

# KIC 012066447

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
012066447-01	OBS	No	0.904494	132.122095	3.9	6.417	10.1	5.5	1.84	7479	0.37	20127.99
012066447-02	OBS	No	213.889154	252.178361	198.2	8.721	12.1	12.0	1.84	7479	2.69	13.76
012066447-03	OBS	No	22.670309	143.588777	134.8	1.984	11.6	10.4	1.84	7479	2.36	274.41
012066447-04	OBS	No	76.691016	175.708725	264.6	4.367	14.1	14.1	1.84	7479	3.28	54.04
012066447-05	OBS	No	48.056665	169.097957	165.8	2.084	11.4	10.1	1.84	7479	2.66	100.77
012066447-06	OBS	No	10.840935	137.846391	88.7	3.025	11.9	10.7	1.84	7479	2.00	733.81

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
012066447-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—CENT_FEW_MEAS
012066447-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
012066447-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_MEAS
012066447-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
012066447-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
012066447-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT

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

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

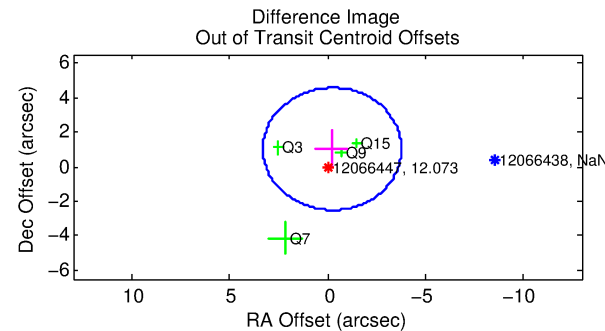
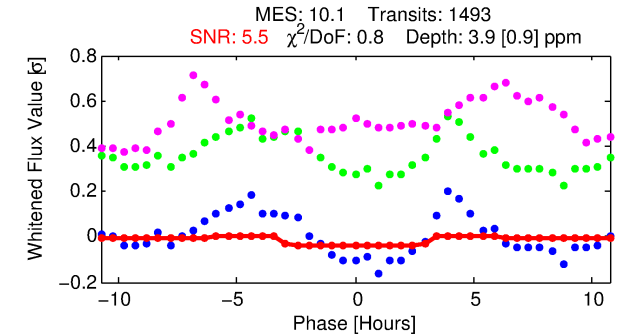
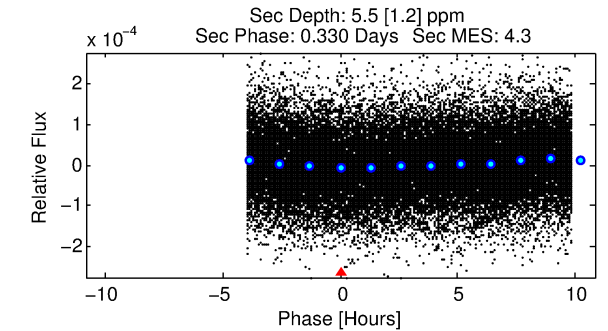
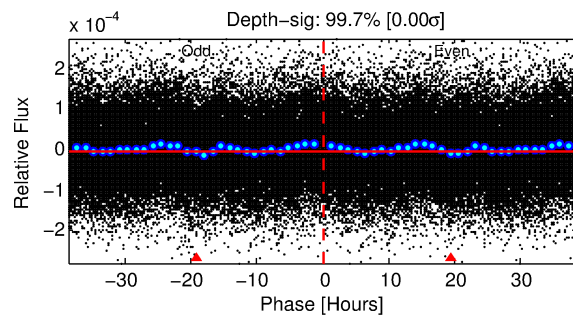
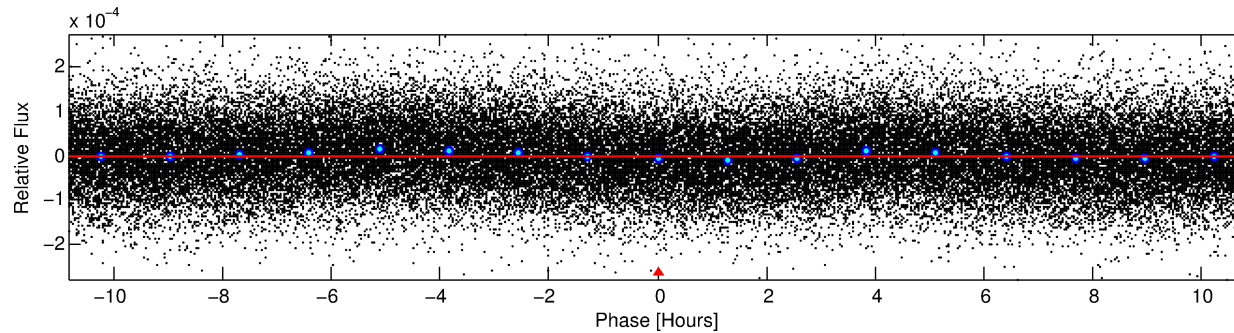
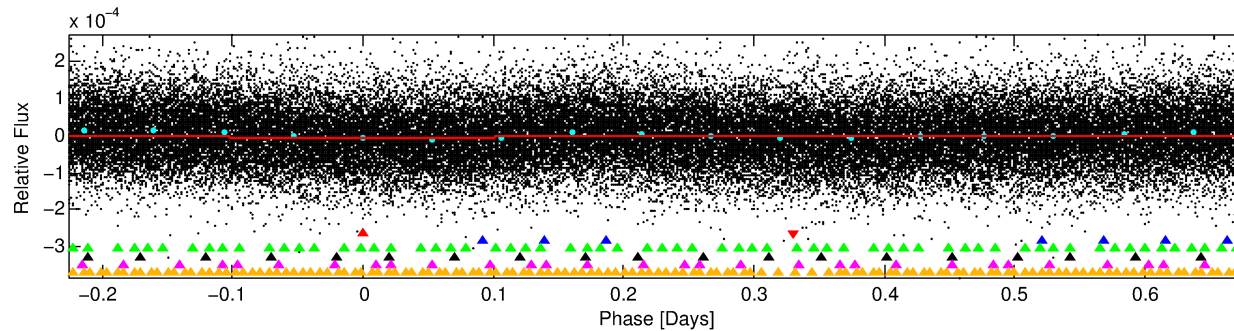
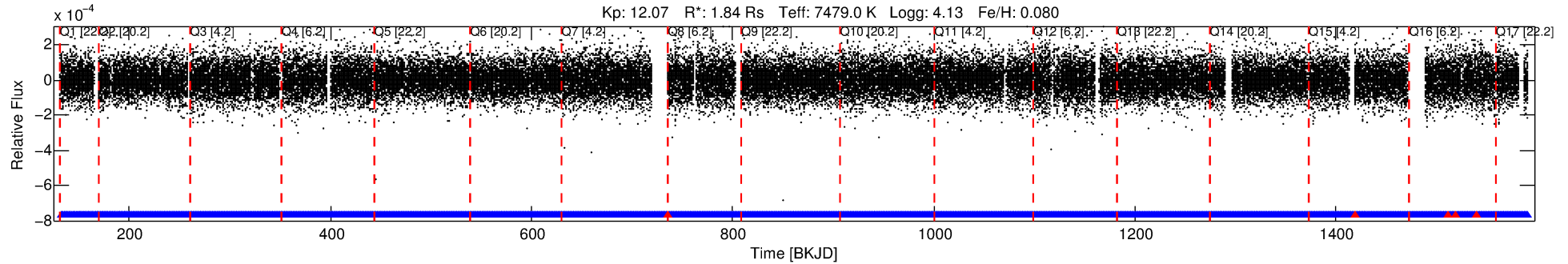
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 012066447-01

No Significant Match Found

# DV One-Page Summary

KIC: 12066447 Candidate: 1 of 6 Period: 0.904 d



## DV Fit Results:

Period = 0.90449 [0.00003] d  
Epoch = 132.1221 [0.0100] BKJD  
Rp/R\* = 0.0018 [0.0030]  
a/R\* = 1.25 [4.43]  
b = 0.11 [92.50]  
Seff = 20127.99 [8159.76]  
Teq = 3037 [308] K  
Rp = 0.37 [0.61] Re  
a = 0.0217 [0.0055] AU  
Ag = 10.35 [33.65] [0.28 $\sigma$ ]  
Teffp = 8424 [6812] K [0.79 $\sigma$ ]

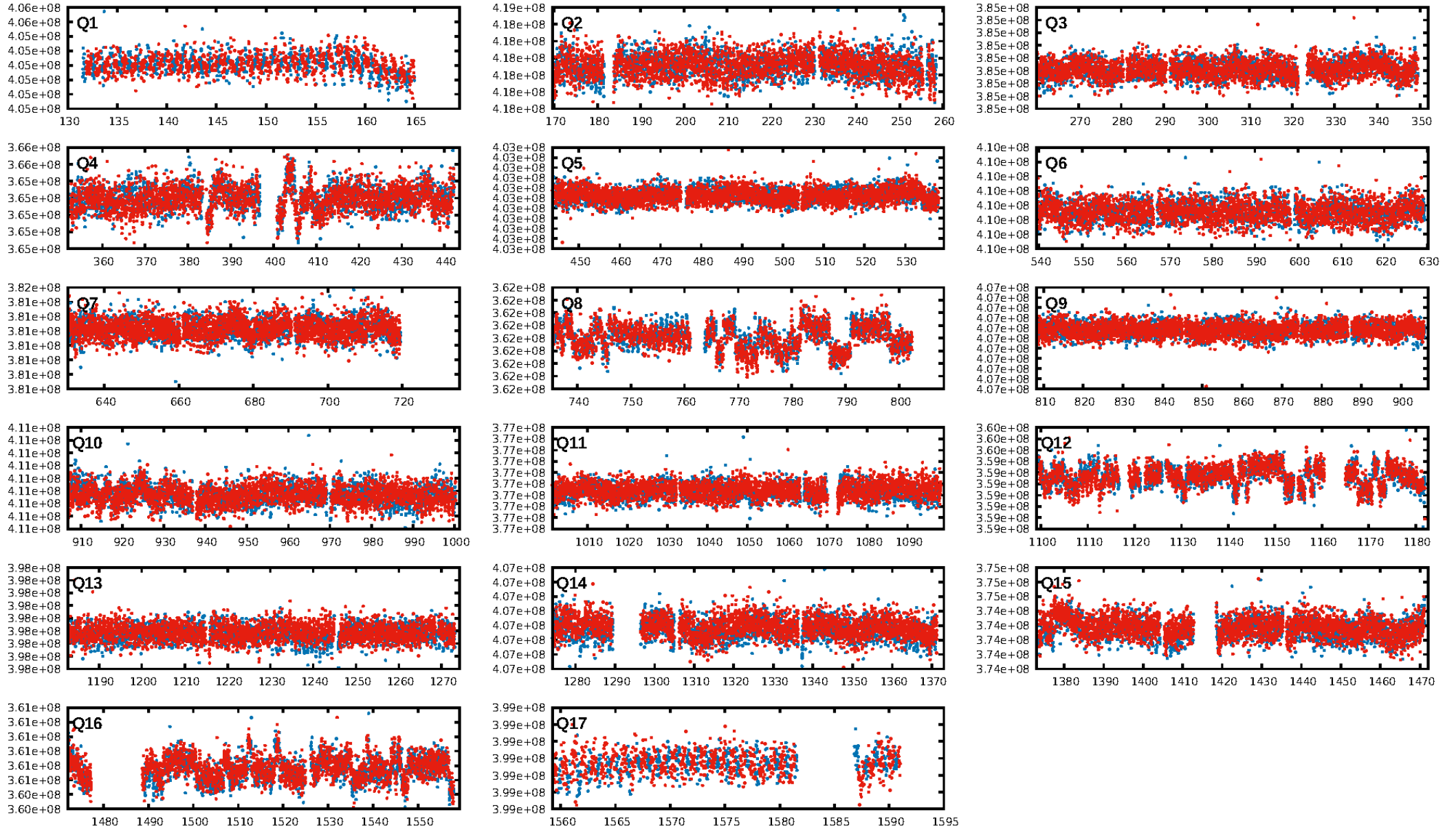
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [33.62 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 4.37e-16  
RollingBand-fgt: 1.00 [1421/1426]  
GhostDiagnostic-chr: N/A  
Centroid-sig: N/A  
Centroid-so: N/A  
OotOffset-rm: 1.053 arcsec [0.89 $\sigma$ ]  
Centroid-so: N/A  
KicOffset-rm: 0.951 arcsec [0.85 $\sigma$ ]  
OotOffset-st: 0/3/0/1 [4]  
KicOffset-st: 0/3/0/1 [4]  
DiffImageQuality-fgm: 0.25 [1/4]  
DiffImageOverlap-fno: 1.00 [17/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 17:32:42 Z

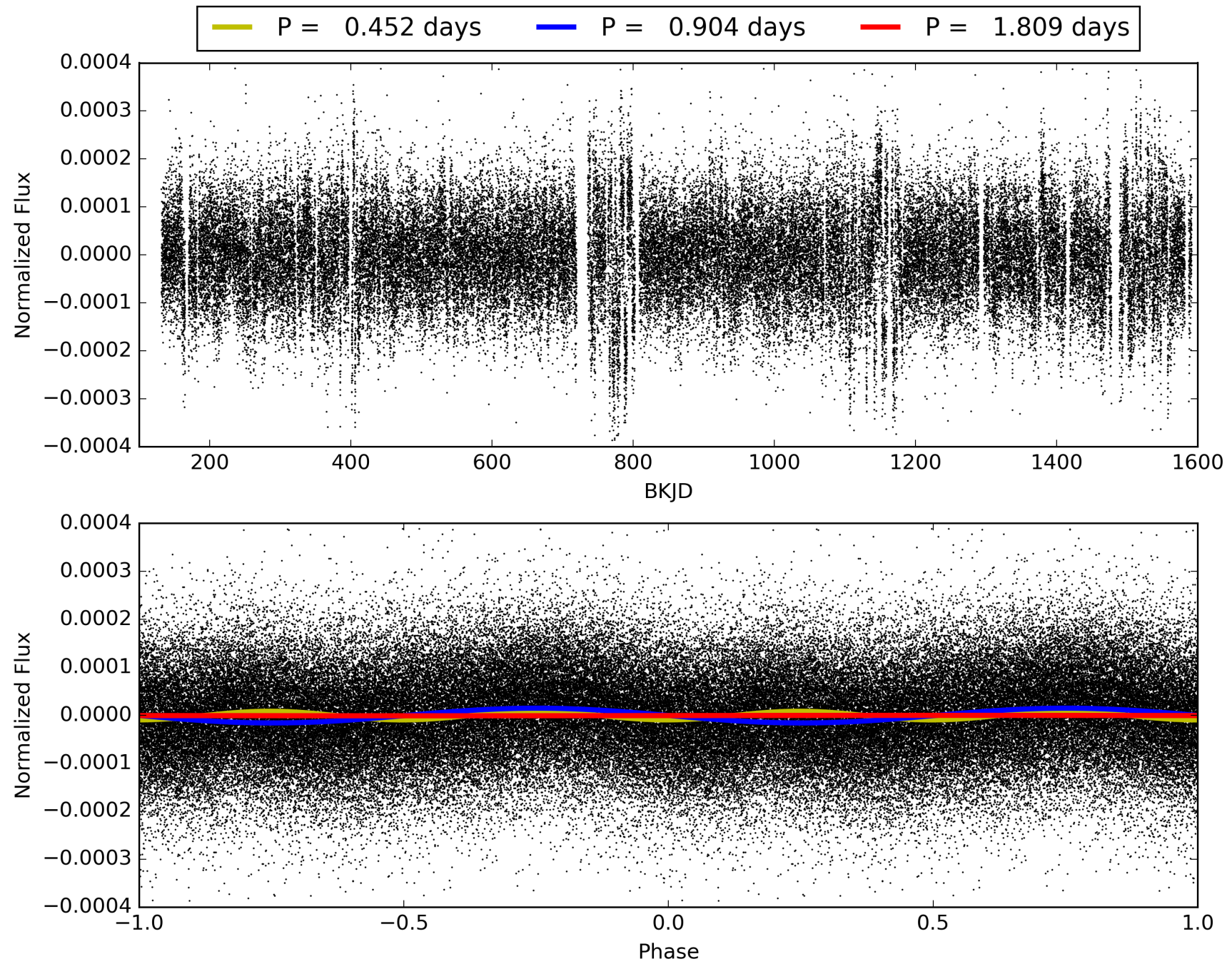
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 012066447-01, PDC Light Curves





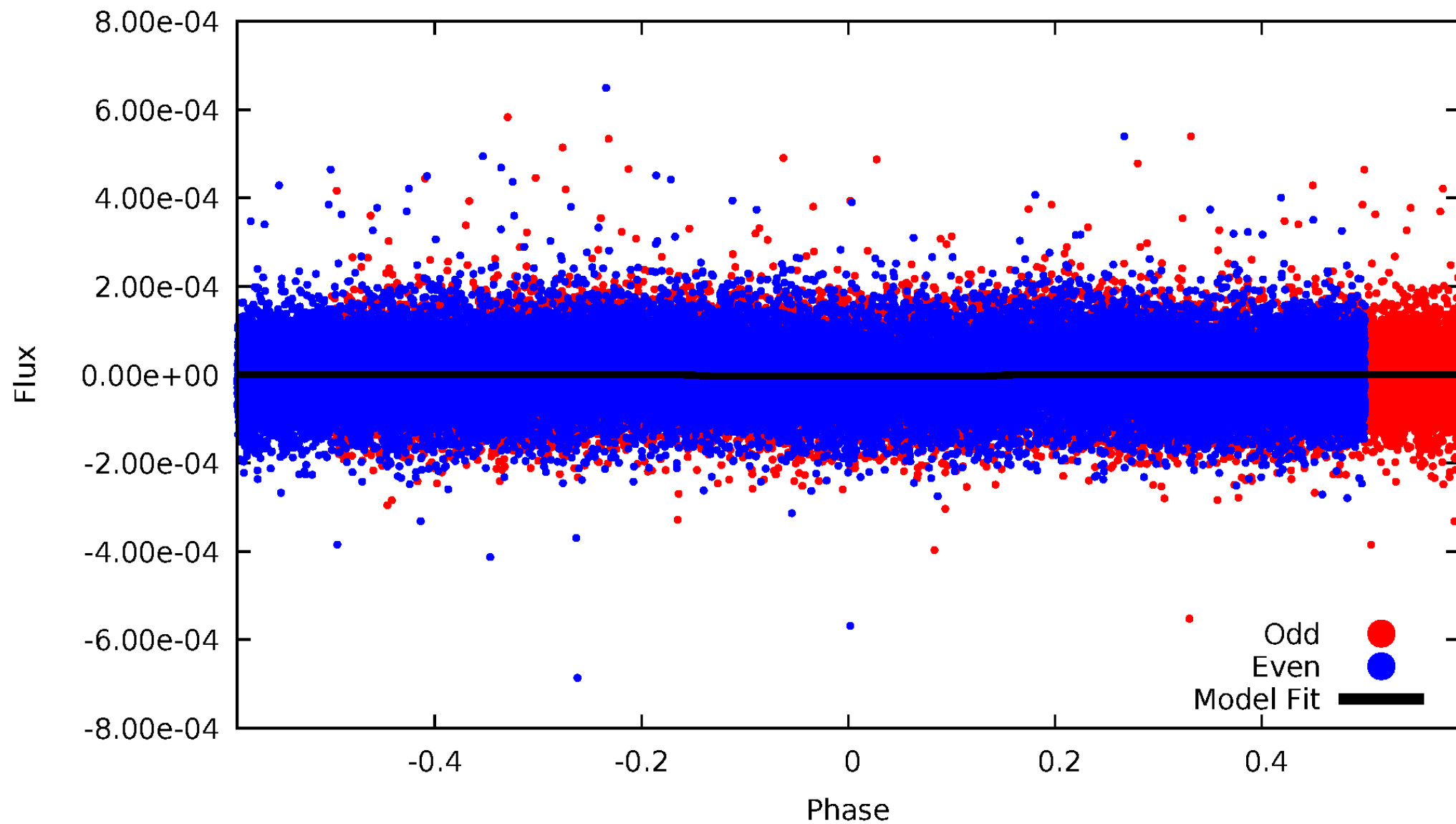
TCE 012066447-01





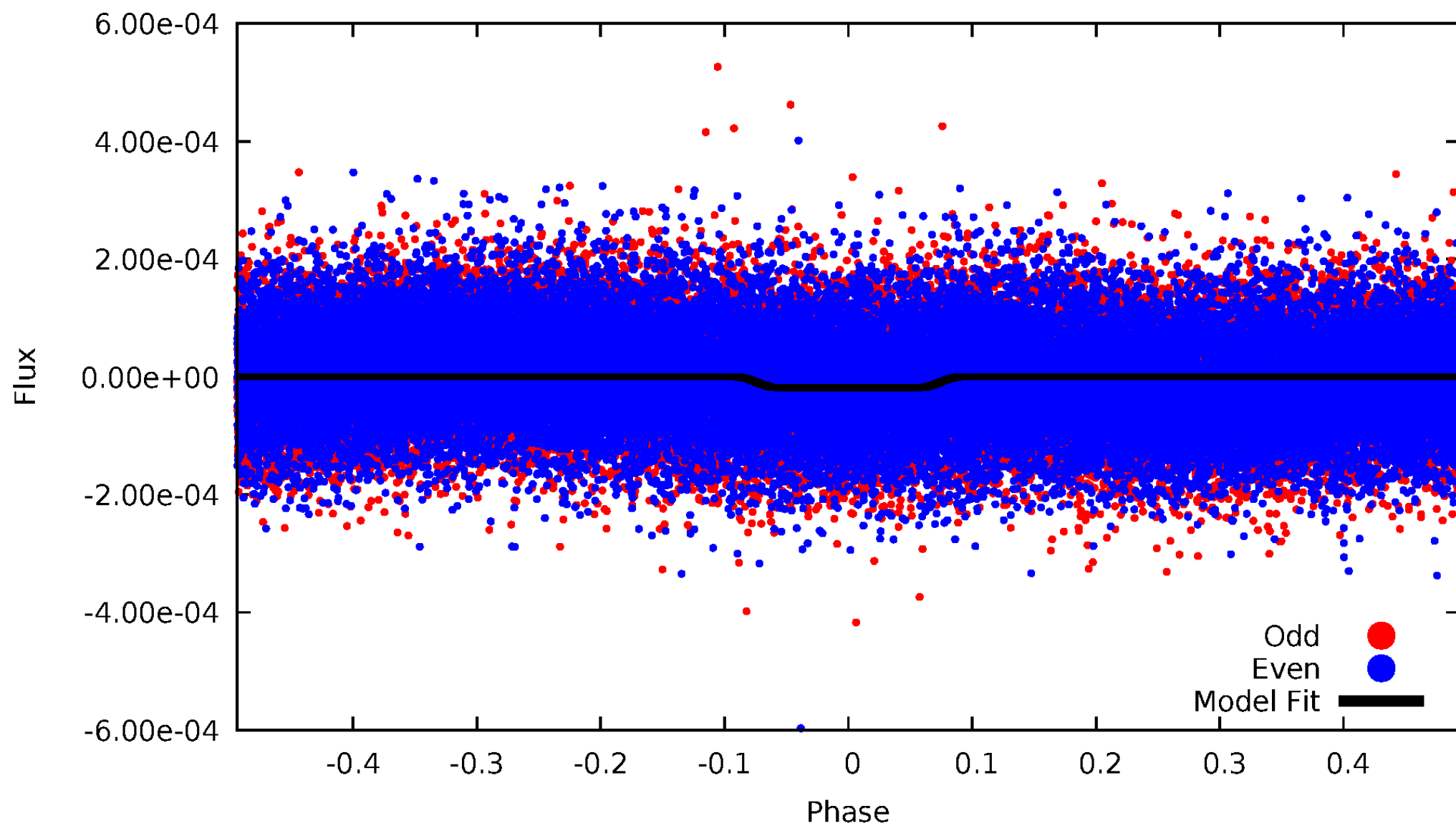
# DV Odd/Even

TCE 012066447-01



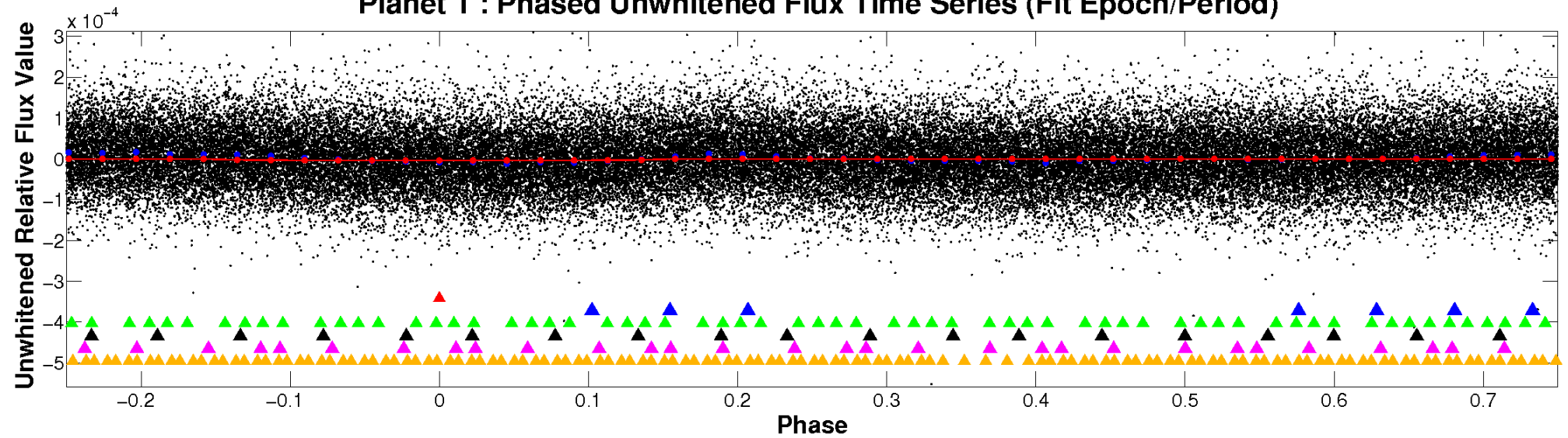
# ALT Odd/Even

TCE 012066447-01

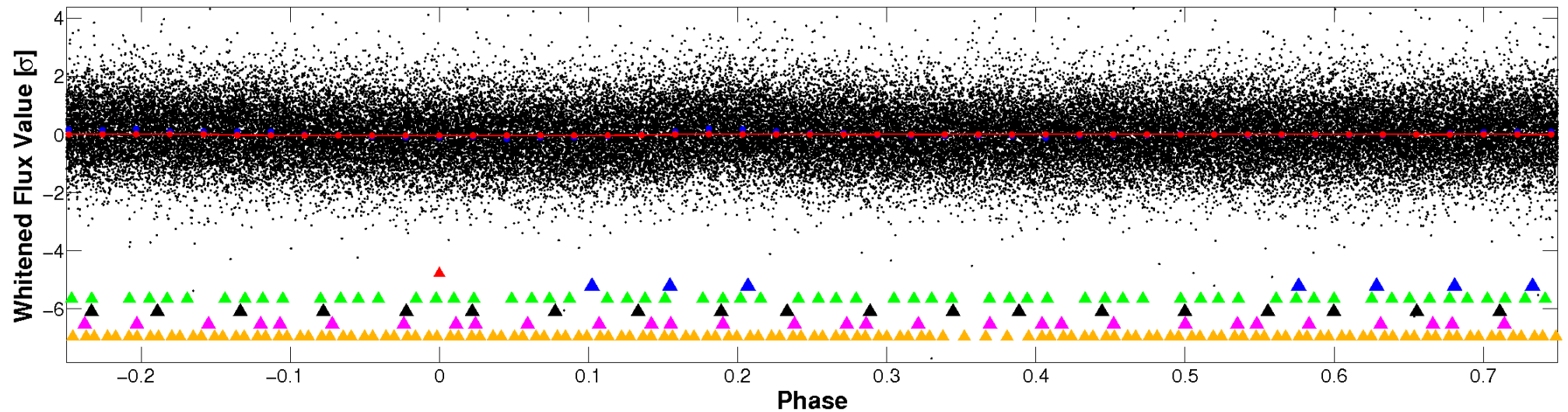


# Non-Whitened Vs. Whitened Light Curve

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



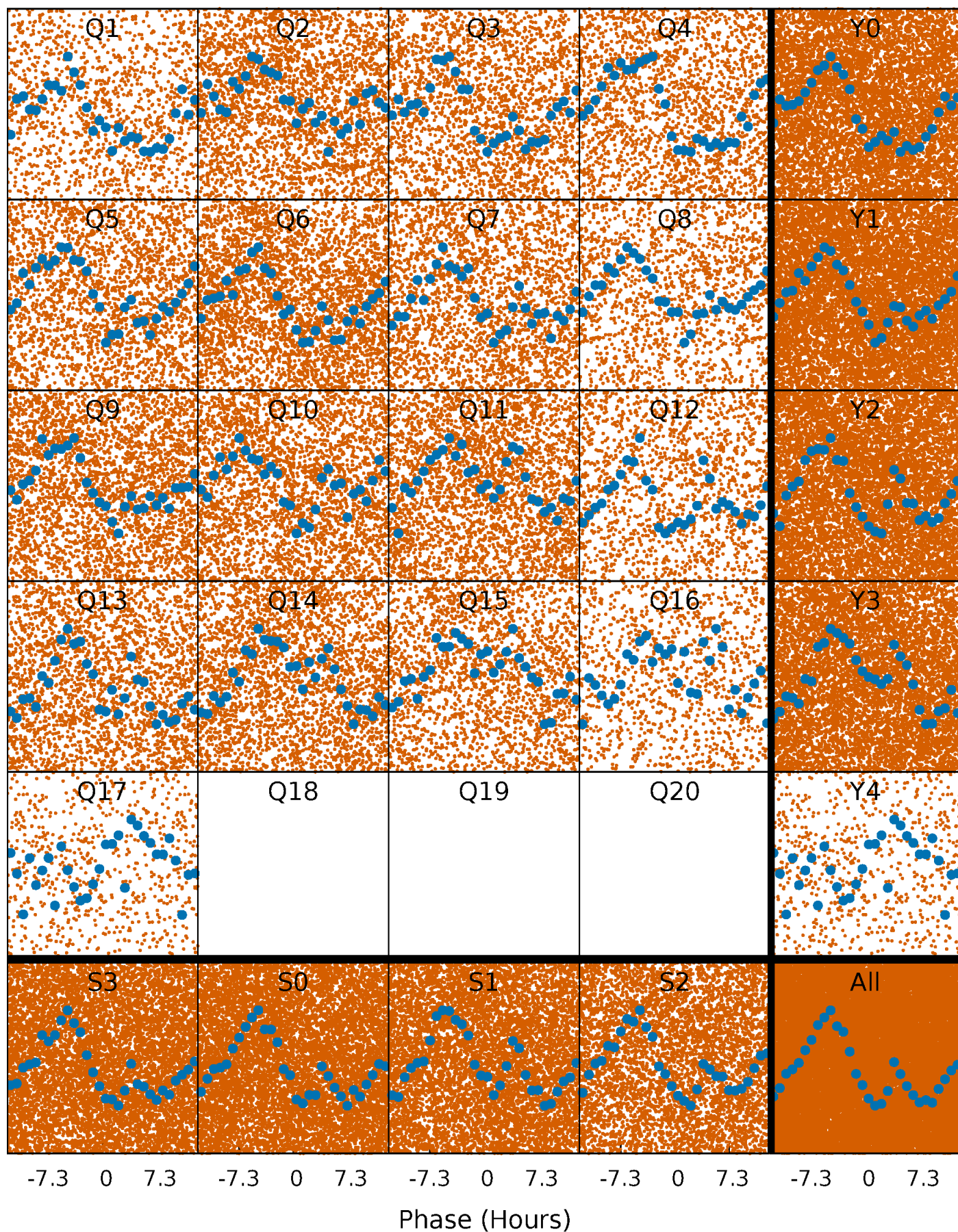
## Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)





# PDC Quarter-Phased Transit Curves

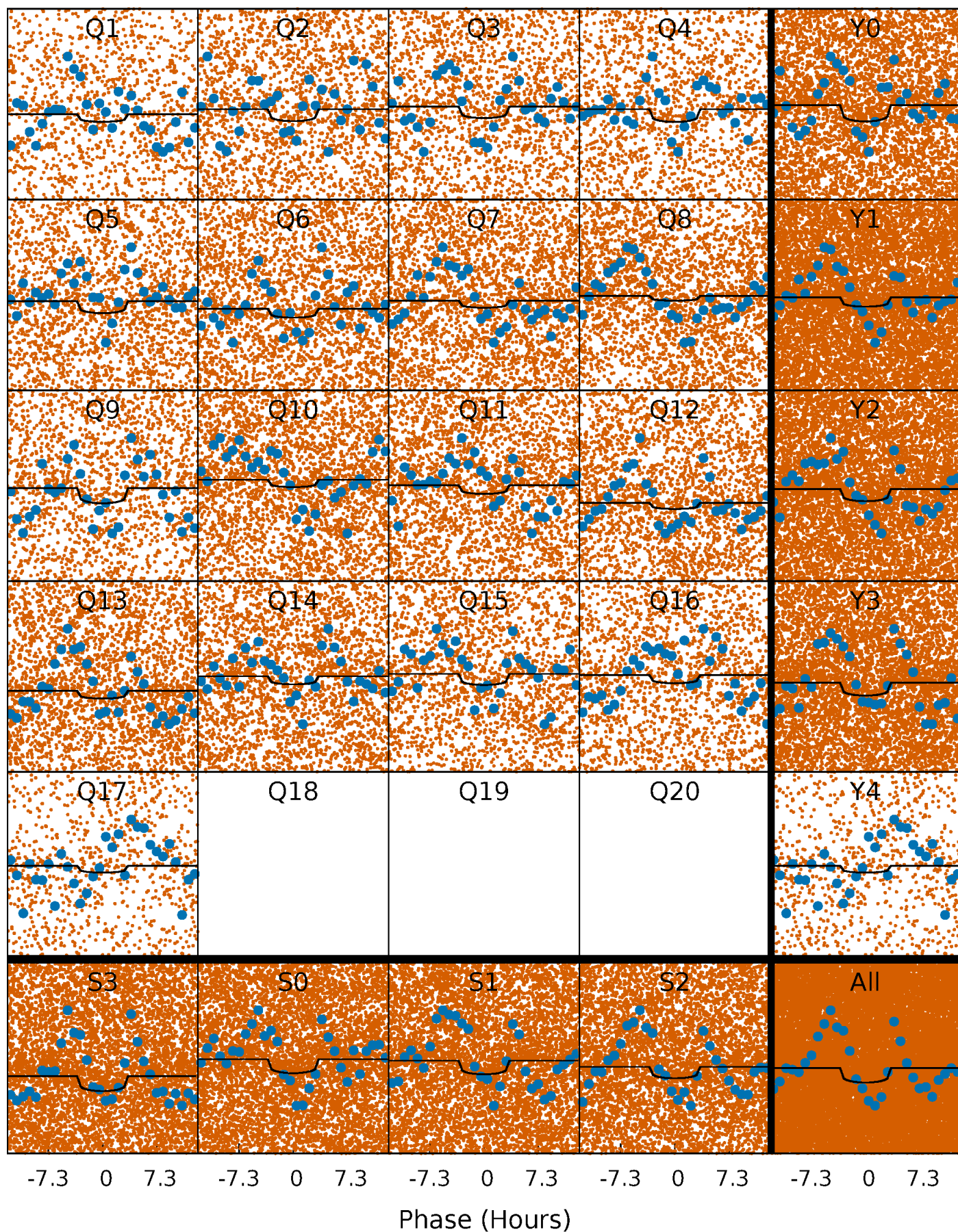
TCE 012066447-01 P= 0.904494 Days  $T_0=132.122095$  (BKJD)





# DV Quarter-Phased Transit Curves

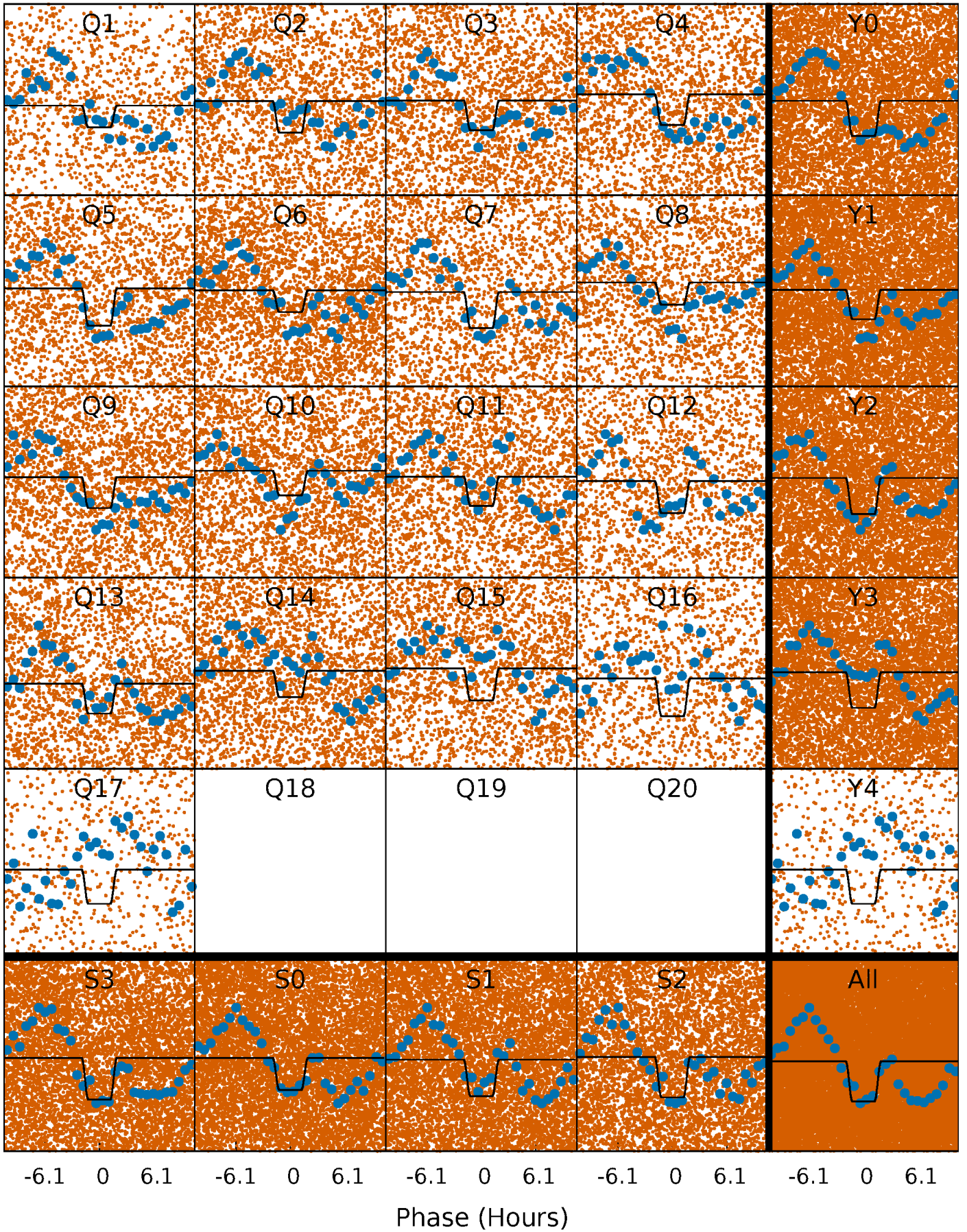
TCE 012066447-01   P= 0.904494 Days    $T_0=132.122095$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

TCE 012066447-01 P= 0.904539 Days  $T_0=132.143022$  (BKJD)

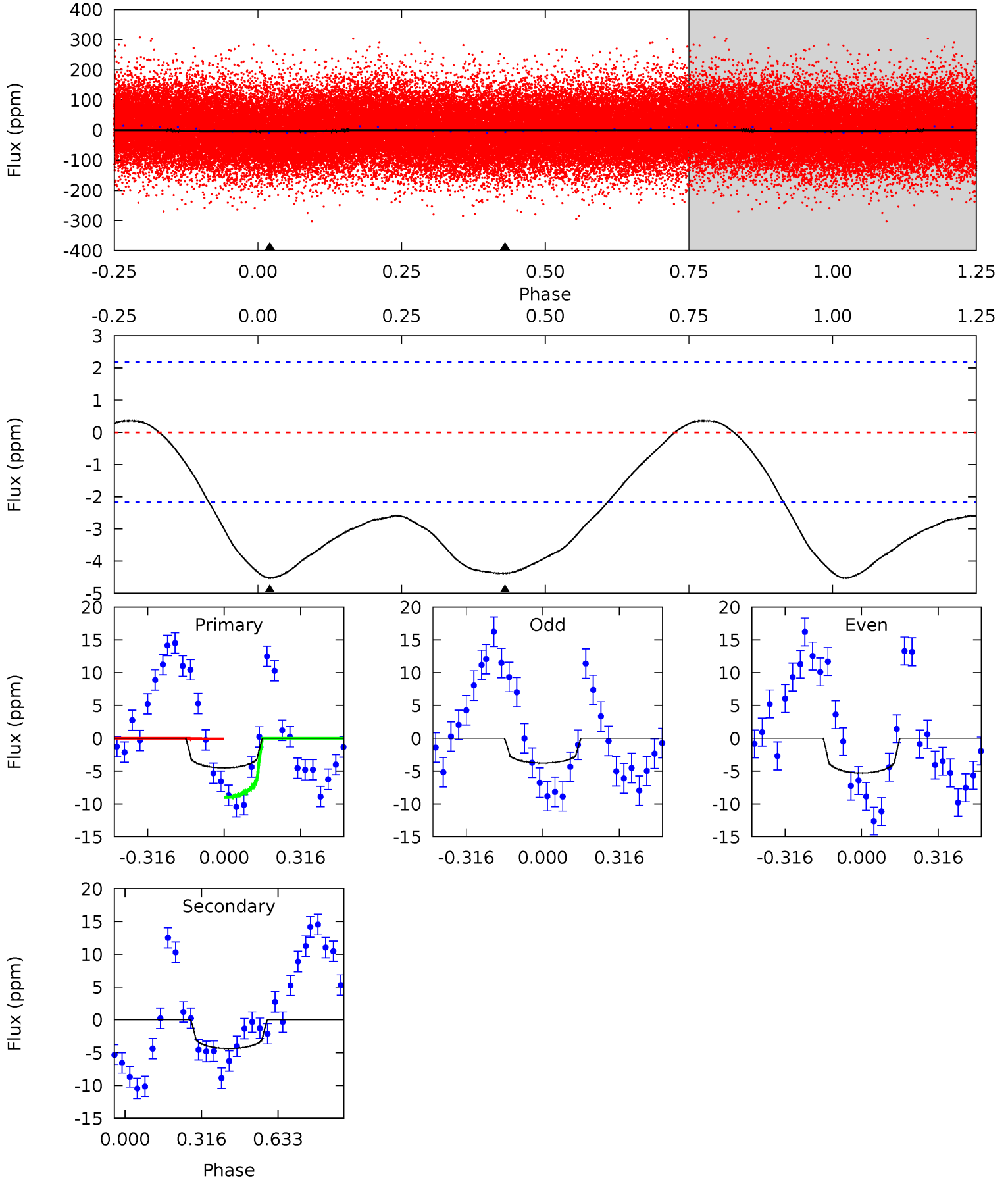




# DV Model-Shift Uniqueness Test

012066447-01, P = 0.904494 Days, E = 131.217601 Days

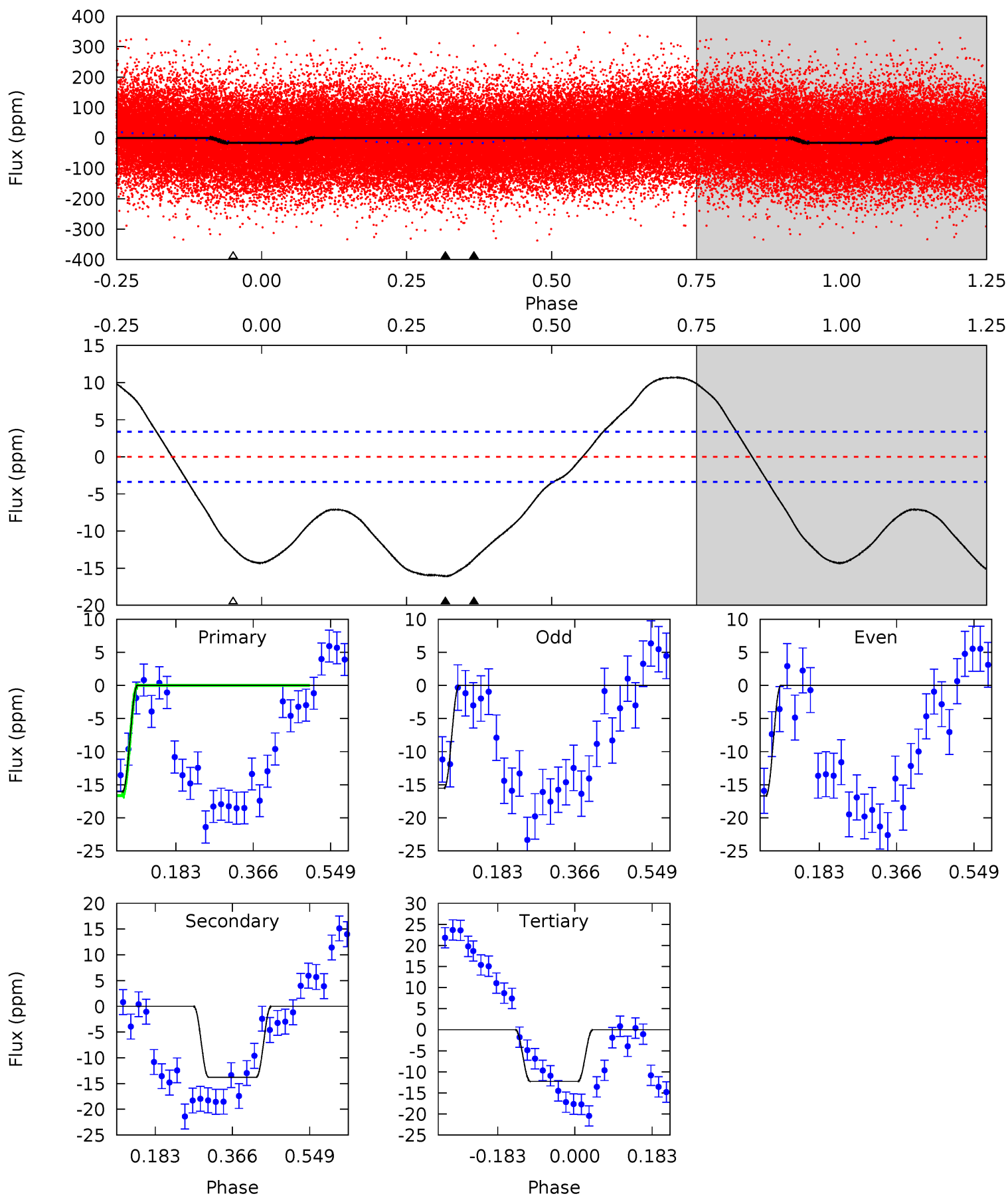
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.97	8.69	0	0	4.32	1.00	0.79	8.97	8.97	8.69	8.69	1.52	1.17	0.07	8.93



# Alt Model-Shift Uniqueness Test

012066447-01, P = 0.904539 Days, E = 131.238483 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
21.1	18.1	16.1	0	4.44	1.33	11.6	4.99	21.1	1.96	18.1	0.76	0.95	0.40	0.70



### Stellar Parameters For KIC 012066447

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7479^{+206}_{-335}$	$4.130^{+0.105}_{-0.195}$	$0.080^{+0.200}_{-0.350}$	$1.837^{+0.569}_{-0.350}$	$1.658^{+0.207}_{-0.253}$	$0.377^{+0.216}_{-0.184}$
	+3%/-4%	+3%/-5%	+250%/-438%	+31%/-19%	+12%/-15%	+57%/-49%
Source	PHO54	PHO54	PHO54	DSEP		

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

### Secondary Eclipse Parameters for KIC 012066447-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-4 \pm 1$	$0.58^{+0.54}_{-0.38}$	$4294^{+299}_{-278}$	$6228^{+6231}_{-1915}$	$3.352^{+25.703}_{-2.472}$
Alt.	$-14 \pm 1$	$0.95^{+0.64}_{-0.55}$	$4274^{+322}_{-260}$	$6392^{+4337}_{-1450}$	$3.925^{+16.114}_{-2.494}$

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



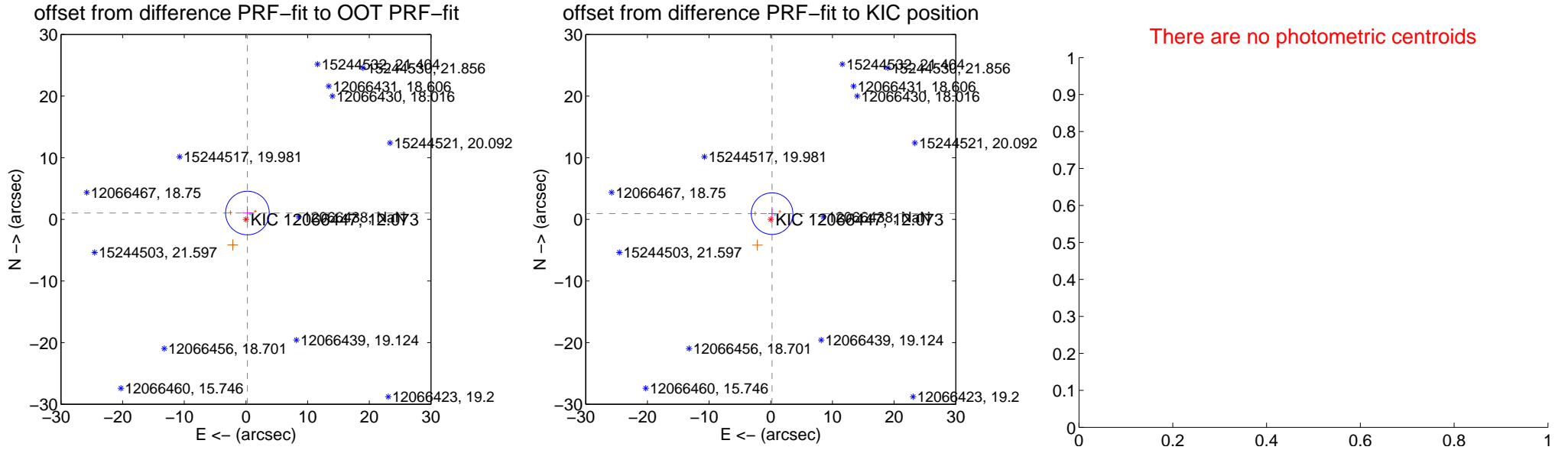
## DV Centroid Data

Supplemental centroid analysis for 012066447-01. Kepler magnitude: 12.07. Transit SNR 5.47

There are 1 quarters with good PRF difference image offsets

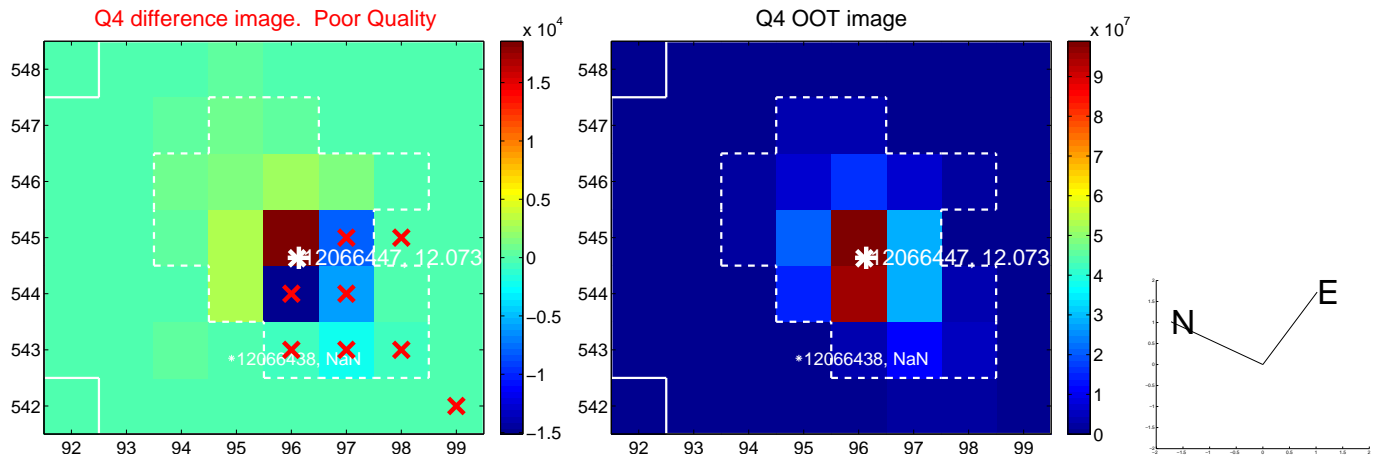
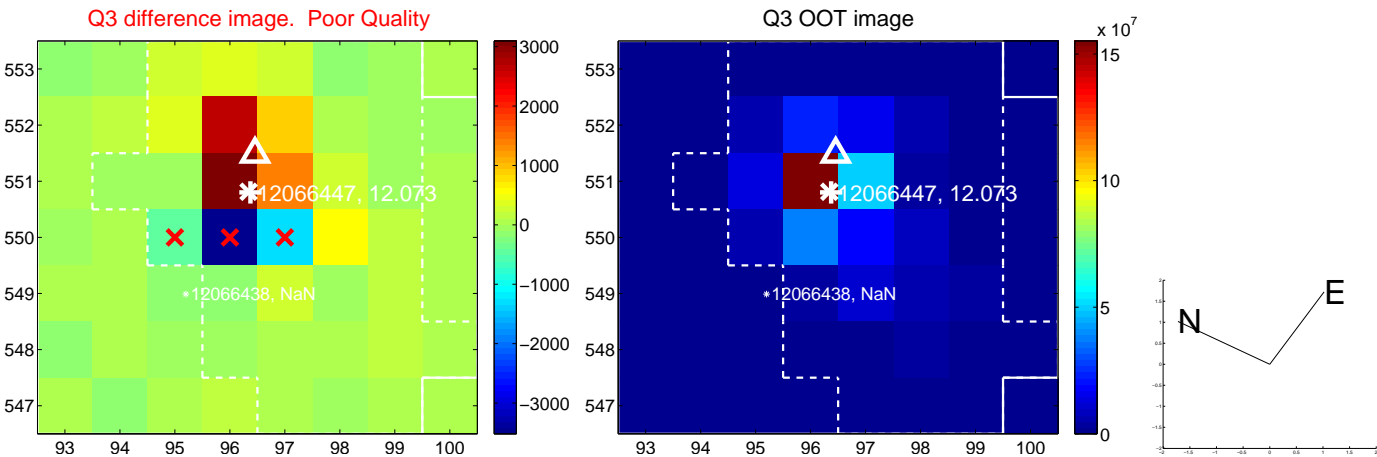
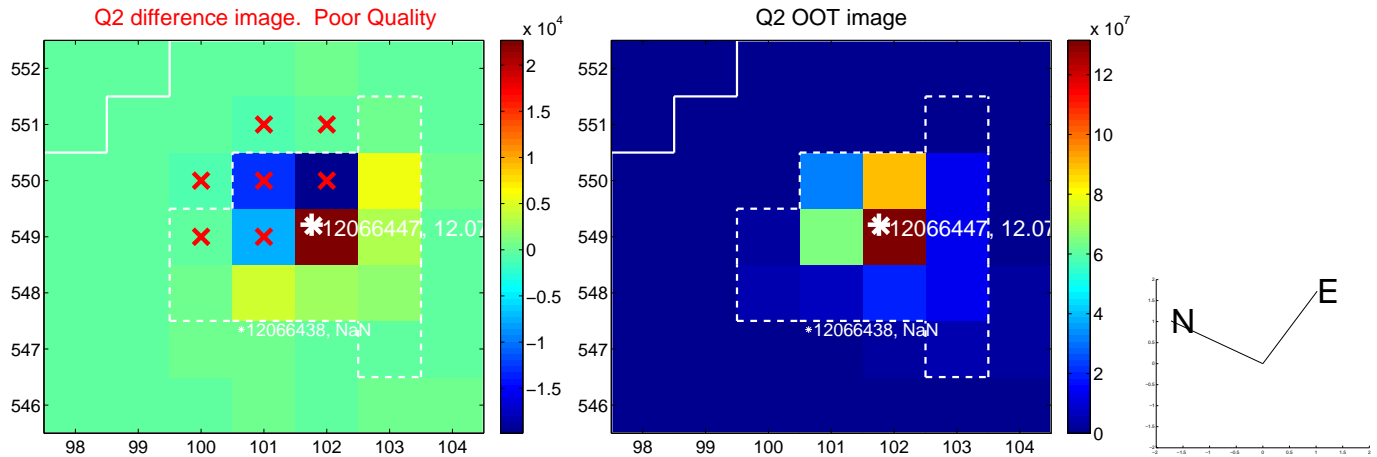
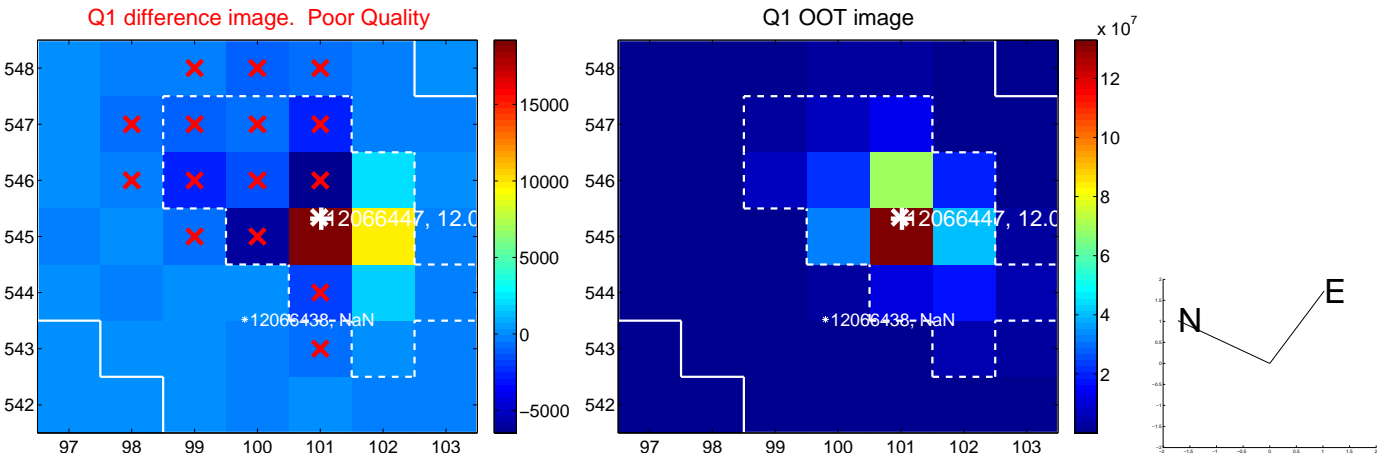
The direct PRF centroid is offset from the target star catalog position by about 0.07 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.053 \pm 1.179$	0.89	$-0.237 \pm 0.814$	$1.026 \pm 1.110$
PRF-fit source offset from KIC position	$0.951 \pm 1.125$	0.85	$-0.213 \pm 0.614$	$0.927 \pm 1.048$
photometric centroid source offset	—	—	—	—

