

# KIC 009150012

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009150012-01	OBS	No	0.952755	132.307520	27.8	1.238	8.3	7.2	1.48	7063	0.80	11907.82
009150012-02	OBS	No	0.952880	131.809020	24.8	5.478	8.3	6.2	1.48	7063	0.79	11905.73
009150012-03	OBS	No	32.385893	152.743564	288.5	6.839	8.6	7.6	1.48	7063	3.32	108.14
009150012-04	OBS	No	33.912389	137.298834	396.2	2.637	8.7	8.7	1.48	7063	3.06	101.70
009150012-05	OBS	No	14.997715	136.947246	361.7	1.111	8.3	8.5	1.48	7063	2.95	301.84

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009150012-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT
009150012-02	OBS	FP	0.00	1	0	0	0	LPP_DV—SAME_NTL_PERIOD
009150012-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_ZUMA—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV
009150012-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV
009150012-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_TRACKER—TRANS_GAPPED

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

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

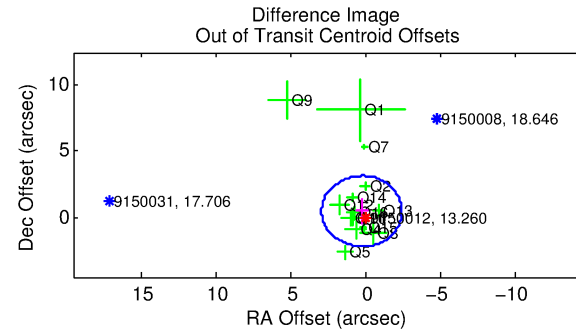
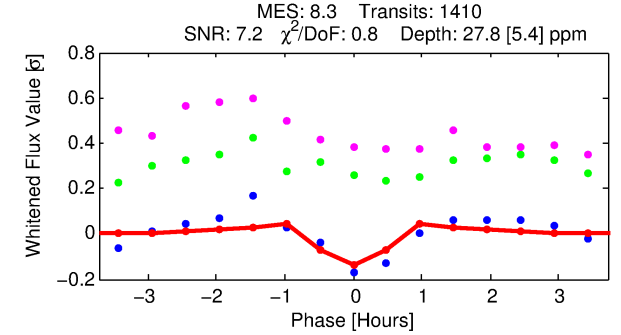
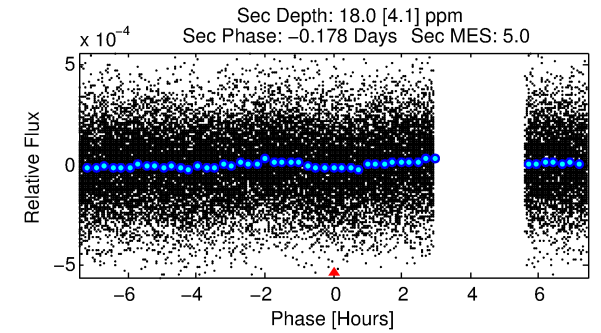
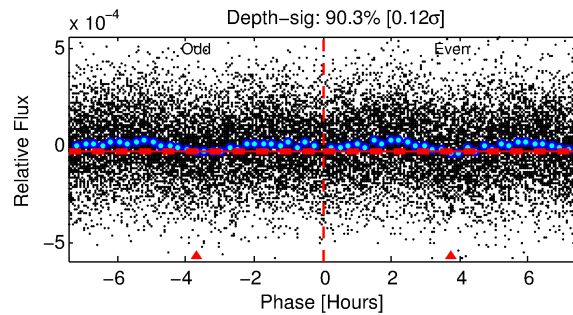
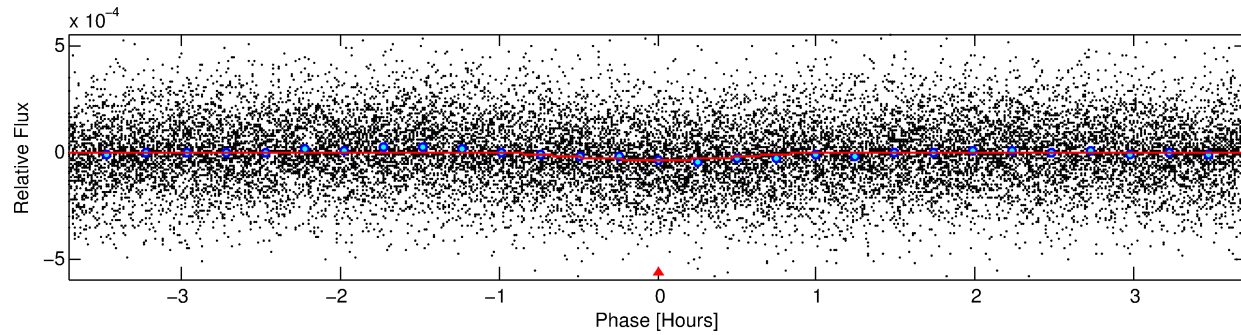
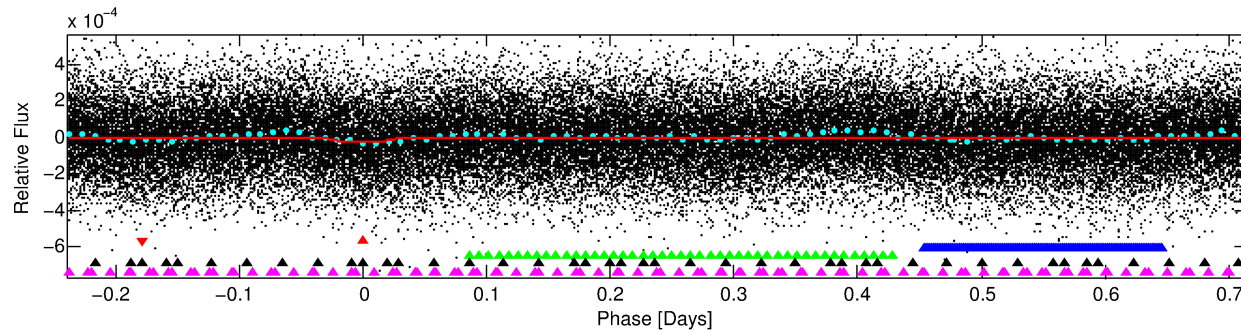
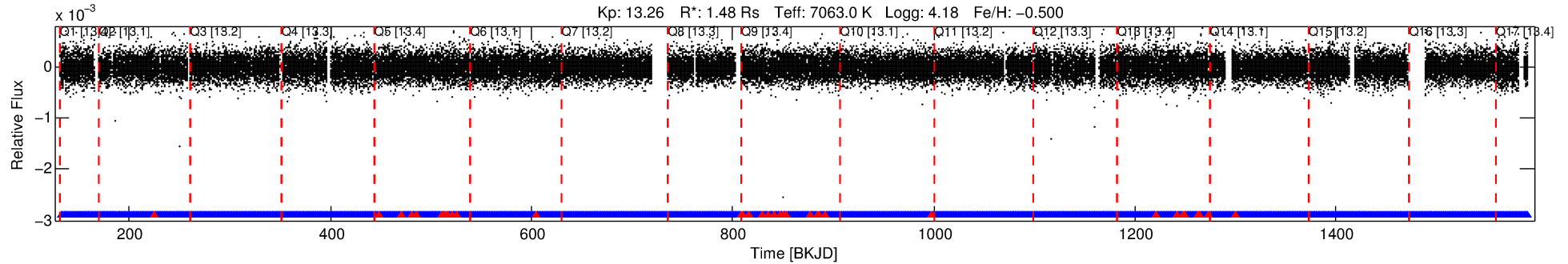
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 009150012-01

No Significant Match Found

# DV One-Page Summary

KIC: 9150012 Candidate: 1 of 5 Period: 0.953 d



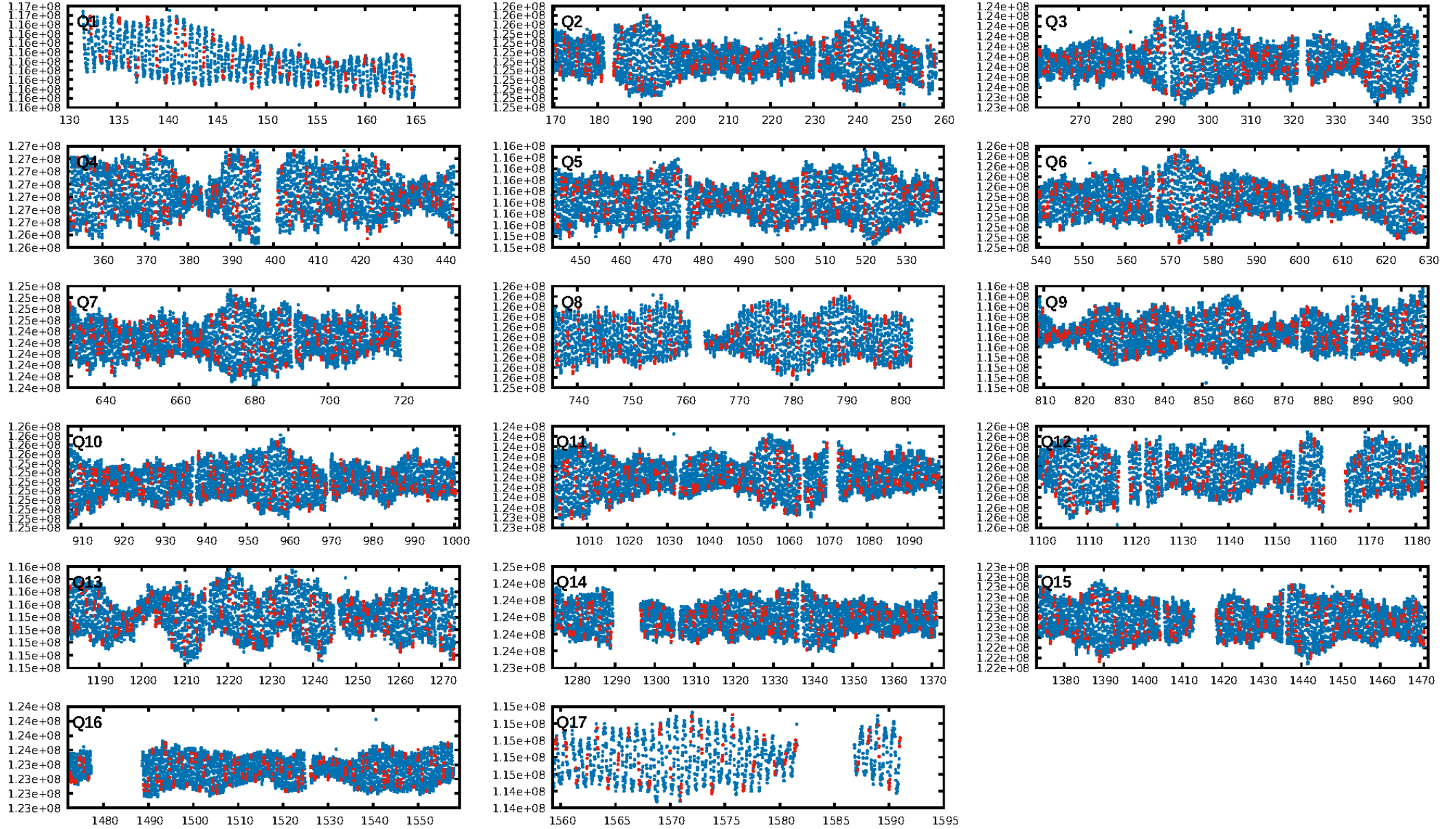
## DV Fit Results:

Period = 0.95275 [0.00001] d  
Epoch = 132.3075 [0.0021] BKJD  
Rp/R\* = 0.0049 [0.0068]  
a/R\* = 5.92 [45.19]  
b = 0.09 [91.97]  
Seff = 11907.82 [4215.32]  
Teq = 2664 [236] K  
Rp = 0.80 [1.12] Re  
a = 0.0203 [0.0046] AU  
Ag = 6.46 [18.02] [0.30σ]  
Teffp = 6566 [4553] K [0.86σ]

## DV Diagnostic Results:

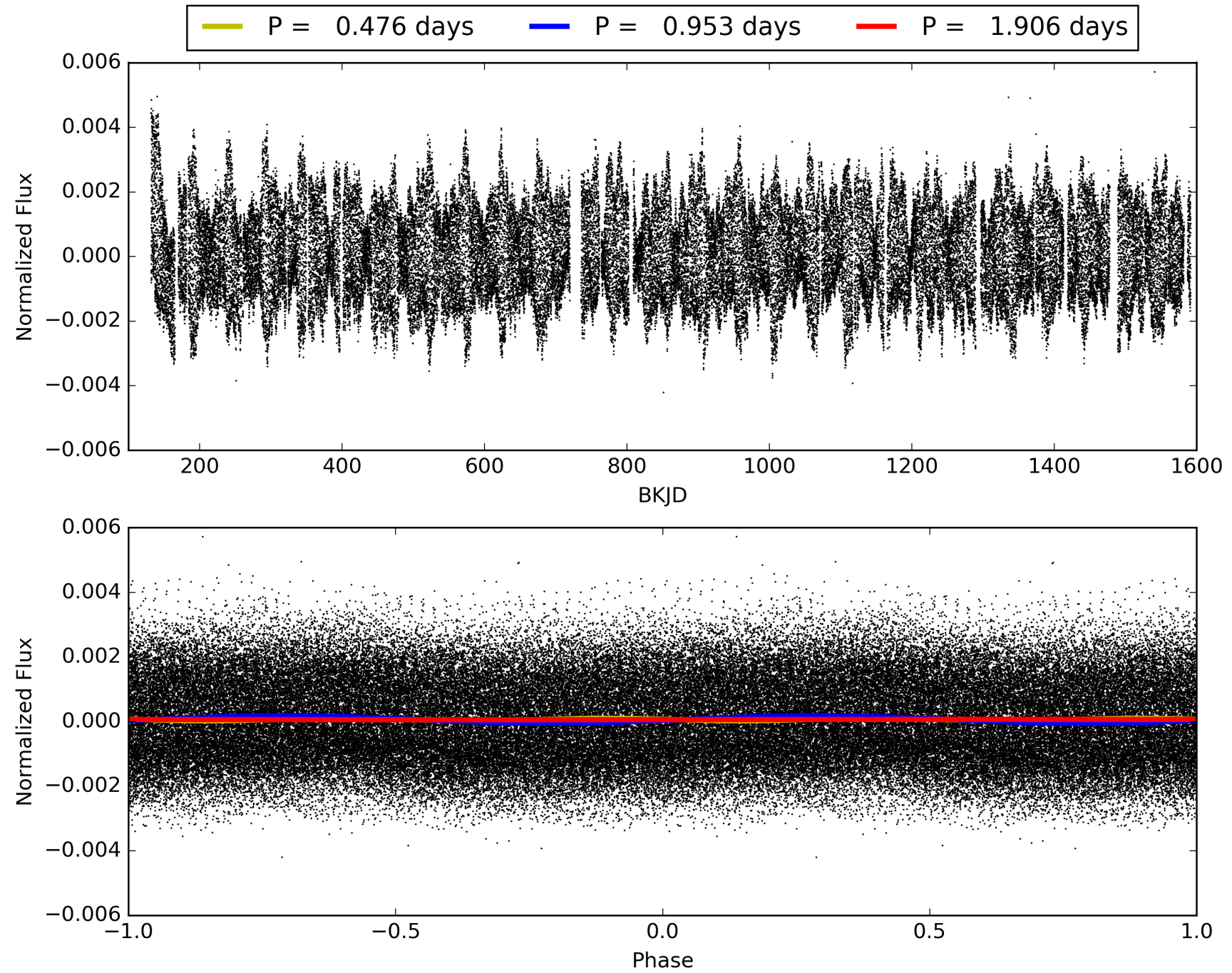
ShortPeriod-sig: N/A  
LongPeriod-sig: 0.0% [0.00σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 1.09e-14  
RollingBand-fgt: 0.97 [1312/1346]  
GhostDiagnostic-chr: -2.052  
Centroid-sig: 85.4%  
Centroid-so: 0.480 arcsec [0.38σ]  
OotOffset-rm: 0.520 arcsec [0.58σ]  
KicOffset-rm: 0.507 arcsec [0.58σ]  
OotOffset-st: 3/3/4/4 [14]  
KicOffset-st: 3/3/4/4 [14]  
DiffImageQuality-fgm: 0.57 [8/14]  
DiffImageOverlap-fno: 0.88 [15/17]

# TCE 009150012-01, PDC Light Curves





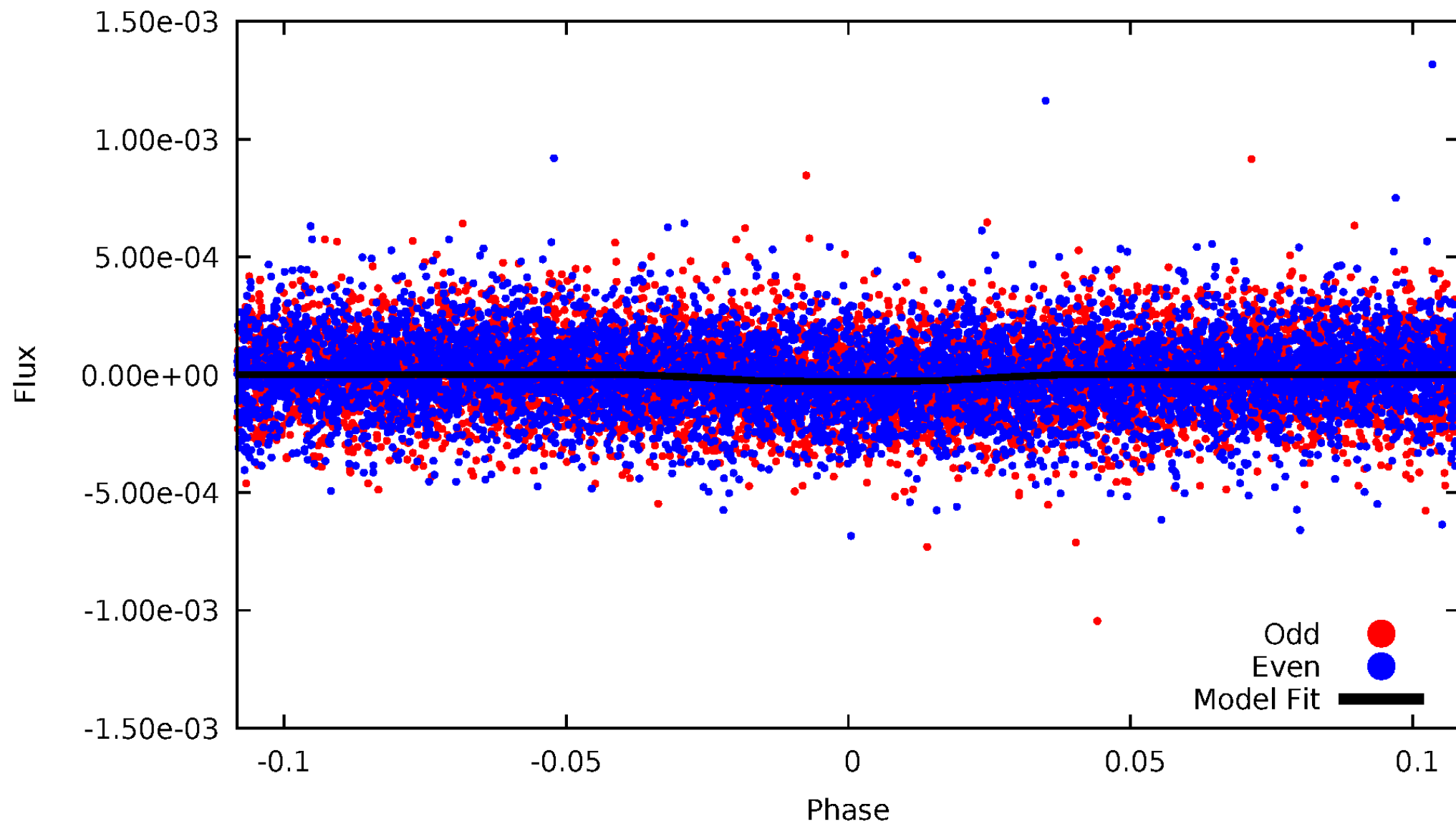
TCE 009150012-01





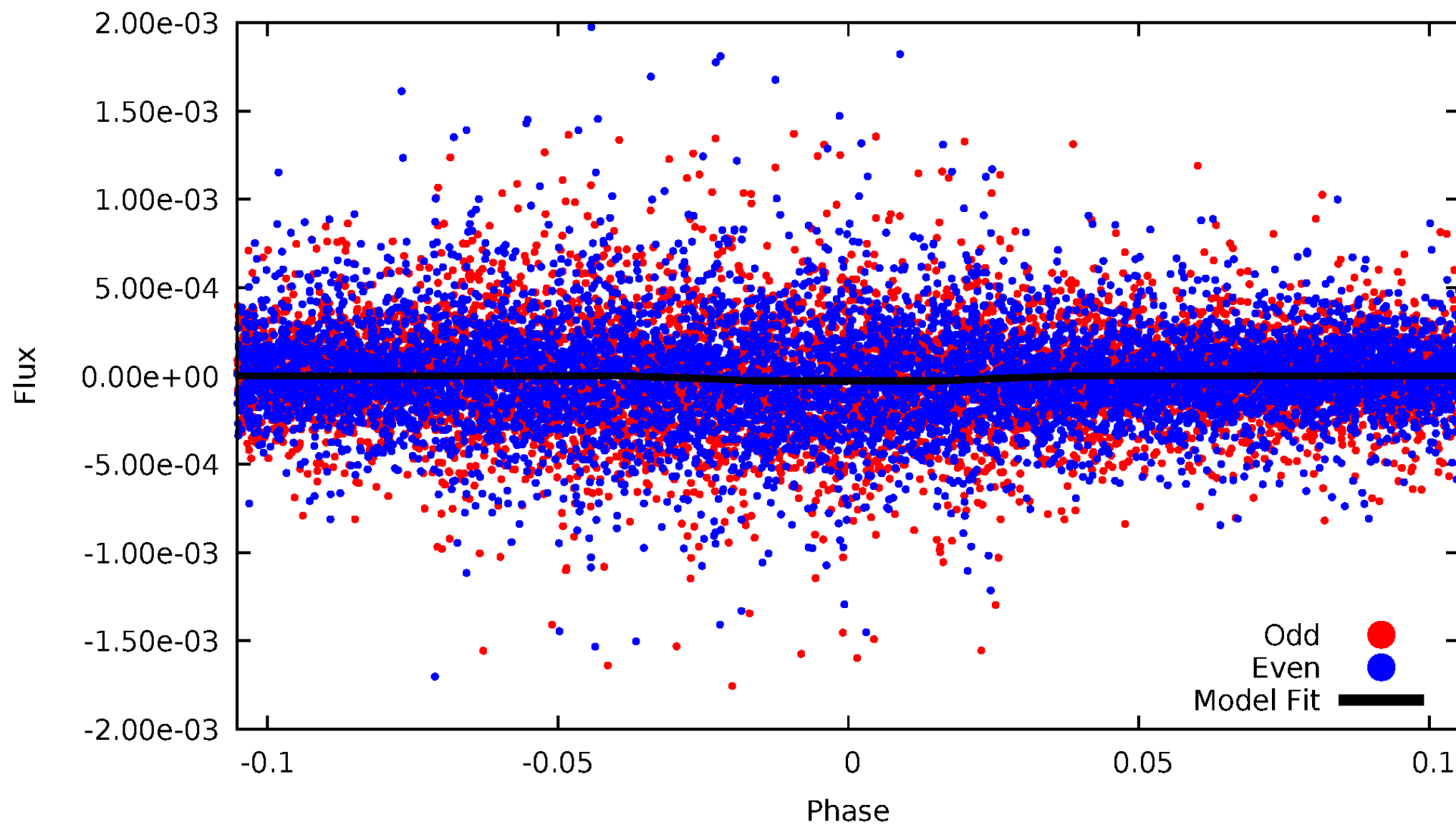
# DV Odd/Even

TCE 009150012-01



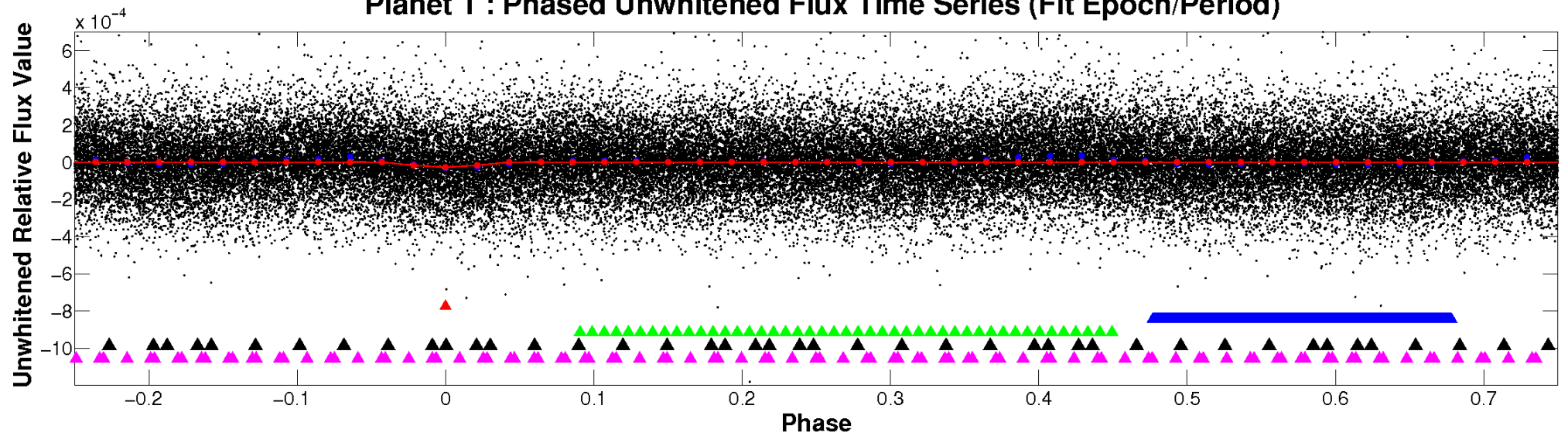
# ALT Odd/Even

TCE 009150012-01

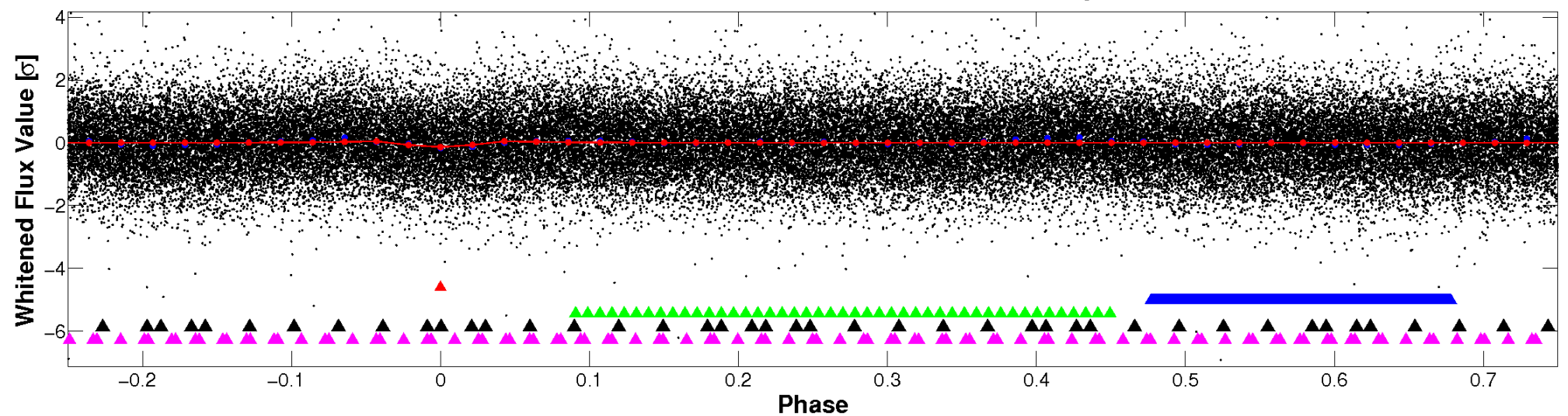


# Non-Whitened Vs. Whitened Light Curve

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



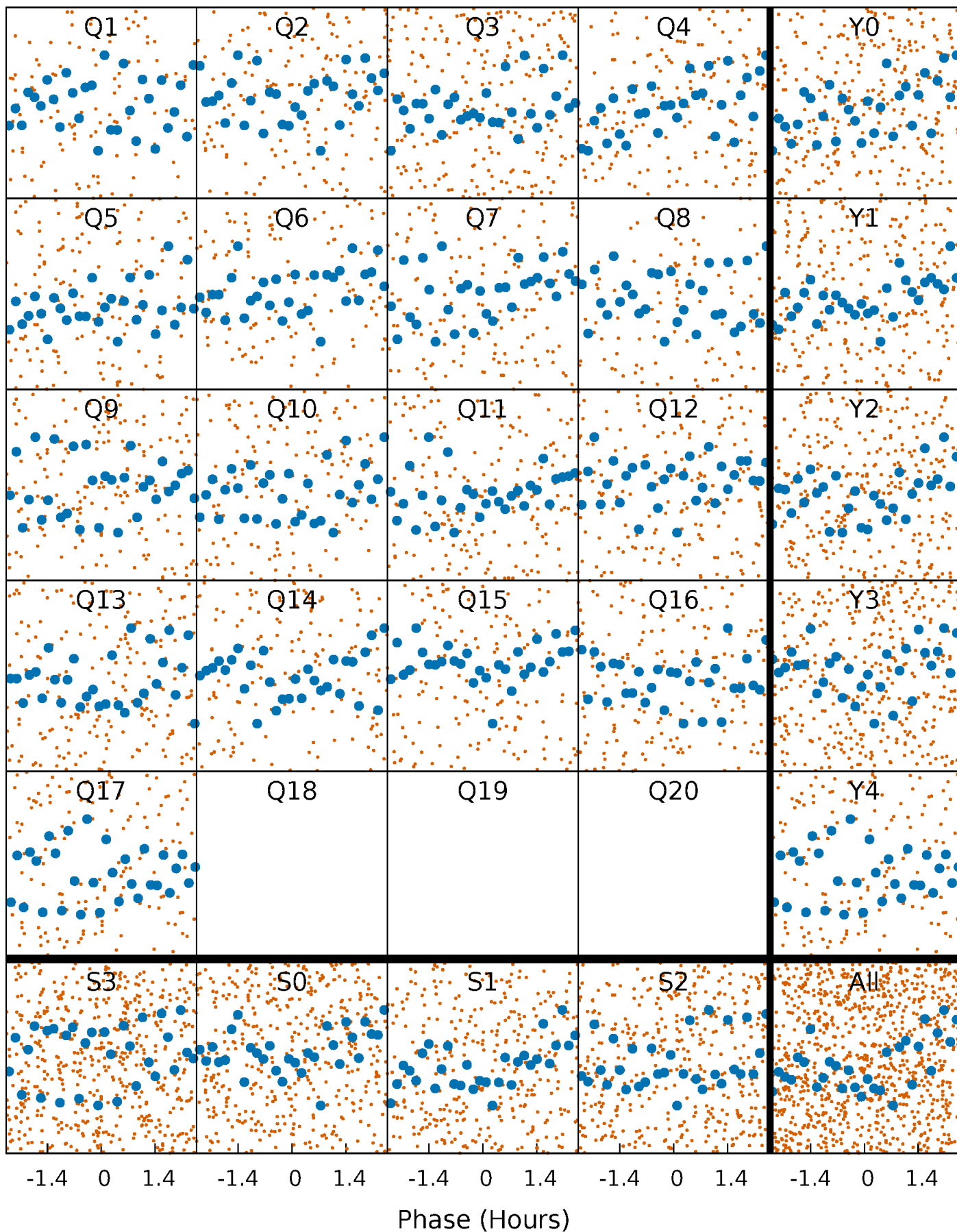
## Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)





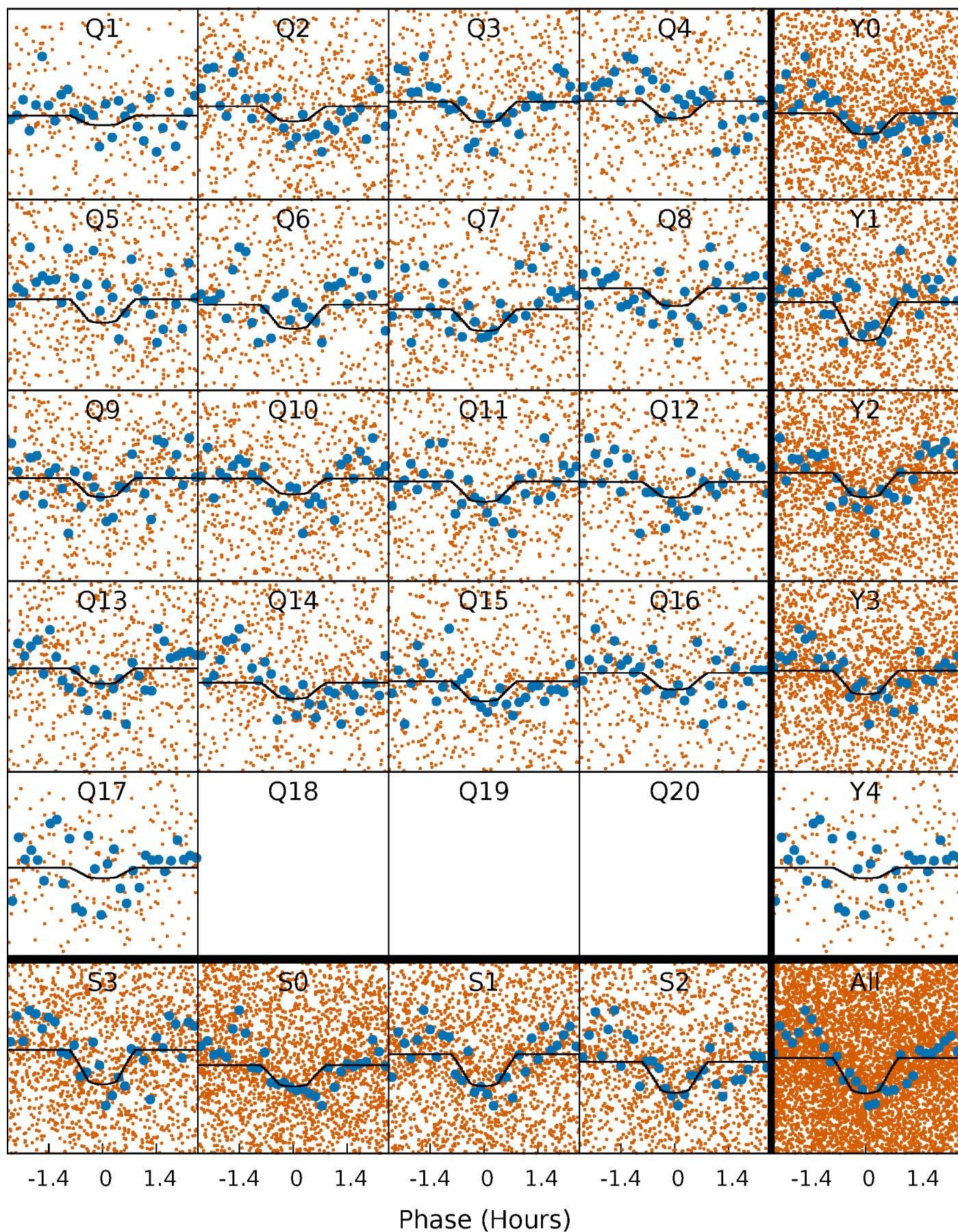
# PDC Quarter-Phased Transit Curves

TCE 009150012-01   P= 0.952755 Days    $T_0=132.307520$  (BKJD)



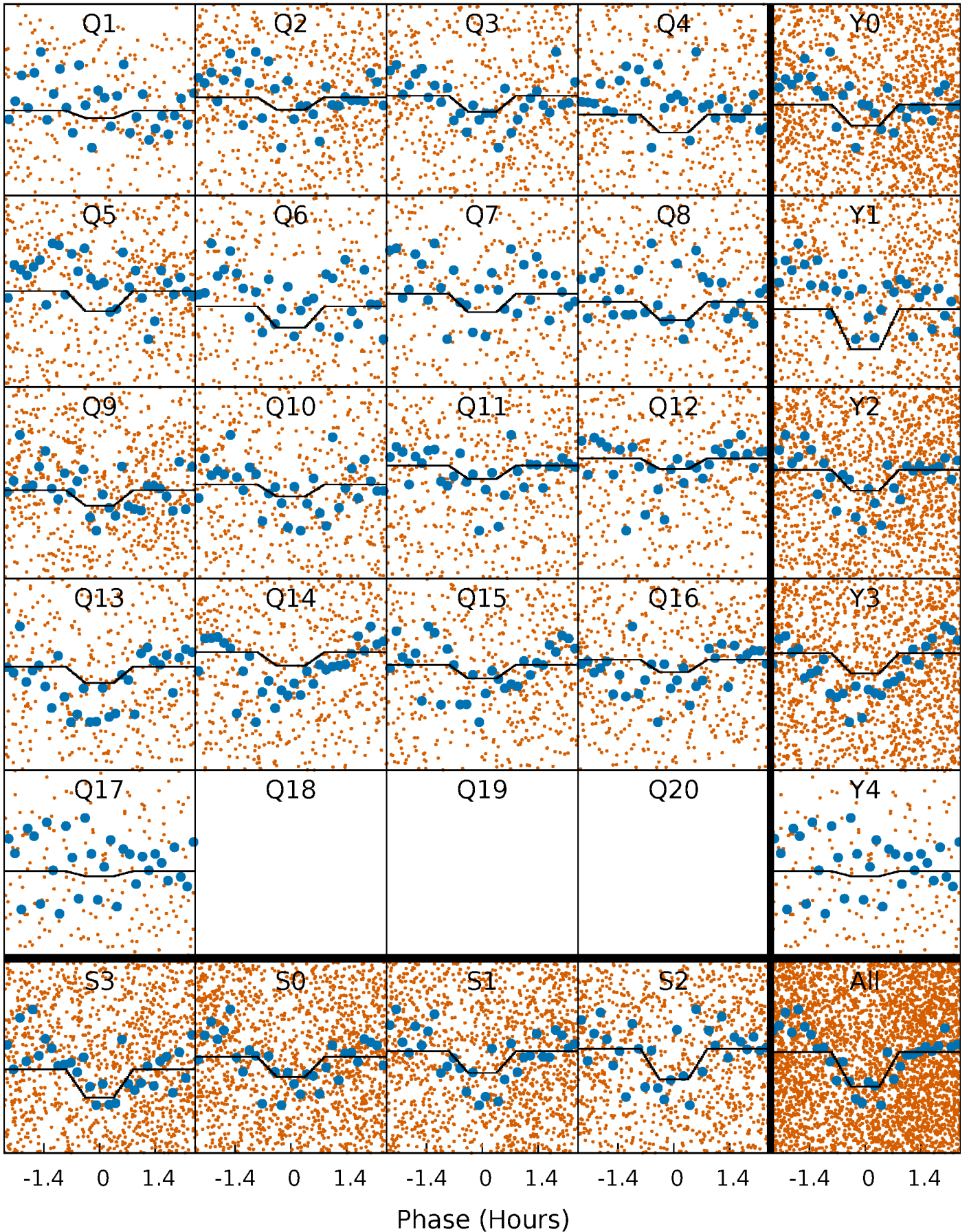
# DV Quarter-Phased Transit Curves

TCE 009150012-01 P= 0.952755 Days  $T_0=132.307520$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 009150012-01   P= 0.952765 Days    $T_0=132.310019$  (BKJD)

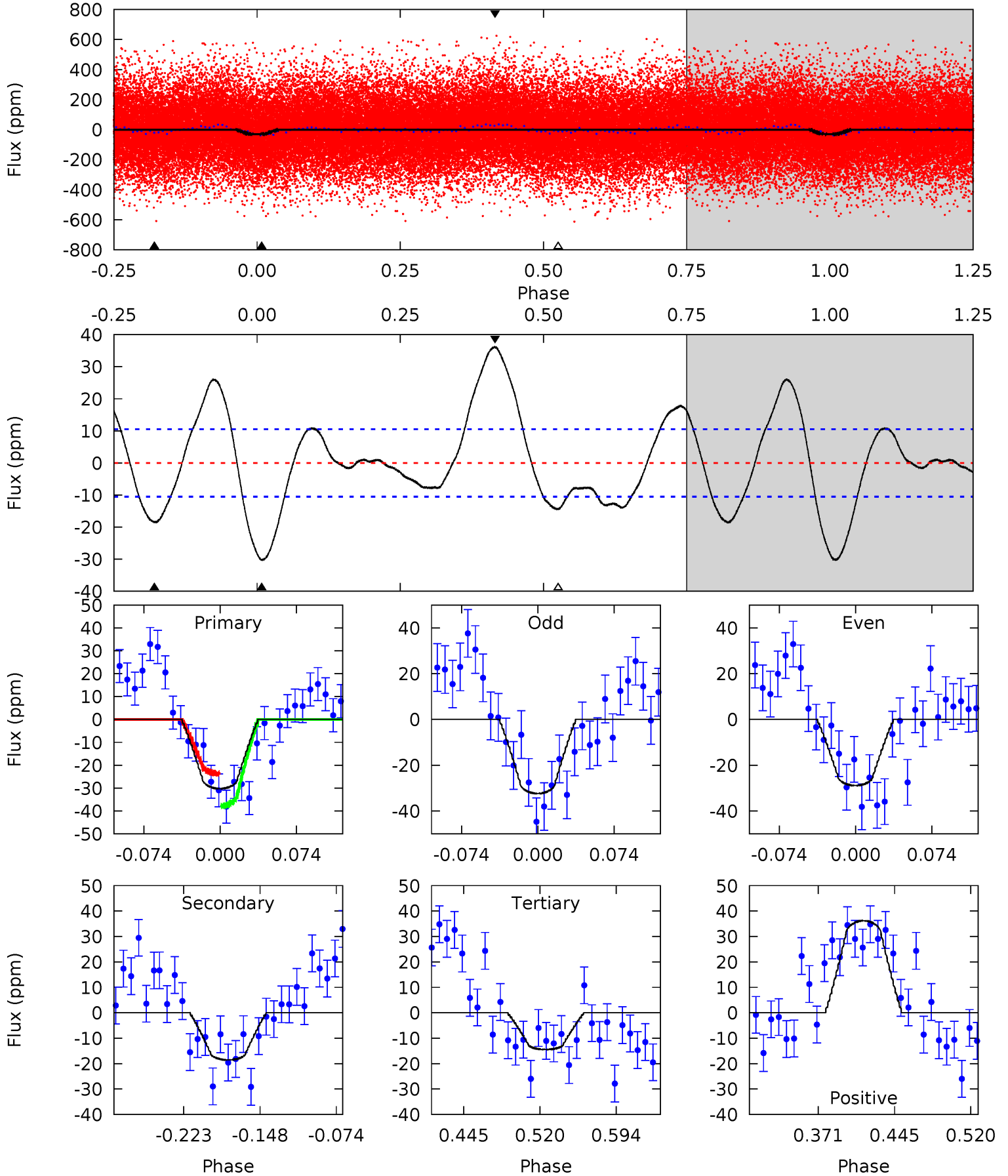




# DV Model-Shift Uniqueness Test

009150012-01, P = 0.952755 Days, E = 131.354765 Days

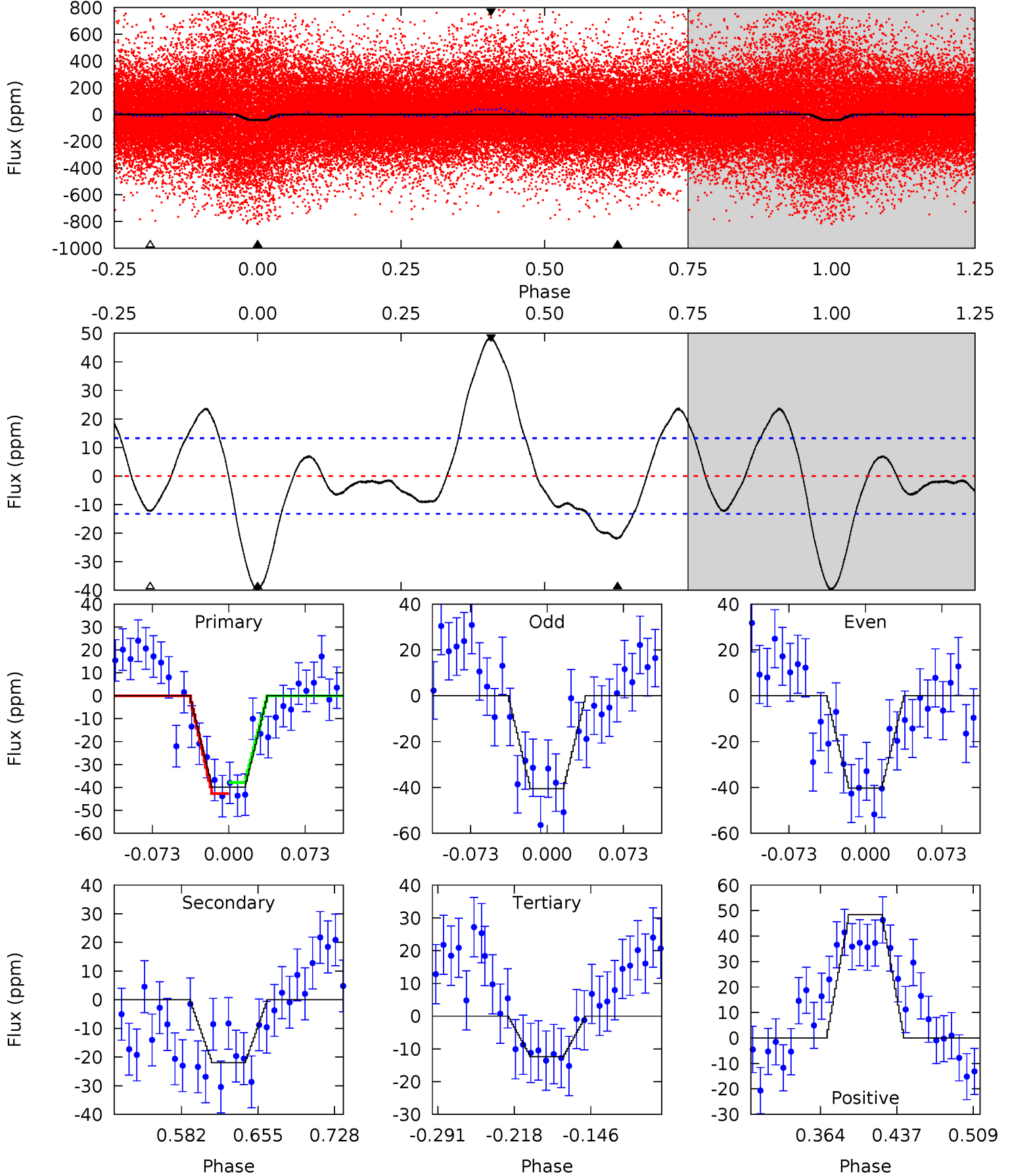
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.3	8.15	6.35	15.9	4.63	1.79	5.94	6.94	-2.60	1.80	-7.74	0.77	1.10	0.54	3.13



# Alt Model-Shift Uniqueness Test

009150012-01, P = 0.952765 Days, E = 131.357254 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
14.0	7.68	4.34	16.9	4.63	1.79	5.60	9.62	-2.96	3.34	-9.23	0.05	0.74	0.55	0.86



### Stellar Parameters For KIC 009150012

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7063^{+200}_{-250}$	$4.185^{+0.175}_{-0.175}$	$-0.500^{+0.250}_{-0.300}$	$1.484^{+0.405}_{-0.331}$	$1.229^{+0.169}_{-0.169}$	$0.529^{+0.489}_{-0.257}$
	+3%/-4%	+4%/-4%	+50%/-60%	+27%/-22%	+14%/-14%	+92%/-48%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 009150012-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-19 \pm 2$	$1.10^{+0.96}_{-0.68}$	$3726^{+316}_{-277}$	$5452^{+4205}_{-1446}$	$3.476^{+20.311}_{-2.534}$
Alt.	$-22 \pm 3$	$1.17^{+1.06}_{-0.77}$	$3723^{+288}_{-266}$	$5537^{+5076}_{-1474}$	$3.698^{+27.209}_{-2.696}$

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



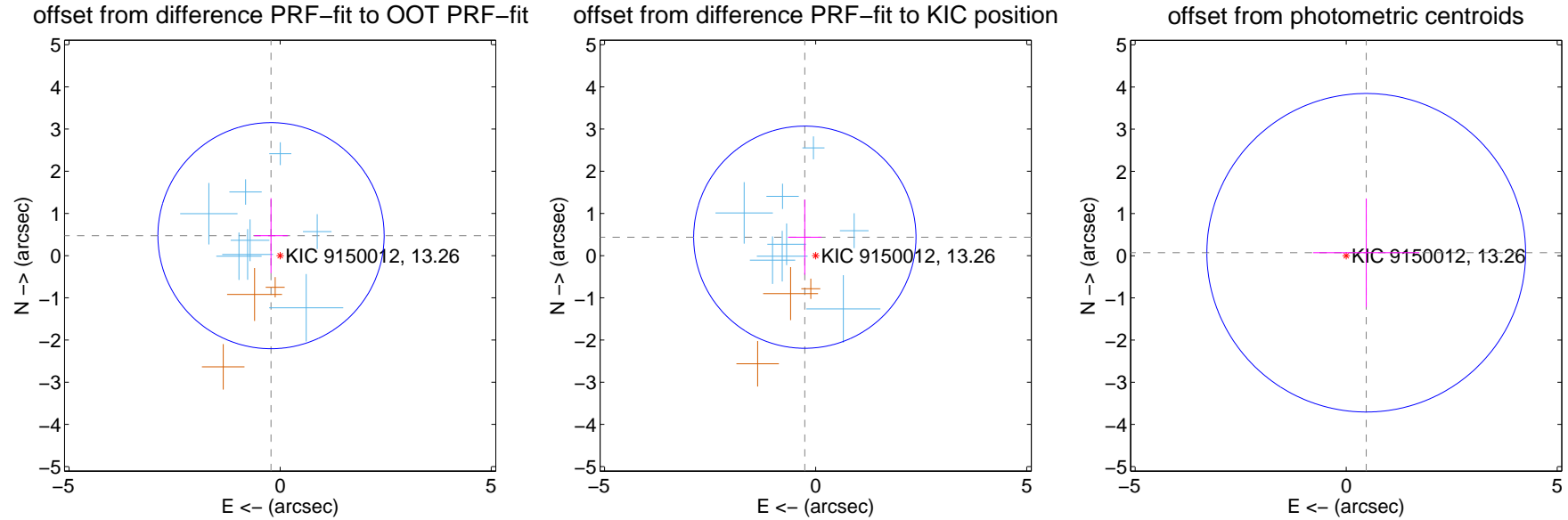
## DV Centroid Data

Supplemental centroid analysis for 009150012-01. Kepler magnitude: 13.26. Transit SNR 7.24

