

# KIC 009143785

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009143785-01	OBS	No	0.993512	132.170246	170.0	5.381	13.2	17.6	1.25	7818	1.66	14186.79
009143785-02	OBS	No	0.785890	131.552344	243.7	9.431	8.8	14.6	1.25	7818	2.00	19392.44

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009143785-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV
009143785-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—TRANS_GAPPED—LPP_DV—LPP_ALT

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

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

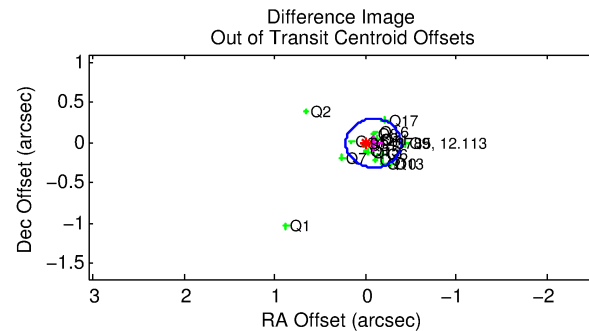
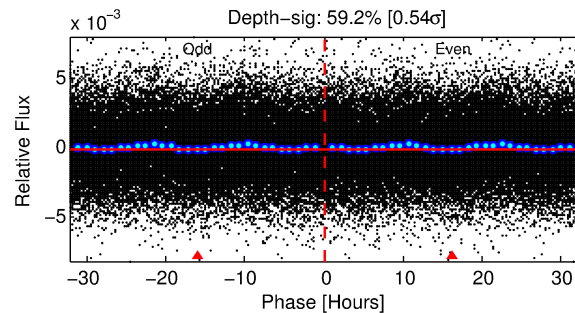
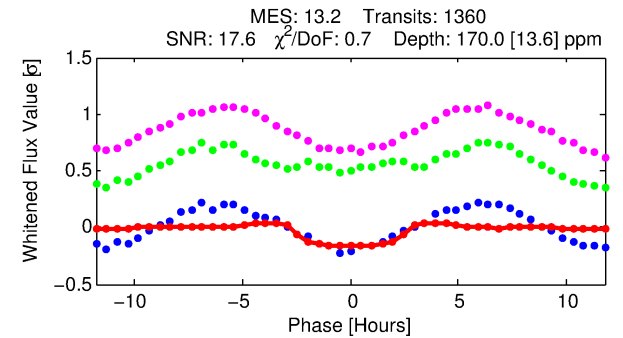
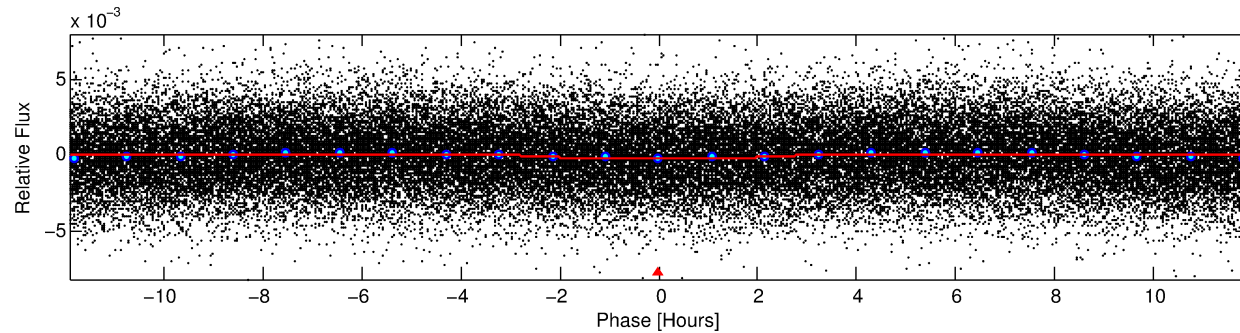
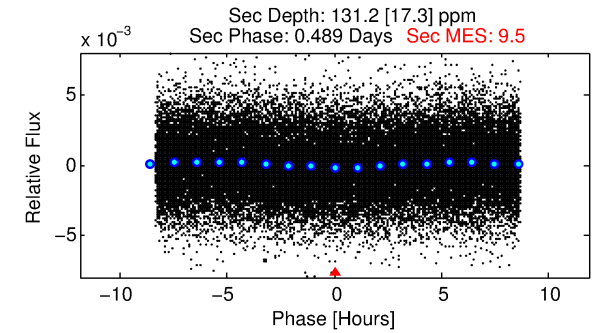
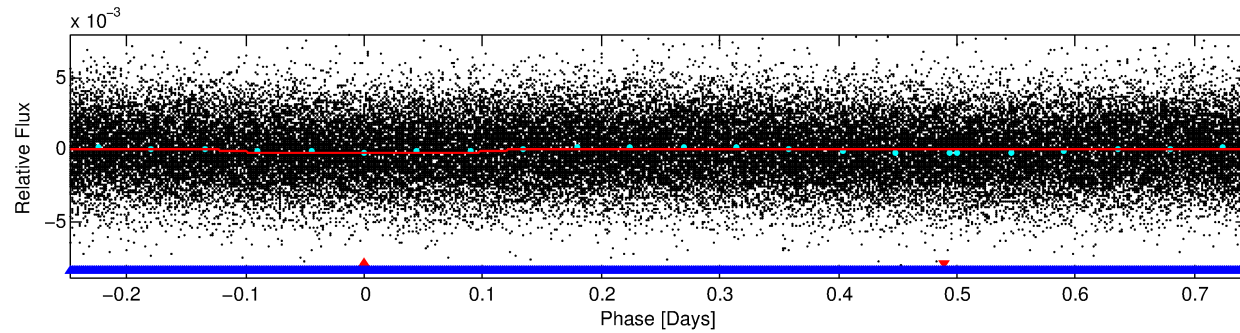
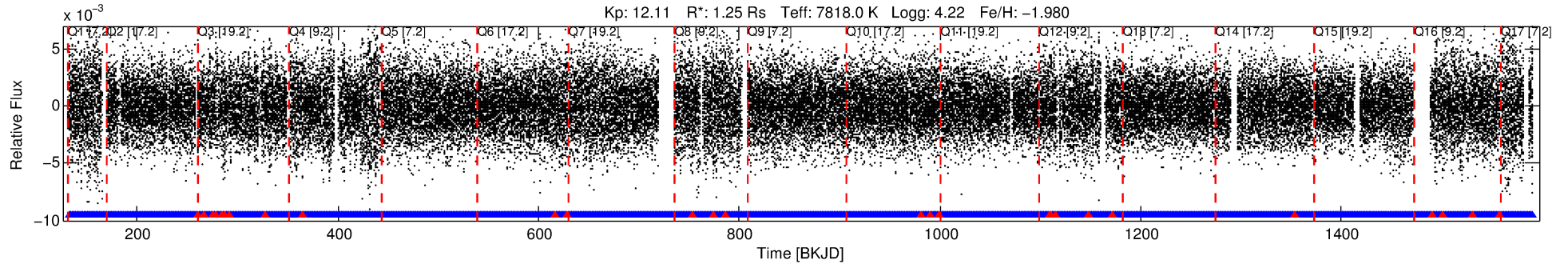
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009143785-01

No Significant Match Found

# DV One-Page Summary

KIC: 9143785 Candidate: 1 of 2 Period: 0.994 d



## DV Fit Results:

Period = 0.99351 [0.00001] d  
Epoch = 132.1702 [0.0037] BKJD  
Rp/R\* = 0.0121 [0.0089]  
a/R\* = 1.55 [4.05]  
b = 0.03 [174.32]  
Seff = 14186.79 [6139.02]  
Teq = 2783 [301] K  
Rp = 1.66 [1.26] Re  
a = 0.0192 [0.0046] AU  
Ag = 9.70 [14.74] [0.59σ]  
Teffp = 7593 [2796] K [1.71σ]

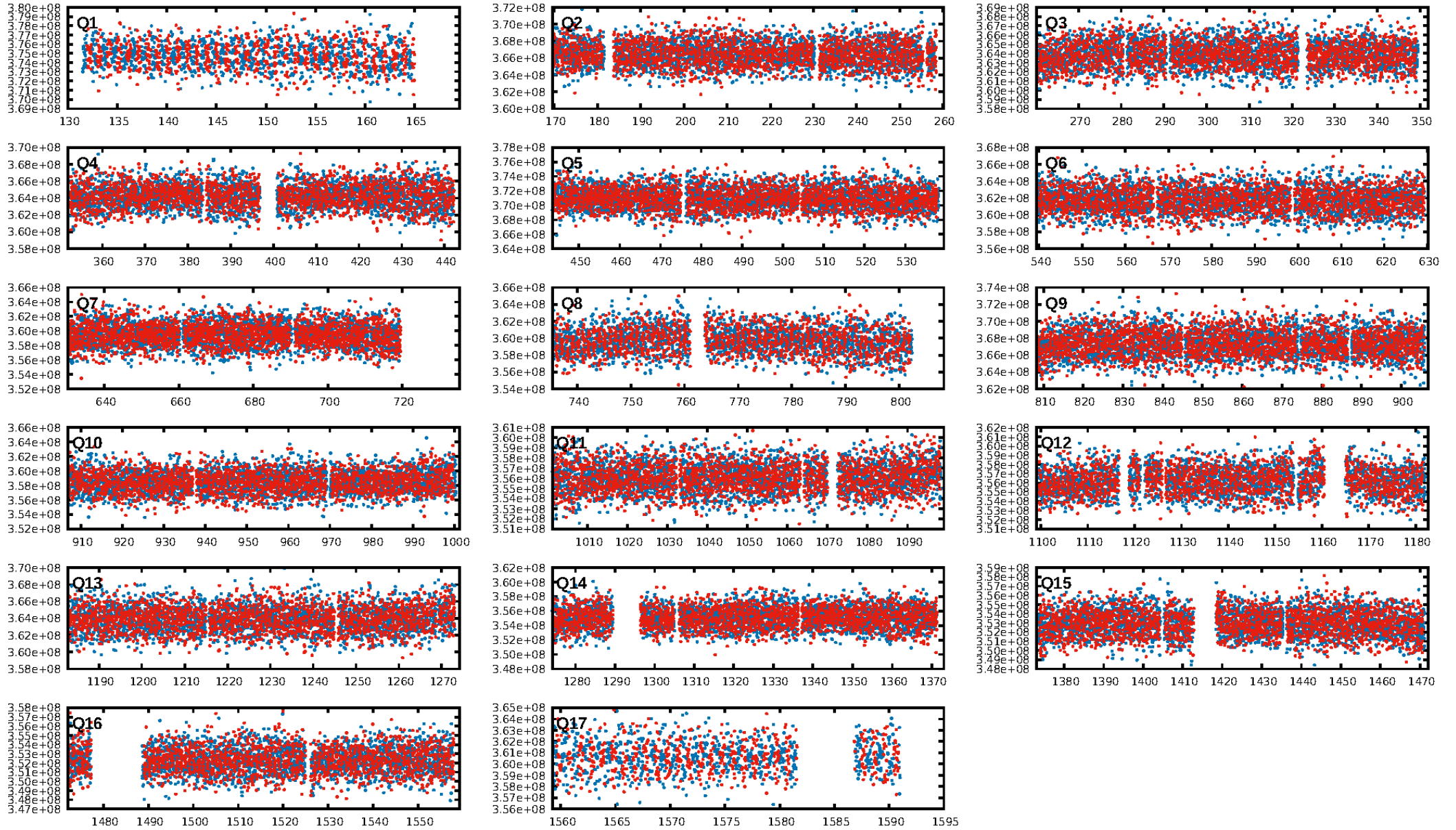
## DV Diagnostic Results:

ShortPeriod-sig: 35.4% [0.46σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 0.98 [1268/1300]  
GhostDiagnostic-chr: 1.084  
**Centroid-sig: 0.1%**  
Centroid-so: 0.099 arcsec [1.85σ]  
OotOffset-rm: 0.087 arcsec [0.86σ]  
KicOffset-rm: 0.041 arcsec [0.45σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 1.00 [17/17]  
DiffImageOverlap-fno: 0.00 [0/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 22:57:42 Z

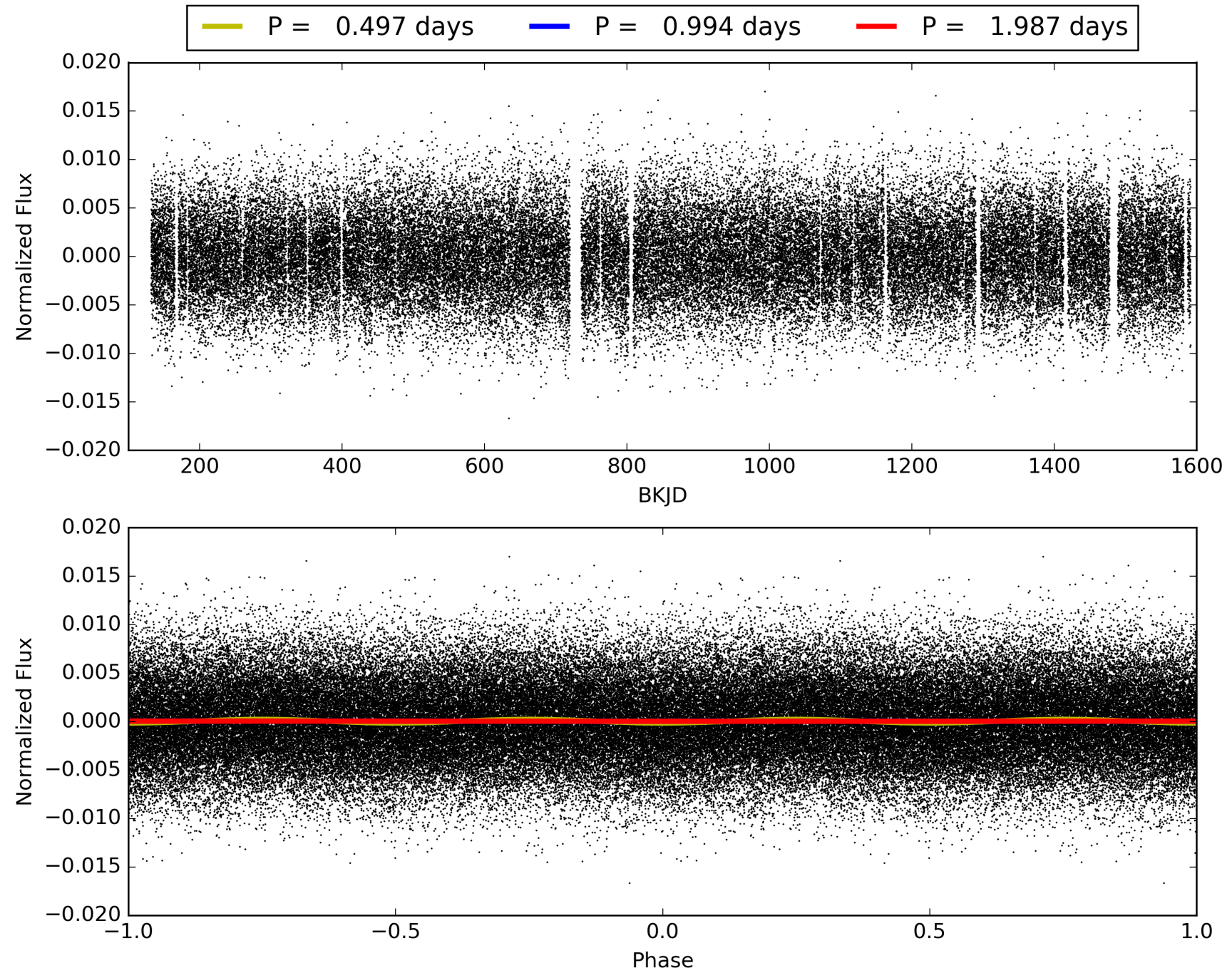
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 009143785-01, PDC Light Curves