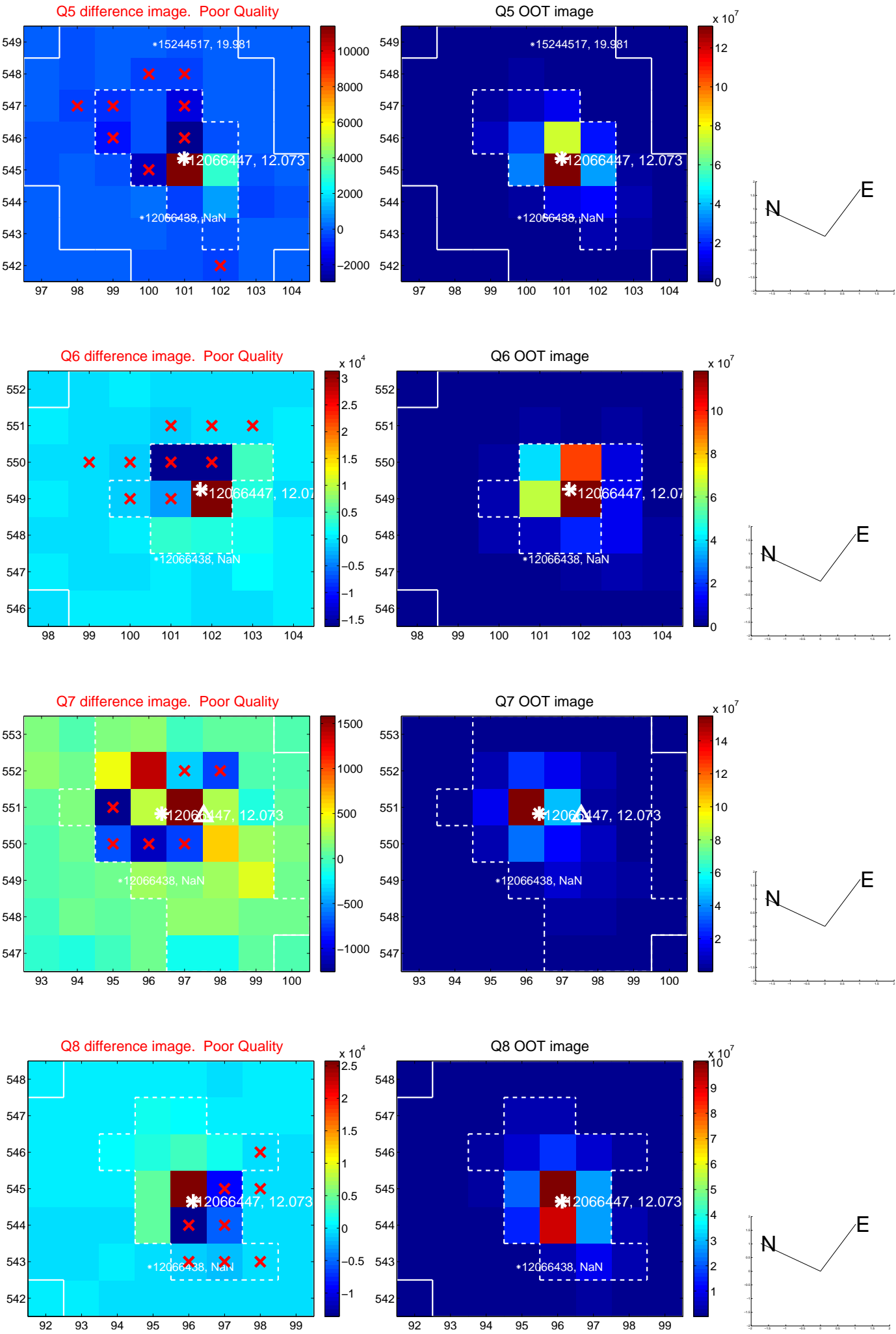


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

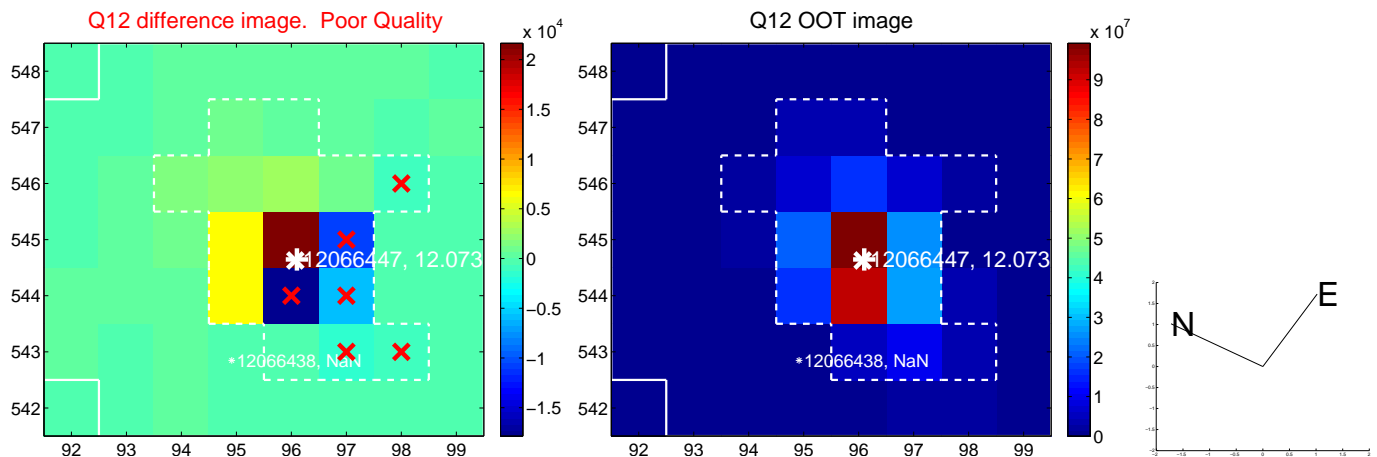
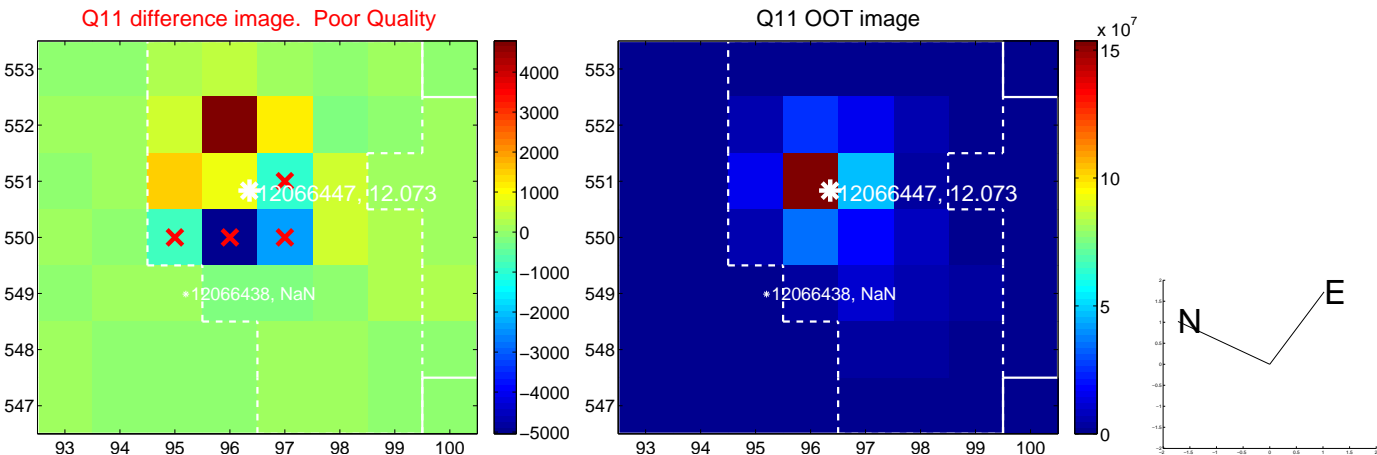
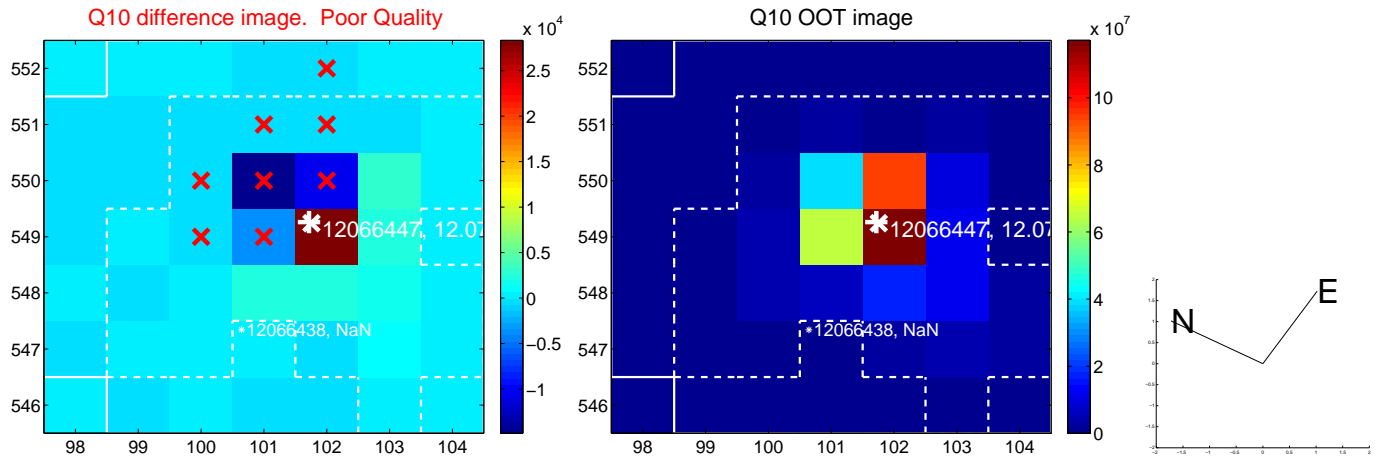
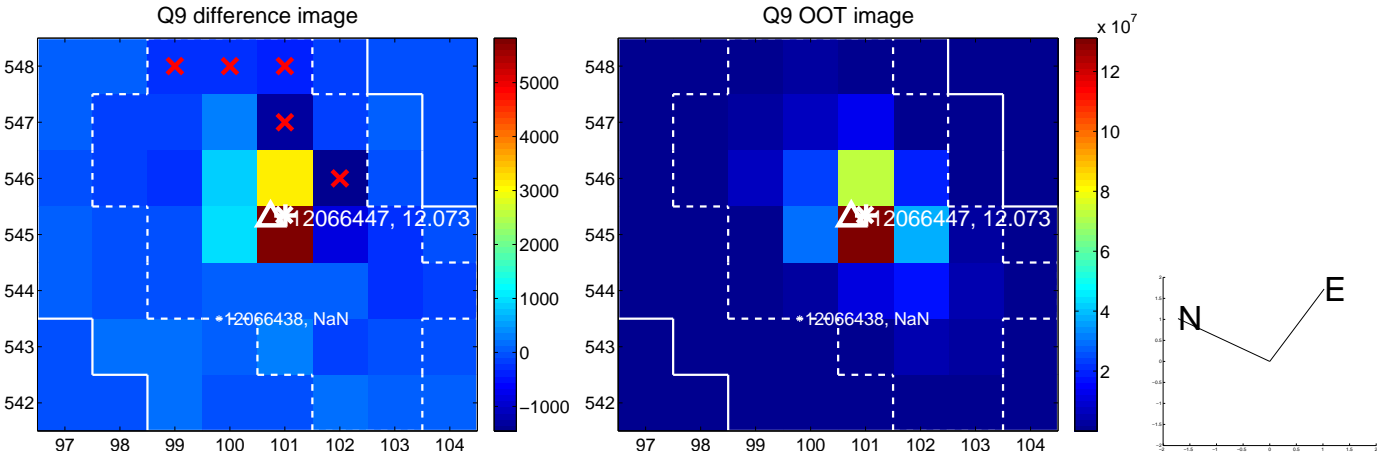


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

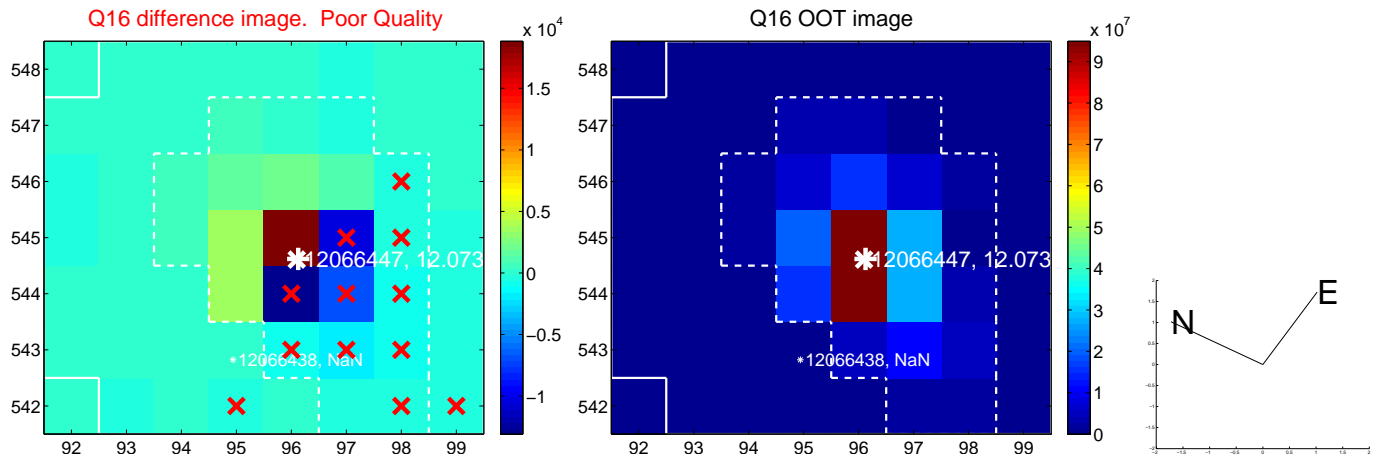
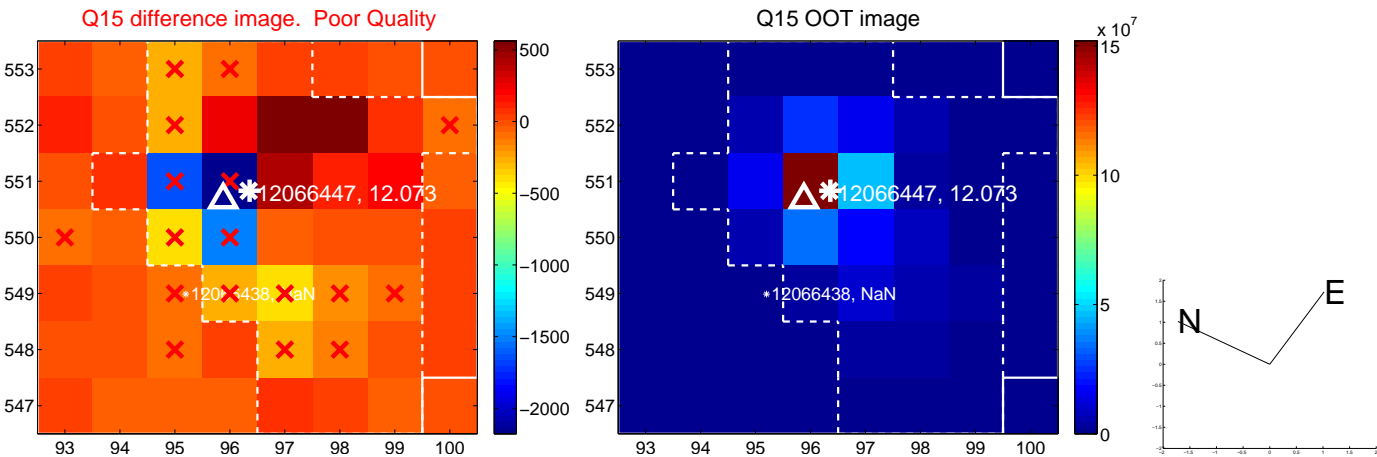
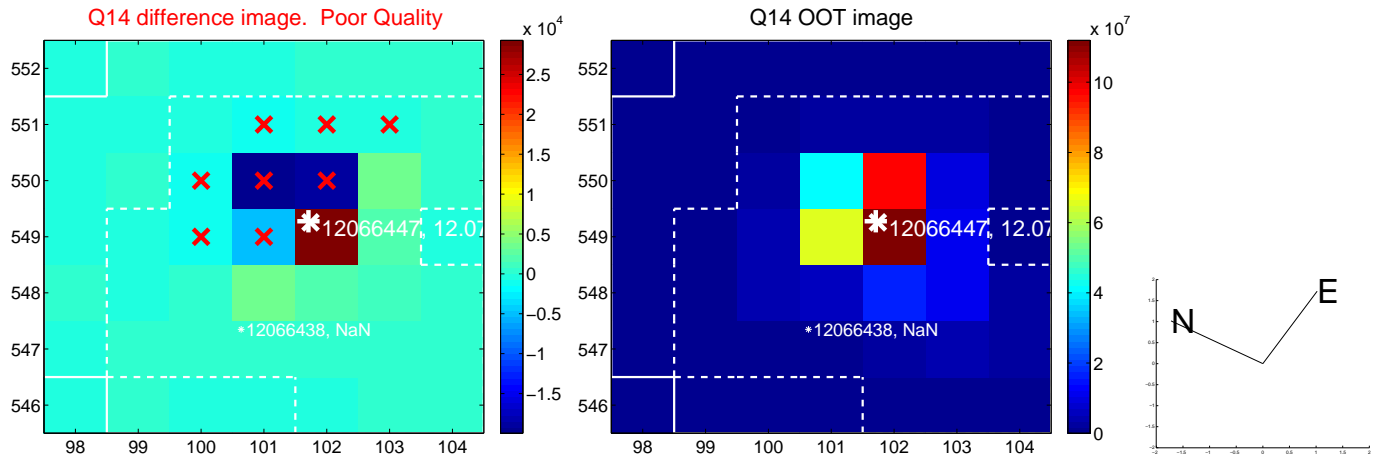
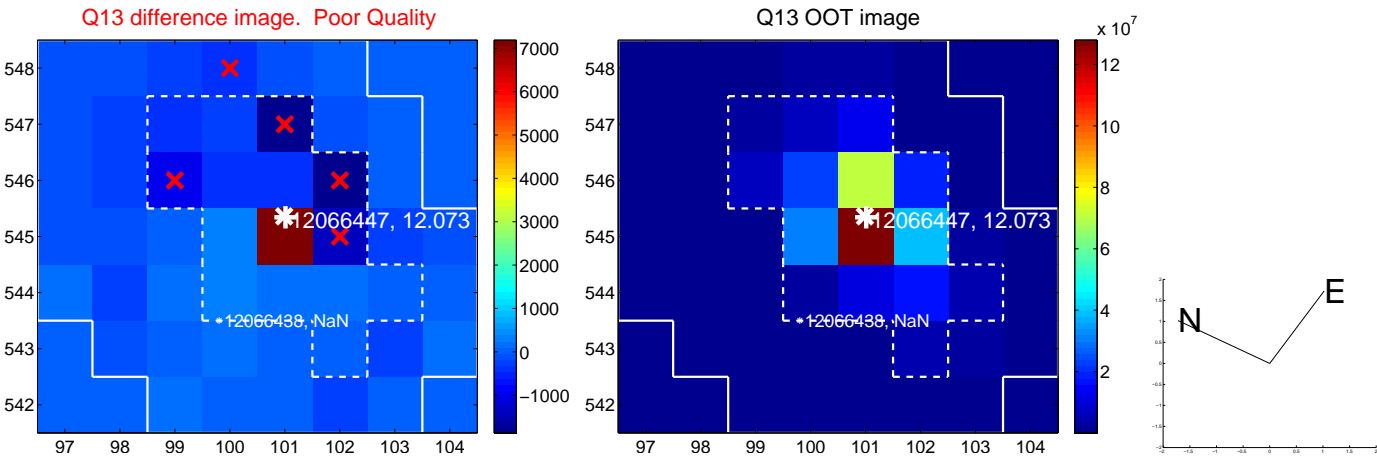




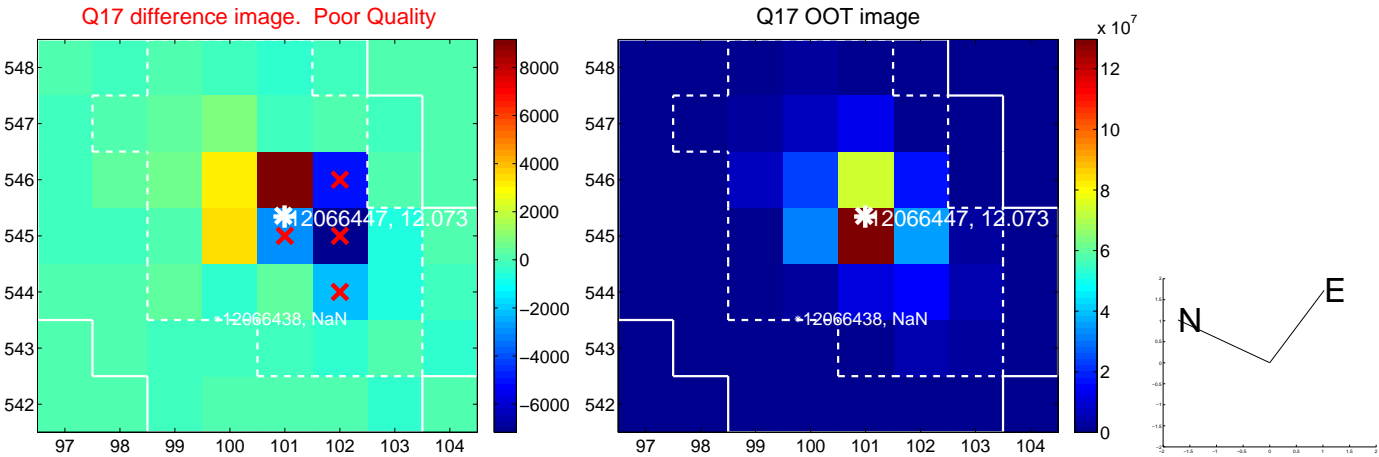
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

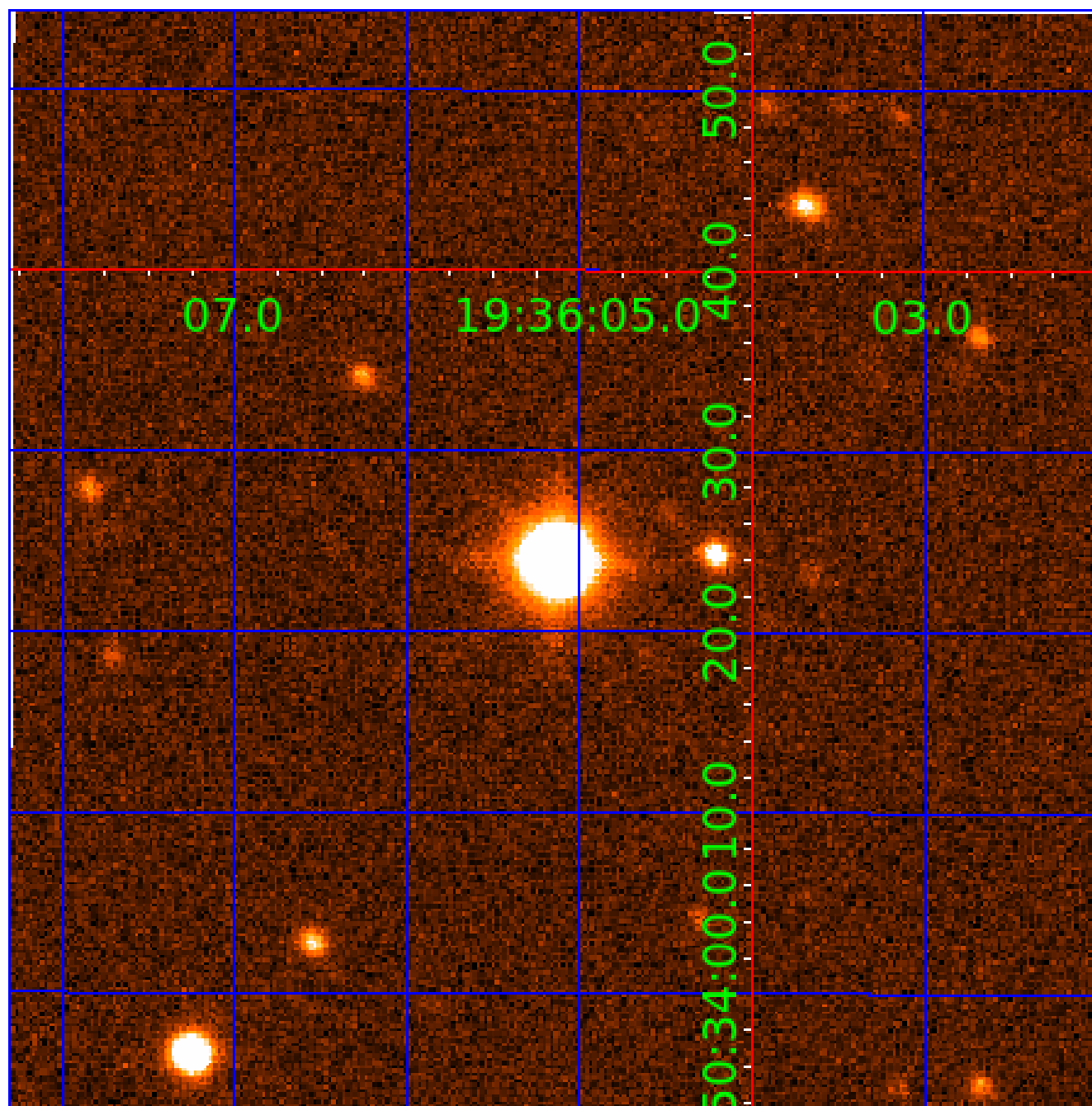


folded centroid time series figure for this object.



UKIRT Image

Declination



# KIC 012066447

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
012066447-01	OBS	No	0.904494	132.122095	3.9	6.417	10.1	5.5	1.84	7479	0.37	20127.99
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012066447-05	OBS	No	48.056665	169.097957	165.8	2.084	11.4	10.1	1.84	7479	2.66	100.77
012066447-06	OBS	No	10.840935	137.846391	88.7	3.025	11.9	10.7	1.84	7479	2.00	733.81

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
012066447-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—CENT_FEW_MEAS
012066447-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
012066447-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_MEAS
012066447-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
012066447-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
012066447-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT

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

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

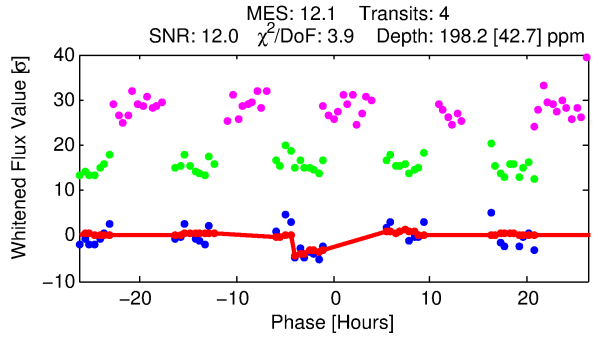
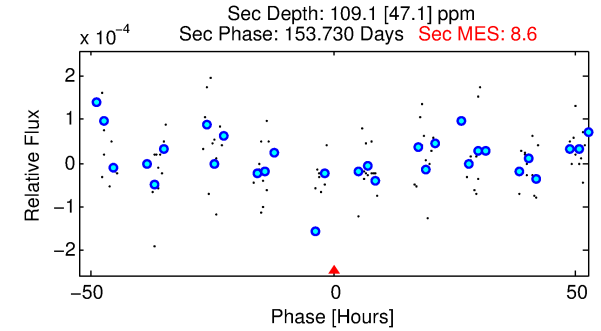
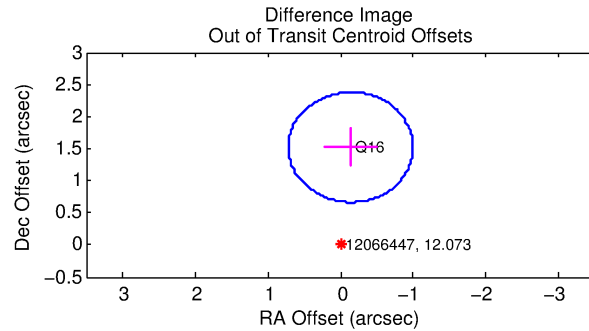
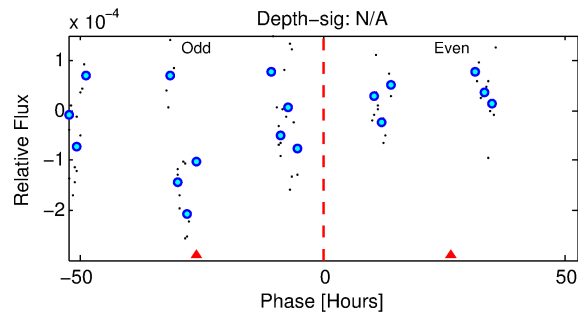
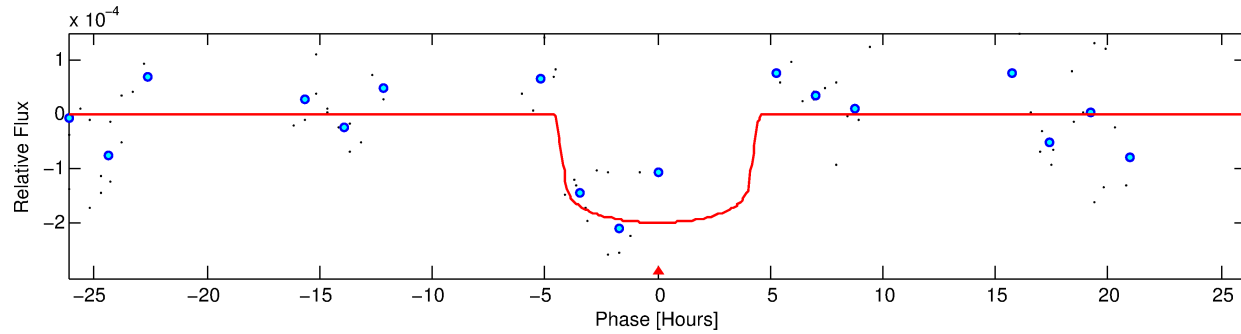
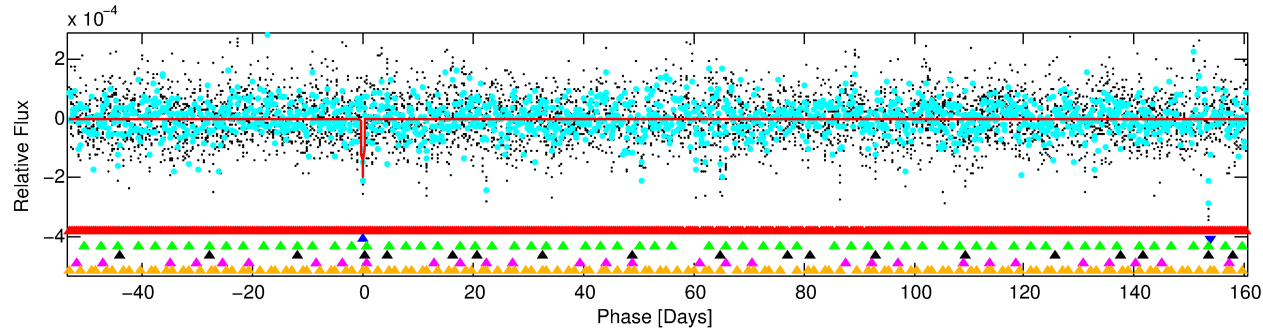
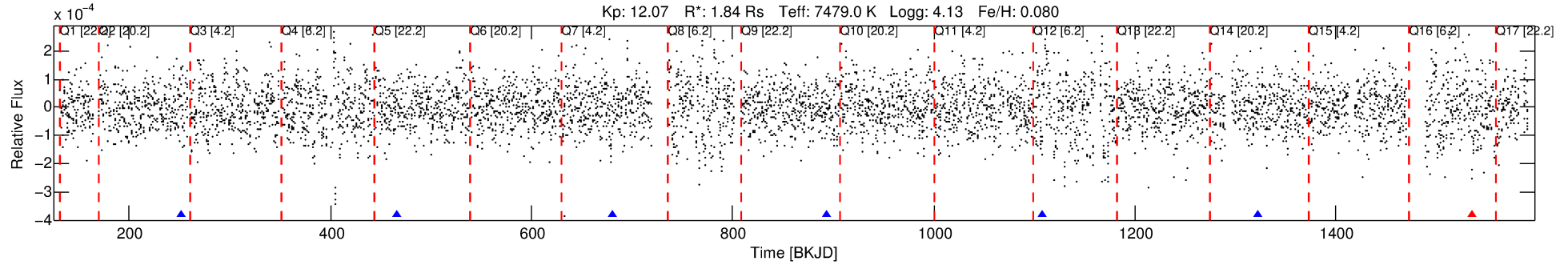
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 012066447-02

No Significant Match Found

# DV One-Page Summary

KIC: 12066447 Candidate: 2 of 6 Period: 213.889 d



## DV Fit Results:

Period = 213.88915 [0.02824] d  
Epoch = 252.1784 [0.0948] BKJD  
Rp/R\* = 0.0134 [0.0154]  
a/R\* = 164.30 [1148.94]  
b = 0.51 [10.61]  
Seff = 13.76 [5.58]  
Teq = 491 [50] K  
Rp = 2.69 [3.19] Re  
a = 0.8290 [0.2114] AU  
Ag = 5699.59 [13430.22] [0.42σ]  
Teffp = 6598 [3852] K [1.59σ]

## DV Diagnostic Results:

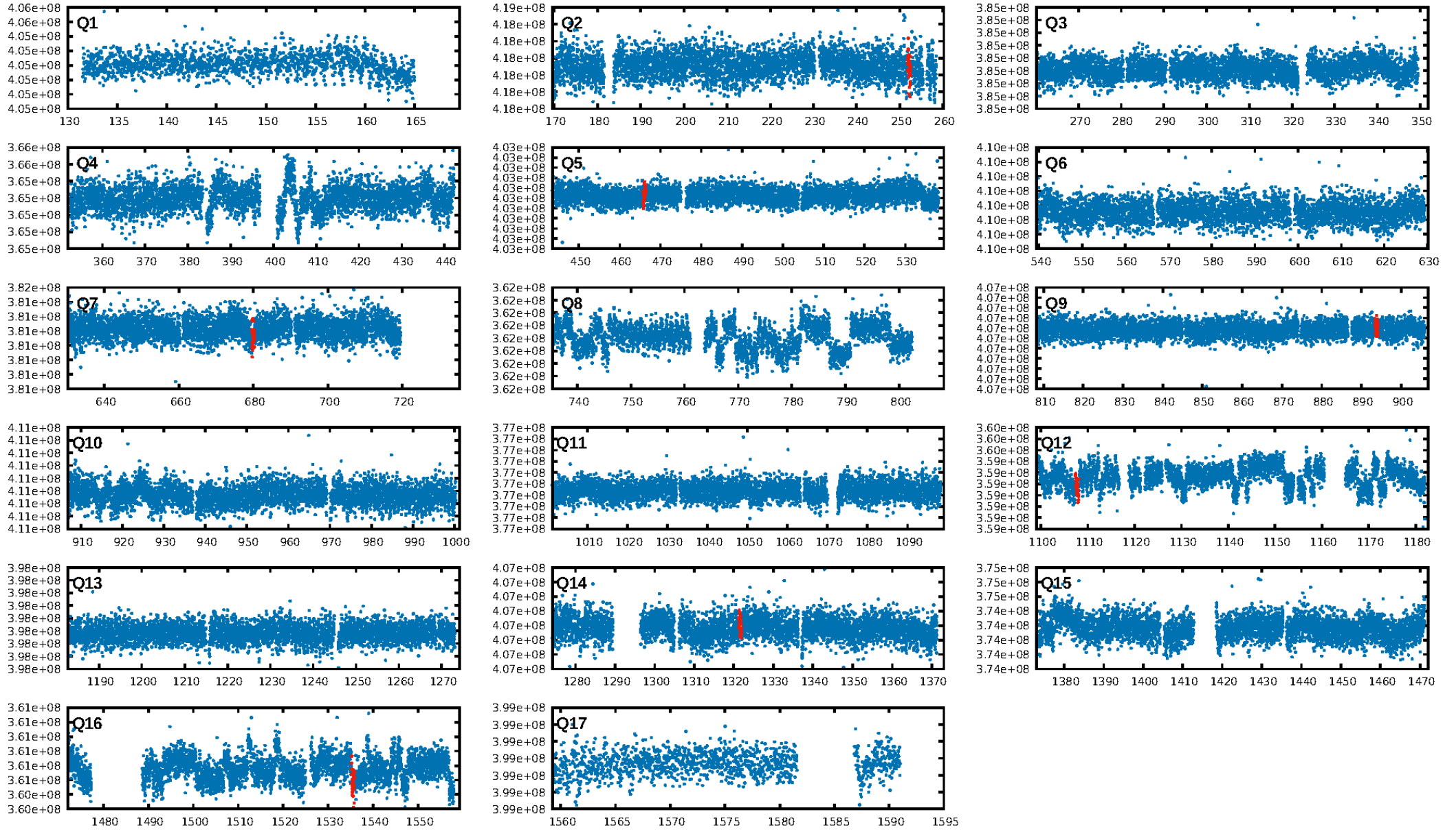
ShortPeriod-sig: 100.0% [337.61σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 0.9%  
ModelChiSquareGof-sig: 100.0%  
**Bootstrap-pfa: 1.14e-11**  
**RollingBand-fgt: 0.75 [3/4]**  
GhostDiagnostic-chr: -4.369  
Centroid-sig: 17.2%  
Centroid-so: 0.975 arcsec [1.50σ]  
**OotOffset-rm: 1.528 arcsec [5.35σ]**  
**KicOffset-rm: 1.454 arcsec [5.10σ]**  
OotOffset-st: 0/0/1/0 [1]  
KicOffset-st: 0/0/1/0 [1]  
DiffImageQuality-fgm: 1.00 [1/1]  
DiffImageOverlap-fno: 0.00 [0/7]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 17:32:53 Z

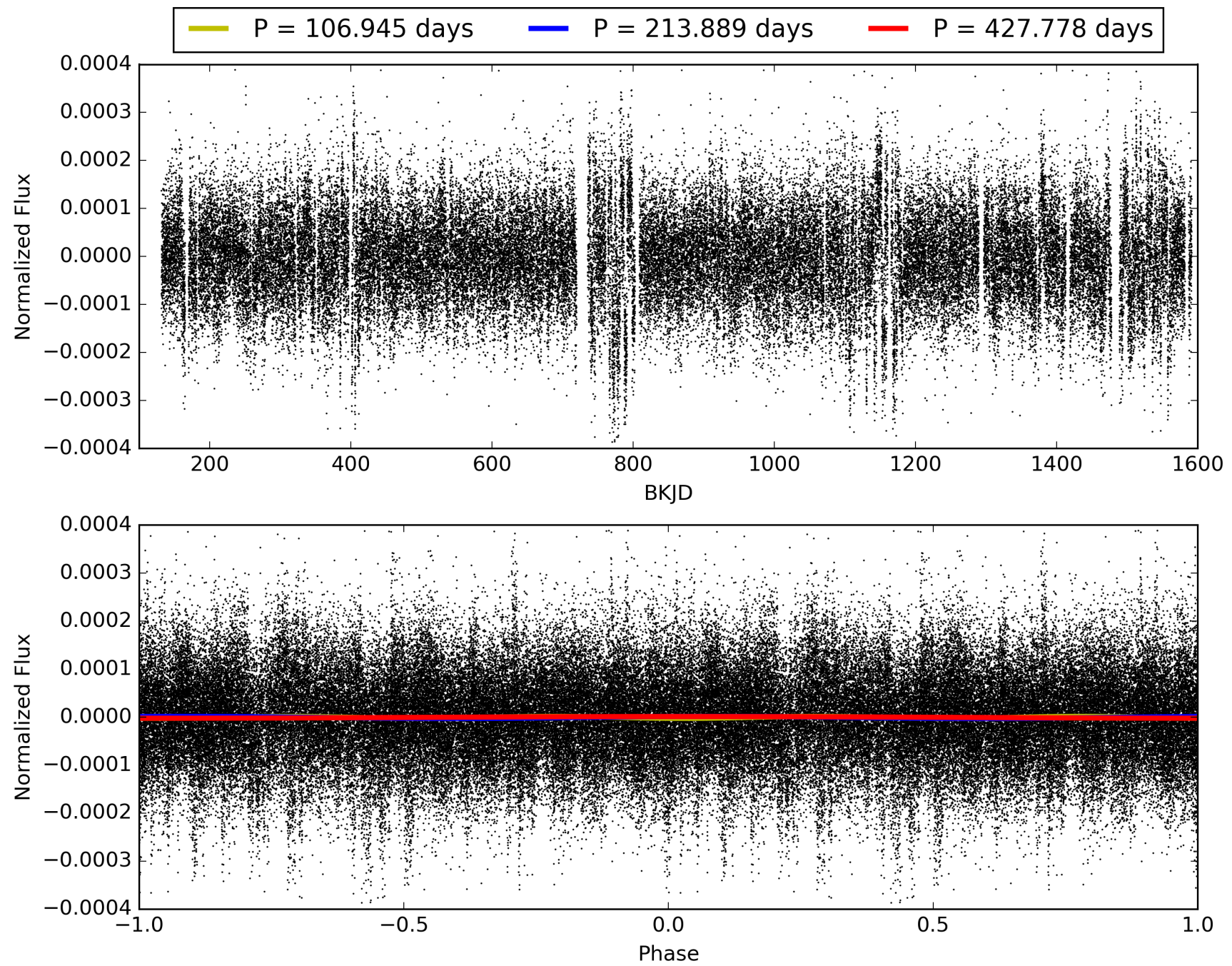
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 012066447-02, PDC Light Curves

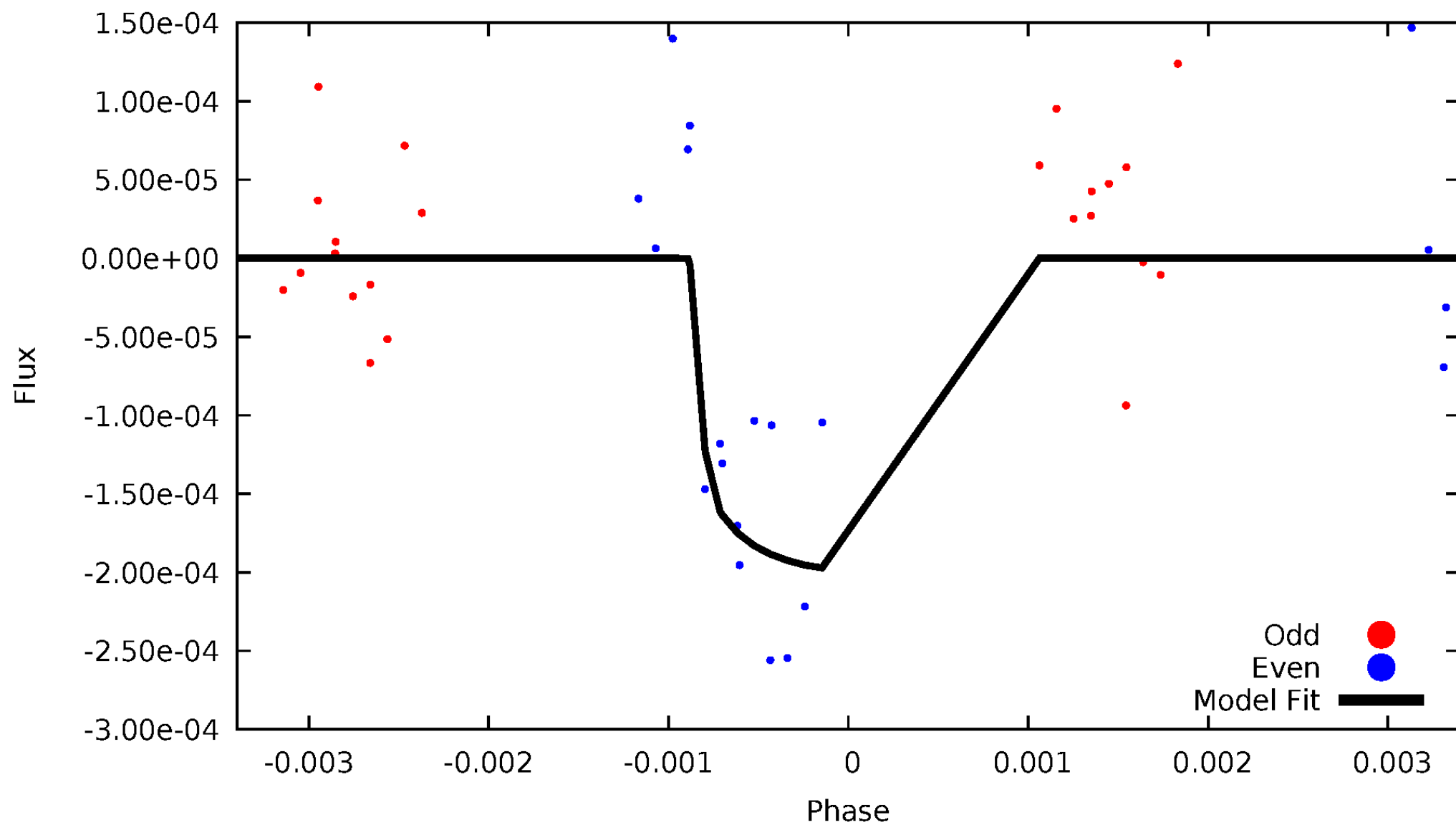


TCE 012066447-02



# DV Odd/Even

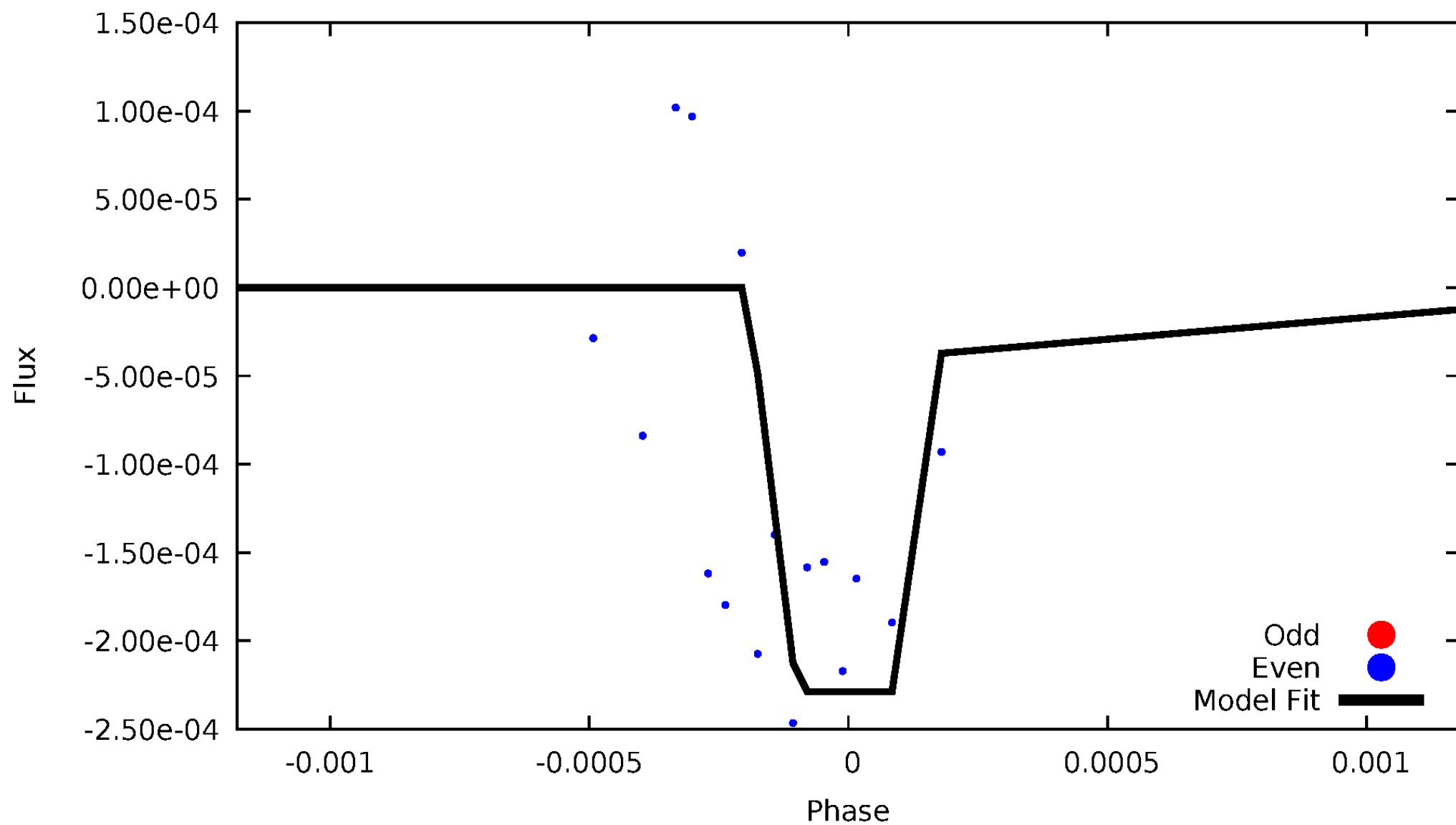
TCE 012066447-02





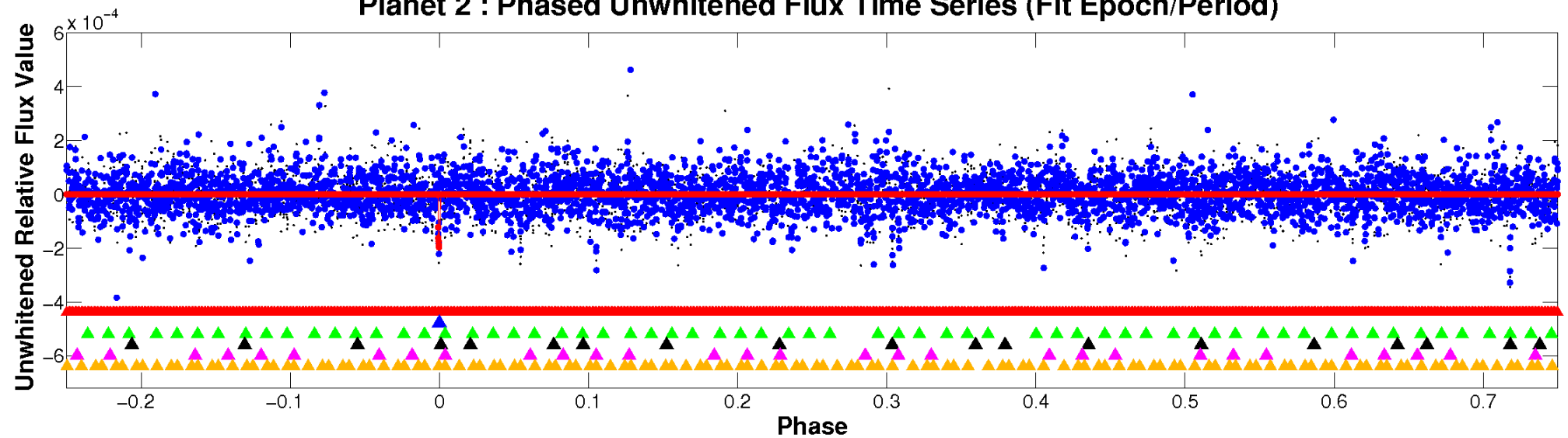
# ALT Odd/Even

TCE 012066447-02

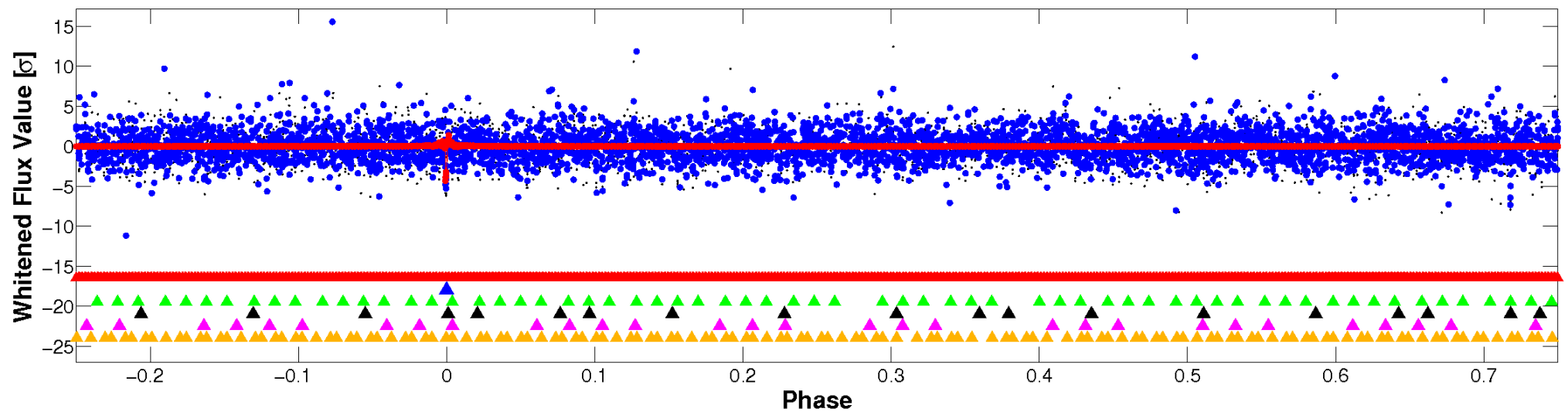


# Non-Whitened Vs. Whitened Light Curve

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

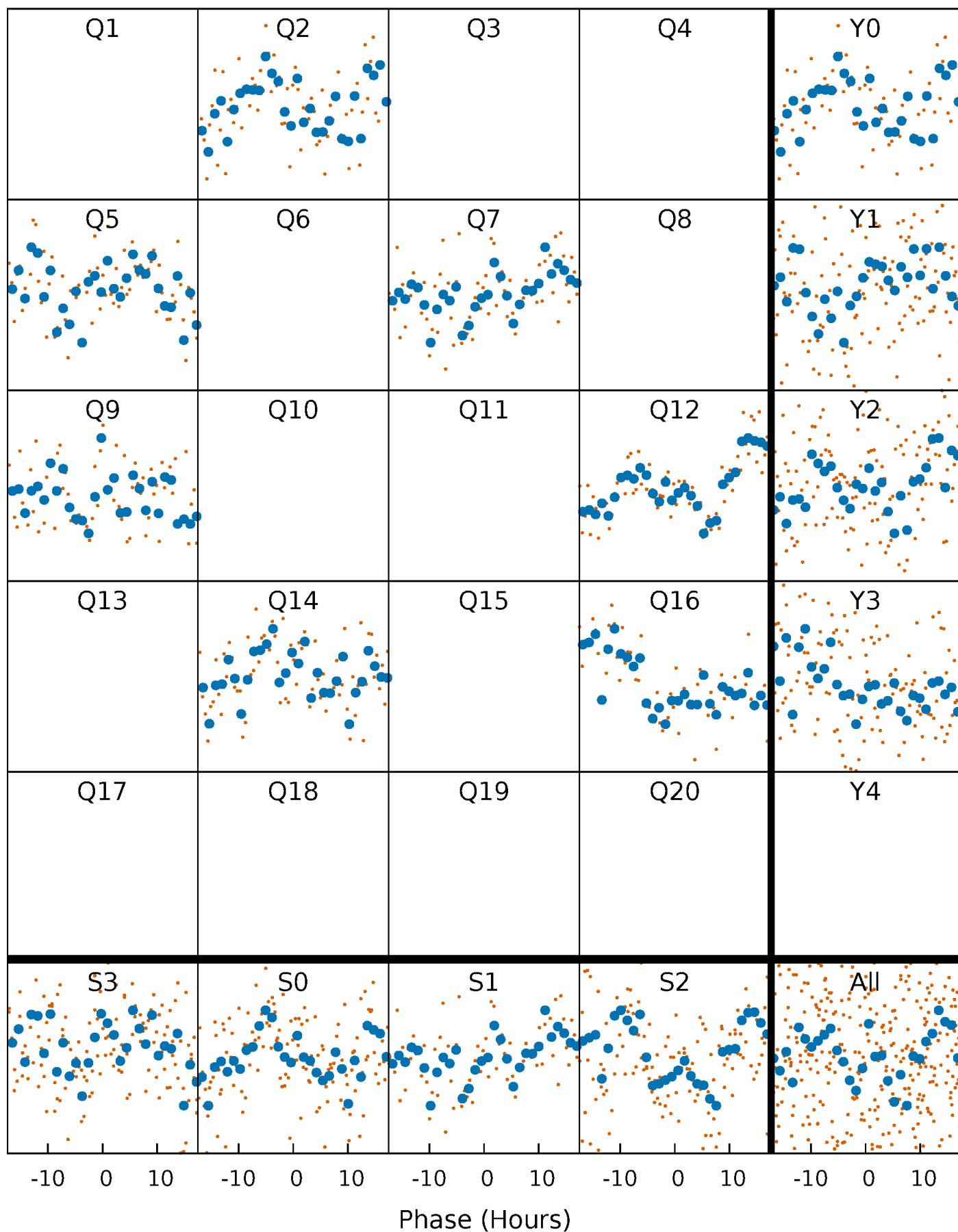


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



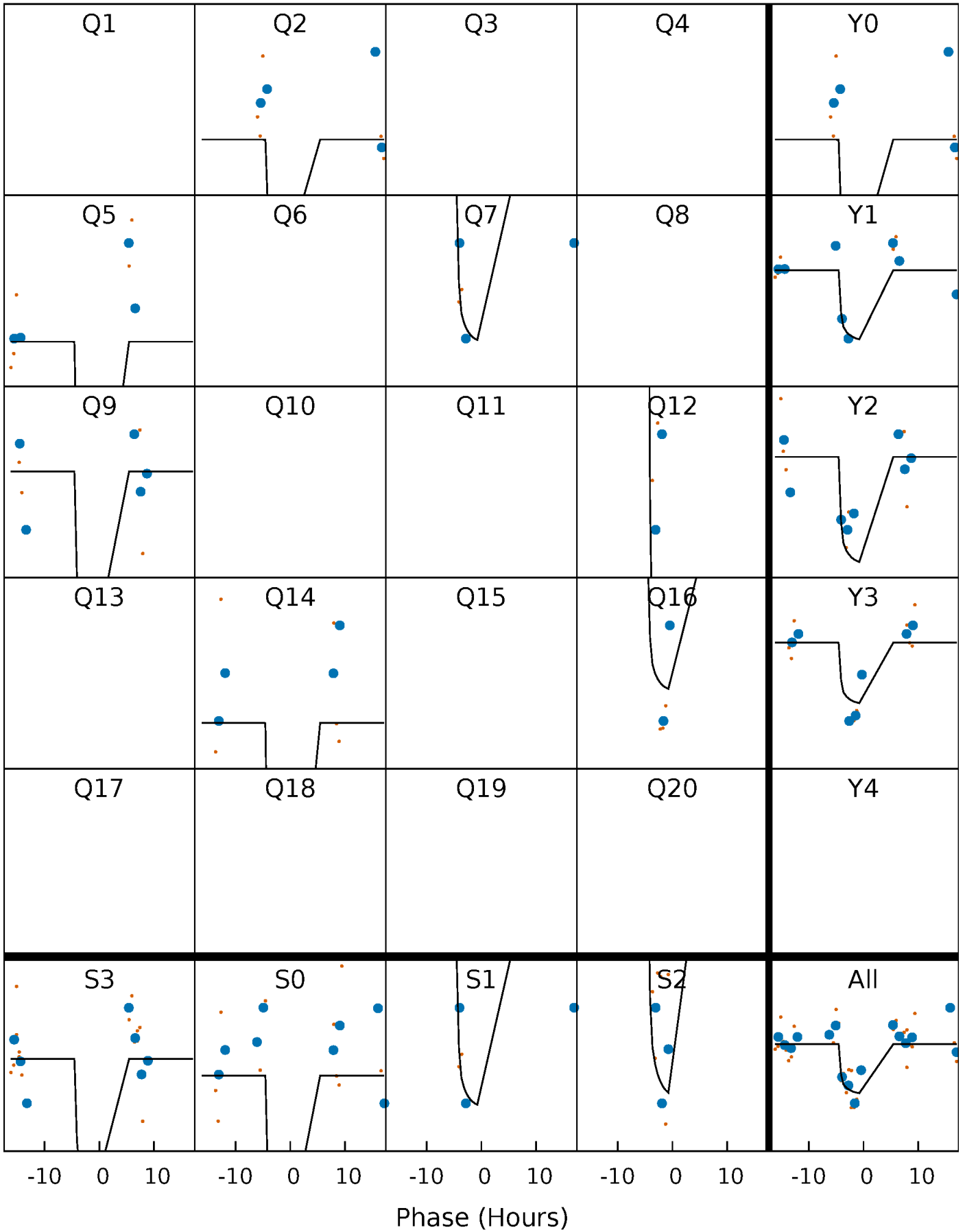
# PDC Quarter-Phased Transit Curves

TCE 012066447-02 P=213.889154 Days  $T_0=252.178360$  (BKJD)



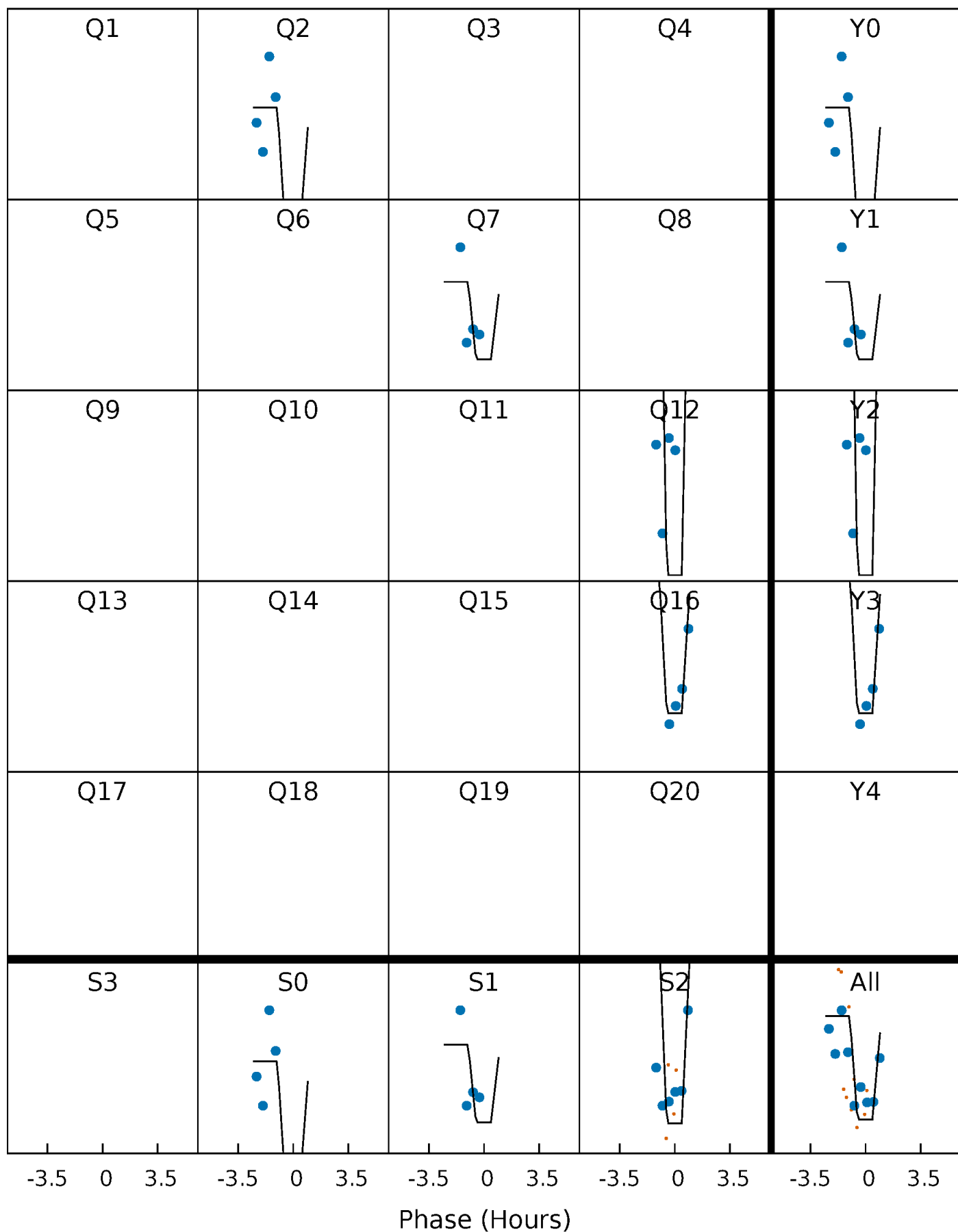
# DV Quarter-Phased Transit Curves

TCE 012066447-02     $P=213.889154$  Days     $T_0=252.178360$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 012066447-02 P=213.901553 Days  $T_0=252.034111$  (BKJD)

