

# KIC 001722916

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
001722916-01	OBS	No	1.813535	132.513520	0.1	1.362	7.1	0.1	1.60	6812	0.09	4824.23
001722916-02	OBS	No	1.813822	132.494408	18.4	10.501	7.4	7.4	1.60	6812	0.75	4823.21
001722916-03	OBS	No	113.456084	213.726772	152.5	10.563	16.5	7.4	1.60	6812	2.25	19.43
001722916-04	OBS	No	59.108474	141.293815	101.1	15.638	8.7	7.4	1.60	6812	1.76	46.34
001722916-05	OBS	No	22.011274	131.997241	79.9	6.325	8.8	8.8	1.60	6812	1.69	172.96
001722916-06	OBS	No	359.058903	202.797449	338.0	20.552	8.5	8.3	1.60	6812	5.69	4.18
001722916-07	OBS	No	80.910752	145.943923	136.1	5.420	8.0	7.3	1.60	6812	2.19	30.49
001722916-08	OBS	No	95.858298	158.854822	172.1	2.318	8.1	7.6	1.60	6812	2.39	24.32
001722916-09	OBS	No	105.723678	156.862664	140.0	6.744	8.2	7.9	1.60	6812	2.40	21.34

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
001722916-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV
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001722916-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
001722916-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
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001722916-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES—TRANS_GAPPED—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
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**Notes:** OBS = Observed. INJ = Injected. INV = Inverted. SCR = Scrambled.

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

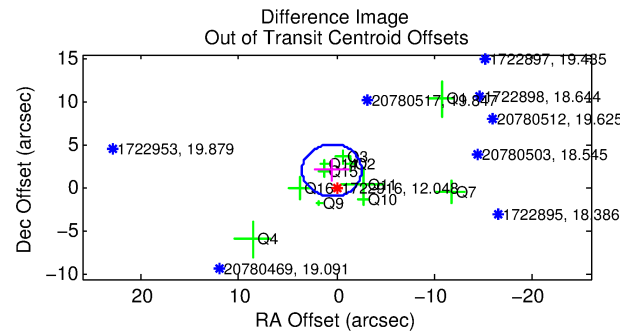
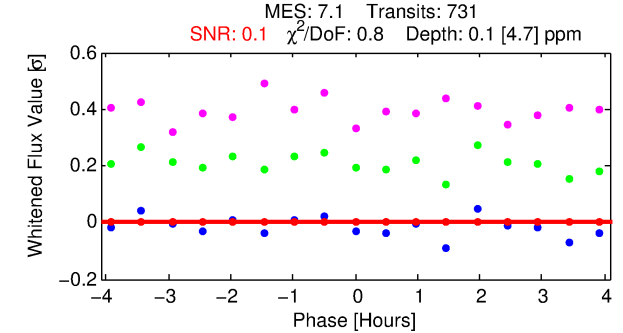
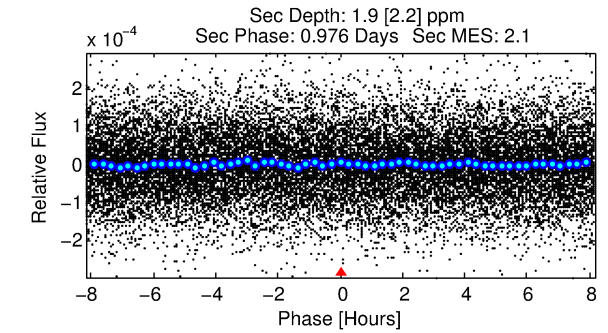
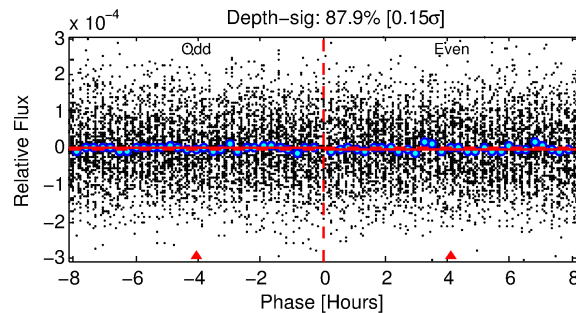
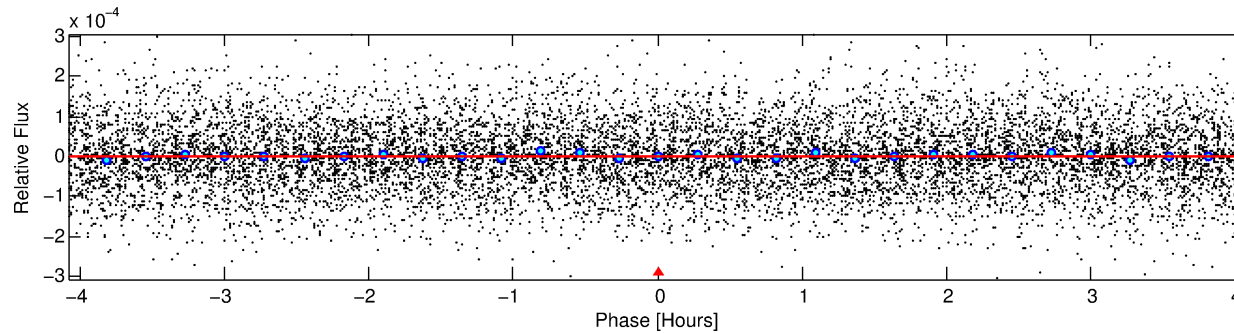
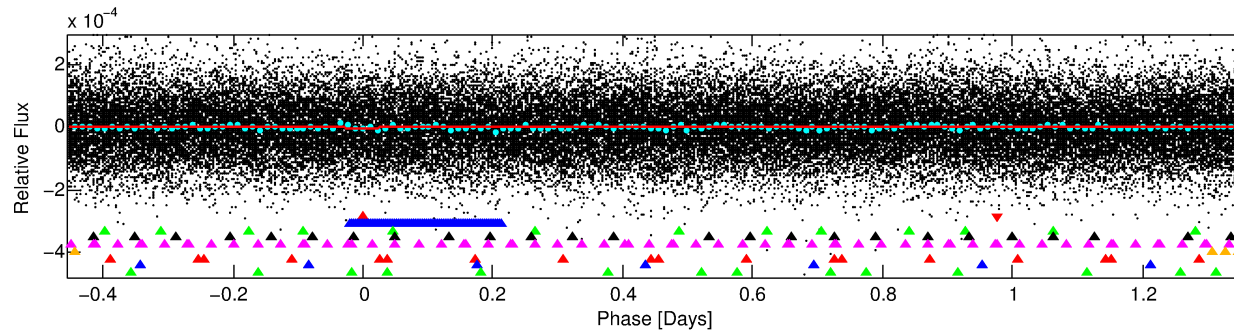
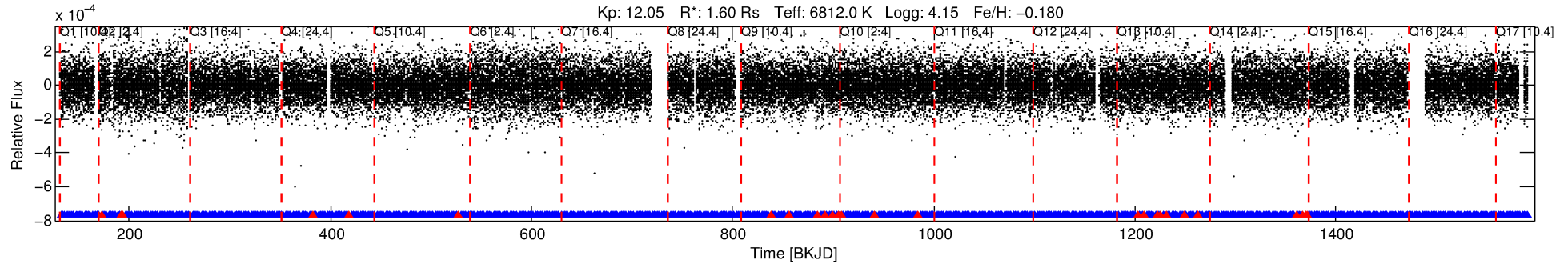
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 001722916-01

No Significant Match Found

# DV One-Page Summary

KIC: 1722916 Candidate: 1 of 9 Period: 1.814 d



## DV Fit Results:

Period = 1.81353 [0.00194] d  
Epoch = 132.5135 [0.3607] BKJD  
Rp/R\* = 0.0005 [0.0124]  
a/R\* = 1.32 [108.60]  
b = 1.00 [1.23]  
Seff = 4824.23 [1033.32]  
Teq = 2125 [114] K  
Rp = 0.09 [2.18] Re  
a = 0.0321 [0.0045] AU  
Ag = 138.72 [6848.62] [0.02 $\sigma$ ]  
Teffp = 11276 [139179] K [0.07 $\sigma$ ]

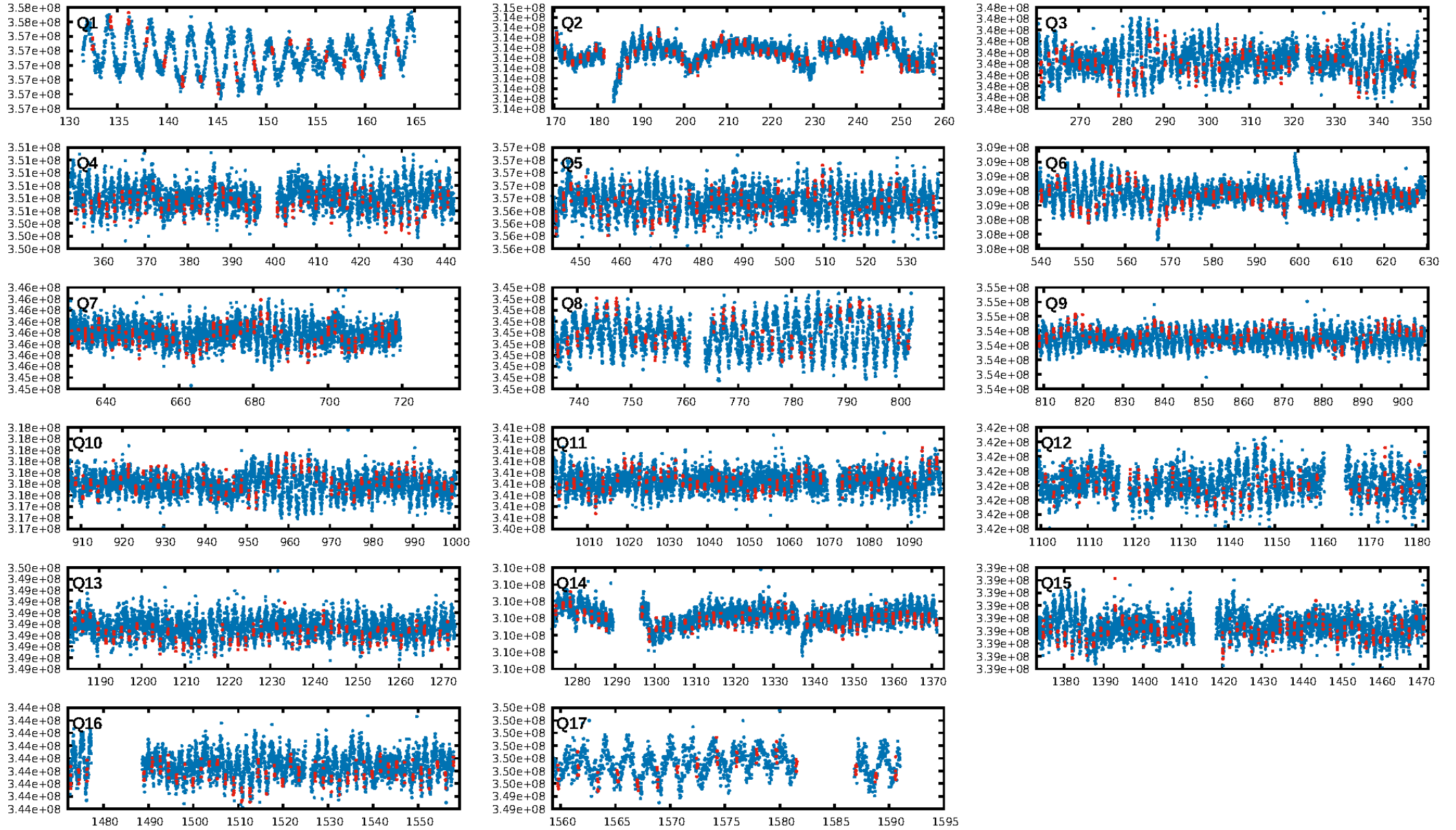
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.1% [0.00 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 1.74e-08  
RollingBand-fgt: 0.96 [671/697]  
GhostDiagnostic-chr: N/A  
Centroid-sig: N/A  
Centroid-so: N/A  
OotOffset-rm: 2.131 arcsec [2.12 $\sigma$ ]  
KicOffset-rm: 2.139 arcsec [1.95 $\sigma$ ]  
OotOffset-st: 3/4/2/2 [11]  
KicOffset-st: 3/4/2/2 [11]  
DiffImageQuality-fgm: 0.18 [2/11]  
DiffImageOverlap-fno: 0.00 [0/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 00:45:58 Z

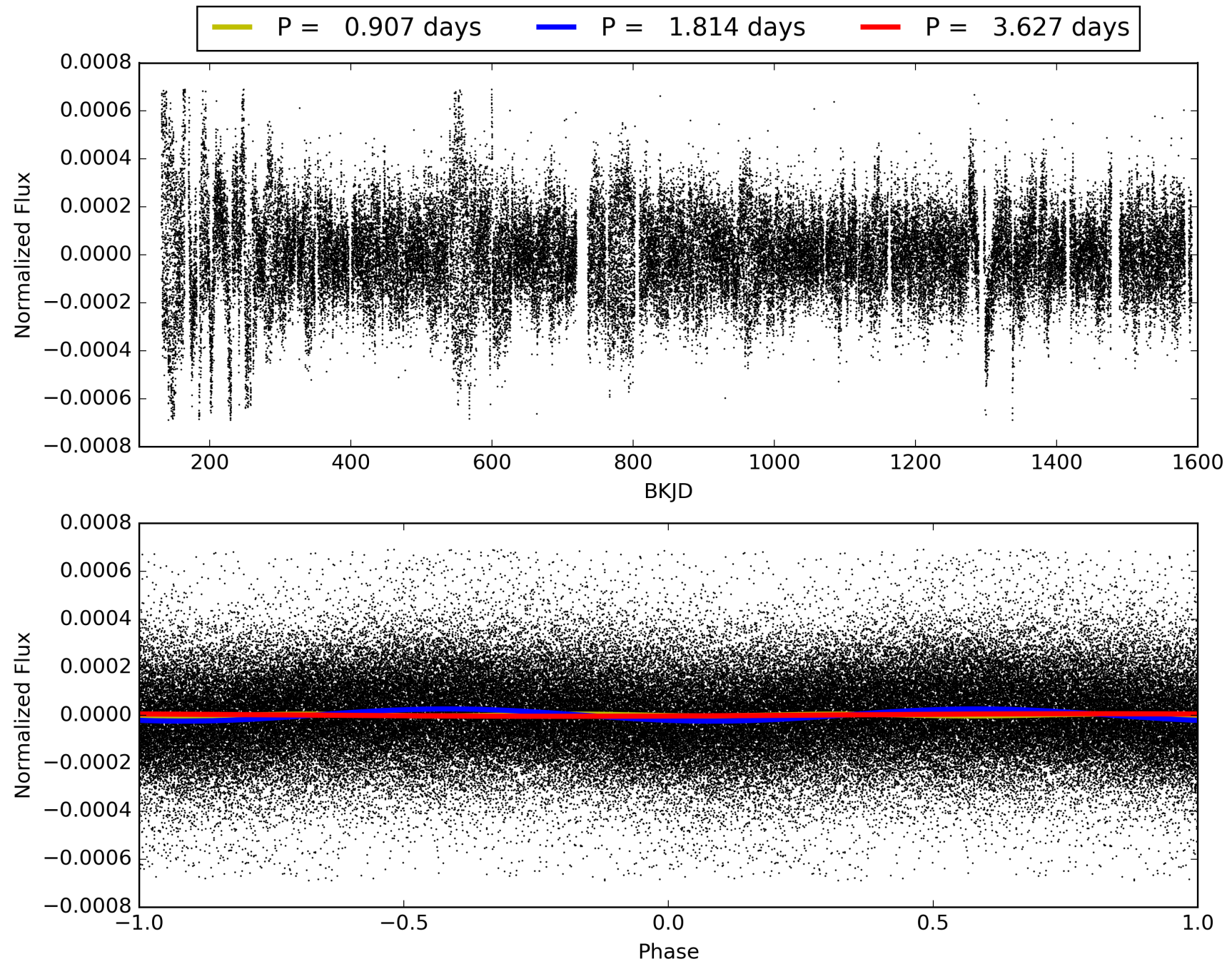
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 001722916-01, PDC Light Curves





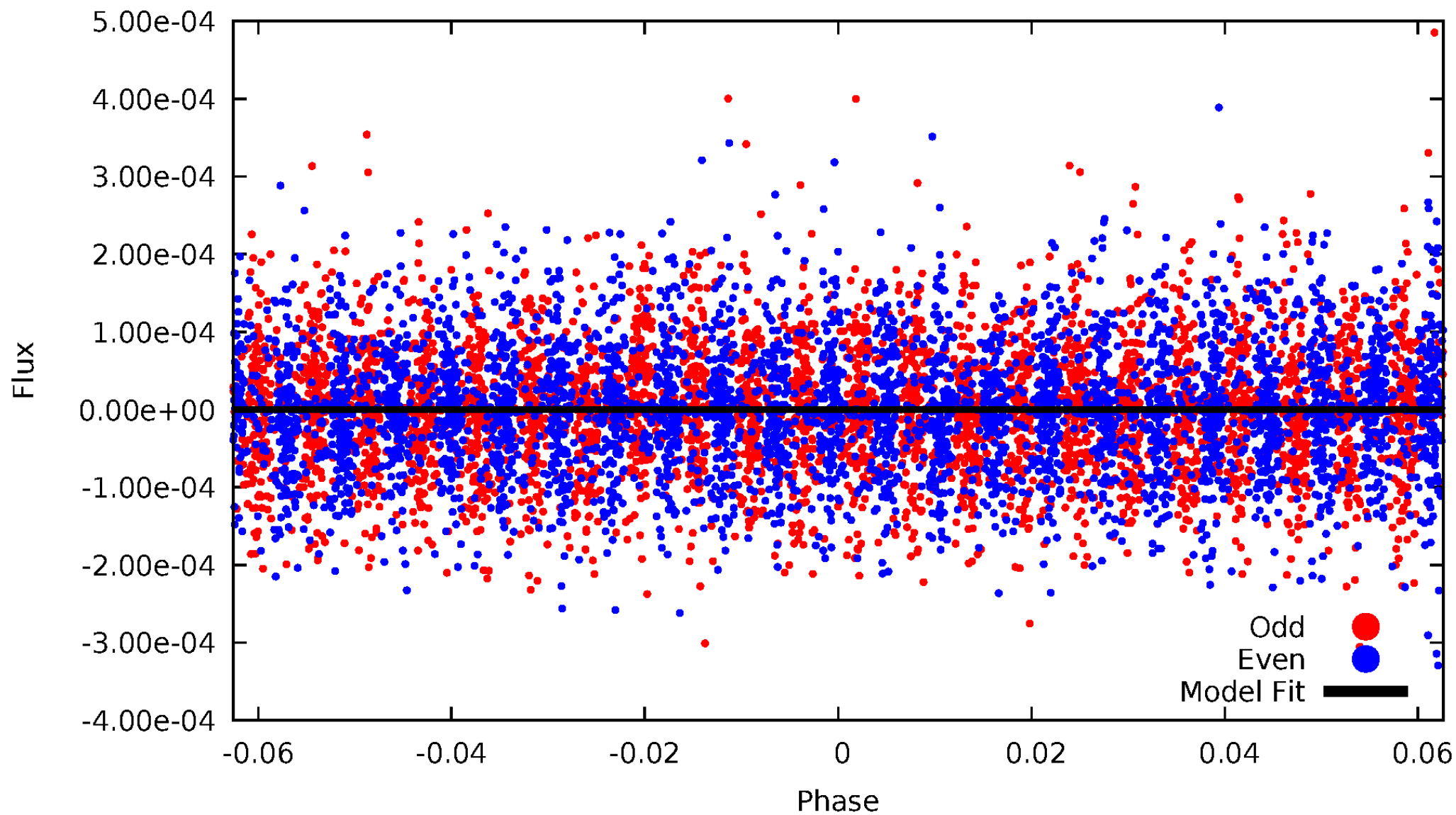
TCE 001722916-01





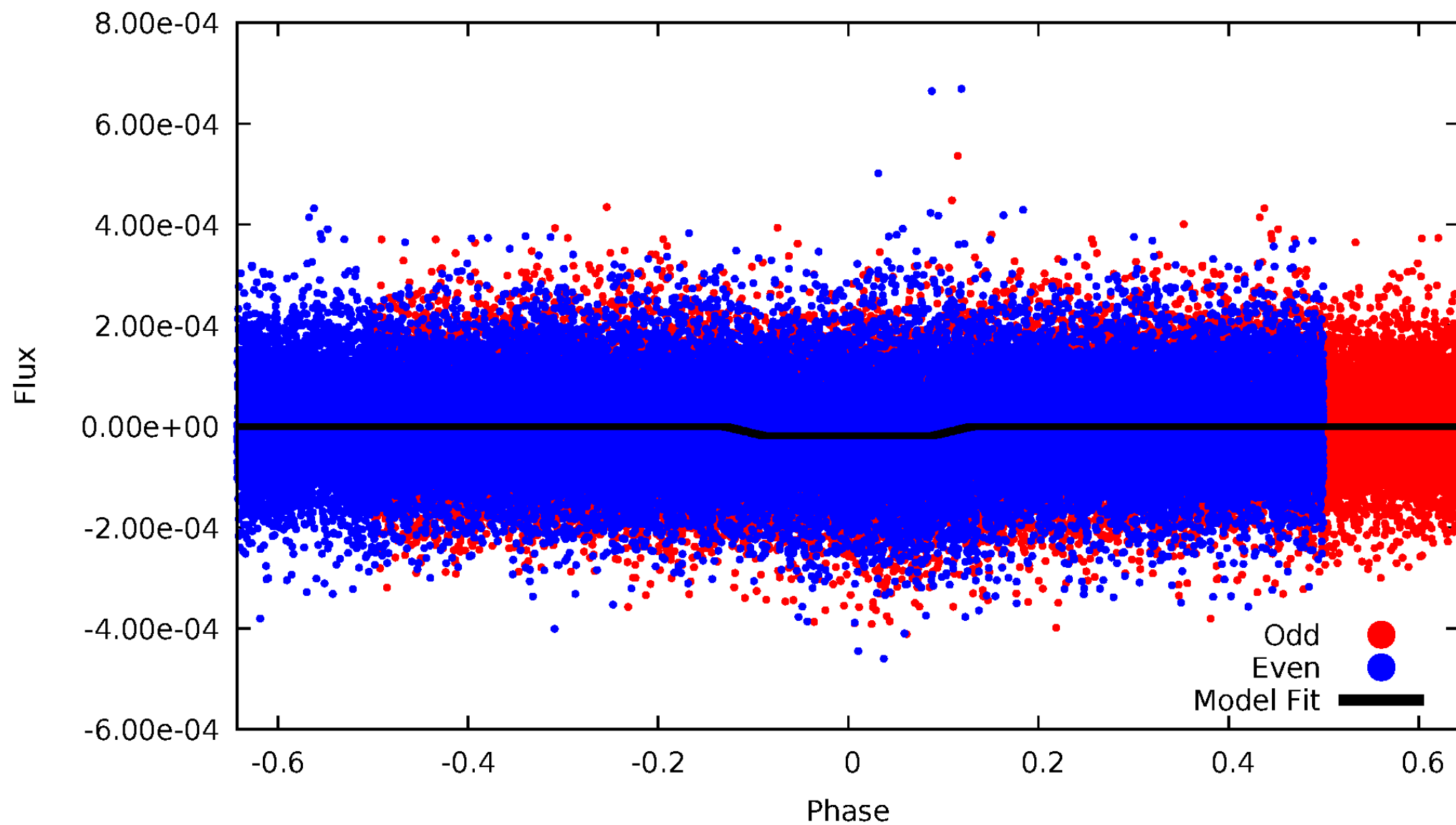
# DV Odd/Even

TCE 001722916-01

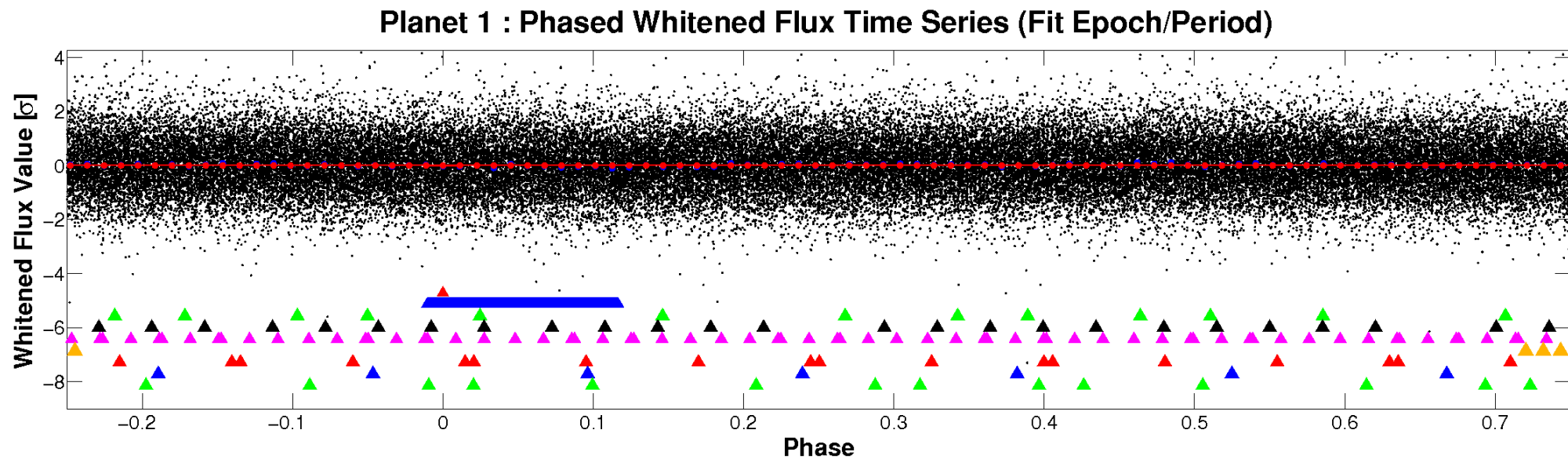
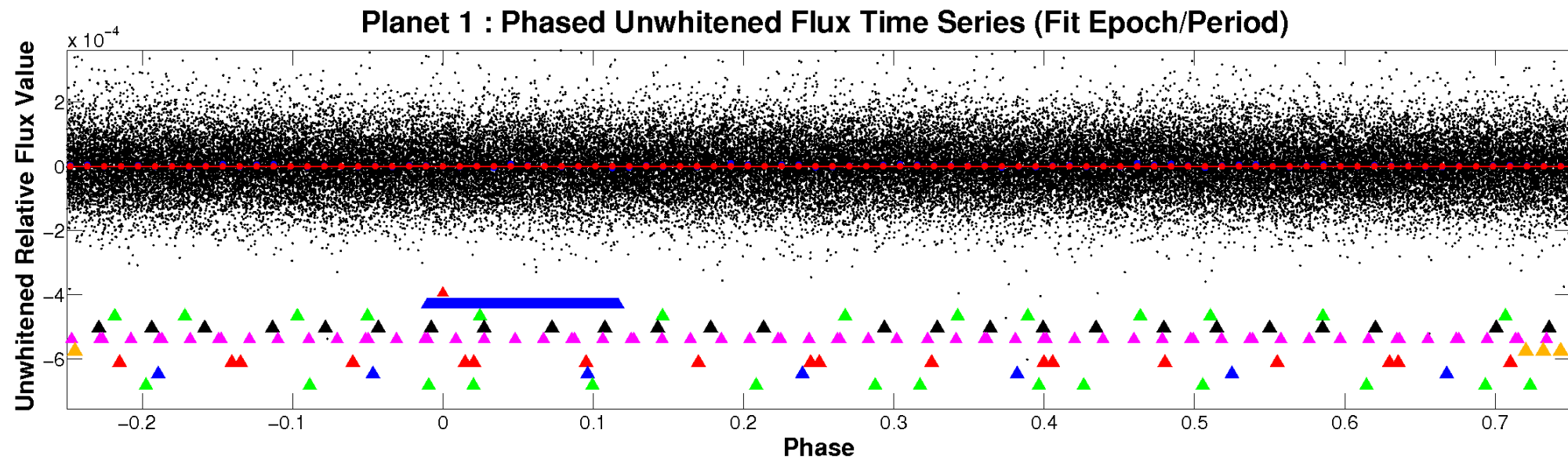


# ALT Odd/Even

TCE 001722916-01



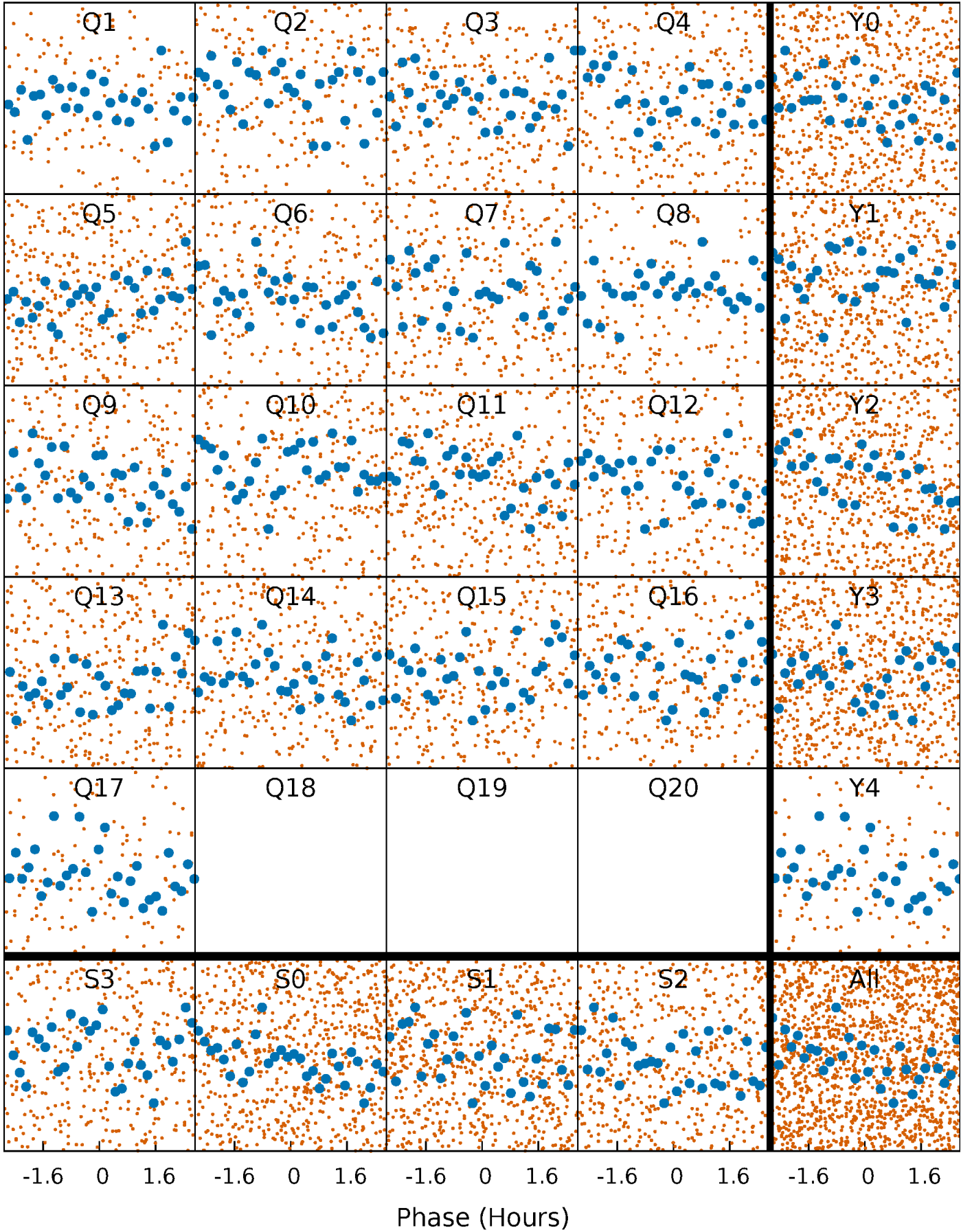
# Non-Whitened Vs. Whitened Light Curve





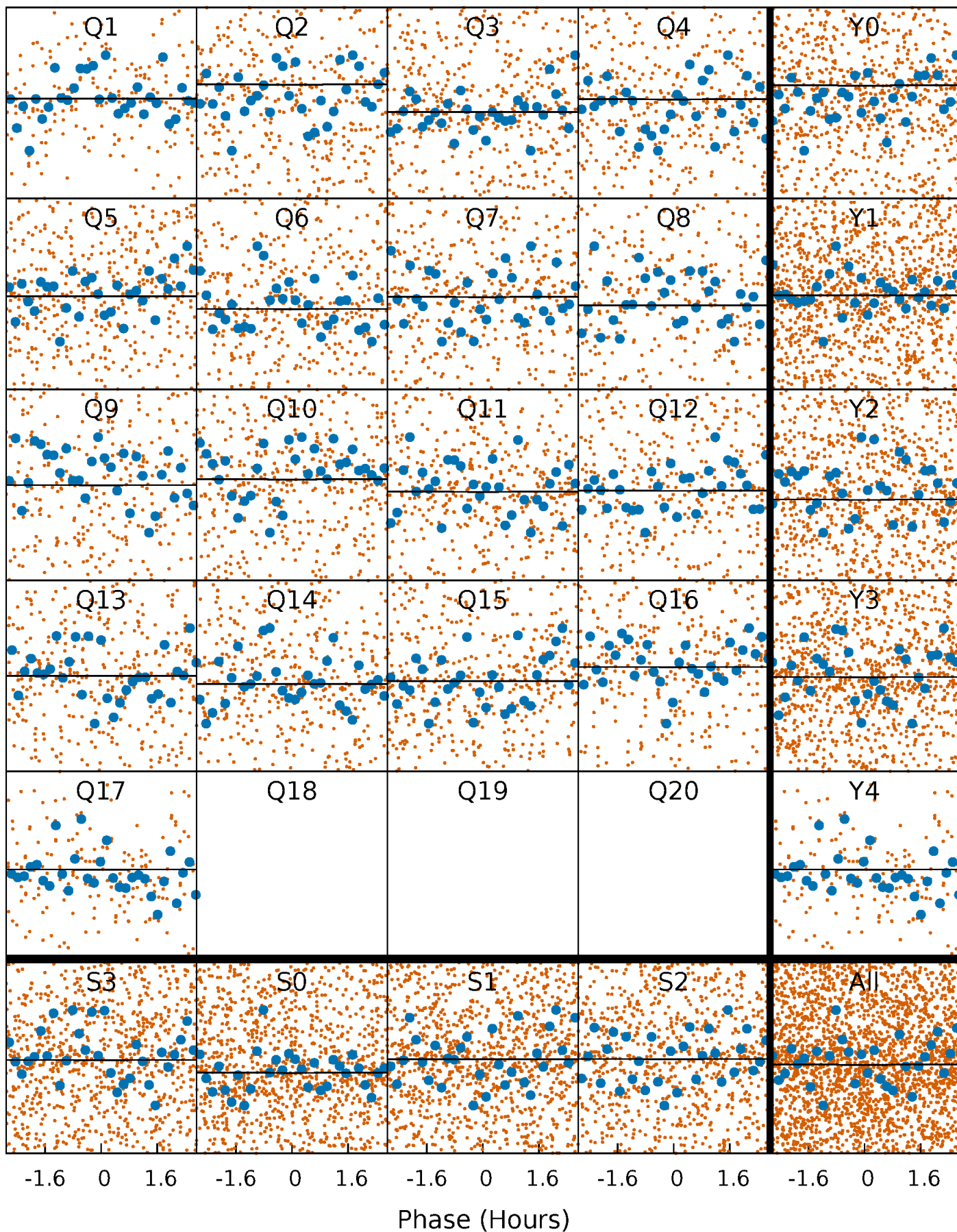
# PDC Quarter-Phased Transit Curves

TCE 001722916-01   P= 1.813535 Days    $T_0=132.513520$  (BKJD)



# DV Quarter-Phased Transit Curves

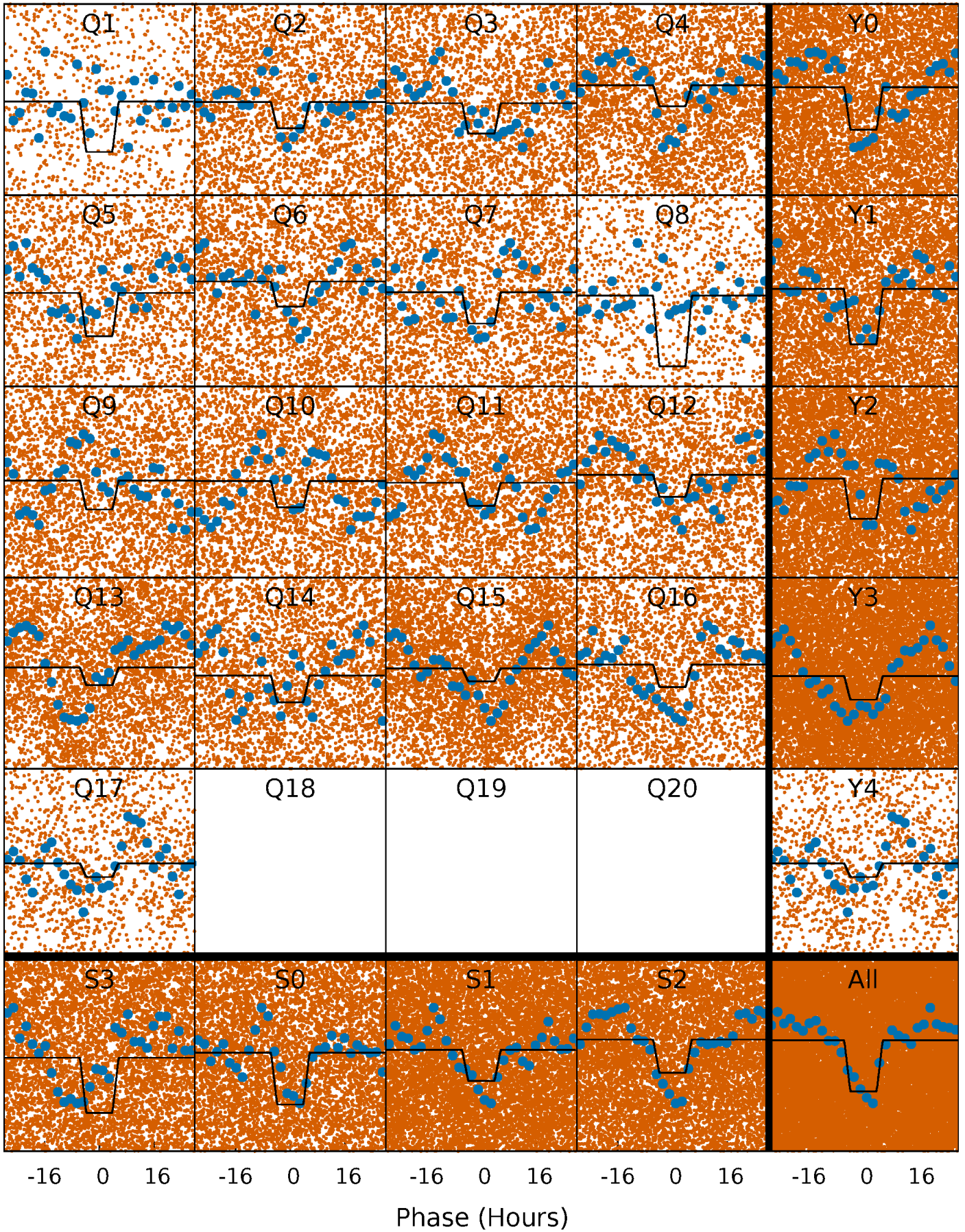
TCE 001722916-01 P= 1.813535 Days  $T_0=132.513520$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

TCE 001722916-01 P= 1.813793 Days  $T_0=132.543994$  (BKJD)

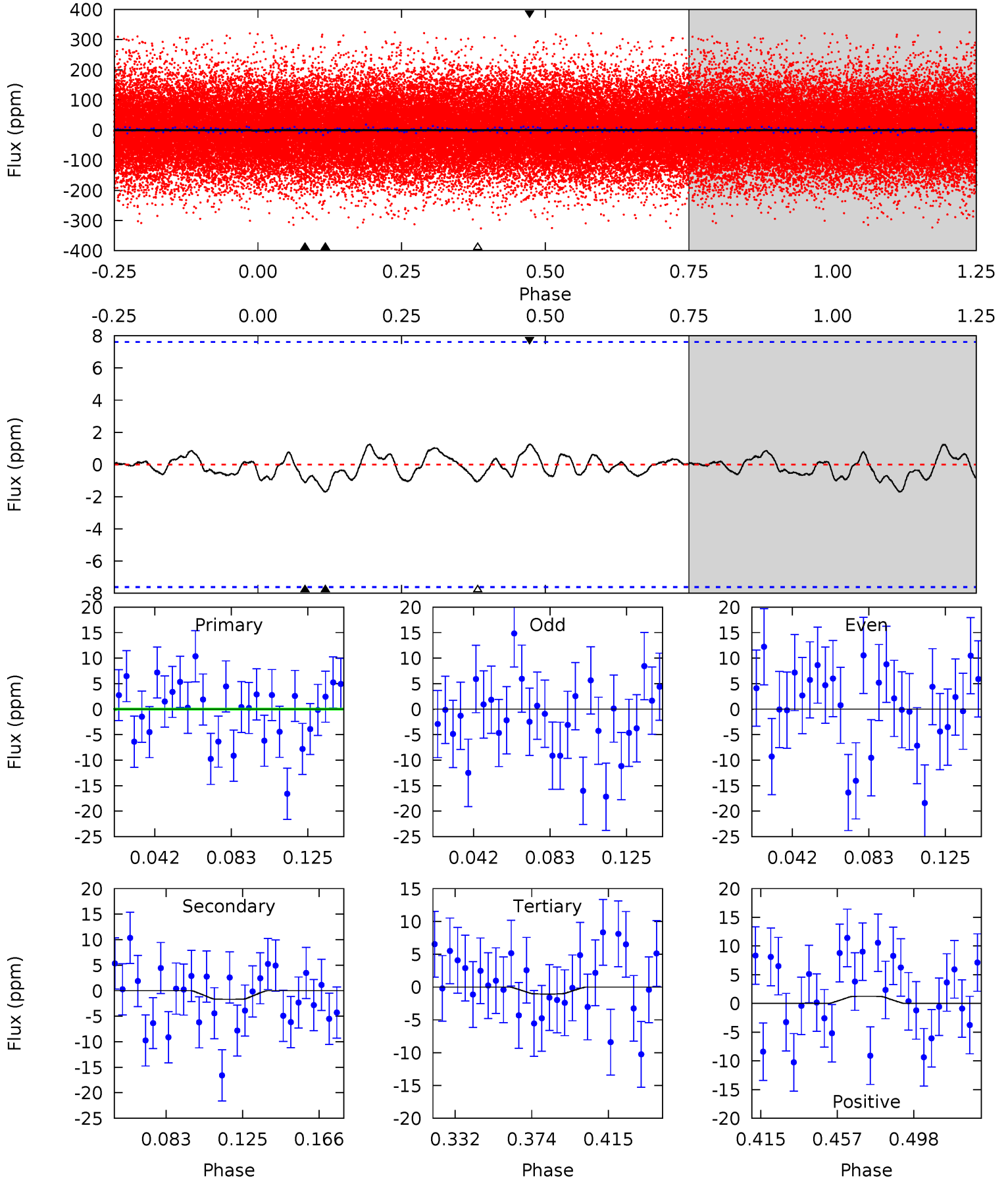




# DV Model-Shift Uniqueness Test

001722916-01, P = 1.813535 Days, E = 130.699985 Days

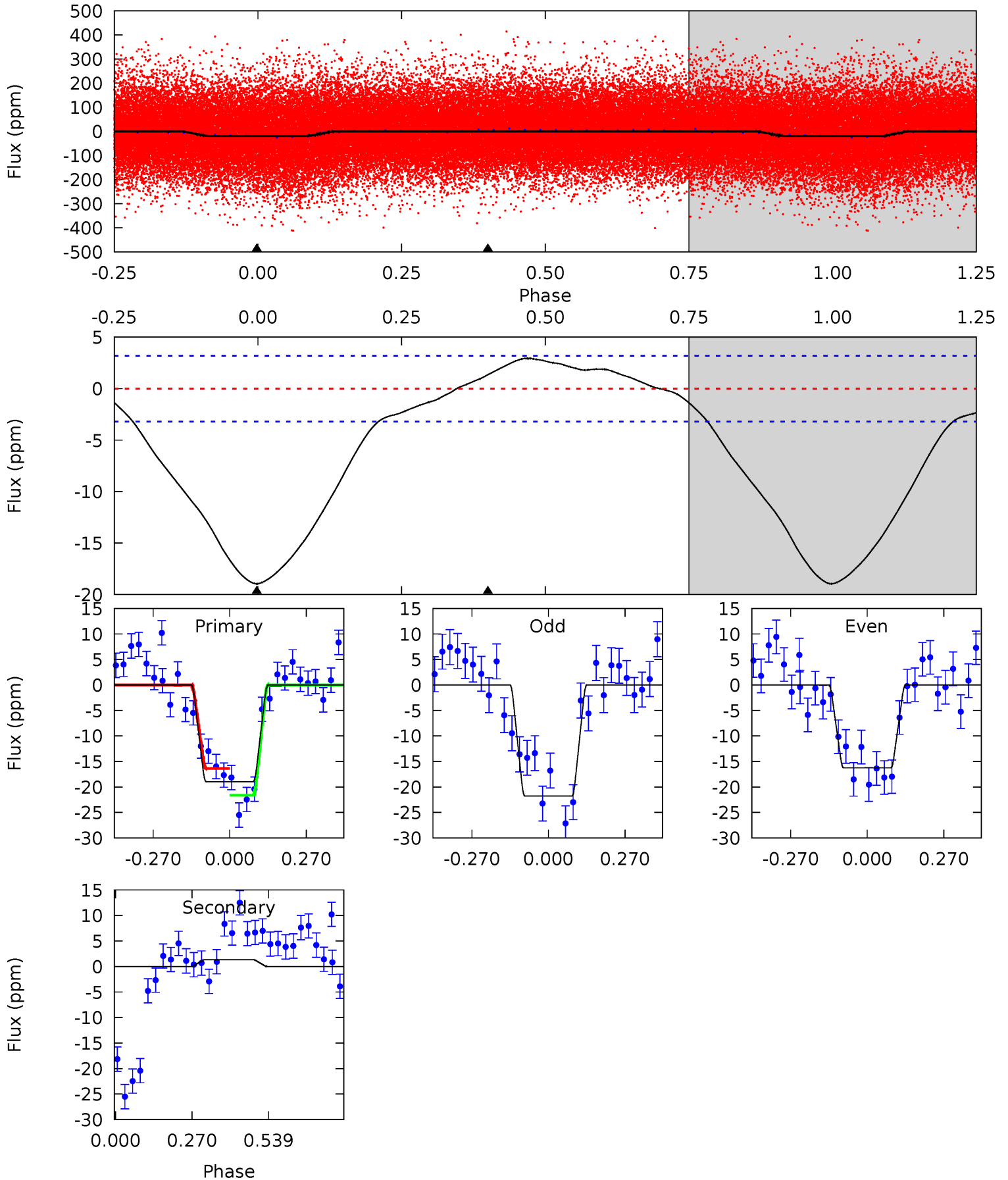
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0.70	1.06	0.66	0.78	4.75	2.04	0.33	0.04	-0.08	0.40	0.28	0.05	0.08	0.42	0.62



# Alt Model-Shift Uniqueness Test

001722916-01, P = 1.813793 Days, E = 130.730201 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
25.8	-1.84	0	0	4.35	1.10	0.85	25.8	25.8	-1.84	-1.84	3.75	1.24	0.13	3.40



### Stellar Parameters For KIC 001722916

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6812^{+71}_{-91}$	$4.154^{+0.115}_{-0.115}$	$-0.180^{+0.150}_{-0.200}$	$1.604^{+0.262}_{-0.236}$	$1.347^{+0.088}_{-0.118}$	$0.460^{+0.237}_{-0.156}$
	+1%/-1%	+3%/-3%	+83%/-111%	+16%/-15%	+7%/-9%	+51%/-34%
Source	SPE68	SPE68	SPE68	DSEP		

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

### Secondary Eclipse Parameters for KIC 001722916-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-2 \pm 2$	$1.47^{+1.82}_{-1.07}$	$2965^{+133}_{-118}$	$-2206^{+7026}_{-894}$	$0.280^{+4.353}_{-0.278}$
Alt.	$1 \pm 1$	$1.76^{+1.76}_{-1.15}$	$2968^{+127}_{-134}$	$-3321^{+205}_{-1019}$	$-0.204^{+0.163}_{-1.882}$

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



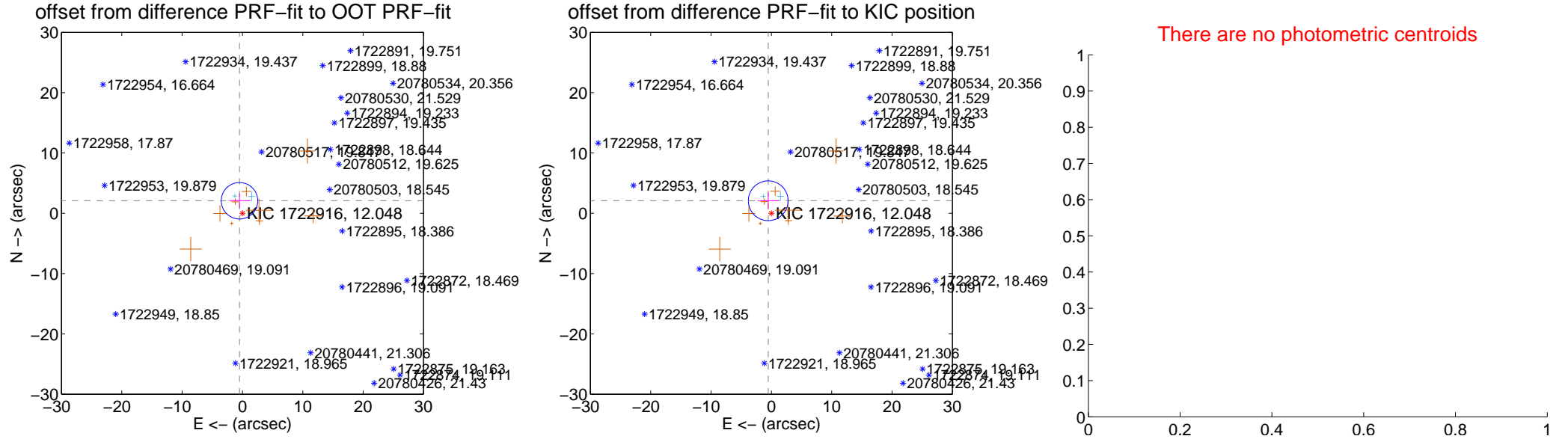
## DV Centroid Data

Supplemental centroid analysis for 001722916-01. Kepler magnitude: 12.05. Transit SNR 0.05

There are 2 quarters with good PRF difference image offsets

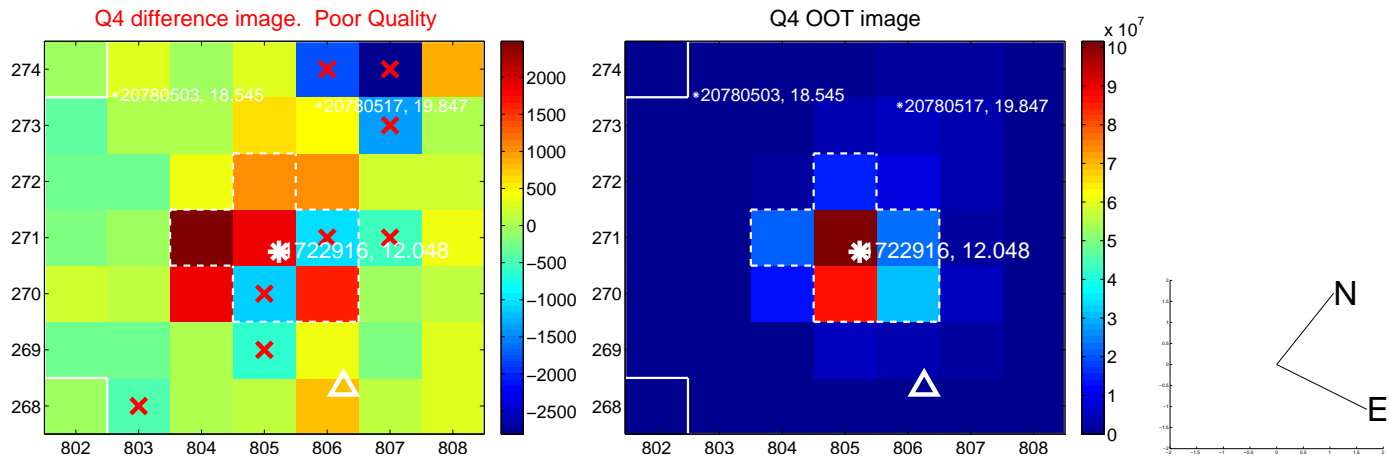
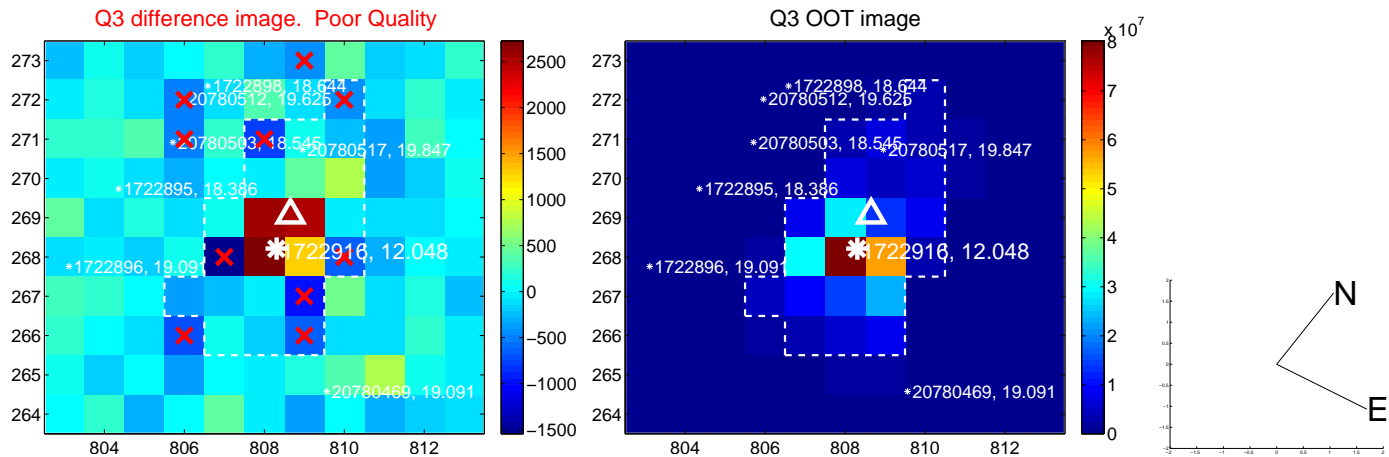
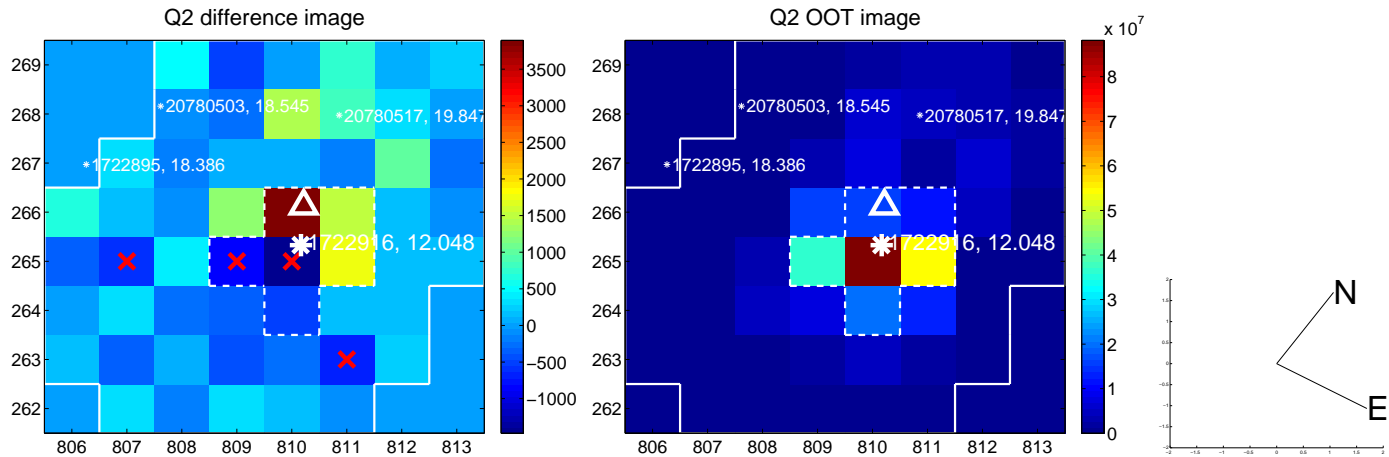
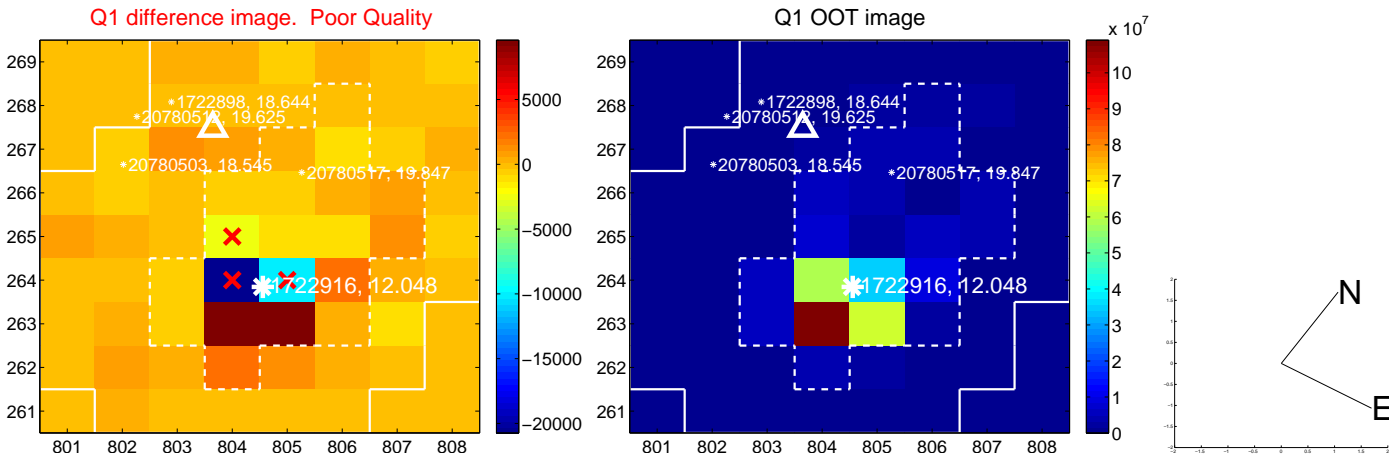
The direct PRF centroid is offset from the target star catalog position by about 0.00 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.131 \pm 1.008$	2.12	$0.490 \pm 1.699$	$2.074 \pm 1.209$
PRF-fit source offset from KIC position	$2.139 \pm 1.098$	1.95	$0.521 \pm 1.790$	$2.075 \pm 1.347$
photometric centroid source offset	—	—	—	—

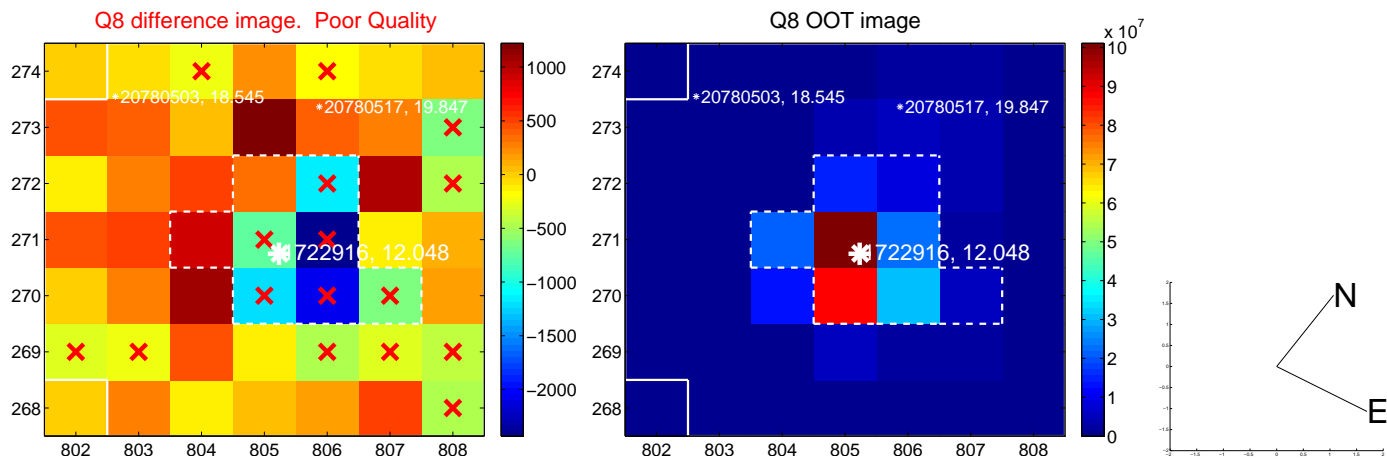
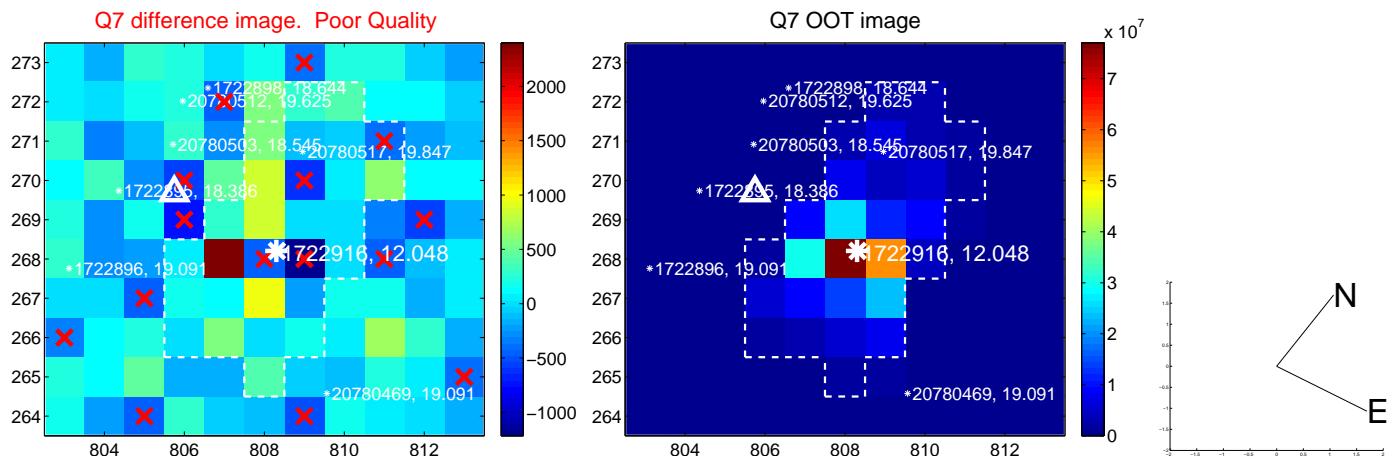
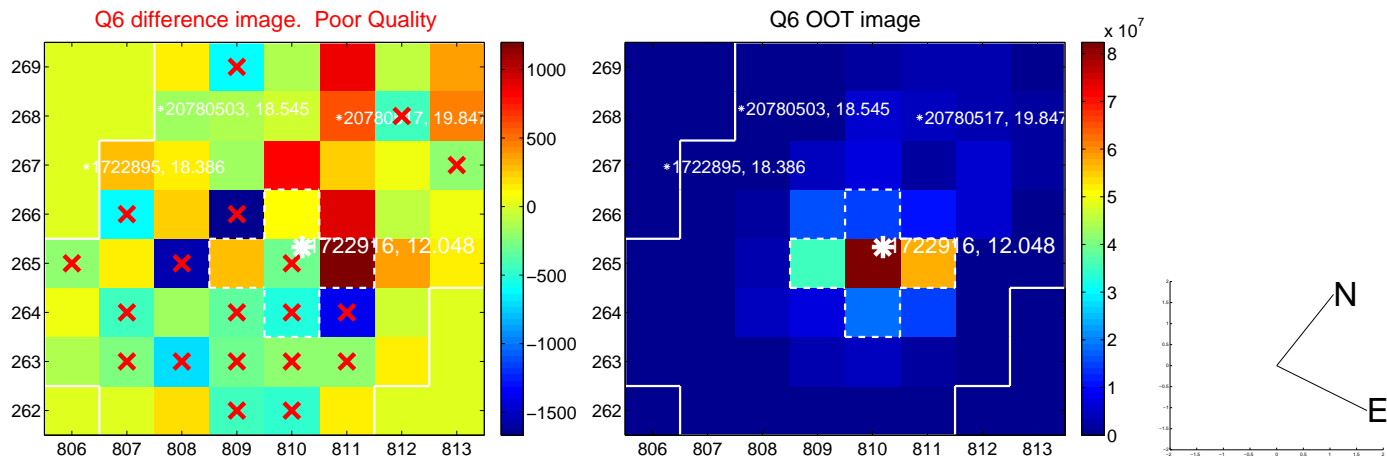
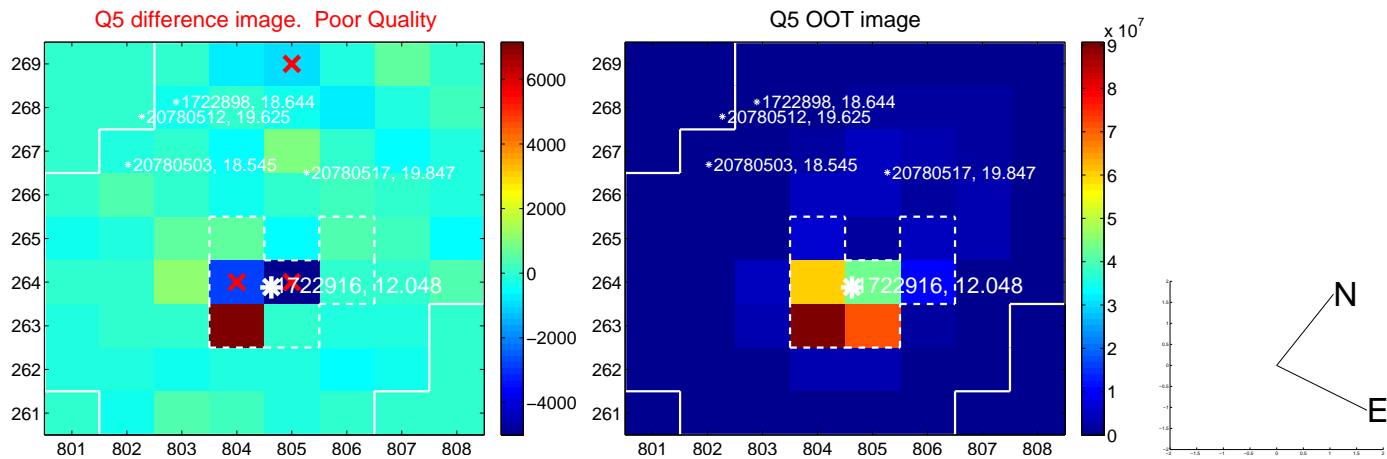


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

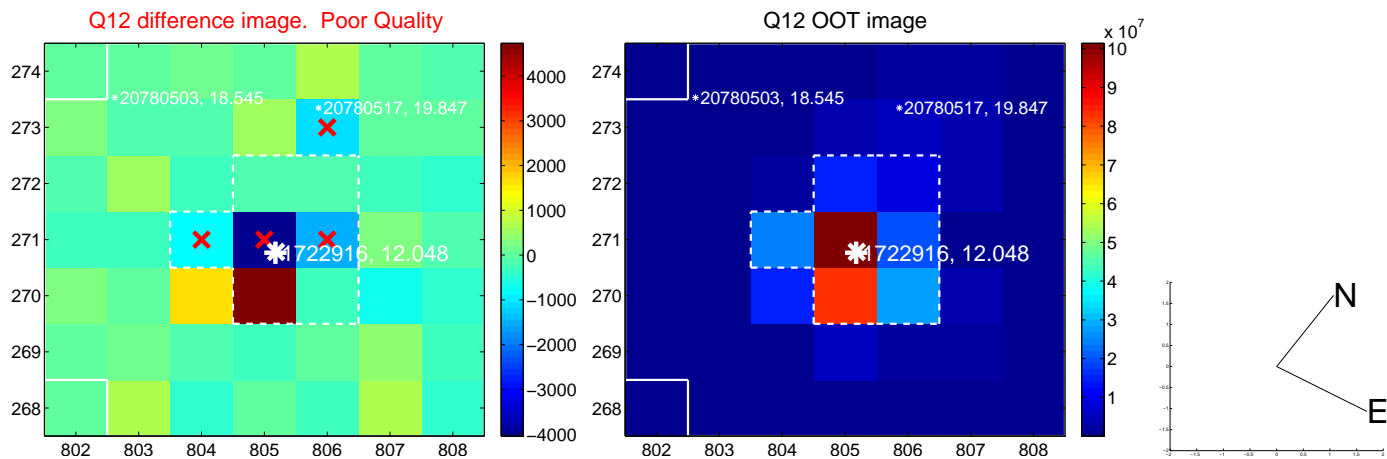
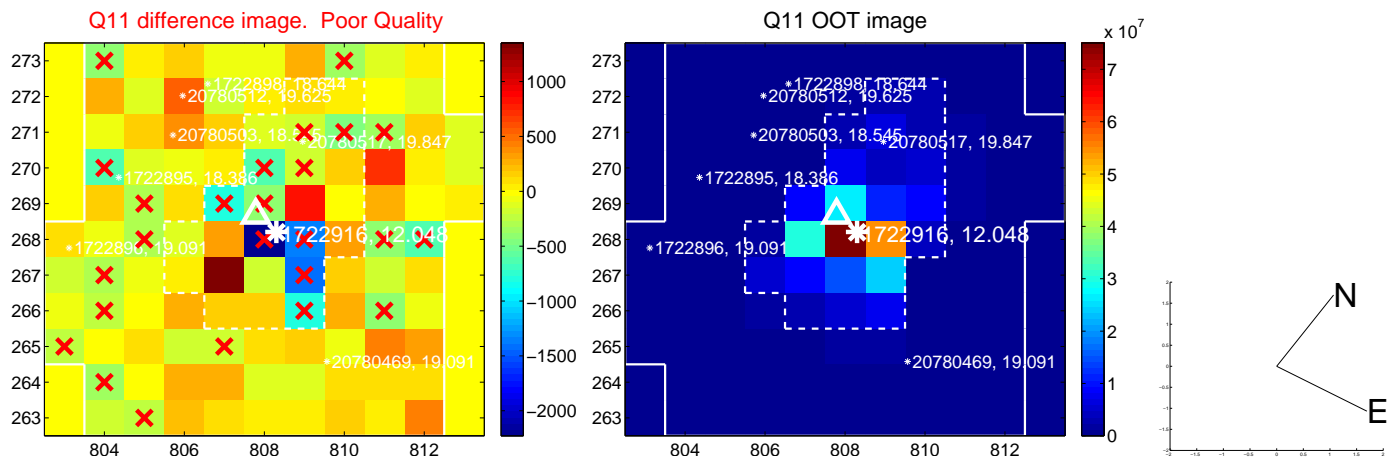
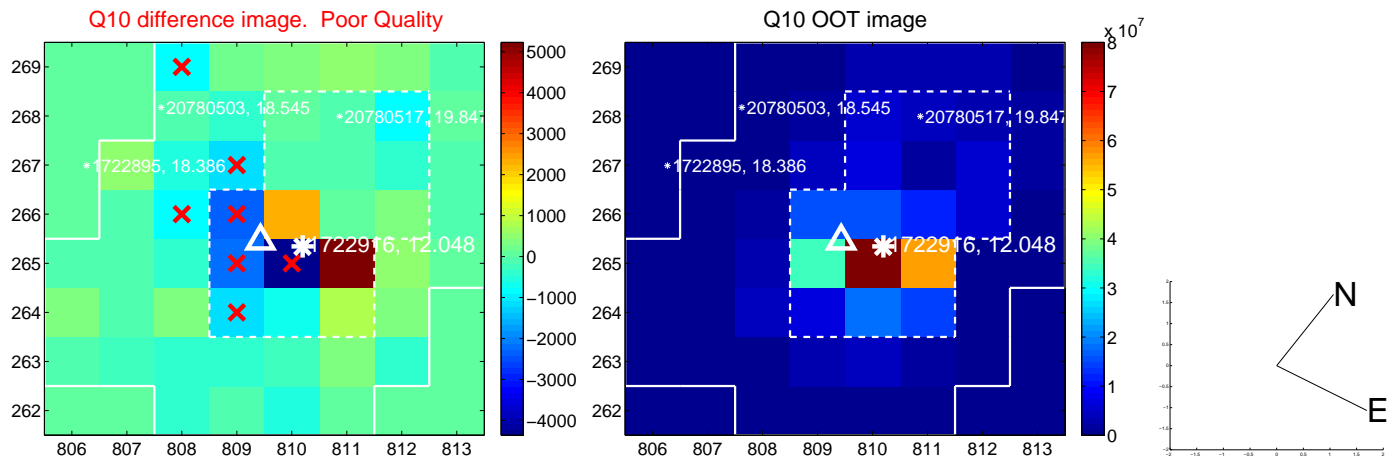
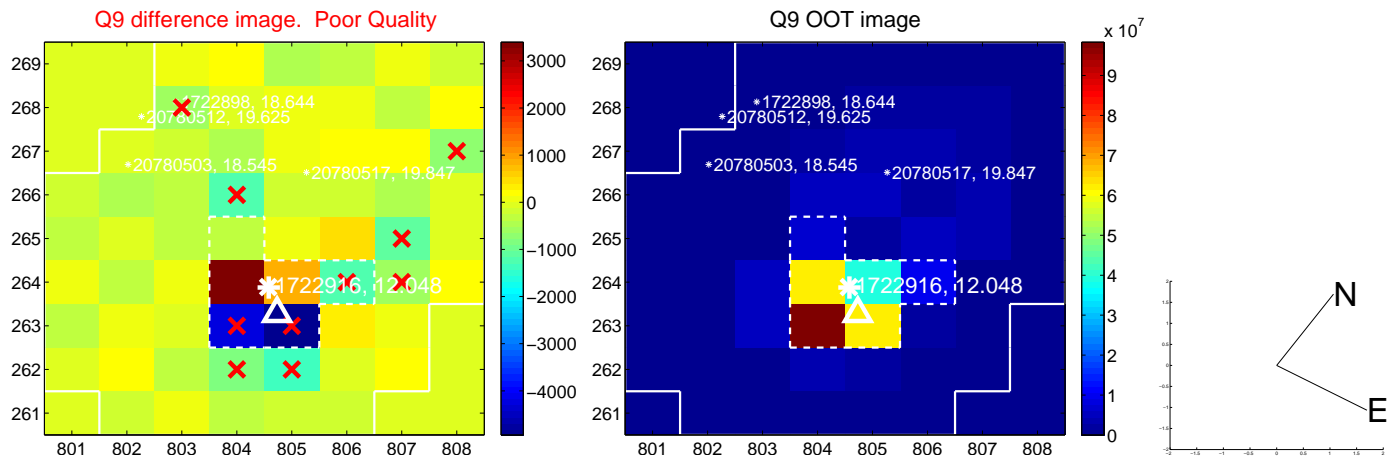
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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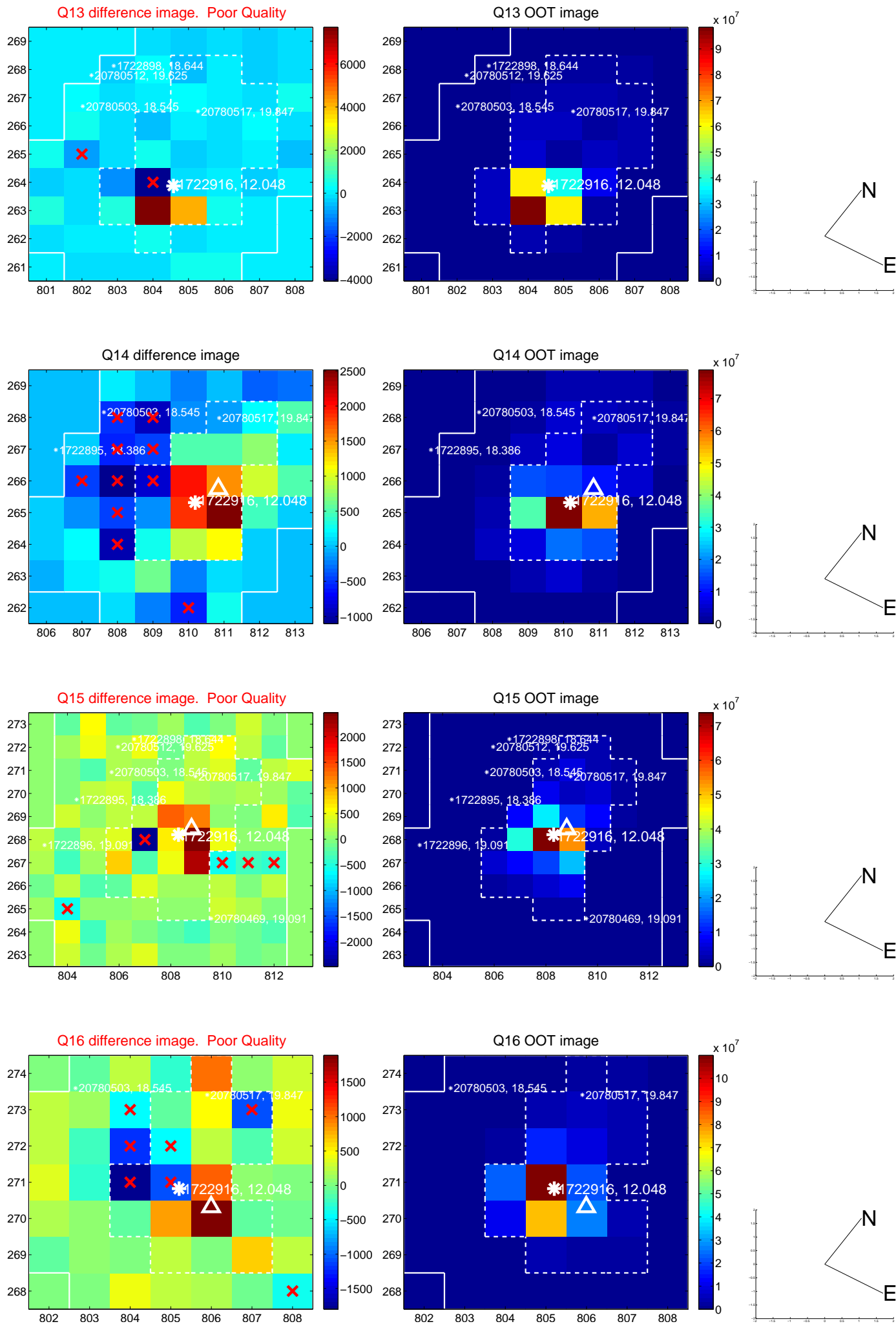


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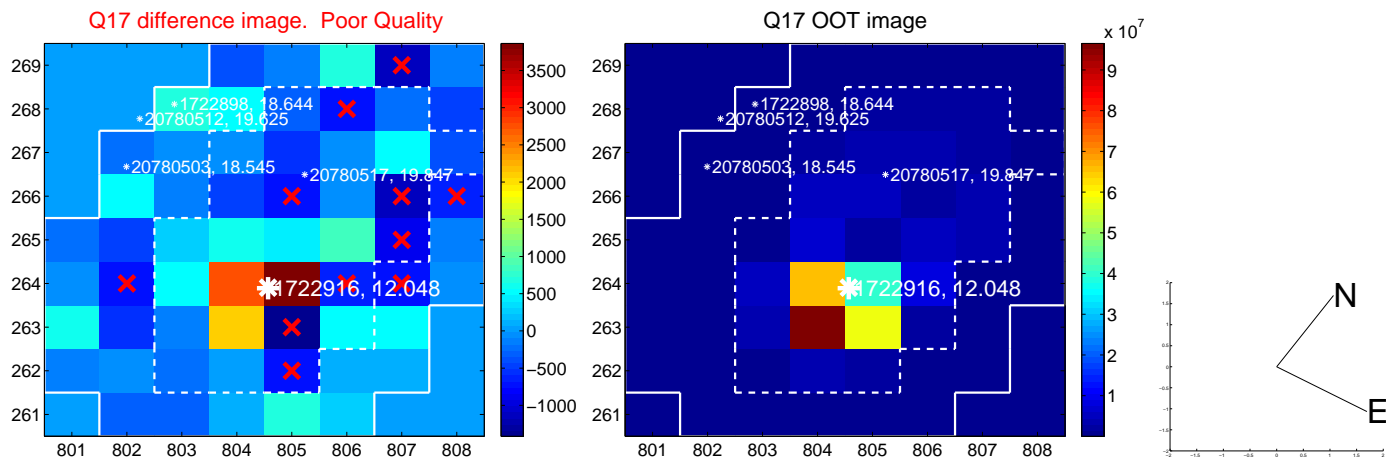




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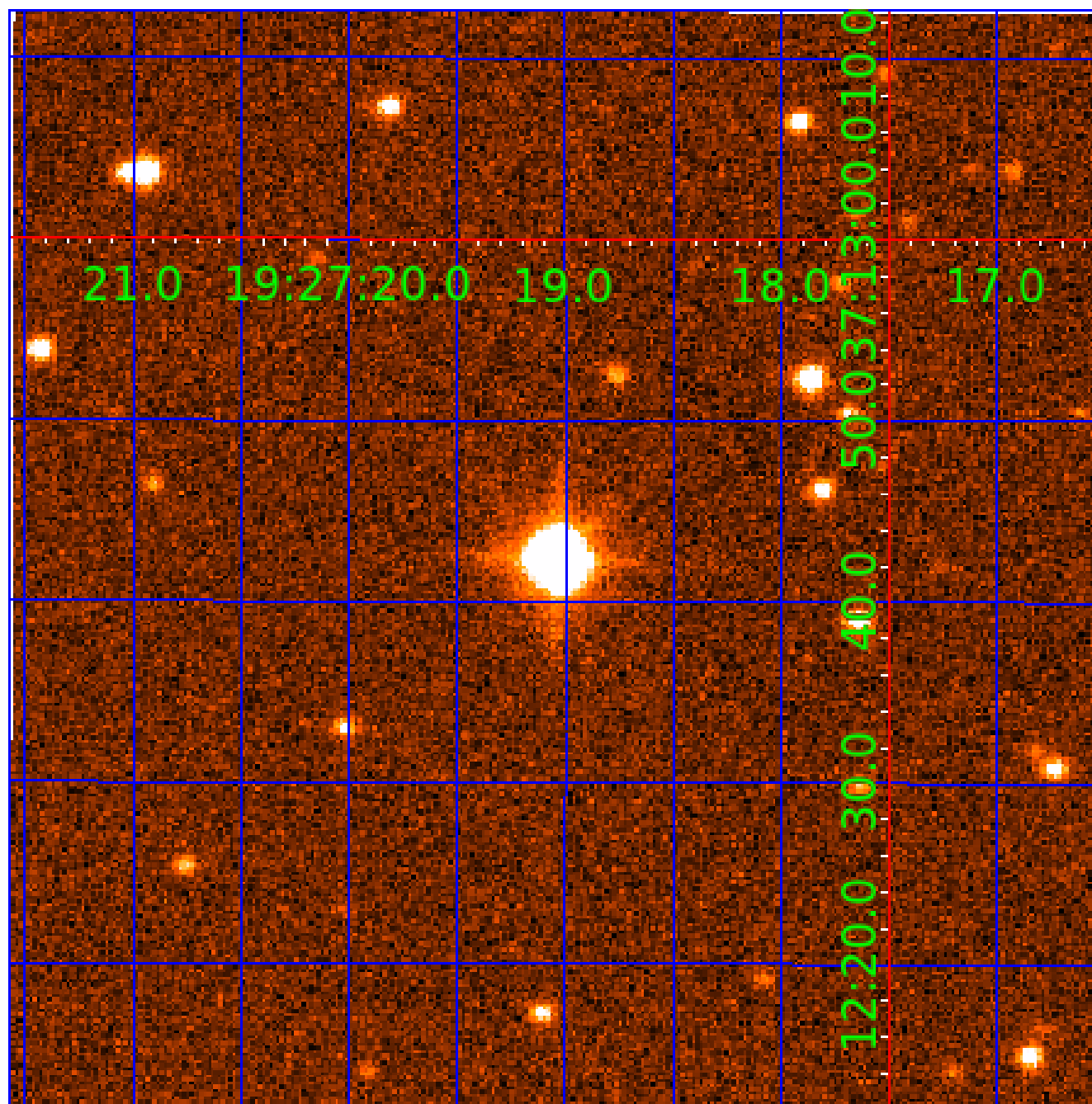
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folded centroid time series figure for this object.

UKIRT Image

Declination



# KIC 001722916

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001722916-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
001722916-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
001722916-06	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS—HALO_GHOST
001722916-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
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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.

