

# KIC 010599245

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010599245-01	OBS	No	102.933504	203.234932	42.4	2.126	28.2	19.6	59.14	3951	51.05	2781.31
010599245-02	OBS	No	185.904559	141.996123	43.9	3.508	16.3	14.6	59.14	3951	47.53	1264.56
010599245-03	OBS	No	118.287967	183.981930	53.7	2.452	15.0	15.8	59.14	3951	59.89	2310.67
010599245-04	OBS	No	170.417068	169.518612	39.7	8.386	14.7	10.0	59.14	3951	43.03	1420.06
010599245-05	OBS	No	72.002790	174.339797	6.7	4.067	14.5	2.3	59.14	3951	19.66	4479.12
010599245-06	OBS	No	62.359596	145.890783	20.7	5.466	13.7	9.2	59.14	3951	33.90	5425.67
010599245-07	OBS	No	102.244200	227.599922	46.6	2.835	13.4	13.2	59.14	3951	52.19	2806.34
010599245-08	OBS	No	80.029016	143.655157	38.5	1.930	13.1	12.9	59.14	3951	45.51	3890.40

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010599245-01	OBS	FP	0.00	1	0	1	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—CENT_UNRESOLVED_OFFSET—HALO_GHOST
010599245-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE_ZUMA—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
010599245-03	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
010599245-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_MARSHALL_SKYE_ZUMA—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_UNRESOLVED_OFFSET
010599245-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
010599245-06	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
010599245-07	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_KIC_POS—CENT_UNCERTAIN
010599245-08	OBS	FP	0.00	1	0	0	0	LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_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.

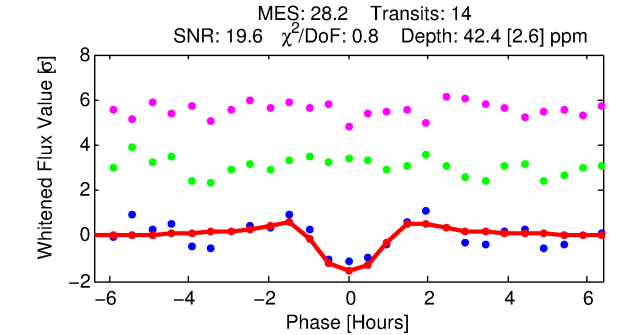
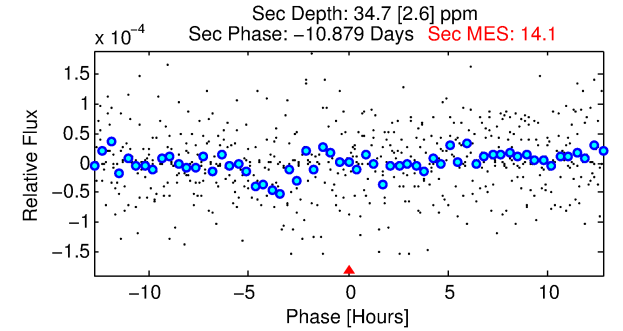
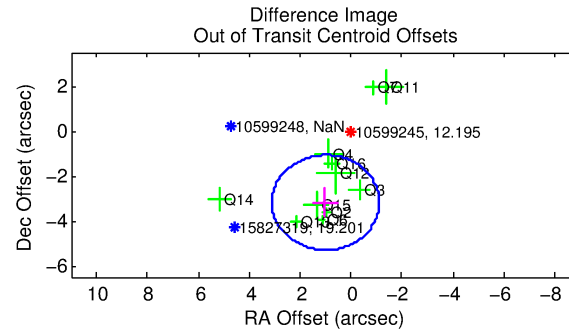
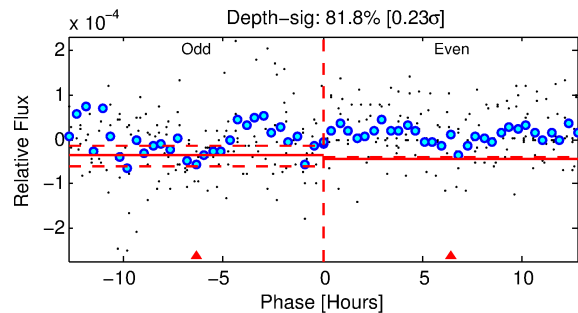
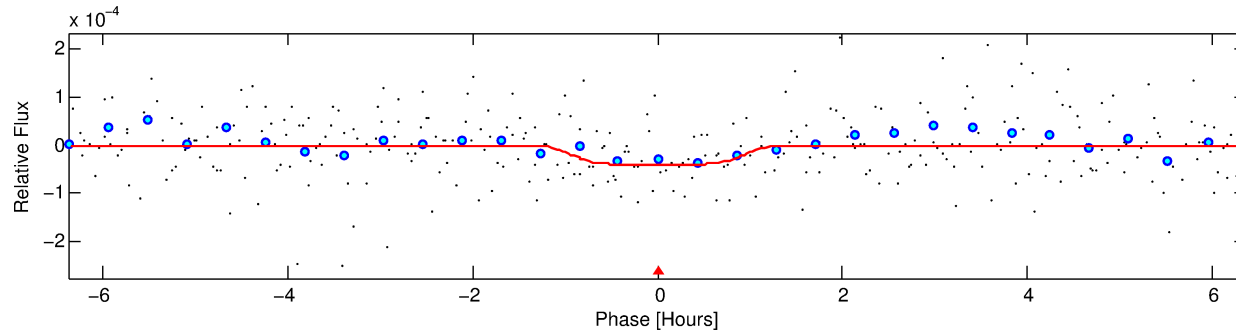
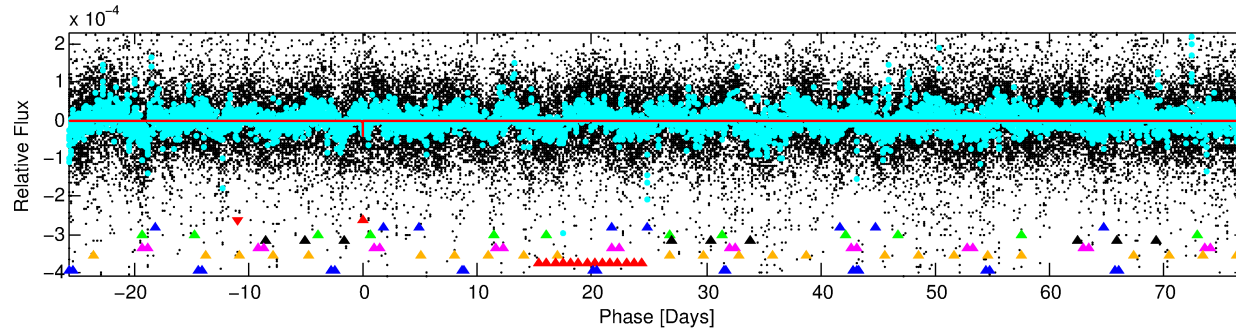
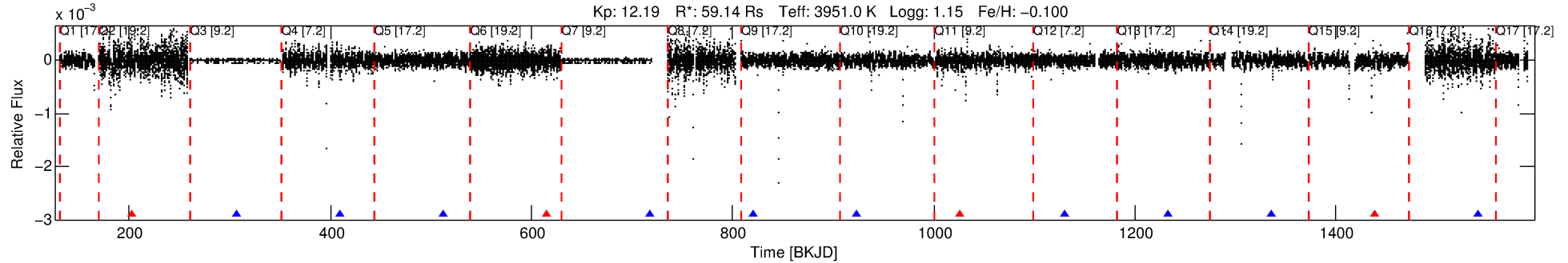
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 010599245-01

No Significant Match Found

# DV One-Page Summary

KIC: 10599245 Candidate: 1 of 8 Period: 102.934 d



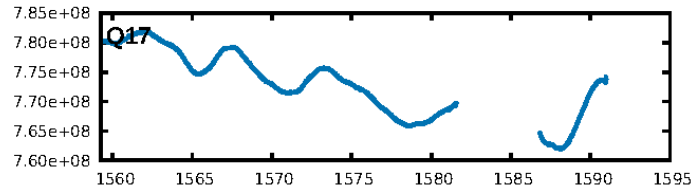
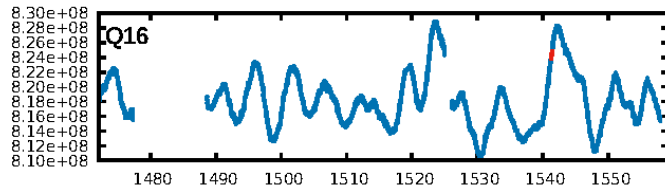
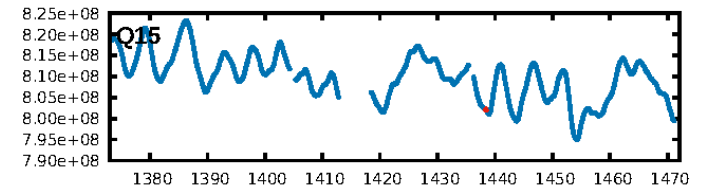
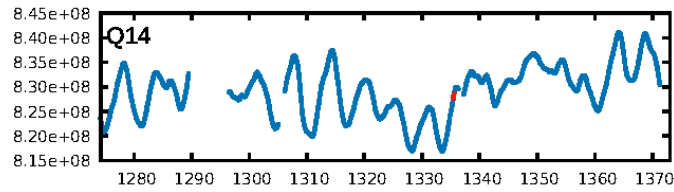
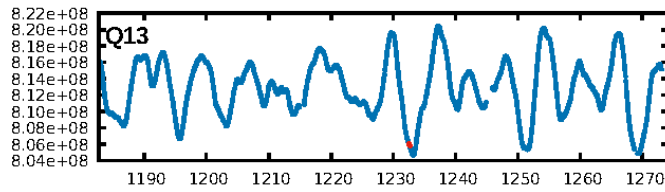
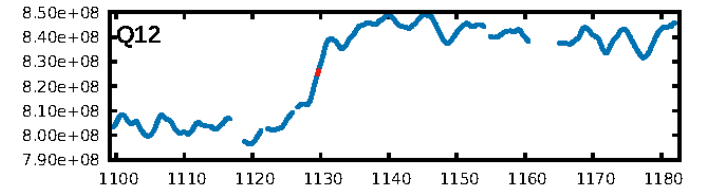
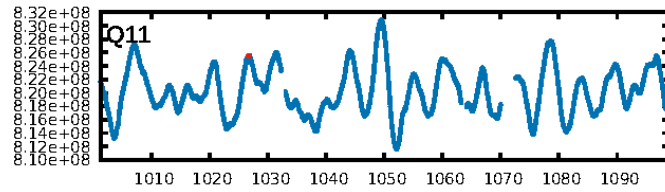
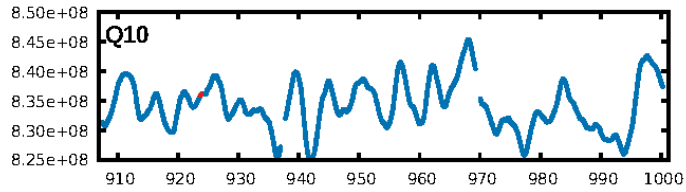
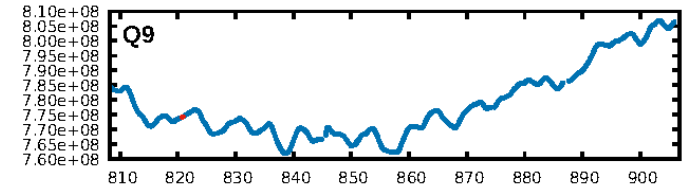
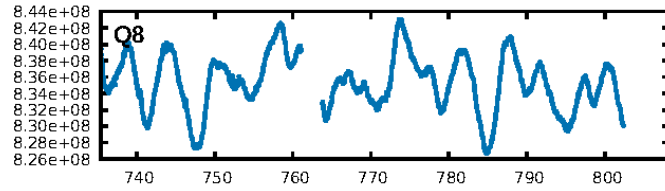
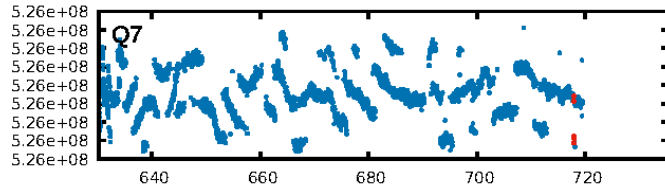
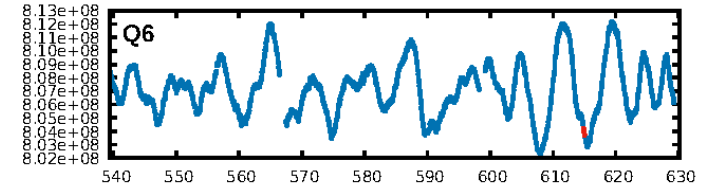
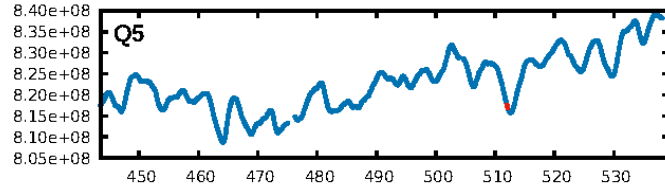
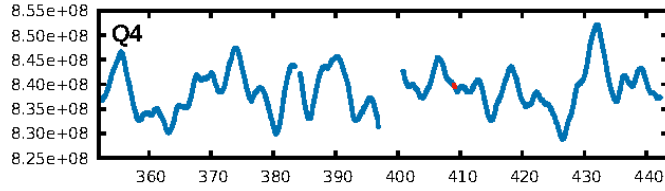
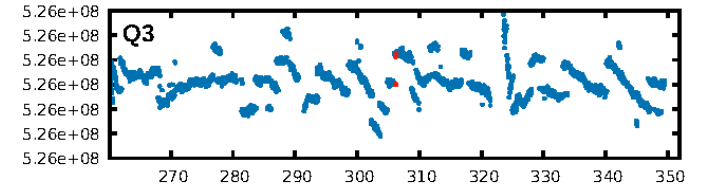
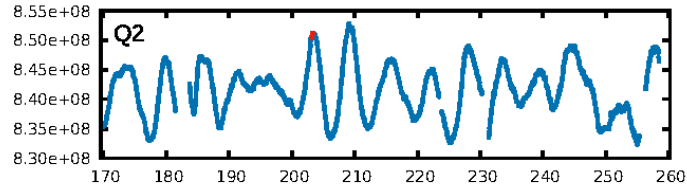
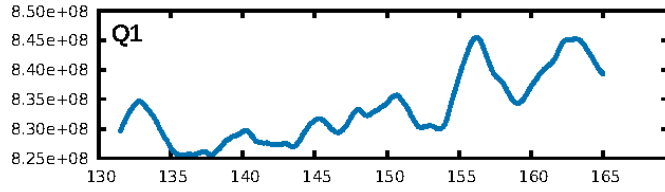
## DV Fit Results:

Period = 102.93350 [0.00065] d  
Epoch = 203.2349 [0.0026] BKJD  
Rp/R\* = 0.0079 [0.0048]  
a/R\* = 144.80 [299.18]  
b = 0.93 [0.32]  
Seff = 2781.31 [518.94]  
Teq = 1852 [86] K  
Rp = 51.05 [32.78] Re  
a = 0.5240 [0.0764] AU  
Ag = 2.01 [2.45] [0.41 $\sigma$ ]  
Teffp = 3408 [1037] K [1.50 $\sigma$ ]

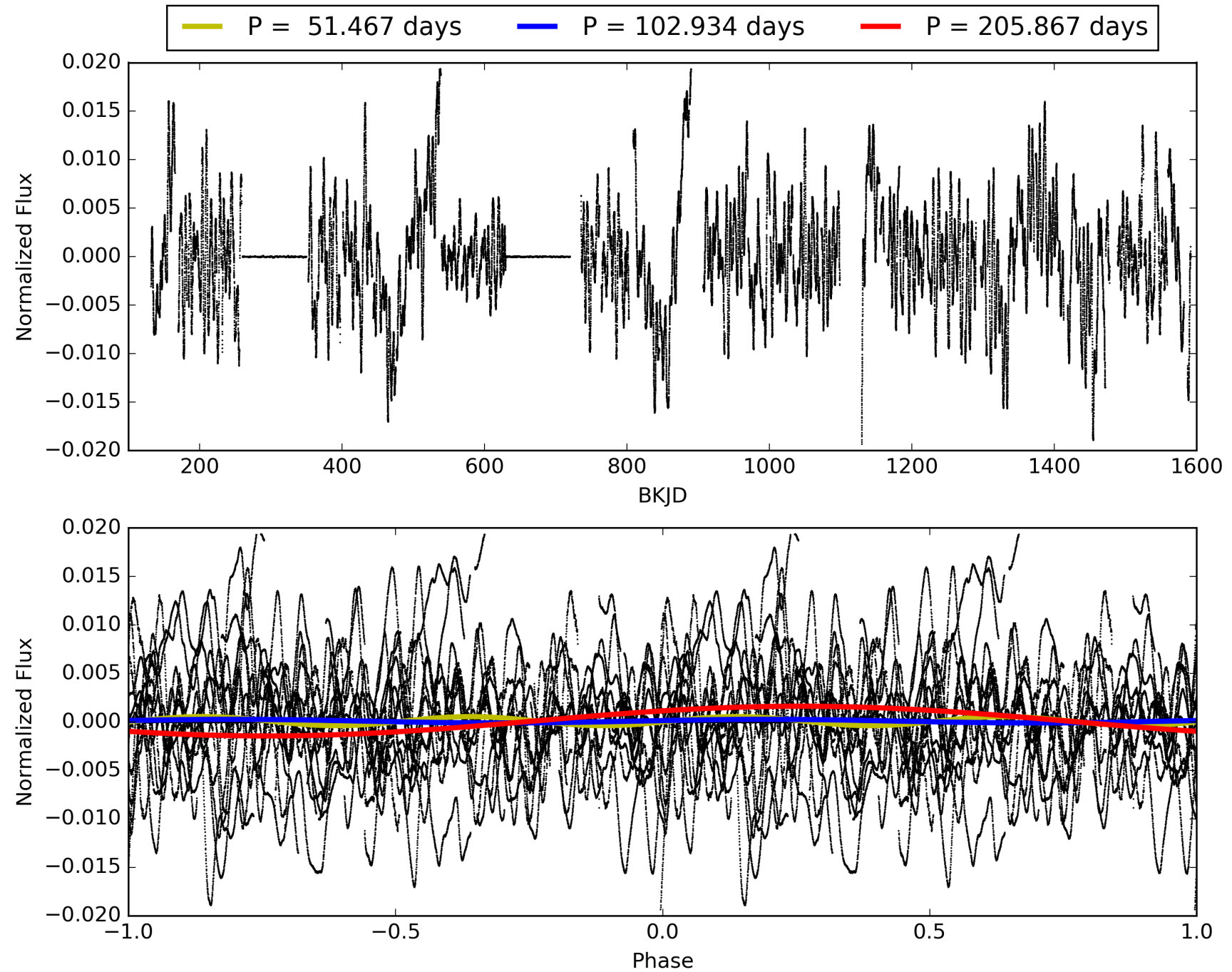
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [4.67 $\sigma$ ]  
LongPeriod-sig: 100.0% [113.54 $\sigma$ ]  
ModelChiSquare2-sig: 86.6%  
ModelChiSquareGof-sig: 99.9%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 0.71 [10/14]  
GhostDiagnostic-chr: 0.03486  
Centroid-sig: N/A  
Centroid-so: 0.447 arcsec [0.14 $\sigma$ ]  
OotOffset-rm: 3.344 arcsec [4.75 $\sigma$ ]  
KicOffset-rm: 3.373 arcsec [4.06 $\sigma$ ]  
OotOffset-st: 3/4/3/1 [11]  
KicOffset-st: 3/4/3/1 [11]  
DiffImageQuality-fgm: 0.55 [6/11]  
DiffImageOverlap-fno: 1.00 [14/14]

# TCE 010599245-01, PDC Light Curves



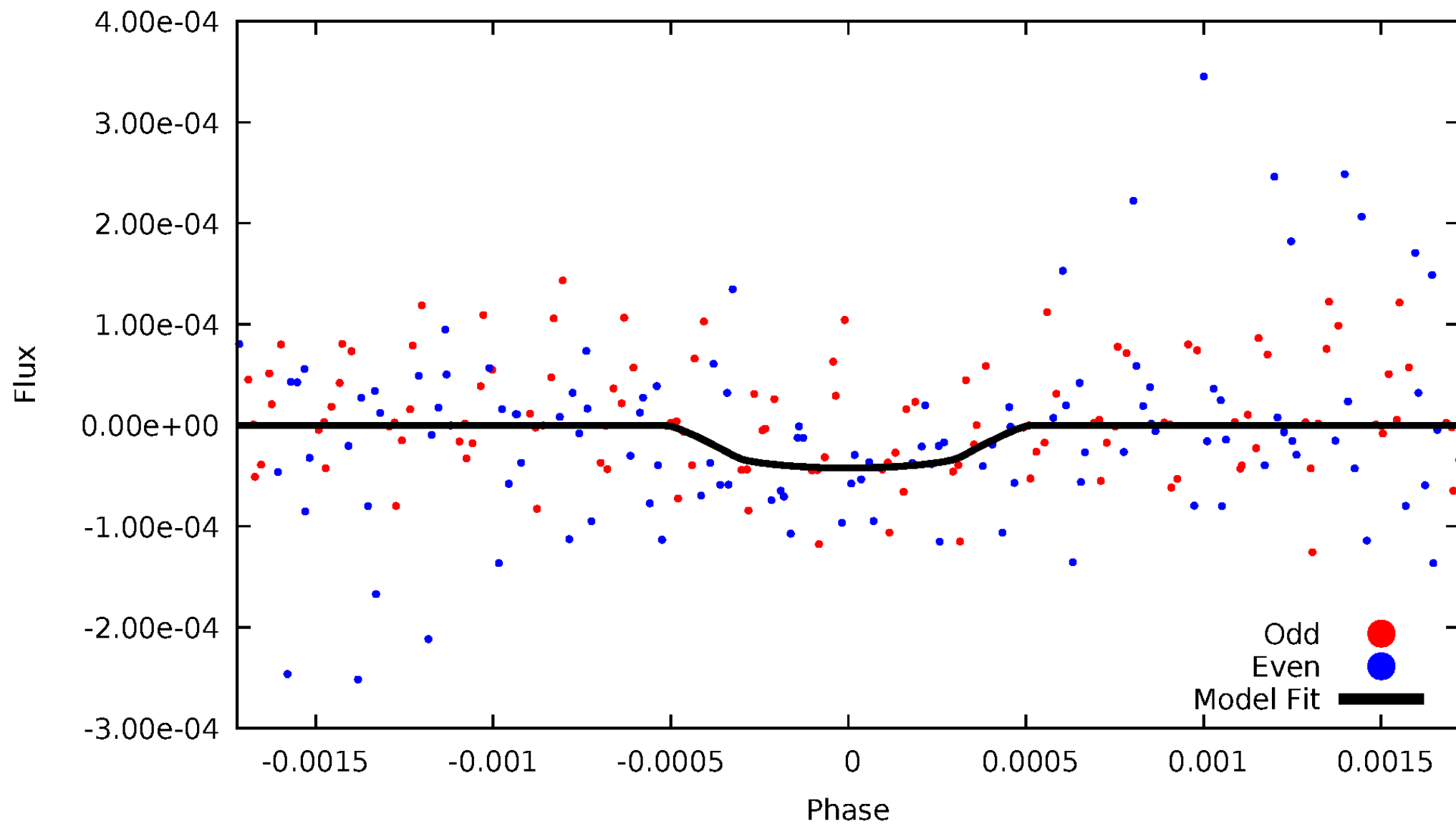
# TCE 010599245-01





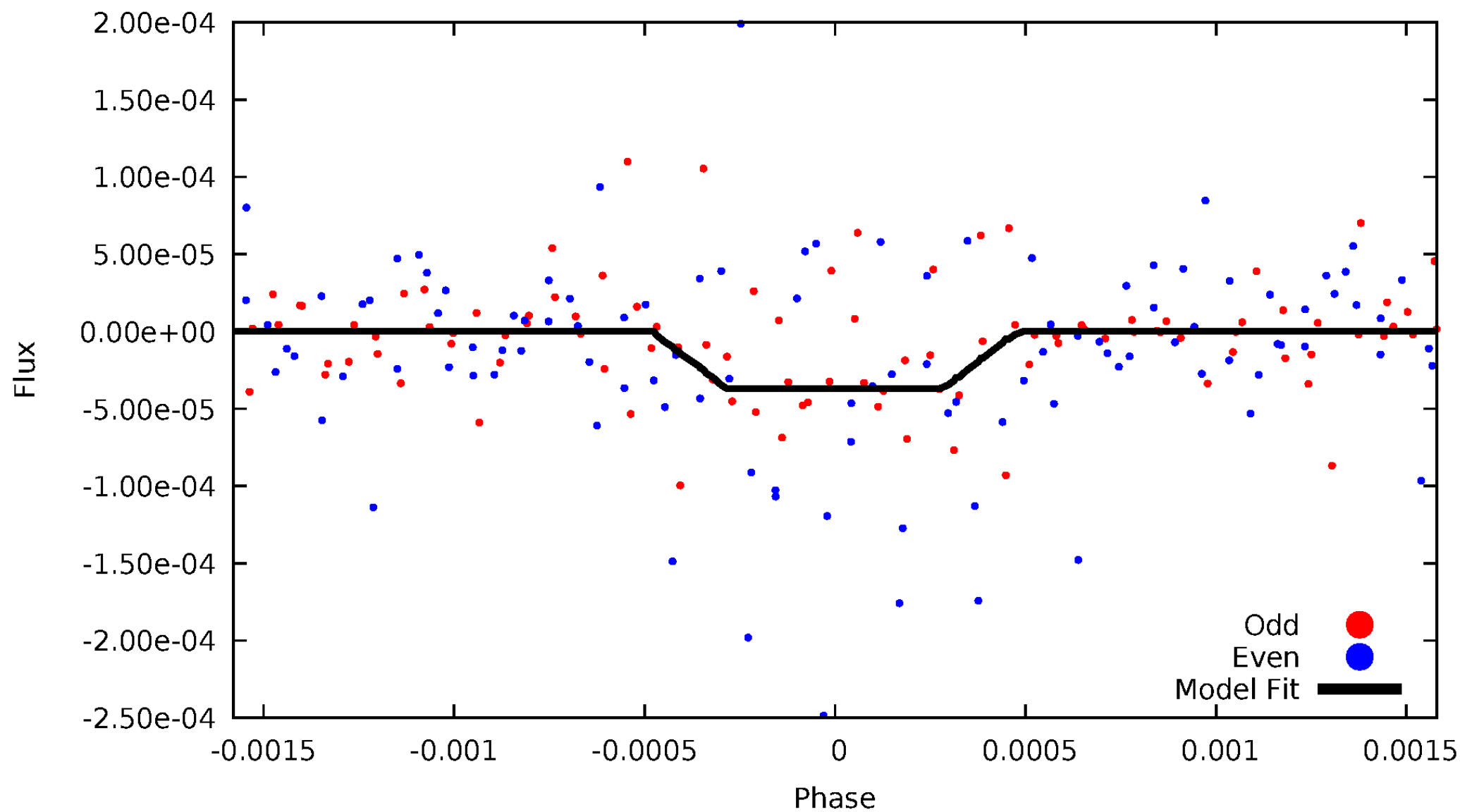
# DV Odd/Even

TCE 010599245-01



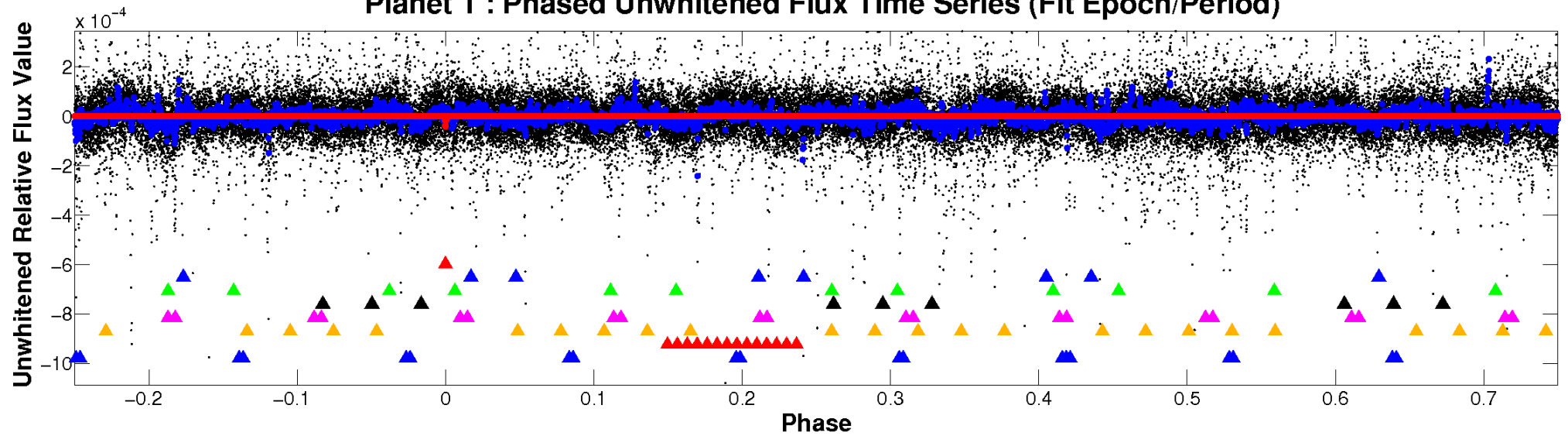
# ALT Odd/Even

TCE 010599245-01

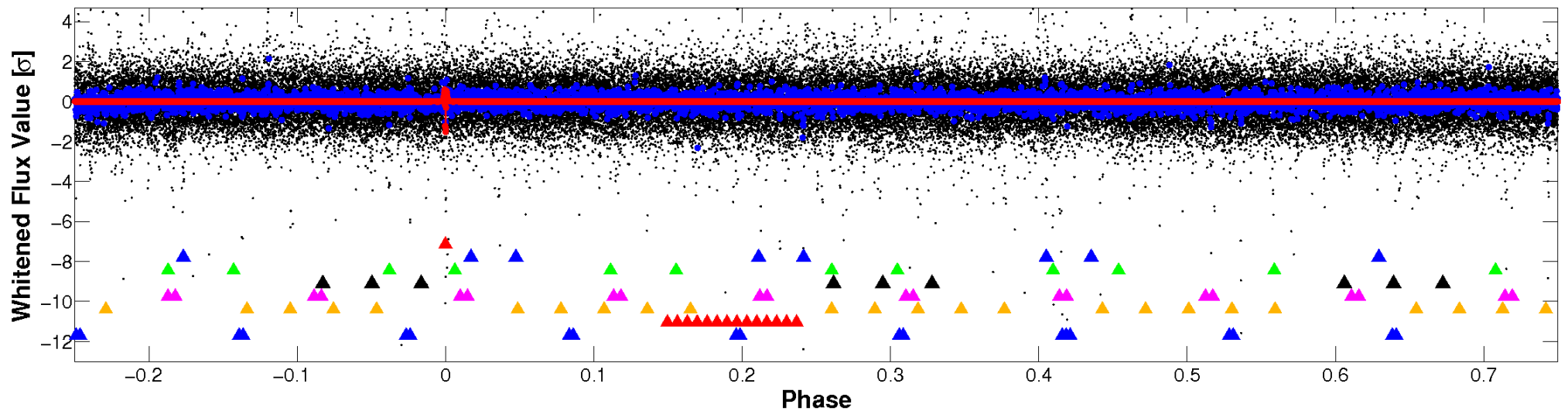


# Non-Whitened Vs. Whitened Light Curve

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

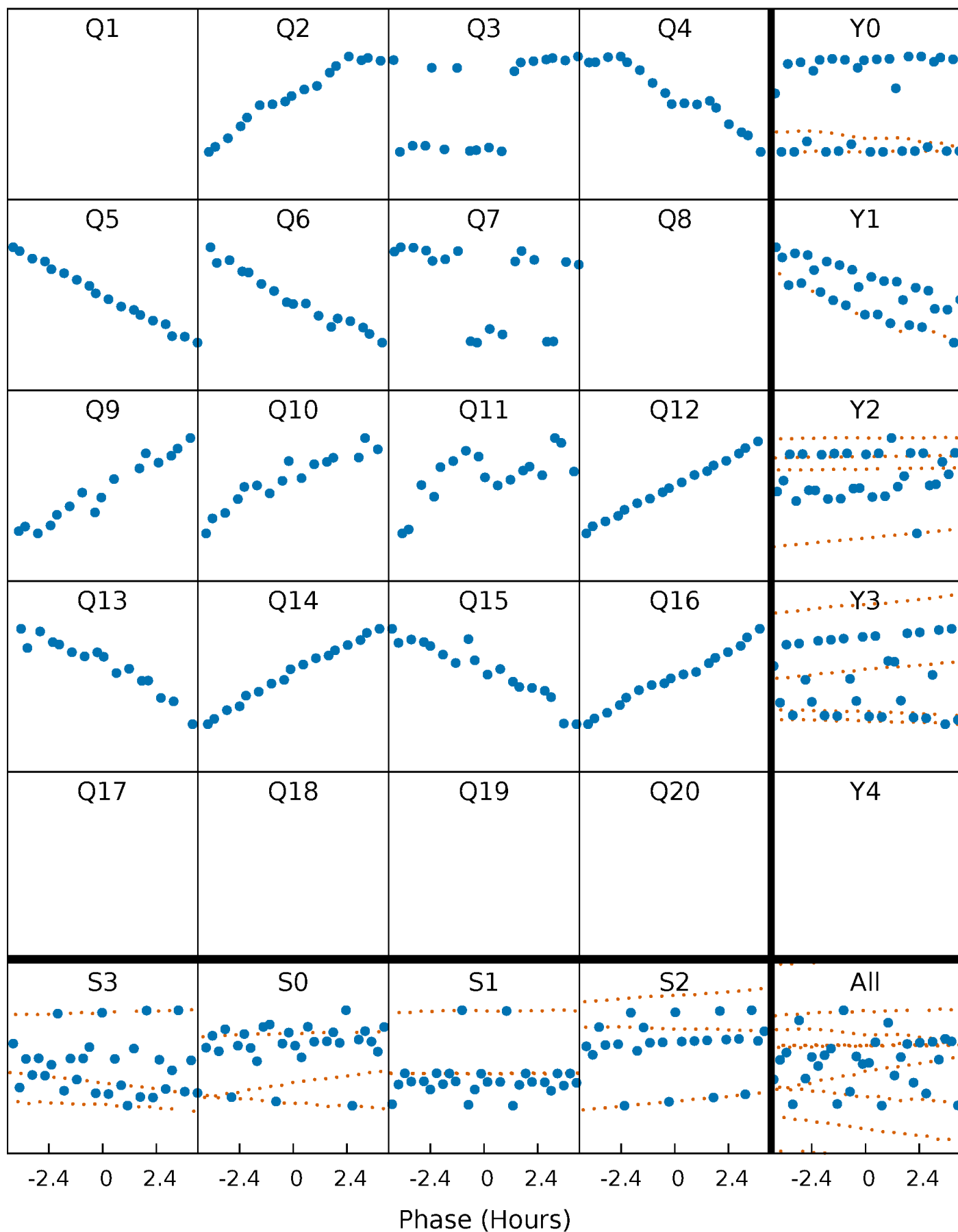


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



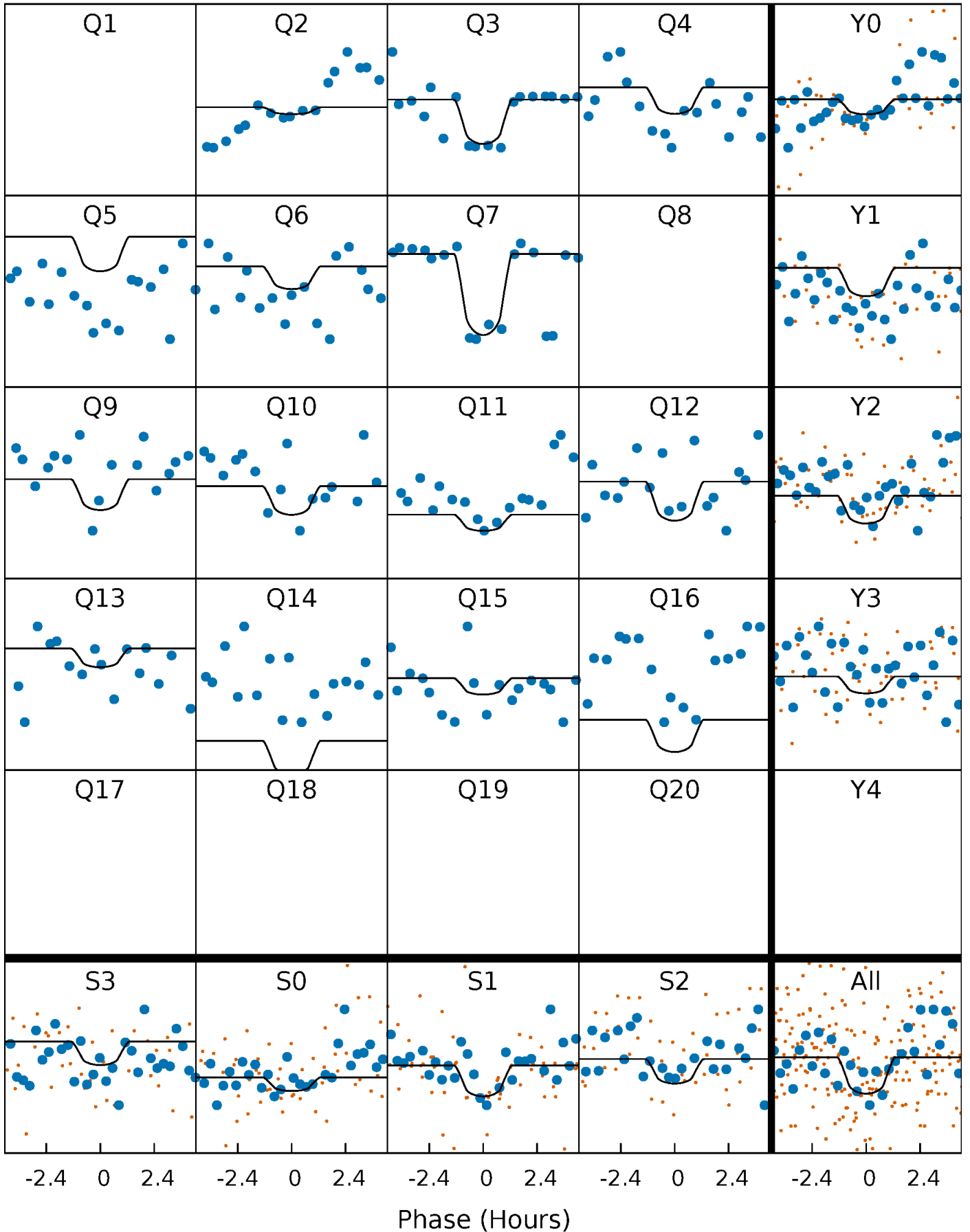
# PDC Quarter-Phased Transit Curves

TCE 010599245-01 P=102.933504 Days  $T_0=203.234932$  (BKJD)



# DV Quarter-Phased Transit Curves

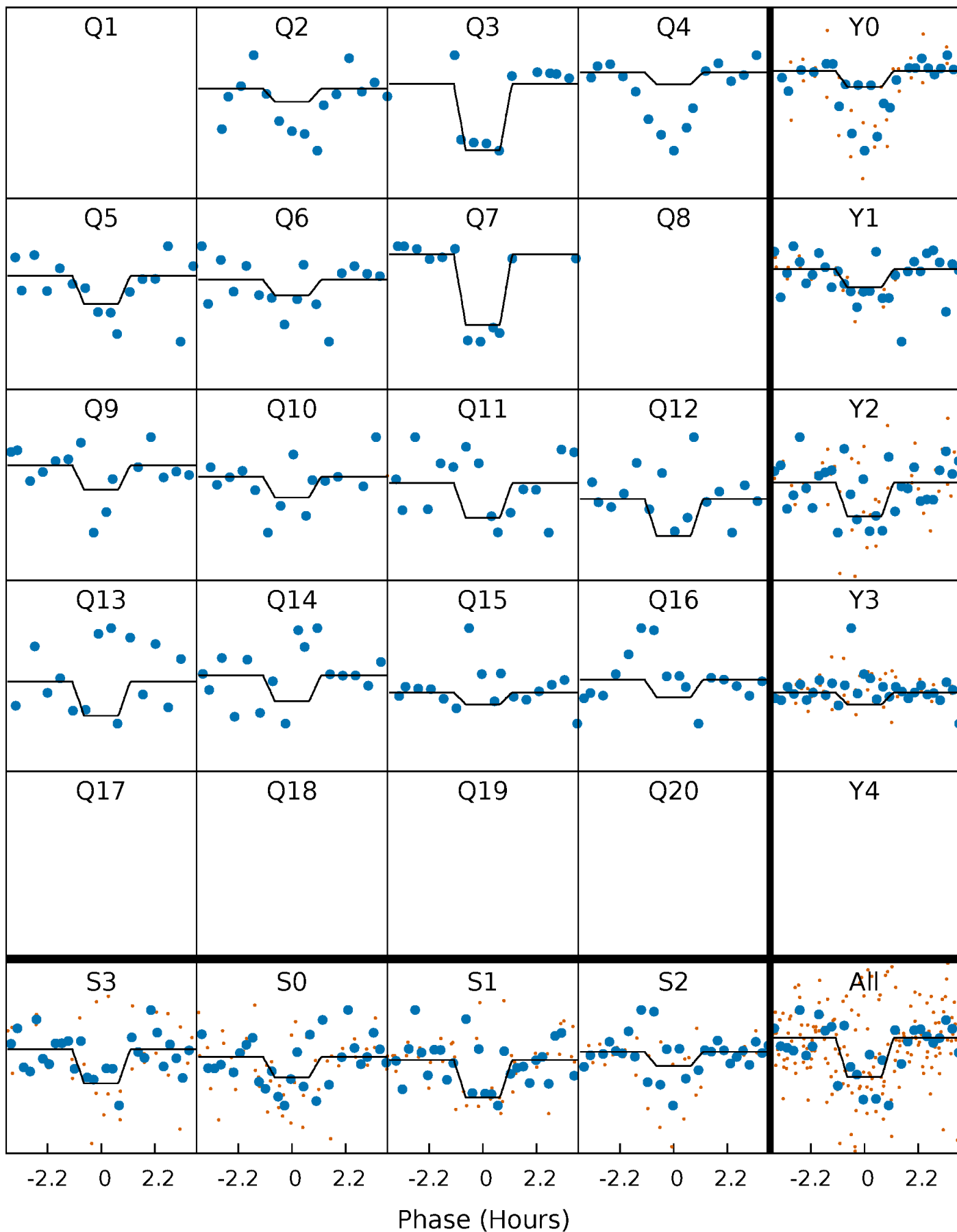
TCE 010599245-01 P=102.933504 Days  $T_0=203.234932$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

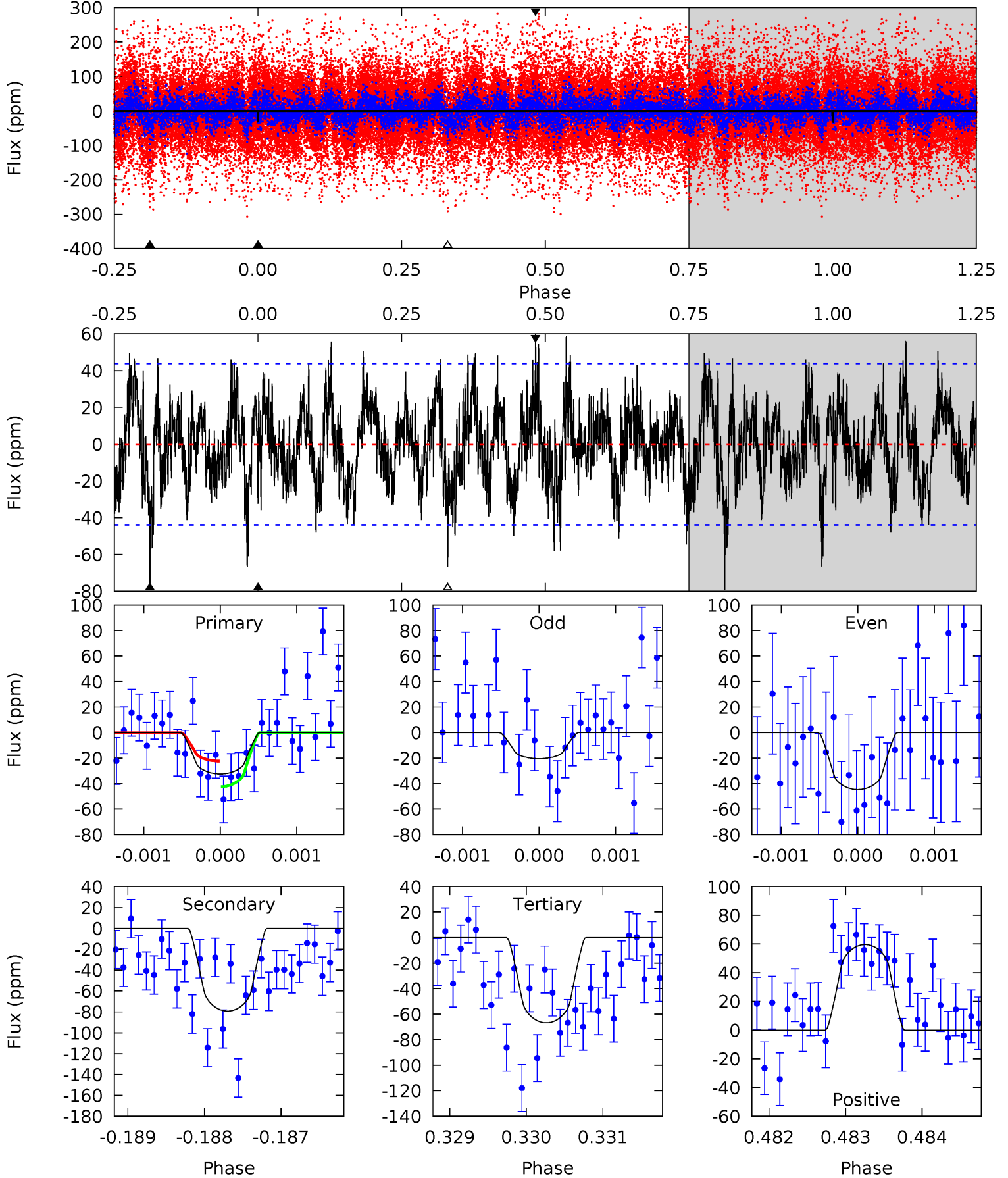
TCE 010599245-01 P=102.932582 Days  $T_0=203.237945$  (BKJD)



# DV Model-Shift Uniqueness Test

010599245-01, P = 102.933504 Days, E = 100.301428 Days

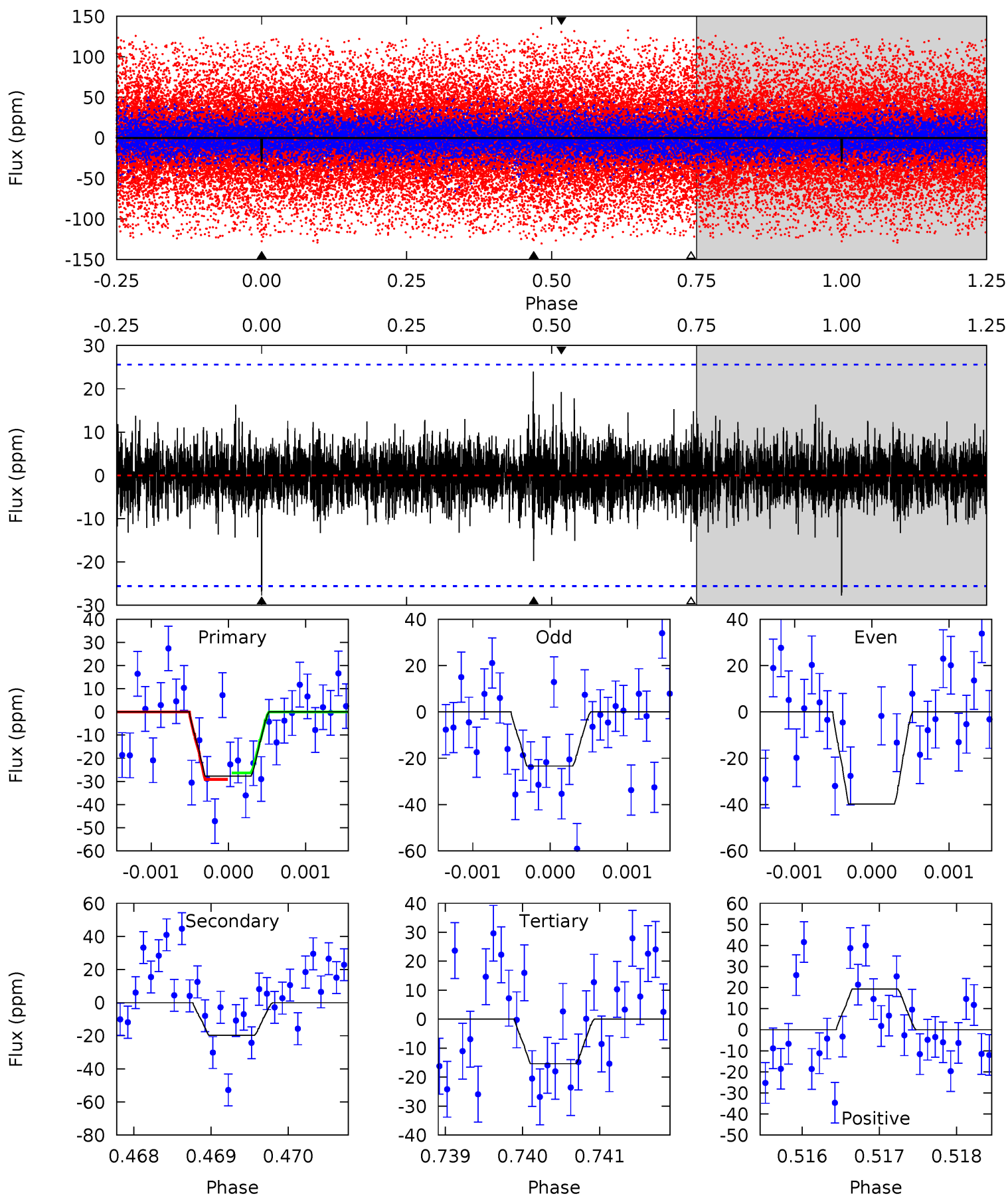
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
4.02	9.84	8.30	7.41	5.45	3.29	2.39	-4.28	-3.39	1.55	2.43	1.48	1.02	0.43	1.26



# Alt Model-Shift Uniqueness Test

010599245-01, P = 102.932582 Days, E = 100.305363 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.93	4.21	3.28	4.11	5.46	3.31	0.92	2.65	1.81	0.93	0.09	1.77	0.99	0.46	0.30



### Stellar Parameters For KIC 010599245

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$3951^{+79}_{-108}$	$1.152^{+0.030}_{-0.030}$	$-0.100^{+0.200}_{-0.250}$	$59.143^{+2.129}_{-12.775}$	$1.811^{+0.036}_{-0.688}$	$0.000^{+0.000}_{-0.000}$
	+2%/-3%	+3%/-3%	+200%/-250%	+4%/-22%	+2%/-38%	+30%/-8%
Source	PHO54	AST54	PHO54	DSEP		

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

### Secondary Eclipse Parameters for KIC 010599245-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-79 \pm 8$	$53.65^{+30.49}_{-30.08}$	$2585^{+67}_{-78}$	$3993^{+1535}_{-645}$	$4.181^{+16.230}_{-2.519}$
Alt.	$-20 \pm 5$	$41.94^{+28.79}_{-25.49}$	$2589^{+64}_{-78}$	$3359^{+1488}_{-720}$	$1.680^{+9.547}_{-1.140}$

$T_{\text{max}}$  = 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

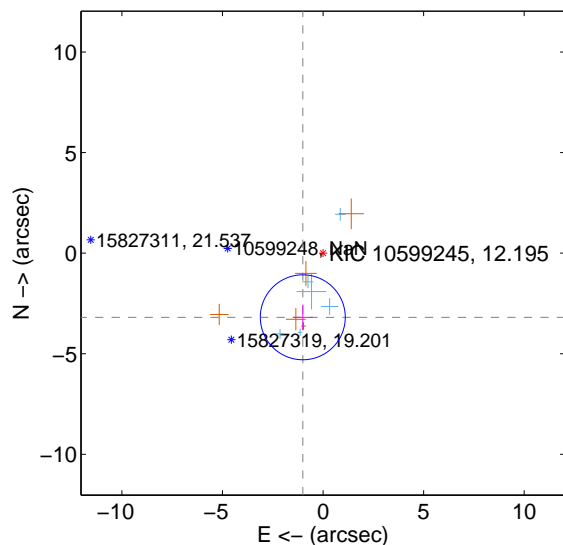
Supplemental centroid analysis for 010599245-01. Kepler magnitude: 12.20. Transit SNR 19.64

There are 6 quarters with good PRF difference image offsets

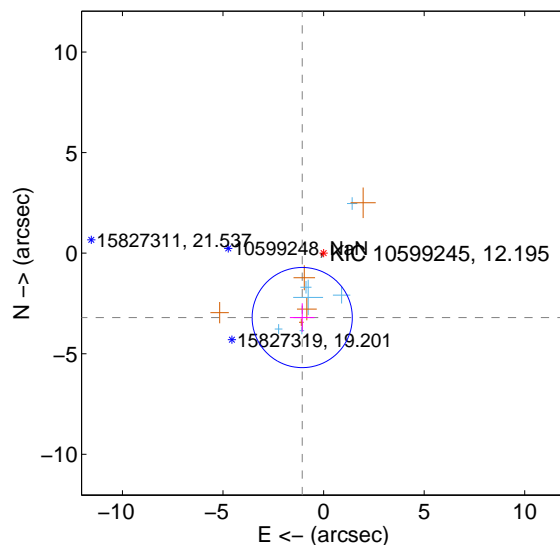
The direct PRF centroid is offset from the target star catalog position by about 0.30 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$3.344 \pm 0.704$	$4.75$	$1.007 \pm 0.501$	$-3.189 \pm 0.632$
PRF-fit source offset from KIC position	$3.373 \pm 0.830$	$4.06$	$1.062 \pm 0.612$	$-3.201 \pm 0.710$
photometric centroid source offset	$0.45 \pm 3.19$	0.14	$0.21 \pm 2.41$	$0.39 \pm 3.38$

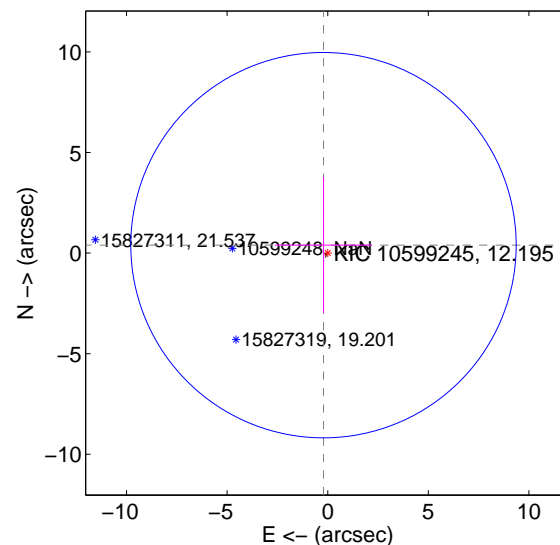
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



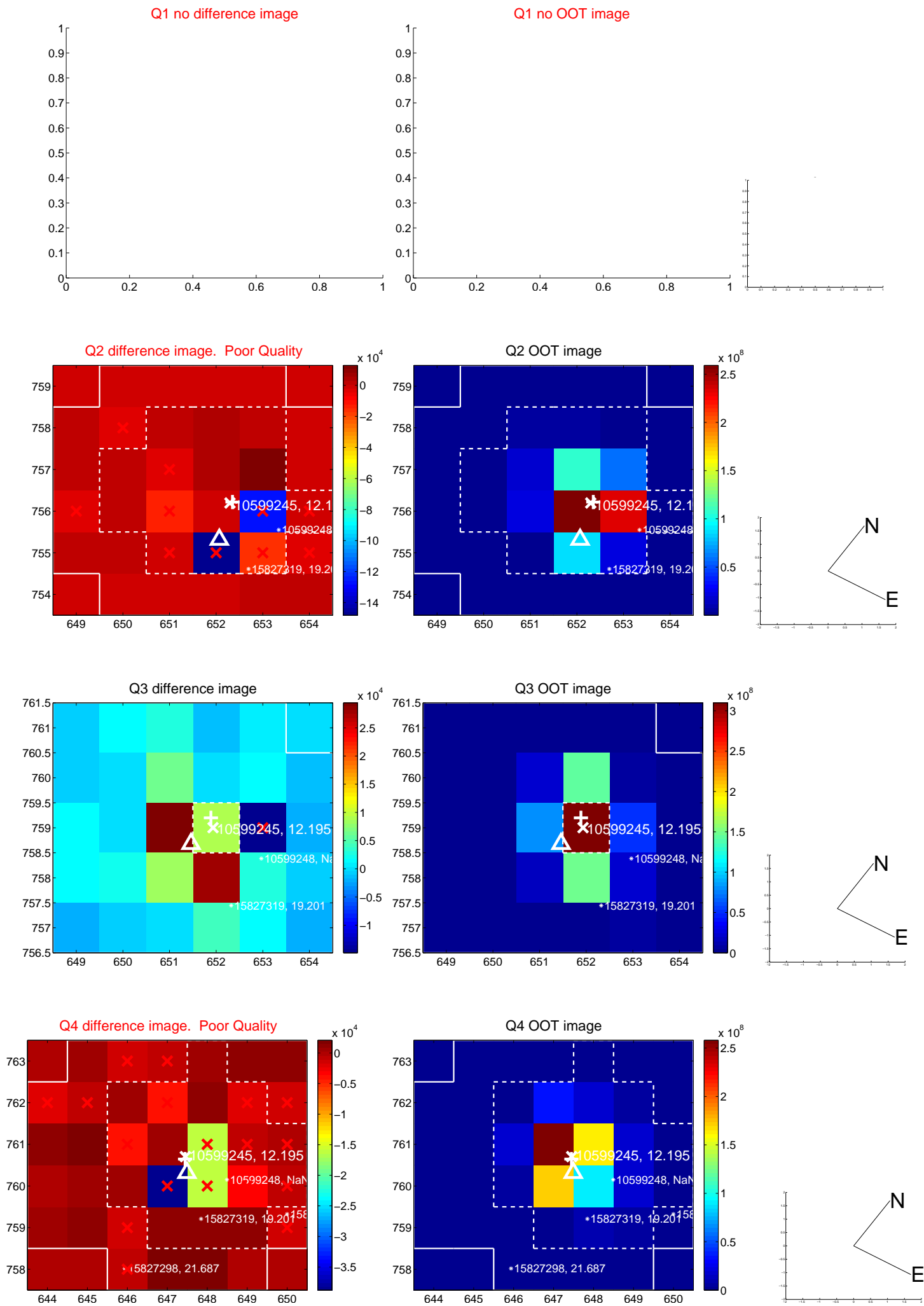
offset from photometric centroids



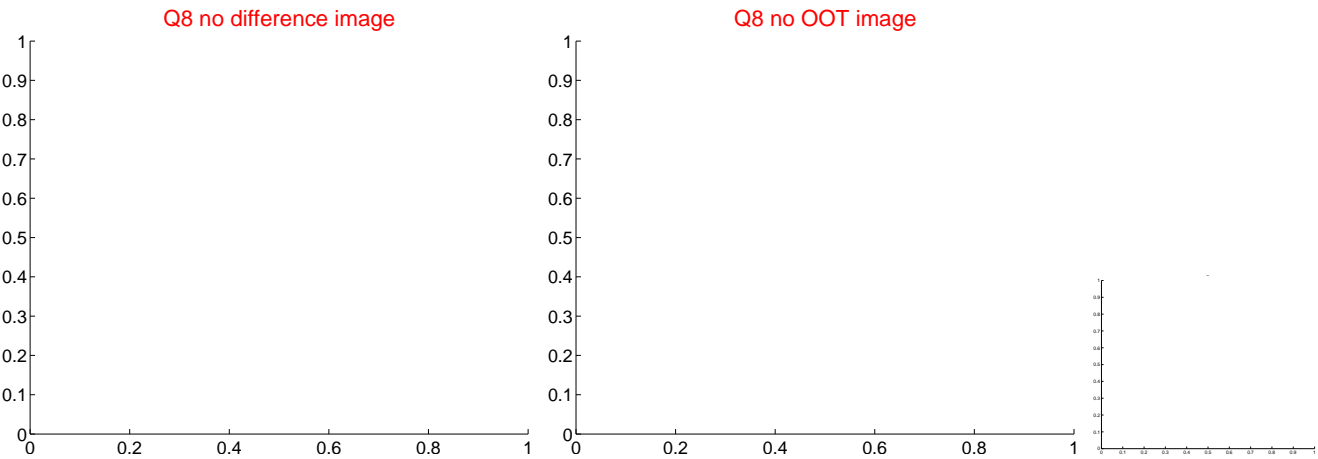
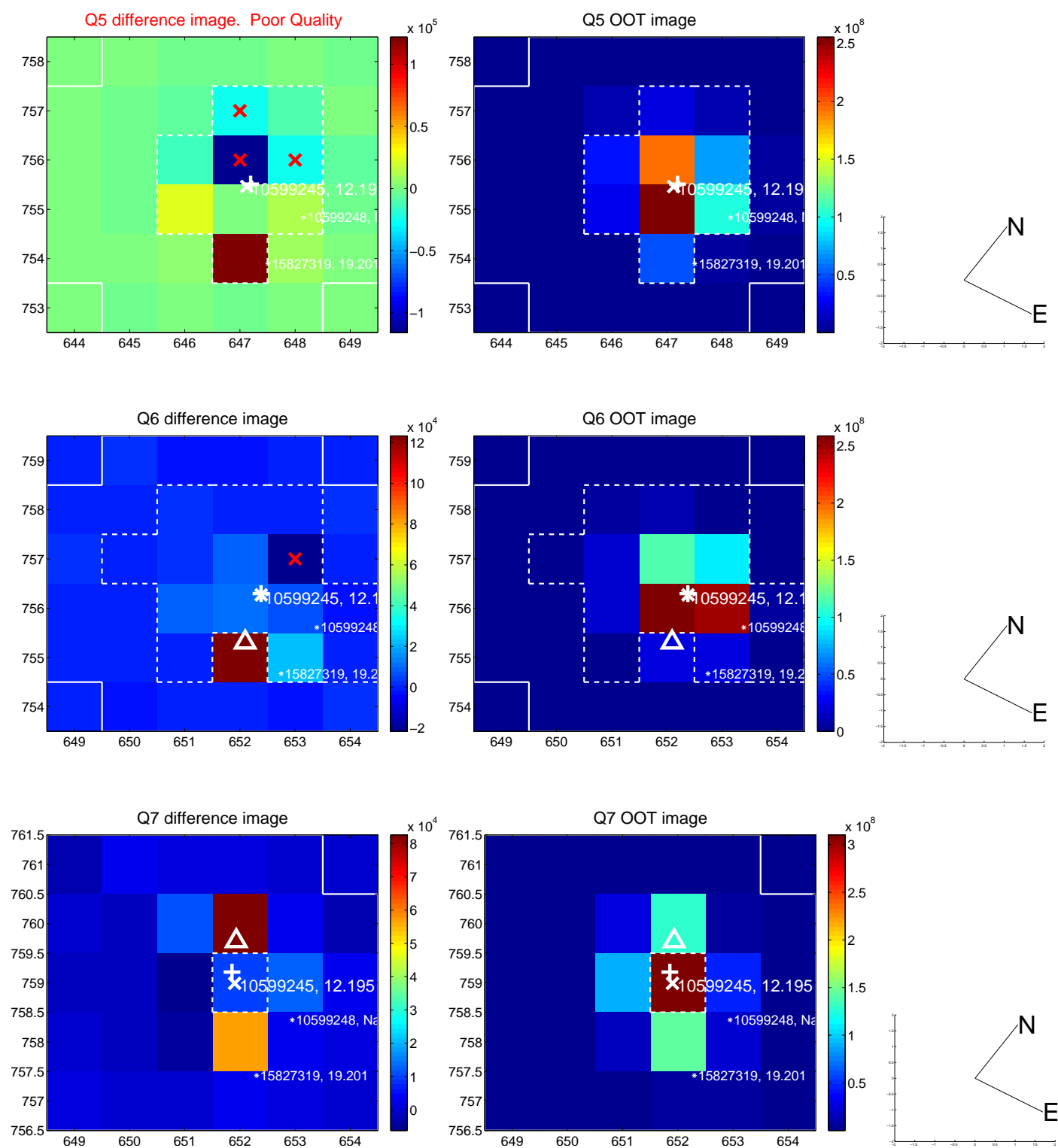
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



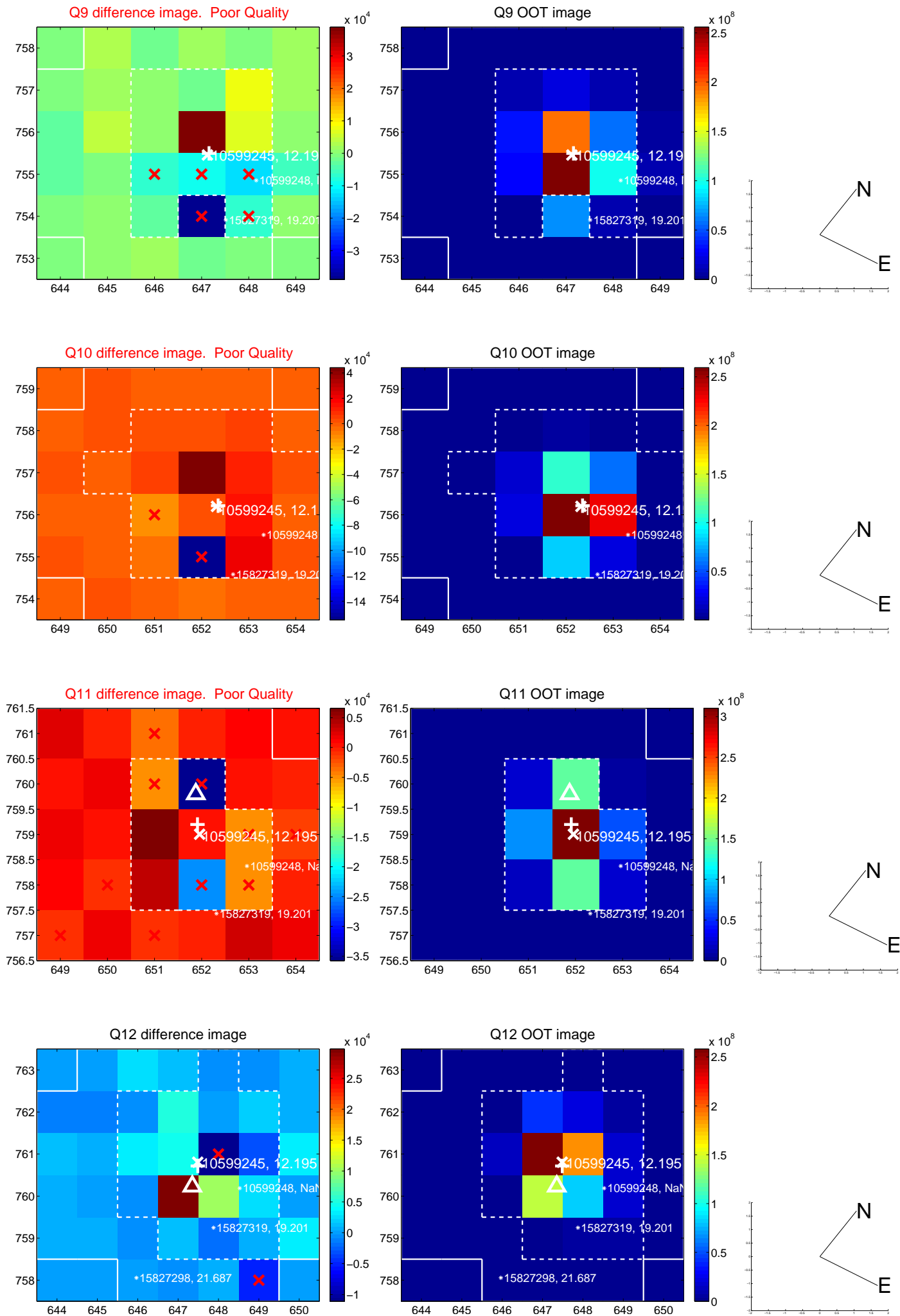
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



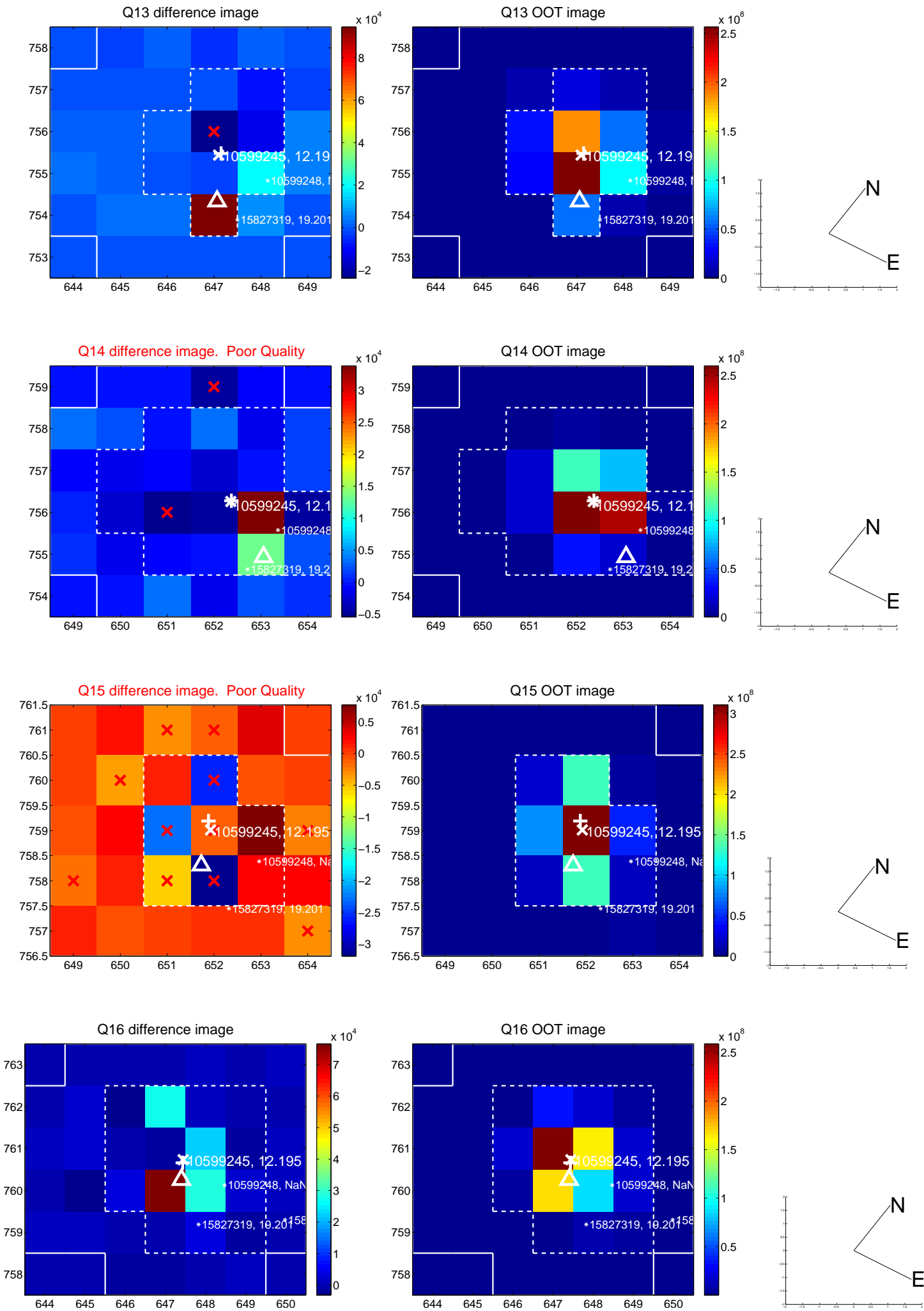
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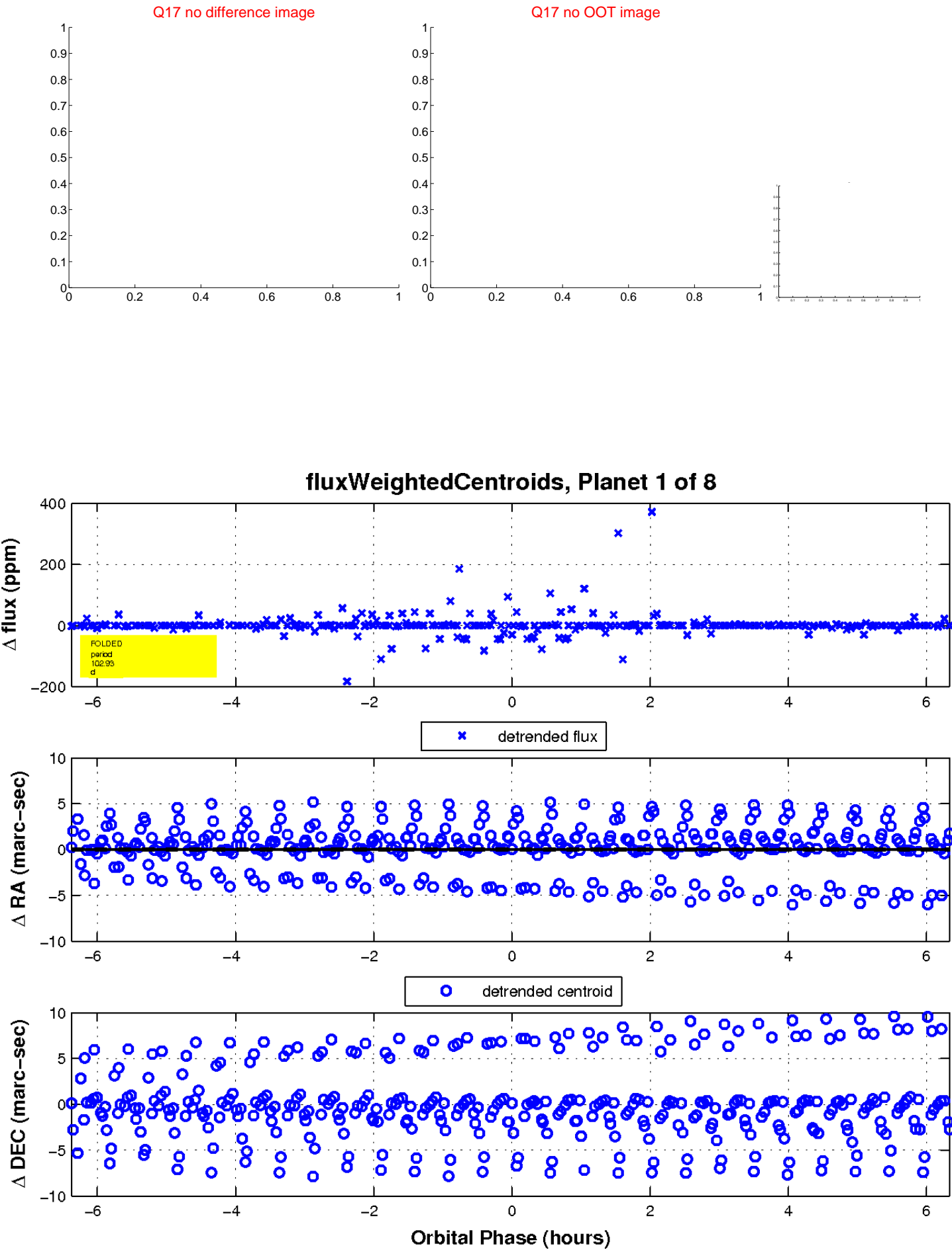
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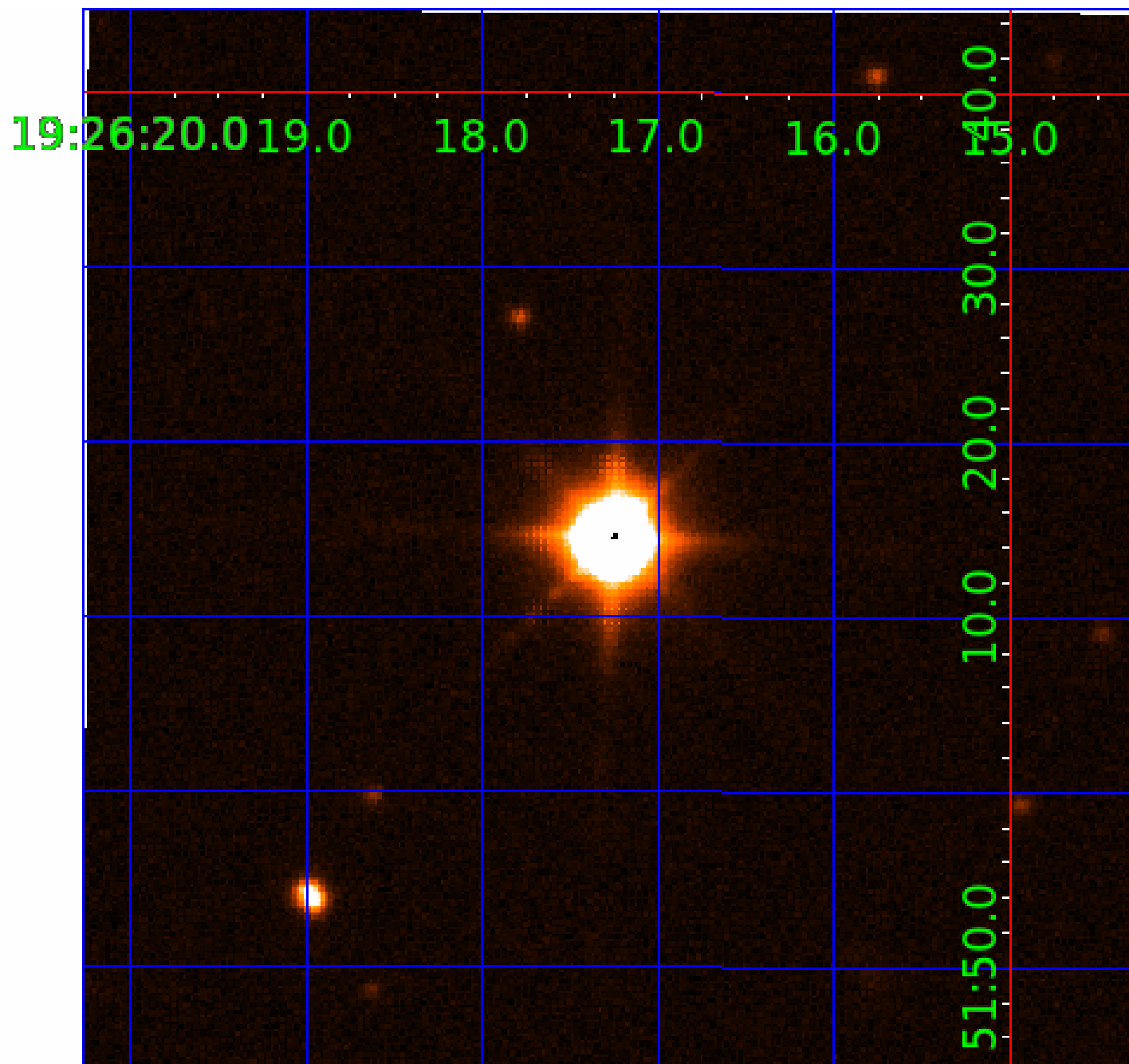
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UKIRT Image

Declination



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010599245-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE_ZUMA—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
010599245-03	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
010599245-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_MARSHALL_SKYE_ZUMA—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_UNRESOLVED_OFFSET
010599245-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
010599245-06	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
010599245-07	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_KIC_POS—CENT_UNCERTAIN
010599245-08	OBS	FP	0.00	1	0	0	0	LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_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.