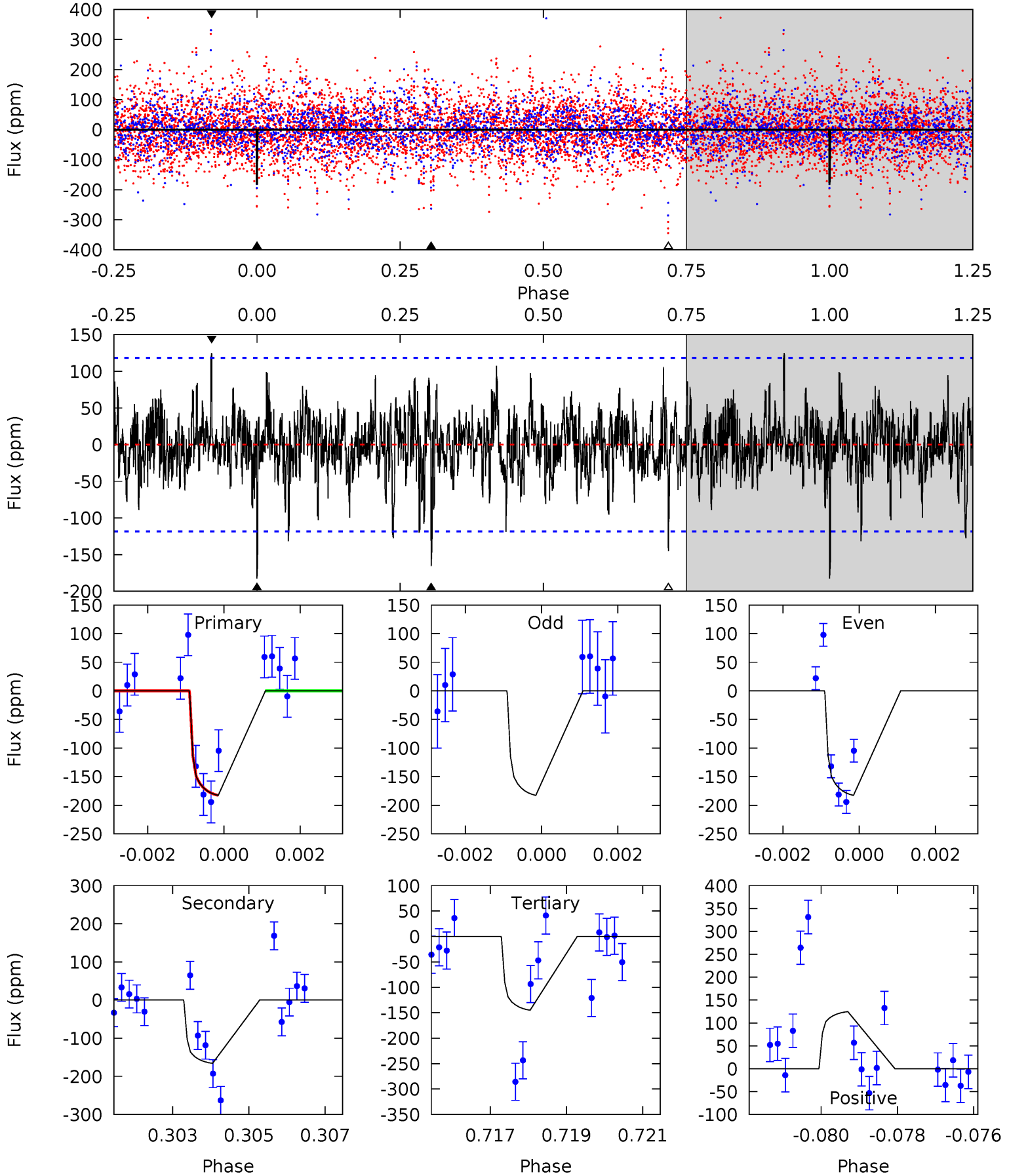




# DV Model-Shift Uniqueness Test

012066447-02,  $P = 213.889154$  Days,  $E = 38.289206$  Days

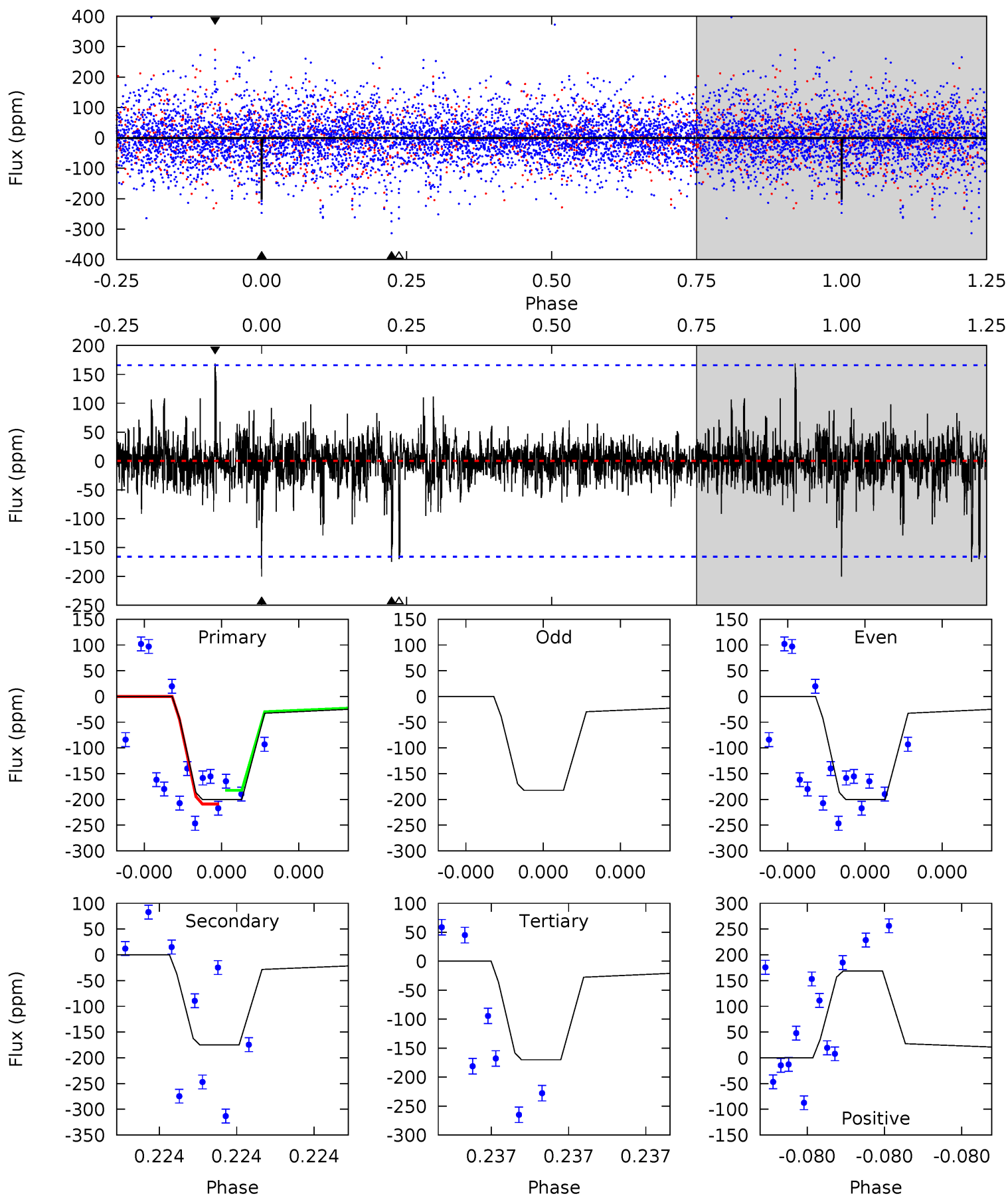
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.23	7.47	6.53	5.62	5.33	3.10	1.48	1.70	2.61	0.94	1.85	0.00	0	0.41	0



# Alt Model-Shift Uniqueness Test

012066447-02, P = 213.901553 Days, E = 38.132558 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
6.82	5.95	5.79	5.74	5.65	3.60	0.95	1.03	1.08	0.16	0.21	0.31	1.08	0.46	0.43



### Stellar Parameters For KIC 012066447

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7479^{+206}_{-335}$	$4.130^{+0.105}_{-0.195}$	$0.080^{+0.200}_{-0.350}$	$1.837^{+0.569}_{-0.350}$	$1.658^{+0.207}_{-0.253}$	$0.377^{+0.216}_{-0.184}$
	+3%/-4%	+3%/-5%	+250%/-438%	+31%/-19%	+12%/-15%	+57%/-49%
Source	PHO54	PHO54	PHO54	DSEP		

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

### Secondary Eclipse Parameters for KIC 012066447-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-166 \pm 22$	$3.54^{+2.90}_{-2.22}$	$697^{+51}_{-47}$	$6316^{+5648}_{-1490}$	$4768^{+27555}_{-3325}$
Alt.	$-175 \pm 29$	$3.83^{+2.81}_{-2.30}$	$691^{+48}_{-41}$	$6100^{+4470}_{-1296}$	$4261^{+22368}_{-2778}$

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

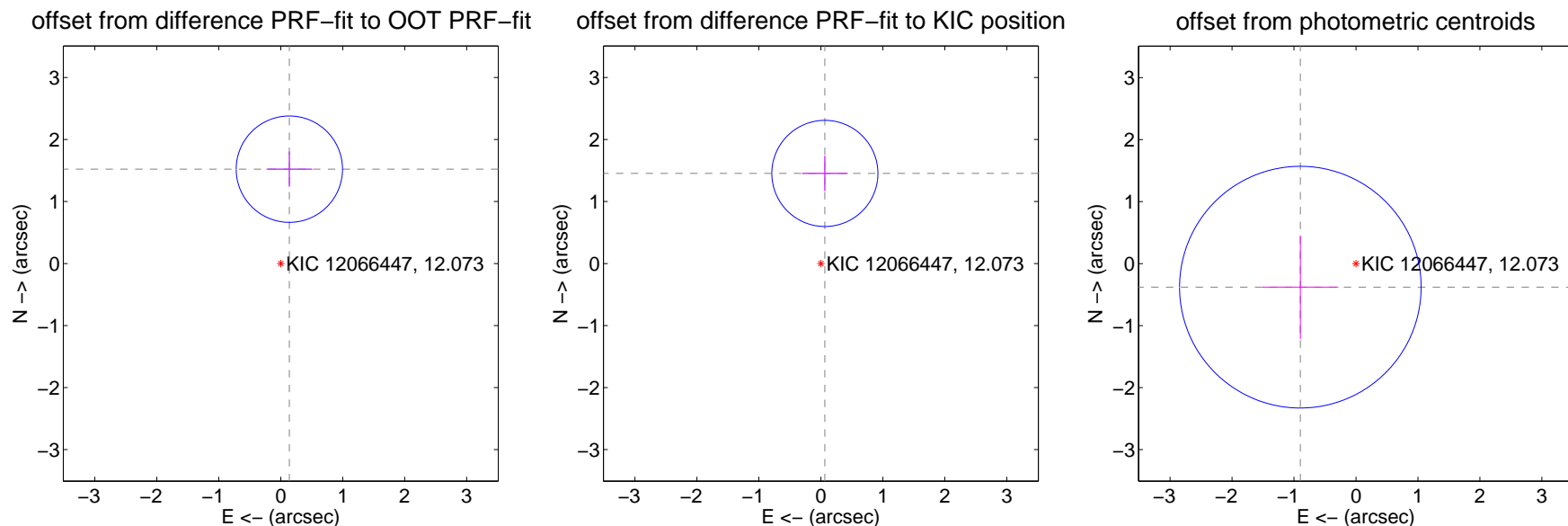
## DV Centroid Data

Supplemental centroid analysis for 012066447-02. Kepler magnitude: 12.07. Transit SNR 12.03

There are 1 quarters with good PRF difference image offsets

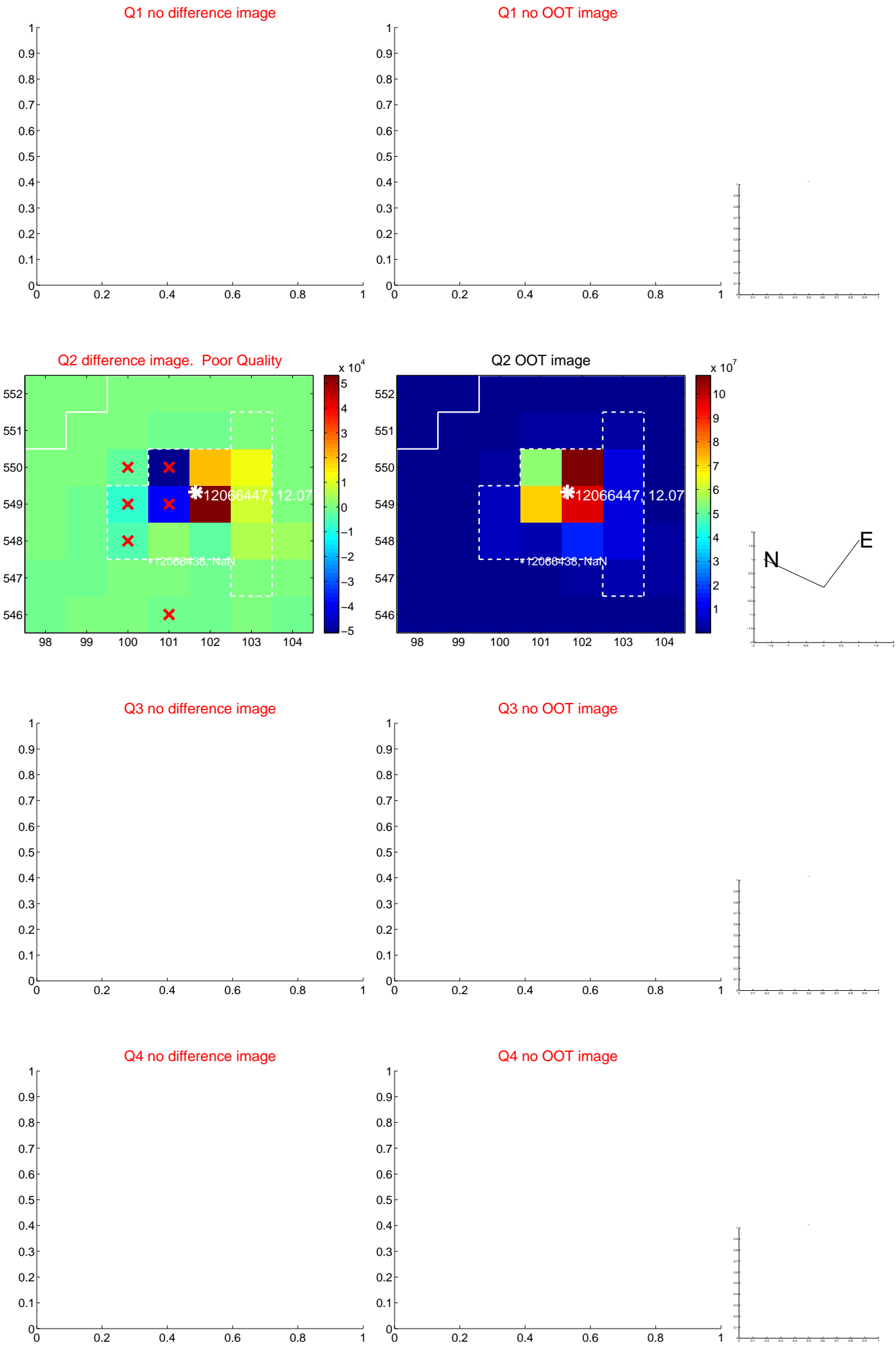
The direct PRF centroid is offset from the target star catalog position by about 0.10 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.528 \pm 0.286$	5.35	$-0.139 \pm 0.369$	$1.522 \pm 0.285$
PRF-fit source offset from KIC position	$1.454 \pm 0.285$	5.10	$-0.065 \pm 0.369$	$1.453 \pm 0.285$
photometric centroid source offset	$0.97 \pm 0.65$	1.50	$0.90 \pm 0.61$	$-0.38 \pm 0.83$



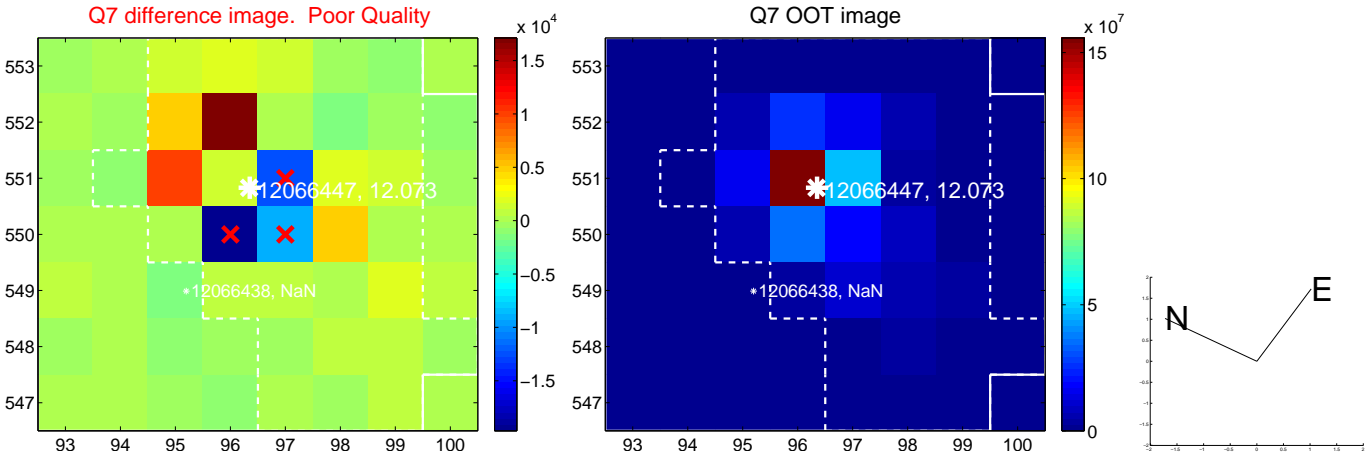
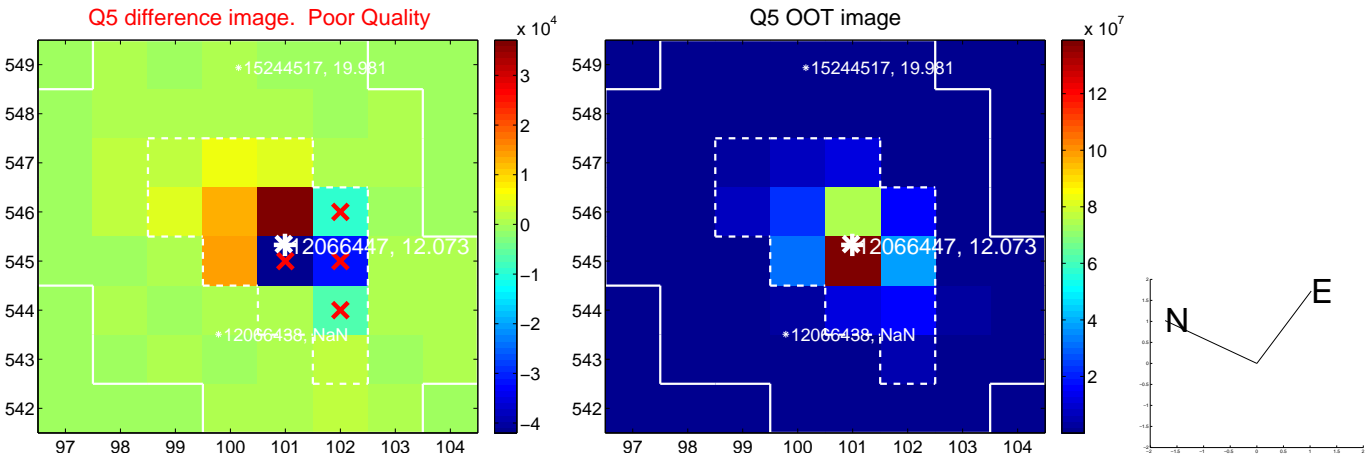
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

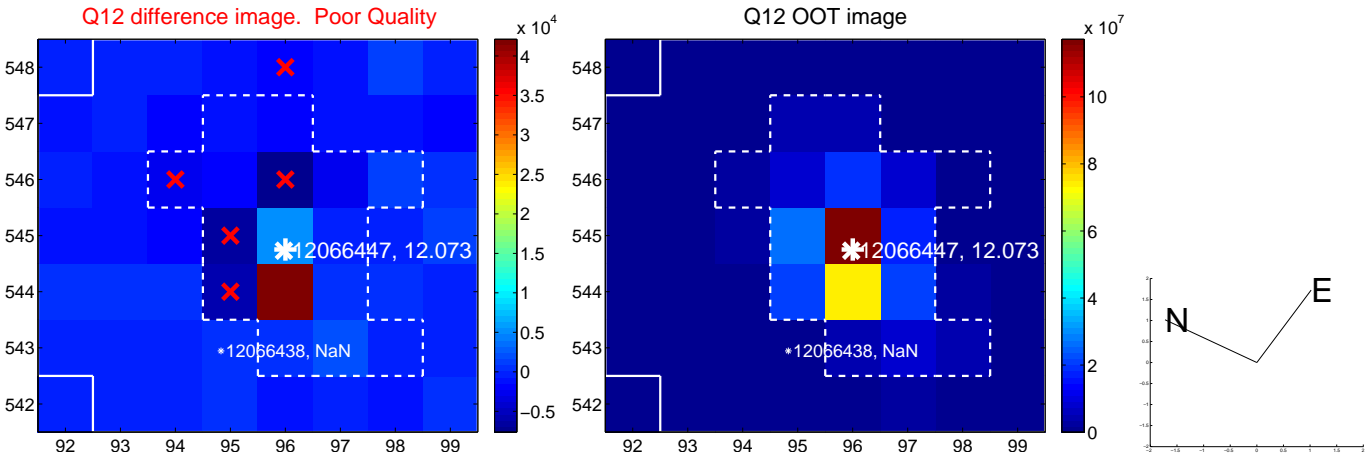
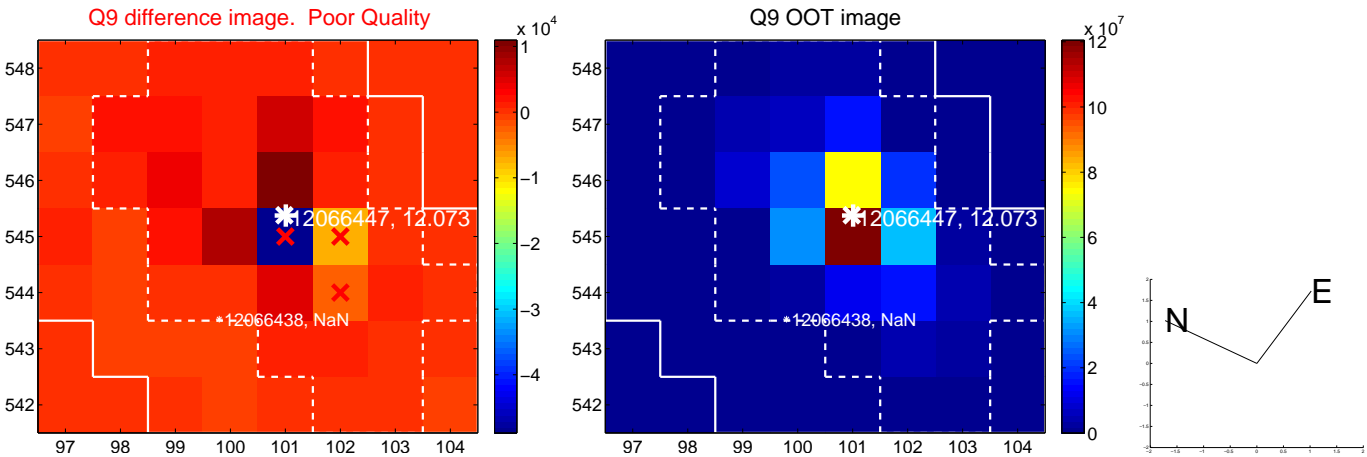




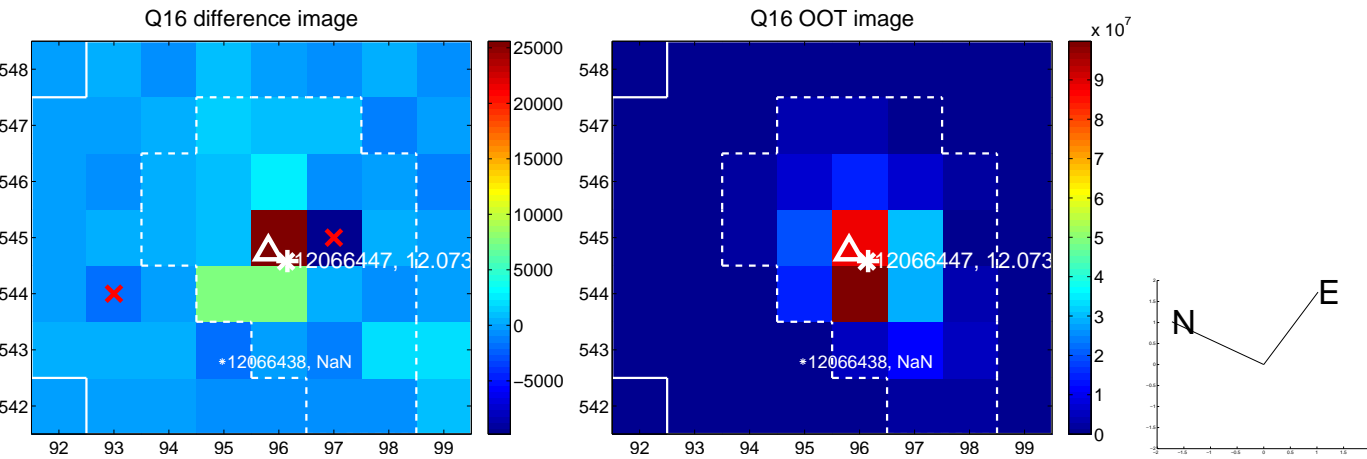
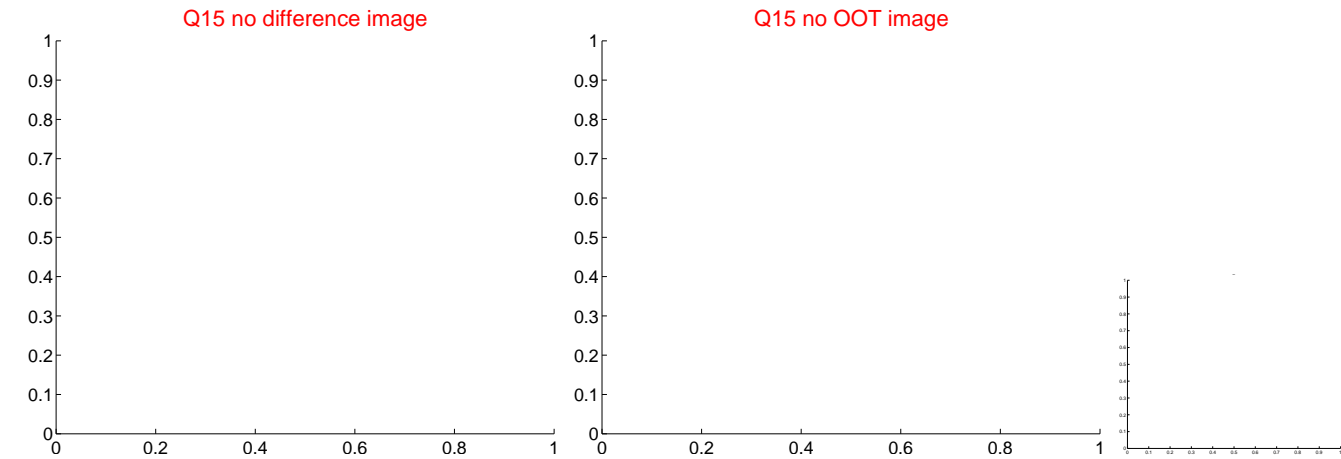
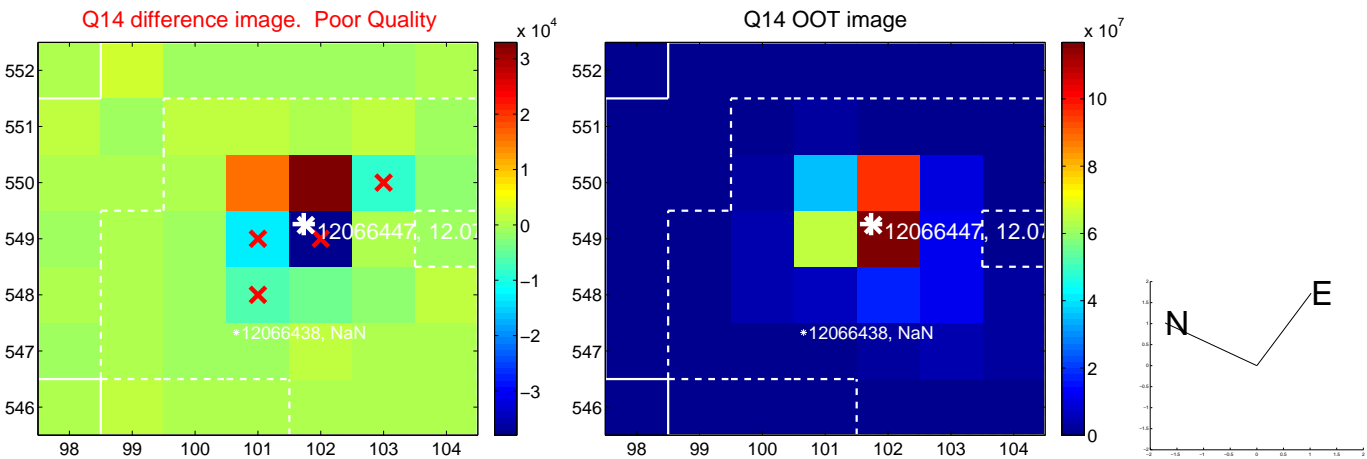
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



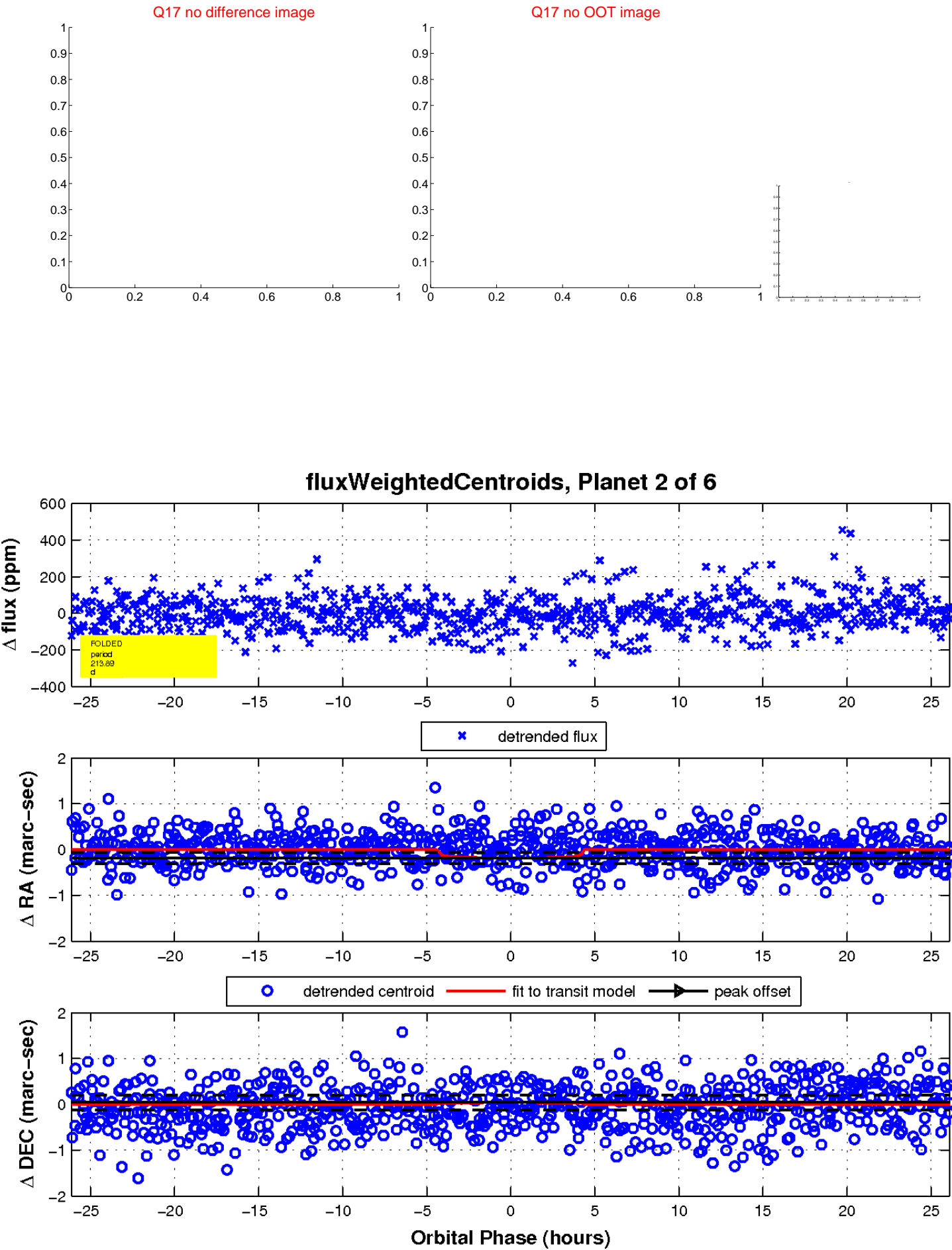
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

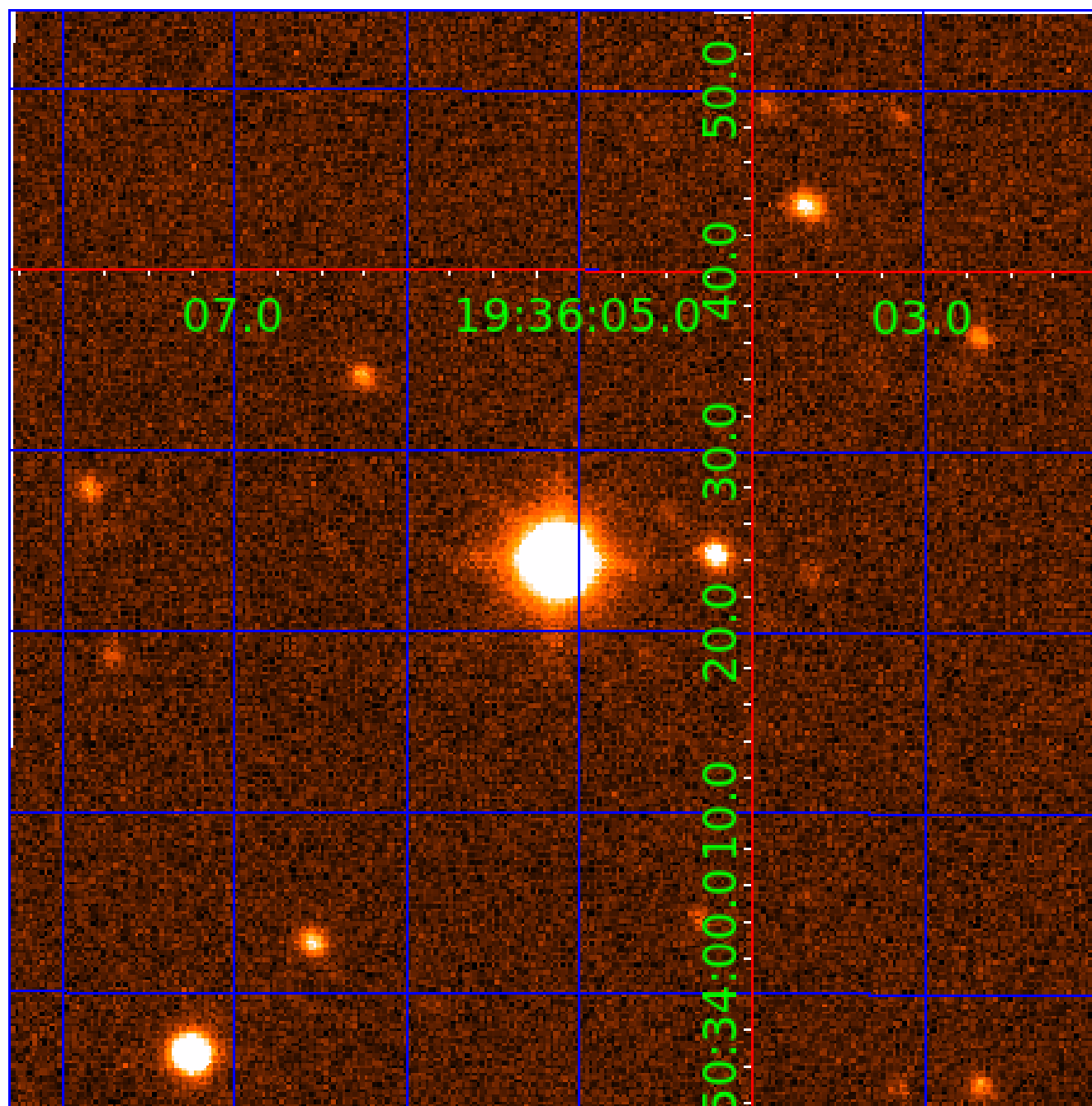


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 012066447

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
012066447-01	OBS	No	0.904494	132.122095	3.9	6.417	10.1	5.5	1.84	7479	0.37	20127.99
012066447-02	OBS	No	213.889154	252.178361	198.2	8.721	12.1	12.0	1.84	7479	2.69	13.76
012066447-03	OBS	No	22.670309	143.588777	134.8	1.984	11.6	10.4	1.84	7479	2.36	274.41
012066447-04	OBS	No	76.691016	175.708725	264.6	4.367	14.1	14.1	1.84	7479	3.28	54.04
012066447-05	OBS	No	48.056665	169.097957	165.8	2.084	11.4	10.1	1.84	7479	2.66	100.77
012066447-06	OBS	No	10.840935	137.846391	88.7	3.025	11.9	10.7	1.84	7479	2.00	733.81

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
012066447-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—CENT_FEW_MEAS
012066447-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
012066447-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_MEAS
012066447-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
012066447-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
012066447-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT

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

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

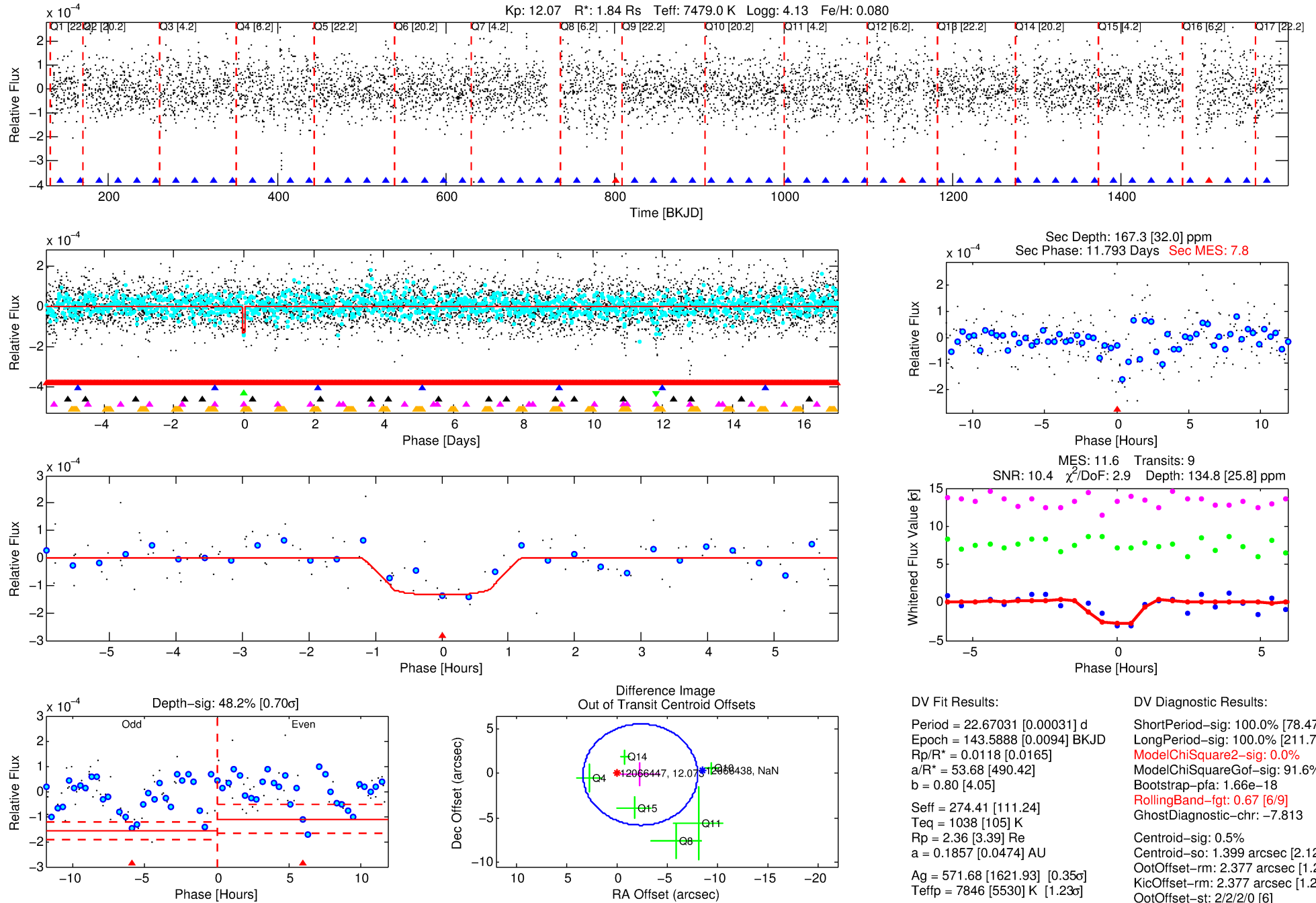
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 012066447-03

No Significant Match Found

# DV One-Page Summary

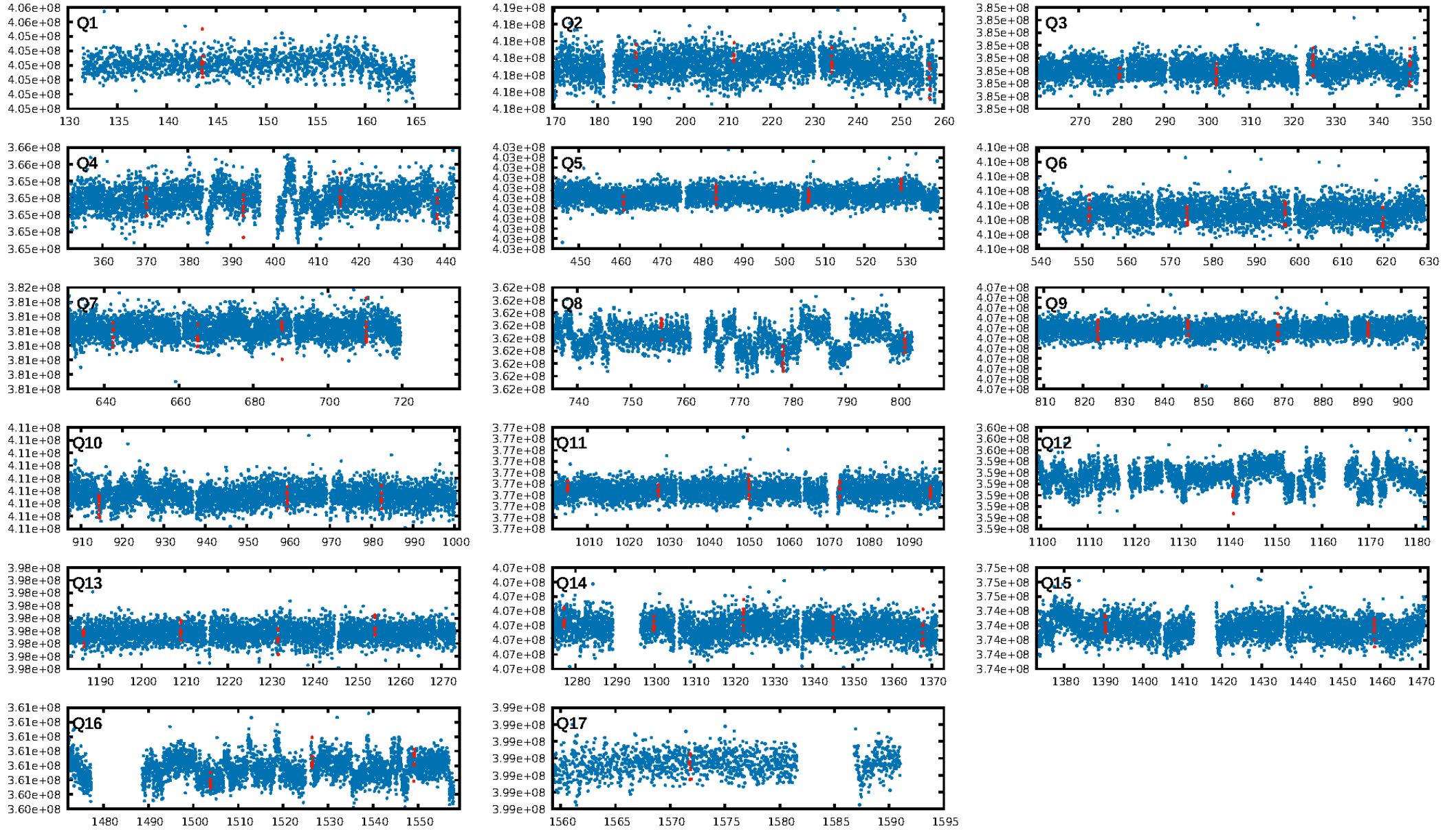
KIC: 12066447 Candidate: 3 of 6 Period: 22.670 d



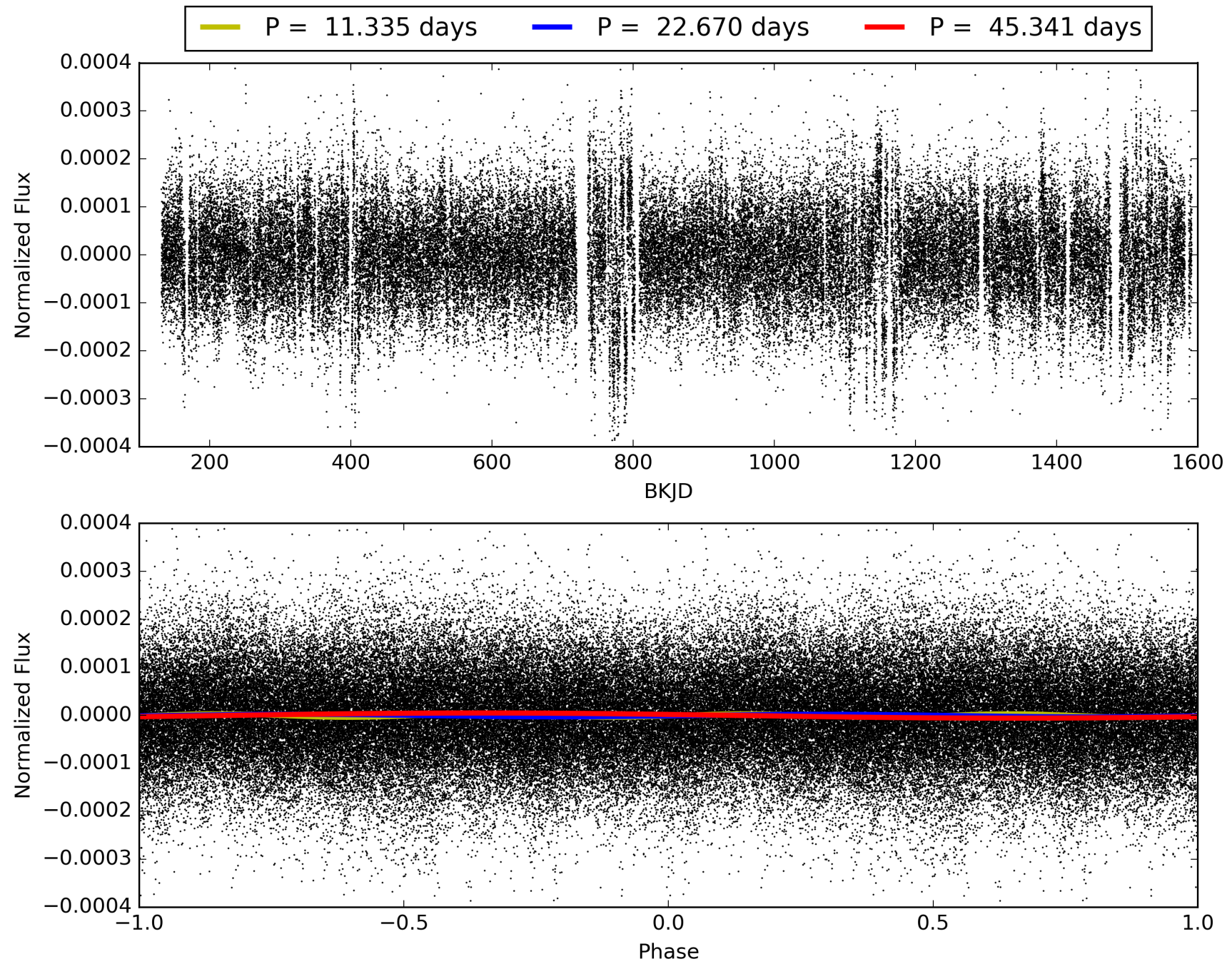
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 17:32:56 Z