There are 8 quarters with good PRF difference image offsets

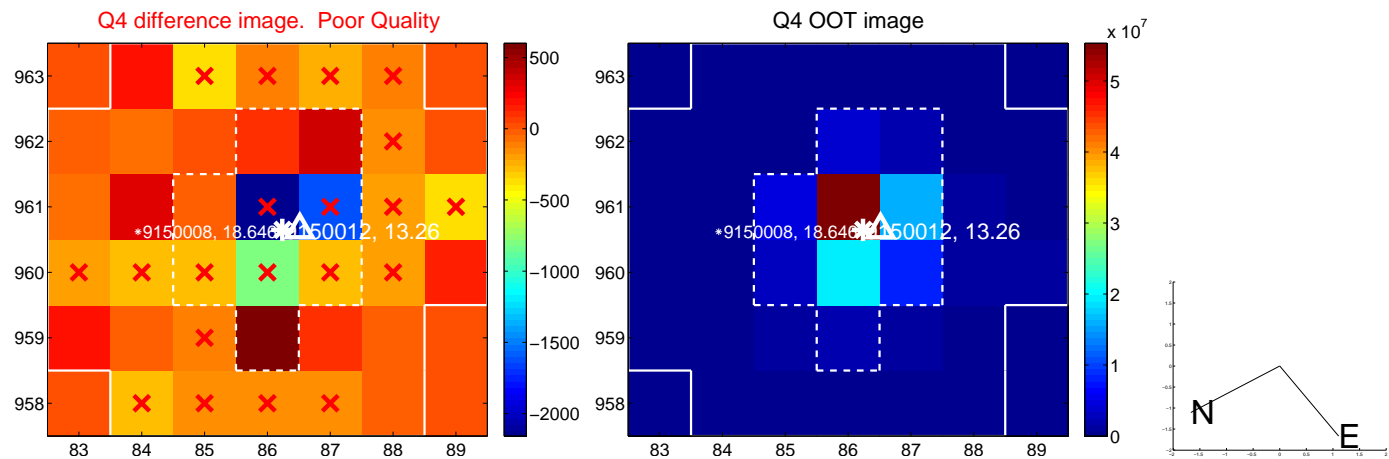
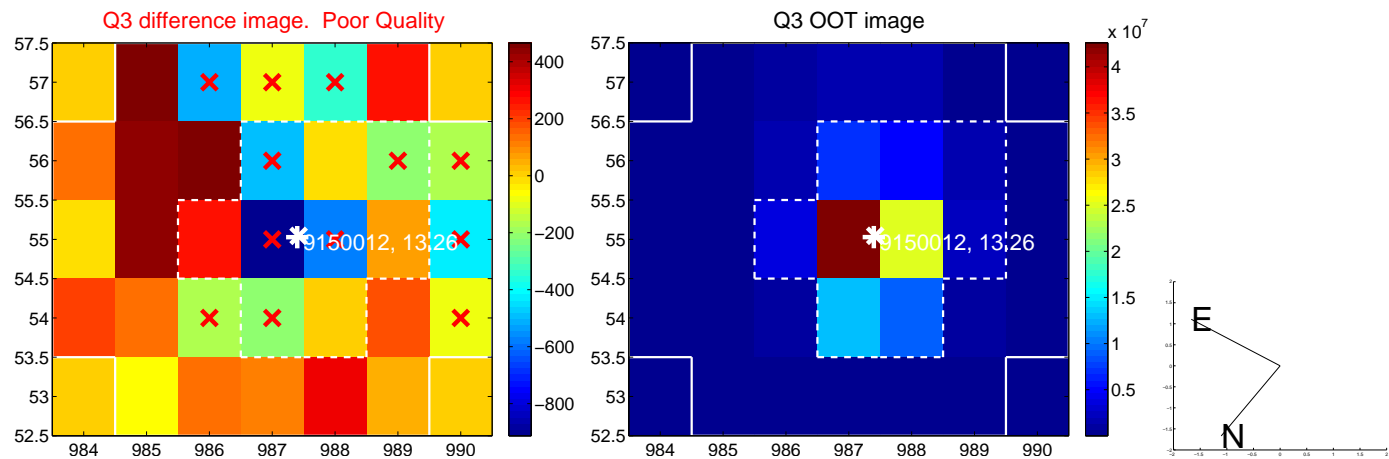
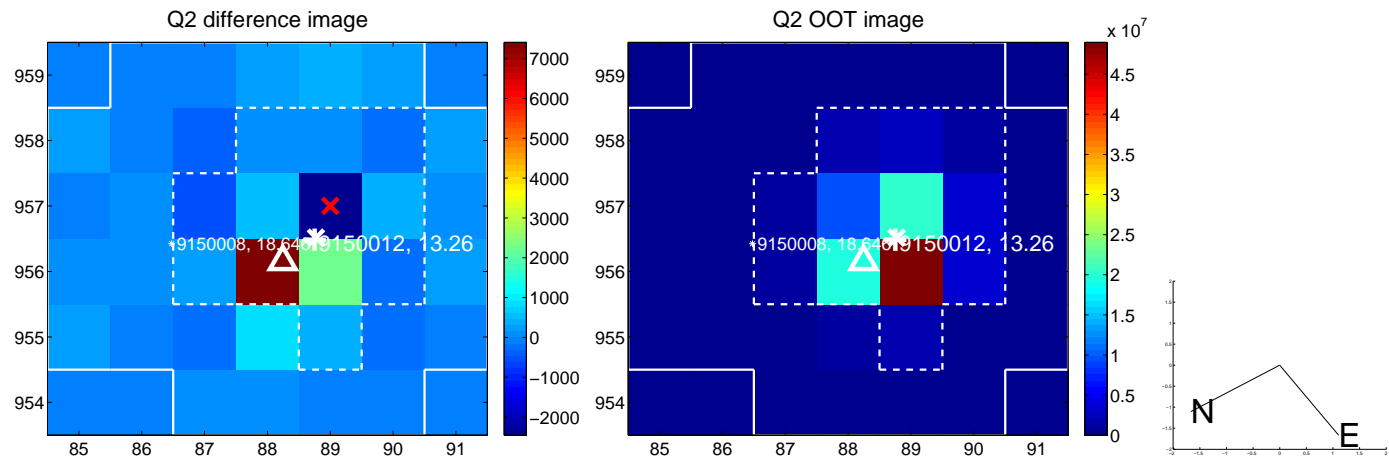
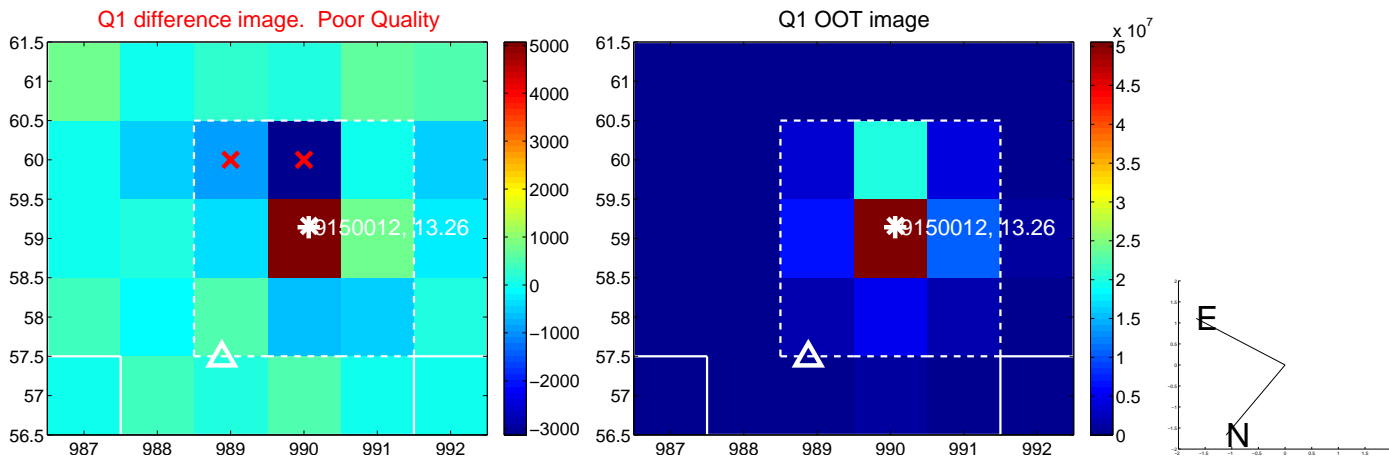
The direct PRF centroid is offset from the target star catalog position by about 0.10 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.520 \pm 0.893$	0.58	$0.216 \pm 0.397$	$0.473 \pm 0.888$
PRF-fit source offset from KIC position	$0.507 \pm 0.878$	0.58	$0.256 \pm 0.397$	$0.437 \pm 0.891$
photometric centroid source offset	$0.48 \pm 1.26$	0.38	$-0.48 \pm 1.26$	$0.07 \pm 1.29$

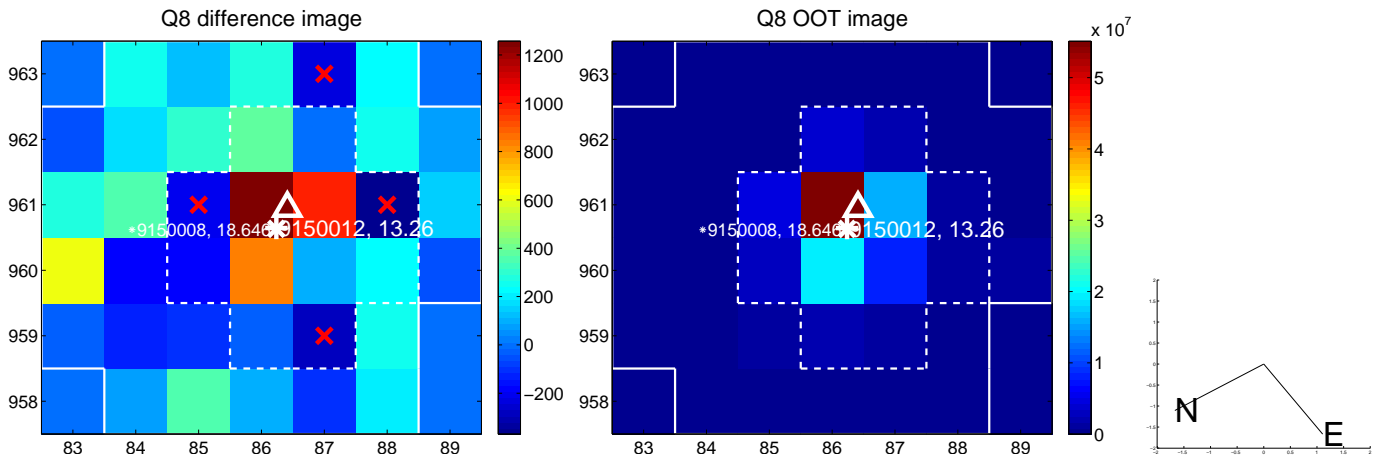
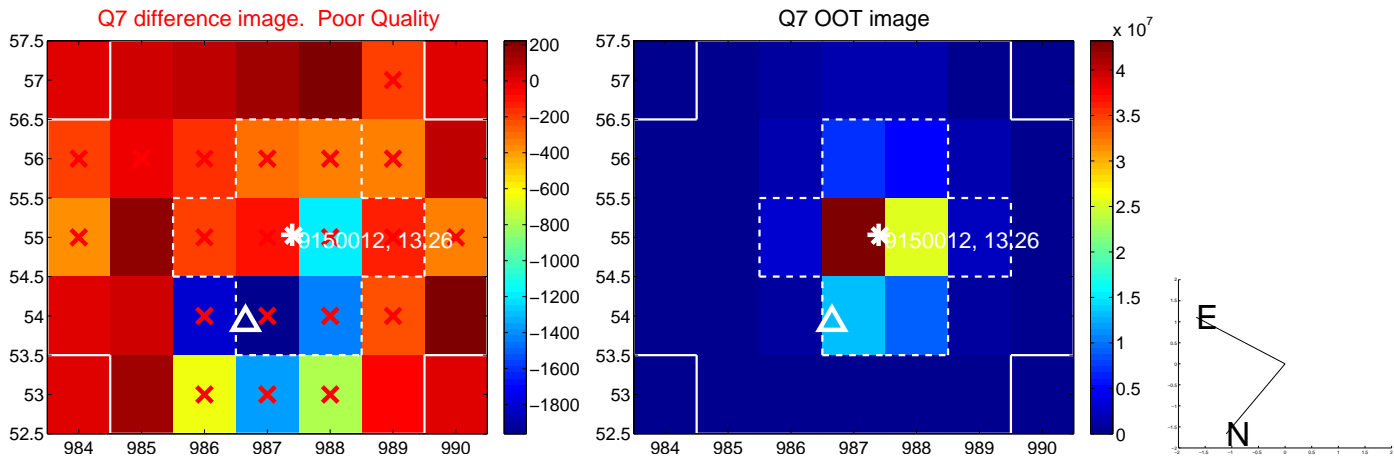
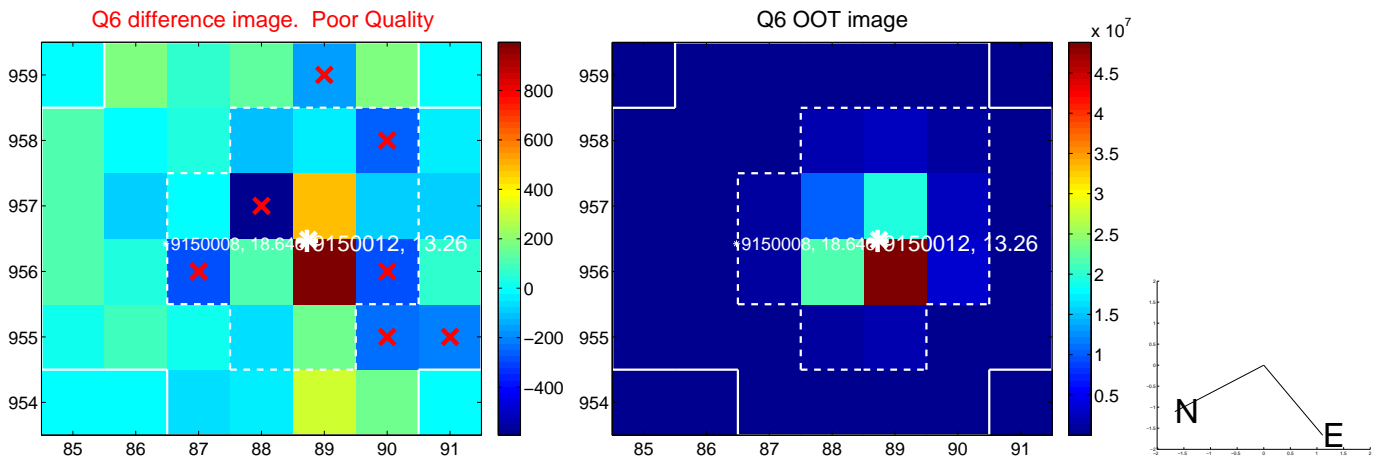
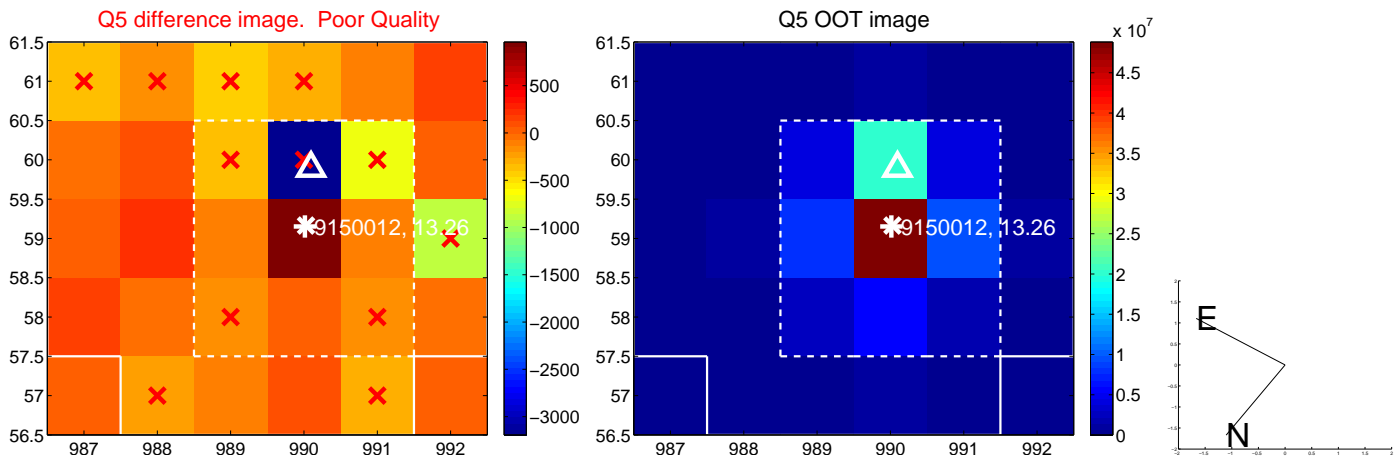


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

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

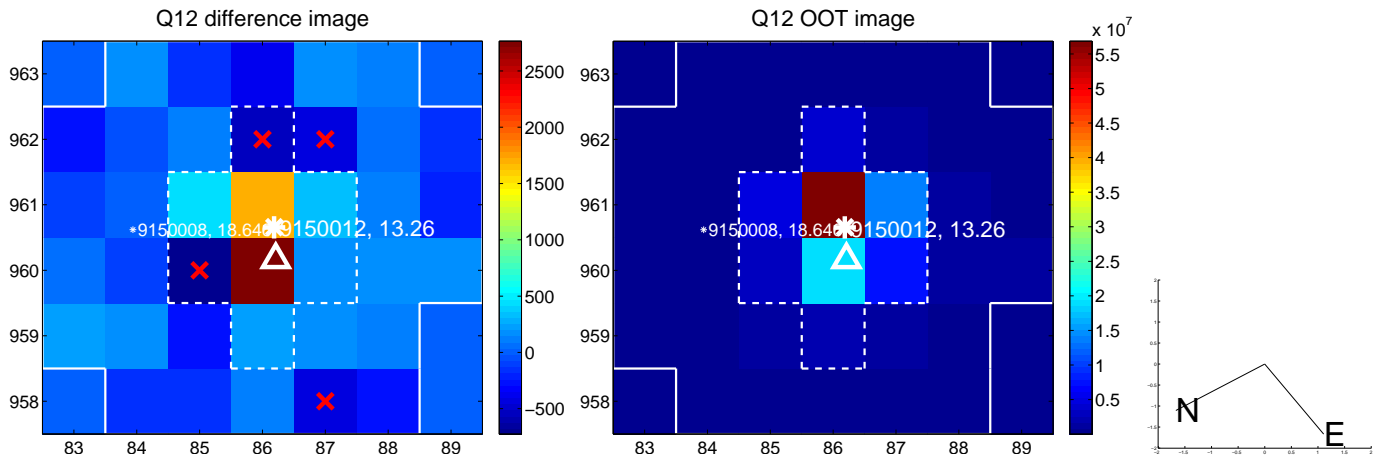
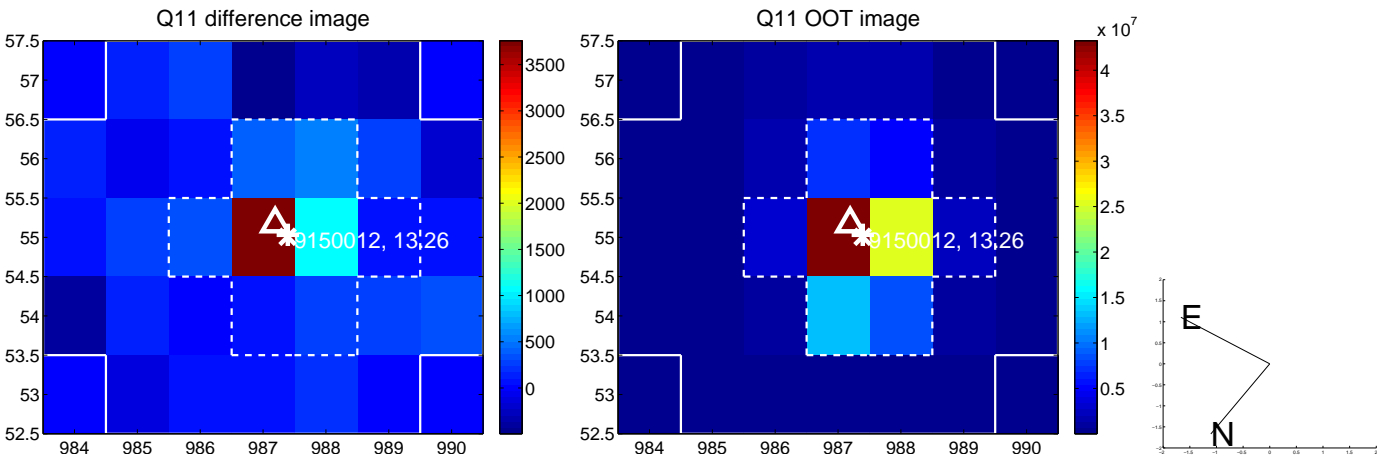
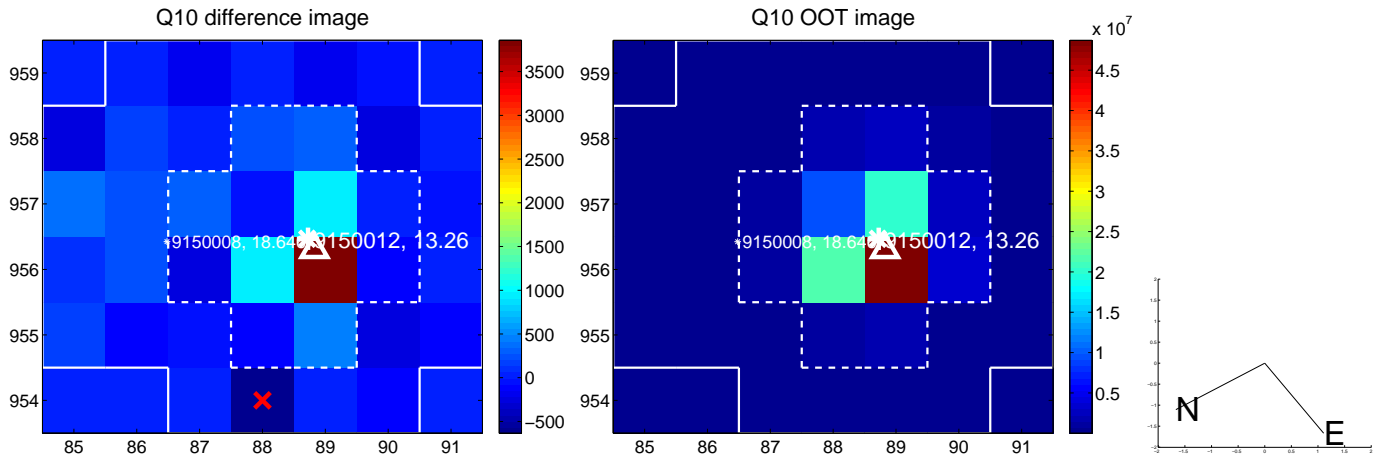
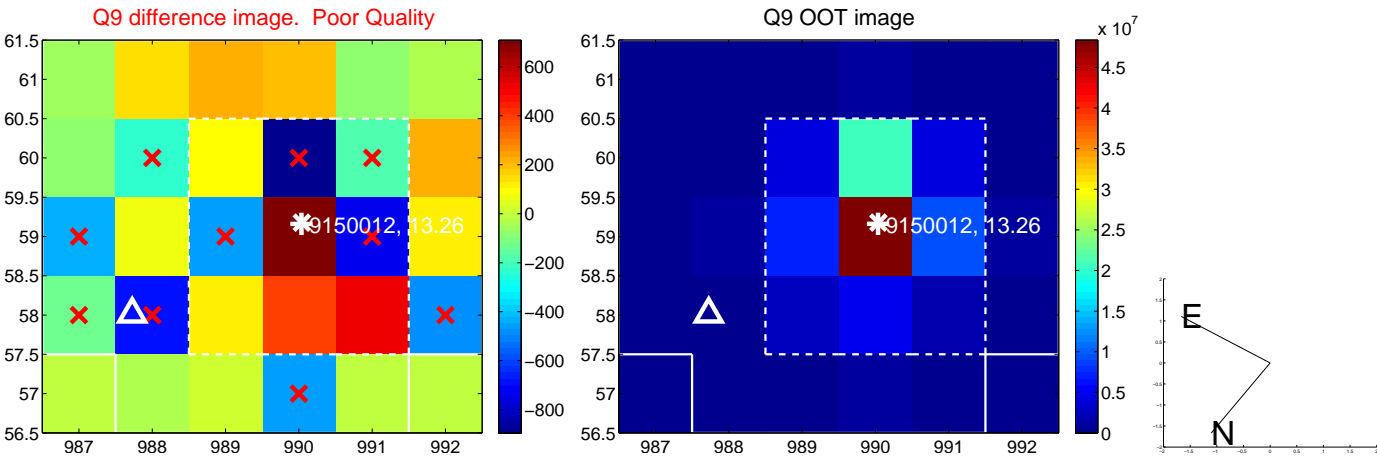


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

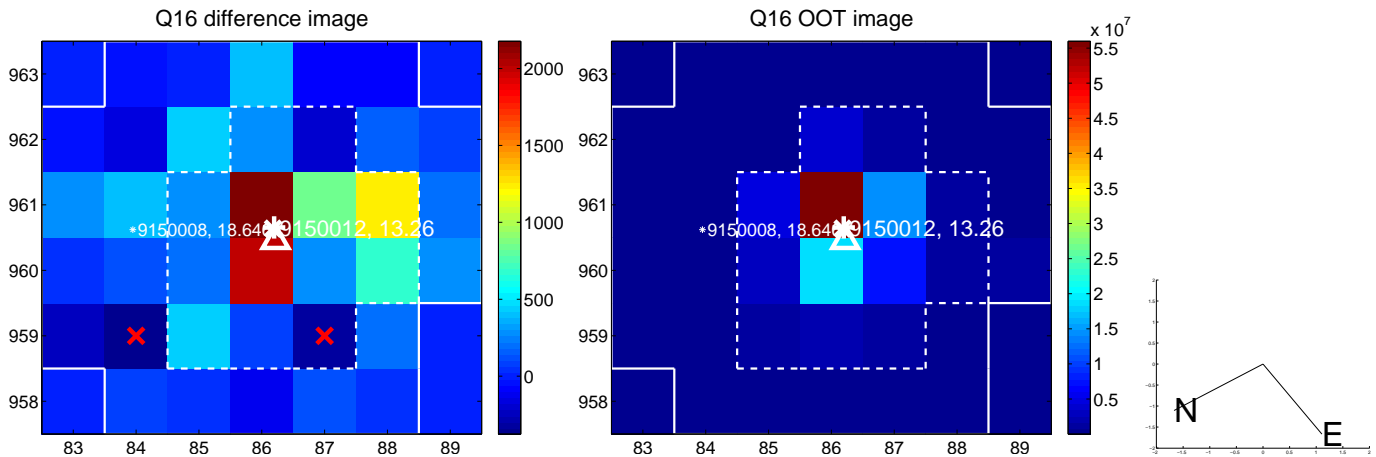
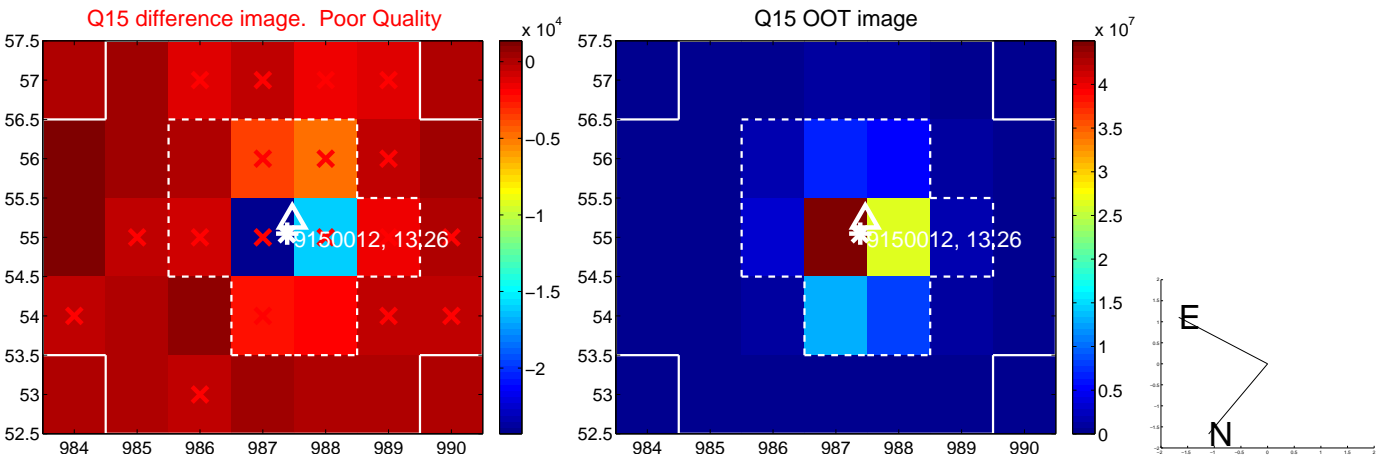
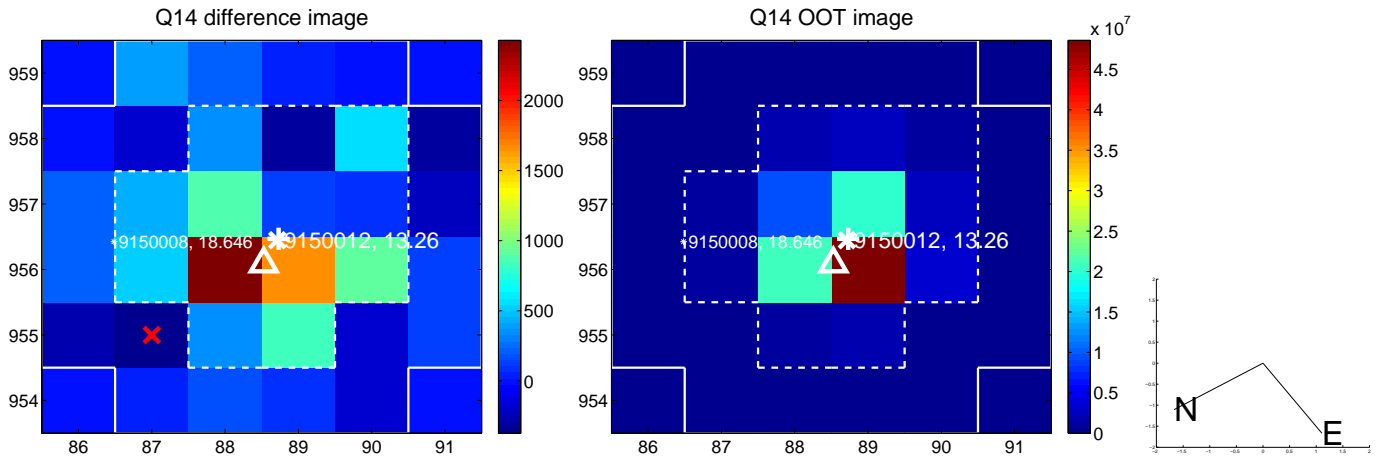
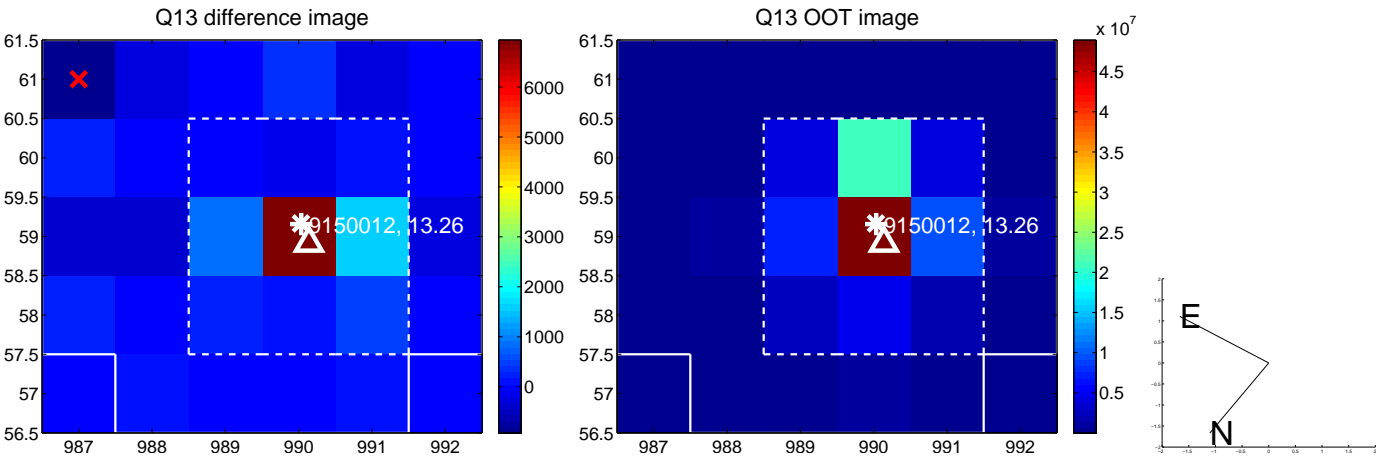




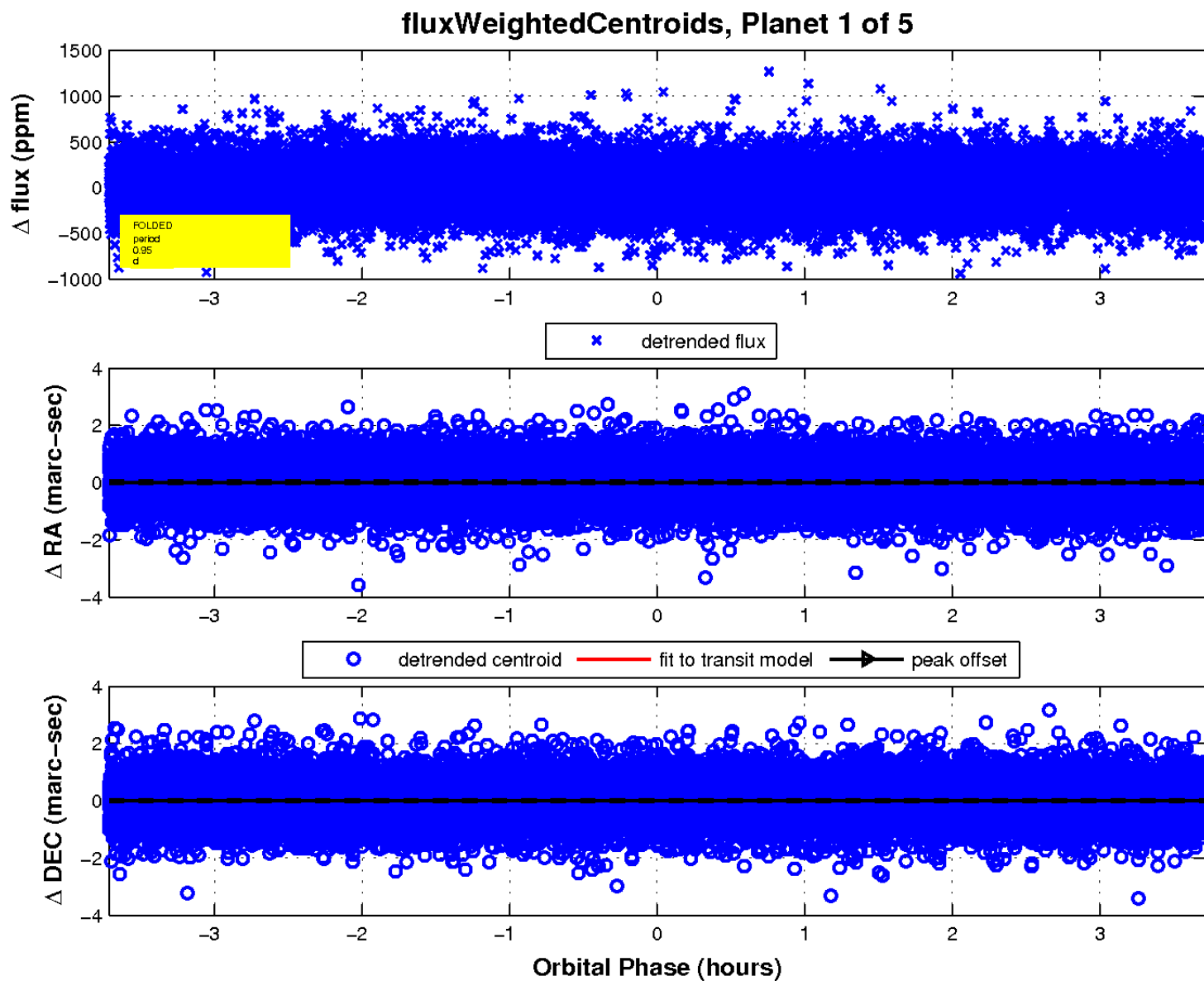
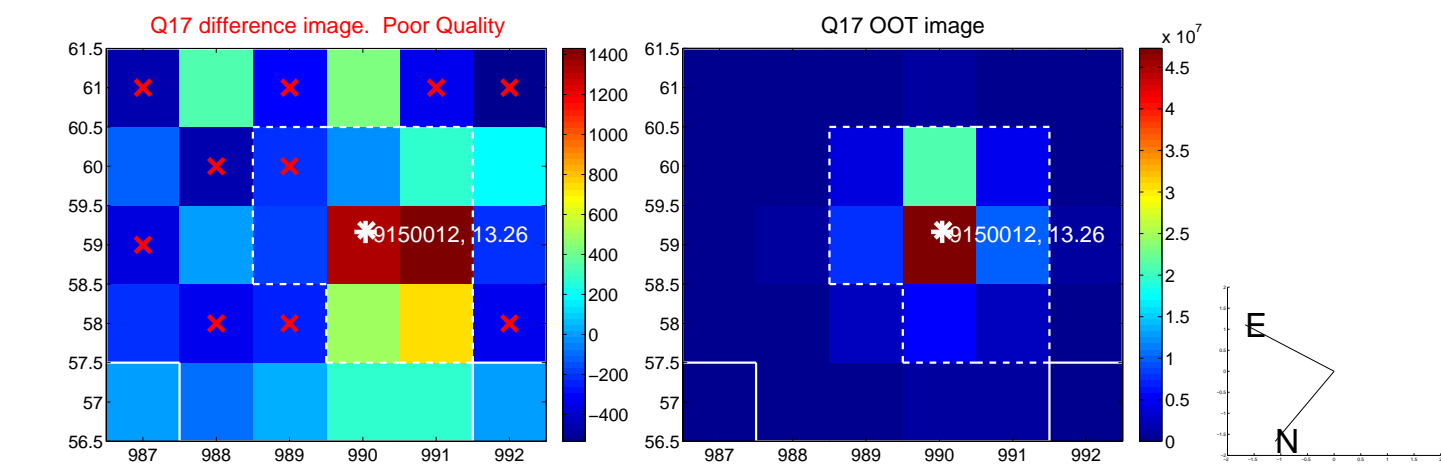
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



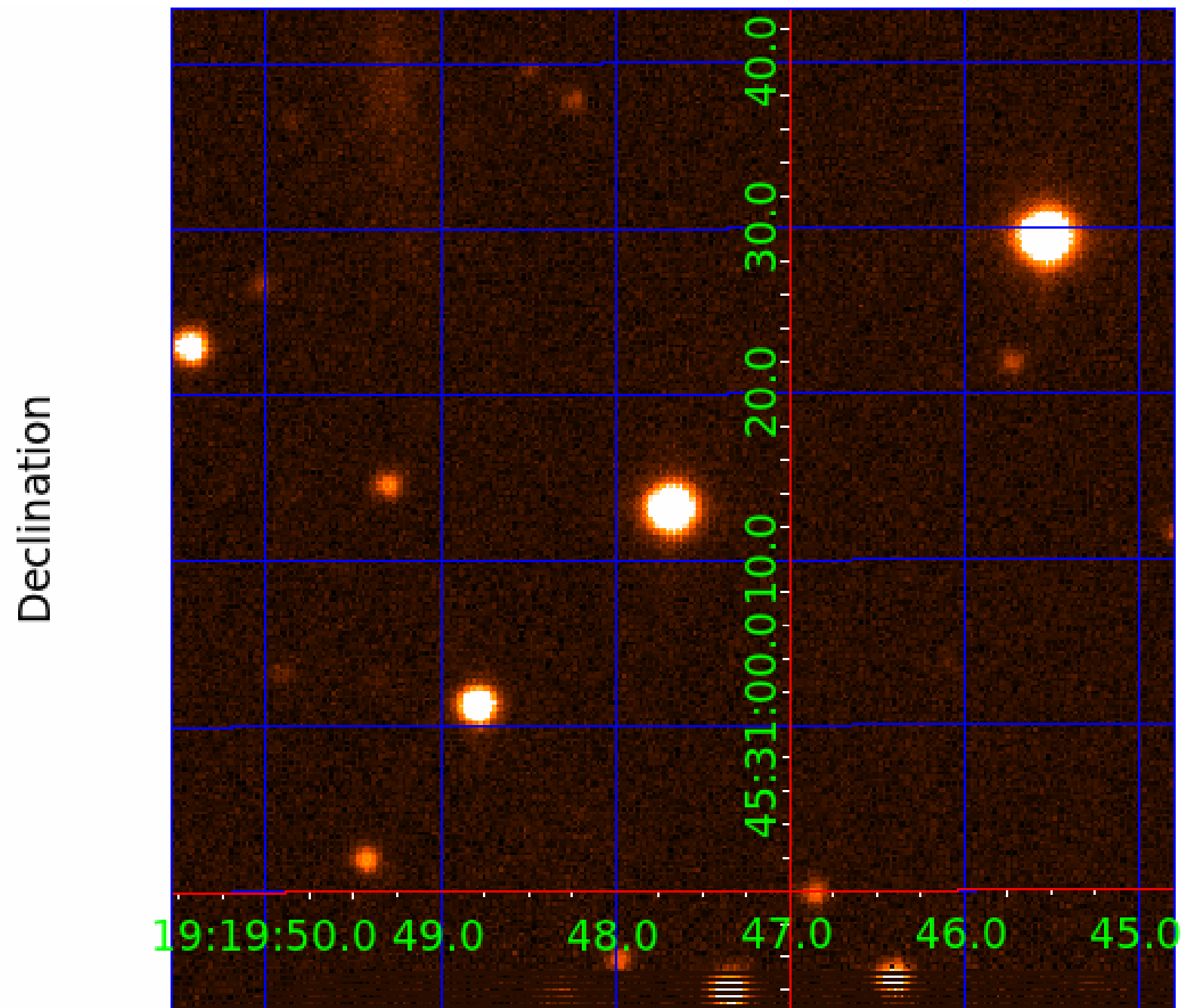
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image



# KIC 009150012

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
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009150012-04	OBS	No	33.912389	137.298834	396.2	2.637	8.7	8.7	1.48	7063	3.06	101.70
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## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009150012-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT
009150012-02	OBS	FP	0.00	1	0	0	0	LPP_DV—SAME_NTL_PERIOD
009150012-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_ZUMA—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV
009150012-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV
009150012-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_TRACKER—TRANS_GAPPED

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

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

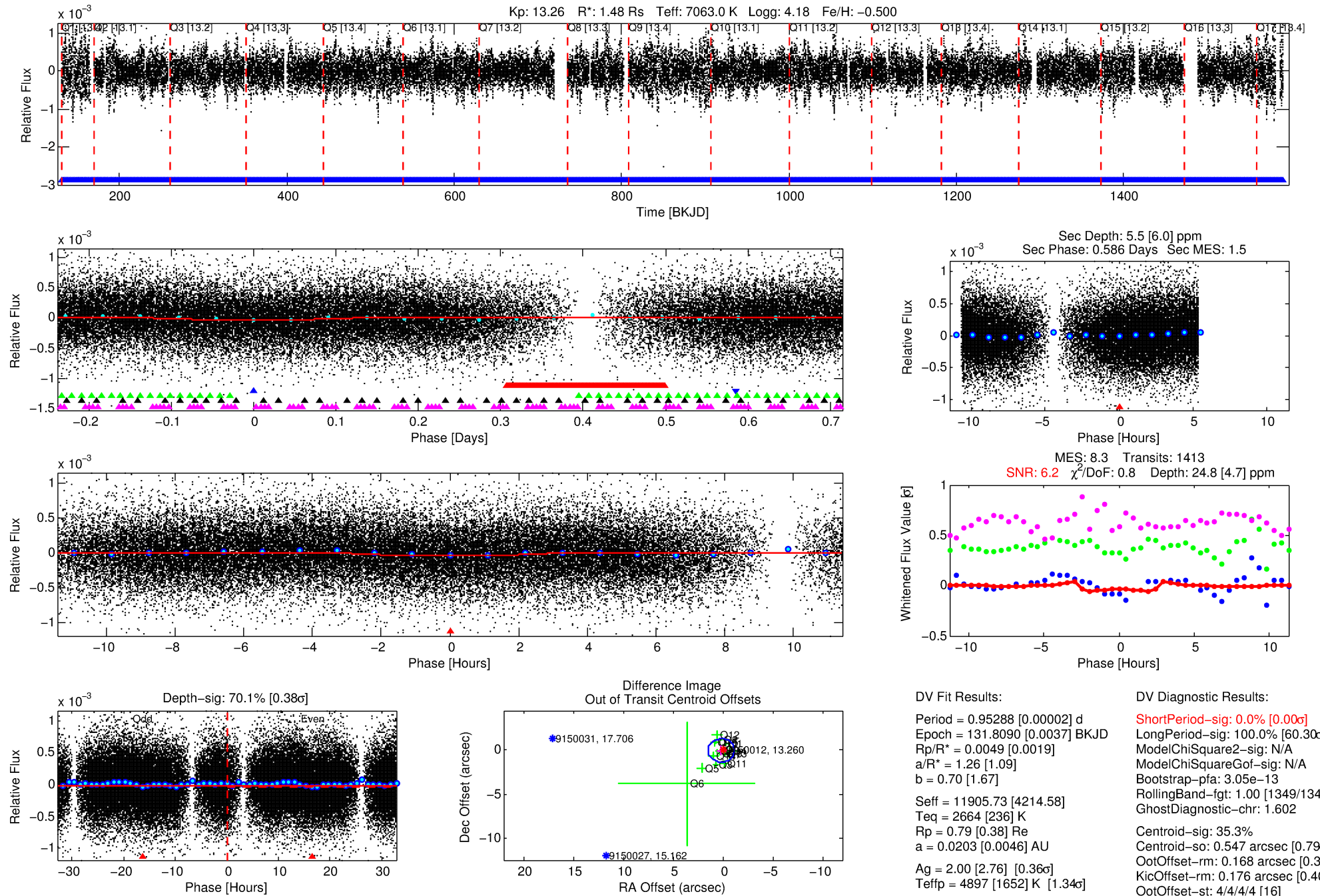
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 009150012-02

No Significant Match Found

# DV One-Page Summary

KIC: 9150012 Candidate: 2 of 5 Period: 0.953 d



## DV Fit Results:

Period = 0.95288 [0.00002] d  
Epoch = 131.8090 [0.0037] BKJD  
Rp/R\* = 0.0049 [0.0019]  
a/R\* = 1.26 [1.09]  
b = 0.70 [1.67]  
Seff = 11905.73 [4214.58]  
Teff = 2664 [236] K  
Rp = 0.79 [0.38] Re  
a = 0.0203 [0.0046] AU  
Ag = 2.00 [2.76] [0.36 $\sigma$ ]  
Teffp = 4897 [1652] K [1.34 $\sigma$ ]

## DV Diagnostic Results:

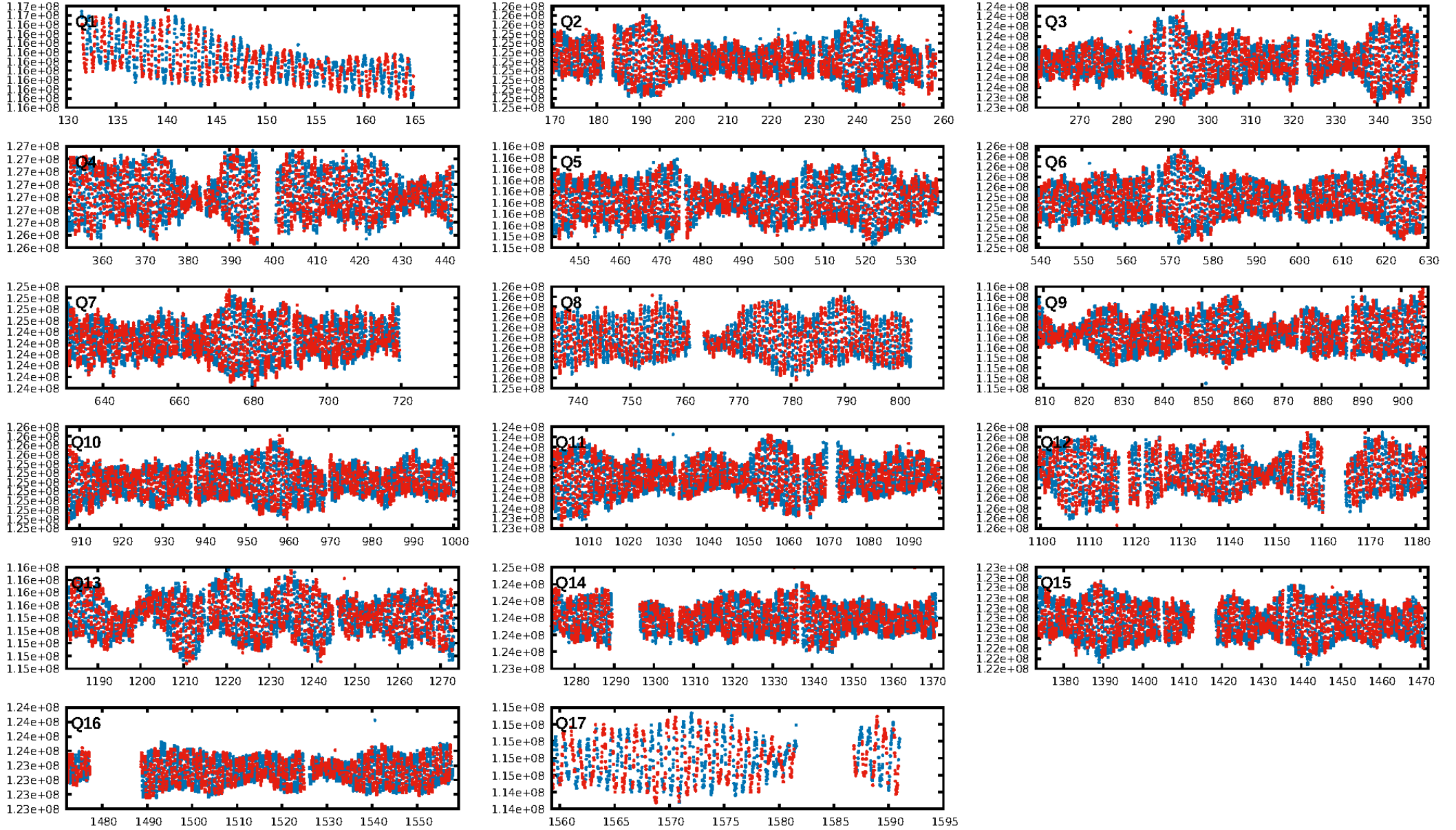
ShortPeriod-sig: 0.0% [0.00 $\sigma$ ]  
LongPeriod-sig: 100.0% [60.30 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 3.05e-13  
RollingBand-fgt: 1.00 [1349/1349]  
GhostDiagnostic-chr: 1.602  
Centroid-sig: 35.3%  
Centroid-so: 0.547 arcsec [0.79 $\sigma$ ]  
OotOffset-rm: 0.168 arcsec [0.38 $\sigma$ ]  
KicOffset-rm: 0.176 arcsec [0.40 $\sigma$ ]  
OotOffset-st: 4/4/4/4 [16]  
KicOffset-st: 4/4/4/4 [16]  
DiffImageQuality-fgm: 0.69 [11/16]  
DiffImageOverlap-fno: 0.00 [0/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 10:23:16 Z

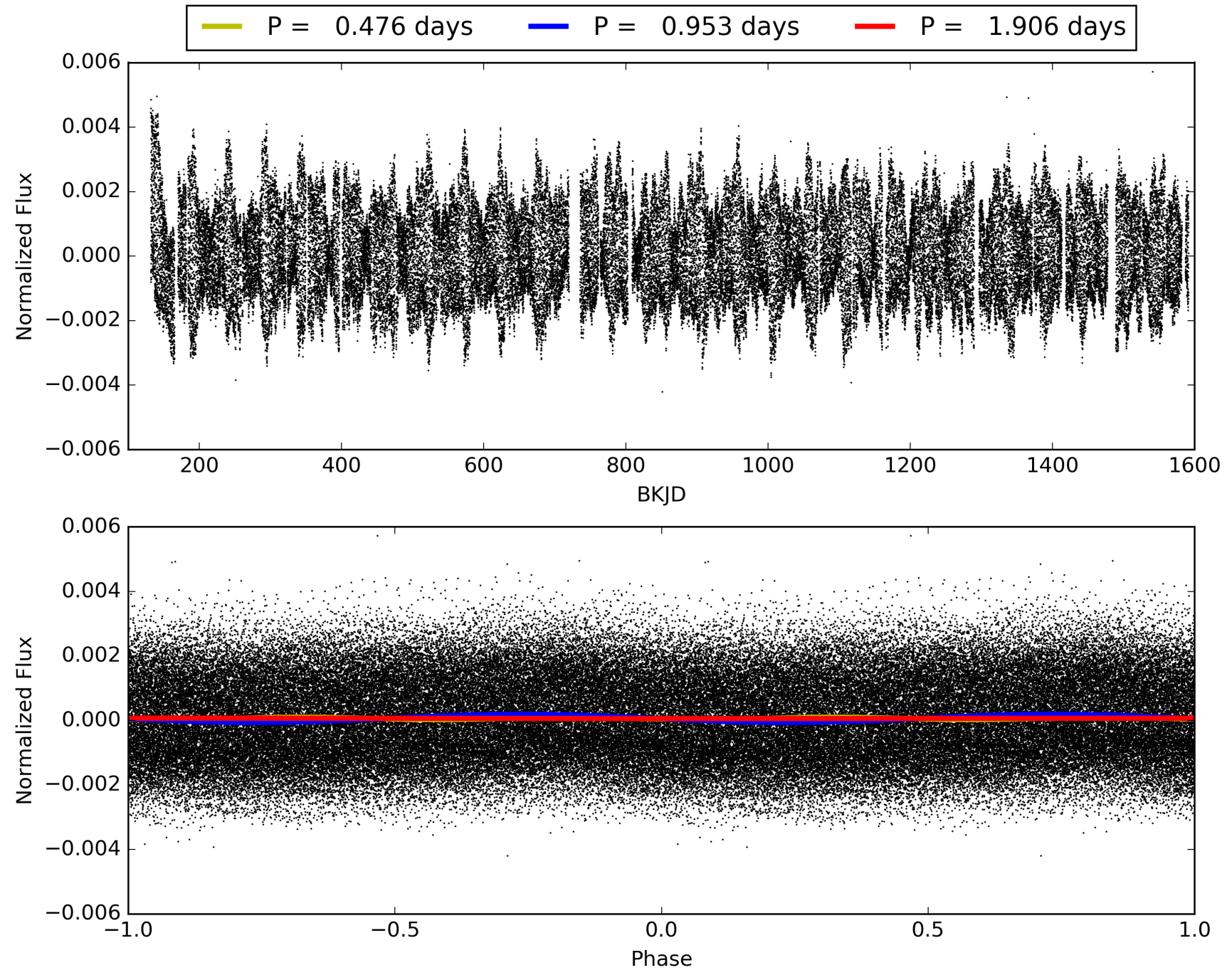
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 009150012-02, PDC Light Curves

