

# KIC 009300946

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009300946-01	OBS	No	3.471798	133.112338	32.5	14.594	10.7	9.7	3.54	6735	2.80	7768.51
009300946-02	OBS	No	0.950368	131.797417	28.6	3.641	13.6	12.4	3.54	6735	2.27	43707.40
009300946-03	OBS	No	356.671301	141.718763	584.2	9.682	14.4	12.2	3.54	6735	9.35	16.15
009300946-04	OBS	No	0.950302	132.312671	26.9	6.076	13.1	13.1	3.54	6735	1.90	43711.43

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009300946-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—CENT_SATURATED
009300946-02	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—CENT_SATURATED
009300946-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
009300946-04	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—LPP_ALT—SAME_NTL_PERIOD—CENT_SATURATED

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

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

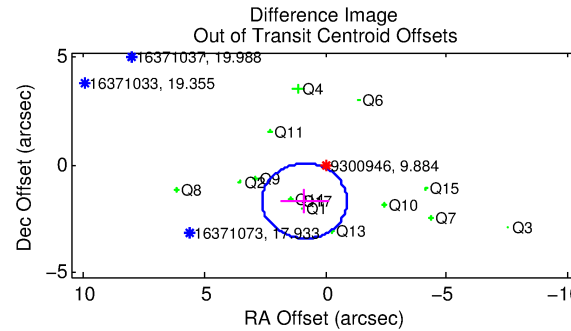
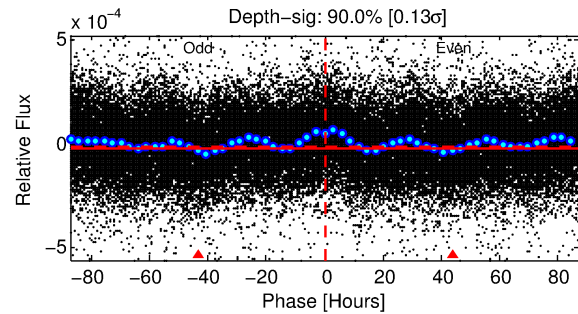
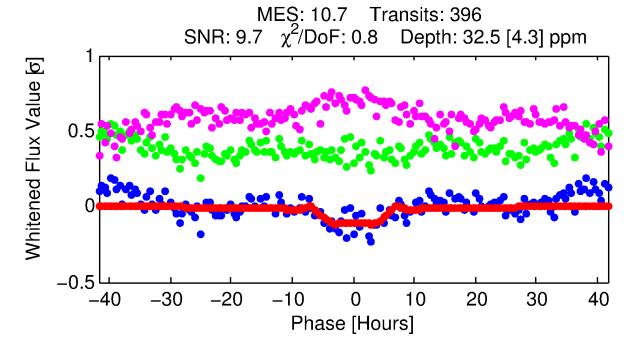
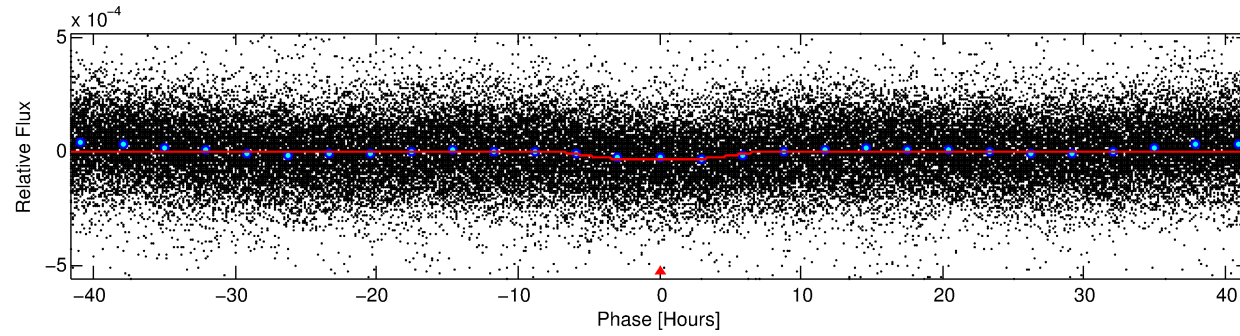
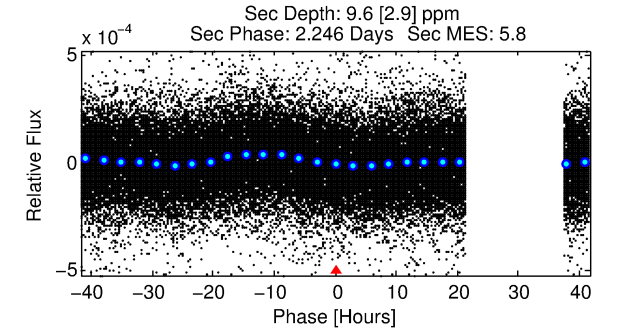
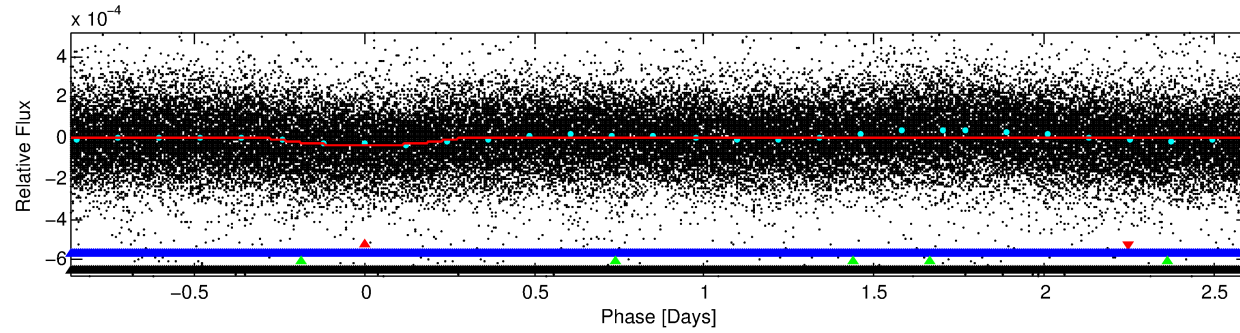
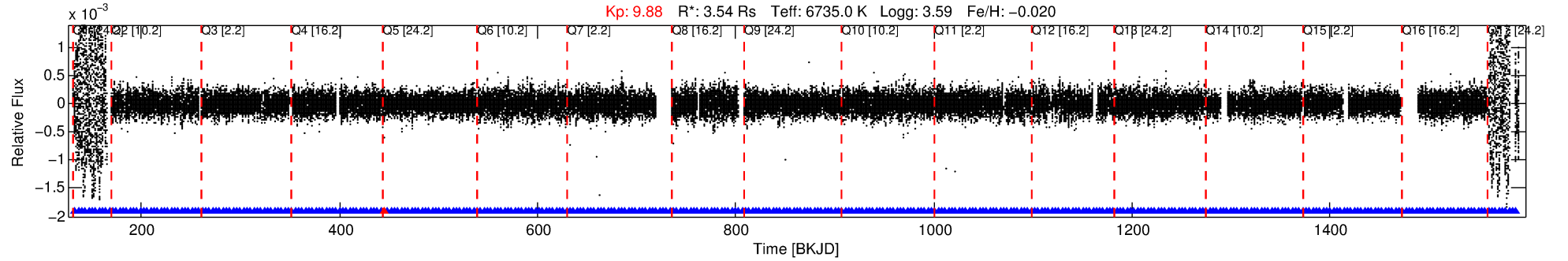
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009300946-01

No Significant Match Found

# DV One-Page Summary

KIC: 9300946 Candidate: 1 of 4 Period: 3.472 d



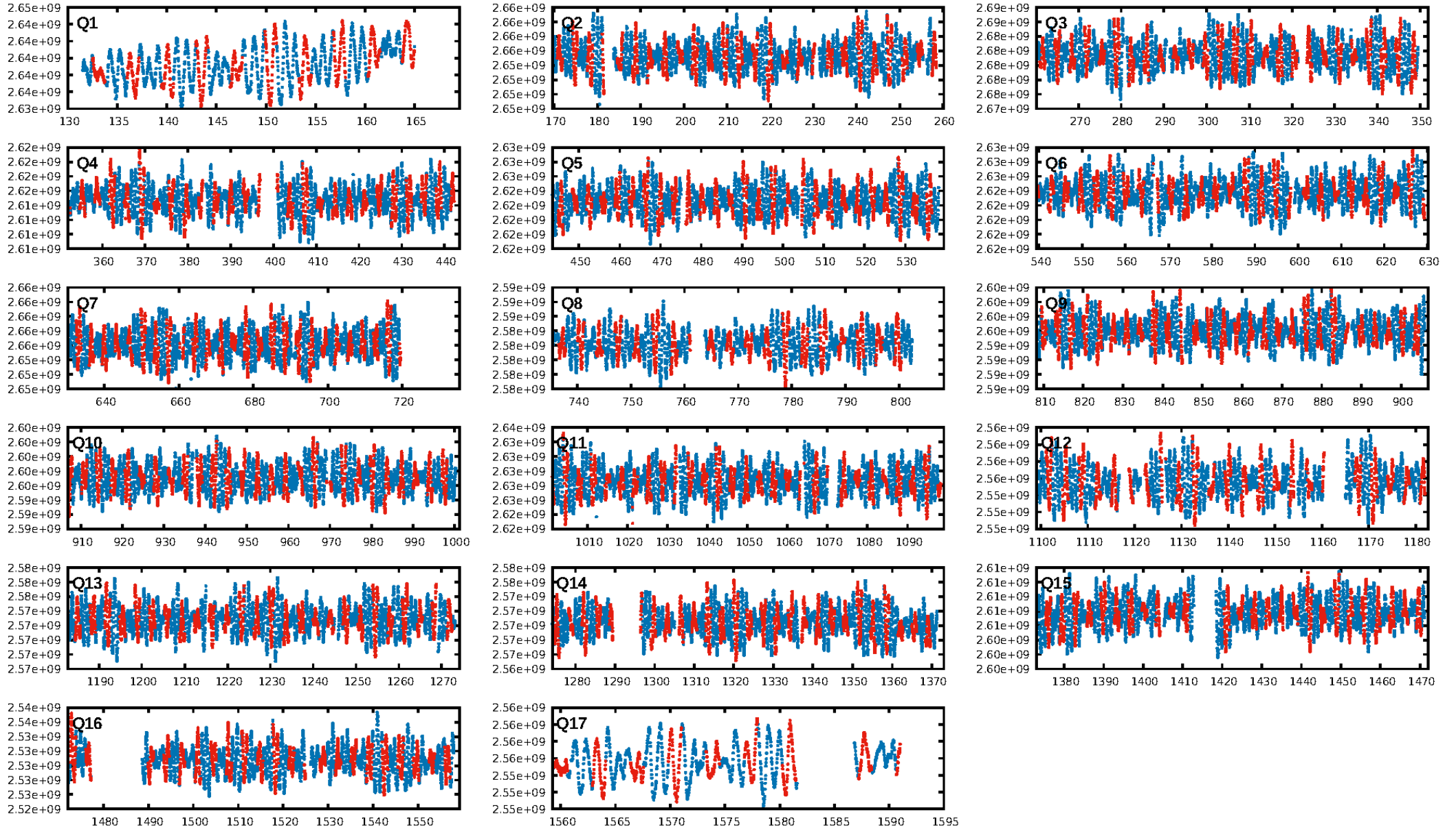
## DV Fit Results:

Period = 3.47180 [0.00012] d  
Epoch = 133.1123 [0.0274] BKJD  
Rp/R\* = 0.0072 [0.0006]  
a/R\* = 1.05 [0.01]  
b = 0.99 [0.00]  
Seff = 7768.51 [4254.11]  
Teff = 2394 [328] K  
Rp = 2.80 [1.00] Re  
a = 0.0546 [0.0183] AU  
Ag = 2.00 [1.27] [0.79σ]  
Teffp = 4402 [392] K [3.93σ]