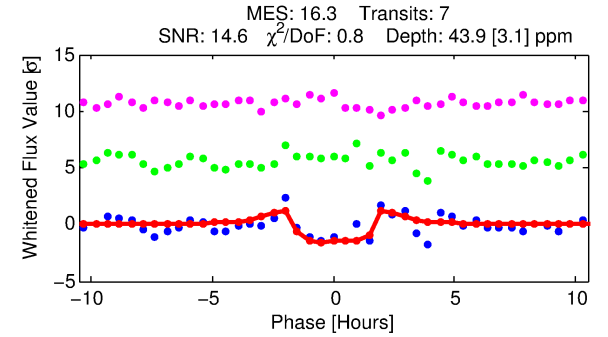
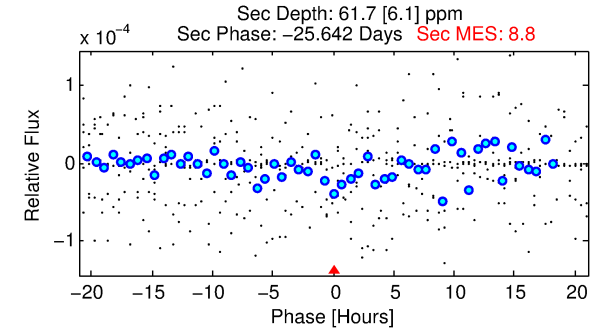
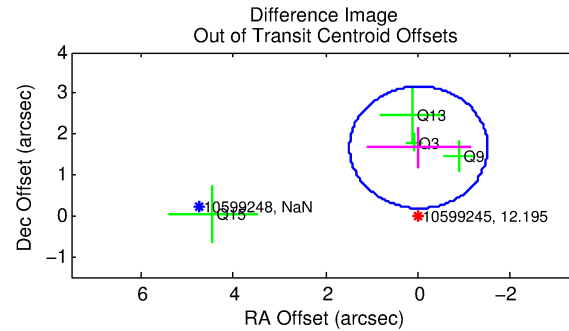
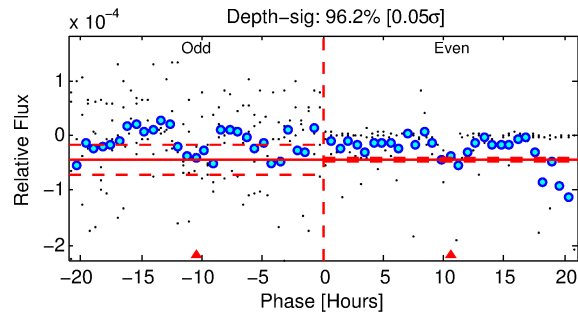
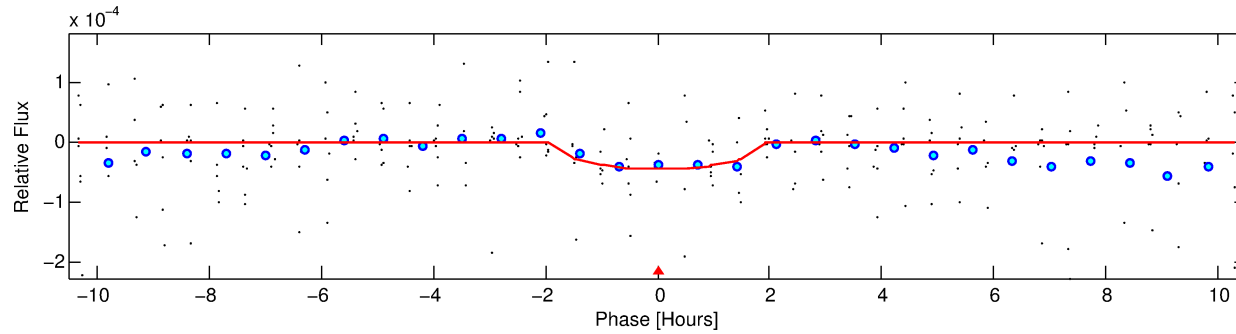
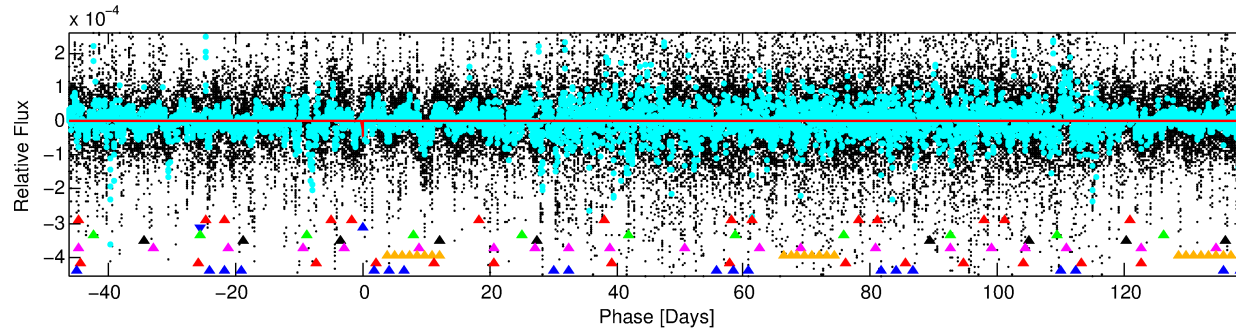
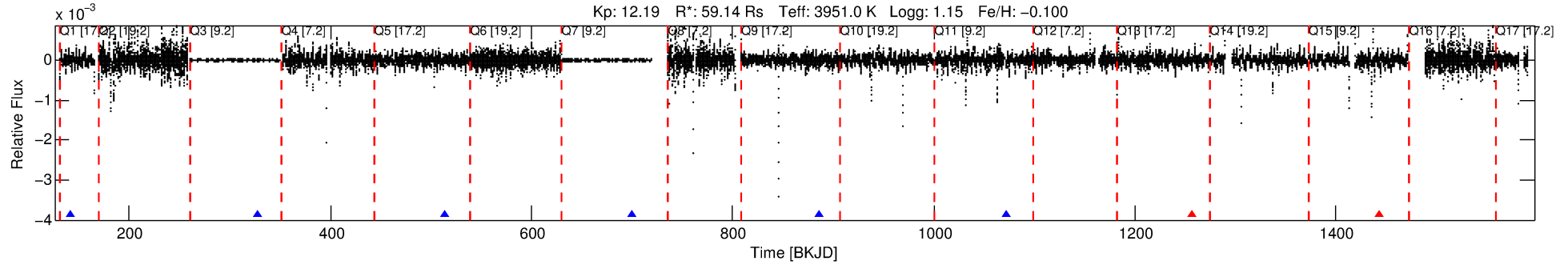
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 010599245-02

No Significant Match Found

# DV One-Page Summary

KIC: 10599245 Candidate: 2 of 8 Period: 185.905 d



## DV Fit Results:

Period = 185.90456 [0.00175] d  
Epoch = 141.9961 [0.0035] BKJD  
Rp/R\* = 0.0074 [0.0028]  
a/R\* = 206.40 [241.19]  
b = 0.87 [0.35]  
Seff = 1264.56 [235.94]  
Teq = 1521 [71] K  
Rp = 47.53 [20.69] Re  
a = 0.7771 [0.1133] AU  
Ag = 9.08 [7.06] [1.14 $\sigma$ ]  
Teffp = 4081 [786] K [3.24 $\sigma$ ]

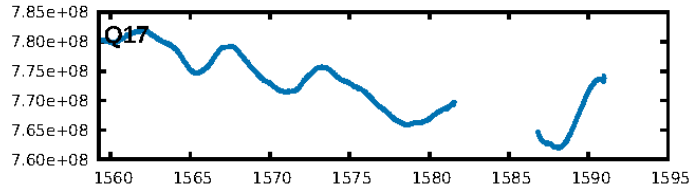
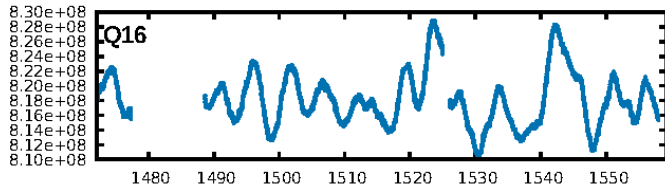
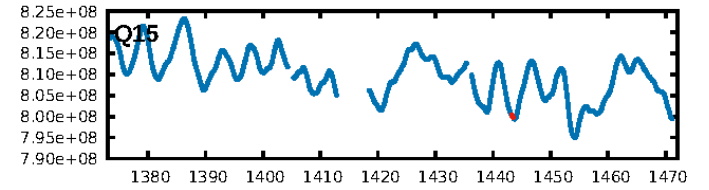
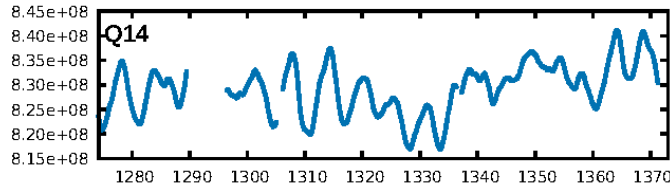
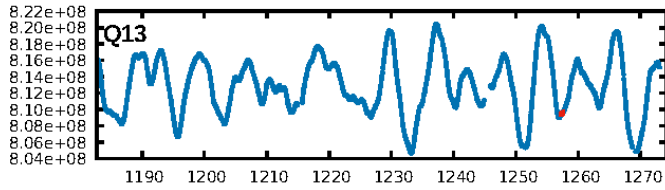
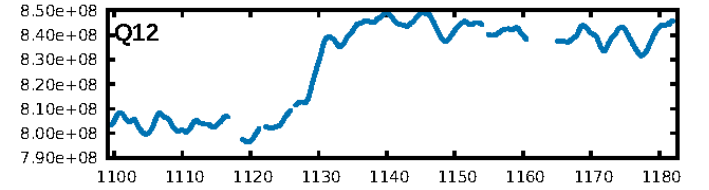
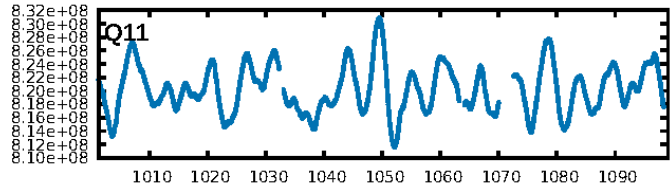
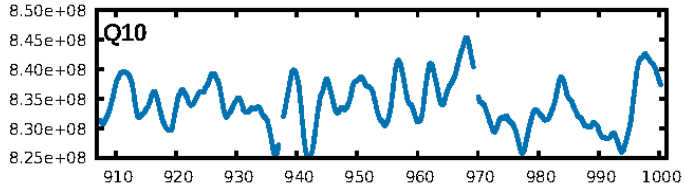
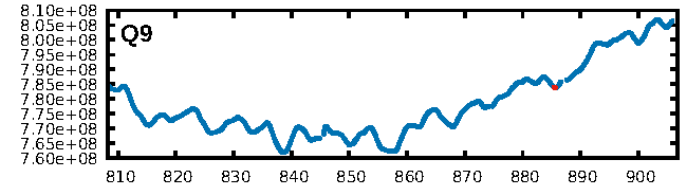
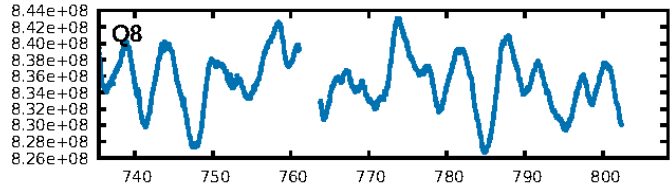
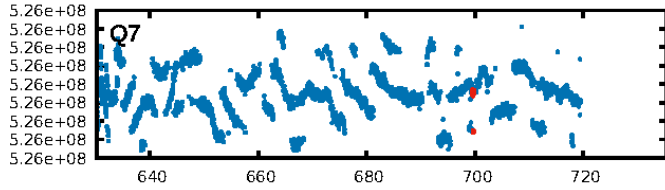
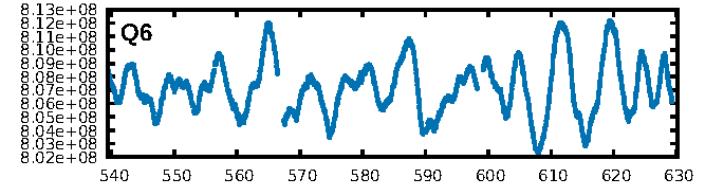
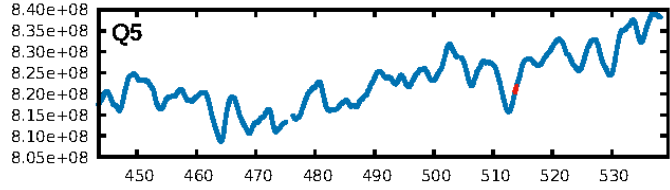
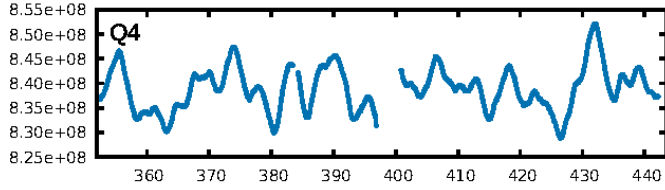
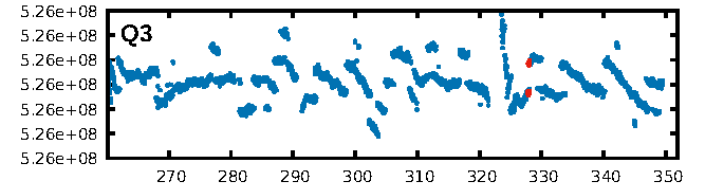
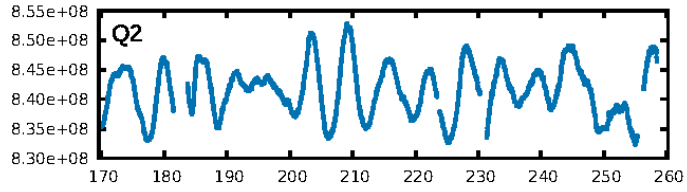
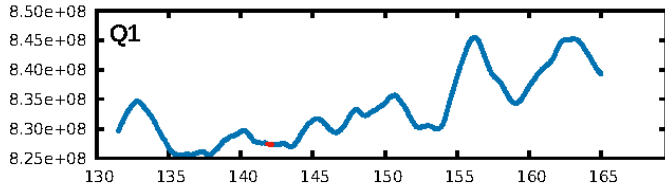
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [40.89 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 83.2%  
ModelChiSquareGof-sig: 99.8%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 0.67 [4/6]  
GhostDiagnostic-chr: -1.338  
Centroid-sig: N/A  
Centroid-so: 1.134 arcsec [0.30 $\sigma$ ]  
OotOffset-rm: 1.673 arcsec [3.36 $\sigma$ ]  
KicOffset-rm: 2.206 arcsec [3.52 $\sigma$ ]  
OotOffset-st: 0/2/0/2 [4]  
KicOffset-st: 0/2/0/2 [4]  
DiffImageQuality-fgm: 0.00 [0/4]  
DiffImageOverlap-fno: 1.00 [7/7]

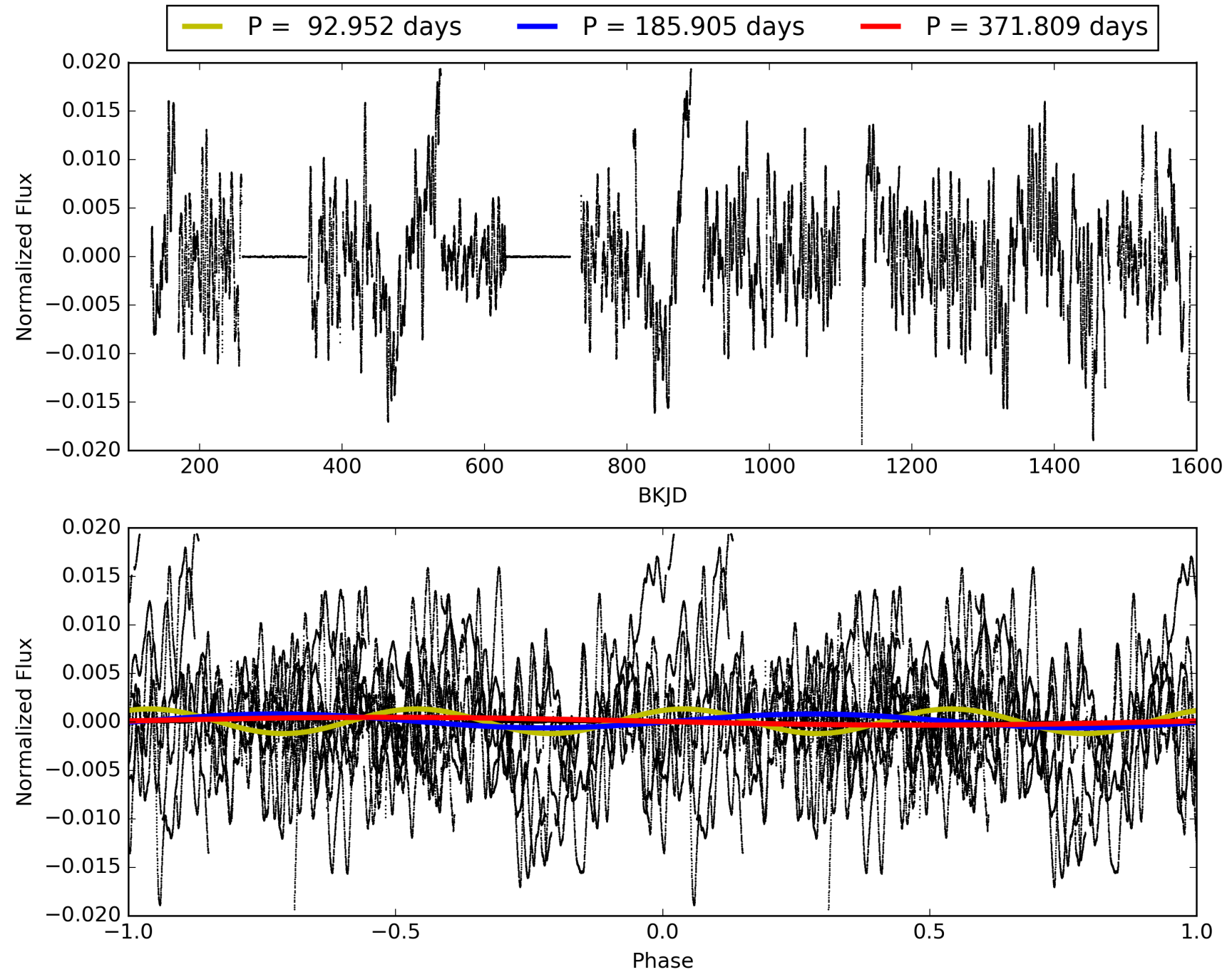
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:39:38 Z

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

## TCE 010599245-02, PDC Light Curves



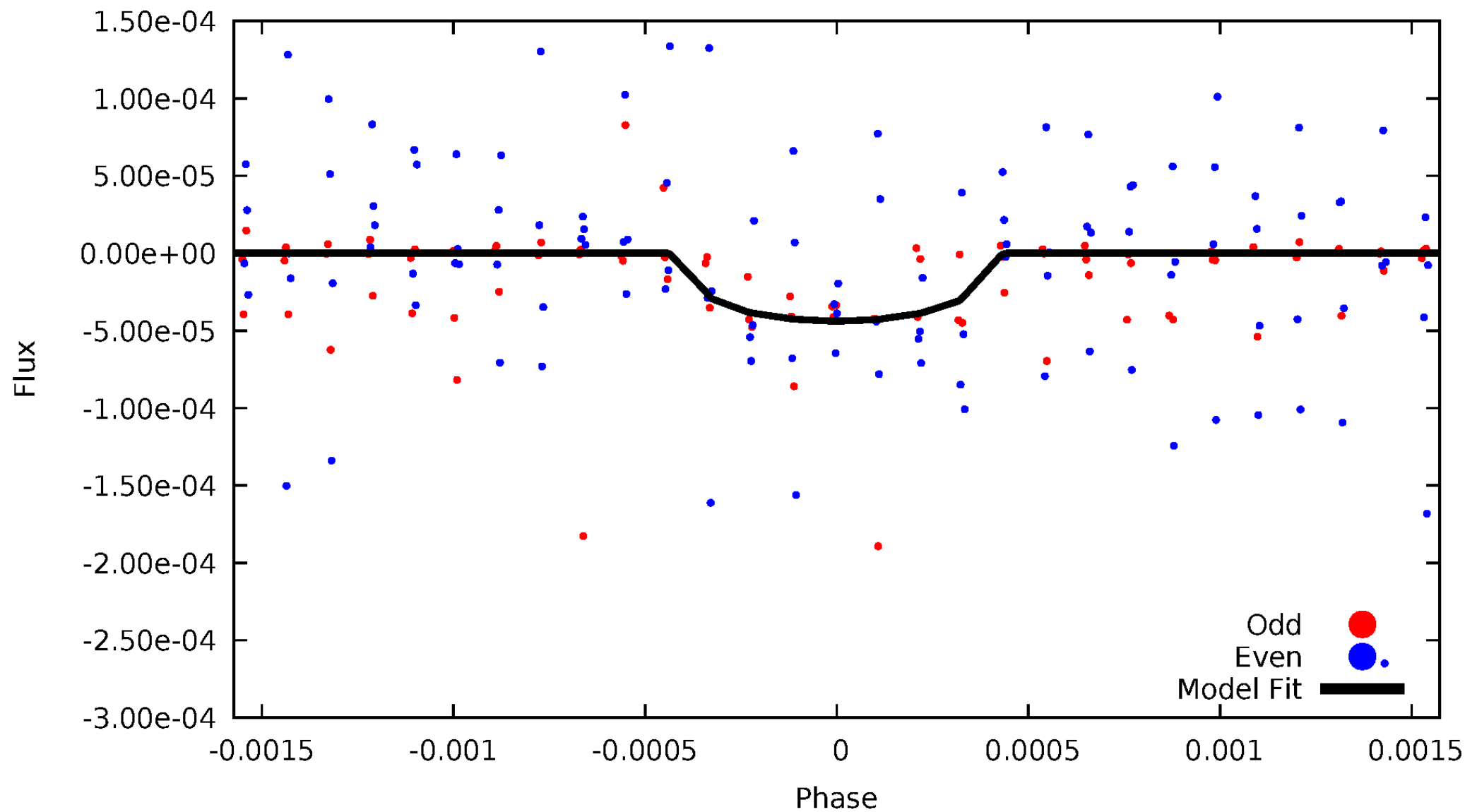
# TCE 010599245-02





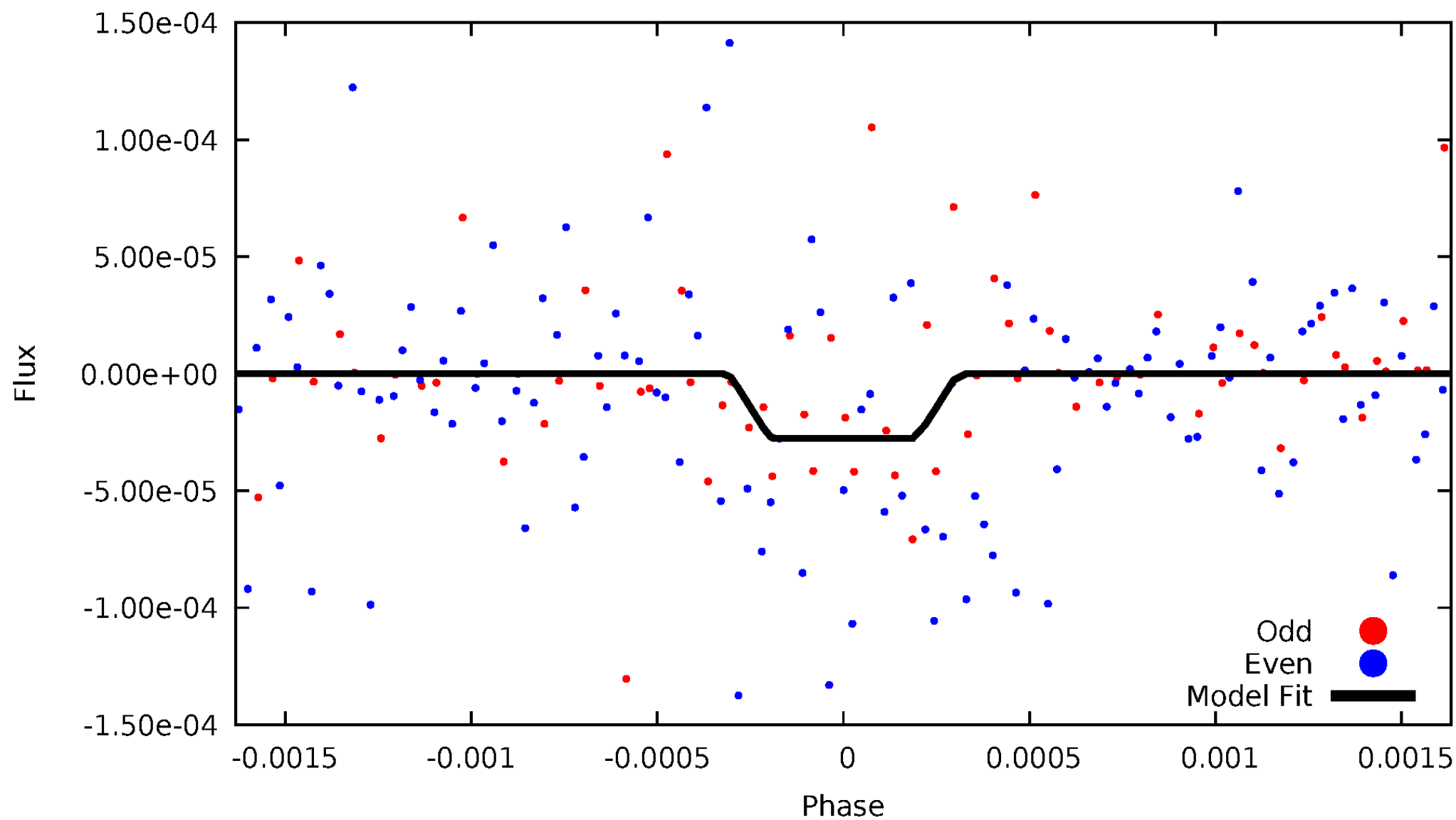
# DV Odd/Even

TCE 010599245-02



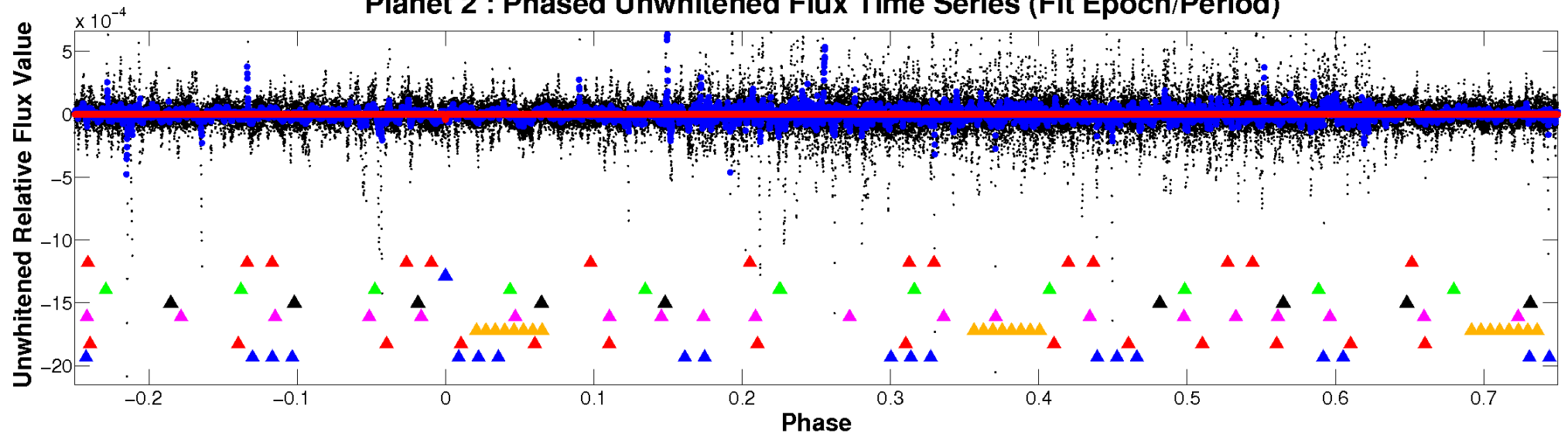
# ALT Odd/Even

TCE 010599245-02

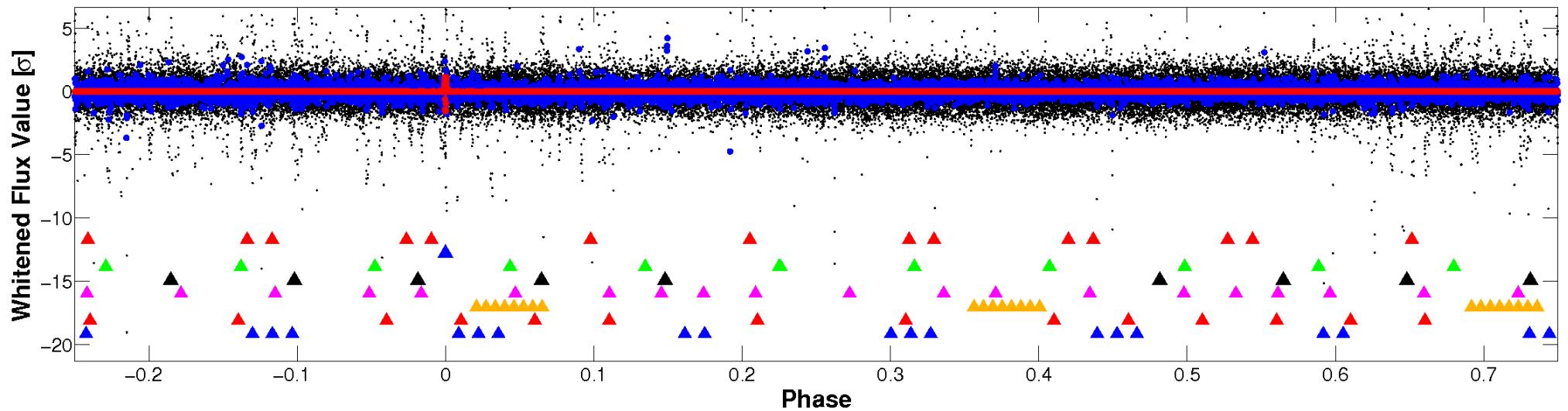


# Non-Whitened Vs. Whitened Light Curve

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

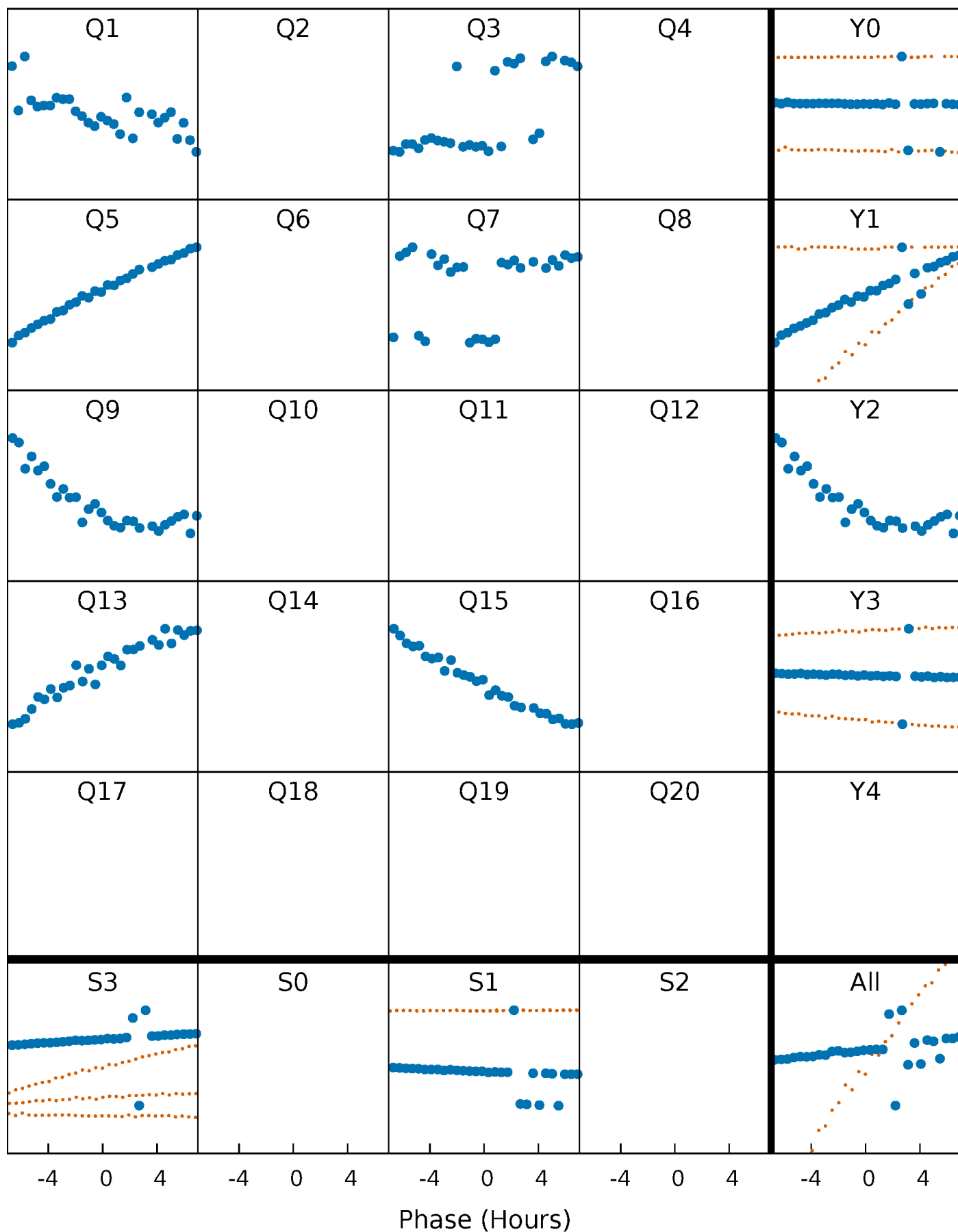


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



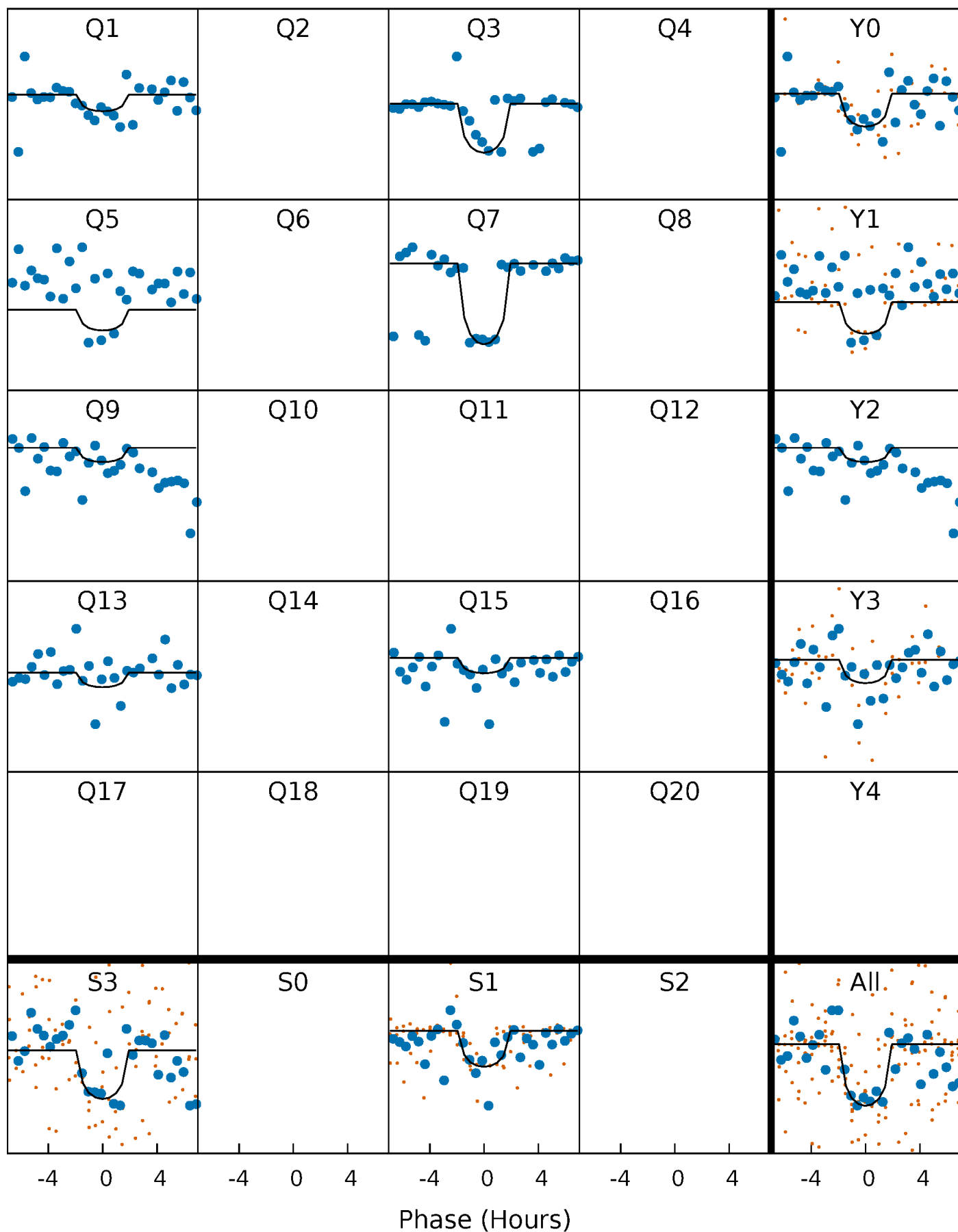
# PDC Quarter-Phased Transit Curves

TCE 010599245-02     $P=185.904559$  Days     $T_0=141.996123$  (BKJD)



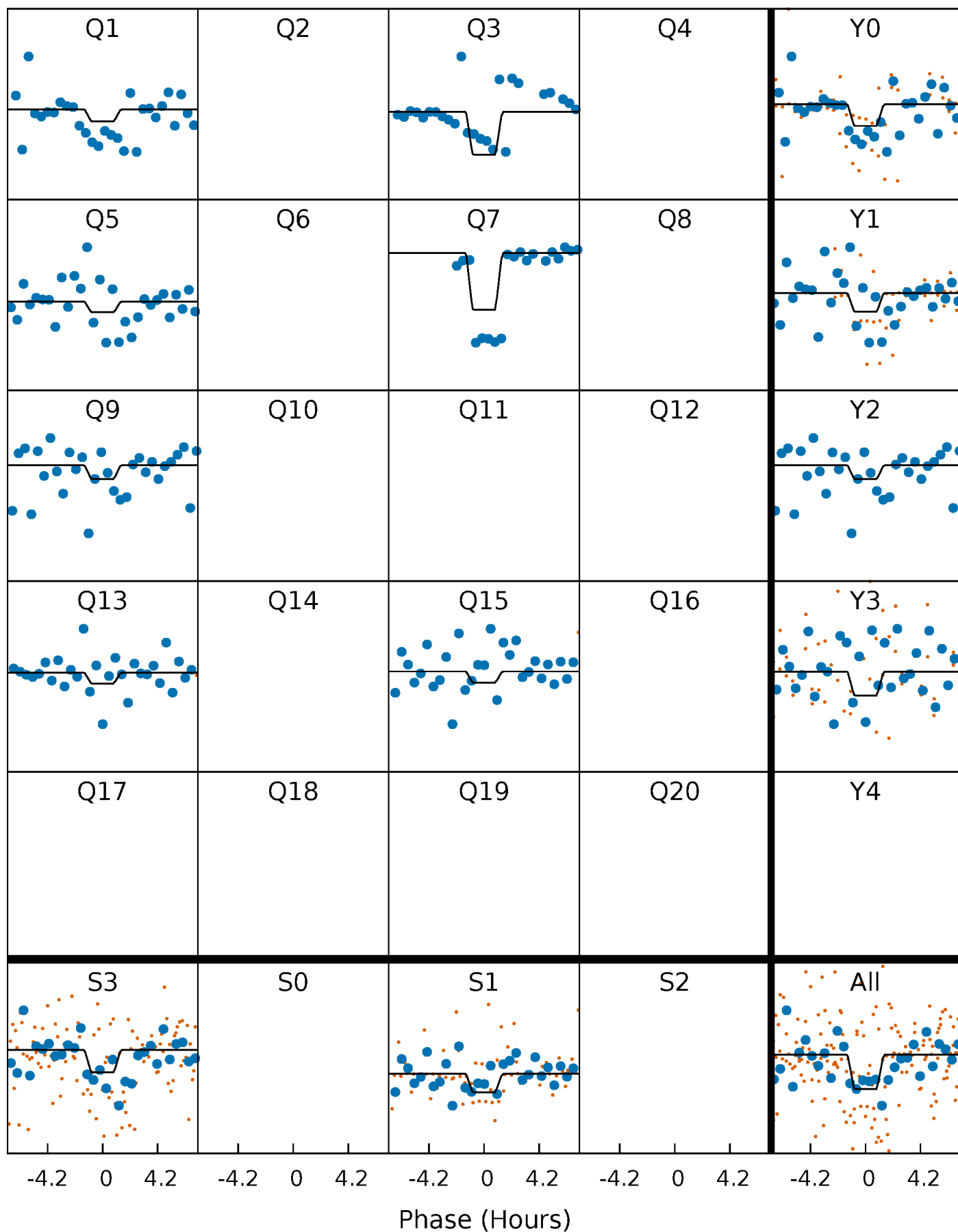
# DV Quarter-Phased Transit Curves

TCE 010599245-02     $P=185.904559$  Days     $T_0=141.996123$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

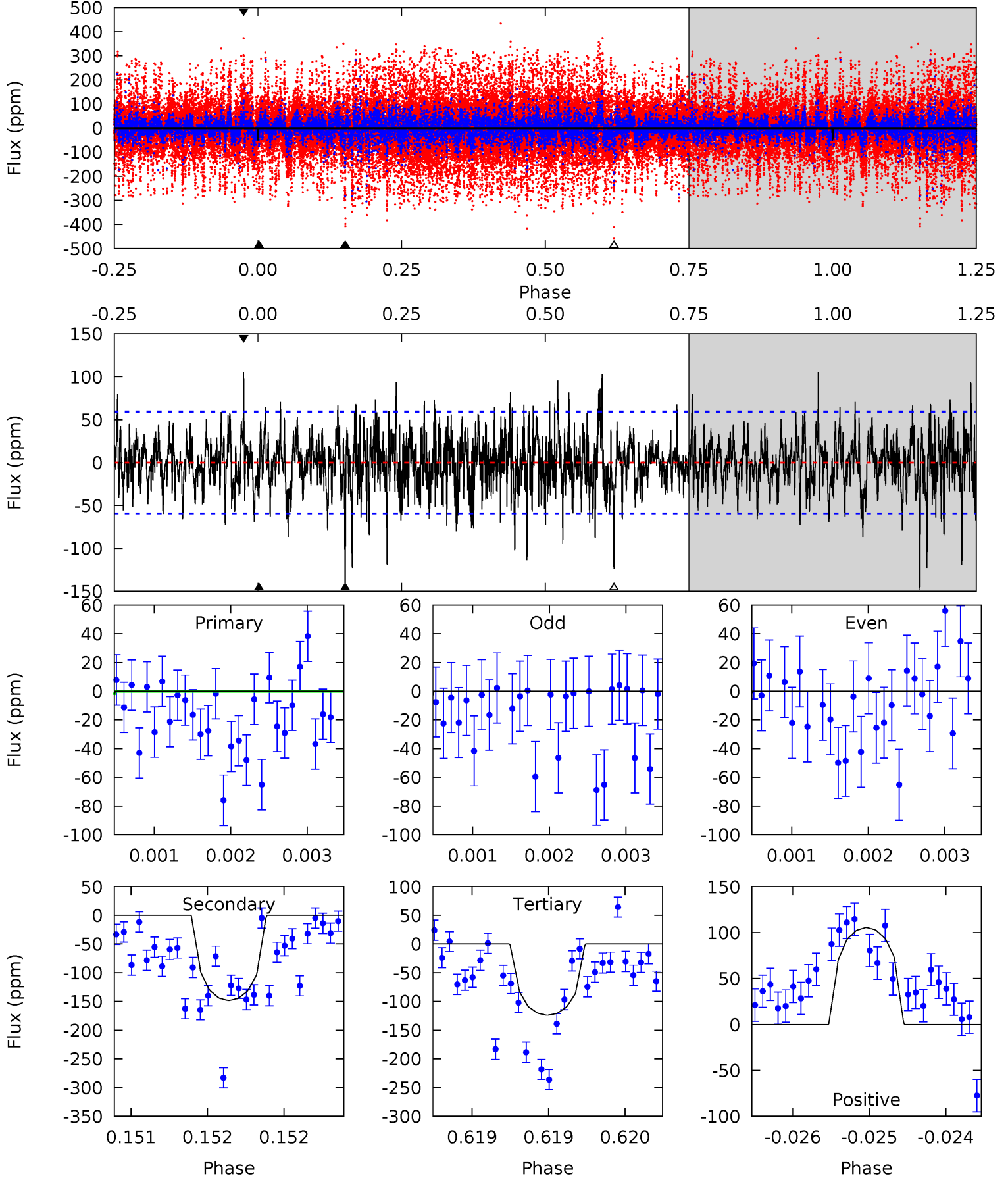
TCE 010599245-02     $P=185.902683$  Days     $T_0=141.994801$  (BKJD)



# DV Model-Shift Uniqueness Test

010599245-02, P = 185.904559 Days, E = 141.996123 Days

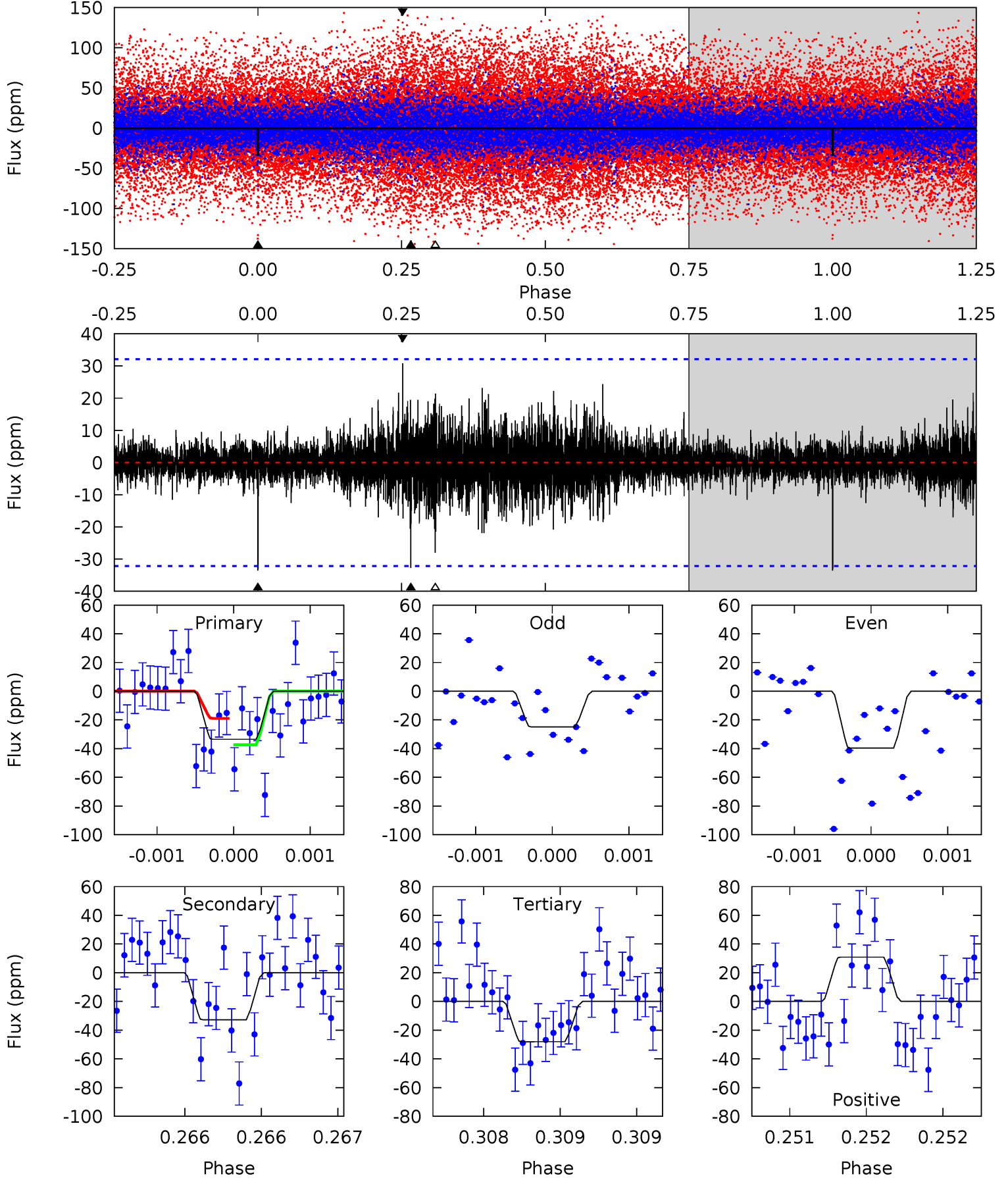
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
3.84	13.7	11.4	9.71	5.47	3.32	2.49	-7.58	-5.87	2.24	3.95	0.43	1.04	0.42	0.06



# Alt Model-Shift Uniqueness Test

010599245-02, P = 185.902683 Days, E = 141.994801 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.77	5.63	4.81	5.31	5.53	3.42	0.91	0.96	0.46	0.82	0.32	1.30	0.98	0.48	1.56





### Stellar Parameters For KIC 010599245

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$3951^{+79}_{-108}$	$1.152^{+0.030}_{-0.030}$	$-0.100^{+0.200}_{-0.250}$	$59.143^{+2.129}_{-12.775}$	$1.811^{+0.036}_{-0.688}$	$0.000^{+0.000}_{-0.000}$
	+2%/-3%	+3%/-3%	+200%/-250%	+4%/-22%	+2%/-38%	+30%/-8%
Source	PHO54	AST54	PHO54	DSEP		

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

### Secondary Eclipse Parameters for KIC 010599245-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-148 \pm 11$	$47.18^{+16.69}_{-17.91}$	$2123^{+56}_{-65}$	$4753^{+1101}_{-569}$	$22^{+34}_{-10}$
Alt.	$-33 \pm 6$	$33.71^{+17.09}_{-16.06}$	$2120^{+54}_{-60}$	$4045^{+1192}_{-584}$	$9.323^{+26.465}_{-5.270}$

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

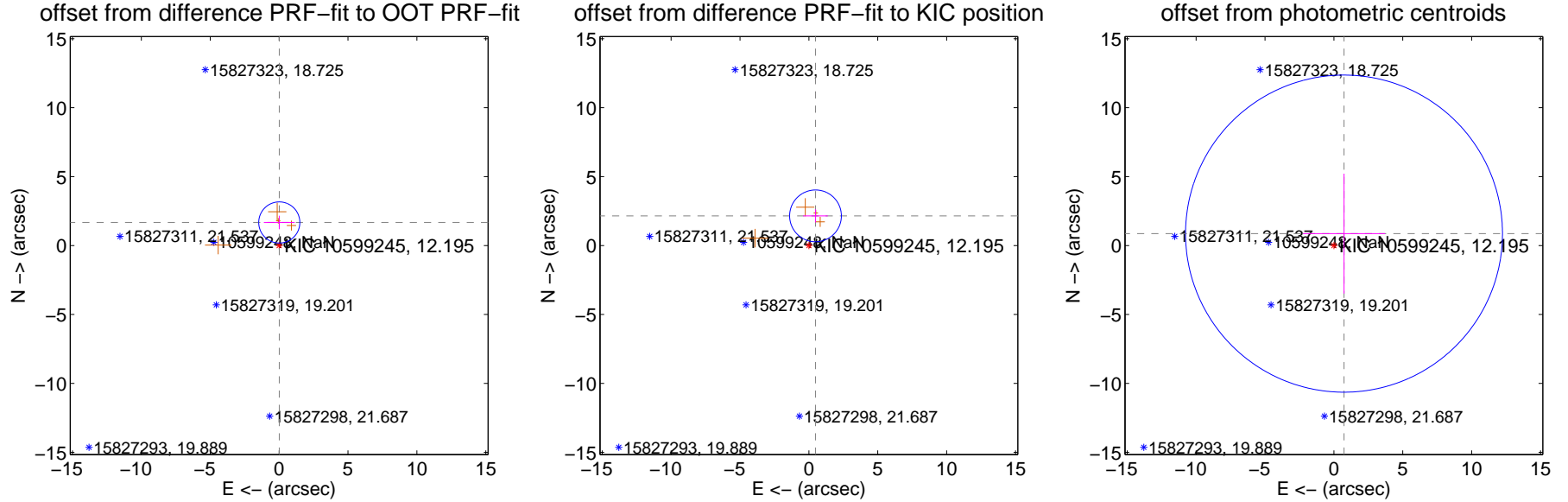
## DV Centroid Data

Supplemental centroid analysis for 010599245-02. Kepler magnitude: 12.20. Transit SNR 14.55

There are 0 quarters with good PRF difference image offsets

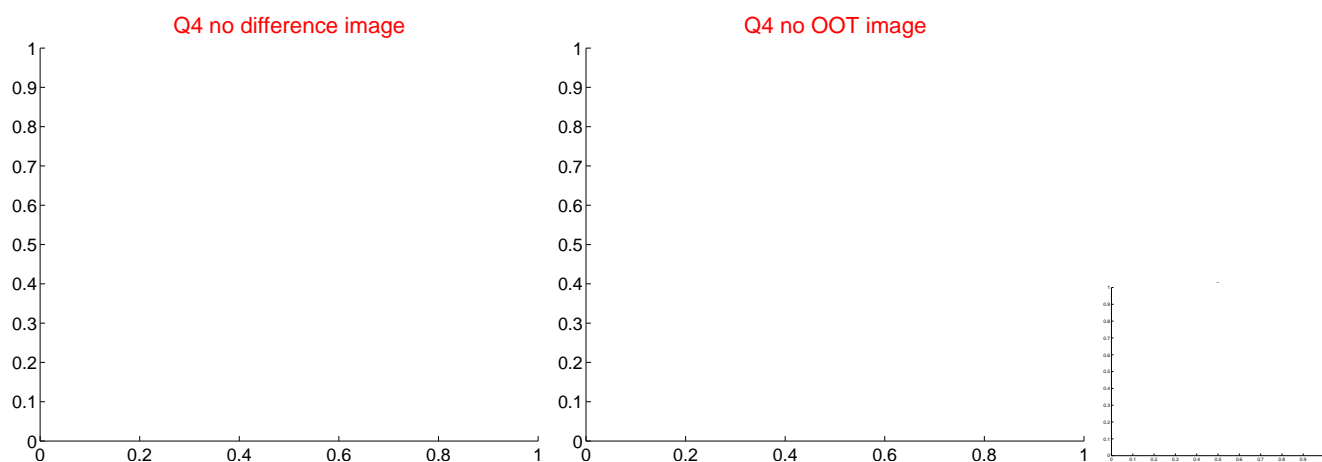
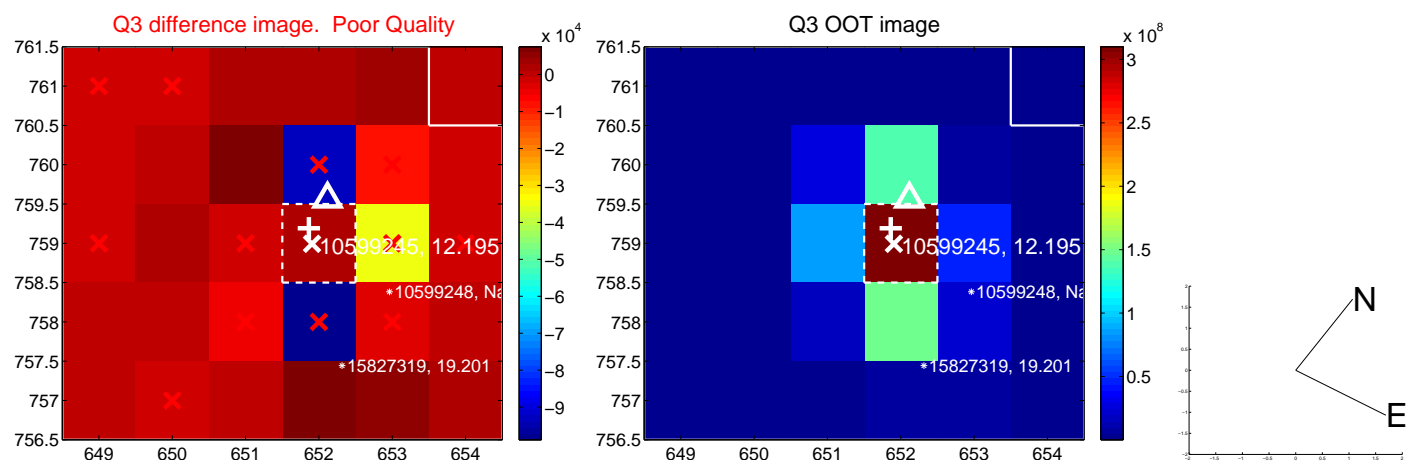
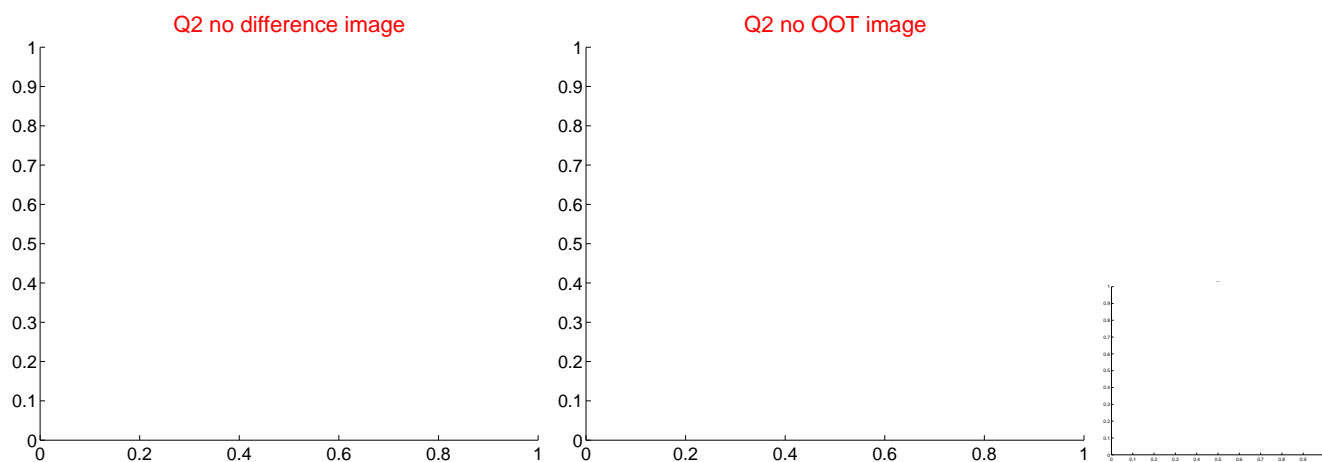
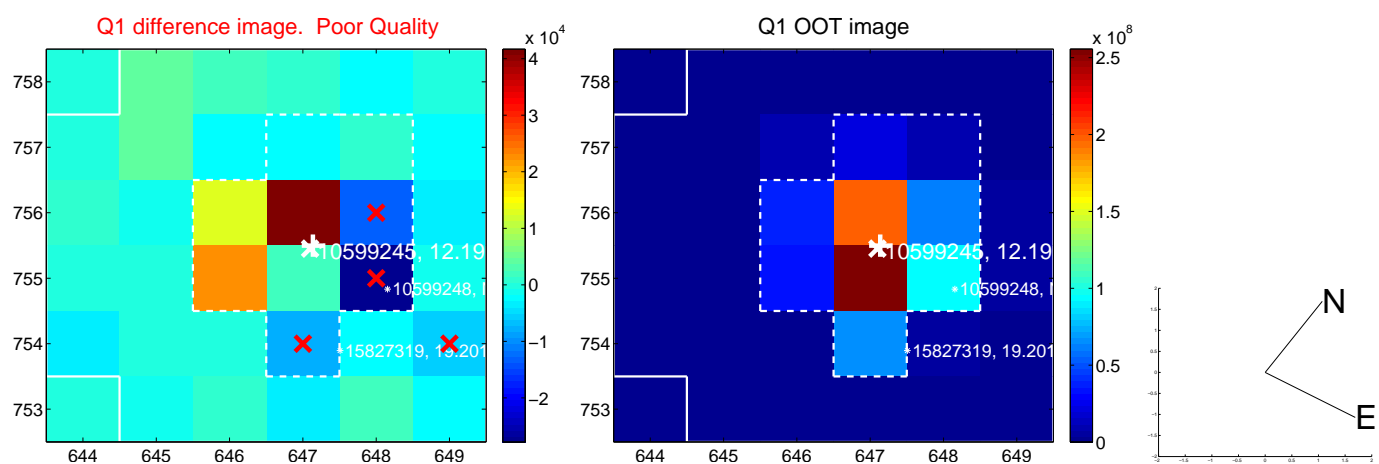
The direct PRF centroid is offset from the target star catalog position by about 0.72 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.673 \pm 0.497$	3.36	$-0.012 \pm 1.121$	$1.673 \pm 0.491$
PRF-fit source offset from KIC position	$2.206 \pm 0.626$	3.52	$-0.481 \pm 0.896$	$2.153 \pm 0.479$
photometric centroid source offset	$1.13 \pm 3.83$	0.30	$-0.73 \pm 2.98$	$0.86 \pm 4.35$

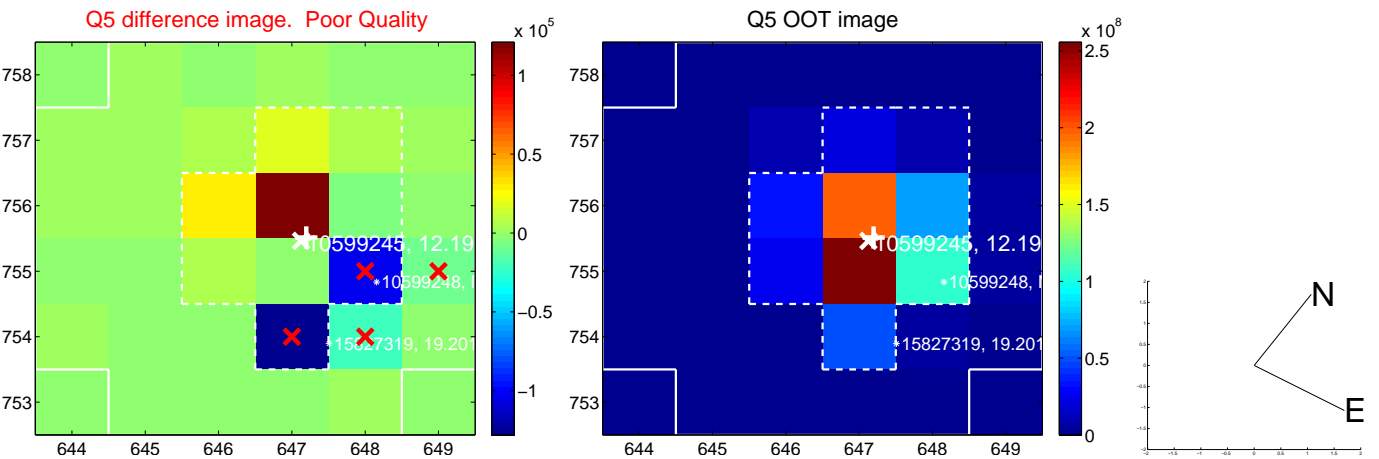


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

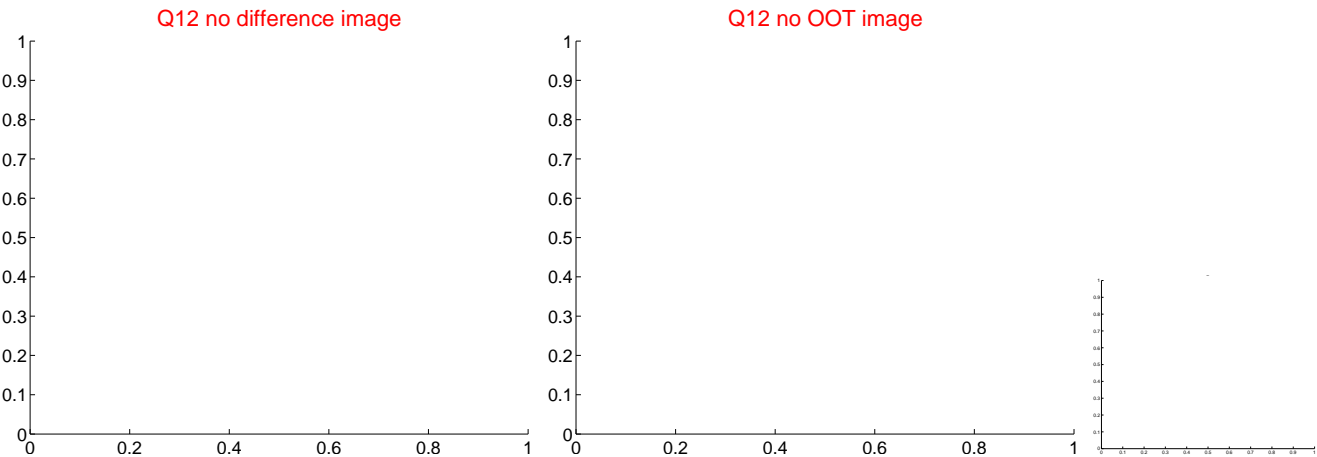
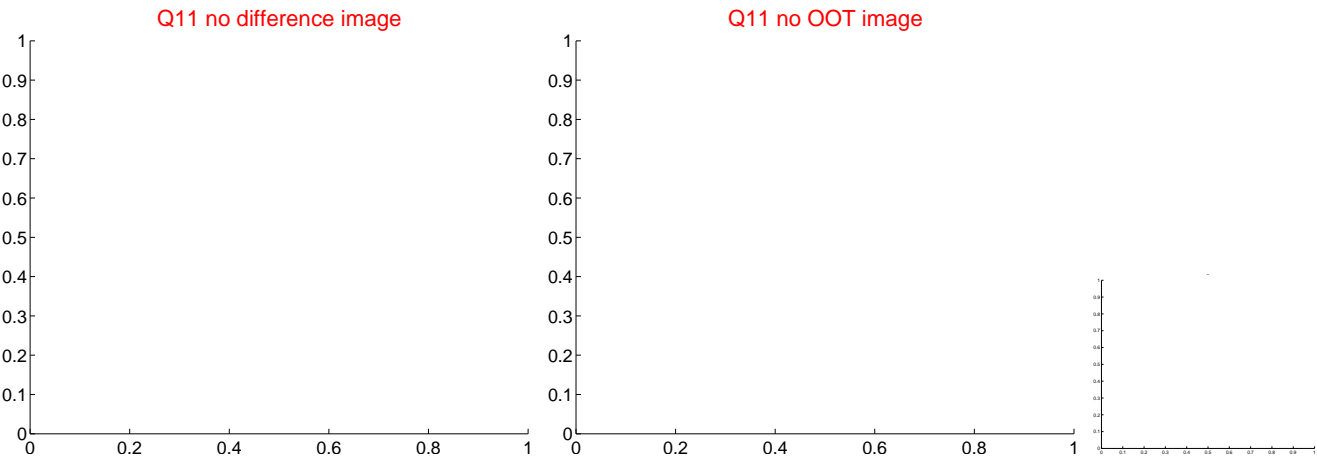
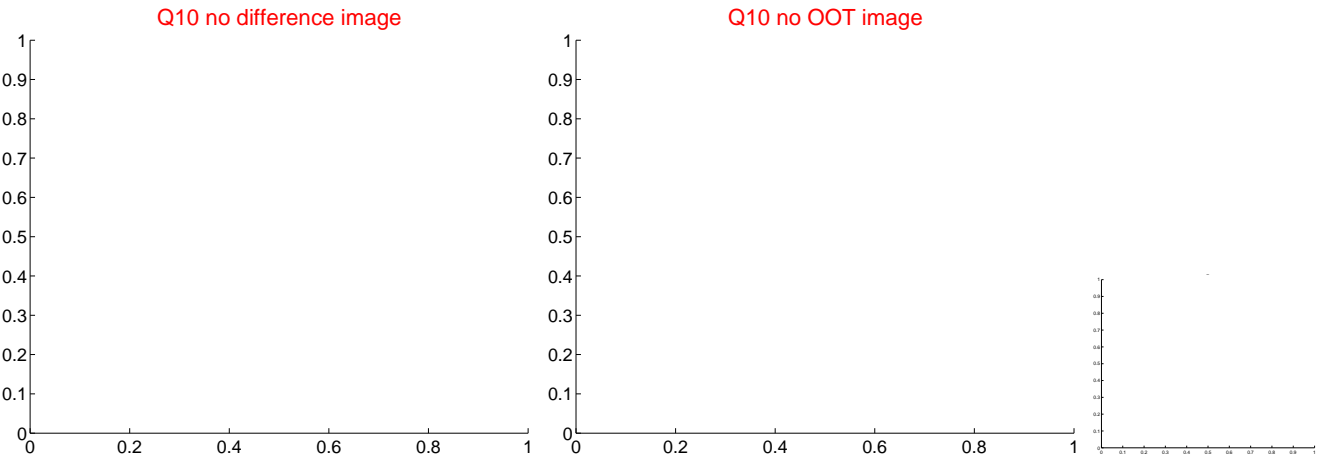
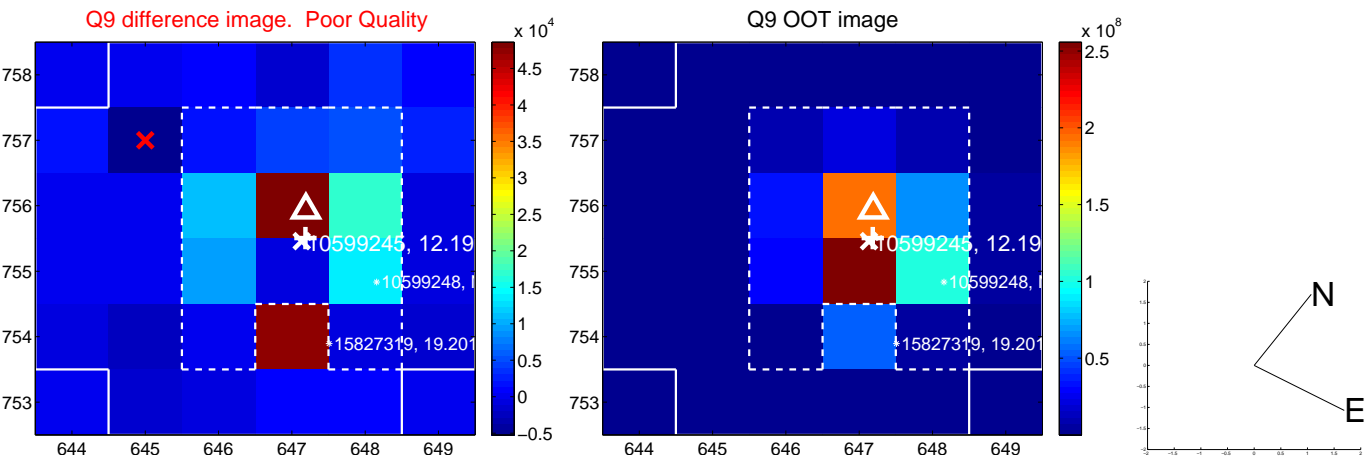
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



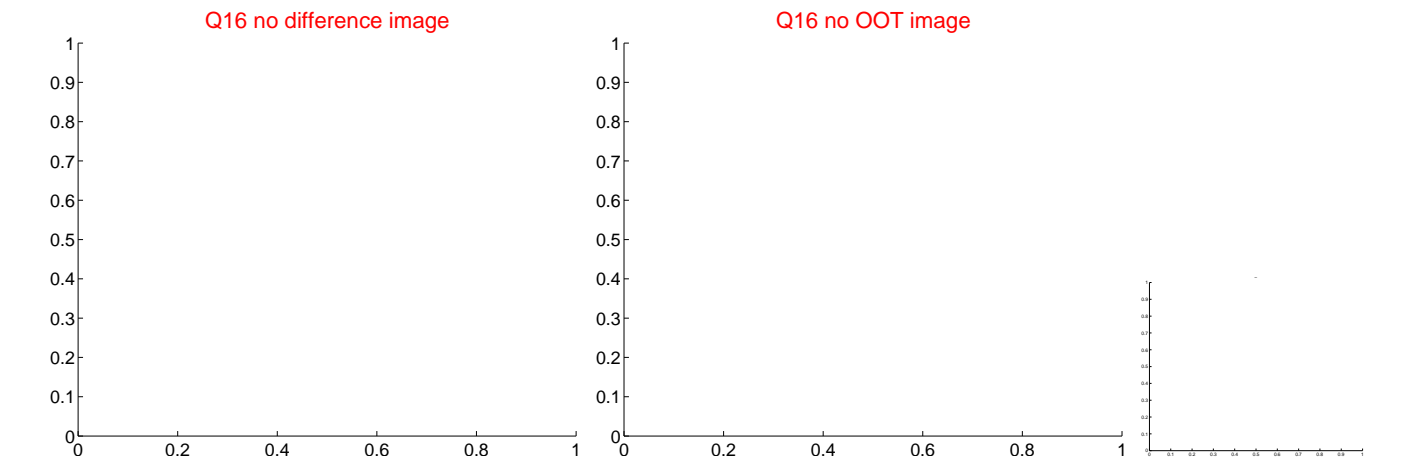
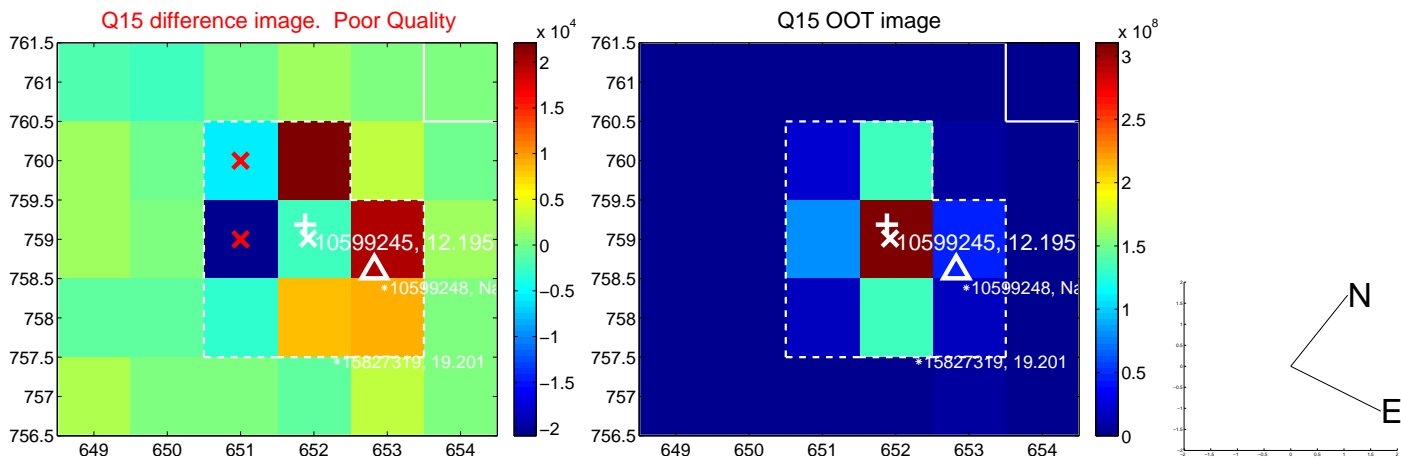
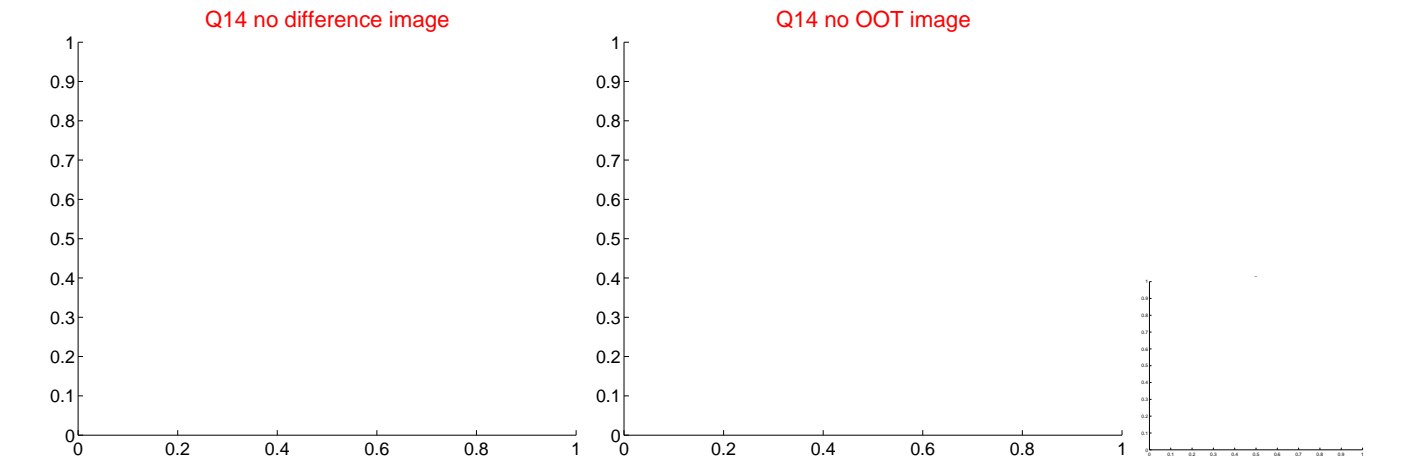
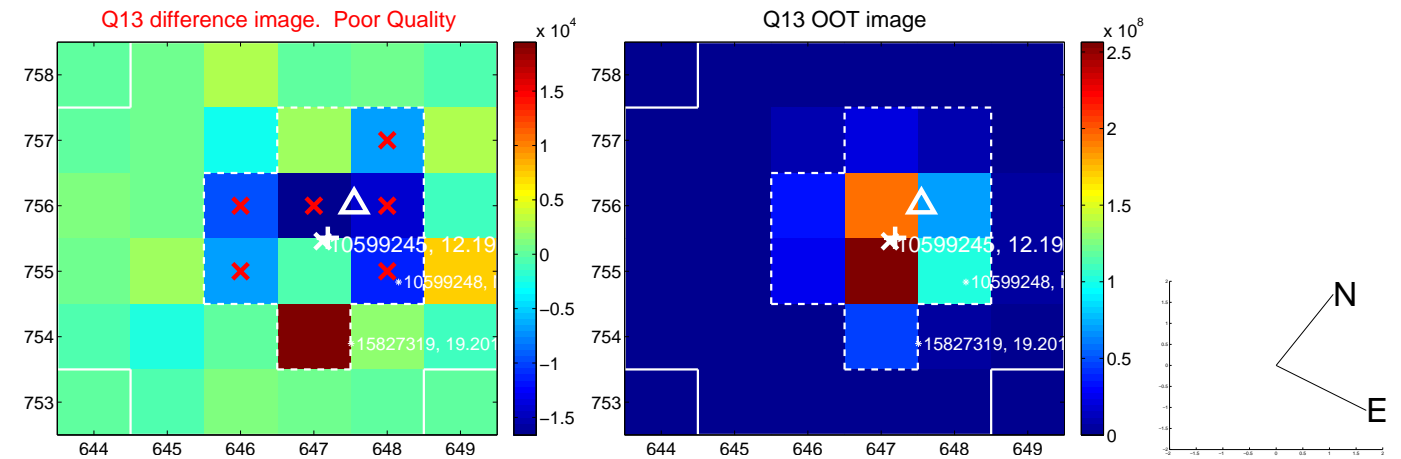
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



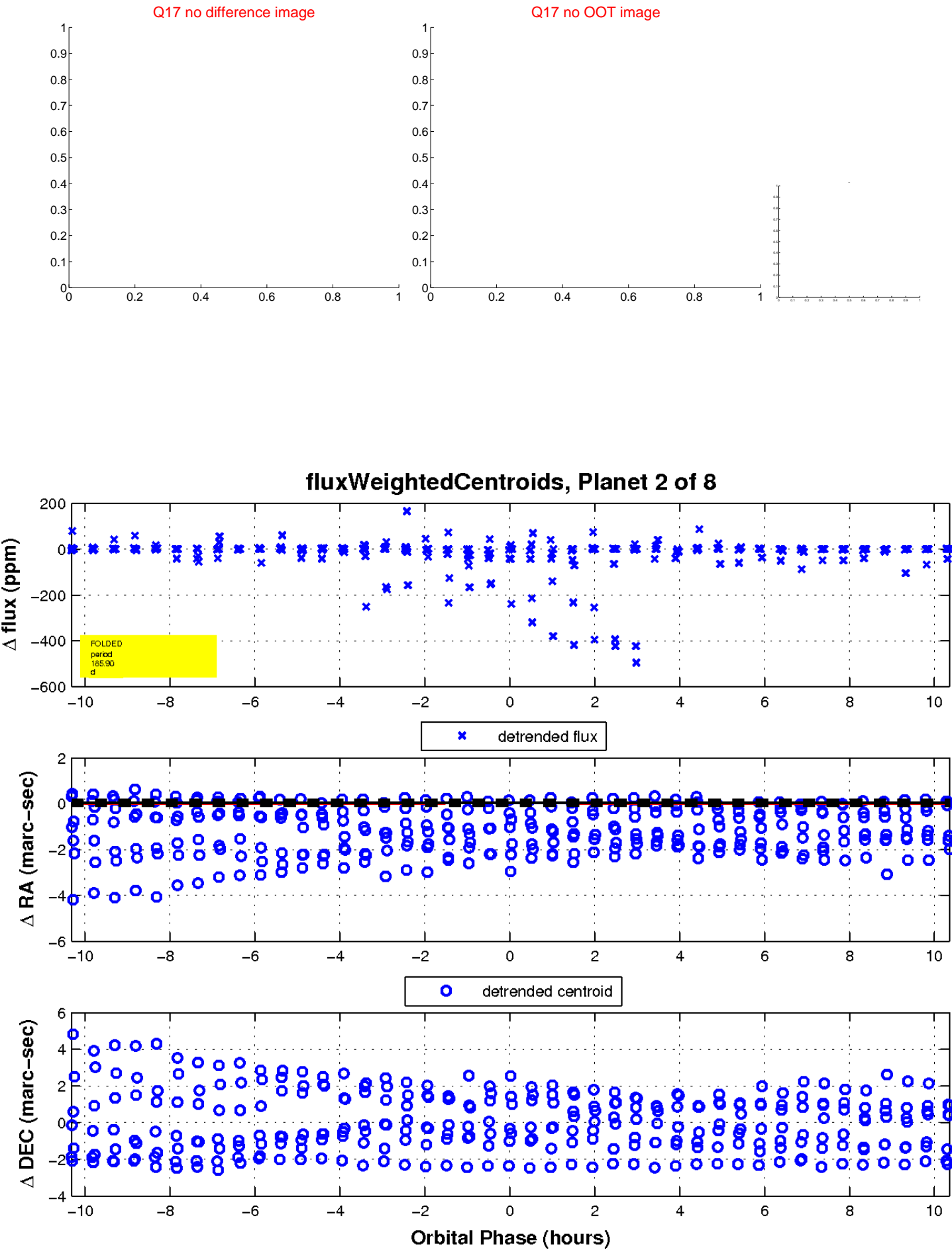
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



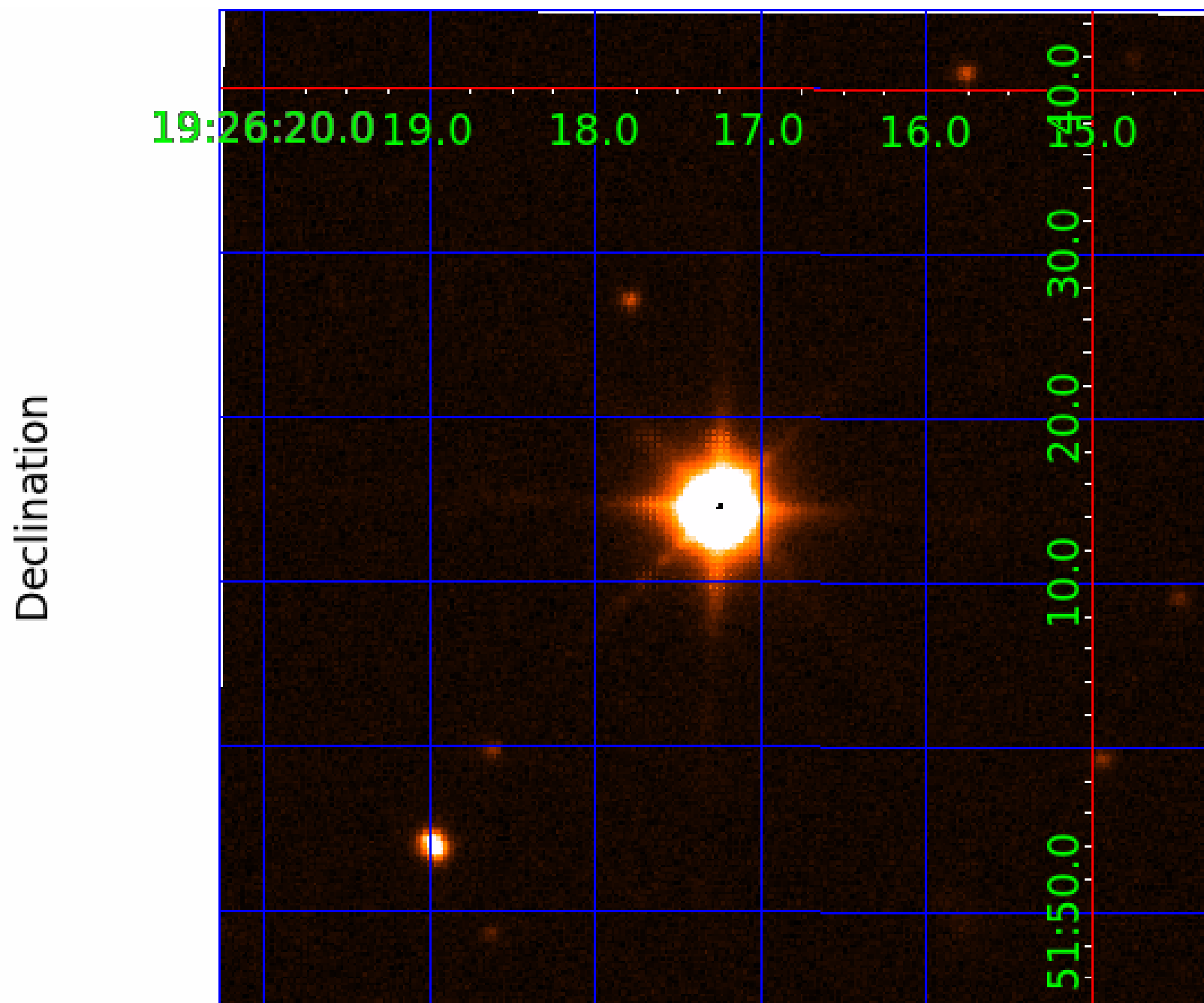
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image





# KIC 010599245

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010599245-01	OBS	No	102.933504	203.234932	42.4	2.126	28.2	19.6	59.14	3951	51.05	2781.31
010599245-02	OBS	No	185.904559	141.996123	43.9	3.508	16.3	14.6	59.14	3951	47.53	1264.56
010599245-03	OBS	No	118.287967	183.981930	53.7	2.452	15.0	15.8	59.14	3951	59.89	2310.67
010599245-04	OBS	No	170.417068	169.518612	39.7	8.386	14.7	10.0	59.14	3951	43.03	1420.06
010599245-05	OBS	No	72.002790	174.339797	6.7	4.067	14.5	2.3	59.14	3951	19.66	4479.12
010599245-06	OBS	No	62.359596	145.890783	20.7	5.466	13.7	9.2	59.14	3951	33.90	5425.67
010599245-07	OBS	No	102.244200	227.599922	46.6	2.835	13.4	13.2	59.14	3951	52.19	2806.34
010599245-08	OBS	No	80.029016	143.655157	38.5	1.930	13.1	12.9	59.14	3951	45.51	3890.40

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010599245-01	OBS	FP	0.00	1	0	1	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—CENT_UNRESOLVED_OFFSET—HALO_GHOST
010599245-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE_ZUMA—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
010599245-03	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
010599245-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_MARSHALL_SKYE_ZUMA—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_UNRESOLVED_OFFSET
010599245-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
010599245-06	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
010599245-07	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_KIC_POS—CENT_UNCERTAIN
010599245-08	OBS	FP	0.00	1	0	0	0	LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_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.

