

# KIC 009851126

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009851126-01	OBS	3592.01	8.480302	135.854699	80218.1	7.446	3876.1	3210.5	0.79	5385	21.98	79.75
009851126-02	OBS	No	8.480294	132.711530	8062.1	8.669	478.7	253.7	0.79	5385	7.61	79.75
009851126-03	OBS	No	390.105548	390.231819	1785.1	53.992	10.6	8.3	0.79	5385	4.11	0.48
009851126-04	OBS	No	8.481368	135.154979	934.5	12.500	9.2	-1.0	0.79	5385	2.36	79.74

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009851126-01	OBS	FP	0.00	0	1	1	1	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE—SEASONAL_DEPTH_DV—SEASONAL_DEPTH_ALT—CENT_RESOLVED_OFFSET—HALO_GHOST—EPHEM_MATCH
009851126-02	OBS	FP	0.00	1	1	1	1	IS_SEC_TCE—CENT_RESOLVED_OFFSET—HALO_GHOST—EPHEM_MATCH
009851126-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009851126-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—RESIDUAL_TCE—CENT_NOFITS—HALO_GHOST

**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 009851126-01

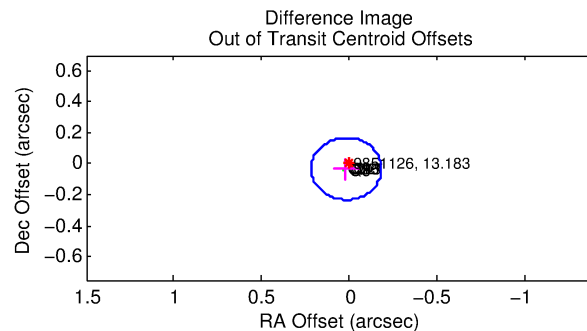
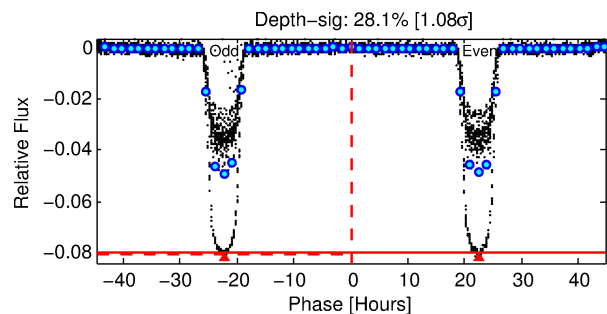
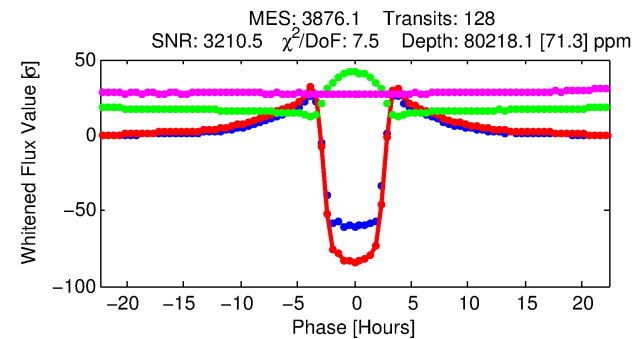
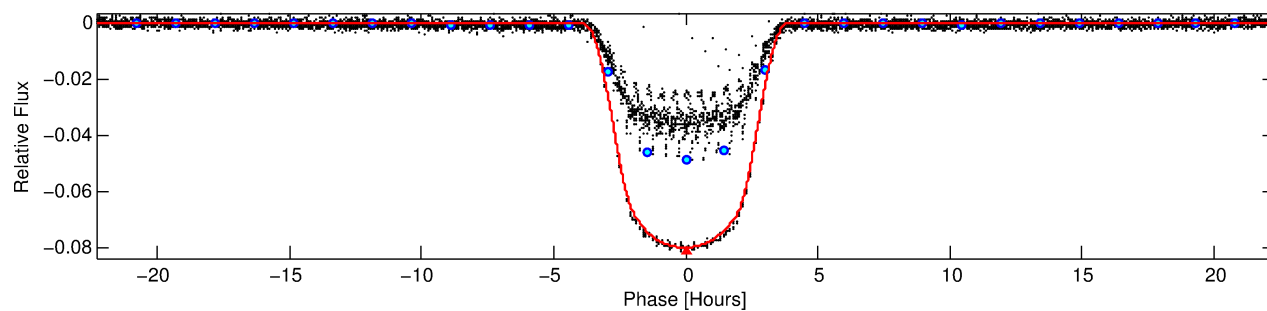
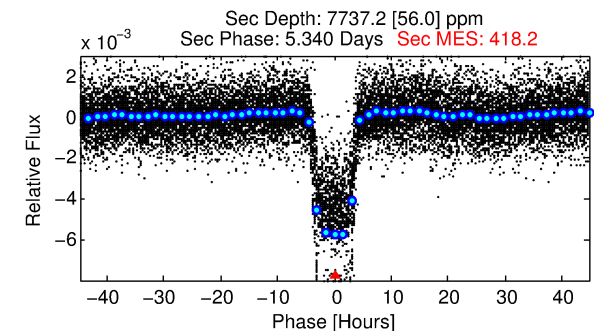
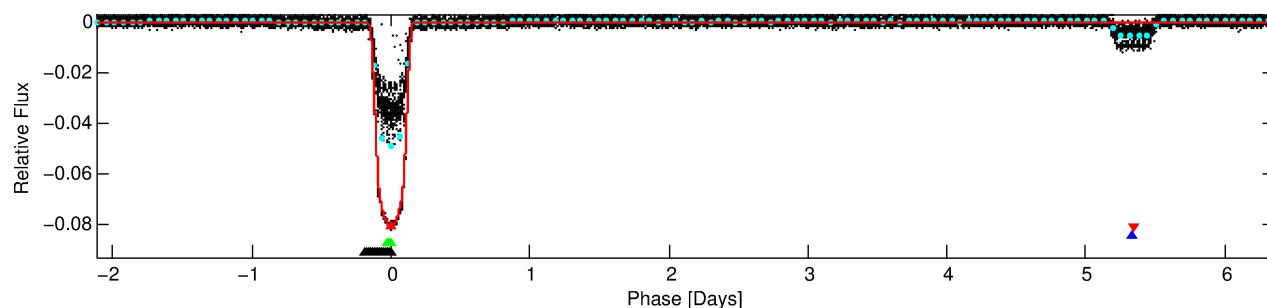
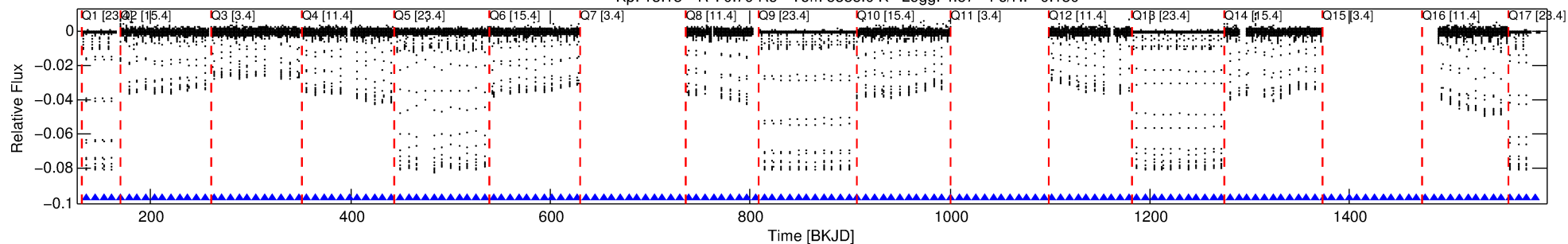
TCE (1)	KIC	Parent (2)	Parent KIC	$P_1:P_2$	Dist ( $''$ )	$\Delta$ Row	$\Delta$ Col	$m_2$	$m_1$	$D_2/D_1$	Mechanism	Flag	$\sigma_P$	$\sigma_T$
009851126-01	9851126	009851142-pri	9851142	1:1	21.4	1	5	7.63	13.18	1.14	Direct-PRF	0	0.01	0.02

**Notes:**  $P_1:P_2$  is the period ratio. Dist is the distance in arcseconds.  $\Delta$ Row and  $\Delta$ Col are the number of pixels apart in row and column.  $m_2$  and  $m_1$  are the magnitudes of the parent and child.  $D_2/D_1$  is the parent's transit depth divided by the child's.  $\sigma_P$  and  $\sigma_T$  are the significance of the match in period and epoch. For a match to be considered significant  $\sigma_P < 5.0$  and  $\sigma_T < 5.0$ . Matches which have  $\sigma_P$  and  $\sigma_T$  very close to this cutoff should receive extra scrutiny, especially if the period ratio is very large.

# DV One-Page Summary

KIC: 9851126 Candidate: 1 of 4 Period: 8.480 d  
KOI: K03592.01 Corr: 1.000

Kp: 13.18 R\*: 0.79 Rs Teff: 5385.0 K Logg: 4.57 Fe/H: -0.180



## DV Fit Results:

Period = 8.48030 [0.00000] d  
Epoch = 135.8547 [0.0001] BKJD  
Rp/R\* = 0.2560 [0.0002]  
a/R\* = 10.91 [0.02]  
b = 0.11 [0.02]  
Seff = 79.75 [20.37]  
Teq = 762 [49] K  
Rp = 21.98 [4.27] Re  
a = 0.0765 [0.0119] AU  
Ag = 51.54 [11.10] [4.55 $\sigma$ ]  
Teffp = 3157 [109] K [20.12 $\sigma$ ]

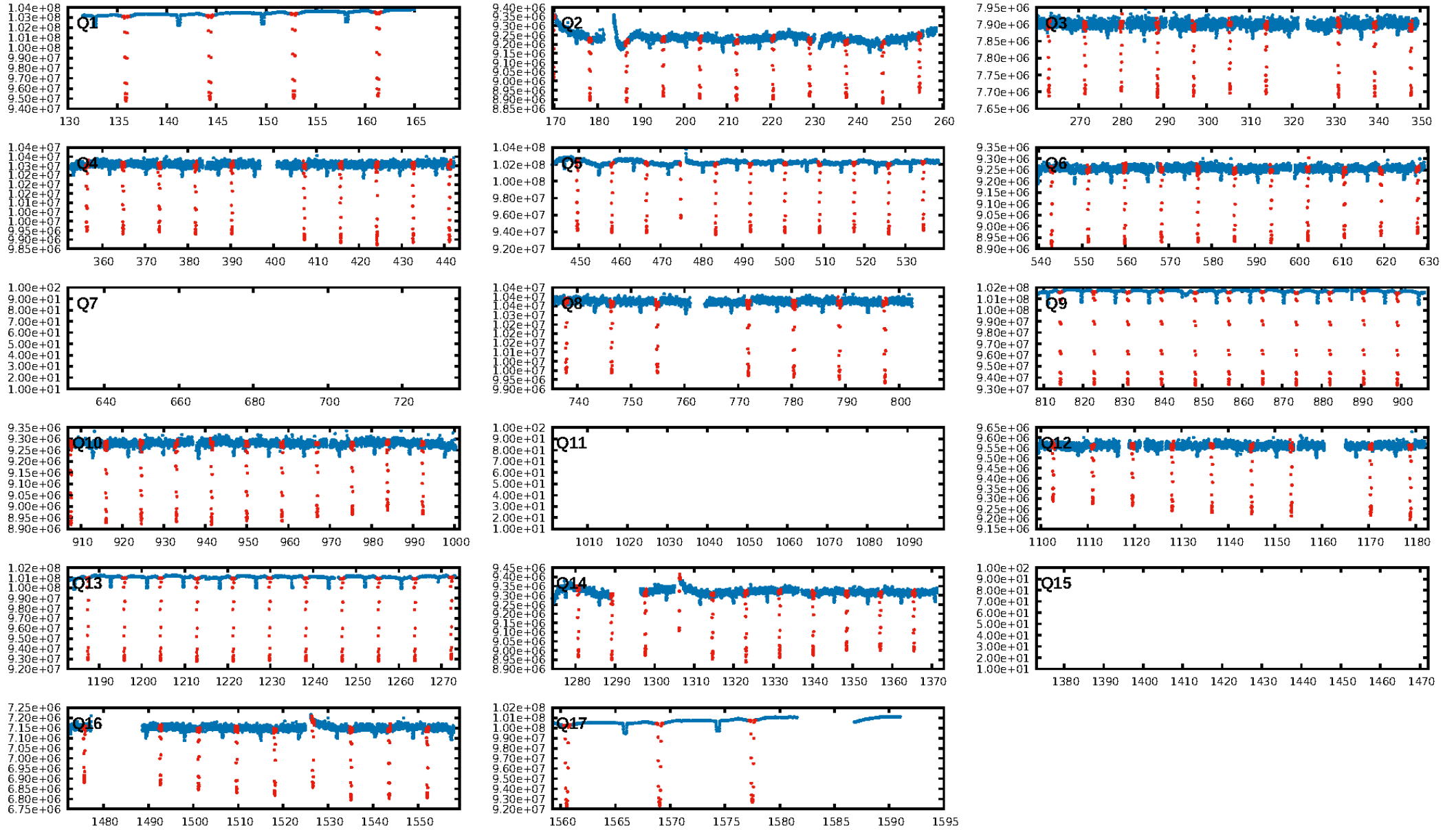
## DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00 $\sigma$ ]  
LongPeriod-sig: 0.1% [0.00 $\sigma$ ]  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 0.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [121/121]  
GhostDiagnostic-chr: -0.03879  
Centroid-sig: N/A  
Centroid-so: 0.955 arcsec [470.10 $\sigma$ ]  
OotOffset-rm: 0.037 arcsec [0.56 $\sigma$ ]  
KicOffset-rm: 11.275 arcsec [20.50 $\sigma$ ]  
OotOffset-st: 0/0/3/3 [6]  
KicOffset-st: 1/0/3/3 [7]  
DiffImageQuality-fgm: 1.00 [7/7]  
DiffImageOverlap-fno: 0.00 [0/14]

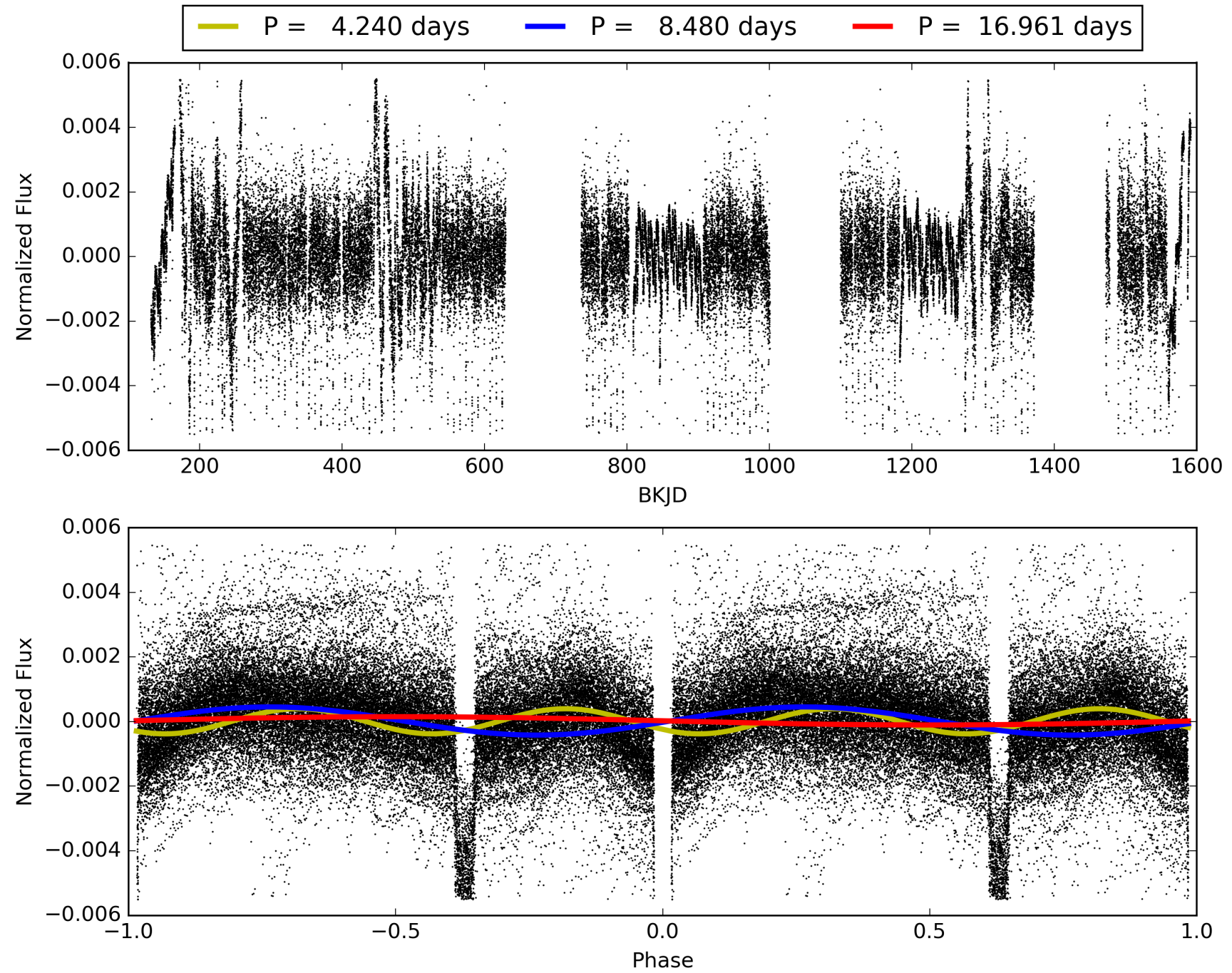
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 18:21:34 Z

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

# TCE 009851126-01, PDC Light Curves



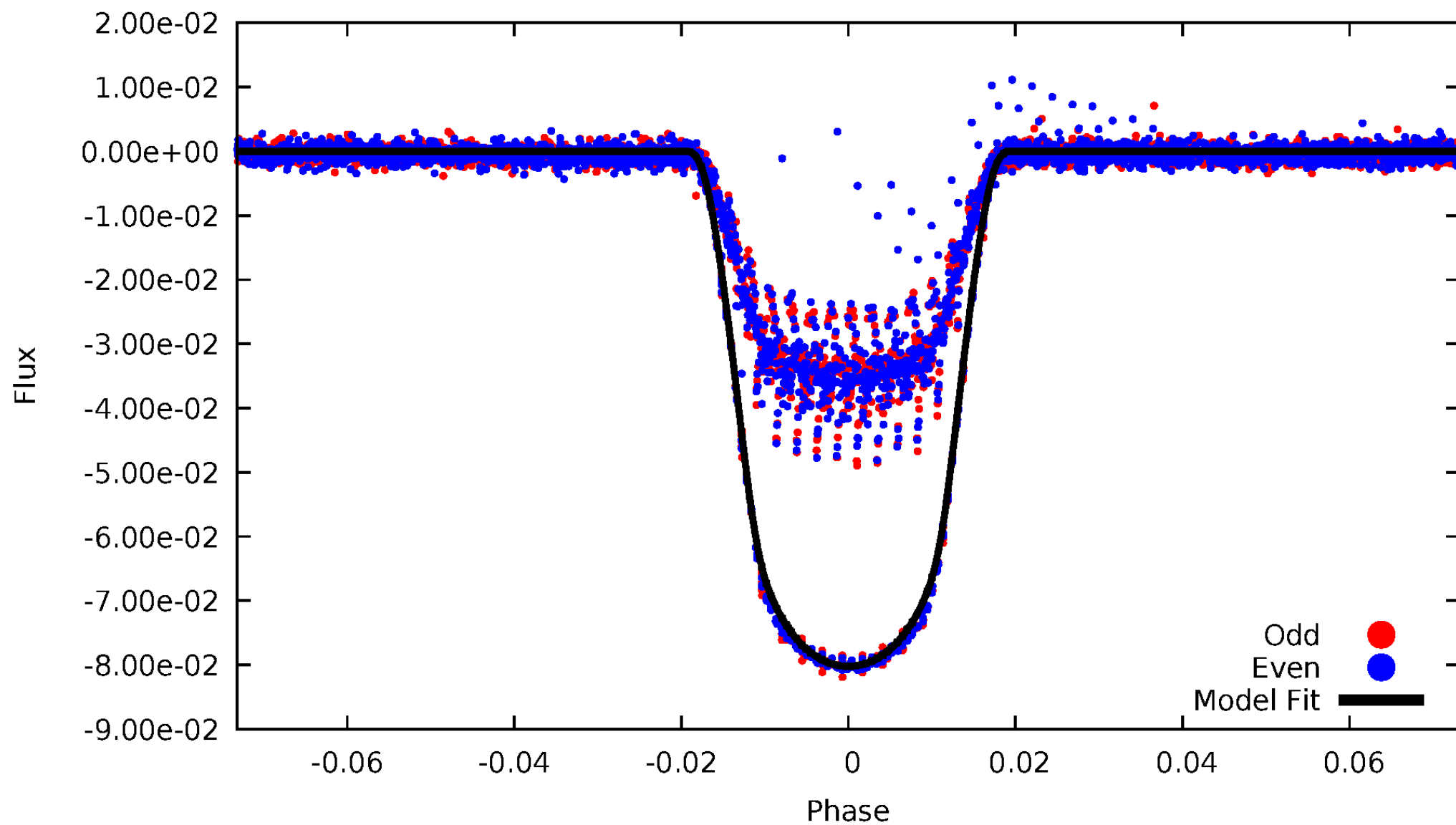
TCE 009851126-01





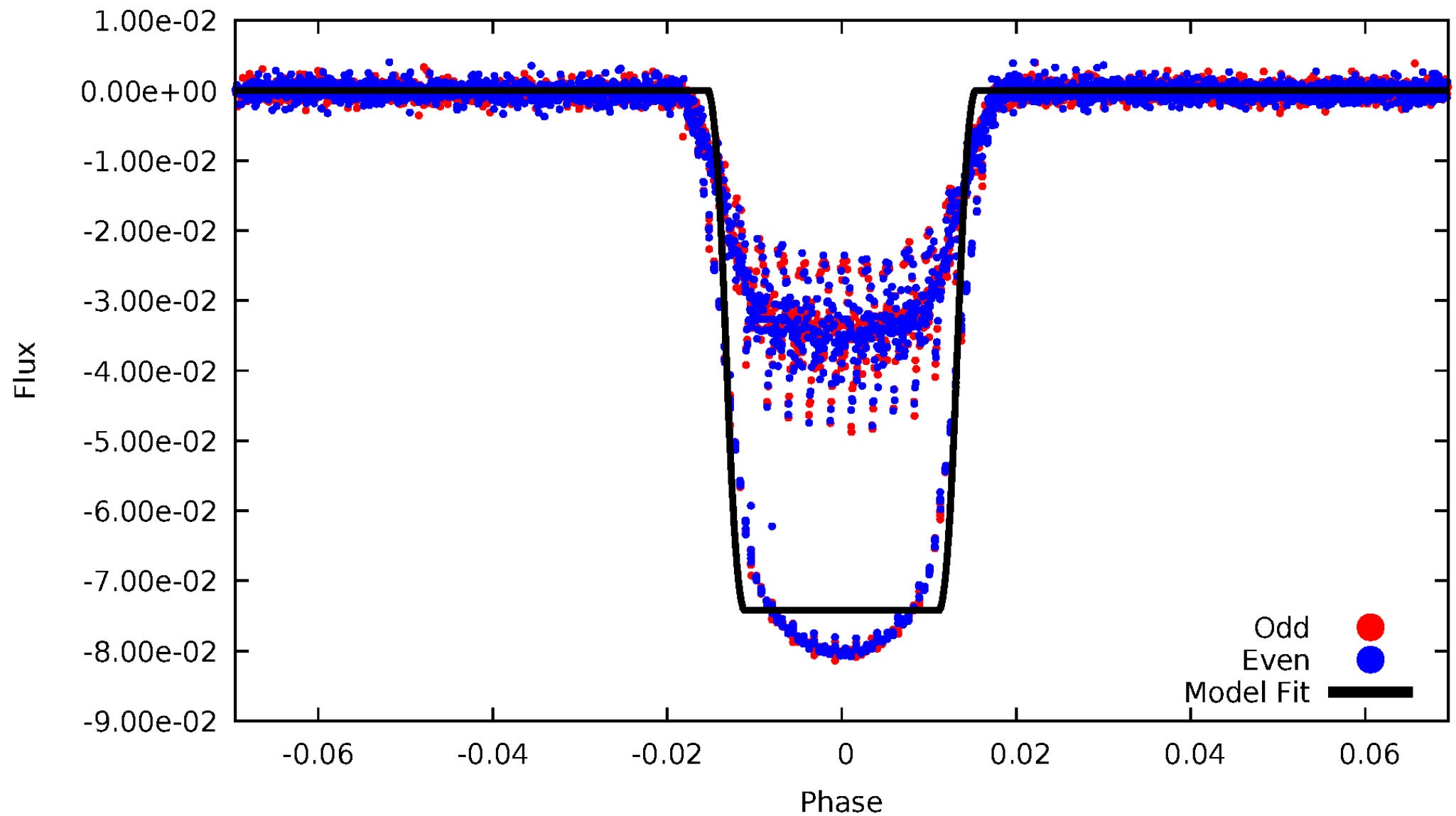
# DV Odd/Even

TCE 009851126-01



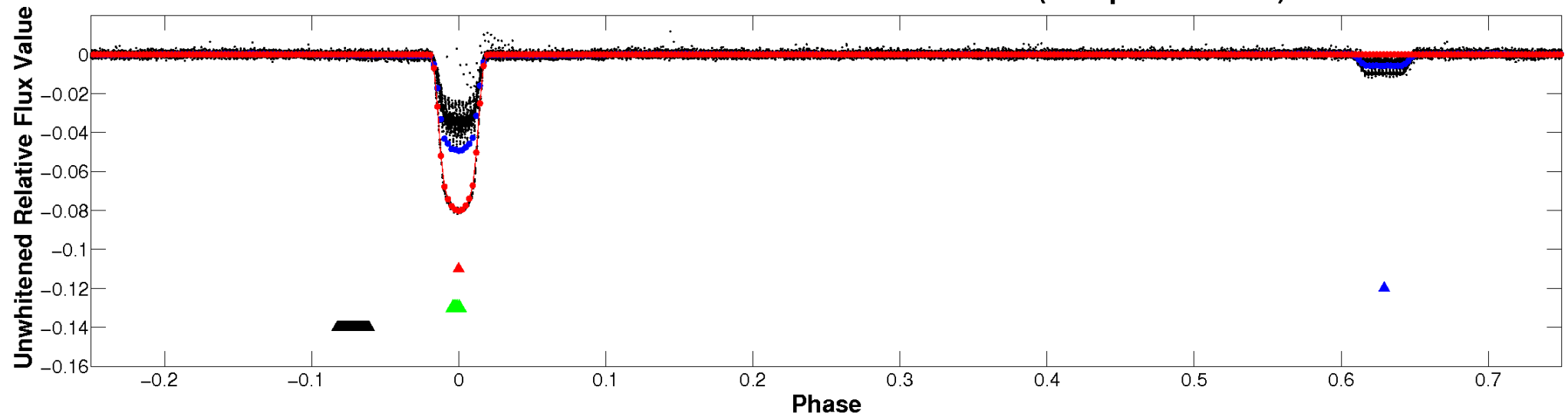
# ALT Odd/Even

TCE 009851126-01

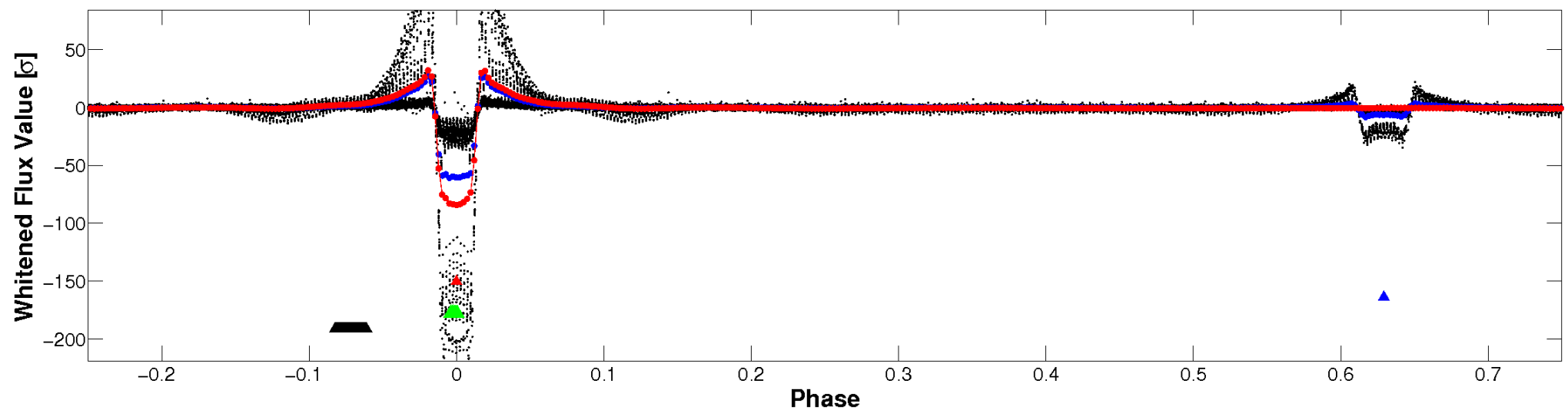


# Non-Whitened Vs. Whitened Light Curve

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

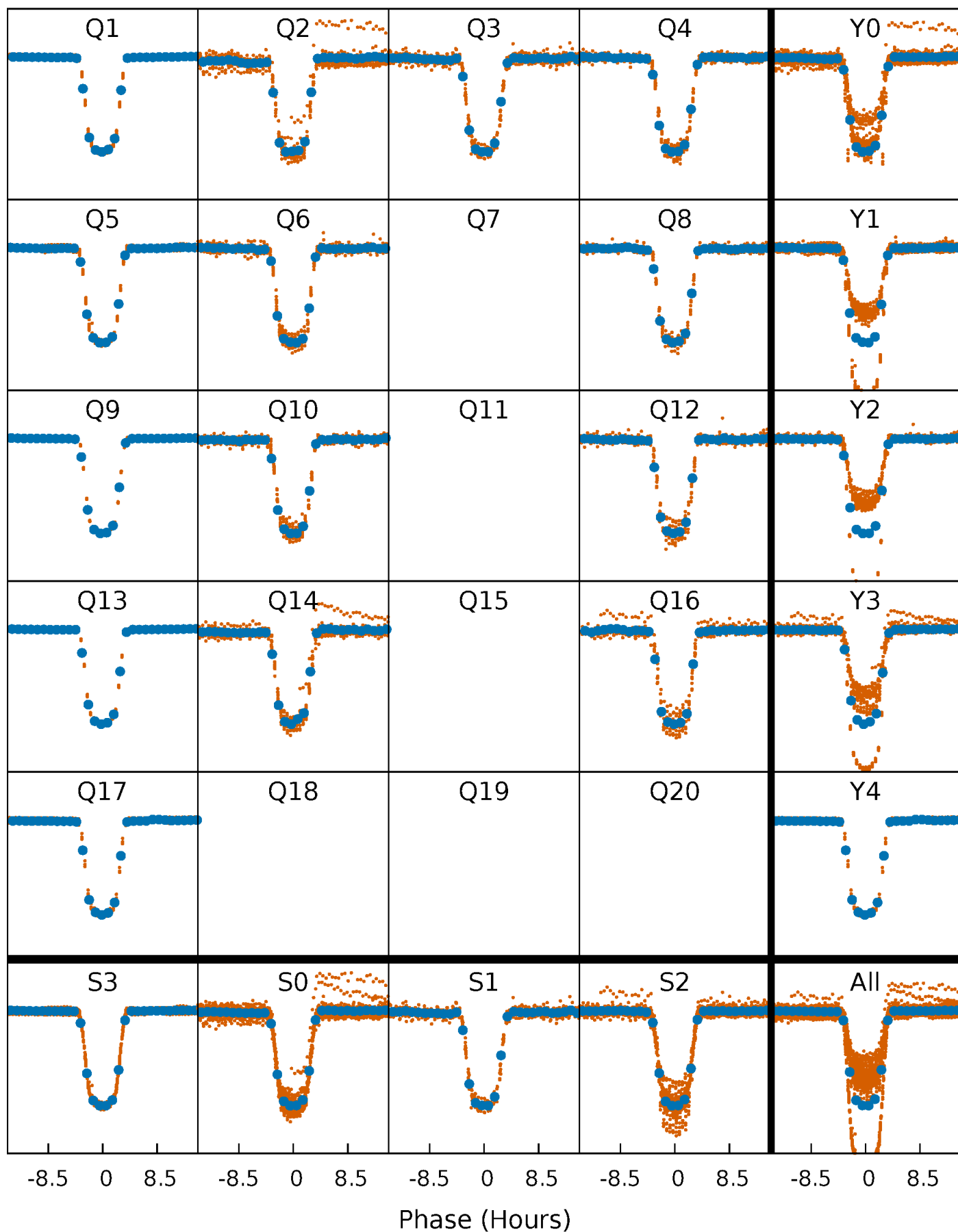


## Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



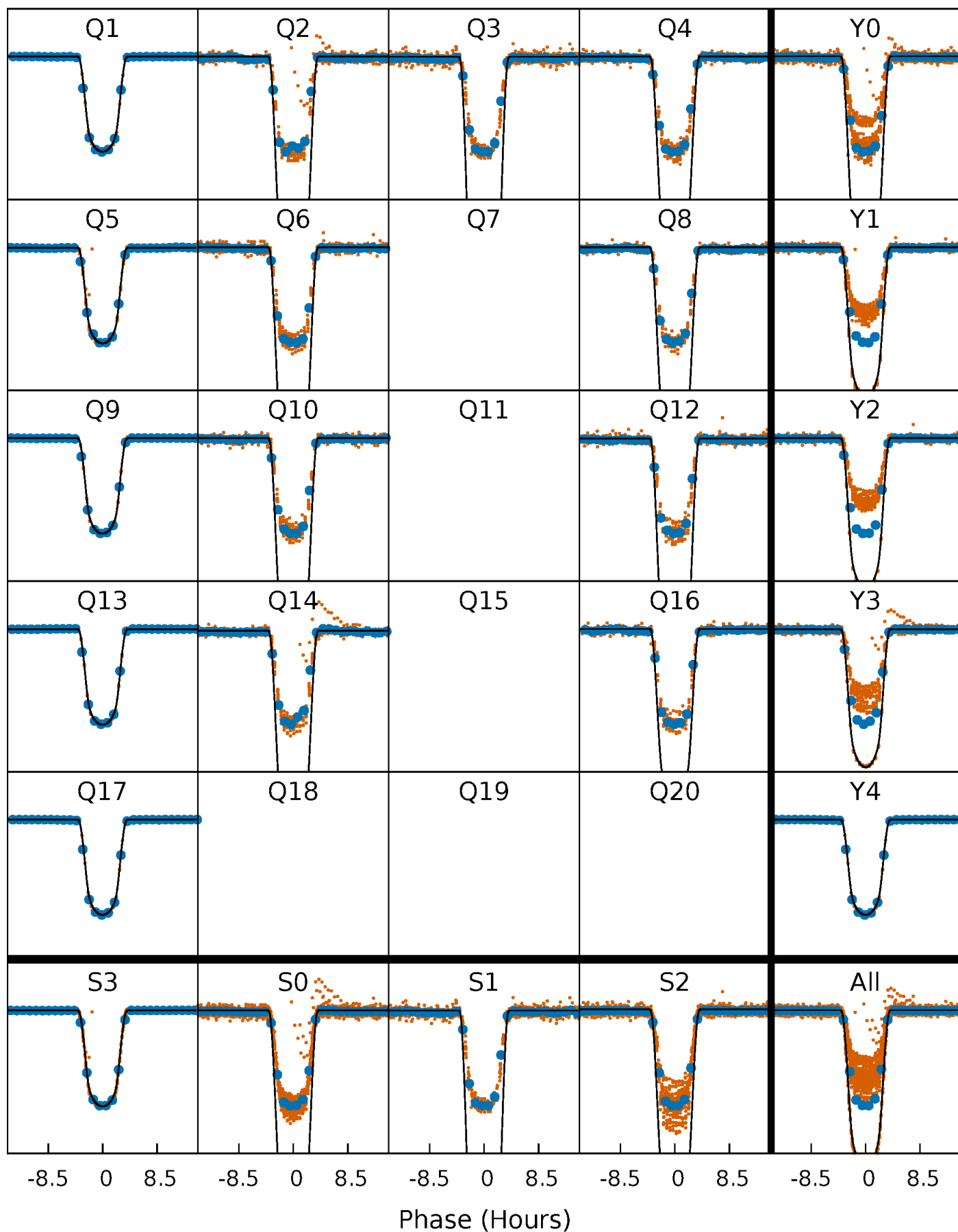
# PDC Quarter-Phased Transit Curves

TCE 009851126-01 P= 8.480302 Days  $T_0=135.854699$  (BKJD)



# DV Quarter-Phased Transit Curves

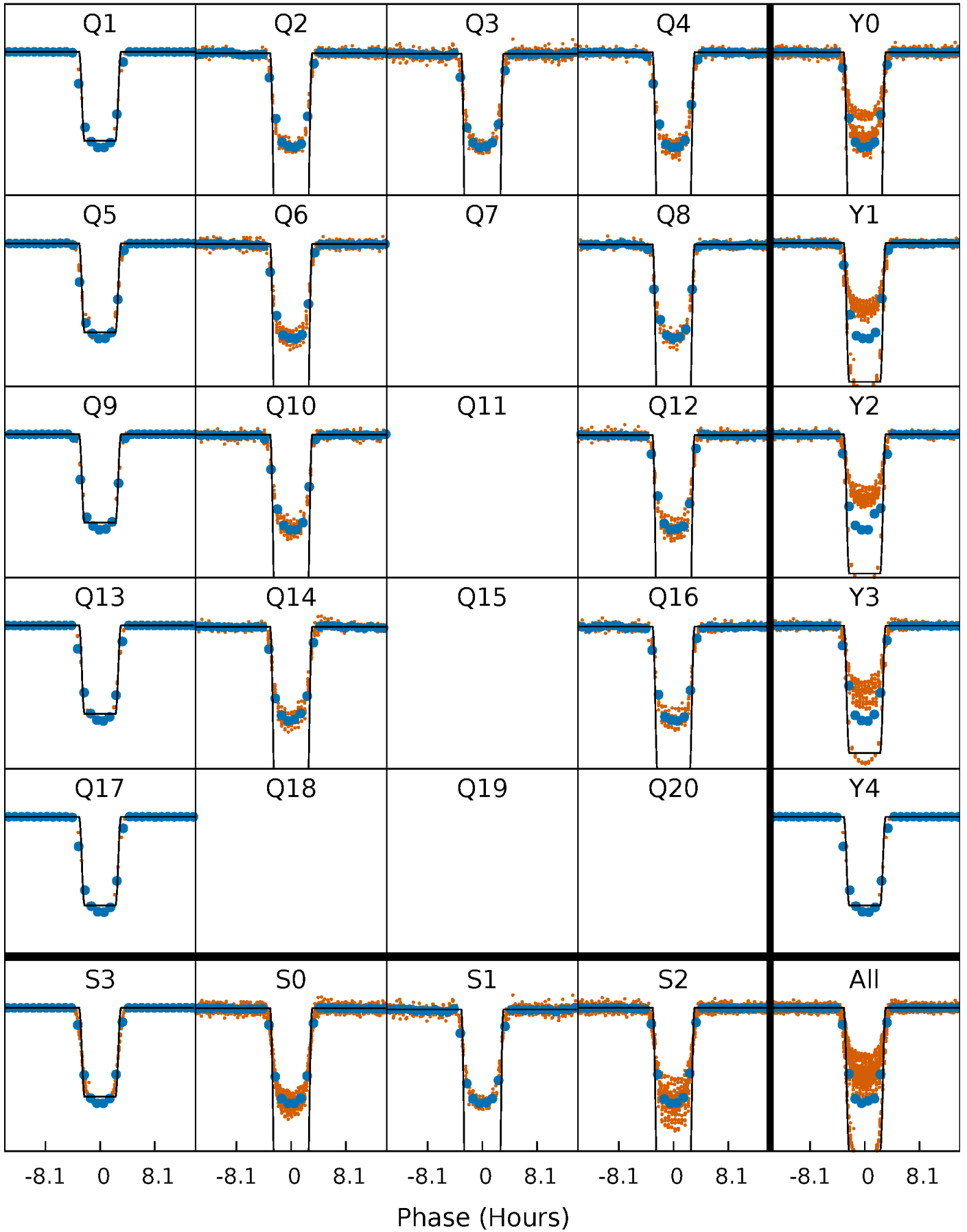
TCE 009851126-01 P= 8.480302 Days  $T_0=135.854699$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