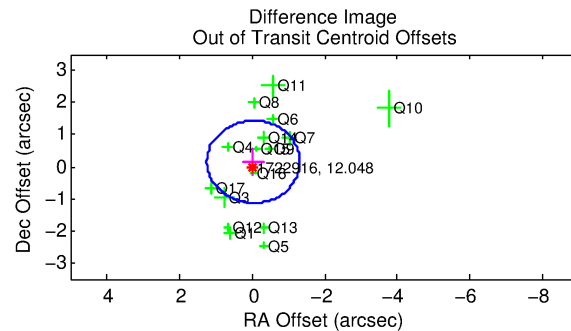
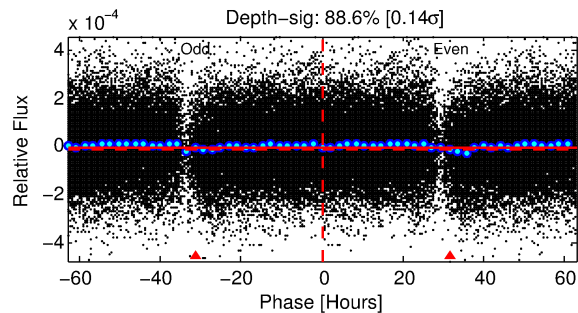
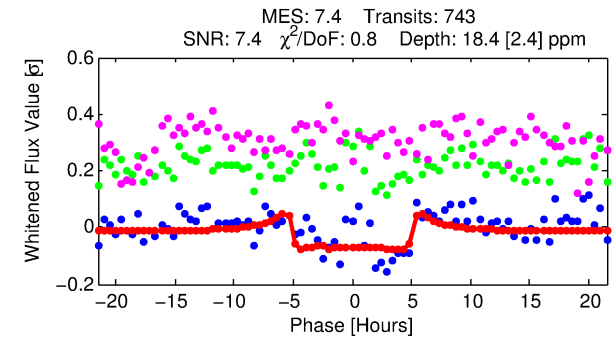
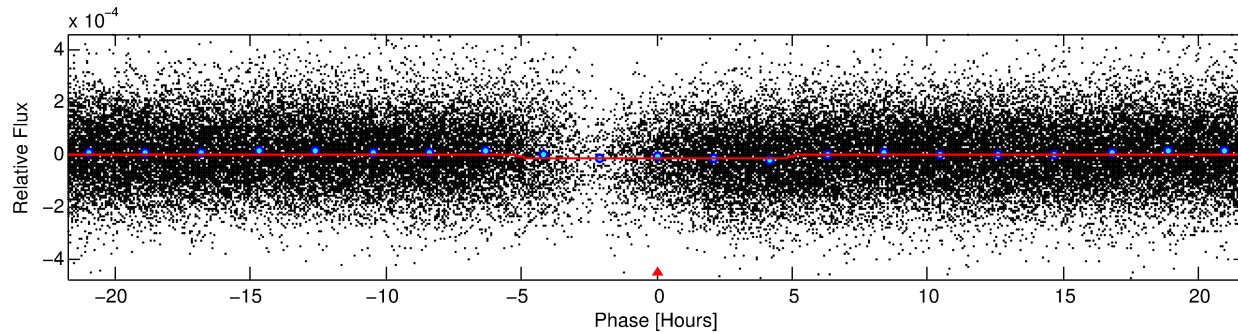
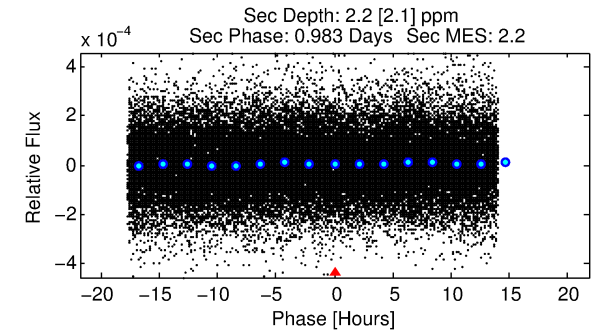
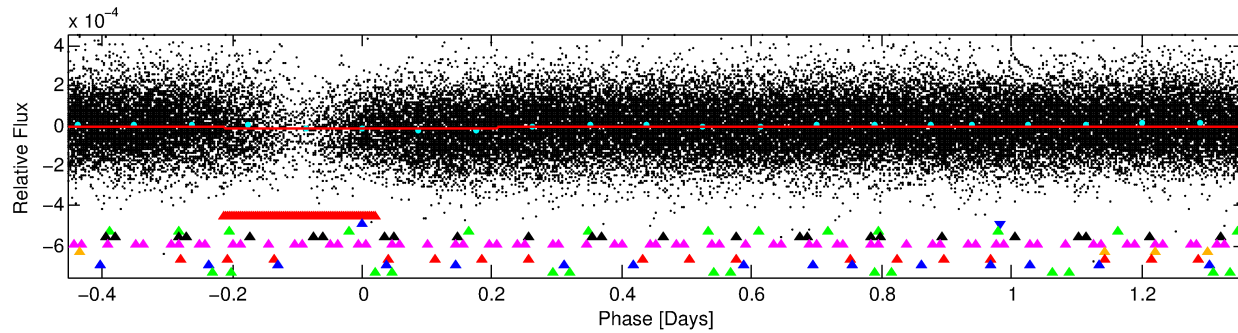
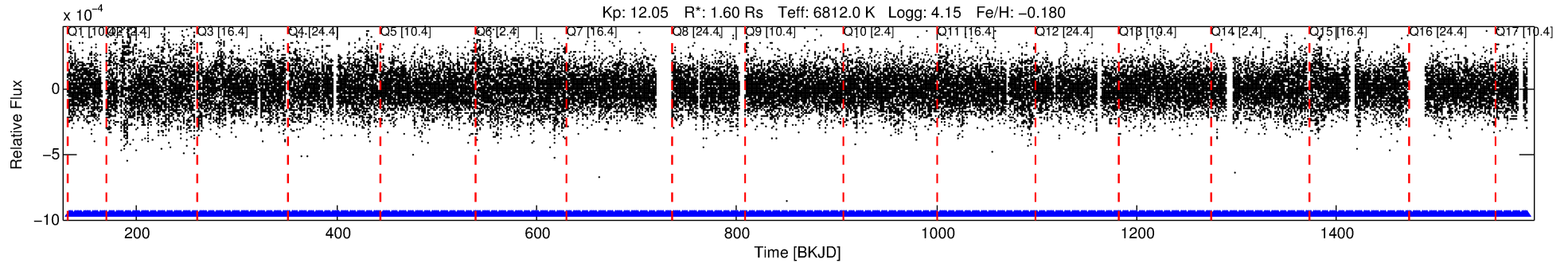
Ephemeris Match Information For 001722916-02

No Significant Match Found



# DV One-Page Summary

KIC: 1722916 Candidate: 2 of 9 Period: 1.814 d



## DV Fit Results:

Period = 1.81382 [0.00002] d  
Epoch = 132.4944 [0.0054] BKJD  
Rp/R\* = 0.0043 [0.0011]  
a/R\* = 1.22 [0.58]  
b = 0.76 [0.80]  
Seff = 4823.21 [1033.08]  
Teq = 2125 [114] K  
Rp = 0.75 [0.23] Re  
a = 0.0321 [0.0045] AU  
Ag = 2.22 [2.49] [0.49σ]  
Teffp = 4011 [1104] K [1.70σ]

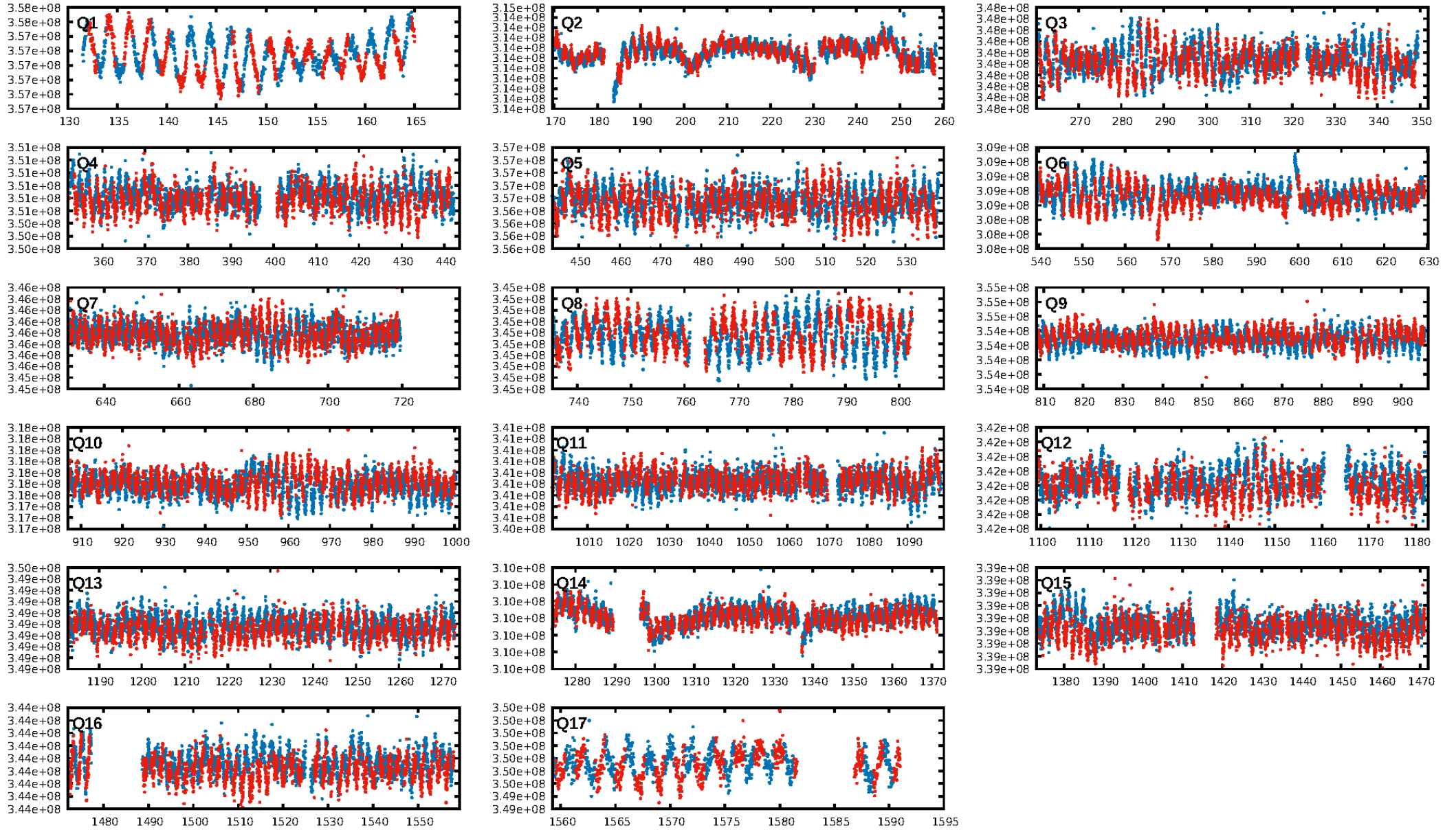
## DV Diagnostic Results:

ShortPeriod-sig: 0.1% [0.00σ]  
LongPeriod-sig: 100.0% [39.54σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 8.13e-09  
RollingBand-fgt: 1.00 [709/709]  
GhostDiagnostic-chr: 1.549  
Centroid-sig: 45.8%  
Centroid-so: 0.214 arcsec [0.29σ]  
OotOffset-rm: 0.155 arcsec [0.36σ]  
KicOffset-rm: 0.142 arcsec [0.34σ]  
OotOffset-st: 3/4/4/5 [16]  
KicOffset-st: 3/4/4/5 [16]  
DiffImageQuality-fgm: 0.81 [13/16]  
DiffImageOverlap-fno: 0.00 [0/17]

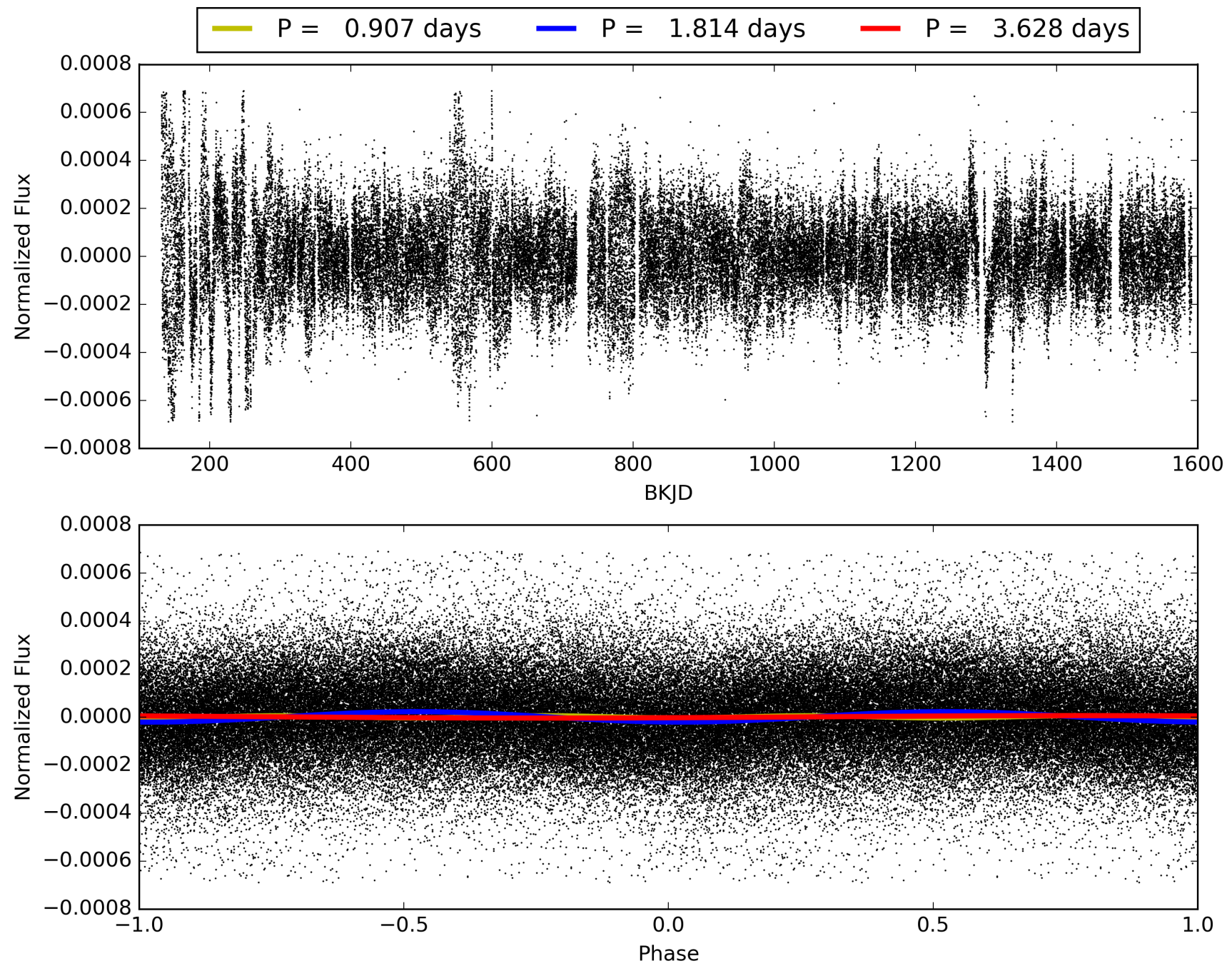
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 00:46:08 Z

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

# TCE 001722916-02, PDC Light Curves



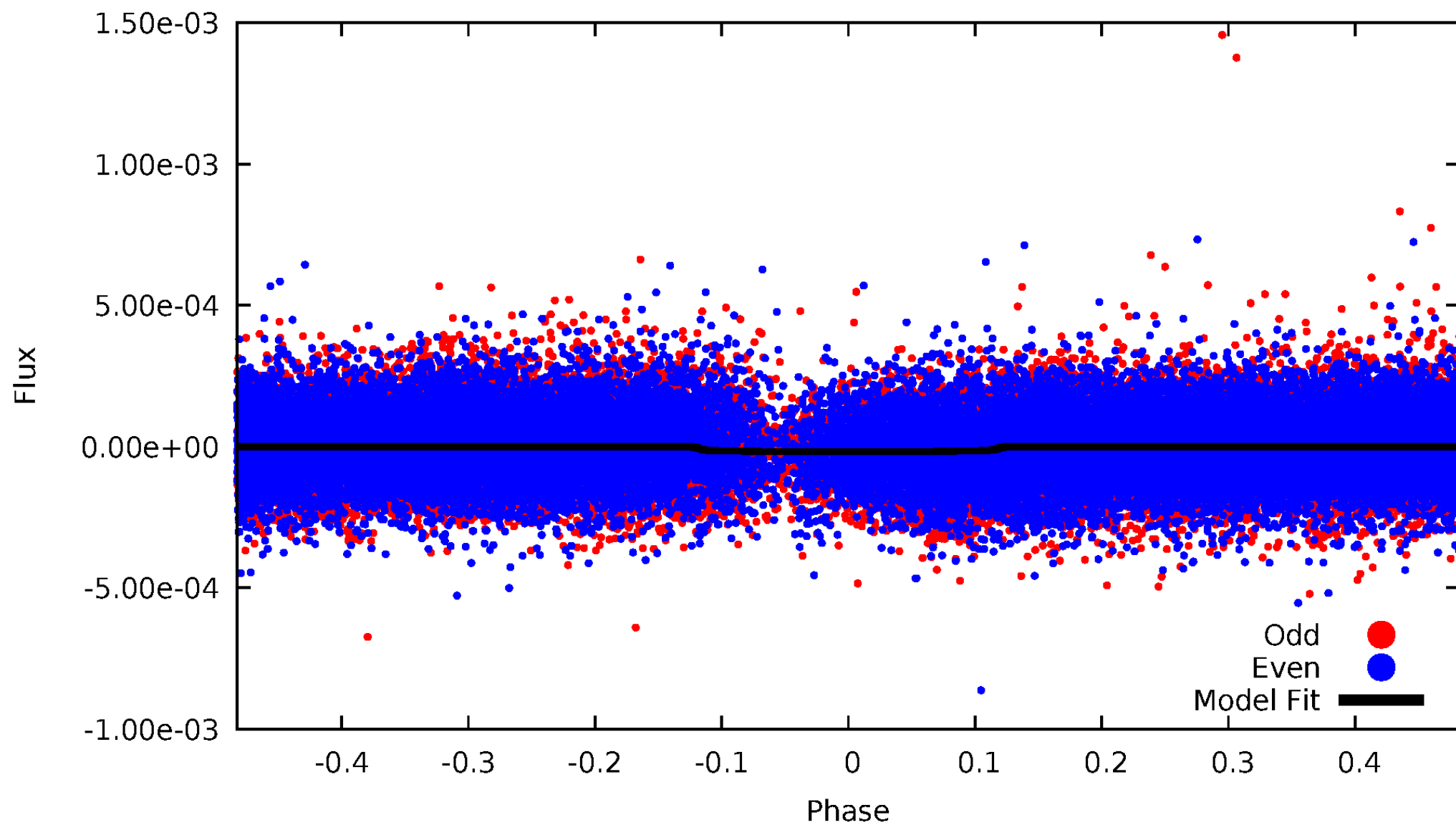
TCE 001722916-02





# DV Odd/Even

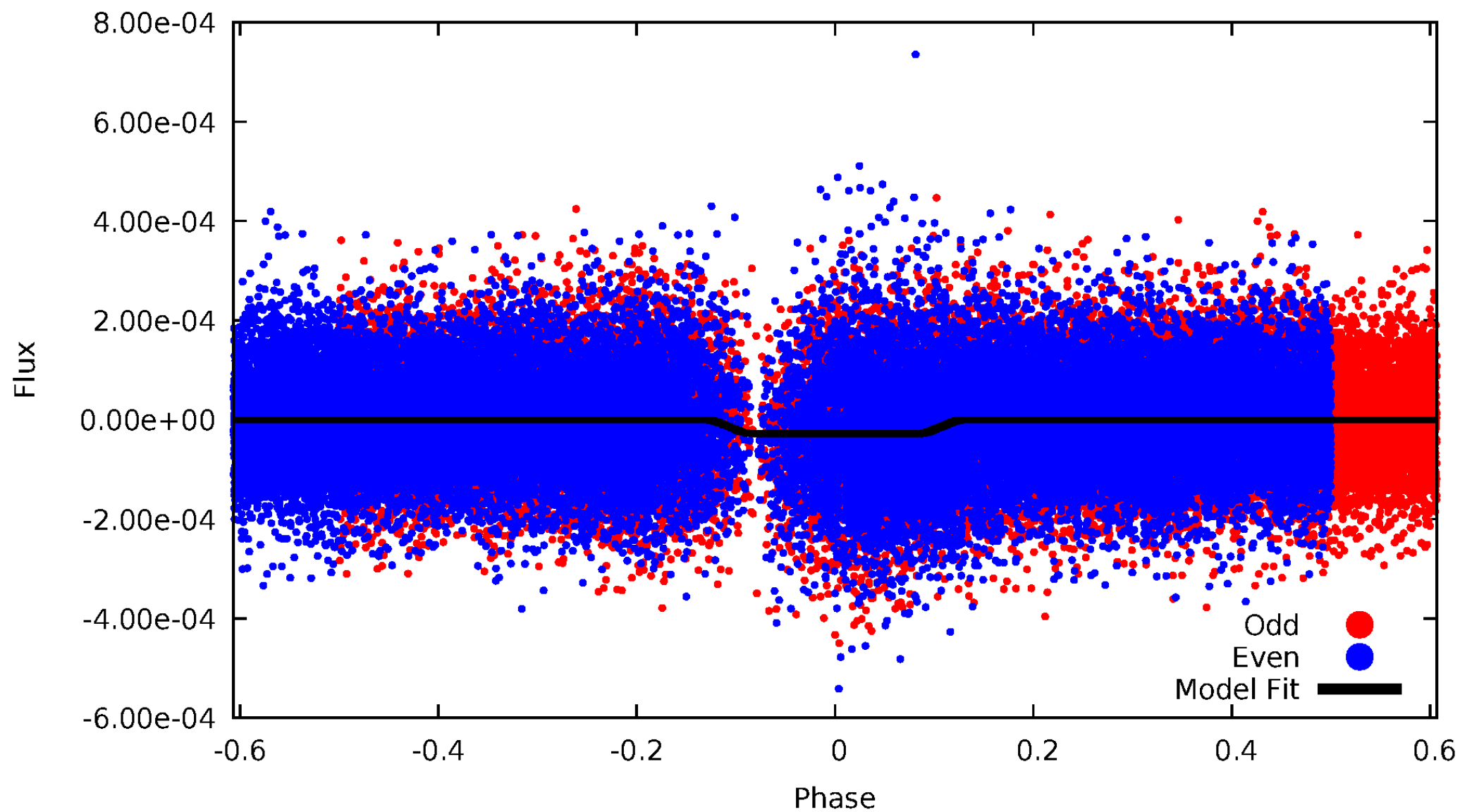
TCE 001722916-02





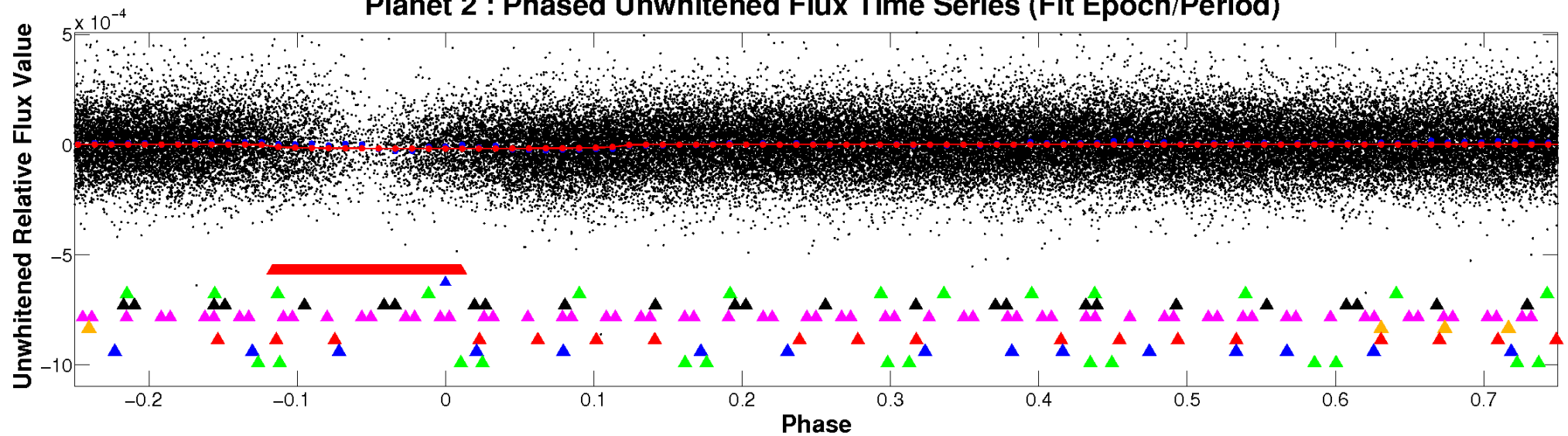
# ALT Odd/Even

TCE 001722916-02

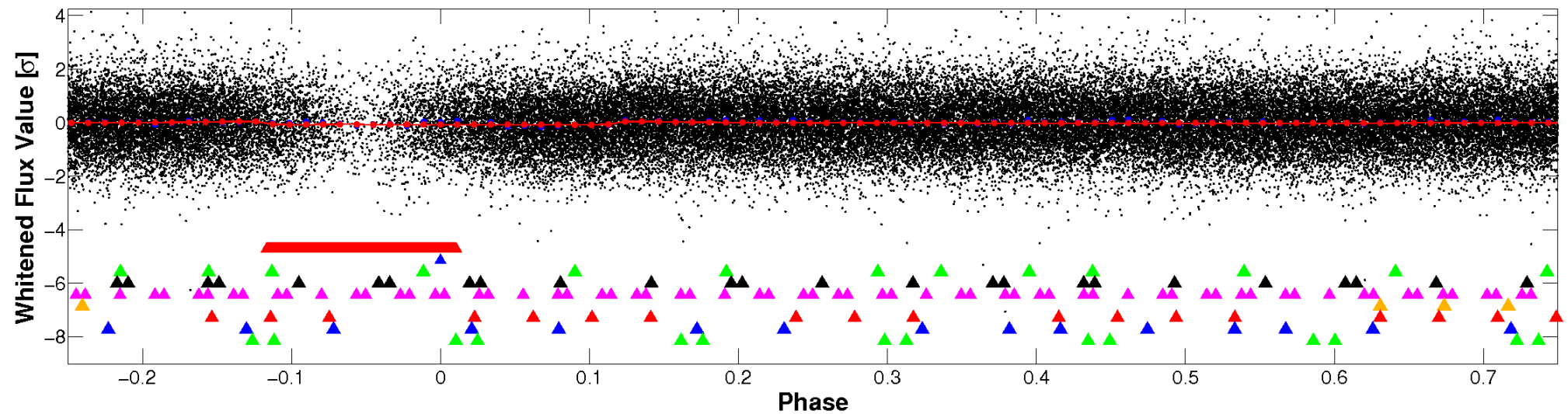


# Non-Whitened Vs. Whitened Light Curve

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

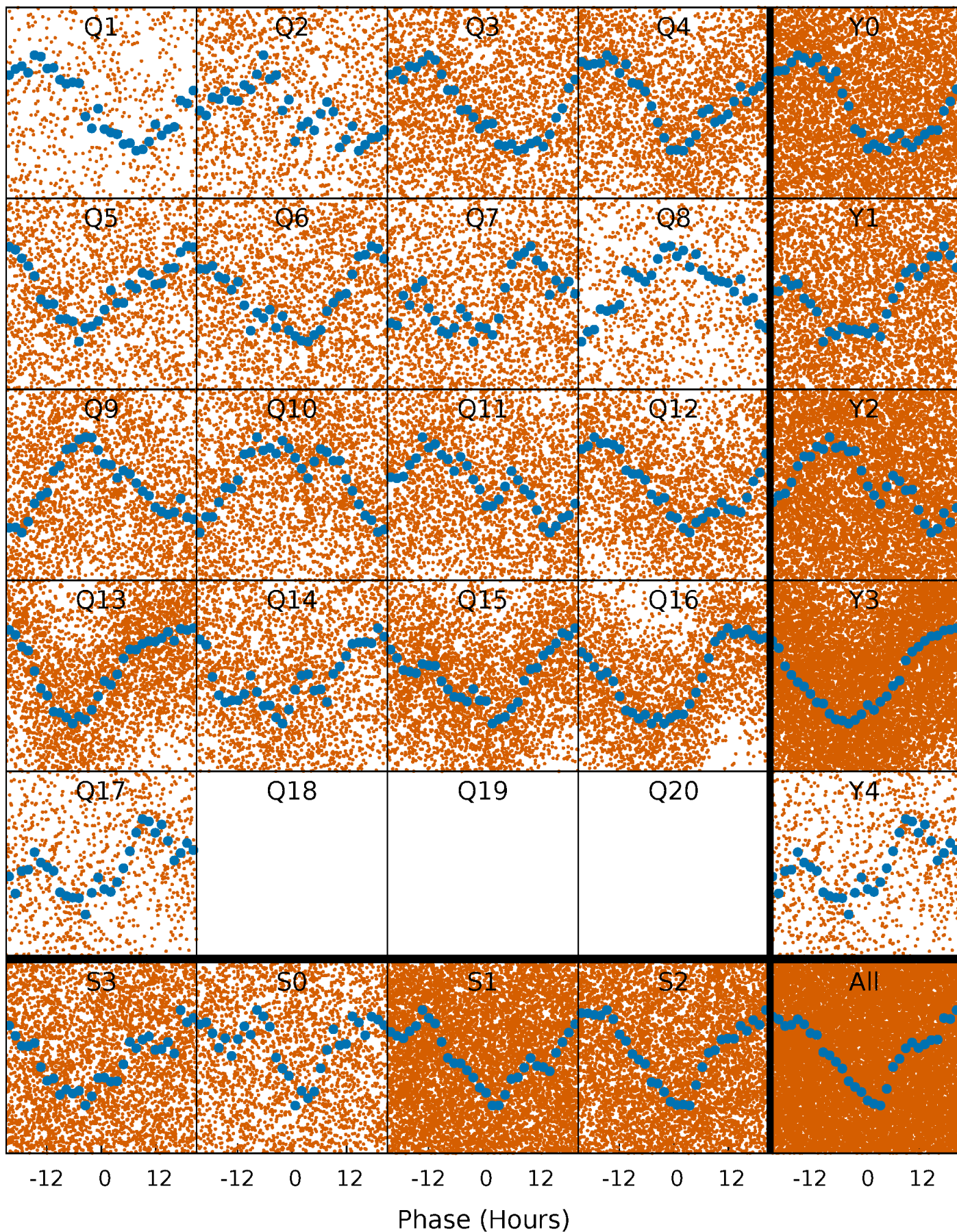


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

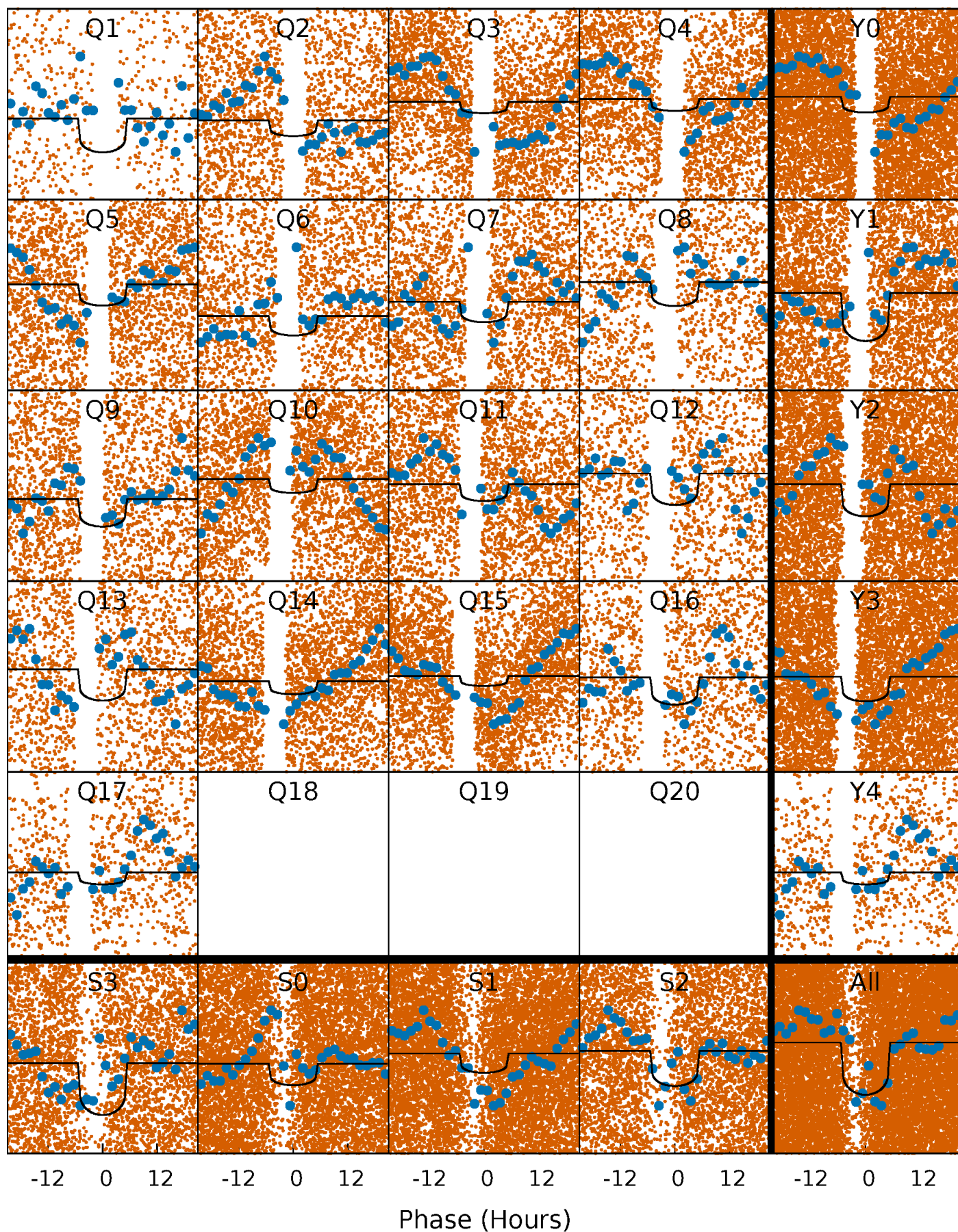
TCE 001722916-02 P= 1.813822 Days  $T_0=132.494408$  (BKJD)





# DV Quarter-Phased Transit Curves

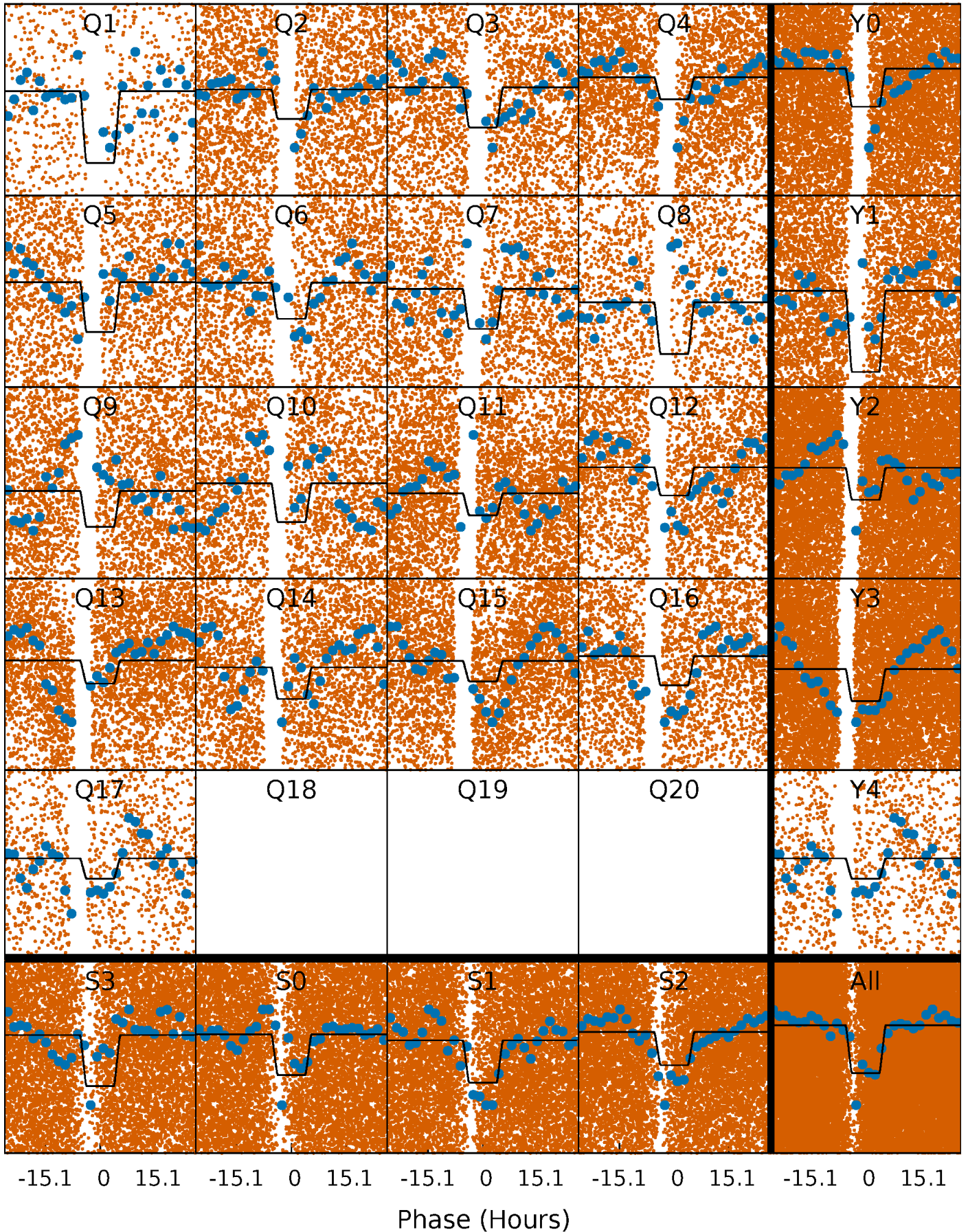
TCE 001722916-02 P= 1.813822 Days  $T_0=132.494408$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

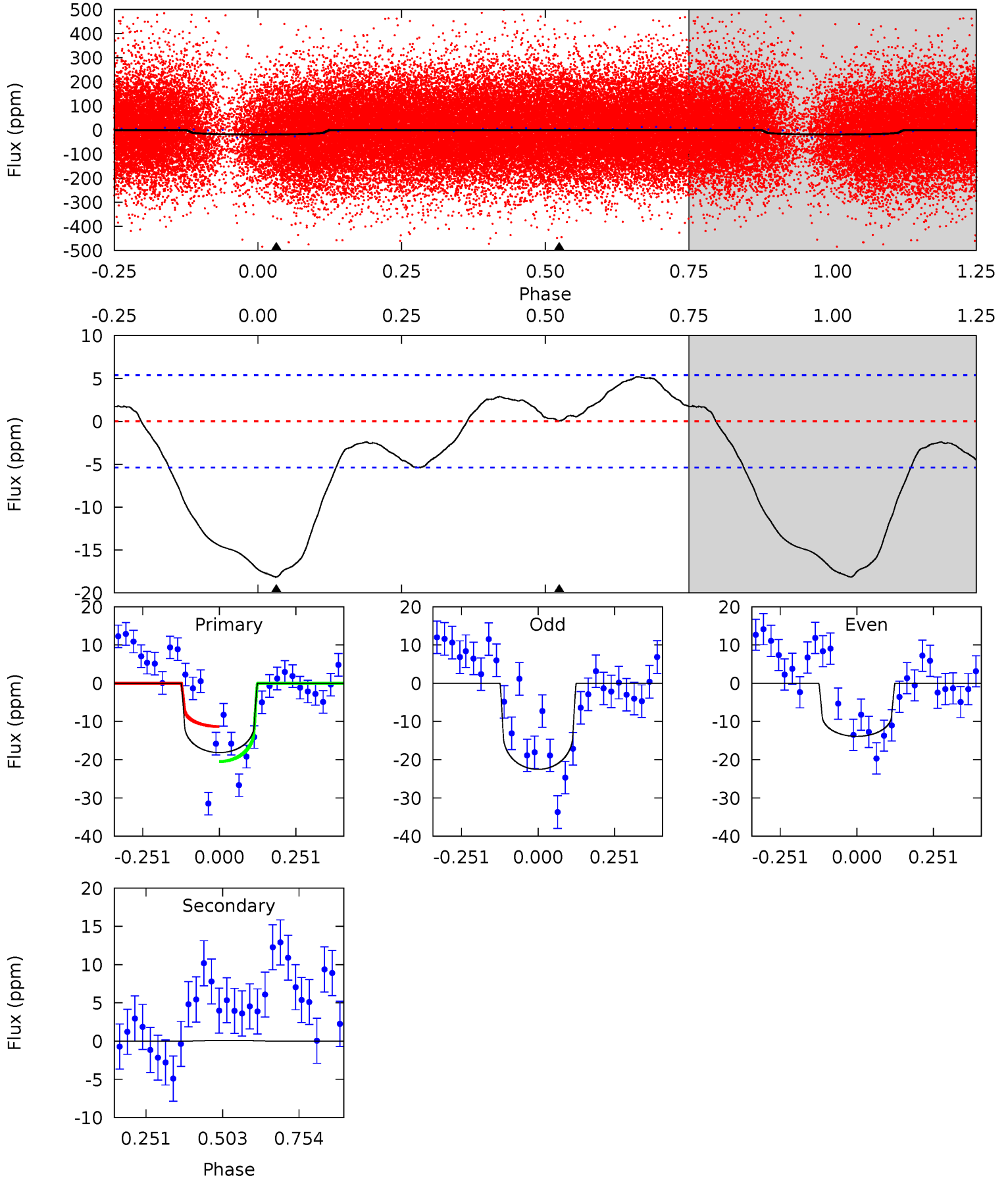
TCE 001722916-02 P= 1.813793 Days  $T_0=132.556215$  (BKJD)



# DV Model-Shift Uniqueness Test

001722916-02, P = 1.813822 Days, E = 130.680586 Days

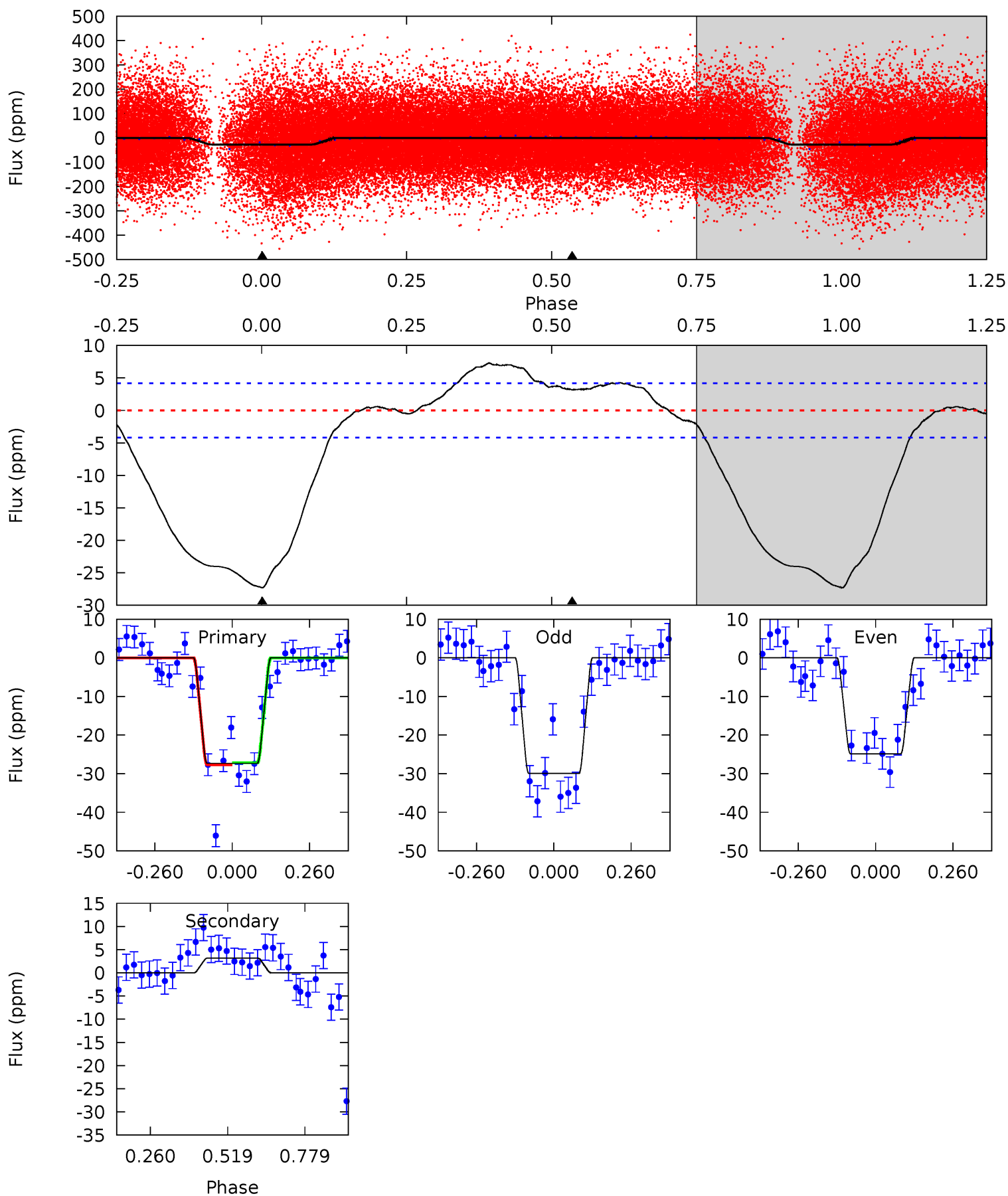
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
14.7	-0.05	0	0	4.37	1.15	2.57	14.7	14.7	-0.05	-0.05	3.50	1.14	0.22	3.23



# Alt Model-Shift Uniqueness Test

001722916-02, P = 1.813793 Days, E = 130.742422 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
28.5	-3.30	0	0	4.36	1.13	1.99	28.5	28.5	-3.30	-3.30	2.64	1.14	0.21	0.25



### Stellar Parameters For KIC 001722916

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6812^{+71}_{-91}$	$4.154^{+0.115}_{-0.115}$	$-0.180^{+0.150}_{-0.200}$	$1.604^{+0.262}_{-0.236}$	$1.347^{+0.088}_{-0.118}$	$0.460^{+0.237}_{-0.156}$
	+1%/-1%	+3%/-3%	+83%/-111%	+16%/-15%	+7%/-9%	+51%/-34%
Source	SPE68	SPE68	SPE68	DSEP		

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

### Secondary Eclipse Parameters for KIC 001722916-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$0 \pm 1$	$0.74^{+0.22}_{-0.18}$	$2965^{+138}_{-126}$	$-3088^{+6696}_{-975}$	$-0.008^{+1.233}_{-1.475}$
Alt.	$3 \pm 1$	$0.93^{+0.20}_{-0.20}$	$2970^{+126}_{-119}$	$-4289^{+310}_{-414}$	$-2.048^{+0.831}_{-1.442}$

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

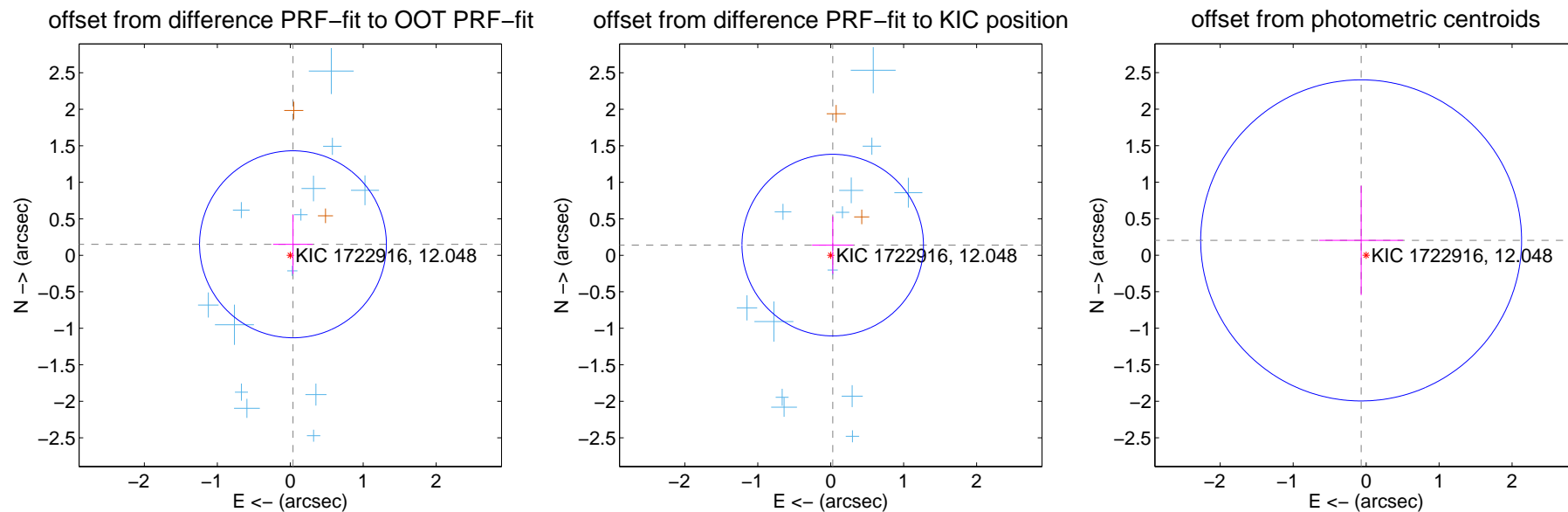
## DV Centroid Data

Supplemental centroid analysis for 001722916-02. Kepler magnitude: 12.05. Transit SNR 7.43

There are 13 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.05 arcsec

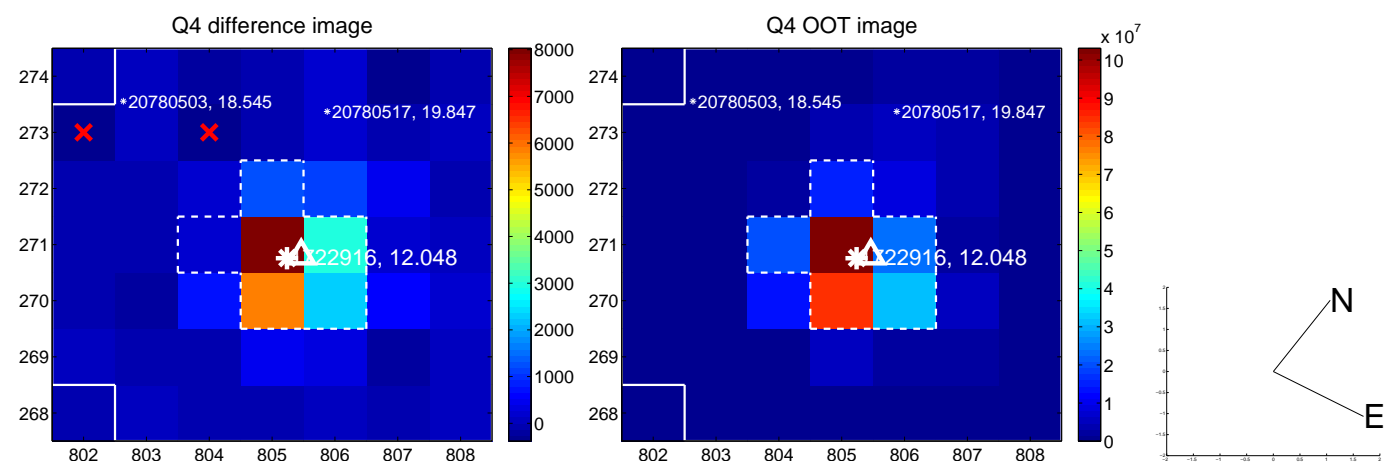
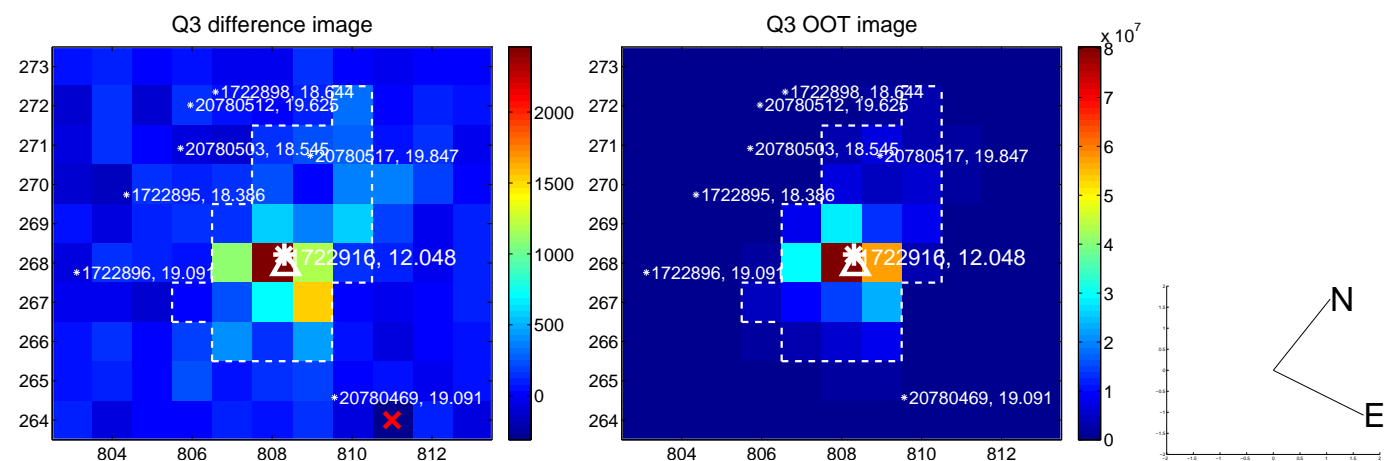
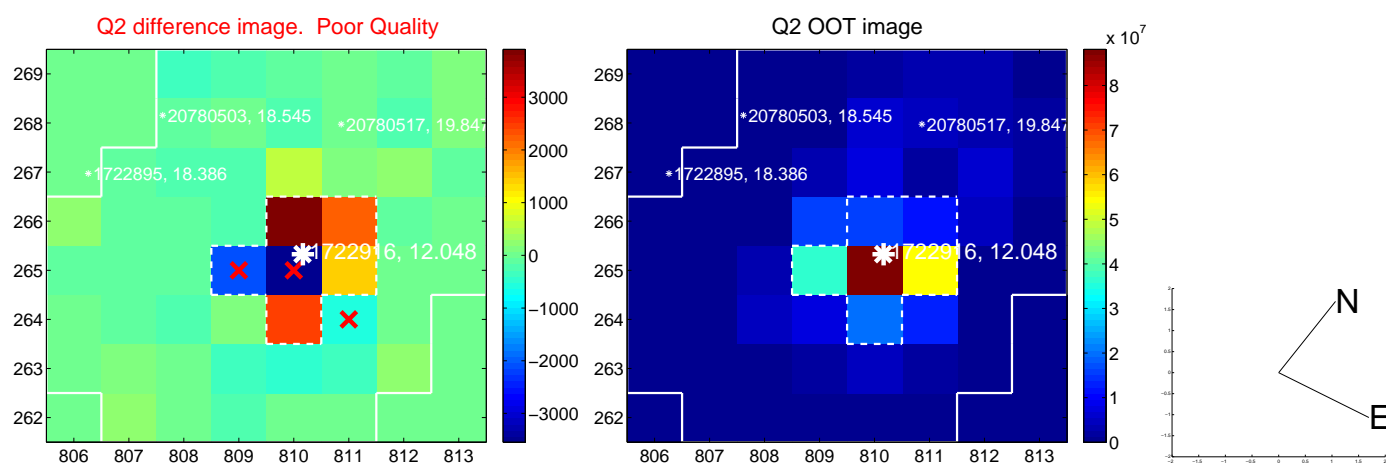
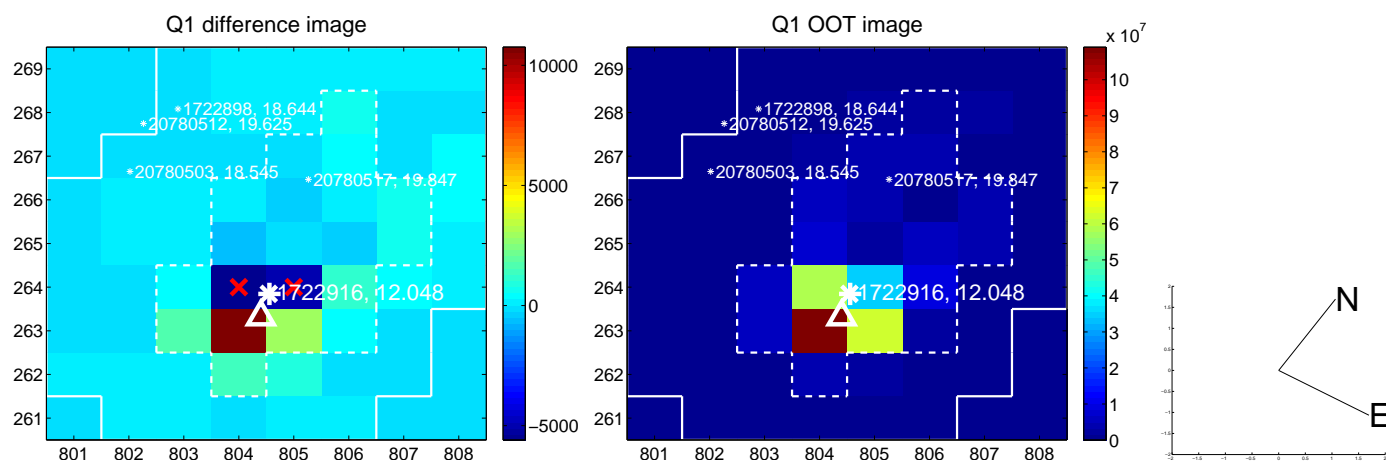
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.155 \pm 0.427$	0.36	$-0.037 \pm 0.272$	$0.151 \pm 0.405$
PRF-fit source offset from KIC position	$0.142 \pm 0.415$	0.34	$-0.027 \pm 0.284$	$0.140 \pm 0.392$
photometric centroid source offset	$0.21 \pm 0.73$	0.29	$0.07 \pm 0.58$	$0.20 \pm 0.75$



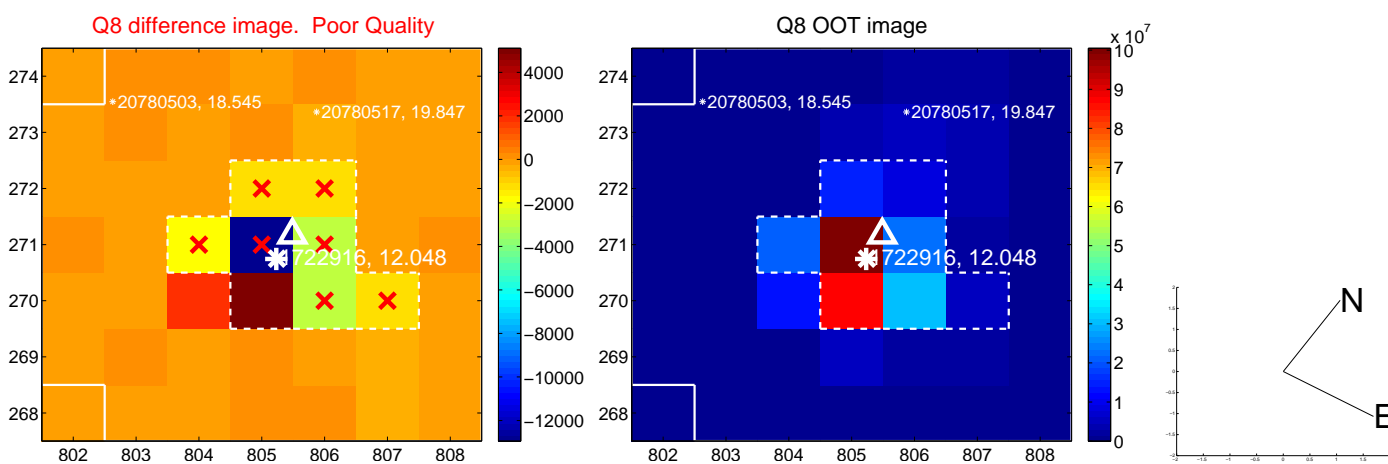
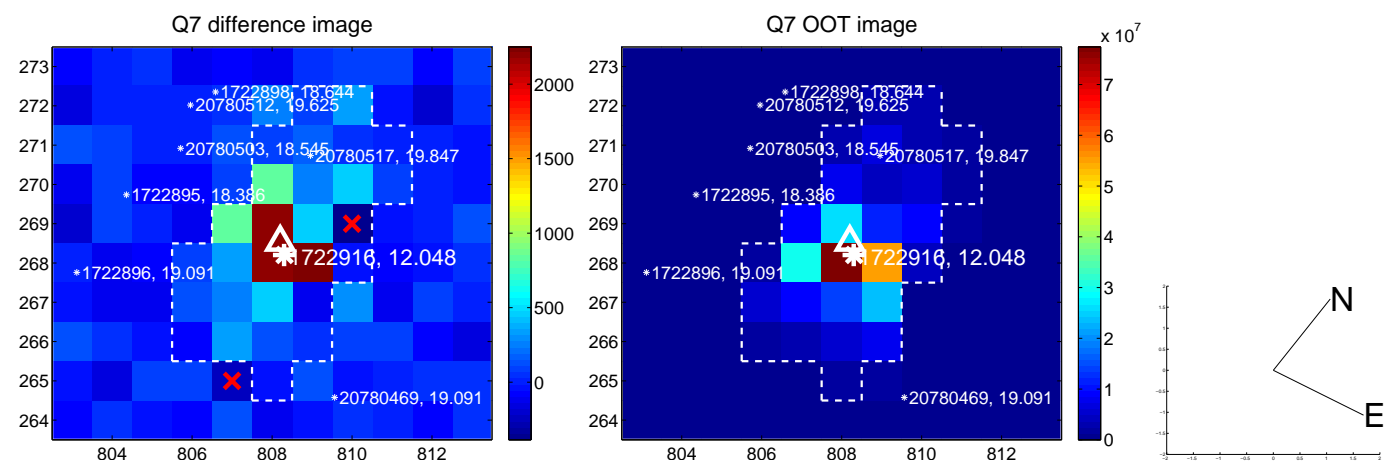
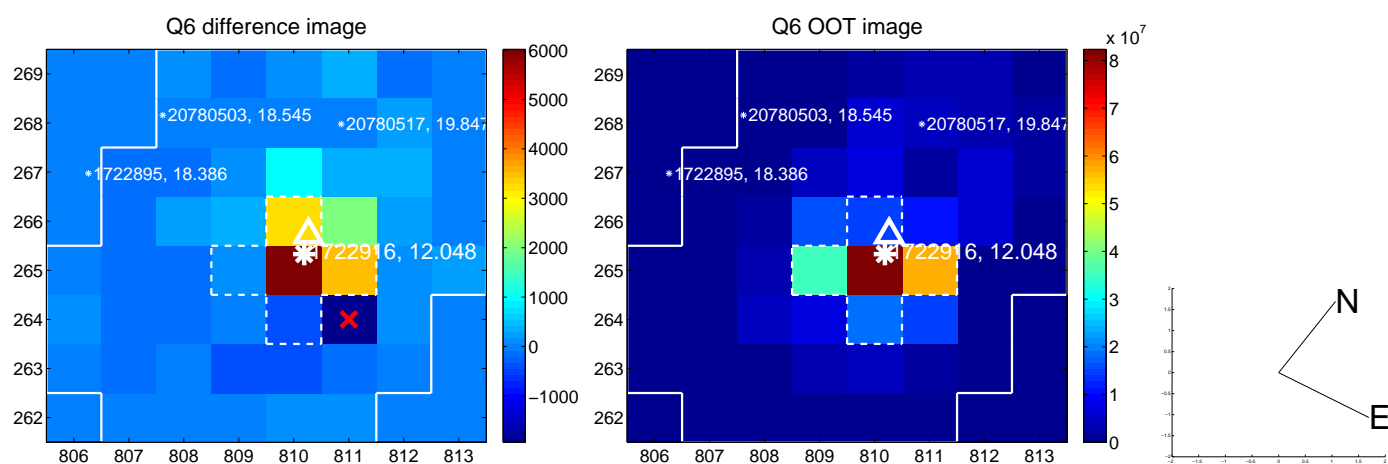
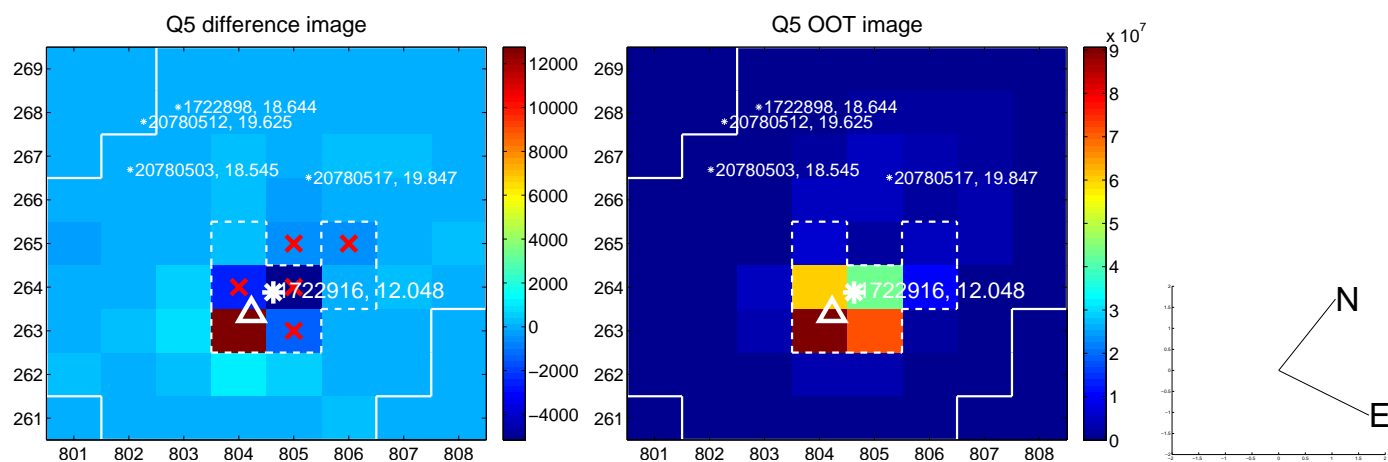
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



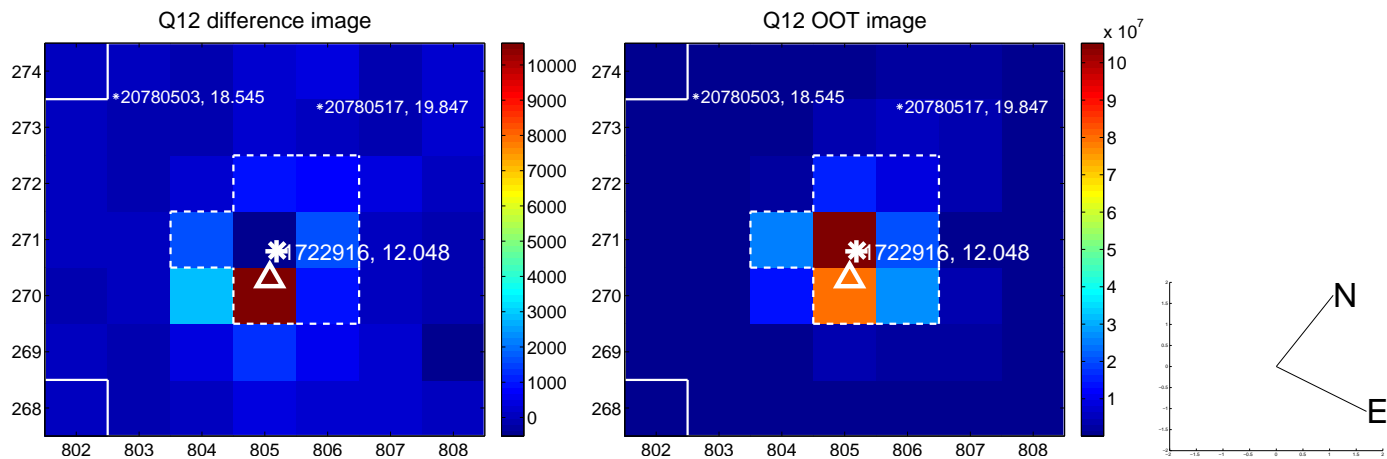
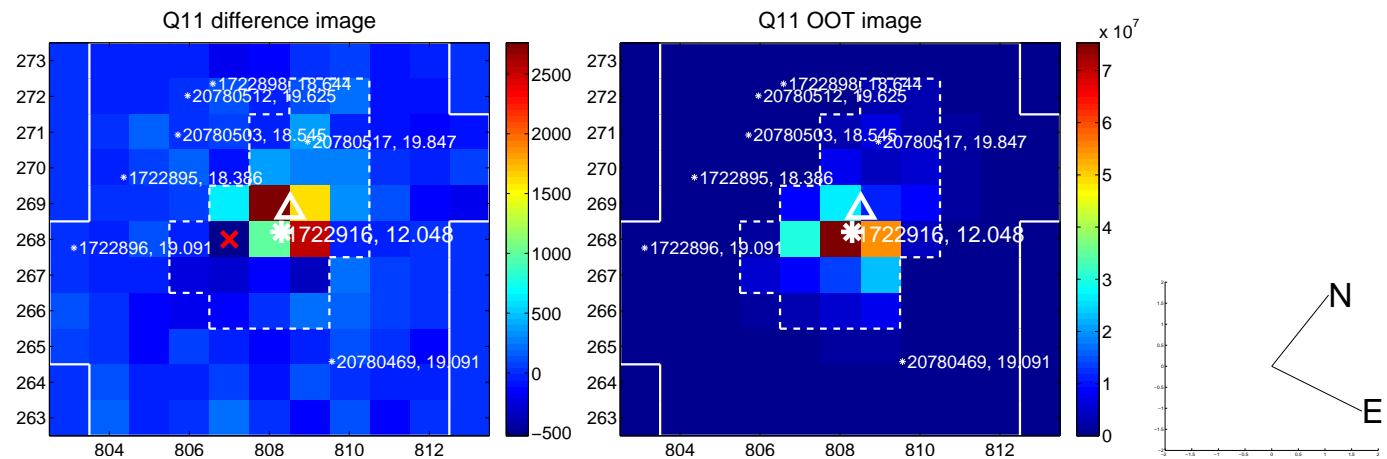
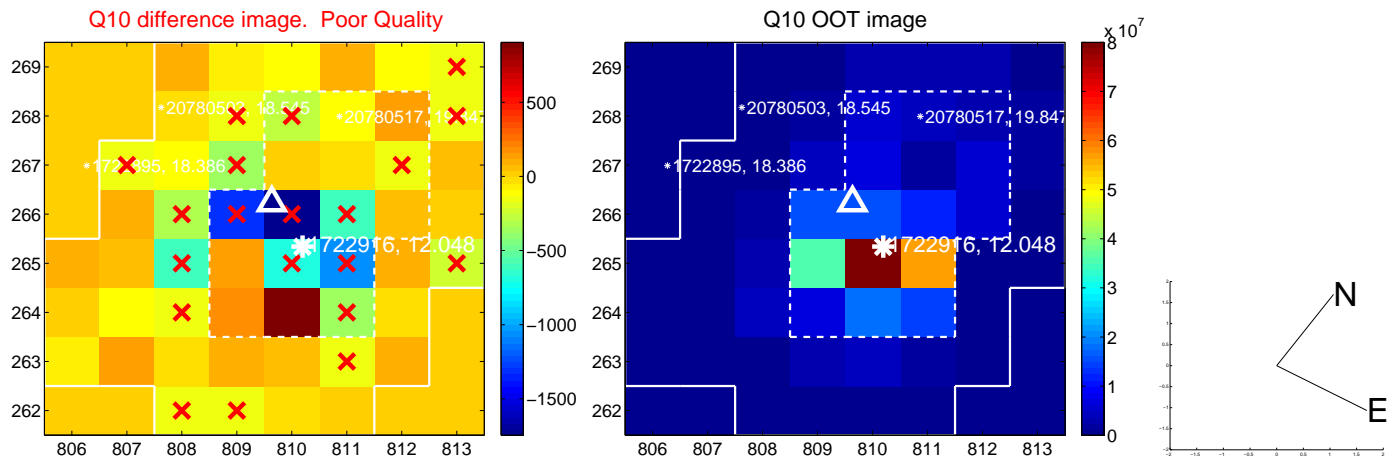
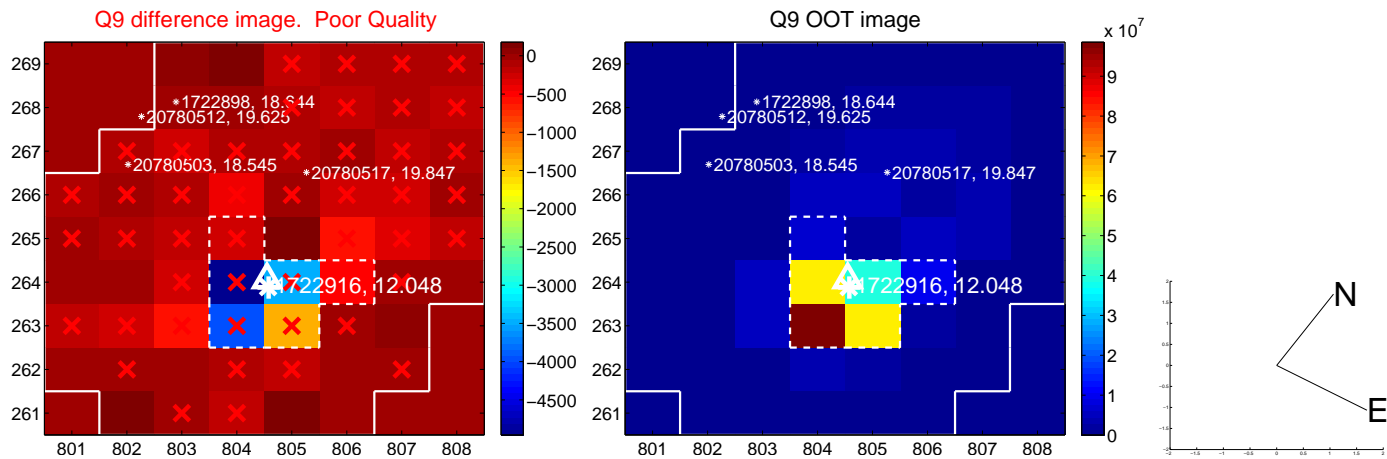
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



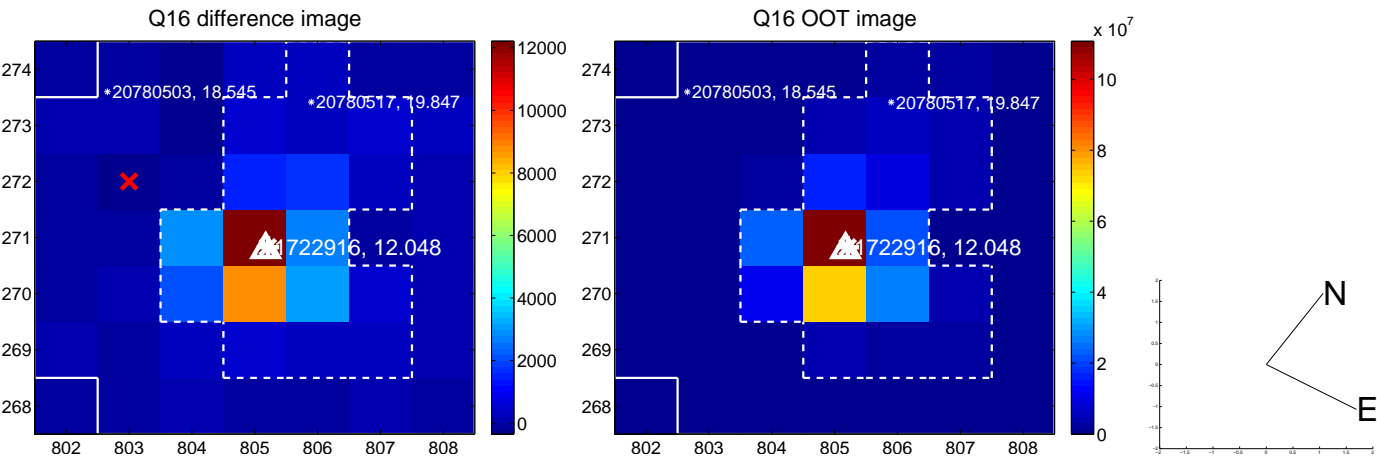
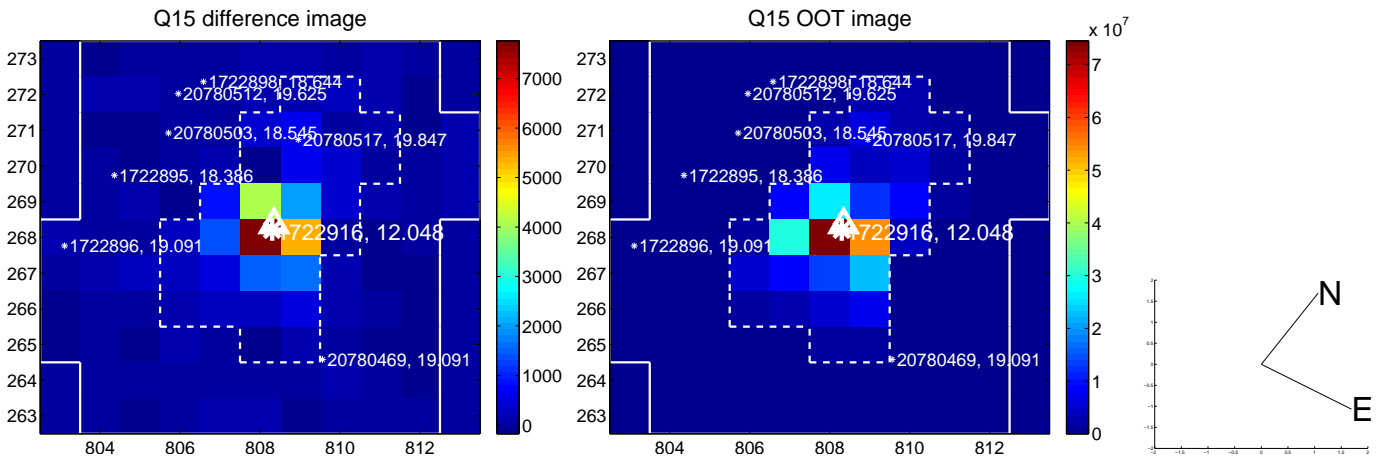
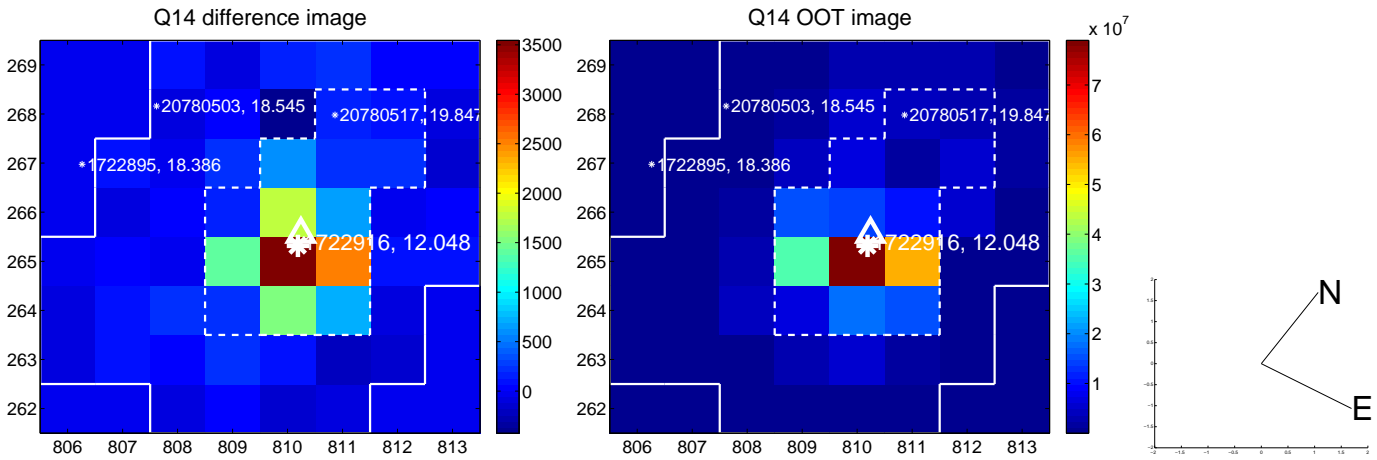
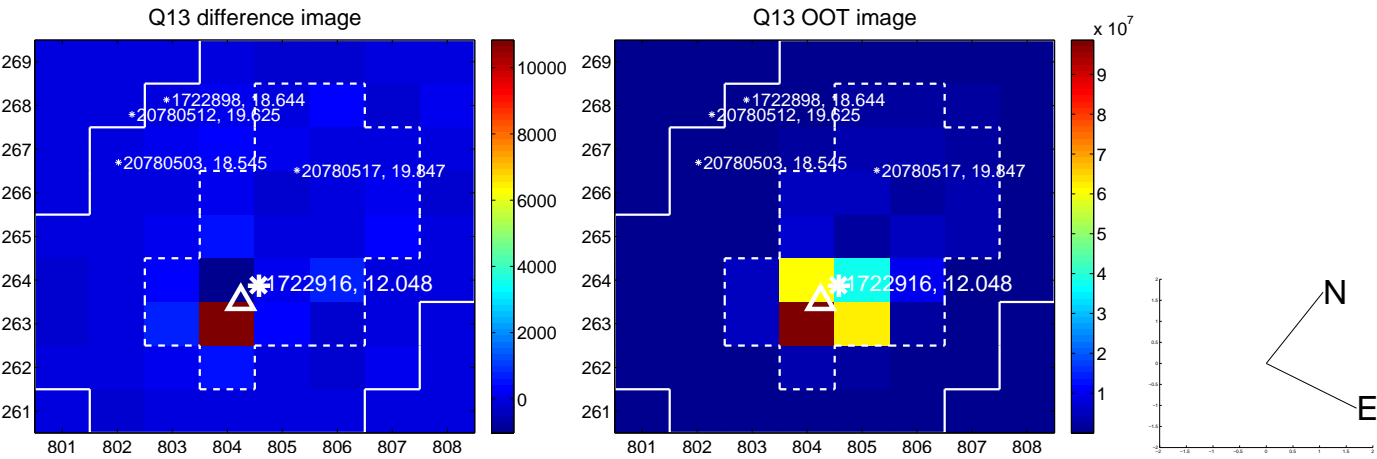
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



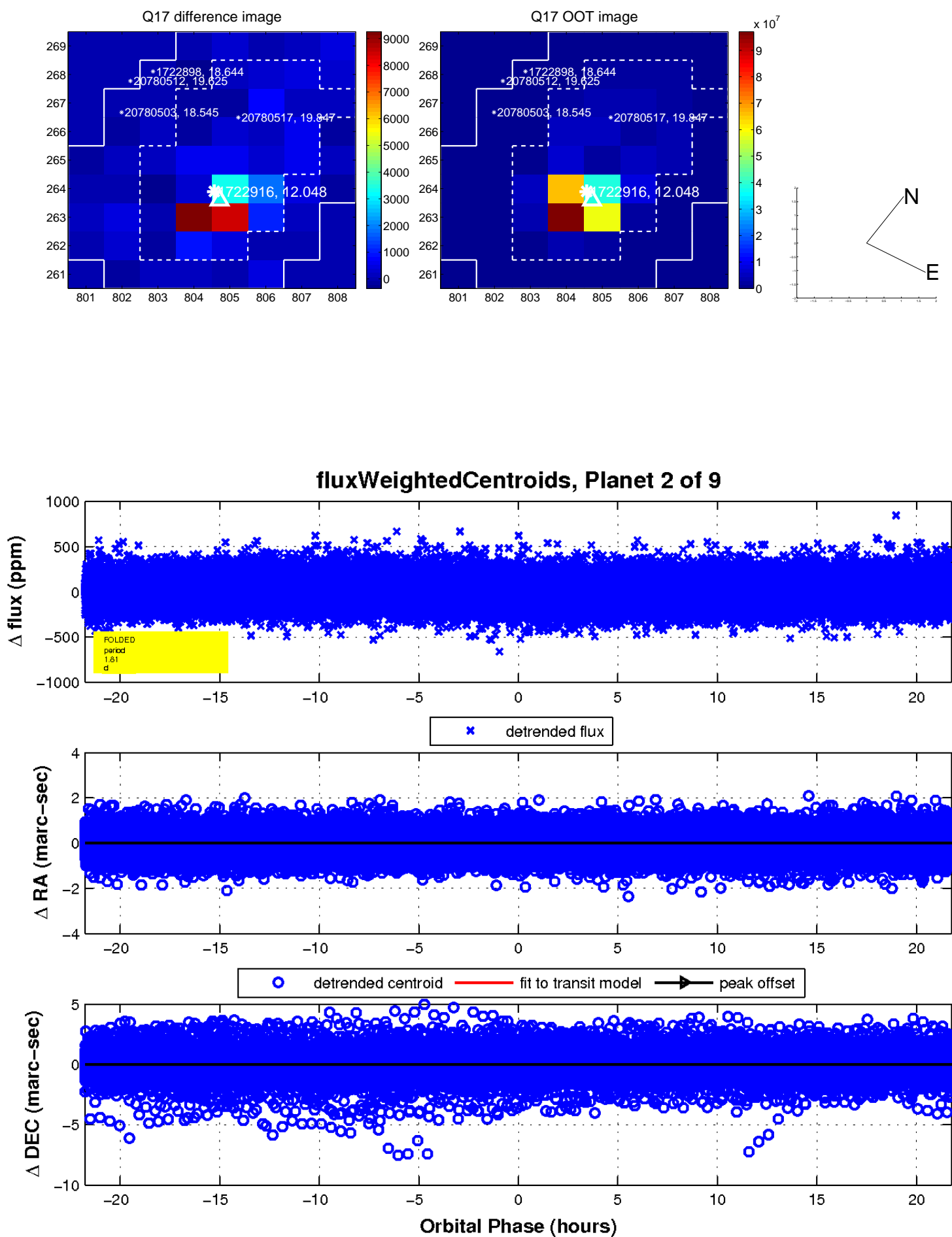
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



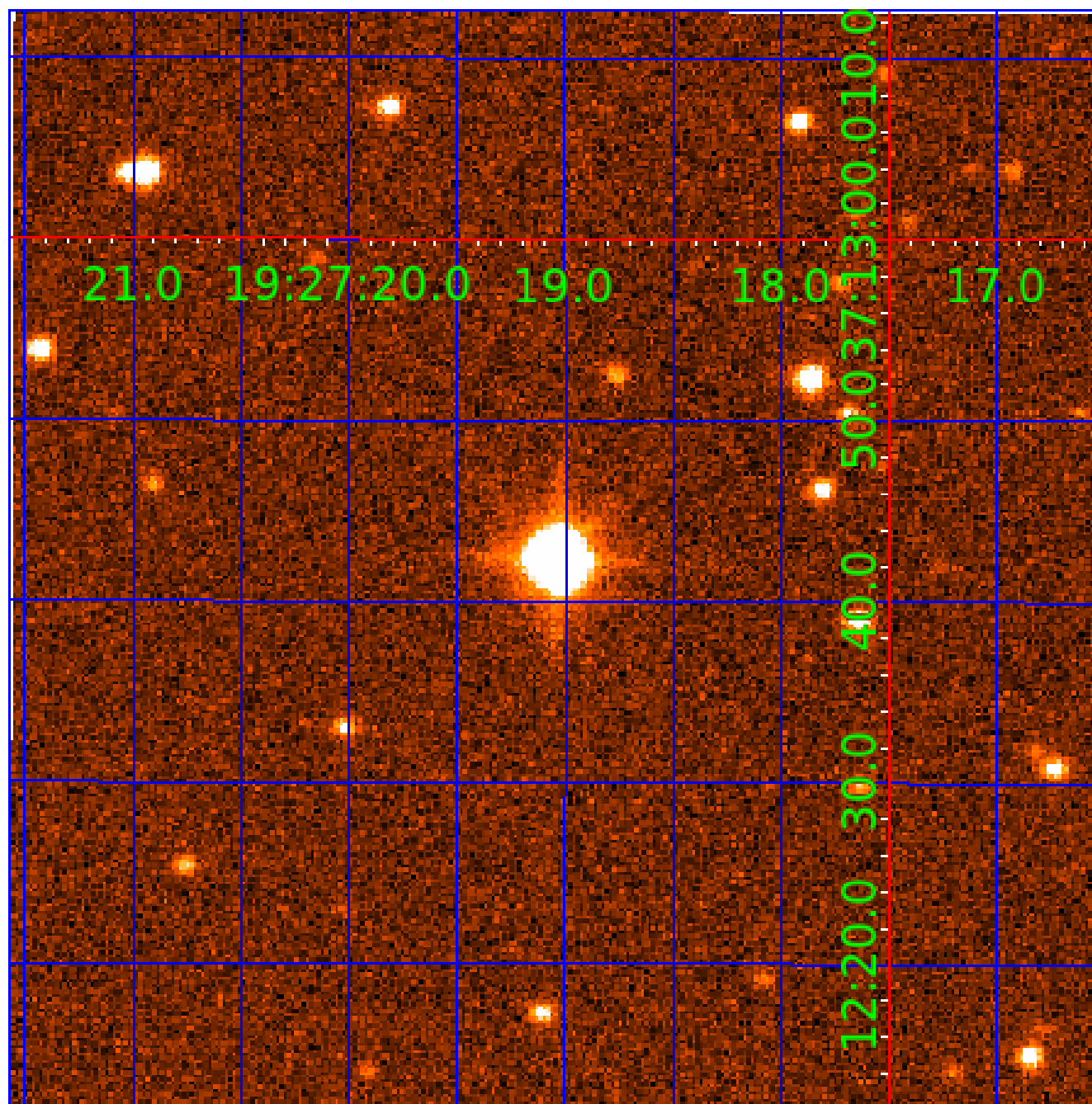
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





UKIRT Image

Declination



# KIC 001722916

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
001722916-01	OBS	No	1.813535	132.513520	0.1	1.362	7.1	0.1	1.60	6812	0.09	4824.23
001722916-02	OBS	No	1.813822	132.494408	18.4	10.501	7.4	7.4	1.60	6812	0.75	4823.21
001722916-03	OBS	No	113.456084	213.726772	152.5	10.563	16.5	7.4	1.60	6812	2.25	19.43
001722916-04	OBS	No	59.108474	141.293815	101.1	15.638	8.7	7.4	1.60	6812	1.76	46.34
001722916-05	OBS	No	22.011274	131.997241	79.9	6.325	8.8	8.8	1.60	6812	1.69	172.96
001722916-06	OBS	No	359.058903	202.797449	338.0	20.552	8.5	8.3	1.60	6812	5.69	4.18
001722916-07	OBS	No	80.910752	145.943923	136.1	5.420	8.0	7.3	1.60	6812	2.19	30.49
001722916-08	OBS	No	95.858298	158.854822	172.1	2.318	8.1	7.6	1.60	6812	2.39	24.32
001722916-09	OBS	No	105.723678	156.862664	140.0	6.744	8.2	7.9	1.60	6812	2.40	21.34

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
001722916-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV
001722916-02	OBS	FP	0.00	1	0	0	0	LPP_DV—SAME_NTL_PERIOD
001722916-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
001722916-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
001722916-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
001722916-06	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS—HALO_GHOST
001722916-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
001722916-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES—TRANS_GAPPED—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
001722916-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT

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

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

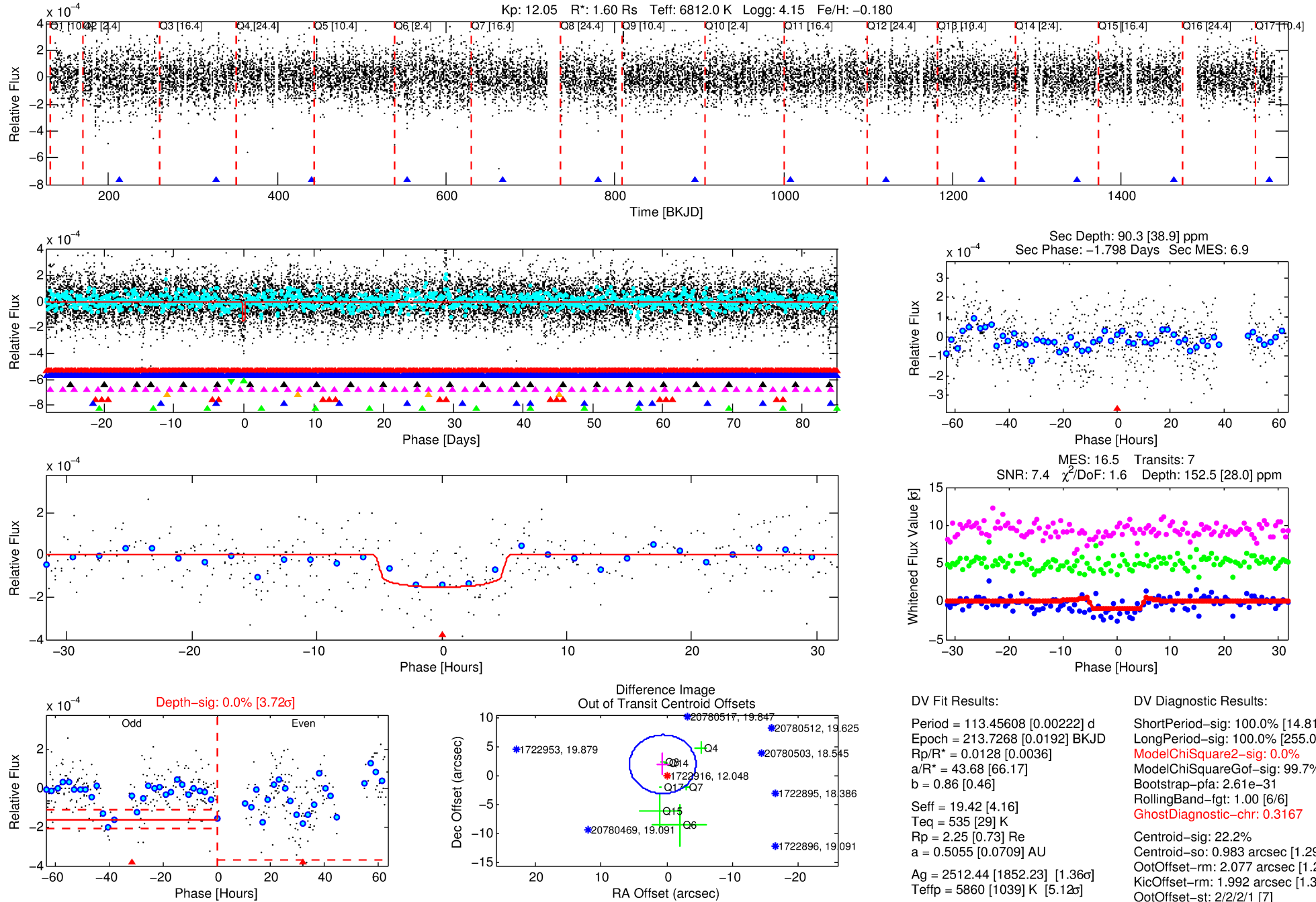
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 001722916-03

No Significant Match Found

# DV One-Page Summary

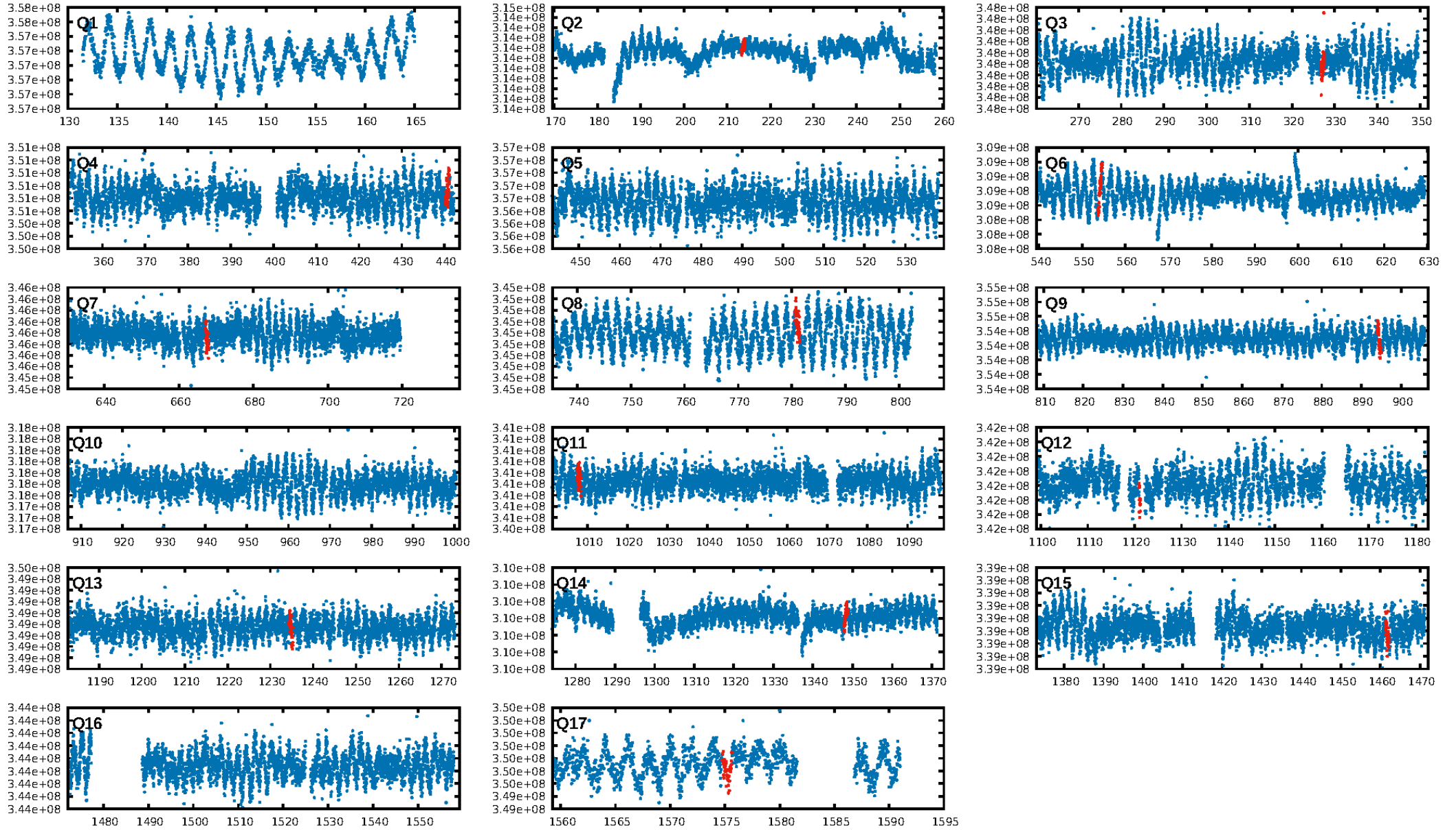
KIC: 1722916 Candidate: 3 of 9 Period: 113.456 d



Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 00:46:19 Z

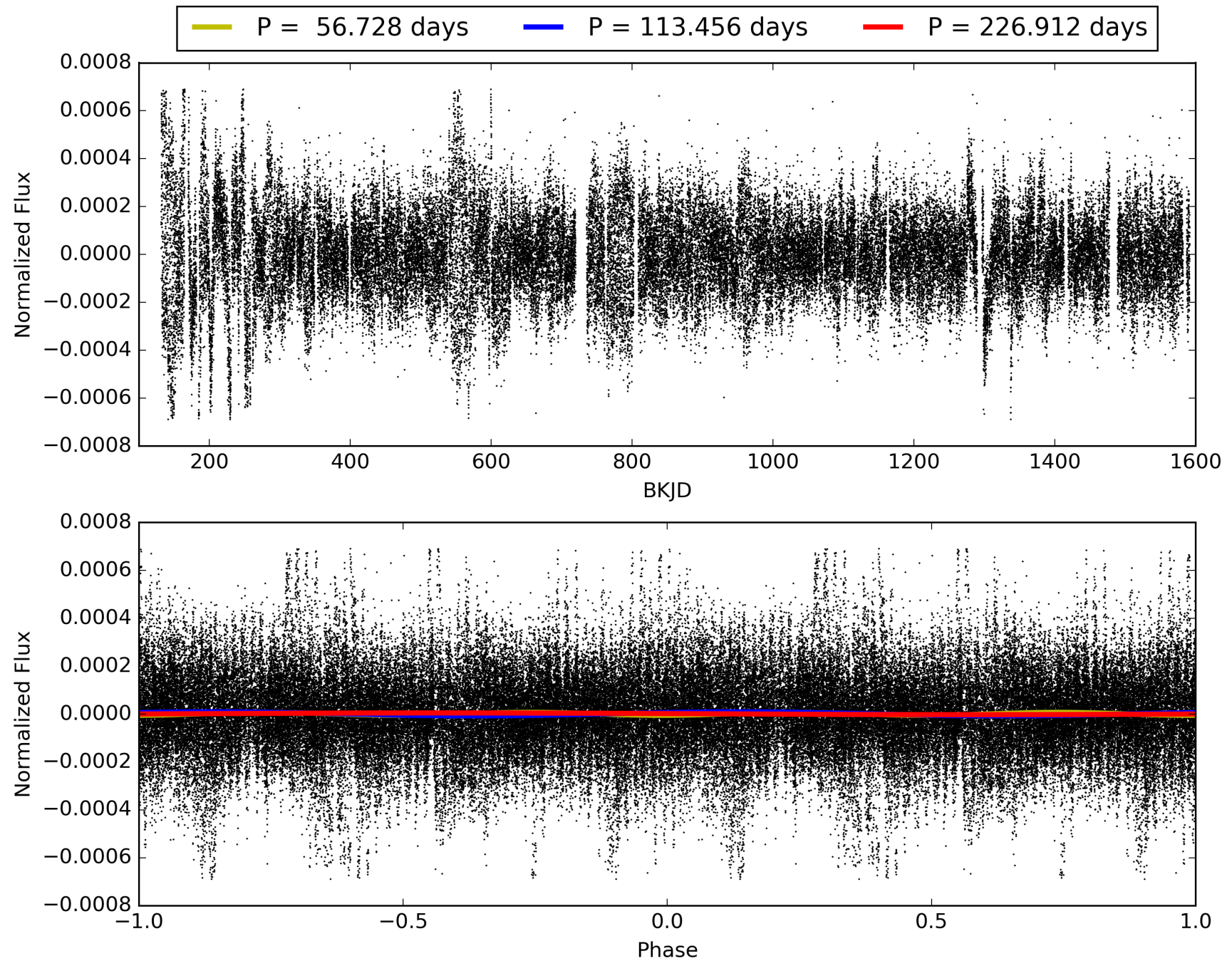
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 001722916-03, PDC Light Curves