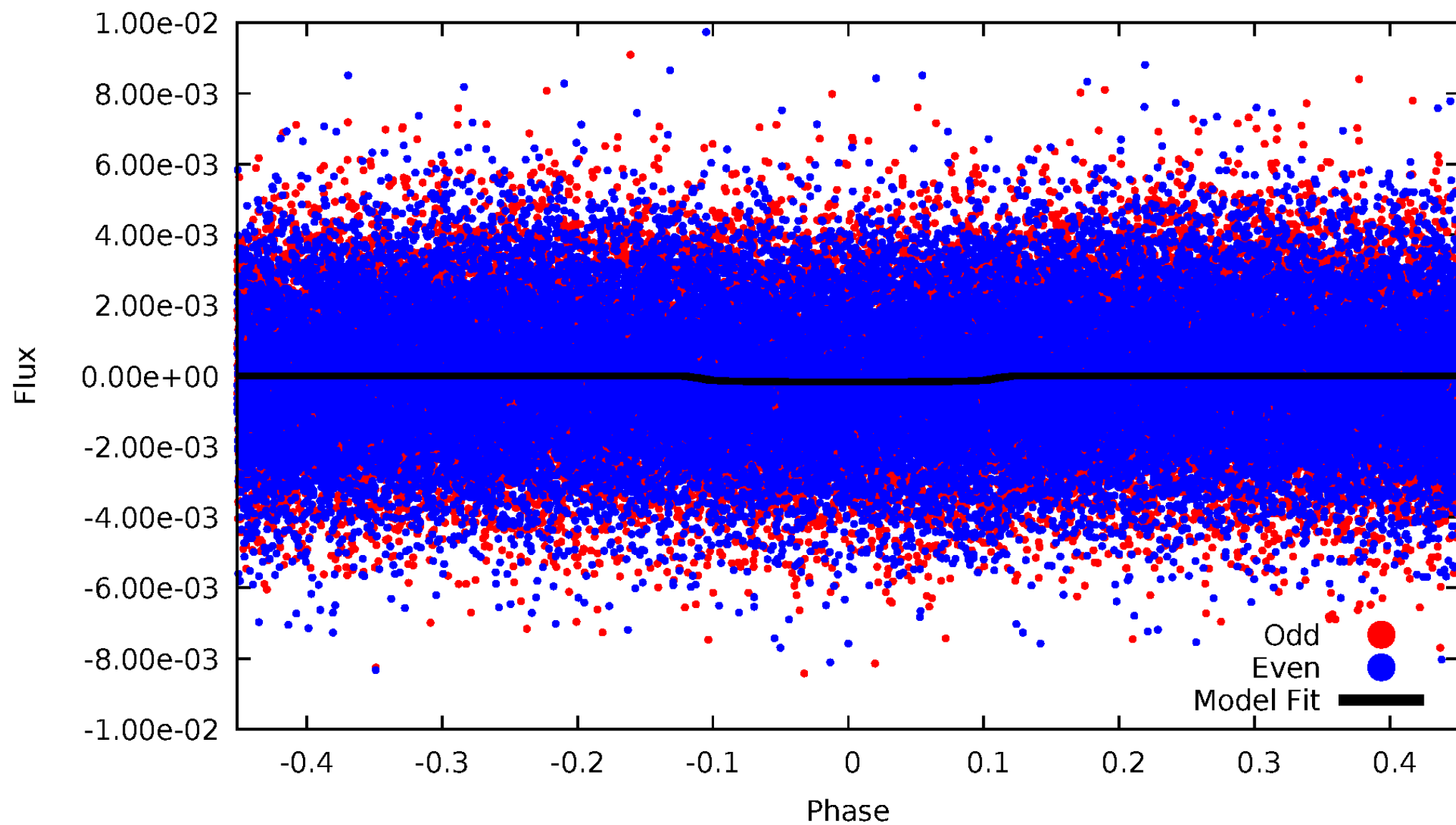


TCE 009143785-01



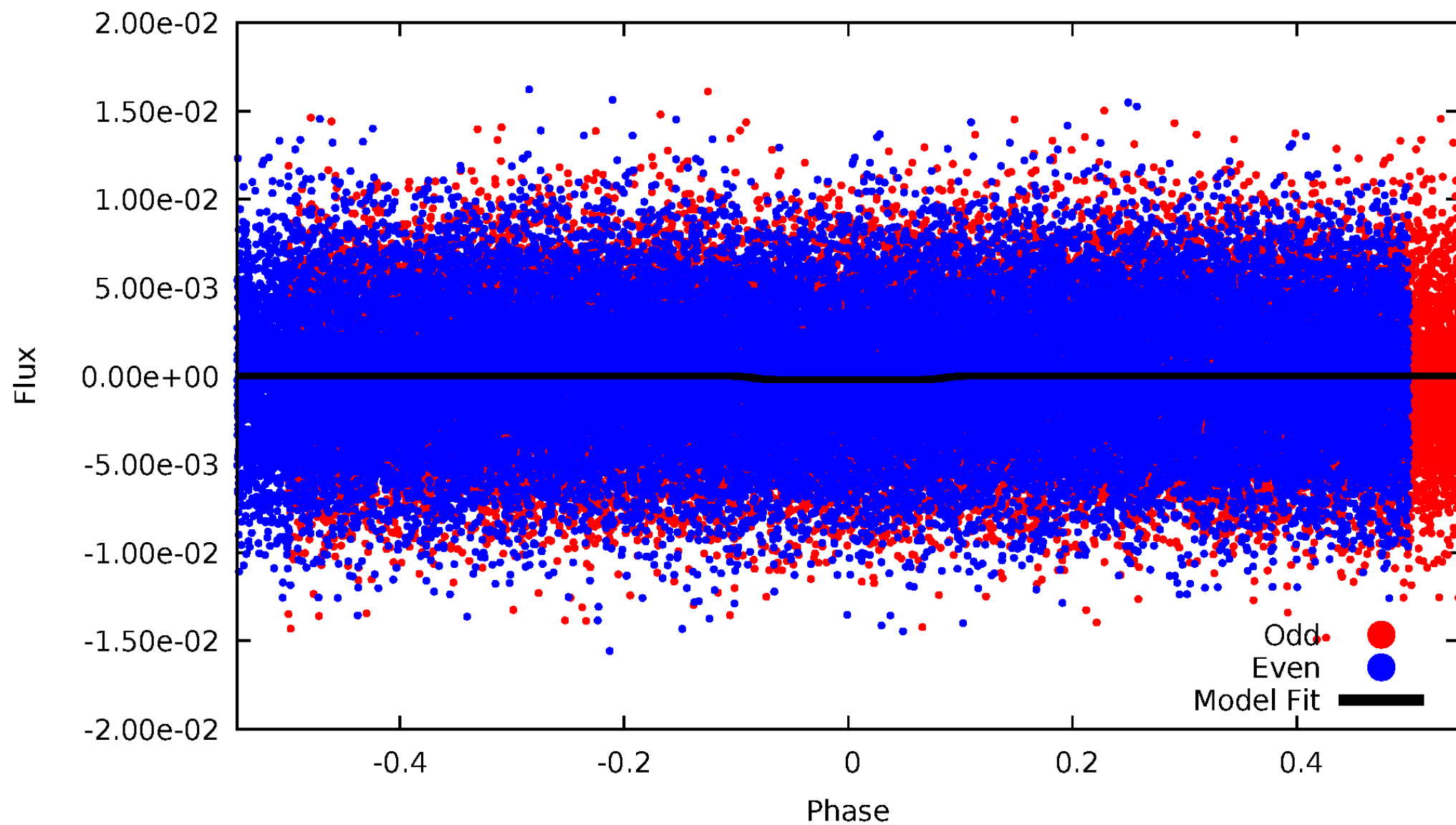
# DV Odd/Even

TCE 009143785-01

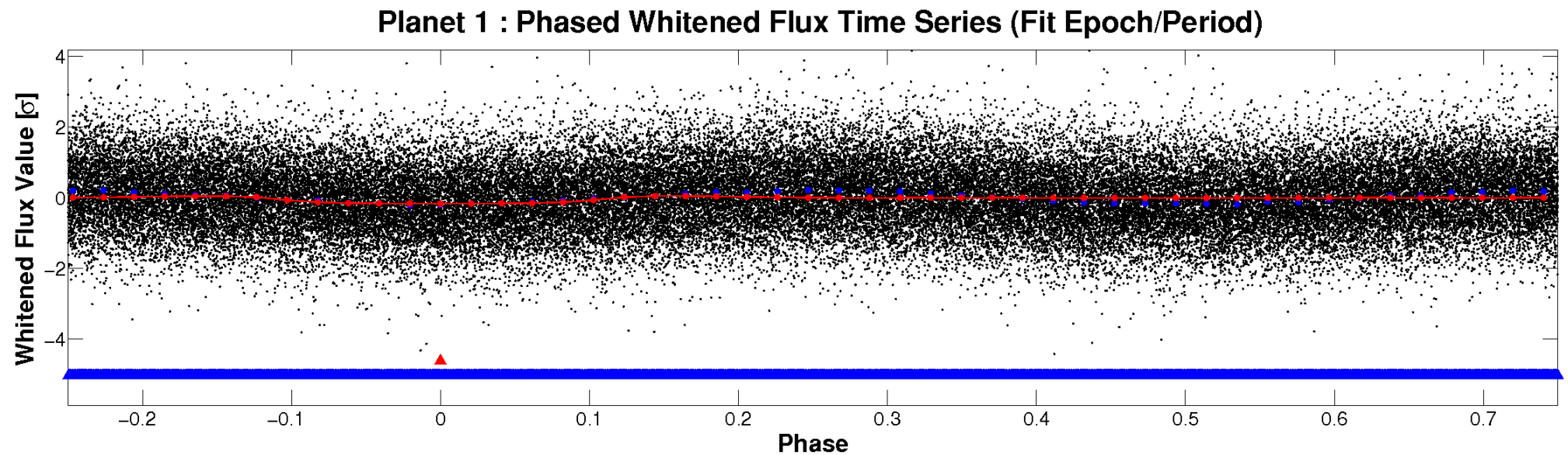
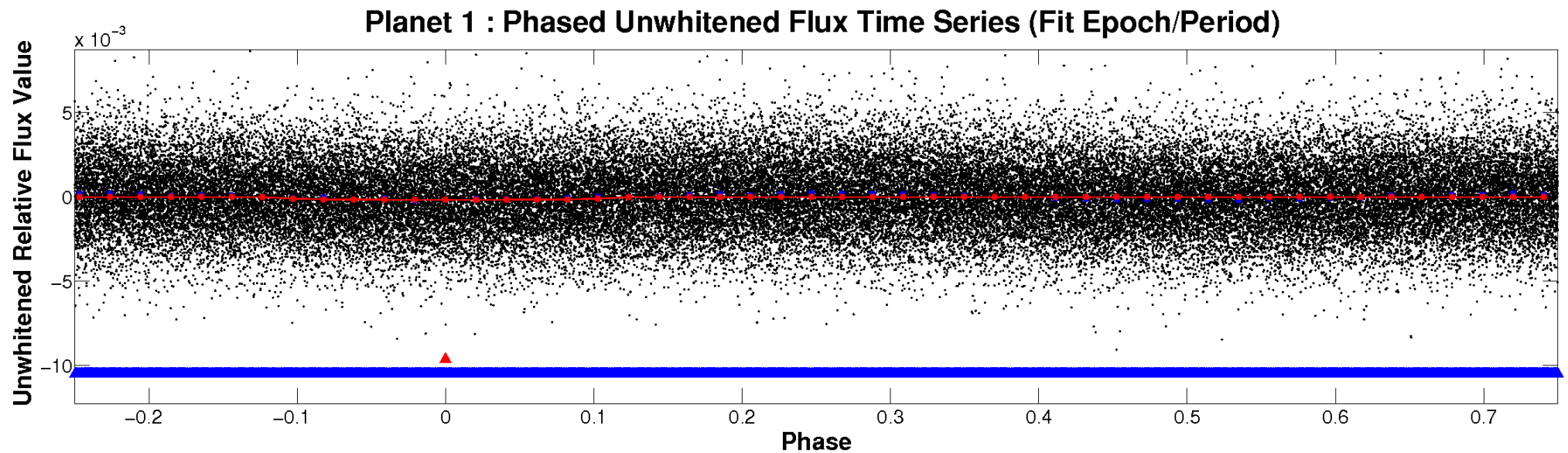


# ALT Odd/Even

TCE 009143785-01



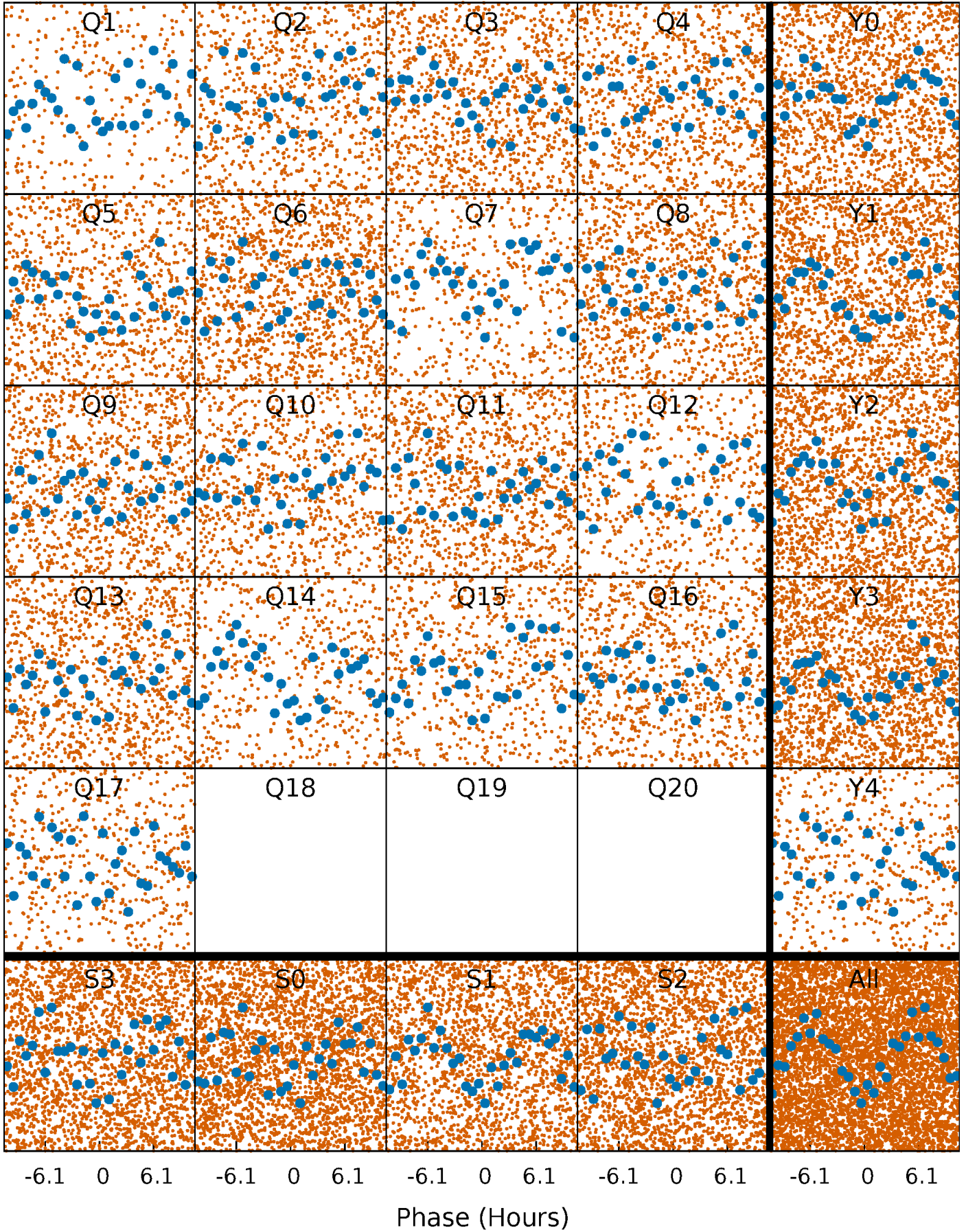
# Non-Whitened Vs. Whitened Light Curve





# PDC Quarter-Phased Transit Curves

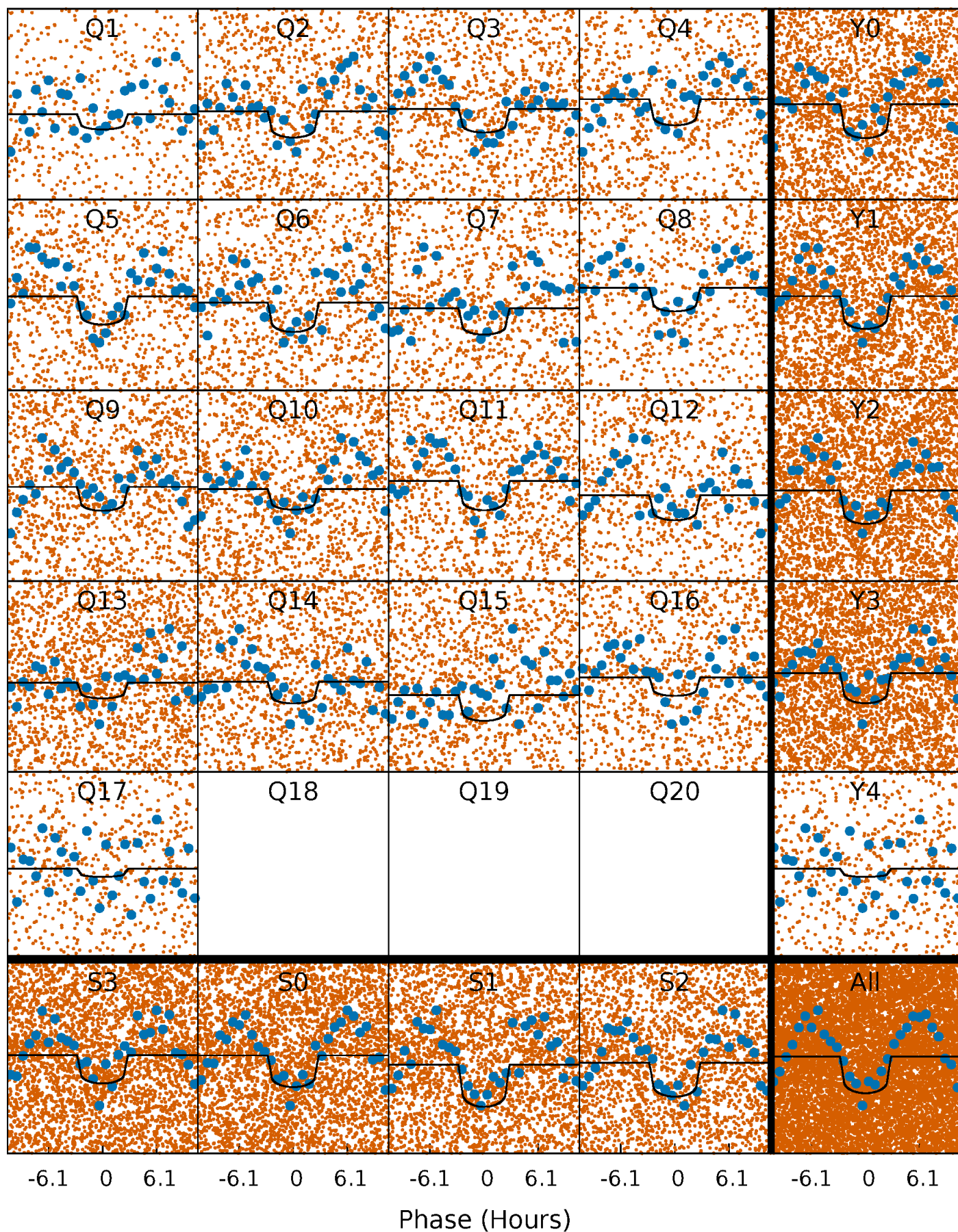
TCE 009143785-01 P= 0.993512 Days  $T_0=132.170246$  (BKJD)





