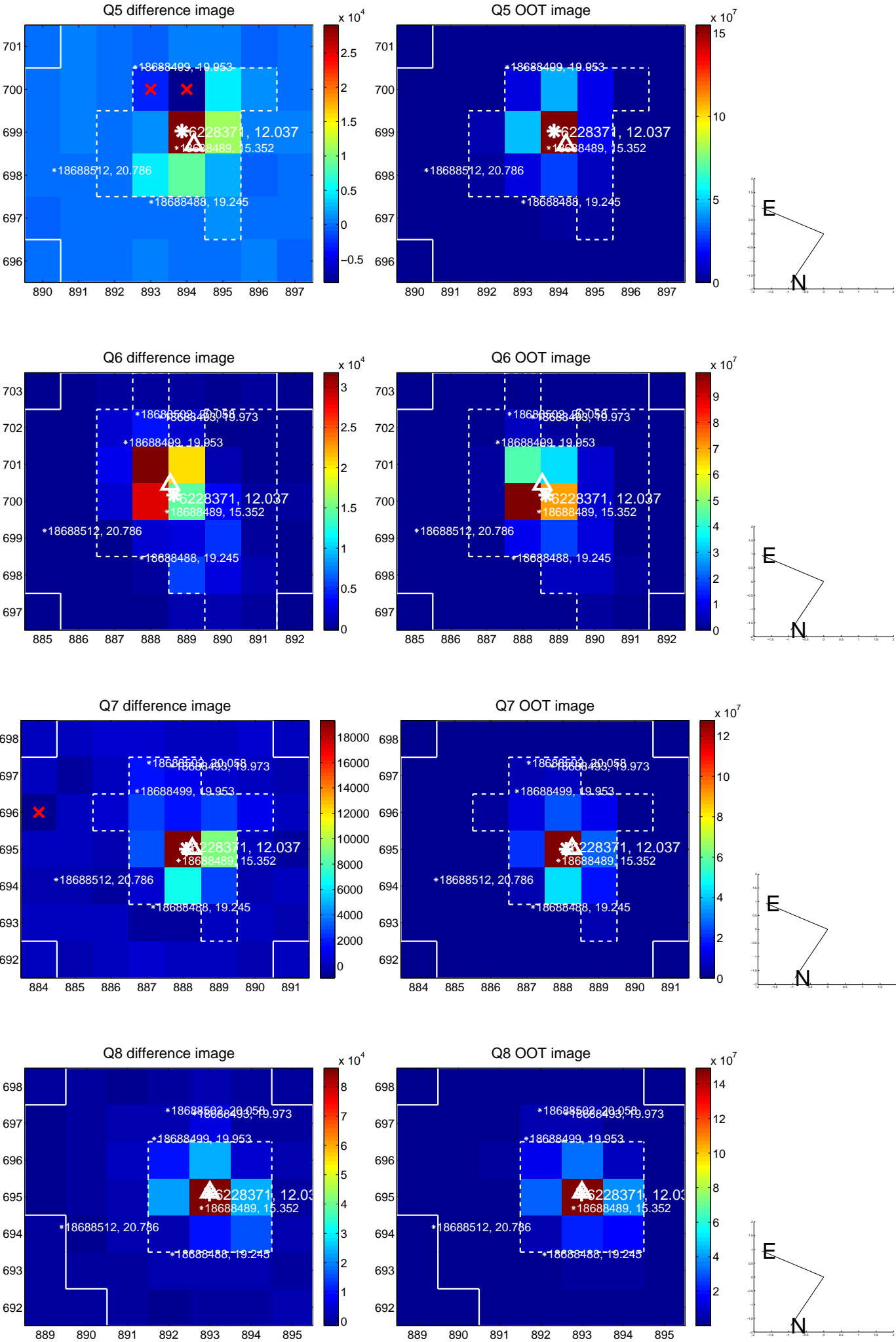


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