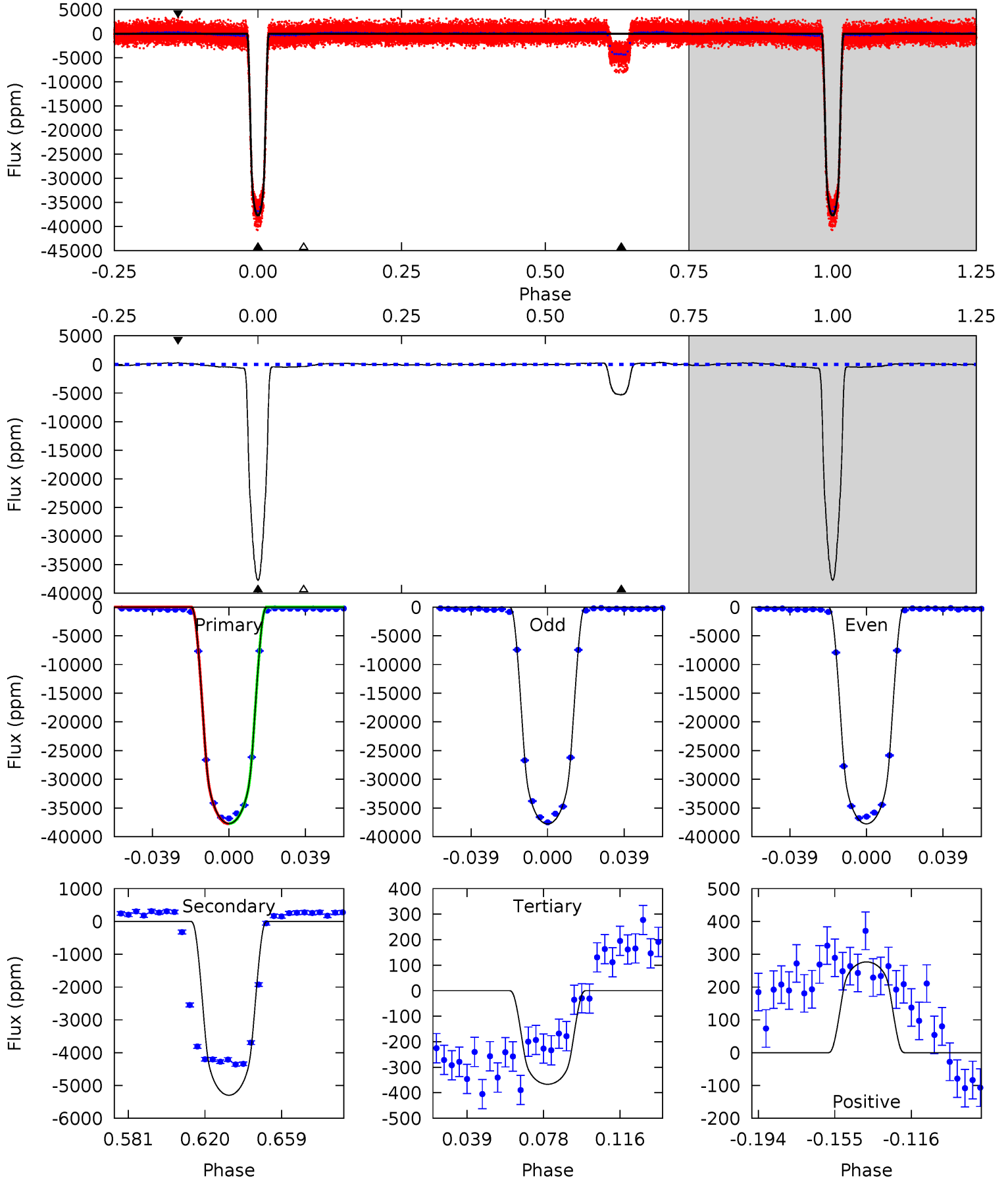
TCE 009851126-01 P= 8.480296 Days  $T_0=135.855333$  (BKJD)



# DV Model-Shift Uniqueness Test

009851126-01, P = 8.480302 Days, E = 127.374397 Days

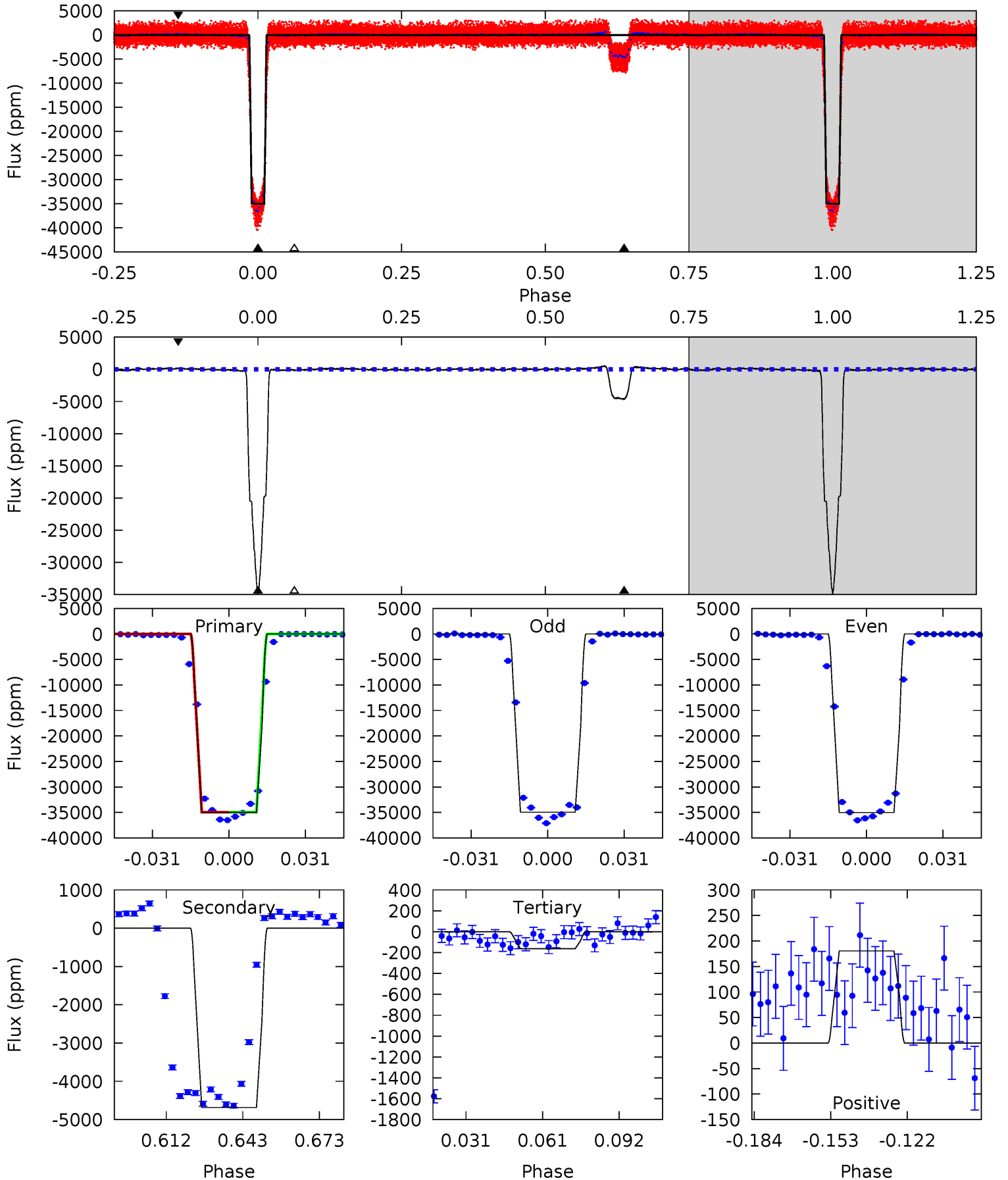
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
1380	193.9	13.4	10.1	4.76	2.07	6.68	1367	1370	180.4	183.7	0.46	1.31	0.01	0



# Alt Model-Shift Uniqueness Test

009851126-01, P = 8.480296 Days, E = 127.375037 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
940.6	125.9	4.41	4.85	4.81	2.16	2.59	936.2	935.8	121.5	121.1	0.88	1.32	0.02	0.09



### Stellar Parameters For KIC 009851126

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5385^{+185}_{-185}$	$4.565^{+0.048}_{-0.112}$	$-0.180^{+0.300}_{-0.300}$	$0.787^{+0.153}_{-0.071}$	$0.832^{+0.096}_{-0.087}$	$2.400^{+0.510}_{-0.819}$
	+3%/-3%	+1%/-2%	+167%/-167%	+19%/-9%	+12%/-10%	+21%/-34%
Source	PHO54	PHO54	PHO54	DSEP		

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

### Secondary Eclipse Parameters for KIC 009851126-01 / KOI 3592.01

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-5297 \pm 27$	$22.17^{+2.36}_{-1.31}$	$1077^{+59}_{-45}$	$3382^{+84}_{-84}$	$34^{+3}_{-5}$
Alt.	$-4683 \pm 37$	$23.51^{+2.40}_{-1.33}$	$1077^{+56}_{-47}$	$3257^{+72}_{-76}$	$27^{+3}_{-4}$

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

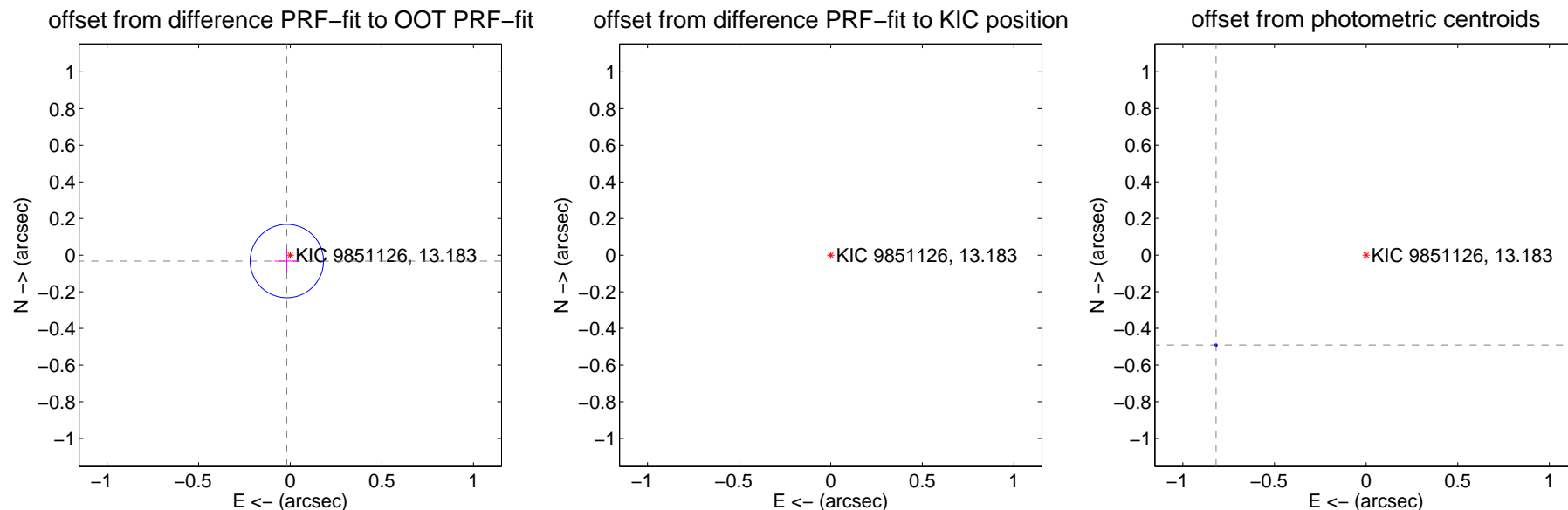
## DV Centroid Data

Supplemental centroid analysis for 009851126-01. Kepler magnitude: 13.18. Transit SNR 3210.50

There are 7 quarters with good PRF difference image offsets

The OOT PRF centroid is offset from the target star catalog position by about 11.35 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

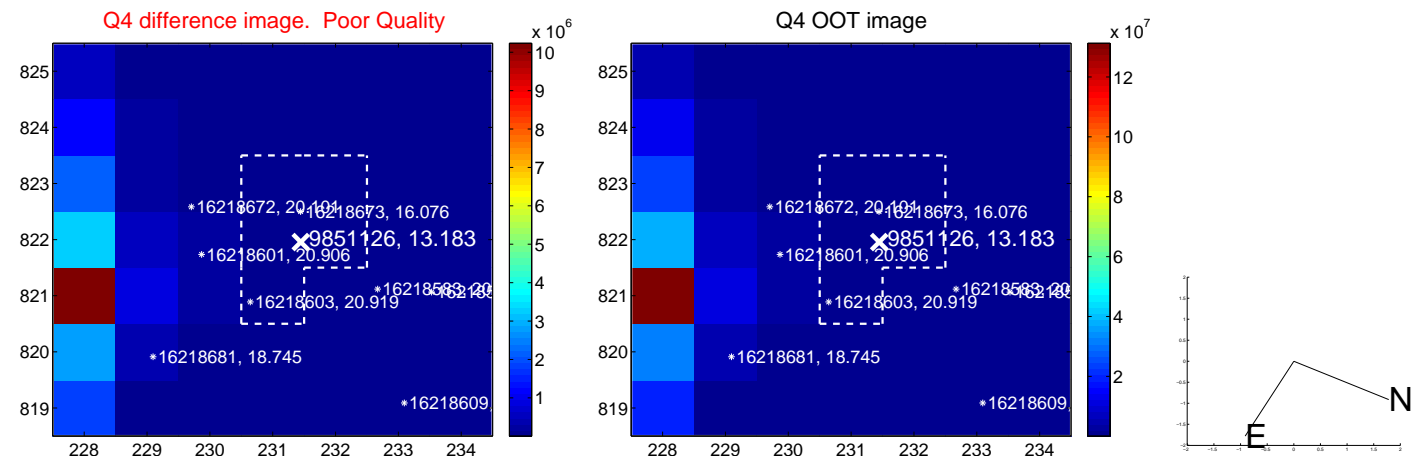
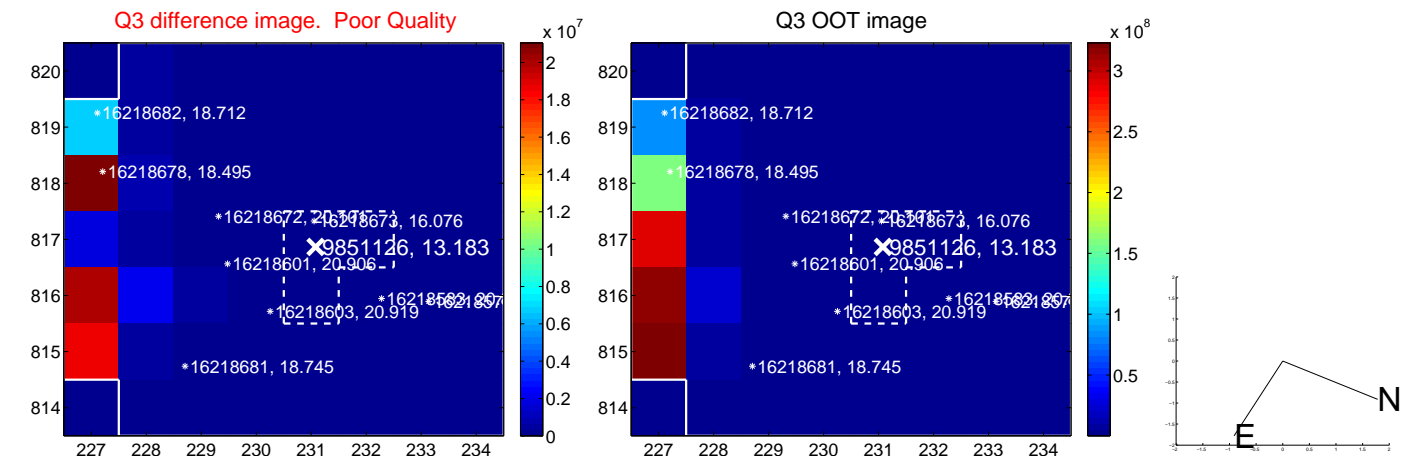
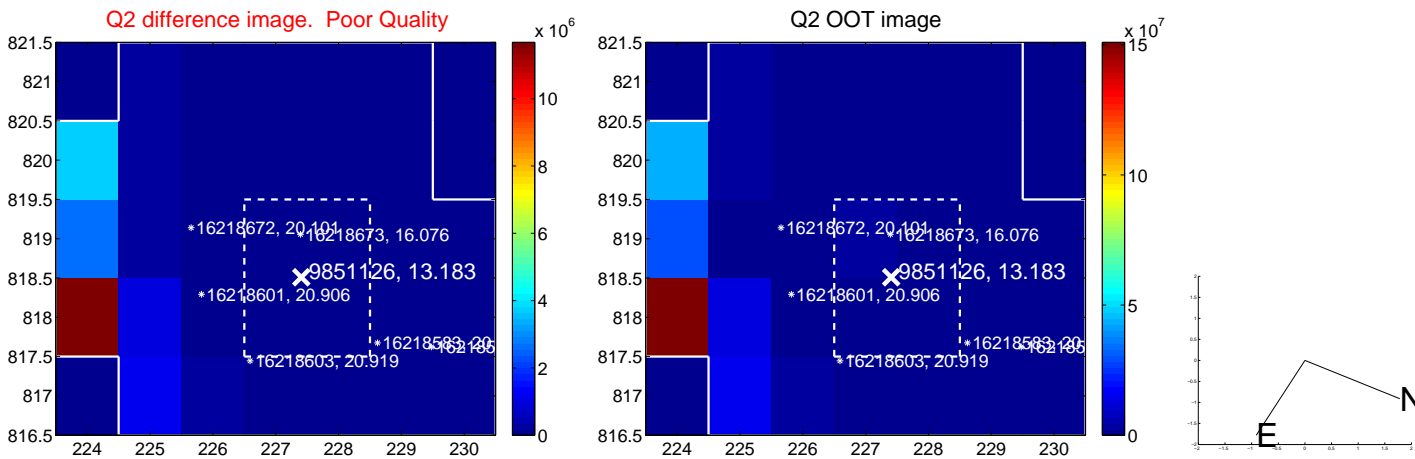
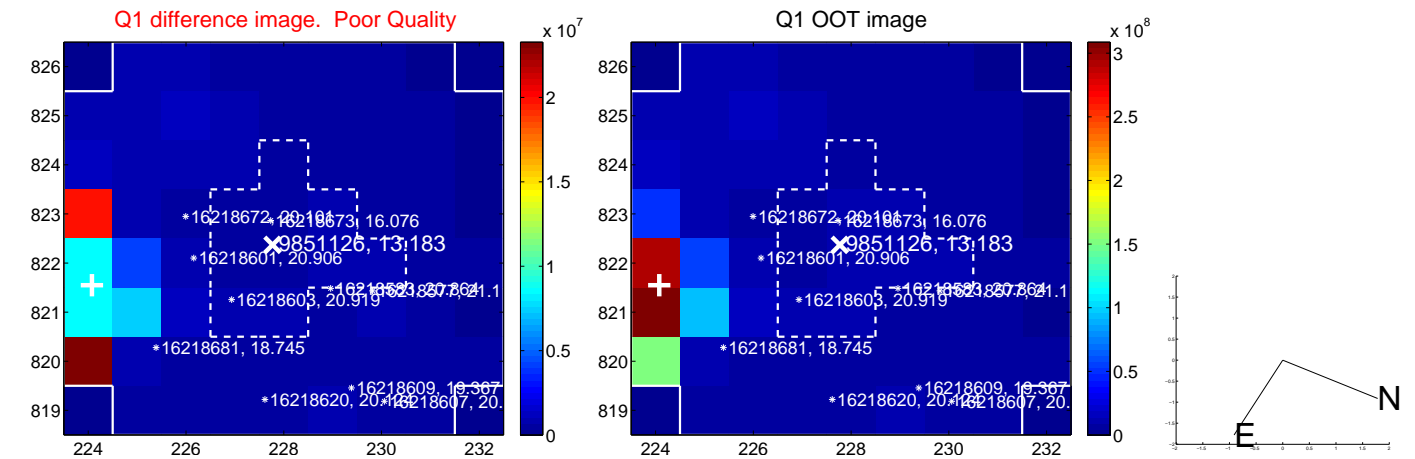
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.037 \pm 0.067$	0.56	$0.019 \pm 0.067$	$-0.032 \pm 0.067$
PRF-fit source offset from KIC position	<b>11.275 <math>\pm</math> 0.550</b>	<b>20.50</b>	$8.062 \pm 0.262$	$-7.882 \pm 0.548$
photometric centroid source offset	<b>0.95 <math>\pm</math> 0.00</b>	<b>470.10</b>	$0.82 \pm 0.00$	$-0.49 \pm 0.00$



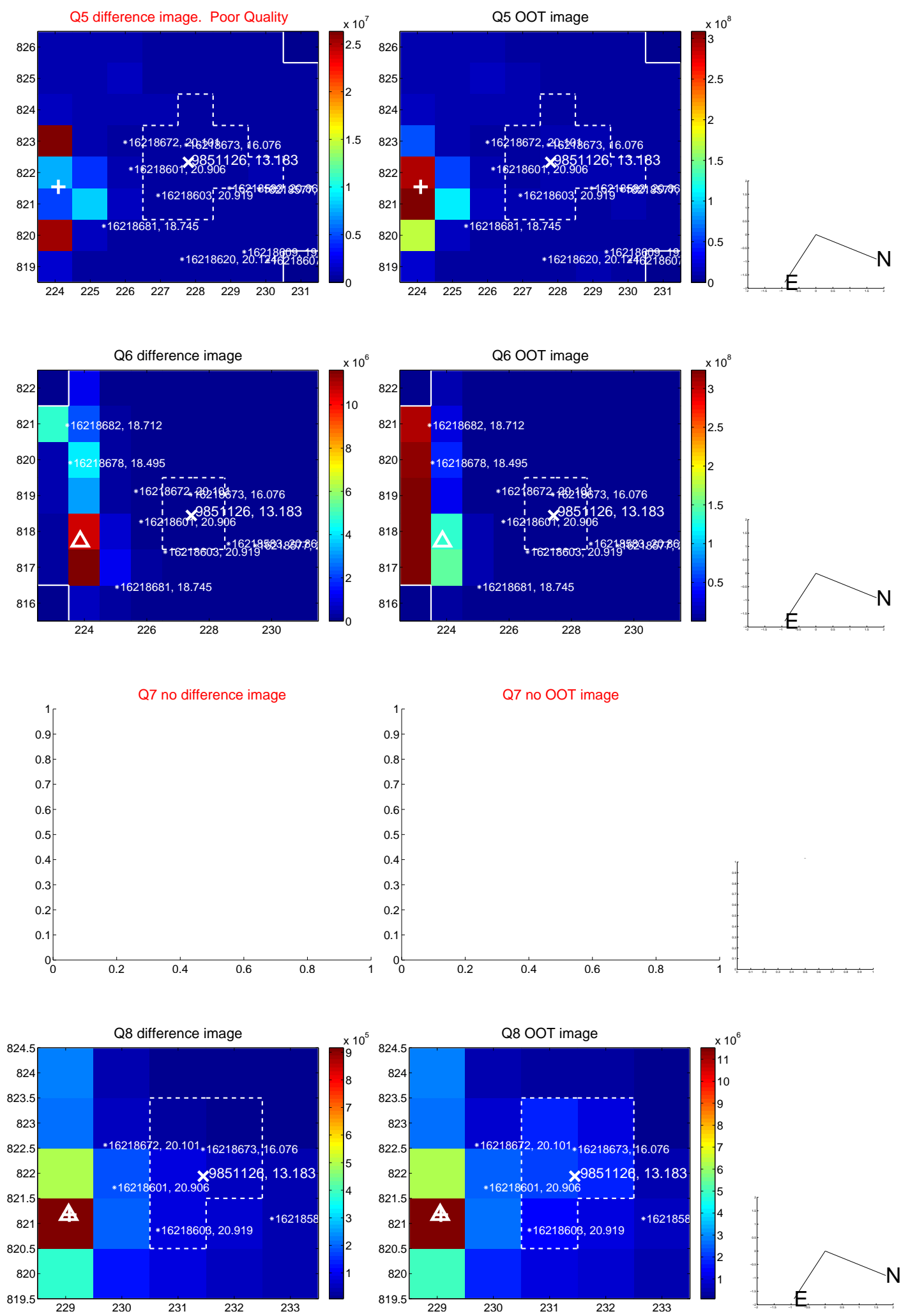
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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



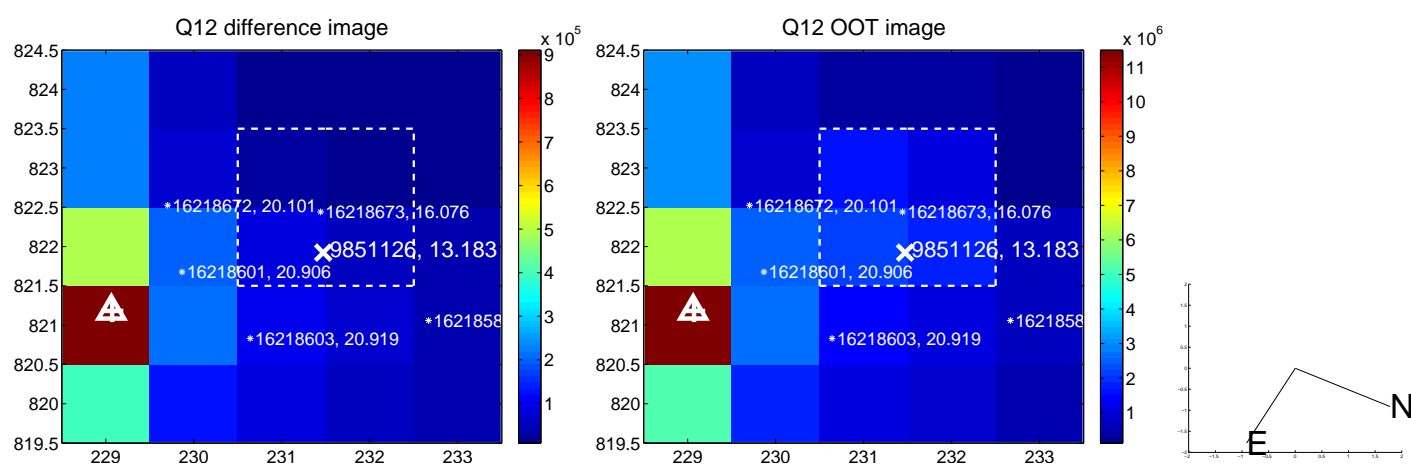
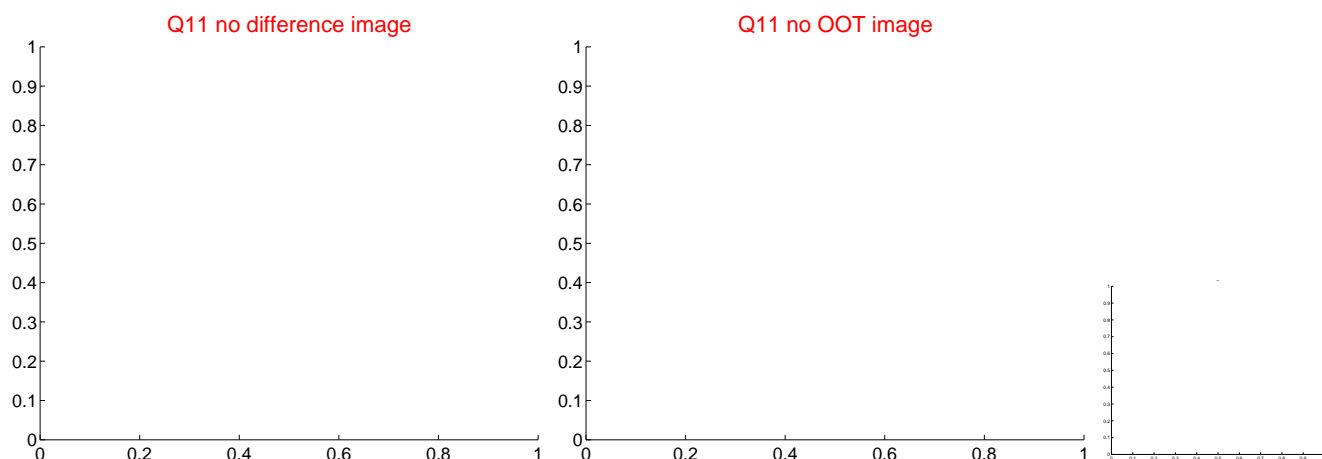
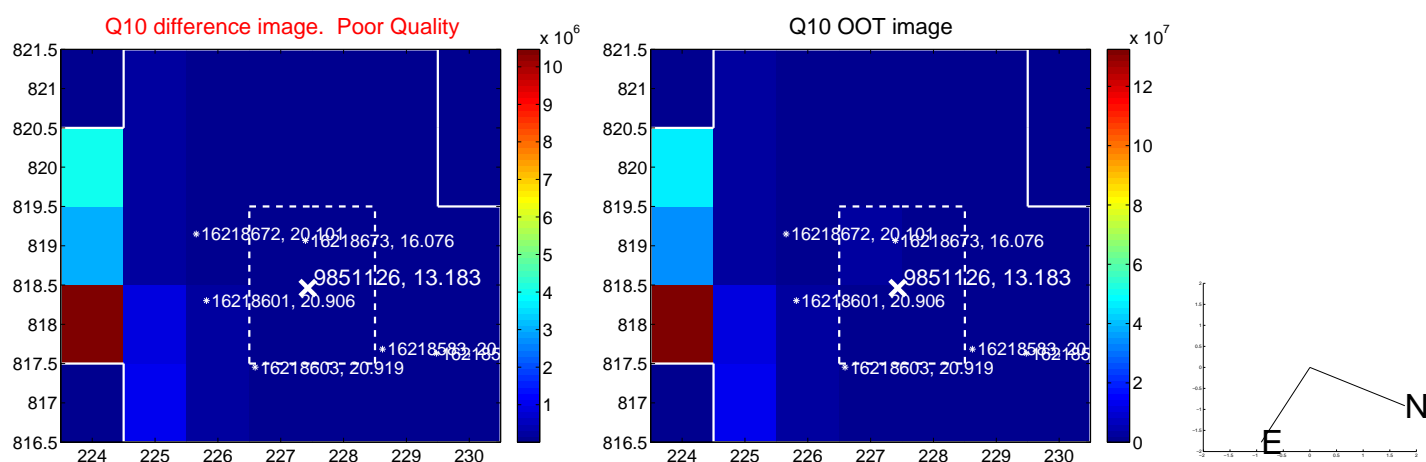
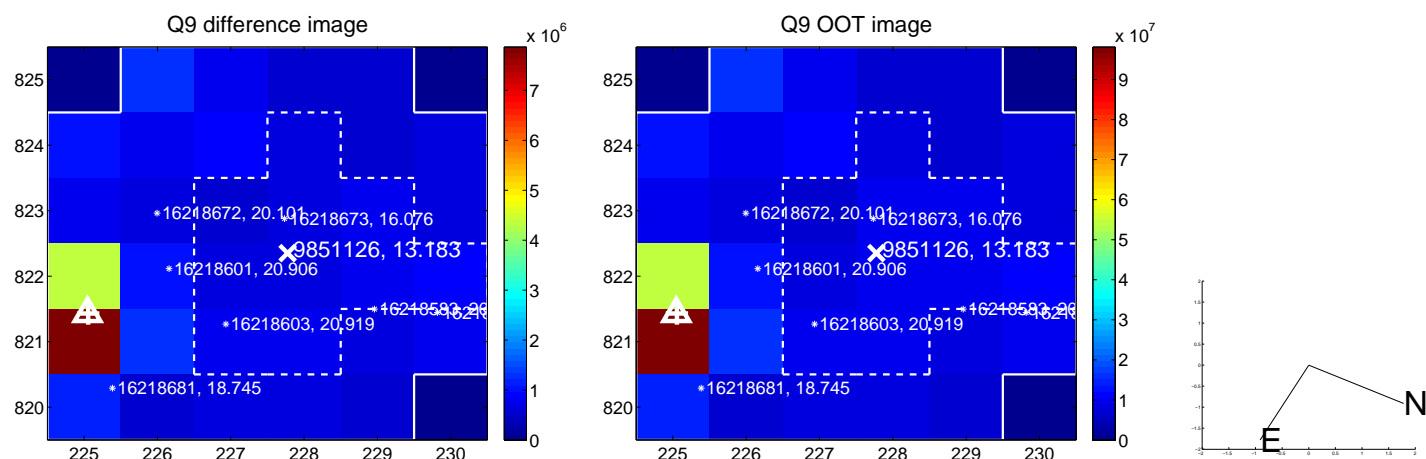
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



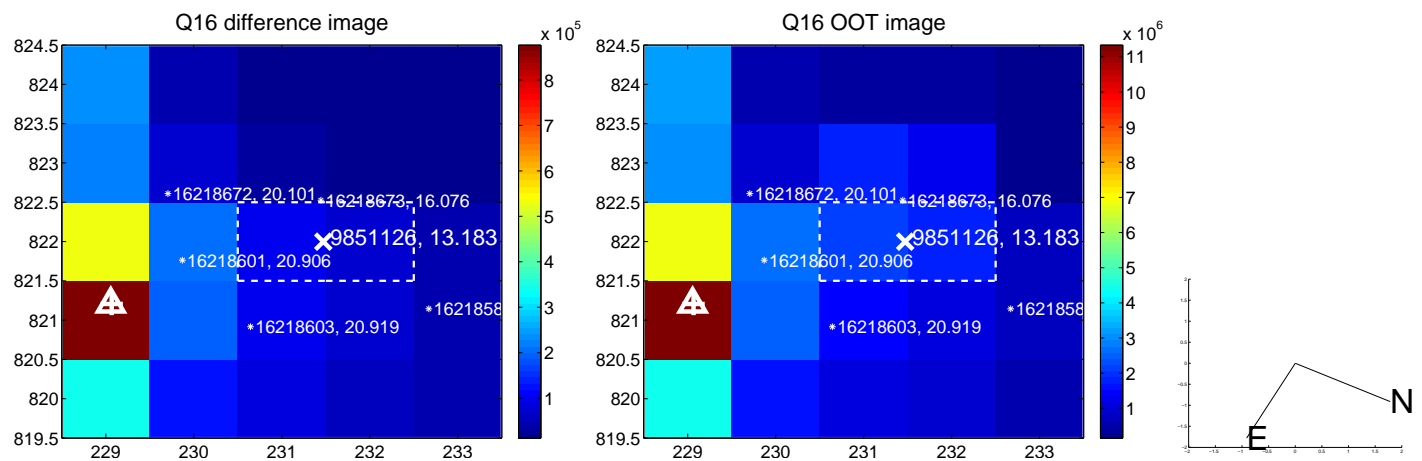
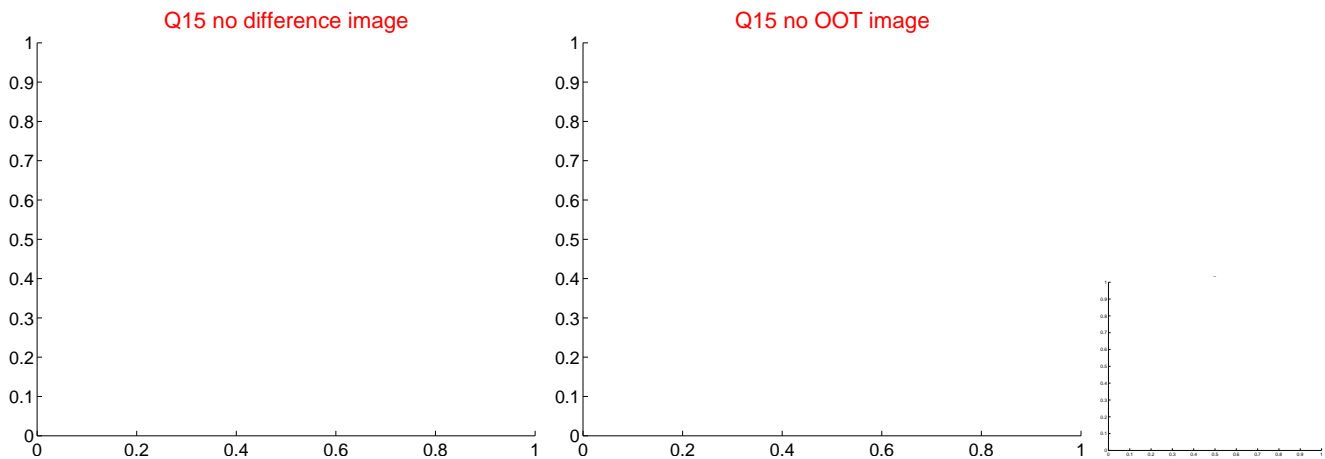
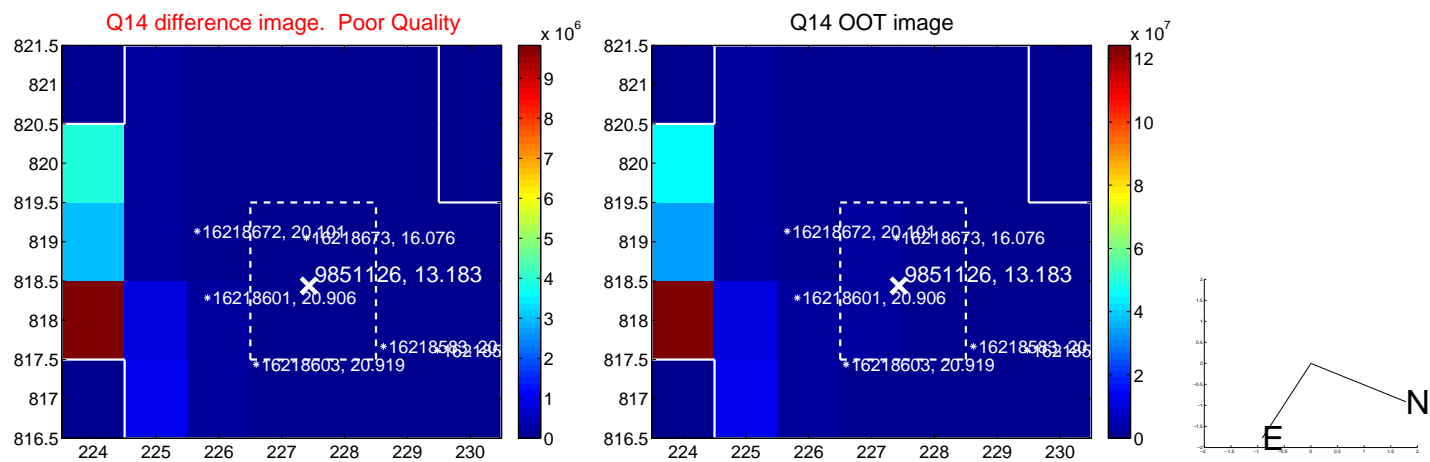
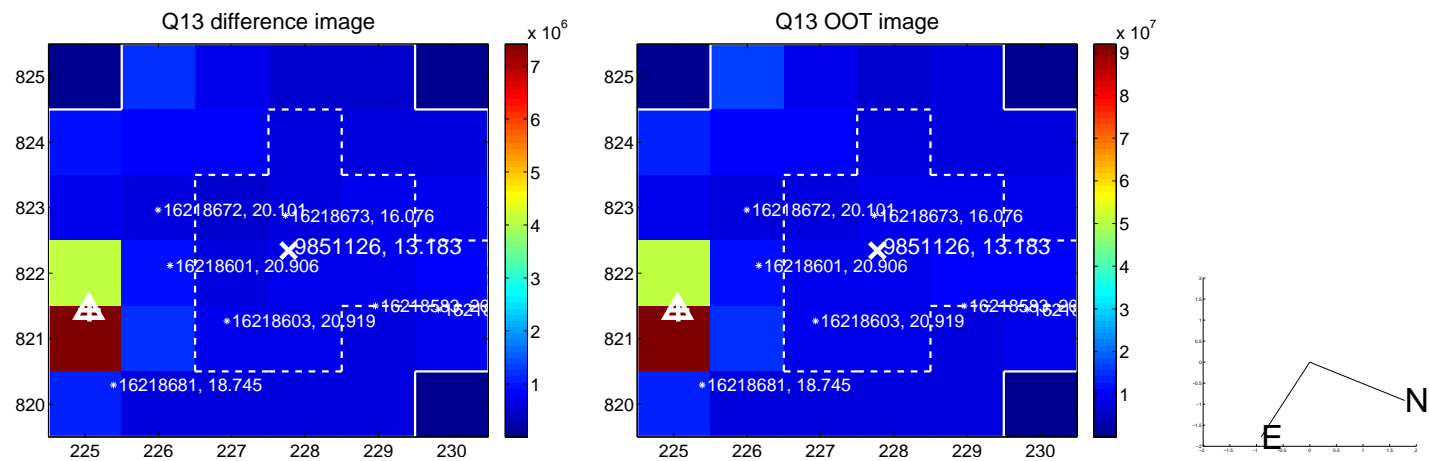
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