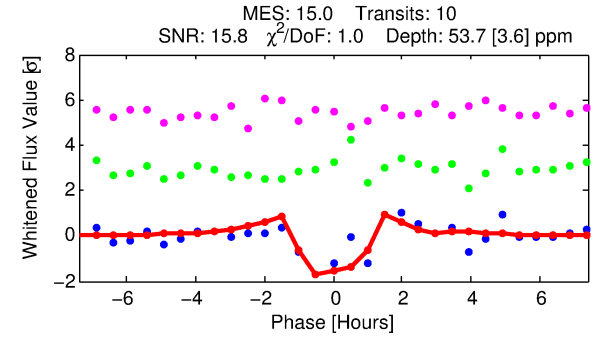
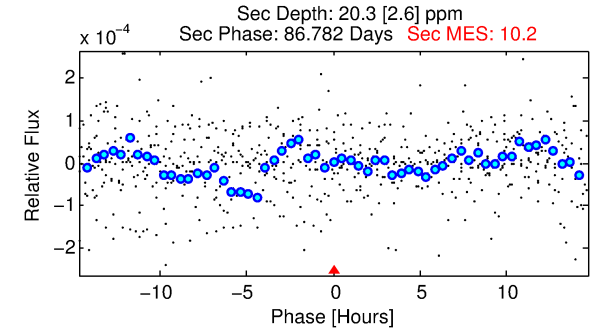
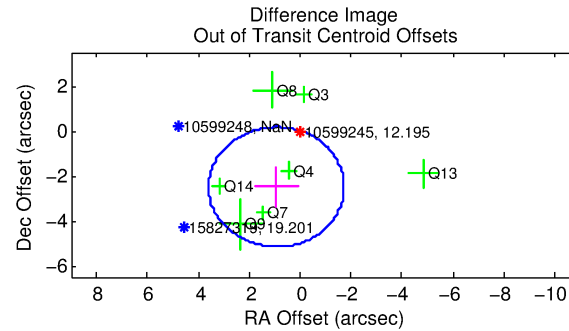
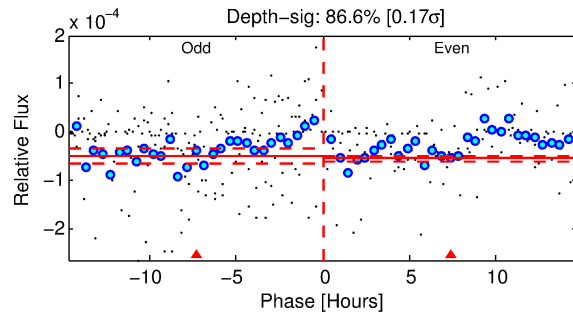
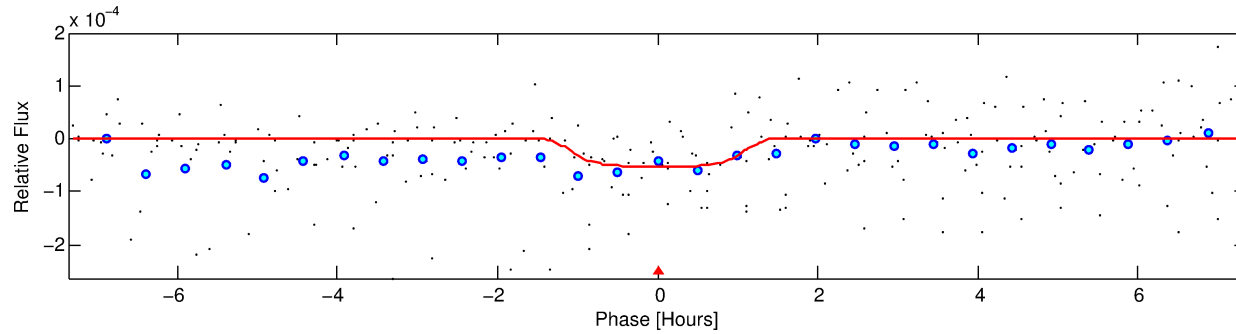
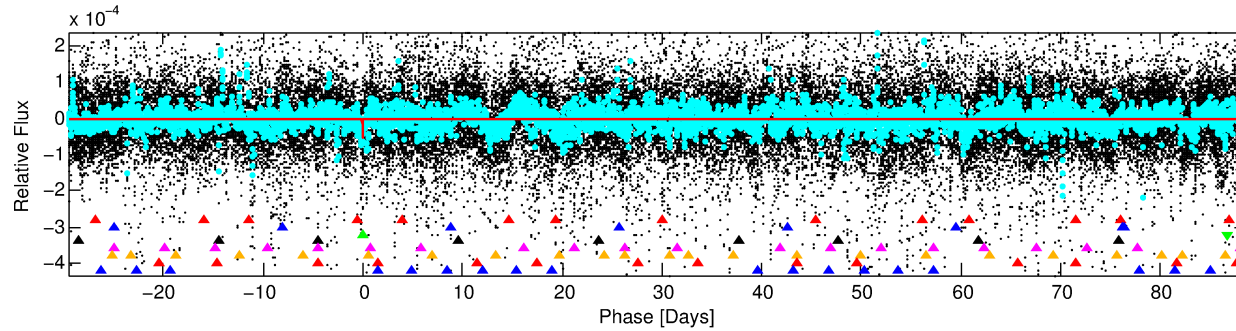
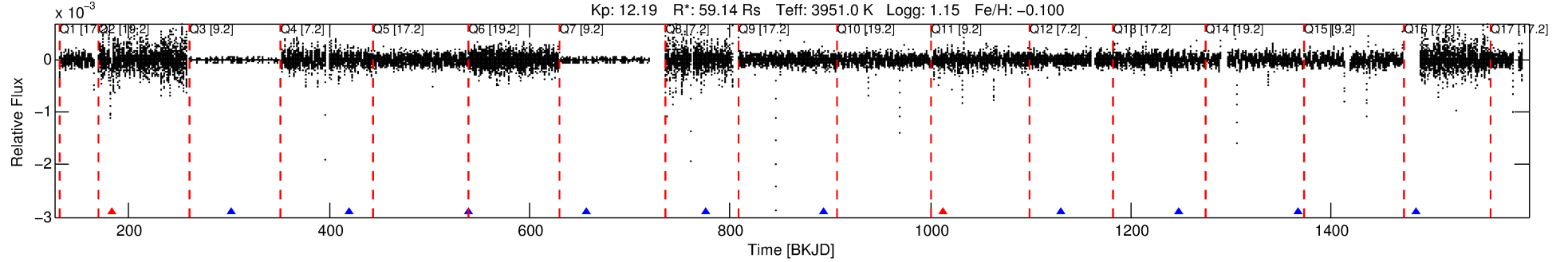
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 010599245-03

No Significant Match Found

# DV One-Page Summary

KIC: 10599245 Candidate: 3 of 8 Period: 118.288 d



## DV Fit Results:

Period = 118.28797 [0.00076] d  
Epoch = 183.9819 [0.0023] BKJD  
Rp/R\* = 0.0093 [0.0029]  
a/R\* = 127.40 [146.37]  
b = 0.95 [0.13]  
Seff = 2310.67 [431.12]  
Teq = 1768 [82] K  
**Rp = 59.89 [22.62] Re**  
a = 0.5749 [0.0838] AU  
Ag = 1.03 [0.67] [0.04 $\sigma$ ]  
Teffp = 2752 [442] K [2.19 $\sigma$ ]

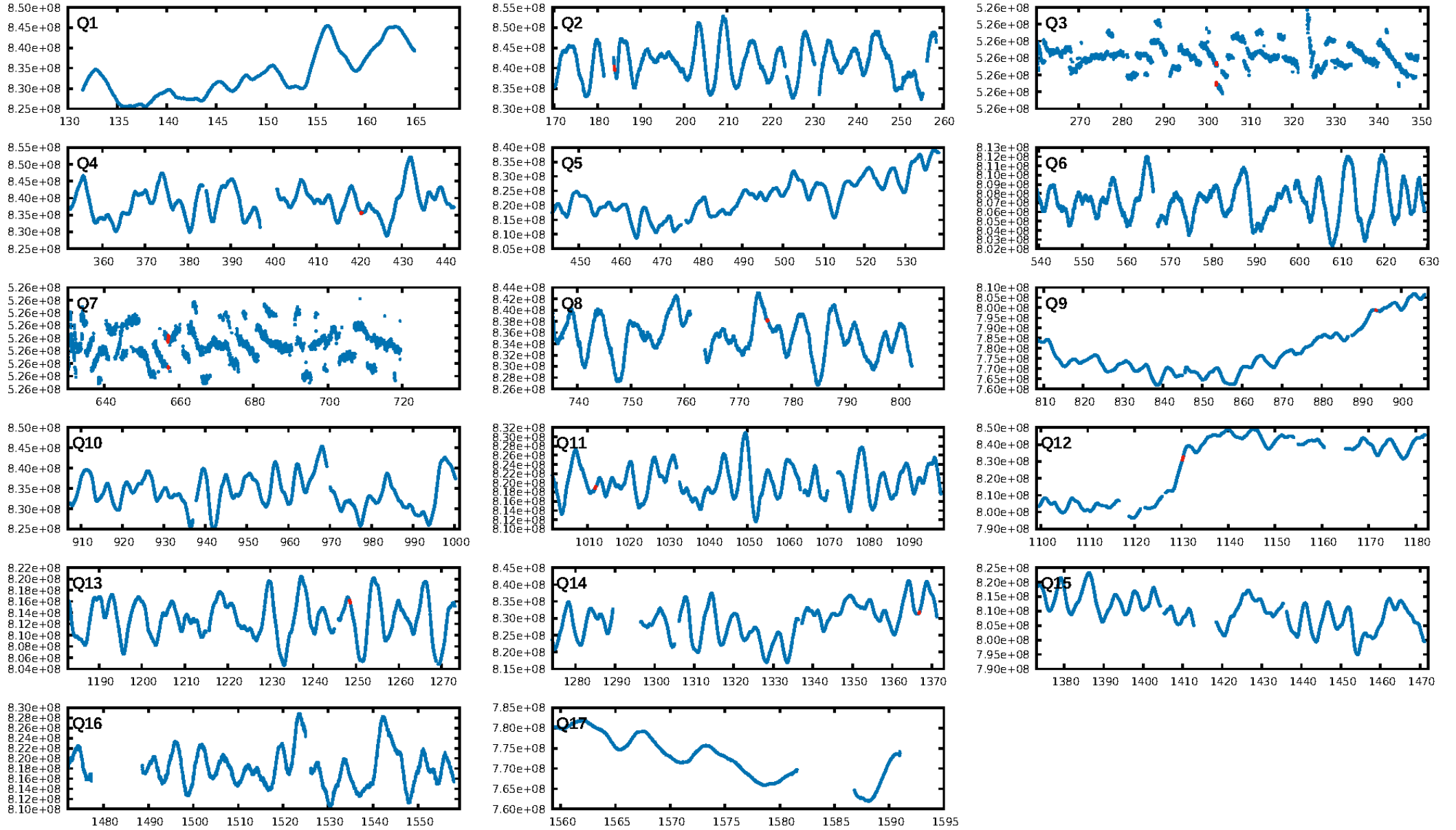
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [113.54 $\sigma$ ]  
LongPeriod-sig: 100.0% [143.19 $\sigma$ ]  
ModelChiSquare2-sig: 26.8%  
ModelChiSquareGof-sig: 94.8%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 0.80 [8/10]  
**GhostDiagnostic-chr: -0.5165**  
Centroid-sig: N/A  
Centroid-so: 1.524 arcsec [0.50 $\sigma$ ]  
OotOffset-rm: 2.663 arcsec [3.00 $\sigma$ ]  
OotOffset-st: 1/2/2/2 [7]  
KicOffset-rm: 2.425 arcsec [2.68 $\sigma$ ]  
KicOffset-st: 1/2/2/2 [7]  
DiffImageQuality-fgm: 0.43 [3/7]  
DiffImageOverlap-fno: 1.00 [8/8]

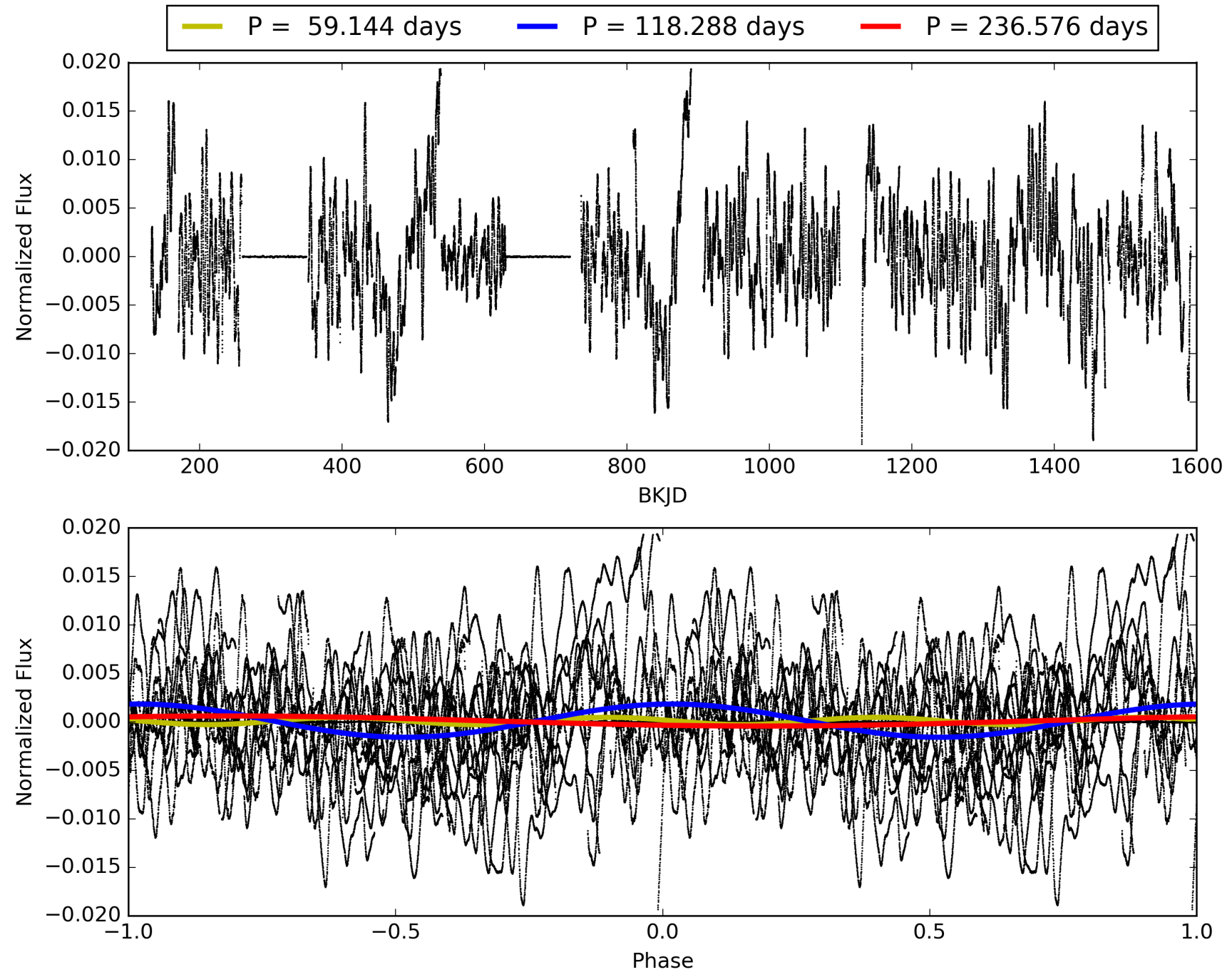
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:39:48 Z

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

# TCE 010599245-03, PDC Light Curves

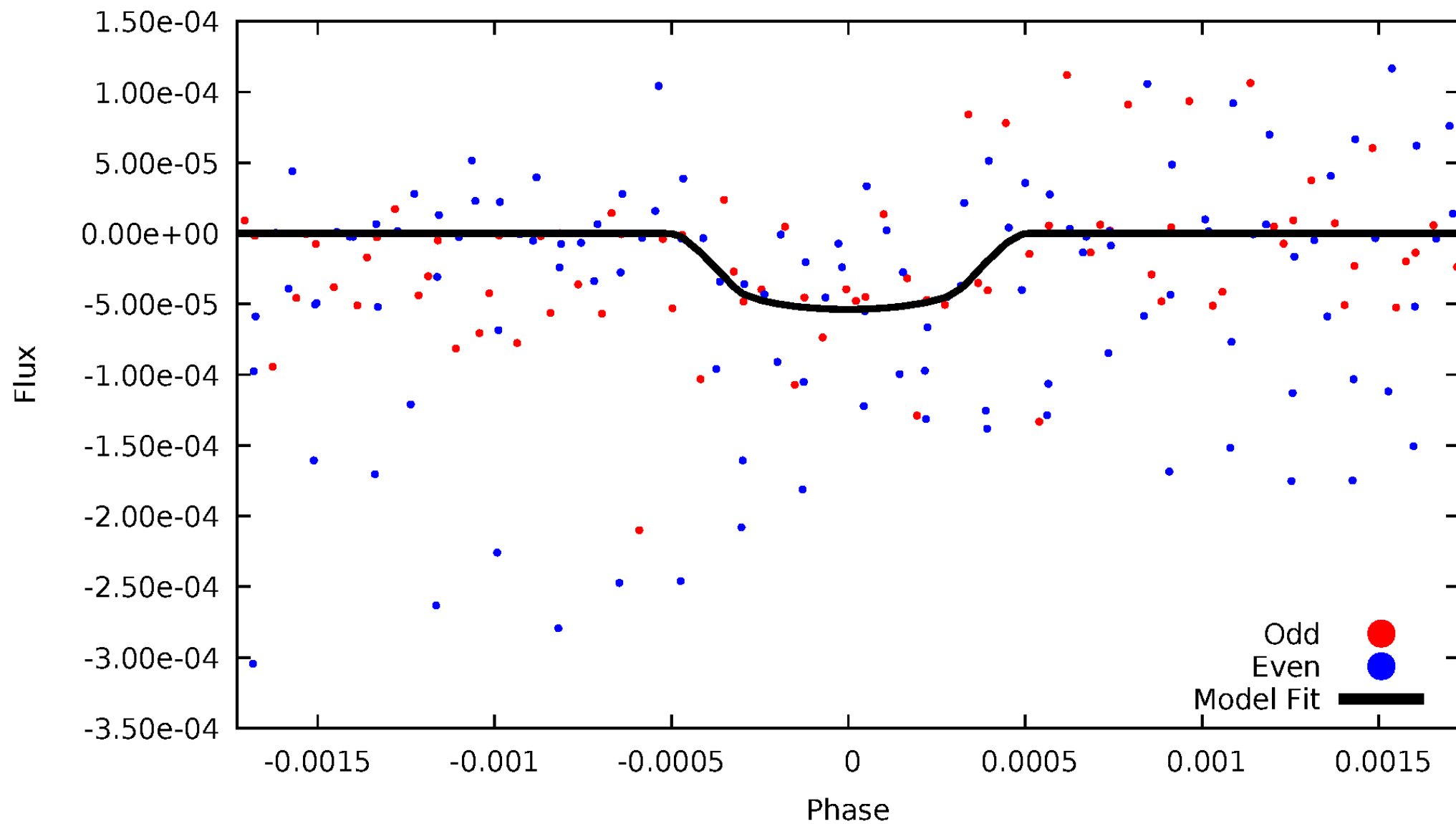


# TCE 010599245-03



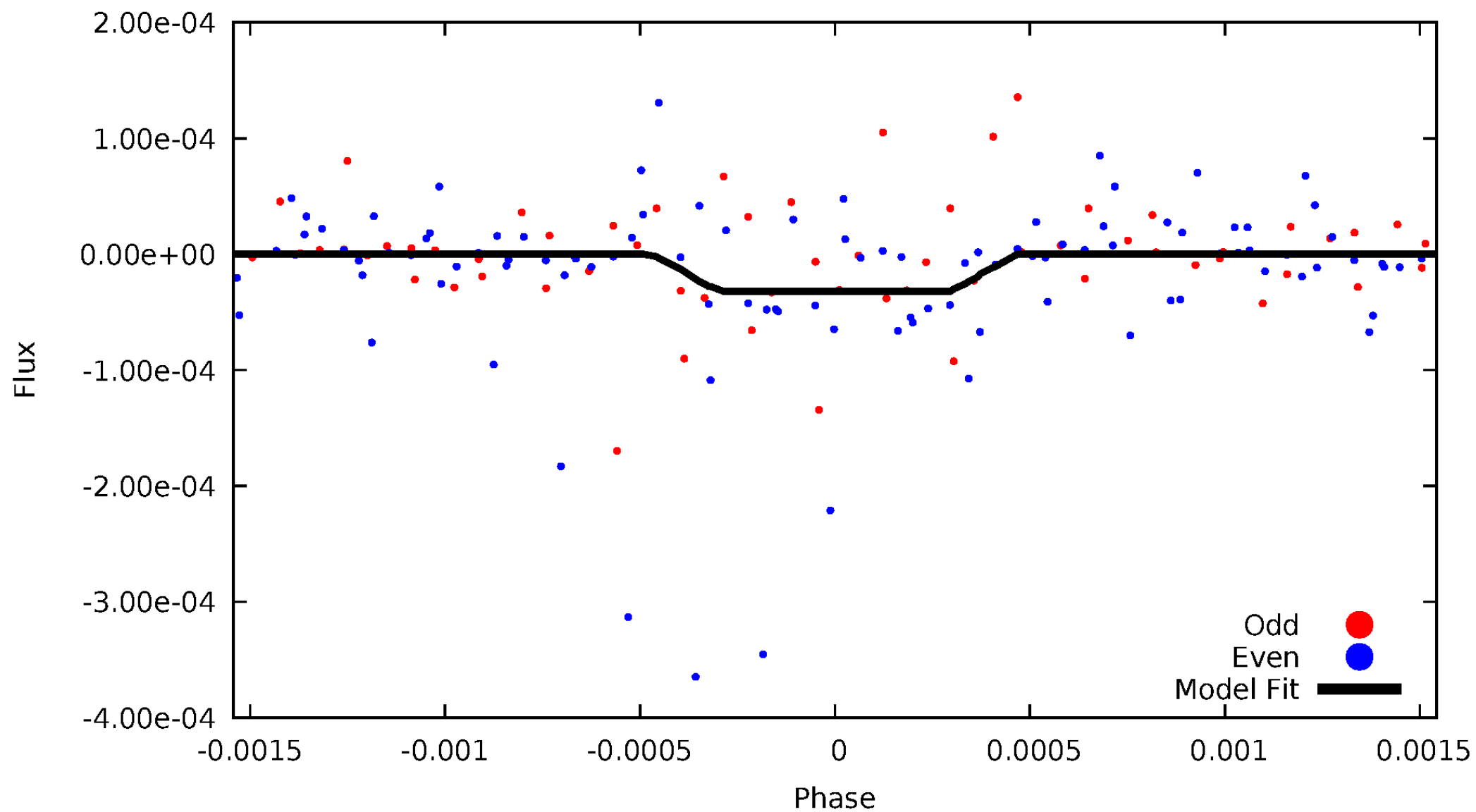
# DV Odd/Even

TCE 010599245-03



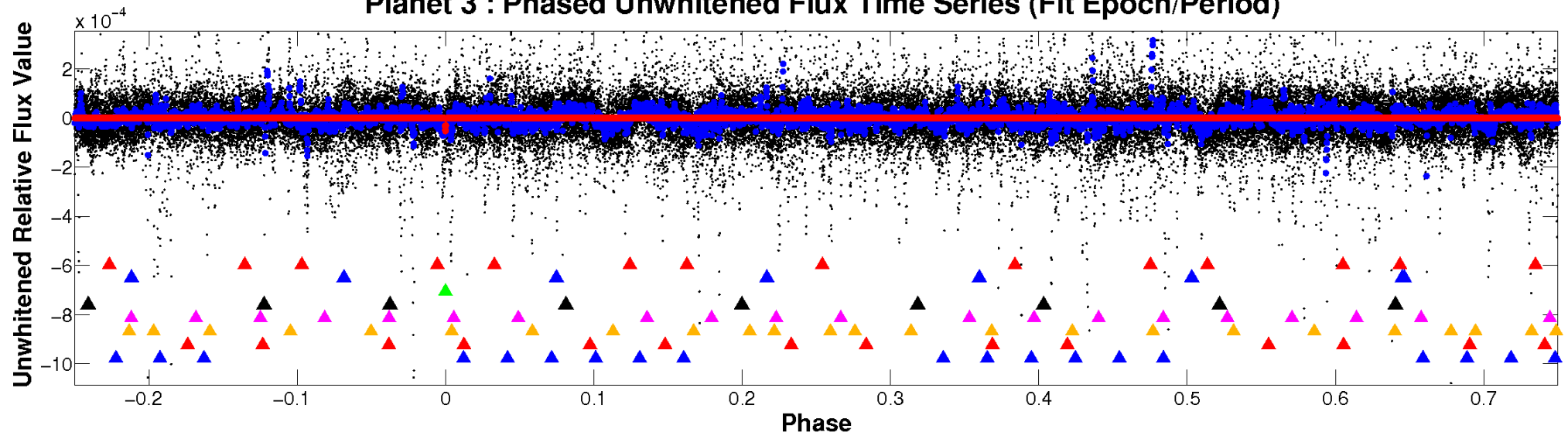
# ALT Odd/Even

TCE 010599245-03

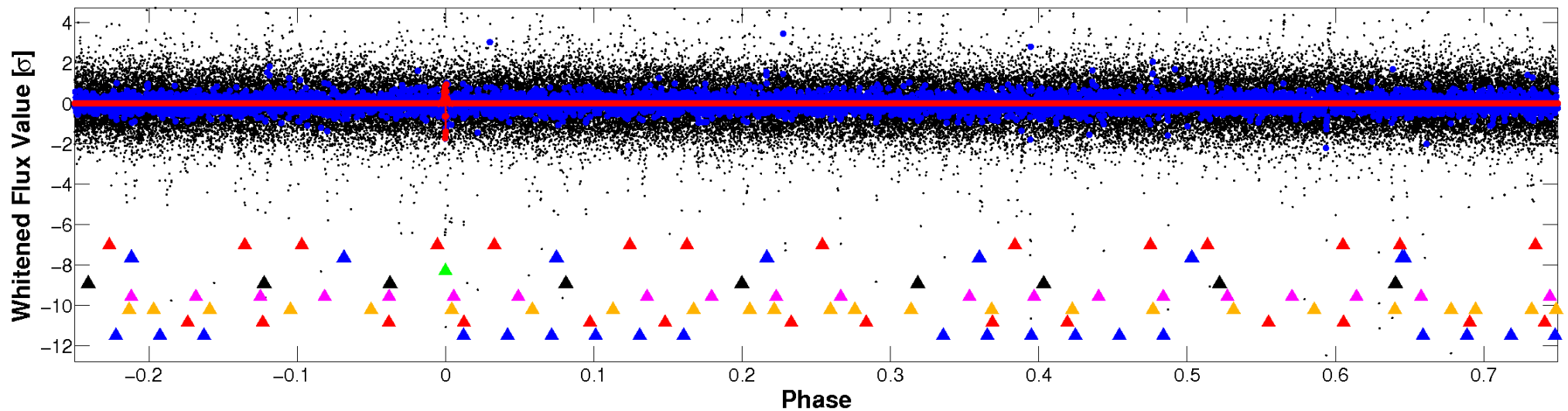


# Non-Whitened Vs. Whitened Light Curve

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



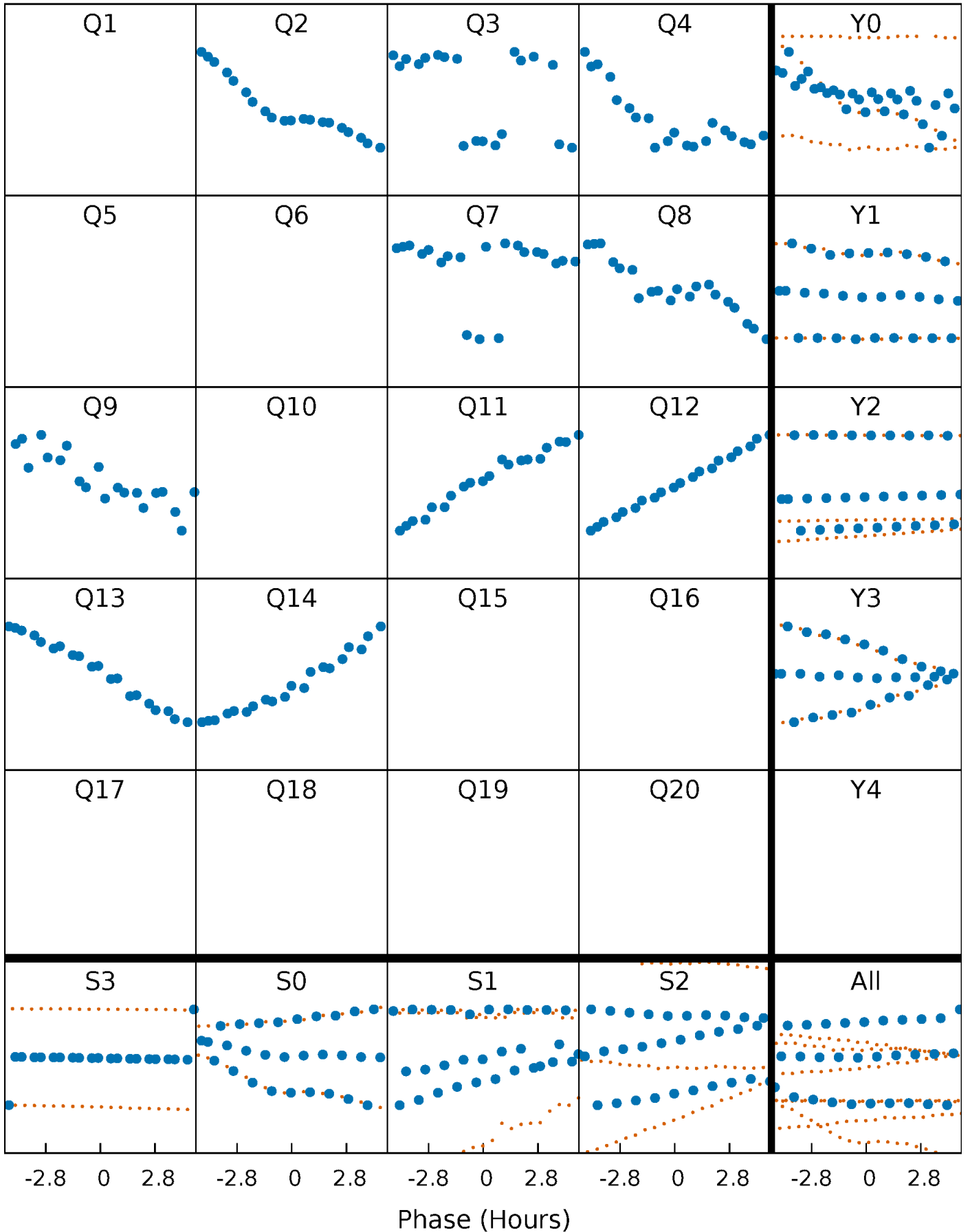
## Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)





# PDC Quarter-Phased Transit Curves

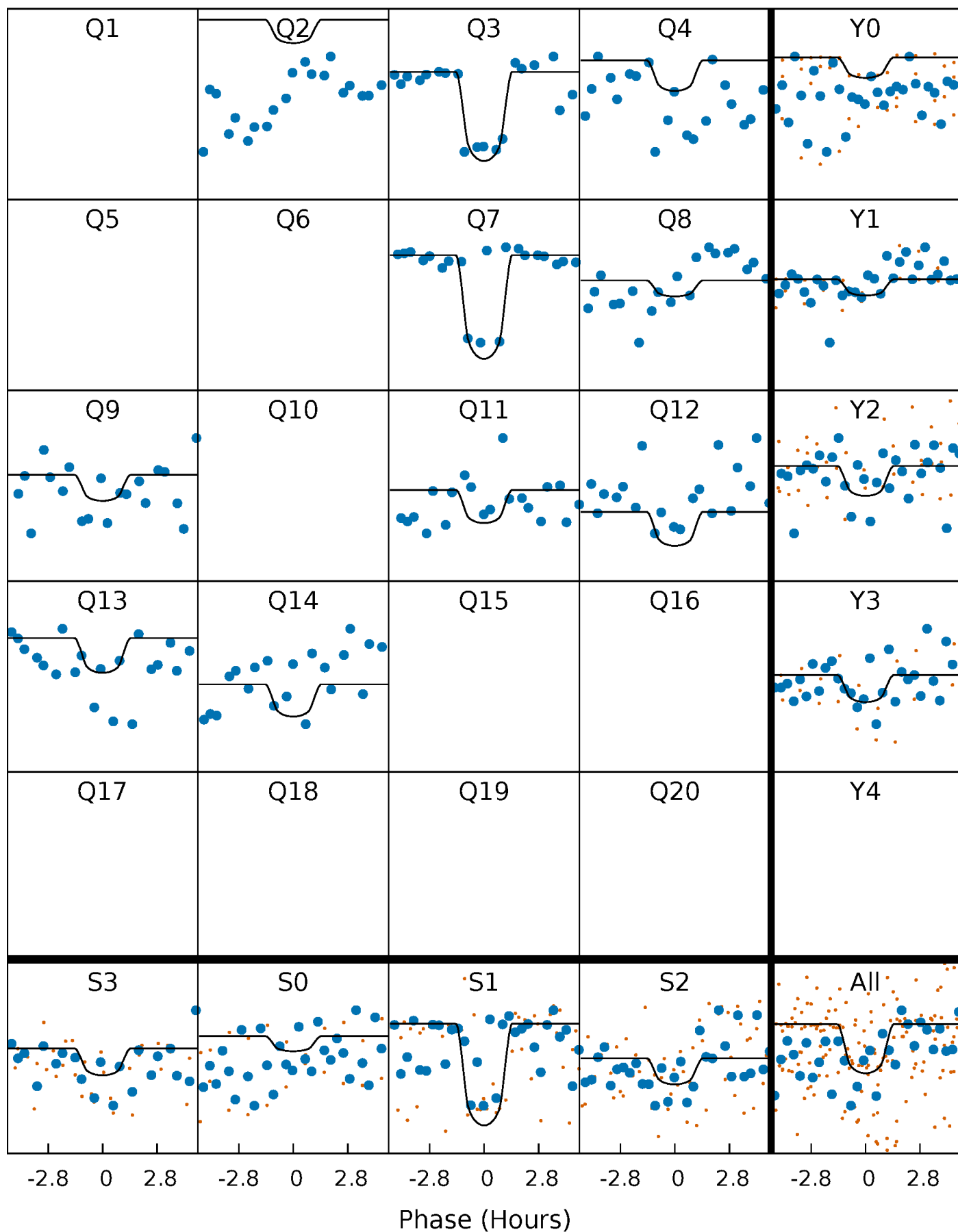
TCE 010599245-03 P=118.287967 Days  $T_0=183.981930$  (BKJD)





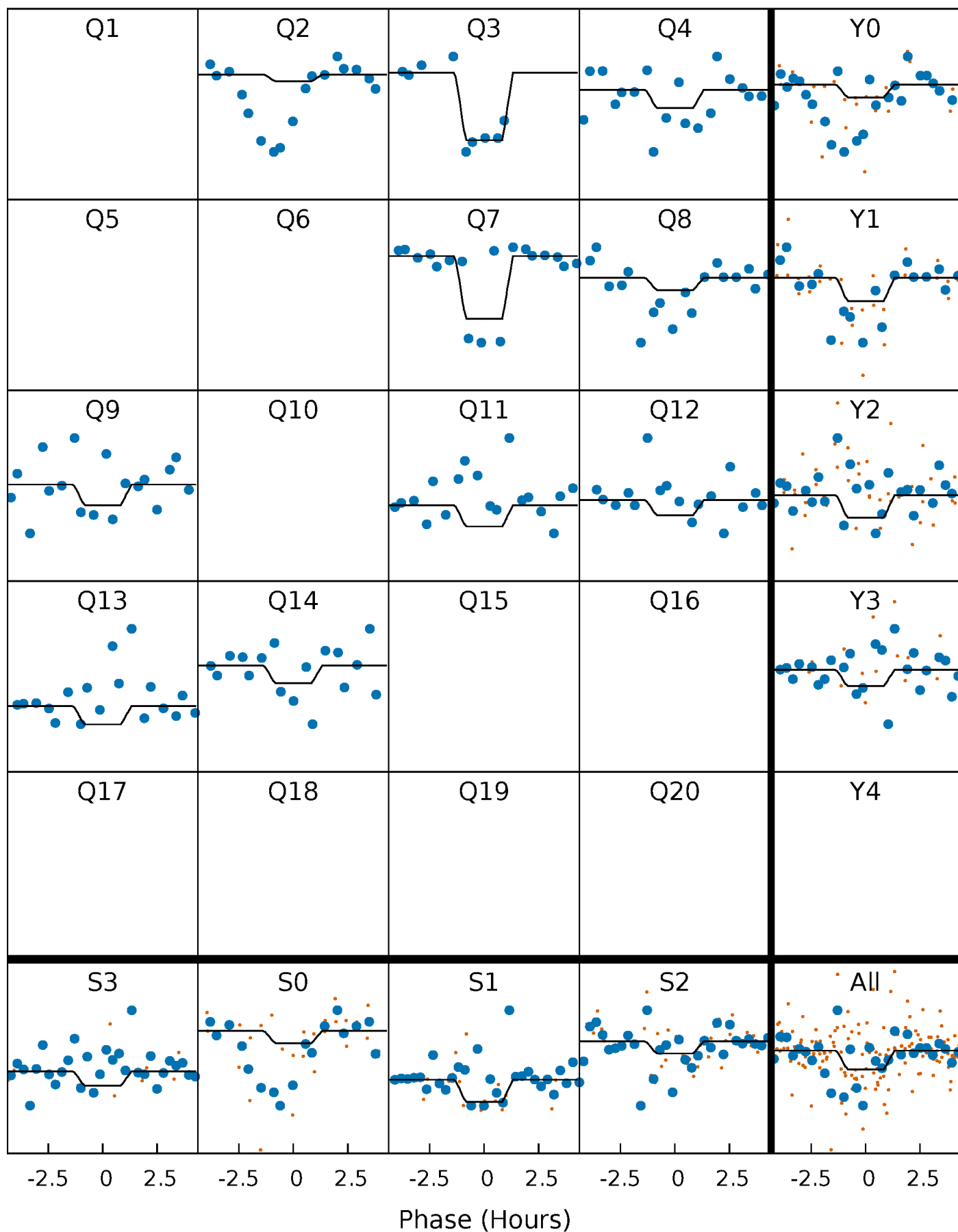
# DV Quarter-Phased Transit Curves

TCE 010599245-03 P=118.287967 Days  $T_0=183.981930$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

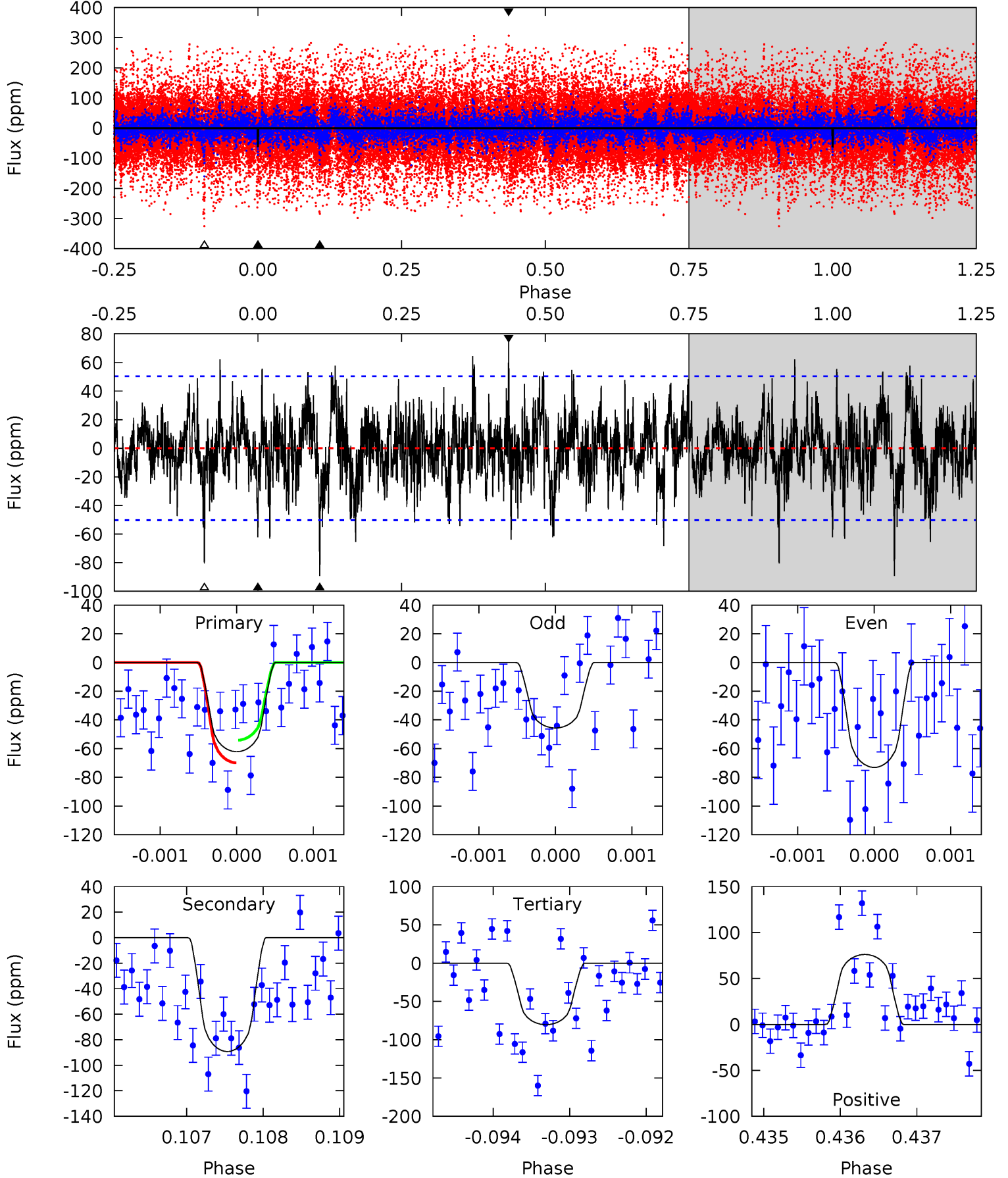
TCE 010599245-03 P=118.285907 Days  $T_0=183.988450$  (BKJD)



# DV Model-Shift Uniqueness Test

010599245-03, P = 118.287967 Days, E = 65.693963 Days

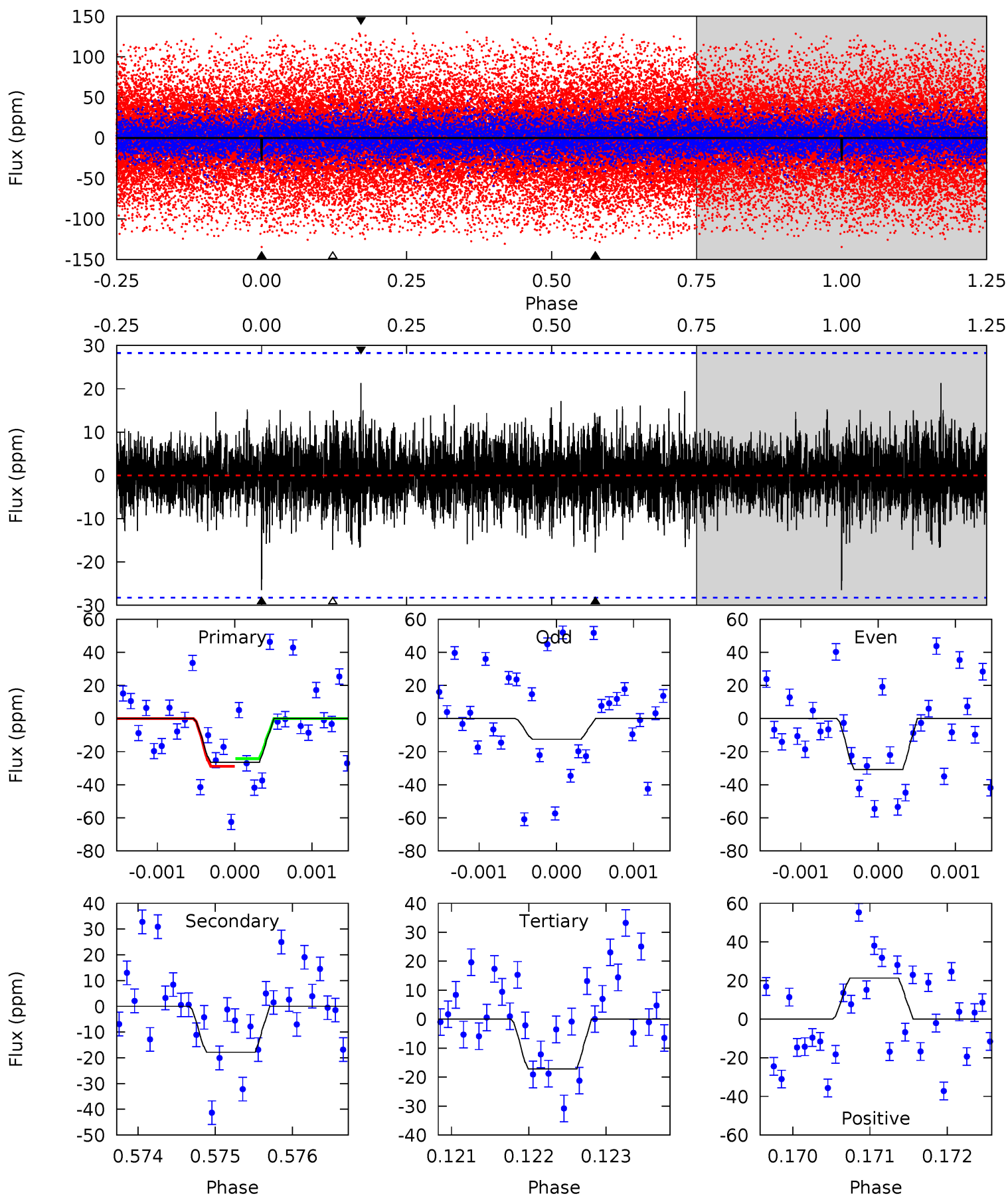
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.74	9.68	8.71	8.25	5.45	3.29	2.05	-1.97	-1.51	0.96	1.42	1.42	1.30	0.46	0.86



# Alt Model-Shift Uniqueness Test

010599245-03, P = 118.285907 Days, E = 65.702543 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.12	3.45	3.32	4.12	5.47	3.31	0.93	1.80	1.00	0.13	-0.67	1.78	1.27	0.45	0.45



### Stellar Parameters For KIC 010599245

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$3951^{+79}_{-108}$	$1.152^{+0.030}_{-0.030}$	$-0.100^{+0.200}_{-0.250}$	$59.143^{+2.129}_{-12.775}$	$1.811^{+0.036}_{-0.688}$	$0.000^{+0.000}_{-0.000}$
	+2%/-3%	+3%/-3%	+200%/-250%	+4%/-22%	+2%/-38%	+30%/-8%
Source	PHO54	AST54	PHO54	DSEP		

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

### Secondary Eclipse Parameters for KIC 010599245-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-89 \pm 9$	$60.40^{+18.44}_{-18.20}$	$2471^{+61}_{-74}$	$3889^{+597}_{-357}$	$4.473^{+4.279}_{-1.879}$
Alt.	$-18 \pm 5$	$36.98^{+18.78}_{-17.83}$	$2475^{+62}_{-81}$	$3457^{+996}_{-527}$	$2.280^{+6.254}_{-1.329}$

$T_{max}$  = 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

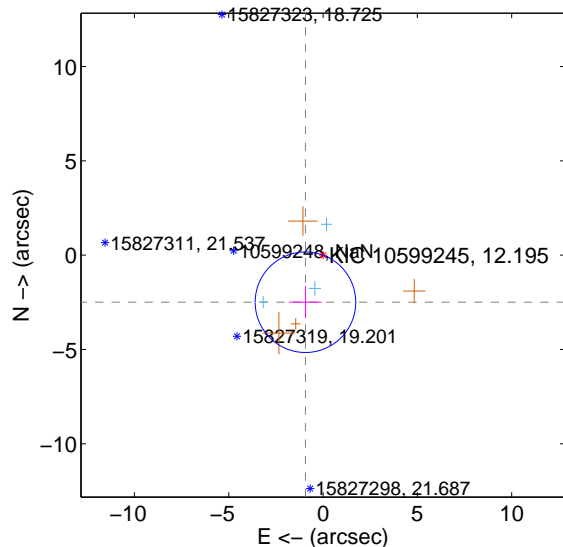
Supplemental centroid analysis for 010599245-03. Kepler magnitude: 12.20. Transit SNR 15.80

There are 3 quarters with good PRF difference image offsets

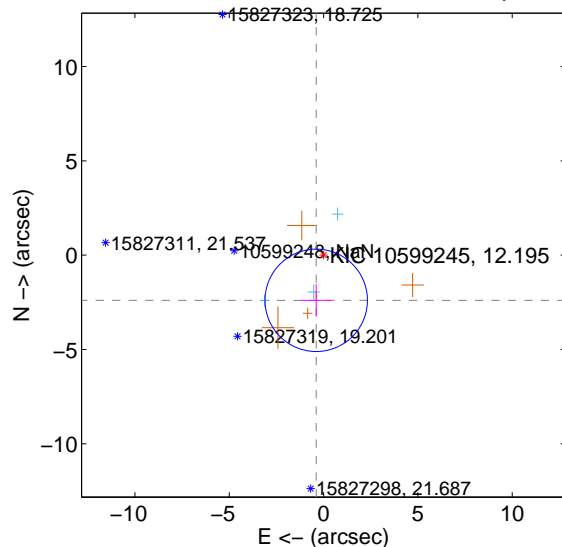
The direct PRF centroid is offset from the target star catalog position by about 0.09 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.663 \pm 0.888$	3.00	$0.932 \pm 0.851$	$-2.494 \pm 0.847$
PRF-fit source offset from KIC position	$2.425 \pm 0.905$	2.68	$0.390 \pm 0.812$	$-2.393 \pm 0.861$
photometric centroid source offset	$1.52 \pm 3.05$	0.50	$0.31 \pm 2.19$	$-1.49 \pm 3.09$

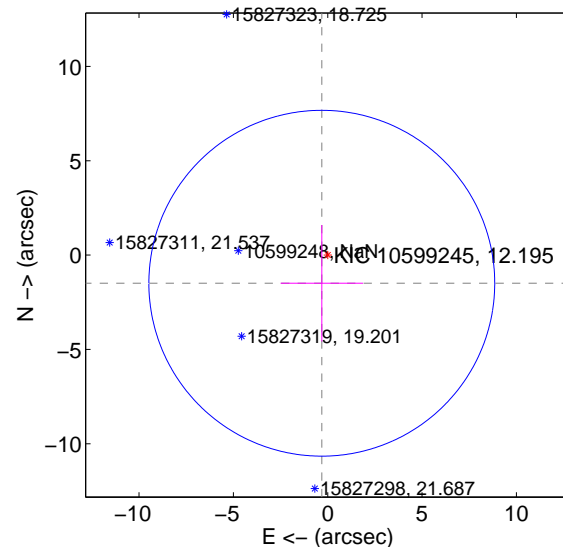
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



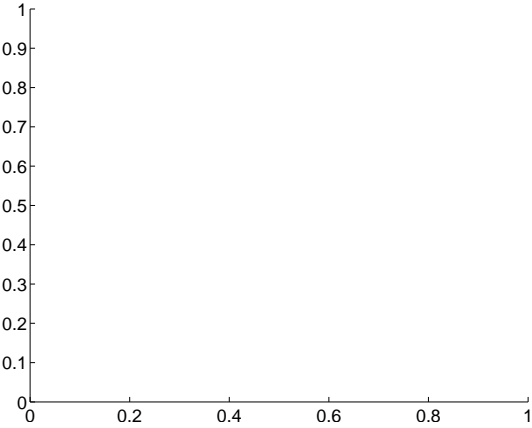
offset from photometric centroids



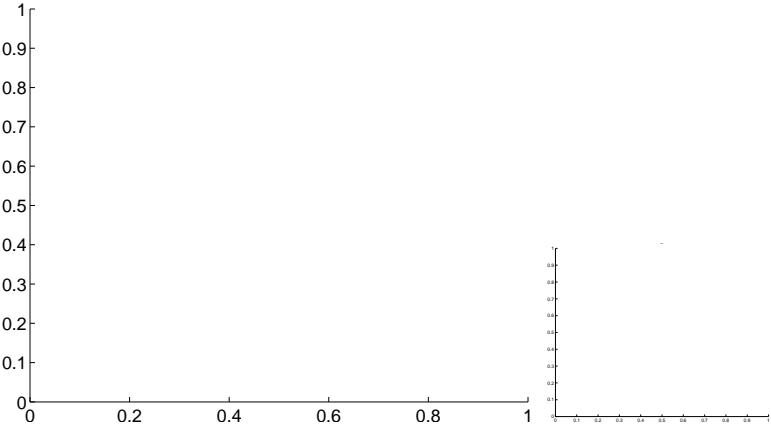
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

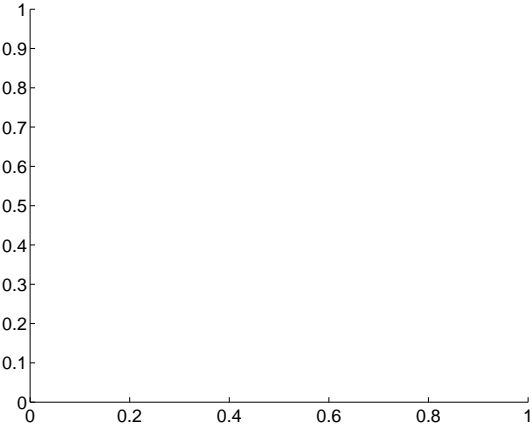
Q1 no difference image



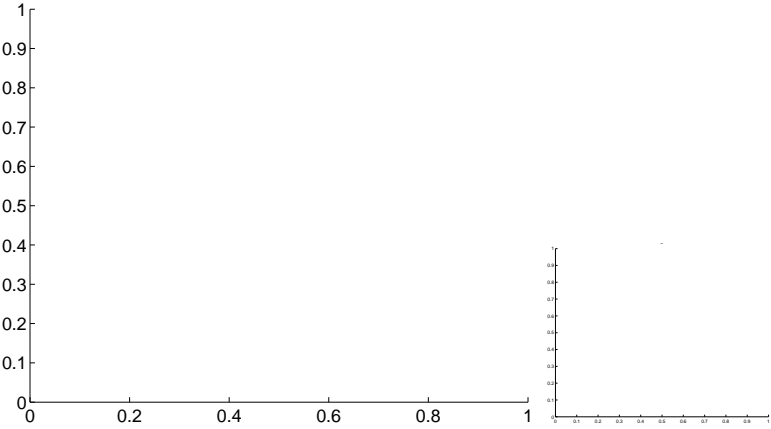
Q1 no OOT image



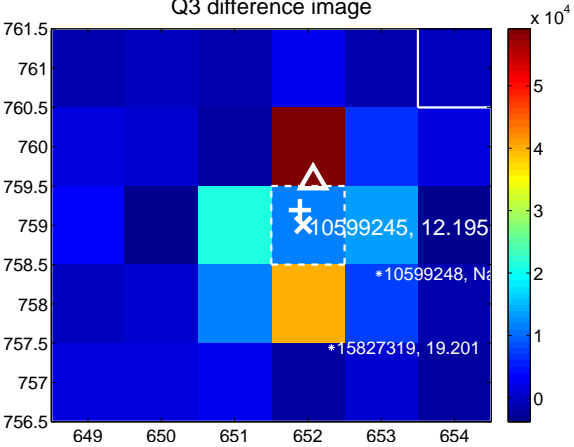
Q2 no difference image



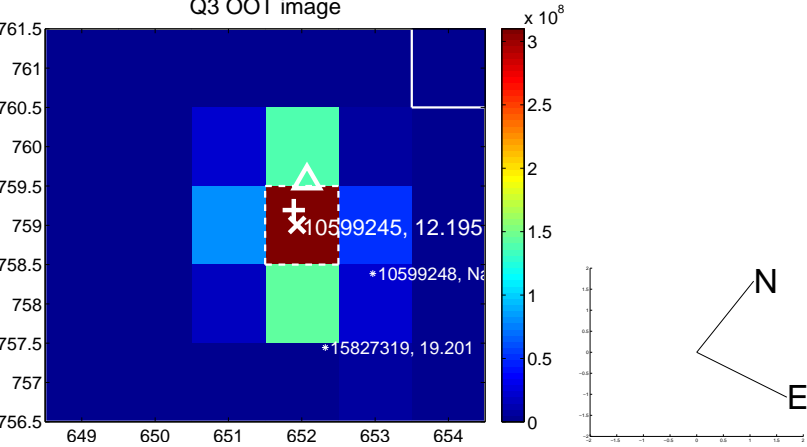
Q2 no OOT image



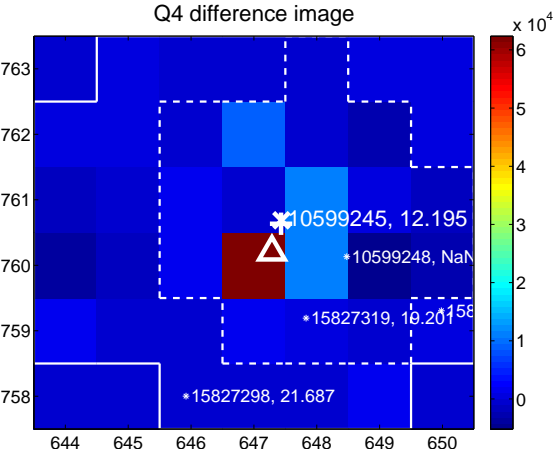
Q3 difference image



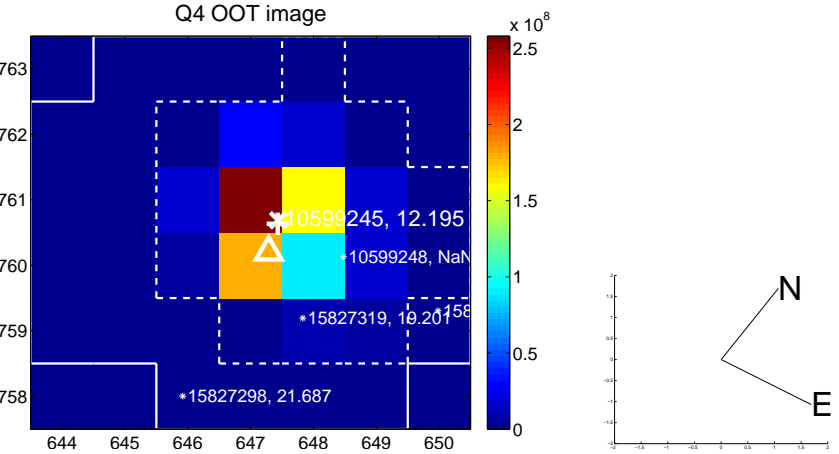
Q3 OOT image



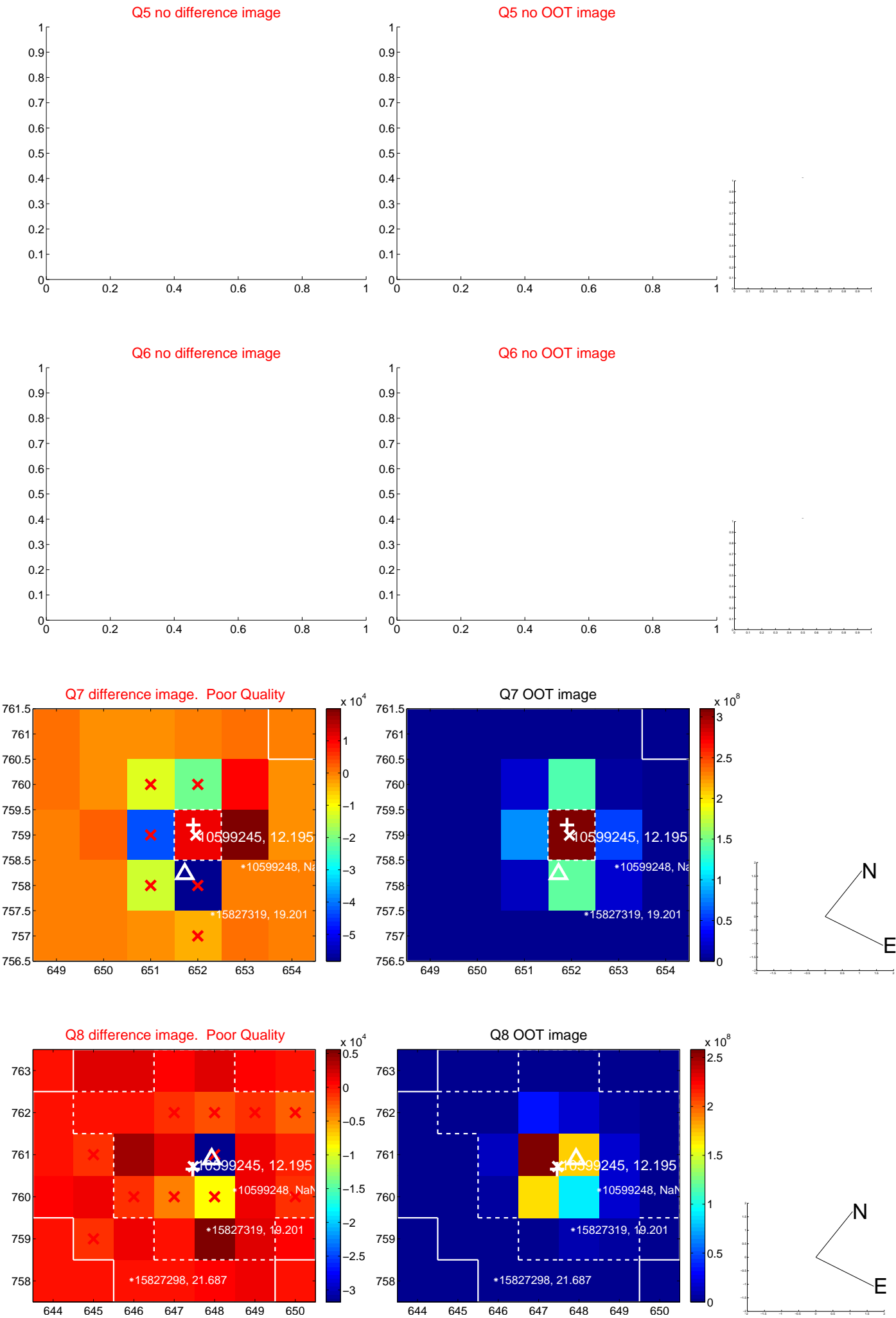
Q4 difference image



Q4 OOT image

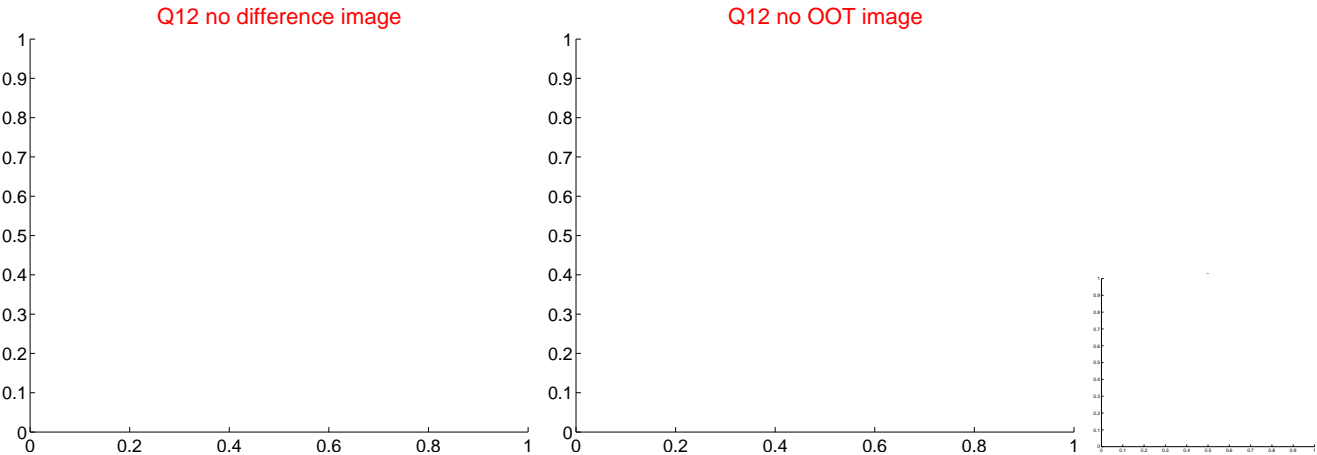
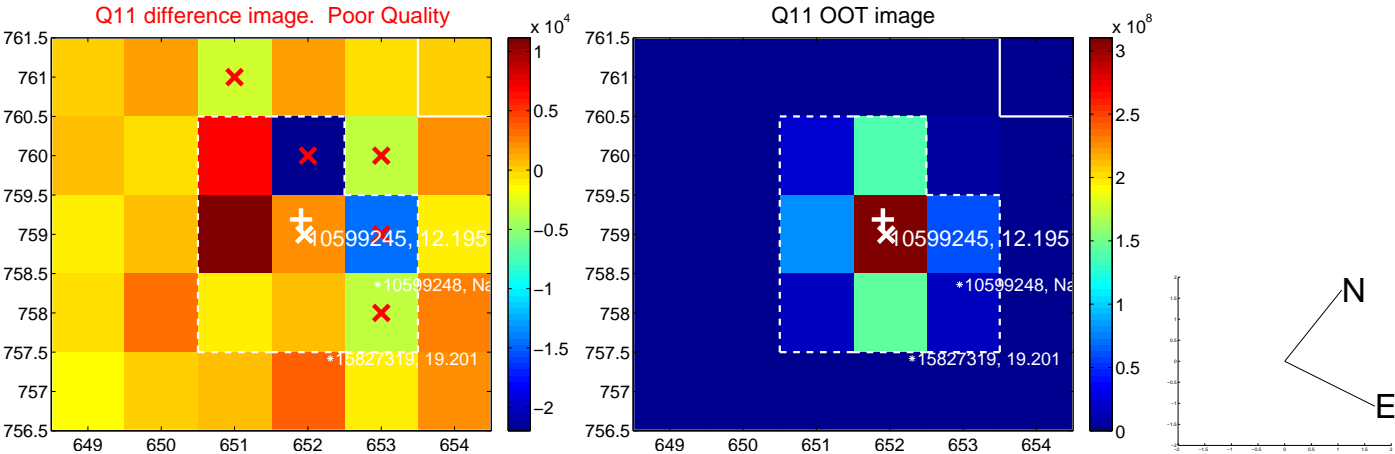
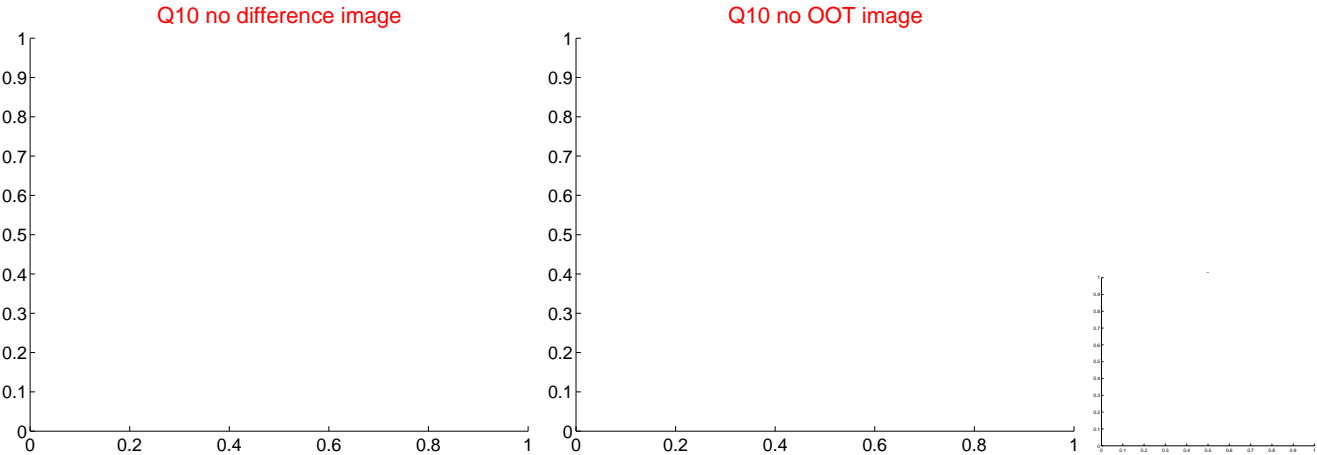
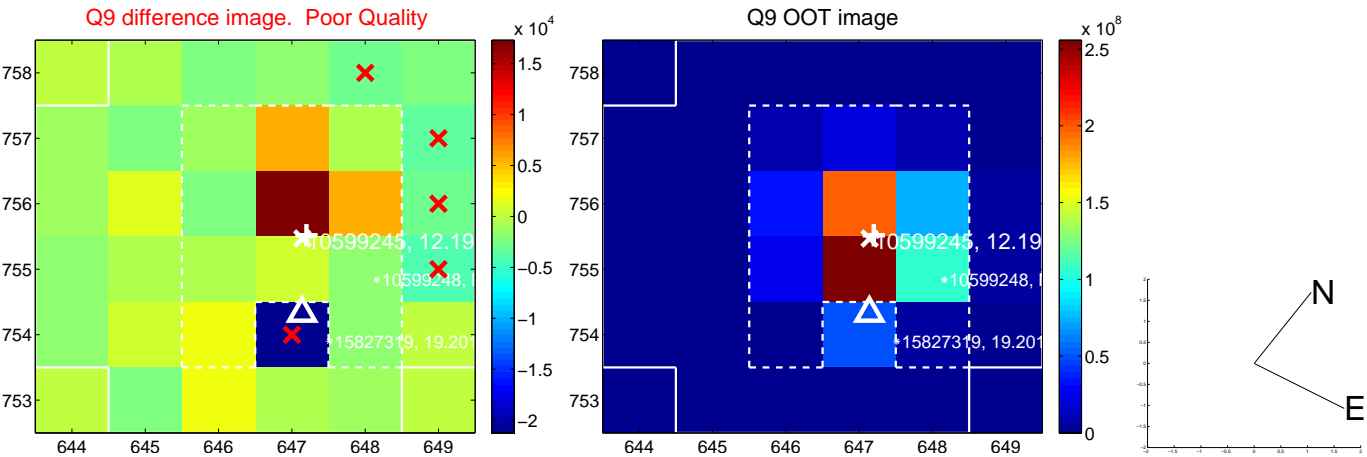


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

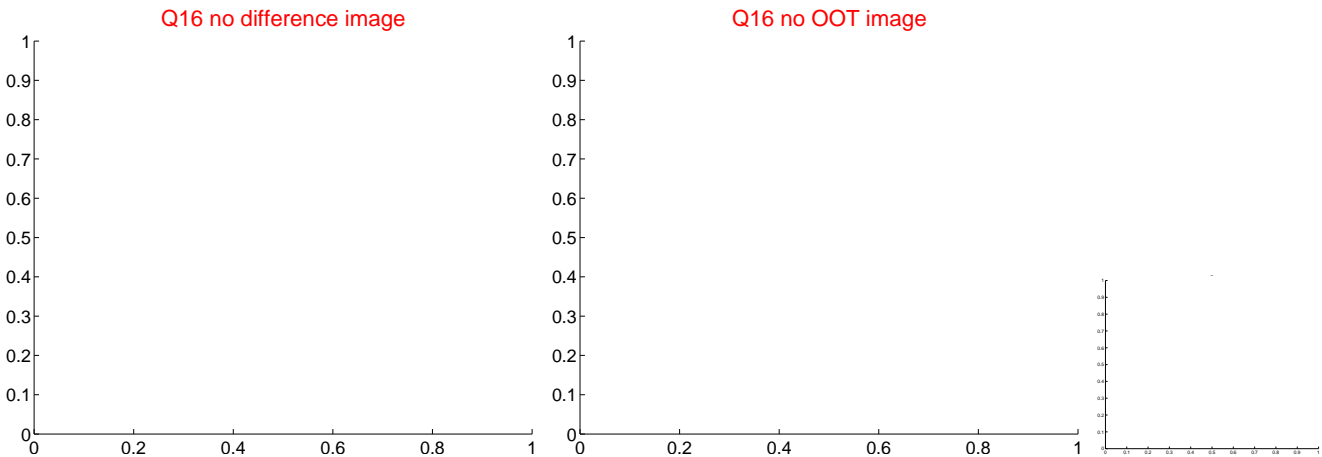
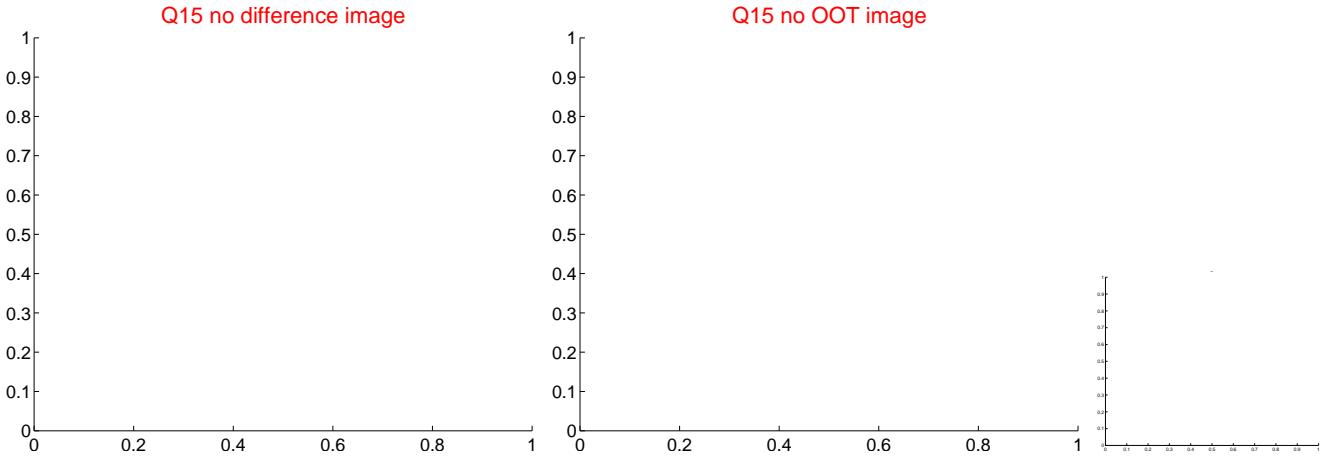
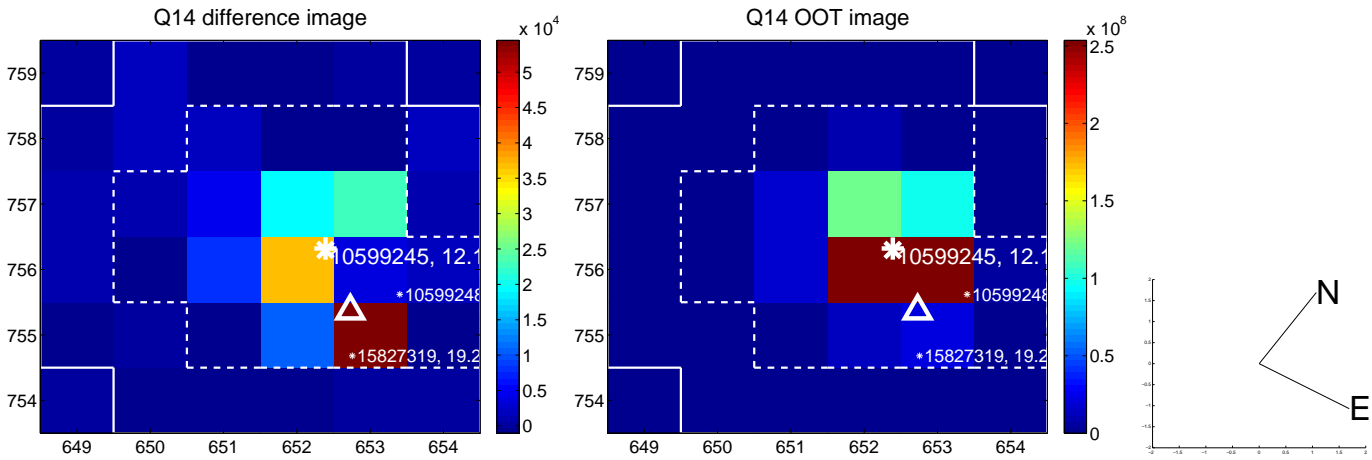
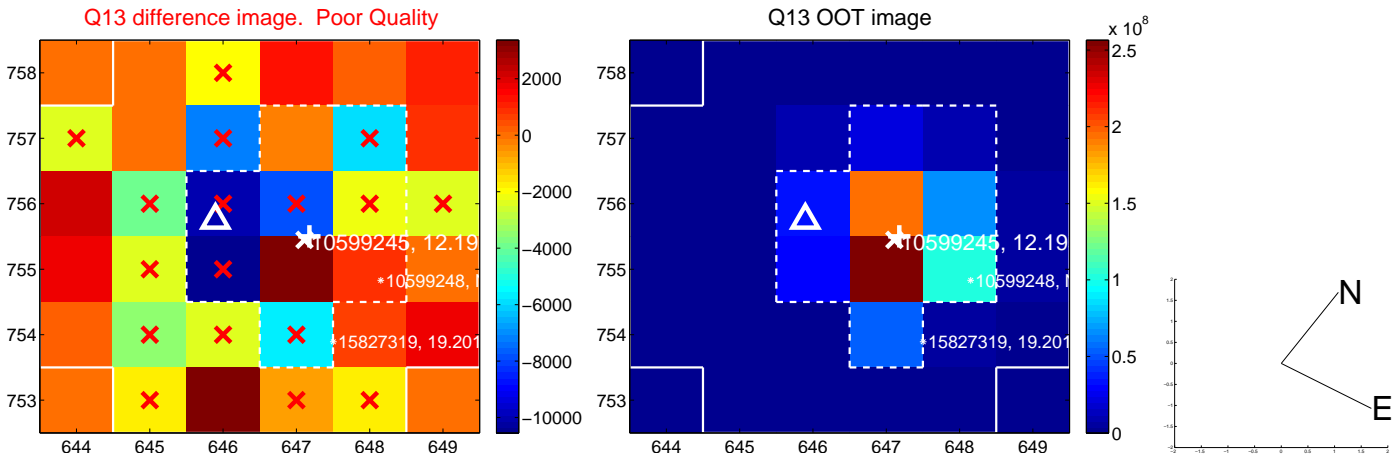




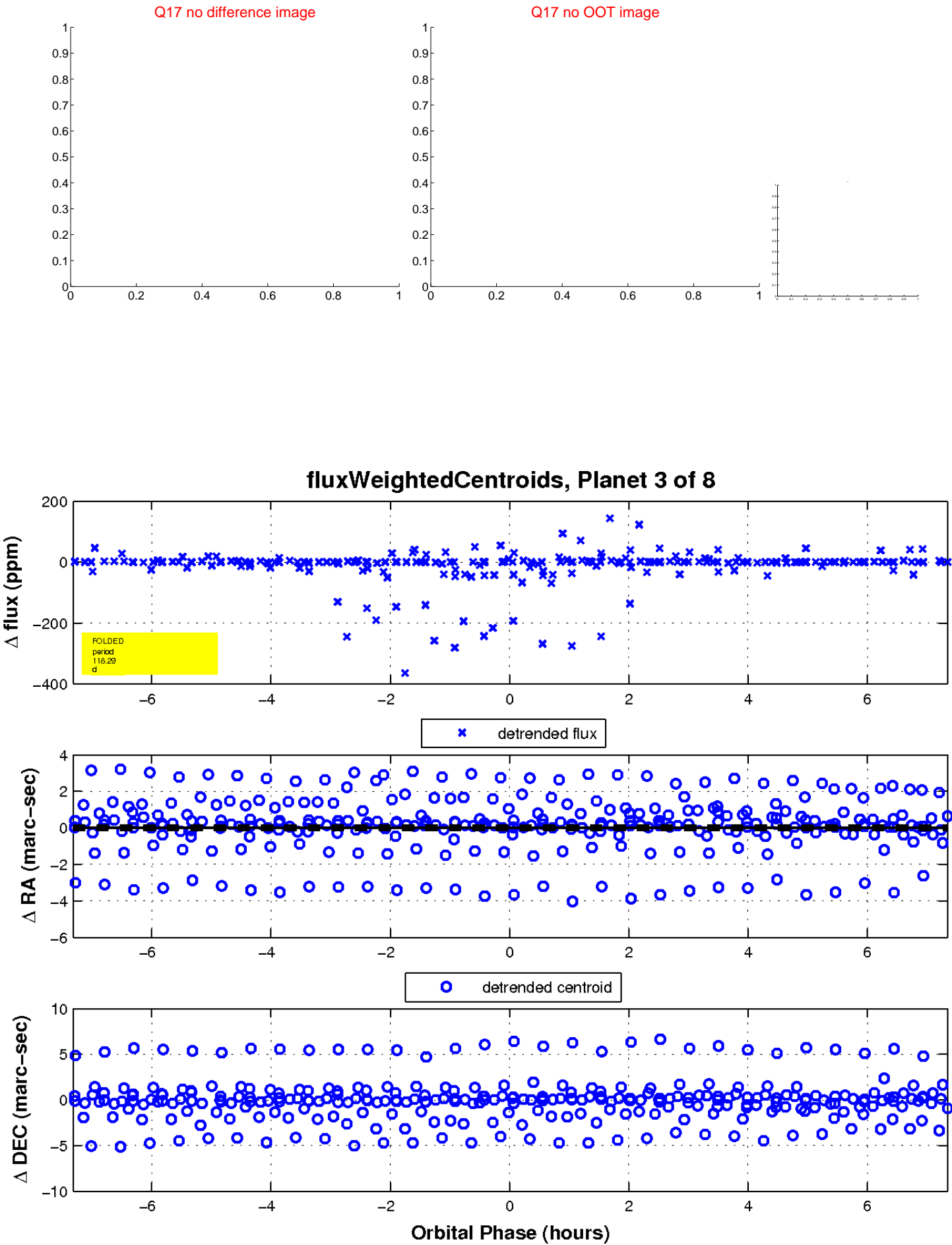
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



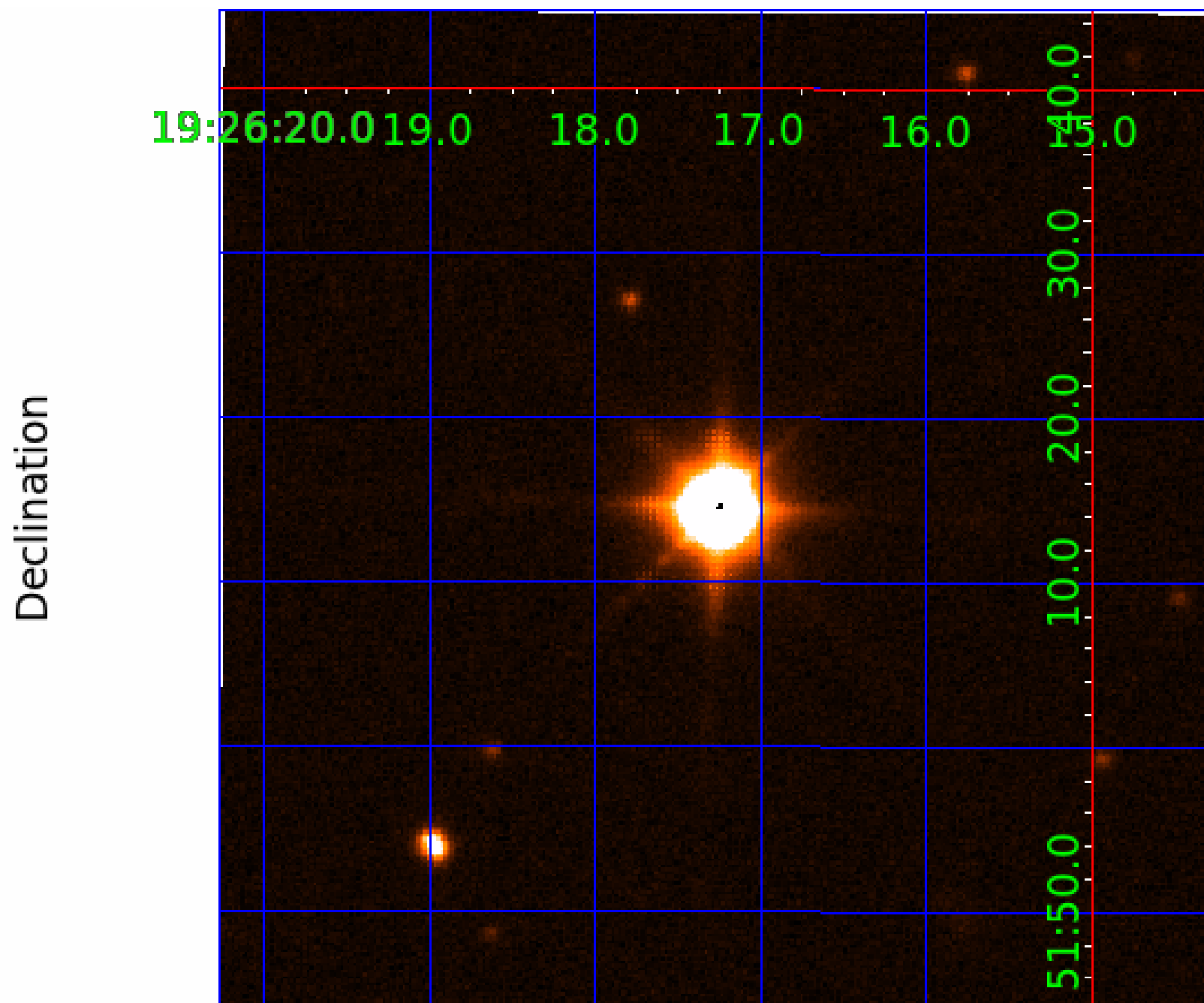
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image



# KIC 010599245

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010599245-01	OBS	No	102.933504	203.234932	42.4	2.126	28.2	19.6	59.14	3951	51.05	2781.31
010599245-02	OBS	No	185.904559	141.996123	43.9	3.508	16.3	14.6	59.14	3951	47.53	1264.56
010599245-03	OBS	No	118.287967	183.981930	53.7	2.452	15.0	15.8	59.14	3951	59.89	2310.67
010599245-04	OBS	No	170.417068	169.518612	39.7	8.386	14.7	10.0	59.14	3951	43.03	1420.06
010599245-05	OBS	No	72.002790	174.339797	6.7	4.067	14.5	2.3	59.14	3951	19.66	4479.12
010599245-06	OBS	No	62.359596	145.890783	20.7	5.466	13.7	9.2	59.14	3951	33.90	5425.67
010599245-07	OBS	No	102.244200	227.599922	46.6	2.835	13.4	13.2	59.14	3951	52.19	2806.34
010599245-08	OBS	No	80.029016	143.655157	38.5	1.930	13.1	12.9	59.14	3951	45.51	3890.40

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010599245-01	OBS	FP	0.00	1	0	1	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—CENT_UNRESOLVED_OFFSET—HALO_GHOST
010599245-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE_ZUMA—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
010599245-03	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
010599245-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_MARSHALL_SKYE_ZUMA—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_UNRESOLVED_OFFSET
010599245-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
010599245-06	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
010599245-07	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_KIC_POS—CENT_UNCERTAIN
010599245-08	OBS	FP	0.00	1	0	0	0	LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_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.