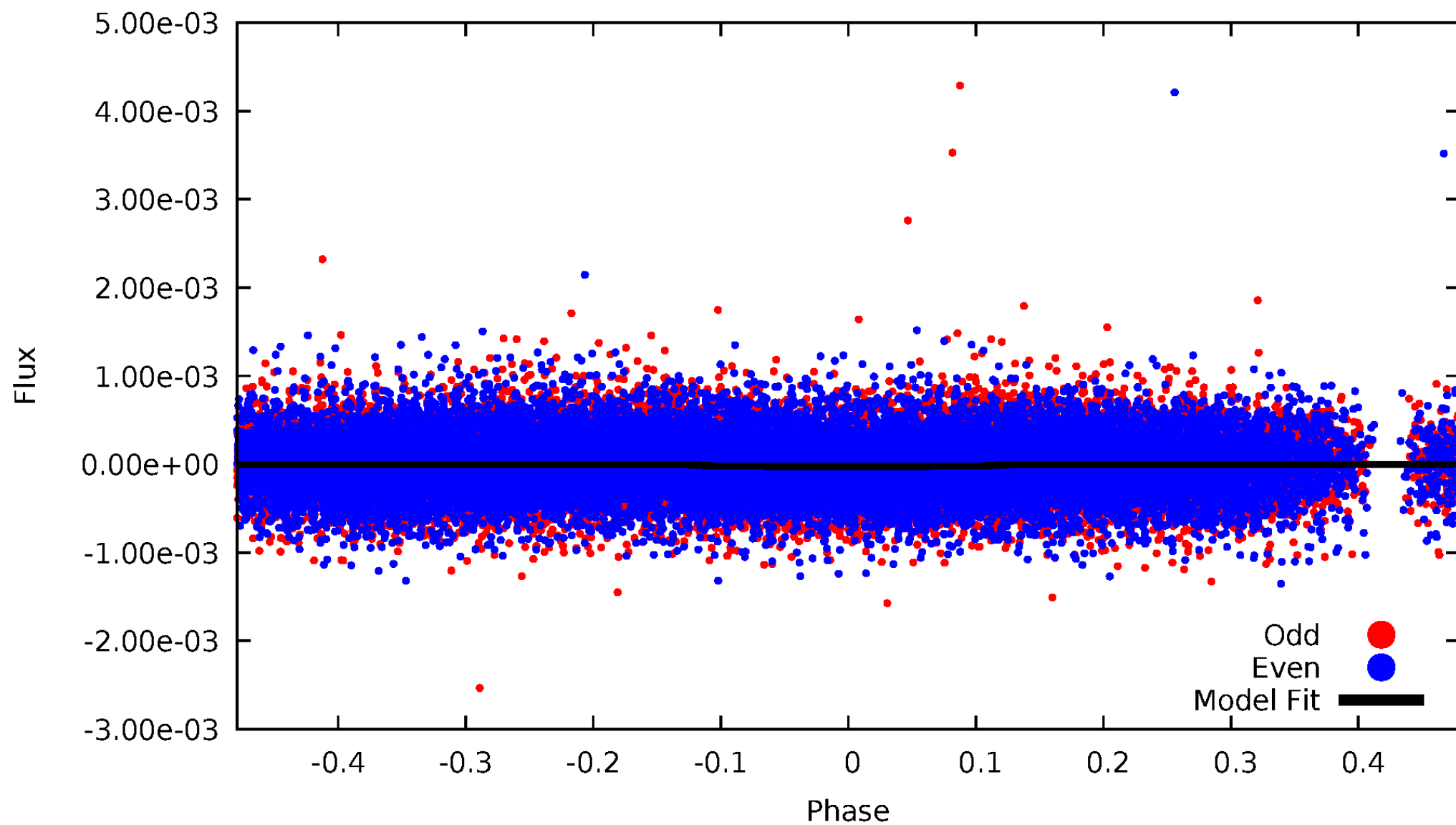


# TCE 009150012-02



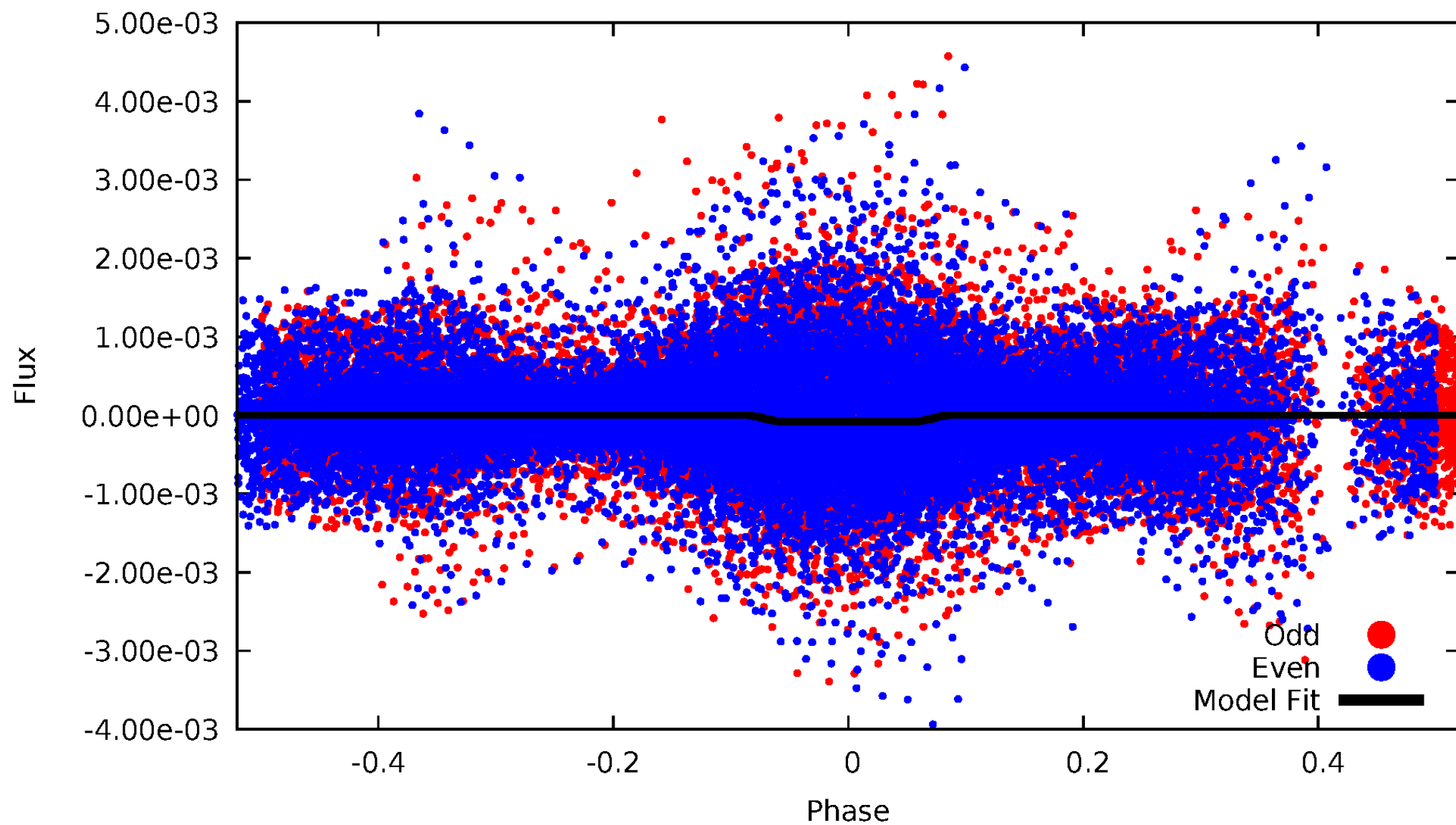
# DV Odd/Even

TCE 009150012-02



# ALT Odd/Even

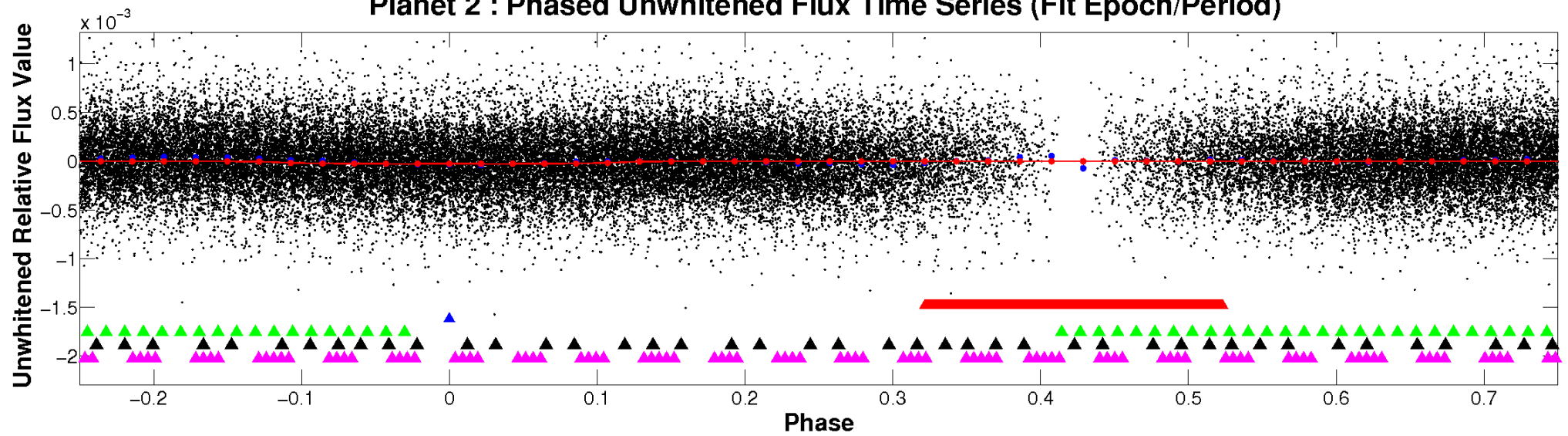
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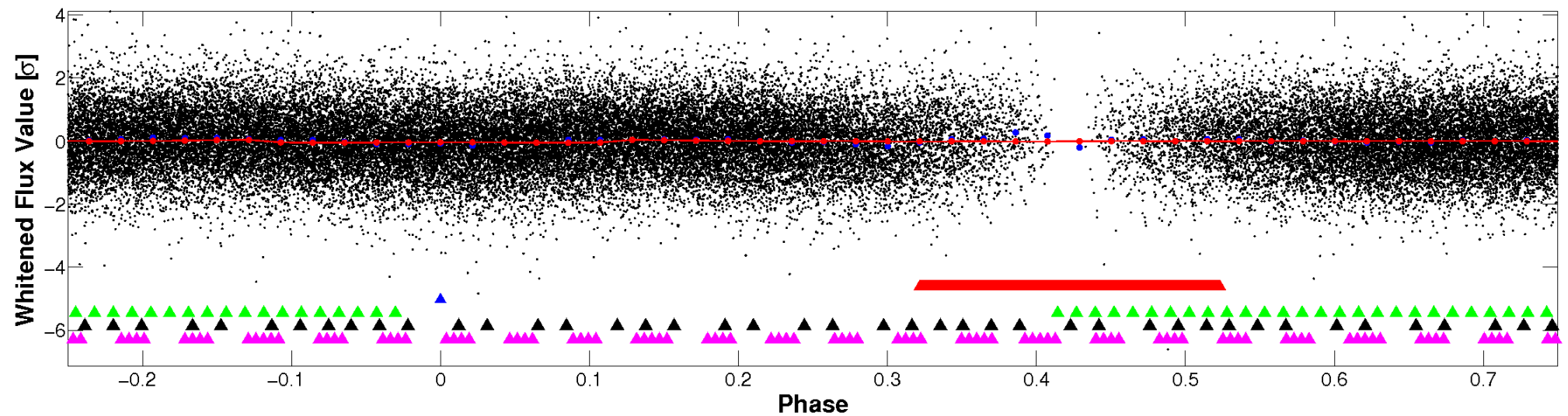


# Non-Whitened Vs. Whitened Light Curve

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

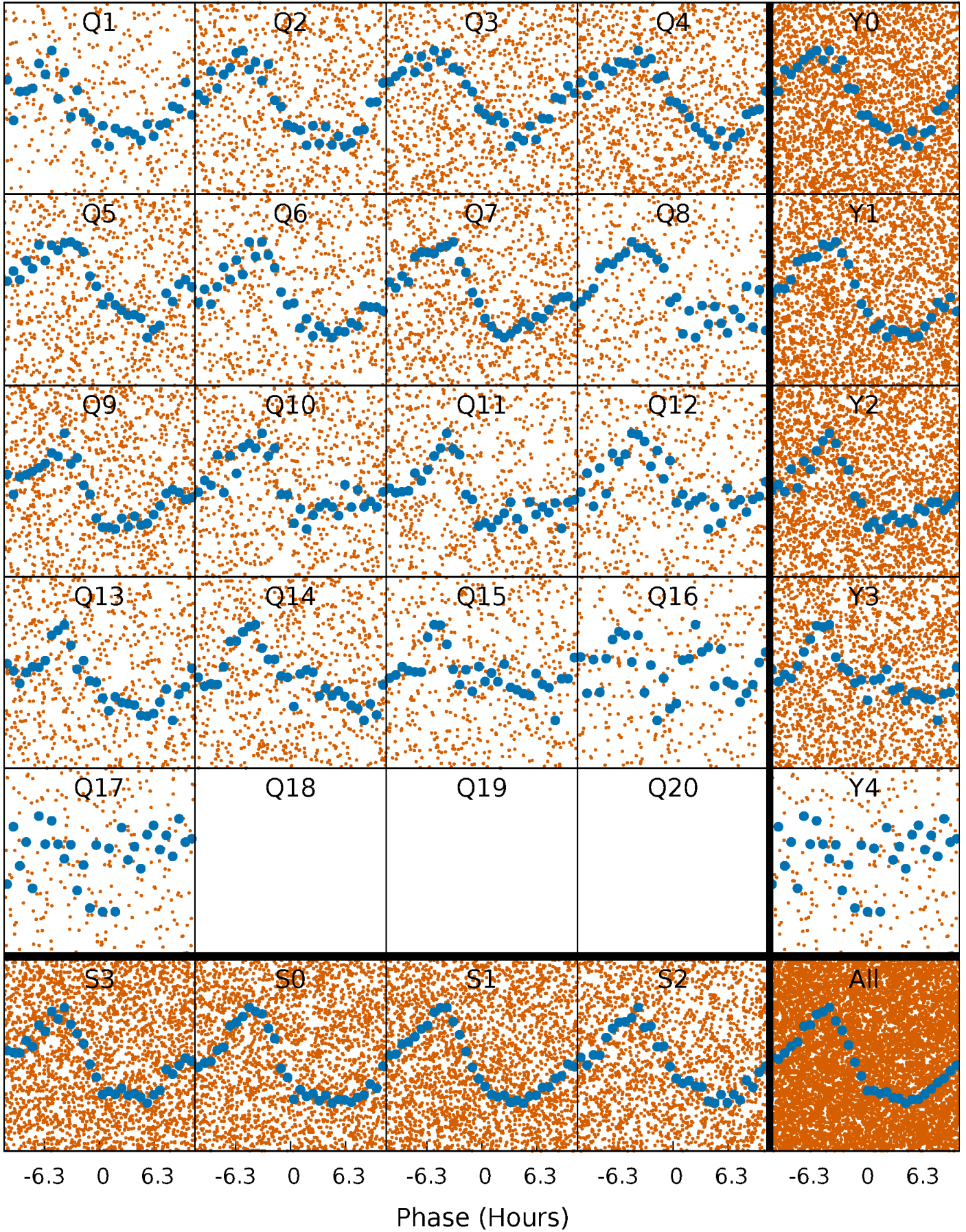


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

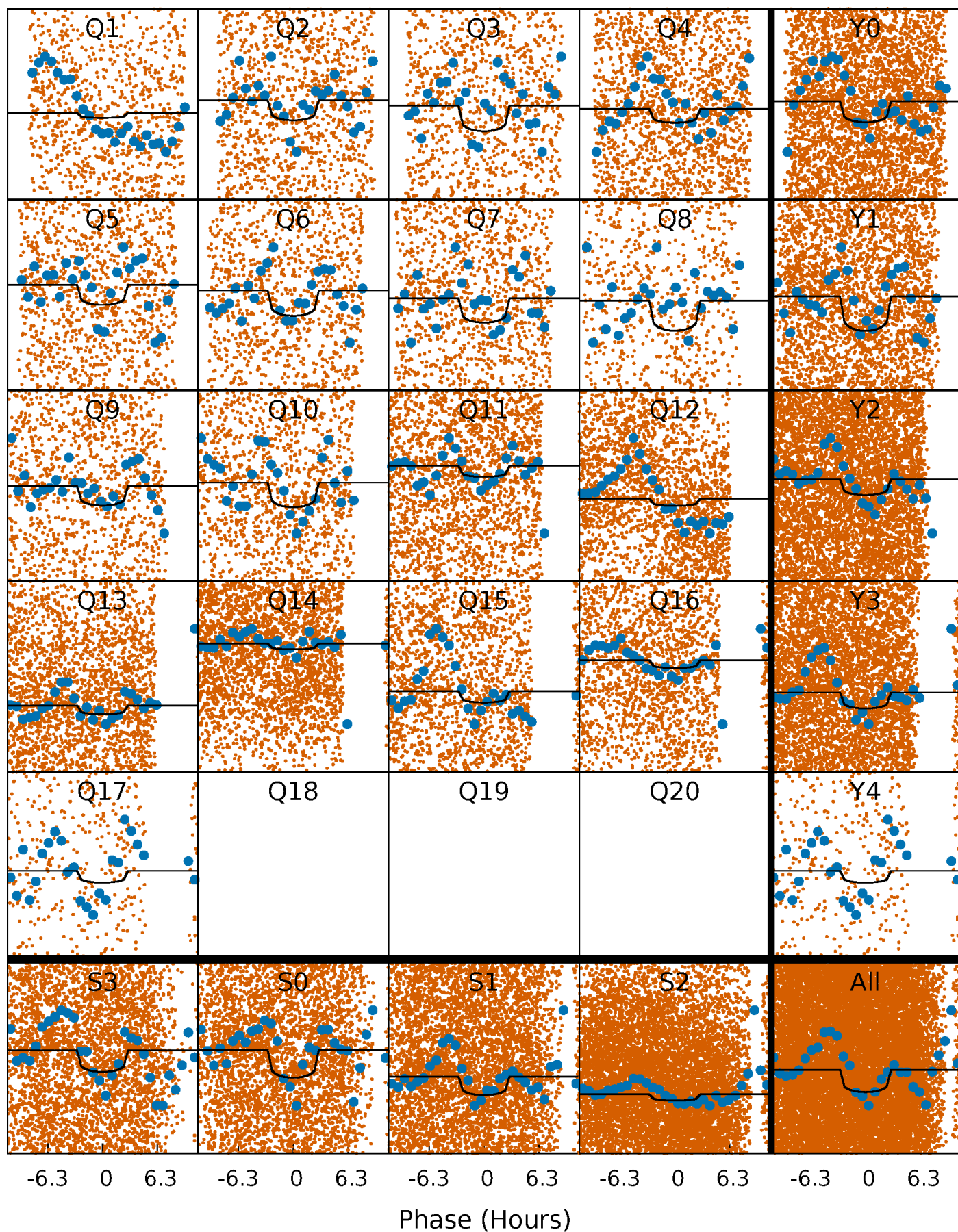
TCE 009150012-02   P= 0.952880 Days    $T_0=131.809020$  (BKJD)





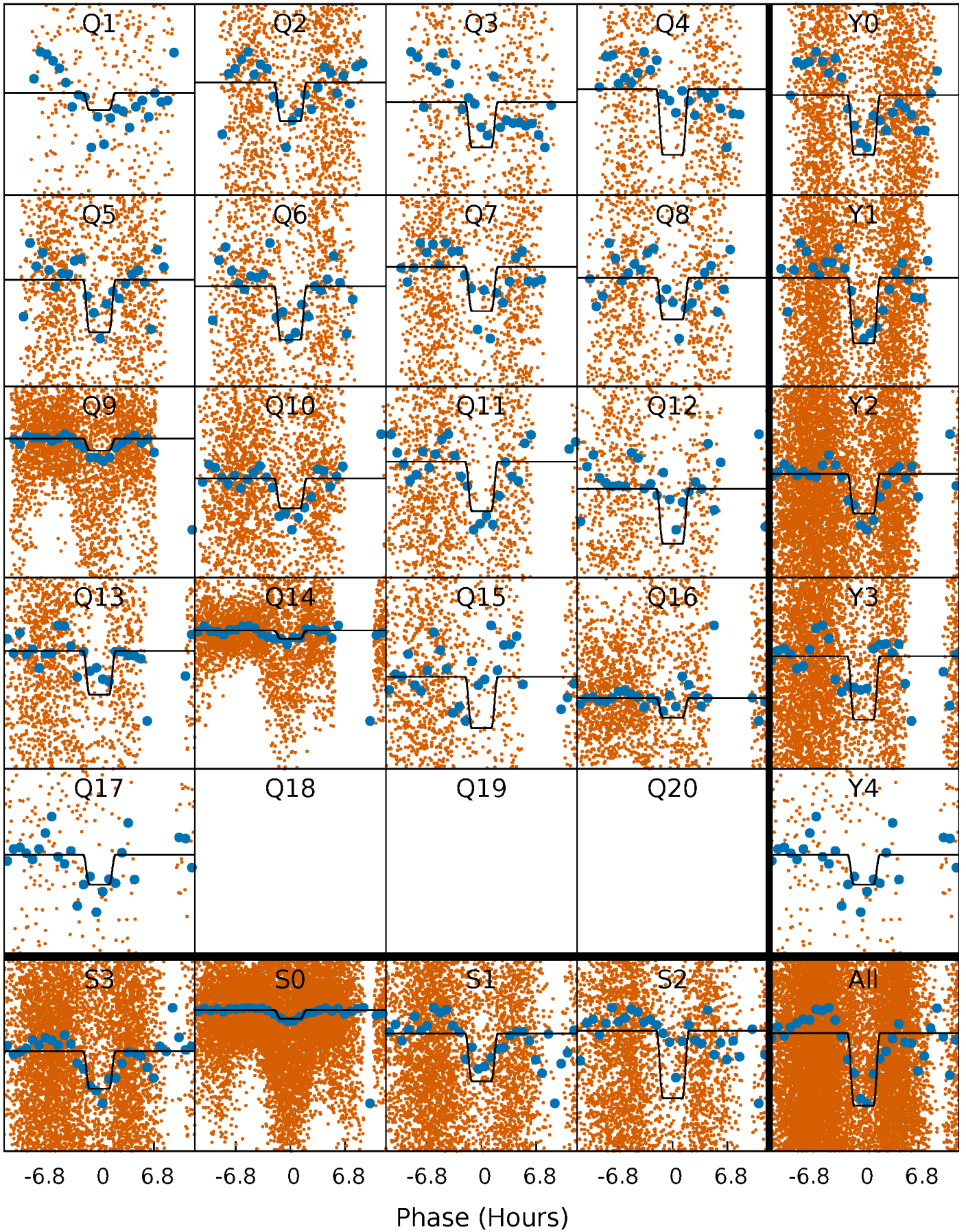
# DV Quarter-Phased Transit Curves

TCE 009150012-02 P= 0.952880 Days  $T_0=131.809020$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

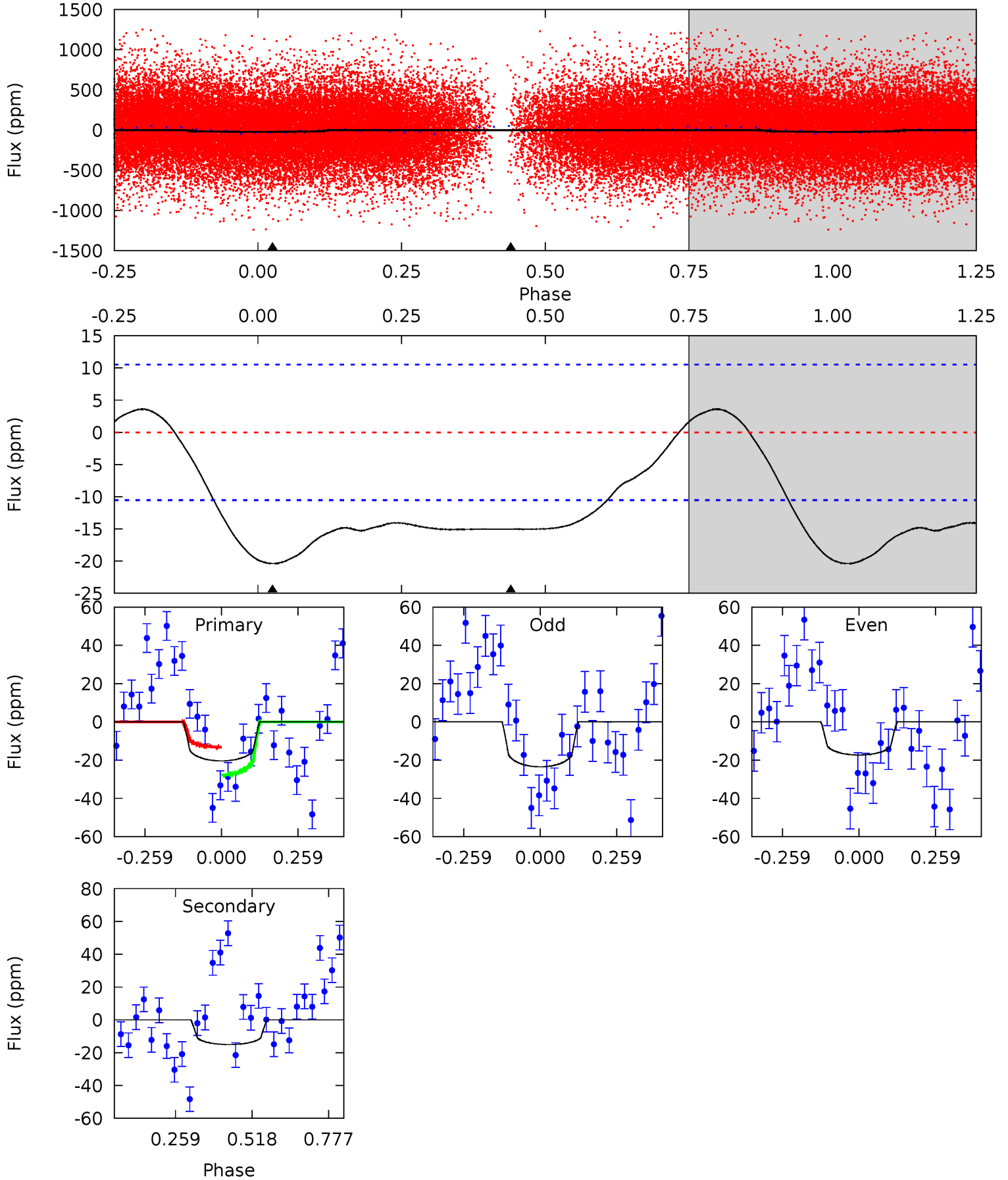
TCE 009150012-02 P= 0.952886 Days  $T_0=131.813046$  (BKJD)



# DV Model-Shift Uniqueness Test

009150012-02, P = 0.952880 Days, E = 130.856140 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.44	6.23	0	0	4.36	1.13	0.94	8.44	8.44	6.23	6.23	1.29	0.93	0.15	3.10

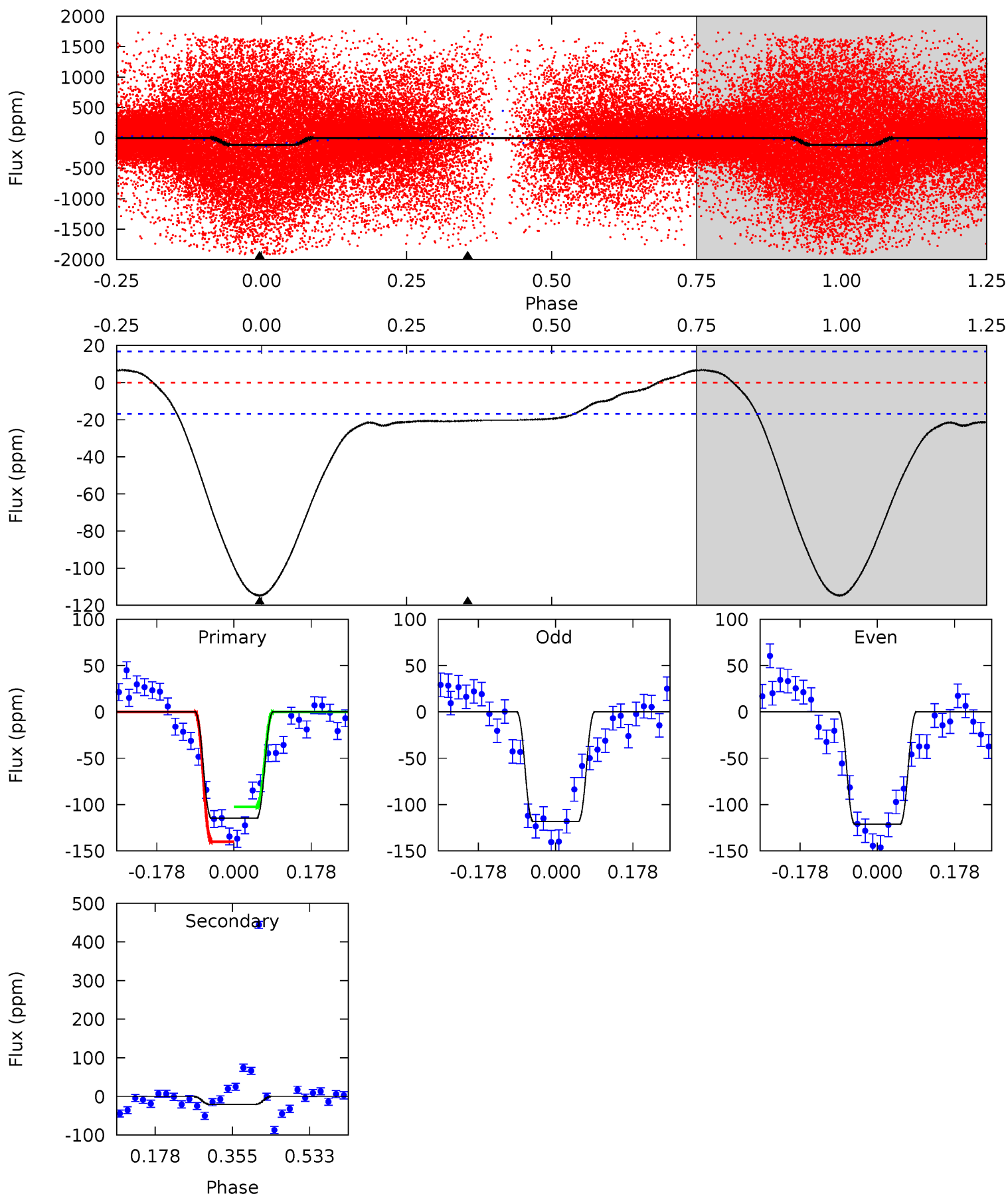




# Alt Model-Shift Uniqueness Test

009150012-02, P = 0.952886 Days, E = 130.860160 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
30.3	5.44	0	0	4.44	1.35	1.86	30.3	30.3	5.44	5.44	0.40	0.54	0.06	4.53



### Stellar Parameters For KIC 009150012

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7063^{+200}_{-250}$	$4.185^{+0.175}_{-0.175}$	$-0.500^{+0.250}_{-0.300}$	$1.484^{+0.405}_{-0.331}$	$1.229^{+0.169}_{-0.169}$	$0.529^{+0.489}_{-0.257}$
	+3%/-4%	+4%/-4%	+50%/-60%	+27%/-22%	+14%/-14%	+92%/-48%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 009150012-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-15 \pm 2$	$0.81^{+0.33}_{-0.32}$	$3713^{+275}_{-256}$	$6084^{+1829}_{-990}$	$5.056^{+9.370}_{-2.607}$
Alt.	$-21 \pm 4$	$1.52^{+0.41}_{-0.39}$	$3746^{+268}_{-266}$	$4778^{+664}_{-471}$	$1.963^{+1.537}_{-0.758}$

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

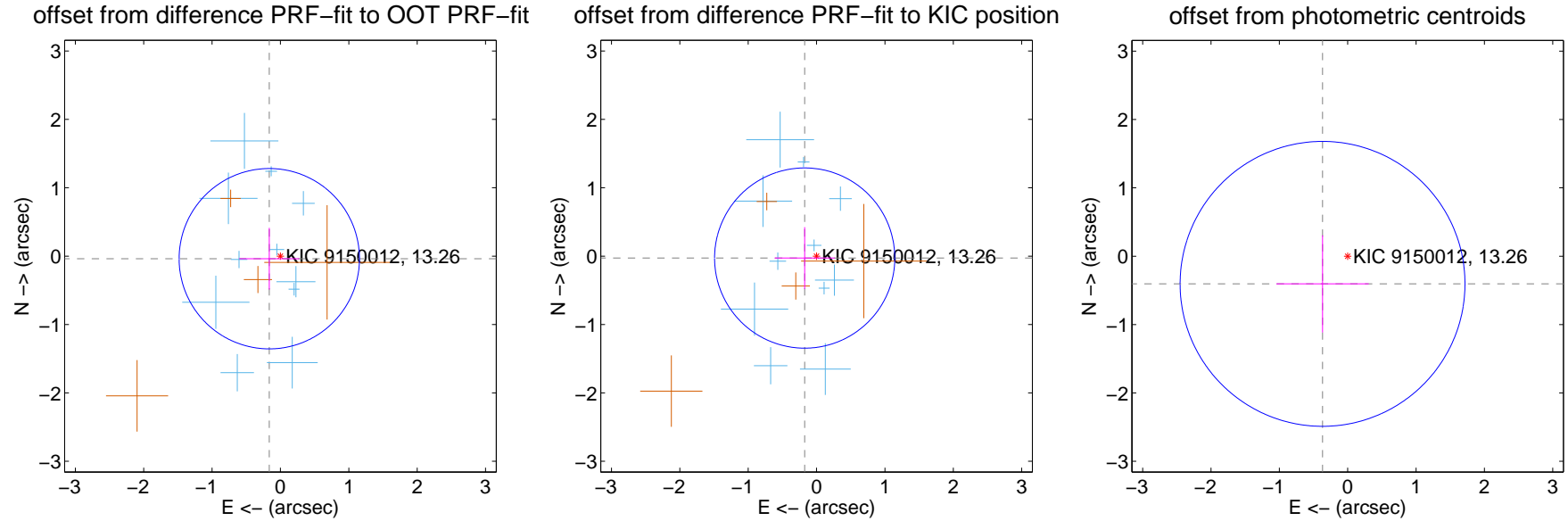
## DV Centroid Data

Supplemental centroid analysis for 009150012-02. Kepler magnitude: 13.26. Transit SNR 6.17

There are 11 quarters with good PRF difference image offsets

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

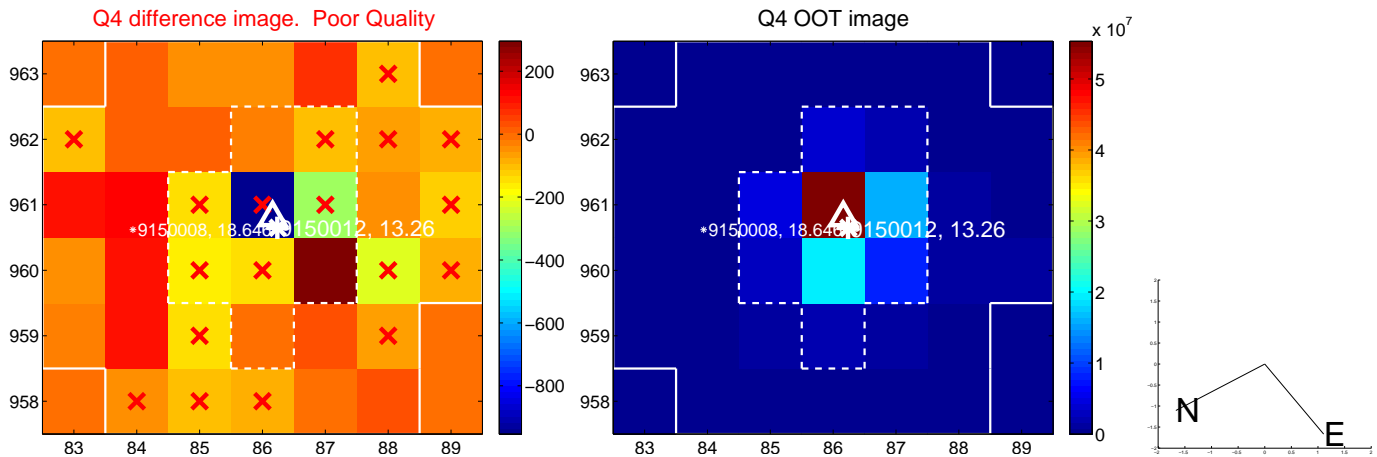
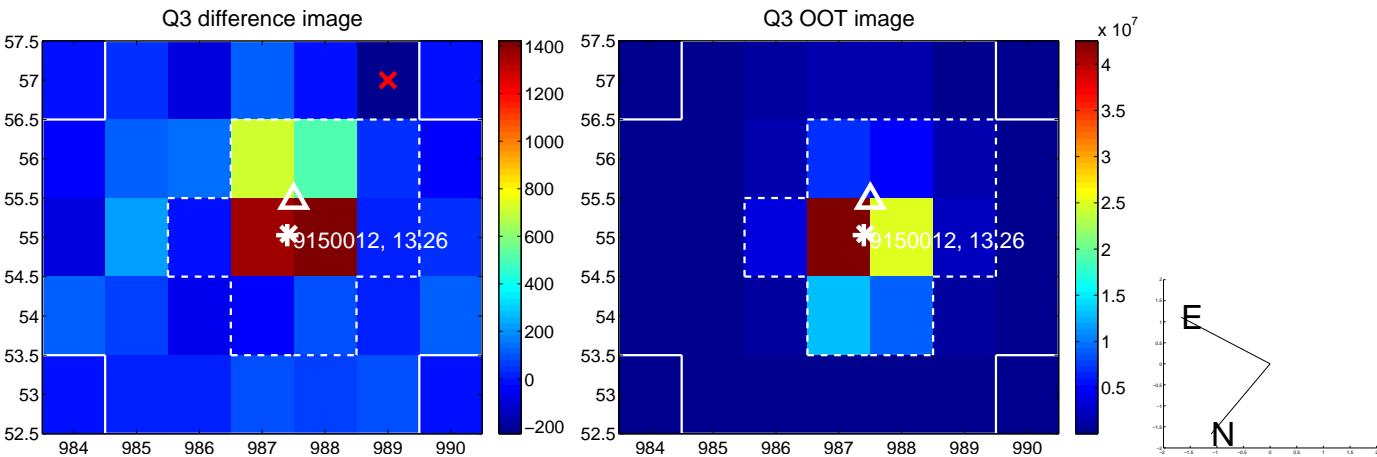
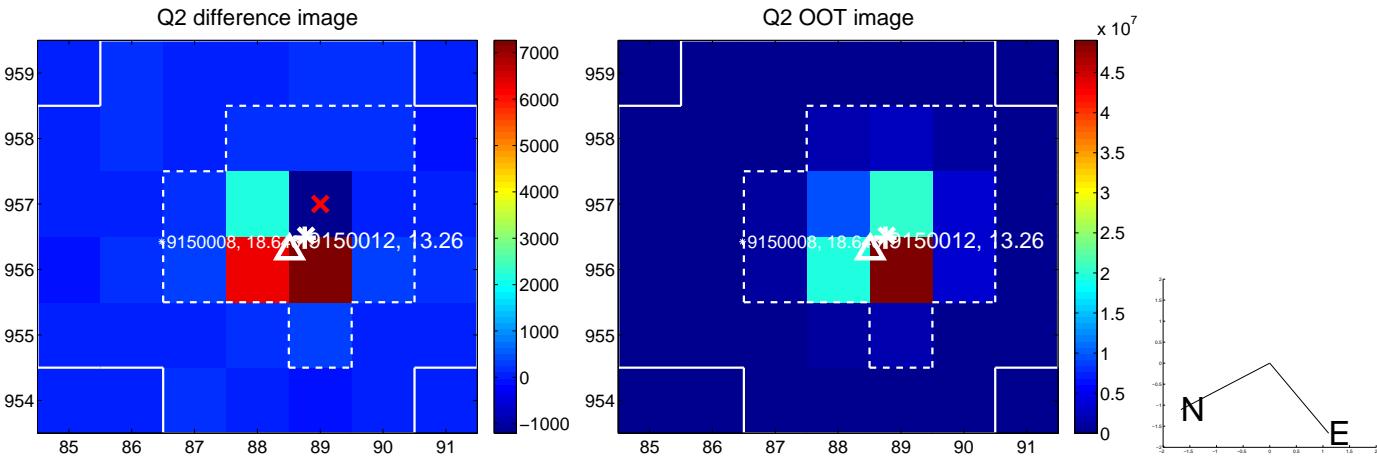
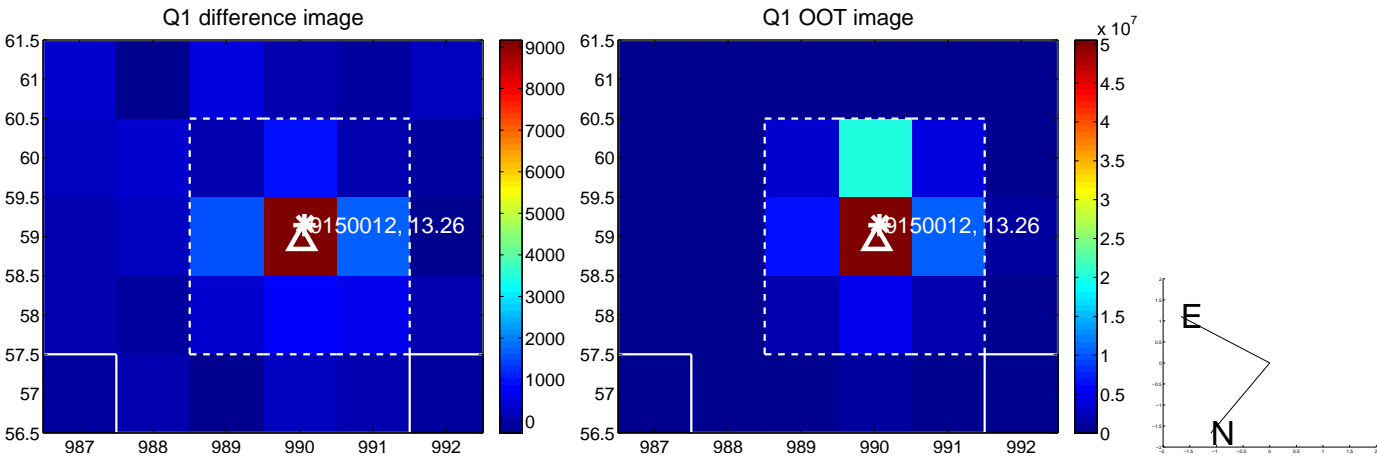
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.168 \pm 0.440$	0.38	$0.163 \pm 0.439$	$-0.038 \pm 0.451$
PRF-fit source offset from KIC position	$0.176 \pm 0.439$	0.40	$0.174 \pm 0.439$	$-0.028 \pm 0.451$
photometric centroid source offset	$0.55 \pm 0.69$	0.79	$0.37 \pm 0.68$	$-0.40 \pm 0.71$



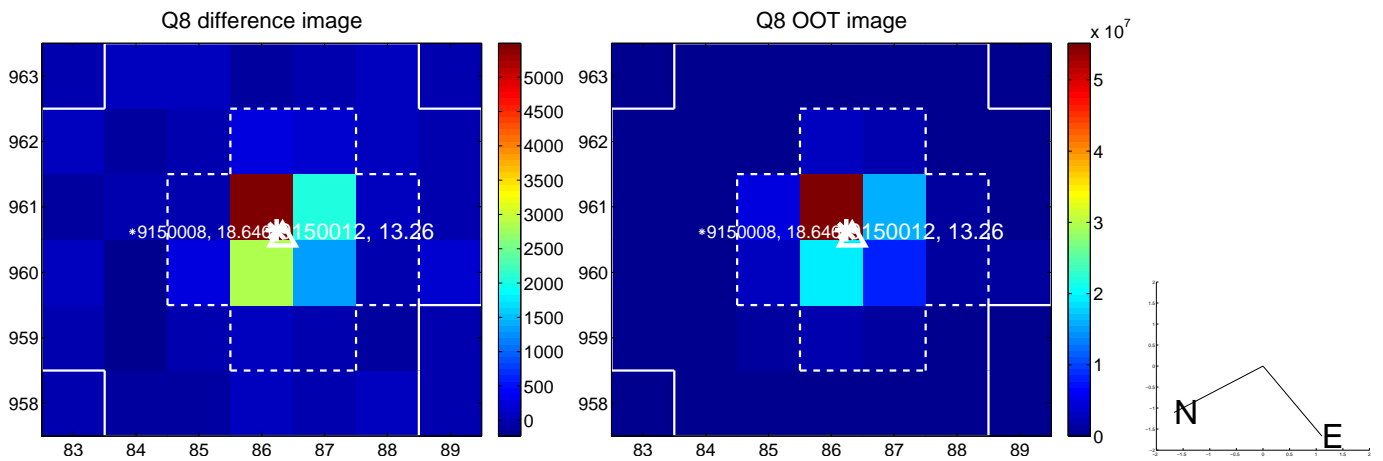
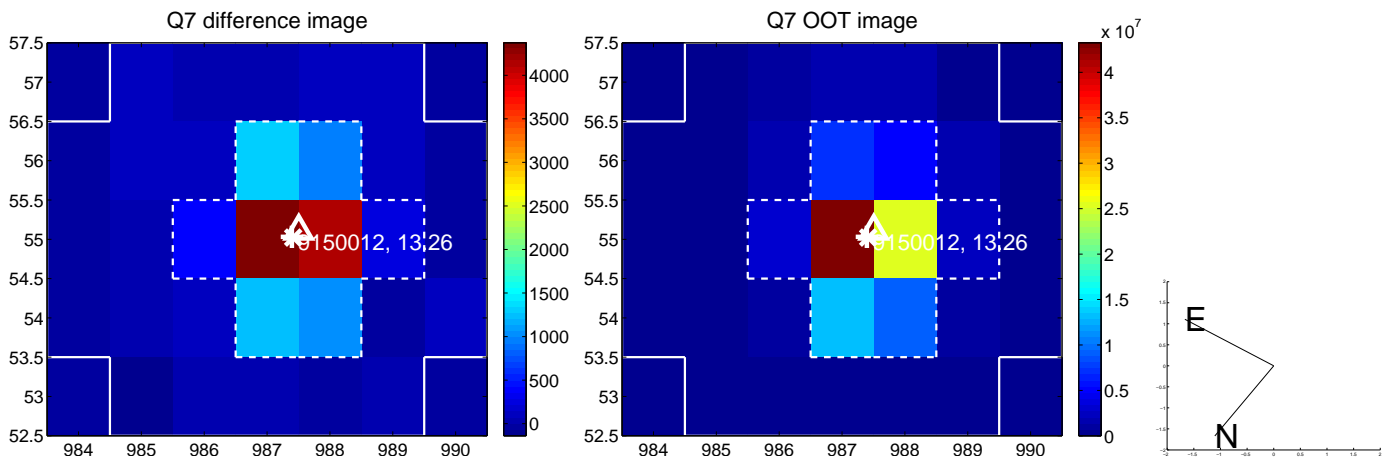
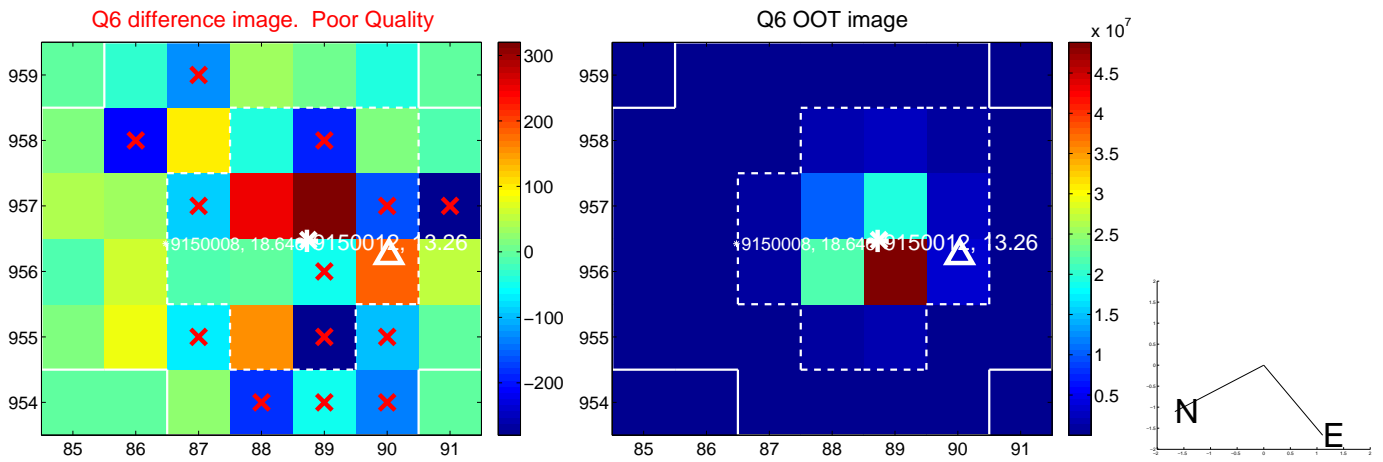
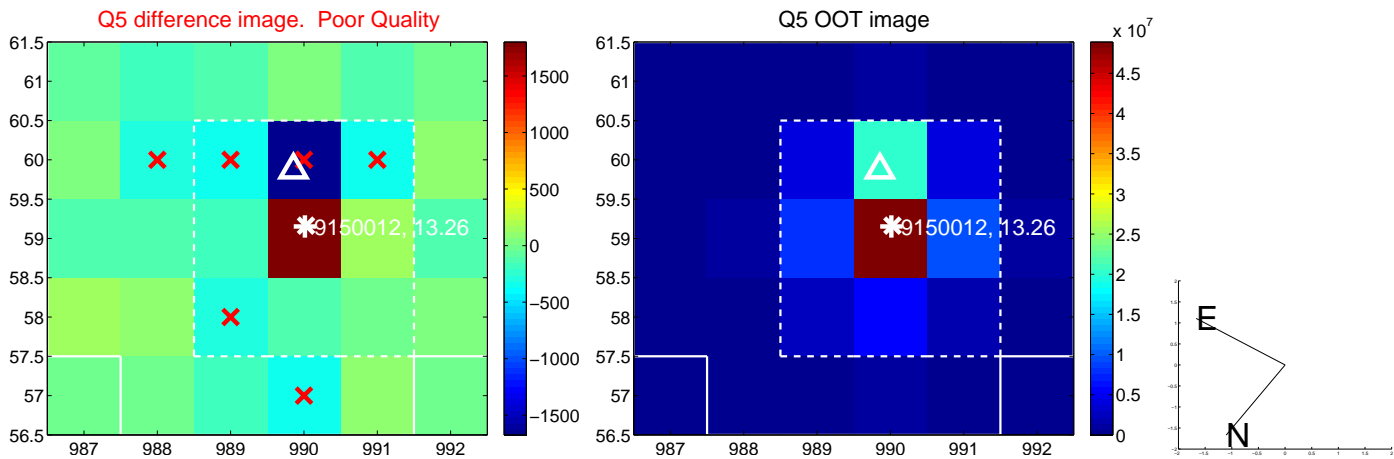
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