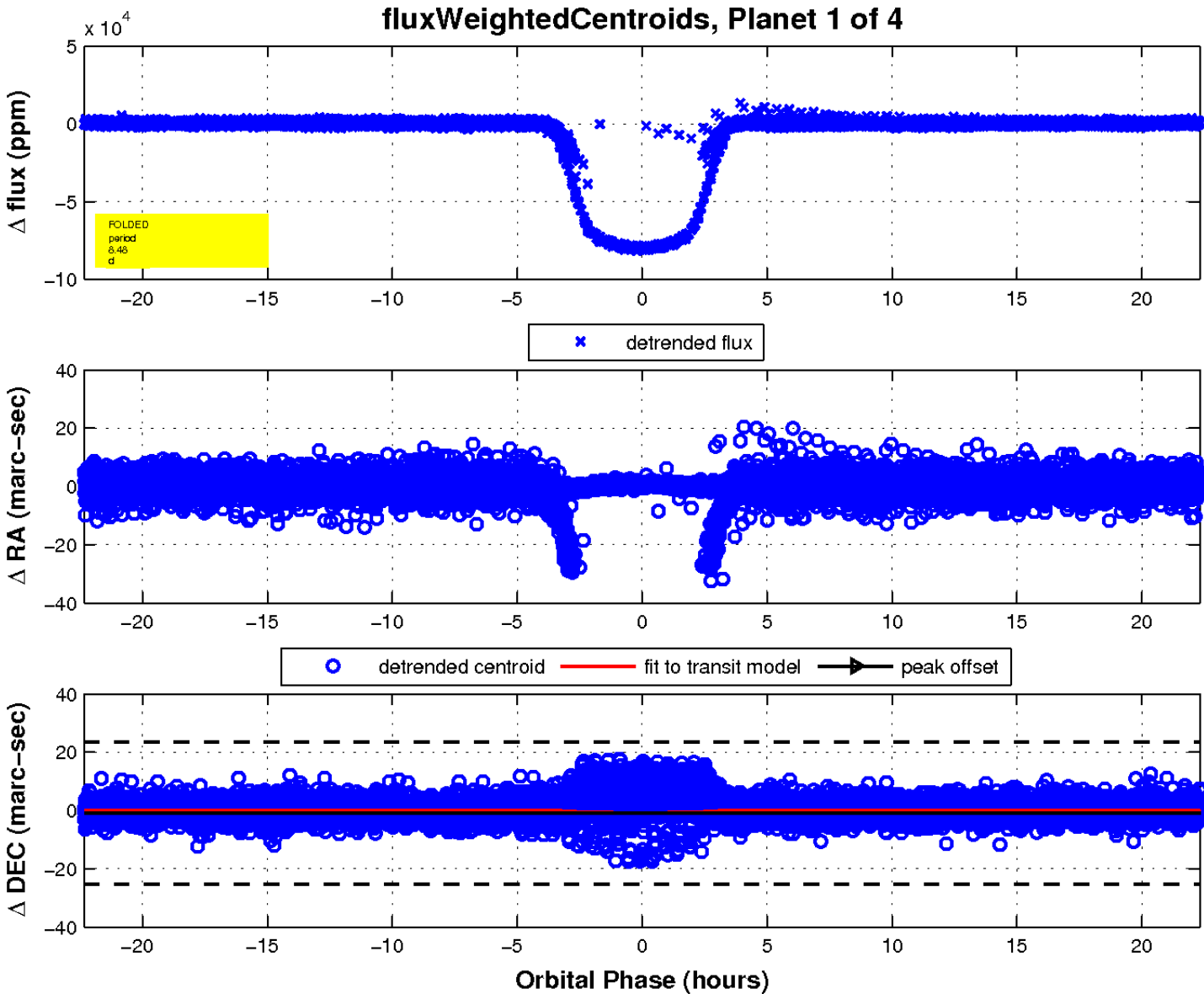
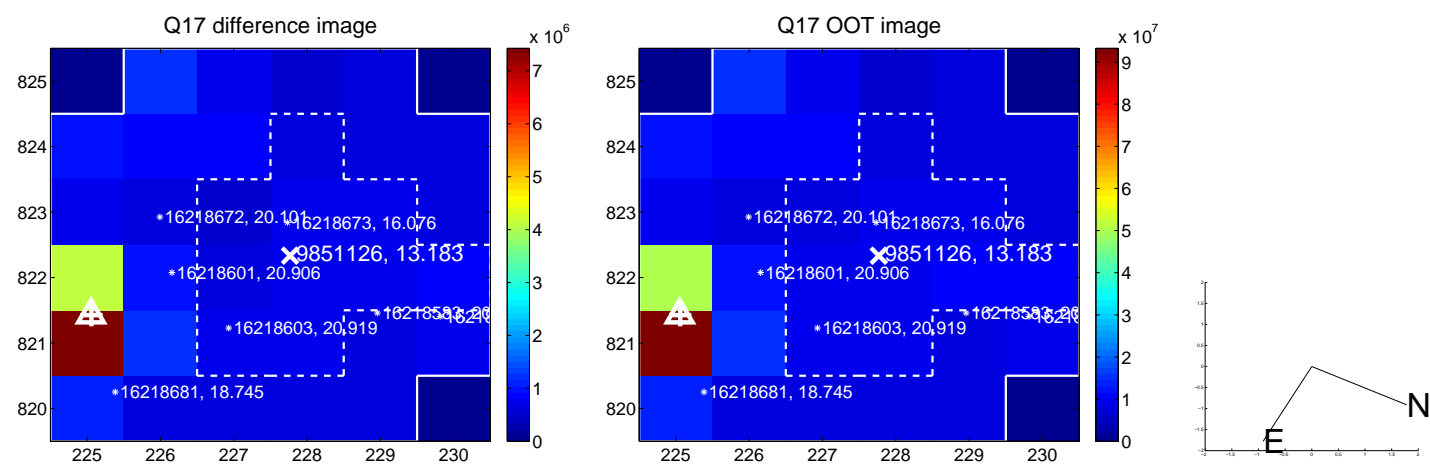
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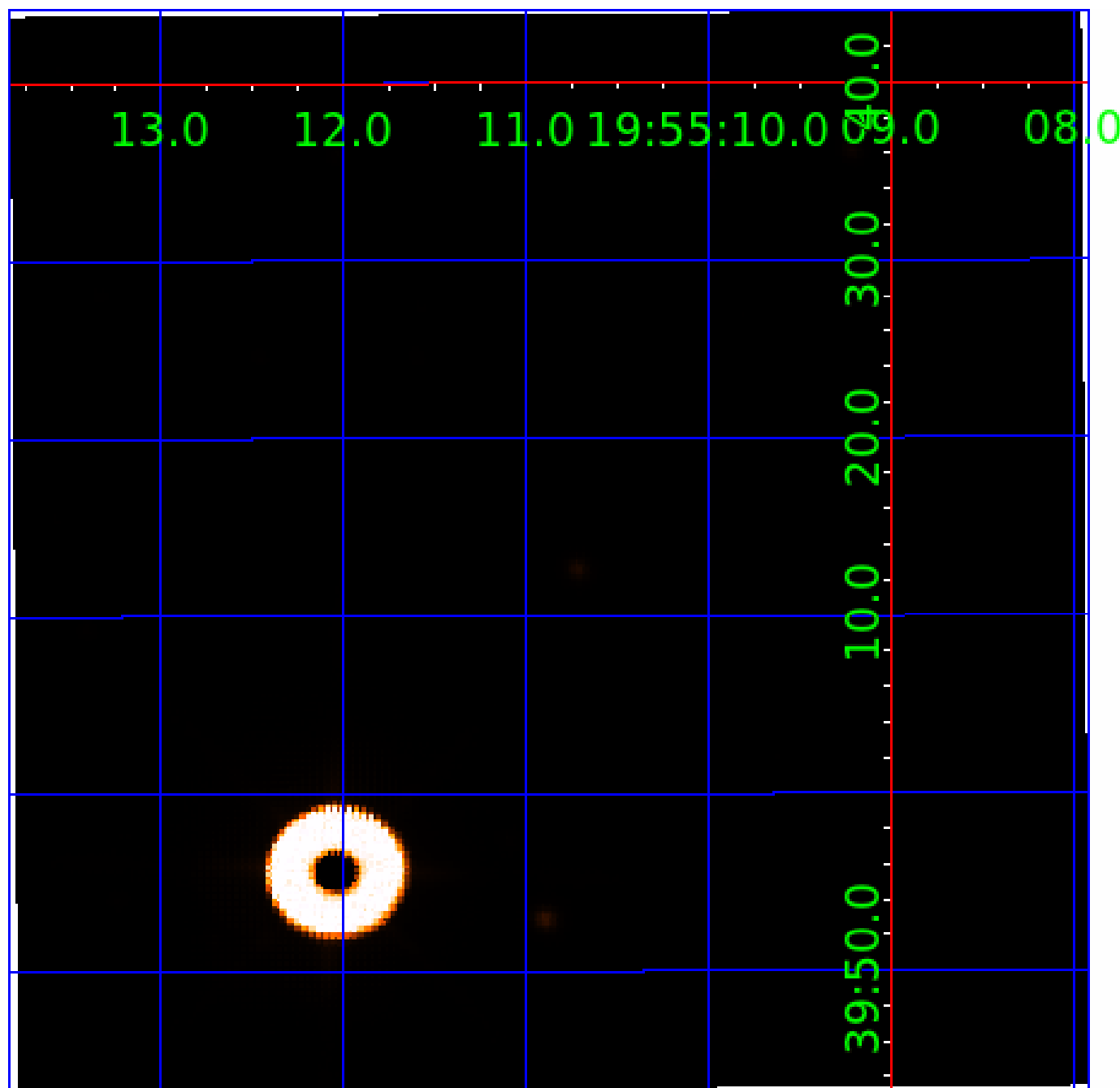
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





UKIRT Image

Declination



# KIC 009851126

## 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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009851126-02	OBS	FP	0.00	1	1	1	1	IS_SEC_TCE—CENT_RESOLVED_OFFSET—HALO_GHOST—EPHEM_MATCH
009851126-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009851126-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—RESIDUAL_TCE—CENT_NOFITS—HALO_GHOST

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

## Ephemeris Match Information For 009851126-02

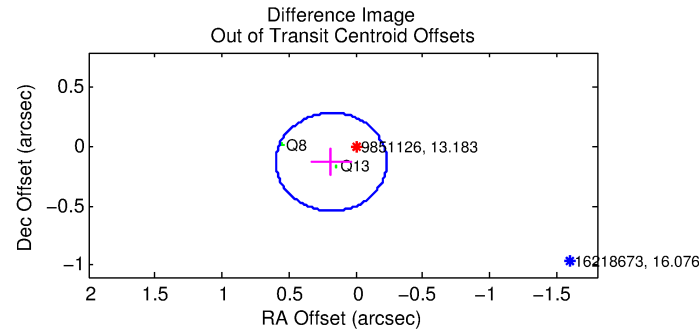
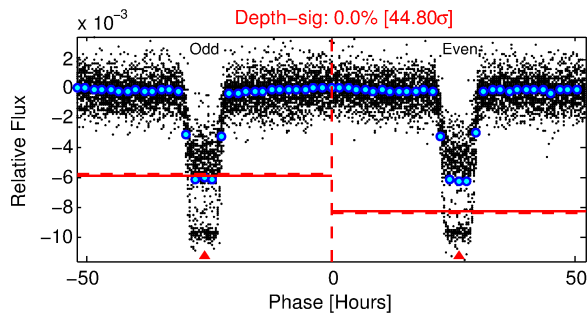
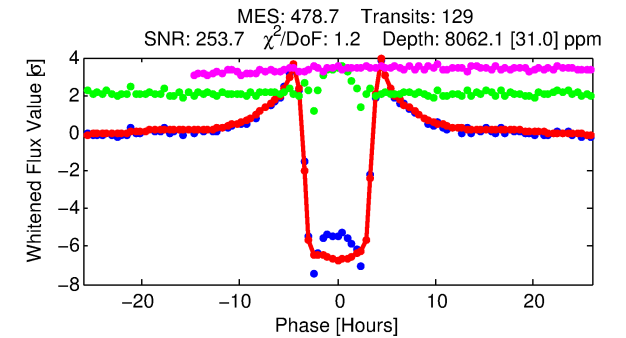
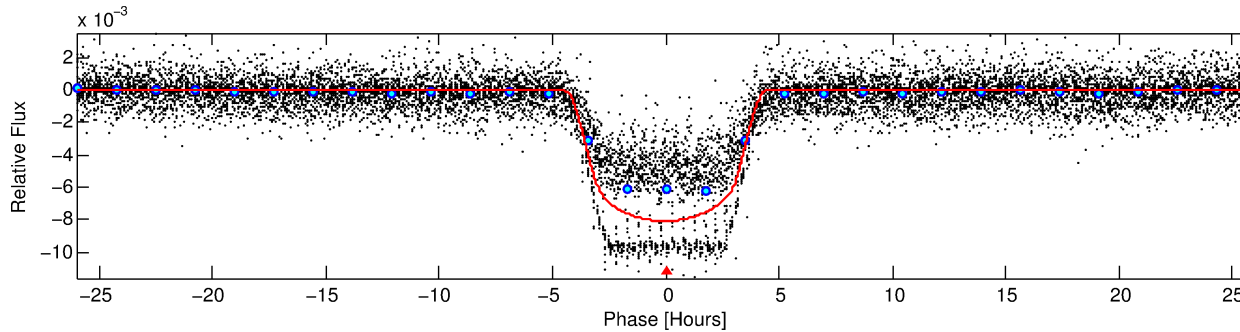
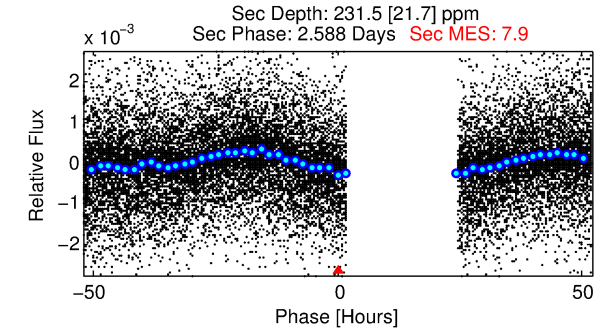
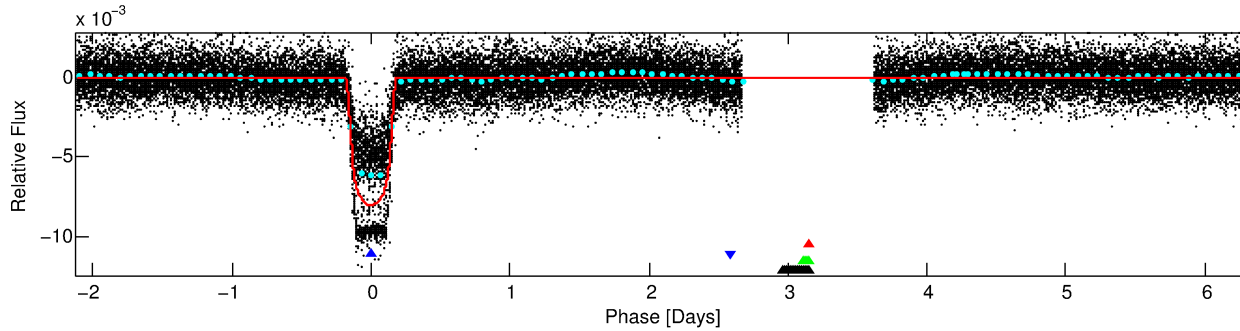
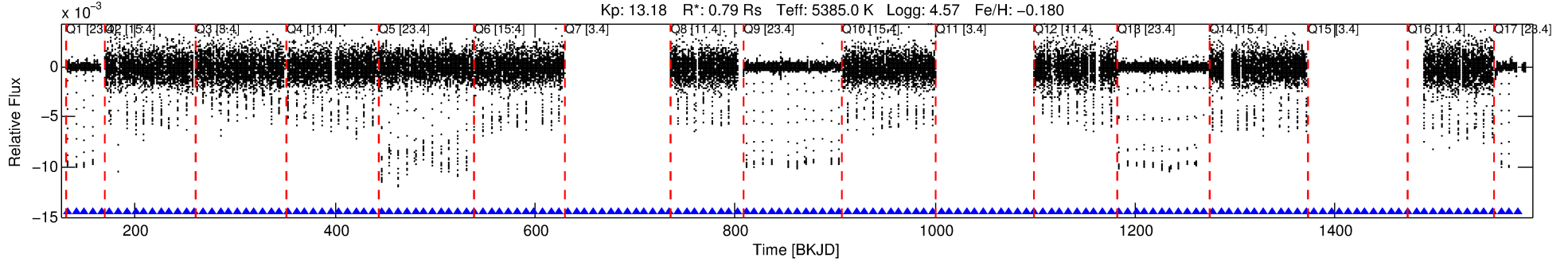
TCE (1)	KIC	Parent (2)	Parent KIC	$P_1:P_2$	Dist ( $''$ )	$\Delta$ Row	$\Delta$ Col	$m_2$	$m_1$	$D_2/D_1$	Mechanism	Flag	$\sigma_P$	$\sigma_T$
009851126-02	9851126	009851142-sec	9851142	1:1	21.4	1	5	7.63	13.18	1.53	Direct-PRF	0	0.03	0.06

**Notes:**  $P_1:P_2$  is the period ratio. Dist is the distance in arcseconds.  $\Delta$ Row and  $\Delta$ Col are the number of pixels apart in row and column.  $m_2$  and  $m_1$  are the magnitudes of the parent and child.  $D_2/D_1$  is the parent's transit depth divided by the child's.  $\sigma_P$  and  $\sigma_T$  are the significance of the match in period and epoch. For a match to be considered significant  $\sigma_P < 5.0$  and  $\sigma_T < 5.0$ . Matches which have  $\sigma_P$  and  $\sigma_T$  very close to this cutoff should receive extra scrutiny, especially if the period ratio is very large.

# DV One-Page Summary

KIC: 9851126 Candidate: 2 of 4 Period: 8.480 d  
KOI: K03592 Corr: No Ephemeris Match

Kp: 13.18 R\*: 0.79 Rs Teff: 5385.0 K Logg: 4.57 Fe/H: -0.180



## DV Fit Results:

Period = 8.48029 [0.00000] d  
Epoch = 132.7115 [0.0004] BKJD  
Rp/R\* = 0.0887 [0.0003]  
a/R\* = 6.14 [0.04]  
b = 0.72 [0.01]  
Seff = 79.75 [20.37]  
Teq = 762 [49] K  
Rp = 7.61 [1.48] Re  
a = 0.0765 [0.0119] AU  
Ag = 12.85 [3.02] [3.93σ]  
Teff = 2231 [93] K [14.01σ]

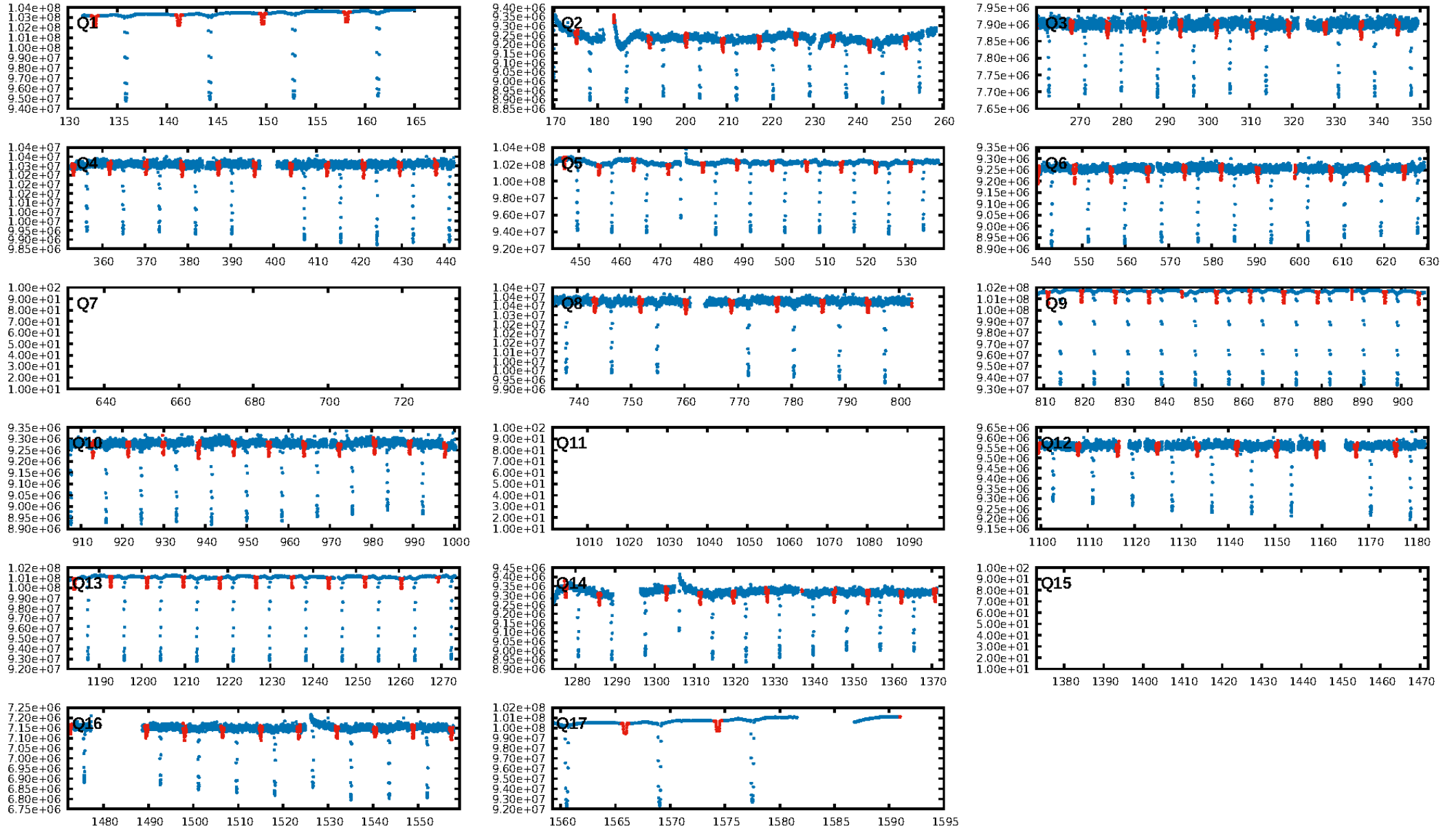
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.0% [0.00σ]  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 0.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [123/123]  
GhostDiagnostic-chr: -0.05688  
Centroid-sig: N/A  
Centroid-so: 1.328 arcsec [69.17σ]  
OotOffset-rm: 0.225 arcsec [1.63σ]  
KicOffset-rm: 13.935 arcsec [19.54σ]  
OotOffset-st: 0/0/1/1 [2]  
KicOffset-st: 1/0/1/1 [3]  
DiffImageQuality-fgm: 1.00 [3/3]  
DiffImageOverlap-fno: 1.00 [14/14]

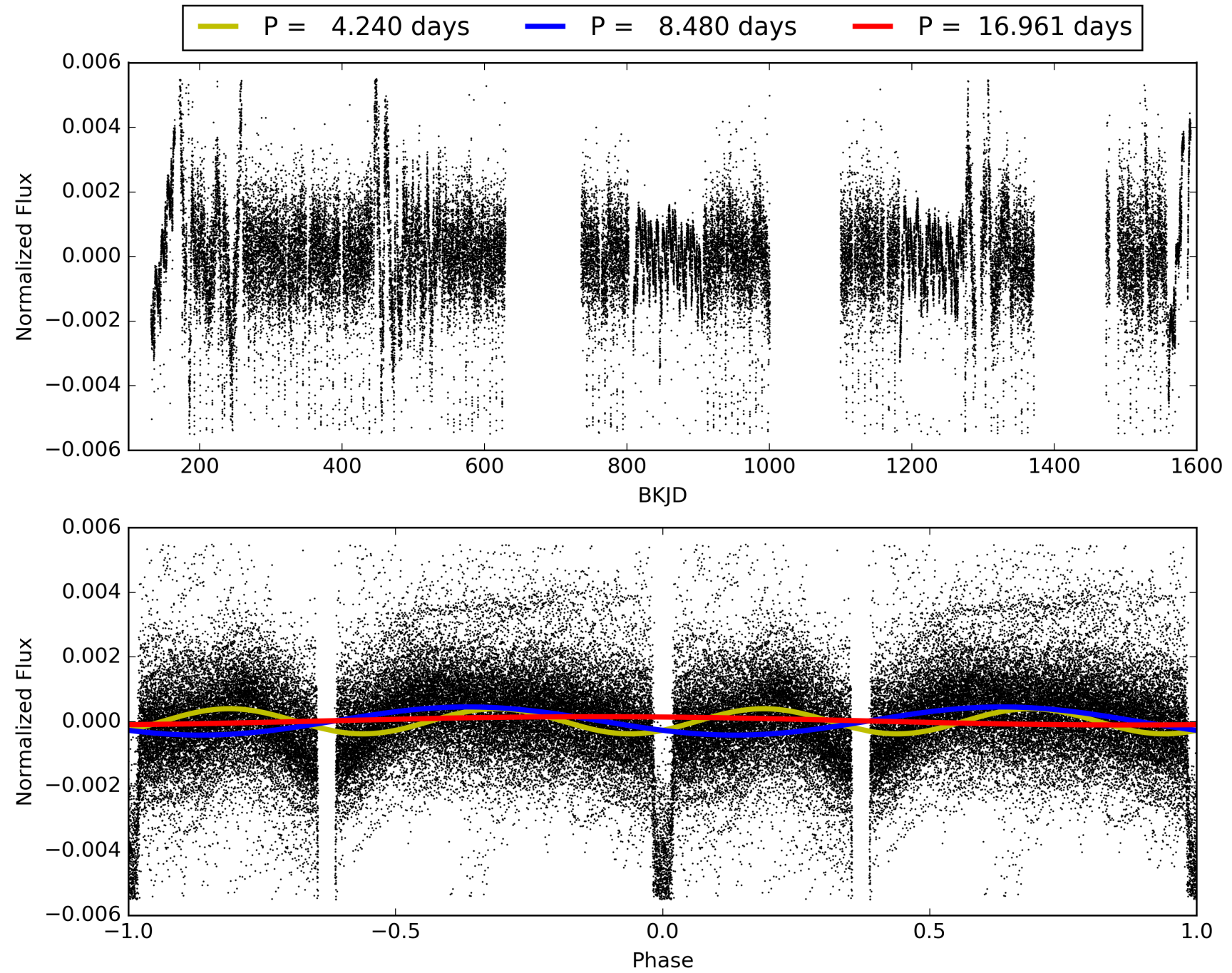
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 18:21:40 Z