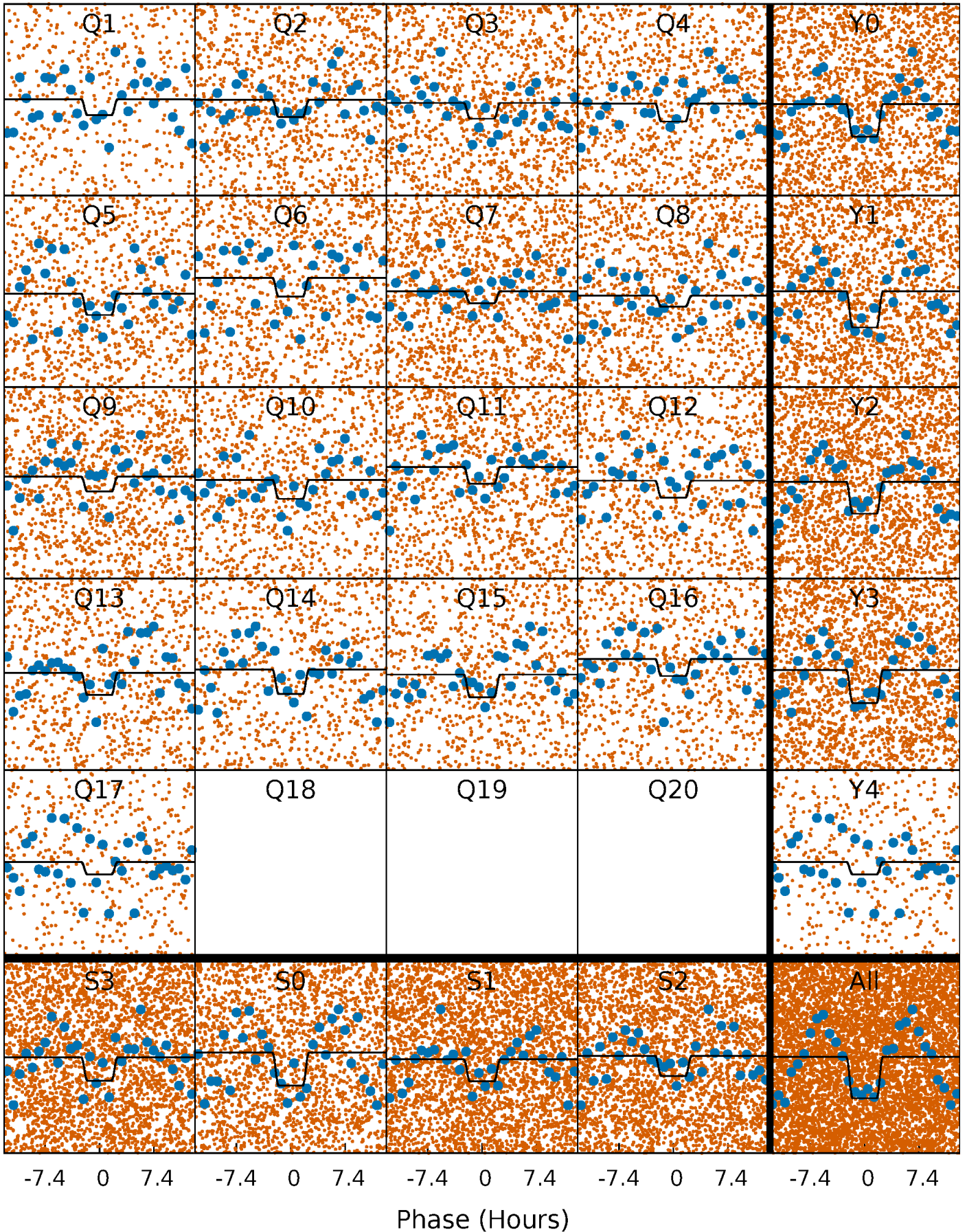
# DV Quarter-Phased Transit Curves

TCE 009143785-01 P= 0.993512 Days  $T_0=132.170246$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 009143785-01 P= 0.993513 Days  $T_0=132.166597$  (BKJD)

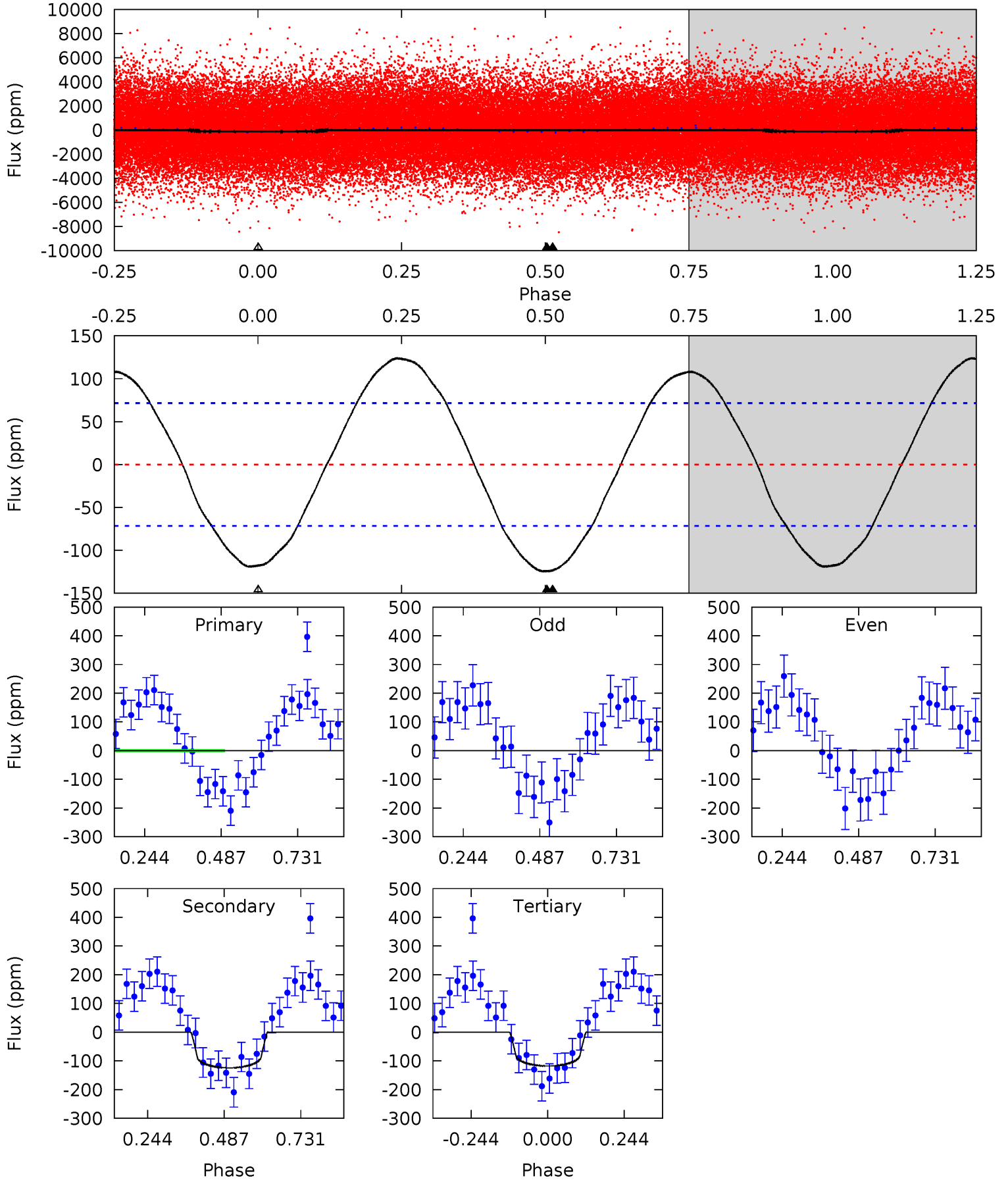




# DV Model-Shift Uniqueness Test

009143785-01, P = 0.993512 Days, E = 131.176734 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.55	7.61	7.20	0	4.37	1.17	5.12	0.34	7.55	0.41	7.61	1.02	0.99	0.50	1.24

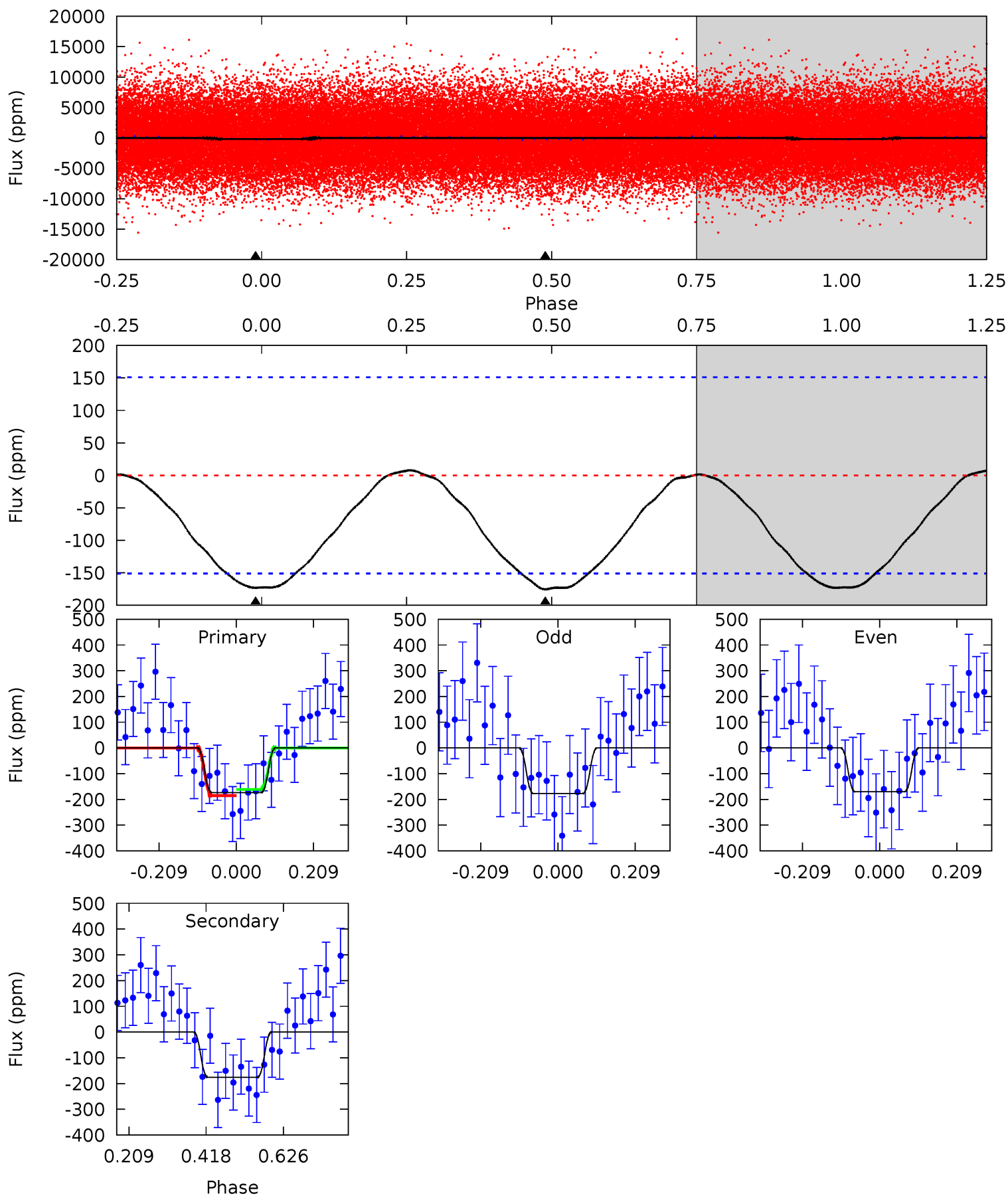




# Alt Model-Shift Uniqueness Test

009143785-01, P = 0.993513 Days, E = 131.173084 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.05	5.12	0	0	4.41	1.26	0.16	5.05	5.05	5.12	5.12	0.11	0.84	0.04	0.35



### Stellar Parameters For KIC 009143785

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7818^{+244}_{-298}$	$4.225^{+0.247}_{-0.133}$	$-1.980^{+0.250}_{-0.050}$	$1.251^{+0.243}_{-0.267}$	$0.959^{+0.094}_{-0.034}$	$0.690^{+0.802}_{-0.277}$
	+3%/-4%	+6%/-3%	+13%/-3%	+19%/-21%	+10%/-4%	+116%/-40%
Source	KIC0	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 009143785-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-124 \pm 16$	$1.71^{+1.17}_{-1.05}$	$3842^{+247}_{-288}$	$7096^{+6779}_{-1706}$	$8.884^{+49.270}_{-5.834}$
Alt.	$-176 \pm 34$	$1.93^{+1.20}_{-1.05}$	$3845^{+248}_{-274}$	$7381^{+5329}_{-1665}$	$9.912^{+37.131}_{-6.147}$

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

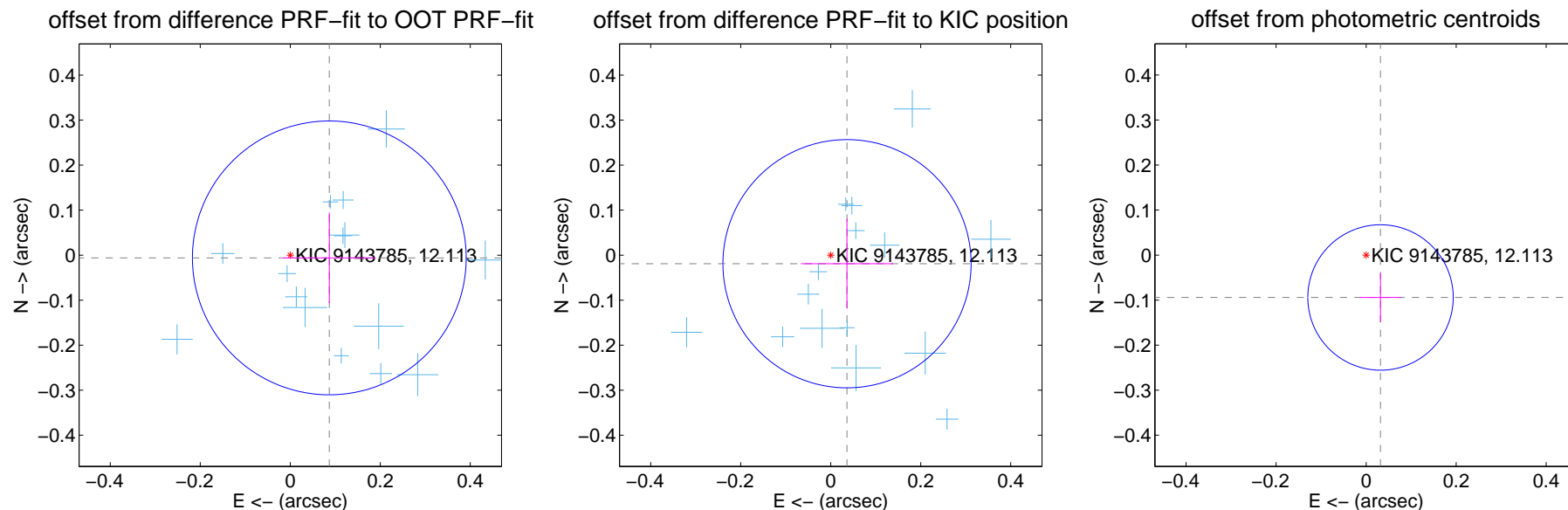
## DV Centroid Data

Supplemental centroid analysis for 009143785-01. Kepler magnitude: 12.11. Transit SNR 17.60

There are 17 quarters with good PRF difference image offsets

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

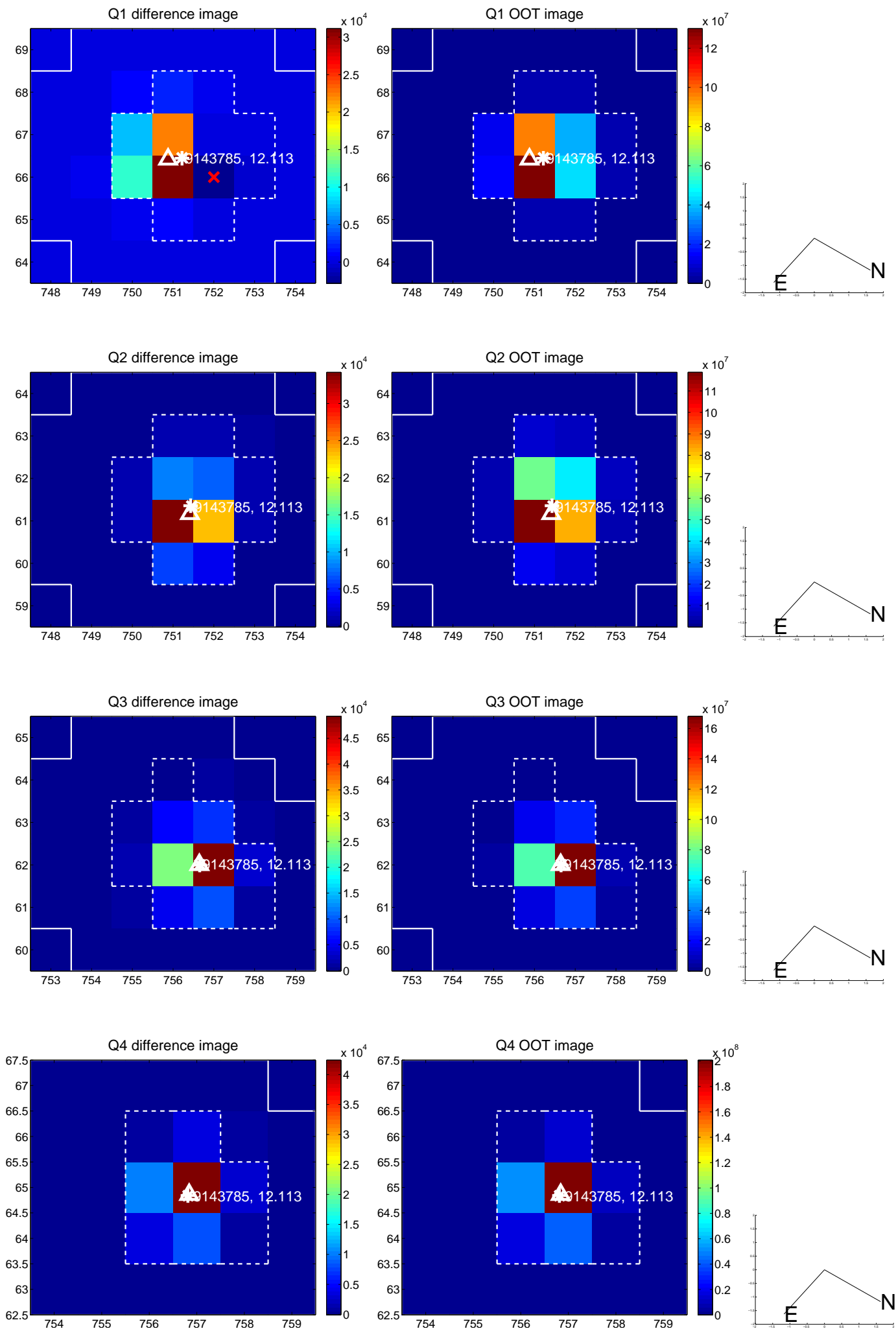
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.087 \pm 0.101$	0.86	$-0.087 \pm 0.103$	$-0.006 \pm 0.100$
PRF-fit source offset from KIC position	$0.041 \pm 0.092$	0.45	$-0.036 \pm 0.102$	$-0.019 \pm 0.100$
photometric centroid source offset	$0.10 \pm 0.05$	1.85	$-0.03 \pm 0.05$	$-0.09 \pm 0.05$