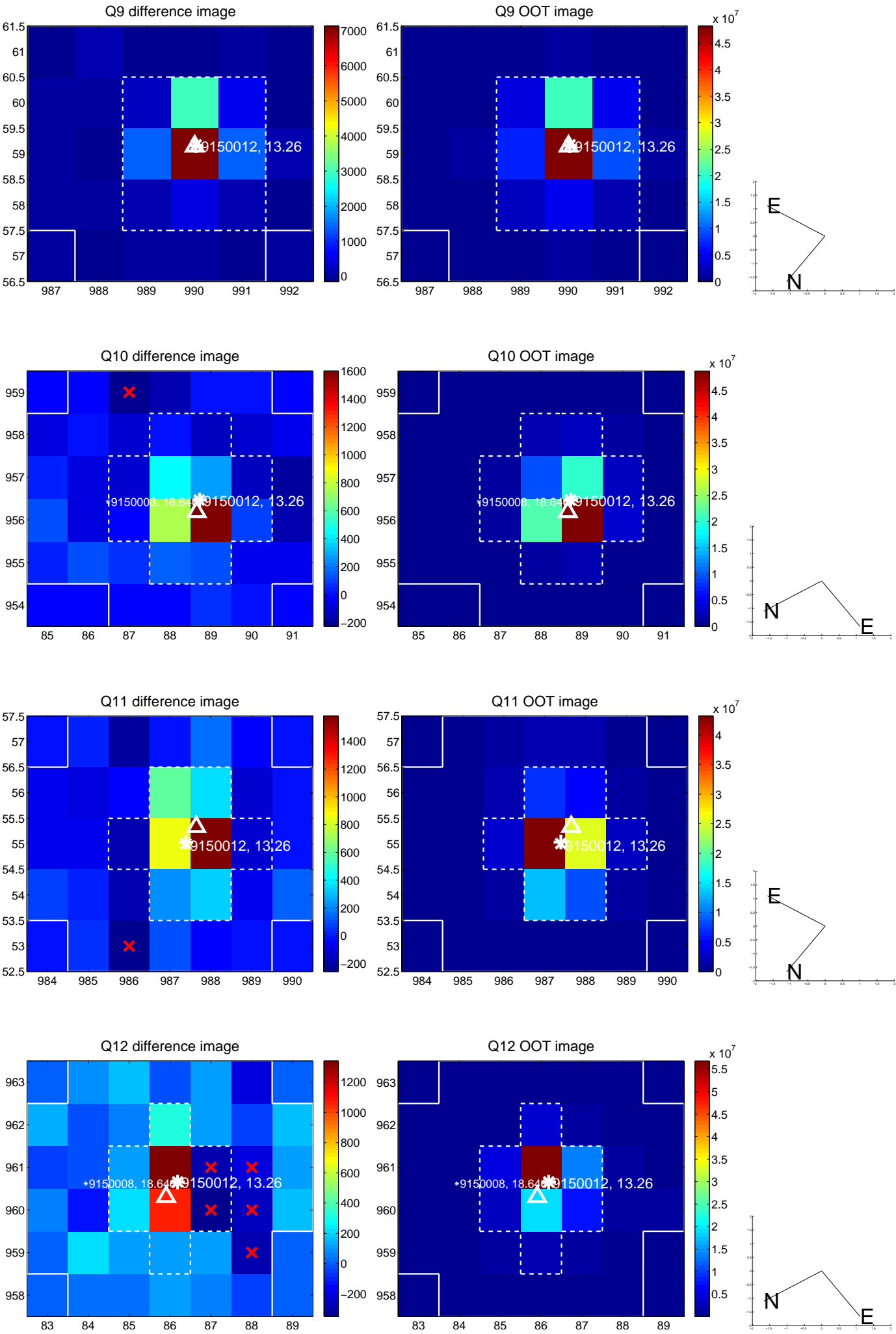
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



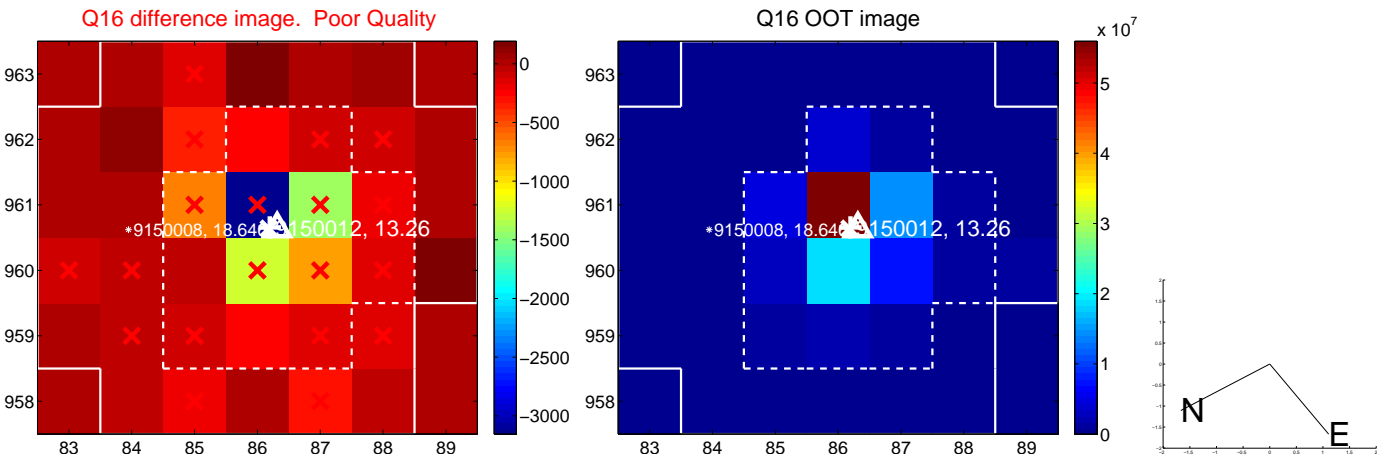
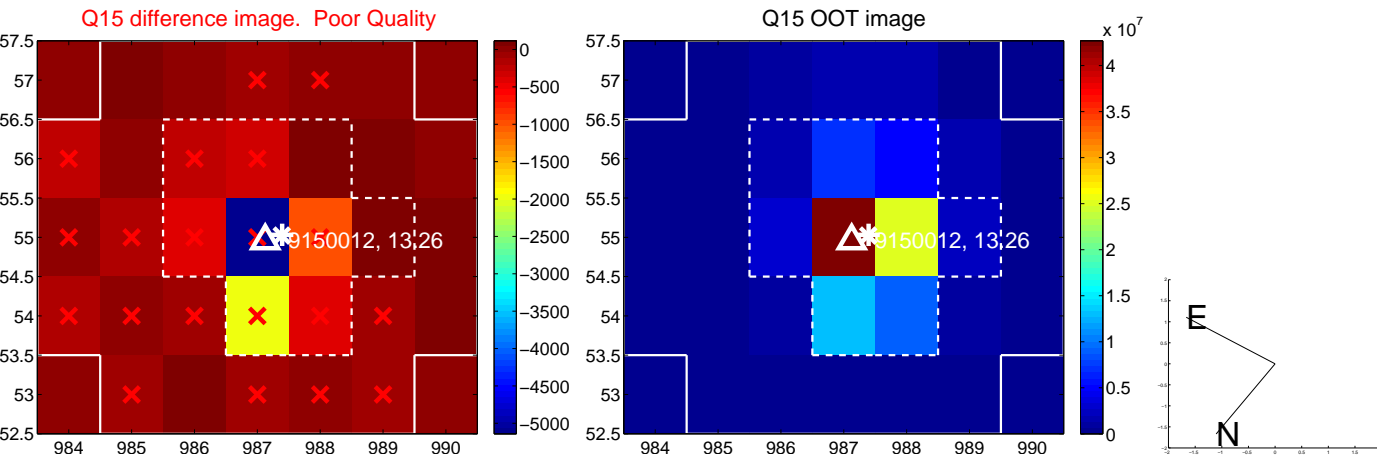
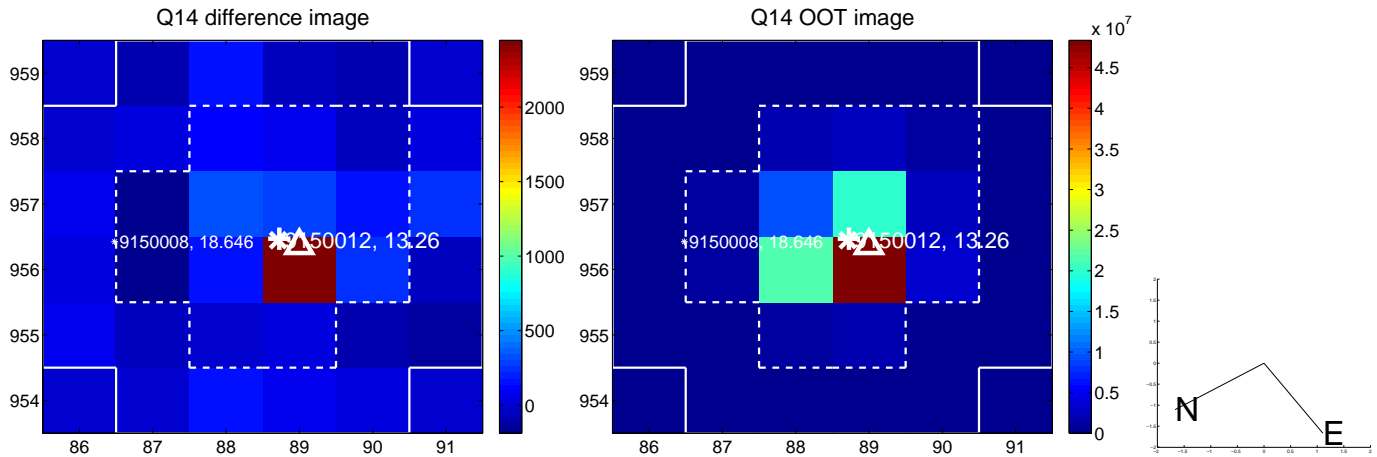
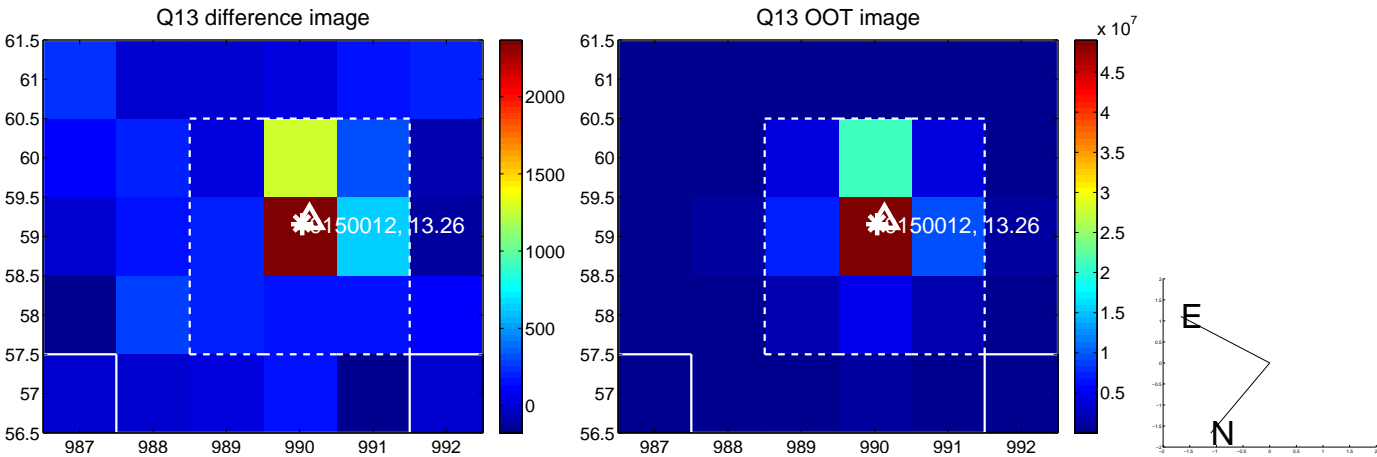
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



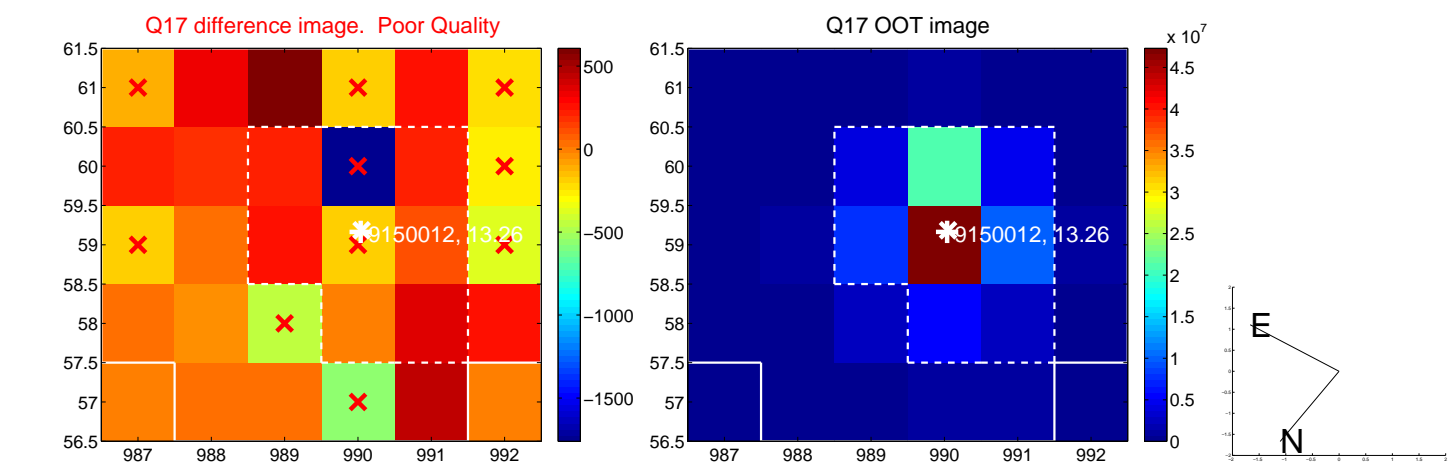
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



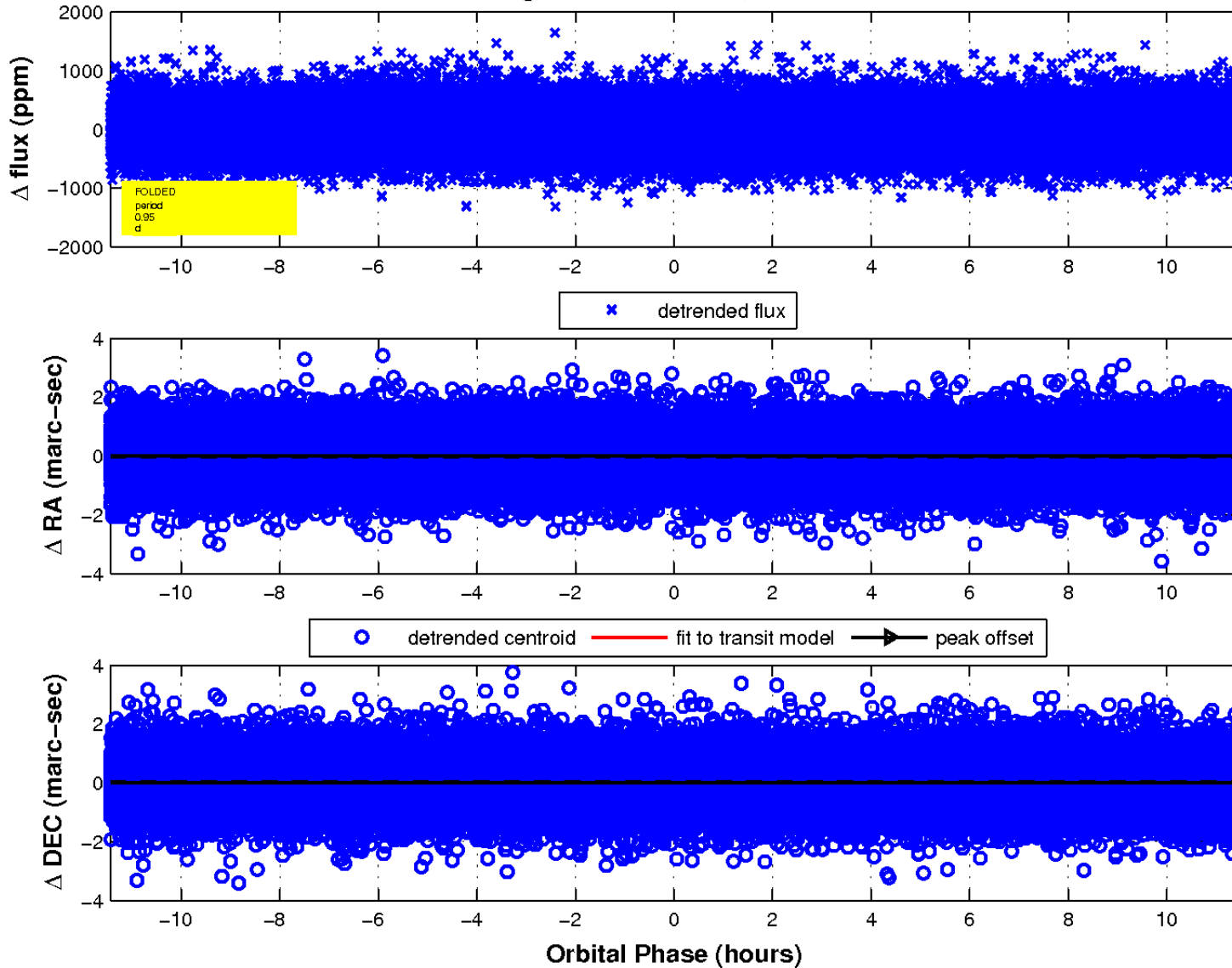
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

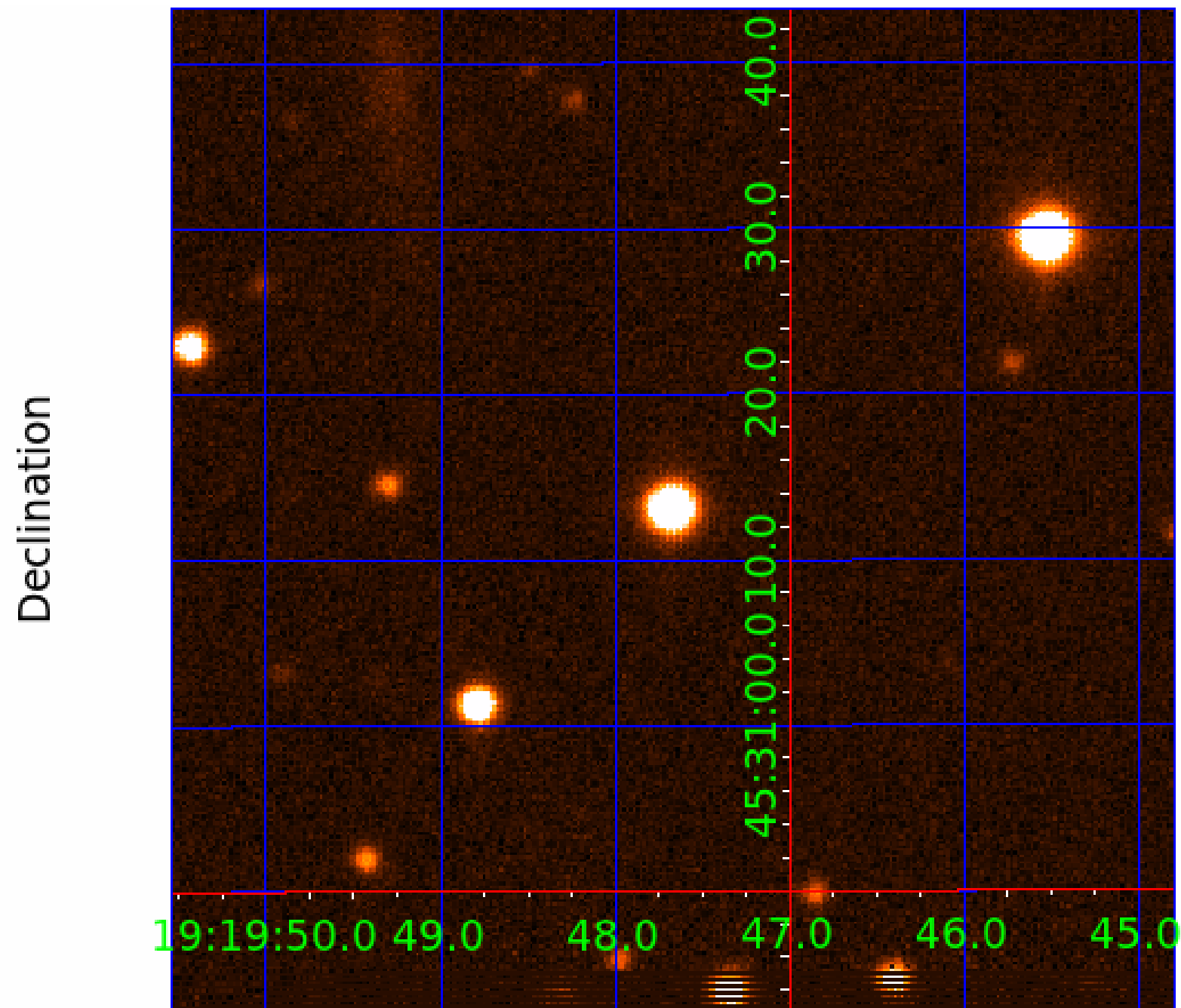


fluxWeightedCentroids, Planet 2 of 5





UKIRT Image



# KIC 009150012

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009150012-01	OBS	No	0.952755	132.307520	27.8	1.238	8.3	7.2	1.48	7063	0.80	11907.82
009150012-02	OBS	No	0.952880	131.809020	24.8	5.478	8.3	6.2	1.48	7063	0.79	11905.73
009150012-03	OBS	No	32.385893	152.743564	288.5	6.839	8.6	7.6	1.48	7063	3.32	108.14
009150012-04	OBS	No	33.912389	137.298834	396.2	2.637	8.7	8.7	1.48	7063	3.06	101.70
009150012-05	OBS	No	14.997715	136.947246	361.7	1.111	8.3	8.5	1.48	7063	2.95	301.84

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009150012-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT
009150012-02	OBS	FP	0.00	1	0	0	0	LPP_DV—SAME_NTL_PERIOD
009150012-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_ZUMA—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV
009150012-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV
009150012-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_TRACKER—TRANS_GAPPED

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

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

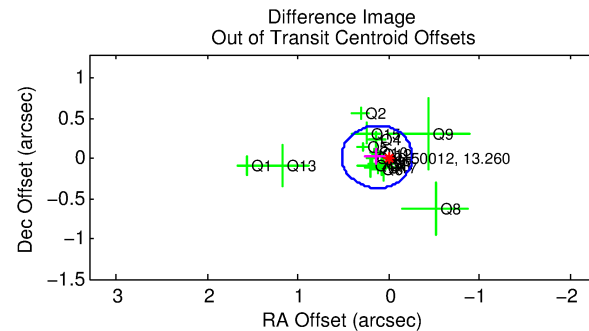
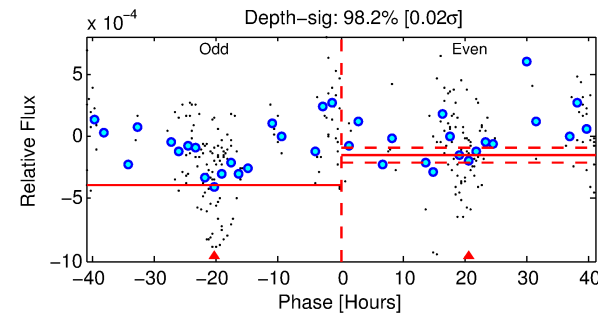
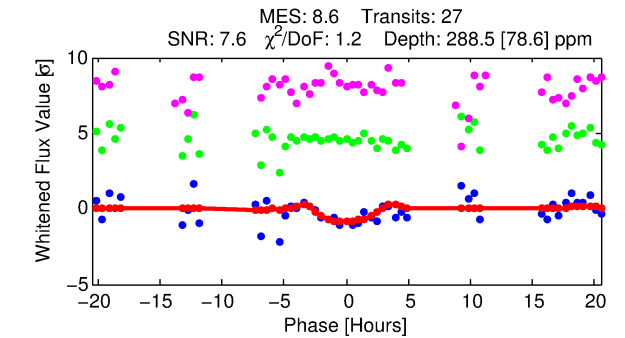
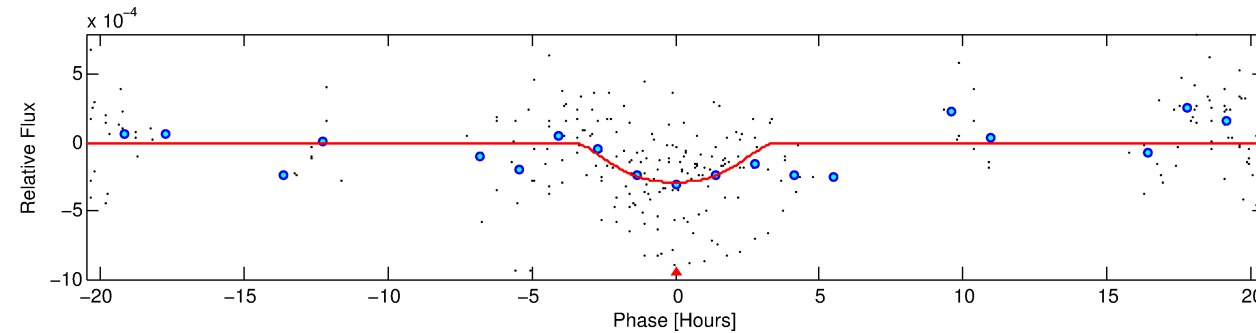
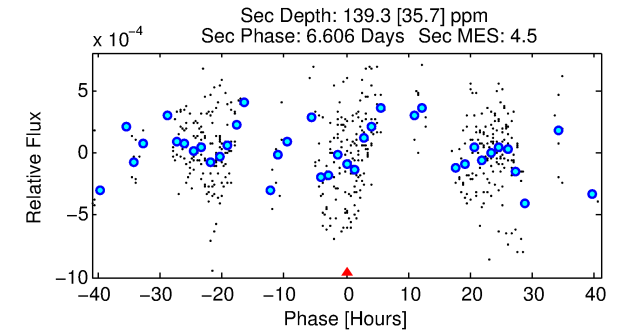
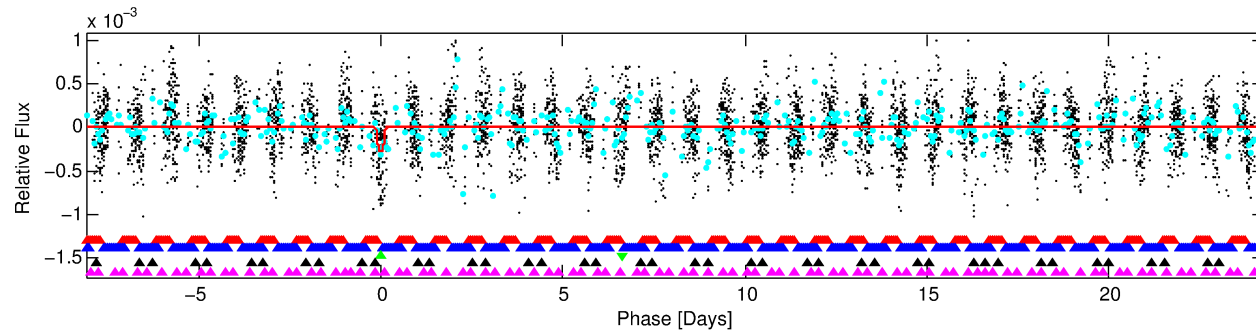
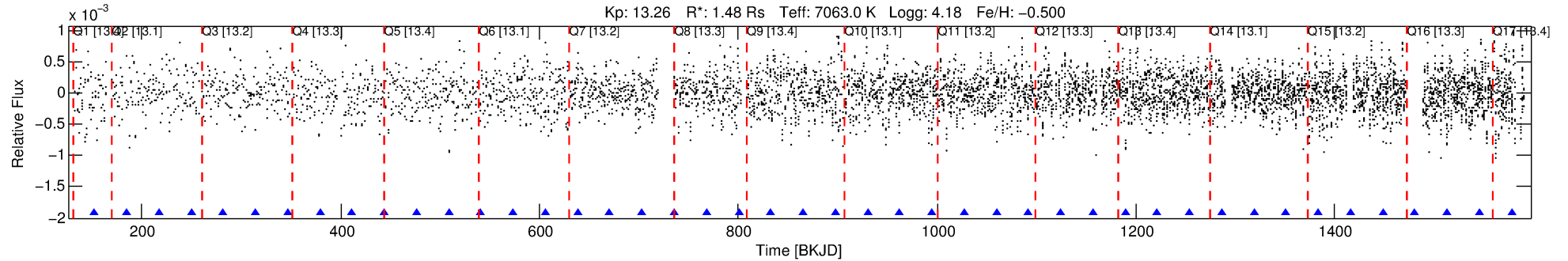
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009150012-03

No Significant Match Found

# DV One-Page Summary

KIC: 9150012 Candidate: 3 of 5 Period: 32.386 d



## DV Fit Results:

Period = 32.38589 [0.00277] d  
Epoch = 152.7436 [0.0881] BKJD  
Rp/R\* = 0.0205 [0.0039]  
a/R\* = 10.32 [2.83]  
b = 0.98 [0.01]  
Seff = 108.14 [38.28]  
Teq = 822 [73] K  
Rp = 3.32 [1.10] Re  
a = 0.2131 [0.0482] AU  
Ag = 315.53 [176.47] [1.78σ]  
Teffp = 5358 [639] K [7.05σ]

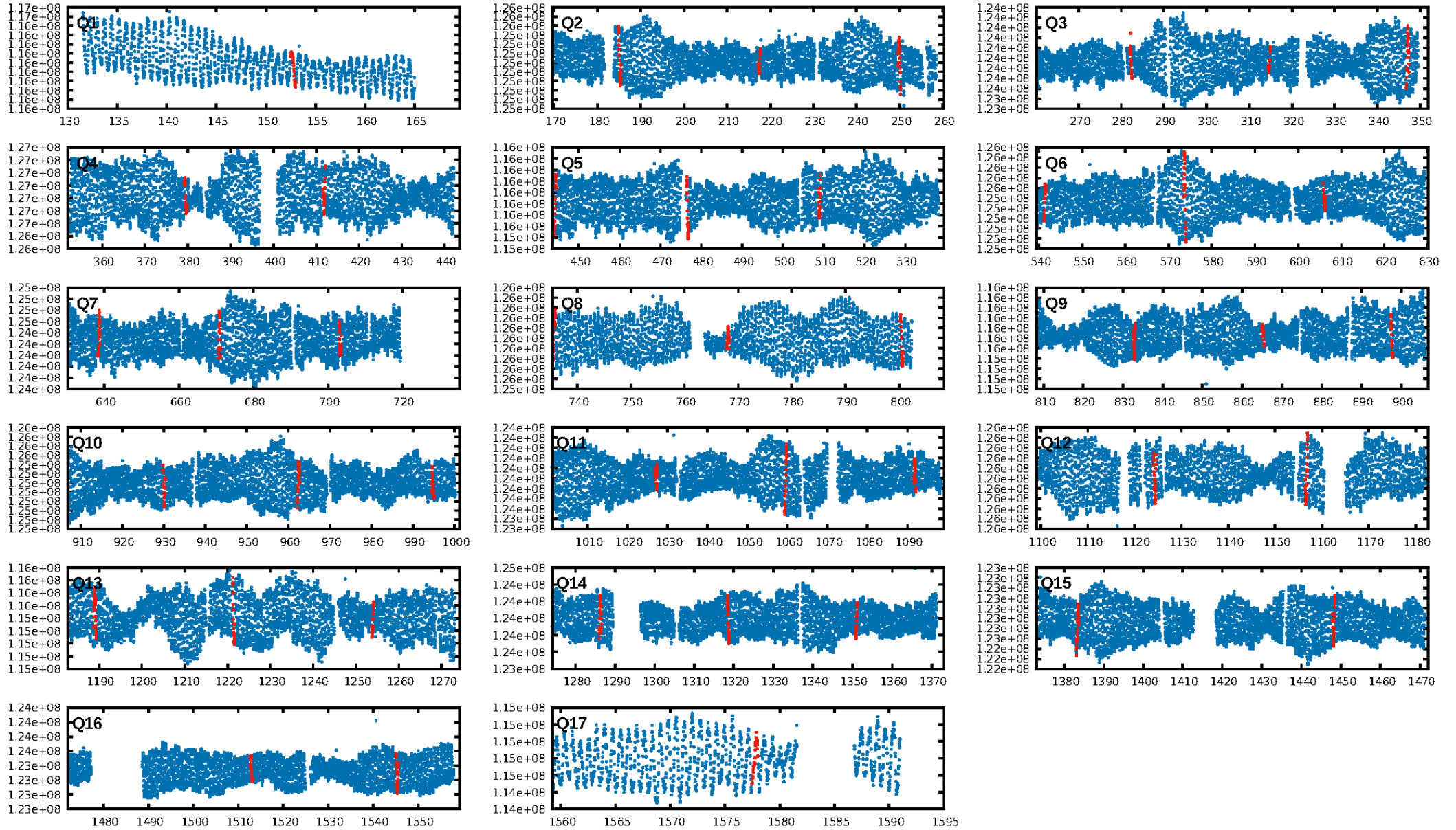
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [60.23σ]  
LongPeriod-sig: 100.0% [5.00σ]  
ModelChiSquare2-sig: 9.2%  
ModelChiSquareGof-sig: 100.0%  
**Bootstrap-pfa: 1.04e-10**  
RollingBand-fgt: 1.00 [26/26]  
**GhostDiagnostic-chr: 0.8321**  
Centroid-sig: 32.1%  
Centroid-so: 0.259 arcsec [0.66σ]  
OotOffset-rm: 0.133 arcsec [1.02σ]  
KicOffset-rm: 0.145 arcsec [1.11σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 0.47 [8/17]  
DiffImageOverlap-fno: 0.00 [0/17]

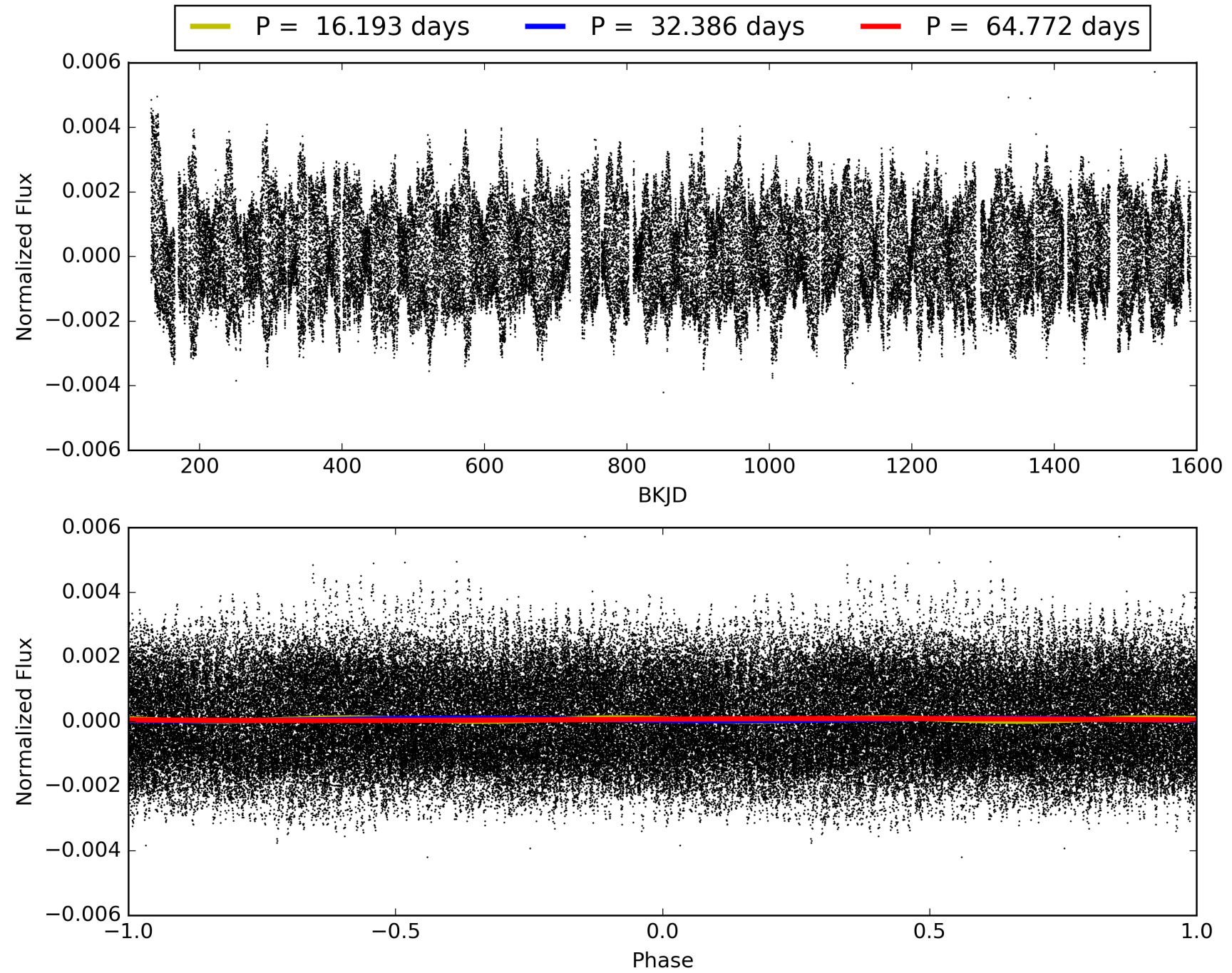
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 10:23:25 Z

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

# TCE 009150012-03, PDC Light Curves

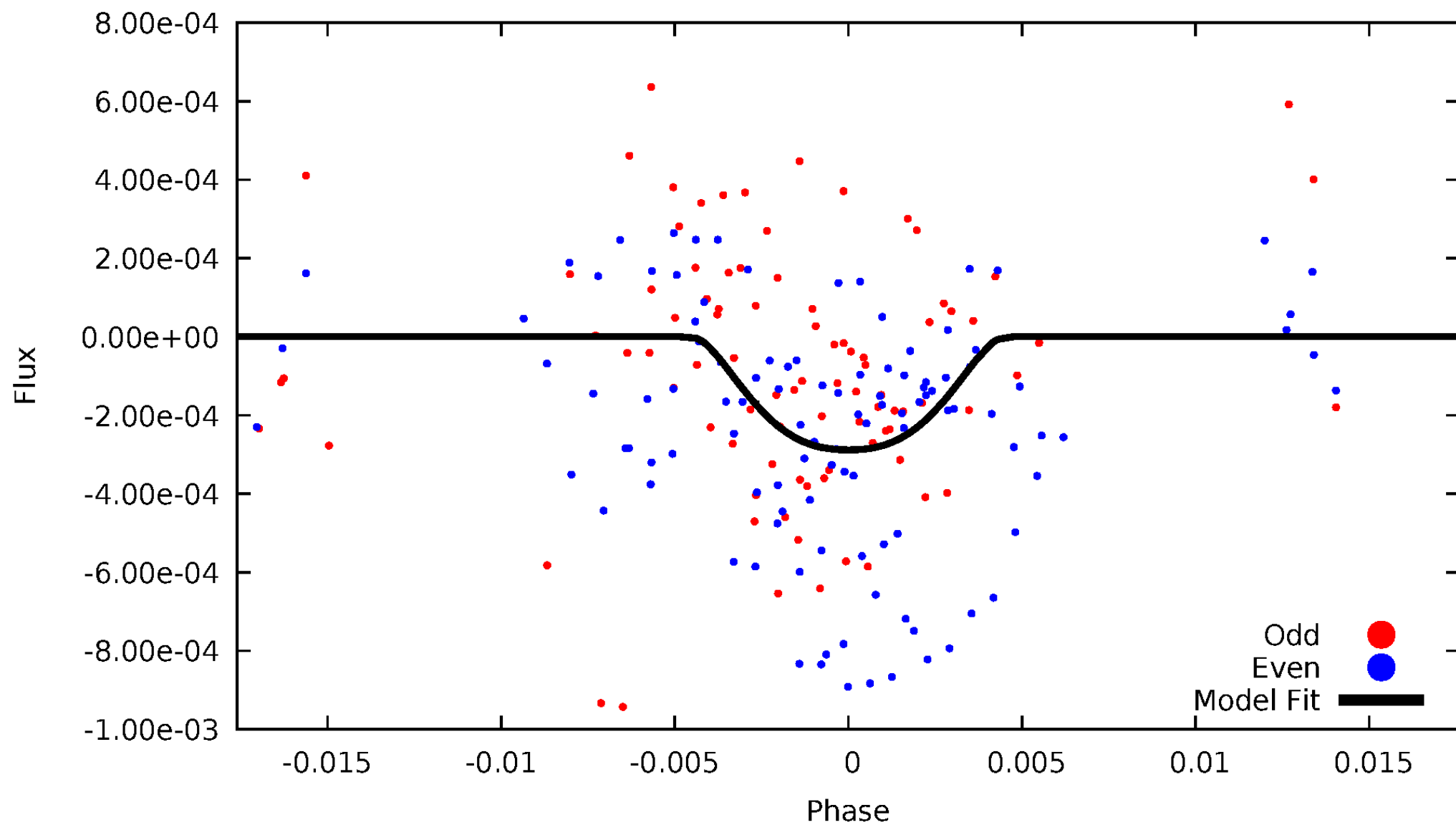


# TCE 009150012-03



# DV Odd/Even

TCE 009150012-03





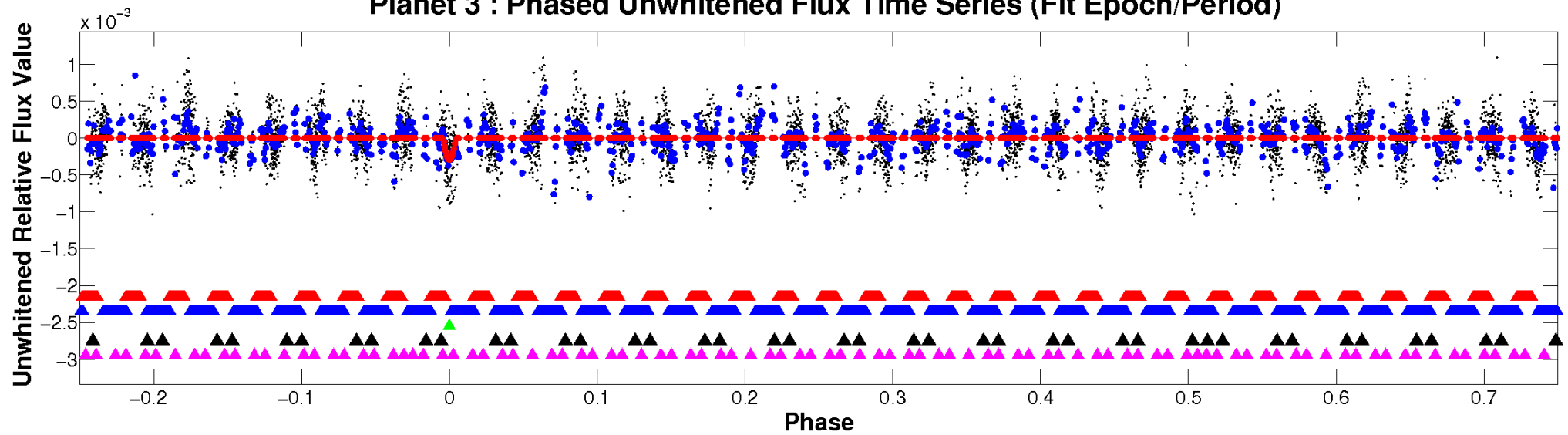


ALT Odd/Even

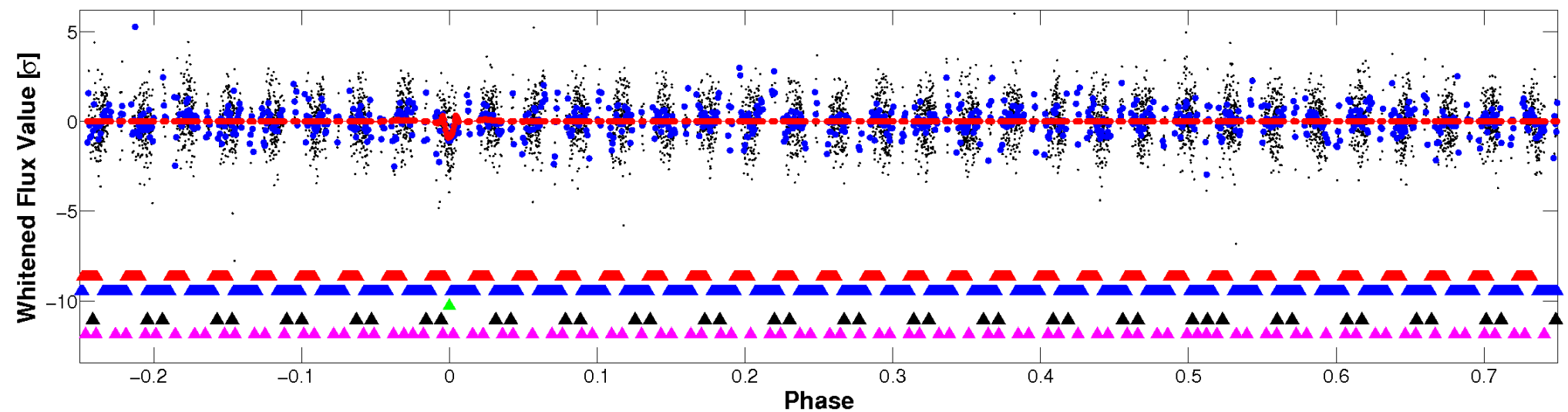
This plot does not exist for this TCE.

# Non-Whitened Vs. Whitened Light Curve

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

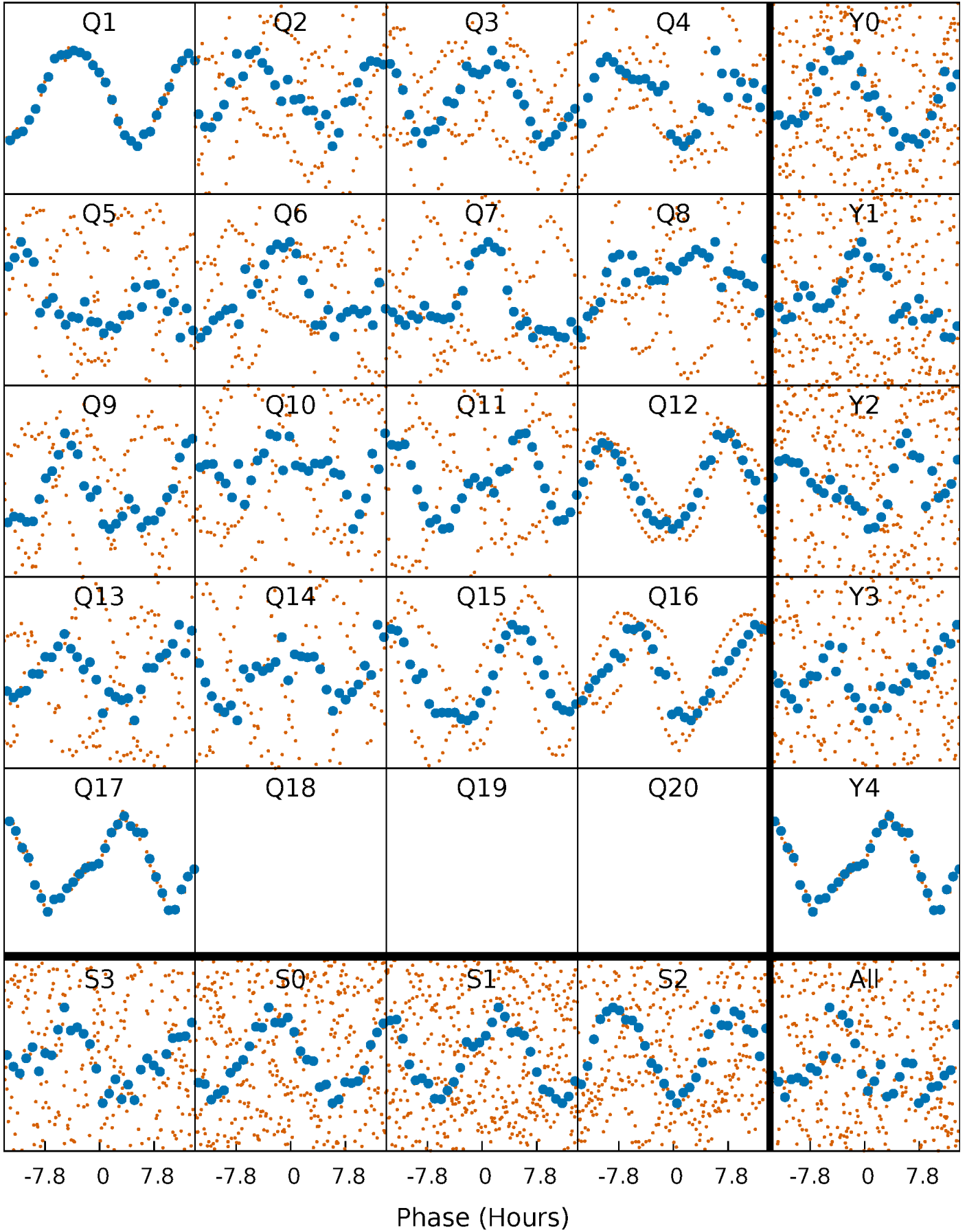


## Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



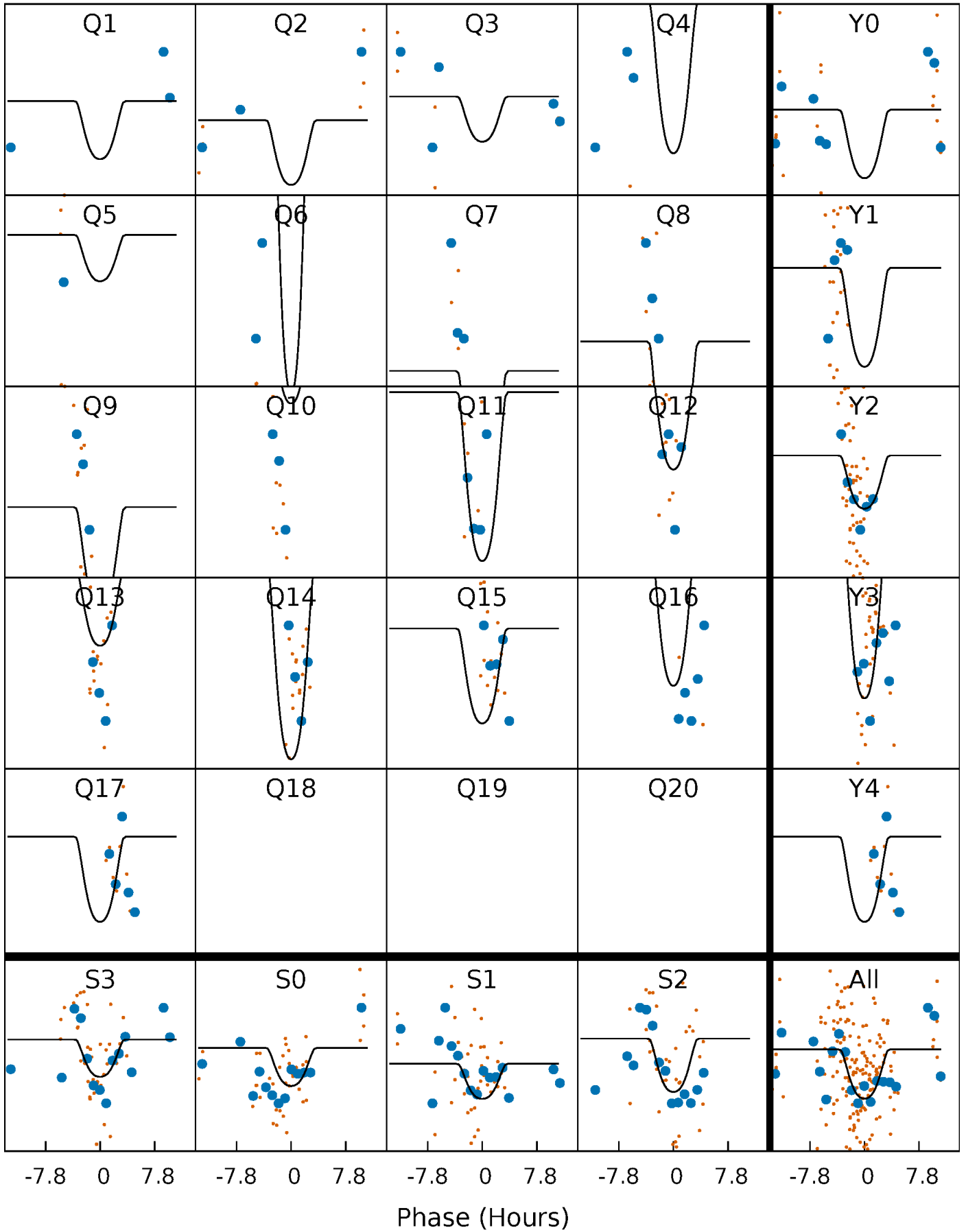
# PDC Quarter-Phased Transit Curves

TCE 009150012-03 P= 32.385893 Days  $T_0=152.743563$  (BKJD)



# DV Quarter-Phased Transit Curves

TCE 009150012-03 P= 32.385893 Days  $T_0=152.743563$  (BKJD)



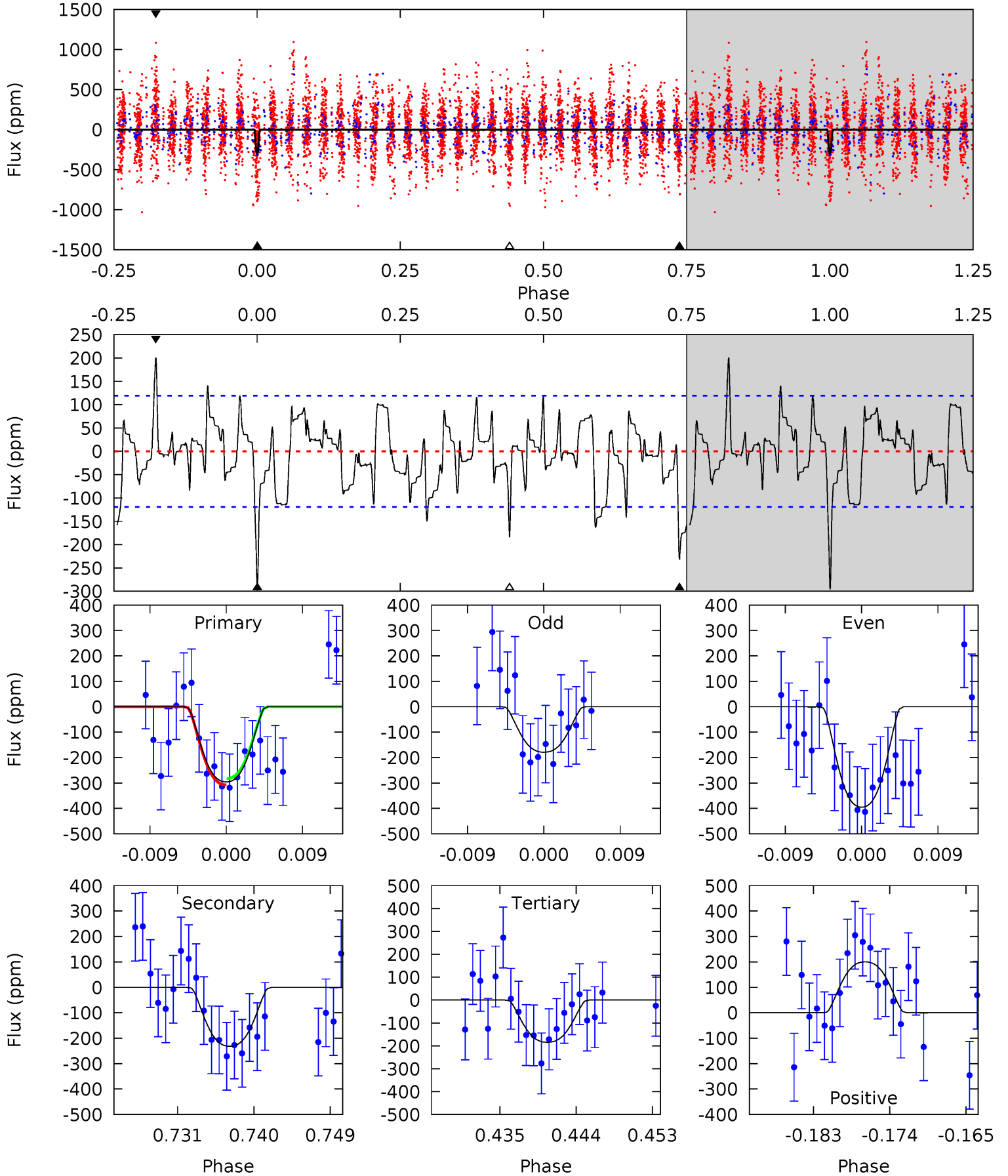
This plot does not exist for this TCE.