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

# TCE 009851126-02, PDC Light Curves



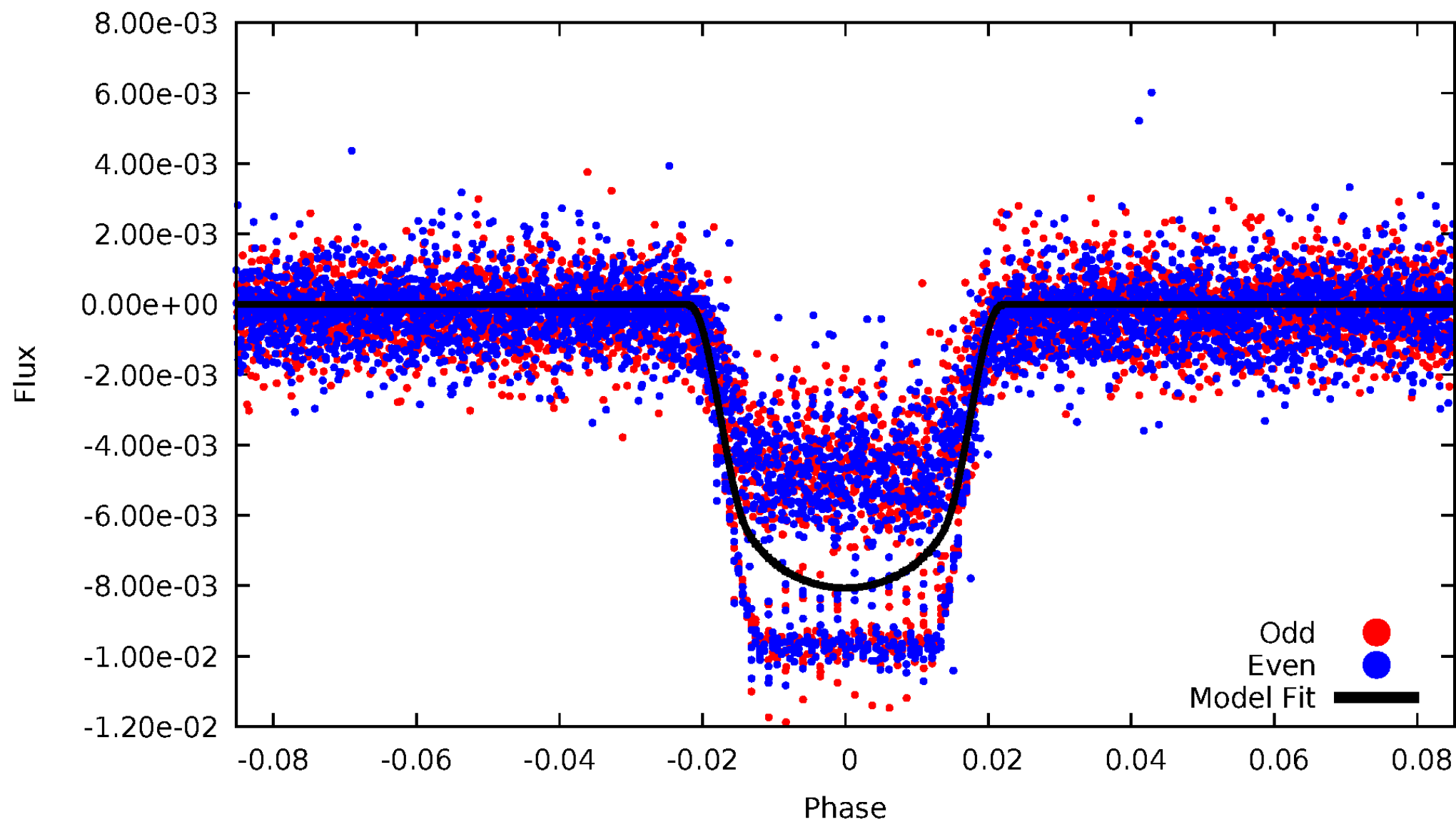
TCE 009851126-02





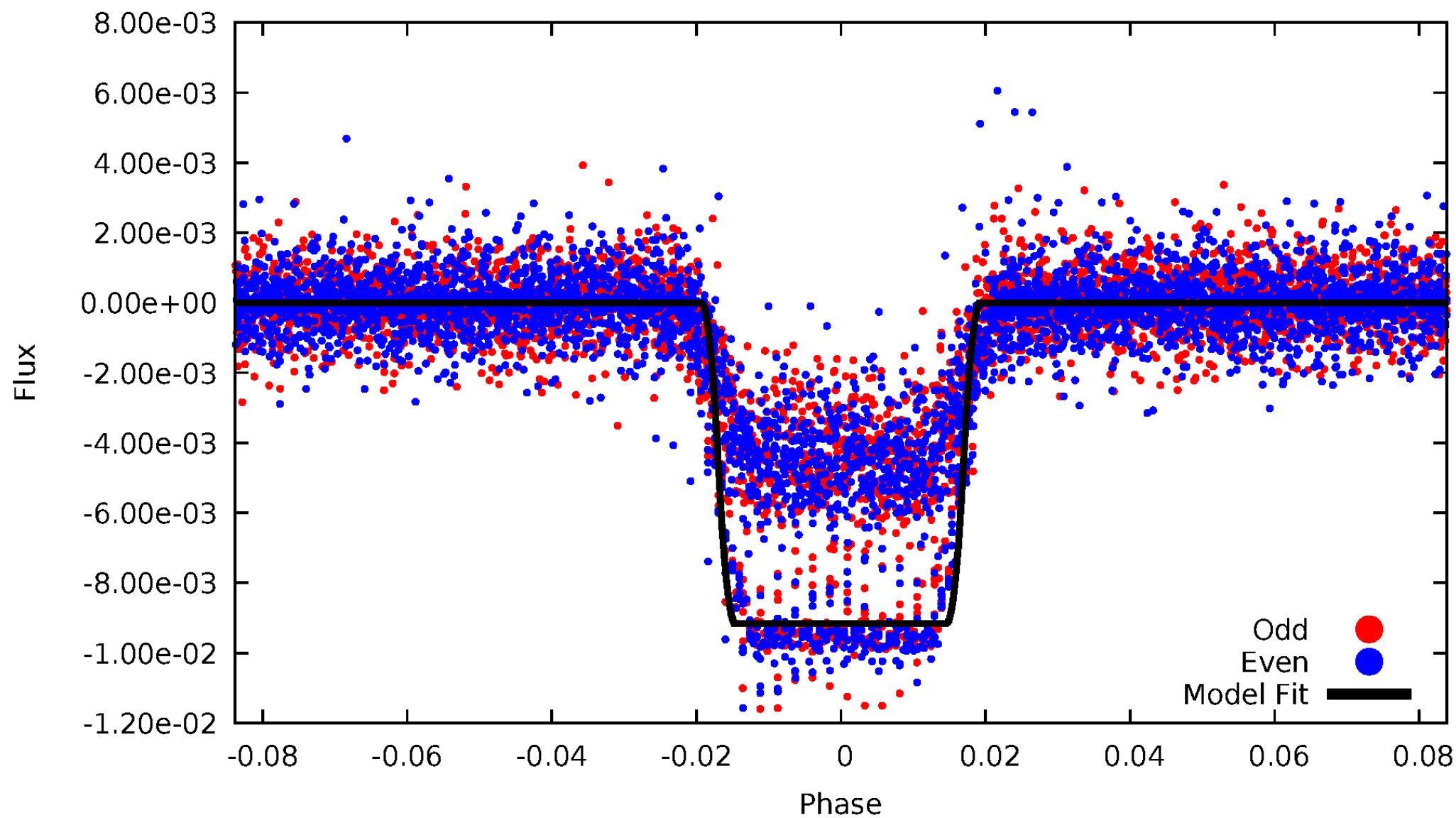
# DV Odd/Even

TCE 009851126-02



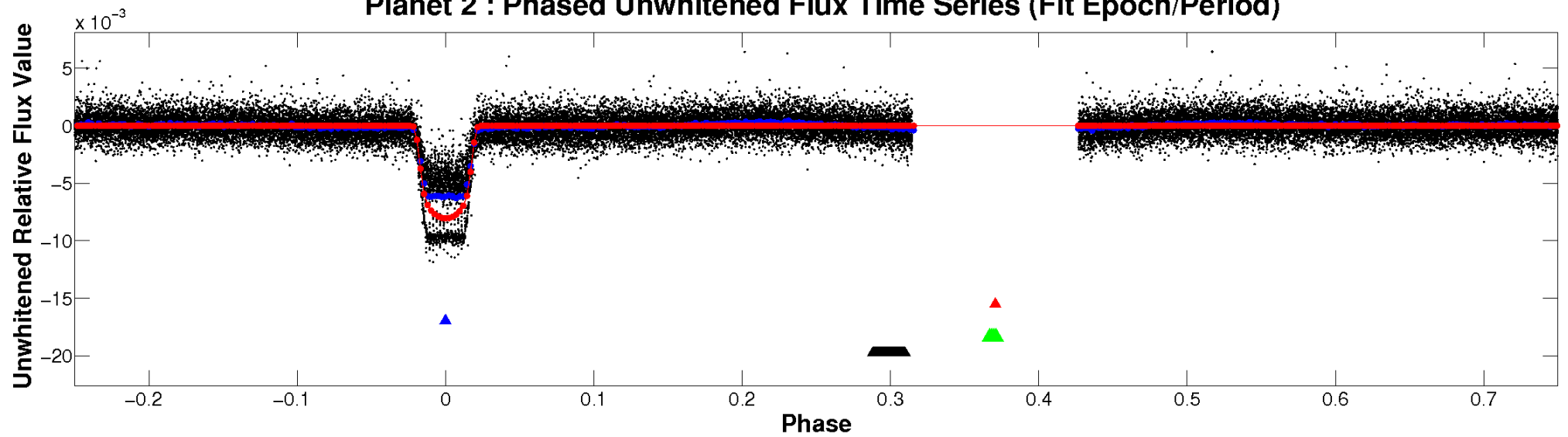
# ALT Odd/Even

TCE 009851126-02

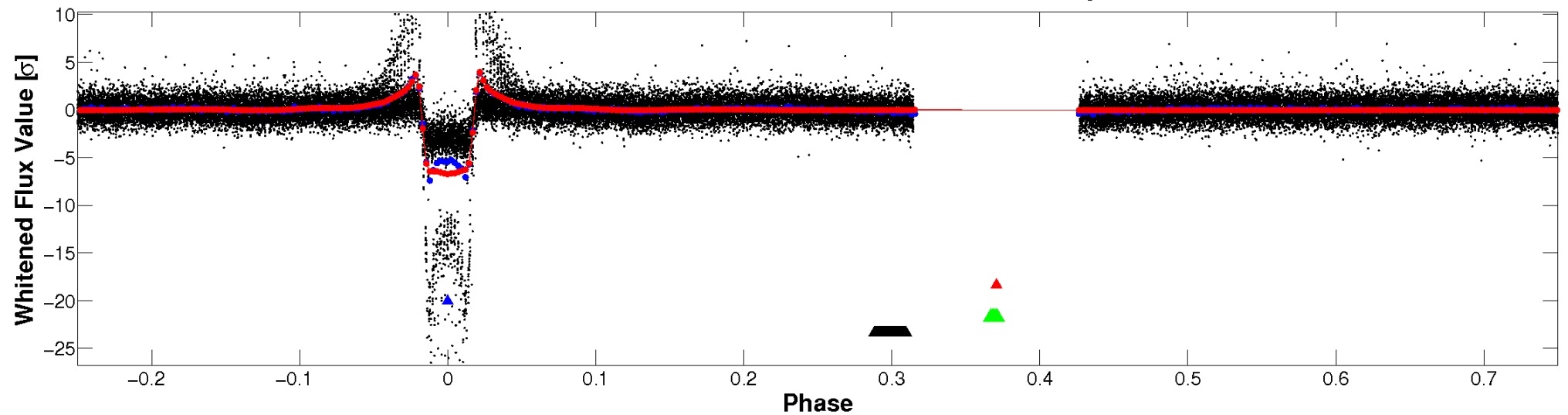


# Non-Whitened Vs. Whitened Light Curve

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

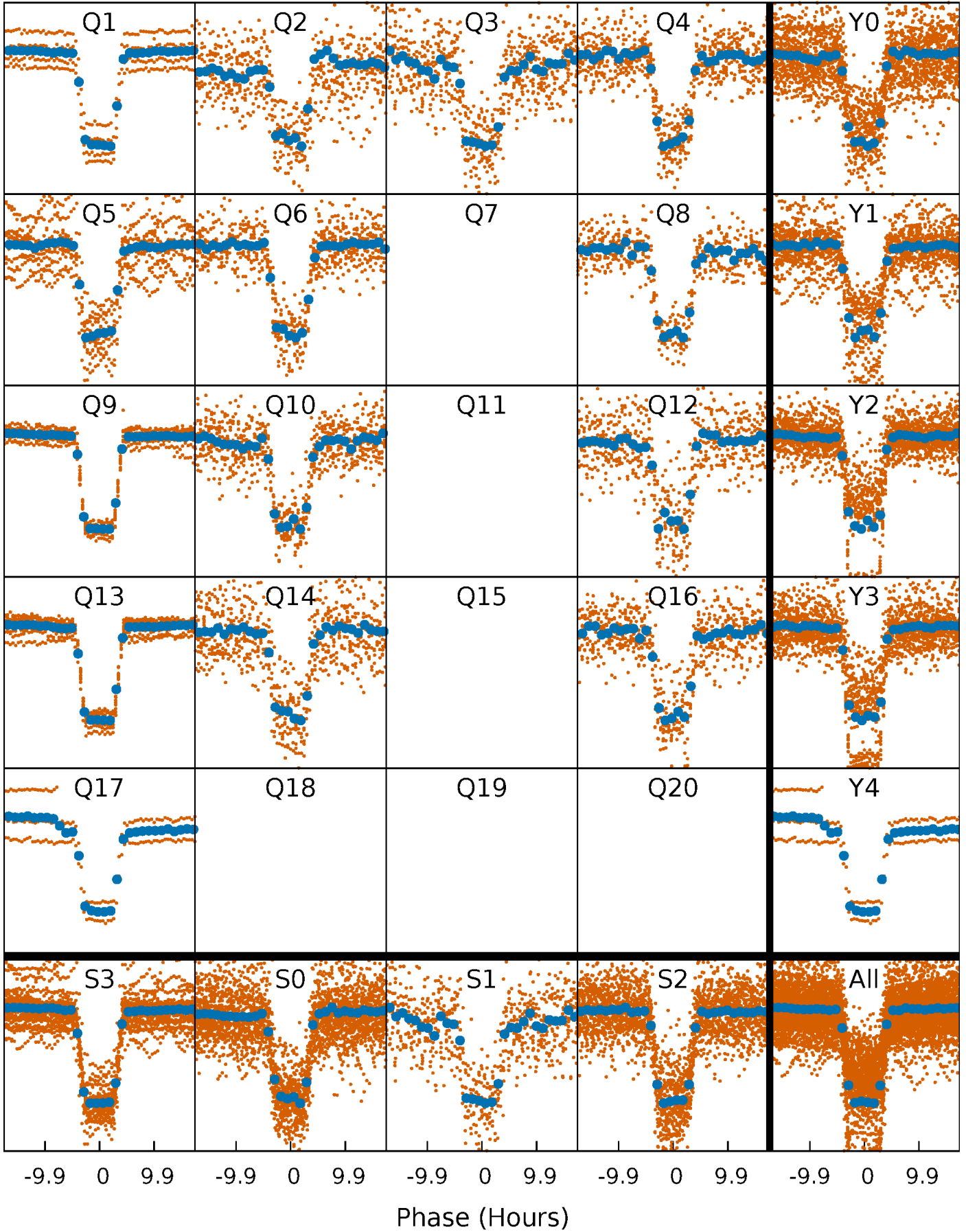


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



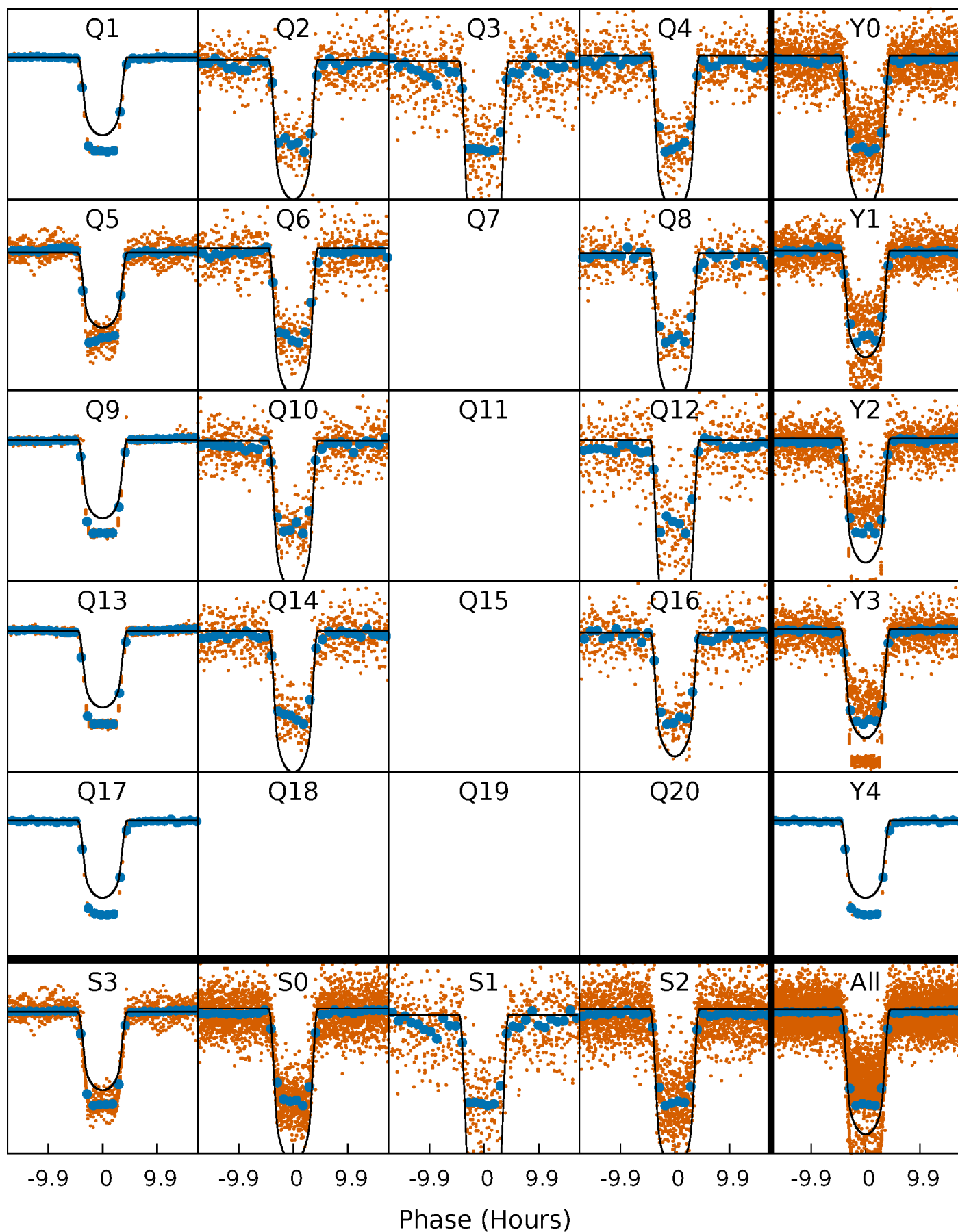
# PDC Quarter-Phased Transit Curves

TCE 009851126-02   P= 8.480294 Days    $T_0=132.711530$  (BKJD)



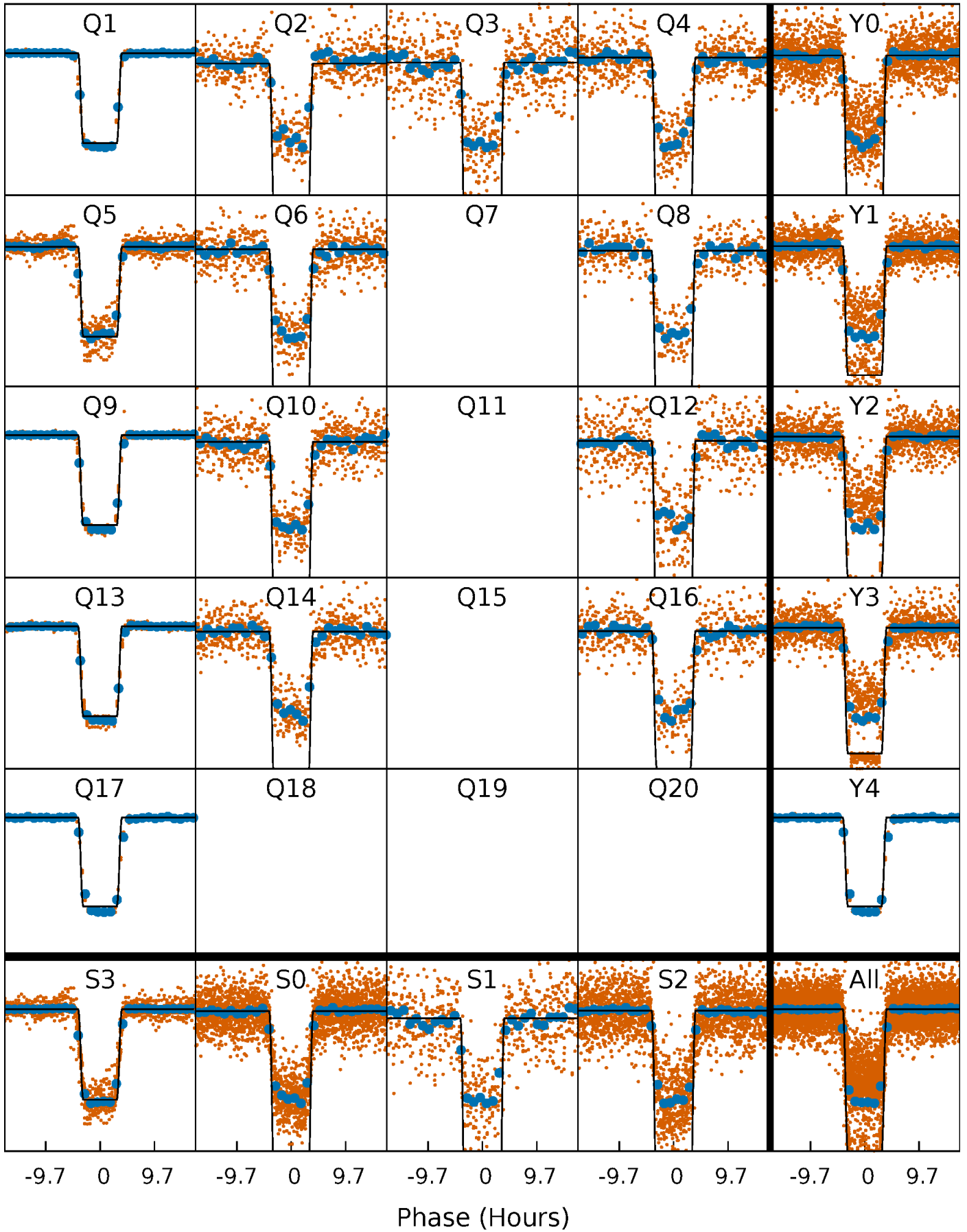
# DV Quarter-Phased Transit Curves

TCE 009851126-02 P= 8.480294 Days  $T_0=132.711530$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

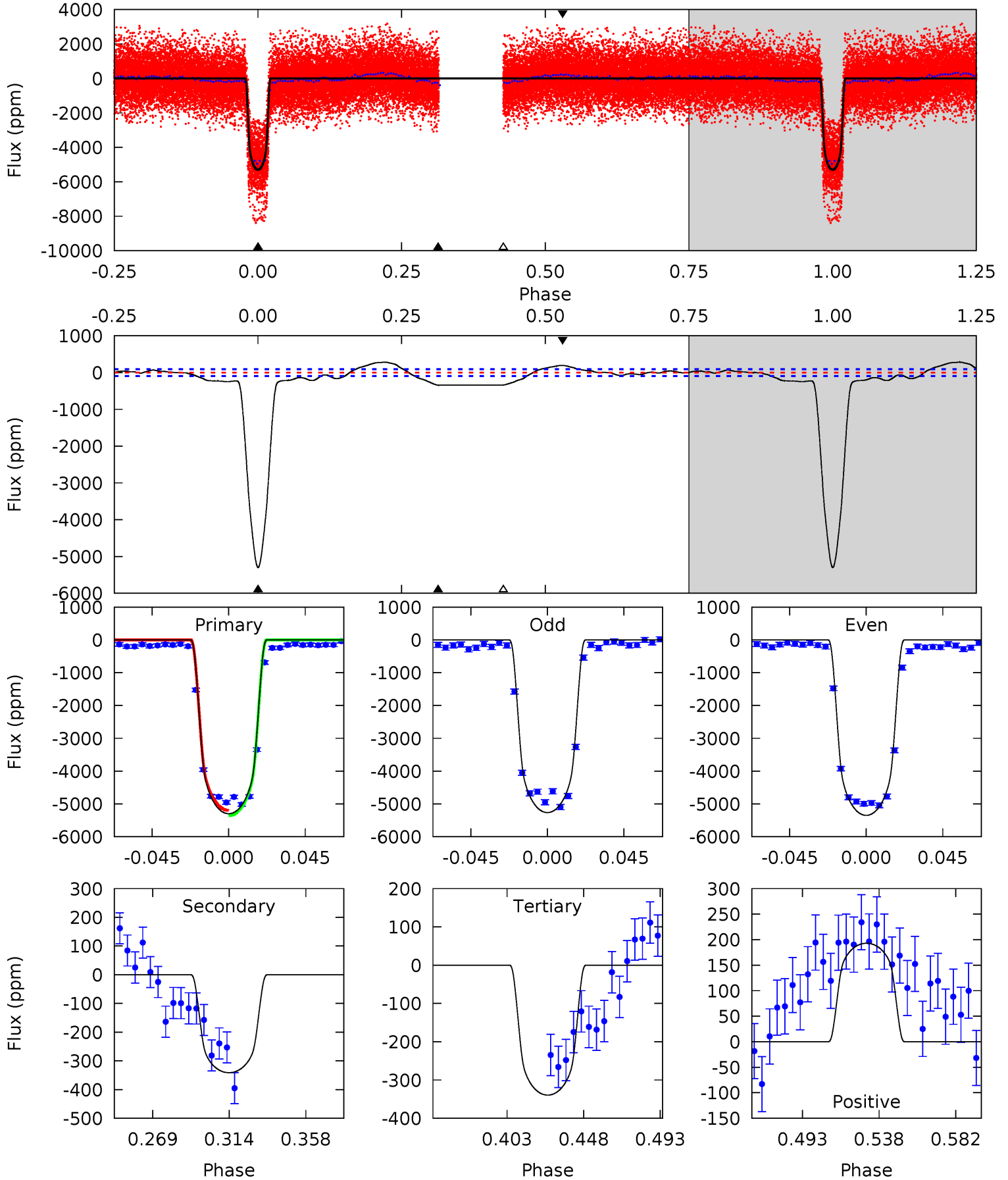
TCE 009851126-02 P= 8.480222 Days  $T_0=132.717892$  (BKJD)



# DV Model-Shift Uniqueness Test

009851126-02, P = 8.480294 Days, E = 124.231236 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
268.7	17.3	17.2	9.79	4.73	2.01	6.95	251.5	258.9	0.09	7.52	2.15	1.20	0.05	4.09

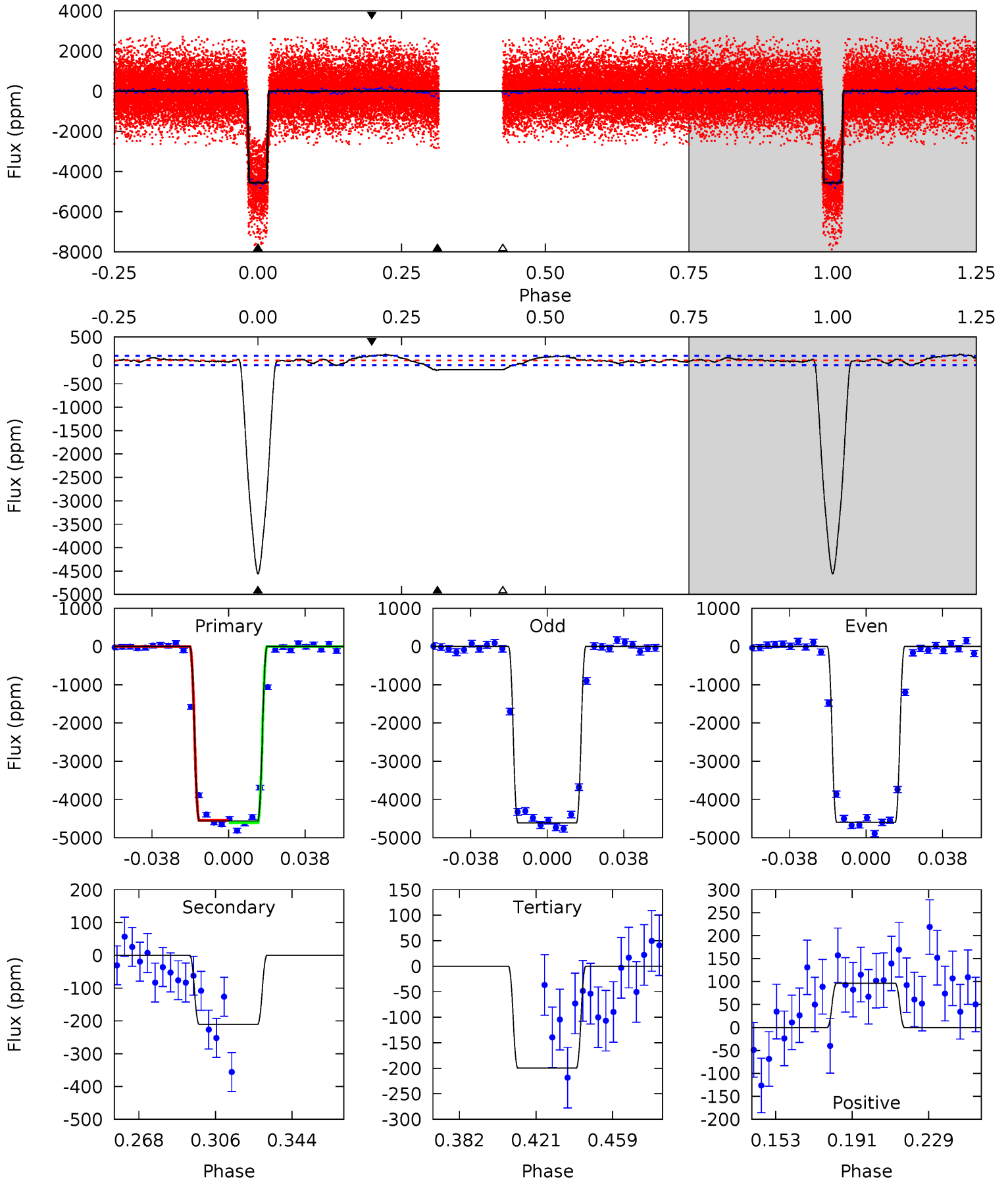




# Alt Model-Shift Uniqueness Test

009851126-02, P = 8.480222 Days, E = 124.237670 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
219.9	10.1	9.63	4.65	4.76	2.07	2.53	210.2	215.2	0.52	5.50	0.30	1.20	0.03	0





### Stellar Parameters For KIC 009851126

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5385^{+185}_{-185}$	$4.565^{+0.048}_{-0.112}$	$-0.180^{+0.300}_{-0.300}$	$0.787^{+0.153}_{-0.071}$	$0.832^{+0.096}_{-0.087}$	$2.400^{+0.510}_{-0.819}$
	+3%/-3%	+1%/-2%	+167%/-167%	+19%/-9%	+12%/-10%	+21%/-34%
Source	PHO54	PHO54	PHO54	DSEP		

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

### Secondary Eclipse Parameters for KIC 009851126-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-341 \pm 20$	$7.74^{+0.70}_{-0.49}$	$1078^{+51}_{-48}$	$3076^{+70}_{-74}$	$18^{+3}_{-3}$
Alt.	$-211 \pm 21$	$8.26^{+0.90}_{-0.43}$	$1080^{+53}_{-47}$	$2808^{+70}_{-69}$	$9.533^{+1.488}_{-1.554}$

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

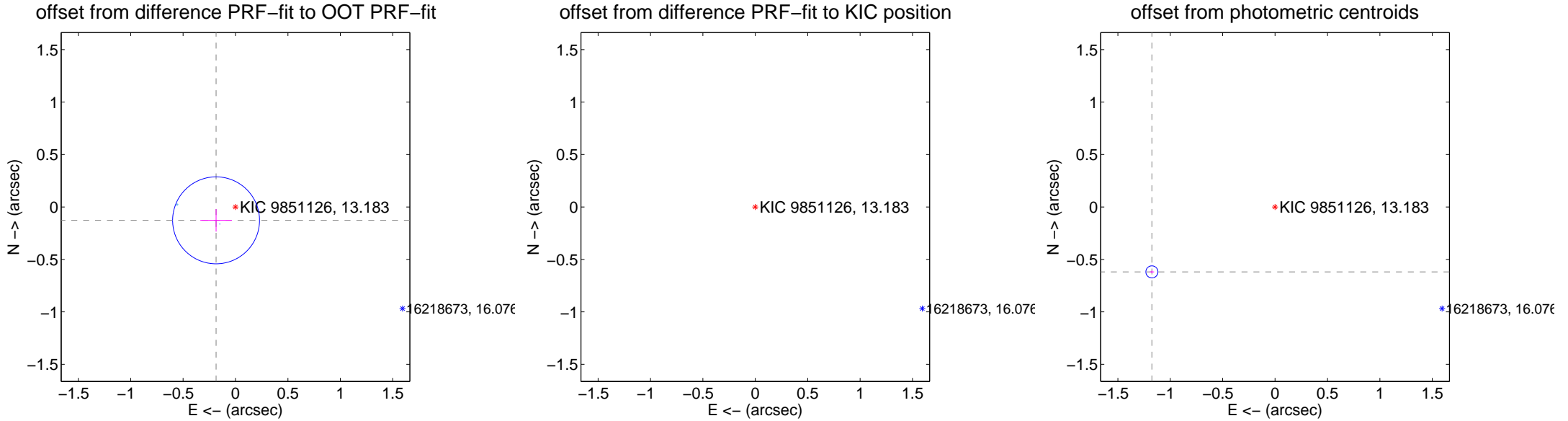
## DV Centroid Data

Supplemental centroid analysis for 009851126-02. Kepler magnitude: 13.18. Transit SNR 253.67

There are 3 quarters with good PRF difference image offsets

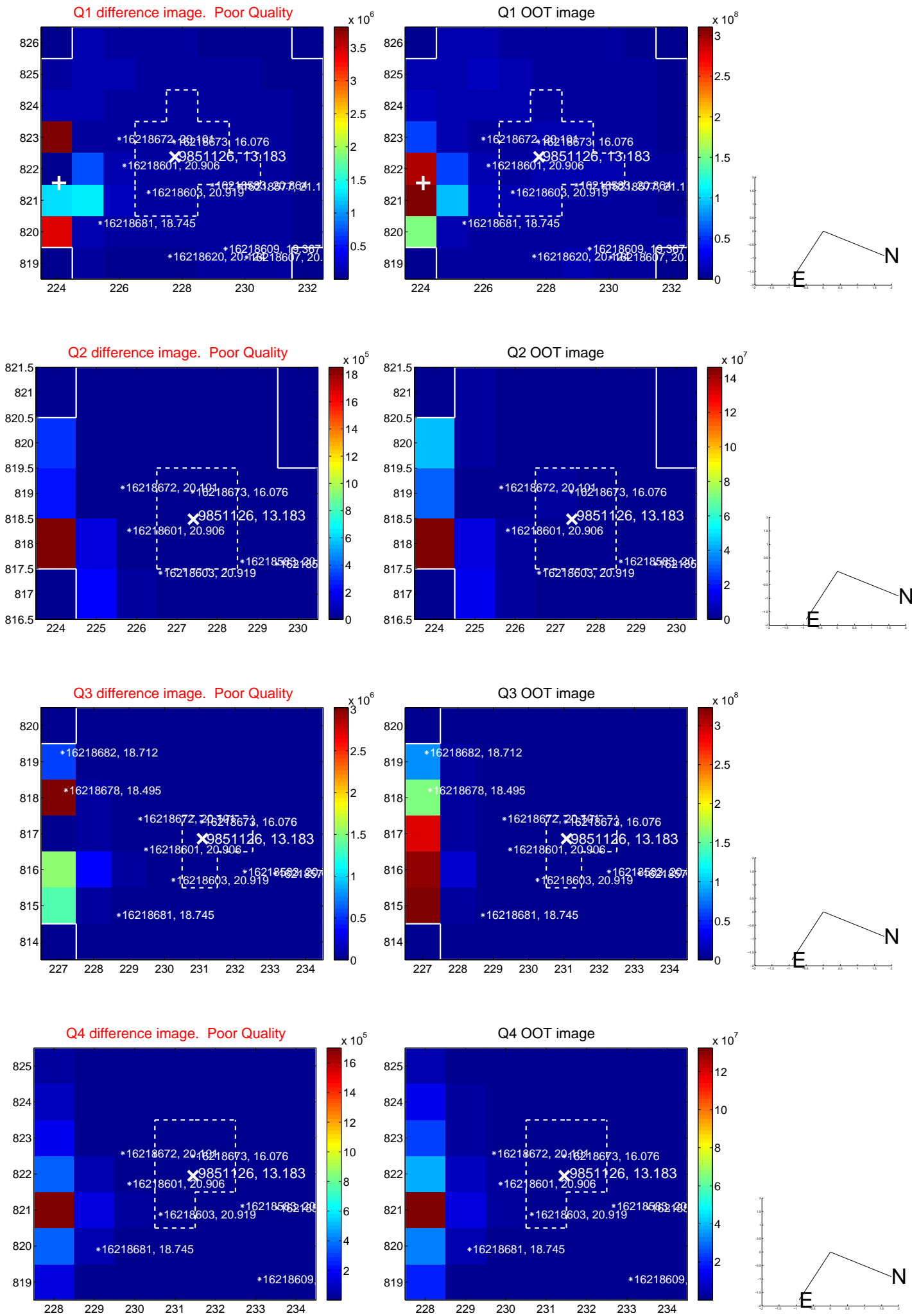
The OOT PRF centroid is offset from the target star catalog position by about 11.40 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.225 \pm 0.138$	1.63	$0.186 \pm 0.150$	$-0.127 \pm 0.107$
PRF-fit source offset from KIC position	$13.935 \pm 0.713$	19.54	$8.925 \pm 0.259$	$-10.702 \pm 0.903$
photometric centroid source offset	$1.33 \pm 0.02$	69.17	$1.18 \pm 0.02$	$-0.62 \pm 0.01$

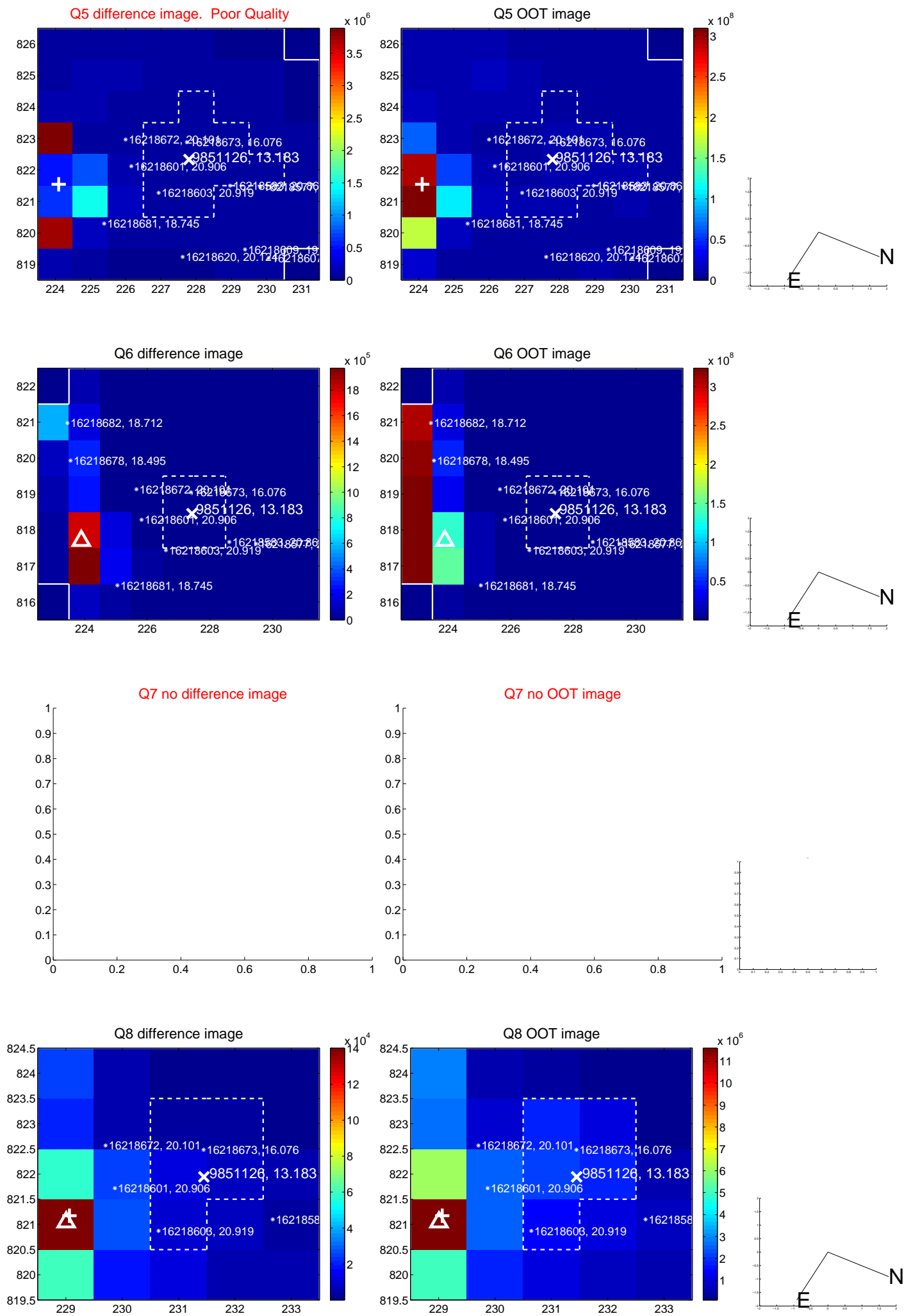


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

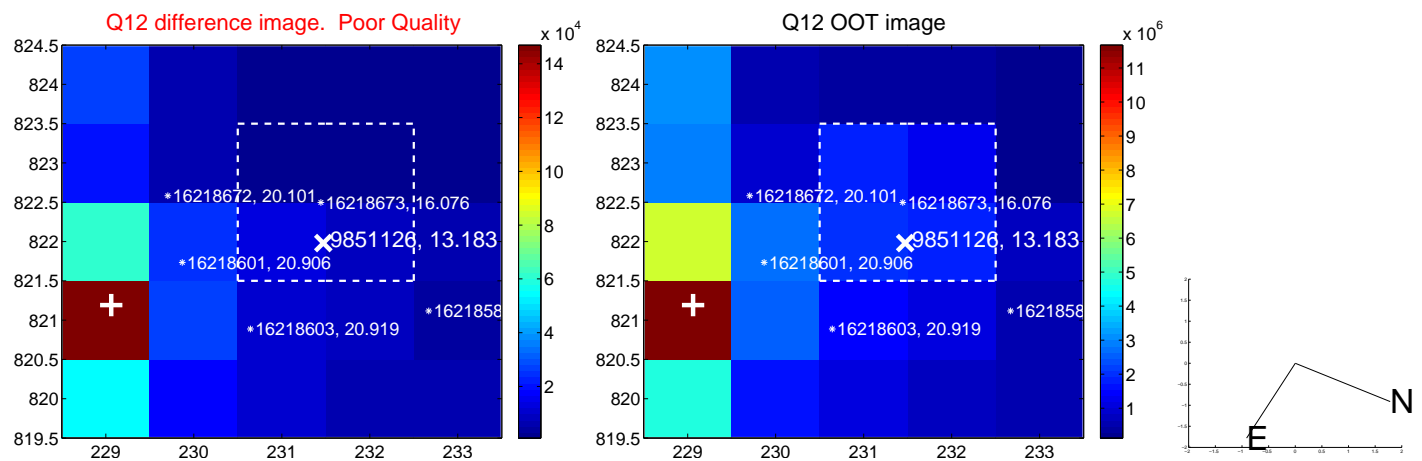
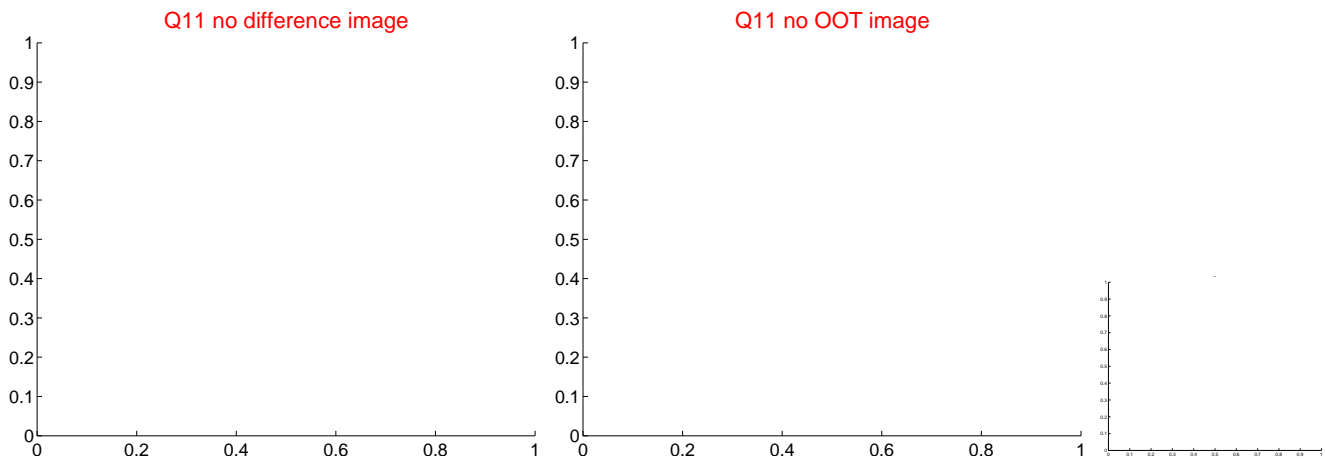
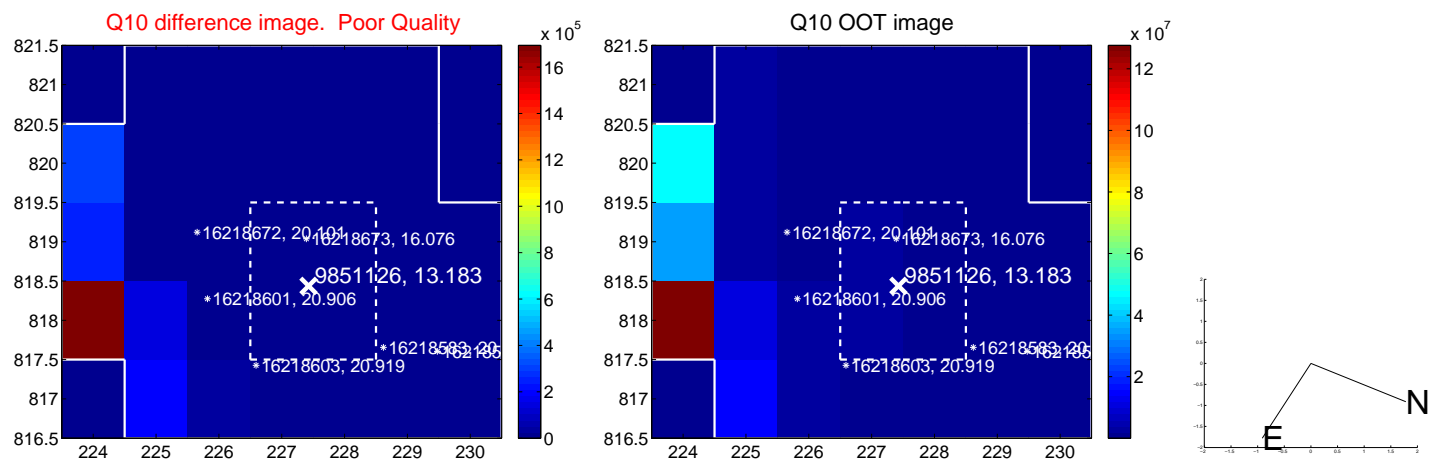
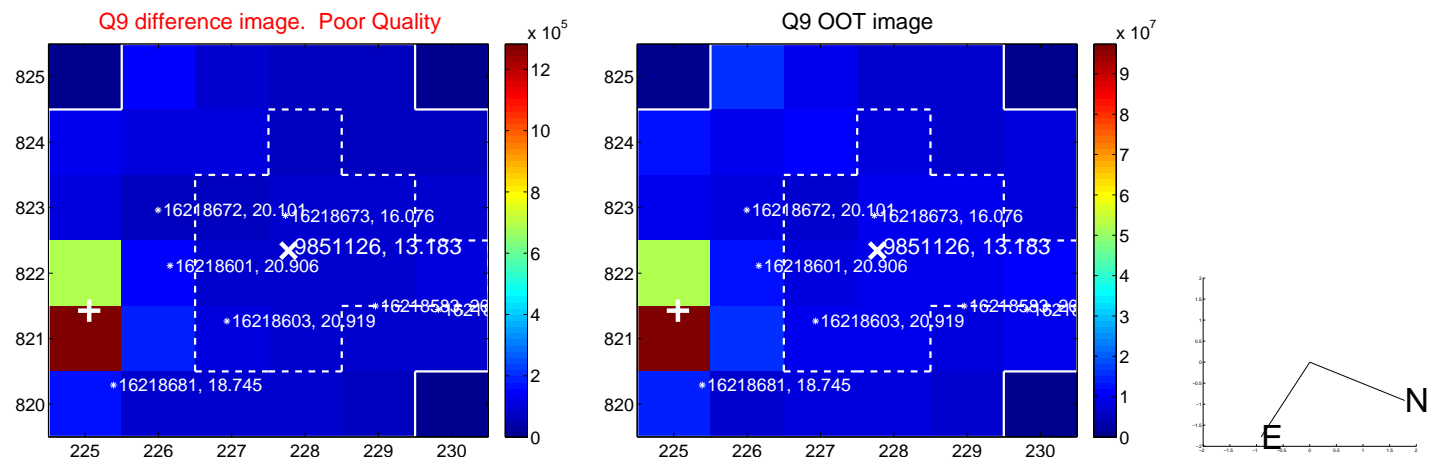
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