## DV Diagnostic Results:

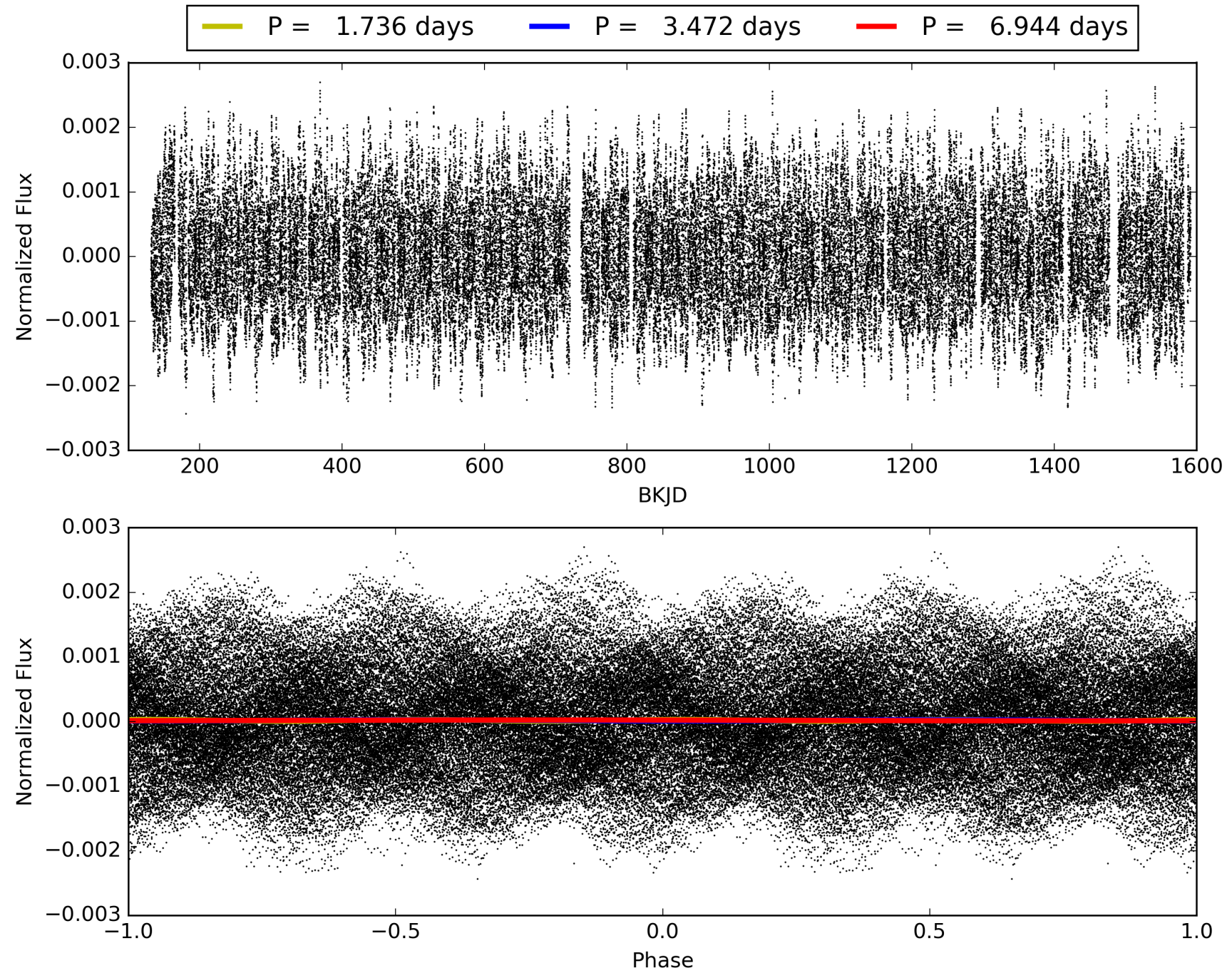
ShortPeriod-sig: 100.0% [4.02σ]  
LongPeriod-sig: 100.0% [484.00σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [376/377]  
GhostDiagnostic-chr: N/A  
Centroid-sig: 2.5%  
Centroid-so: 2.121 arcsec [1.73σ]  
OotOffset-rm: 1.904 arcsec [3.26σ]  
KicOffset-rm: 2.623 arcsec [4.90σ]  
OotOffset-st: 4/4/2/4 [14]  
KicOffset-st: 4/4/2/4 [14]  
DiffImageQuality-fgm: 0.14 [2/14]  
DiffImageOverlap-fno: 0.00 [0/17]