# DV Model-Shift Uniqueness Test

009150012-03, P = 32.385893 Days, E = 120.357670 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.6	9.83	7.83	8.50	5.05	2.62	2.76	4.72	4.05	2.00	1.33	4.59	0.60	0.40	0.53



## Alt Model-Shift Uniqueness Test

This plot does not exist for this TCE.

### Stellar Parameters For KIC 009150012

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7063^{+200}_{-250}$	$4.185^{+0.175}_{-0.175}$	$-0.500^{+0.250}_{-0.300}$	$1.484^{+0.405}_{-0.331}$	$1.229^{+0.169}_{-0.169}$	$0.529^{+0.489}_{-0.257}$
	+3%/-4%	+4%/-4%	+50%/-60%	+27%/-22%	+14%/-14%	+92%/-48%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 009150012-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-232 \pm 24$	$3.34^{+0.82}_{-0.72}$	$1151^{+90}_{-76}$	$6039^{+698}_{-517}$	$517^{+333}_{-182}$
Alt.	N/A	N/A	N/A	N/A	N/A

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

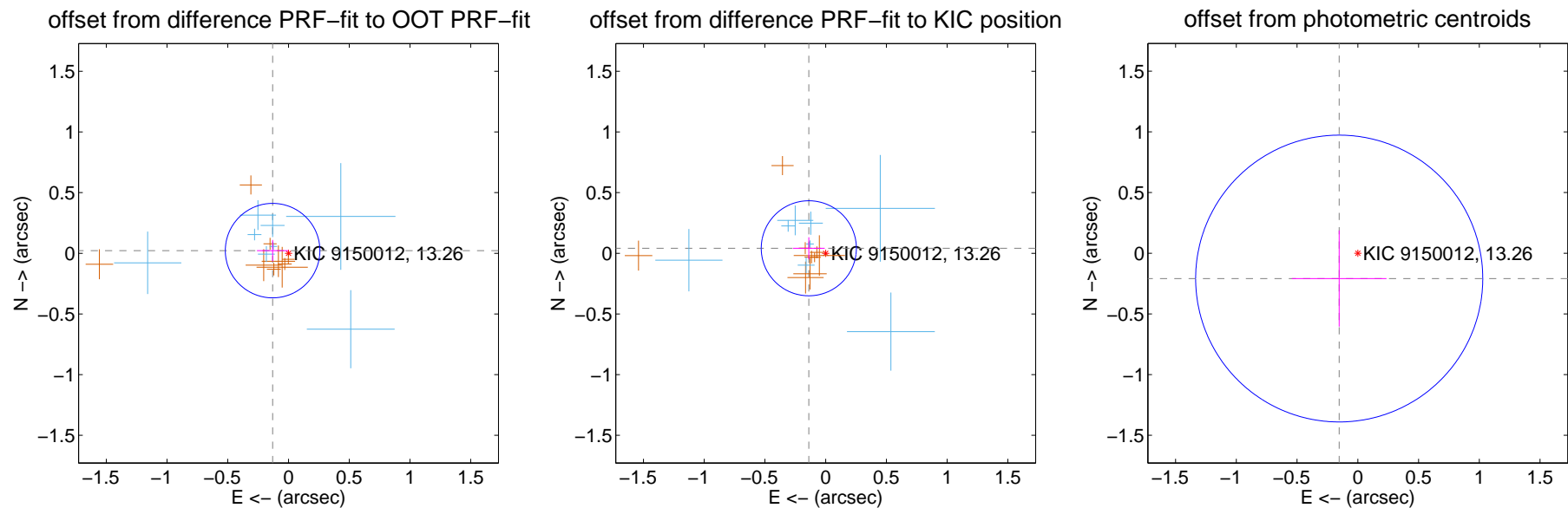
## DV Centroid Data

Supplemental centroid analysis for 009150012-03. Kepler magnitude: 13.26. Transit SNR 7.65

There are 8 quarters with good PRF difference image offsets

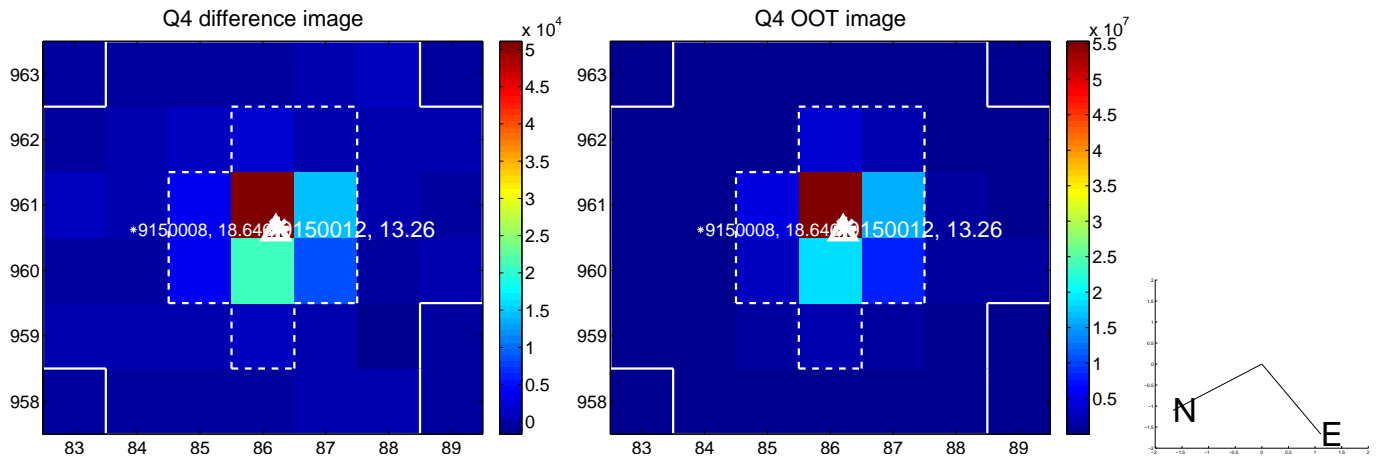
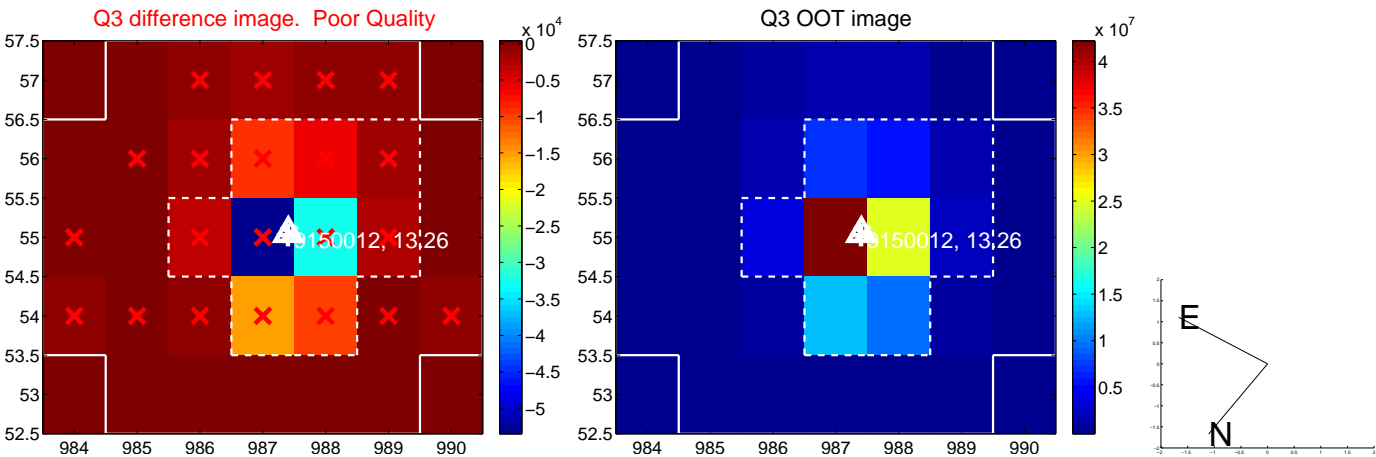
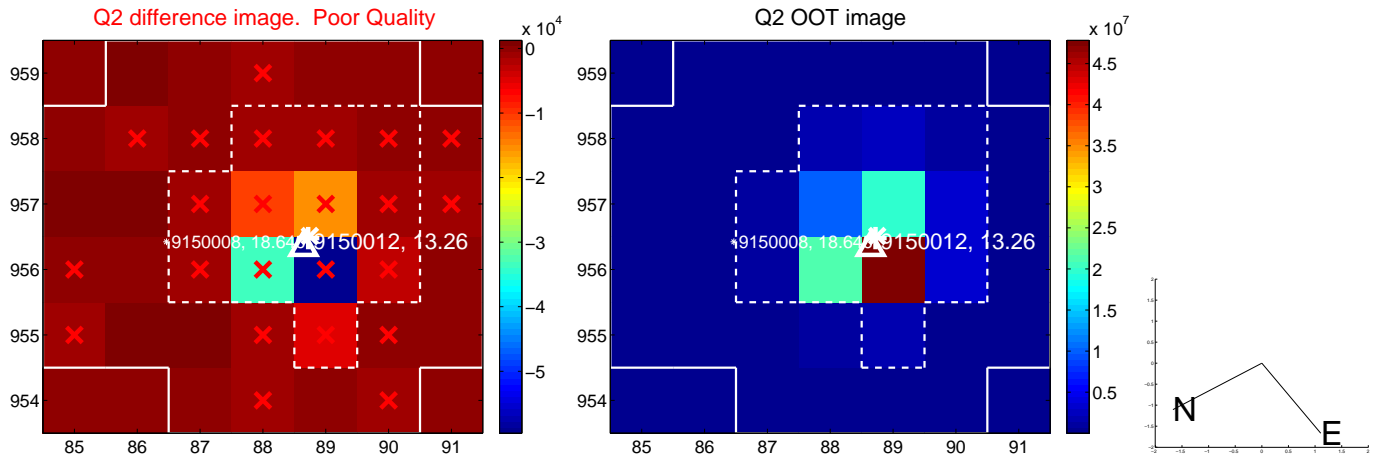
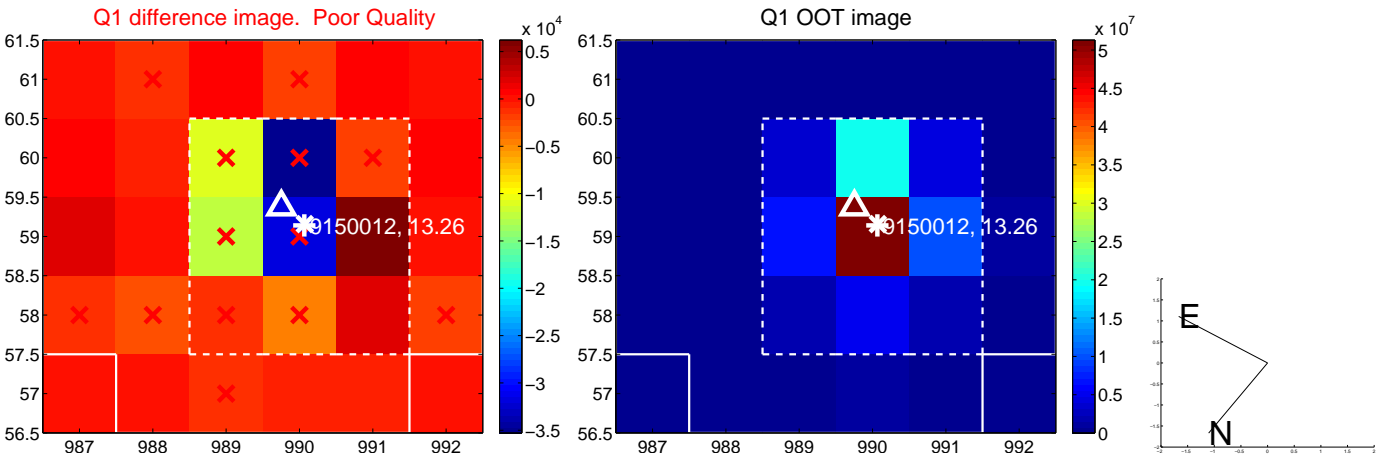
The direct PRF centroid is offset from the target star catalog position by about 0.10 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.133 \pm 0.130$	1.02	$0.131 \pm 0.129$	$0.022 \pm 0.088$
PRF-fit source offset from KIC position	$0.145 \pm 0.131$	1.11	$0.139 \pm 0.131$	$0.041 \pm 0.091$
photometric centroid source offset	$0.26 \pm 0.39$	0.66	$0.15 \pm 0.39$	$-0.21 \pm 0.40$



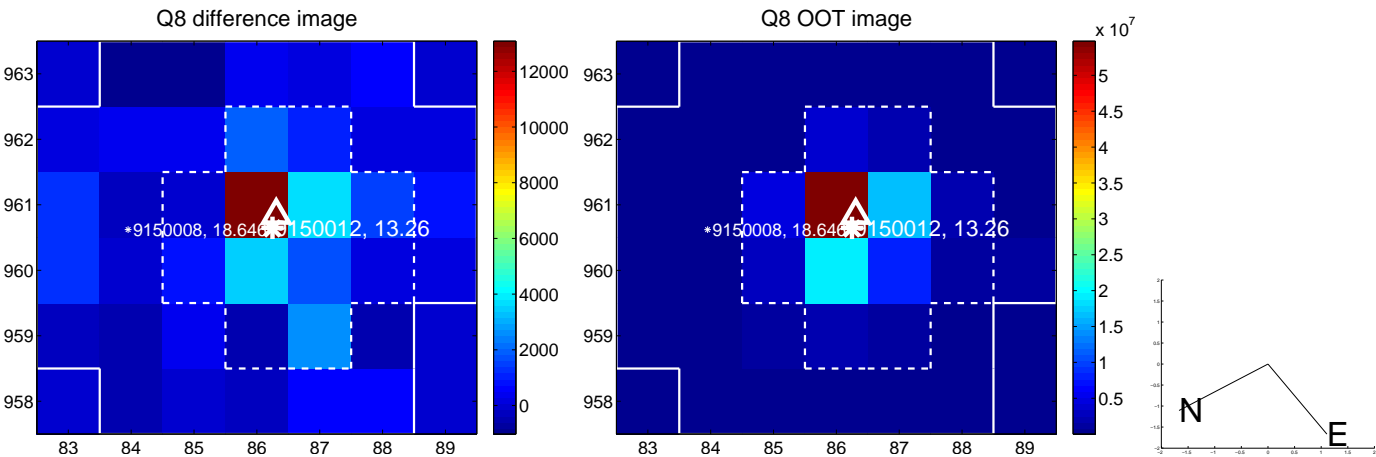
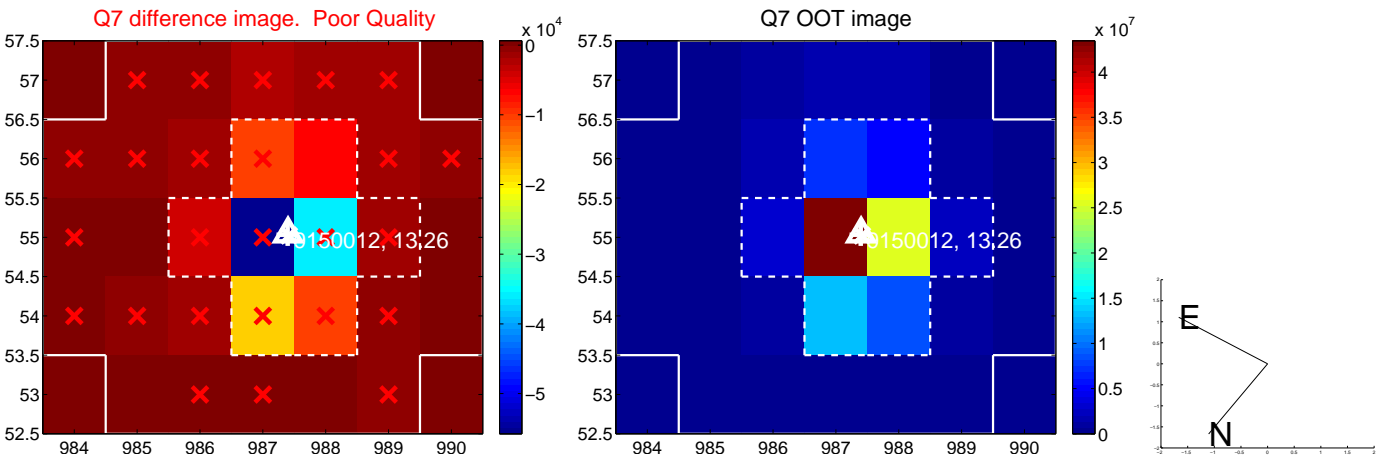
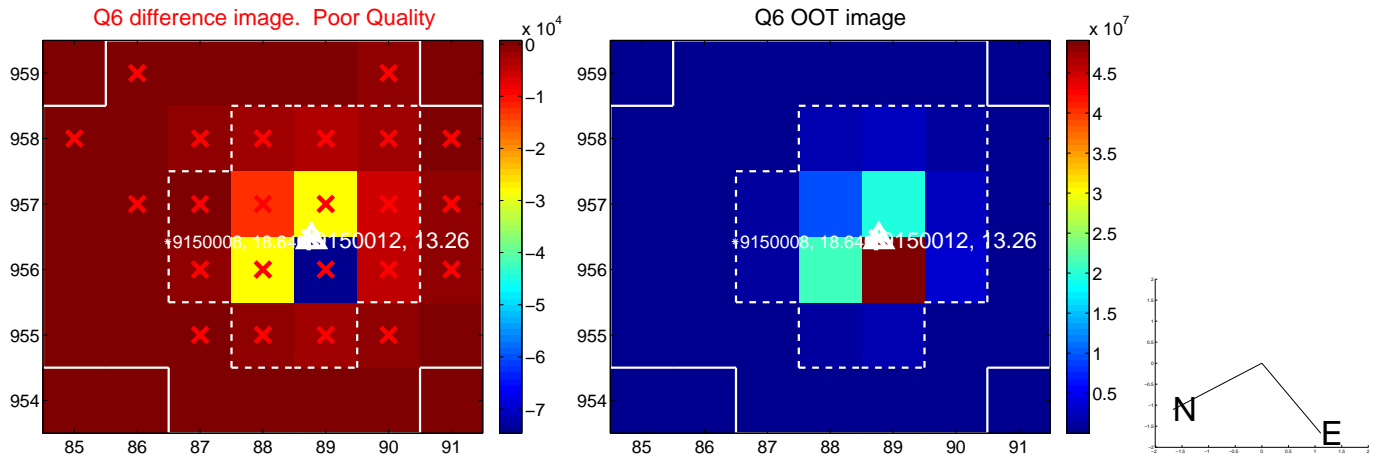
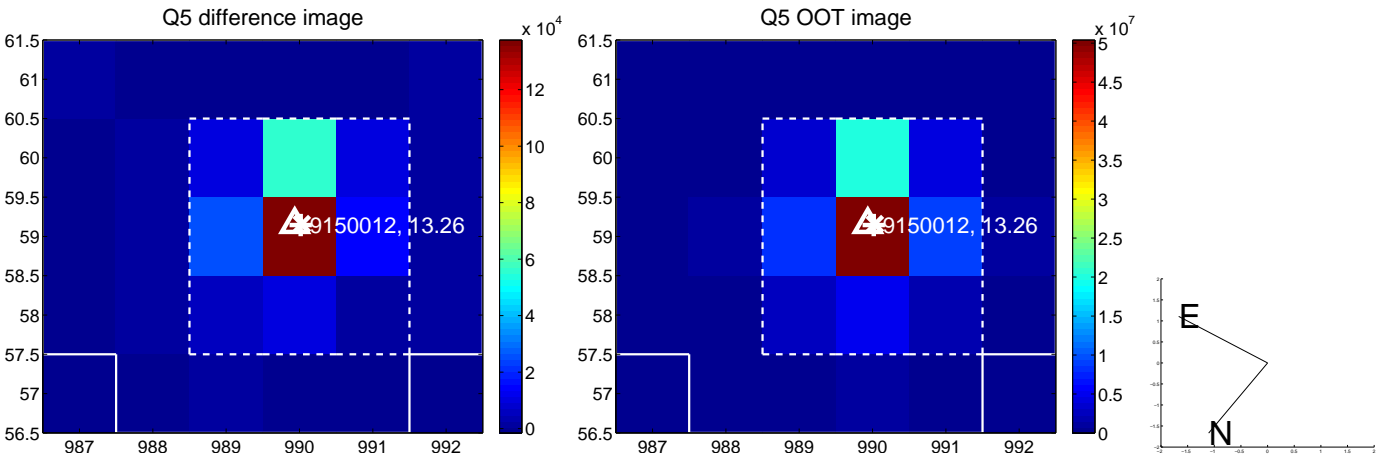
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

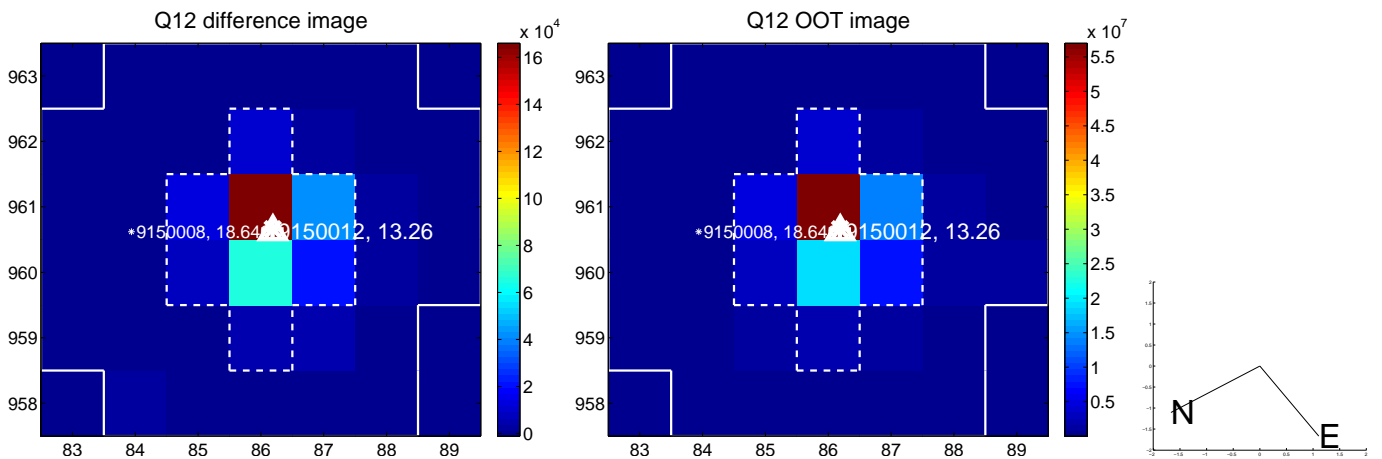
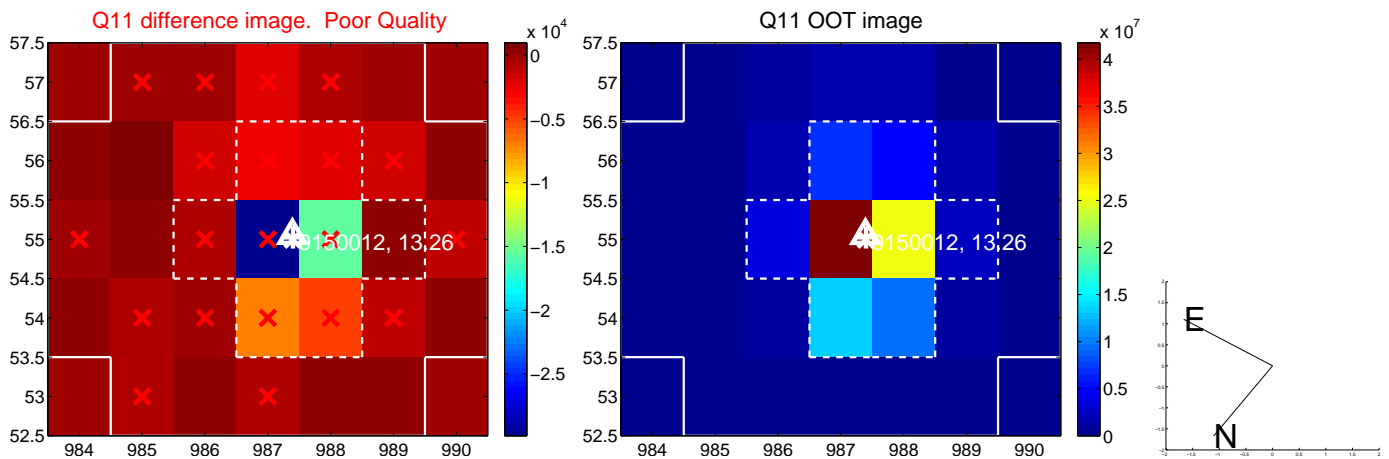
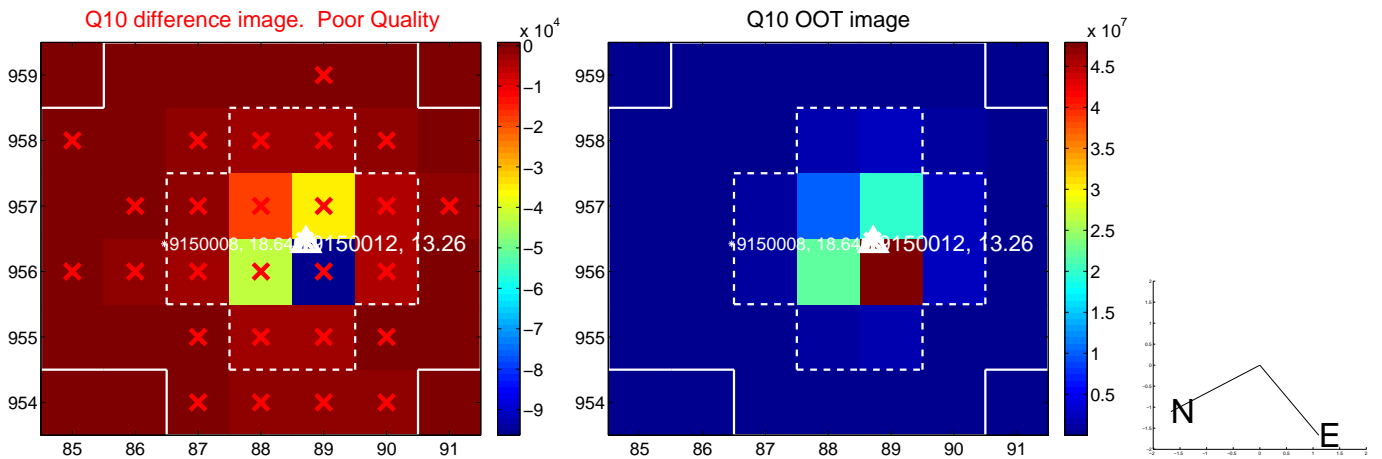
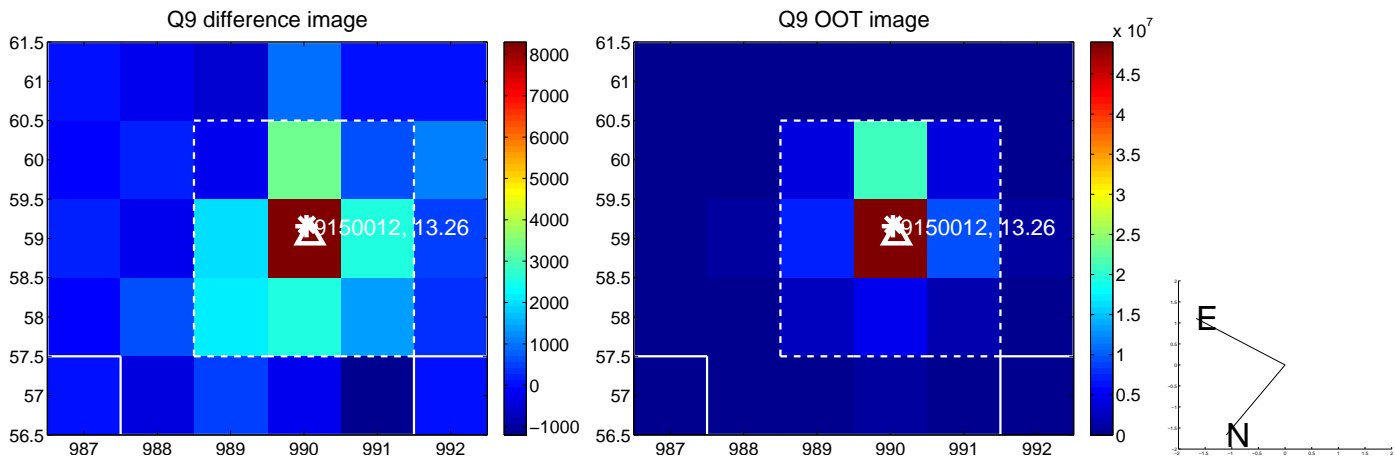




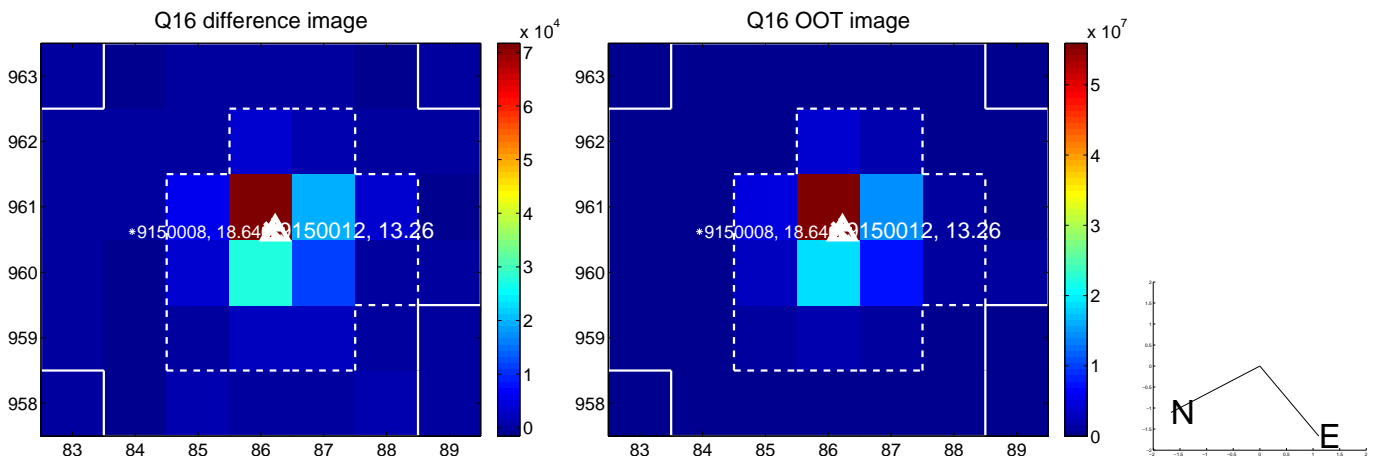
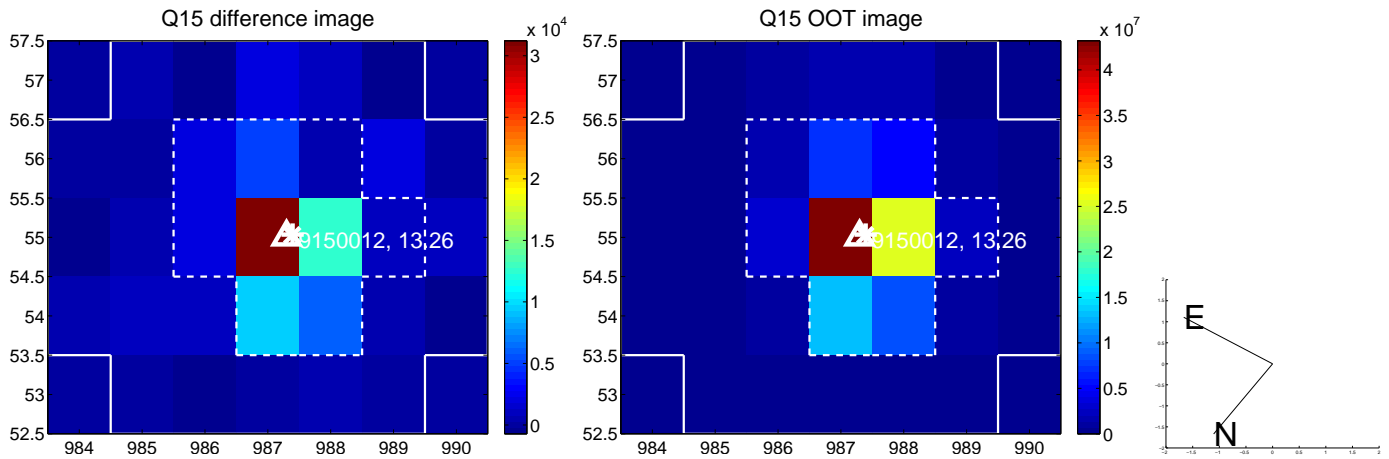
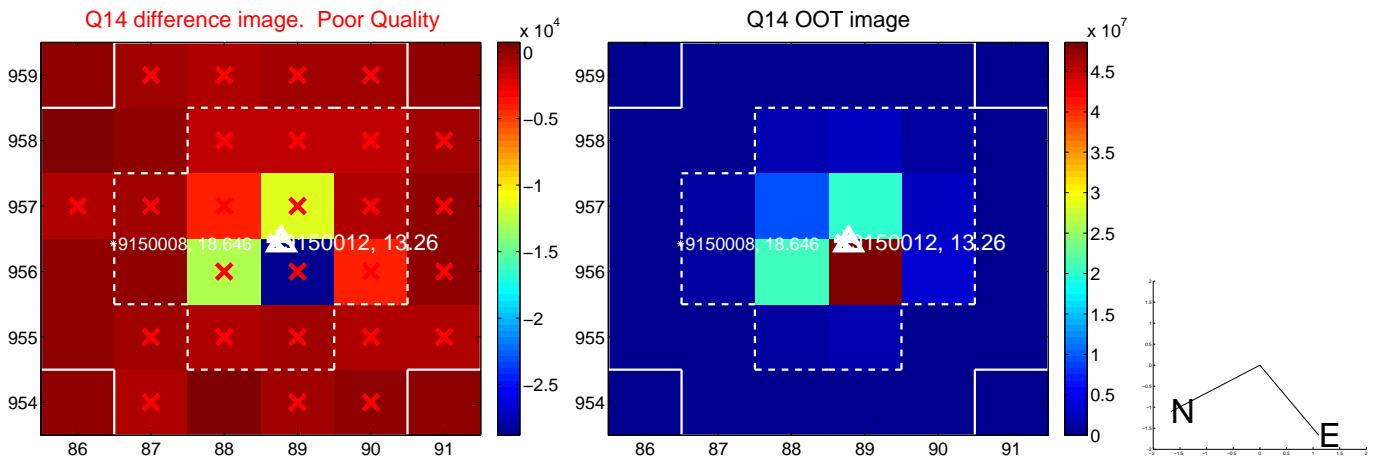
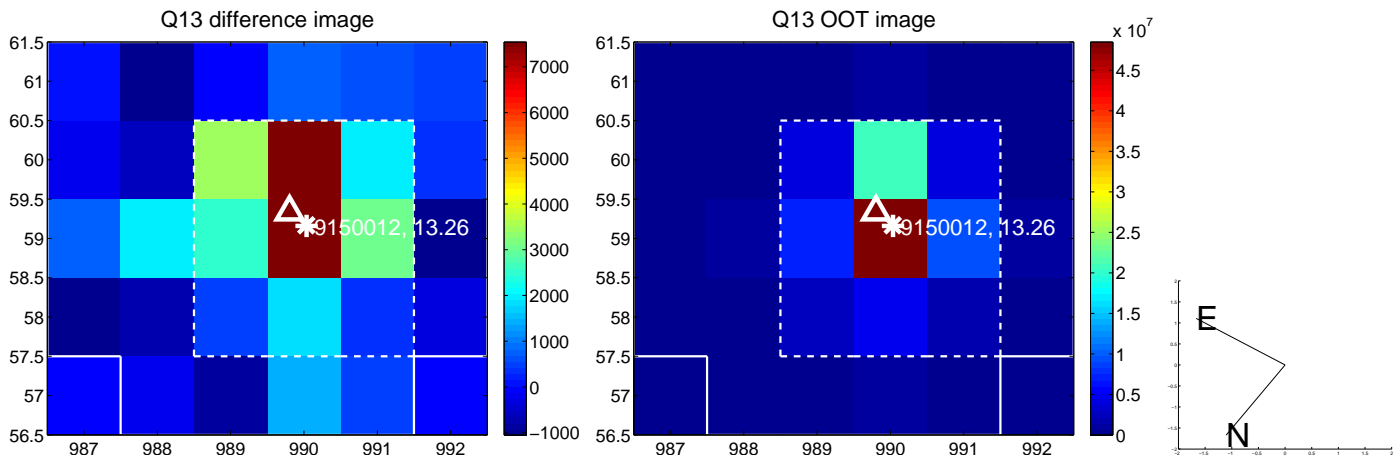
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



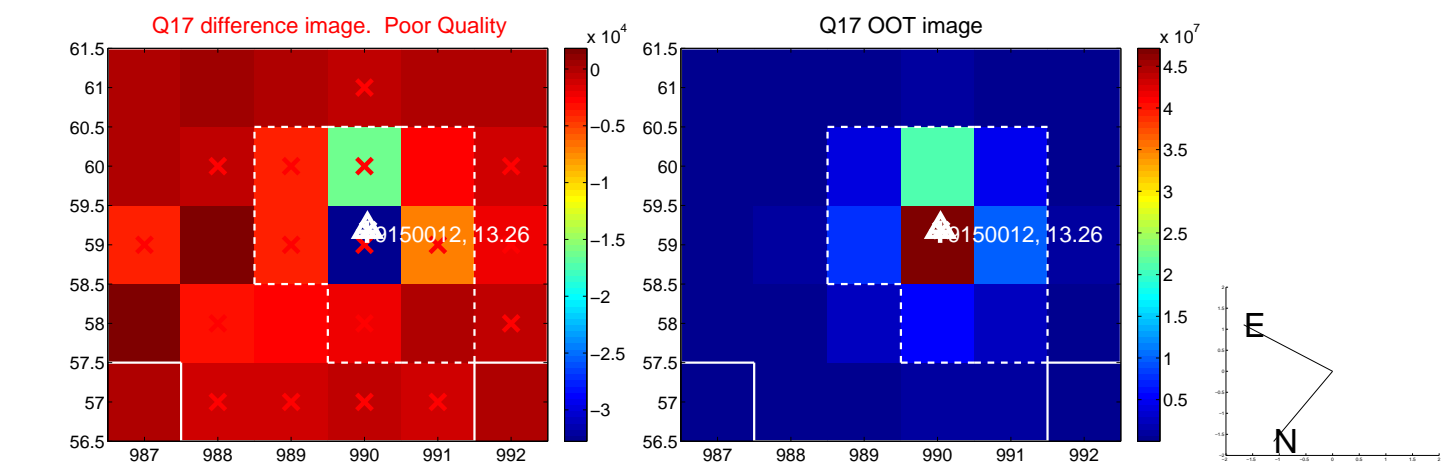
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



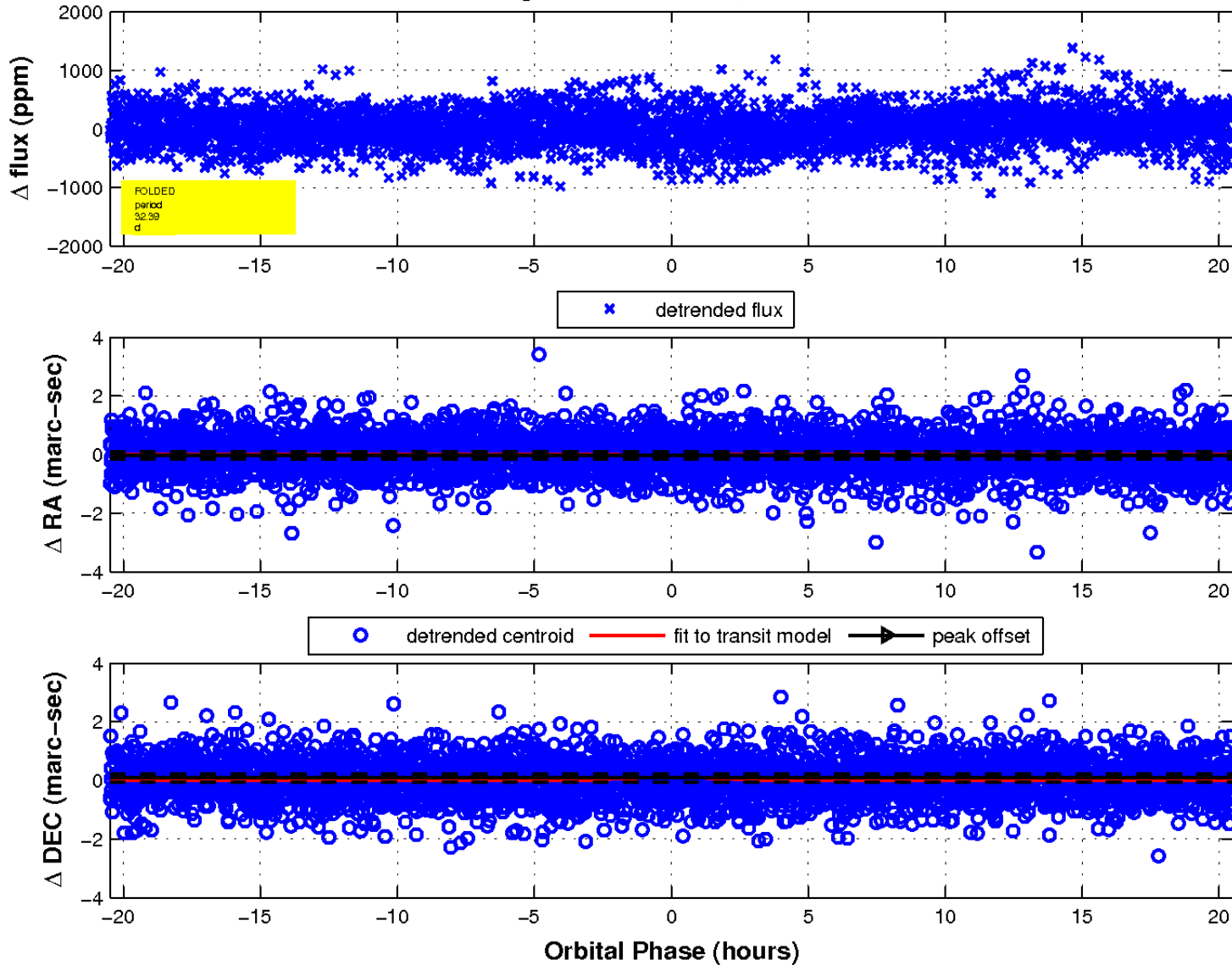
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



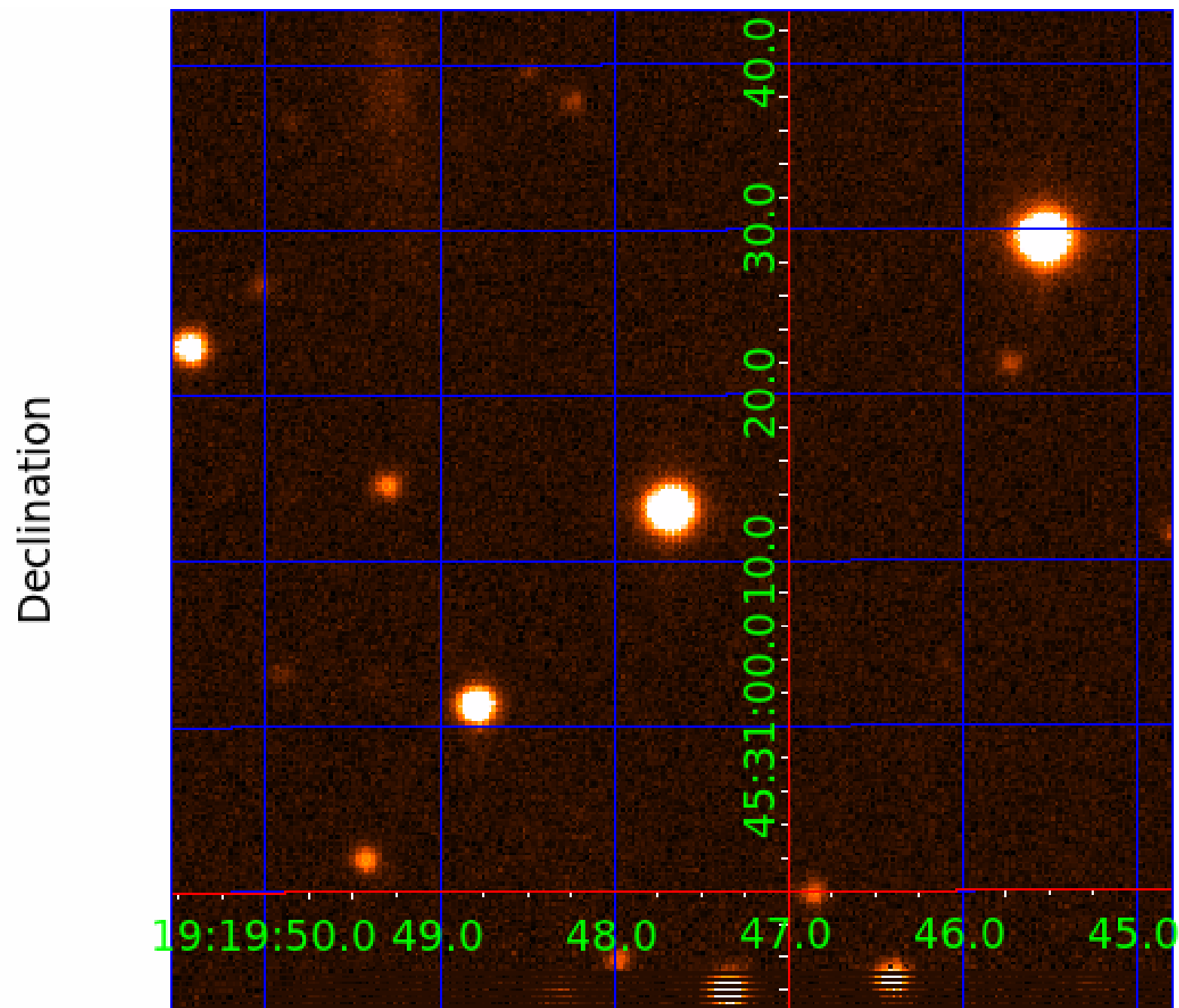
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



fluxWeightedCentroids, Planet 3 of 5



UKIRT Image





# KIC 009150012

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009150012-01	OBS	No	0.952755	132.307520	27.8	1.238	8.3	7.2	1.48	7063	0.80	11907.82
009150012-02	OBS	No	0.952880	131.809020	24.8	5.478	8.3	6.2	1.48	7063	0.79	11905.73
009150012-03	OBS	No	32.385893	152.743564	288.5	6.839	8.6	7.6	1.48	7063	3.32	108.14
009150012-04	OBS	No	33.912389	137.298834	396.2	2.637	8.7	8.7	1.48	7063	3.06	101.70
009150012-05	OBS	No	14.997715	136.947246	361.7	1.111	8.3	8.5	1.48	7063	2.95	301.84

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009150012-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT
009150012-02	OBS	FP	0.00	1	0	0	0	LPP_DV—SAME_NTL_PERIOD
009150012-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_ZUMA—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV
009150012-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV
009150012-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_TRACKER—TRANS_GAPPED

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

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

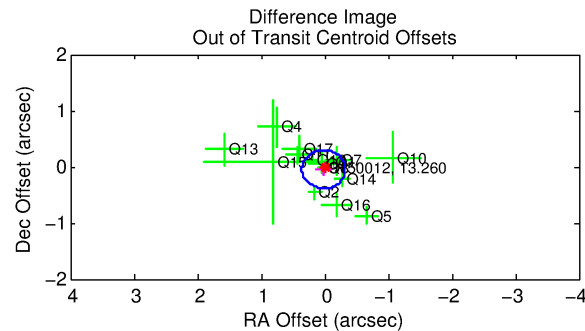
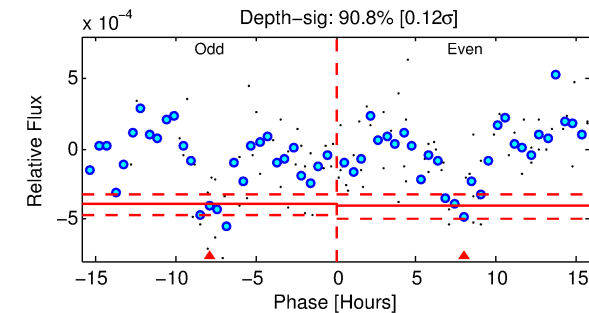
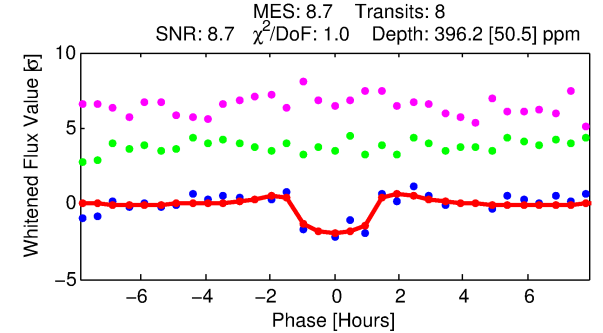
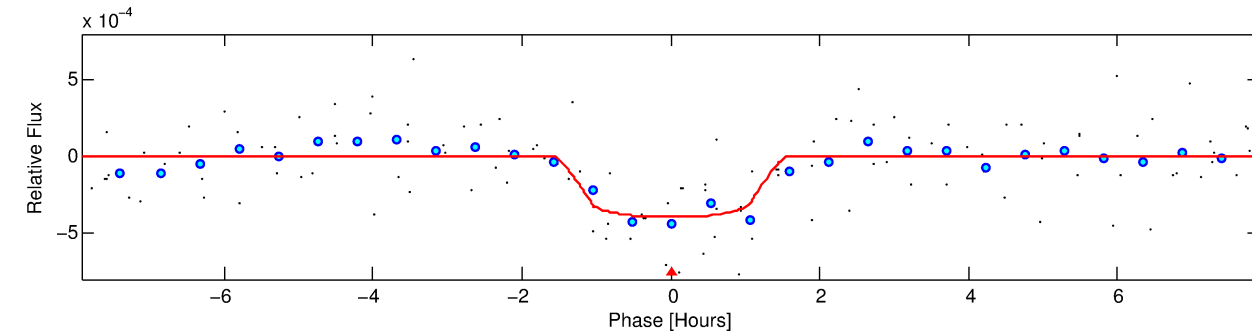
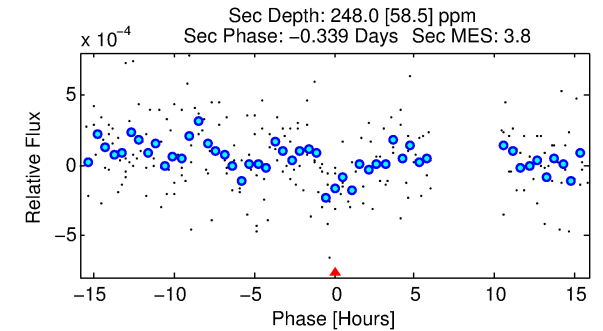
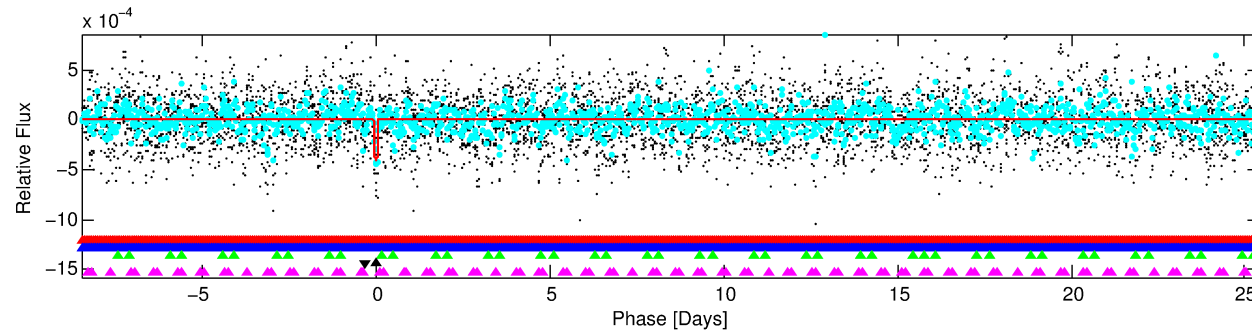
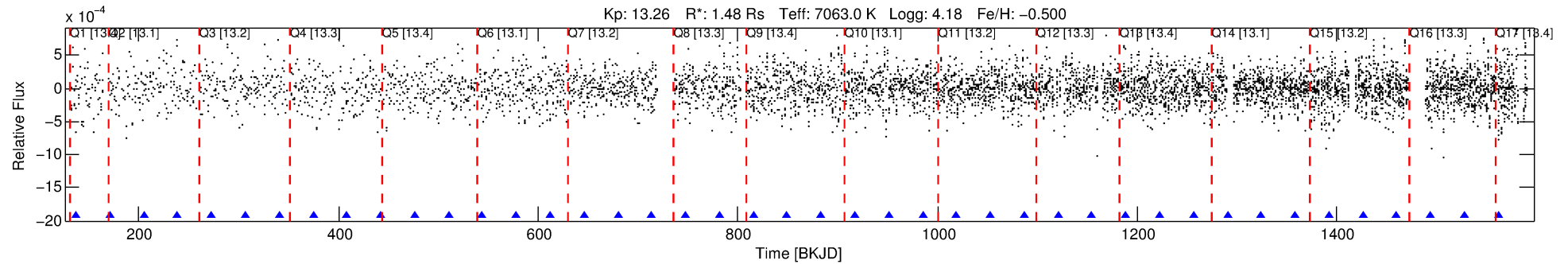
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 009150012-04