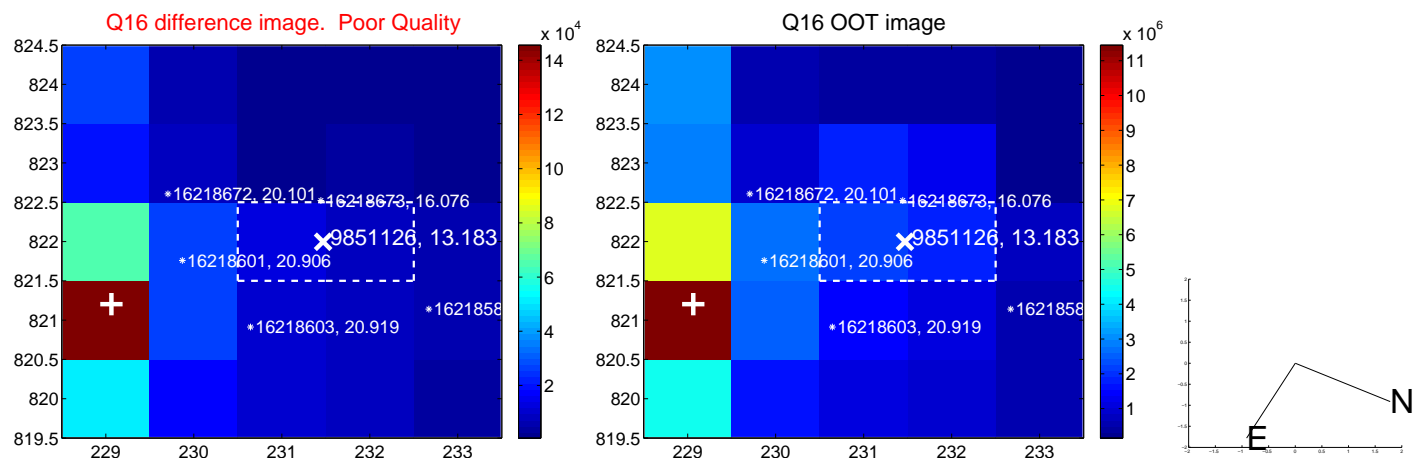
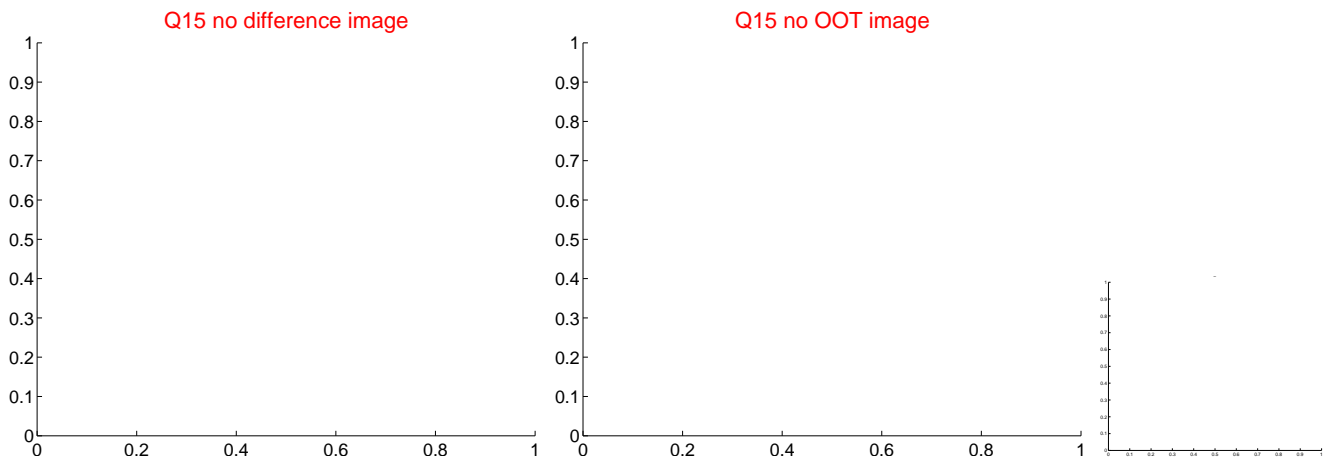
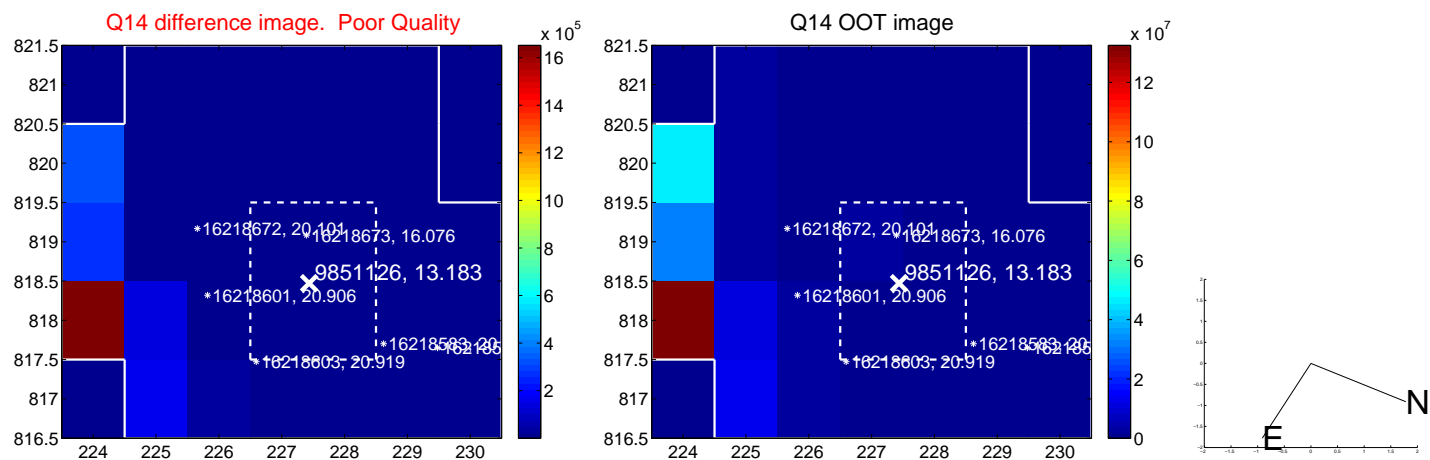
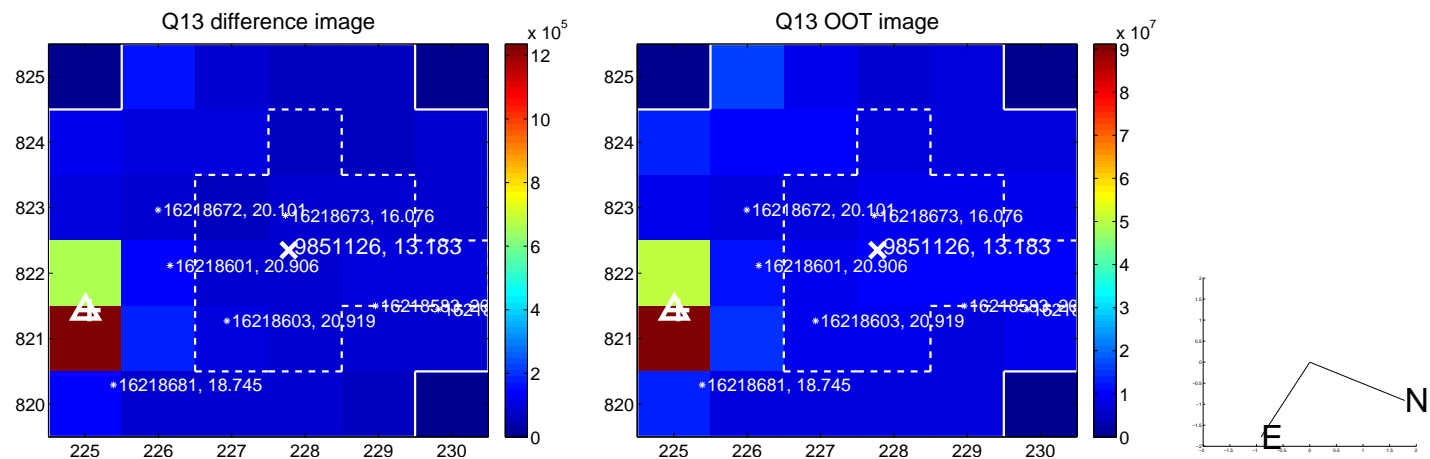
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



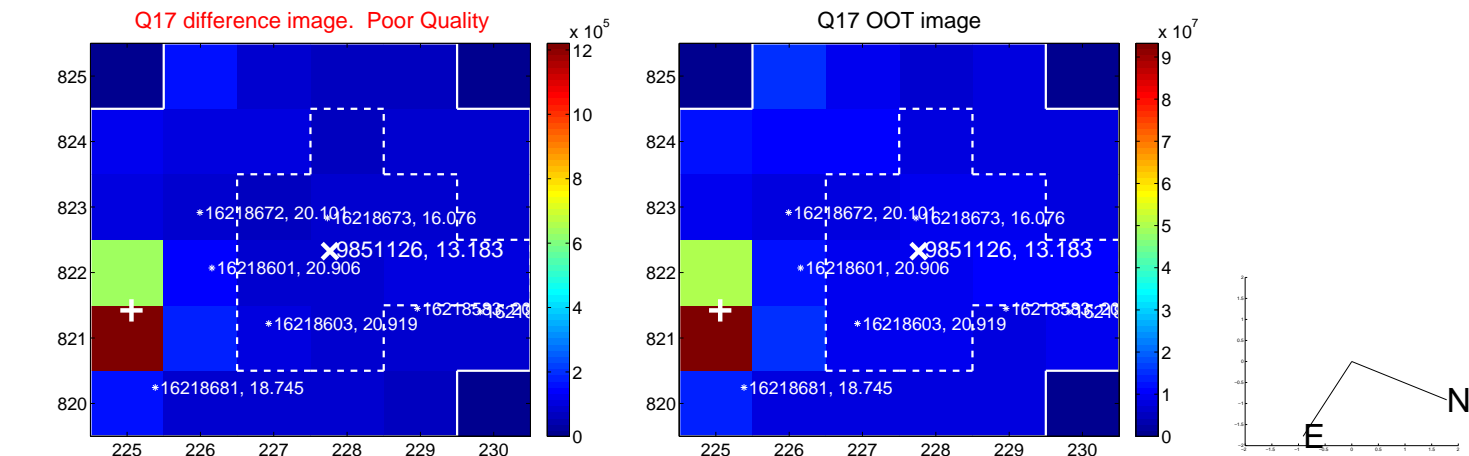
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



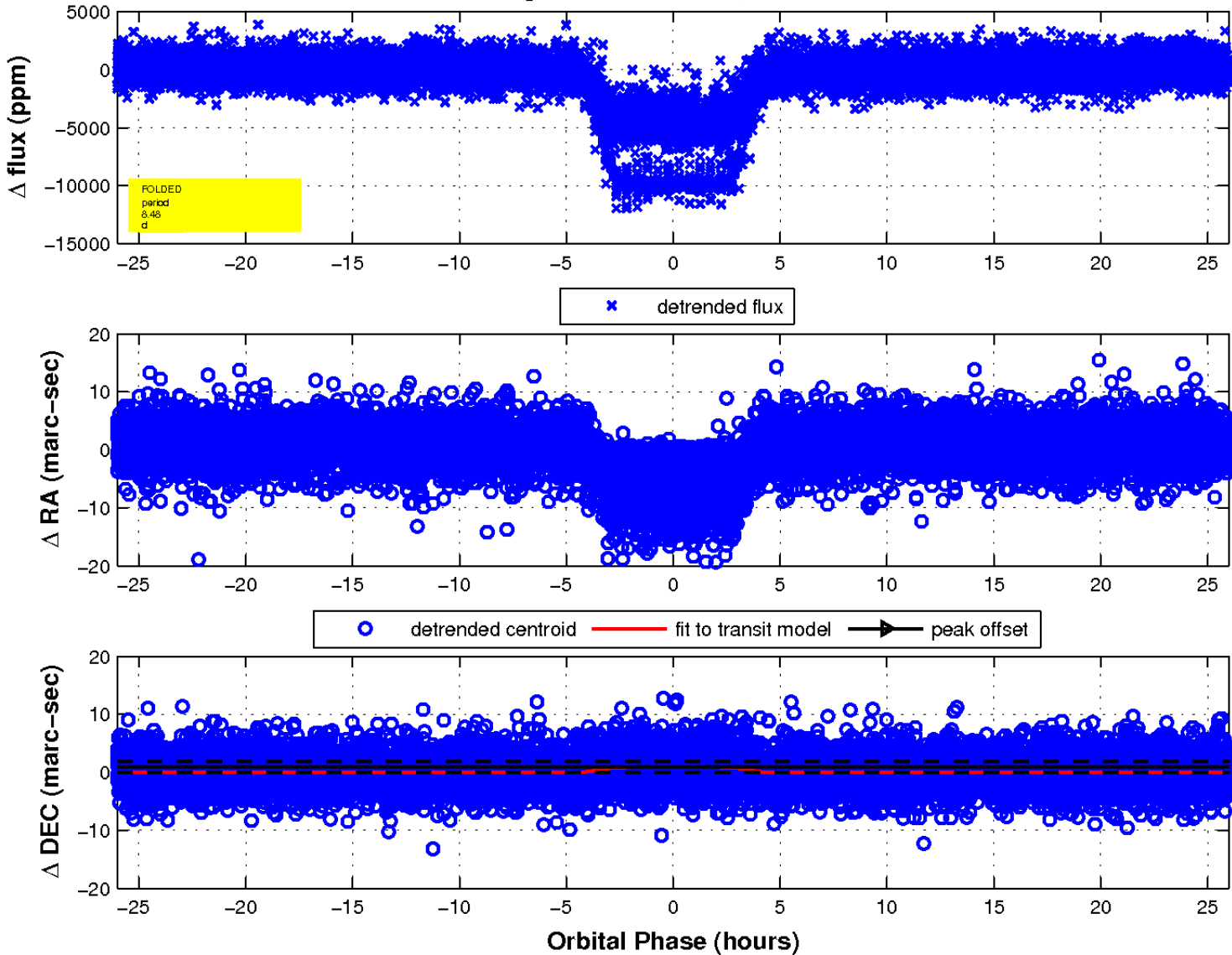
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

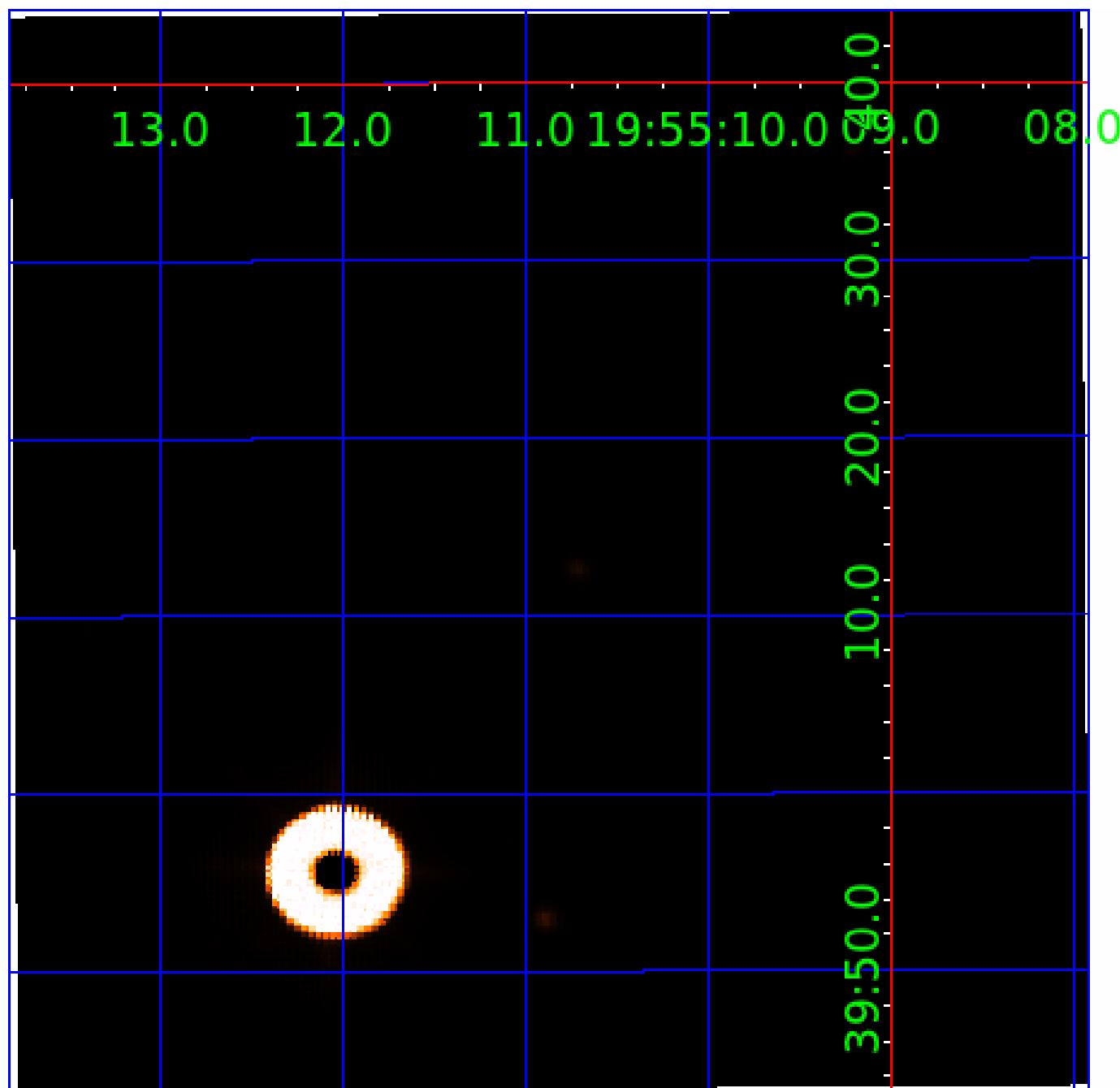


fluxWeightedCentroids, Planet 2 of 4



UKIRT Image

Declination





# KIC 009851126

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009851126-01	OBS	3592.01	8.480302	135.854699	80218.1	7.446	3876.1	3210.5	0.79	5385	21.98	79.75
009851126-02	OBS	No	8.480294	132.711530	8062.1	8.669	478.7	253.7	0.79	5385	7.61	79.75
009851126-03	OBS	No	390.105548	390.231819	1785.1	53.992	10.6	8.3	0.79	5385	4.11	0.48
009851126-04	OBS	No	8.481368	135.154979	934.5	12.500	9.2	-1.0	0.79	5385	2.36	79.74

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009851126-01	OBS	FP	0.00	0	1	1	1	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE—SEASONAL_DEPTH_DV—SEASONAL_DEPTH_ALT—CENT_RESOLVED_OFFSET—HALO_GHOST—EPHEM_MATCH
009851126-02	OBS	FP	0.00	1	1	1	1	IS_SEC_TCE—CENT_RESOLVED_OFFSET—HALO_GHOST—EPHEM_MATCH
009851126-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009851126-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—RESIDUAL_TCE—CENT_NOFITS—HALO_GHOST

**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.

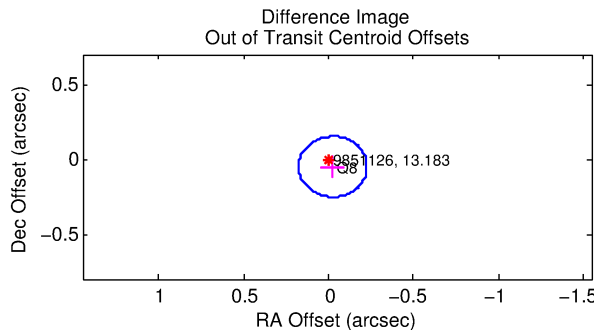
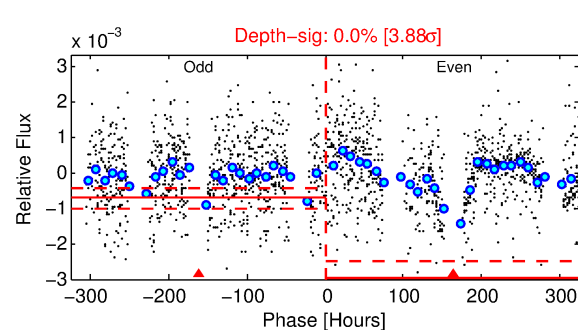
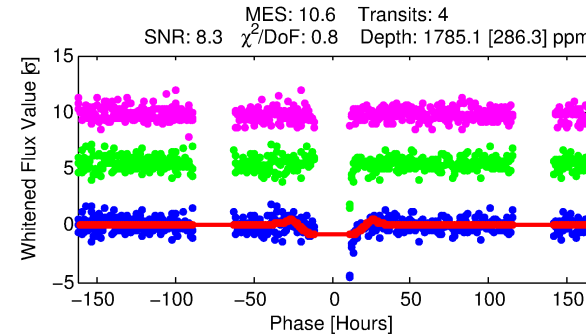
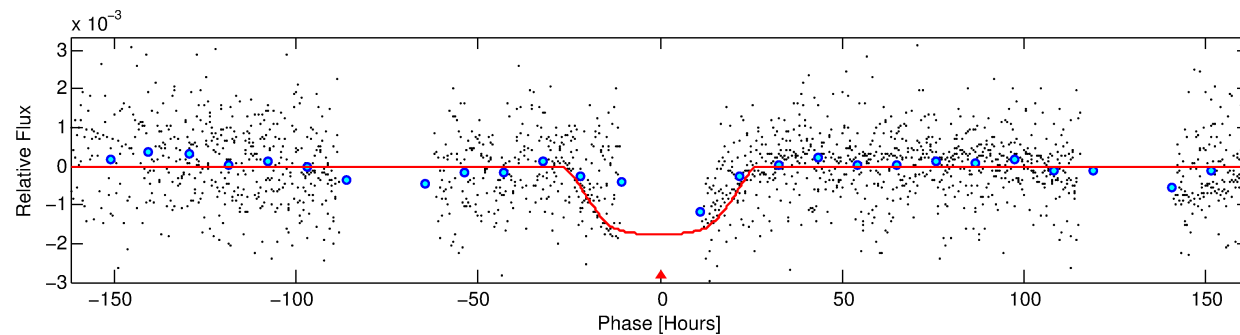
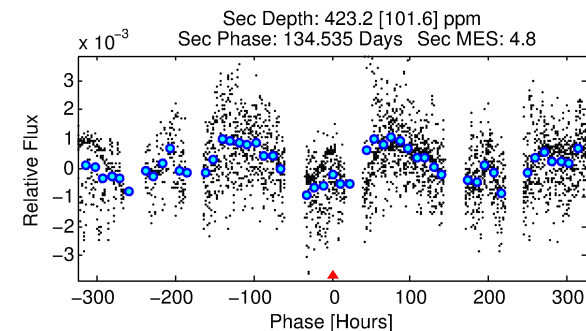
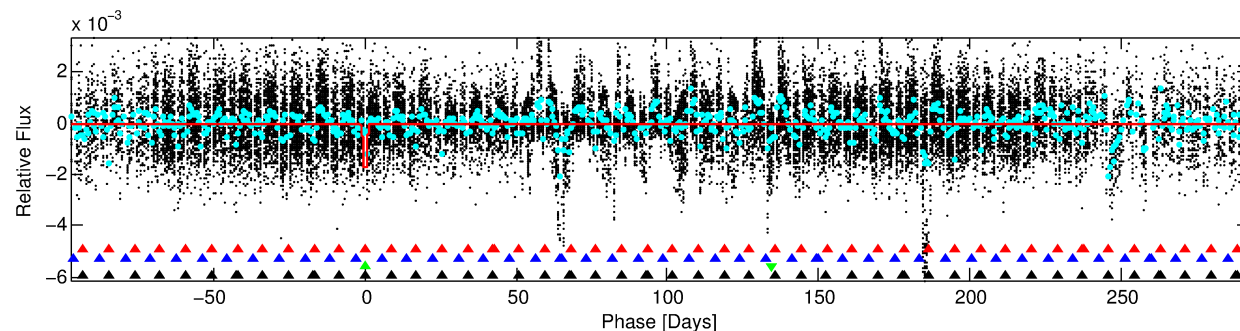
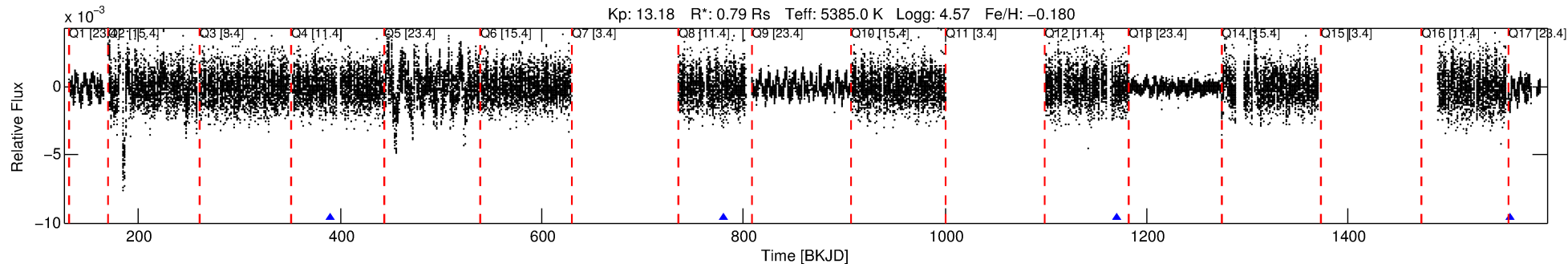
Ephemeris Match Information For 009851126-03

No Significant Match Found

# DV One-Page Summary

KIC: 9851126 Candidate: 3 of 4 Period: 390.106 d  
KOI: K03592 Corr: No Ephemeris Match

Kp: 13.18 R\*: 0.79 Rs Teff: 5385.0 K Logg: 4.57 Fe/H: -0.180



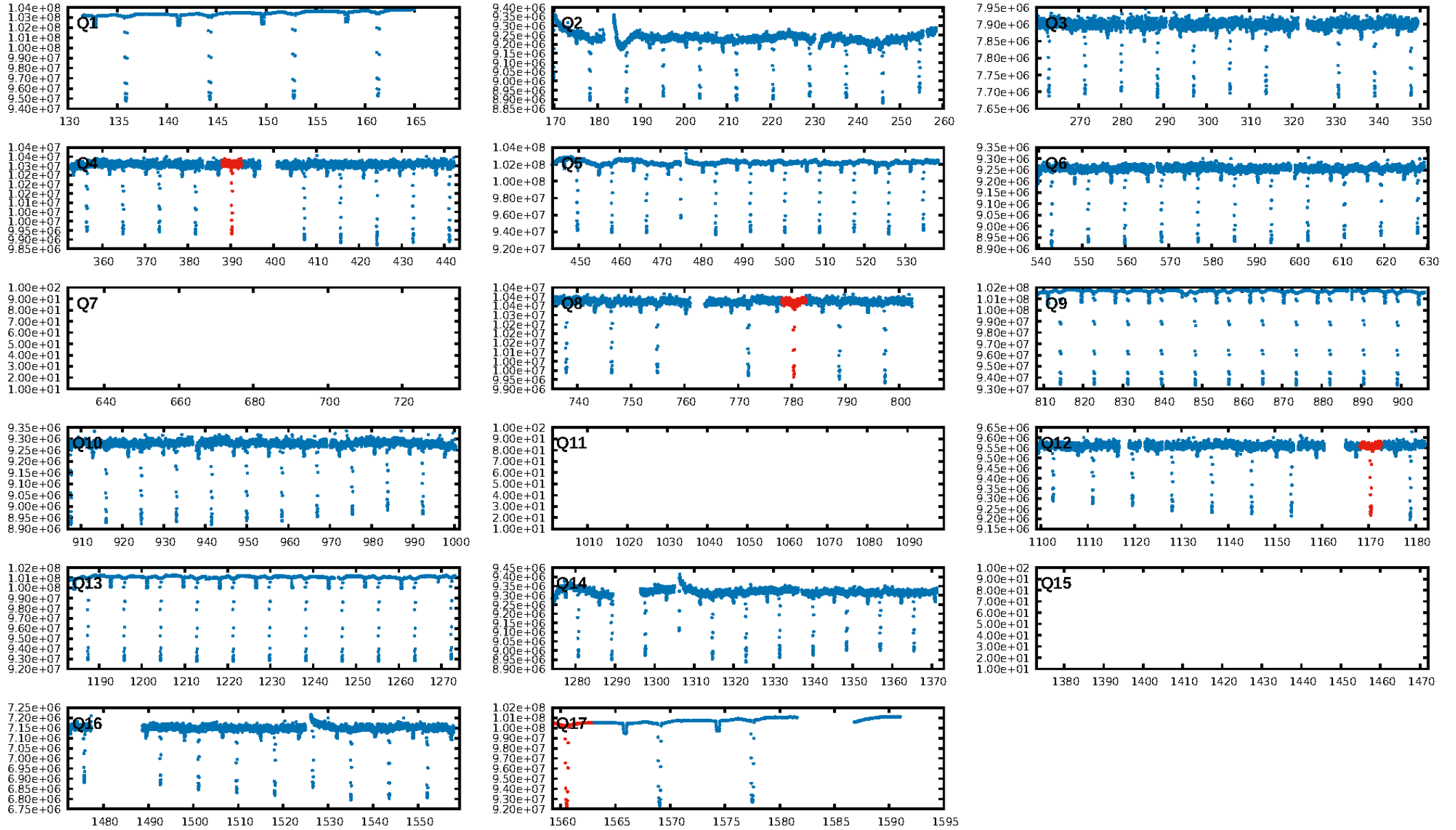
## DV Fit Results:

Period = 390.10555 [0.02251] d  
Epoch = 390.2318 [0.0588] BKJD  
Rp/R\* = 0.0478 [0.0041]  
a/R\* = 27.48 [1.37]  
b = 0.92 [0.01]  
Seff = 0.48 [0.12]  
Teq = 213 [14] K  
Rp = 4.11 [0.87] Re  
a = 0.9821 [0.1527] AU  
Ag = 13303.79 [4867.34] [2.73σ]  
Teff = 3531 [288] K [11.51σ]

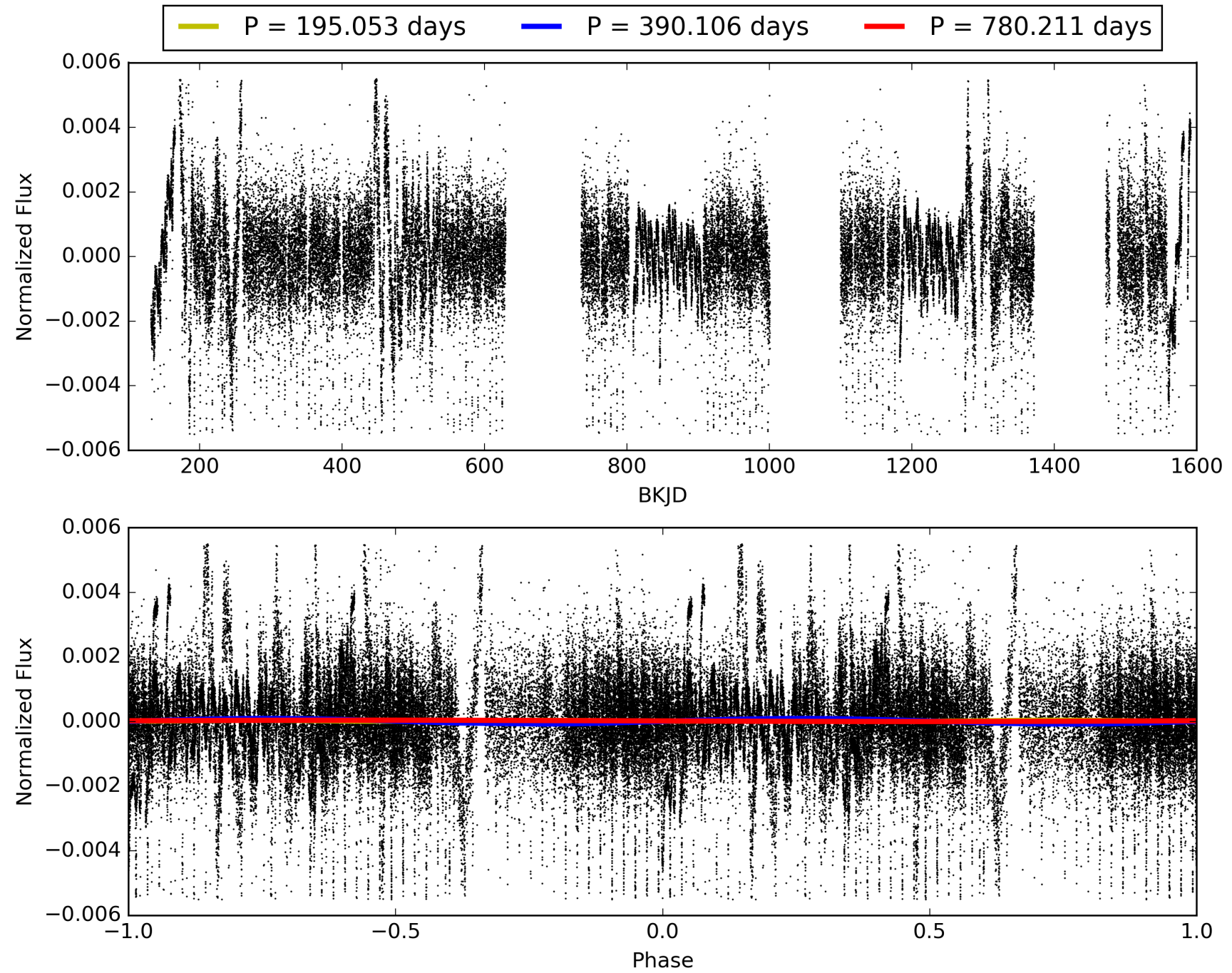
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [165.26σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 0.3%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 0.7466  
Centroid-sig: N/A  
Centroid-so: 1.346 arcsec [5.96σ]  
OotOffset-rm: 0.056 arcsec [0.82σ]  
KicOffset-rm: 10.052 arcsec [149.48σ]  
OotOffset-st: 0/0/1/0 [1]  
KicOffset-st: 0/0/1/0 [1]  
DiffImageQuality-fgm: 1.00 [1/1]  
DiffImageOverlap-fno: 0.00 [0/2]

# TCE 009851126-03, PDC Light Curves

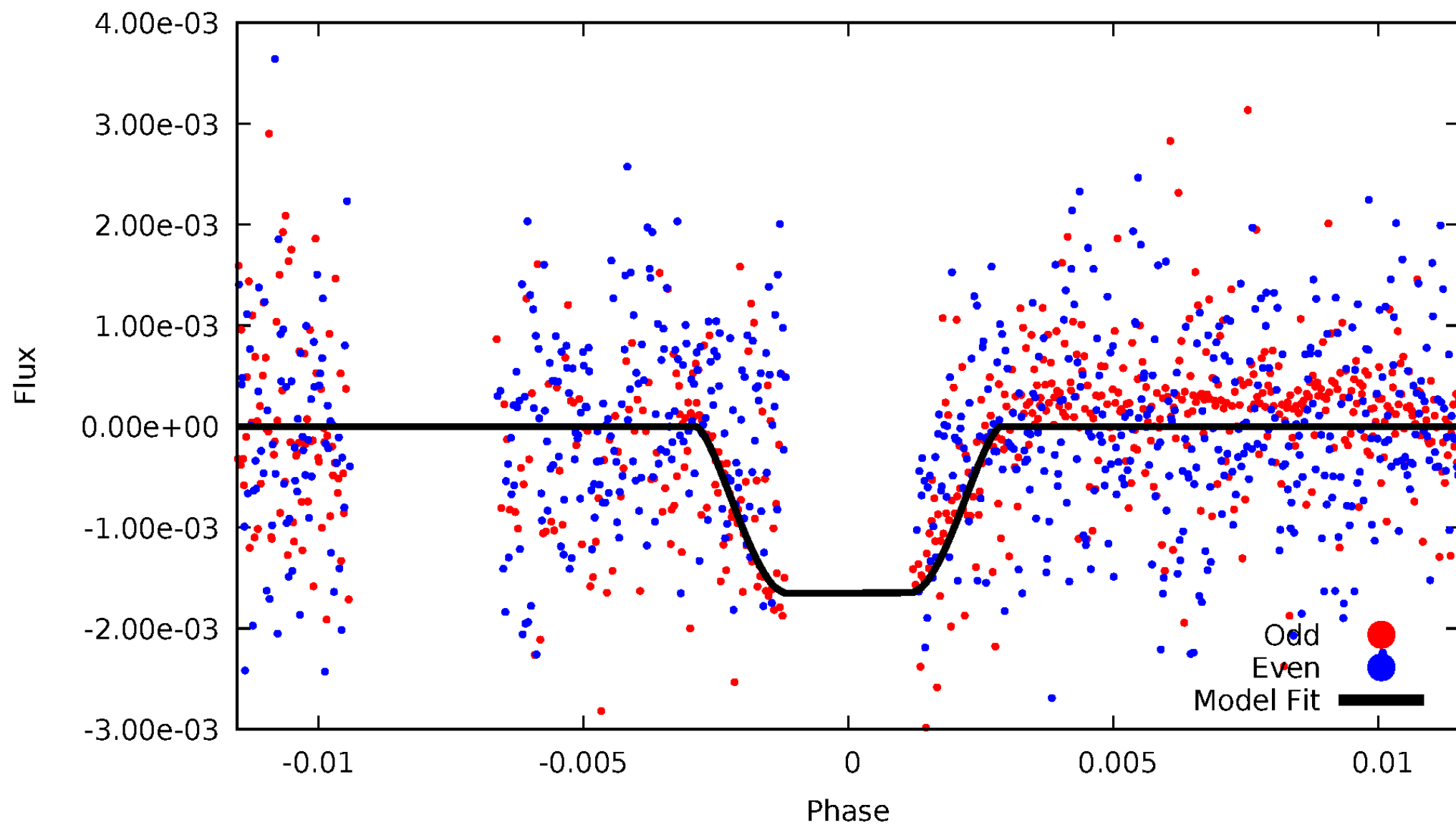


TCE 009851126-03



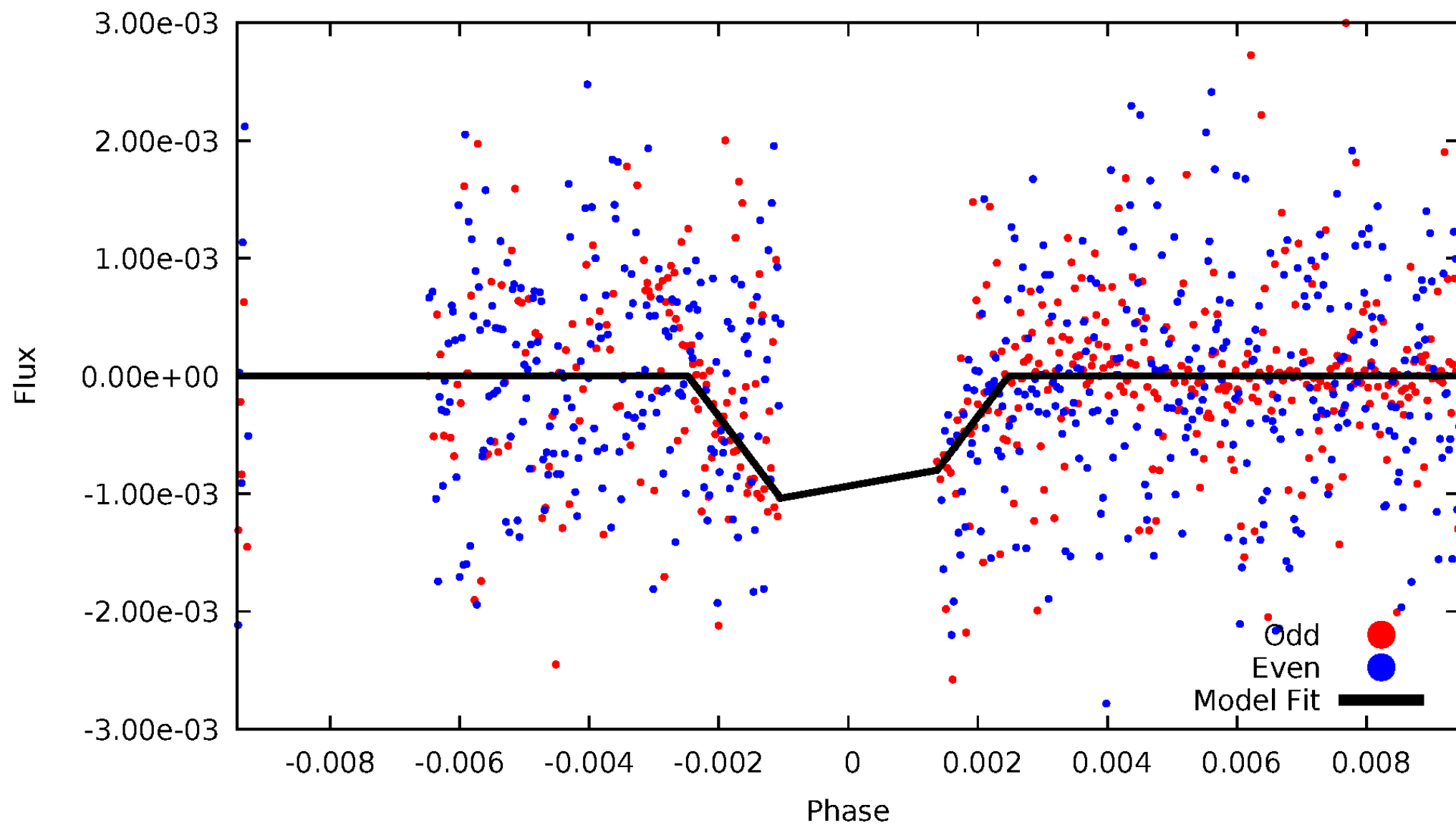
# DV Odd/Even

TCE 009851126-03



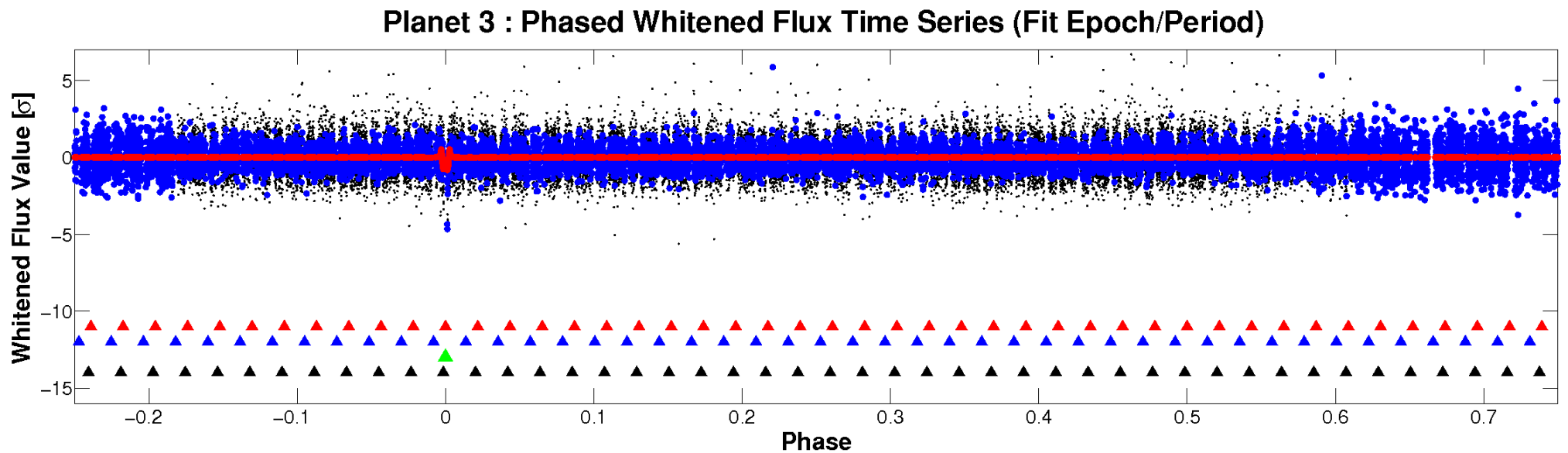
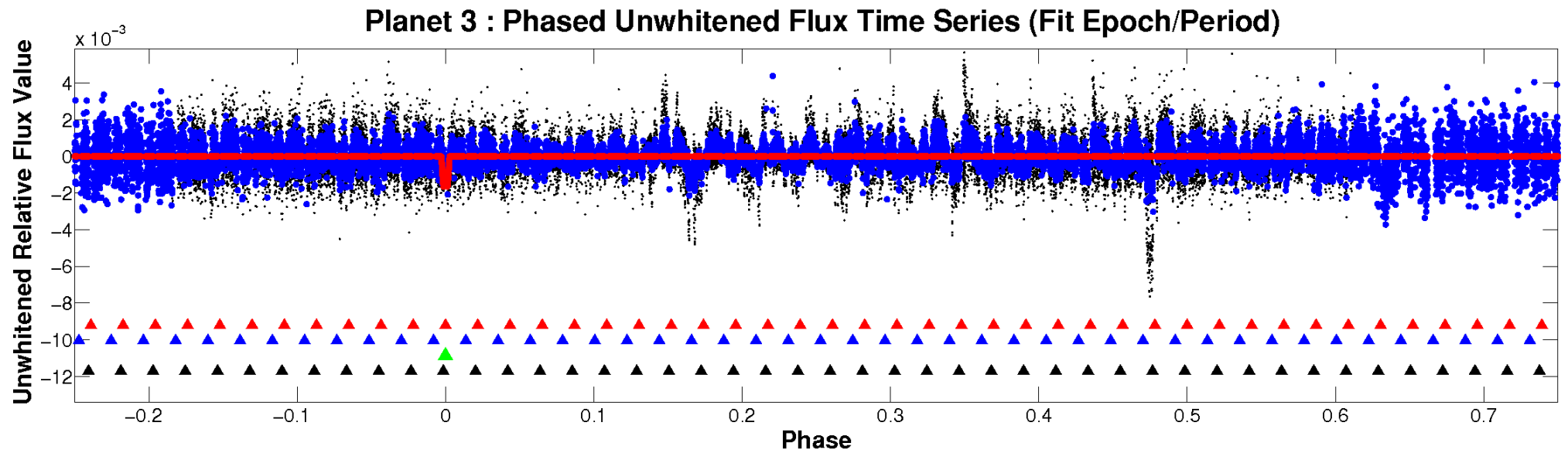
# ALT Odd/Even