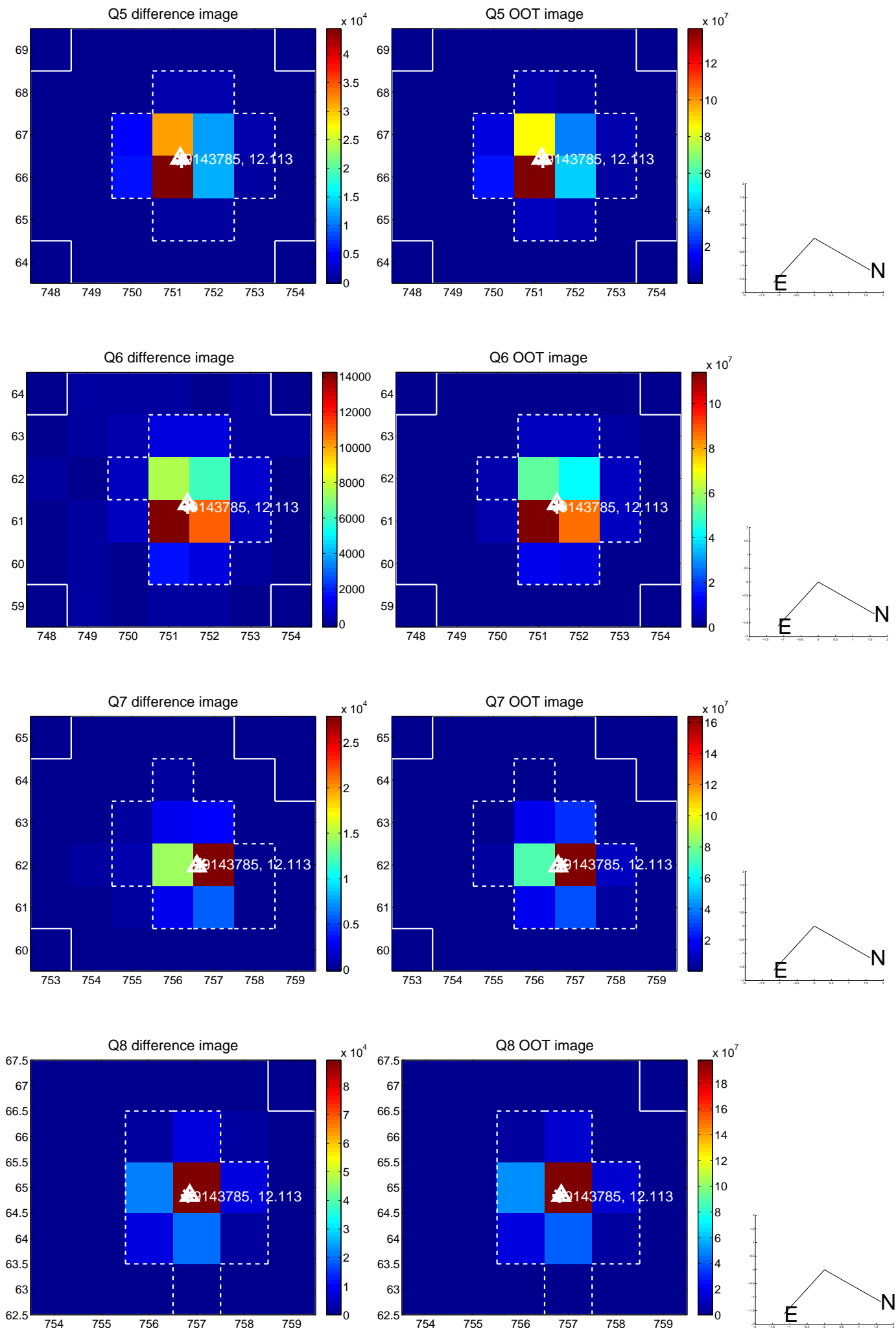
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



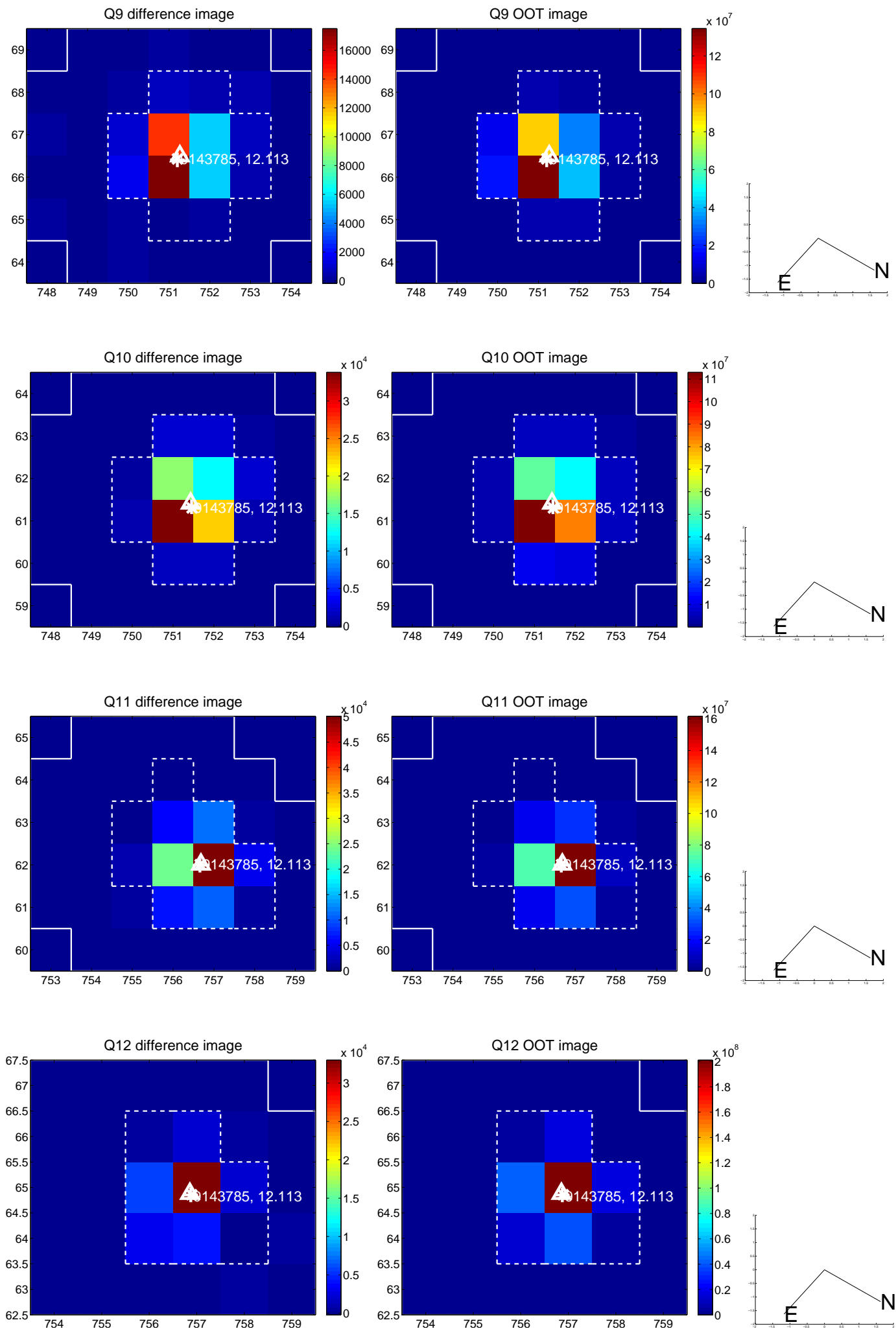
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

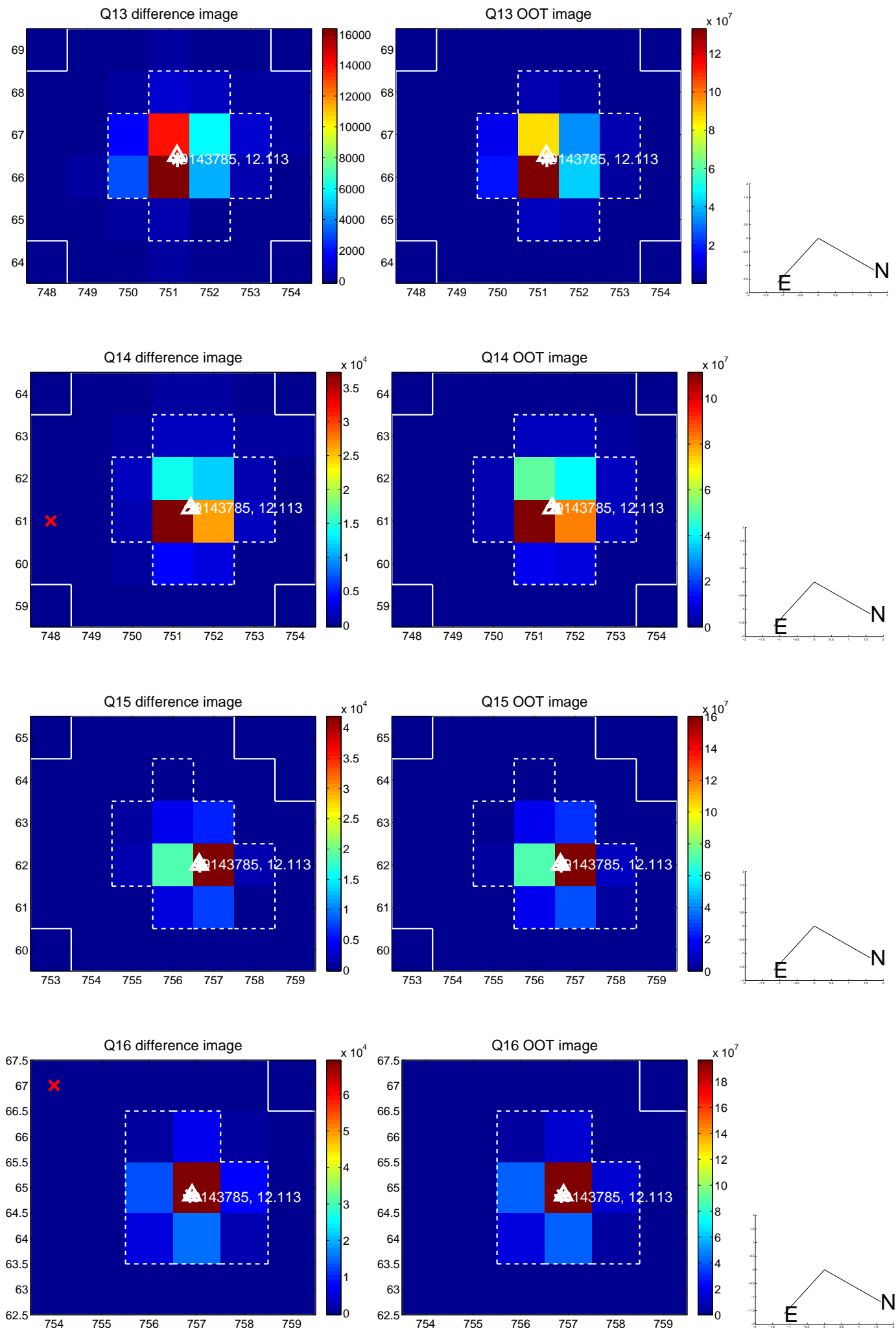


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

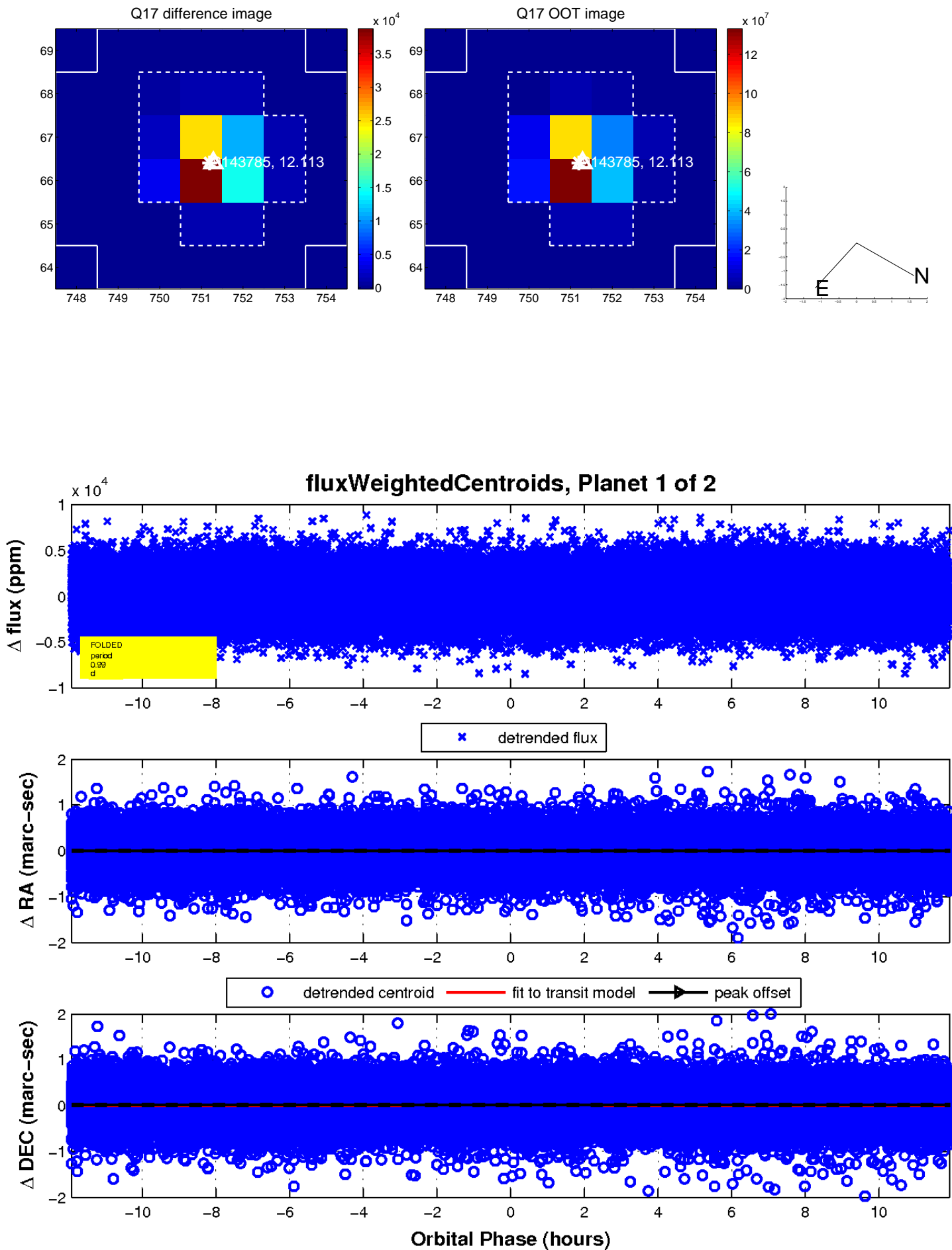




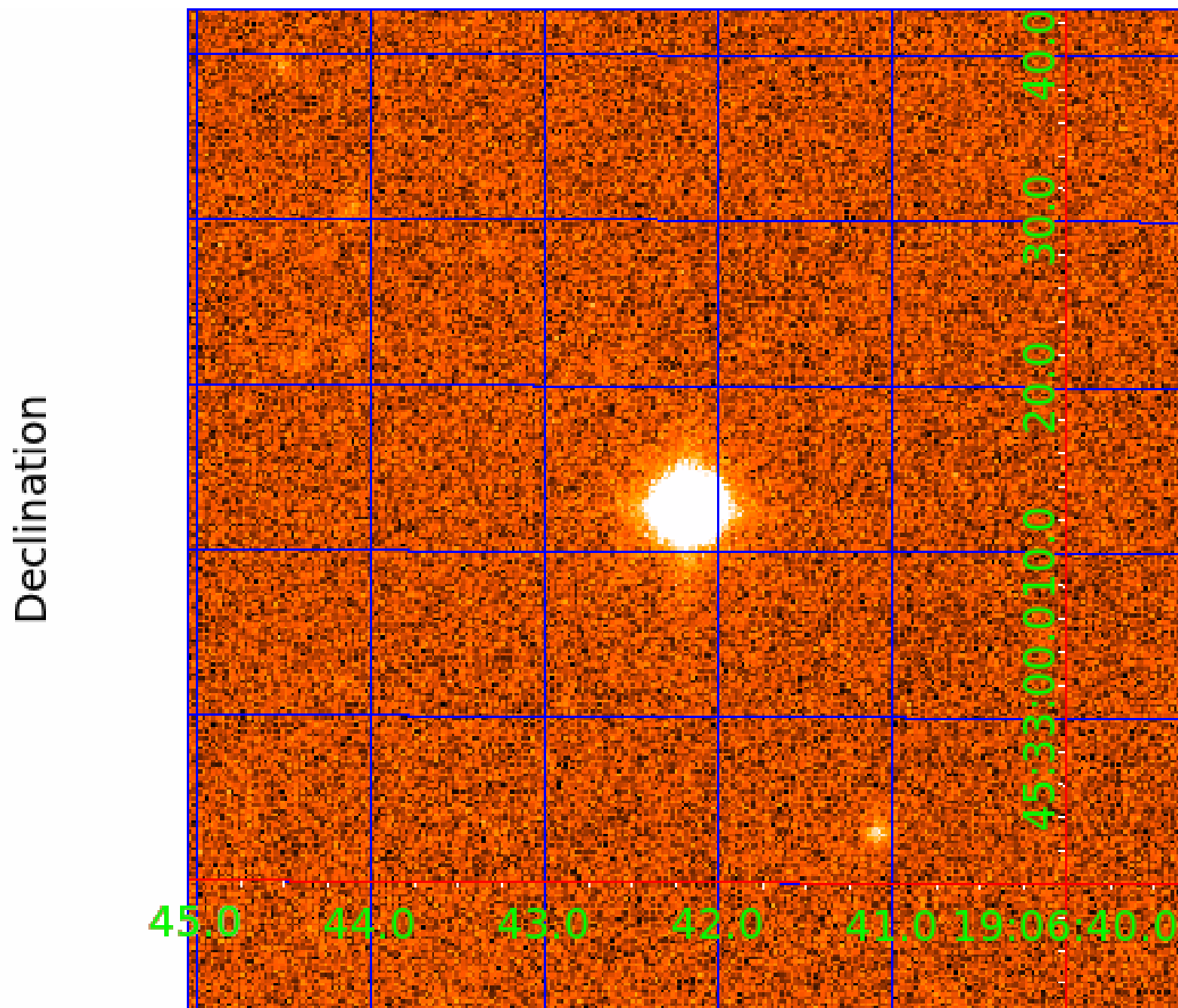
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image



