

# KIC 006116612

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006116612-01	OBS	No	1.681228	131.589662	6.3	12.078	10.0	4.0	1.70	7012	0.46	6881.93
006116612-02	OBS	No	51.176242	134.321375	184.4	4.030	25.8	11.4	1.70	7012	2.58	72.41
006116612-05	OBS	No	53.716410	159.379257	144.0	4.533	12.6	7.9	1.70	7012	2.28	67.88
006116612-06	OBS	No	26.461710	140.609317	82.9	15.220	11.4	8.1	1.70	7012	1.72	174.47

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006116612-01	OBS	FP	0.00	1	0	0	0	LPP_DV
006116612-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
006116612-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT
006116612-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS

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

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

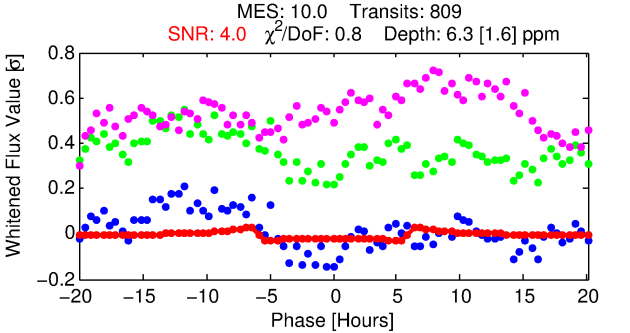
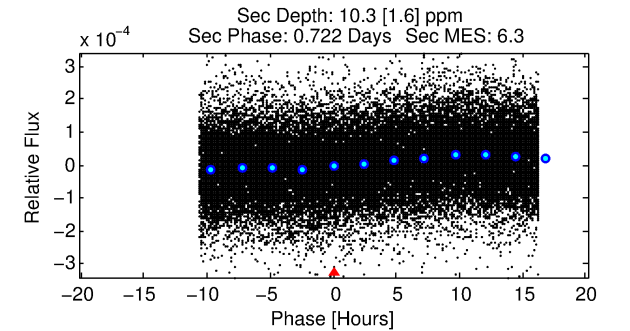
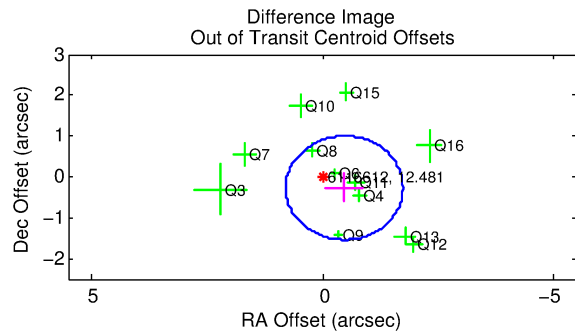
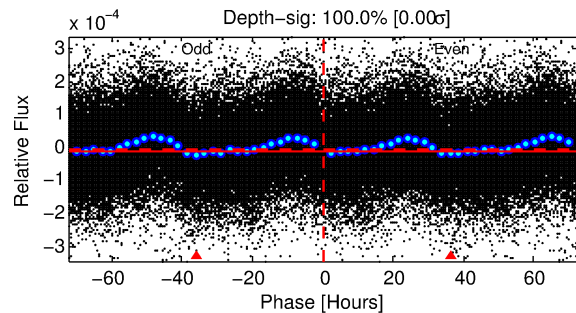
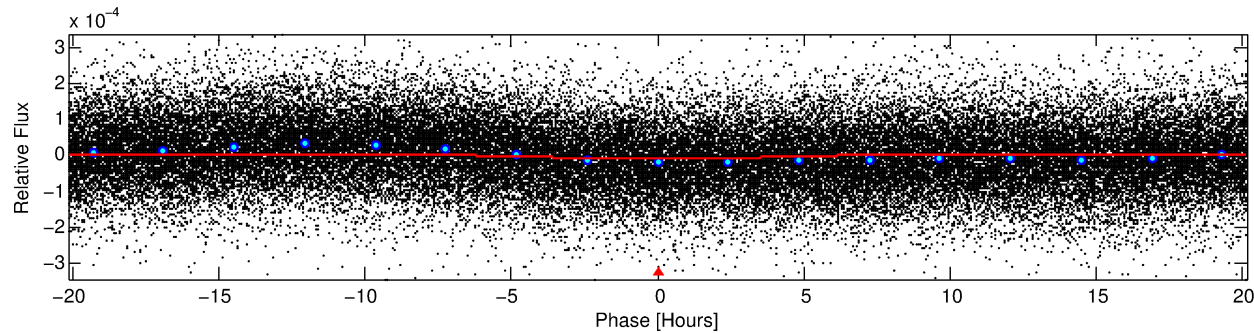
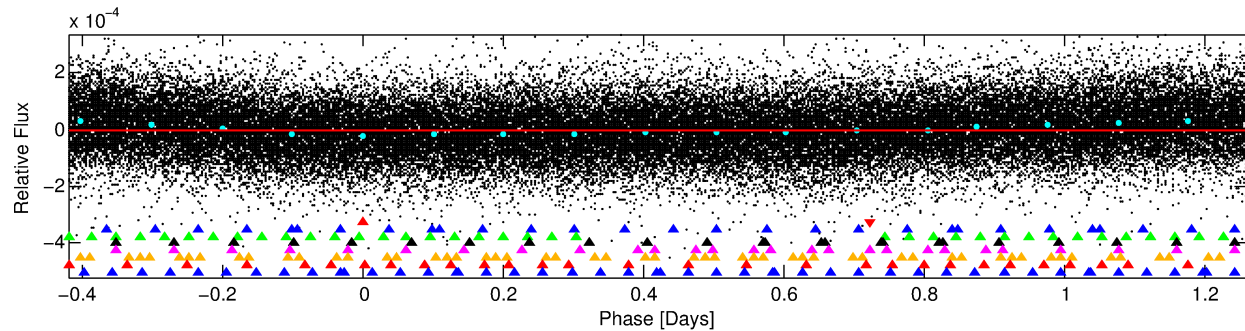
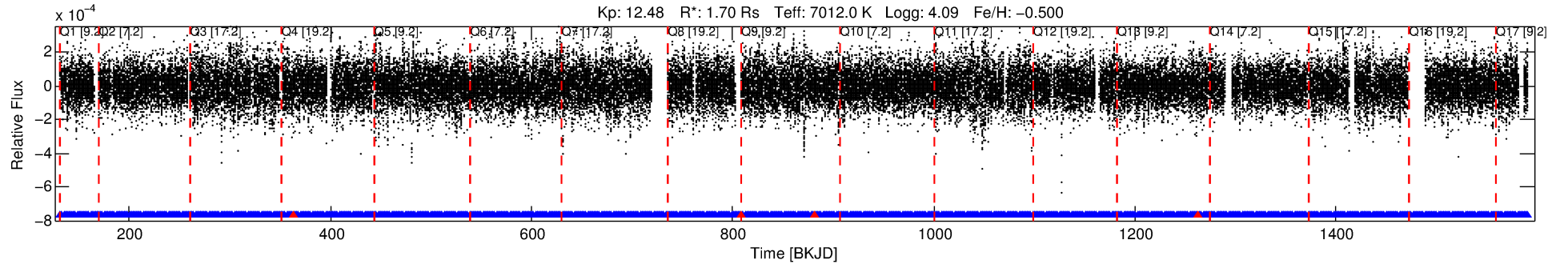
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 006116612-01

No Significant Match Found

# DV One-Page Summary

KIC: 6116612 Candidate: 1 of 8 Period: 1.681 d



## DV Fit Results:

Period = 1.68123 [0.00004] d  
Epoch = 131.5897 [0.0101] BKJD  
Rp/R\* = 0.0025 [0.0011]  
a/R\* = 1.12 [0.62]  
b = 0.72 [1.79]  
Seff = 6881.93 [3150.55]  
Teq = 2322 [266] K  
Rp = 0.46 [0.25] Re  
a = 0.0301 [0.0080] AU  
Ag = 24.45 [24.81] [0.95σ]  
Teffp = 7985 [1876] K [2.99σ]

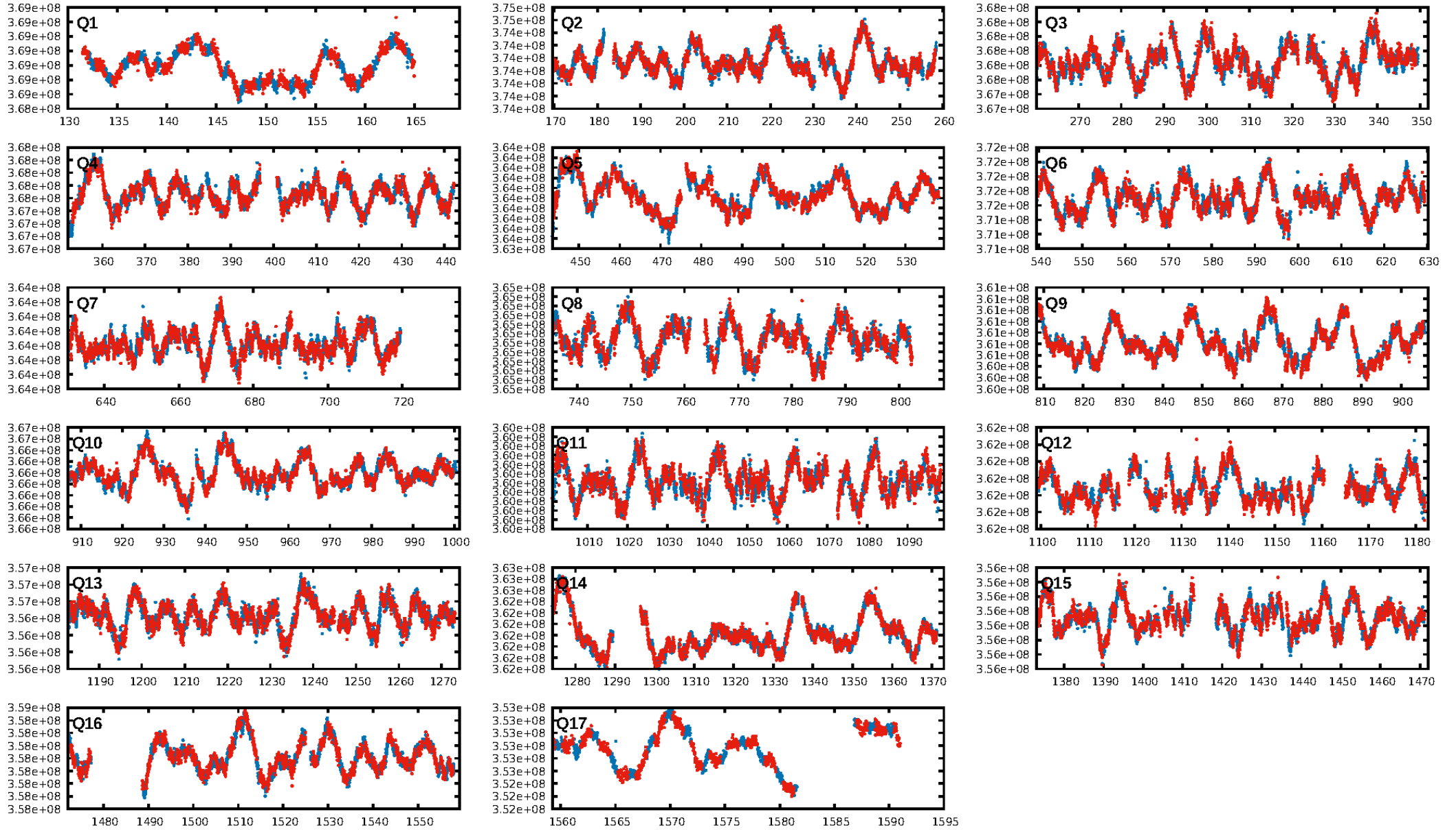
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [30.61σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 4.57e-21  
RollingBand-fgt: 0.99 [768/772]  
GhostDiagnostic-chr: 2.651  
Centroid-sig: 2.5%  
Centroid-so: 1.915 arcsec [1.56σ]  
OotOffset-rm: 0.542 arcsec [1.28σ]  
KicOffset-rm: 0.481 arcsec [1.09σ]  
OotOffset-st: 2/4/4/2 [12]  
KicOffset-st: 2/4/4/2 [12]  
DiffImageQuality-fgm: 0.92 [11/12]  
DiffImageOverlap-fno: 1.00 [17/17]

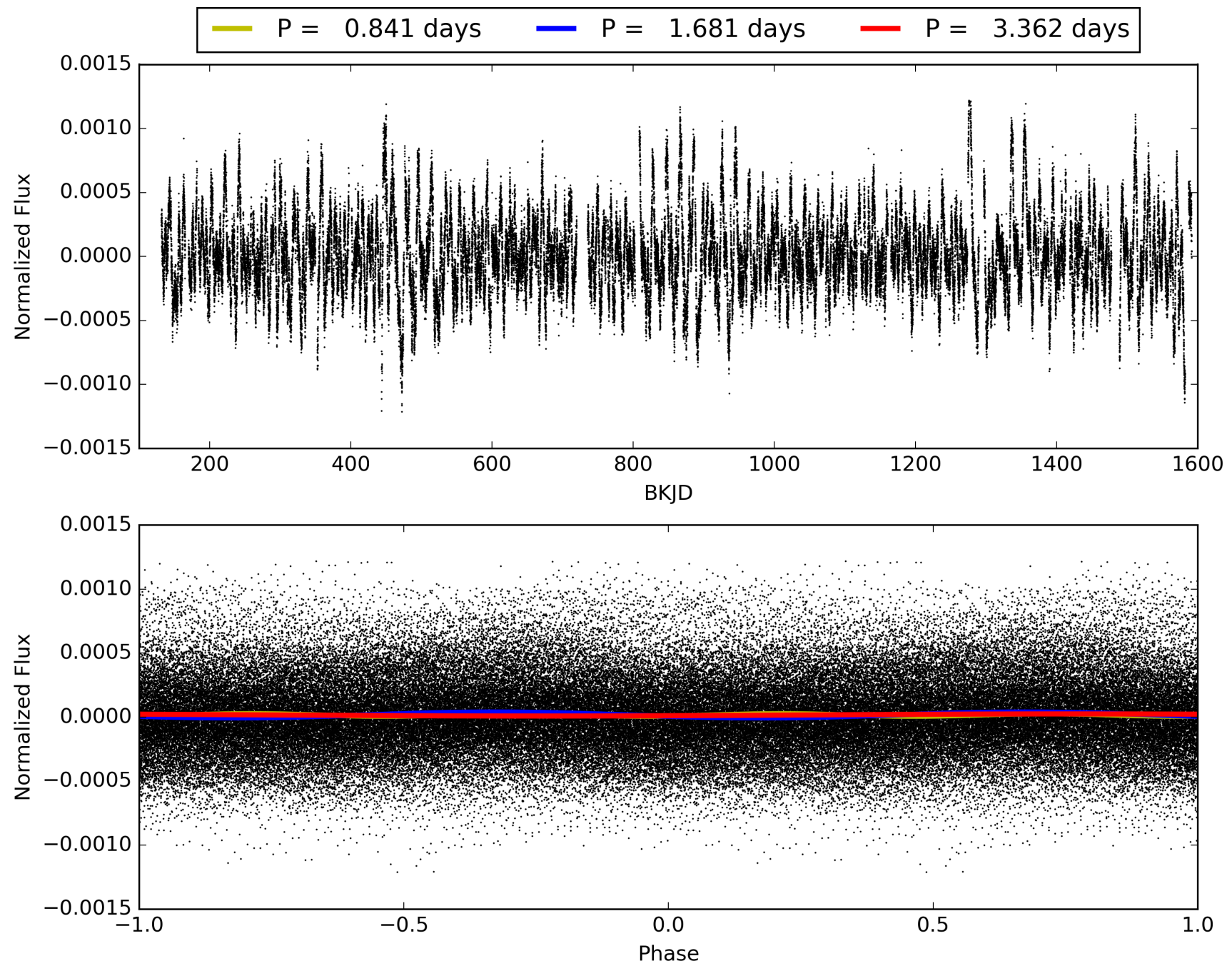
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 19:43:09 Z

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

# TCE 006116612-01, PDC Light Curves



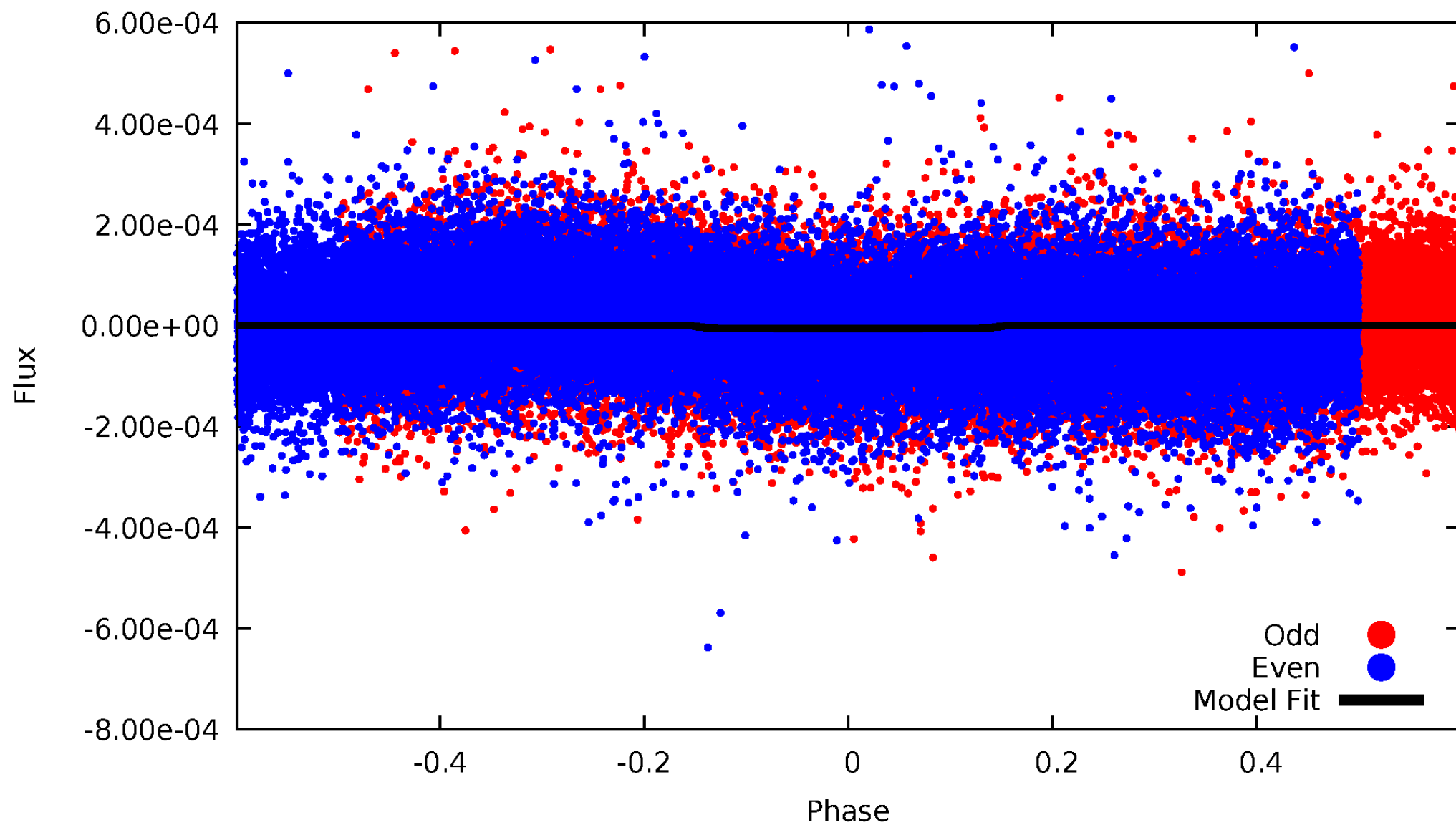
# TCE 006116612-01





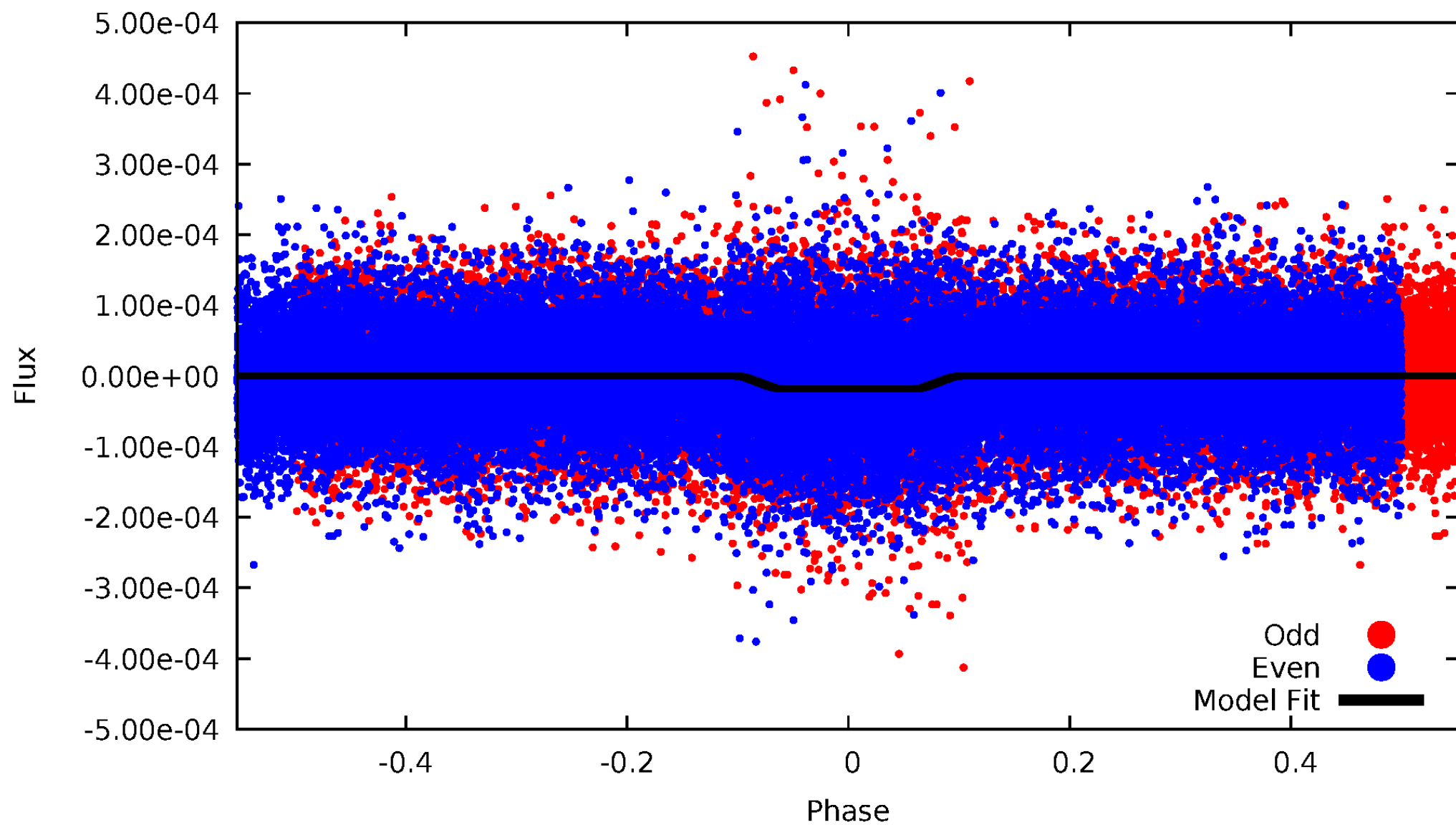
# DV Odd/Even

TCE 006116612-01

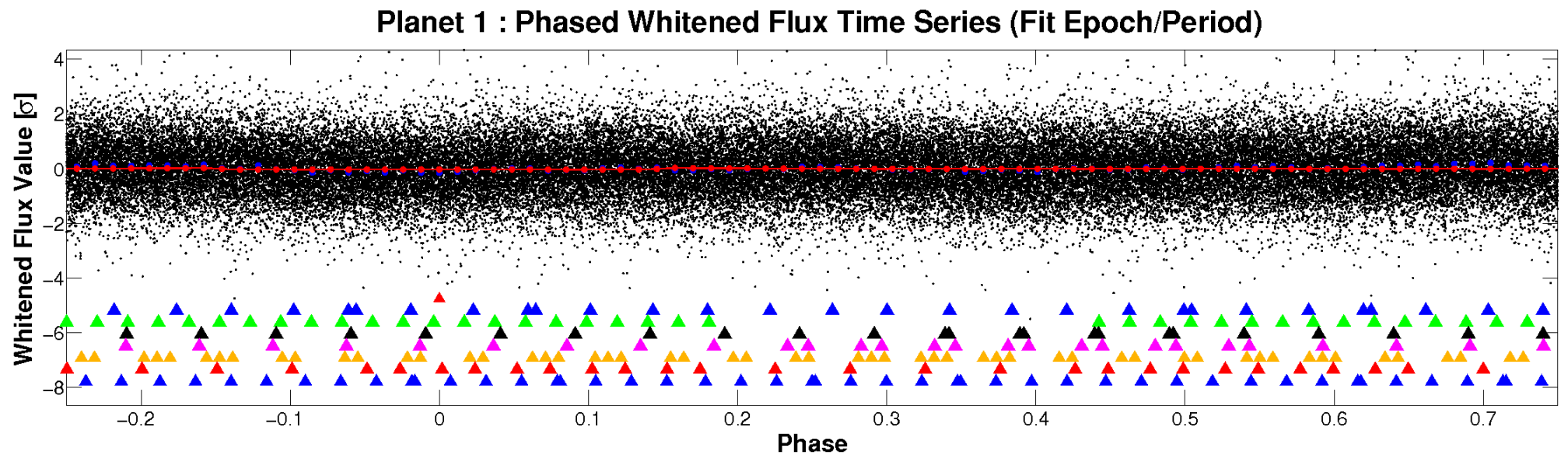
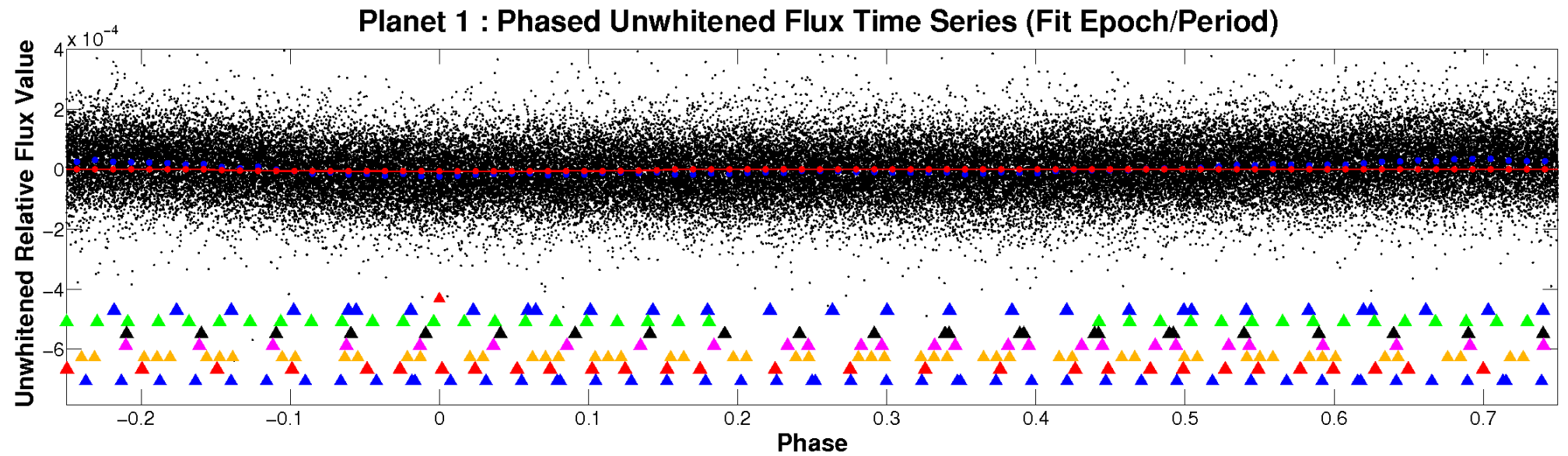


# ALT Odd/Even

TCE 006116612-01

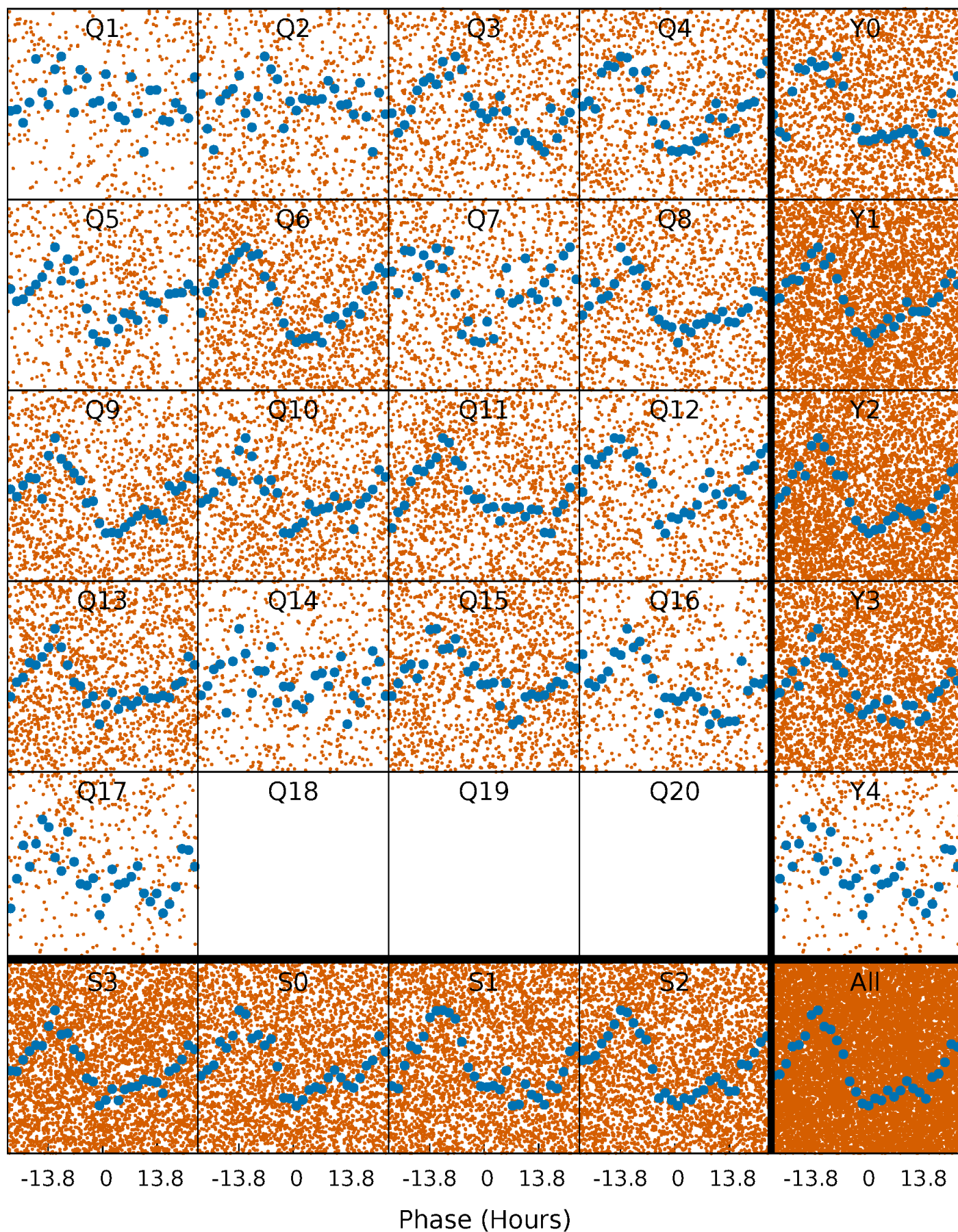


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

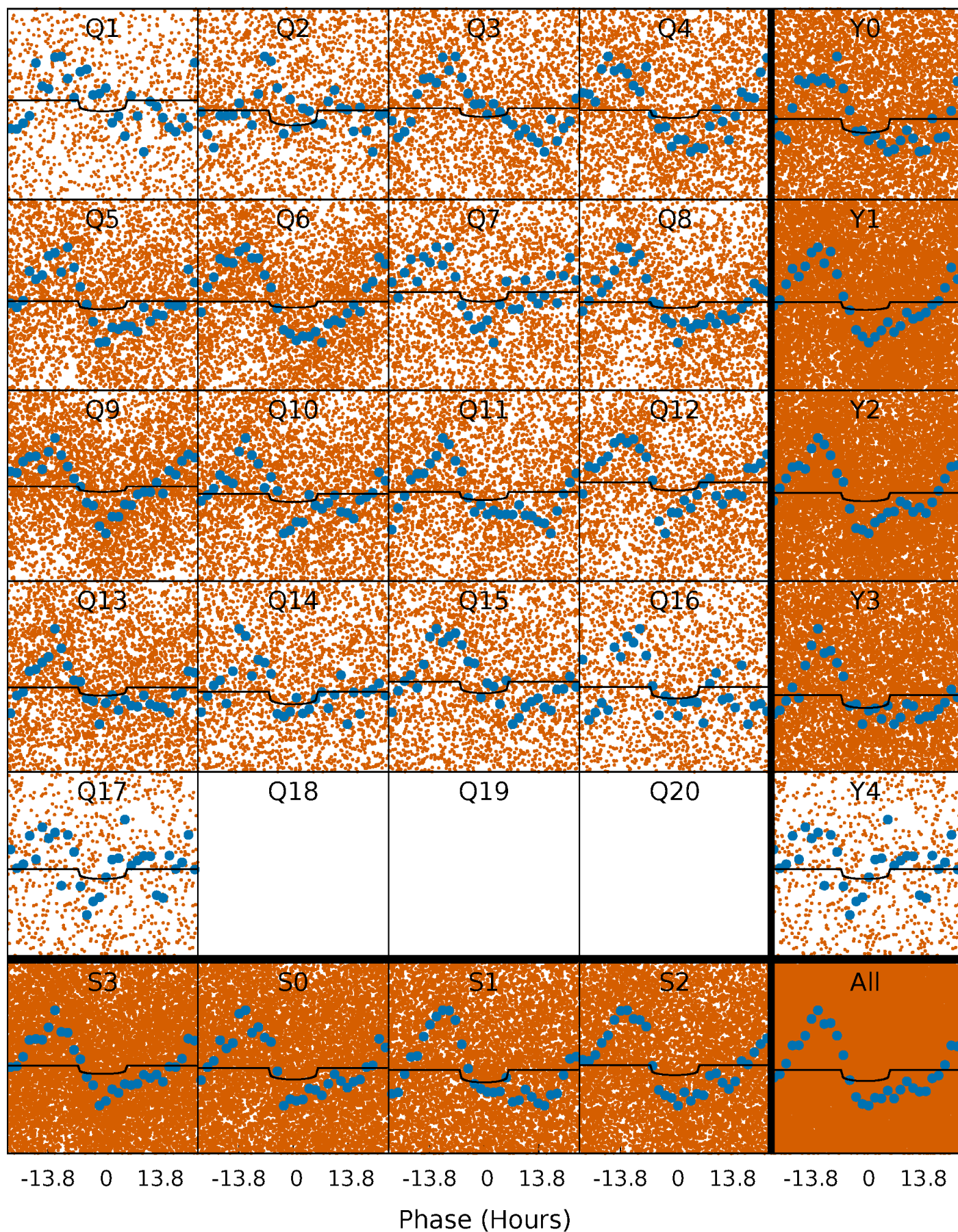
TCE 006116612-01 P= 1.681228 Days  $T_0=131.589662$  (BKJD)





# DV Quarter-Phased Transit Curves

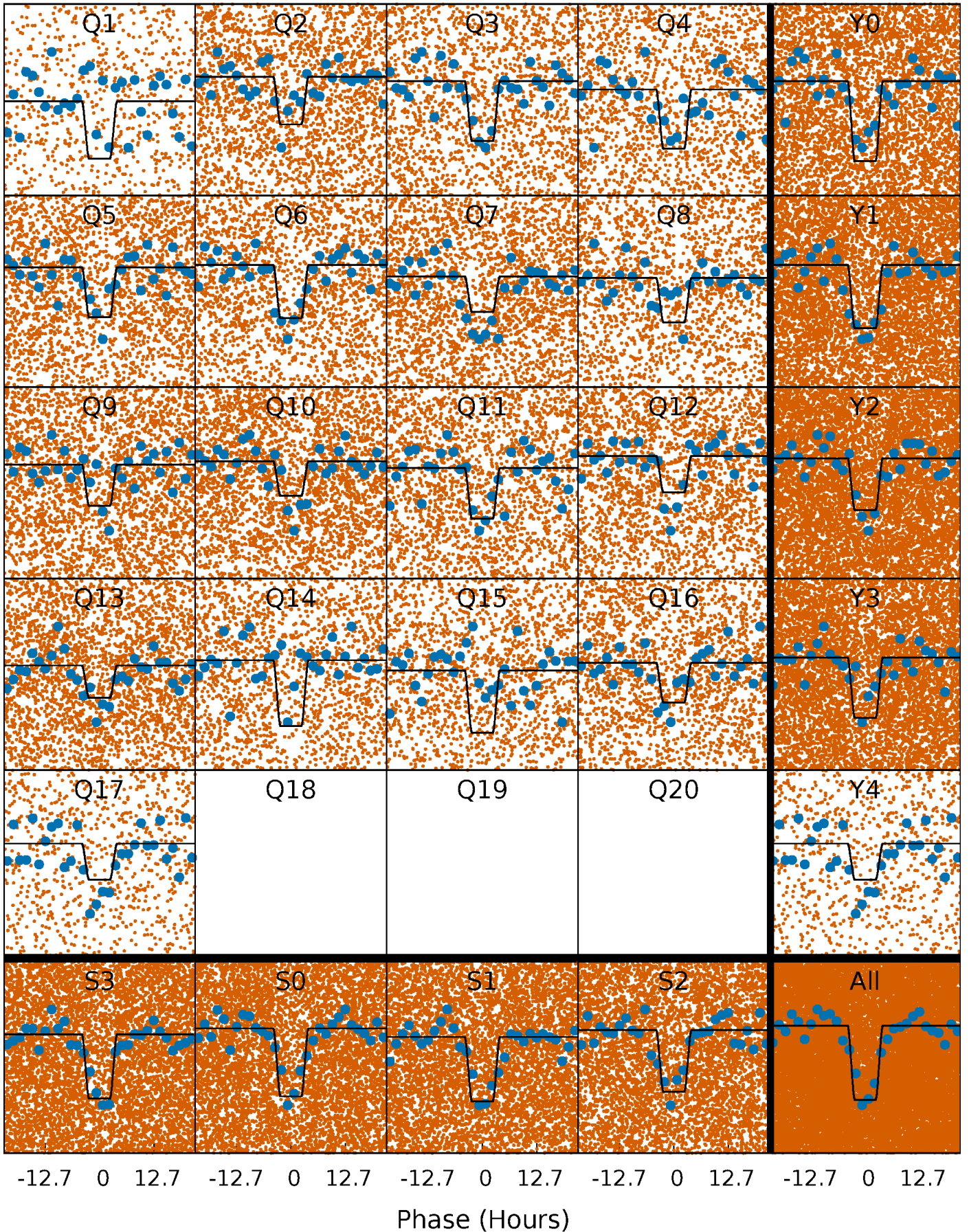
TCE 006116612-01 P= 1.681228 Days  $T_0=131.589662$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

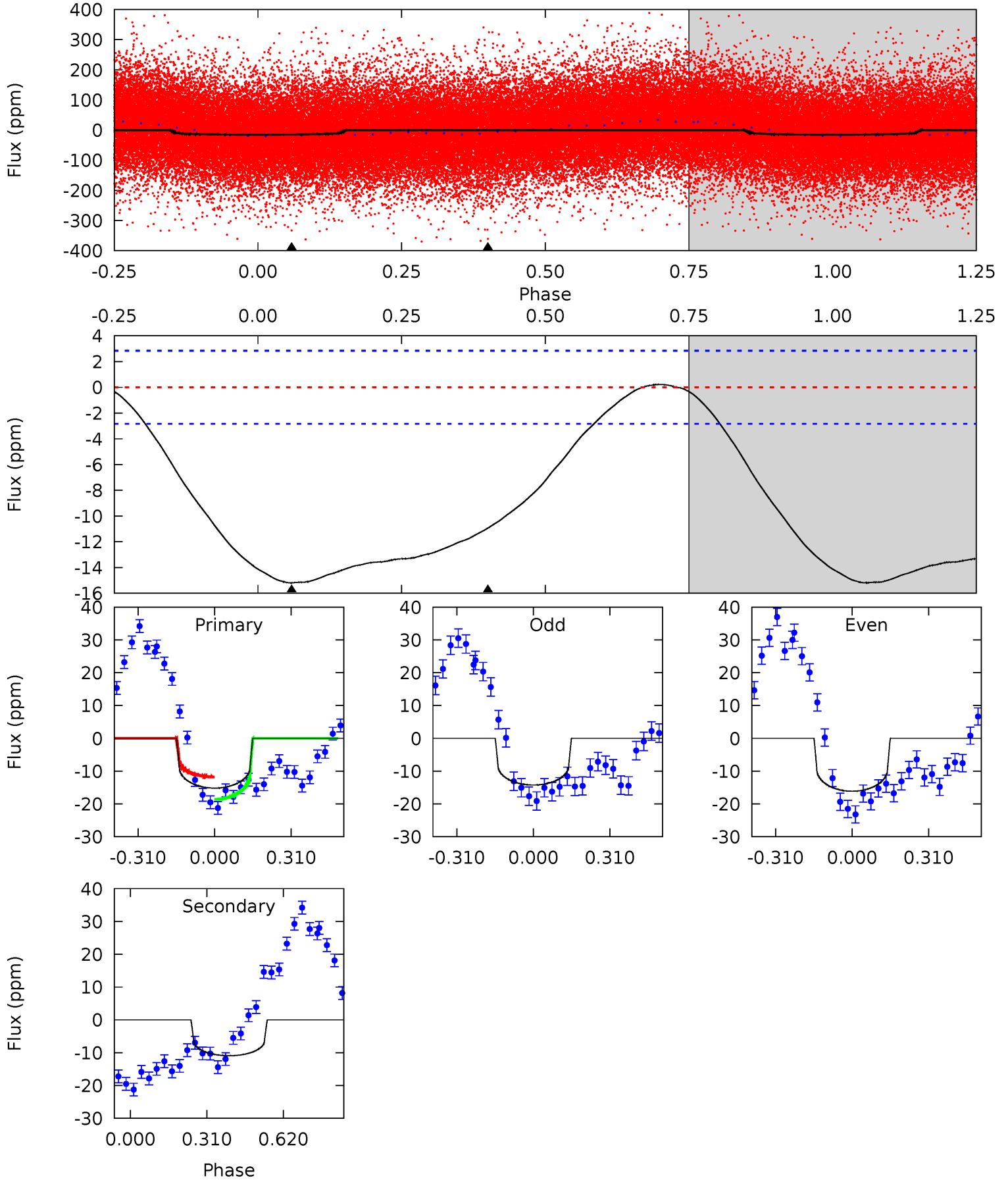
TCE 006116612-01 P= 1.681111 Days  $T_0=131.568383$  (BKJD)