# TCE 009300946-01, PDC Light Curves





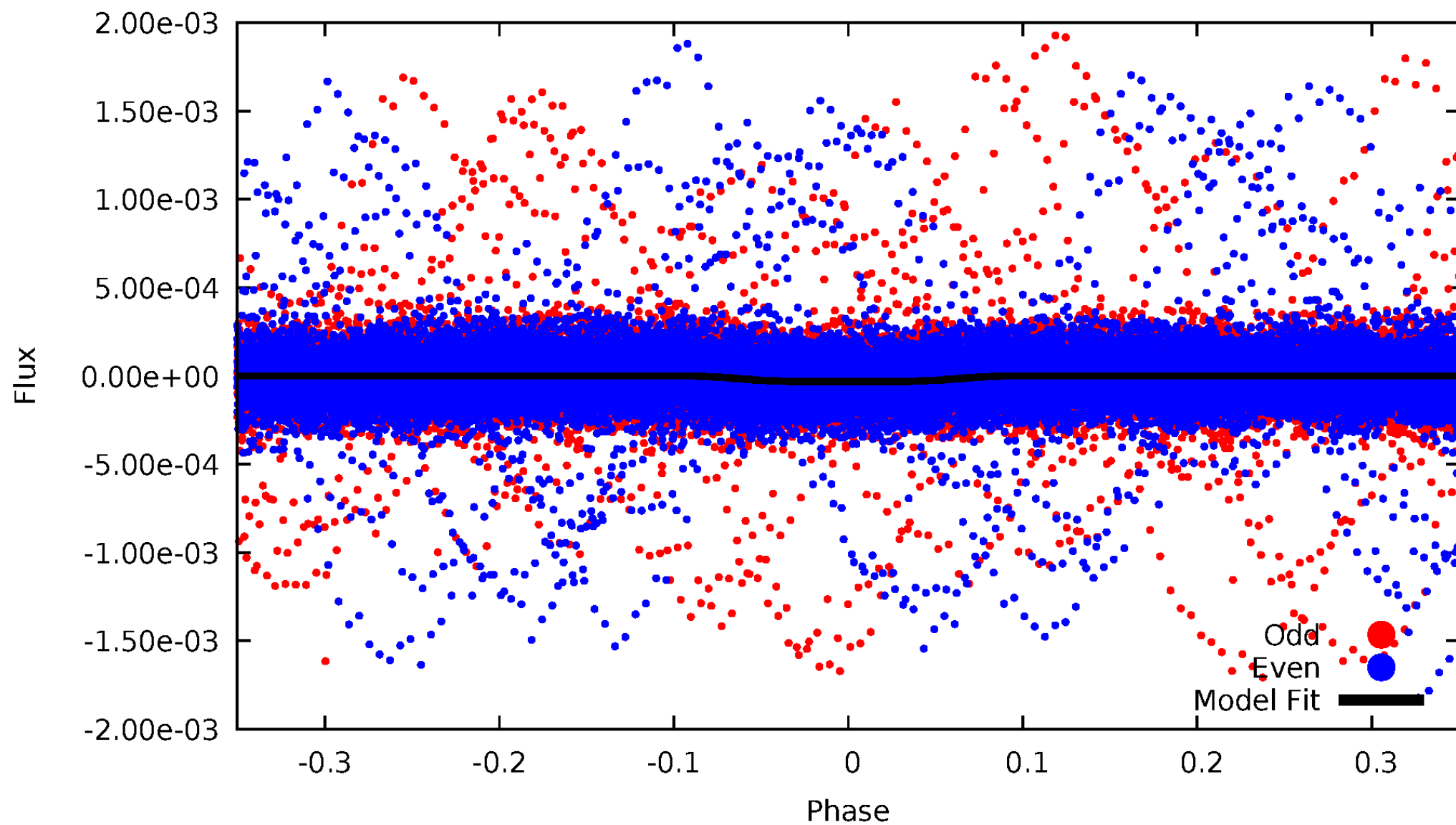
TCE 009300946-01





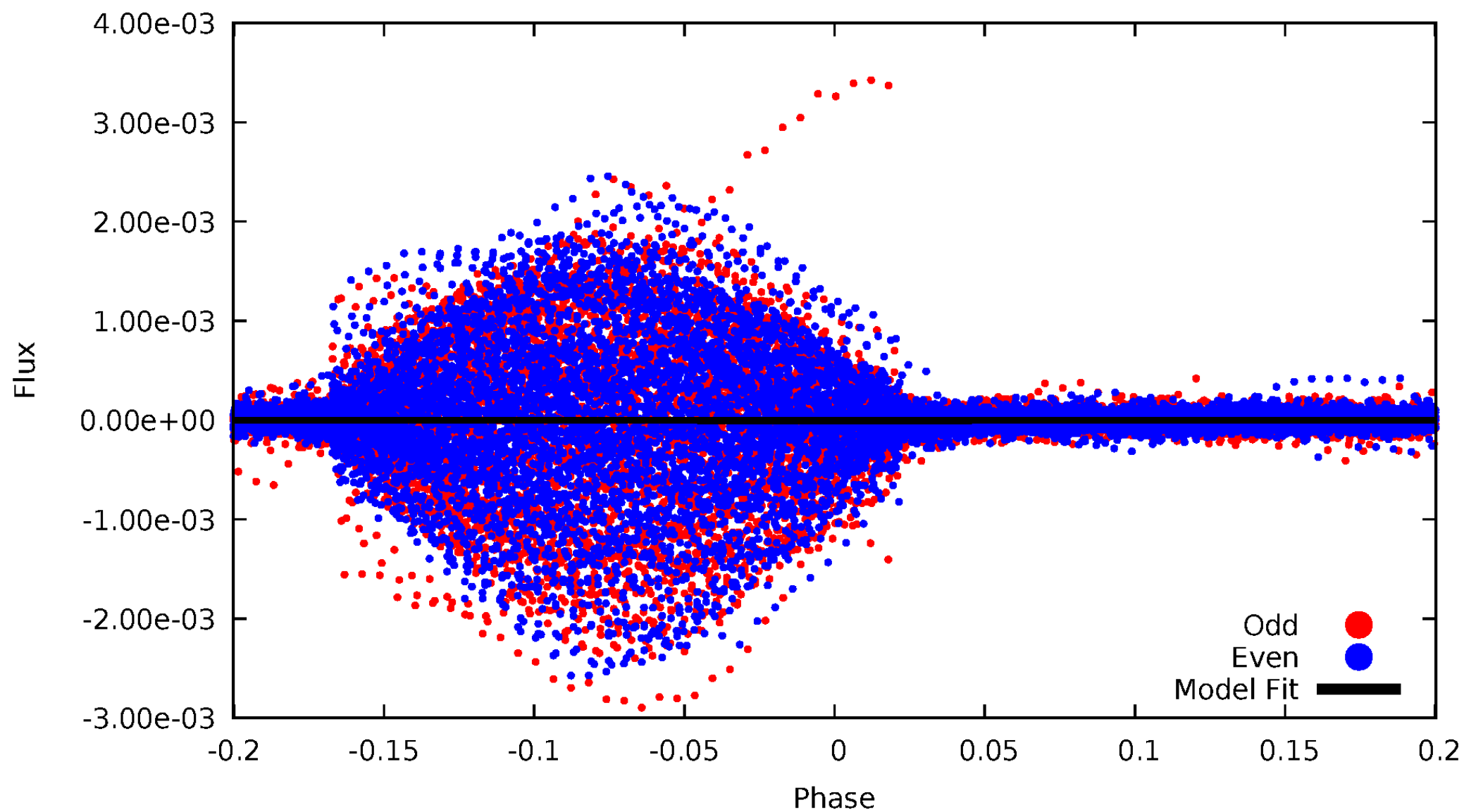
# DV Odd/Even

TCE 009300946-01



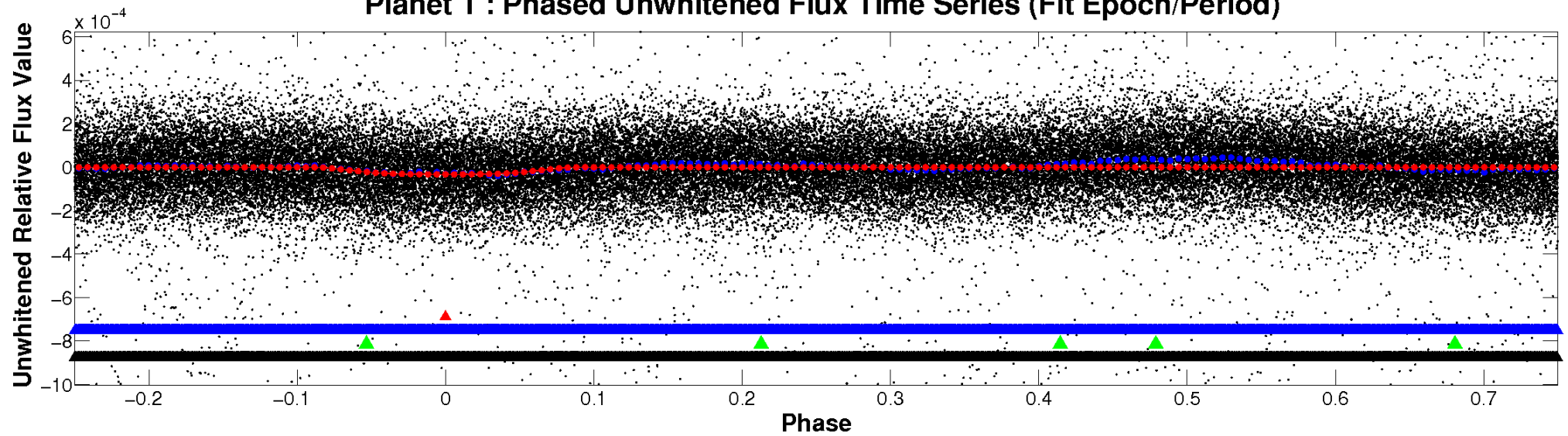
# ALT Odd/Even

TCE 009300946-01

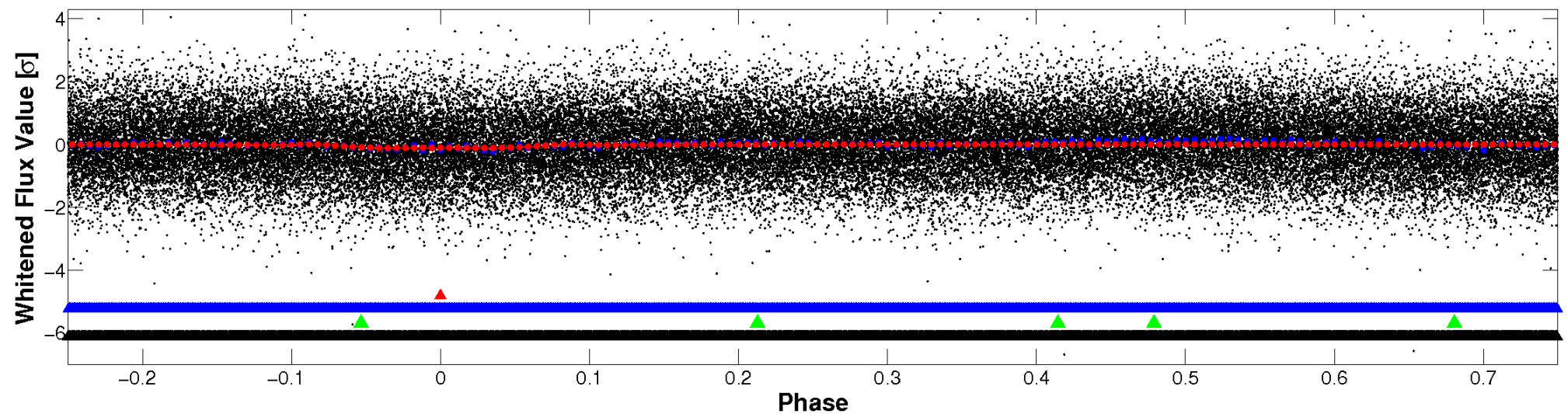


# Non-Whitened Vs. Whitened Light Curve

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



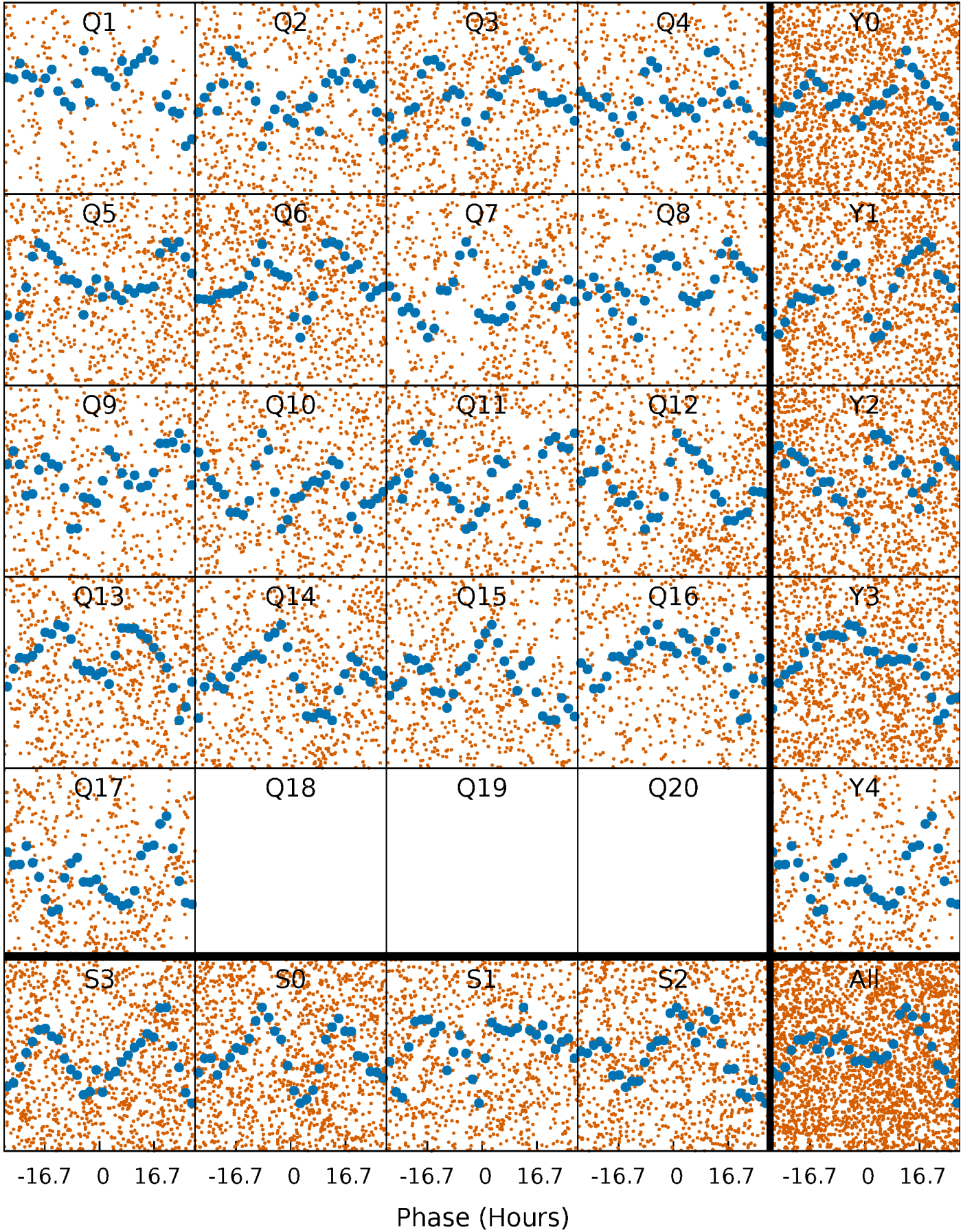
Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)





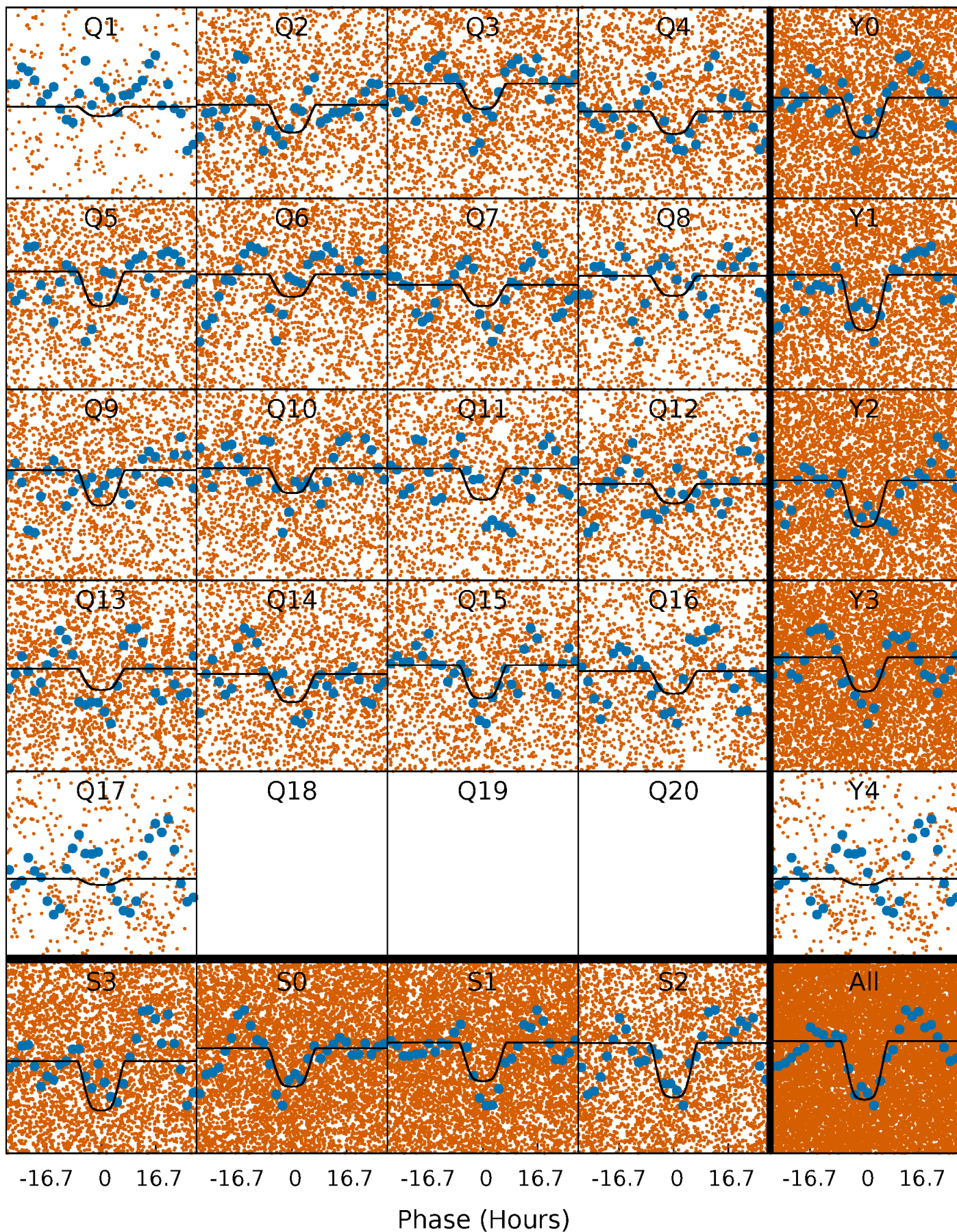
# PDC Quarter-Phased Transit Curves

TCE 009300946-01   P= 3.471798 Days    $T_0=133.112338$  (BKJD)



# DV Quarter-Phased Transit Curves

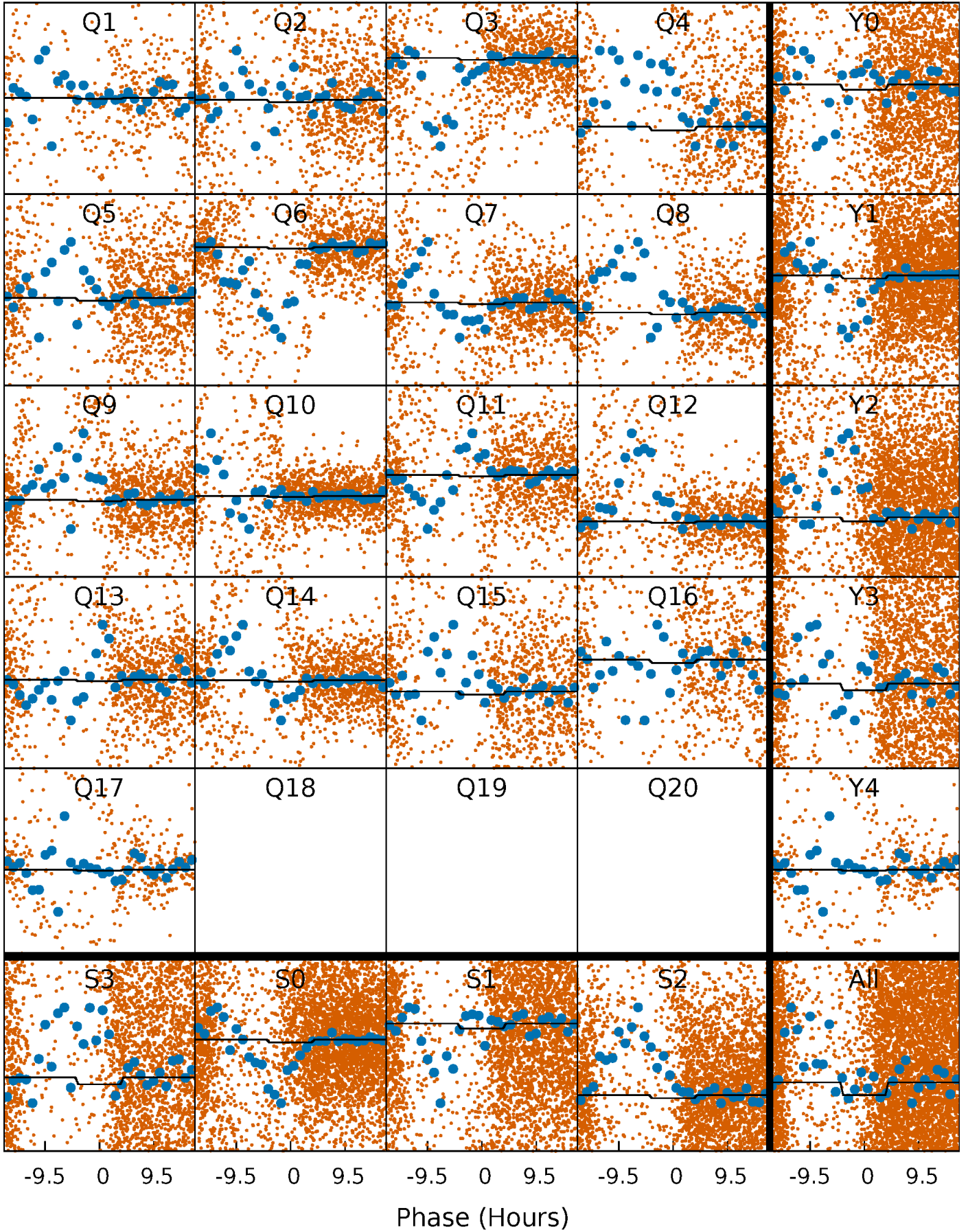
TCE 009300946-01 P= 3.471798 Days  $T_0=133.112338$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

TCE 009300946-01 P= 3.472000 Days  $T_0=133.317355$  (BKJD)