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

# TCE 012066447-03, PDC Light Curves

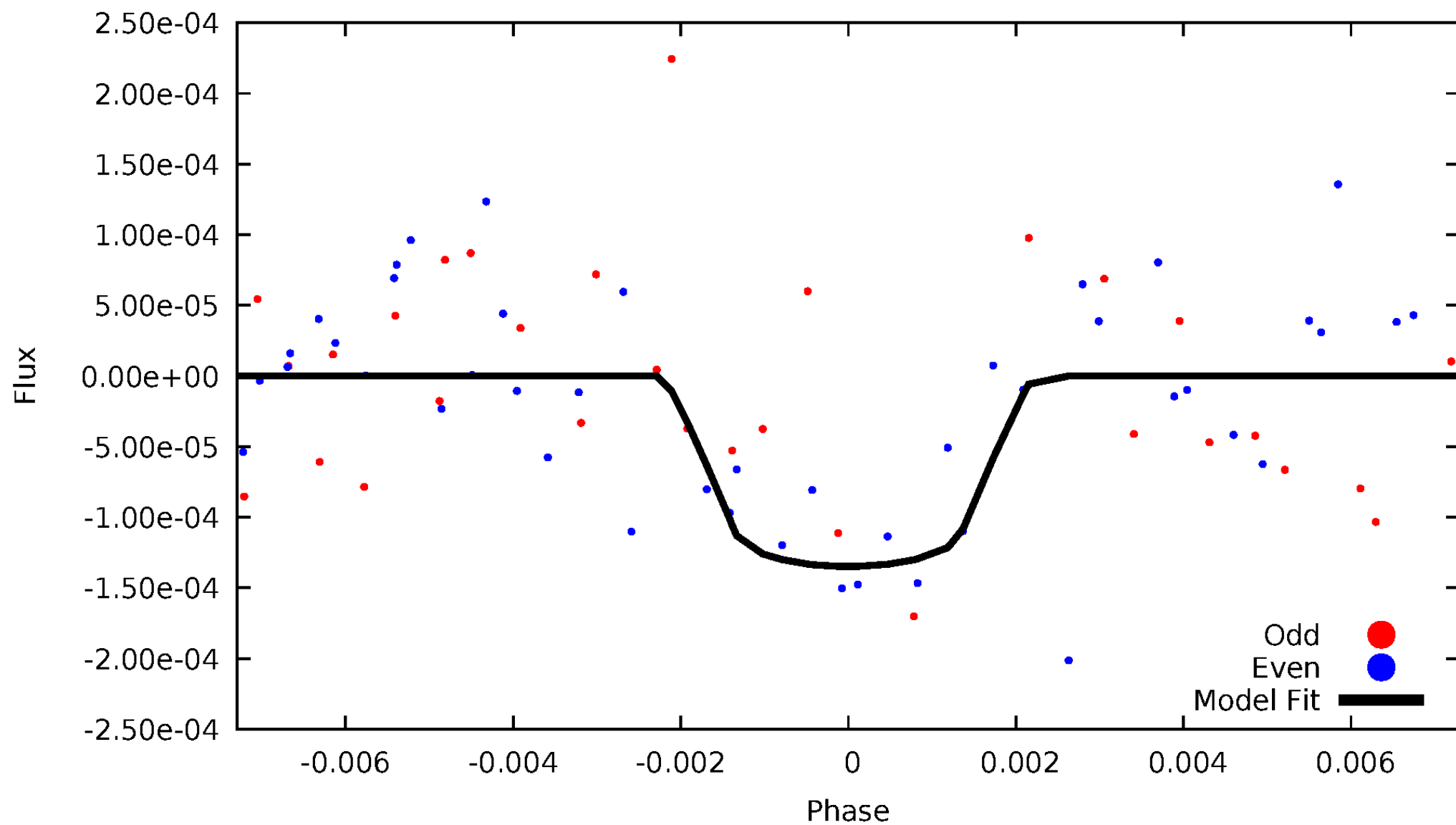


TCE 012066447-03



# DV Odd/Even

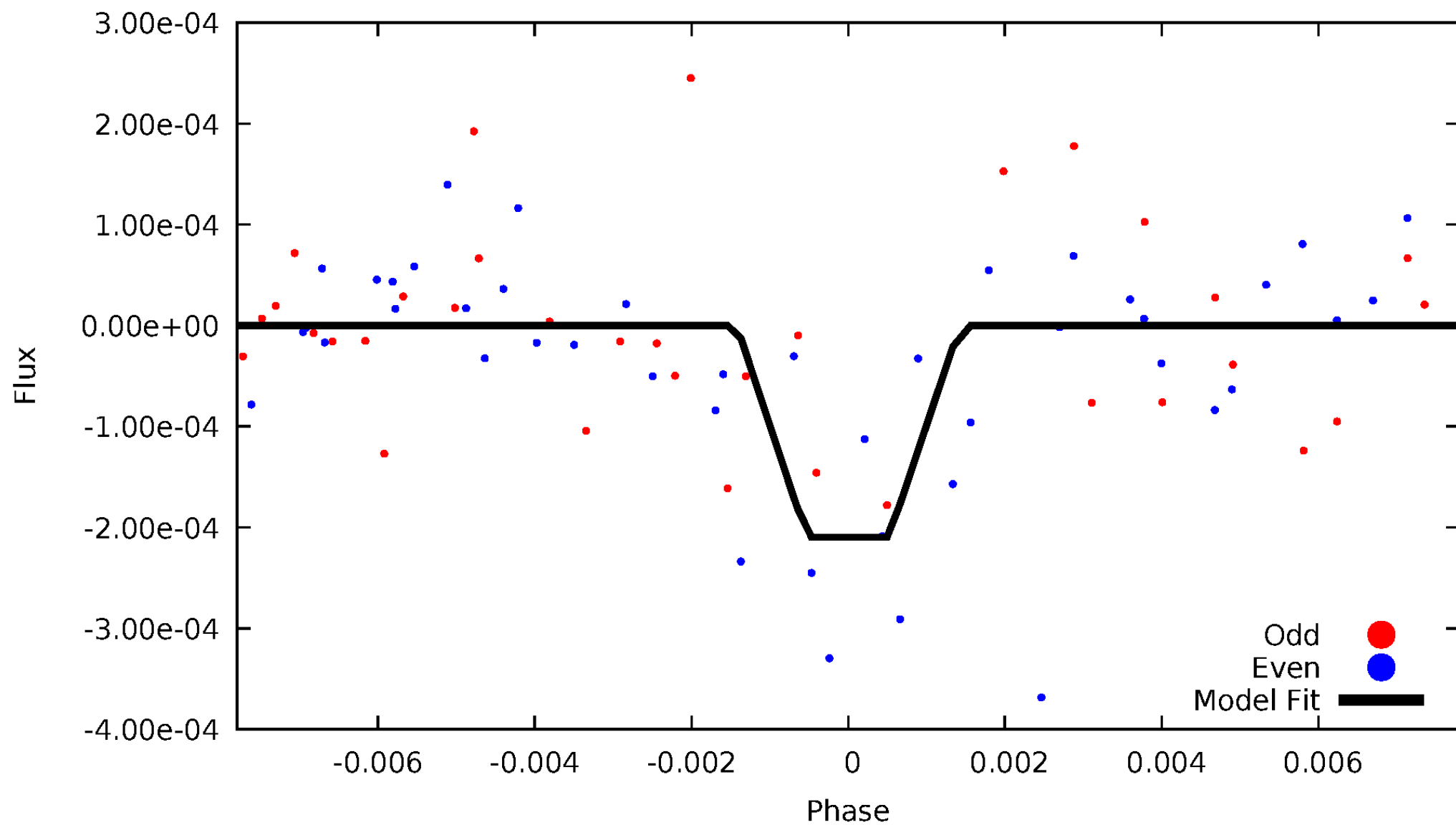
TCE 012066447-03





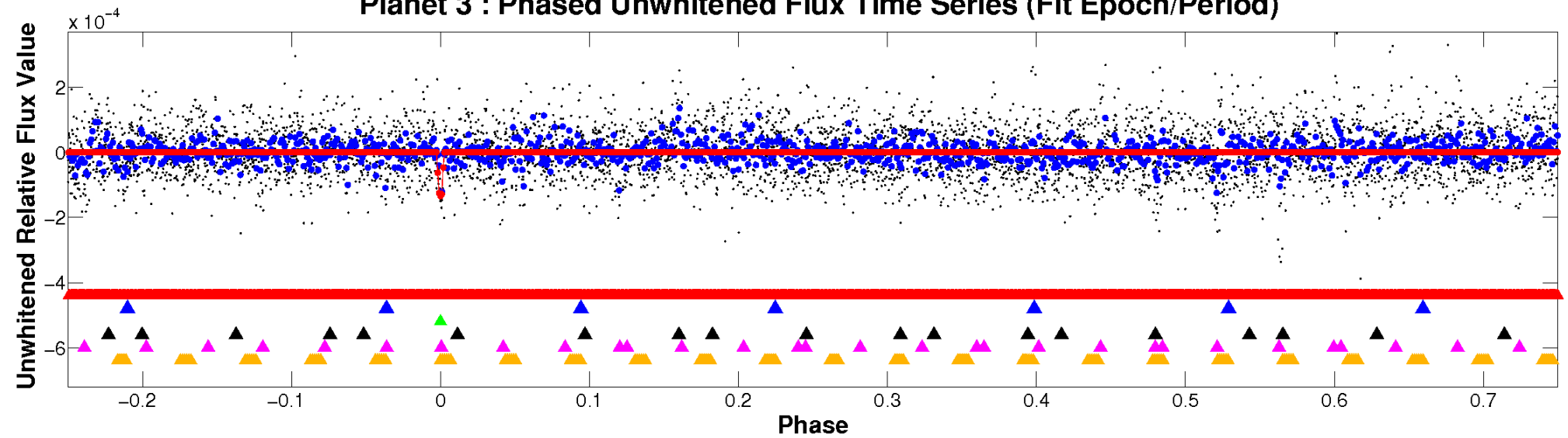
# ALT Odd/Even

TCE 012066447-03

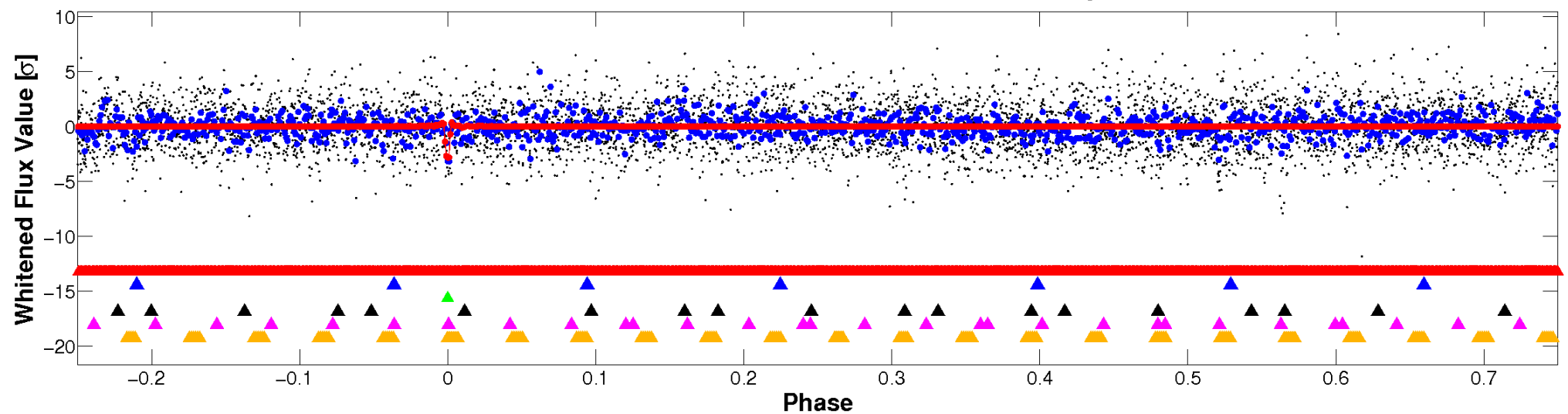


# Non-Whitened Vs. Whitened Light Curve

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

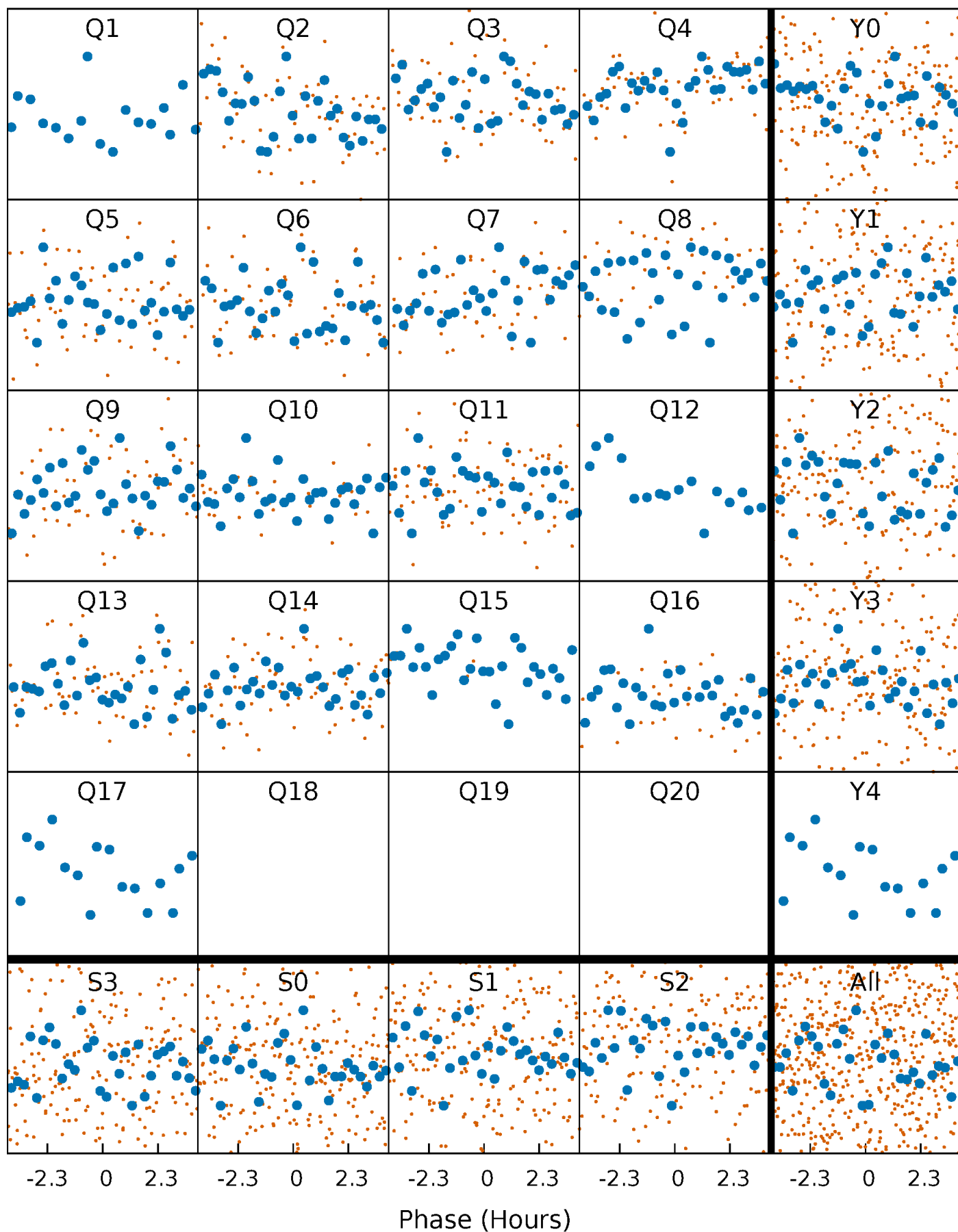


## Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



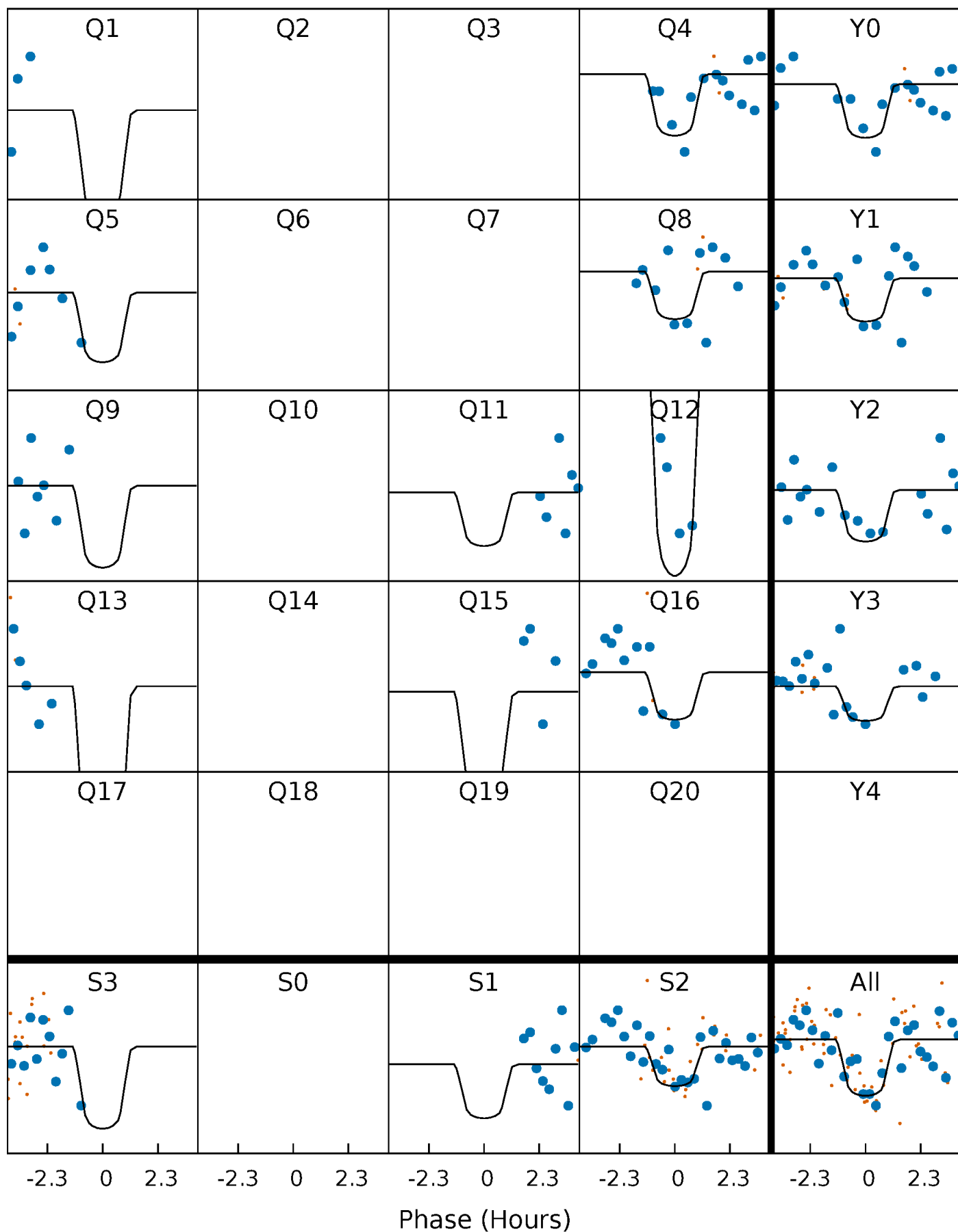
# PDC Quarter-Phased Transit Curves

TCE 012066447-03 P= 22.670309 Days  $T_0=143.588777$  (BKJD)



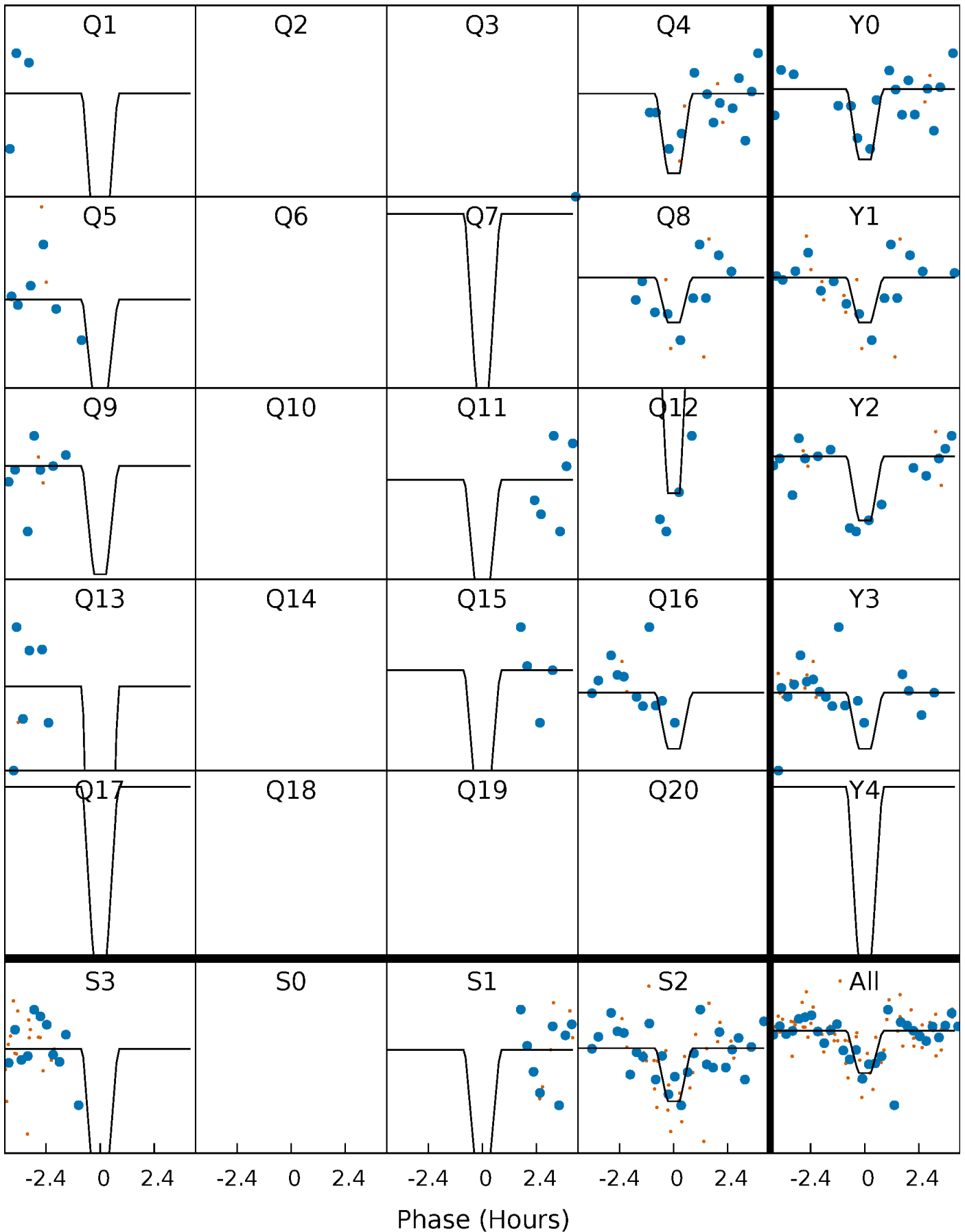
# DV Quarter-Phased Transit Curves

TCE 012066447-03   P= 22.670309 Days    $T_0=143.588777$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

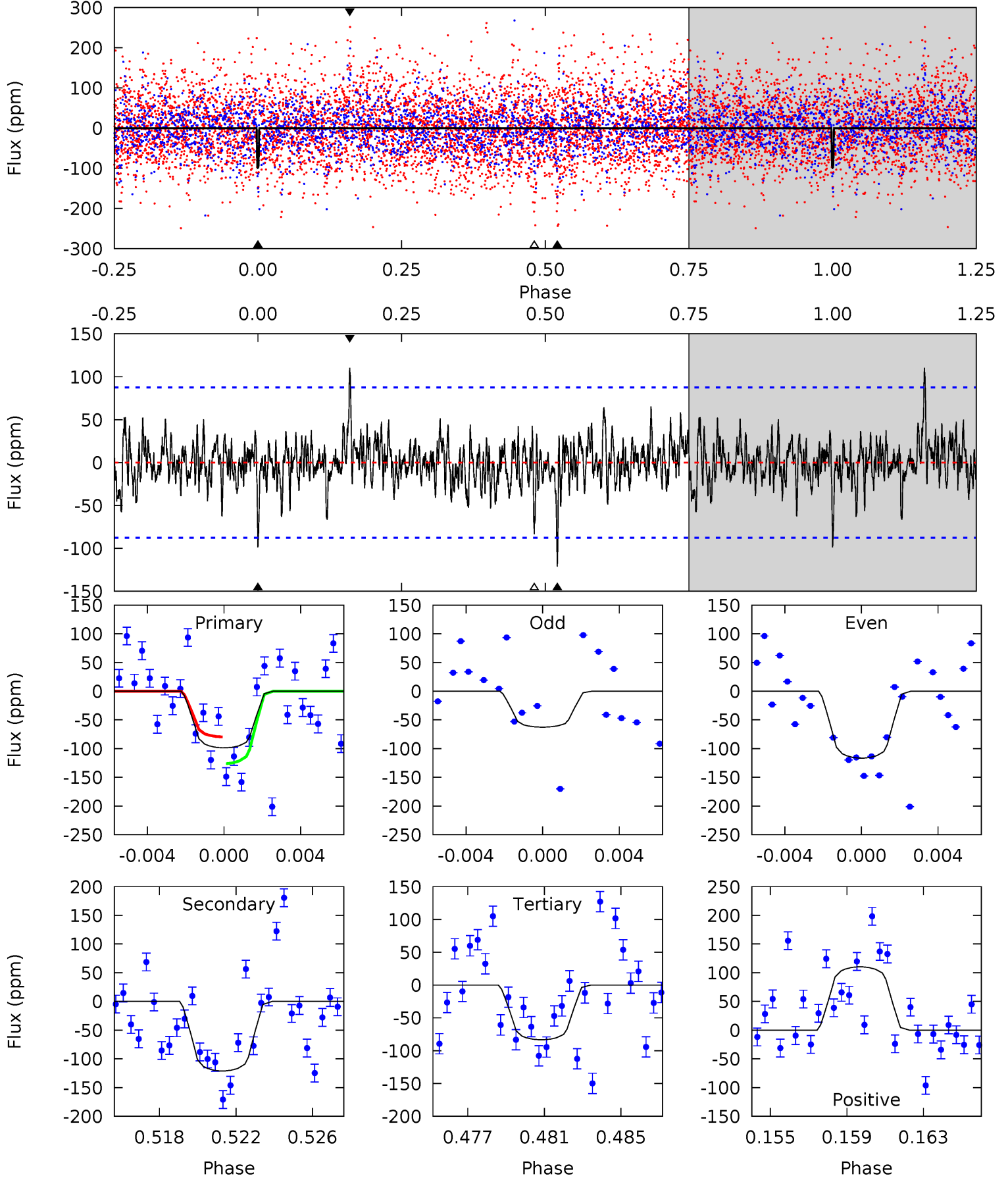
TCE 012066447-03     $P = 22.670126$  Days     $T_0 = 143.597668$  (BKJD)



# DV Model-Shift Uniqueness Test

012066447-03, P = 22.670309 Days, E = 120.918468 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
5.86	7.19	4.95	6.55	5.20	2.87	1.26	0.91	-0.69	2.24	0.64	1.43	0.84	0.48	1.37

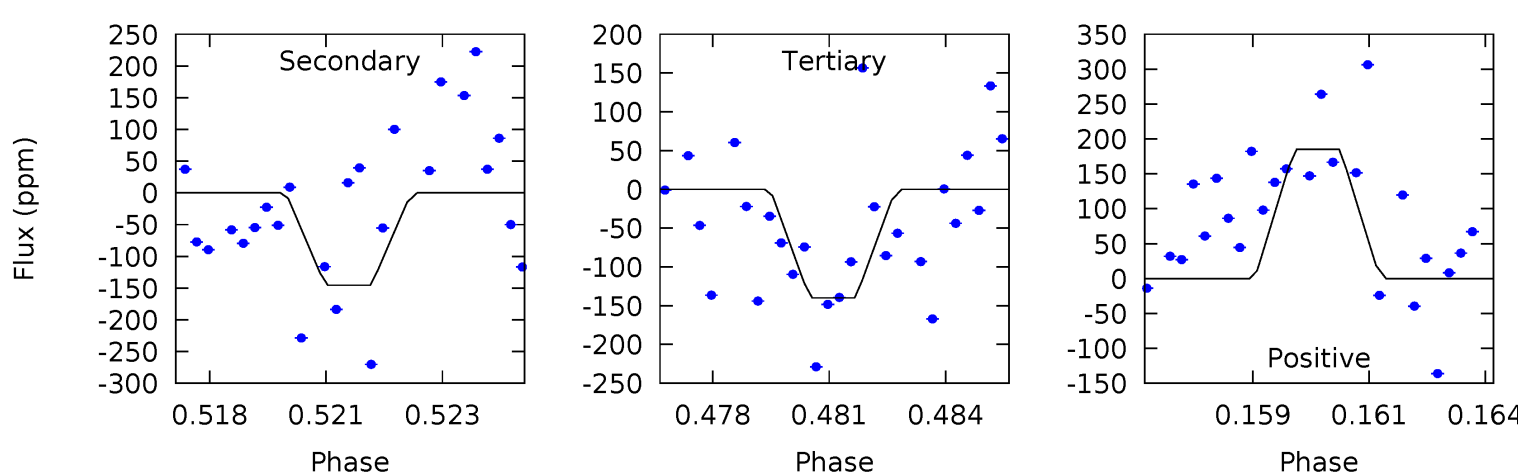
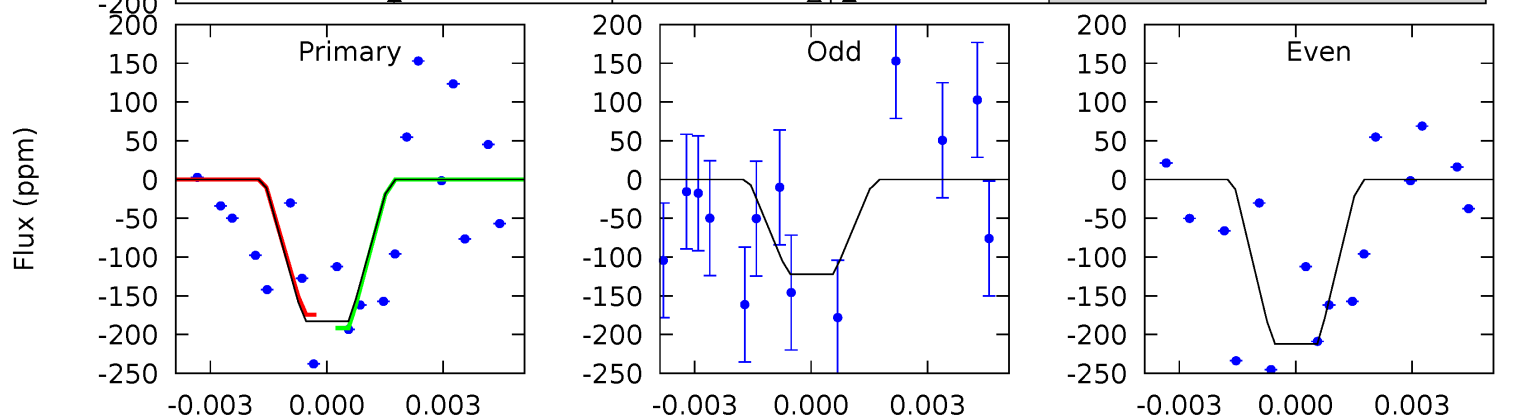
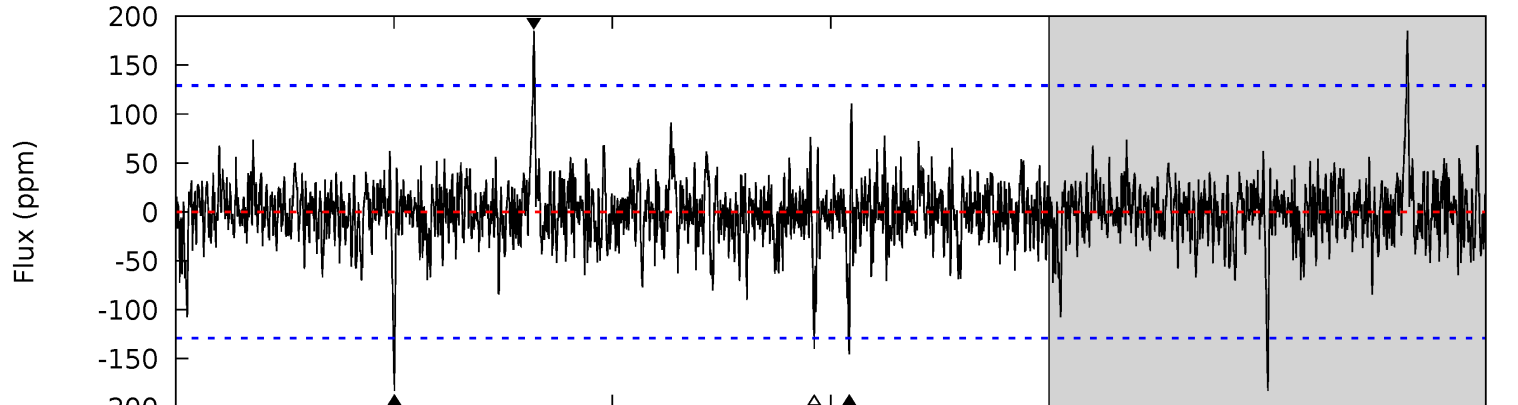
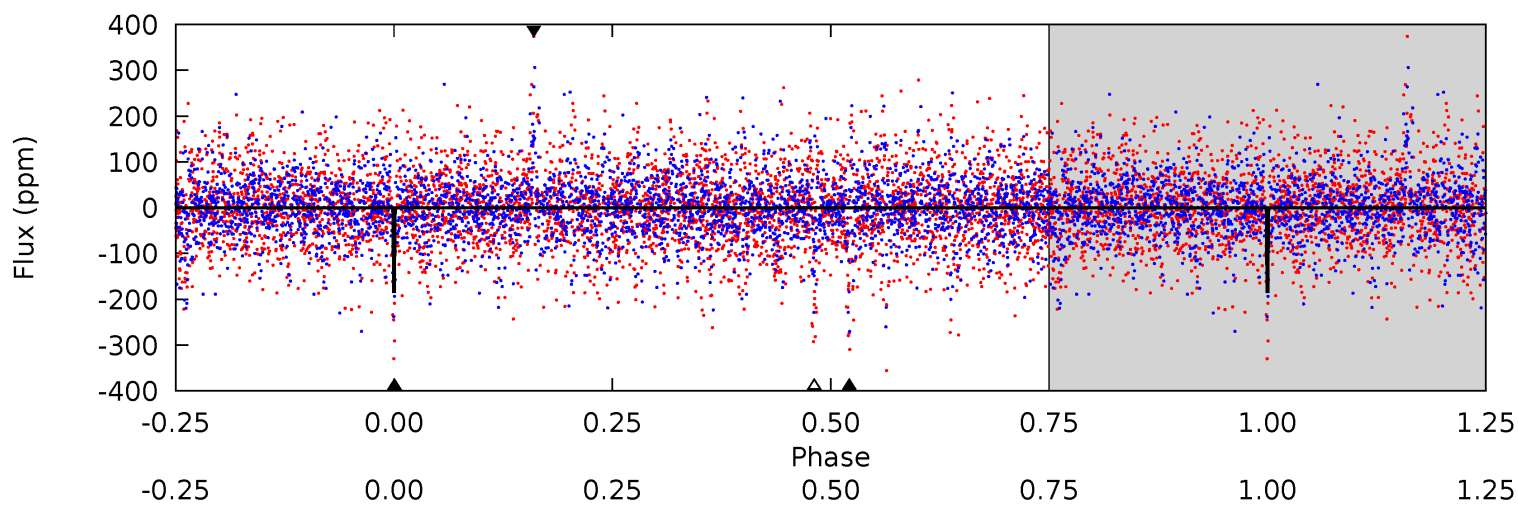




# Alt Model-Shift Uniqueness Test

012066447-03, P = 22.670126 Days, E = 120.927542 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
7.47	5.95	5.73	7.57	5.28	3.01	1.11	1.74	-0.10	0.22	-1.62	1.68	1.02	0.50	0.36



### Stellar Parameters For KIC 012066447

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7479^{+206}_{-335}$	$4.130^{+0.105}_{-0.195}$	$0.080^{+0.200}_{-0.350}$	$1.837^{+0.569}_{-0.350}$	$1.658^{+0.207}_{-0.253}$	$0.377^{+0.216}_{-0.184}$
	+3%/-4%	+3%/-5%	+250%/-438%	+31%/-19%	+12%/-15%	+57%/-49%
Source	PHO54	PHO54	PHO54	DSEP		

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

### Secondary Eclipse Parameters for KIC 012066447-03 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-121 \pm 17$	$3.43^{+2.99}_{-2.33}$	$1457^{+124}_{-88}$	$5976^{+6944}_{-1466}$	$191^{+1654}_{-137}$
Alt.	$-146 \pm 24$	$3.65^{+3.08}_{-2.42}$	$1465^{+120}_{-87}$	$6078^{+6001}_{-1426}$	$198^{+1665}_{-139}$

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

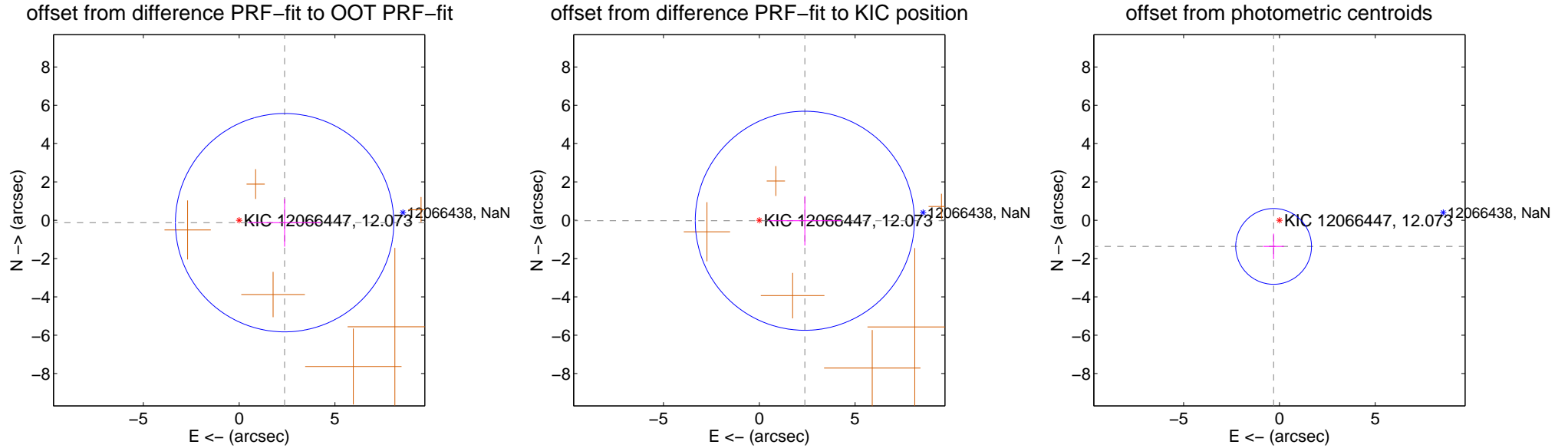
## DV Centroid Data

Supplemental centroid analysis for 012066447-03. Kepler magnitude: 12.07. Transit SNR 10.40

There are 0 quarters with good PRF difference image offsets

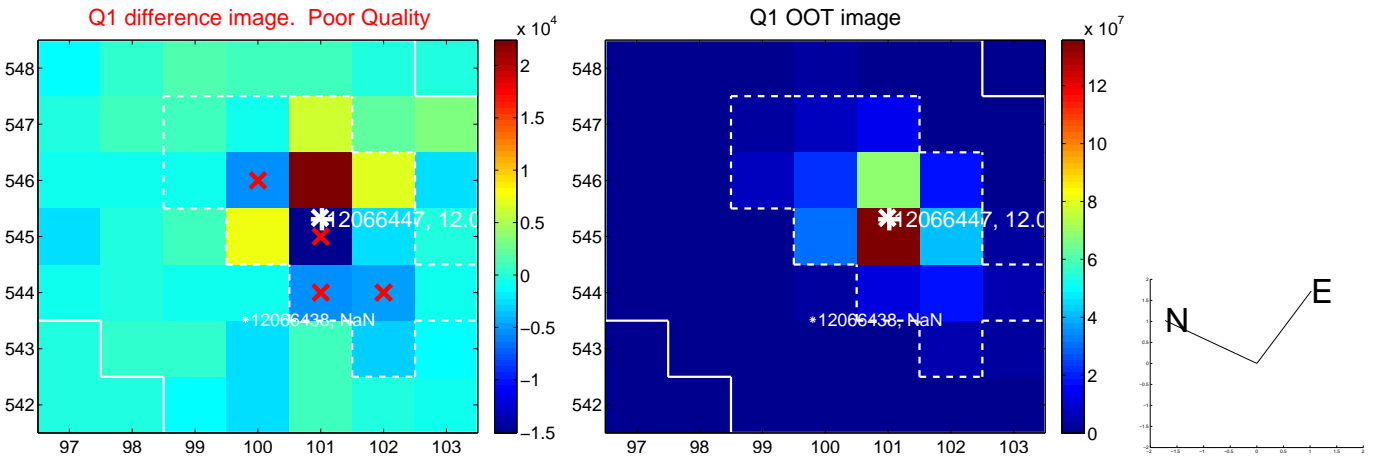
The direct PRF centroid is offset from the target star catalog position by about 0.07 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.377 \pm 1.900$	1.25	$-2.373 \pm 1.901$	$-0.128 \pm 1.251$
PRF-fit source offset from KIC position	$2.377 \pm 1.906$	1.25	$-2.376 \pm 1.906$	$-0.027 \pm 1.291$
photometric centroid source offset	$1.40 \pm 0.66$	2.12	$0.30 \pm 0.54$	$-1.37 \pm 0.66$

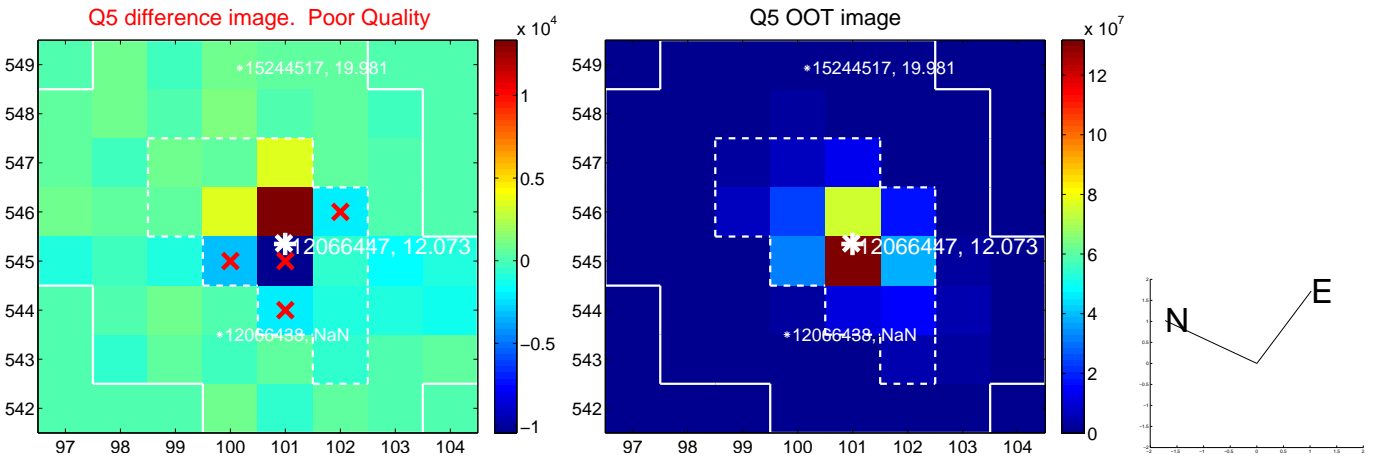


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

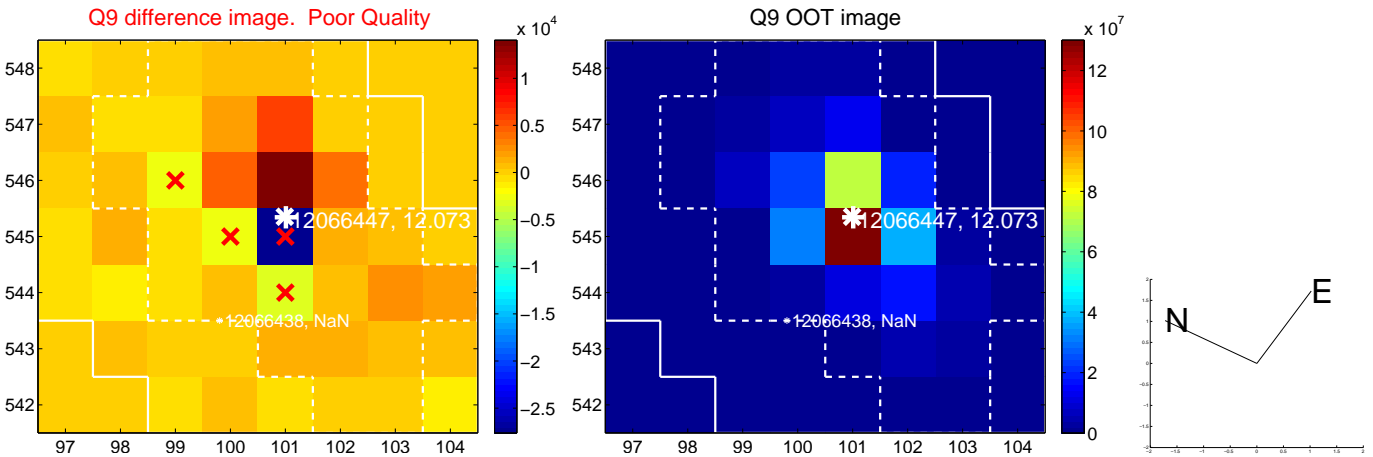
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

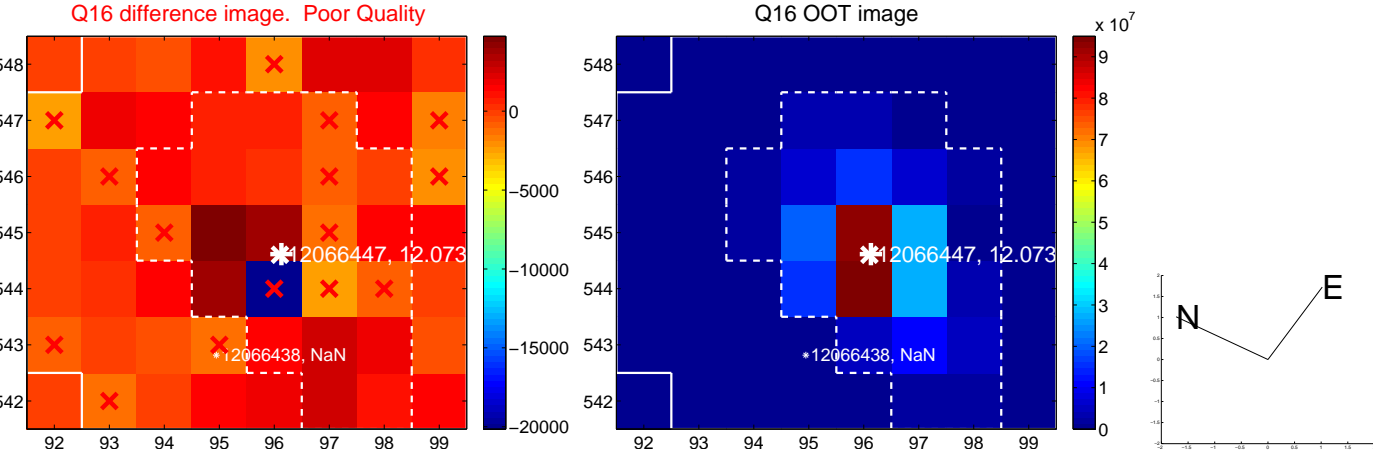
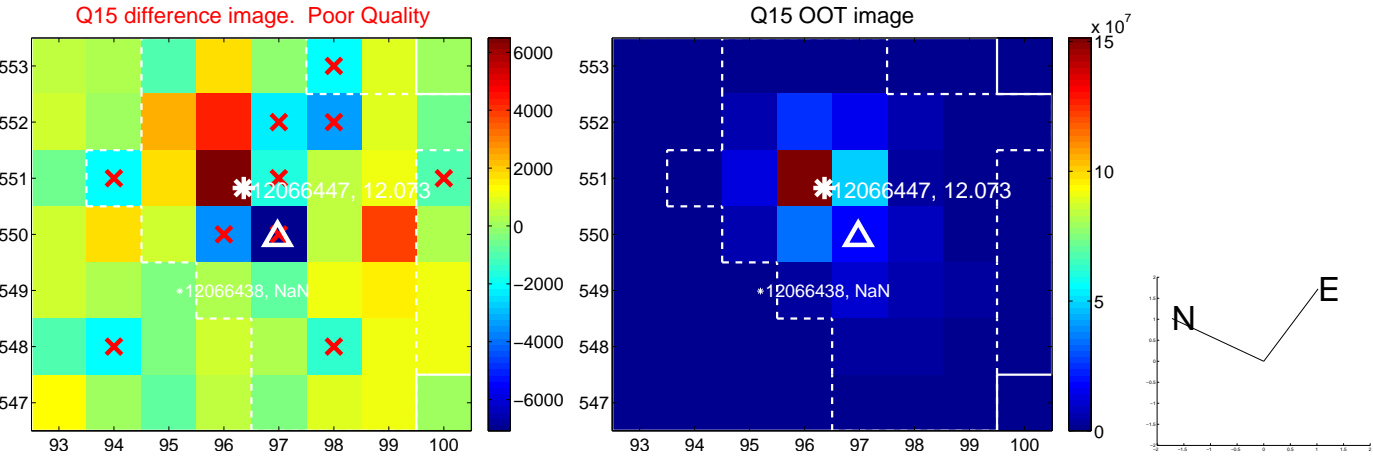
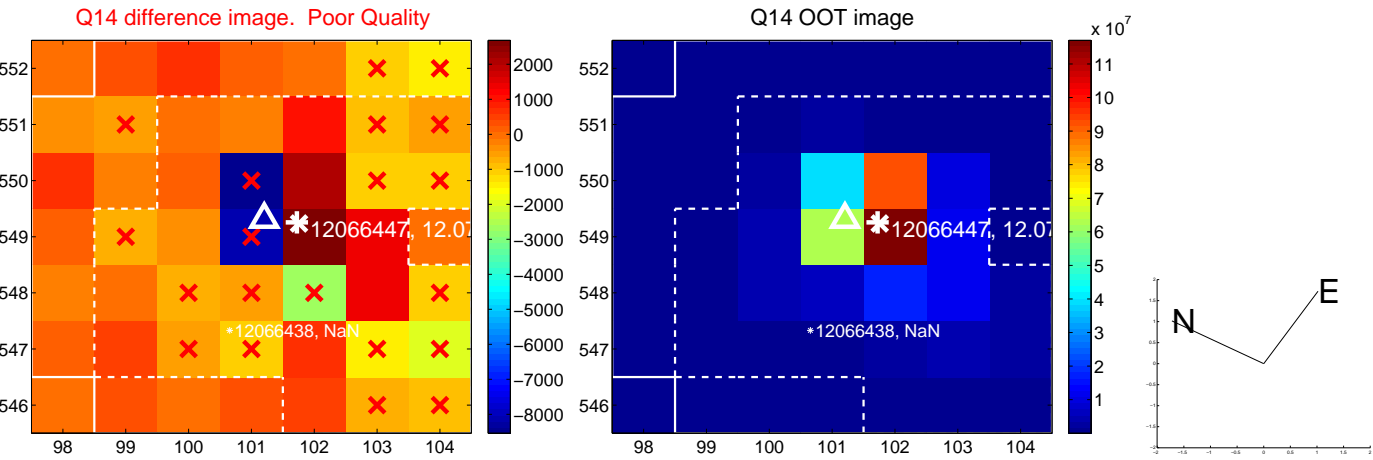
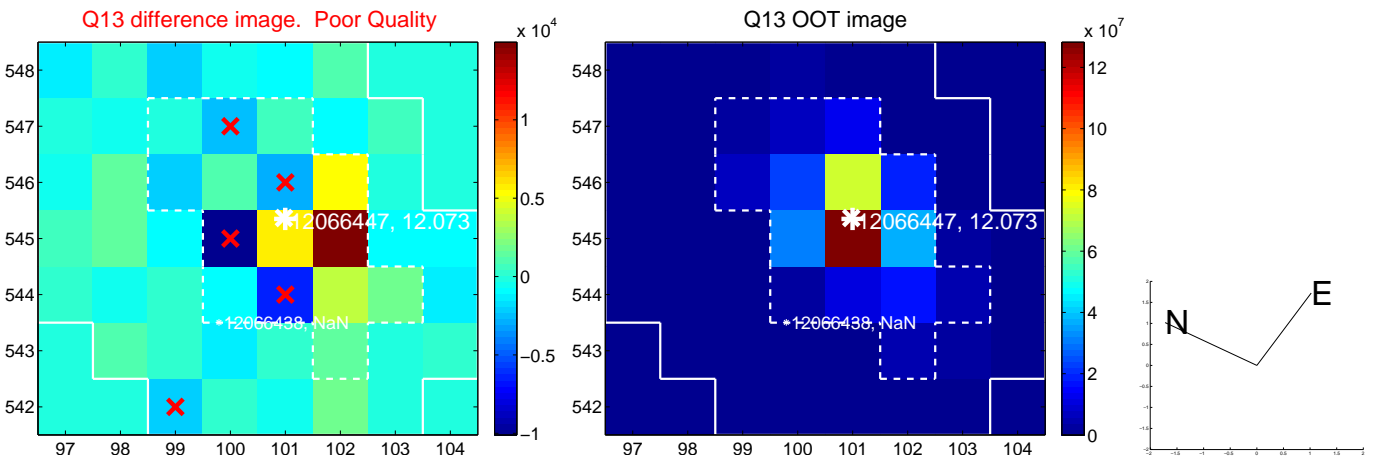


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

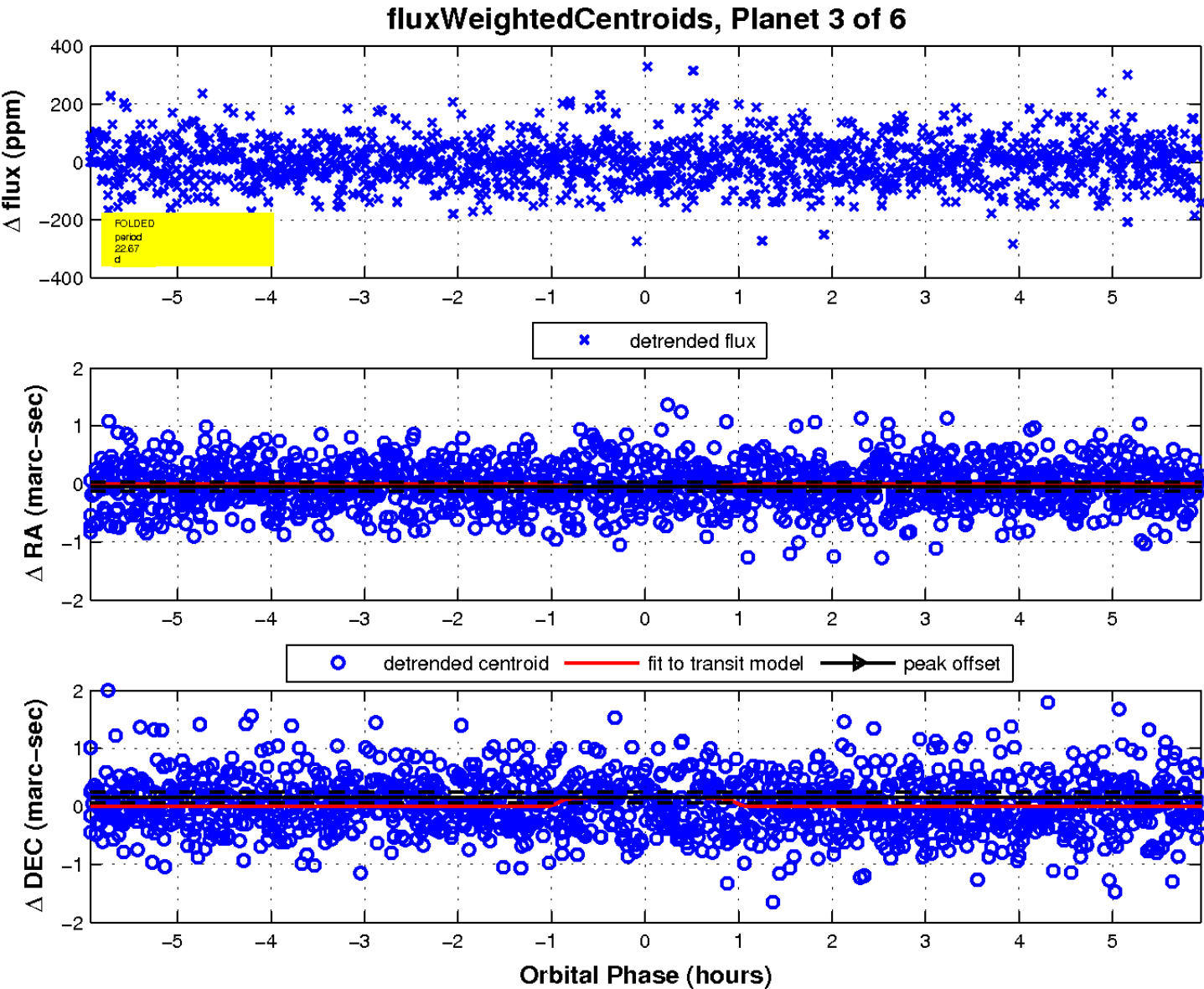
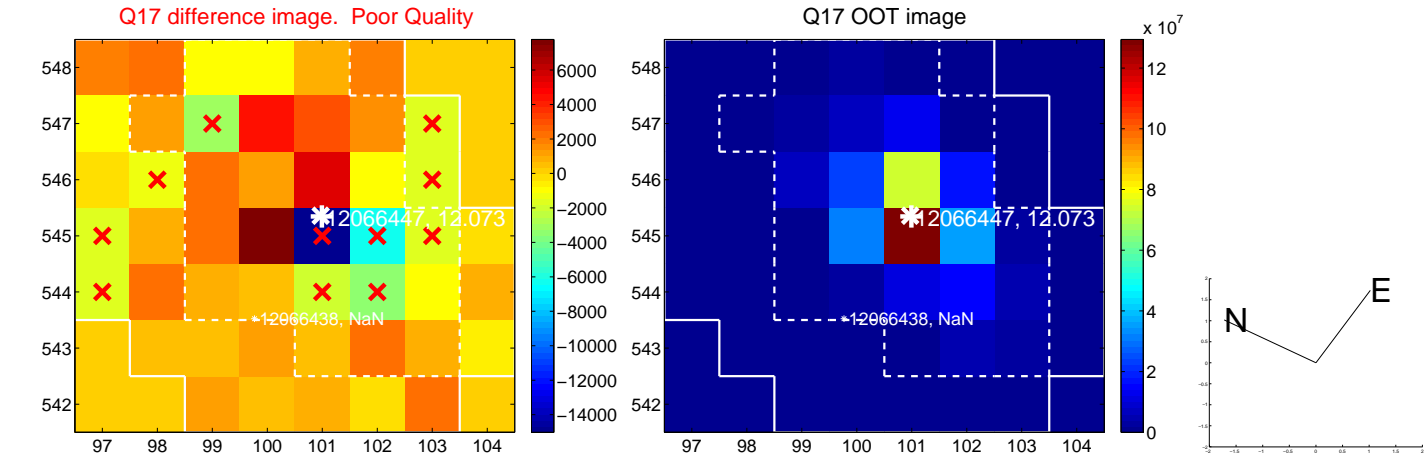




white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

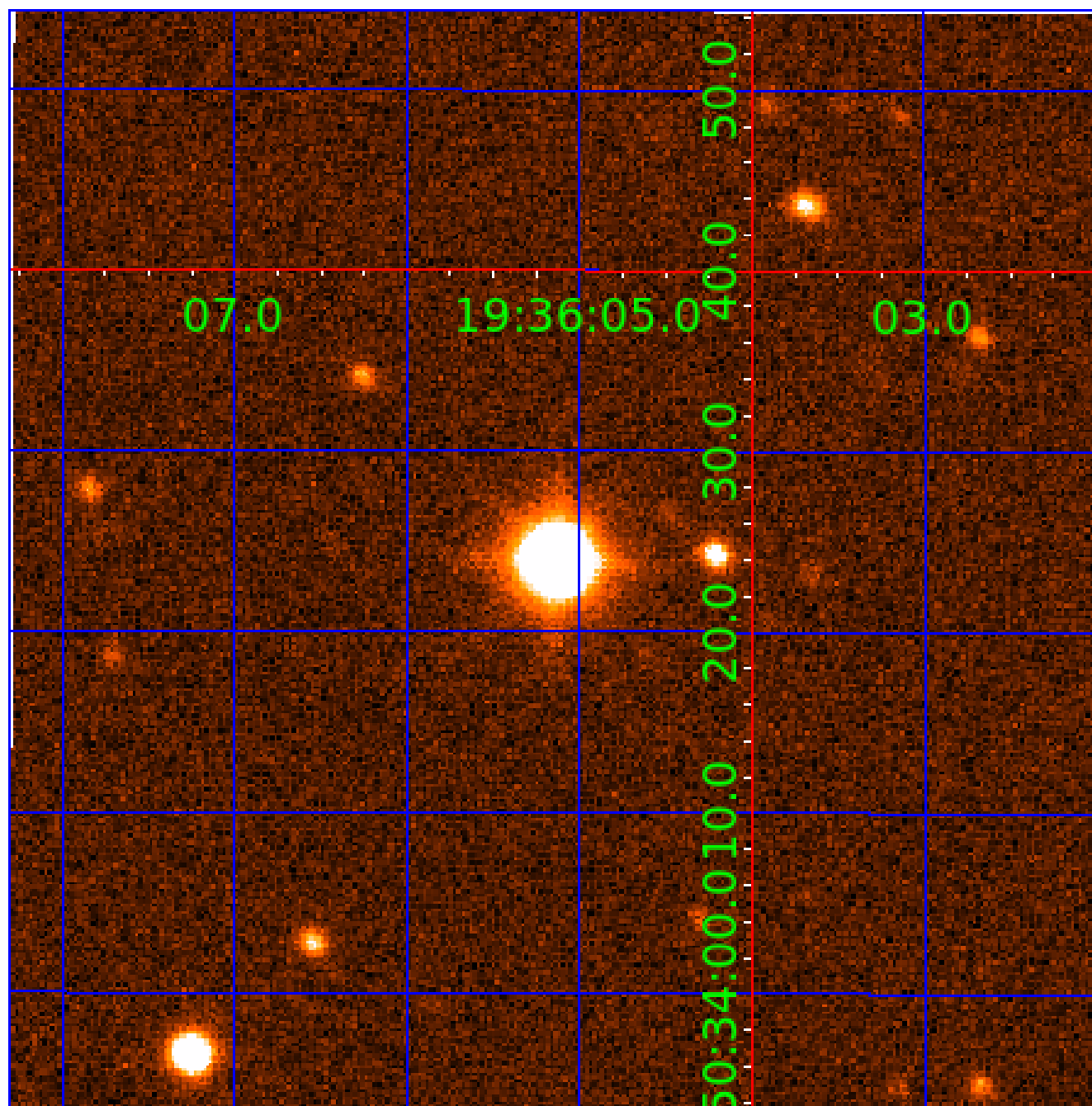


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 012066447

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
012066447-01	OBS	No	0.904494	132.122095	3.9	6.417	10.1	5.5	1.84	7479	0.37	20127.99
012066447-02	OBS	No	213.889154	252.178361	198.2	8.721	12.1	12.0	1.84	7479	2.69	13.76
012066447-03	OBS	No	22.670309	143.588777	134.8	1.984	11.6	10.4	1.84	7479	2.36	274.41
012066447-04	OBS	No	76.691016	175.708725	264.6	4.367	14.1	14.1	1.84	7479	3.28	54.04
012066447-05	OBS	No	48.056665	169.097957	165.8	2.084	11.4	10.1	1.84	7479	2.66	100.77
012066447-06	OBS	No	10.840935	137.846391	88.7	3.025	11.9	10.7	1.84	7479	2.00	733.81

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
012066447-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—CENT_FEW_MEAS
012066447-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
012066447-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_MEAS
012066447-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
012066447-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
012066447-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT

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

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

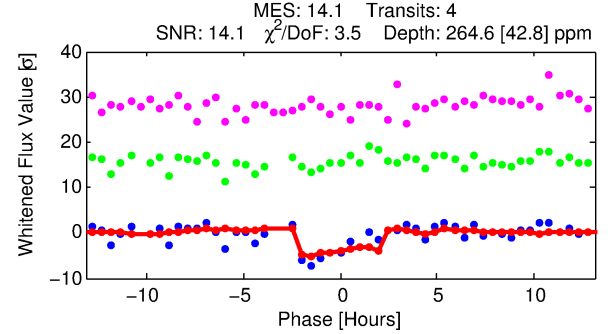
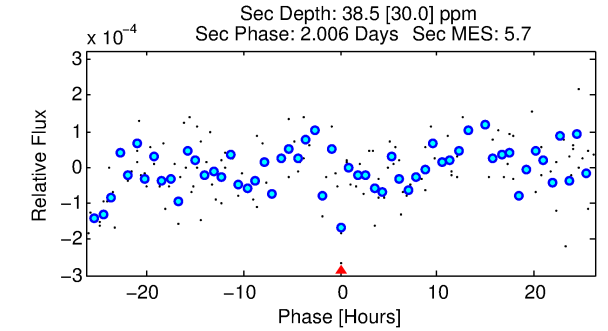
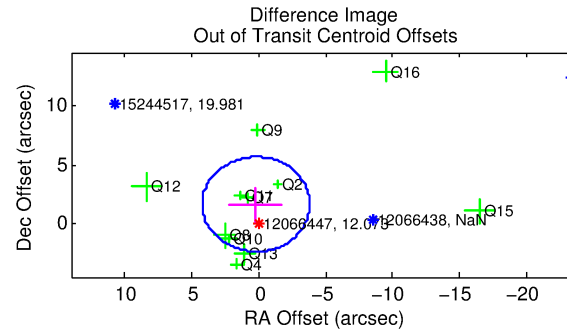
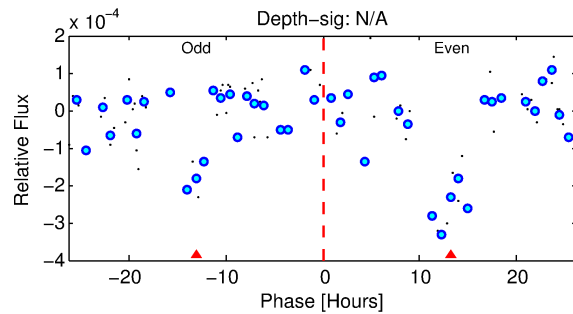
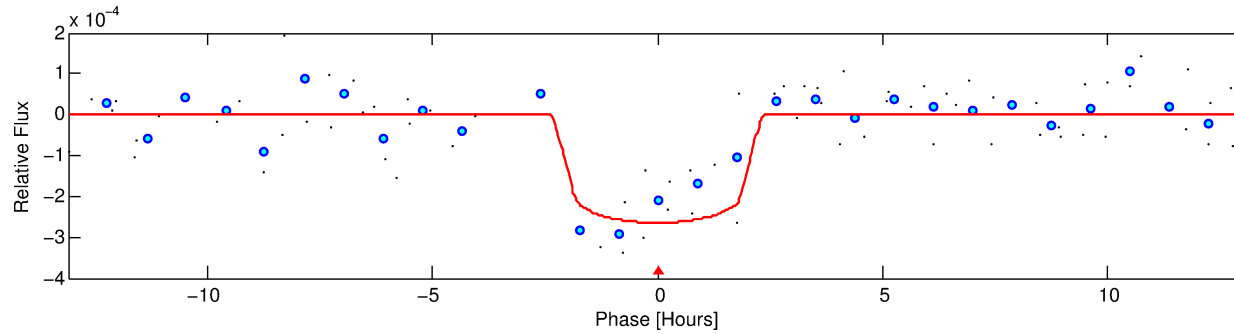
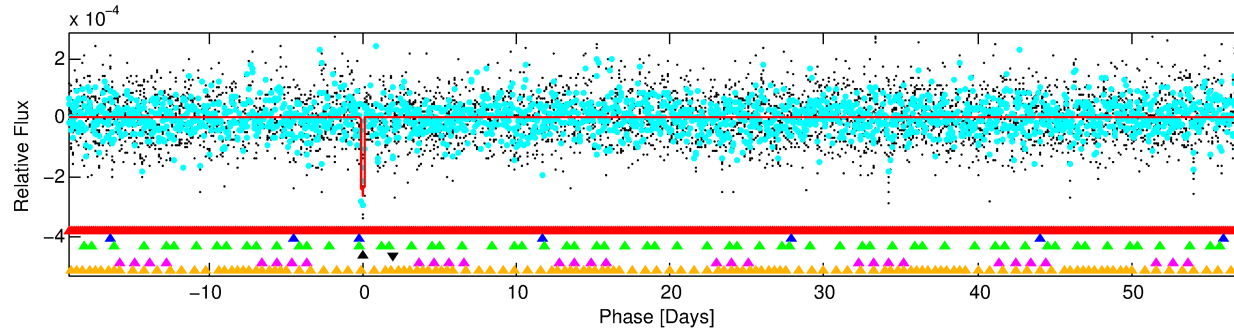
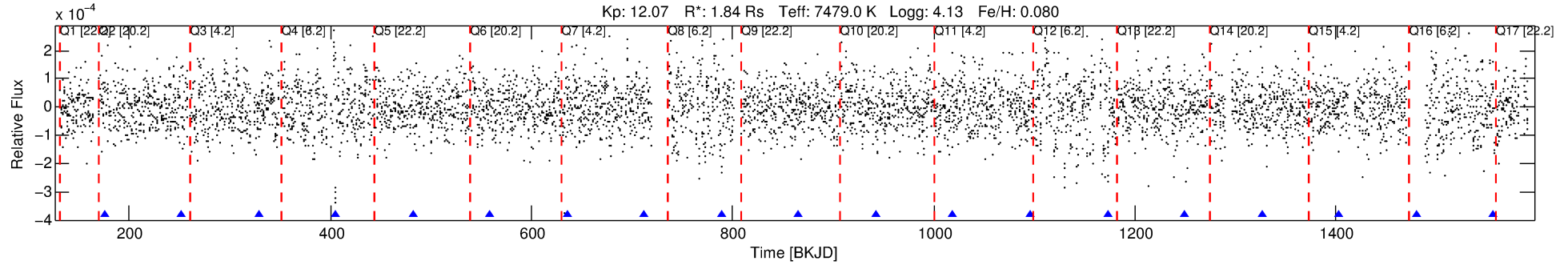
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 012066447-04