# DV Model-Shift Uniqueness Test

006116612-01, P = 1.681228 Days, E = 129.908434 Days

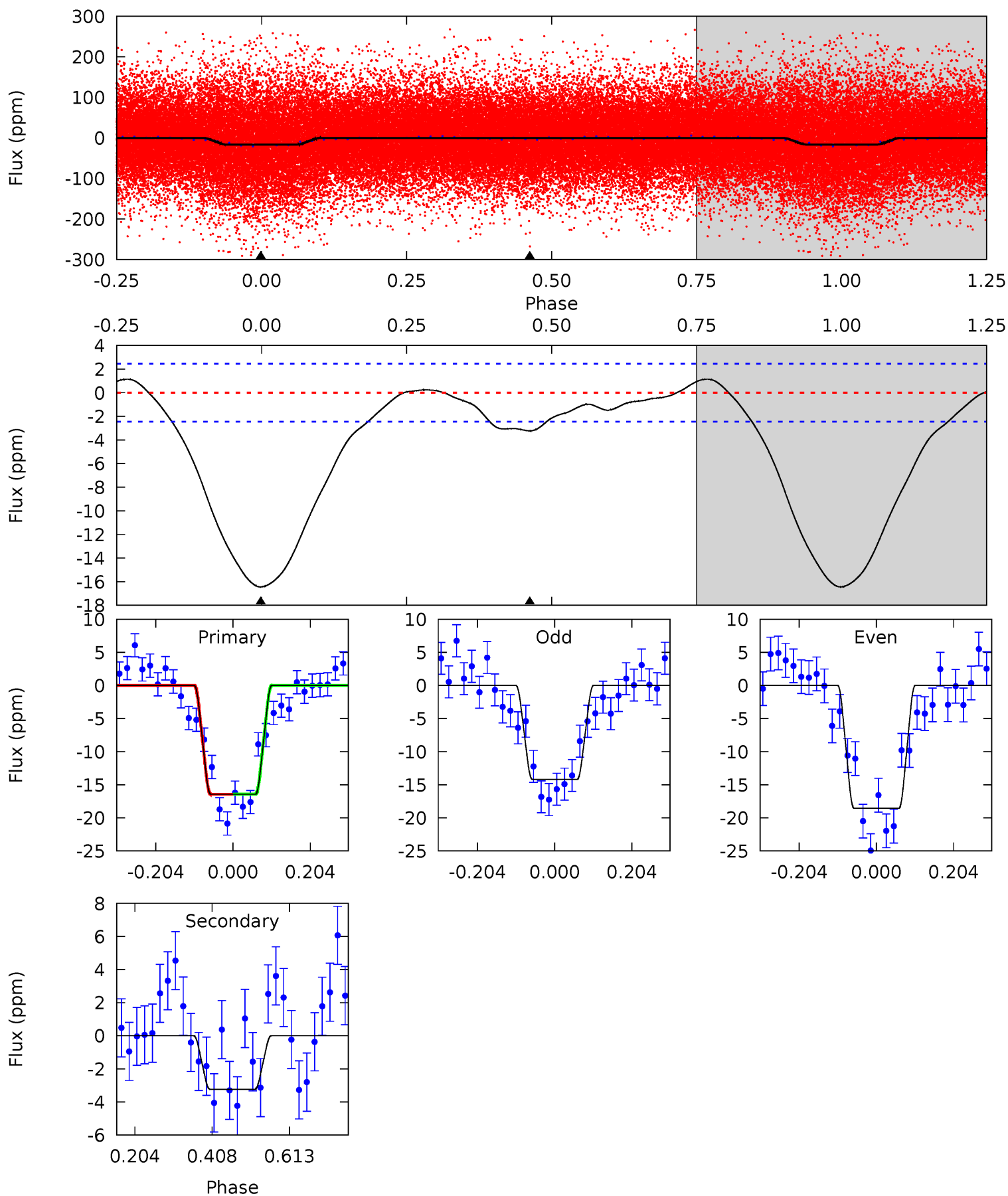
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
23.1	16.6	0	0	4.32	1.01	0.72	23.1	23.1	16.6	16.6	1.45	1.15	0.01	5.50



# Alt Model-Shift Uniqueness Test

006116612-01, P = 1.681111 Days, E = 129.887272 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
29.6	5.82	0	0	4.41	1.27	1.28	29.6	29.6	5.82	5.82	3.92	1.02	0.07	0.01





### Stellar Parameters For KIC 006116612

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7012^{+216}_{-312}$	$4.088^{+0.246}_{-0.164}$	$-0.500^{+0.250}_{-0.300}$	$1.696^{+0.430}_{-0.478}$	$1.283^{+0.169}_{-0.211}$	$0.370^{+0.569}_{-0.174}$
	+3%/-4%	+6%/-4%	+50%/-60%	+25%/-28%	+13%/-16%	+153%/-47%
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 006116612-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-11 \pm 1$	$0.45^{+0.22}_{-0.20}$	$3215^{+252}_{-267}$	$8202^{+4566}_{-1647}$	$26^{+61}_{-14}$
Alt.	$-3 \pm 1$	$0.76^{+0.24}_{-0.23}$	$3198^{+249}_{-281}$	$4541^{+748}_{-476}$	$2.736^{+2.924}_{-1.166}$

$T_{max}$  = 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

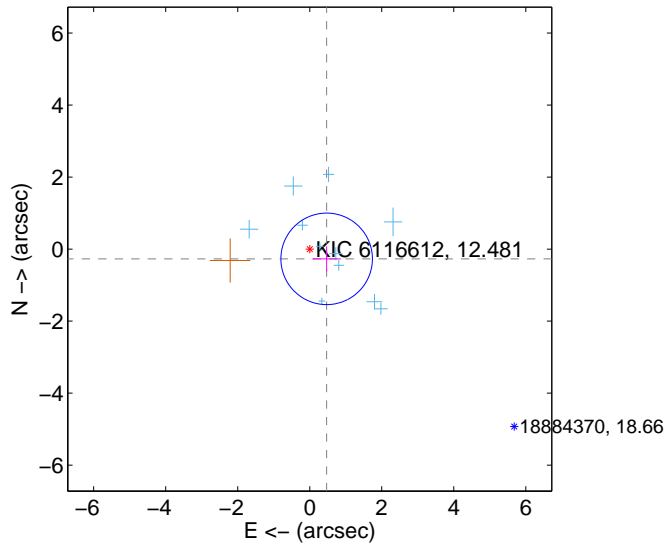
Supplemental centroid analysis for 006116612-01. Kepler magnitude: 12.48. Transit SNR 4.02

There are 11 quarters with good PRF difference image offsets

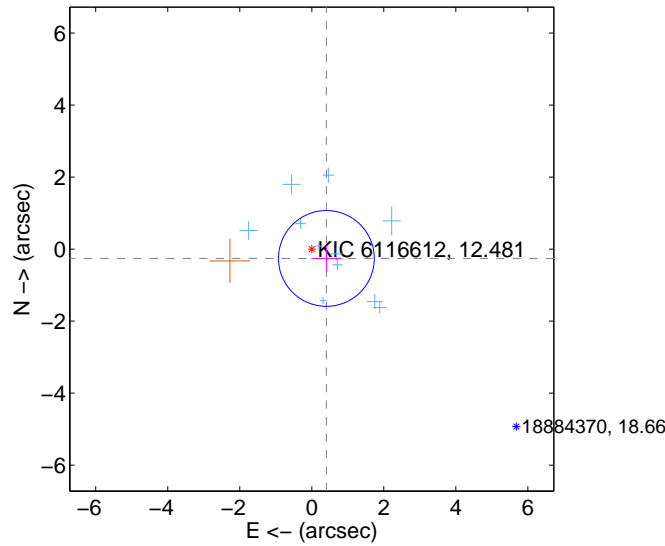
The direct PRF centroid is offset from the target star catalog position by about 0.10 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.542 \pm 0.423$	1.28	$-0.470 \pm 0.396$	$-0.271 \pm 0.349$
PRF-fit source offset from KIC position	$0.481 \pm 0.443$	1.09	$-0.405 \pm 0.418$	$-0.260 \pm 0.362$
photometric centroid source offset	$1.91 \pm 1.23$	1.56	$-1.03 \pm 1.40$	$-1.62 \pm 1.15$

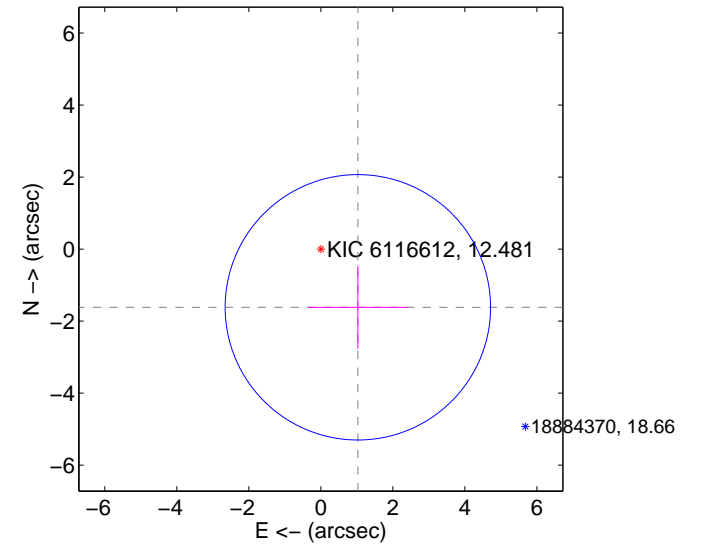
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

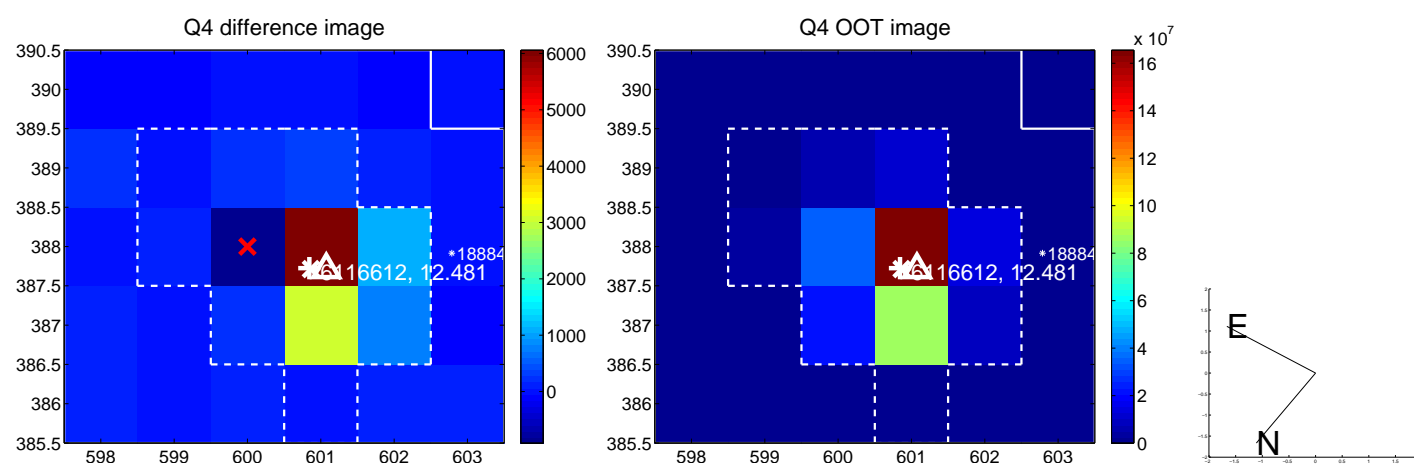
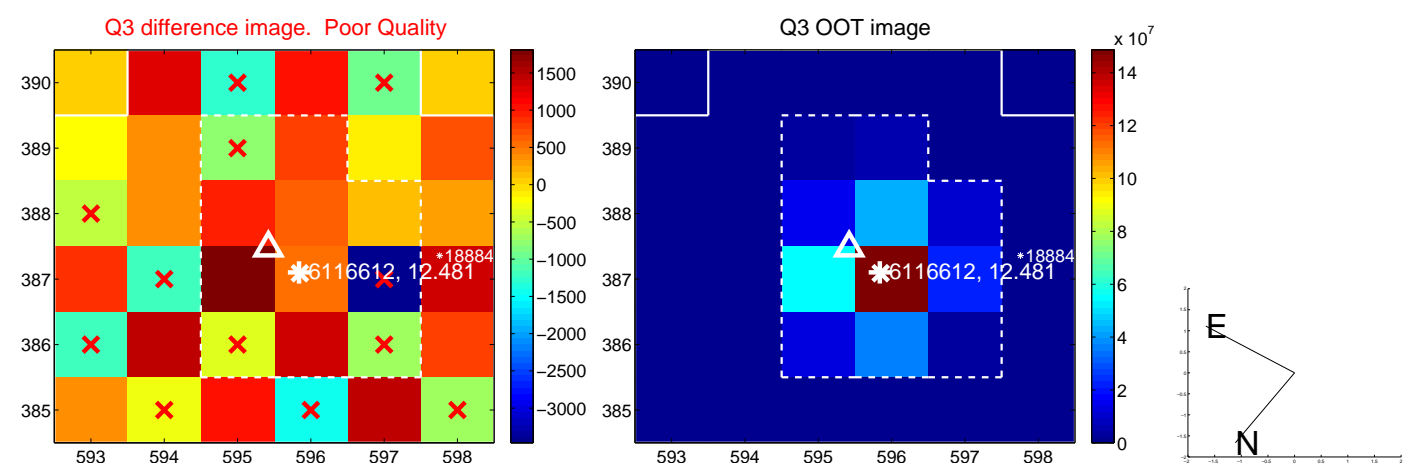
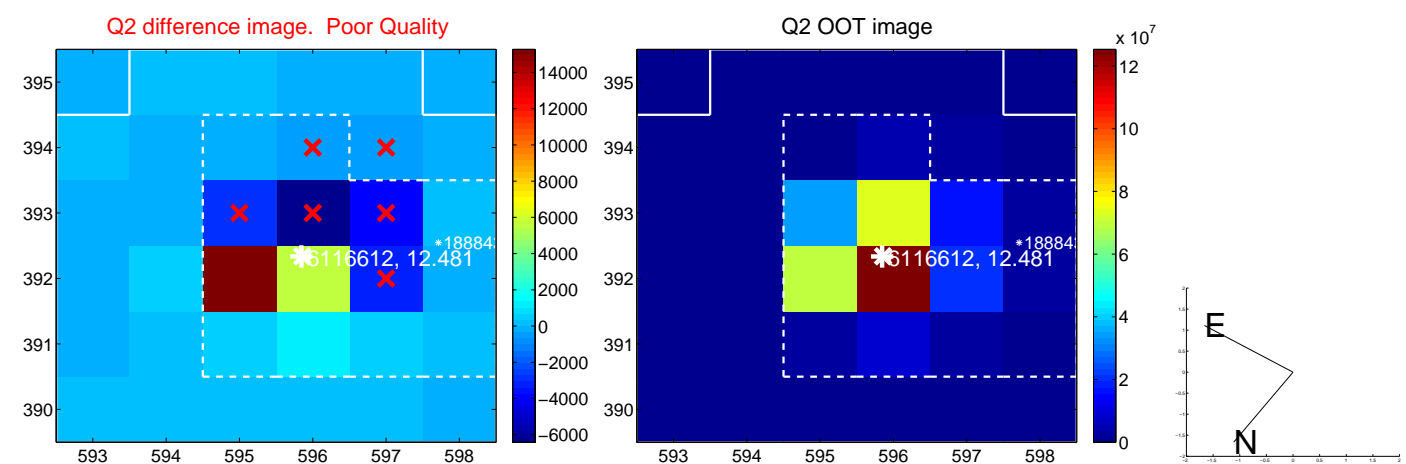
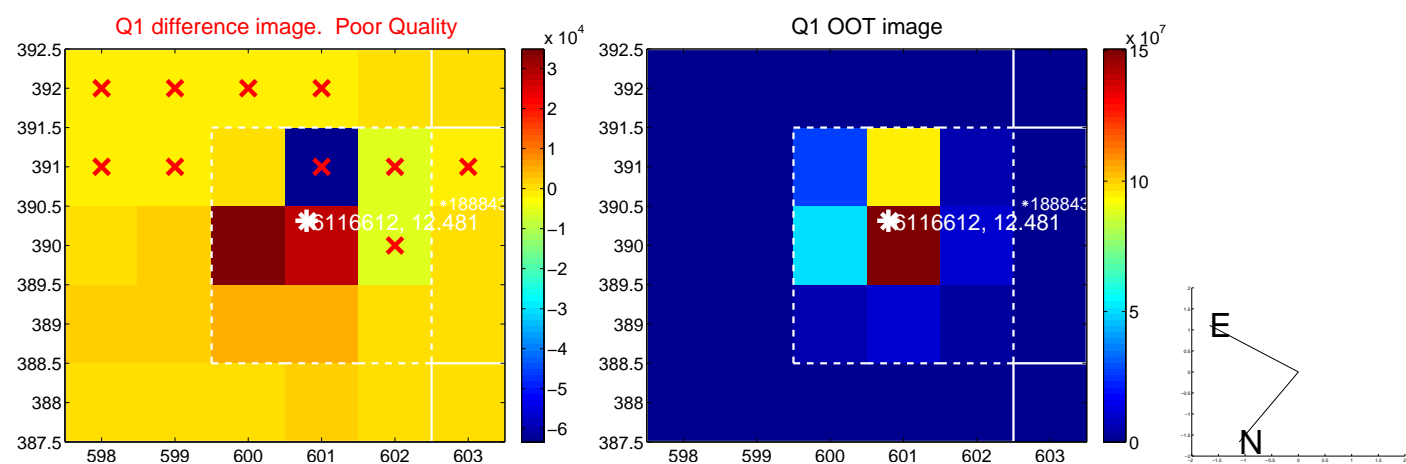


offset from photometric centroids

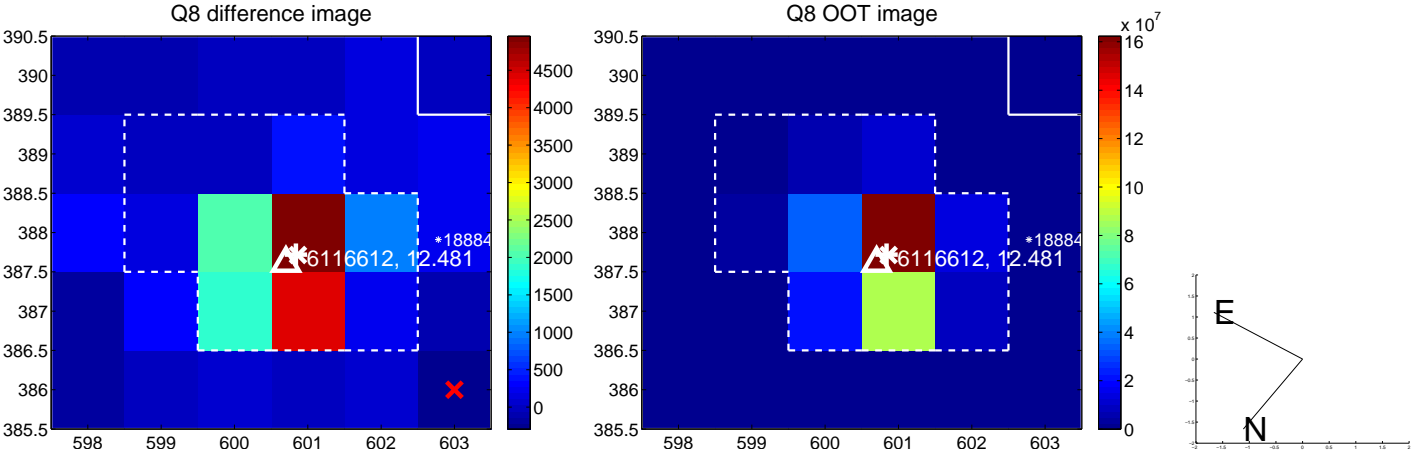
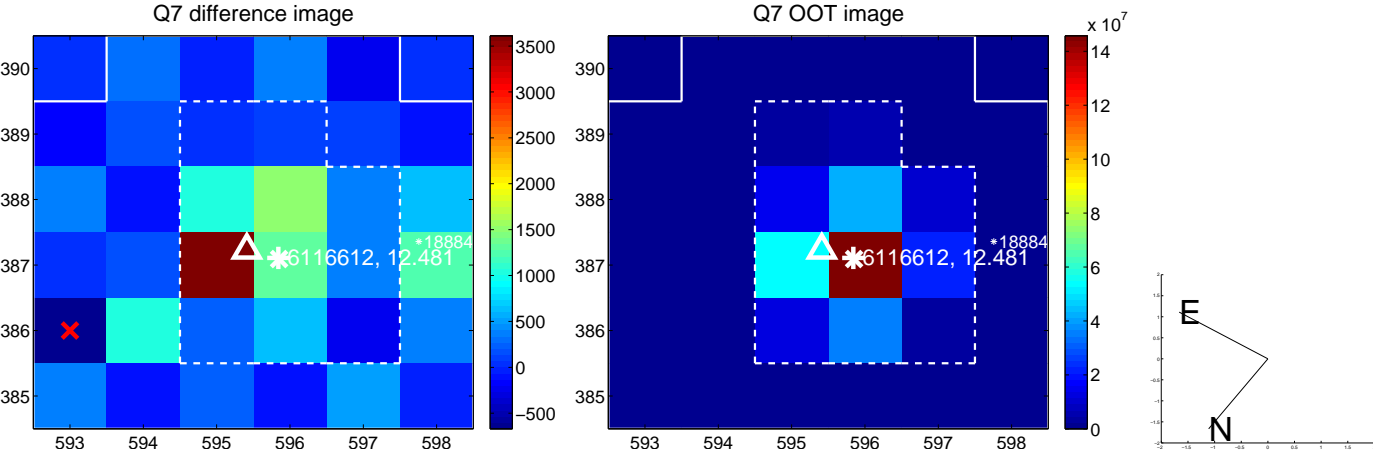
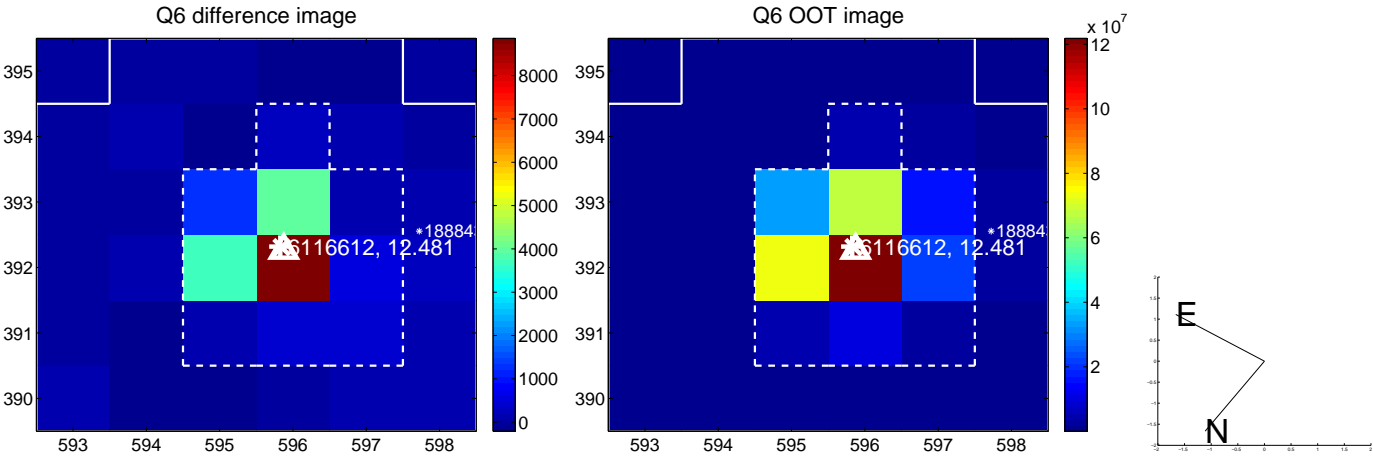
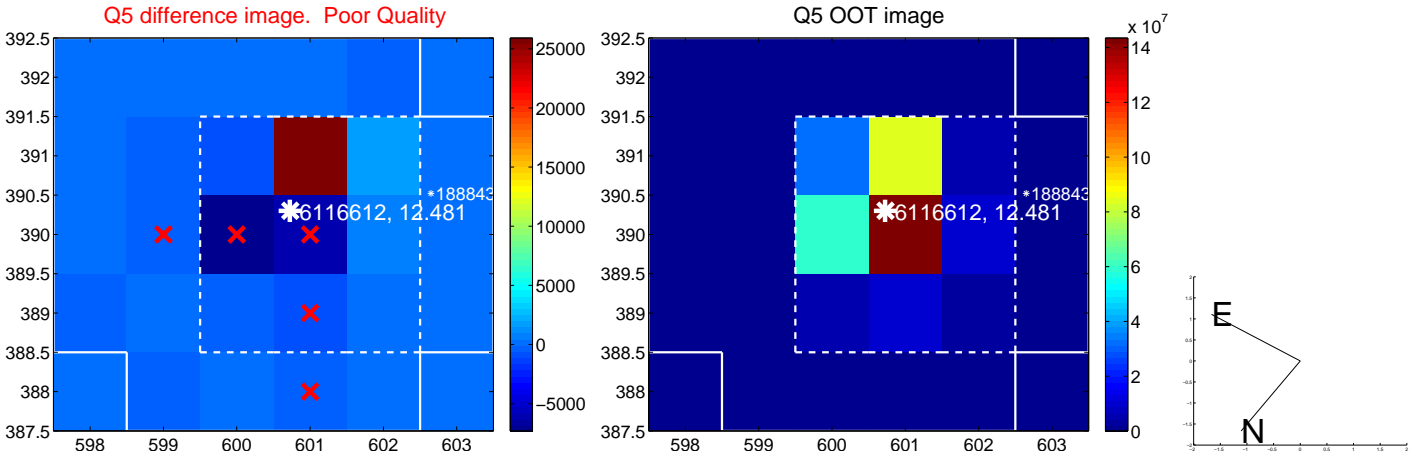


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

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

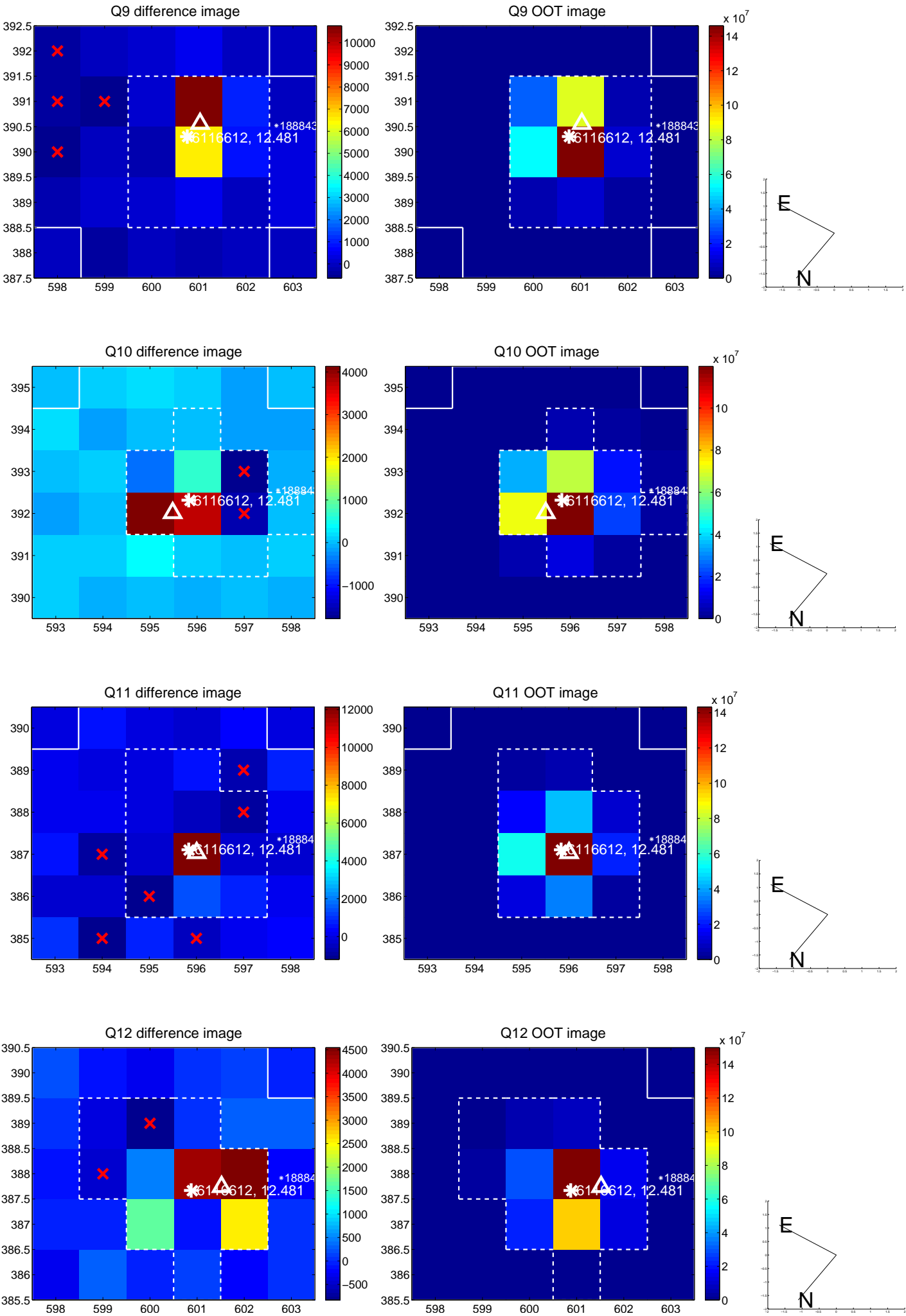


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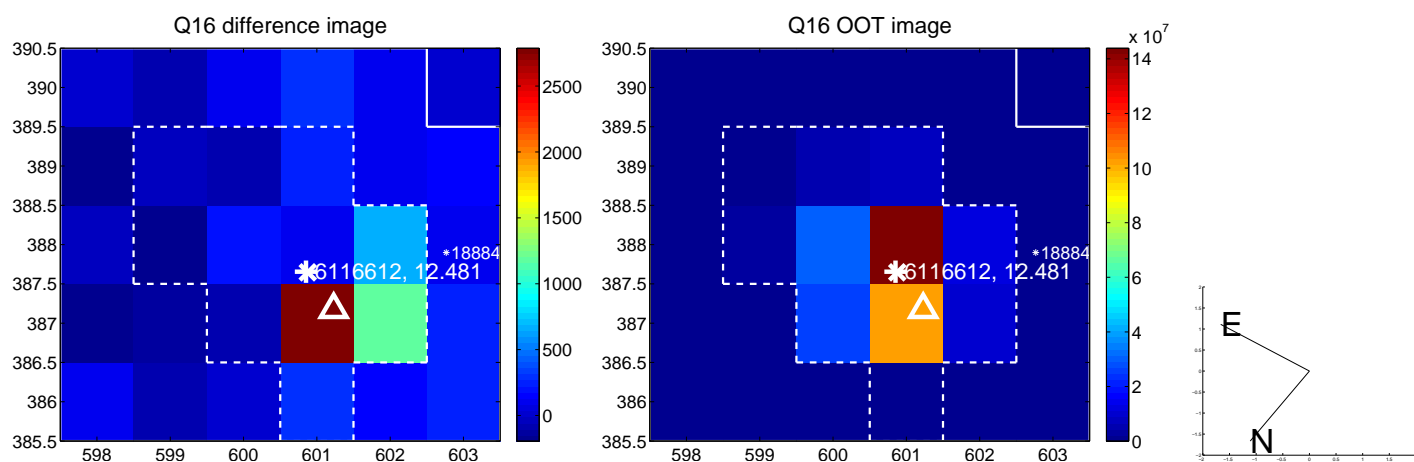
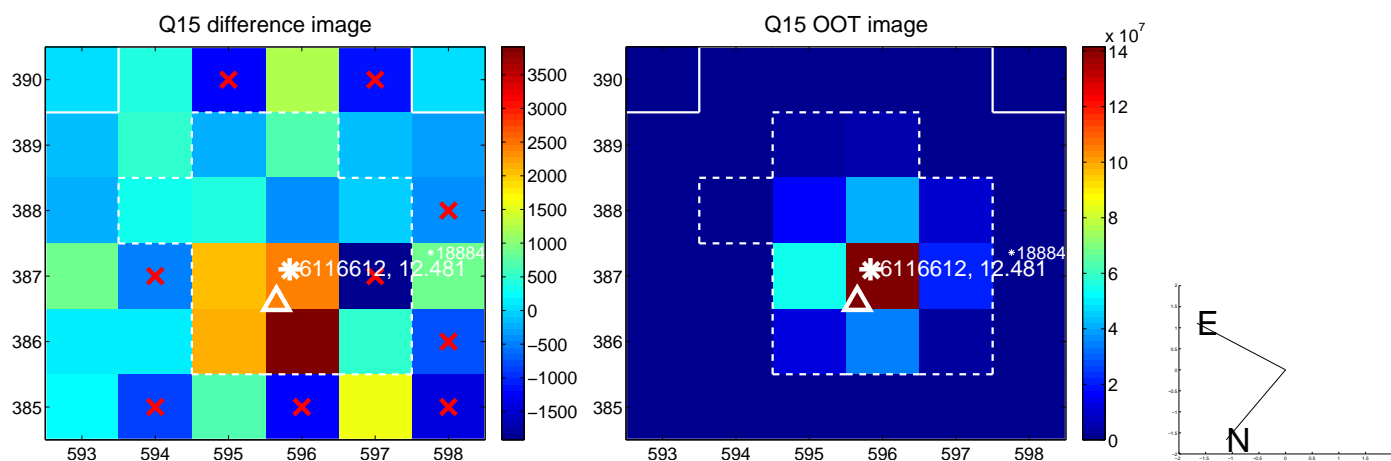
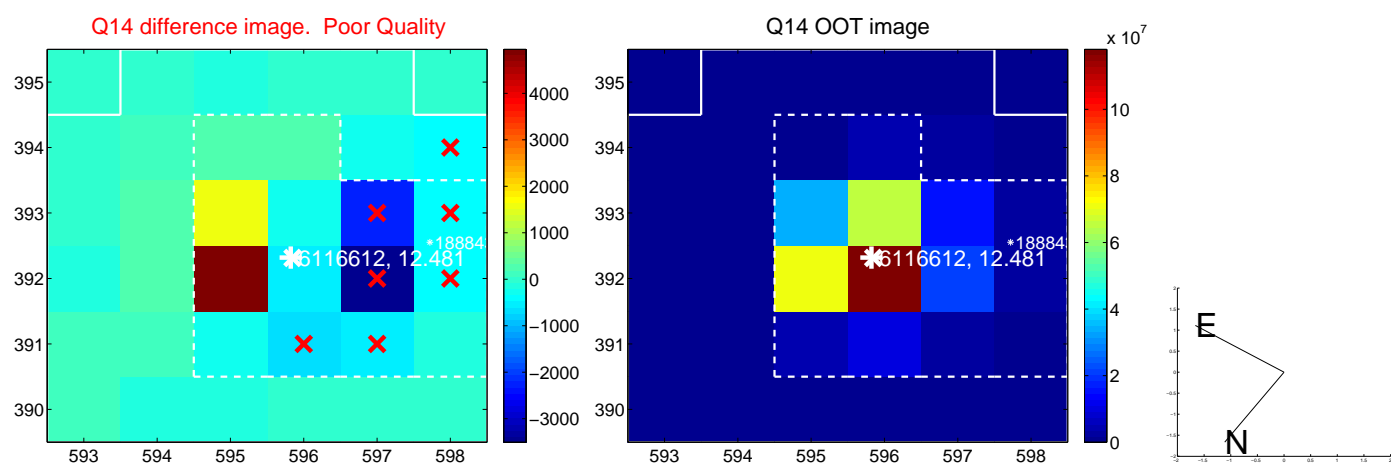
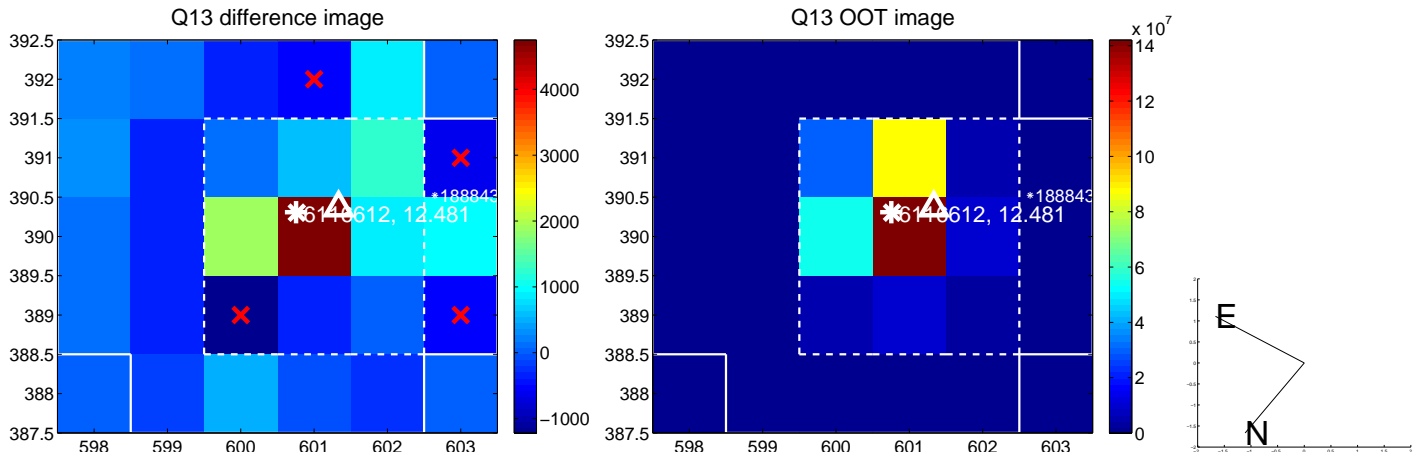




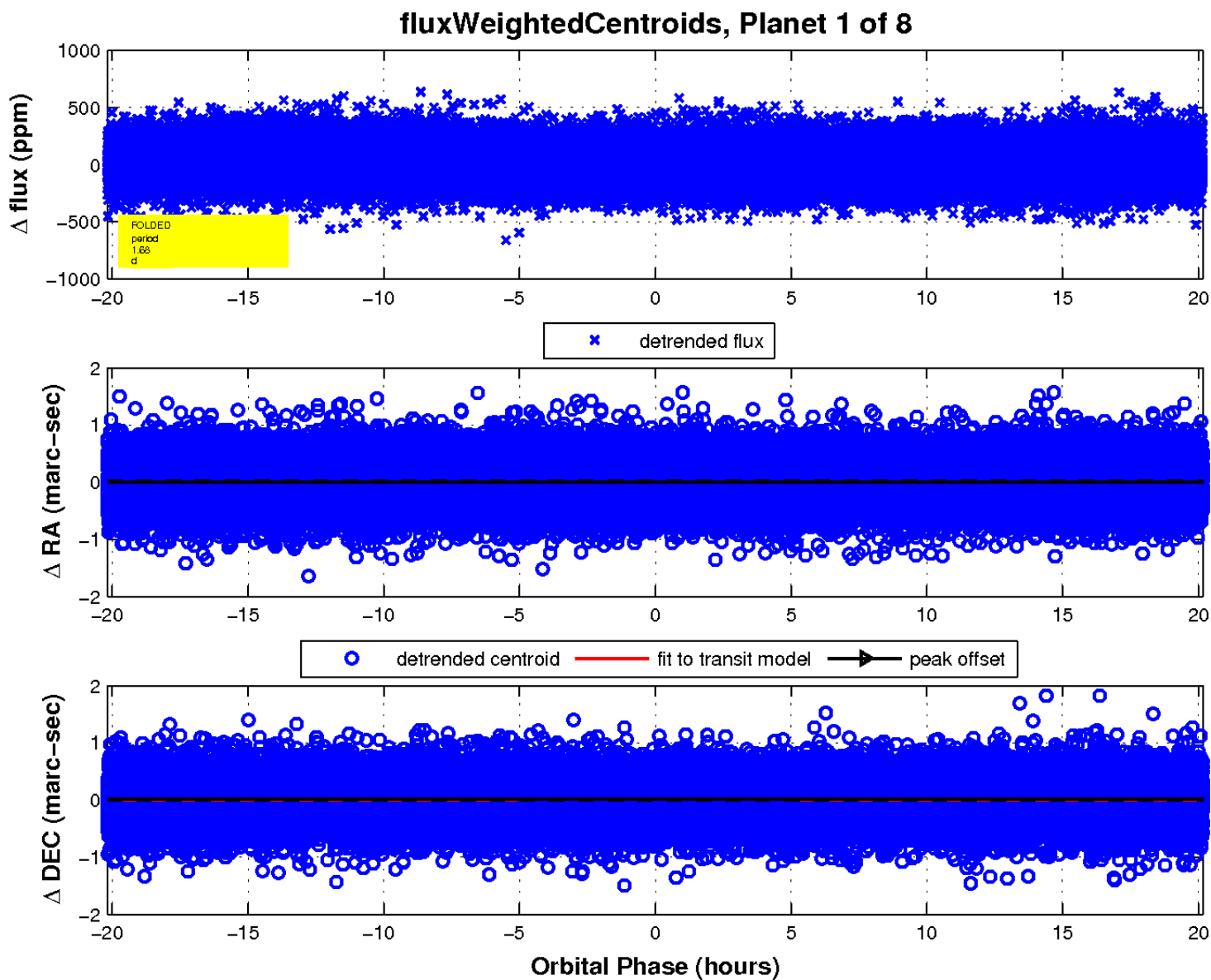
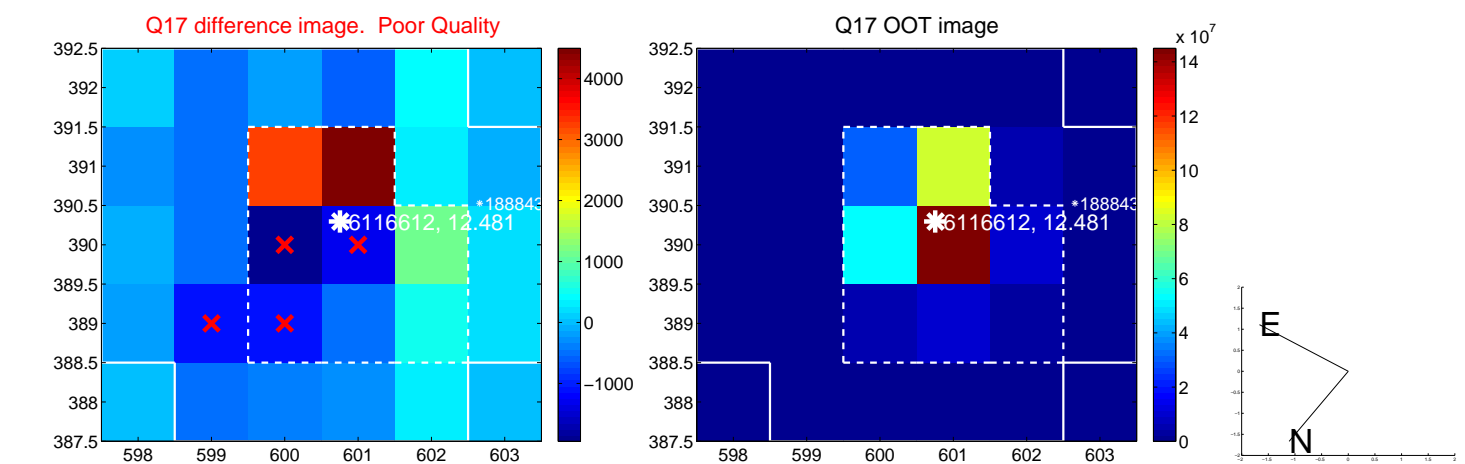
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white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

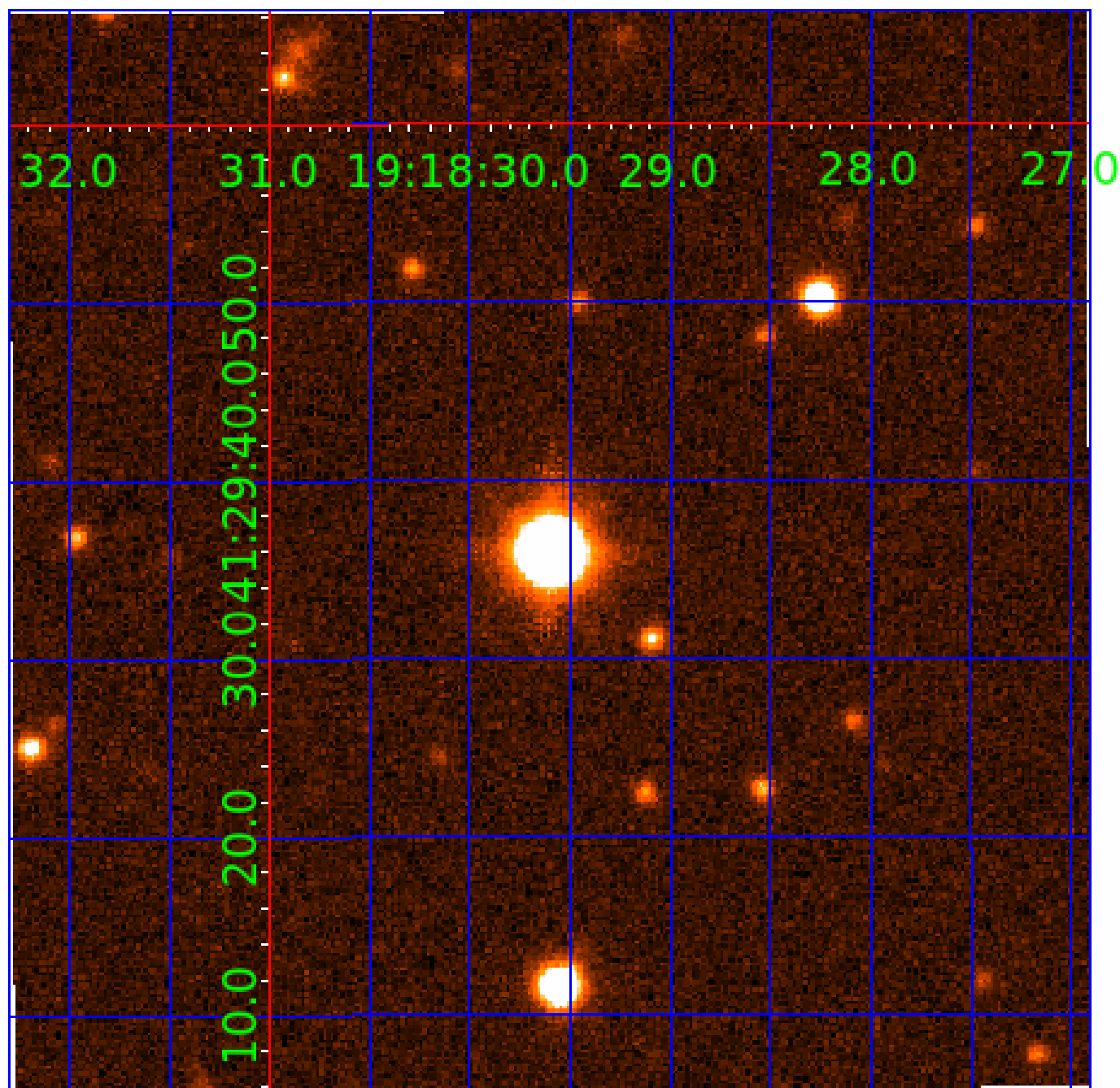


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 006116612

## Q1-17 DR25 TCE Parameters

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006116612-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT
006116612-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS

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

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

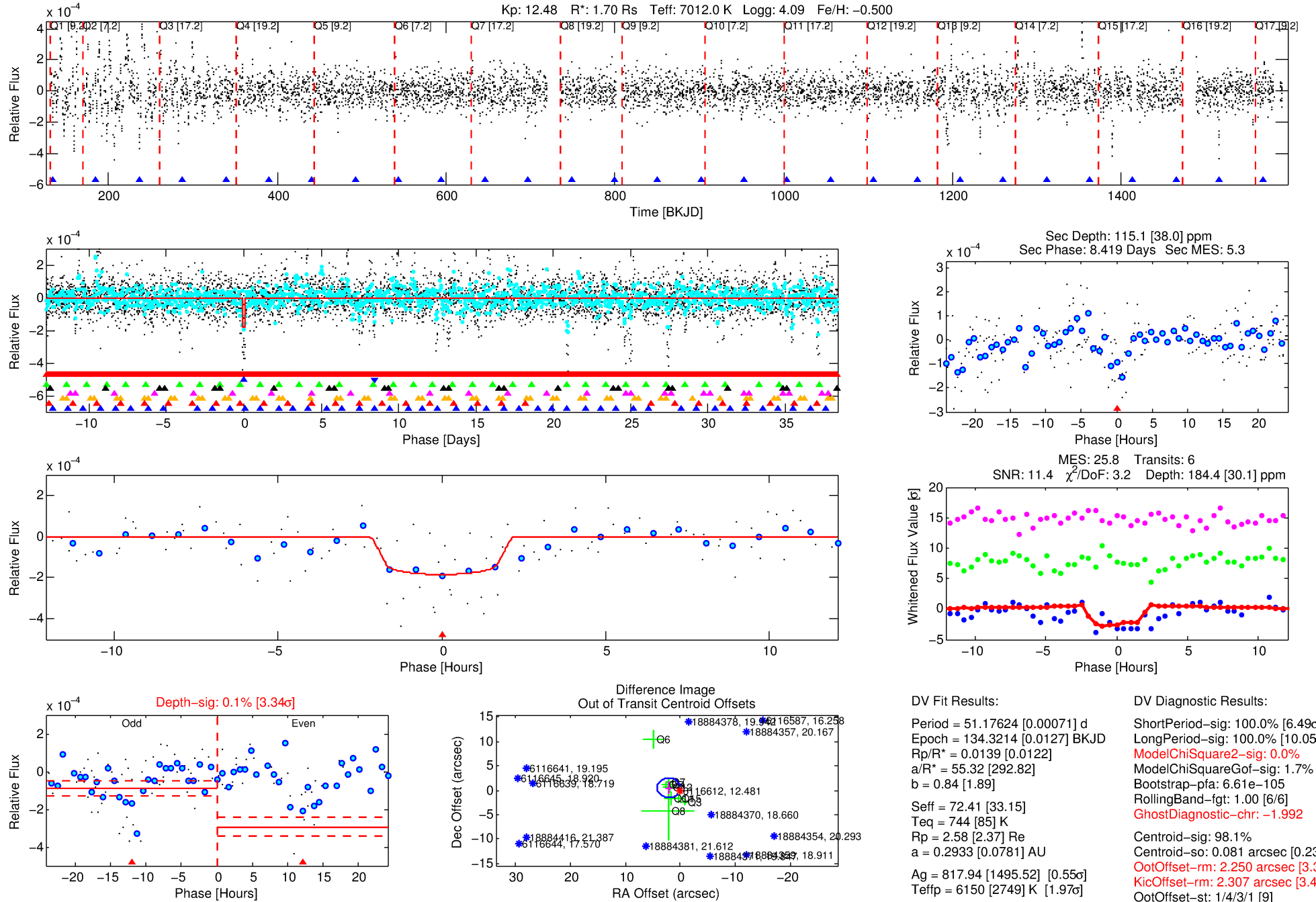
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 006116612-02

No Significant Match Found

# DV One-Page Summary

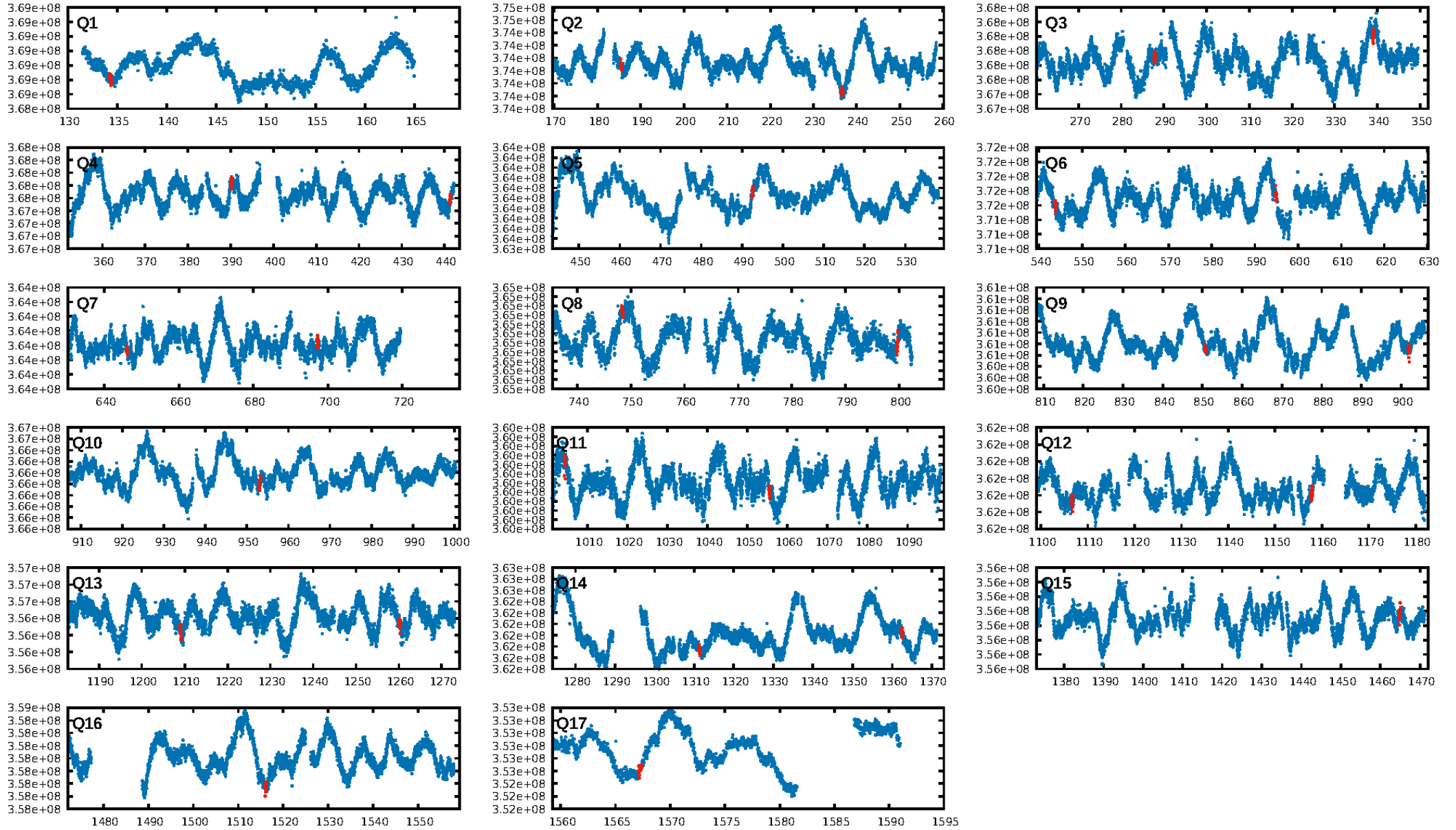
KIC: 6116612 Candidate: 2 of 8 Period: 51.176 d



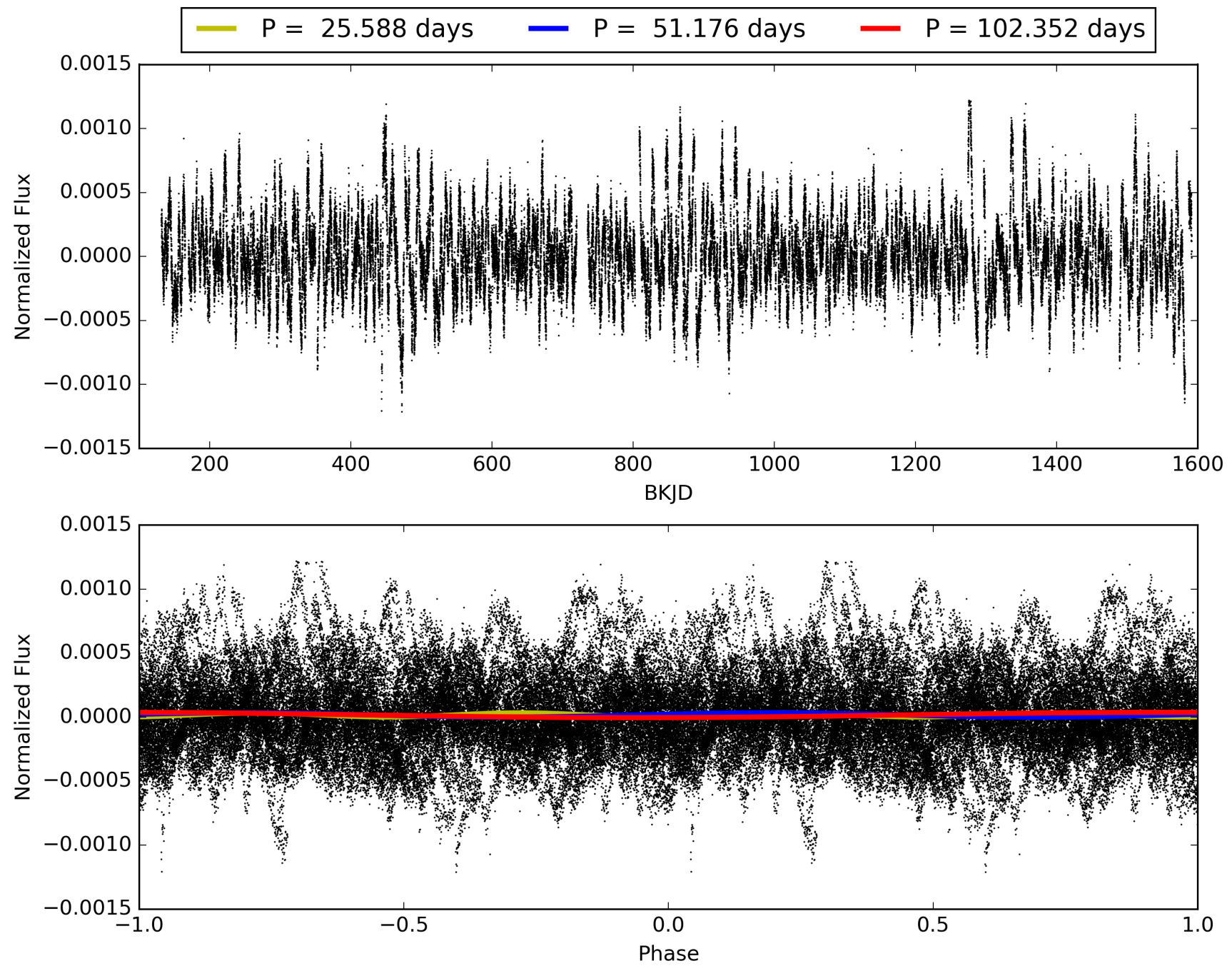
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 19:43:21 Z

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

# TCE 006116612-02, PDC Light Curves



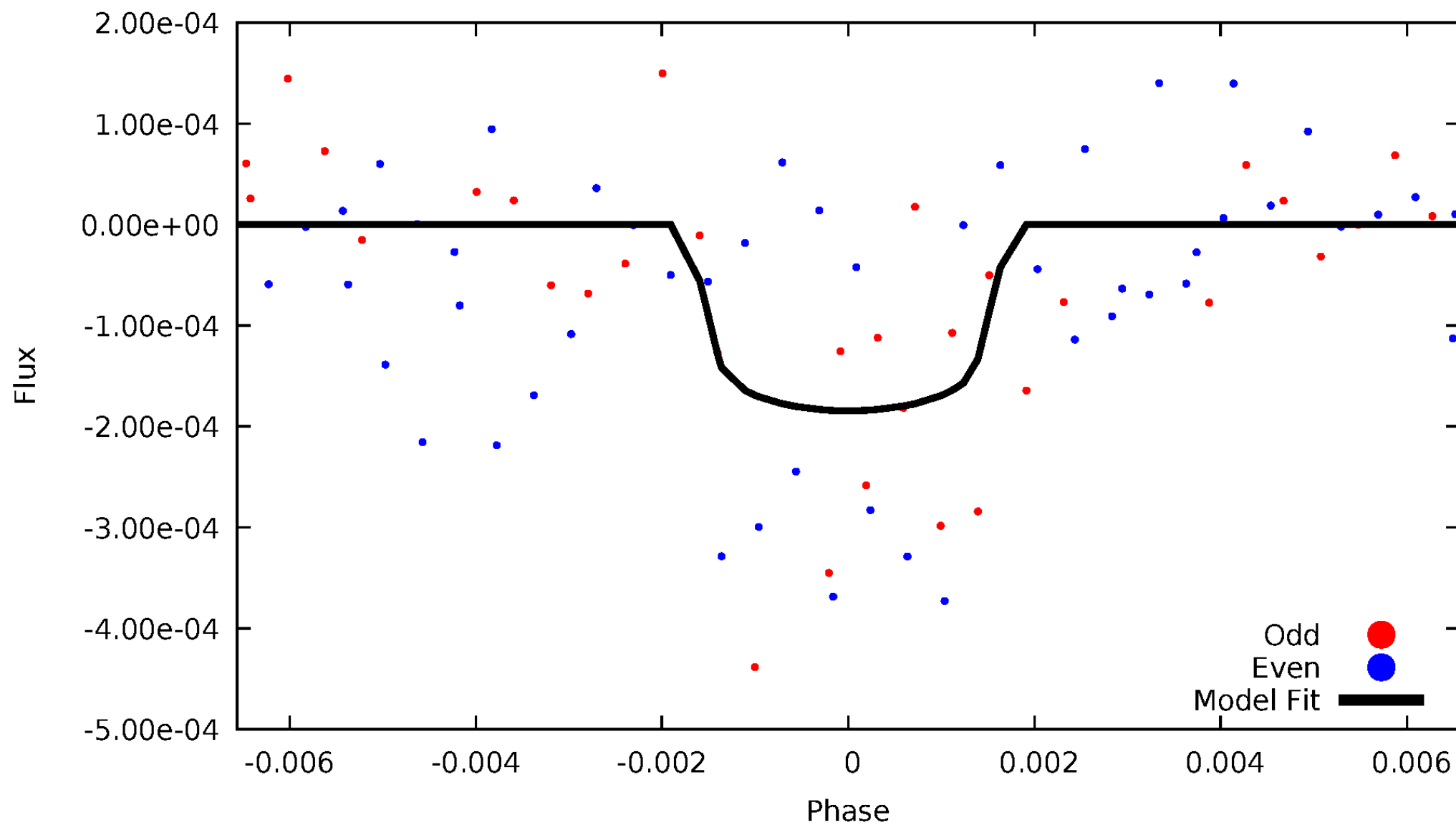
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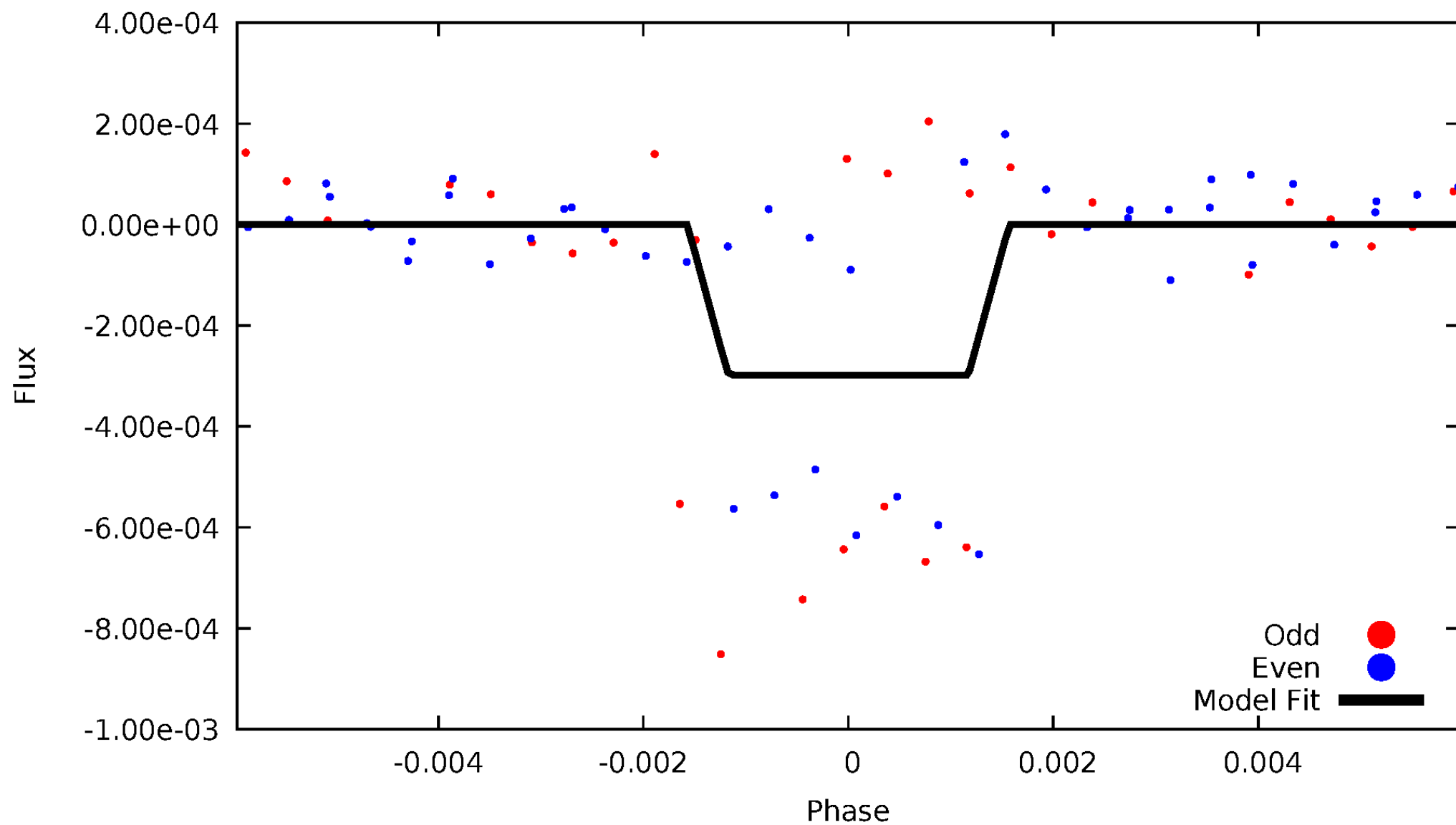
# DV Odd/Even

TCE 006116612-02



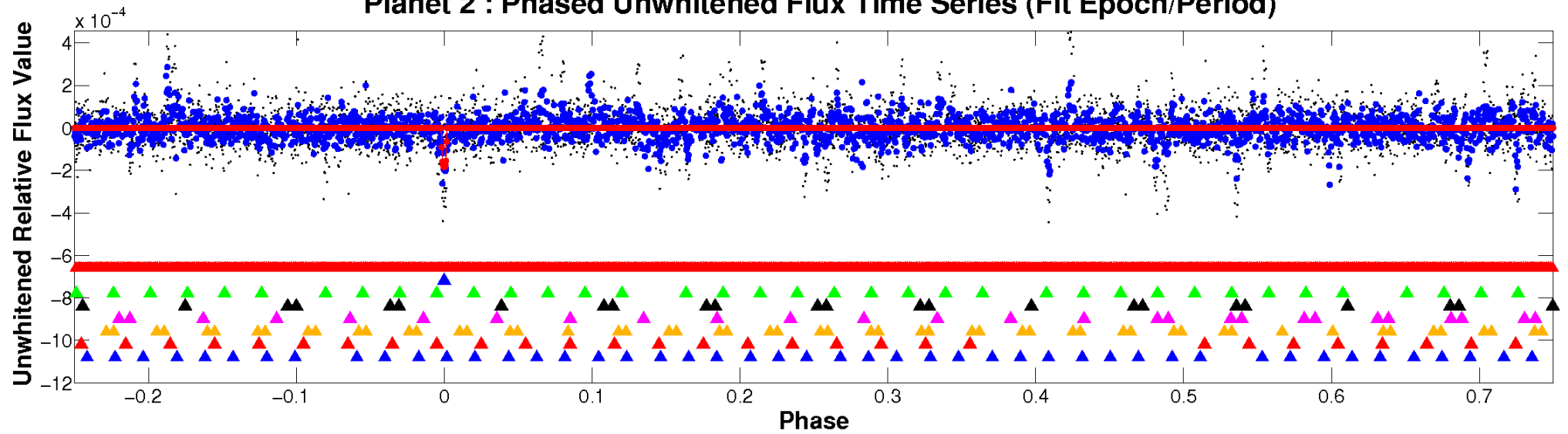
# ALT Odd/Even

TCE 006116612-02

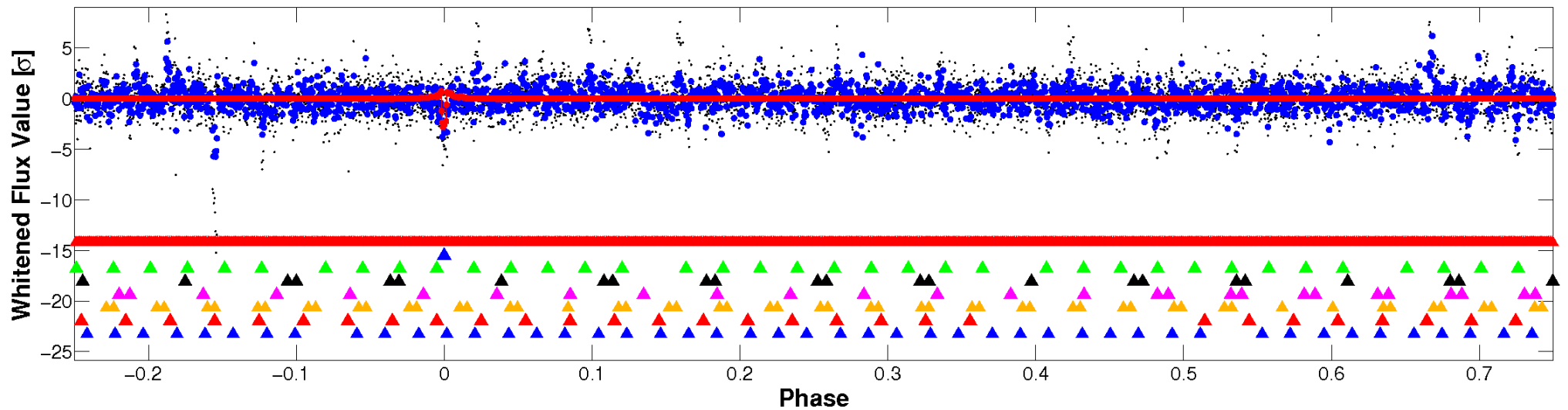


# Non-Whitened Vs. Whitened Light Curve

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

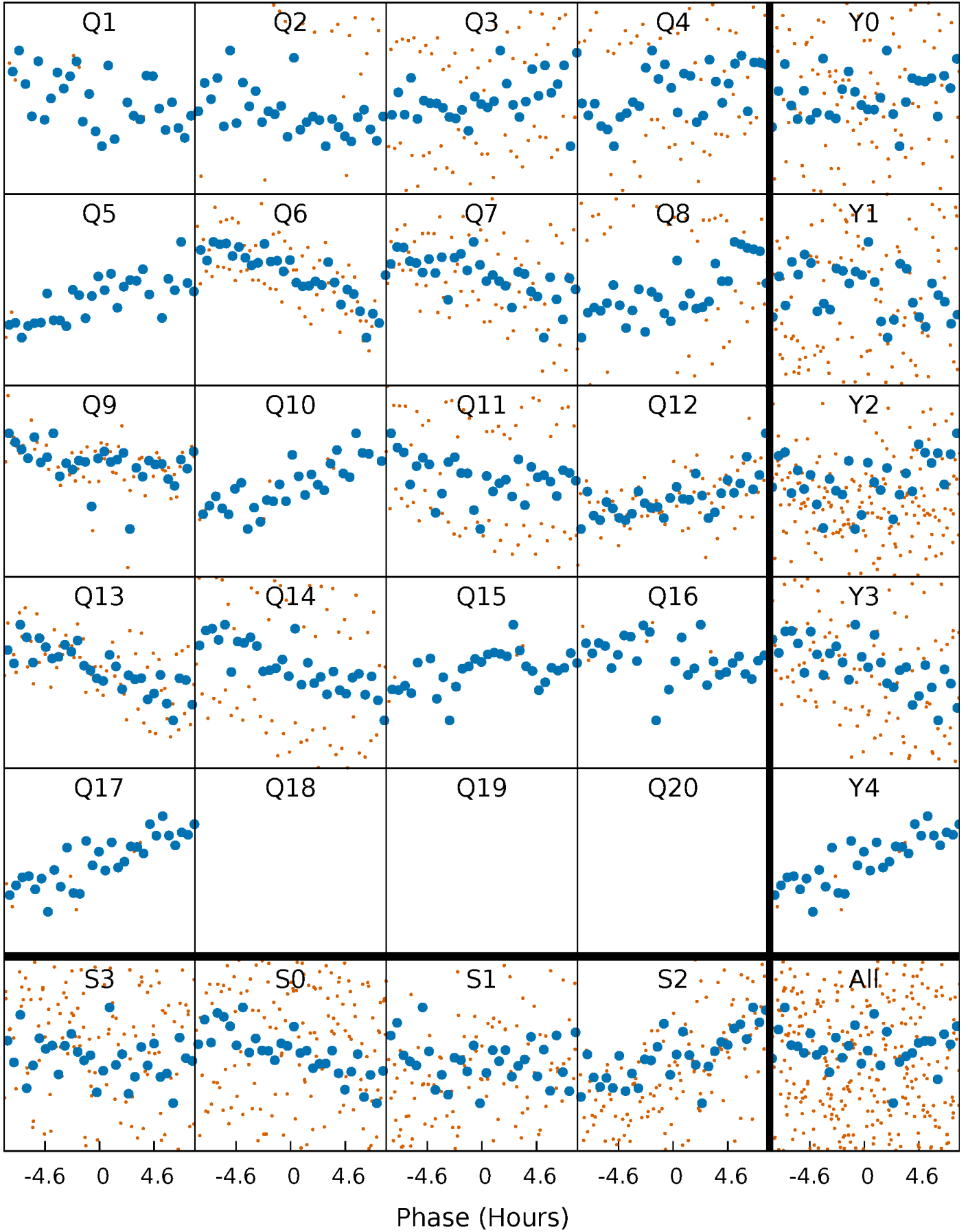


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



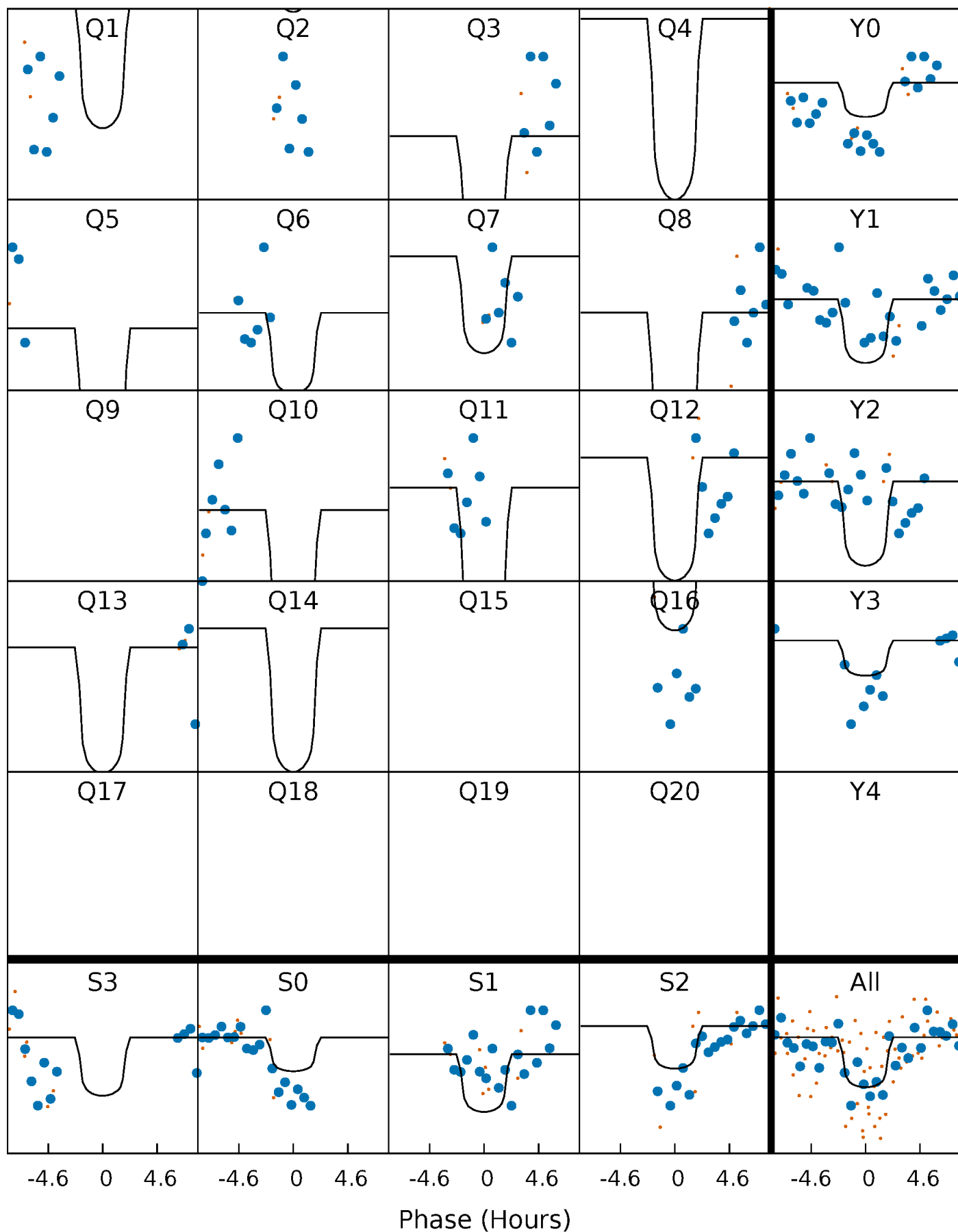
# PDC Quarter-Phased Transit Curves

TCE 006116612-02 P= 51.176242 Days  $T_0=134.321375$  (BKJD)



# DV Quarter-Phased Transit Curves

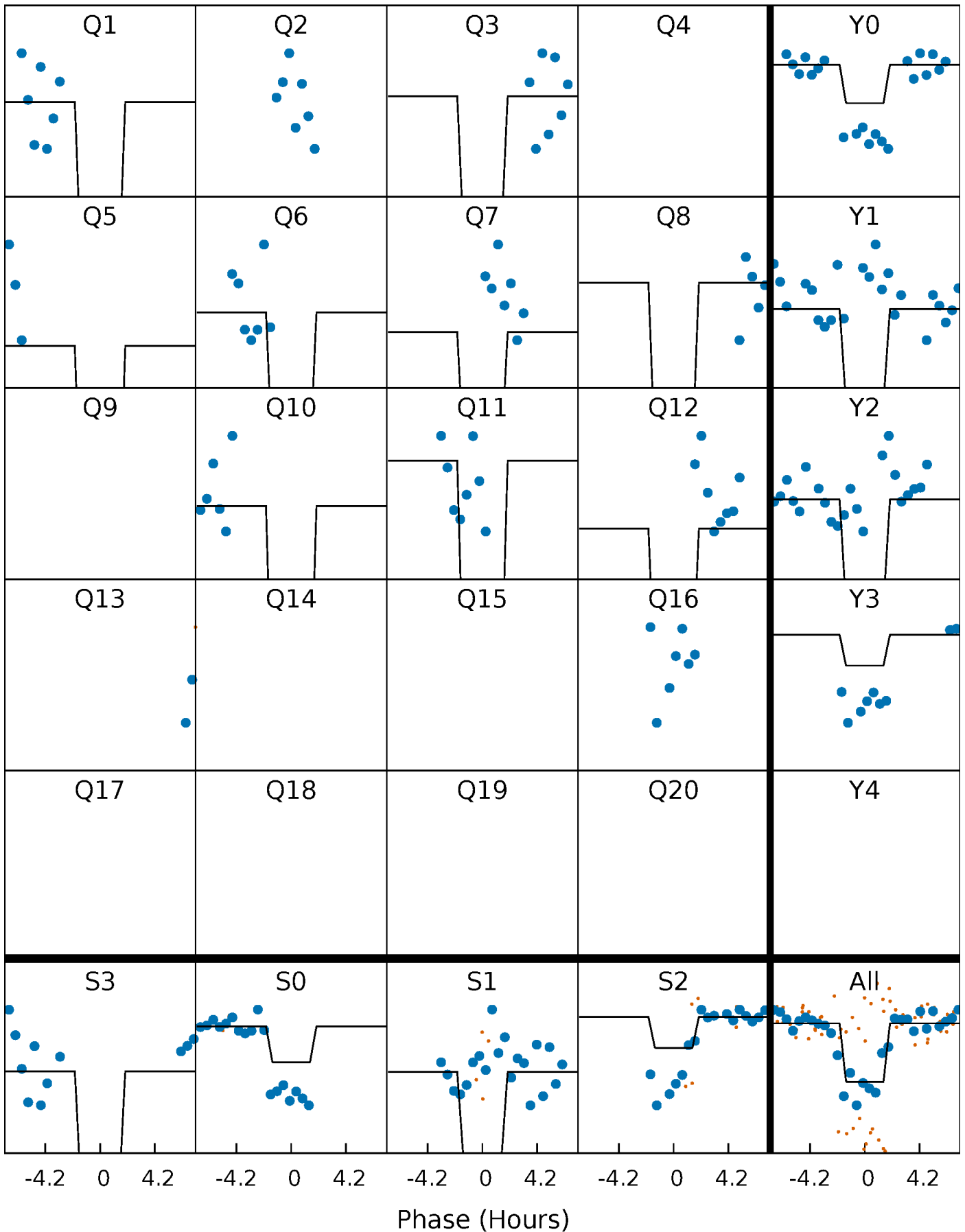
TCE 006116612-02   P= 51.176242 Days    $T_0=134.321375$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

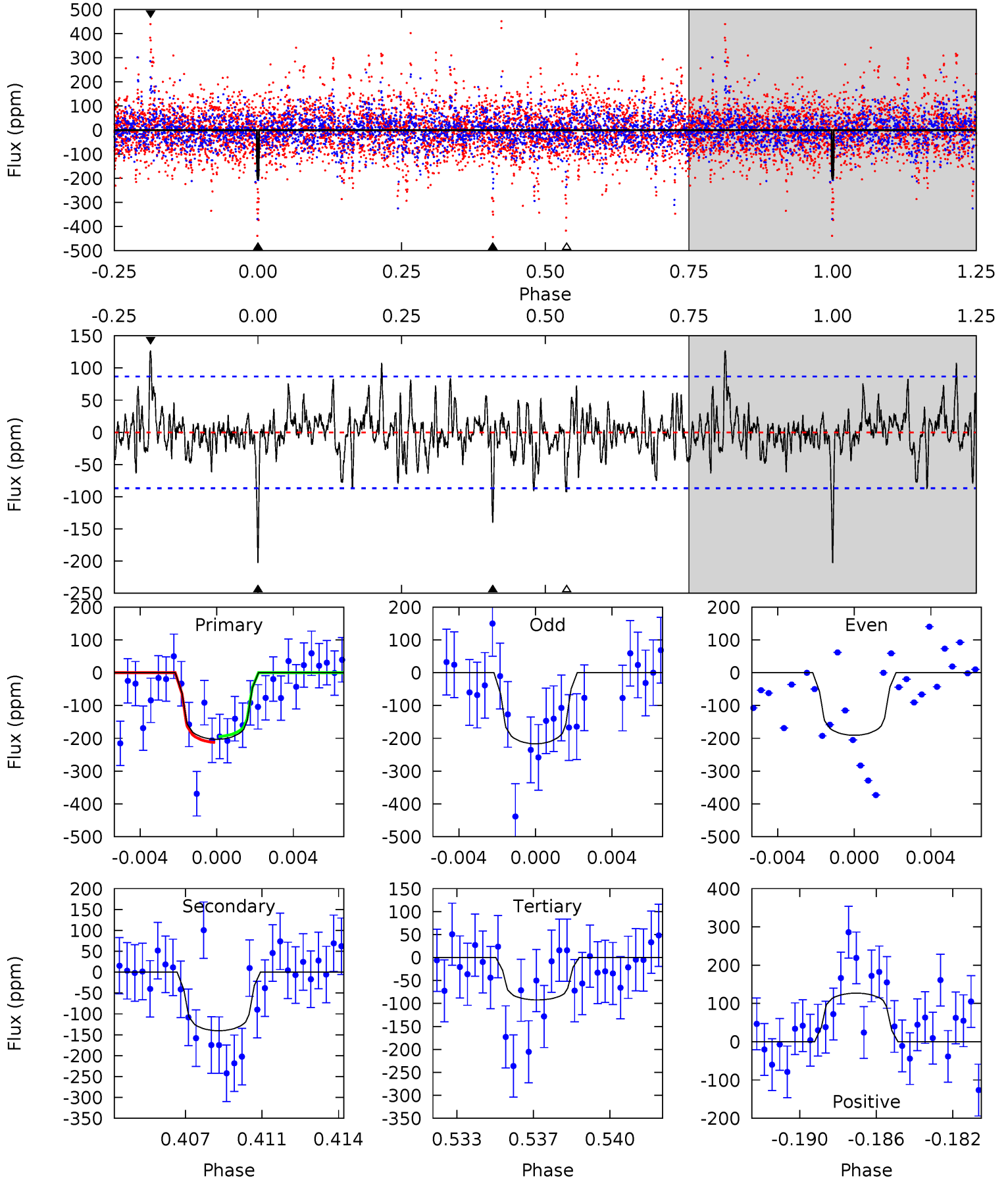
TCE 006116612-02 P= 51.177222 Days  $T_0=134.307111$  (BKJD)



# DV Model-Shift Uniqueness Test

006116612-02, P = 51.176242 Days, E = 83.145133 Days

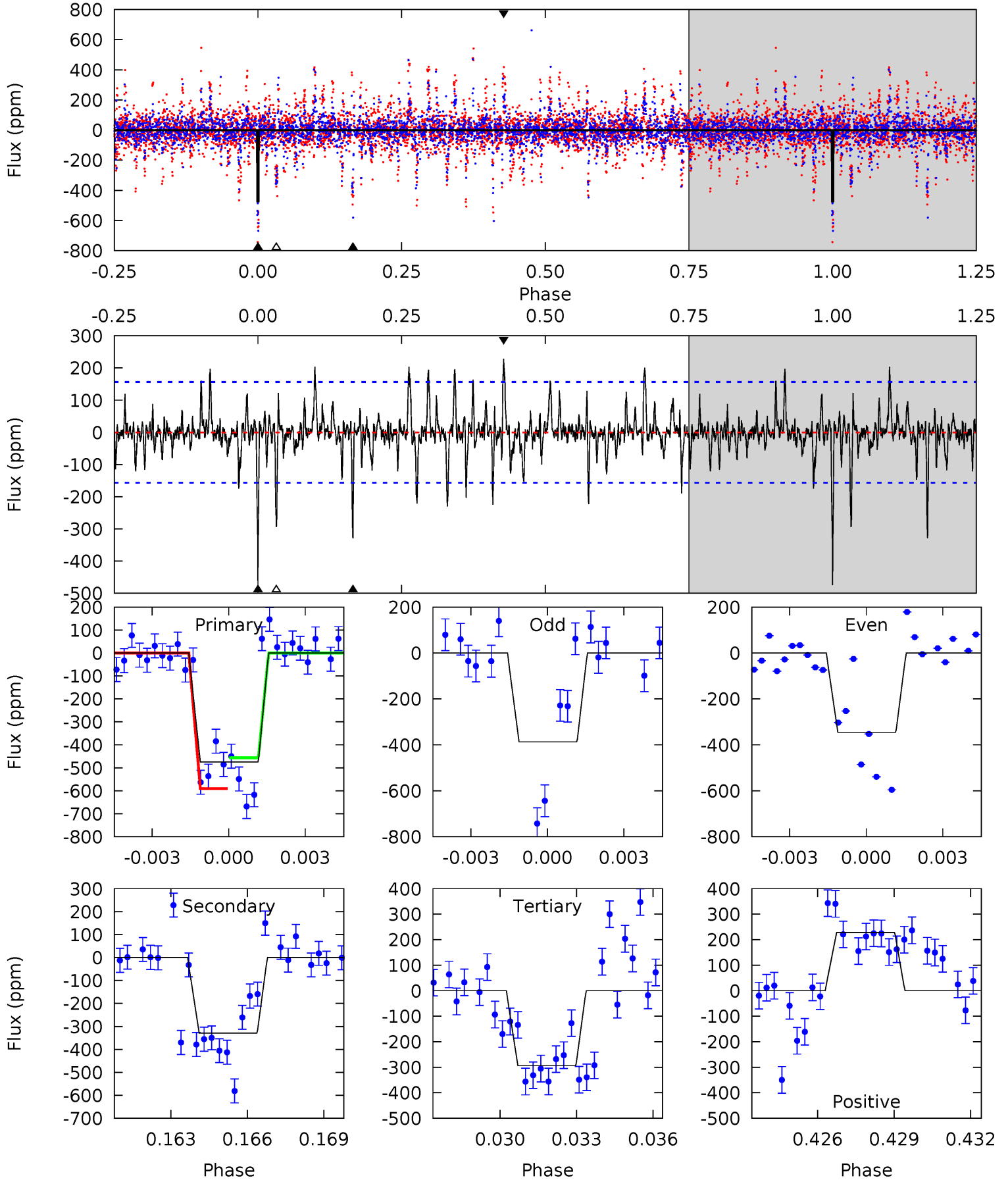
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.2	8.44	5.55	7.63	5.22	2.92	1.76	6.66	4.58	2.89	0.81	0.74	1.67	0.38	0.54



# Alt Model-Shift Uniqueness Test

006116612-02, P = 51.177222 Days, E = 83.129889 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
15.9	11.0	9.86	7.66	5.25	2.97	1.85	6.04	8.24	1.16	3.36	0.72	6.54	0.33	0



### Stellar Parameters For KIC 006116612

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7012^{+216}_{-312}$	$4.088^{+0.246}_{-0.164}$	$-0.500^{+0.250}_{-0.300}$	$1.696^{+0.430}_{-0.478}$	$1.283^{+0.169}_{-0.211}$	$0.370^{+0.569}_{-0.174}$
	+3%/-4%	+6%/-4%	+50%/-60%	+25%/-28%	+13%/-16%	+153%/-47%
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 006116612-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-140 \pm 17$	$2.76^{+2.02}_{-1.68}$	$1022^{+83}_{-88}$	$6065^{+4640}_{-1302}$	$884^{+4612}_{-603}$
Alt.	$-329 \pm 30$	$3.47^{+2.24}_{-2.01}$	$1028^{+88}_{-85}$	$6811^{+5615}_{-1513}$	$1305^{+5941}_{-833}$