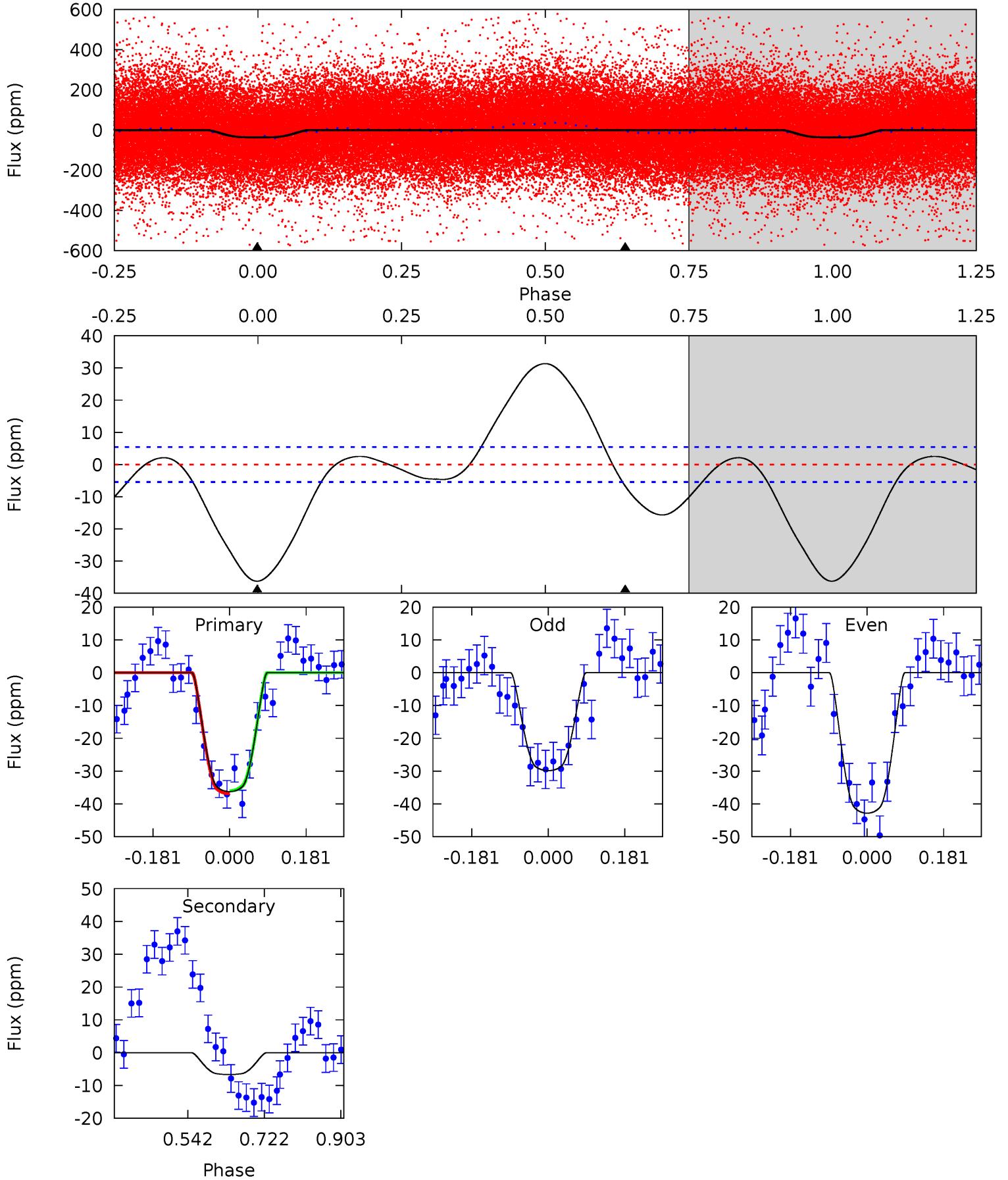




# DV Model-Shift Uniqueness Test

009300946-01, P = 3.471798 Days, E = 129.640540 Days

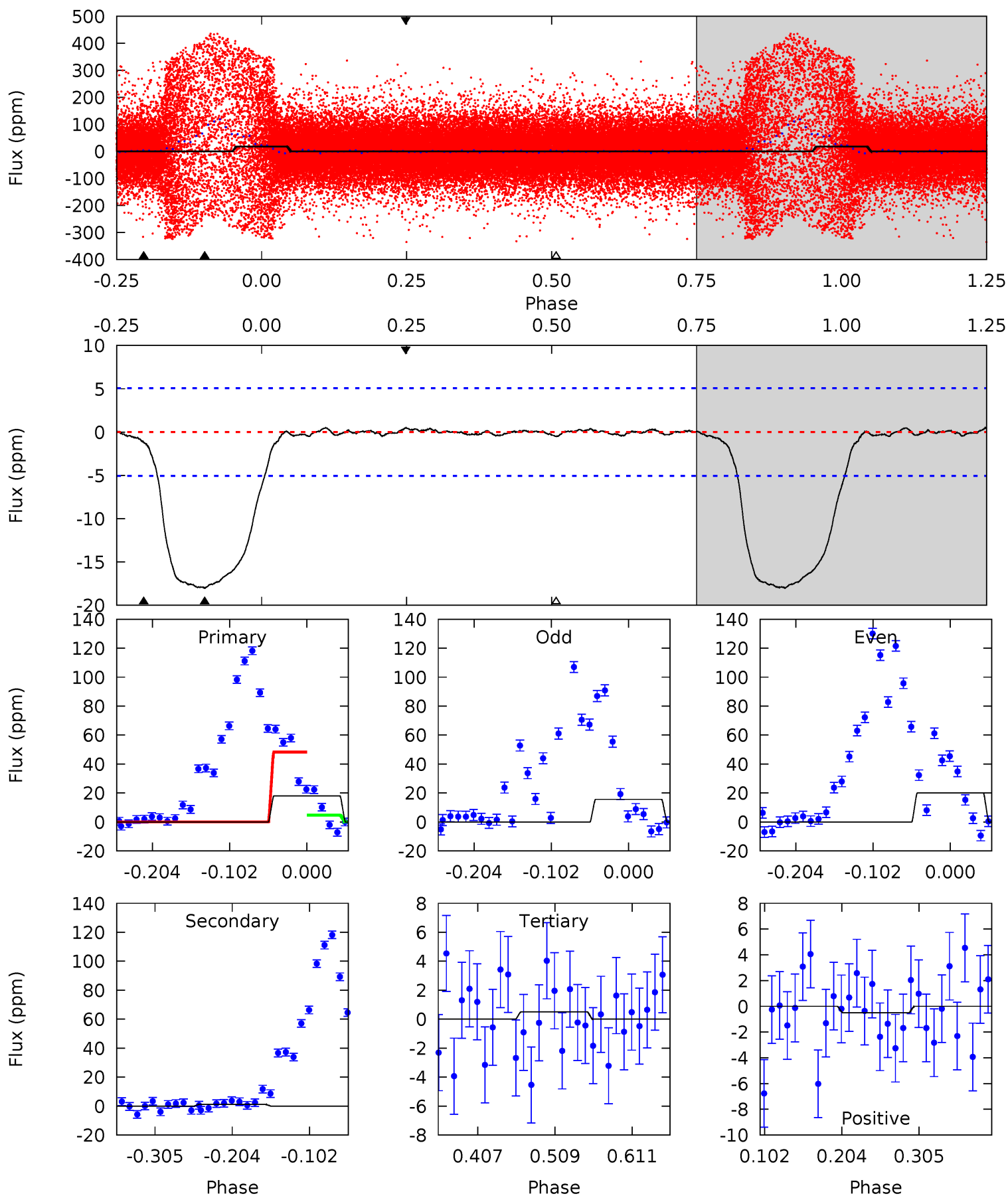
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
29.5	5.42	0	0	4.44	1.34	6.95	29.5	29.5	5.42	5.42	5.31	0.88	0.46	0.33



# Alt Model-Shift Uniqueness Test

009300946-01, P = 3.472000 Days, E = 129.845355 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
16.2	1.07	0.46	0.45	4.56	1.64	0.46	15.7	15.7	0.61	0.62	1.90	-0.35	0.03	16.3



### Stellar Parameters For KIC 009300946

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6735^{+167}_{-184}$	$3.594^{+0.315}_{-0.053}$	$-0.020^{+0.250}_{-0.250}$	$3.542^{+0.412}_{-1.236}$	$1.799^{+0.173}_{-0.321}$	$0.057^{+0.120}_{-0.010}$
	+2%/-3%	+9%/-1%	+1250%/-1250%	+12%/-35%	+10%/-18%	+210%/-18%
Source	PHO1	FLK73	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 009300946-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-7 \pm 1$	$2.67^{+0.37}_{-0.54}$	$3264^{+179}_{-321}$	$4097^{+237}_{-238}$	$1.569^{+0.839}_{-0.441}$
Alt.	$-1 \pm 1$	$0.67^{+0.22}_{-0.21}$	$3241^{+189}_{-263}$	$4996^{+1293}_{-7920}$	$3.975^{+6.645}_{-3.836}$

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



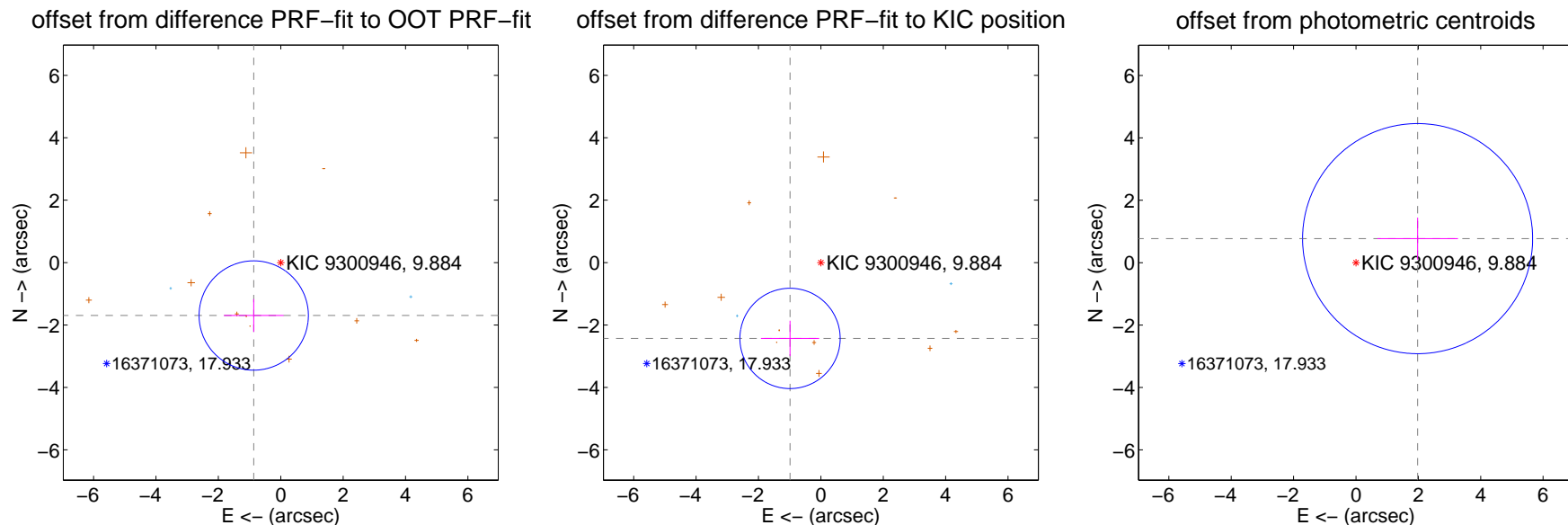
## DV Centroid Data

Supplemental centroid analysis for 009300946-01. **Kepler magnitude: 9.88.** Transit SNR 9.69

**There are 2 quarters with good PRF difference image offsets**

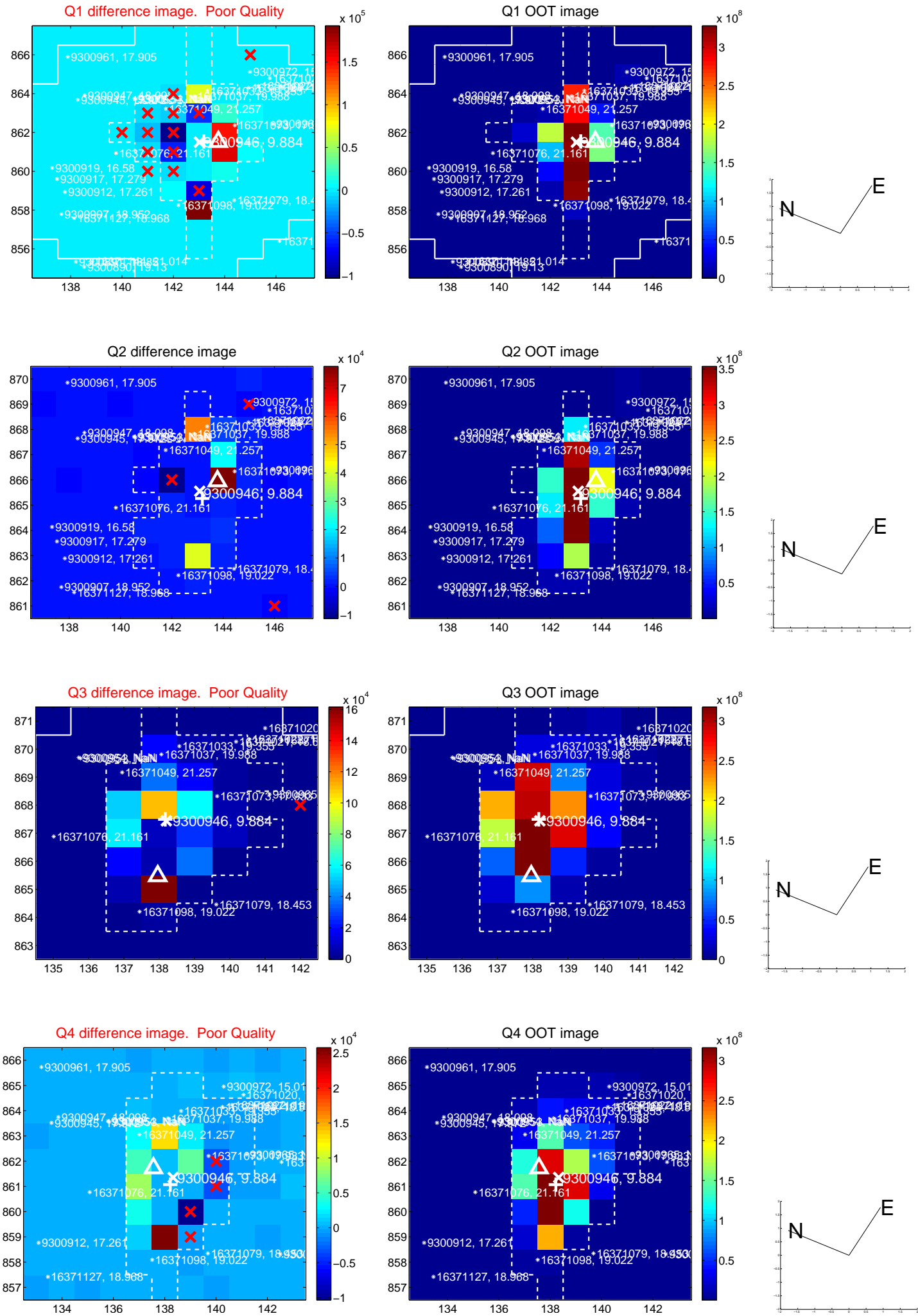
The direct PRF centroid is offset from the target star catalog position by about 0.51 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b><math>1.904 \pm 0.584</math></b>	<b>3.26</b>	$0.866 \pm 0.956$	$-1.696 \pm 0.527$
PRF-fit source offset from KIC position	<b><math>2.623 \pm 0.536</math></b>	<b>4.90</b>	$0.988 \pm 0.933$	$-2.430 \pm 0.566$
photometric centroid source offset	$2.12 \pm 1.23$	1.73	$-1.98 \pm 1.29$	$0.77 \pm 0.67$