# KIC 009143785

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009143785-01	OBS	No	0.993512	132.170246	170.0	5.381	13.2	17.6	1.25	7818	1.66	14186.79
009143785-02	OBS	No	0.785890	131.552344	243.7	9.431	8.8	14.6	1.25	7818	2.00	19392.44

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009143785-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV
009143785-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—TRANS_GAPPED—LPP_DV—LPP_ALT

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

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

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

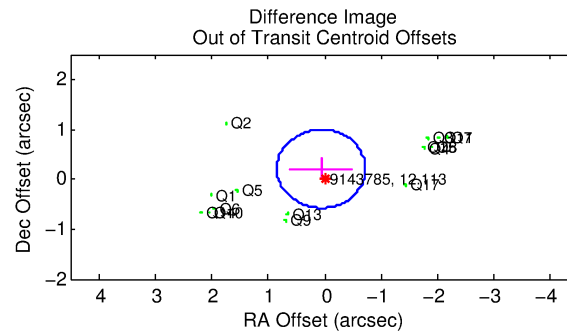
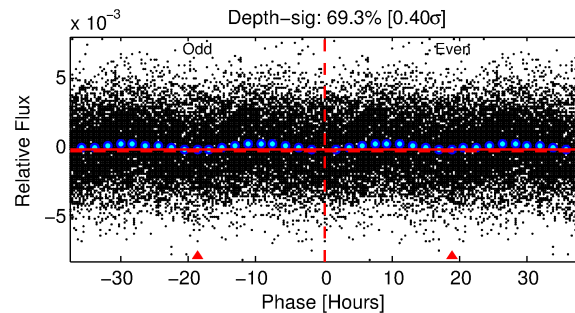
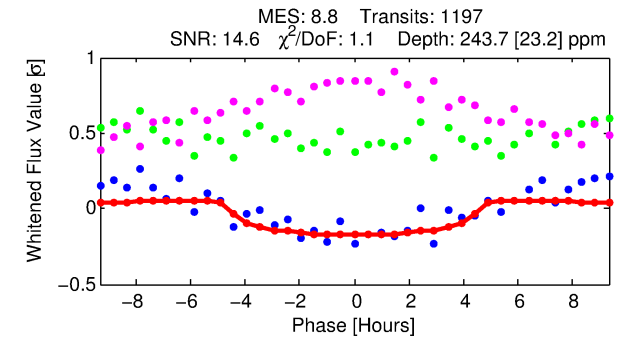
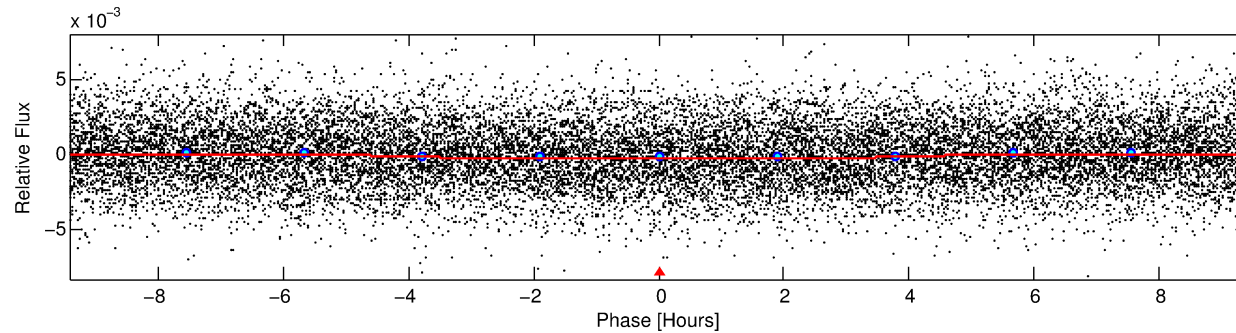
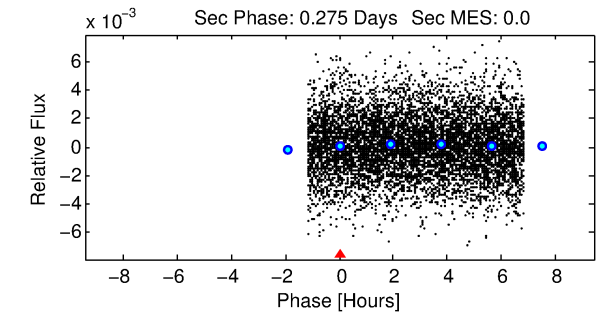
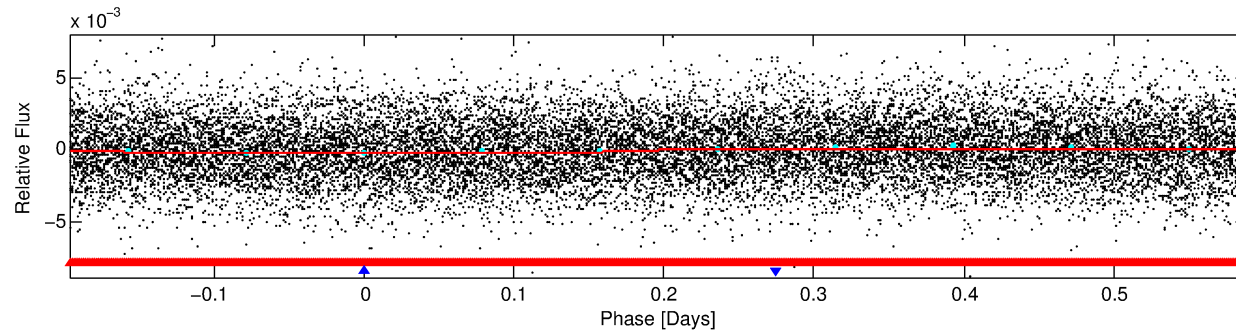
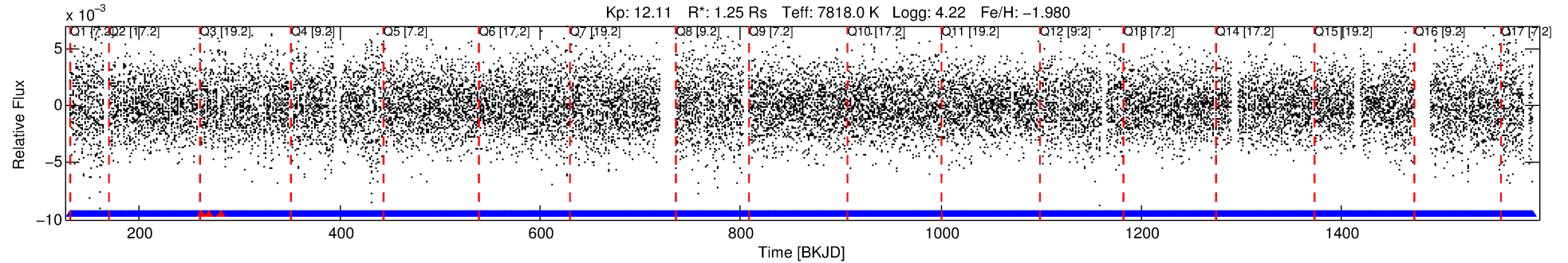
## Ephemeris Match Information For 009143785-02

No Significant Match Found



# DV One-Page Summary

KIC: 9143785 Candidate: 2 of 2 Period: 0.786 d



## DV Fit Results:

Period = 0.78589 [0.00001] d  
Epoch = 131.5523 [0.0081] BKJD  
Rp/R\* = 0.0146 [0.0064]  
a/R\* = 1.00 [0.01]  
b = 0.28 [8.93]  
Seff = 19392.44 [8391.66]  
Teff = 3009 [326] K  
Rp = 2.00 [0.97] Re  
a = 0.0164 [0.0039] AU  
Ag = N/A  
Teffp = N/A

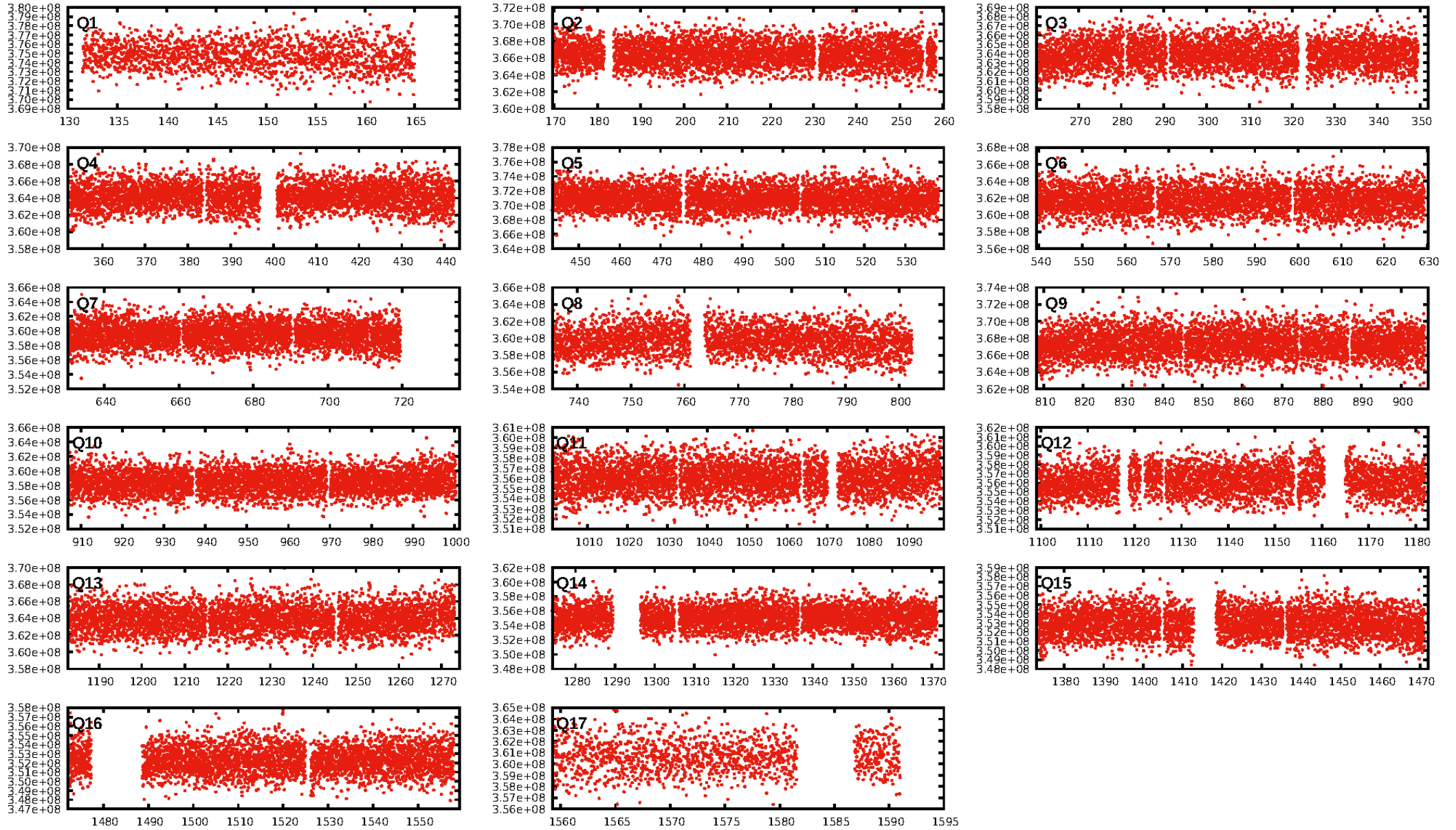
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 35.4% [0.46σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [1139/1142]  
GhostDiagnostic-chr: 1.611  
Centroid-sig: 31.1%  
Centroid-so: 0.036 arcsec [1.54σ]  
OotOffset-rm: 0.216 arcsec [0.83σ]  
KicOffset-rm: 0.204 arcsec [0.61σ]  
OotOffset-st: 4/4/2/5 [15]  
KicOffset-st: 4/4/2/5 [15]  
DiffImageQuality-fgm: 1.00 [15/15]  
DiffImageOverlap-fno: 0.00 [0/17]

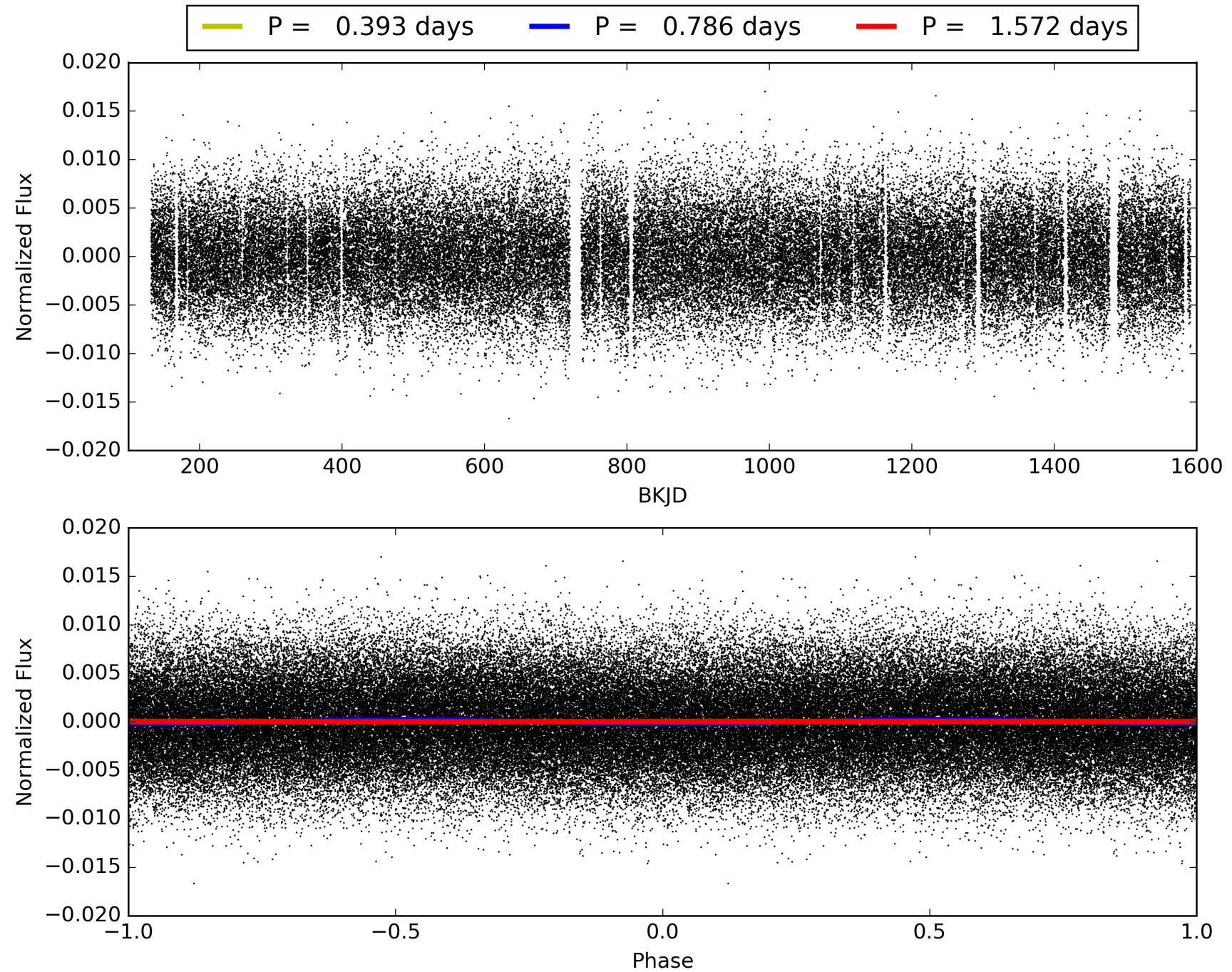
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 22:58:00 Z