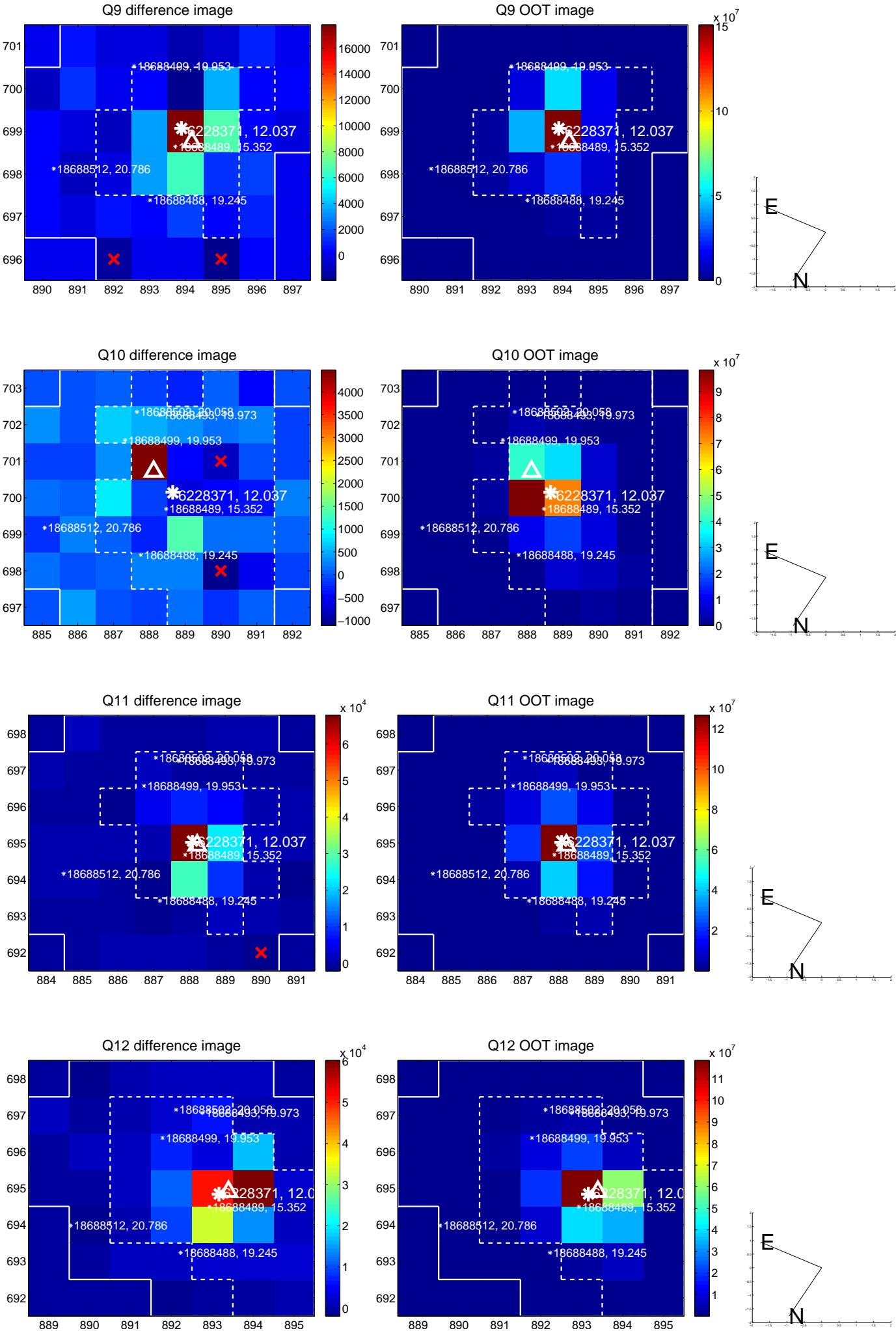
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

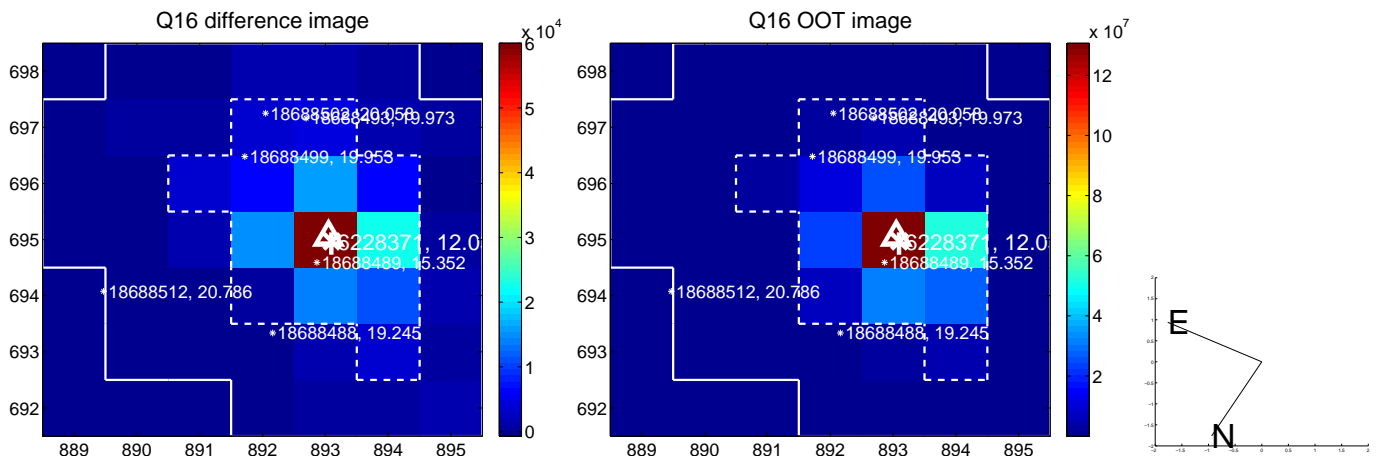