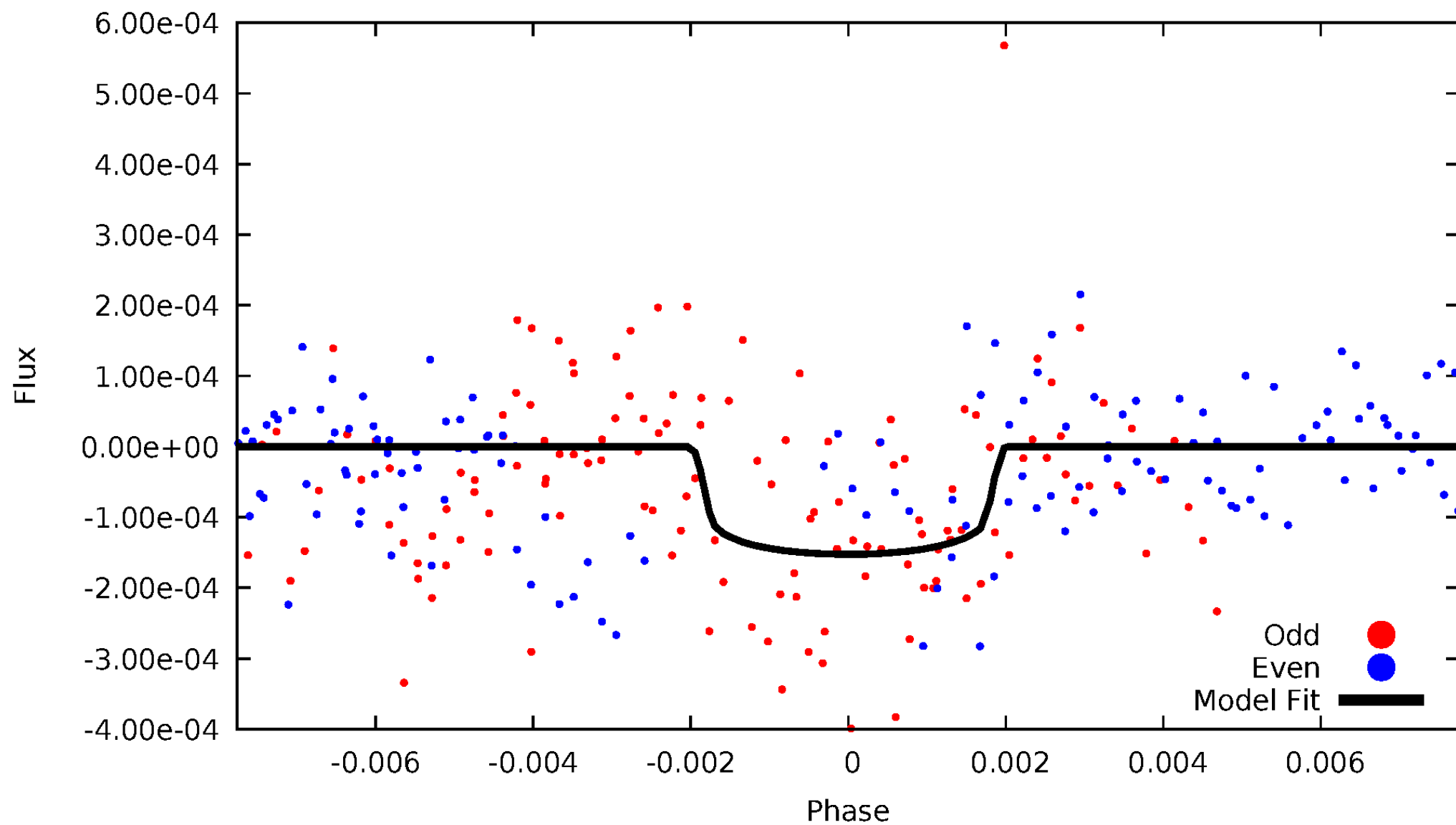


# TCE 001722916-03



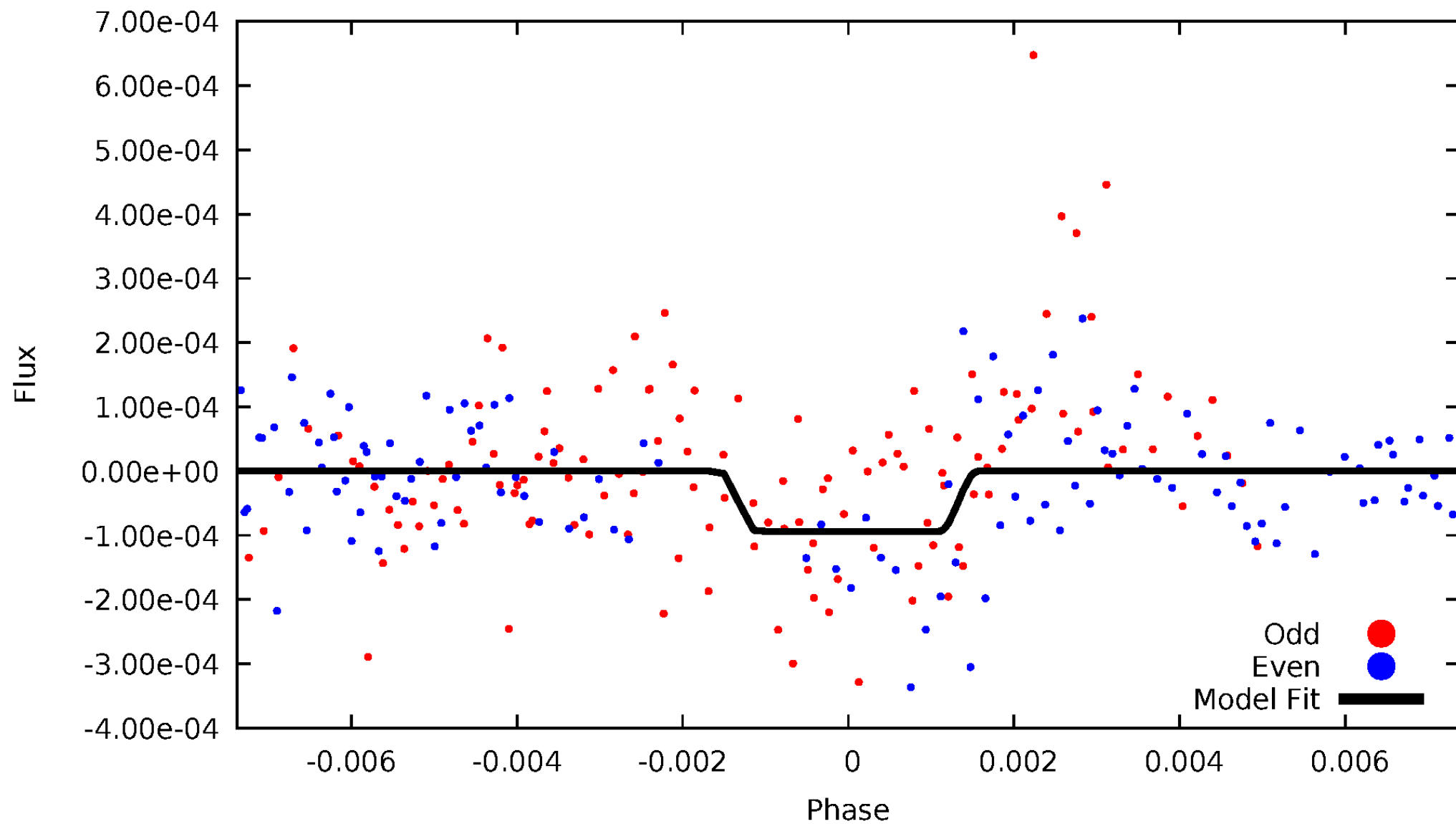
# DV Odd/Even

TCE 001722916-03



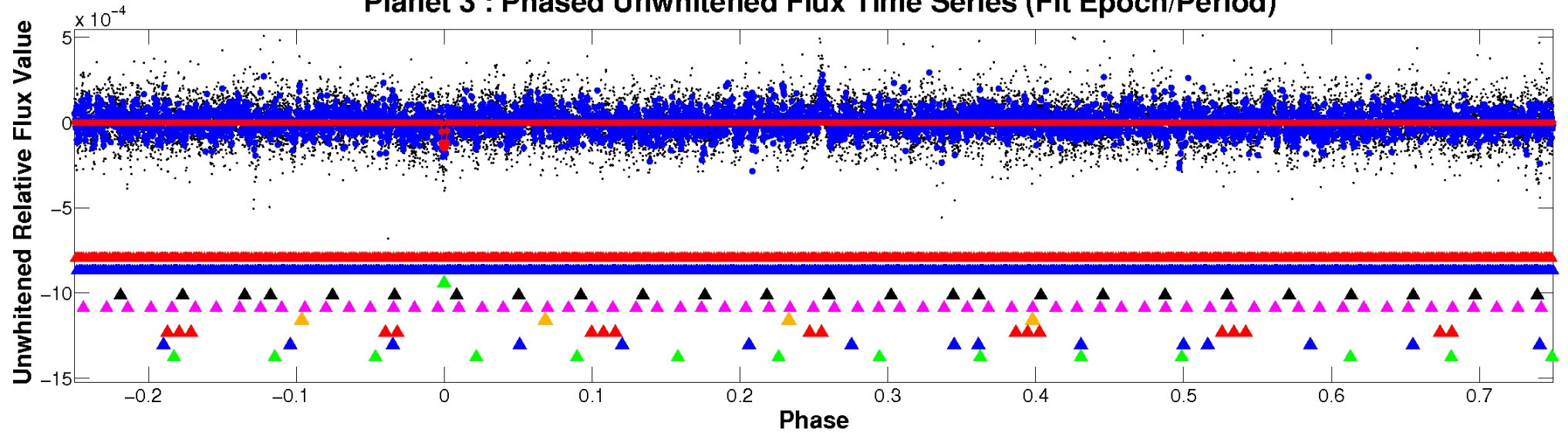
# ALT Odd/Even

TCE 001722916-03

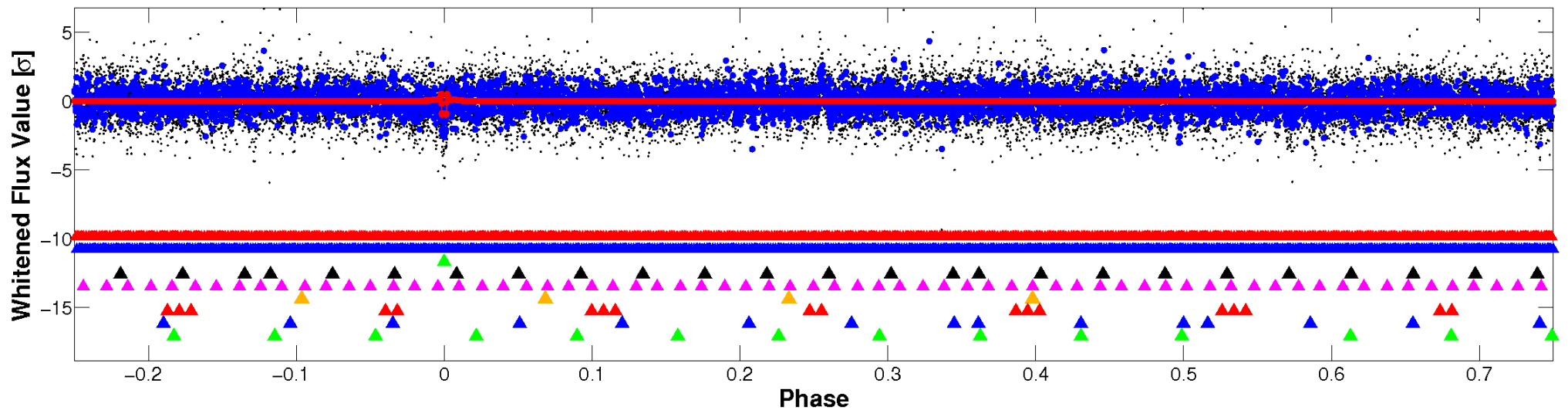


# Non-Whitened Vs. Whitened Light Curve

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



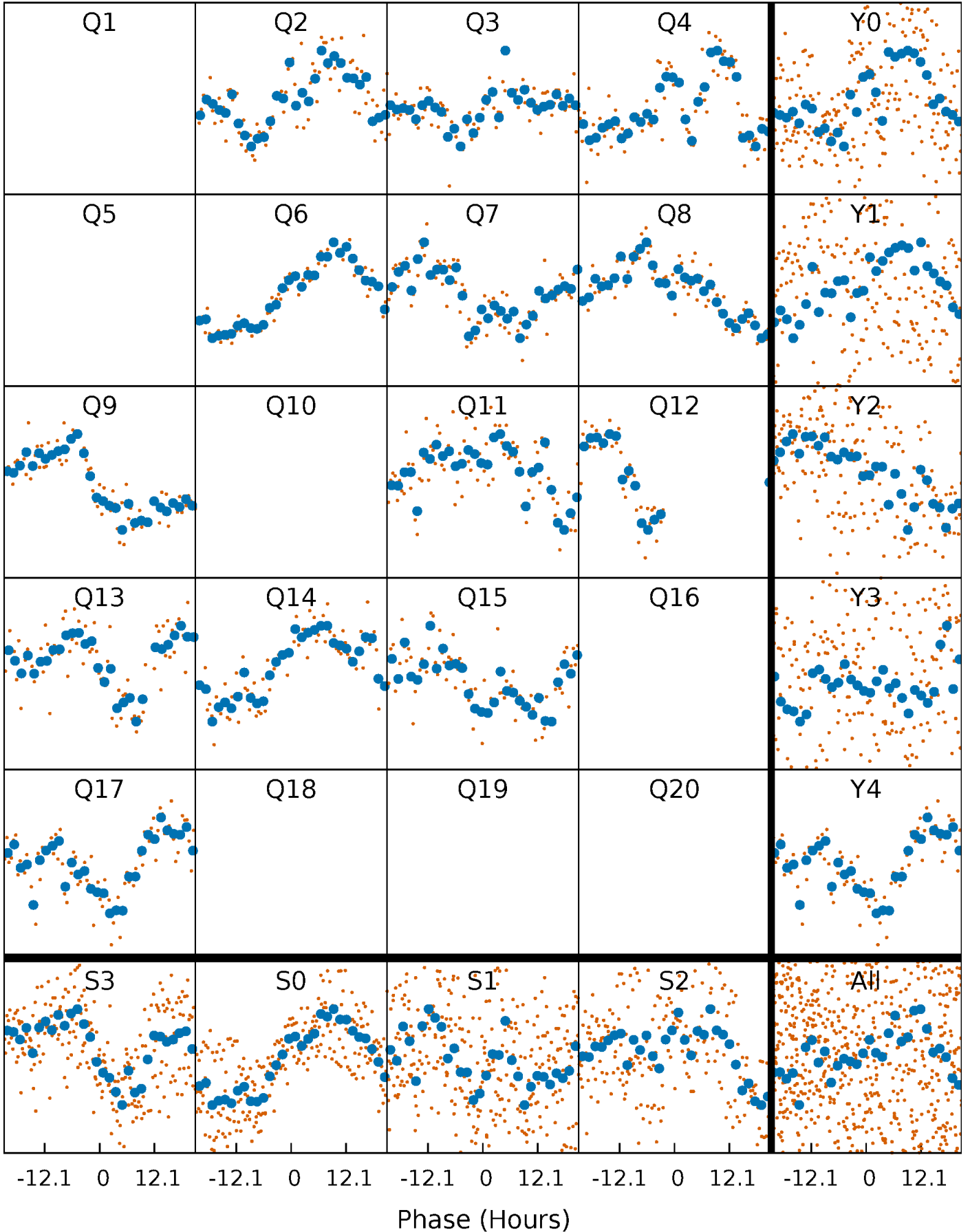
## Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)





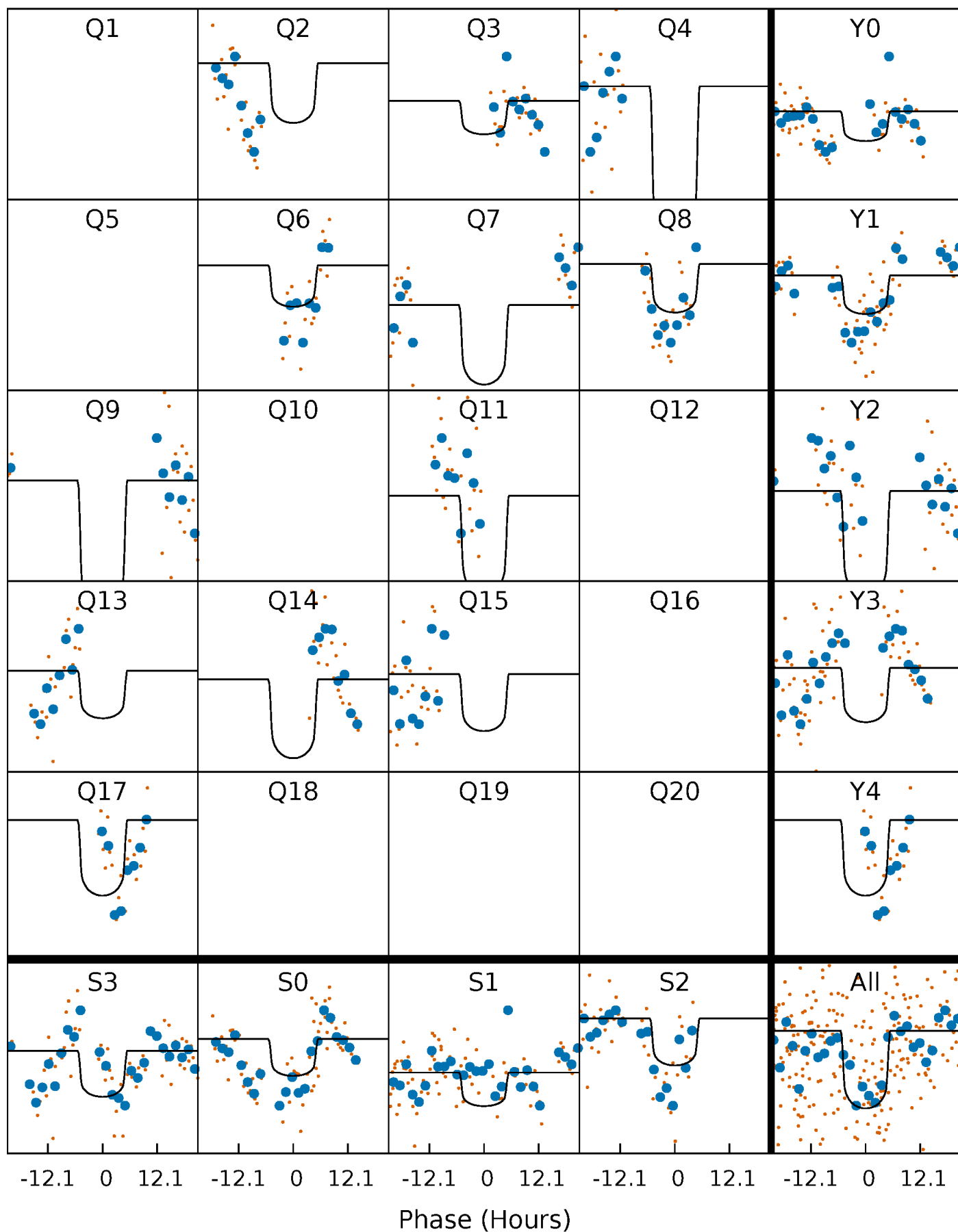
# PDC Quarter-Phased Transit Curves

TCE 001722916-03 P=113.456084 Days  $T_0=213.726772$  (BKJD)



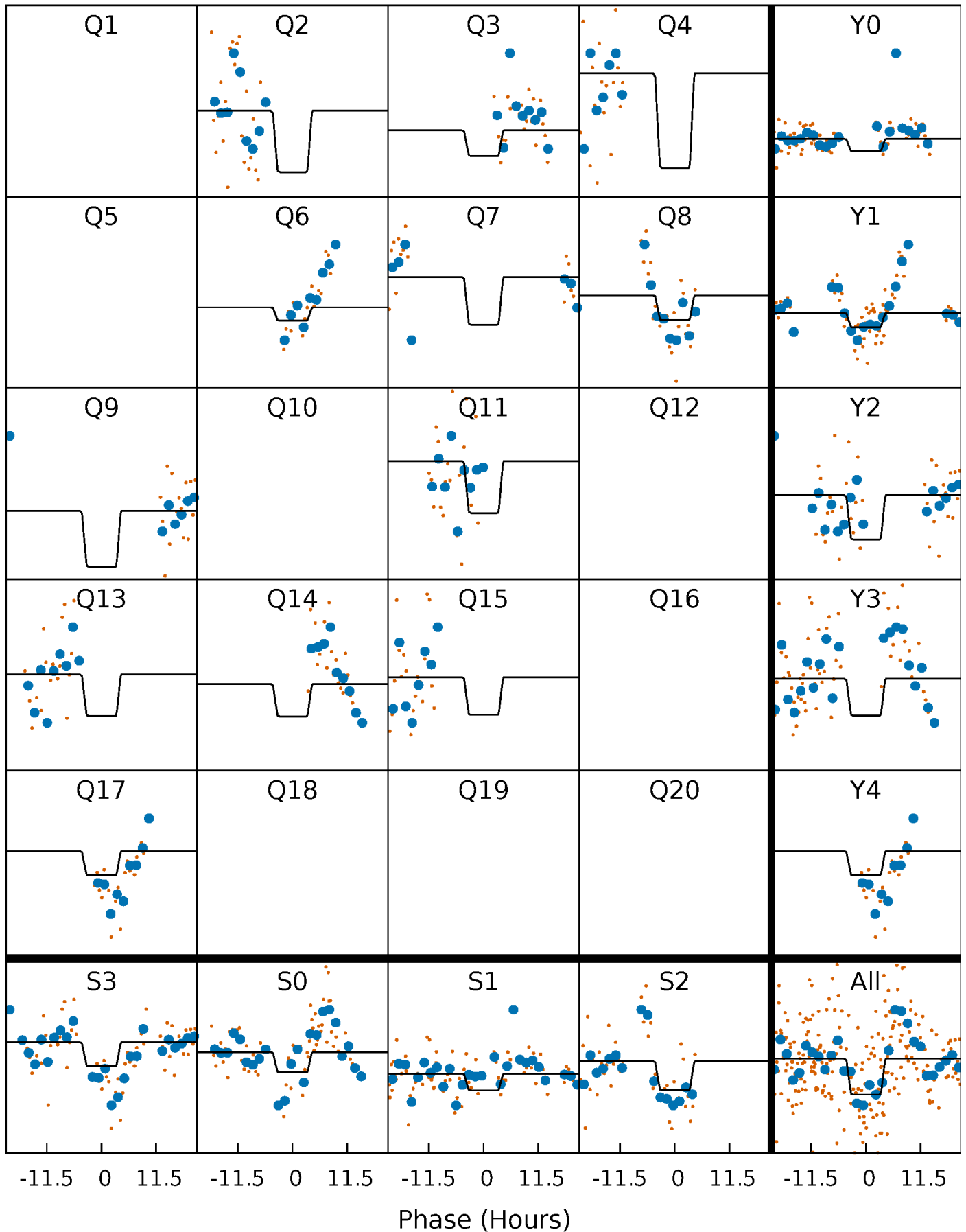
# DV Quarter-Phased Transit Curves

TCE 001722916-03 P=113.456084 Days  $T_0=213.726772$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

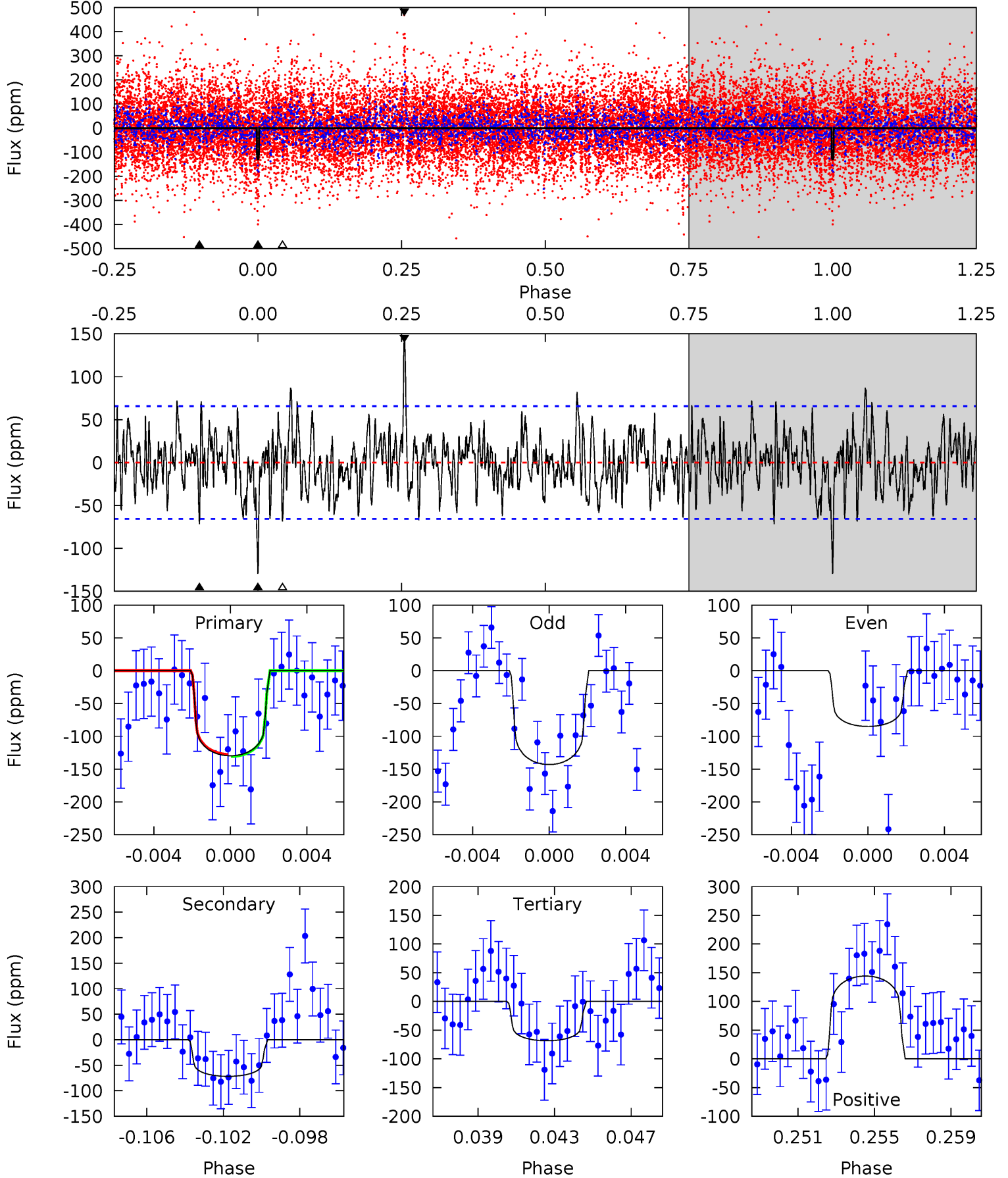
TCE 001722916-03 P=113.460747 Days  $T_0=213.693127$  (BKJD)



# DV Model-Shift Uniqueness Test

001722916-03, P = 113.456084 Days, E = 100.270688 Days

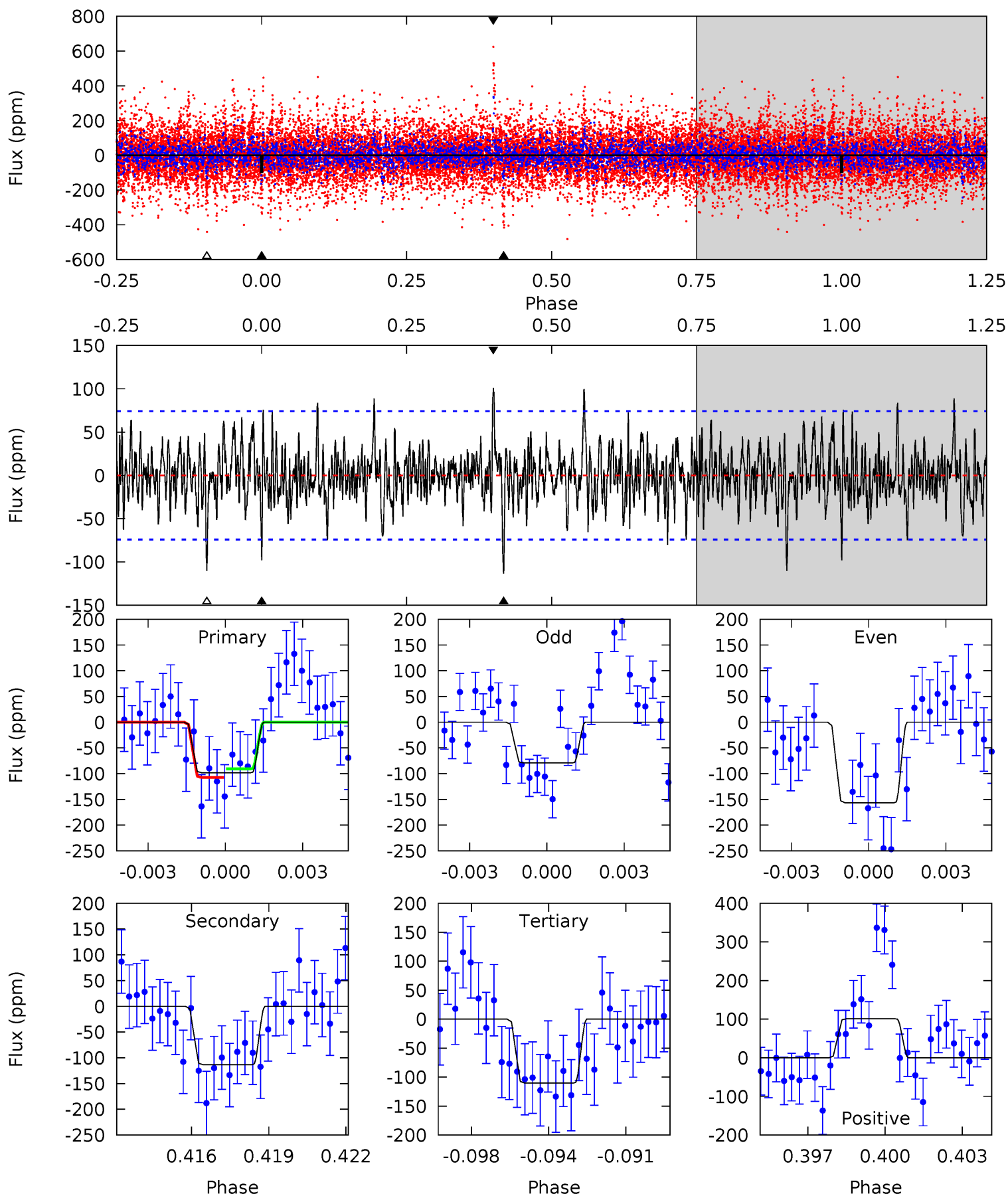
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.3	5.69	5.43	11.4	5.20	2.88	2.18	4.86	-1.16	0.26	-5.75	1.98	0.88	0.53	0.12



# Alt Model-Shift Uniqueness Test

001722916-03, P = 113.460747 Days, E = 100.232380 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
6.94	8.01	7.78	7.14	5.24	2.95	1.82	-0.85	-0.20	0.23	0.87	2.48	0.97	0.47	0.57





### Stellar Parameters For KIC 001722916

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6812^{+71}_{-91}$	$4.154^{+0.115}_{-0.115}$	$-0.180^{+0.150}_{-0.200}$	$1.604^{+0.262}_{-0.236}$	$1.347^{+0.088}_{-0.118}$	$0.460^{+0.237}_{-0.156}$
	+1%/-1%	+3%/-3%	+83%/-111%	+16%/-15%	+7%/-9%	+51%/-34%
Source	SPE68	SPE68	SPE68	DSEP		

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

### Secondary Eclipse Parameters for KIC 001722916-03 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-72 \pm 13$	$2.28^{+0.72}_{-0.73}$	$749^{+31}_{-33}$	$5506^{+1075}_{-648}$	$1950^{+2243}_{-875}$
Alt.	$-113 \pm 14$	$1.68^{+0.66}_{-0.65}$	$747^{+35}_{-32}$	$7140^{+2587}_{-1094}$	$5487^{+9056}_{-2644}$

$T_{\text{max}}$  = 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

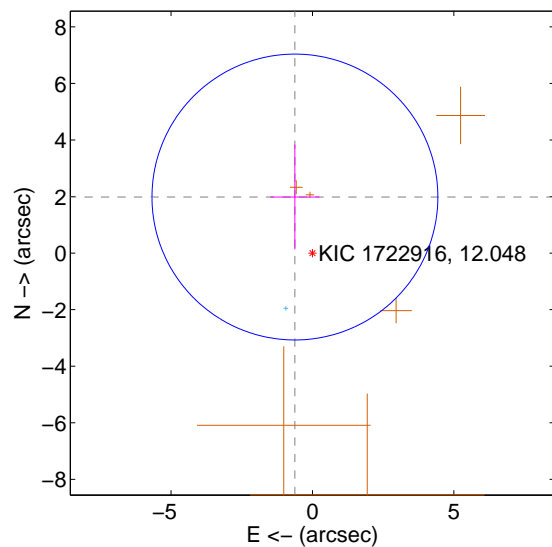
Supplemental centroid analysis for 001722916-03. Kepler magnitude: 12.05. Transit SNR 7.40

There are 1 quarters with good PRF difference image offsets

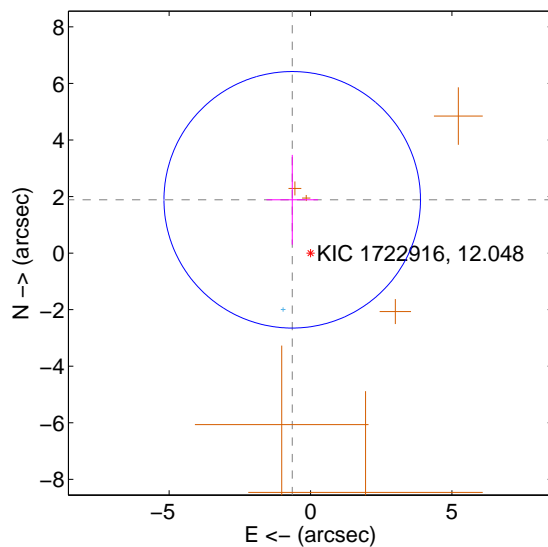
The direct PRF centroid is offset from the target star catalog position by about 0.05 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.077 \pm 1.684$	1.23	$0.620 \pm 0.867$	$1.982 \pm 1.851$
PRF-fit source offset from KIC position	$1.992 \pm 1.511$	1.32	$0.647 \pm 0.910$	$1.884 \pm 1.587$
photometric centroid source offset	$0.98 \pm 0.76$	1.29	$-0.19 \pm 0.58$	$-0.96 \pm 0.77$

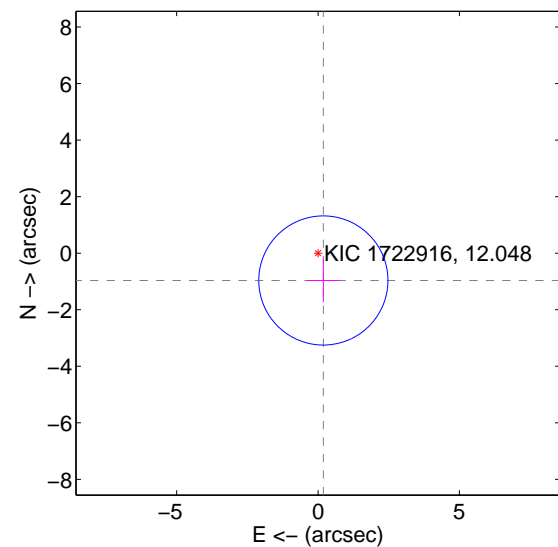
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

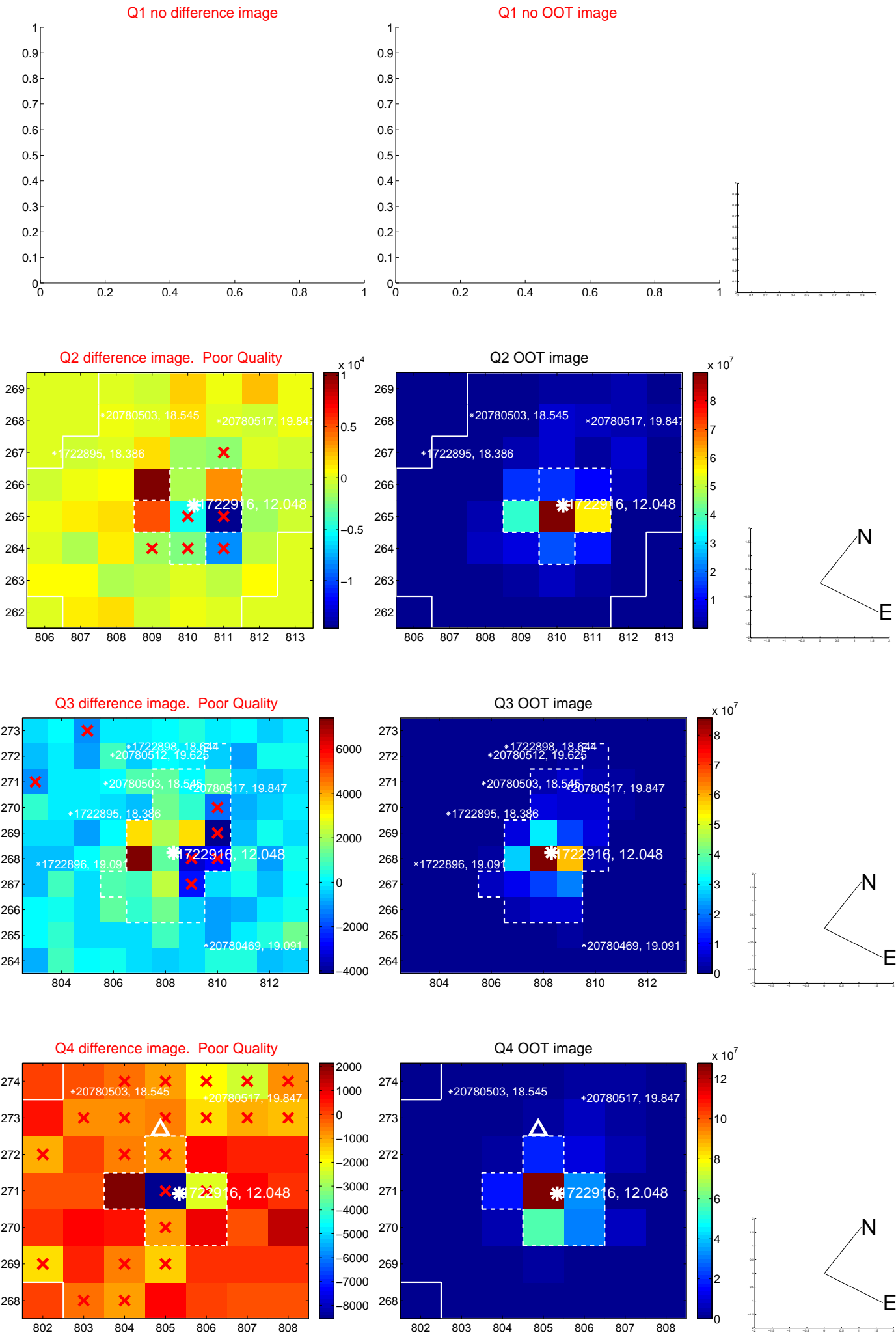


offset from photometric centroids

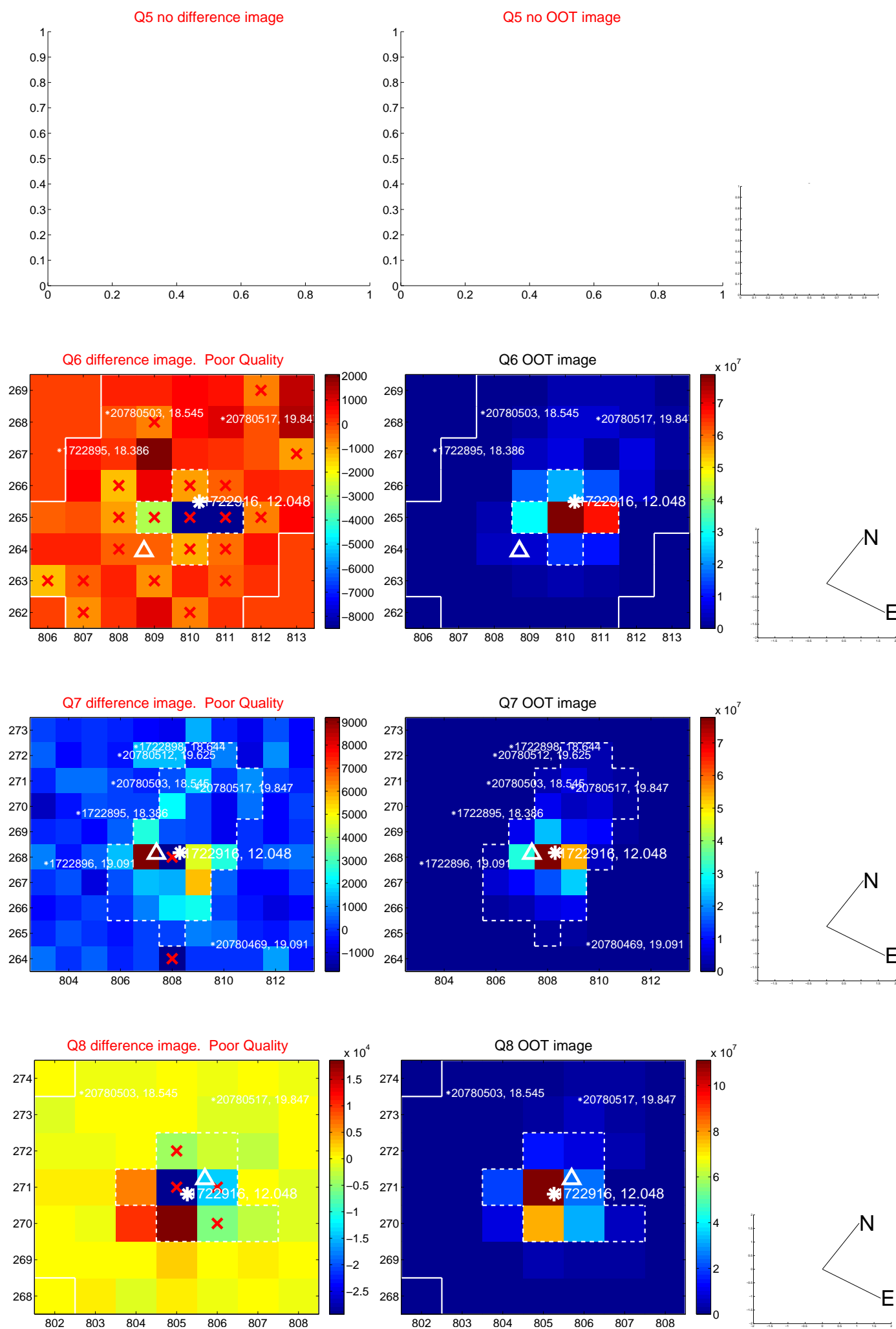


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

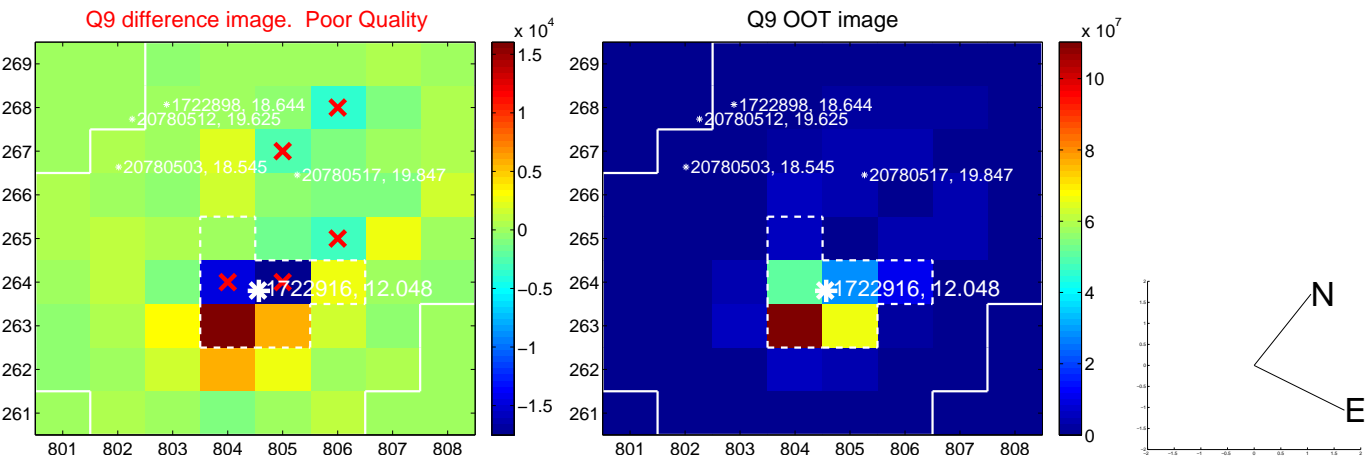
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

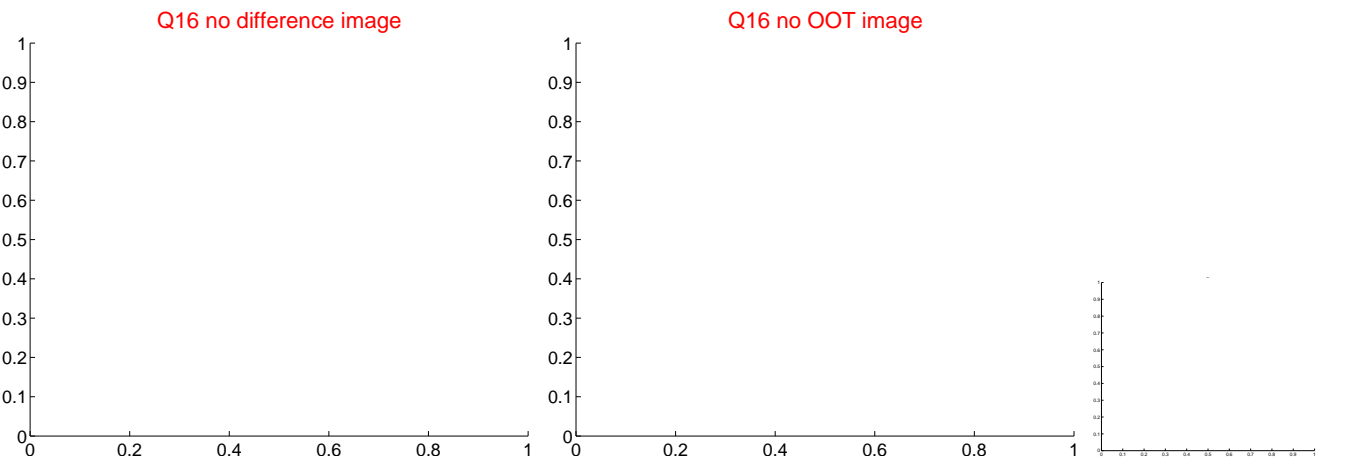
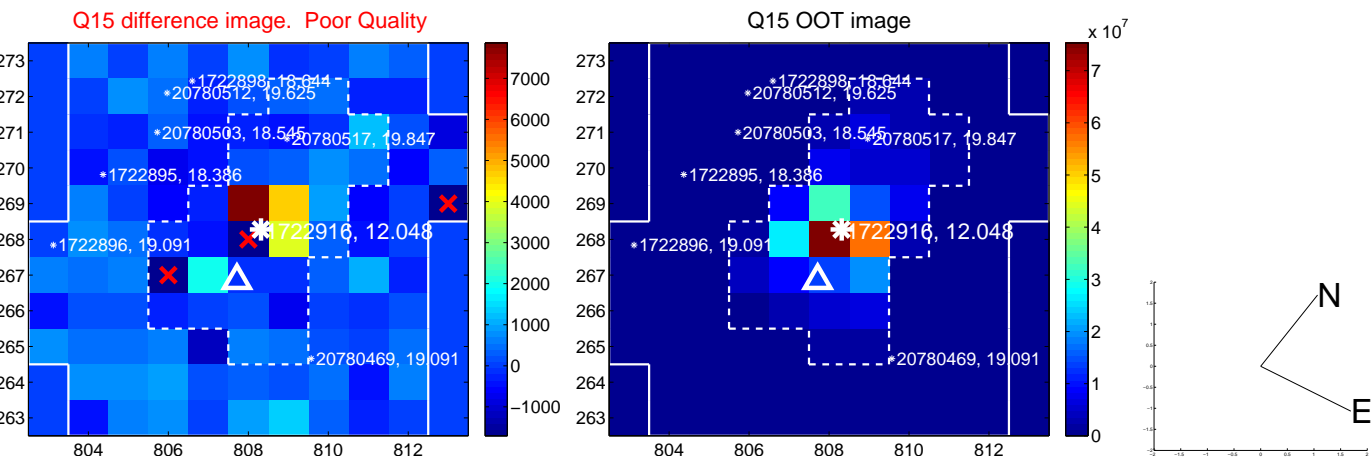
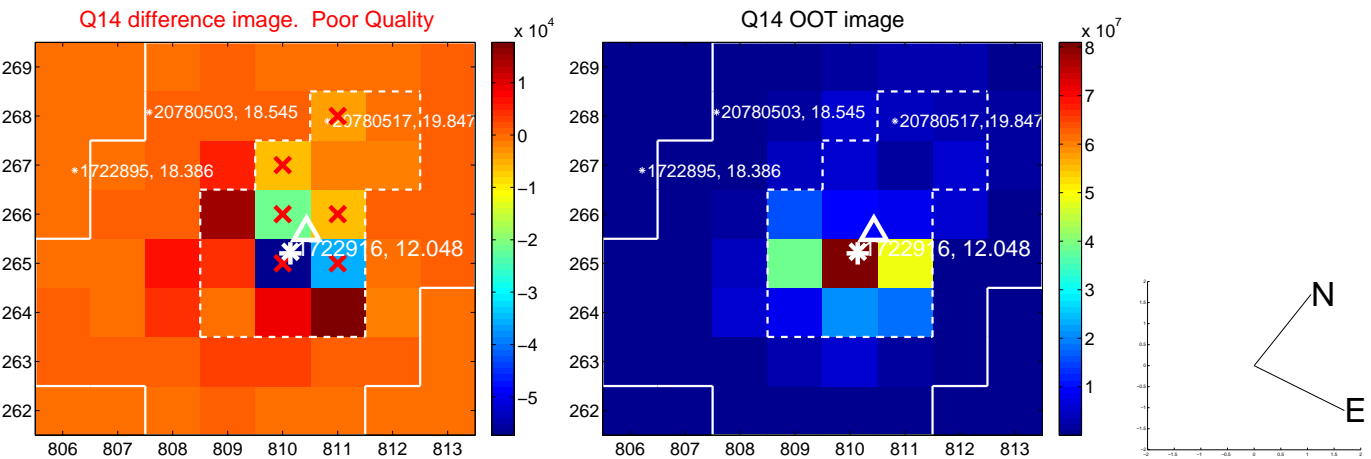
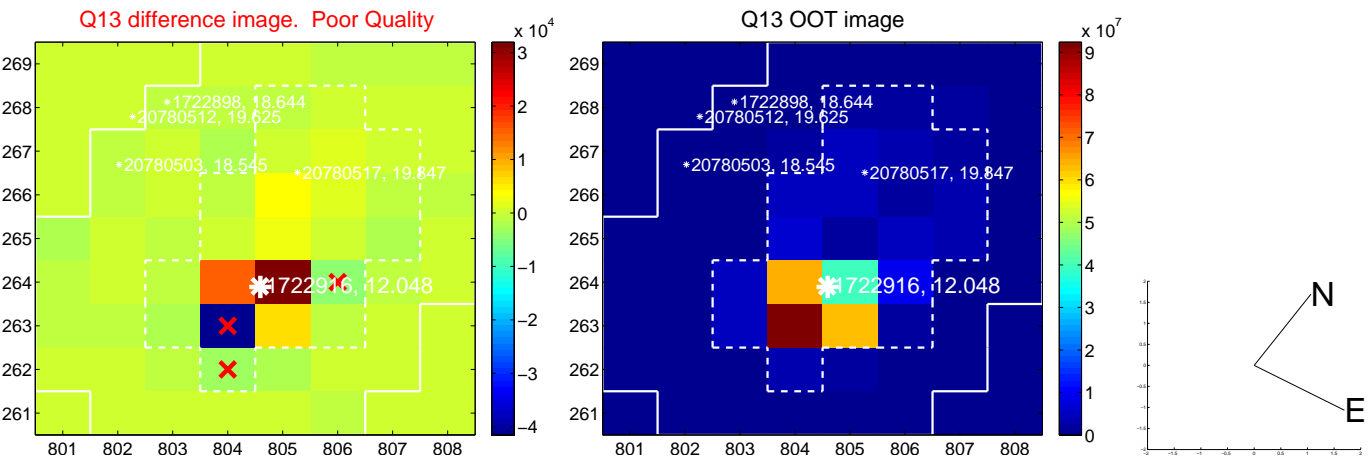


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

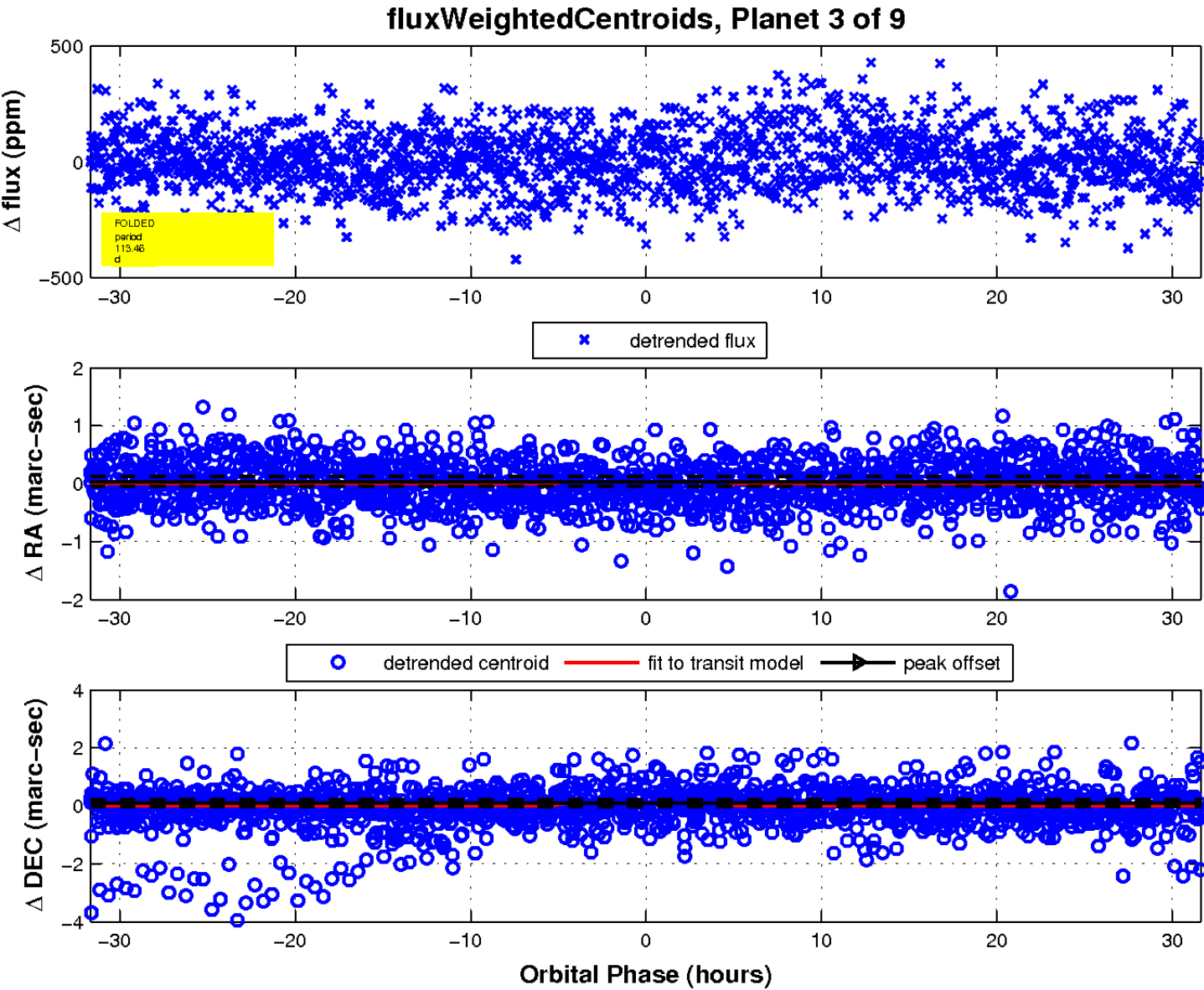
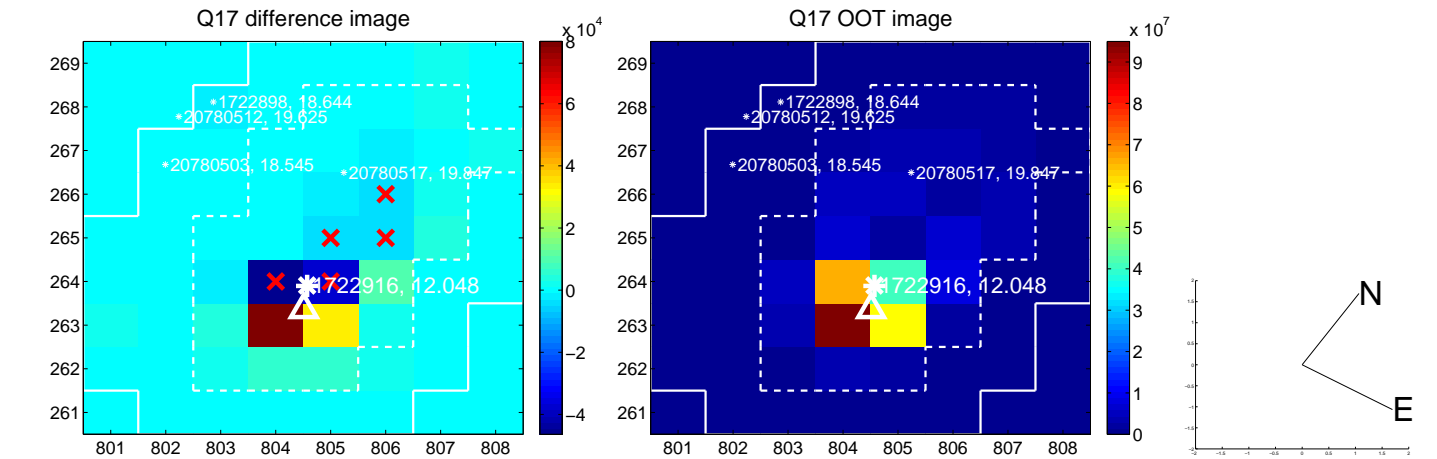




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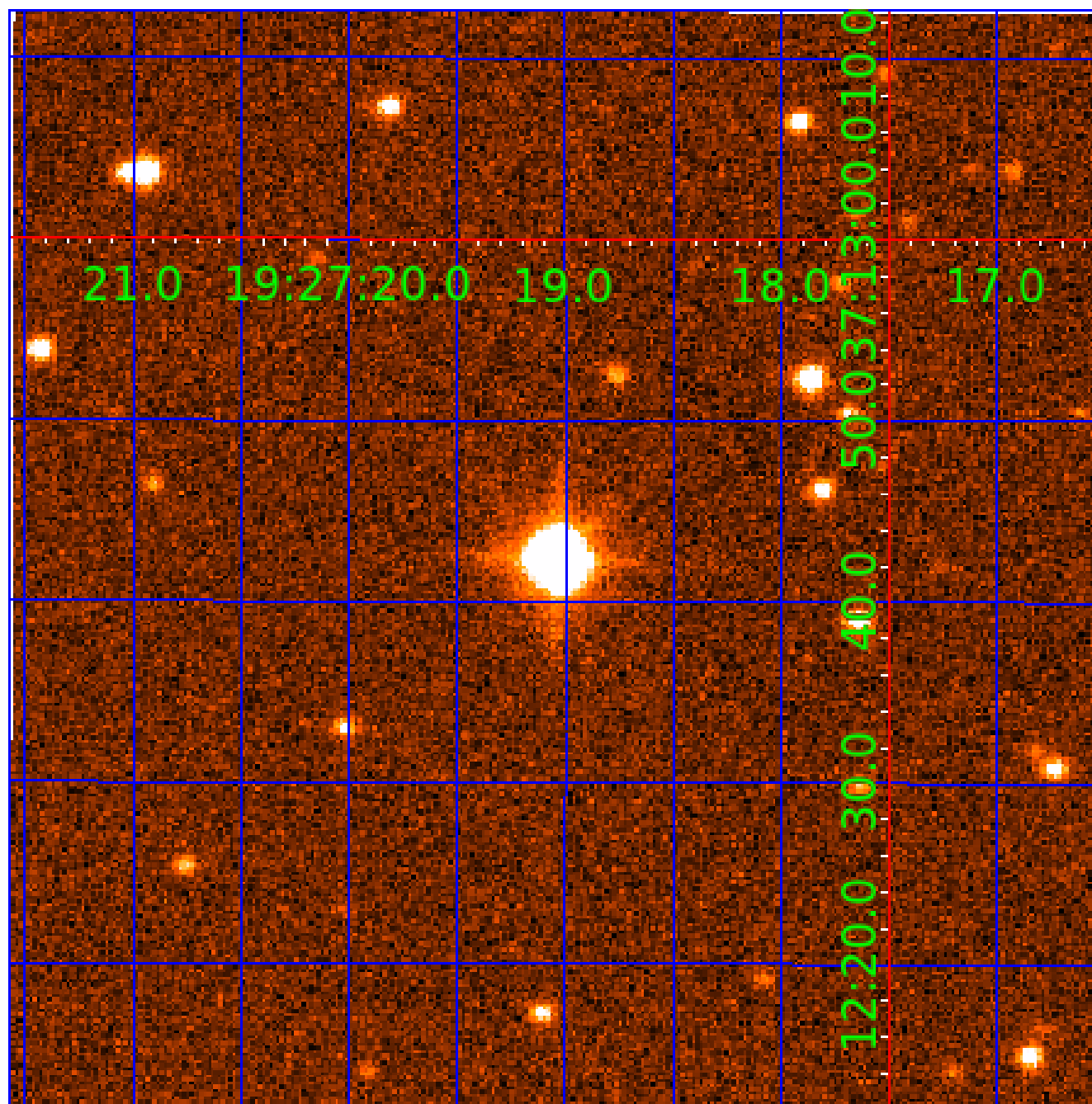


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 001722916

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
001722916-01	OBS	No	1.813535	132.513520	0.1	1.362	7.1	0.1	1.60	6812	0.09	4824.23
001722916-02	OBS	No	1.813822	132.494408	18.4	10.501	7.4	7.4	1.60	6812	0.75	4823.21
001722916-03	OBS	No	113.456084	213.726772	152.5	10.563	16.5	7.4	1.60	6812	2.25	19.43
001722916-04	OBS	No	59.108474	141.293815	101.1	15.638	8.7	7.4	1.60	6812	1.76	46.34
001722916-05	OBS	No	22.011274	131.997241	79.9	6.325	8.8	8.8	1.60	6812	1.69	172.96
001722916-06	OBS	No	359.058903	202.797449	338.0	20.552	8.5	8.3	1.60	6812	5.69	4.18
001722916-07	OBS	No	80.910752	145.943923	136.1	5.420	8.0	7.3	1.60	6812	2.19	30.49
001722916-08	OBS	No	95.858298	158.854822	172.1	2.318	8.1	7.6	1.60	6812	2.39	24.32
001722916-09	OBS	No	105.723678	156.862664	140.0	6.744	8.2	7.9	1.60	6812	2.40	21.34

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
001722916-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV
001722916-02	OBS	FP	0.00	1	0	0	0	LPP_DV—SAME_NTL_PERIOD
001722916-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
001722916-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
001722916-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
001722916-06	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS—HALO_GHOST
001722916-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
001722916-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES—TRANS_GAPPED—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
001722916-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT

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

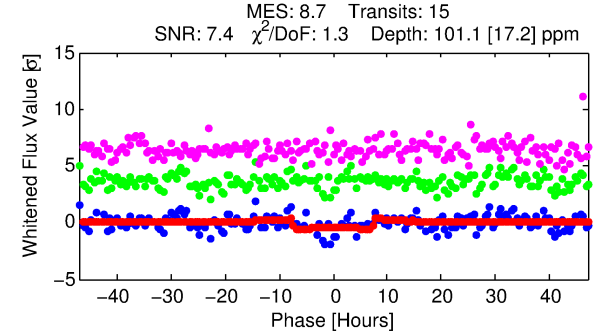
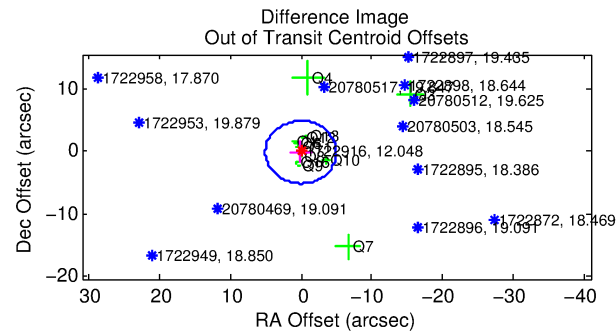
N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

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 001722916-04

No Significant Match Found

## KIC: 1722916    Candidate: 4 of 9    Period: 59.108 d

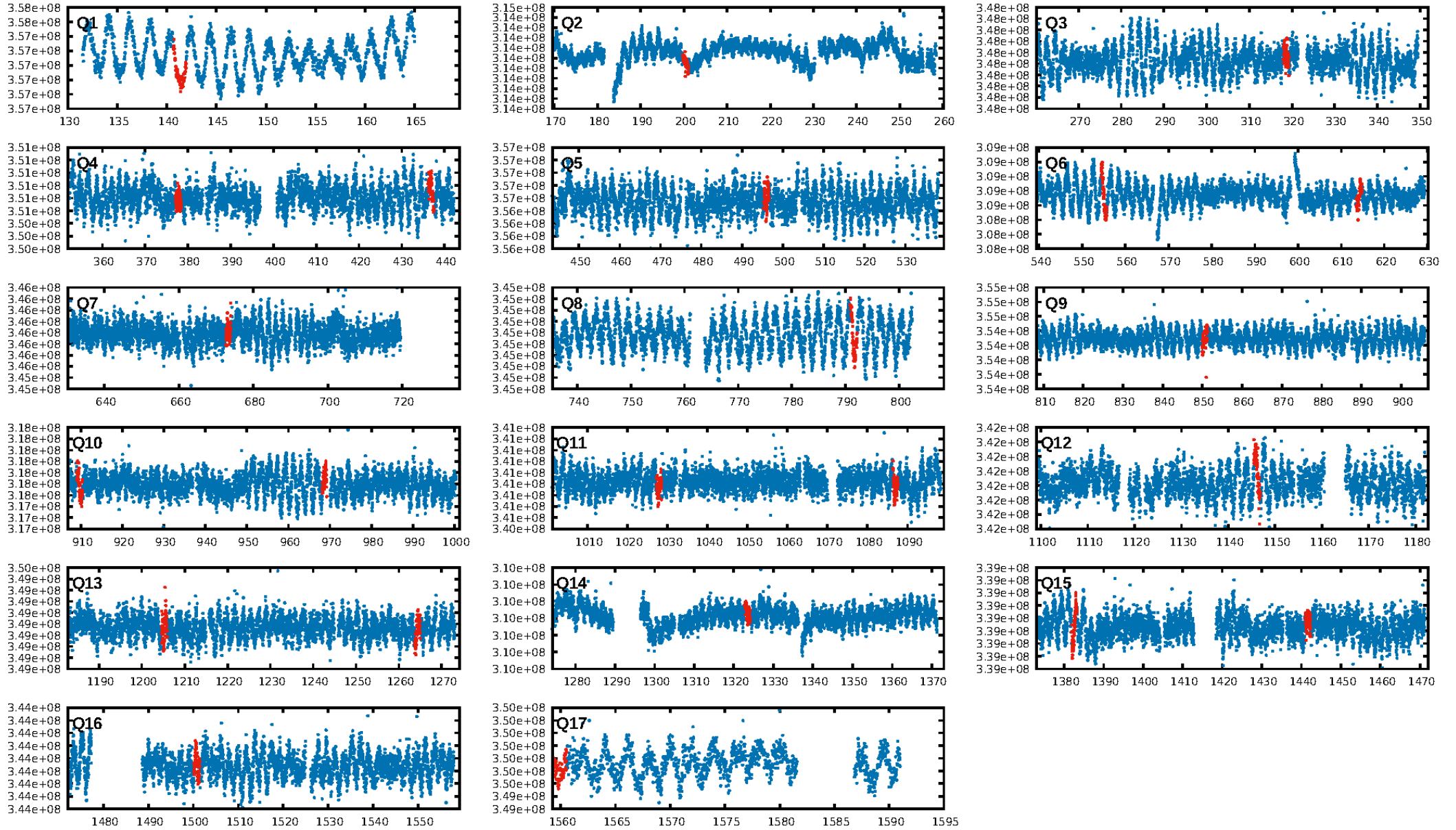


ShortPeriod-sig: 100.0% [52.78σ]  
 LongPeriod-sig: 100.0% [31.62σ]  
 ModelChiSquare2-sig: 53.1%  
 ModelChiSquareGof-sig: 100.0%  
**Bootstrap-pfa: 4.17e-08**  
 RollingBand-fgt: 1.00 [15/15]  
 GhostDiagnostic-chr: -0.7443  
  
 Centroid-sig: 50.9%  
 Centroid-so: 0.683 arcsec [0.92σ]  
 OotOffset-rm: 0.191 arcsec [0.11σ]  
 KicOffset-rm: 0.214 arcsec [0.12σ]  
 OotOffset-st: 2/3/4/3 [12]  
 KicOffset-st: 2/3/4/3 [12]  
 DiffImageQuality-fgm: 0.25 [3/12]  
 DiffImageOverlap-fno: 0.00 [0/15]

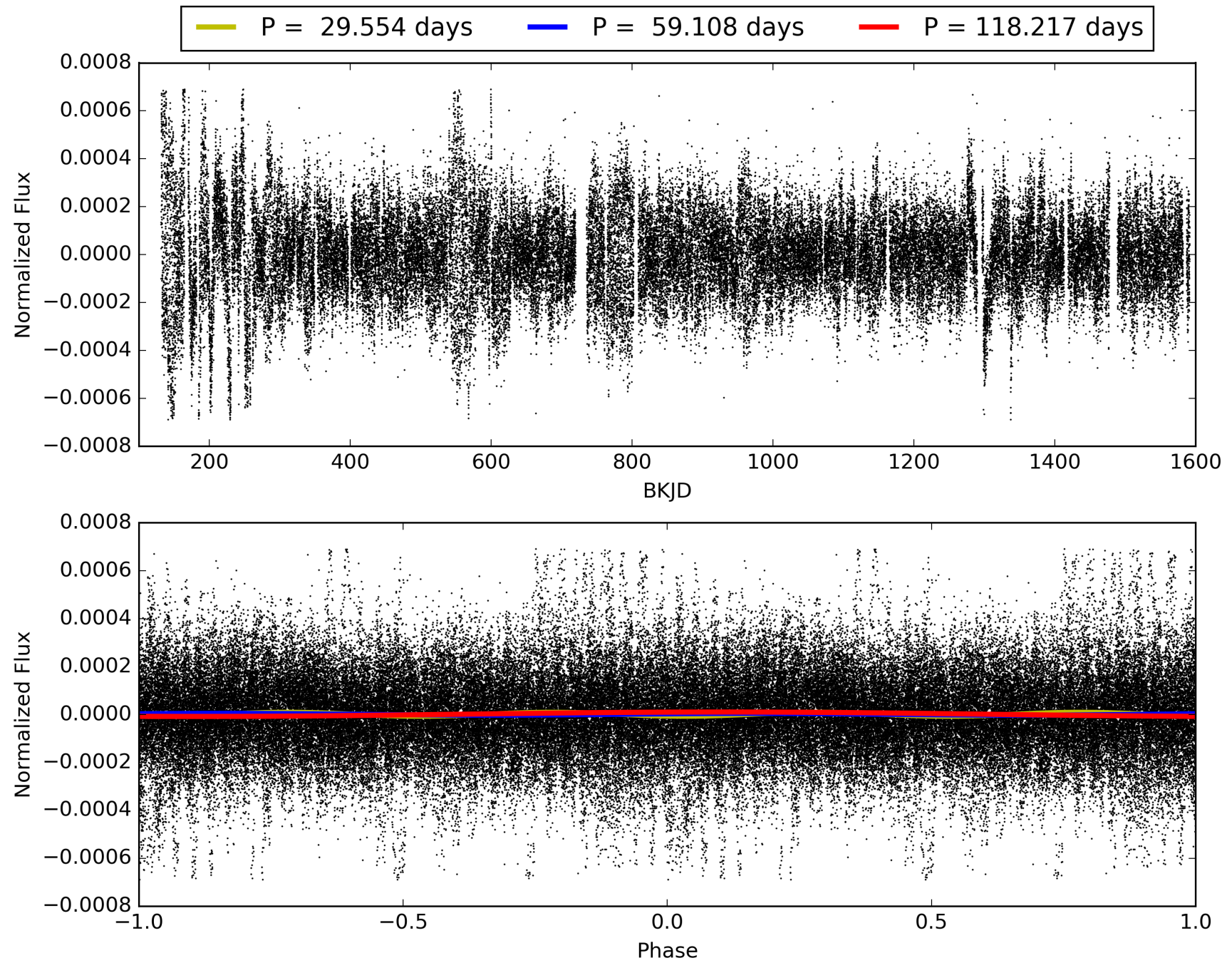
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 001722916-04, PDC Light Curves

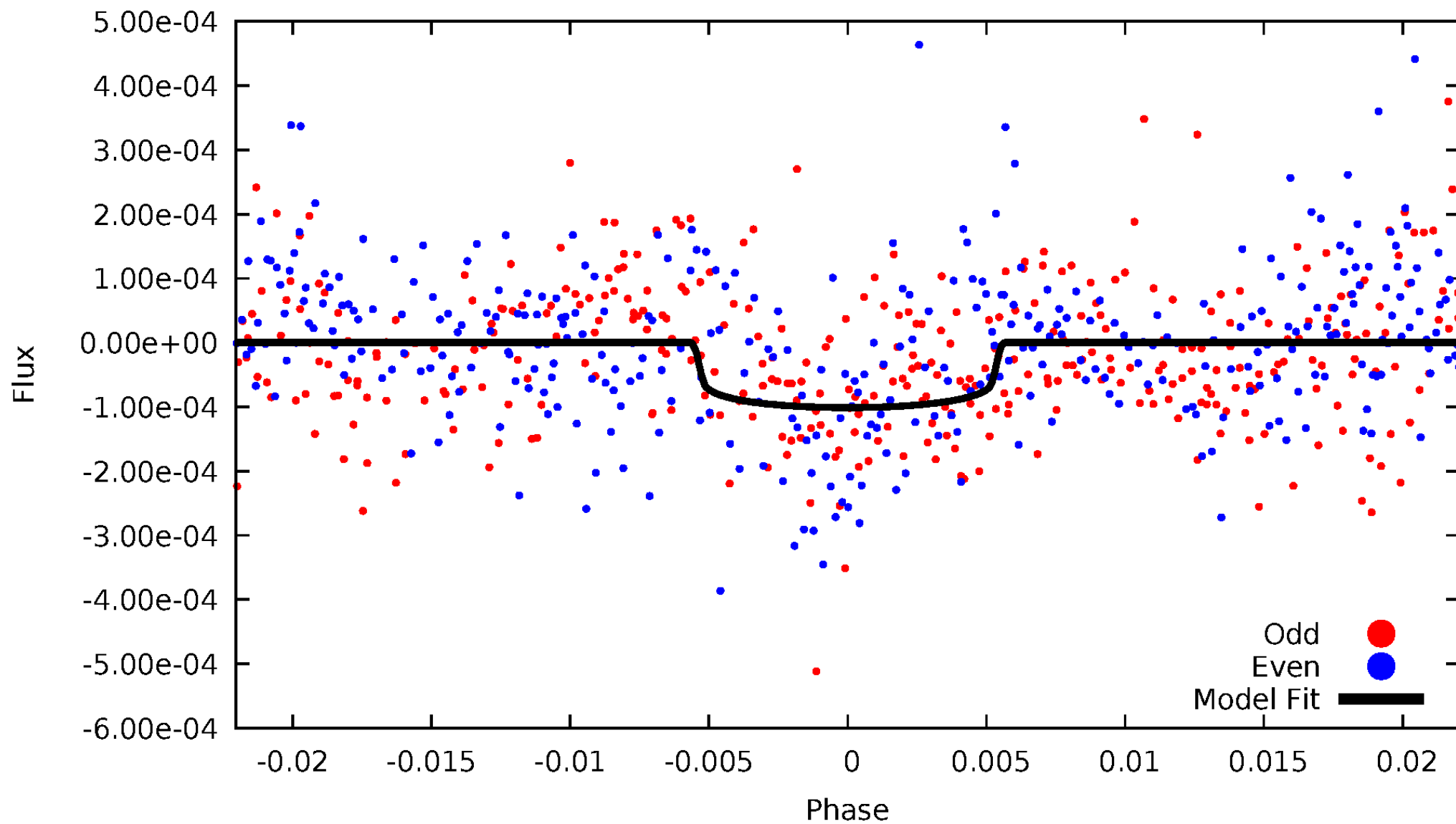


# TCE 001722916-04



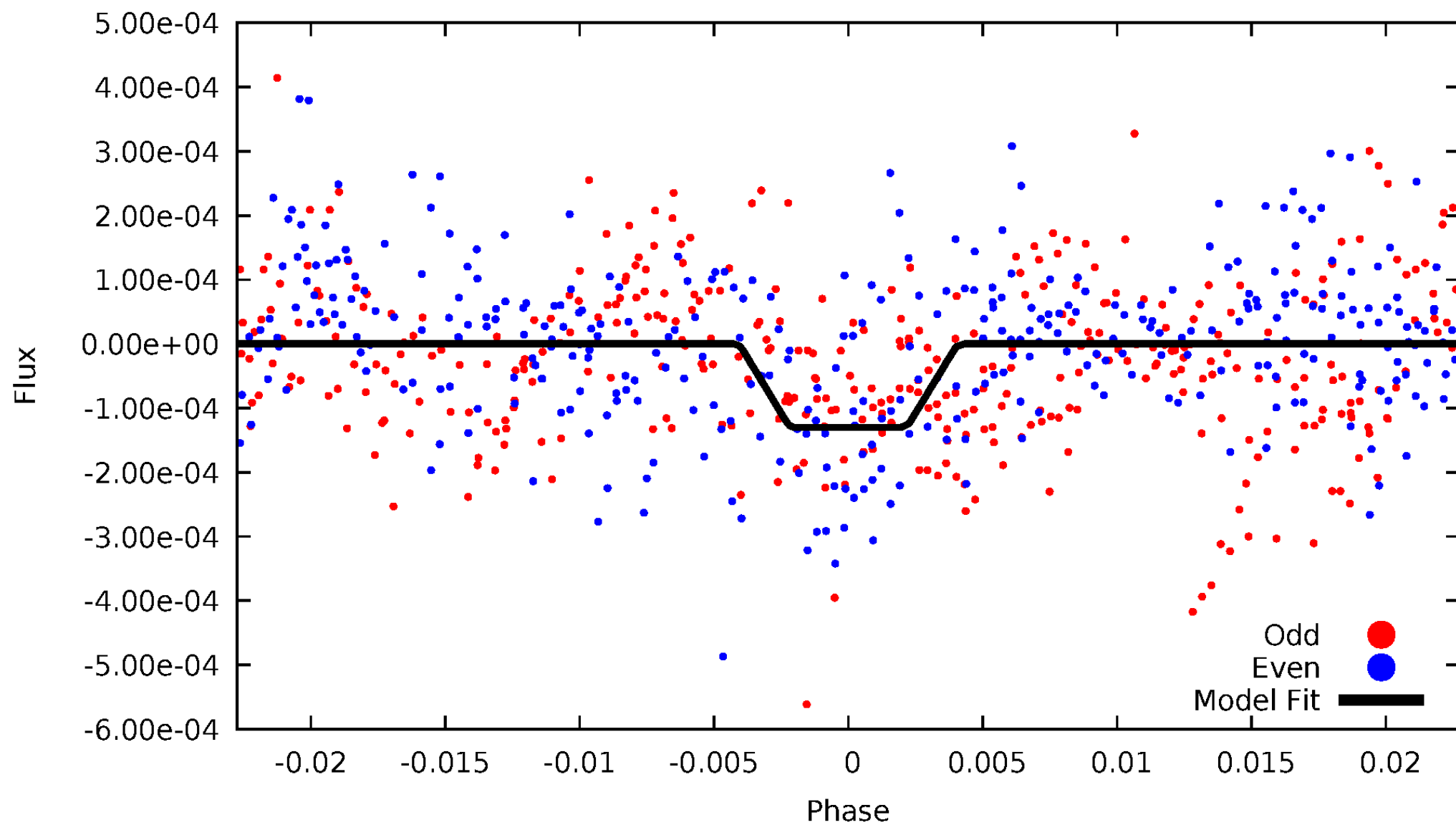
# DV Odd/Even

TCE 001722916-04



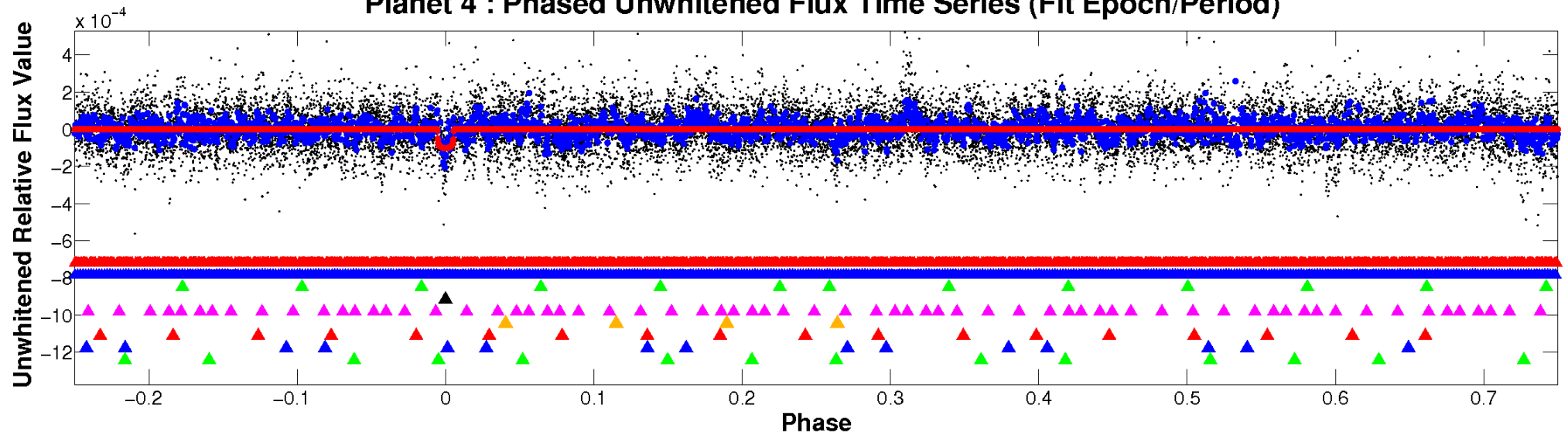
# ALT Odd/Even

TCE 001722916-04

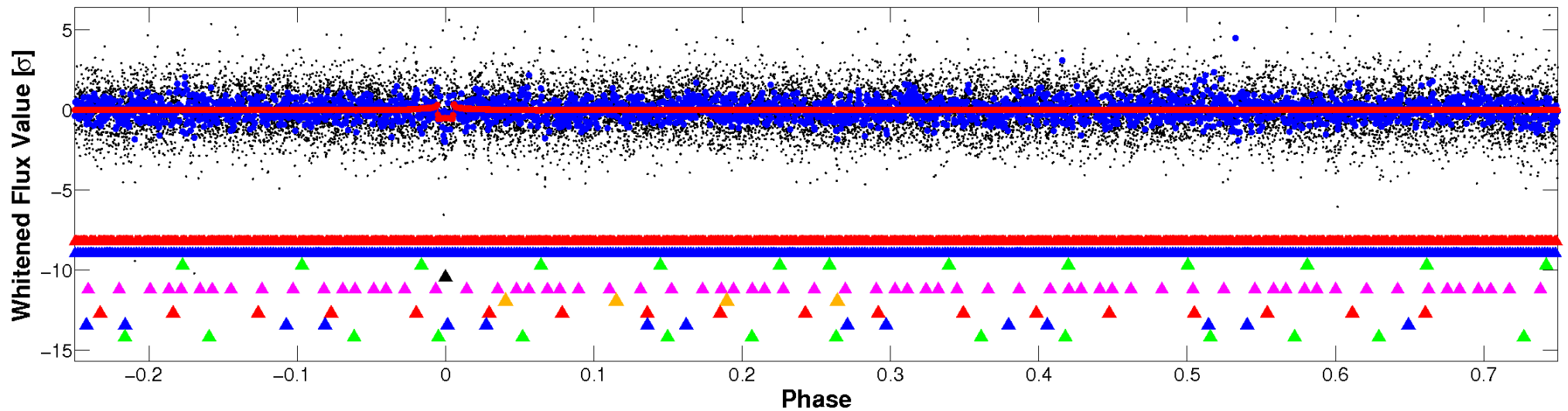


# Non-Whitened Vs. Whitened Light Curve

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



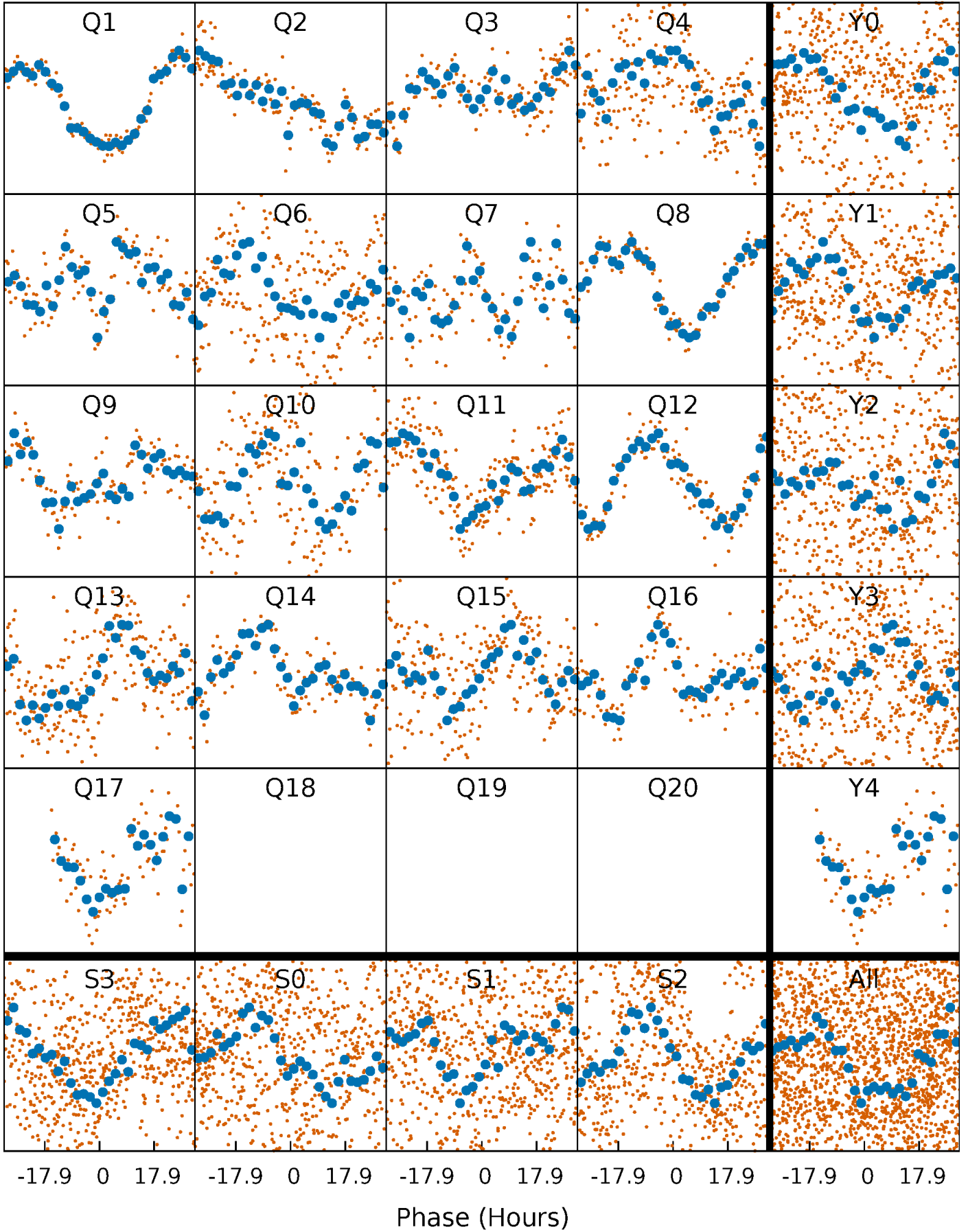
## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)





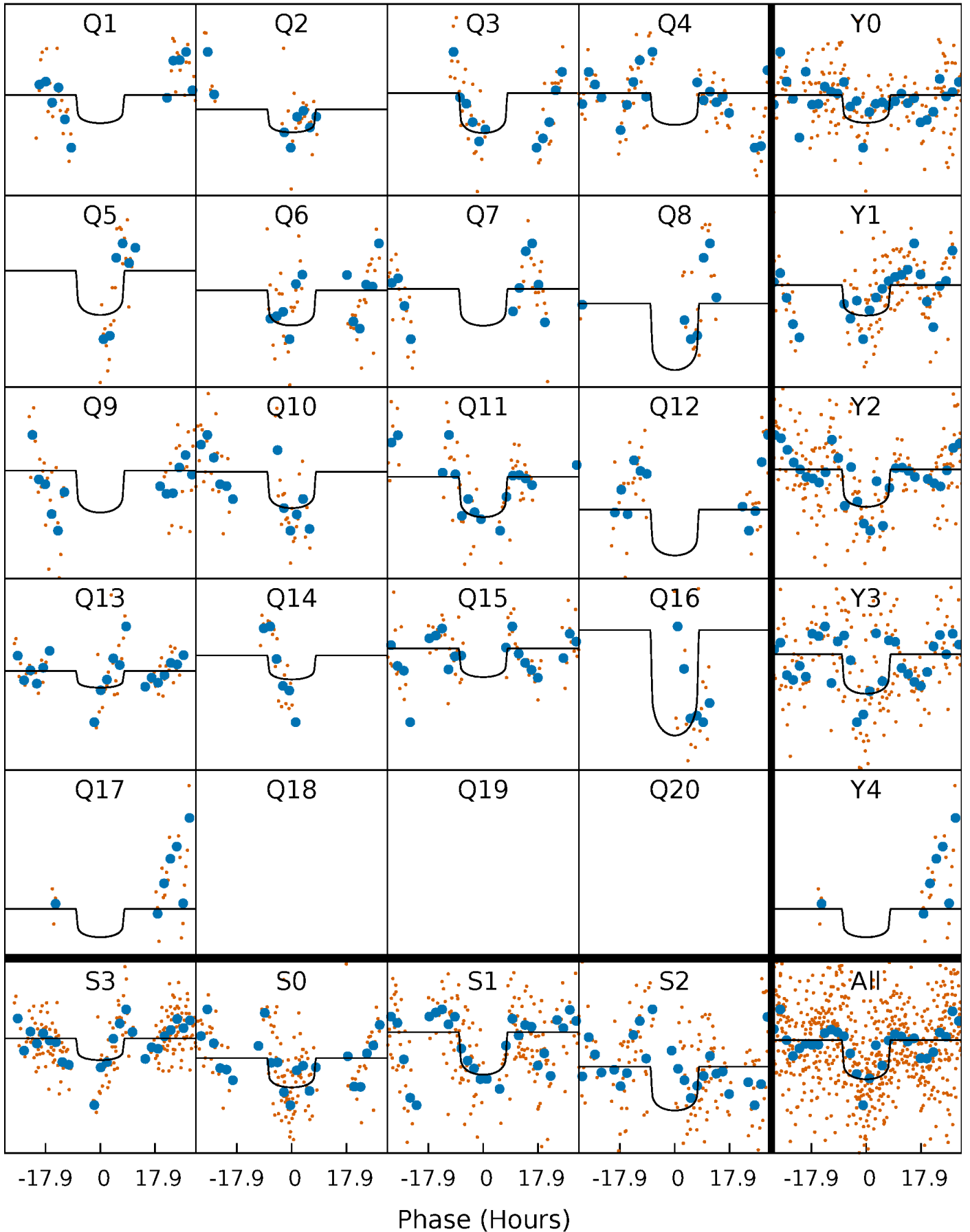
# PDC Quarter-Phased Transit Curves

TCE 001722916-04   P= 59.108474 Days    $T_0=141.293815$  (BKJD)



