

# KIC 010189546

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010189546-01	OBS	0427.01	24.614833	142.510876	1770.7	2.785	53.9	56.0	0.99	5312	4.55	27.98
010189546-02	OBS	0427.02	42.949530	153.738160	942.1	5.563	27.6	28.6	0.99	5312	3.29	13.32
010189546-03	OBS	0427.03	117.041503	245.615467	810.1	7.315	13.2	14.6	0.99	5312	3.34	3.50

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010189546-01	OBS	PC	1.00	0	0	0	0	CENT_KIC_POS
010189546-02	OBS	PC	1.00	0	0	0	0	CENT_KIC_POS
010189546-03	OBS	PC	0.99	0	0	0	0	CENT_KIC_POS

**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.

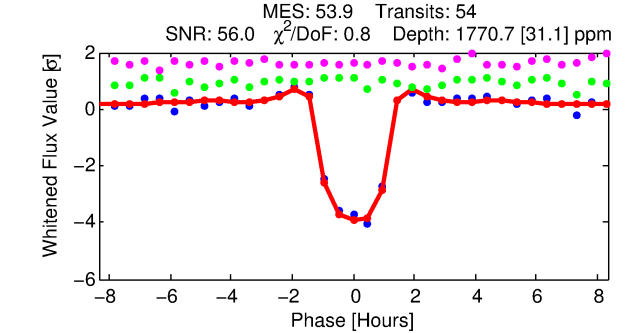
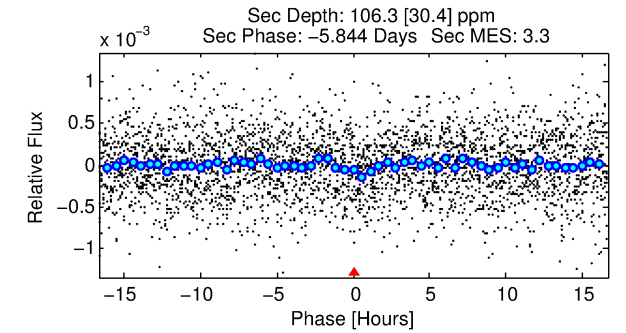
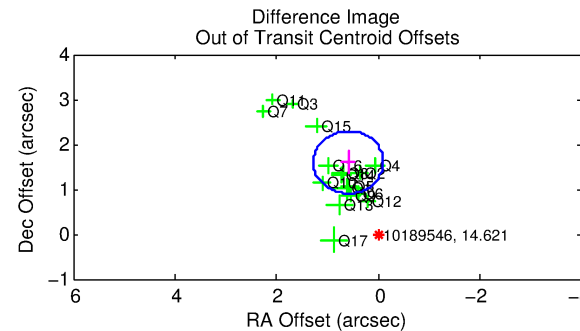
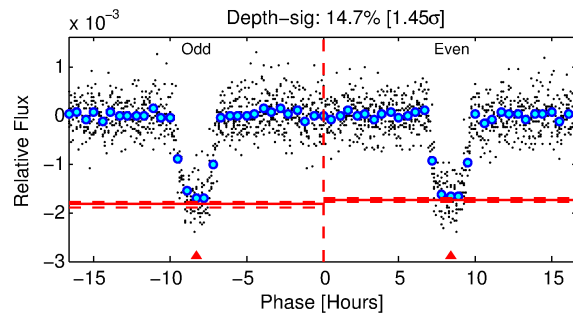
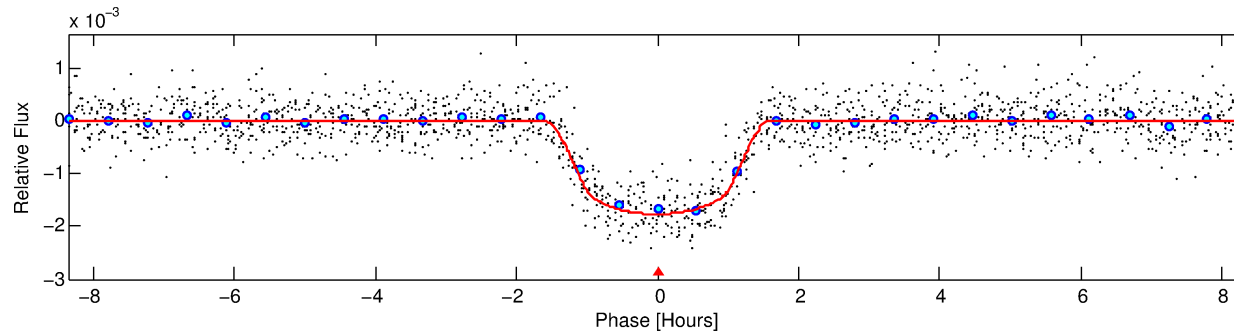
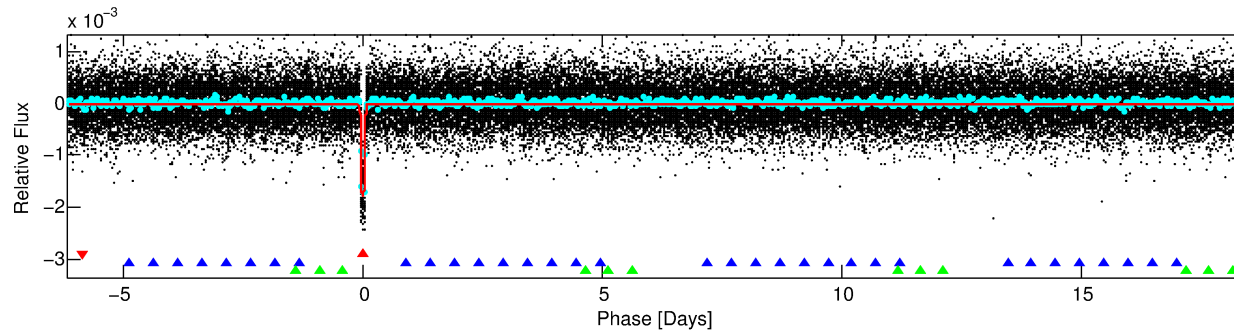
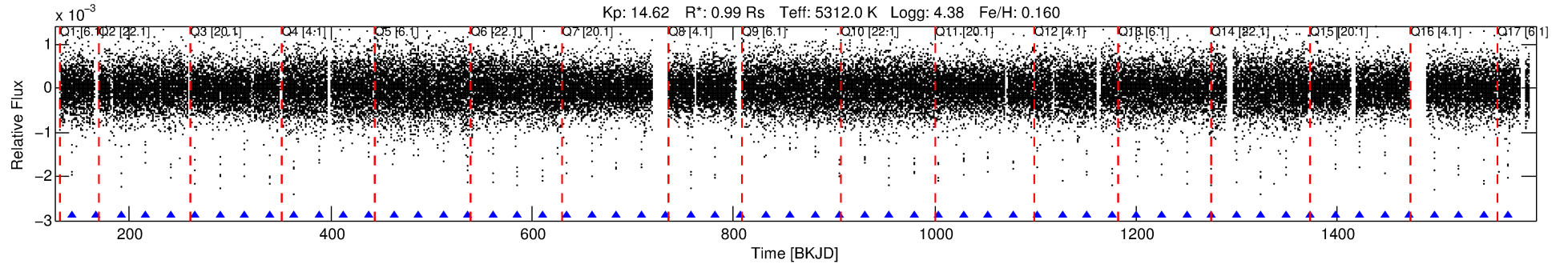
Ephemeris Match Information For 010189546-01

No Significant Match Found

# DV One-Page Summary

KIC: 10189546 Candidate: 1 of 3 Period: 24.615 d

KOI: K00427.01 Corr: 0.975



## DV Fit Results:

Period = 24.61483 [0.00003] d  
Epoch = 142.5109 [0.0010] BKJD  
Rp/R\* = 0.0422 [0.0045]  
a/R\* = 48.12 [18.93]  
b = 0.76 [0.22]  
Seff = 27.98 [6.50]  
Teq = 586 [34] K  
Rp = 4.55 [0.73] Re  
a = 0.1574 [0.0207] AU  
Ag = 70.14 [29.58] [2.34 $\sigma$ ]  
Teffp = 2624 [237] K [8.50 $\sigma$ ]

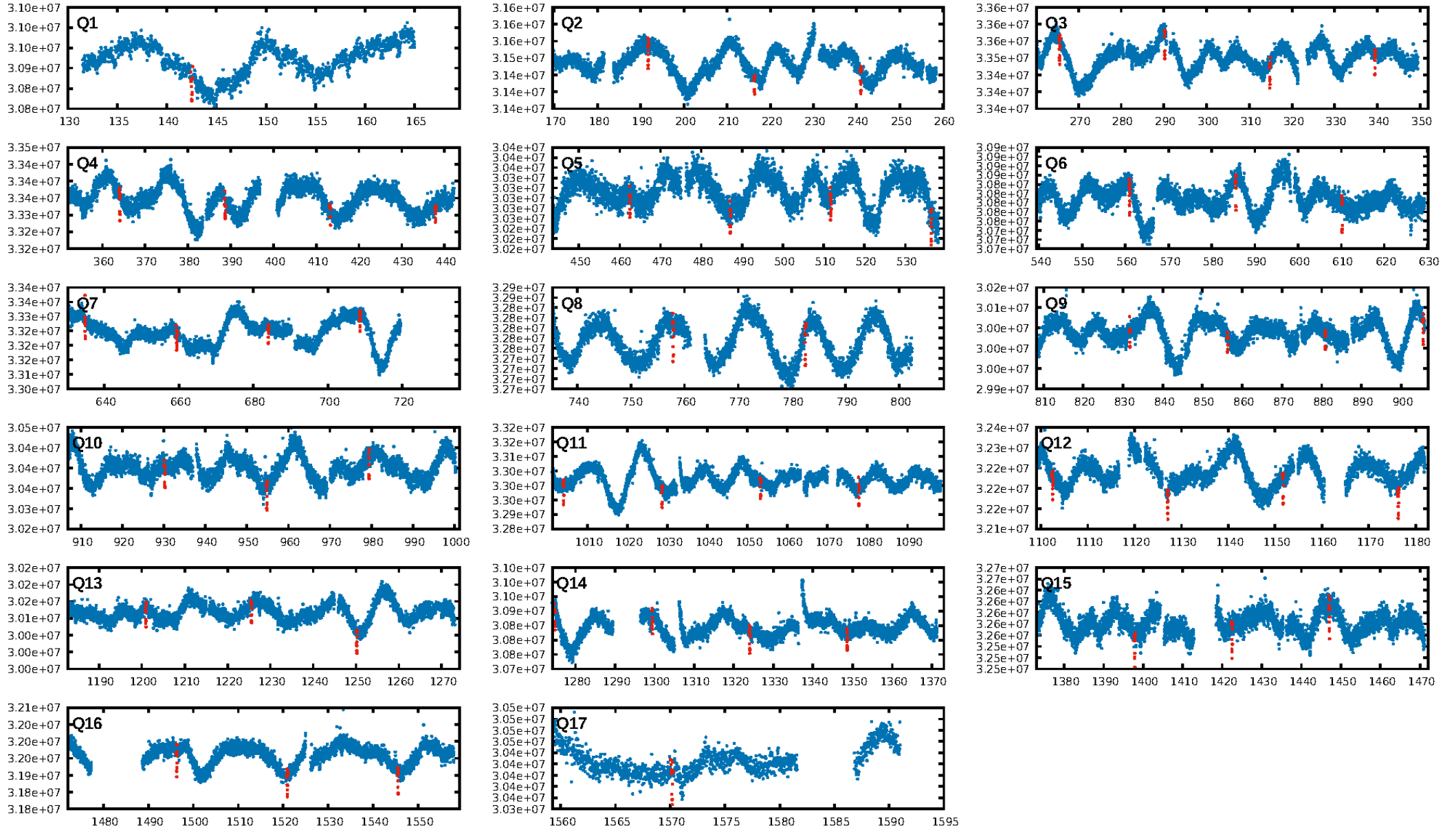
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [70.73 $\sigma$ ]  
ModelChiSquare2-sig: 93.9%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 1.00 [52/52]  
GhostDiagnostic-chr: 4.838  
Centroid-sig: 0.0%  
Centroid-so: 0.815 arcsec [6.83 $\sigma$ ]  
OotOffset-rm: 1.703 arcsec [7.40 $\sigma$ ]  
KicOffset-rm: 0.205 arcsec [1.97 $\sigma$ ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 1.00 [17/17]  
DiffImageOverlap-fno: 1.00 [17/17]

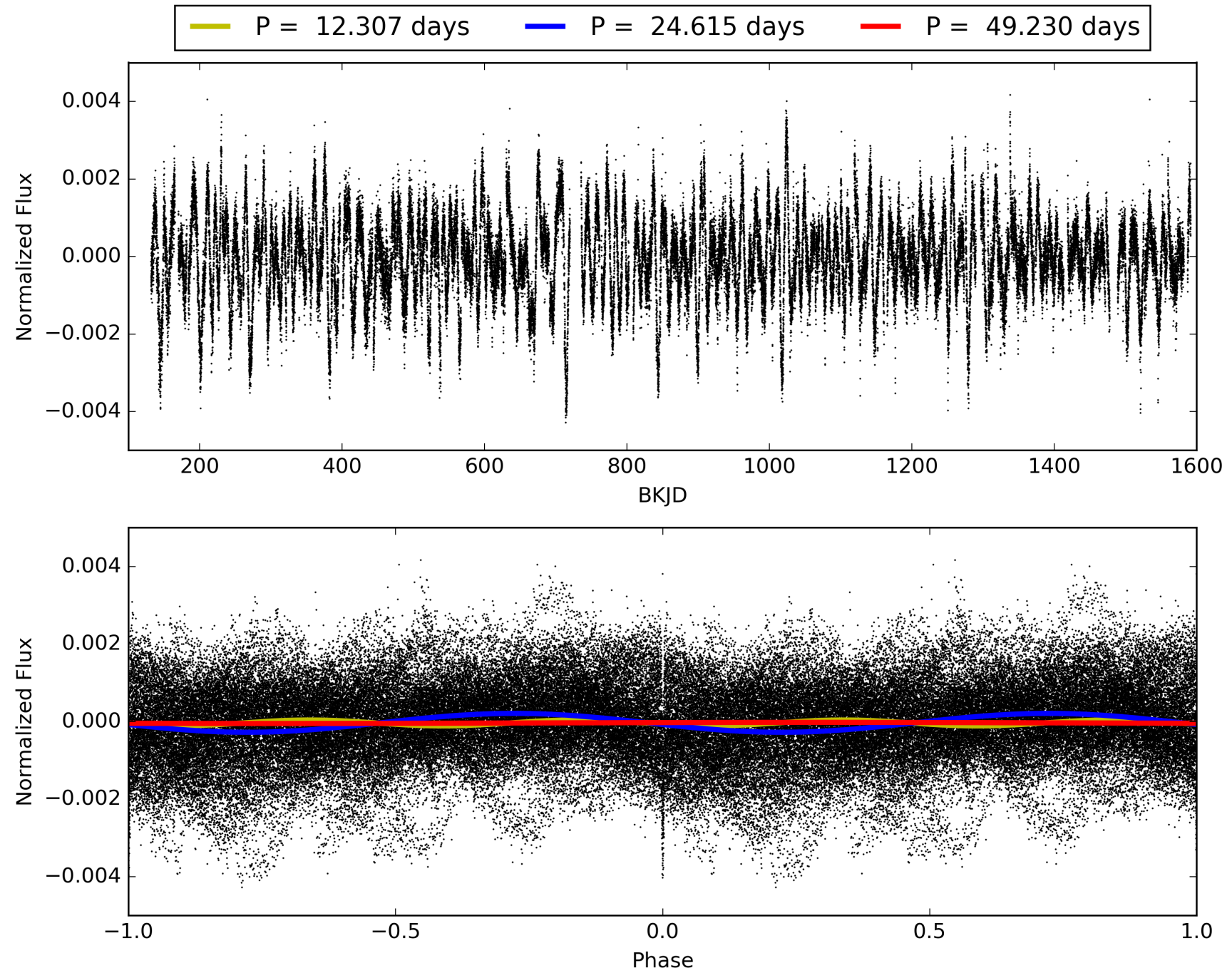
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 04:58:59 Z

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

# TCE 010189546-01, PDC Light Curves

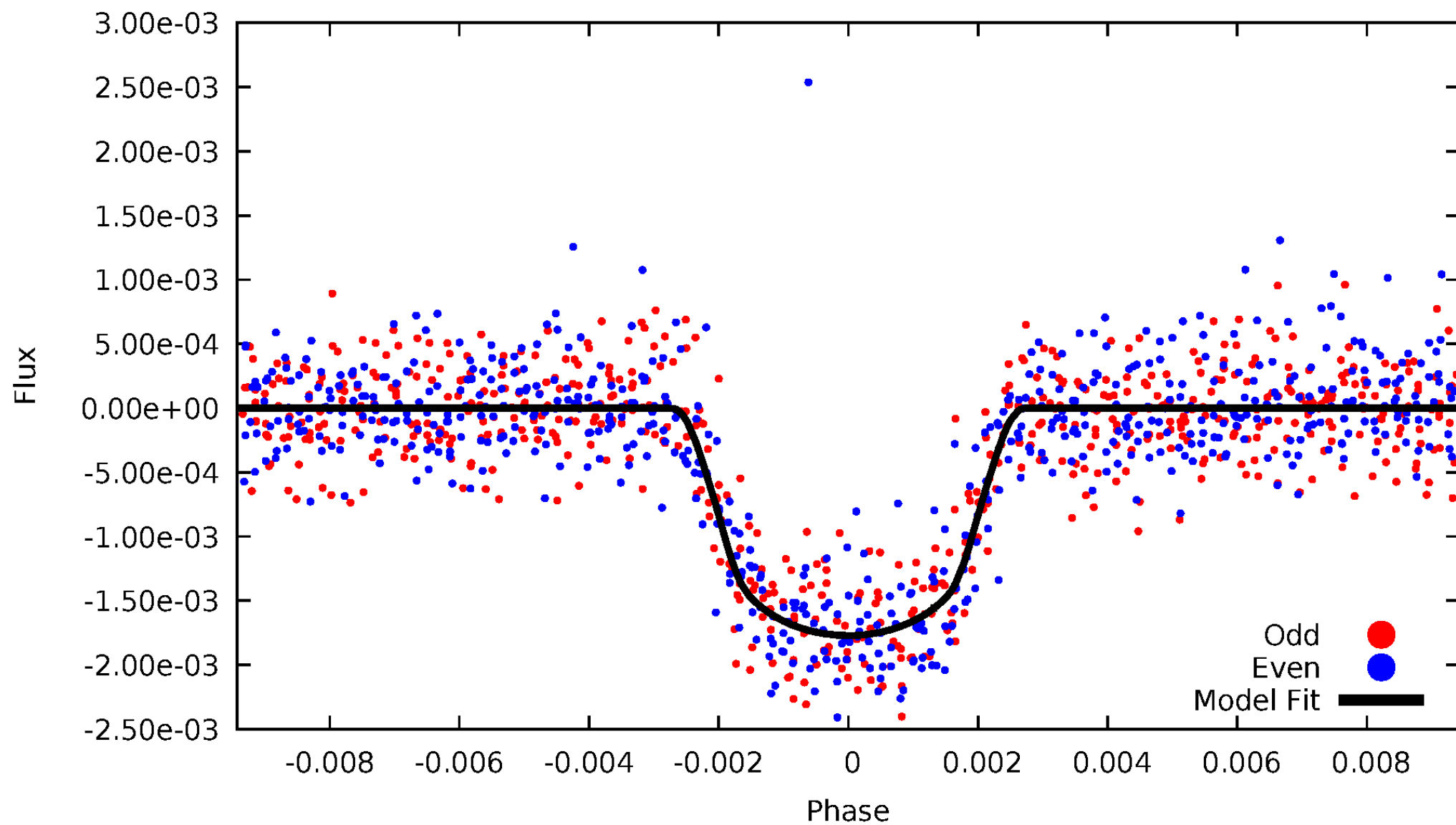


TCE 010189546-01



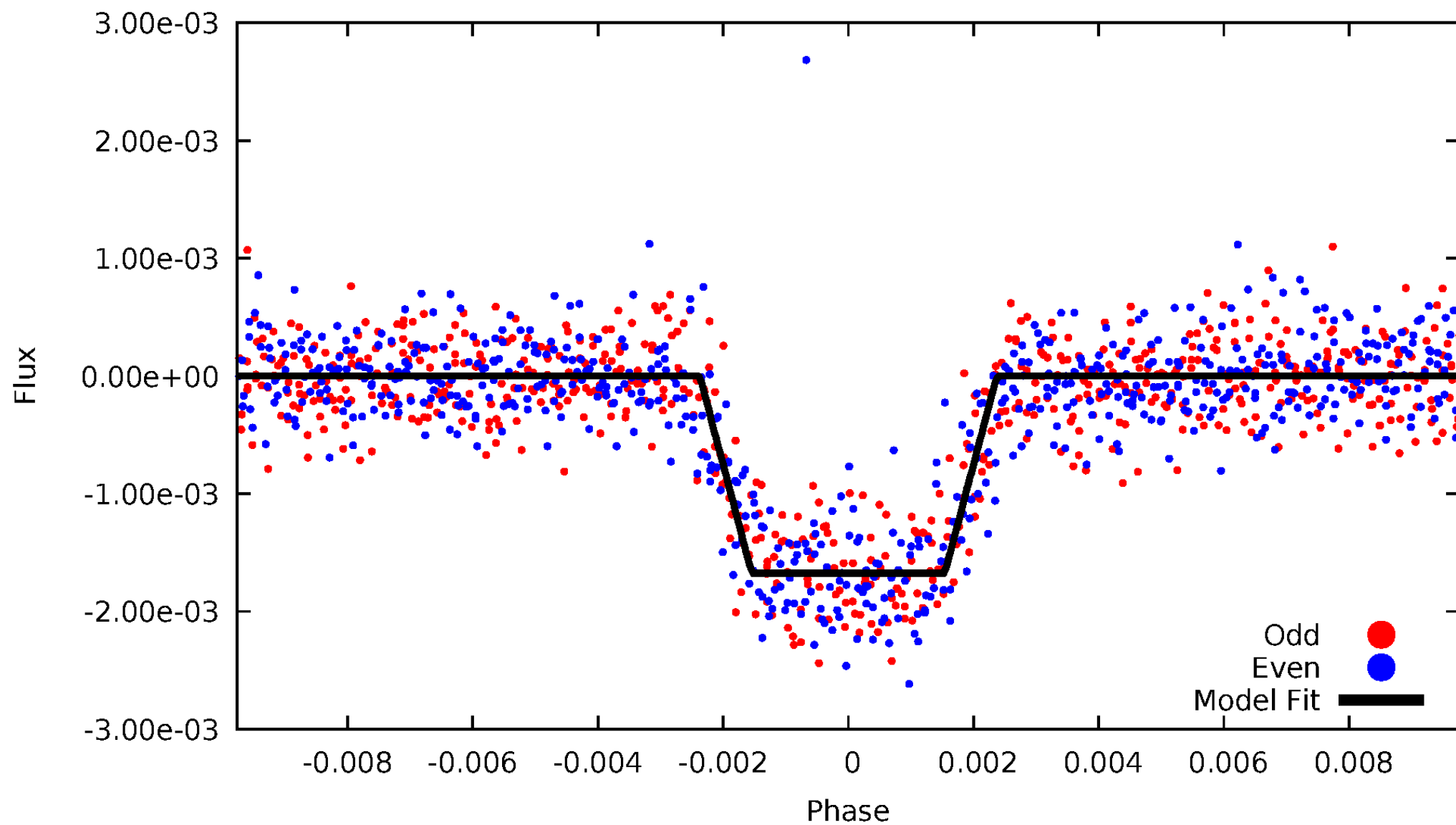
# DV Odd/Even

TCE 010189546-01



# ALT Odd/Even

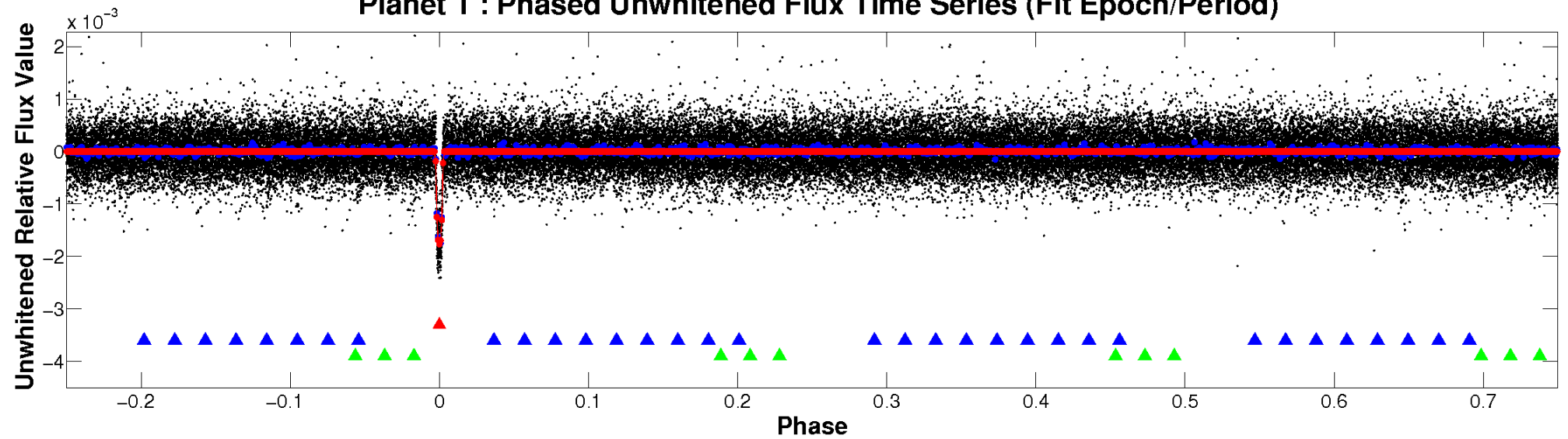
TCE 010189546-01



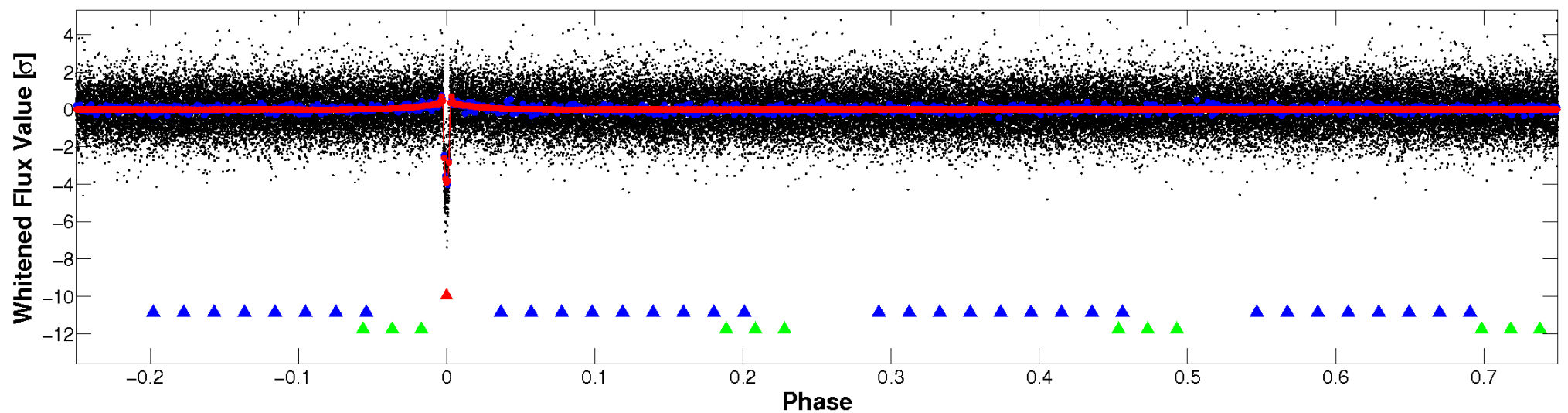


# Non-Whitened Vs. Whitened Light Curve

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

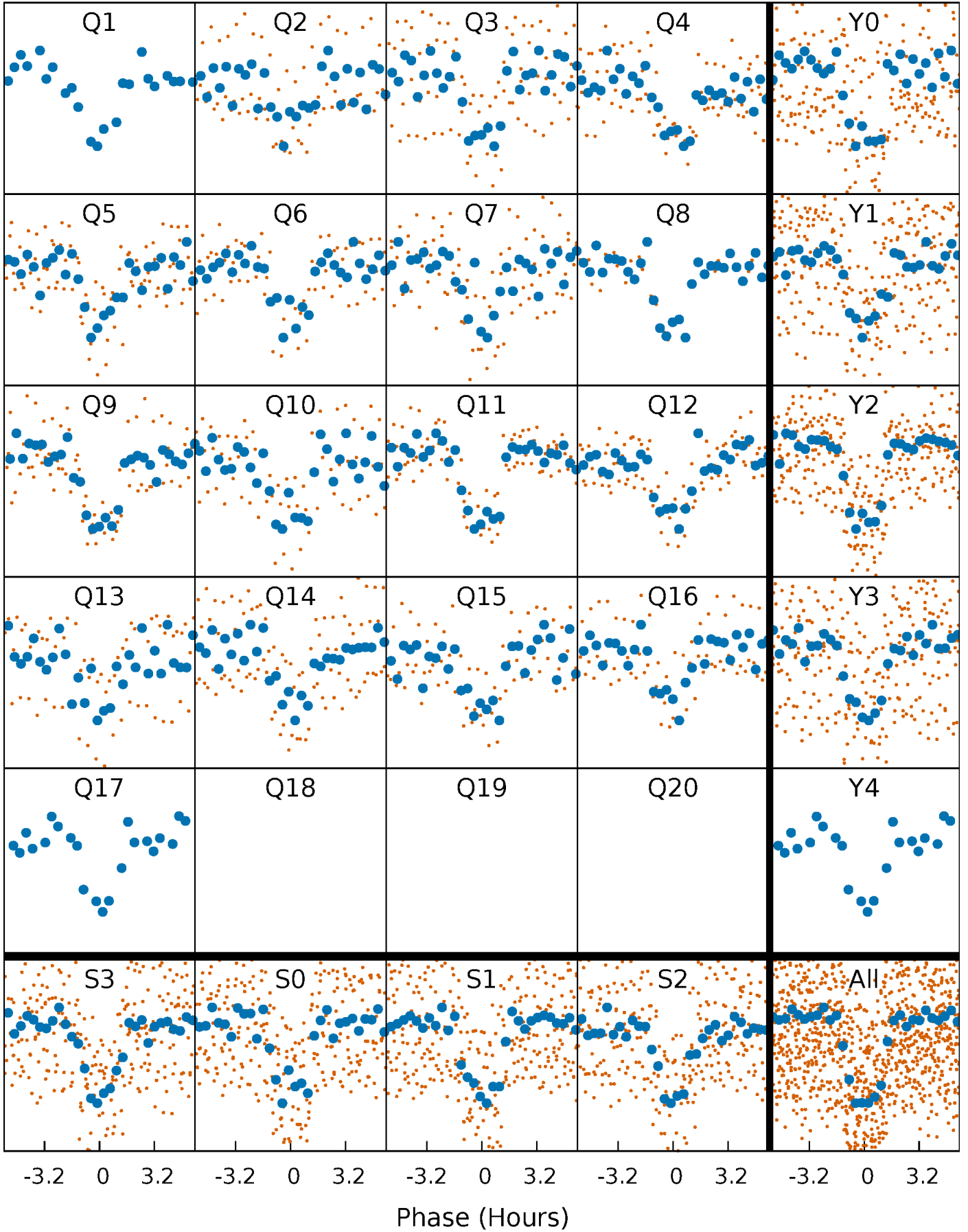


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

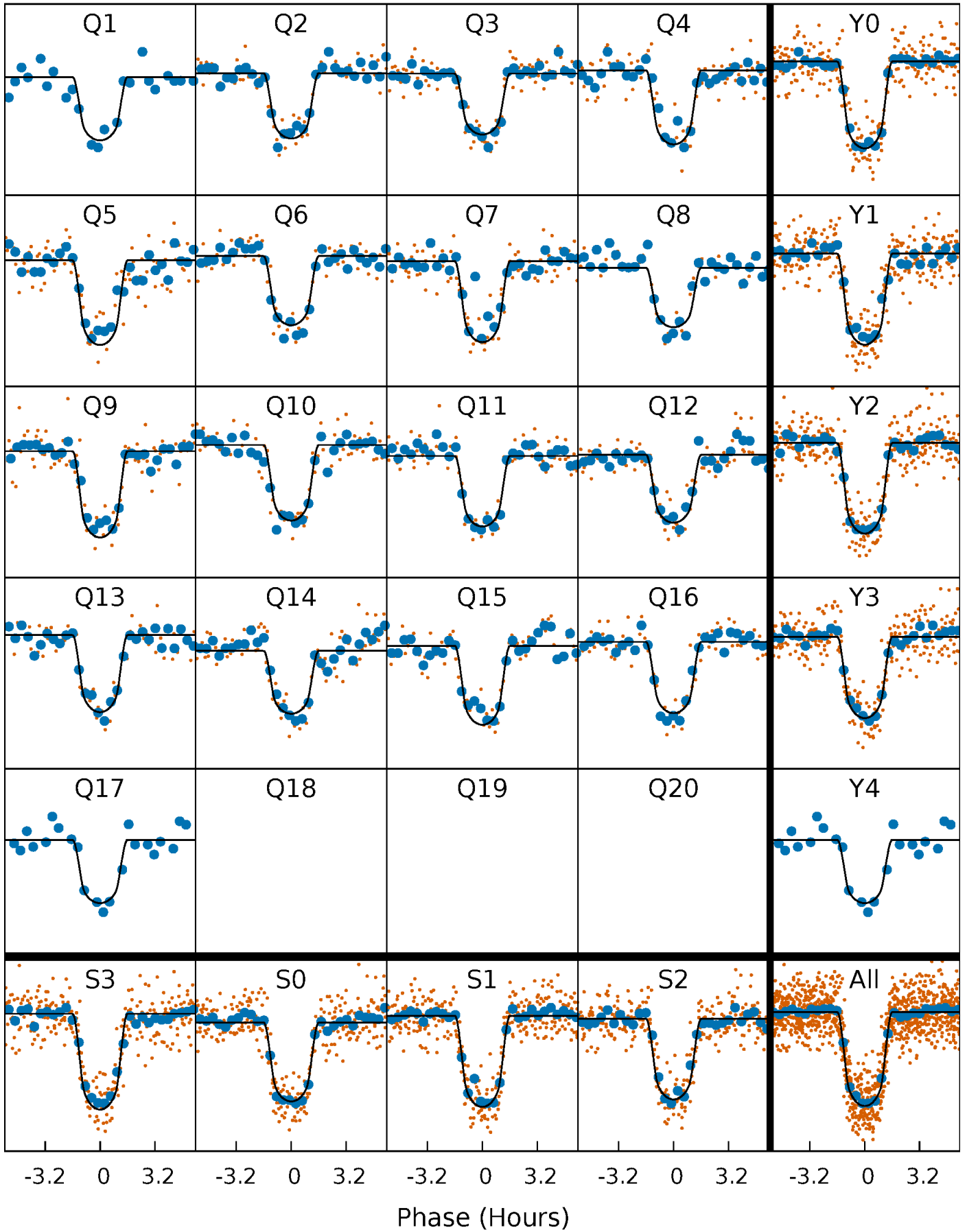
TCE 010189546-01 P= 24.614833 Days  $T_0=142.510876$  (BKJD)