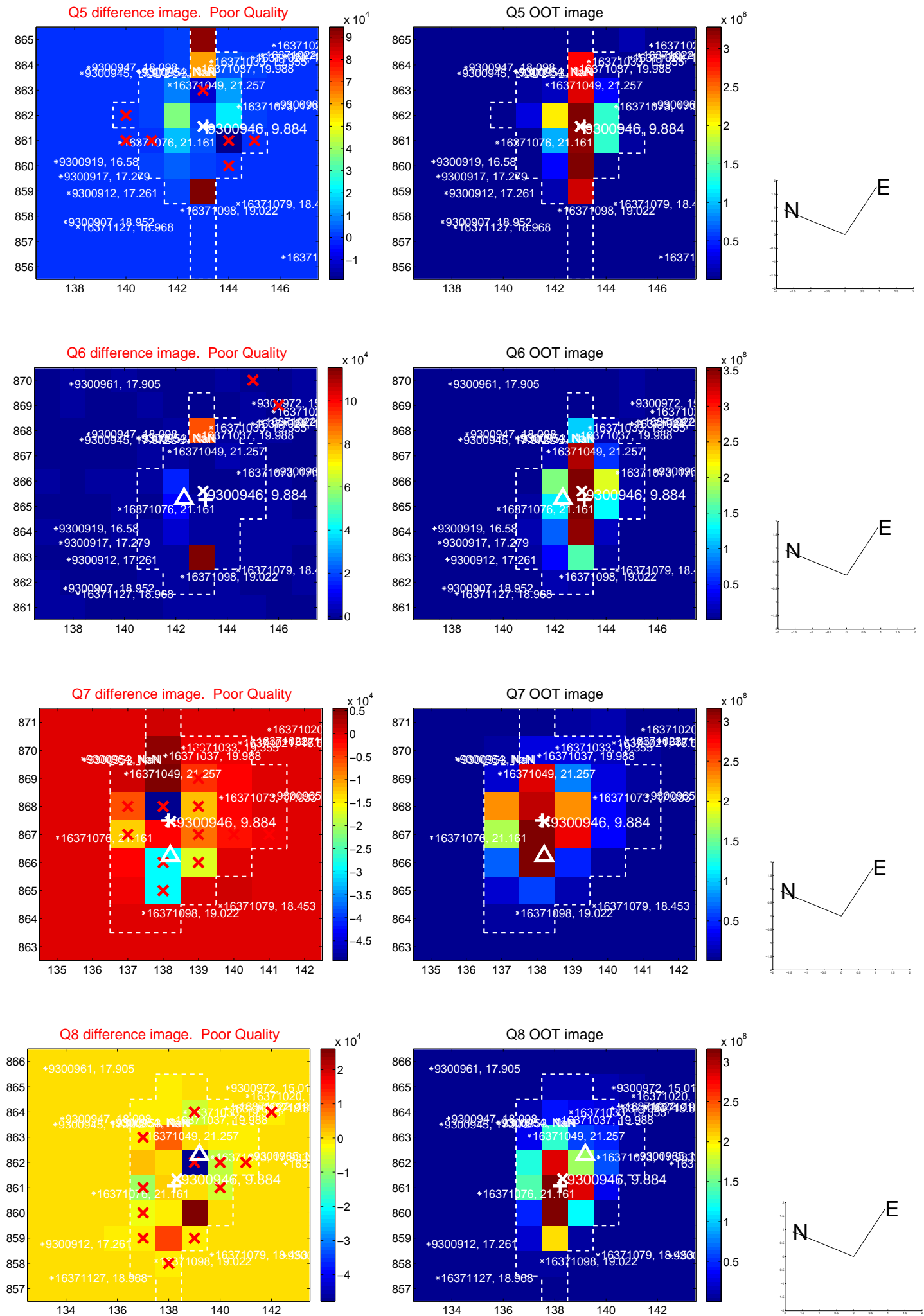


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

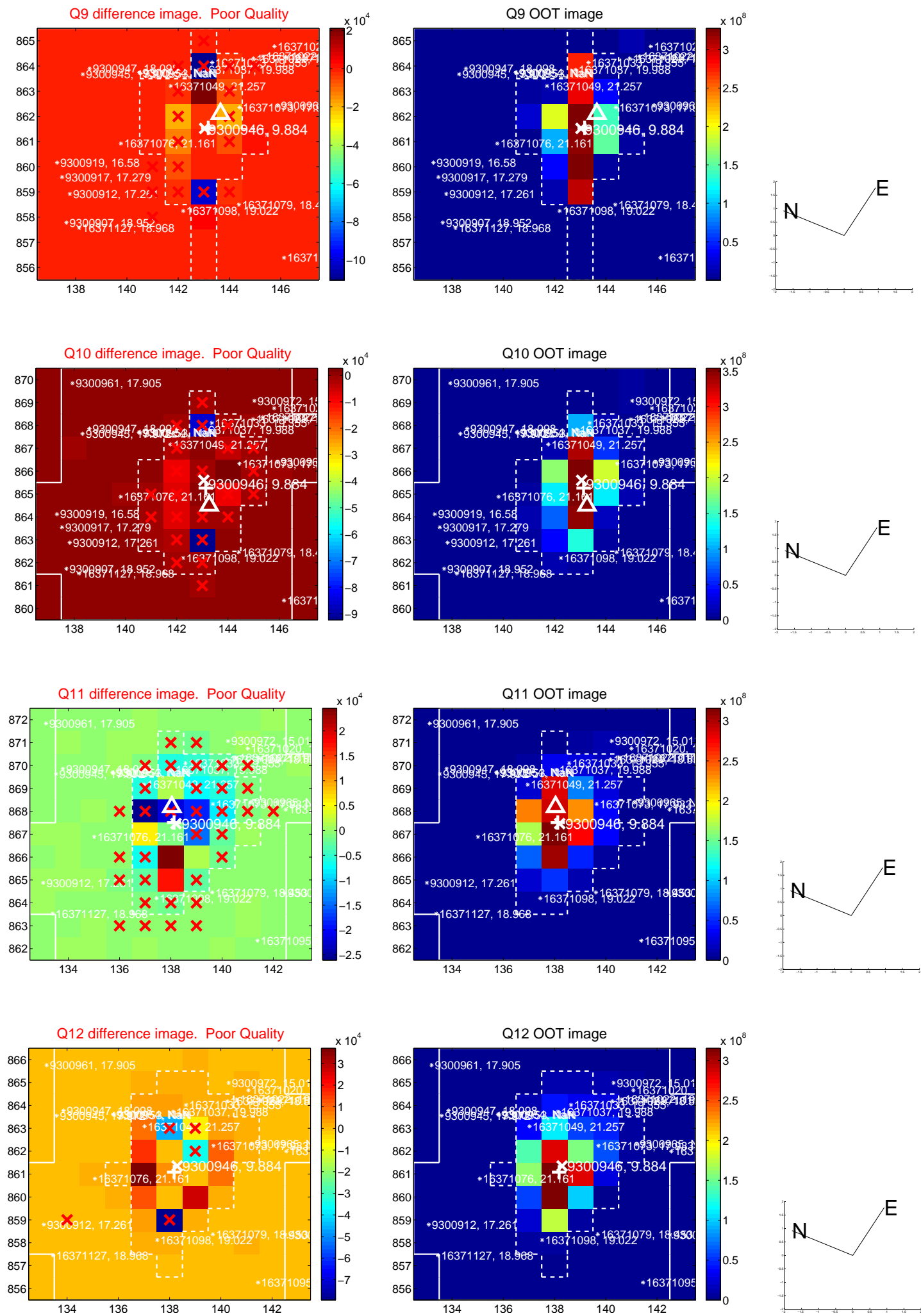
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