TCE 009851126-03



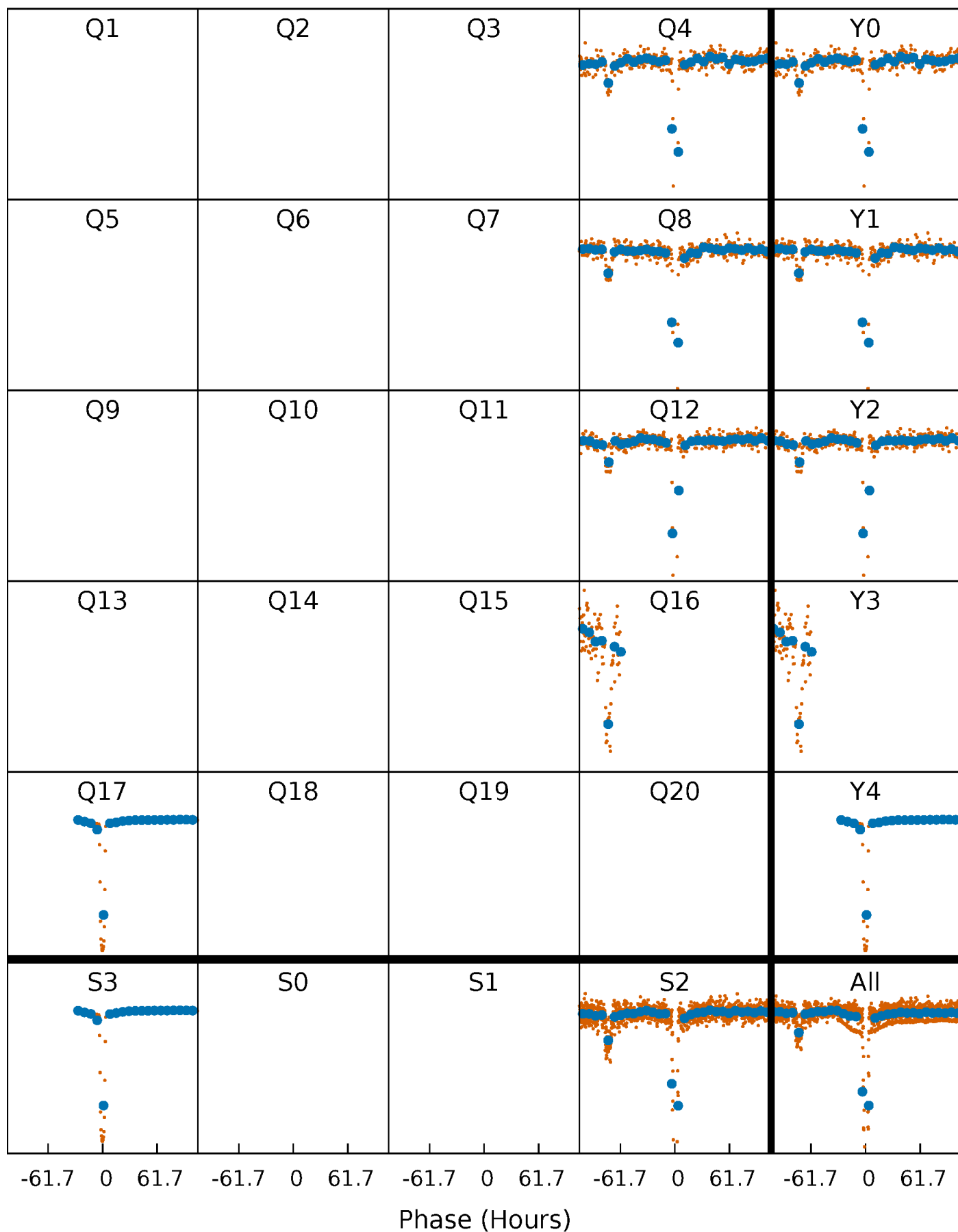


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

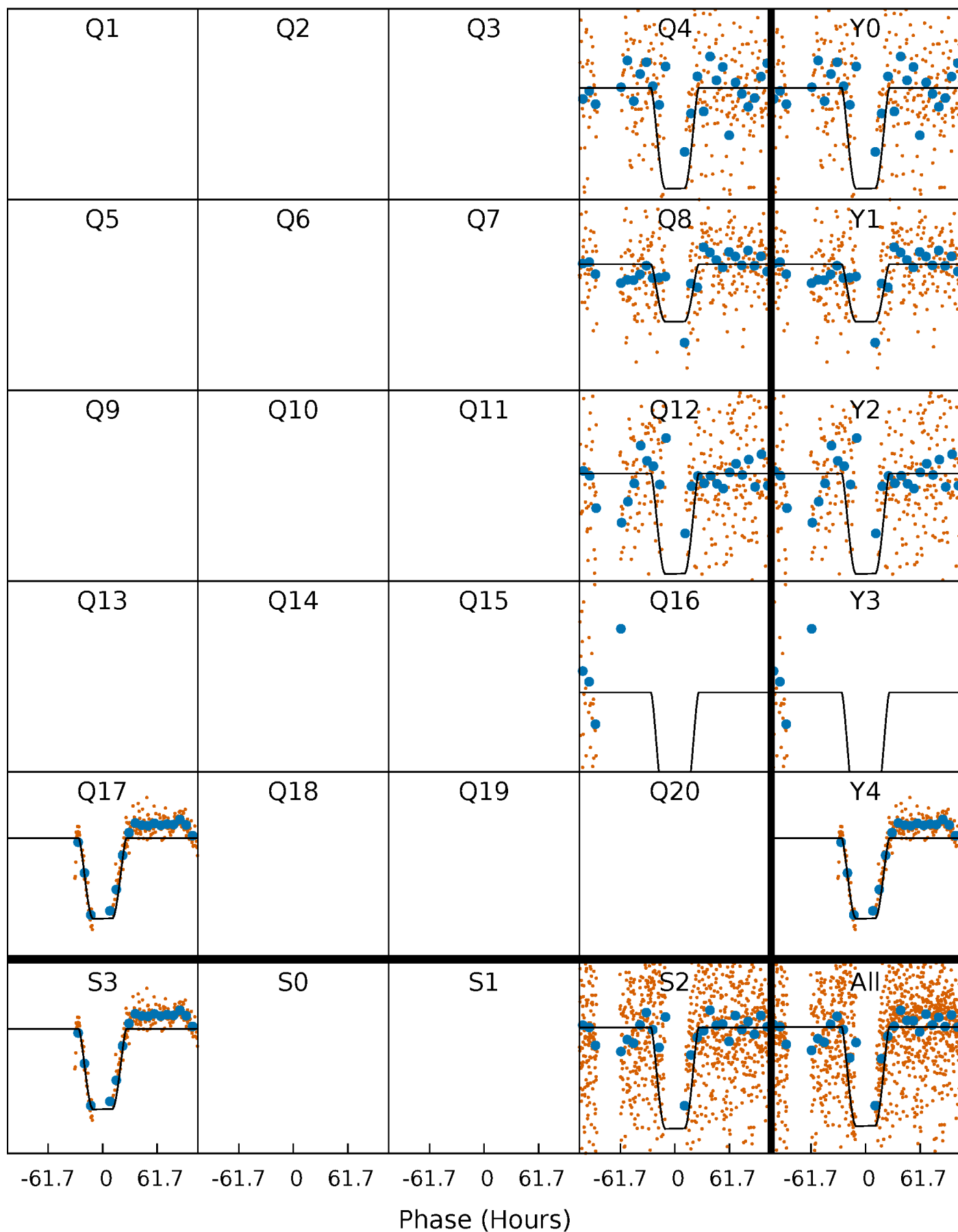
TCE 009851126-03 P=390.105548 Days  $T_0=390.231819$  (BKJD)





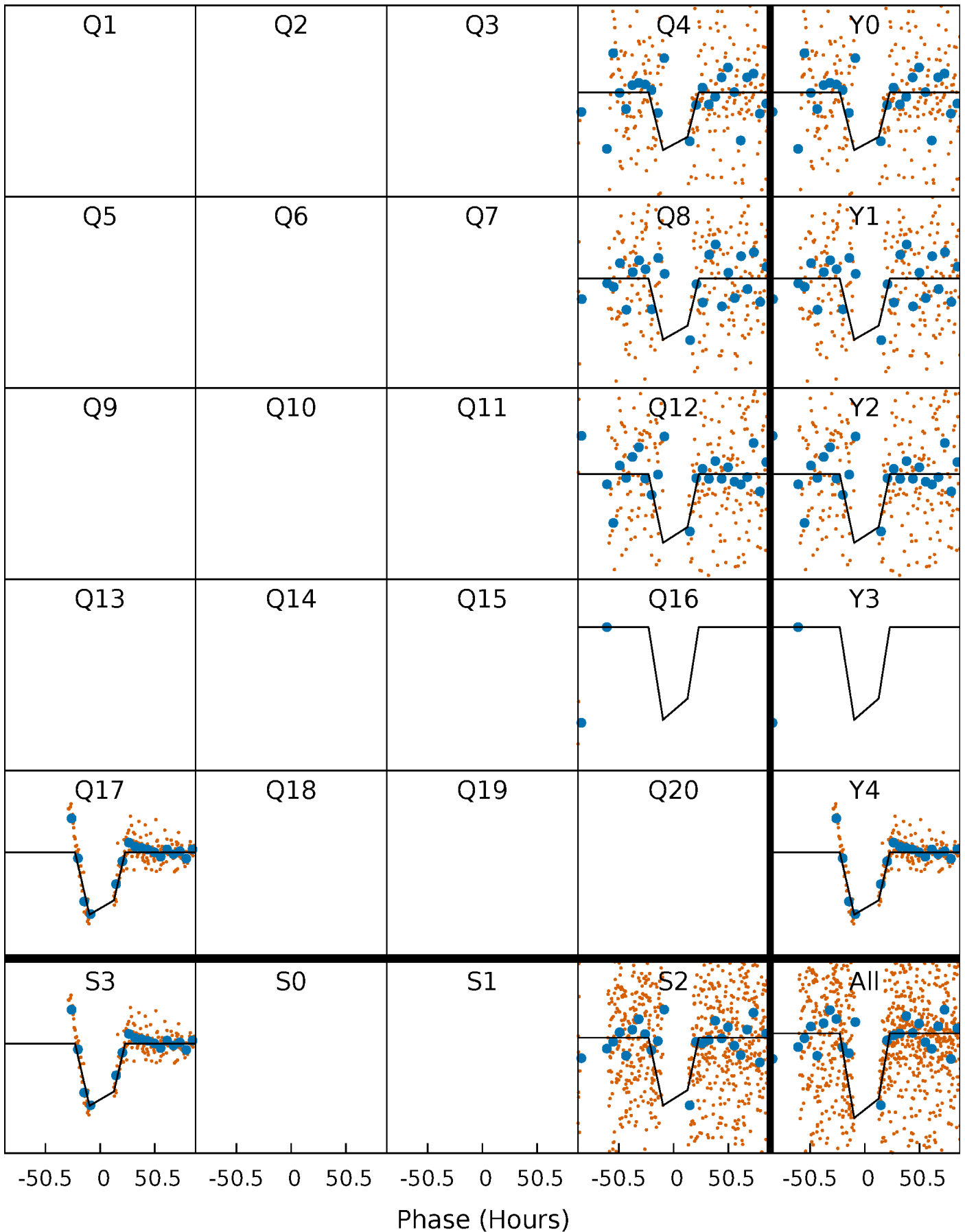
# DV Quarter-Phased Transit Curves

TCE 009851126-03     $P=390.105548$  Days     $T_0=390.231819$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

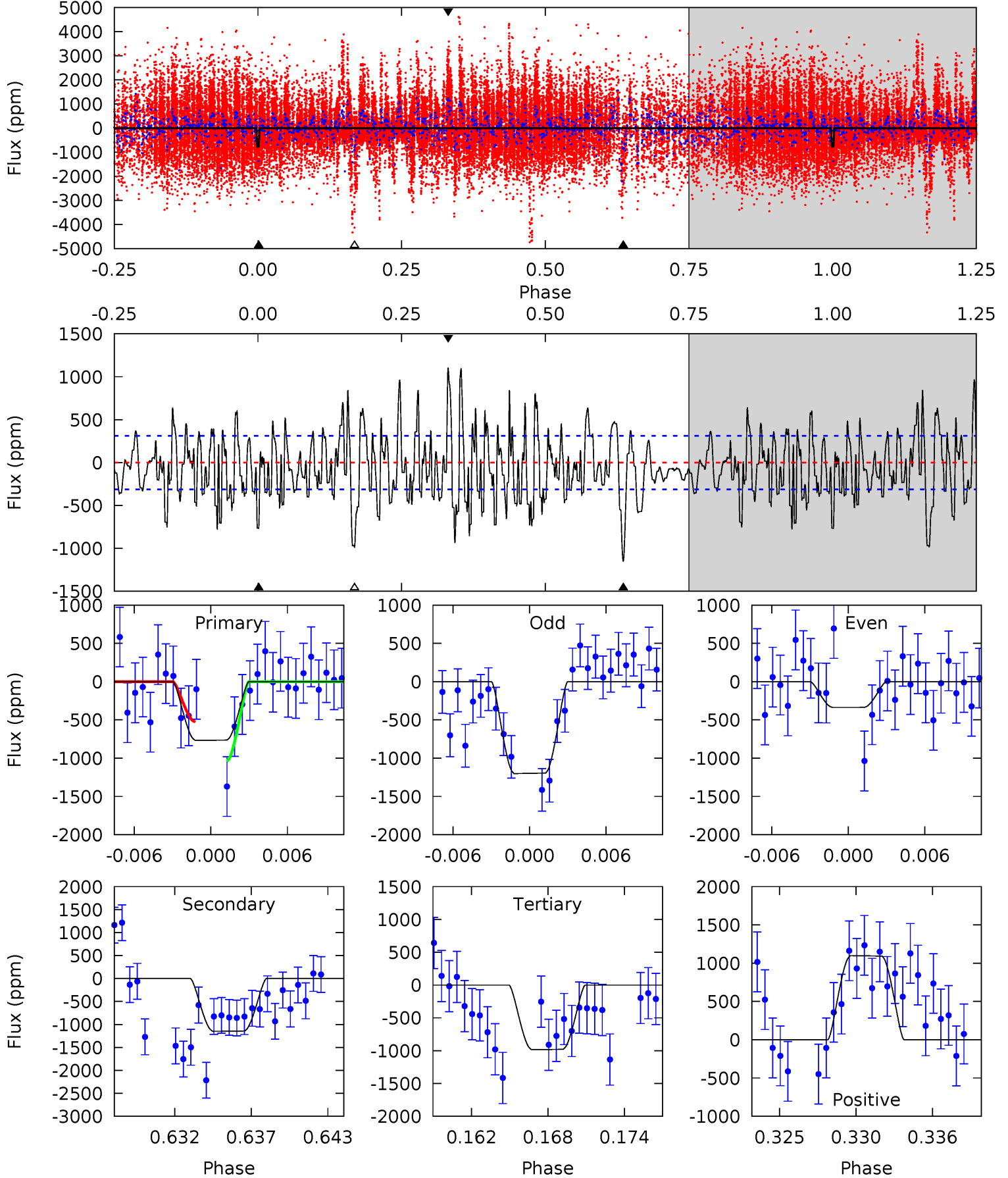
TCE 009851126-03 P=390.103905 Days  $T_0=390.177302$  (BKJD)



# DV Model-Shift Uniqueness Test

009851126-03, P = 390.105548 Days, E = 0.126271 Days

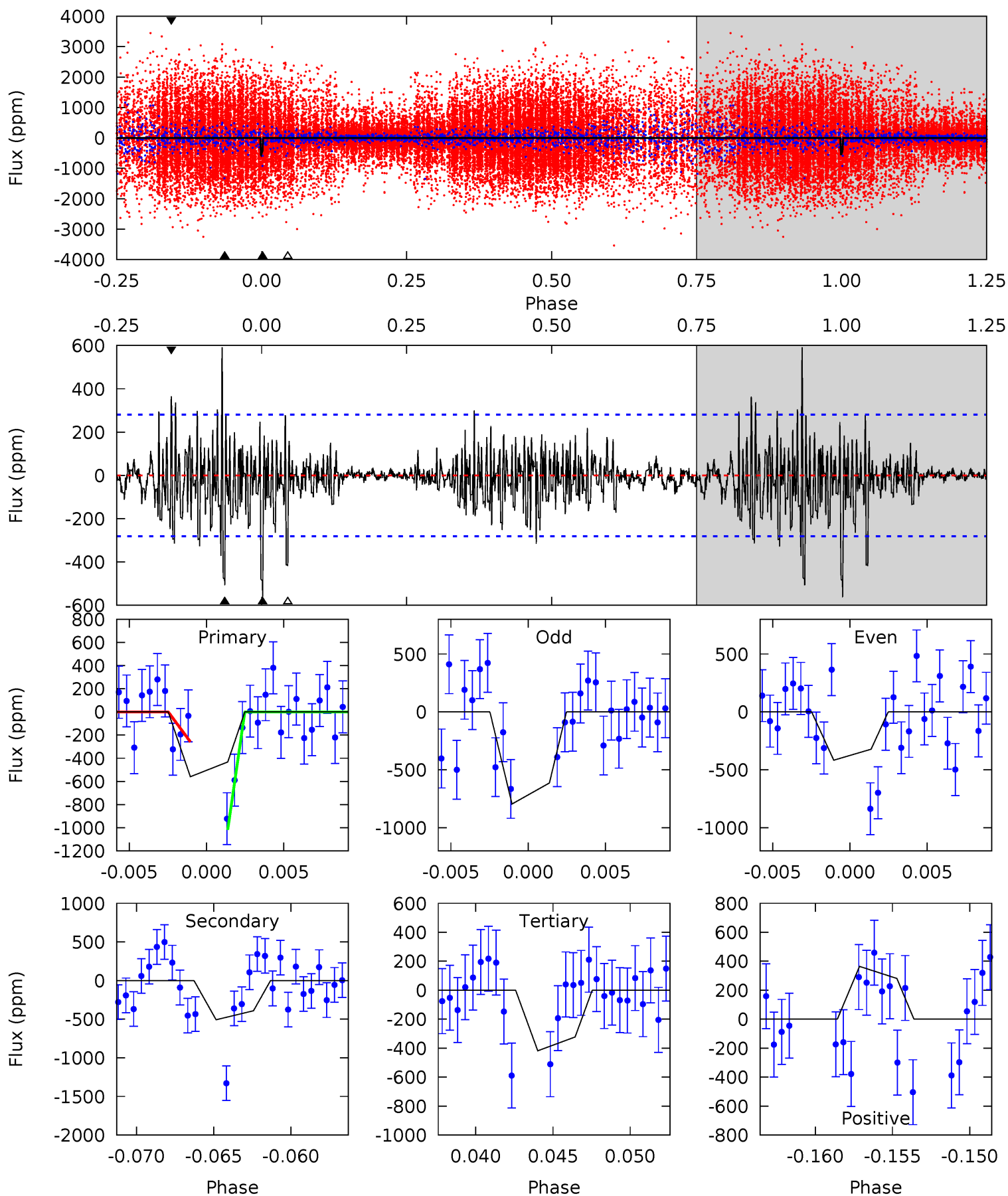
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.6	18.9	16.2	18.1	5.13	2.76	5.89	-3.56	-5.44	2.72	0.84	7.15	1.26	0.49	4.21



# Alt Model-Shift Uniqueness Test

009851126-03, P = 390.103905 Days, E = 0.073397 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.3	9.32	7.68	6.69	5.16	2.81	1.60	2.61	3.59	1.64	2.62	3.54	1.32	0.51	6.87



### Stellar Parameters For KIC 009851126

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5385^{+185}_{-185}$	$4.565^{+0.048}_{-0.112}$	$-0.180^{+0.300}_{-0.300}$	$0.787^{+0.153}_{-0.071}$	$0.832^{+0.096}_{-0.087}$	$2.400^{+0.510}_{-0.819}$
	+3%/-3%	+1%/-2%	+167%/-167%	+19%/-9%	+12%/-10%	+21%/-34%
Source	PHO54	PHO54	PHO54	DSEP		

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

### Secondary Eclipse Parameters for KIC 009851126-03 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-1150 \pm 61$	$4.20^{+0.49}_{-0.43}$	$300^{+15}_{-14}$	$4658^{+230}_{-211}$	$34336^{+7901}_{-6575}$
Alt.	$-507 \pm 54$	$3.39^{+0.52}_{-0.44}$	$301^{+15}_{-13}$	$4302^{+241}_{-209}$	$22984^{+7722}_{-5662}$

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

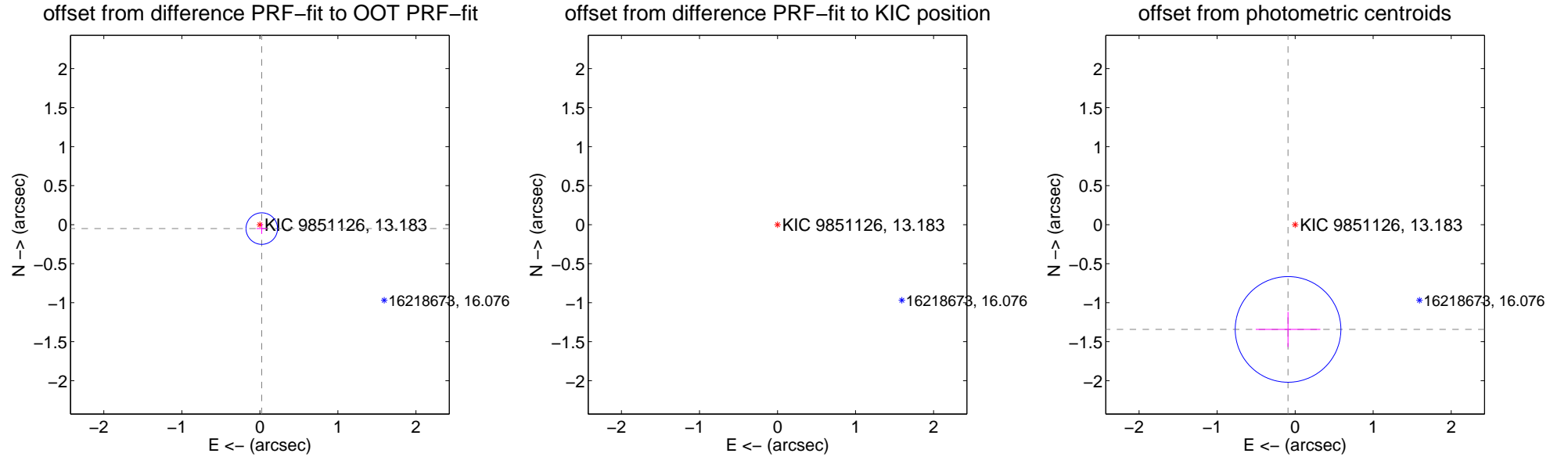
## DV Centroid Data

Supplemental centroid analysis for 009851126-03. Kepler magnitude: 13.18. Transit SNR 8.35

There are 1 quarters with good PRF difference image offsets

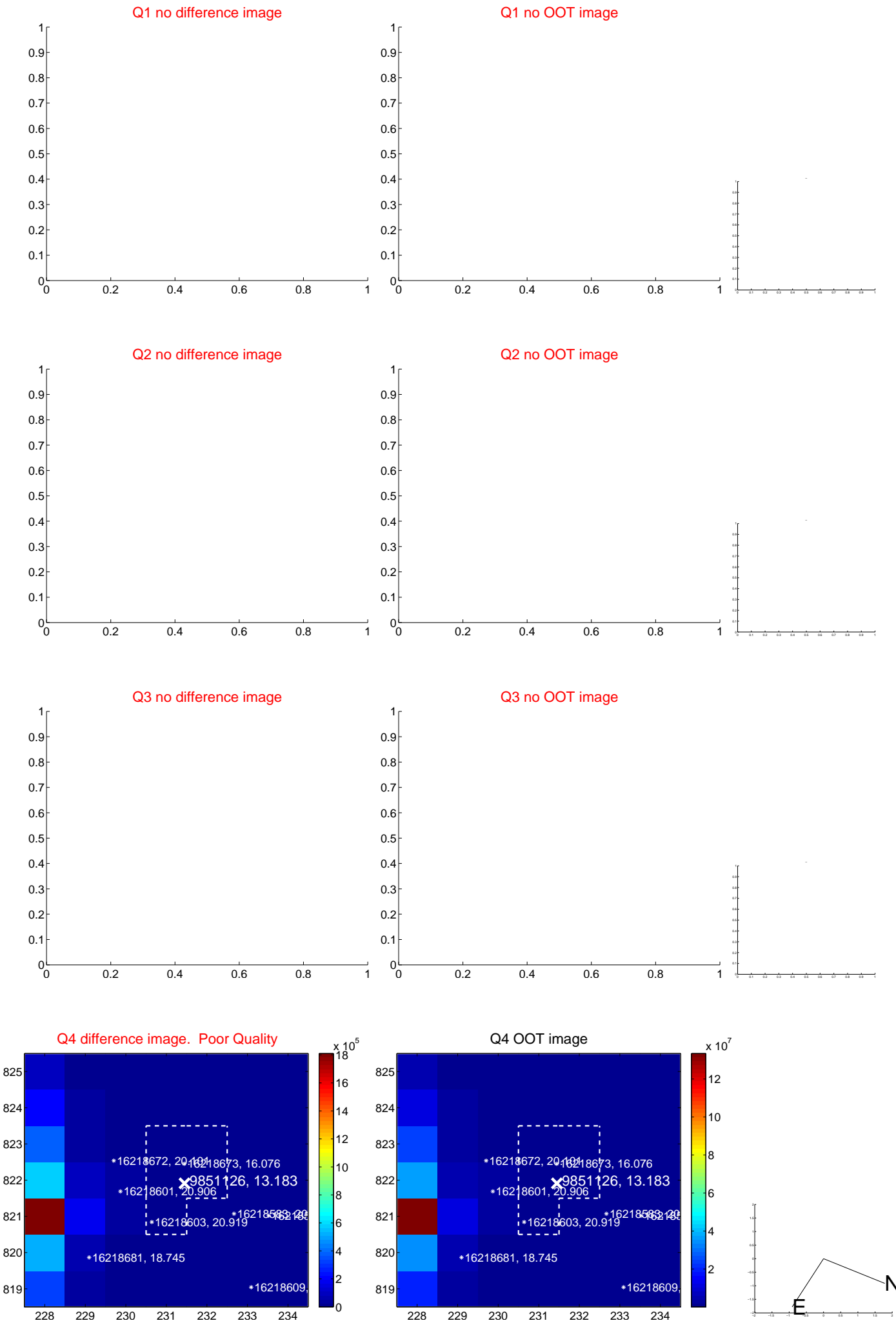
The OOT PRF centroid is offset from the target star catalog position by about 10.03 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.056 \pm 0.067$	0.82	$-0.024 \pm 0.067$	$-0.050 \pm 0.067$
PRF-fit source offset from KIC position	<b>10.052 <math>\pm</math> 0.067</b>	<b>149.48</b>	$7.175 \pm 0.067$	$-7.040 \pm 0.067$
photometric centroid source offset	<b>1.35 <math>\pm</math> 0.23</b>	<b>5.96</b>	$0.09 \pm 0.41$	$-1.34 \pm 0.22$

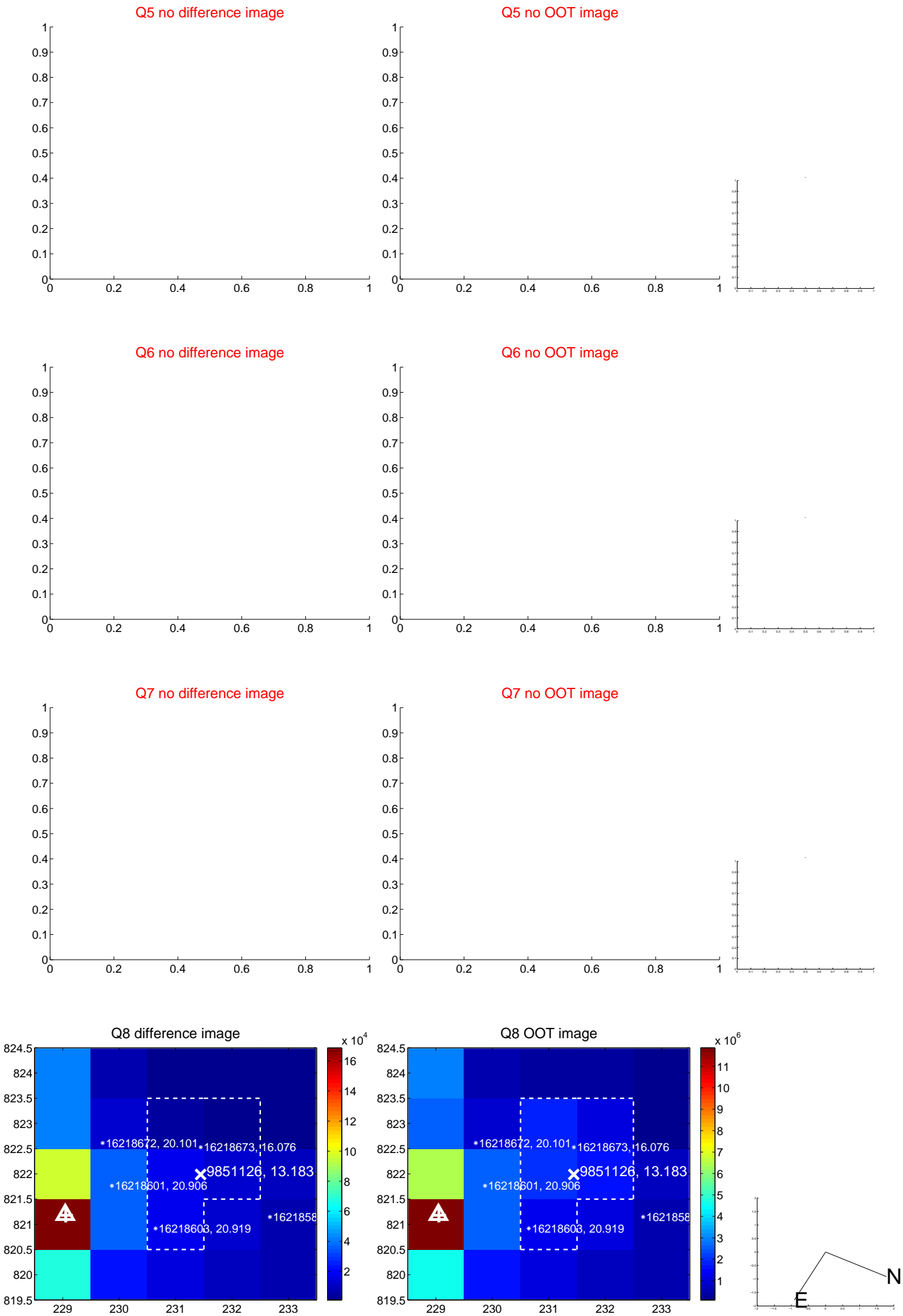


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three- $\sigma$ . 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 ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



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





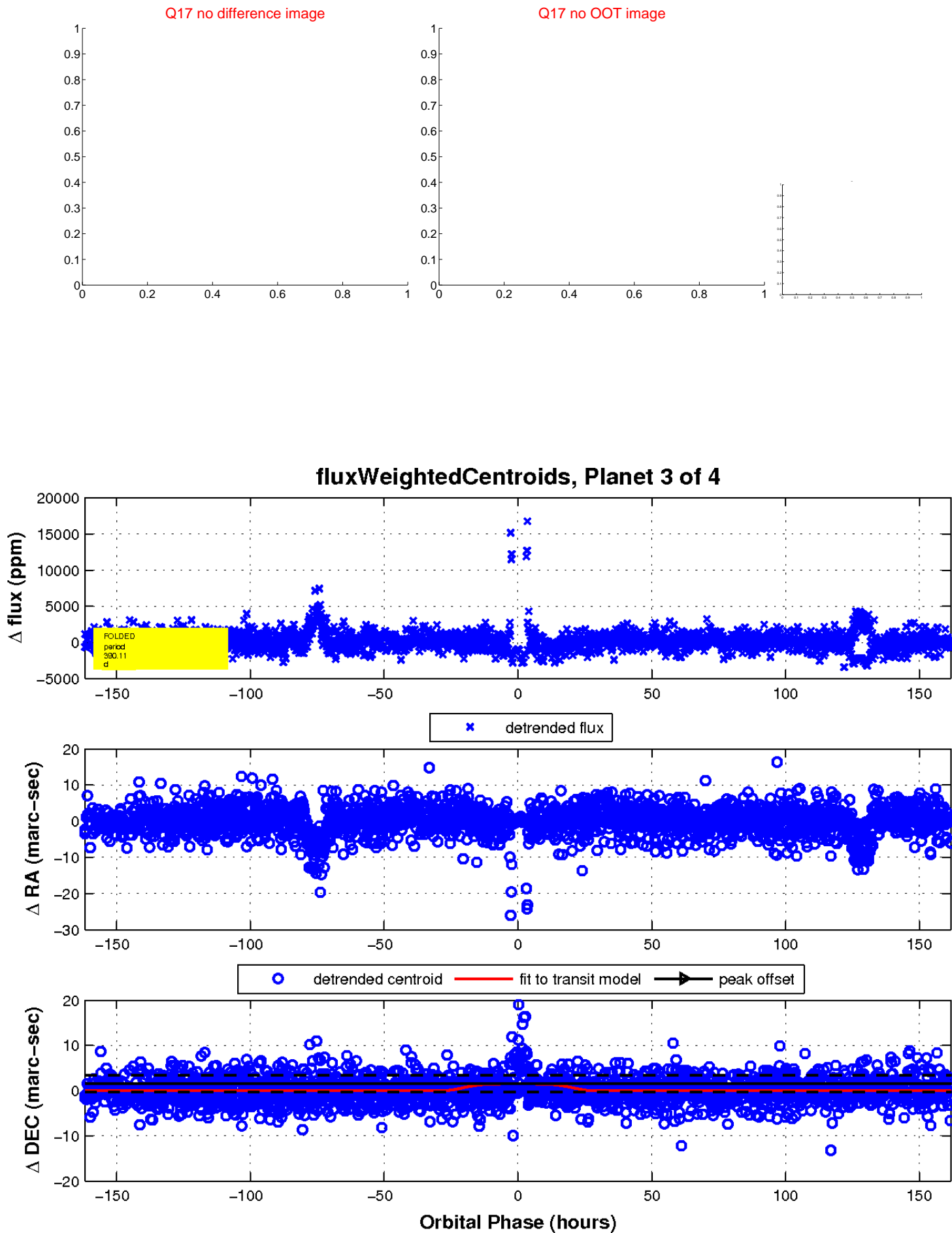
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

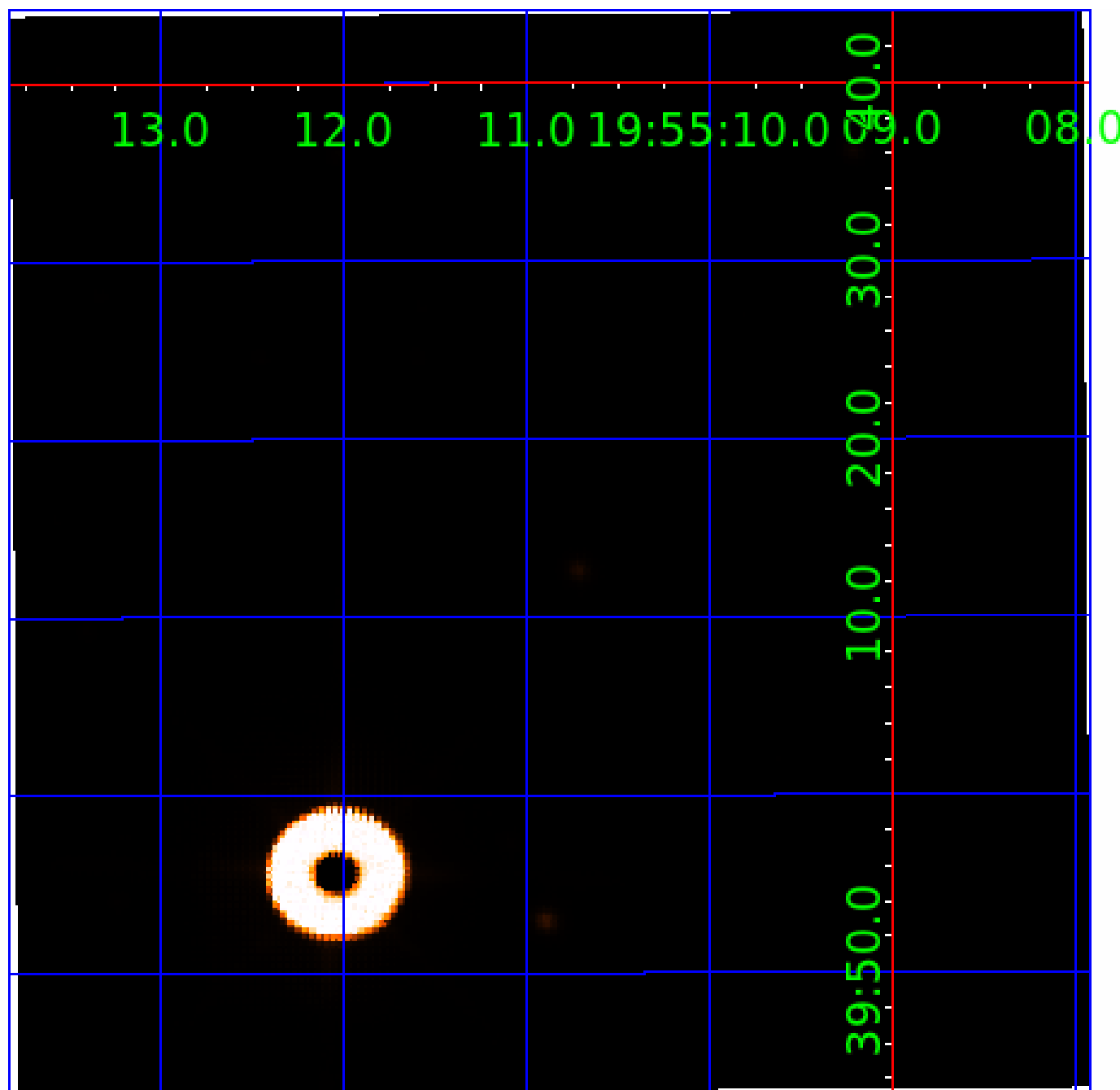


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



# UKIRT Image

Declination



# KIC 009851126

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009851126-01	OBS	3592.01	8.480302	135.854699	80218.1	7.446	3876.1	3210.5	0.79	5385	21.98	79.75
009851126-02	OBS	No	8.480294	132.711530	8062.1	8.669	478.7	253.7	0.79	5385	7.61	79.75
009851126-03	OBS	No	390.105548	390.231819	1785.1	53.992	10.6	8.3	0.79	5385	4.11	0.48
009851126-04	OBS	No	8.481368	135.154979	934.5	12.500	9.2	-1.0	0.79	5385	2.36	79.74