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

# TCE 009143785-02, PDC Light Curves



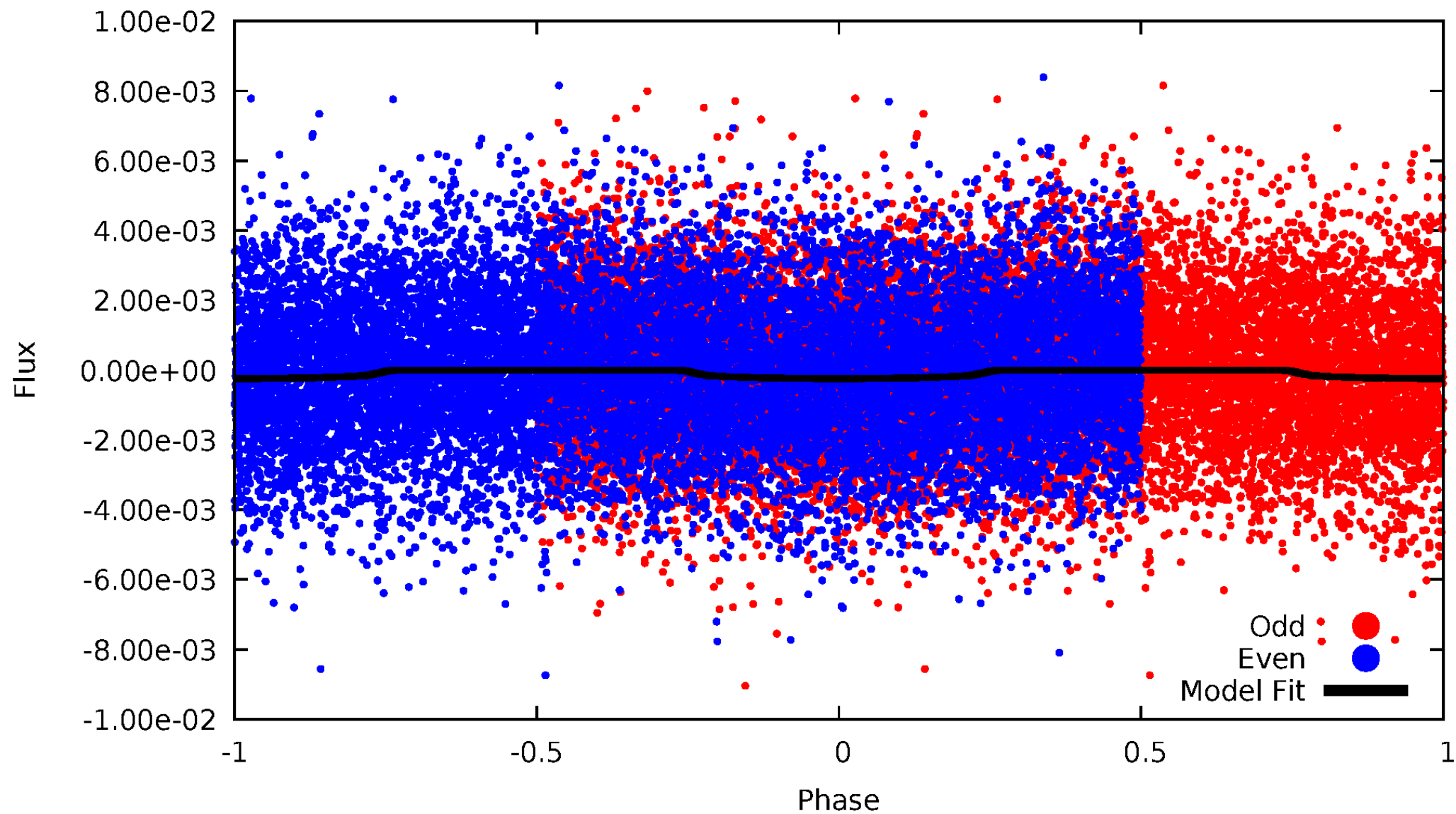
# TCE 009143785-02





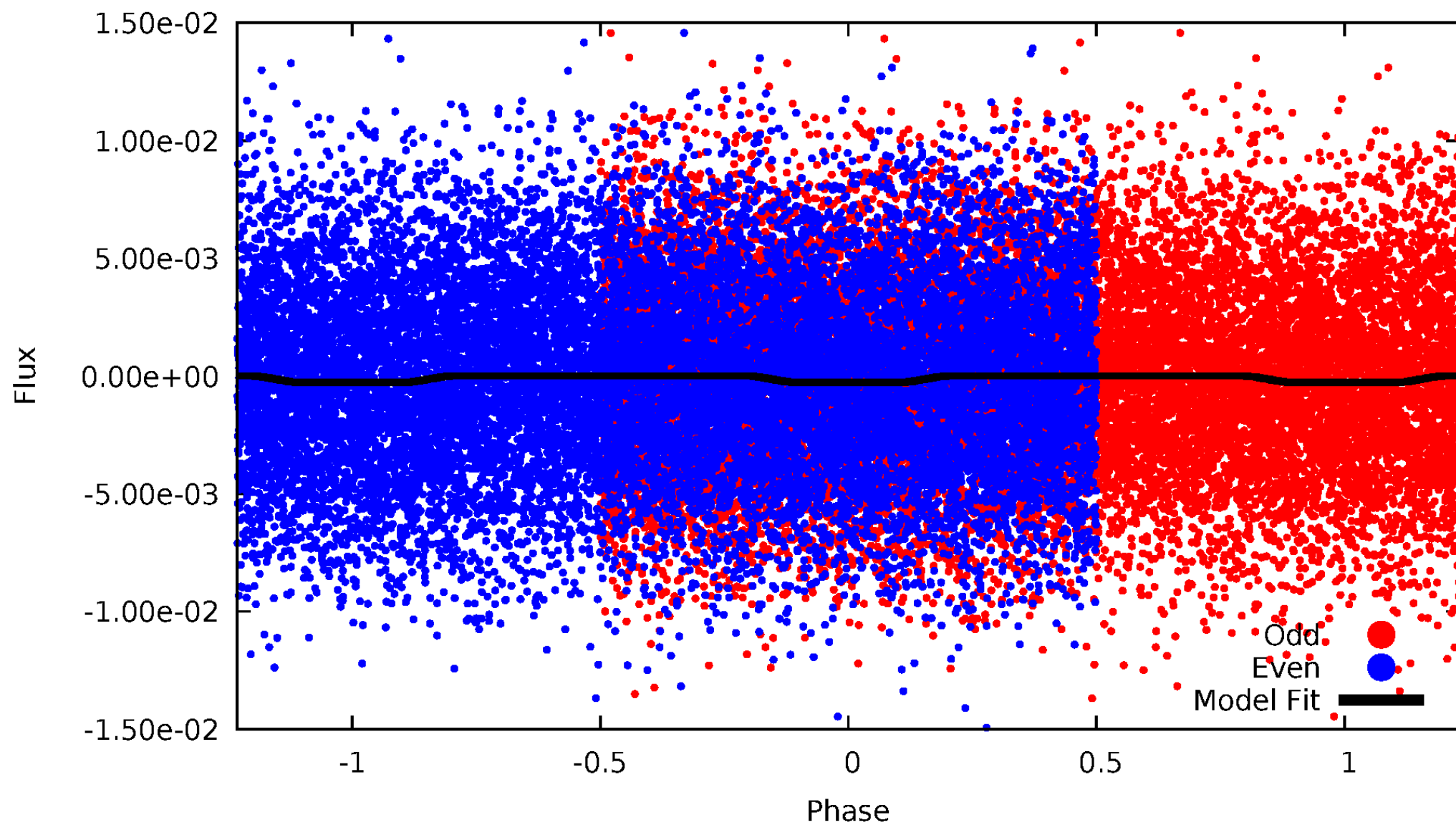
# DV Odd/Even

TCE 009143785-02



# ALT Odd/Even

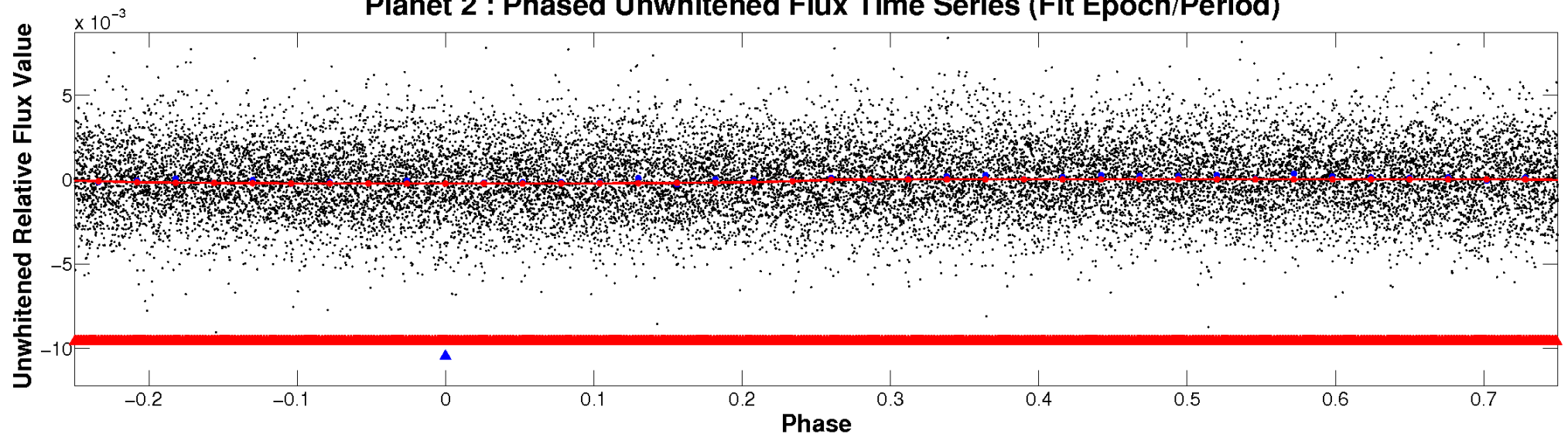
TCE 009143785-02



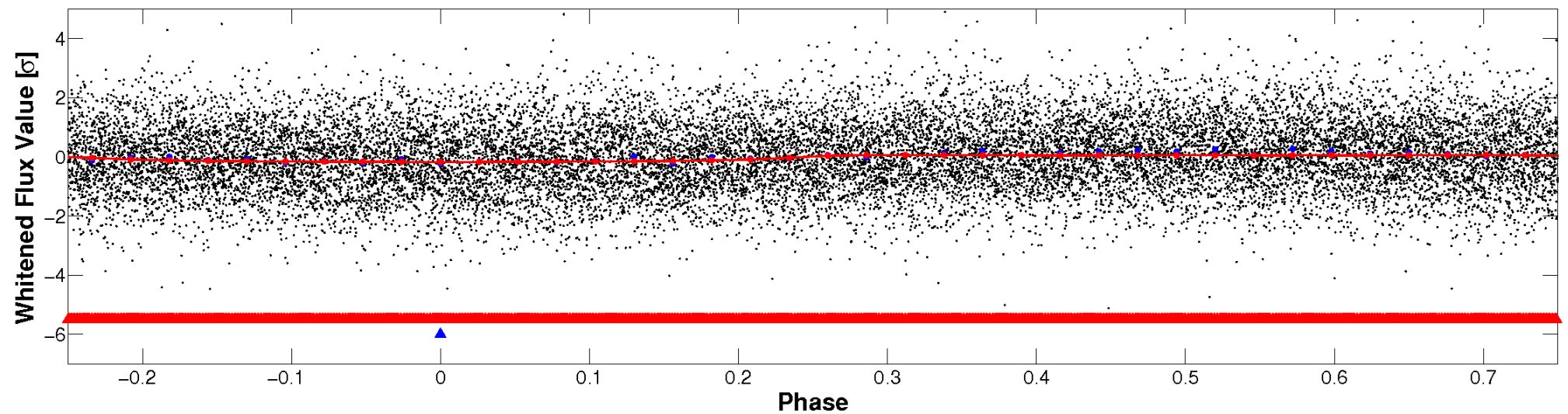


# Non-Whitened Vs. Whitened Light Curve

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

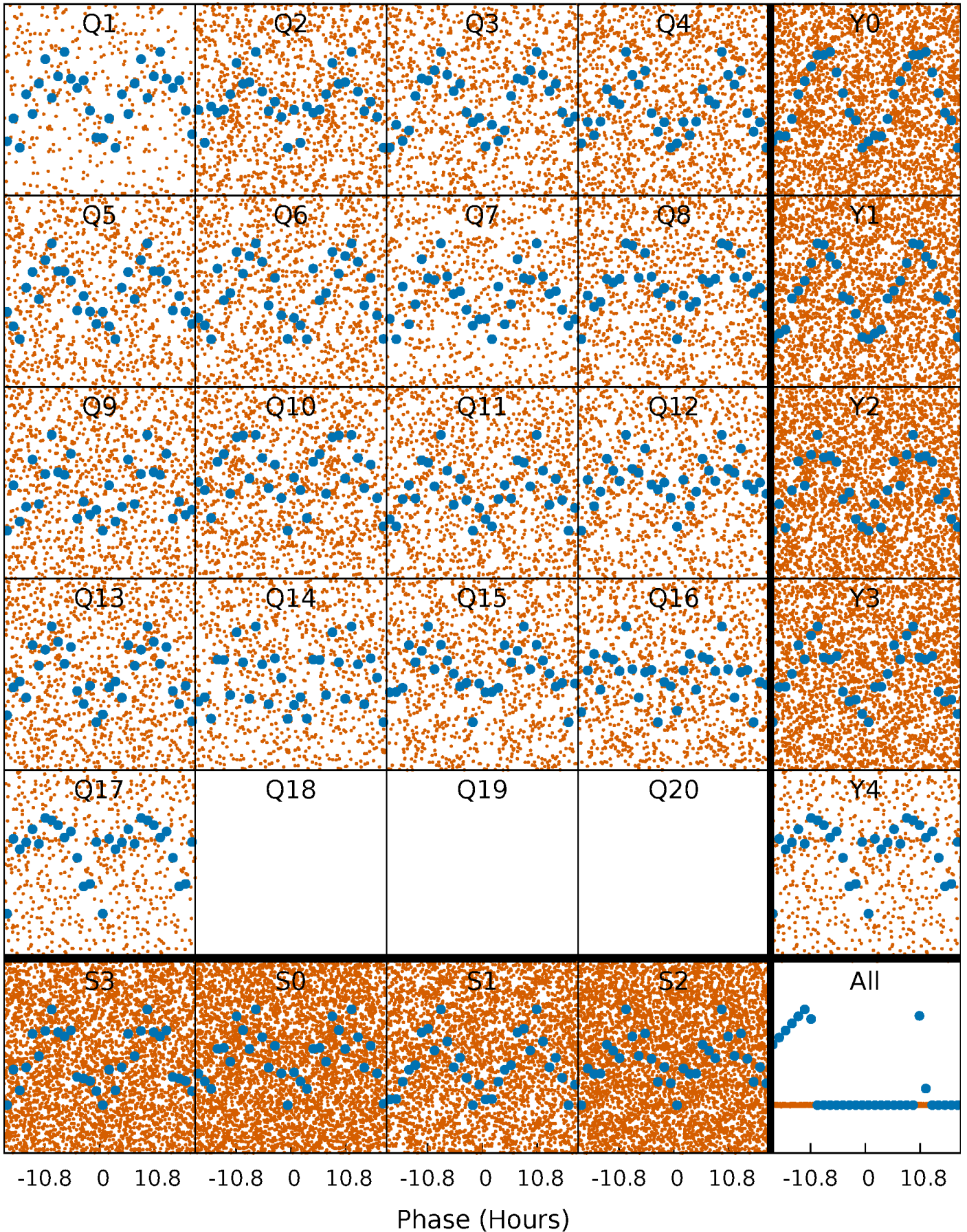


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

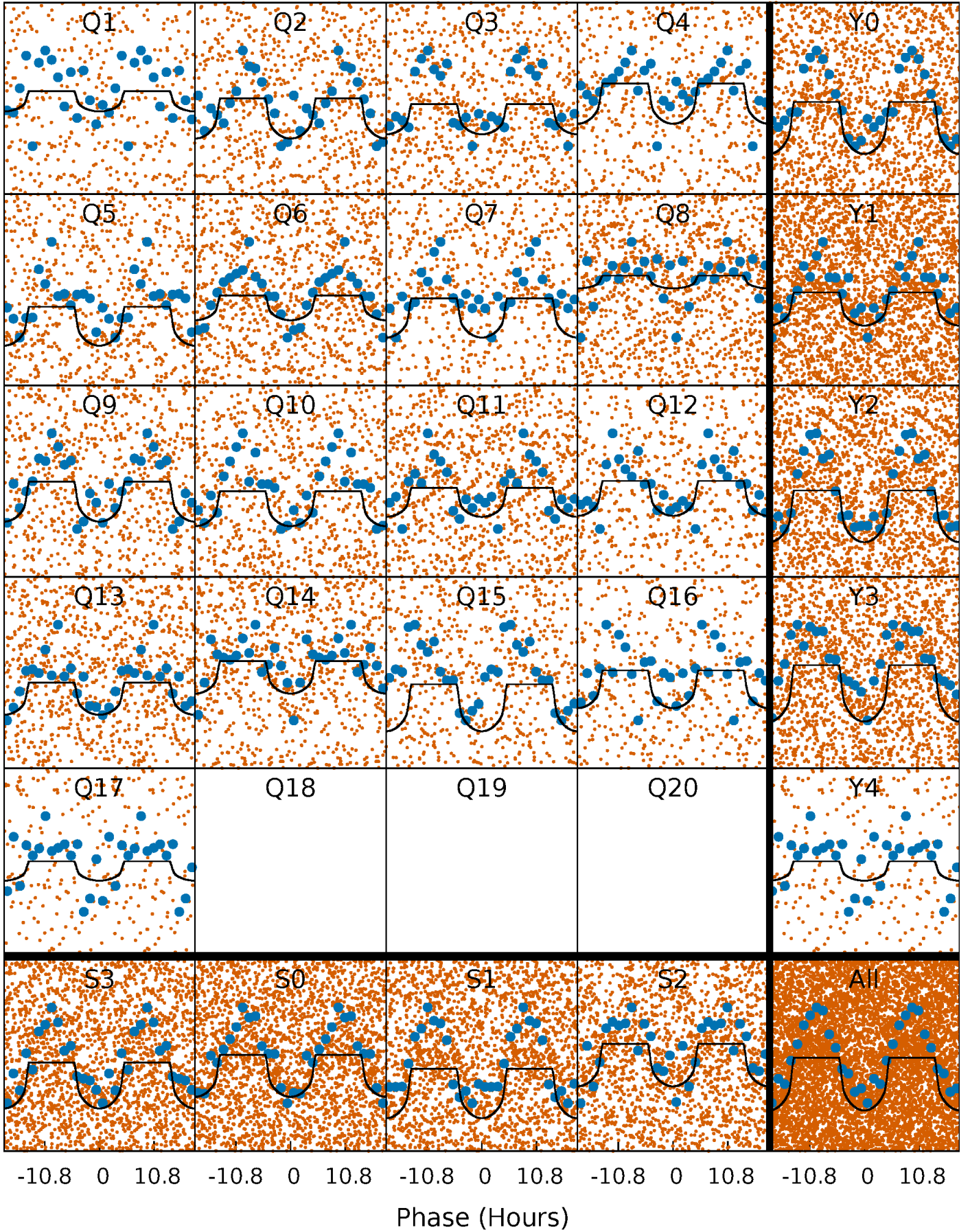
TCE 009143785-02   P= 0.785890 Days    $T_0=131.552344$  (BKJD)