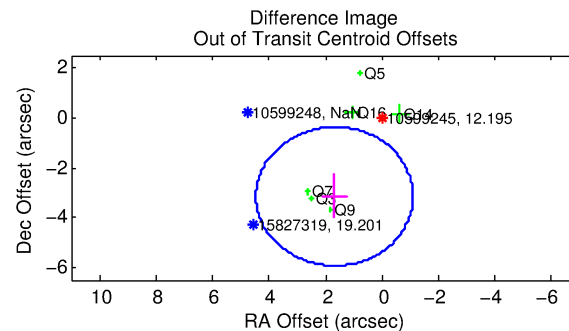
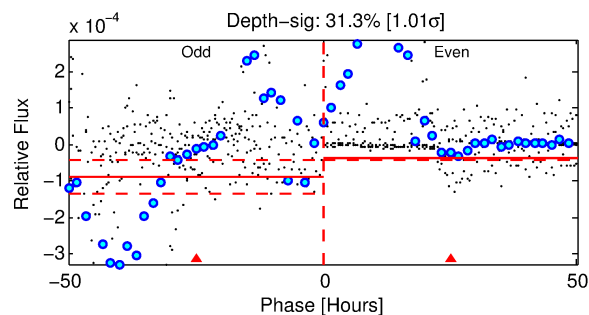
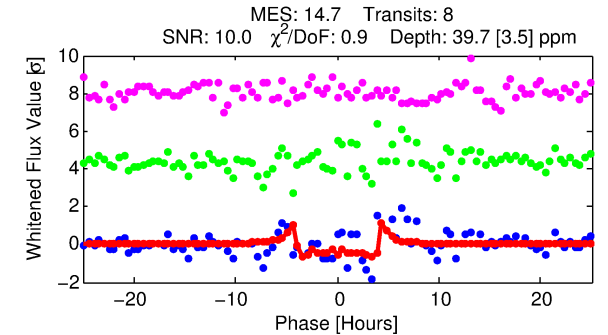
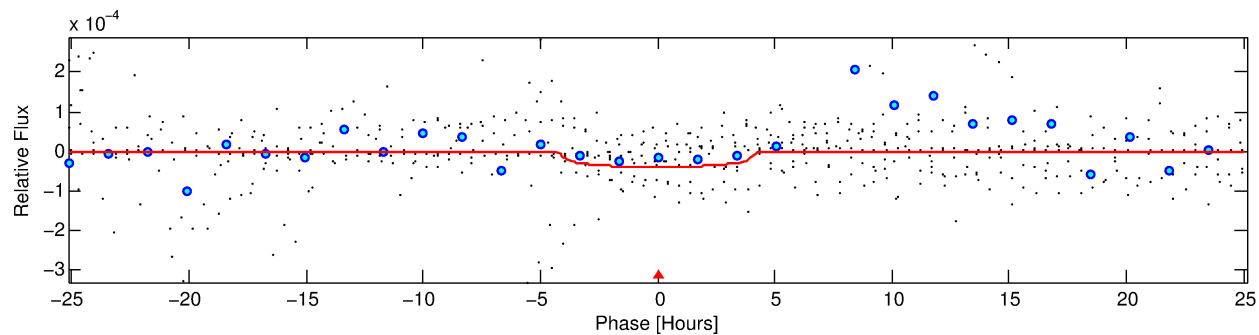
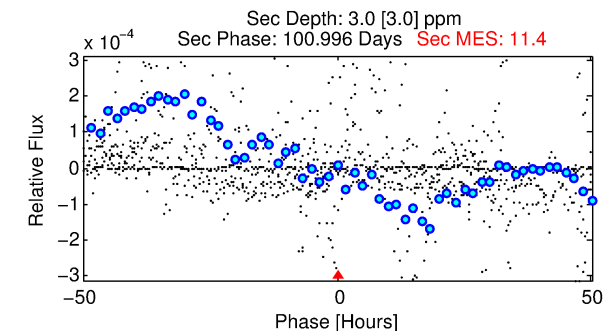
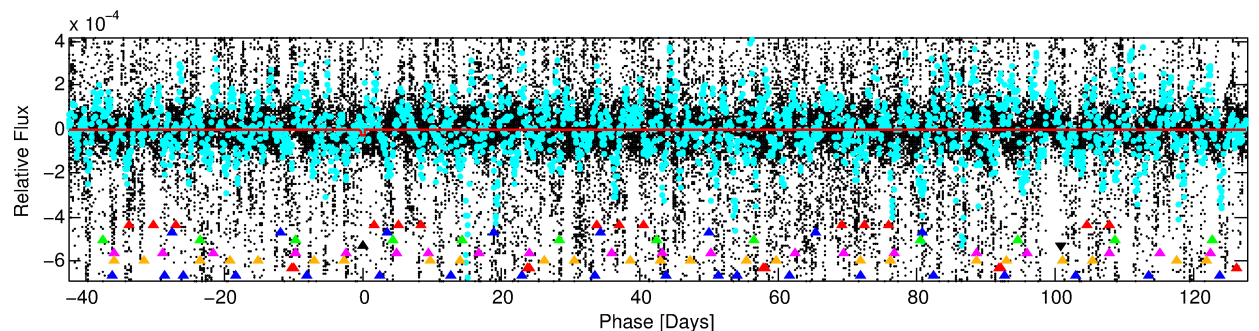
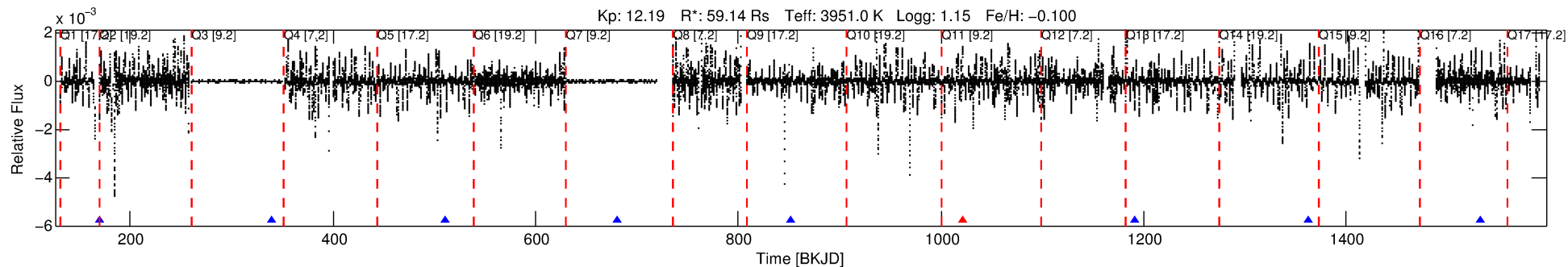
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 010599245-04

No Significant Match Found

# DV One-Page Summary

KIC: 10599245 Candidate: 4 of 8 Period: 170.417 d



## DV Fit Results:

Period = 170.41707 [0.00177] d  
Epoch = 169.5186 [0.0039] BKJD  
Rp/R\* = 0.0067 [0.0009]  
a/R\* = 90.74 [37.24]  
b = 0.82 [0.17]  
Seff = 1420.06 [264.96]  
Teq = 1565 [73] K  
Rp = 43.03 [11.11] Re  
a = 0.7333 [0.1069] AU  
Ag = 0.47 [0.51] [-1.03σ]  
Teffp = 2009 [537] K [0.82σ]

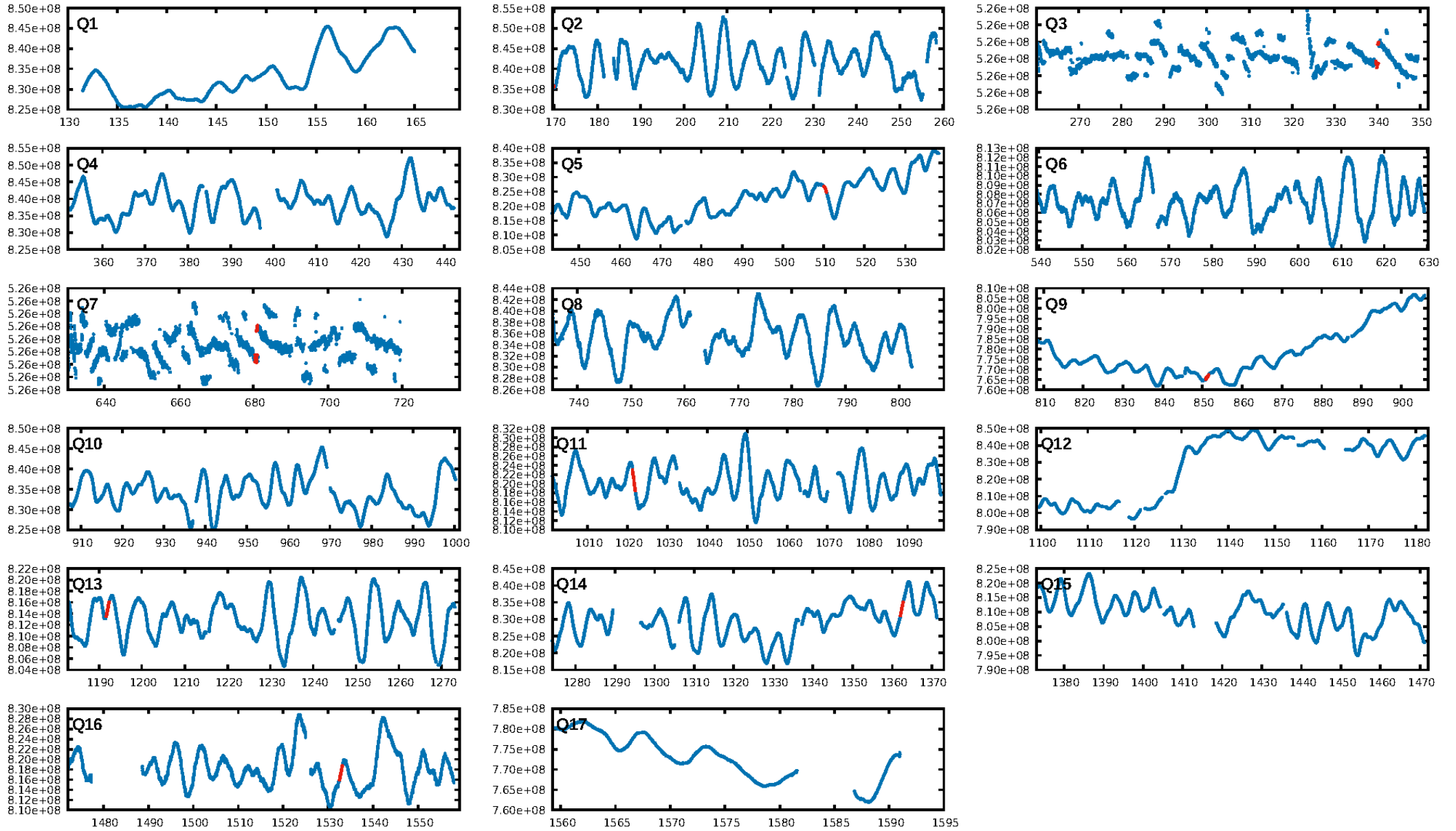
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [143.19σ]  
LongPeriod-sig: 100.0% [40.89σ]  
ModelChiSquare2-sig: 81.1%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 0.88 [7/8]  
GhostDiagnostic-chr: -1.674  
Centroid-sig: N/A  
Centroid-so: 5.100 arcsec [1.74σ]  
OotOffset-rm: 3.573 arcsec [3.86σ]  
KicOffset-rm: 3.143 arcsec [3.87σ]  
OotOffset-st: 1/2/1/2 [6]  
KicOffset-st: 1/2/1/2 [6]  
DiffImageQuality-fgm: 0.50 [3/6]  
DiffImageOverlap-fno: 1.00 [6/6]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:39:56 Z

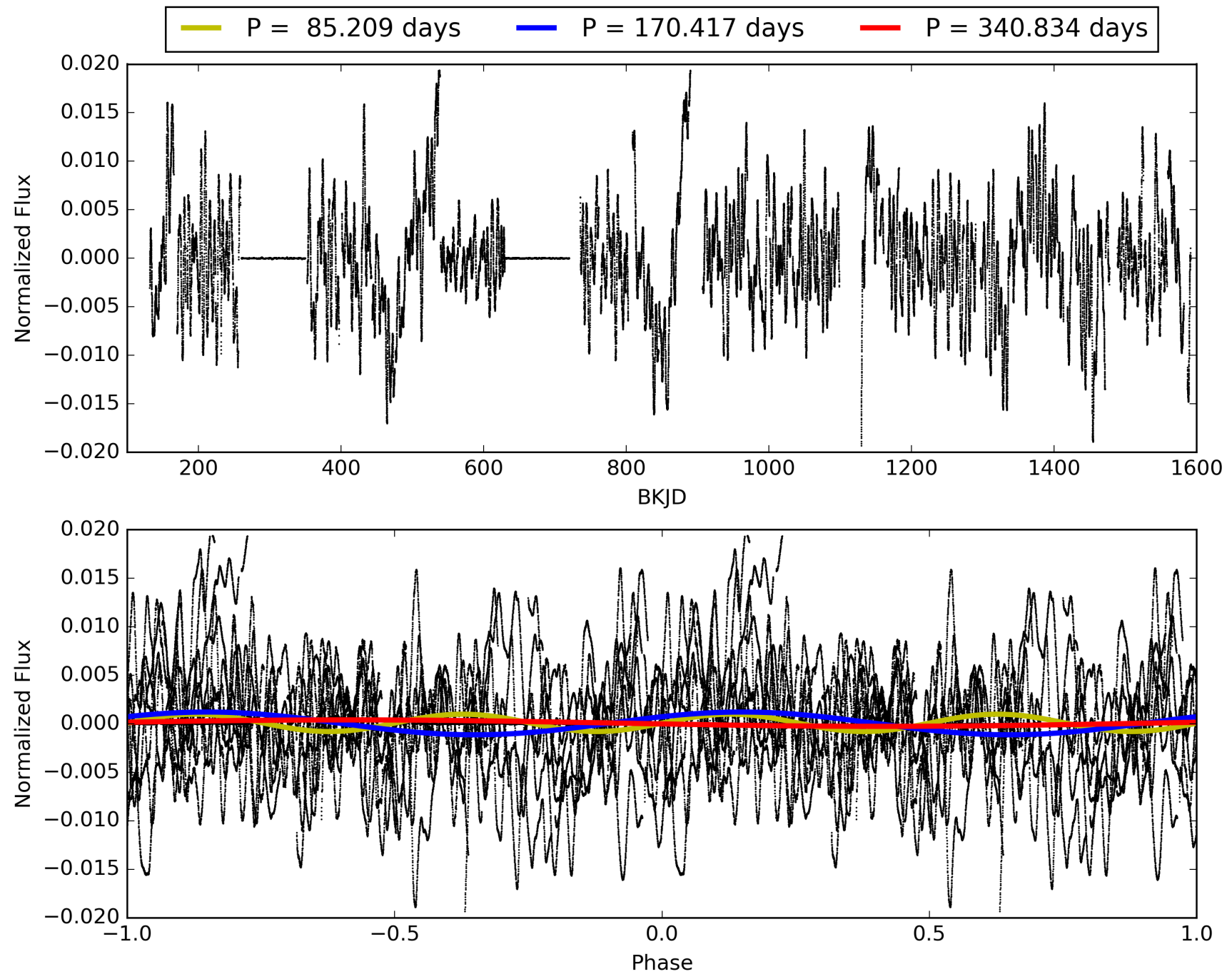
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 010599245-04, PDC Light Curves





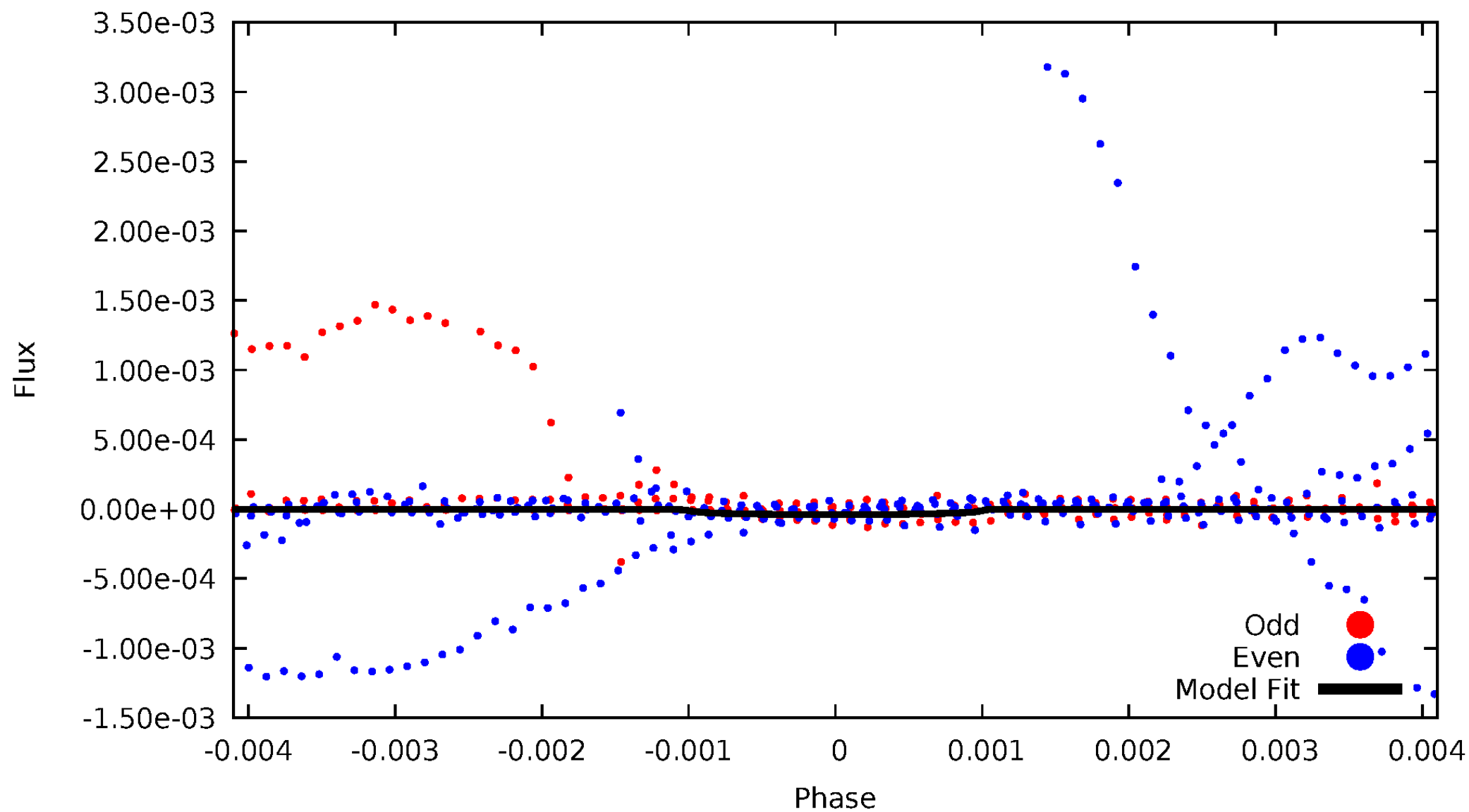
# TCE 010599245-04





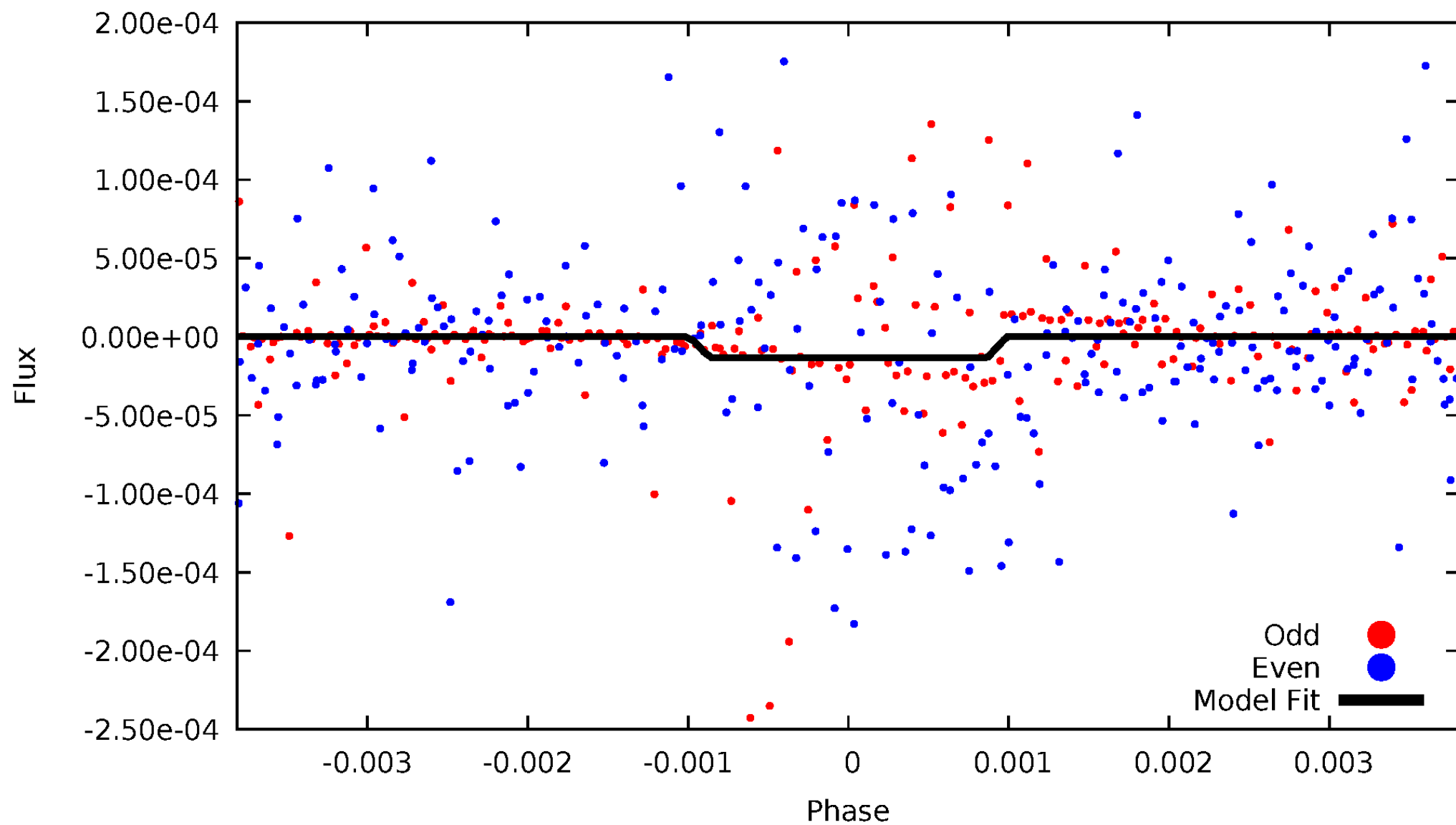
# DV Odd/Even

TCE 010599245-04



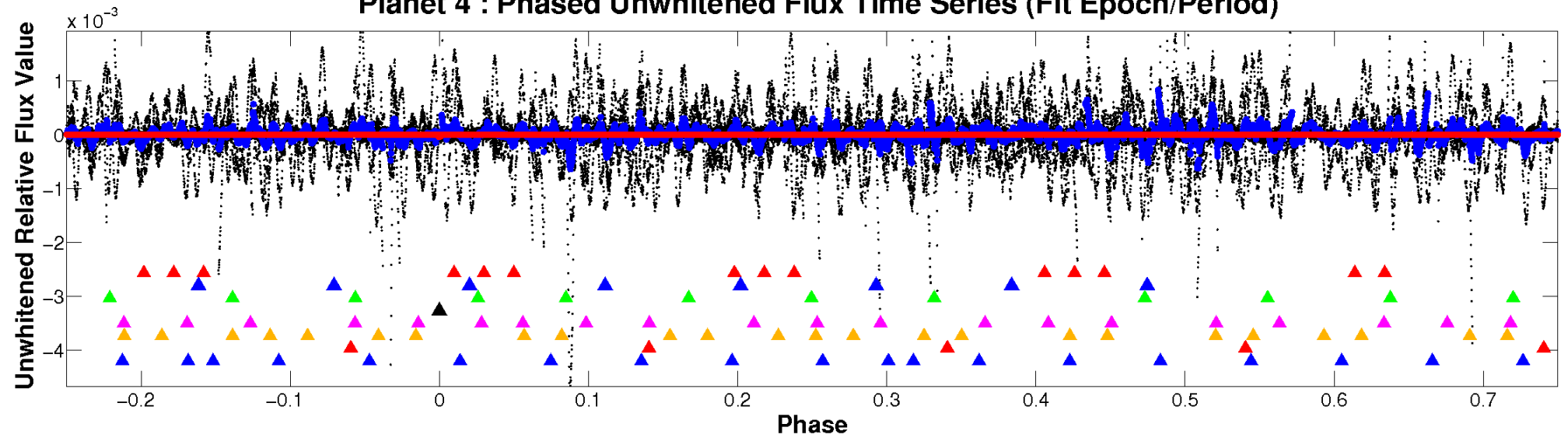
# ALT Odd/Even

TCE 010599245-04

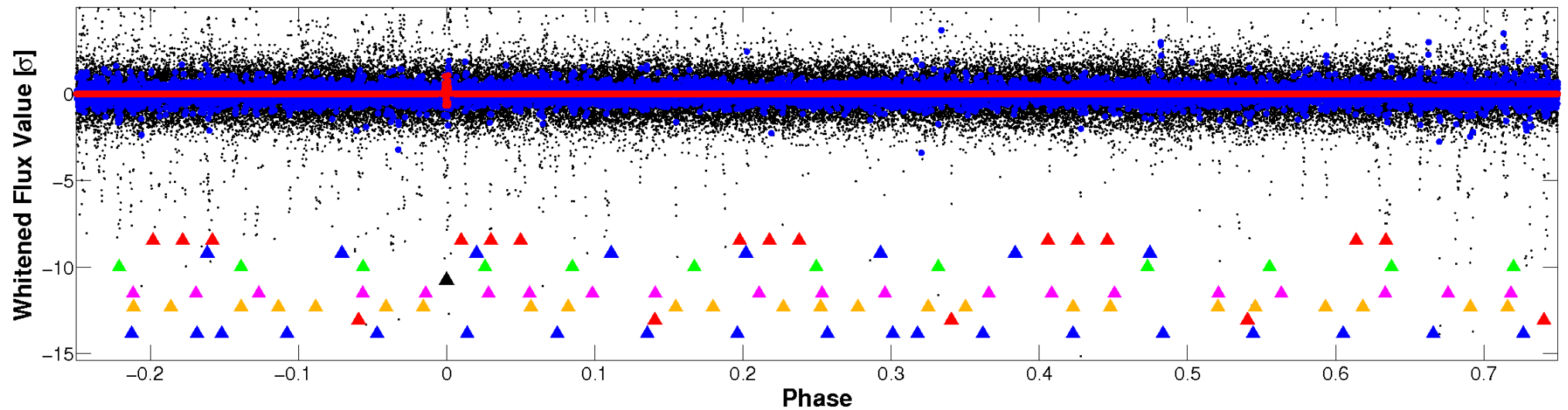


# Non-Whitened Vs. Whitened Light Curve

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

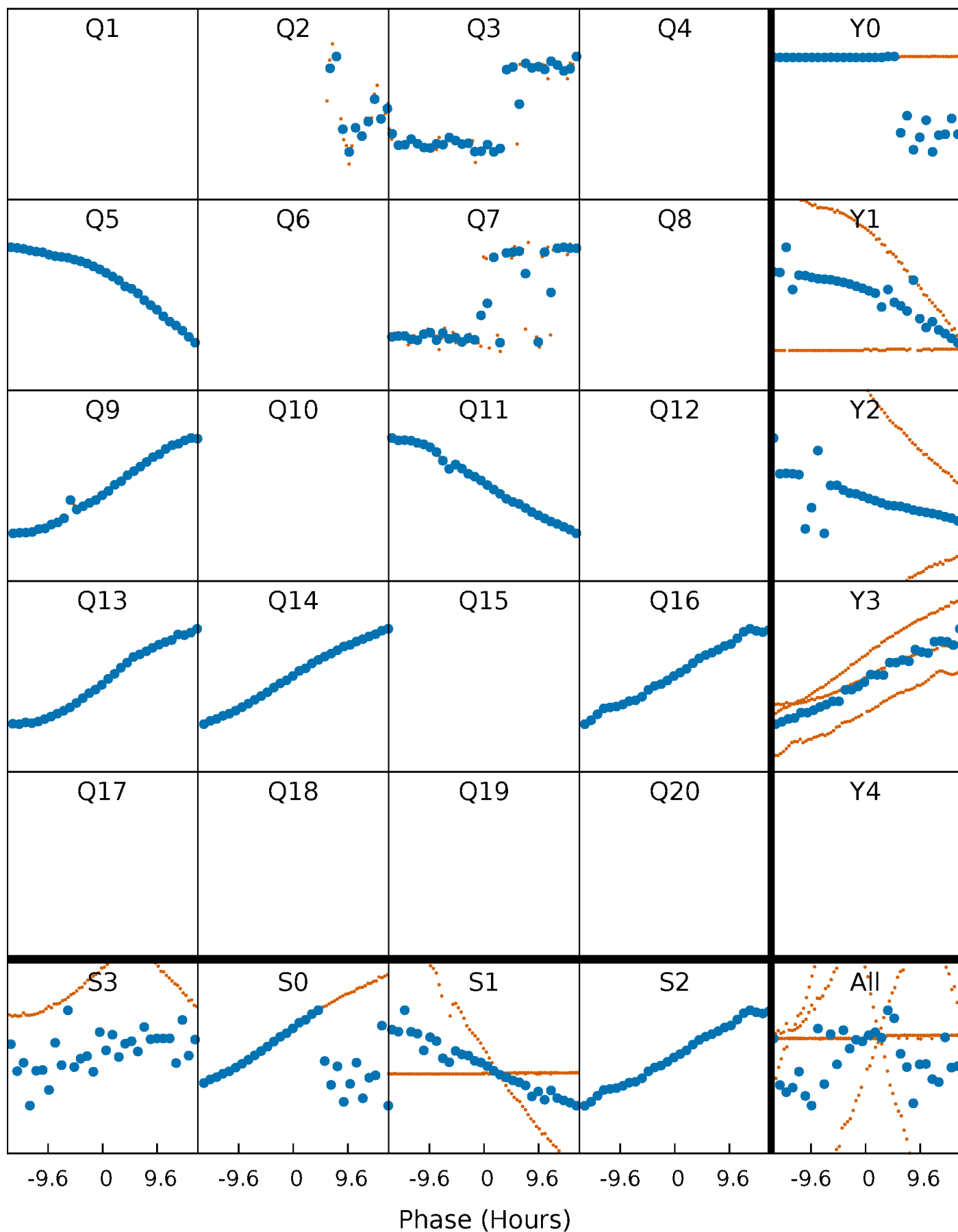


**Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



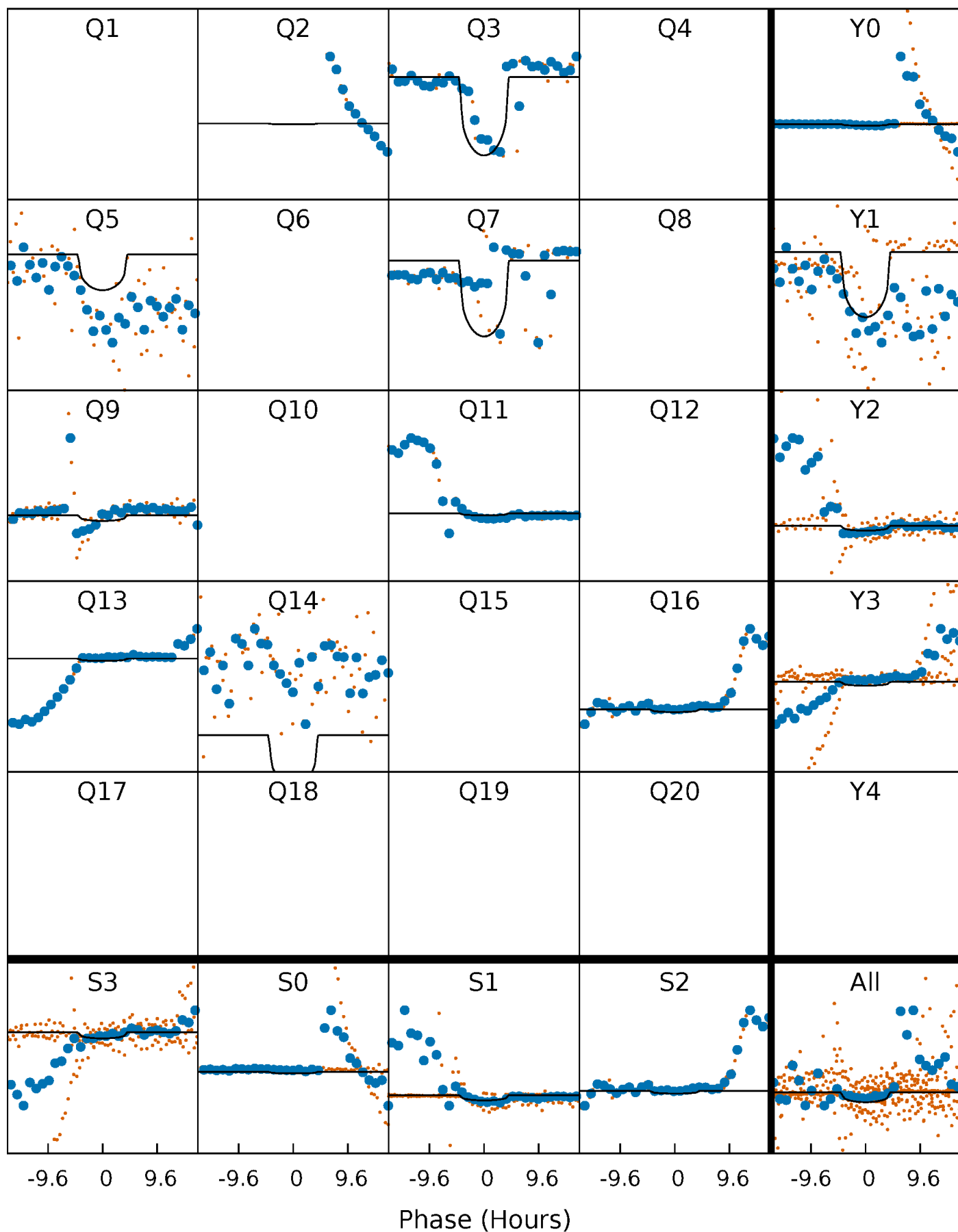
# PDC Quarter-Phased Transit Curves

TCE 010599245-04 P=170.417068 Days  $T_0=169.518612$  (BKJD)



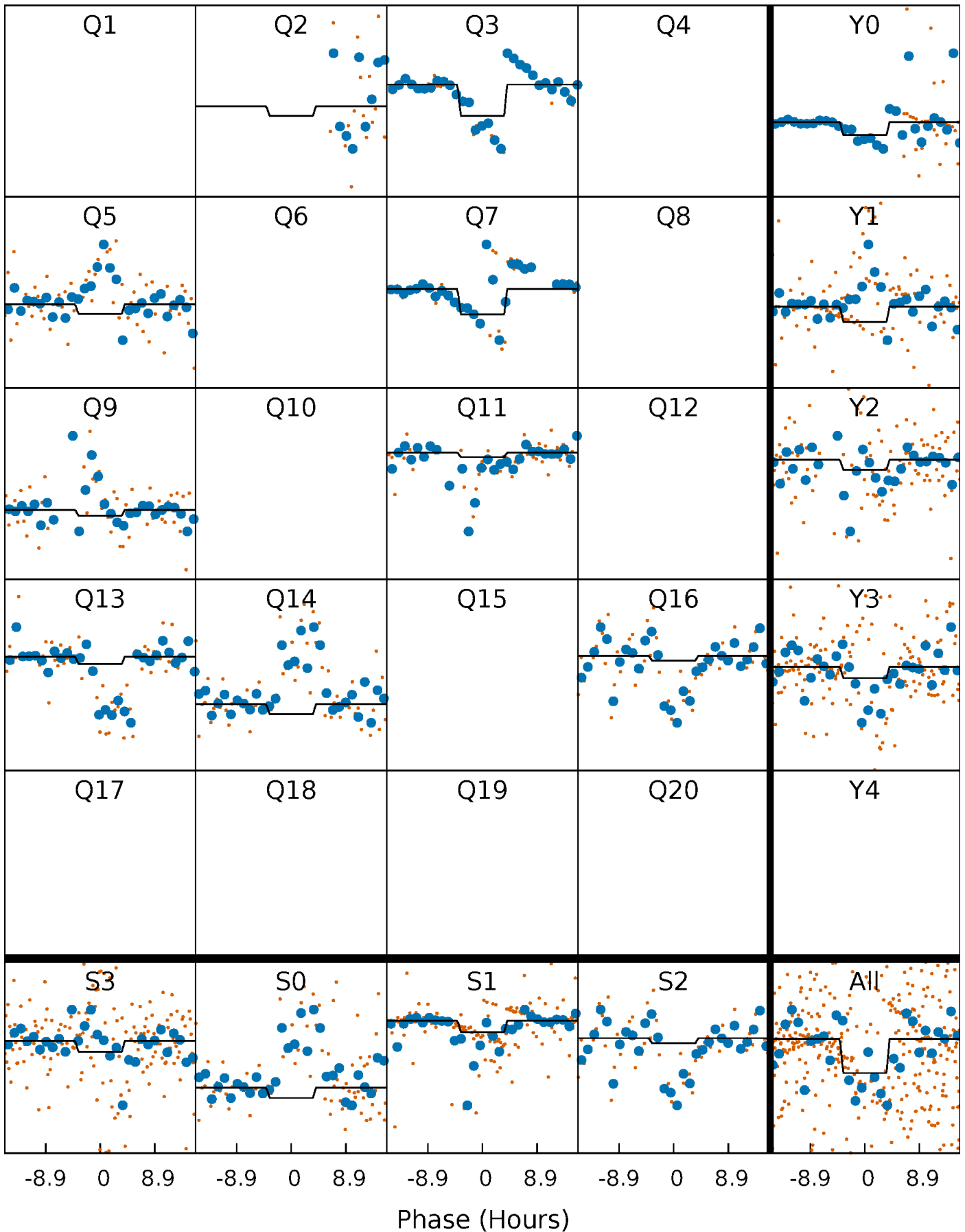
# DV Quarter-Phased Transit Curves

TCE 010599245-04     $P=170.417068$  Days     $T_0=169.518612$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

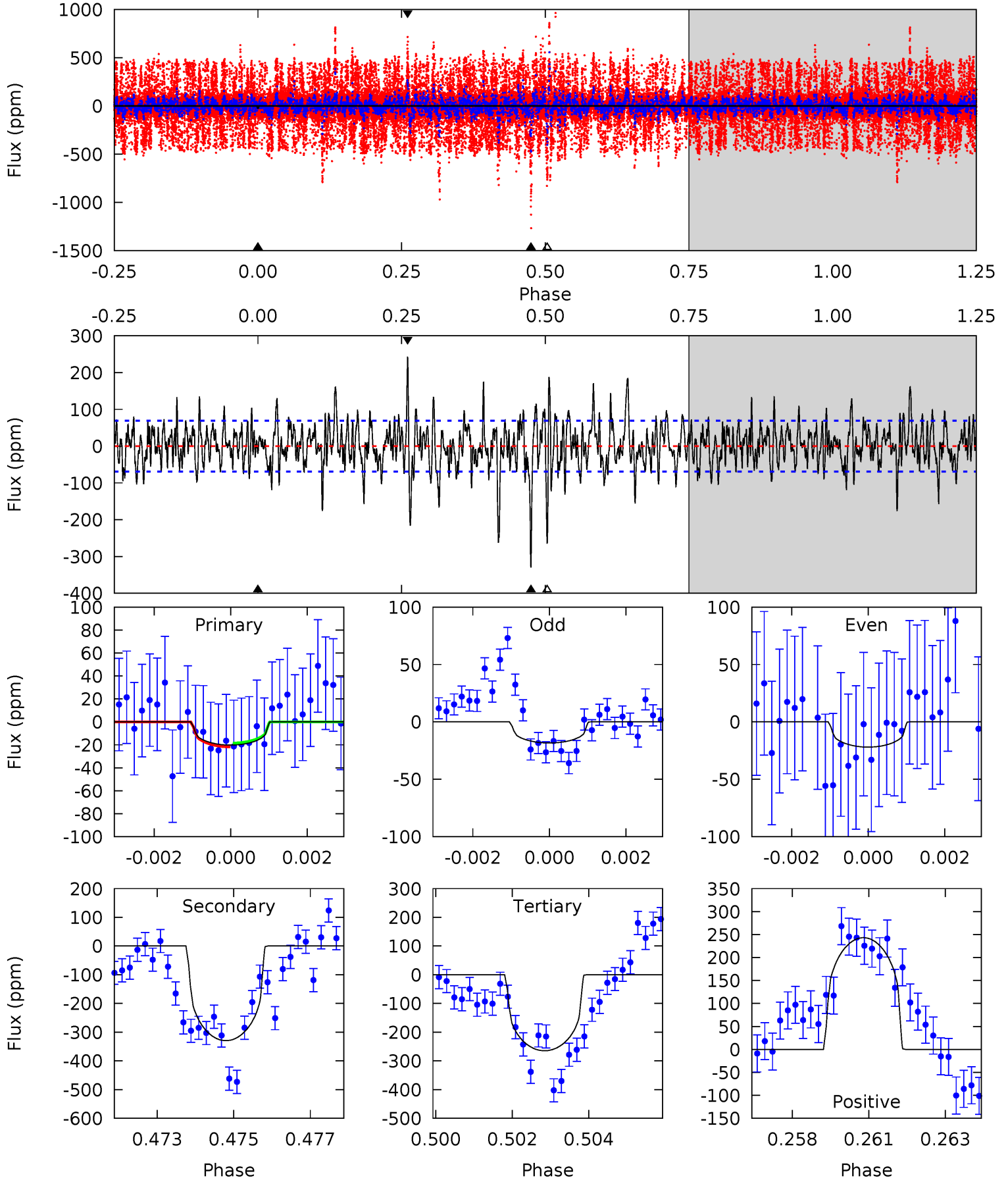
TCE 010599245-04     $P=170.412536$  Days     $T_0=169.519202$  (BKJD)



# DV Model-Shift Uniqueness Test

010599245-04, P = 170.417068 Days, E = 169.518612 Days

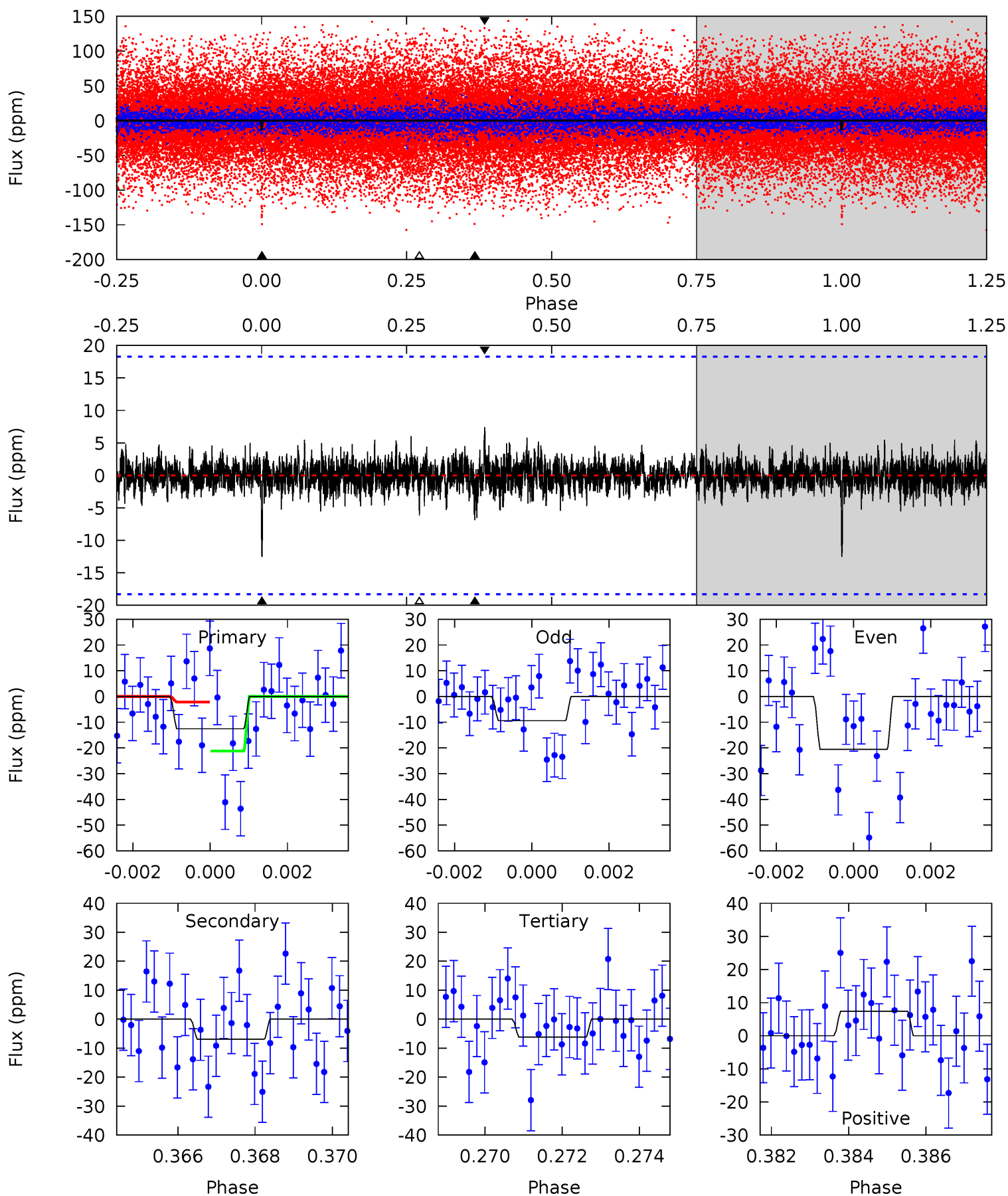
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
1.56	25.4	20.4	18.7	5.32	3.08	4.23	-18.8	-17.2	4.98	6.65	0.10	0.88	0.42	0.13



# Alt Model-Shift Uniqueness Test

010599245-04, P = 170.412536 Days, E = 169.519202 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
3.66	2.01	1.81	2.16	5.33	3.10	0.45	1.86	1.50	0.20	-0.15	1.67	1.26	0.37	0





### Stellar Parameters For KIC 010599245

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$3951^{+79}_{-108}$	$1.152^{+0.030}_{-0.030}$	$-0.100^{+0.200}_{-0.250}$	$59.143^{+2.129}_{-12.775}$	$1.811^{+0.036}_{-0.688}$	$0.000^{+0.000}_{-0.000}$
	+2%/-3%	+3%/-3%	+200%/-250%	+4%/-22%	+2%/-38%	+30%/-8%
Source	PHO54	AST54	PHO54	DSEP		

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

### Secondary Eclipse Parameters for KIC 010599245-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-330 \pm 13$	$43.73^{+5.95}_{-6.46}$	$2192^{+54}_{-65}$	$5898^{+515}_{-395}$	$51^{+19}_{-12}$
Alt.	$-7 \pm 3$	$23.87^{+6.34}_{-6.52}$	$2190^{+52}_{-65}$	$3440^{+472}_{-523}$	$3.366^{+3.537}_{-2.006}$

$T_{max}$  = 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

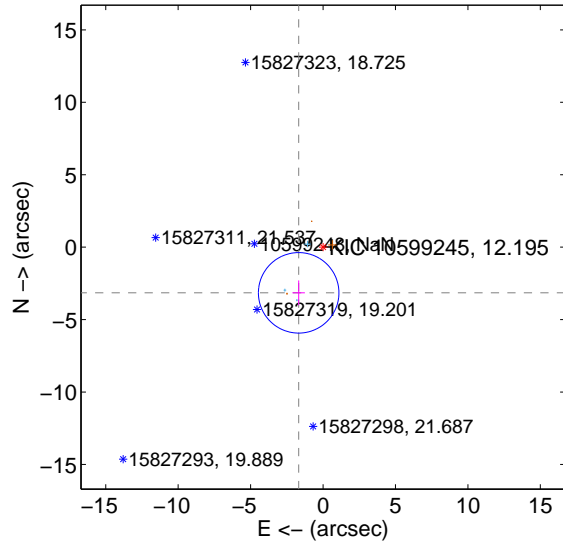
Supplemental centroid analysis for 010599245-04. Kepler magnitude: 12.20. Transit SNR 10.01

There are 3 quarters with good PRF difference image offsets

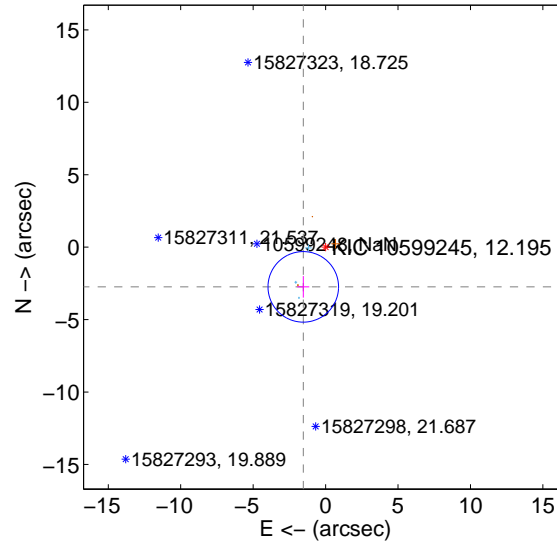
The direct PRF centroid is offset from the target star catalog position by about 0.29 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$3.573 \pm 0.926$	3.86	$1.682 \pm 0.432$	$-3.152 \pm 0.854$
PRF-fit source offset from KIC position	$3.143 \pm 0.812$	3.87	$1.540 \pm 0.413$	$-2.740 \pm 0.745$
photometric centroid source offset	$5.10 \pm 2.94$	1.74	$5.10 \pm 2.94$	$0.19 \pm 4.73$

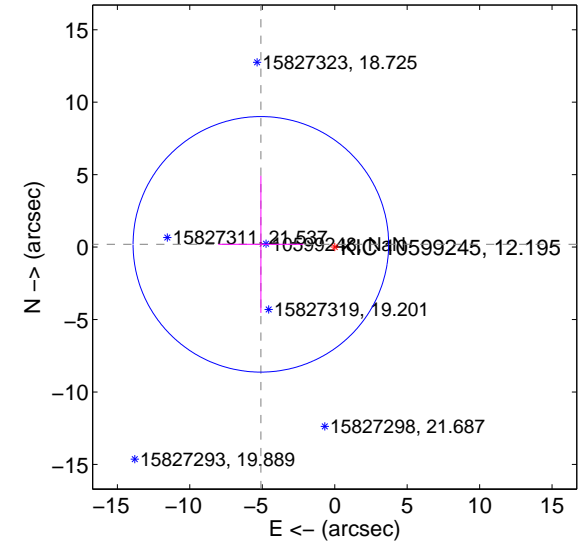
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

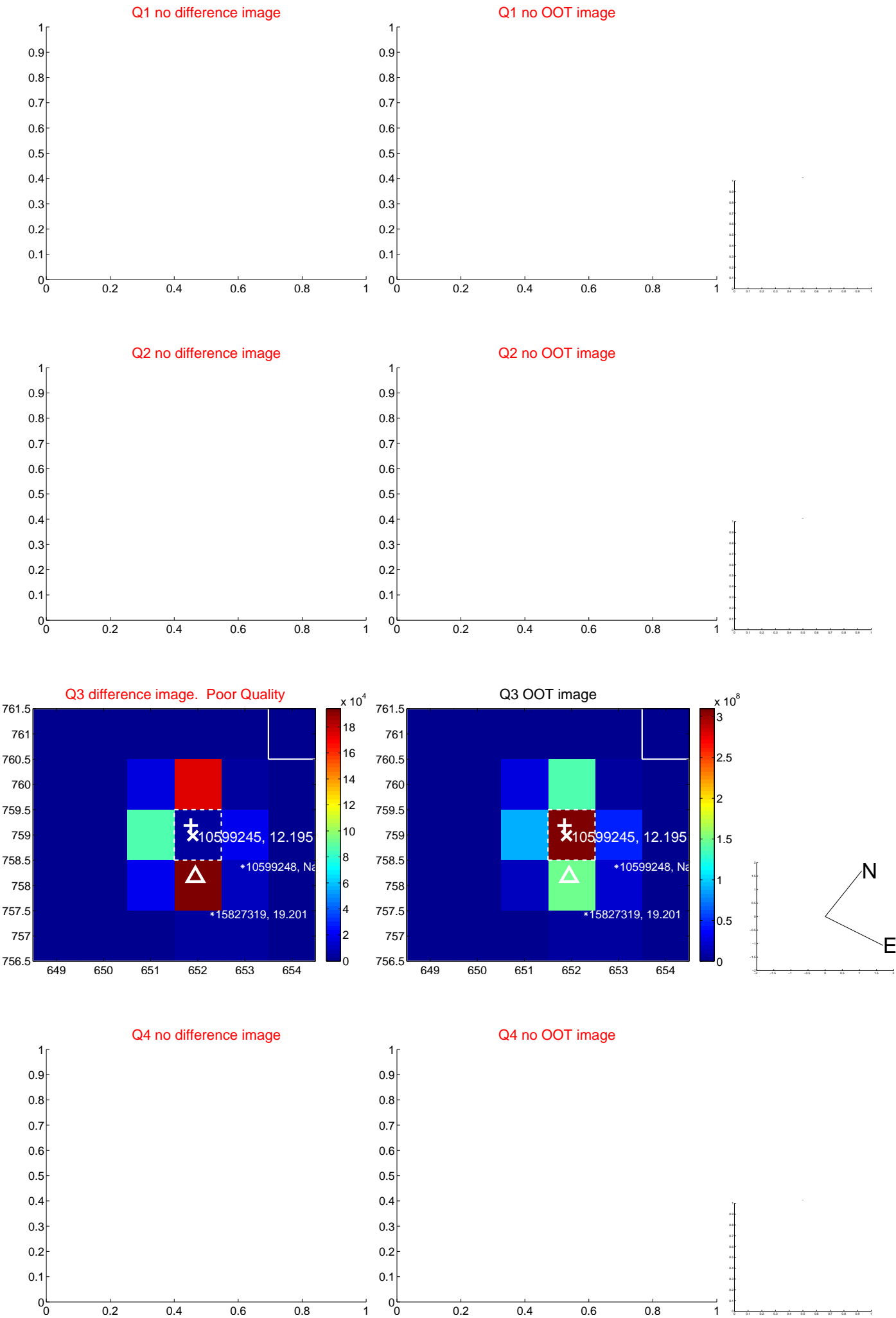


offset from photometric centroids



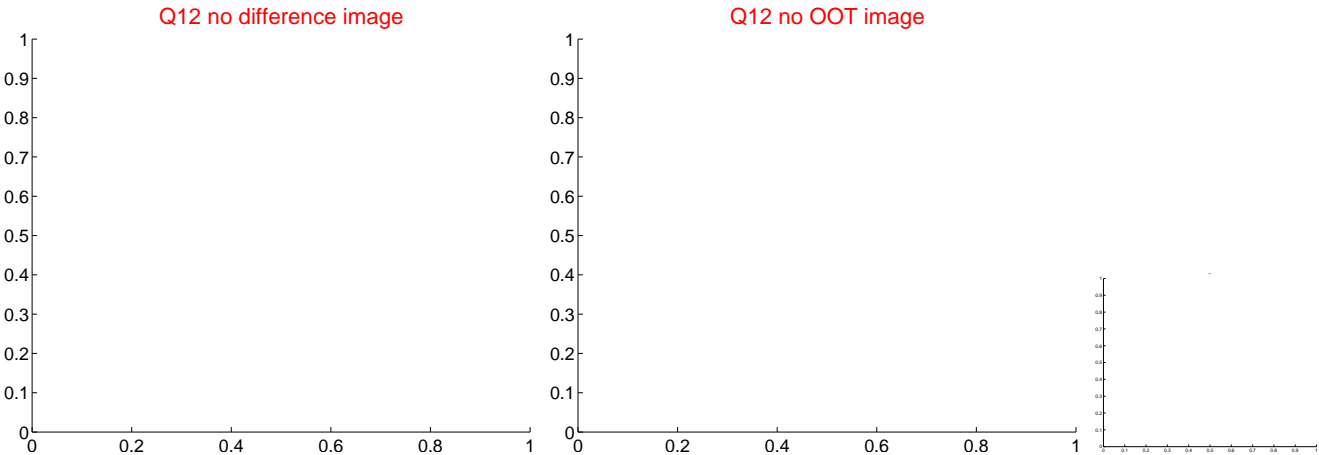
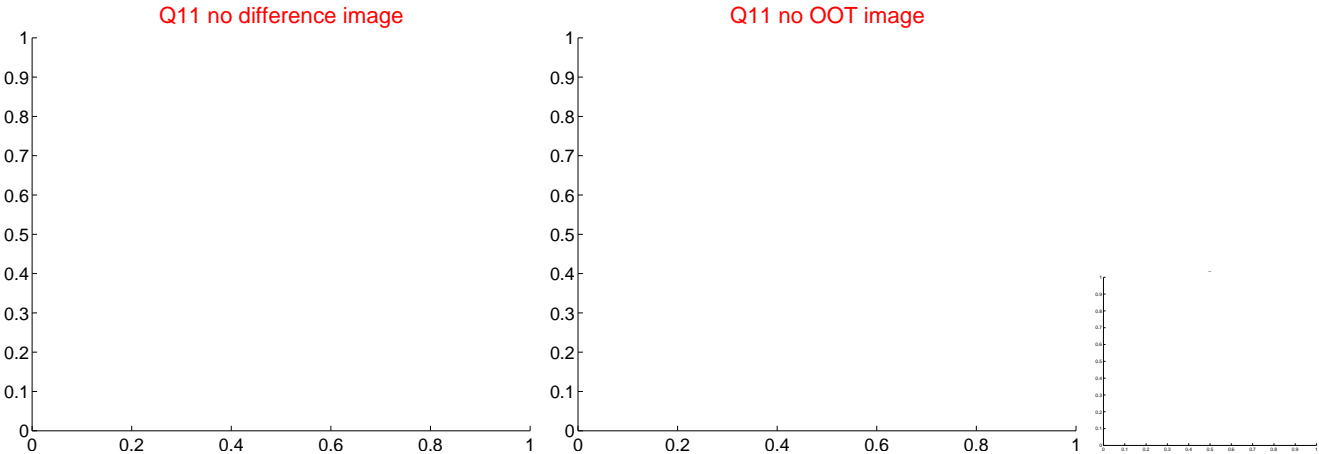
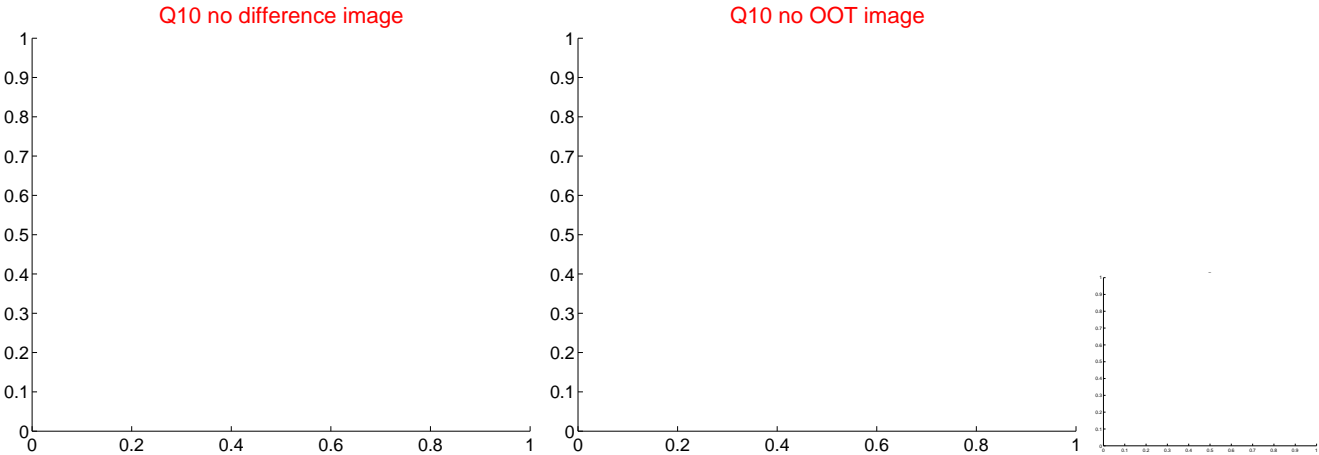
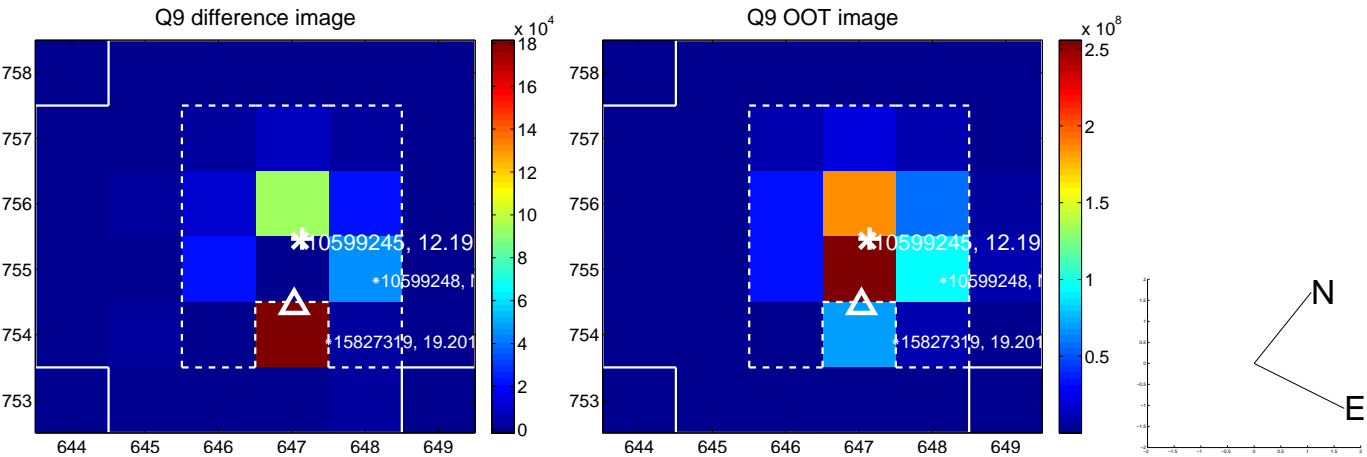
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

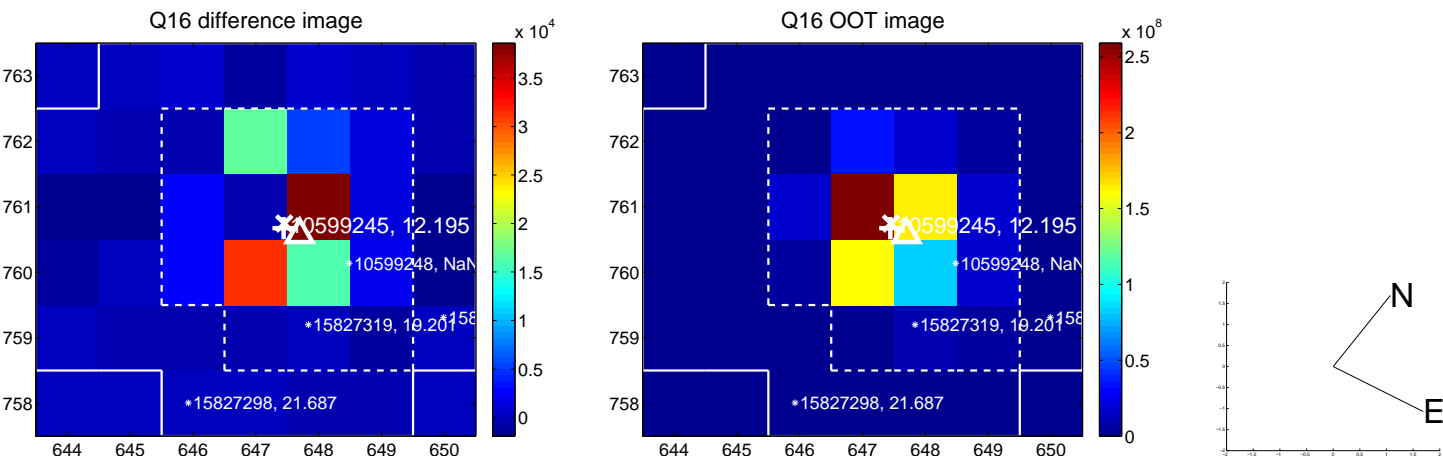
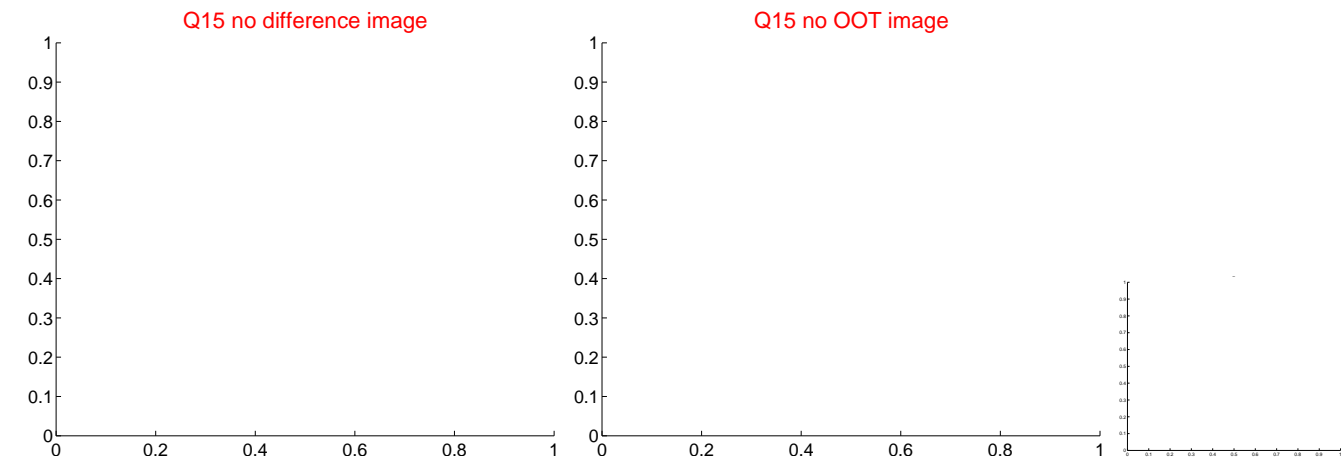
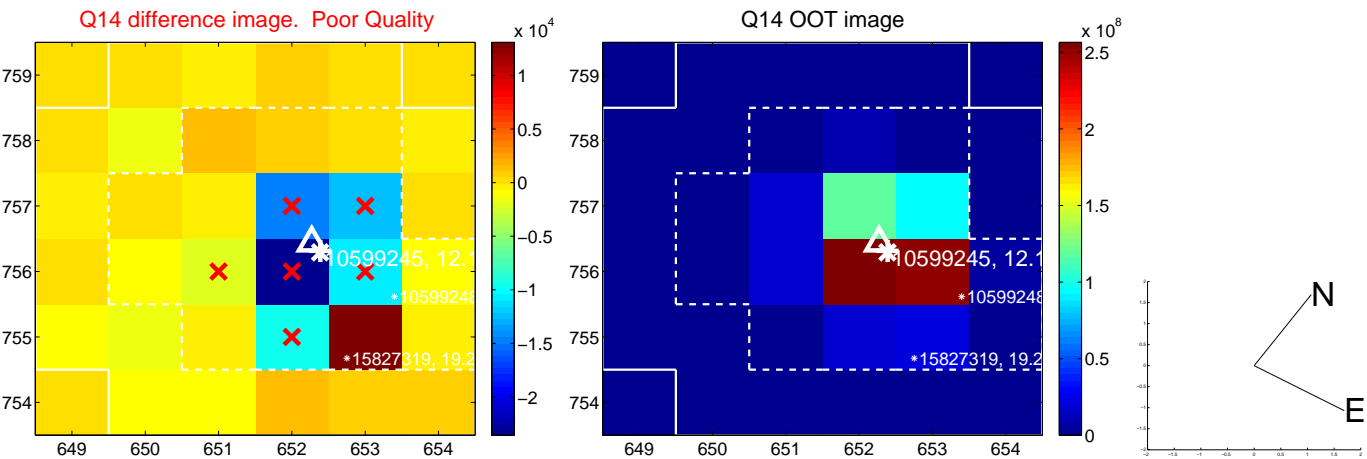
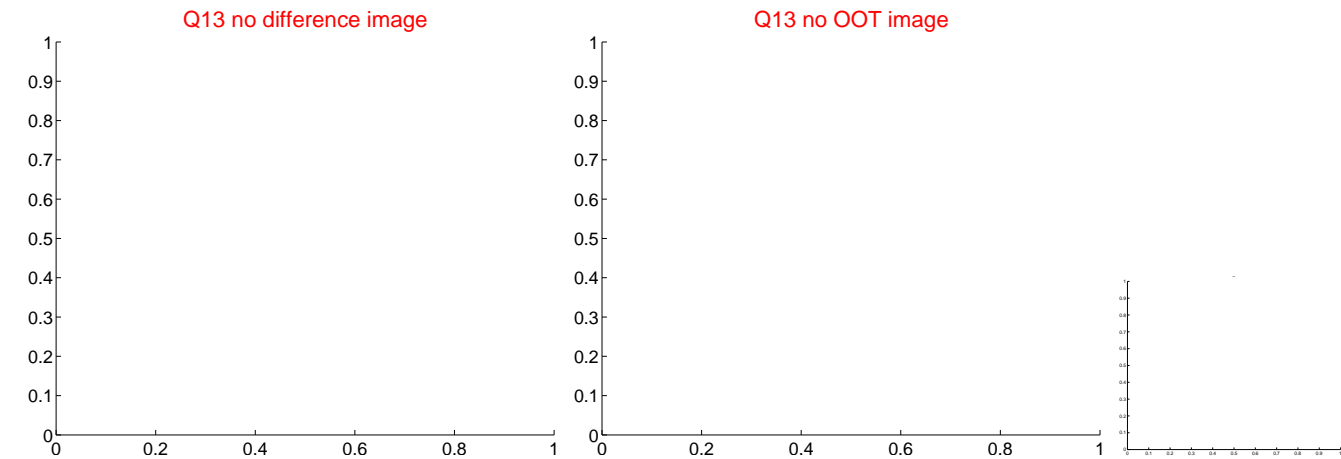




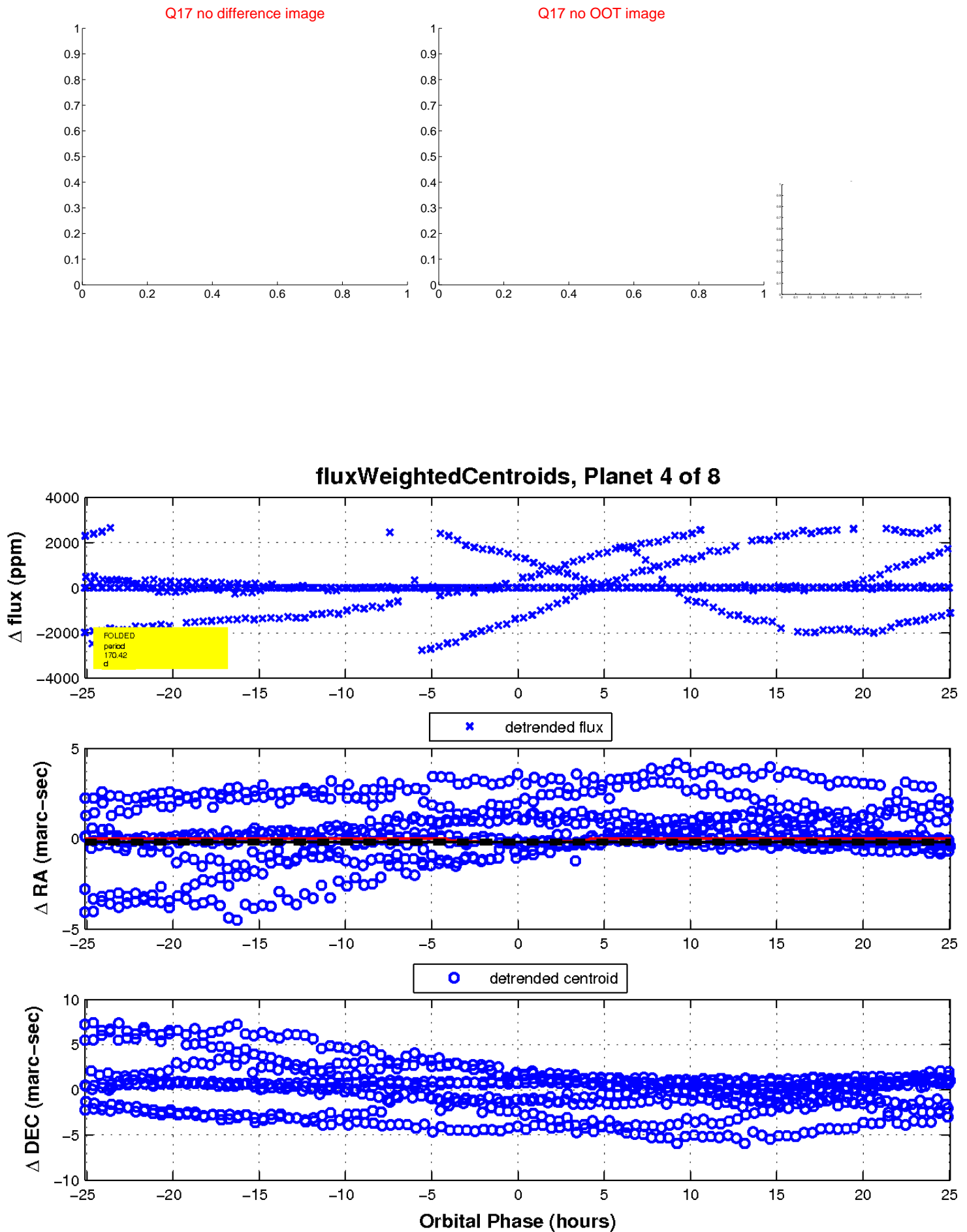
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



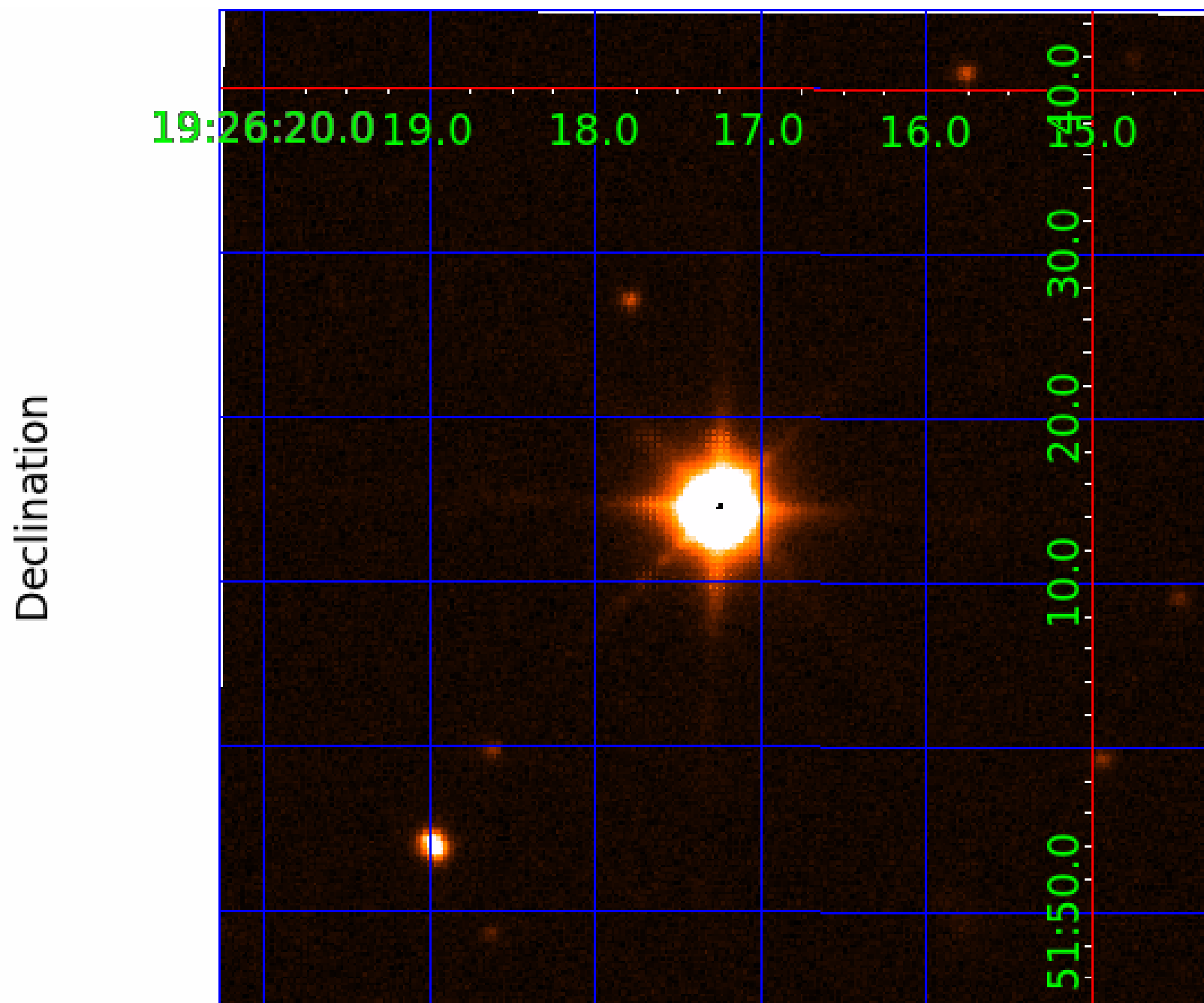
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image





# KIC 010599245

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010599245-01	OBS	No	102.933504	203.234932	42.4	2.126	28.2	19.6	59.14	3951	51.05	2781.31
010599245-02	OBS	No	185.904559	141.996123	43.9	3.508	16.3	14.6	59.14	3951	47.53	1264.56
010599245-03	OBS	No	118.287967	183.981930	53.7	2.452	15.0	15.8	59.14	3951	59.89	2310.67
010599245-04	OBS	No	170.417068	169.518612	39.7	8.386	14.7	10.0	59.14	3951	43.03	1420.06
010599245-05	OBS	No	72.002790	174.339797	6.7	4.067	14.5	2.3	59.14	3951	19.66	4479.12
010599245-06	OBS	No	62.359596	145.890783	20.7	5.466	13.7	9.2	59.14	3951	33.90	5425.67
010599245-07	OBS	No	102.244200	227.599922	46.6	2.835	13.4	13.2	59.14	3951	52.19	2806.34
010599245-08	OBS	No	80.029016	143.655157	38.5	1.930	13.1	12.9	59.14	3951	45.51	3890.40

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010599245-01	OBS	FP	0.00	1	0	1	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—CENT_UNRESOLVED_OFFSET—HALO_GHOST
010599245-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE_ZUMA—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
010599245-03	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
010599245-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_MARSHALL_SKYE_ZUMA—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_UNRESOLVED_OFFSET
010599245-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
010599245-06	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
010599245-07	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_KIC_POS—CENT_UNCERTAIN
010599245-08	OBS	FP	0.00	1	0	0	0	LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_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.