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009851126-01	OBS	FP	0.00	0	1	1	1	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE—SEASONAL_DEPTH_DV—SEASONAL_DEPTH_ALT—CENT_RESOLVED_OFFSET—HALO_GHOST—EPHEM_MATCH
009851126-02	OBS	FP	0.00	1	1	1	1	IS_SEC_TCE—CENT_RESOLVED_OFFSET—HALO_GHOST—EPHEM_MATCH
009851126-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009851126-04	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—RESIDUAL_TCE—CENT_NOFITS—HALO_GHOST

**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 009851126-04

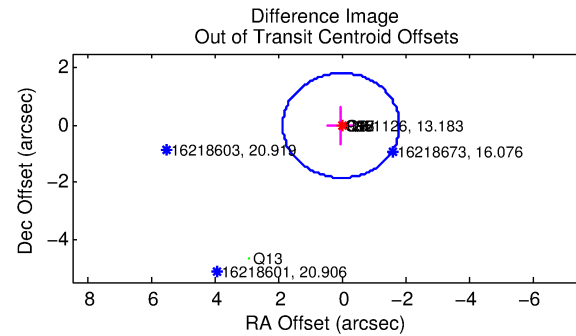
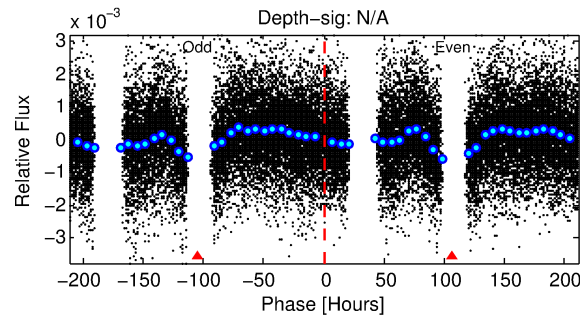
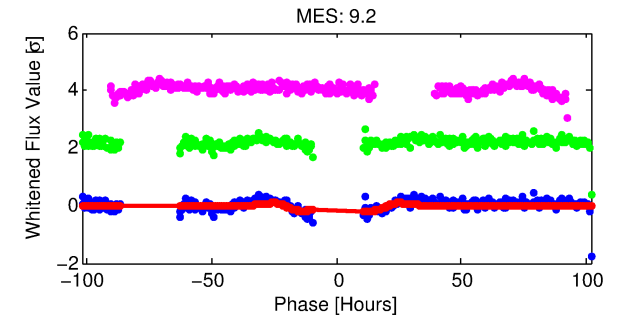
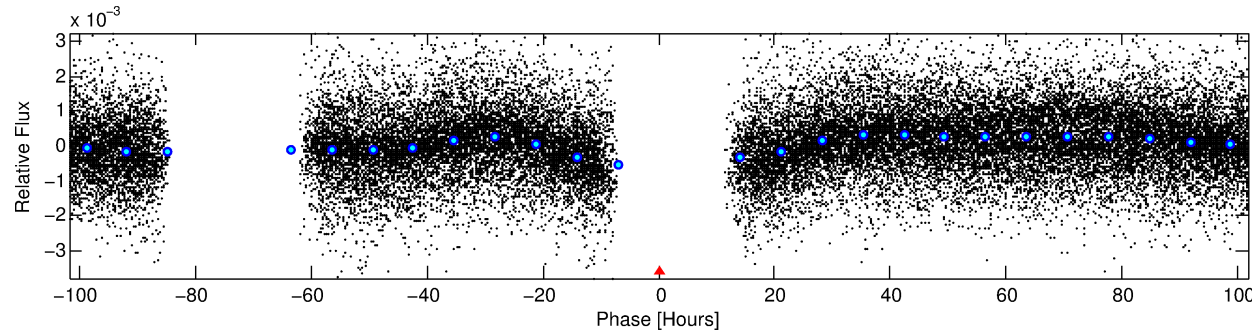
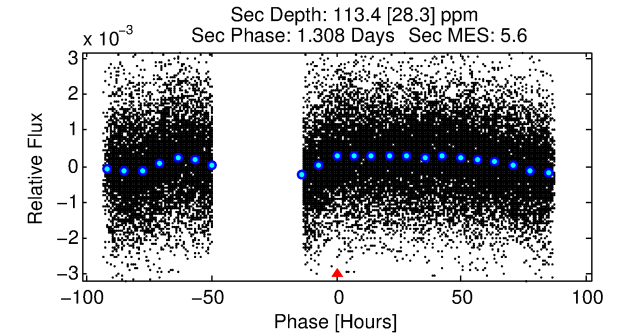
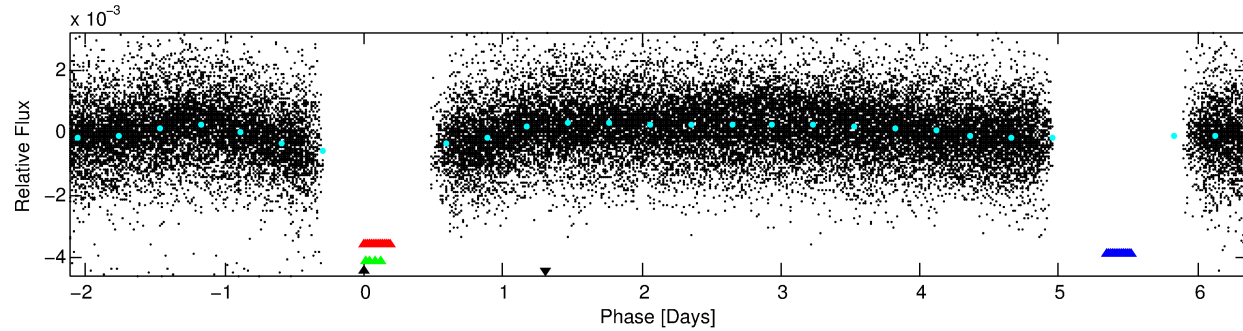
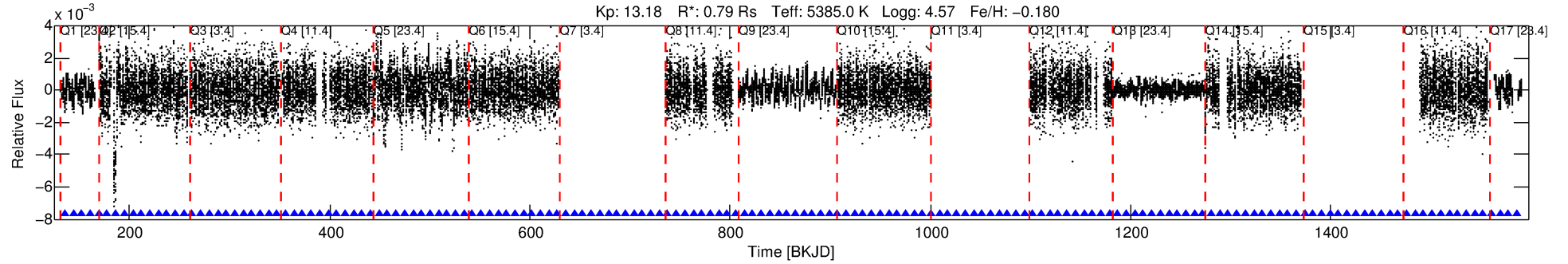
No Significant Match Found

# DV One-Page Summary

KIC: 9851126 Candidate: 4 of 4 Period: 8.481 d

KOI: K03592 Corr: No Ephemeris Match

Kp: 13.18 R\*: 0.79 Rs Teff: 5385.0 K Logg: 4.57 Fe/H: -0.180



TPS TCE Results:

Period = 8.48137 d  
Epoch = 135.1550 BKJD

DV fit results are unavailable

DV Diagnostic Results:

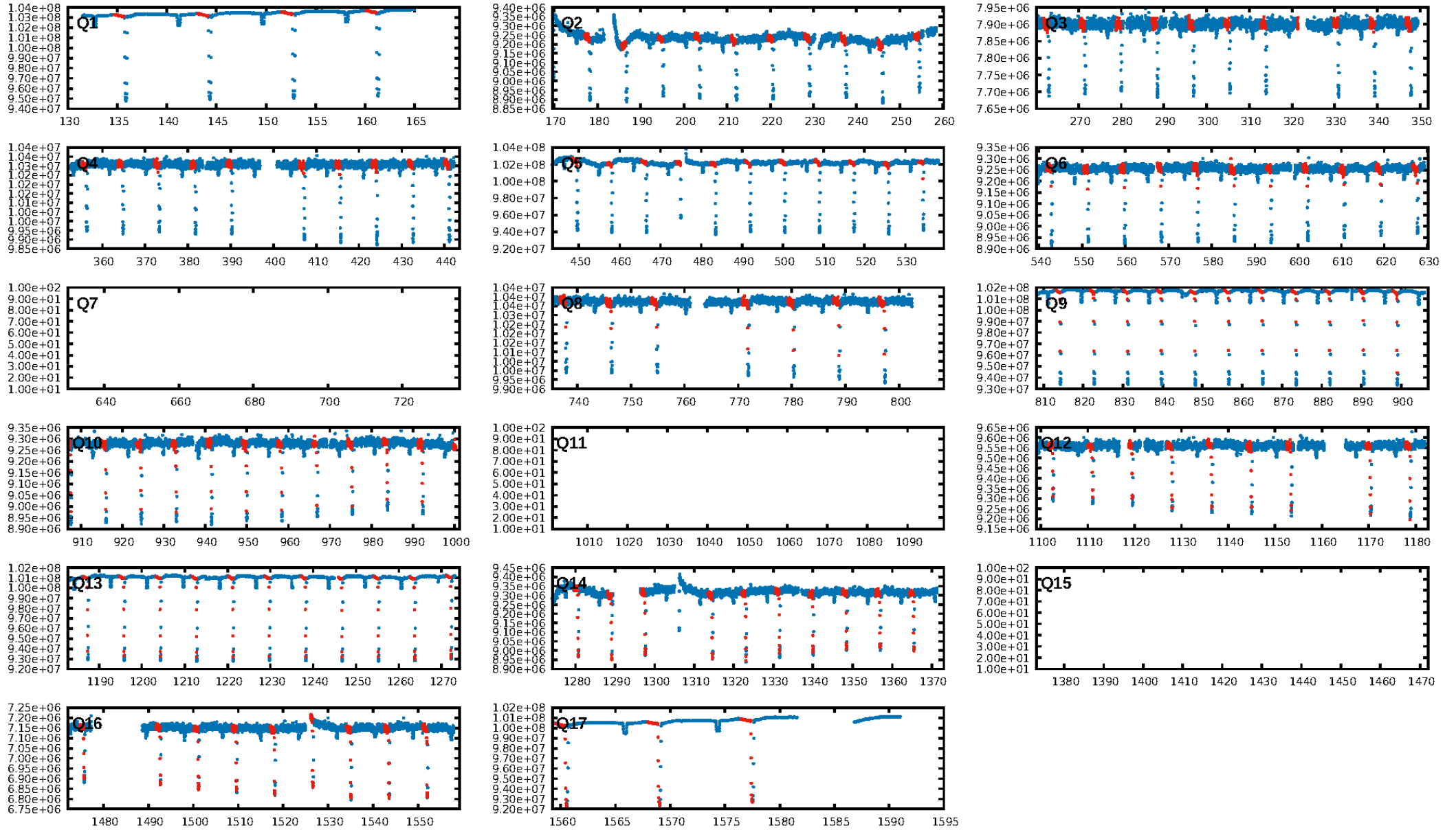
ShortPeriod-sig: 0.1% [0.00σ]  
LongPeriod-sig: 100.0% [165.26σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGoF-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [120/120]  
GhostDiagnostic-chr: -0.1728

Centroid-sig: N/A  
Centroid-so: 2.254 arcsec [8.70σ]  
OotOffset-rm: 0.048 arcsec [0.08σ]  
KicOffset-rm: 11.300 arcsec [26.16σ]  
OotOffset-st: 0/0/3/3 [6]  
KicOffset-st: 1/0/3/3 [7]  
DiffImageQuality-fgm: 1.00 [7/7]  
DiffImageOverlap-fno: 0.00 [0/14]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 18:21:56 Z

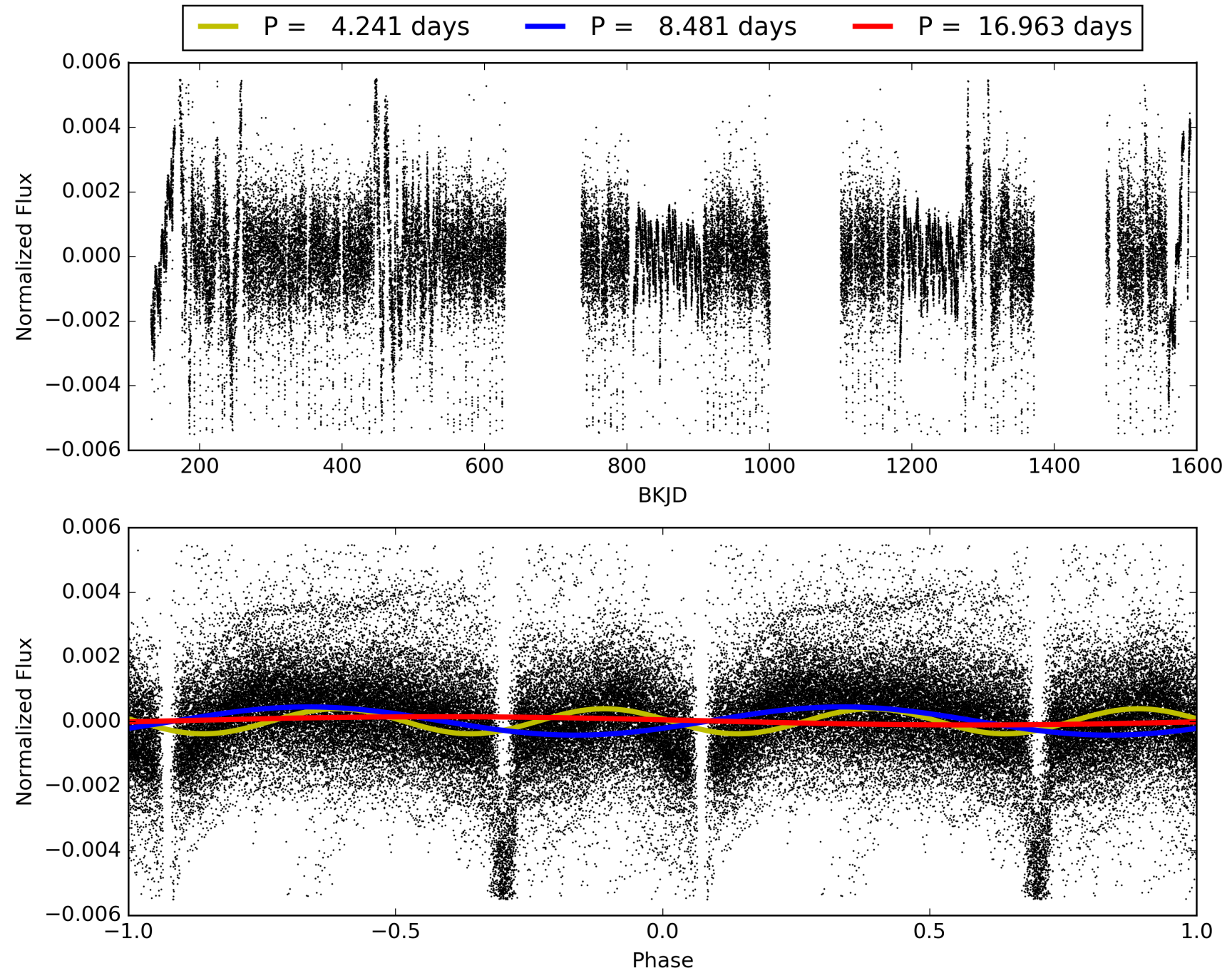
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 009851126-04, PDC Light Curves





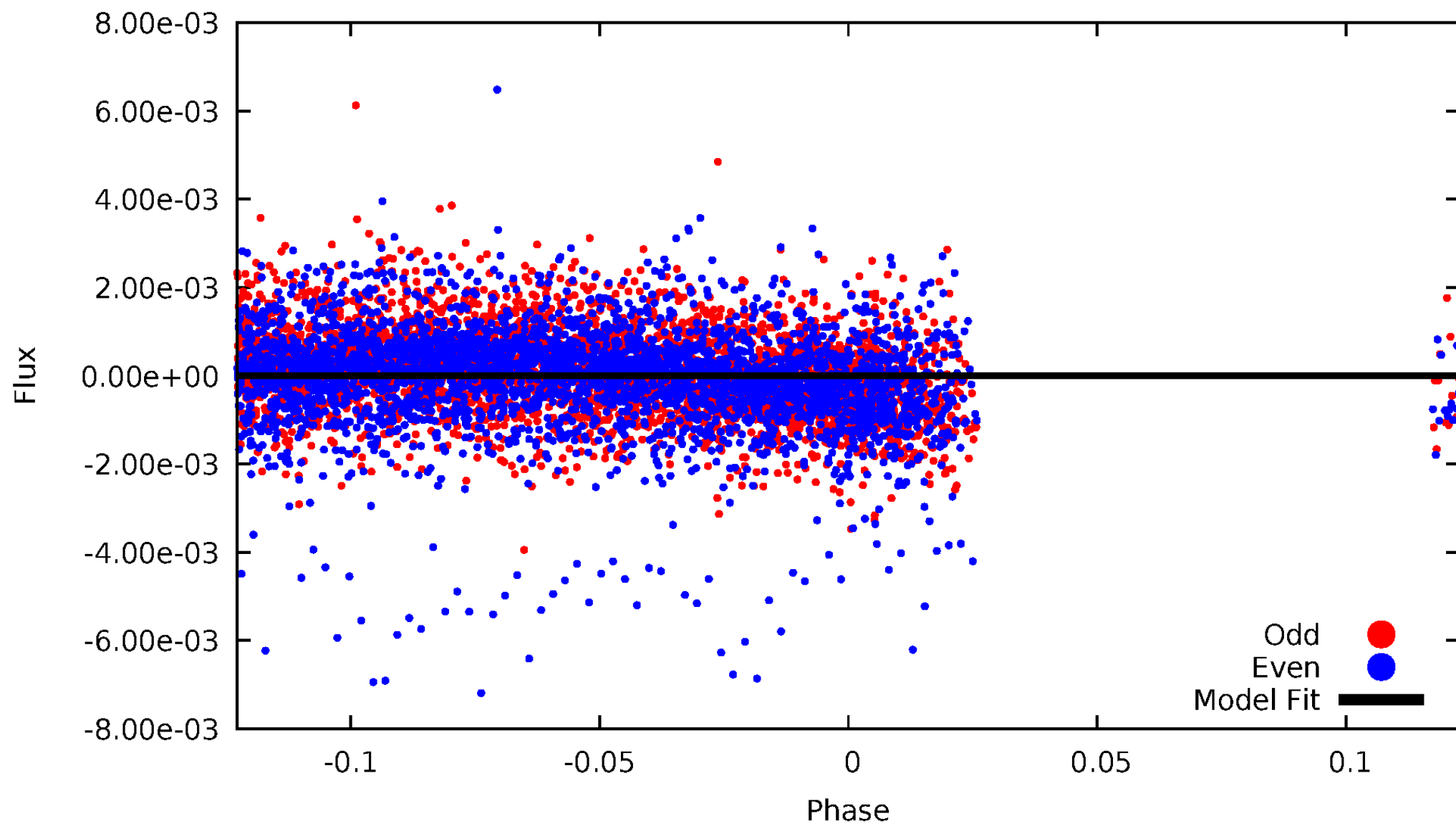
TCE 009851126-04





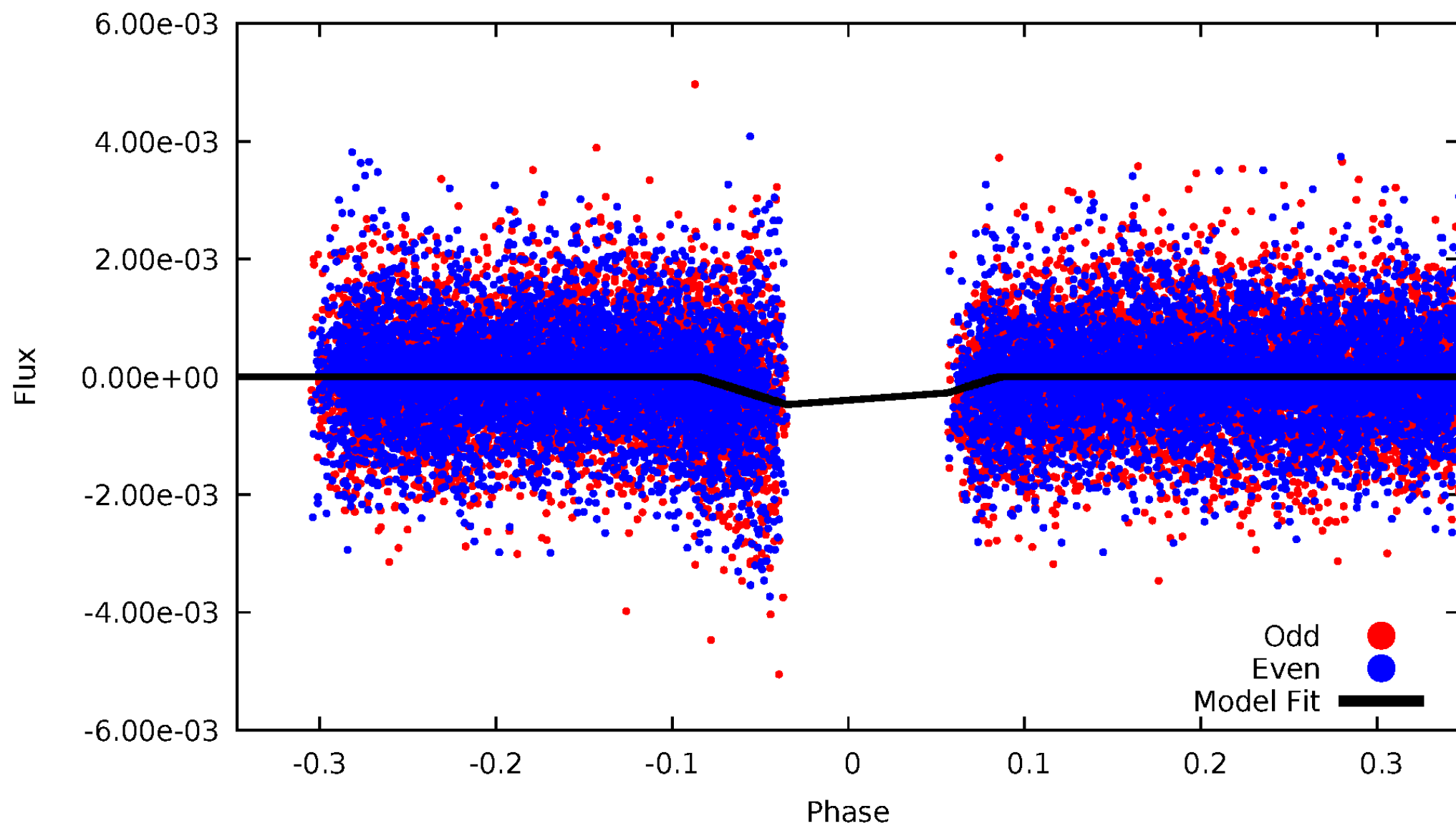
DV Odd/Even

TCE 009851126-04



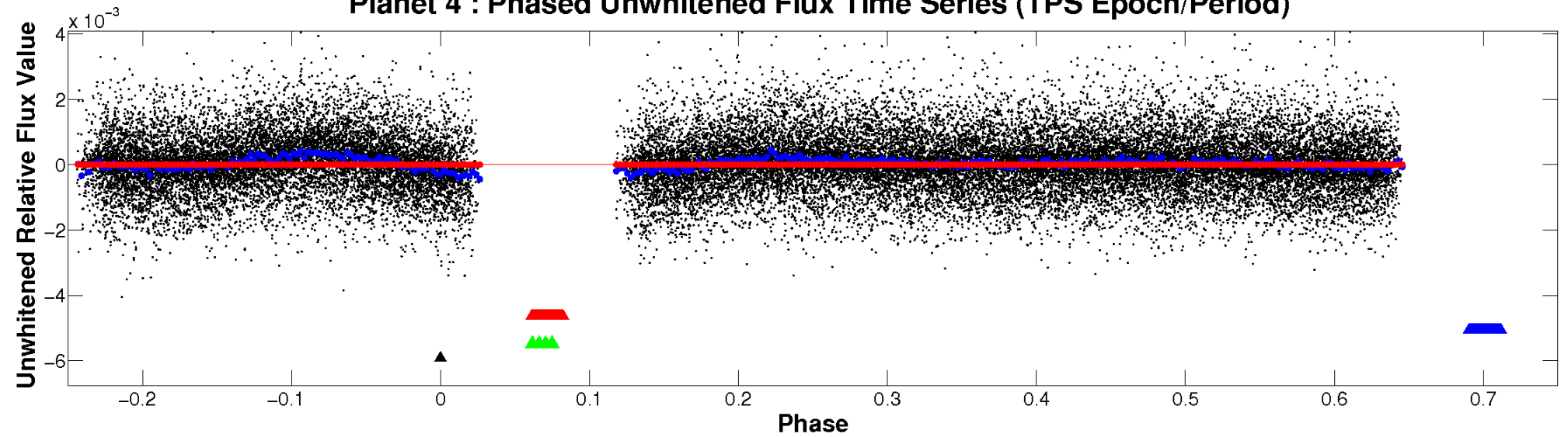
# ALT Odd/Even

TCE 009851126-04



# Non-Whitened Vs. Whitened Light Curve

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

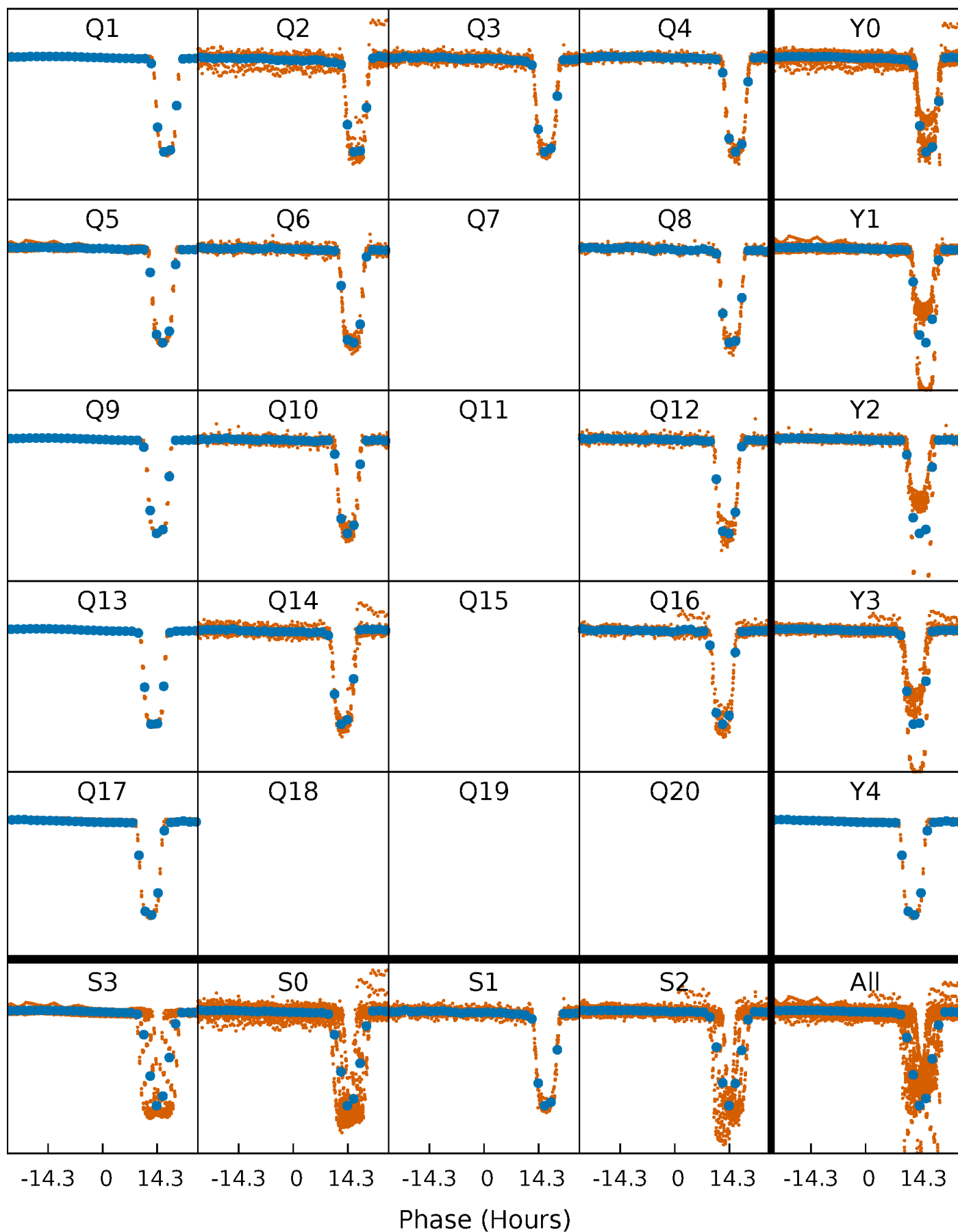


**Planet 4 : Phased Whitened Flux Time Series (TPS Epoch/Period)**



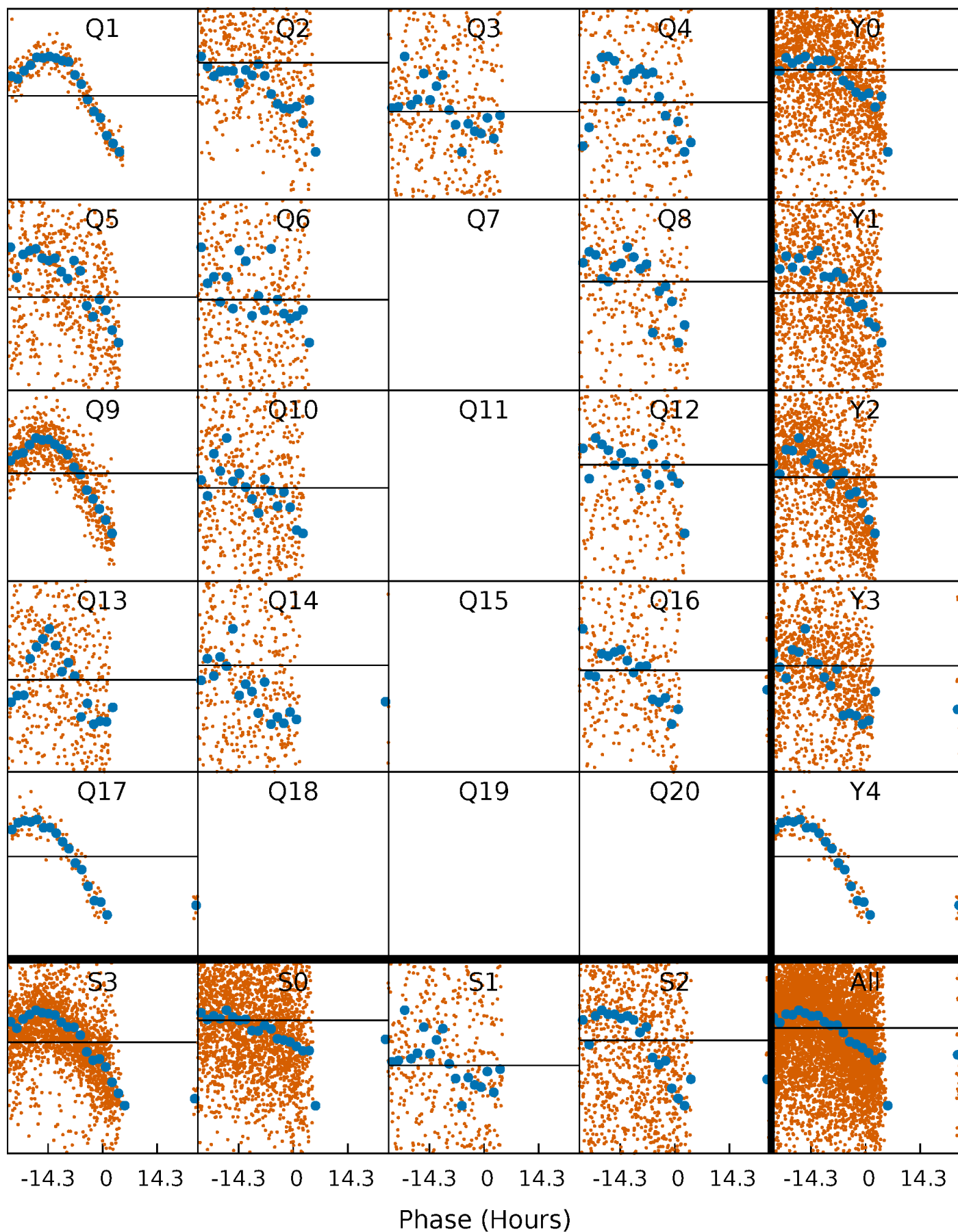
# PDC Quarter-Phased Transit Curves

TCE 009851126-04 P= 8.481368 Days  $T_0=135.154979$  (BKJD)



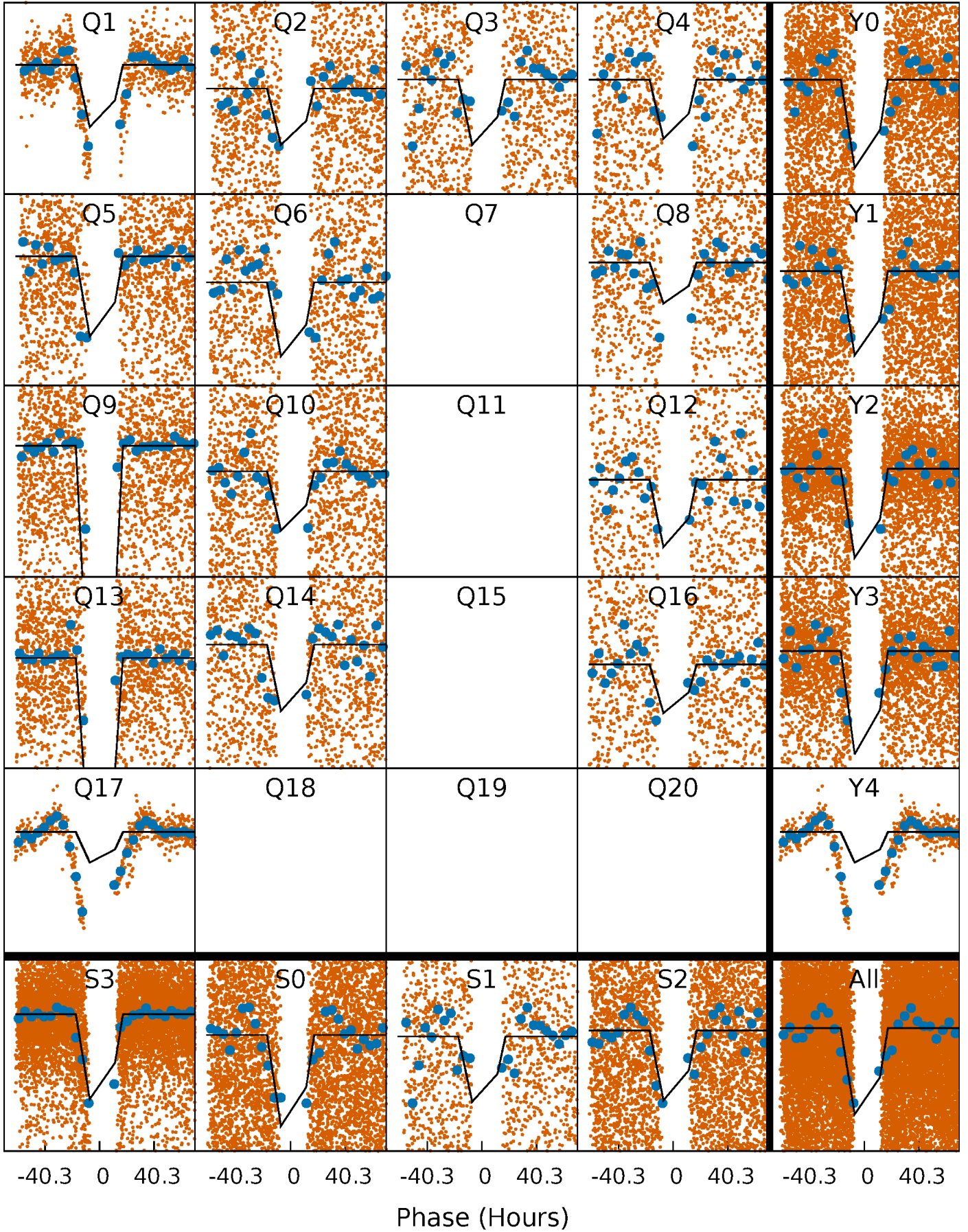
# DV Quarter-Phased Transit Curves

TCE 009851126-04 P= 8.481368 Days  $T_0=135.154979$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 009851126-04 P= 8.481368 Days  $T_0=135.671158$  (BKJD)