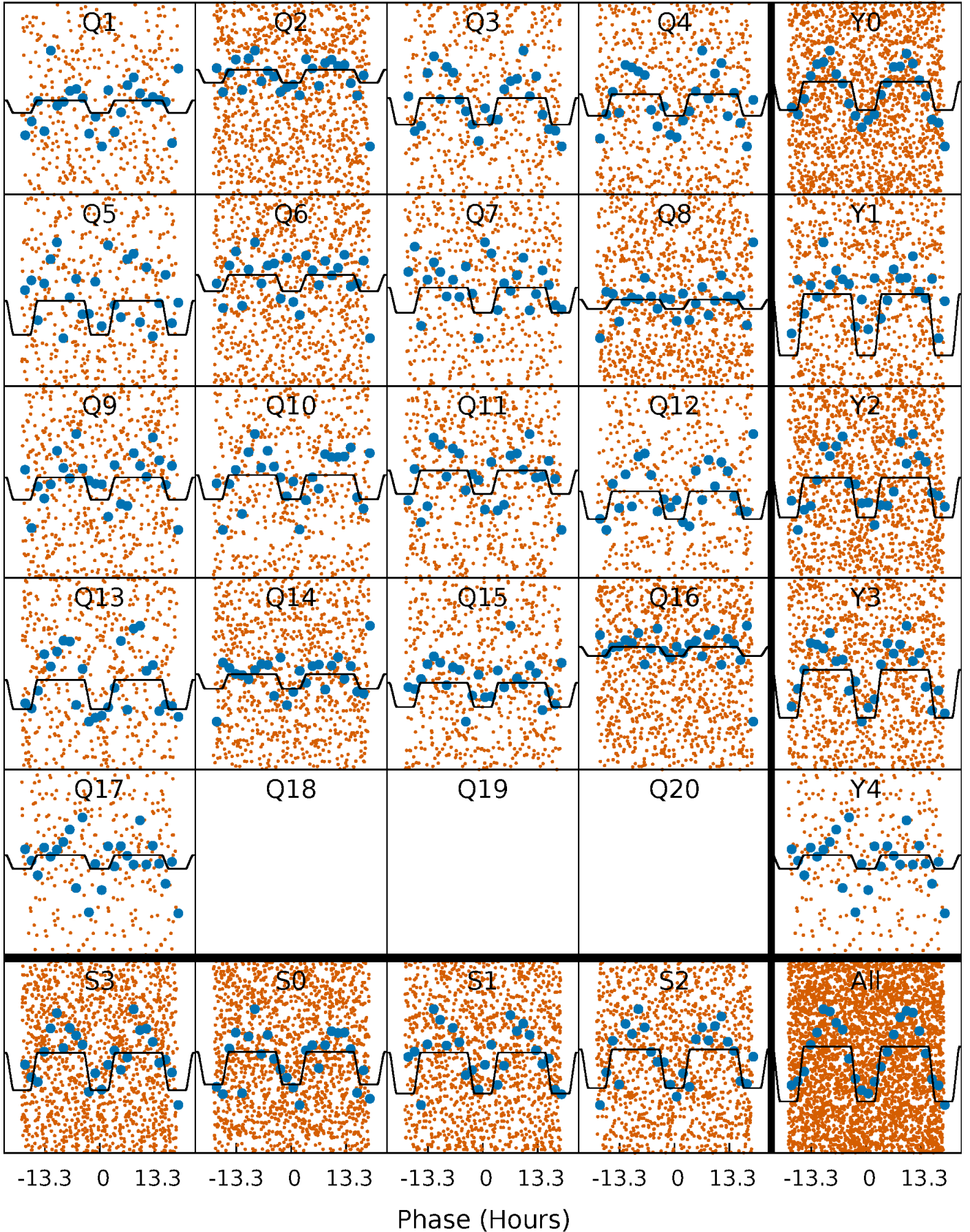
# DV Quarter-Phased Transit Curves

TCE 009143785-02    P= 0.785890 Days     $T_0=131.552344$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

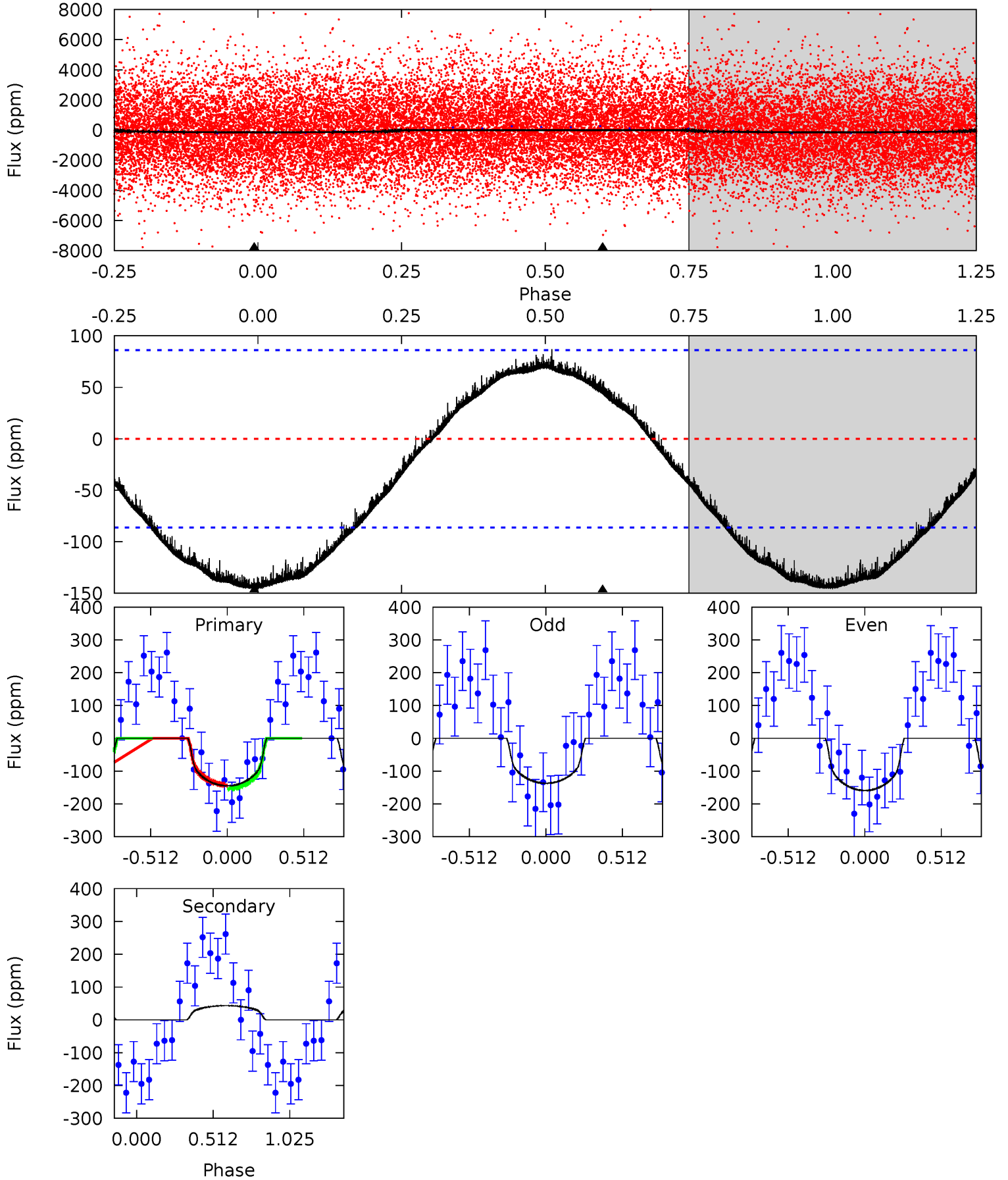
TCE 009143785-02     $P = 0.785879$  Days     $T_0 = 131.554196$  (BKJD)



# DV Model-Shift Uniqueness Test

009143785-02, P = 0.785890 Days, E = 130.766454 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.09	-2.12	0	0	4.21	0.66	0.91	7.09	7.09	-2.12	-2.12	0.54	1.10	0.37	0.28

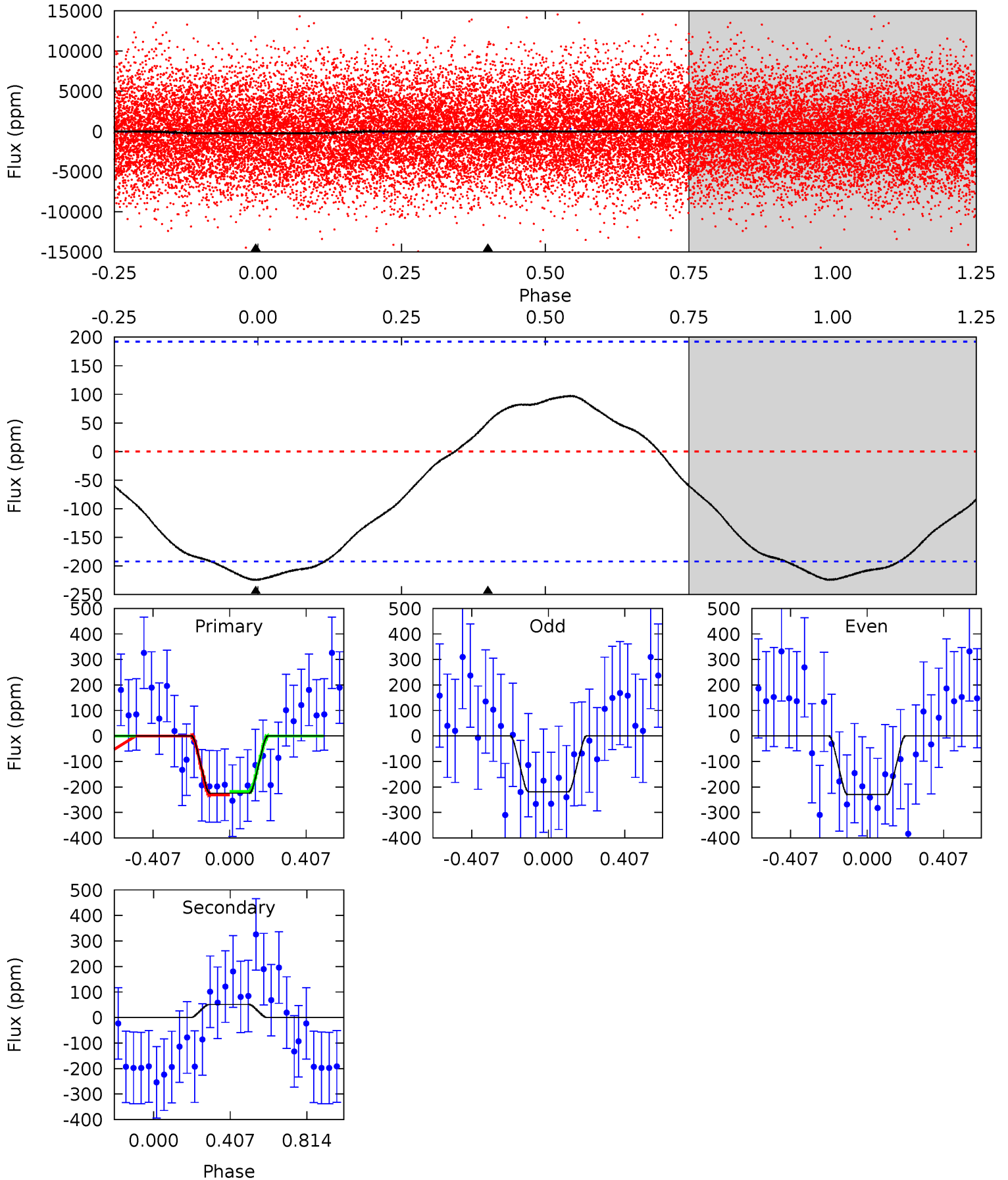




# Alt Model-Shift Uniqueness Test

009143785-02, P = 0.785879 Days, E = 130.768317 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
4.97	-1.13	0	0	4.26	0.83	0.69	4.97	4.97	-1.13	-1.13	0.12	1.18	0.30	0.15



### Stellar Parameters For KIC 009143785

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7818^{+244}_{-298}$	$4.225^{+0.247}_{-0.133}$	$-1.980^{+0.250}_{-0.050}$	$1.251^{+0.243}_{-0.267}$	$0.959^{+0.094}_{-0.034}$	$0.690^{+0.802}_{-0.277}$
	+3%/-4%	+6%/-3%	+13%/-3%	+19%/-21%	+10%/-4%	+116%/-40%
Source	KIC0	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 009143785-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$43 \pm 20$	$2.00^{+0.90}_{-0.87}$	$4158^{+275}_{-287}$	$-5307^{+792}_{-1586}$	$-1.570^{+1.006}_{-3.841}$
Alt.	$51 \pm 45$	$2.20^{+0.95}_{-0.85}$	$4148^{+276}_{-291}$	$-5176^{+1218}_{-1480}$	$-1.376^{+1.255}_{-3.251}$

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

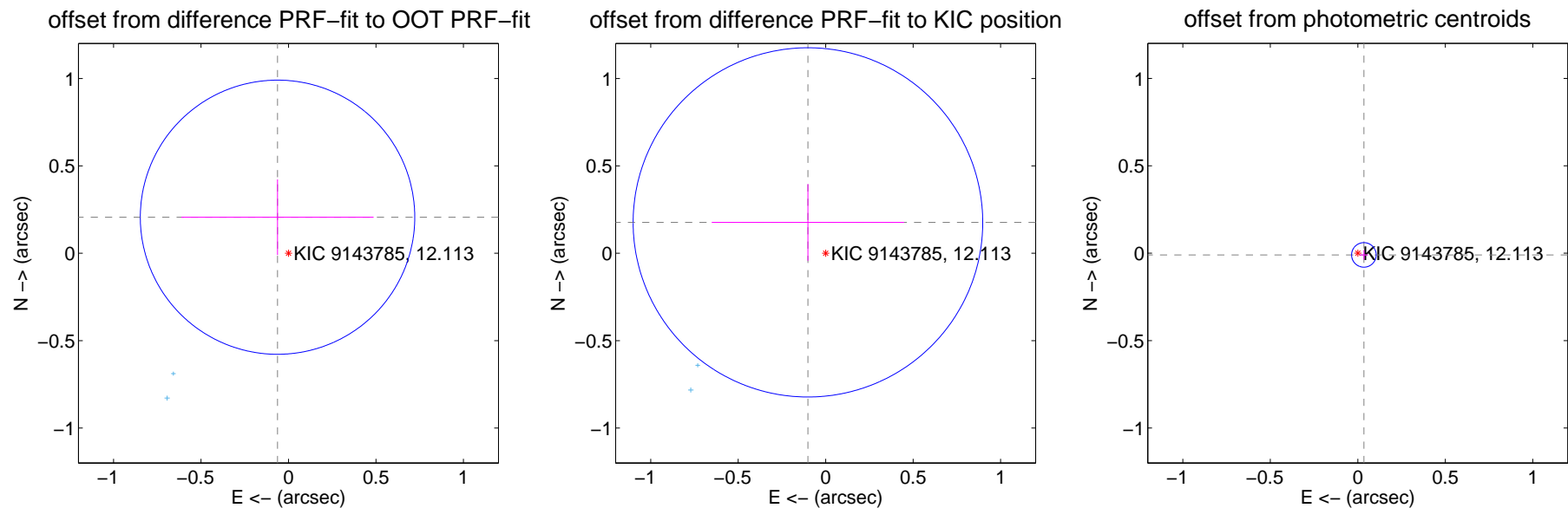
## DV Centroid Data

Supplemental centroid analysis for 009143785-02. Kepler magnitude: 12.11. Transit SNR 14.62

There are 15 quarters with good PRF difference image offsets

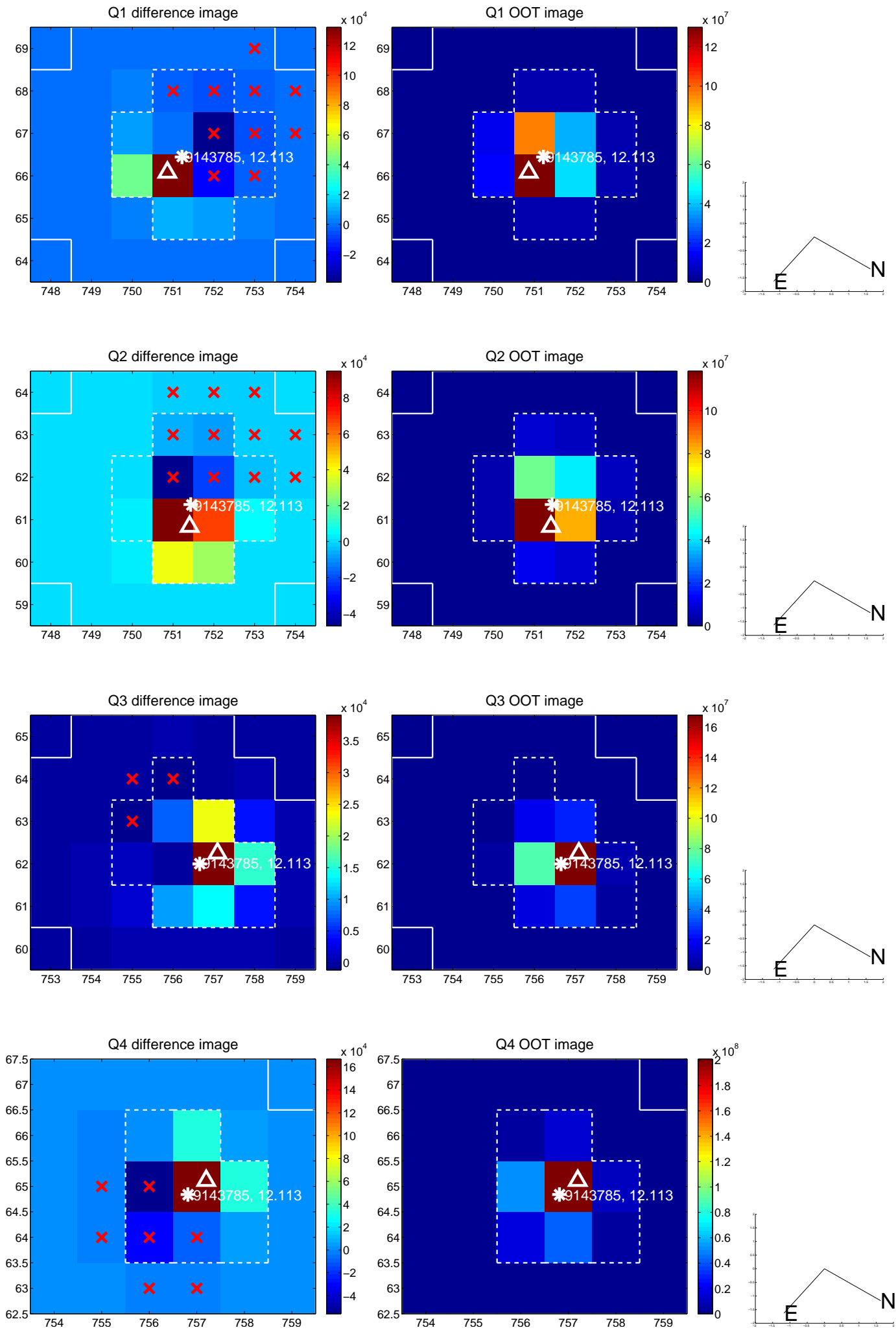
The direct PRF centroid is offset from the target star catalog position by about 0.05 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.216 \pm 0.261$	0.83	$0.063 \pm 0.549$	$0.206 \pm 0.216$
PRF-fit source offset from KIC position	$0.204 \pm 0.333$	0.61	$0.101 \pm 0.550$	$0.177 \pm 0.220$
photometric centroid source offset	$0.04 \pm 0.02$	1.54	$-0.03 \pm 0.02$	$-0.01 \pm 0.03$