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

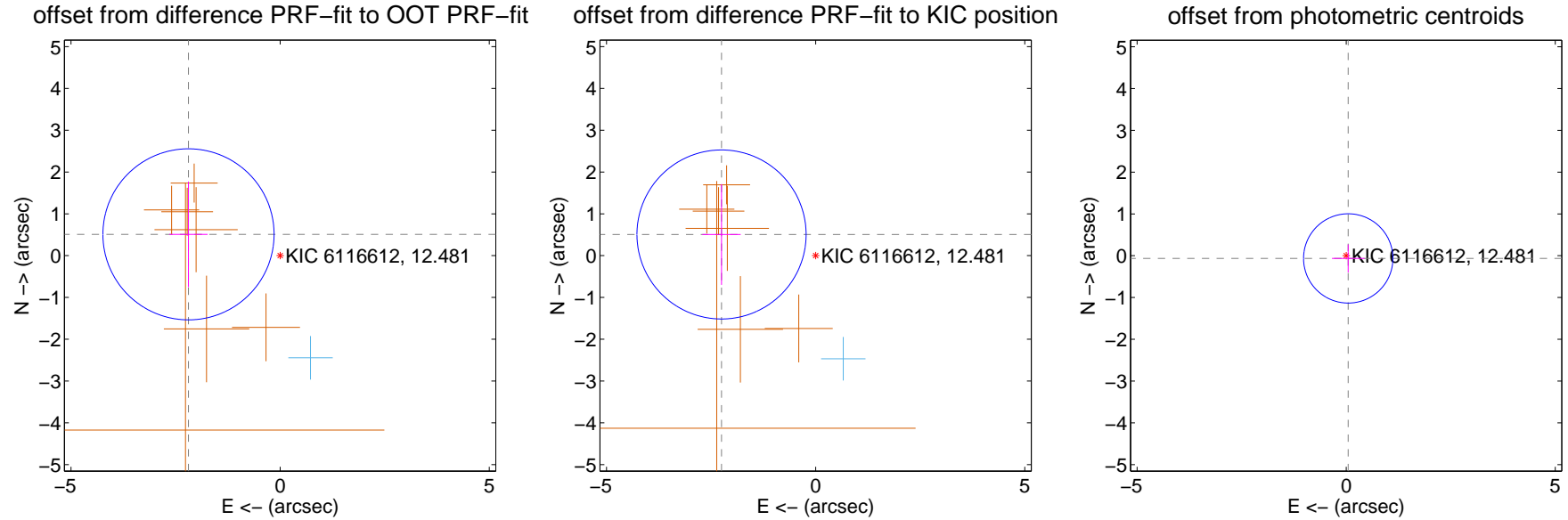
## DV Centroid Data

Supplemental centroid analysis for 006116612-02. Kepler magnitude: 12.48. Transit SNR 11.42

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

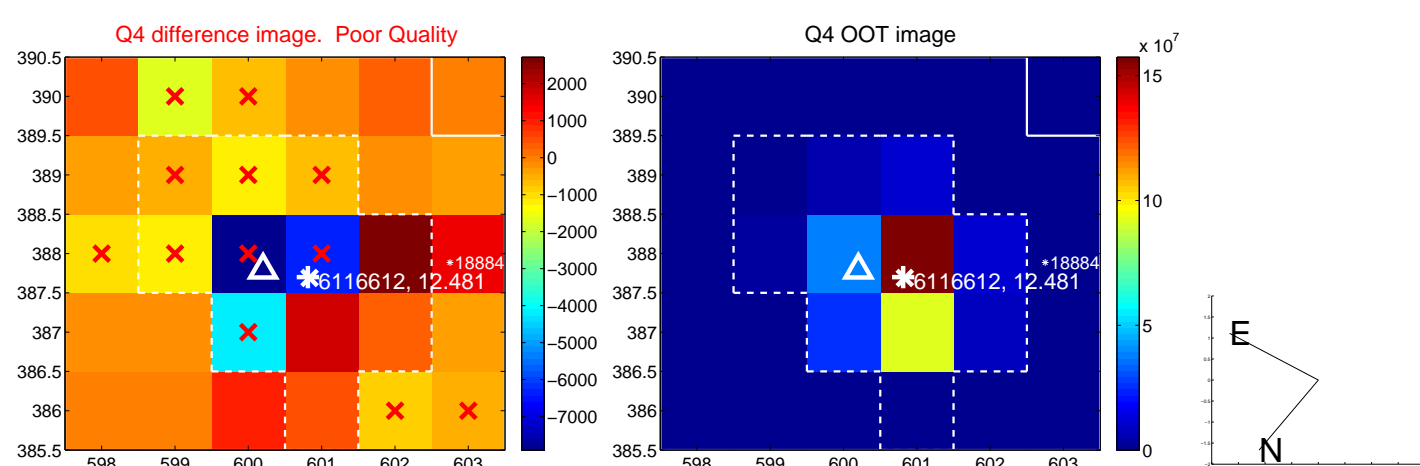
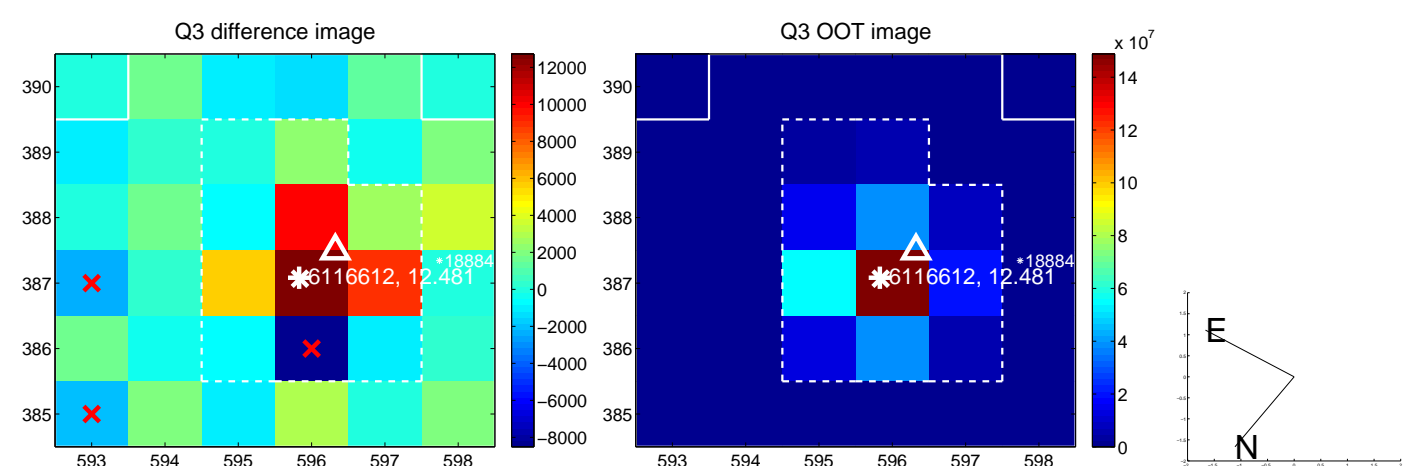
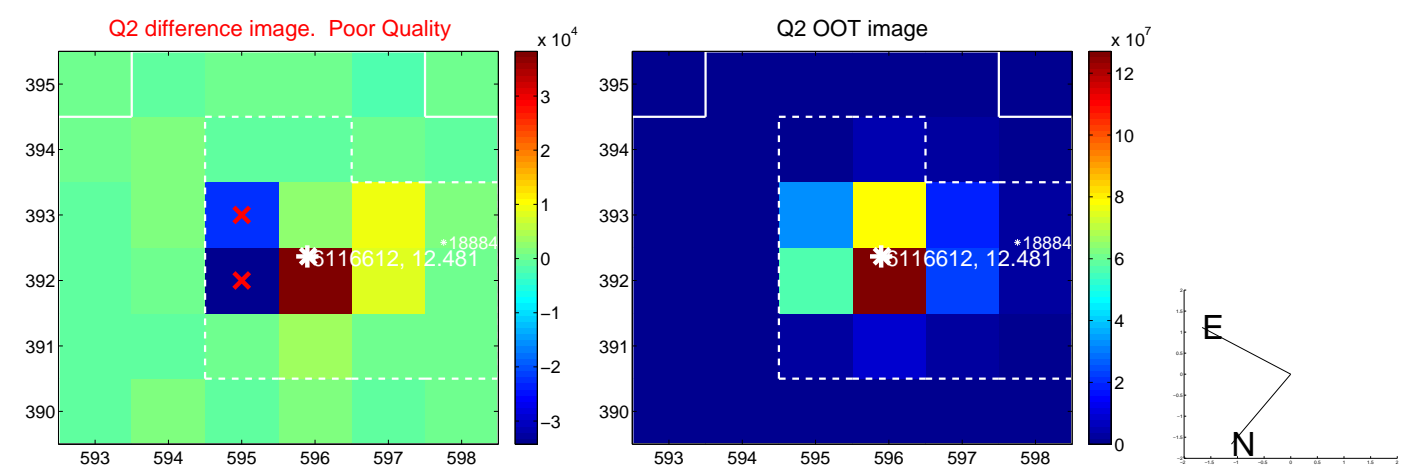
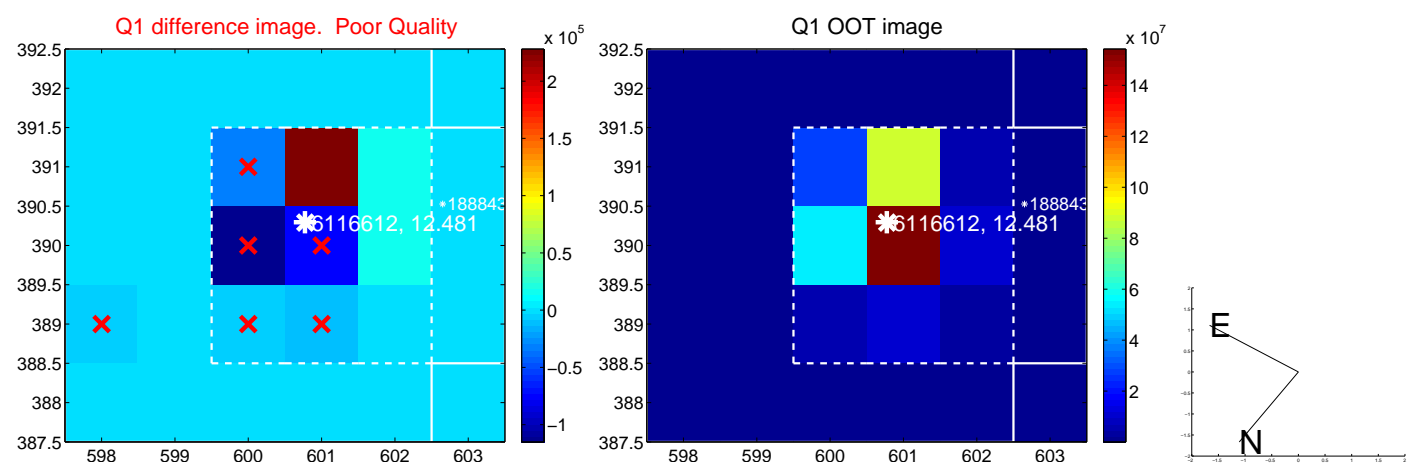
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.250 \pm 0.682$	3.30	$2.192 \pm 0.459$	$0.510 \pm 1.264$
PRF-fit source offset from KIC position	$2.307 \pm 0.674$	3.42	$2.251 \pm 0.459$	$0.506 \pm 1.206$
photometric centroid source offset	$0.08 \pm 0.36$	0.23	$-0.05 \pm 0.39$	$-0.06 \pm 0.34$



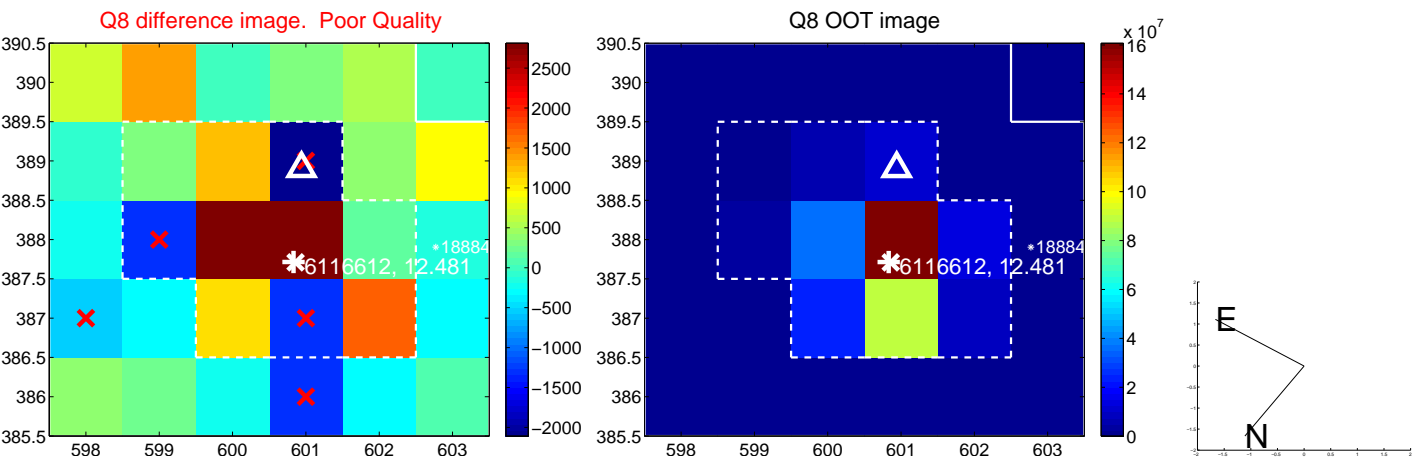
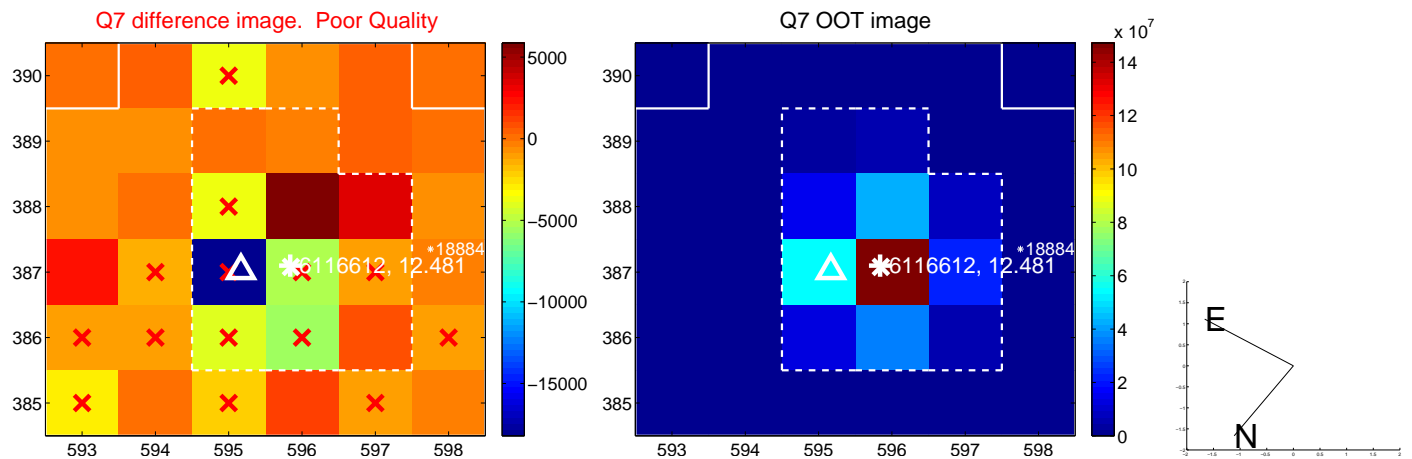
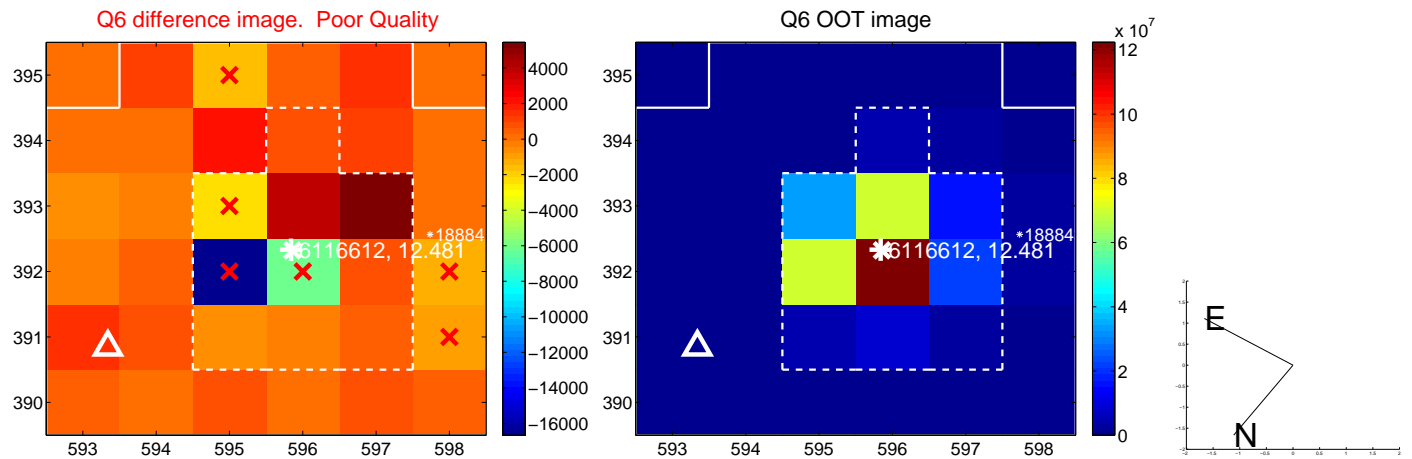
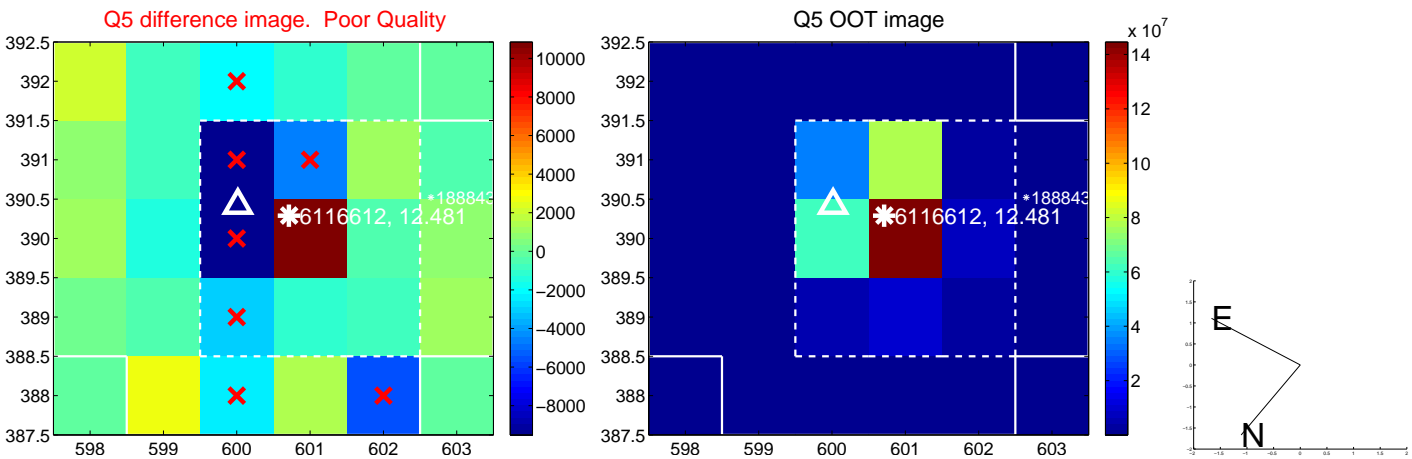
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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



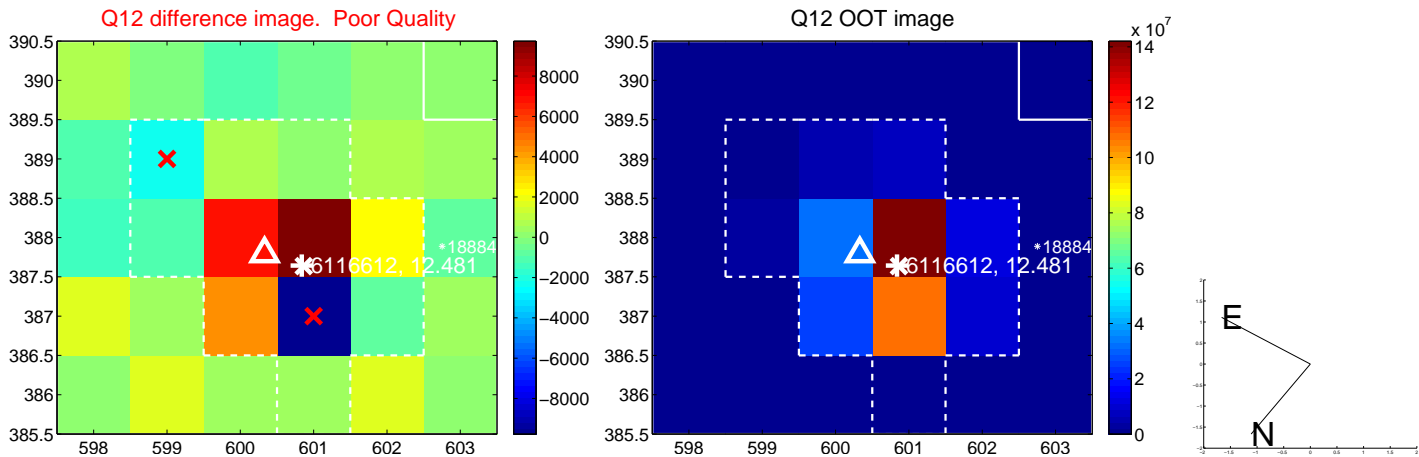
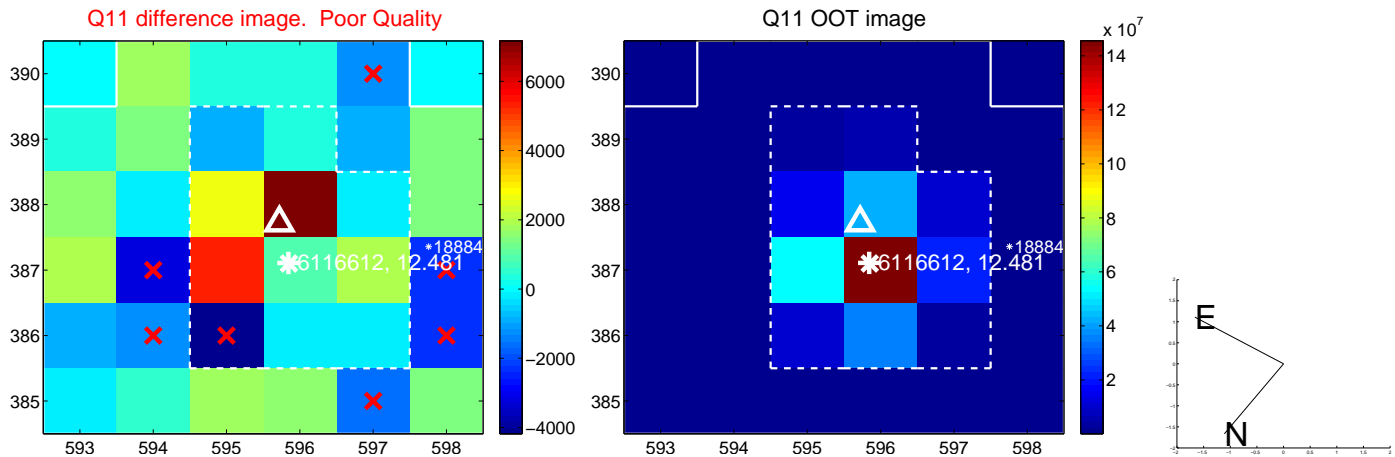
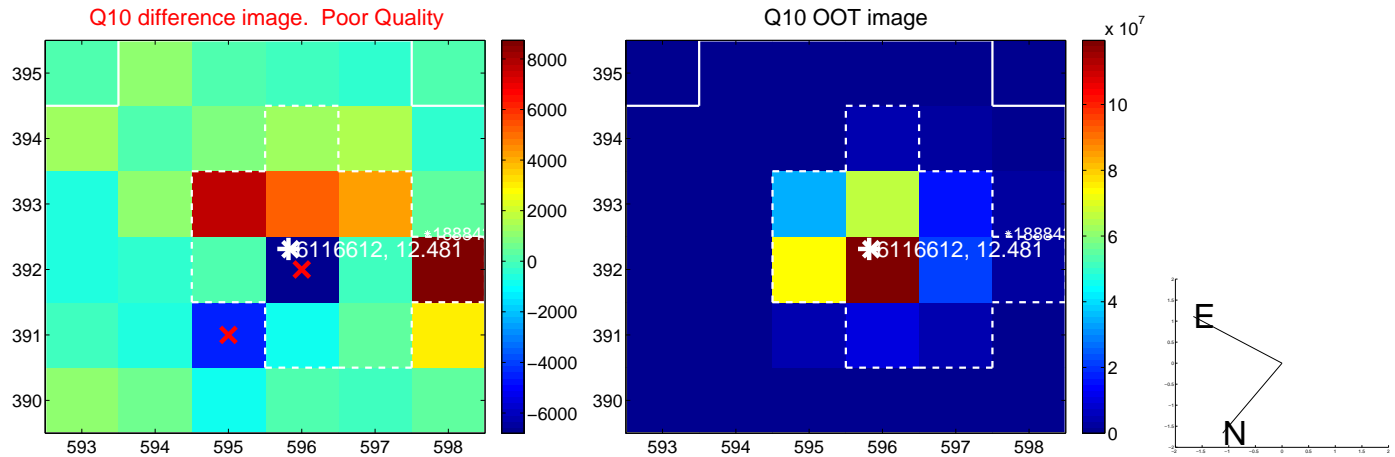
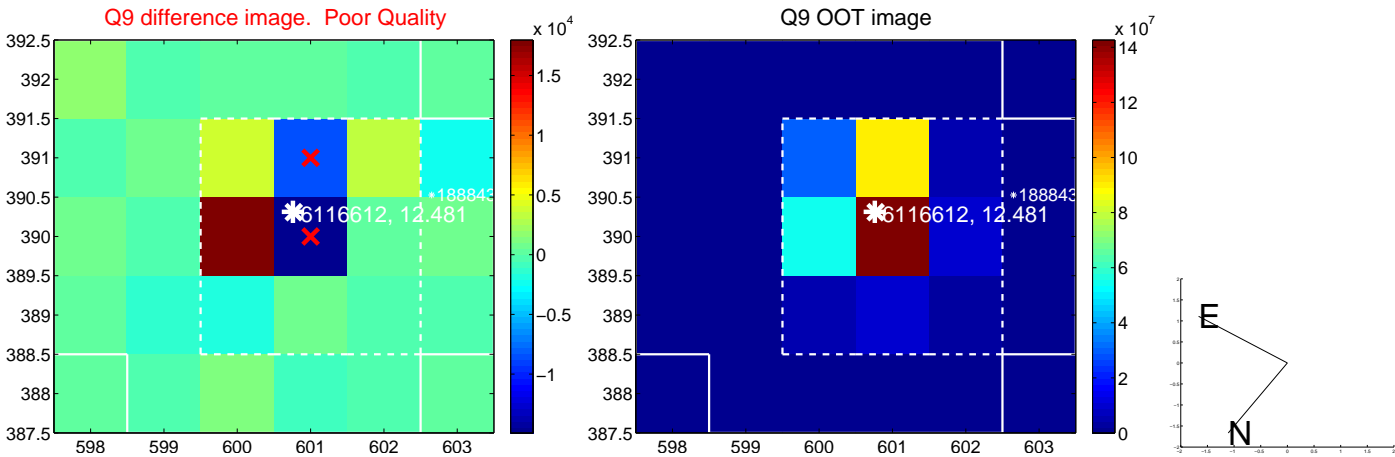
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



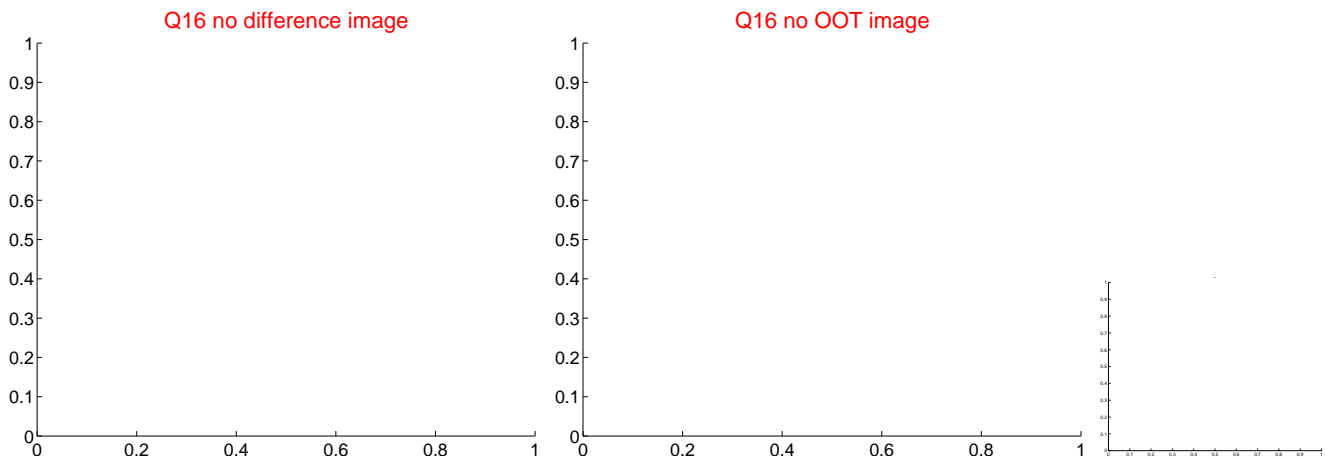
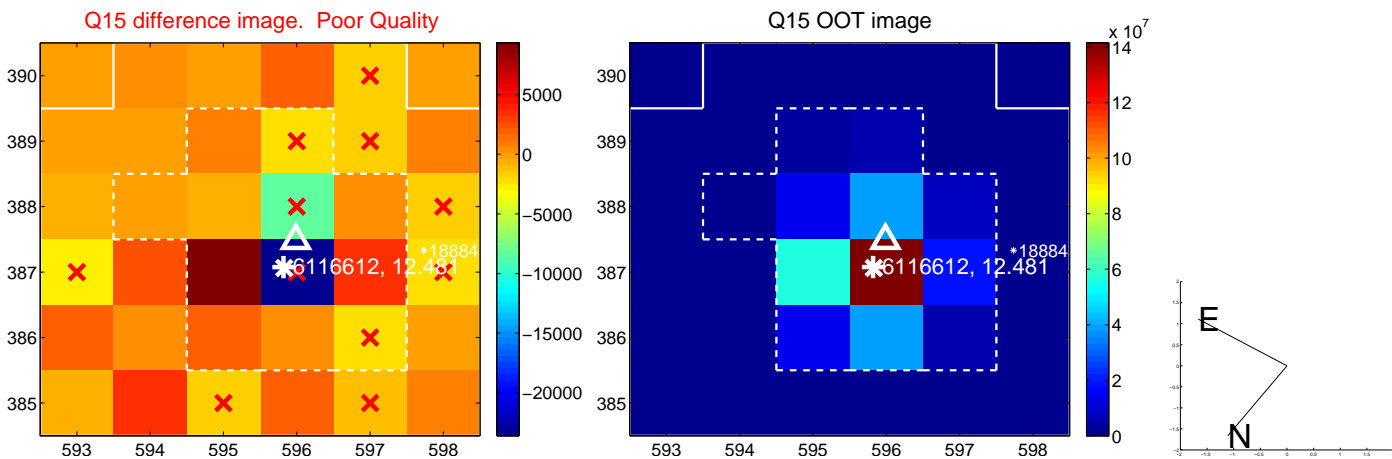
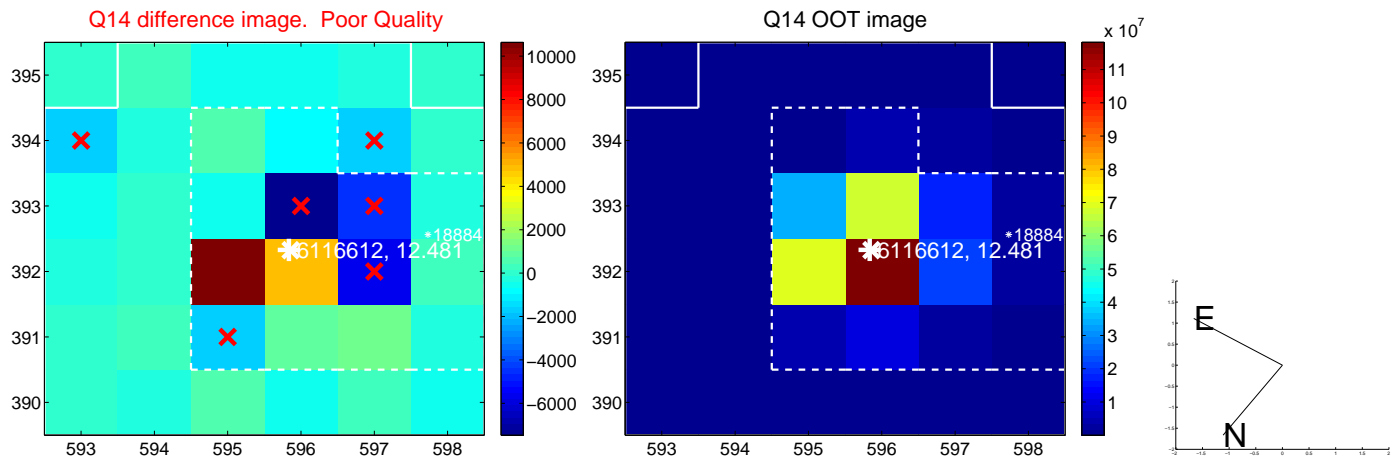
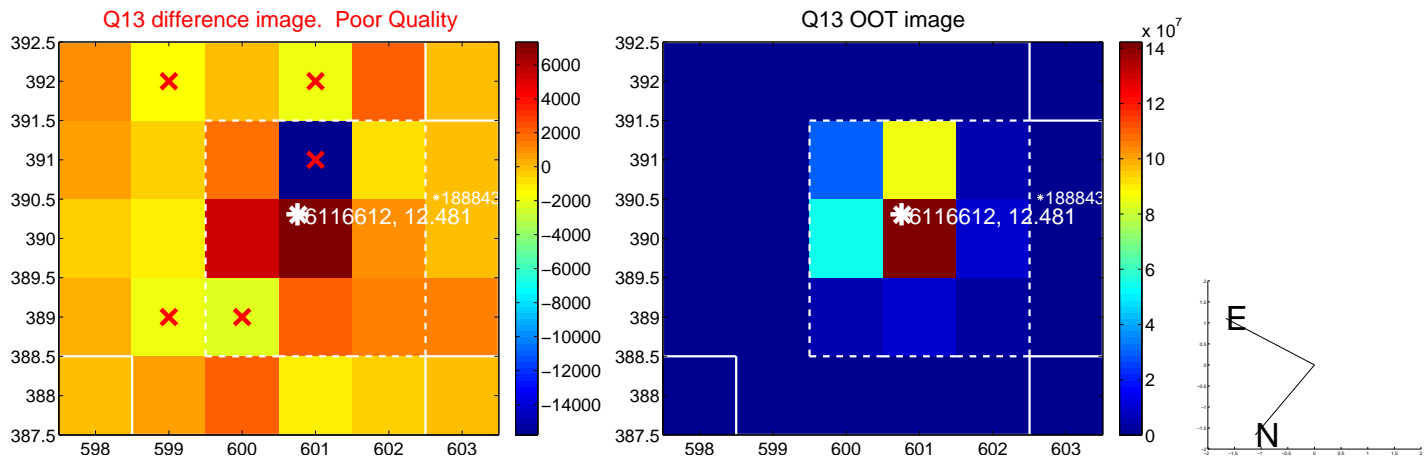
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



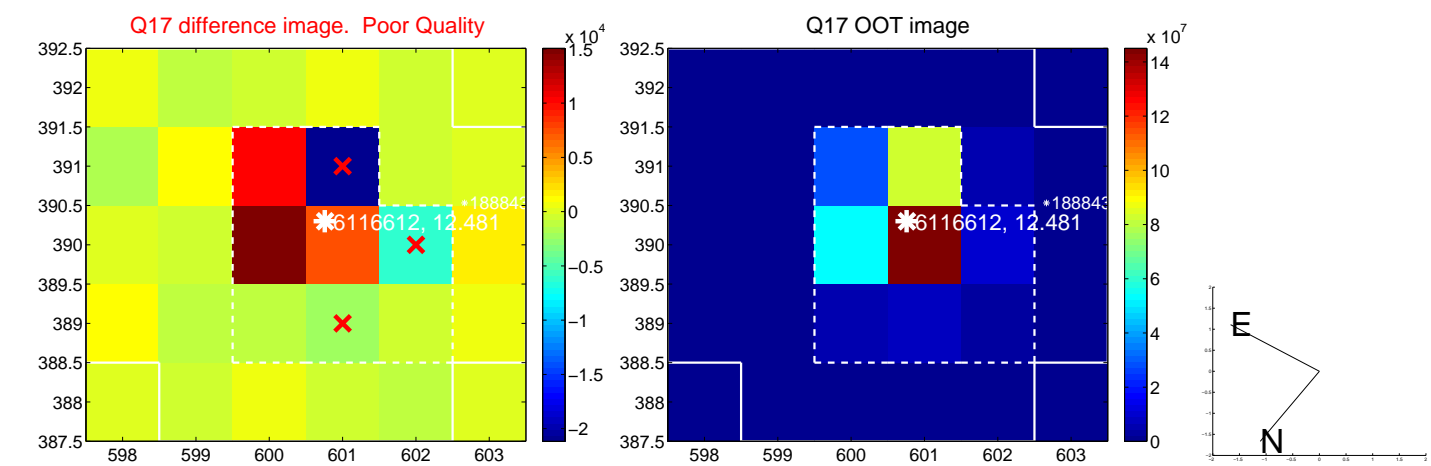
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



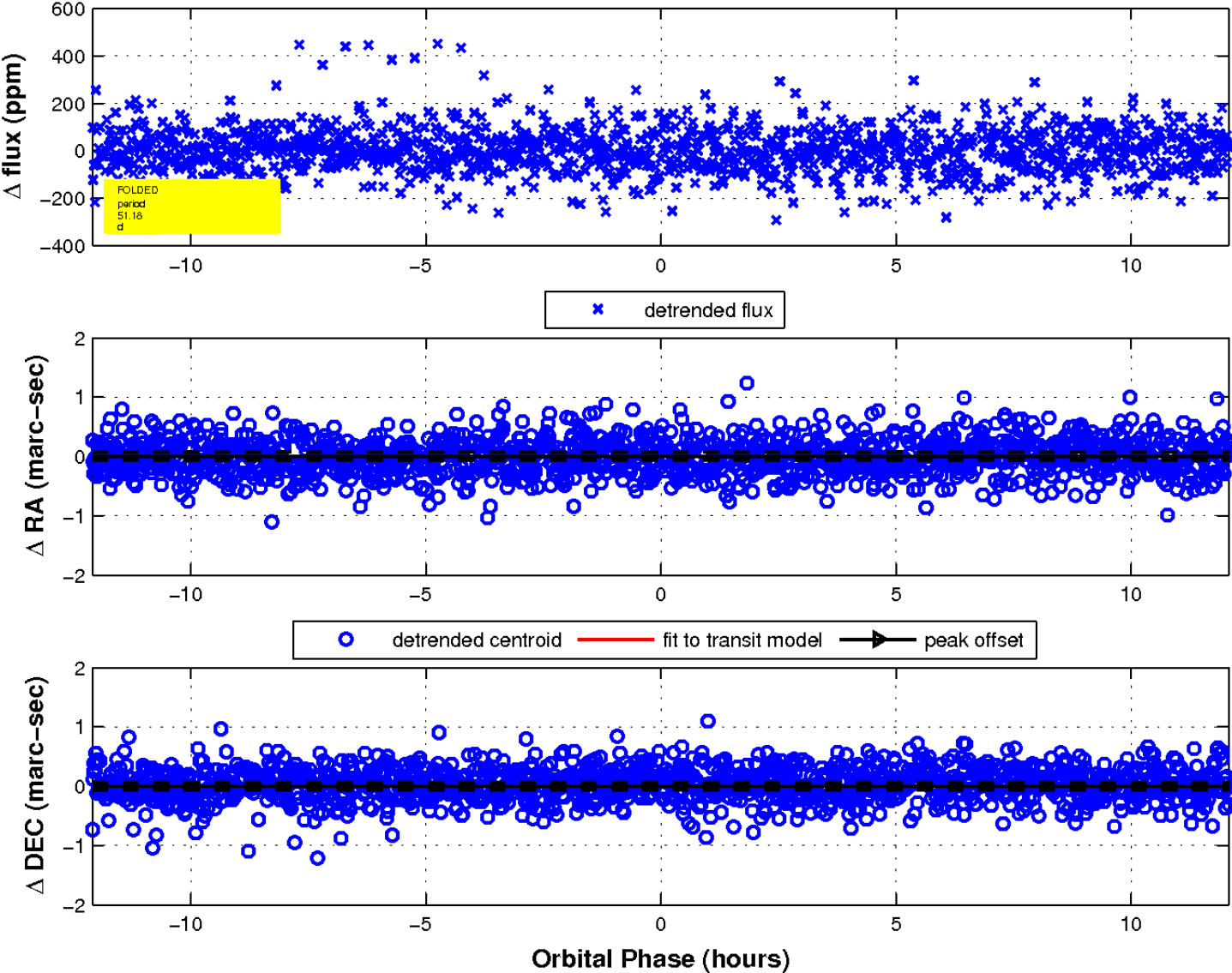
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



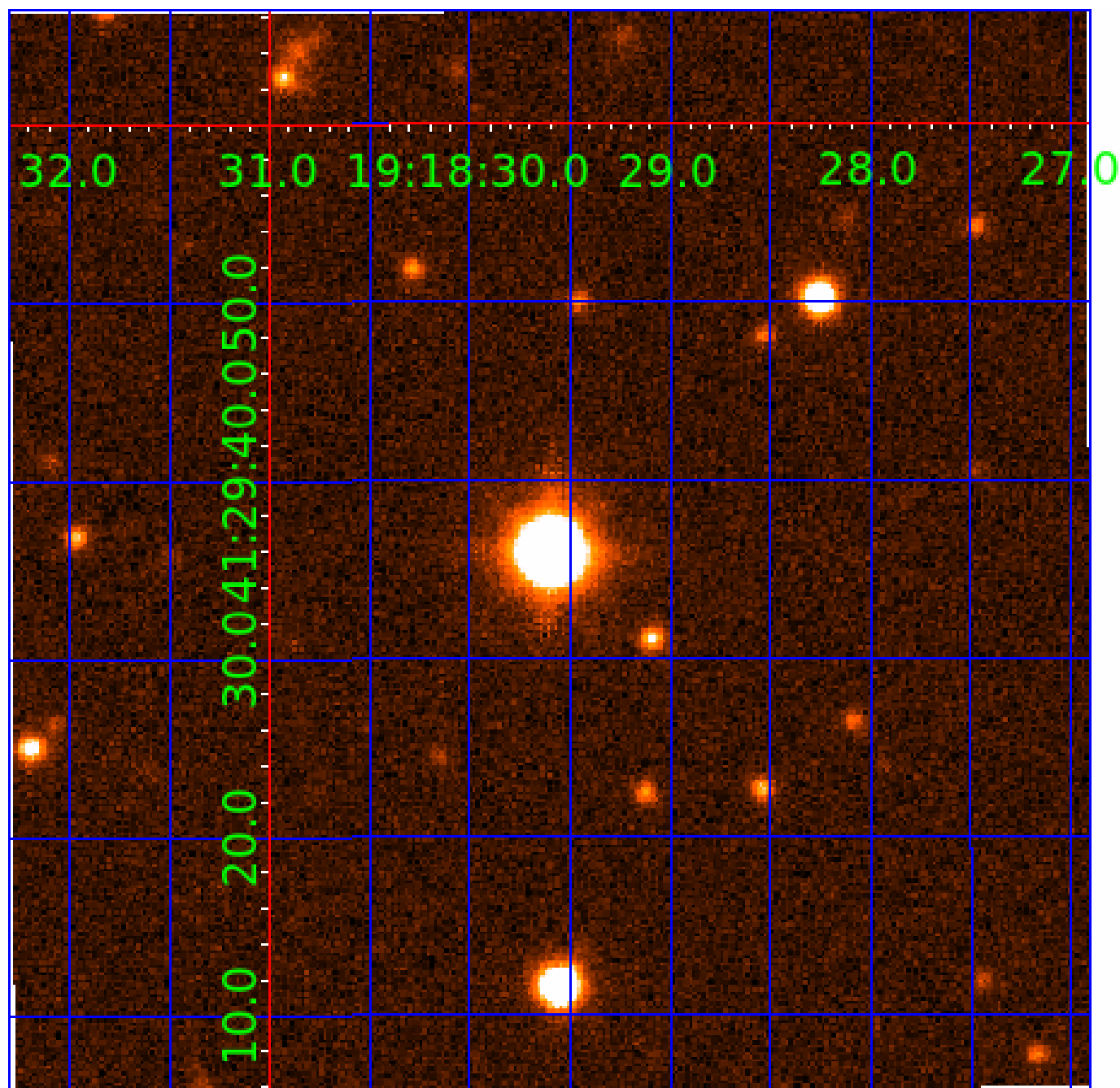
fluxWeightedCentroids, Planet 2 of 8





UKIRT Image

Declination



# KIC 006116612

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006116612-01	OBS	No	1.681228	131.589662	6.3	12.078	10.0	4.0	1.70	7012	0.46	6881.93
006116612-02	OBS	No	51.176242	134.321375	184.4	4.030	25.8	11.4	1.70	7012	2.58	72.41
006116612-05	OBS	No	53.716410	159.379257	144.0	4.533	12.6	7.9	1.70	7012	2.28	67.88
006116612-06	OBS	No	26.461710	140.609317	82.9	15.220	11.4	8.1	1.70	7012	1.72	174.47