No Significant Match Found

# DV One-Page Summary

KIC: 12066447 Candidate: 4 of 6 Period: 76.691 d



## DV Fit Results:

Period = 76.69102 [0.00327] d  
Epoch = 175.7087 [0.0264] BKJD  
Rp/R\* = 0.0164 [0.0141]  
a/R\* = 85.41 [468.19]  
b = 0.79 [2.55]  
Seff = 54.04 [21.91]  
Teq = 691 [70] K  
Rp = 3.28 [3.00] Re  
a = 0.4184 [0.1067] AU  
Ag = 343.92 [660.44] [0.52σ]  
Teffp = 4603 [2180] K [1.79σ]

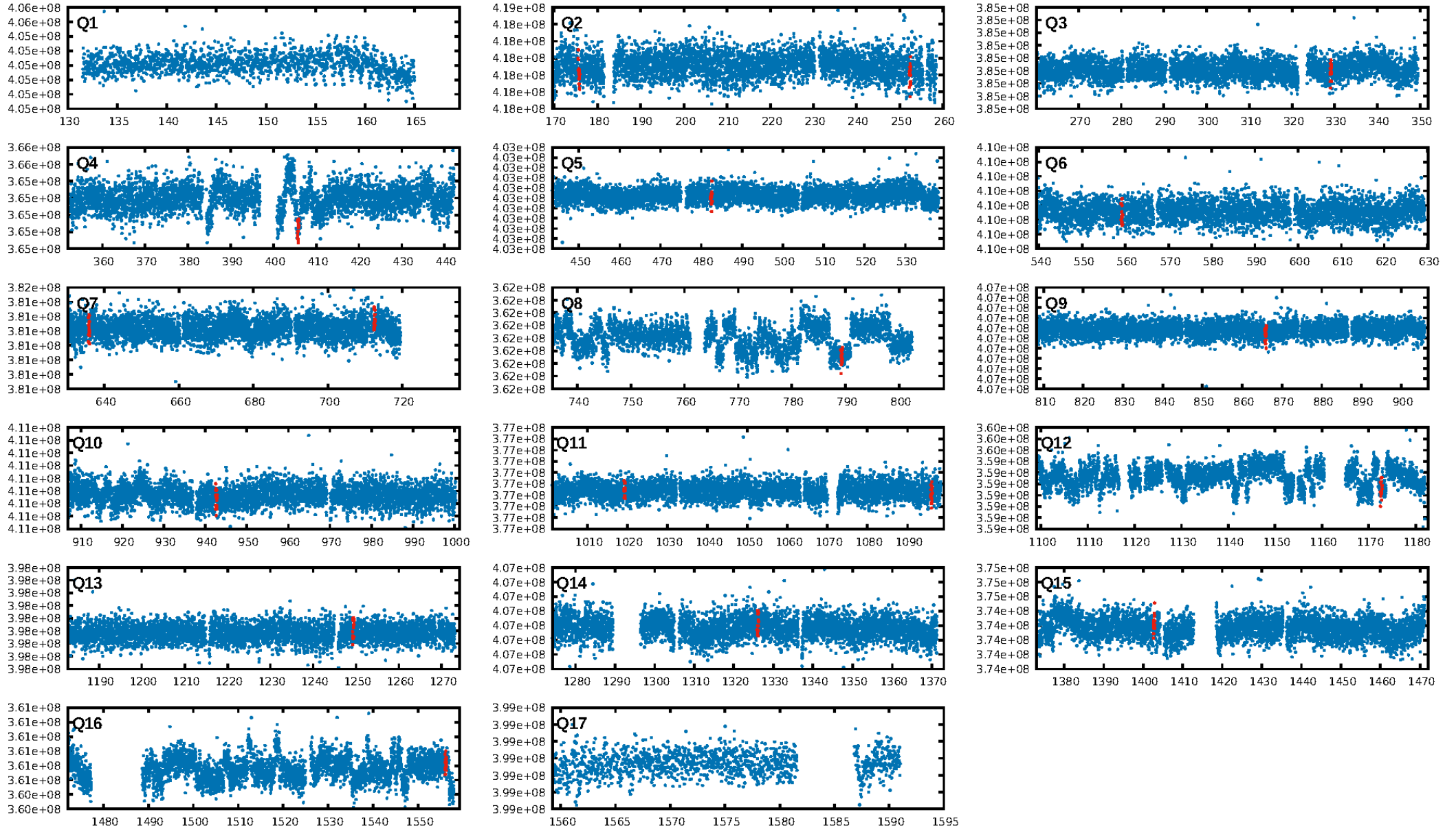
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [142.02σ]  
LongPeriod-sig: 100.0% [337.61σ]  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 94.0%  
Bootstrap-pfa: 1.58e-17  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: 0.5679  
Centroid-sig: 27.7%  
Centroid-so: 0.580 arcsec [1.53σ]  
OotOffset-rm: 1.660 arcsec [1.24σ]  
KicOffset-rm: 1.690 arcsec [1.35σ]  
OotOffset-st: 2/3/4/2 [11]  
KicOffset-st: 2/3/4/2 [11]  
DiffImageQuality-fgm: 0.27 [3/11]  
DiffImageOverlap-fno: 0.00 [0/15]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 17:32:59 Z

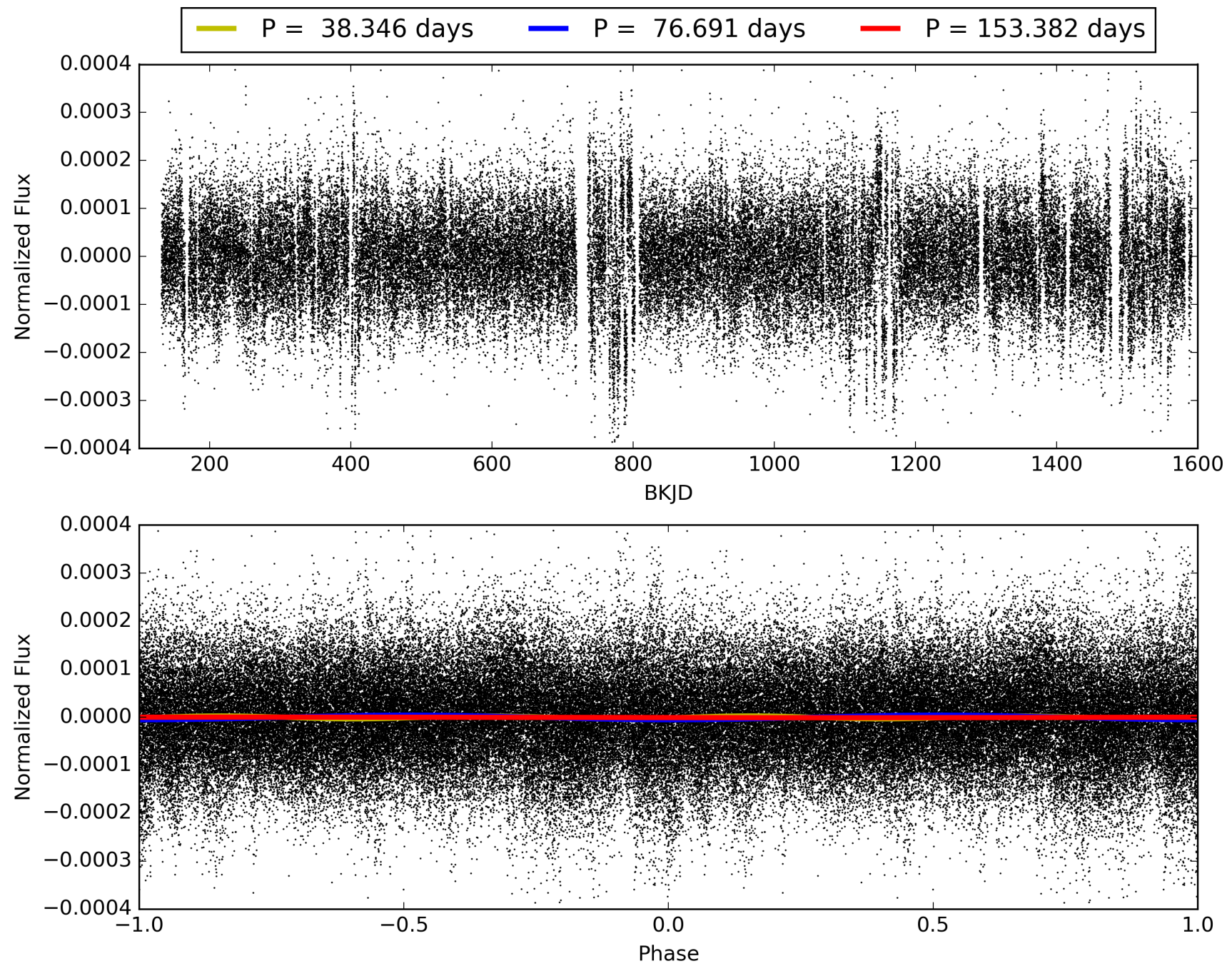
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 012066447-04, PDC Light Curves



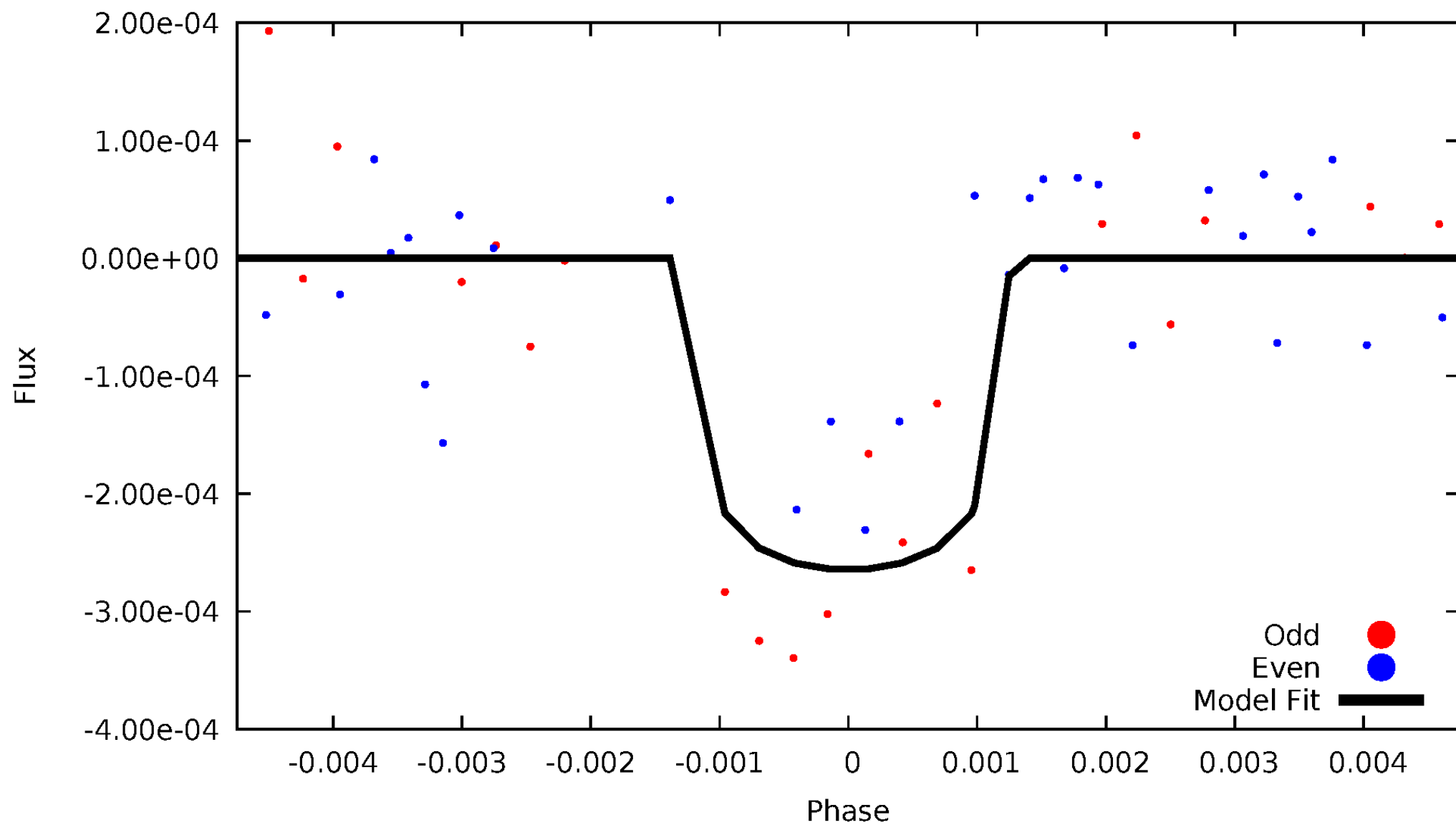


TCE 012066447-04



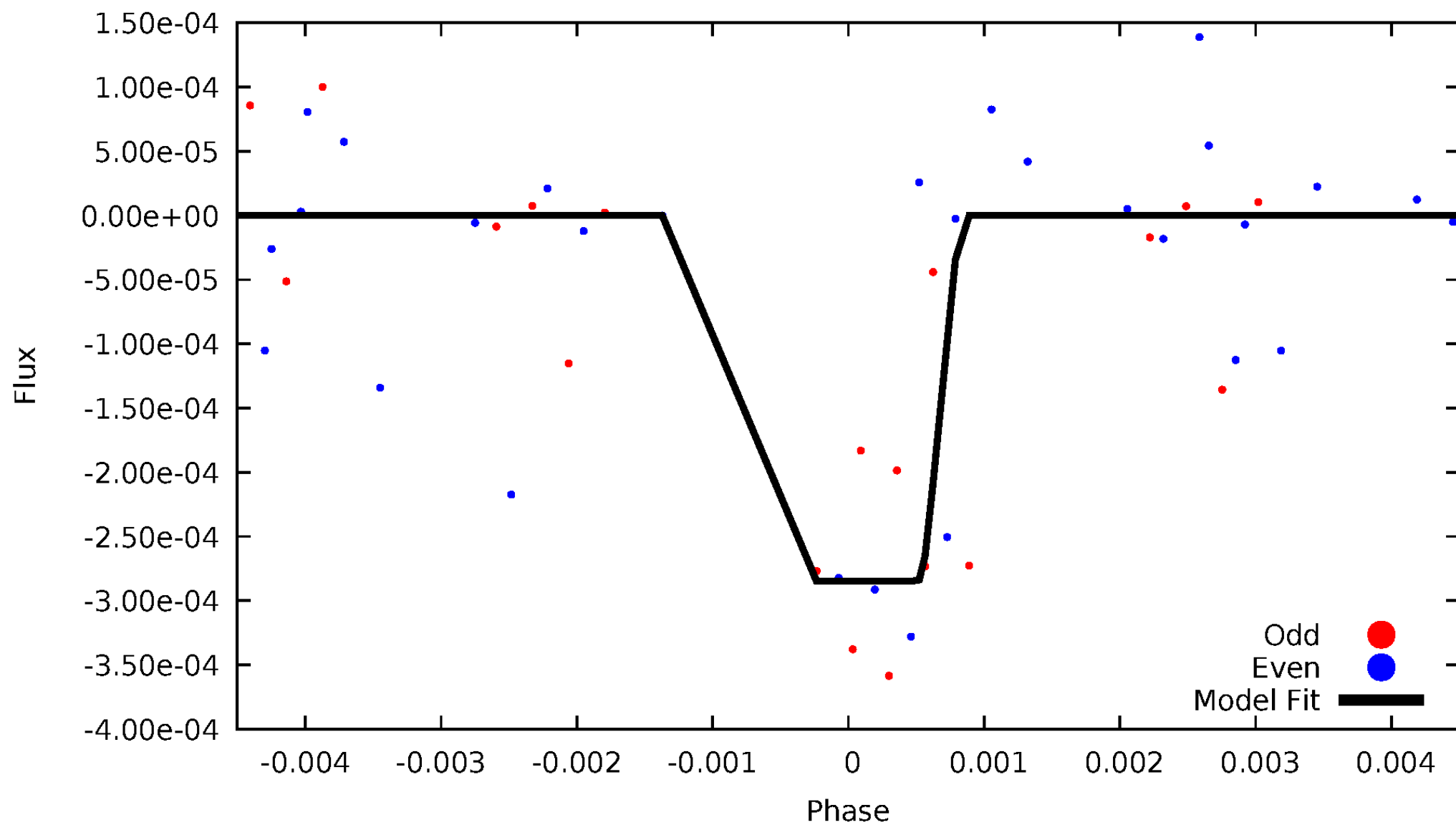
# DV Odd/Even

TCE 012066447-04



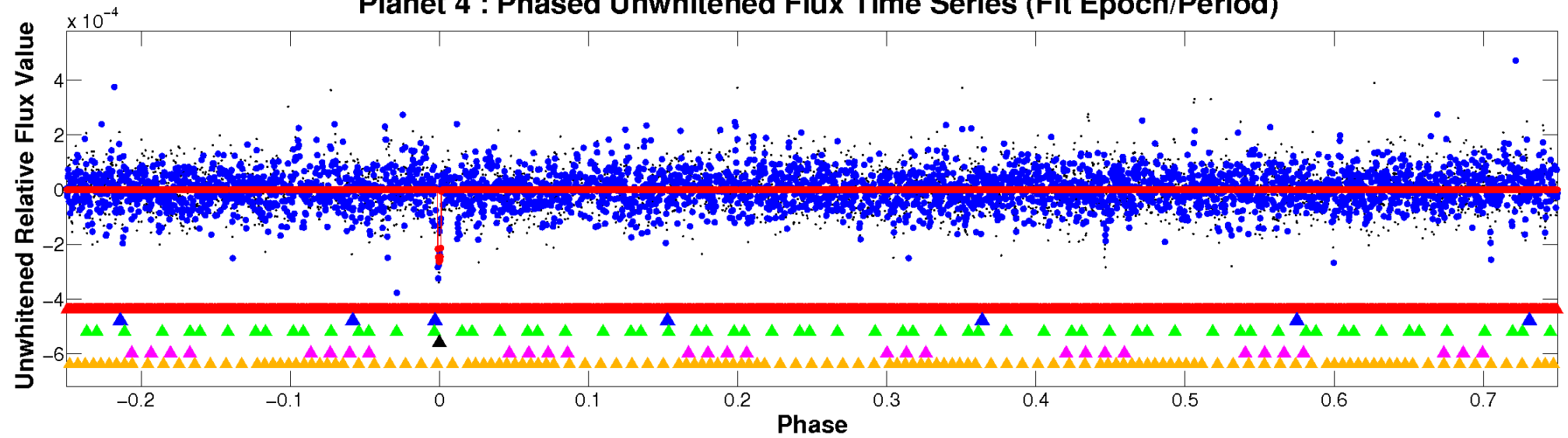
# ALT Odd/Even

TCE 012066447-04

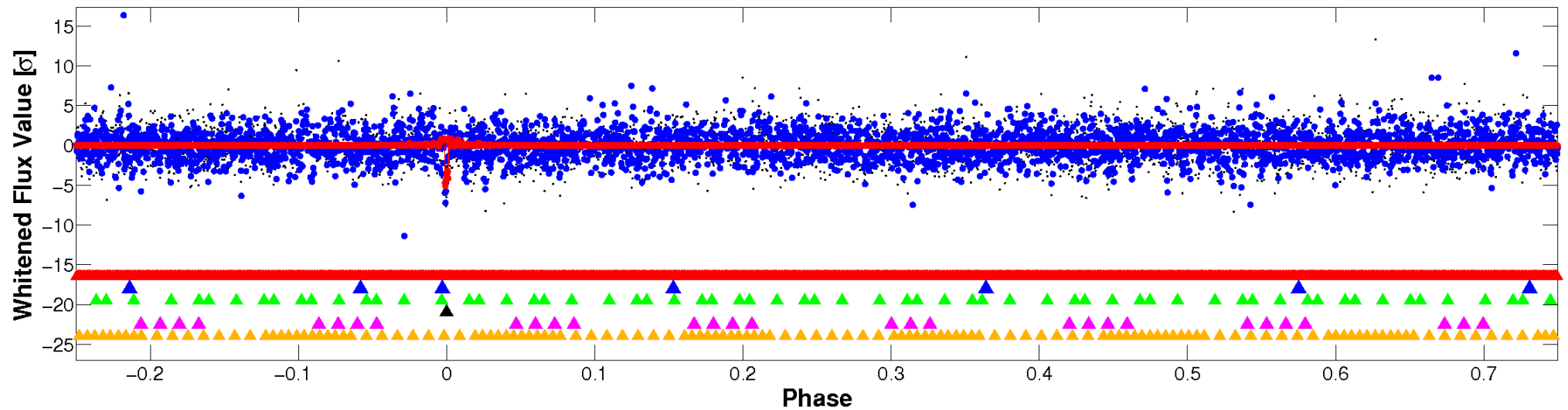


# Non-Whitened Vs. Whitened Light Curve

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

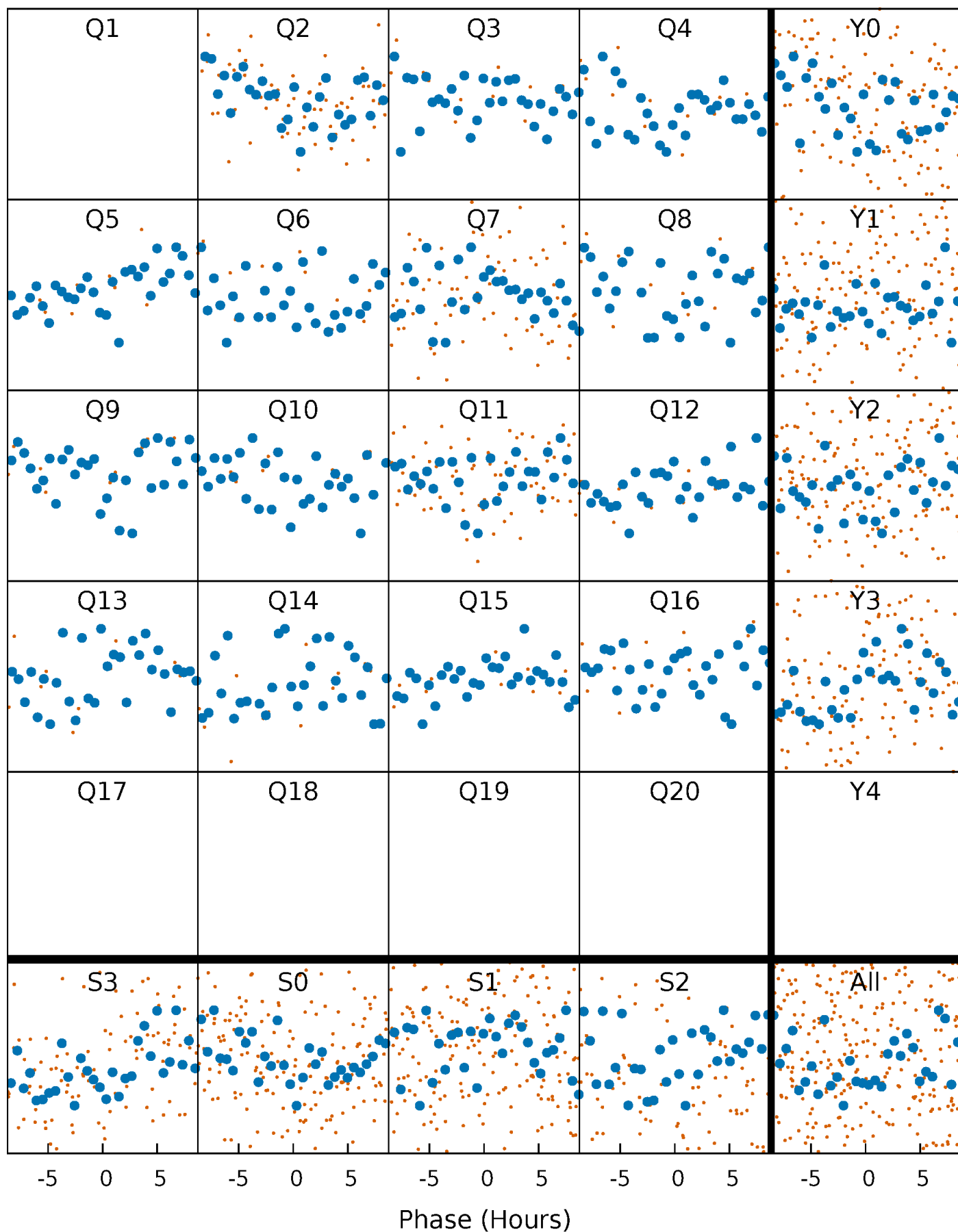


## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



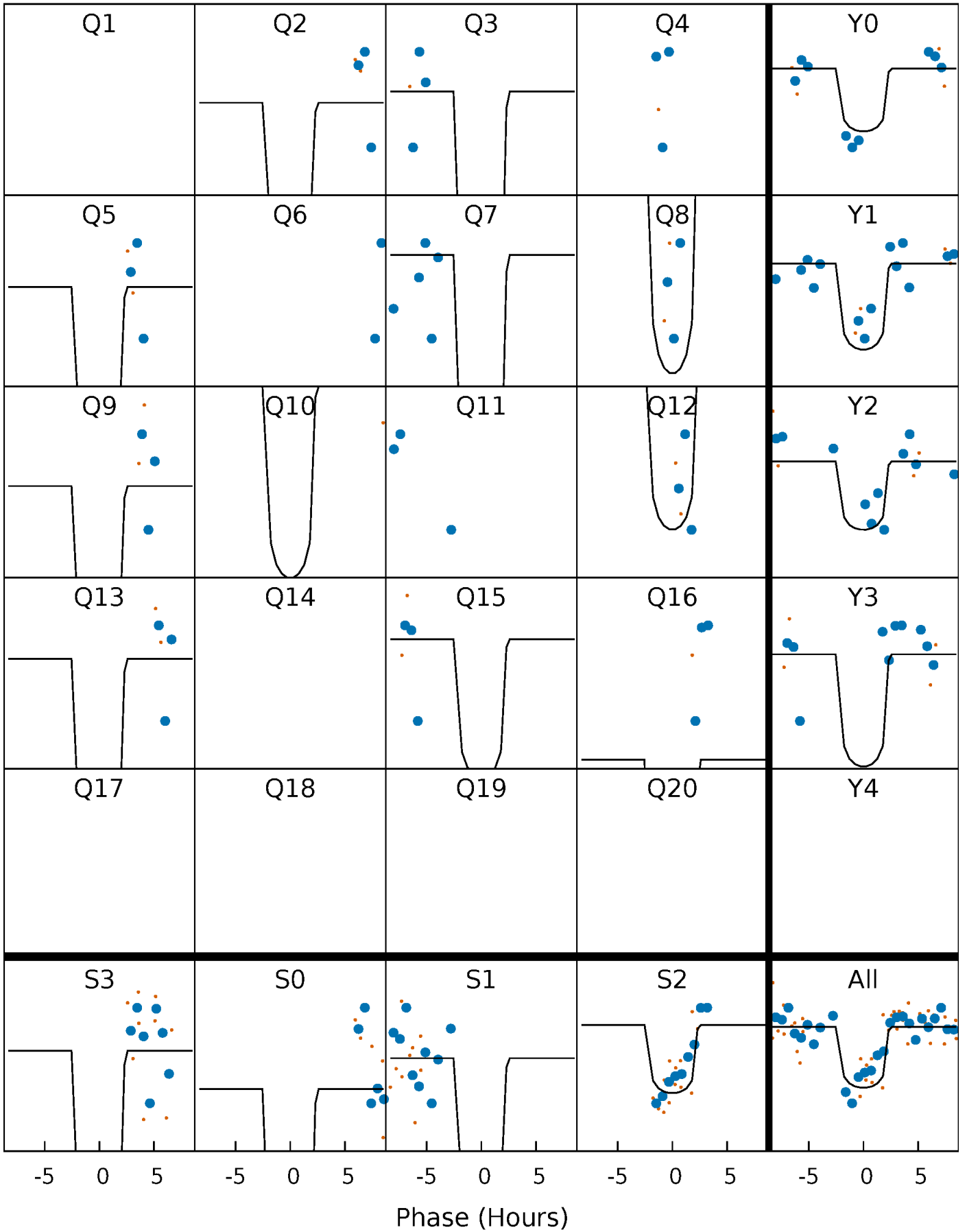
# PDC Quarter-Phased Transit Curves

TCE 012066447-04 P= 76.691016 Days  $T_0=175.708725$  (BKJD)



# DV Quarter-Phased Transit Curves

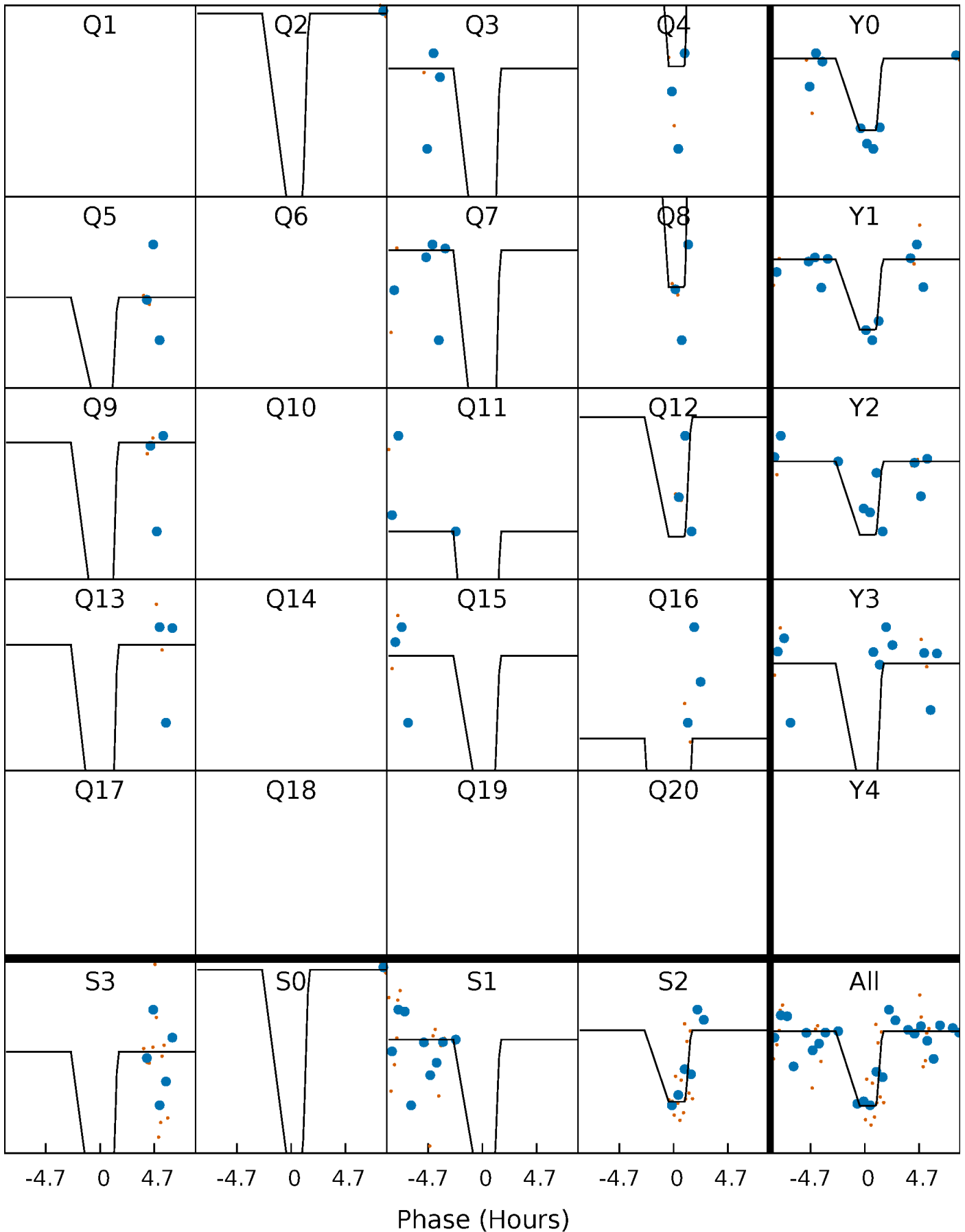
TCE 012066447-04   P= 76.691016 Days    $T_0=175.708725$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

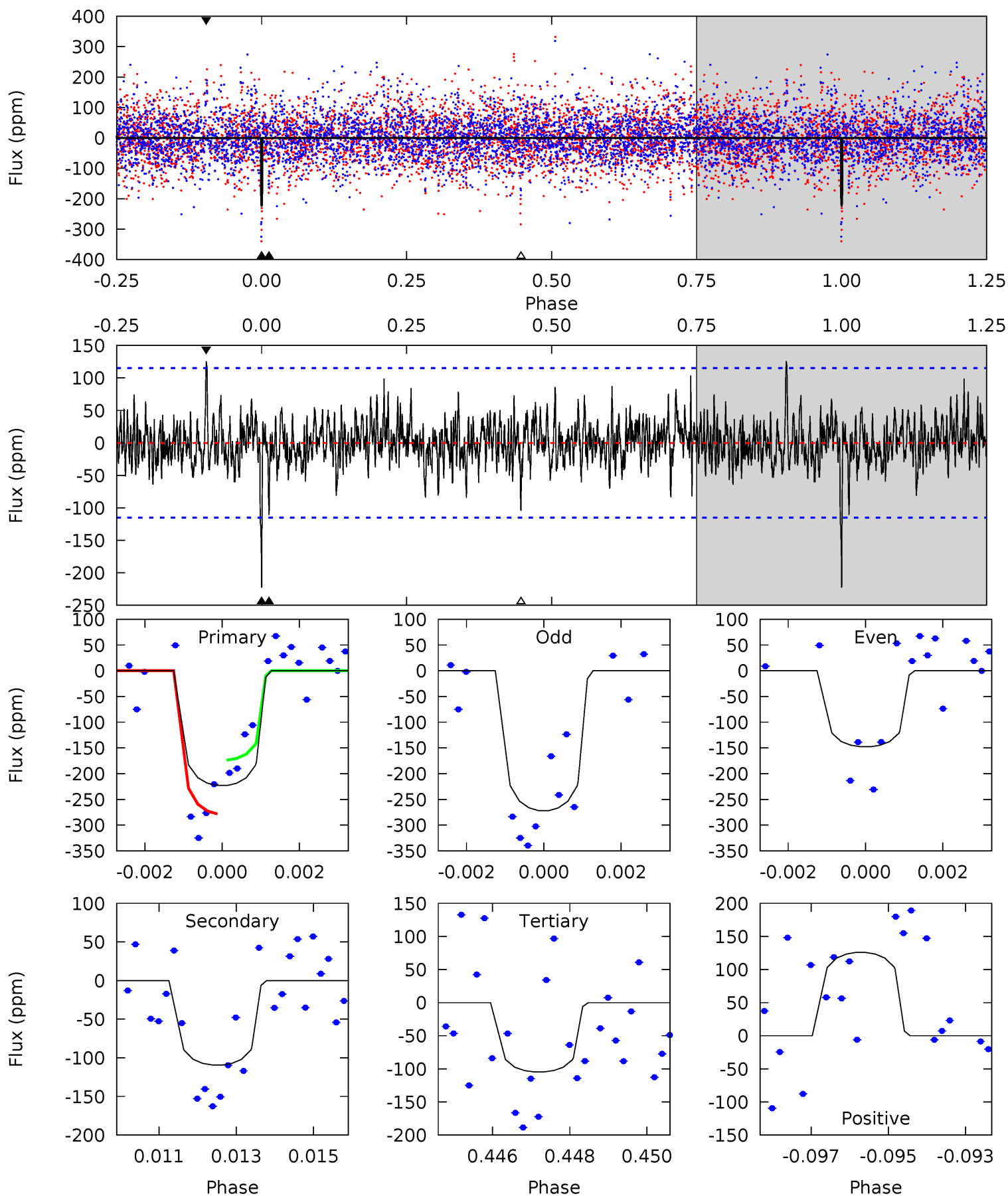
TCE 012066447-04     $P = 76.697076$  Days     $T_0 = 175.634926$  (BKJD)



# DV Model-Shift Uniqueness Test

012066447-04, P = 76.691016 Days, E = 99.017709 Days

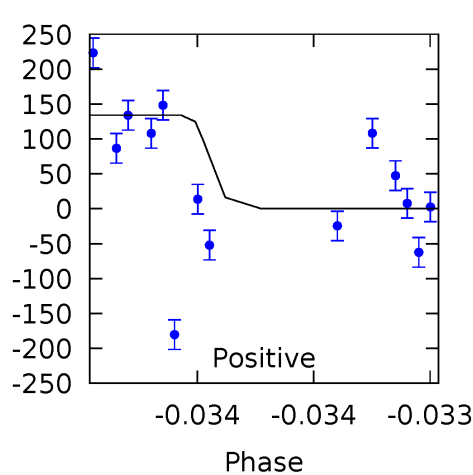
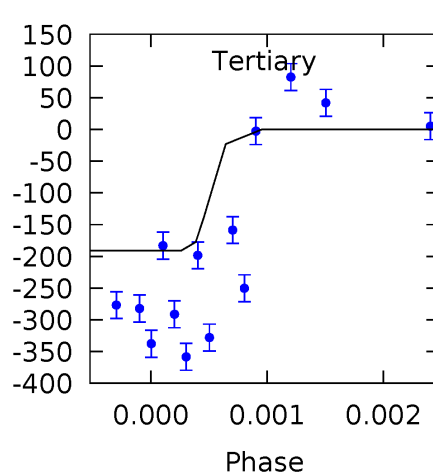
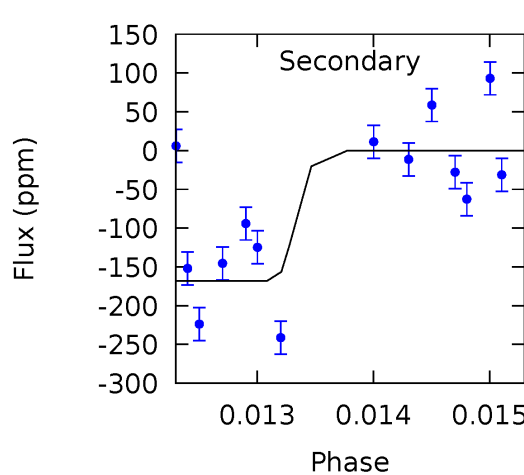
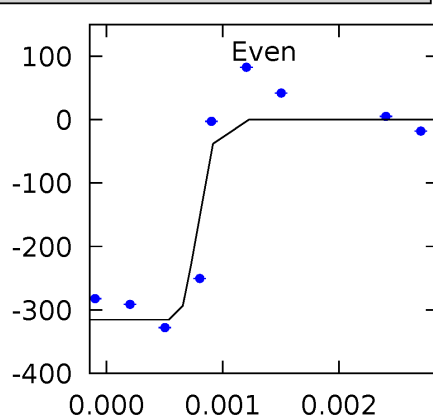
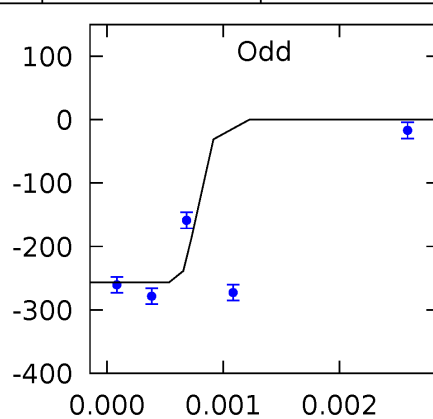
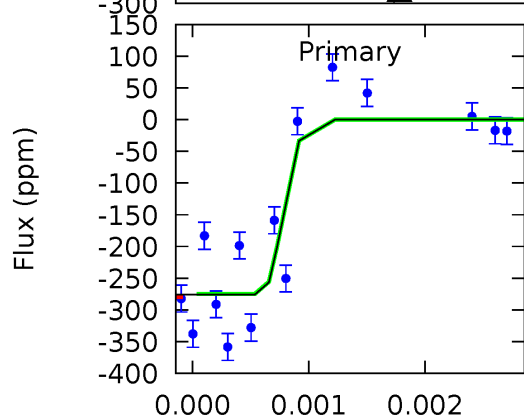
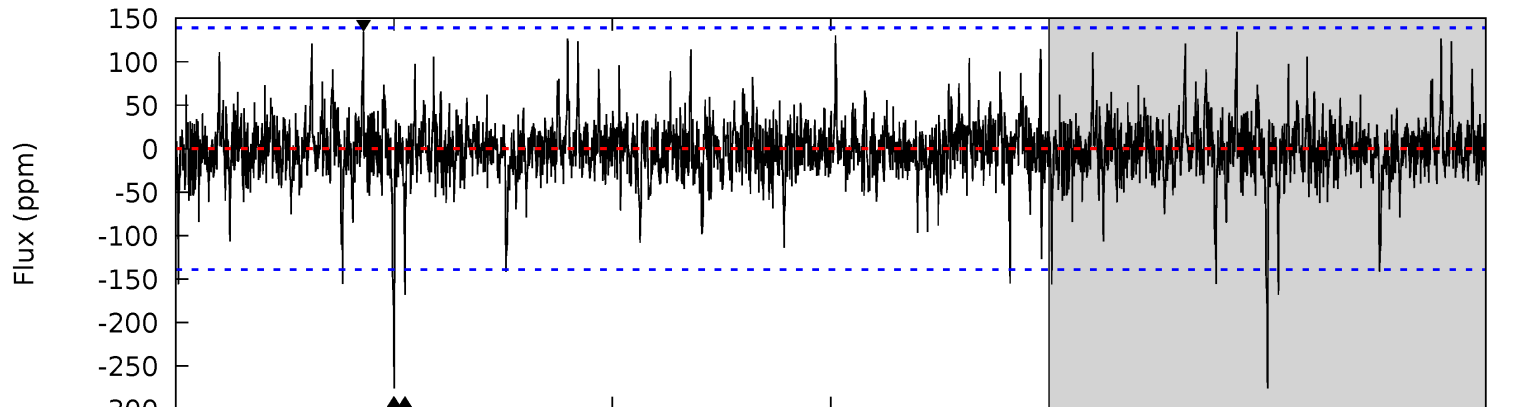
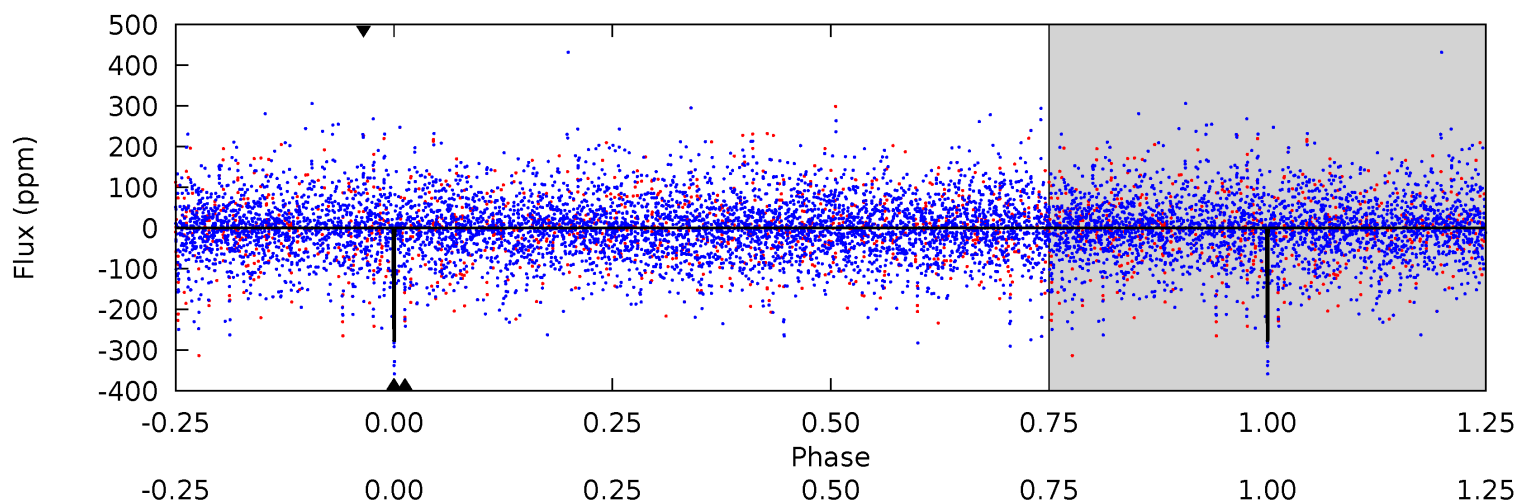
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.3	5.04	4.82	5.80	5.31	3.06	1.27	5.45	4.48	0.22	-0.76	2.83	0.84	0.36	2.36



# Alt Model-Shift Uniqueness Test

012066447-04, P = 76.697076 Days, E = 98.937850 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
10.9	6.62	7.52	5.28	5.48	3.33	1.17	3.35	5.59	-0.90	1.34	1.20	0.80	0.33	0.00



### Stellar Parameters For KIC 012066447

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7479^{+206}_{-335}$	$4.130^{+0.105}_{-0.195}$	$0.080^{+0.200}_{-0.350}$	$1.837^{+0.569}_{-0.350}$	$1.658^{+0.207}_{-0.253}$	$0.377^{+0.216}_{-0.184}$
	+3%/-4%	+3%/-5%	+250%/-438%	+31%/-19%	+12%/-15%	+57%/-49%
Source	PHO54	PHO54	PHO54	DSEP		

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

### Secondary Eclipse Parameters for KIC 012066447-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-109 \pm 22$	$3.98^{+2.81}_{-2.46}$	$976^{+77}_{-59}$	$5378^{+4079}_{-994}$	$621^{+3879}_{-401}$
Alt.	$-168 \pm 25$	$3.96^{+2.63}_{-2.34}$	$974^{+79}_{-59}$	$6044^{+4103}_{-1248}$	$1001^{+5101}_{-650}$

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

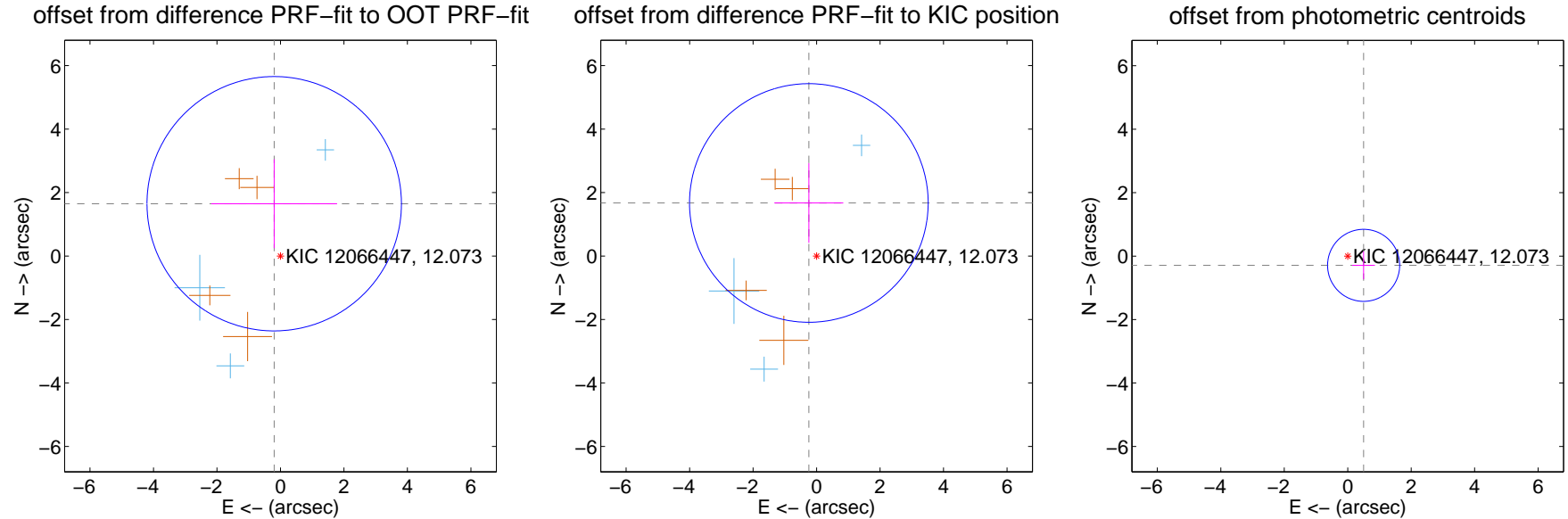
## DV Centroid Data

Supplemental centroid analysis for 012066447-04. Kepler magnitude: 12.07. Transit SNR 14.08

There are 3 quarters with good PRF difference image offsets

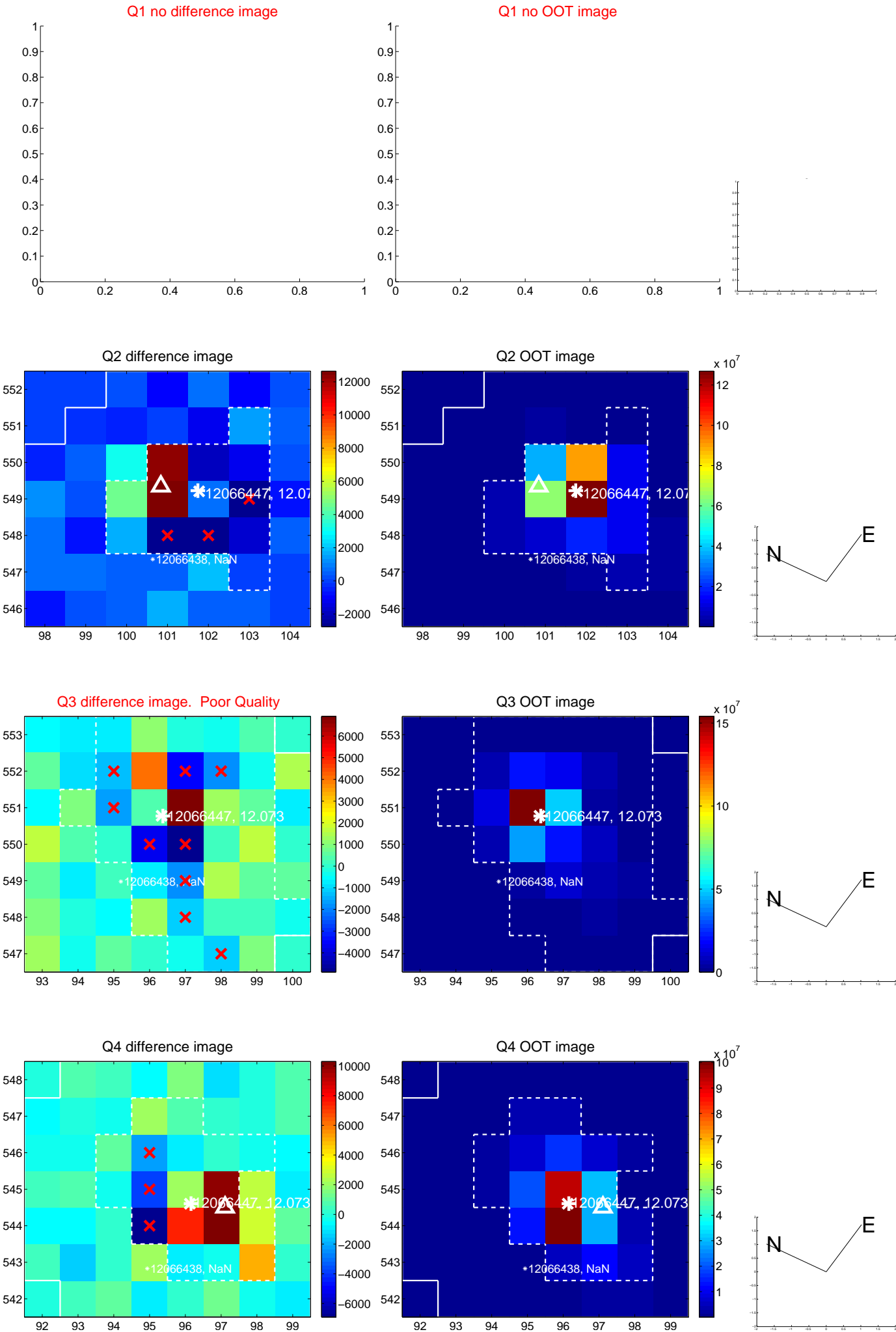
The direct PRF centroid is offset from the target star catalog position by about 0.09 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.660 \pm 1.336$	1.24	$0.197 \pm 1.982$	$1.648 \pm 1.402$
PRF-fit source offset from KIC position	$1.690 \pm 1.253$	1.35	$0.244 \pm 1.087$	$1.672 \pm 1.256$
photometric centroid source offset	$0.58 \pm 0.38$	1.53	$-0.50 \pm 0.36$	$-0.29 \pm 0.44$

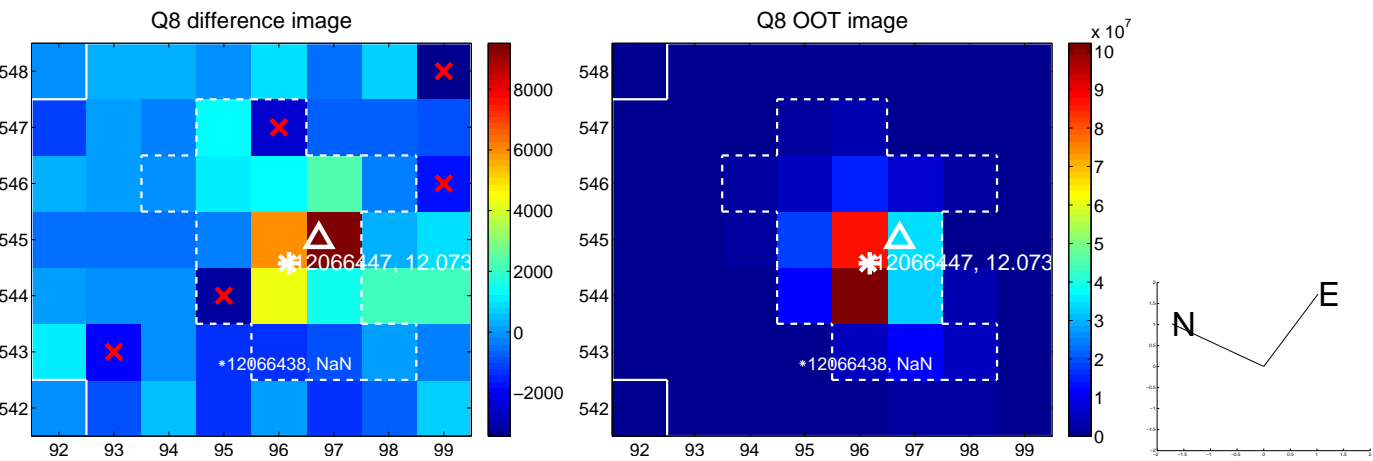
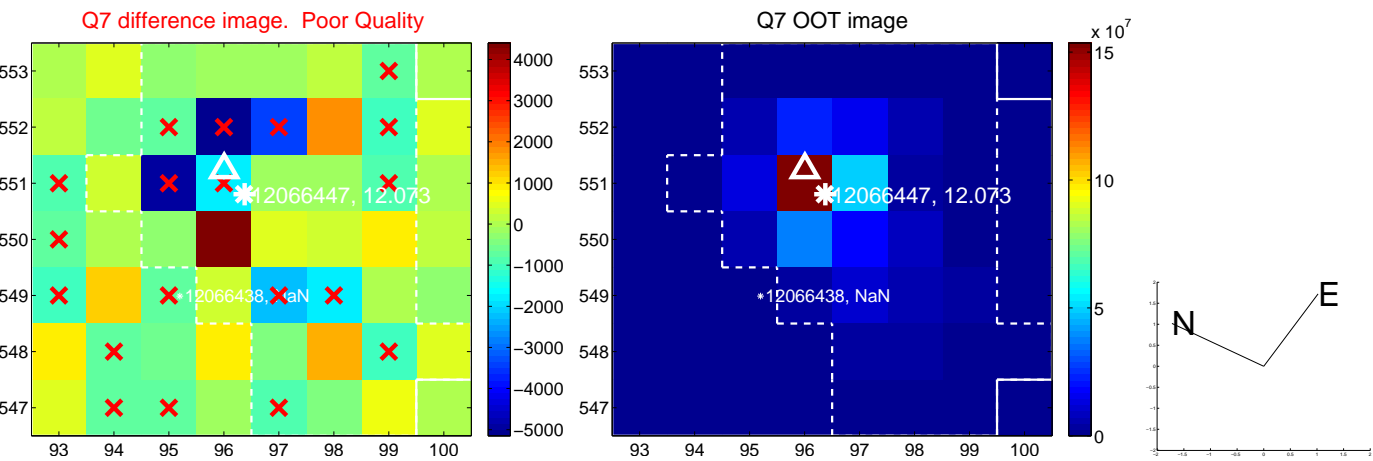
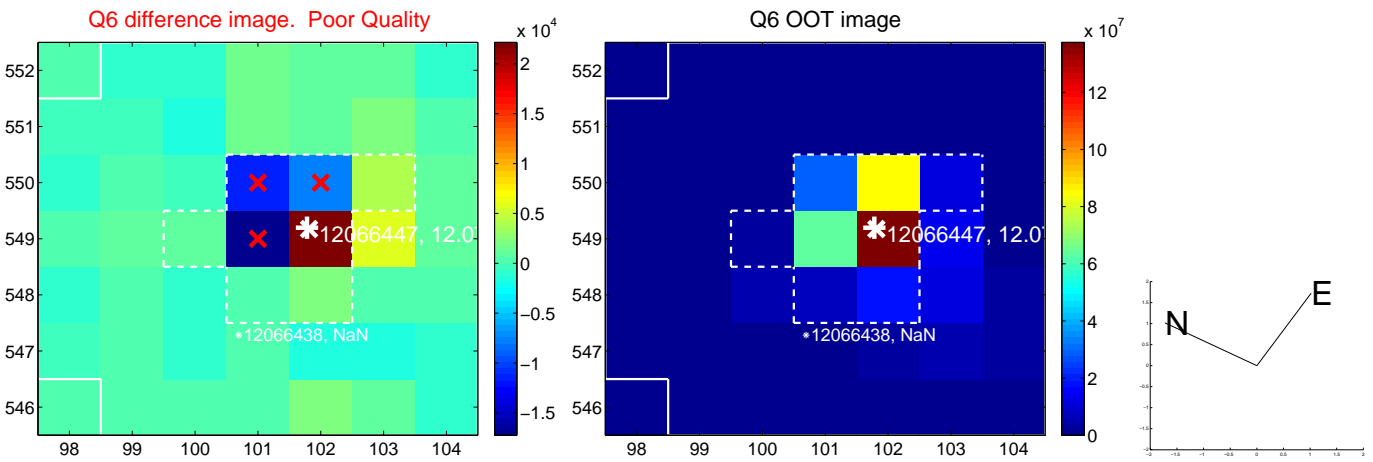
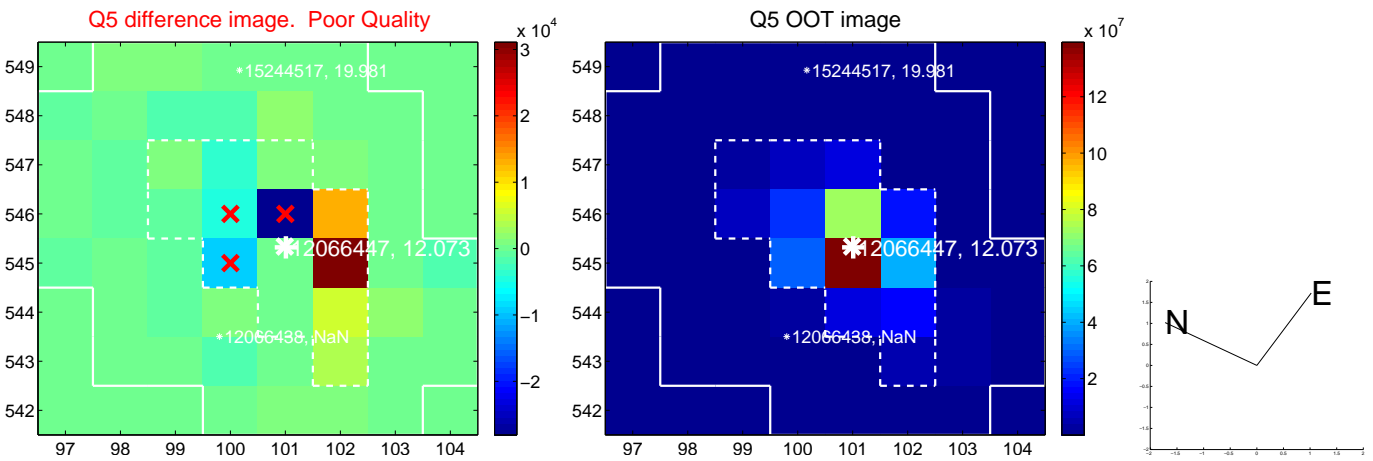