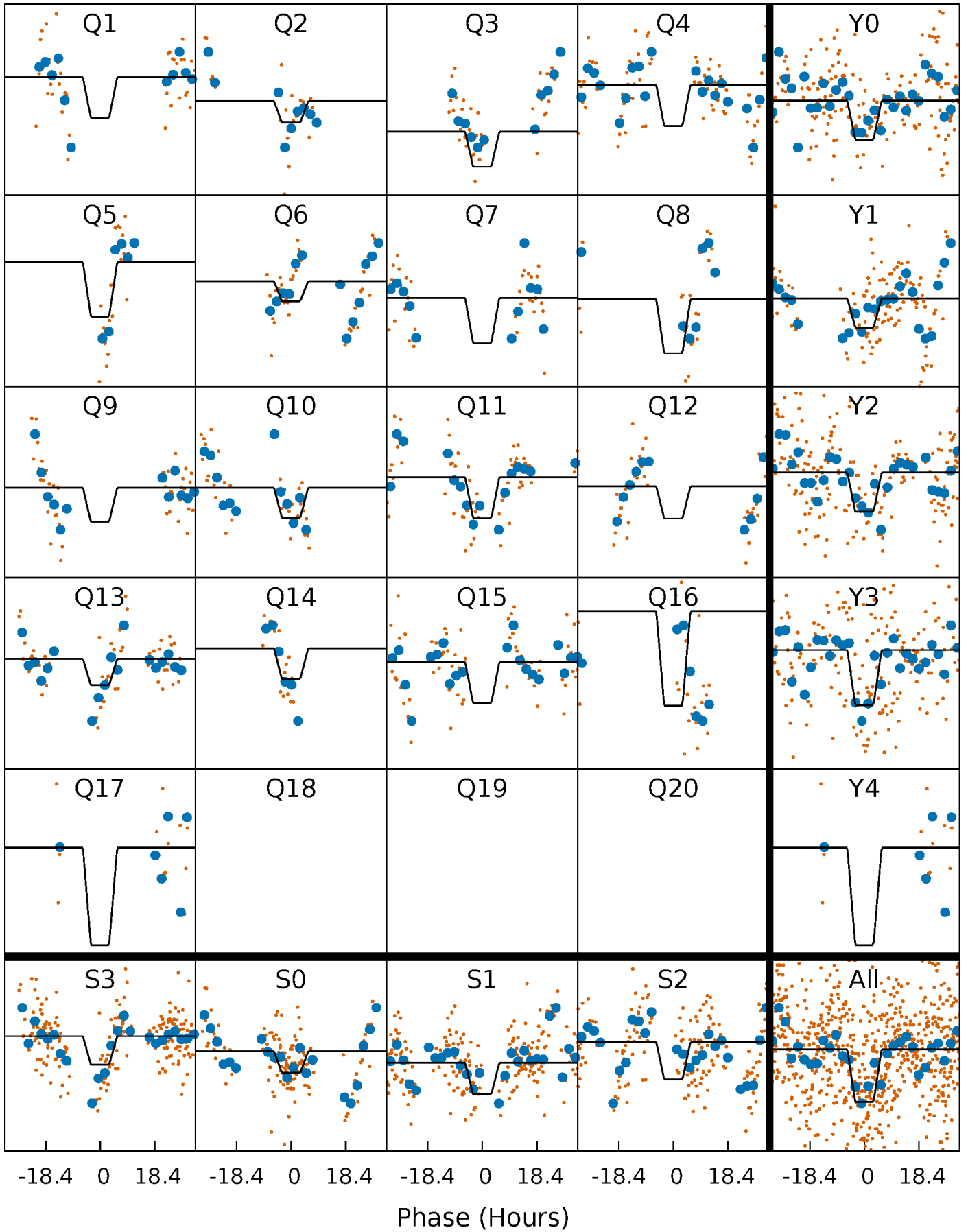
# DV Quarter-Phased Transit Curves

TCE 001722916-04   P= 59.108474 Days    $T_0=141.293815$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

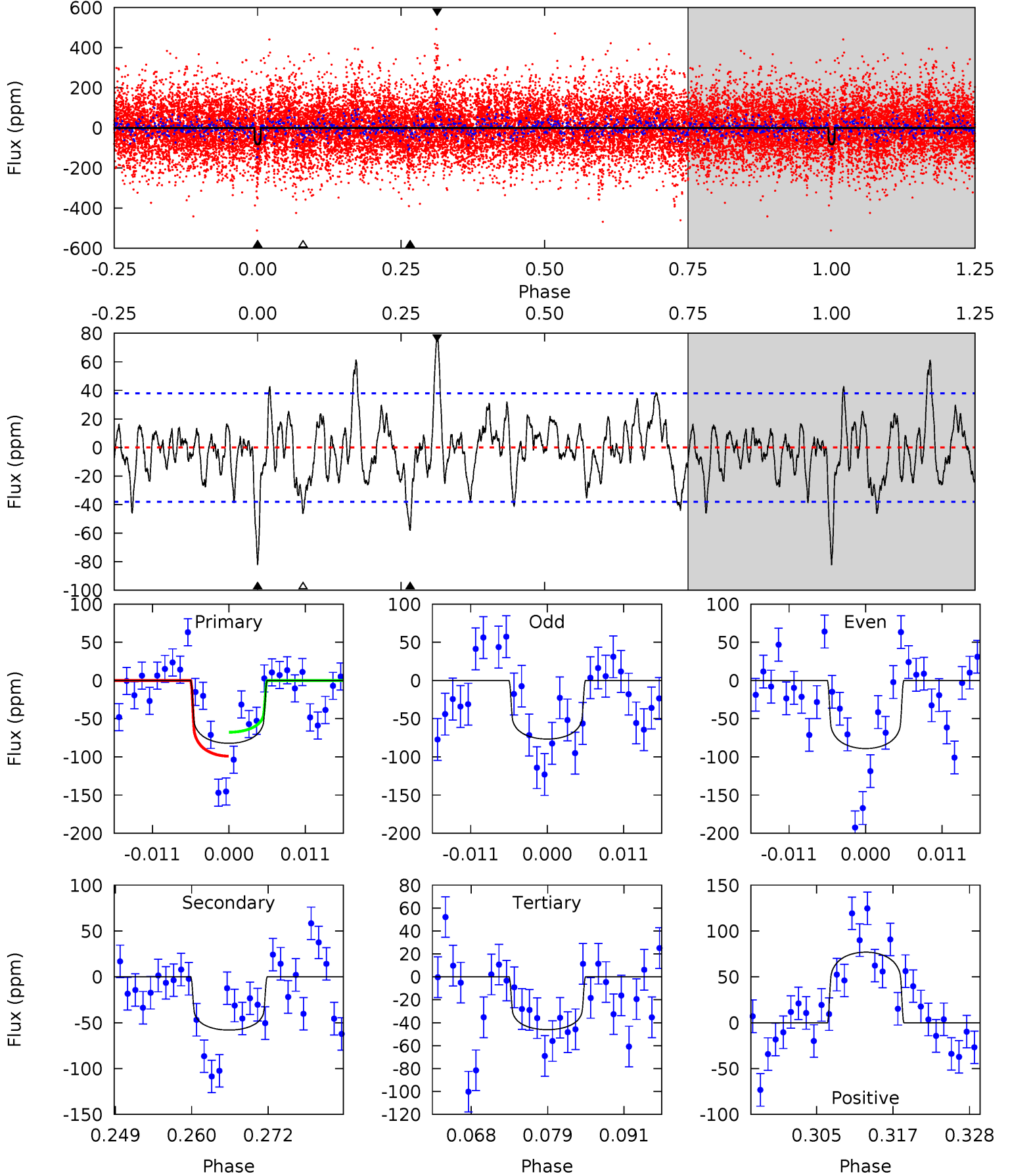
TCE 001722916-04 P= 59.105640 Days  $T_0=141.321056$  (BKJD)



# DV Model-Shift Uniqueness Test

001722916-04, P = 59.108474 Days, E = 82.185341 Days

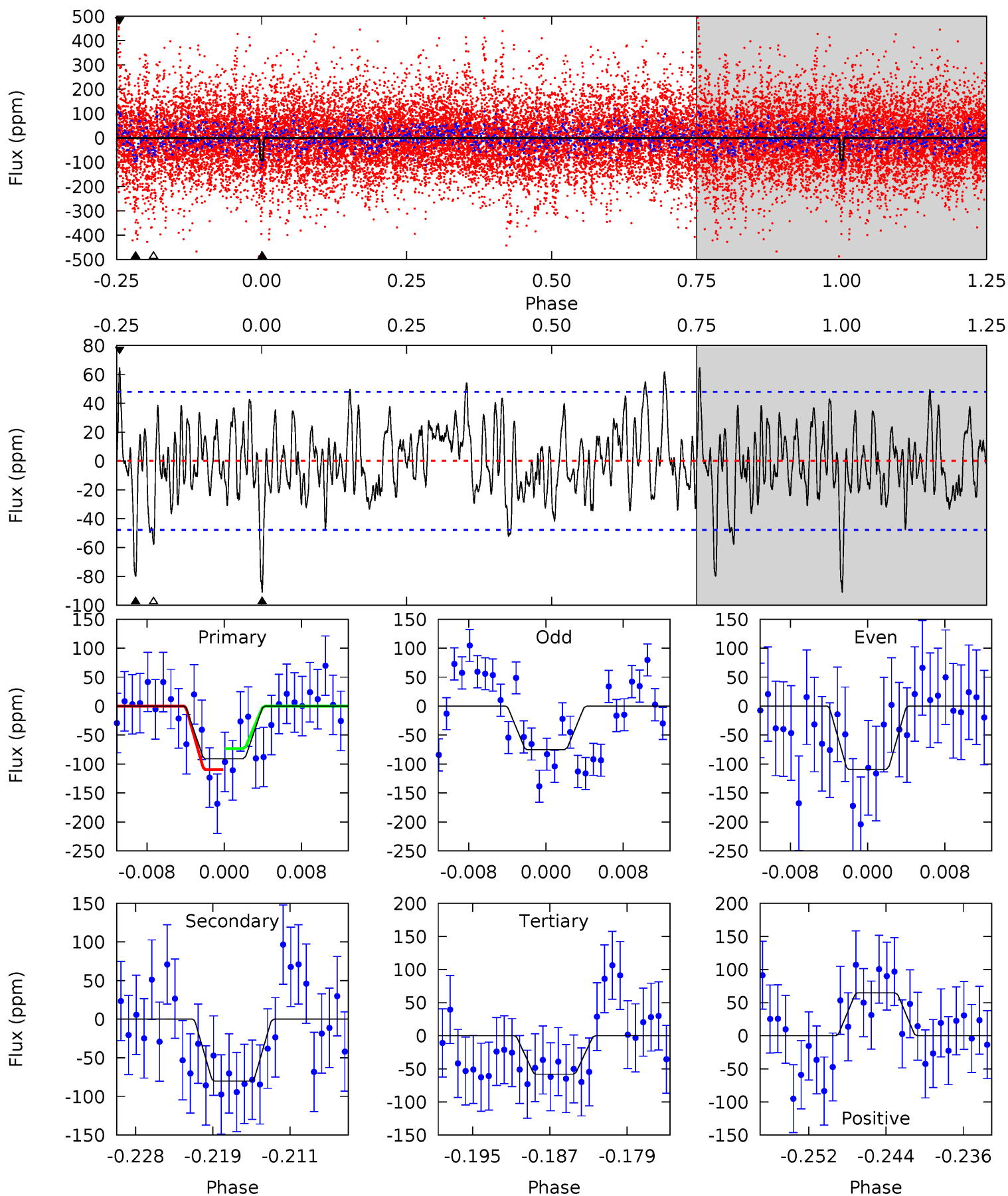
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.8	7.65	6.07	10.1	5.00	2.53	2.43	4.76	0.71	1.58	-2.48	0.82	0.75	0.48	2.06



# Alt Model-Shift Uniqueness Test

001722916-04, P = 59.105640 Days, E = 82.215416 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
9.64	8.48	6.15	6.86	5.07	2.65	2.21	3.49	2.78	2.34	1.62	1.78	0.95	0.42	1.91



### Stellar Parameters For KIC 001722916

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6812^{+71}_{-91}$	$4.154^{+0.115}_{-0.115}$	$-0.180^{+0.150}_{-0.200}$	$1.604^{+0.262}_{-0.236}$	$1.347^{+0.088}_{-0.118}$	$0.460^{+0.237}_{-0.156}$
	+1%/-1%	+3%/-3%	+83%/-111%	+16%/-15%	+7%/-9%	+51%/-34%
Source	SPE68	SPE68	SPE68	DSEP		

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

### Secondary Eclipse Parameters for KIC 001722916-04 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-58 \pm 8$	$1.79^{+0.46}_{-0.45}$	$932^{+39}_{-44}$	$5847^{+925}_{-569}$	$1062^{+837}_{-407}$
Alt.	$-80 \pm 9$	$2.03^{+0.50}_{-0.48}$	$930^{+40}_{-40}$	$5991^{+771}_{-571}$	$1151^{+816}_{-416}$

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



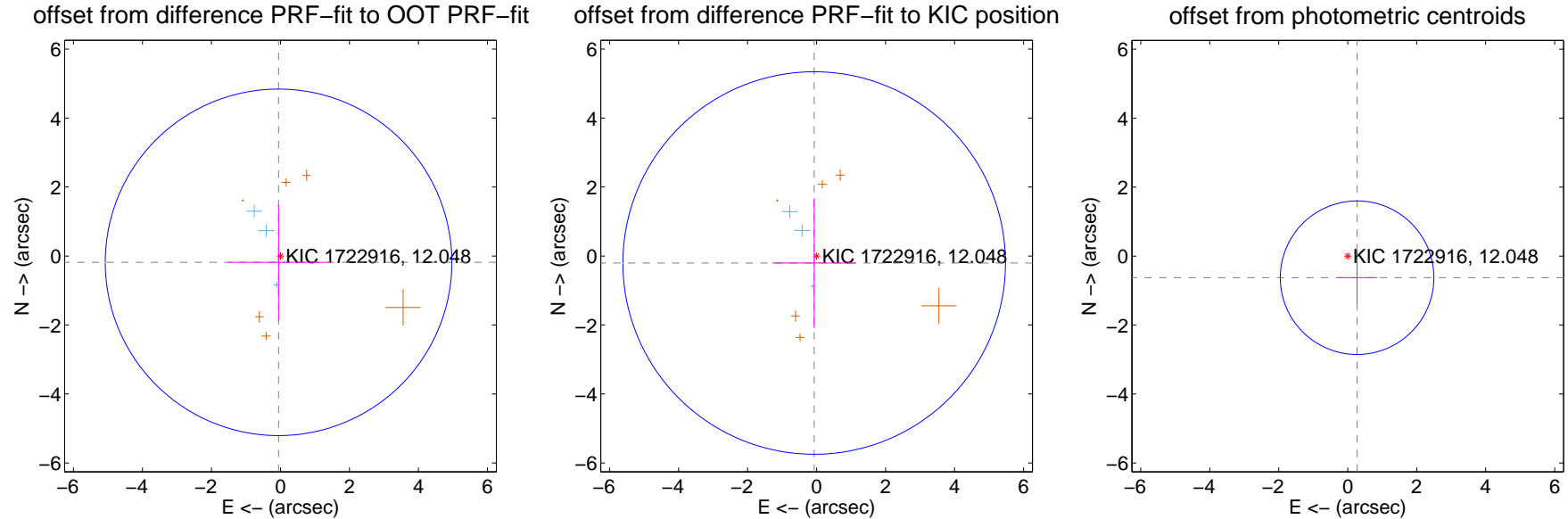
## DV Centroid Data

Supplemental centroid analysis for 001722916-04. Kepler magnitude: 12.05. Transit SNR 7.38

There are 3 quarters with good PRF difference image offsets

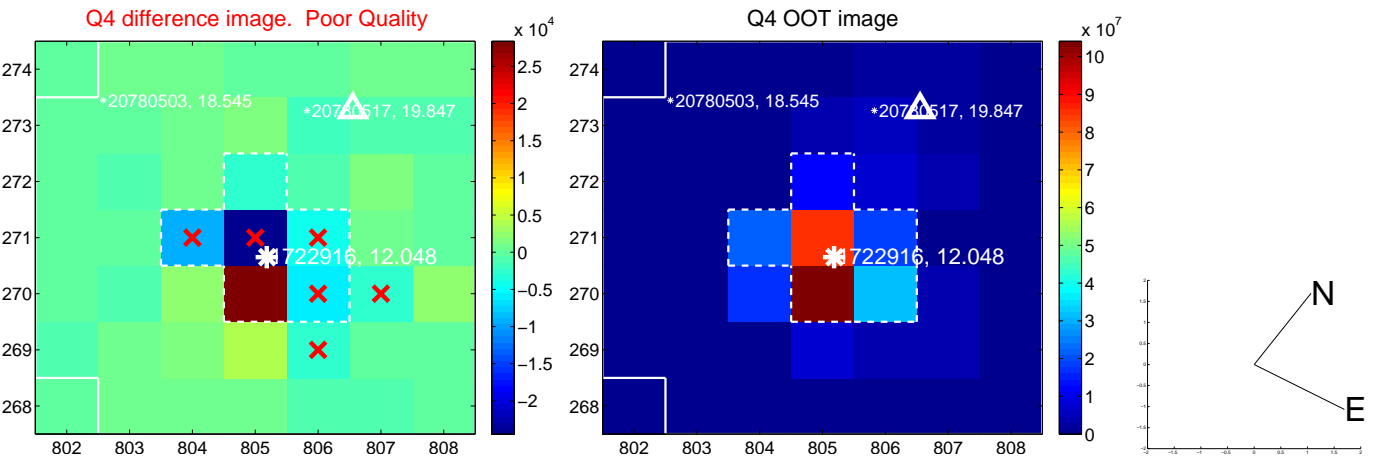
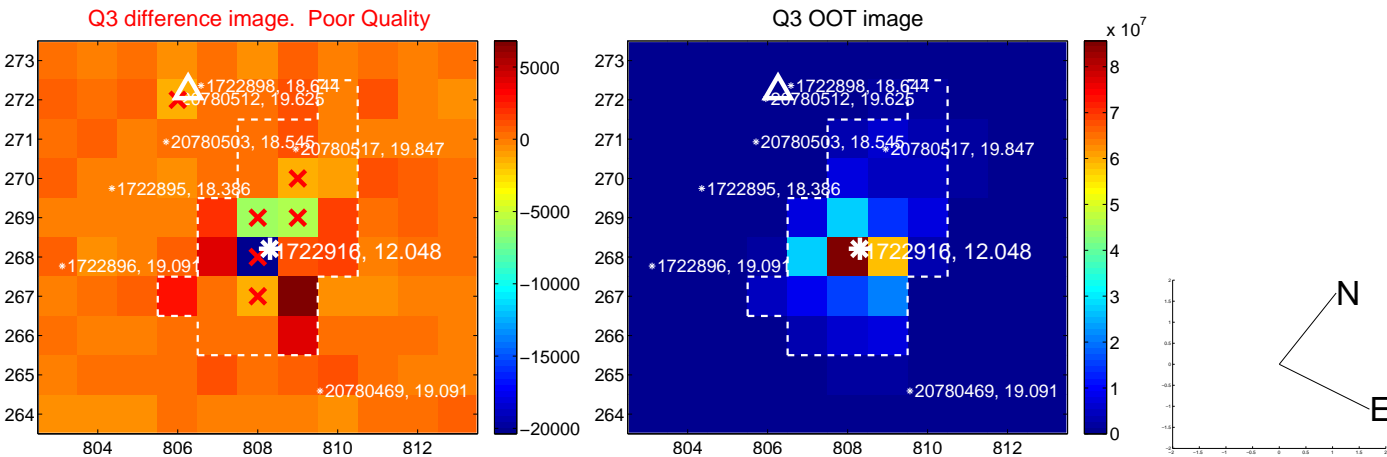
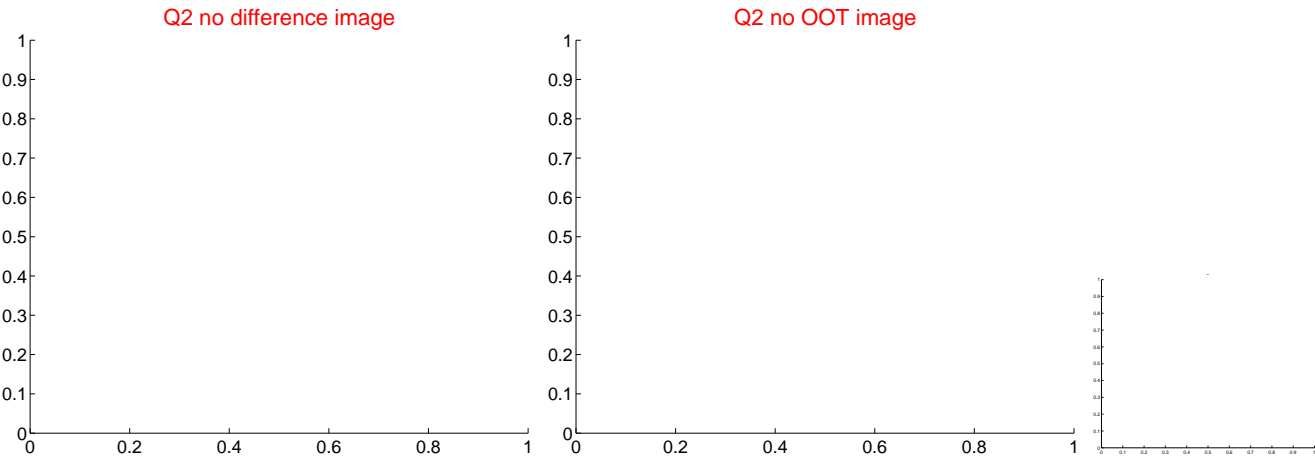
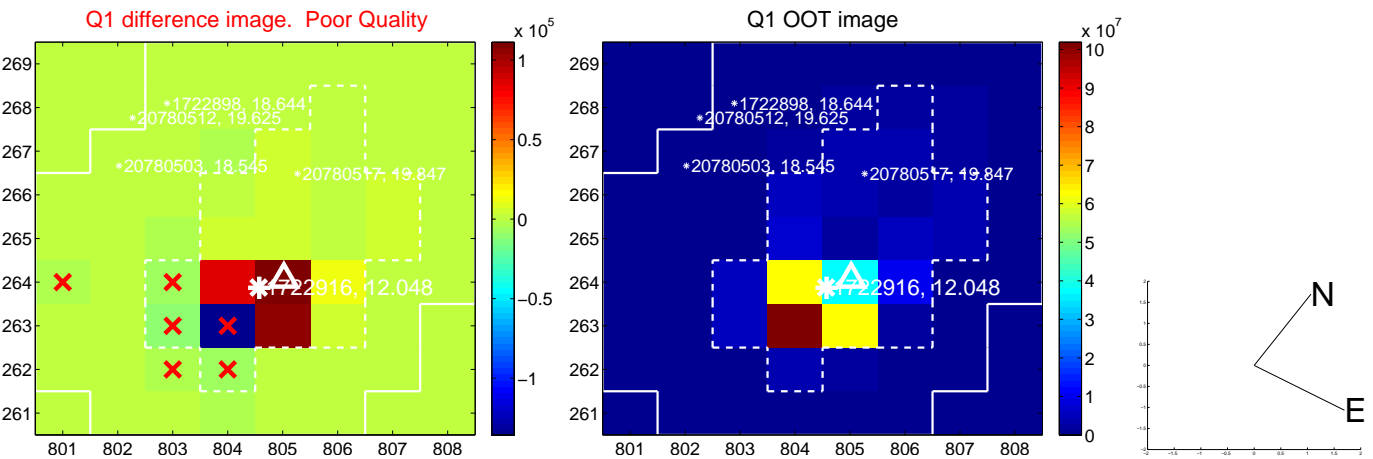
The direct PRF centroid is offset from the target star catalog position by about 0.02 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.191 \pm 1.674$	0.11	$0.055 \pm 1.463$	$-0.183 \pm 1.670$
PRF-fit source offset from KIC position	$0.214 \pm 1.848$	0.12	$0.069 \pm 1.213$	$-0.203 \pm 1.879$
photometric centroid source offset	$0.68 \pm 0.74$	0.92	$-0.27 \pm 0.58$	$-0.63 \pm 0.77$

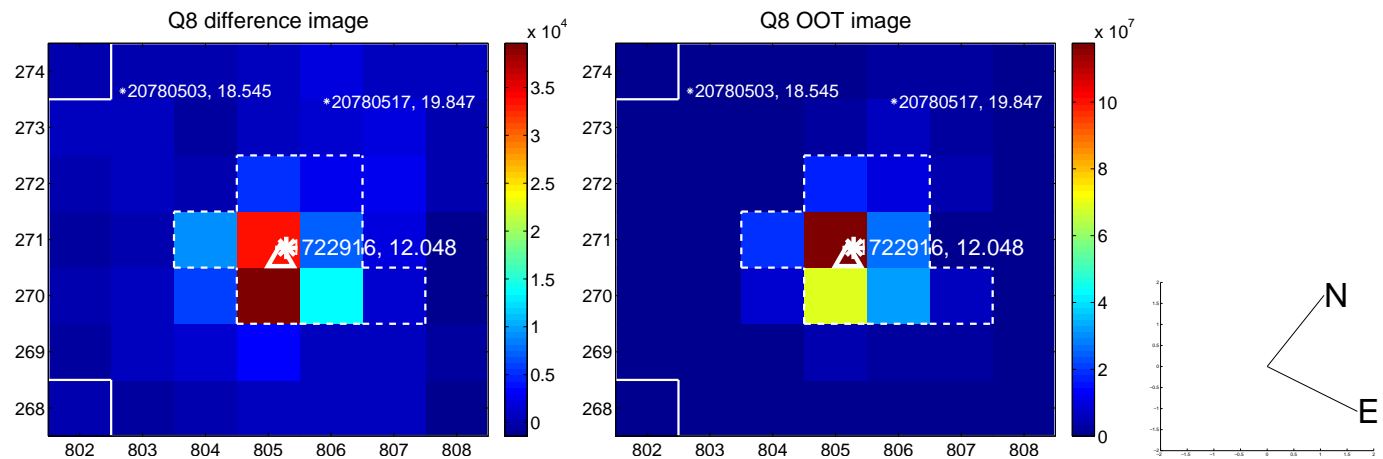
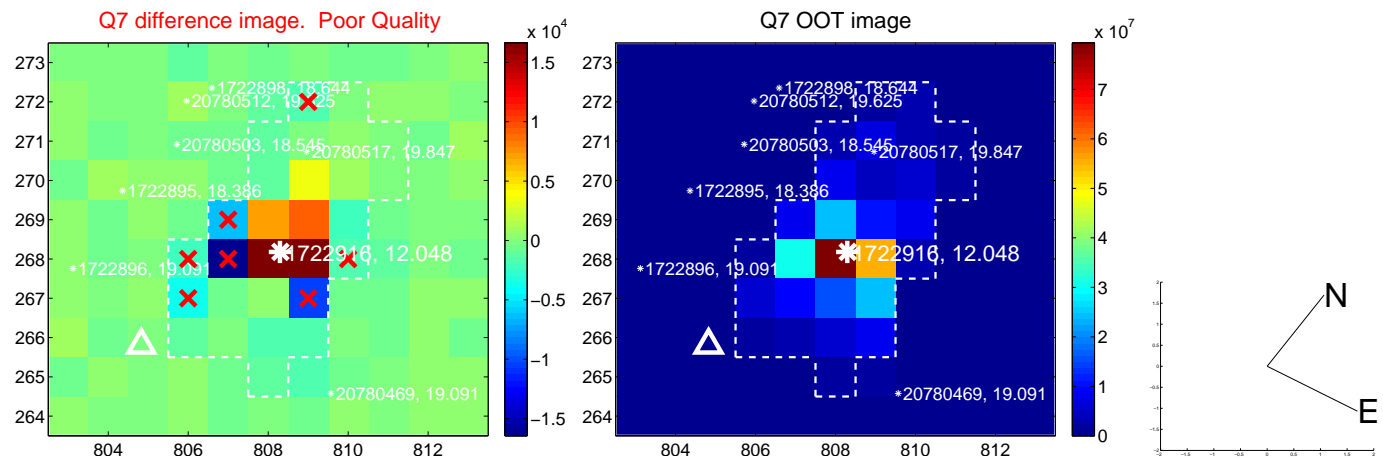
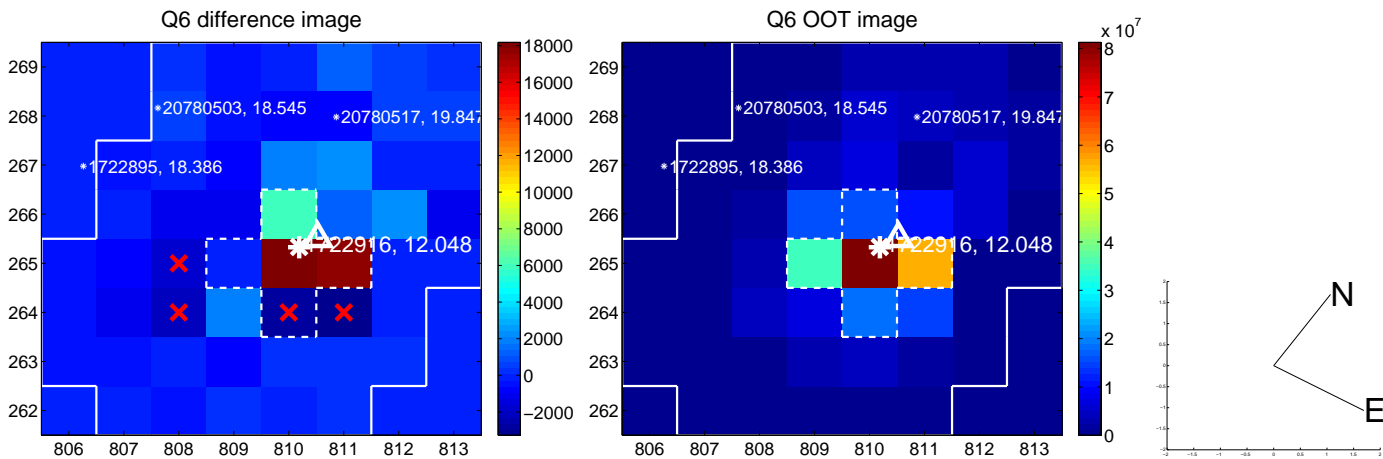
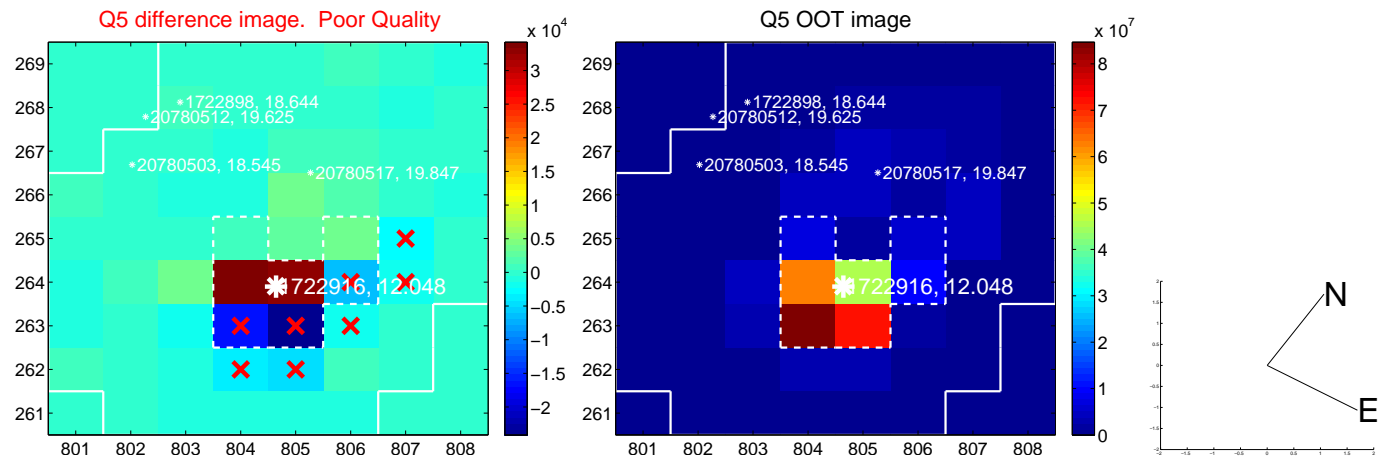


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

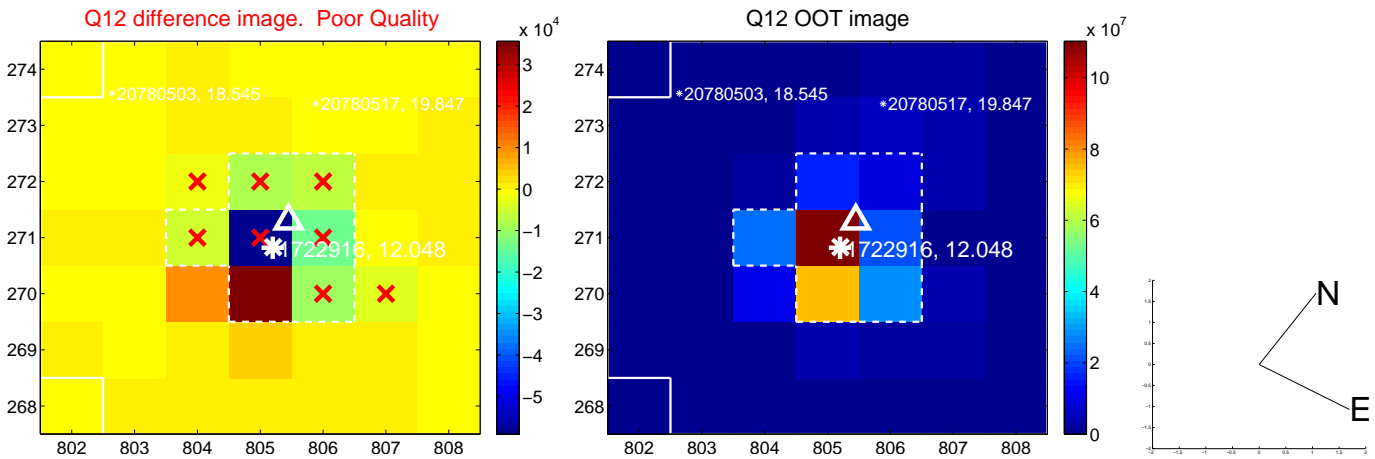
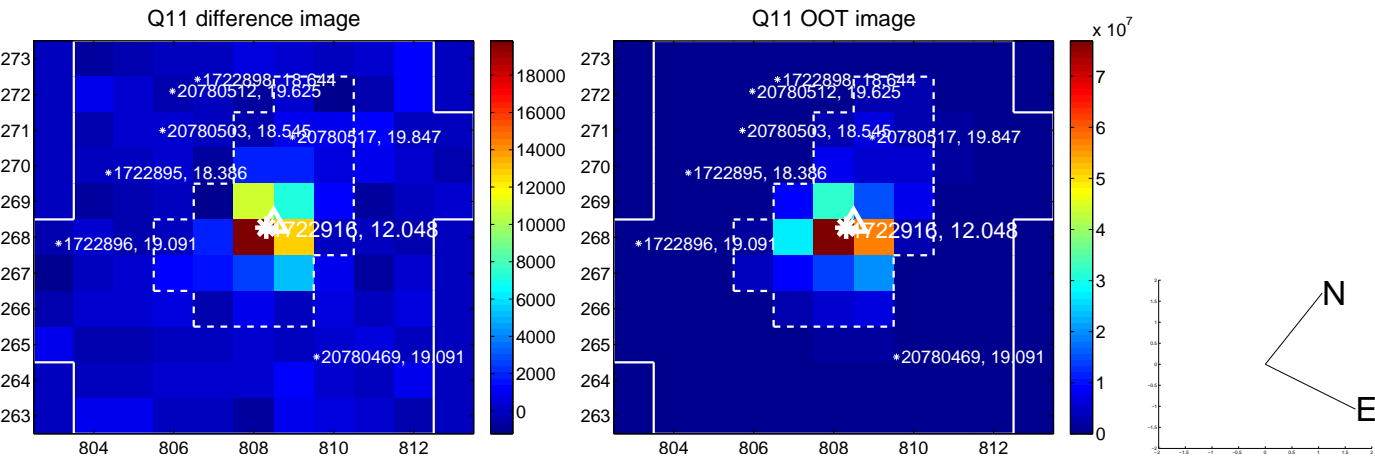
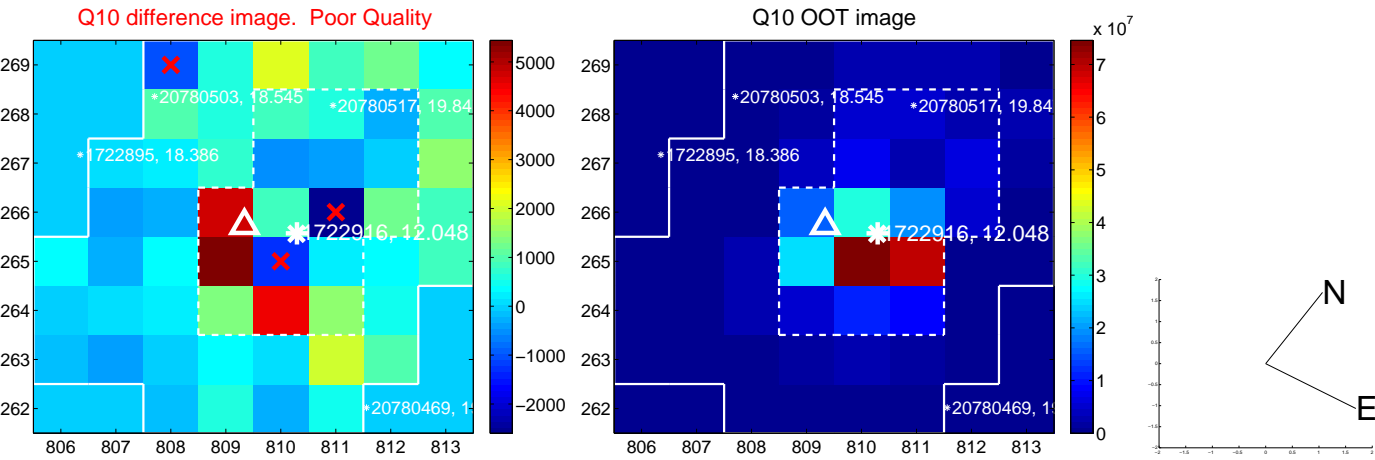
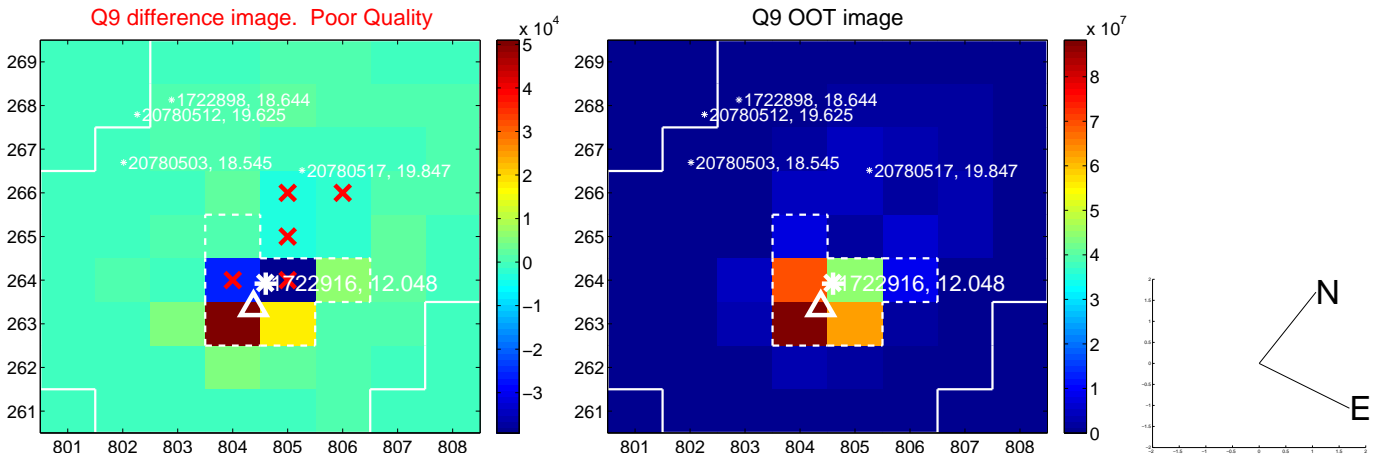
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



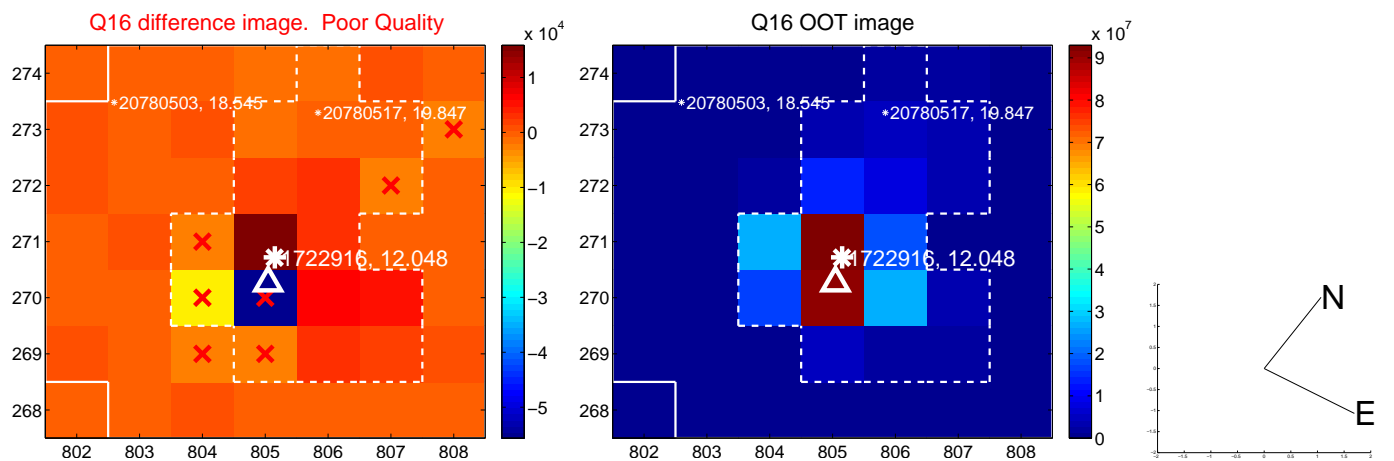
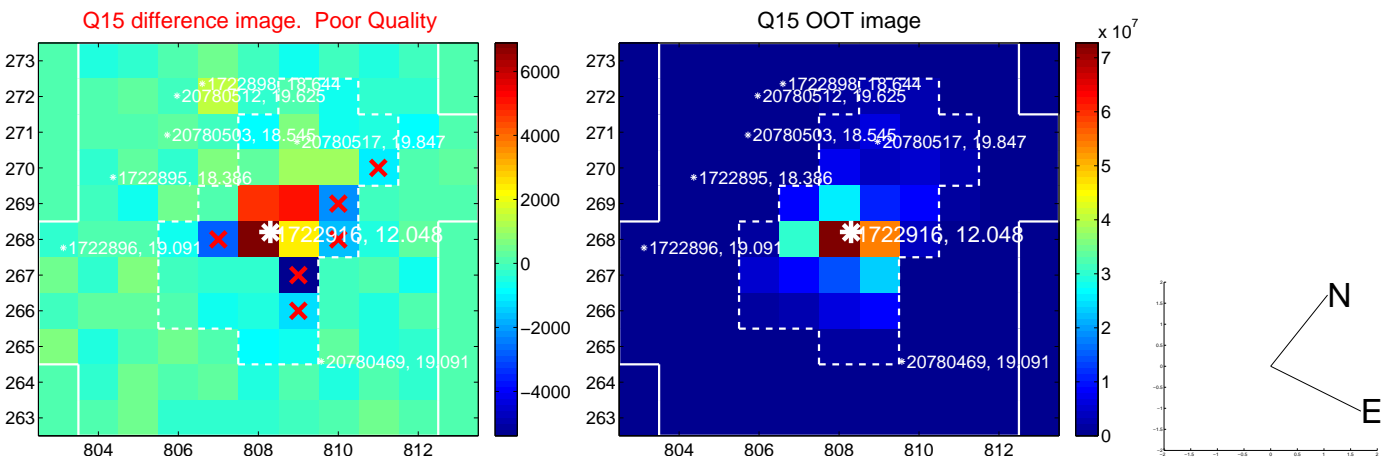
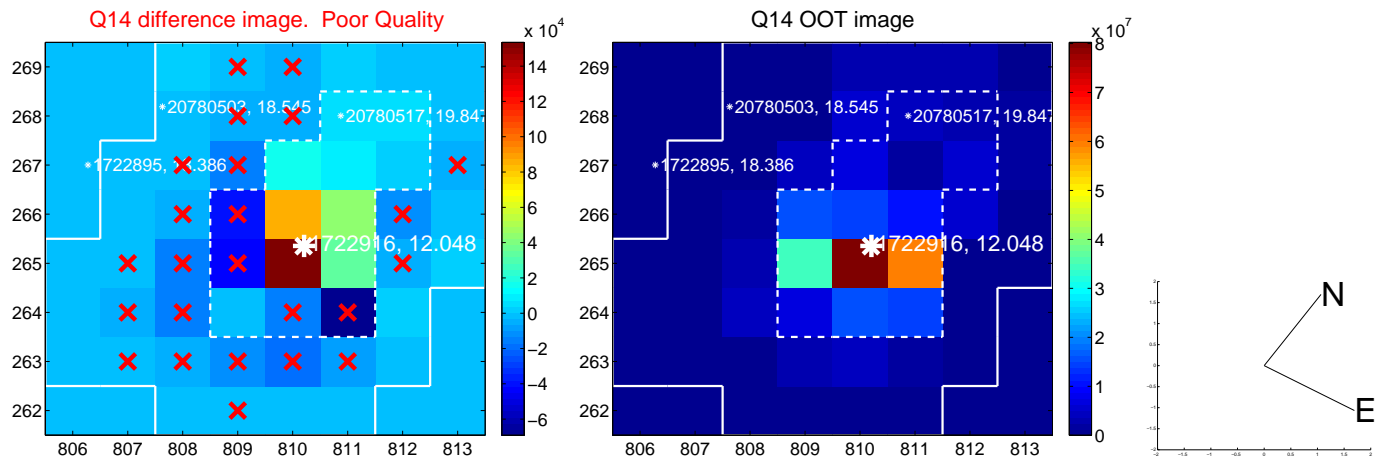
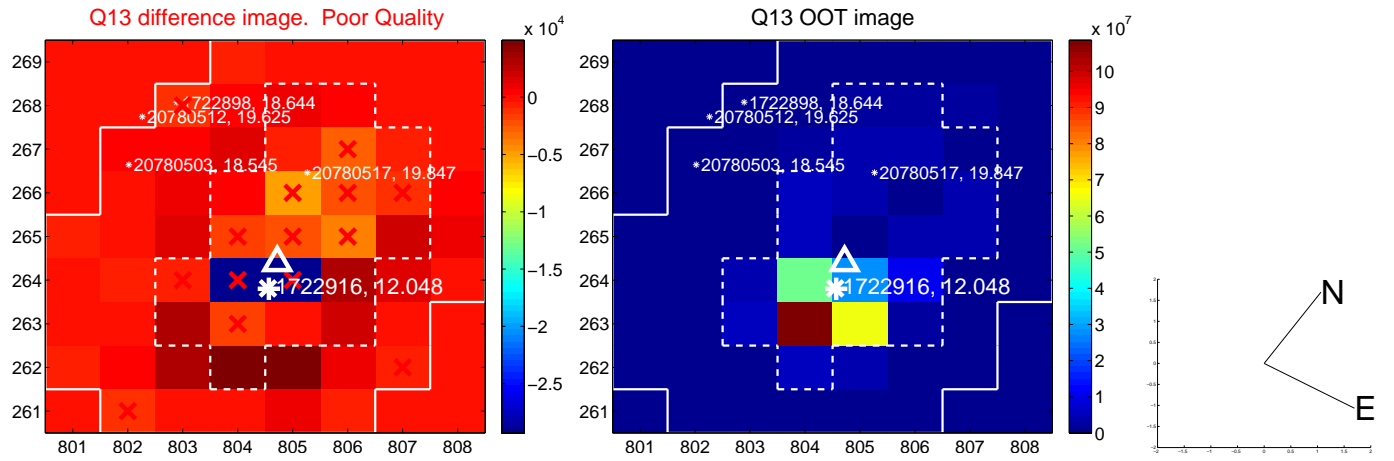
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



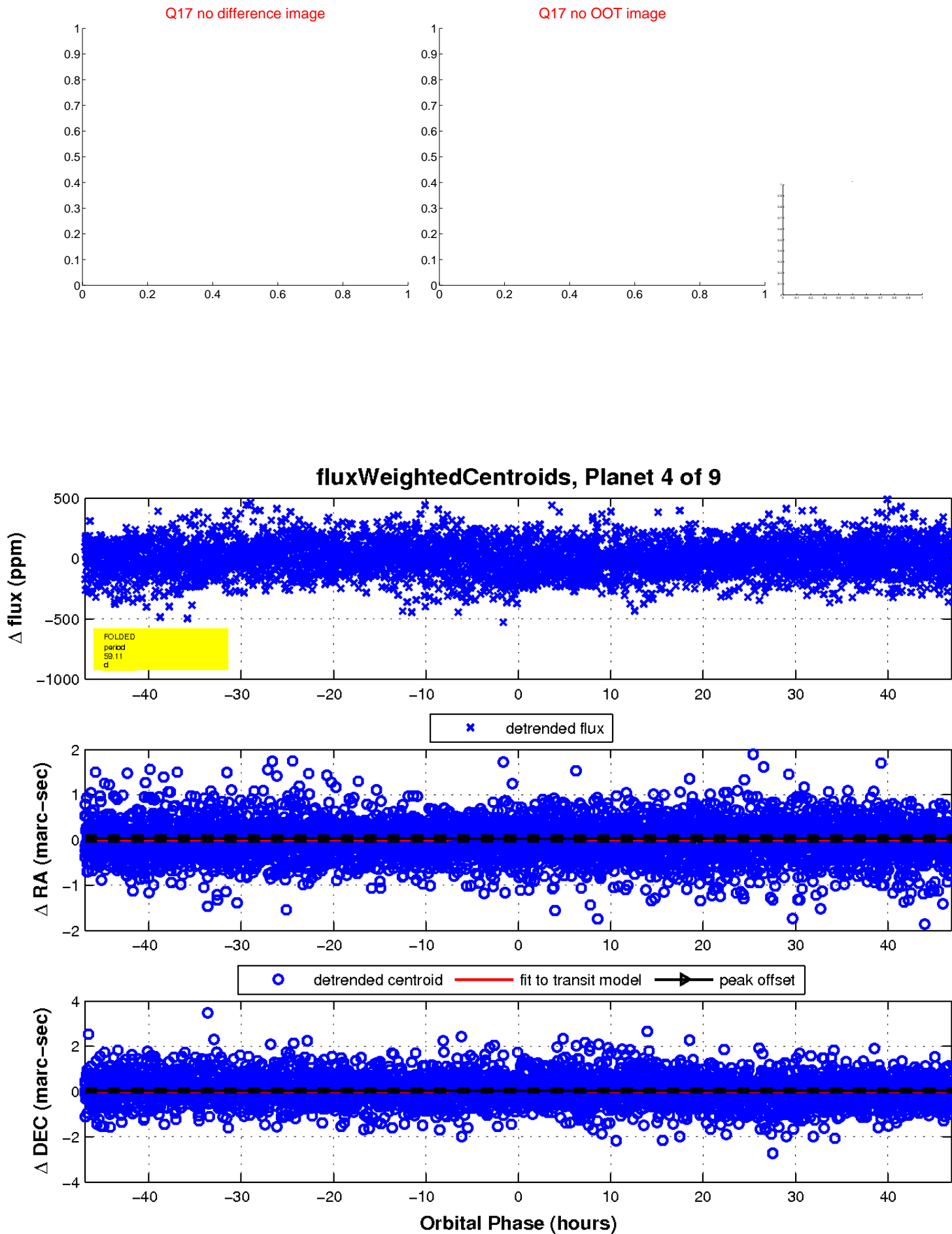
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



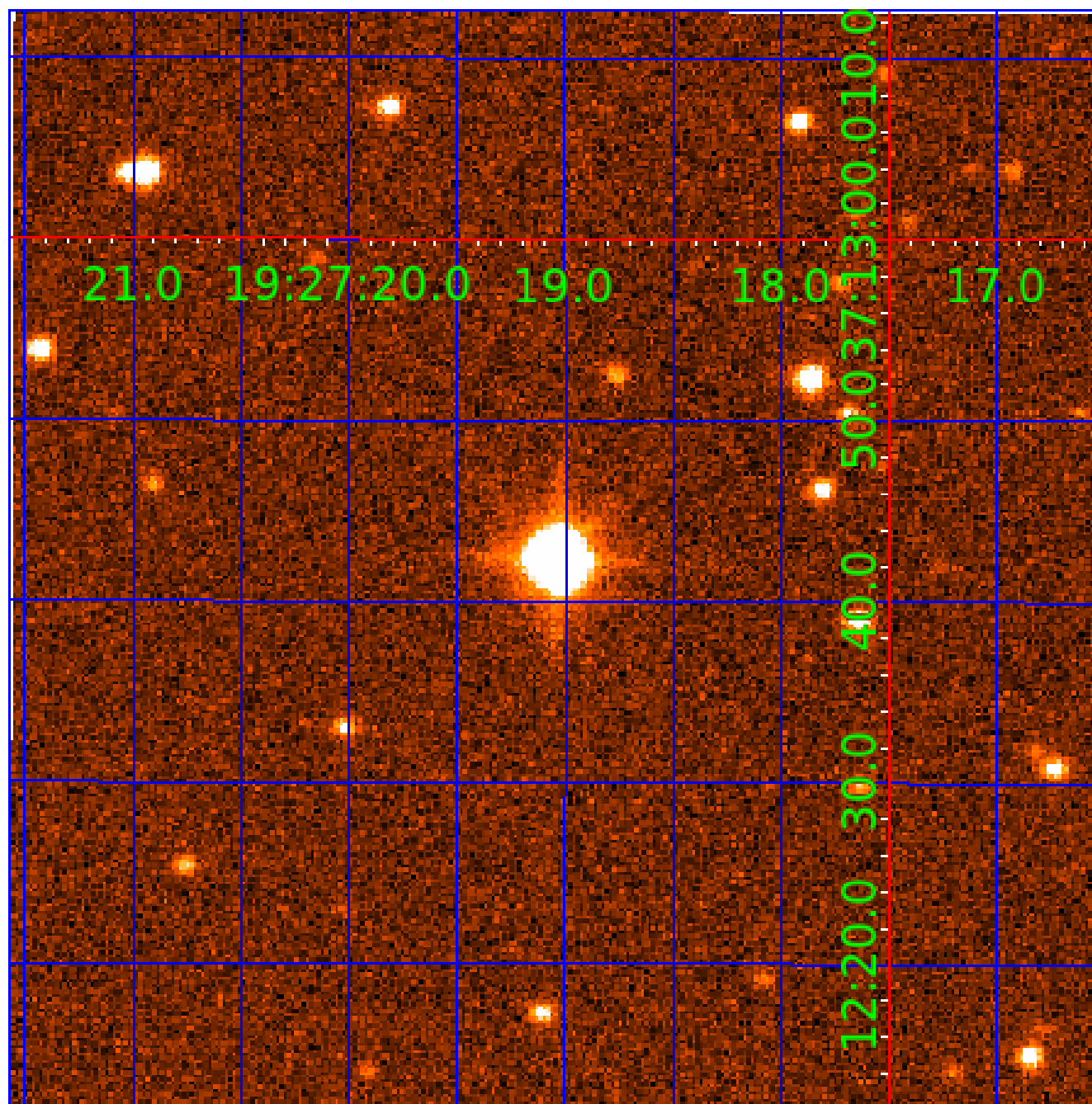
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





UKIRT Image

Declination



# KIC 001722916

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
001722916-01	OBS	No	1.813535	132.513520	0.1	1.362	7.1	0.1	1.60	6812	0.09	4824.23
001722916-02	OBS	No	1.813822	132.494408	18.4	10.501	7.4	7.4	1.60	6812	0.75	4823.21
001722916-03	OBS	No	113.456084	213.726772	152.5	10.563	16.5	7.4	1.60	6812	2.25	19.43
001722916-04	OBS	No	59.108474	141.293815	101.1	15.638	8.7	7.4	1.60	6812	1.76	46.34
001722916-05	OBS	No	22.011274	131.997241	79.9	6.325	8.8	8.8	1.60	6812	1.69	172.96
001722916-06	OBS	No	359.058903	202.797449	338.0	20.552	8.5	8.3	1.60	6812	5.69	4.18
001722916-07	OBS	No	80.910752	145.943923	136.1	5.420	8.0	7.3	1.60	6812	2.19	30.49
001722916-08	OBS	No	95.858298	158.854822	172.1	2.318	8.1	7.6	1.60	6812	2.39	24.32
001722916-09	OBS	No	105.723678	156.862664	140.0	6.744	8.2	7.9	1.60	6812	2.40	21.34

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
001722916-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV
001722916-02	OBS	FP	0.00	1	0	0	0	LPP_DV—SAME_NTL_PERIOD
001722916-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
001722916-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
001722916-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
001722916-06	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS—HALO_GHOST
001722916-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
001722916-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES—TRANS_GAPPED—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
001722916-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT

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

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

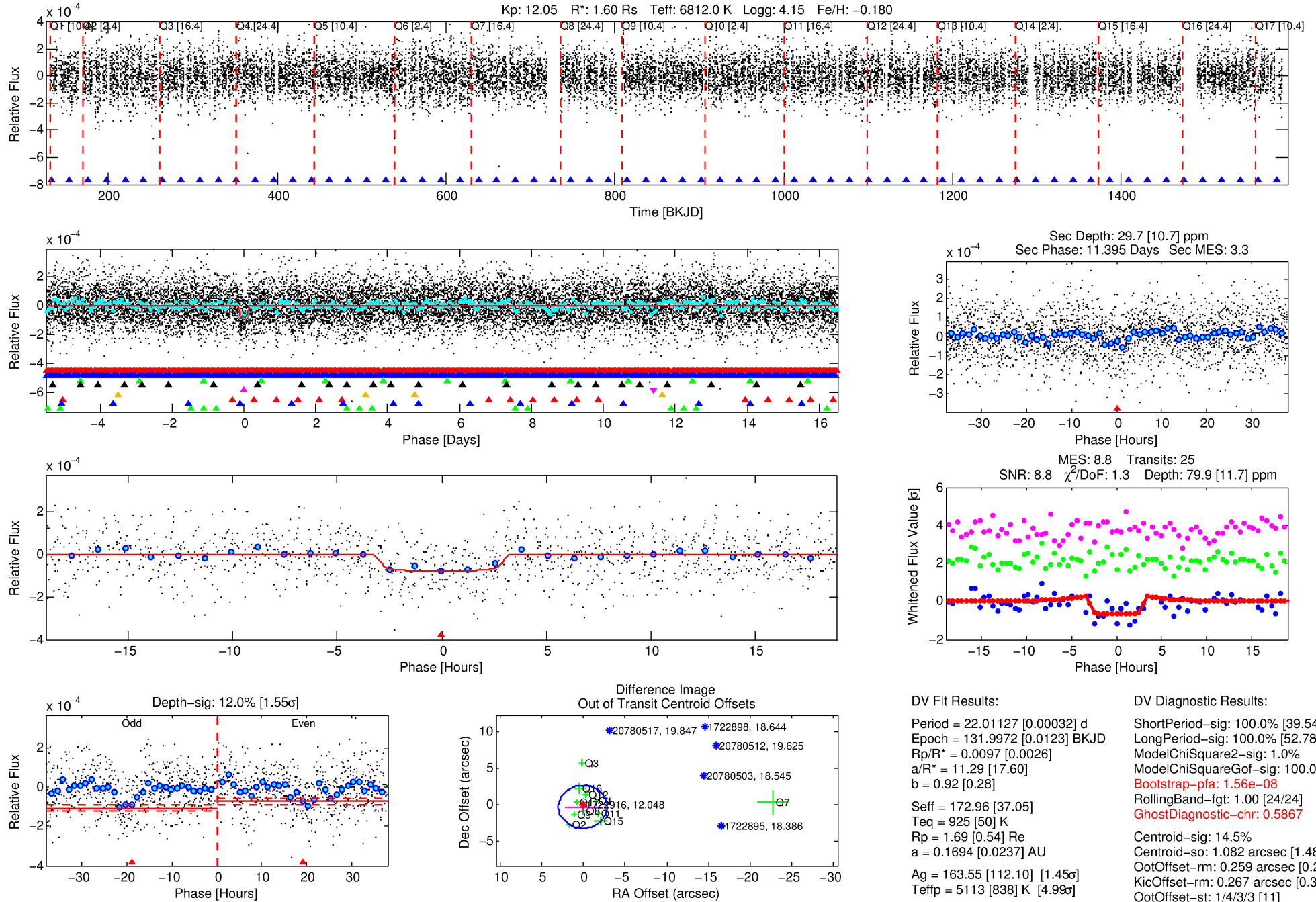
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 001722916-05

No Significant Match Found

# DV One-Page Summary

KIC: 1722916 Candidate: 5 of 9 Period: 22.011 d



## DV Fit Results:

Period = 22.01127 [0.00032] d  
Epoch = 131.9972 [0.0123] BKJD  
Rp/R\* = 0.0097 [0.0026]  
a/R\* = 11.29 [17.60]  
b = 0.92 [0.28]  
Seff = 172.96 [37.05]  
Teq = 925 [50] K  
Rp = 1.69 [0.54] Re  
a = 0.1694 [0.0237] AU  
Ag = 163.55 [112.10] [1.45 $\sigma$ ]  
Teffp = 5113 [838] K [4.99 $\sigma$ ]

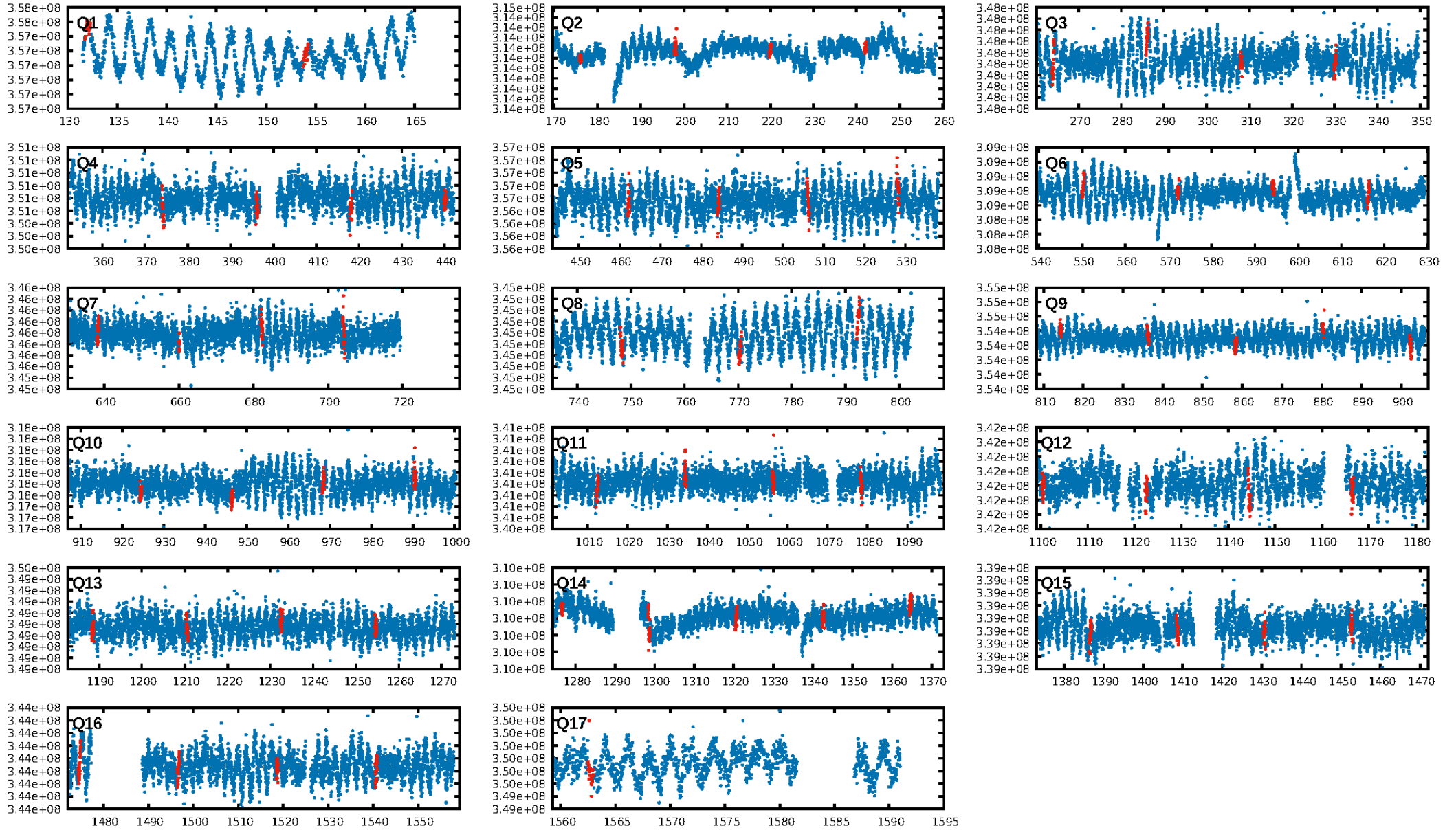
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [39.54 $\sigma$ ]  
LongPeriod-sig: 100.0% [52.78 $\sigma$ ]  
ModelChiSquare2-sig: 1.0%  
ModelChiSquareGof-sig: 100.0%  
**Bootstrap-pfa: 1.56e-08**  
RollingBand-fgt: 1.00 [24/24]  
**GhostDiagnostic-chr: 0.5867**  
Centroid-sig: 14.5%  
Centroid-so: 1.082 arcsec [1.48 $\sigma$ ]  
OotOffset-rm: 0.259 arcsec [0.27 $\sigma$ ]  
KicOffset-rm: 0.267 arcsec [0.30 $\sigma$ ]  
OotOffset-st: 1/4/3/3 [11]  
KicOffset-st: 1/4/3/3 [11]  
DiffImageQuality-fgm: 0.45 [5/11]  
DiffImageOverlap-fno: 0.53 [9/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 00:46:27 Z

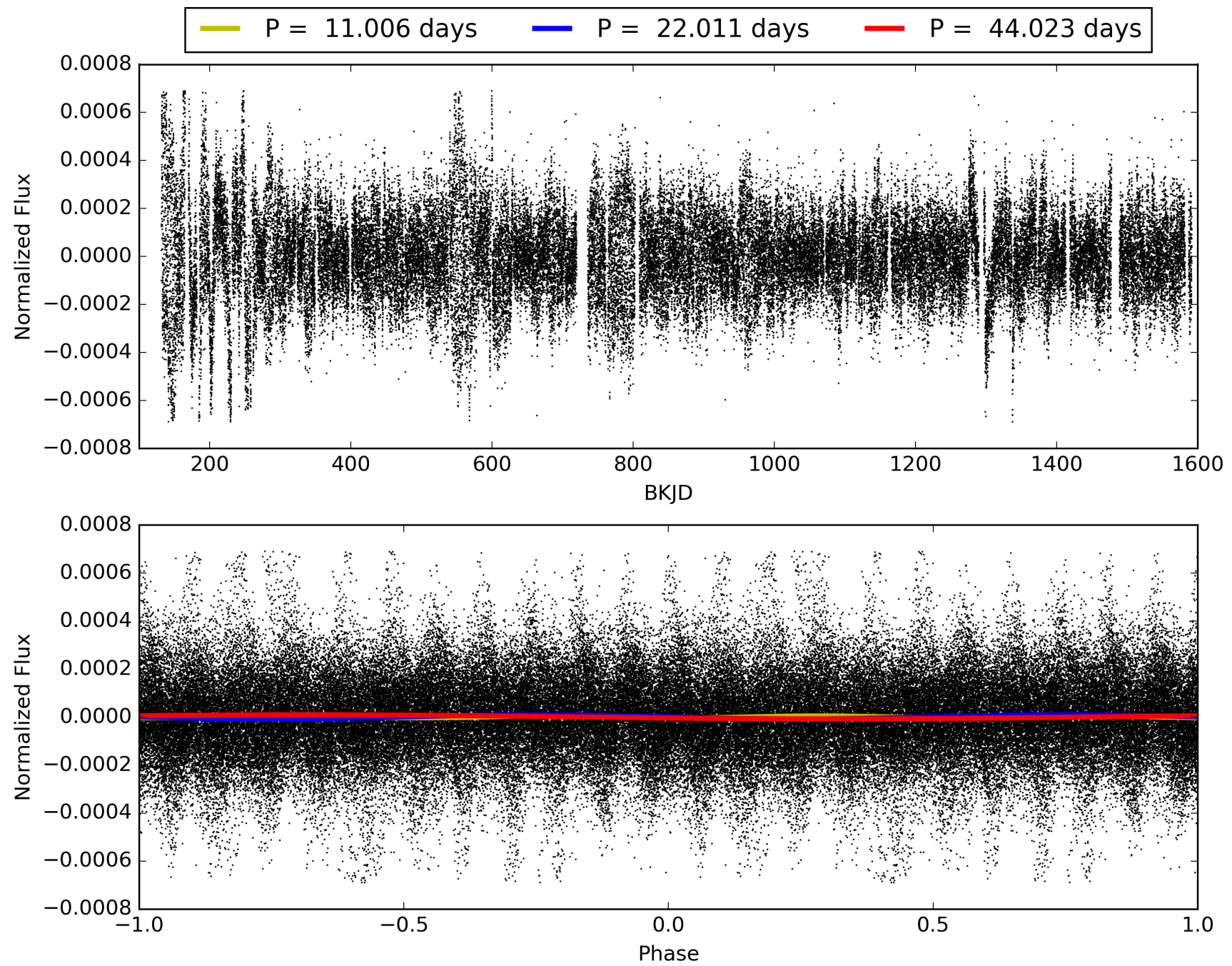
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 001722916-05, PDC Light Curves



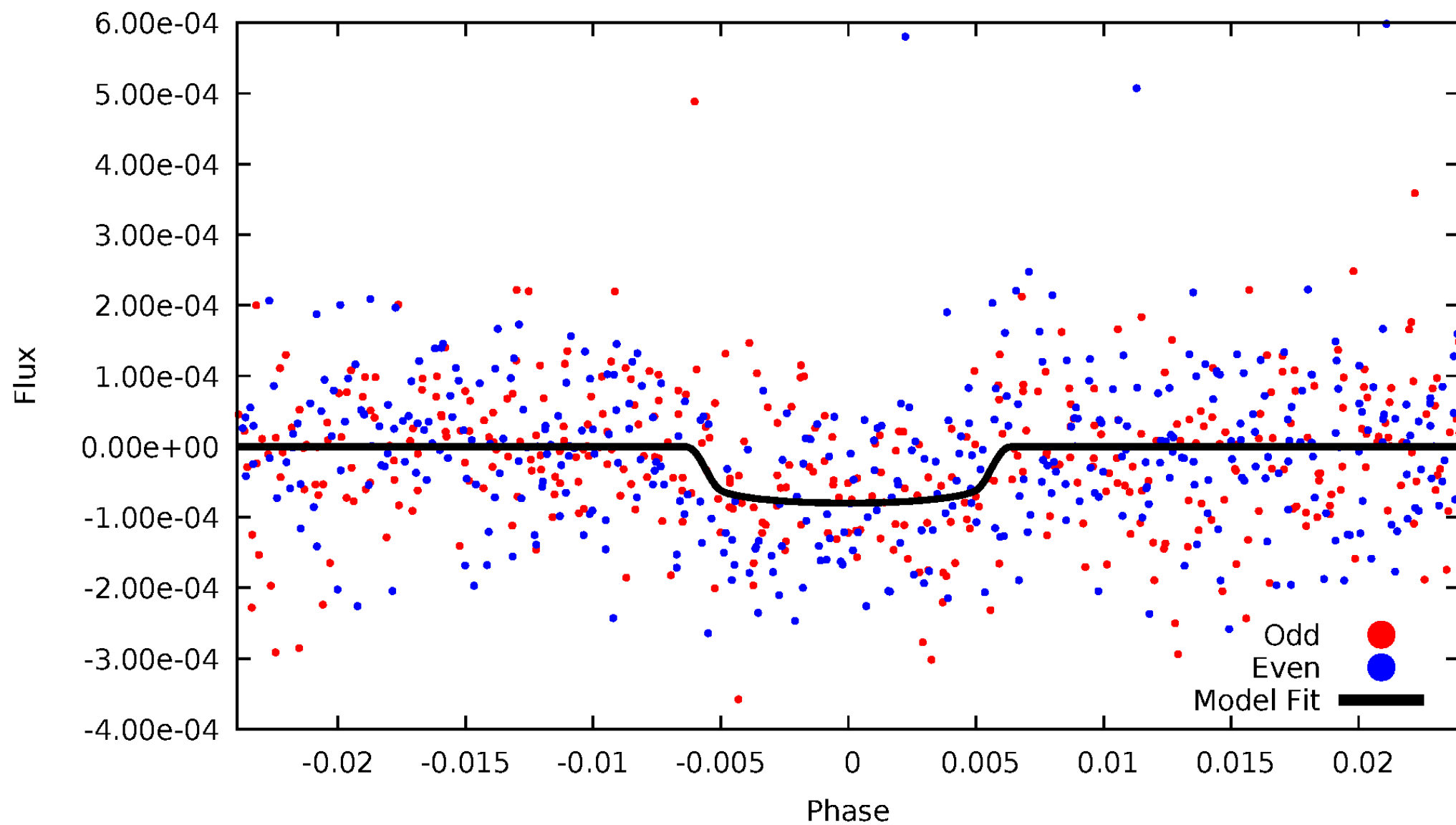


# TCE 001722916-05



# DV Odd/Even

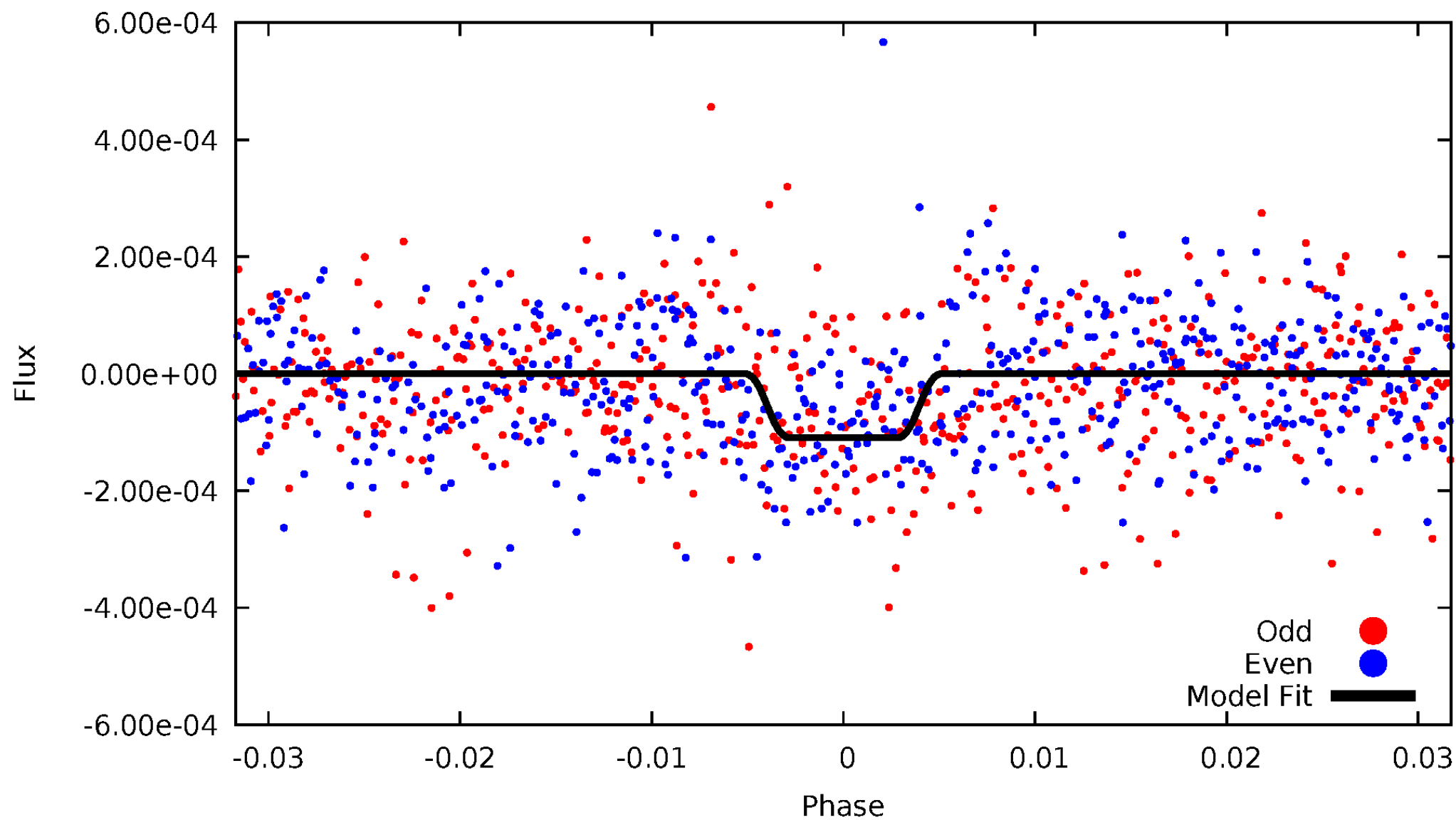
TCE 001722916-05





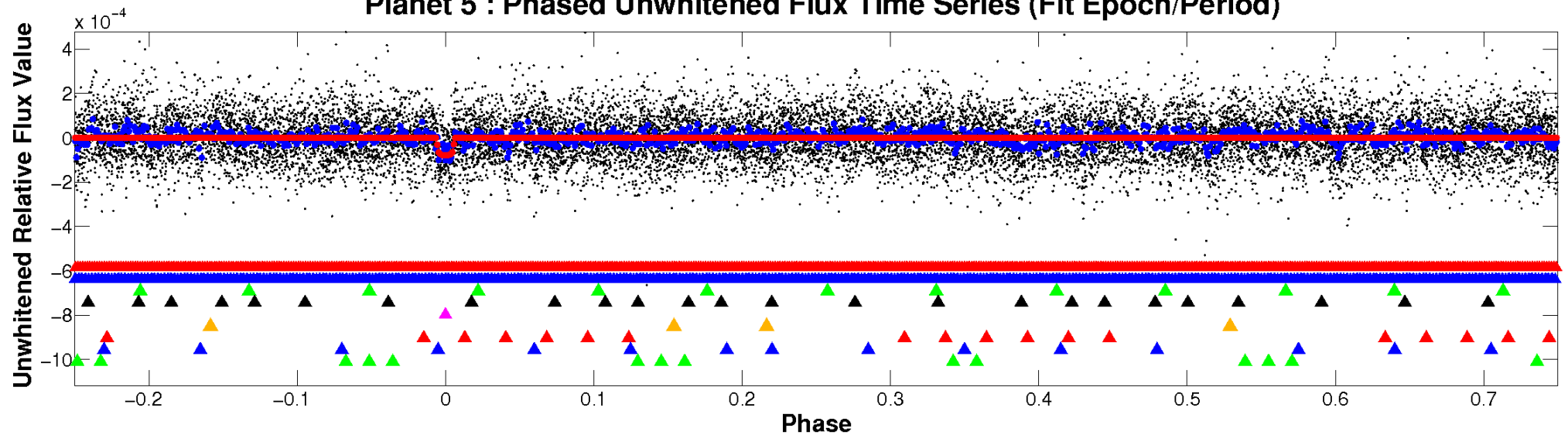
# ALT Odd/Even

TCE 001722916-05

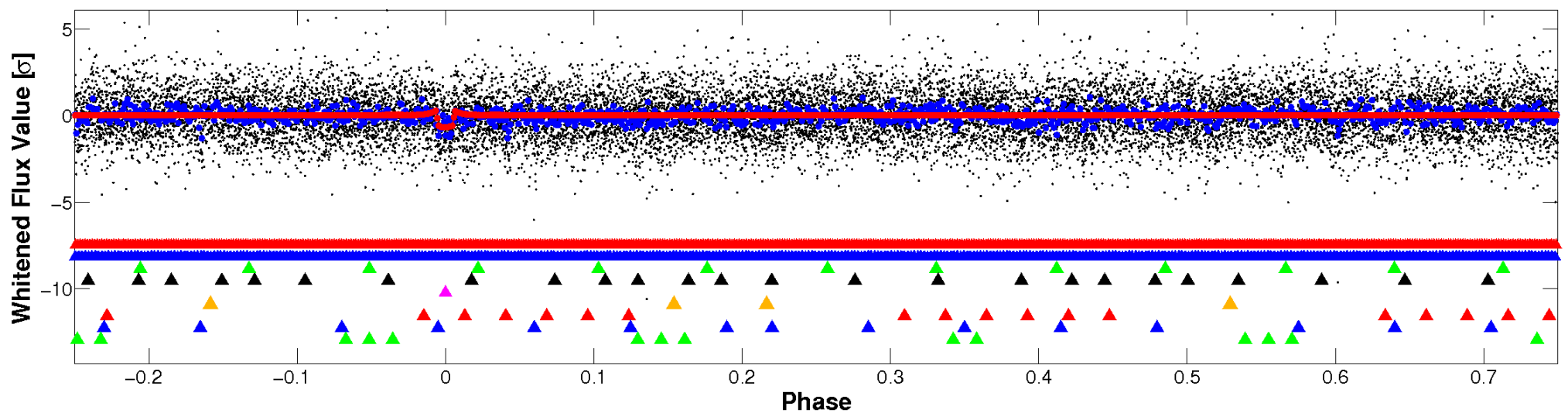


# Non-Whitened Vs. Whitened Light Curve

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

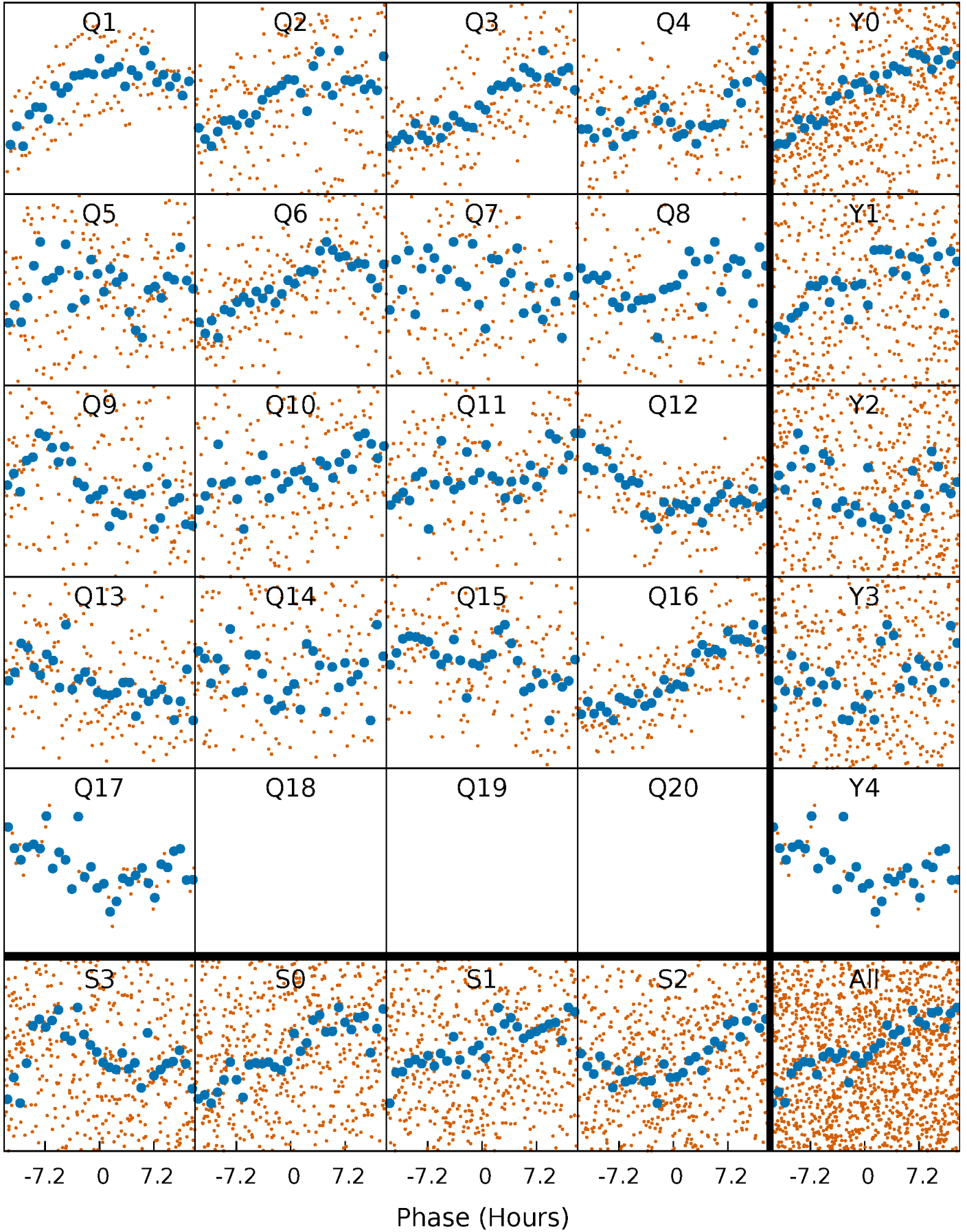


## Planet 5 : Phased Whitened Flux Time Series (Fit Epoch/Period)



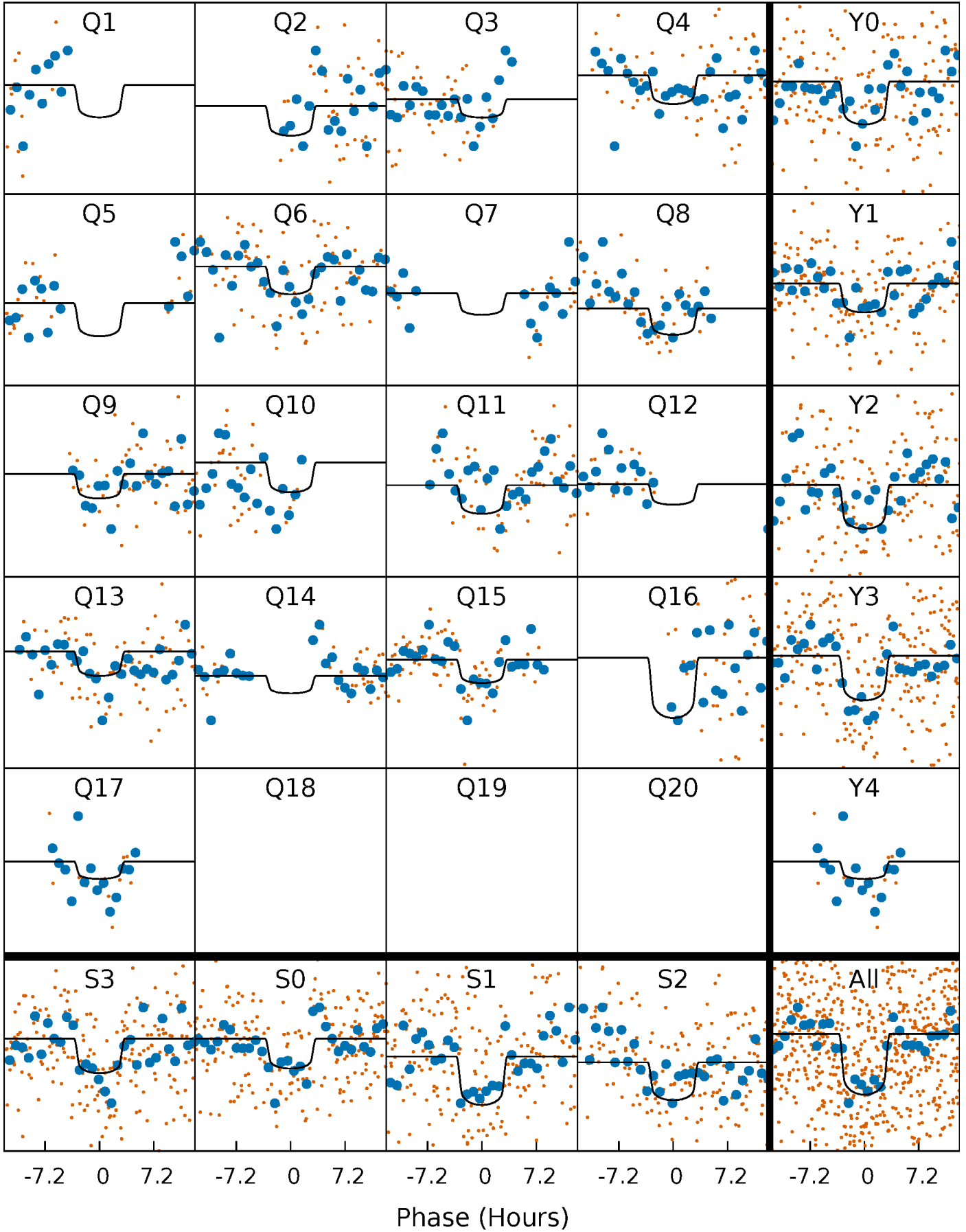
# PDC Quarter-Phased Transit Curves

TCE 001722916-05   P= 22.011274 Days    $T_0=131.997241$  (BKJD)



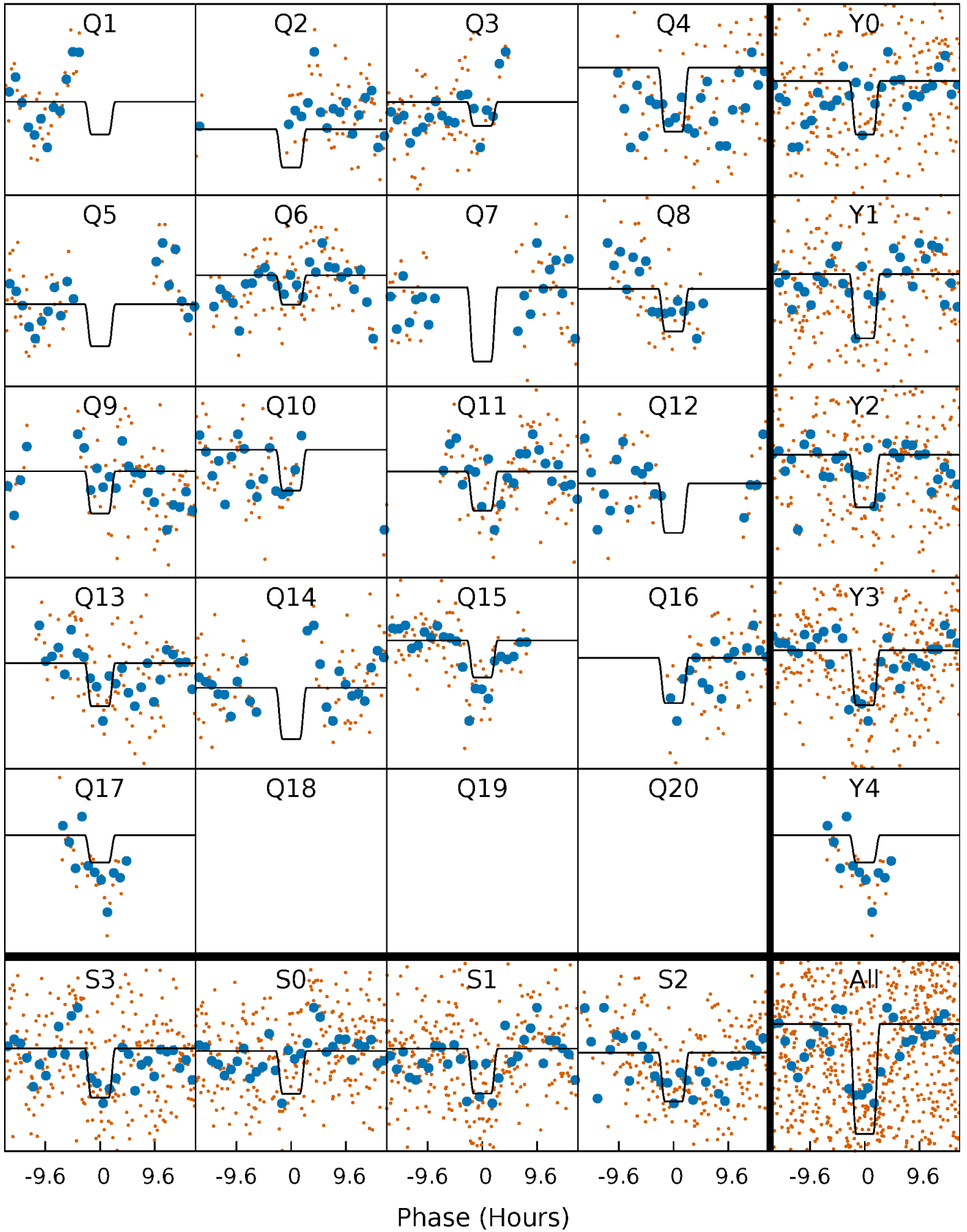
# DV Quarter-Phased Transit Curves

TCE 001722916-05   P= 22.011274 Days    $T_0=131.997241$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