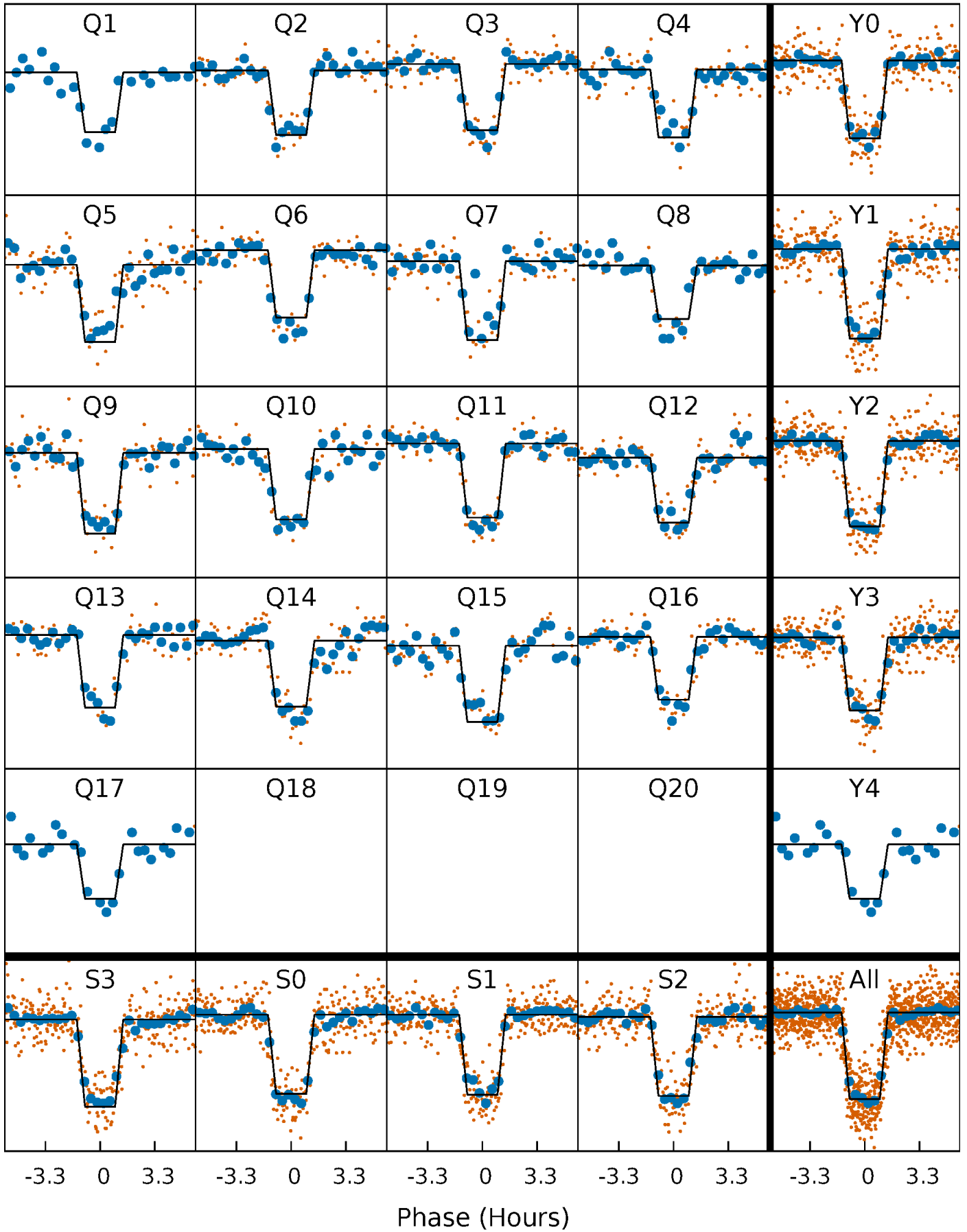
# DV Quarter-Phased Transit Curves

TCE 010189546-01 P= 24.614833 Days  $T_0=142.510876$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

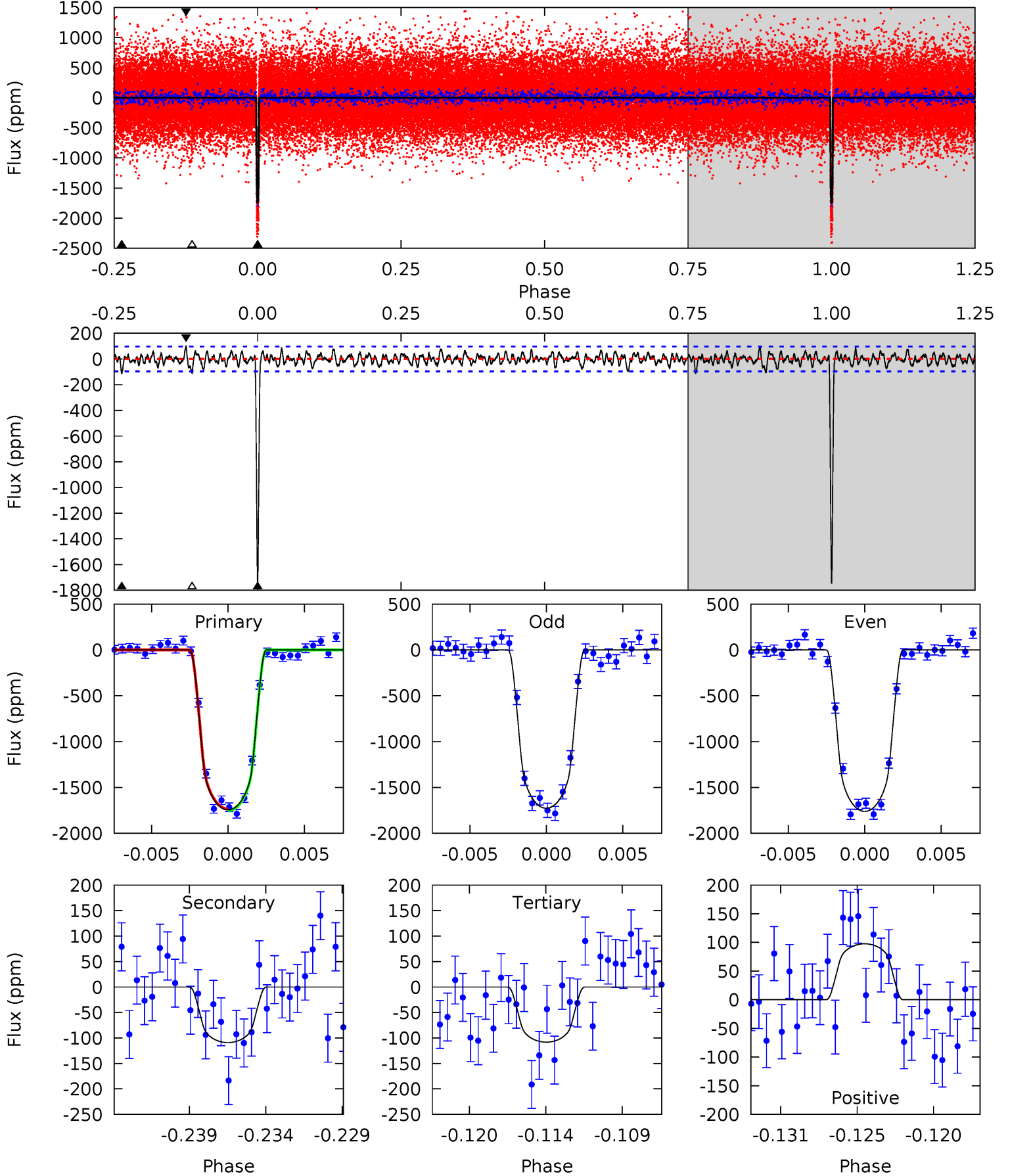
TCE 010189546-01 P= 24.614664 Days  $T_0=142.515650$  (BKJD)



# DV Model-Shift Uniqueness Test

010189546-01, P = 24.614833 Days, E = 117.896043 Days

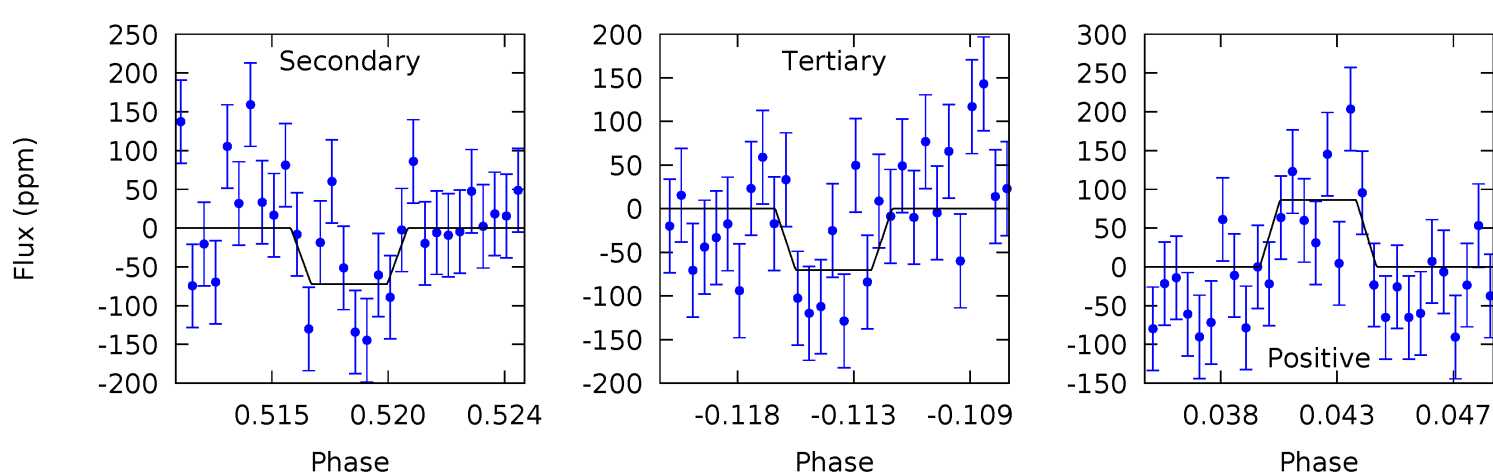
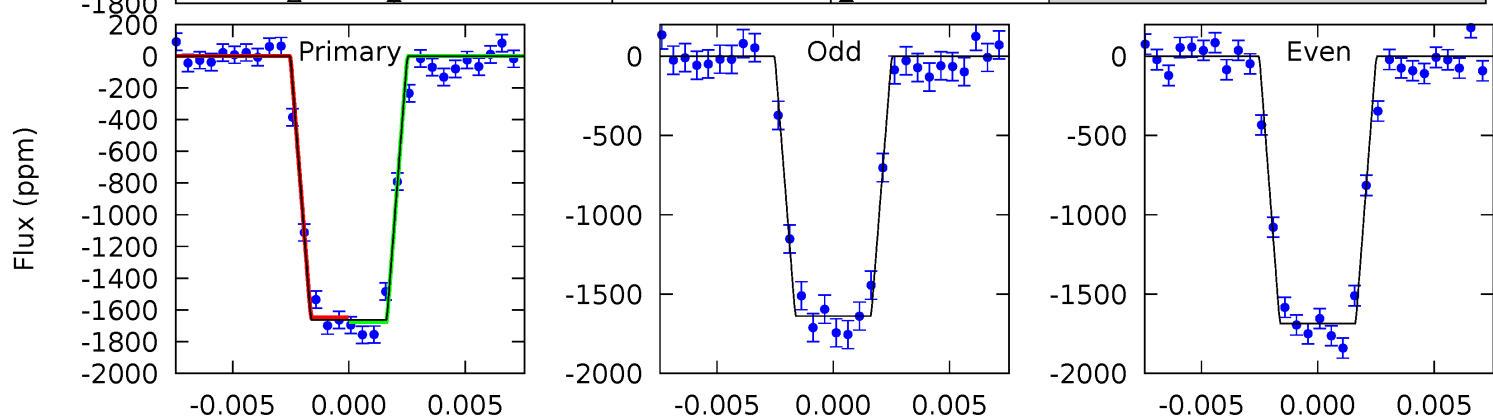
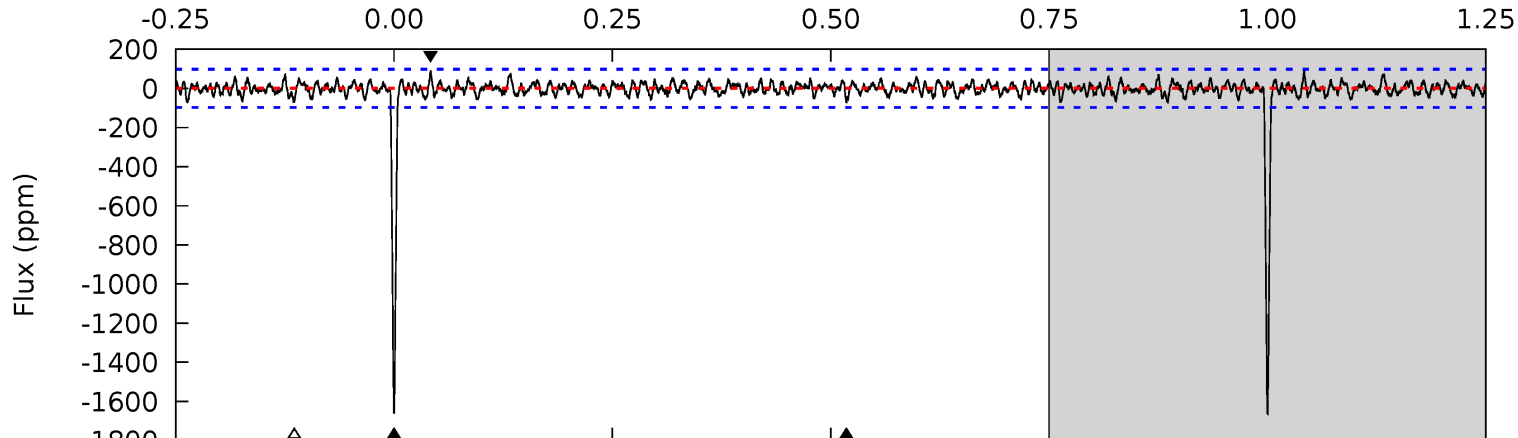
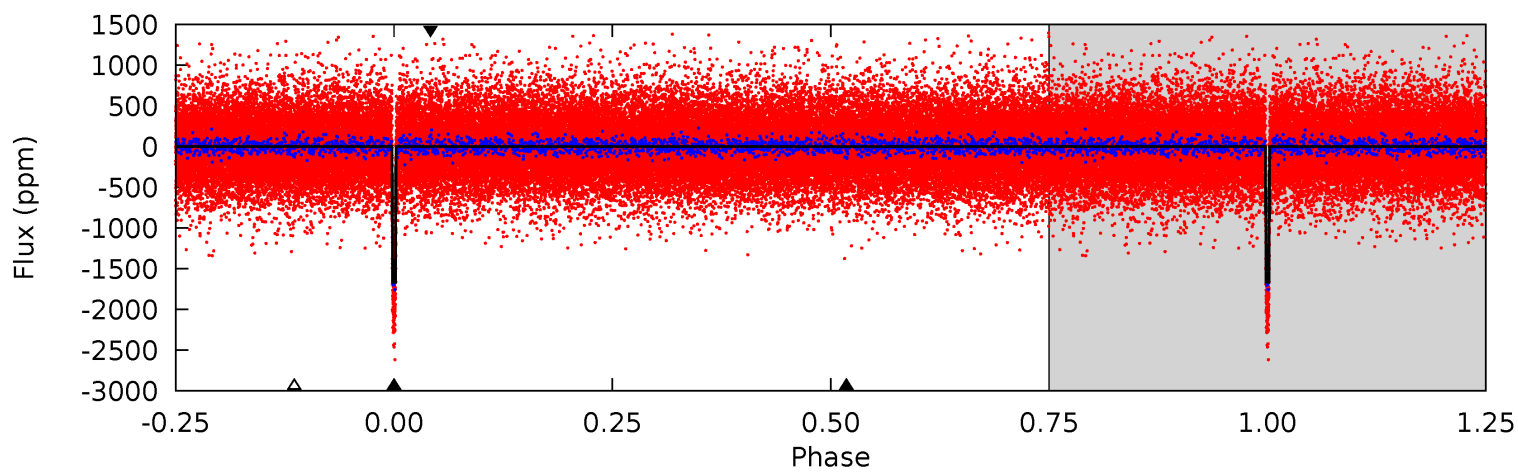
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
92.6	5.79	5.74	5.18	5.14	2.78	1.63	86.8	87.4	0.05	0.61	0.92	0.99	0.05	0.48



# Alt Model-Shift Uniqueness Test

010189546-01, P = 24.614664 Days, E = 117.900986 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
87.4	3.80	3.69	4.55	5.17	2.83	1.27	83.7	82.9	0.11	-0.75	1.25	0.98	0.05	0.73



### Stellar Parameters For KIC 010189546

	$T_{\text{eff}} (K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5312^{+79}_{-79}$	$4.384^{+0.137}_{-0.074}$	$0.160^{+0.150}_{-0.150}$	$0.986^{+0.107}_{-0.117}$	$0.859^{+0.060}_{-0.033}$	$1.262^{+0.665}_{-0.309}$
	+1%/-1%	+3%/-2%	+94%/-94%	+11%/-12%	+7%/-4%	+53%/-24%
Source	SPE90	SPE90	SPE90	DSEP		

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

### Secondary Eclipse Parameters for KIC 010189546-01 / KOI 0427.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-109 \pm 19$	$4.49^{+0.59}_{-0.60}$	$814^{+29}_{-34}$	$3213^{+146}_{-138}$	$75^{+29}_{-21}$
Alt.	$-72 \pm 19$	$4.33^{+0.63}_{-0.58}$	$813^{+31}_{-32}$	$3052^{+156}_{-170}$	$53^{+23}_{-19}$

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

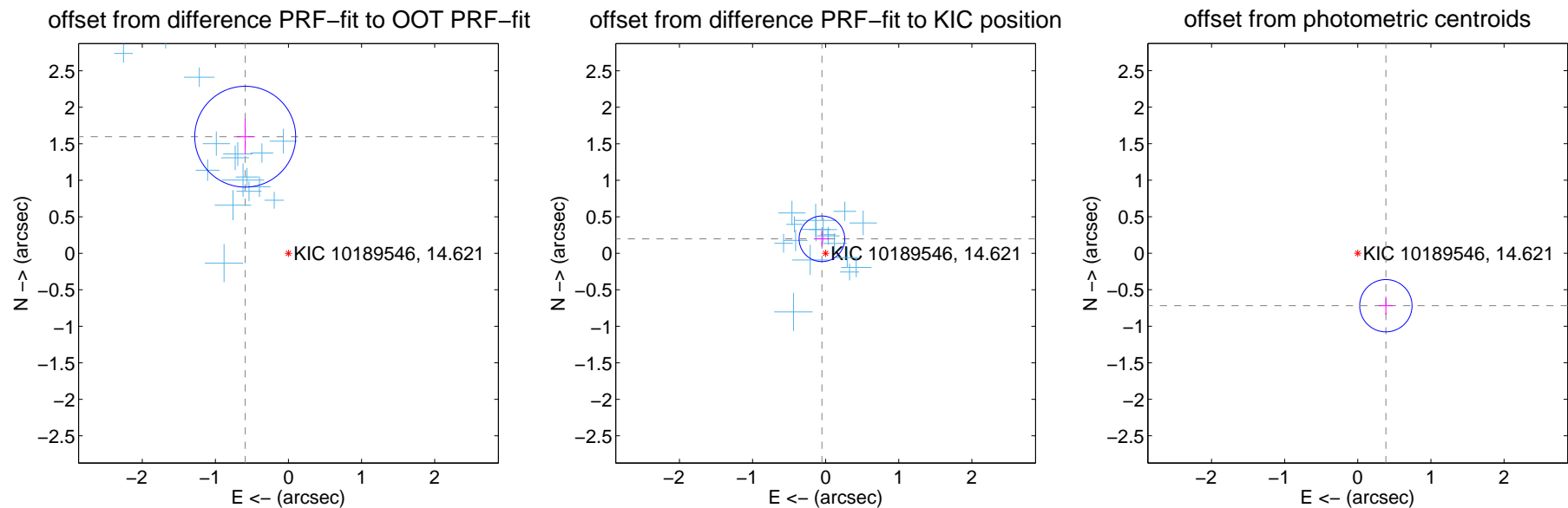
## DV Centroid Data

Supplemental centroid analysis for 010189546-01. Kepler magnitude: 14.62. Transit SNR 56.00

There are 17 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.80 arcsec

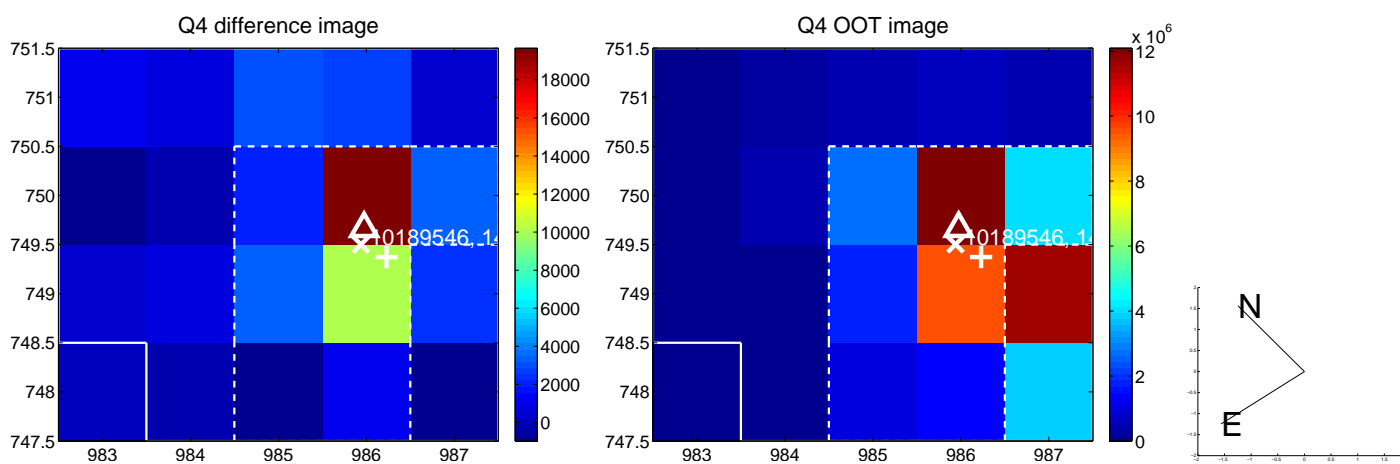
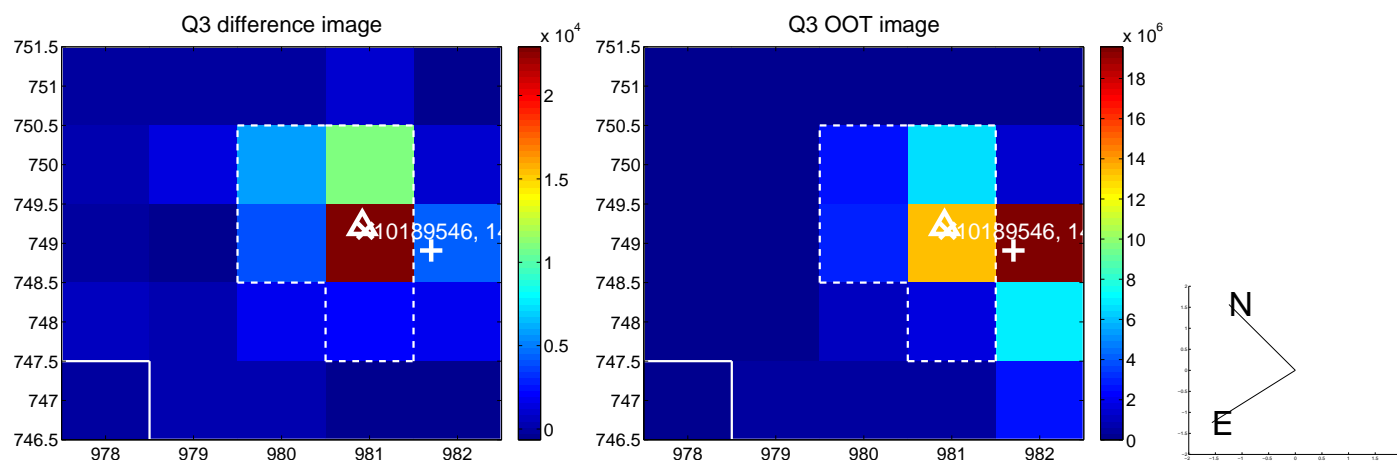
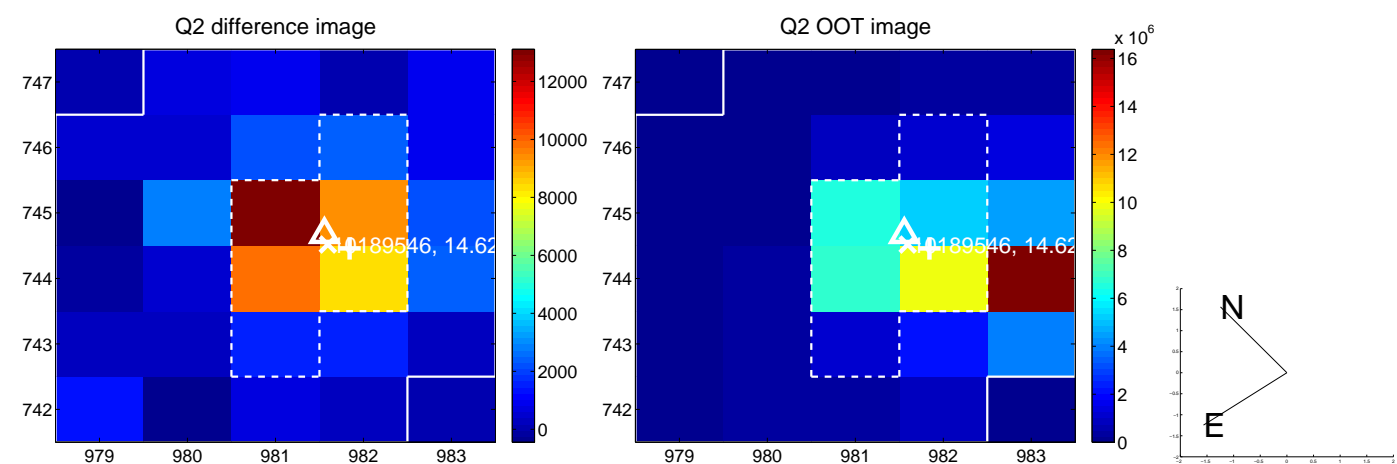
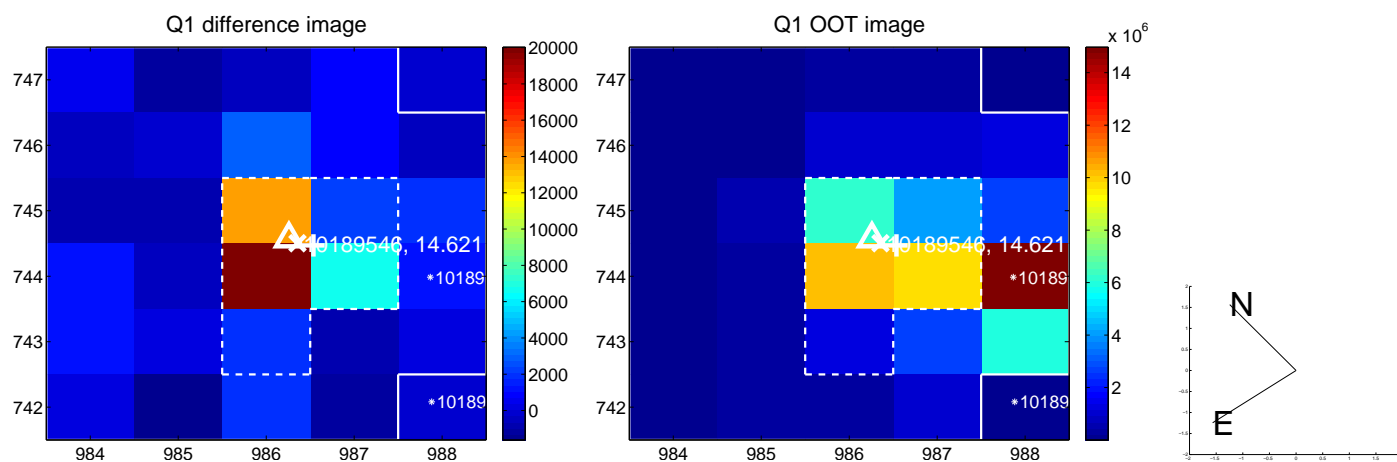
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b><math>1.703 \pm 0.230</math></b>	<b>7.40</b>	$0.592 \pm 0.116$	$1.597 \pm 0.242$
PRF-fit source offset from KIC position	$0.205 \pm 0.104$	1.97	$0.051 \pm 0.103$	$0.198 \pm 0.106$
photometric centroid source offset	<b><math>0.81 \pm 0.12</math></b>	<b>6.83</b>	$-0.38 \pm 0.10$	$-0.72 \pm 0.12$