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

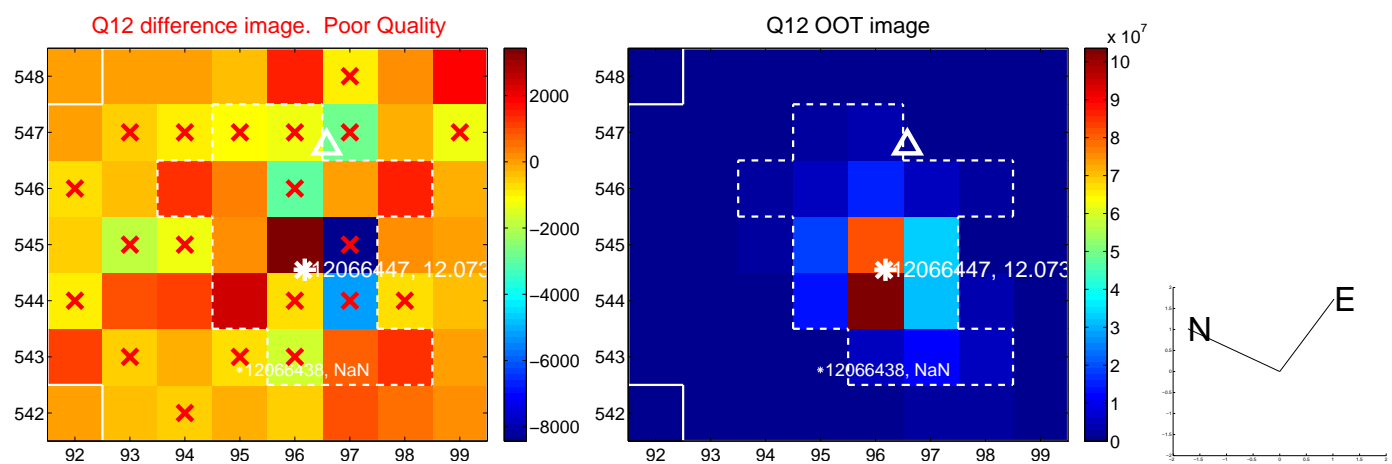
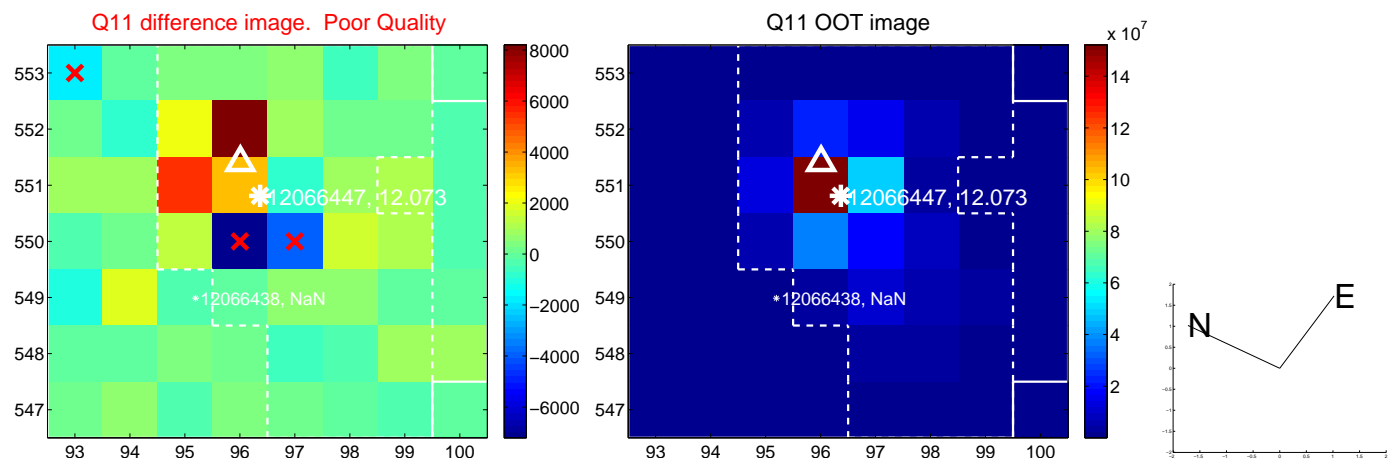
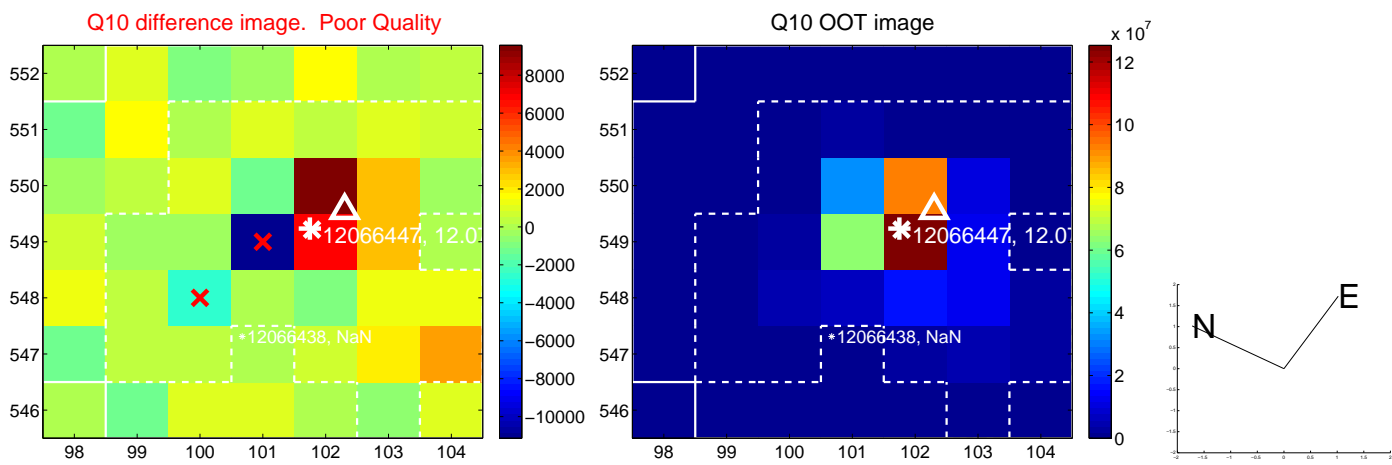
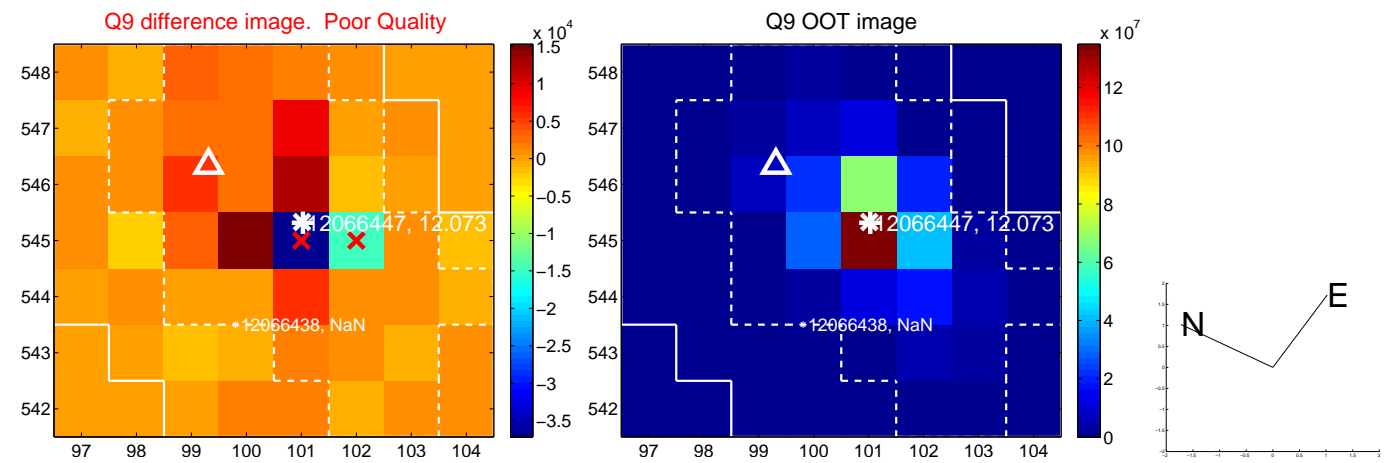


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

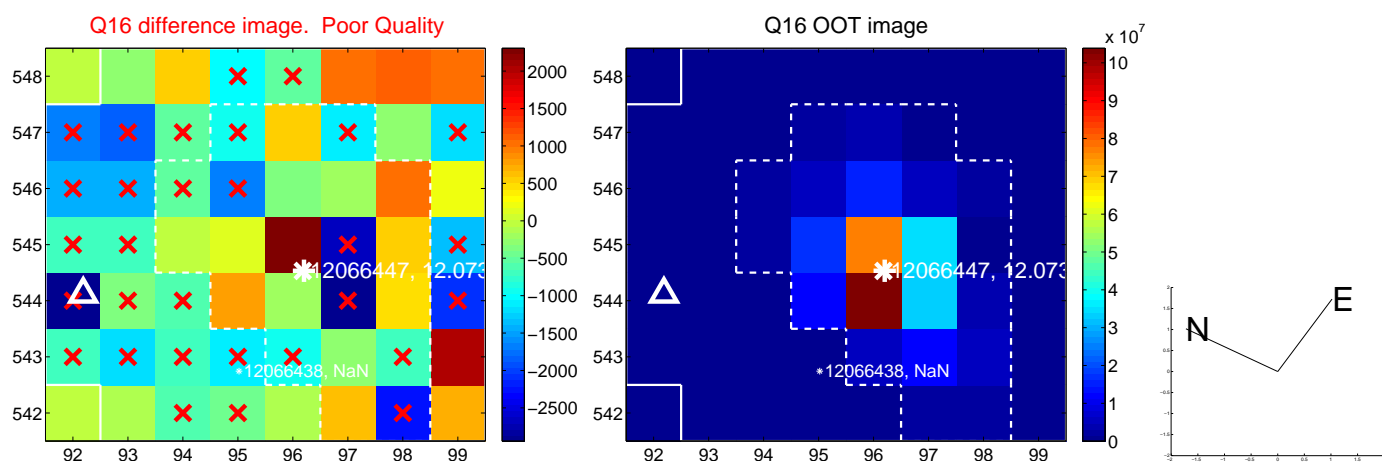
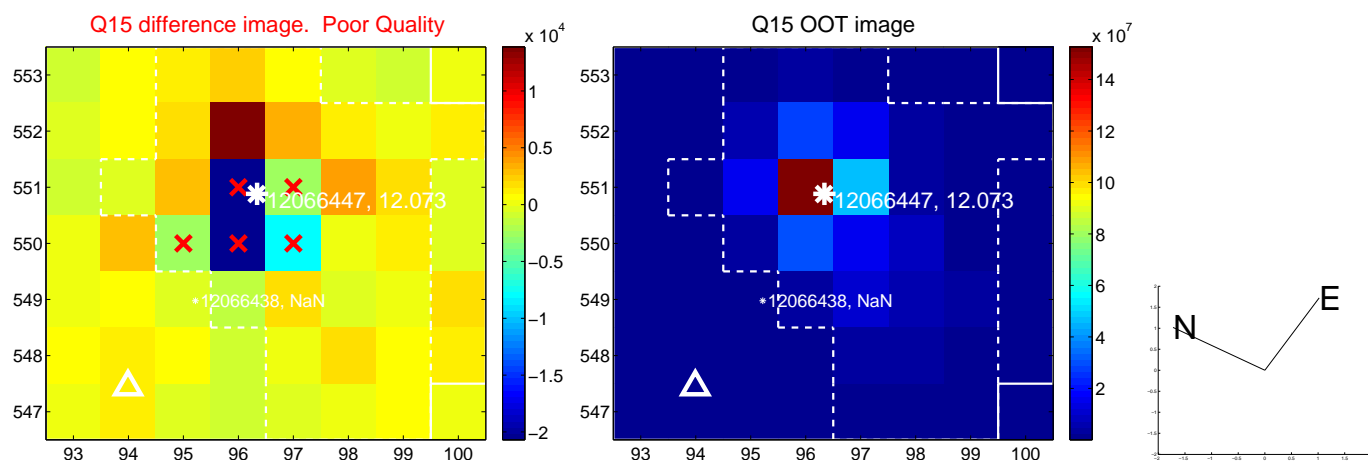
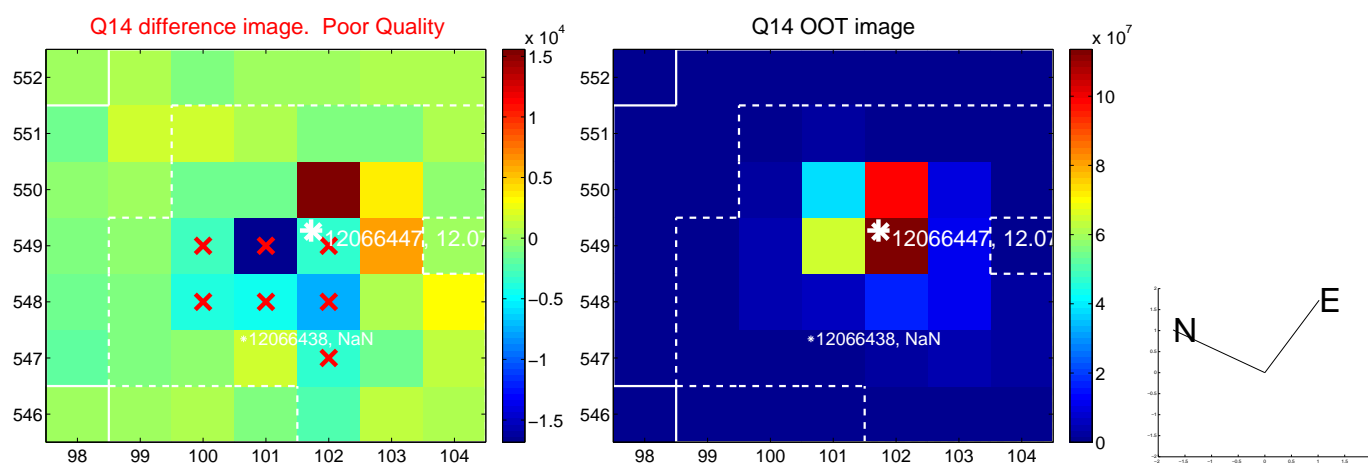
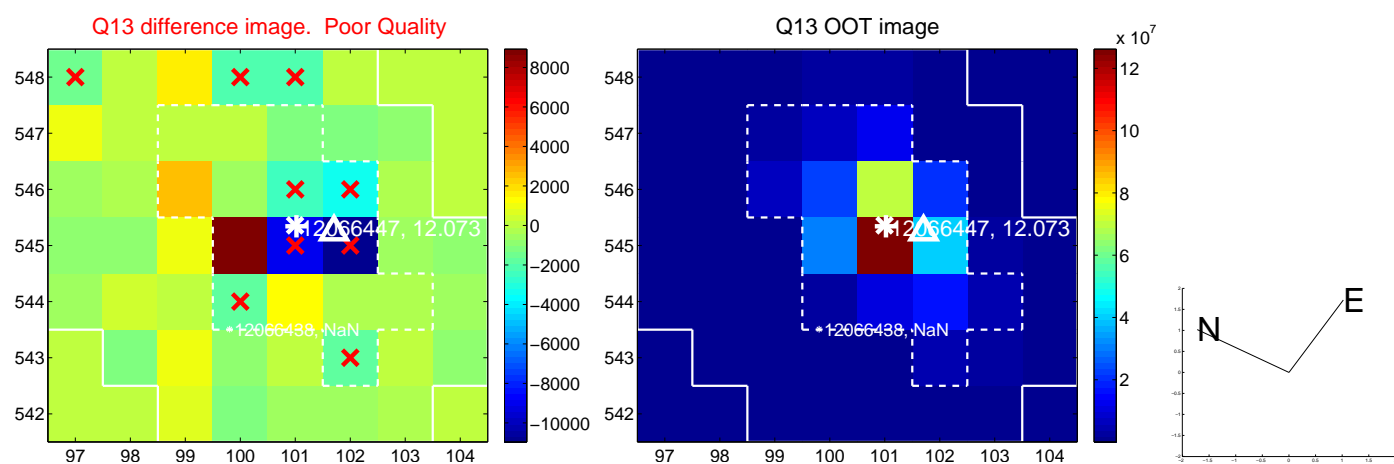




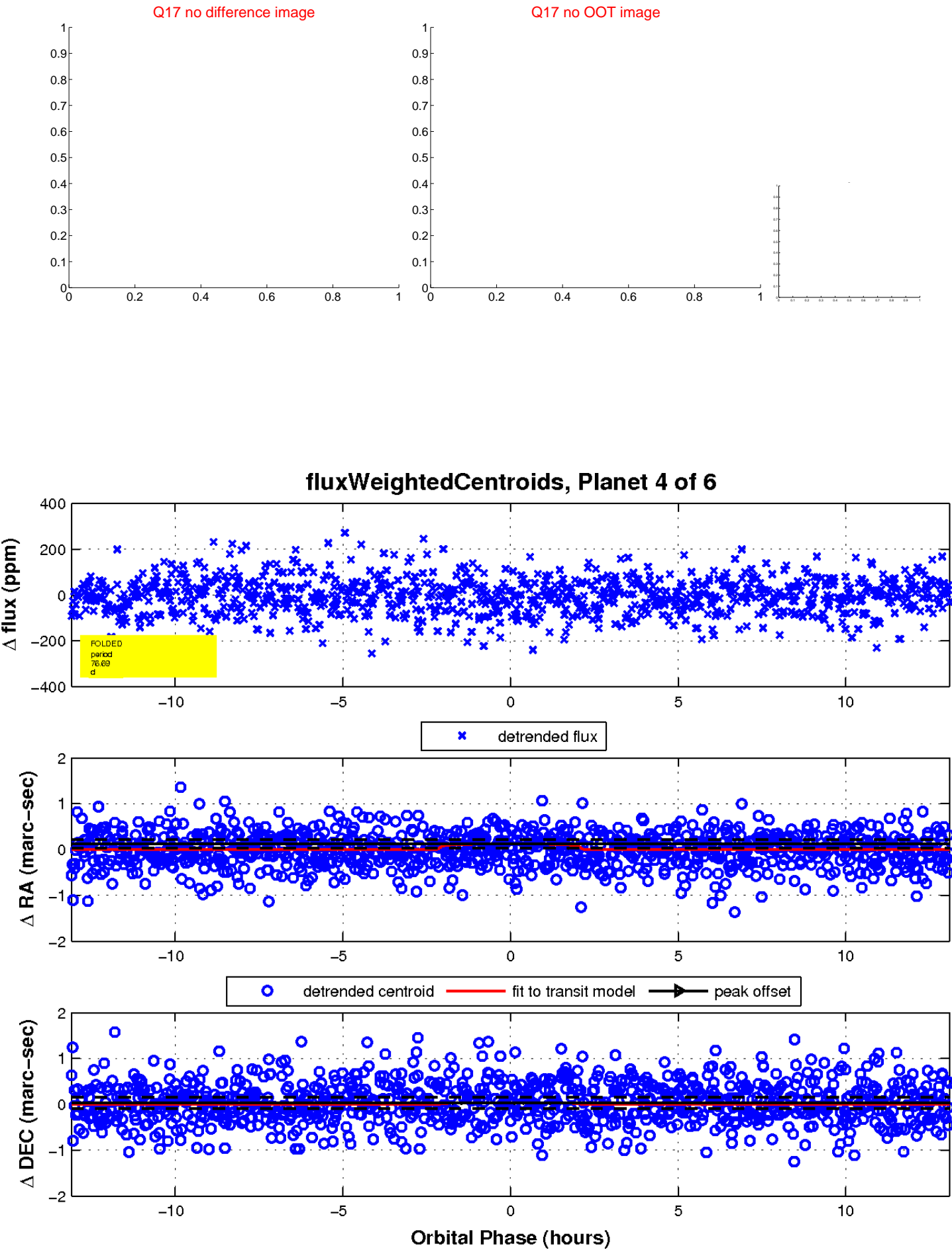
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

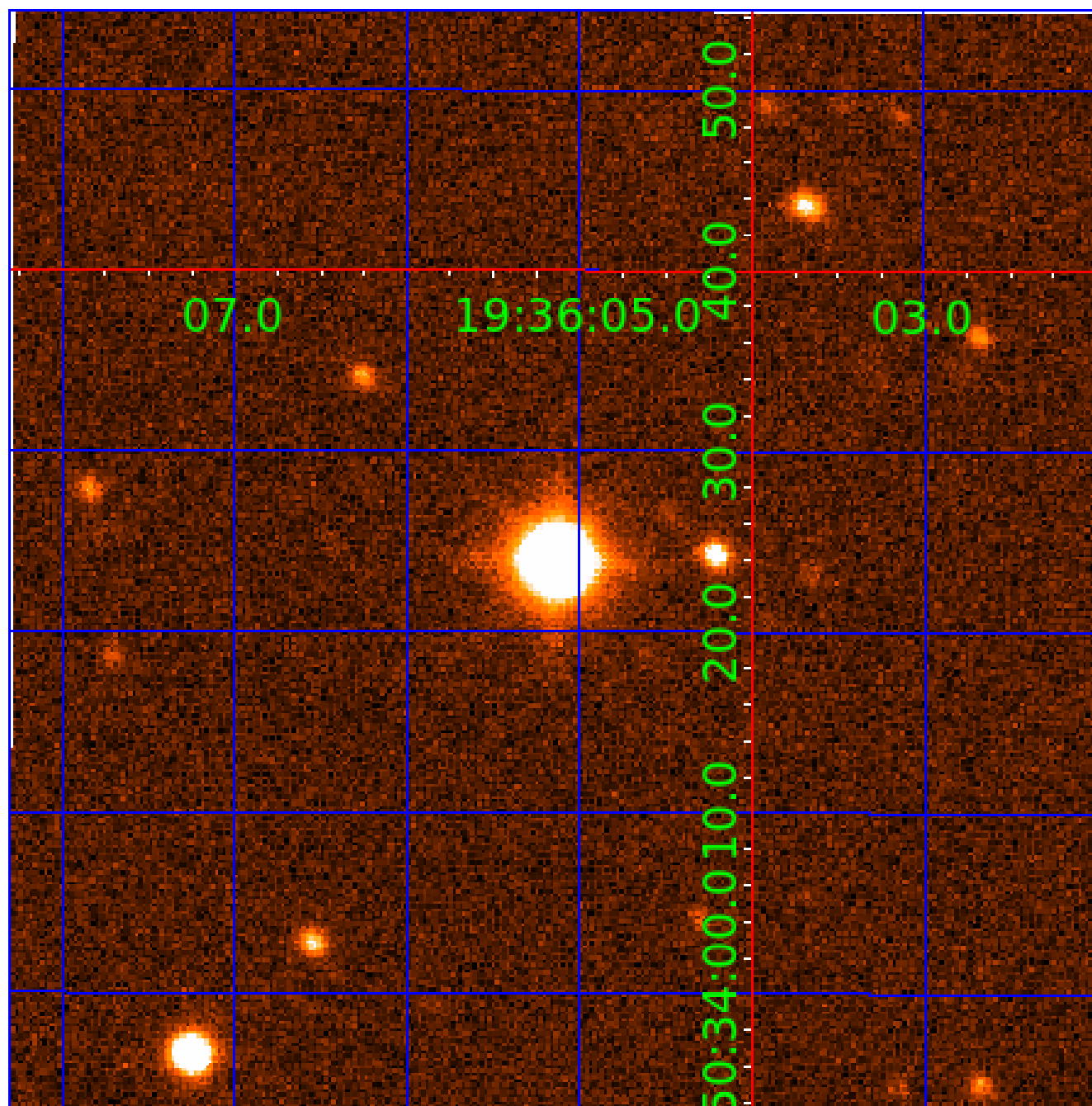


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 012066447

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
012066447-01	OBS	No	0.904494	132.122095	3.9	6.417	10.1	5.5	1.84	7479	0.37	20127.99
012066447-02	OBS	No	213.889154	252.178361	198.2	8.721	12.1	12.0	1.84	7479	2.69	13.76
012066447-03	OBS	No	22.670309	143.588777	134.8	1.984	11.6	10.4	1.84	7479	2.36	274.41
012066447-04	OBS	No	76.691016	175.708725	264.6	4.367	14.1	14.1	1.84	7479	3.28	54.04
012066447-05	OBS	No	48.056665	169.097957	165.8	2.084	11.4	10.1	1.84	7479	2.66	100.77
012066447-06	OBS	No	10.840935	137.846391	88.7	3.025	11.9	10.7	1.84	7479	2.00	733.81

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
012066447-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—CENT_FEW_MEAS
012066447-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
012066447-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_MEAS
012066447-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
012066447-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
012066447-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT

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

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

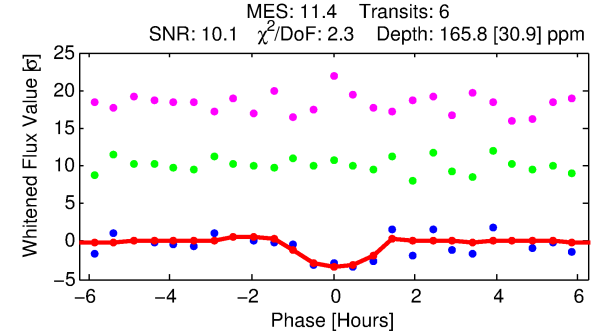
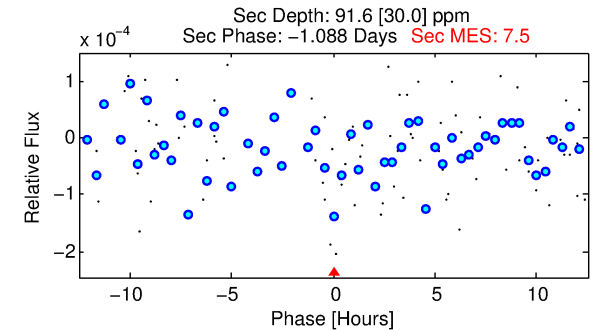
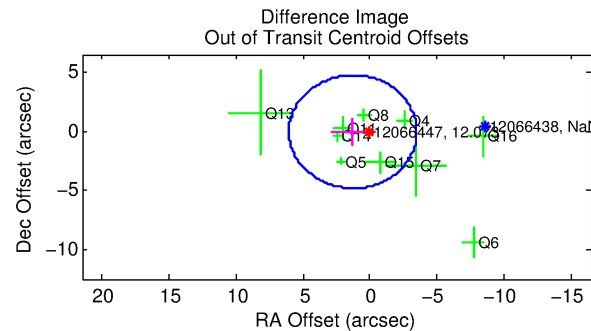
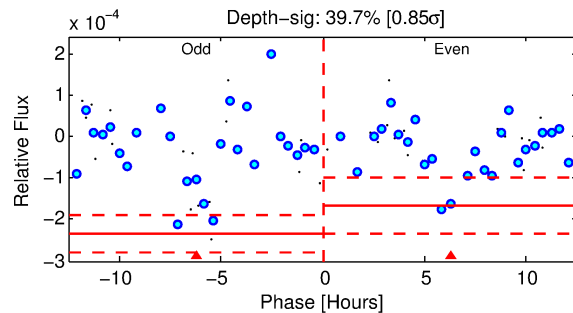
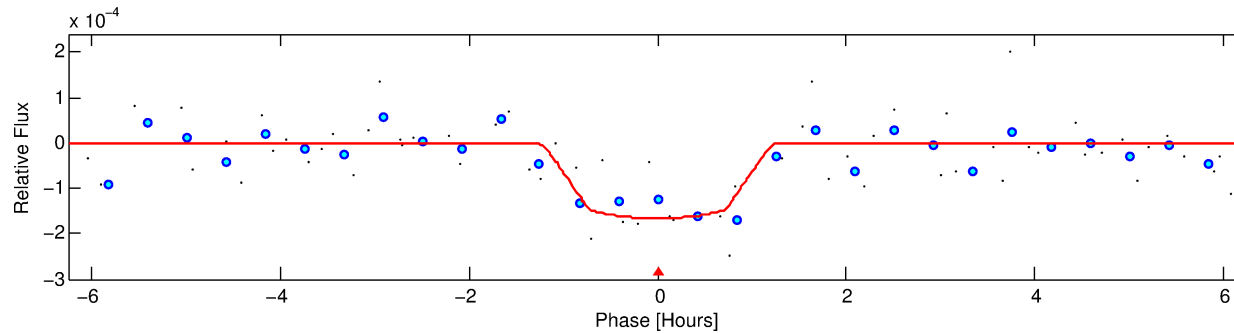
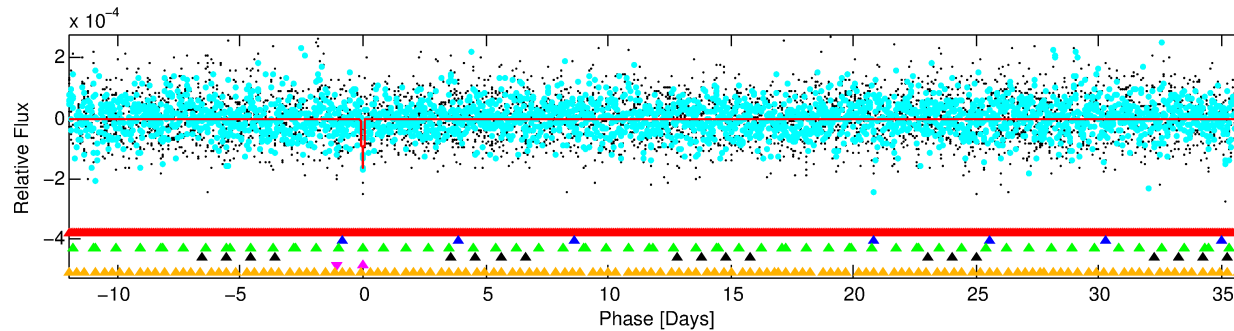
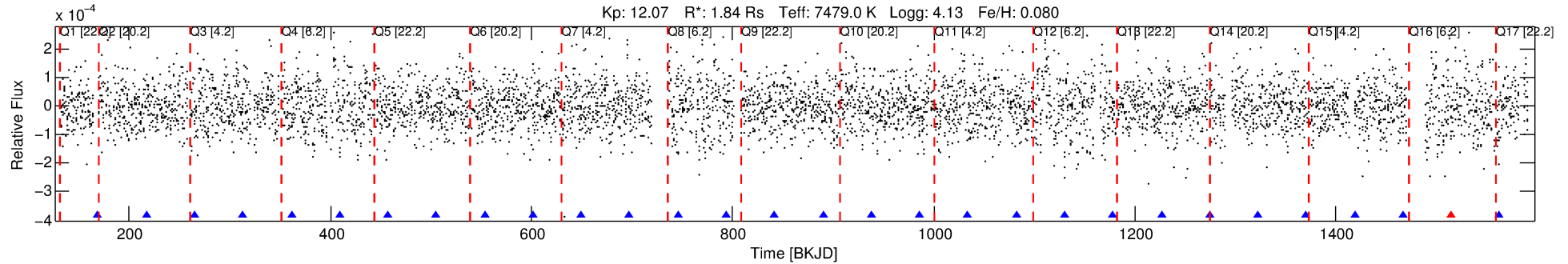
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 012066447-05

No Significant Match Found

# DV One-Page Summary

KIC: 12066447 Candidate: 5 of 6 Period: 48.057 d



## DV Fit Results:

Period = 48.05666 [0.00054] d  
Epoch = 169.0980 [0.0108] BKJD  
Rp/R\* = 0.0133 [0.0141]  
a/R\* = 96.54 [671.63]  
b = 0.85 [2.23]  
Seff = 100.77 [40.85]  
Teq = 808 [82] K  
Rp = 2.66 [2.95] Re  
a = 0.3064 [0.0781] AU  
Ag = 666.38 [1453.56] [0.46 $\sigma$ ]  
Teffp = 6346 [3424] K [1.62 $\sigma$ ]

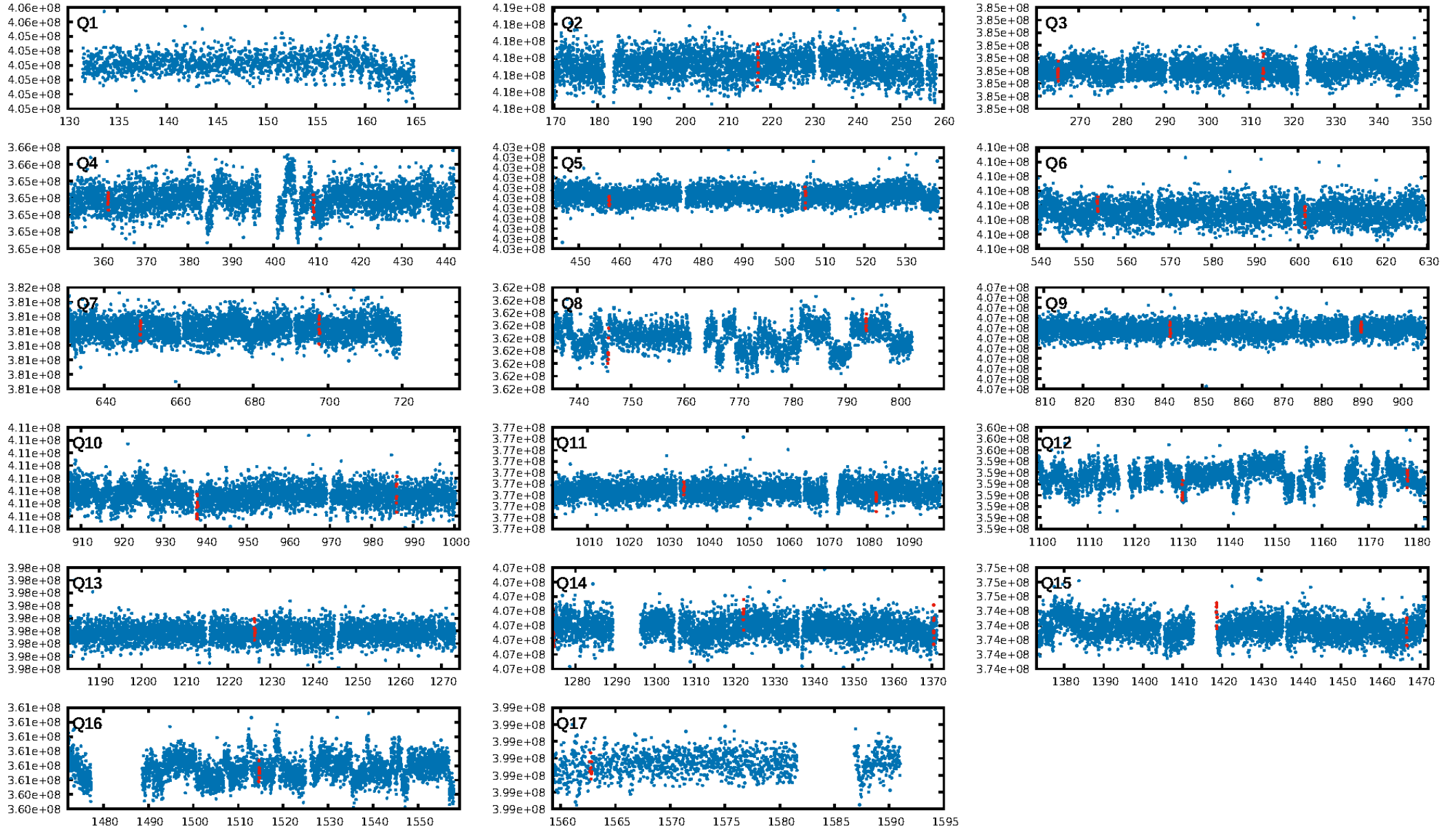
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [211.72 $\sigma$ ]  
LongPeriod-sig: 100.0% [142.02 $\sigma$ ]  
ModelChiSquare2-sig: 0.2%  
ModelChiSquareGof-sig: 95.3%  
Bootstrap-pfa: 9.62e-10  
RollingBand-fgt: 0.83 [5/6]  
GhostDiagnostic-chr: -1.042  
Centroid-sig: 71.4%  
Centroid-so: 0.423 arcsec [0.67 $\sigma$ ]  
OotOffset-rm: 1.284 arcsec [0.81 $\sigma$ ]  
KicOffset-rm: 1.311 arcsec [0.85 $\sigma$ ]  
OotOffset-st: 2/3/3/2 [10]  
KicOffset-st: 2/3/3/2 [10]  
DiffImageQuality-fgm: 0.20 [2/10]  
DiffImageOverlap-fno: 0.12 [2/16]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 17:33:02 Z

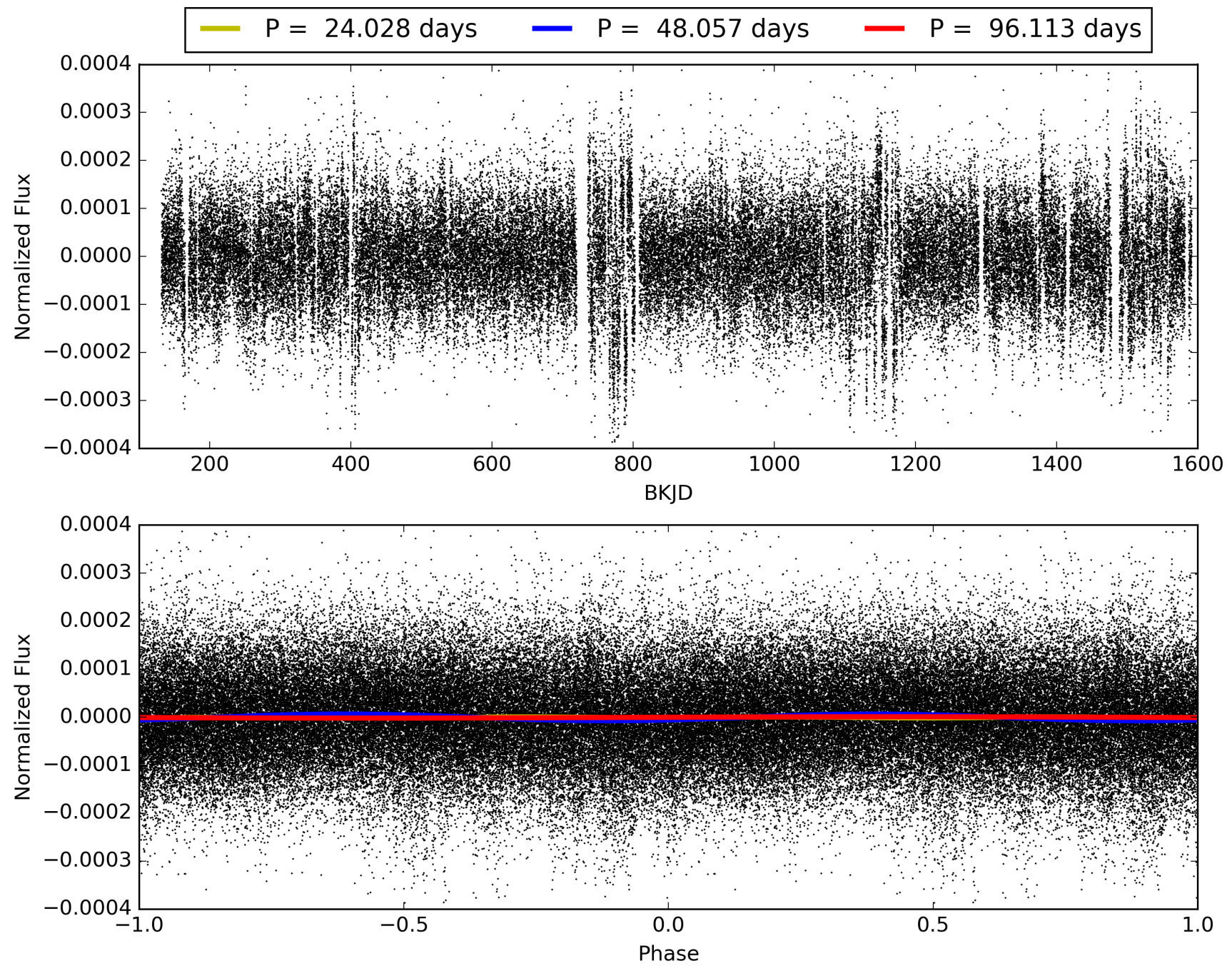
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 012066447-05, PDC Light Curves



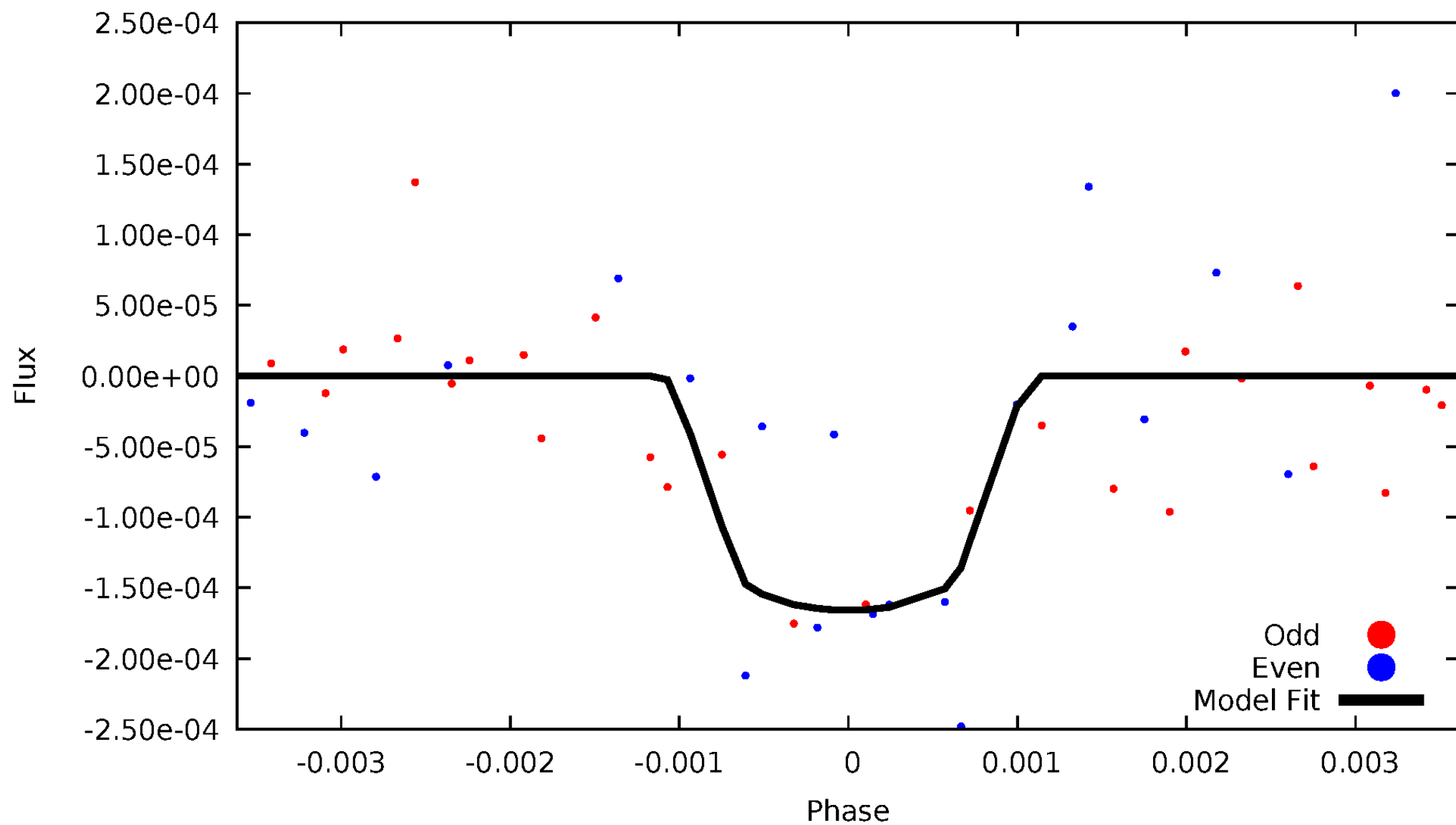


TCE 012066447-05



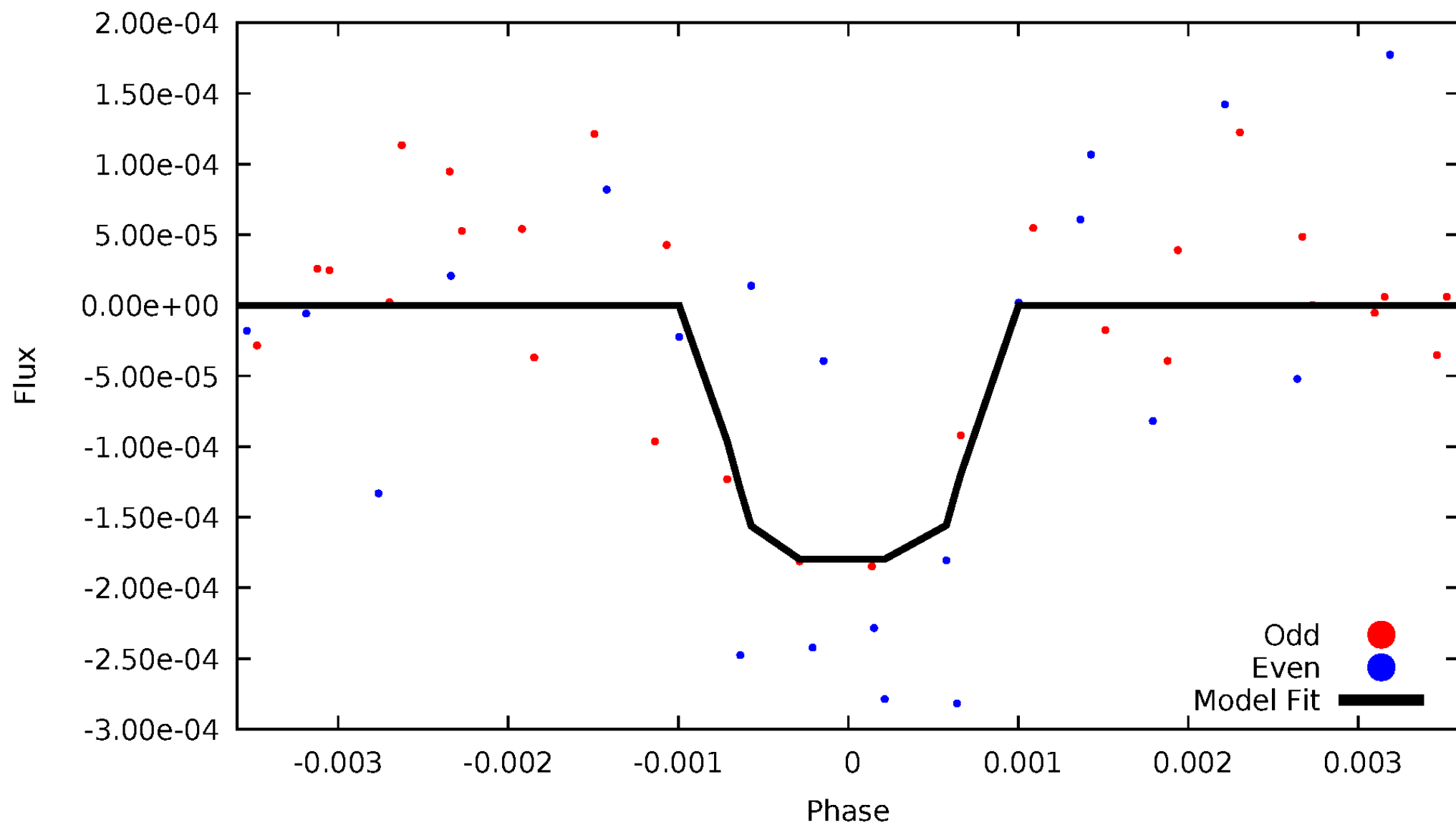
# DV Odd/Even

TCE 012066447-05



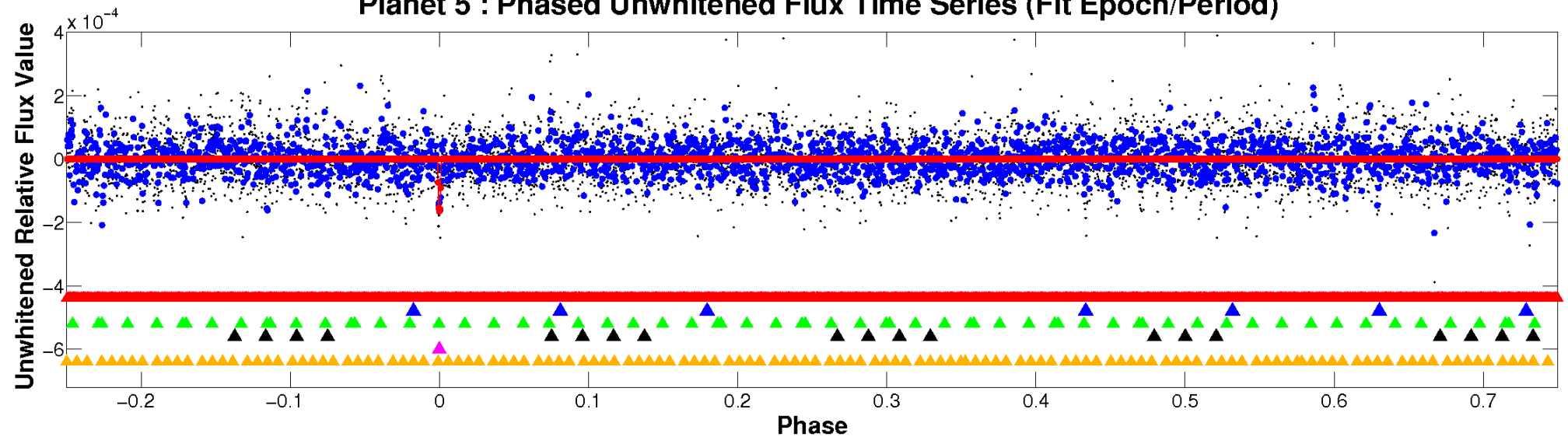
# ALT Odd/Even

TCE 012066447-05

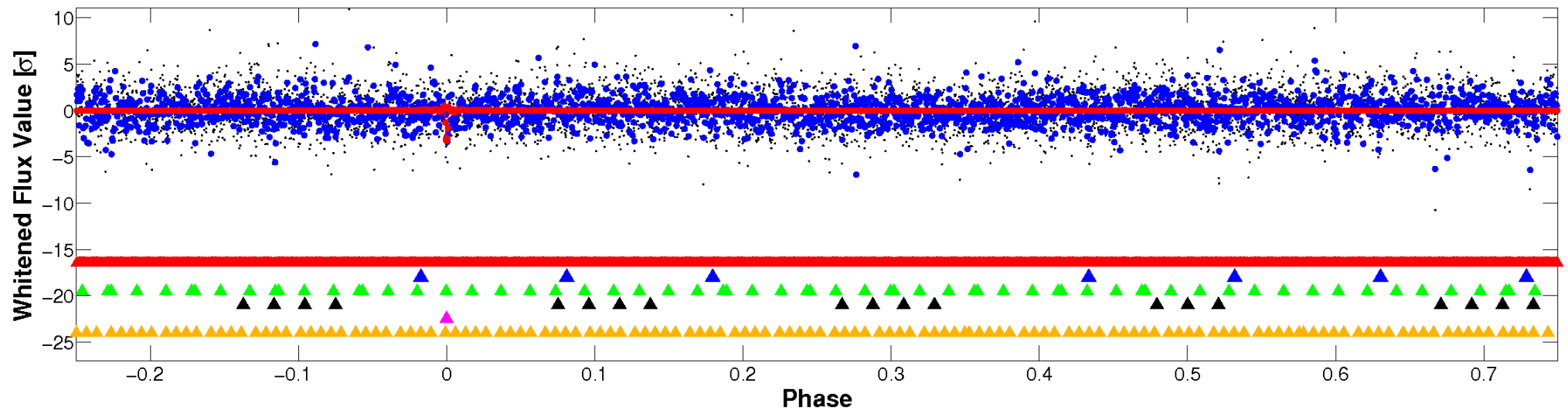


# Non-Whitened Vs. Whitened Light Curve

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

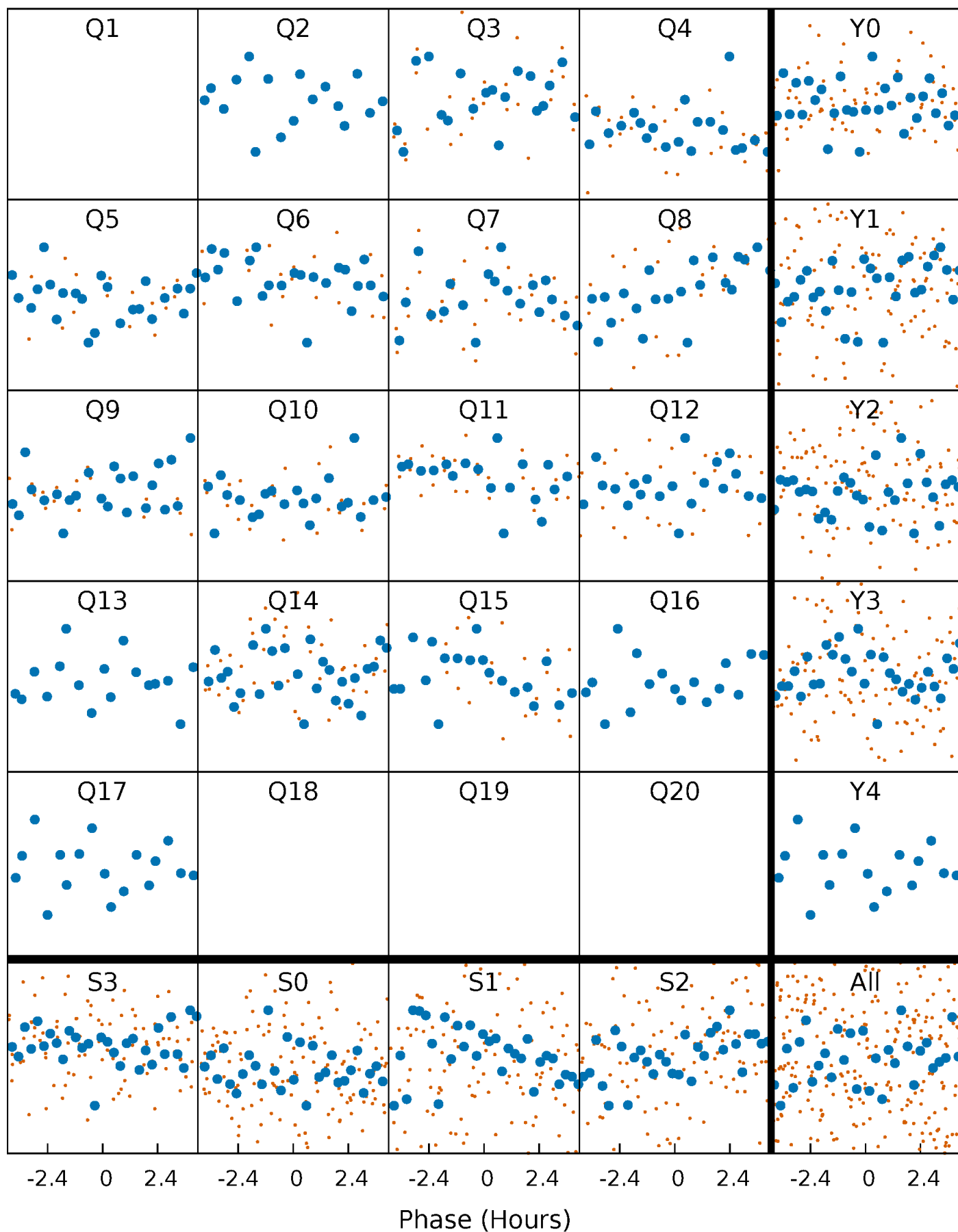


Planet 5 : Phased Whitened Flux Time Series (Fit Epoch/Period)



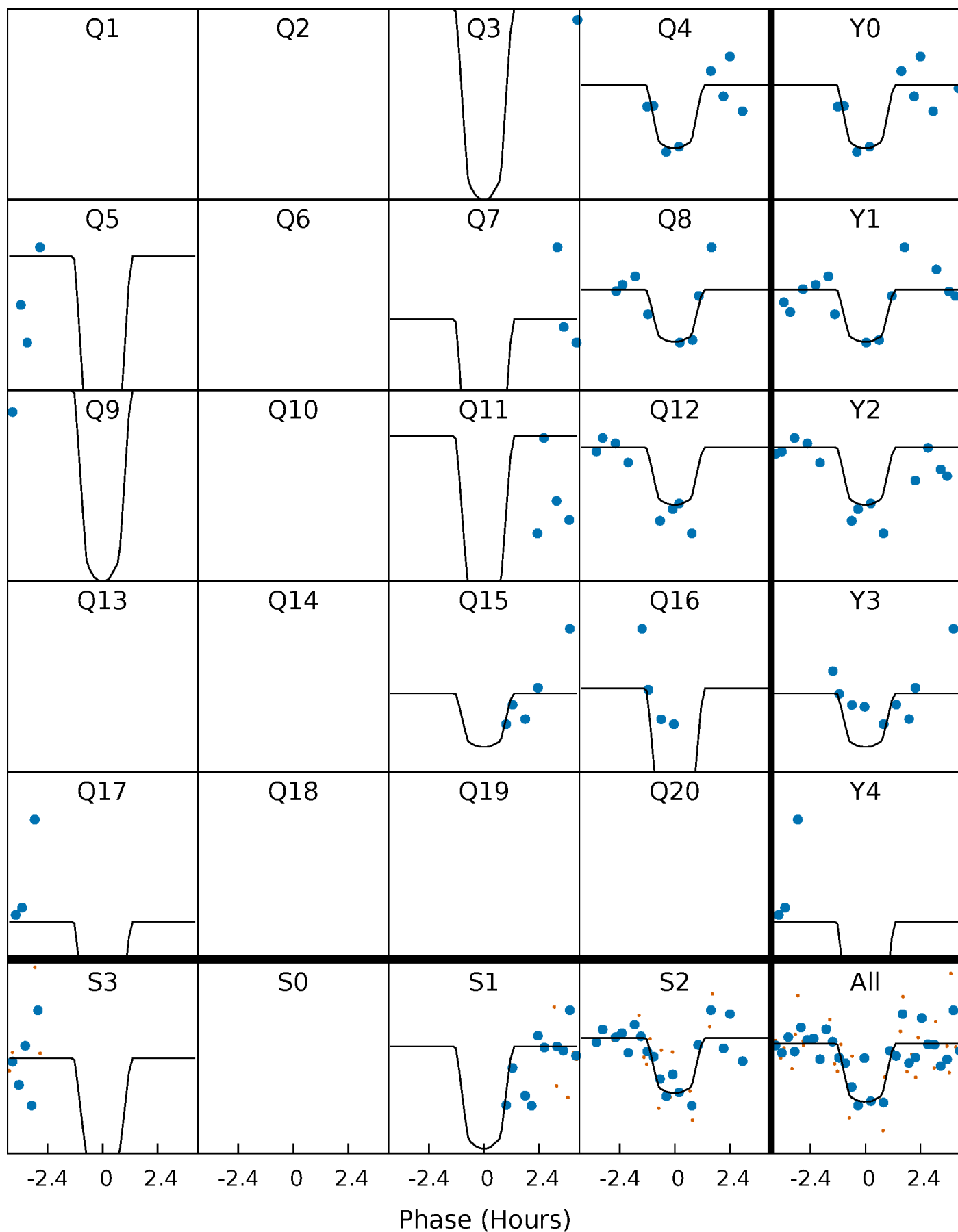
# PDC Quarter-Phased Transit Curves

TCE 012066447-05     $P = 48.056665$  Days     $T_0 = 169.097957$  (BKJD)



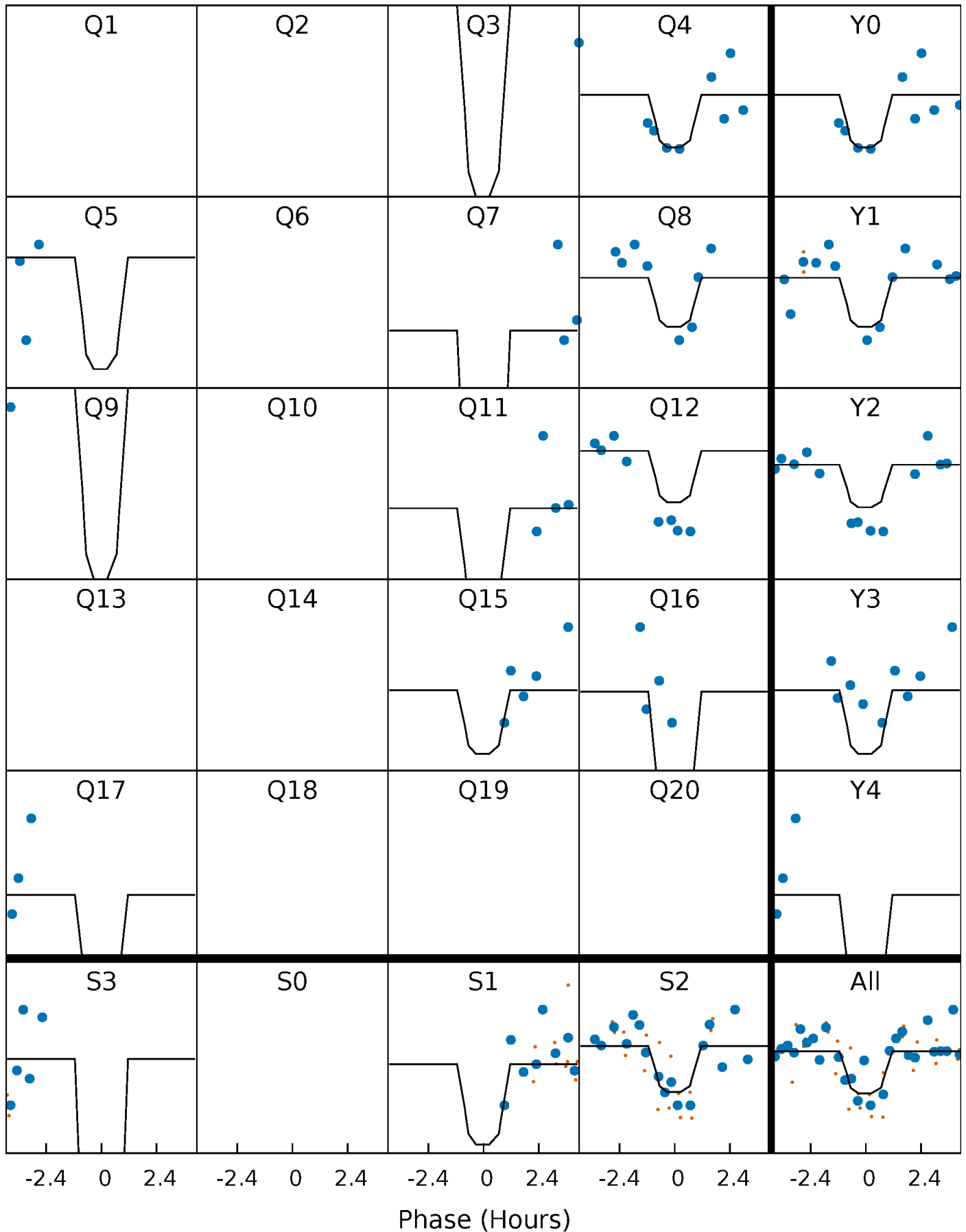
# DV Quarter-Phased Transit Curves

TCE 012066447-05     $P = 48.056665$  Days     $T_0 = 169.097957$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 012066447-05     $P = 48.056863$  Days     $T_0 = 169.095303$  (BKJD)