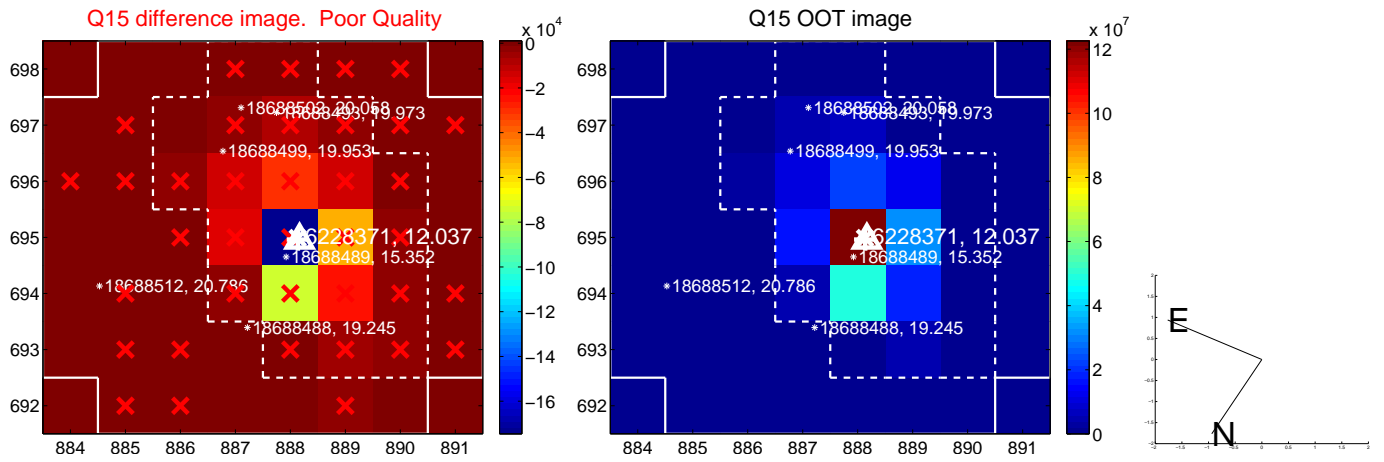
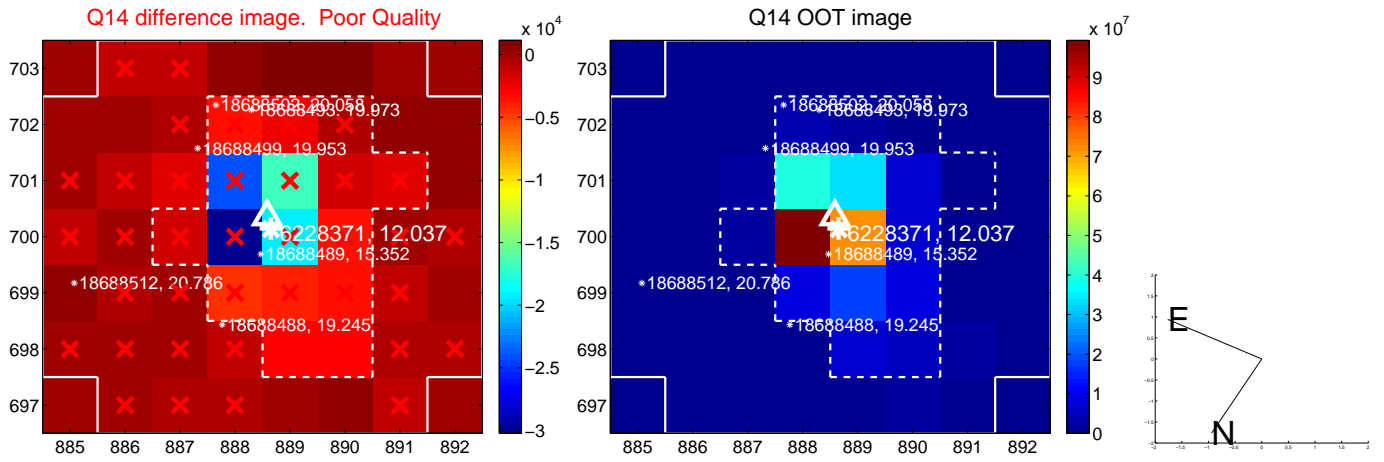
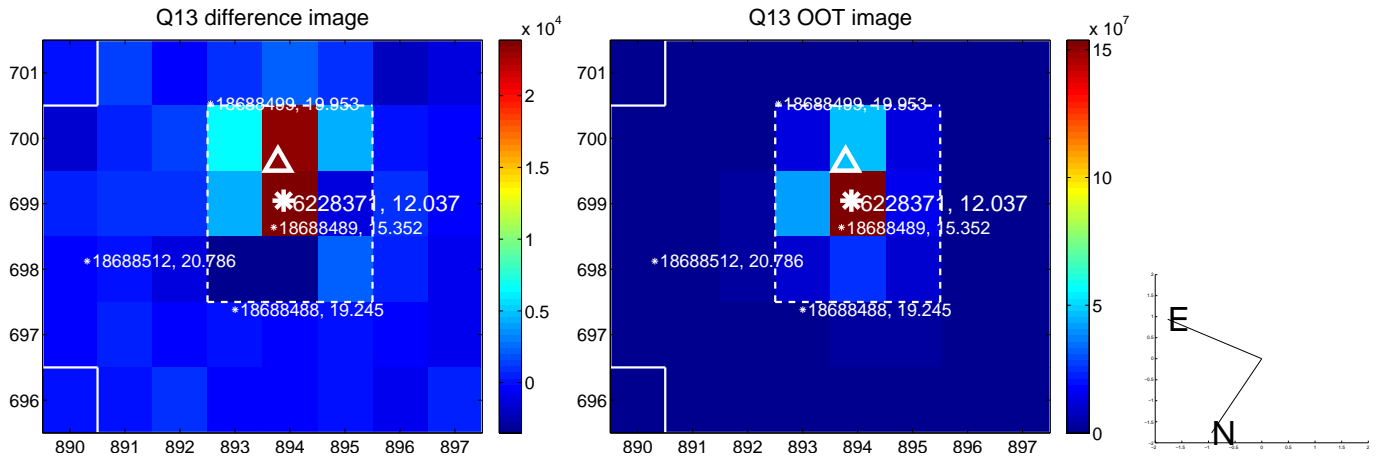