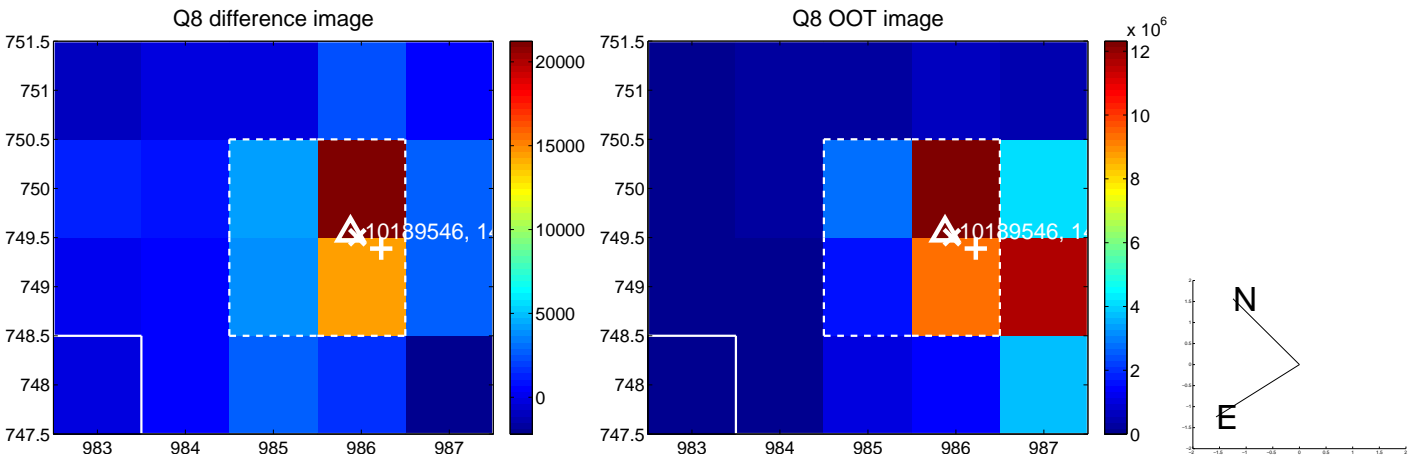
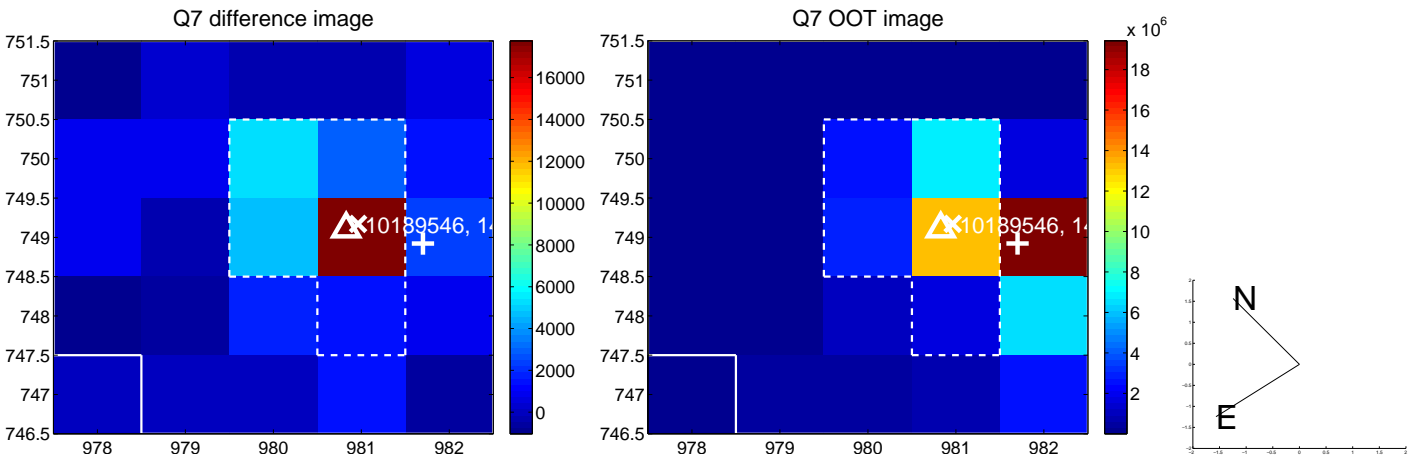
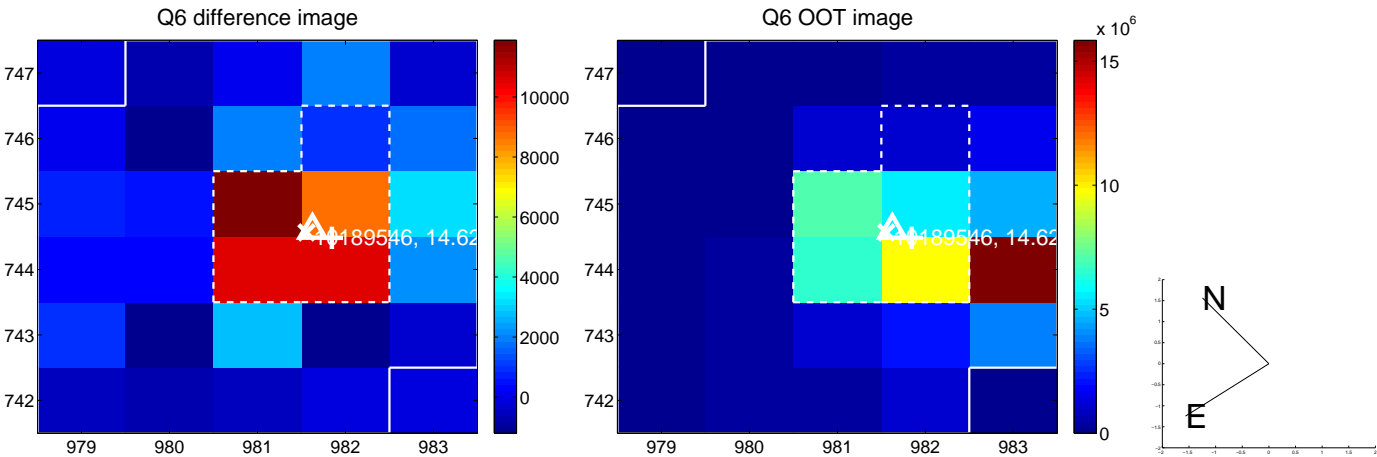
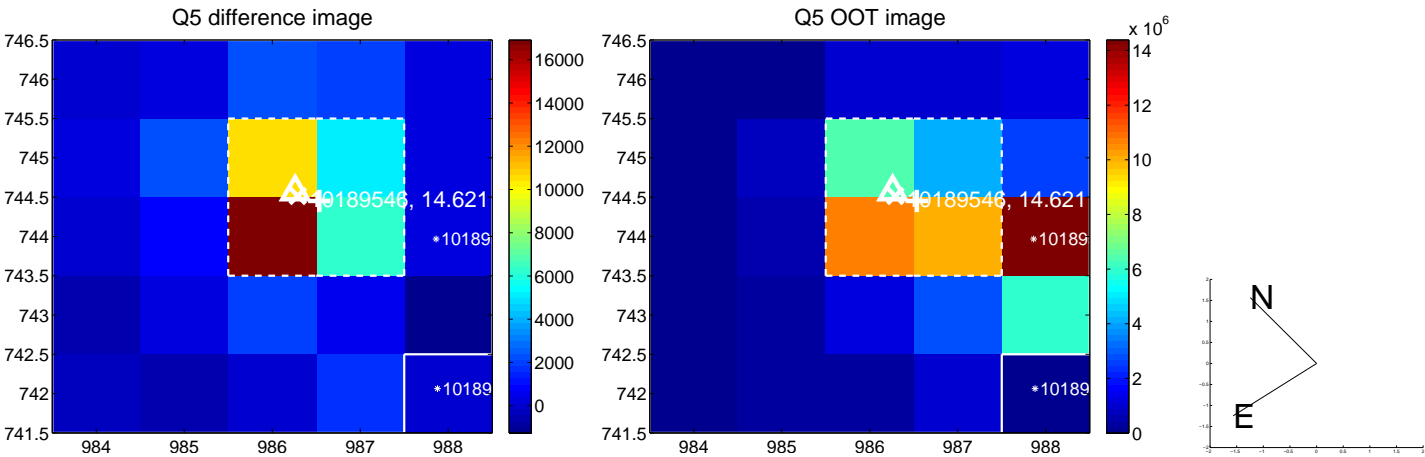
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



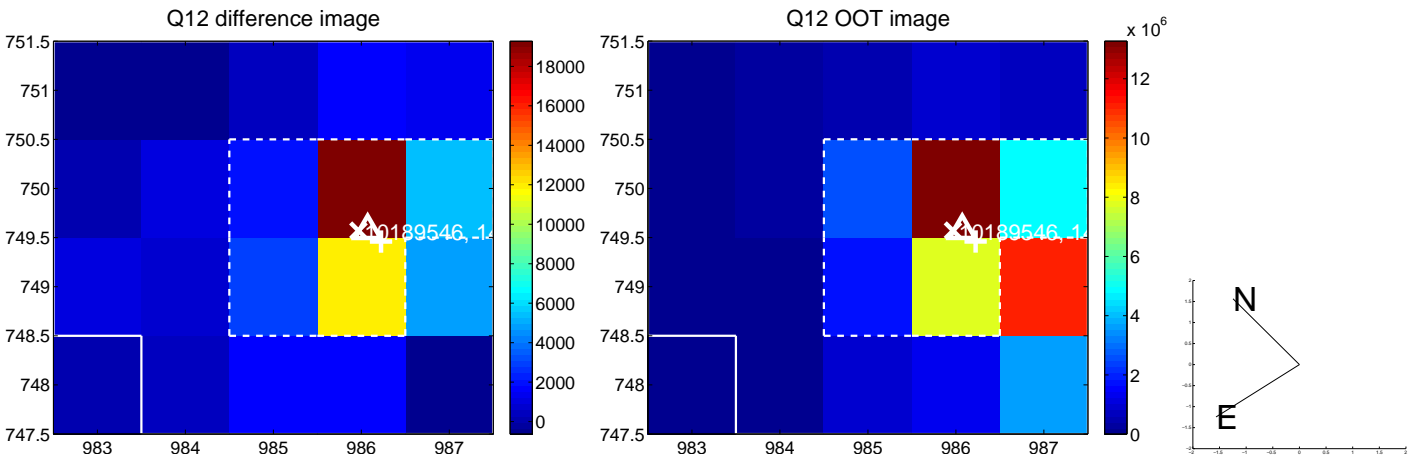
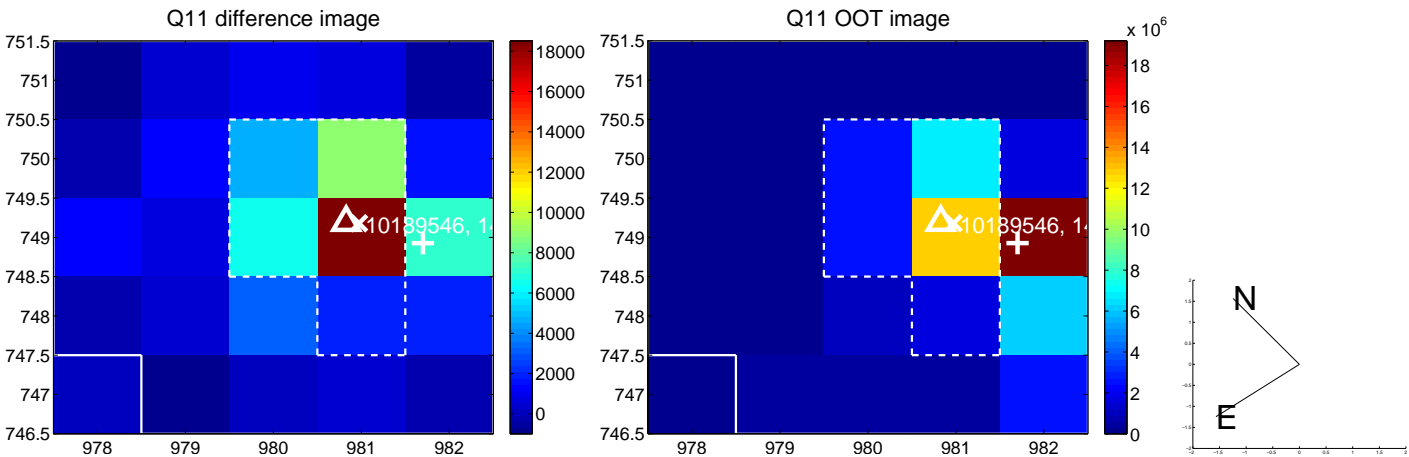
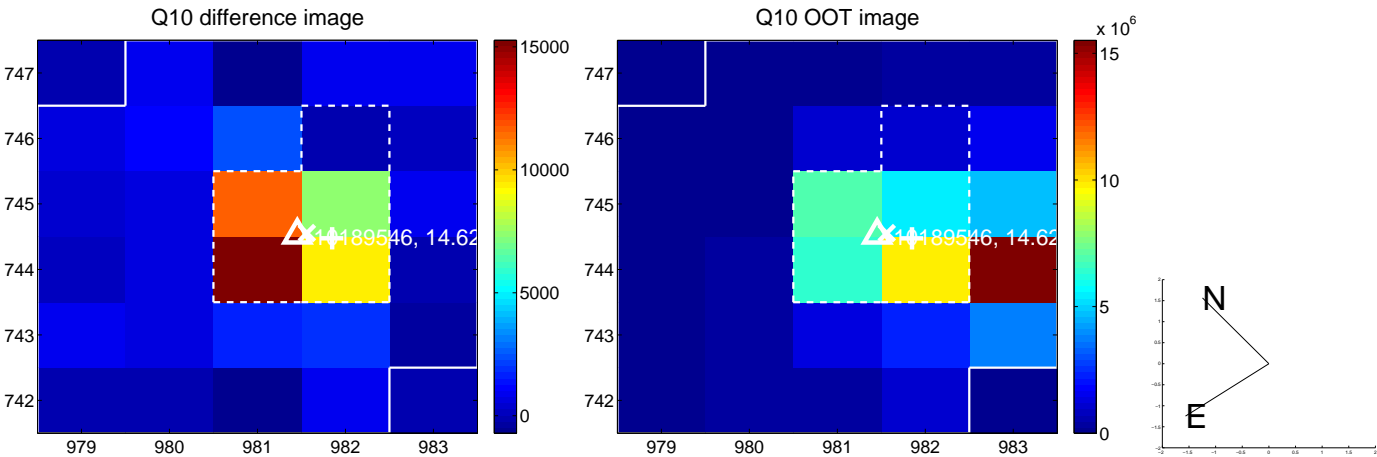
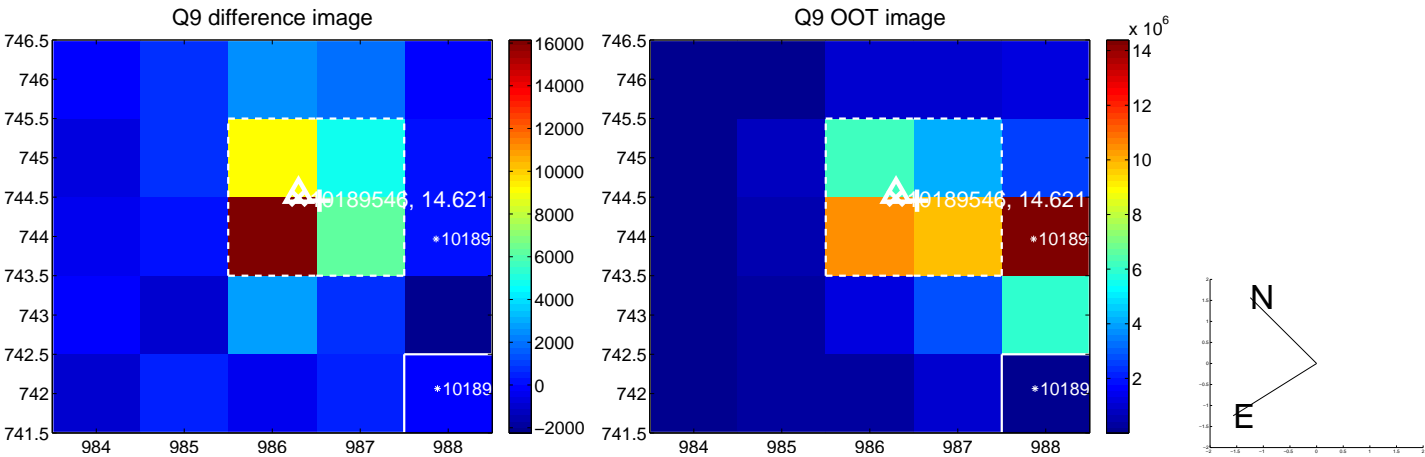
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value



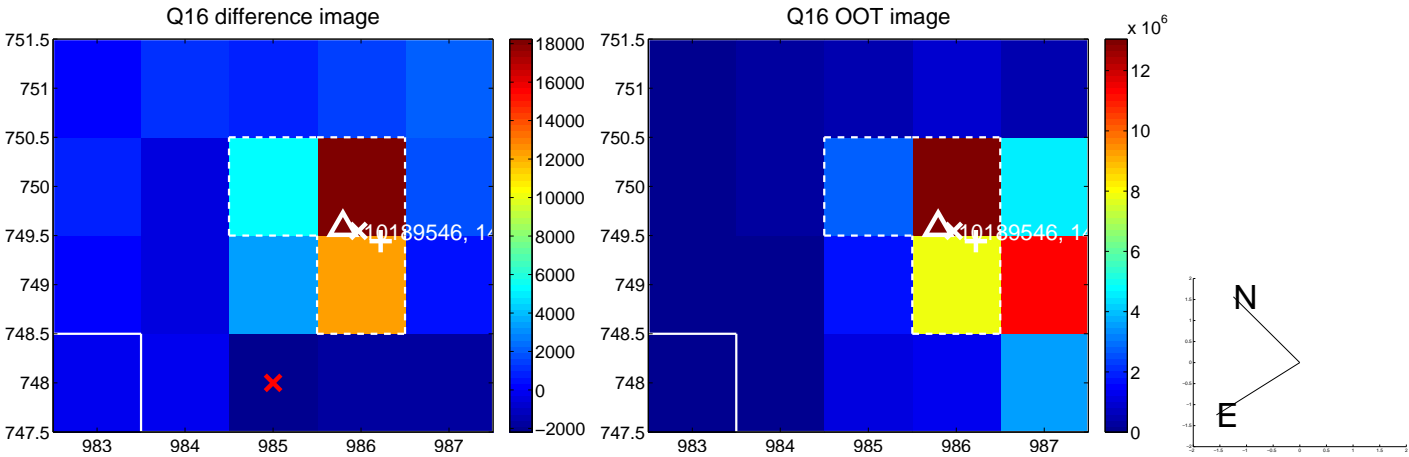
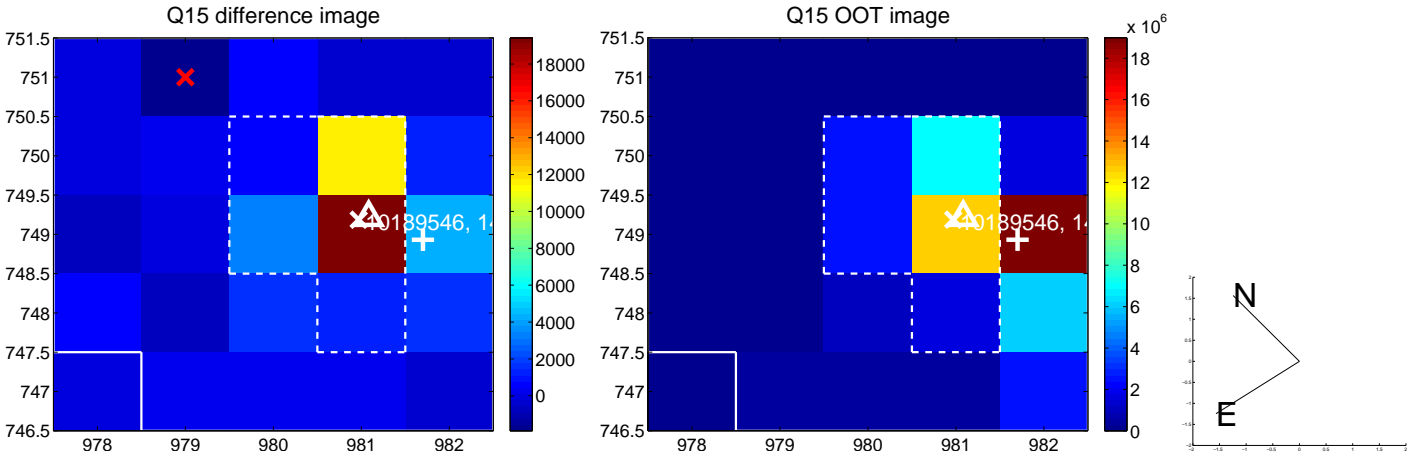
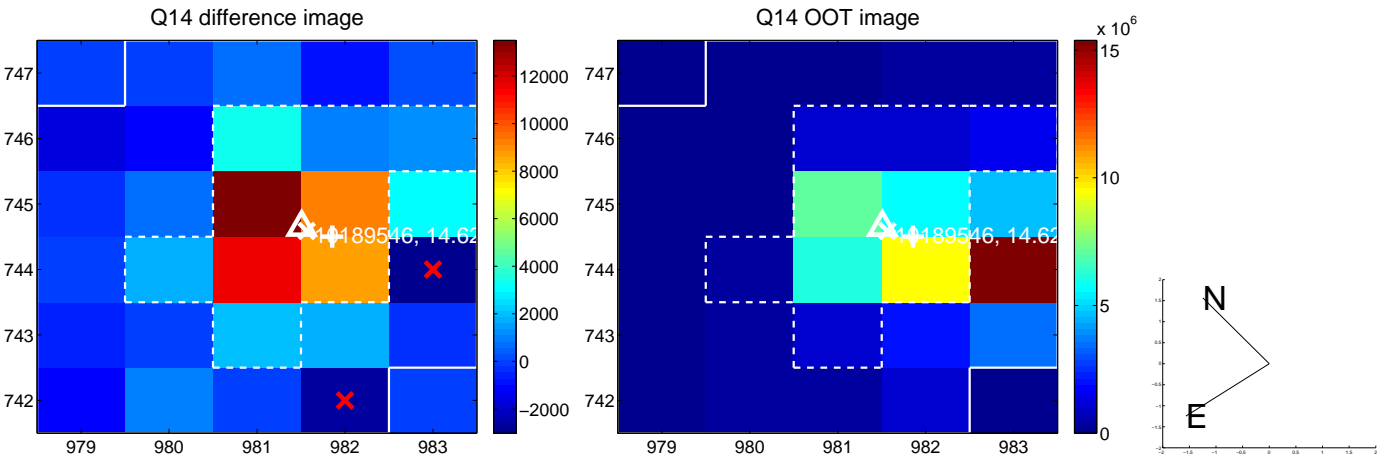
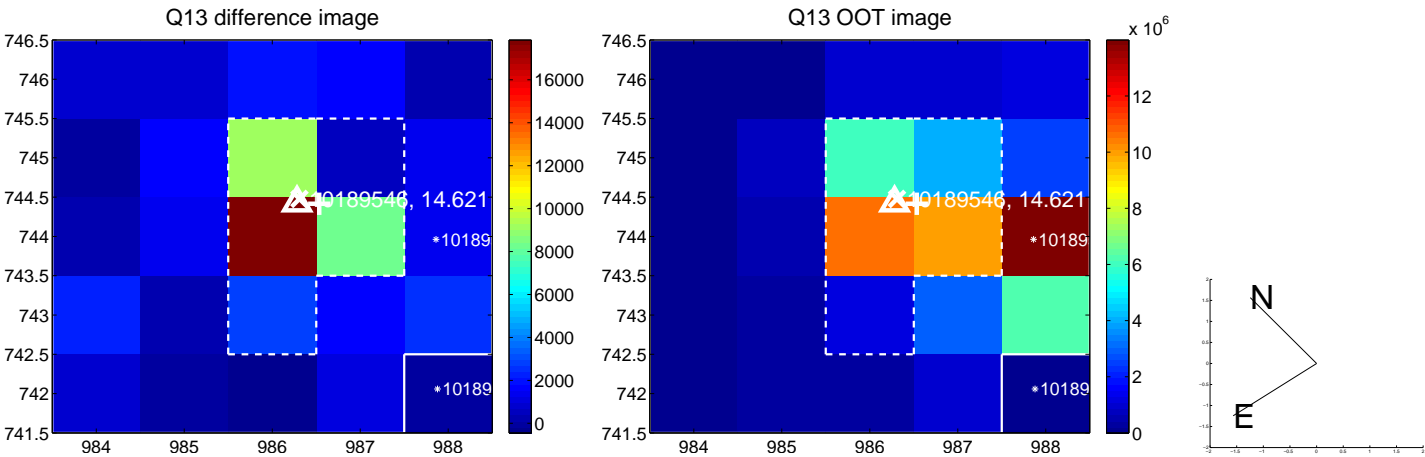
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



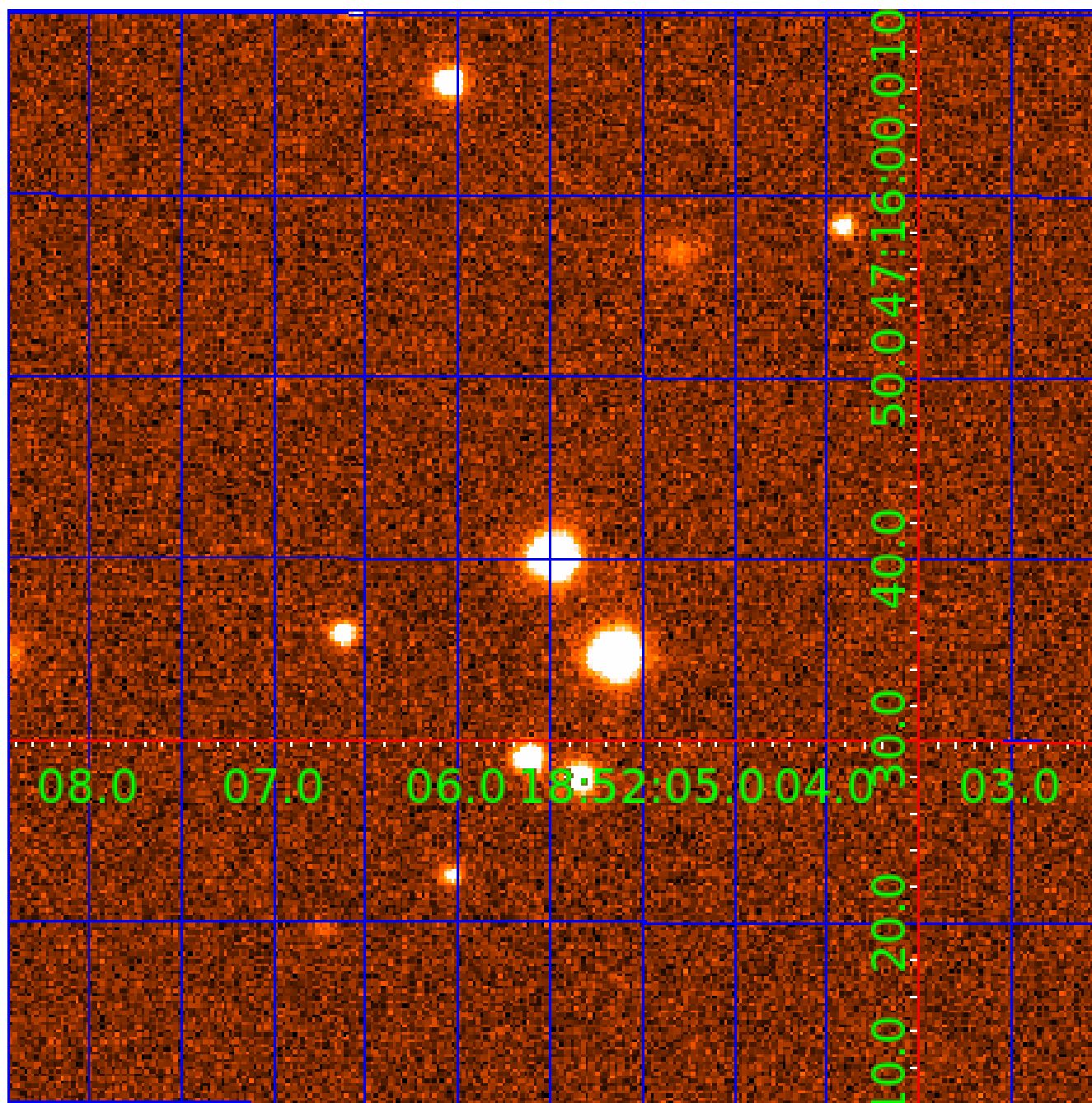
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





UKIRT Image

Declination





# KIC 010189546

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010189546-01	OBS	0427.01	24.614833	142.510876	1770.7	2.785	53.9	56.0	0.99	5312	4.55	27.98
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## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010189546-01	OBS	PC	1.00	0	0	0	0	CENT_KIC_POS
010189546-02	OBS	PC	1.00	0	0	0	0	CENT_KIC_POS
010189546-03	OBS	PC	0.99	0	0	0	0	CENT_KIC_POS

**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.

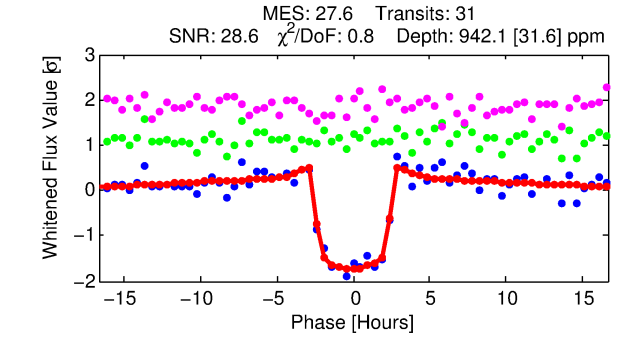
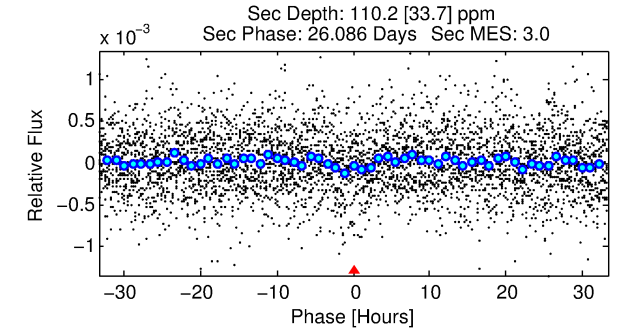
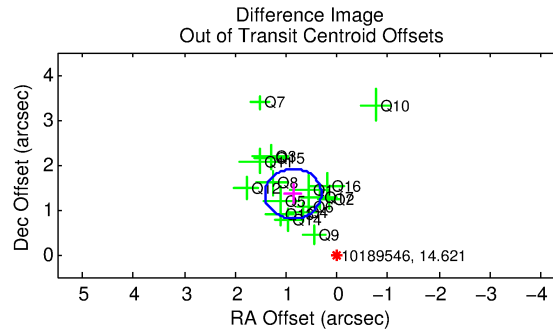
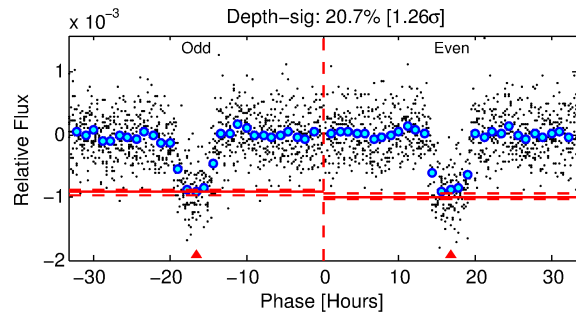
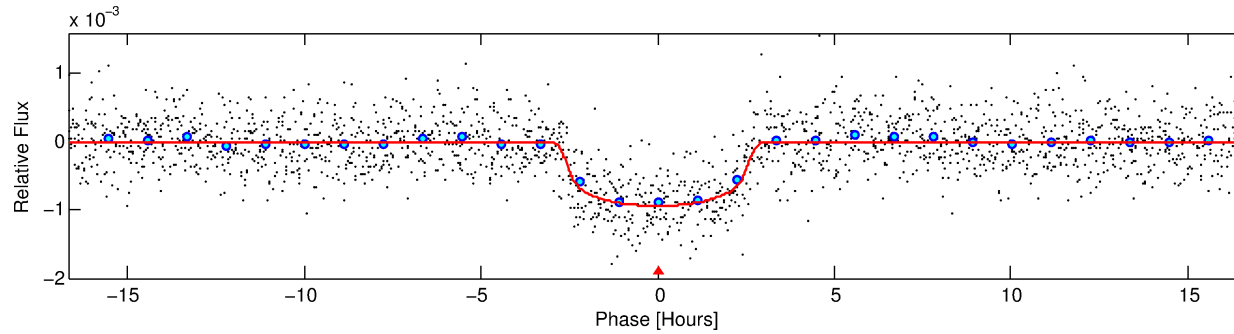
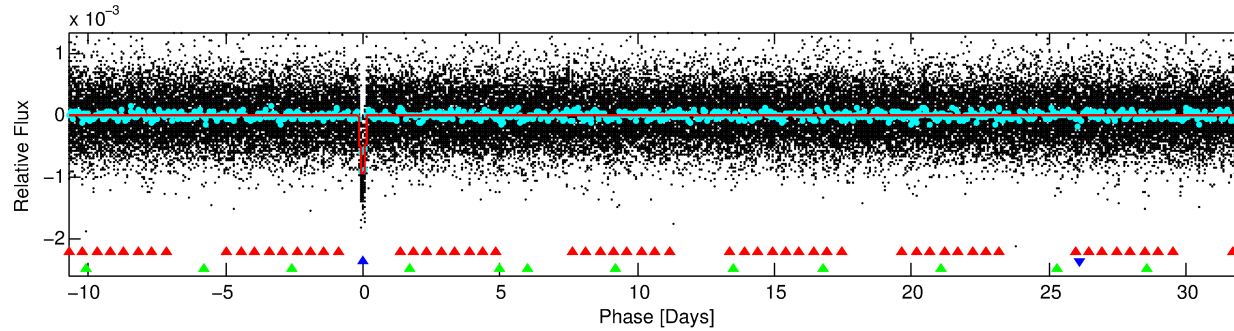
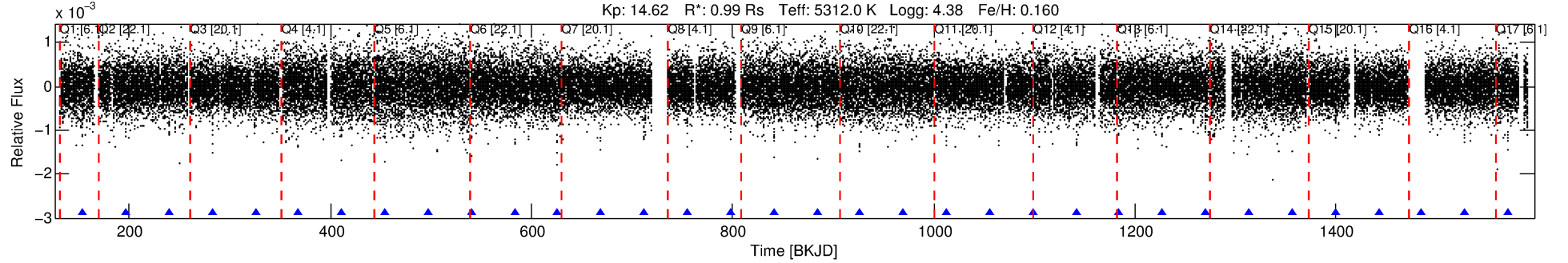
Ephemeris Match Information For 010189546-02