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006116612-01	OBS	FP	0.00	1	0	0	0	LPP_DV
006116612-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
006116612-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT
006116612-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS

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

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

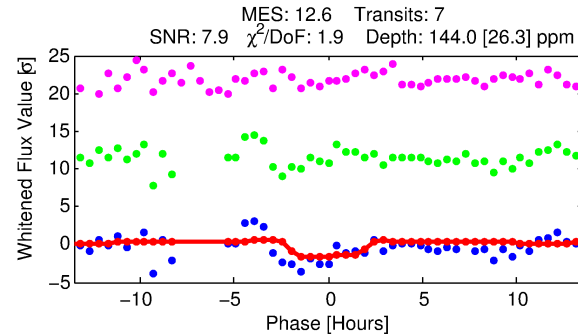
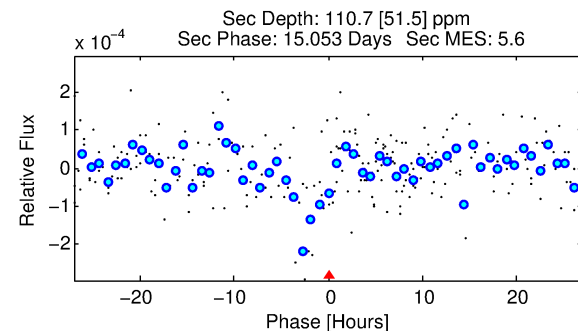
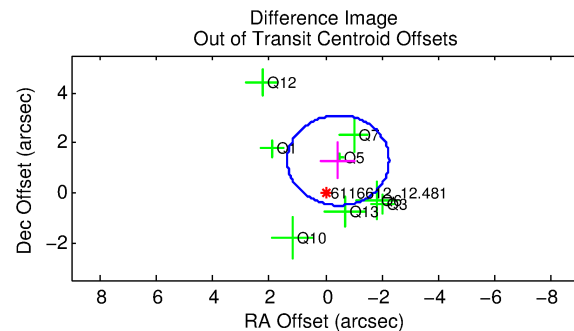
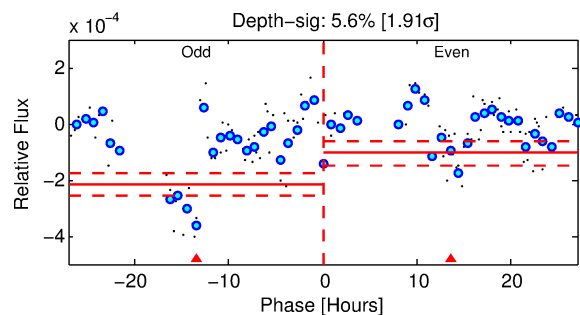
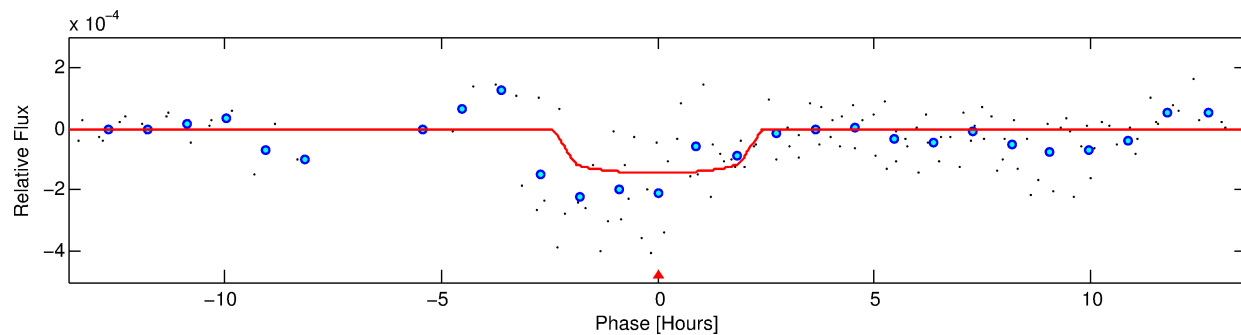
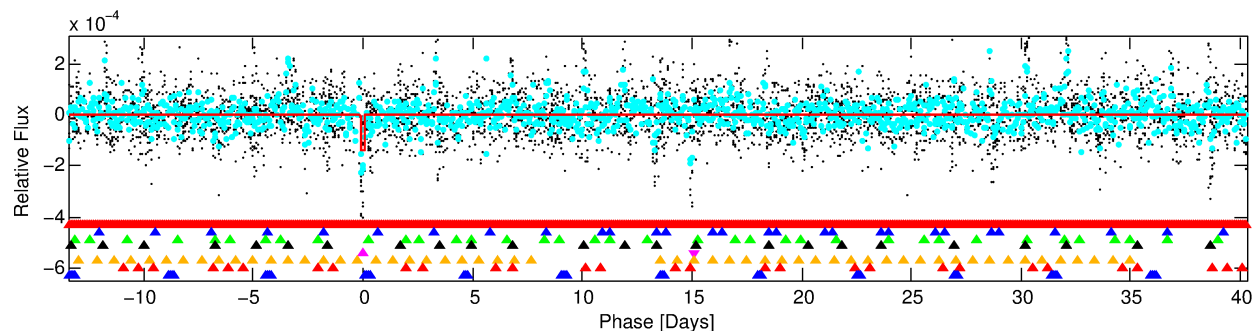
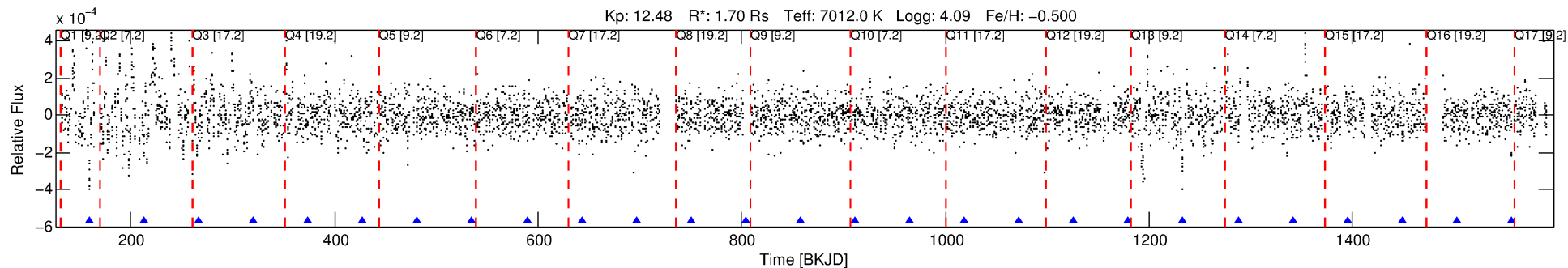
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 006116612-05

No Significant Match Found

# DV One-Page Summary

KIC: 6116612 Candidate: 5 of 8 Period: 53.716 d



## DV Fit Results:

Period = 53.71641 [0.00080] d  
Epoch = 159.3793 [0.0139] BKJD  
Rp/R\* = 0.0123 [0.0149]  
a/R\* = 51.50 [384.89]  
b = 0.84 [2.67]  
Seff = 67.88 [31.08]  
Teff = 732 [84] K  
Rp = 2.28 [2.83] Re  
a = 0.3030 [0.0807] AU  
Ag = 1075.73 [2688.76] [0.40 $\sigma$ ]  
Teffp = 6481 [4002] K [1.44 $\sigma$ ]

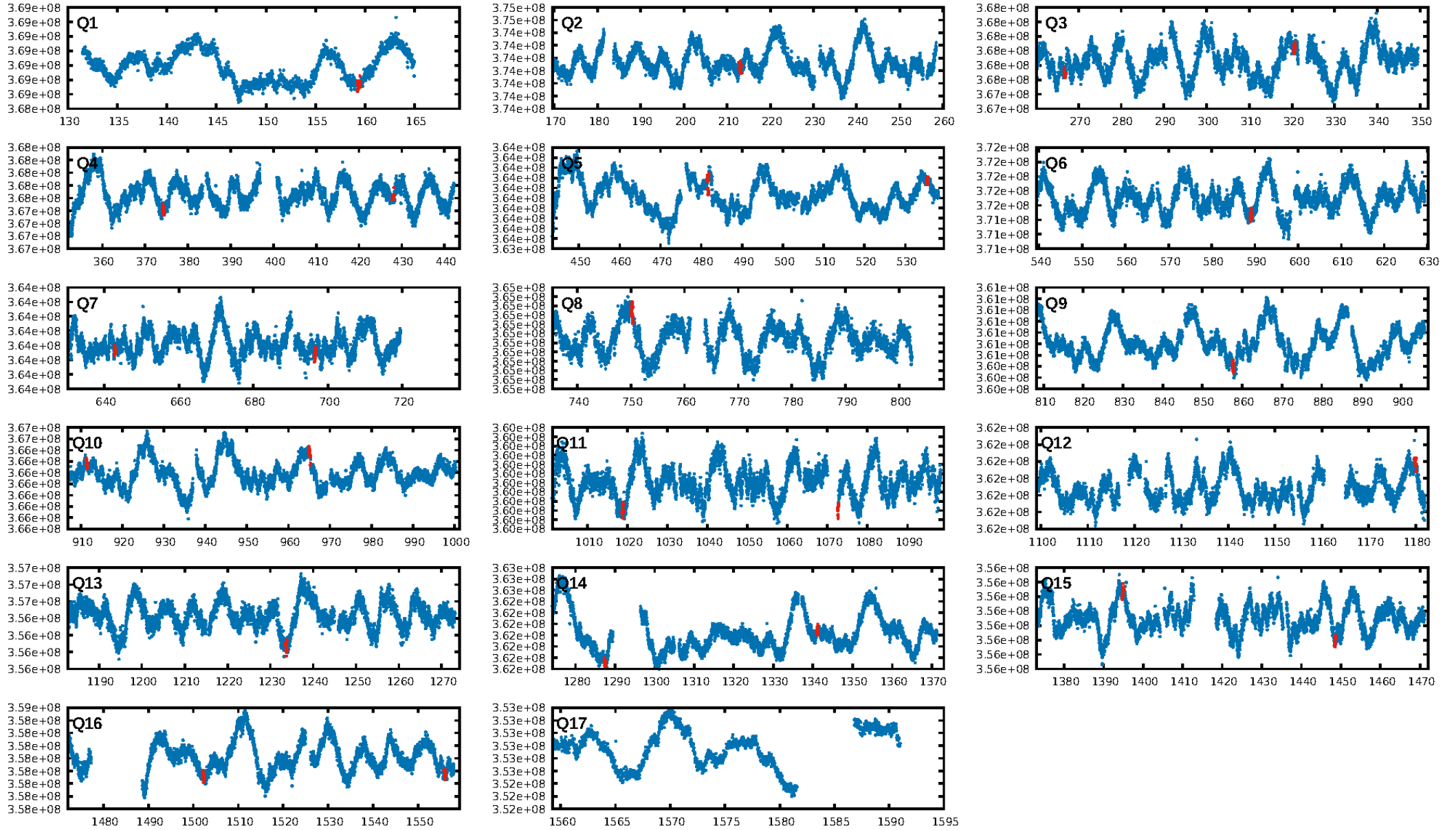
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [10.05 $\sigma$ ]  
LongPeriod-sig: 100.0% [35.94 $\sigma$ ]  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 99.4%  
Bootstrap-pfa: 1.45e-20  
RollingBand-fgt: 1.00 [6/6]  
GhostDiagnostic-chr: 0.3152  
Centroid-sig: 0.5%  
Centroid-so: 1.157 arcsec [2.27 $\sigma$ ]  
OotOffset-rm: 1.369 arcsec [2.27 $\sigma$ ]  
OotOffset-st: 2/2/1/3 [8]  
KicOffset-rm: 1.371 arcsec [2.12 $\sigma$ ]  
KicOffset-st: 2/2/1/3 [8]  
DiffImageQuality-fgm: 0.62 [5/8]  
DiffImageOverlap-fno: 0.31 [5/16]

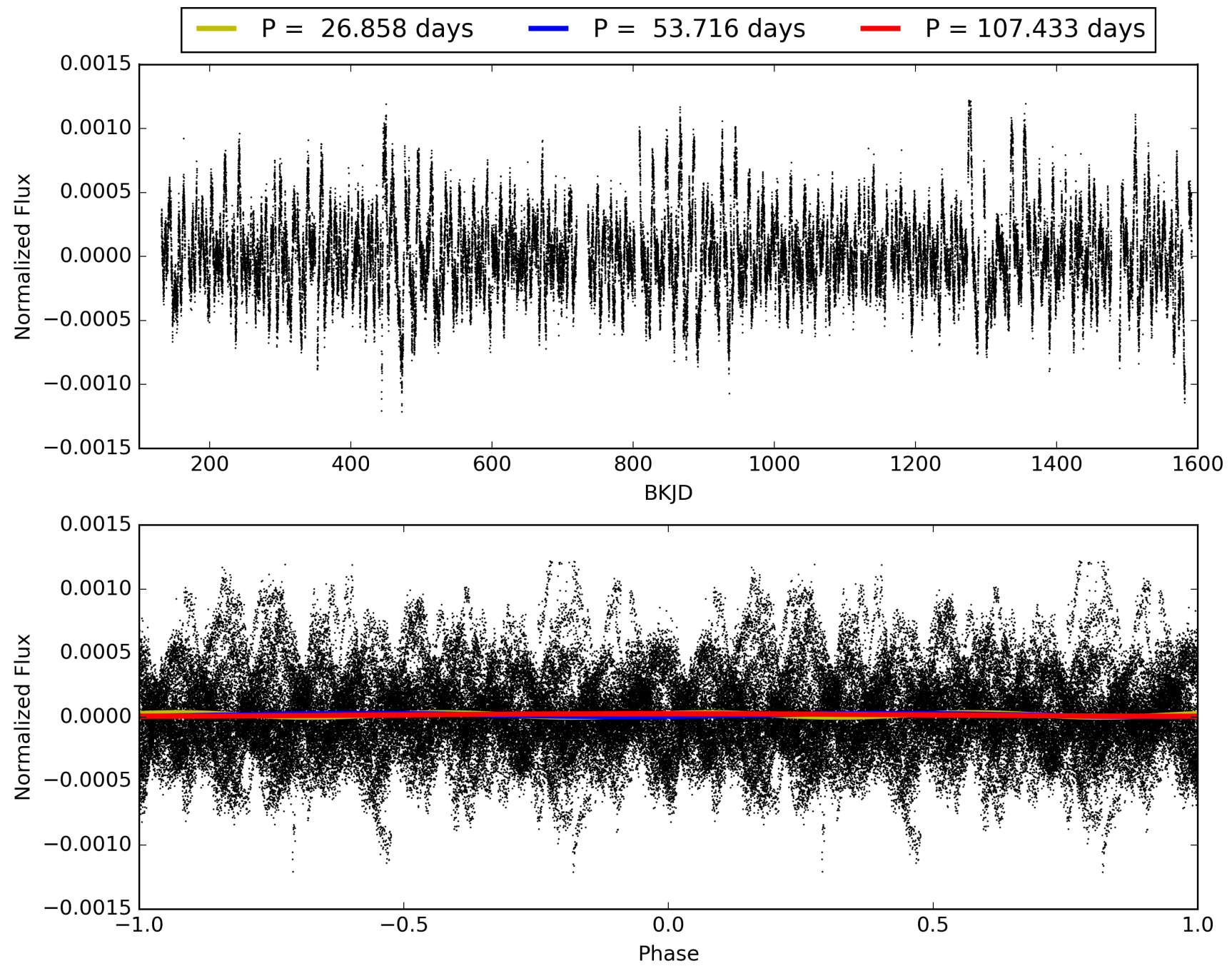
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 19:43:30 Z

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

# TCE 006116612-05, PDC Light Curves



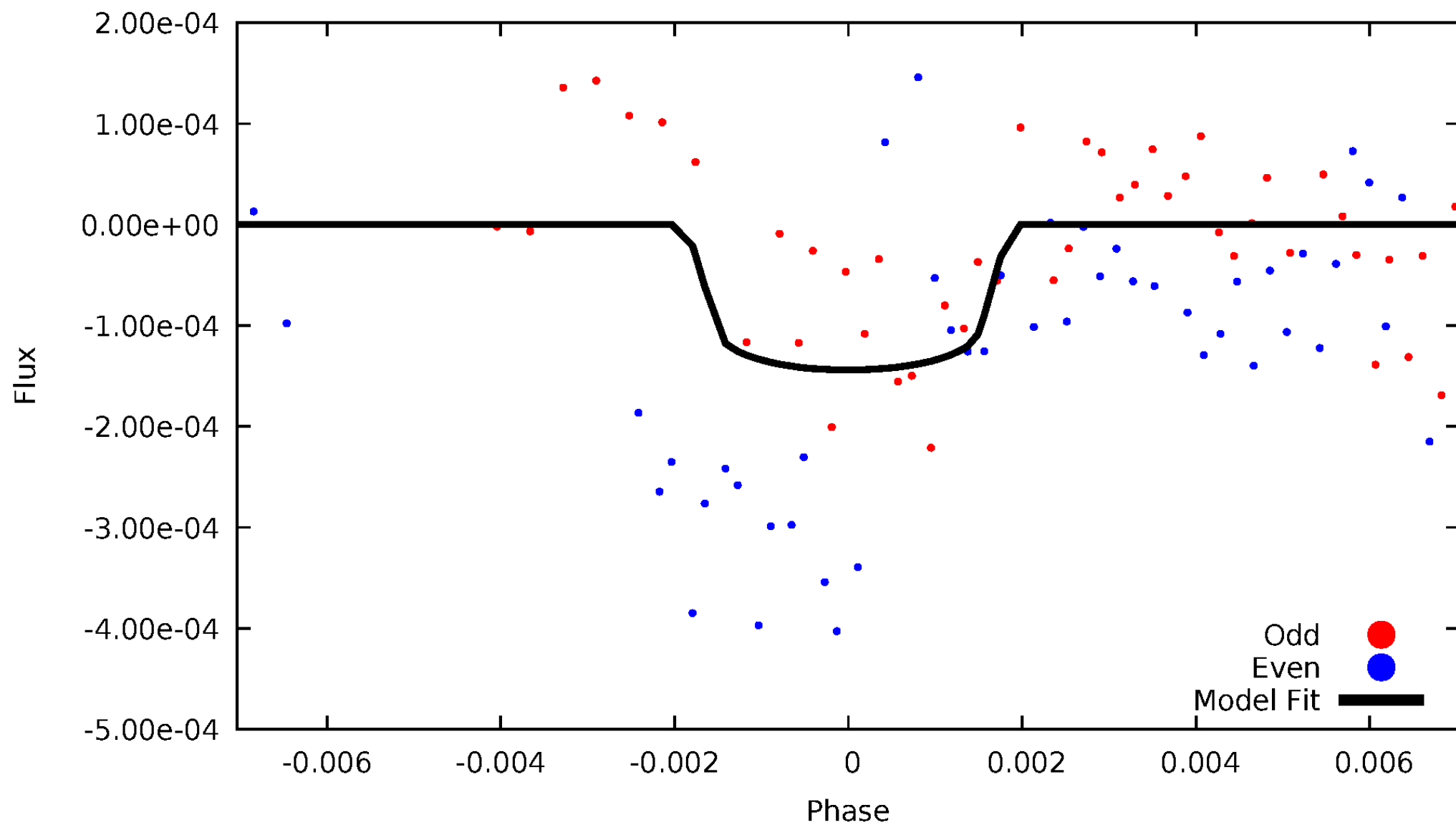
# TCE 006116612-05





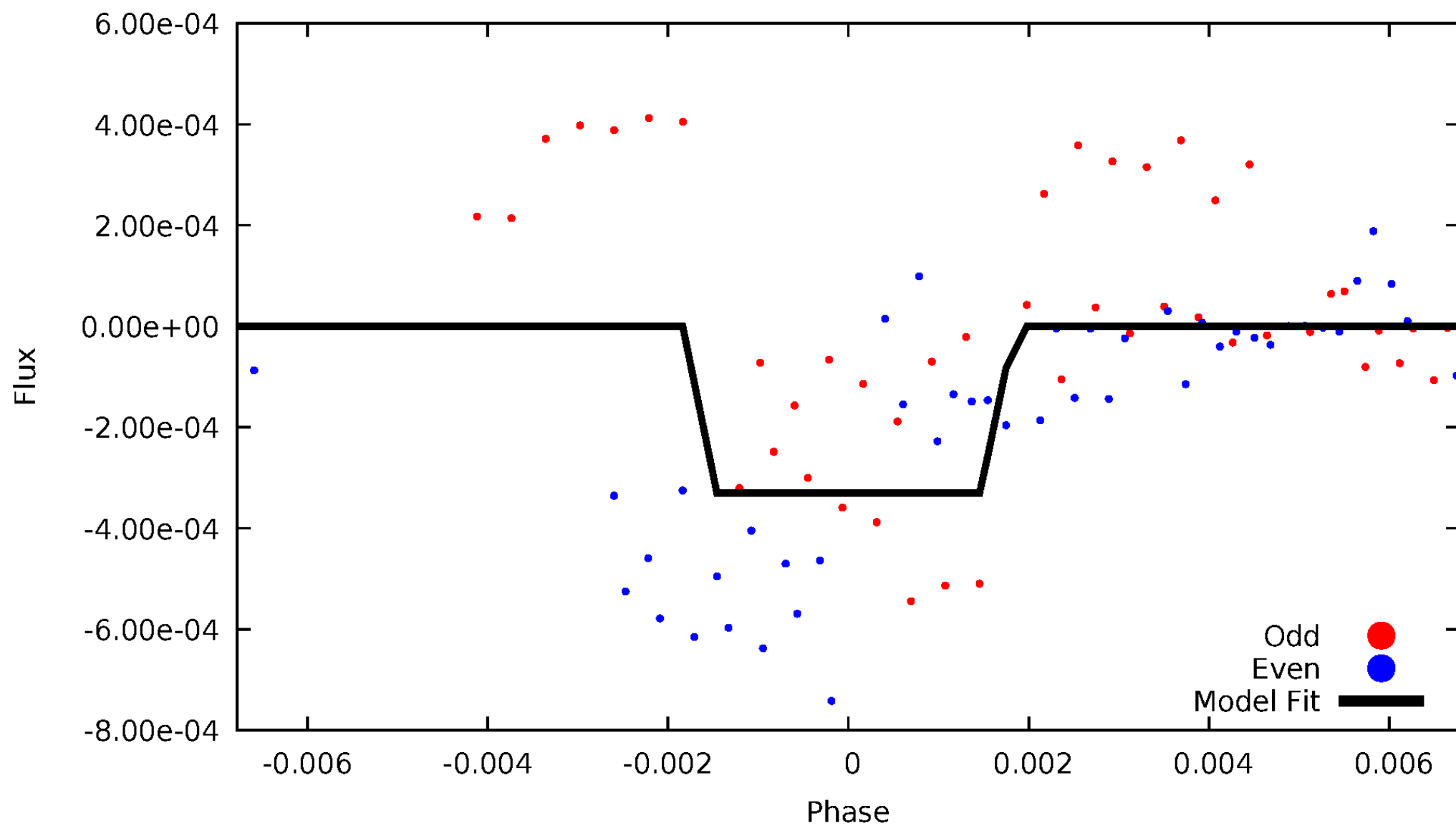
# DV Odd/Even

TCE 006116612-05



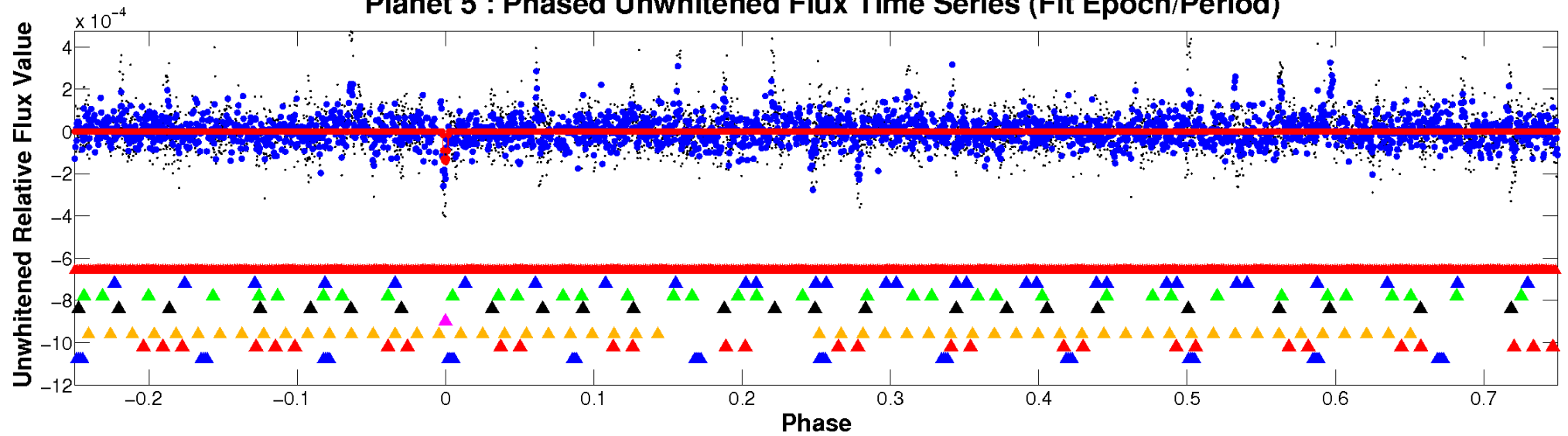
# ALT Odd/Even

TCE 006116612-05

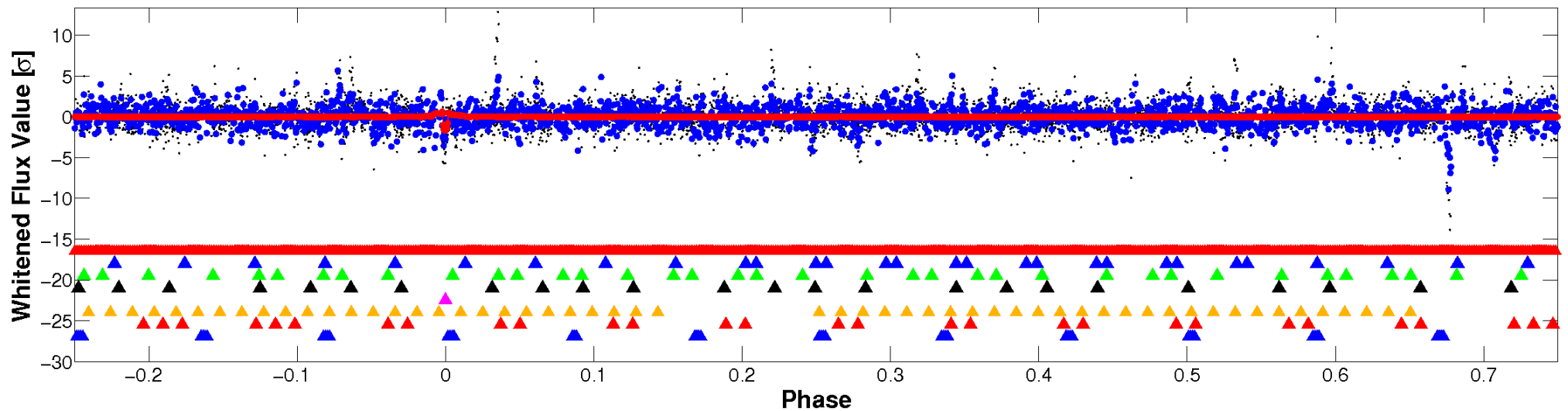


# Non-Whitened Vs. Whitened Light Curve

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

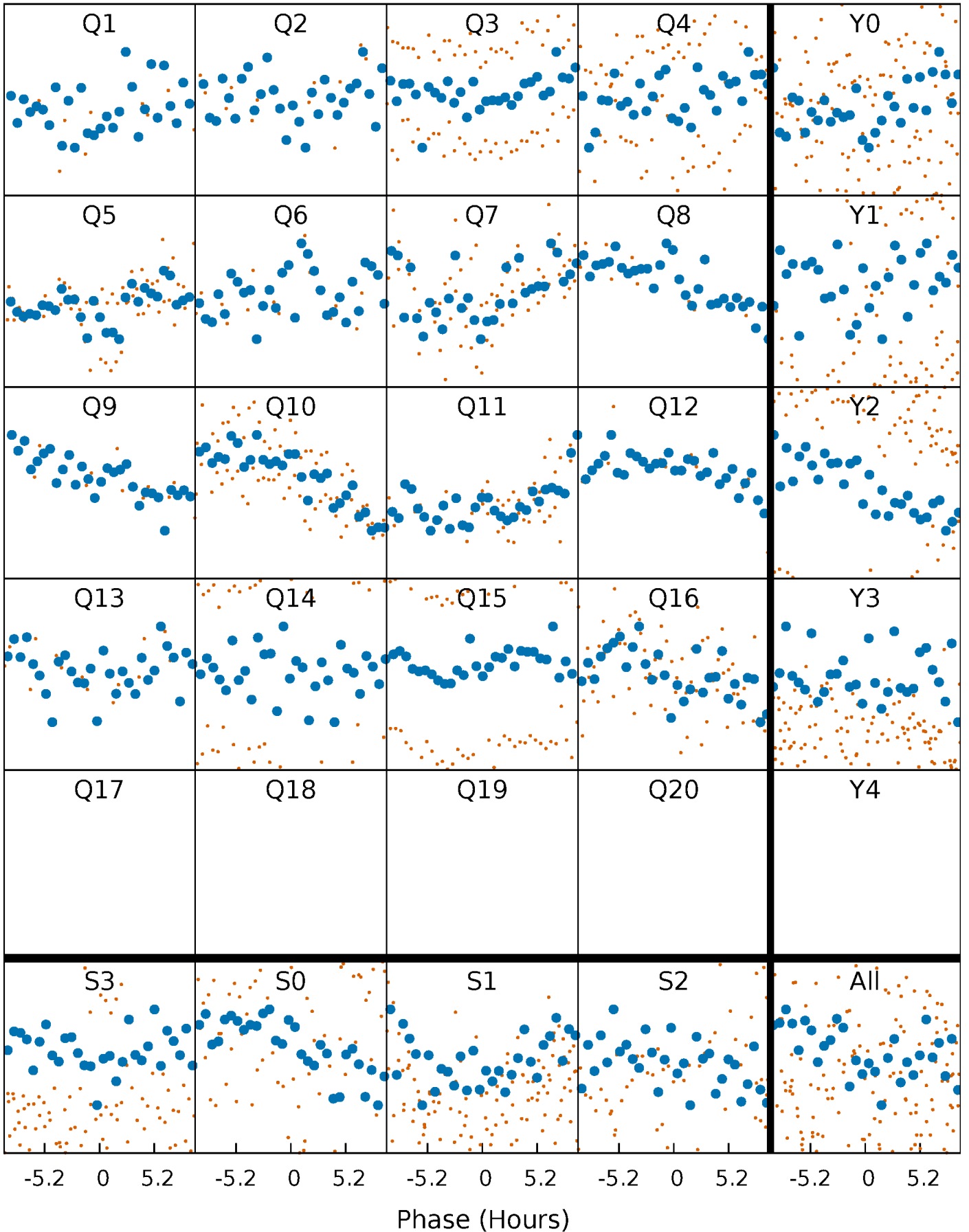


Planet 5 : Phased Whitened Flux Time Series (Fit Epoch/Period)



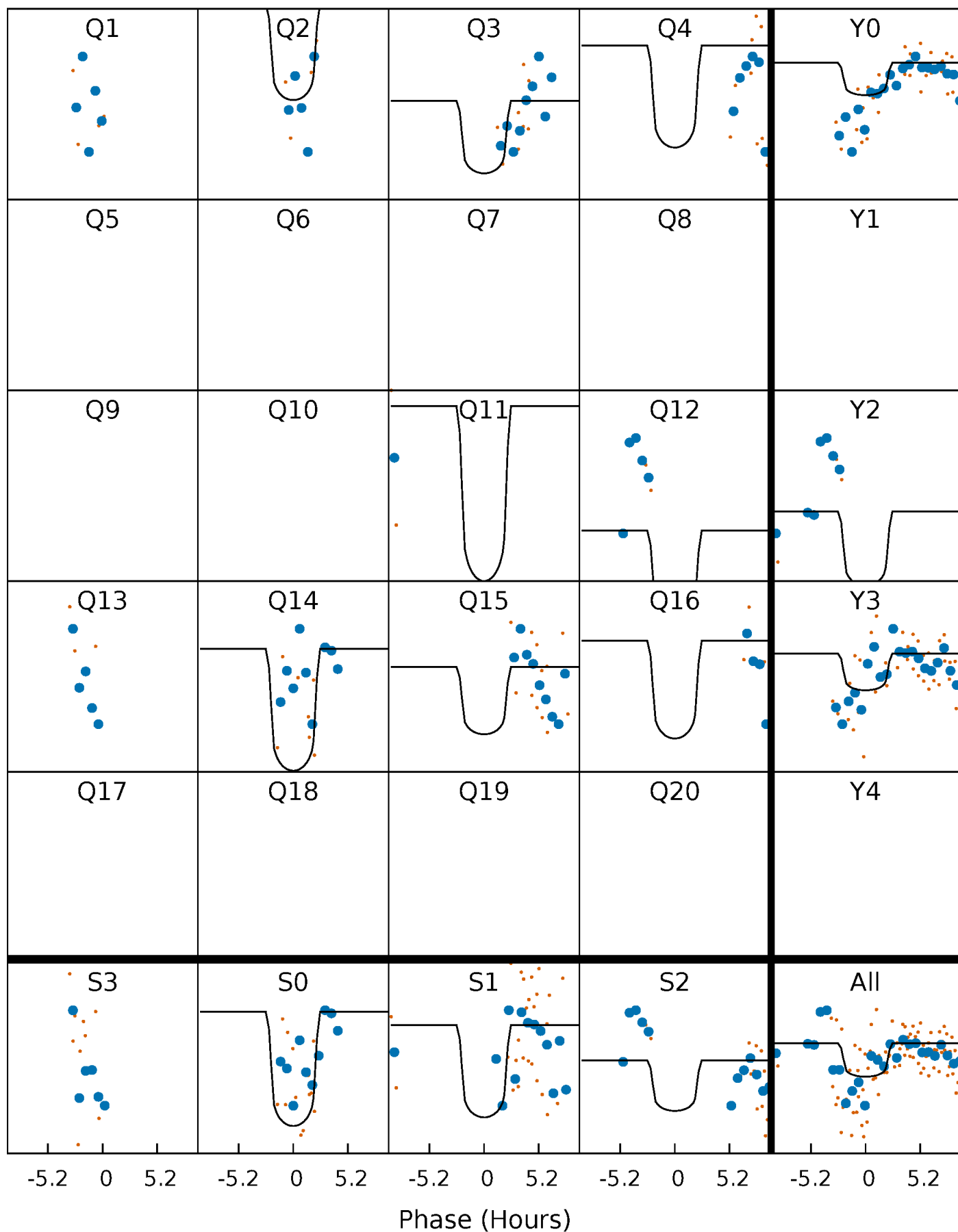
# PDC Quarter-Phased Transit Curves

TCE 006116612-05   P= 53.716410 Days    $T_0=159.379257$  (BKJD)



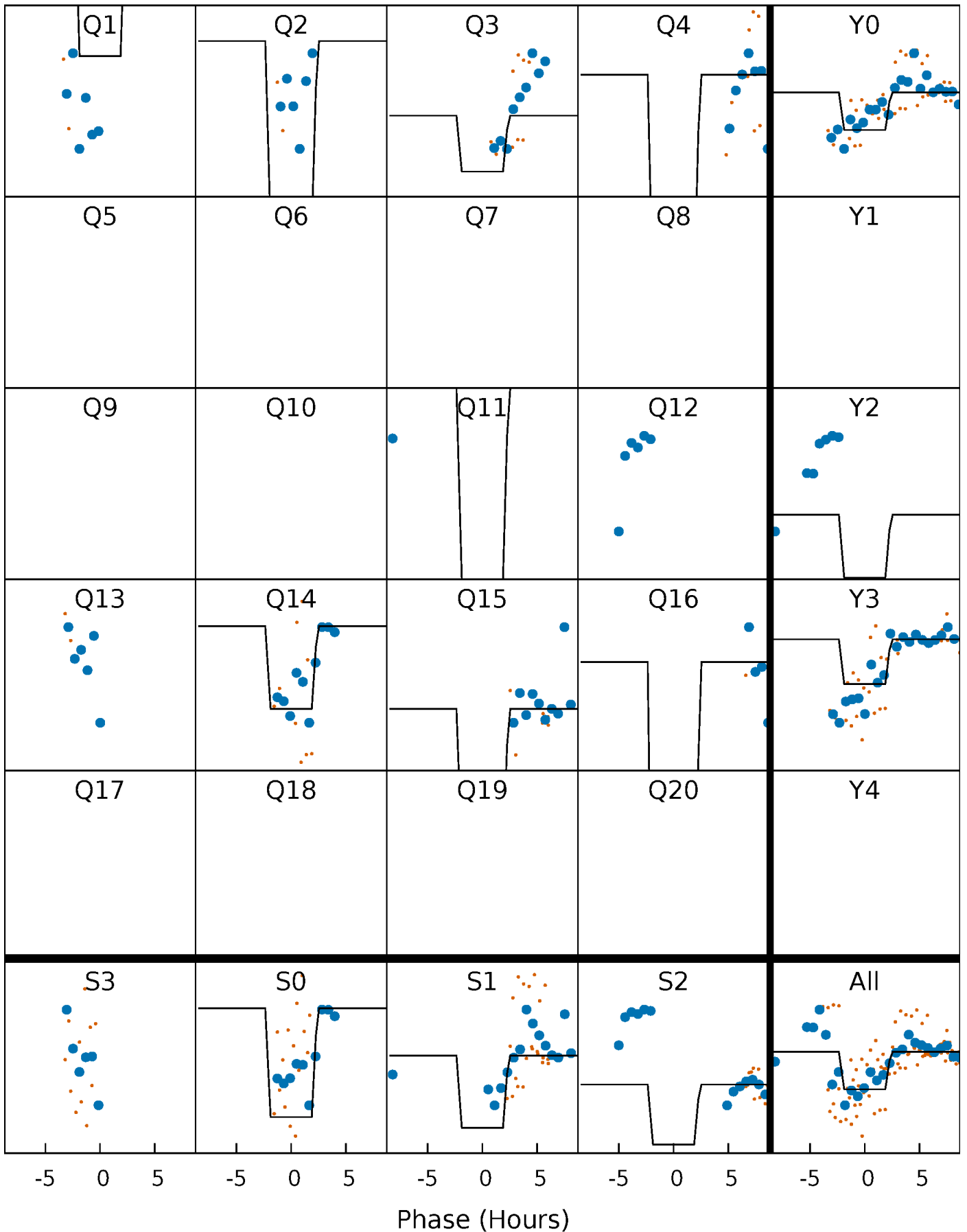
# DV Quarter-Phased Transit Curves

TCE 006116612-05   P= 53.716410 Days    $T_0=159.379257$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 006116612-05   P= 53.715420 Days    $T_0=159.402009$  (BKJD)

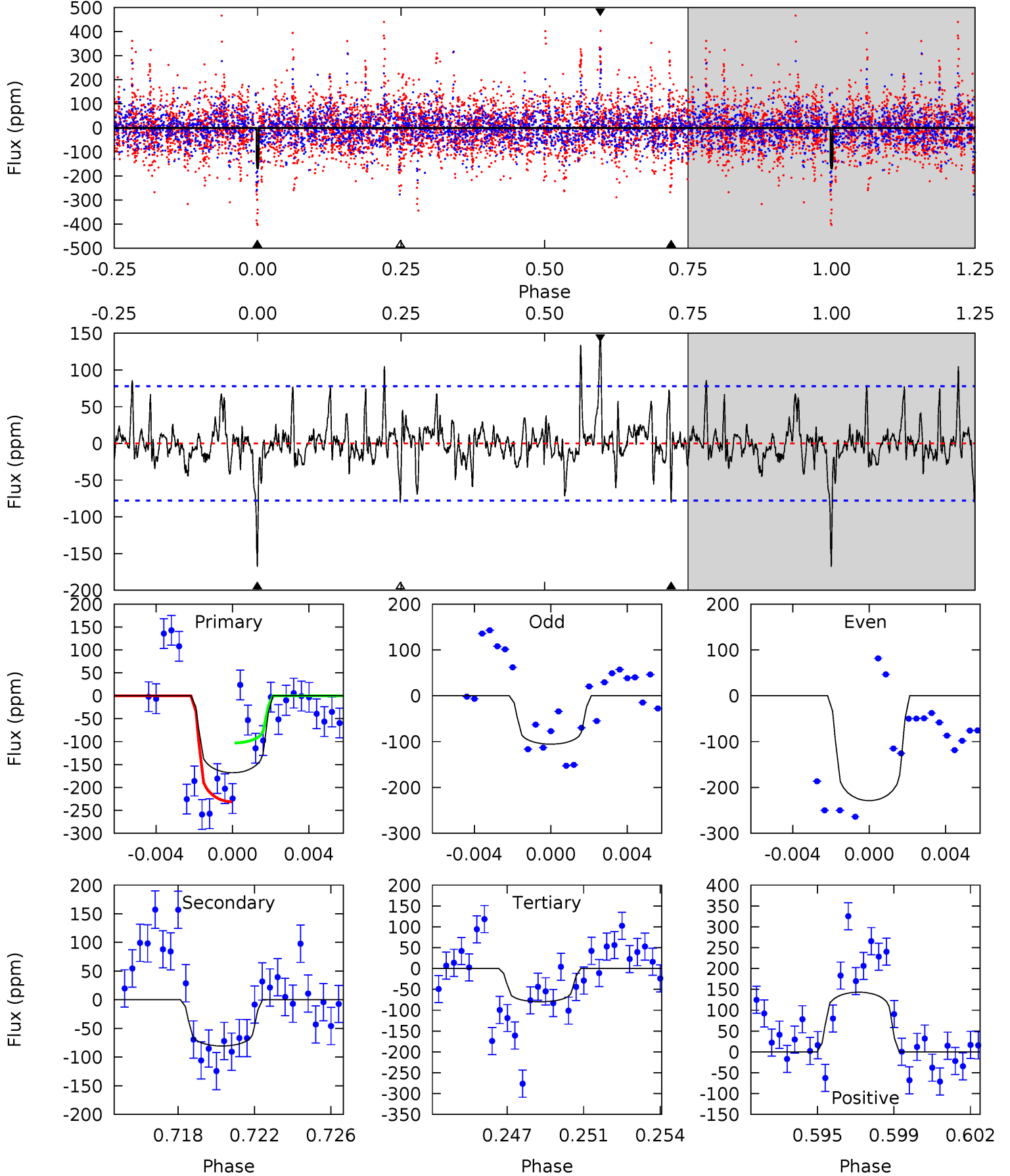




# DV Model-Shift Uniqueness Test

006116612-05, P = 53.716410 Days, E = 105.662847 Days

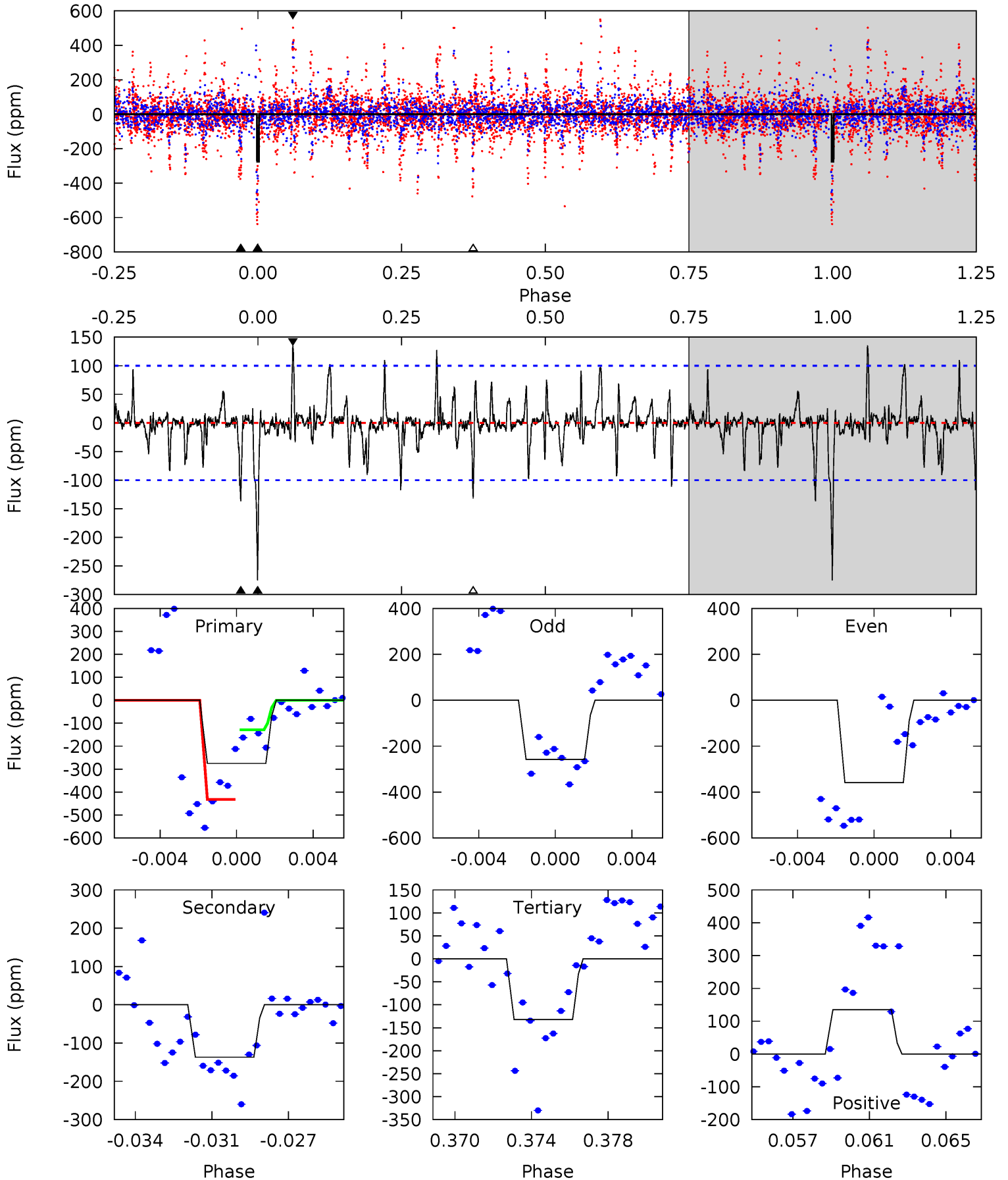
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.3	5.40	5.35	9.59	5.21	2.90	1.77	5.91	1.66	0.05	-4.19	3.86	1.28	0.46	4.29