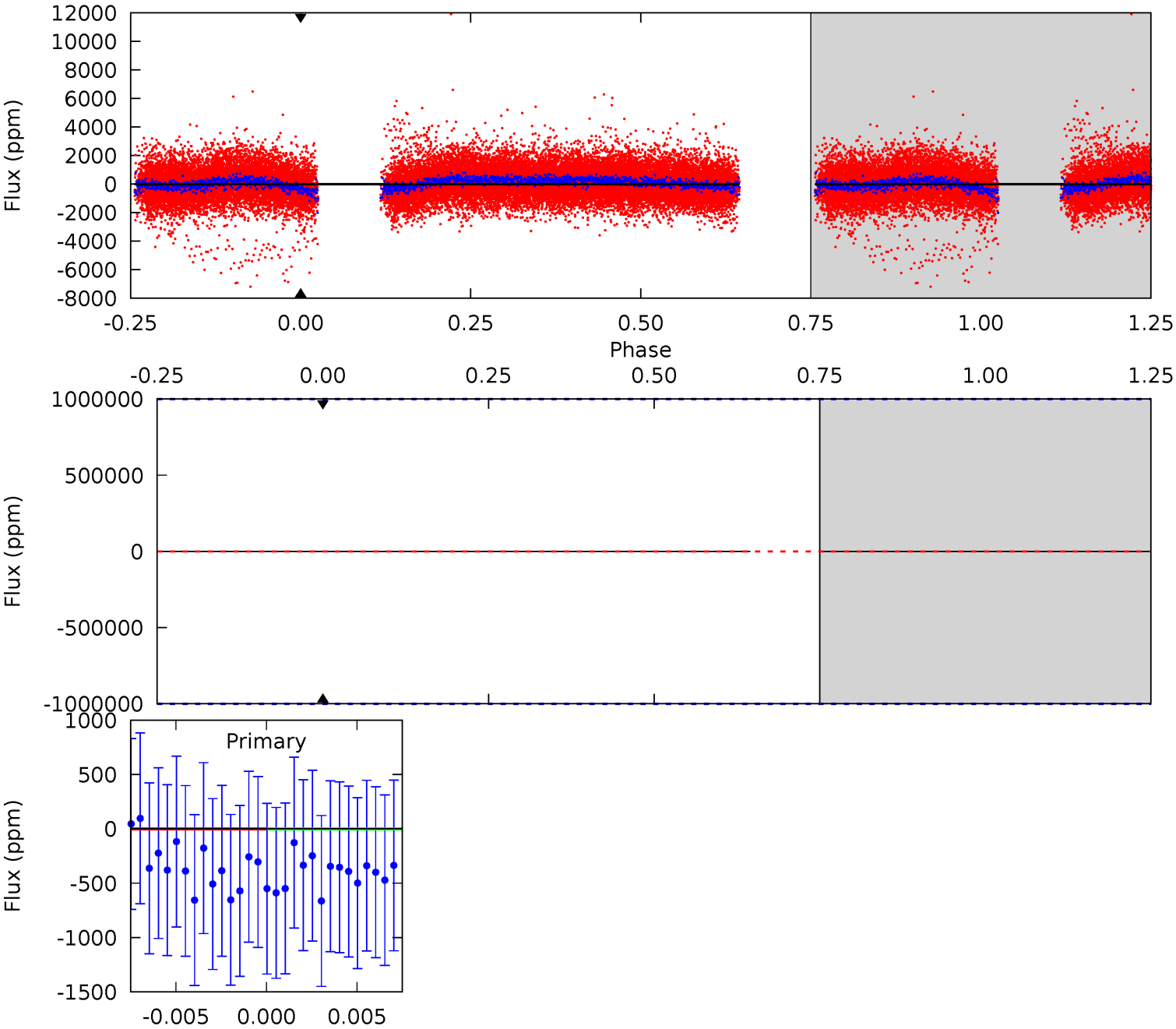




# DV Model-Shift Uniqueness Test

009851126-04, P = 8.481368 Days, E = 126.673611 Days

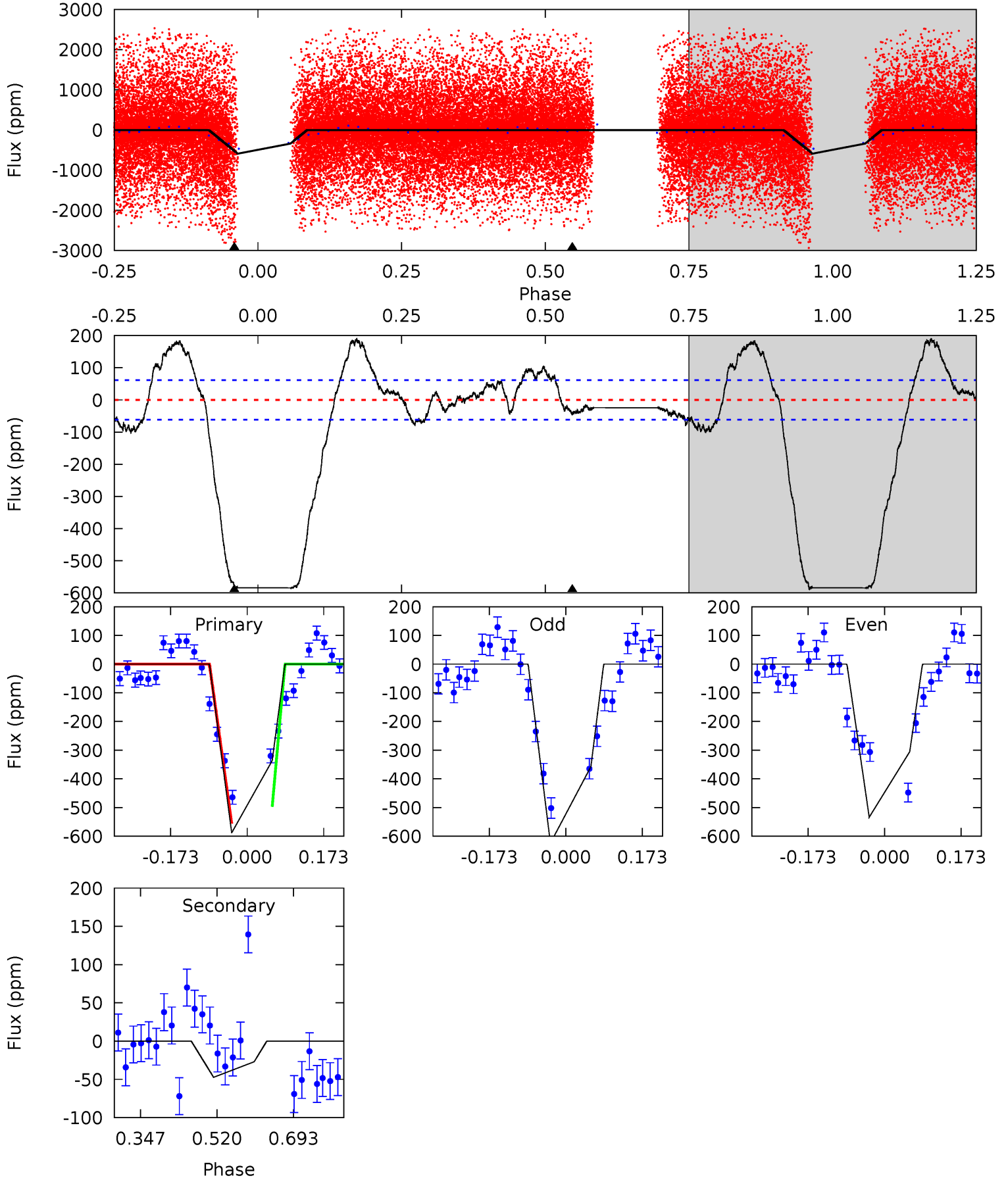
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



# Alt Model-Shift Uniqueness Test

009851126-04, P = 8.481368 Days, E = 127.189790 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
42.6	3.42	0	0	4.45	1.36	5.49	42.6	42.6	3.42	3.42	3.23	0.98	0.24	1.96





### Stellar Parameters For KIC 009851126

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5385^{+185}_{-185}$	$4.565^{+0.048}_{-0.112}$	$-0.180^{+0.300}_{-0.300}$	$0.787^{+0.153}_{-0.071}$	$0.832^{+0.096}_{-0.087}$	$2.400^{+0.510}_{-0.819}$
	+3%/-3%	+1%/-2%	+167%/-167%	+19%/-9%	+12%/-10%	+21%/-34%
Source	PHO54	PHO54	PHO54	DSEP		

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

### Secondary Eclipse Parameters for KIC 009851126-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$0 \pm 1000000$	$7.21^{+6.88}_{-4.89}$	$1077^{+54}_{-47}$	$-4104^{+18295}_{-13480}$	$-111.363^{+8670.839}_{-13254.453}$
Alt.	$-47 \pm 14$	$6.68^{+7.33}_{-4.51}$	$1079^{+53}_{-52}$	$2436^{+878}_{-463}$	$3.295^{+26.457}_{-2.567}$

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

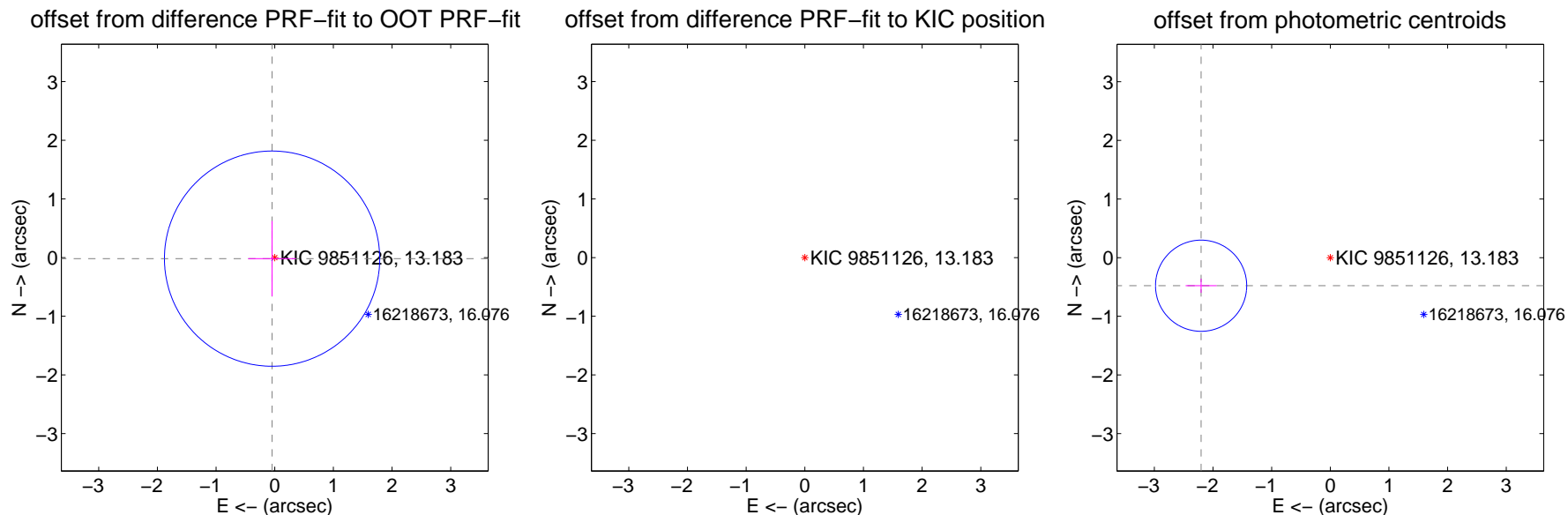
## DV Centroid Data

Supplemental centroid analysis for 009851126-04. Kepler magnitude: 13.18. Transit SNR -1.00

There are 7 quarters with good PRF difference image offsets

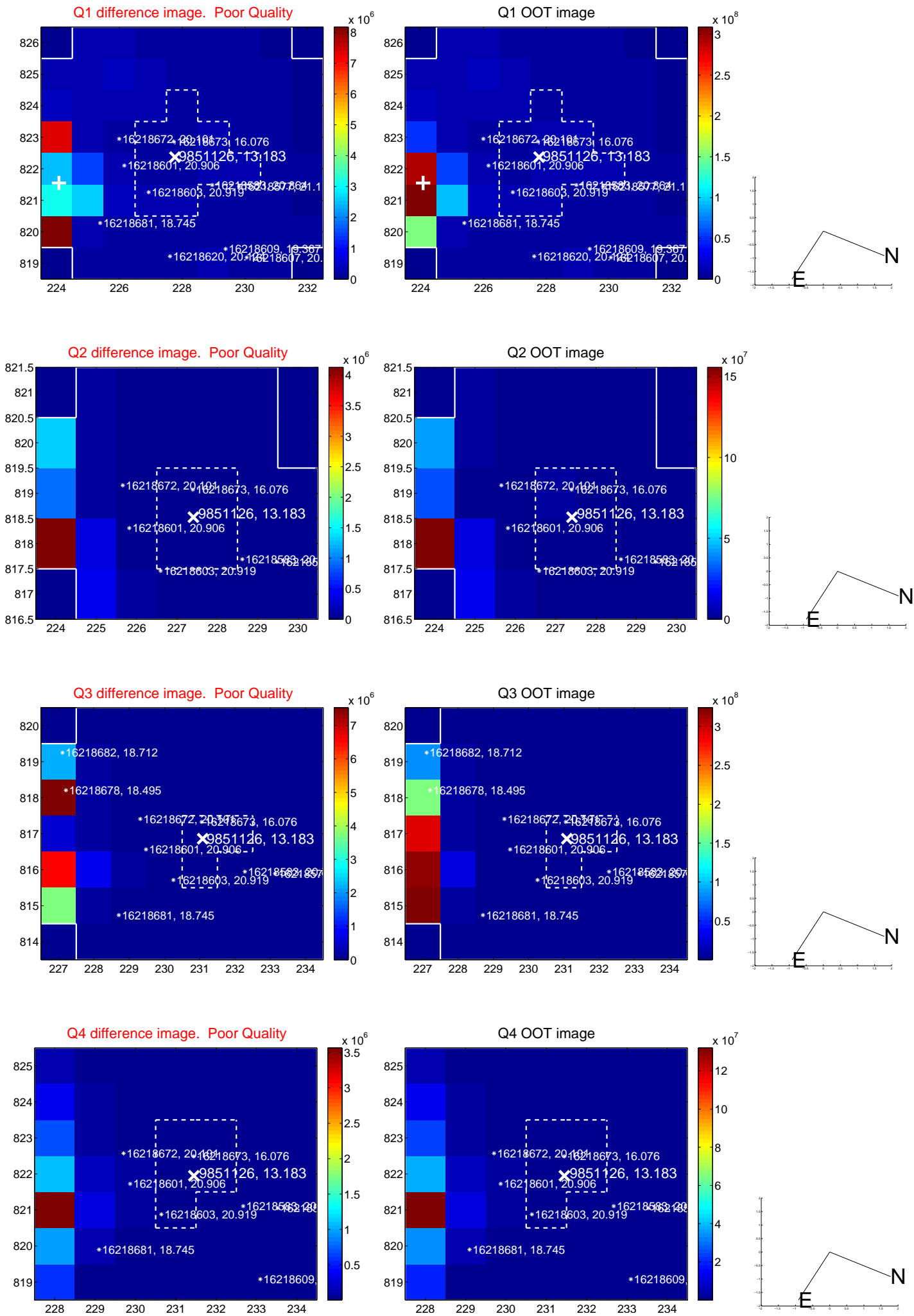
The OOT PRF centroid is offset from the target star catalog position by about 11.35 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.048 \pm 0.611$	0.08	$0.045 \pm 0.406$	$-0.018 \pm 0.641$
PRF-fit source offset from KIC position	<b><math>11.300 \pm 0.432</math></b>	<b>26.16</b>	$8.104 \pm 0.209$	$-7.874 \pm 0.440$
photometric centroid source offset	<b><math>2.25 \pm 0.26</math></b>	<b>8.70</b>	$2.20 \pm 0.26$	$-0.48 \pm 0.12$

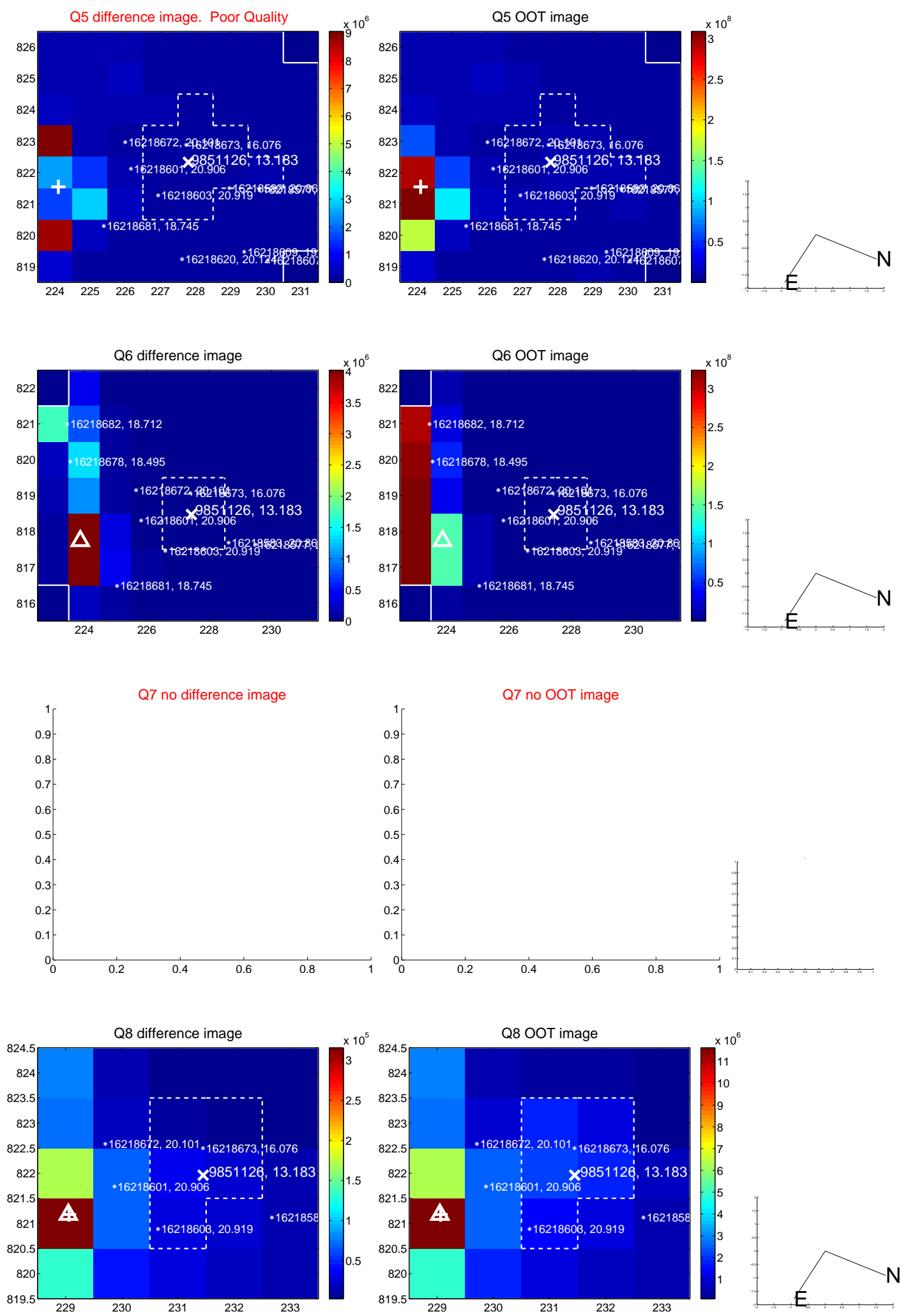


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

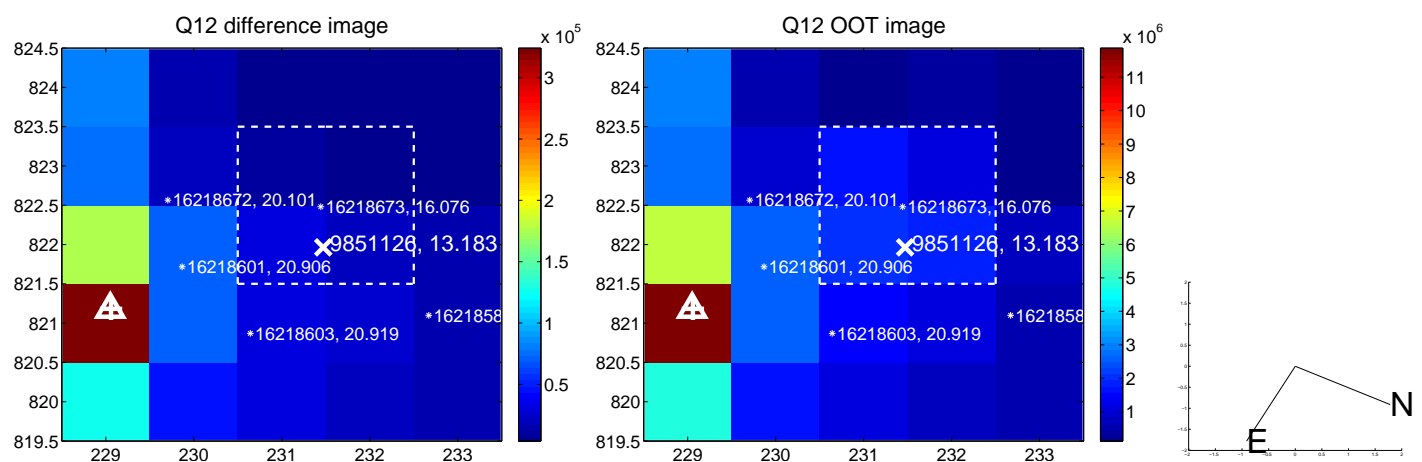
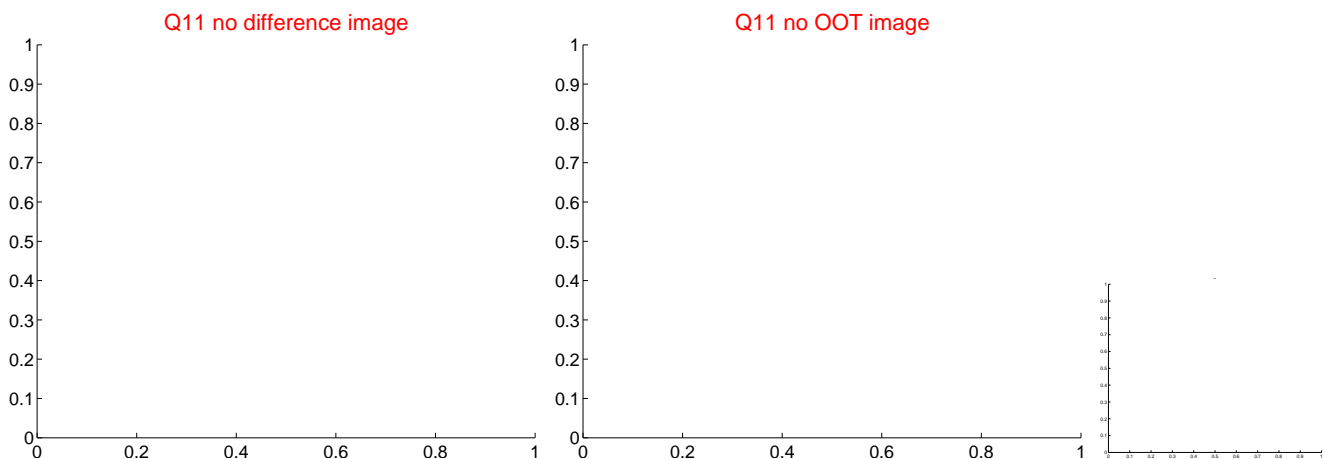
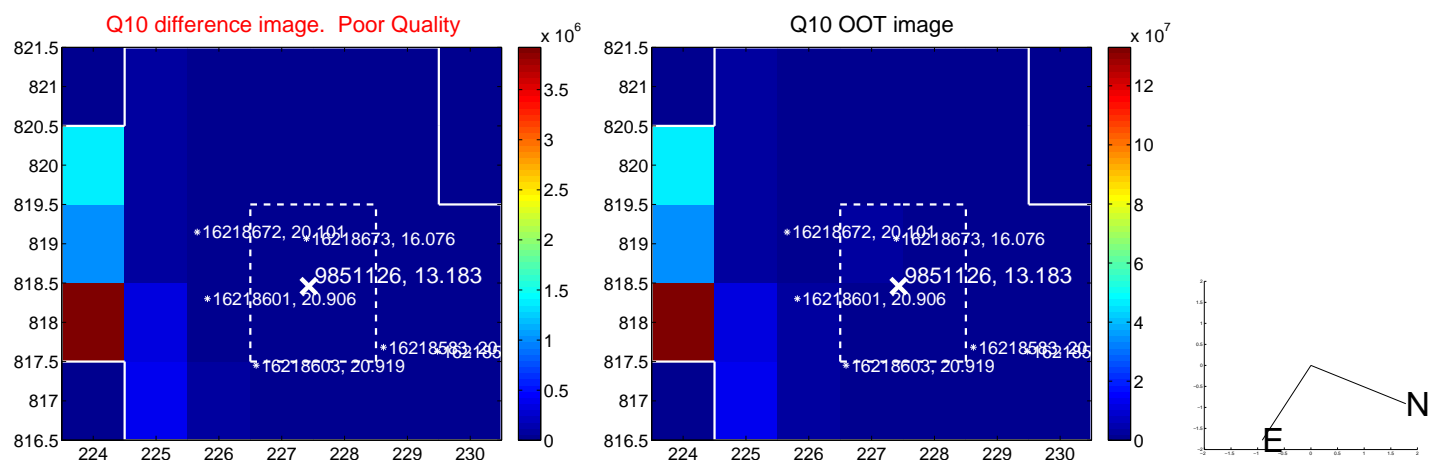
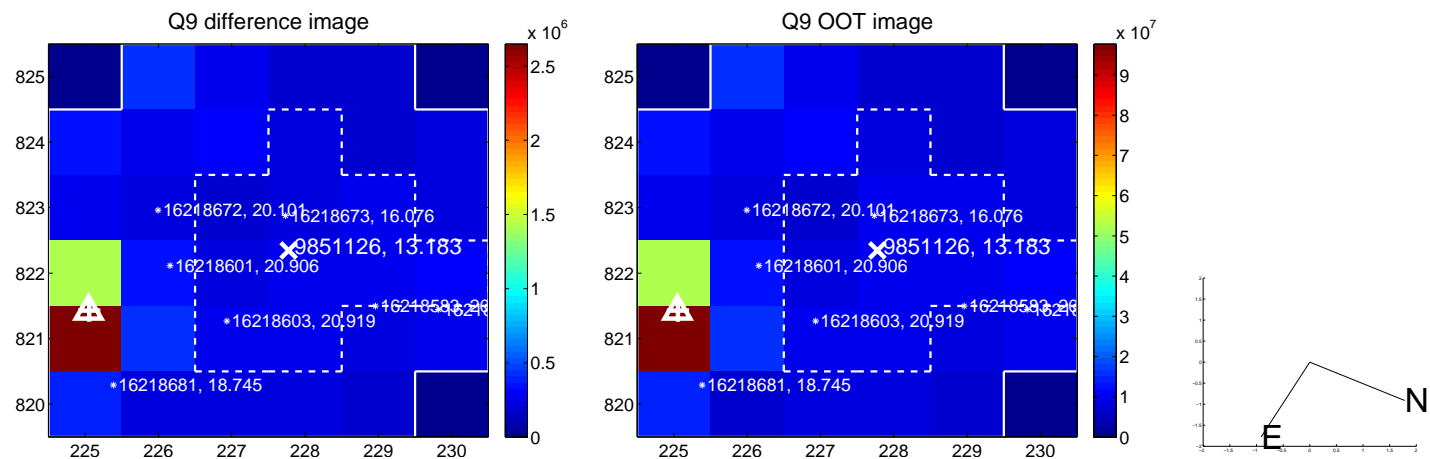
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



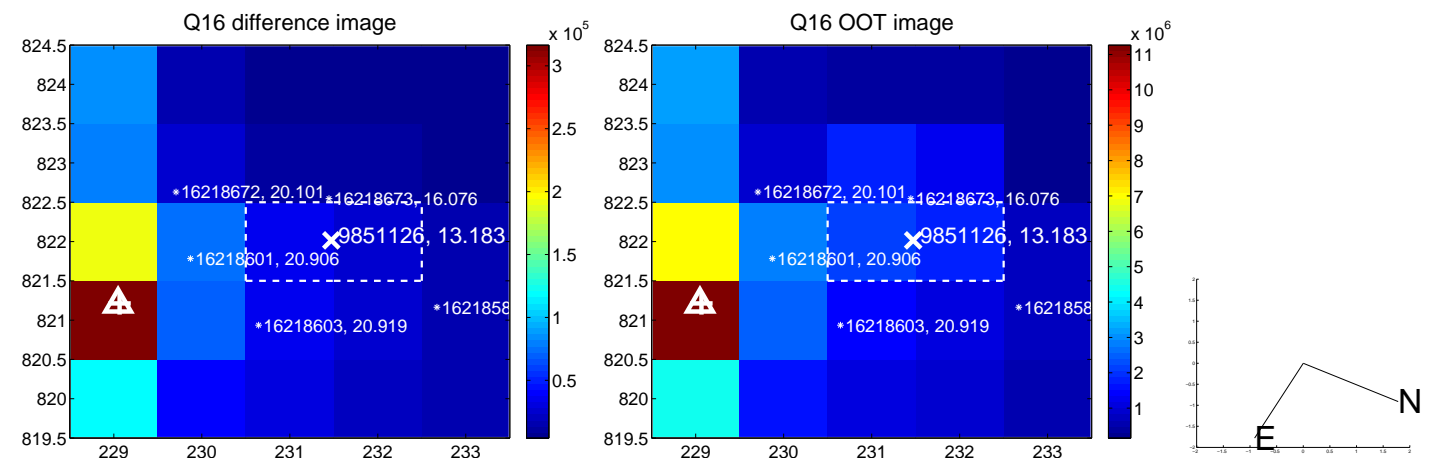
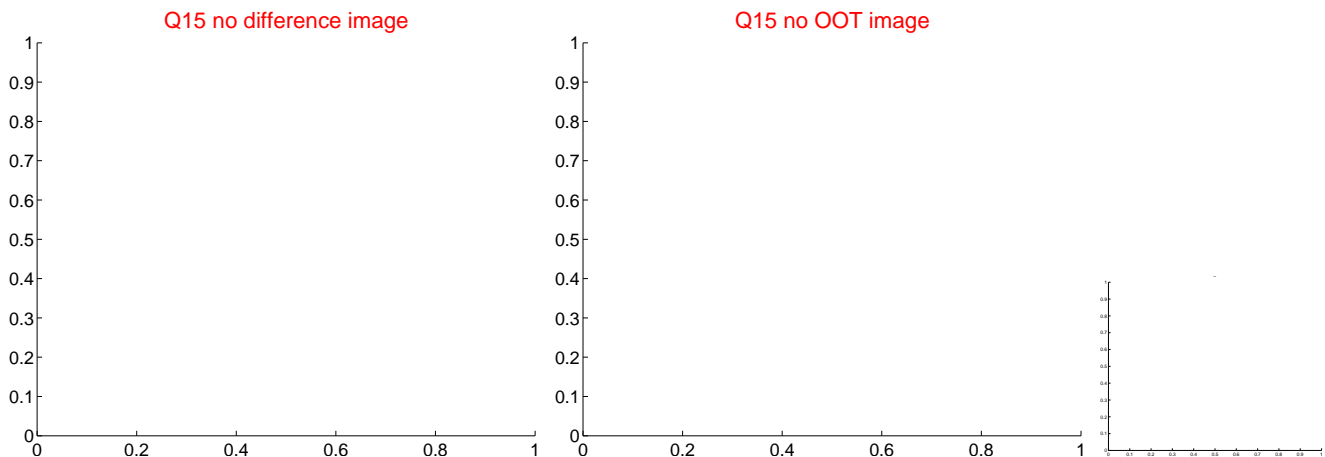
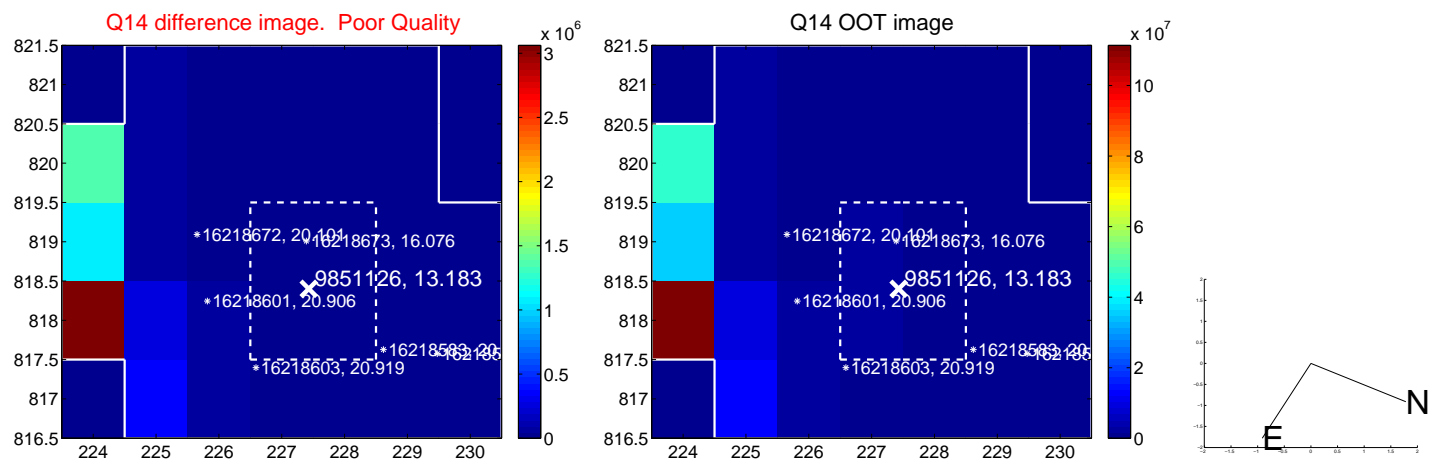
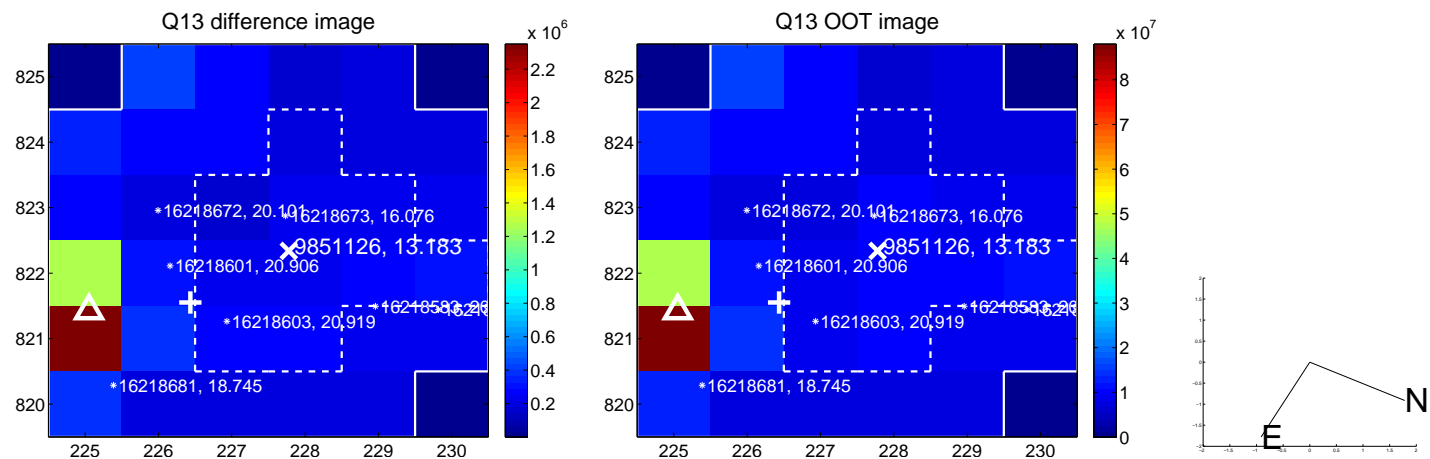
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



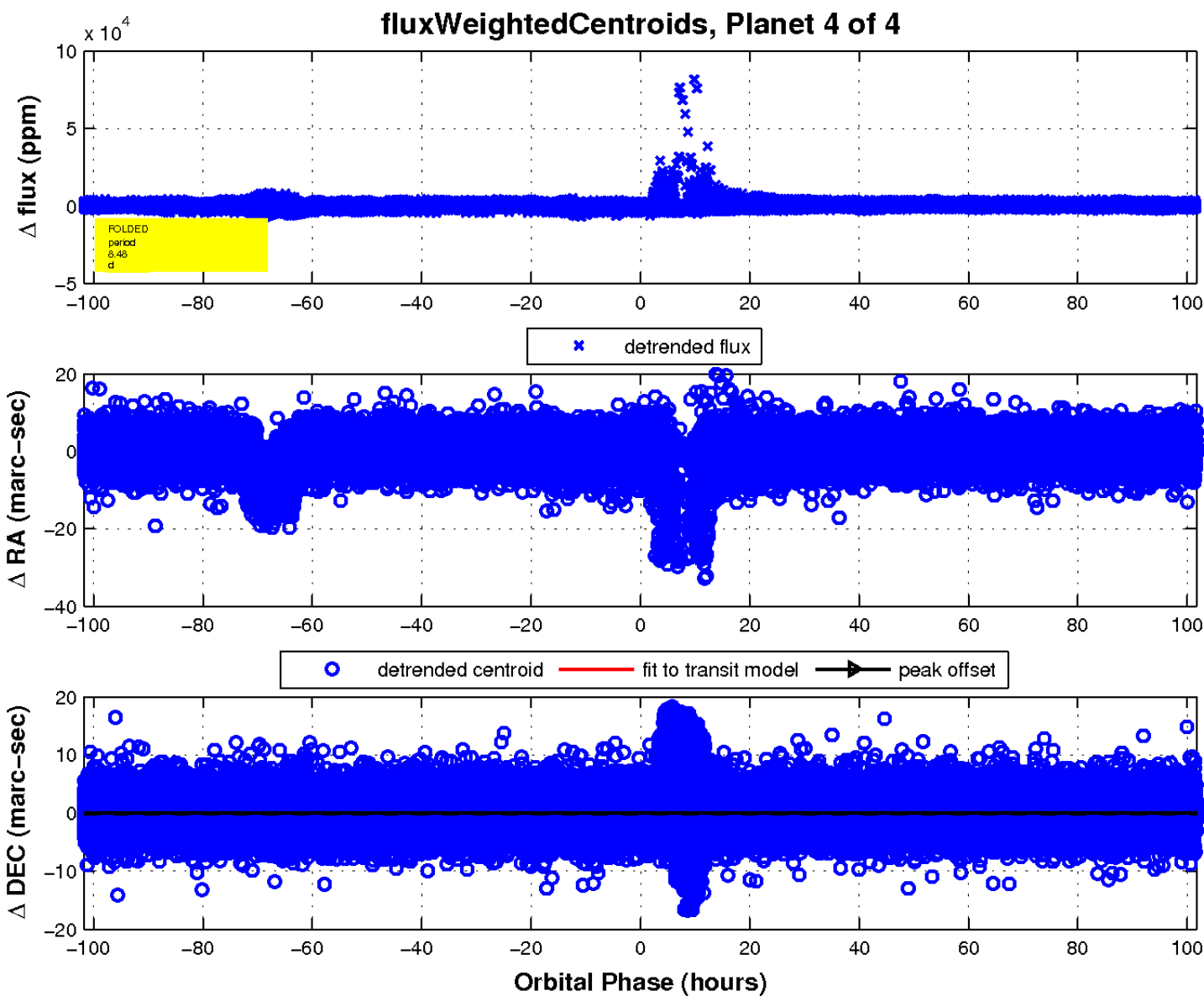
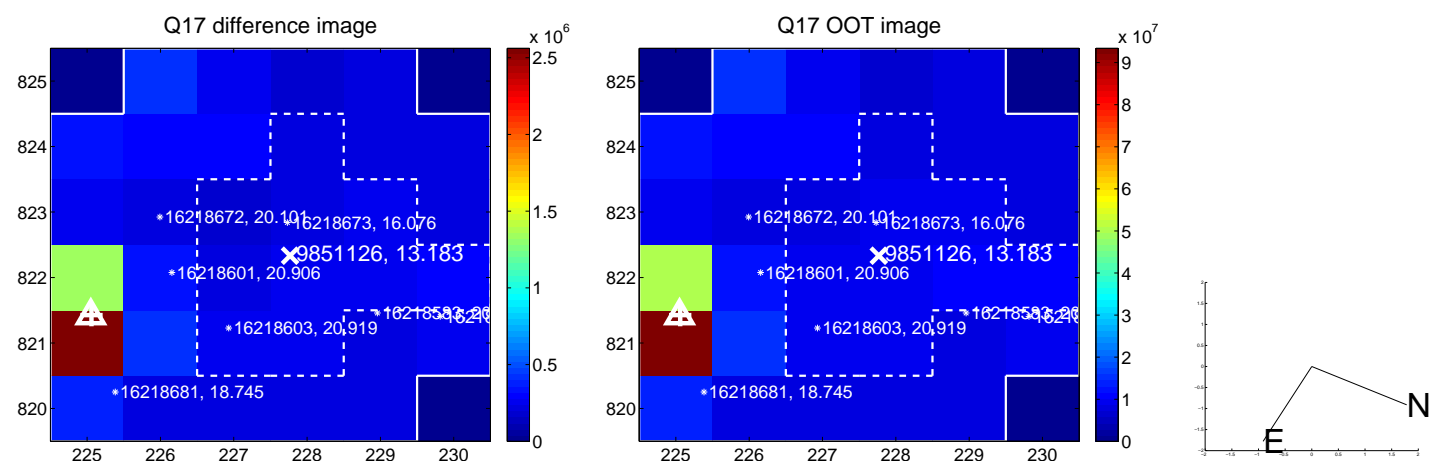
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



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



UKIRT Image

Declination