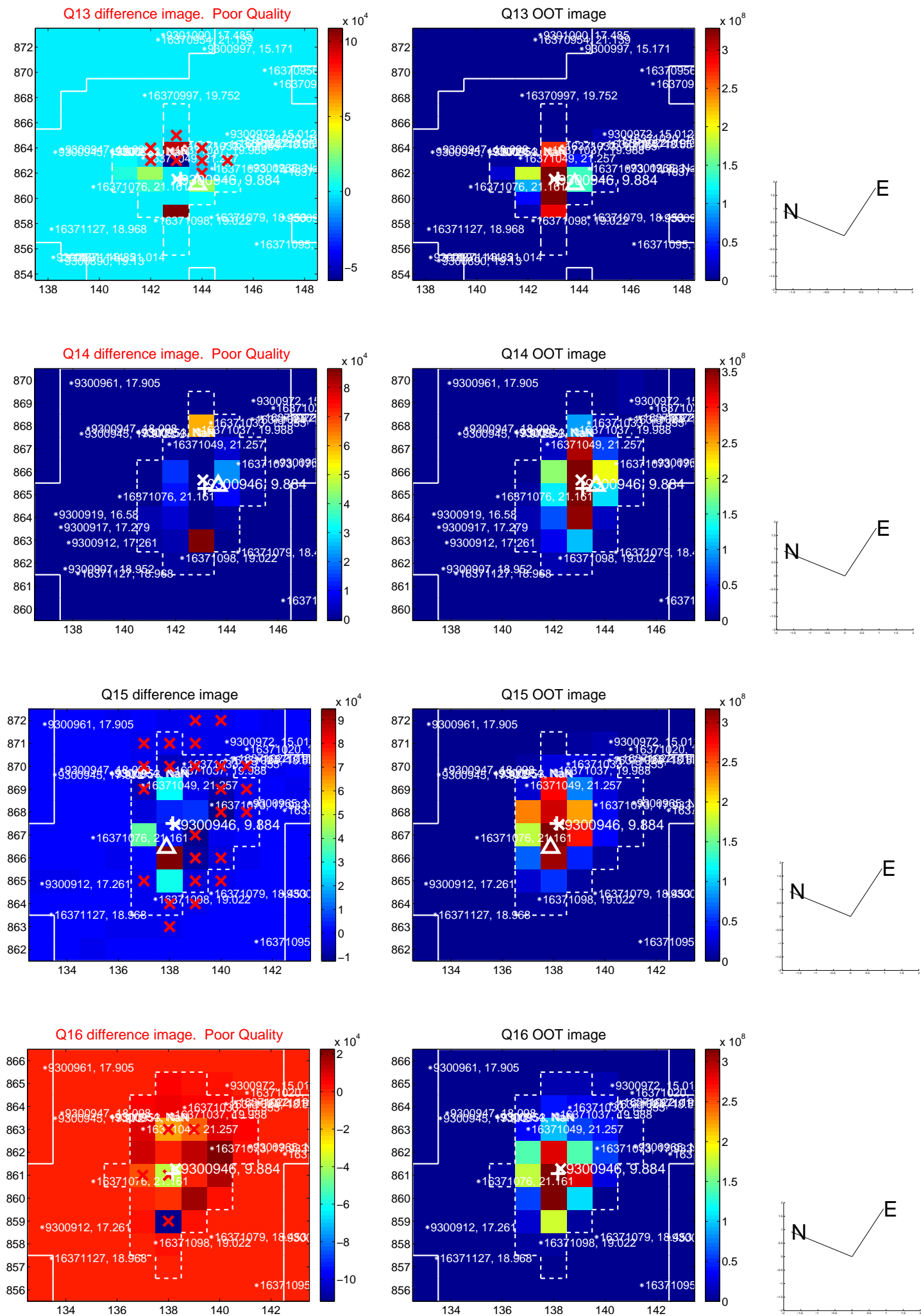
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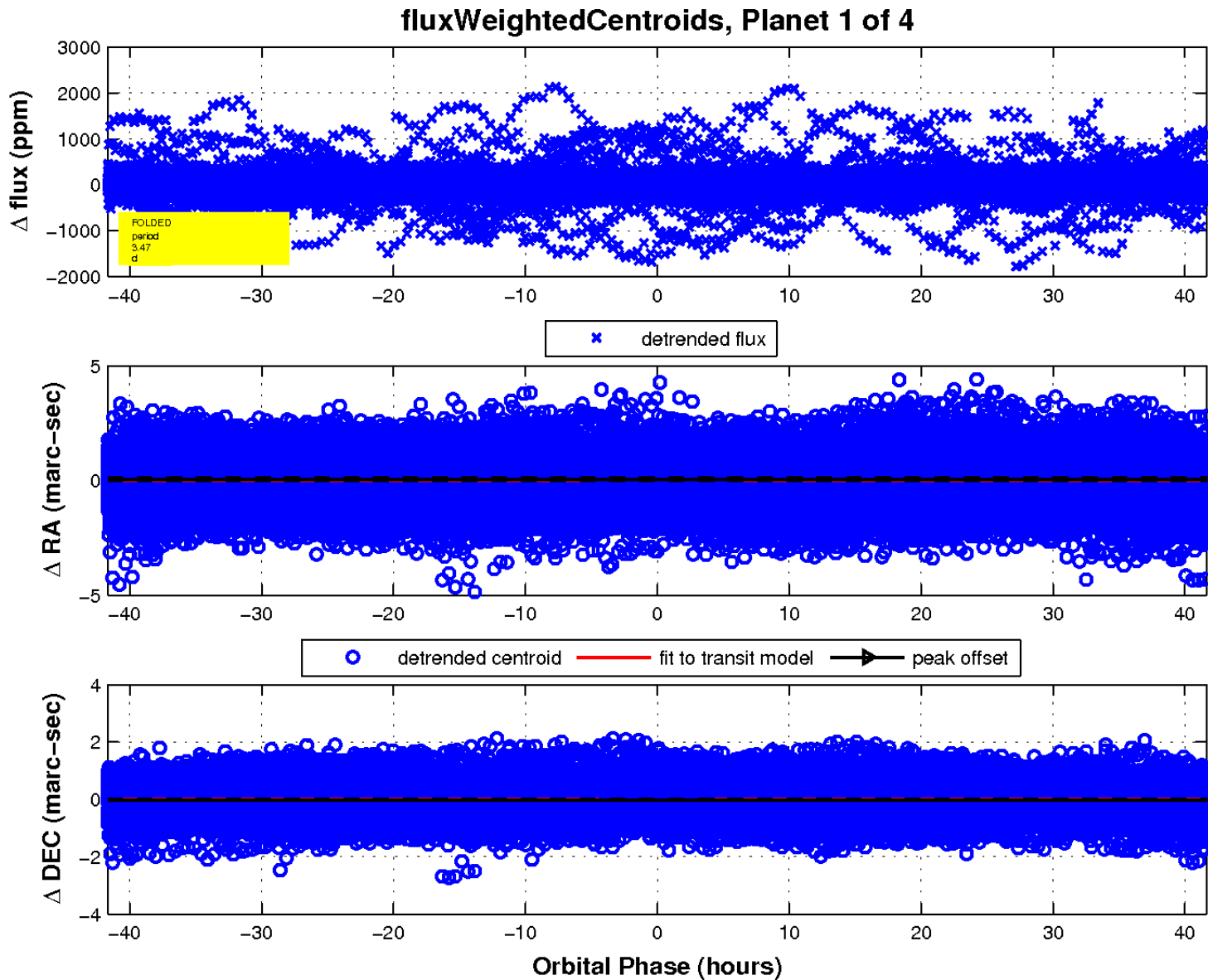
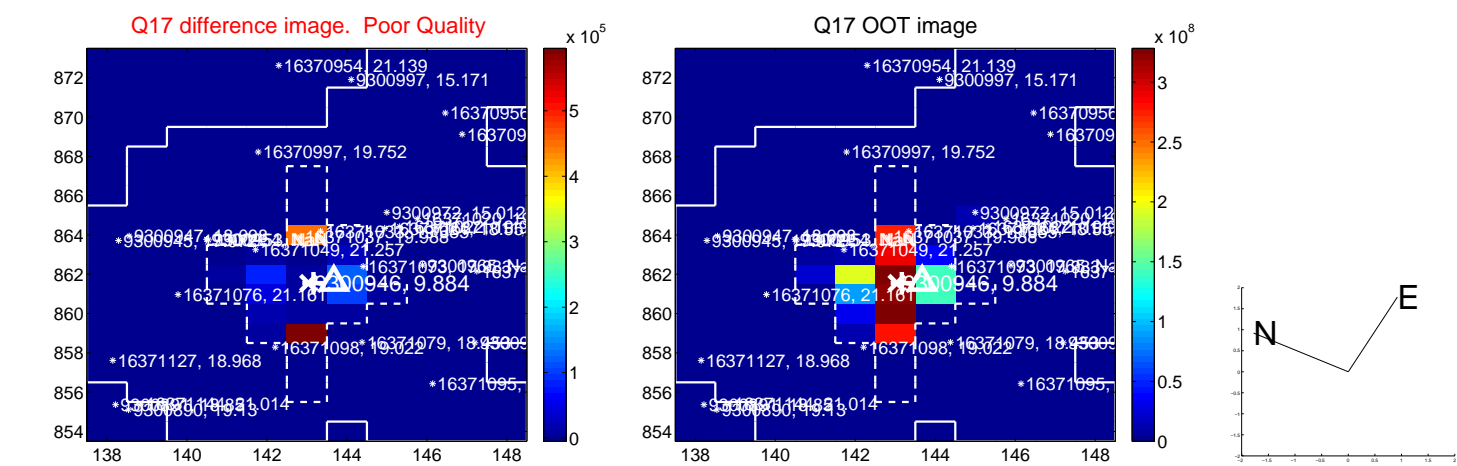


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

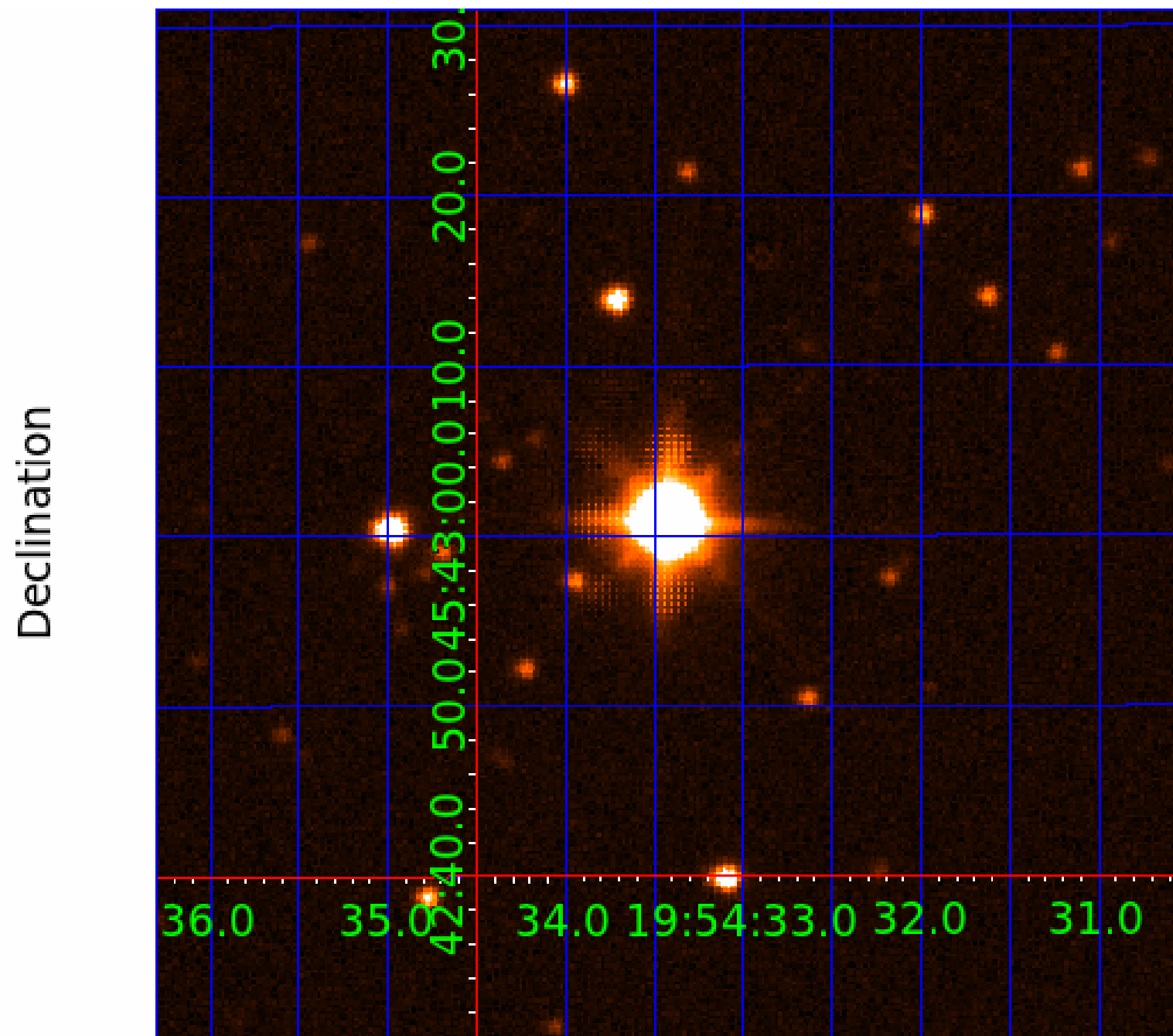




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image



# KIC 009300946

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009300946-01	OBS	No	3.471798	133.112338	32.5	14.594	10.7	9.7	3.54	6735	2.80	7768.51
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## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009300946-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—CENT_SATURATED
009300946-02	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—CENT_SATURATED
009300946-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
009300946-04	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—LPP_ALT—SAME_NTL_PERIOD—CENT_SATURATED

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

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

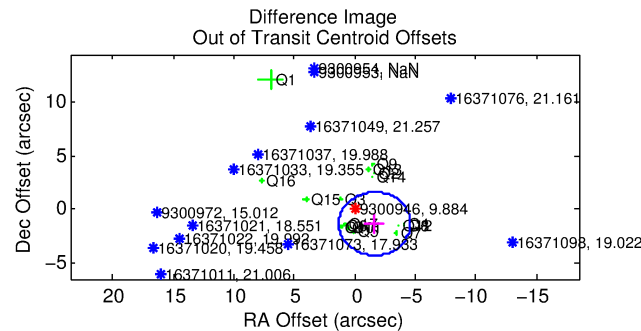
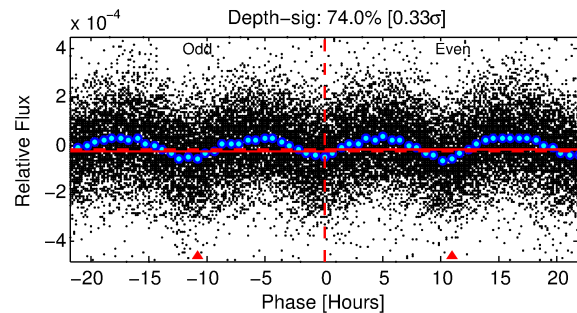
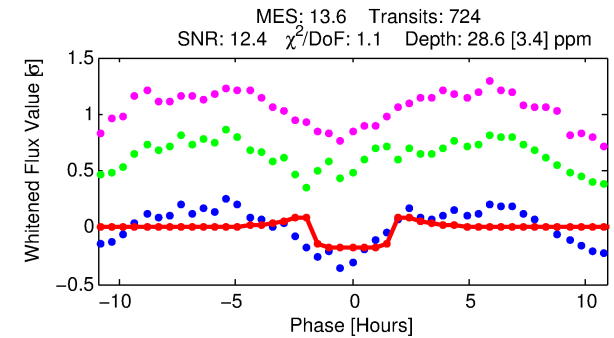
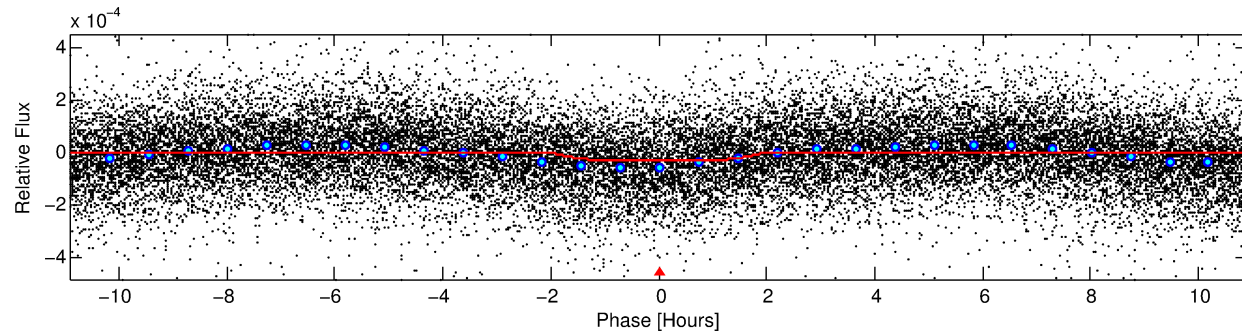
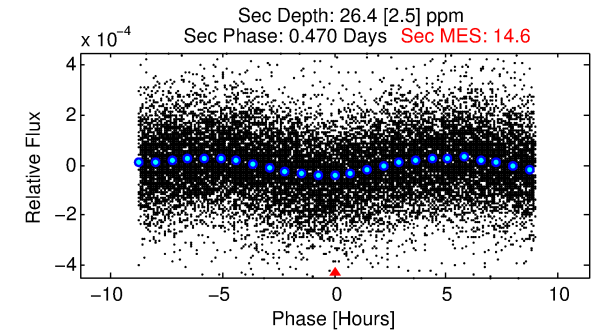
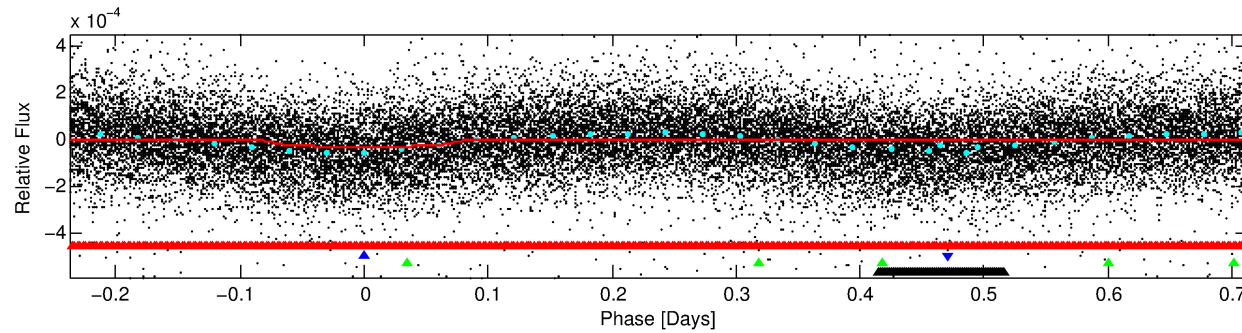
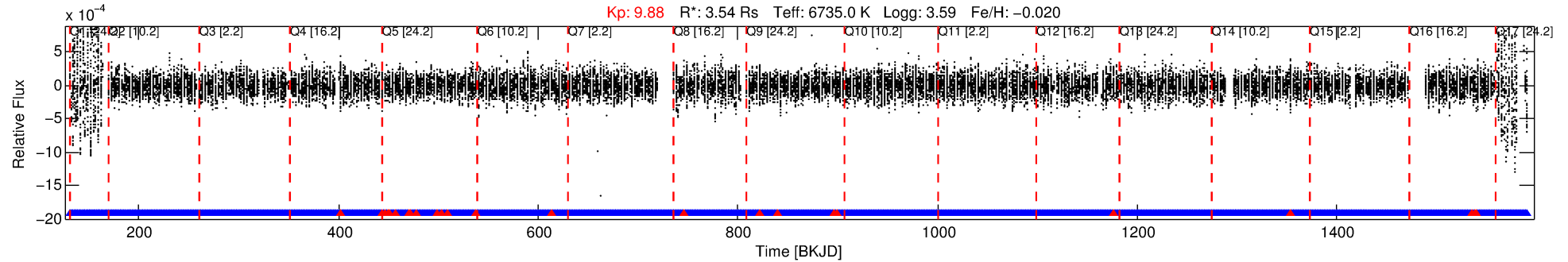
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009300946-02