# Alt Model-Shift Uniqueness Test

006116612-05, P = 53.715420 Days, E = 105.686589 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
14.3	7.13	6.89	7.01	5.21	2.89	1.55	7.45	7.33	0.24	0.12	2.38	1.05	0.33	7.59



### Stellar Parameters For KIC 006116612

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7012^{+216}_{-312}$	$4.088^{+0.246}_{-0.164}$	$-0.500^{+0.250}_{-0.300}$	$1.696^{+0.430}_{-0.478}$	$1.283^{+0.169}_{-0.211}$	$0.370^{+0.569}_{-0.174}$
	+3%/-4%	+6%/-4%	+50%/-60%	+25%/-28%	+13%/-16%	+153%/-47%
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 006116612-05 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-81 \pm 15$	$2.79^{+2.44}_{-1.86}$	$1015^{+82}_{-87}$	$5415^{+4387}_{-1297}$	$534^{+4054}_{-393}$
Alt.	$-137 \pm 19$	$3.67^{+2.50}_{-2.19}$	$1014^{+74}_{-89}$	$5333^{+3377}_{-1055}$	$497^{+2506}_{-324}$

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

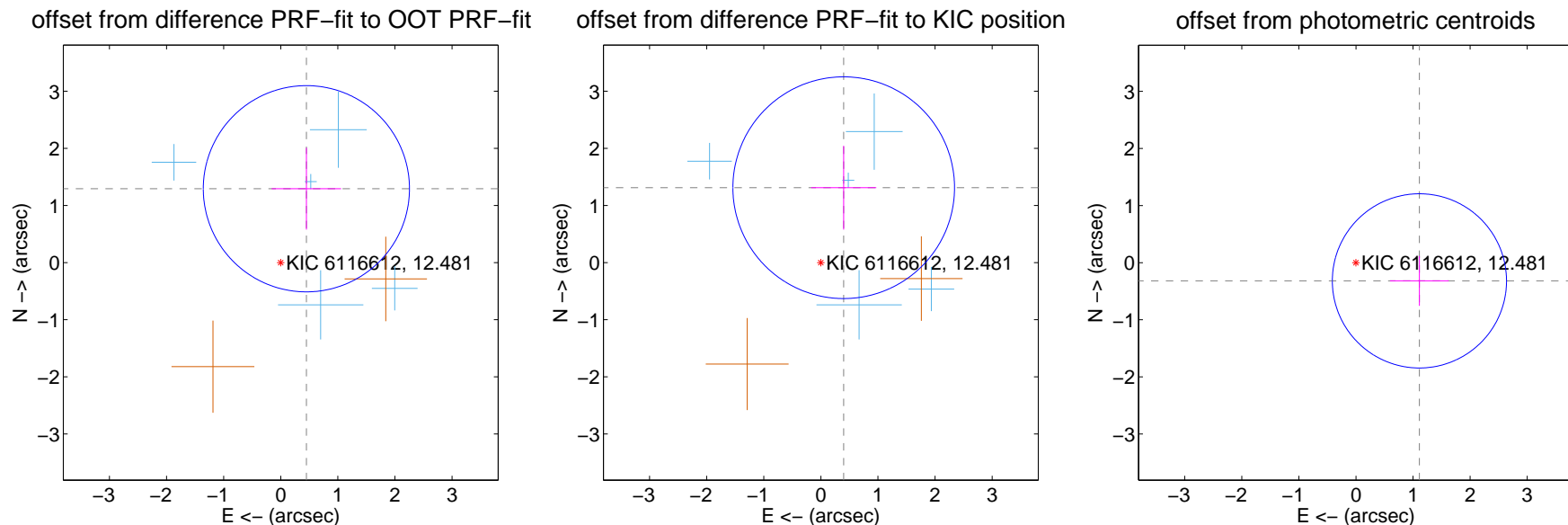
## DV Centroid Data

Supplemental centroid analysis for 006116612-05. Kepler magnitude: 12.48. Transit SNR 7.86

There are 5 quarters with good PRF difference image offsets

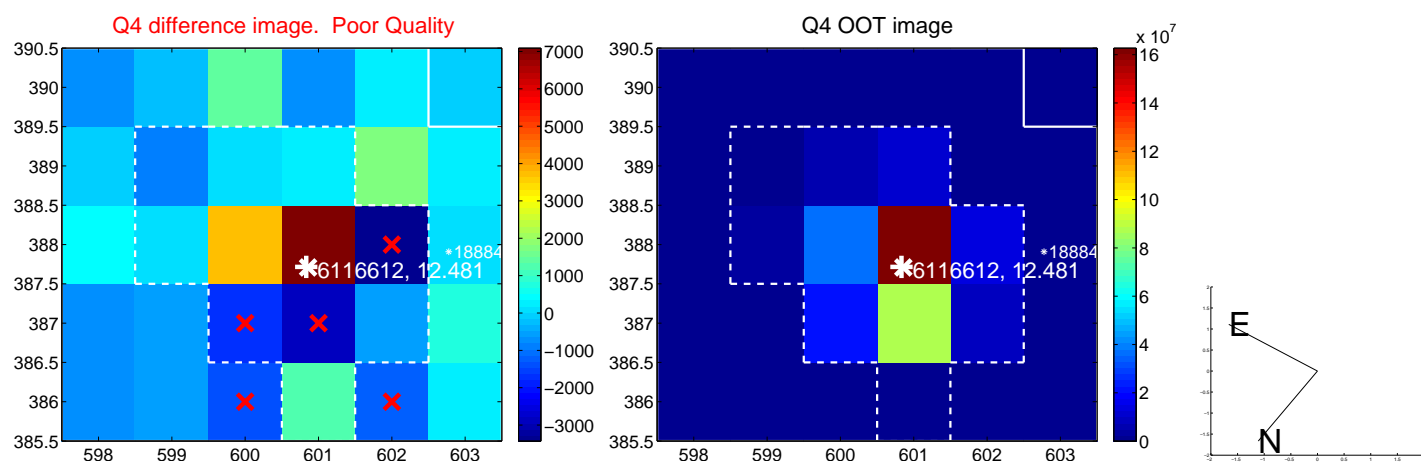
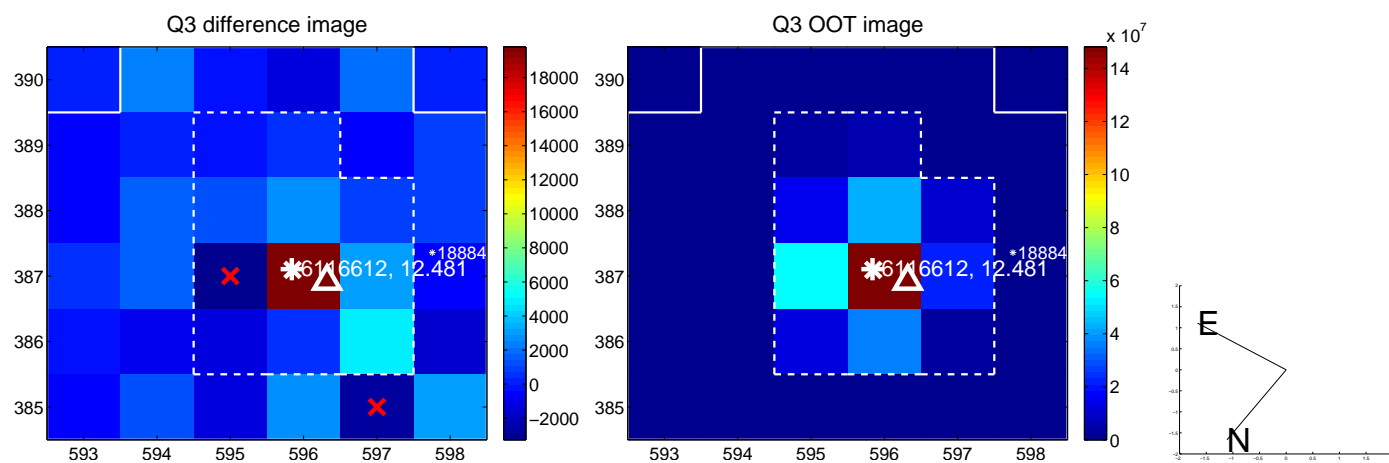
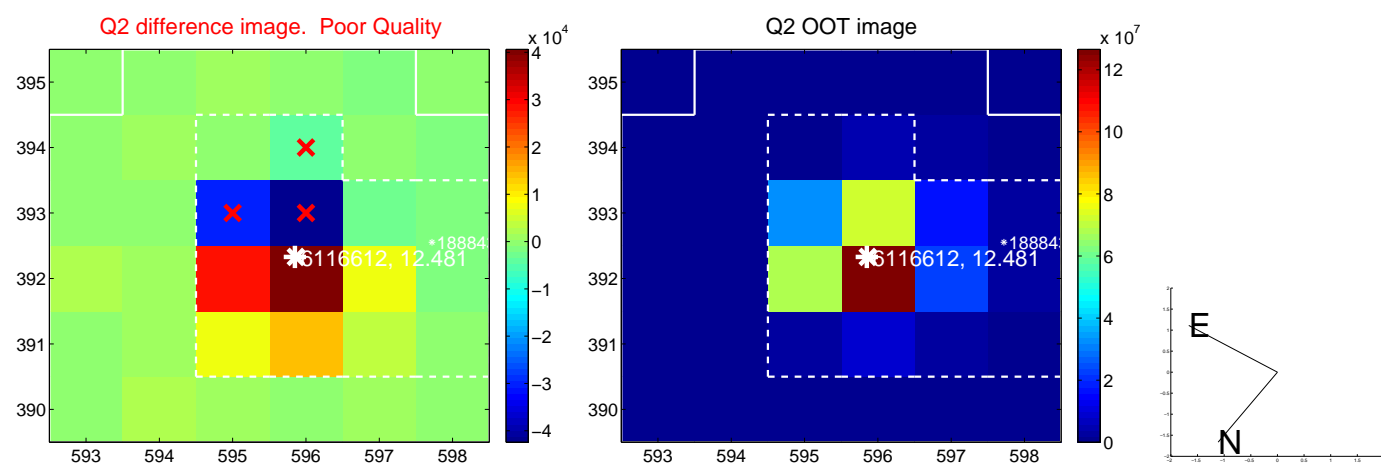
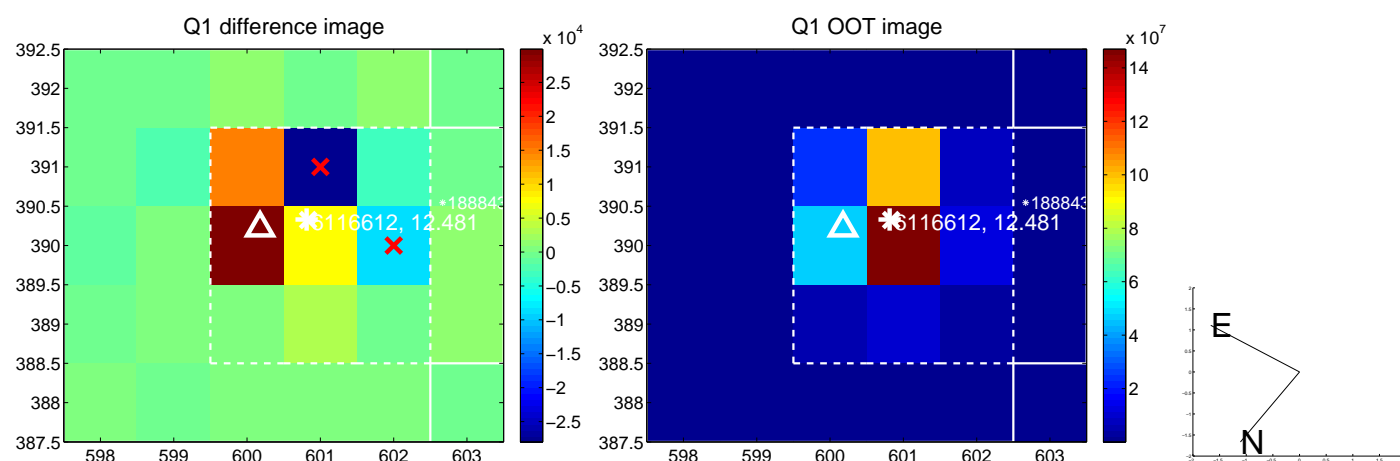
The direct PRF centroid is offset from the target star catalog position by about 0.03 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.369 \pm 0.602$	2.27	$-0.449 \pm 0.609$	$1.293 \pm 0.715$
PRF-fit source offset from KIC position	$1.371 \pm 0.647$	2.12	$-0.400 \pm 0.570$	$1.311 \pm 0.734$
photometric centroid source offset	$1.16 \pm 0.51$	2.27	$-1.11 \pm 0.51$	$-0.32 \pm 0.44$

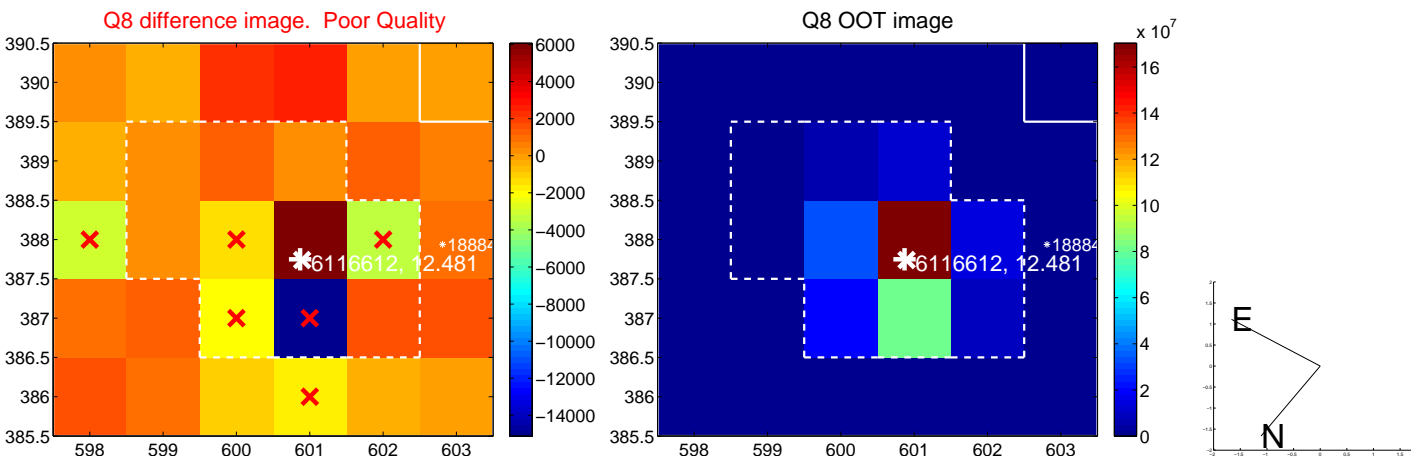
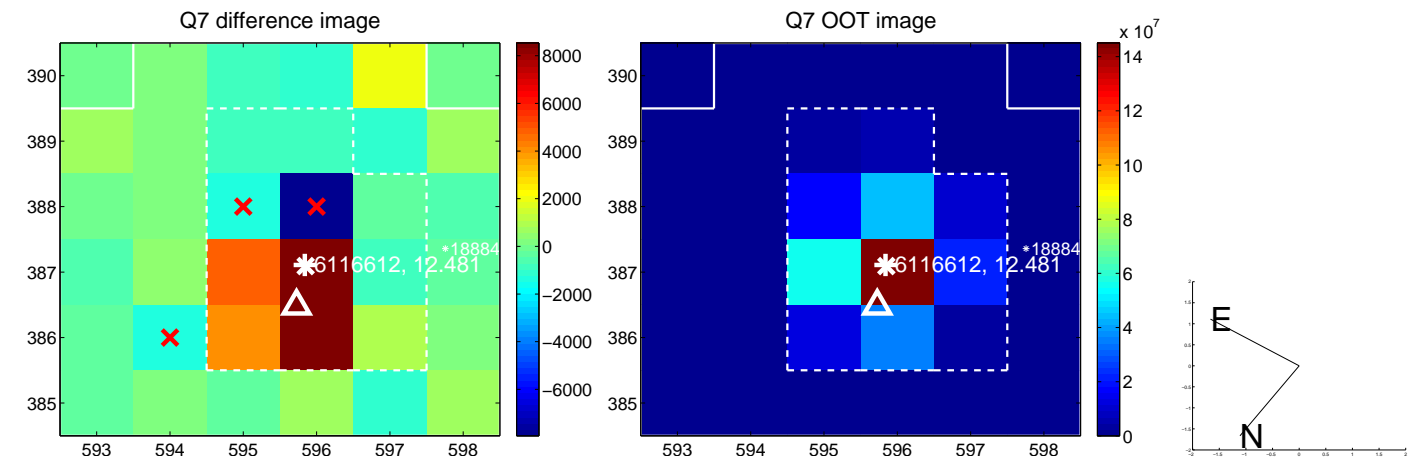
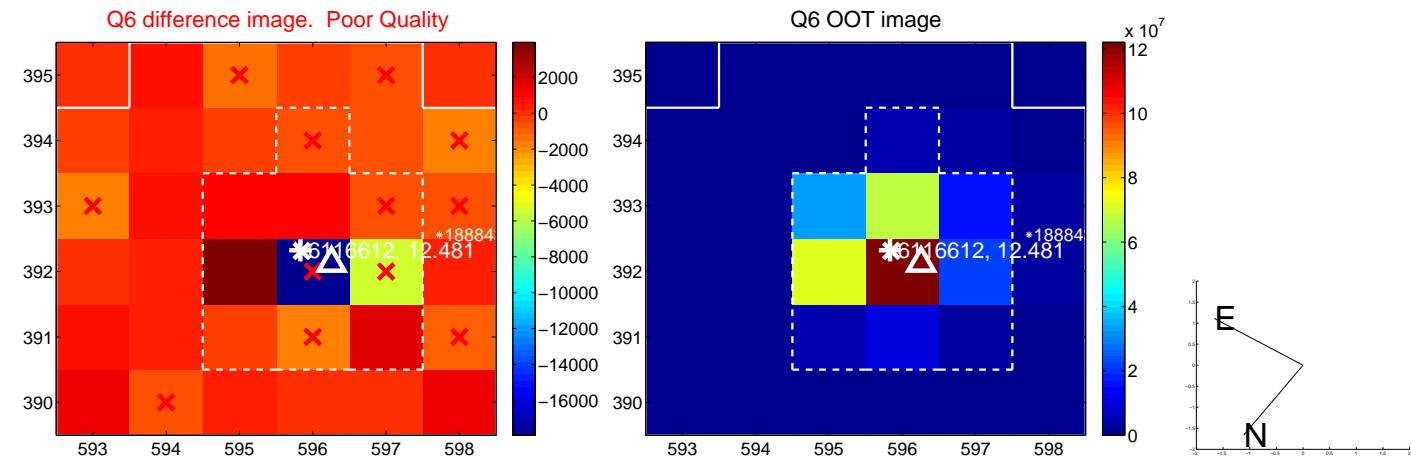
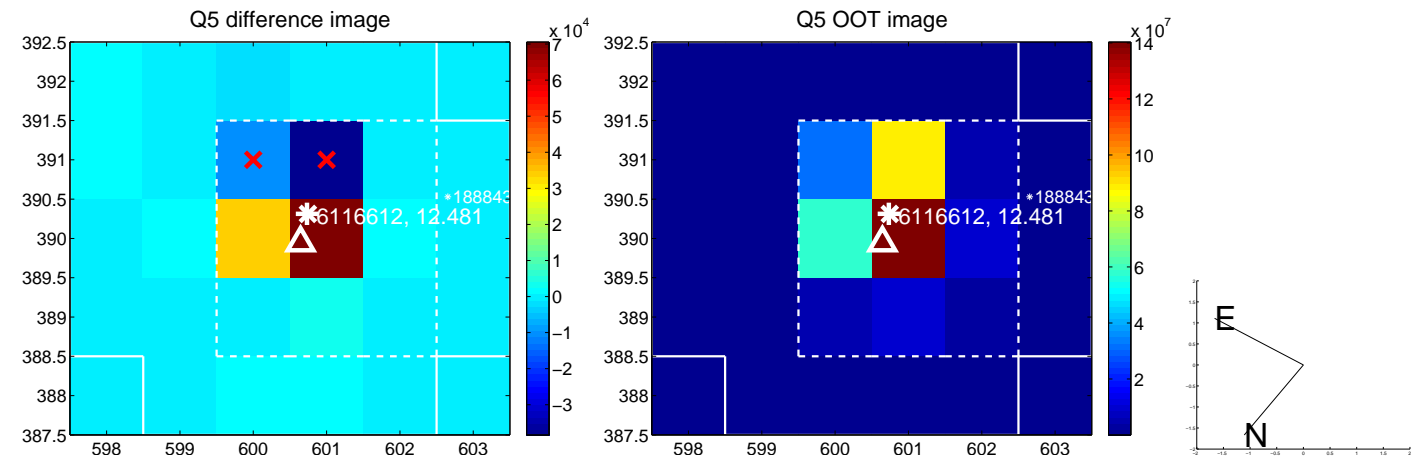


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

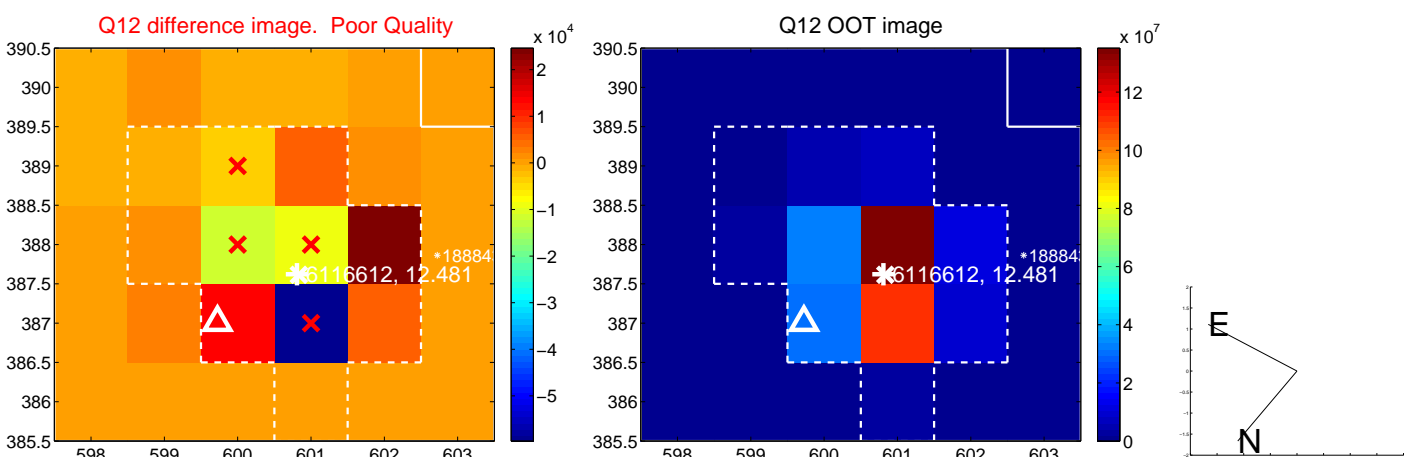
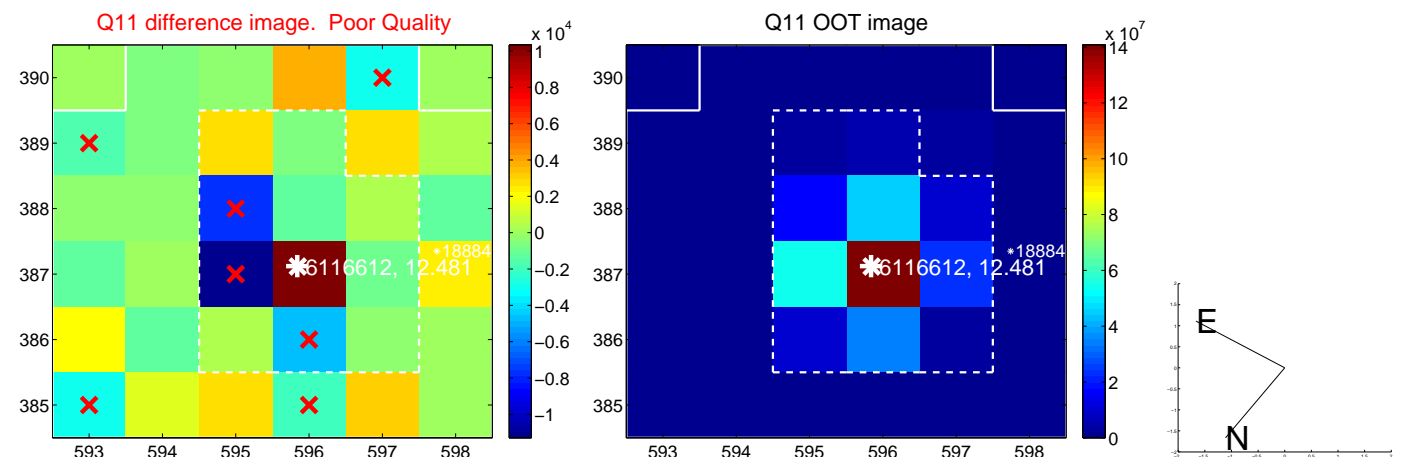
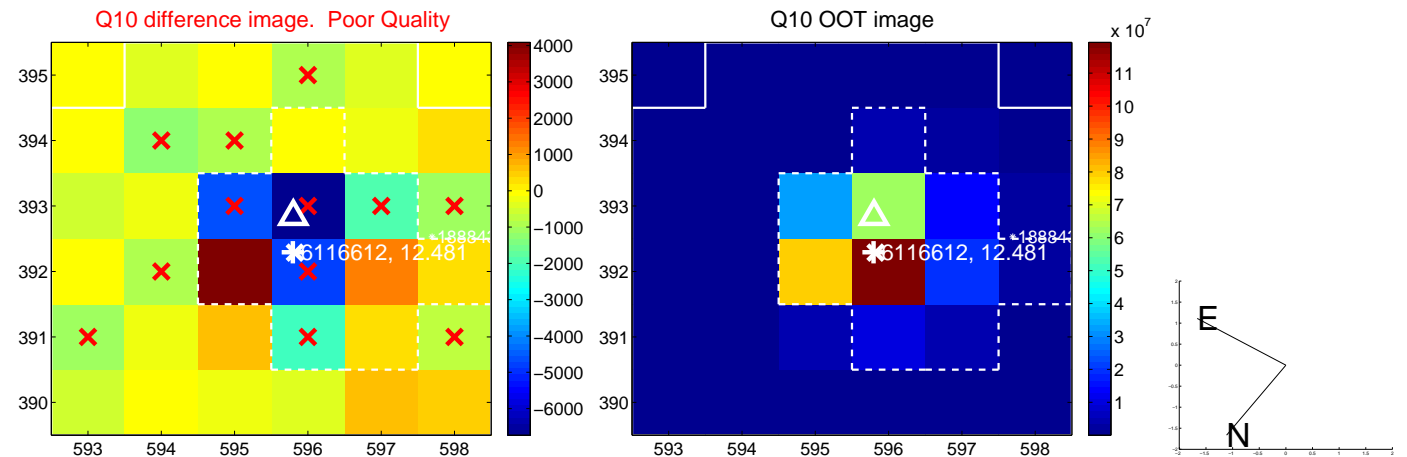
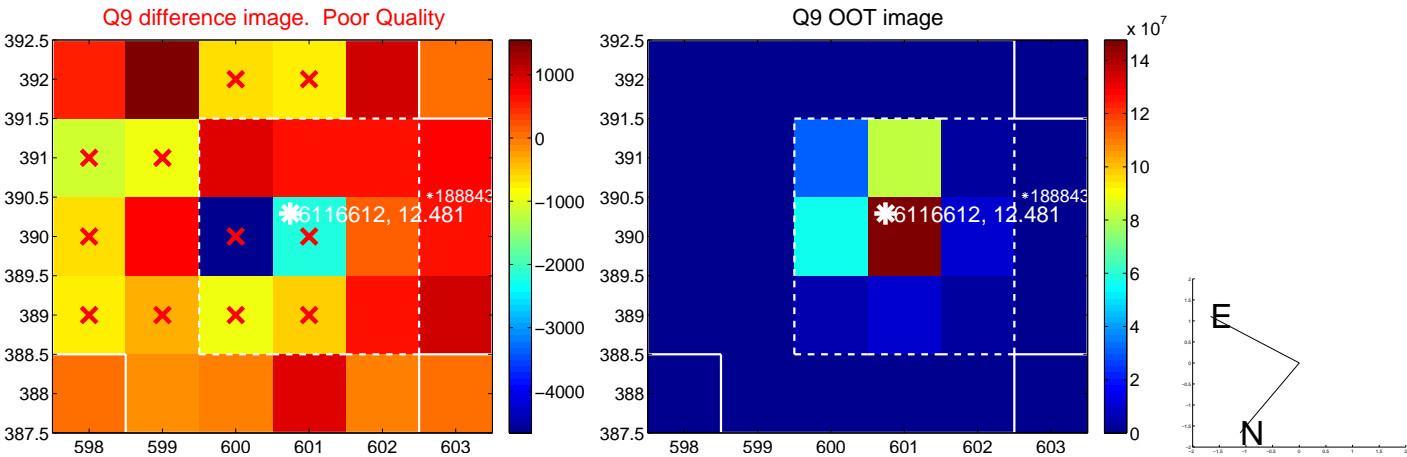
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

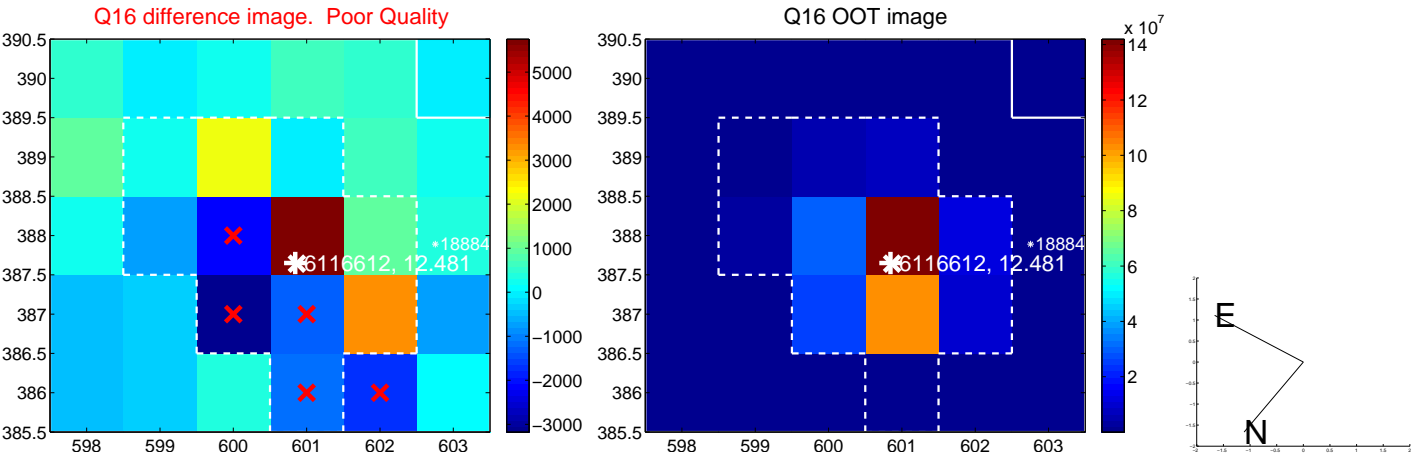
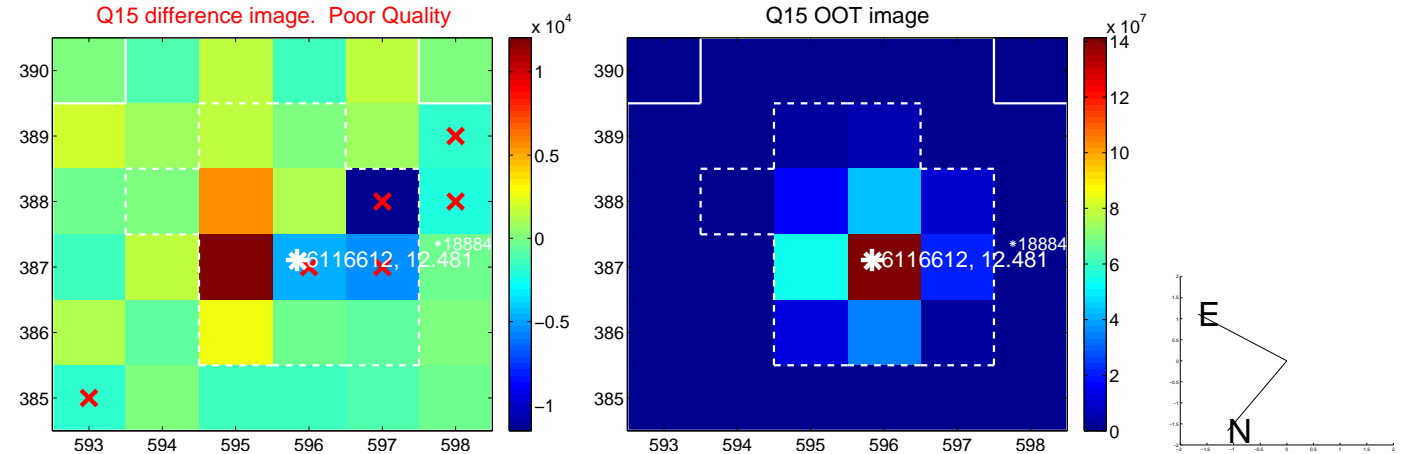
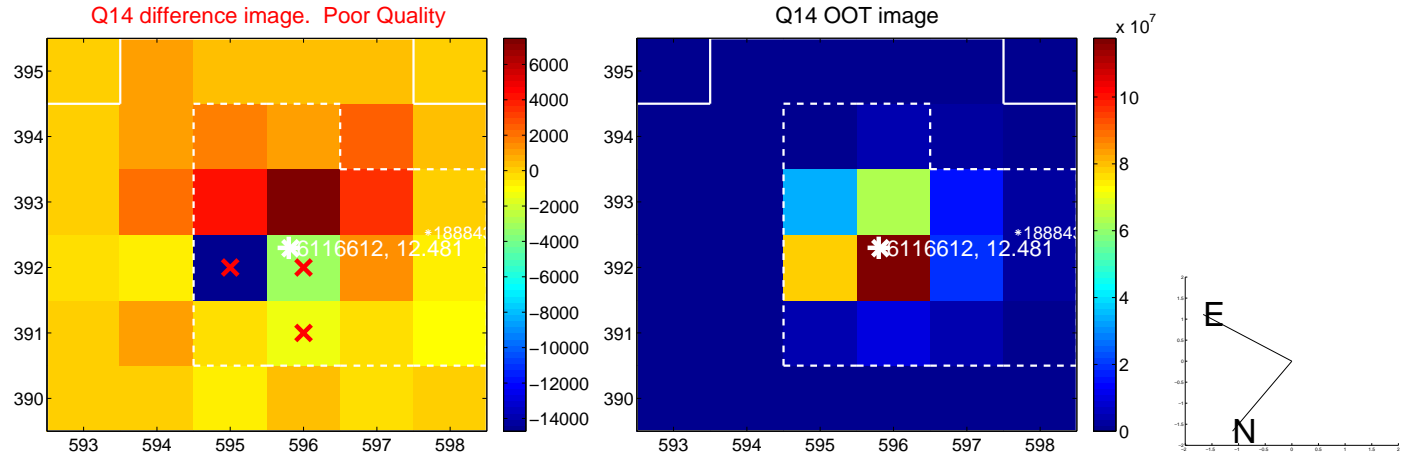
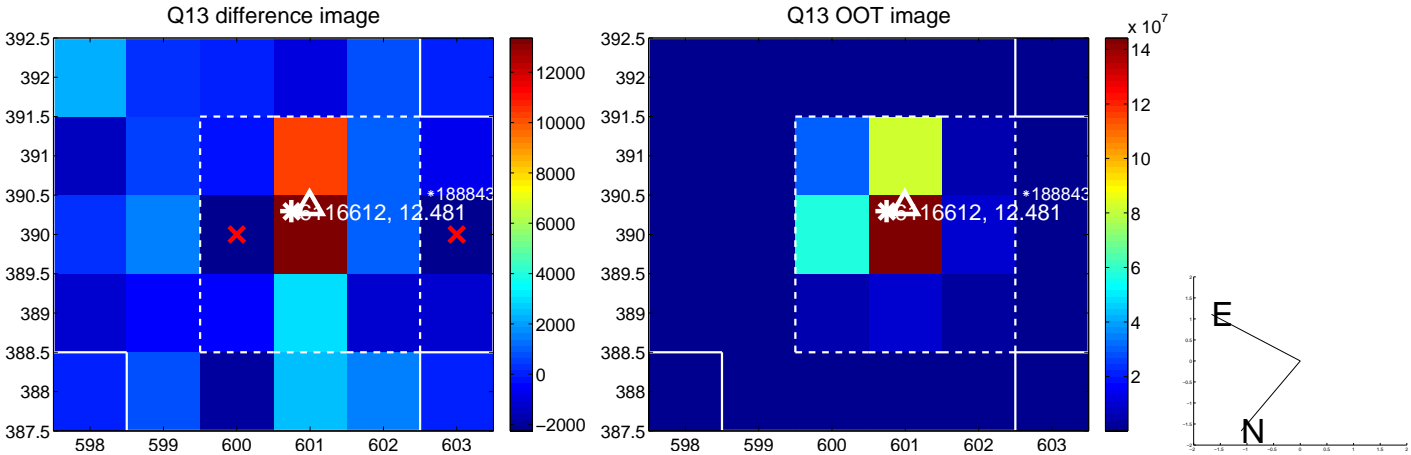


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

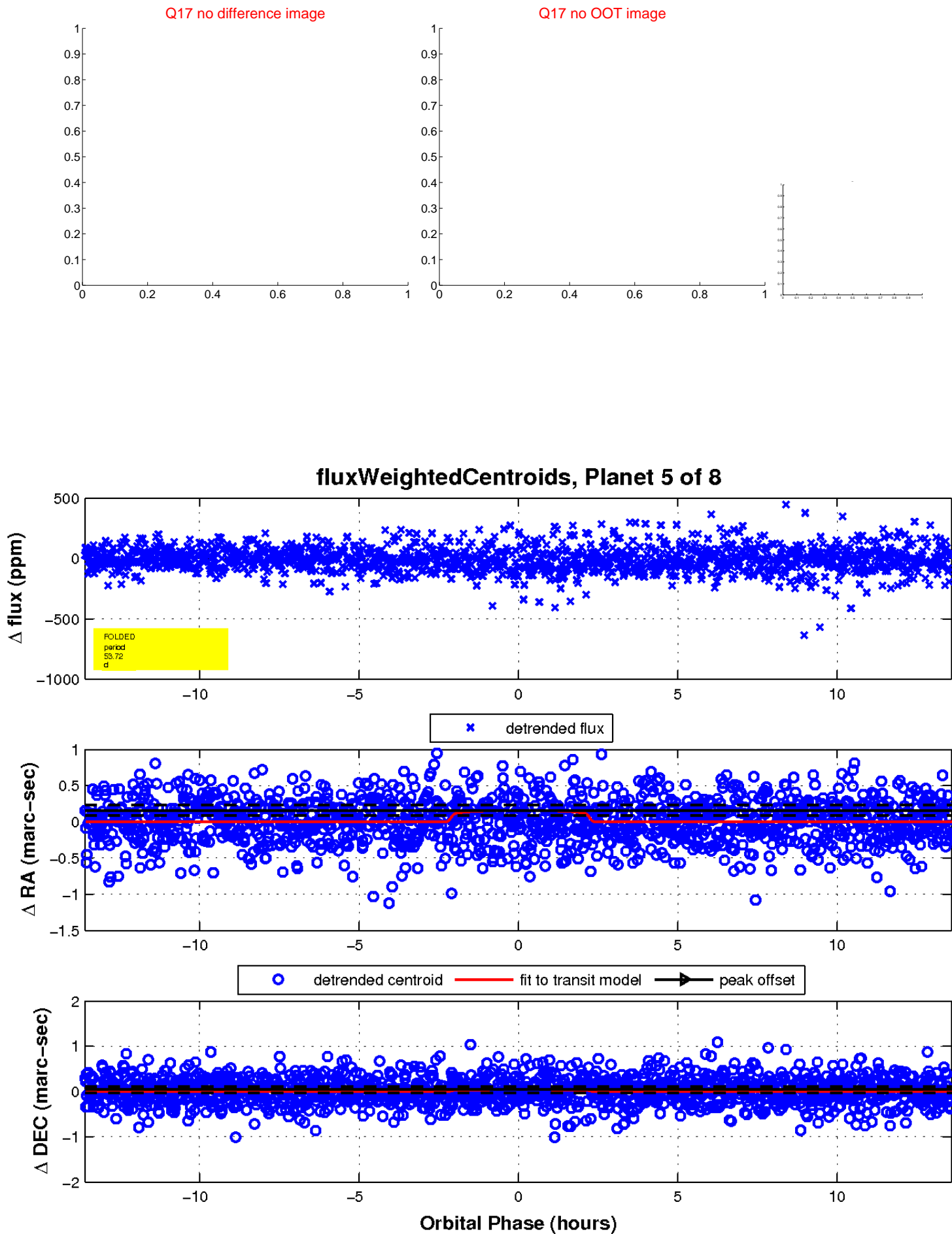




white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

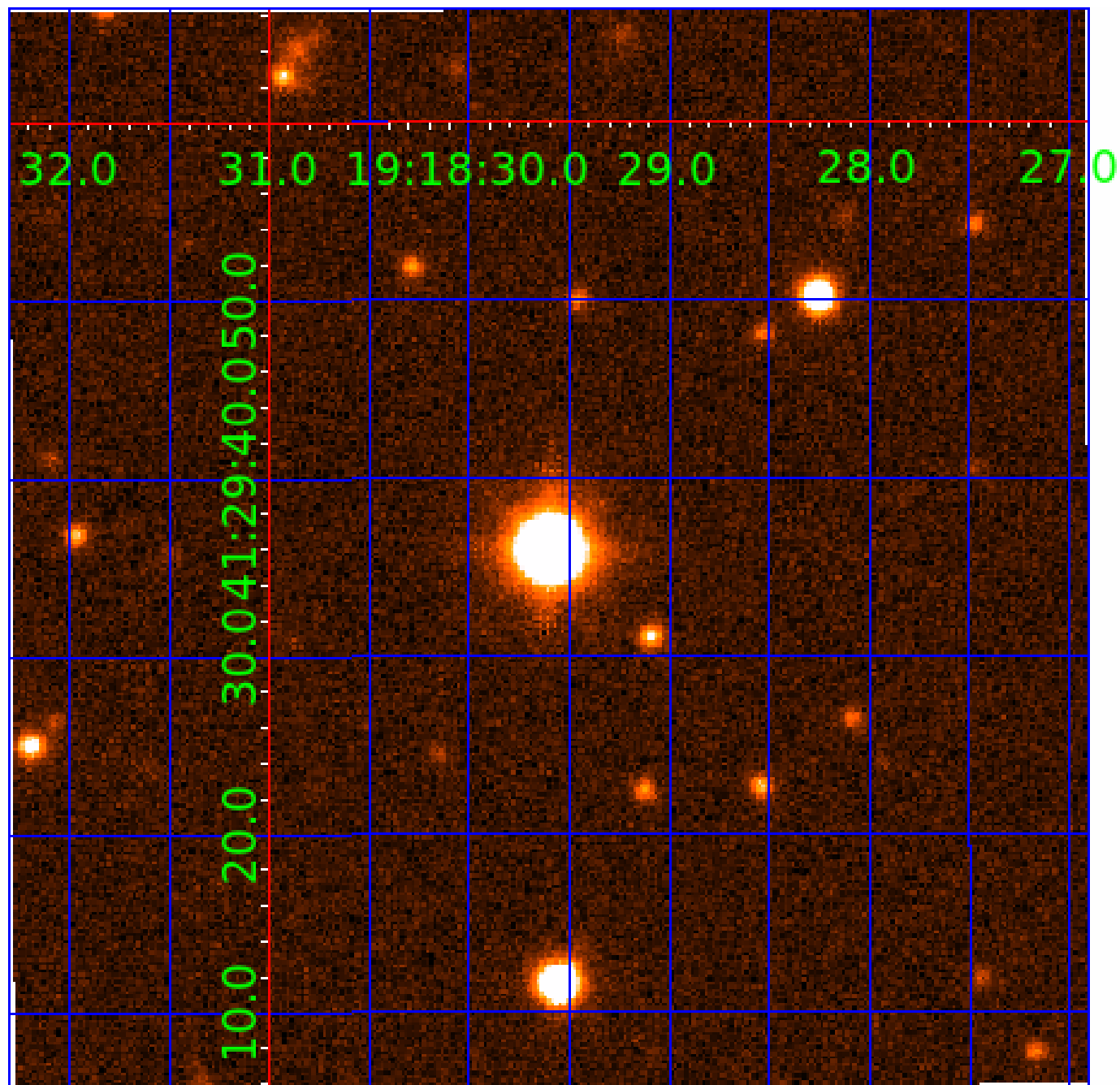


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 006116612

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006116612-01	OBS	No	1.681228	131.589662	6.3	12.078	10.0	4.0	1.70	7012	0.46	6881.93
006116612-02	OBS	No	51.176242	134.321375	184.4	4.030	25.8	11.4	1.70	7012	2.58	72.41
006116612-05	OBS	No	53.716410	159.379257	144.0	4.533	12.6	7.9	1.70	7012	2.28	67.88
006116612-06	OBS	No	26.461710	140.609317	82.9	15.220	11.4	8.1	1.70	7012	1.72	174.47