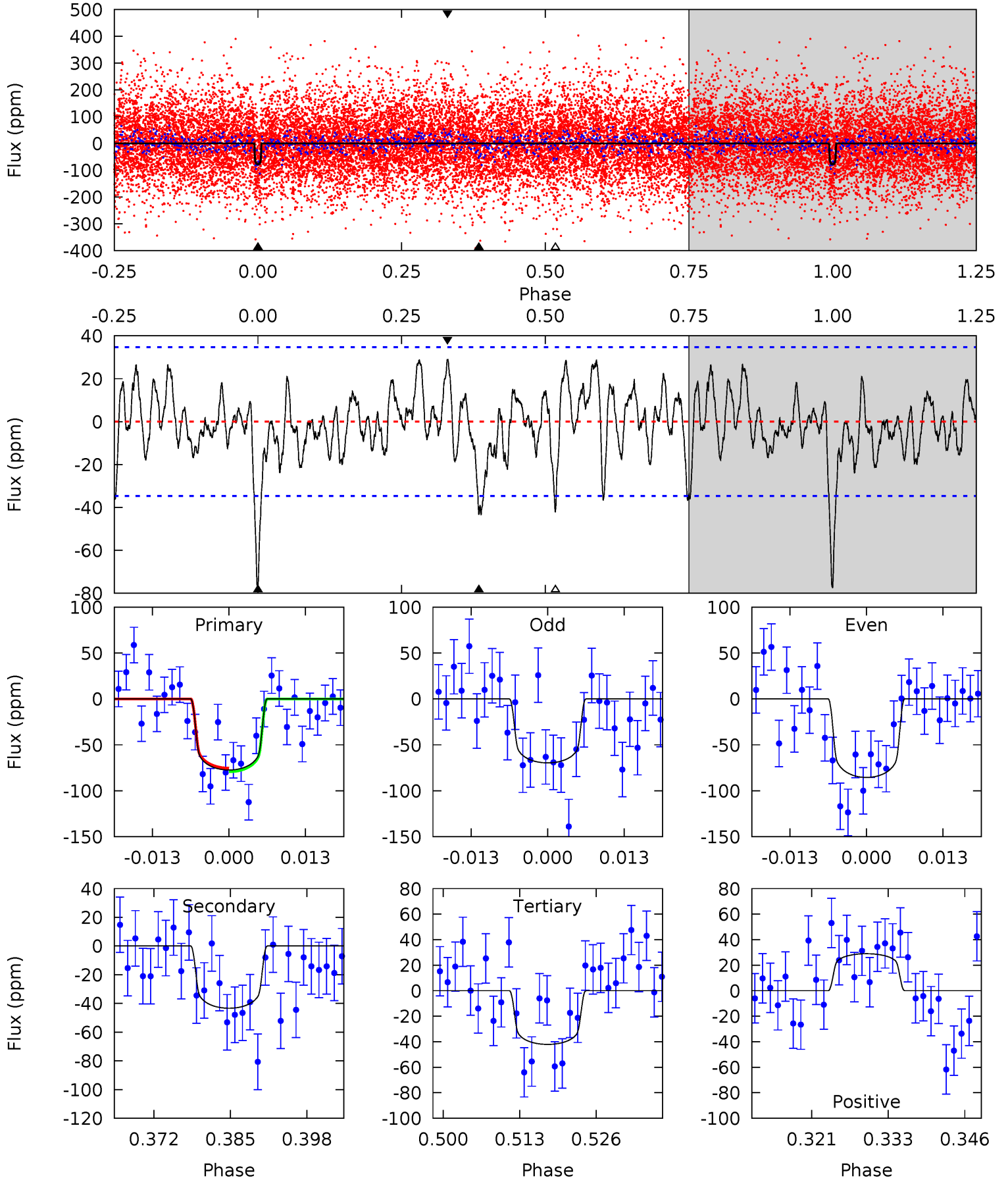
TCE 001722916-05   P= 22.011967 Days    $T_0=131.971428$  (BKJD)



# DV Model-Shift Uniqueness Test

001722916-05, P = 22.011274 Days, E = 109.985967 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
11.1	6.22	6.04	4.16	4.98	2.49	1.82	5.06	6.95	0.18	2.06	1.14	0.87	0.27	0.28

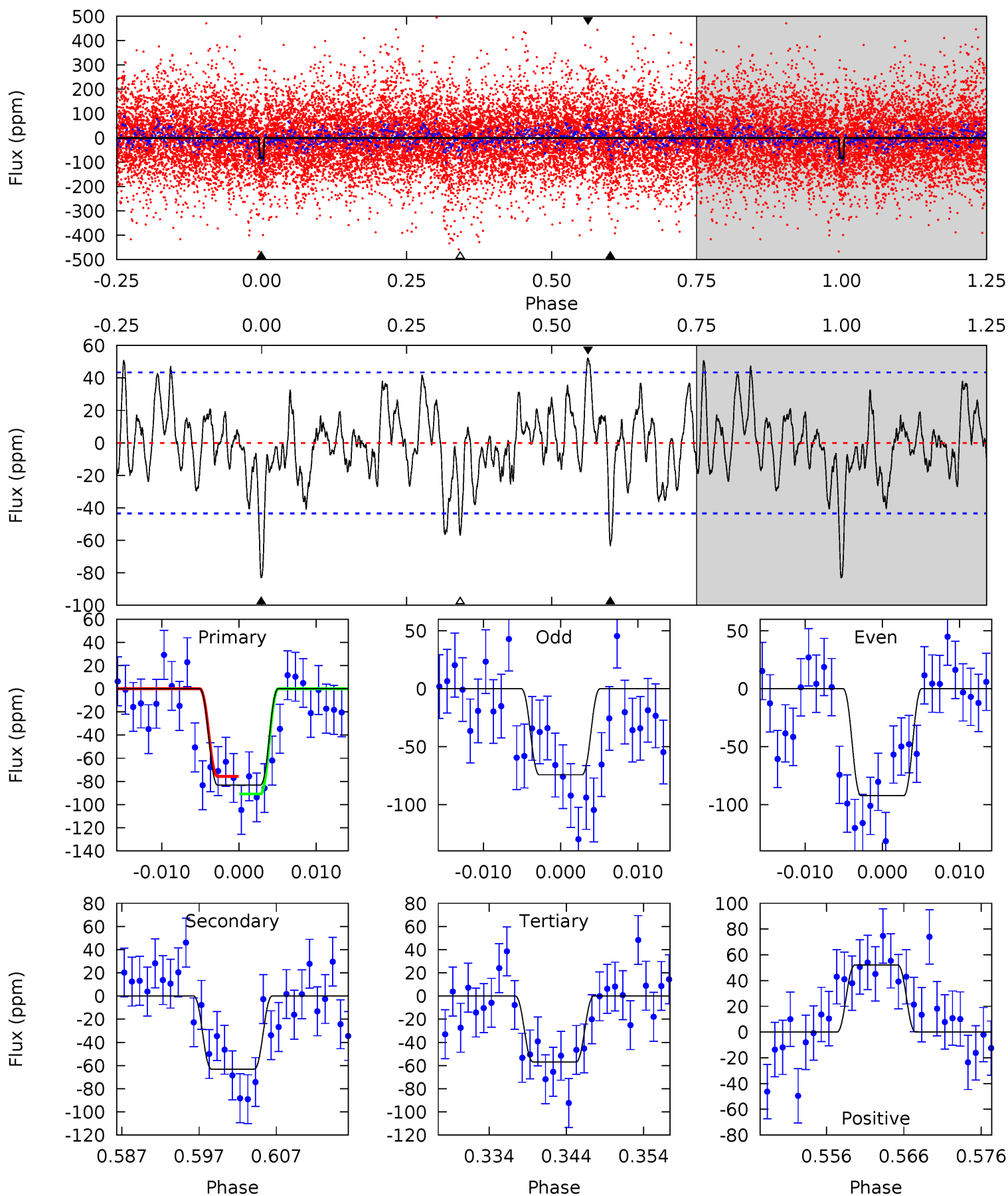




# Alt Model-Shift Uniqueness Test

001722916-05, P = 22.011967 Days, E = 109.959461 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
9.63	7.31	6.60	6.04	5.02	2.57	2.21	3.03	3.60	0.71	1.27	1.05	0.32	0.39	0.88



### Stellar Parameters For KIC 001722916

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6812^{+71}_{-91}$	$4.154^{+0.115}_{-0.115}$	$-0.180^{+0.150}_{-0.200}$	$1.604^{+0.262}_{-0.236}$	$1.347^{+0.088}_{-0.118}$	$0.460^{+0.237}_{-0.156}$
	+1%/-1%	+3%/-3%	+83%/-111%	+16%/-15%	+7%/-9%	+51%/-34%
Source	SPE68	SPE68	SPE68	DSEP		

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

### Secondary Eclipse Parameters for KIC 001722916-05 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-43 \pm 7$	$1.68^{+0.45}_{-0.47}$	$1293^{+61}_{-52}$	$5643^{+875}_{-591}$	$242^{+223}_{-99}$
Alt.	$-63 \pm 9$	$1.82^{+0.50}_{-0.47}$	$1293^{+55}_{-54}$	$5949^{+934}_{-633}$	$303^{+243}_{-121}$

$T_{\text{max}}$  = 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

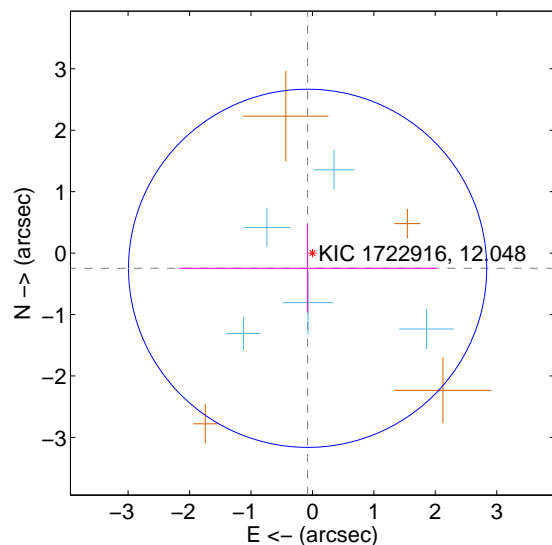
Supplemental centroid analysis for 001722916-05. Kepler magnitude: 12.05. Transit SNR 8.75

There are 5 quarters with good PRF difference image offsets

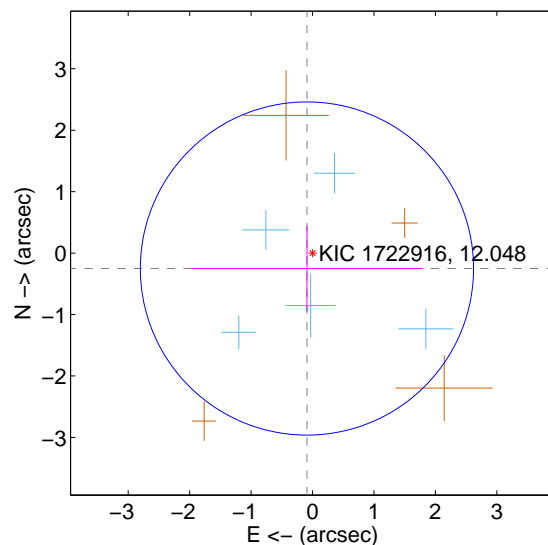
The direct PRF centroid is offset from the target star catalog position by about 0.04 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.259 \pm 0.972$	0.27	$0.079 \pm 2.093$	$-0.247 \pm 0.717$
PRF-fit source offset from KIC position	$0.267 \pm 0.904$	0.30	$0.091 \pm 1.884$	$-0.251 \pm 0.695$
photometric centroid source offset	$1.08 \pm 0.73$	1.48	$0.04 \pm 0.57$	$-1.08 \pm 0.73$

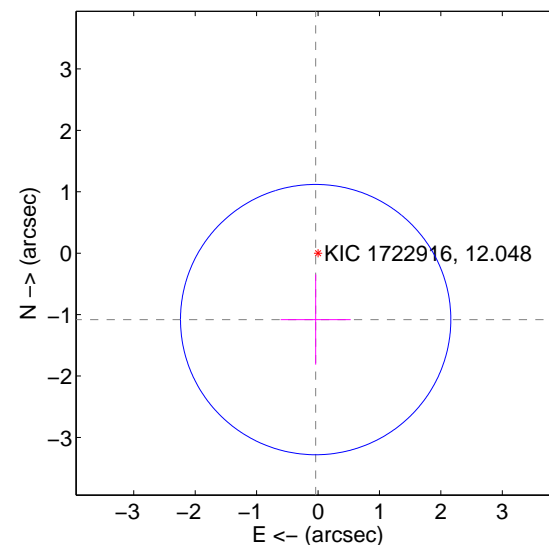
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

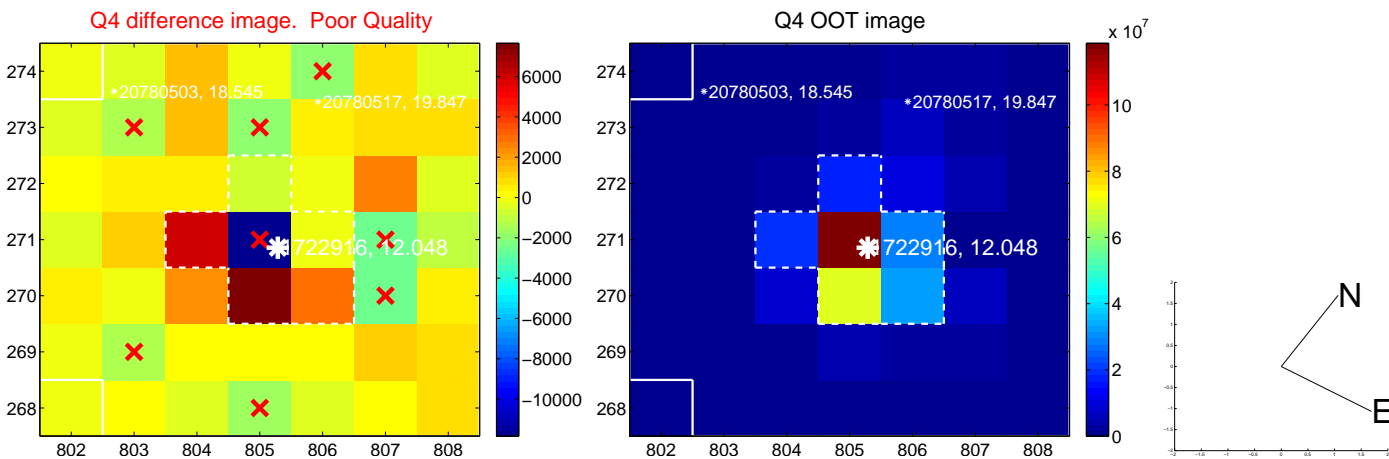
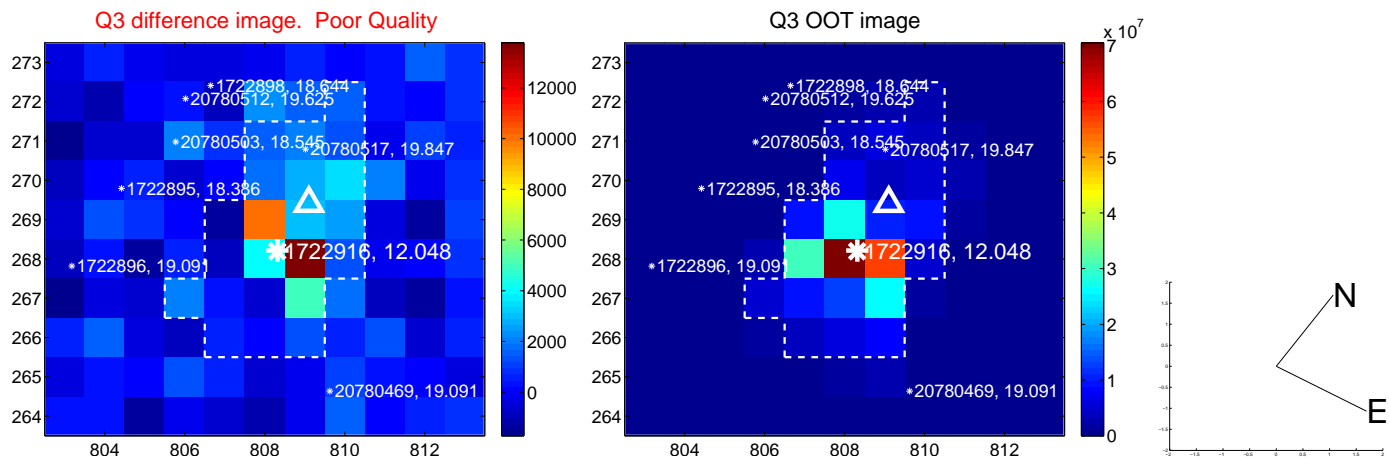
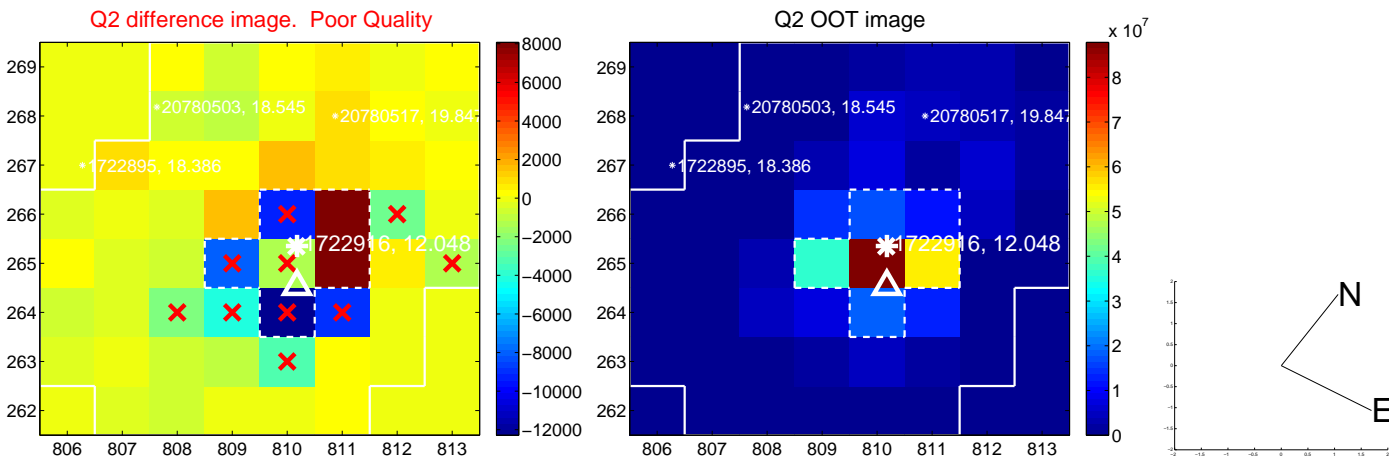
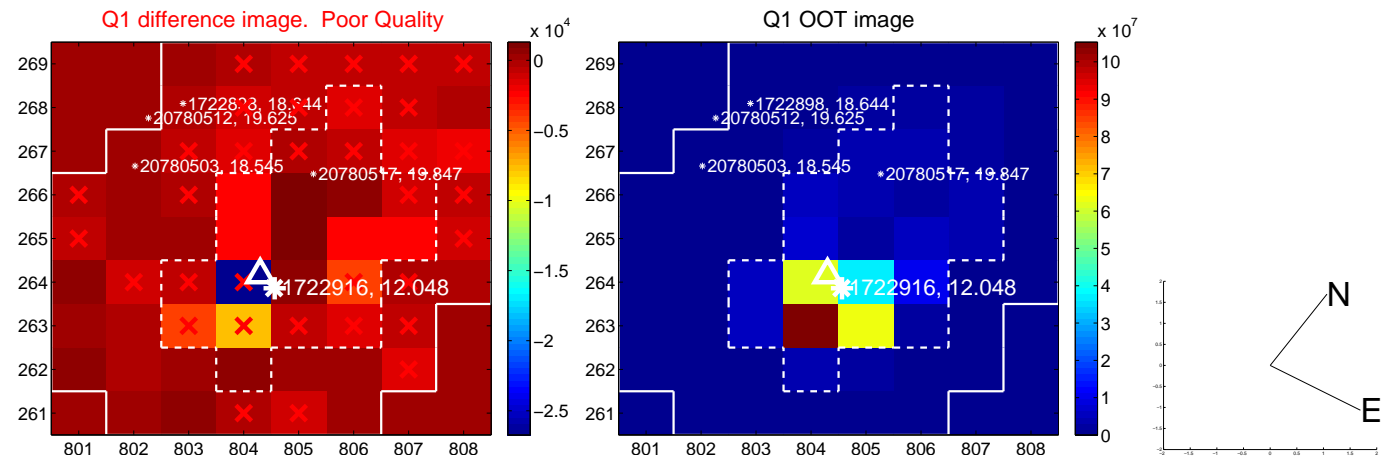


offset from photometric centroids

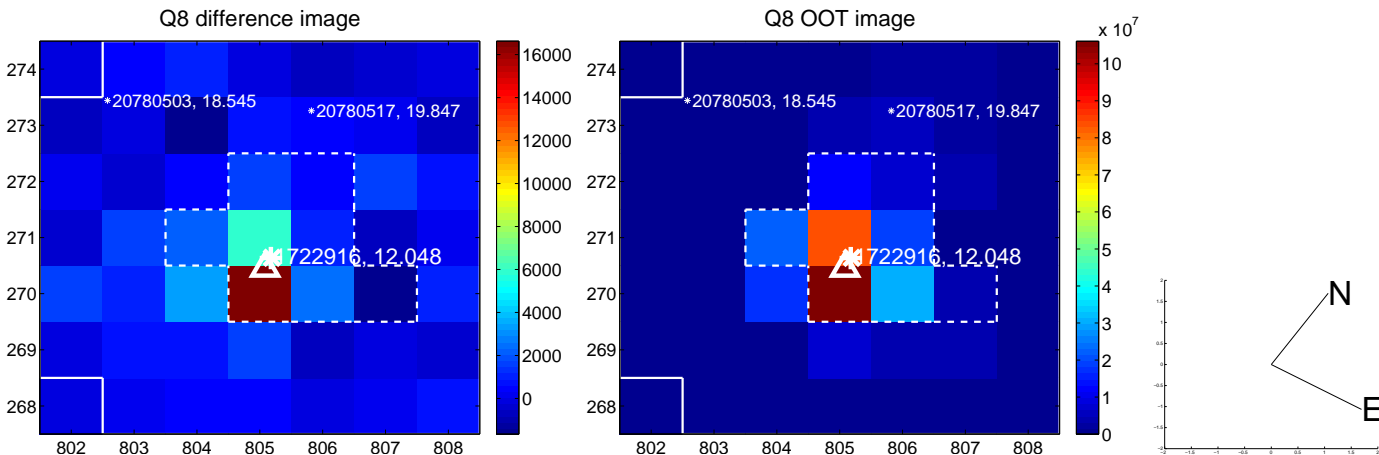
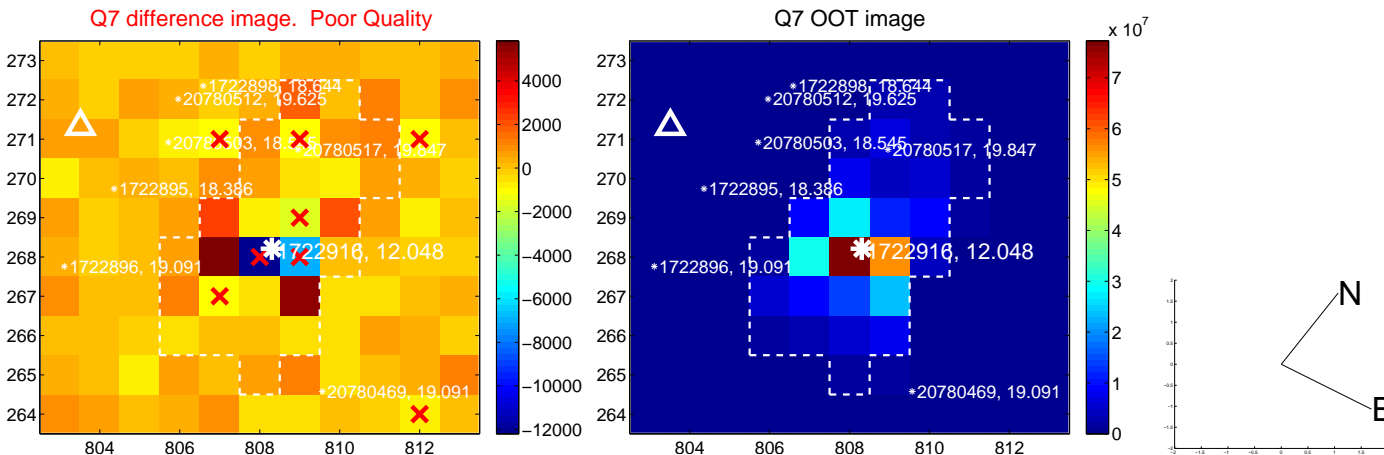
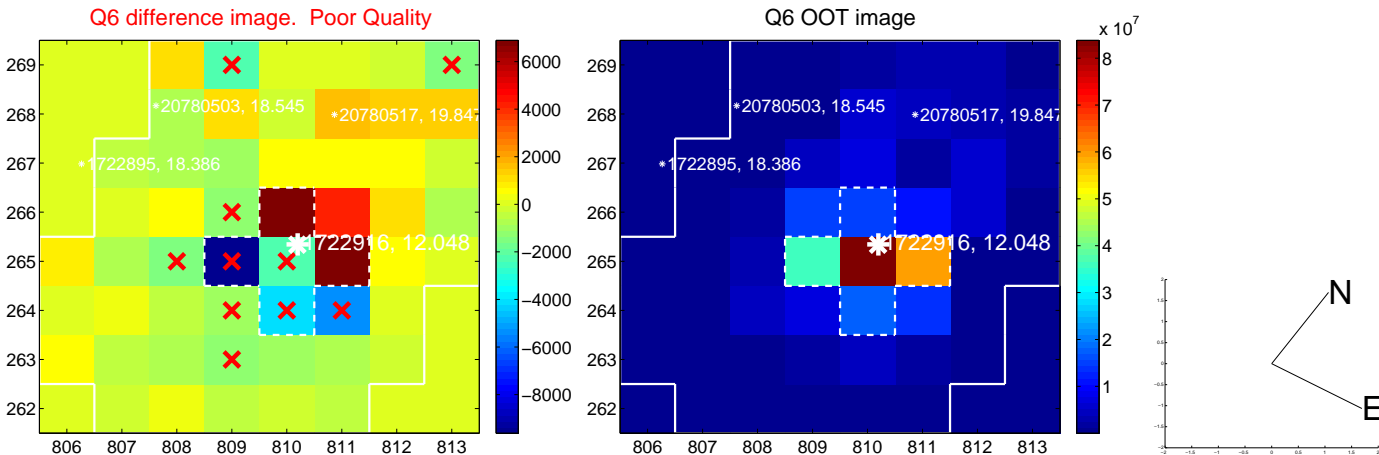
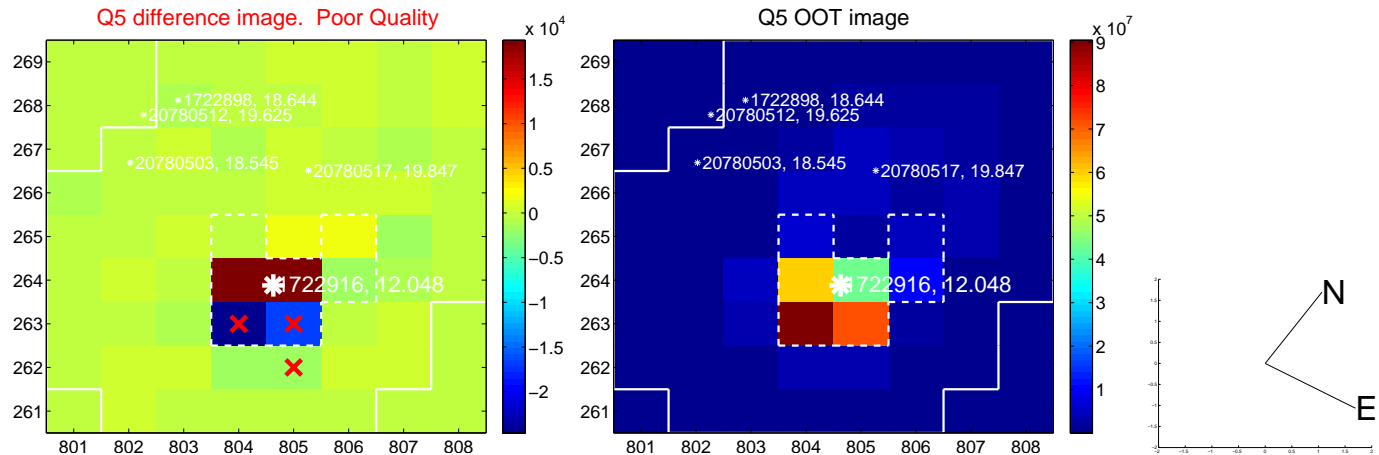


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

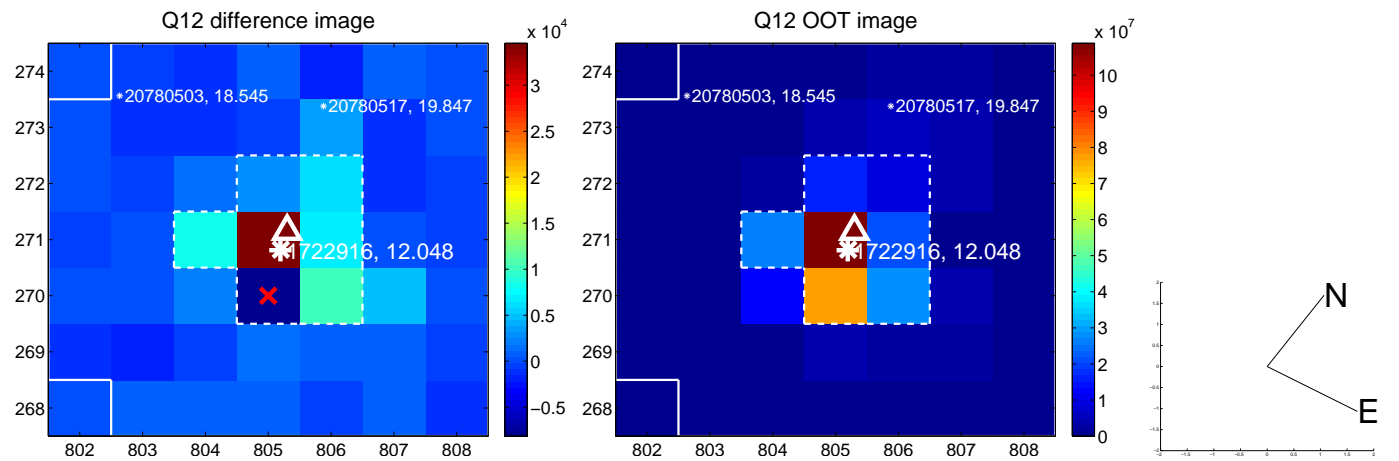
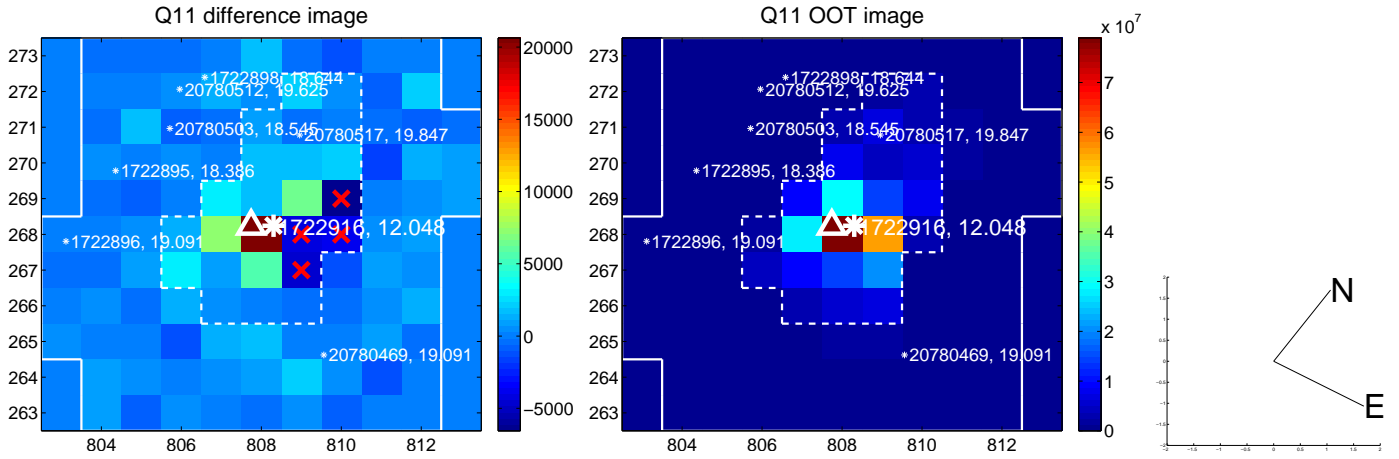
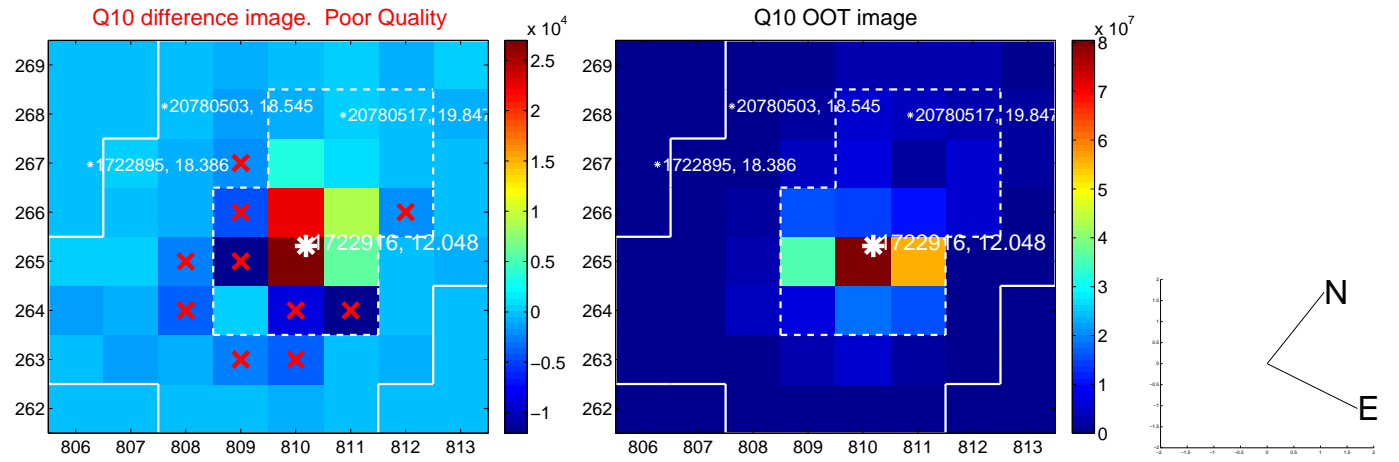
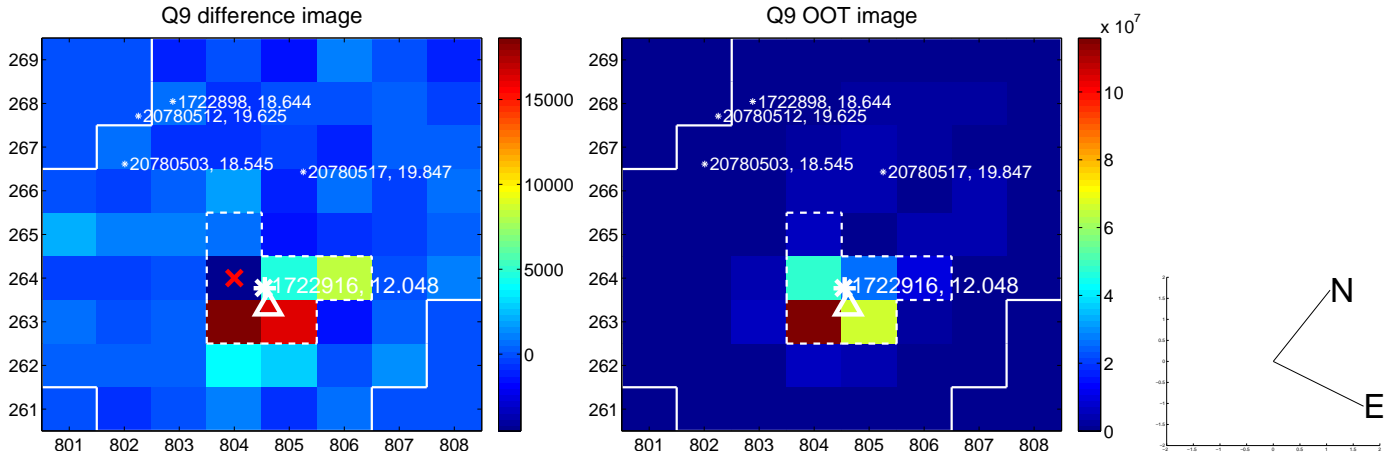
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

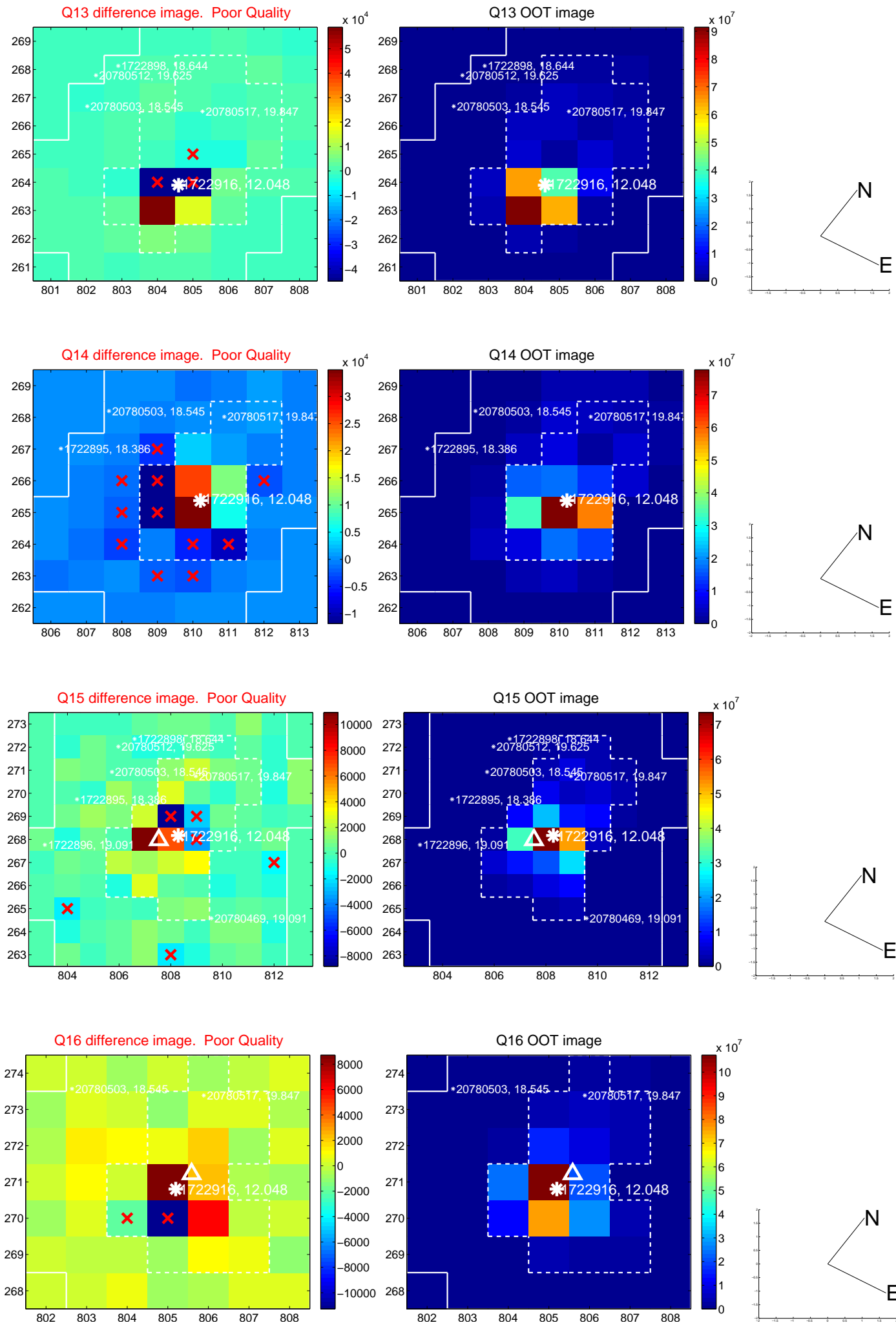


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

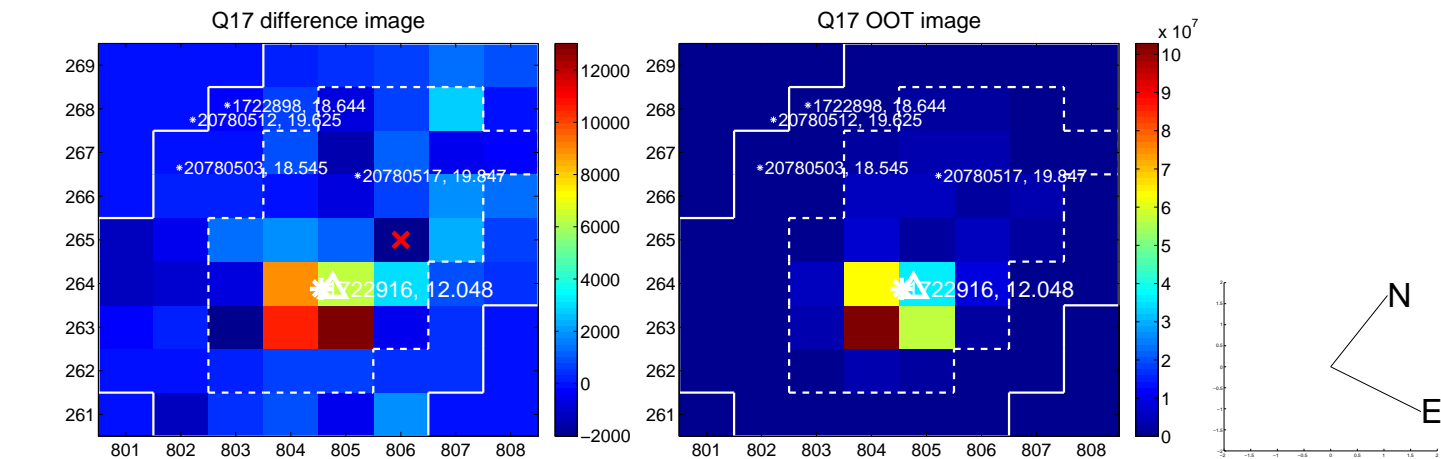




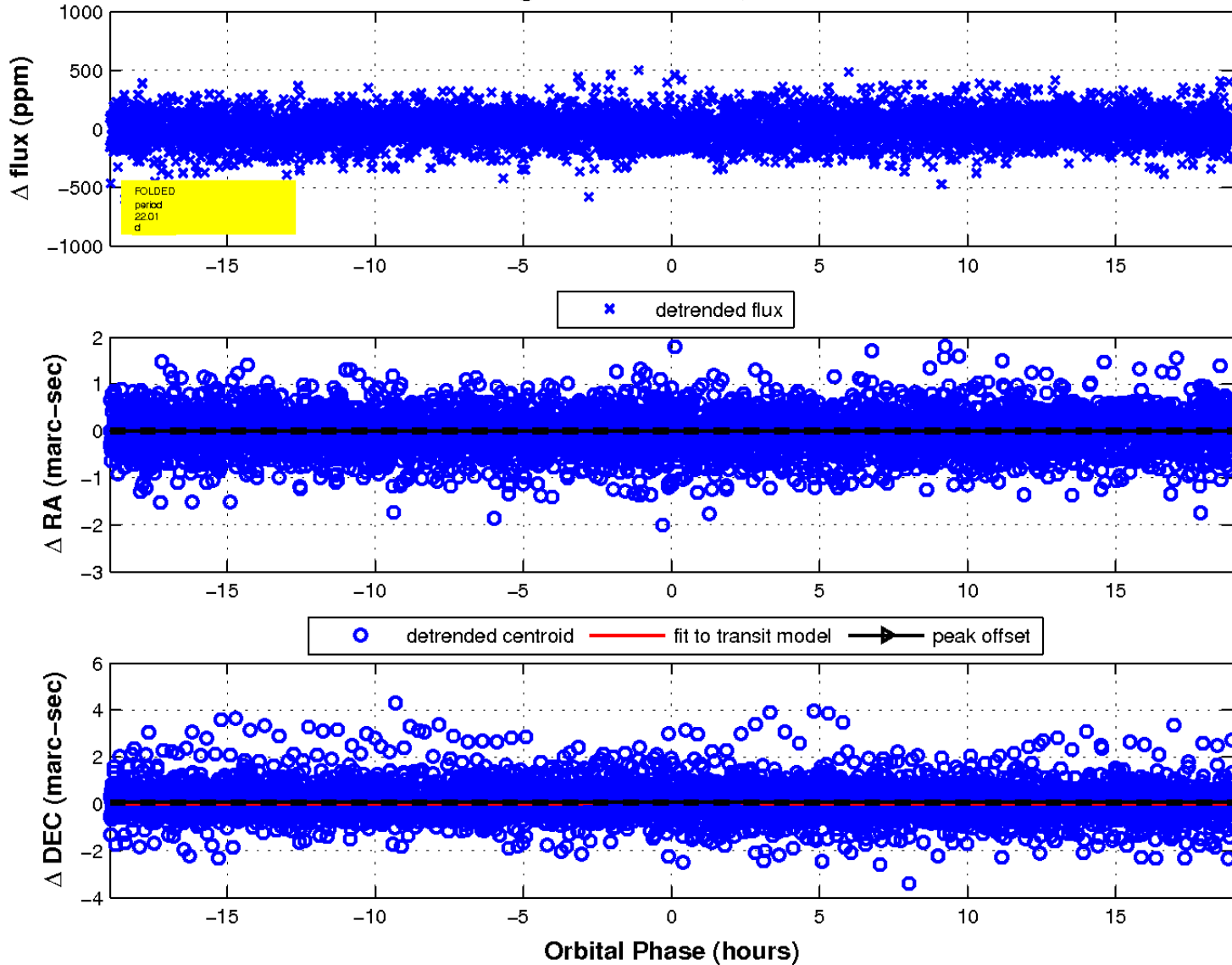
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

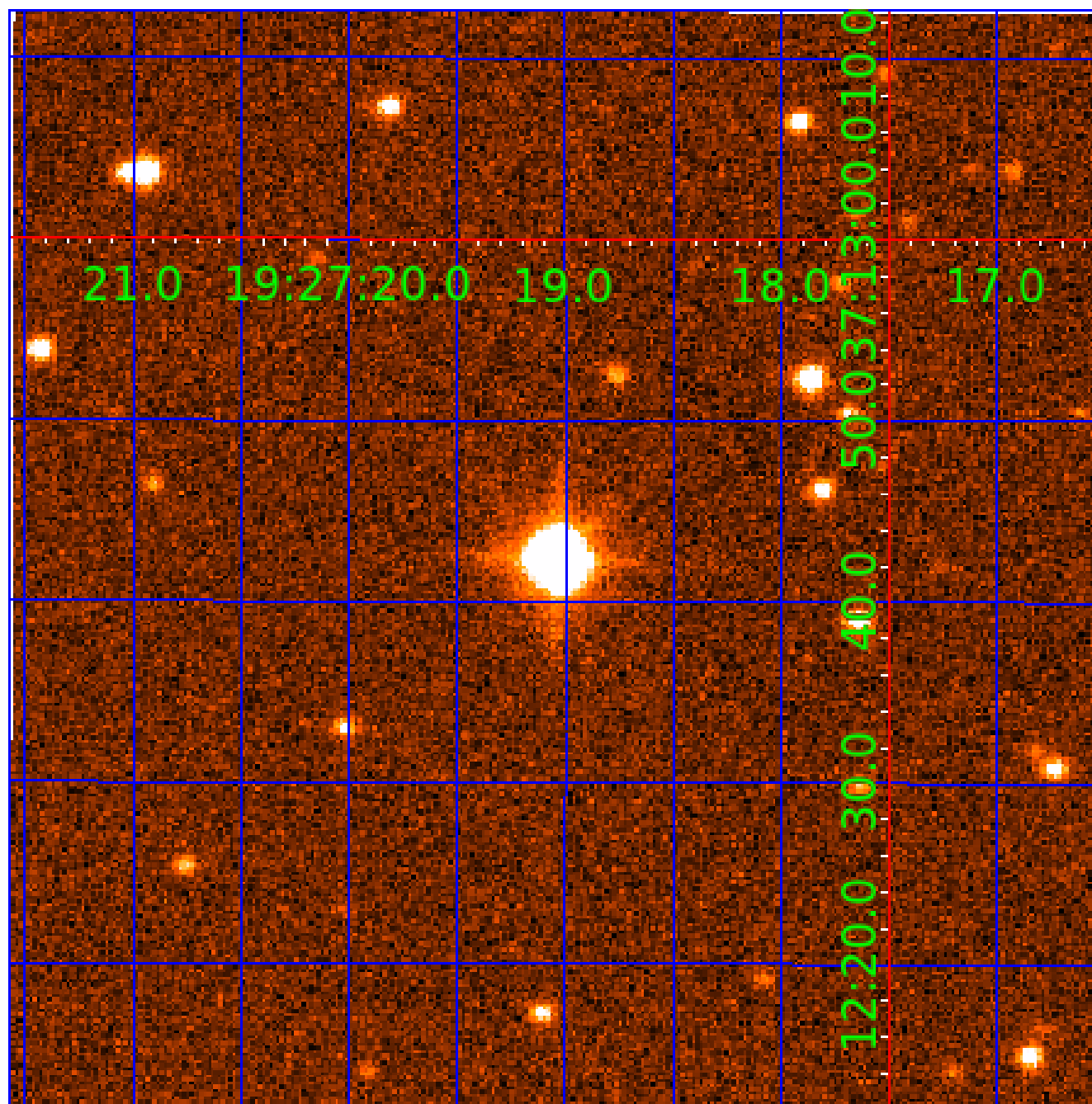


fluxWeightedCentroids, Planet 5 of 9



UKIRT Image

Declination



# KIC 001722916

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
001722916-01	OBS	No	1.813535	132.513520	0.1	1.362	7.1	0.1	1.60	6812	0.09	4824.23
001722916-02	OBS	No	1.813822	132.494408	18.4	10.501	7.4	7.4	1.60	6812	0.75	4823.21
001722916-03	OBS	No	113.456084	213.726772	152.5	10.563	16.5	7.4	1.60	6812	2.25	19.43
001722916-04	OBS	No	59.108474	141.293815	101.1	15.638	8.7	7.4	1.60	6812	1.76	46.34
001722916-05	OBS	No	22.011274	131.997241	79.9	6.325	8.8	8.8	1.60	6812	1.69	172.96
001722916-06	OBS	No	359.058903	202.797449	338.0	20.552	8.5	8.3	1.60	6812	5.69	4.18
001722916-07	OBS	No	80.910752	145.943923	136.1	5.420	8.0	7.3	1.60	6812	2.19	30.49
001722916-08	OBS	No	95.858298	158.854822	172.1	2.318	8.1	7.6	1.60	6812	2.39	24.32
001722916-09	OBS	No	105.723678	156.862664	140.0	6.744	8.2	7.9	1.60	6812	2.40	21.34

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
001722916-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV
001722916-02	OBS	FP	0.00	1	0	0	0	LPP_DV—SAME_NTL_PERIOD
001722916-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
001722916-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
001722916-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
001722916-06	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS—HALO_GHOST
001722916-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
001722916-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES—TRANS_GAPPED—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
001722916-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT

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

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

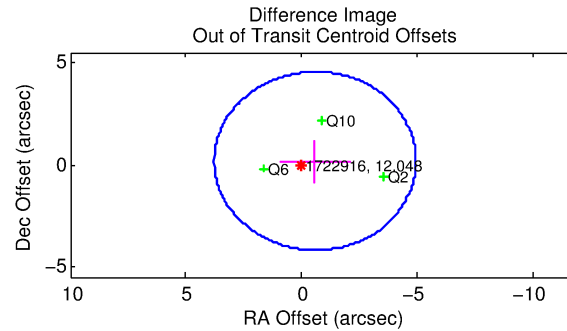
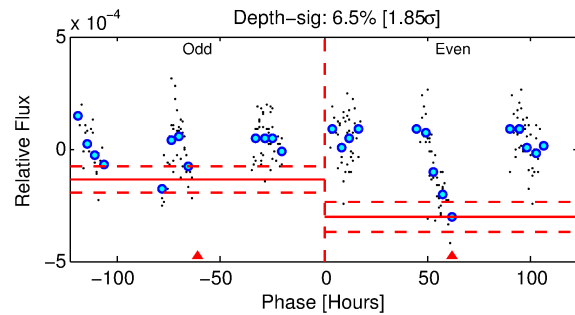
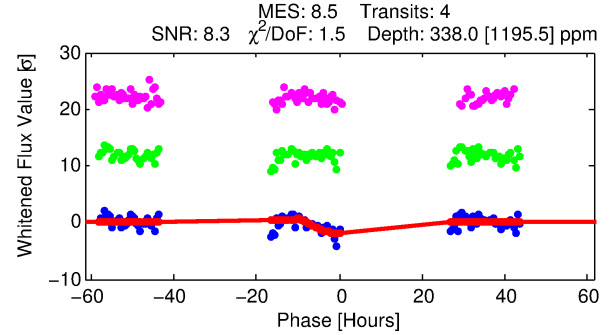
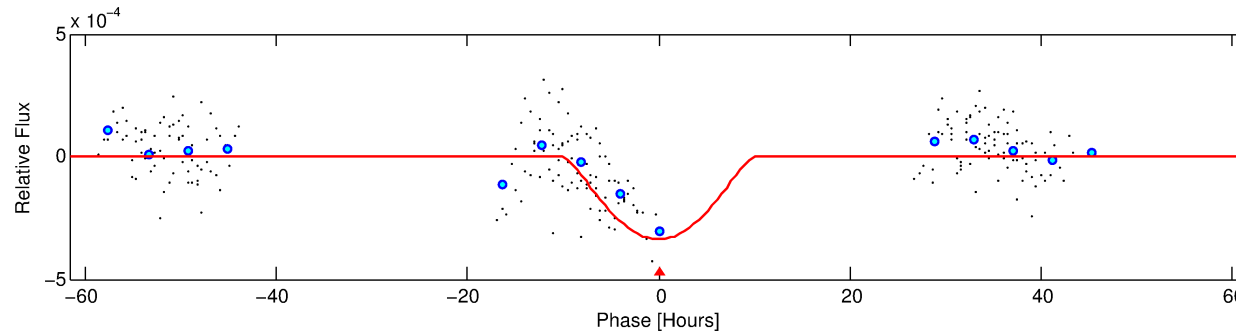
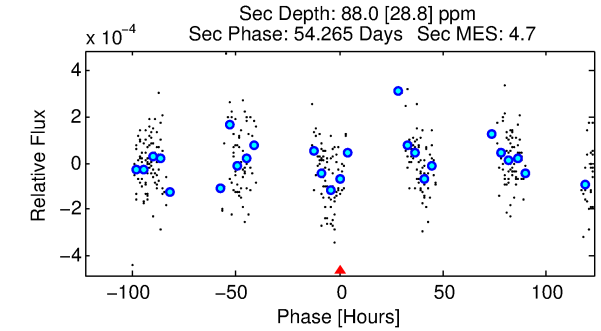
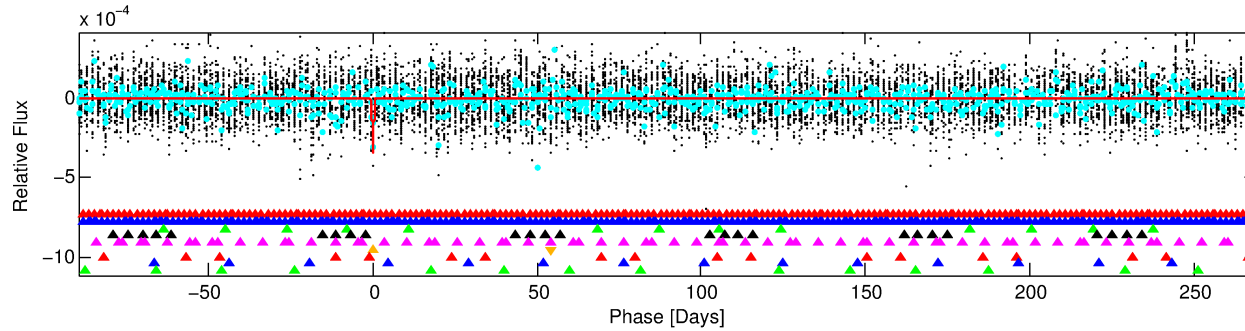
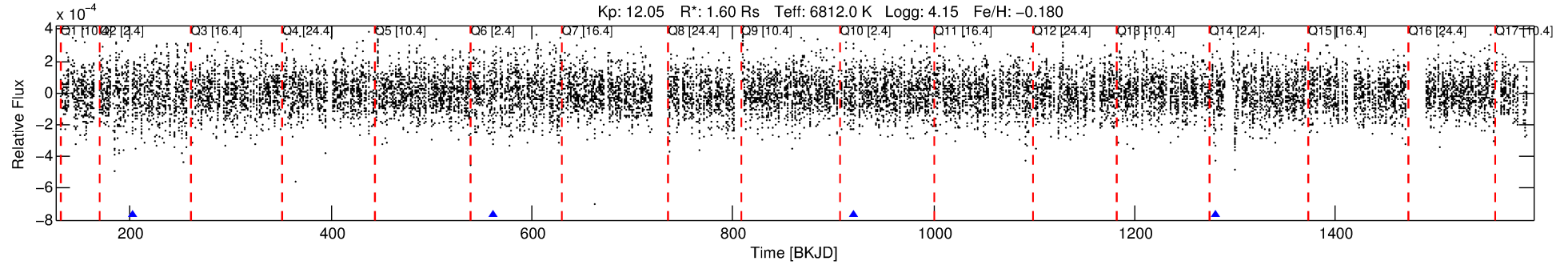
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 001722916-06

No Significant Match Found

# DV One-Page Summary

KIC: 1722916 Candidate: 6 of 9 Period: 359.059 d



## DV Fit Results:

Period = 359.05890 [0.02058] d  
Epoch = 202.7974 [0.0917] BKJD  
Rp/R\* = 0.0325 [0.0865]  
a/R\* = 34.33 [21.35]  
b = 1.00 [0.05]  
Seff = 4.18 [0.90]  
Teq = 365 [20] K  
Rp = 5.69 [15.18] Re  
a = 1.0896 [0.1527] AU  
Ag = 1773.01 [9460.50] [0.19 $\sigma$ ]  
Teffp = 3658 [4876] K [0.68 $\sigma$ ]

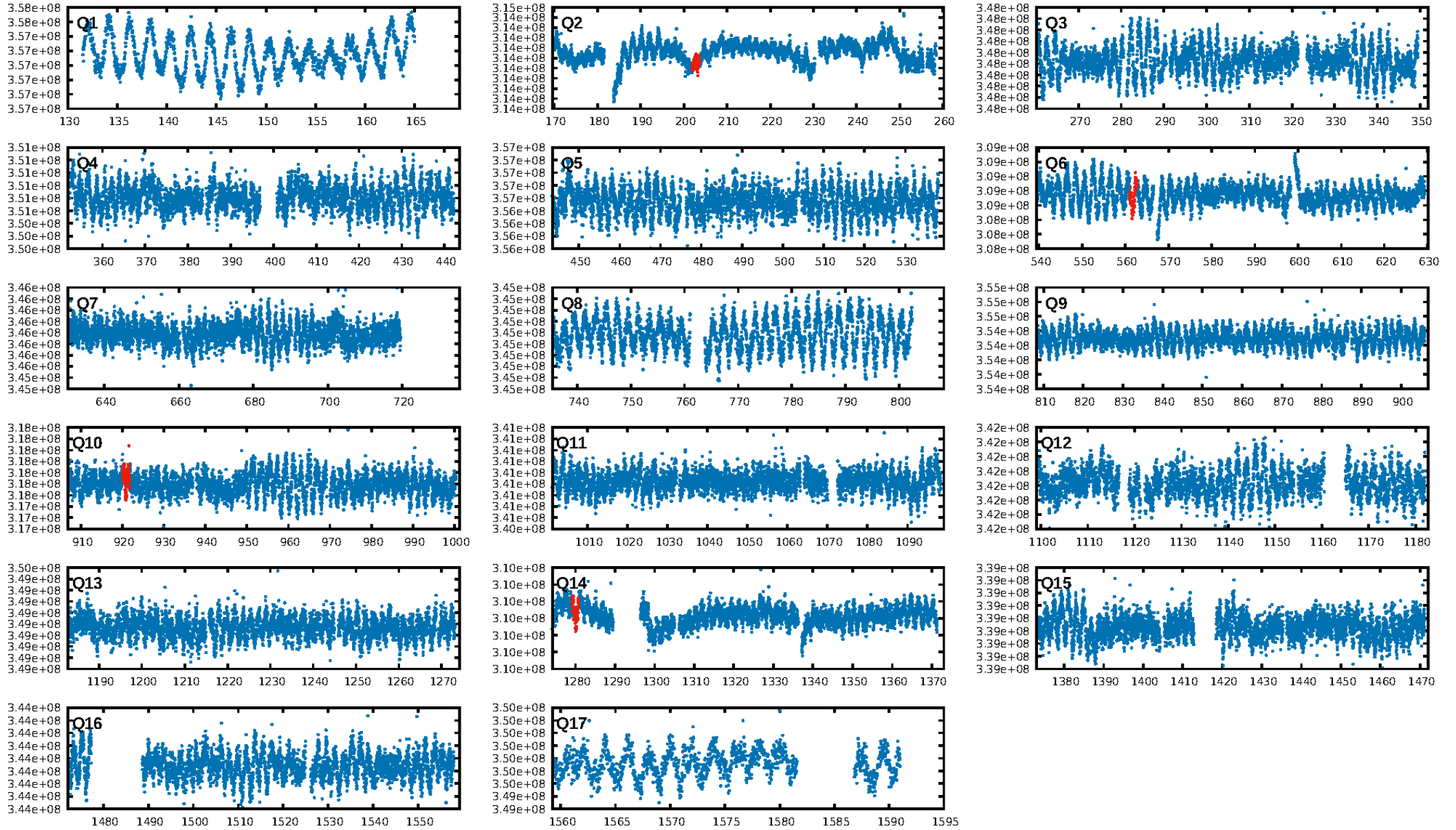
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [255.08 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 14.1%  
ModelChiSquareGoF-sig: 100.0%  
**Bootstrap-pfa: 2.94e-07**  
RollingBand-fgt: 1.00 [4/4]  
**GhostDiagnostic-chr: 0.1308**  
Centroid-sig: 9.0%  
Centroid-so: 0.965 arcsec [1.19 $\sigma$ ]  
OotOffset-rm: 0.619 arcsec [0.43 $\sigma$ ]  
KicOffset-rm: 0.635 arcsec [0.45 $\sigma$ ]  
OotOffset-st: 3/0/0/0 [3]  
KicOffset-st: 3/0/0/0 [3]  
DiffImageQuality-fgm: 0.67 [2/3]  
DiffImageOverlap-fno: 0.00 [0/3]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 00:46:32 Z

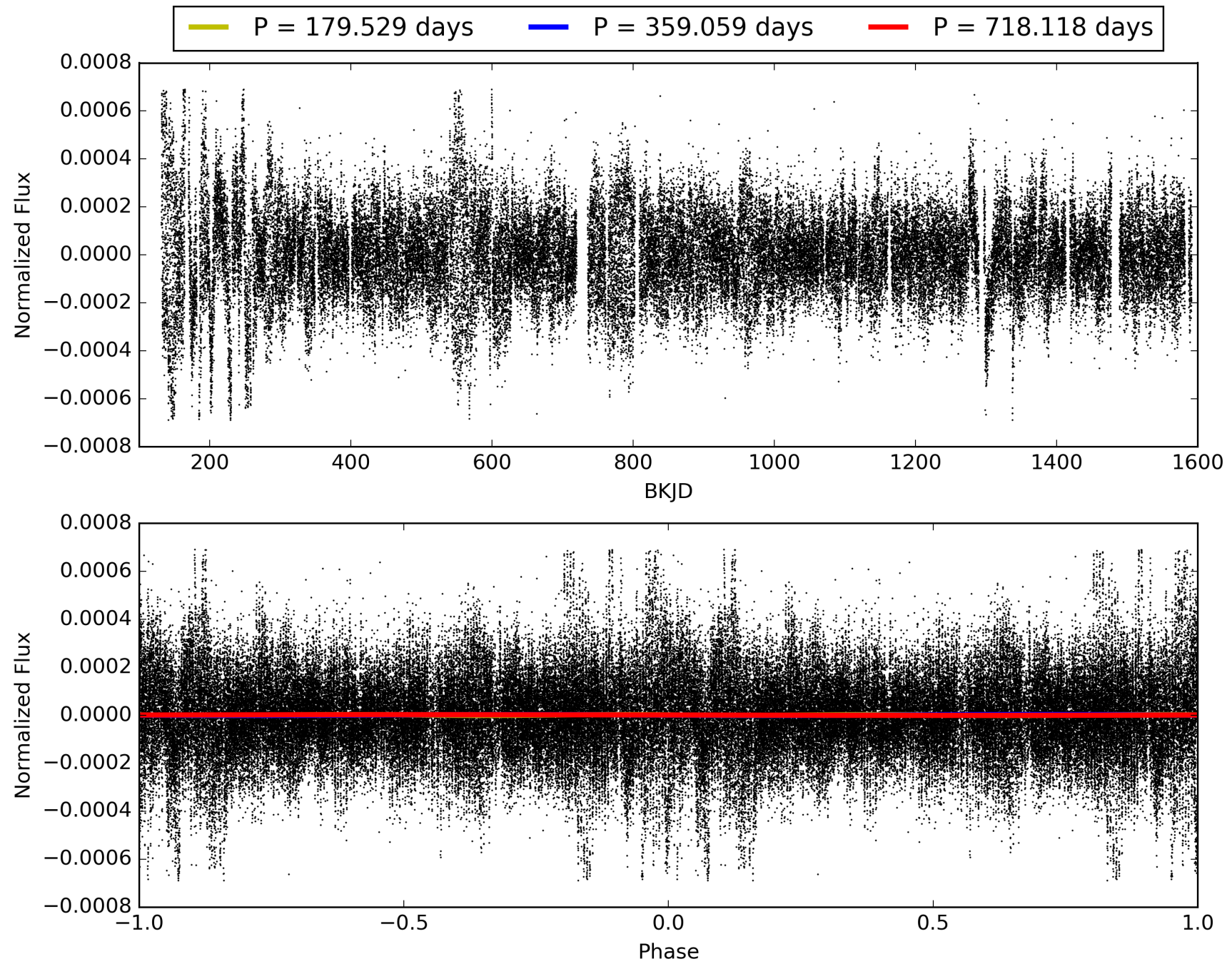
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 001722916-06, PDC Light Curves



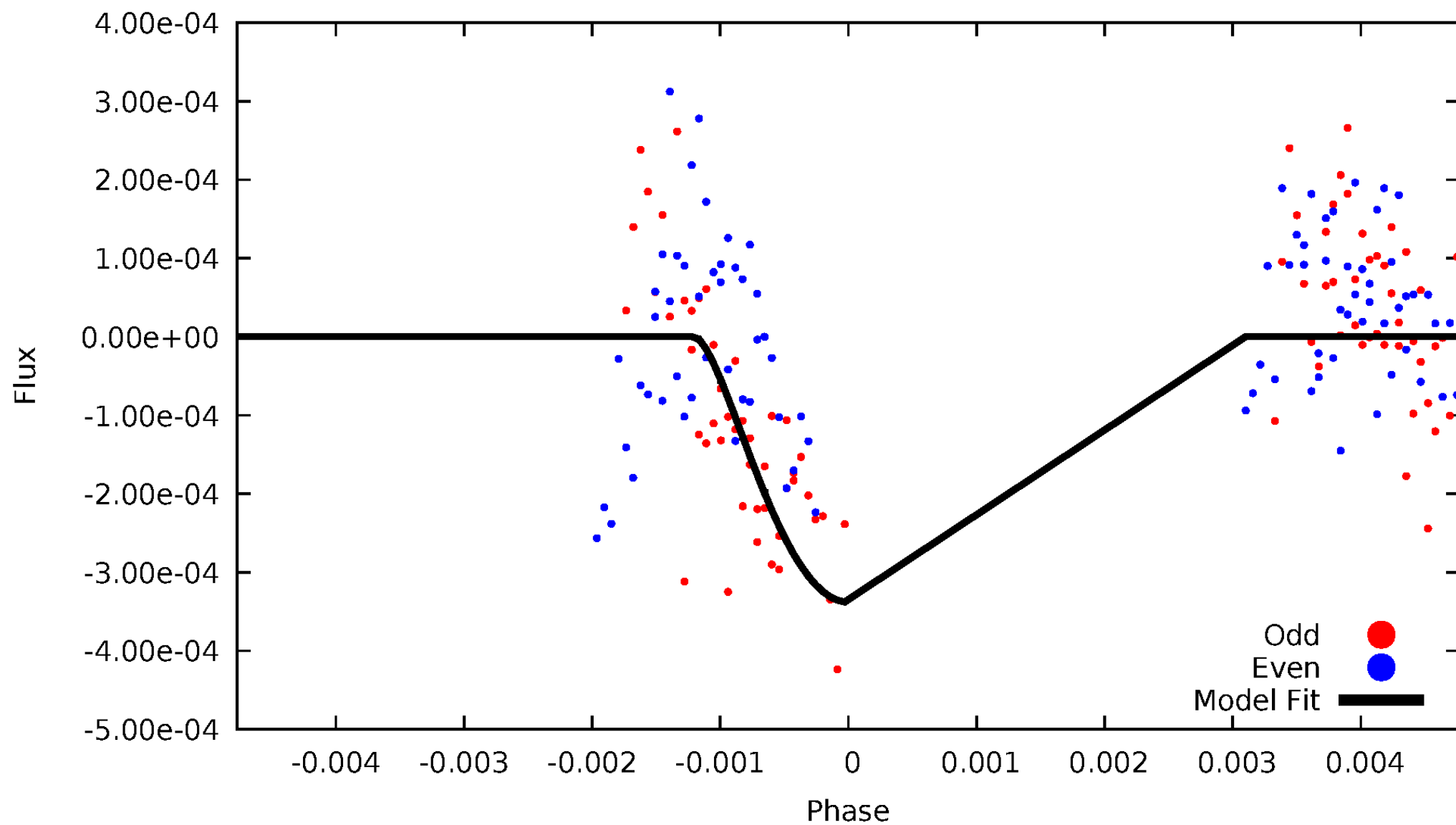


TCE 001722916-06



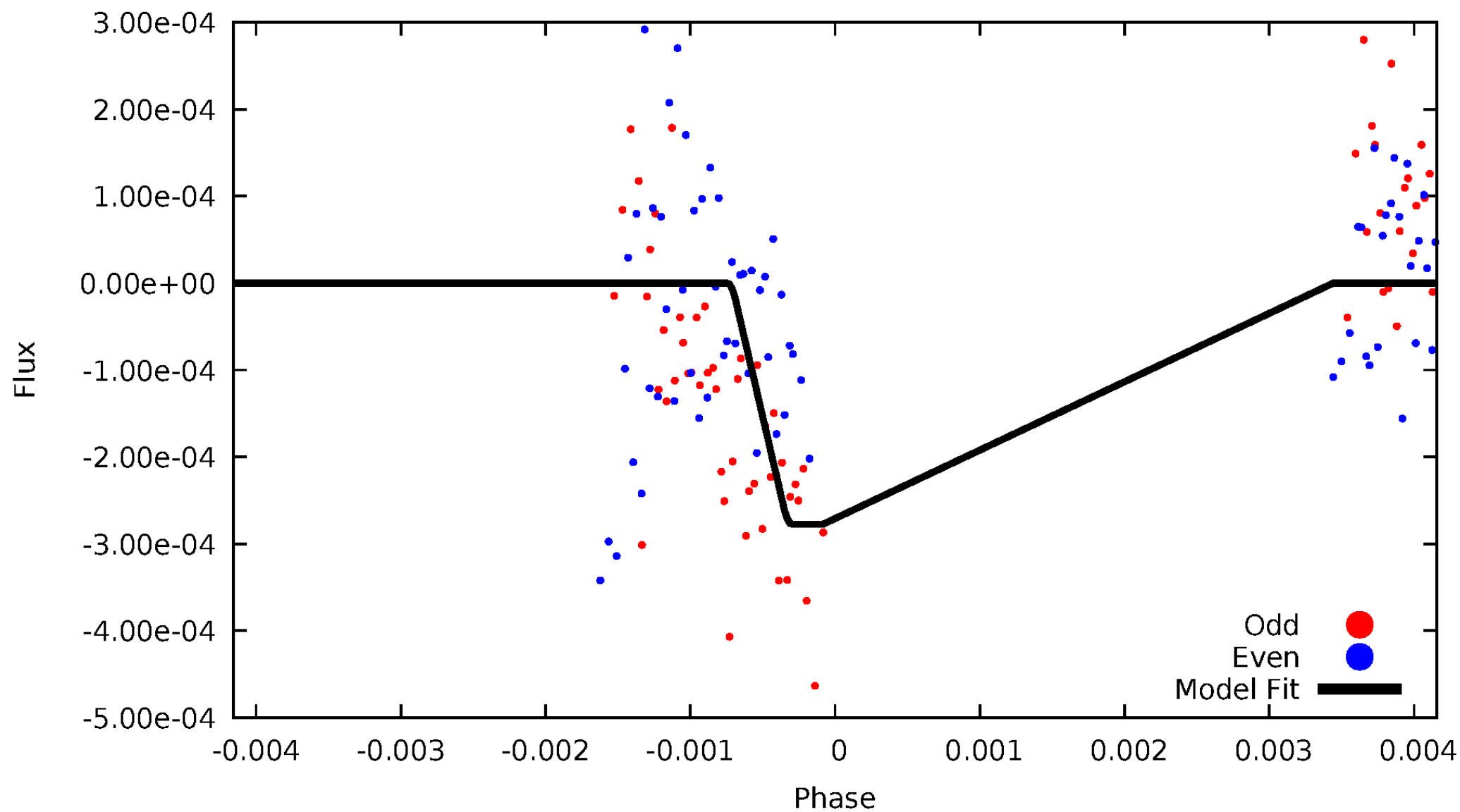
# DV Odd/Even

TCE 001722916-06



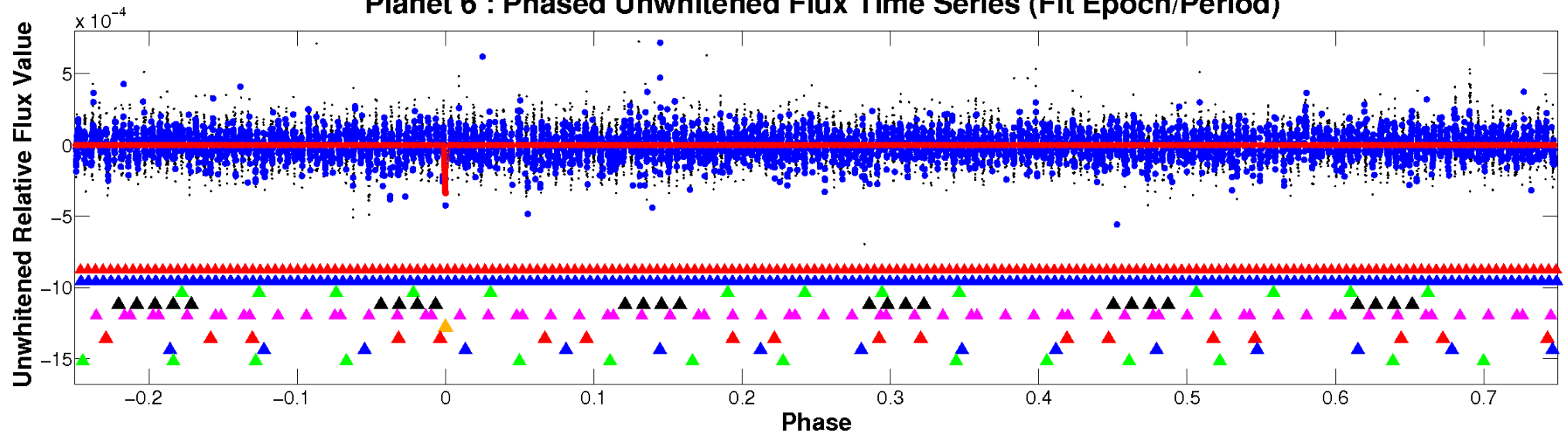
# ALT Odd/Even

TCE 001722916-06

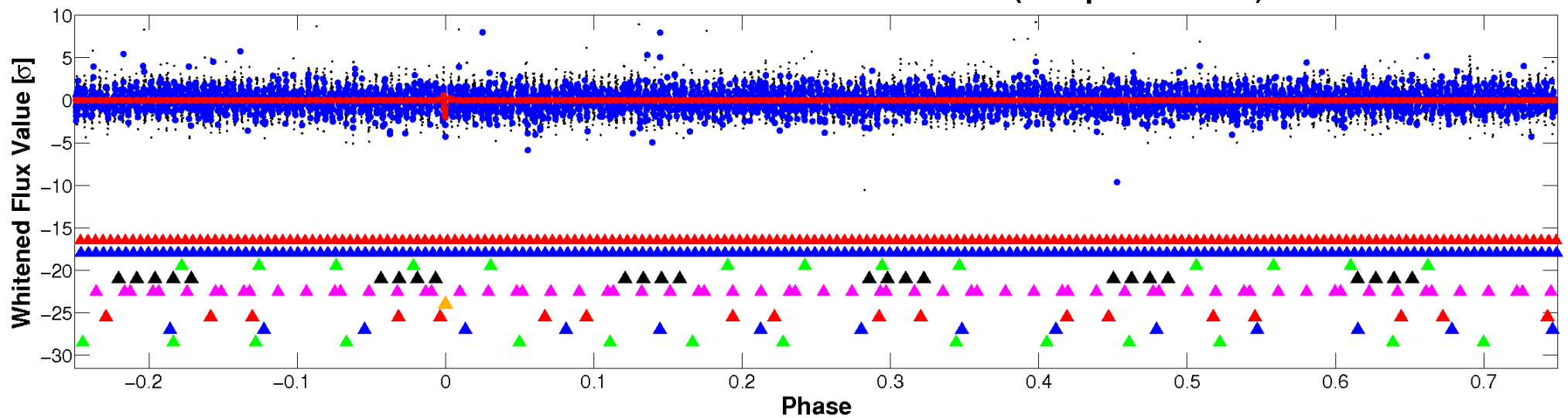


# Non-Whitened Vs. Whitened Light Curve

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

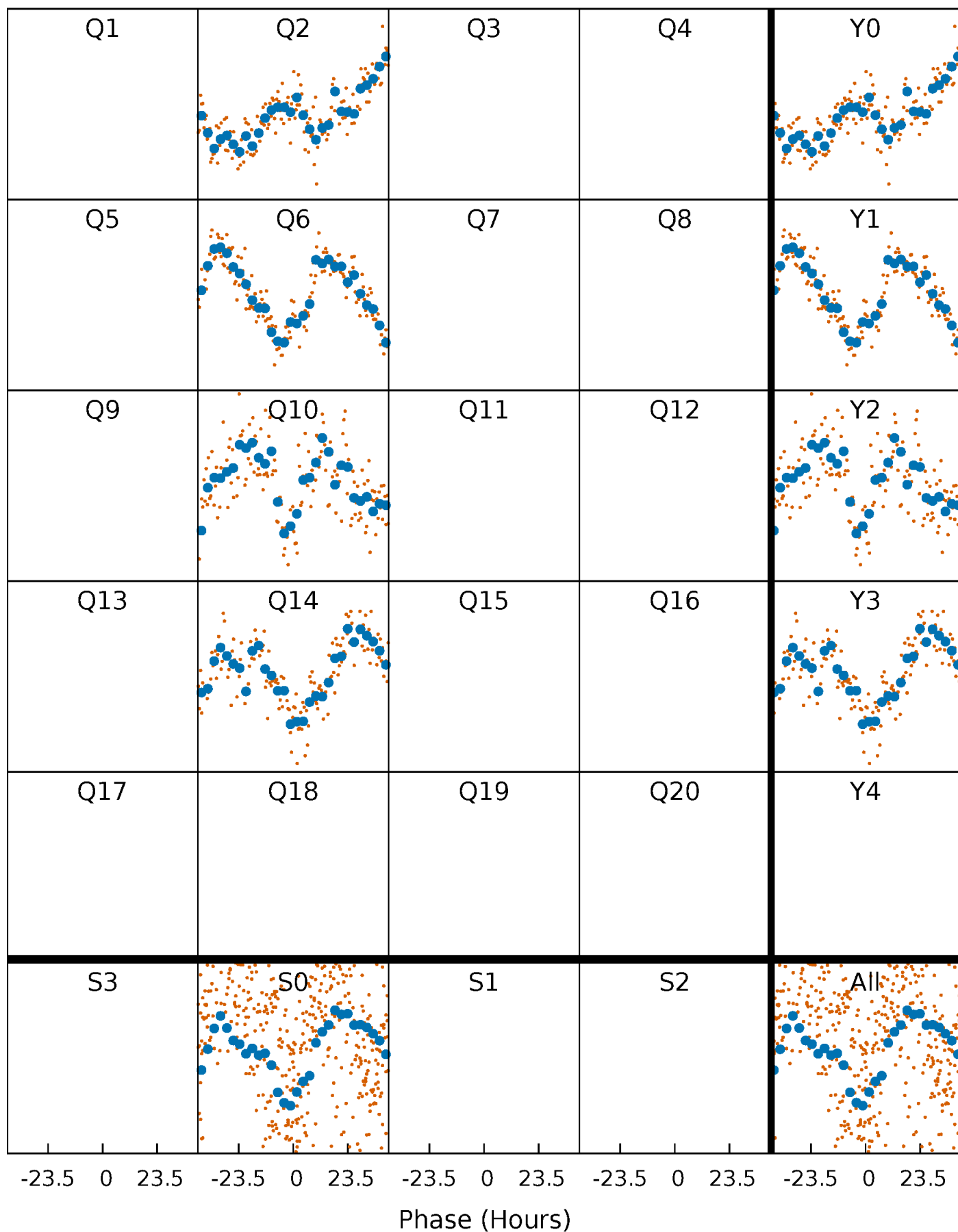


## Planet 6 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

TCE 001722916-06     $P=359.058903$  Days     $T_0=202.797449$  (BKJD)



# DV Quarter-Phased Transit Curves

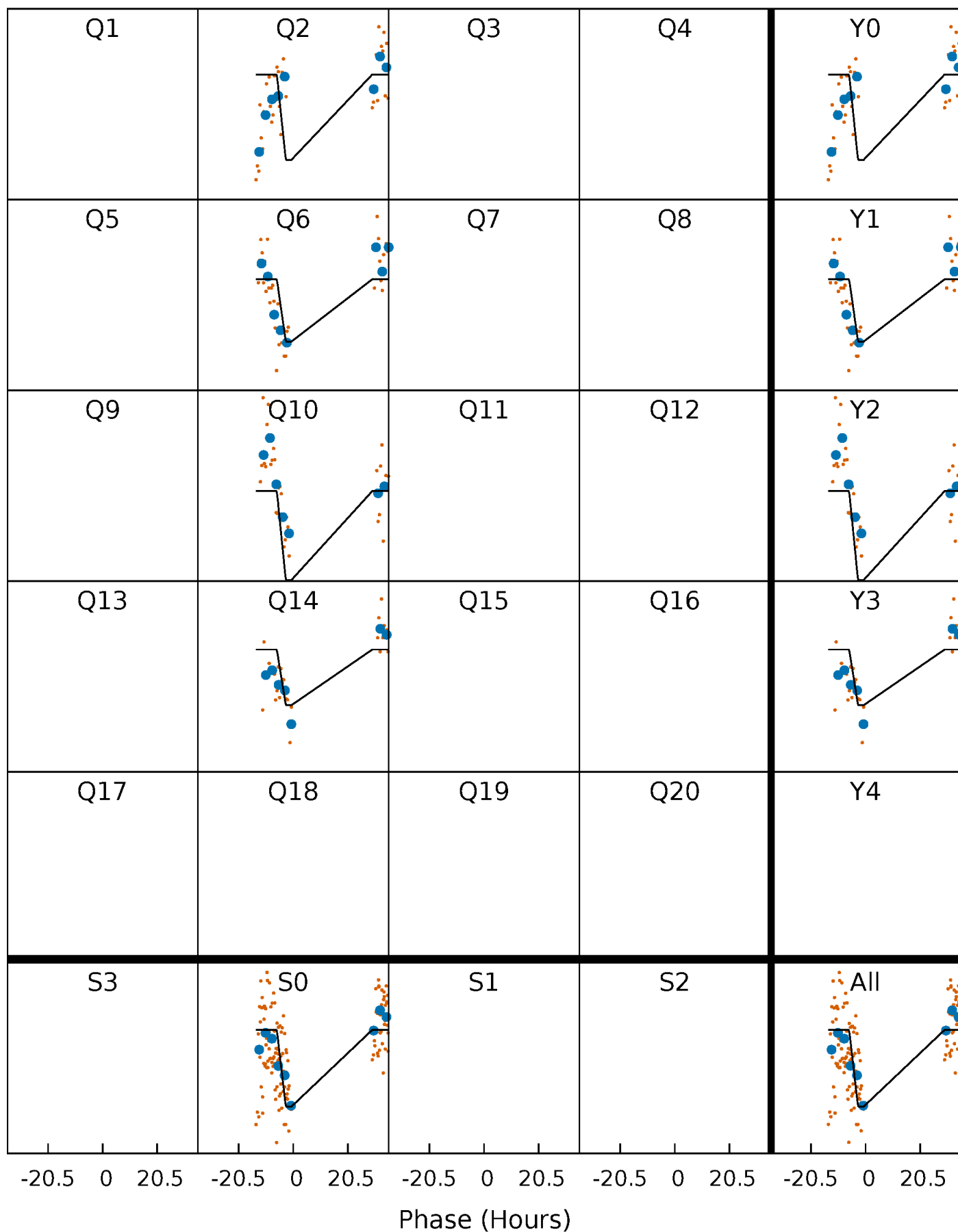
TCE 001722916-06 P=359.058903 Days  $T_0=202.797449$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

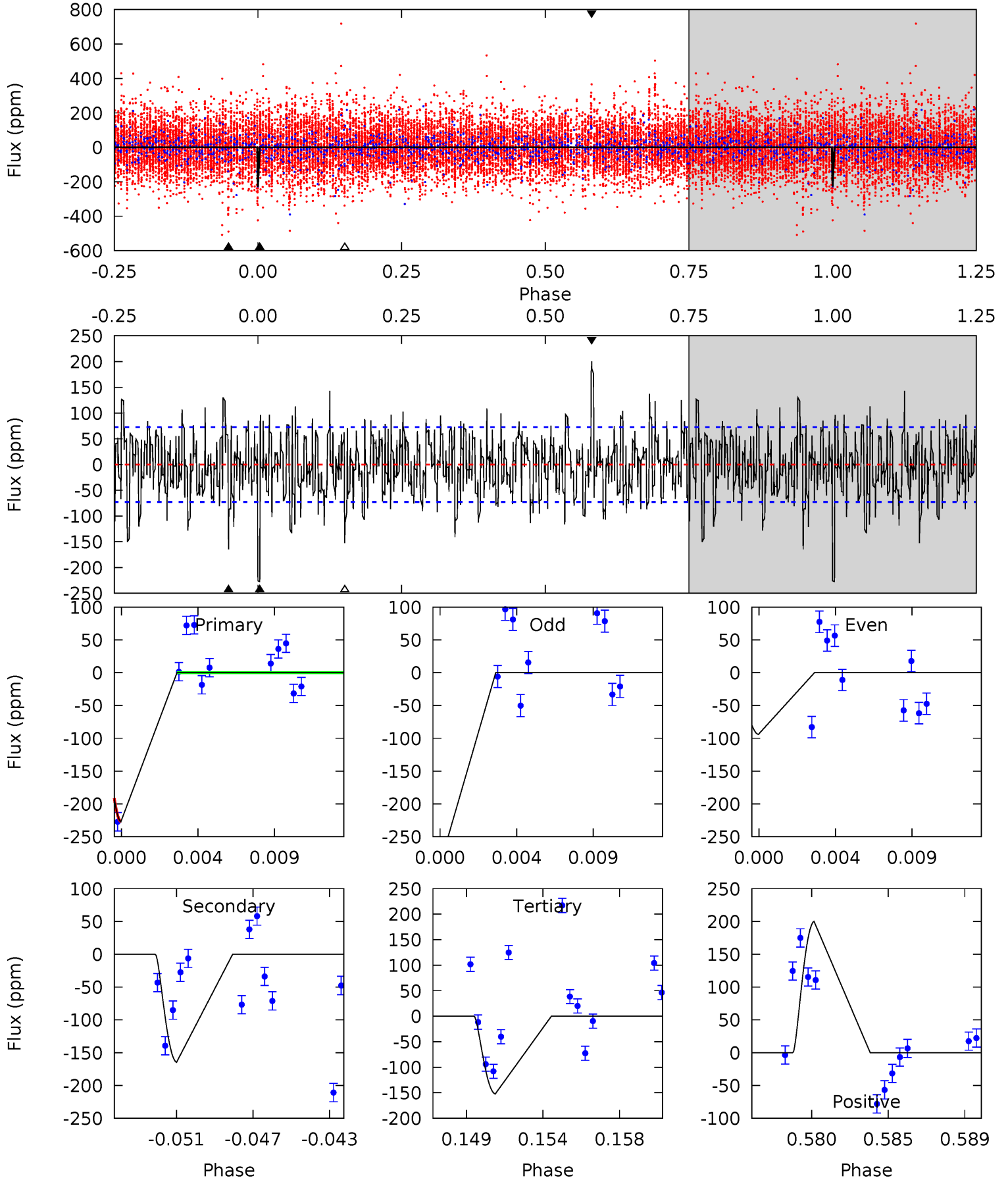
TCE 001722916-06 P=359.106195 Days  $T_0=202.674975$  (BKJD)



# DV Model-Shift Uniqueness Test

001722916-06, P = 359.058903 Days, E = 202.797449 Days

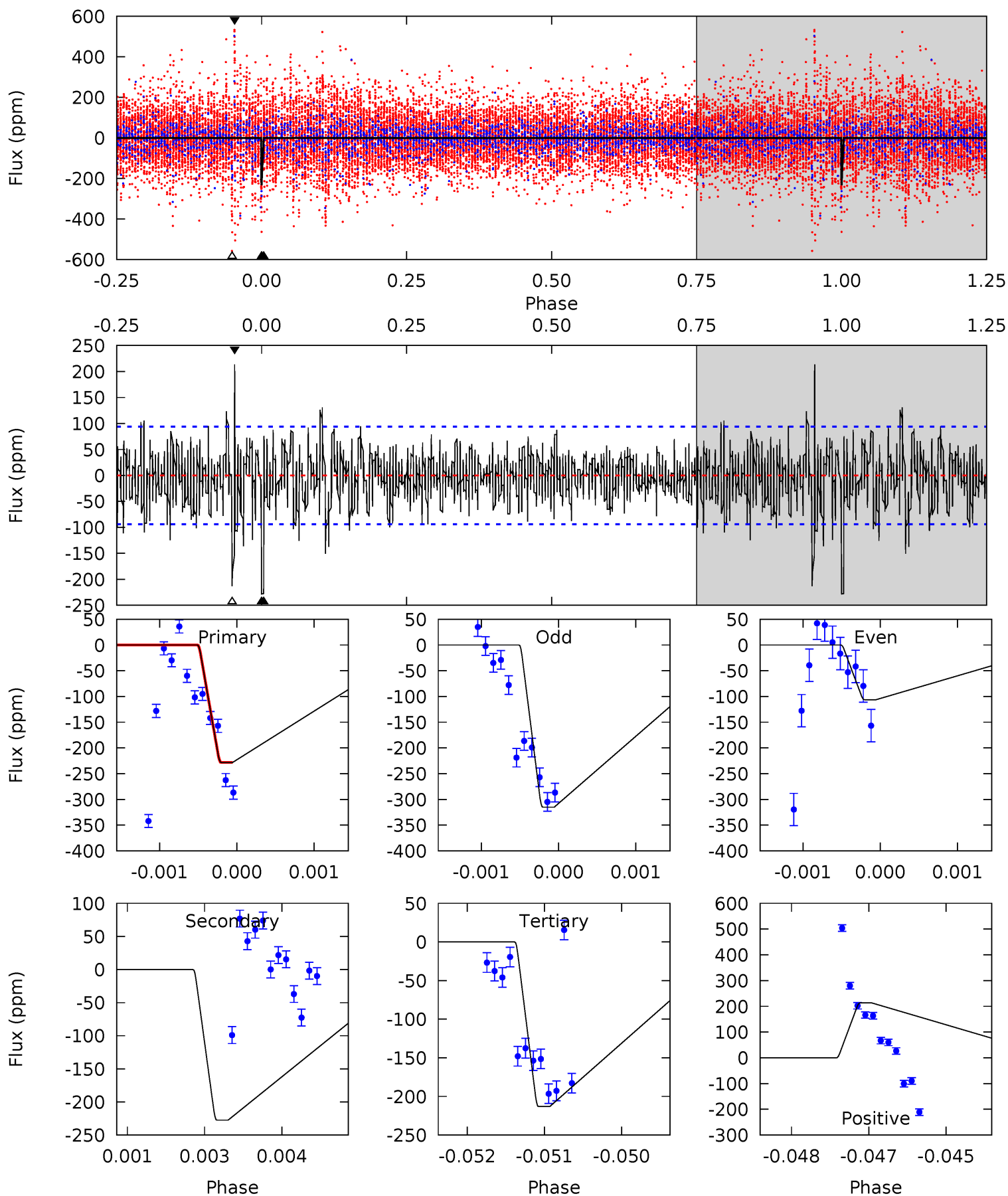
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
16.2	11.8	10.9	14.3	5.19	2.86	3.27	5.34	1.94	0.87	-2.53	7.19	0	0.47	0



# Alt Model-Shift Uniqueness Test

001722916-06, P = 359.106195 Days, E = 202.674975 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
13.1	13.0	12.2	12.2	5.38	3.18	2.21	0.87	0.85	0.82	0.80	5.95	0	0.48	0