No Significant Match Found

# DV One-Page Summary

KIC: 9300946 Candidate: 2 of 4 Period: 0.950 d



## DV Fit Results:

Period = 0.95037 [0.00001] d  
Epoch = 131.7974 [0.0022] BKJD  
 $R_p/R^* = 0.0059$  [0.0013]  
 $a/R^* = 1.23$  [0.54]  
 $b = 0.93$  [0.19]  
 $S_{\text{eff}} = 43707.40$  [23934.57]  
 $T_{\text{eq}} = 3687$  [505] K  
 $R_p = 2.27$  [0.94]  $R_e$   
 $a = 0.0230$  [0.0077] AU  
 $A_g = 1.50$  [1.05] [0.47σ]  
 $T_{\text{eff}} = 6304$  [739] K [2.93σ]

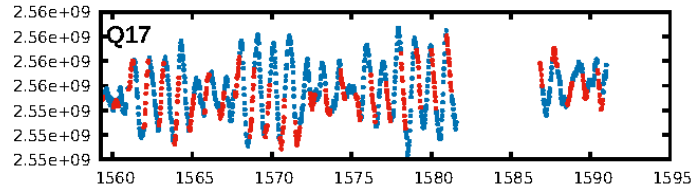
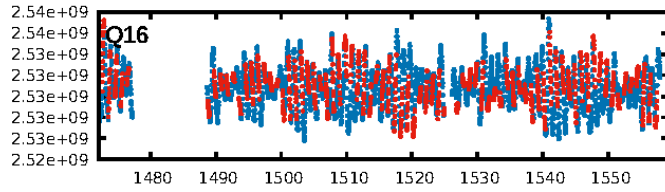
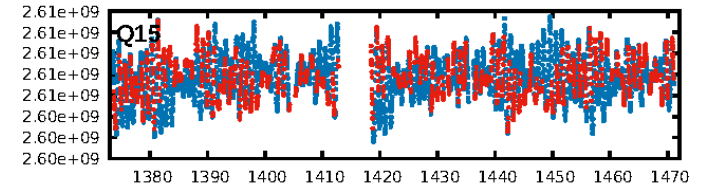
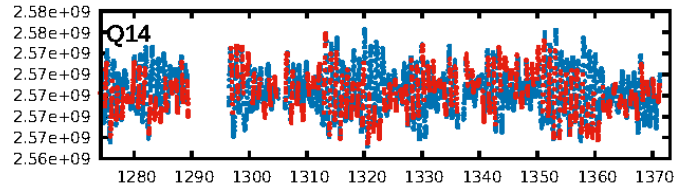
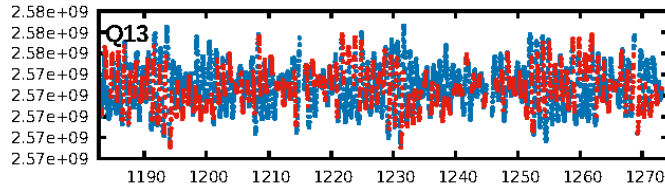
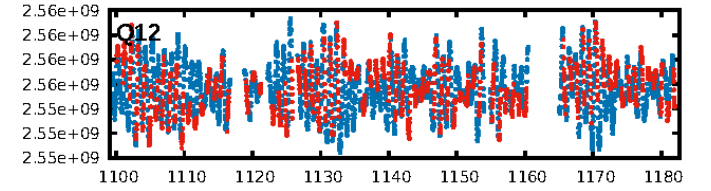
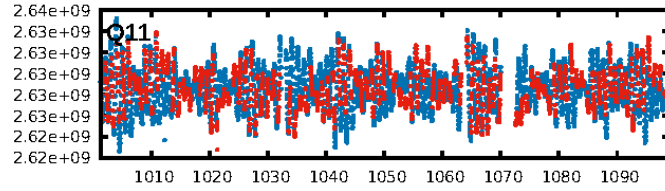
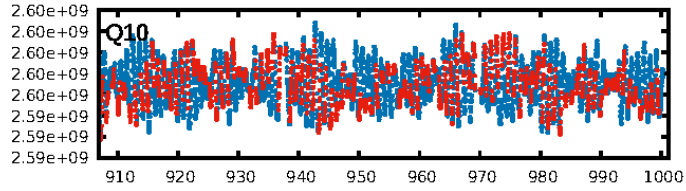
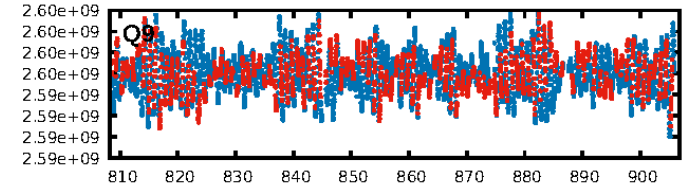
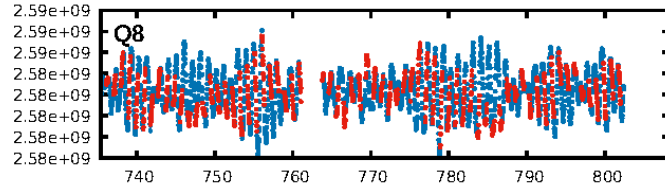
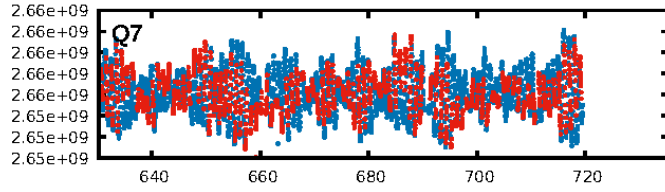
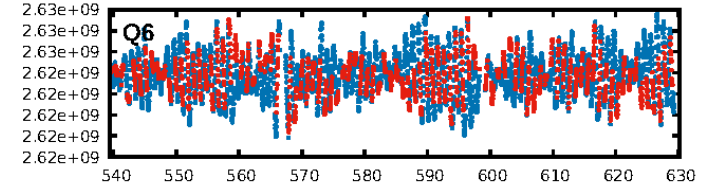
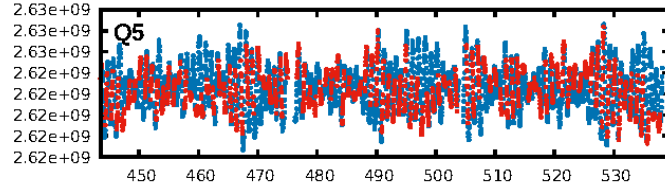
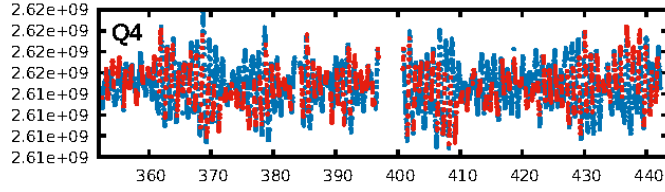
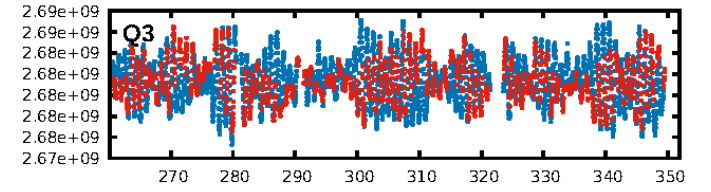
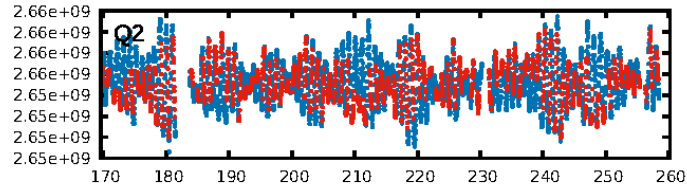
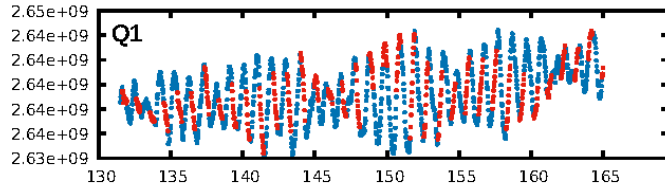
## DV Diagnostic Results:

**ShortPeriod-sig: 0.0% [0.00σ]**  
LongPeriod-sig: 100.0% [4.02σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 0.96 [666/691]  
GhostDiagnostic-chr: N/A  
**Centroid-sig: 0.1%**  
Centroid-so: 1.340 arcsec [2.63σ]  
OotOffset-rm: 2.102 arcsec [2.13σ]  
KicOffset-rm: 2.895 arcsec [2.69σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 0.06 [1/17]  
DiffImageOverlap-fno: 0.00 [0/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 18:49:45 Z

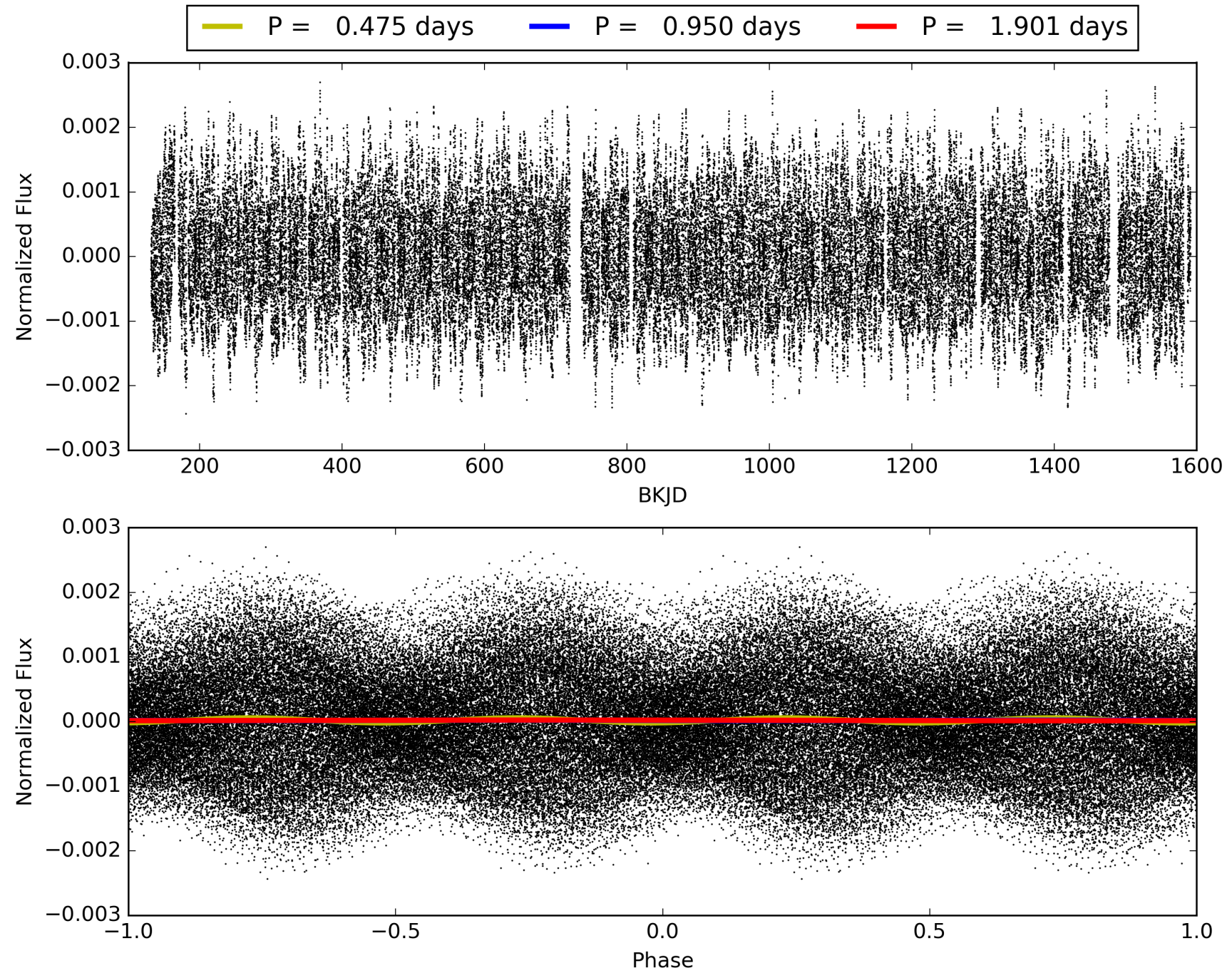
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 009300946-02, PDC Light Curves