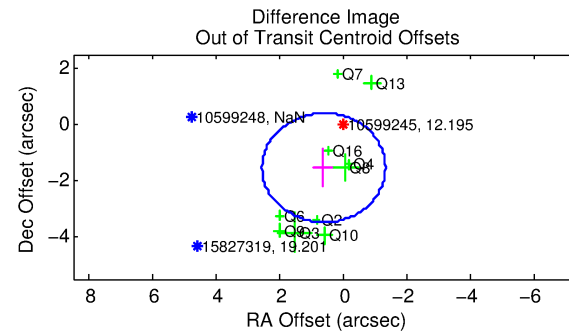
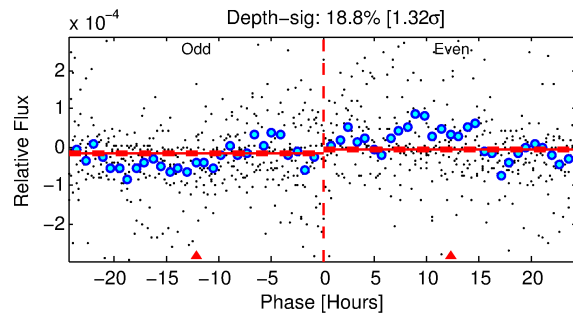
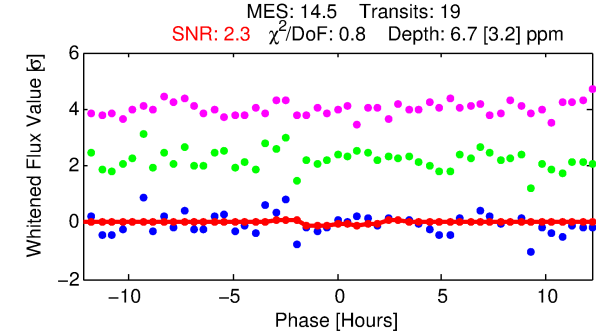
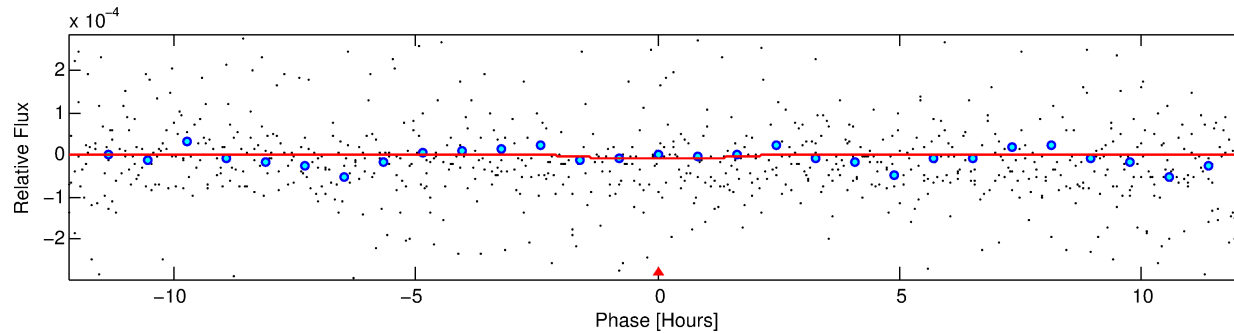
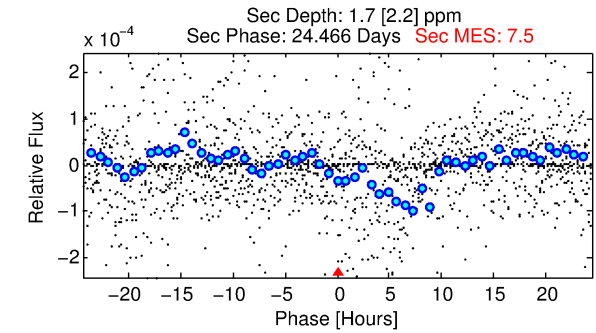
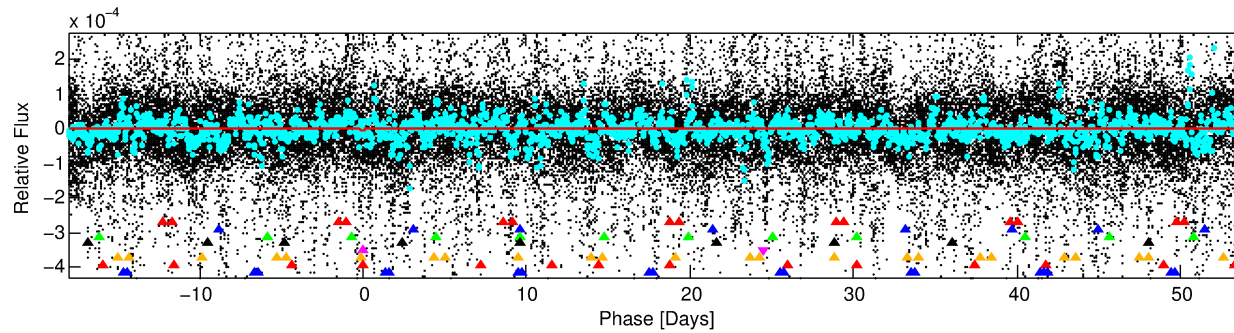
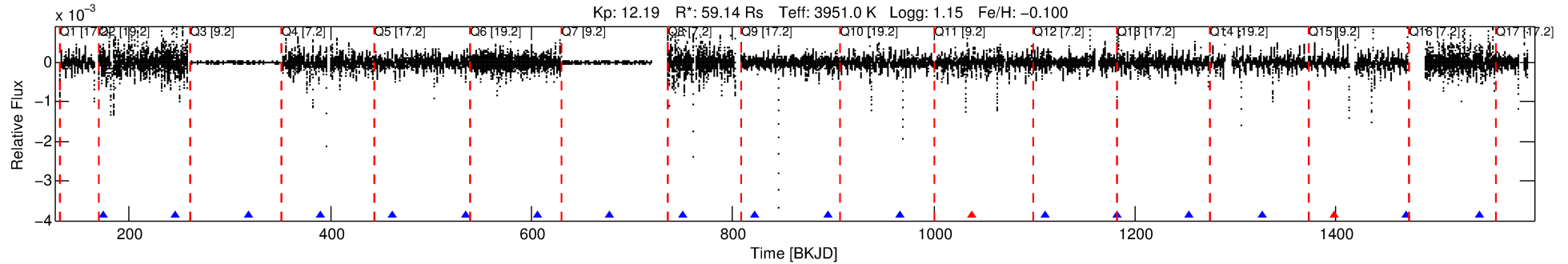
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 010599245-05

No Significant Match Found

# DV One-Page Summary

KIC: 10599245 Candidate: 5 of 8 Period: 72.003 d



## DV Fit Results:

Period = 72.00279 [0.00343] d  
Epoch = 174.3398 [0.0223] BKJD  
Rp/R\* = 0.0030 [0.0027]  
a/R\* = 57.04 [190.44]  
b = 0.91 [0.63]  
Seff = 4479.12 [835.72]  
Teq = 2086 [97] K  
Rp = 19.66 [17.70] Re  
a = 0.4129 [0.0602] AU  
Ag = 0.40 [0.89] [-0.67σ]  
Teffp = 2570 [1408] K [0.34σ]

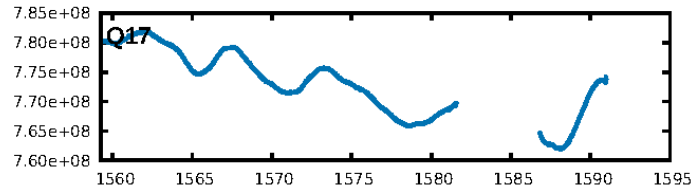
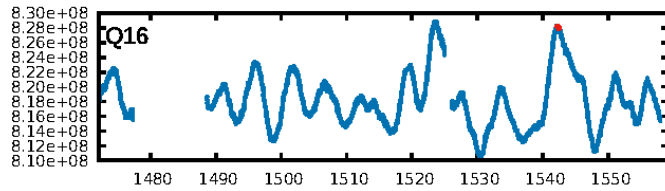
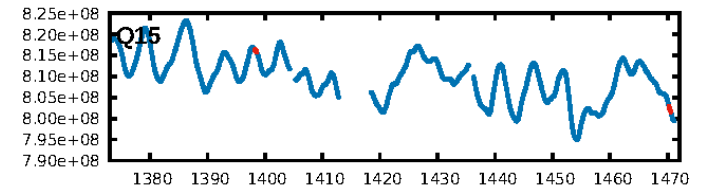
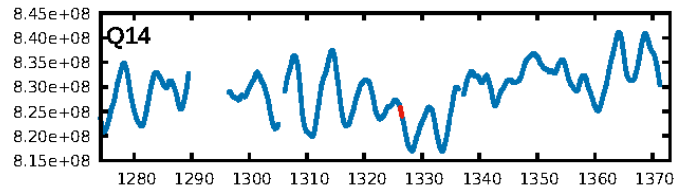
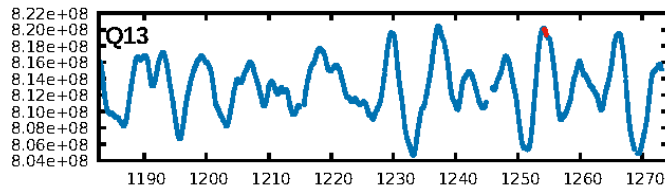
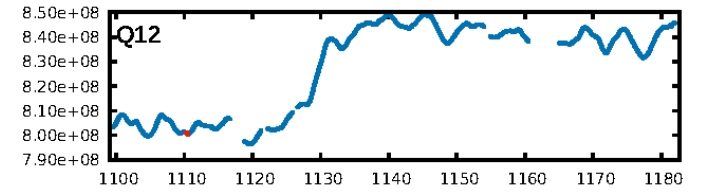
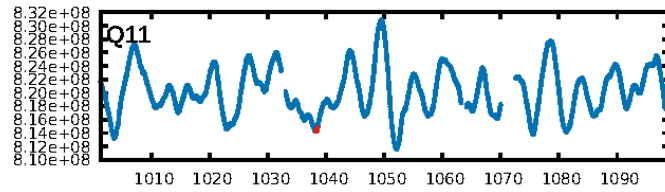
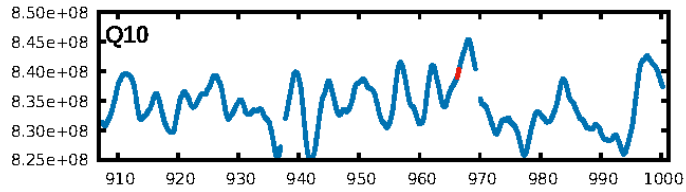
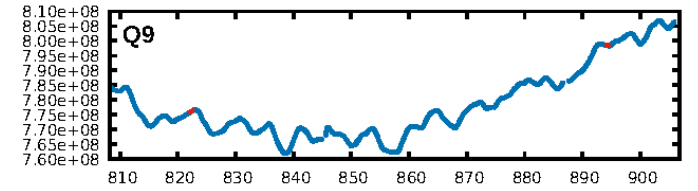
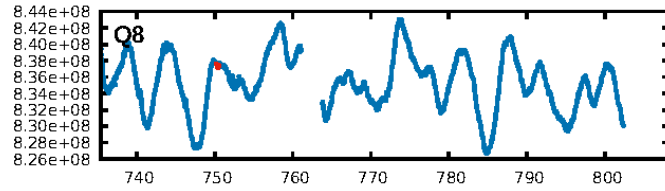
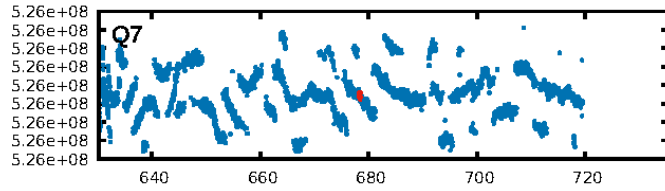
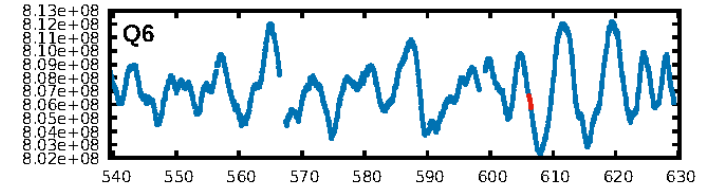
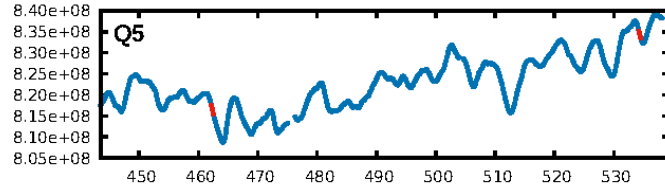
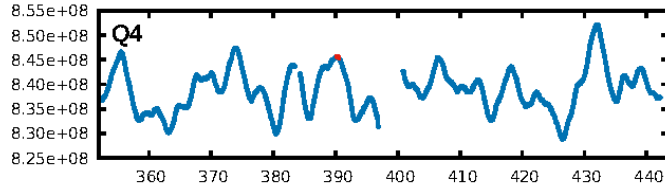
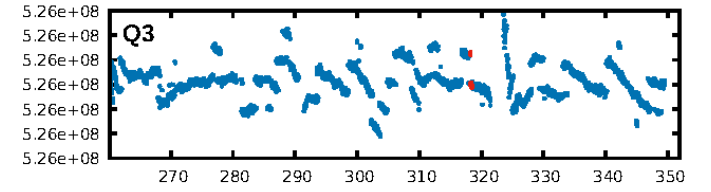
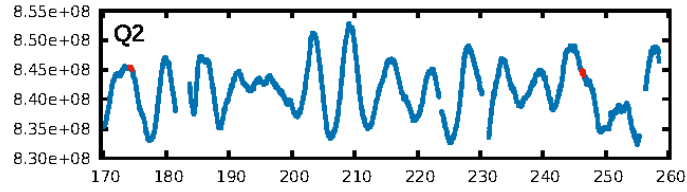
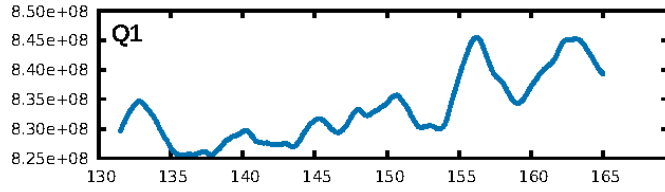
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [33.97σ]  
LongPeriod-sig: 100.0% [42.79σ]  
ModelChiSquare2-sig: 76.9%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 0.89 [17/19]  
**GhostDiagnostic-chr: 0.5778**  
Centroid-sig: N/A  
Centroid-so: 10.891 arcsec [0.67σ]  
OotOffset-rm: 1.657 arcsec [2.56σ]  
KicOffset-rm: 1.876 arcsec [2.84σ]  
OotOffset-st: 3/2/3/2 [10]  
KicOffset-st: 3/2/3/2 [10]  
DiffImageQuality-fgm: 0.20 [2/10]  
DiffImageOverlap-fno: 1.00 [13/13]

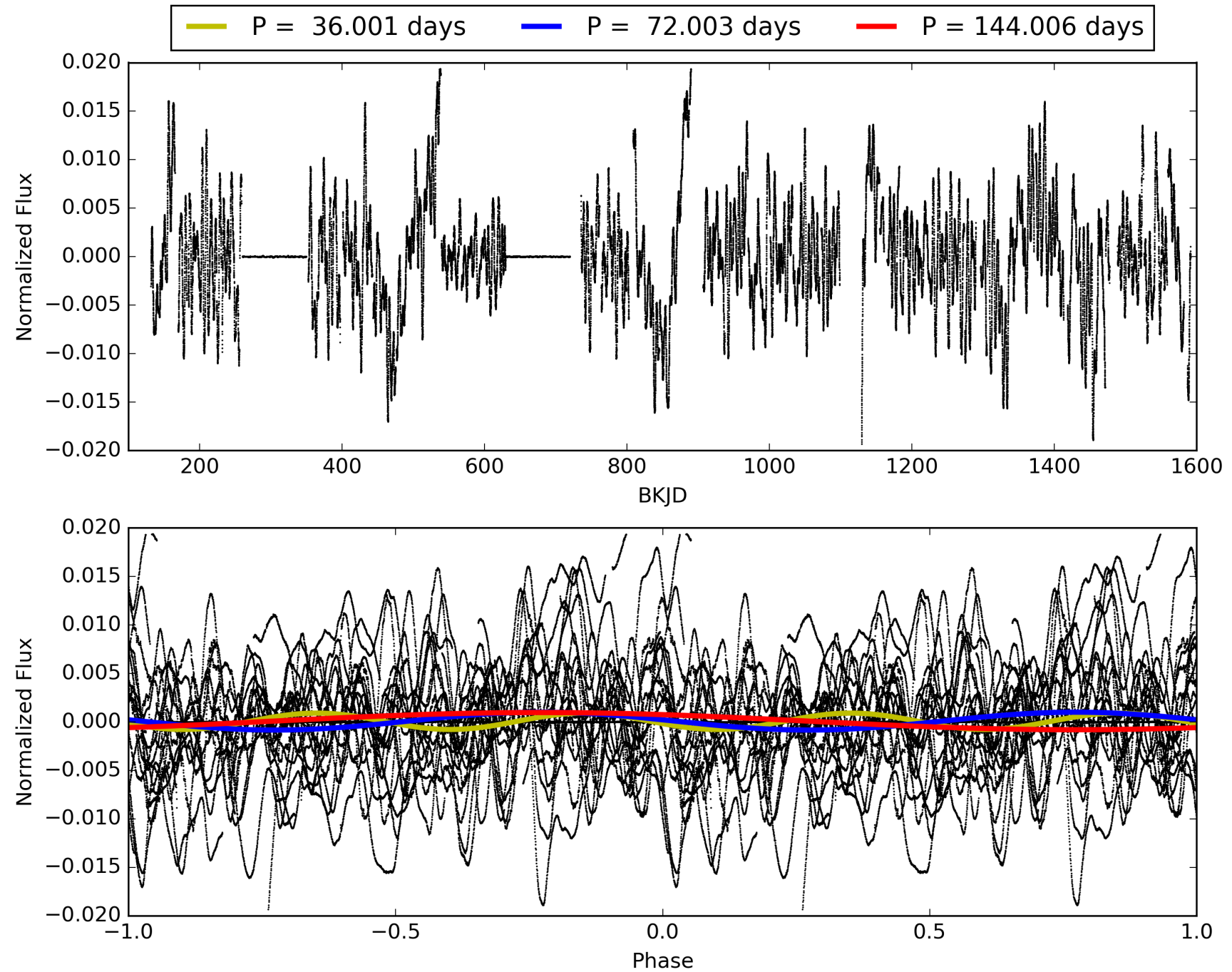
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:40:03 Z

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

# TCE 010599245-05, PDC Light Curves

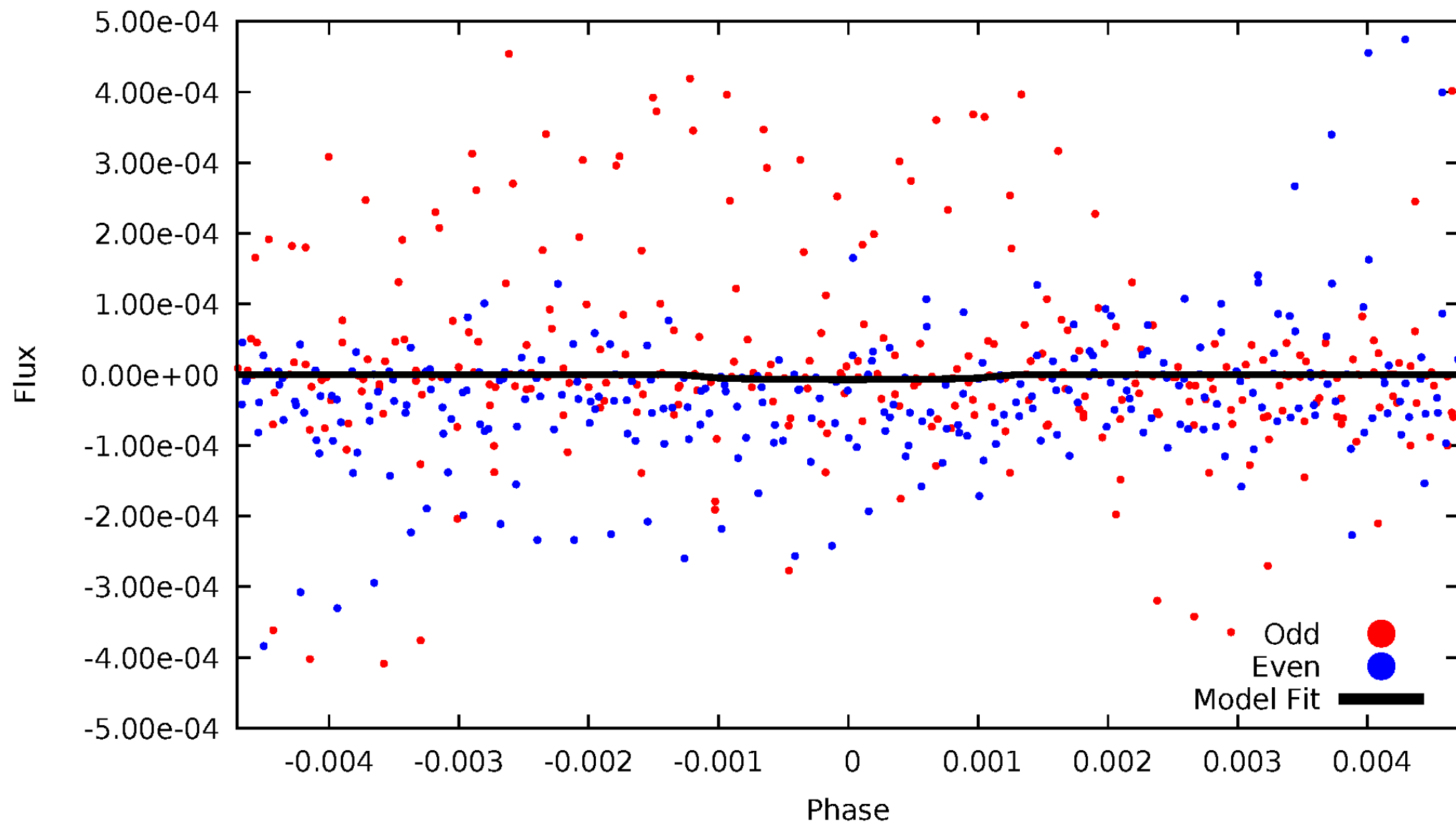


# TCE 010599245-05



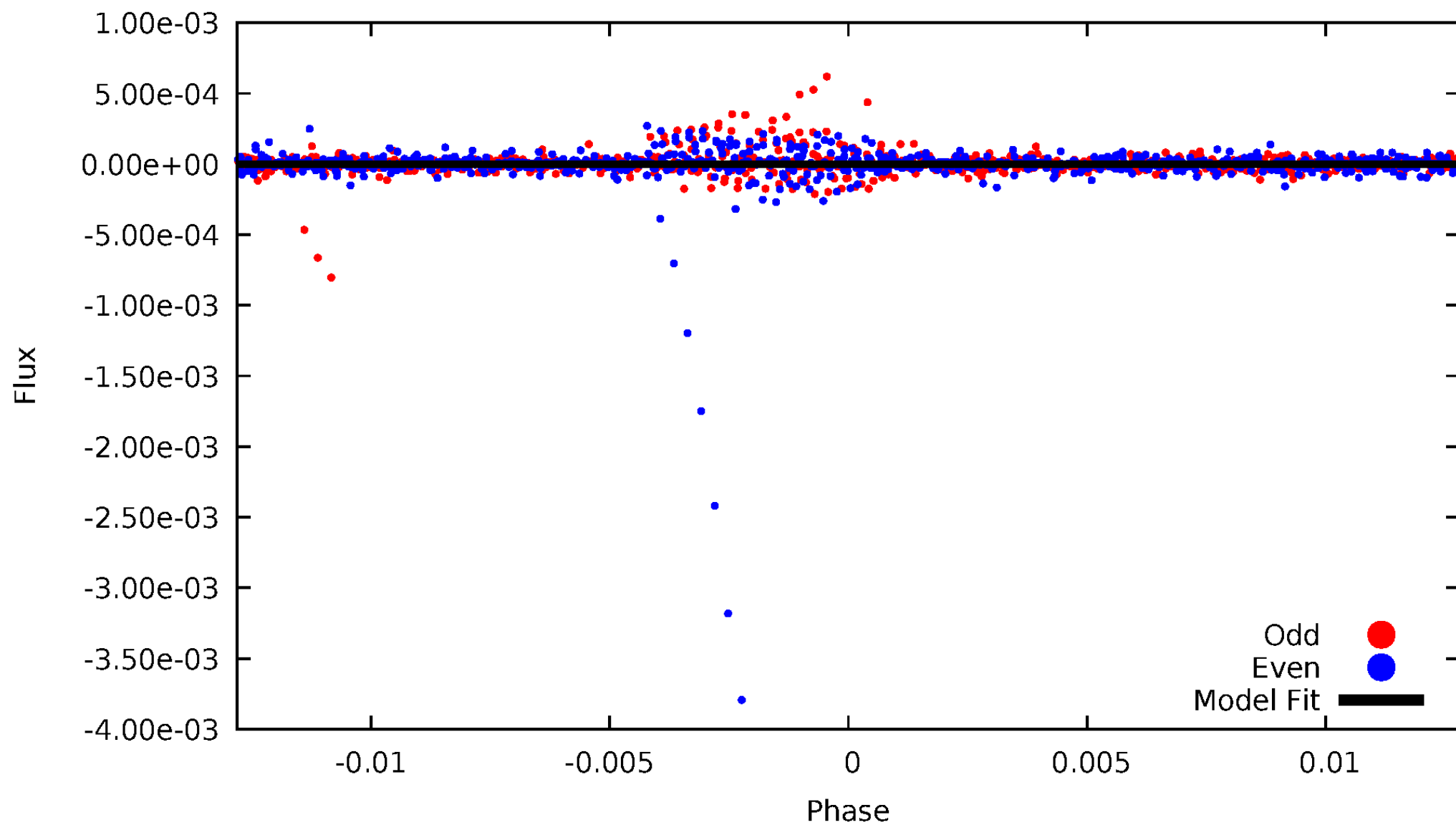
# DV Odd/Even

TCE 010599245-05



ALT Odd/Even

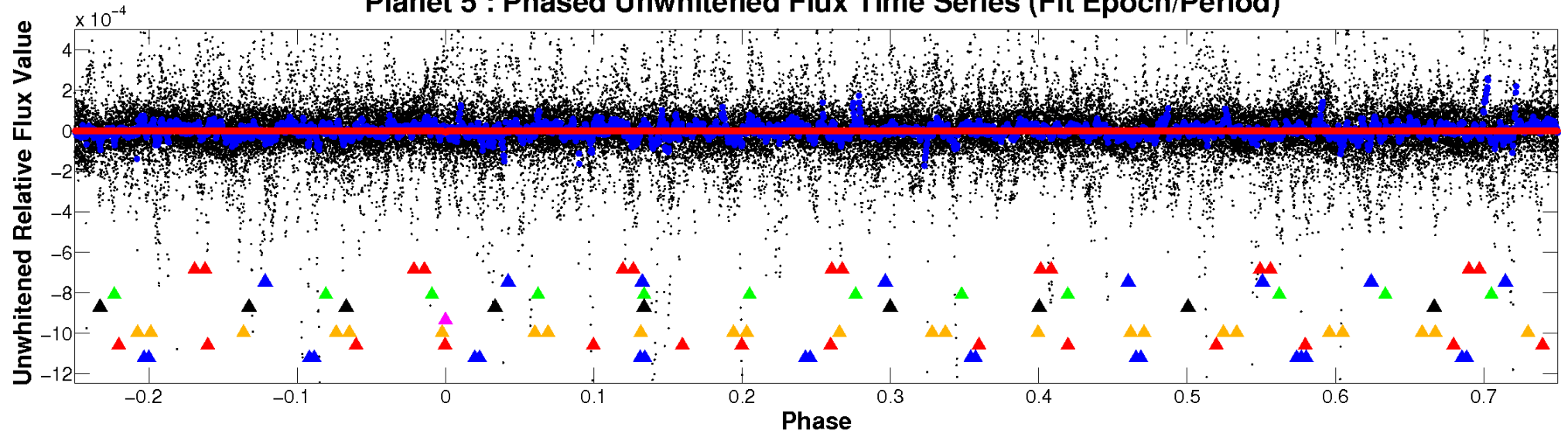
TCE 010599245-05



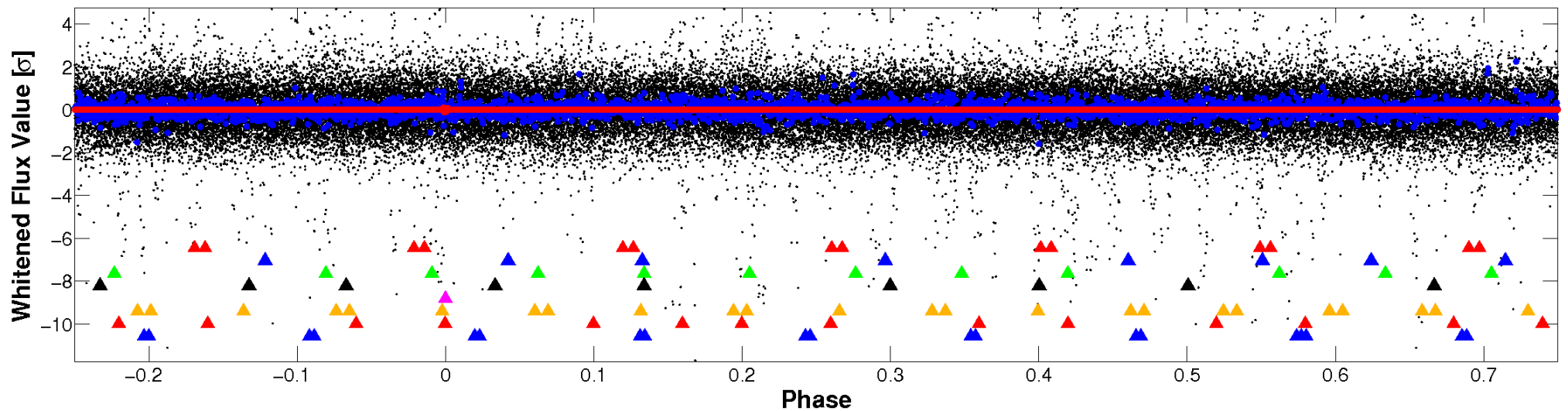


# Non-Whitened Vs. Whitened Light Curve

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

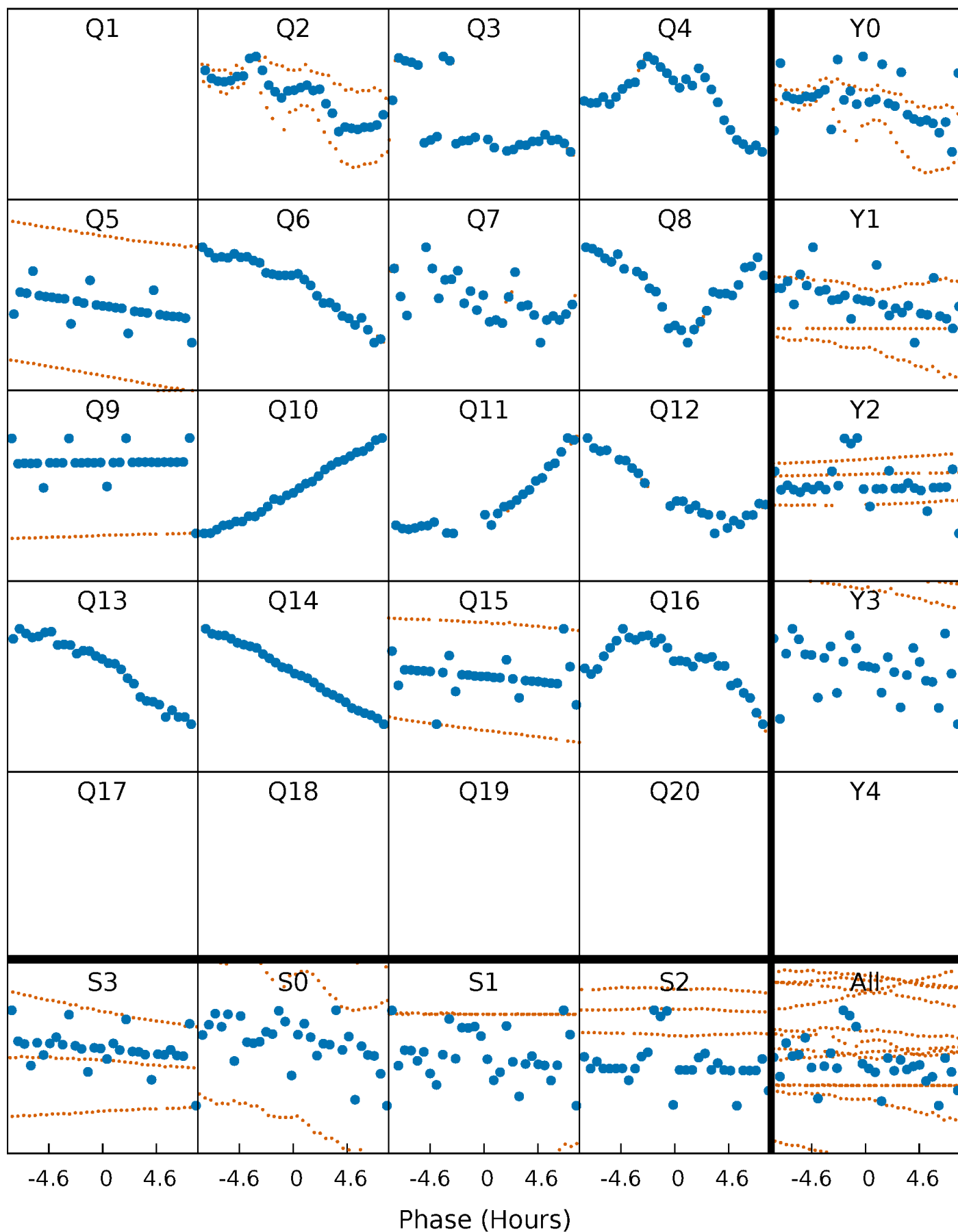


Planet 5 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

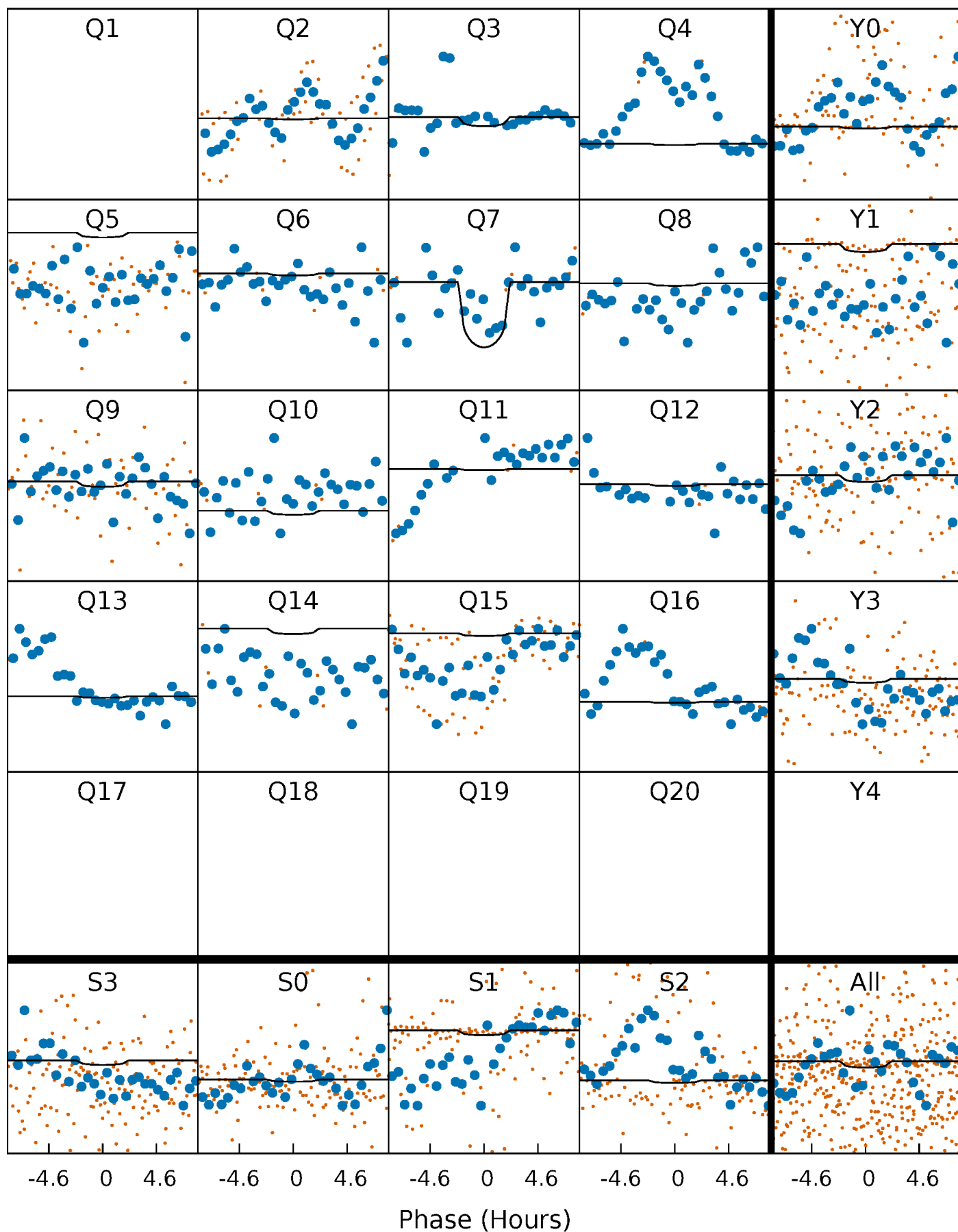
TCE 010599245-05 P= 72.002790 Days  $T_0=174.339797$  (BKJD)





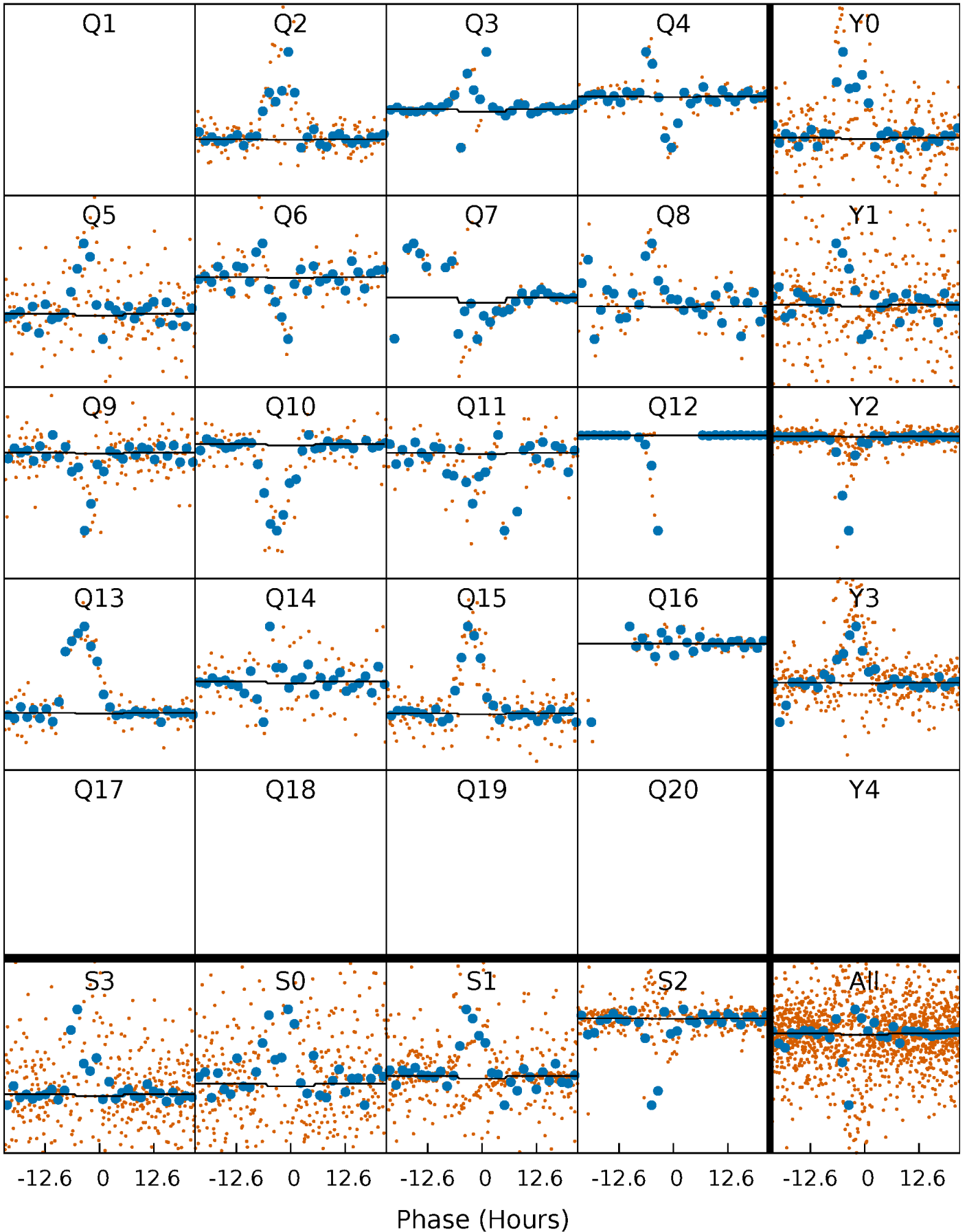
# DV Quarter-Phased Transit Curves

TCE 010599245-05     $P = 72.002790$  Days     $T_0 = 174.339797$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

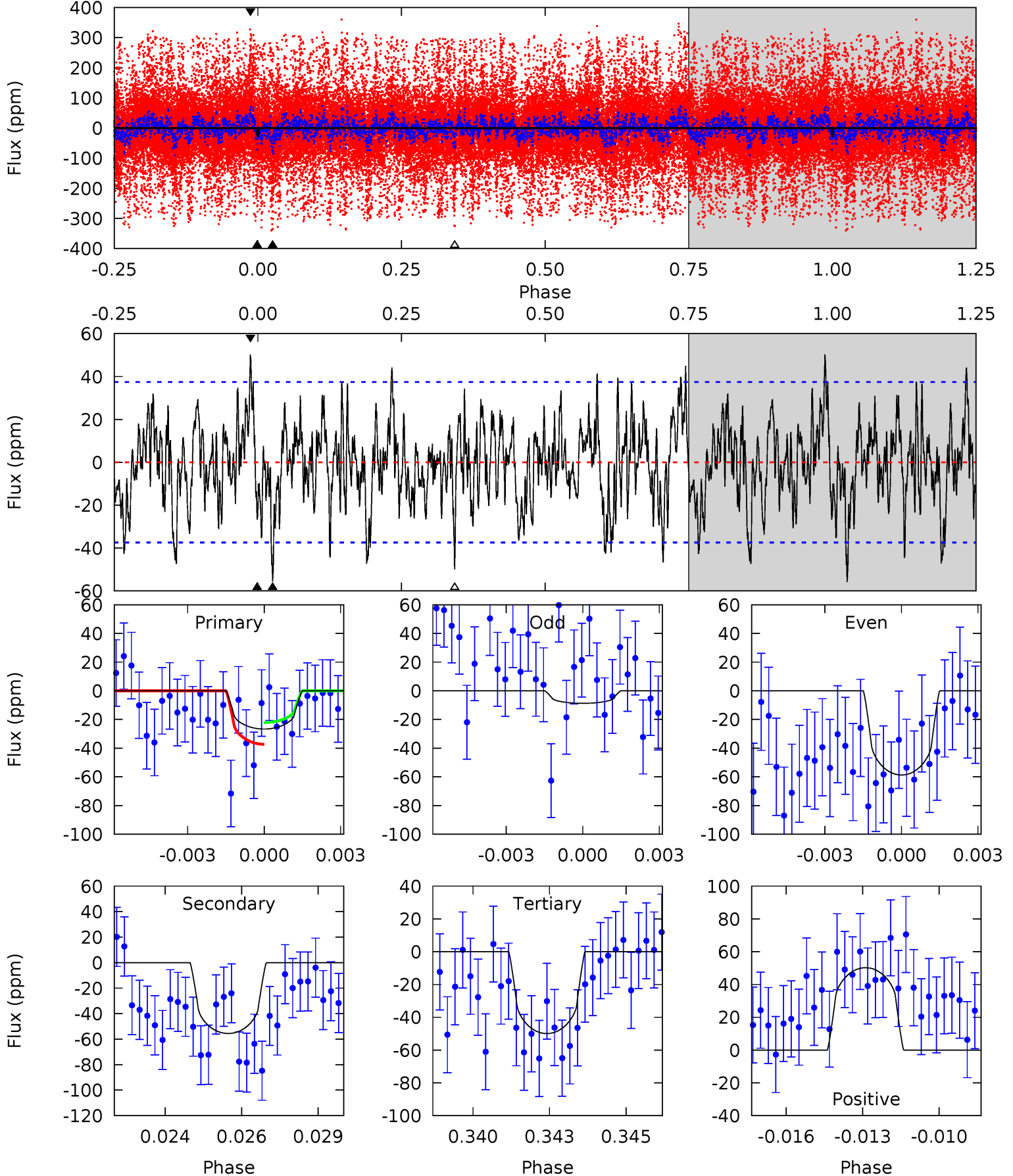
TCE 010599245-05     $P = 71.984600$  Days     $T_0 = 174.214343$  (BKJD)



# DV Model-Shift Uniqueness Test

010599245-05,  $P = 72.002790$  Days,  $E = 102.337007$  Days

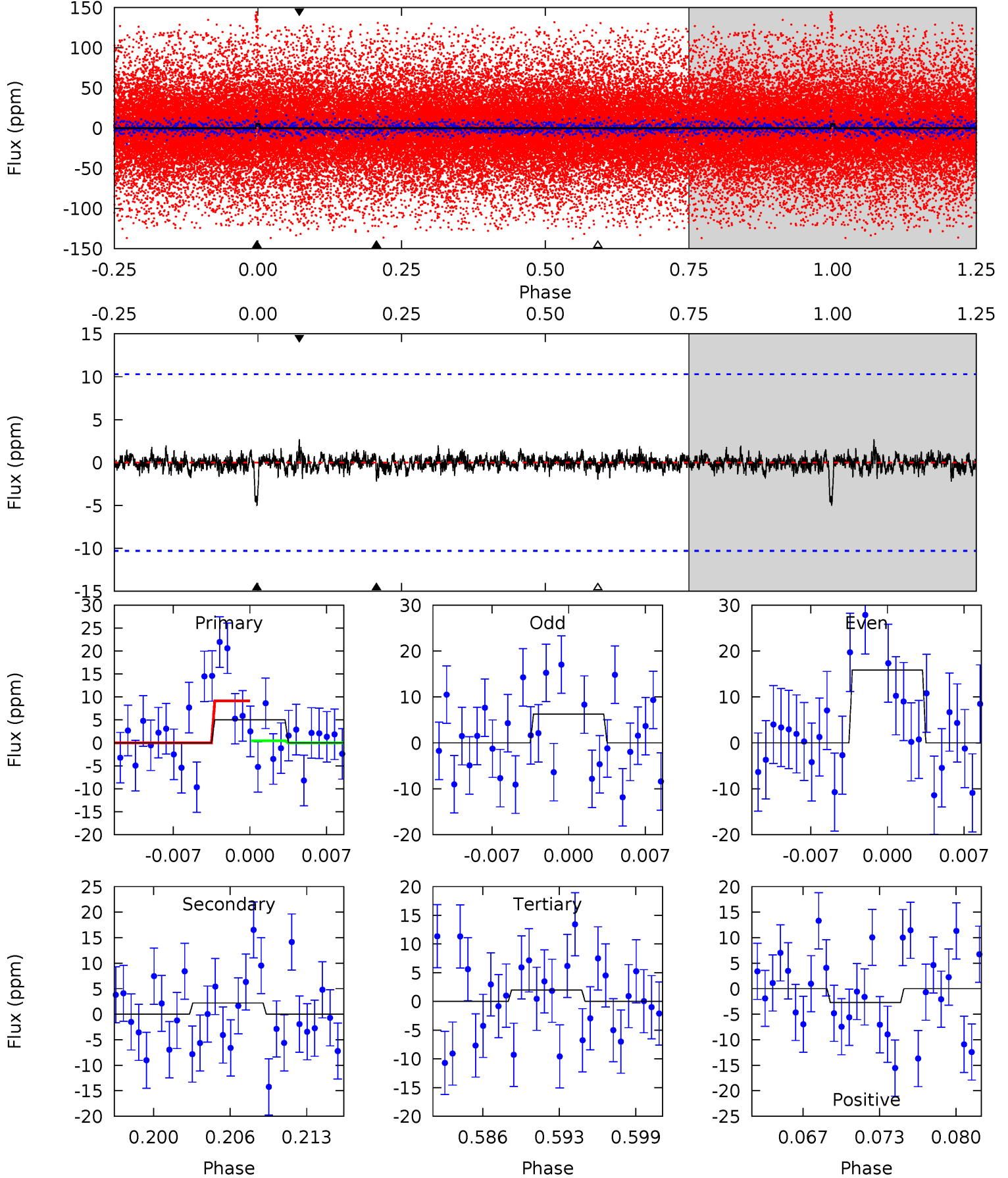
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
3.76	7.84	7.04	7.08	5.28	3.01	2.36	-3.28	-3.32	0.79	0.75	3.55	0.09	0.47	1.08



# Alt Model-Shift Uniqueness Test

010599245-05, P = 71.984600 Days, E = 102.229743 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2.49	1.09	0.98	1.35	5.10	2.71	0.29	1.51	1.15	0.11	-0.25	2.41	-109.2	0.35	2.15



### Stellar Parameters For KIC 010599245

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (g \cdot \text{cm}^{-3})$
	$3951^{+79}_{-108}$	$1.152^{+0.030}_{-0.030}$	$-0.100^{+0.200}_{-0.250}$	$59.143^{+2.129}_{-12.775}$	$1.811^{+0.036}_{-0.688}$	$0.000^{+0.000}_{-0.000}$
	+2%/-3%	+3%/-3%	+200%/-250%	+4%/-22%	+2%/-38%	+30%/-8%
Source	PHO54	AST54	PHO54	DSEP		

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

### Secondary Eclipse Parameters for KIC 010599245-05 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-56 \pm 7$	$22.63^{+16.25}_{-14.10}$	$2928^{+69}_{-86}$	$5308^{+3920}_{-1135}$	$10^{+62}_{-7}$
Alt.	$-2 \pm 2$	$15.24^{+14.08}_{-10.60}$	$2920^{+72}_{-88}$	$2991^{+1883}_{-5887}$	$0.698^{+6.298}_{-0.690}$

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

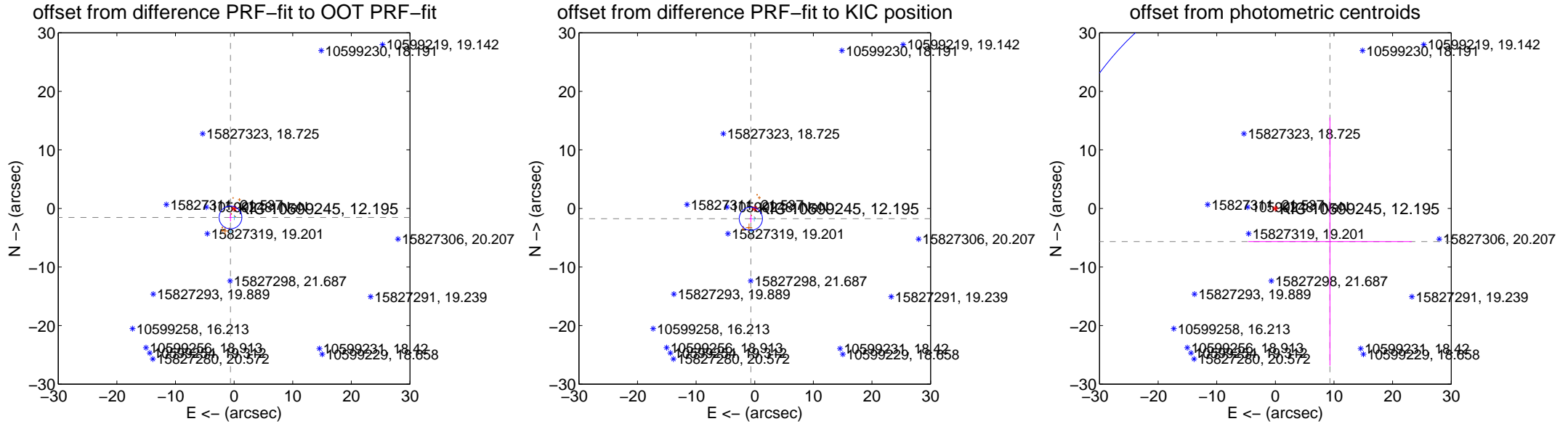
## DV Centroid Data

Supplemental centroid analysis for 010599245-05. Kepler magnitude: 12.20. Transit SNR 2.26

There are 2 quarters with good PRF difference image offsets

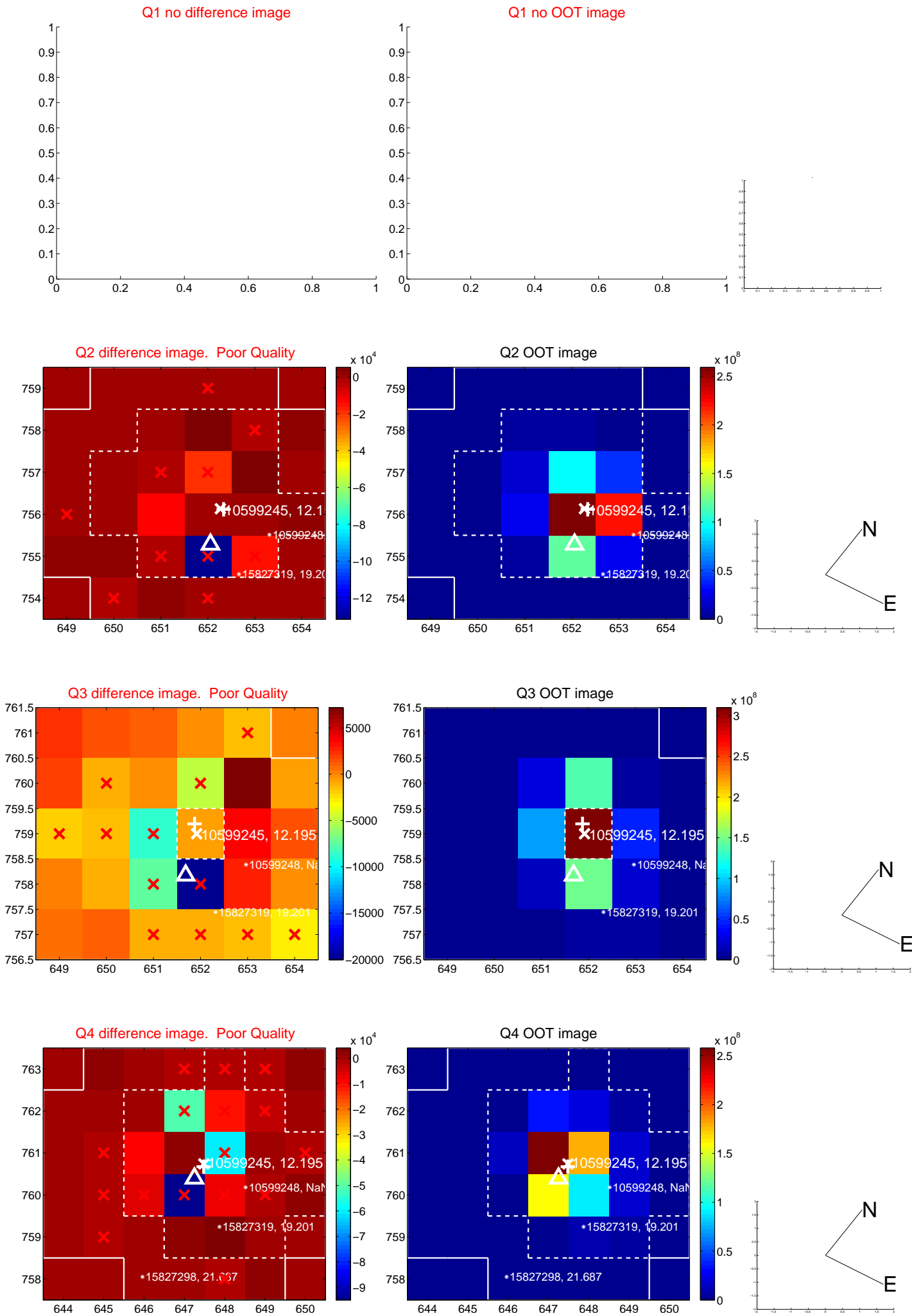
The direct PRF centroid is offset from the target star catalog position by about 0.30 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.657 \pm 0.647$	2.56	$0.618 \pm 0.294$	$-1.537 \pm 0.687$
PRF-fit source offset from KIC position	$1.876 \pm 0.660$	2.84	$0.665 \pm 0.257$	$-1.755 \pm 0.630$
photometric centroid source offset	$10.89 \pm 16.23$	0.67	$-9.31 \pm 13.97$	$-5.66 \pm 21.18$

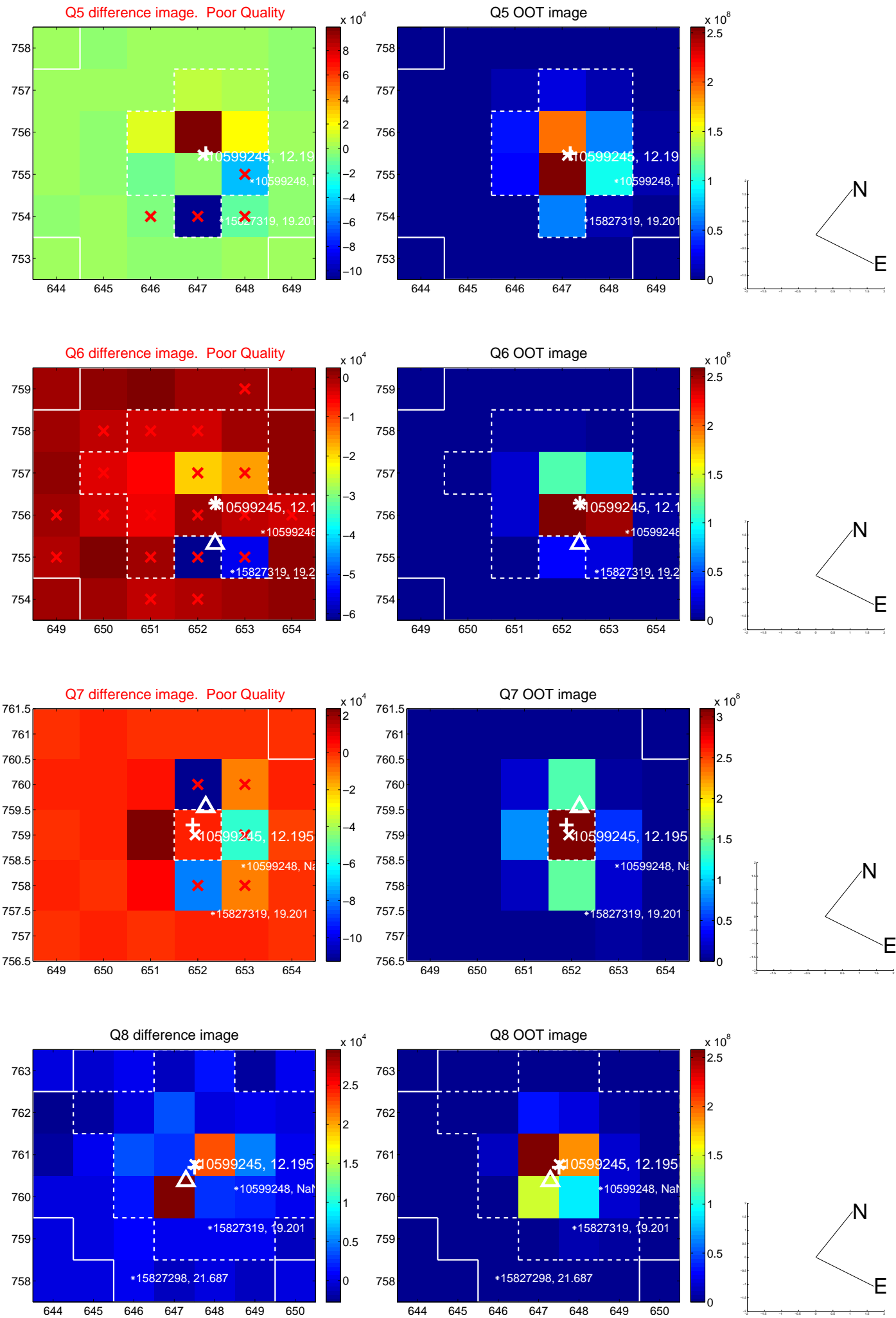


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

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

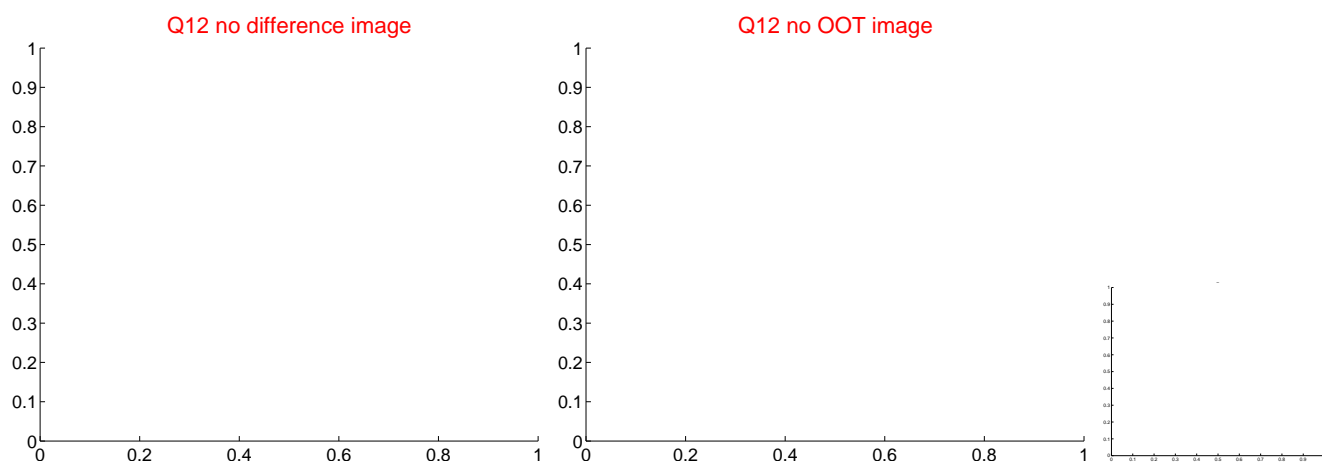
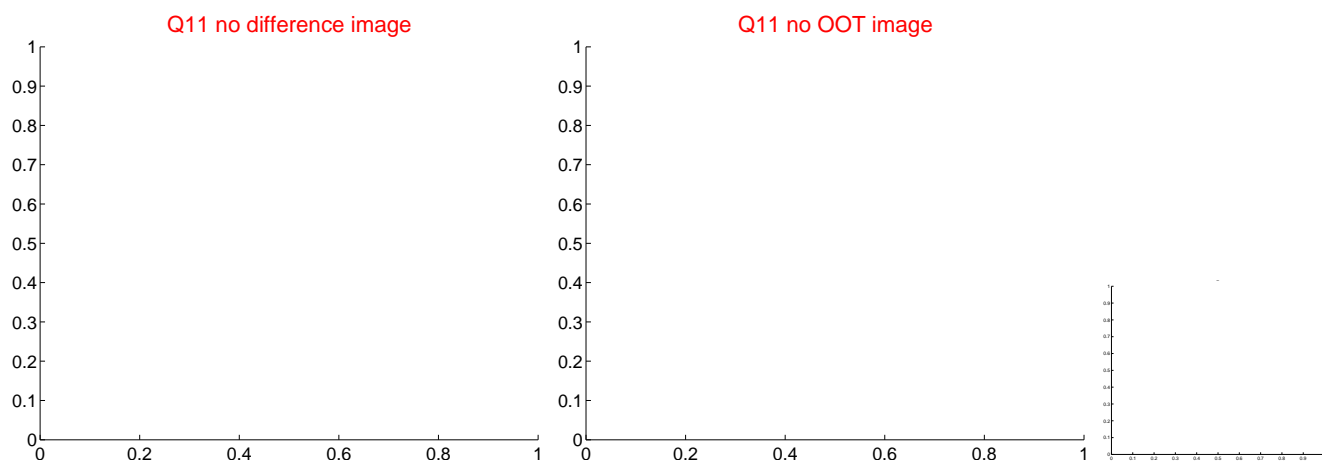
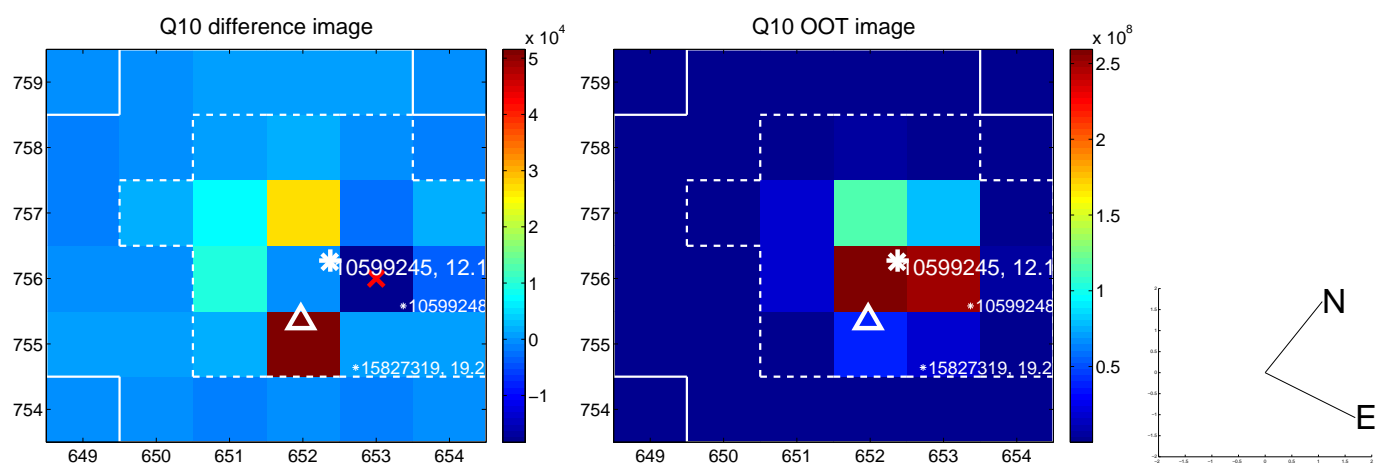
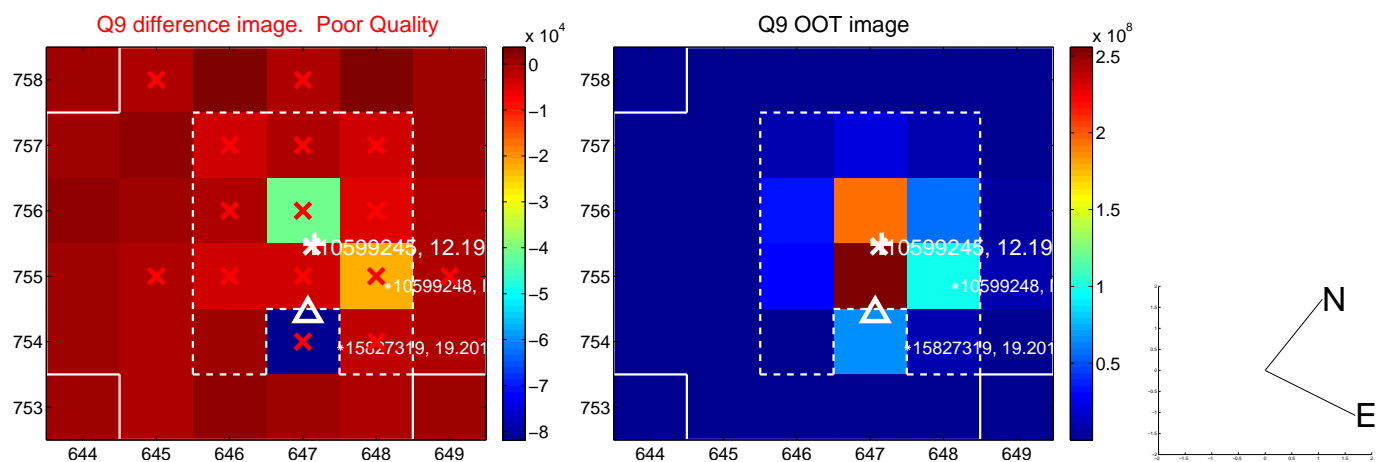


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

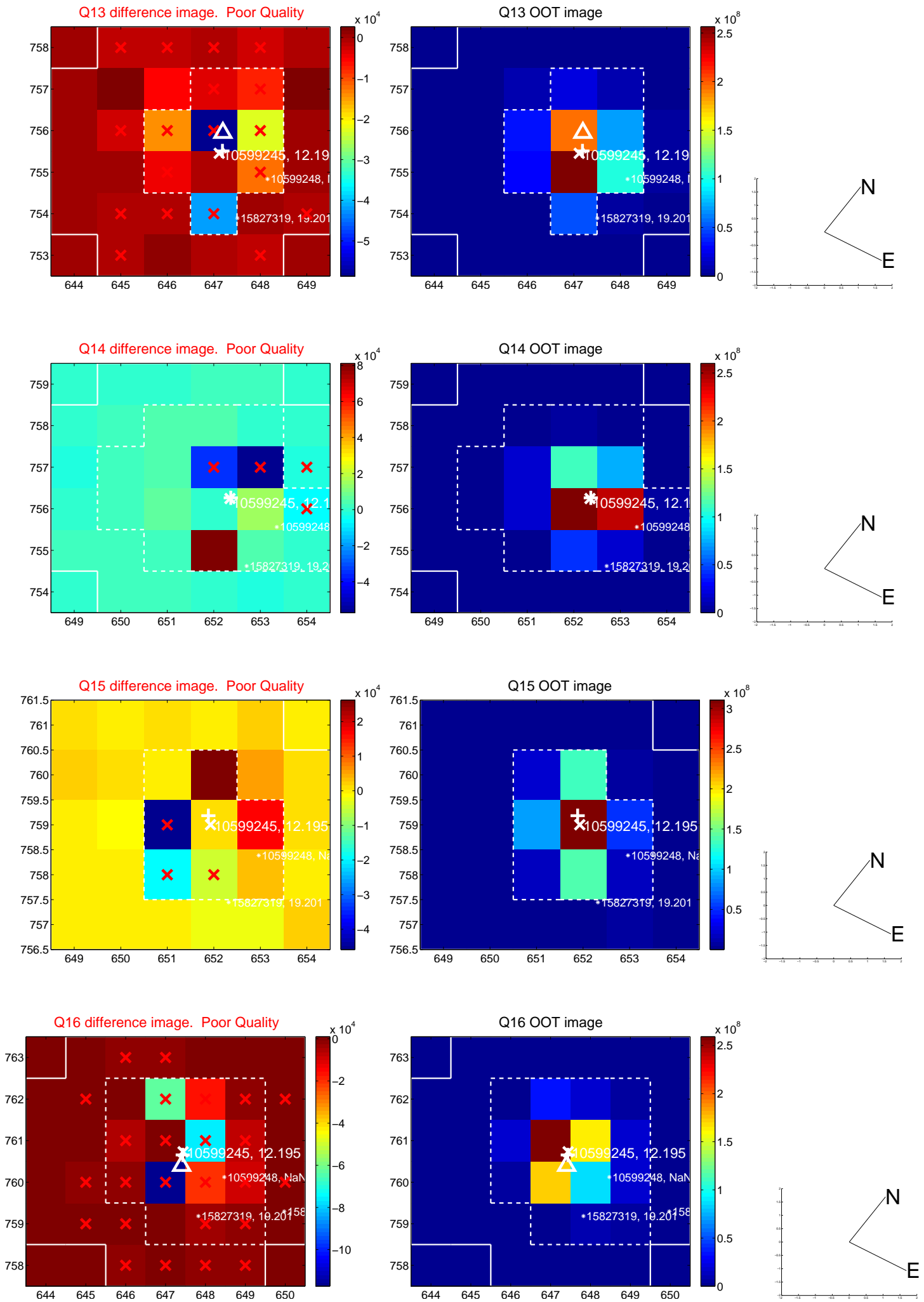




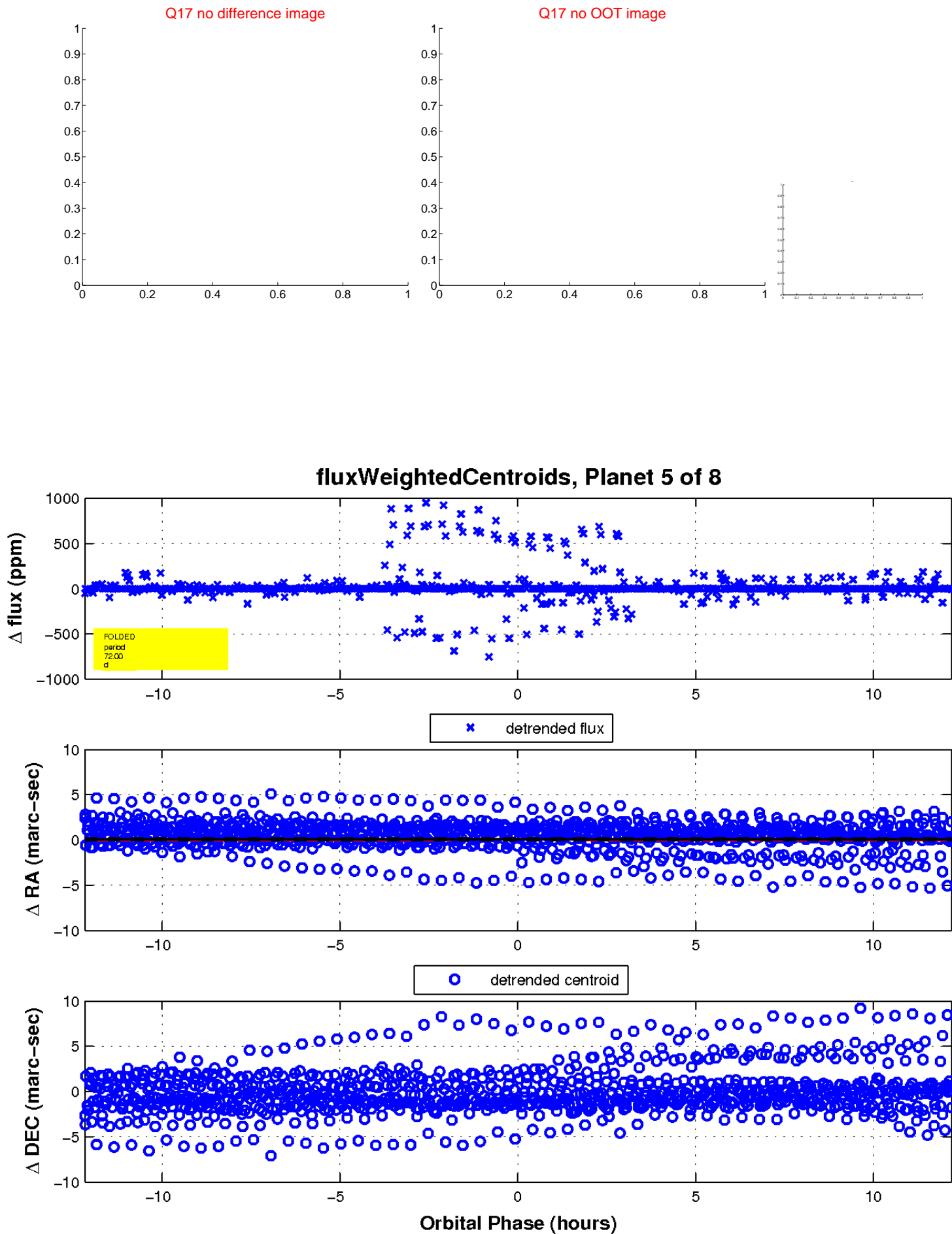
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value



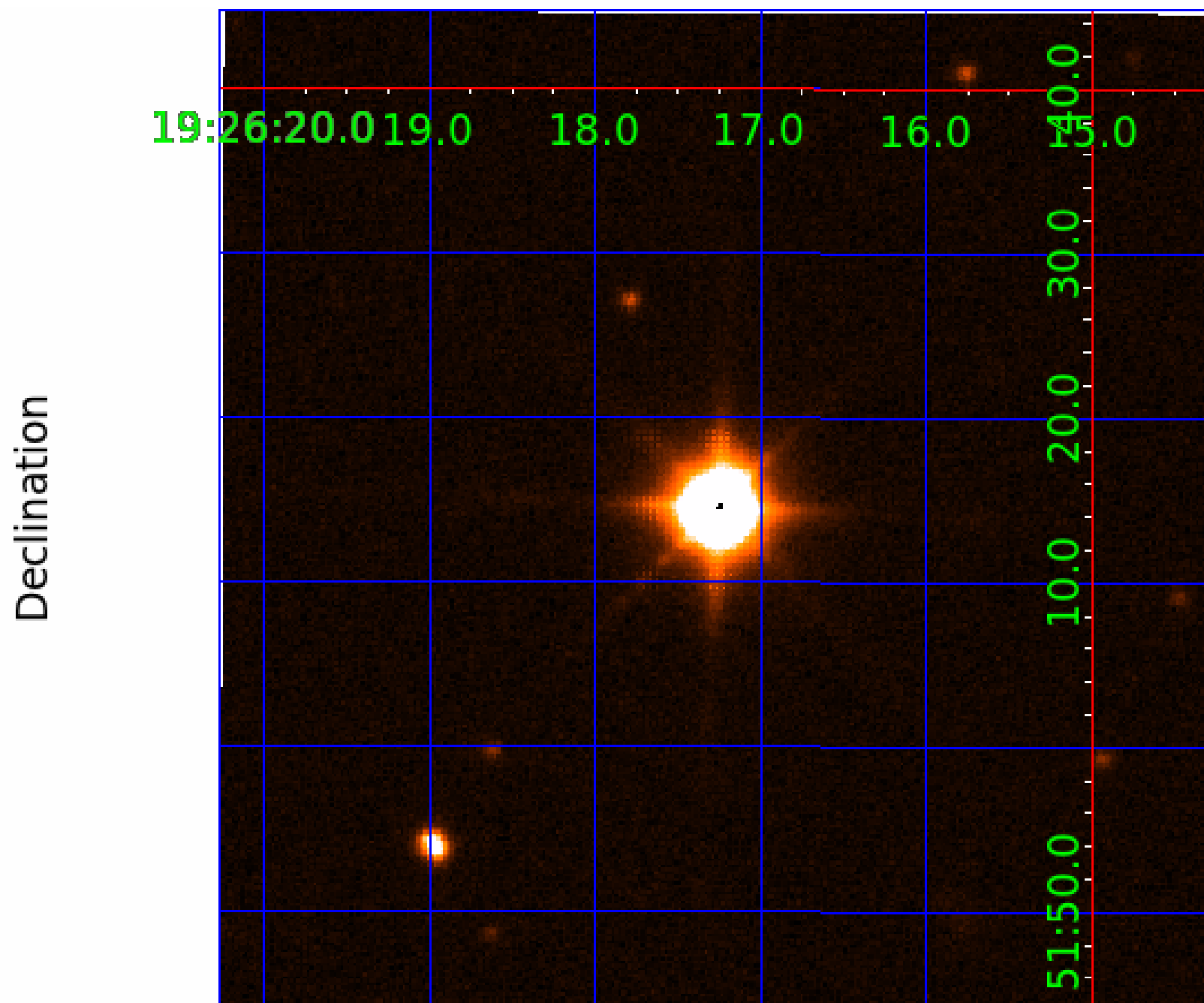
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image



# KIC 010599245

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010599245-01	OBS	No	102.933504	203.234932	42.4	2.126	28.2	19.6	59.14	3951	51.05	2781.31
010599245-02	OBS	No	185.904559	141.996123	43.9	3.508	16.3	14.6	59.14	3951	47.53	1264.56
010599245-03	OBS	No	118.287967	183.981930	53.7	2.452	15.0	15.8	59.14	3951	59.89	2310.67
010599245-04	OBS	No	170.417068	169.518612	39.7	8.386	14.7	10.0	59.14	3951	43.03	1420.06
010599245-05	OBS	No	72.002790	174.339797	6.7	4.067	14.5	2.3	59.14	3951	19.66	4479.12
010599245-06	OBS	No	62.359596	145.890783	20.7	5.466	13.7	9.2	59.14	3951	33.90	5425.67
010599245-07	OBS	No	102.244200	227.599922	46.6	2.835	13.4	13.2	59.14	3951	52.19	2806.34
010599245-08	OBS	No	80.029016	143.655157	38.5	1.930	13.1	12.9	59.14	3951	45.51	3890.40

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010599245-01	OBS	FP	0.00	1	0	1	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—CENT_UNRESOLVED_OFFSET—HALO_GHOST
010599245-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE_ZUMA—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
010599245-03	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
010599245-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_MARSHALL_SKYE_ZUMA—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_UNRESOLVED_OFFSET
010599245-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
010599245-06	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
010599245-07	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_KIC_POS—CENT_UNCERTAIN
010599245-08	OBS	FP	0.00	1	0	0	0	LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_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.