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006116612-01	OBS	FP	0.00	1	0	0	0	LPP_DV
006116612-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
006116612-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT
006116612-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS

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

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

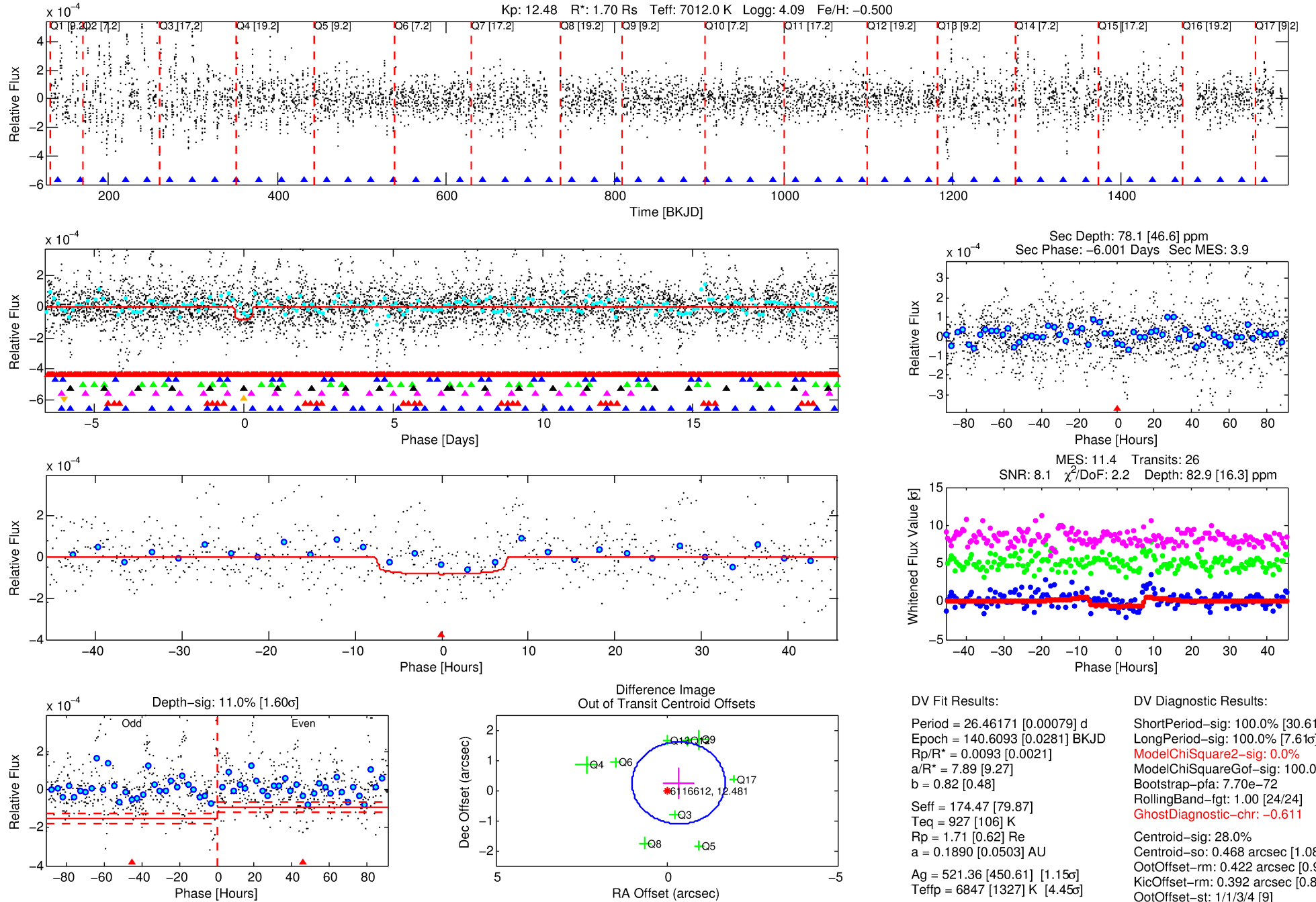
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 006116612-06

No Significant Match Found

# DV One-Page Summary

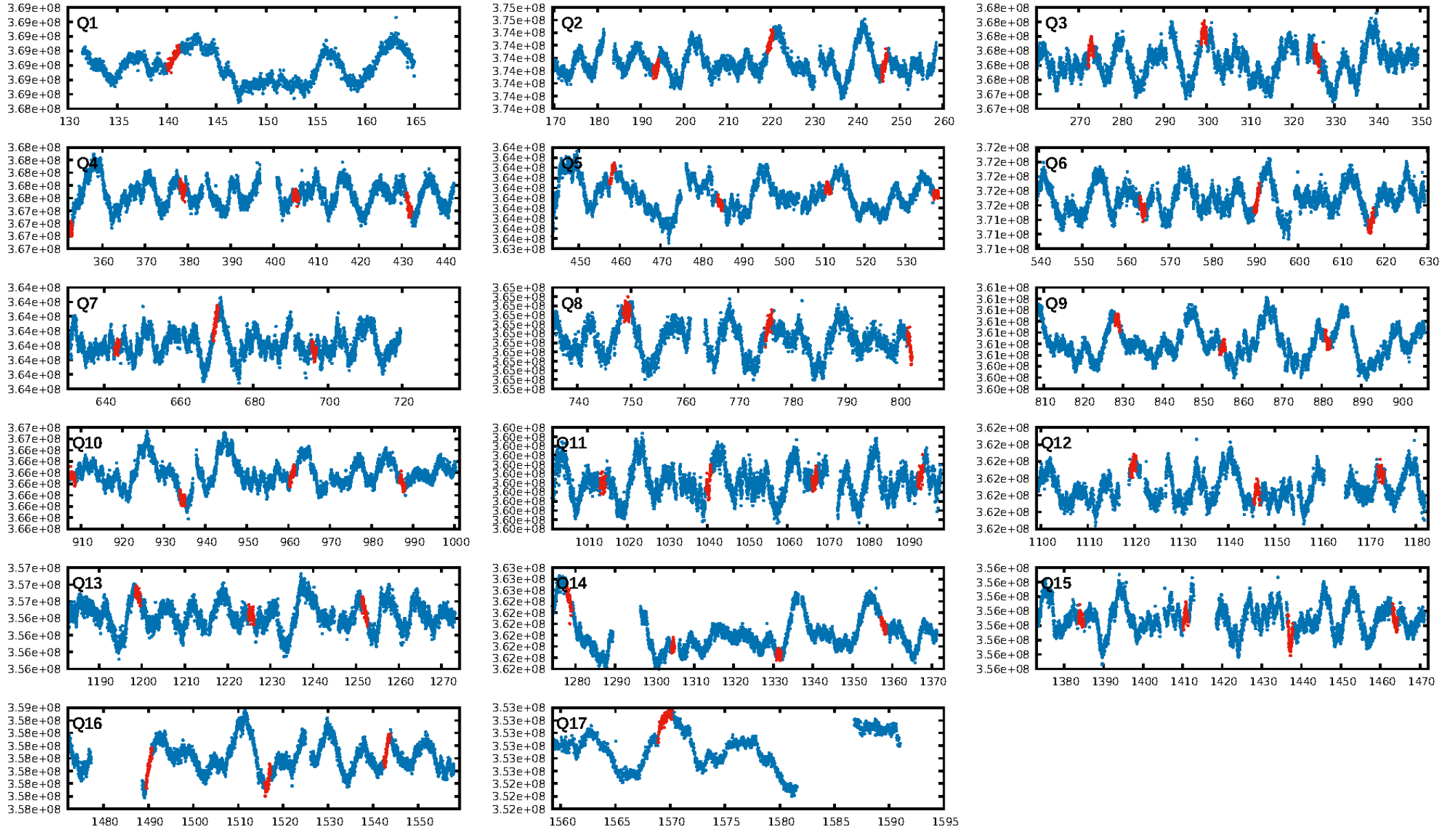
KIC: 6116612 Candidate: 6 of 8 Period: 26.462 d



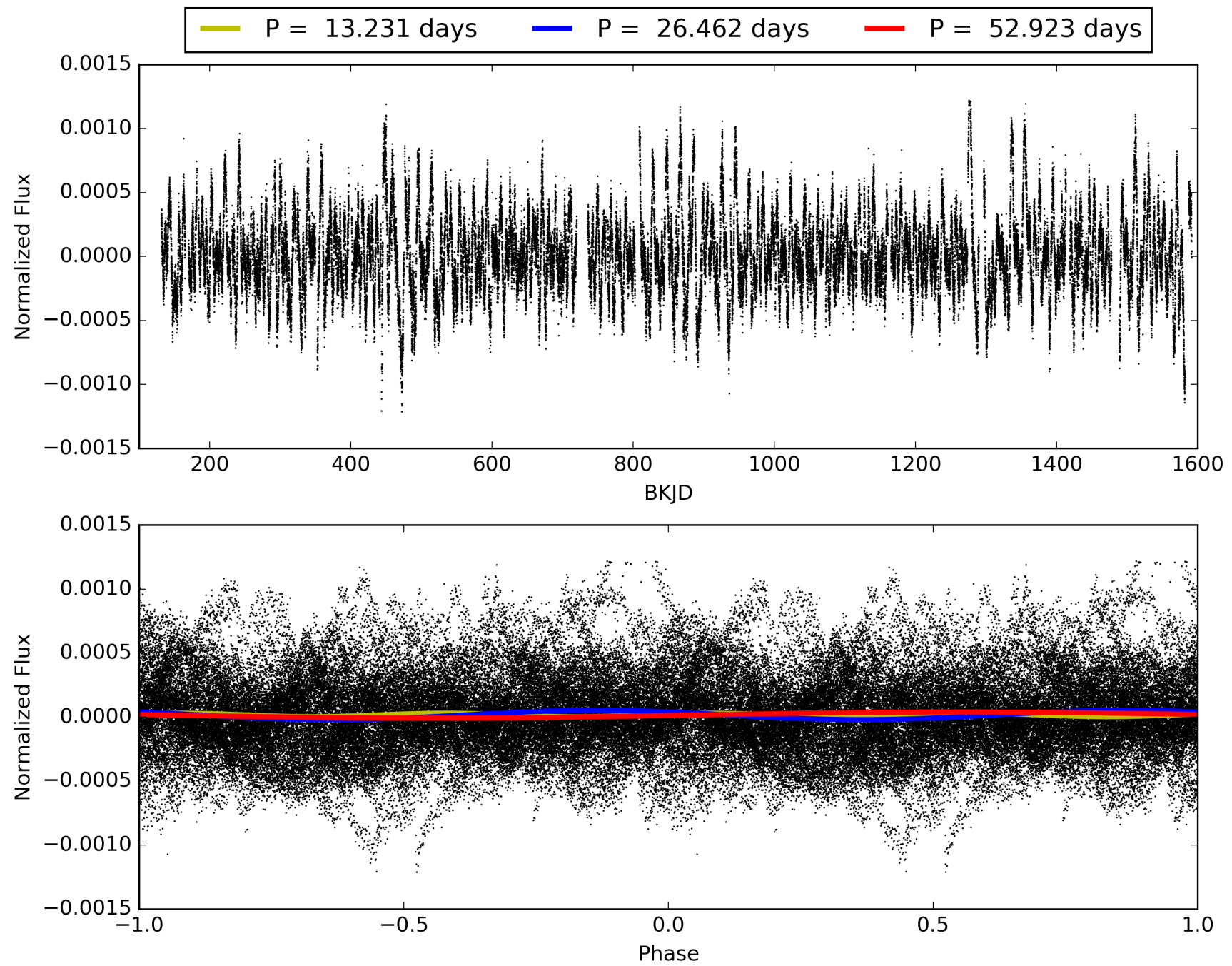
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 19:43:34 Z

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

# TCE 006116612-06, PDC Light Curves



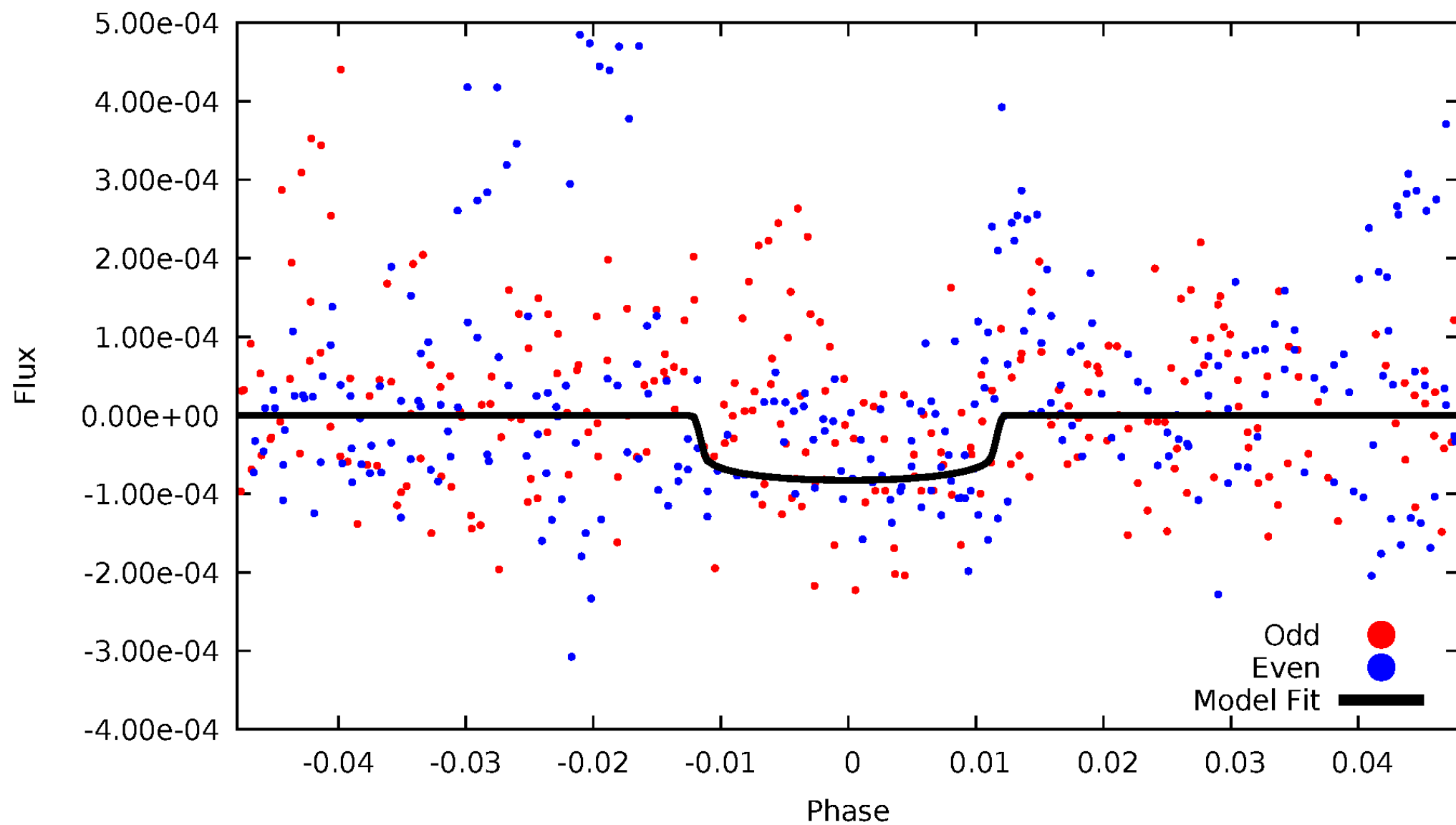
# TCE 006116612-06





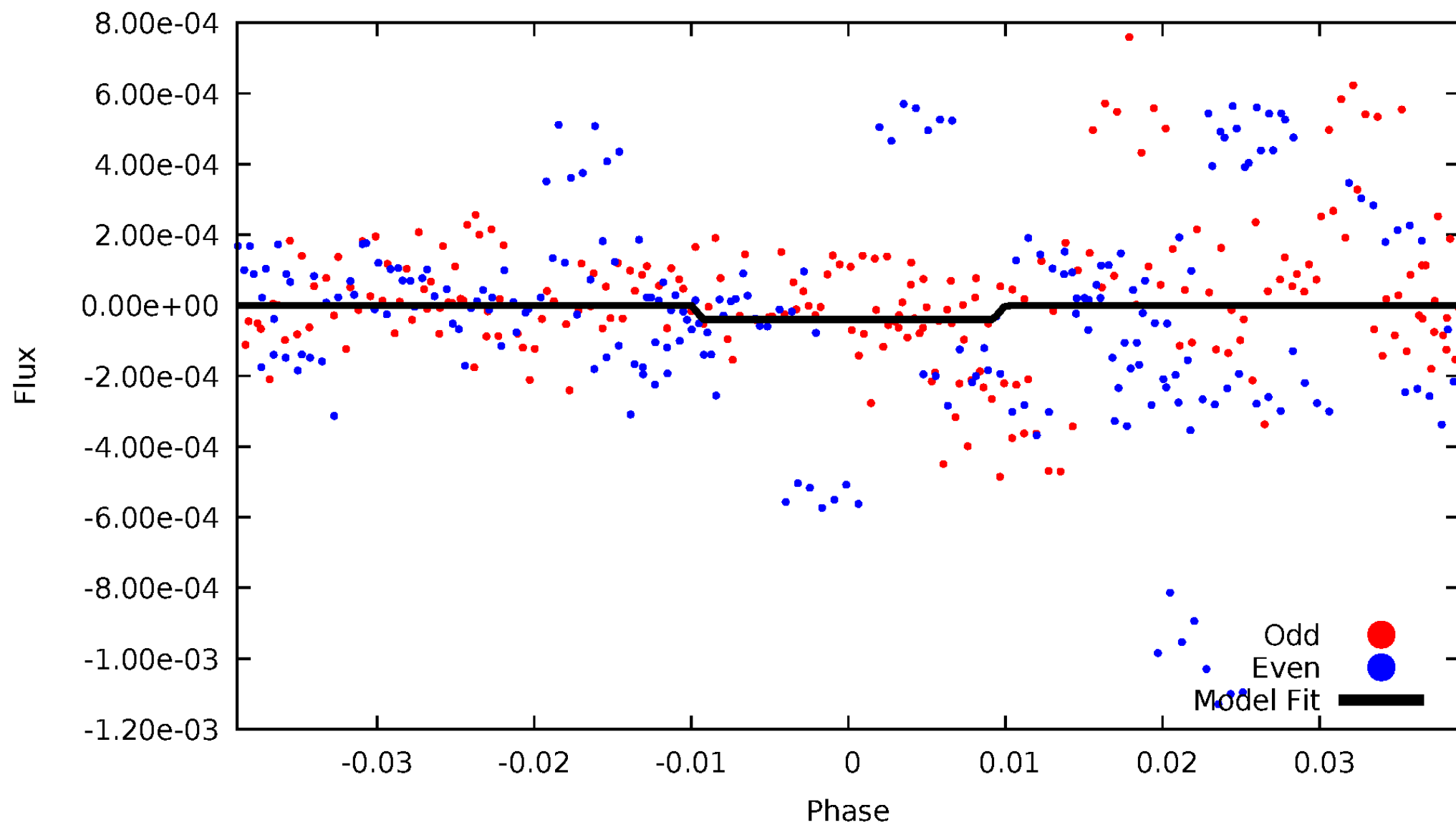
# DV Odd/Even

TCE 006116612-06



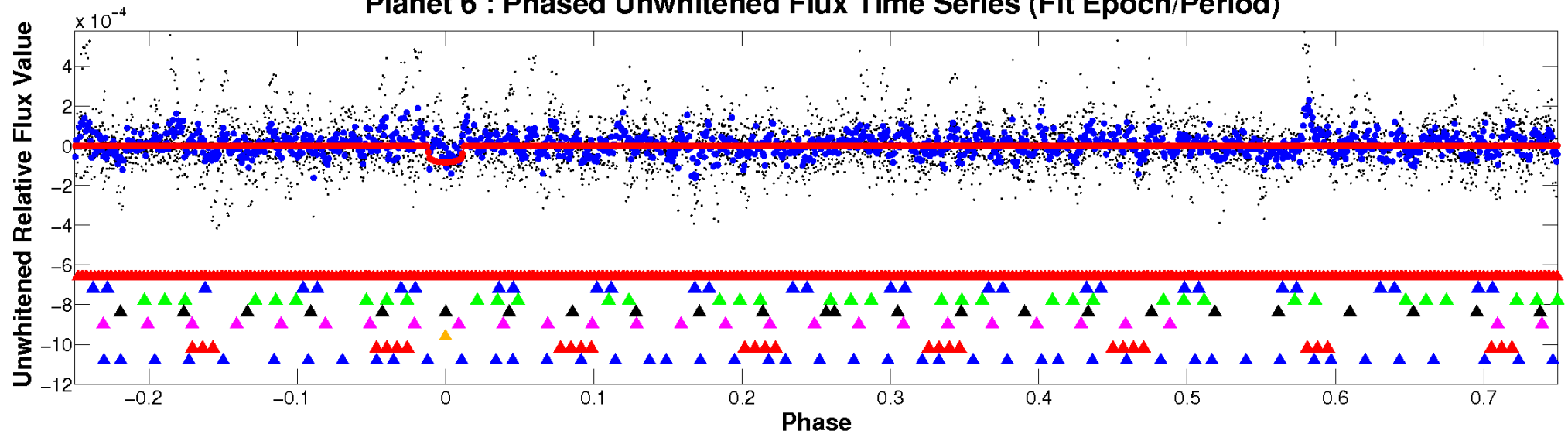
# ALT Odd/Even

TCE 006116612-06

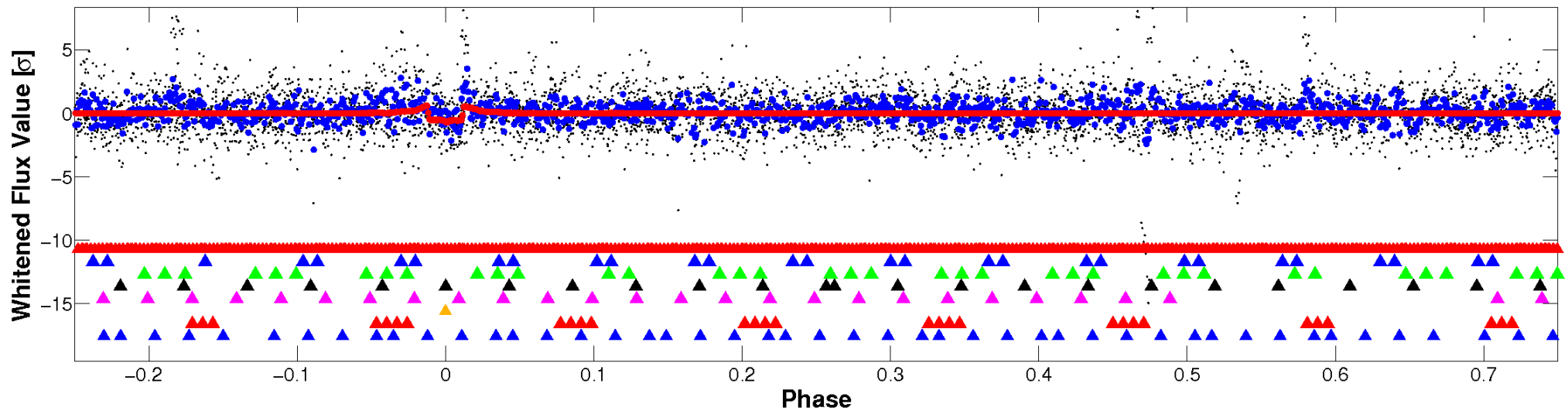


# Non-Whitened Vs. Whitened Light Curve

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

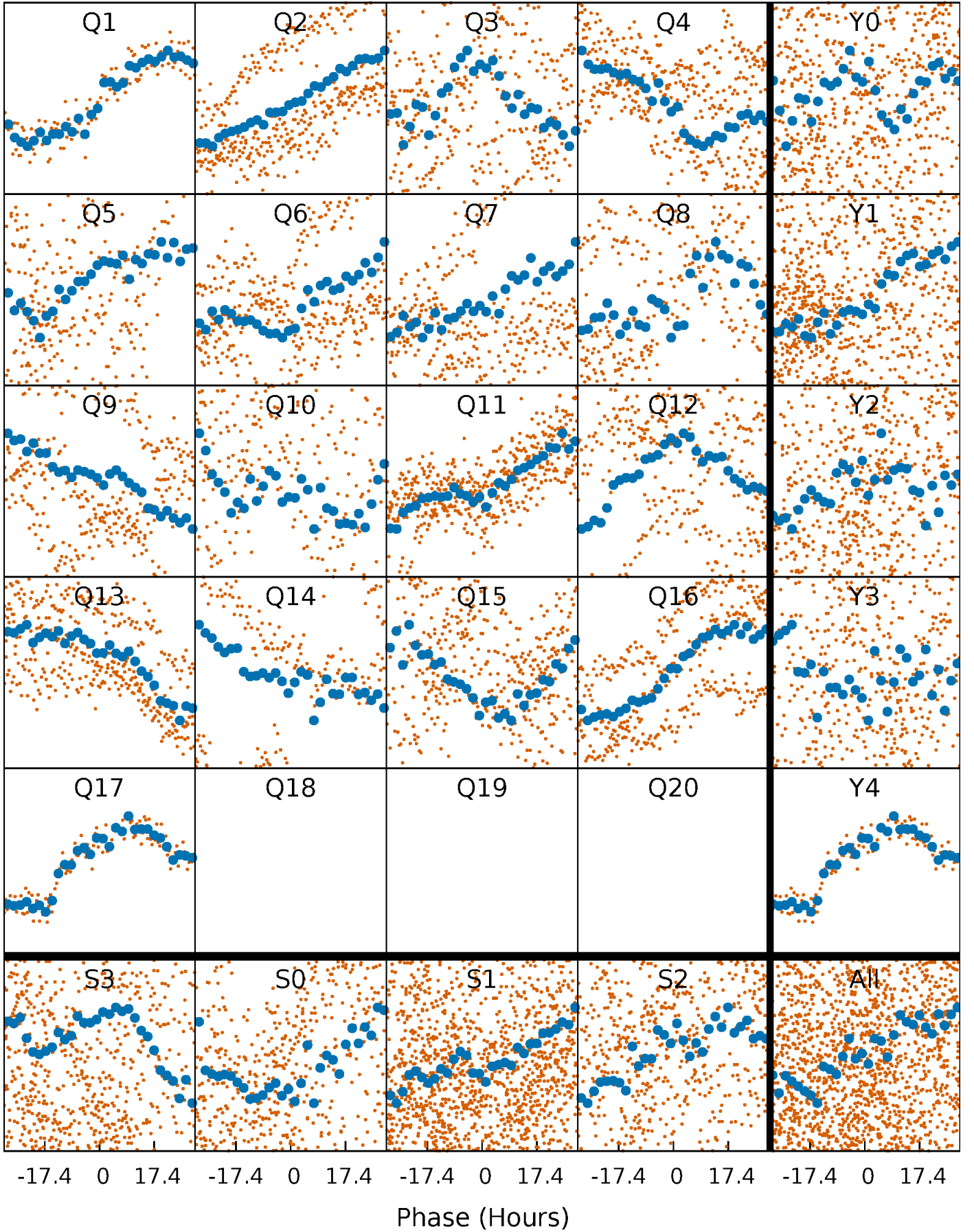


## Planet 6 : Phased Whitened Flux Time Series (Fit Epoch/Period)



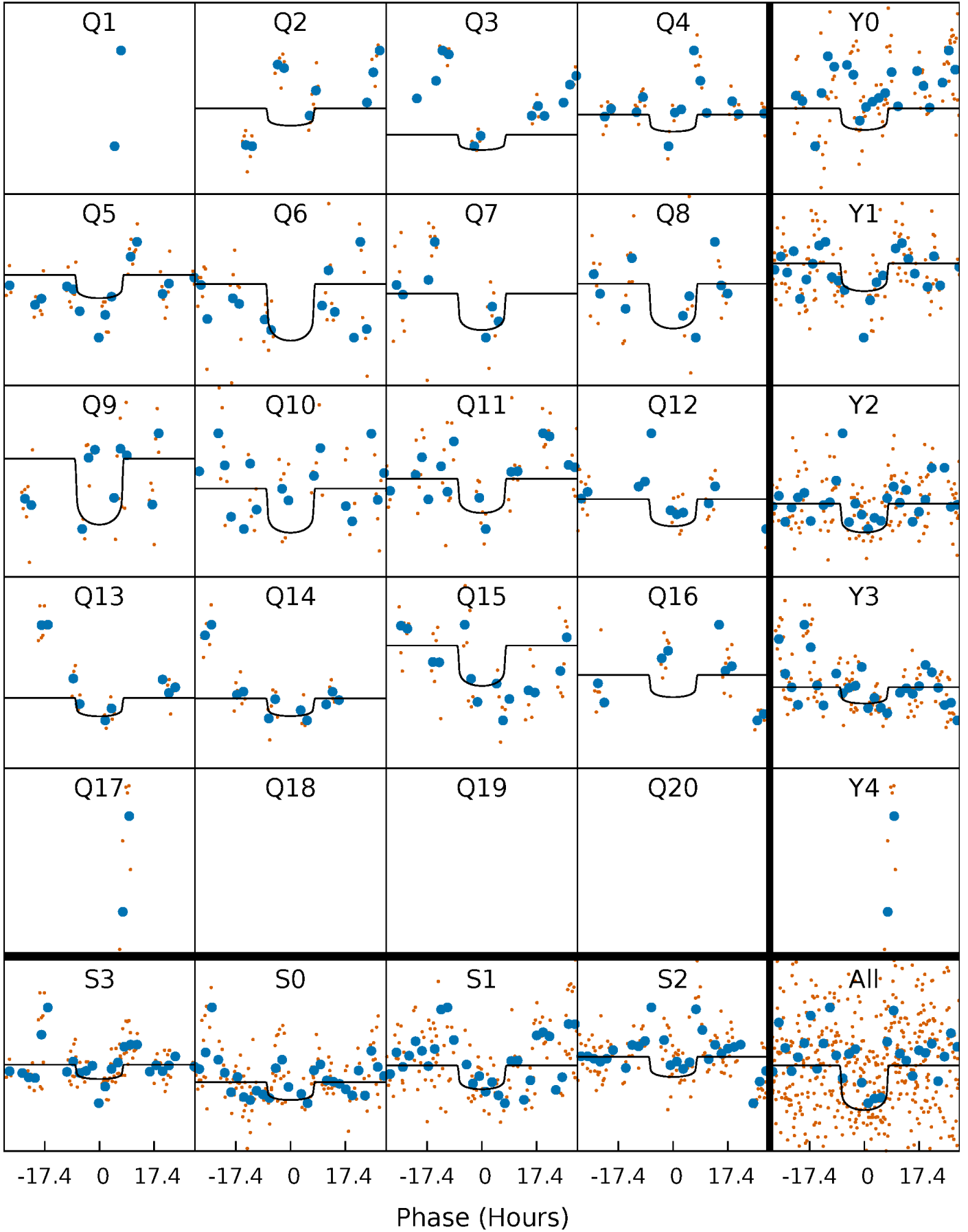
# PDC Quarter-Phased Transit Curves

TCE 006116612-06 P= 26.461710 Days  $T_0=140.609317$  (BKJD)



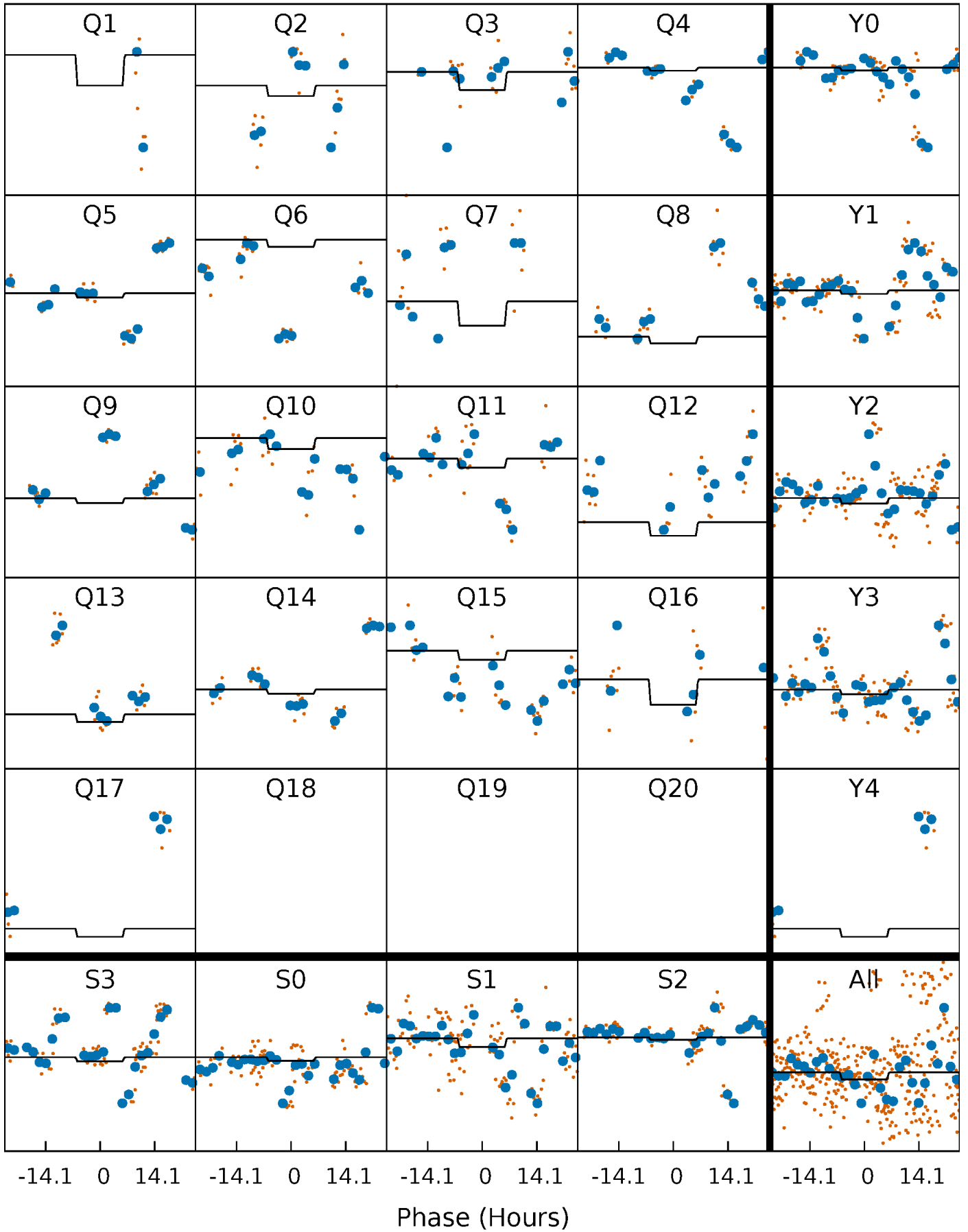
# DV Quarter-Phased Transit Curves

TCE 006116612-06 P= 26.461710 Days  $T_0=140.609317$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 006116612-06 P= 26.459229 Days  $T_0=140.406196$  (BKJD)

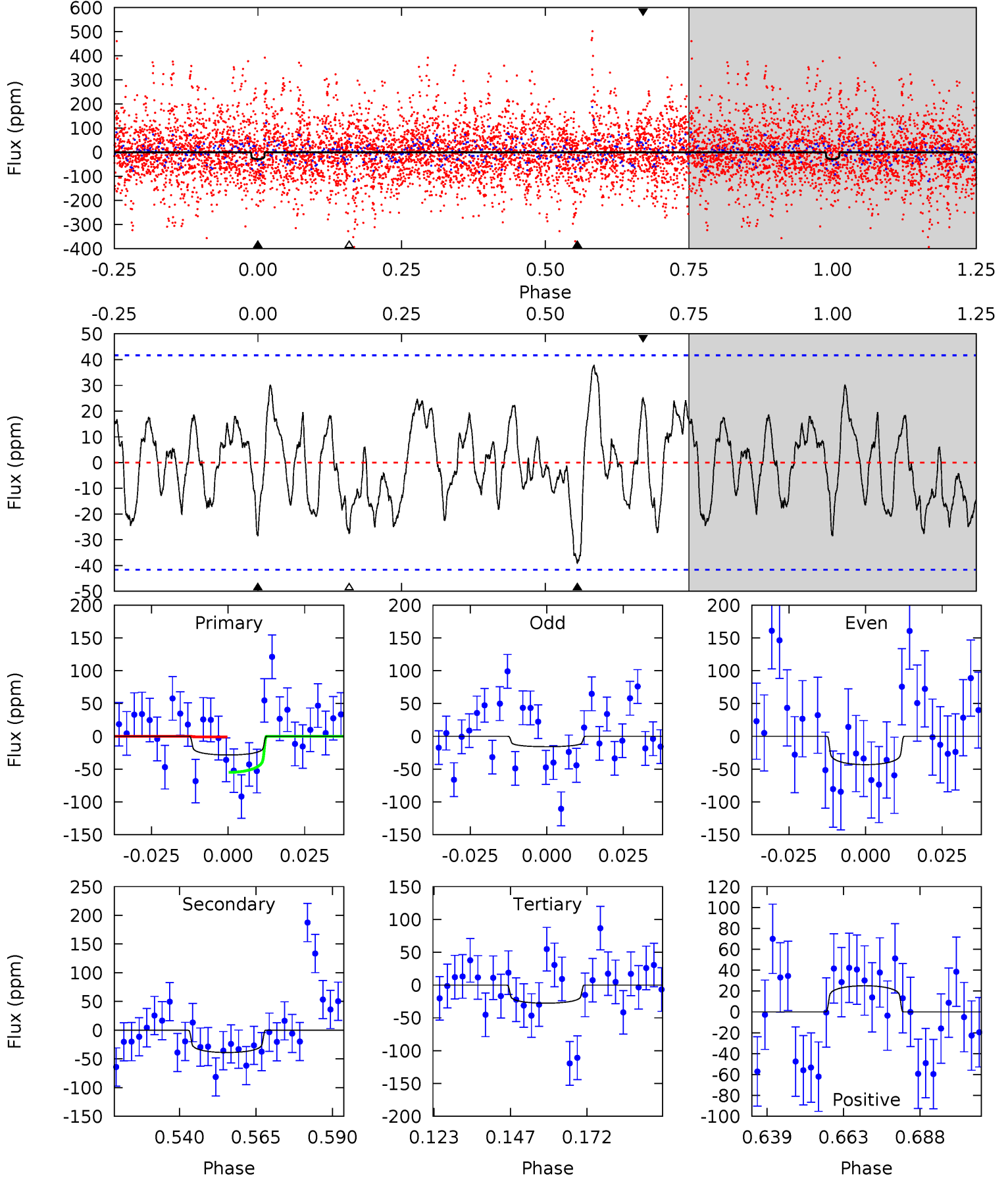




# DV Model-Shift Uniqueness Test

006116612-06, P = 26.461710 Days, E = 114.147607 Days

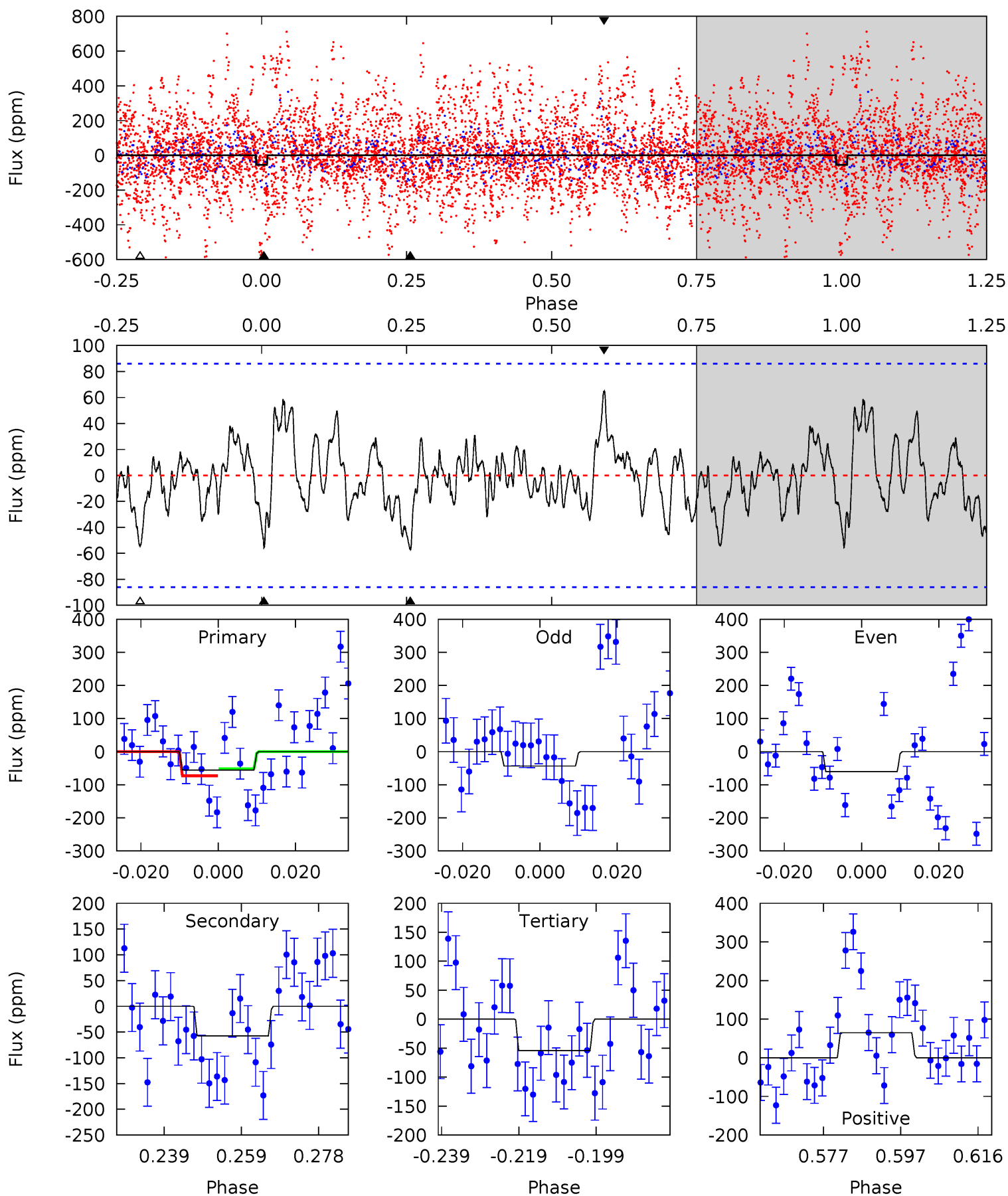
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
3.32	4.53	3.22	2.91	4.85	2.25	1.55	0.10	0.40	1.32	1.62	1.59	0.28	0.49	3.20