### Stellar Parameters For KIC 001722916

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6812^{+71}_{-91}$	$4.154^{+0.115}_{-0.115}$	$-0.180^{+0.150}_{-0.200}$	$1.604^{+0.262}_{-0.236}$	$1.347^{+0.088}_{-0.118}$	$0.460^{+0.237}_{-0.156}$
	+1%/-1%	+3%/-3%	+83%/-111%	+16%/-15%	+7%/-9%	+51%/-34%
Source	SPE68	SPE68	SPE68	DSEP		

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

### Secondary Eclipse Parameters for KIC 001722916-06 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-165 \pm 14$	$12.19^{+10.98}_{-8.15}$	$509^{+23}_{-20}$	$3408^{+1707}_{-569}$	$714^{+5790}_{-518}$
Alt.	$-227 \pm 17$	$11.15^{+11.71}_{-8.01}$	$510^{+20}_{-21}$	$3697^{+2436}_{-731}$	$1202^{+13899}_{-921}$

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

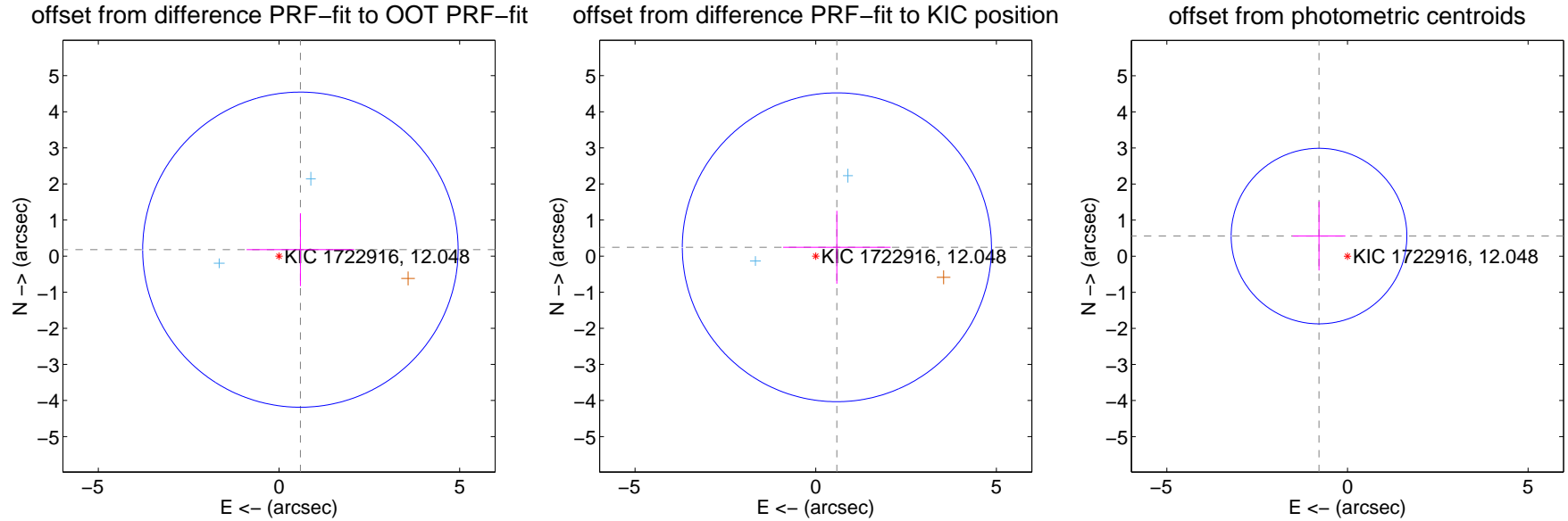
## DV Centroid Data

Supplemental centroid analysis for 001722916-06. Kepler magnitude: 12.05. Transit SNR 8.34

There are 2 quarters with good PRF difference image offsets

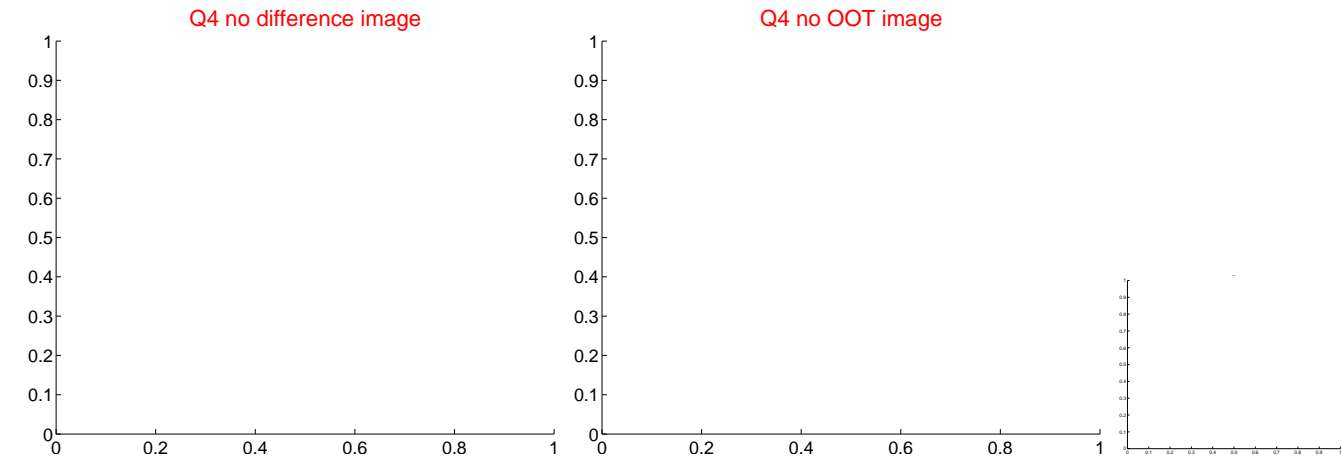
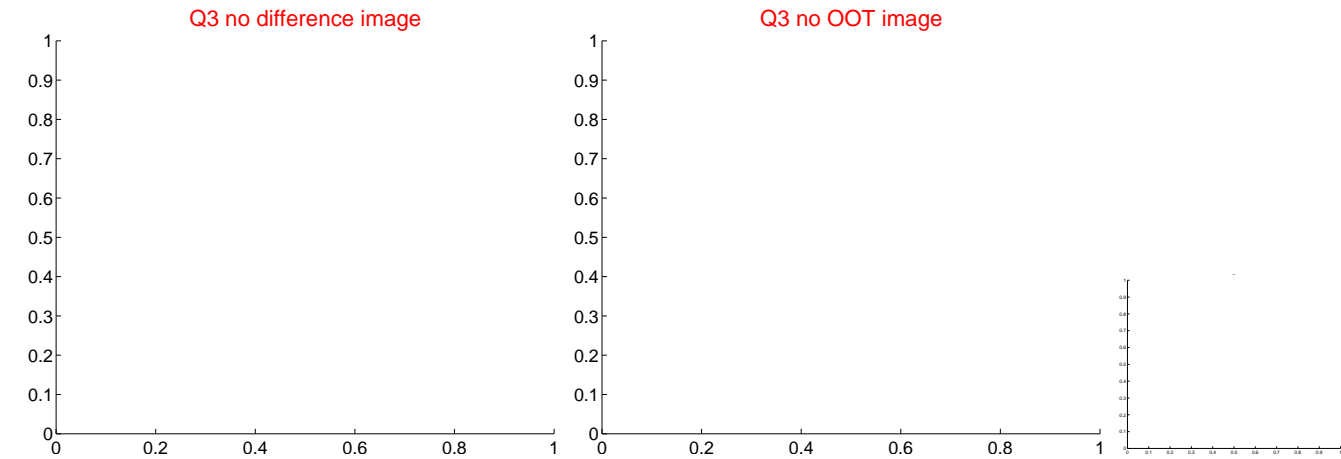
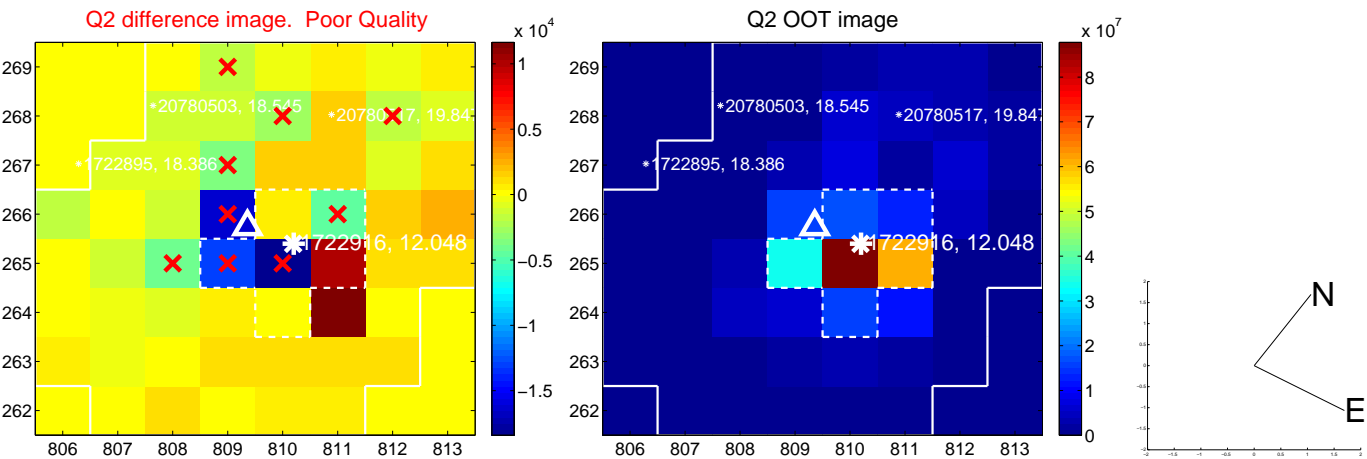
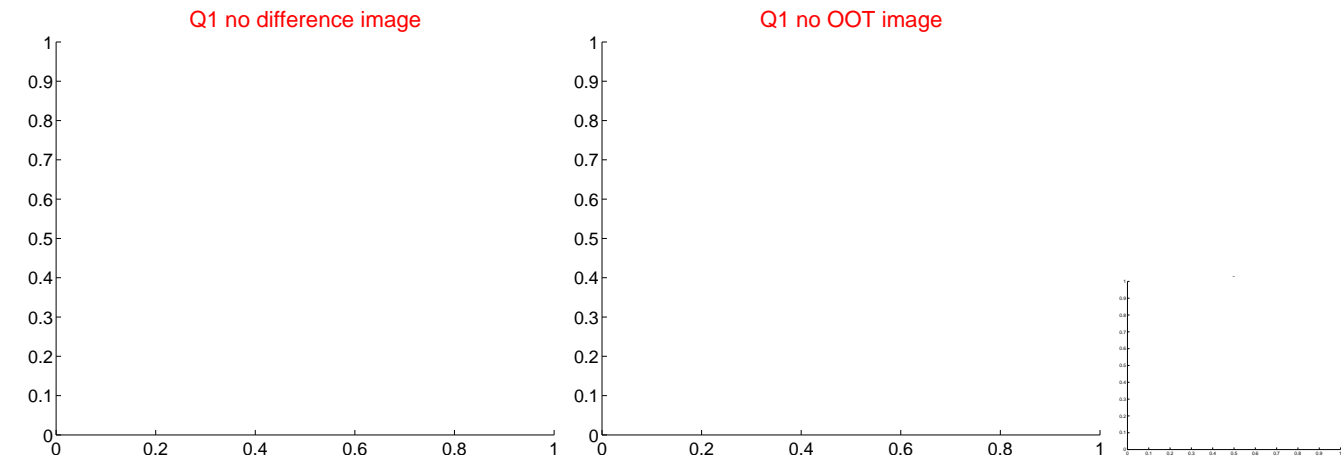
The direct PRF centroid is offset from the target star catalog position by about 0.09 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.619 \pm 1.455$	0.43	$-0.593 \pm 1.489$	$0.179 \pm 1.009$
PRF-fit source offset from KIC position	$0.635 \pm 1.426$	0.45	$-0.586 \pm 1.487$	$0.245 \pm 1.011$
photometric centroid source offset	$0.97 \pm 0.81$	1.19	$0.79 \pm 0.73$	$0.56 \pm 0.95$



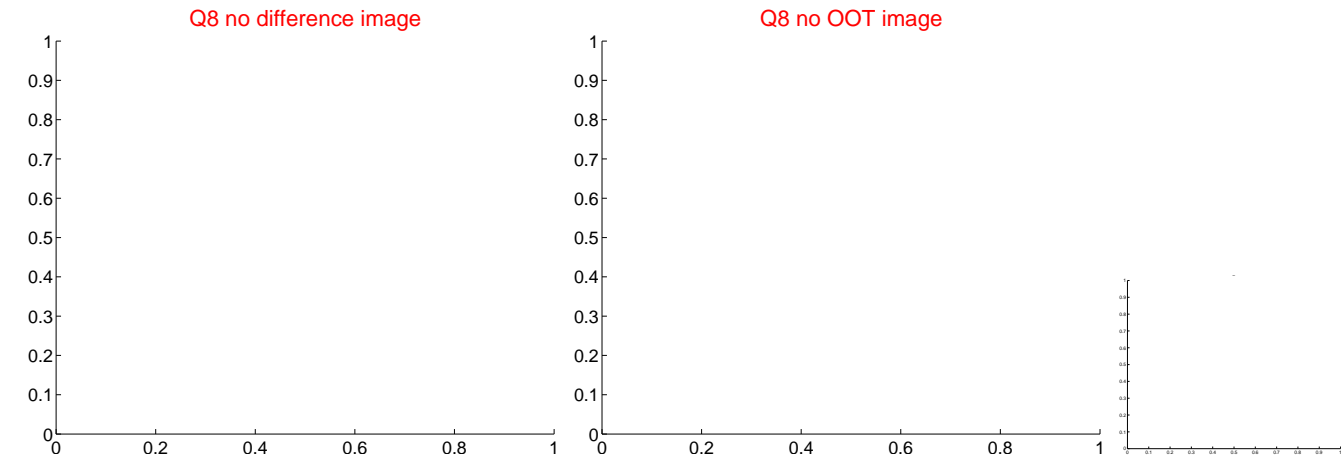
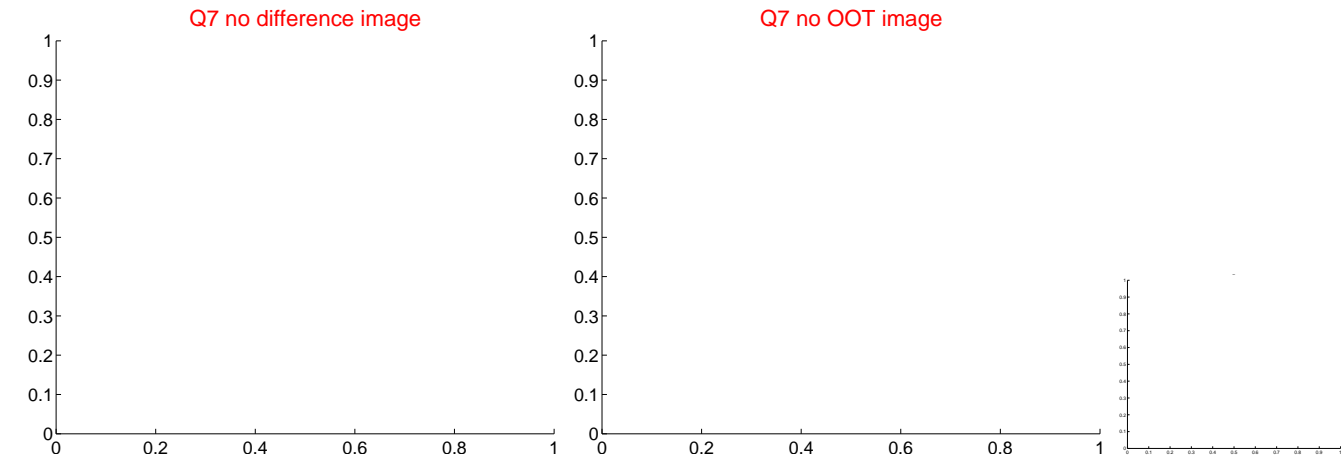
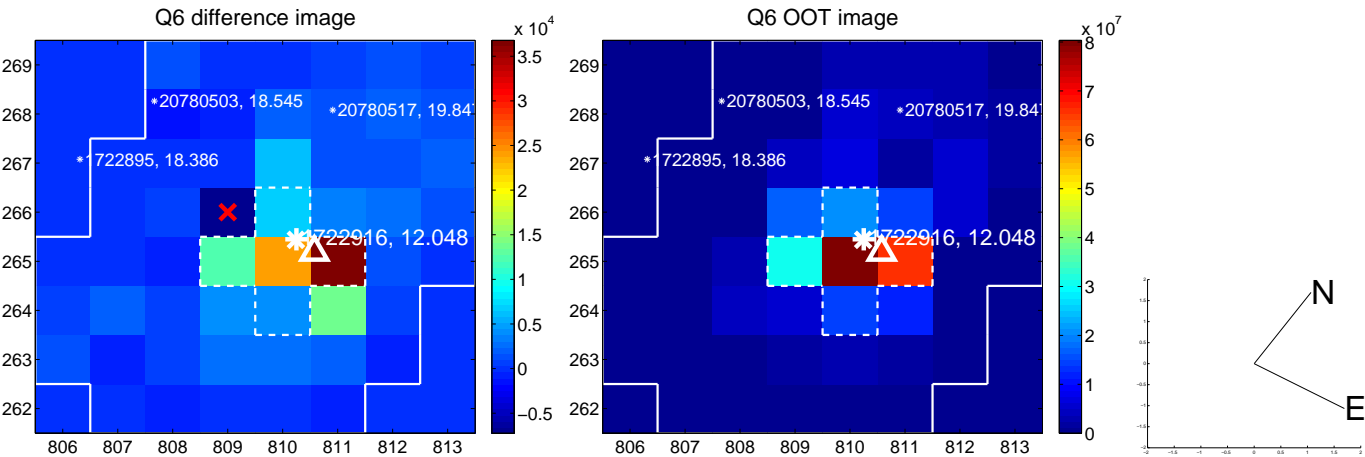
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

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

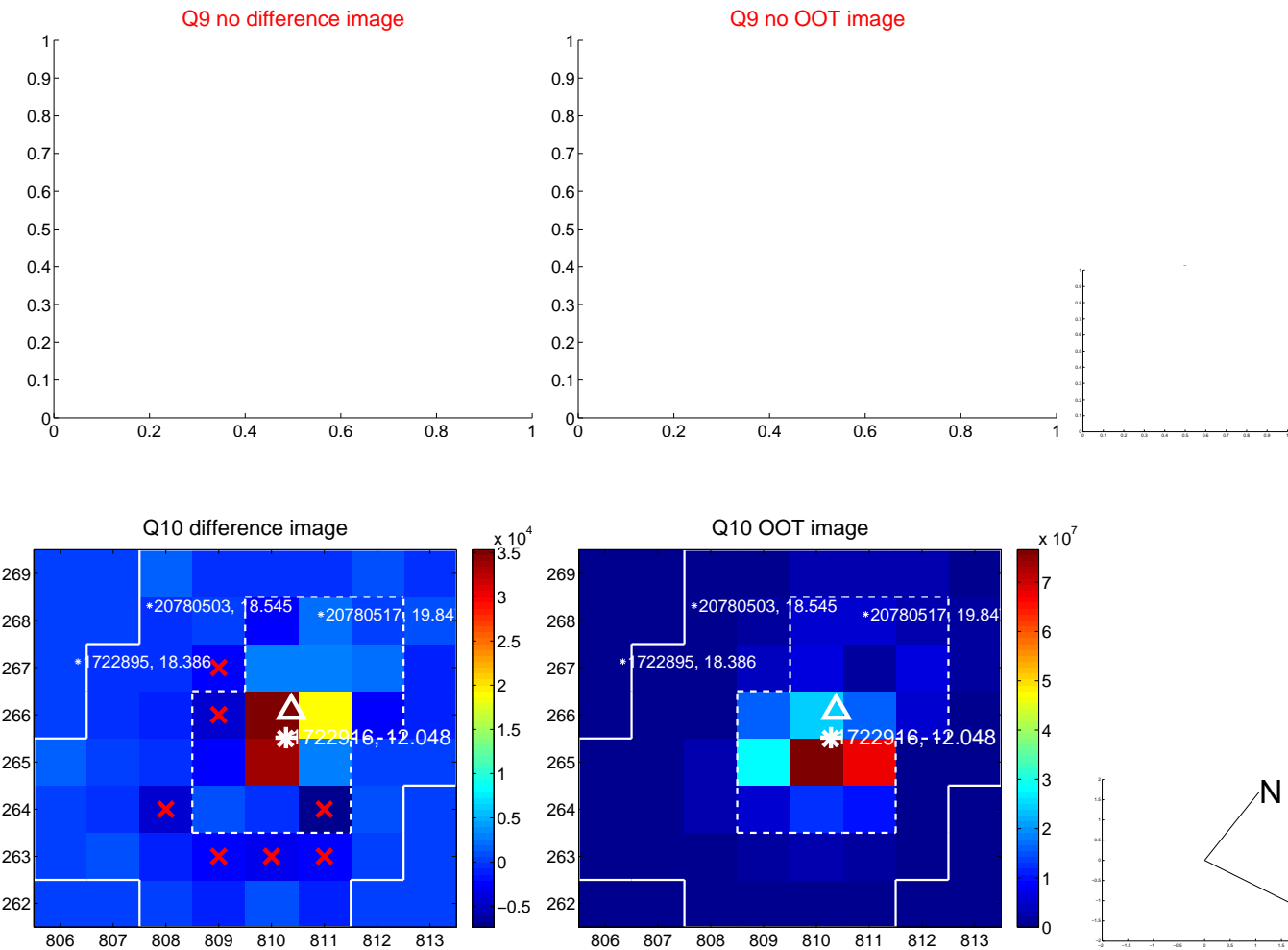




white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



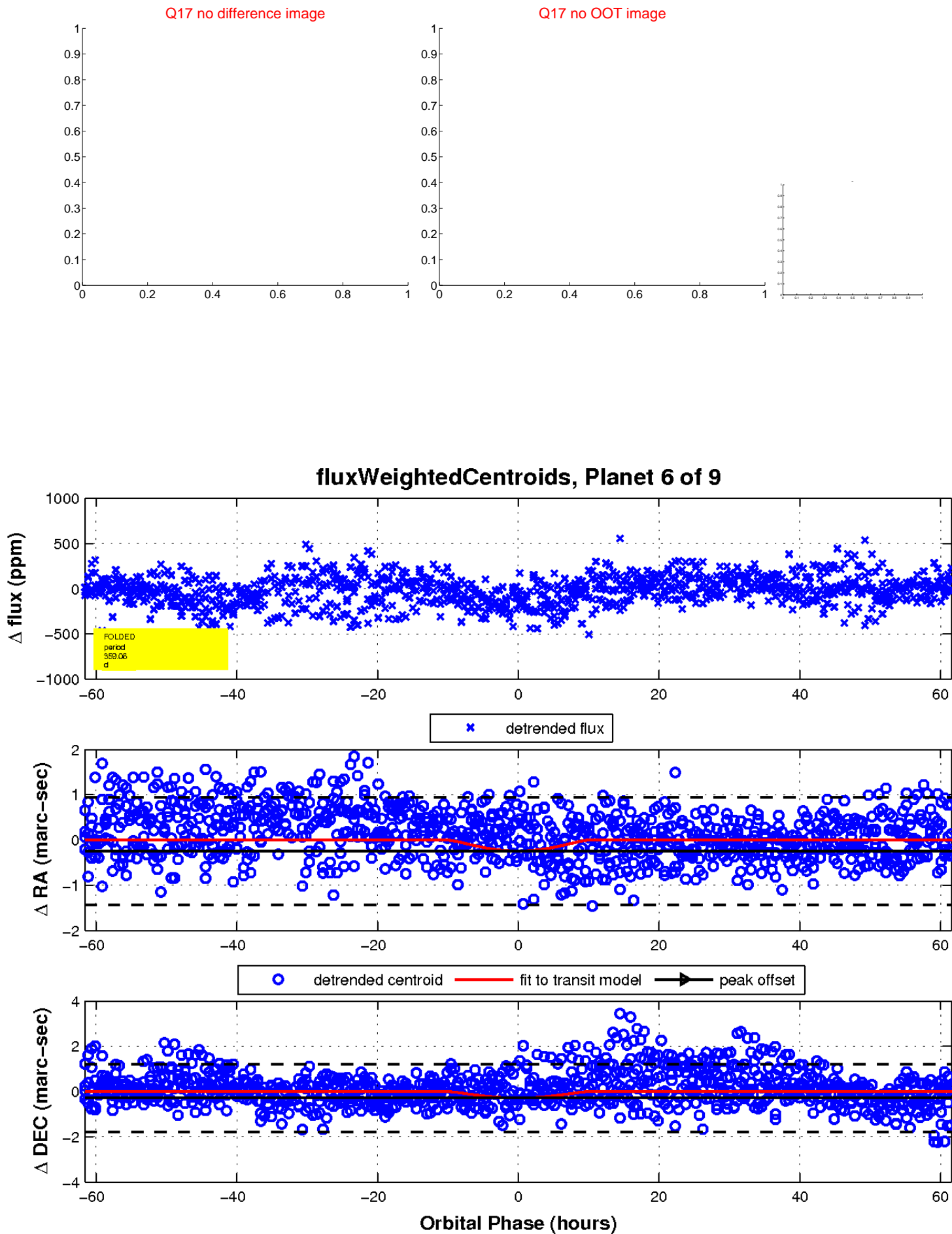
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

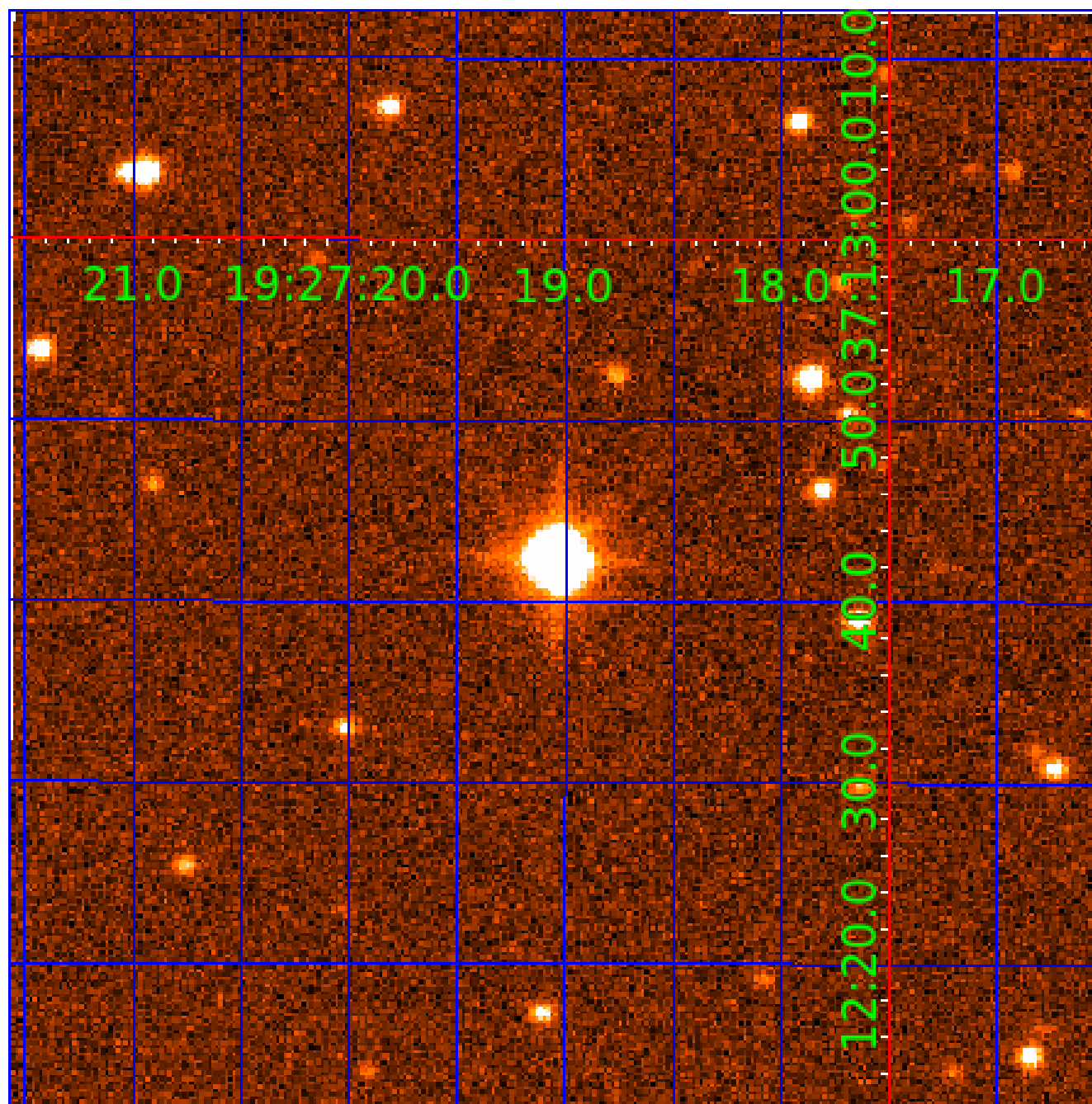


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 001722916

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
001722916-01	OBS	No	1.813535	132.513520	0.1	1.362	7.1	0.1	1.60	6812	0.09	4824.23
001722916-02	OBS	No	1.813822	132.494408	18.4	10.501	7.4	7.4	1.60	6812	0.75	4823.21
001722916-03	OBS	No	113.456084	213.726772	152.5	10.563	16.5	7.4	1.60	6812	2.25	19.43
001722916-04	OBS	No	59.108474	141.293815	101.1	15.638	8.7	7.4	1.60	6812	1.76	46.34
001722916-05	OBS	No	22.011274	131.997241	79.9	6.325	8.8	8.8	1.60	6812	1.69	172.96
001722916-06	OBS	No	359.058903	202.797449	338.0	20.552	8.5	8.3	1.60	6812	5.69	4.18
001722916-07	OBS	No	80.910752	145.943923	136.1	5.420	8.0	7.3	1.60	6812	2.19	30.49
001722916-08	OBS	No	95.858298	158.854822	172.1	2.318	8.1	7.6	1.60	6812	2.39	24.32
001722916-09	OBS	No	105.723678	156.862664	140.0	6.744	8.2	7.9	1.60	6812	2.40	21.34

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
001722916-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV
001722916-02	OBS	FP	0.00	1	0	0	0	LPP_DV—SAME_NTL_PERIOD
001722916-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
001722916-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
001722916-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
001722916-06	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS—HALO_GHOST
001722916-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
001722916-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES—TRANS_GAPPED—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
001722916-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_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.

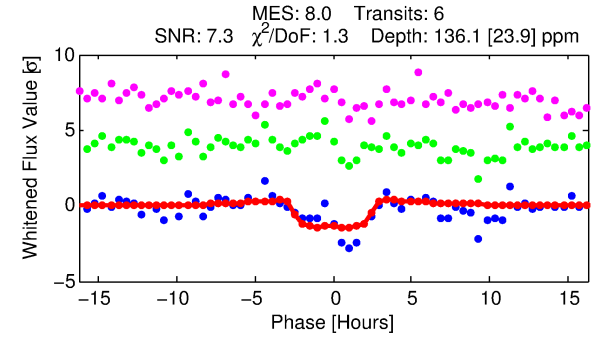
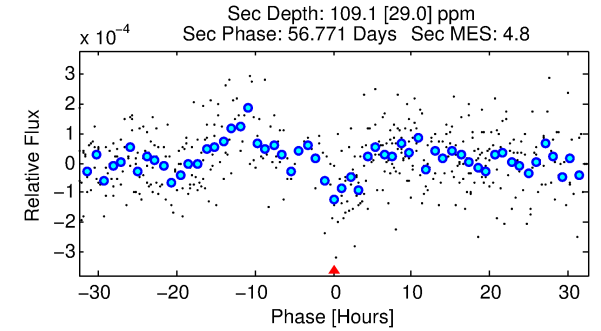
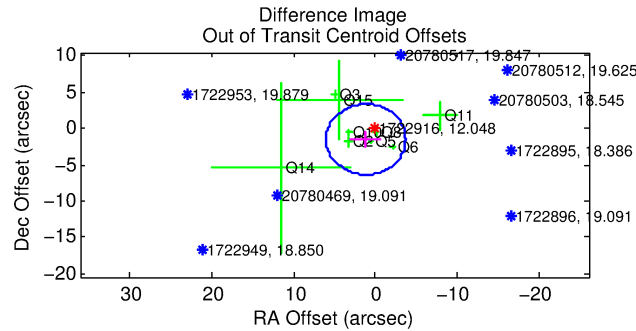
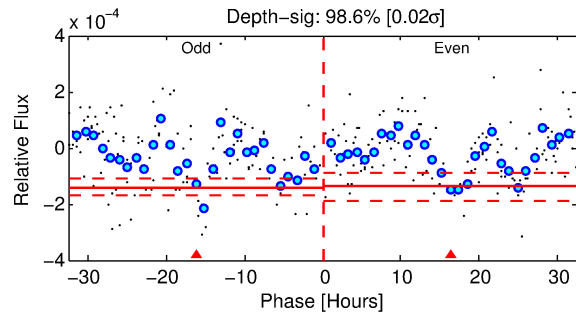
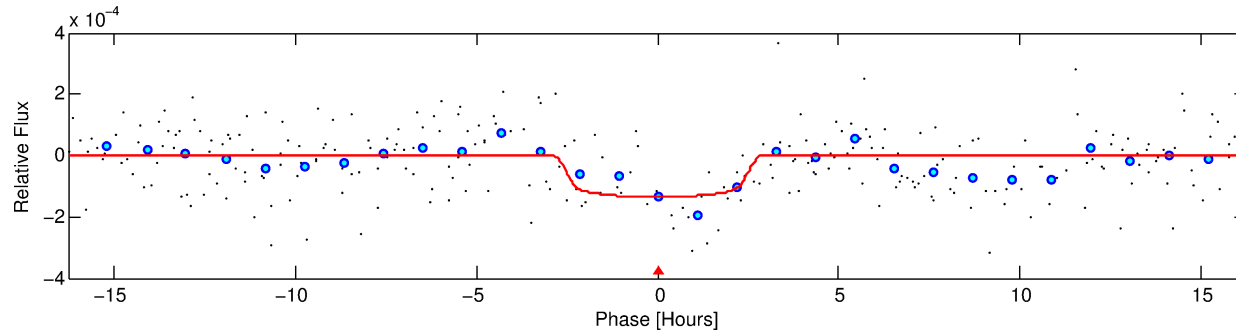
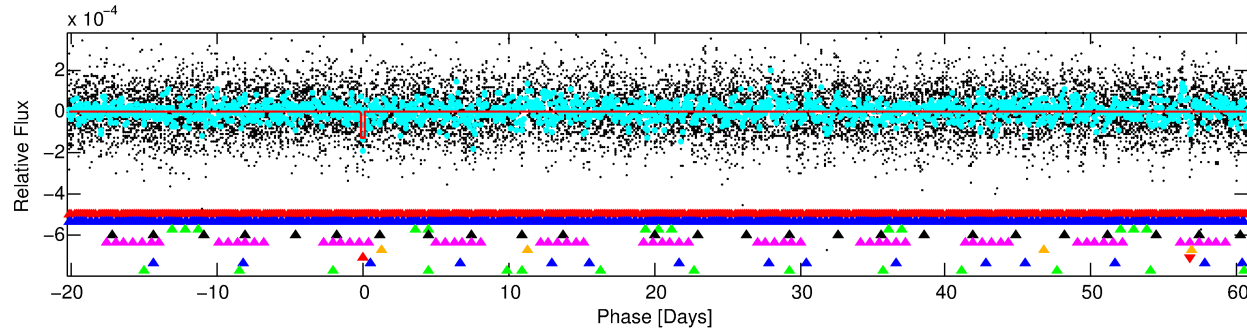
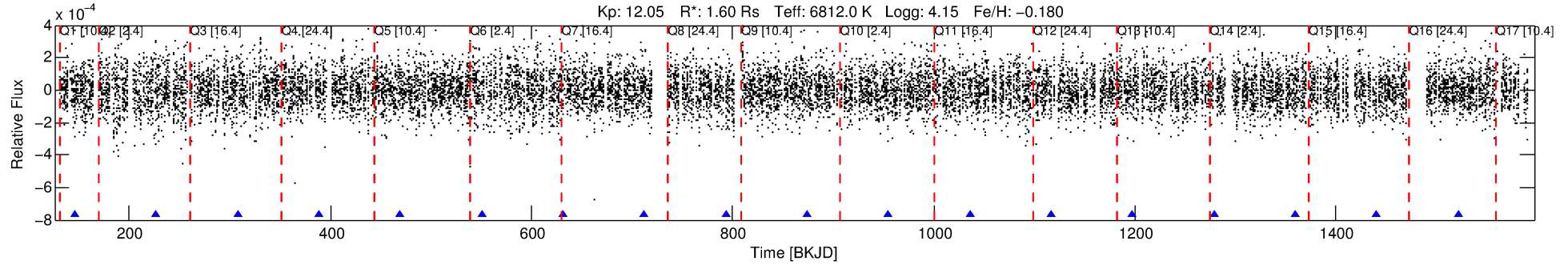
Ephemeris Match Information For 001722916-07

No Significant Match Found



# DV One-Page Summary

KIC: 1722916 Candidate: 7 of 9 Period: 80.911 d



## DV Fit Results:

Period = 80.91075 [0.00156] d  
Epoch = 145.9439 [0.0159] BKJD  
Rp/R\* = 0.0125 [0.0045]  
a/R\* = 51.15 [105.38]  
b = 0.91 [0.40]  
Seff = 30.49 [6.53]  
Teq = 599 [32] K  
Rp = 2.19 [0.87] Re  
a = 0.4035 [0.0566] AU  
Ag = 2035.68 [1628.93] [1.25σ]  
Teffp = 6223 [1205] K [4.66σ]

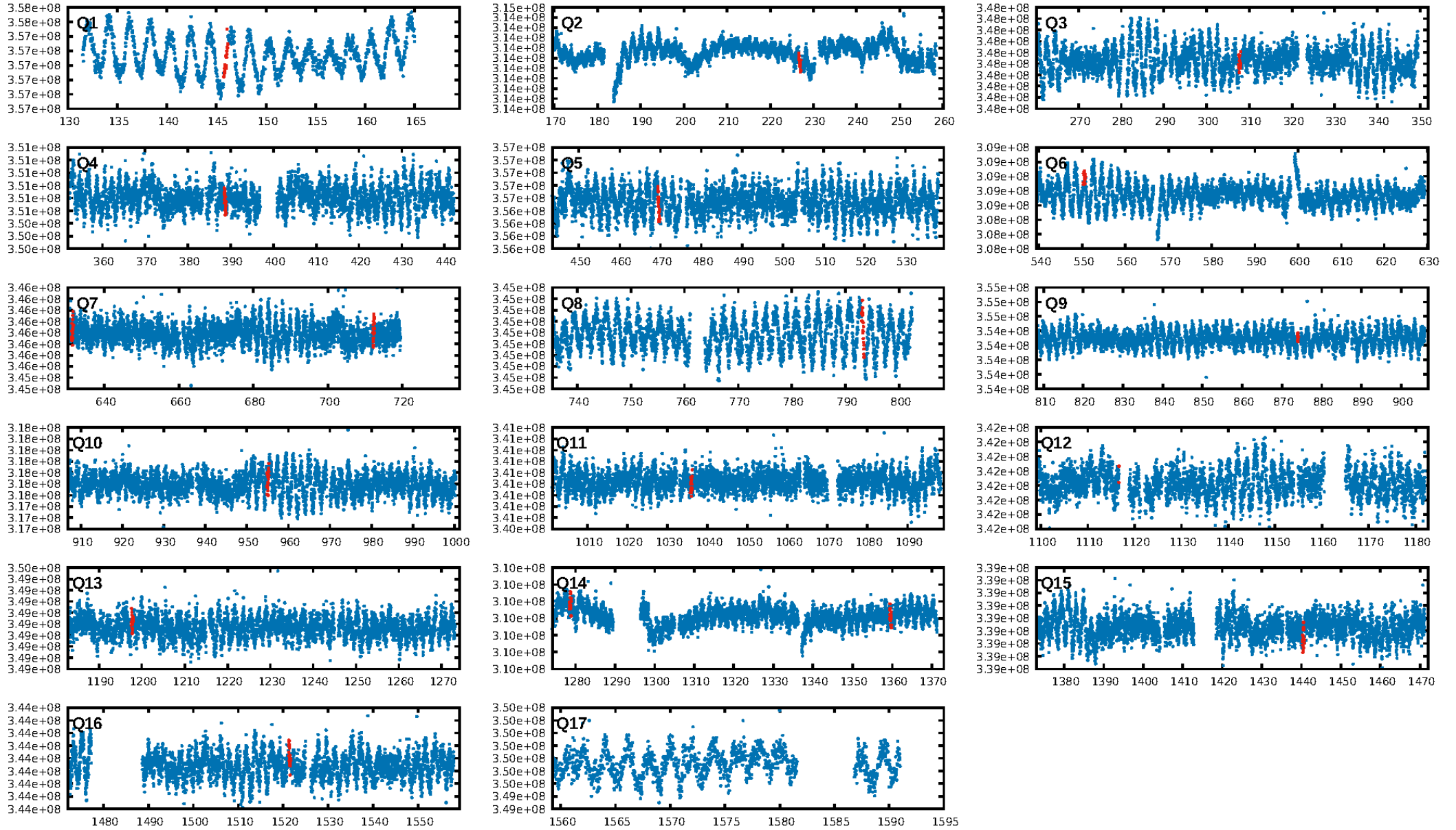
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [31.62σ]  
LongPeriod-sig: 100.0% [60.86σ]  
ModelChiSquare2-sig: 80.5%  
ModelChiSquareGof-sig: 100.0%  
**Bootstrap-pfa: 2.56e-08**  
RollingBand-fgt: 1.00 [5/5]  
**GhostDiagnostic-chr: 0.7582**  
Centroid-sig: 17.4%  
Centroid-so: 0.749 arcsec [0.99σ]  
OotOffset-rm: 1.926 arcsec [1.19σ]  
KicOffset-rm: 1.945 arcsec [1.38σ]  
OotOffset-st: 4/3/1/1 [9]  
KicOffset-st: 4/3/1/1 [9]  
DiffImageQuality-fgm: 0.11 [1/9]  
DiffImageOverlap-fno: 0.23 [3/13]

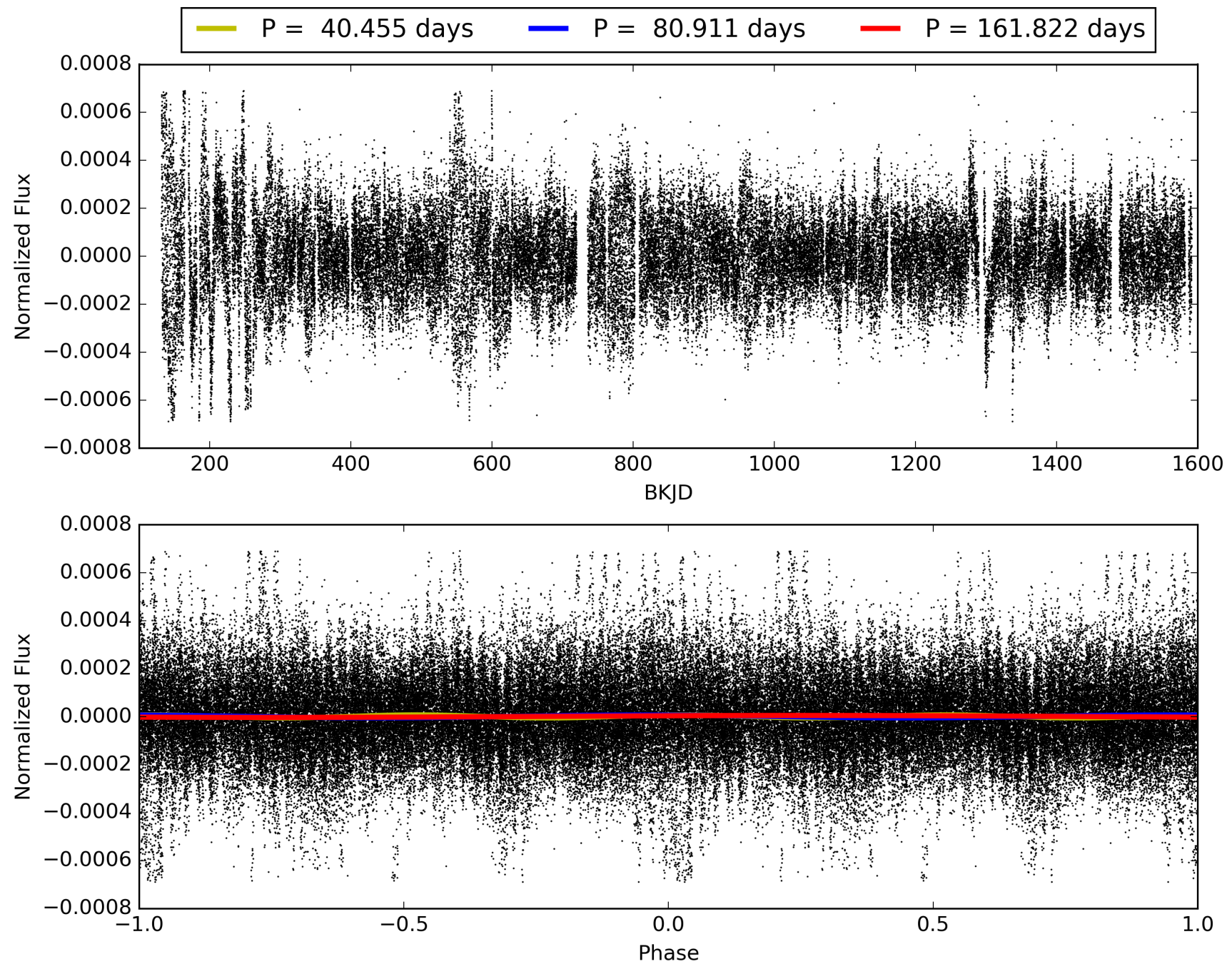
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 00:46:36 Z

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

# TCE 001722916-07, PDC Light Curves

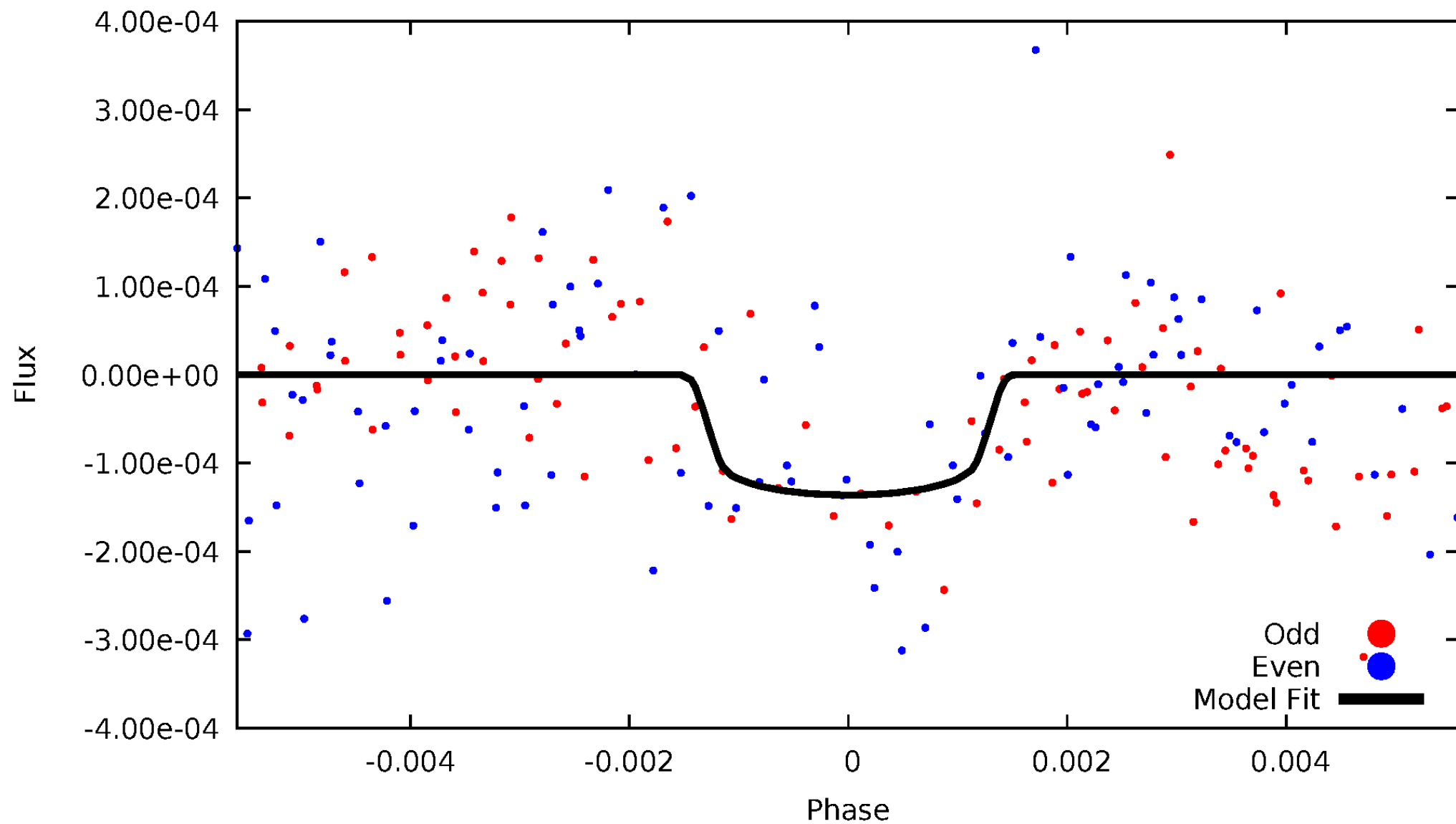


# TCE 001722916-07



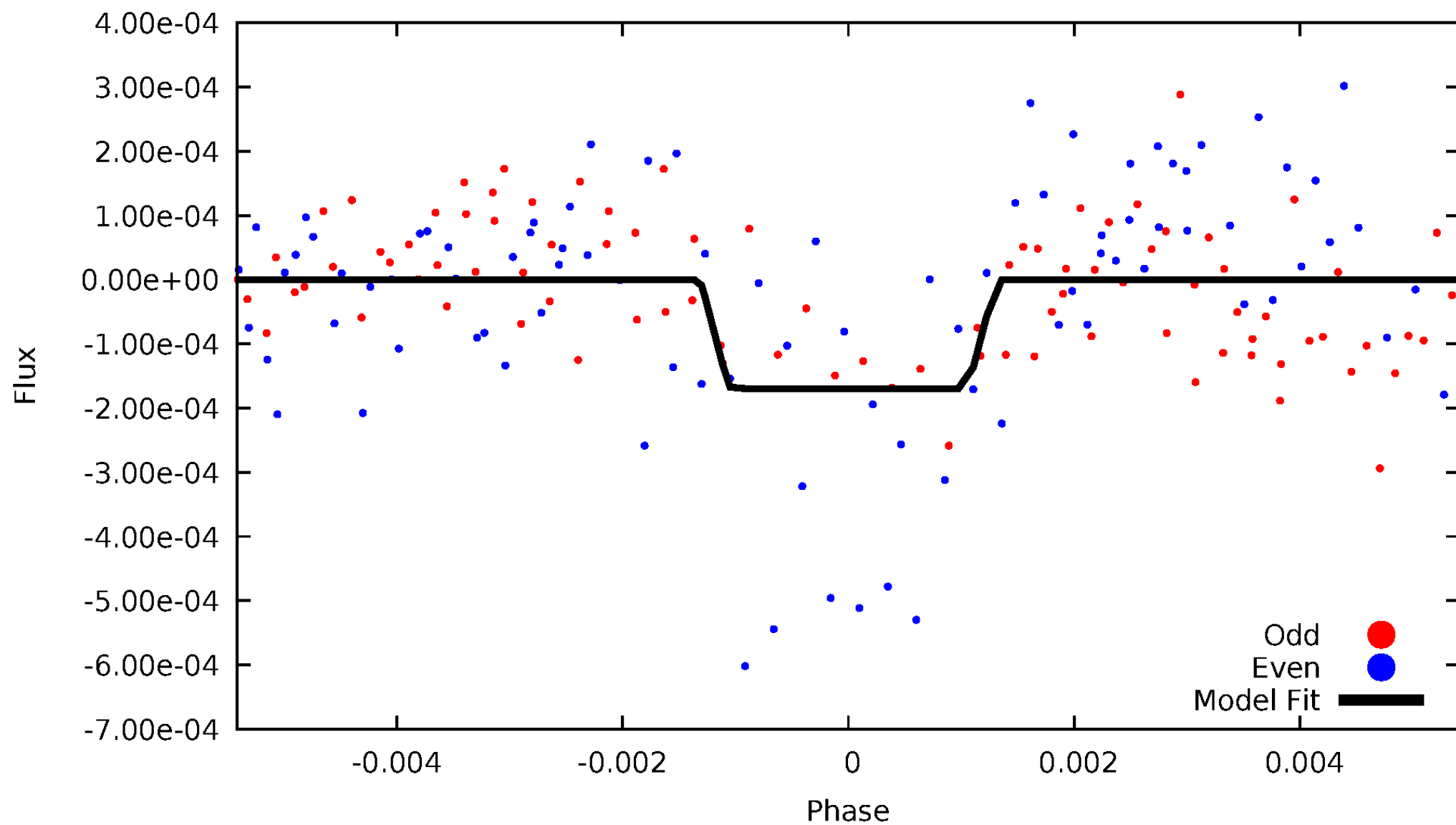
# DV Odd/Even

TCE 001722916-07



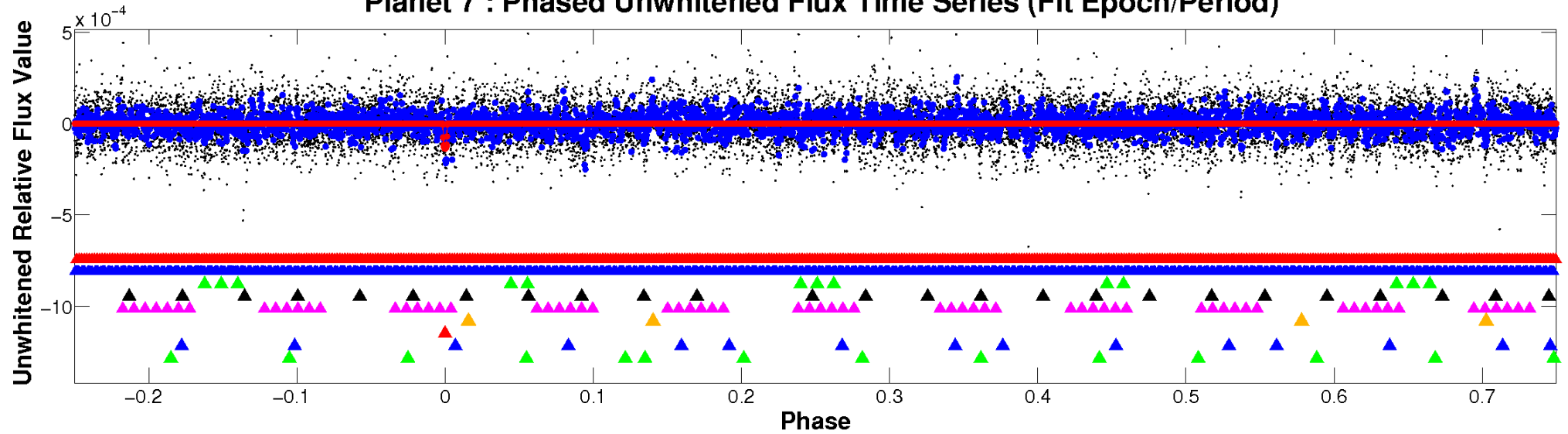
# ALT Odd/Even

TCE 001722916-07

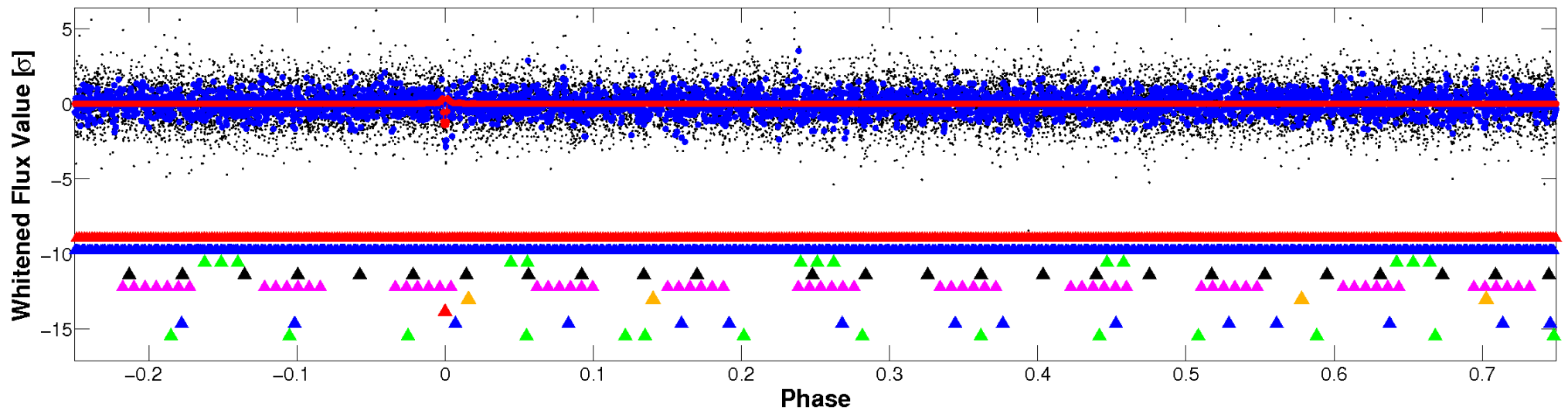


# Non-Whitened Vs. Whitened Light Curve

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



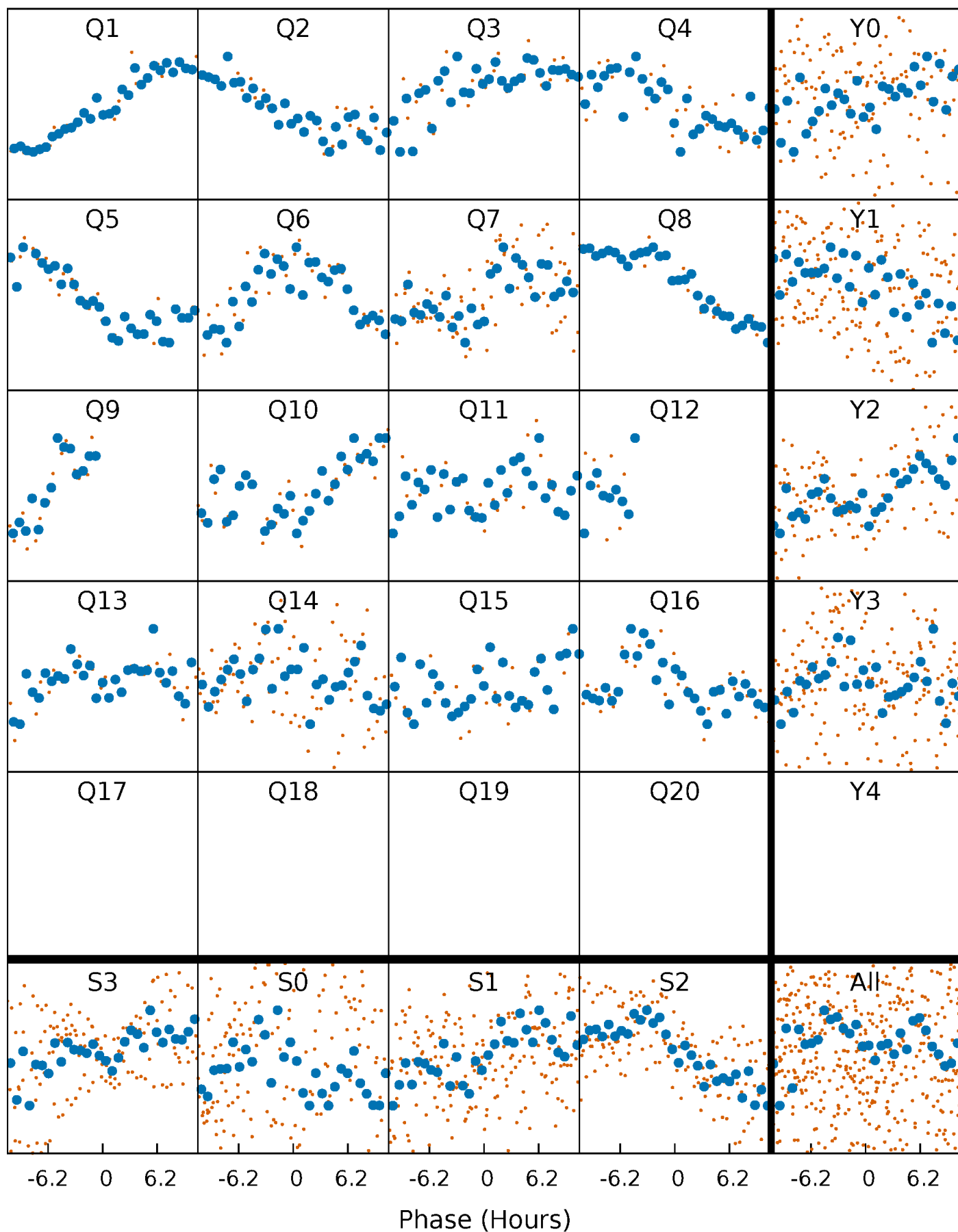
Planet 7 : Phased Whitened Flux Time Series (Fit Epoch/Period)





# PDC Quarter-Phased Transit Curves

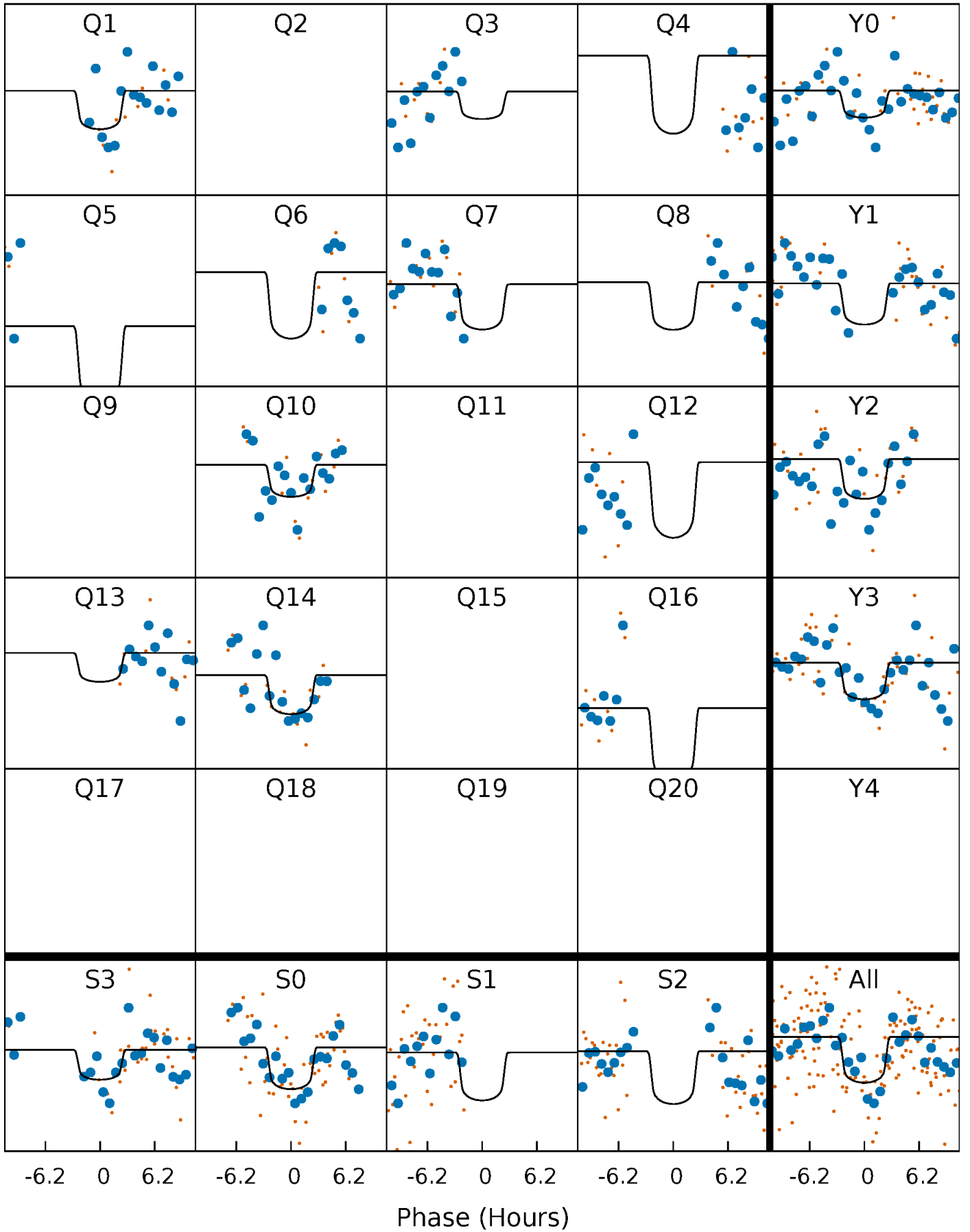
TCE 001722916-07   P= 80.910752 Days    $T_0=145.943923$  (BKJD)





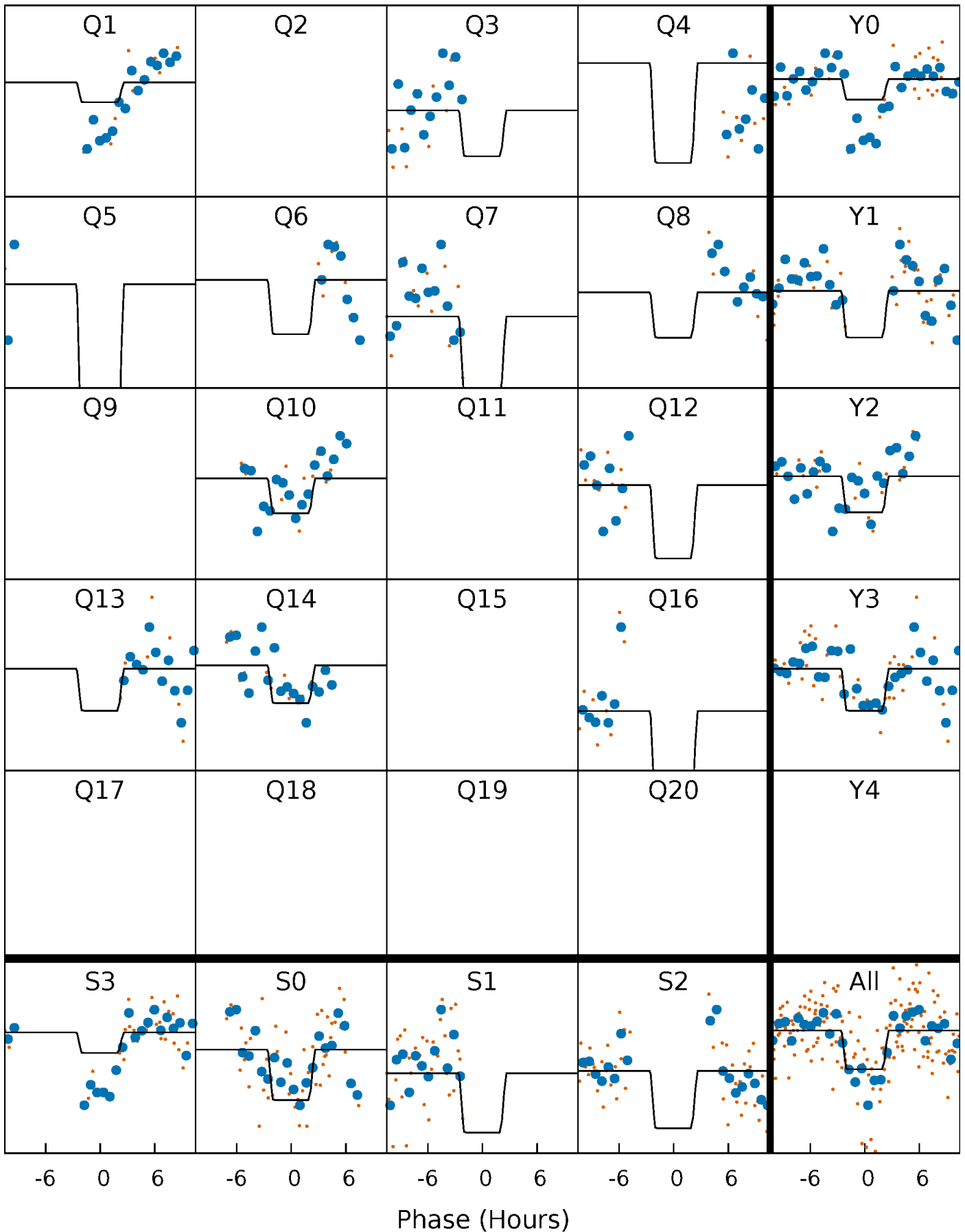
# DV Quarter-Phased Transit Curves

TCE 001722916-07   P= 80.910752 Days    $T_0=145.943923$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

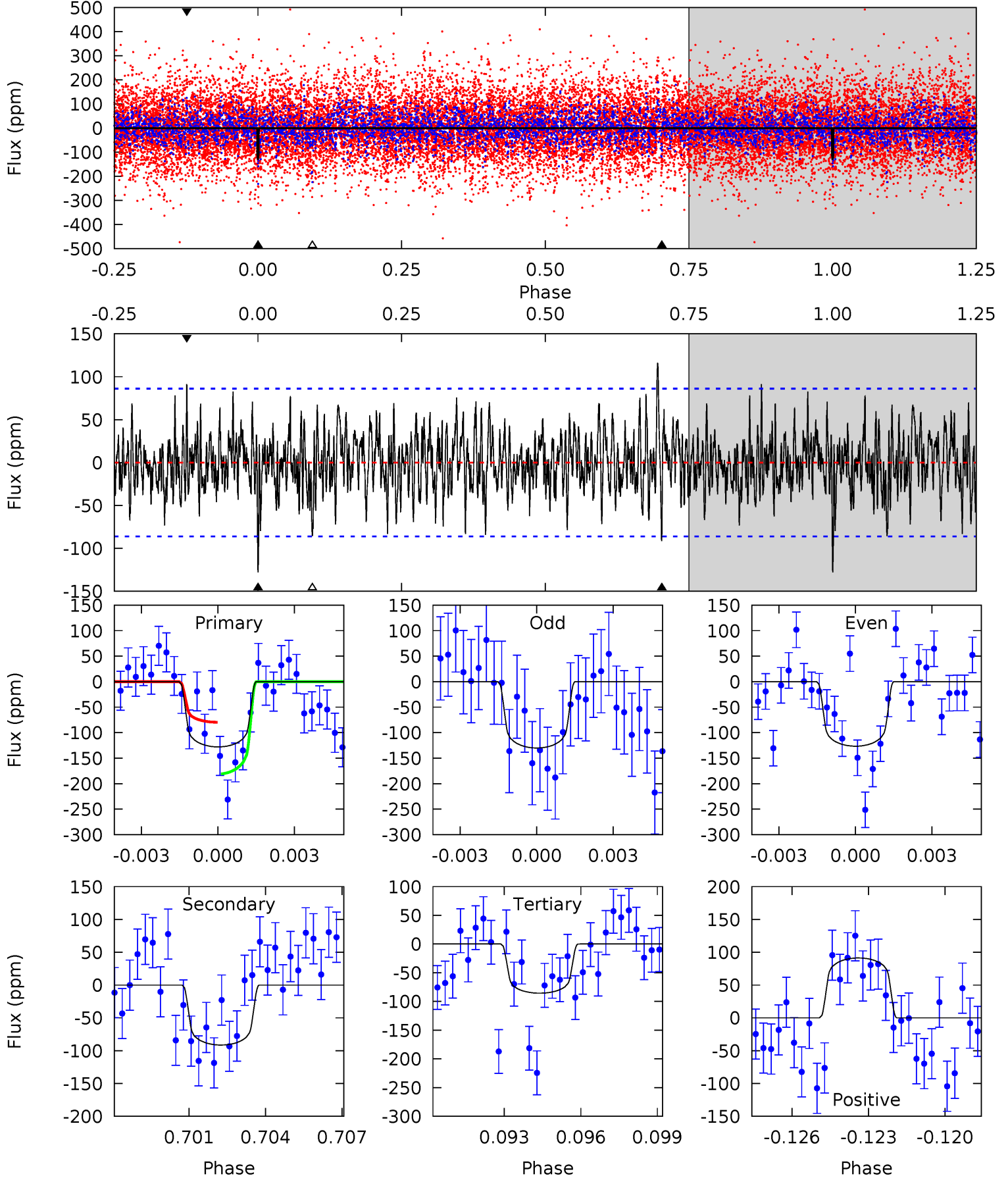
TCE 001722916-07     $P = 80.910120$  Days     $T_0 = 145.952043$  (BKJD)



# DV Model-Shift Uniqueness Test

001722916-07, P = 80.910752 Days, E = 65.033171 Days

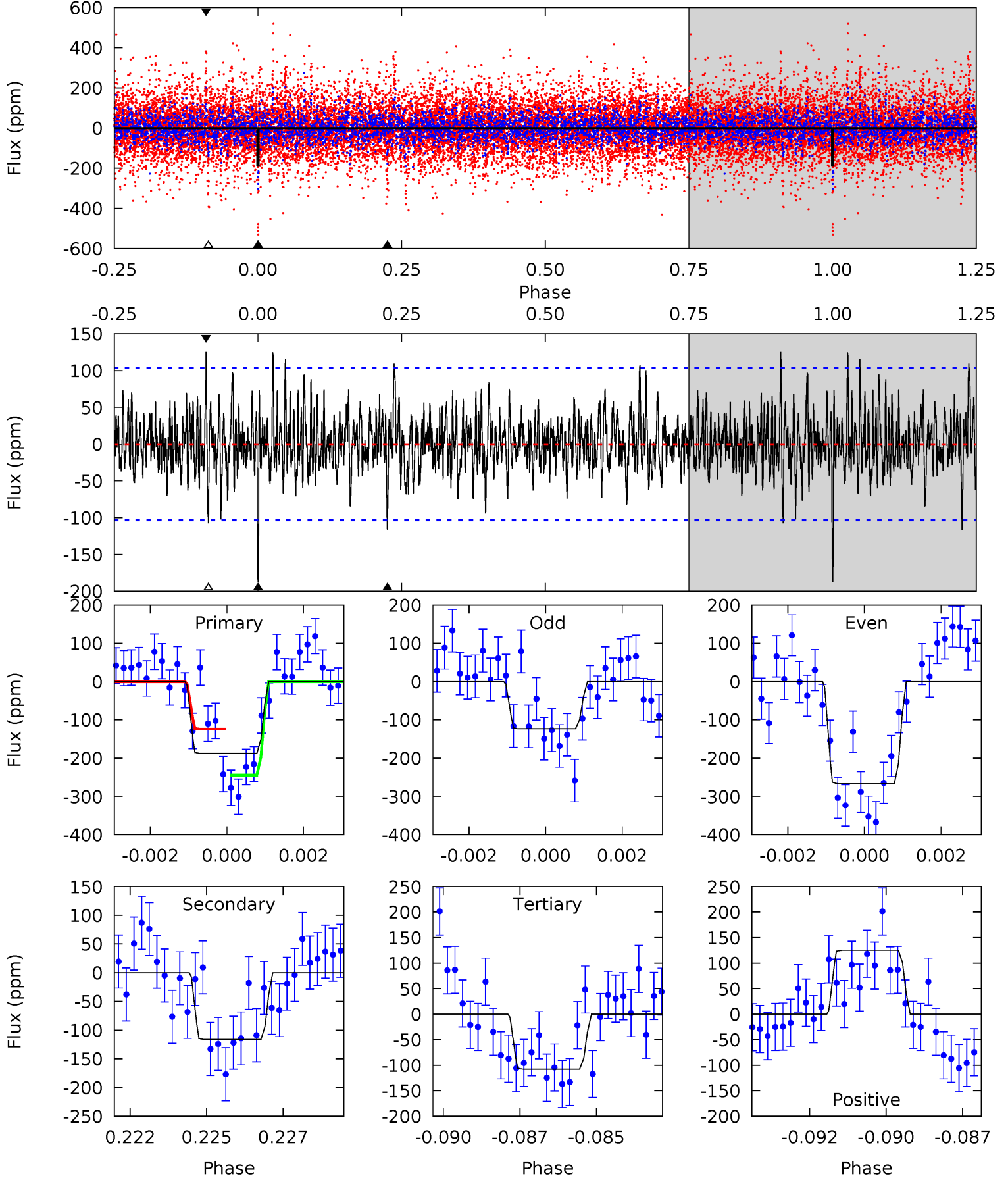
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.80	5.57	5.22	5.57	5.25	2.97	1.76	2.58	2.23	0.36	0.01	0.10	0.83	0.48	3.09



# Alt Model-Shift Uniqueness Test

001722916-07, P = 80.910120 Days, E = 65.041923 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
9.59	5.93	5.49	6.40	5.29	3.02	1.61	4.09	3.19	0.44	-0.46	3.75	1.88	0.40	3.07



### Stellar Parameters For KIC 001722916

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6812^{+71}_{-91}$	$4.154^{+0.115}_{-0.115}$	$-0.180^{+0.150}_{-0.200}$	$1.604^{+0.262}_{-0.236}$	$1.347^{+0.088}_{-0.118}$	$0.460^{+0.237}_{-0.156}$
	+1%/-1%	+3%/-3%	+83%/-111%	+16%/-15%	+7%/-9%	+51%/-34%
Source	SPE68	SPE68	SPE68	DSEP		

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

### Secondary Eclipse Parameters for KIC 001722916-07 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-91 \pm 16$	$2.17^{+0.84}_{-0.78}$	$837^{+35}_{-34}$	$5998^{+1494}_{-883}$	$1730^{+2581}_{-852}$
Alt.	$-116 \pm 20$	$2.30^{+0.77}_{-0.74}$	$837^{+38}_{-35}$	$6138^{+1472}_{-807}$	$1952^{+2546}_{-928}$

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

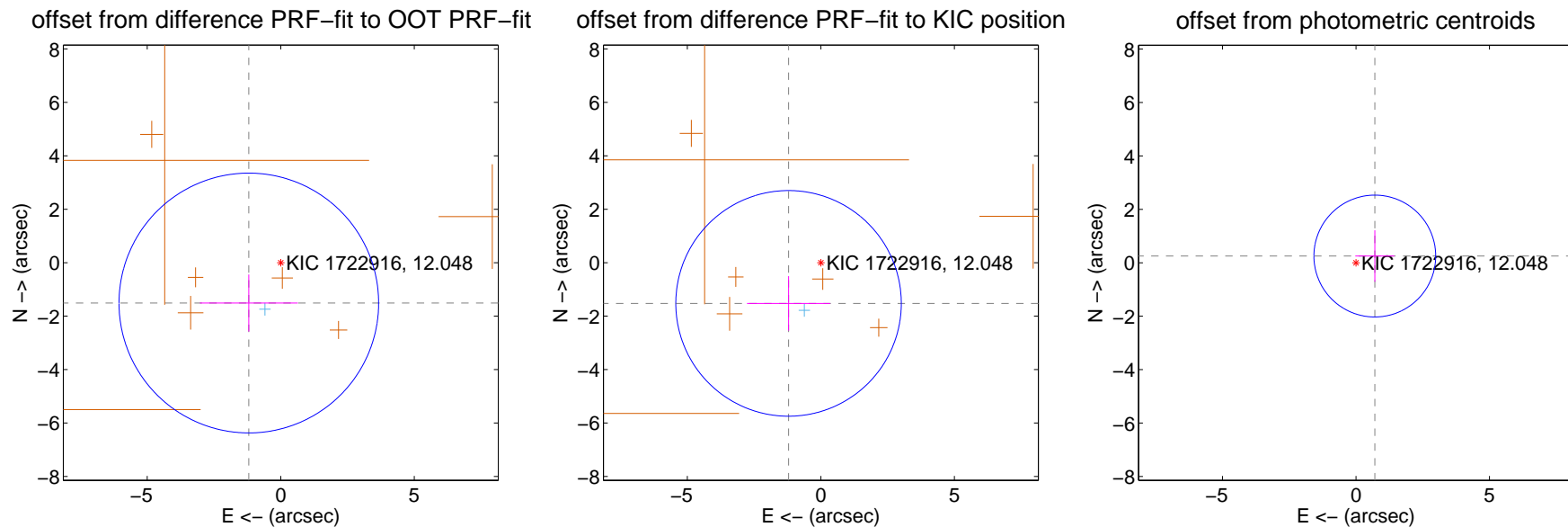
## DV Centroid Data

Supplemental centroid analysis for 001722916-07. Kepler magnitude: 12.05. Transit SNR 7.34

There are 1 quarters with good PRF difference image offsets

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

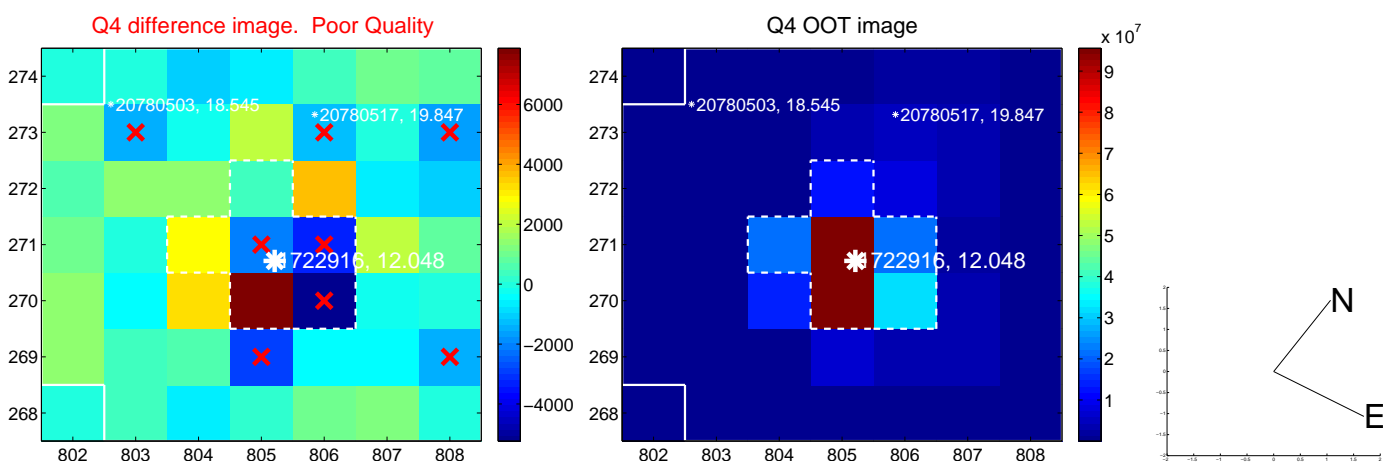
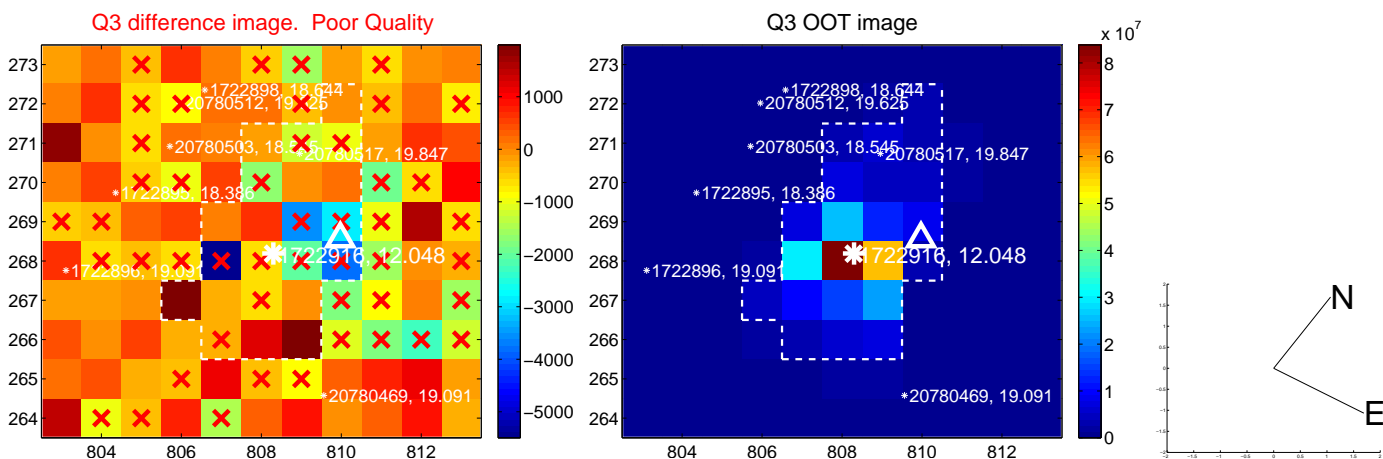
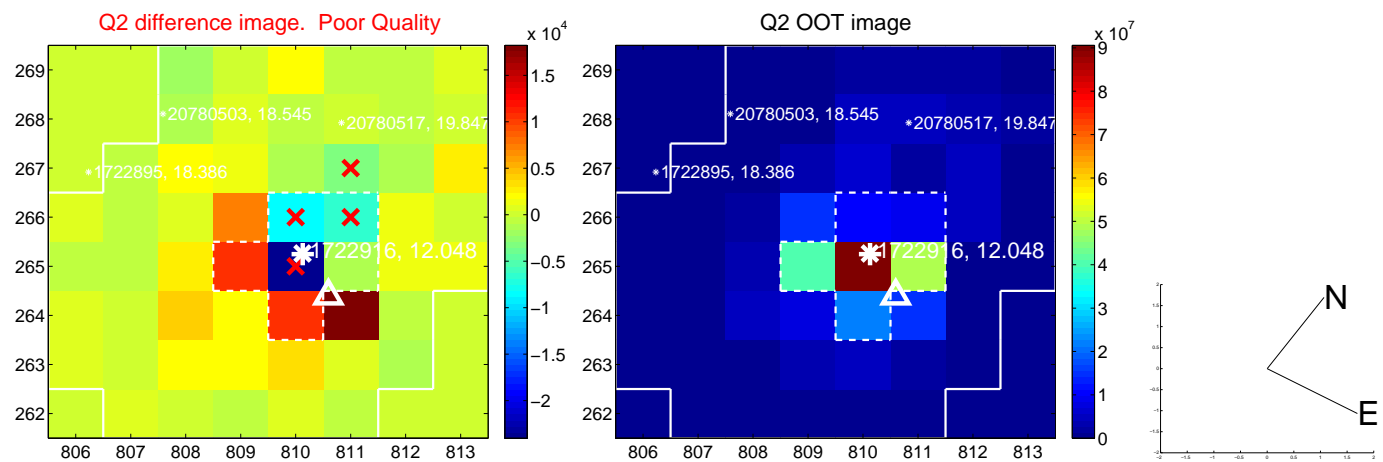
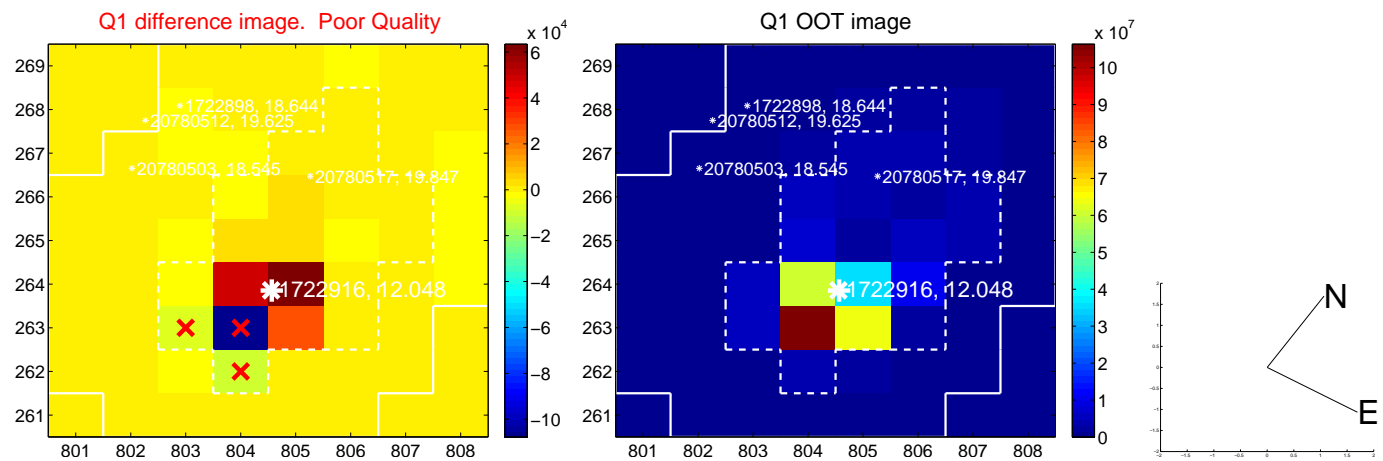
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.926 \pm 1.620$	1.19	$1.196 \pm 1.834$	$-1.509 \pm 1.069$
PRF-fit source offset from KIC position	$1.945 \pm 1.407$	1.38	$1.210 \pm 1.556$	$-1.523 \pm 1.018$
photometric centroid source offset	$0.75 \pm 0.76$	0.99	$-0.71 \pm 0.73$	$0.25 \pm 0.96$



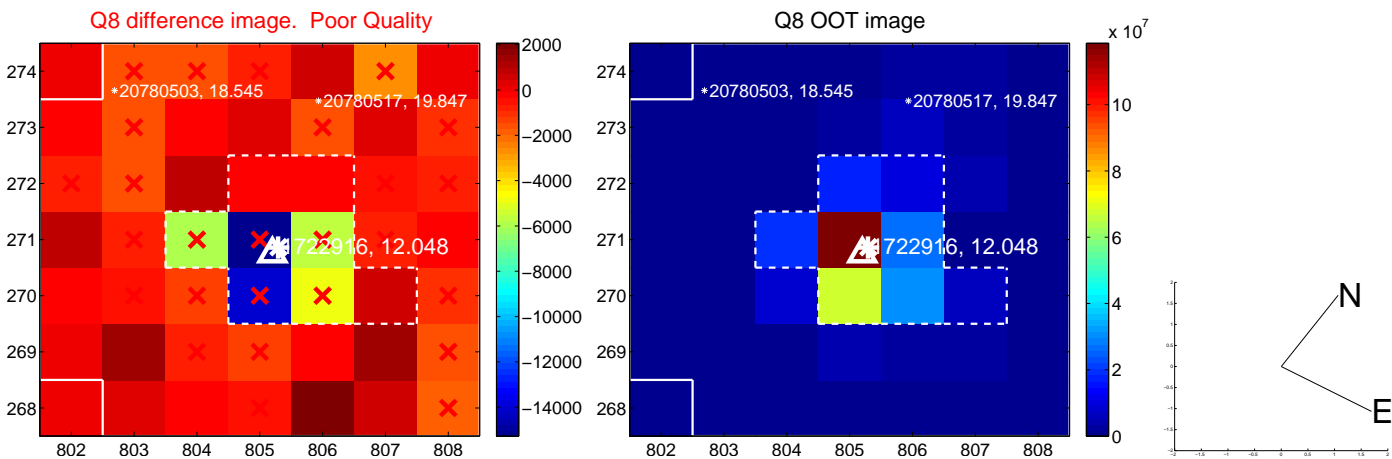
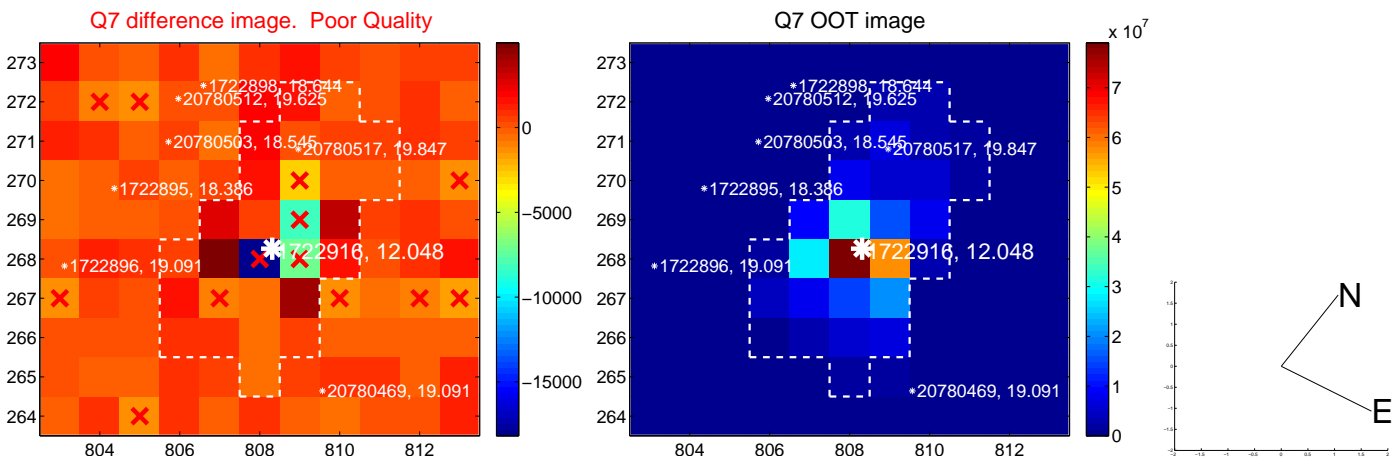
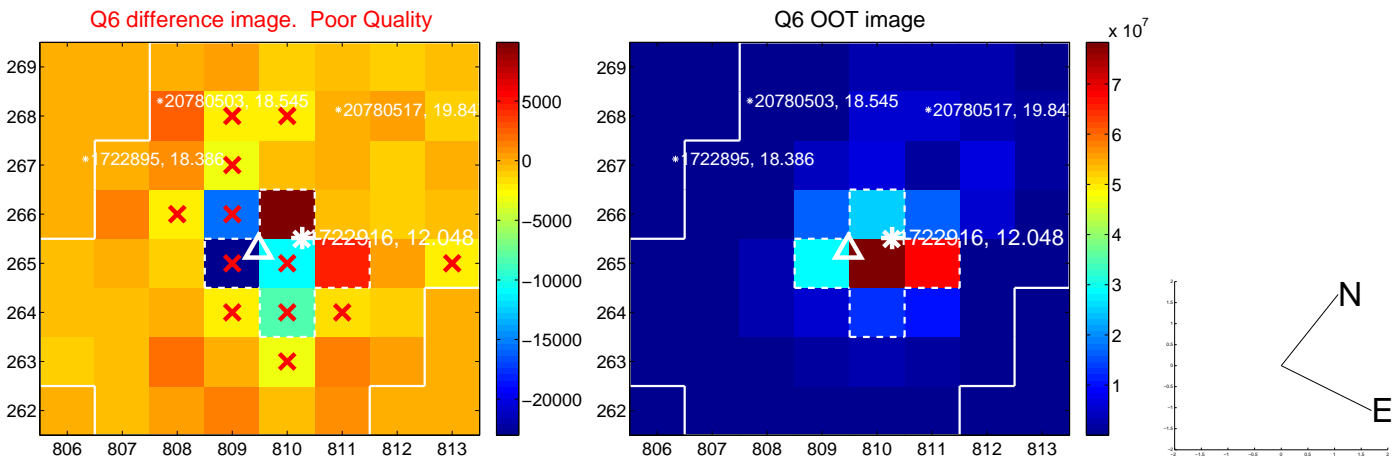
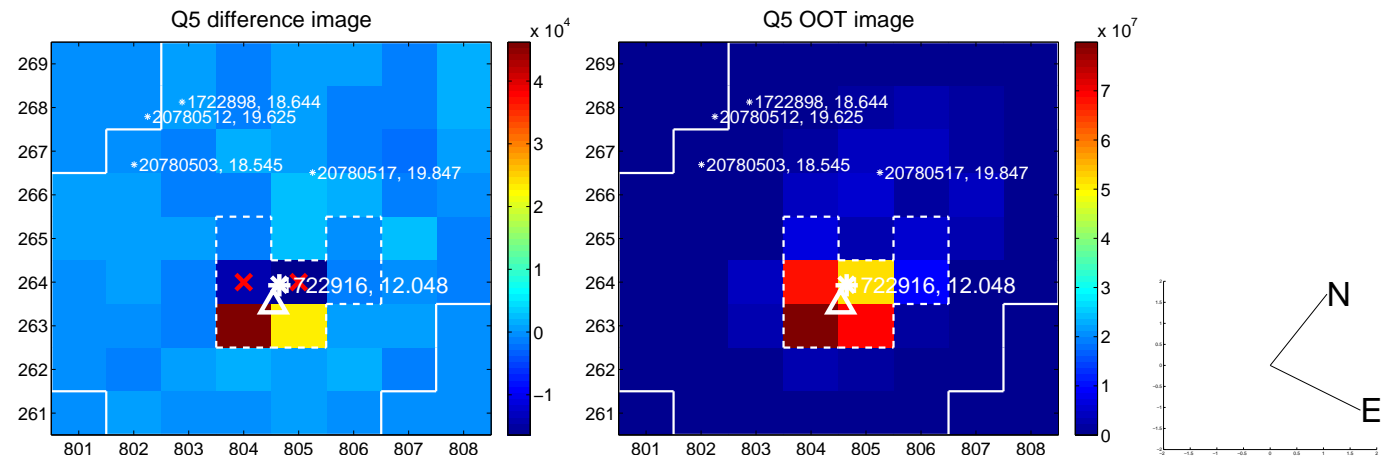
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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