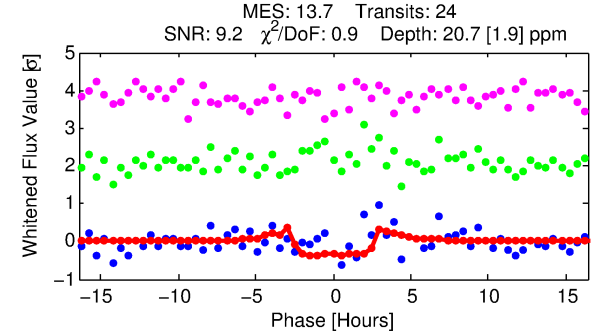
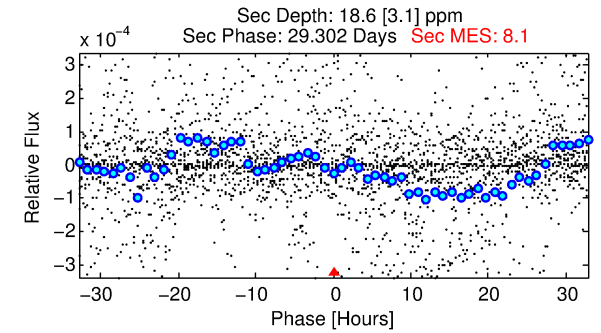
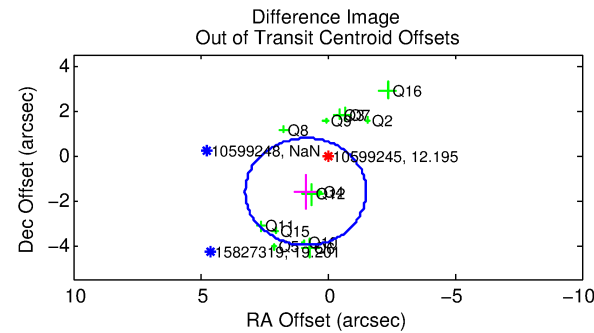
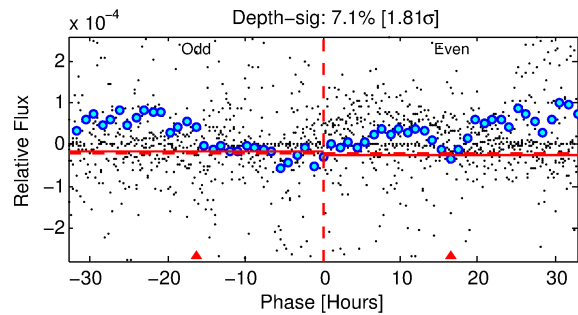
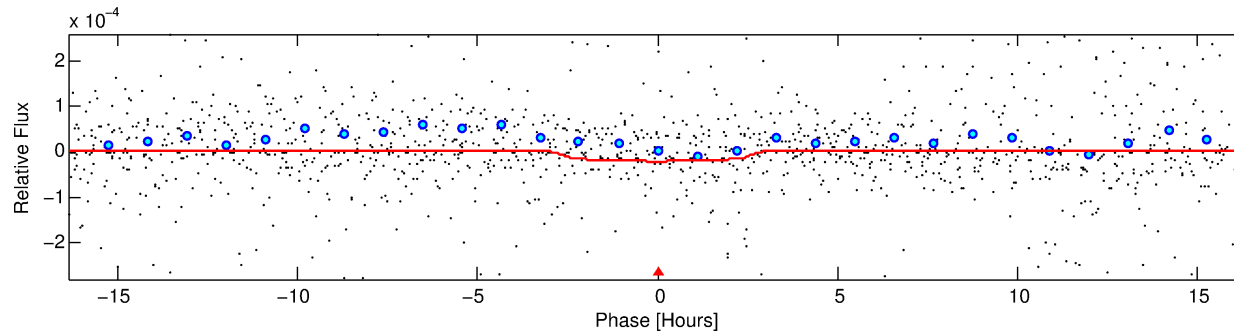
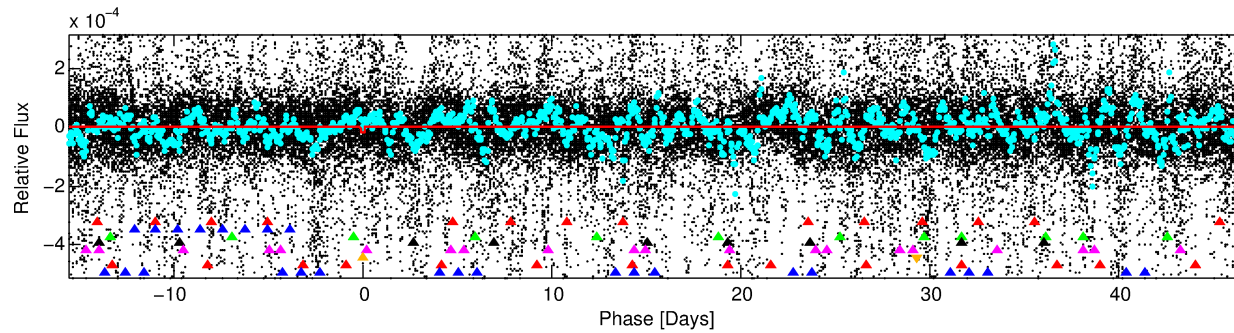
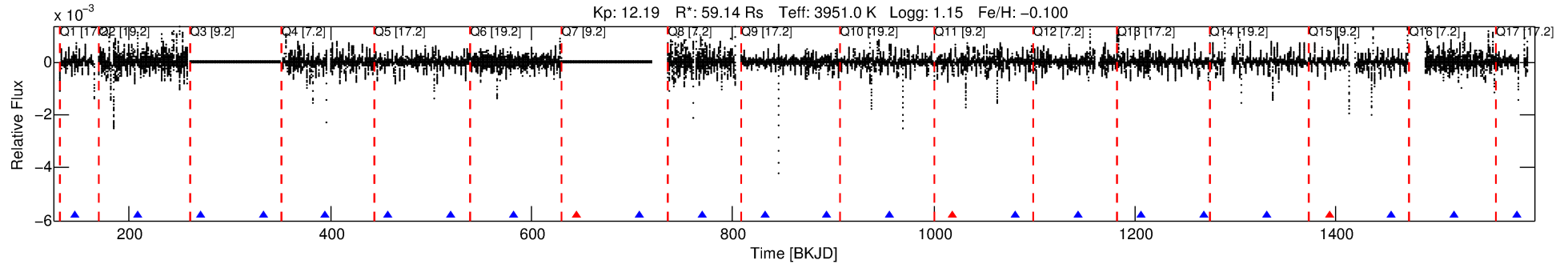
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 010599245-06

No Significant Match Found

# DV One-Page Summary

KIC: 10599245 Candidate: 6 of 8 Period: 62.360 d



## DV Fit Results:

Period = 62.35960 [0.00078] d  
Epoch = 145.8908 [0.0050] BKJD  
Rp/R\* = 0.0053 [0.0012]  
a/R\* = 39.10 [30.25]  
b = 0.90 [0.17]  
Seff = 5425.67 [1012.32]  
Teq = 2188 [102] K  
Rp = 33.90 [10.80] Re  
a = 0.3752 [0.0547] AU  
Ag = 1.25 [0.65] [0.39 $\sigma$ ]  
Teffp = 3581 [456] K [2.98 $\sigma$ ]

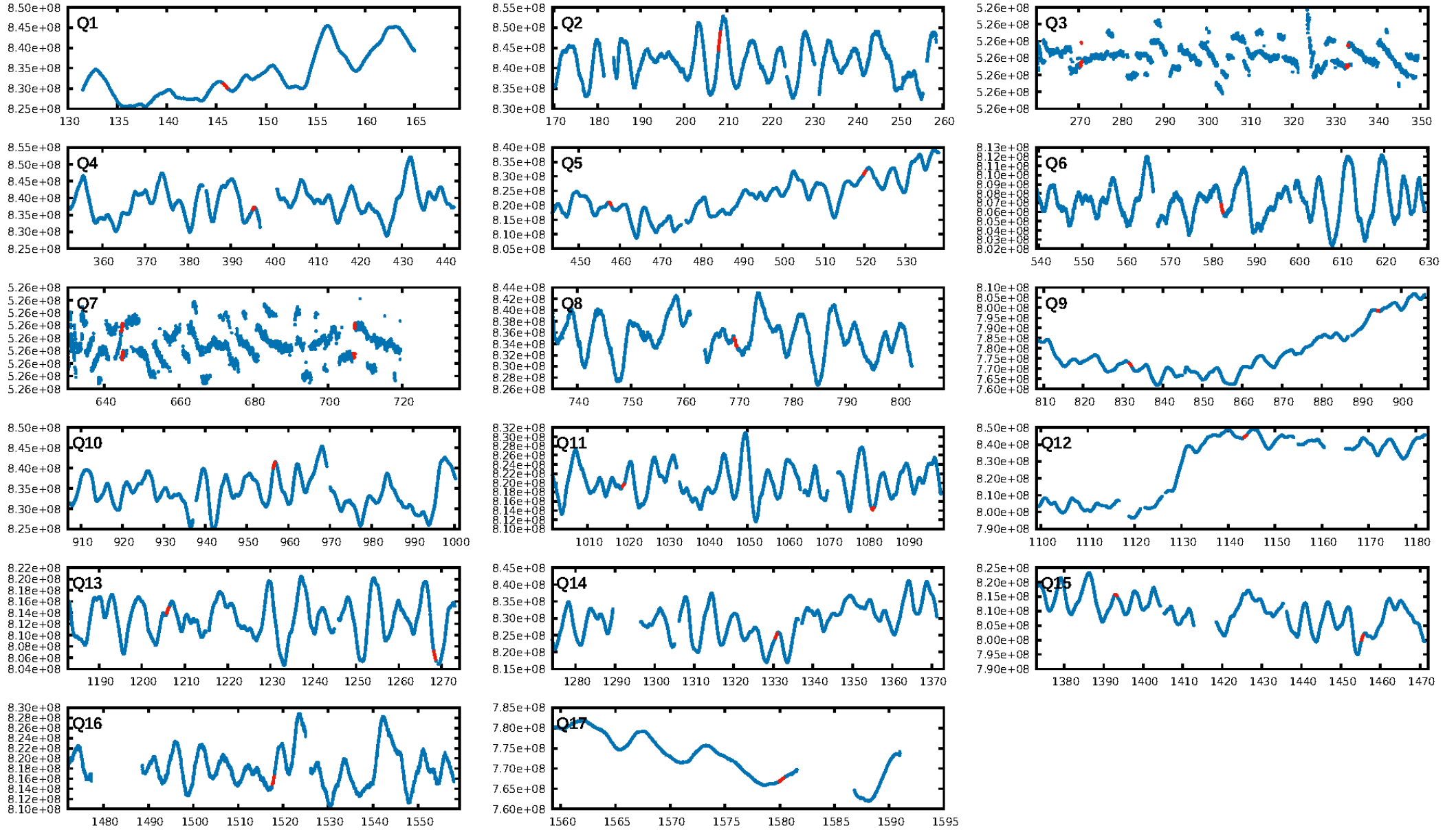
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [33.97 $\sigma$ ]  
ModelChiSquare2-sig: 26.5%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 0.86 [19/22]  
GhostDiagnostic-chr: 1.006  
Centroid-sig: N/A  
Centroid-so: 3.100 arcsec [0.57 $\sigma$ ]  
OotOffset-rm: 1.830 arcsec [2.30 $\sigma$ ]  
KicOffset-rm: 1.526 arcsec [1.94 $\sigma$ ]  
OotOffset-st: 3/4/4/2 [13]  
KicOffset-st: 3/4/4/2 [13]  
DiffImageQuality-fgm: 0.15 [2/13]  
DiffImageOverlap-fno: 1.00 [16/16]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:40:09 Z

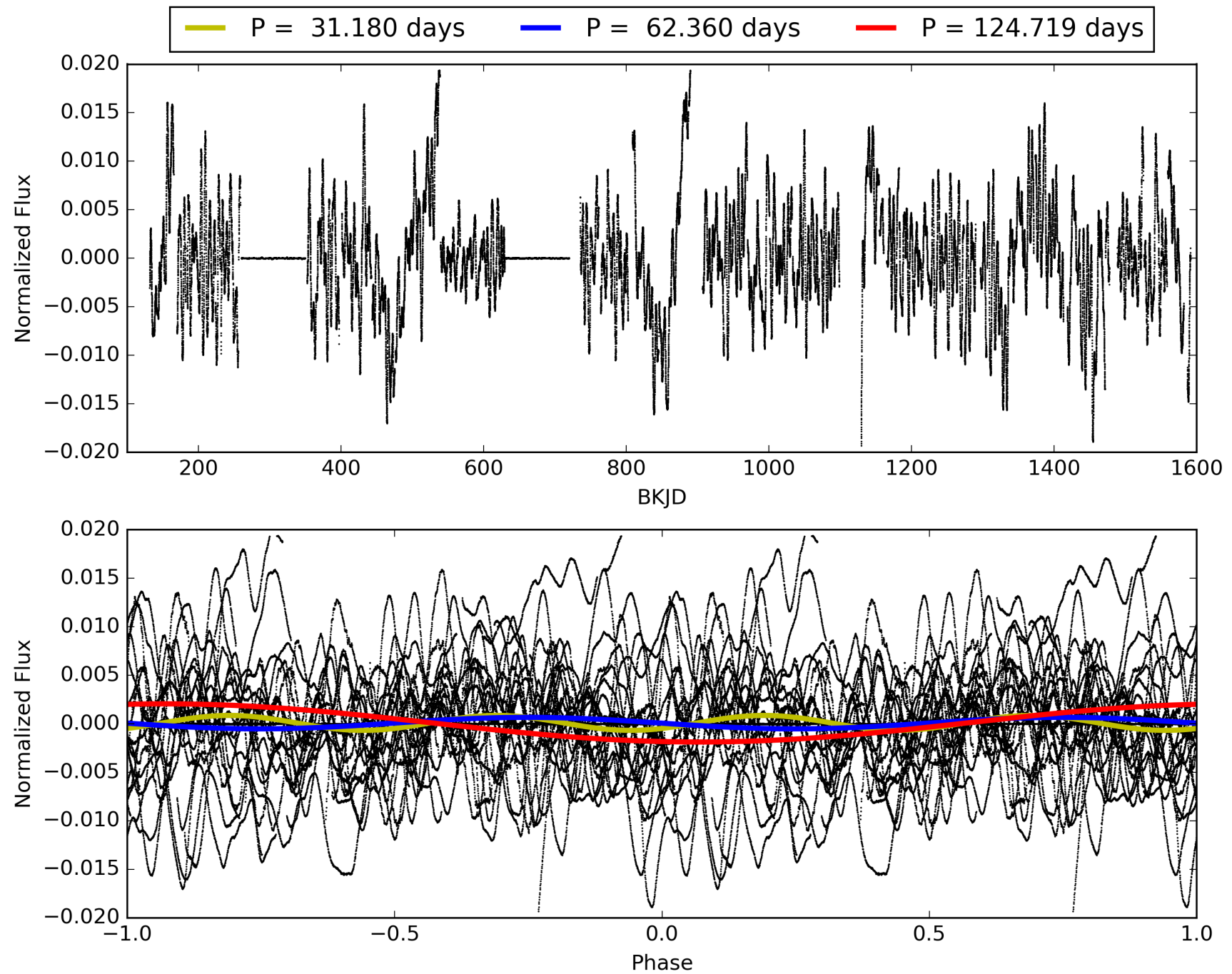
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 010599245-06, PDC Light Curves





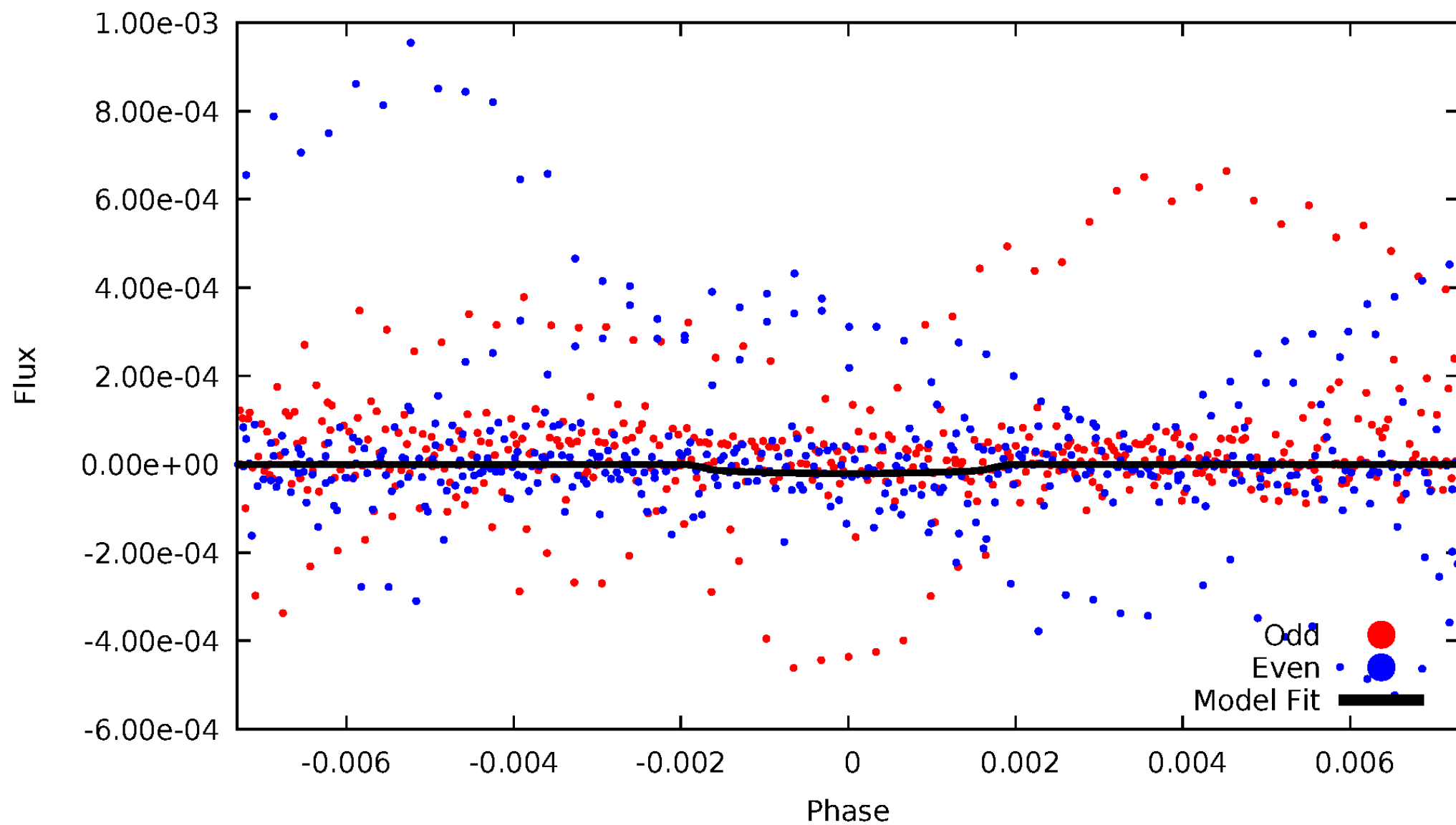
# TCE 010599245-06





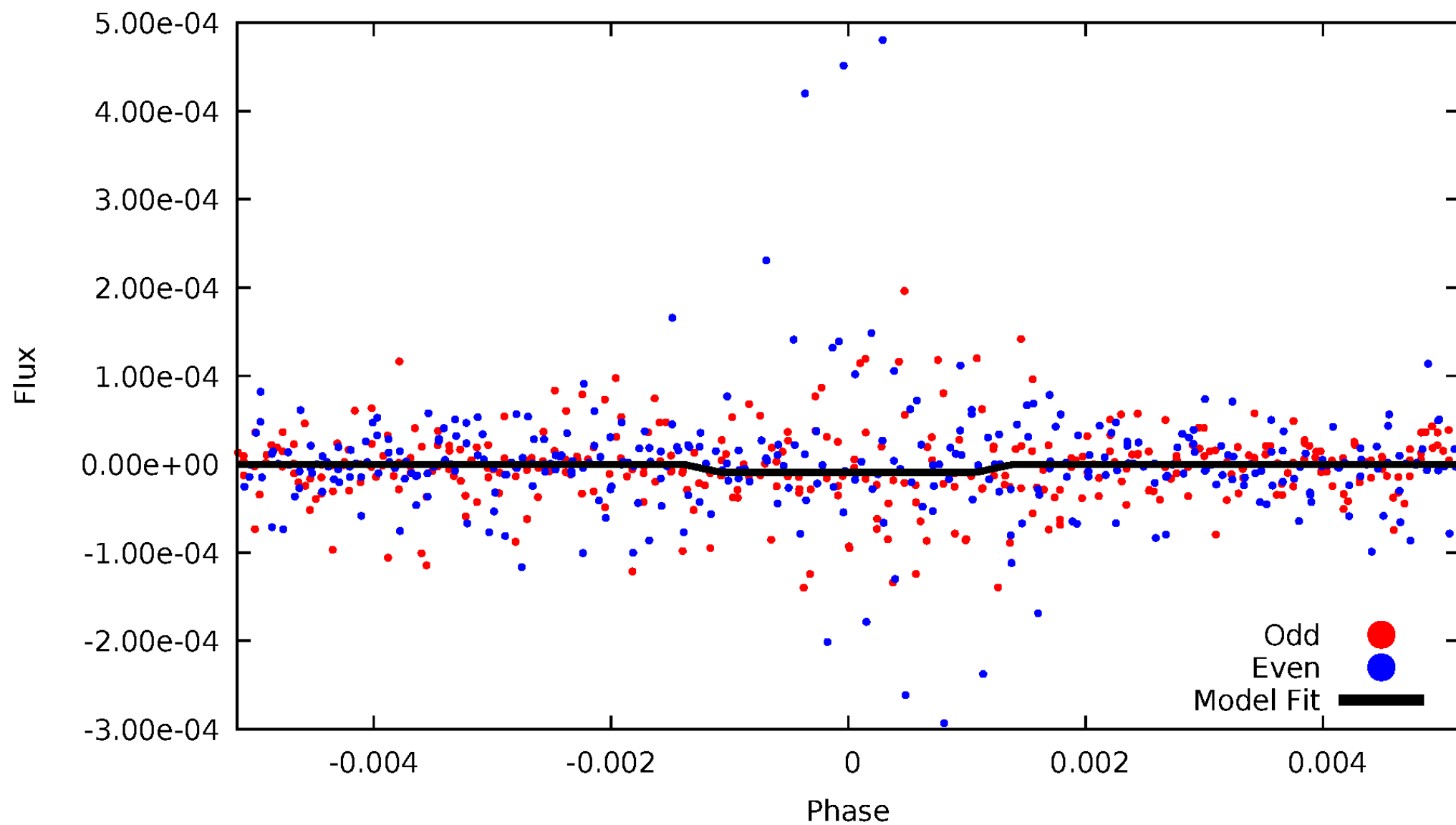
# DV Odd/Even

TCE 010599245-06



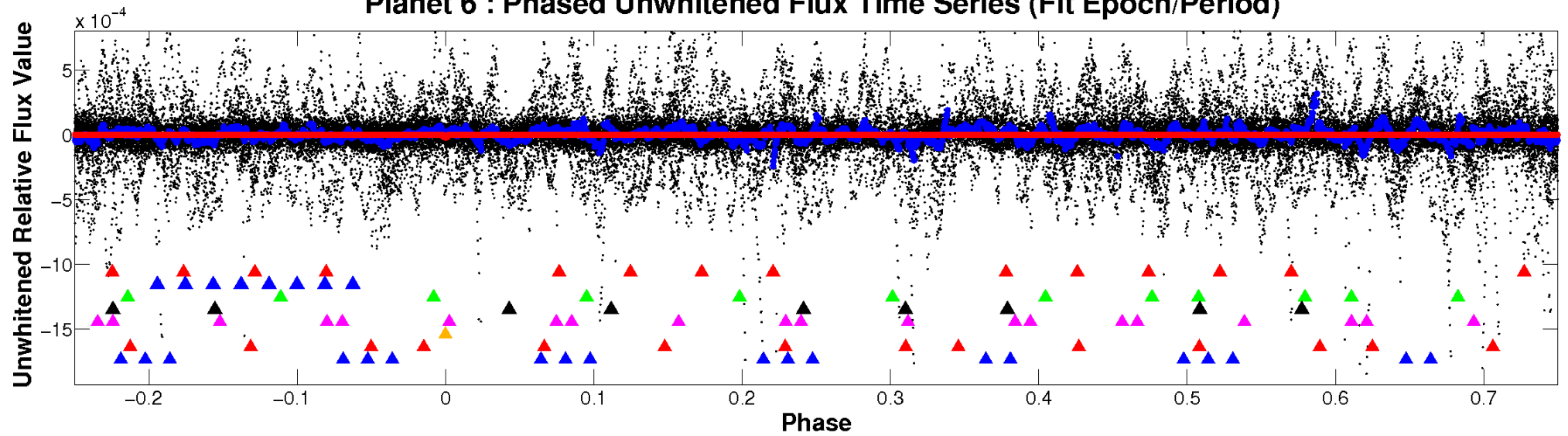
# ALT Odd/Even

TCE 010599245-06

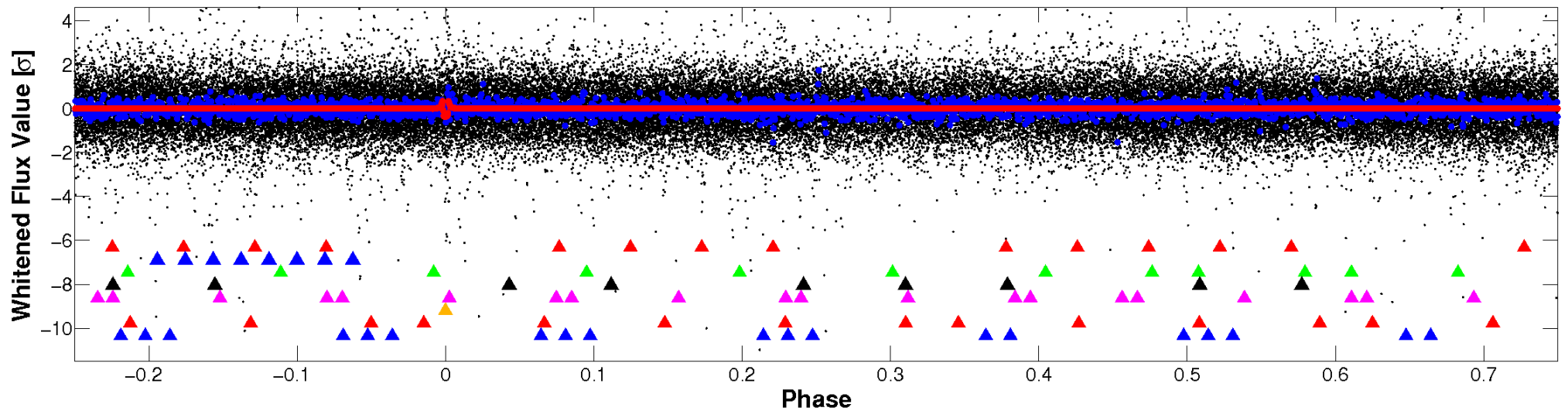


# Non-Whitened Vs. Whitened Light Curve

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

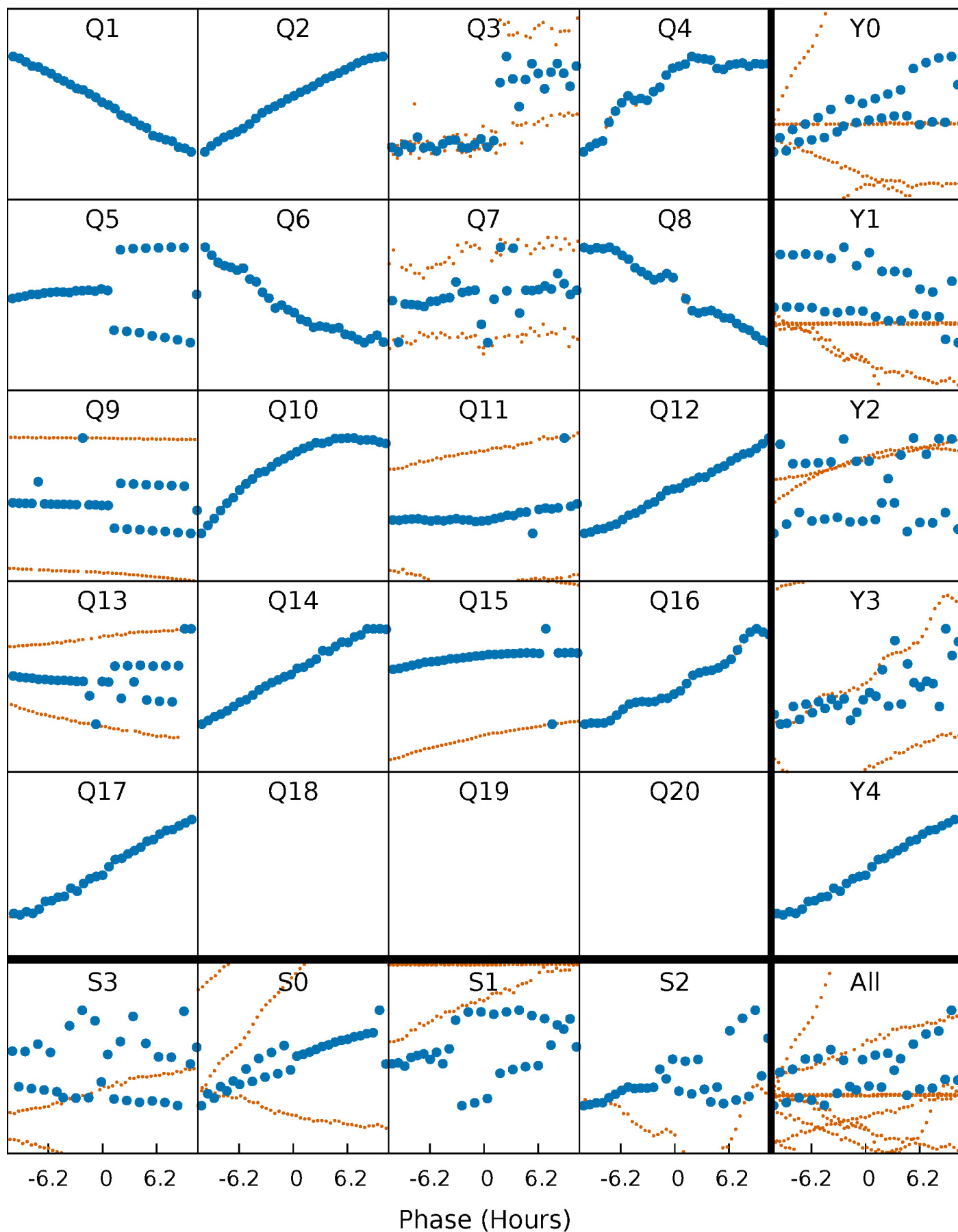


## Planet 6 : Phased Whitened Flux Time Series (Fit Epoch/Period)



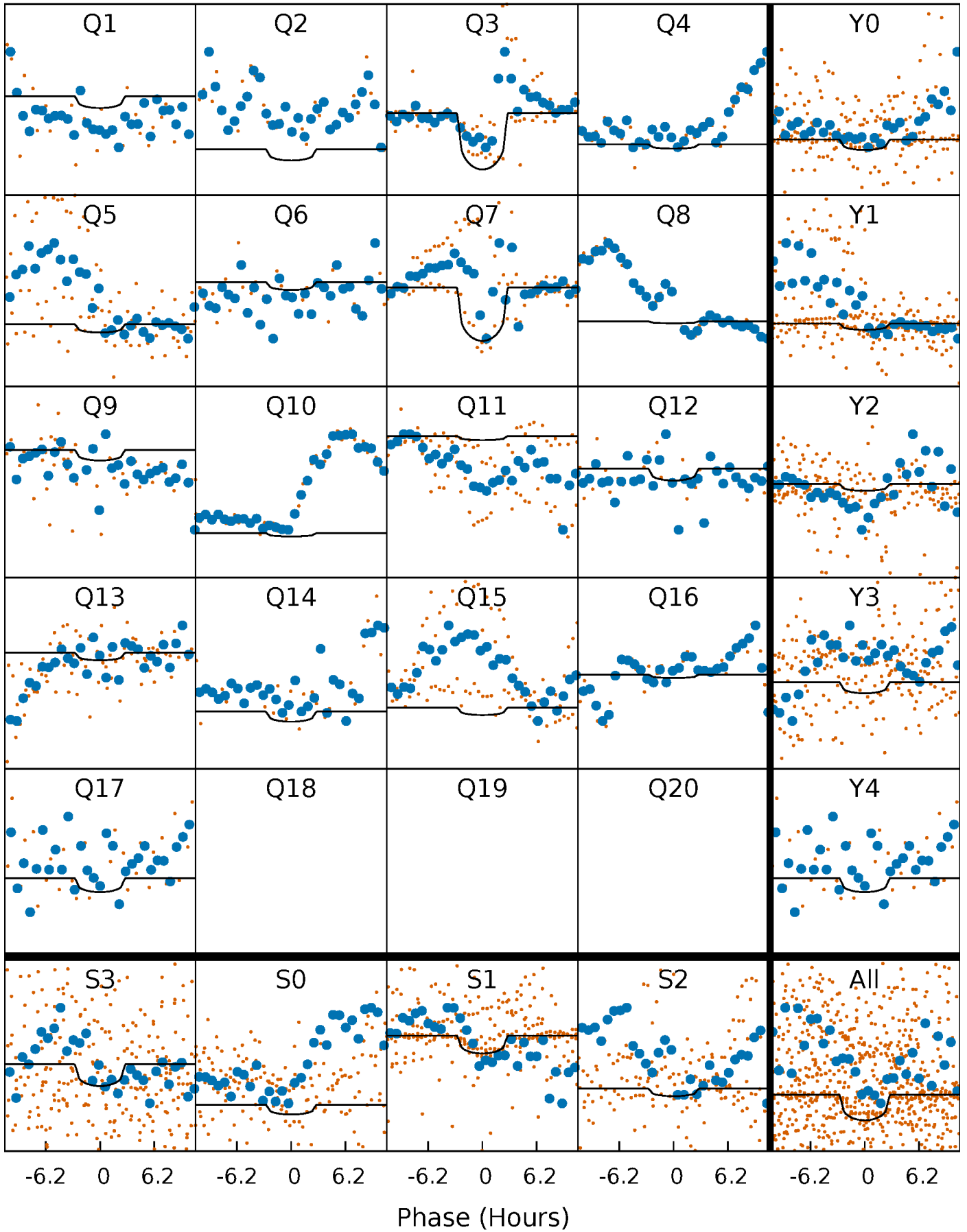
# PDC Quarter-Phased Transit Curves

TCE 010599245-06     $P = 62.359596$  Days     $T_0 = 145.890783$  (BKJD)



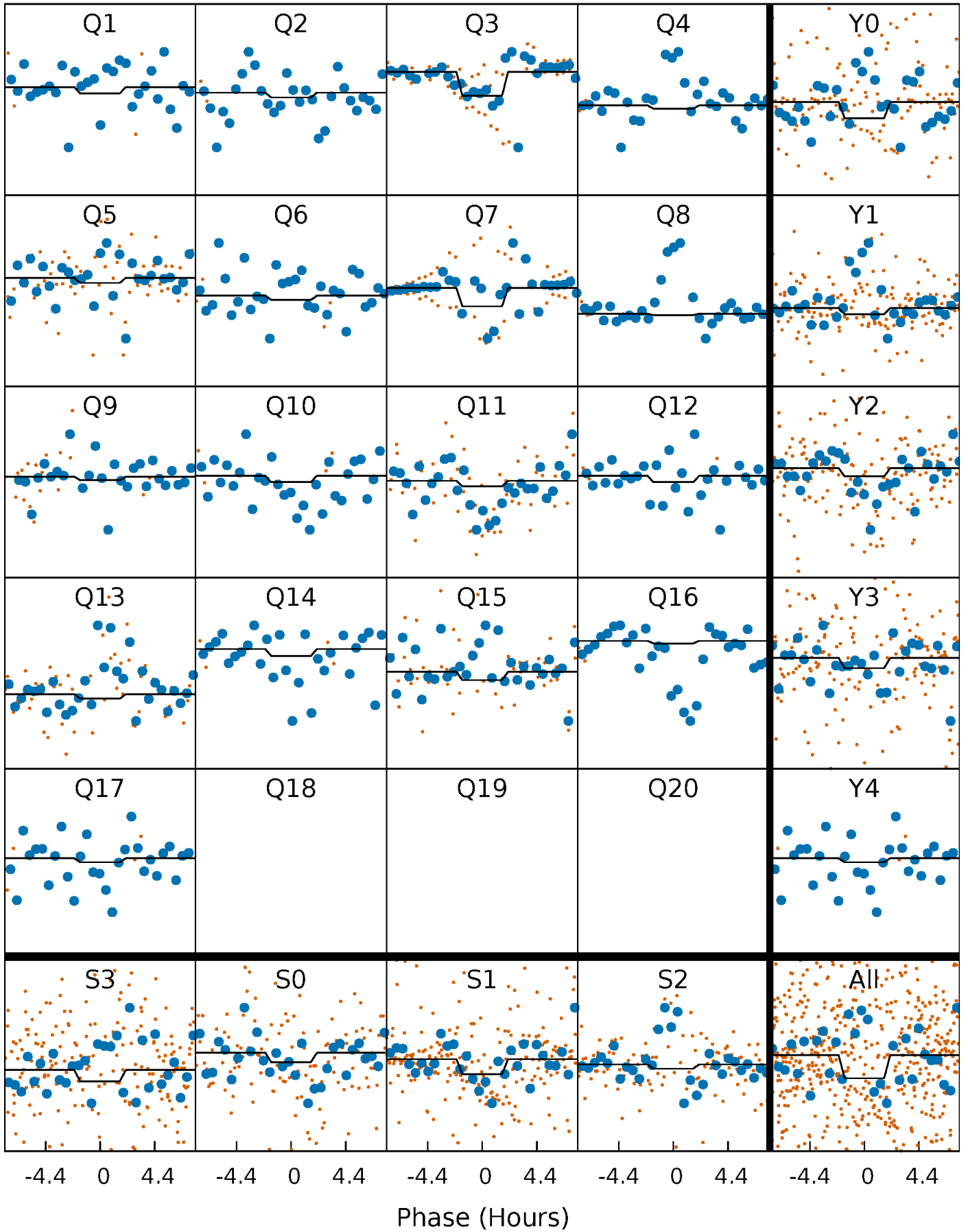
# DV Quarter-Phased Transit Curves

TCE 010599245-06   P= 62.359596 Days    $T_0=145.890783$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

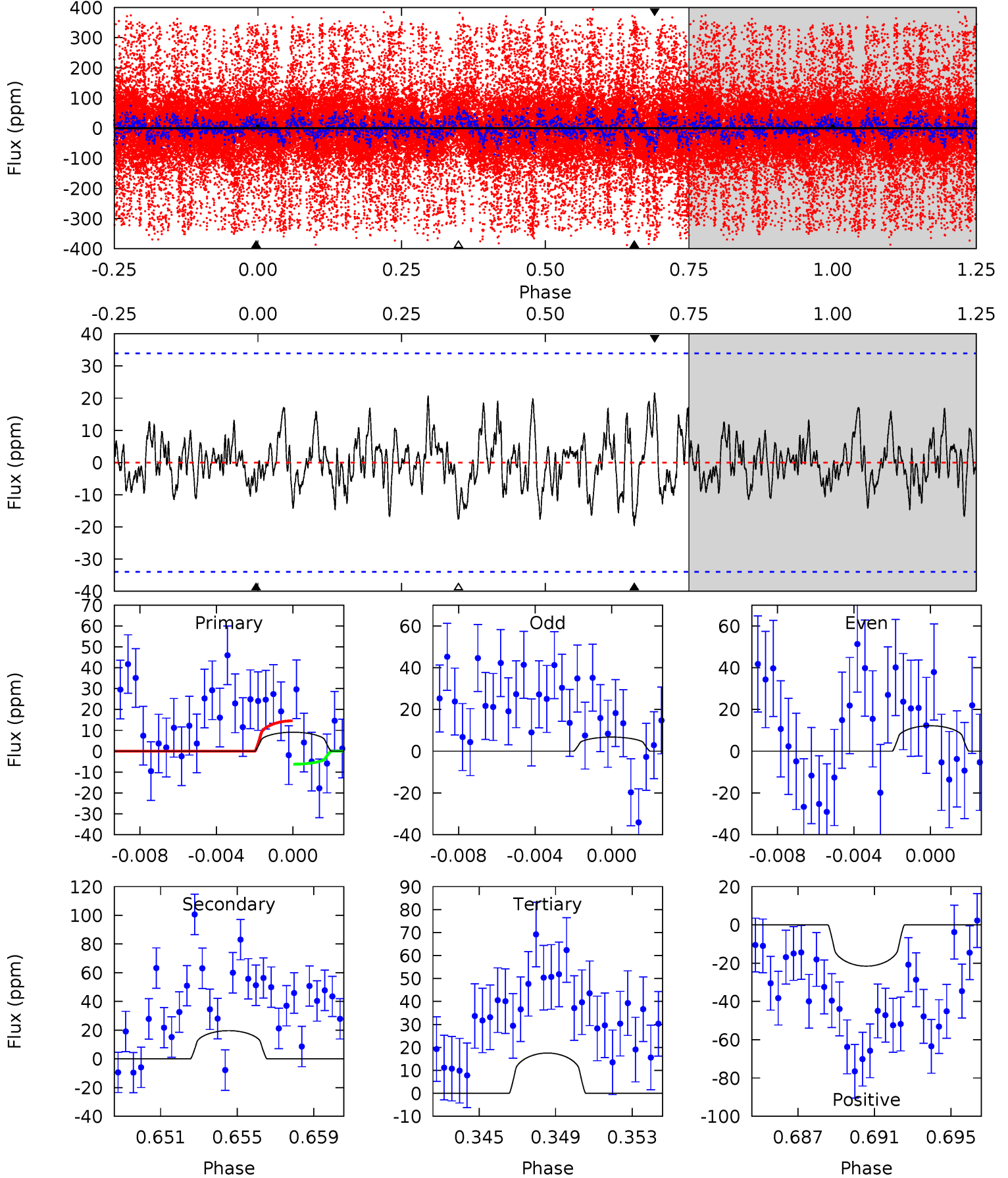
TCE 010599245-06     $P = 62.358946$  Days     $T_0 = 145.879913$  (BKJD)



# DV Model-Shift Uniqueness Test

010599245-06, P = 62.359596 Days, E = 83.531187 Days

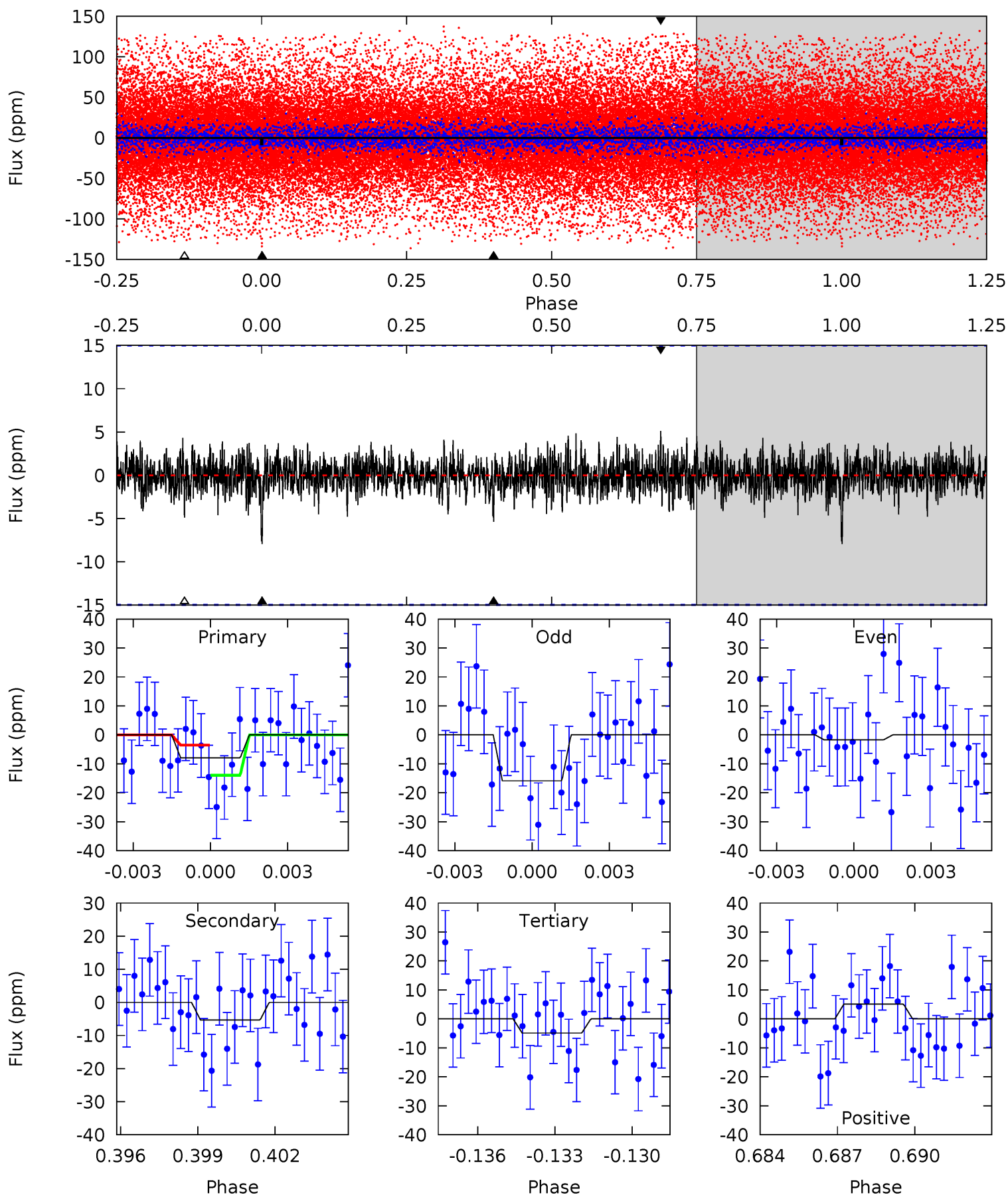
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
1.40	3.01	2.69	3.30	5.20	2.88	1.10	-1.29	-1.91	0.33	-0.29	0.42	0.68	0.52	0.65



# Alt Model-Shift Uniqueness Test

010599245-06, P = 62.358946 Days, E = 83.520967 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2.79	1.89	1.72	1.80	5.27	2.99	0.52	1.07	0.99	0.16	0.08	2.50	-0.71	0.39	1.83





### Stellar Parameters For KIC 010599245

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$3951^{+79}_{-108}$	$1.152^{+0.030}_{-0.030}$	$-0.100^{+0.200}_{-0.250}$	$59.143^{+2.129}_{-12.775}$	$1.811^{+0.036}_{-0.688}$	$0.000^{+0.000}_{-0.000}$
	+2%/-3%	+3%/-3%	+200%/-250%	+4%/-22%	+2%/-38%	+30%/-8%
Source	PHO54	AST54	PHO54	DSEP		

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

### Secondary Eclipse Parameters for KIC 010599245-06 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-20 \pm 7$	$34.59^{+7.65}_{-8.31}$	$3056^{+76}_{-89}$	$3514^{+491}_{-418}$	$1.262^{+1.039}_{-0.551}$
Alt.	$-5 \pm 3$	$19.62^{+8.10}_{-7.73}$	$3058^{+75}_{-88}$	$3303^{+834}_{-1011}$	$0.938^{+1.847}_{-0.598}$

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

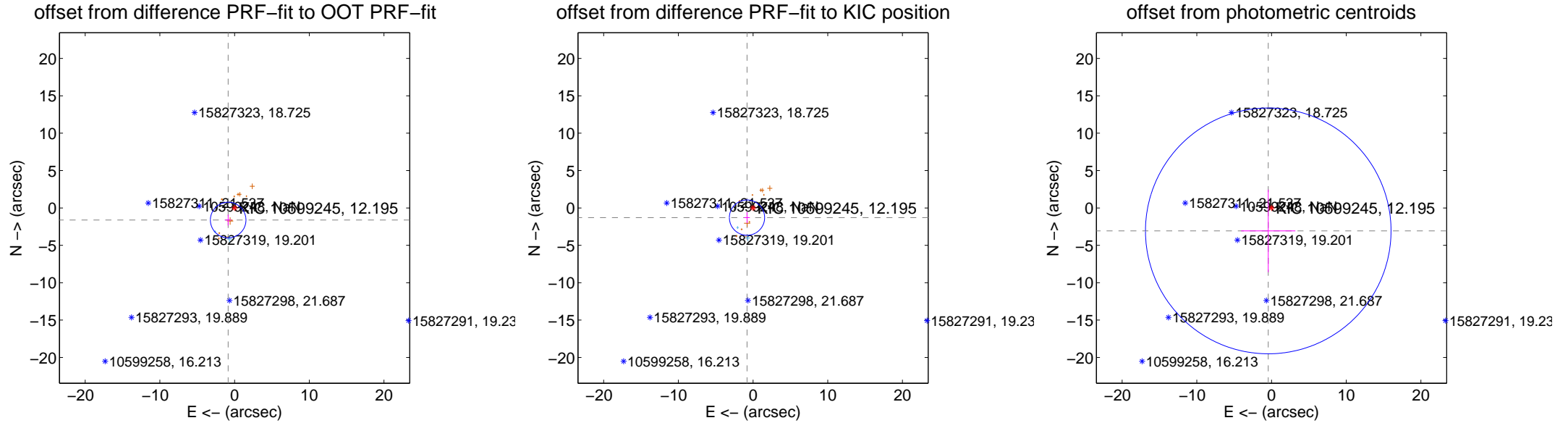
## DV Centroid Data

Supplemental centroid analysis for 010599245-06. Kepler magnitude: 12.20. Transit SNR 9.24

There are 2 quarters with good PRF difference image offsets

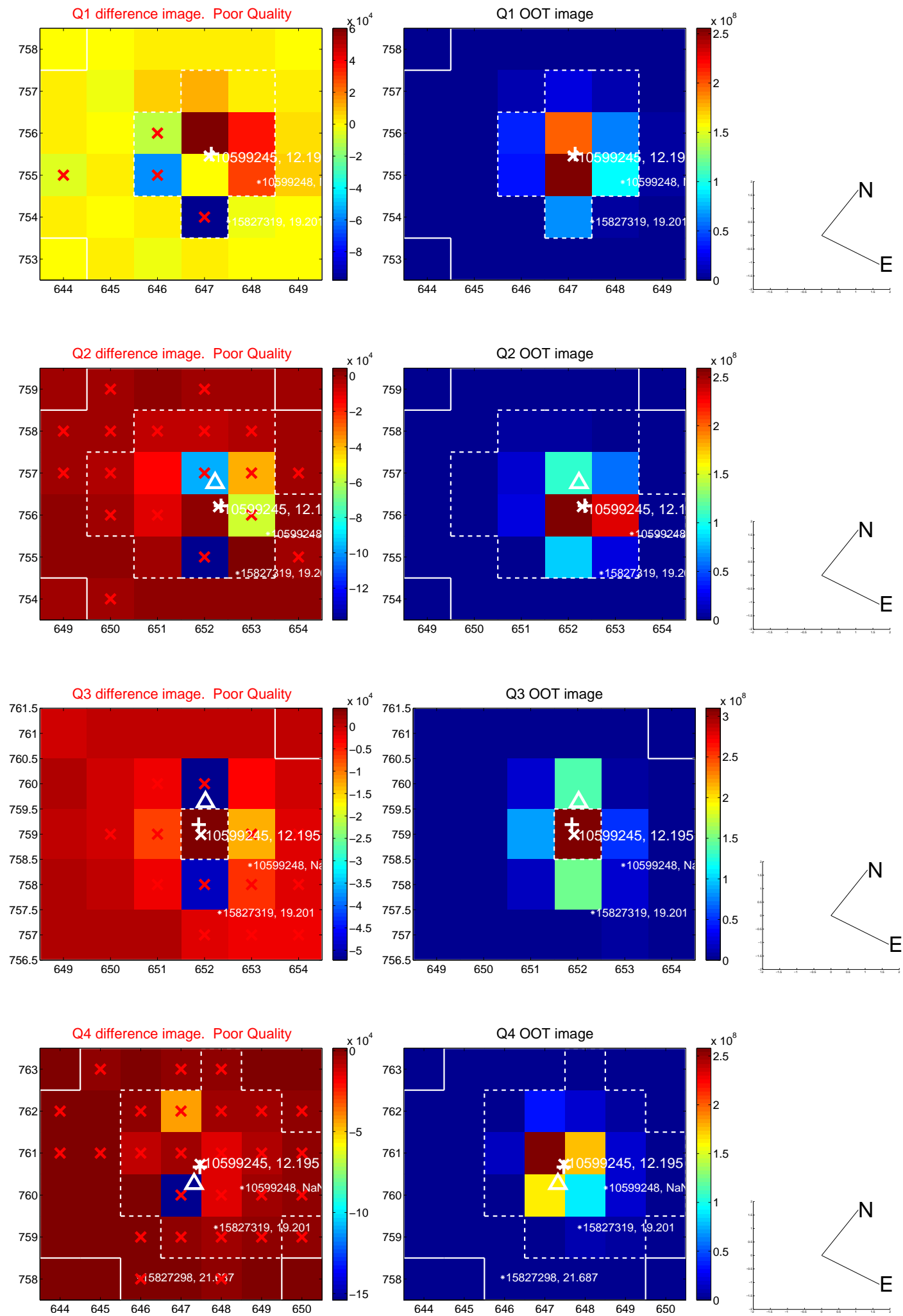
The direct PRF centroid is offset from the target star catalog position by about 0.30 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.830 \pm 0.794$	2.30	$0.859 \pm 0.415$	$-1.616 \pm 0.727$
PRF-fit source offset from KIC position	$1.526 \pm 0.787$	1.94	$0.810 \pm 0.384$	$-1.293 \pm 0.733$
photometric centroid source offset	$3.10 \pm 5.48$	0.57	$0.44 \pm 3.62$	$-3.07 \pm 5.51$

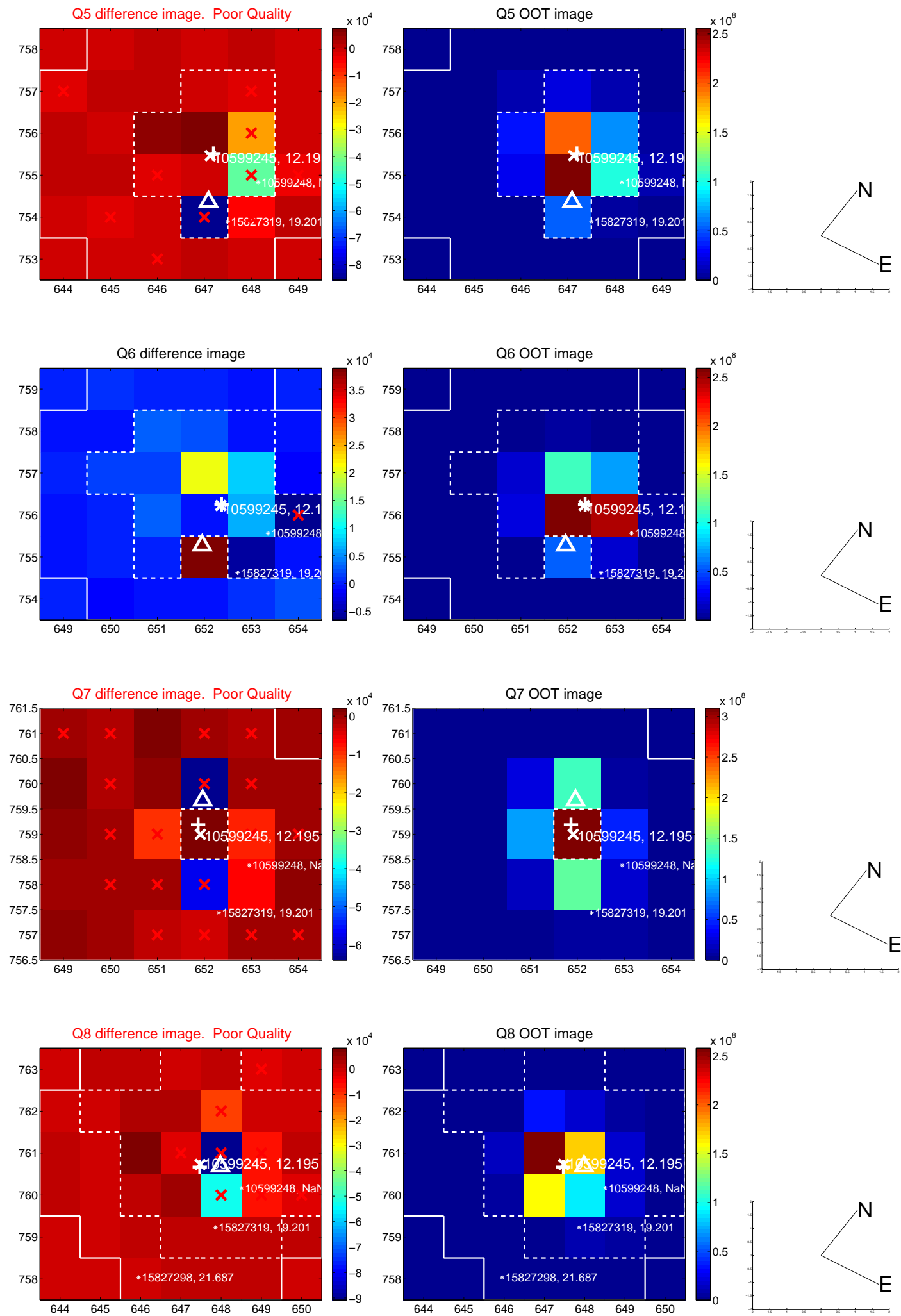


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

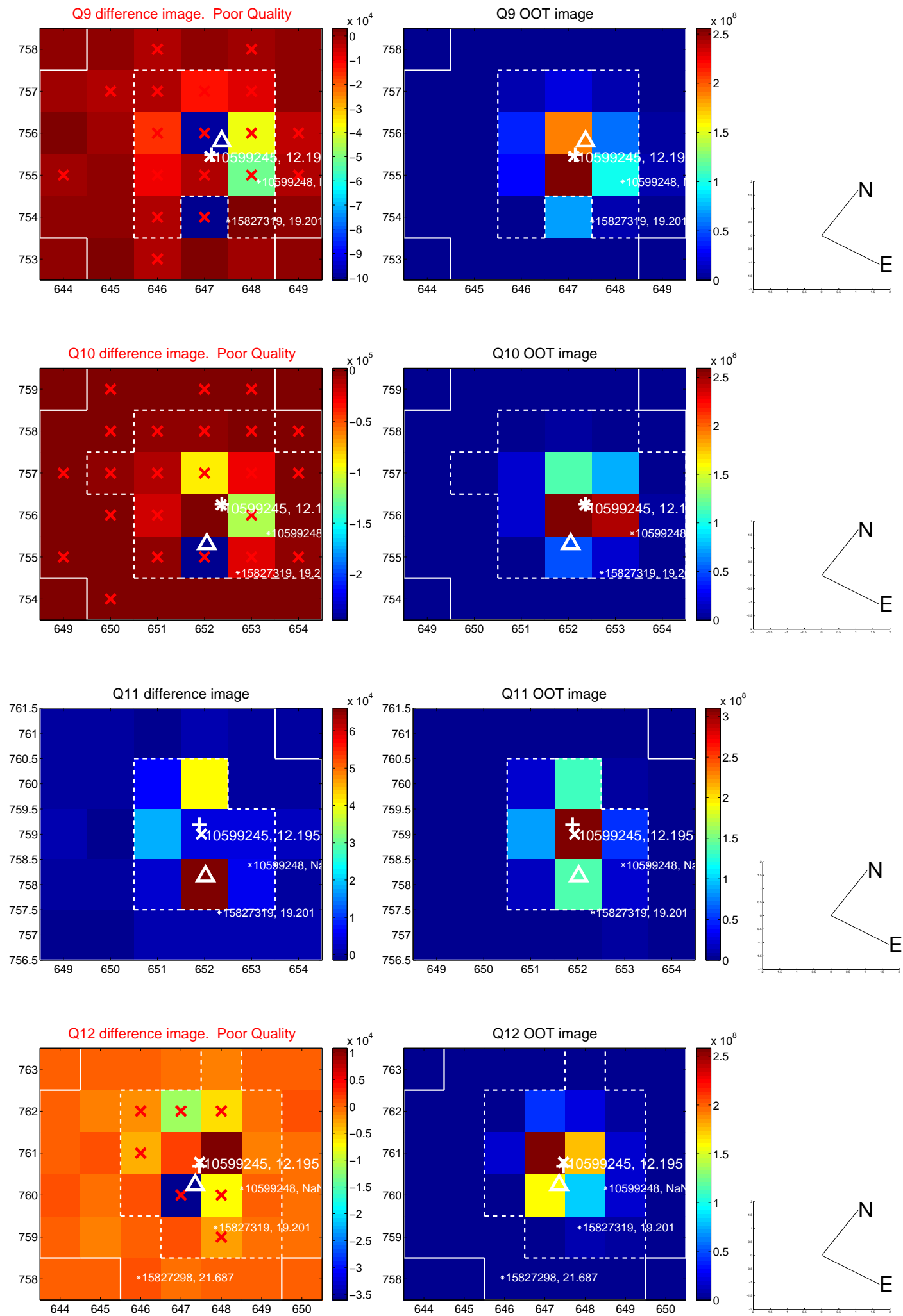
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



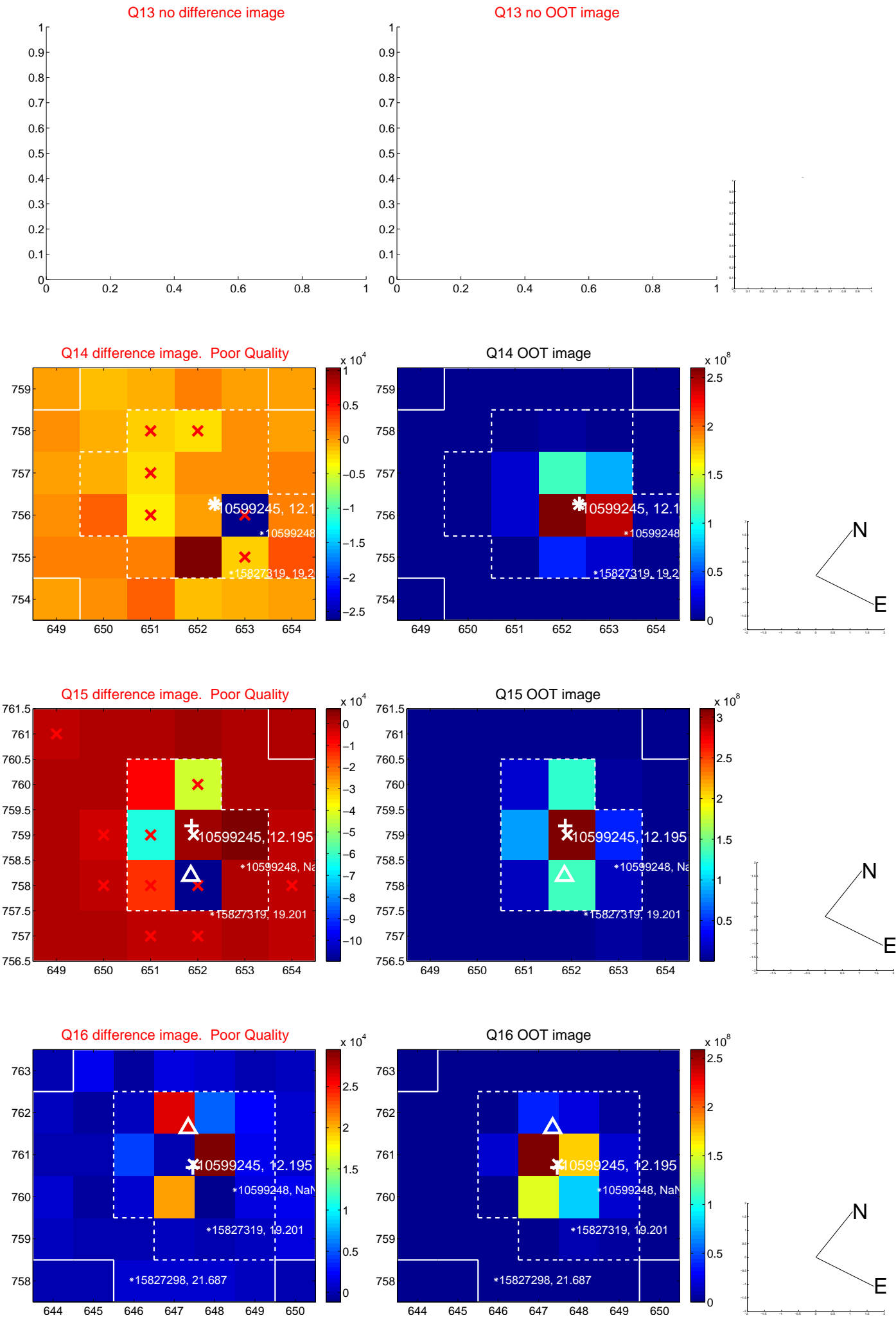
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



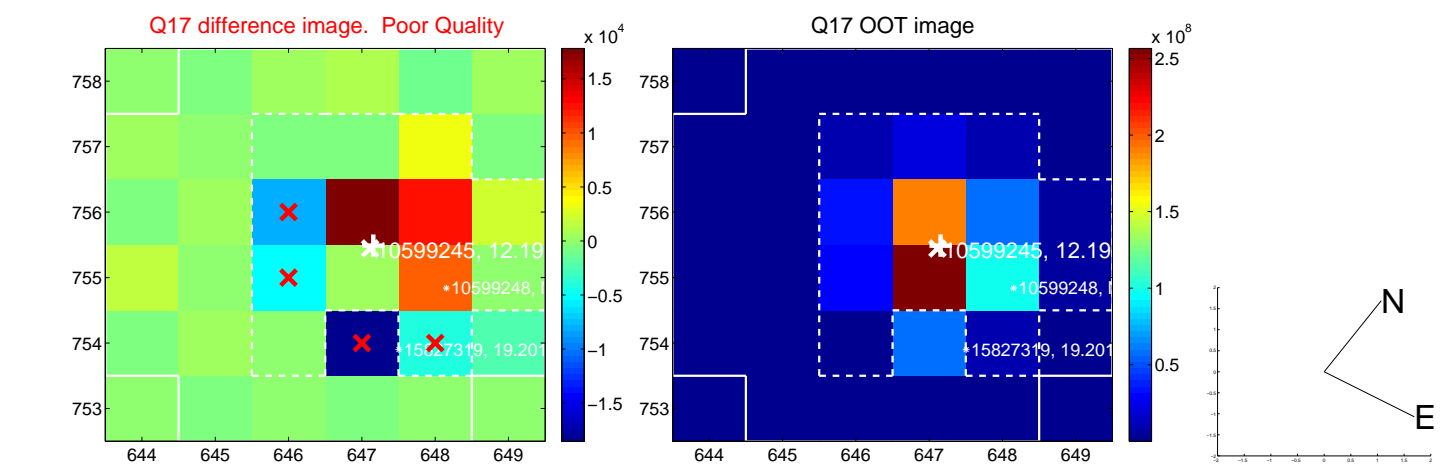
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



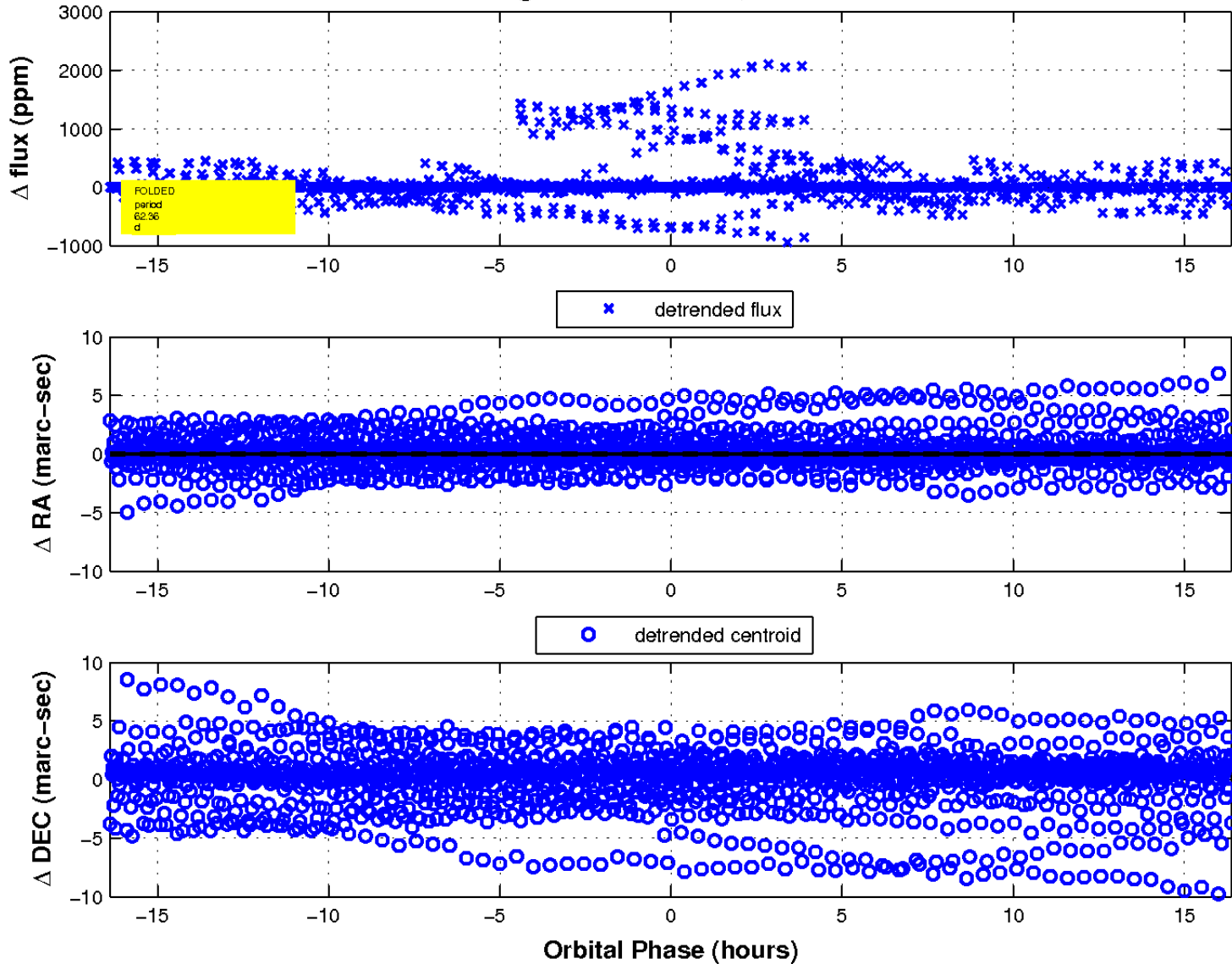
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



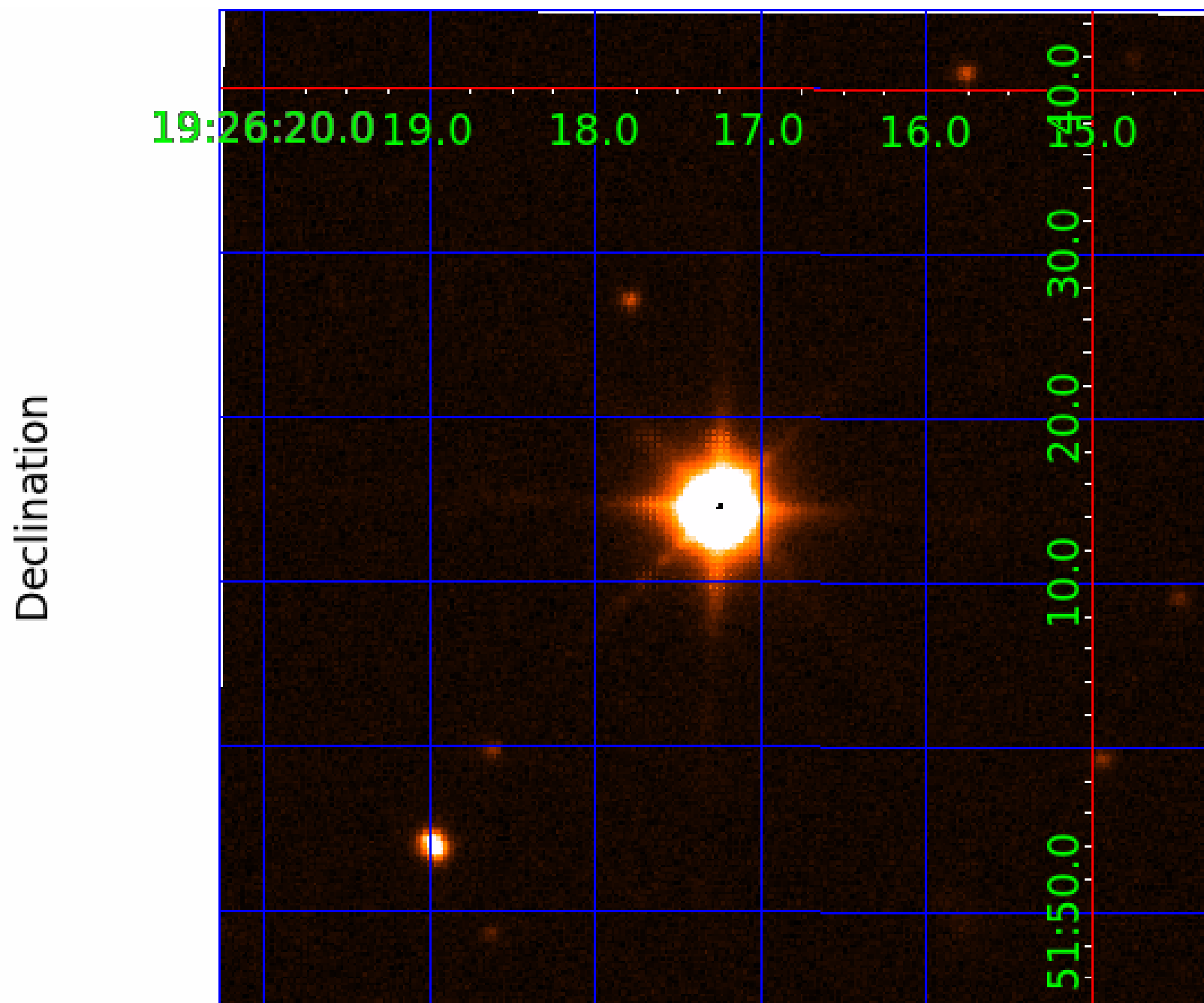
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



fluxWeightedCentroids, Planet 6 of 8



UKIRT Image





# KIC 010599245

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010599245-01	OBS	No	102.933504	203.234932	42.4	2.126	28.2	19.6	59.14	3951	51.05	2781.31
010599245-02	OBS	No	185.904559	141.996123	43.9	3.508	16.3	14.6	59.14	3951	47.53	1264.56
010599245-03	OBS	No	118.287967	183.981930	53.7	2.452	15.0	15.8	59.14	3951	59.89	2310.67
010599245-04	OBS	No	170.417068	169.518612	39.7	8.386	14.7	10.0	59.14	3951	43.03	1420.06
010599245-05	OBS	No	72.002790	174.339797	6.7	4.067	14.5	2.3	59.14	3951	19.66	4479.12
010599245-06	OBS	No	62.359596	145.890783	20.7	5.466	13.7	9.2	59.14	3951	33.90	5425.67
010599245-07	OBS	No	102.244200	227.599922	46.6	2.835	13.4	13.2	59.14	3951	52.19	2806.34
010599245-08	OBS	No	80.029016	143.655157	38.5	1.930	13.1	12.9	59.14	3951	45.51	3890.40

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010599245-01	OBS	FP	0.00	1	0	1	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—CENT_UNRESOLVED_OFFSET—HALO_GHOST
010599245-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE_ZUMA—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
010599245-03	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
010599245-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_MARSHALL_SKYE_ZUMA—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_UNRESOLVED_OFFSET
010599245-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
010599245-06	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
010599245-07	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_KIC_POS—CENT_UNCERTAIN
010599245-08	OBS	FP	0.00	1	0	0	0	LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_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.