# Alt Model-Shift Uniqueness Test

006116612-06, P = 26.459229 Days, E = 113.946967 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
3.17	3.25	3.09	3.71	4.89	2.33	1.16	0.08	-0.54	0.16	-0.45	0.46	2.54	0.53	0.59



### Stellar Parameters For KIC 006116612

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7012^{+216}_{-312}$	$4.088^{+0.246}_{-0.164}$	$-0.500^{+0.250}_{-0.300}$	$1.696^{+0.430}_{-0.478}$	$1.283^{+0.169}_{-0.211}$	$0.370^{+0.569}_{-0.174}$
	+3%/-4%	+6%/-4%	+50%/-60%	+25%/-28%	+13%/-16%	+153%/-47%
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 006116612-06 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-39 \pm 9$	$1.69^{+0.51}_{-0.46}$	$1287^{+102}_{-105}$	$5698^{+865}_{-619}$	$263^{+243}_{-113}$
Alt.	$-57 \pm 18$	$1.10^{+0.48}_{-0.38}$	$1280^{+97}_{-108}$	$7757^{+2632}_{-1434}$	$870^{+1283}_{-476}$

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

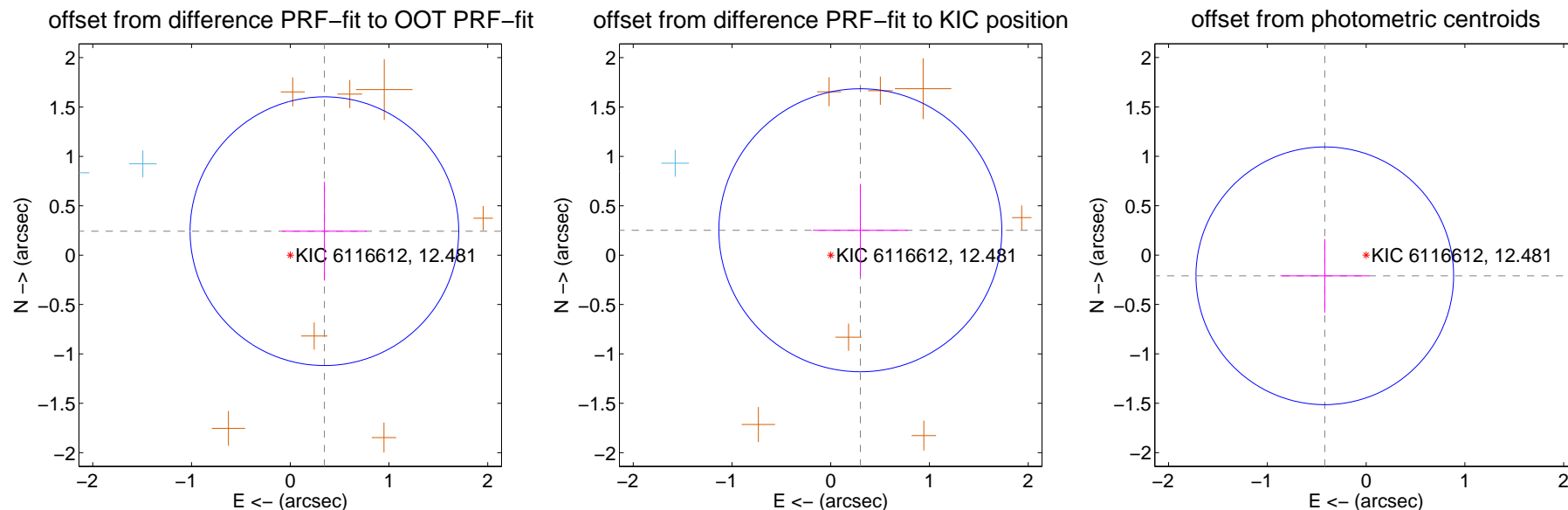
## DV Centroid Data

Supplemental centroid analysis for 006116612-06. Kepler magnitude: 12.48. Transit SNR 8.07

There are 2 quarters with good PRF difference image offsets

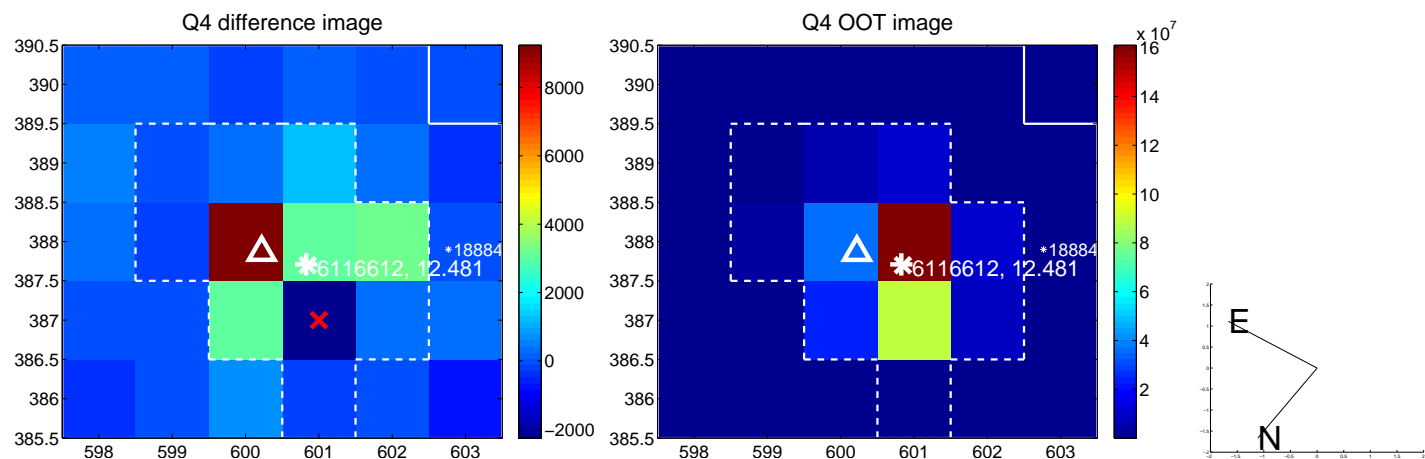
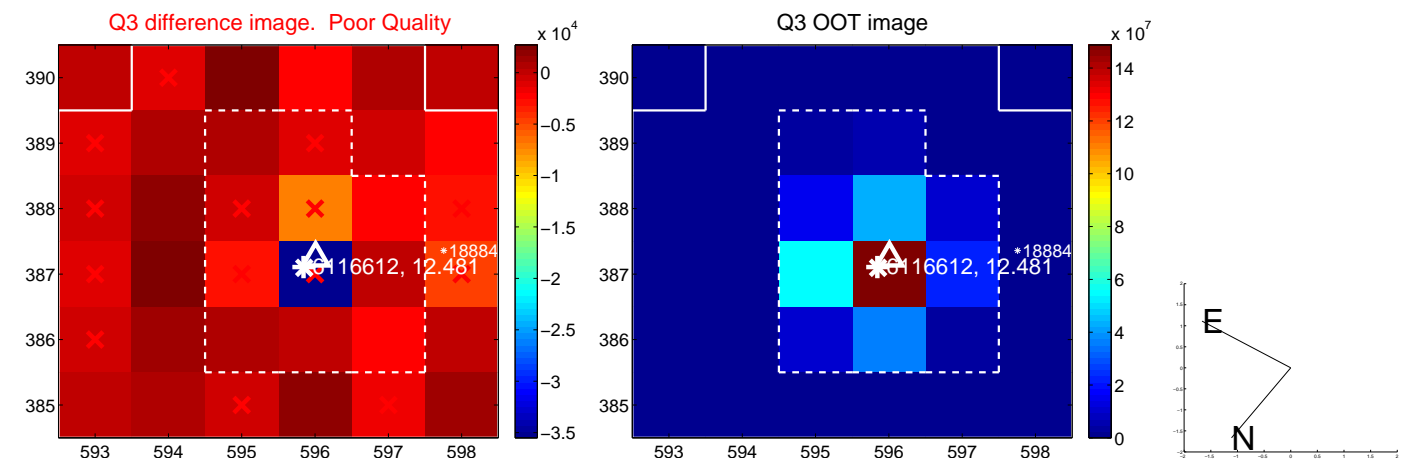
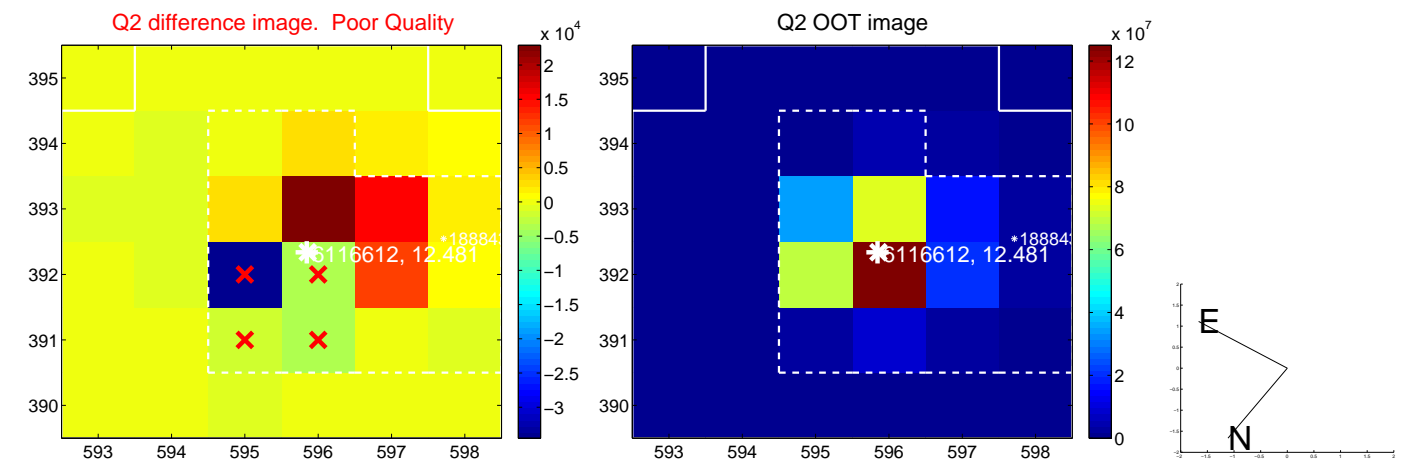
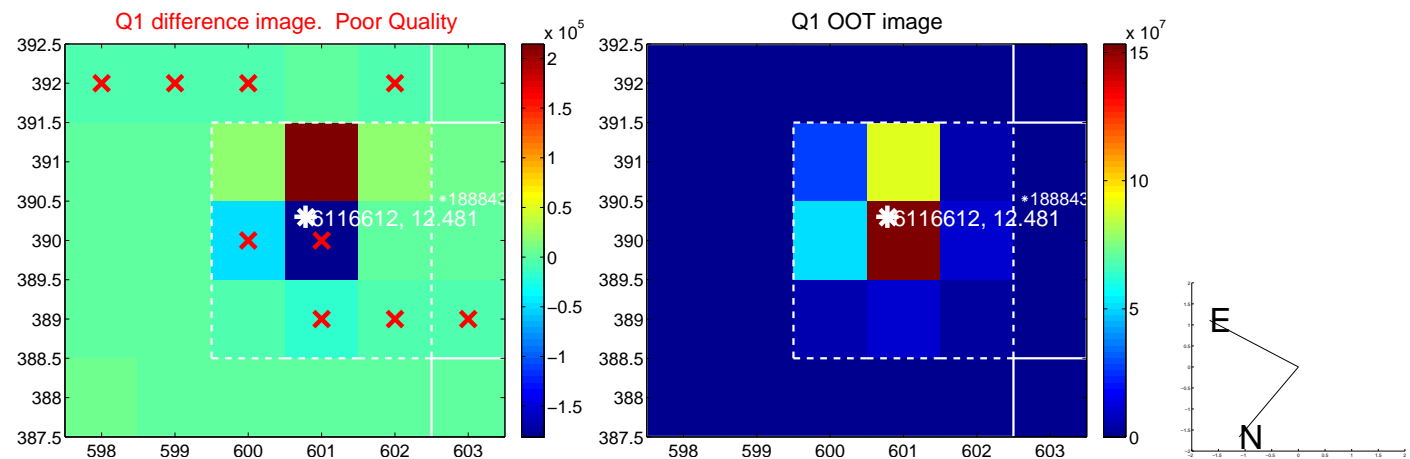
The direct PRF centroid is offset from the target star catalog position by about 0.02 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.422 \pm 0.453$	0.93	$-0.346 \pm 0.429$	$0.243 \pm 0.500$
PRF-fit source offset from KIC position	$0.392 \pm 0.477$	0.82	$-0.300 \pm 0.481$	$0.252 \pm 0.468$
photometric centroid source offset	$0.47 \pm 0.43$	1.08	$0.42 \pm 0.45$	$-0.21 \pm 0.37$

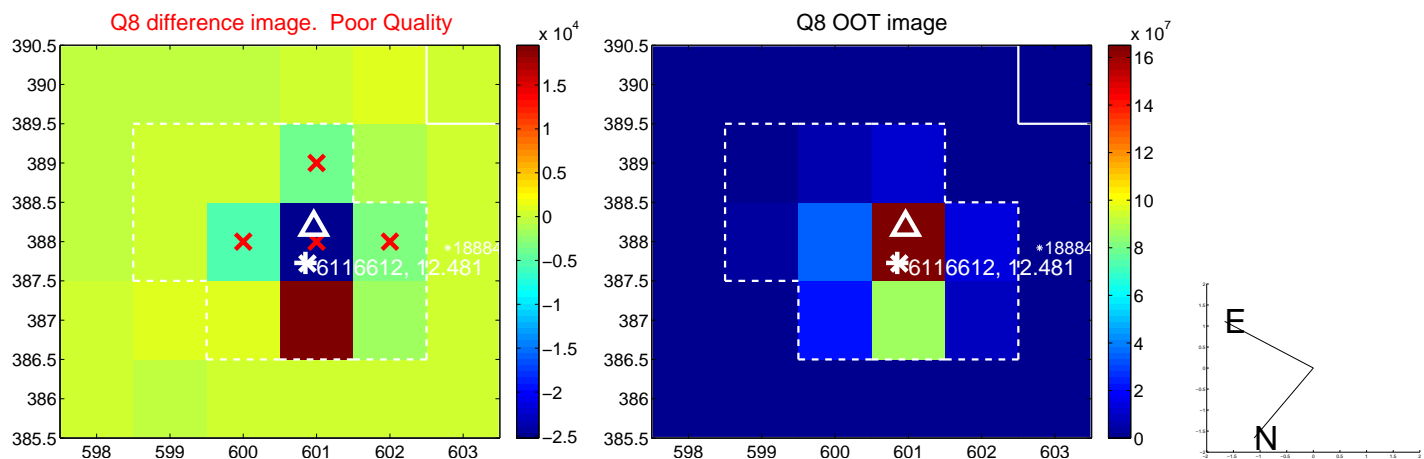
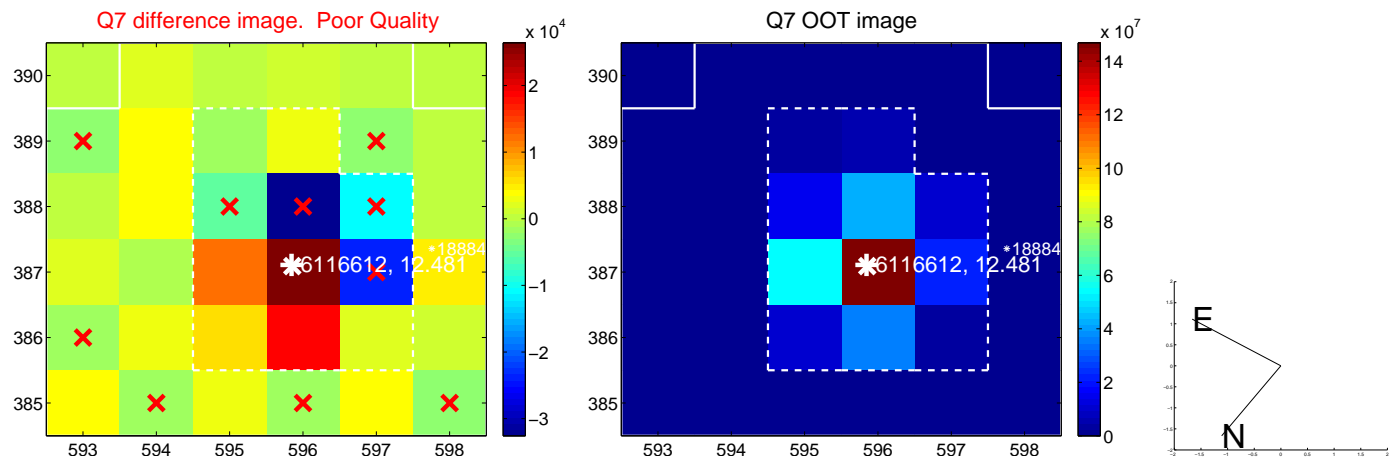
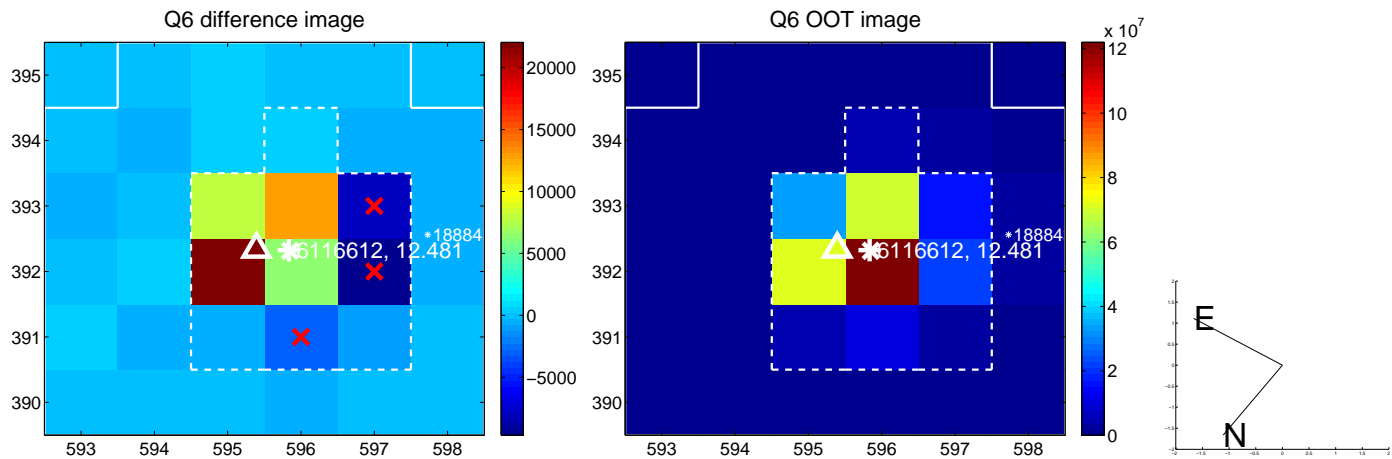
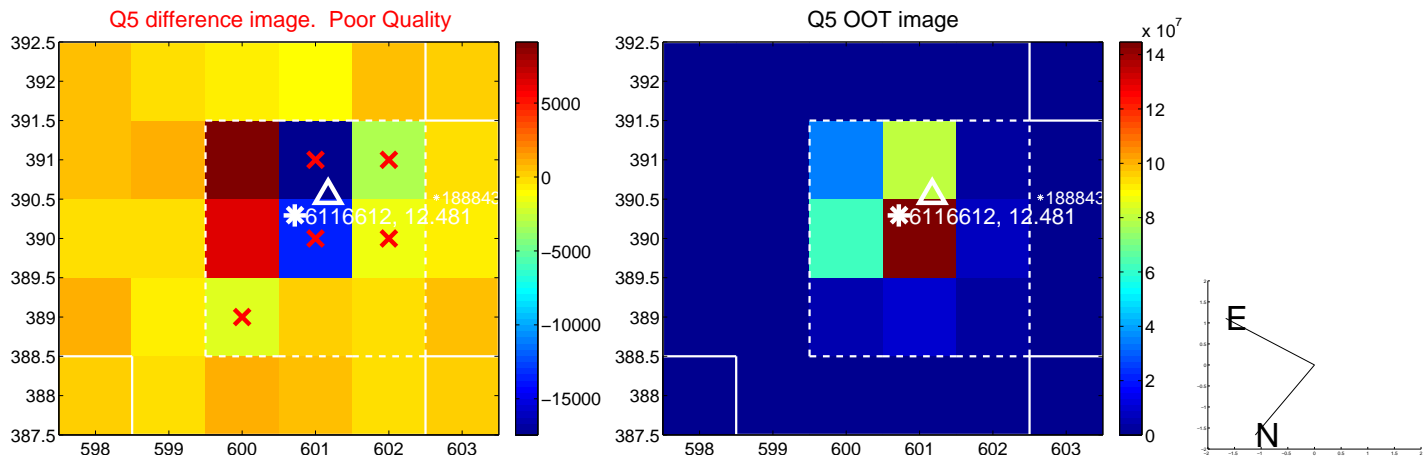


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

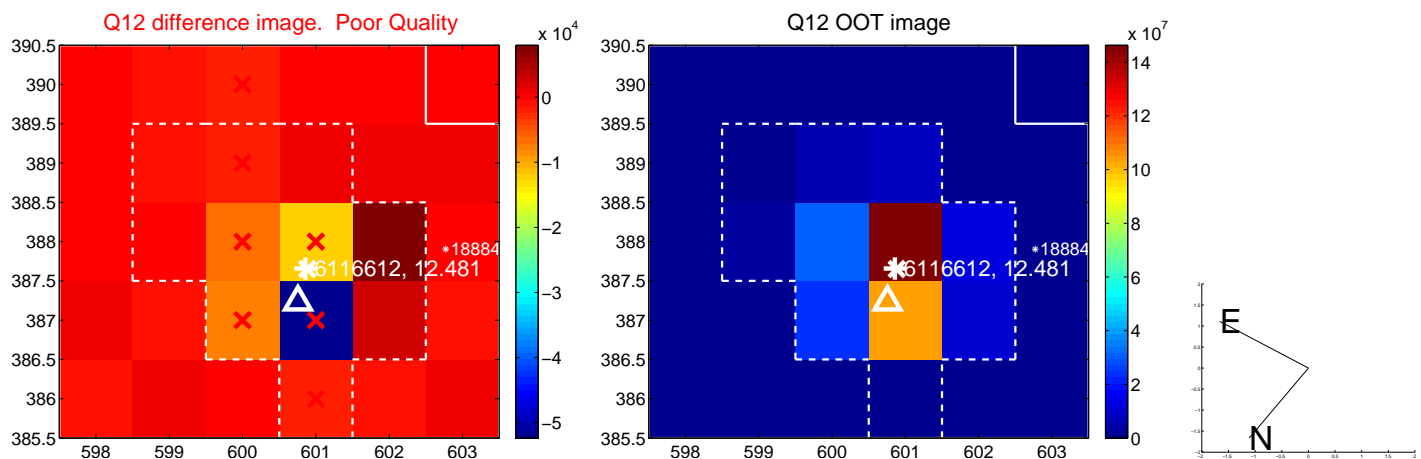
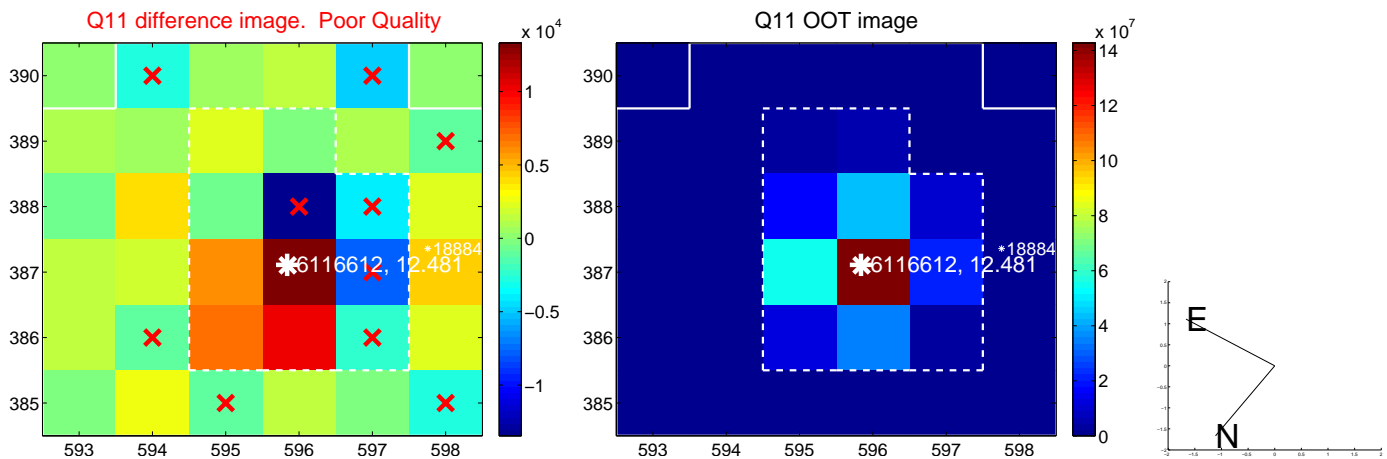
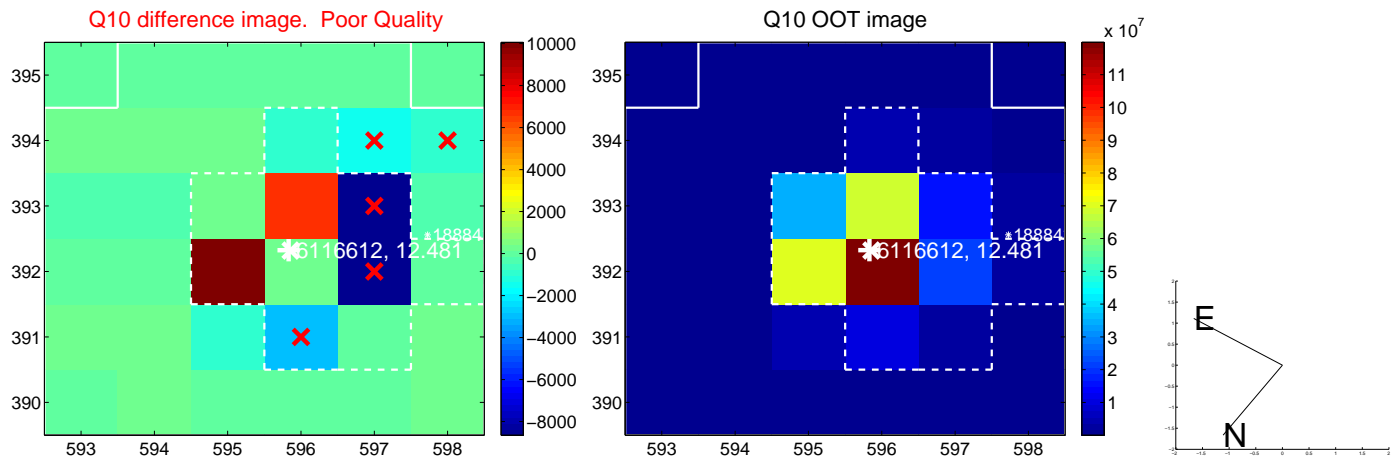
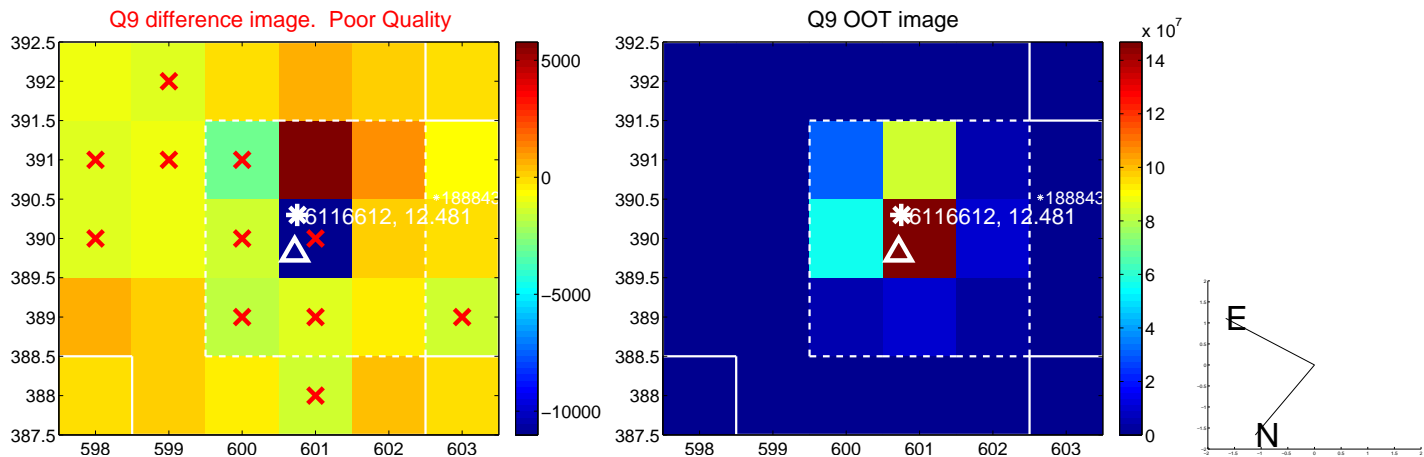
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

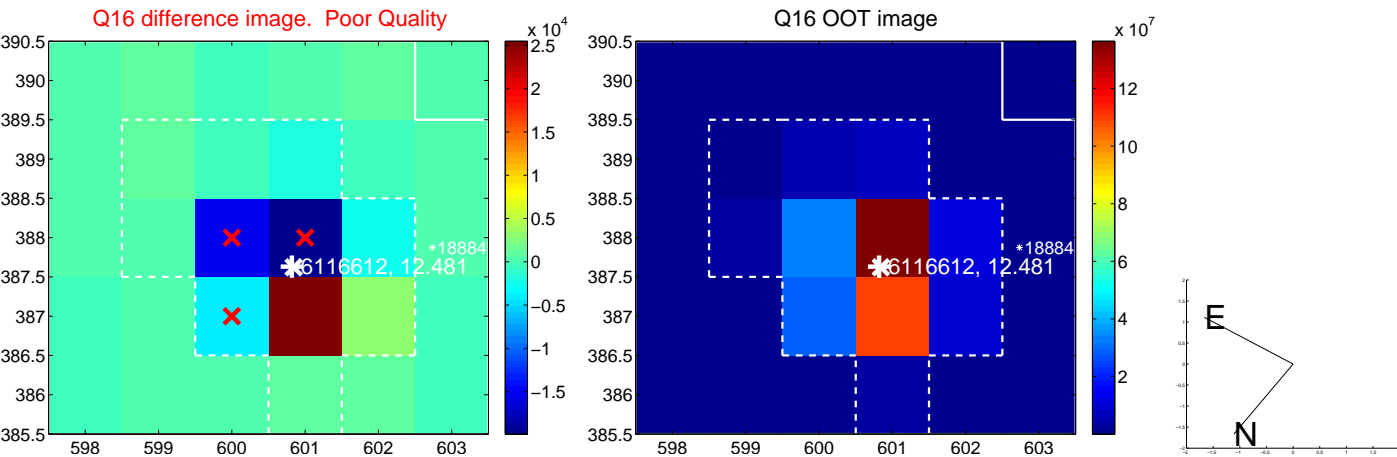
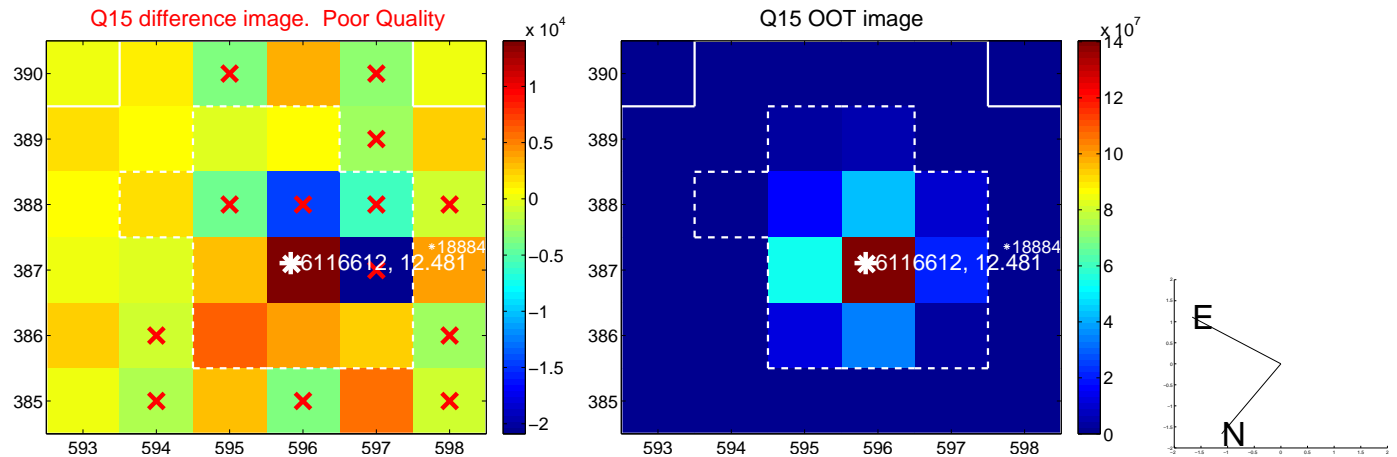
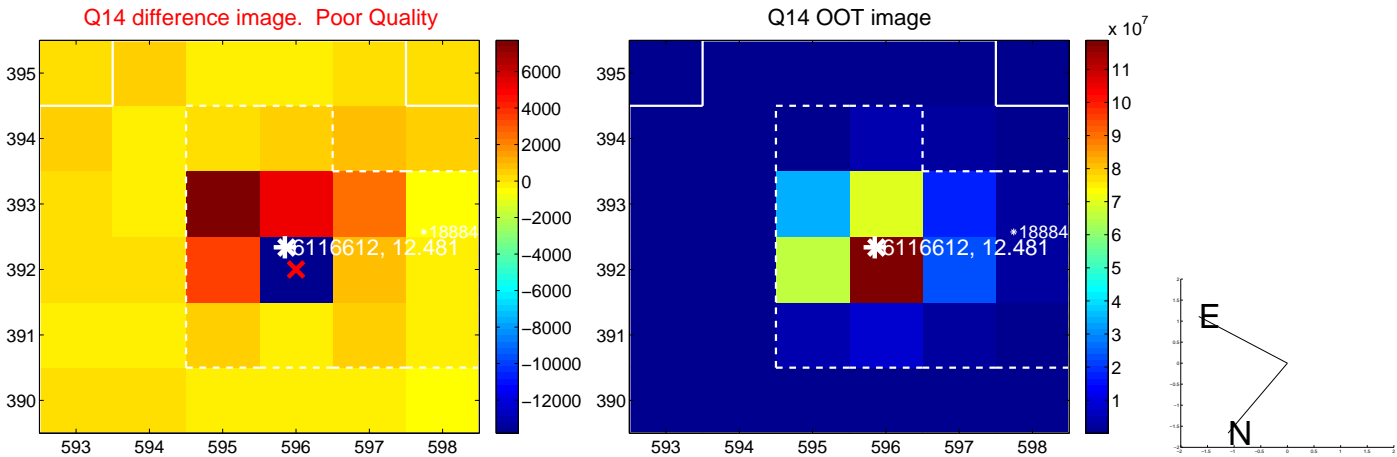
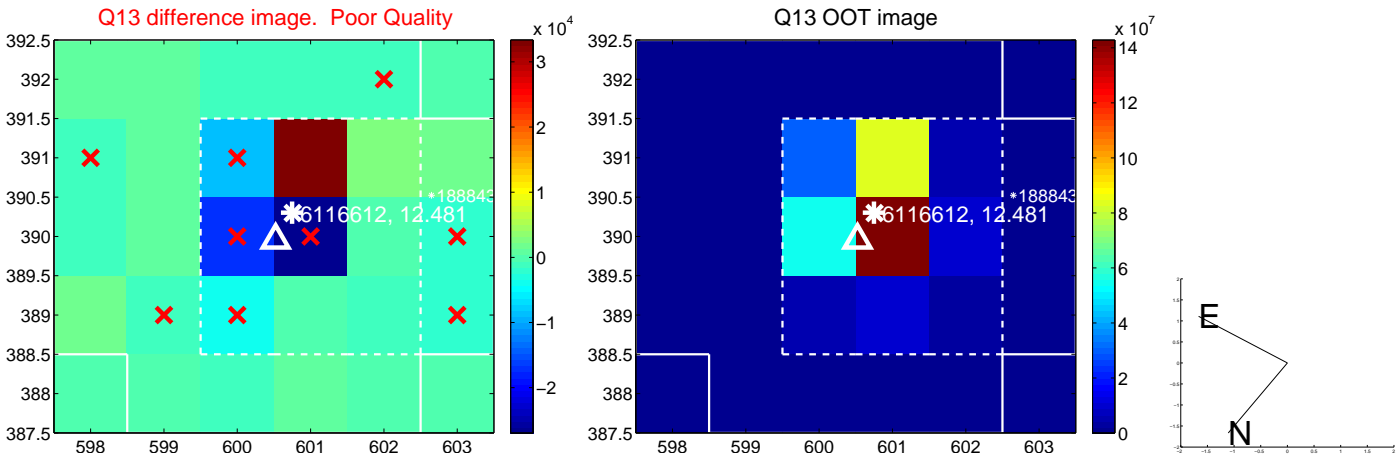


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

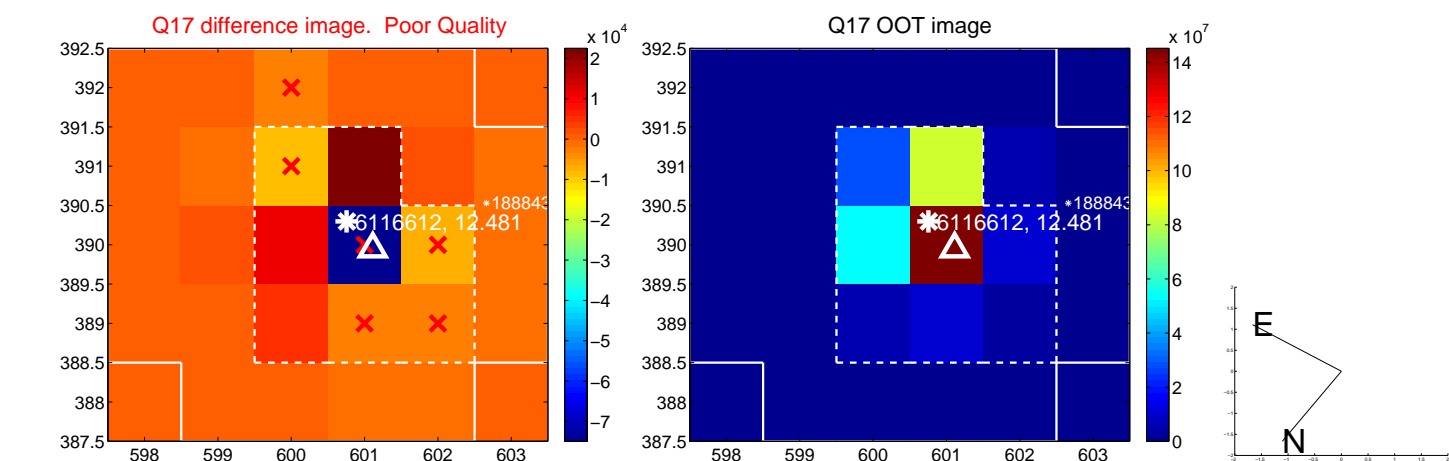




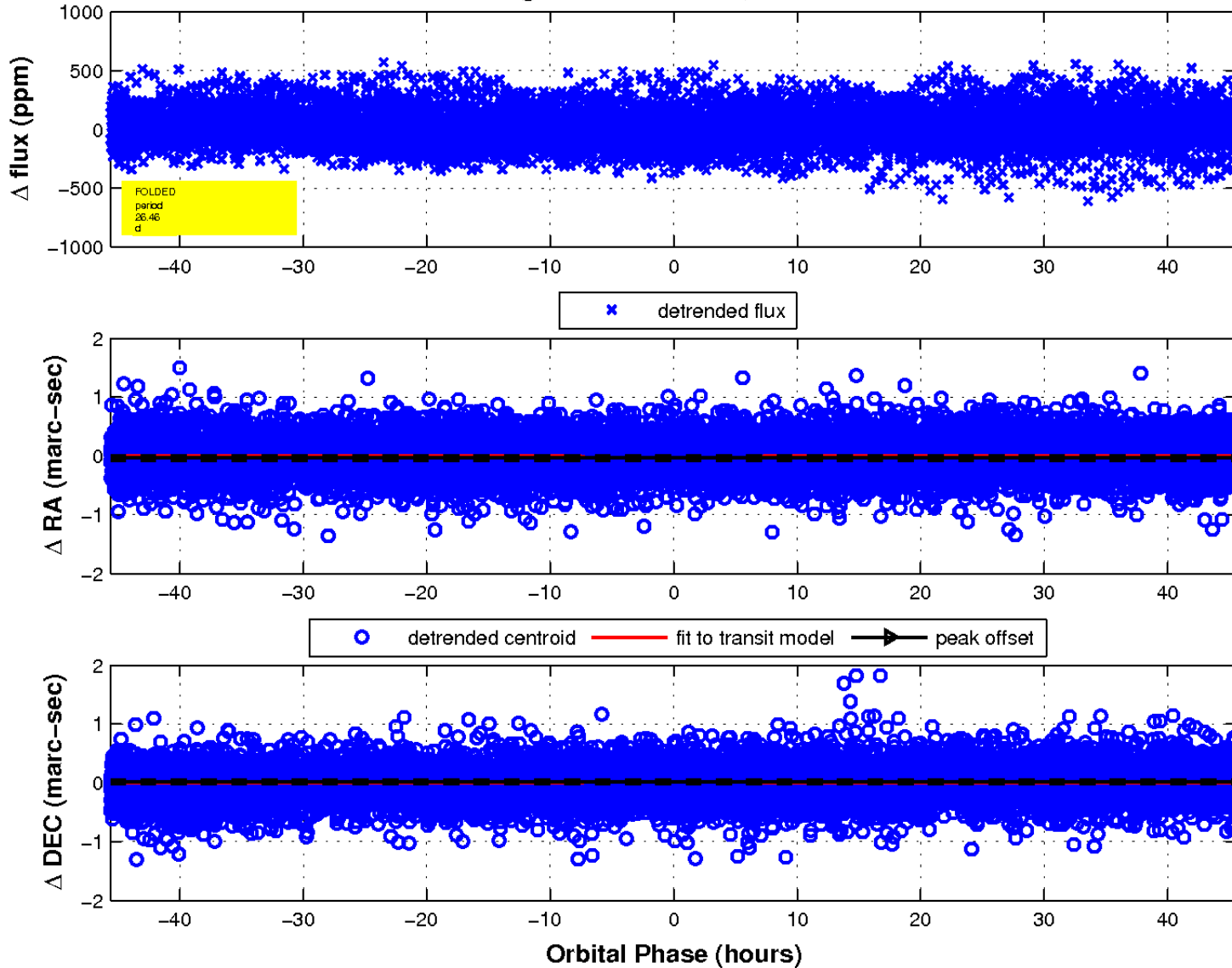
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 6 of 8



UKIRT Image

Declination