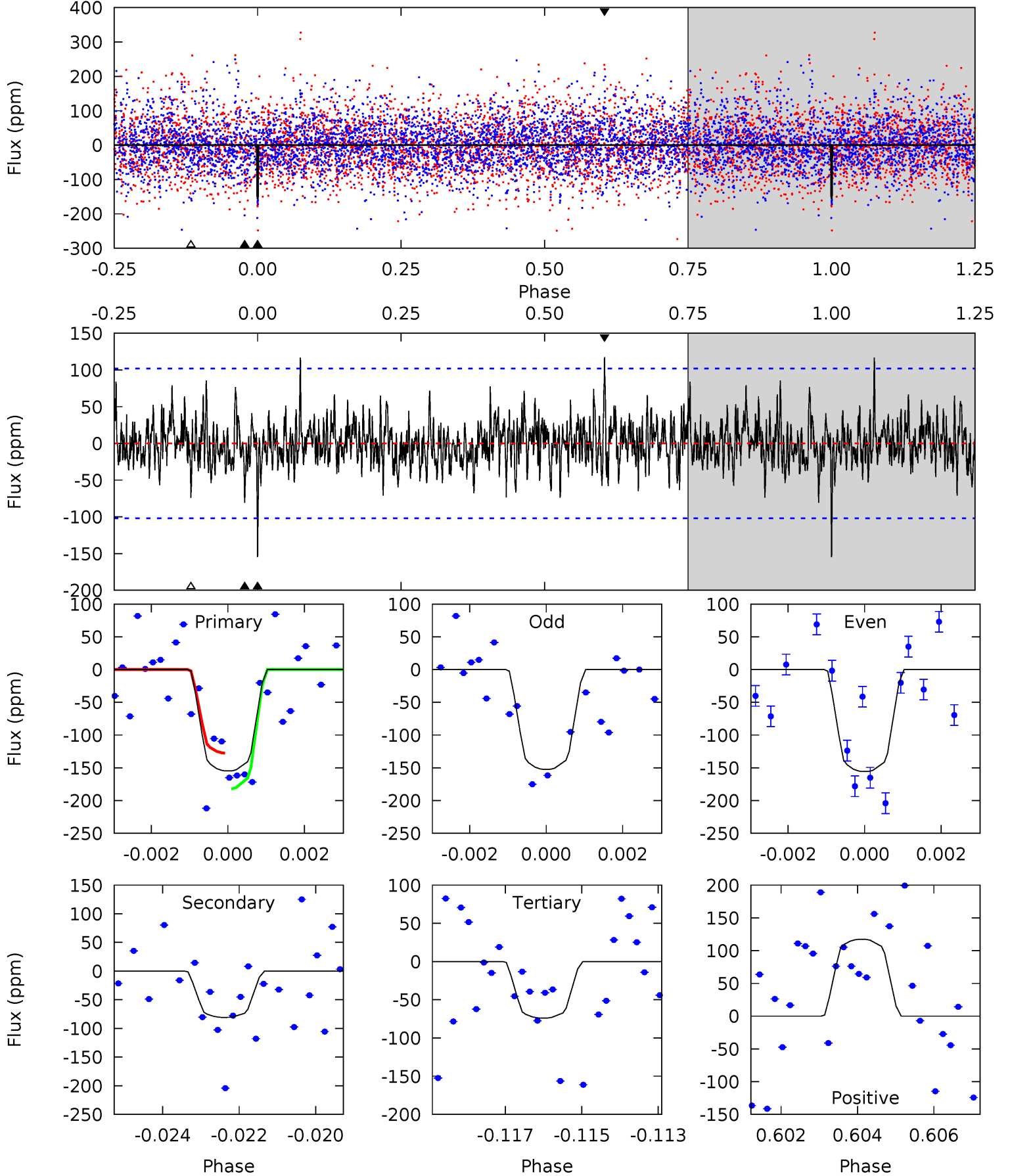




# DV Model-Shift Uniqueness Test

012066447-05,  $P = 48.056665$  Days,  $E = 121.041292$  Days

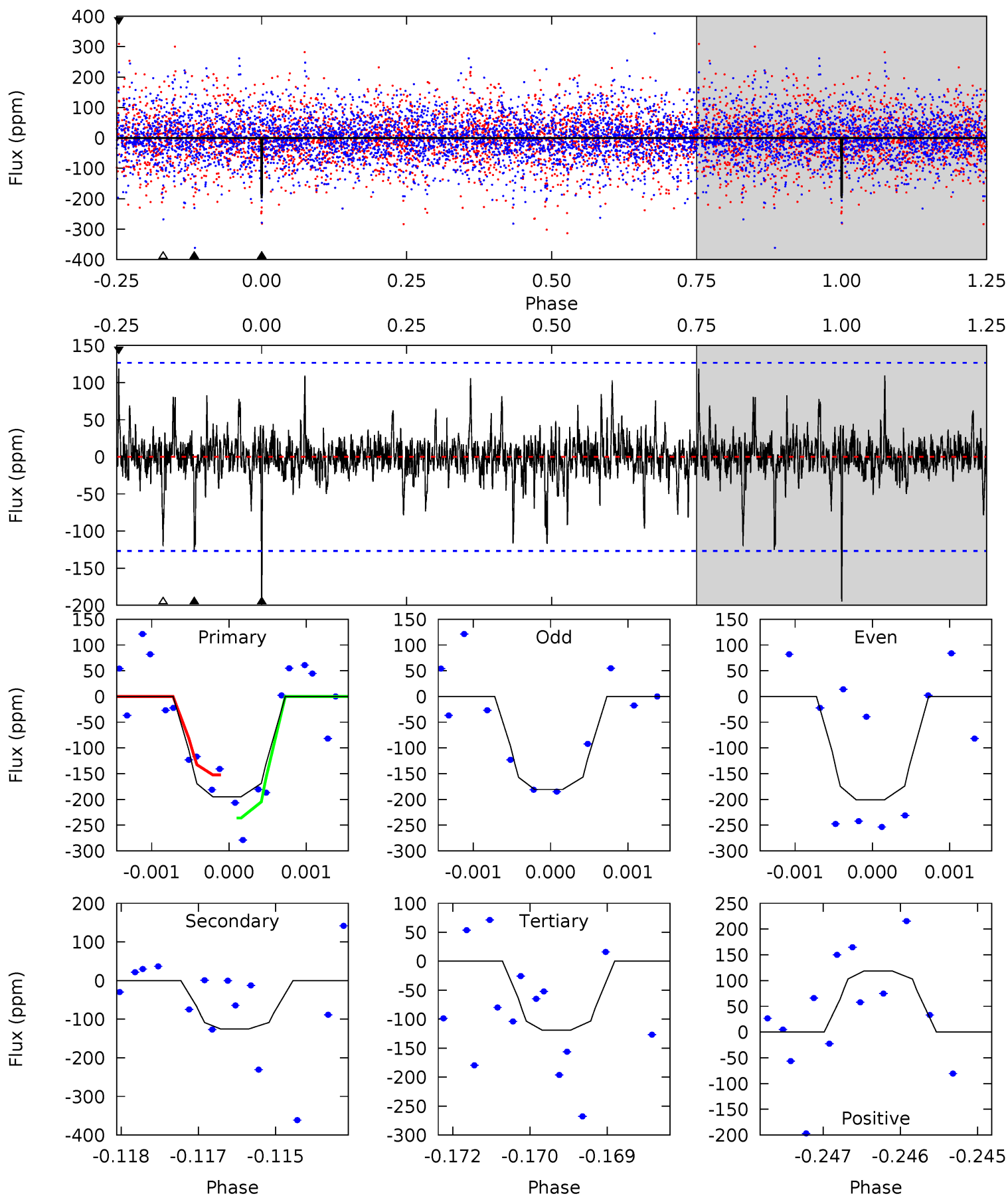
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.06	4.21	3.85	6.11	5.31	3.06	1.32	4.20	1.95	0.35	-1.90	0.08	0.88	0.43	1.41



# Alt Model-Shift Uniqueness Test

012066447-05, P = 48.056863 Days, E = 121.038440 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
8.30	5.33	5.07	5.05	5.39	3.20	1.02	3.23	3.24	0.26	0.28	0.35	0.88	0.38	1.80



### Stellar Parameters For KIC 012066447

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7479^{+206}_{-335}$	$4.130^{+0.105}_{-0.195}$	$0.080^{+0.200}_{-0.350}$	$1.837^{+0.569}_{-0.350}$	$1.658^{+0.207}_{-0.253}$	$0.377^{+0.216}_{-0.184}$
	+3%/-4%	+3%/-5%	+250%/-438%	+31%/-19%	+12%/-15%	+57%/-49%
Source	PHO54	PHO54	PHO54	DSEP		

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

### Secondary Eclipse Parameters for KIC 012066447-05 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-81 \pm 19$	$3.30^{+2.51}_{-2.20}$	$1140^{+85}_{-76}$	$5589^{+4845}_{-1315}$	$380^{+2954}_{-271}$
Alt.	$-125 \pm 23$	$3.41^{+2.84}_{-2.14}$	$1138^{+88}_{-72}$	$6040^{+5475}_{-1441}$	$553^{+3670}_{-393}$

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

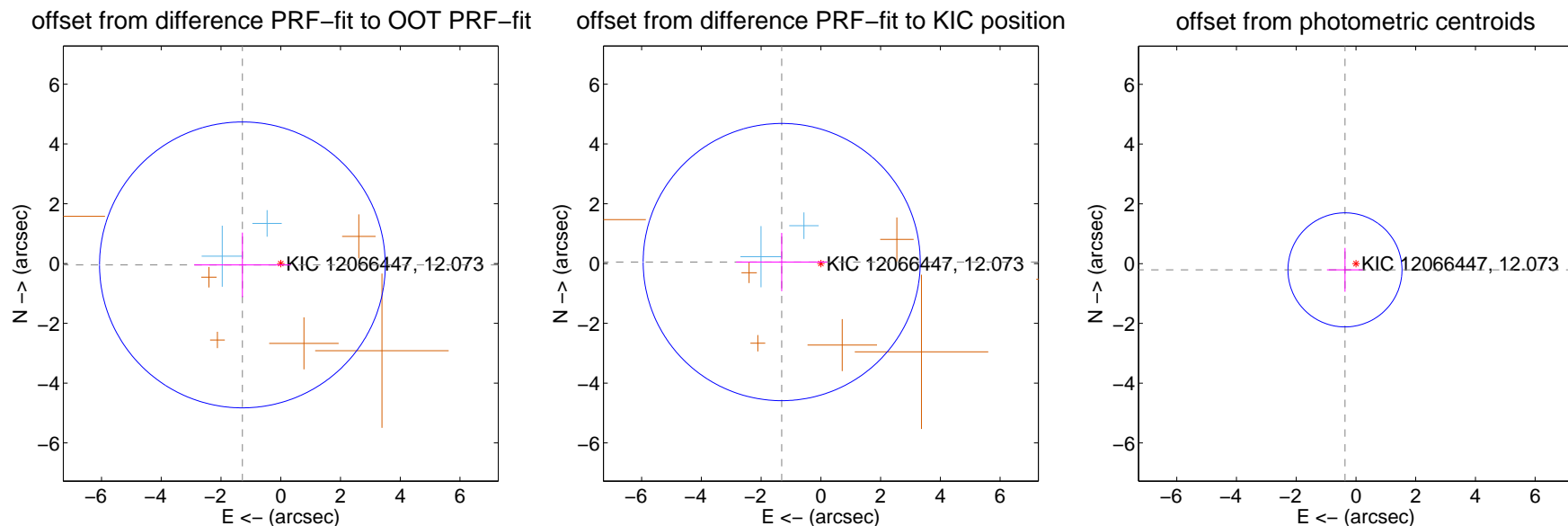
## DV Centroid Data

Supplemental centroid analysis for 012066447-05. Kepler magnitude: 12.07. Transit SNR 10.13

There are 2 quarters with good PRF difference image offsets

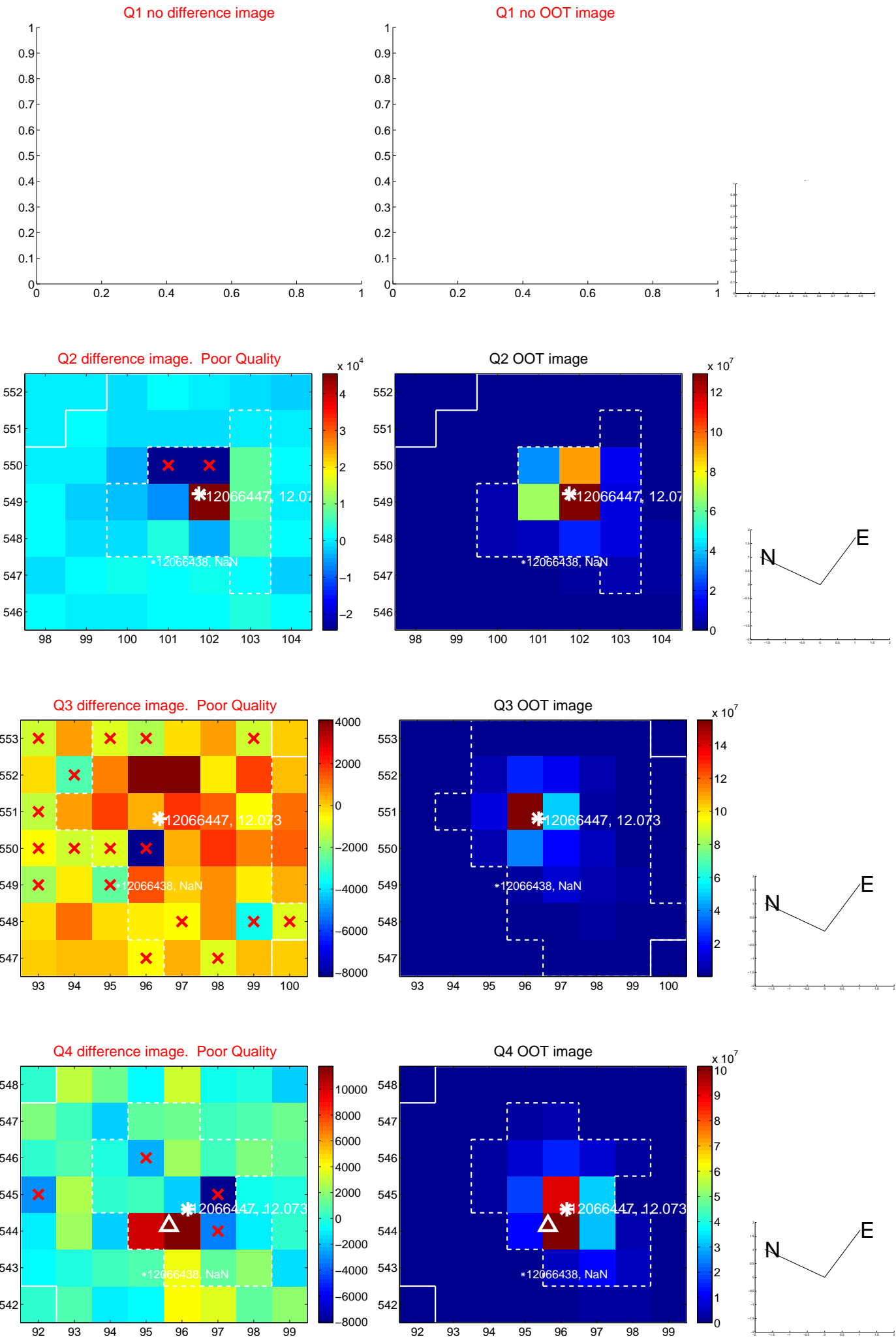
The direct PRF centroid is offset from the target star catalog position by about 0.12 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.284 \pm 1.594$	0.81	$1.283 \pm 1.617$	$-0.046 \pm 1.080$
PRF-fit source offset from KIC position	$1.311 \pm 1.545$	0.85	$1.310 \pm 1.525$	$0.049 \pm 0.974$
photometric centroid source offset	$0.42 \pm 0.64$	0.67	$0.37 \pm 0.60$	$-0.21 \pm 0.73$

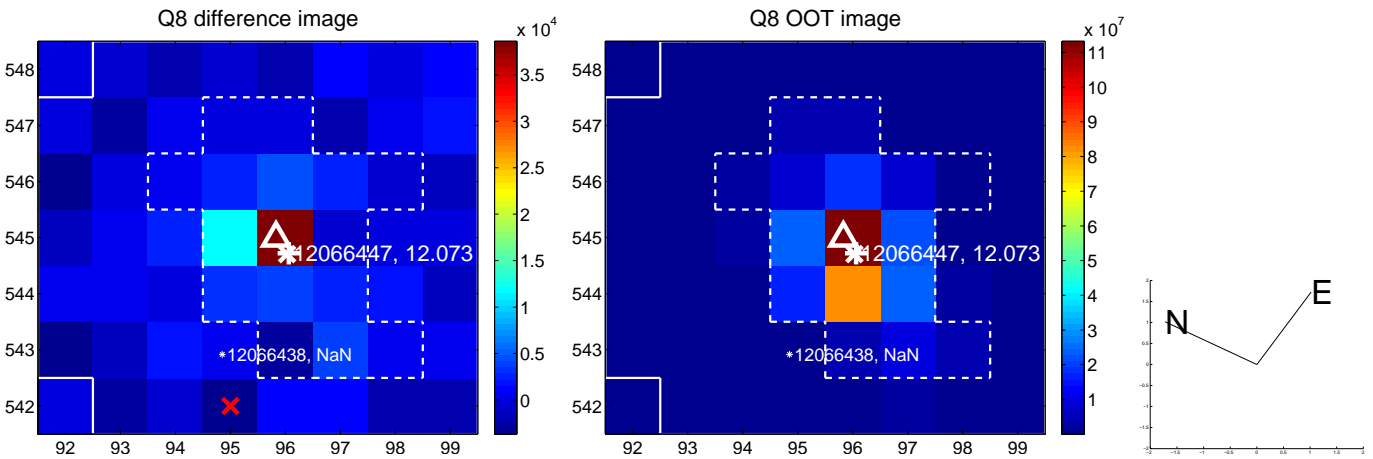
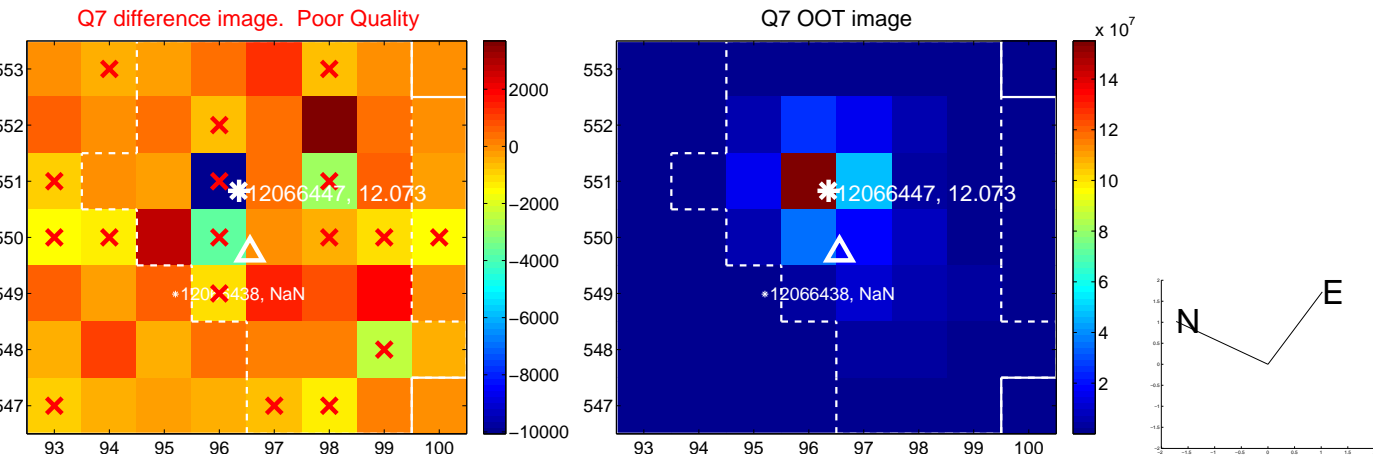
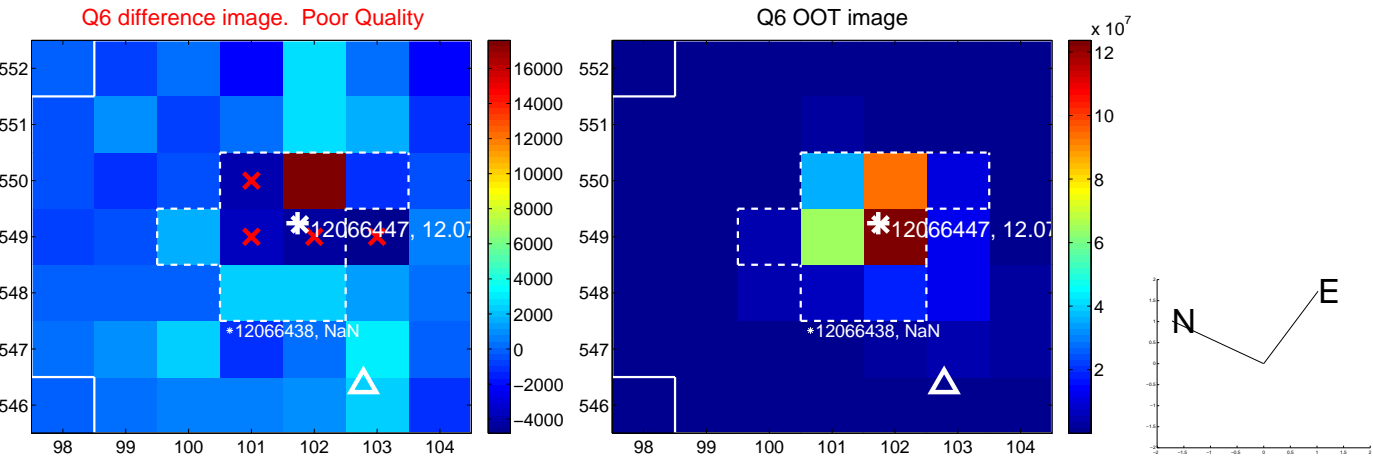
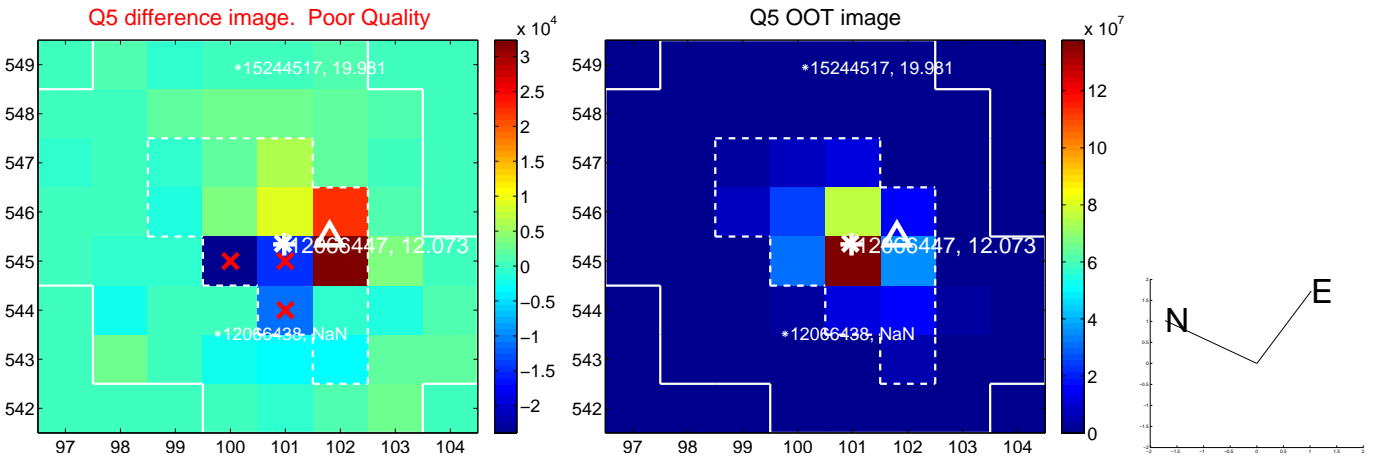


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

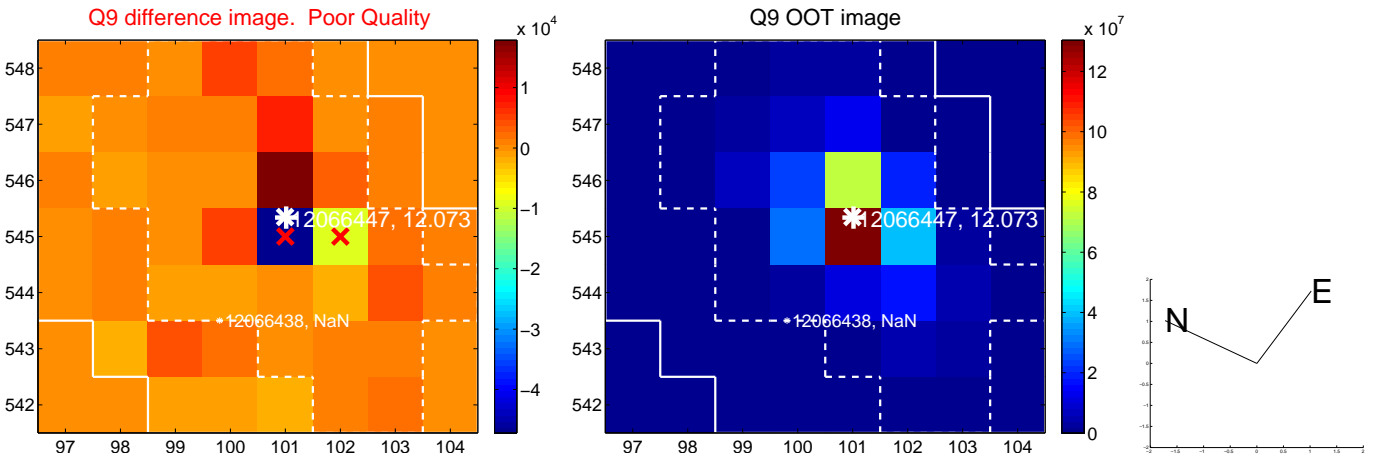
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

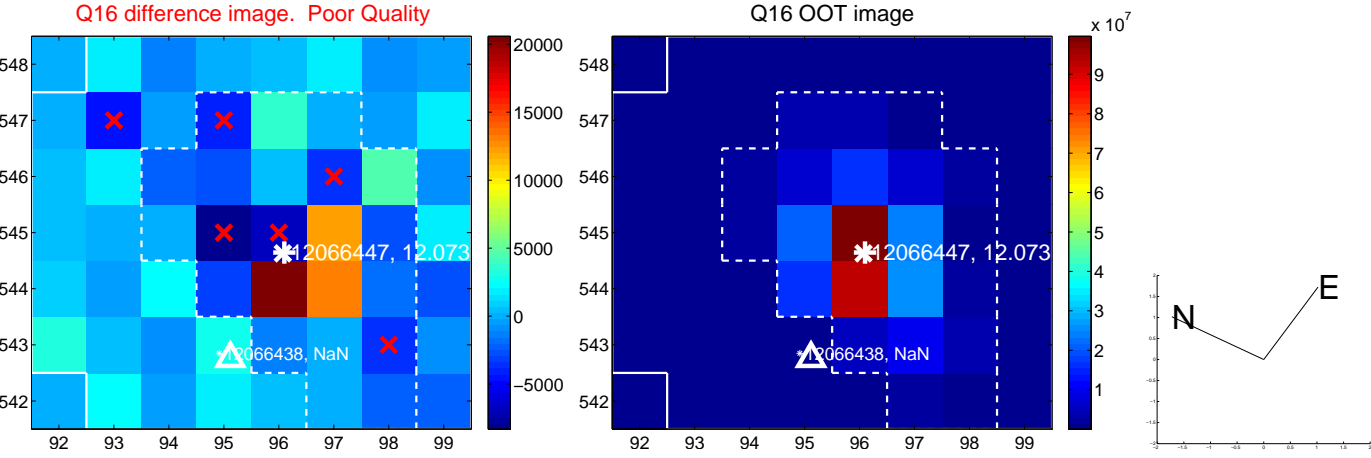
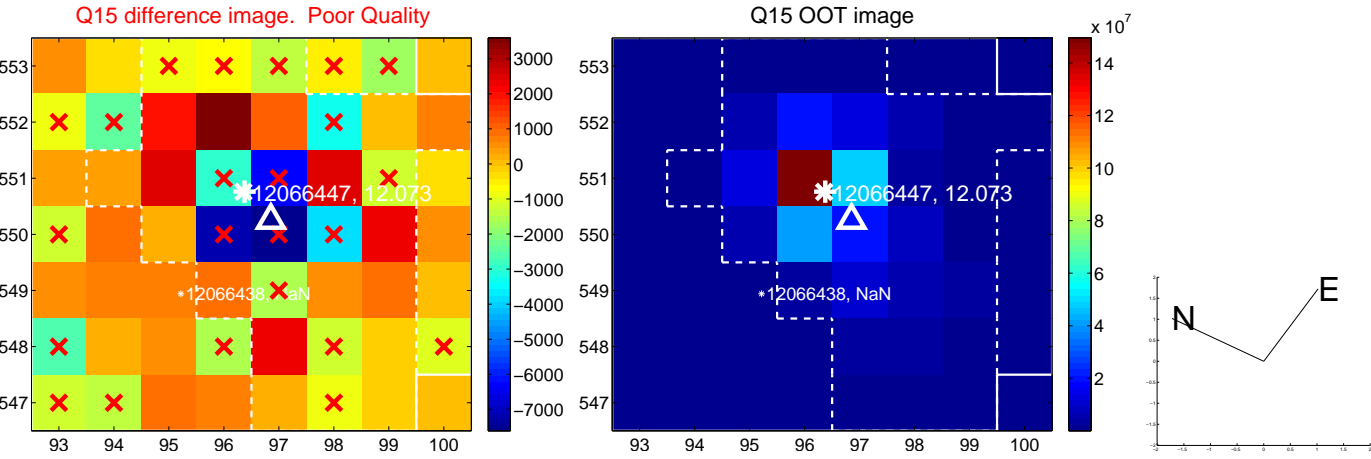
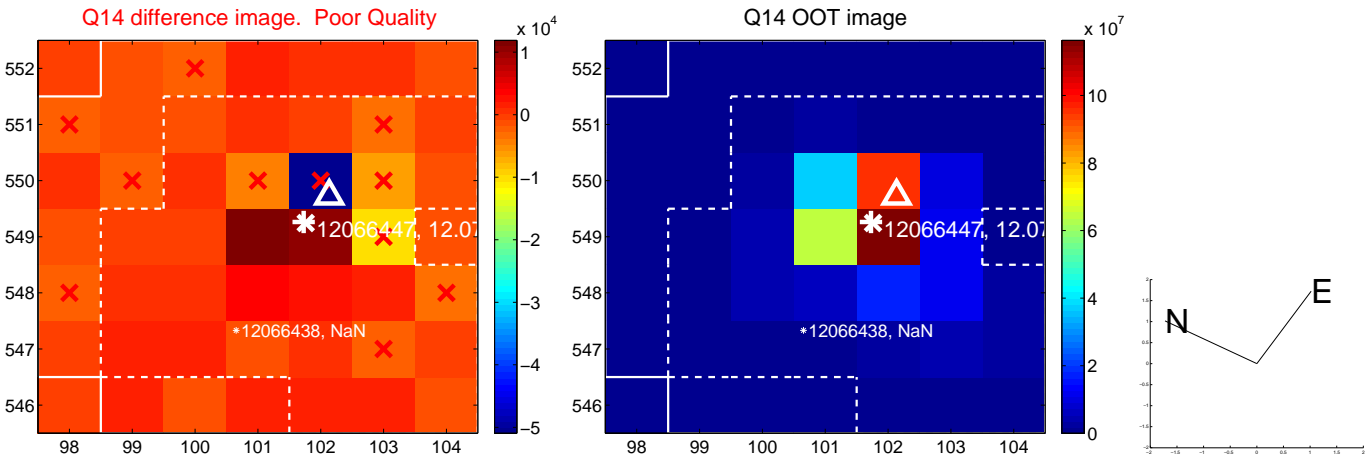
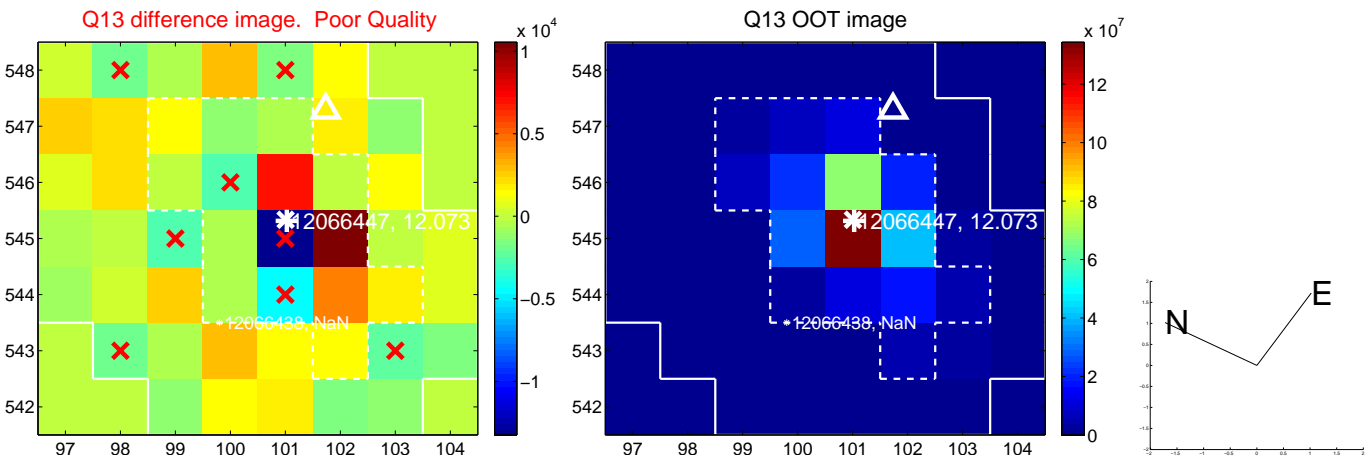


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

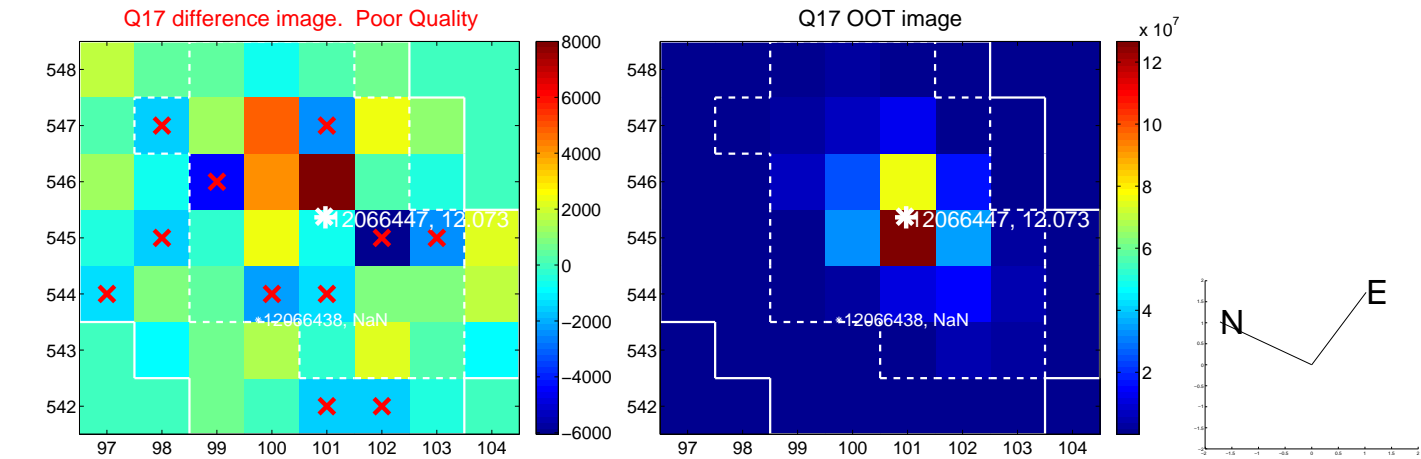




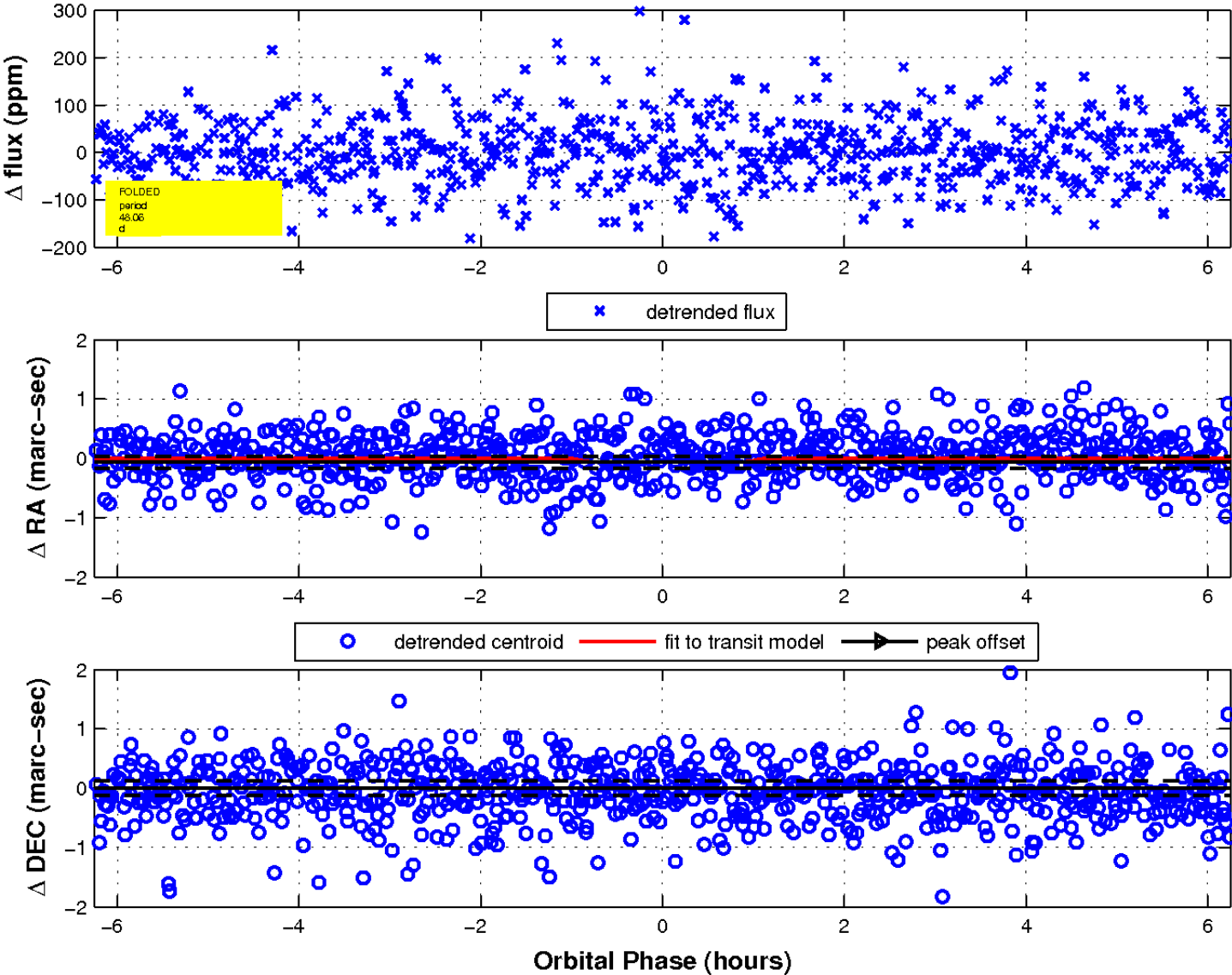
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

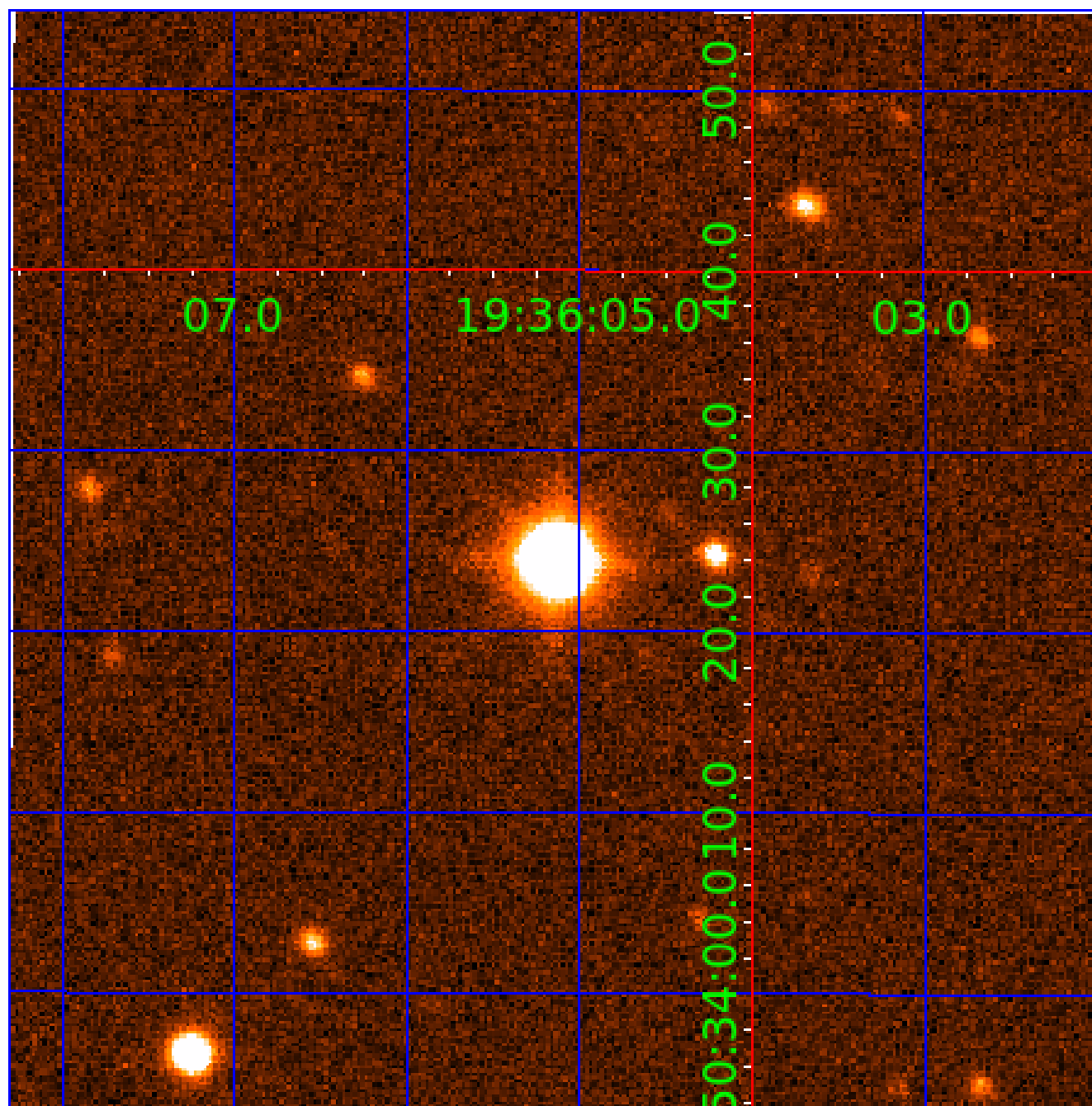


fluxWeightedCentroids, Planet 5 of 6



UKIRT Image

Declination



# KIC 012066447

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
012066447-01	OBS	No	0.904494	132.122095	3.9	6.417	10.1	5.5	1.84	7479	0.37	20127.99
012066447-02	OBS	No	213.889154	252.178361	198.2	8.721	12.1	12.0	1.84	7479	2.69	13.76
012066447-03	OBS	No	22.670309	143.588777	134.8	1.984	11.6	10.4	1.84	7479	2.36	274.41
012066447-04	OBS	No	76.691016	175.708725	264.6	4.367	14.1	14.1	1.84	7479	3.28	54.04
012066447-05	OBS	No	48.056665	169.097957	165.8	2.084	11.4	10.1	1.84	7479	2.66	100.77
012066447-06	OBS	No	10.840935	137.846391	88.7	3.025	11.9	10.7	1.84	7479	2.00	733.81

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
012066447-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—CENT_FEW_MEAS
012066447-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
012066447-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_MEAS
012066447-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
012066447-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
012066447-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT

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

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

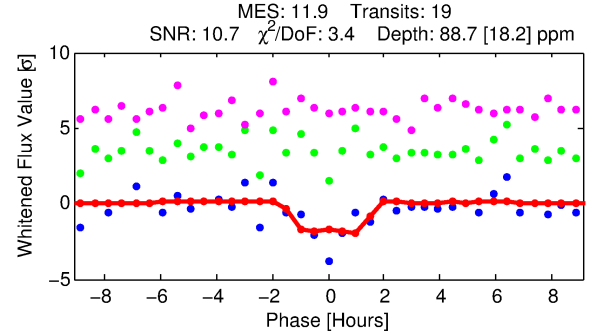
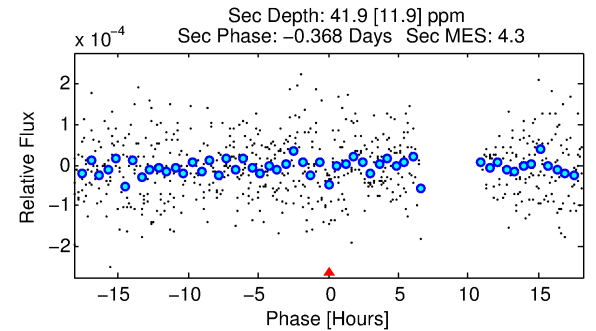
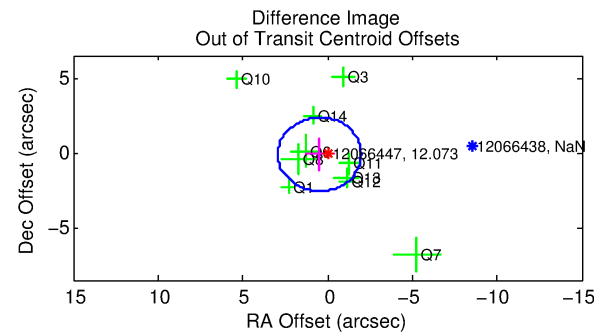
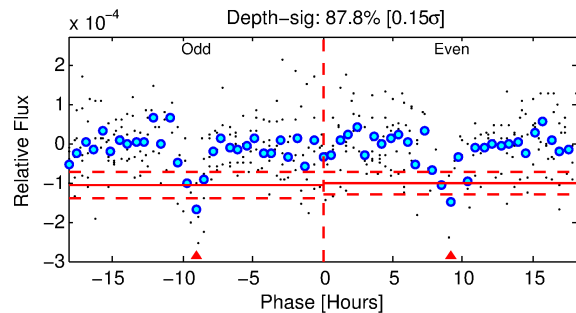
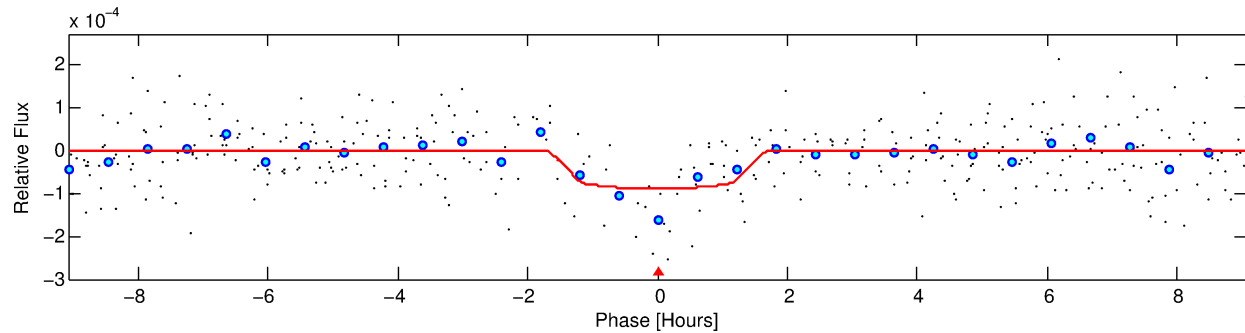
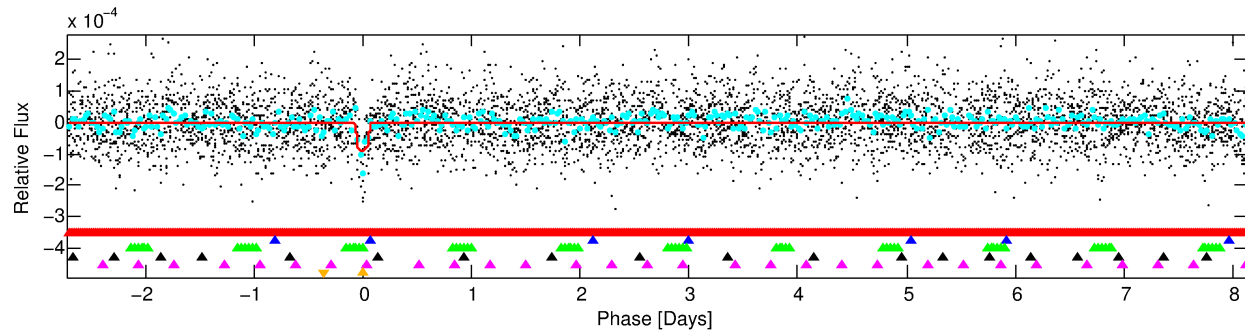
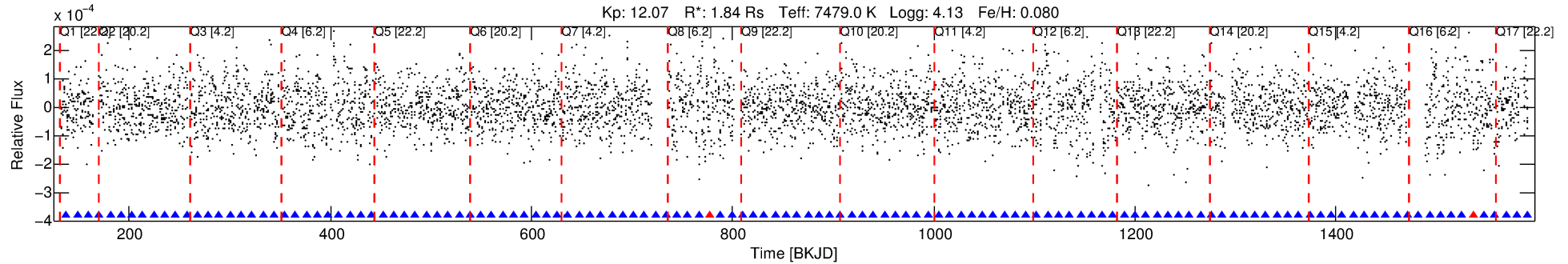
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 012066447-06

No Significant Match Found

# DV One-Page Summary

KIC: 12066447 Candidate: 6 of 6 Period: 10.841 d



## DV Fit Results:

Period = 10.84094 [0.00016] d  
Epoch = 137.8464 [0.0150] BKJD  
Rp/R\* = 0.0100 [0.0085]  
a/R\* = 12.58 [70.39]  
b = 0.90 [1.20]  
Seff = 733.81 [297.48]  
Teq = 1327 [135] K  
Rp = 2.00 [1.82] Re  
a = 0.1135 [0.0290] AU  
Ag = 74.16 [131.45] [0.56 $\sigma$ ]  
Teffp = 6021 [2625] K [1.79 $\sigma$ ]

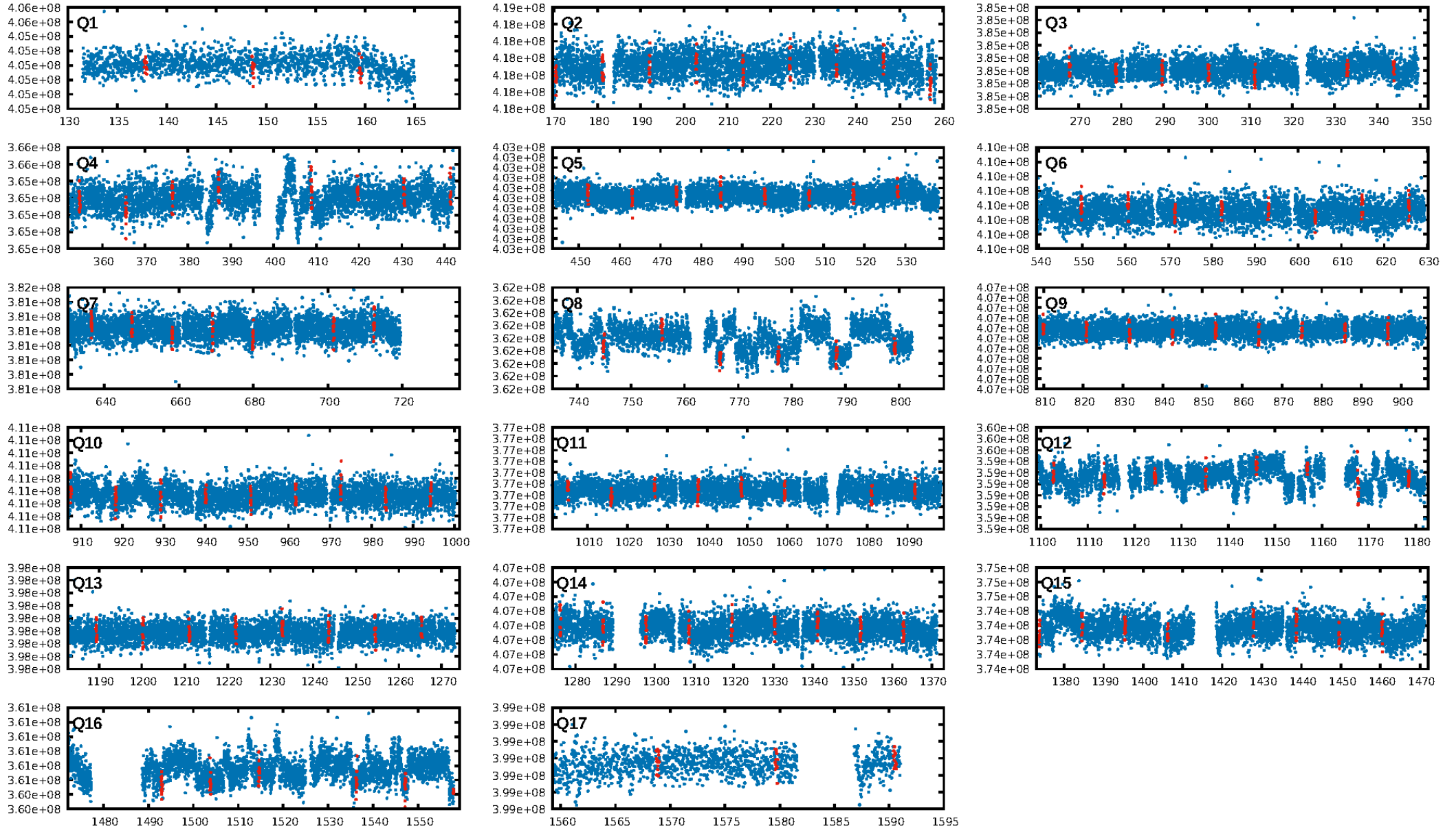
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [33.62 $\sigma$ ]  
LongPeriod-sig: 100.0% [78.47 $\sigma$ ]  
**ModelChiSquare2-sig: 0.0%**  
ModelChiSquareGof-sig: 66.0%  
Bootstrap-pfa: 3.22e-15  
RollingBand-fgt: 0.88 [14/16]  
GhostDiagnostic-chr: -9.058  
**Centroid-sig: 0.2%**  
Centroid-so: 1.305 arcsec [2.45 $\sigma$ ]  
OotOffset-rm: 0.484 arcsec [0.59 $\sigma$ ]  
OotOffset-st: 3/3/2/2 [10]  
KicOffset-rm: 0.533 arcsec [0.66 $\sigma$ ]  
KicOffset-st: 3/3/2/2 [10]  
DiffImageQuality-fgm: 0.40 [4/10]  
DiffImageOverlap-fno: 0.00 [0/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 17:33:05 Z

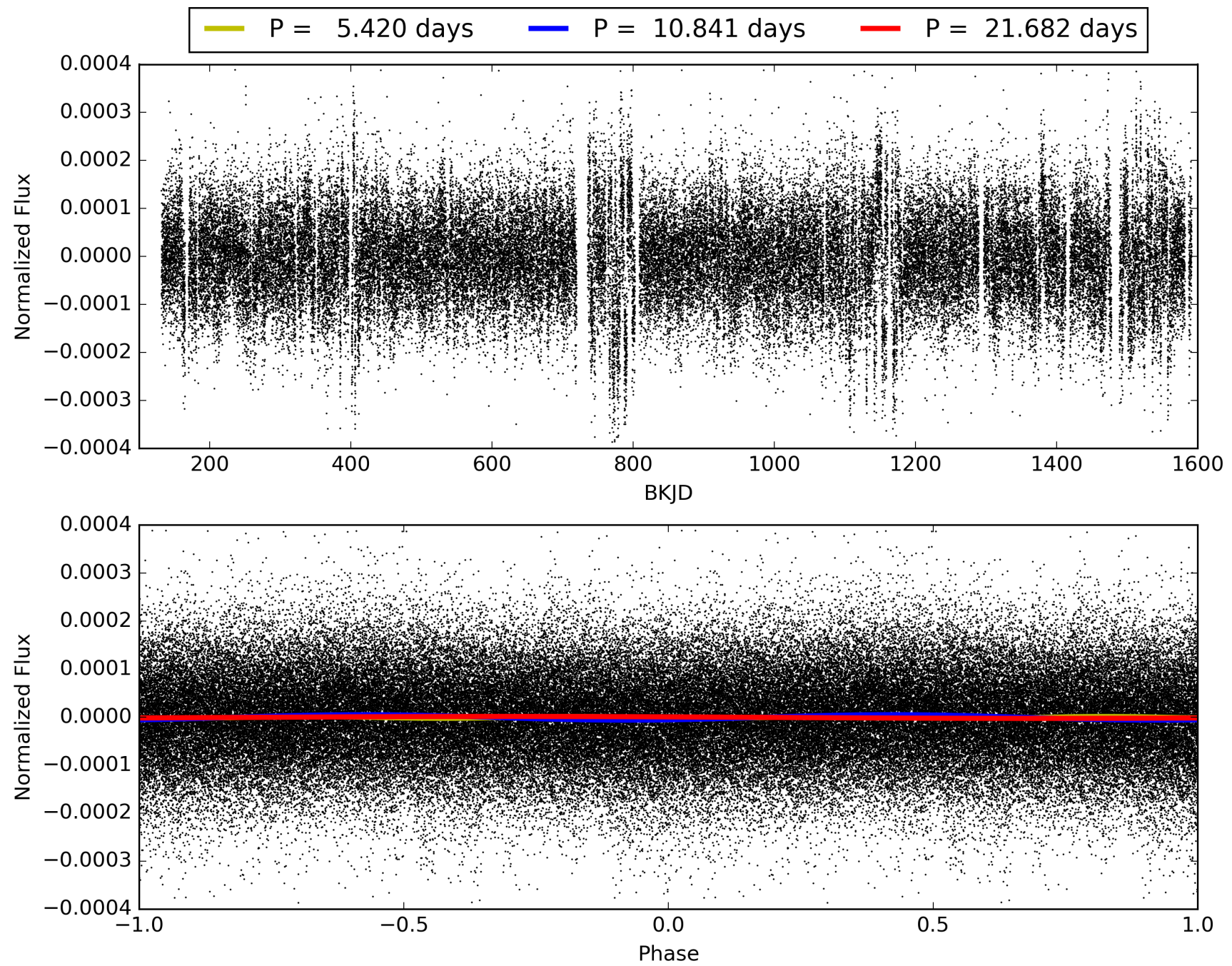
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 012066447-06, PDC Light Curves