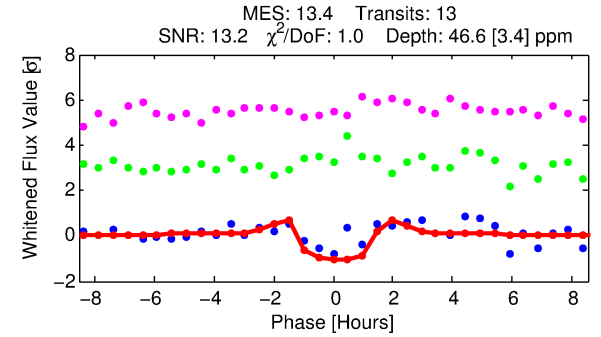
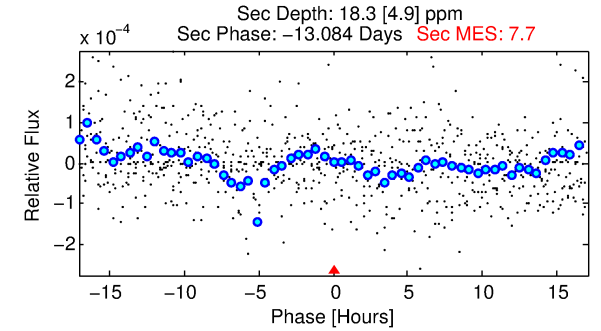
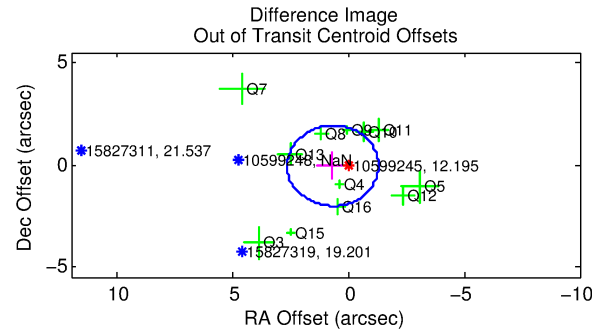
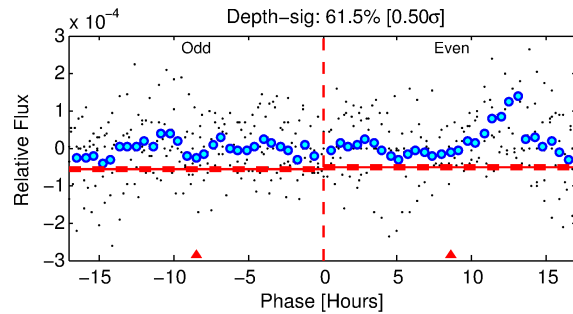
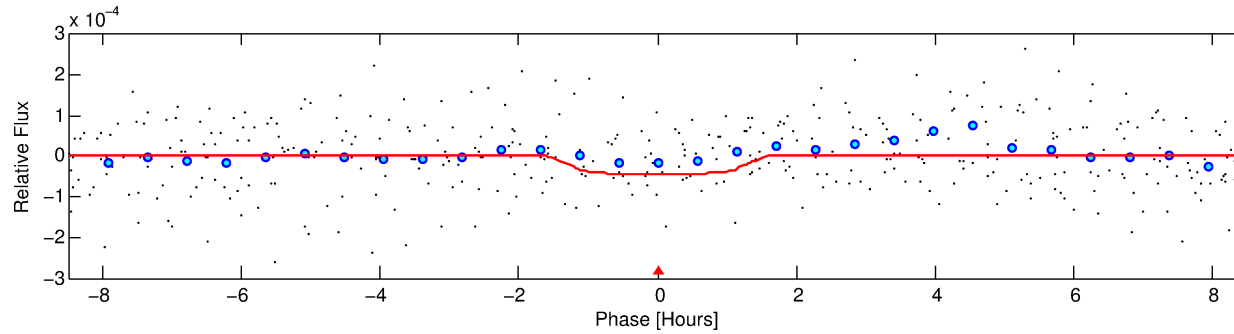
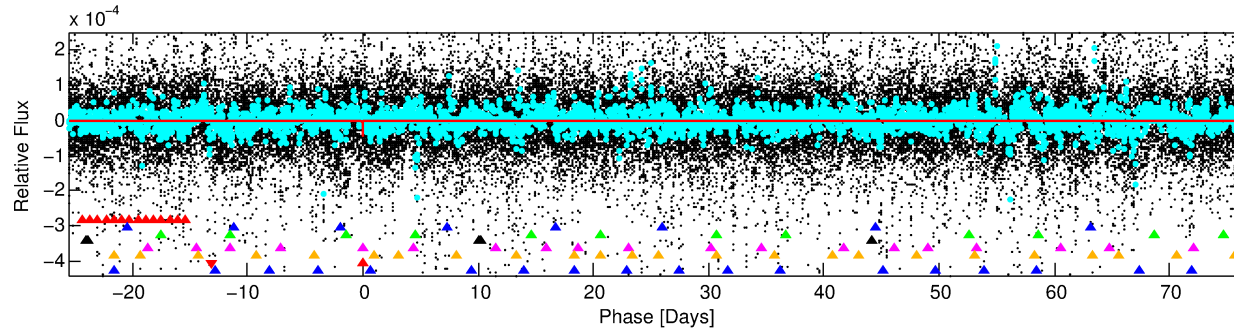
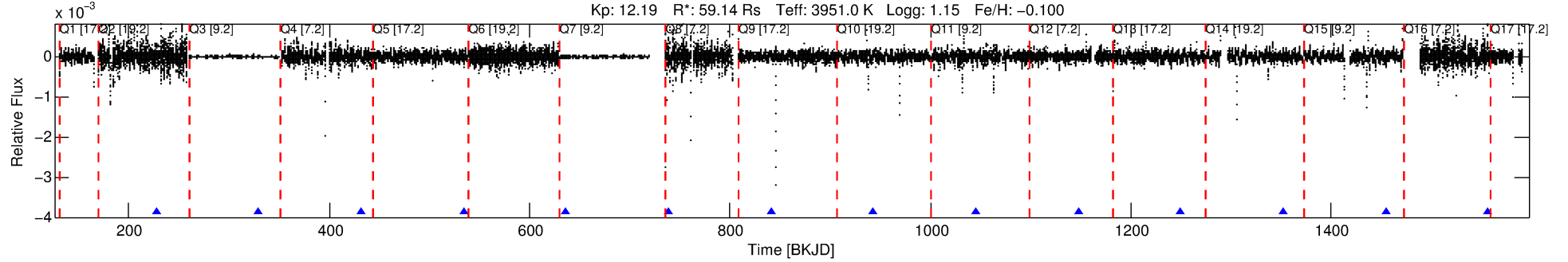
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 010599245-07

No Significant Match Found

# DV One-Page Summary

KIC: 10599245 Candidate: 7 of 8 Period: 102.244 d



## DV Fit Results:

Period = 102.24420 [0.00081] d  
Epoch = 227.5999 [0.0027] BKJD  
Rp/R\* = 0.0081 [0.0035]  
a/R\* = 116.63 [169.14]  
b = 0.91 [0.27]  
Seff = 2806.34 [523.61]  
Teq = 1856 [87] K  
Rp = 52.19 [25.30] Re  
a = 0.5217 [0.0761] AU  
Ag = 1.01 [0.93] [0.01 $\sigma$ ]  
Teffp = 2873 [658] K [1.53 $\sigma$ ]

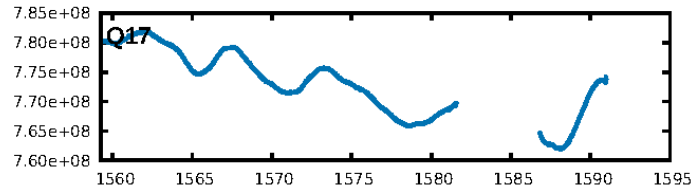
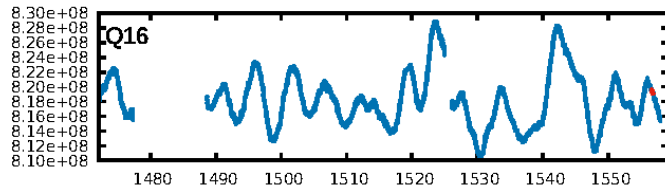
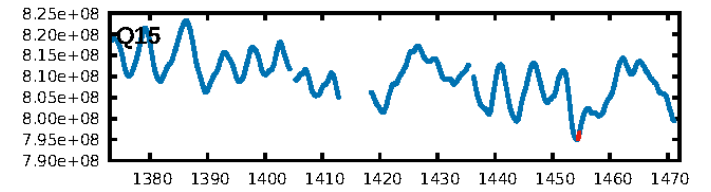
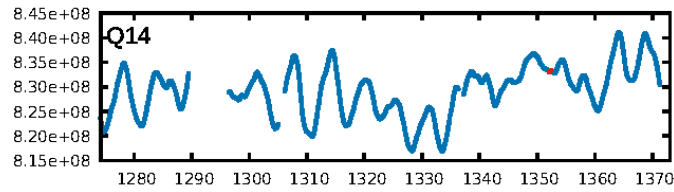
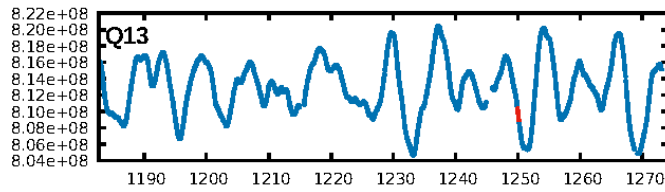
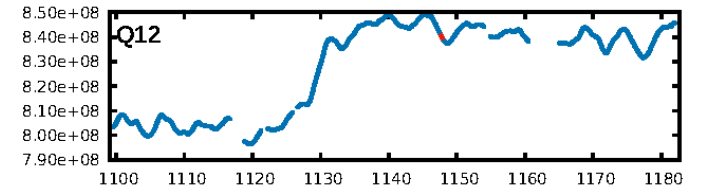
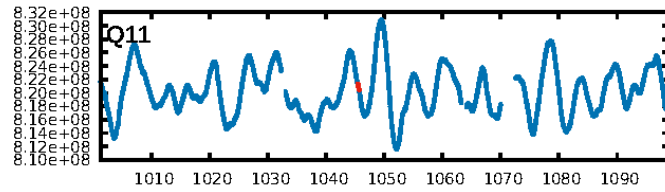
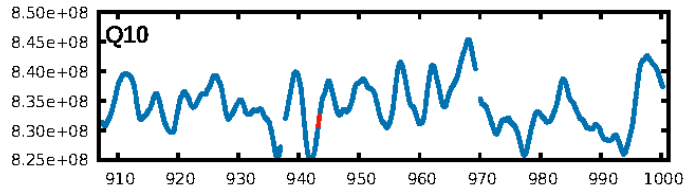
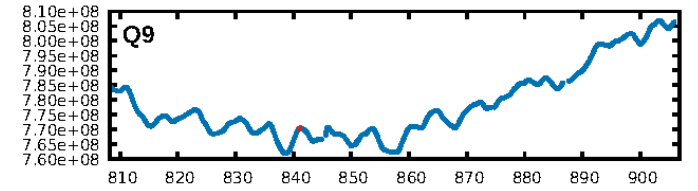
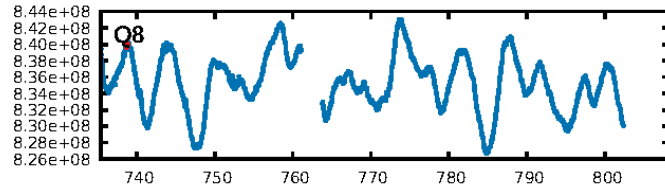
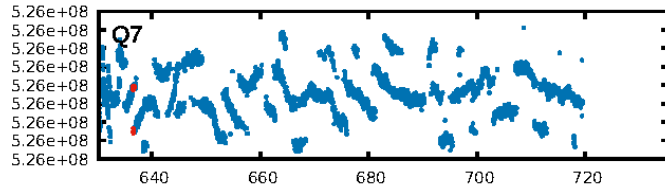
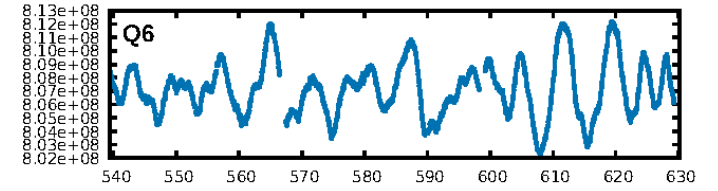
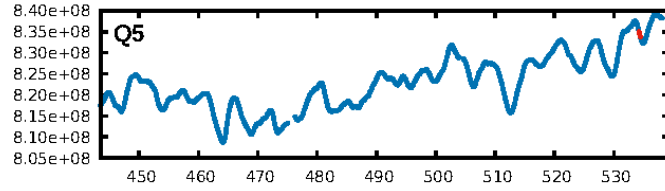
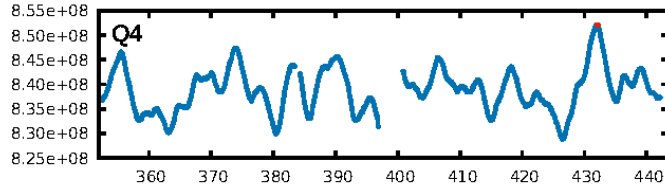
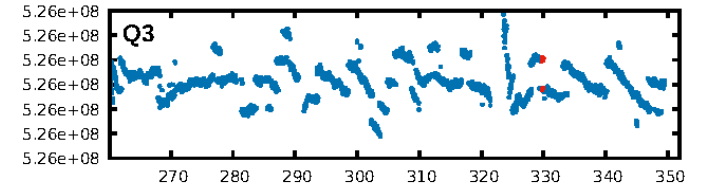
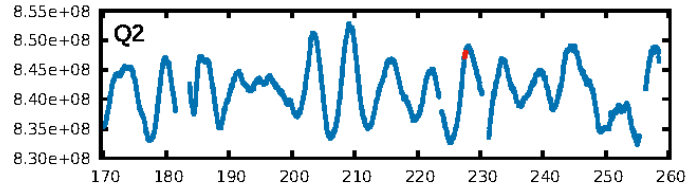
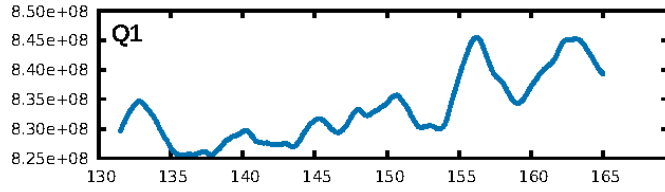
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [155.46 $\sigma$ ]  
LongPeriod-sig: 100.0% [4.67 $\sigma$ ]  
ModelChiSquare2-sig: 15.3%  
ModelChiSquareGof-sig: 99.9%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [13/13]  
GhostDiagnostic-chr: -0.9861  
Centroid-sig: N/A  
Centroid-so: 1.523 arcsec [0.52 $\sigma$ ]  
OotOffset-rm: 0.688 arcsec [1.05 $\sigma$ ]  
OotOffset-st: 1/4/4/3 [12]  
KicOffset-rm: 0.741 arcsec [1.21 $\sigma$ ]  
KicOffset-st: 1/4/4/3 [12]  
DiffImageQuality-fgm: 0.25 [3/12]  
DiffImageOverlap-fno: 0.93 [13/14]

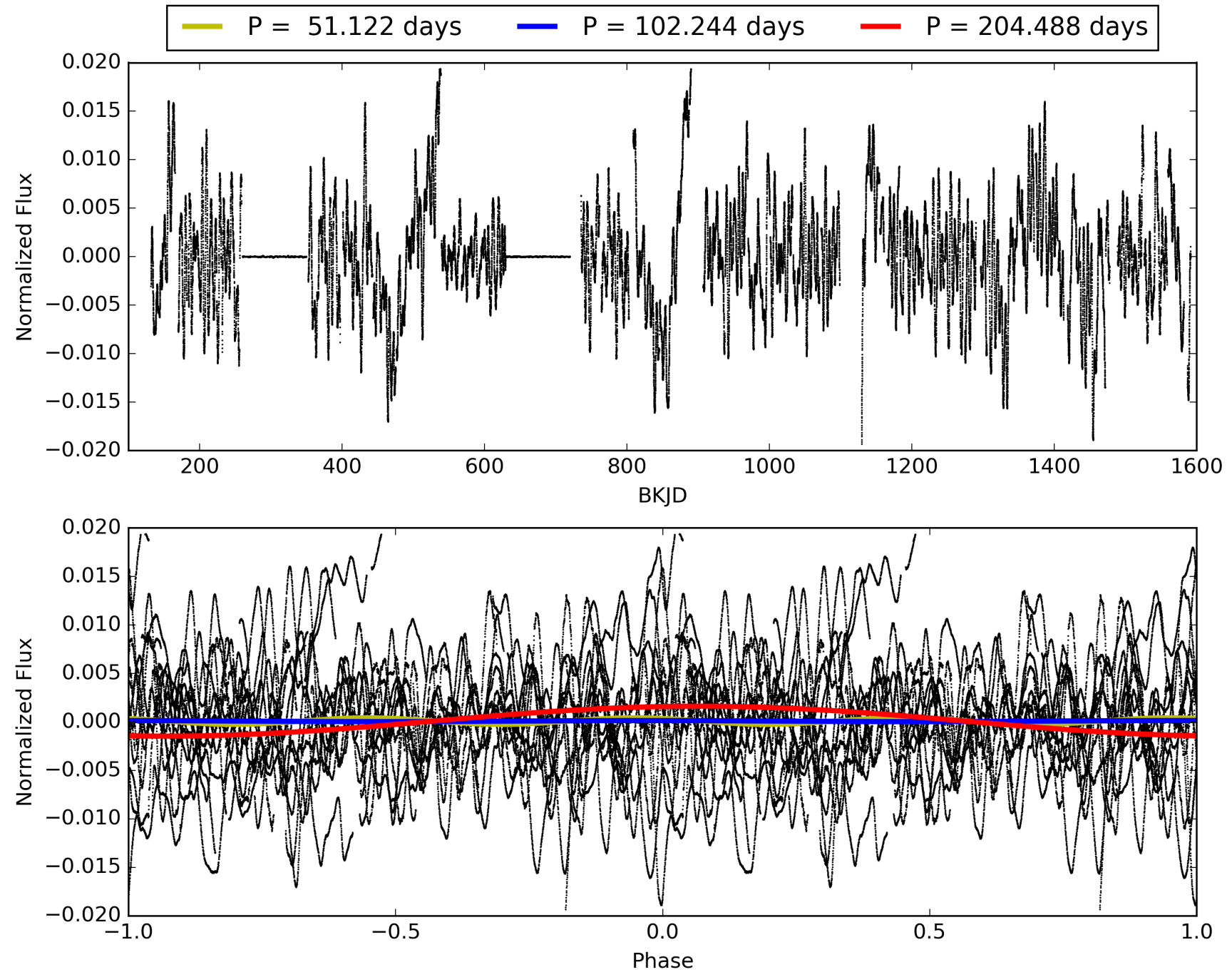
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:40:18 Z

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

# TCE 010599245-07, PDC Light Curves

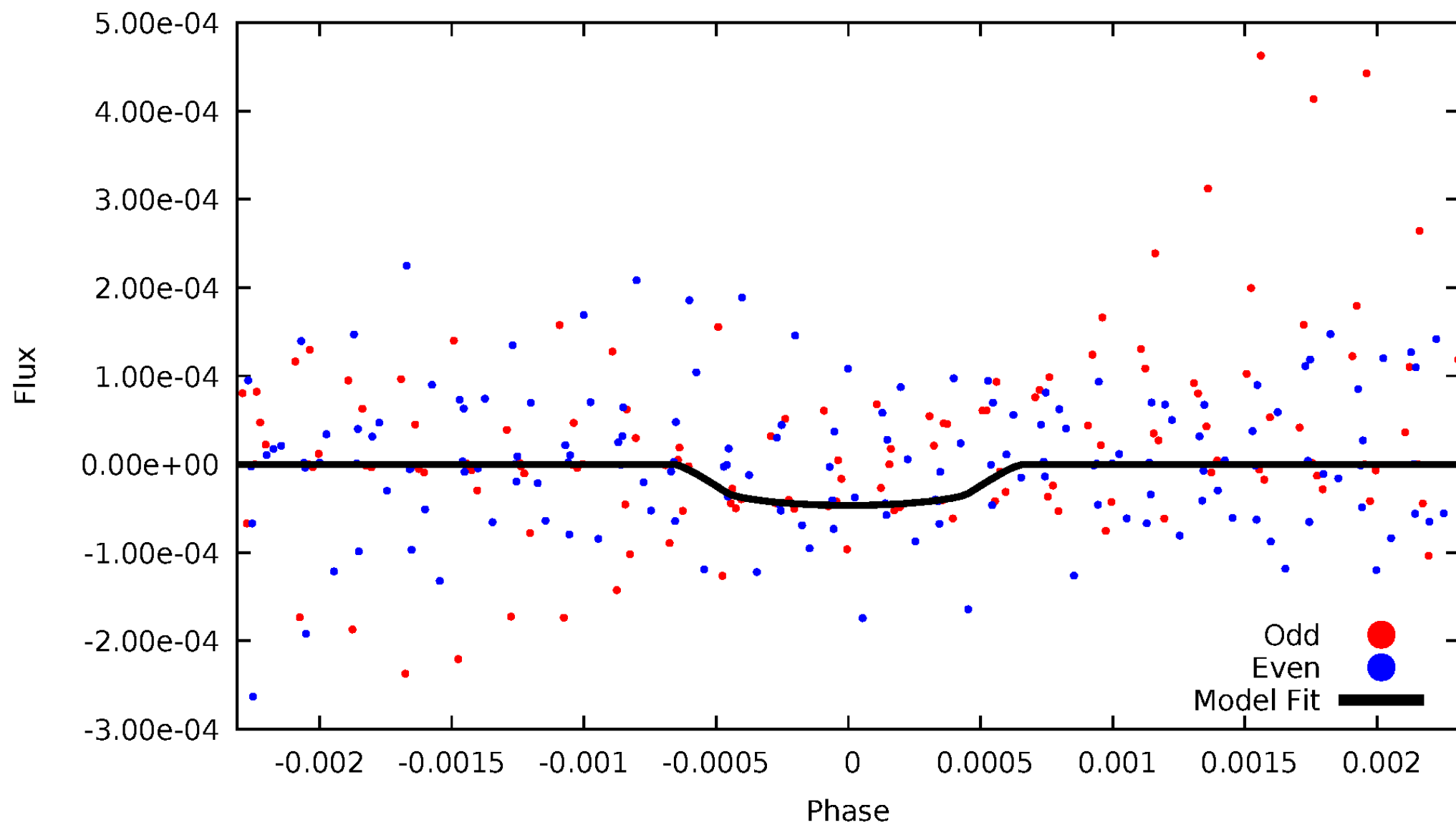


# TCE 010599245-07



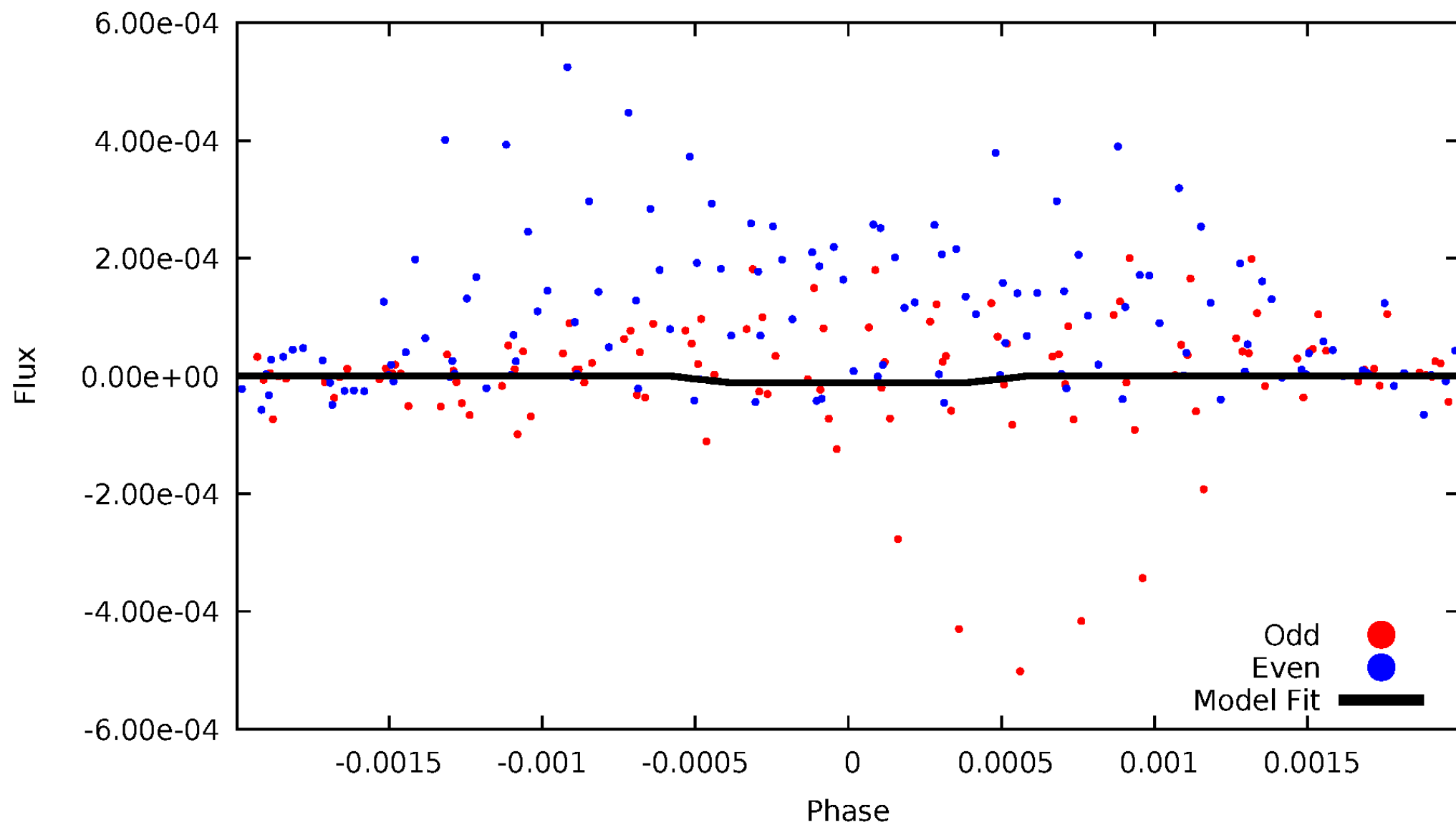
# DV Odd/Even

TCE 010599245-07



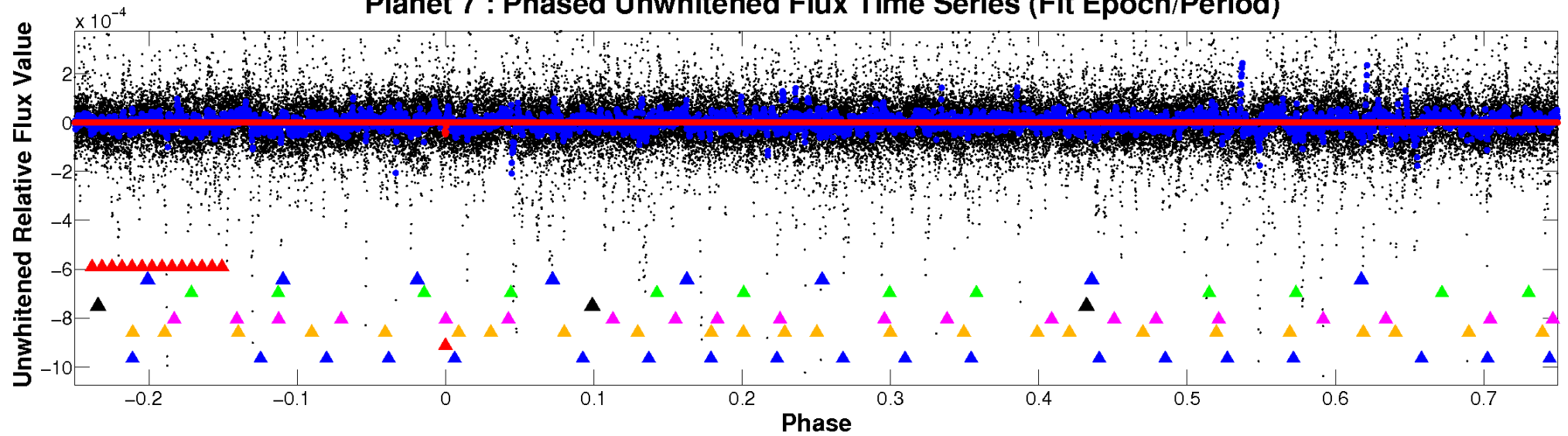
# ALT Odd/Even

TCE 010599245-07

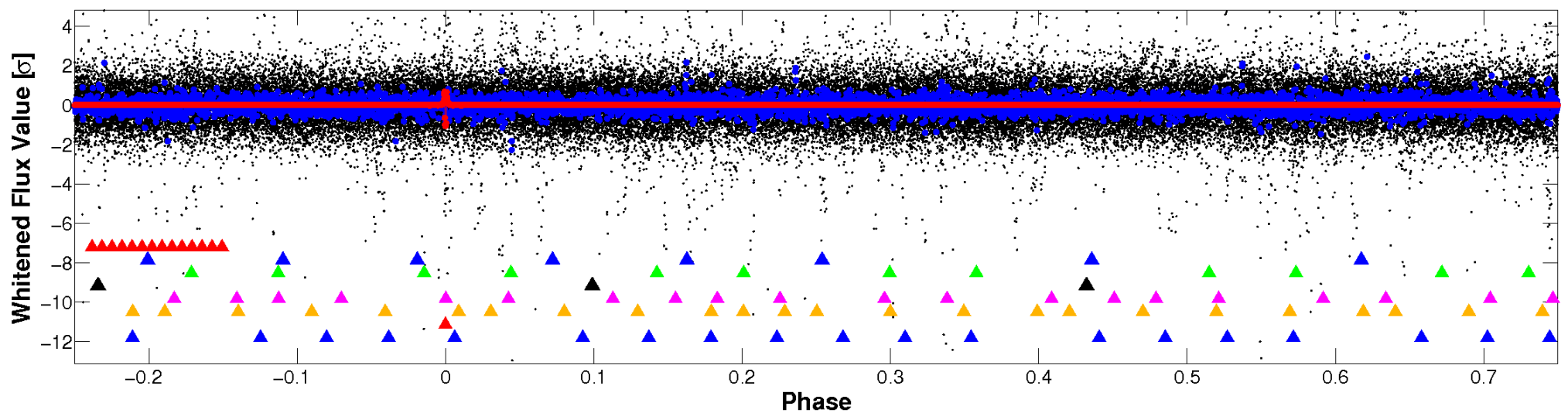


# Non-Whitened Vs. Whitened Light Curve

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



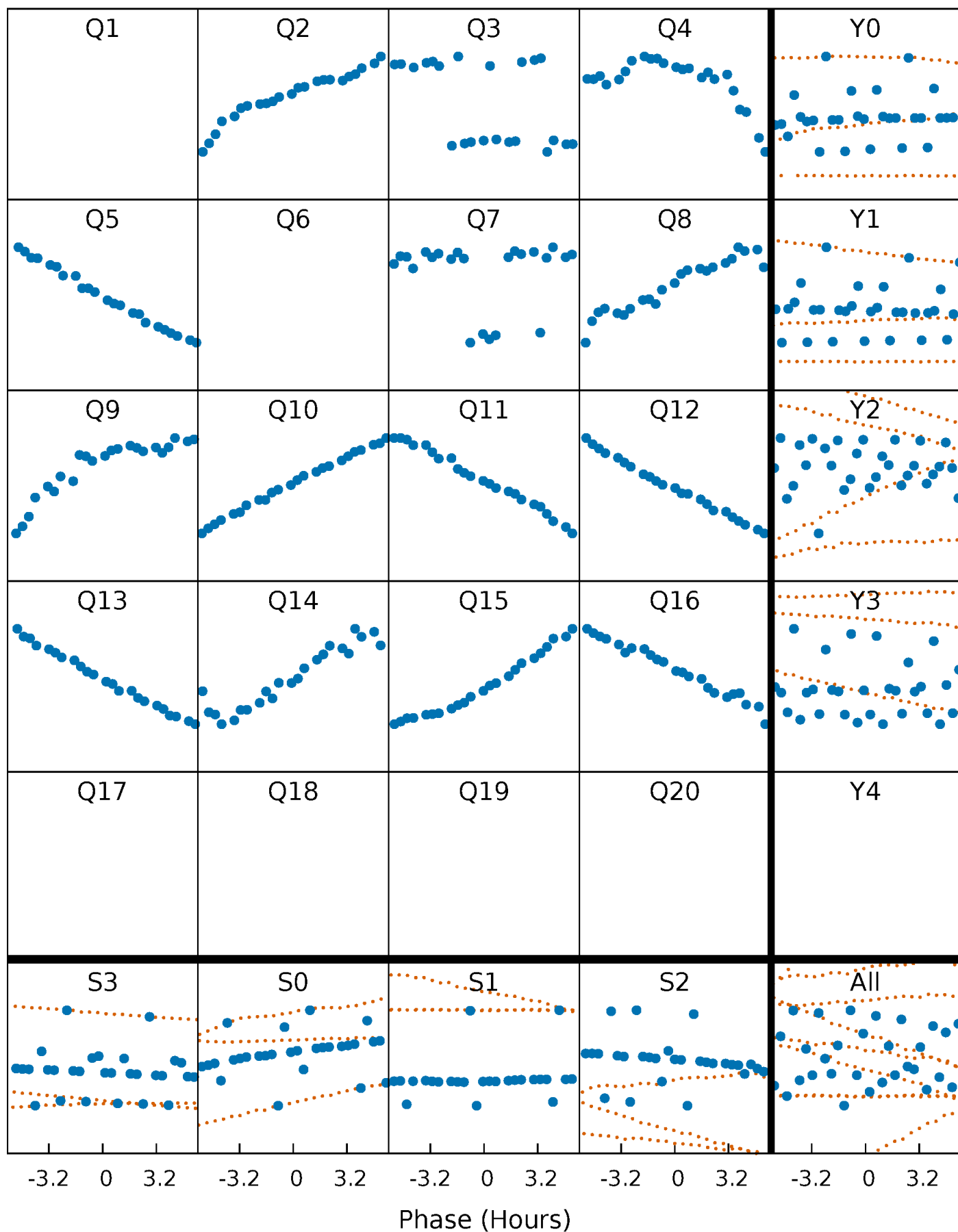
## Planet 7 : Phased Whitened Flux Time Series (Fit Epoch/Period)





# PDC Quarter-Phased Transit Curves

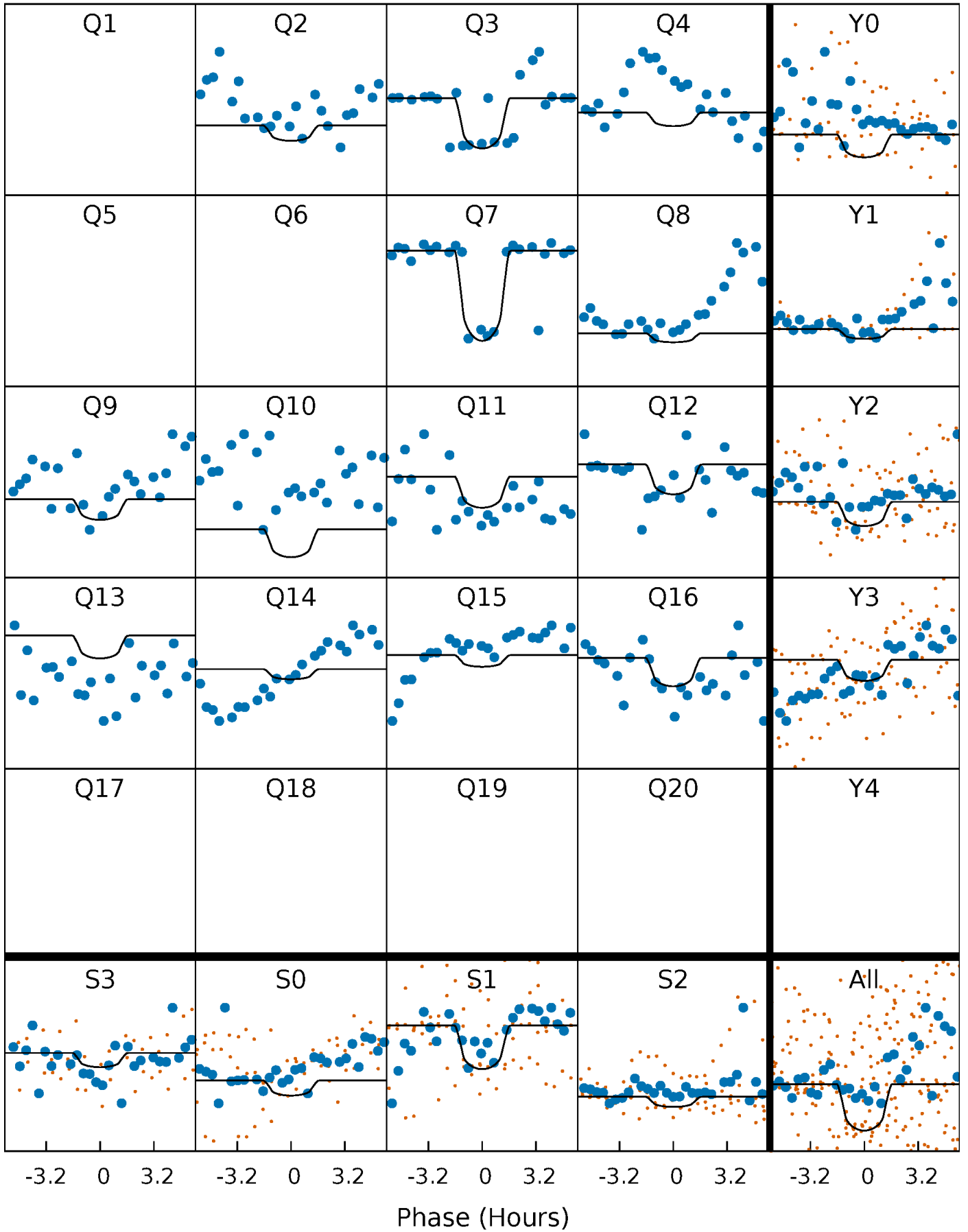
TCE 010599245-07 P=102.244200 Days  $T_0=227.599922$  (BKJD)





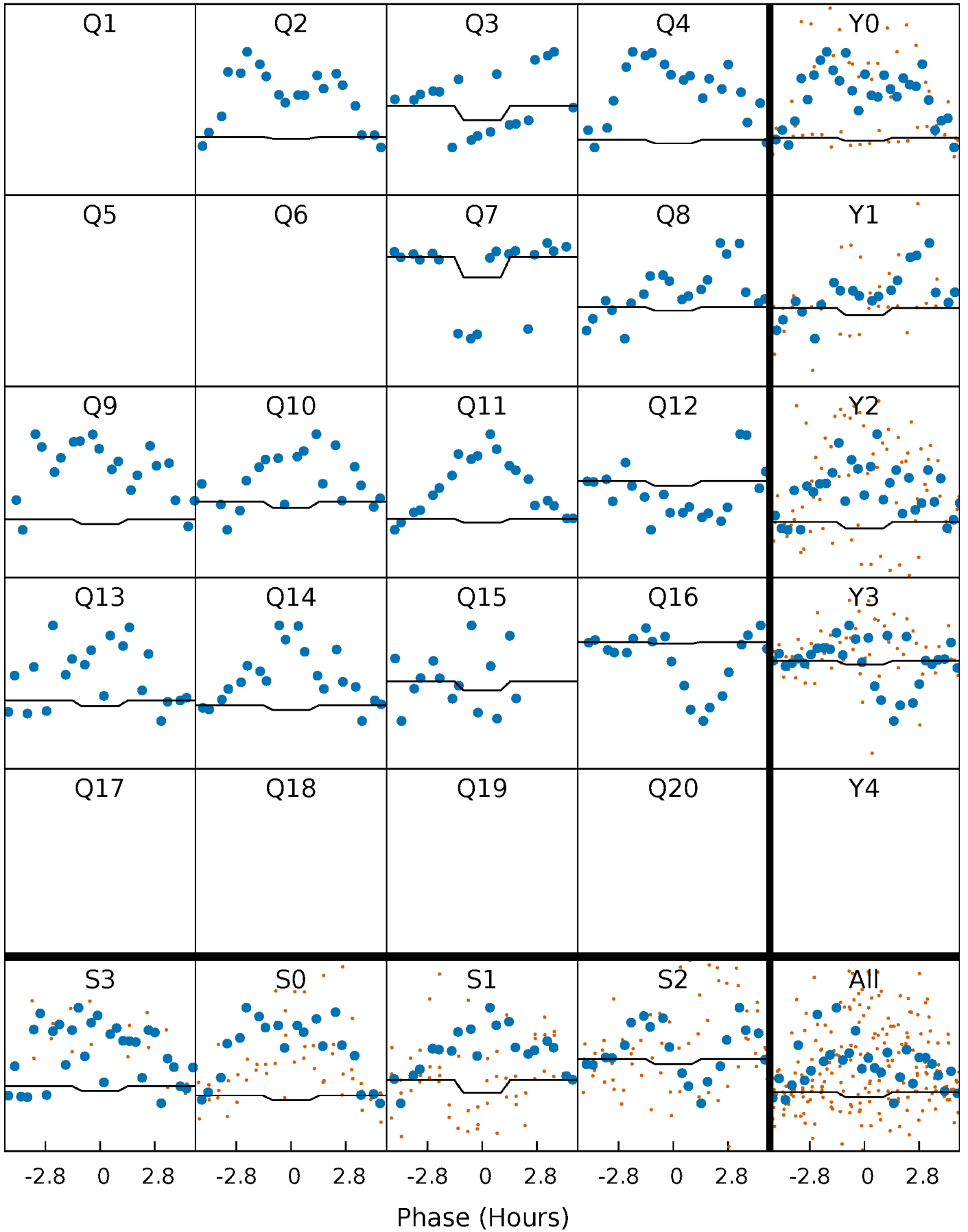
# DV Quarter-Phased Transit Curves

TCE 010599245-07     $P=102.244200$  Days     $T_0=227.599922$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

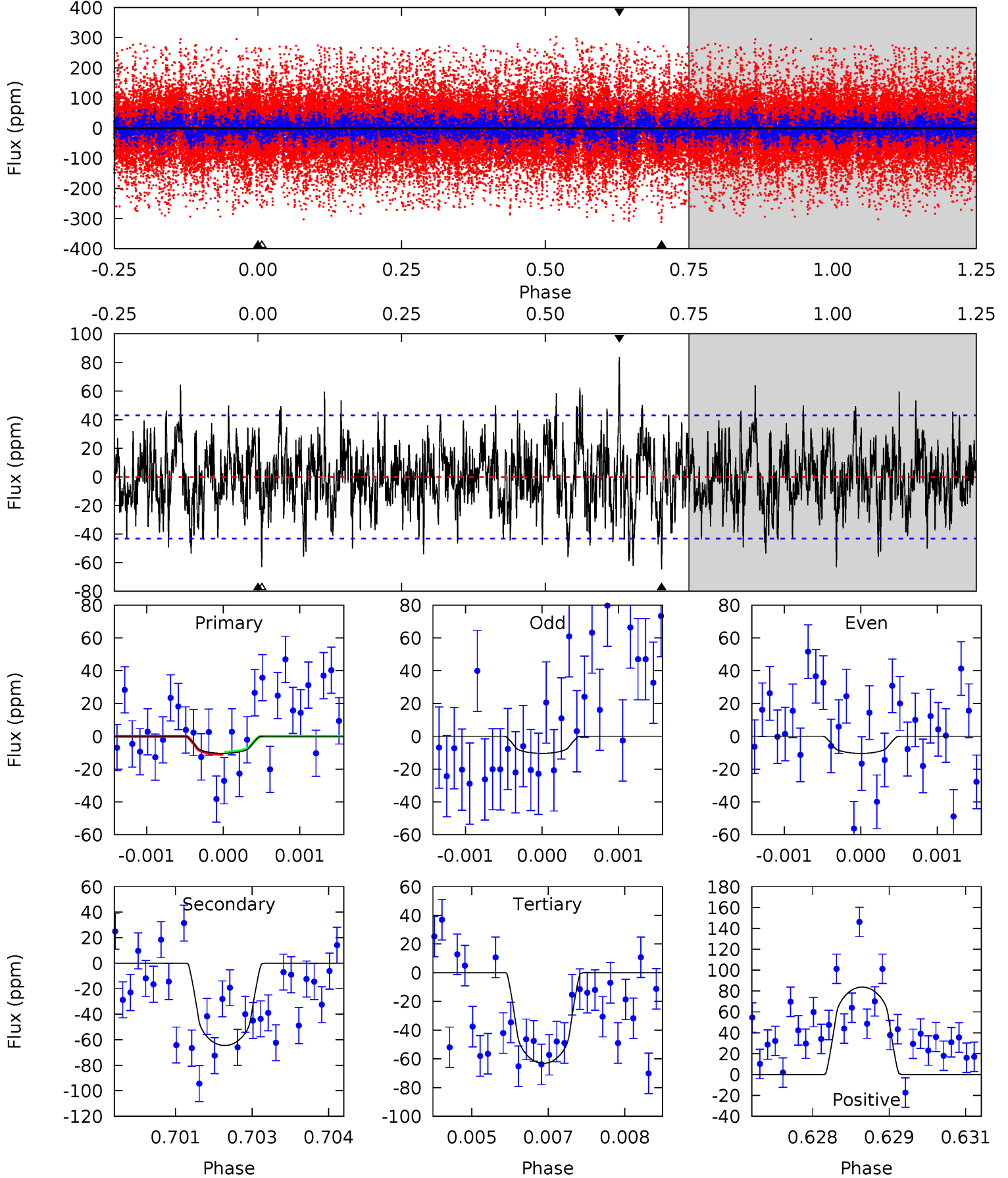
TCE 010599245-07     $P=102.264523$  Days     $T_0=227.563923$  (BKJD)



# DV Model-Shift Uniqueness Test

010599245-07, P = 102.244200 Days, E = 125.355722 Days

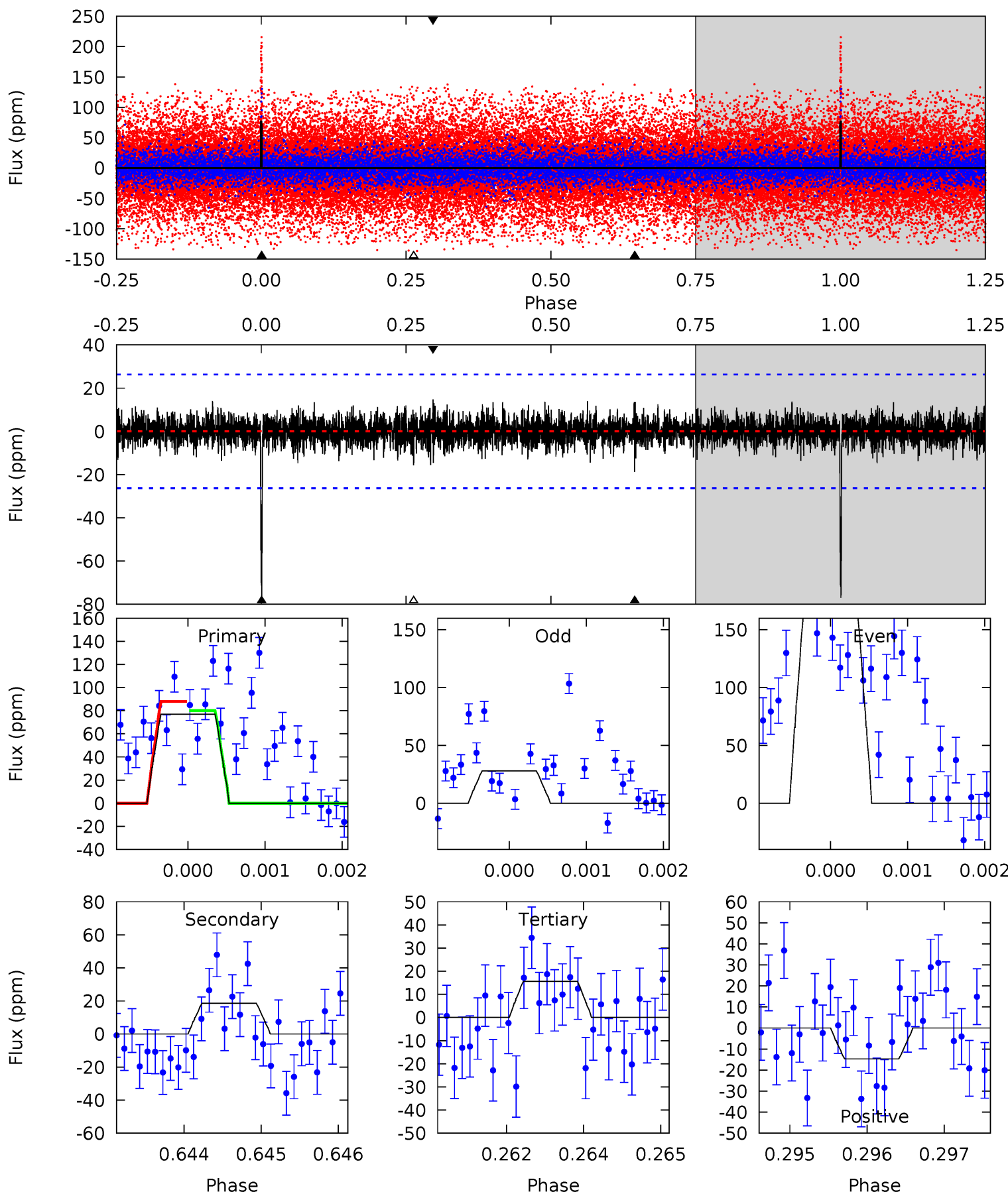
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
1.31	8.09	7.92	10.5	5.40	3.20	2.44	-6.61	-9.20	0.18	-2.41	0.00	0.39	0.56	0.09



# Alt Model-Shift Uniqueness Test

010599245-07, P = 102.264523 Days, E = 125.299400 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
15.9	3.86	3.22	3.03	5.44	3.27	0.91	12.7	12.9	0.64	0.82	14.3	1.02	0.16	0.79



### Stellar Parameters For KIC 010599245

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$3951^{+79}_{-108}$	$1.152^{+0.030}_{-0.030}$	$-0.100^{+0.200}_{-0.250}$	$59.143^{+2.129}_{-12.775}$	$1.811^{+0.036}_{-0.688}$	$0.000^{+0.000}_{-0.000}$
	+2%/-3%	+3%/-3%	+200%/-250%	+4%/-22%	+2%/-38%	+30%/-8%
Source	PHO54	AST54	PHO54	DSEP		

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

### Secondary Eclipse Parameters for KIC 010599245-07 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-65 \pm 8$	$54.18^{+22.83}_{-24.79}$	$2597^{+64}_{-82}$	$3813^{+973}_{-493}$	$3.230^{+6.753}_{-1.650}$
Alt.	$-19 \pm 5$	$27.37^{+20.22}_{-16.87}$	$2596^{+63}_{-74}$	$3869^{+1845}_{-742}$	$3.584^{+18.418}_{-2.473}$

$T_{max}$  = 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

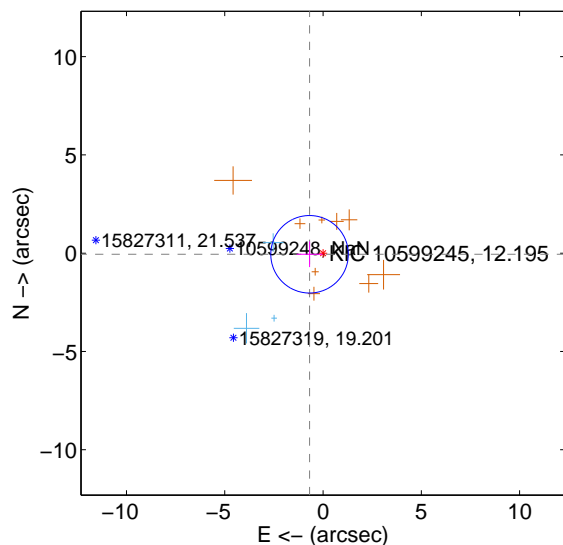
Supplemental centroid analysis for 010599245-07. Kepler magnitude: 12.20. Transit SNR 13.15

There are 3 quarters with good PRF difference image offsets

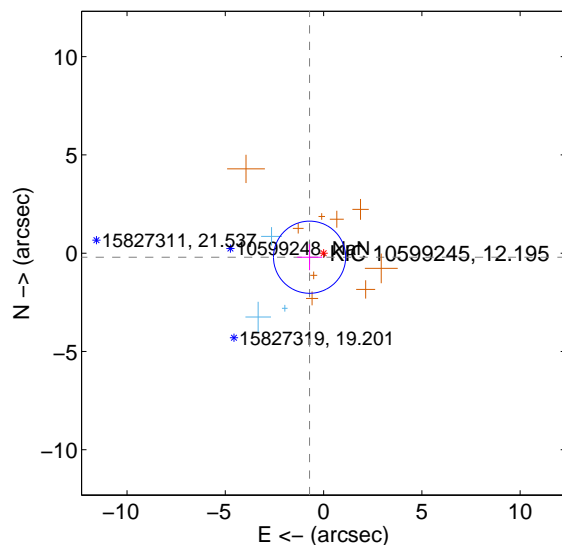
The direct PRF centroid is offset from the target star catalog position by about 0.27 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.688 \pm 0.657$	1.05	$0.686 \pm 0.658$	$-0.056 \pm 0.653$
PRF-fit source offset from KIC position	$0.741 \pm 0.612$	1.21	$0.712 \pm 0.632$	$-0.205 \pm 0.660$
photometric centroid source offset	$1.52 \pm 2.91$	0.52	$-0.67 \pm 2.22$	$-1.37 \pm 3.05$

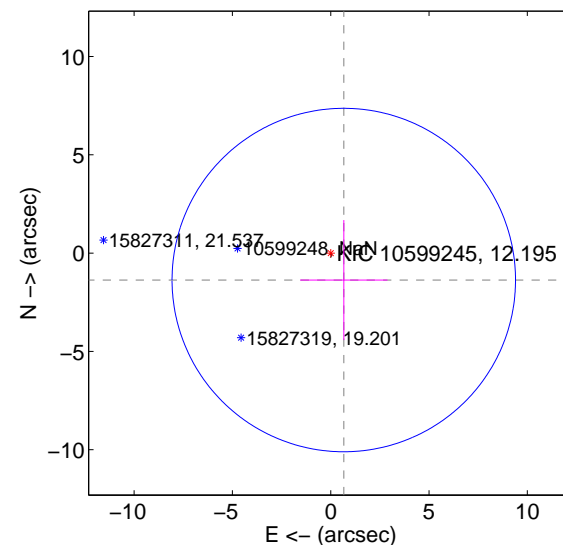
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

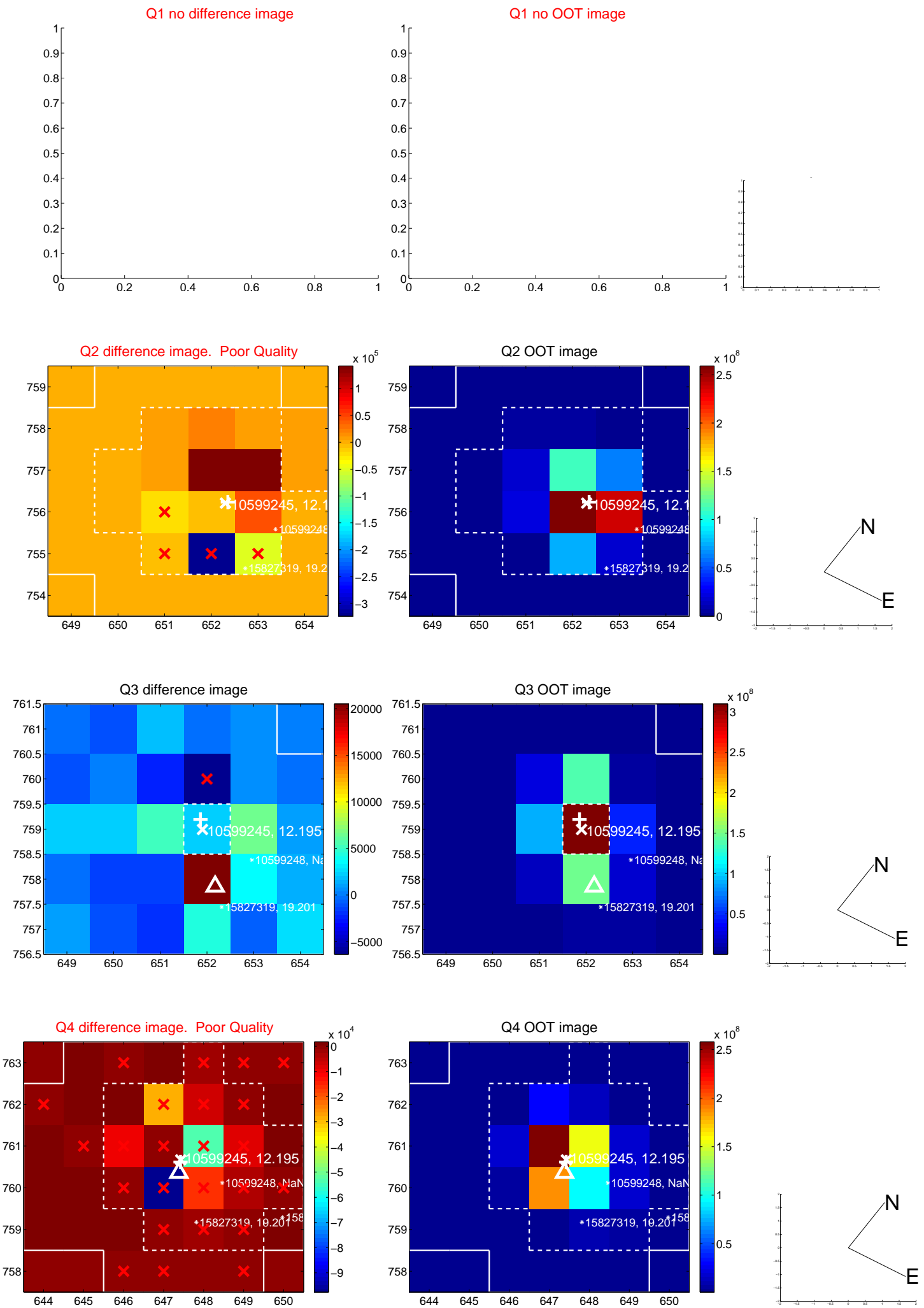


offset from photometric centroids

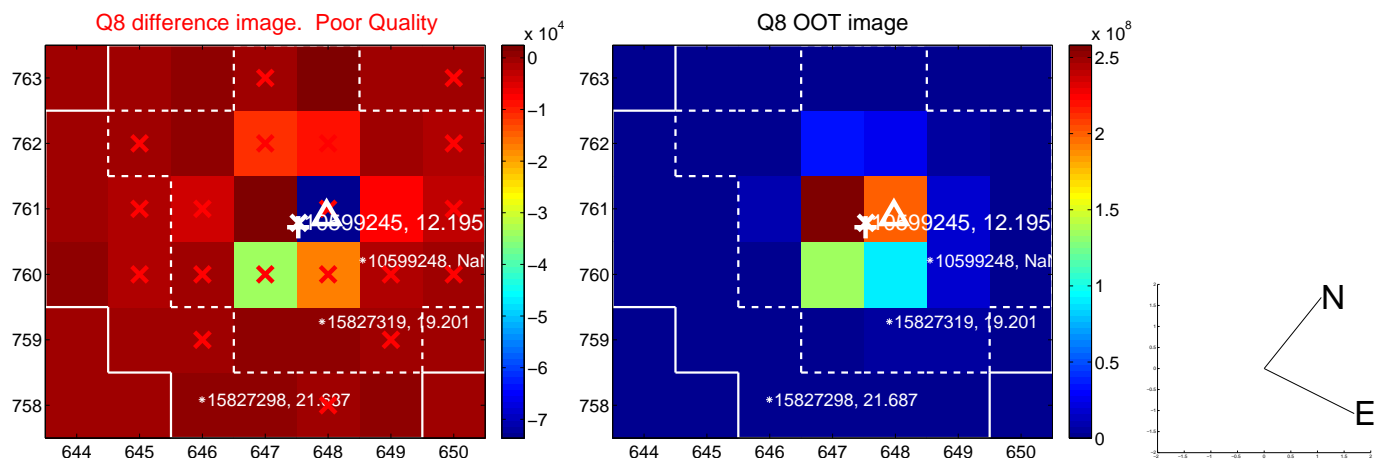
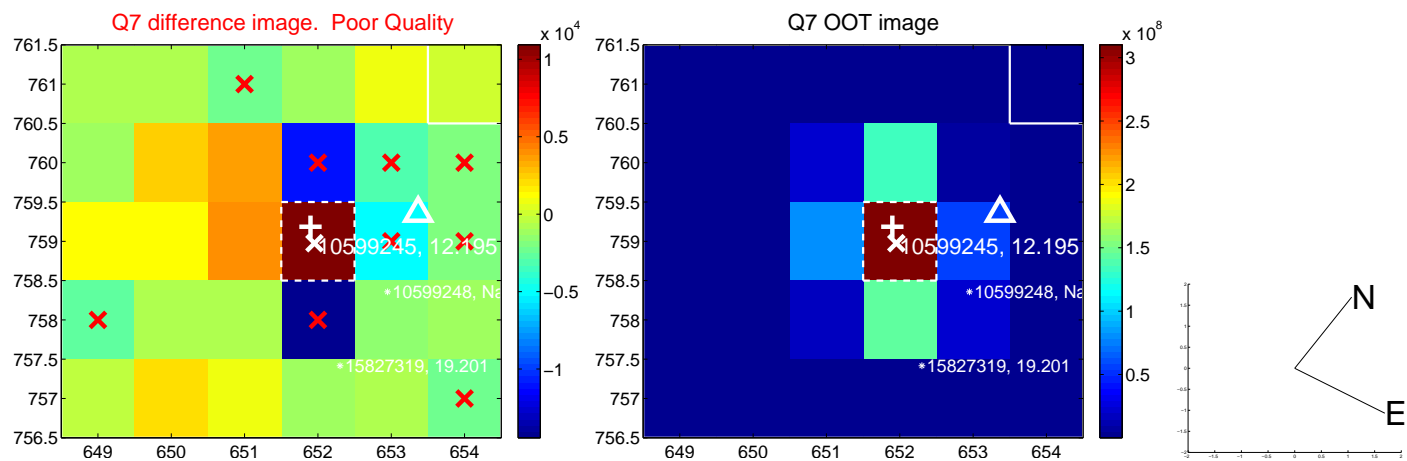
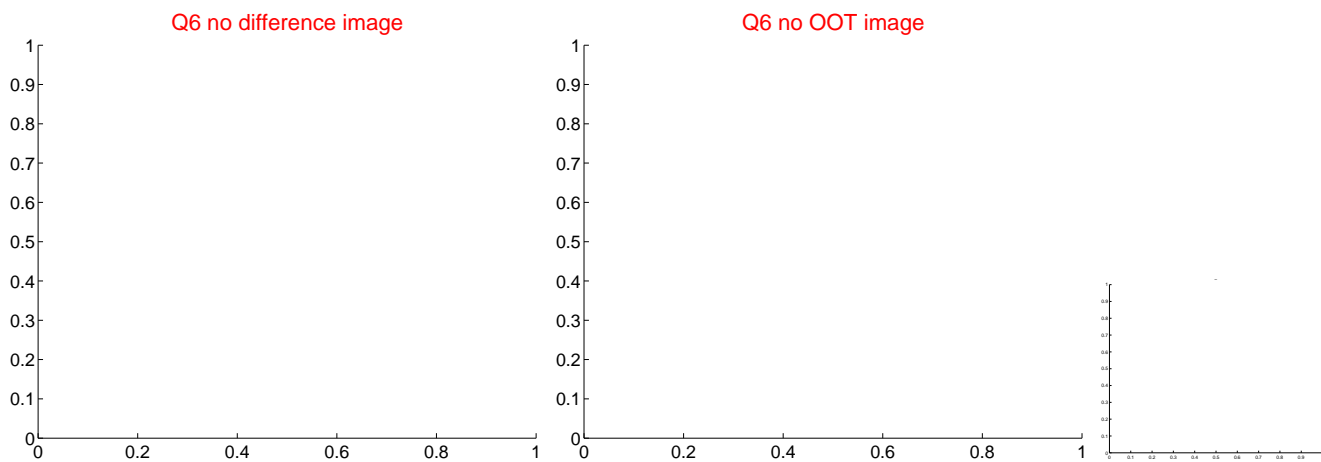
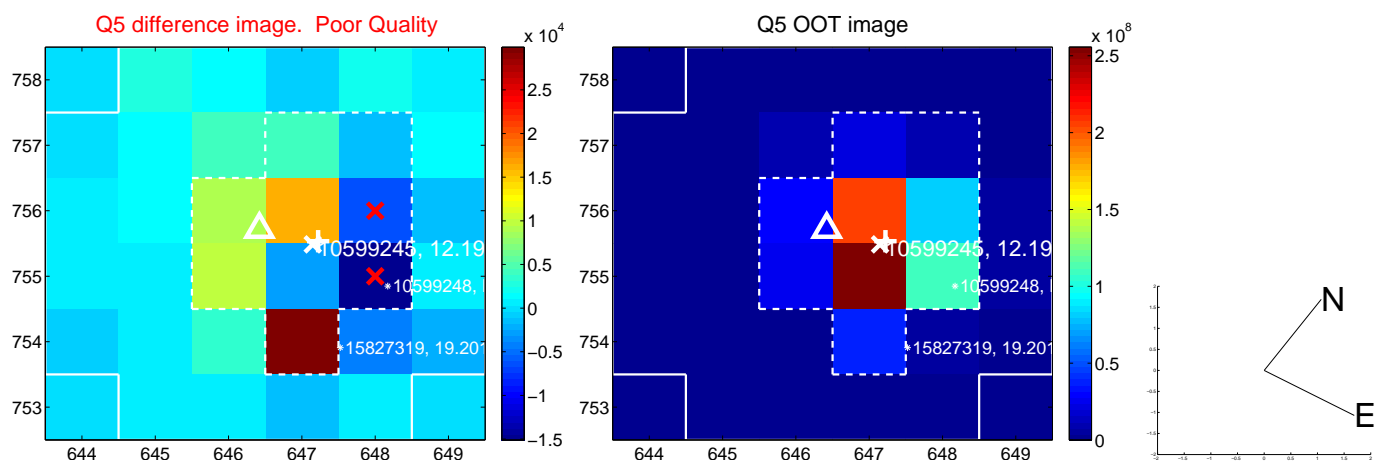


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

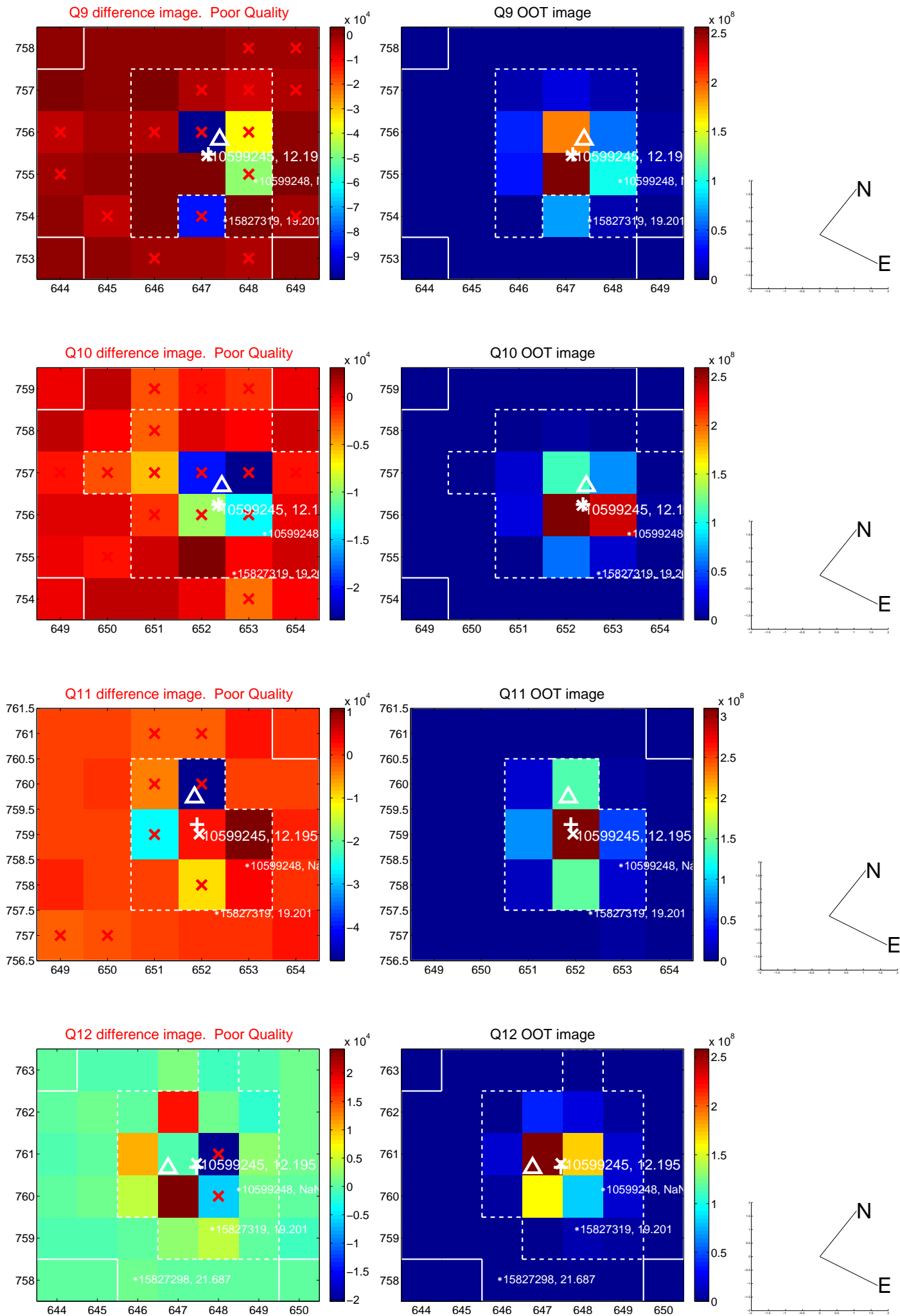


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

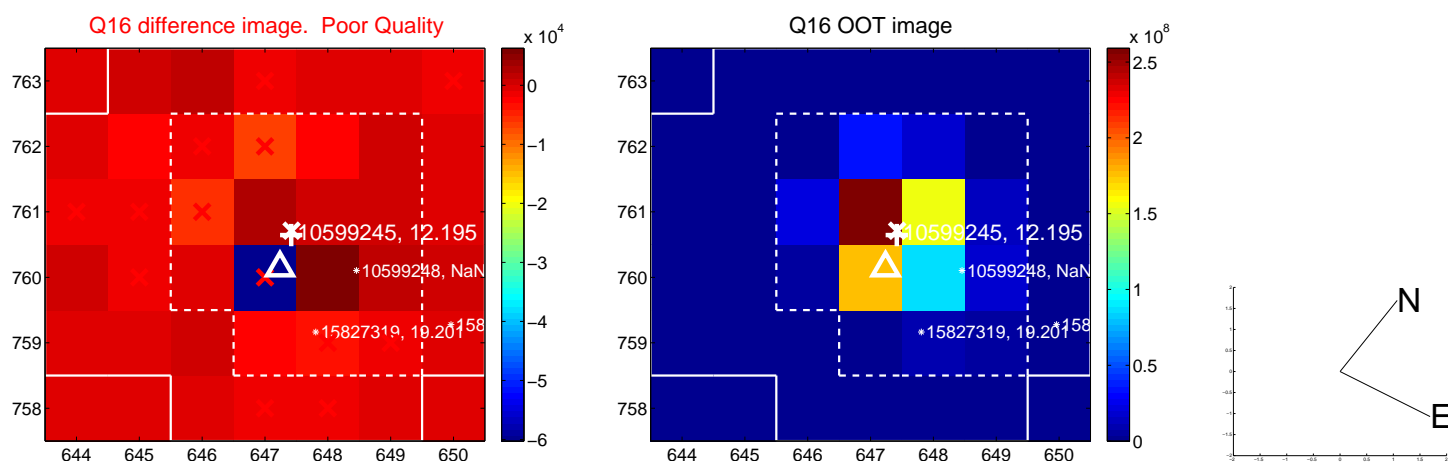
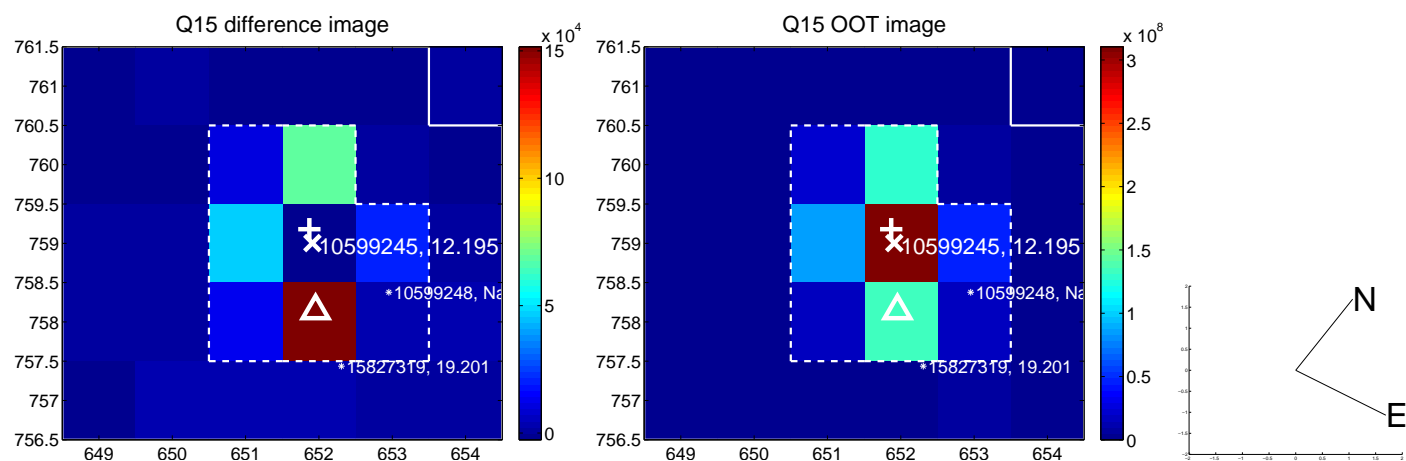
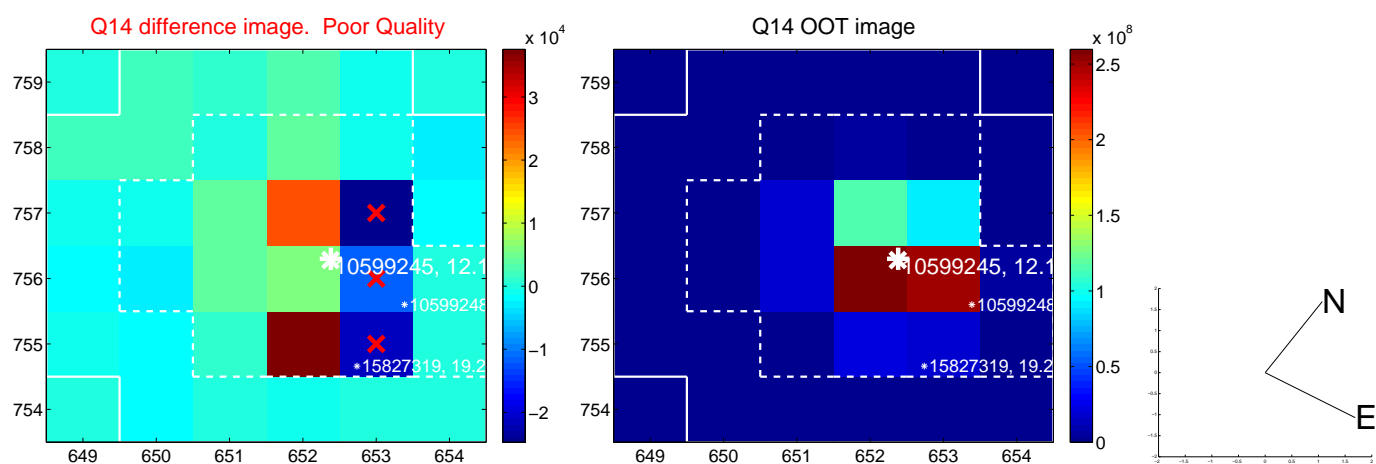
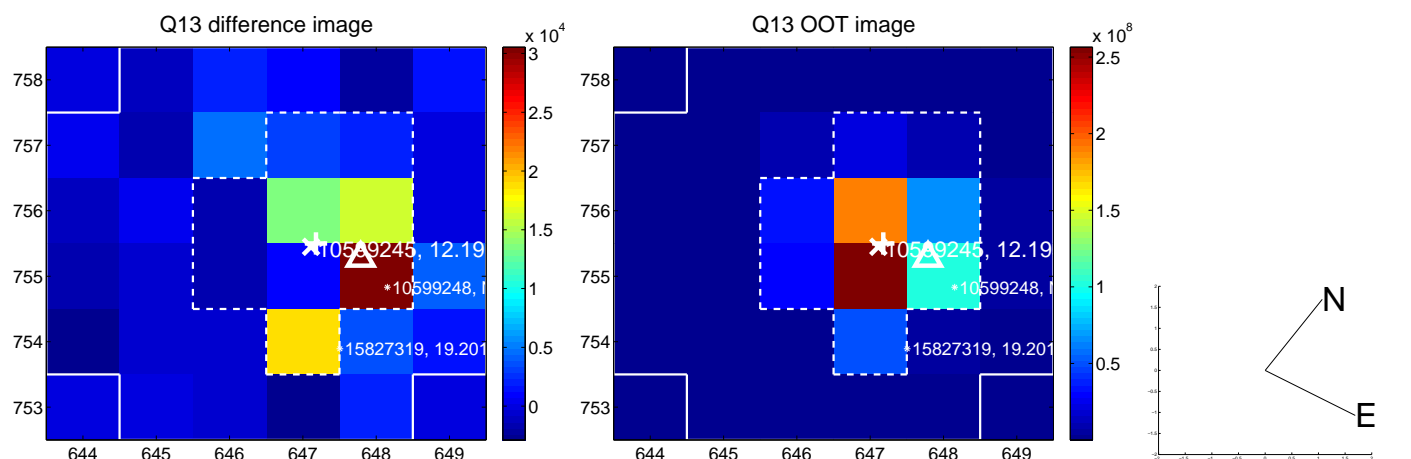




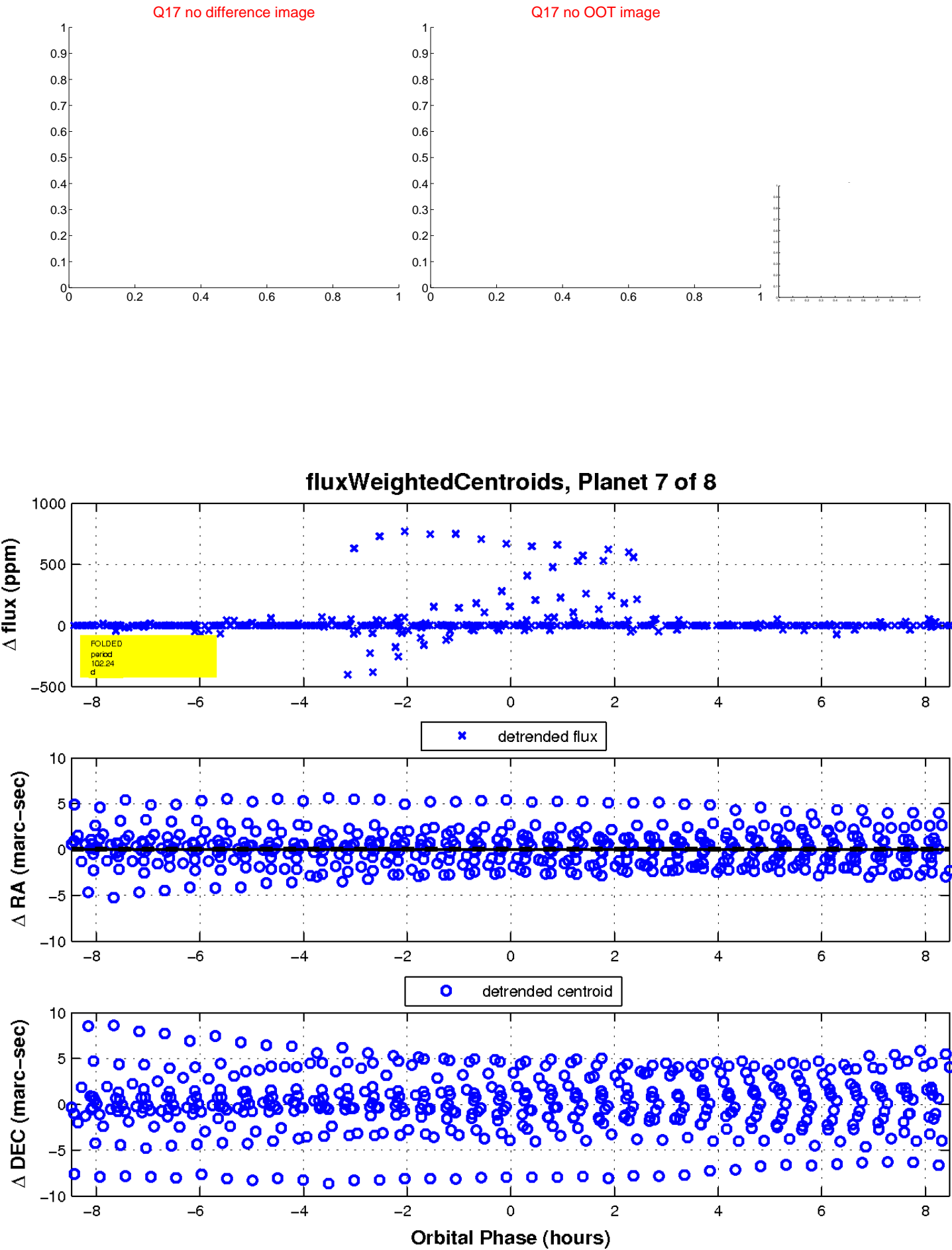
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



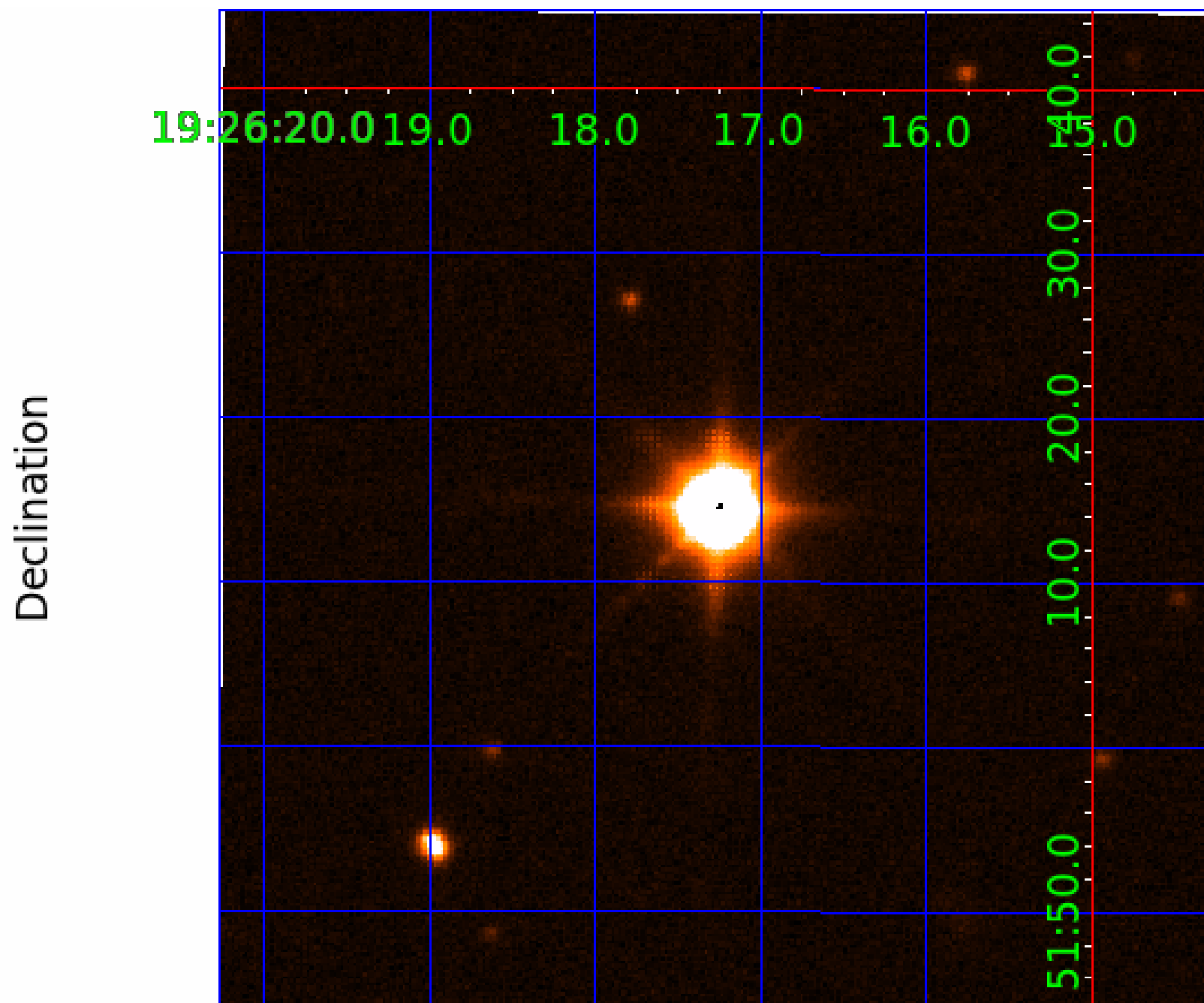
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image



# KIC 010599245

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010599245-01	OBS	No	102.933504	203.234932	42.4	2.126	28.2	19.6	59.14	3951	51.05	2781.31
010599245-02	OBS	No	185.904559	141.996123	43.9	3.508	16.3	14.6	59.14	3951	47.53	1264.56
010599245-03	OBS	No	118.287967	183.981930	53.7	2.452	15.0	15.8	59.14	3951	59.89	2310.67
010599245-04	OBS	No	170.417068	169.518612	39.7	8.386	14.7	10.0	59.14	3951	43.03	1420.06
010599245-05	OBS	No	72.002790	174.339797	6.7	4.067	14.5	2.3	59.14	3951	19.66	4479.12
010599245-06	OBS	No	62.359596	145.890783	20.7	5.466	13.7	9.2	59.14	3951	33.90	5425.67
010599245-07	OBS	No	102.244200	227.599922	46.6	2.835	13.4	13.2	59.14	3951	52.19	2806.34
010599245-08	OBS	No	80.029016	143.655157	38.5	1.930	13.1	12.9	59.14	3951	45.51	3890.40

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010599245-01	OBS	FP	0.00	1	0	1	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—CENT_UNRESOLVED_OFFSET—HALO_GHOST
010599245-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE_ZUMA—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
010599245-03	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
010599245-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_MARSHALL_SKYE_ZUMA—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_UNRESOLVED_OFFSET
010599245-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
010599245-06	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
010599245-07	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_KIC_POS—CENT_UNCERTAIN
010599245-08	OBS	FP	0.00	1	0	0	0	LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_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.