No Significant Match Found

# DV One-Page Summary

KIC: 10189546 Candidate: 2 of 3 Period: 42.950 d

KOI: K00427.02 Corr: 0.982



## DV Fit Results:

Period = 42.94953 [0.00015] d  
Epoch = 153.7382 [0.0029] BKJD  
Rp/R\* = 0.0306 [0.0047]  
a/R\* = 42.01 [24.12]  
b = 0.74 [0.35]  
Seff = 13.32 [3.10]  
Teq = 487 [28] K  
Rp = 3.29 [0.64] Re  
a = 0.2282 [0.0300] AU  
Ag = 292.01 [142.82] [2.04 $\sigma$ ]  
Teffp = 3114 [341] K [7.67 $\sigma$ ]

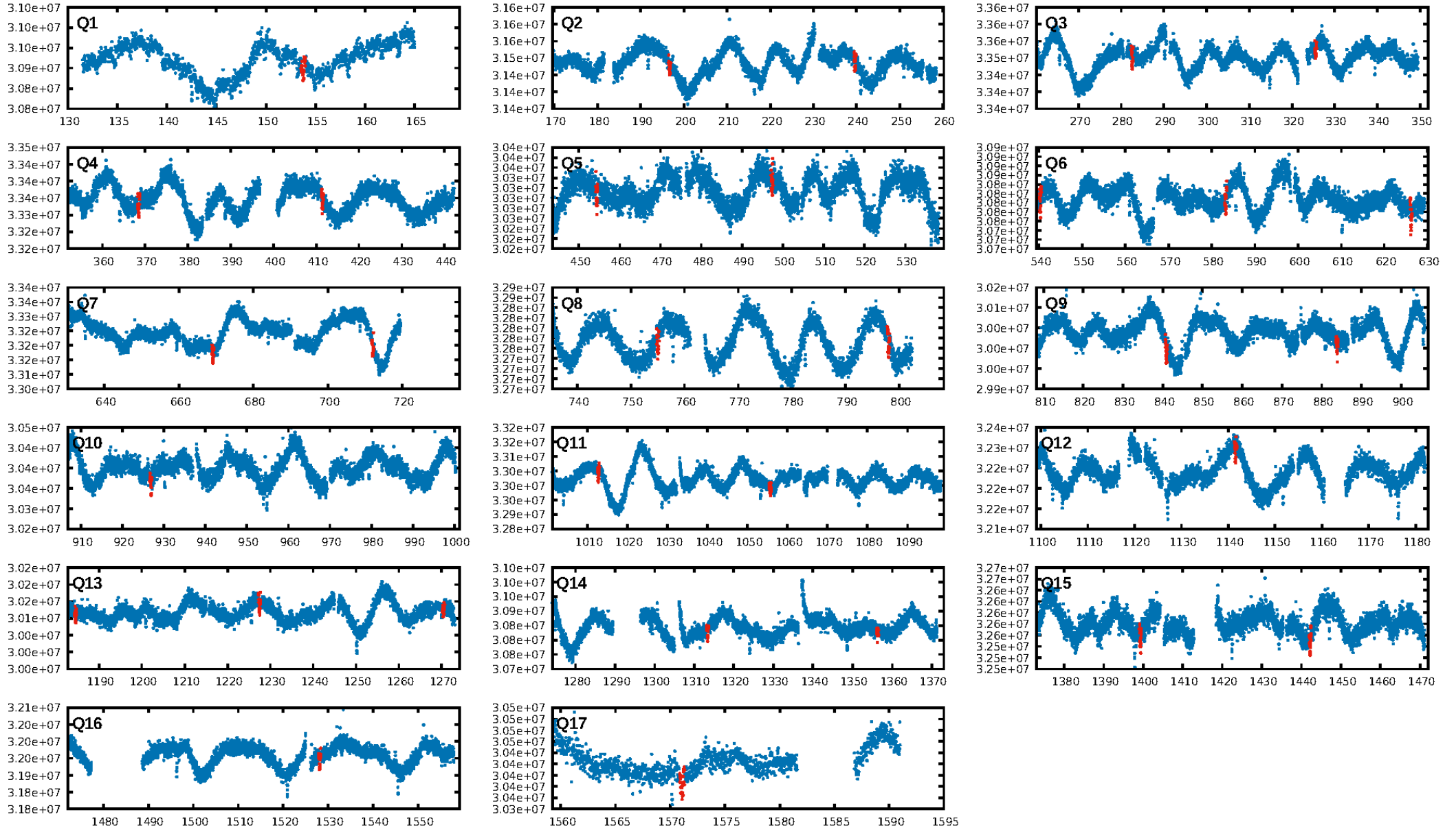
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [70.73 $\sigma$ ]  
LongPeriod-sig: 100.0% [193.49 $\sigma$ ]  
ModelChiSquare2-sig: 94.6%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 1.94e-154  
RollingBand-fgt: 1.00 [29/29]  
GhostDiagnostic-chr: 3.372  
Centroid-sig: 0.0%  
Centroid-so: 1.300 arcsec [5.59 $\sigma$ ]  
OotOffset-rm: 1.601 arcsec [8.65 $\sigma$ ]  
KicOffset-rm: 0.223 arcsec [1.33 $\sigma$ ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 1.00 [17/17]  
DiffImageOverlap-fno: 1.00 [17/17]

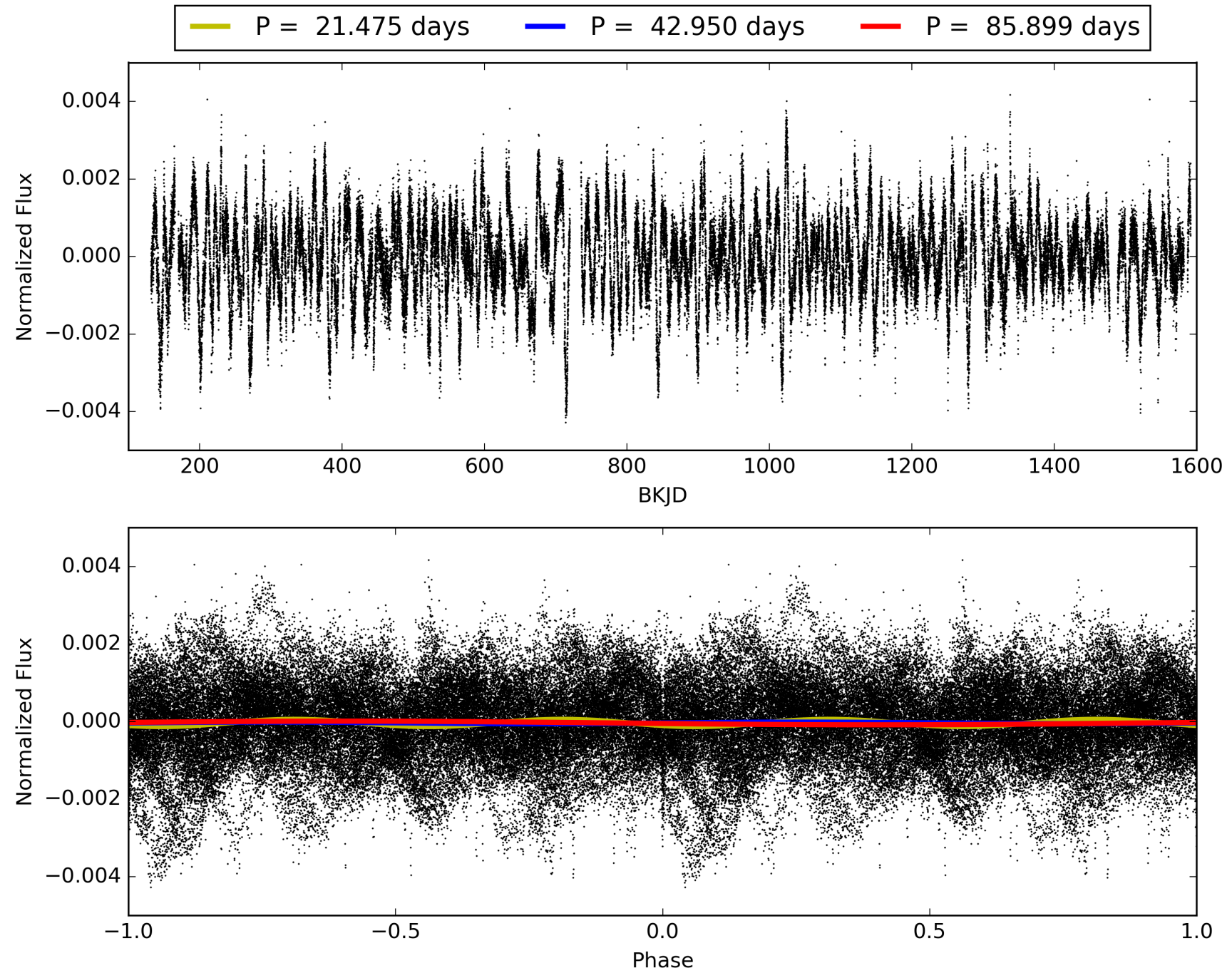
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 04:59:06 Z

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

# TCE 010189546-02, PDC Light Curves

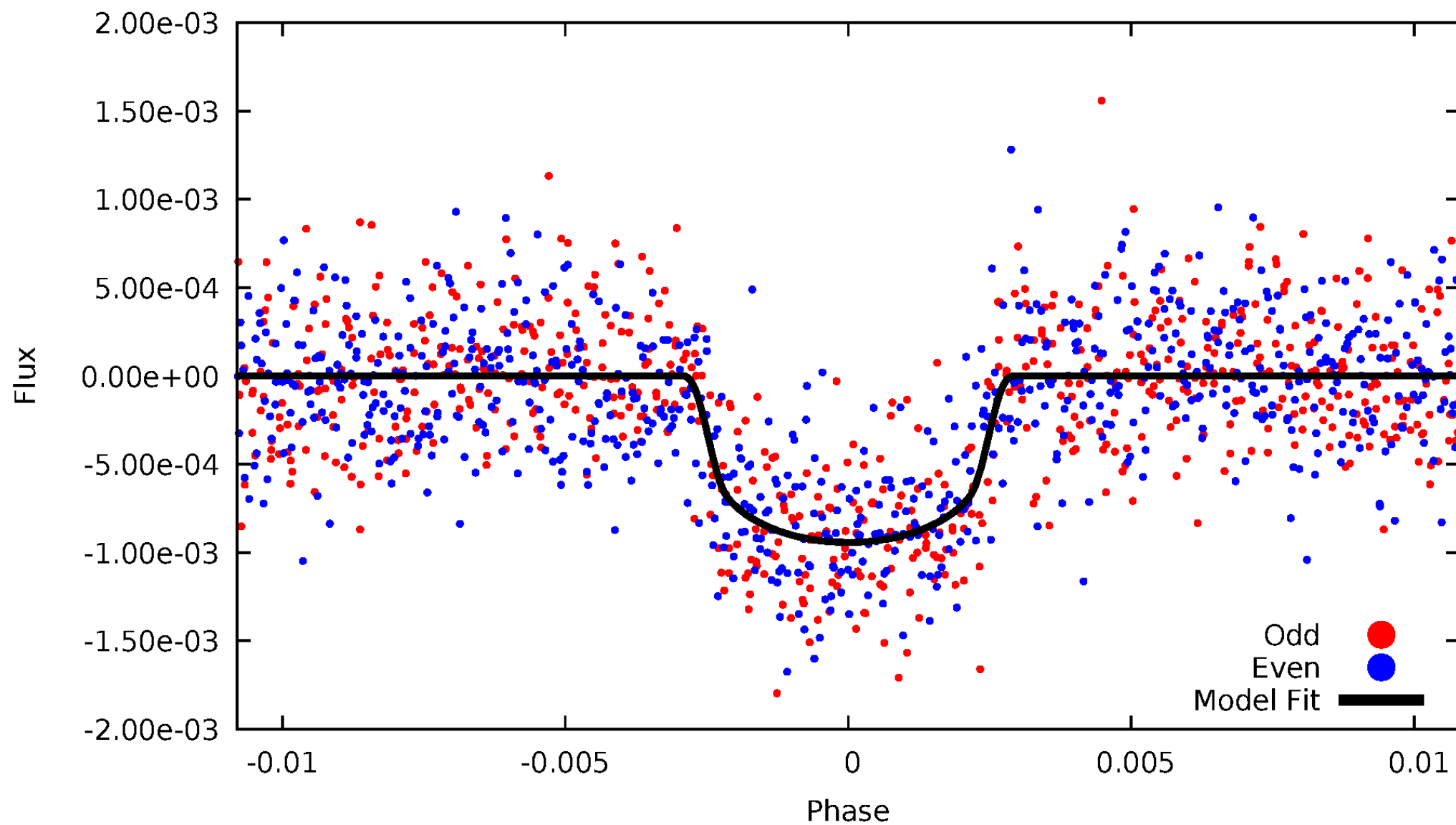


TCE 010189546-02



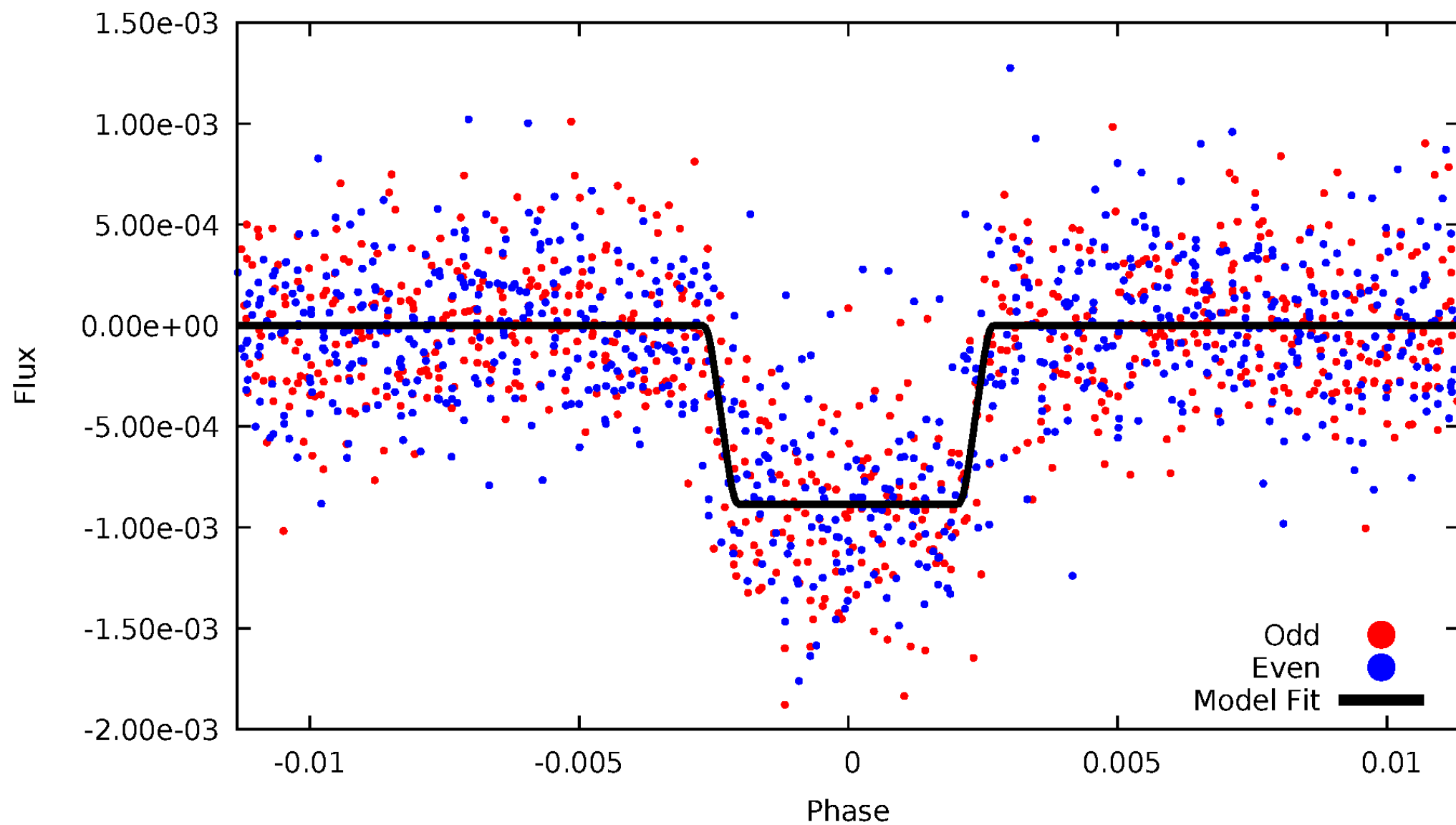
# DV Odd/Even

TCE 010189546-02



# ALT Odd/Even

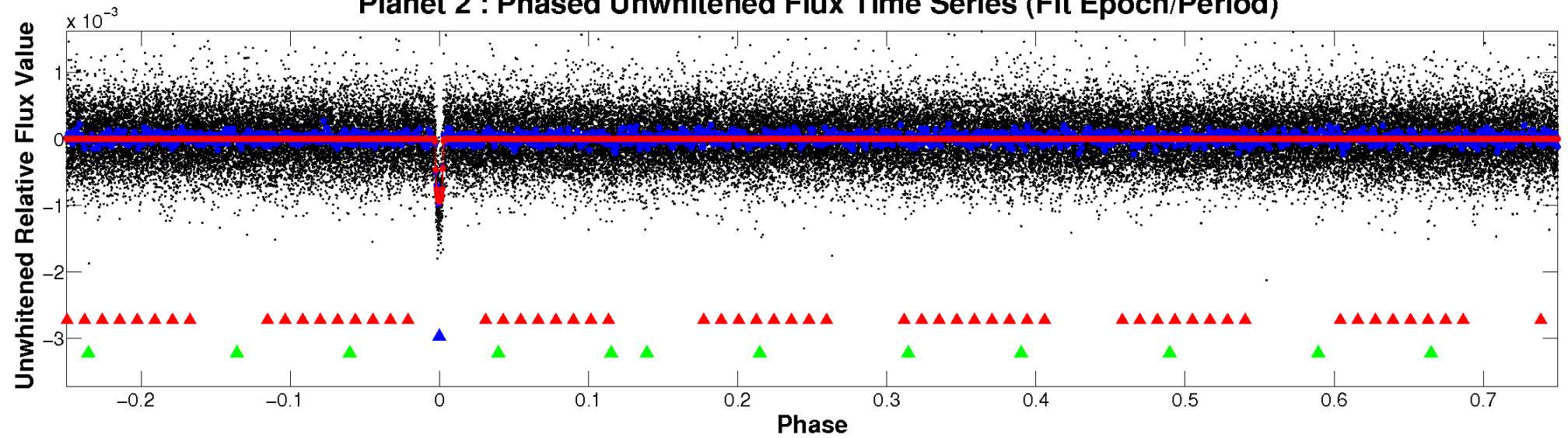
TCE 010189546-02



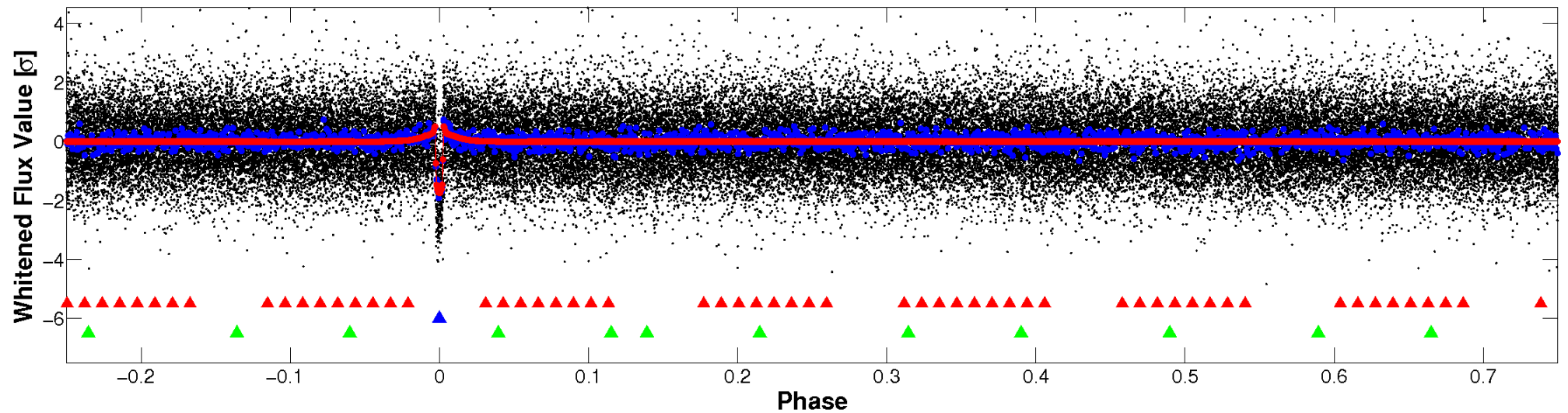


# Non-Whitened Vs. Whitened Light Curve

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

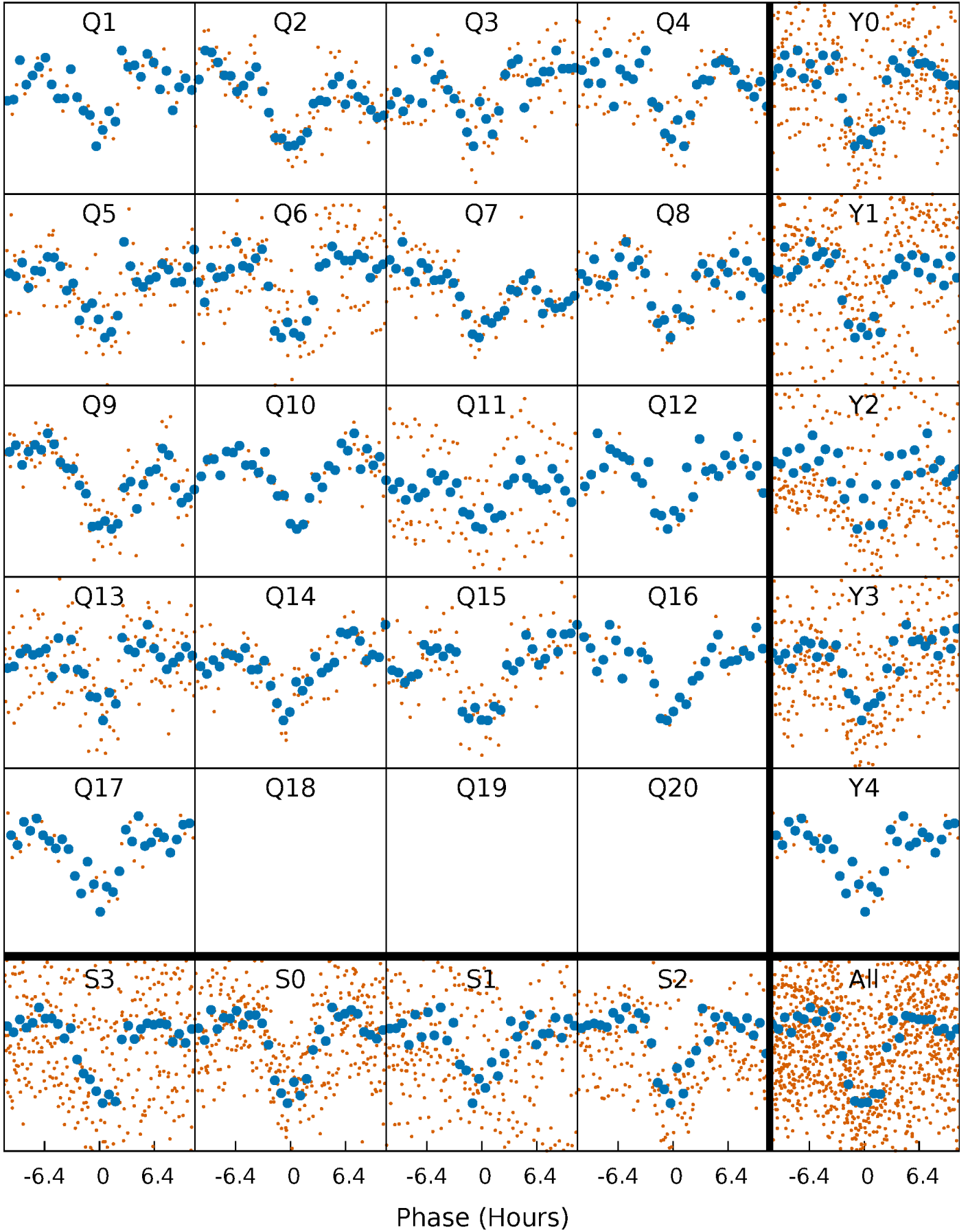


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



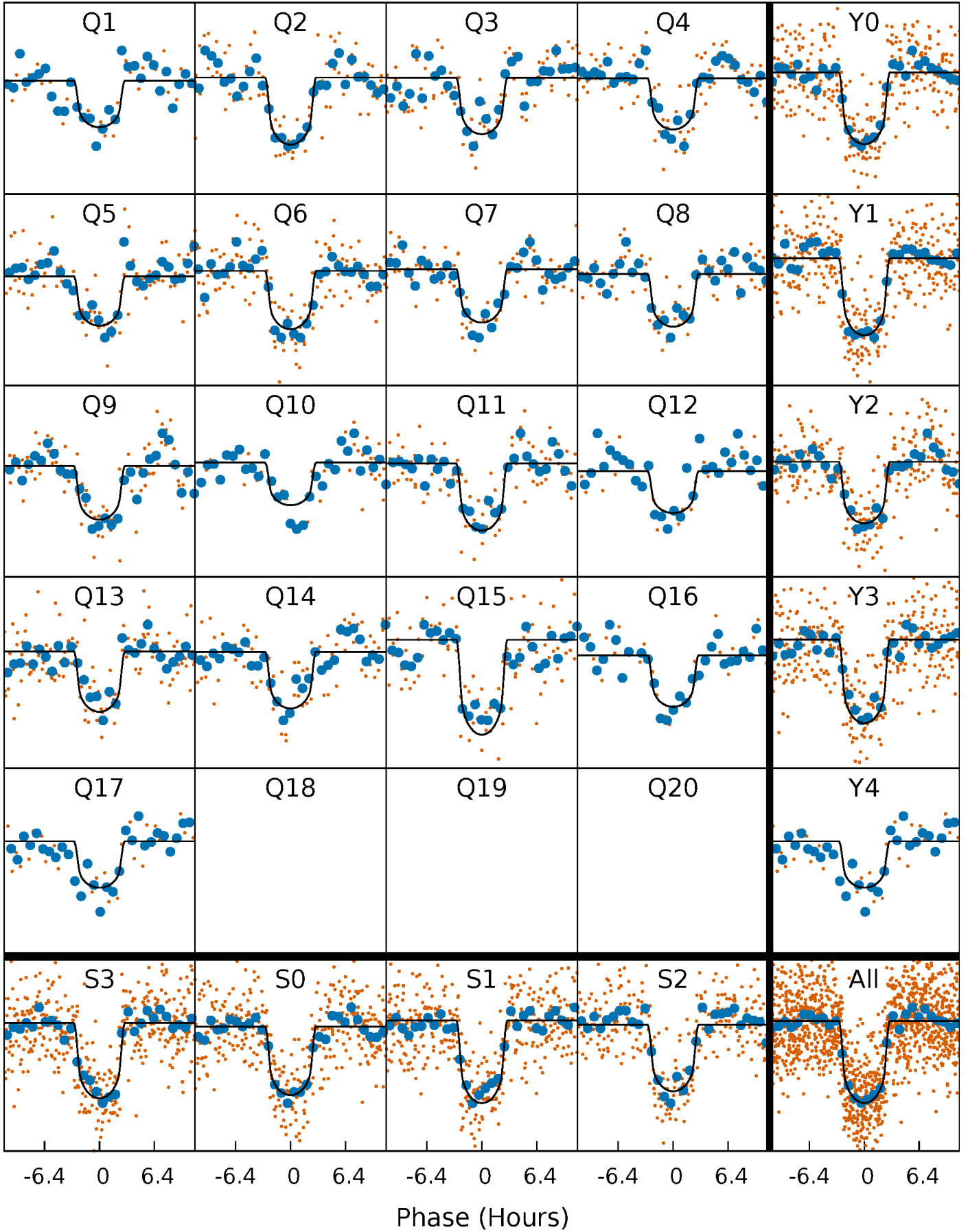
# PDC Quarter-Phased Transit Curves

TCE 010189546-02   P= 42.949530 Days    $T_0=153.738159$  (BKJD)



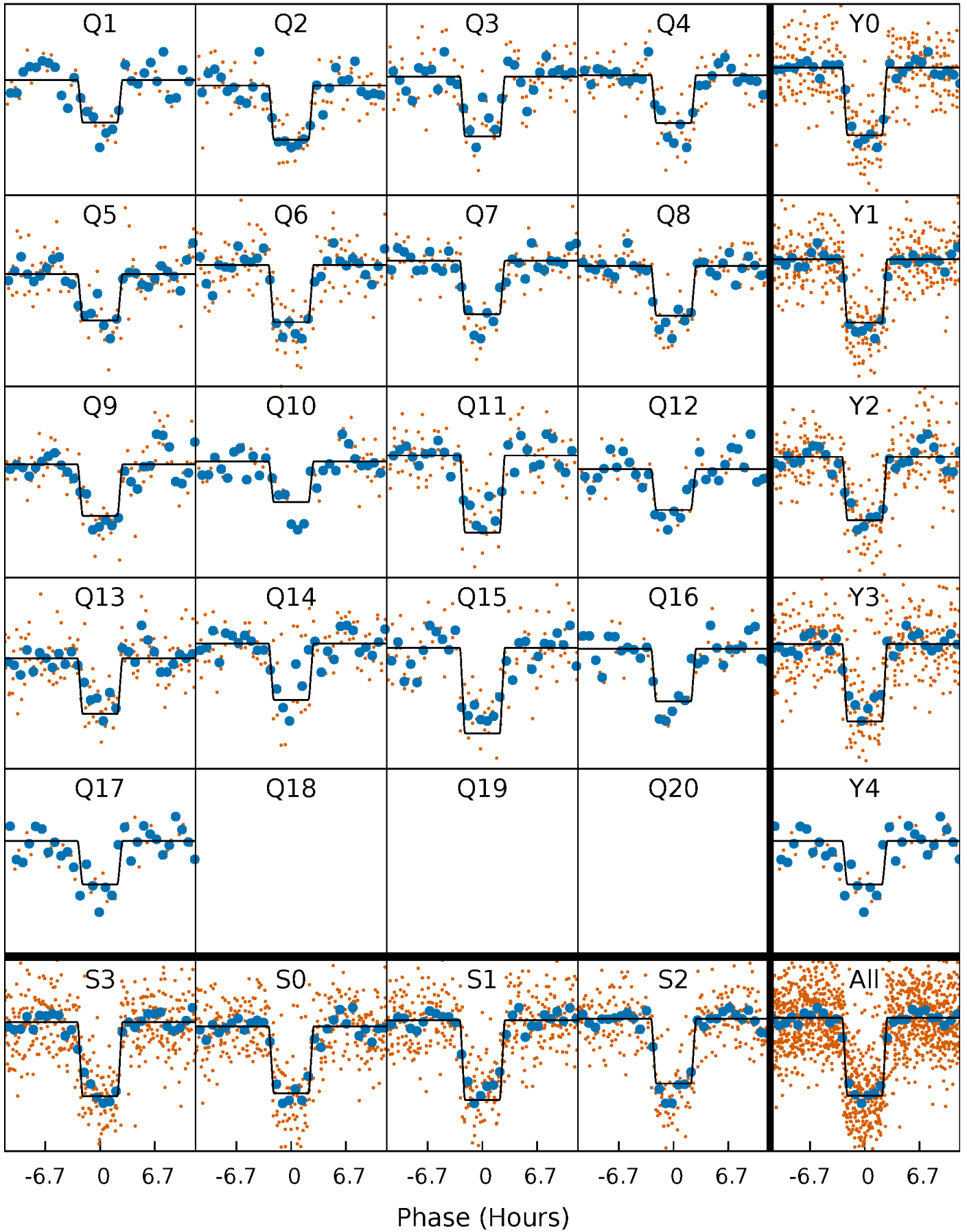
# DV Quarter-Phased Transit Curves

TCE 010189546-02     $P = 42.949530$  Days     $T_0 = 153.738159$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