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

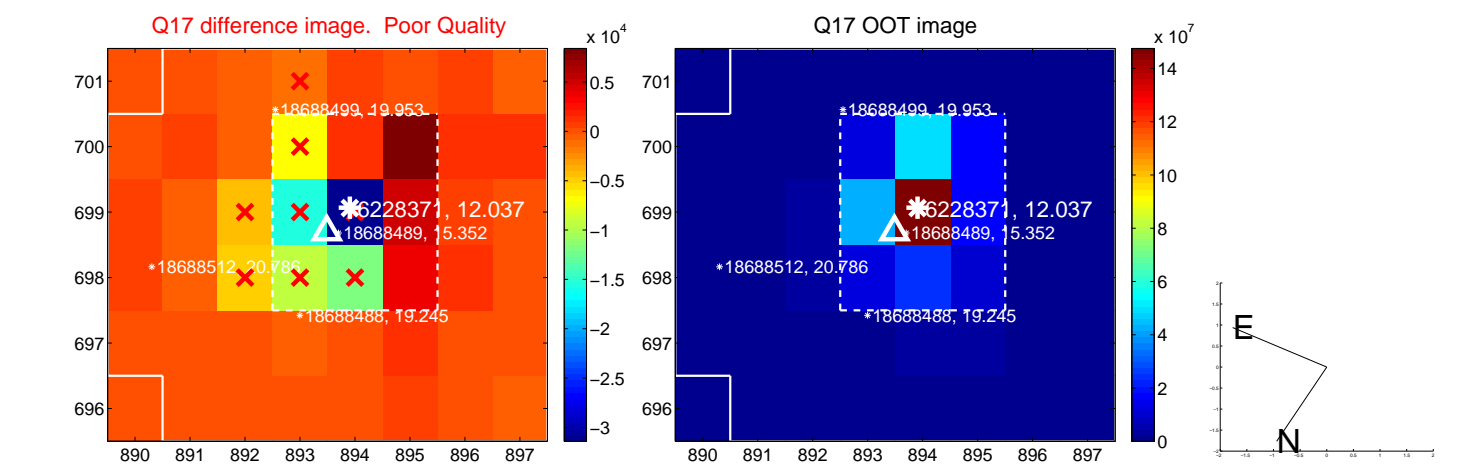