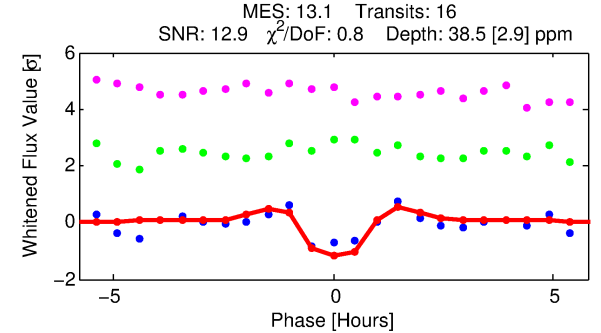
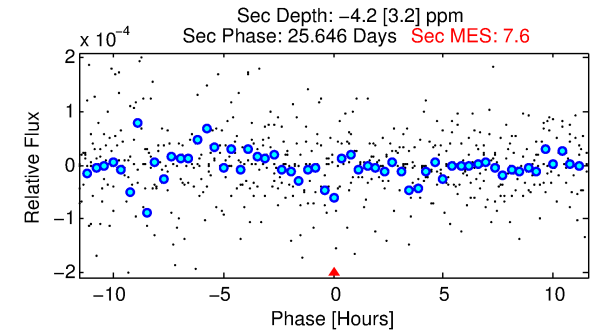
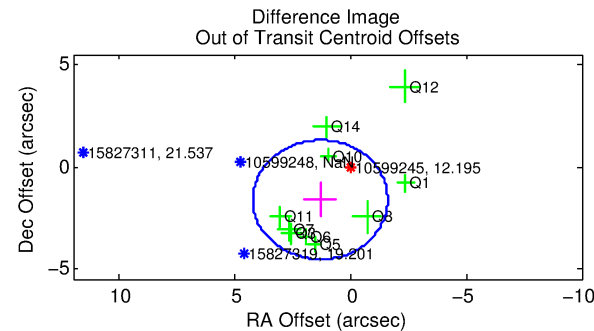
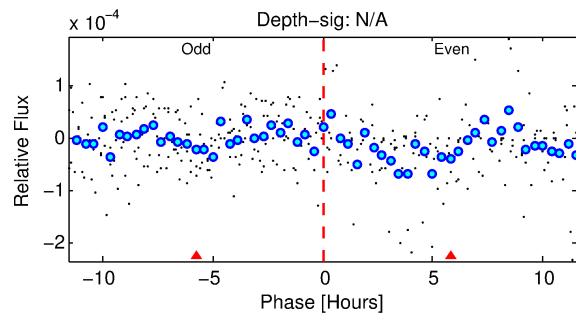
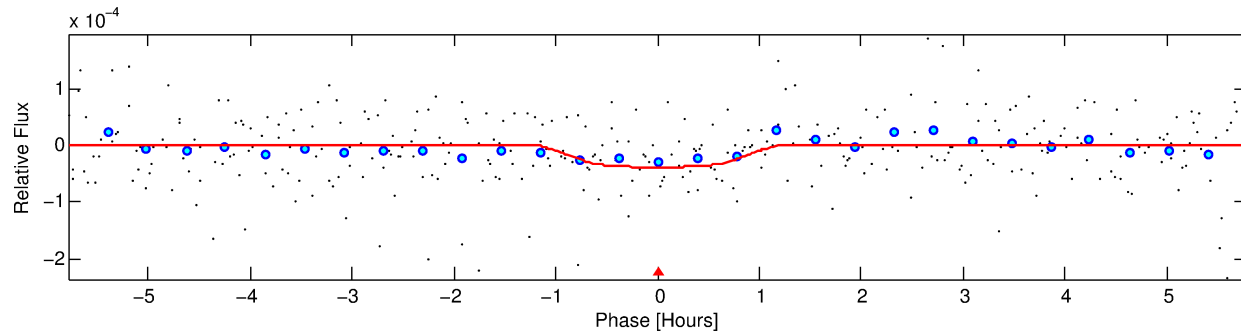
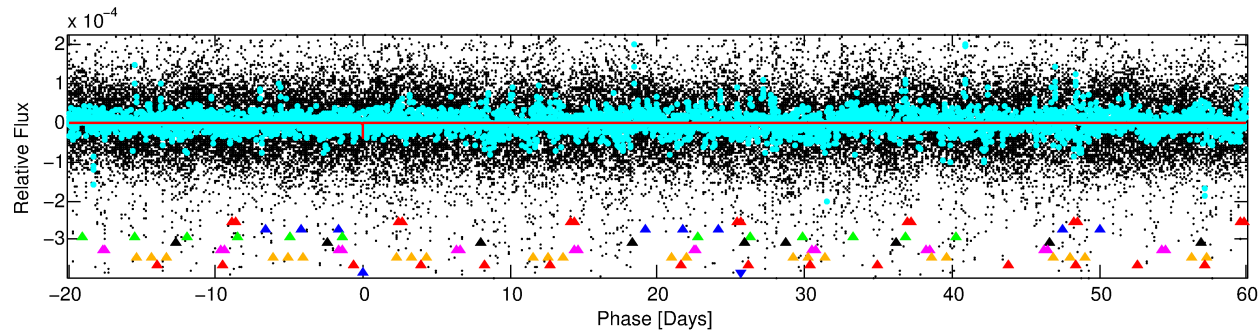
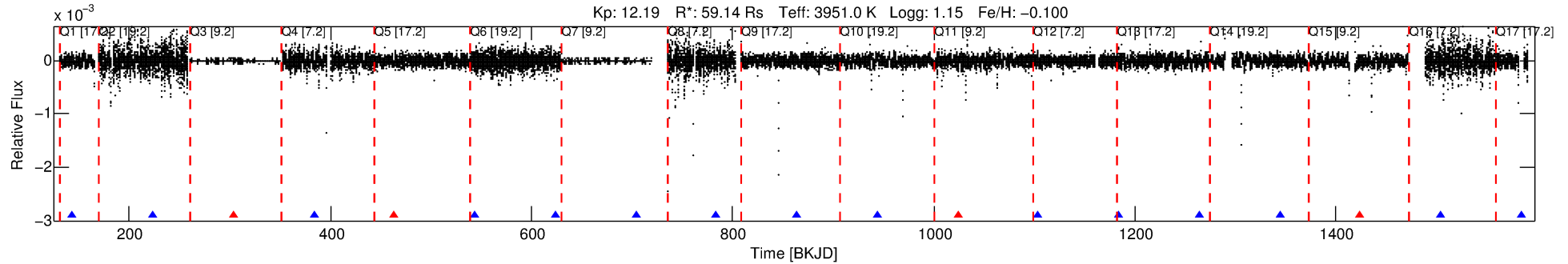
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 010599245-08

No Significant Match Found

# DV One-Page Summary

KIC: 10599245 Candidate: 8 of 8 Period: 80.029 d



## DV Fit Results:

Period = 80.02902 [0.00047] d  
Epoch = 143.6552 [0.0030] BKJD  
Rp/R\* = 0.0071 [0.0043]  
a/R\* = 152.60 [295.63]  
b = 0.88 [0.49]  
Seff = 3890.40 [725.87]  
Teq = 2014 [94] K  
Rp = 45.51 [29.20] Re  
a = 0.4431 [0.0646] AU  
Ag = N/A  
Teffp = N/A

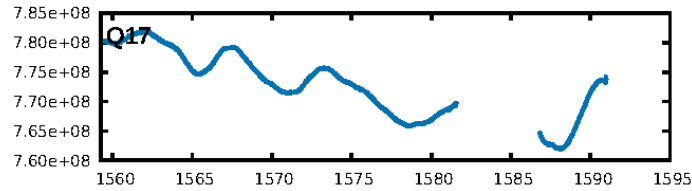
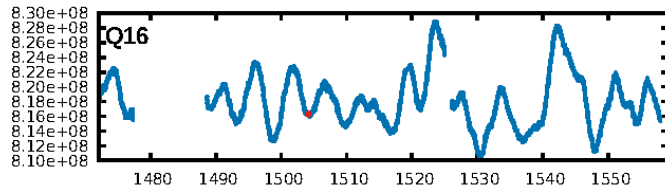
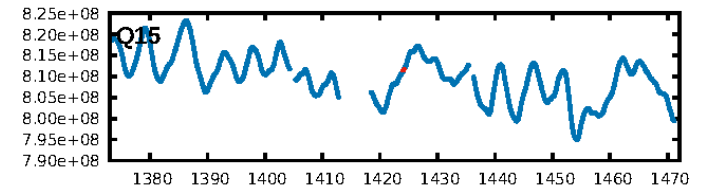
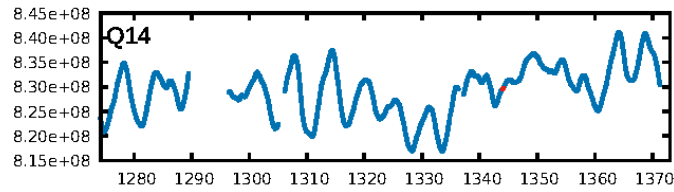
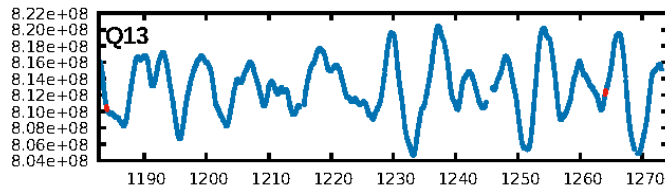
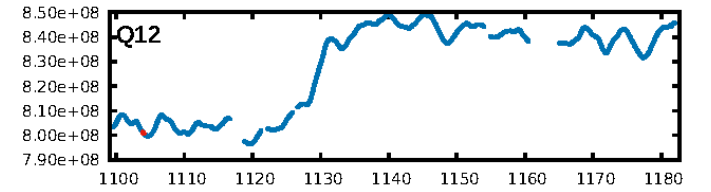
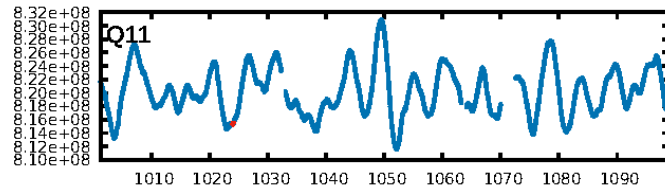
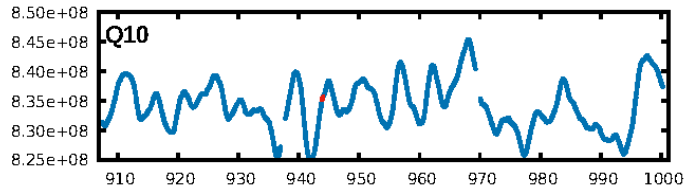
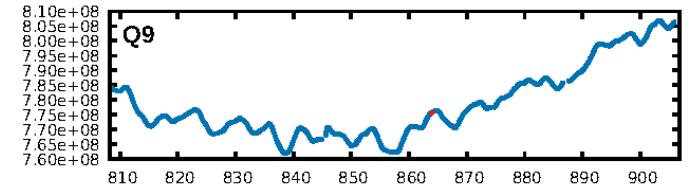
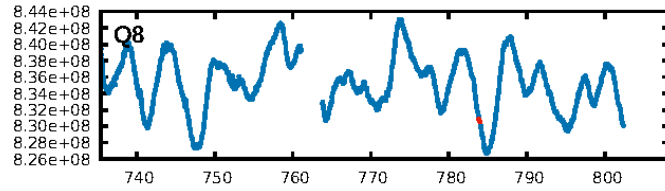
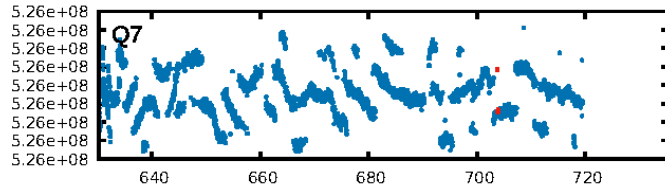
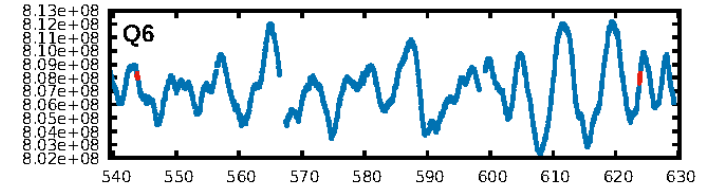
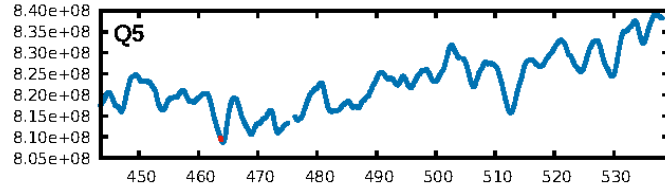
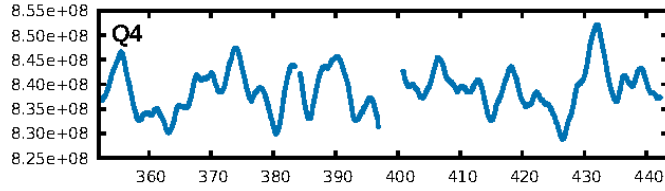
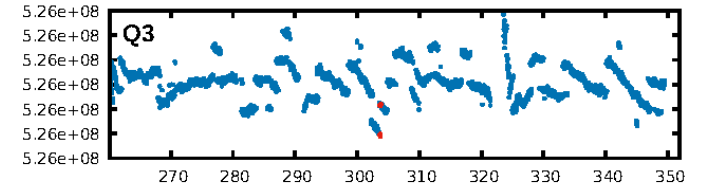
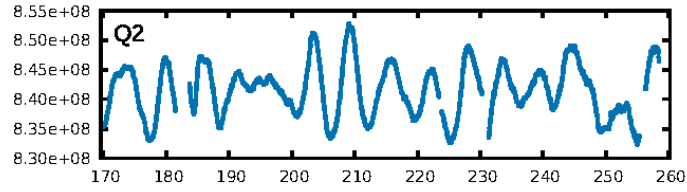
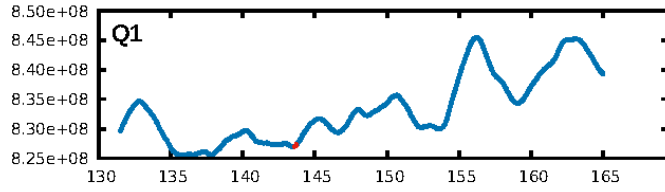
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [42.79σ]  
LongPeriod-sig: 100.0% [155.46σ]  
ModelChiSquare2-sig: 57.0%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 0.73 [11/15]  
GhostDiagnostic-chr: -1.963  
Centroid-sig: N/A  
Centroid-so: 3.284 arcsec [0.83σ]  
OotOffset-rm: 2.087 arcsec [2.15σ]  
KicOffset-rm: 2.014 arcsec [2.42σ]  
OotOffset-st: 3/3/2/2 [10]  
KicOffset-st: 3/3/2/2 [10]  
DiffImageQuality-fgm: 0.40 [4/10]  
DiffImageOverlap-fno: 1.00 [14/14]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 06:40:27 Z

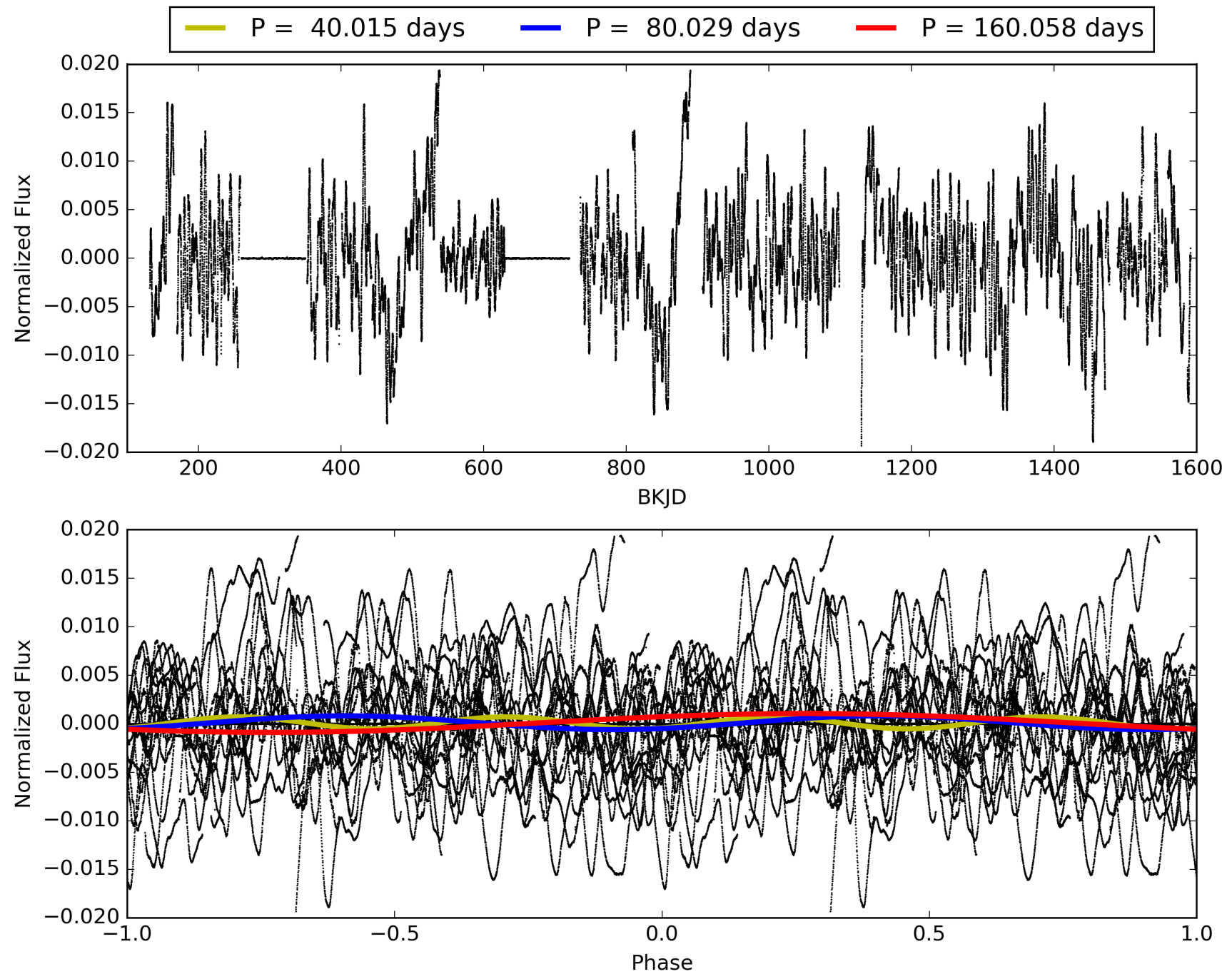
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 010599245-08, PDC Light Curves





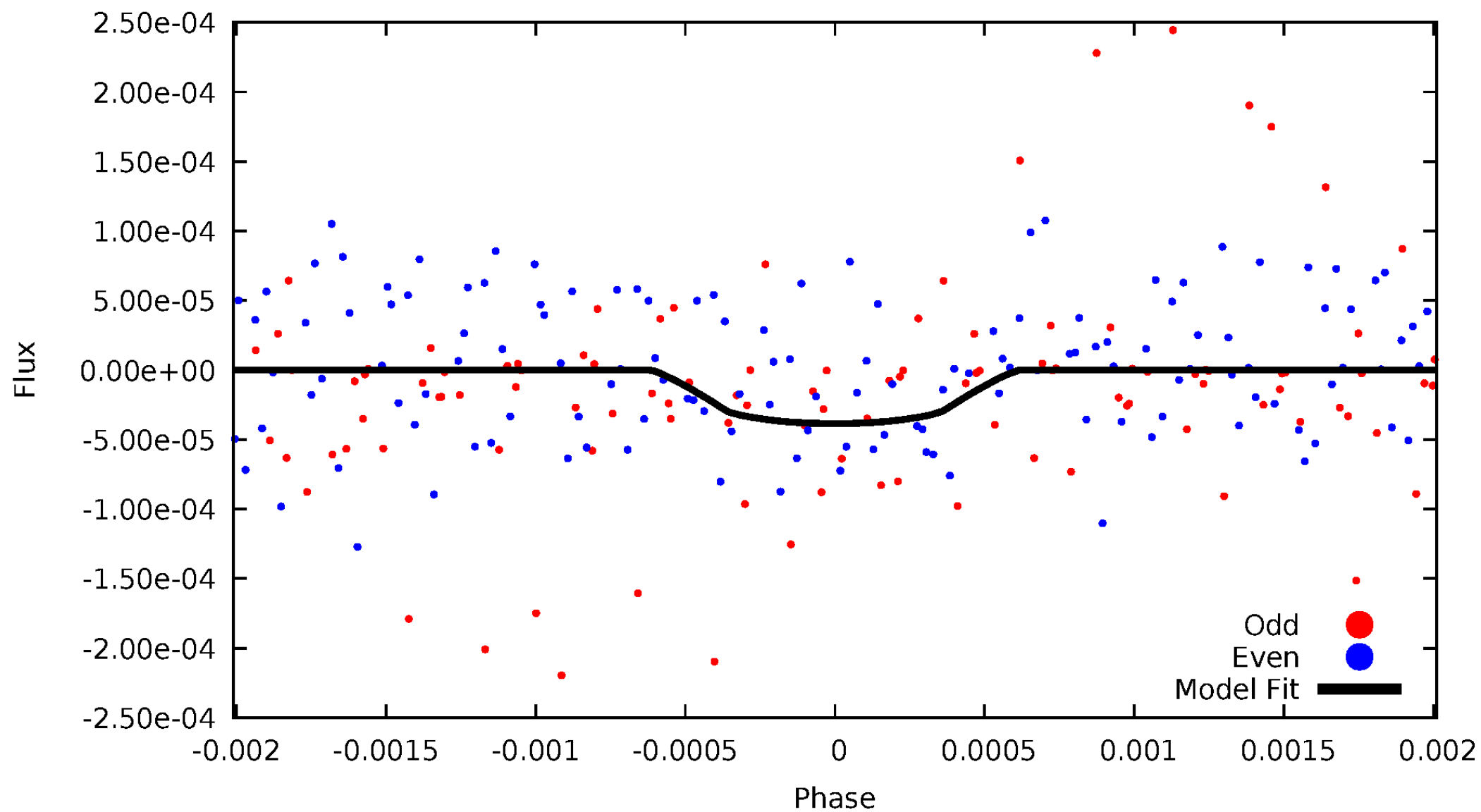
# TCE 010599245-08





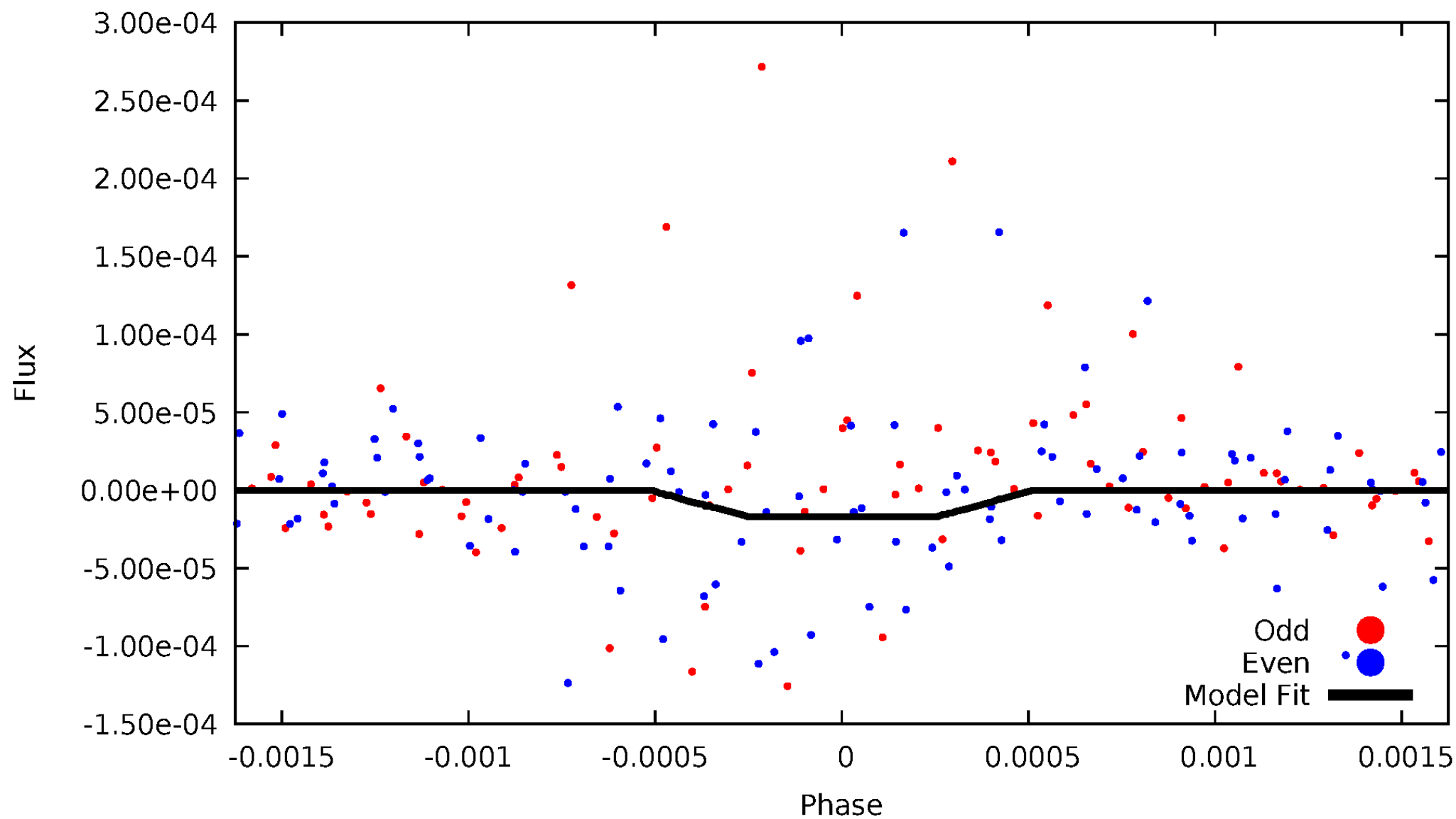
# DV Odd/Even

TCE 010599245-08



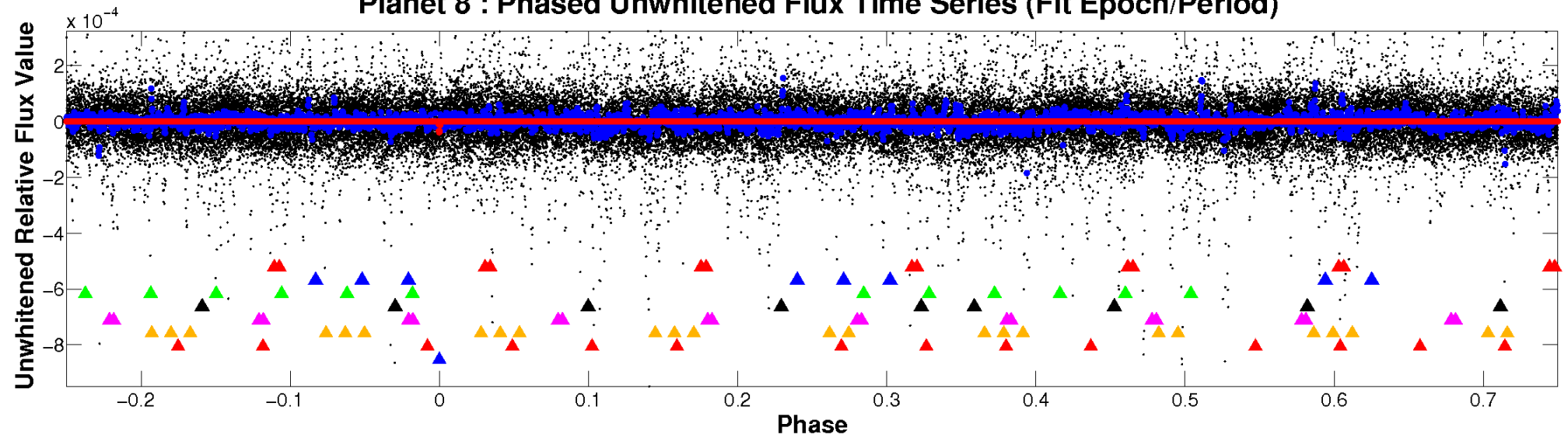
# ALT Odd/Even

TCE 010599245-08

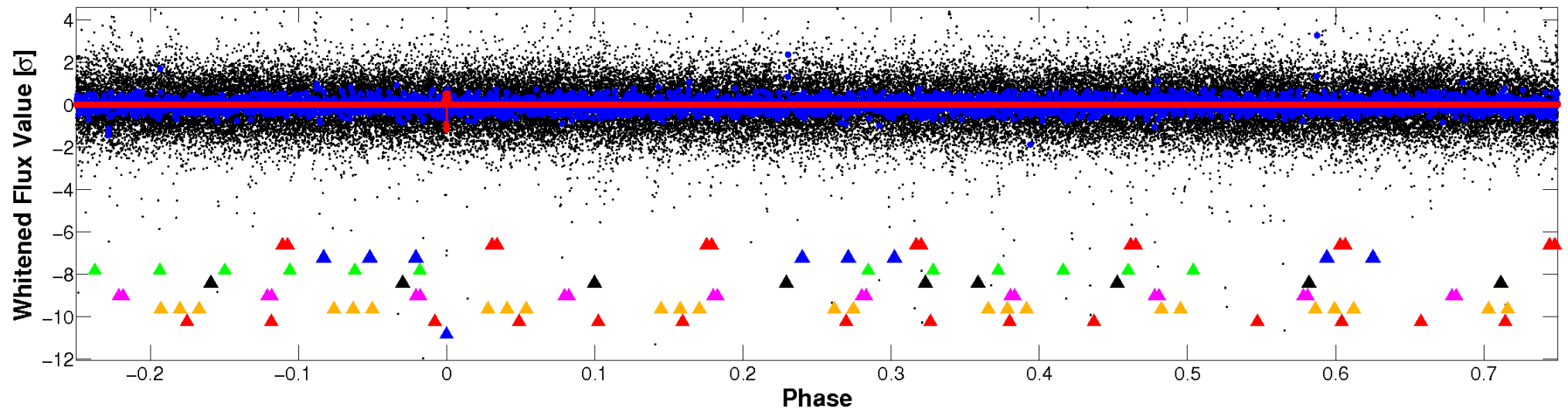


# Non-Whitened Vs. Whitened Light Curve

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

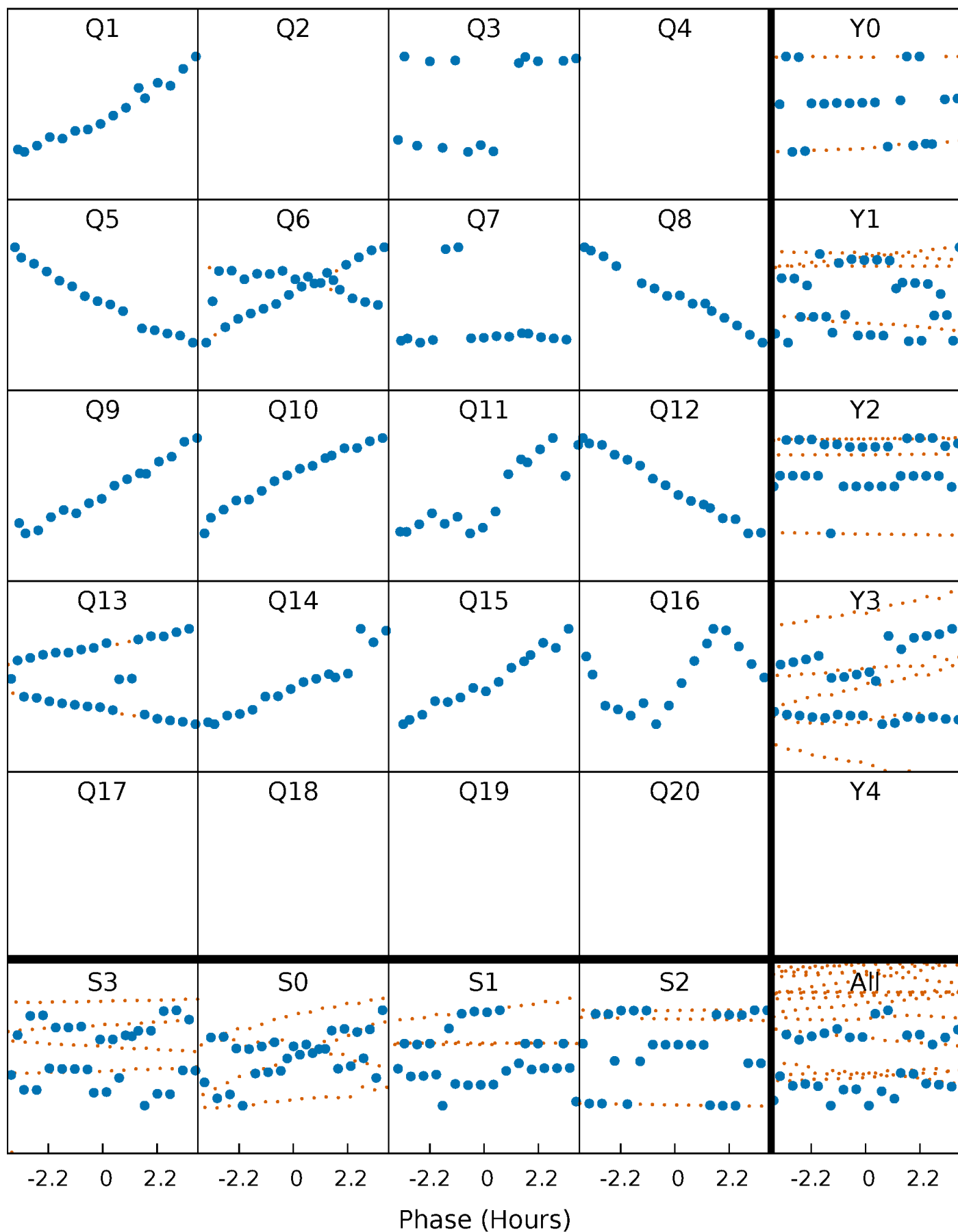


## Planet 8 : Phased Whitened Flux Time Series (Fit Epoch/Period)



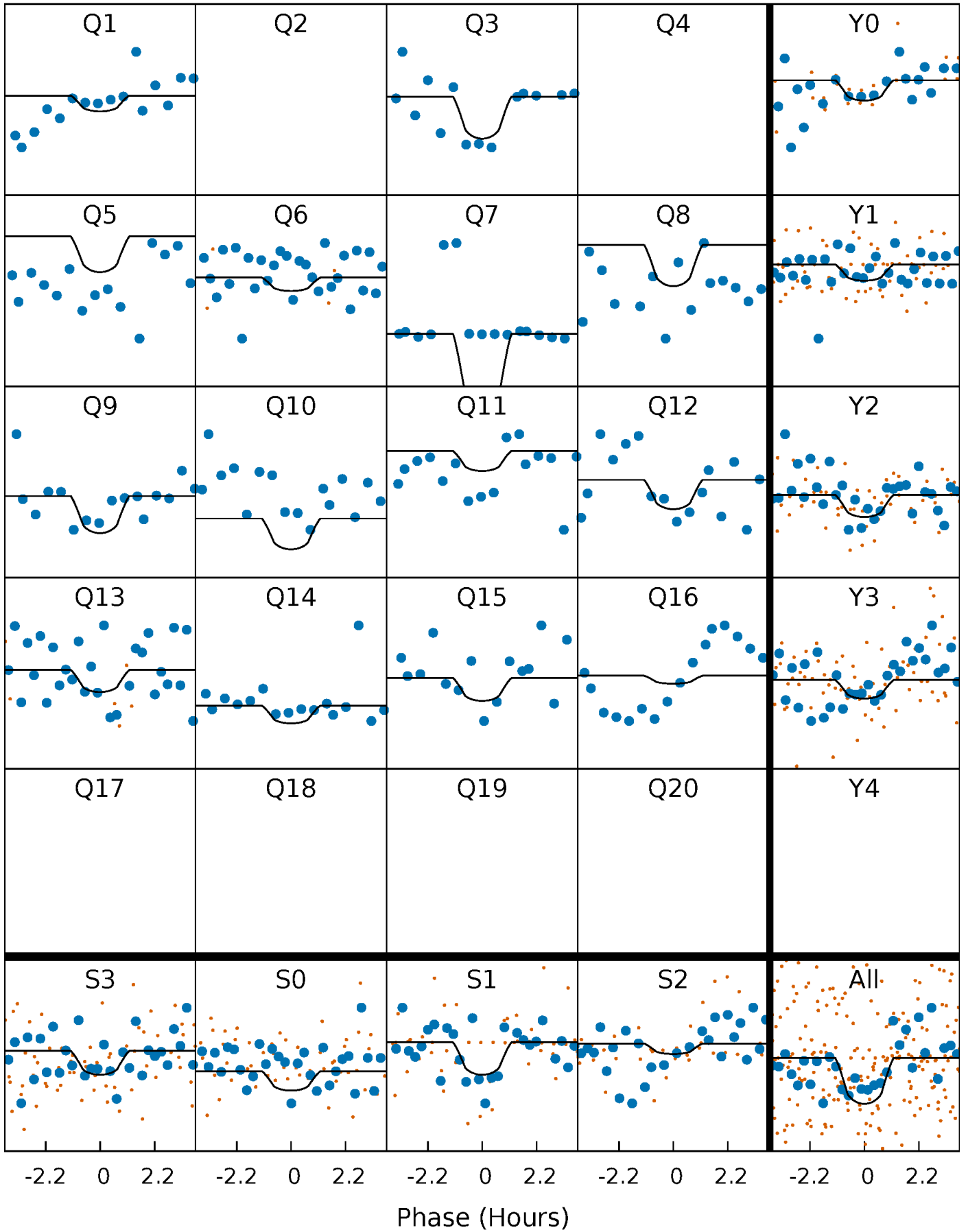
# PDC Quarter-Phased Transit Curves

TCE 010599245-08 P= 80.029016 Days  $T_0=143.655157$  (BKJD)



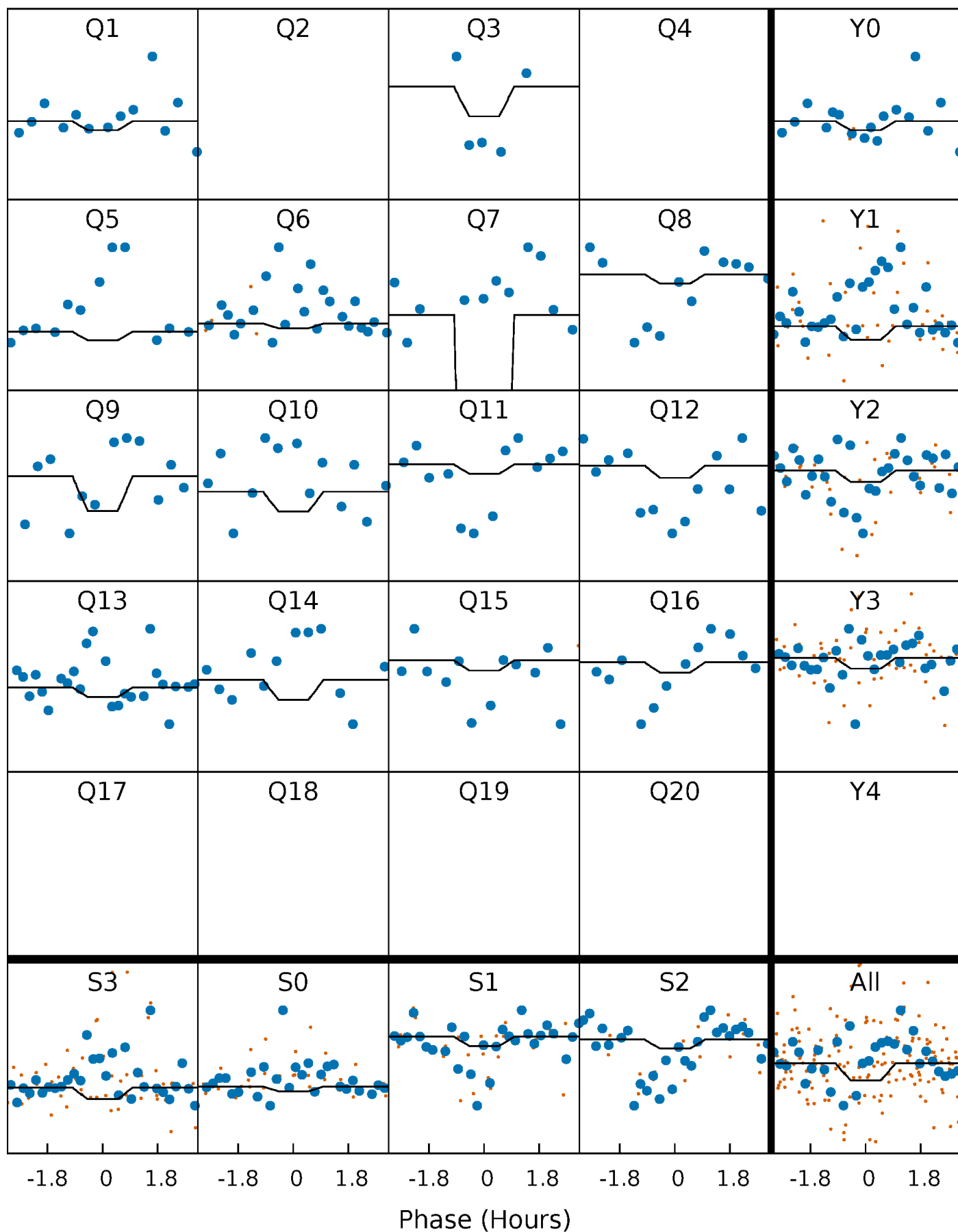
# DV Quarter-Phased Transit Curves

TCE 010599245-08     $P = 80.029016$  Days     $T_0 = 143.655157$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

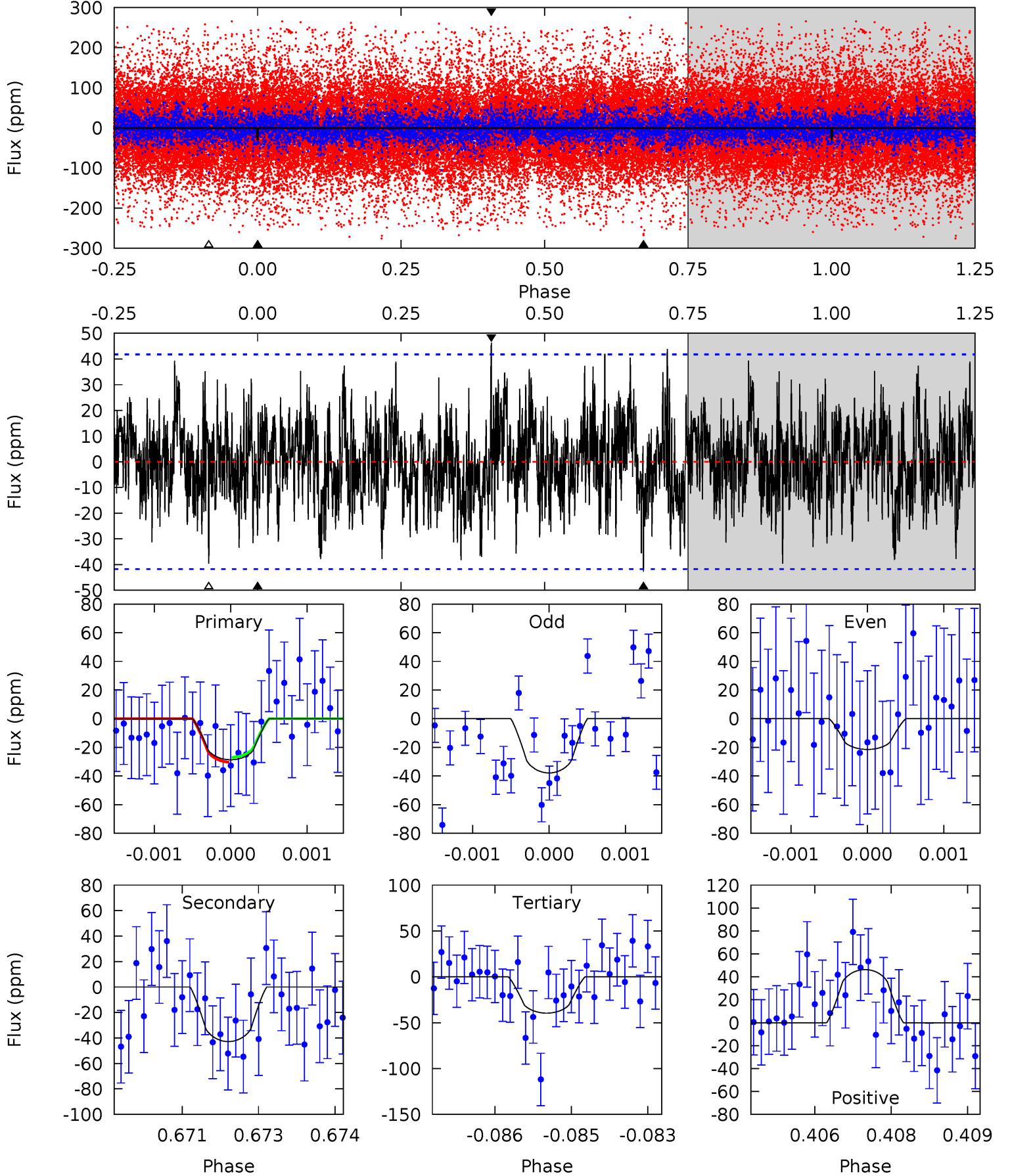
TCE 010599245-08     $P = 80.030596$  Days     $T_0 = 143.645804$  (BKJD)



# DV Model-Shift Uniqueness Test

010599245-08, P = 80.029016 Days, E = 63.626141 Days

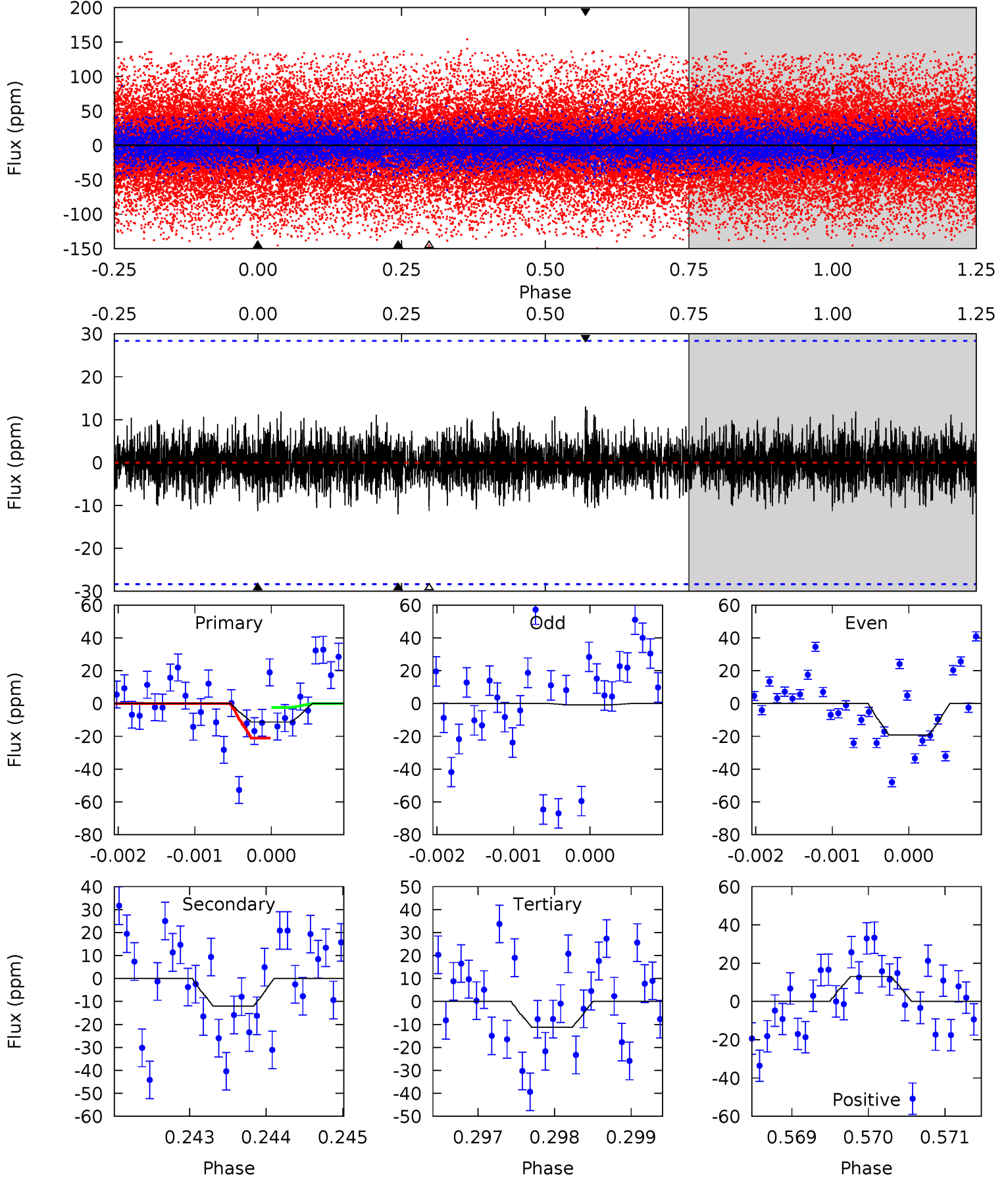
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
3.72	5.55	5.13	6.00	5.41	3.23	1.75	-1.41	-2.28	0.42	-0.45	1.04	1.12	0.52	0.22



# Alt Model-Shift Uniqueness Test

010599245-08, P = 80.030596 Days, E = 63.615208 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2.18	2.32	2.17	2.51	5.46	3.30	0.69	0.01	-0.34	0.15	-0.19	1.69	-4.02	0.52	1.82





### Stellar Parameters For KIC 010599245

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$3951^{+79}_{-108}$	$1.152^{+0.030}_{-0.030}$	$-0.100^{+0.200}_{-0.250}$	$59.143^{+2.129}_{-12.775}$	$1.811^{+0.036}_{-0.688}$	$0.000^{+0.000}_{-0.000}$
	+2%/-3%	+3%/-3%	+200%/-250%	+4%/-22%	+2%/-38%	+30%/-8%
Source	PHO54	AST54	PHO54	DSEP		

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

### Secondary Eclipse Parameters for KIC 010599245-08 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-43 \pm 8$	$48.13^{+24.64}_{-25.41}$	$2816^{+66}_{-88}$	$3650^{+1301}_{-602}$	$1.948^{+6.748}_{-1.121}$
Alt.	$-12 \pm 5$	$31.74^{+25.16}_{-20.56}$	$2818^{+66}_{-85}$	$3282^{+1707}_{-1326}$	$1.168^{+7.952}_{-0.857}$

$T_{max}$  = 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

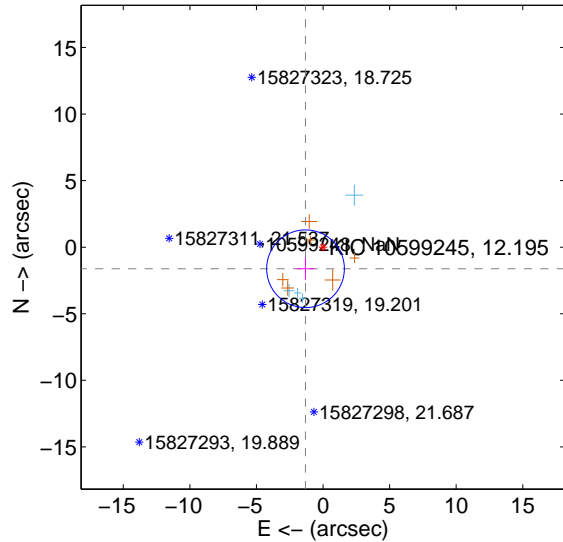
Supplemental centroid analysis for 010599245-08. Kepler magnitude: 12.20. Transit SNR 12.95

There are 4 quarters with good PRF difference image offsets

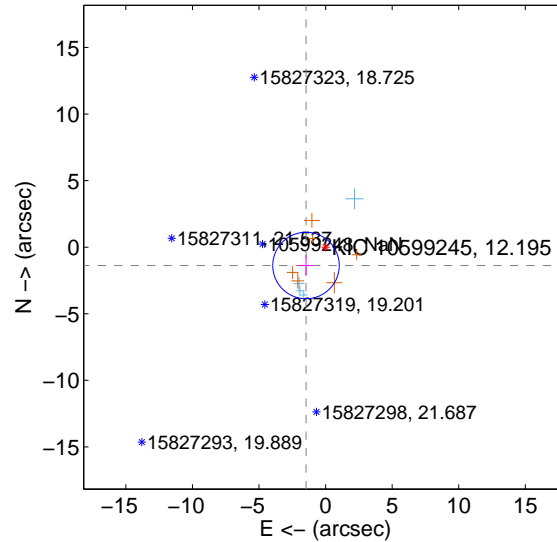
The direct PRF centroid is offset from the target star catalog position by about 0.08 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.087 \pm 0.973$	2.15	$1.316 \pm 0.656$	$-1.620 \pm 0.828$
PRF-fit source offset from KIC position	$2.014 \pm 0.832$	2.42	$1.470 \pm 0.560$	$-1.376 \pm 0.780$
photometric centroid source offset	$3.28 \pm 3.95$	0.83	$0.79 \pm 2.93$	$-3.19 \pm 4.01$

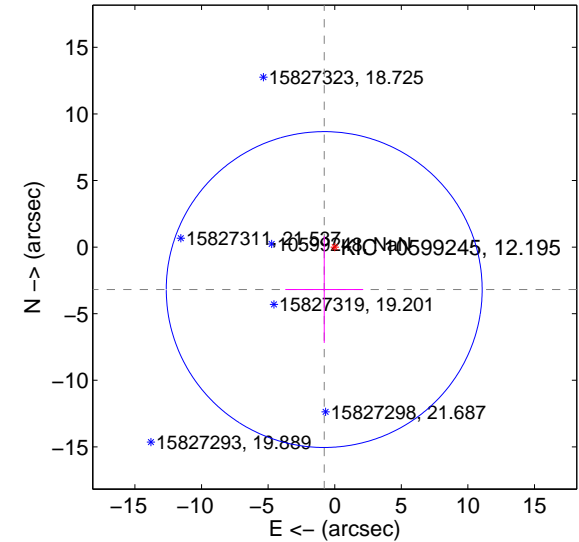
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

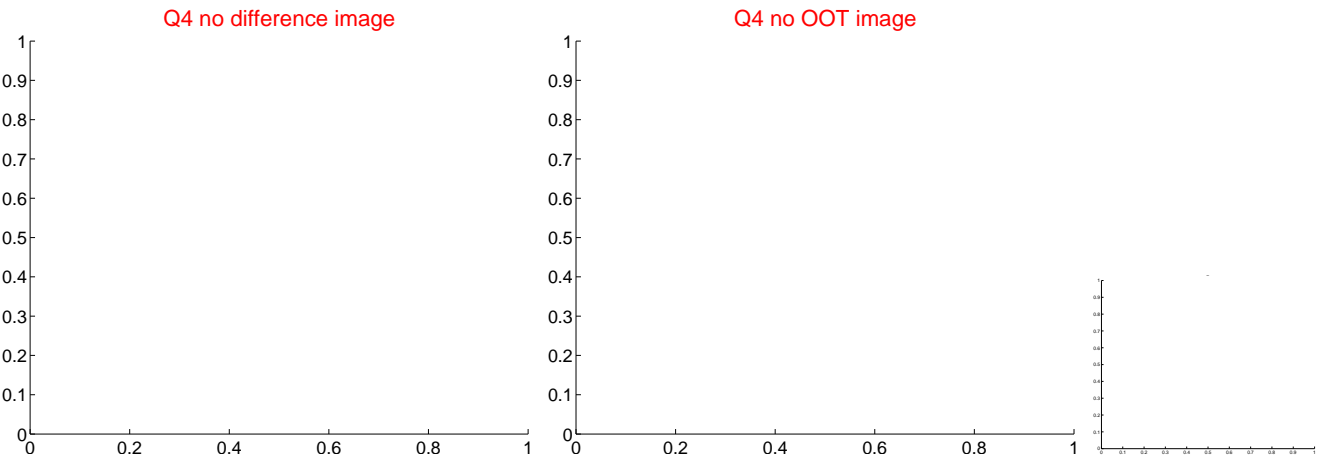
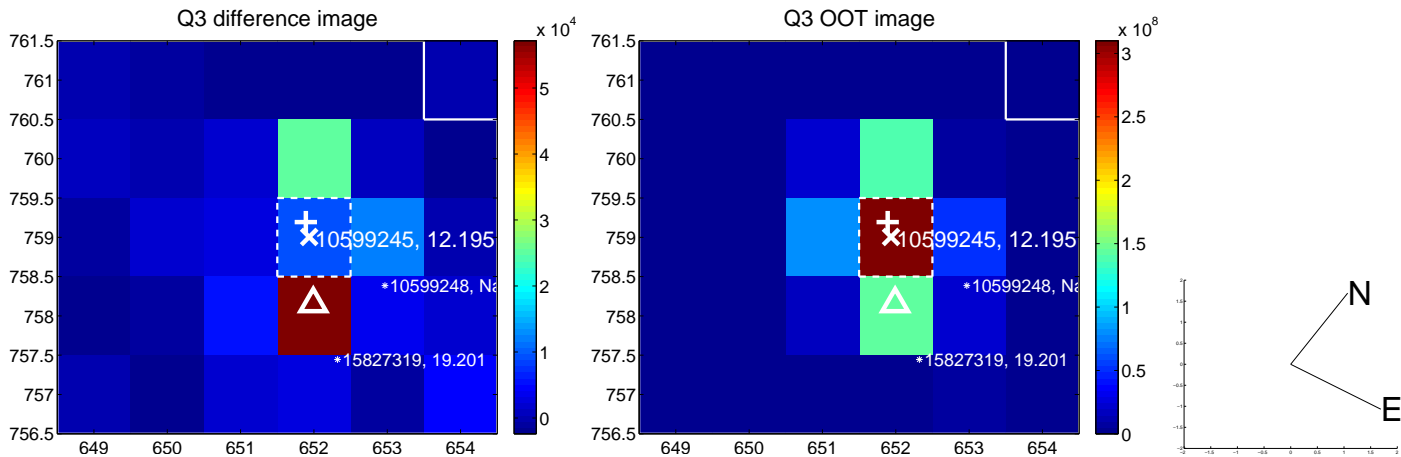
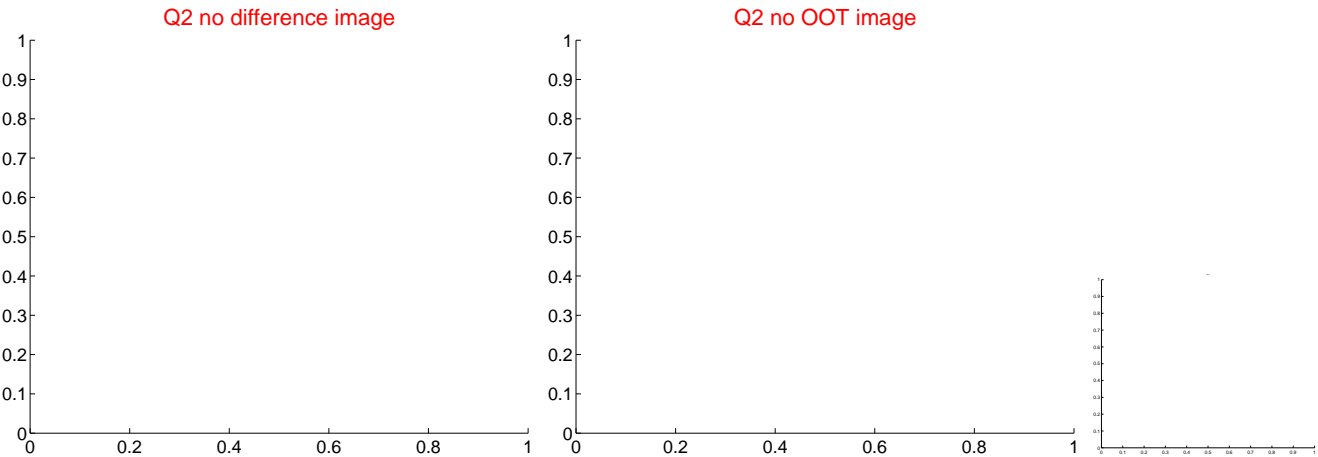
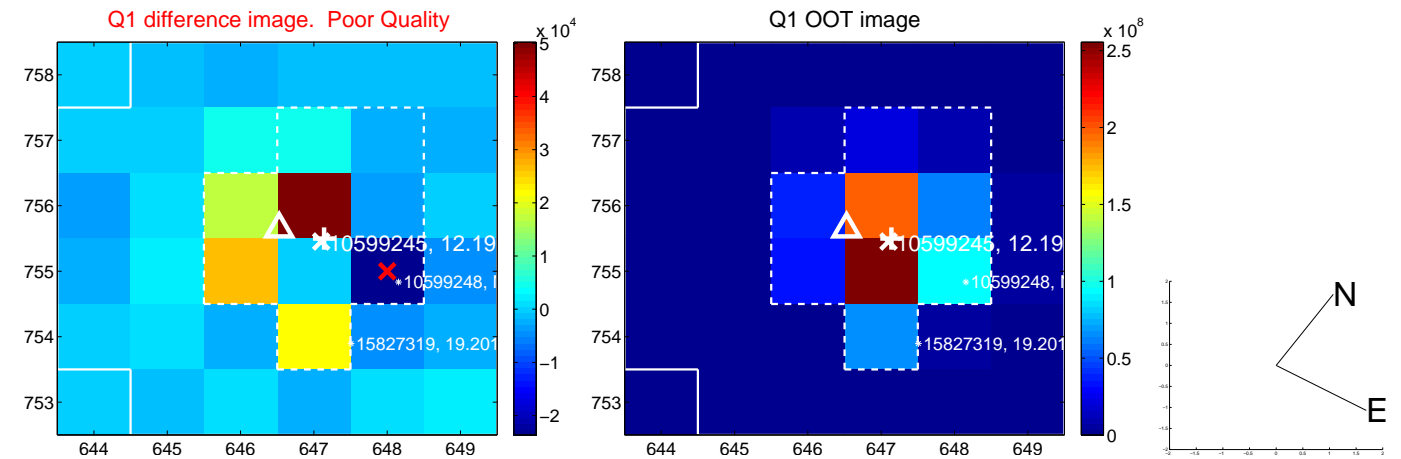


offset from photometric centroids

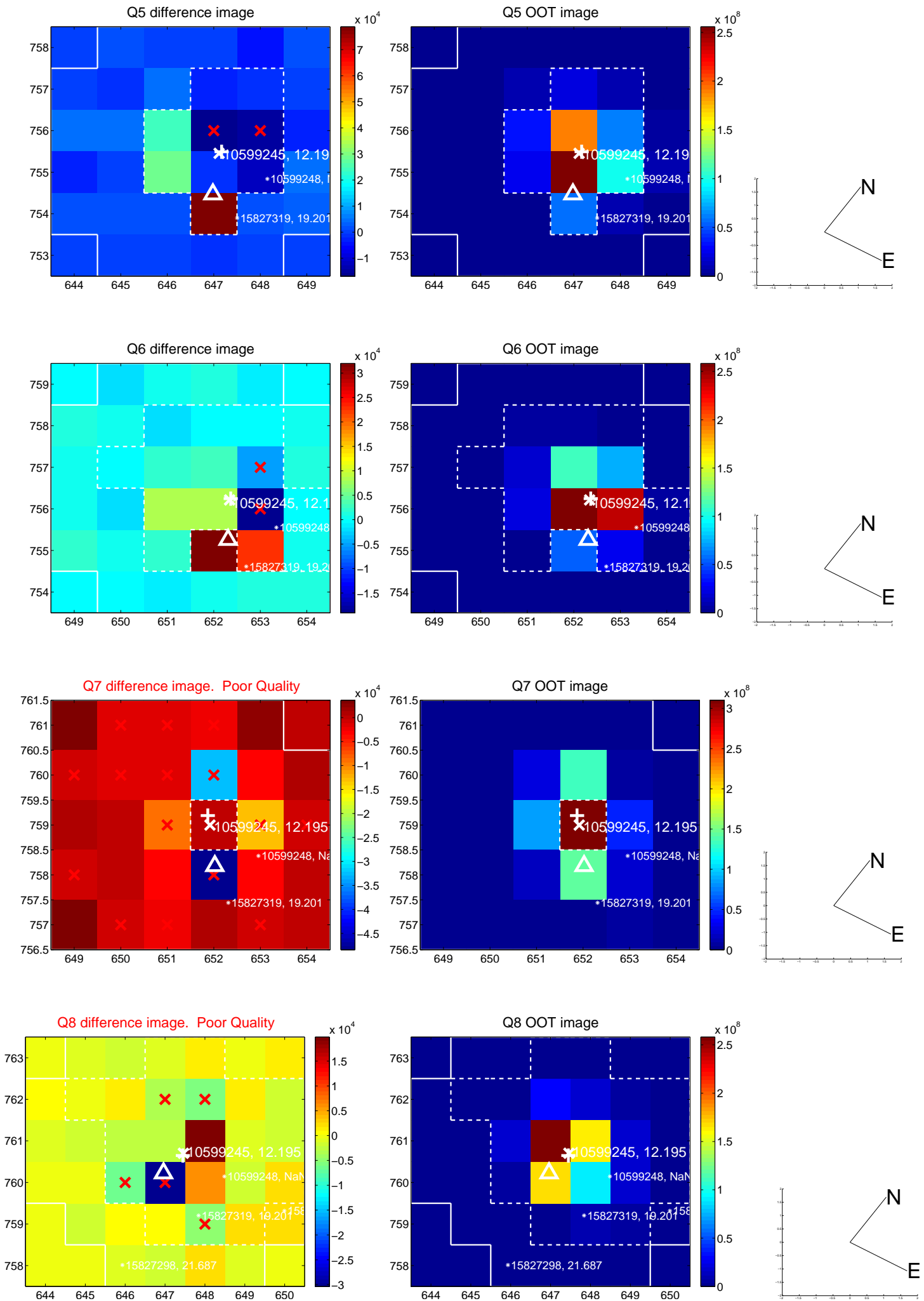


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

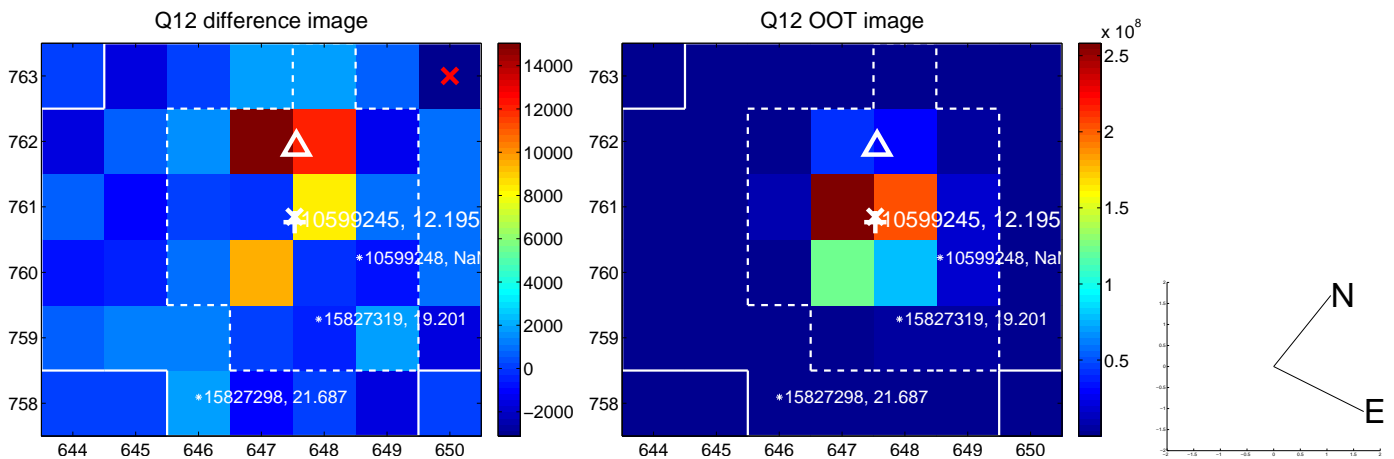
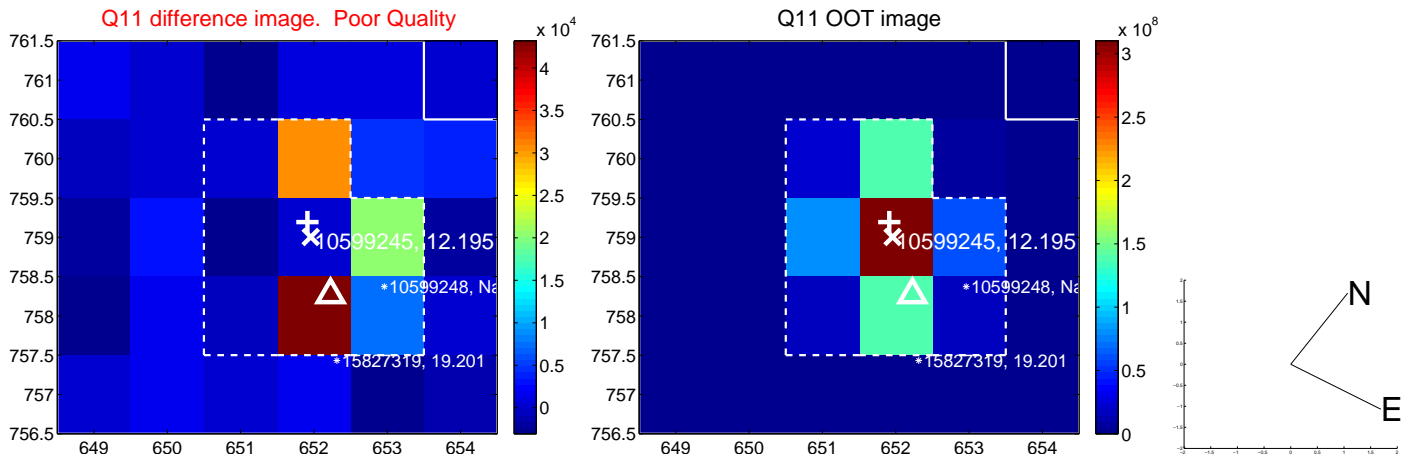
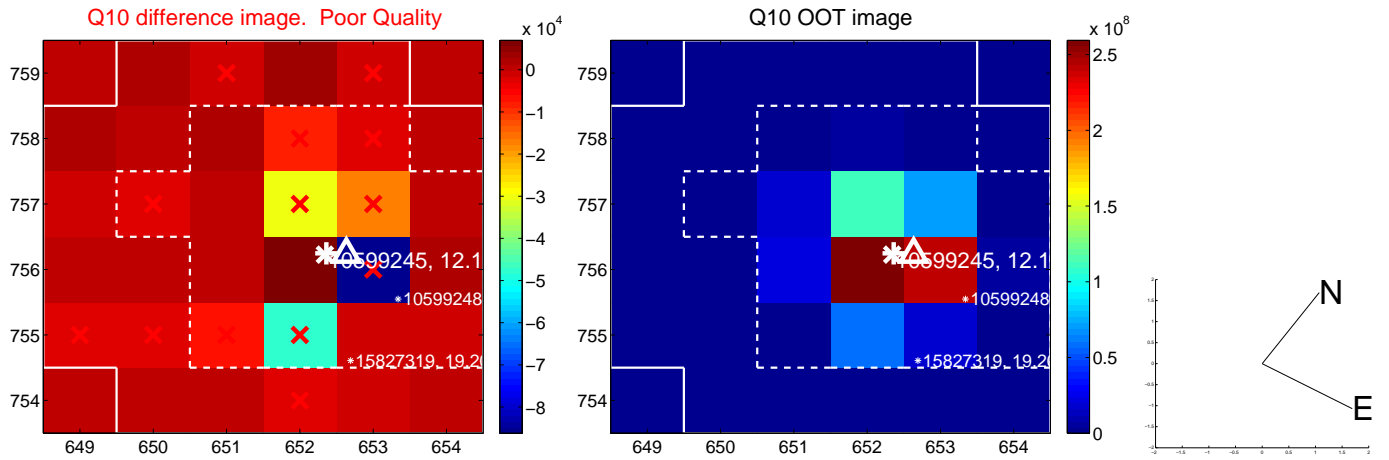
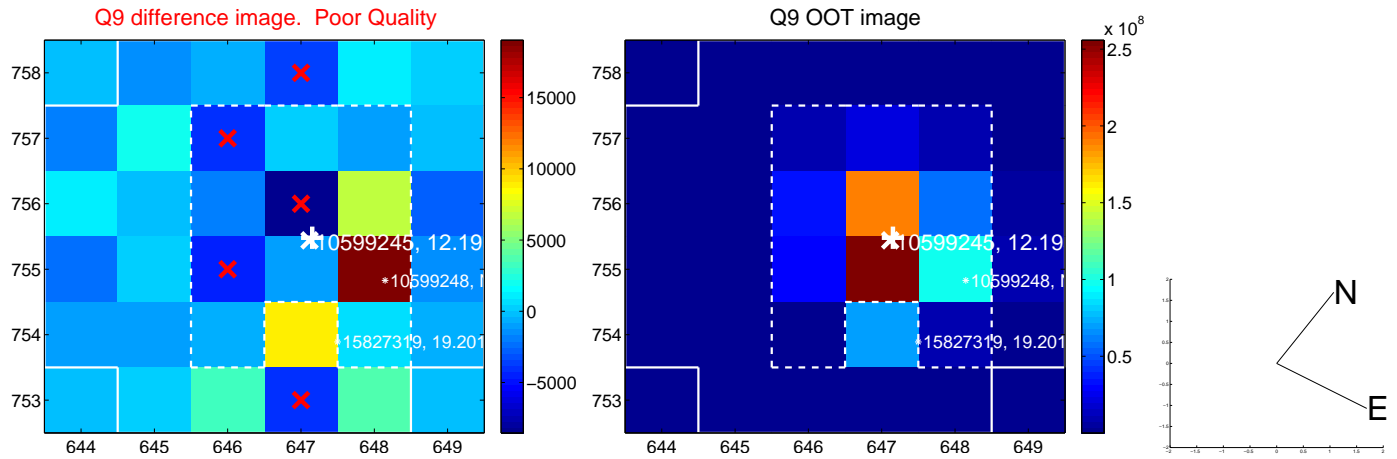
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



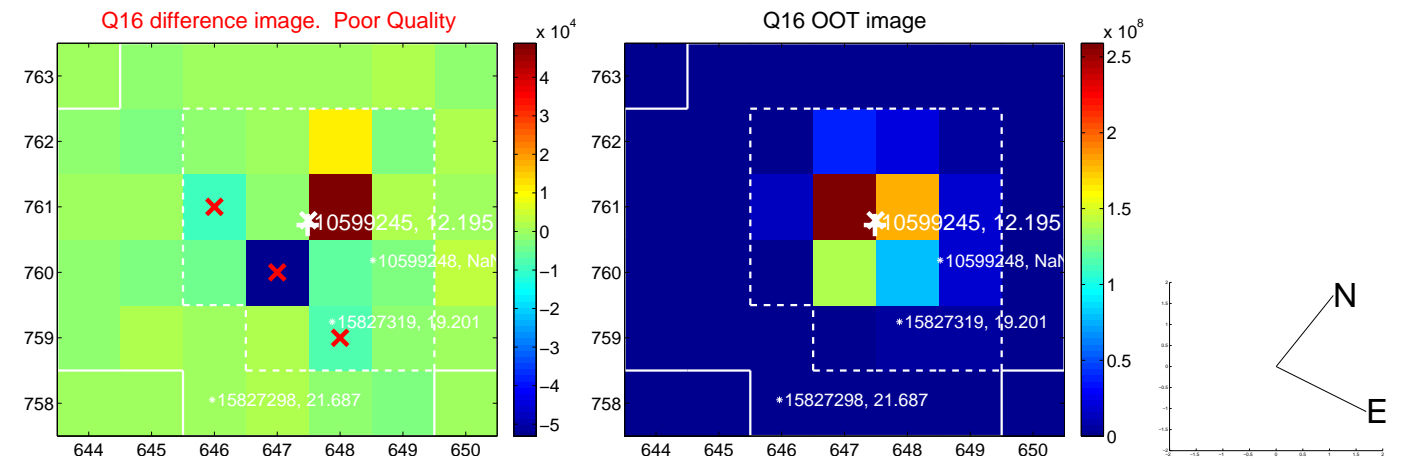
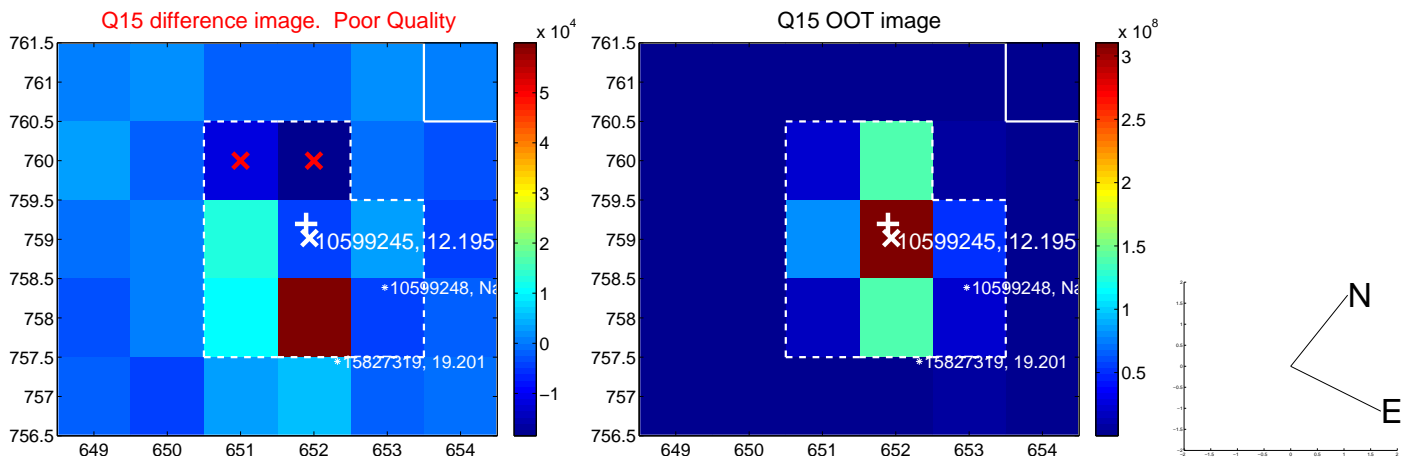
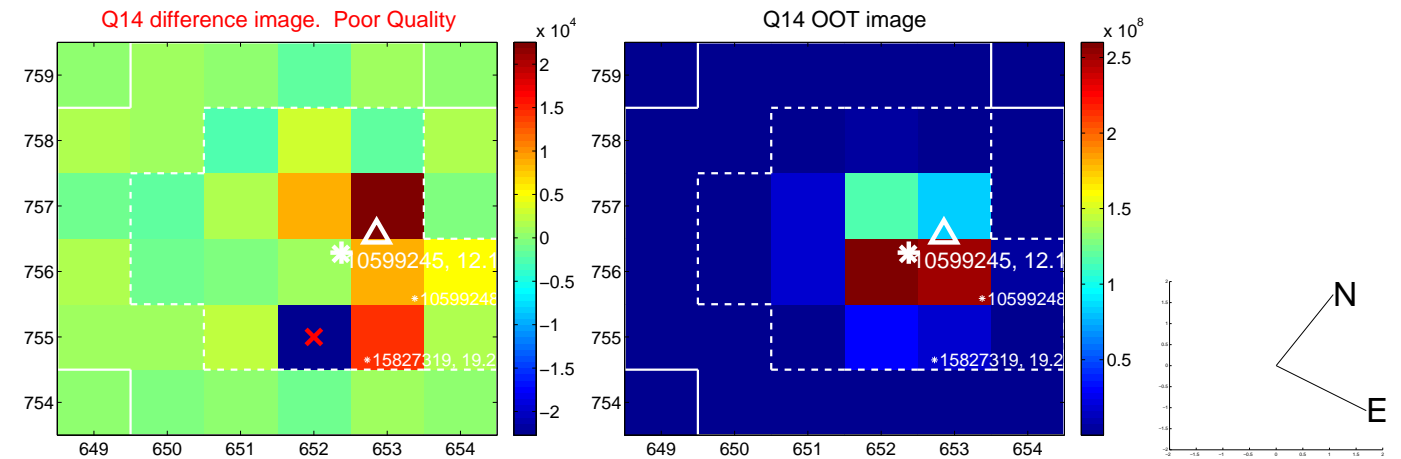
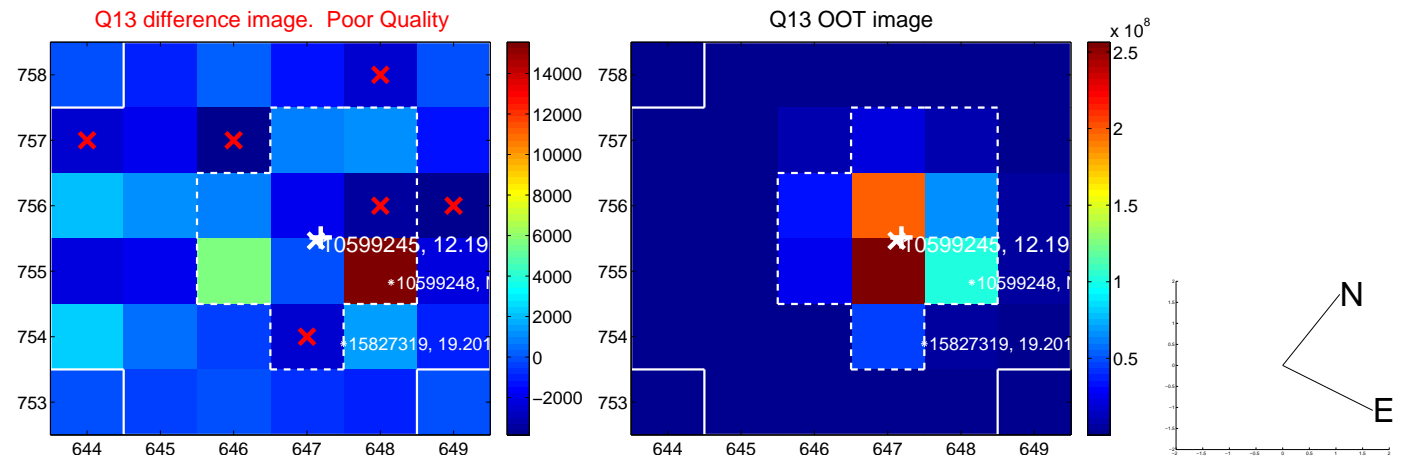
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



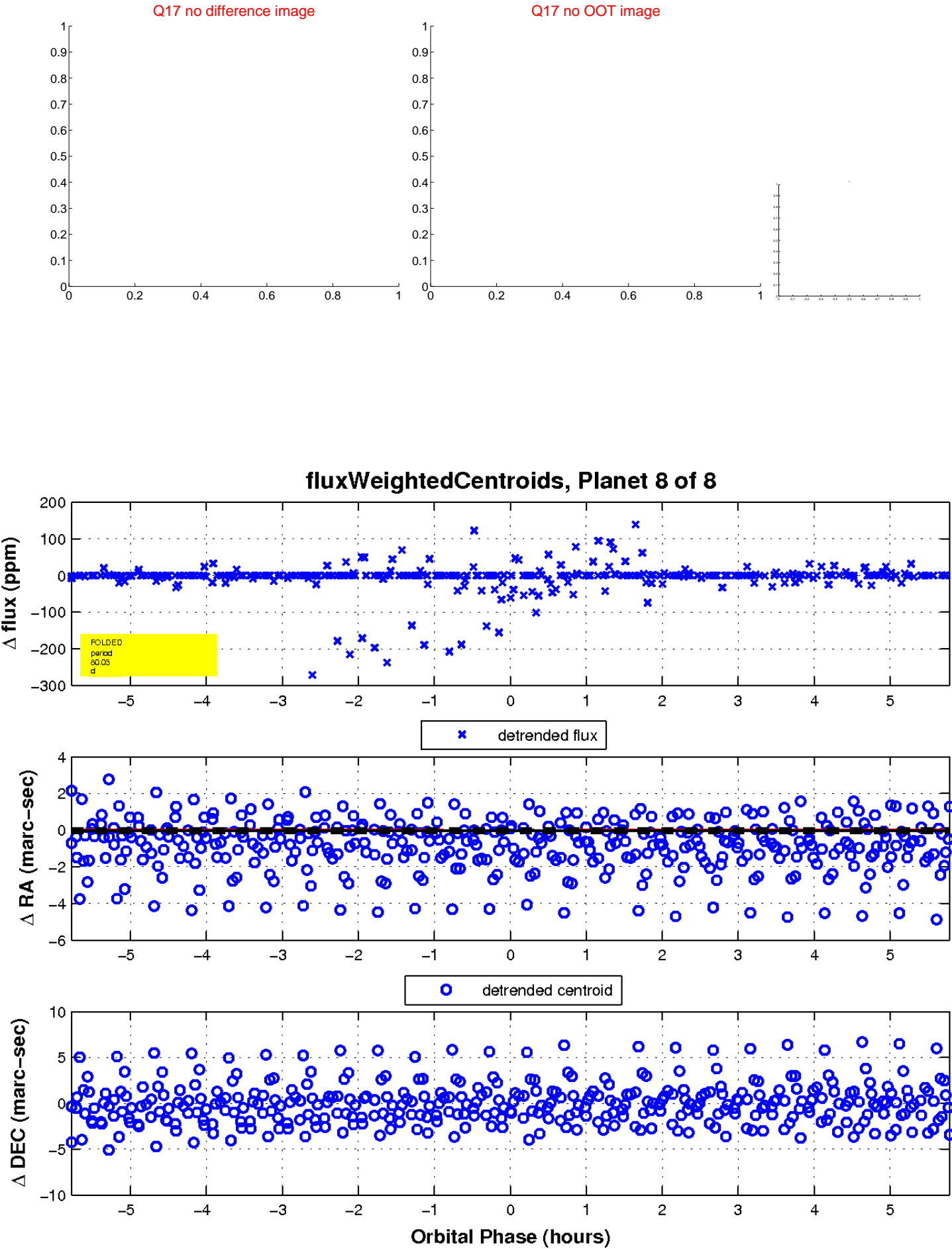
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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.



UKIRT Image