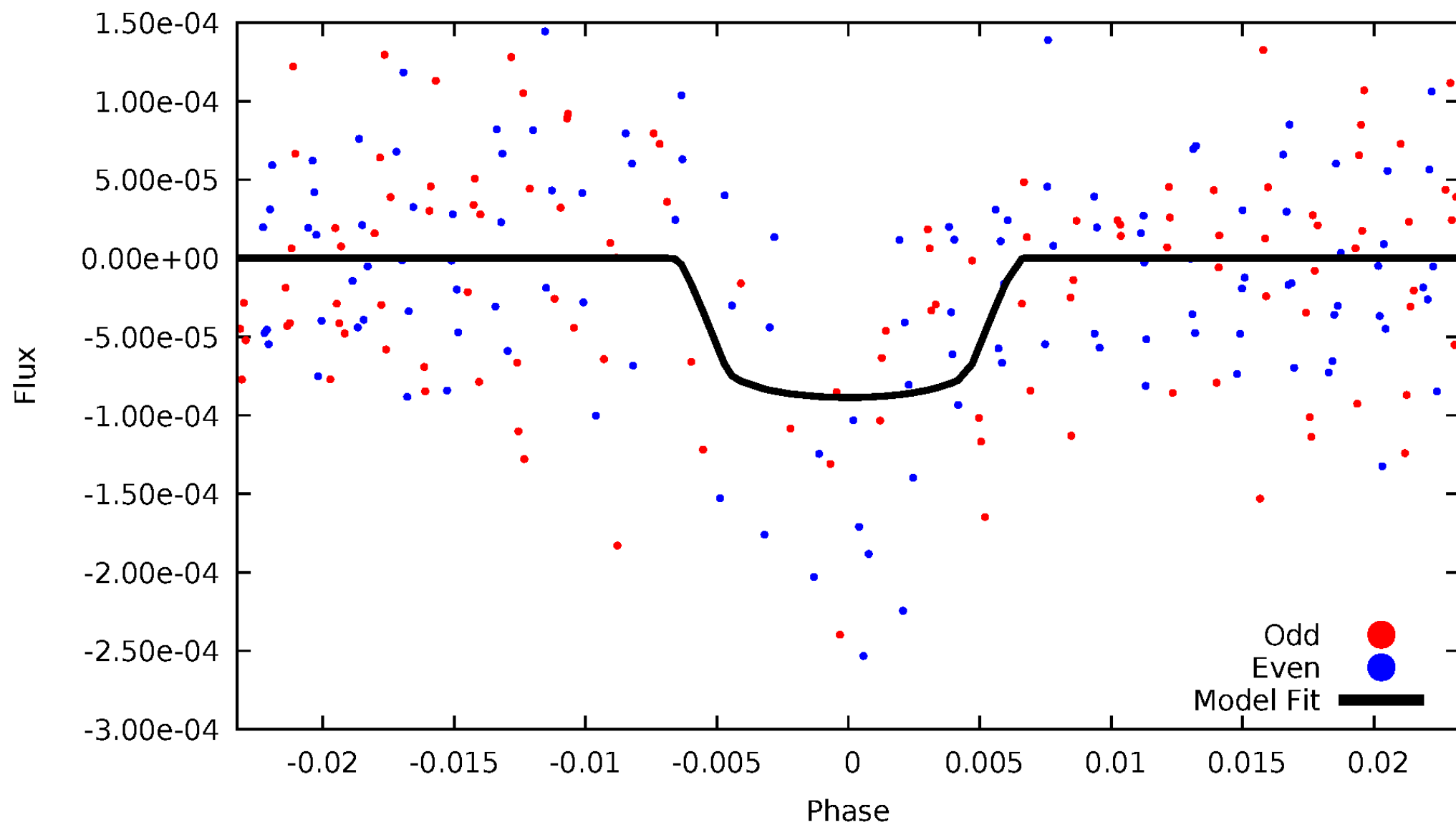
TCE 012066447-06





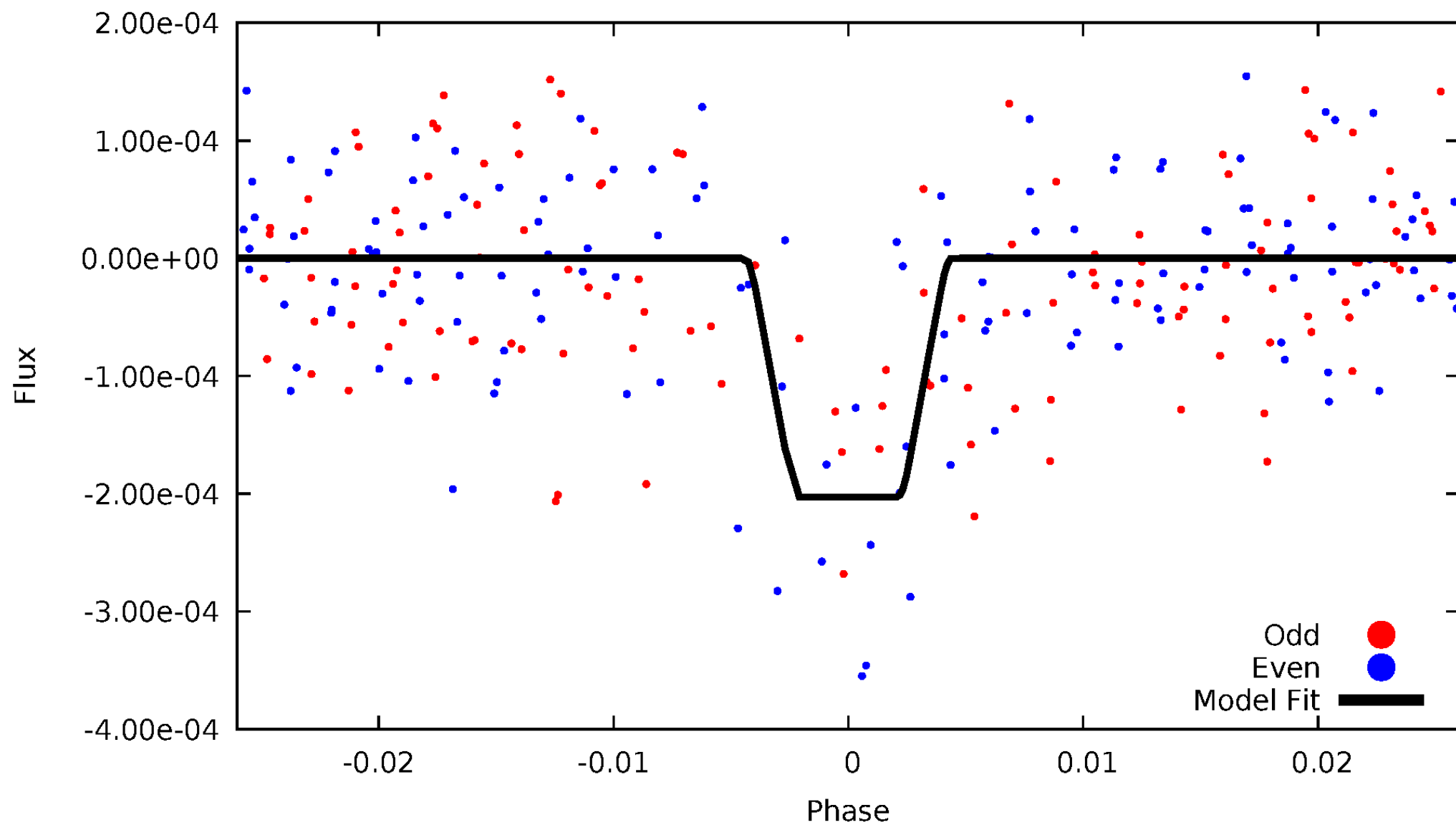
# DV Odd/Even

TCE 012066447-06



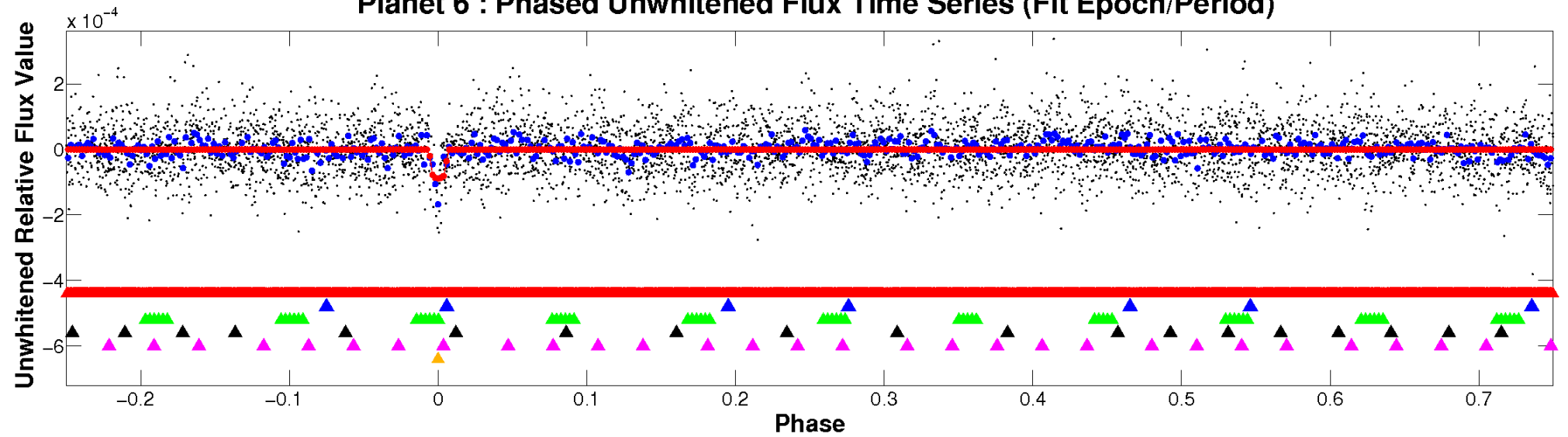
# ALT Odd/Even

TCE 012066447-06

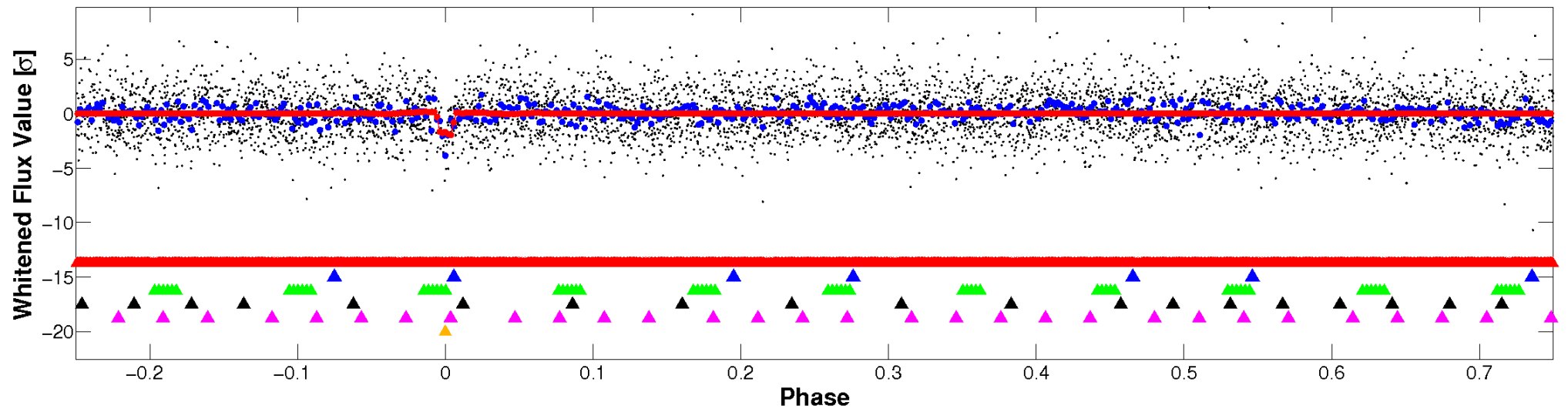


# Non-Whitened Vs. Whitened Light Curve

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

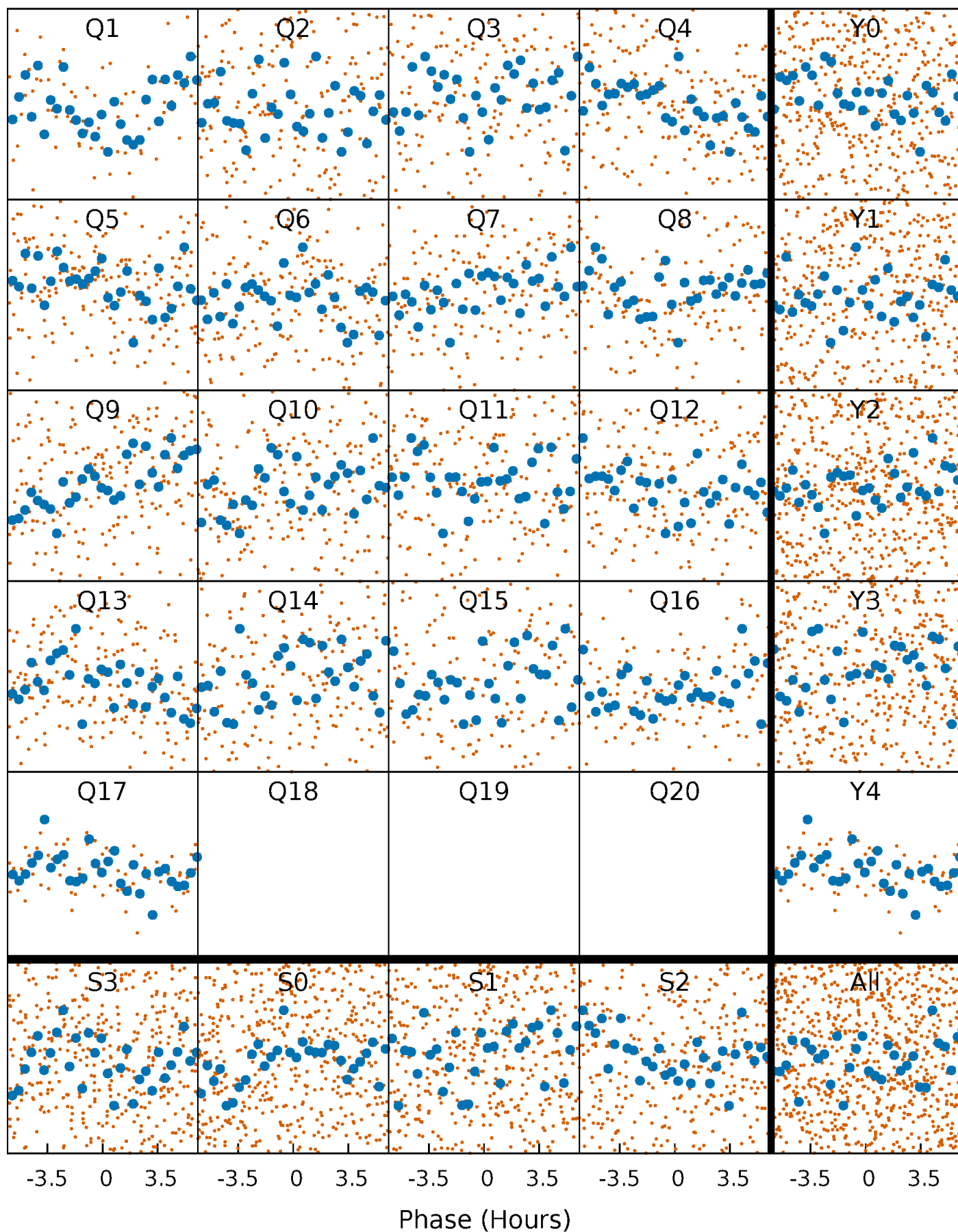


## Planet 6 : Phased Whitened Flux Time Series (Fit Epoch/Period)



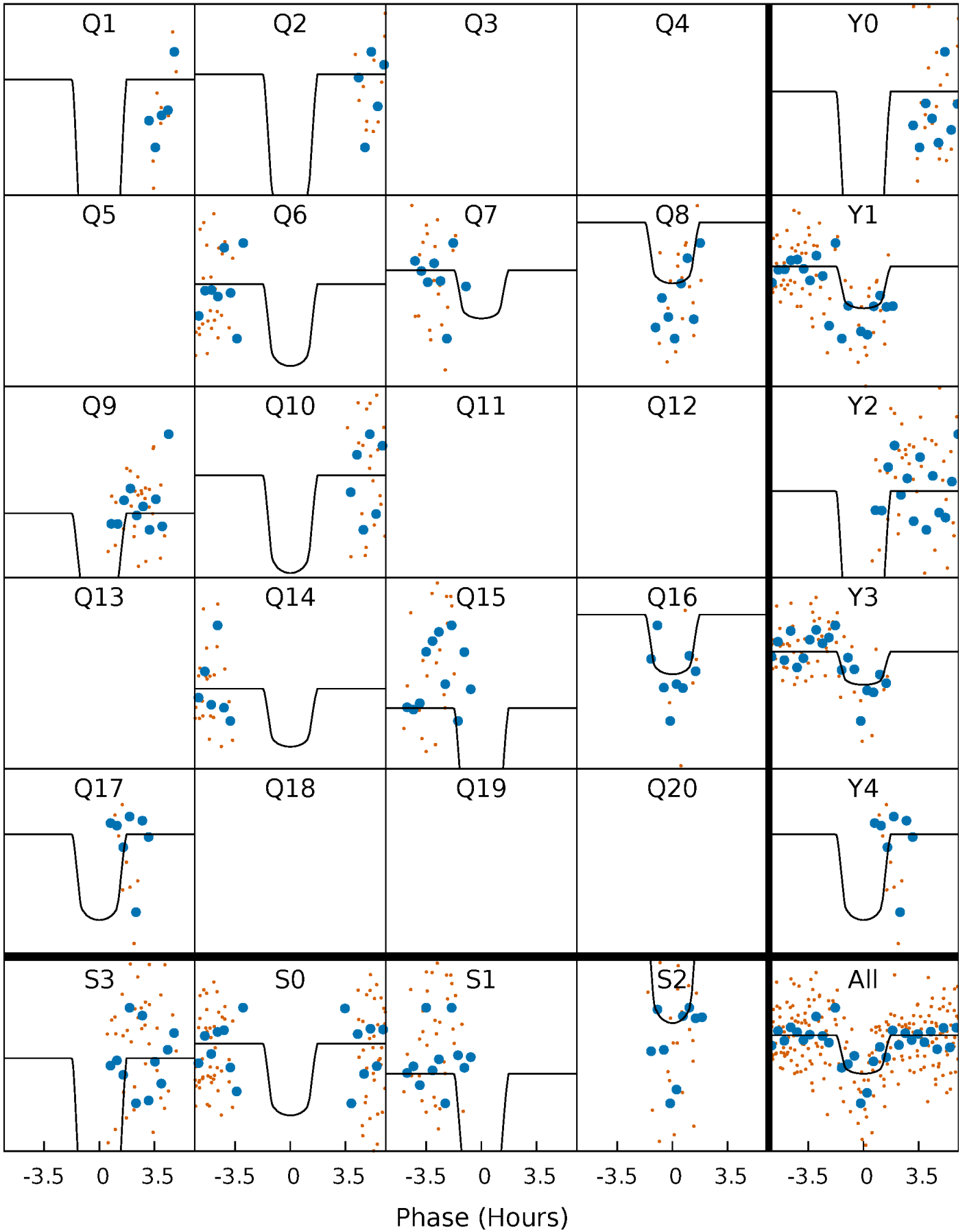
# PDC Quarter-Phased Transit Curves

TCE 012066447-06 P= 10.840935 Days  $T_0=137.846391$  (BKJD)



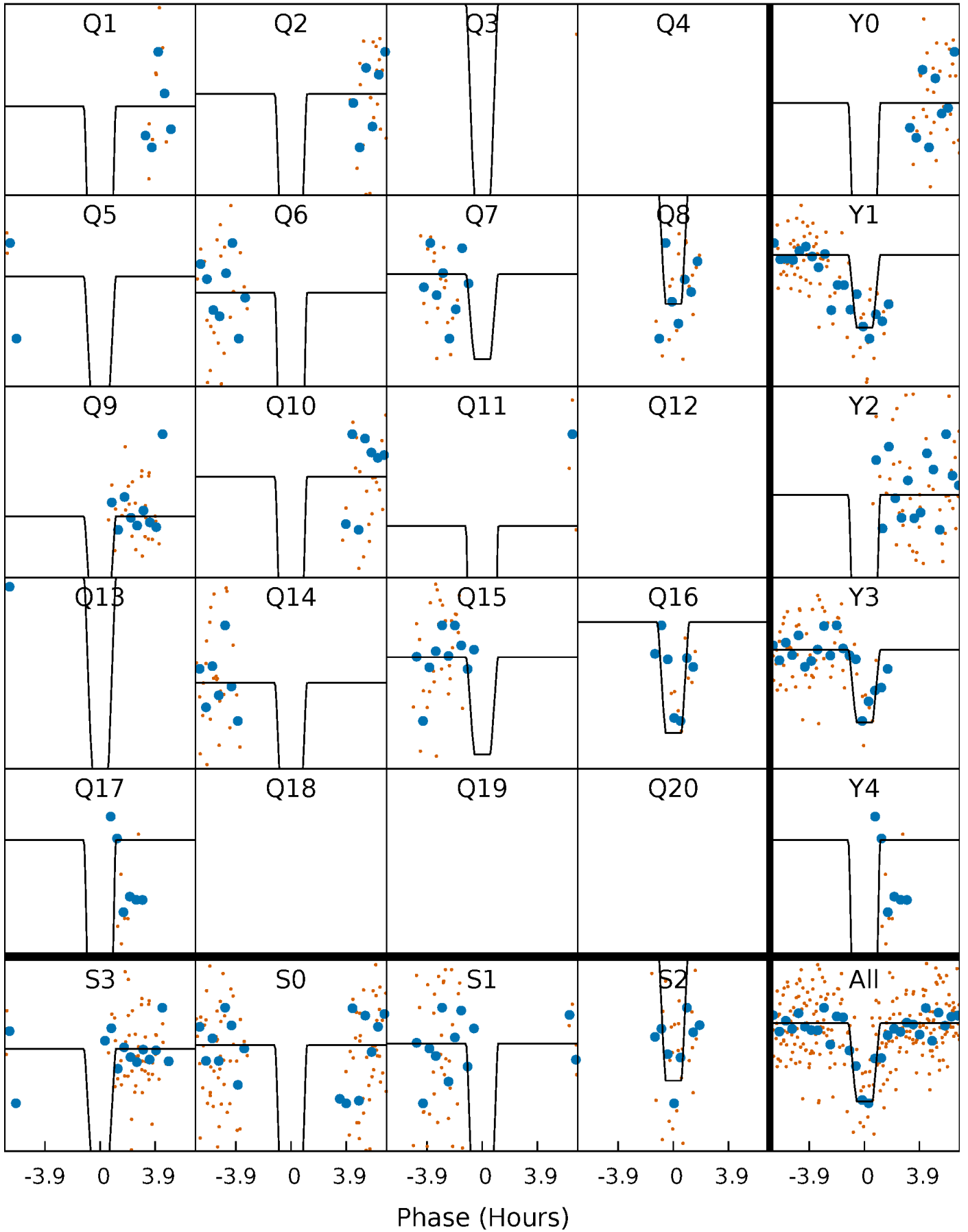
# DV Quarter-Phased Transit Curves

TCE 012066447-06     $P = 10.840935$  Days     $T_0 = 137.846391$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

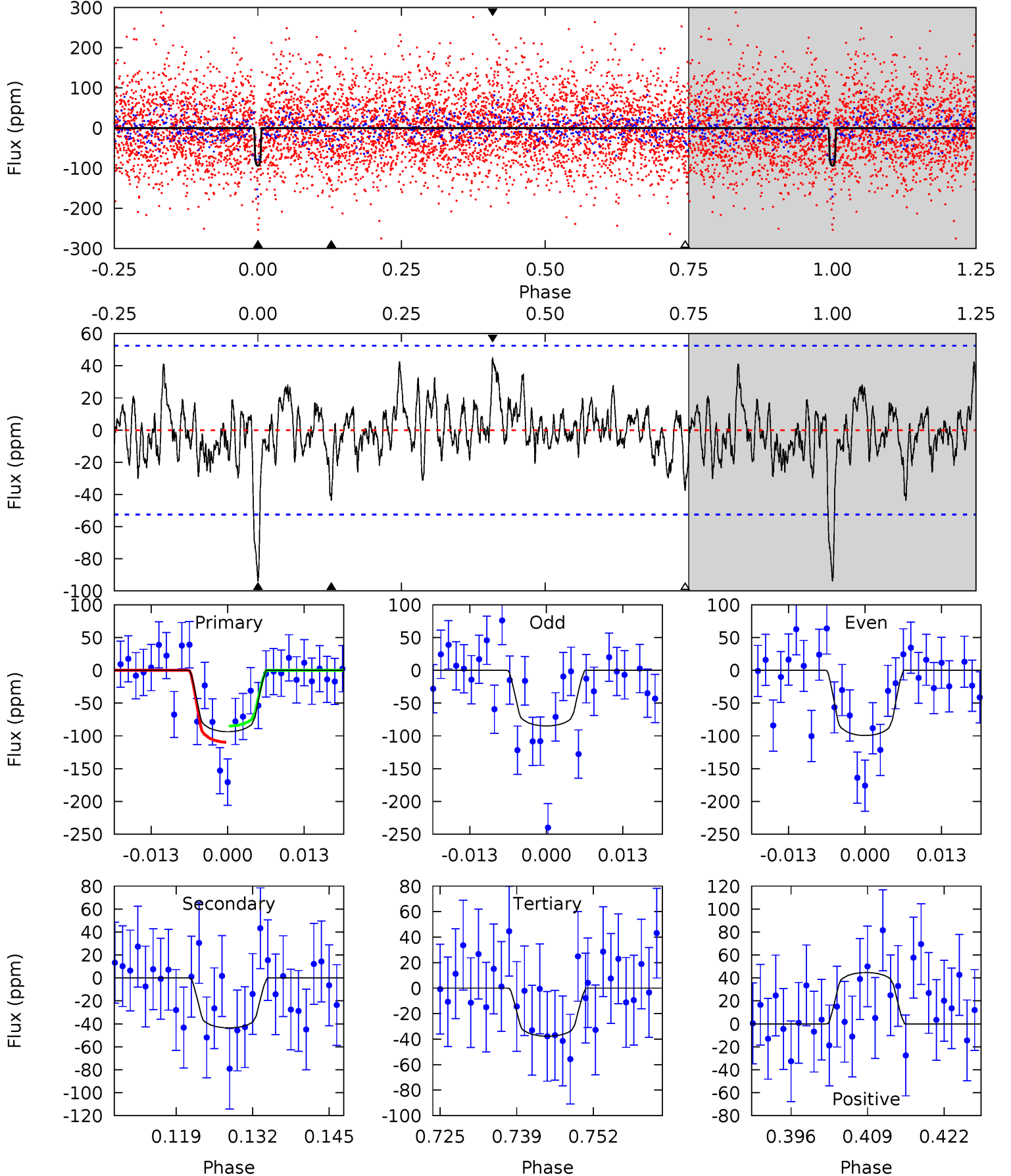
TCE 012066447-06 P= 10.840944 Days  $T_0=137.843989$  (BKJD)



# DV Model-Shift Uniqueness Test

012066447-06, P = 10.840935 Days, E = 127.005456 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
8.86	4.12	3.57	4.23	4.97	2.48	1.26	5.30	4.63	0.55	-0.11	0.68	0.96	0.32	1.13

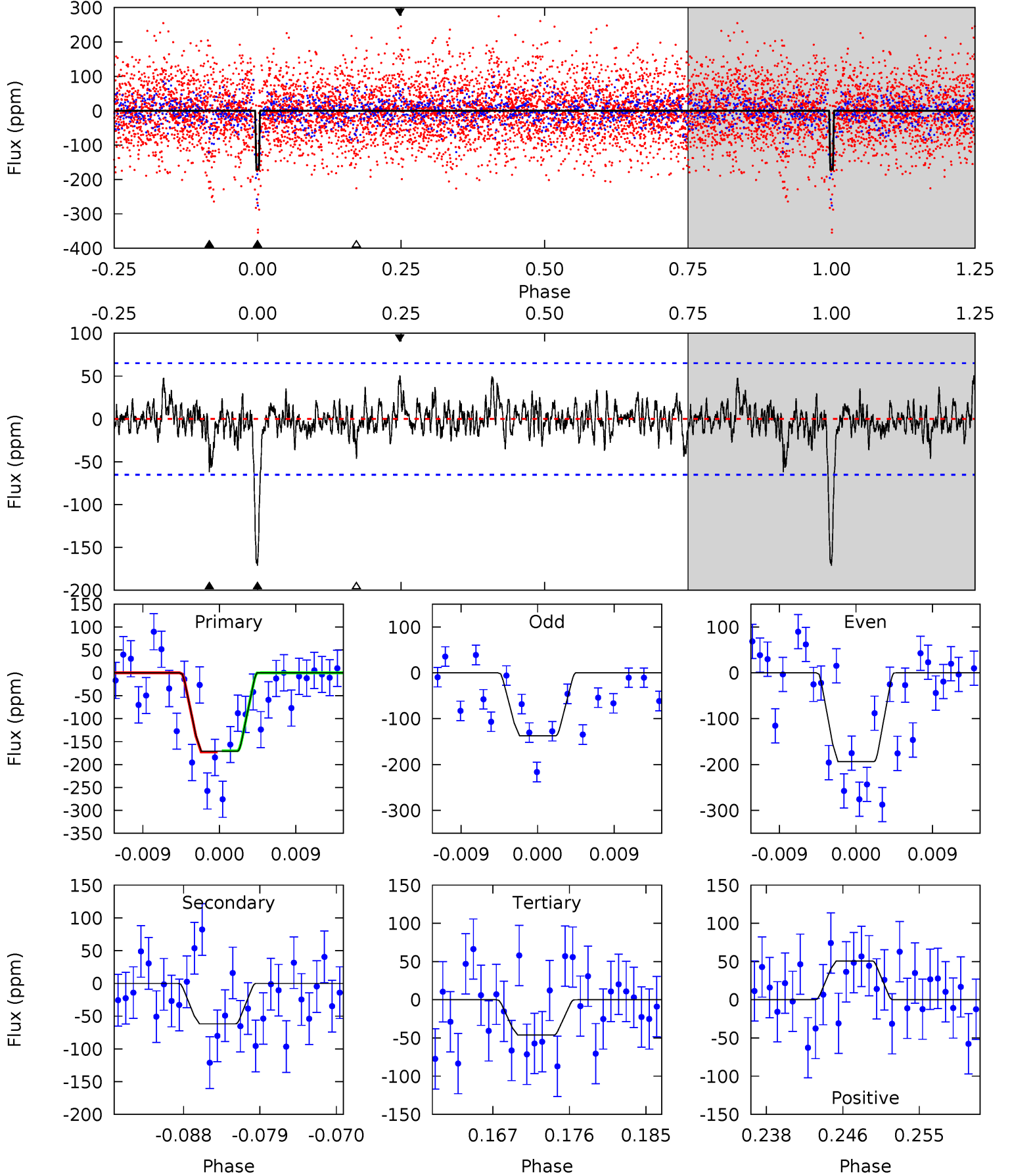




# Alt Model-Shift Uniqueness Test

012066447-06,  $P = 10.840944$  Days,  $E = 127.003045$  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
13.3	4.79	3.59	3.93	5.05	2.62	1.07	9.68	9.34	1.21	0.86	2.10	0.99	0.23	0.09



### Stellar Parameters For KIC 012066447

	$T_{\text{eff}} (K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7479^{+206}_{-335}$	$4.130^{+0.105}_{-0.195}$	$0.080^{+0.200}_{-0.350}$	$1.837^{+0.569}_{-0.350}$	$1.658^{+0.207}_{-0.253}$	$0.377^{+0.216}_{-0.184}$
	+3%/-4%	+3%/-5%	+250%/-438%	+31%/-19%	+12%/-15%	+57%/-49%
Source	PHO54	PHO54	PHO54	DSEP		

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

### Secondary Eclipse Parameters for KIC 012066447-06 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-44 \pm 11$	$2.18^{+1.66}_{-1.30}$	$1873^{+137}_{-114}$	$5752^{+3949}_{-1260}$	$61^{+349}_{-41}$
Alt.	$-62 \pm 13$	$3.01^{+1.64}_{-1.57}$	$1869^{+136}_{-122}$	$5391^{+2673}_{-955}$	$49^{+168}_{-30}$

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

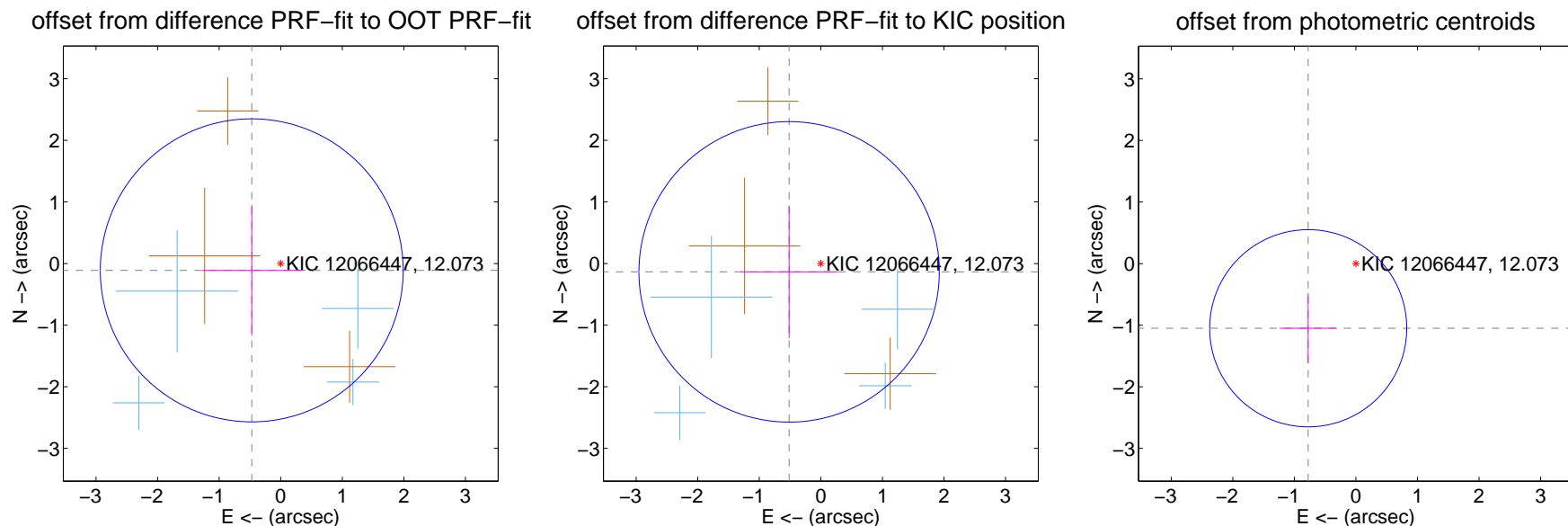
## DV Centroid Data

Supplemental centroid analysis for 012066447-06. Kepler magnitude: 12.07. Transit SNR 10.72

There are 4 quarters with good PRF difference image offsets

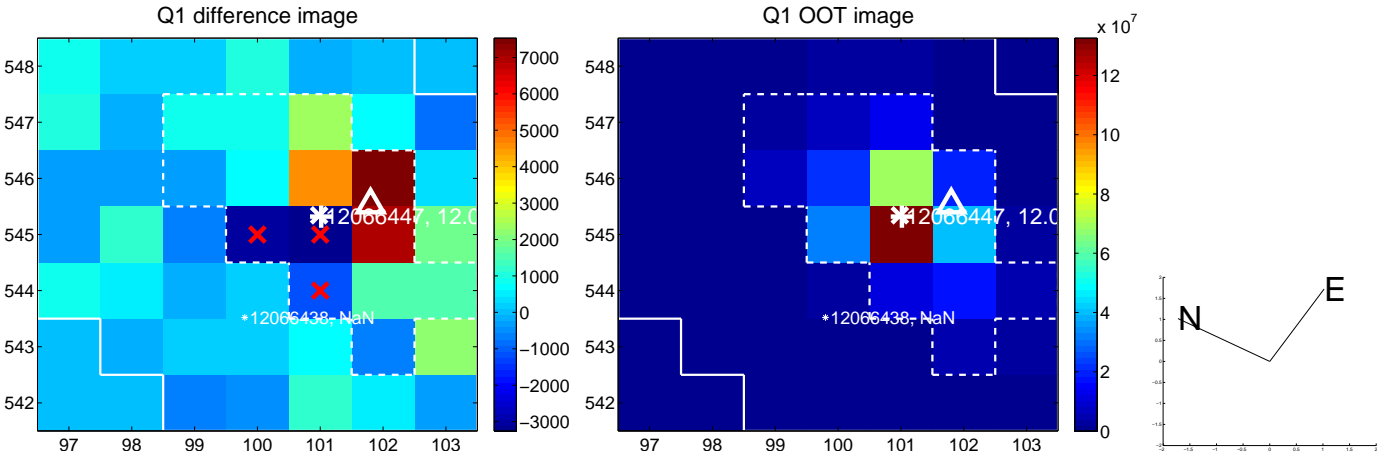
The direct PRF centroid is offset from the target star catalog position by about 0.16 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.484 \pm 0.820$	0.59	$0.471 \pm 0.805$	$-0.111 \pm 1.060$
PRF-fit source offset from KIC position	$0.533 \pm 0.813$	0.66	$0.516 \pm 0.791$	$-0.135 \pm 1.079$
photometric centroid source offset	$1.31 \pm 0.53$	2.45	$0.78 \pm 0.46$	$-1.05 \pm 0.57$

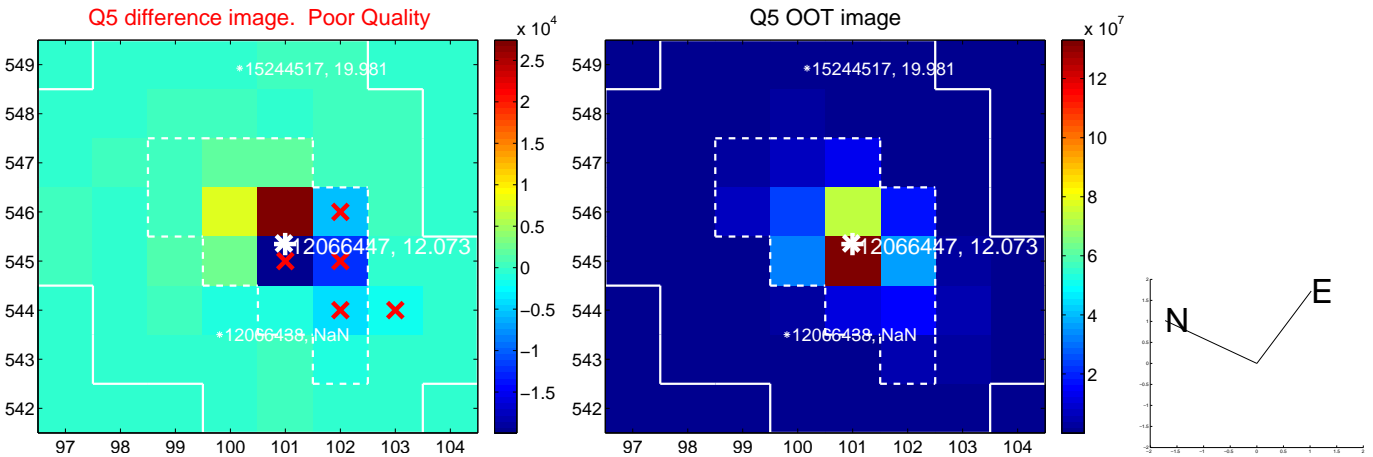


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

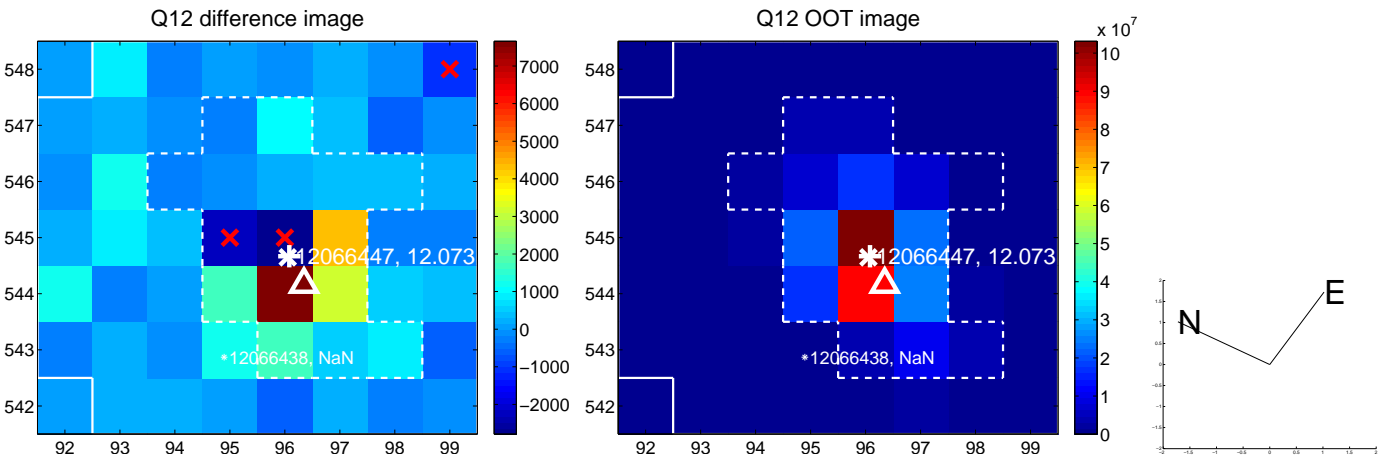
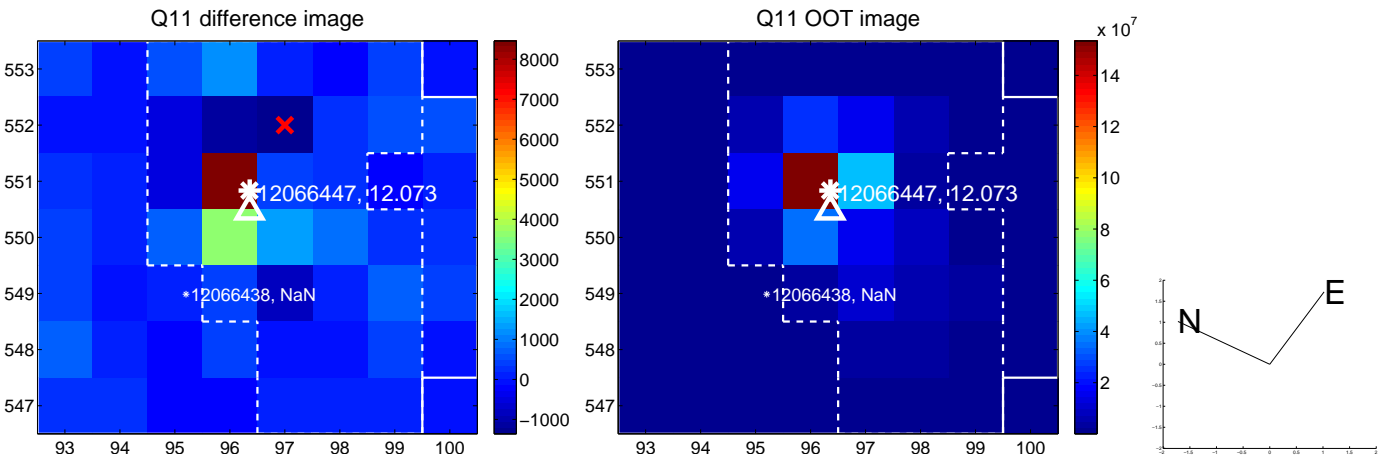
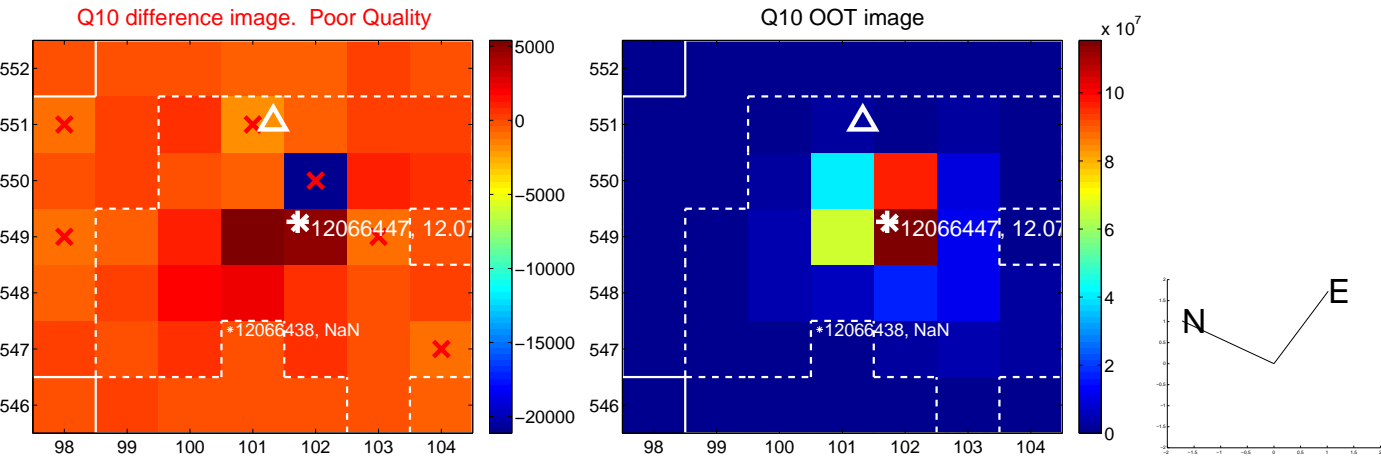
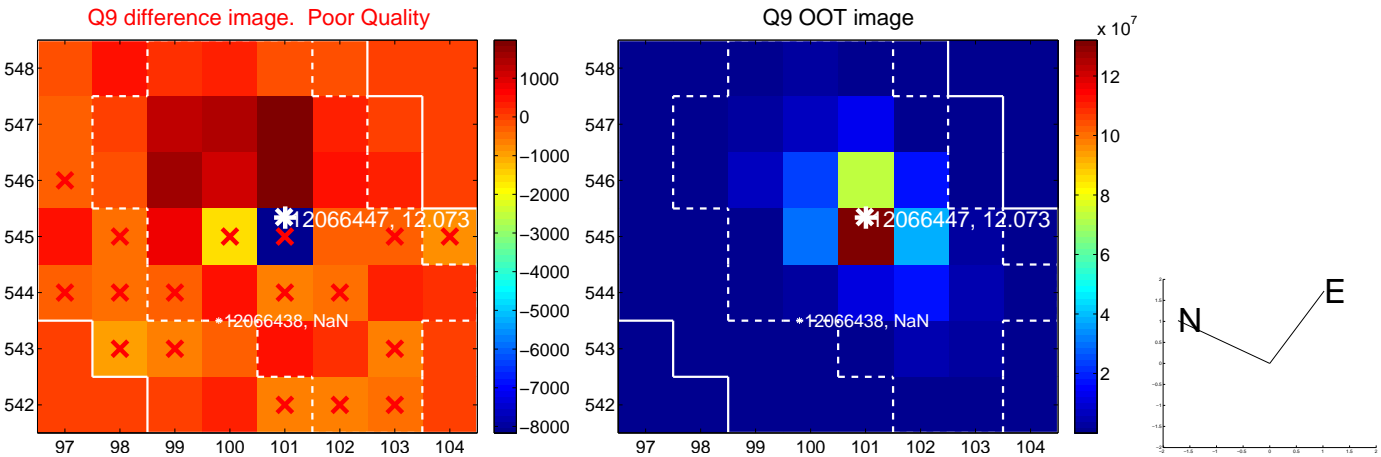
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



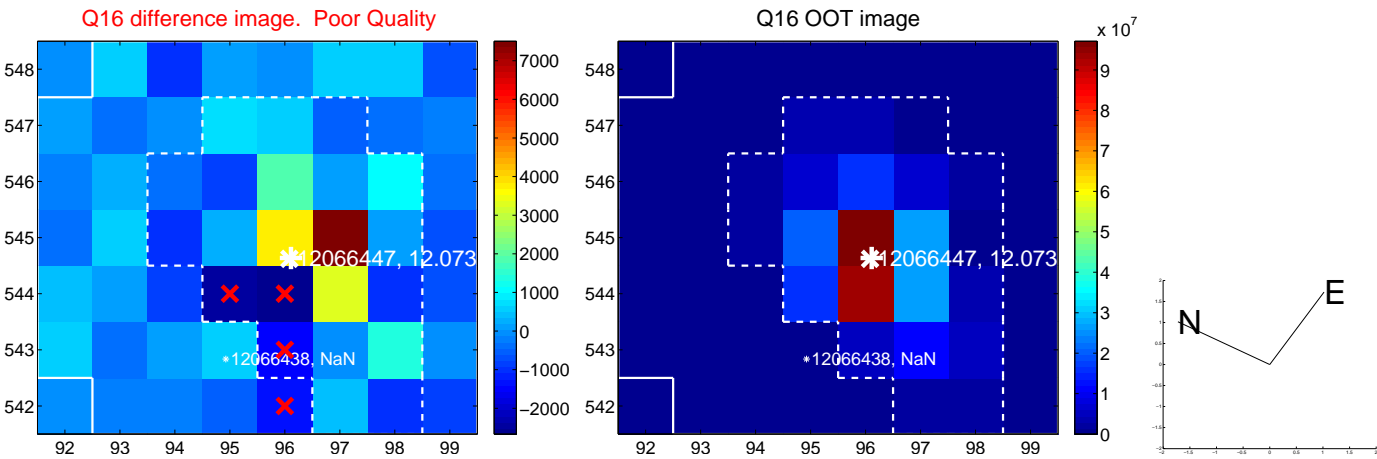
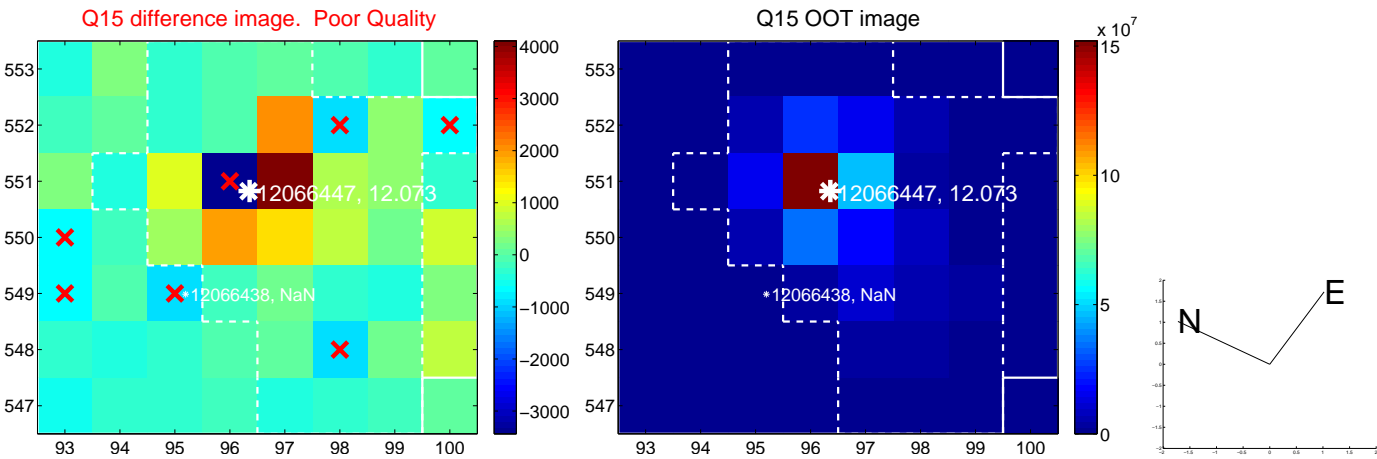
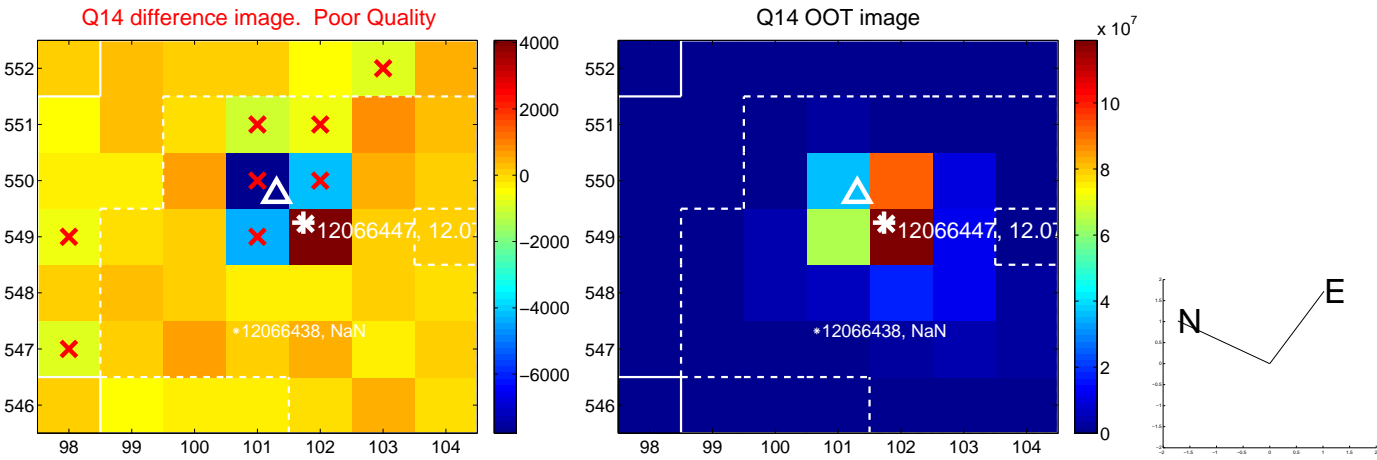
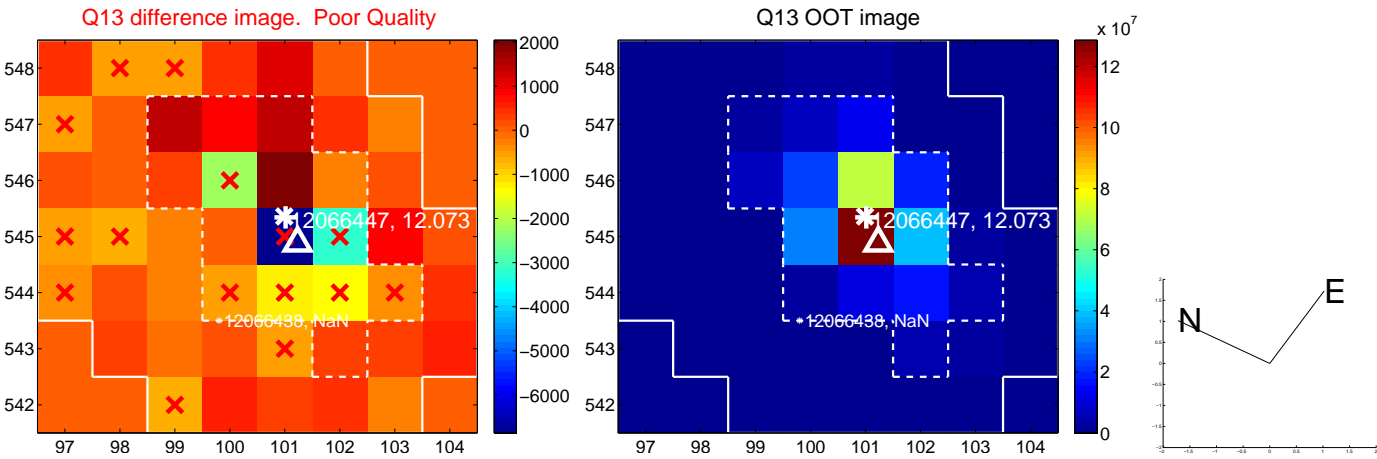
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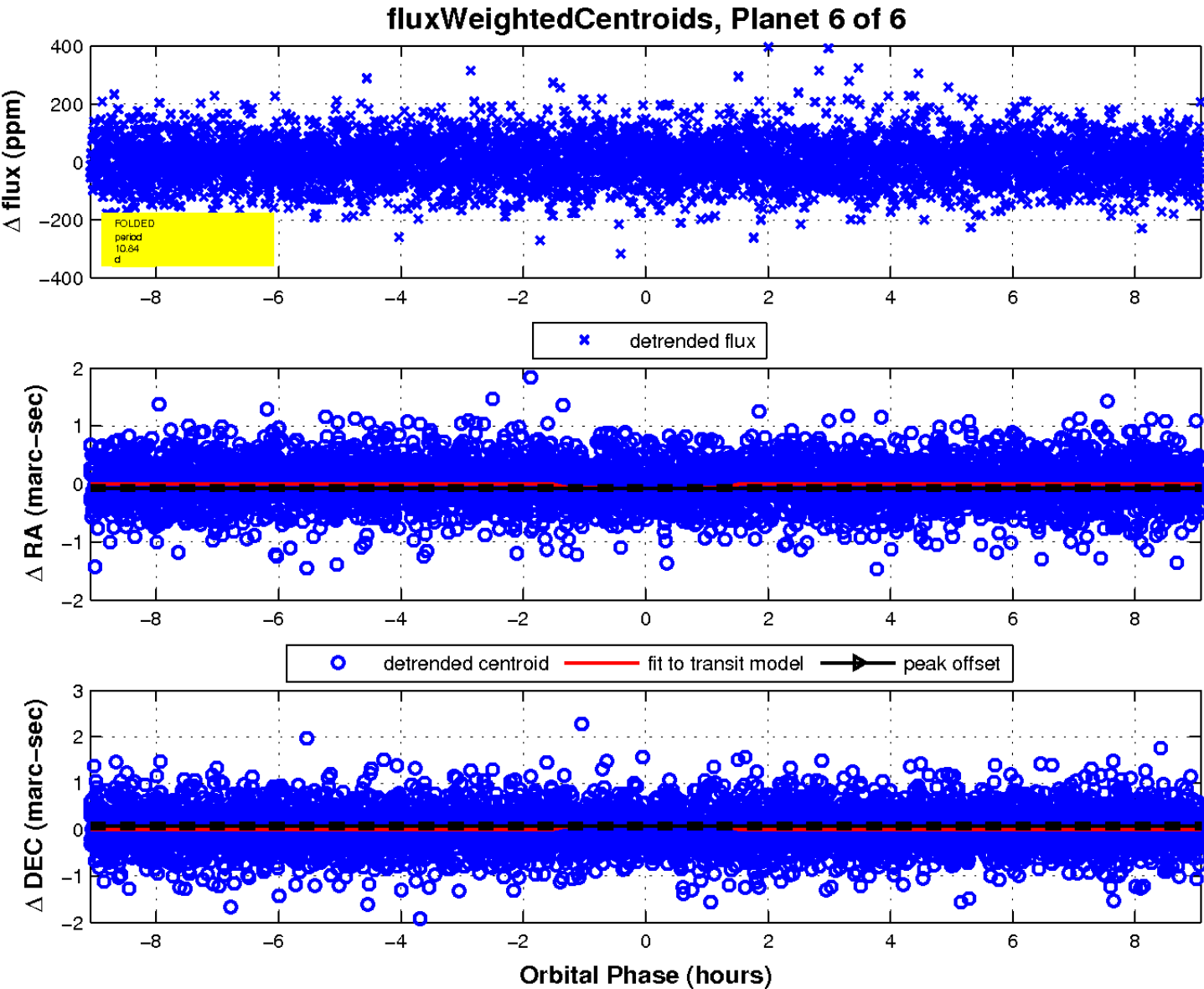
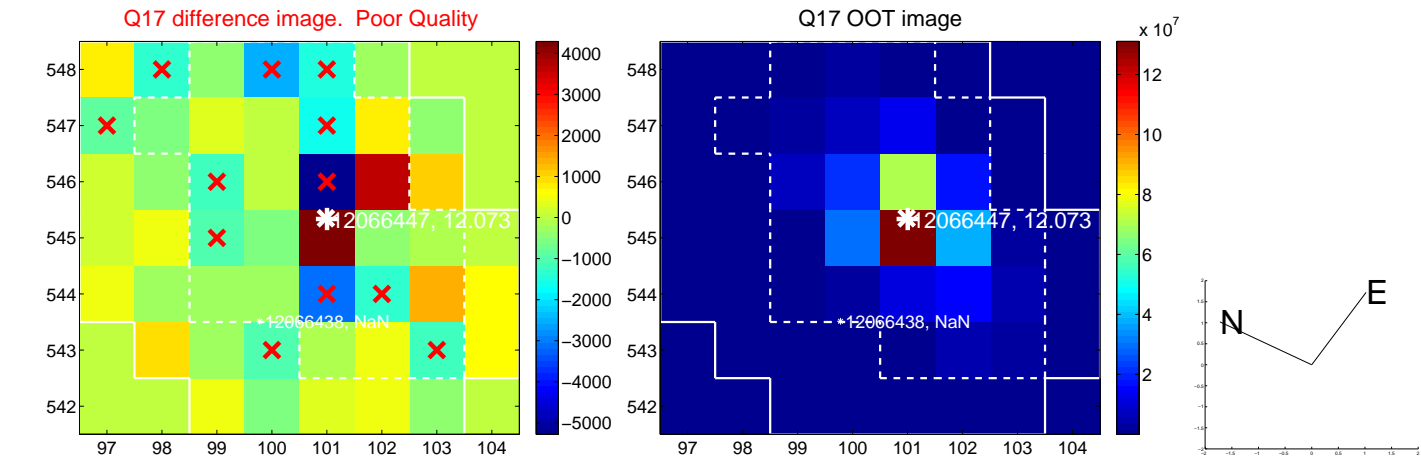


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UKIRT Image

Declination