No Significant Match Found

# DV One-Page Summary

KIC: 9150012 Candidate: 4 of 5 Period: 33.912 d



## DV Fit Results:

Period = 33.91239 [0.00034] d  
Epoch = 137.2988 [0.0110] BKJD  
Rp/R\* = 0.0189 [0.0233]  
a/R\* = 87.61 [629.43]  
b = 0.49 [11.09]  
Seff = 101.70 [36.00]  
Teff = 810 [72] K  
Rp = 3.06 [3.87] Re  
a = 0.2197 [0.0497] AU  
Ag = 702.13 [1755.97] [0.40σ]  
Teffp = 6445 [4002] K [1.41σ]

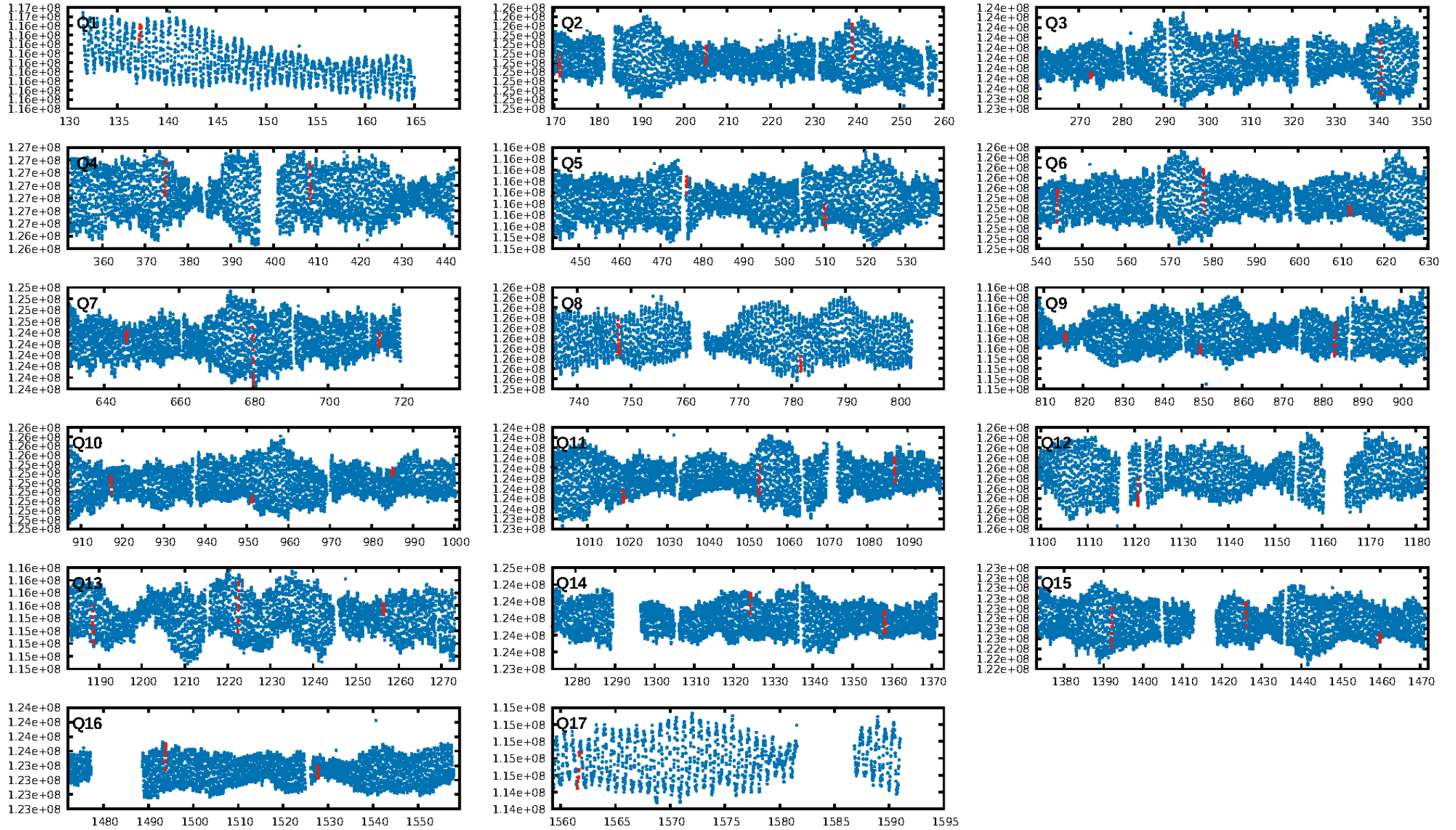
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [5.00σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 23.6%  
ModelChiSquareGof-sig: 100.0%  
**Bootstrap-pfa: 1.83e-11**  
RollingBand-fgt: 1.00 [7/7]  
**GhostDiagnostic-chr: 0.5794**  
Centroid-sig: 82.2%  
Centroid-so: 0.280 arcsec [0.76σ]  
OotOffset-rm: 0.052 arcsec [0.46σ]  
KicOffset-rm: 0.053 arcsec [0.46σ]  
OotOffset-st: 3/3/4/5 [15]  
KicOffset-st: 3/3/4/5 [15]  
DiffImageQuality-fgm: 0.60 [9/15]  
DiffImageOverlap-fno: 0.00 [0/17]

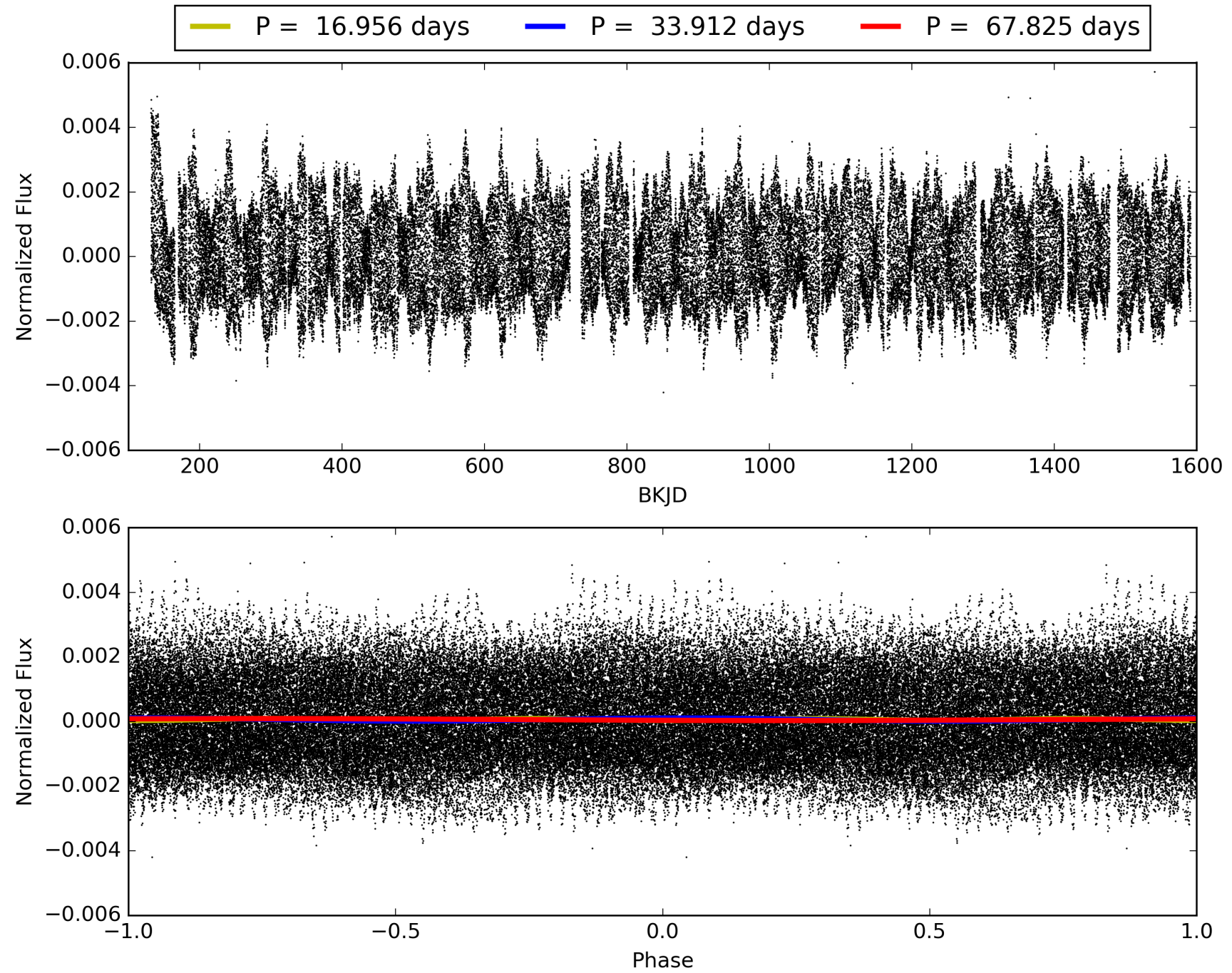
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 10:23:28 Z

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

# TCE 009150012-04, PDC Light Curves

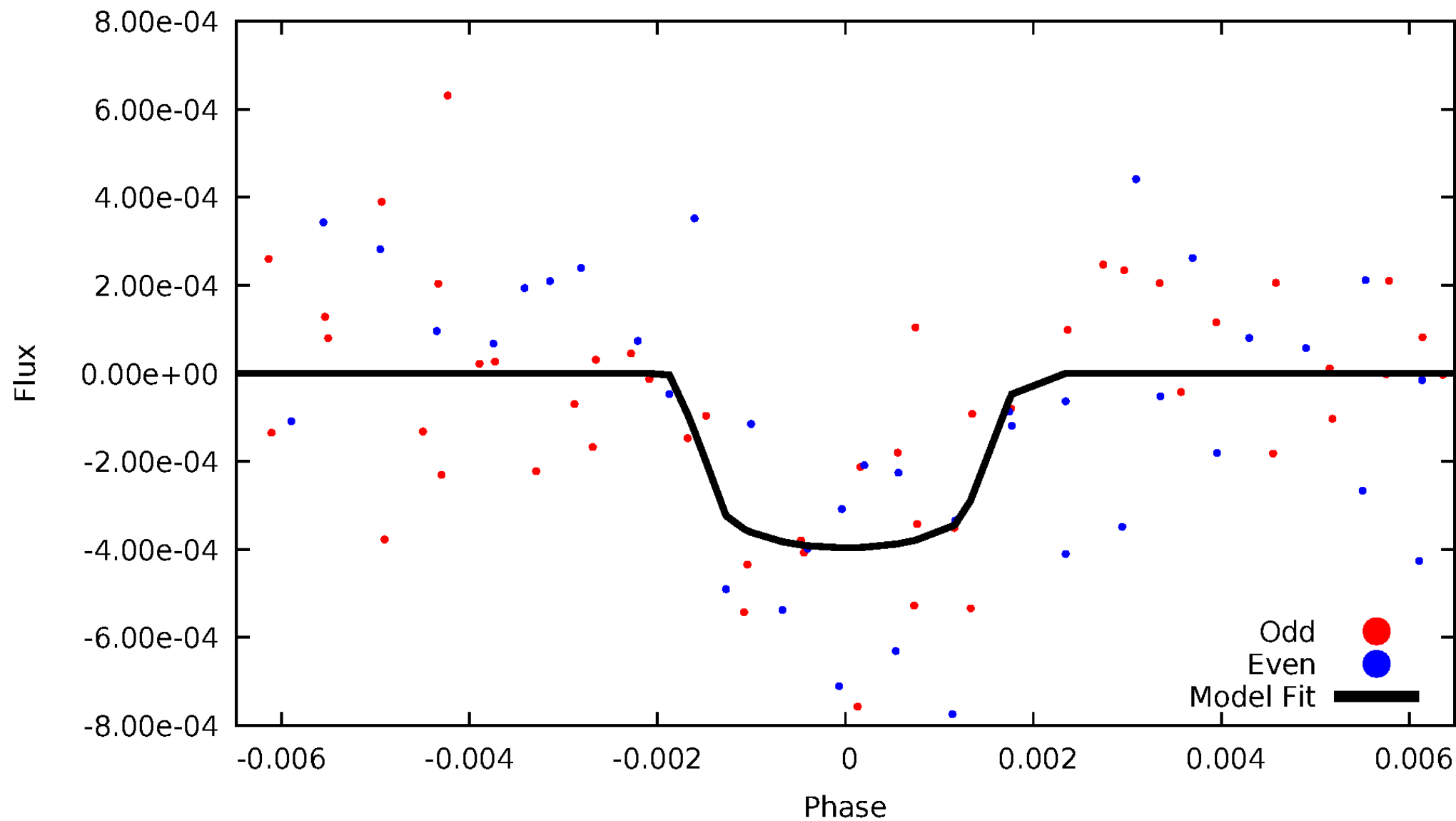


TCE 009150012-04



# DV Odd/Even

TCE 009150012-04





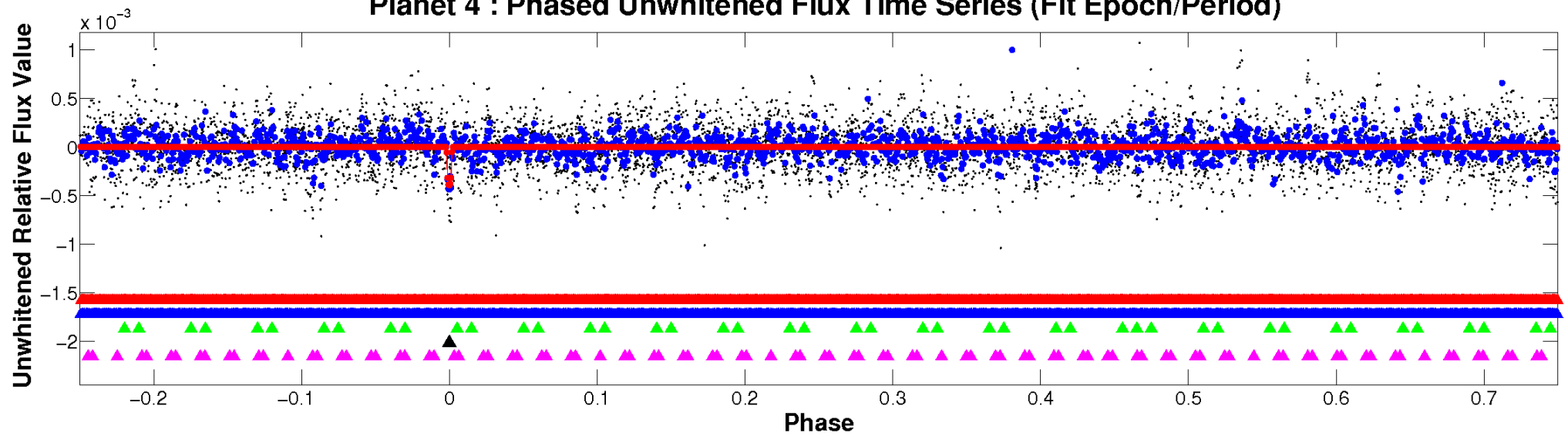


ALT Odd/Even

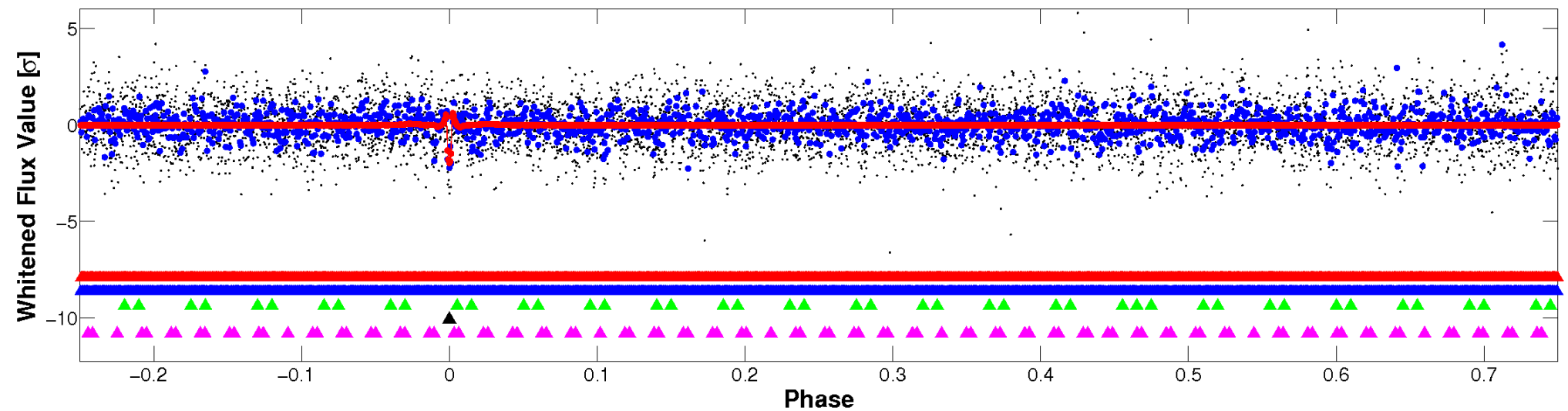
This plot does not exist for this TCE.

# Non-Whitened Vs. Whitened Light Curve

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

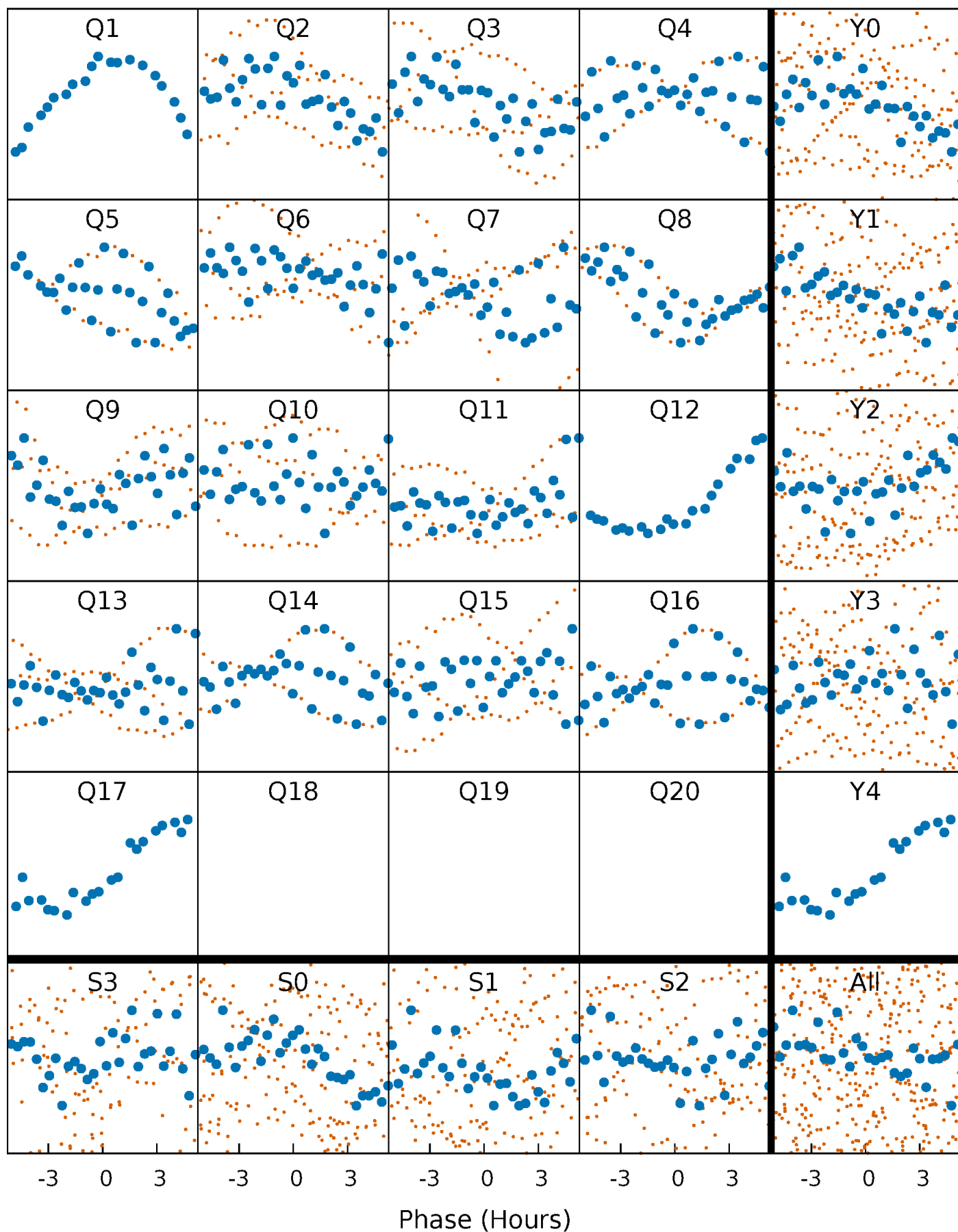


## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



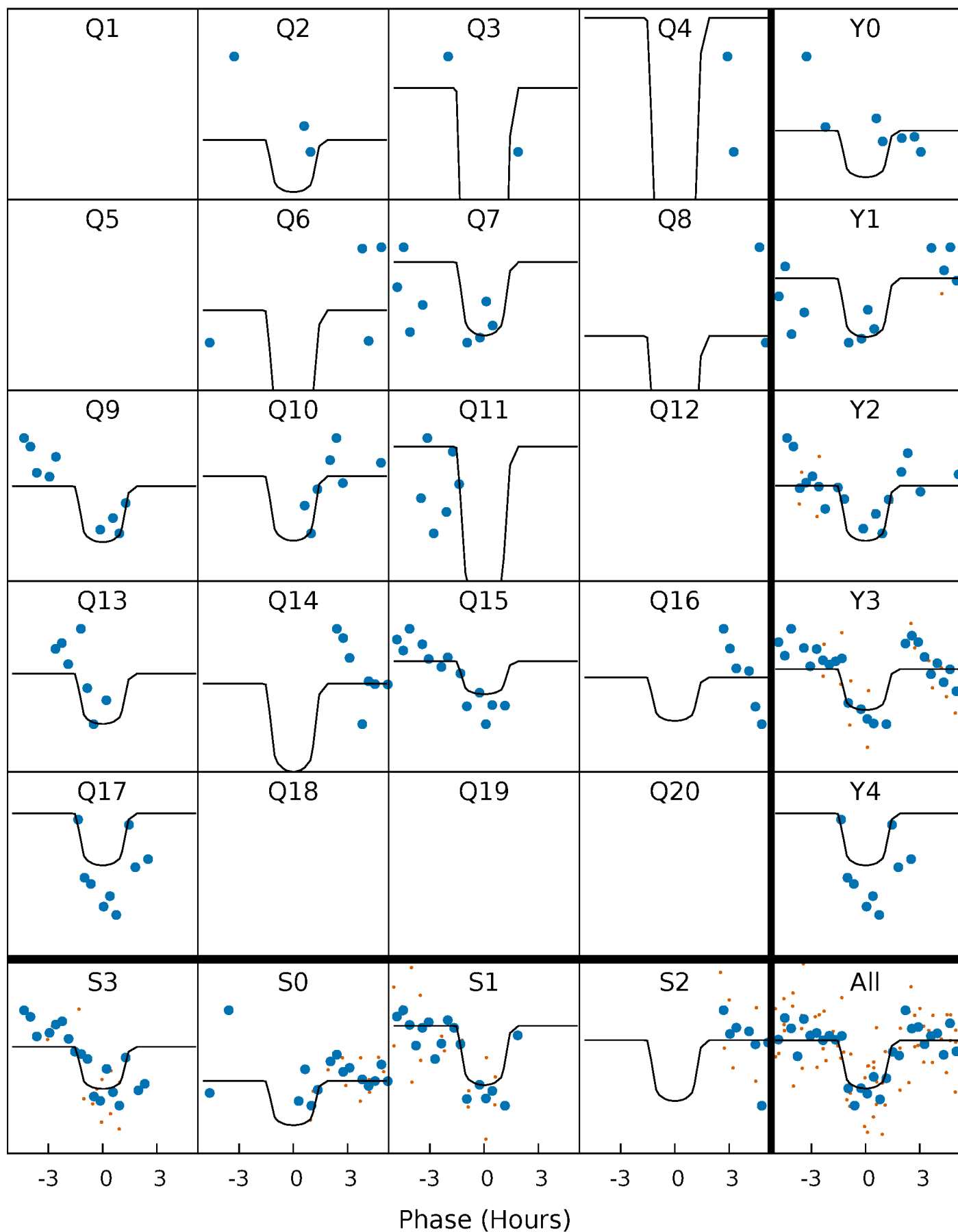
# PDC Quarter-Phased Transit Curves

TCE 009150012-04 P= 33.912389 Days  $T_0=137.298834$  (BKJD)



# DV Quarter-Phased Transit Curves

TCE 009150012-04 P= 33.912389 Days  $T_0=137.298834$  (BKJD)

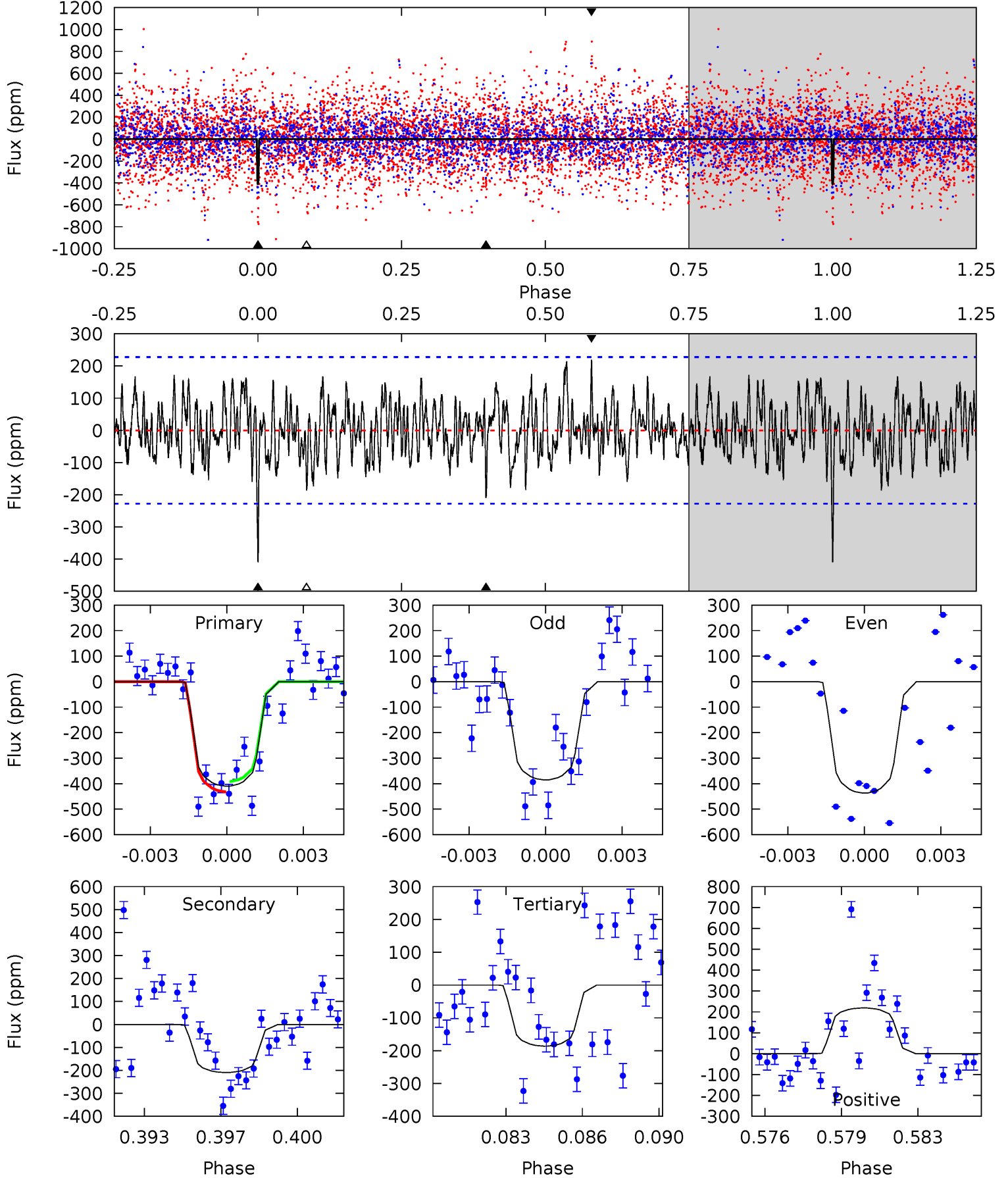


This plot does not exist for this TCE.

# DV Model-Shift Uniqueness Test

009150012-04, P = 33.912389 Days, E = 103.386445 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.41	4.81	4.27	5.03	5.23	2.92	1.64	5.13	4.38	0.54	-0.22	0.61	1.12	0.35	0.46





## Alt Model-Shift Uniqueness Test

This plot does not exist for this TCE.

### Stellar Parameters For KIC 009150012

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7063^{+200}_{-250}$	$4.185^{+0.175}_{-0.175}$	$-0.500^{+0.250}_{-0.300}$	$1.484^{+0.405}_{-0.331}$	$1.229^{+0.169}_{-0.169}$	$0.529^{+0.489}_{-0.257}$
	+3%/-4%	+4%/-4%	+50%/-60%	+27%/-22%	+14%/-14%	+92%/-48%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 009150012-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-210 \pm 44$	$3.76^{+3.55}_{-2.44}$	$1130^{+83}_{-73}$	$5454^{+4773}_{-1246}$	$390^{+2817}_{-291}$
Alt.	N/A	N/A	N/A	N/A	N/A

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

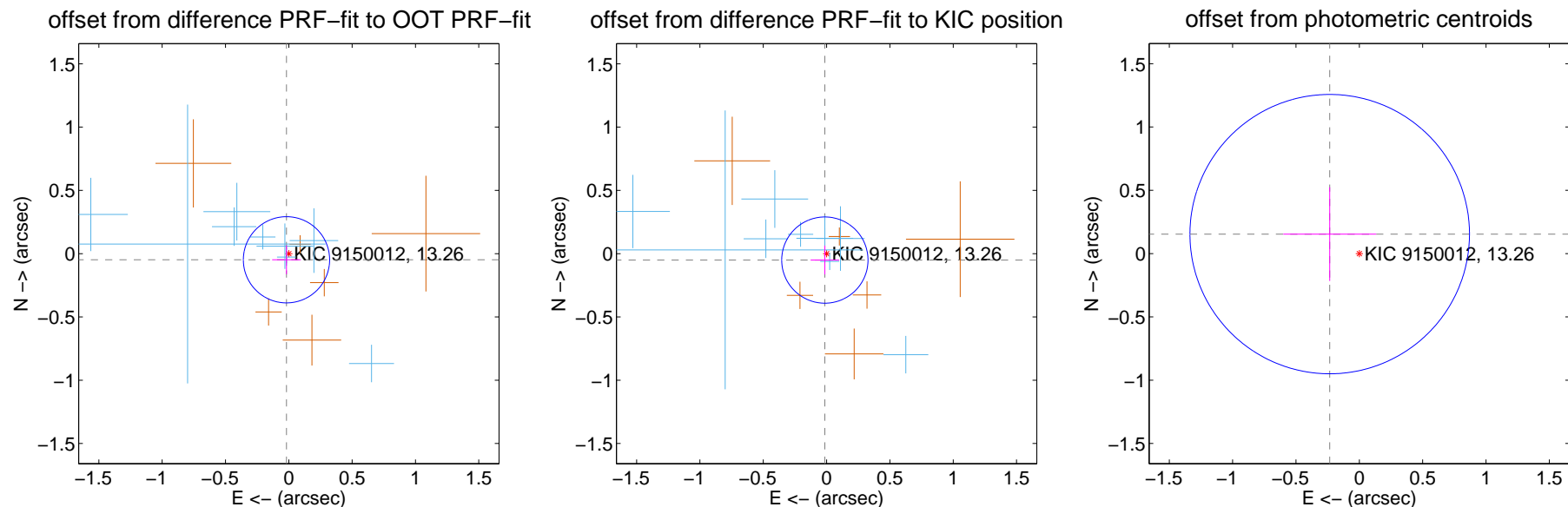
## DV Centroid Data

Supplemental centroid analysis for 009150012-04. Kepler magnitude: 13.26. Transit SNR 8.74

There are 9 quarters with good PRF difference image offsets

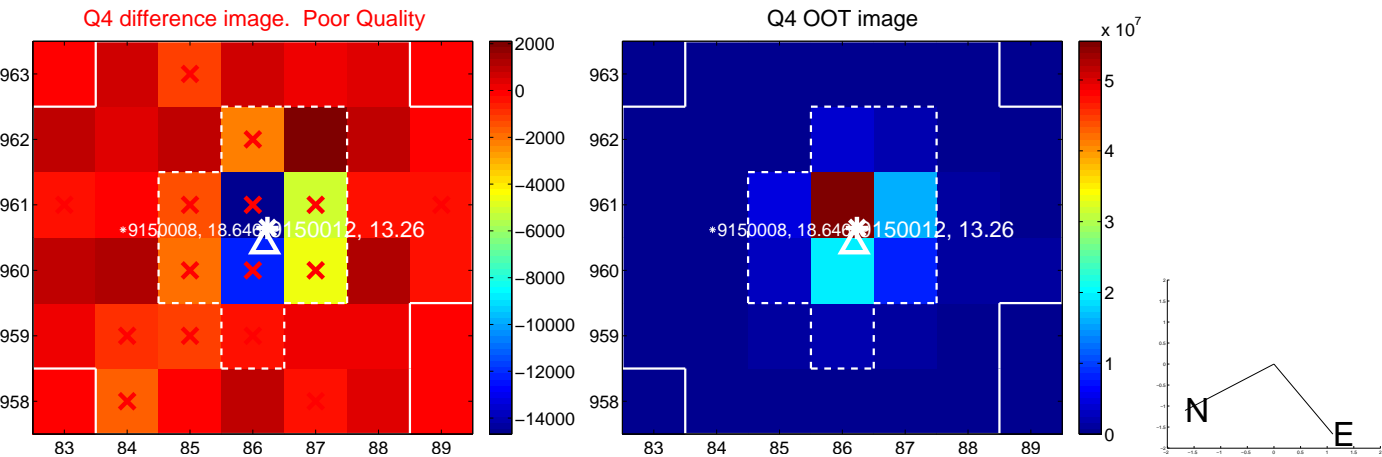
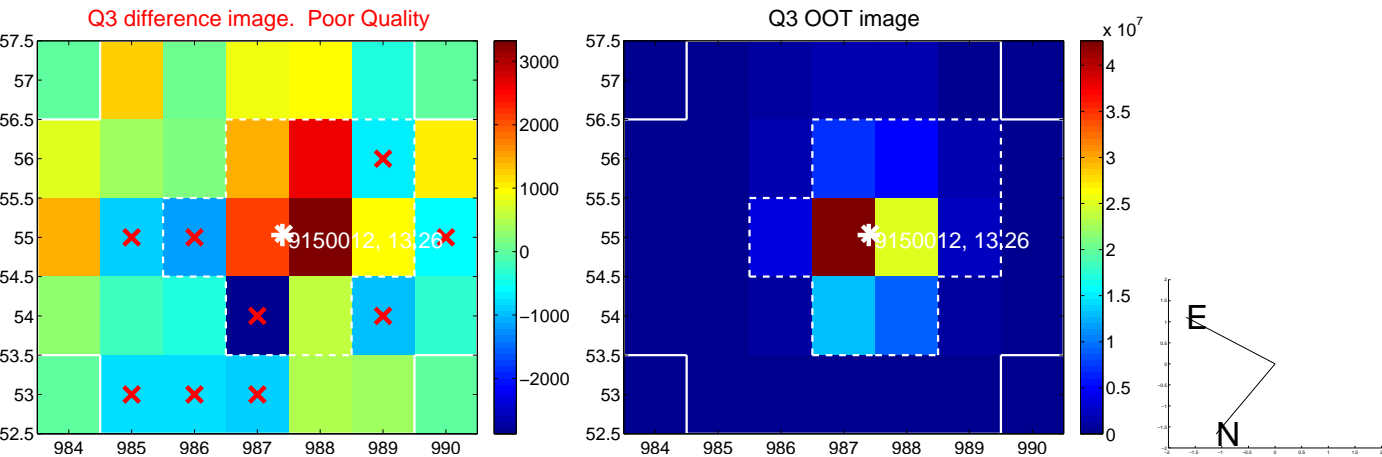
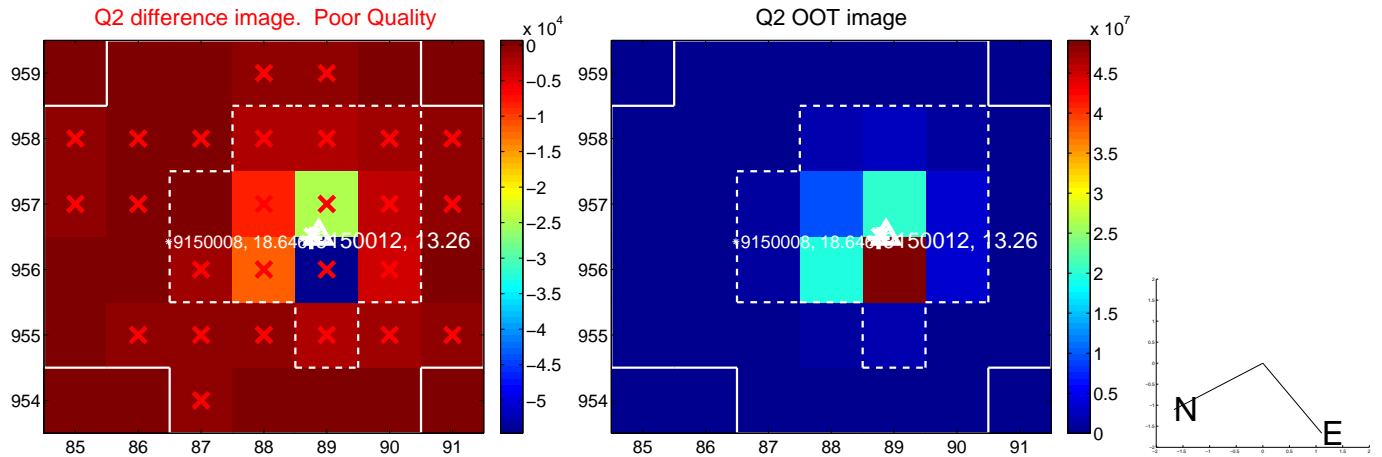
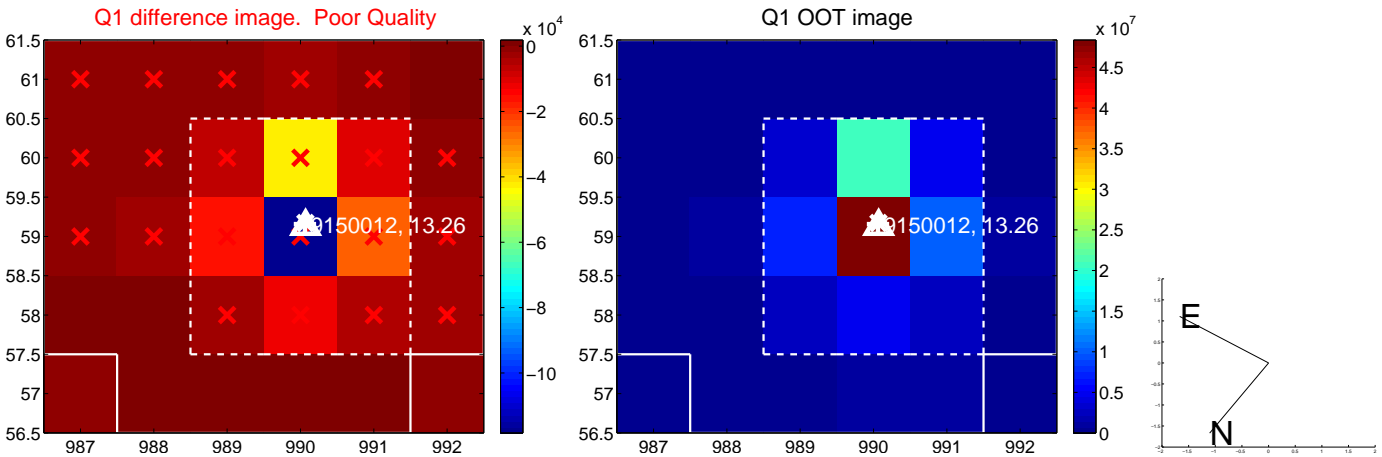
The direct PRF centroid is offset from the target star catalog position by about 0.10 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.052 \pm 0.114$	0.46	$0.018 \pm 0.113$	$-0.048 \pm 0.114$
PRF-fit source offset from KIC position	$0.053 \pm 0.114$	0.46	$0.014 \pm 0.113$	$-0.051 \pm 0.114$
photometric centroid source offset	$0.28 \pm 0.37$	0.76	$0.23 \pm 0.37$	$0.15 \pm 0.37$

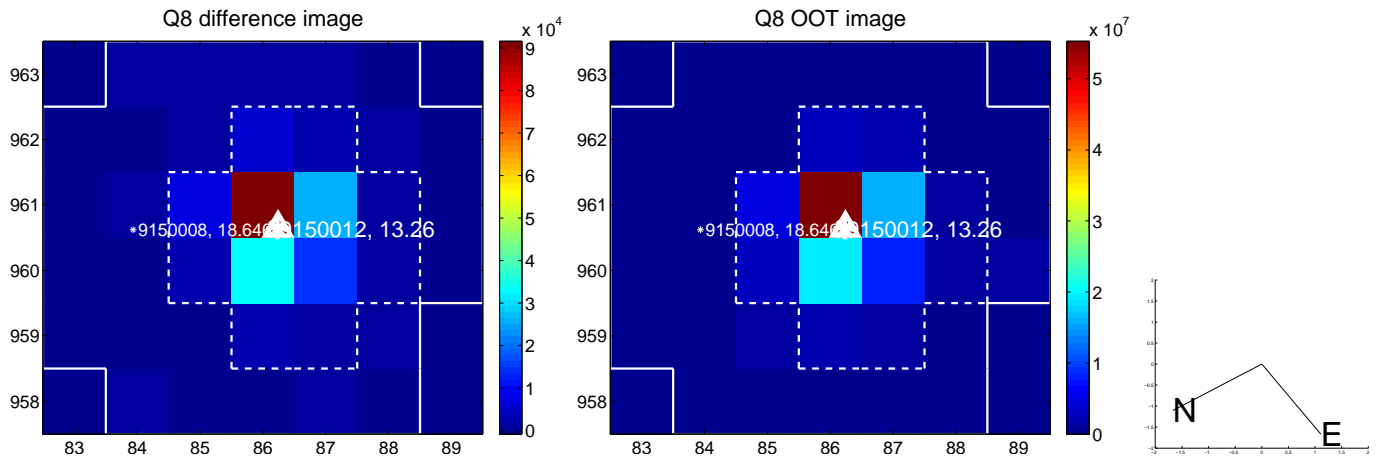
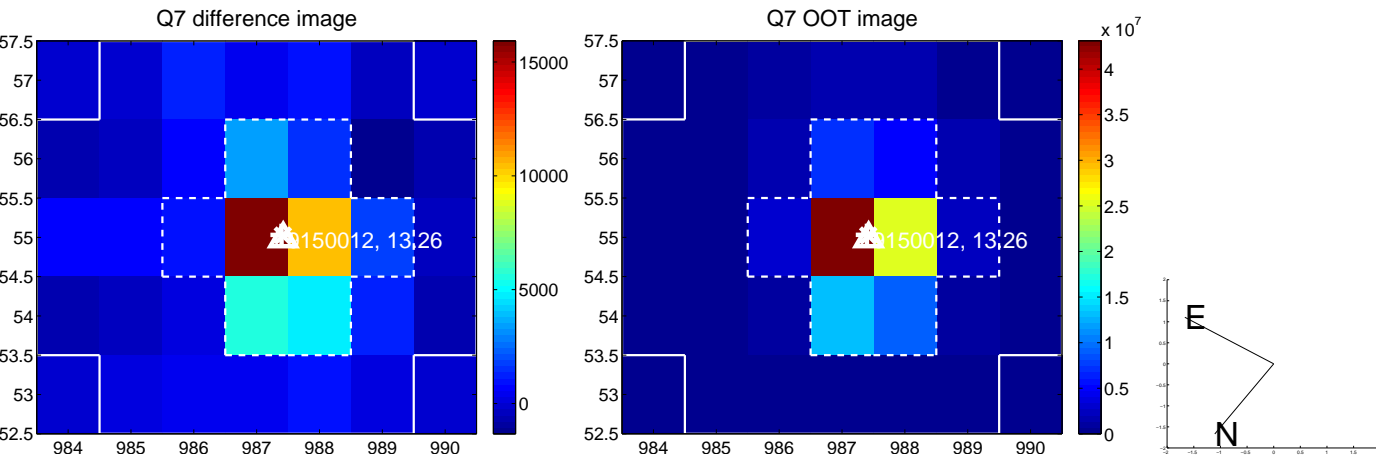
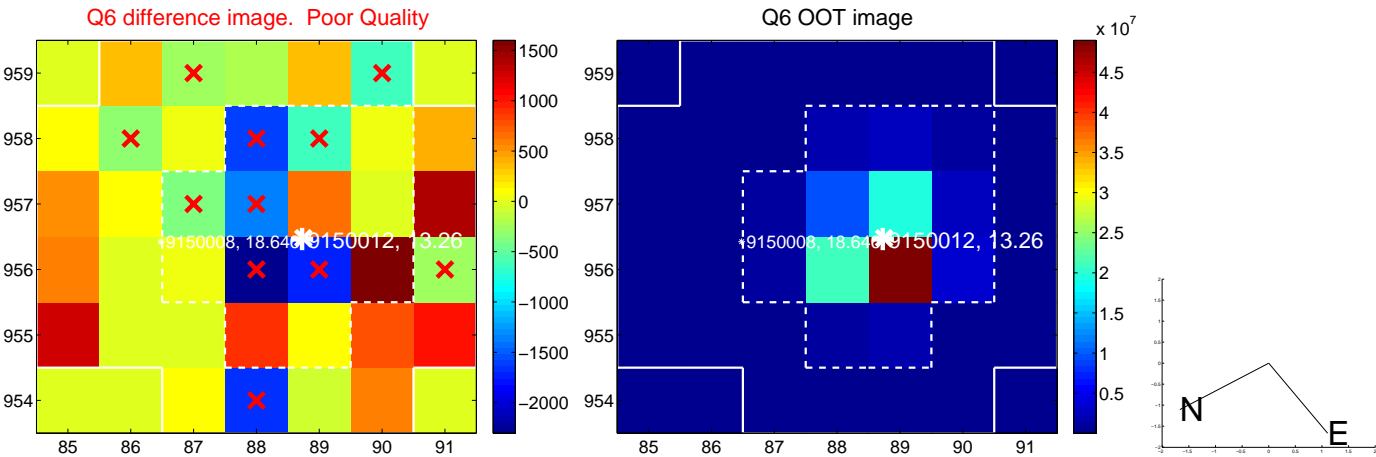
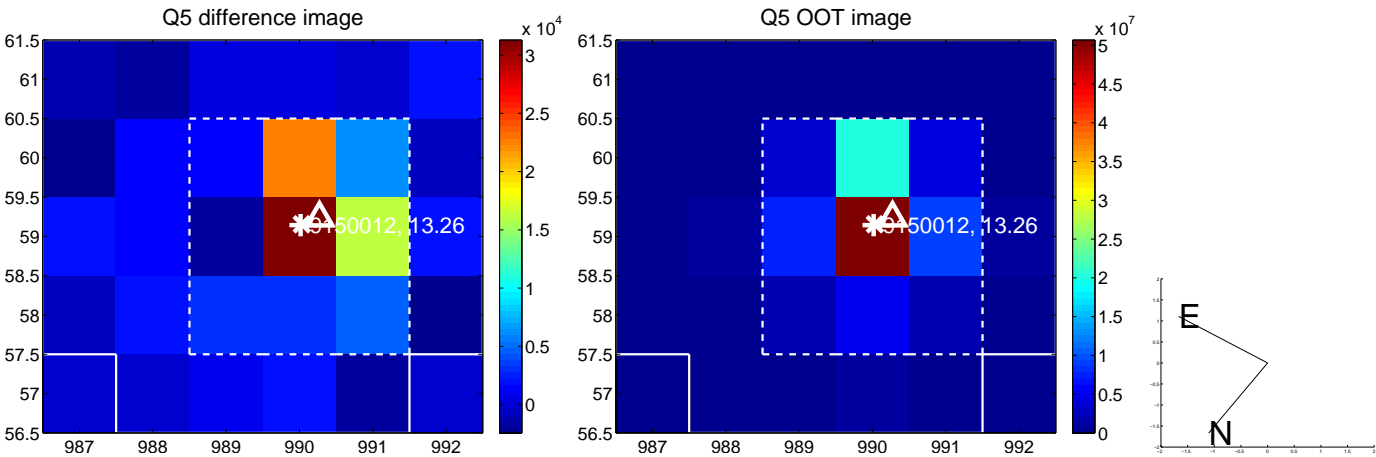