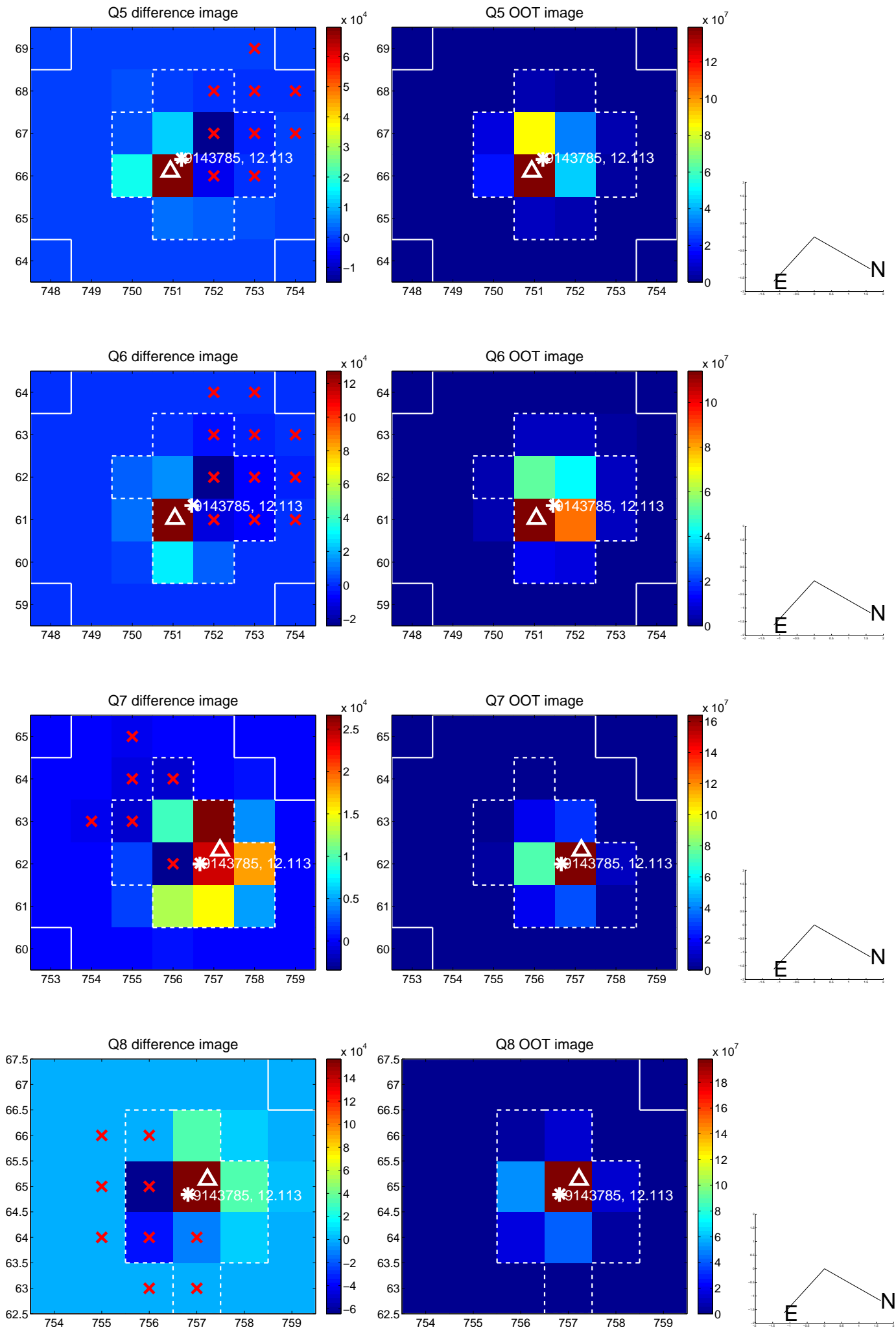


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

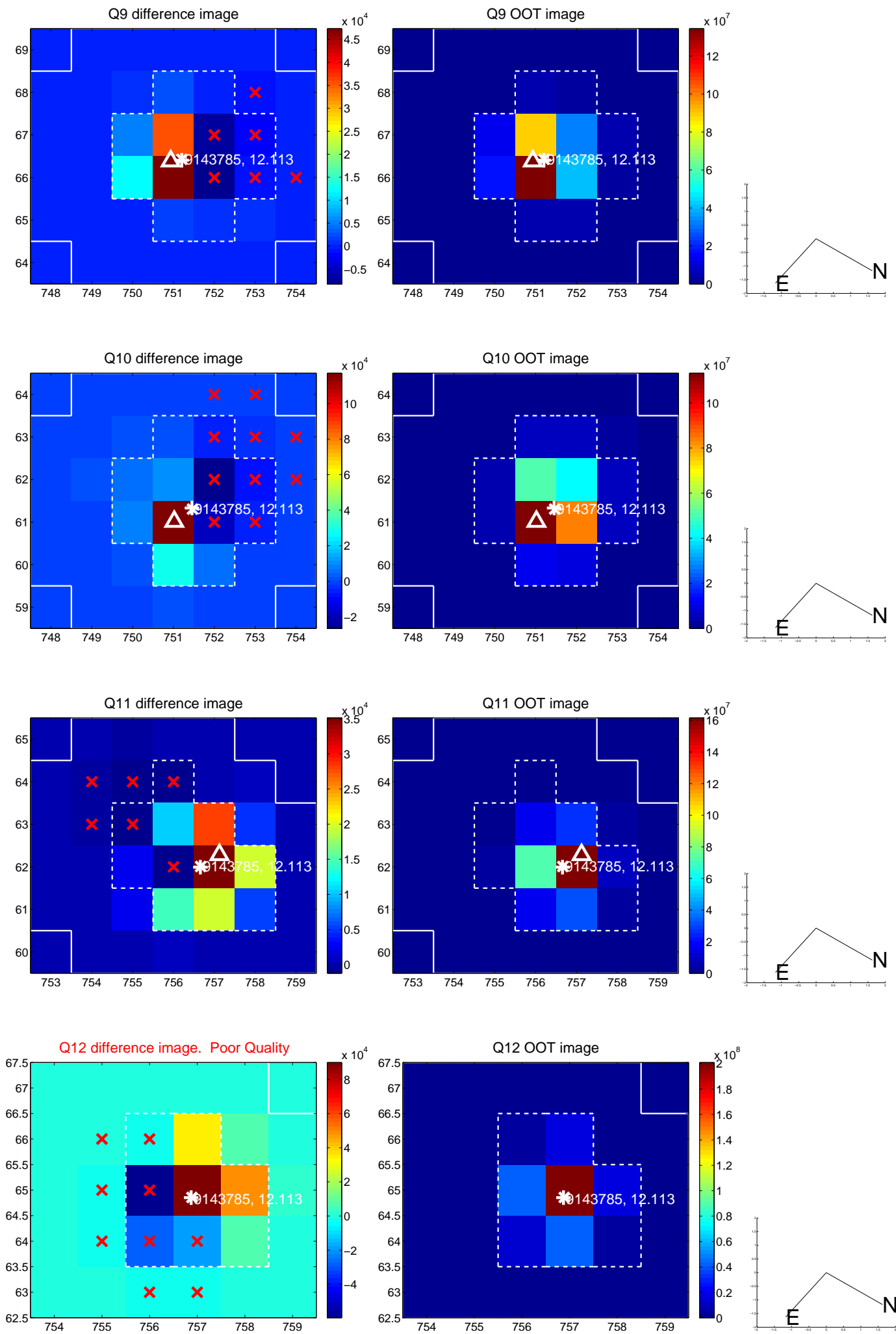


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

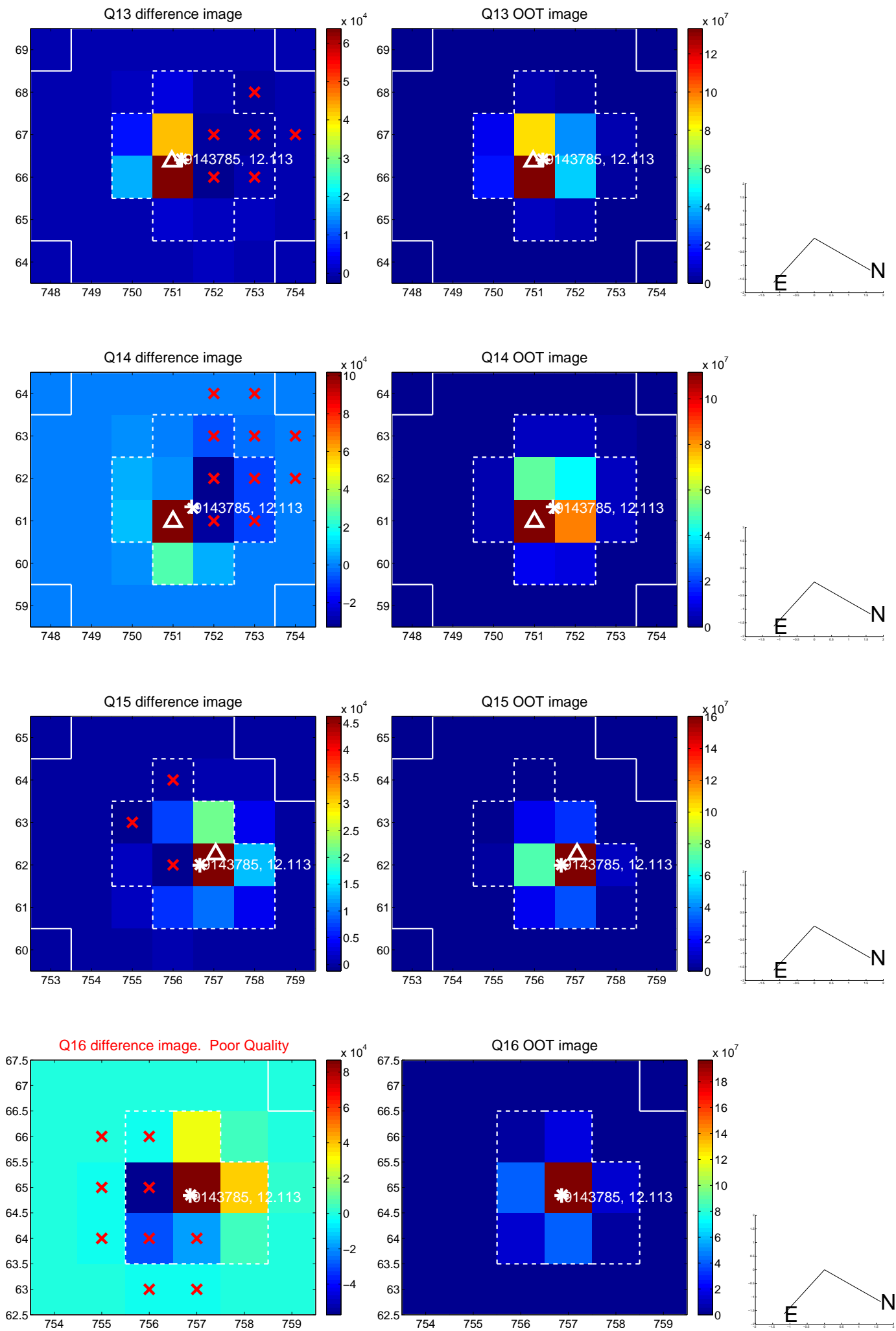




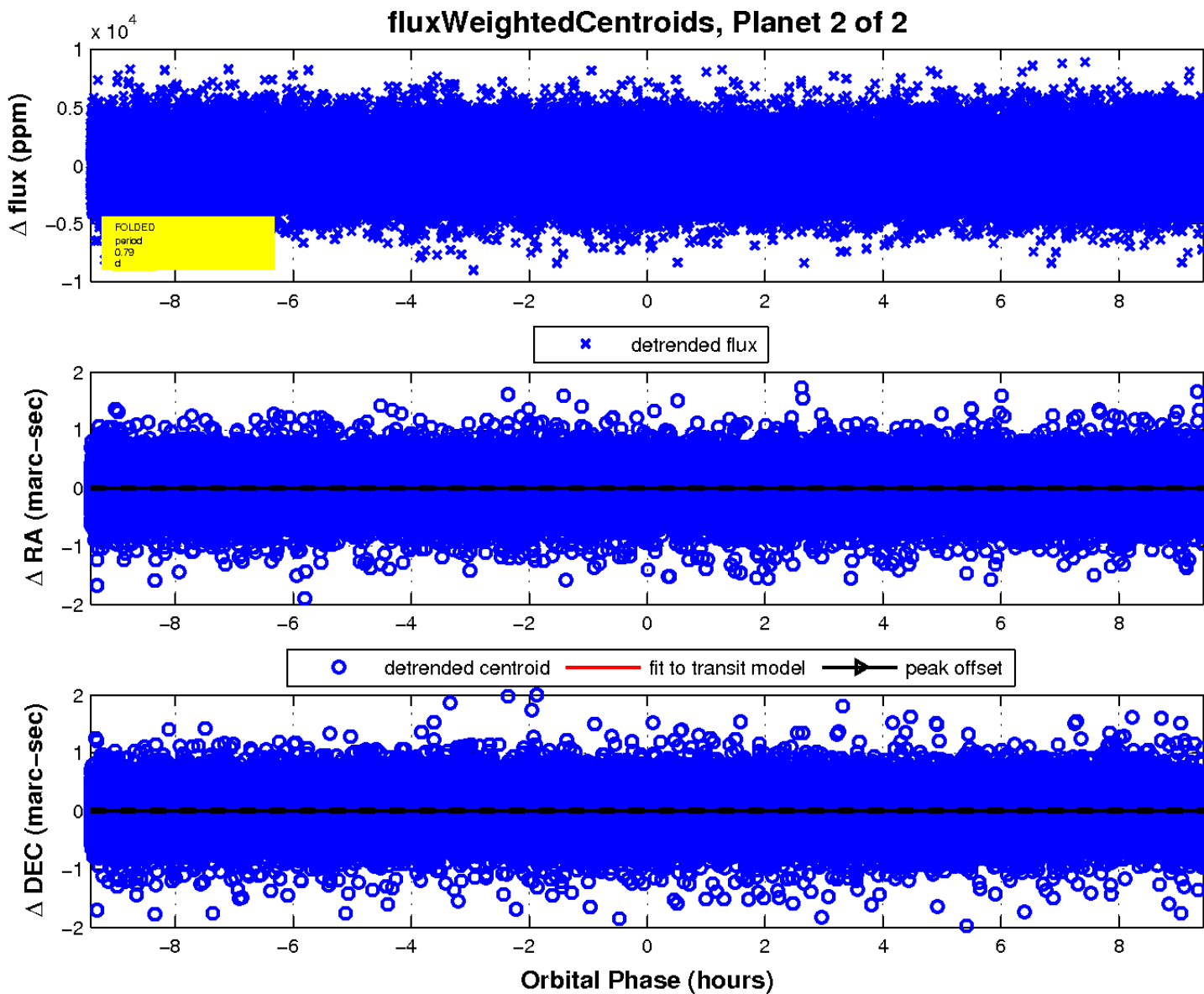
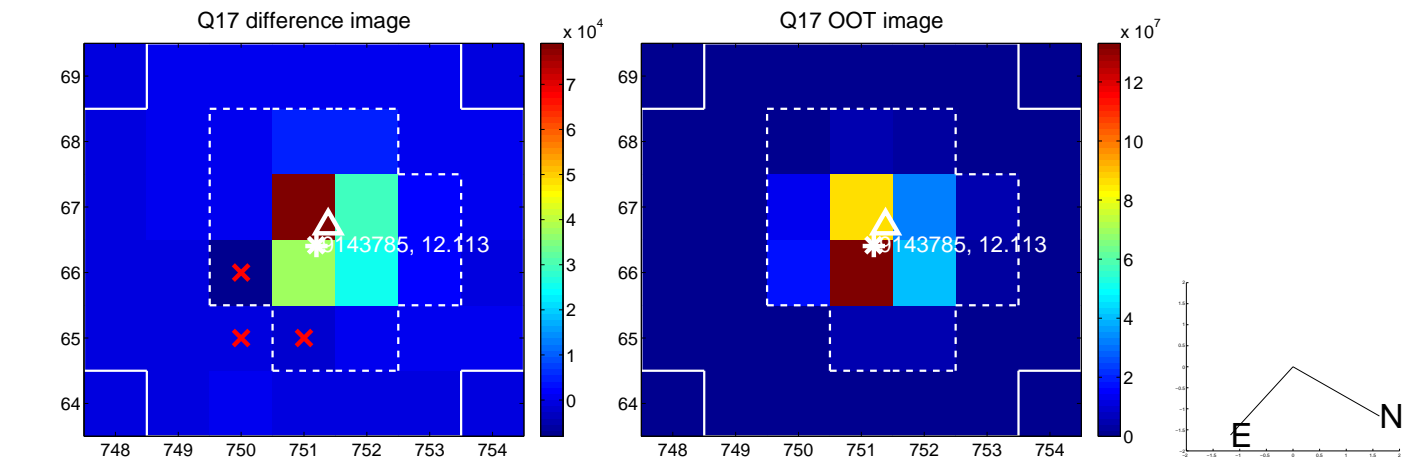
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white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