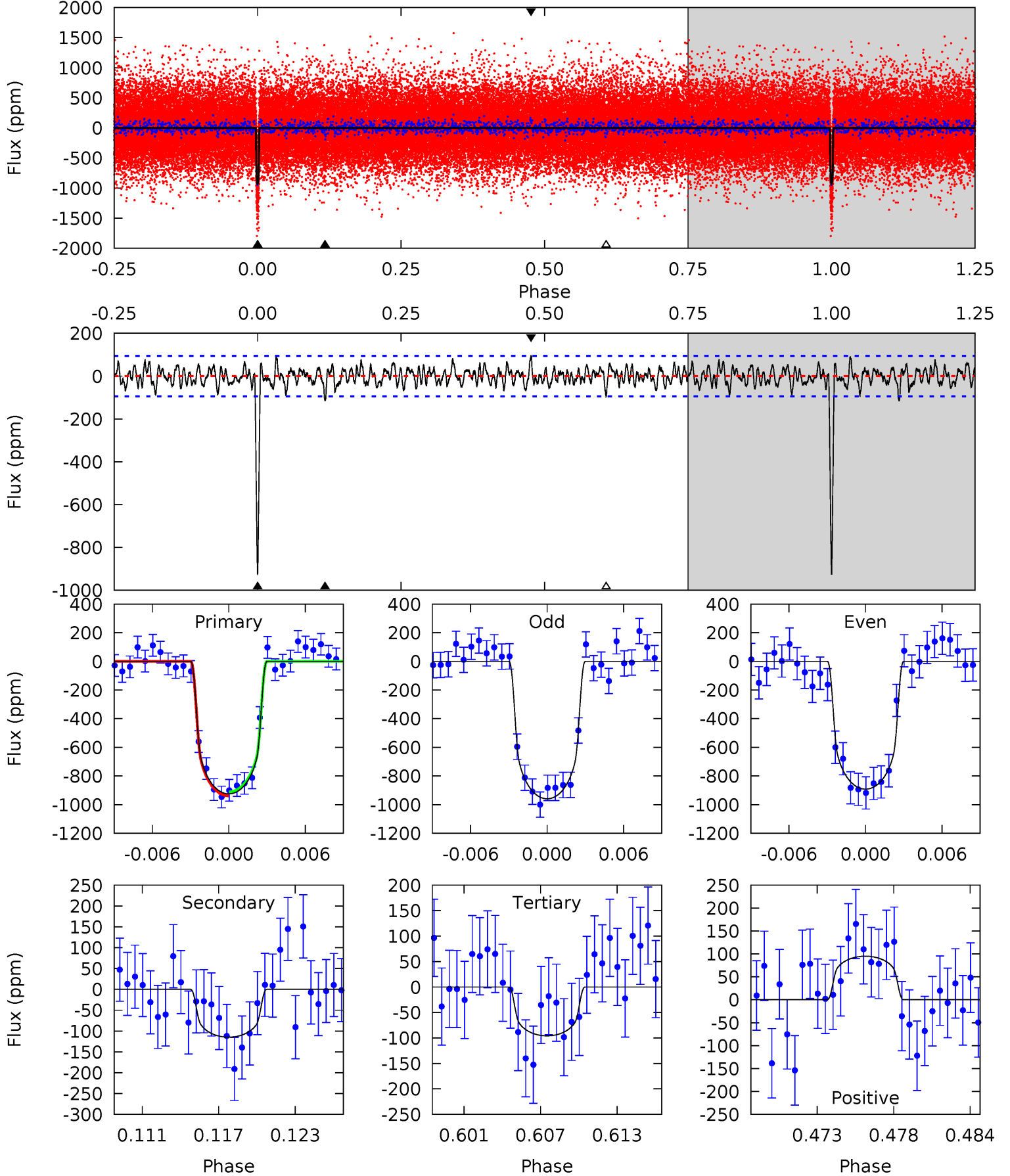
TCE 010189546-02 P= 42.950194 Days  $T_0=153.727222$  (BKJD)



# DV Model-Shift Uniqueness Test

010189546-02, P = 42.949530 Days, E = 110.788629 Days

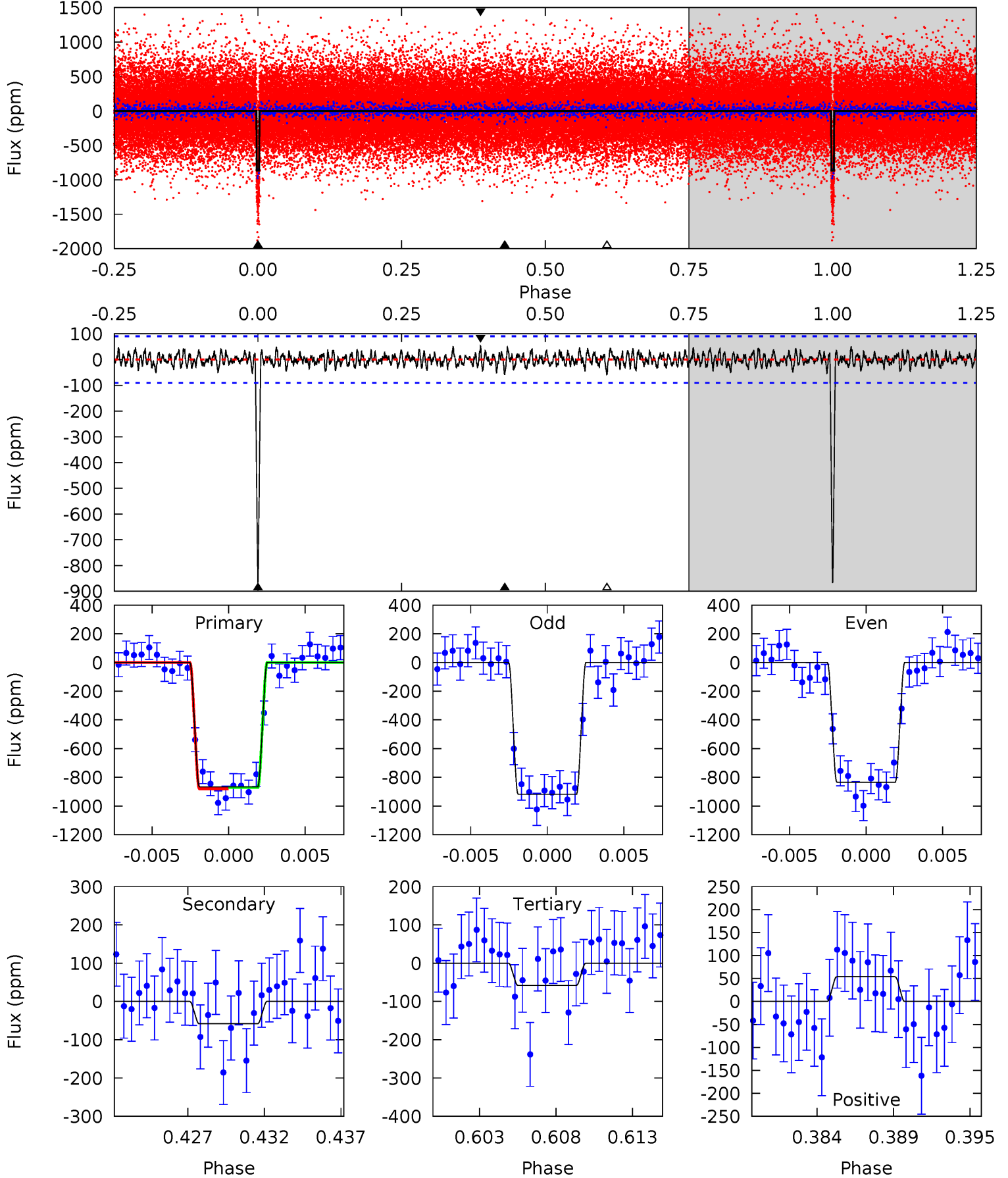
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
50.5	6.26	5.23	5.18	5.13	2.76	1.72	45.2	45.3	1.03	1.08	1.84	0.98	0.09	0.74



# Alt Model-Shift Uniqueness Test

010189546-02, P = 42.950194 Days, E = 110.777028 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
49.4	3.32	3.31	3.06	5.15	2.79	1.06	46.0	46.3	0.02	0.27	2.39	0.93	0.06	0.25





### Stellar Parameters For KIC 010189546

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5312^{+79}_{-79}$	$4.384^{+0.137}_{-0.074}$	$0.160^{+0.150}_{-0.150}$	$0.986^{+0.107}_{-0.117}$	$0.859^{+0.060}_{-0.033}$	$1.262^{+0.665}_{-0.309}$
	+1%/-1%	+3%/-2%	+94%/-94%	+11%/-12%	+7%/-4%	+53%/-24%
Source	SPE90	SPE90	SPE90	DSEP		

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

### Secondary Eclipse Parameters for KIC 010189546-02 / KOI 0427.02

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-115 \pm 18$	$3.24^{+0.57}_{-0.53}$	$676^{+23}_{-27}$	$3586^{+220}_{-193}$	$319^{+151}_{-98}$
Alt.	$-58 \pm 18$	$3.14^{+0.53}_{-0.52}$	$676^{+23}_{-25}$	$3248^{+234}_{-217}$	$167^{+110}_{-61}$

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

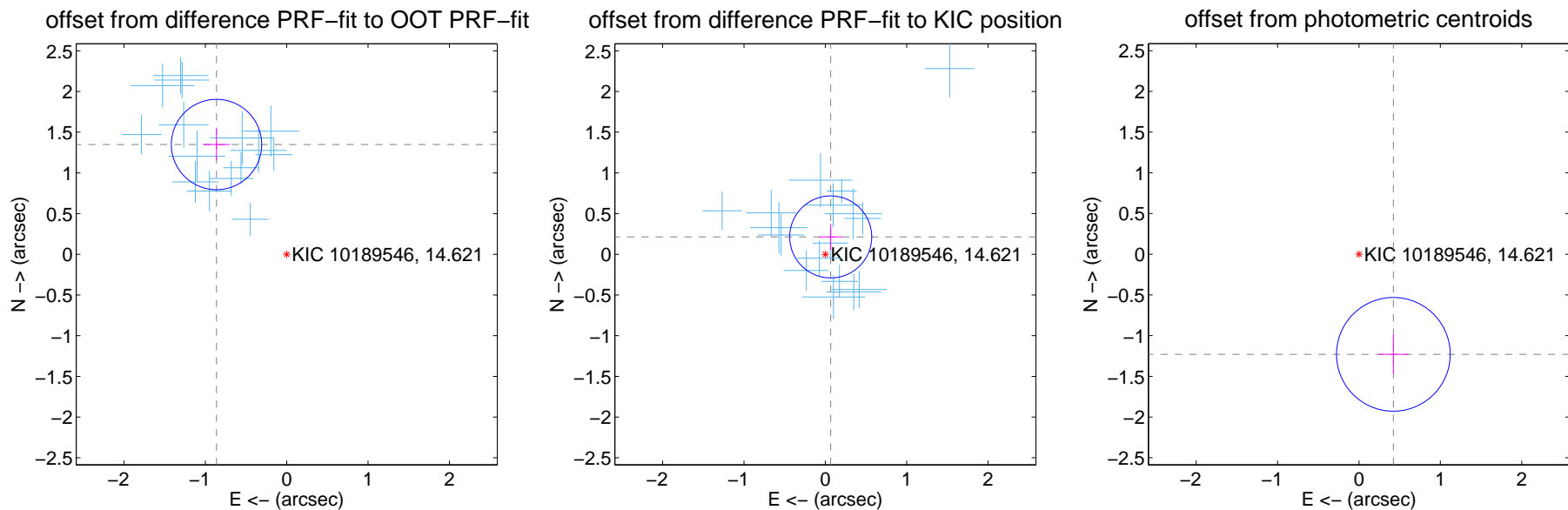
## DV Centroid Data

Supplemental centroid analysis for 010189546-02. Kepler magnitude: 14.62. Transit SNR 28.63

There are 17 quarters with good PRF difference image offsets

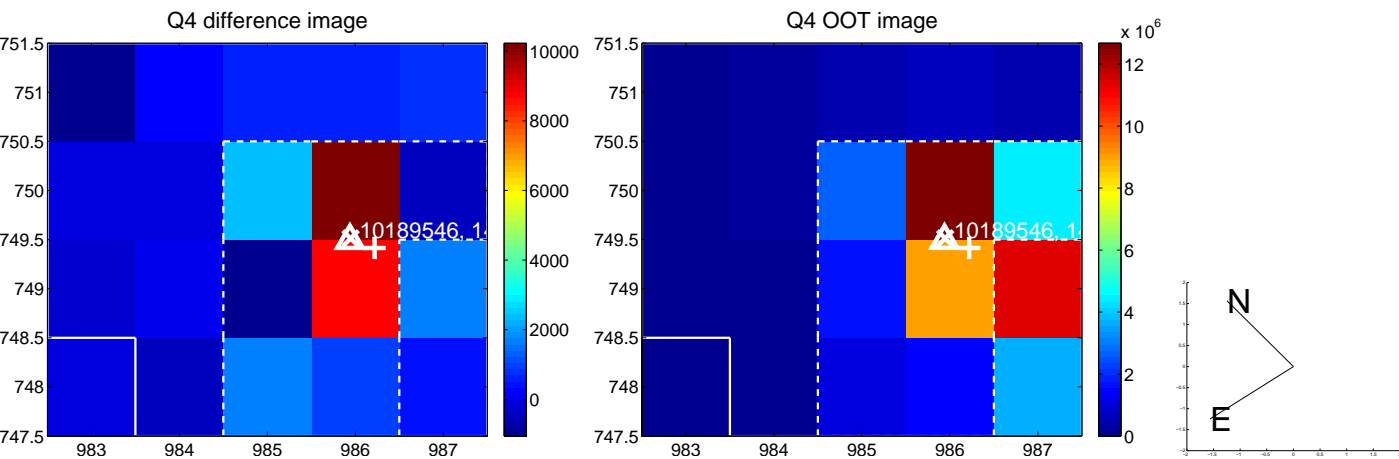
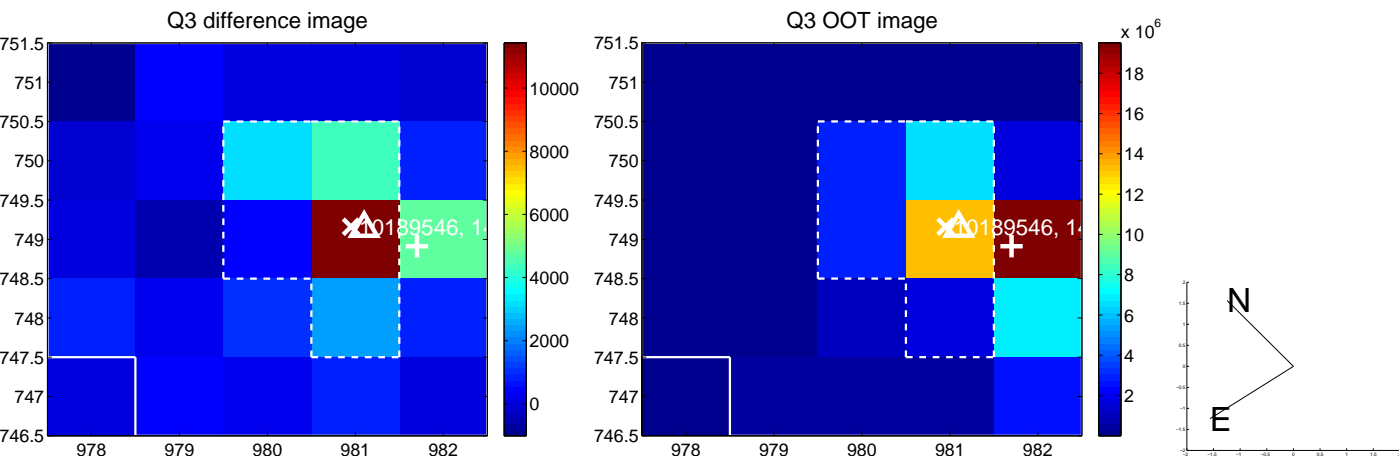
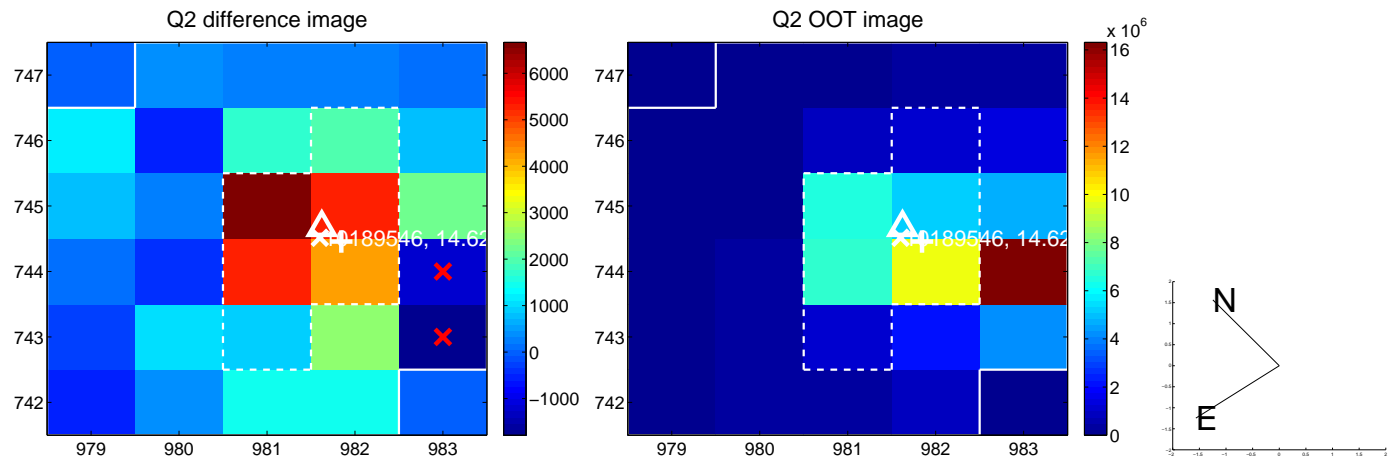
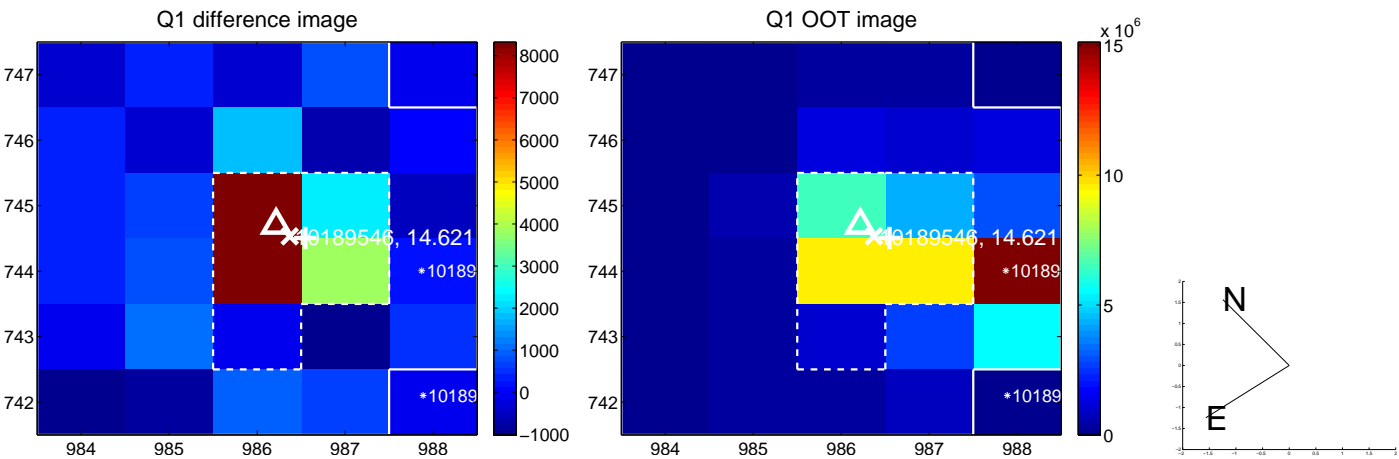
The direct PRF centroid is offset from the target star catalog position by about 0.80 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.601 \pm 0.185$	$8.65$	$0.862 \pm 0.161$	$1.349 \pm 0.194$
PRF-fit source offset from KIC position	$0.223 \pm 0.168$	$1.33$	$-0.066 \pm 0.145$	$0.213 \pm 0.159$
photometric centroid source offset	$1.30 \pm 0.23$	$5.59$	$-0.42 \pm 0.18$	$-1.23 \pm 0.24$

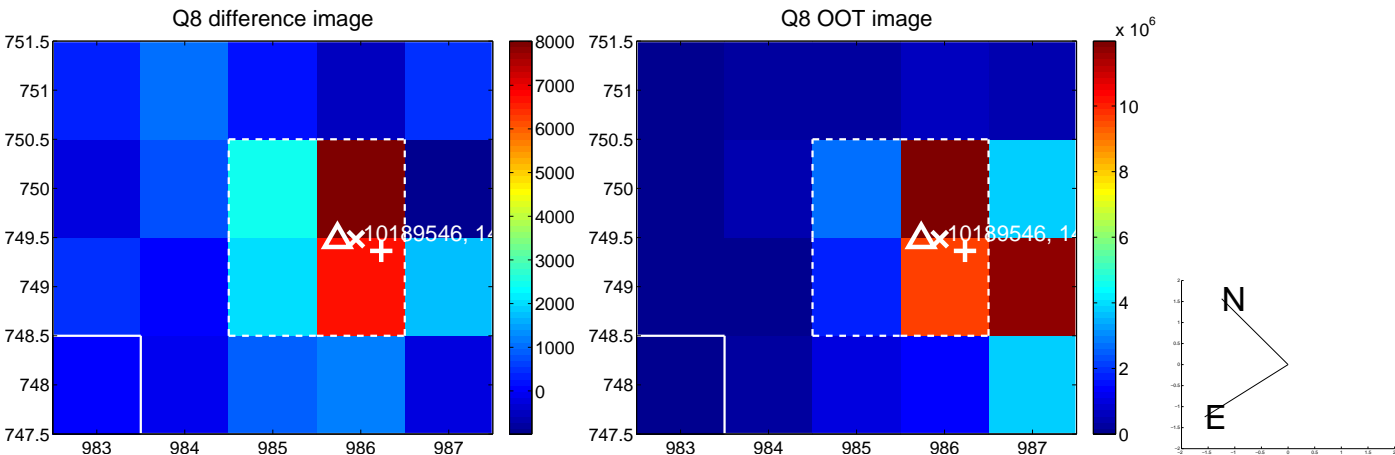
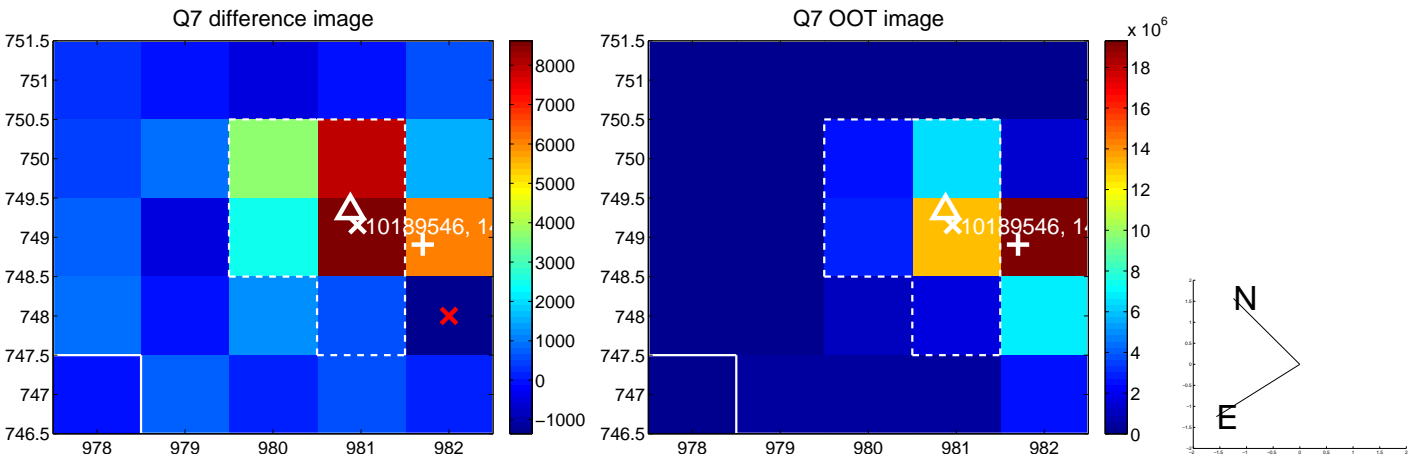
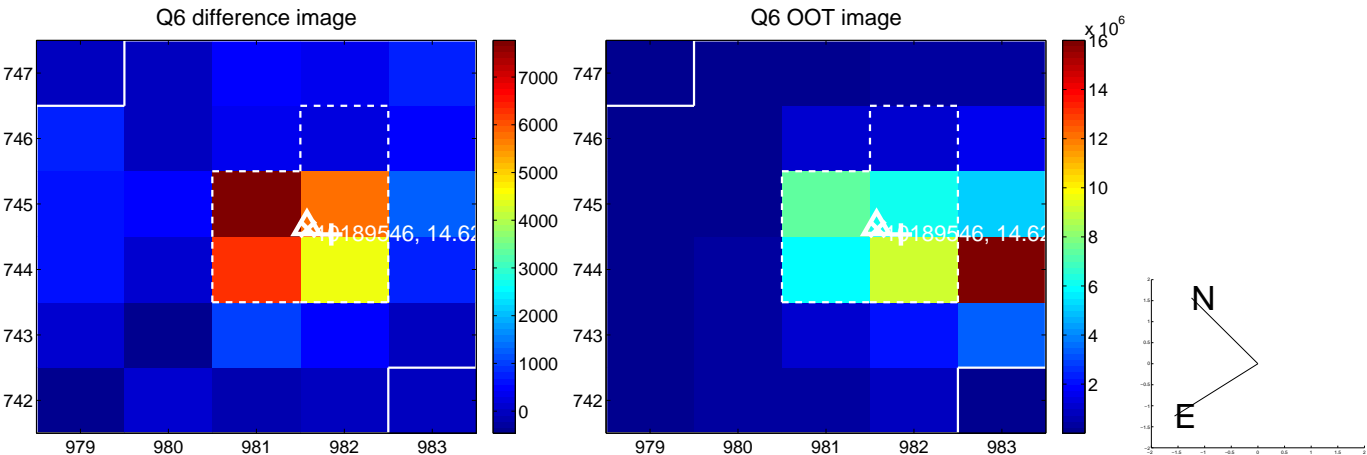
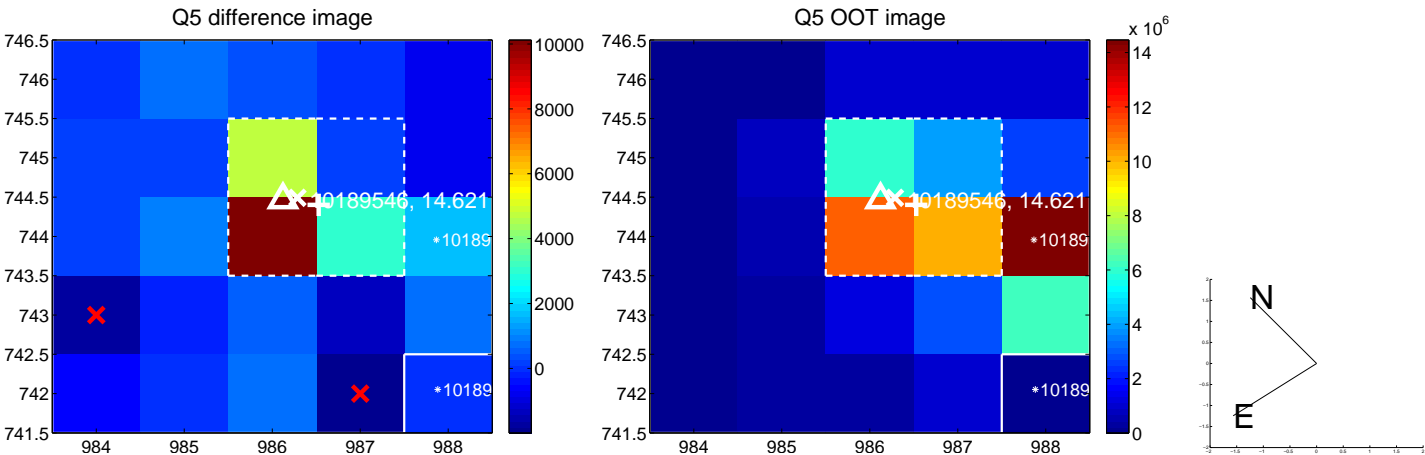


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

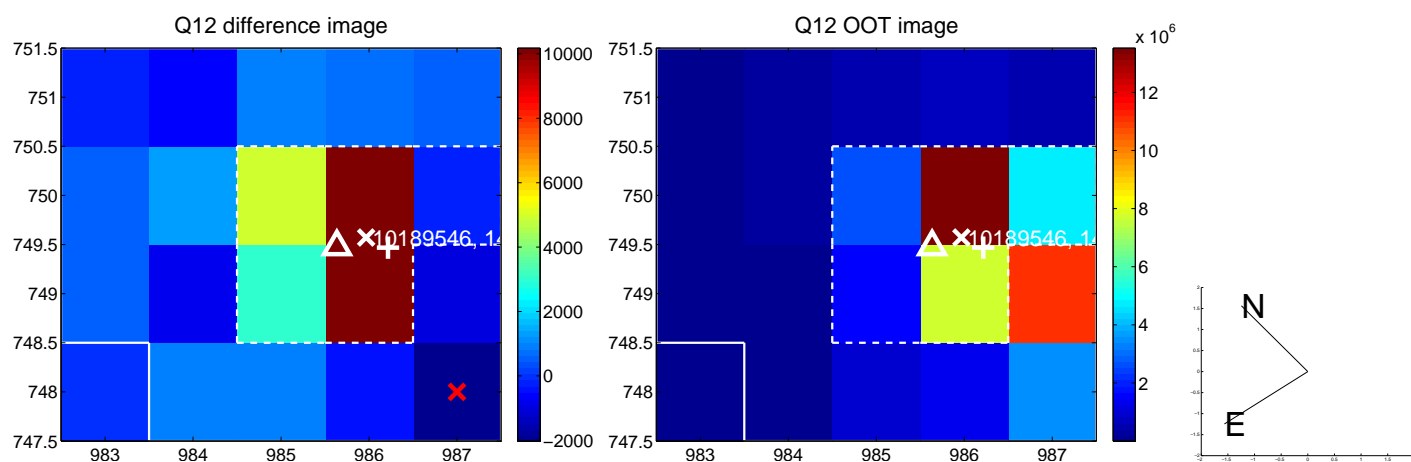
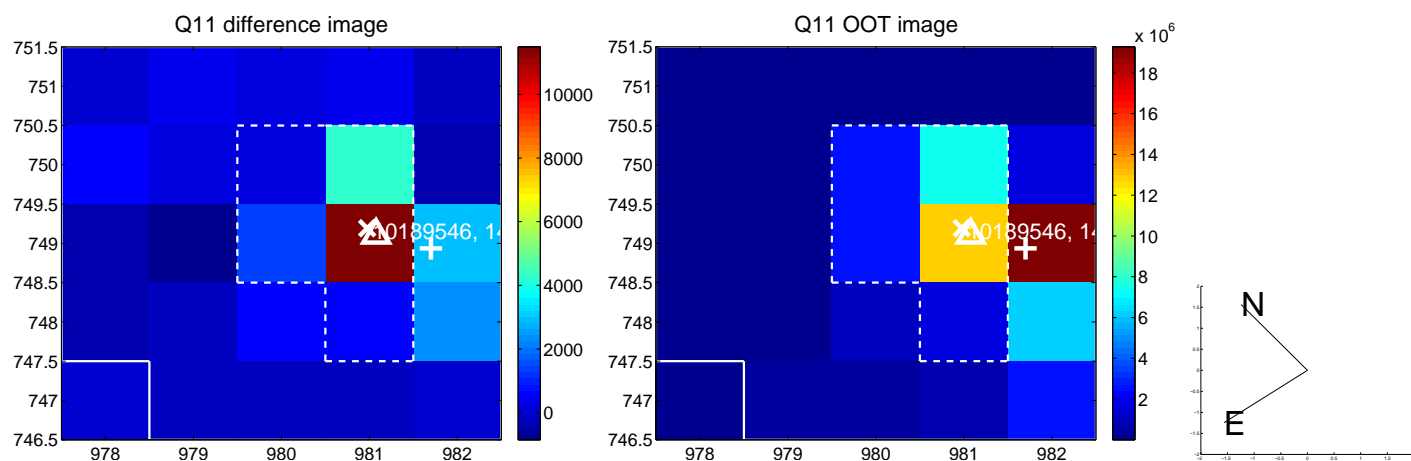
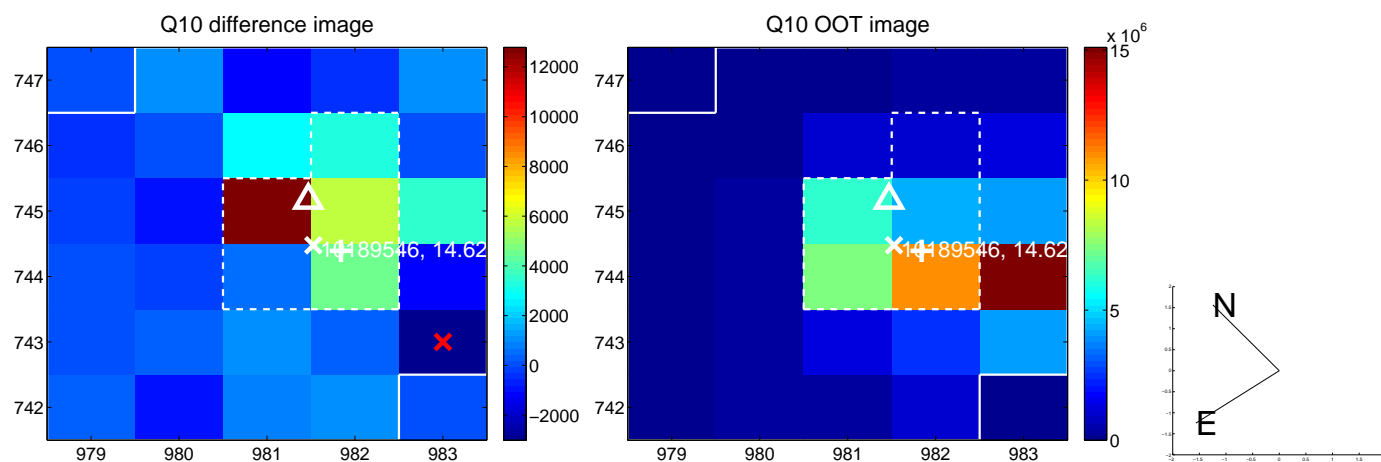
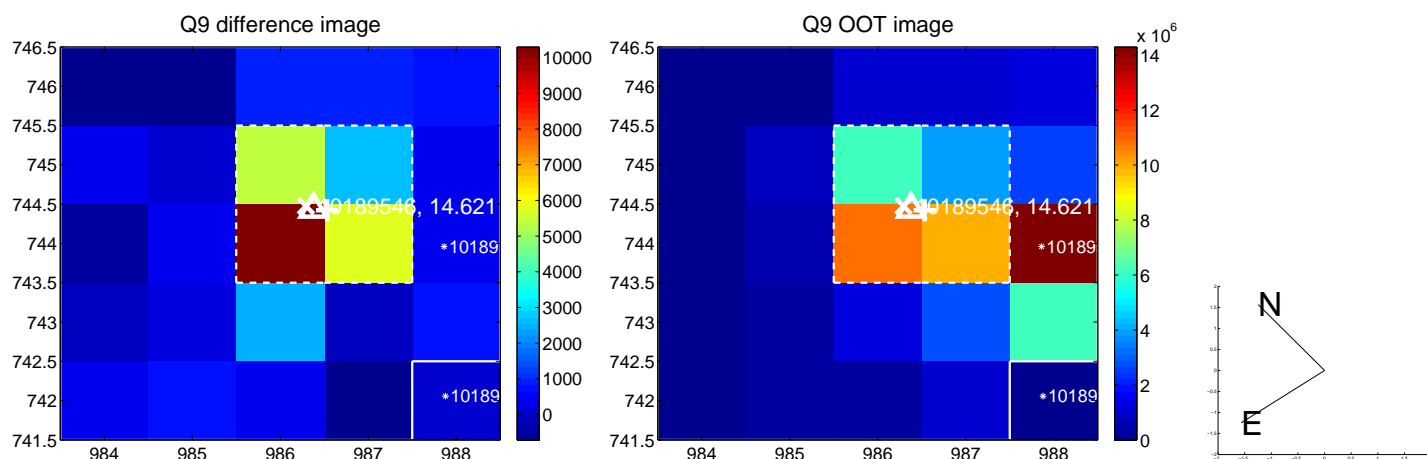
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