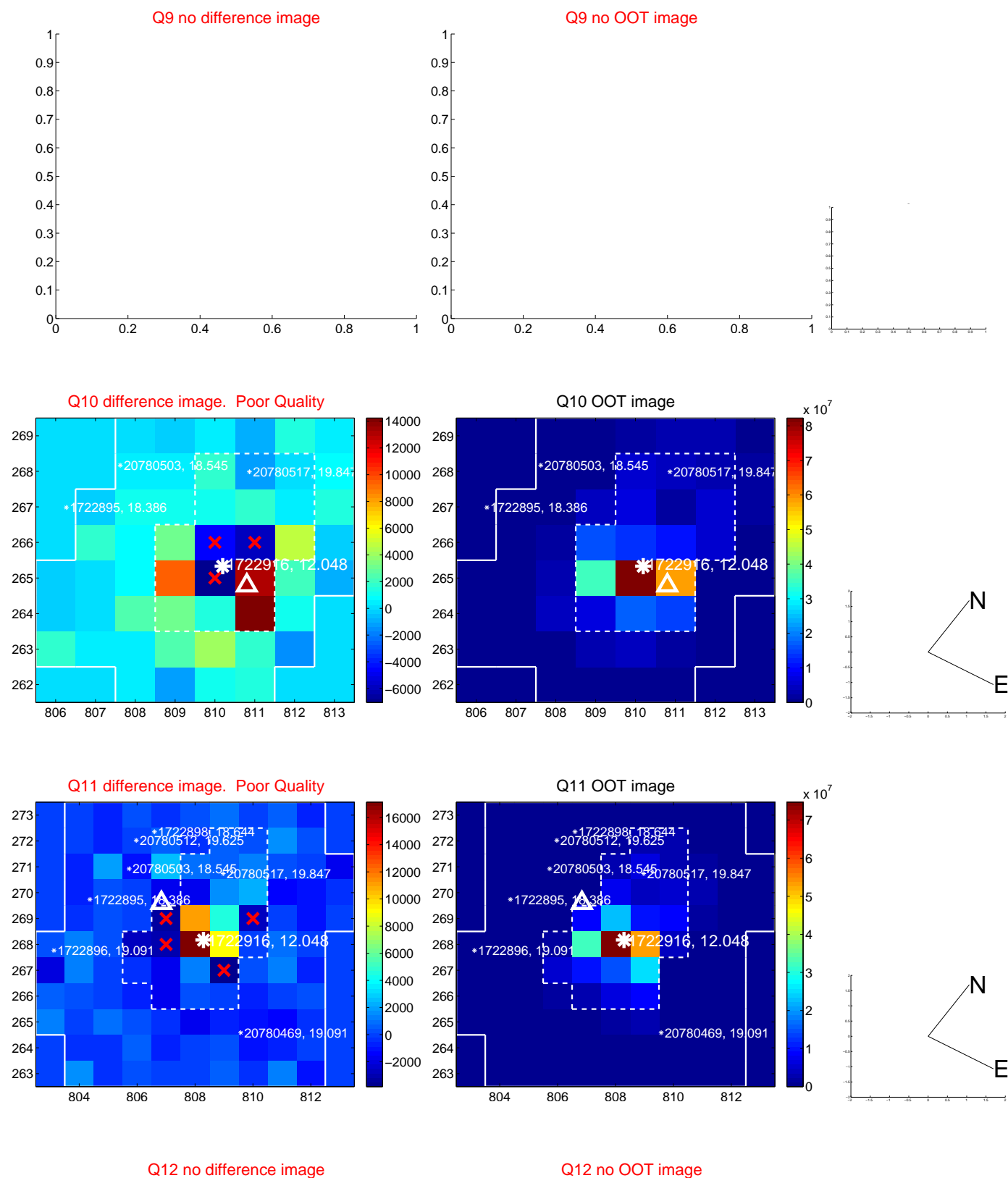
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



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



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

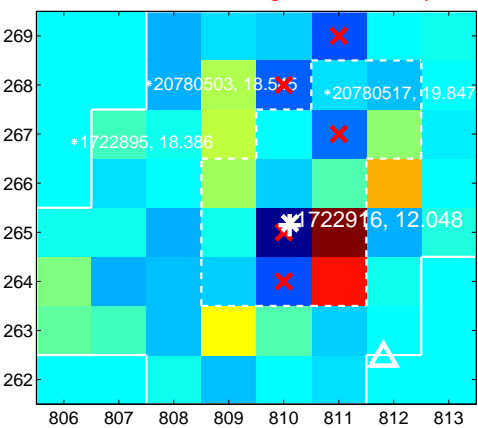
Q13 no difference image



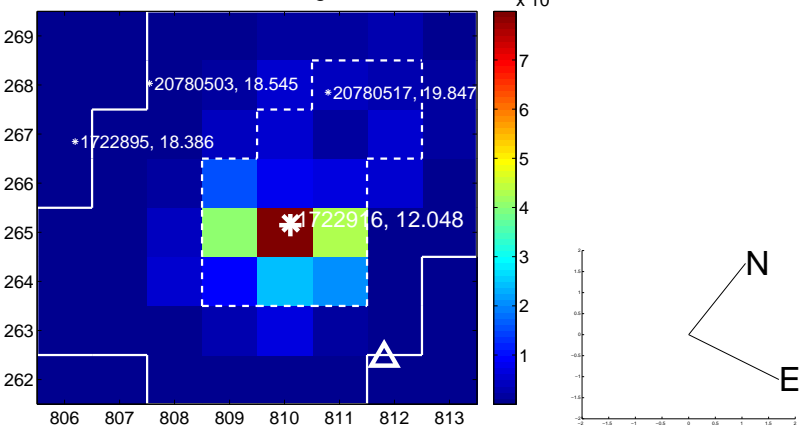
Q13 no OOT image



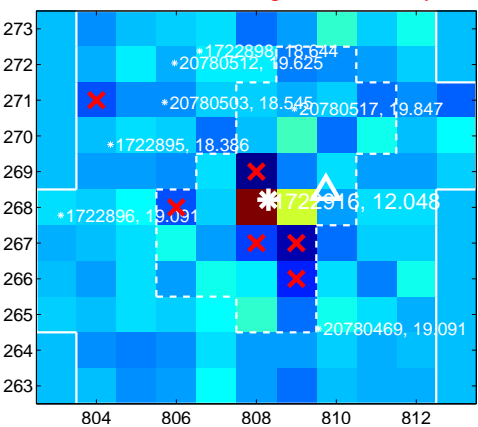
Q14 difference image. Poor Quality



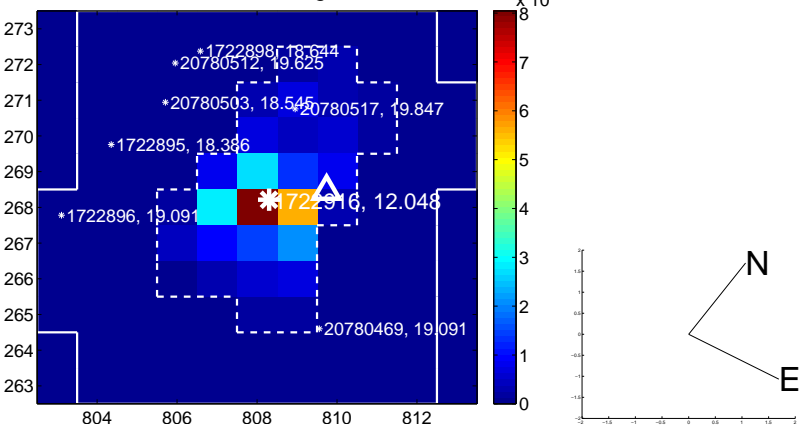
Q14 OOT image



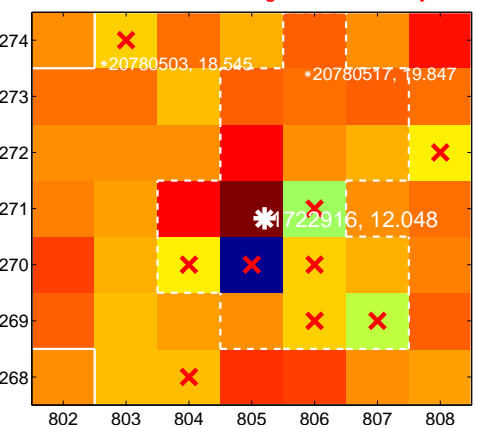
Q15 difference image. Poor Quality



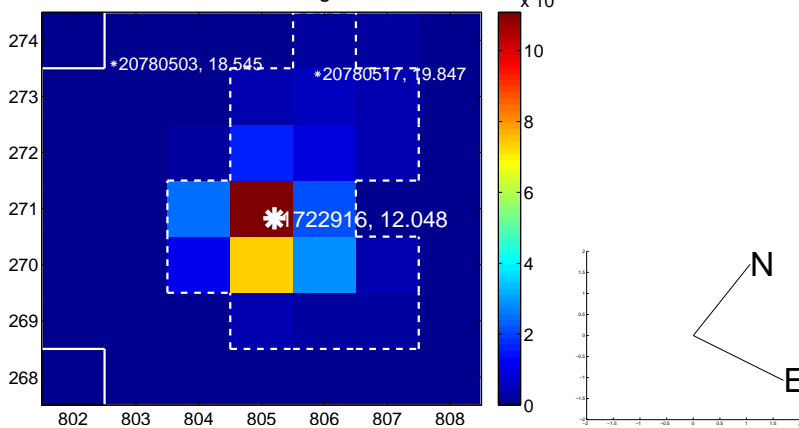
Q15 OOT image



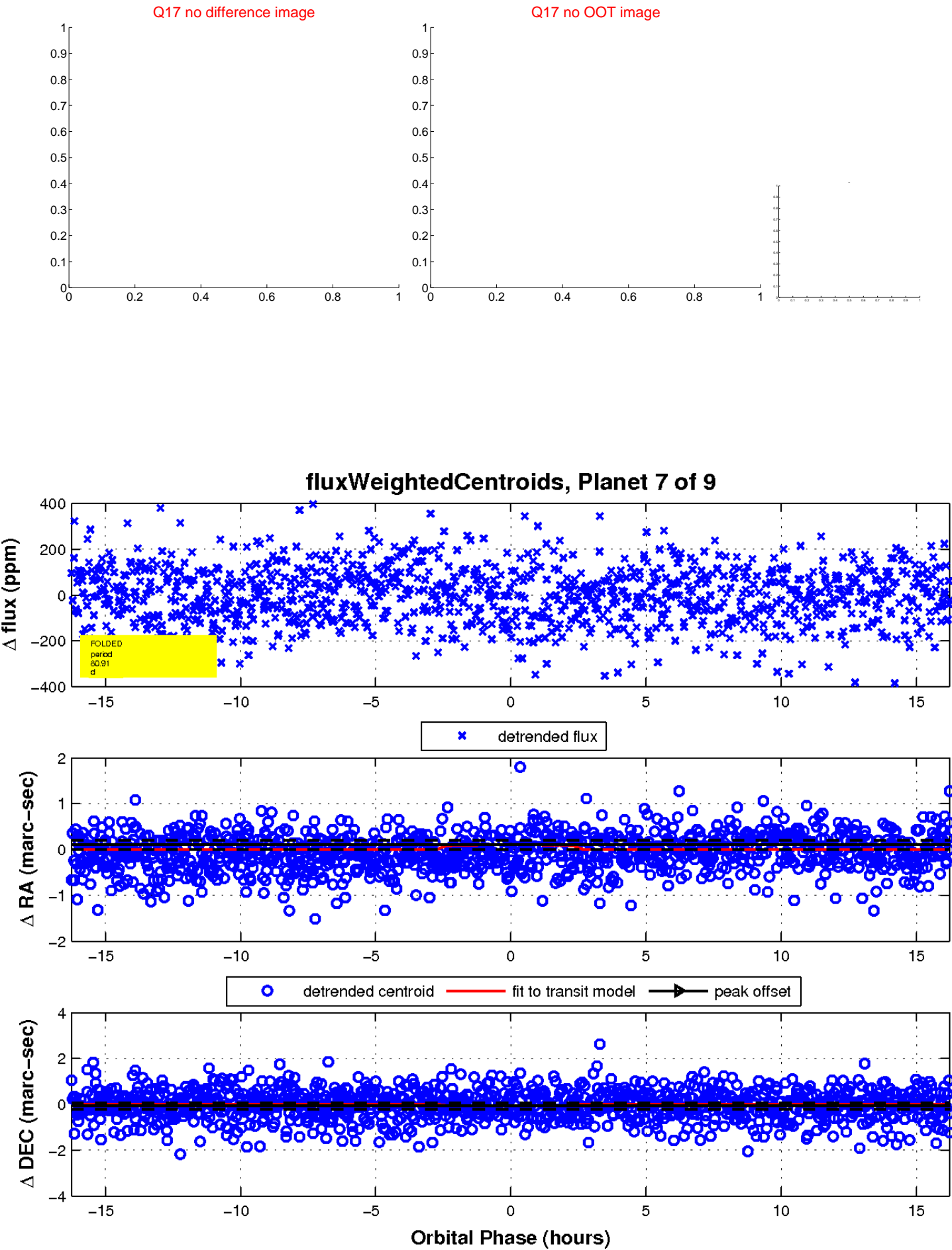
Q16 difference image. Poor Quality



Q16 OOT image

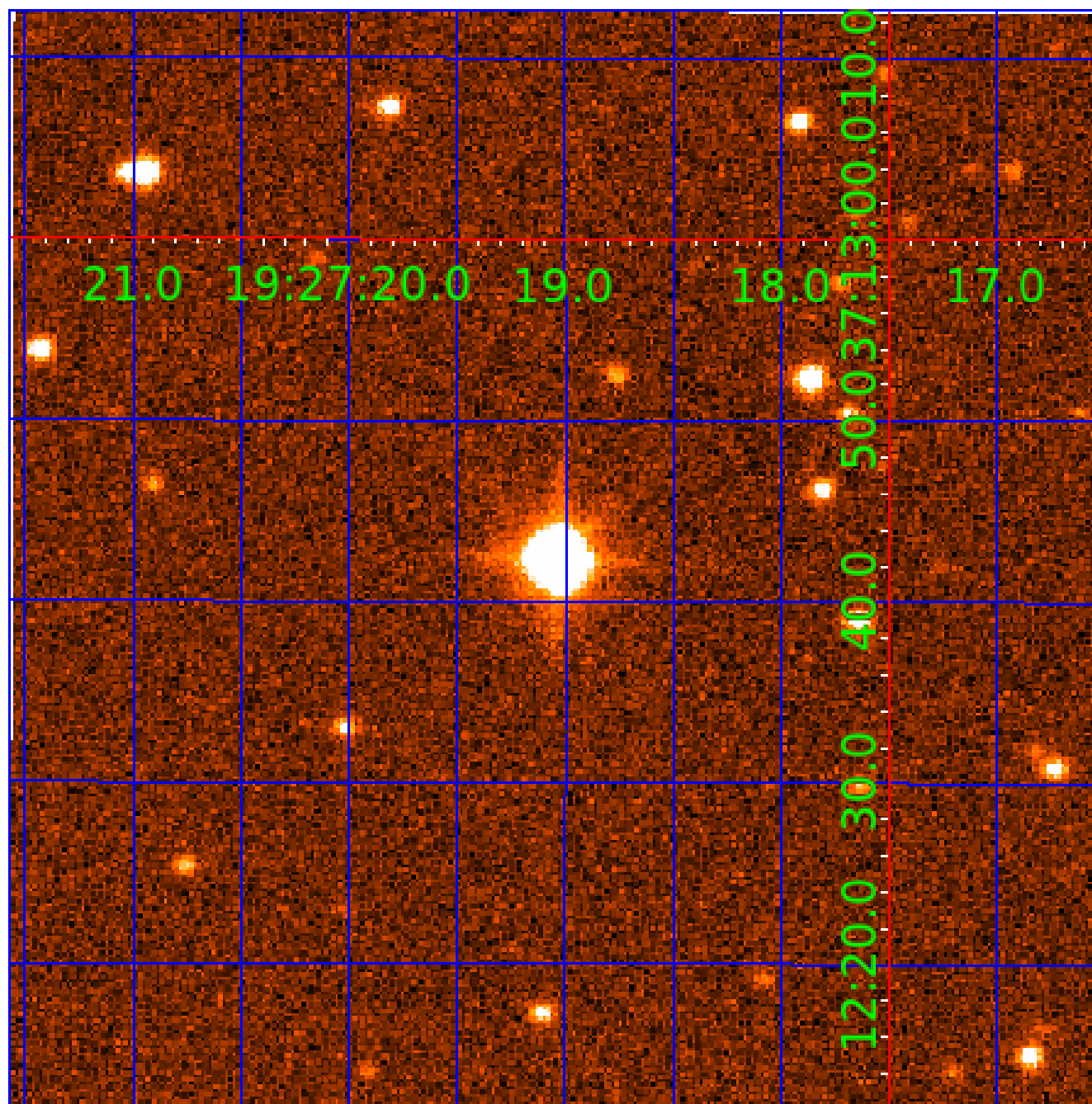


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 001722916

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
001722916-01	OBS	No	1.813535	132.513520	0.1	1.362	7.1	0.1	1.60	6812	0.09	4824.23
001722916-02	OBS	No	1.813822	132.494408	18.4	10.501	7.4	7.4	1.60	6812	0.75	4823.21
001722916-03	OBS	No	113.456084	213.726772	152.5	10.563	16.5	7.4	1.60	6812	2.25	19.43
001722916-04	OBS	No	59.108474	141.293815	101.1	15.638	8.7	7.4	1.60	6812	1.76	46.34
001722916-05	OBS	No	22.011274	131.997241	79.9	6.325	8.8	8.8	1.60	6812	1.69	172.96
001722916-06	OBS	No	359.058903	202.797449	338.0	20.552	8.5	8.3	1.60	6812	5.69	4.18
001722916-07	OBS	No	80.910752	145.943923	136.1	5.420	8.0	7.3	1.60	6812	2.19	30.49
001722916-08	OBS	No	95.858298	158.854822	172.1	2.318	8.1	7.6	1.60	6812	2.39	24.32
001722916-09	OBS	No	105.723678	156.862664	140.0	6.744	8.2	7.9	1.60	6812	2.40	21.34

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
001722916-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV
001722916-02	OBS	FP	0.00	1	0	0	0	LPP_DV—SAME_NTL_PERIOD
001722916-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
001722916-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
001722916-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
001722916-06	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS—HALO_GHOST
001722916-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
001722916-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES—TRANS_GAPPED—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
001722916-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_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.

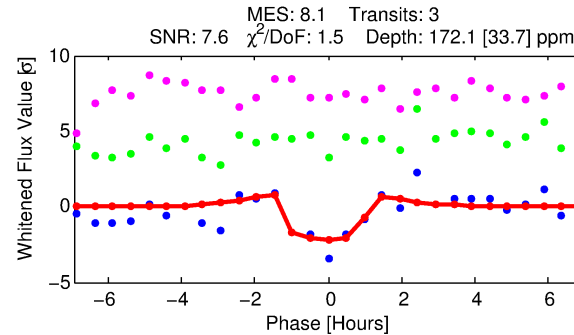
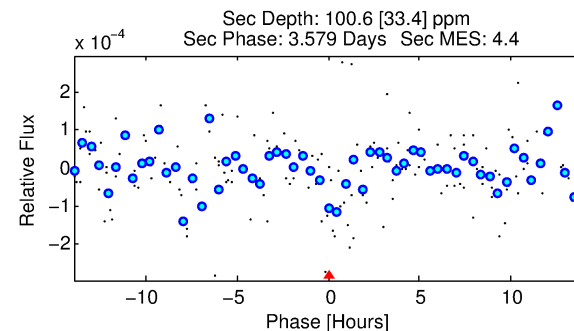
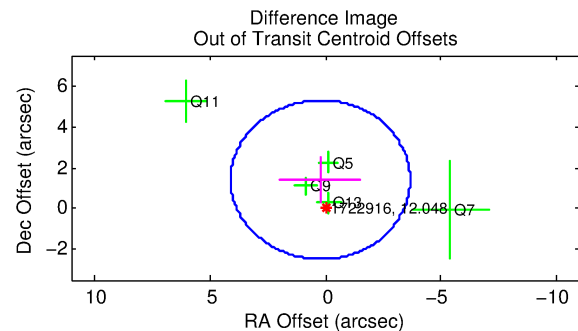
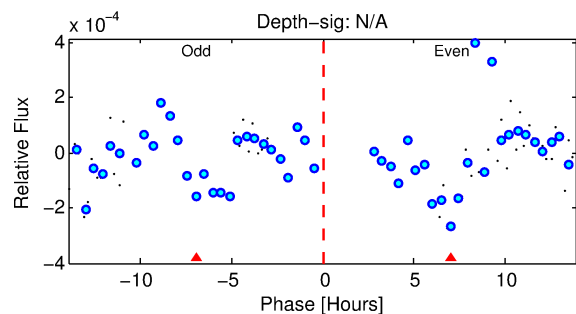
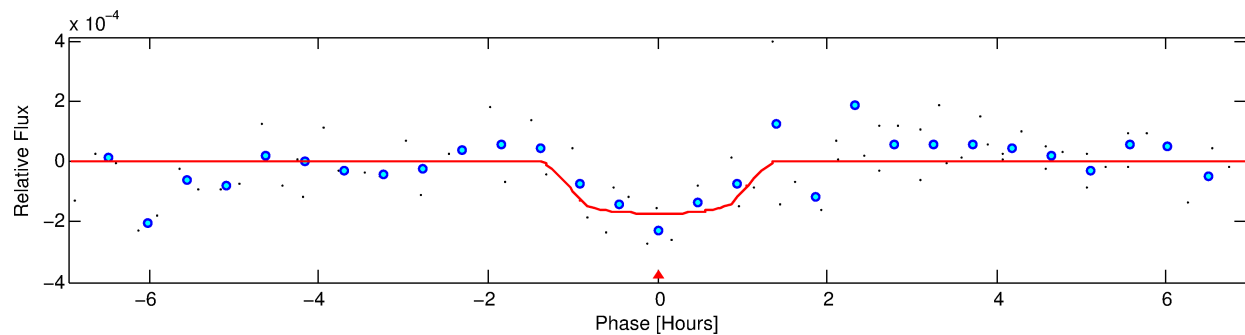
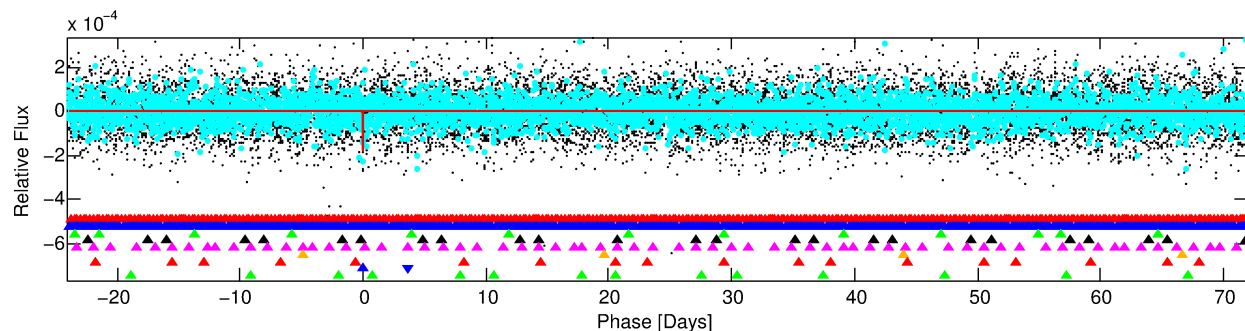
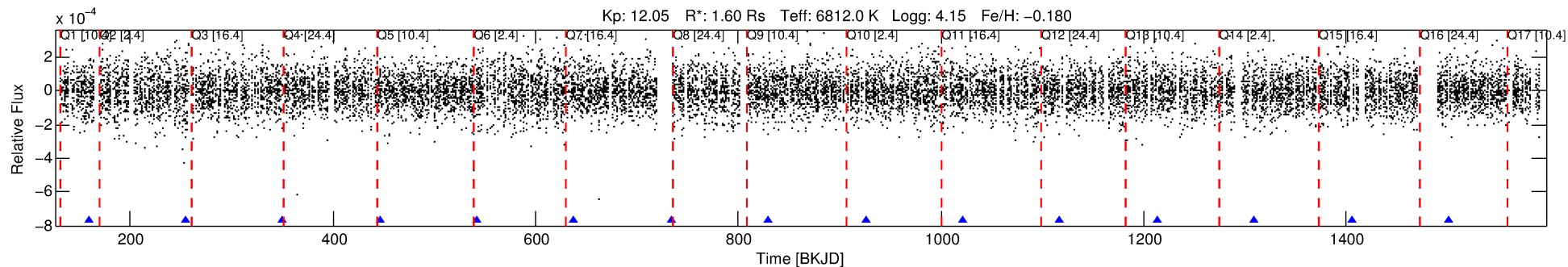
Ephemeris Match Information For 001722916-08

No Significant Match Found



# DV One-Page Summary

KIC: 1722916 Candidate: 8 of 9 Period: 95.858 d



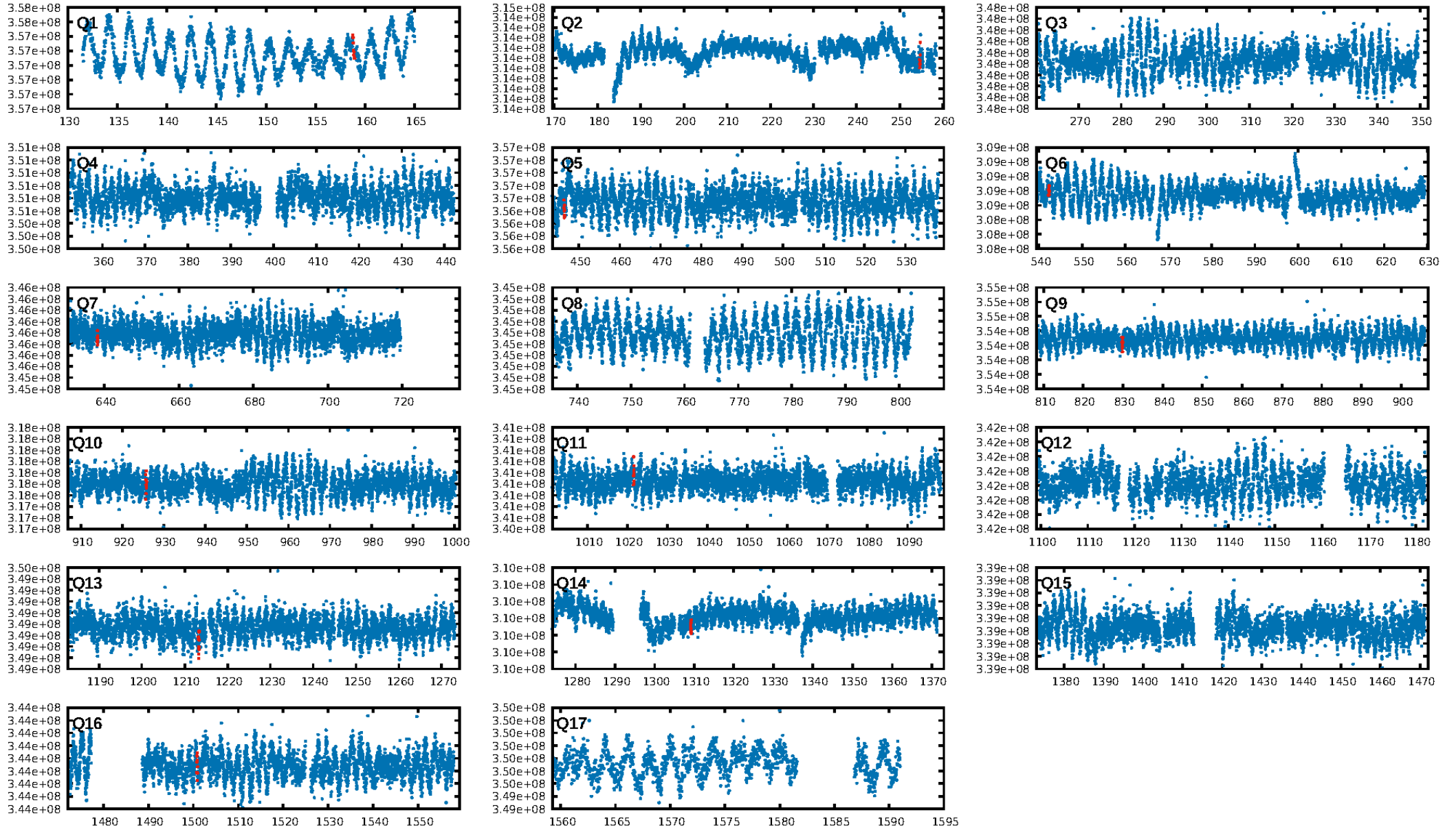
## DV Fit Results:

Period = 95.85830 [0.00147] d  
Epoch = 158.8548 [0.0089] BKJD  
Rp/R\* = 0.0137 [0.0098]  
a/R\* = 169.07 [704.26]  
b = 0.86 [1.26]  
Seff = 24.32 [5.21]  
Teq = 566 [30] K  
Rp = 2.39 [1.77] Re  
a = 0.4518 [0.0633] AU  
Ag = 1978.15 [2955.54] [0.67σ]  
Teffp = 5839 [2161] K [2.44σ]

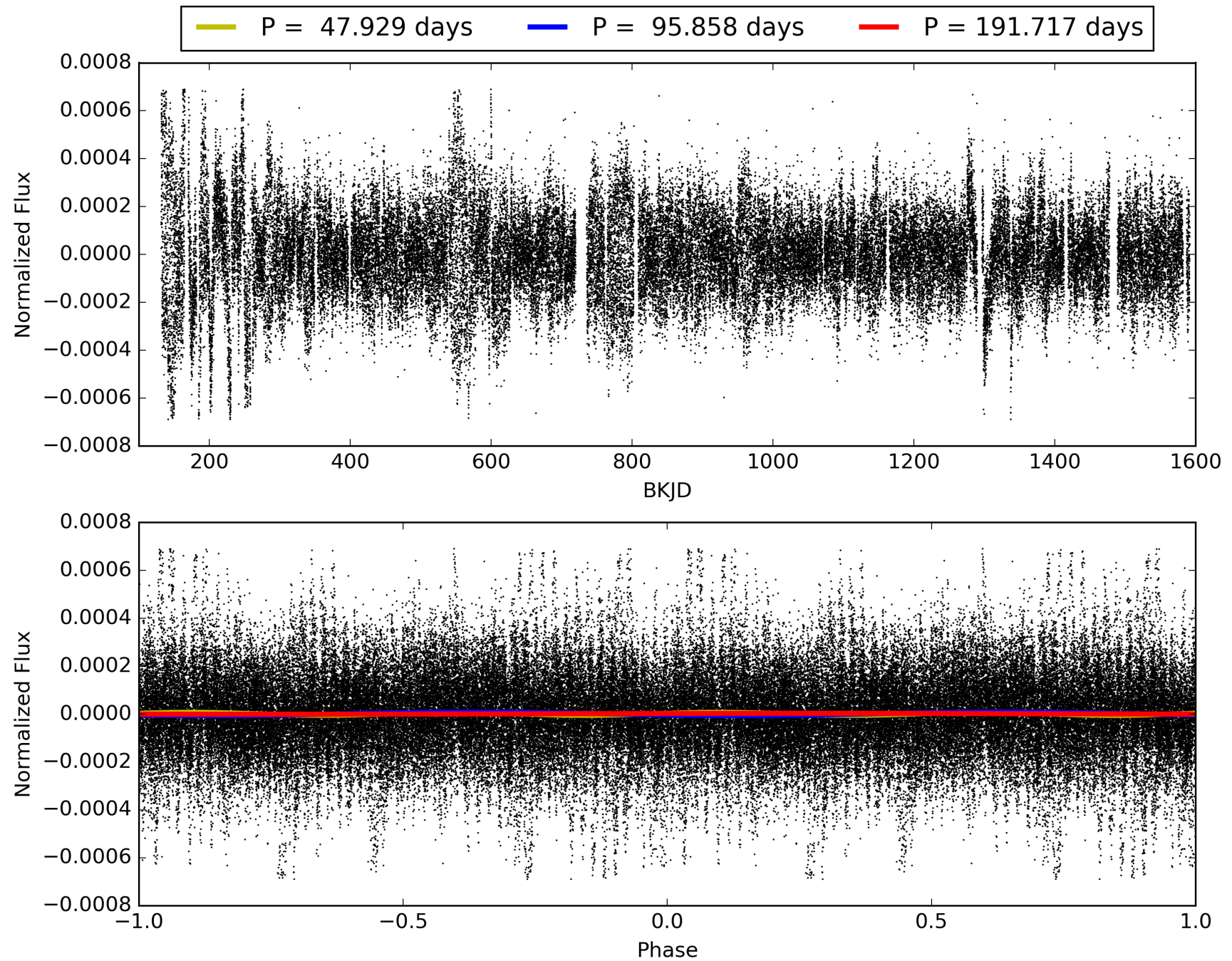
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [60.86σ]  
LongPeriod-sig: 100.0% [33.20σ]  
ModelChiSquare2-sig: 81.5%  
ModelChiSquareGof-sig: 49.4%  
**Bootstrap-pfa: 4.09e-09**  
RollingBand-fgt: 1.00 [2/2]  
GhostDiagnostic-chr: 3.097  
Centroid-sig: 1.3%  
Centroid-so: 1.932 arcsec [1.56σ]  
OotOffset-rm: 1.422 arcsec [1.10σ]  
OotOffset-st: 0/2/0/3 [5]  
KicOffset-rm: 1.390 arcsec [1.31σ]  
KicOffset-st: 0/2/0/3 [5]  
DiffImageQuality-fgm: 0.40 [2/5]  
DiffImageOverlap-fno: 0.45 [5/11]

# TCE 001722916-08, PDC Light Curves

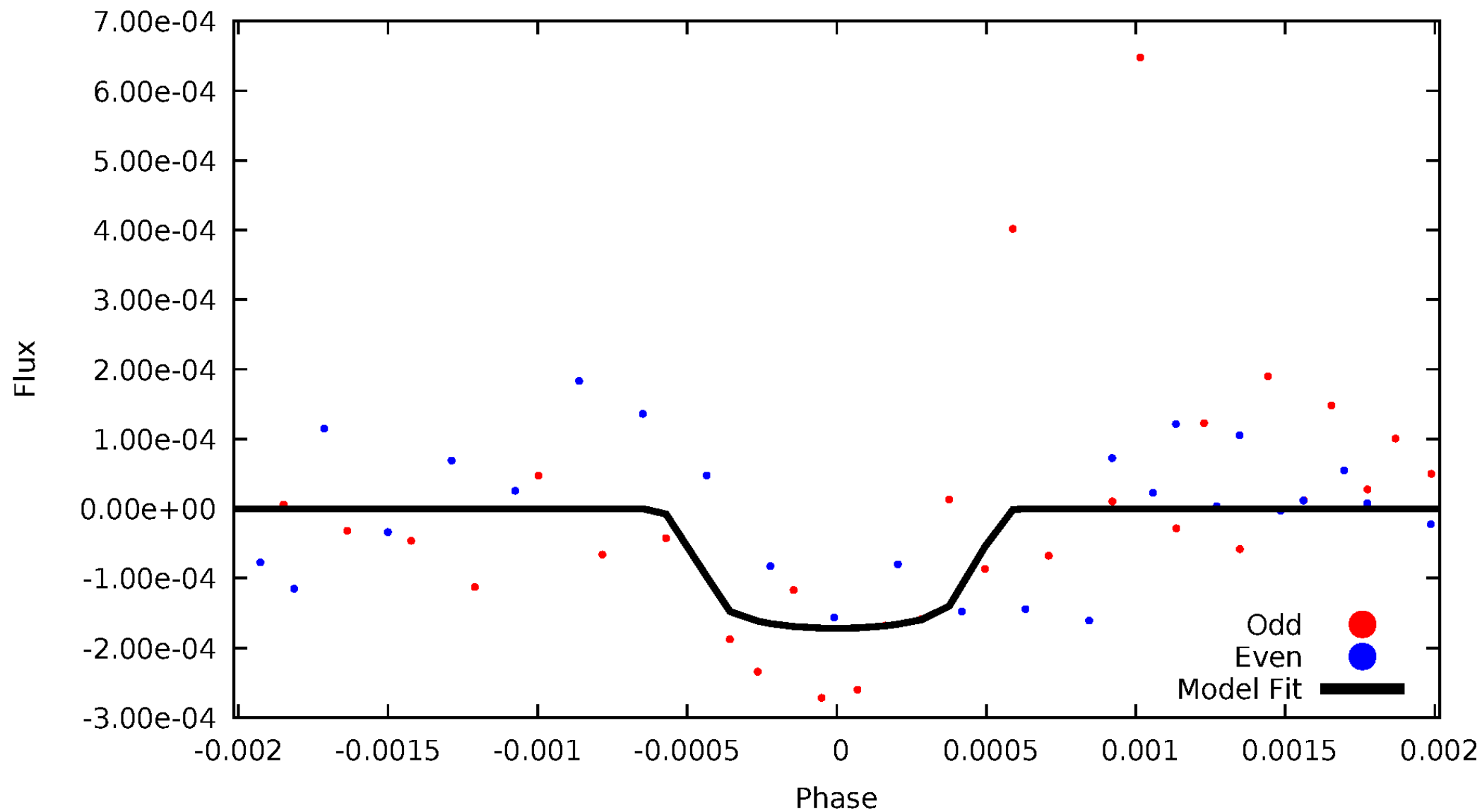


# TCE 001722916-08



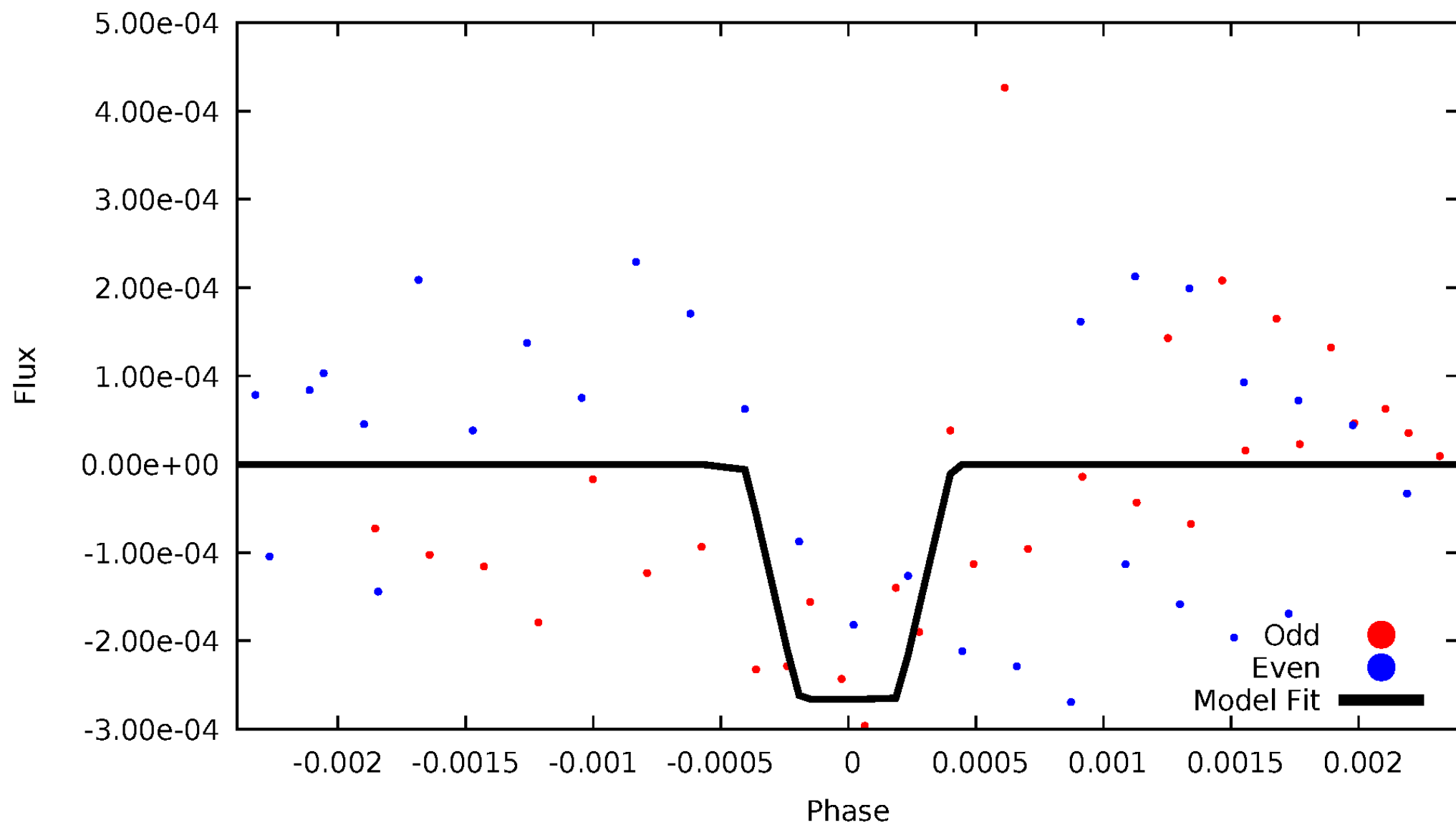
# DV Odd/Even

TCE 001722916-08



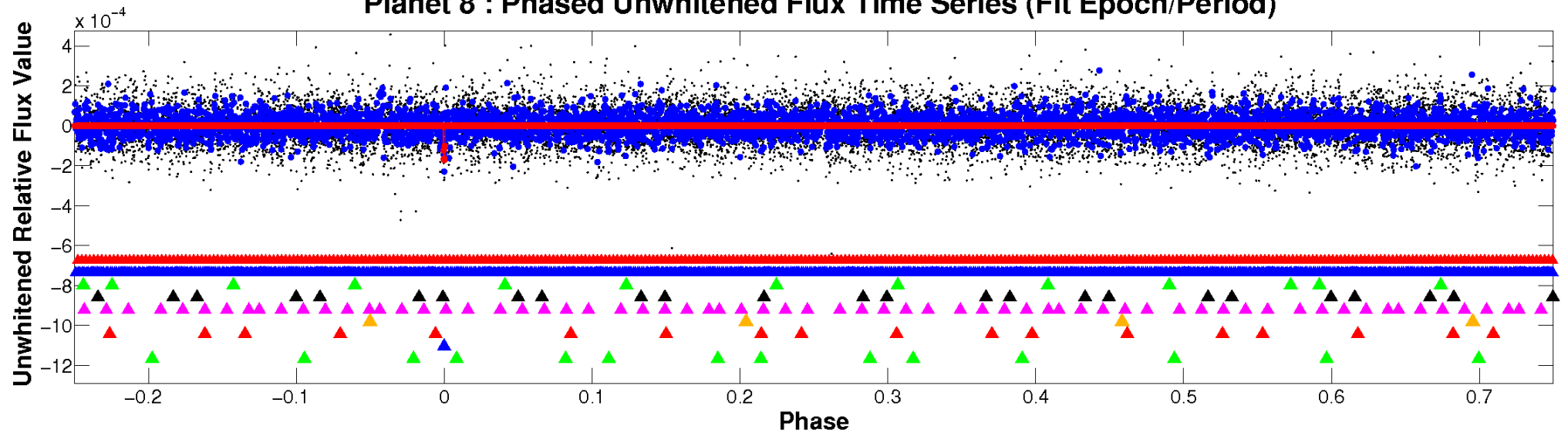
# ALT Odd/Even

TCE 001722916-08

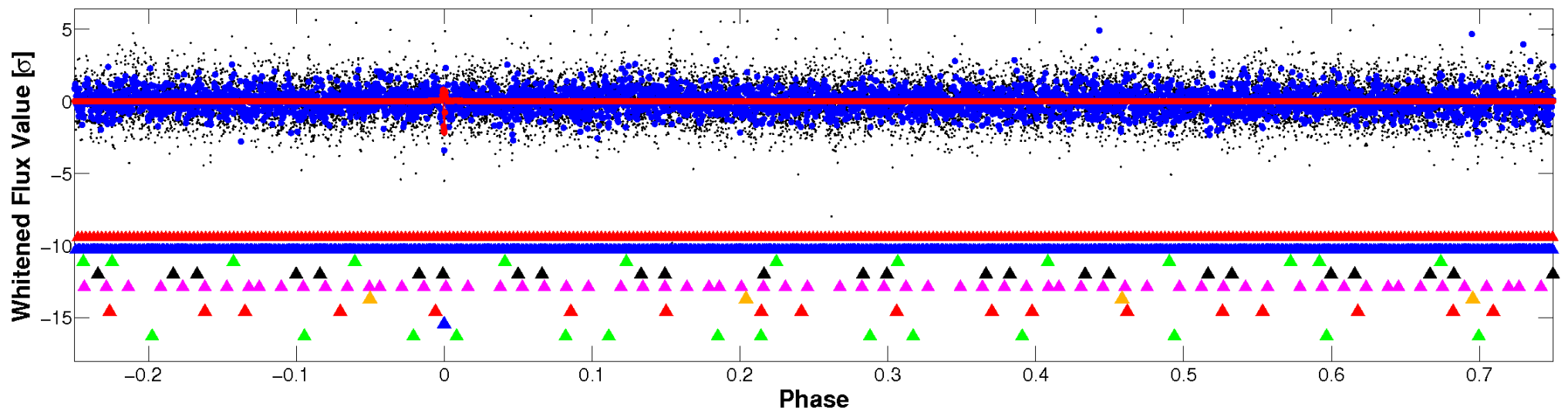


# Non-Whitened Vs. Whitened Light Curve

## Planet 8 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)



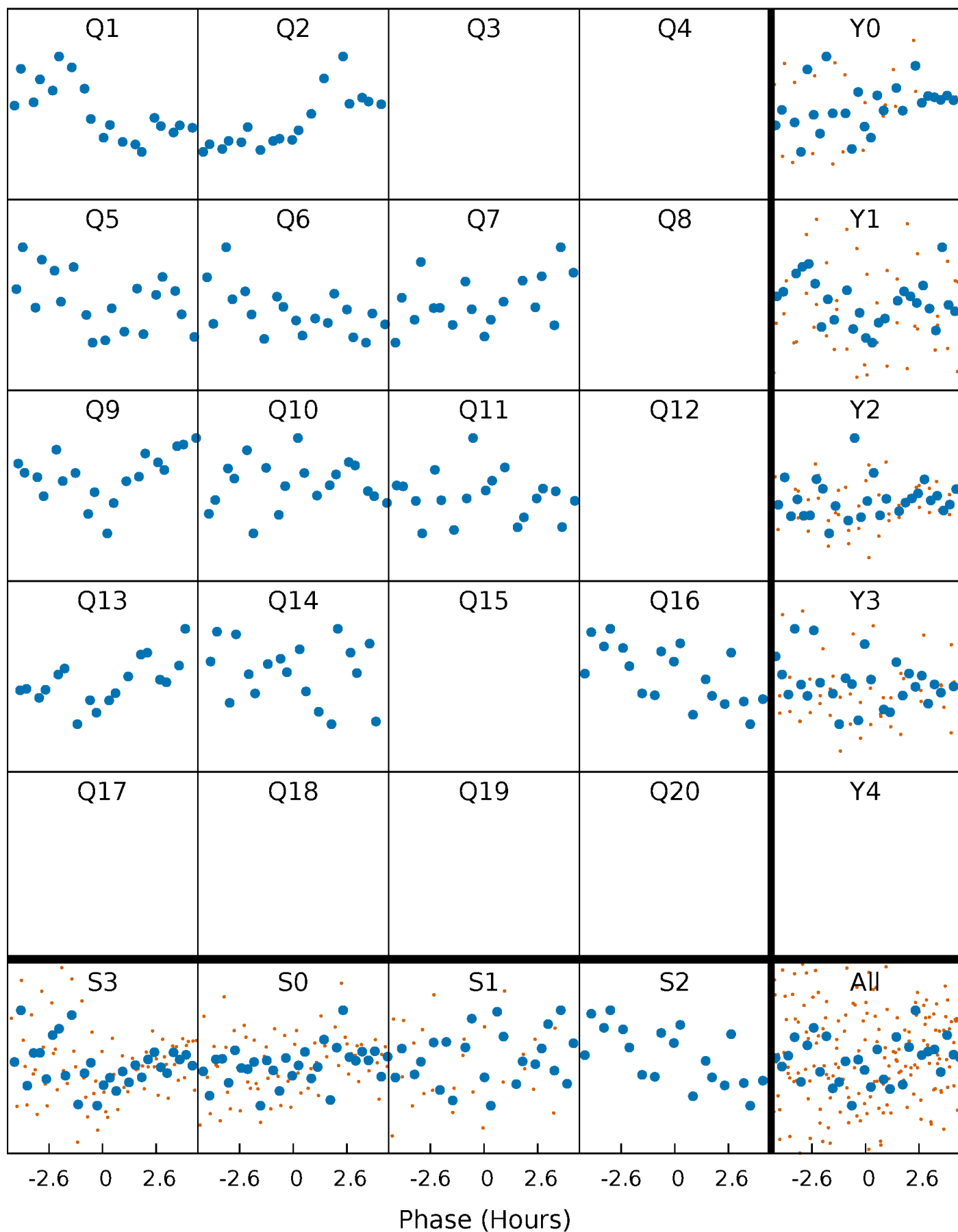
## Planet 8 : Phased Whitened Flux Time Series (Fit Epoch/Period)





# PDC Quarter-Phased Transit Curves

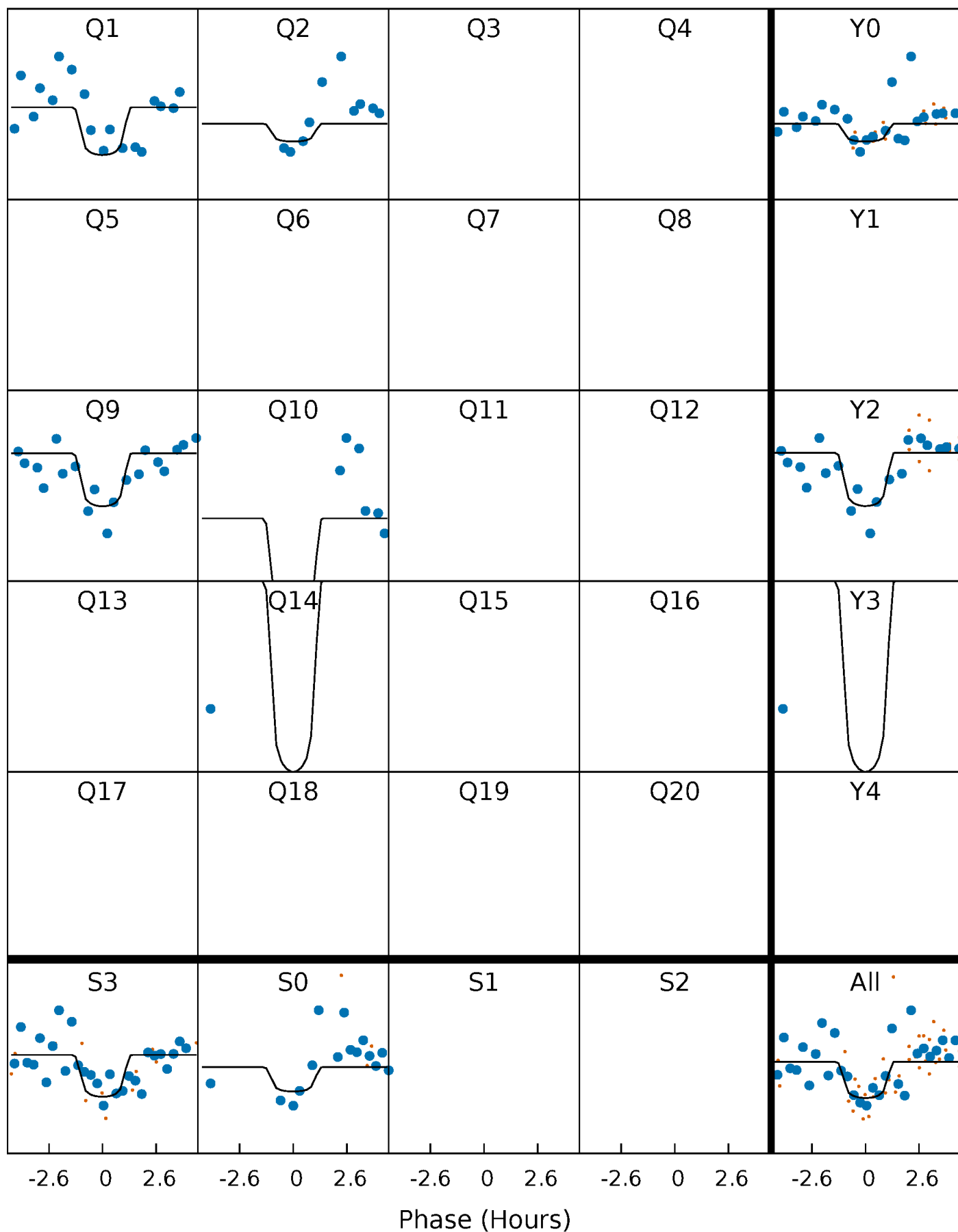
TCE 001722916-08   P= 95.858298 Days    $T_0=158.854822$  (BKJD)





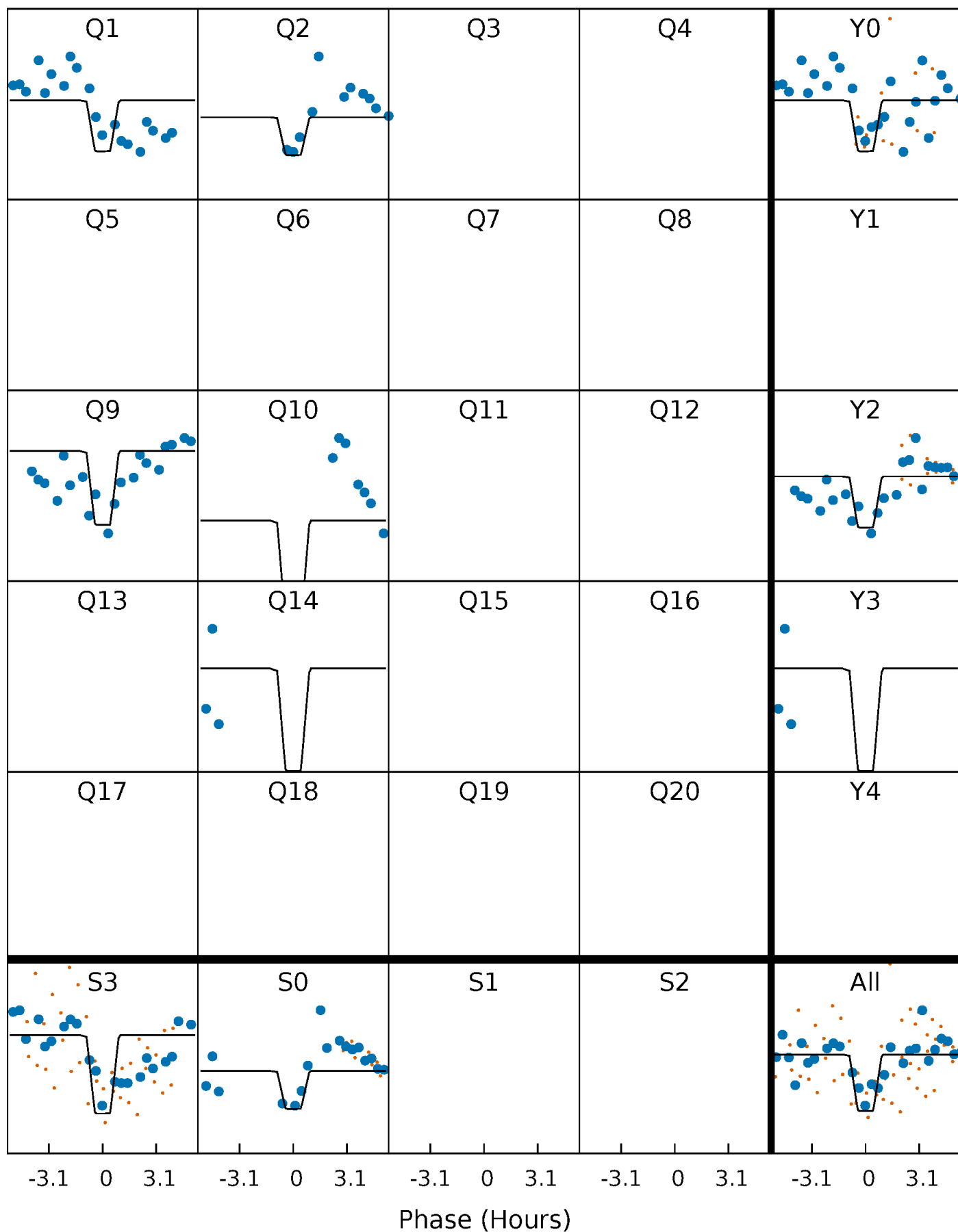
# DV Quarter-Phased Transit Curves

TCE 001722916-08 P= 95.858298 Days  $T_0=158.854822$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

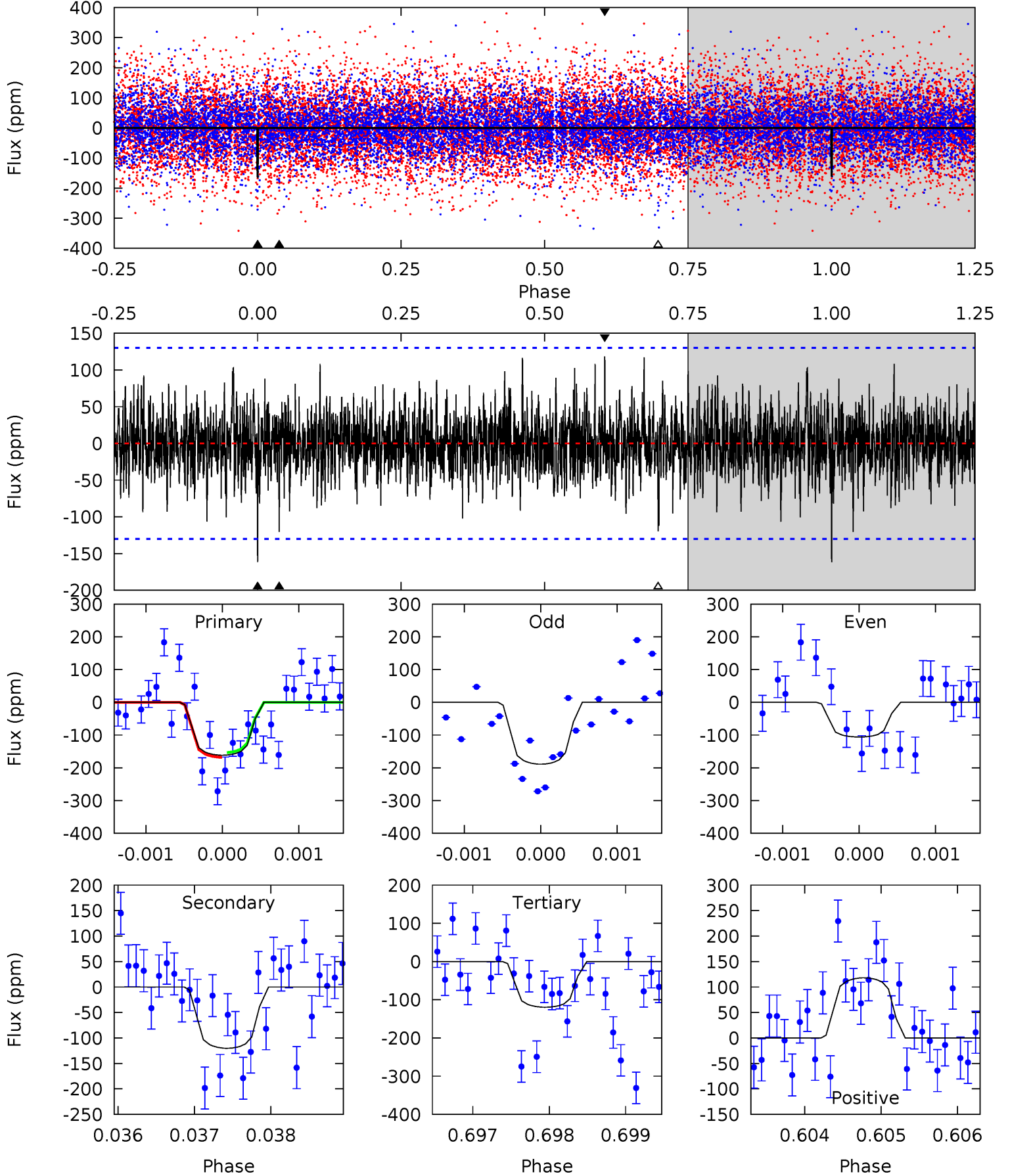
TCE 001722916-08     $P = 95.858761$  Days     $T_0 = 158.852036$  (BKJD)



# DV Model-Shift Uniqueness Test

001722916-08, P = 95.858298 Days, E = 62.996524 Days

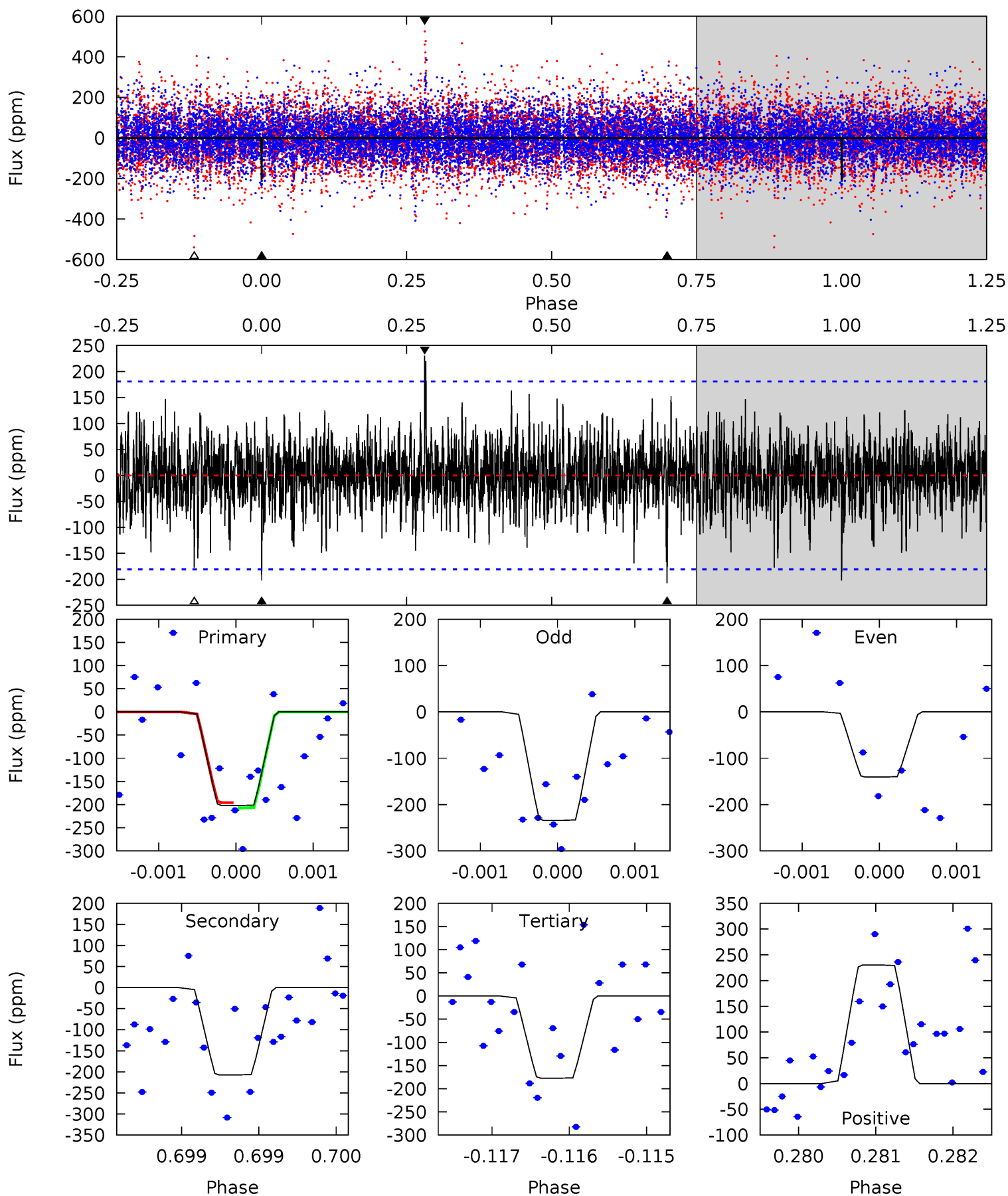
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.74	5.02	4.99	4.93	5.42	3.25	1.31	1.76	1.82	0.03	0.09	1.66	0.88	0.42	0.29



# Alt Model-Shift Uniqueness Test

001722916-08, P = 95.858761 Days, E = 62.993275 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
6.13	6.29	5.38	6.99	5.49	3.35	1.40	0.75	-0.85	0.91	-0.69	1.42	0.95	0.53	0.17



### Stellar Parameters For KIC 001722916

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6812^{+71}_{-91}$	$4.154^{+0.115}_{-0.115}$	$-0.180^{+0.150}_{-0.200}$	$1.604^{+0.262}_{-0.236}$	$1.347^{+0.088}_{-0.118}$	$0.460^{+0.237}_{-0.156}$
	+1%/-1%	+3%/-3%	+83%/-111%	+16%/-15%	+7%/-9%	+51%/-34%
Source	SPE68	SPE68	SPE68	DSEP		

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

### Secondary Eclipse Parameters for KIC 001722916-08 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-120 \pm 24$	$2.52^{+1.76}_{-1.39}$	$790^{+35}_{-32}$	$5899^{+3519}_{-1233}$	$2121^{+8799}_{-1426}$
Alt.	$-207 \pm 33$	$2.84^{+1.56}_{-1.41}$	$793^{+36}_{-32}$	$6403^{+3354}_{-1210}$	$2792^{+8938}_{-1605}$

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

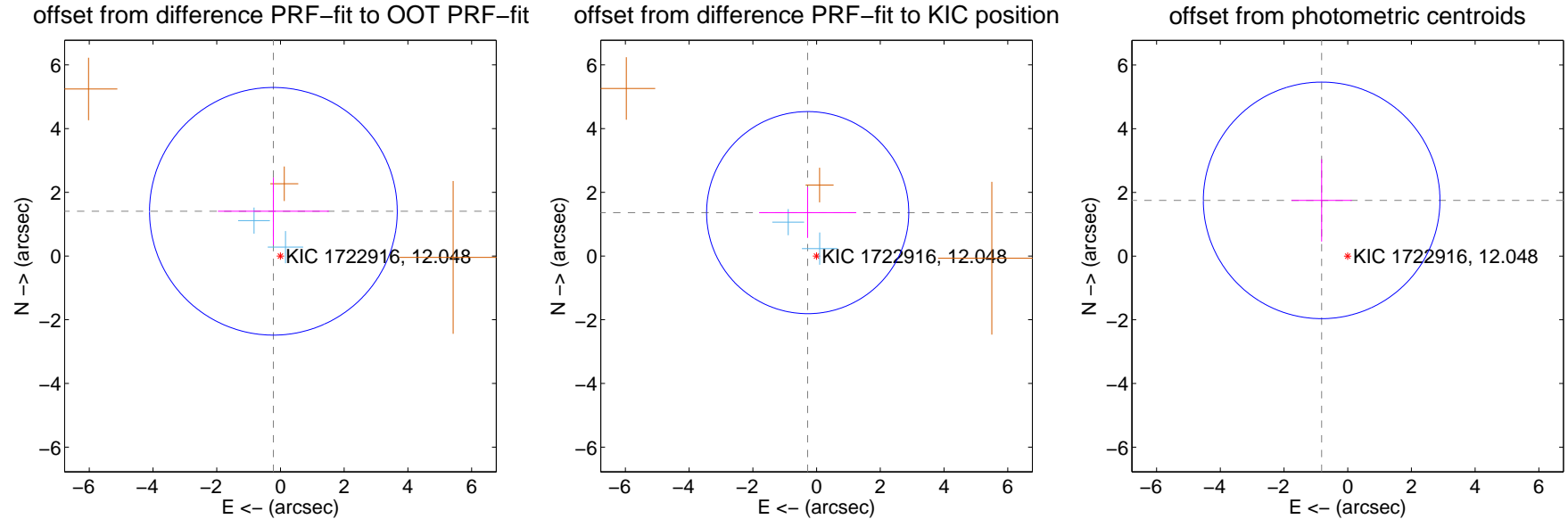
## DV Centroid Data

Supplemental centroid analysis for 001722916-08. Kepler magnitude: 12.05. Transit SNR 7.55

There are 2 quarters with good PRF difference image offsets

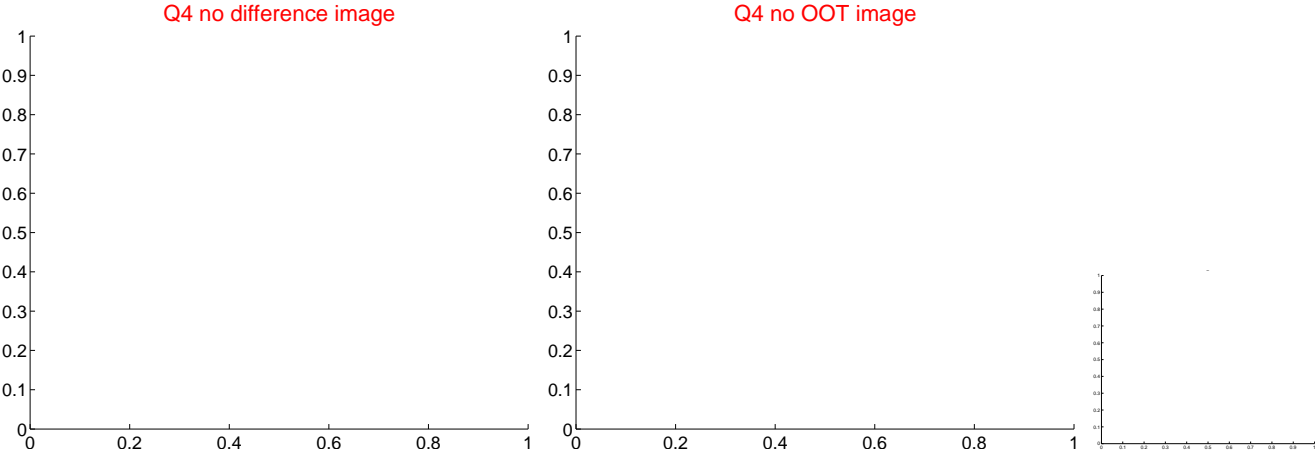
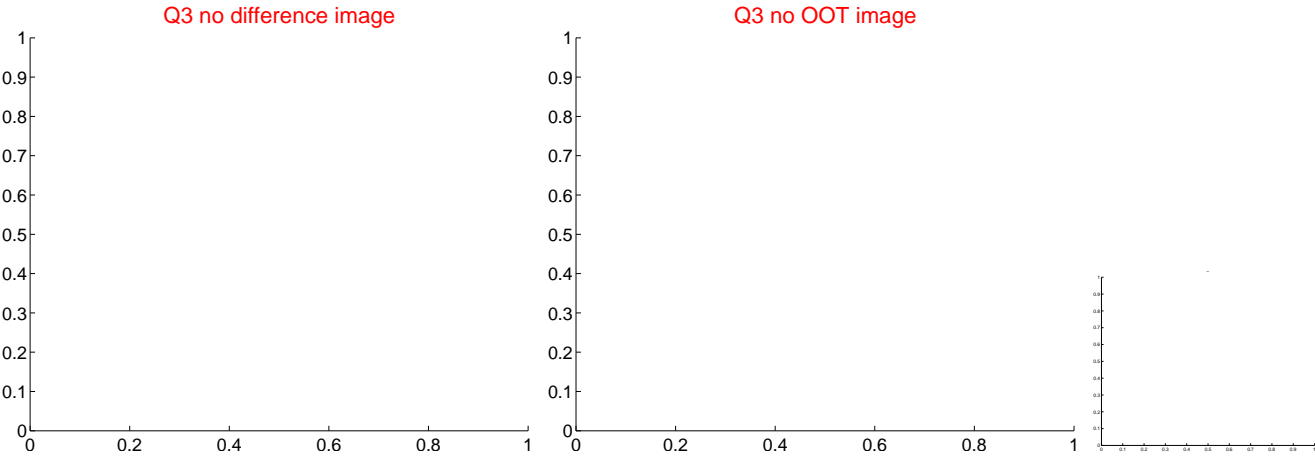
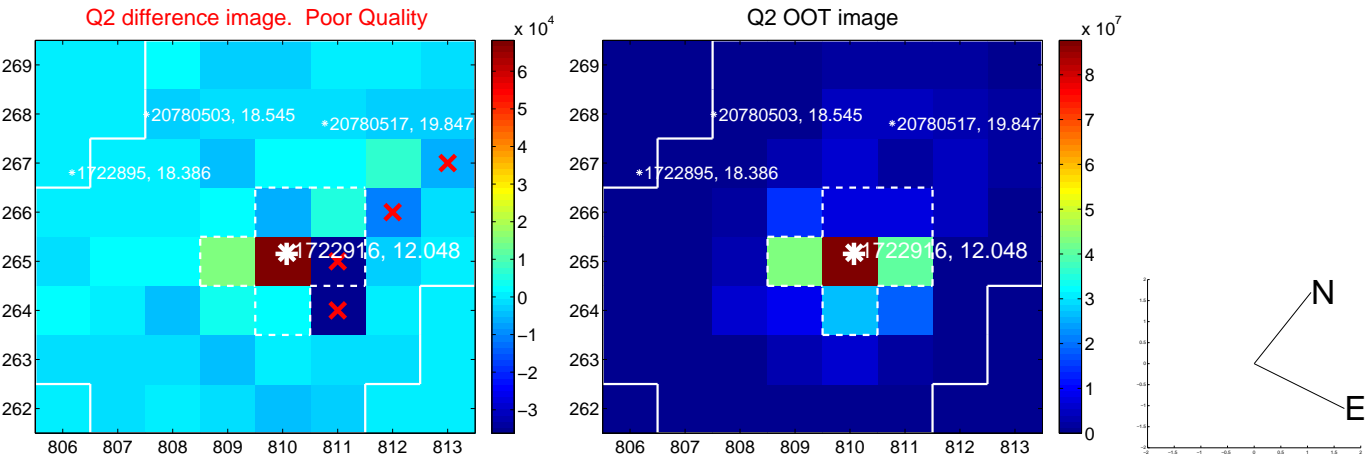
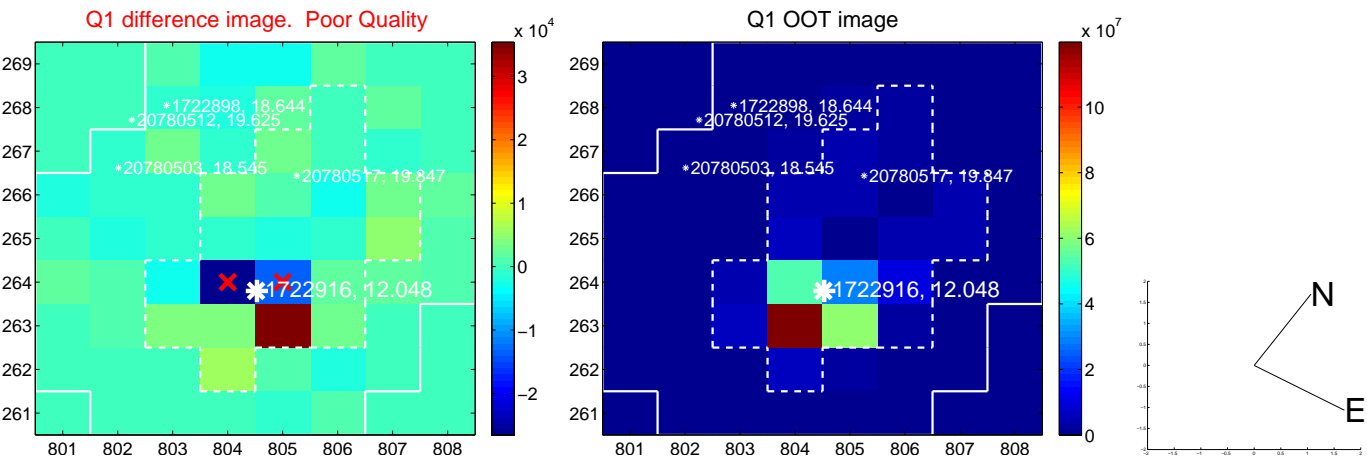
The direct PRF centroid is offset from the target star catalog position by about 0.08 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.422 \pm 1.296$	1.10	$0.222 \pm 1.742$	$1.404 \pm 1.056$
PRF-fit source offset from KIC position	$1.390 \pm 1.057$	1.31	$0.279 \pm 1.525$	$1.362 \pm 0.794$
photometric centroid source offset	$1.93 \pm 1.24$	1.56	$0.82 \pm 0.95$	$1.75 \pm 1.29$



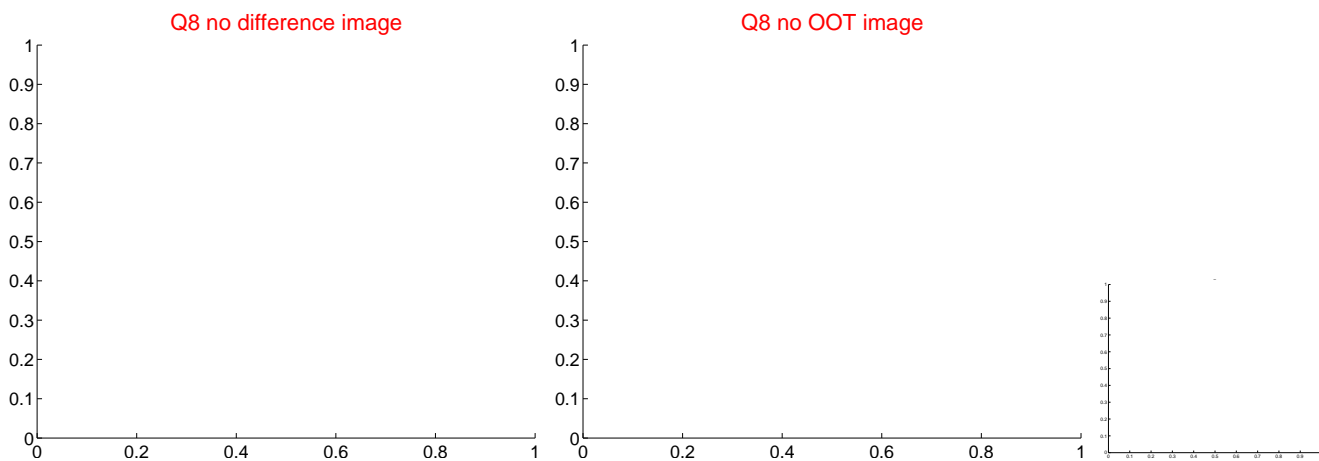
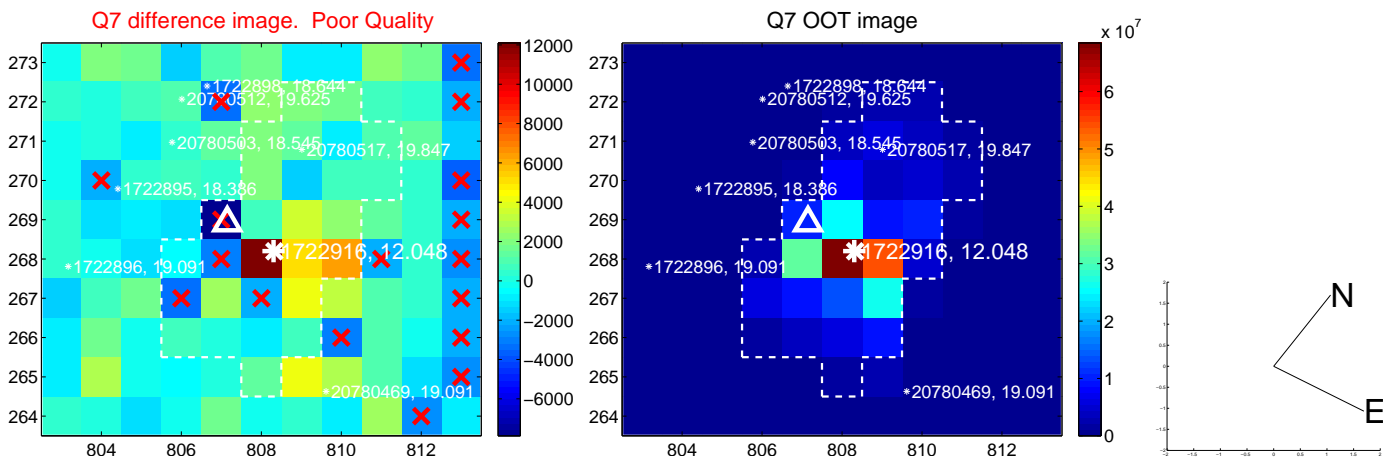
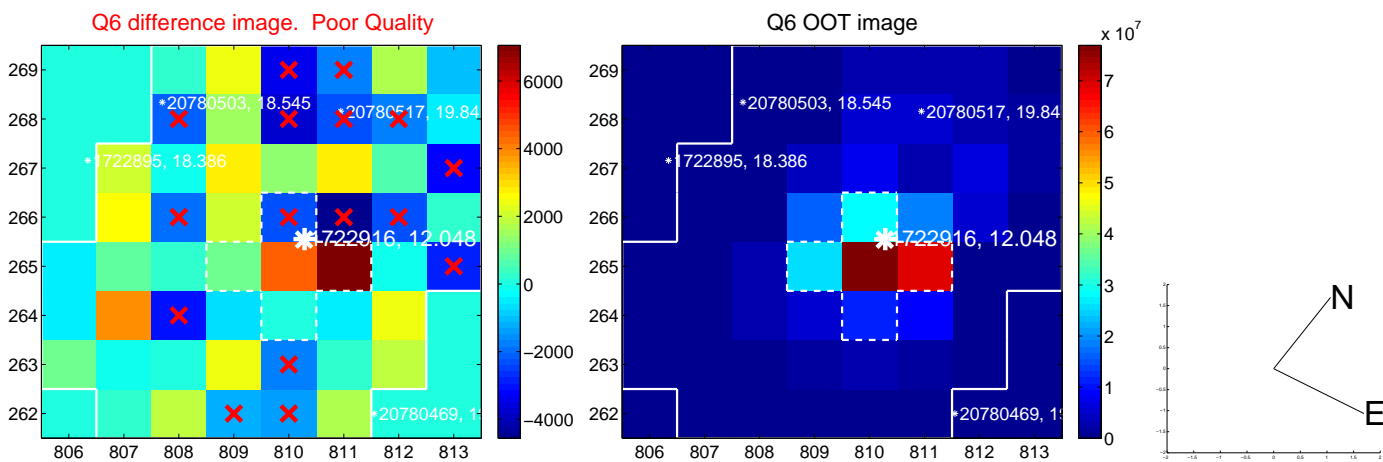
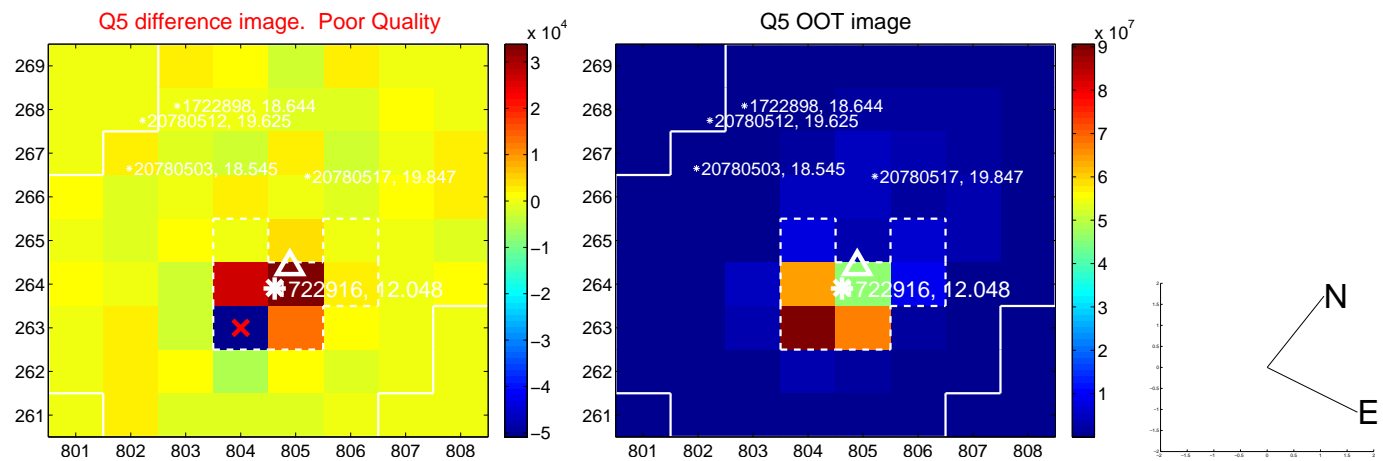
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

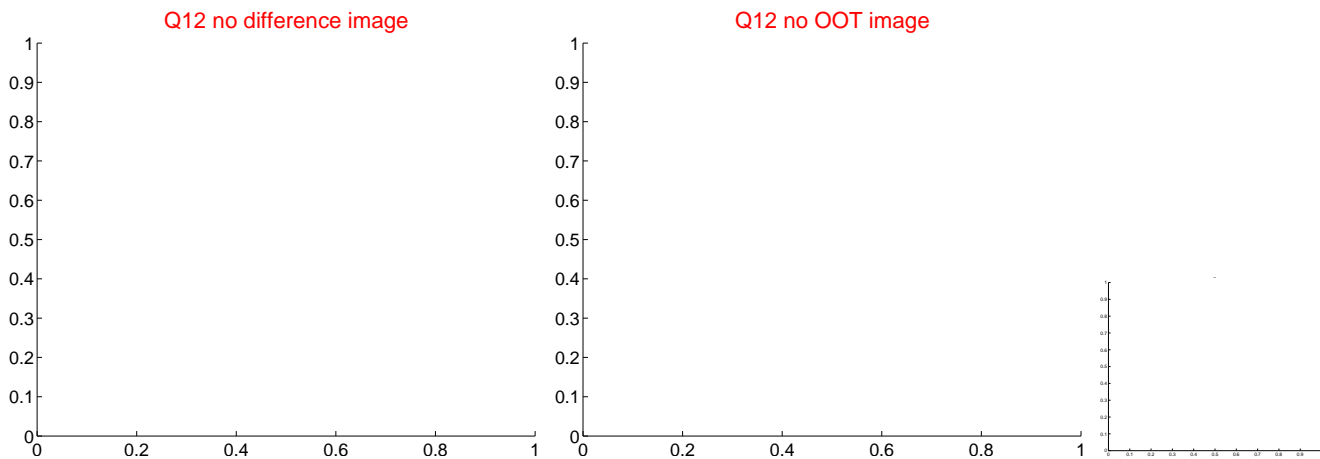
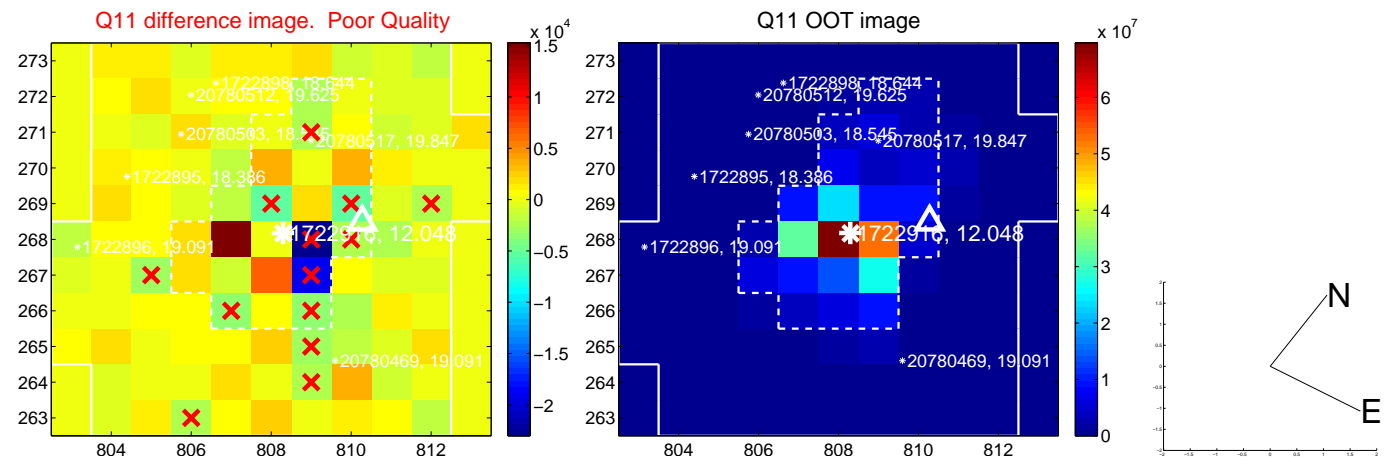
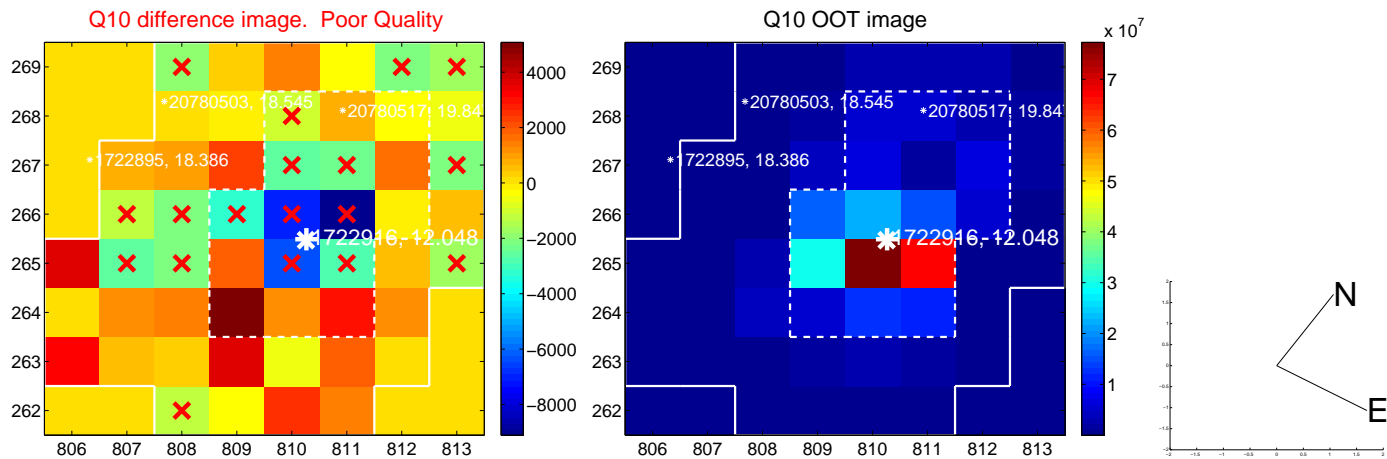
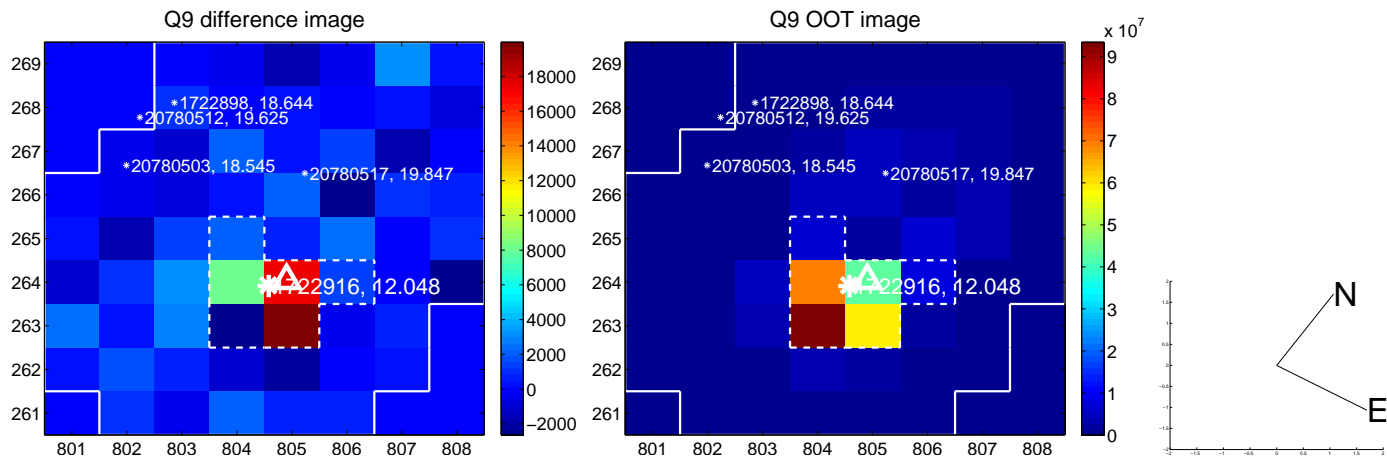