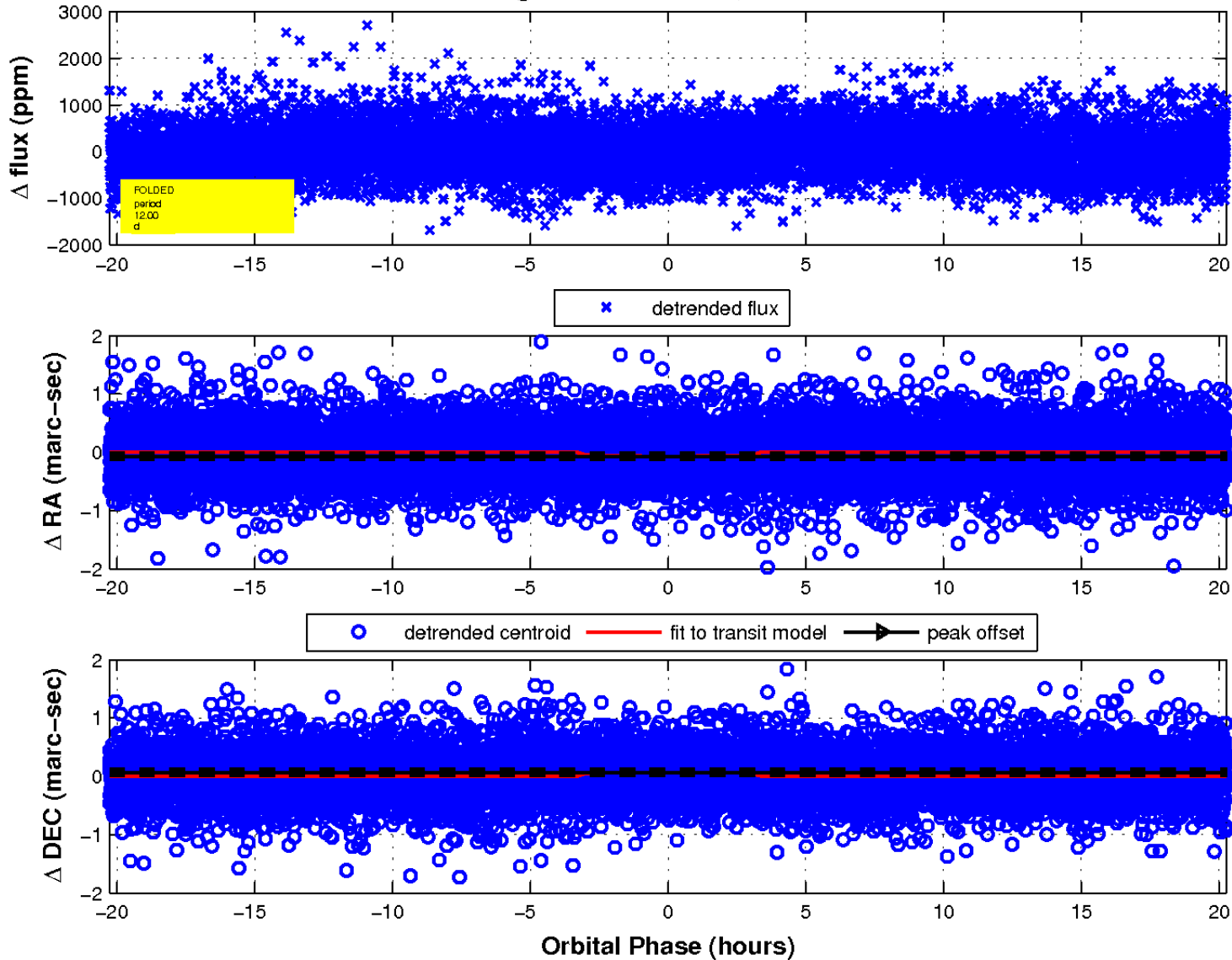
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 7 of 7



UKIRT Image

Declination