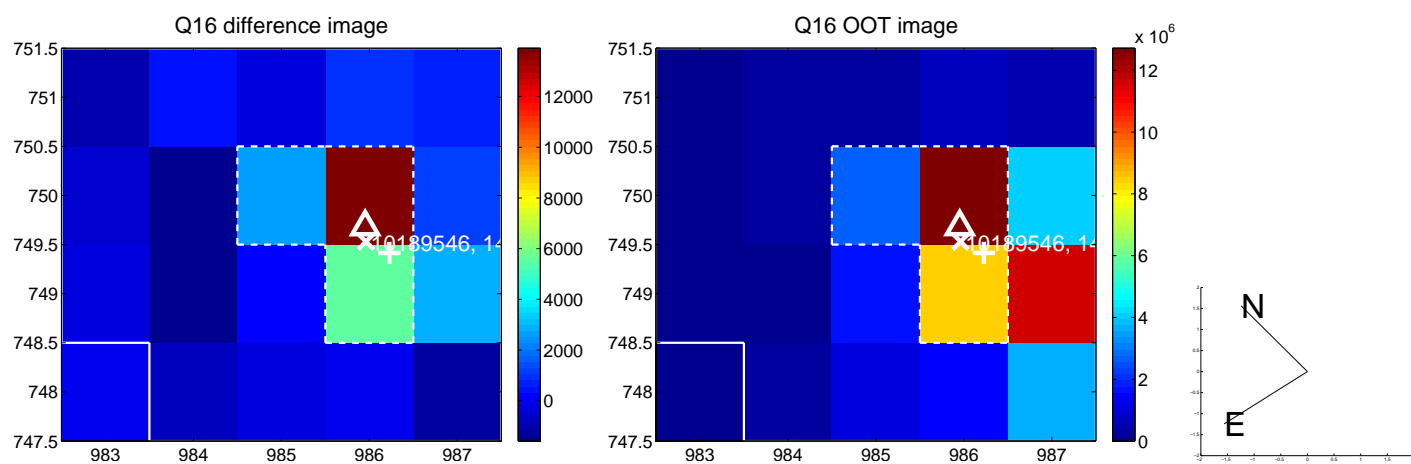
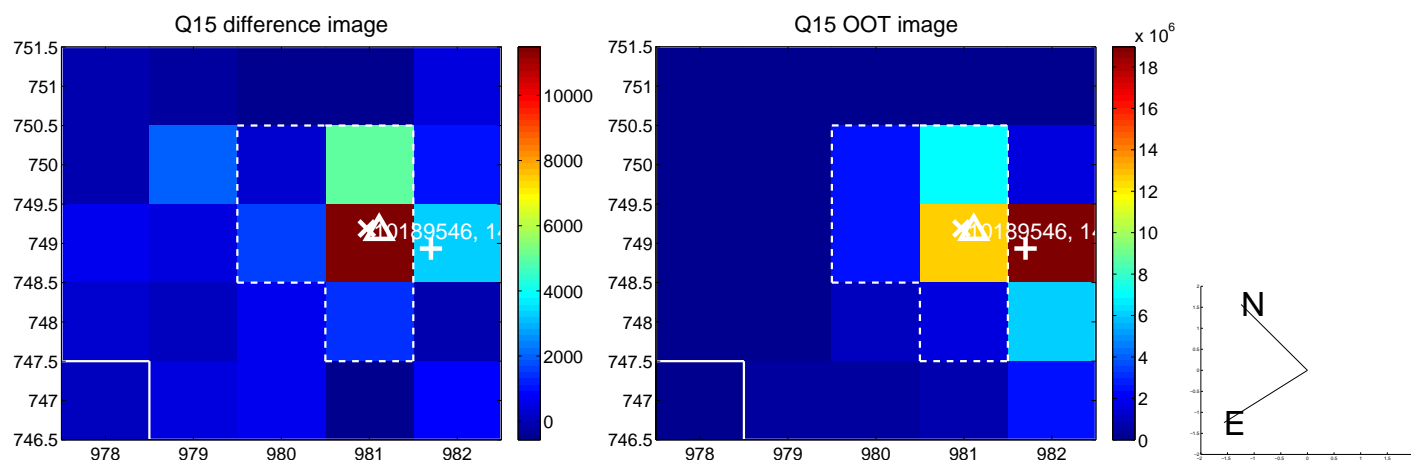
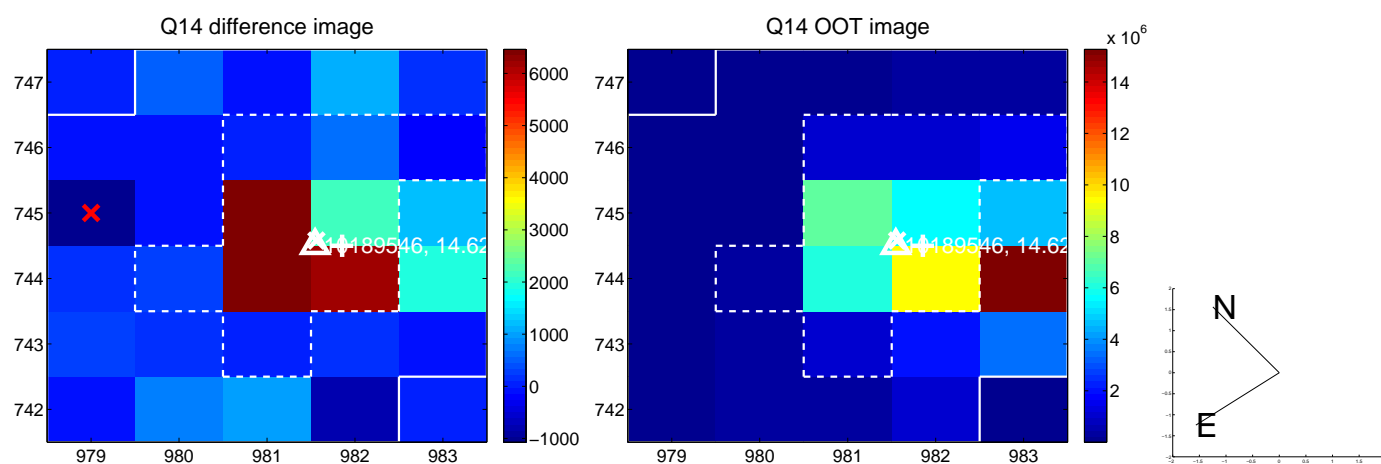
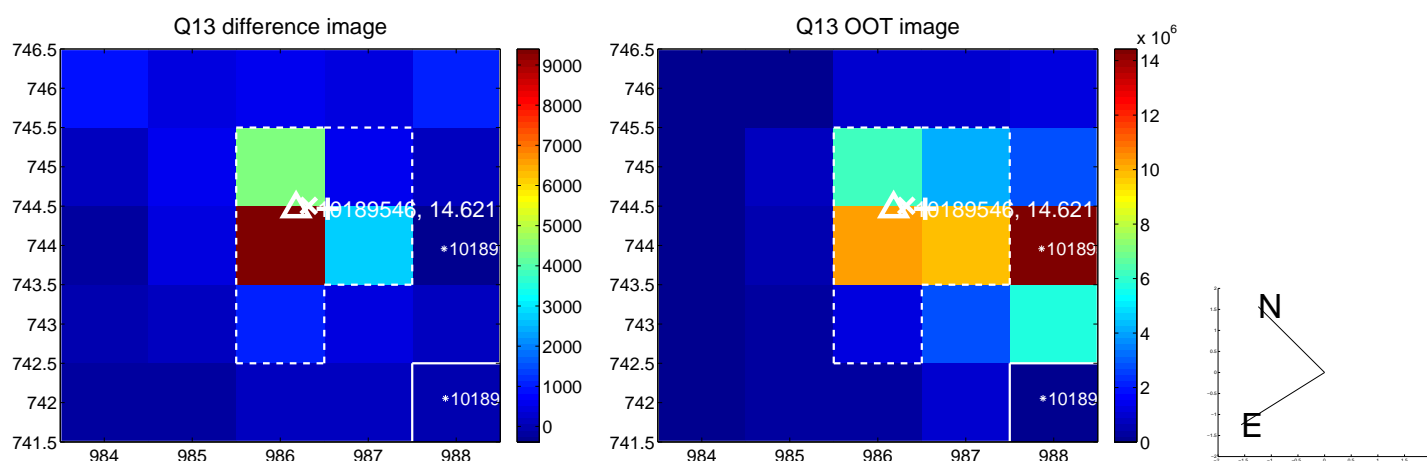
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



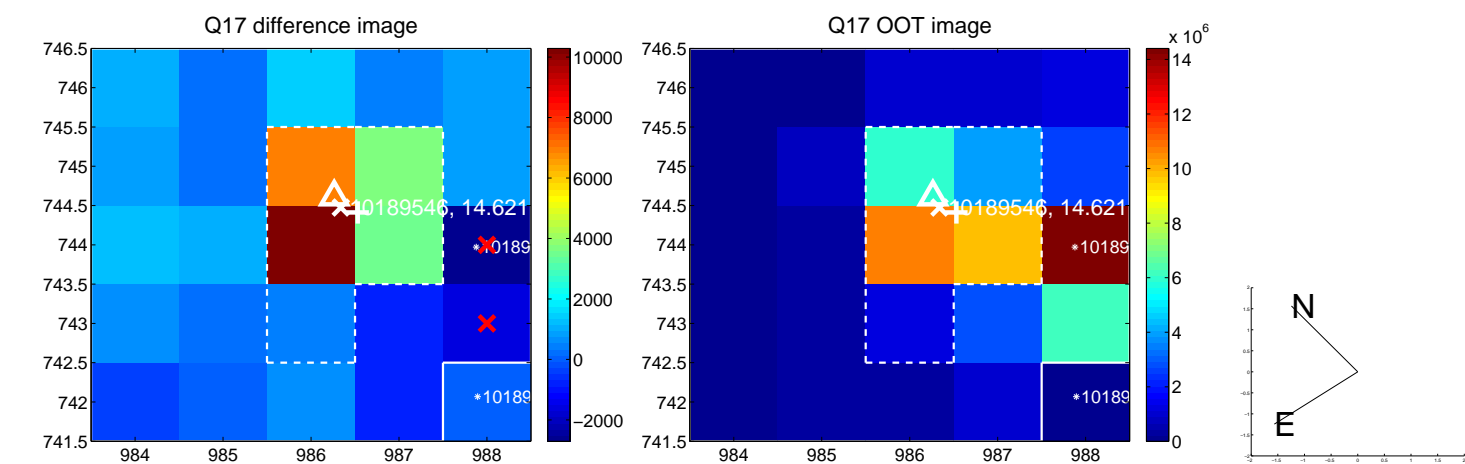
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



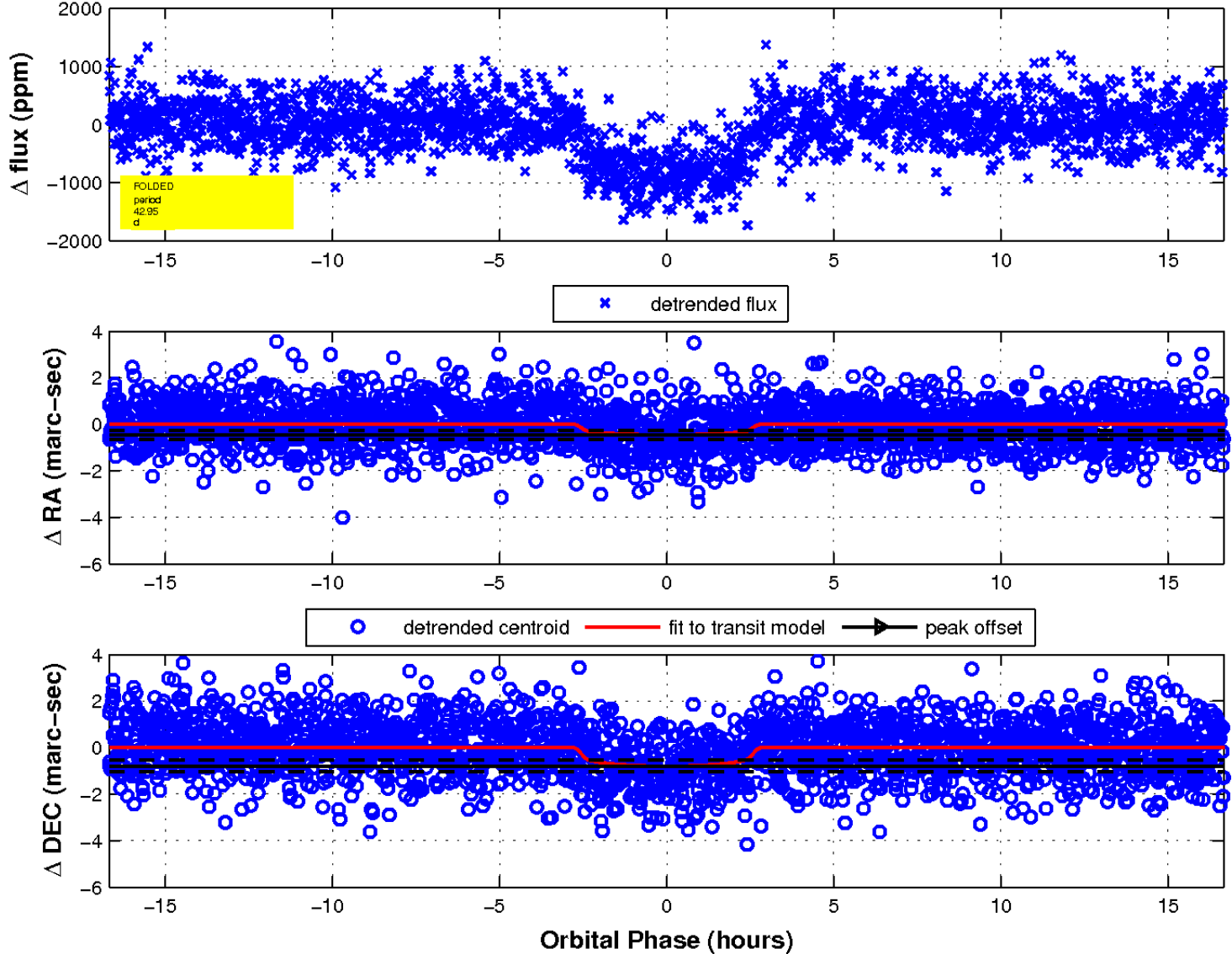
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value



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

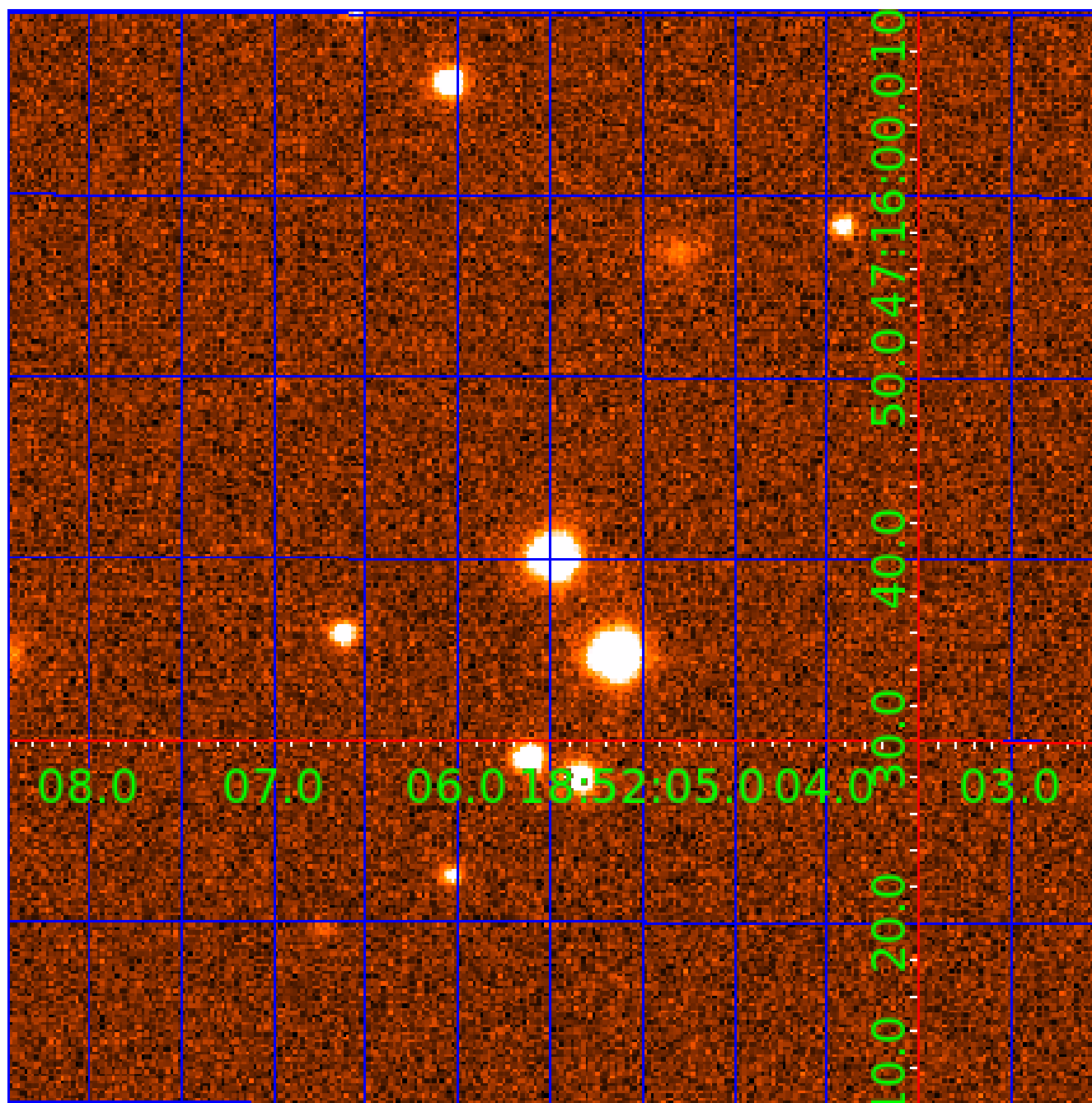


fluxWeightedCentroids, Planet 2 of 3



UKIRT Image

Declination





# KIC 010189546

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010189546-01	OBS	0427.01	24.614833	142.510876	1770.7	2.785	53.9	56.0	0.99	5312	4.55	27.98
010189546-02	OBS	0427.02	42.949530	153.738160	942.1	5.563	27.6	28.6	0.99	5312	3.29	13.32
010189546-03	OBS	0427.03	117.041503	245.615467	810.1	7.315	13.2	14.6	0.99	5312	3.34	3.50

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010189546-01	OBS	PC	1.00	0	0	0	0	CENT_KIC_POS
010189546-02	OBS	PC	1.00	0	0	0	0	CENT_KIC_POS
010189546-03	OBS	PC	0.99	0	0	0	0	CENT_KIC_POS

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

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

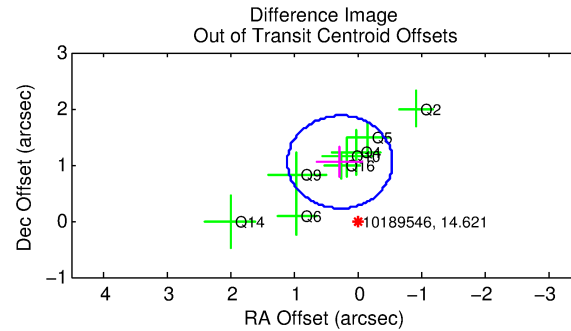
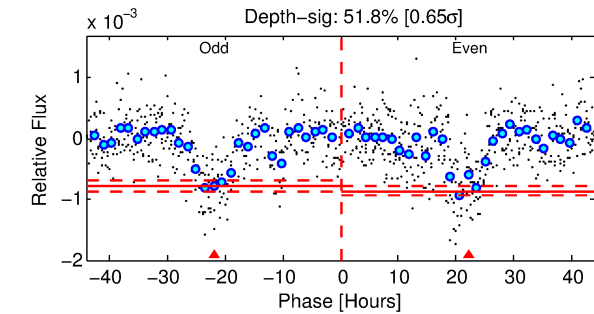
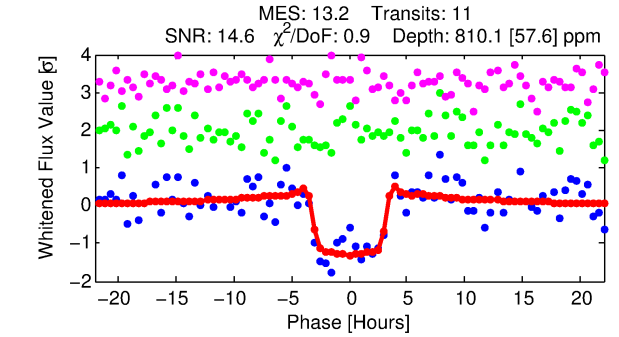
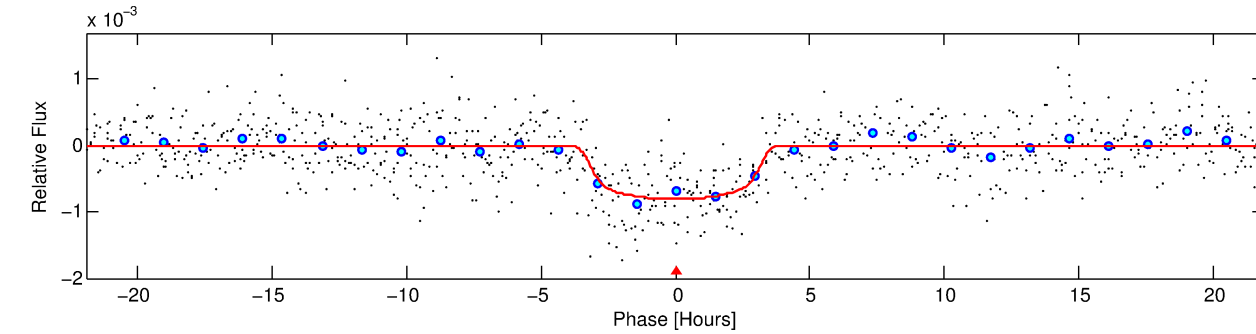
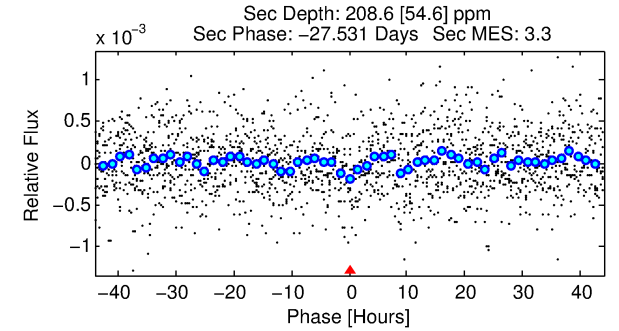
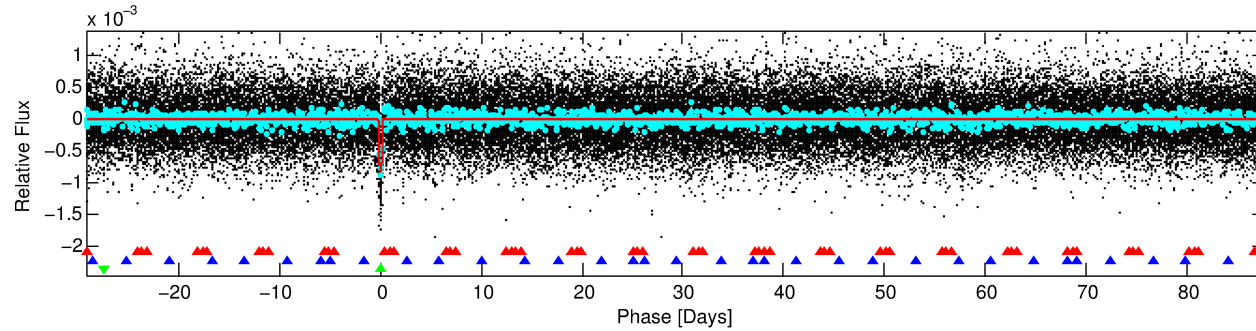
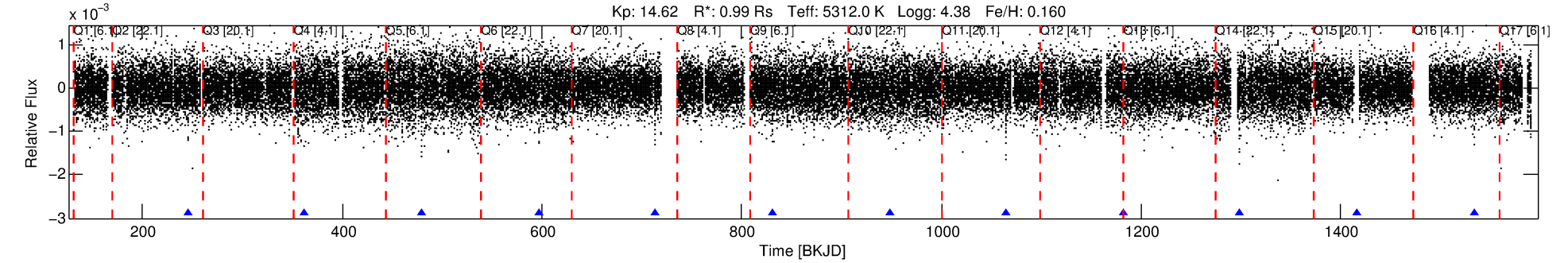
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 010189546-03

No Significant Match Found

# DV One-Page Summary

KIC: 10189546 Candidate: 3 of 3 Period: 117.042 d  
KOI: K00427.03 Corr: 0.925



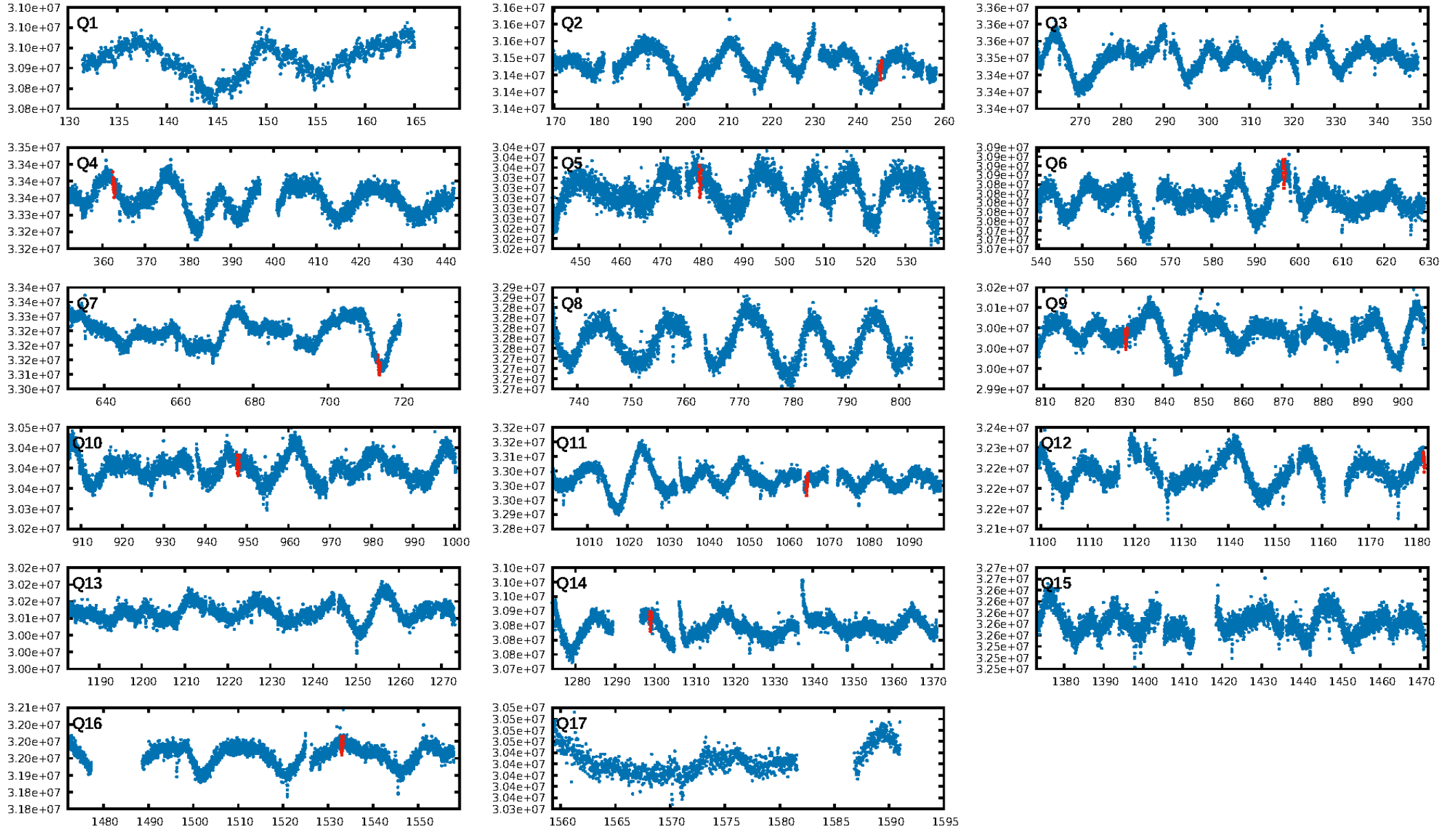
## DV Fit Results:

Period = 117.04150 [0.00119] d  
Epoch = 245.6155 [0.0072] BKJD  
Rp/R\* = 0.0310 [0.0025]  
a/R\* = 64.63 [17.87]  
b = 0.89 [0.07]  
Seff = 3.50 [0.81]  
Teff = 349 [20] K  
Rp = 3.34 [0.48] Re  
a = 0.4452 [0.0586] AU  
Ag = 2039.89 [776.68] [2.63 $\sigma$ ]  
Teffp = 3624 [284] K [11.52 $\sigma$ ]

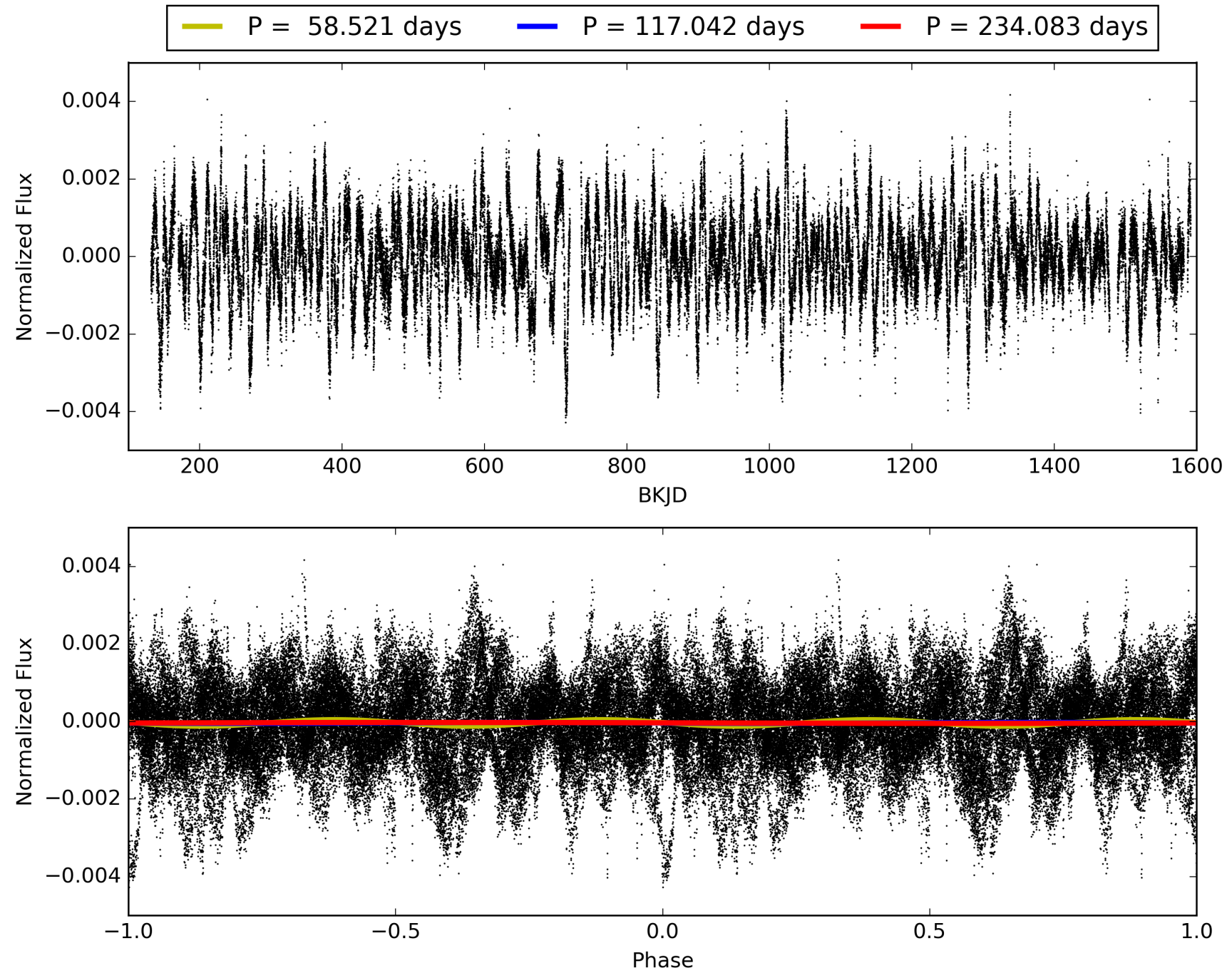
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [193.49 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 78.0%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 3.54e-34  
RollingBand-fgt: 1.00 [11/11]  
GhostDiagnostic-chr: 2.081  
Centroid-sig: 0.1%  
Centroid-so: 1.435 arcsec [3.26 $\sigma$ ]  
OotOffset-rm: 1.083 arcsec [3.94 $\sigma$ ]  
KicOffset-rm: 0.326 arcsec [0.99 $\sigma$ ]  
OotOffset-st: 4/0/2/2 [8]  
KicOffset-st: 4/0/2/2 [8]  
DiffImageQuality-fgm: 1.00 [8/8]  
DiffImageOverlap-fno: 0.88 [7/8]

# TCE 010189546-03, PDC Light Curves

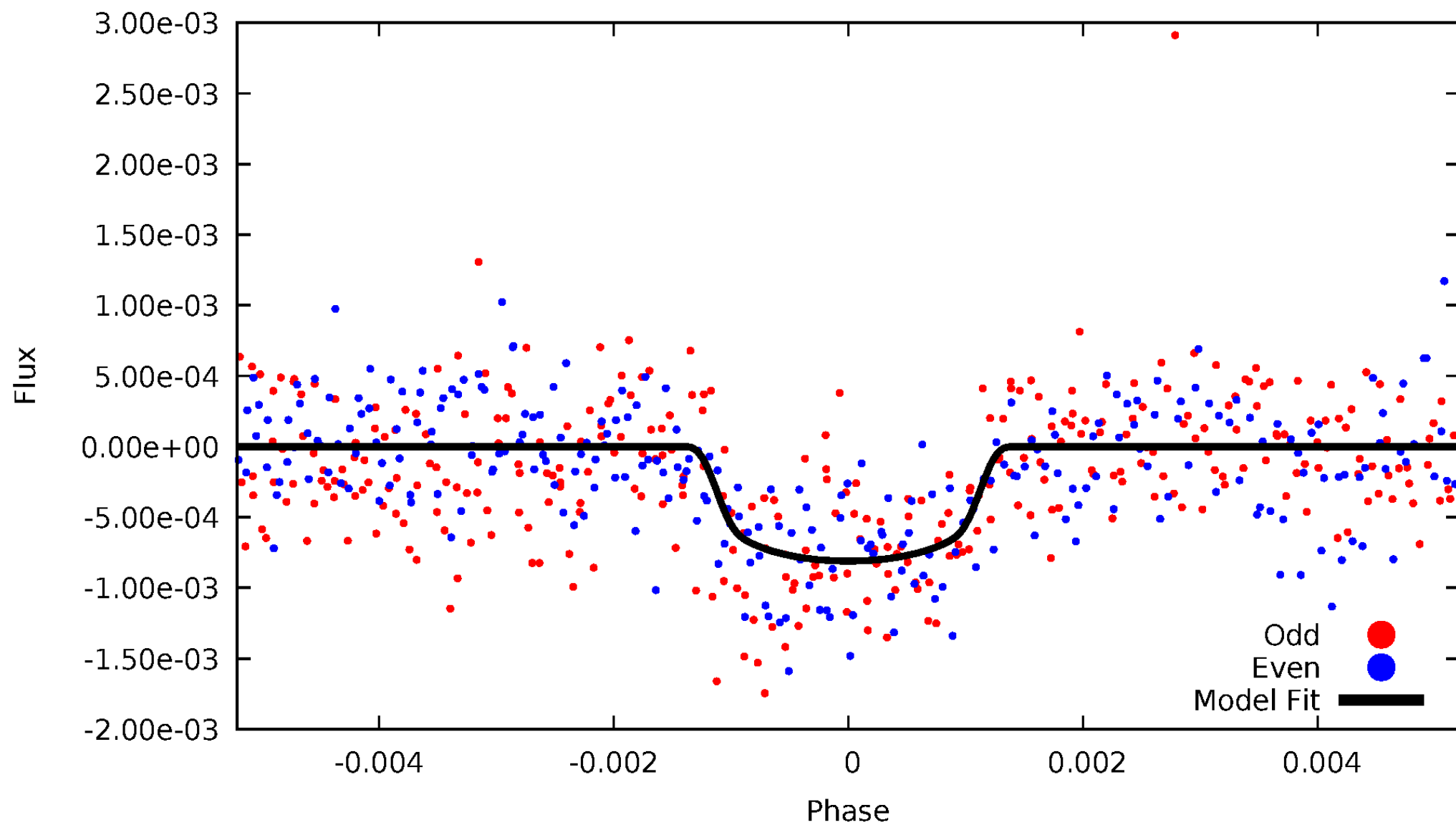


TCE 010189546-03



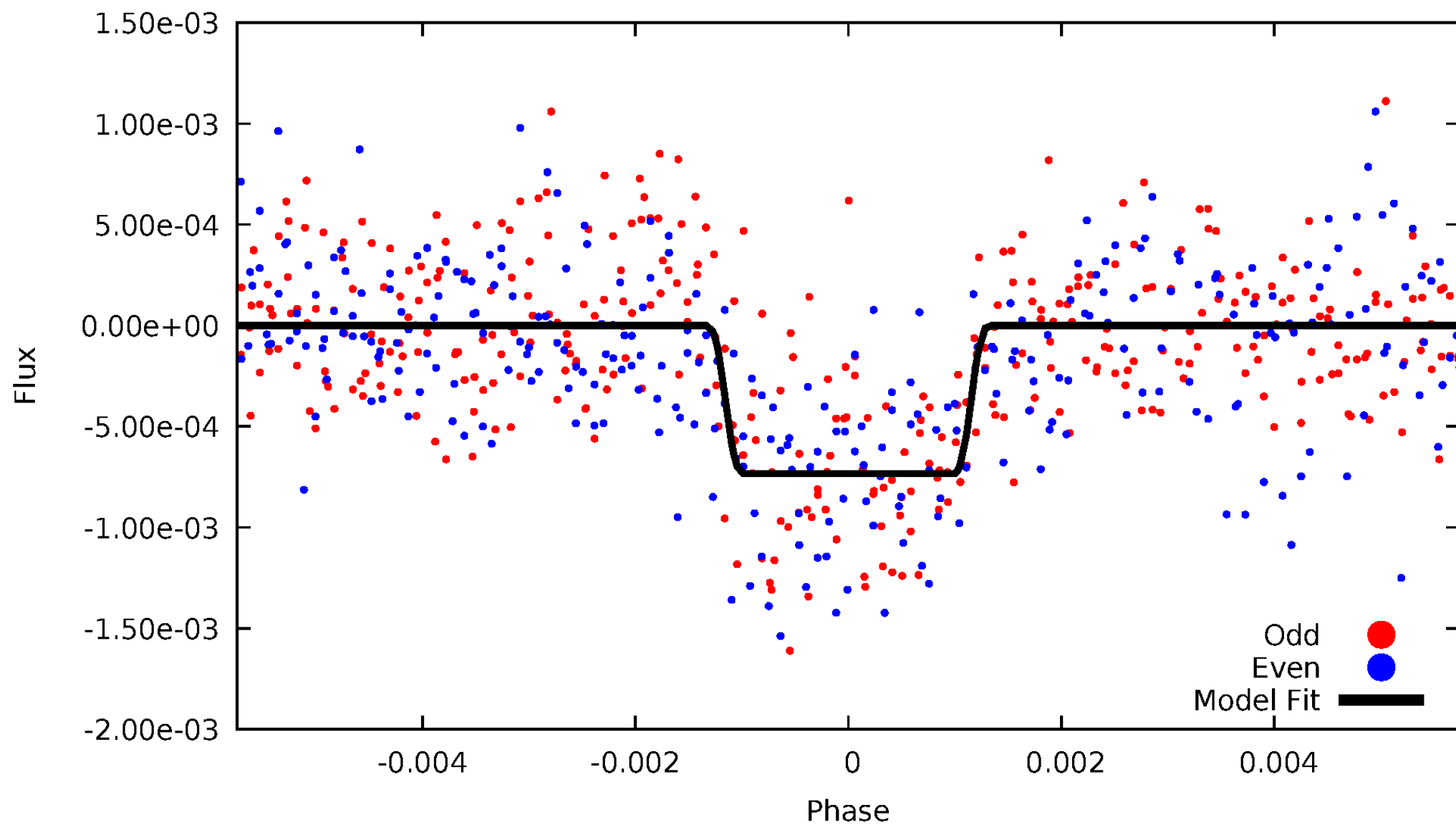
# DV Odd/Even

TCE 010189546-03



# ALT Odd/Even

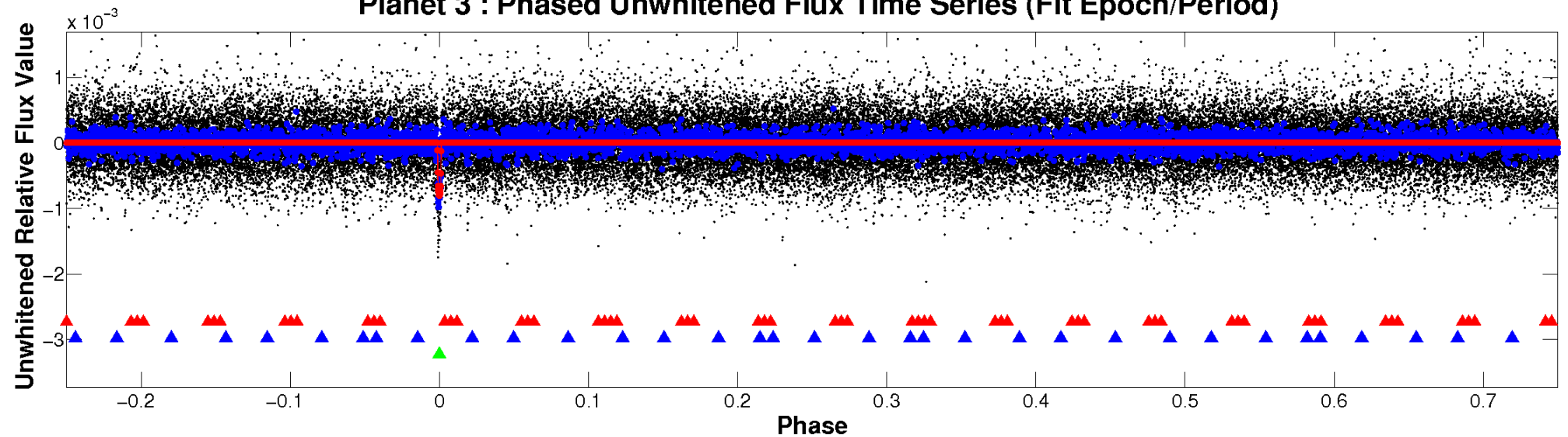
TCE 010189546-03



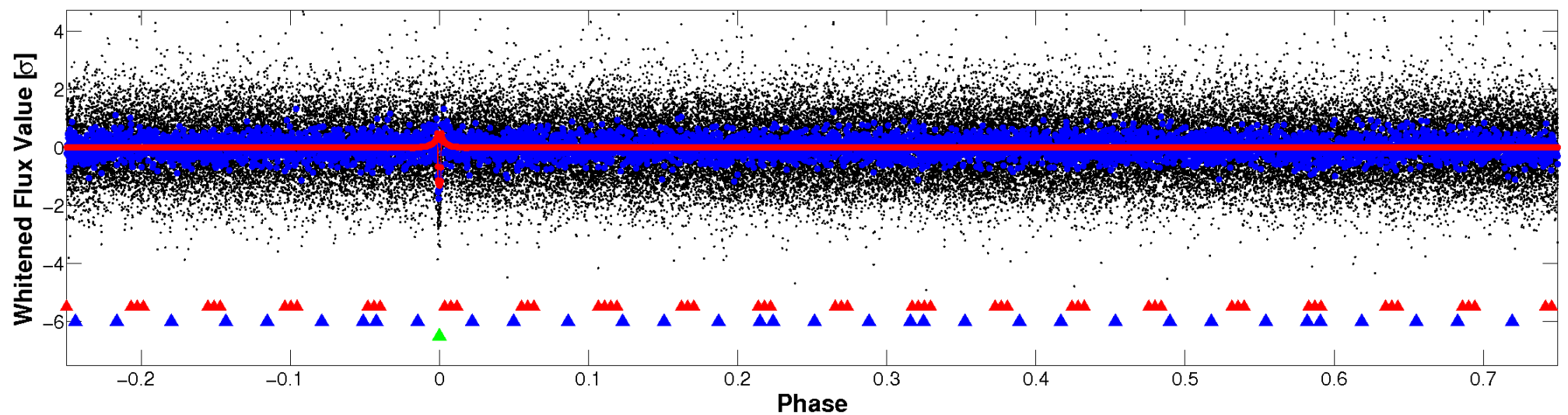


# Non-Whitened Vs. Whitened Light Curve

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

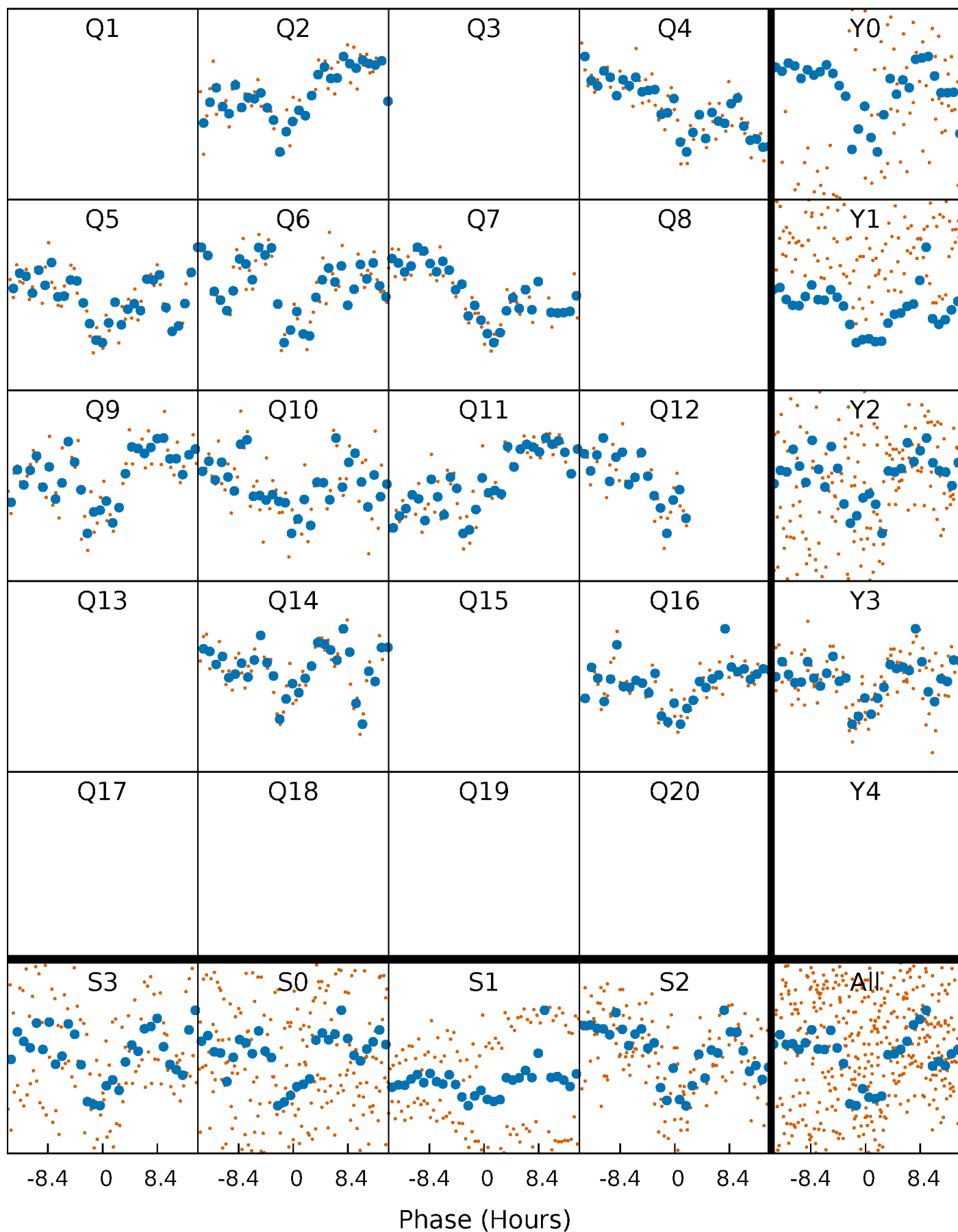


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

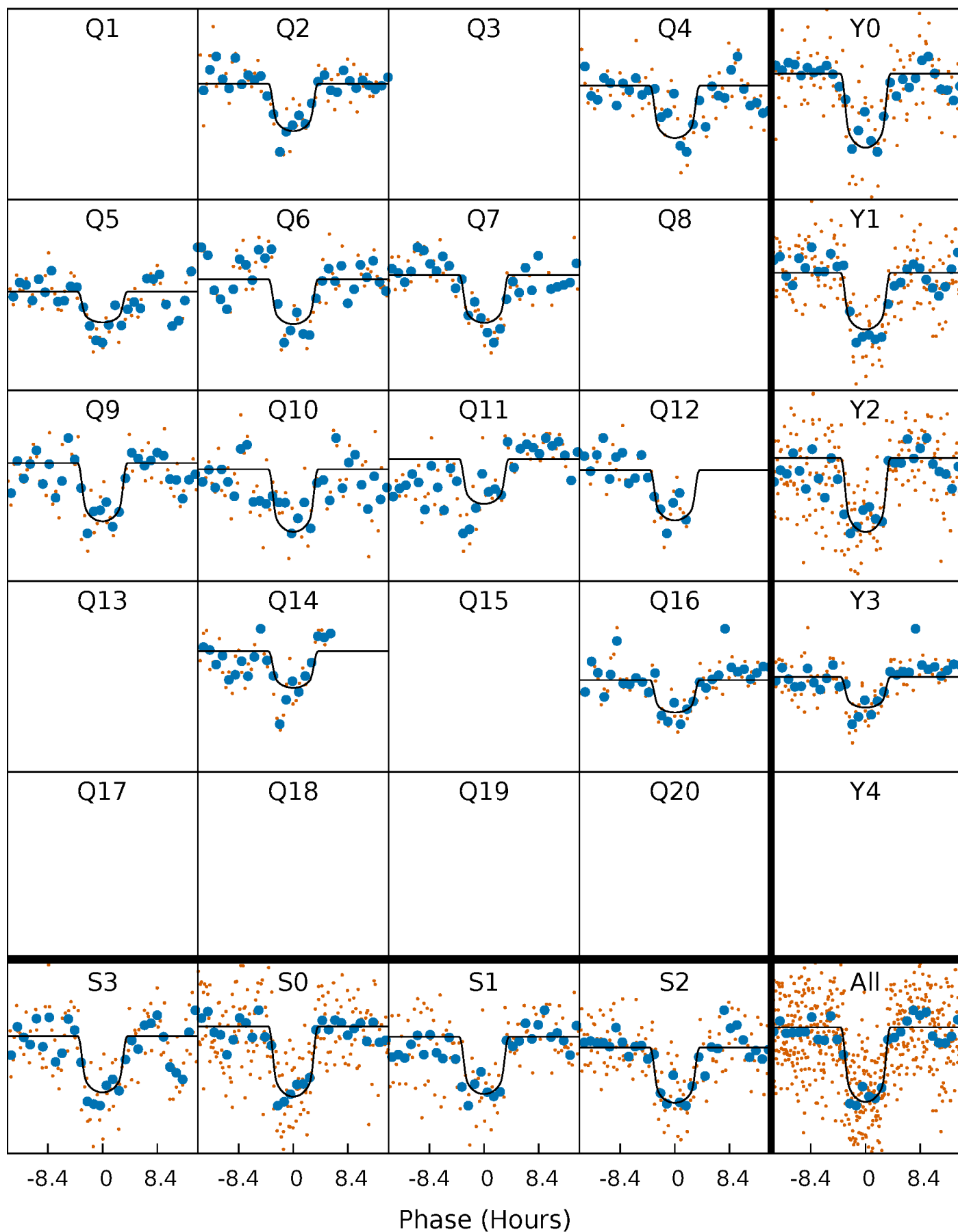
TCE 010189546-03 P=117.041503 Days  $T_0=245.615467$  (BKJD)





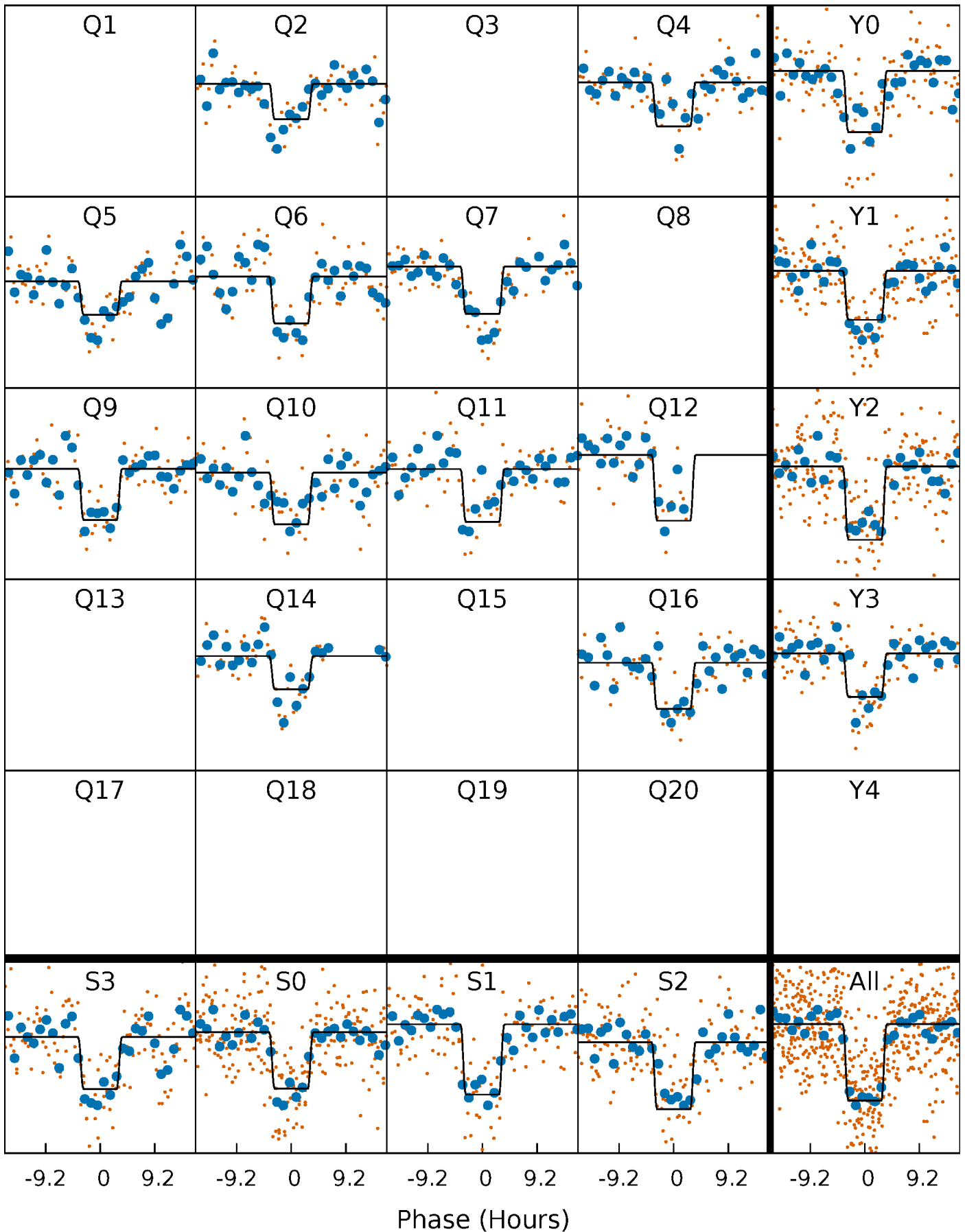
# DV Quarter-Phased Transit Curves

TCE 010189546-03 P=117.041503 Days  $T_0=245.615467$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

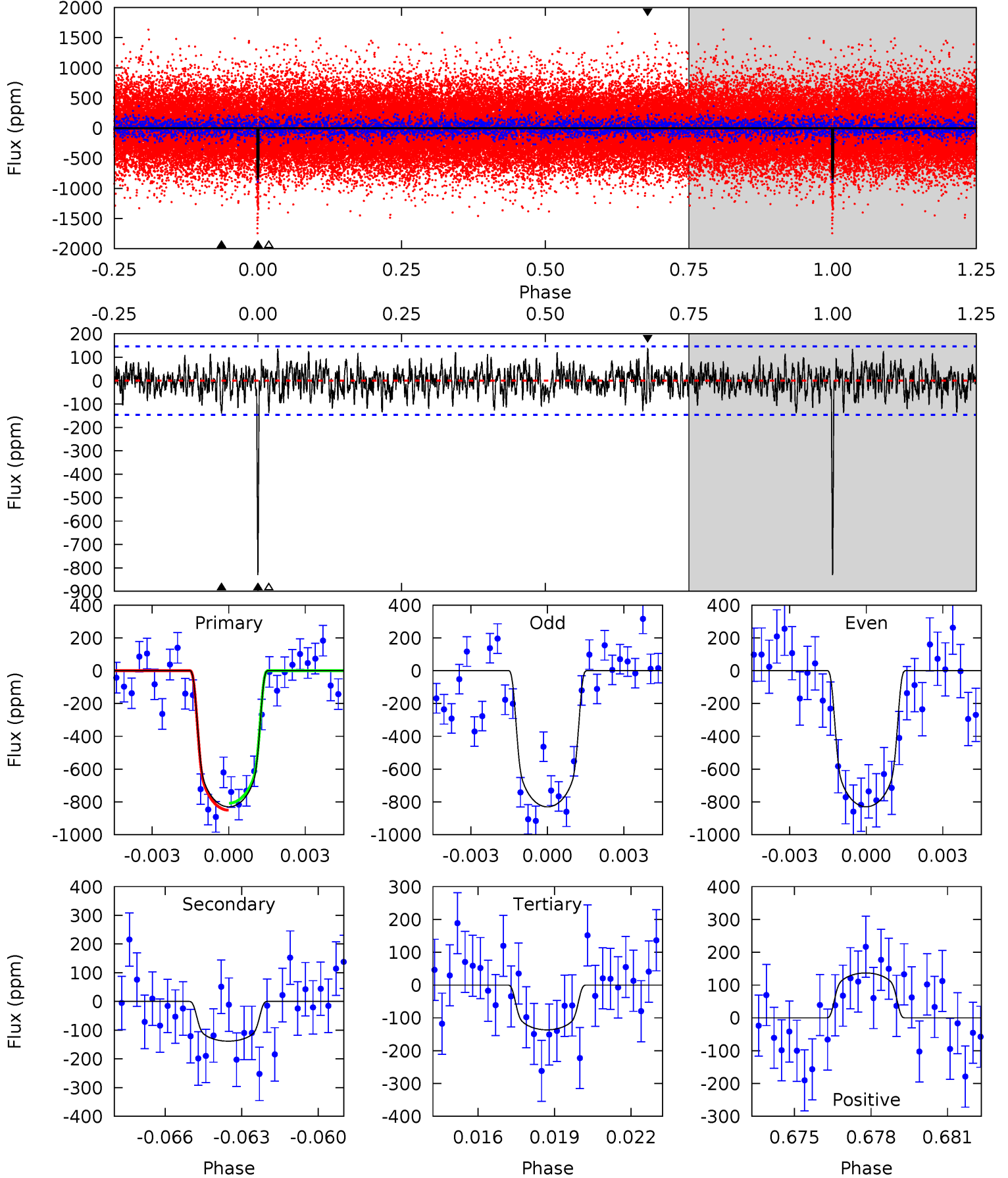
TCE 010189546-03 P=117.036589 Days  $T_0=245.640615$  (BKJD)