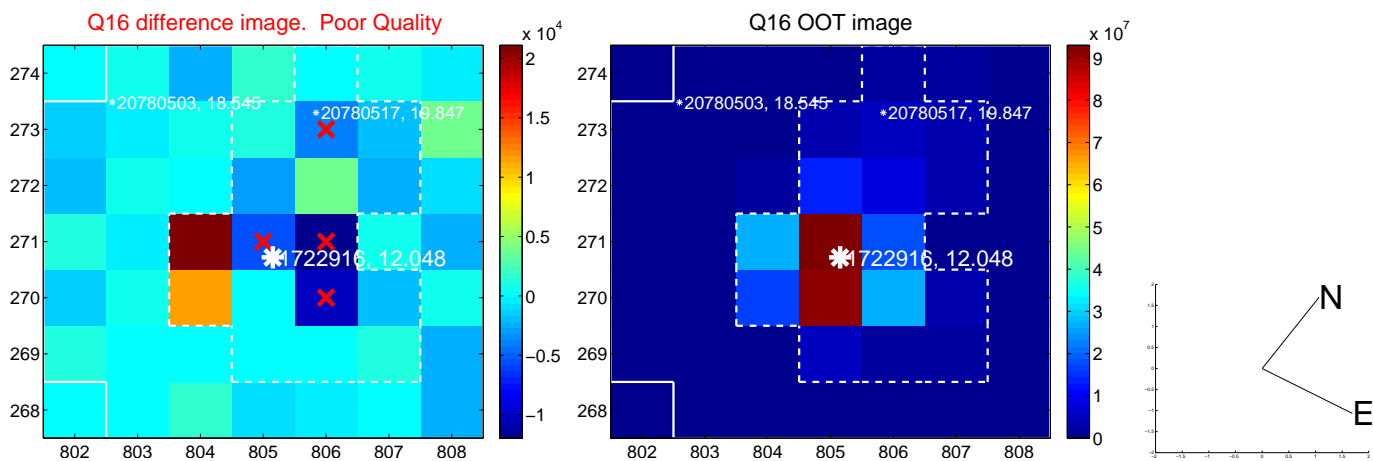
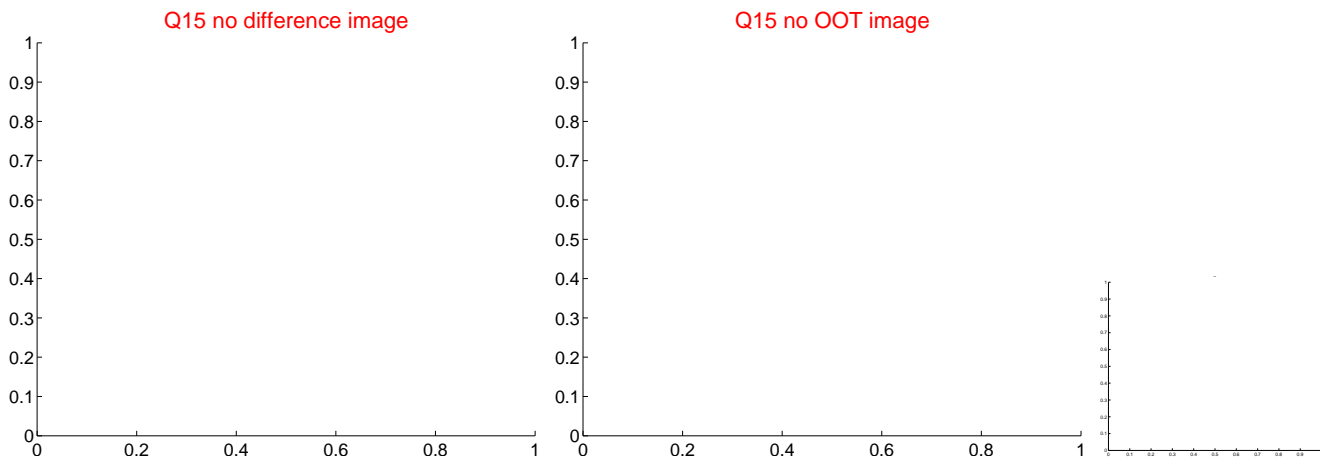
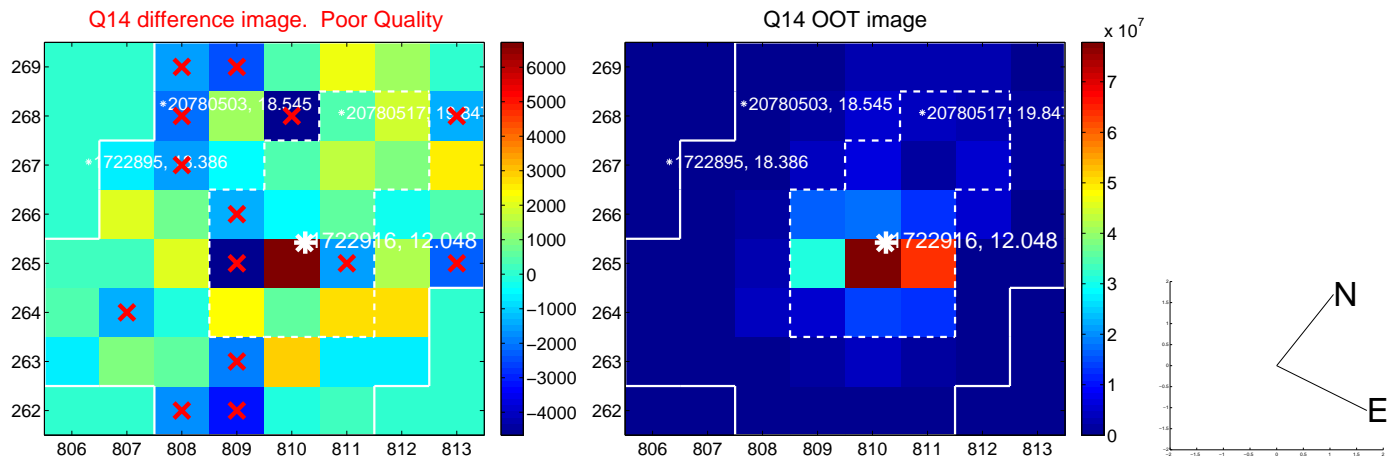
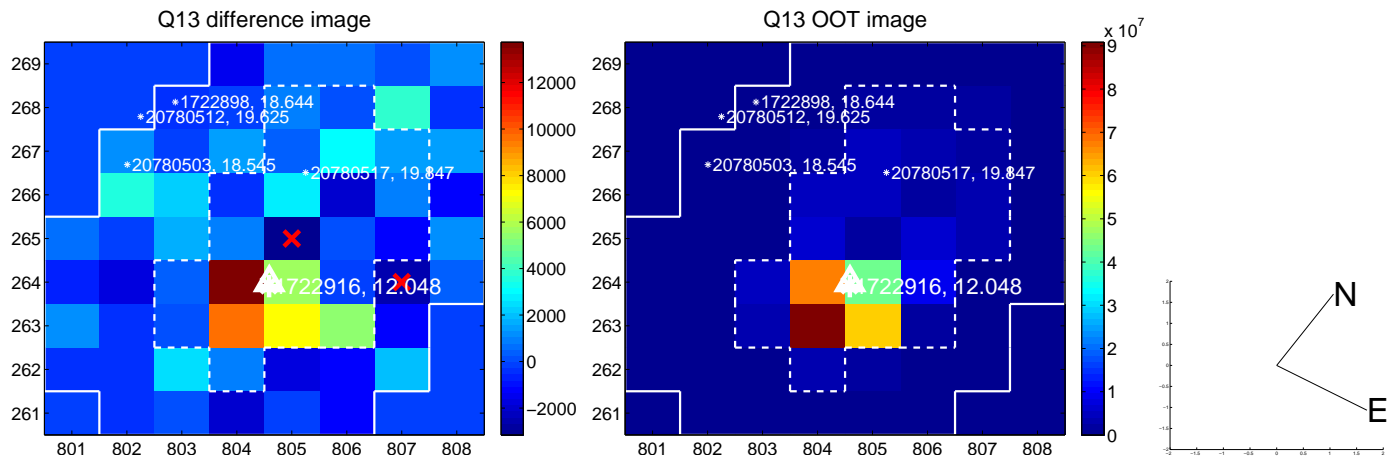
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



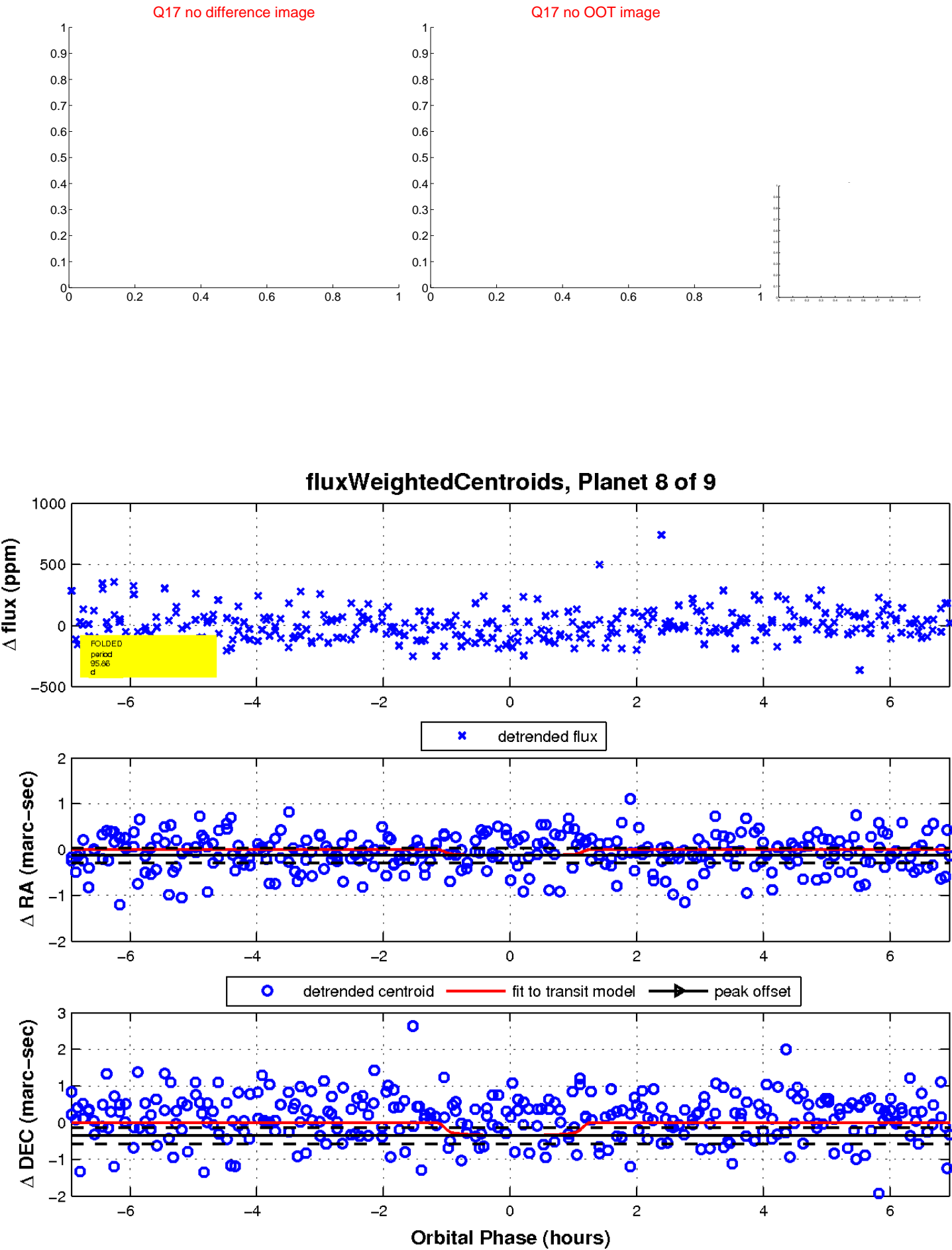
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

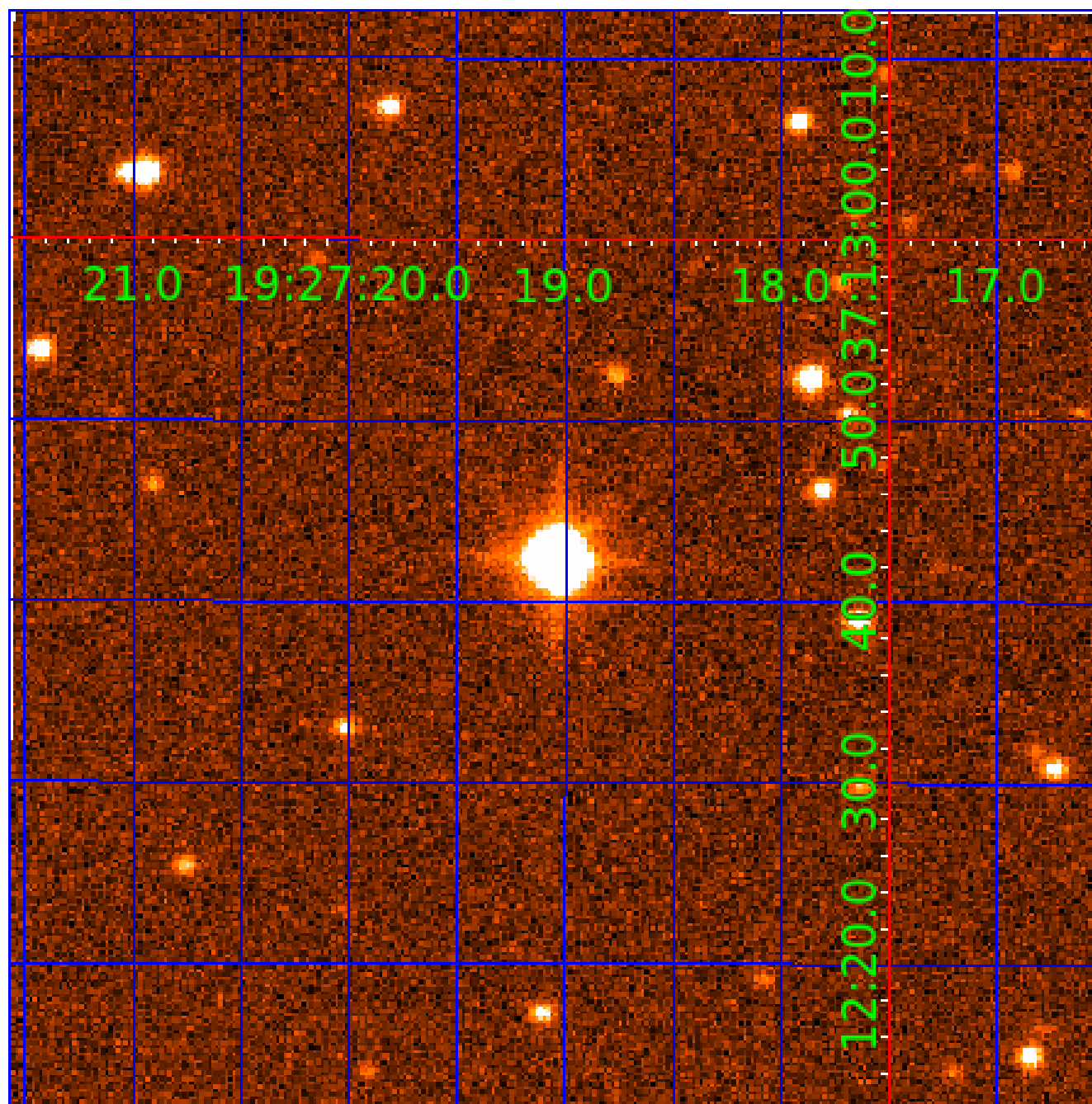


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 001722916

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
001722916-01	OBS	No	1.813535	132.513520	0.1	1.362	7.1	0.1	1.60	6812	0.09	4824.23
001722916-02	OBS	No	1.813822	132.494408	18.4	10.501	7.4	7.4	1.60	6812	0.75	4823.21
001722916-03	OBS	No	113.456084	213.726772	152.5	10.563	16.5	7.4	1.60	6812	2.25	19.43
001722916-04	OBS	No	59.108474	141.293815	101.1	15.638	8.7	7.4	1.60	6812	1.76	46.34
001722916-05	OBS	No	22.011274	131.997241	79.9	6.325	8.8	8.8	1.60	6812	1.69	172.96
001722916-06	OBS	No	359.058903	202.797449	338.0	20.552	8.5	8.3	1.60	6812	5.69	4.18
001722916-07	OBS	No	80.910752	145.943923	136.1	5.420	8.0	7.3	1.60	6812	2.19	30.49
001722916-08	OBS	No	95.858298	158.854822	172.1	2.318	8.1	7.6	1.60	6812	2.39	24.32
001722916-09	OBS	No	105.723678	156.862664	140.0	6.744	8.2	7.9	1.60	6812	2.40	21.34

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
001722916-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV
001722916-02	OBS	FP	0.00	1	0	0	0	LPP_DV—SAME_NTL_PERIOD
001722916-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
001722916-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
001722916-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
001722916-06	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS—HALO_GHOST
001722916-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
001722916-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES—TRANS_GAPPED—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
001722916-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT

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

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

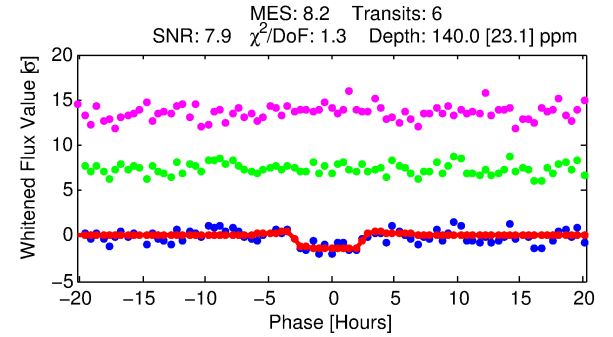
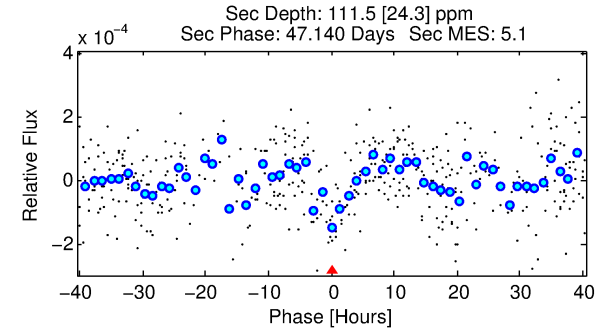
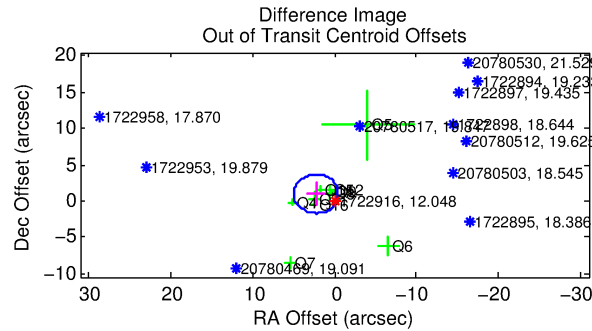
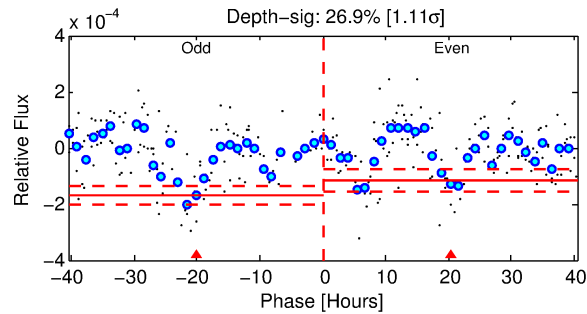
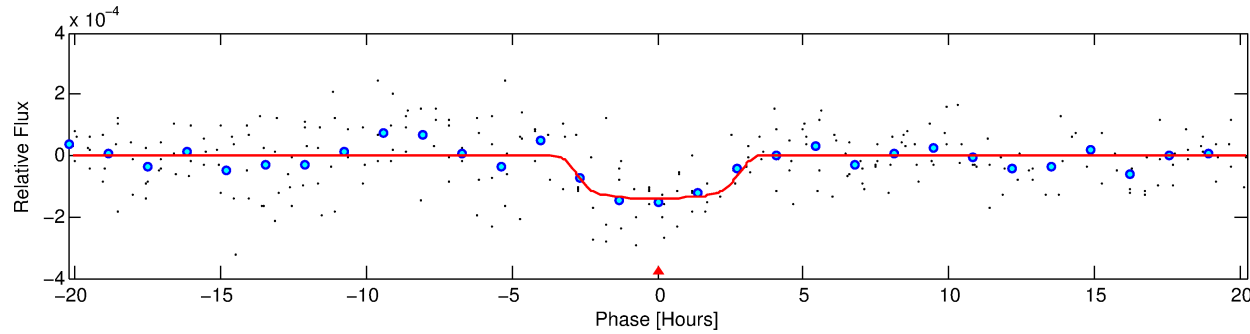
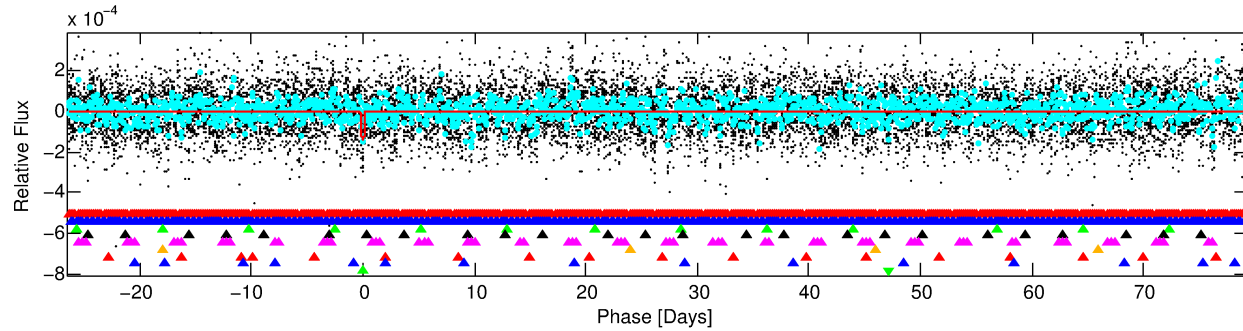
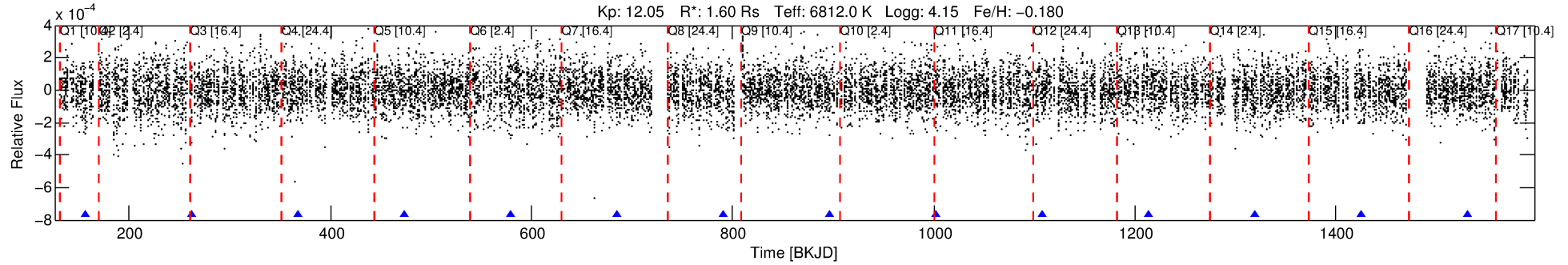
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 001722916-09

No Significant Match Found

# DV One-Page Summary

KIC: 1722916 Candidate: 9 of 9 Period: 105.724 d



## DV Fit Results:

Period = 105.72368 [0.00255] d  
Epoch = 156.8627 [0.0171] BKJD  
Rp/R\* = 0.0137 [0.0017]  
a/R\* = 36.59 [17.47]  
b = 0.97 [0.03]  
Seff = 21.34 [4.57]  
Teq = 548 [29] K  
Rp = 2.40 [0.49] Re  
a = 0.4823 [0.0676] AU  
Ag = 2474.67 [960.44] [2.58 $\sigma$ ]  
Teffp = 5977 [497] K [10.91 $\sigma$ ]

## DV Diagnostic Results:

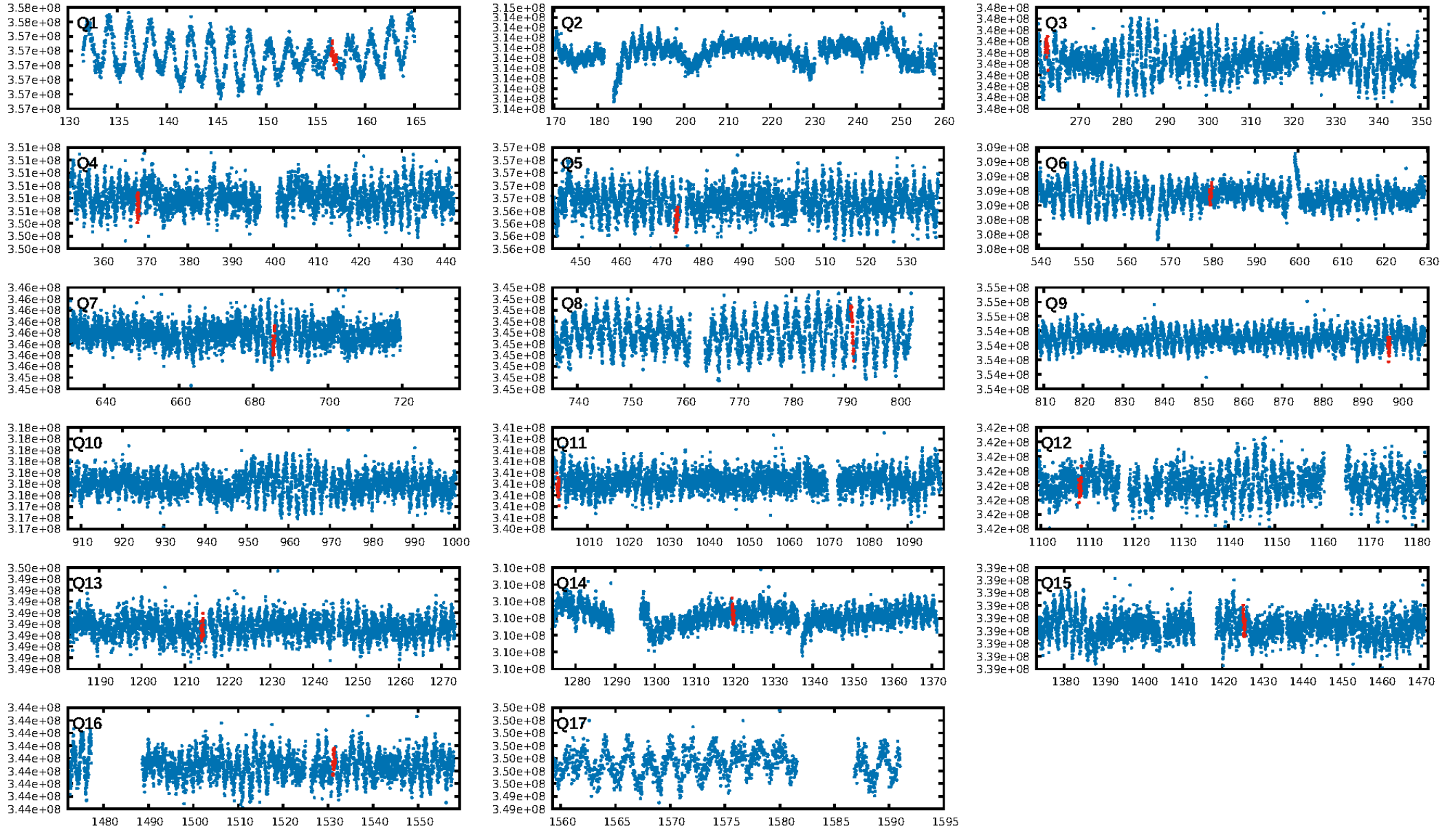
ShortPeriod-sig: 100.0% [33.20 $\sigma$ ]  
LongPeriod-sig: 100.0% [14.81 $\sigma$ ]  
ModelChiSquare2-sig: 34.9%  
ModelChiSquareGof-sig: 100.0%  
**Bootstrap-pfa: 9.60e-08**  
RollingBand-fgt: 1.00 [5/5]  
GhostDiagnostic-chr: -43.78  
Centroid-sig: 97.1%  
Centroid-so: 0.309 arcsec [0.35 $\sigma$ ]  
OotOffset-rm: 2.462 arcsec [2.73 $\sigma$ ]  
KicOffset-rm: 2.375 arcsec [2.48 $\sigma$ ]  
OotOffset-st: 1/3/4/2 [10]  
KicOffset-st: 1/3/4/2 [10]  
DiffImageQuality-fgm: 0.30 [3/10]  
DiffImageOverlap-fno: 0.15 [2/13]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 00:46:45 Z

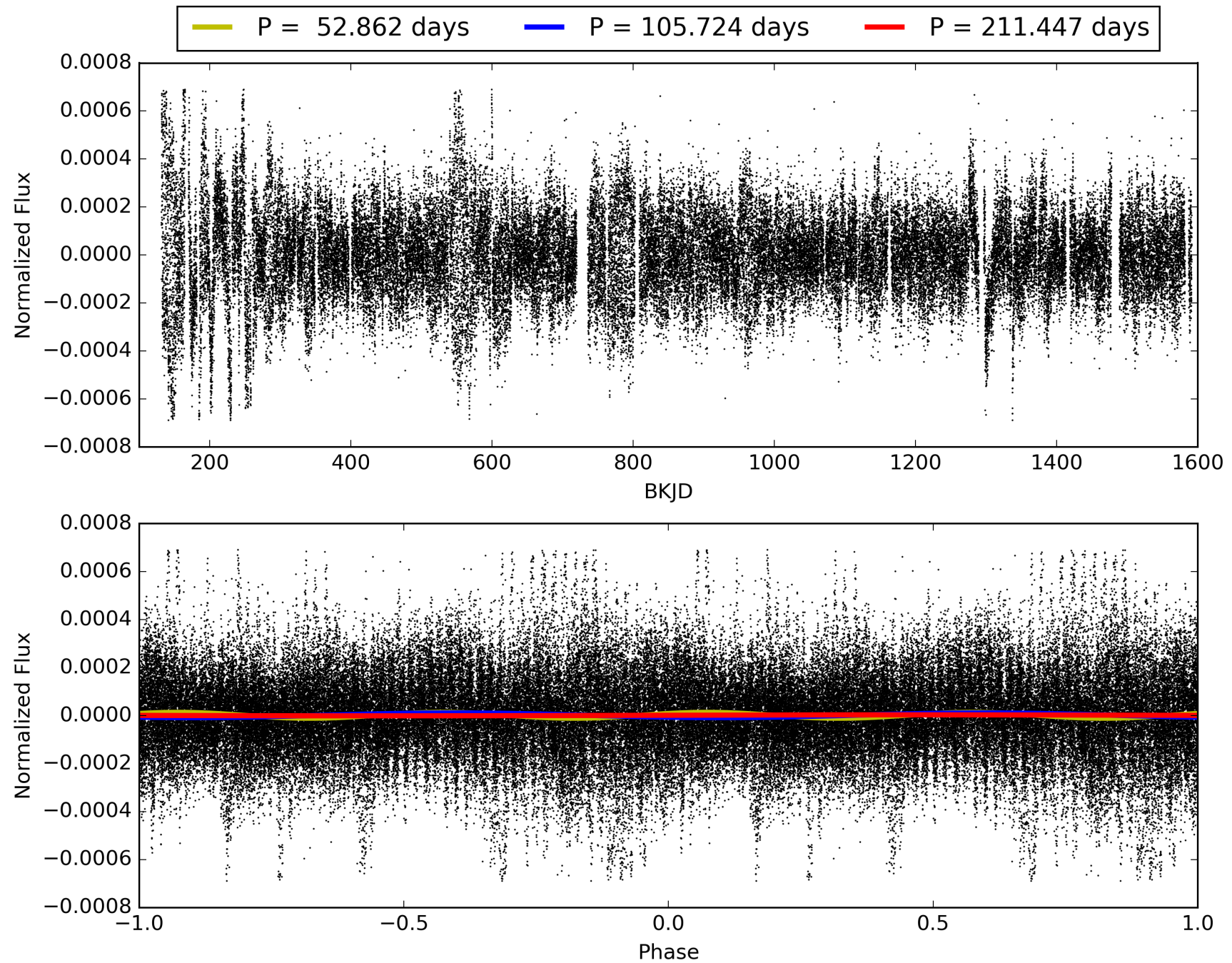
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 001722916-09, PDC Light Curves

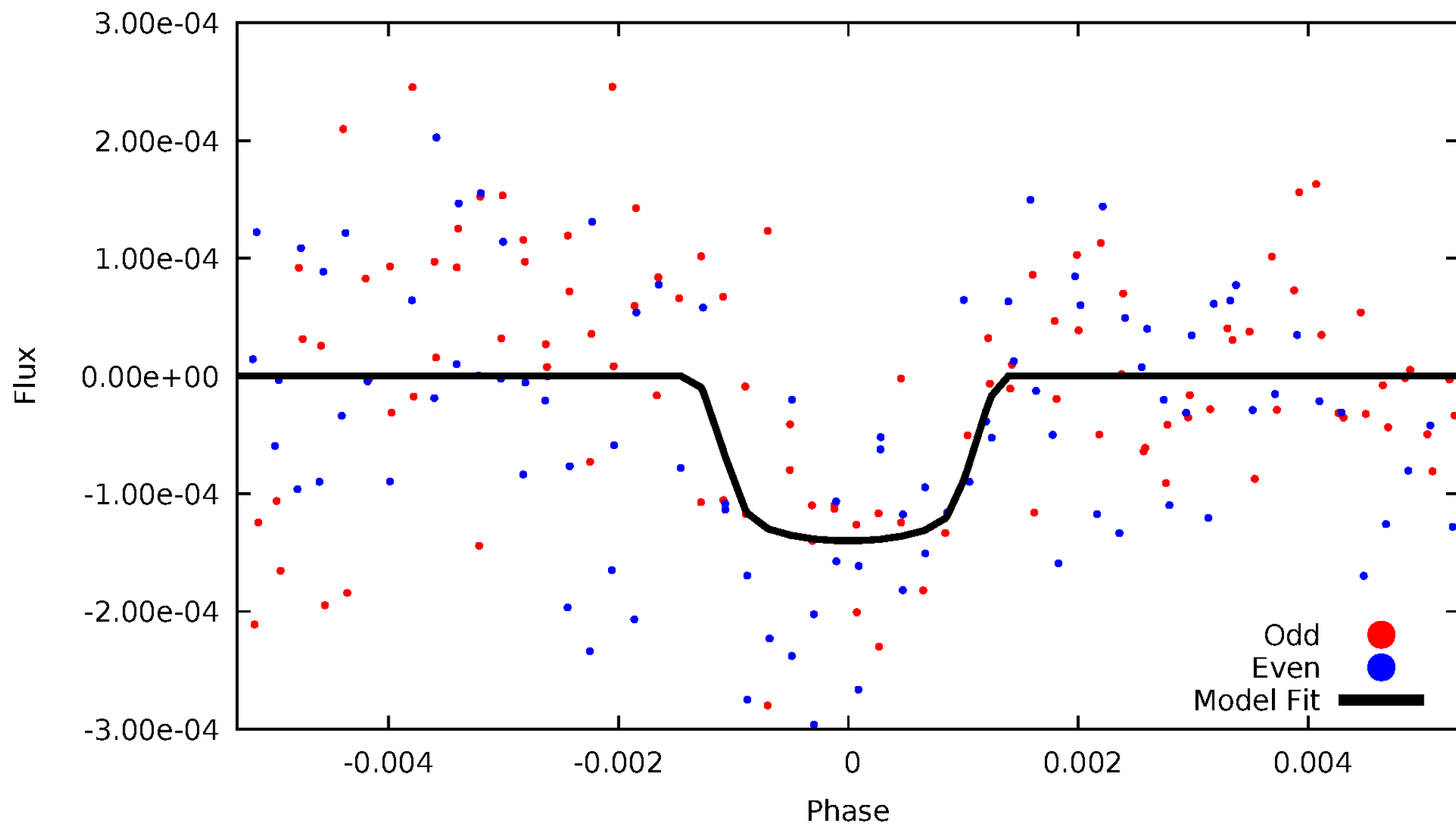


TCE 001722916-09



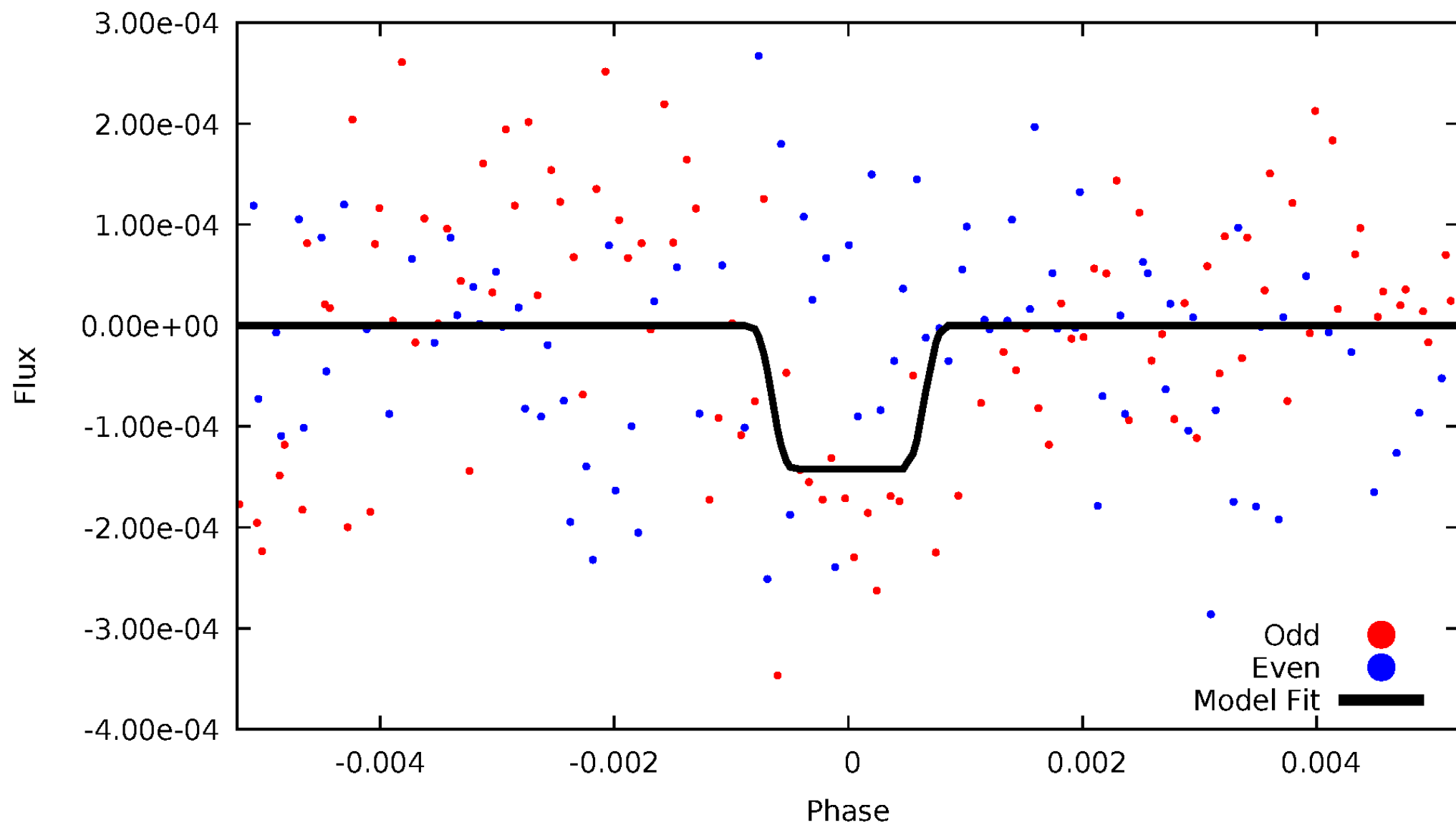
# DV Odd/Even

TCE 001722916-09



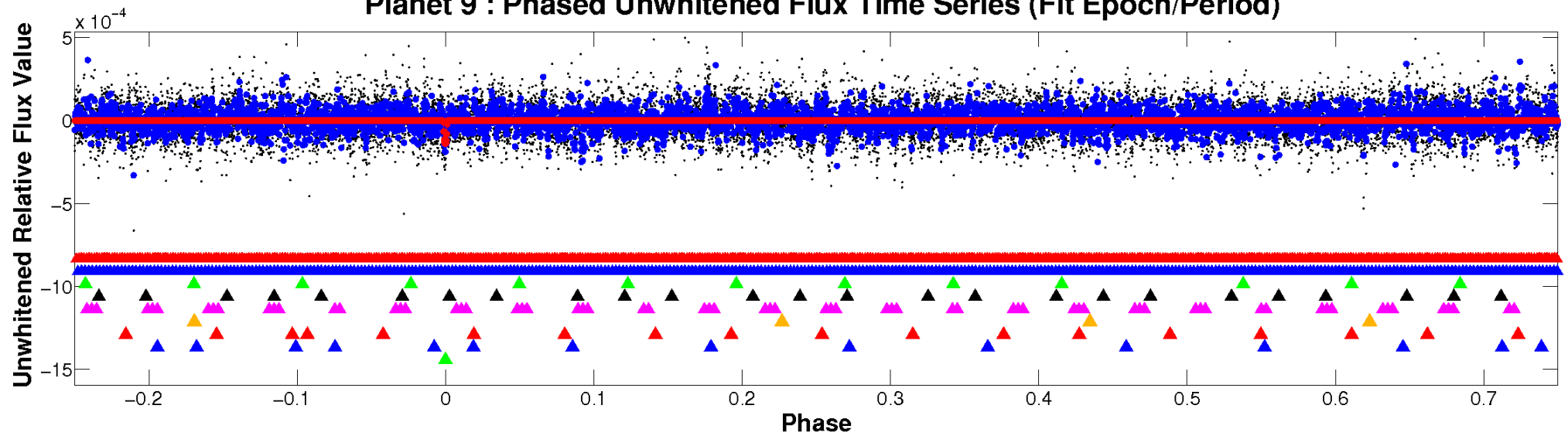
# ALT Odd/Even

TCE 001722916-09

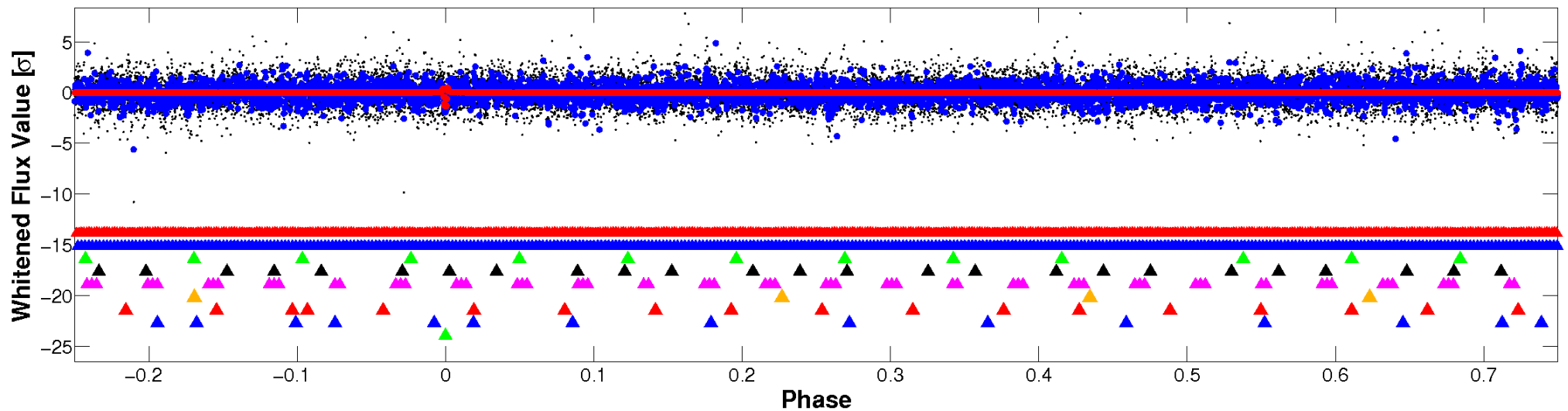


# Non-Whitened Vs. Whitened Light Curve

Planet 9 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

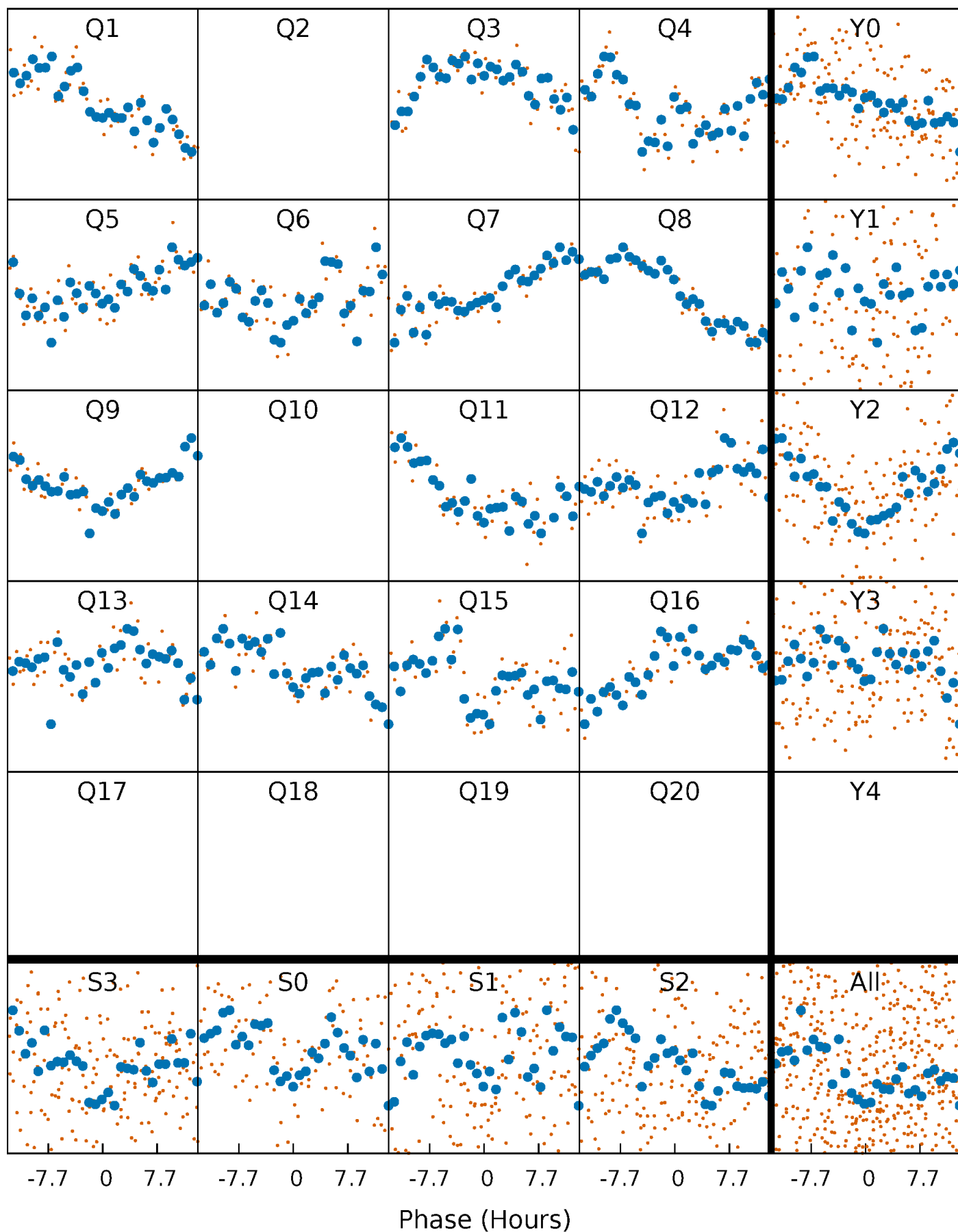


Planet 9 : Phased Whitened Flux Time Series (Fit Epoch/Period)



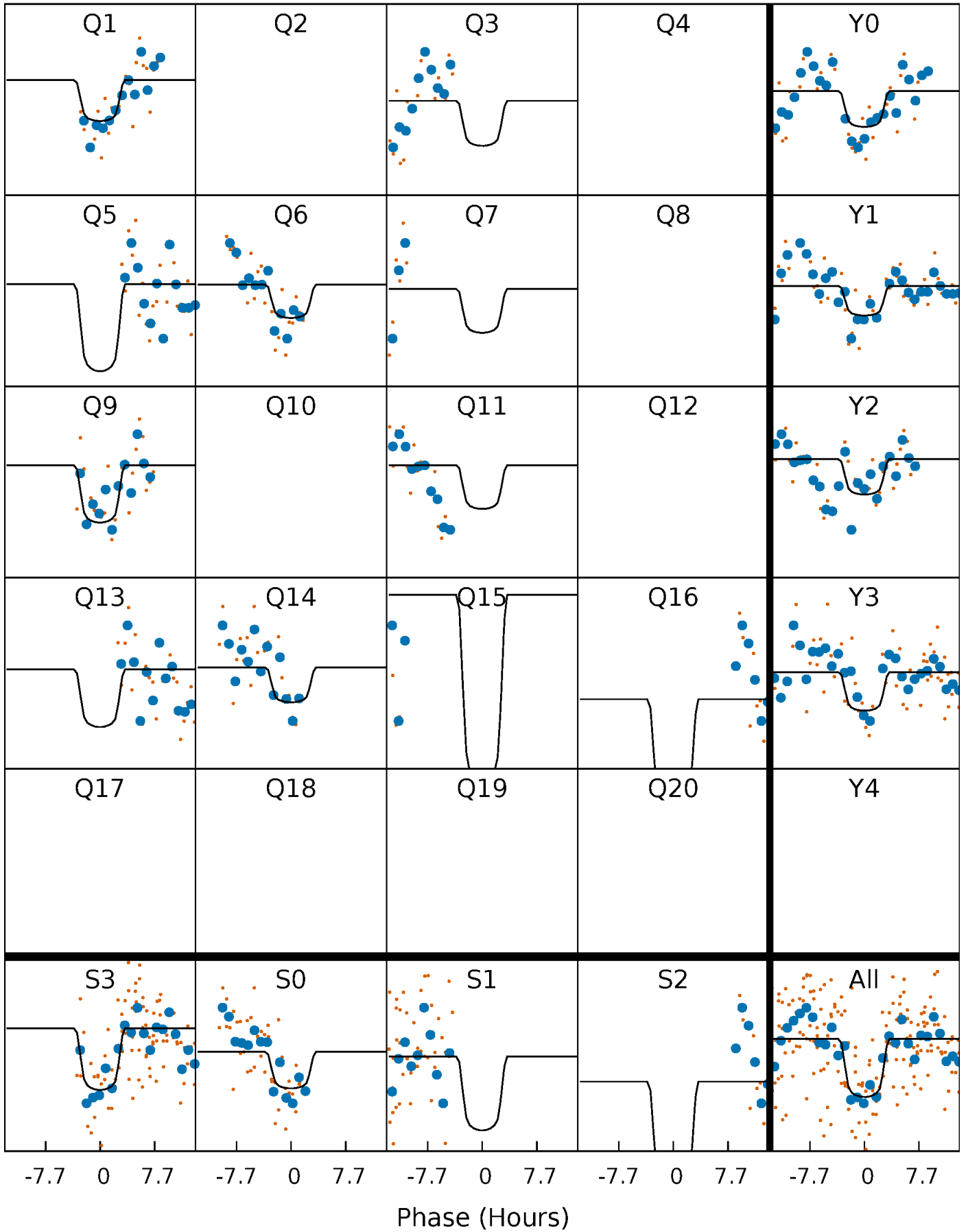
# PDC Quarter-Phased Transit Curves

TCE 001722916-09     $P=105.723678$  Days     $T_0=156.862664$  (BKJD)



# DV Quarter-Phased Transit Curves

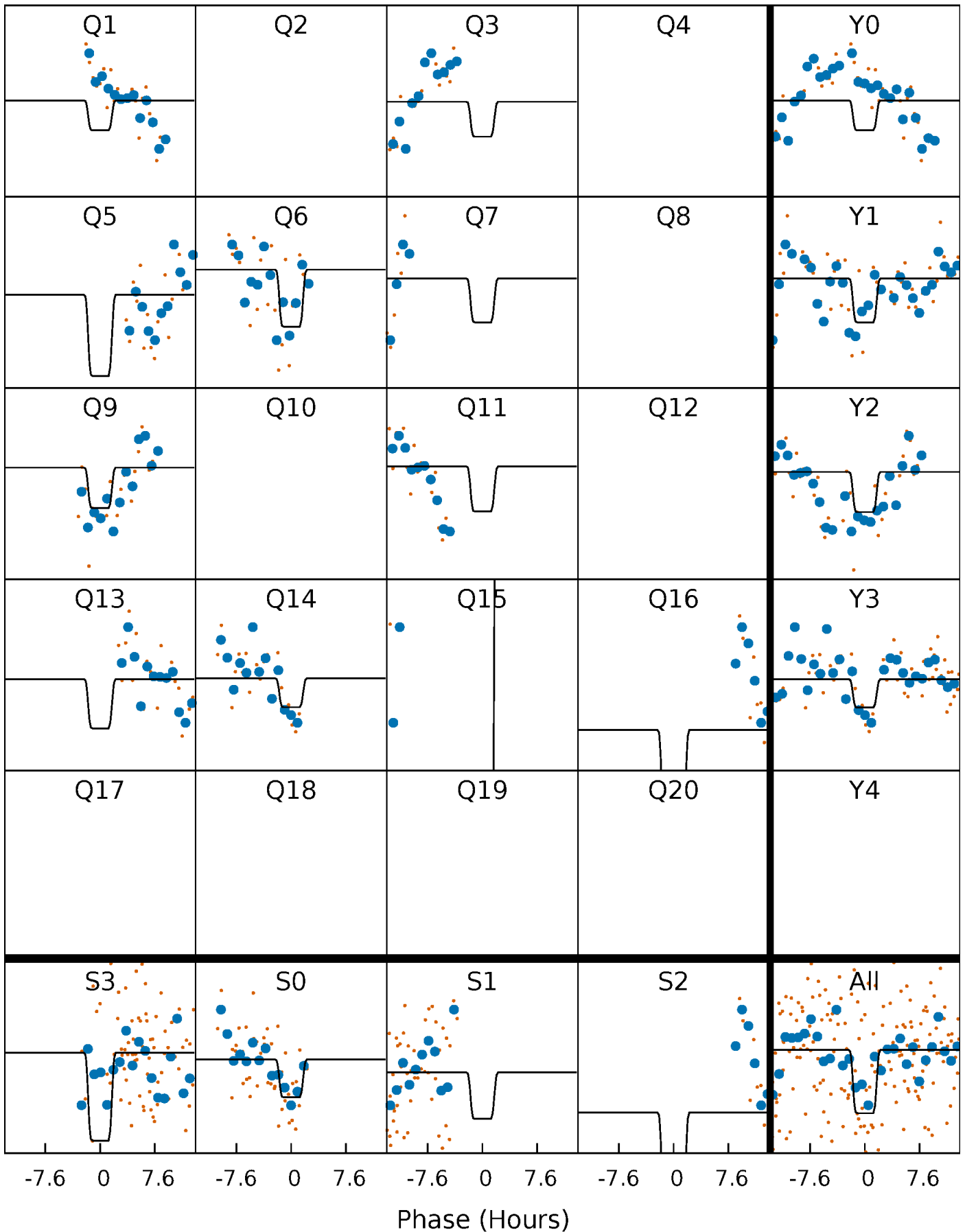
TCE 001722916-09   P=105.723678 Days    $T_0=156.862664$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

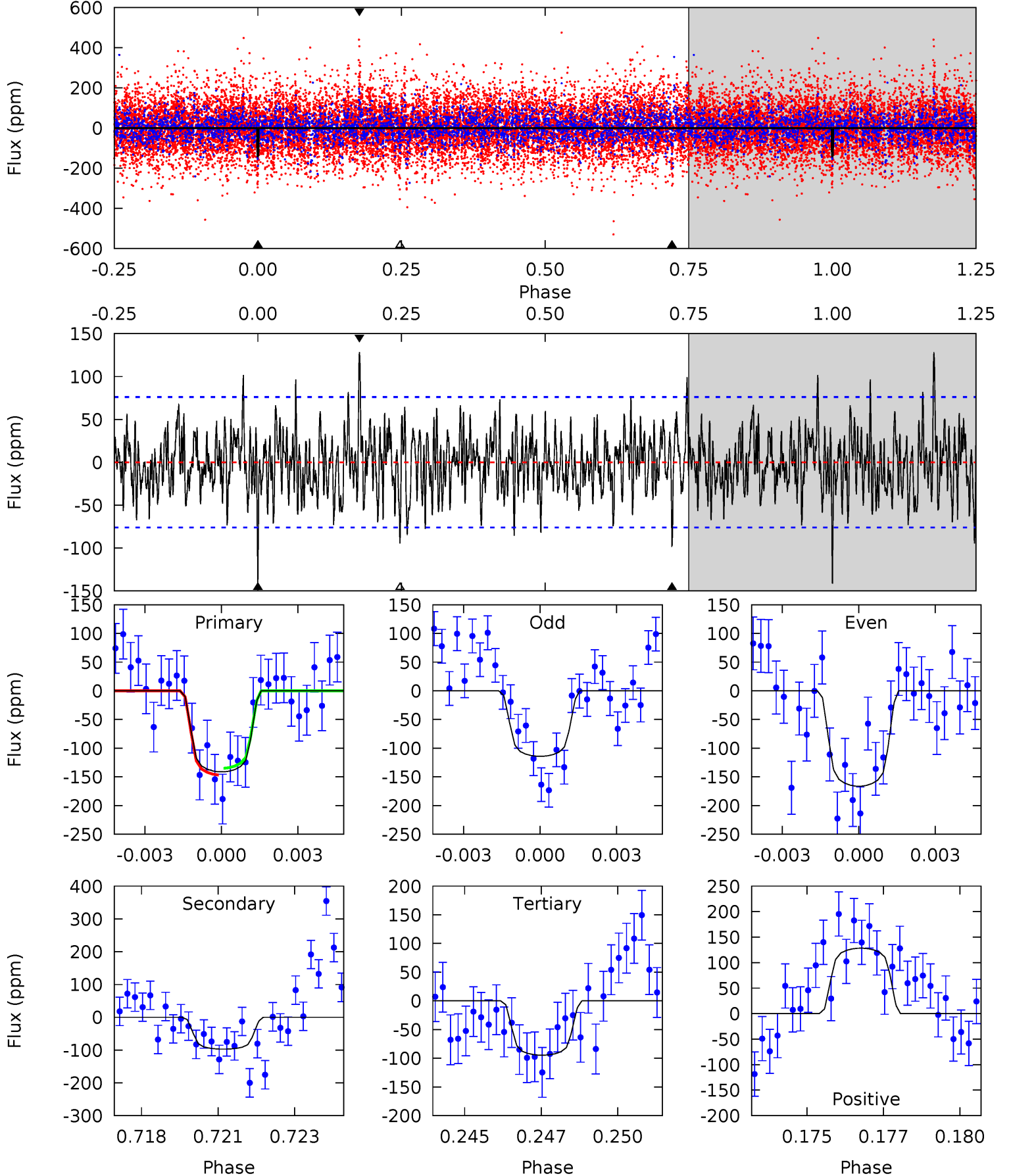
TCE 001722916-09 P=105.726825 Days  $T_0=156.830441$  (BKJD)



# DV Model-Shift Uniqueness Test

001722916-09, P = 105.723678 Days, E = 51.138986 Days

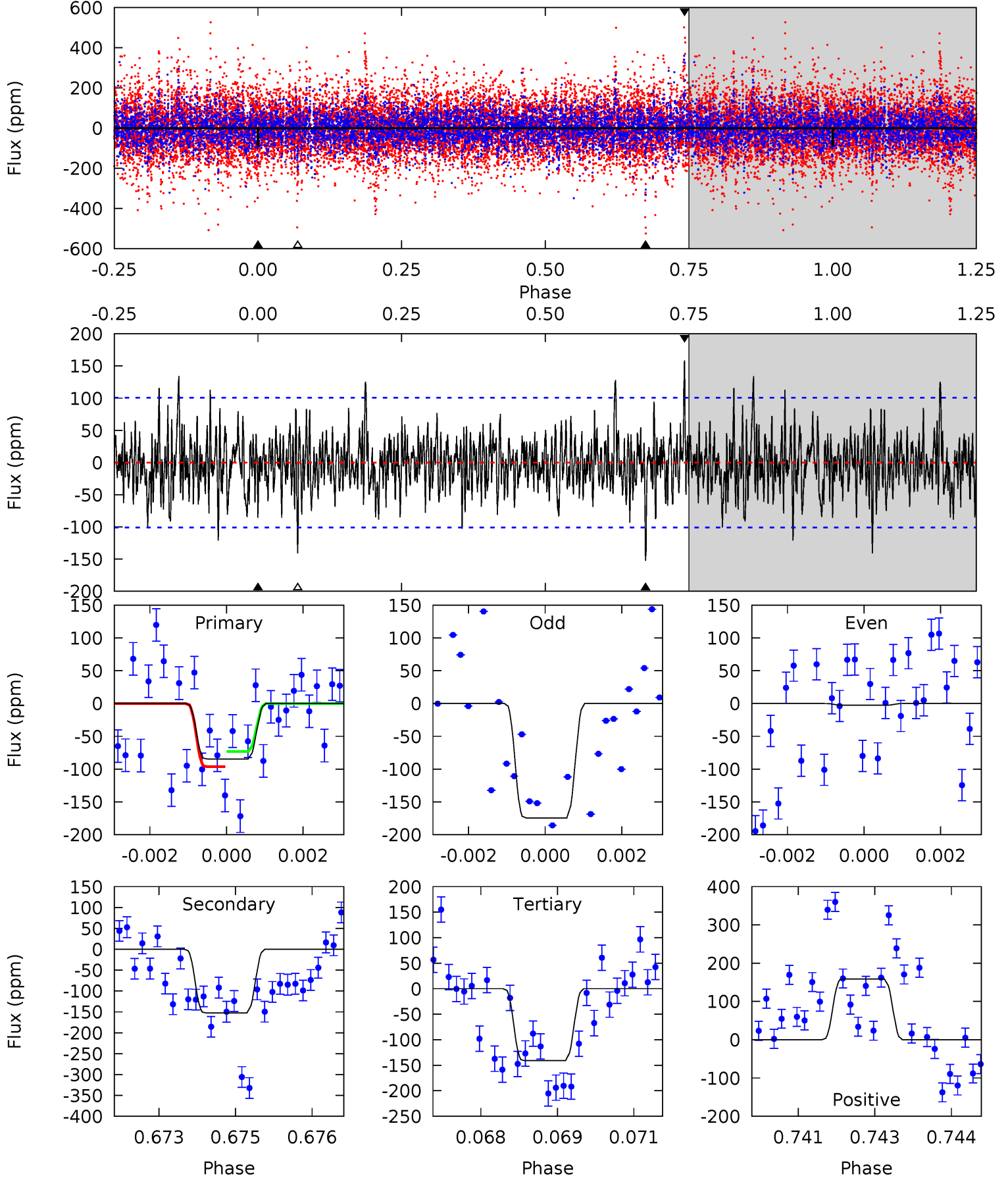
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.80	6.74	6.57	8.90	5.27	3.00	2.12	3.23	0.90	0.18	-2.16	1.81	0.46	0.48	0.41



# Alt Model-Shift Uniqueness Test

001722916-09, P = 105.726825 Days, E = 51.103616 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
4.50	8.10	7.50	8.43	5.36	3.15	1.86	-3.00	-3.93	0.61	-0.32	4.54	0.65	0.51	0.62



### Stellar Parameters For KIC 001722916

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6812^{+71}_{-91}$	$4.154^{+0.115}_{-0.115}$	$-0.180^{+0.150}_{-0.200}$	$1.604^{+0.262}_{-0.236}$	$1.347^{+0.088}_{-0.118}$	$0.460^{+0.237}_{-0.156}$
	+1%/-1%	+3%/-3%	+83%/-111%	+16%/-15%	+7%/-9%	+51%/-34%
Source	SPE68	SPE68	SPE68	DSEP		

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

### Secondary Eclipse Parameters for KIC 001722916-09 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-97 \pm 14$	$2.39^{+0.40}_{-0.34}$	$766^{+34}_{-32}$	$5786^{+381}_{-425}$	$2158^{+808}_{-642}$
Alt.	$-152 \pm 19$	$2.08^{+0.35}_{-0.34}$	$766^{+34}_{-33}$	$6957^{+675}_{-540}$	$4487^{+2043}_{-1305}$

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

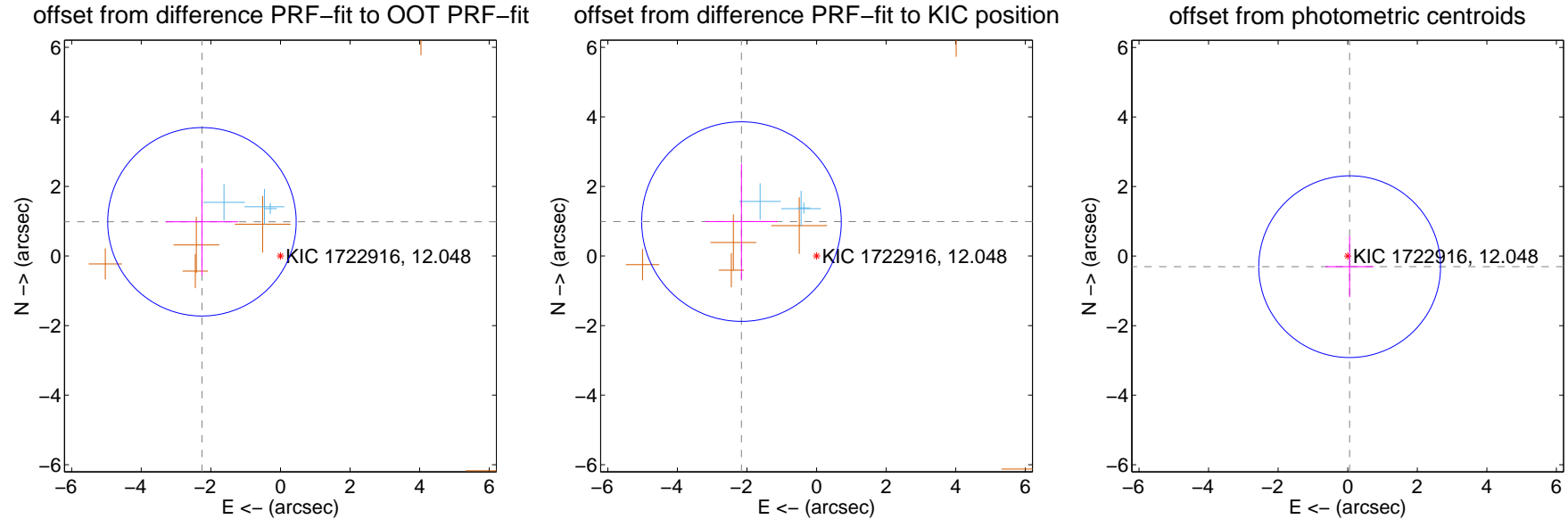
## DV Centroid Data

Supplemental centroid analysis for 001722916-09. Kepler magnitude: 12.05. Transit SNR 7.94

There are 3 quarters with good PRF difference image offsets

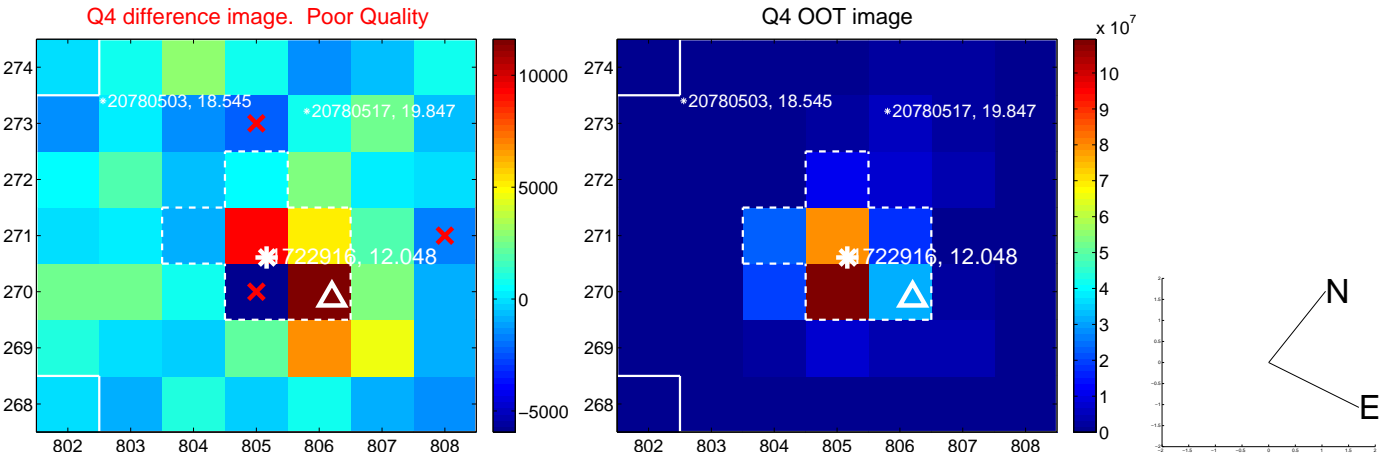
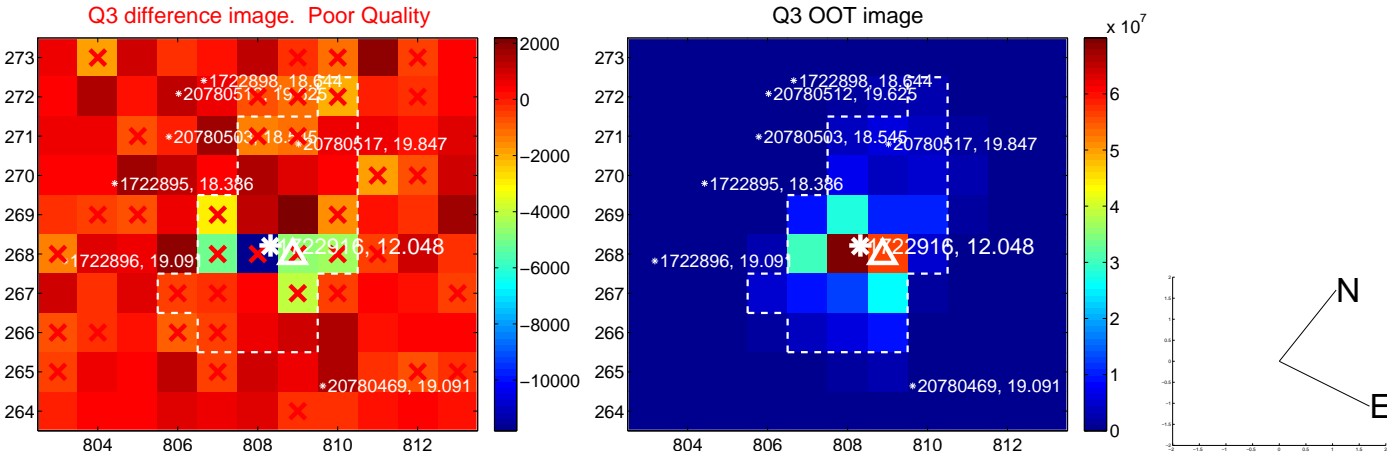
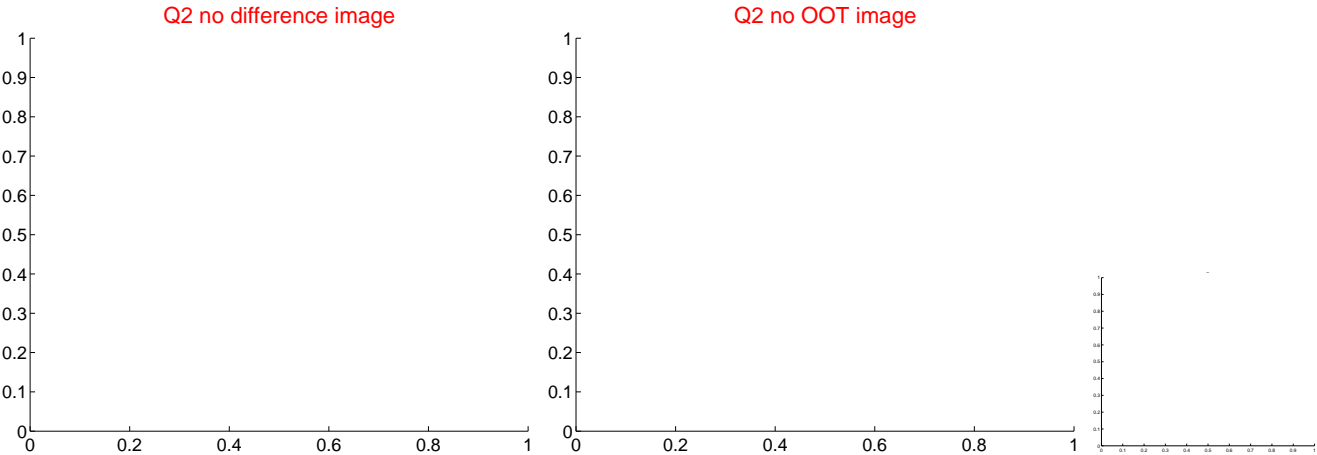
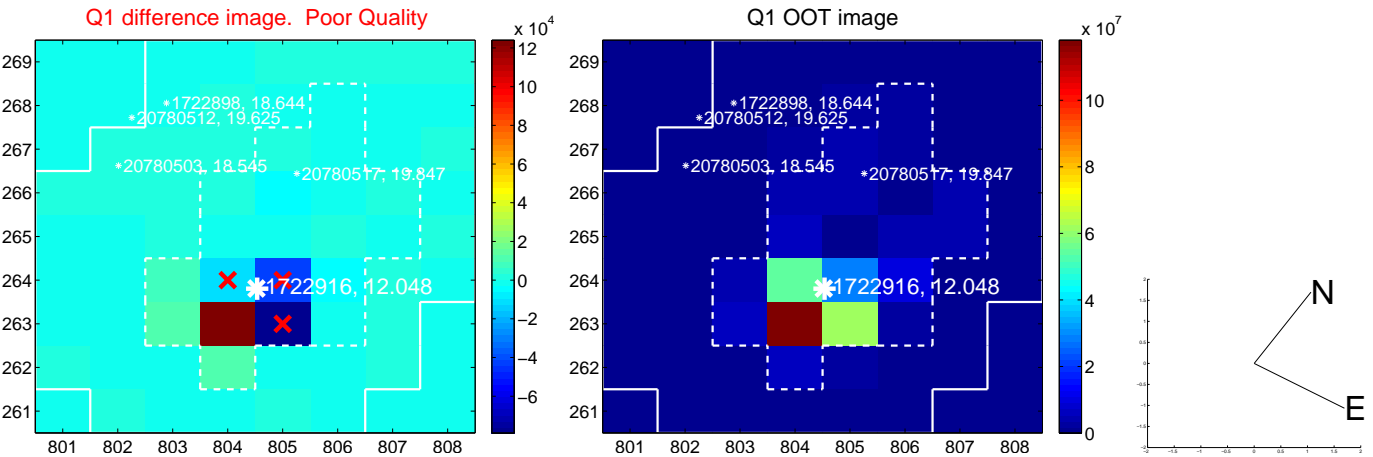
The direct PRF centroid is offset from the target star catalog position by about 0.03 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.462 \pm 0.903$	2.73	$2.256 \pm 1.037$	$0.984 \pm 1.538$
PRF-fit source offset from KIC position	$2.375 \pm 0.956$	2.48	$2.158 \pm 1.039$	$0.990 \pm 1.662$
photometric centroid source offset	$0.31 \pm 0.87$	0.35	$-0.06 \pm 0.69$	$-0.30 \pm 0.88$

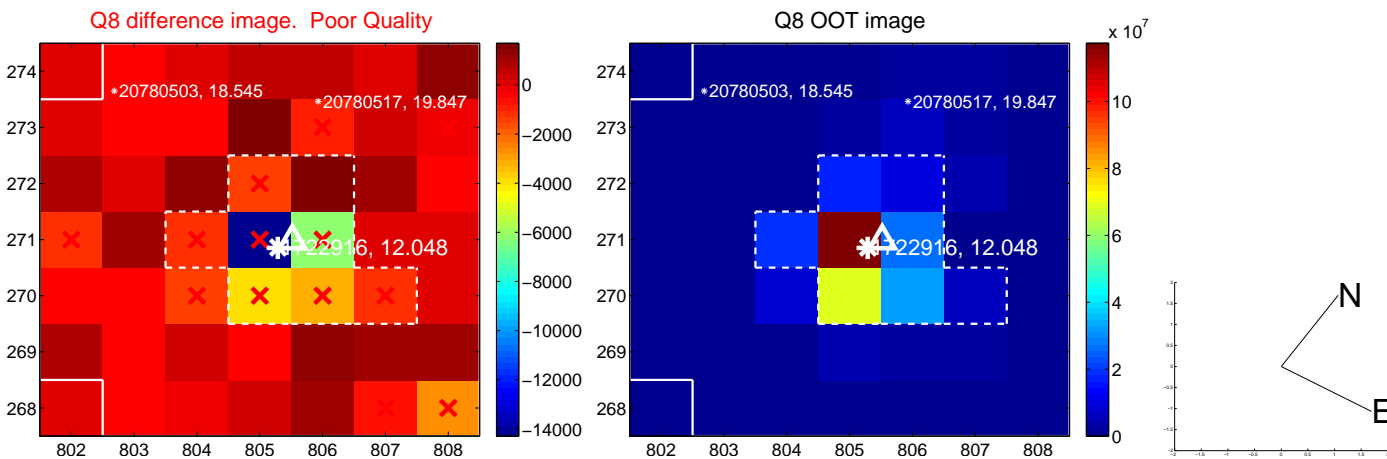
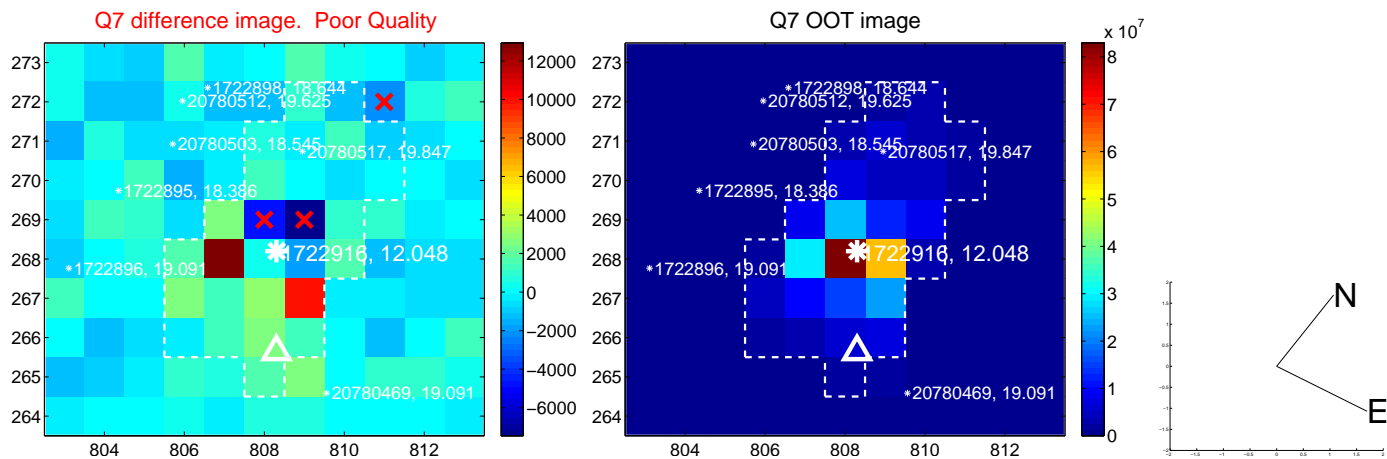
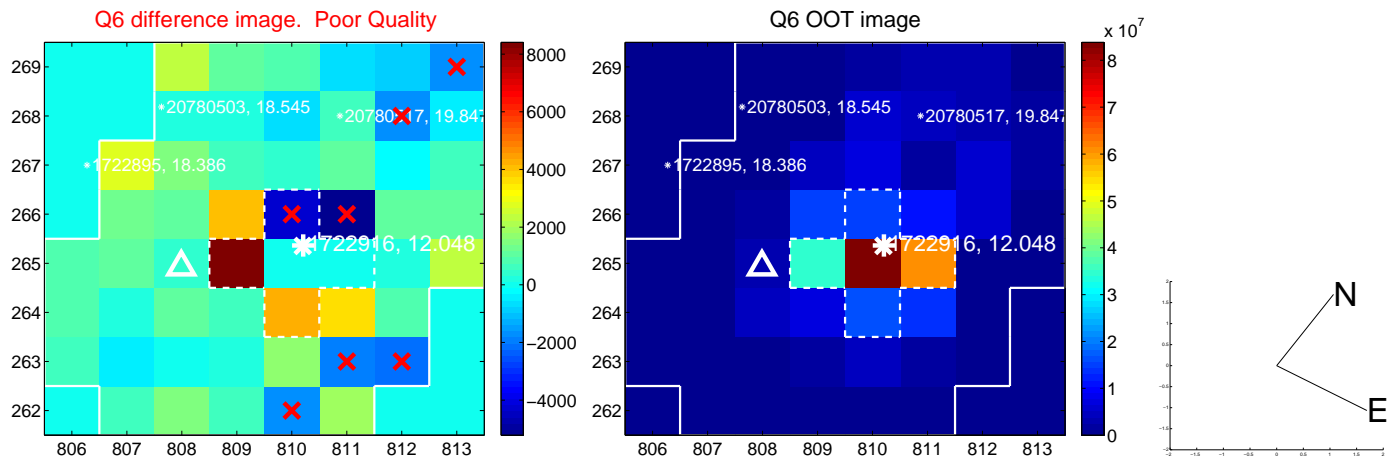
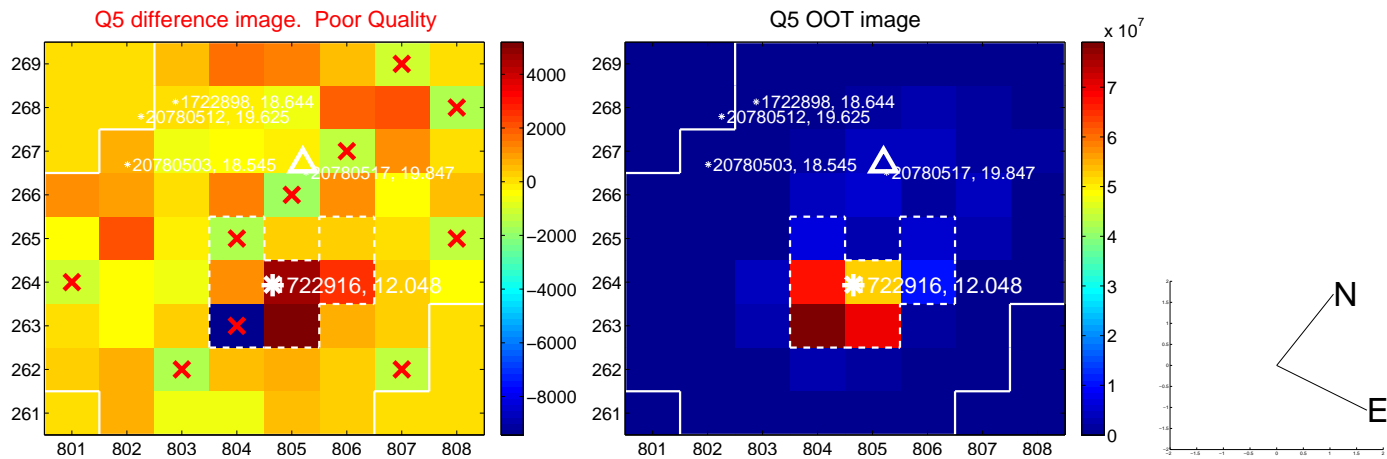


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

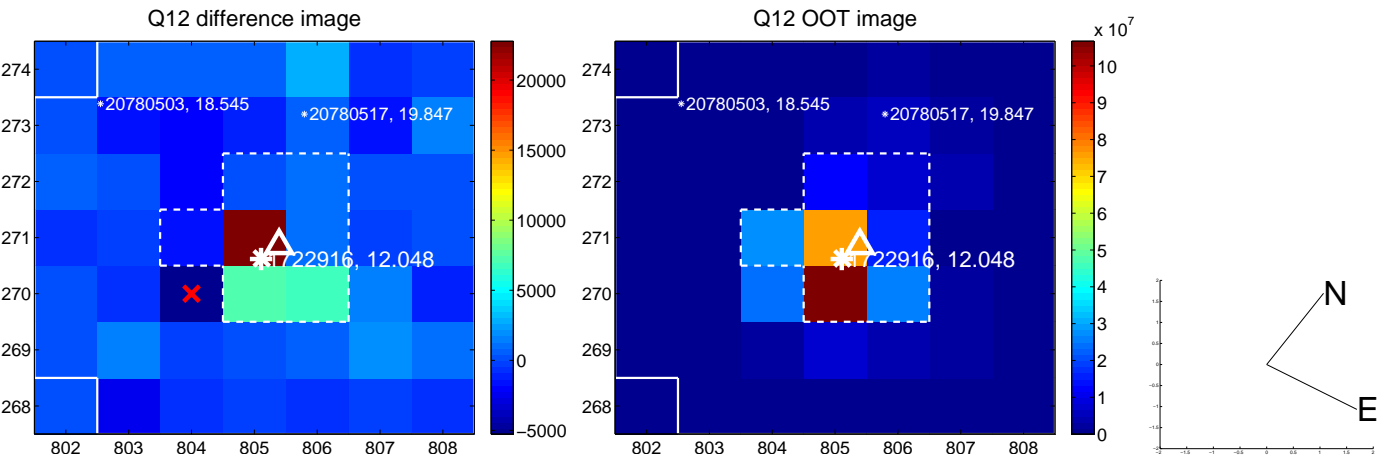
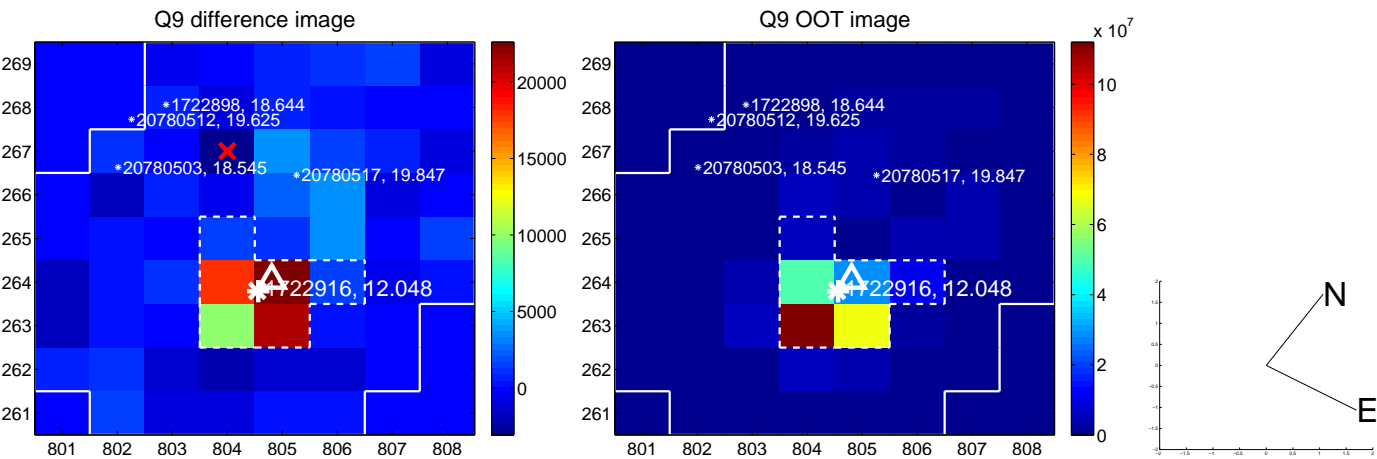


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



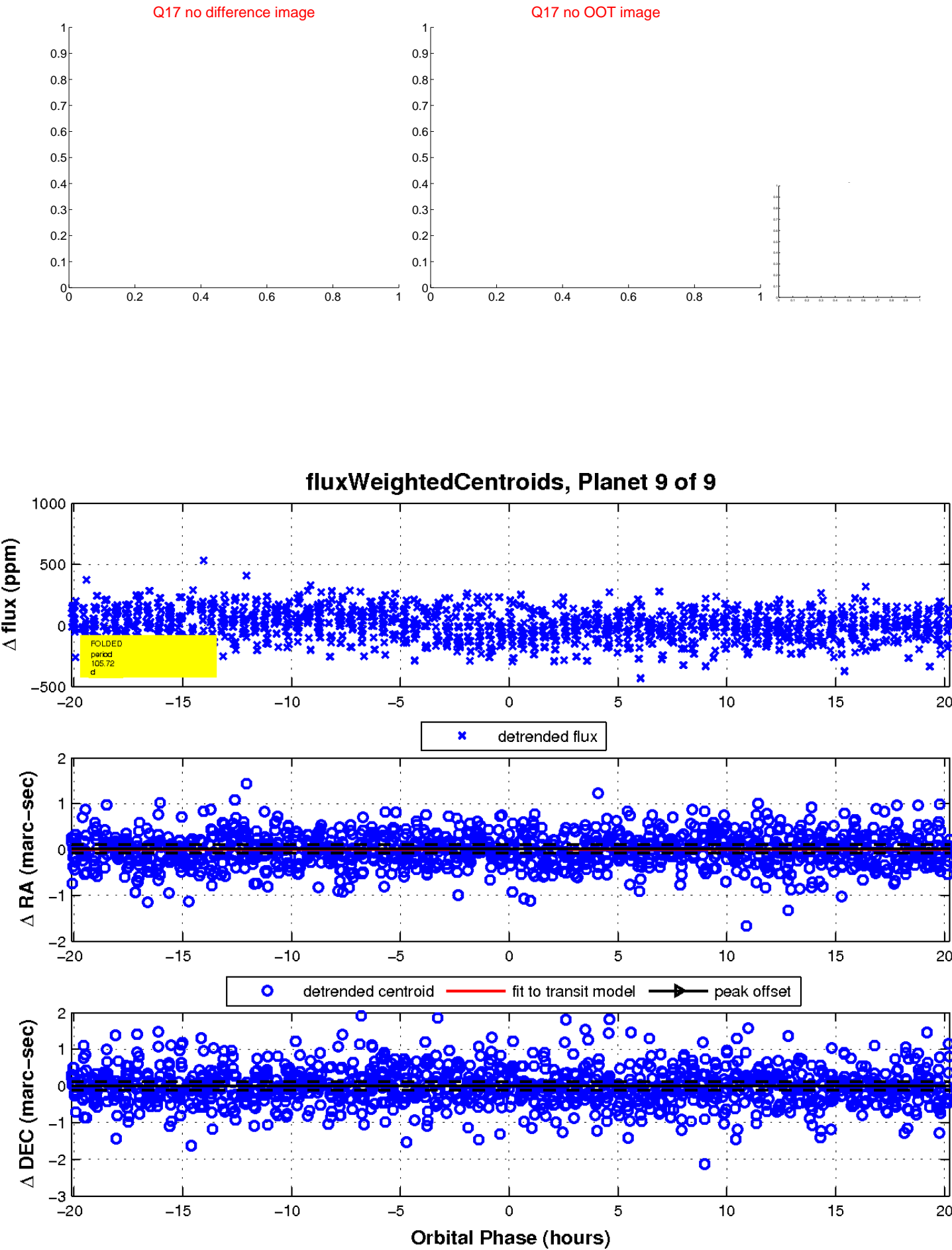


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





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



UKIRT Image

Declination