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

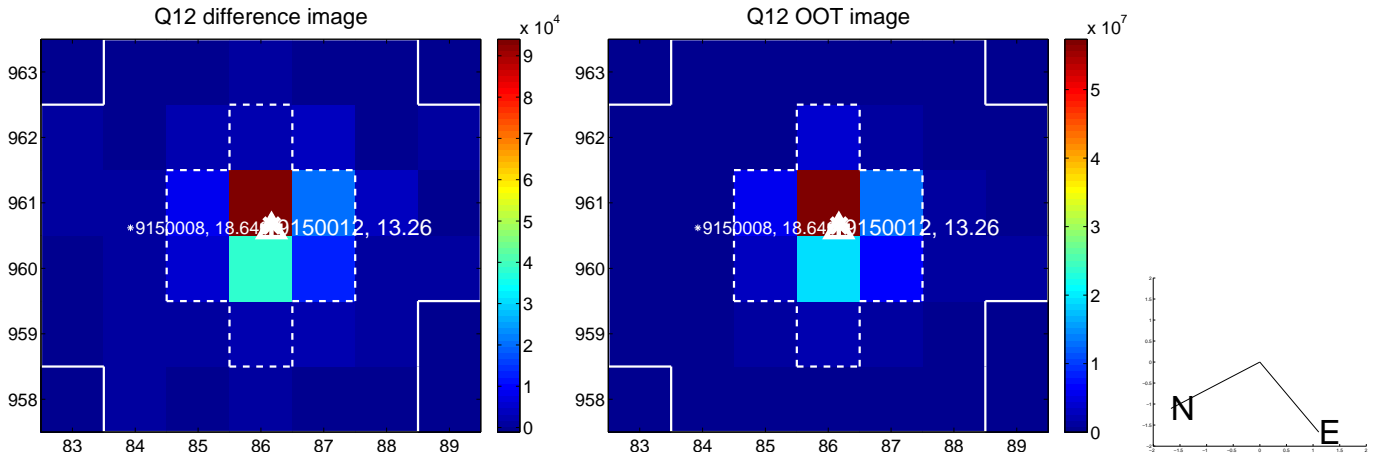
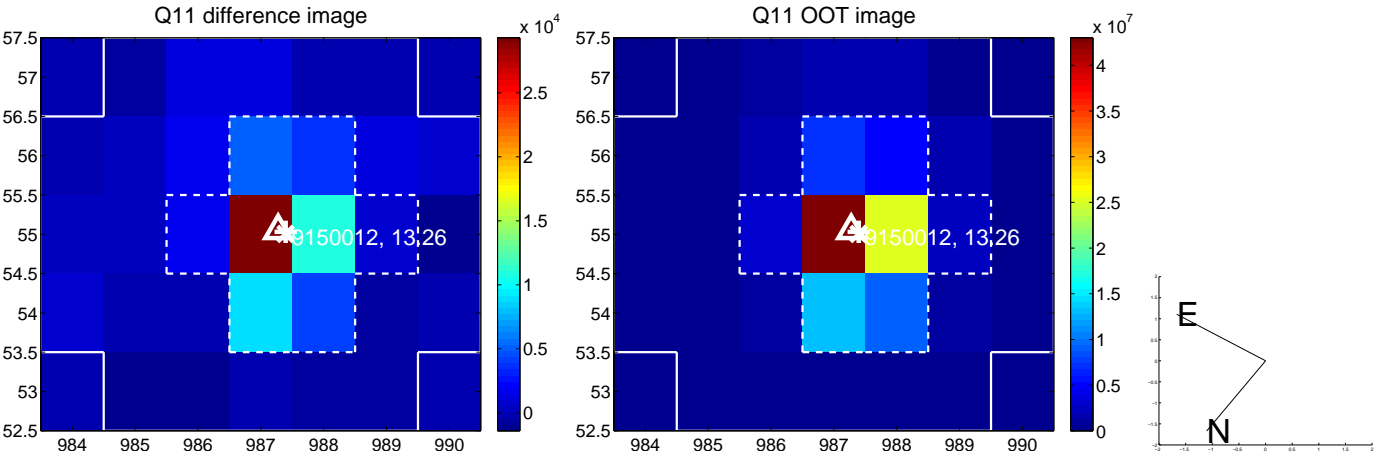
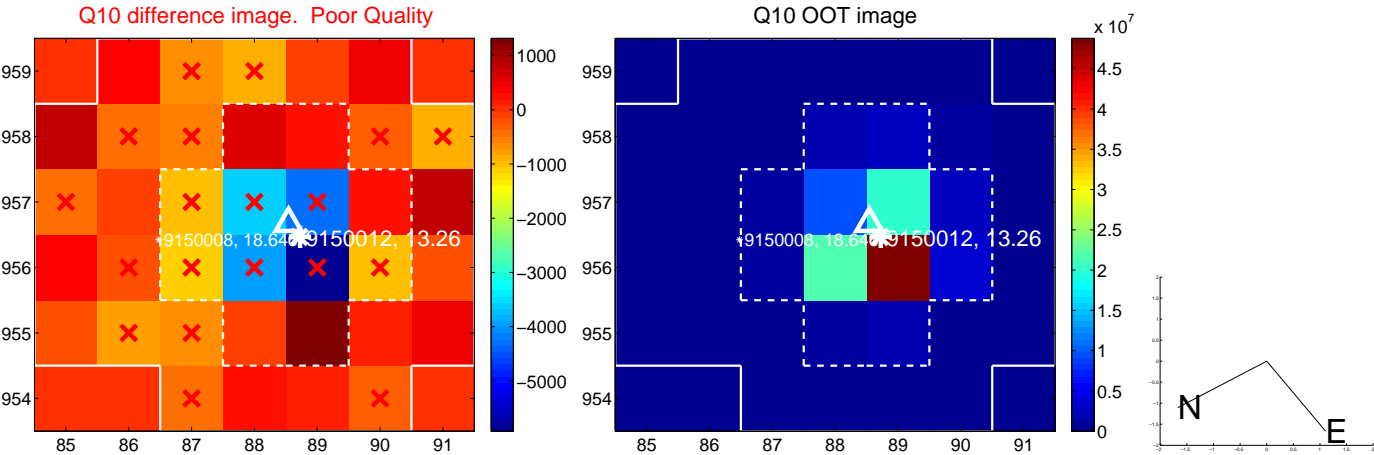
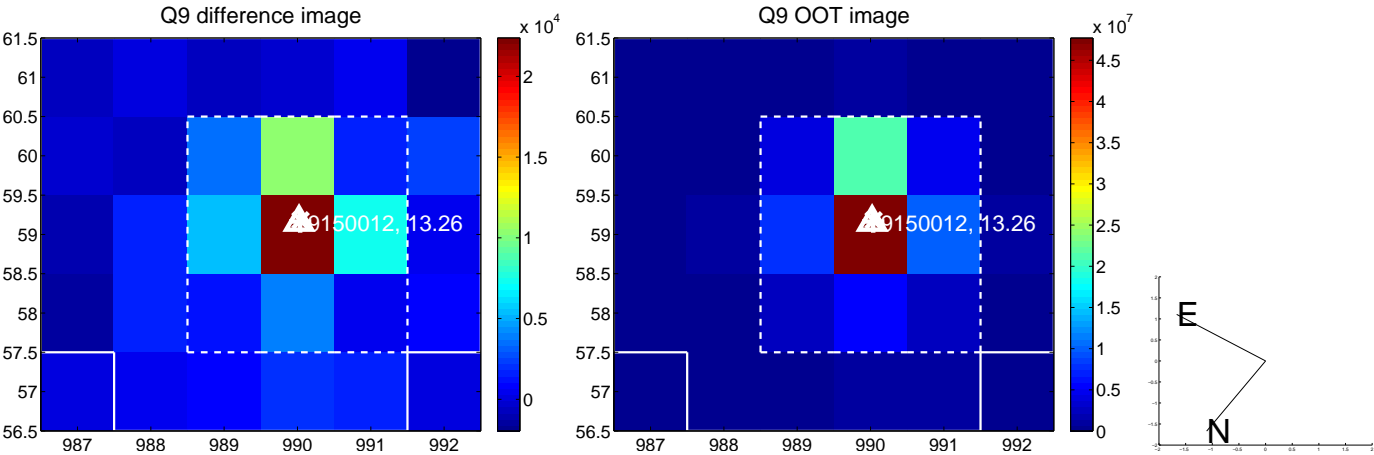
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



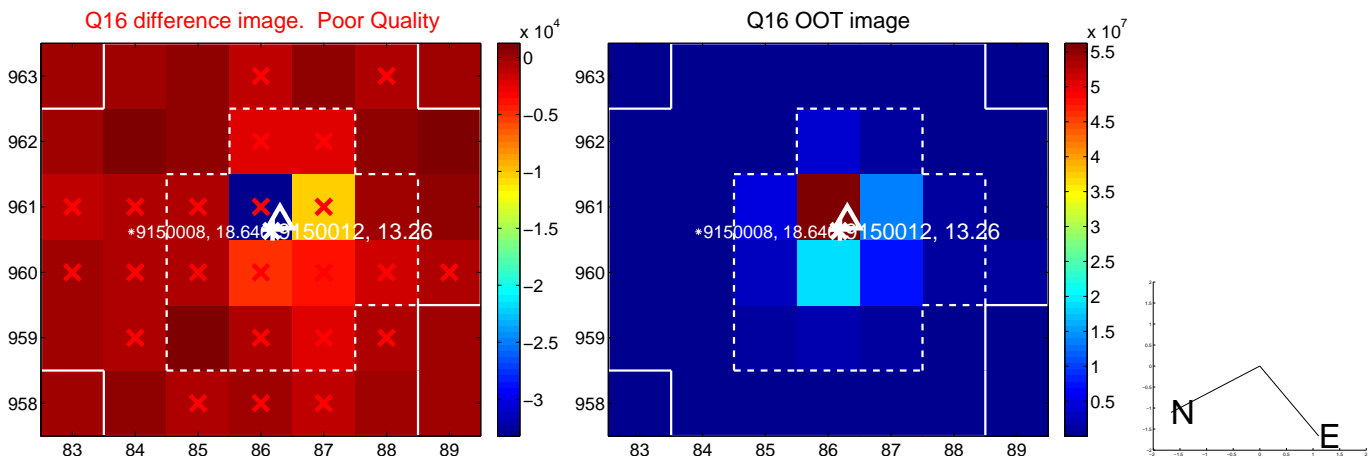
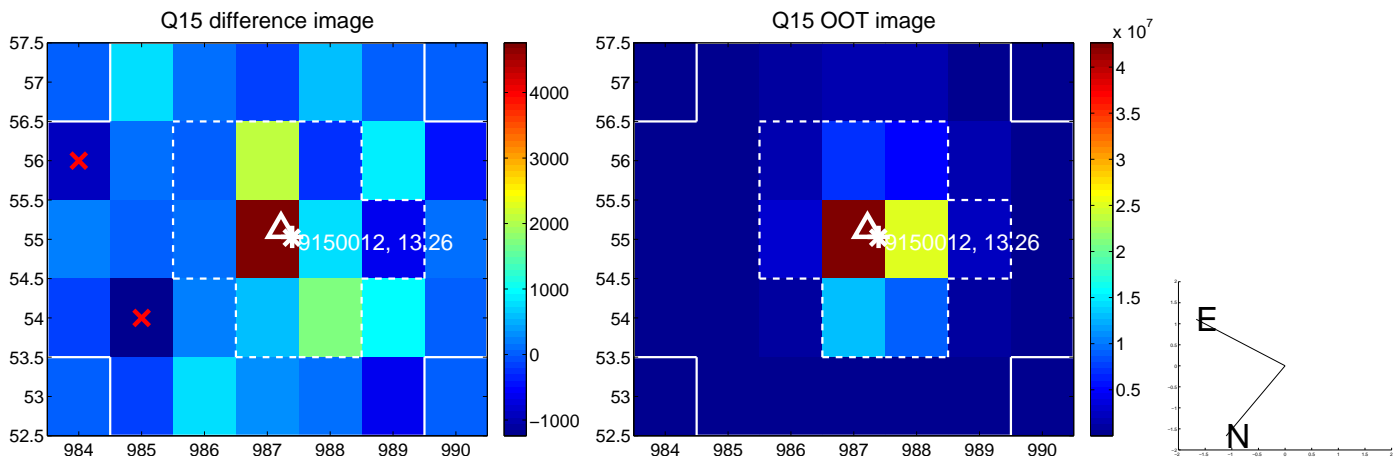
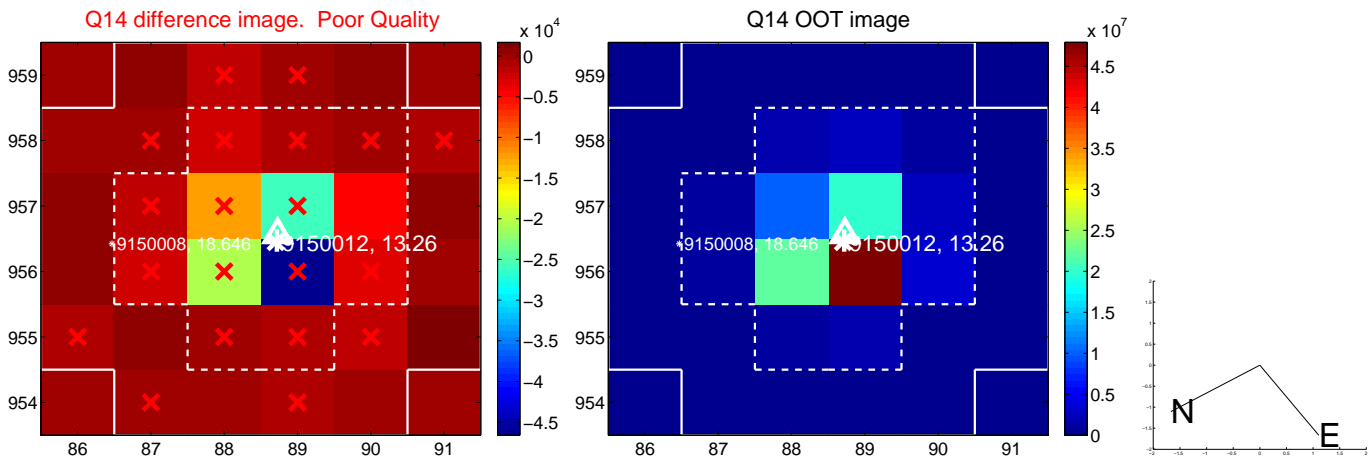
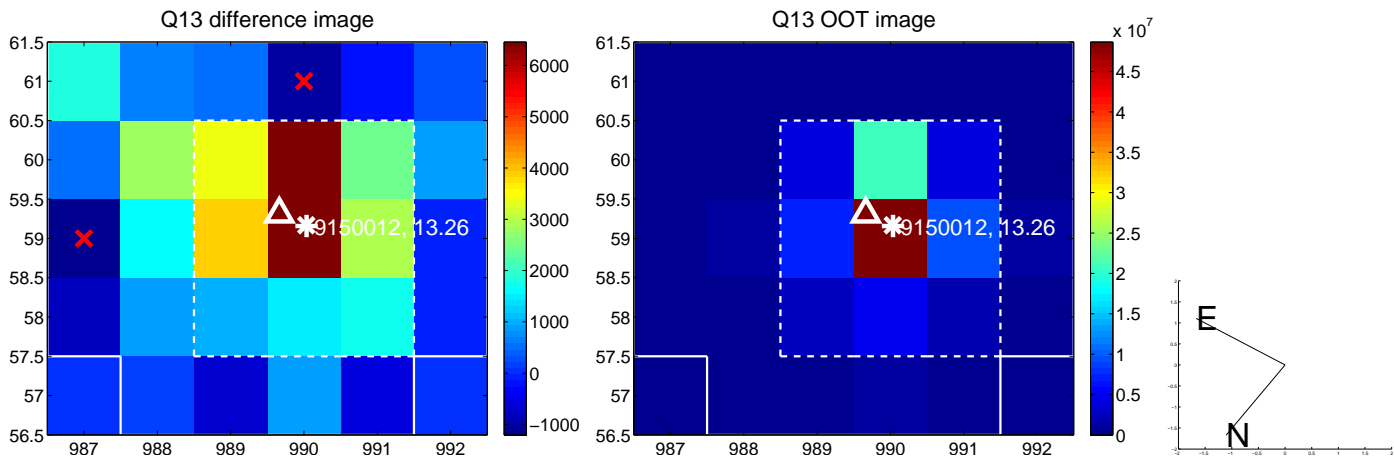
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

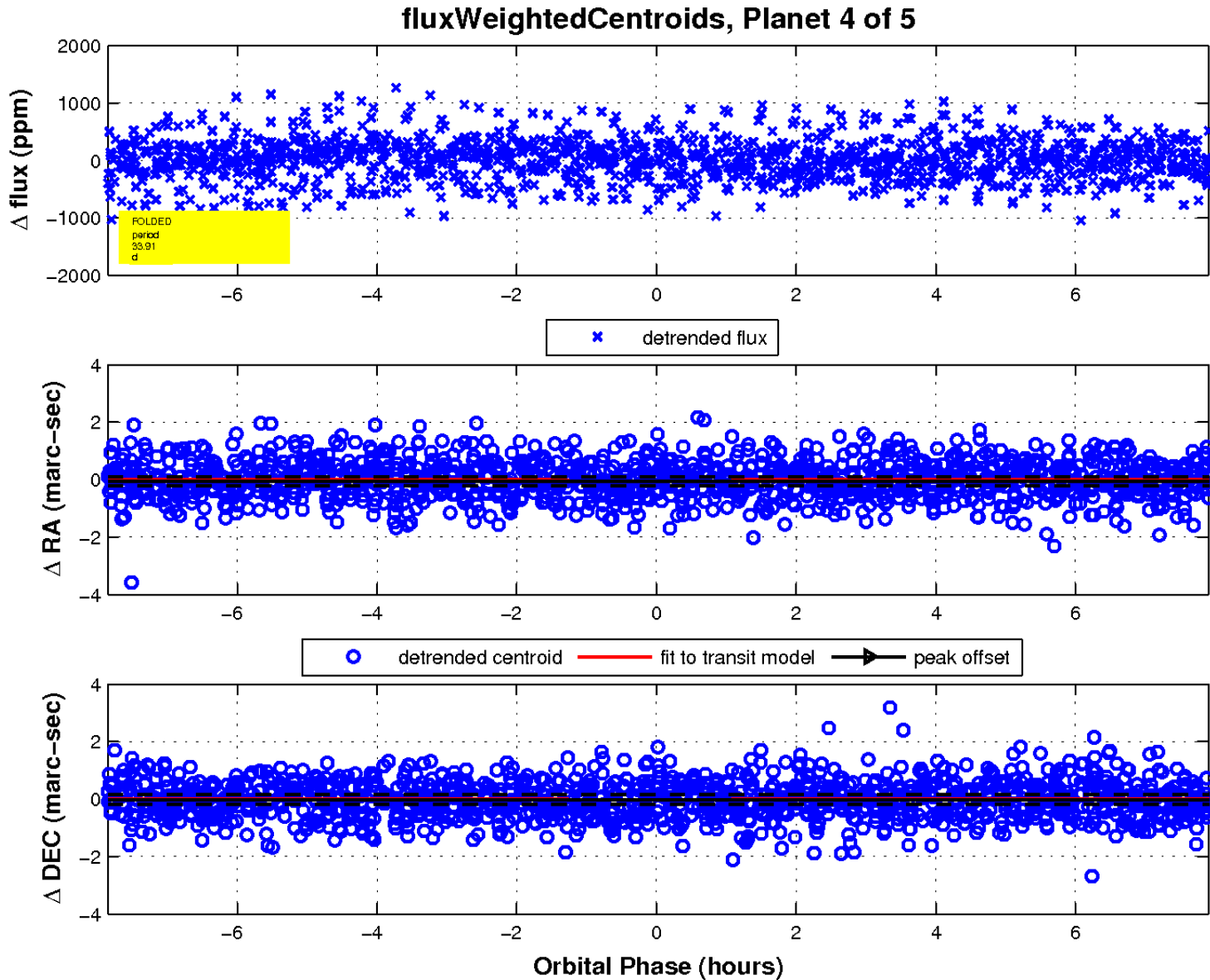
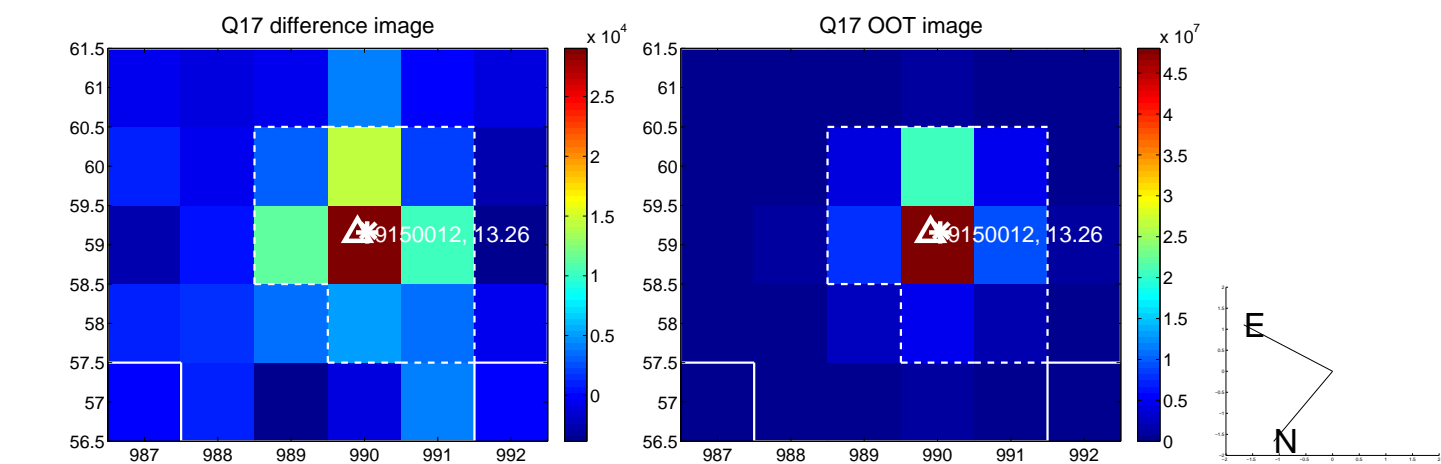


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

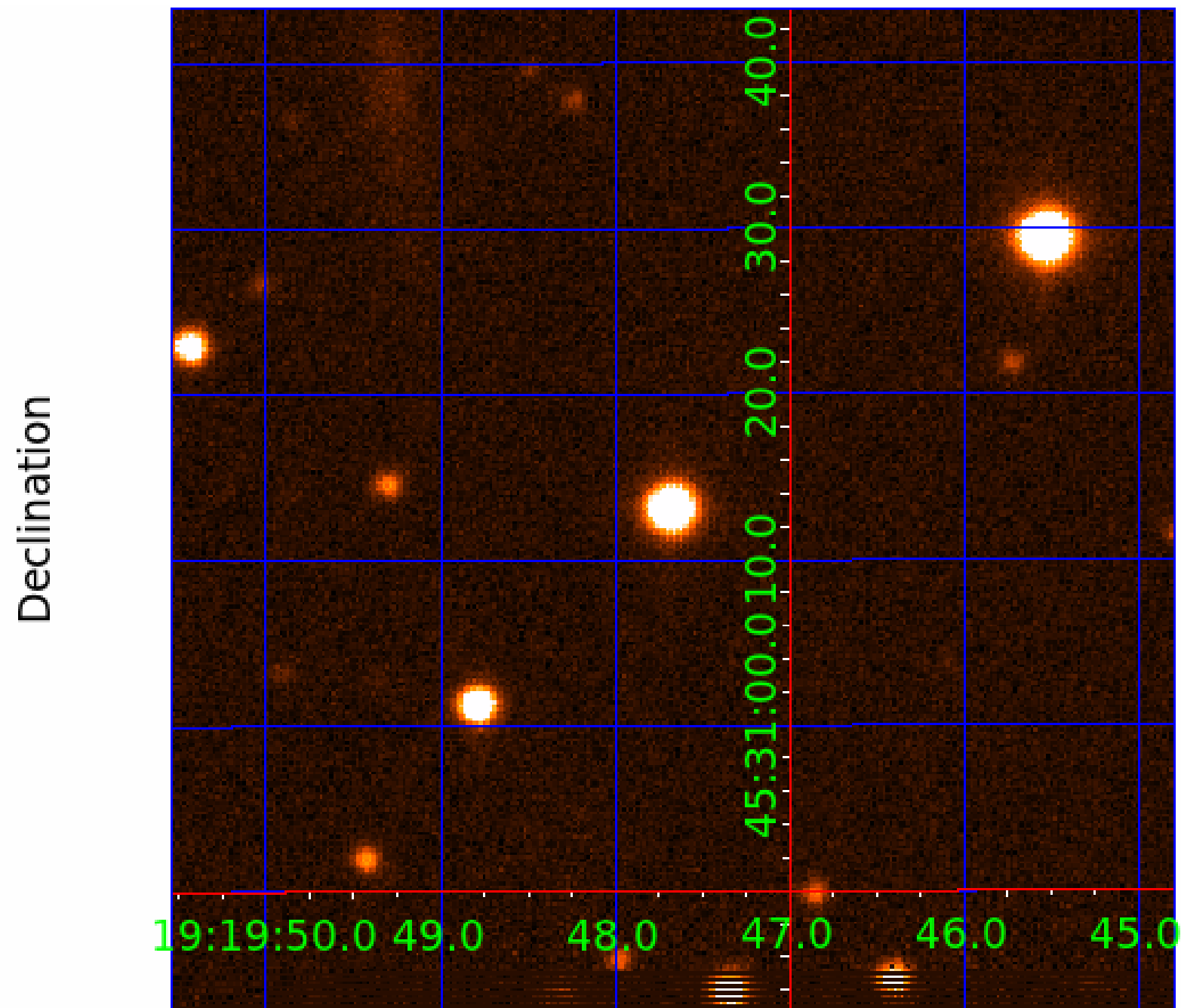




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image



# KIC 009150012

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009150012-01	OBS	No	0.952755	132.307520	27.8	1.238	8.3	7.2	1.48	7063	0.80	11907.82
009150012-02	OBS	No	0.952880	131.809020	24.8	5.478	8.3	6.2	1.48	7063	0.79	11905.73
009150012-03	OBS	No	32.385893	152.743564	288.5	6.839	8.6	7.6	1.48	7063	3.32	108.14
009150012-04	OBS	No	33.912389	137.298834	396.2	2.637	8.7	8.7	1.48	7063	3.06	101.70
009150012-05	OBS	No	14.997715	136.947246	361.7	1.111	8.3	8.5	1.48	7063	2.95	301.84

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009150012-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT
009150012-02	OBS	FP	0.00	1	0	0	0	LPP_DV—SAME_NTL_PERIOD
009150012-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_ZUMA—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV
009150012-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV
009150012-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_TRACKER—TRANS_GAPPED

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

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

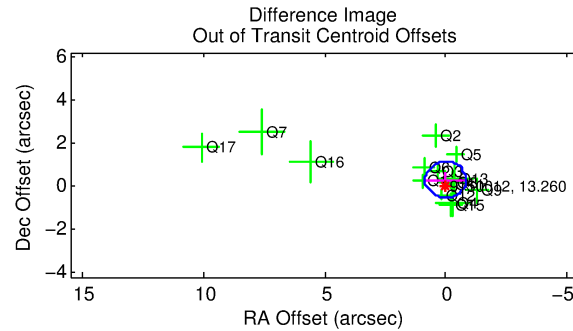
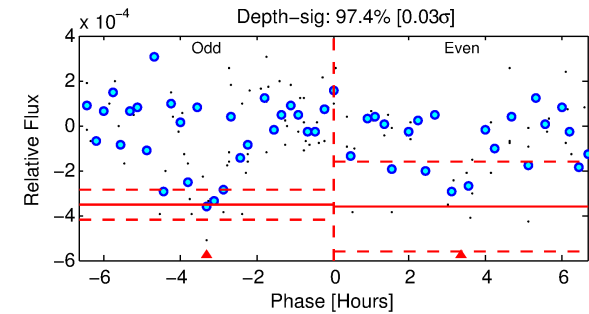
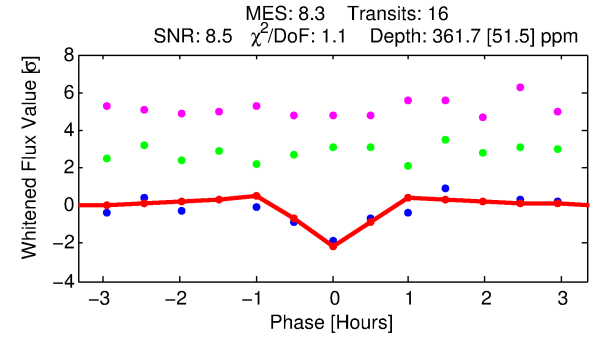
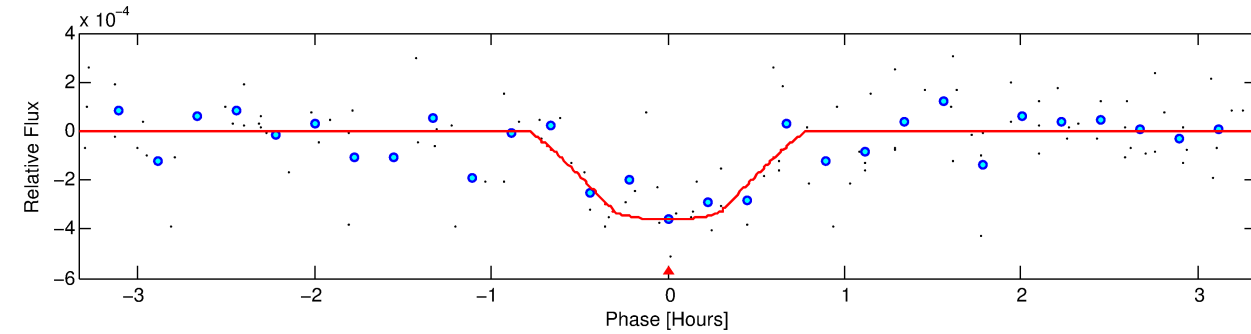
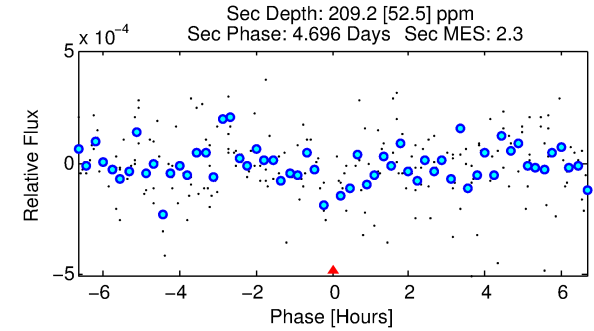
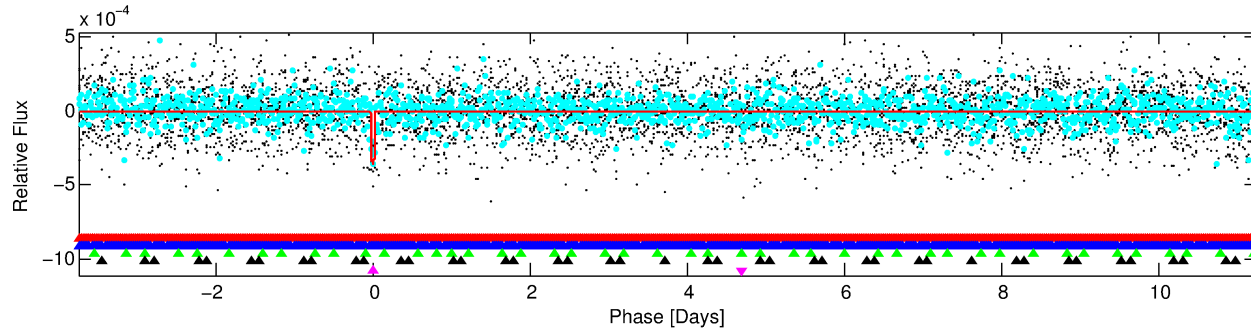
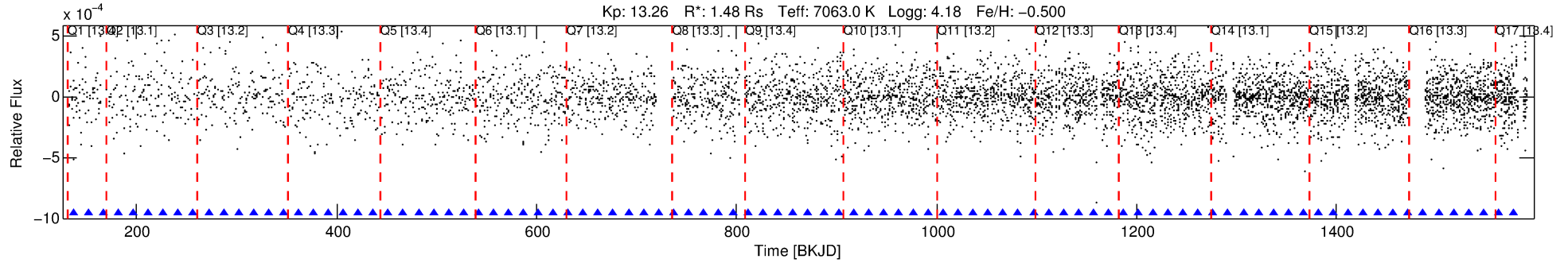
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 009150012-05

No Significant Match Found

# DV One-Page Summary

KIC: 9150012 Candidate: 5 of 5 Period: 14.998 d



## DV Fit Results:

Period = 14.99772 [0.00009] d  
Epoch = 136.9472 [0.0058] BKJD  
Rp/R\* = 0.0182 [0.0179]  
a/R\* = 90.36 [511.86]  
b = 0.52 [8.07]  
Seff = 301.84 [106.85]  
Teq = 1063 [94] K  
Rp = 2.95 [3.01] Re  
a = 0.1275 [0.0288] AU  
Ag = 215.12 [432.41] [0.50σ]  
Teffp = 6293 [3129] K [1.67σ]

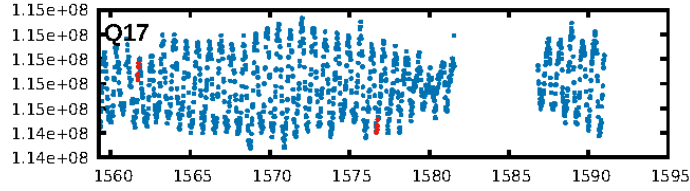
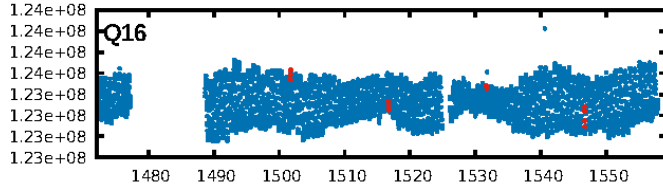
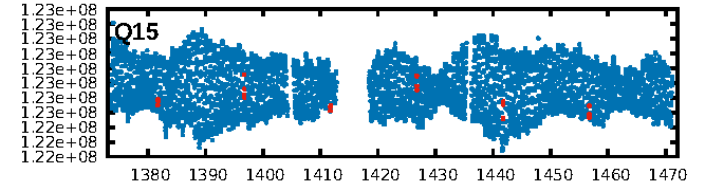
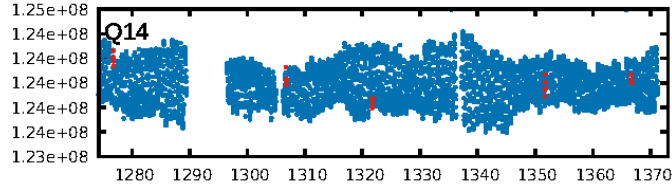
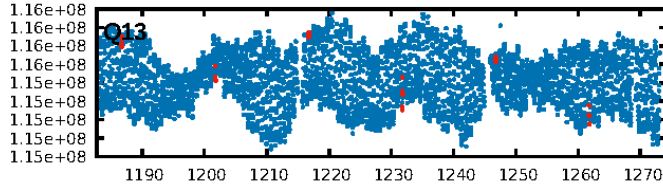
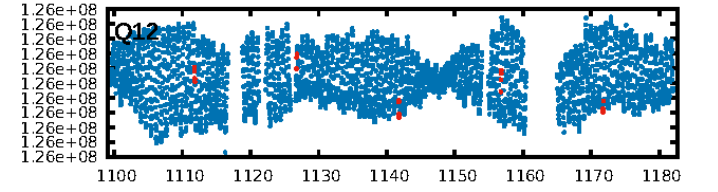
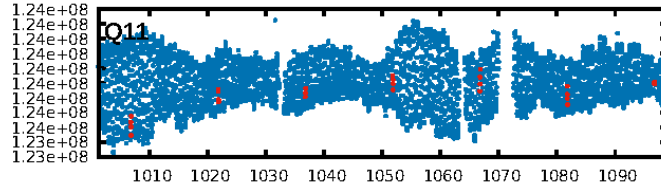
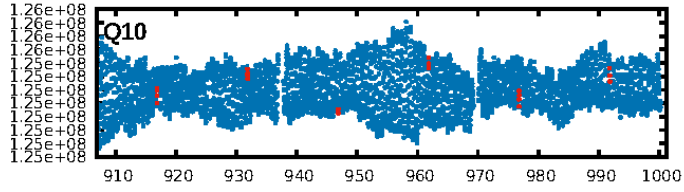
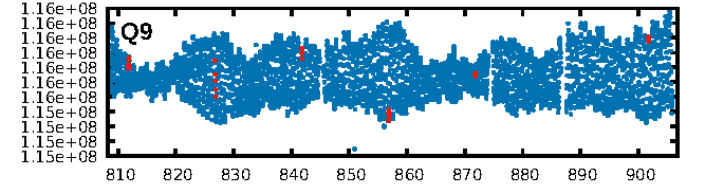
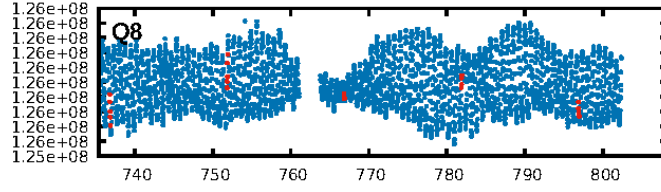
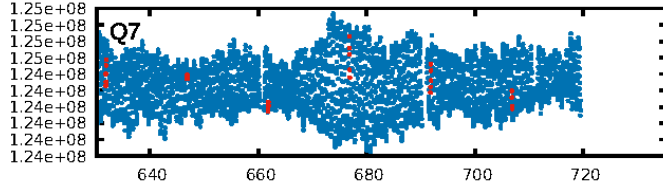
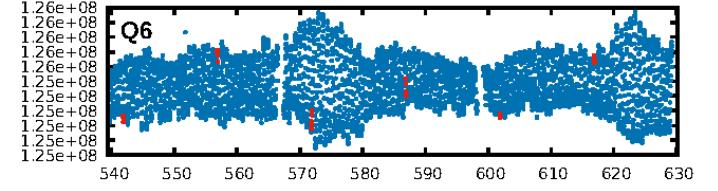
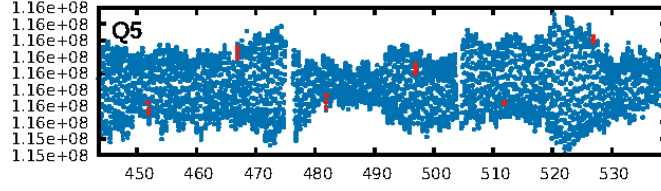
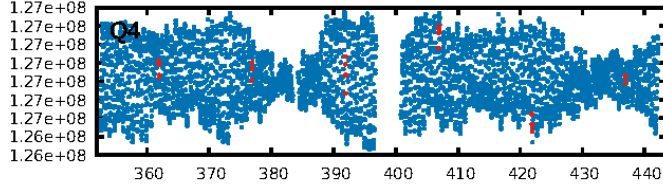
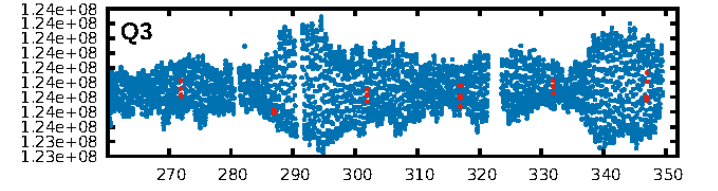
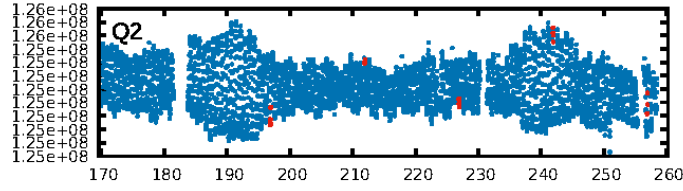
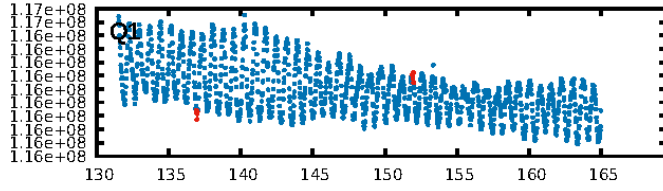
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [60.30σ]  
LongPeriod-sig: 100.0% [60.23σ]  
ModelChiSquare2-sig: 49.5%  
ModelChiSquareGof-sig: 100.0%  
**Bootstrap-pfa: 6.33e-12**  
RollingBand-fgt: 1.00 [15/15]  
**GhostDiagnostic-chr: -1.235**  
Centroid-sig: 8.0%  
Centroid-so: 0.682 arcsec [1.67σ]  
OotOffset-rm: 0.297 arcsec [1.06σ]  
OotOffset-st: 2/4/4/5 [15]  
KicOffset-rm: 0.307 arcsec [1.04σ]  
KicOffset-st: 2/4/4/5 [15]  
DiffImageQuality-fgm: 0.53 [8/15]  
DiffImageOverlap-fno: 0.00 [0/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 10:23:31 Z

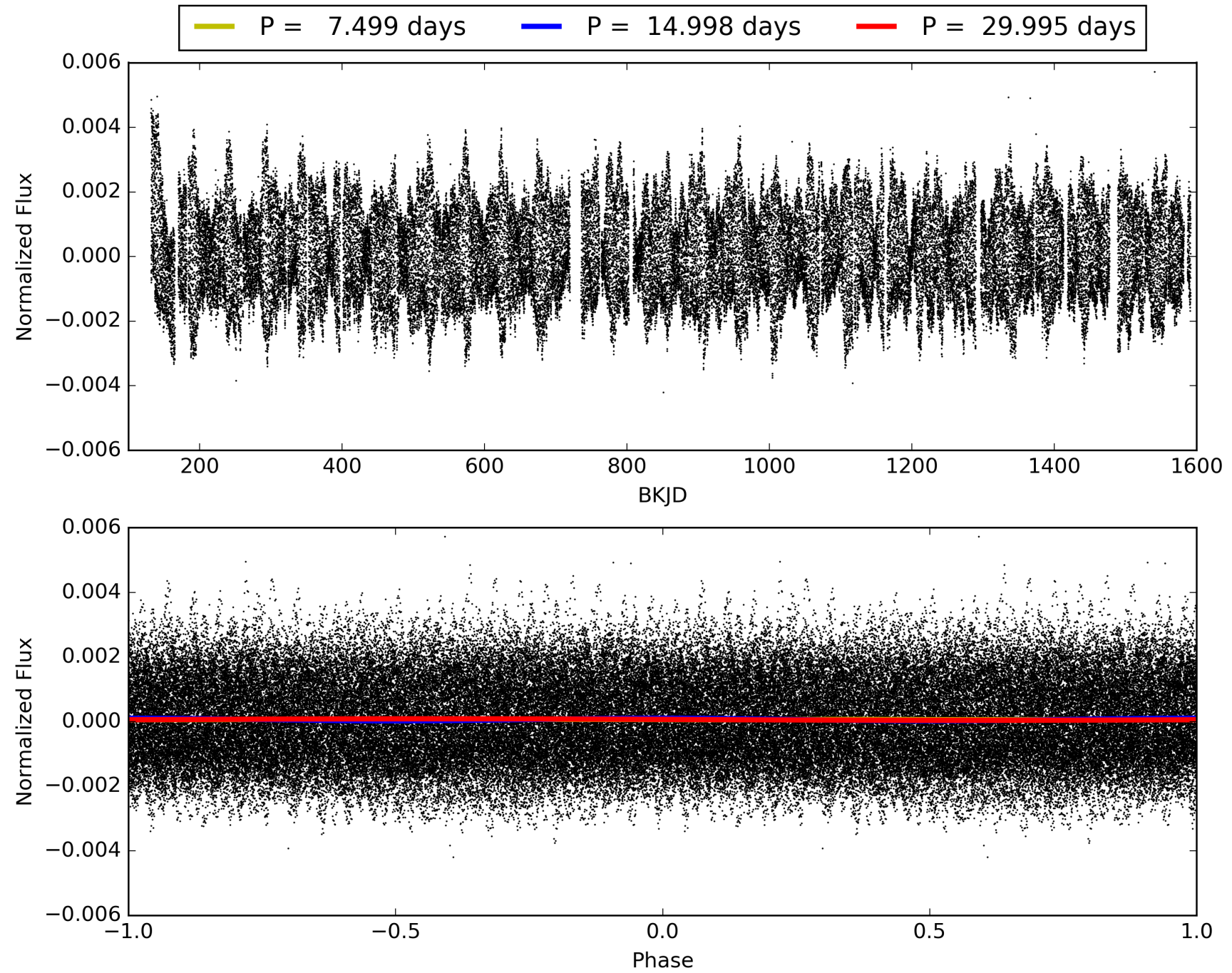
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 009150012-05, PDC Light Curves





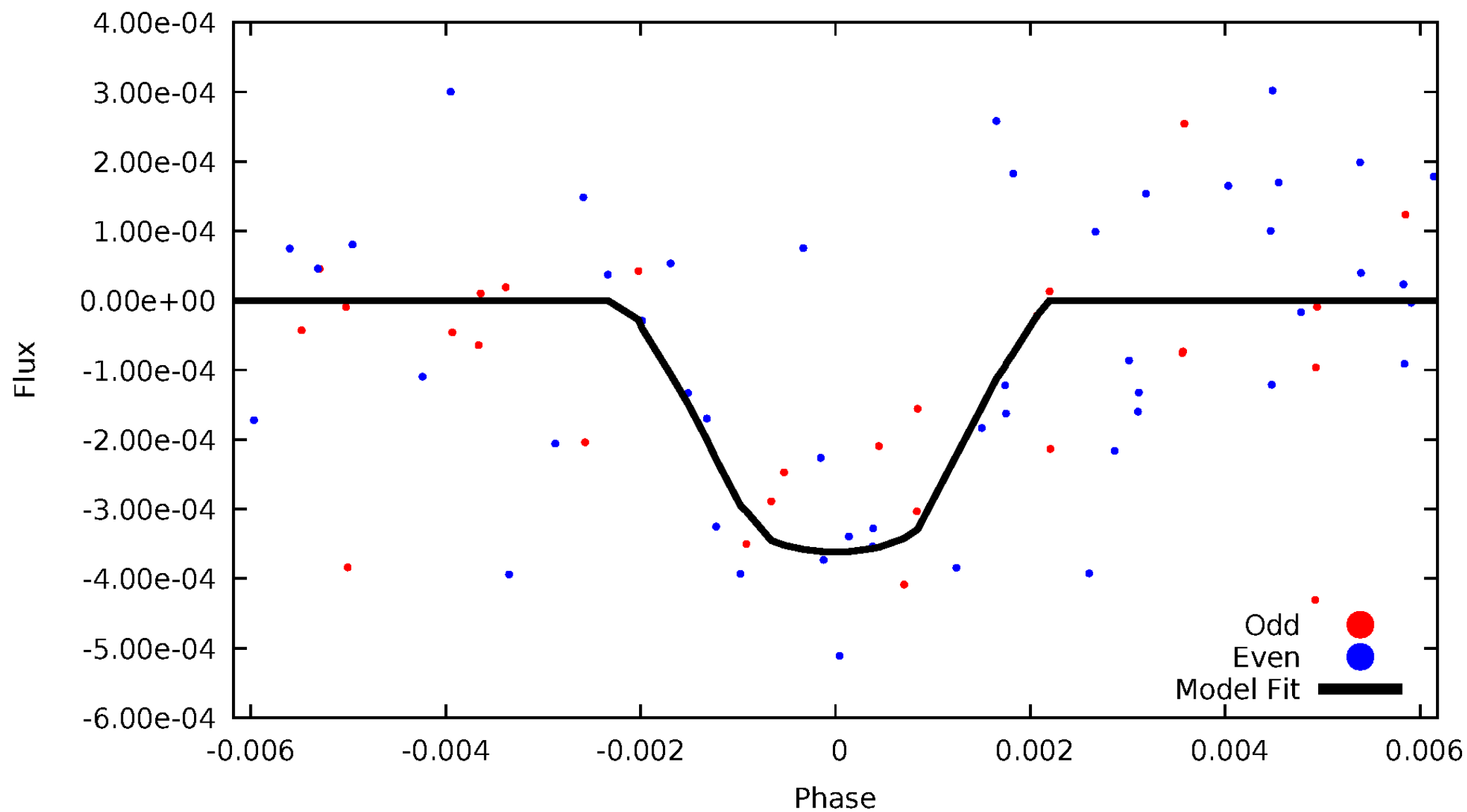
# TCE 009150012-05





# DV Odd/Even

TCE 009150012-05



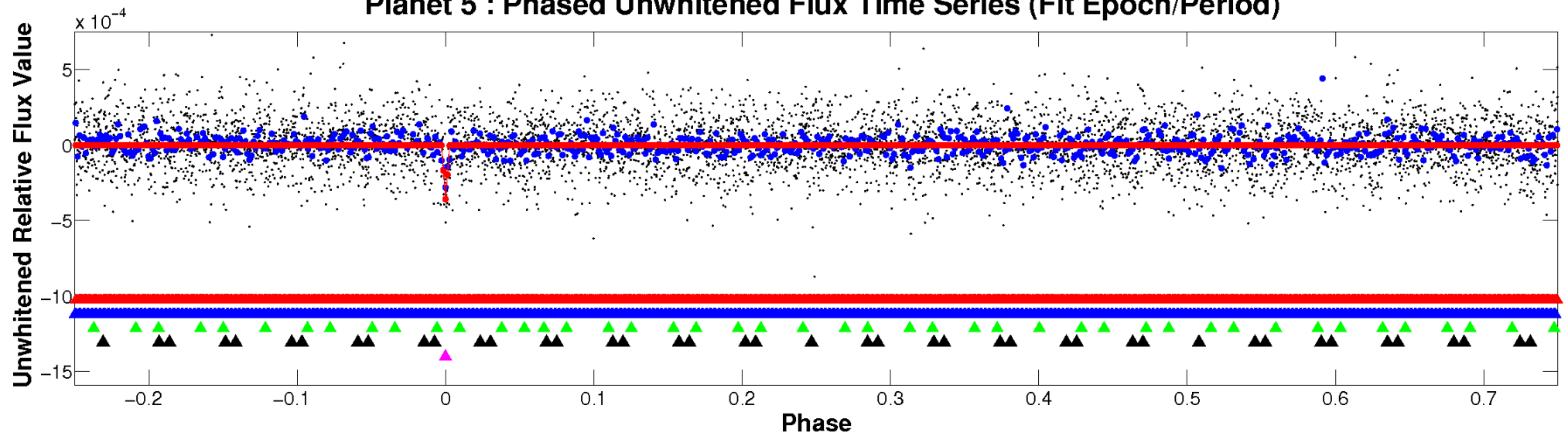


ALT Odd/Even

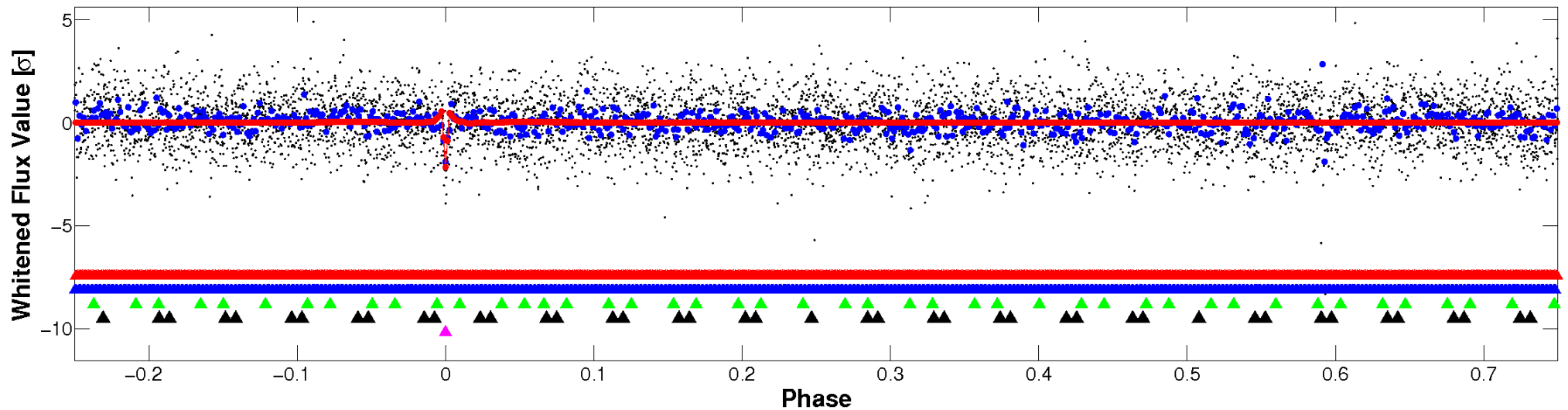
This plot does not exist for this TCE.