# DV Model-Shift Uniqueness Test

010189546-03, P = 117.041503 Days, E = 128.573964 Days

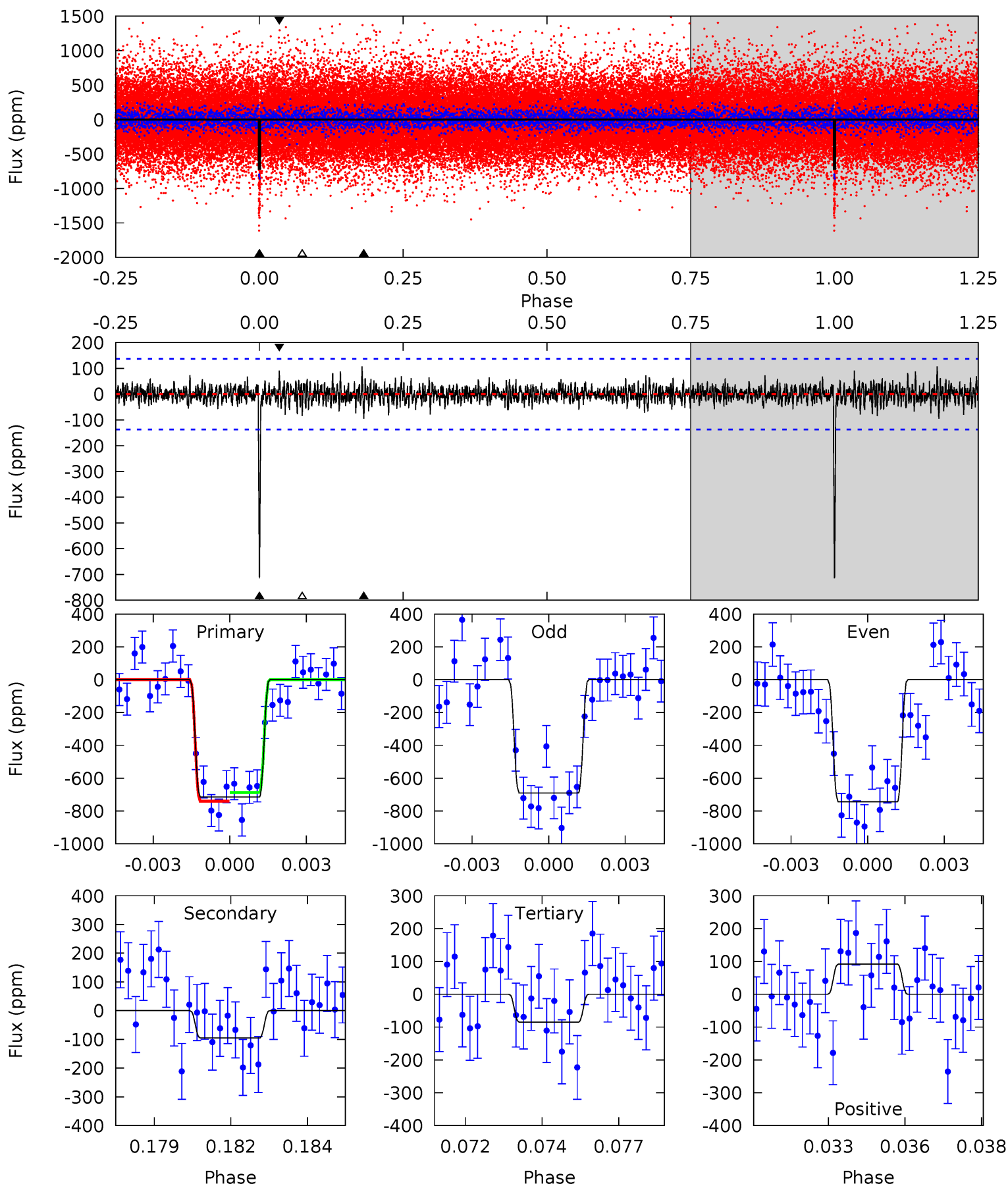
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
29.9	4.98	4.92	4.93	5.27	3.00	1.57	25.0	25.0	0.06	0.06	0.01	1.01	0.14	0.76



# Alt Model-Shift Uniqueness Test

010189546-03, P = 117.036589 Days, E = 128.604026 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
27.5	3.67	3.27	3.53	5.28	3.02	0.89	24.3	24.0	0.40	0.14	1.02	0.98	0.13	1.03



### Stellar Parameters For KIC 010189546

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5312^{+79}_{-79}$	$4.384^{+0.137}_{-0.074}$	$0.160^{+0.150}_{-0.150}$	$0.986^{+0.107}_{-0.117}$	$0.859^{+0.060}_{-0.033}$	$1.262^{+0.665}_{-0.309}$
	+1%/-1%	+3%/-2%	+94%/-94%	+11%/-12%	+7%/-4%	+53%/-24%
Source	SPE90	SPE90	SPE90	DSEP		

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

### Secondary Eclipse Parameters for KIC 010189546-03 / KOI 0427.03

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-138 \pm 28$	$3.30^{+0.36}_{-0.36}$	$483^{+18}_{-20}$	$3660^{+166}_{-154}$	$1409^{+448}_{-376}$
Alt.	$-95 \pm 26$	$2.92^{+0.32}_{-0.33}$	$485^{+16}_{-18}$	$3591^{+189}_{-199}$	$1211^{+462}_{-371}$

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

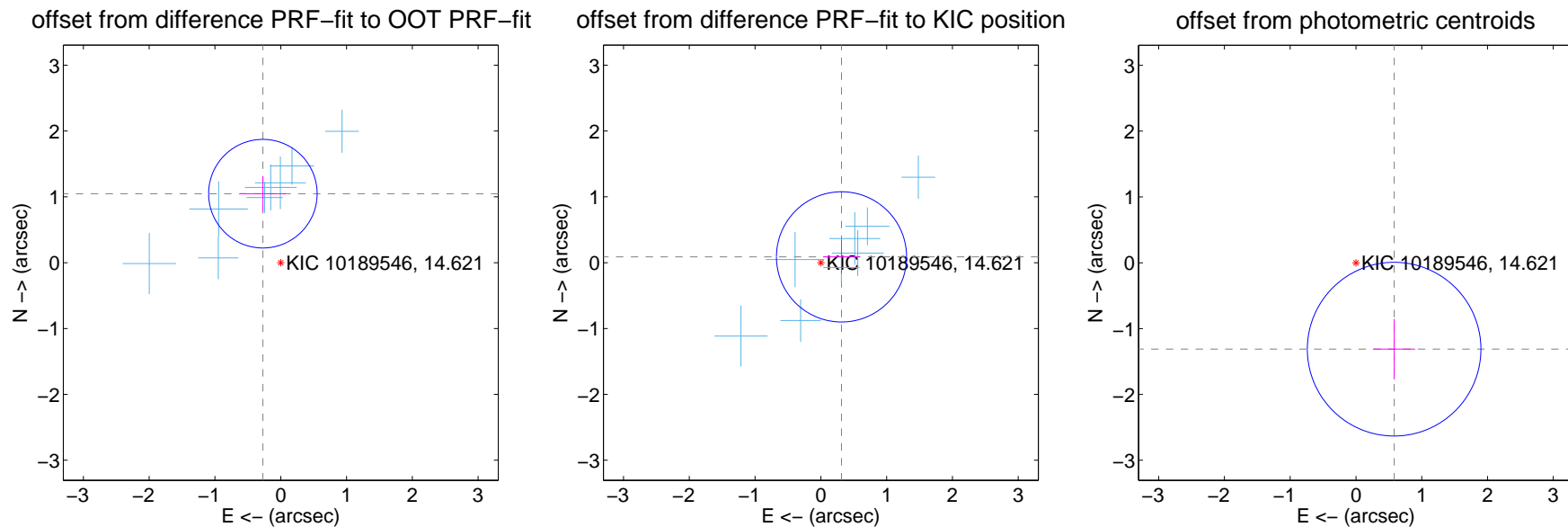
## DV Centroid Data

Supplemental centroid analysis for 010189546-03. Kepler magnitude: 14.62. Transit SNR 14.58

There are 8 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 1.20 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.083 \pm 0.275$	$3.94$	$0.272 \pm 0.351$	$1.048 \pm 0.269$
PRF-fit source offset from KIC position	$0.326 \pm 0.330$	$0.99$	$-0.314 \pm 0.279$	$0.088 \pm 0.253$
photometric centroid source offset	$1.43 \pm 0.44$	$3.26$	$-0.58 \pm 0.32$	$-1.31 \pm 0.46$



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.

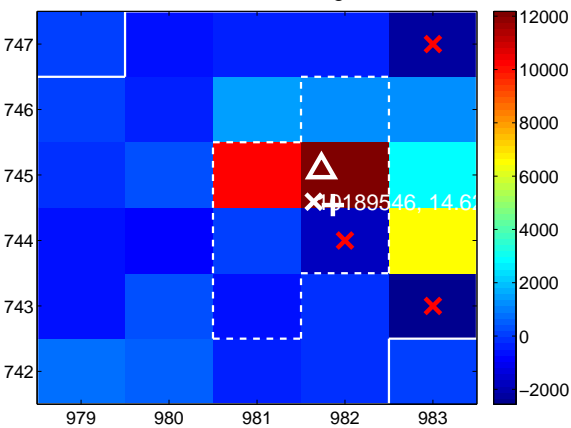
Q1 no difference image



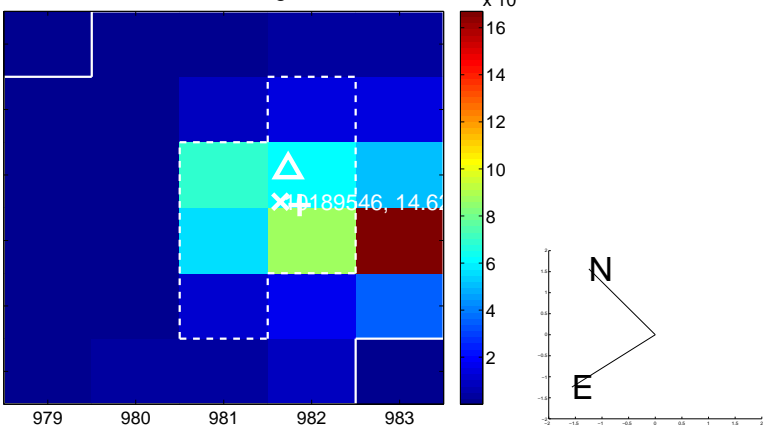
Q1 no OOT image



Q2 difference image



Q2 OOT image



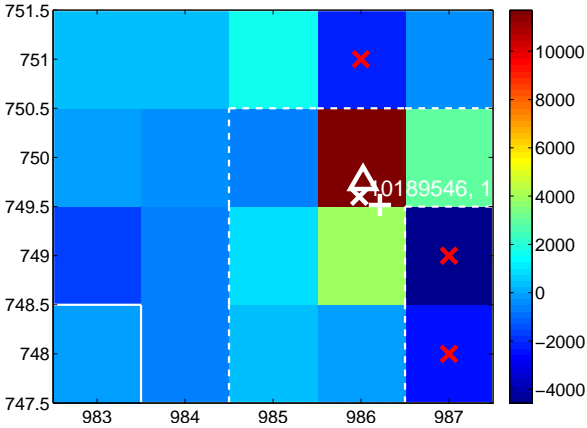
Q3 no difference image



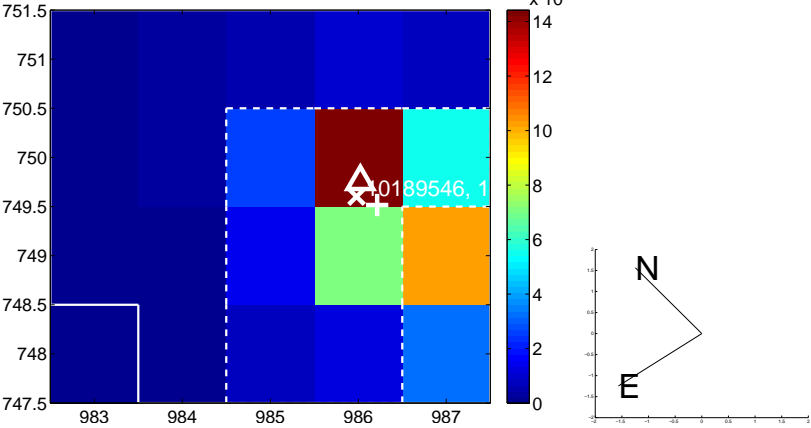
Q3 no OOT image



Q4 difference image

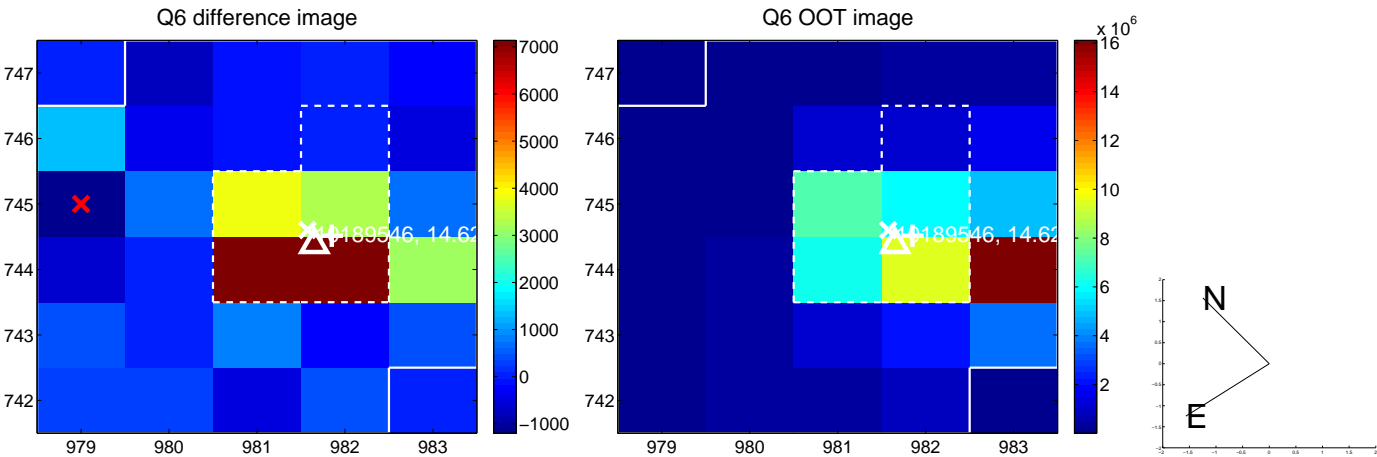
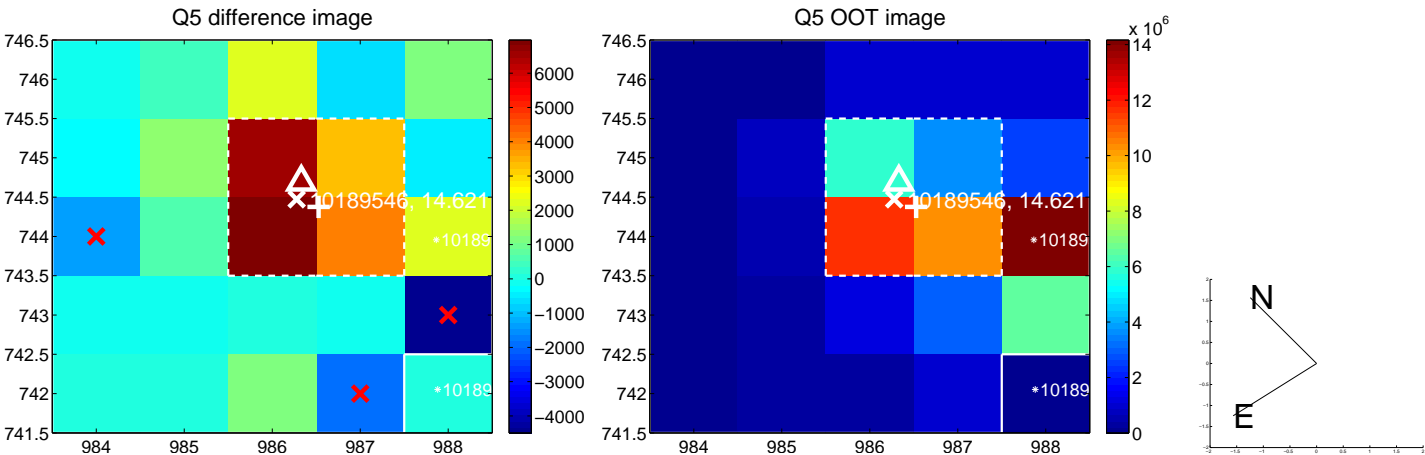


Q4 OOT image

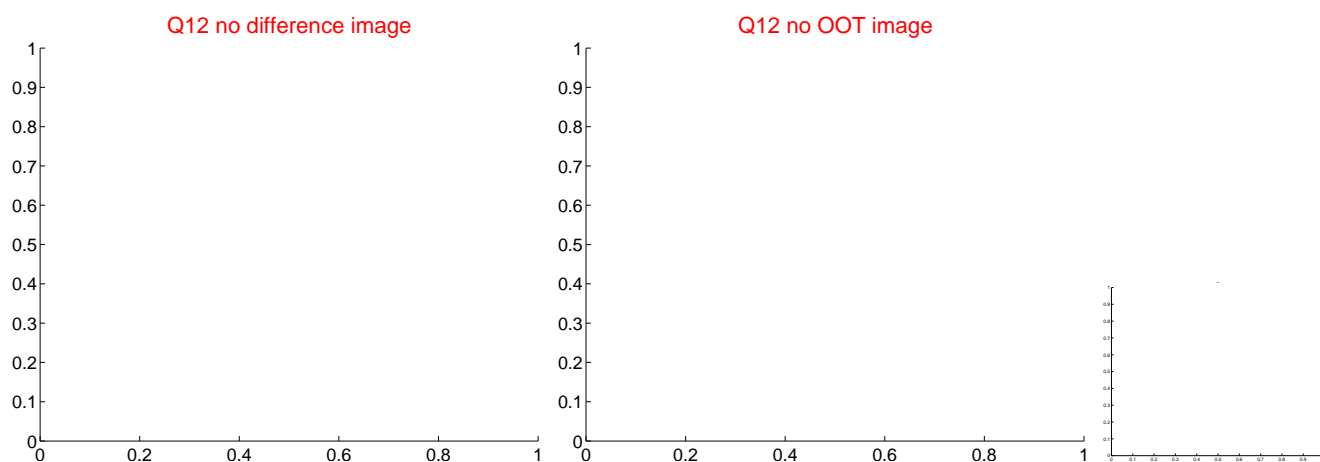
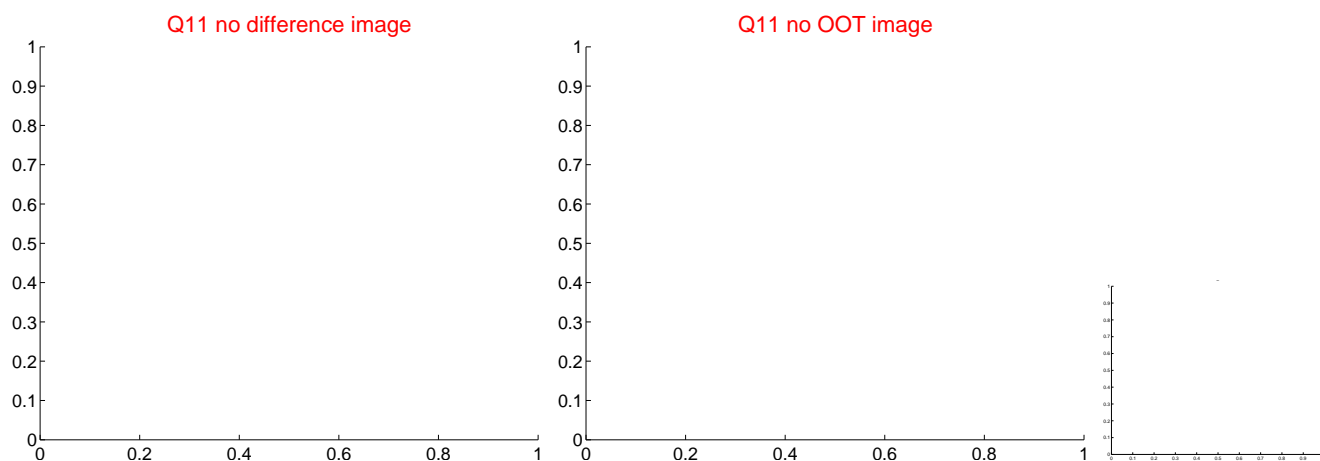
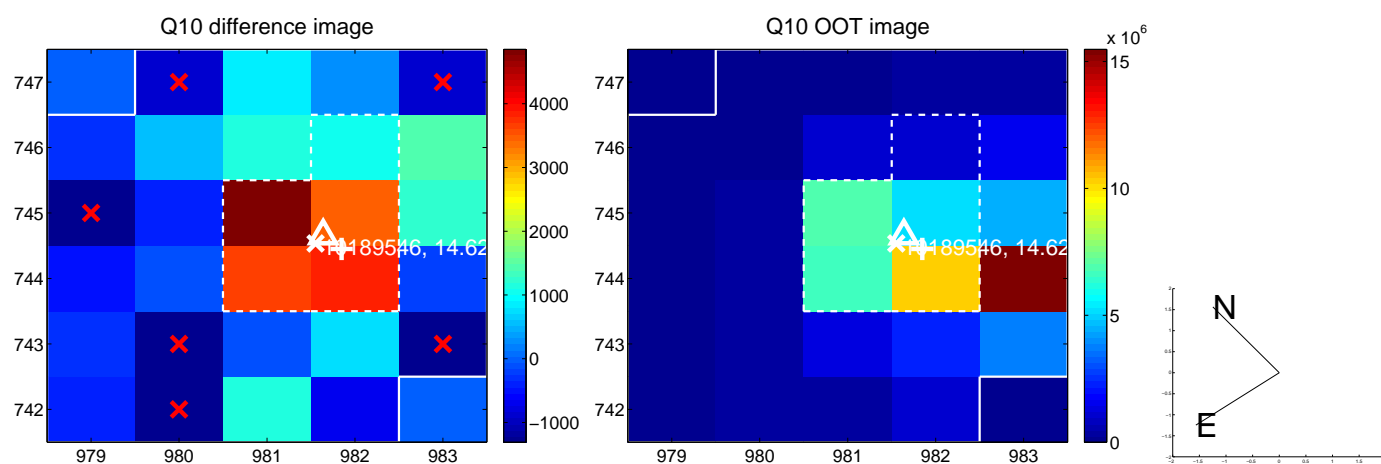
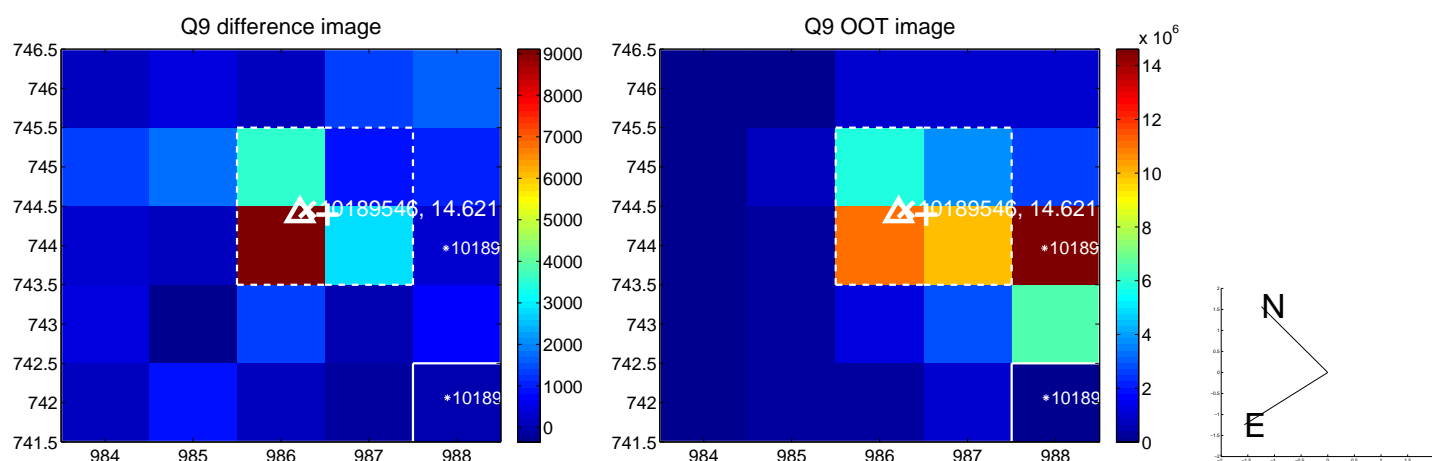




white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

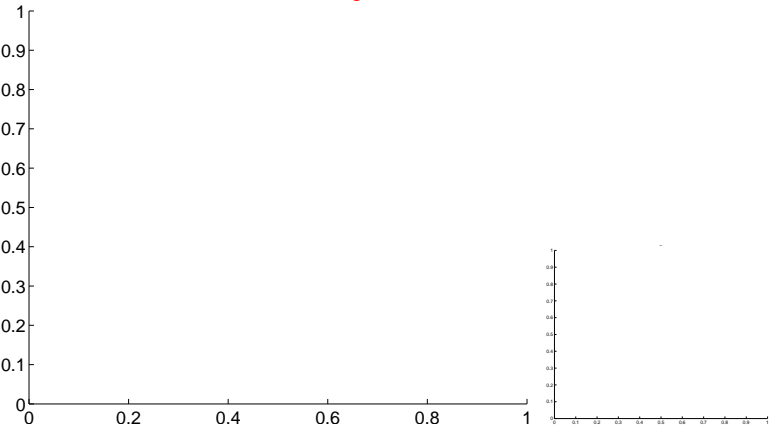


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

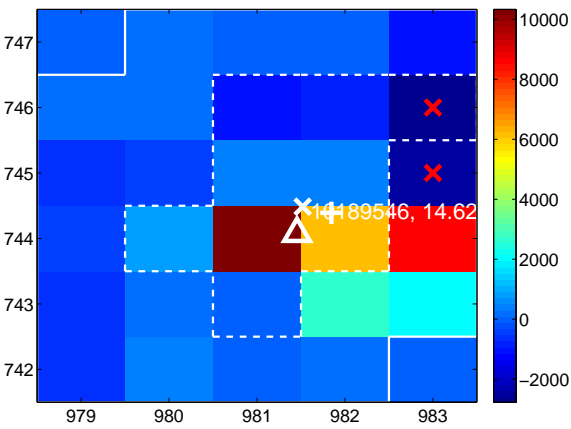
Q13 no difference image



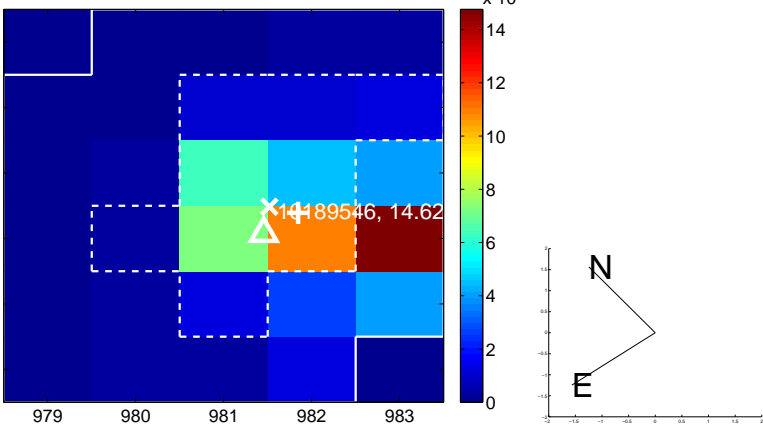
Q13 no OOT image



Q14 difference image



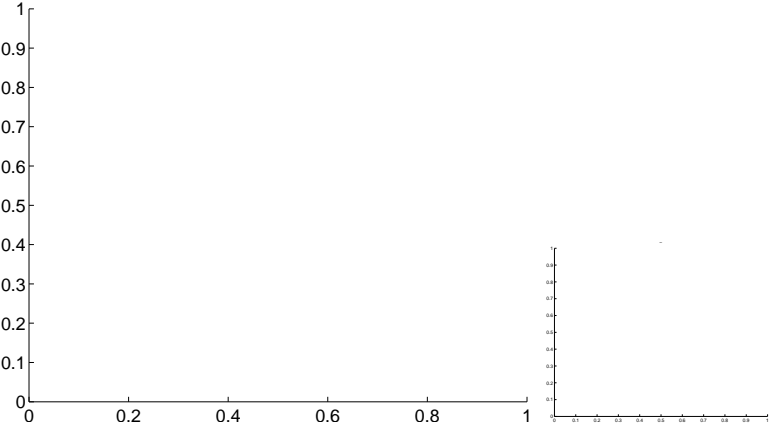
Q14 OOT image



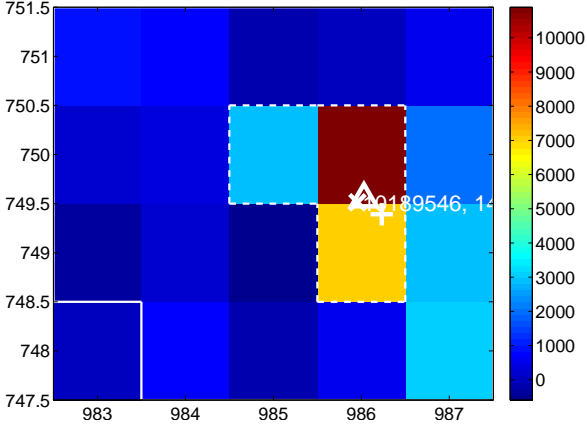
Q15 no difference image



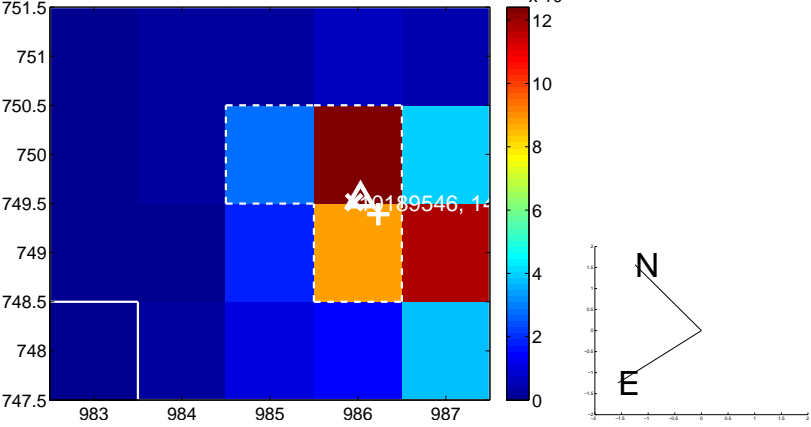
Q15 no OOT image



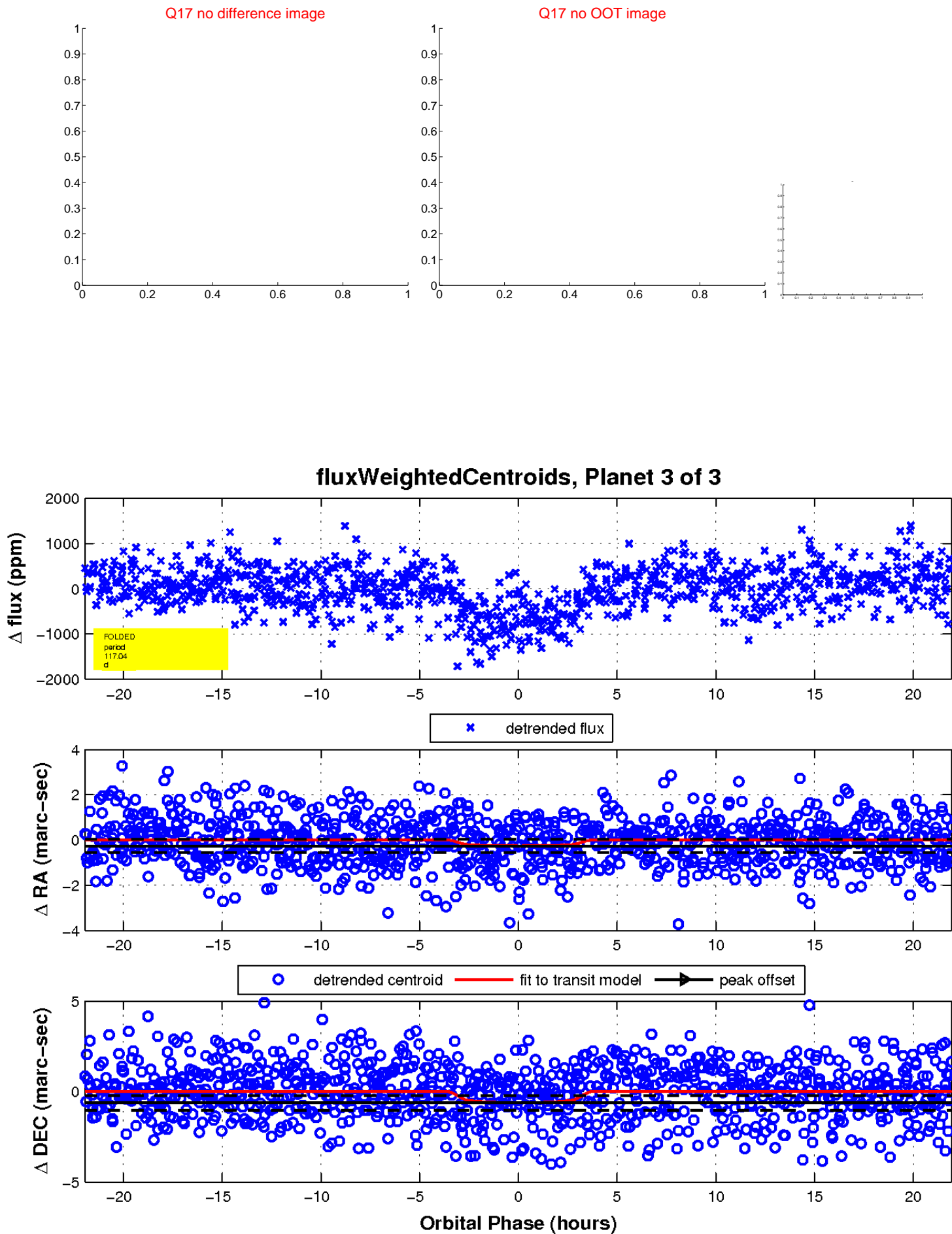
Q16 difference image



Q16 OOT image



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



UKIRT Image

Declination