# Non-Whitened Vs. Whitened Light Curve

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

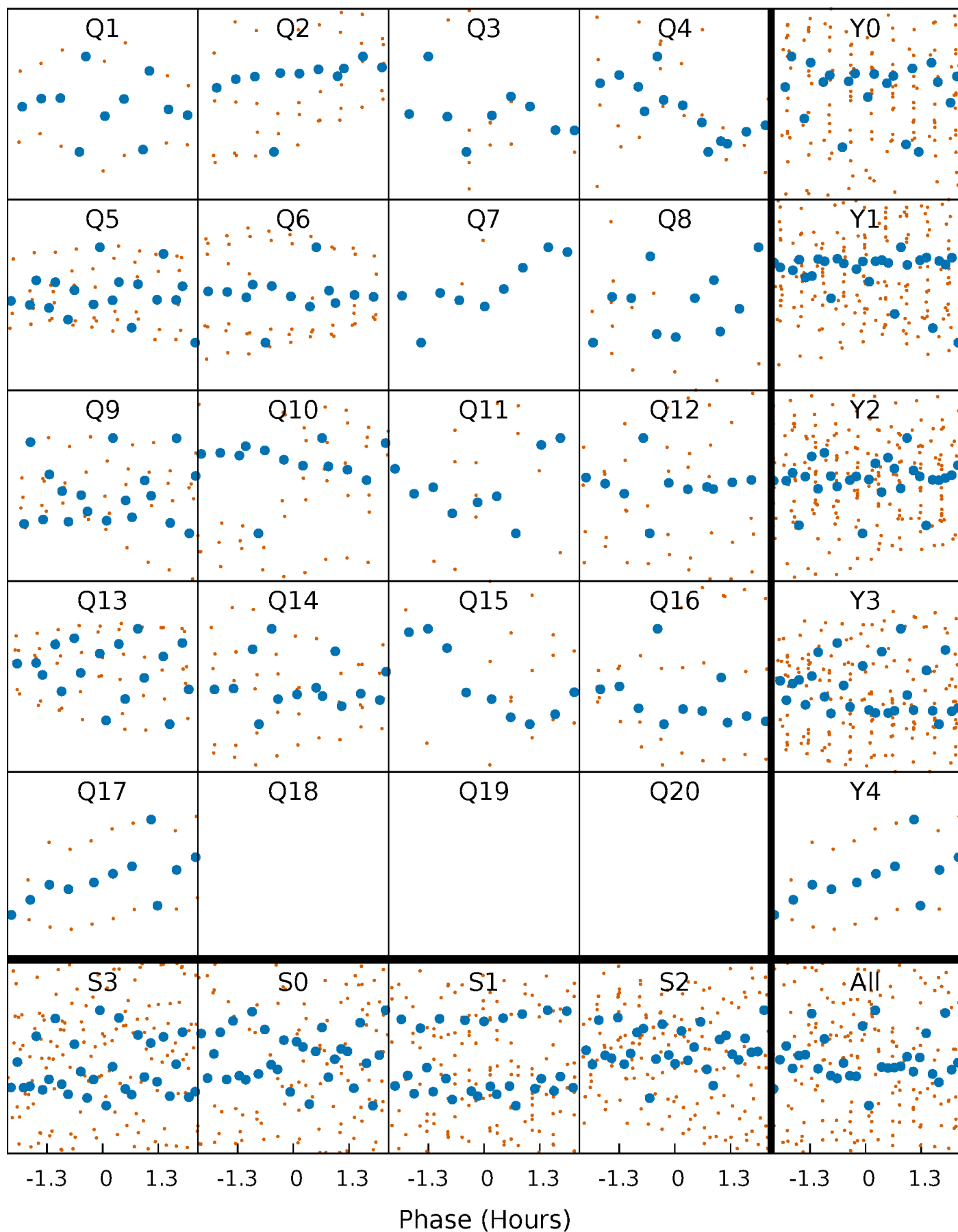


## Planet 5 : Phased Whitened Flux Time Series (Fit Epoch/Period)



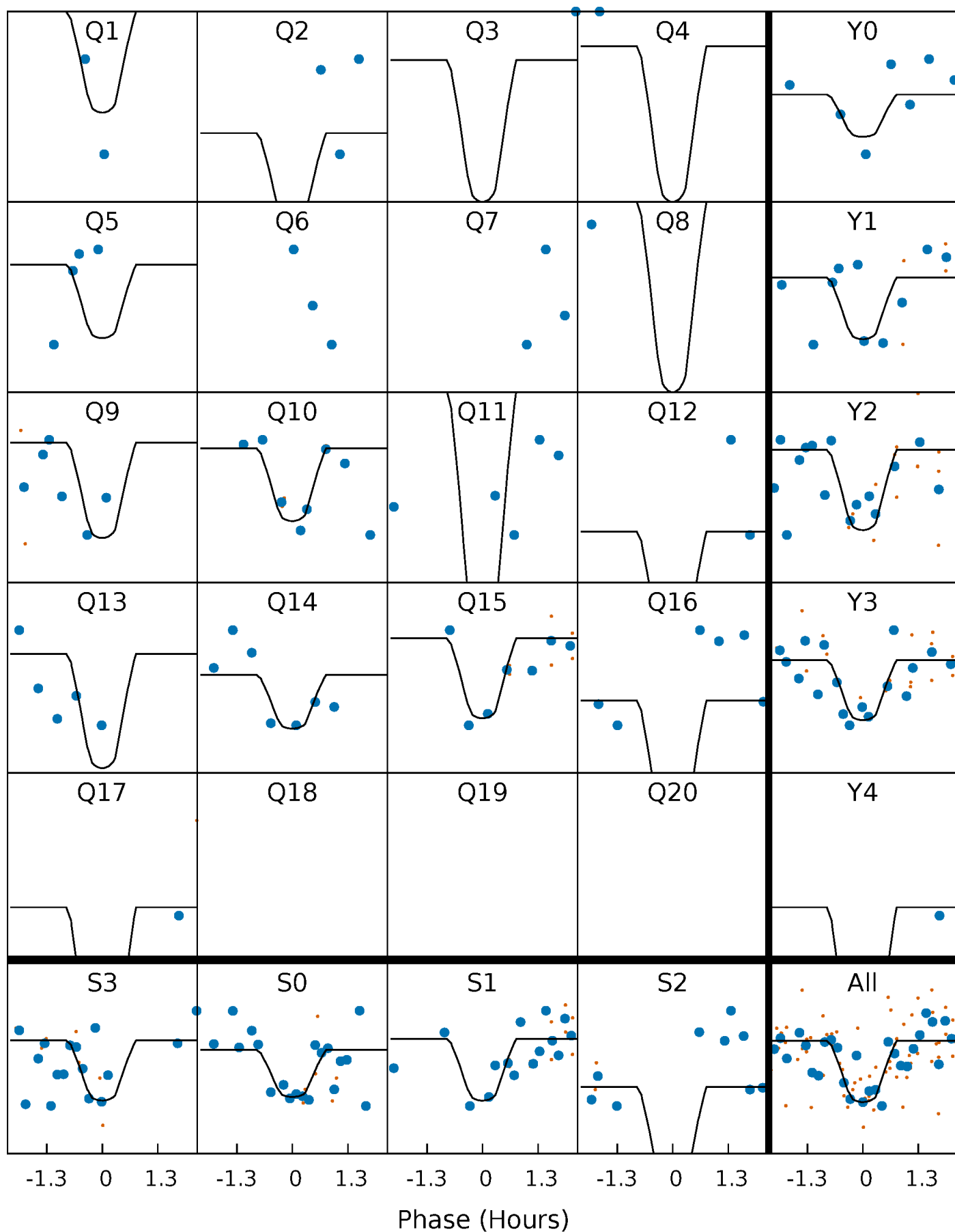
# PDC Quarter-Phased Transit Curves

TCE 009150012-05   P= 14.997715 Days    $T_0=136.947246$  (BKJD)



# DV Quarter-Phased Transit Curves

TCE 009150012-05   P= 14.997715 Days    $T_0=136.947246$  (BKJD)



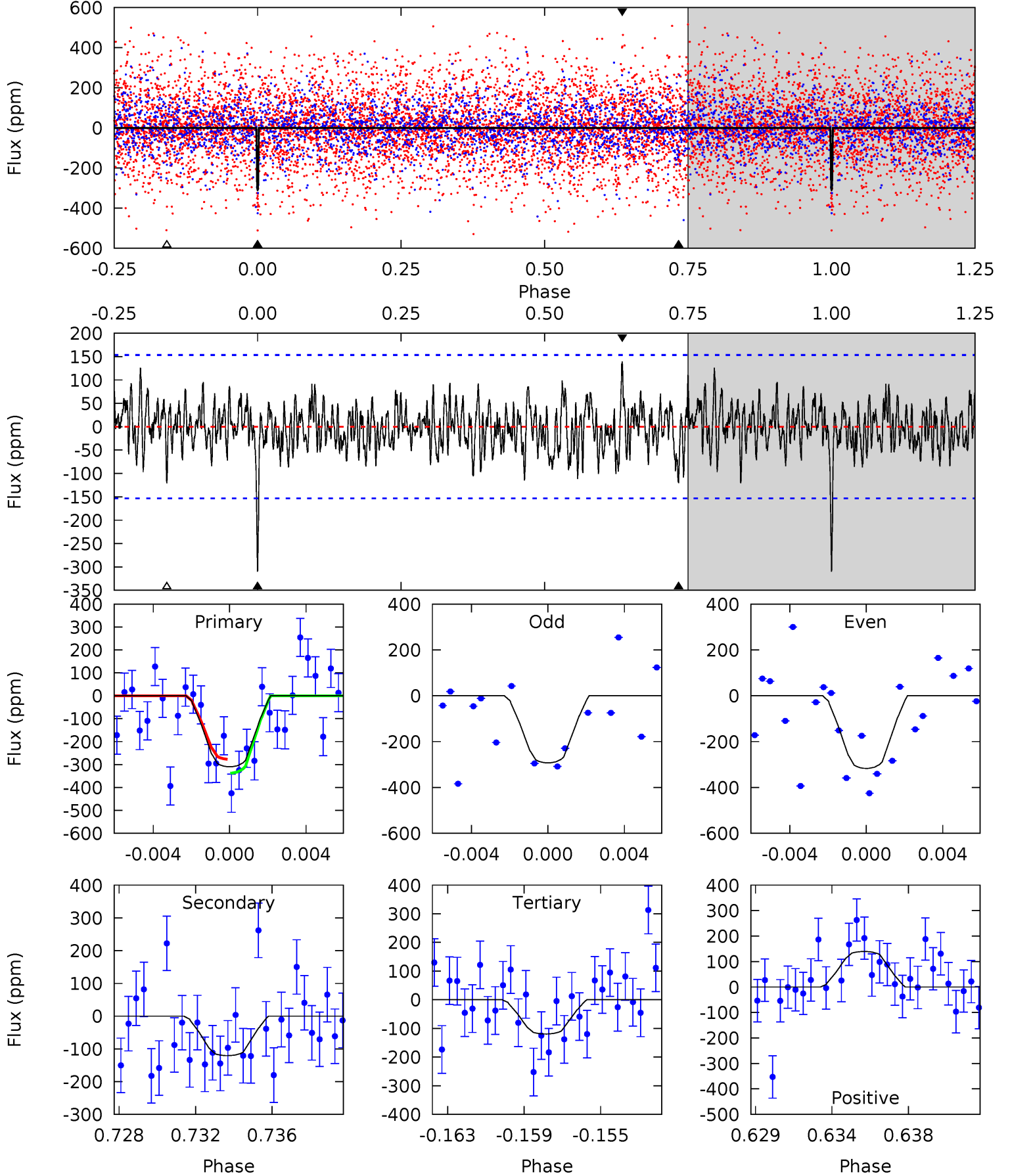
This plot does not exist for this TCE.



# DV Model-Shift Uniqueness Test

009150012-05,  $P = 14.997715$  Days,  $E = 121.949531$  Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.5	4.09	4.05	4.72	5.20	2.87	1.38	6.45	5.78	0.04	-0.63	0.37	0.87	0.31	1.02



## Alt Model-Shift Uniqueness Test

This plot does not exist for this TCE.

### Stellar Parameters For KIC 009150012

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7063^{+200}_{-250}$	$4.185^{+0.175}_{-0.175}$	$-0.500^{+0.250}_{-0.300}$	$1.484^{+0.405}_{-0.331}$	$1.229^{+0.169}_{-0.169}$	$0.529^{+0.489}_{-0.257}$
	+3%/-4%	+4%/-4%	+50%/-60%	+27%/-22%	+14%/-14%	+92%/-48%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 009150012-05 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-121 \pm 30$	$3.33^{+2.99}_{-2.07}$	$1477^{+117}_{-98}$	$5127^{+3480}_{-1158}$	$93^{+595}_{-67}$
Alt.	N/A	N/A	N/A	N/A	N/A

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

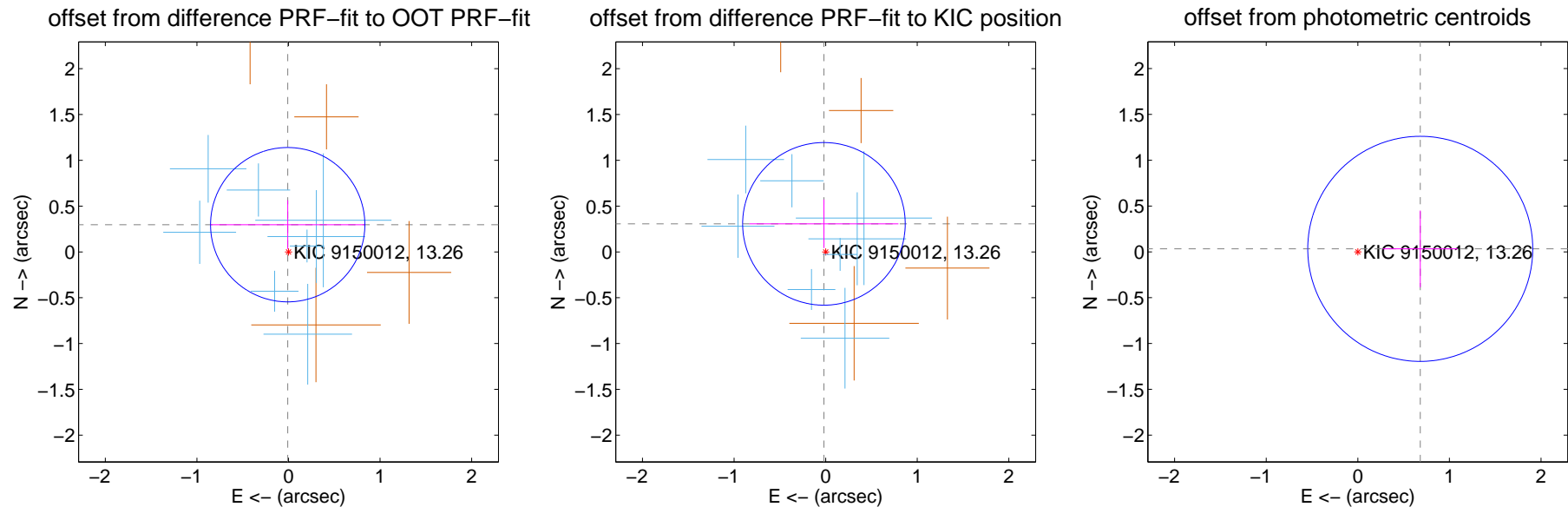
## DV Centroid Data

Supplemental centroid analysis for 009150012-05. Kepler magnitude: 13.26. Transit SNR 8.51

There are 8 quarters with good PRF difference image offsets

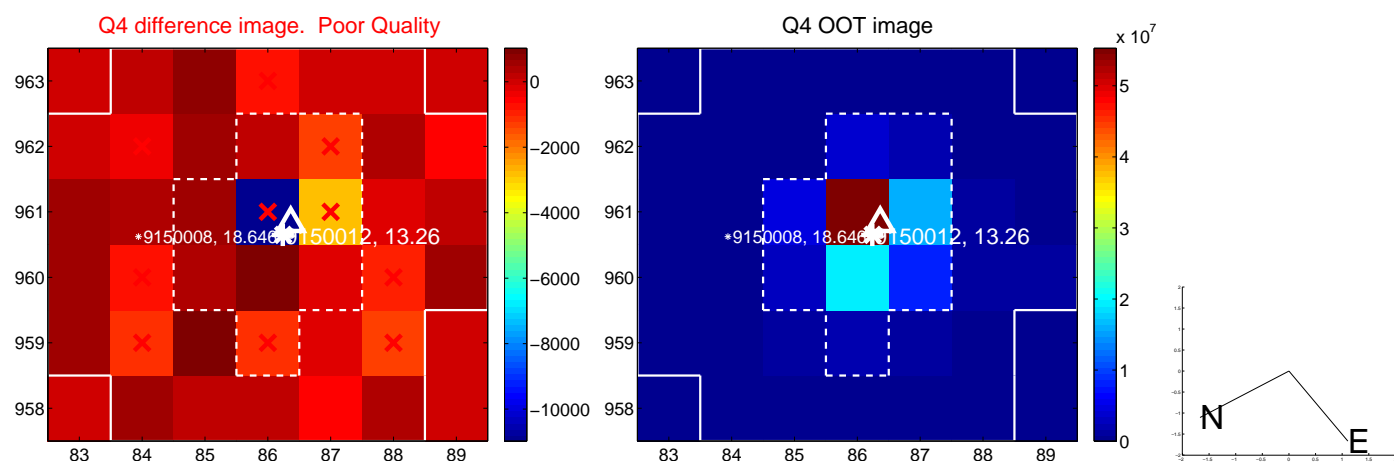
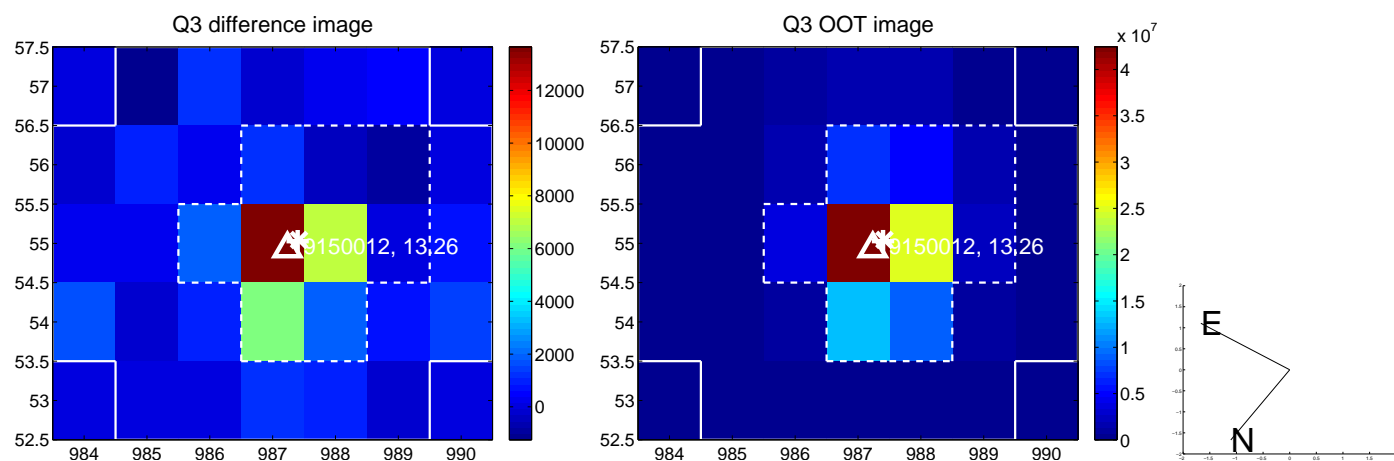
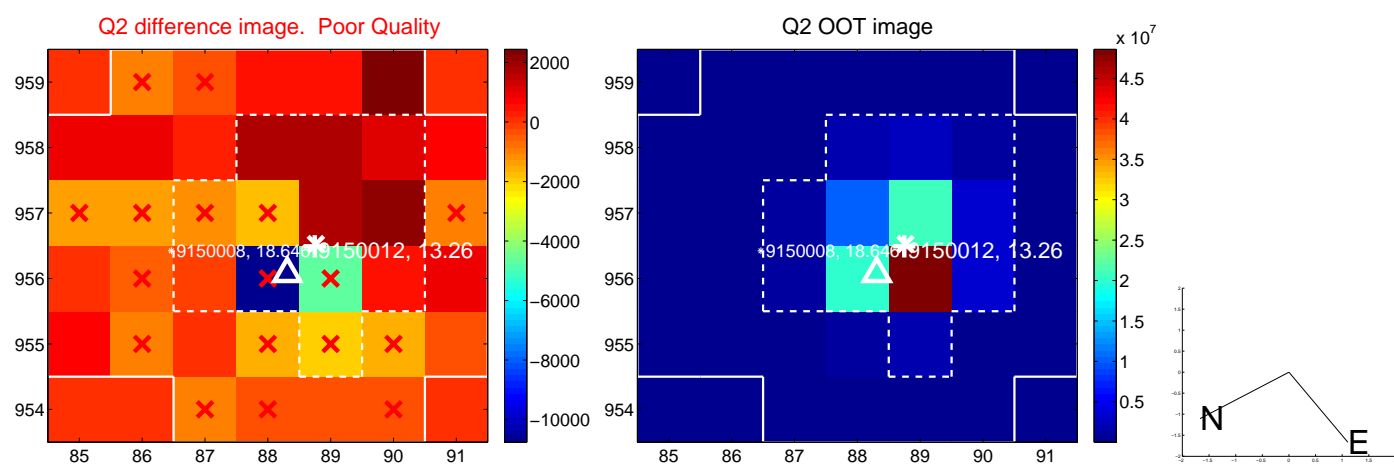
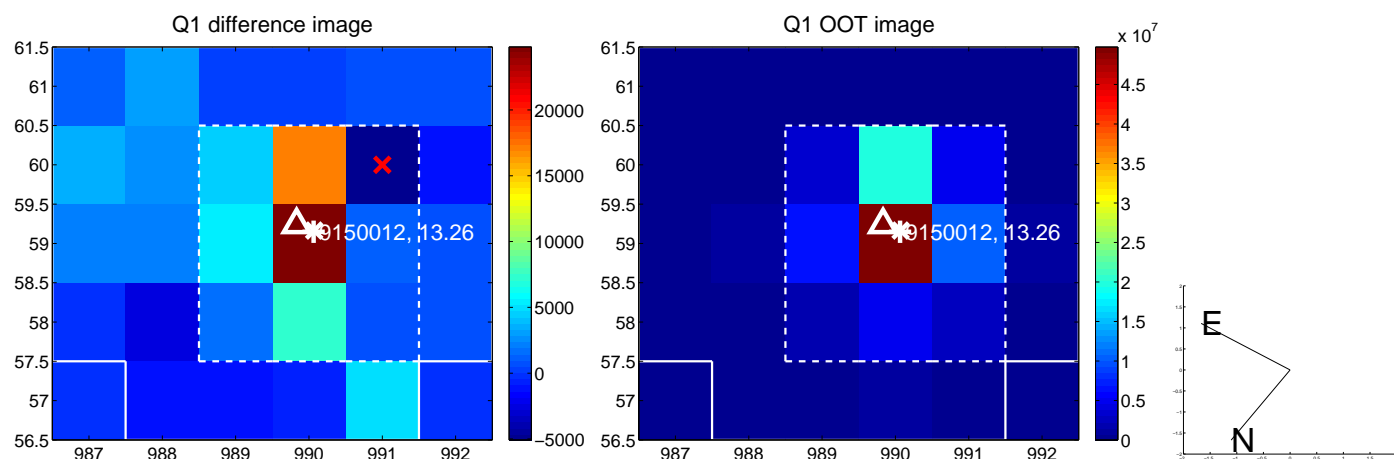
The direct PRF centroid is offset from the target star catalog position by about 0.10 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.297 \pm 0.281$	1.06	$0.009 \pm 0.844$	$0.297 \pm 0.266$
PRF-fit source offset from KIC position	$0.307 \pm 0.296$	1.04	$0.019 \pm 0.814$	$0.306 \pm 0.265$
photometric centroid source offset	$0.68 \pm 0.41$	1.67	$-0.68 \pm 0.41$	$0.03 \pm 0.42$

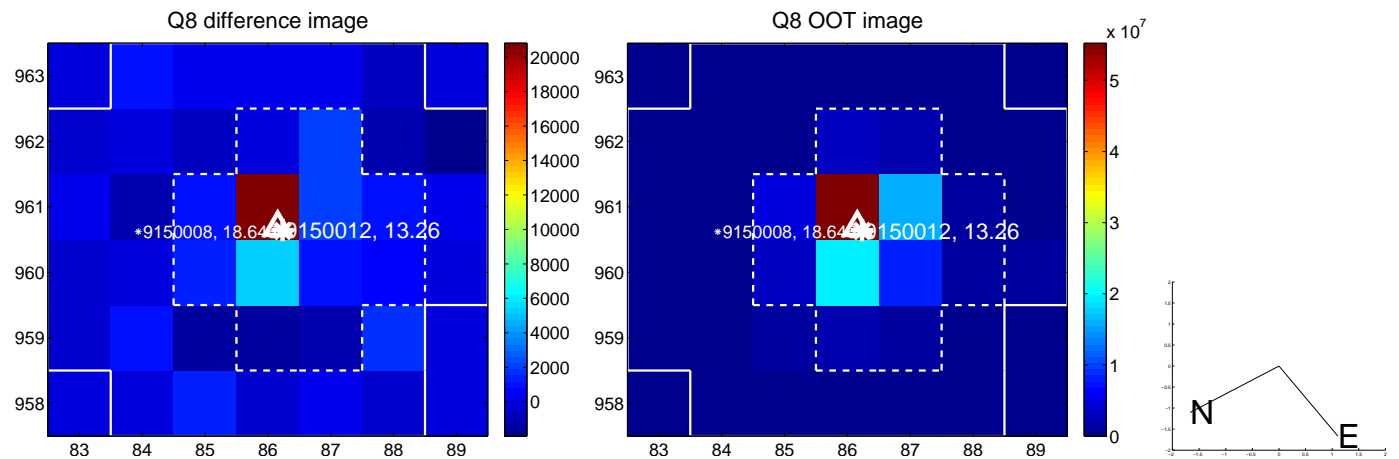
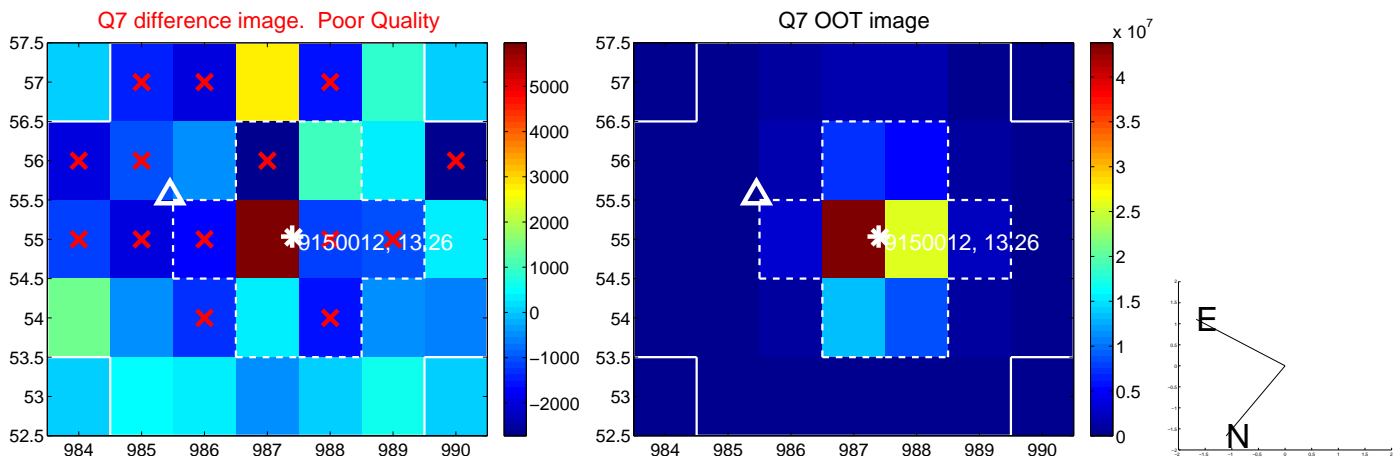
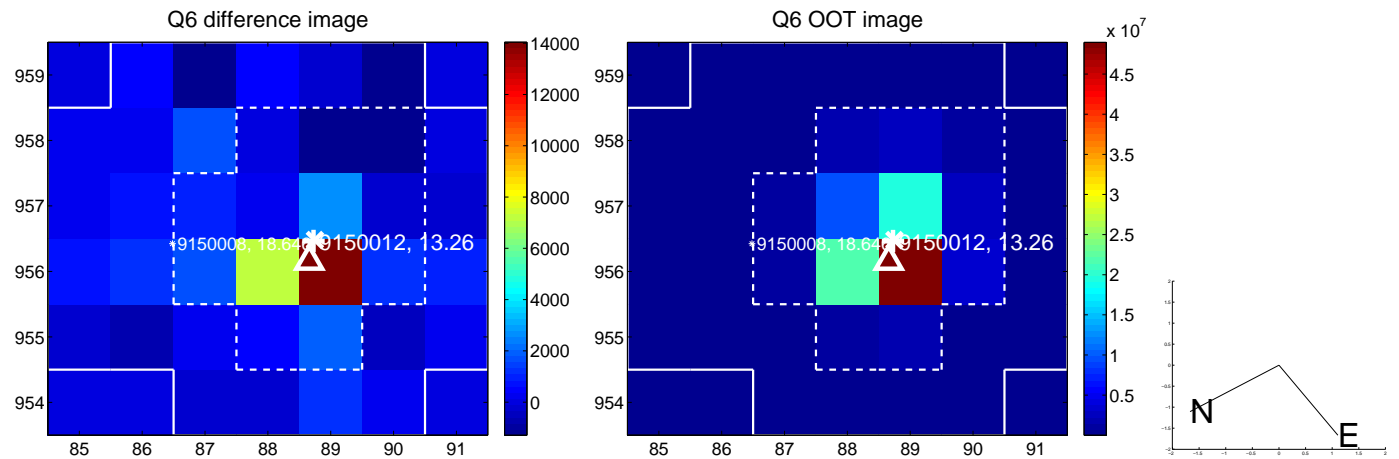
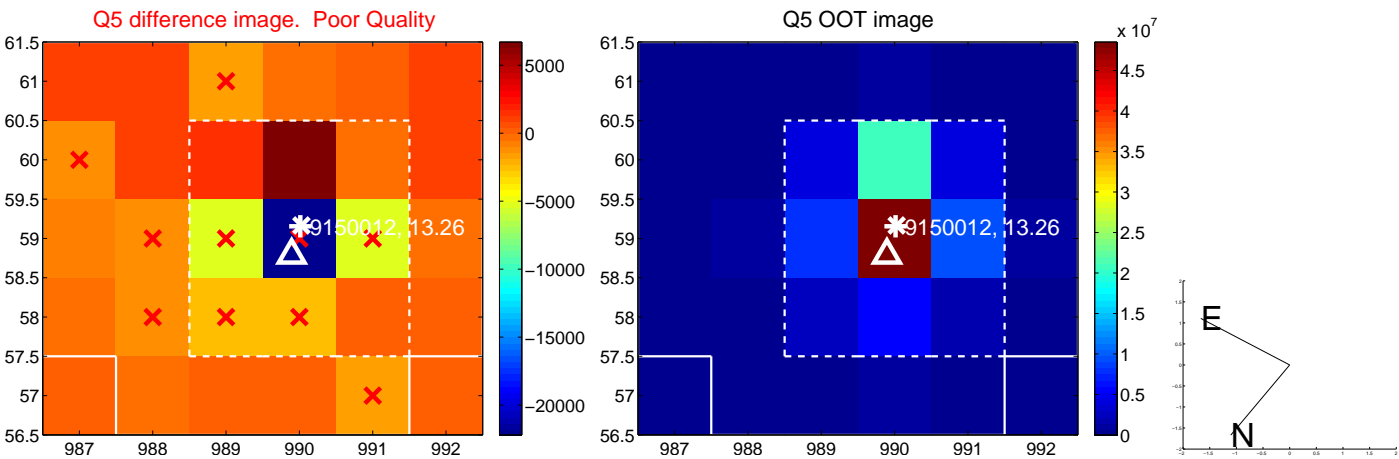


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

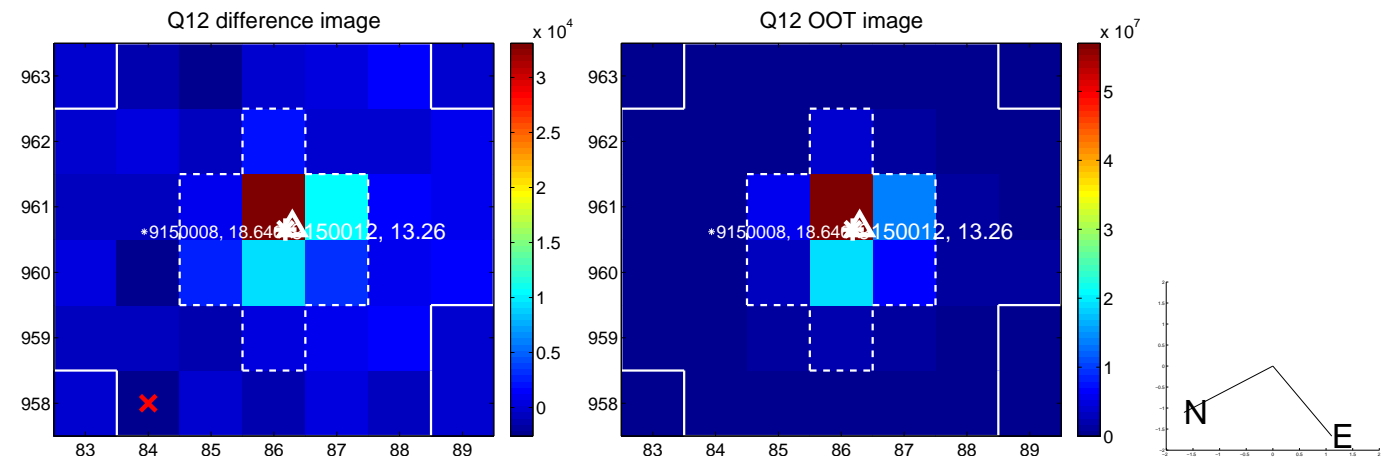
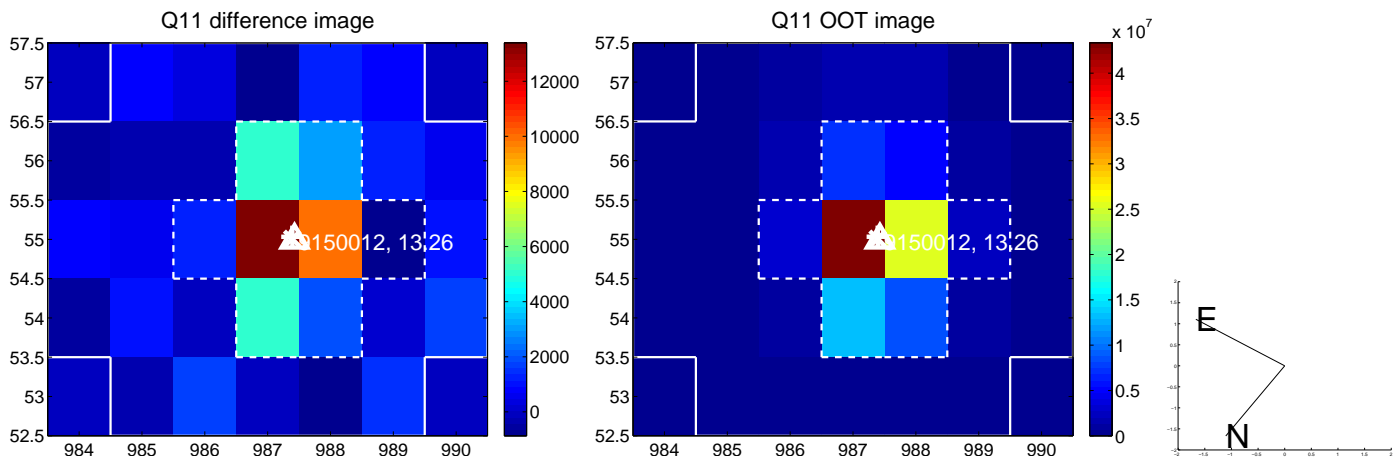
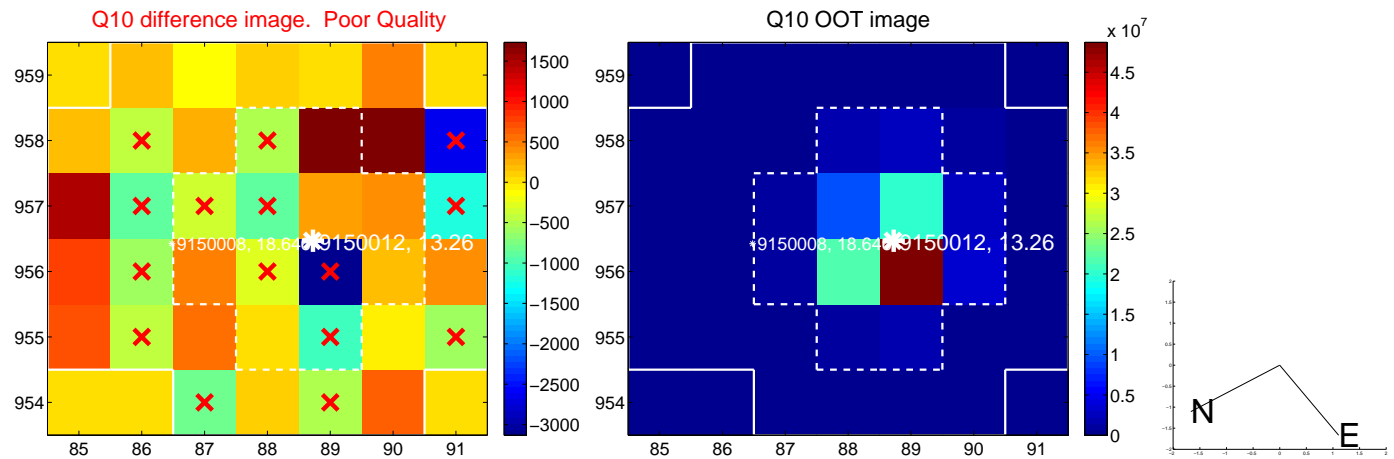
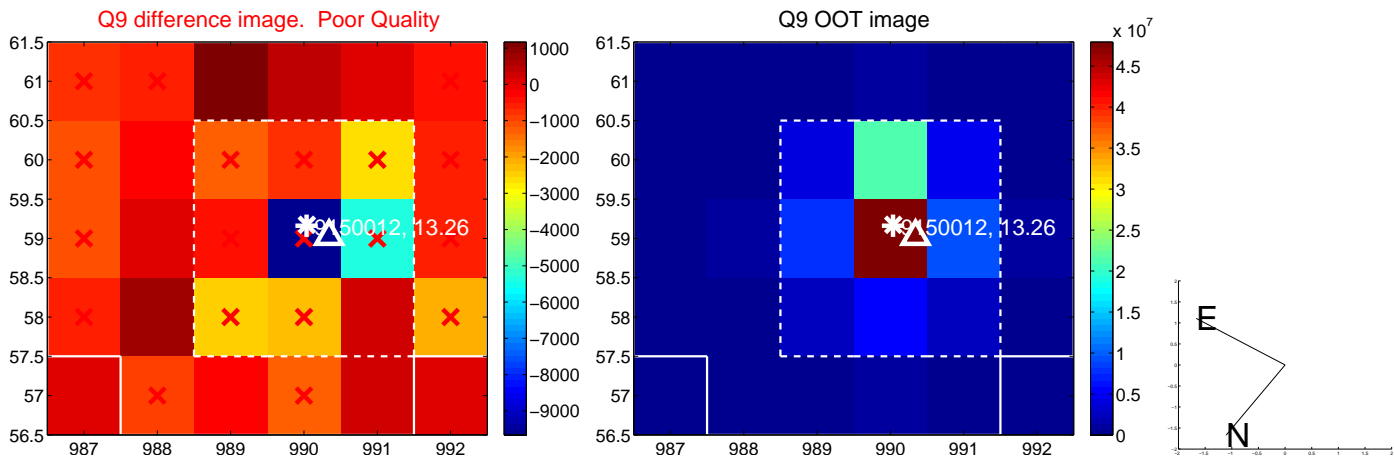
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

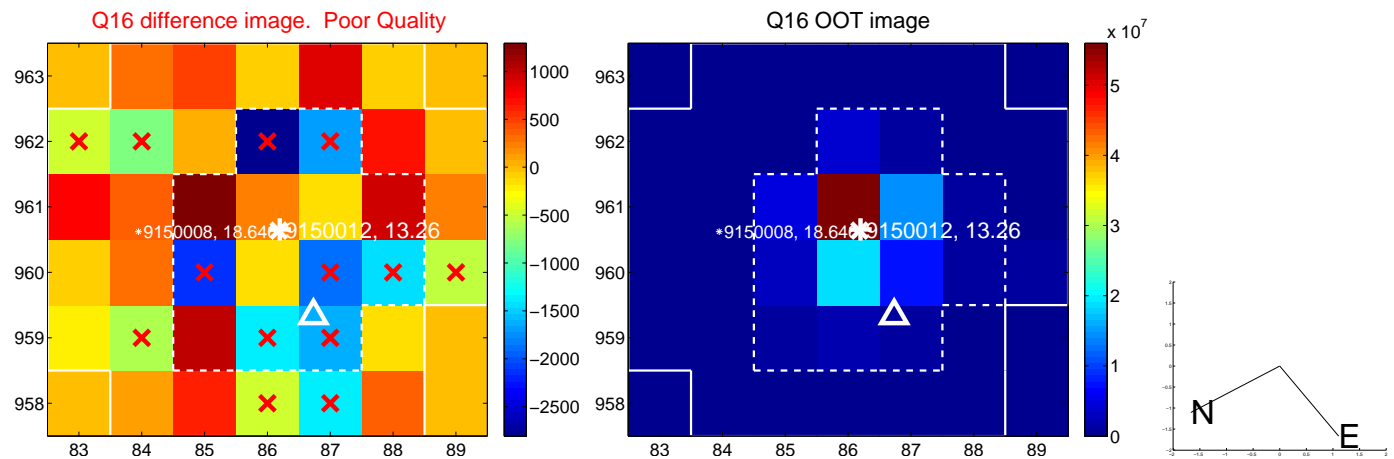
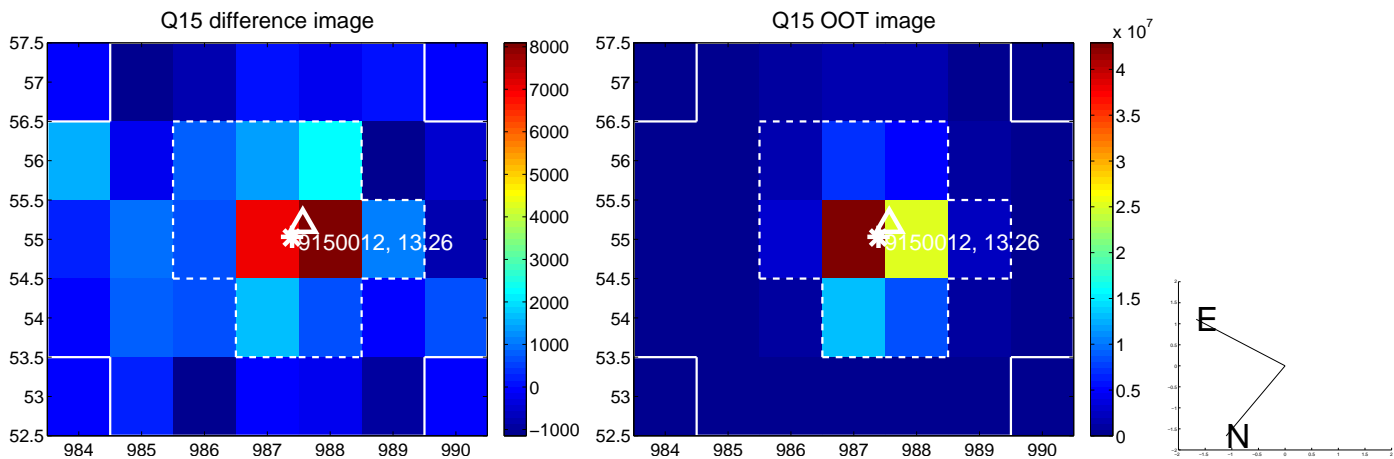
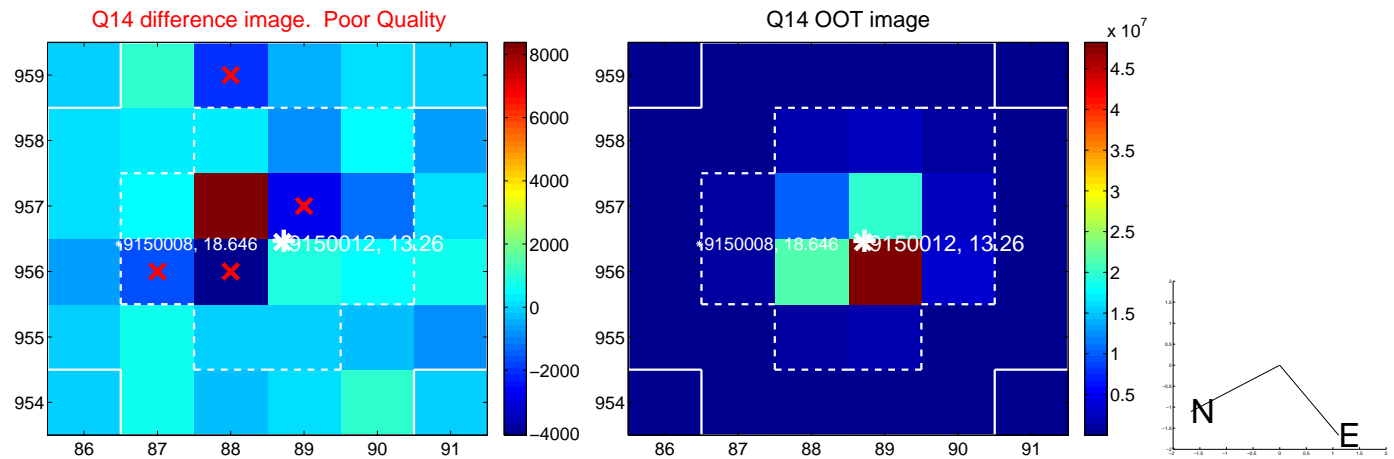
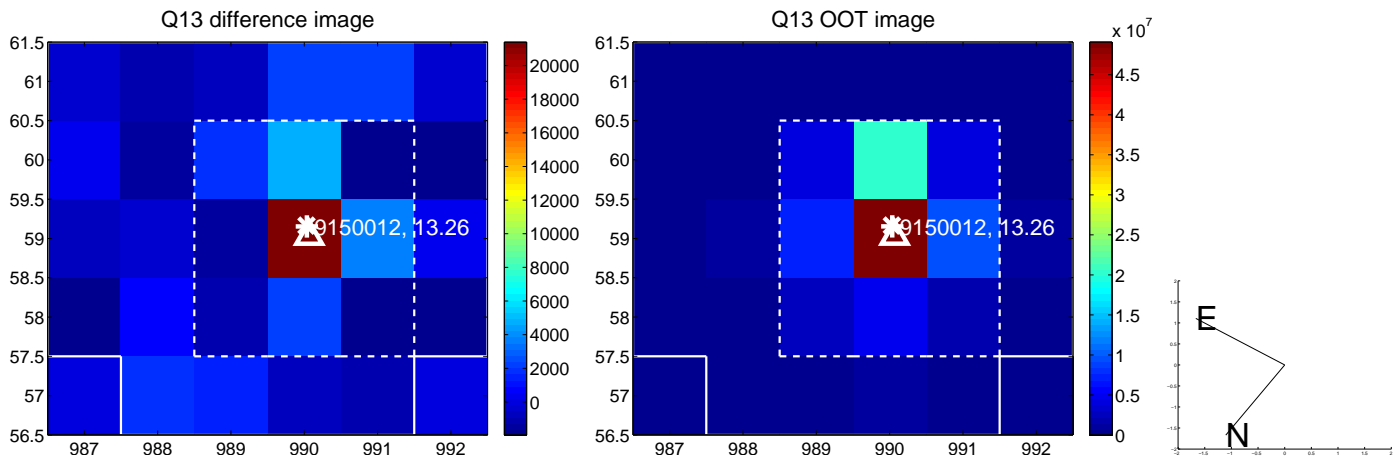


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

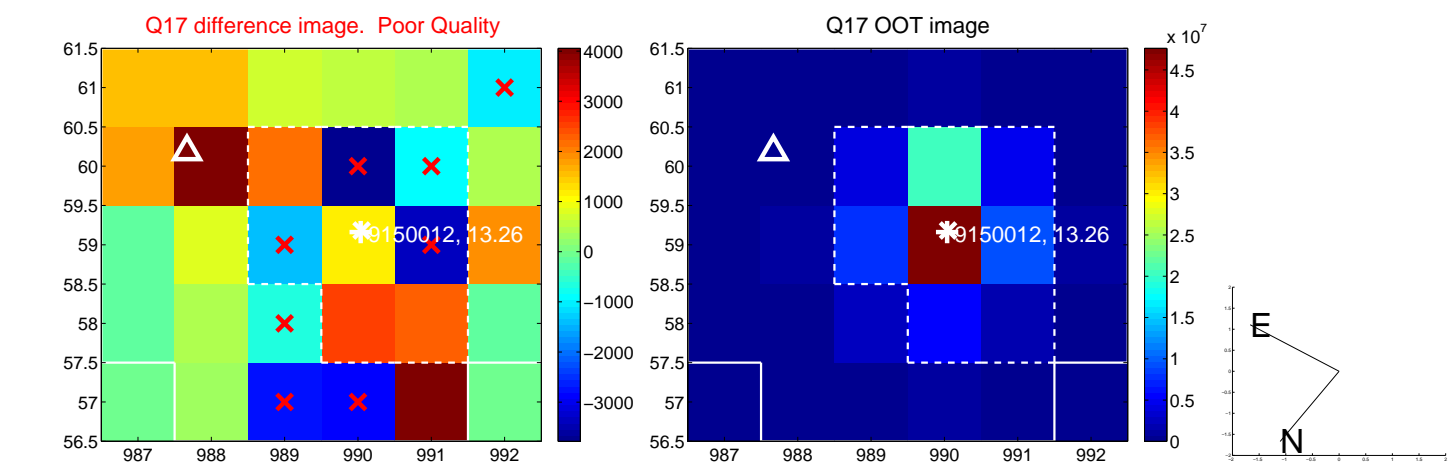




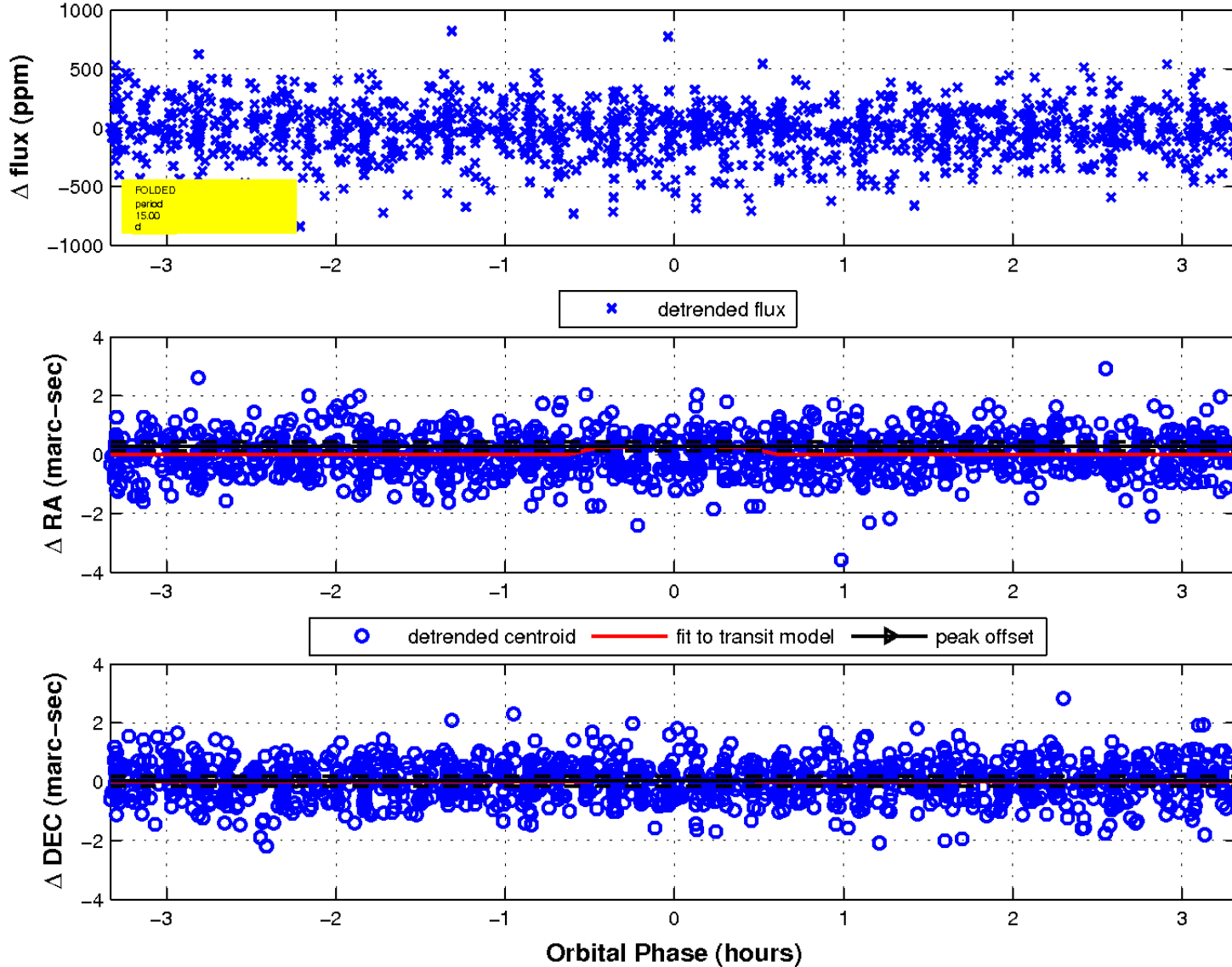
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 5 of 5



UKIRT Image