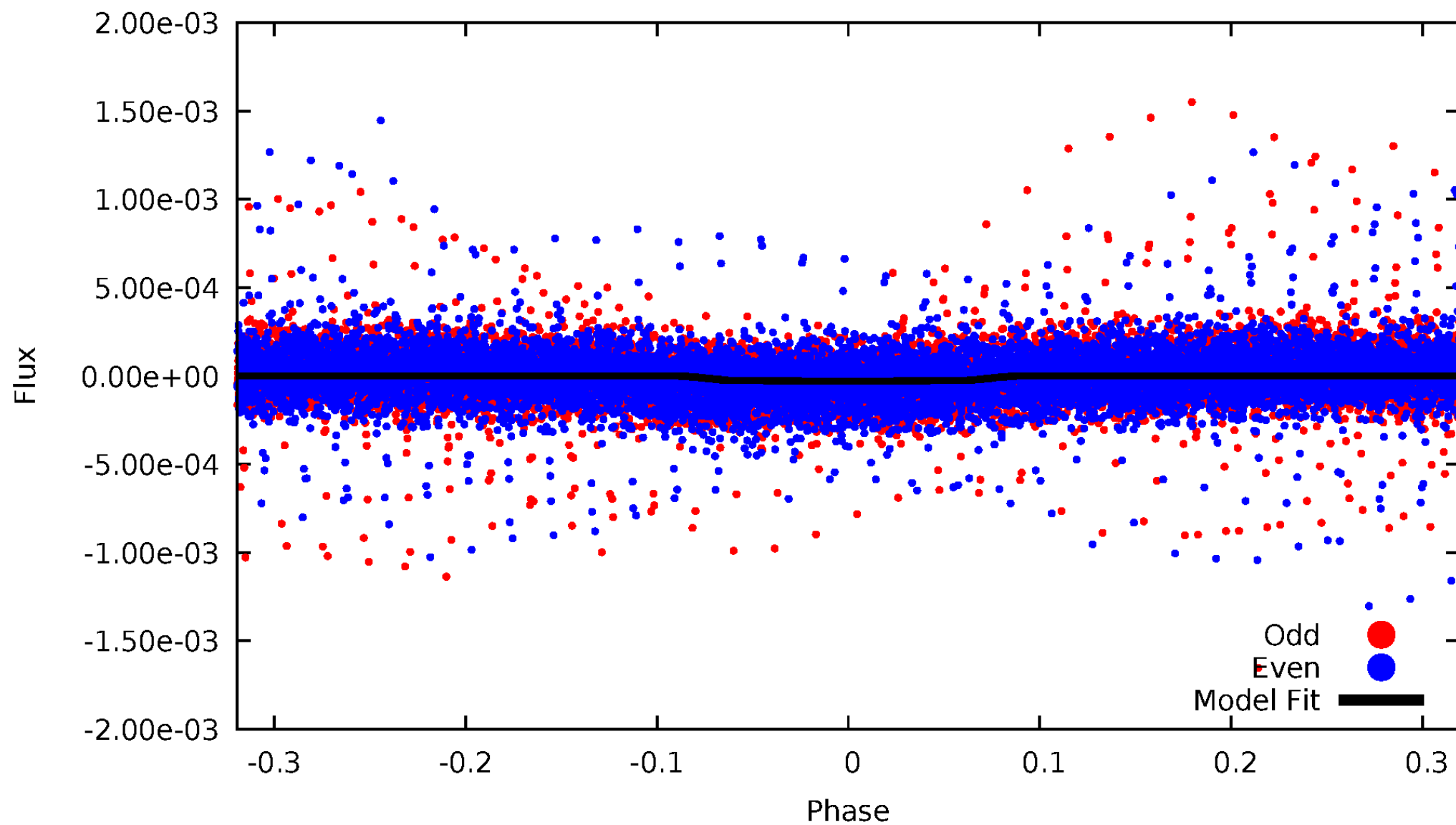


TCE 009300946-02



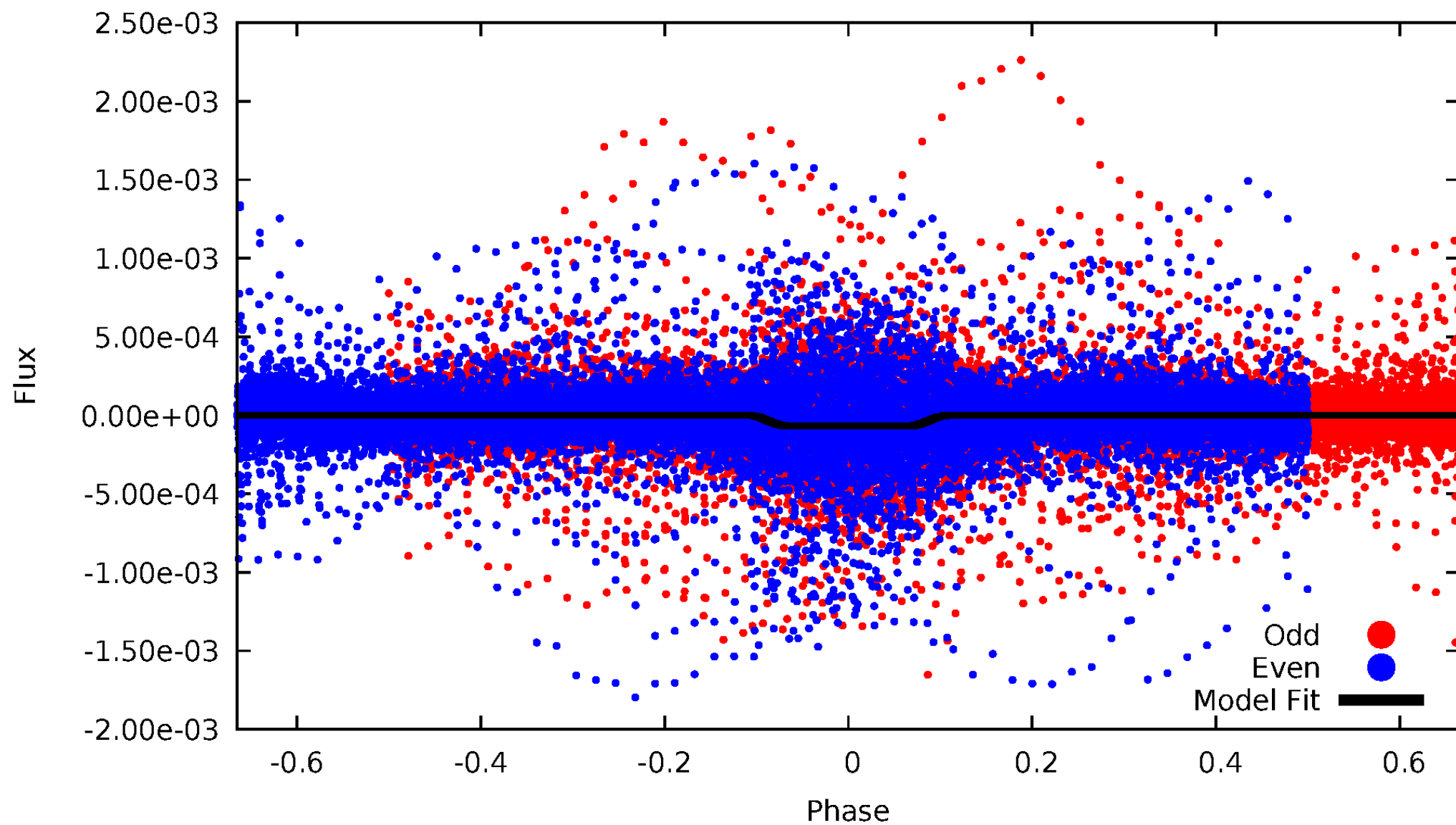
# DV Odd/Even

TCE 009300946-02



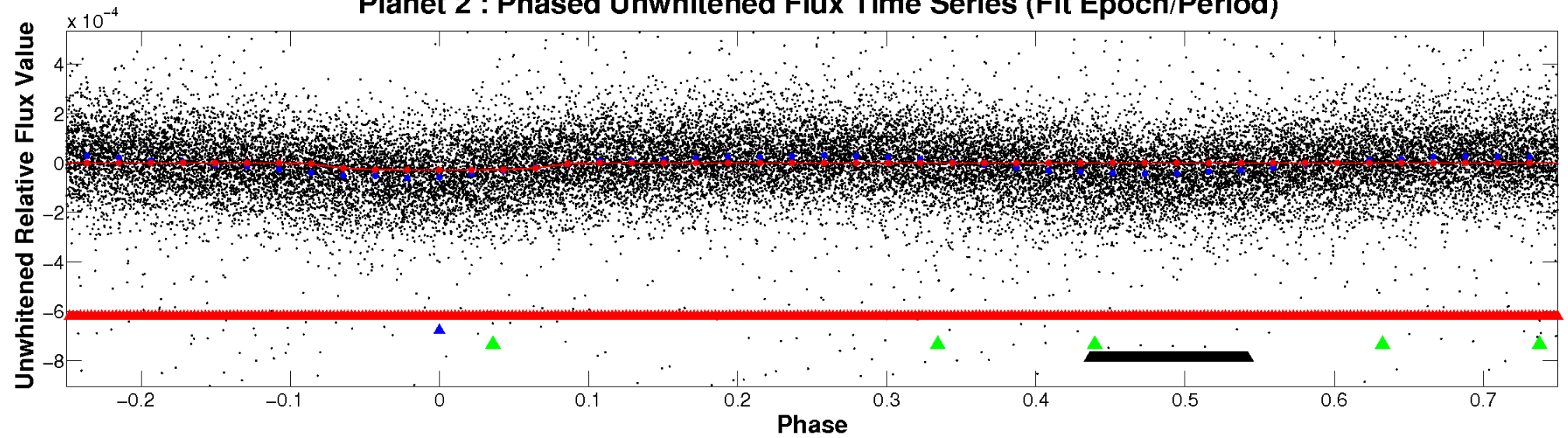
# ALT Odd/Even

TCE 009300946-02

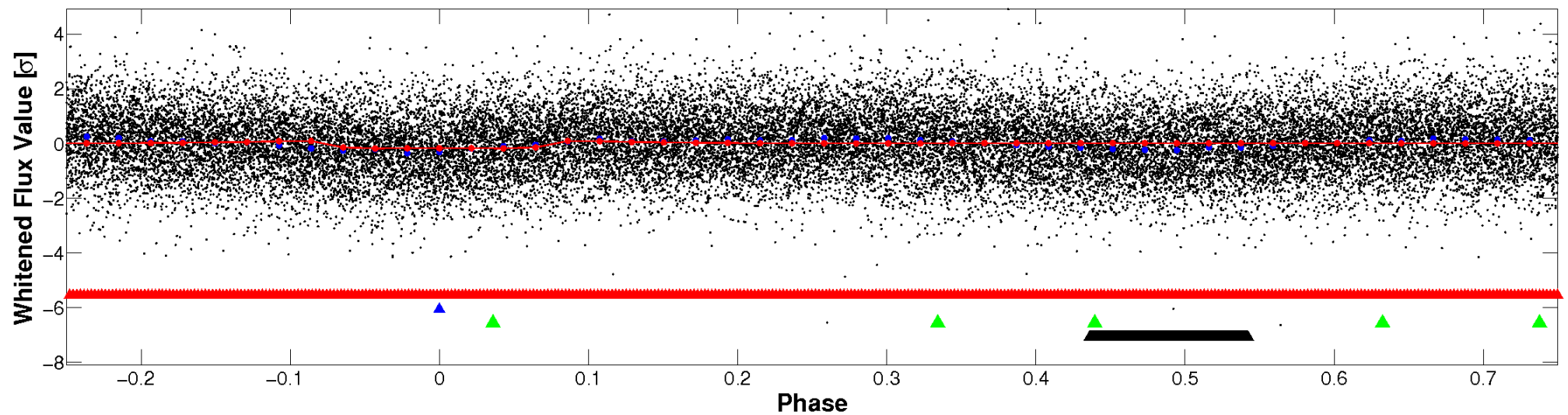


# Non-Whitened Vs. Whitened Light Curve

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



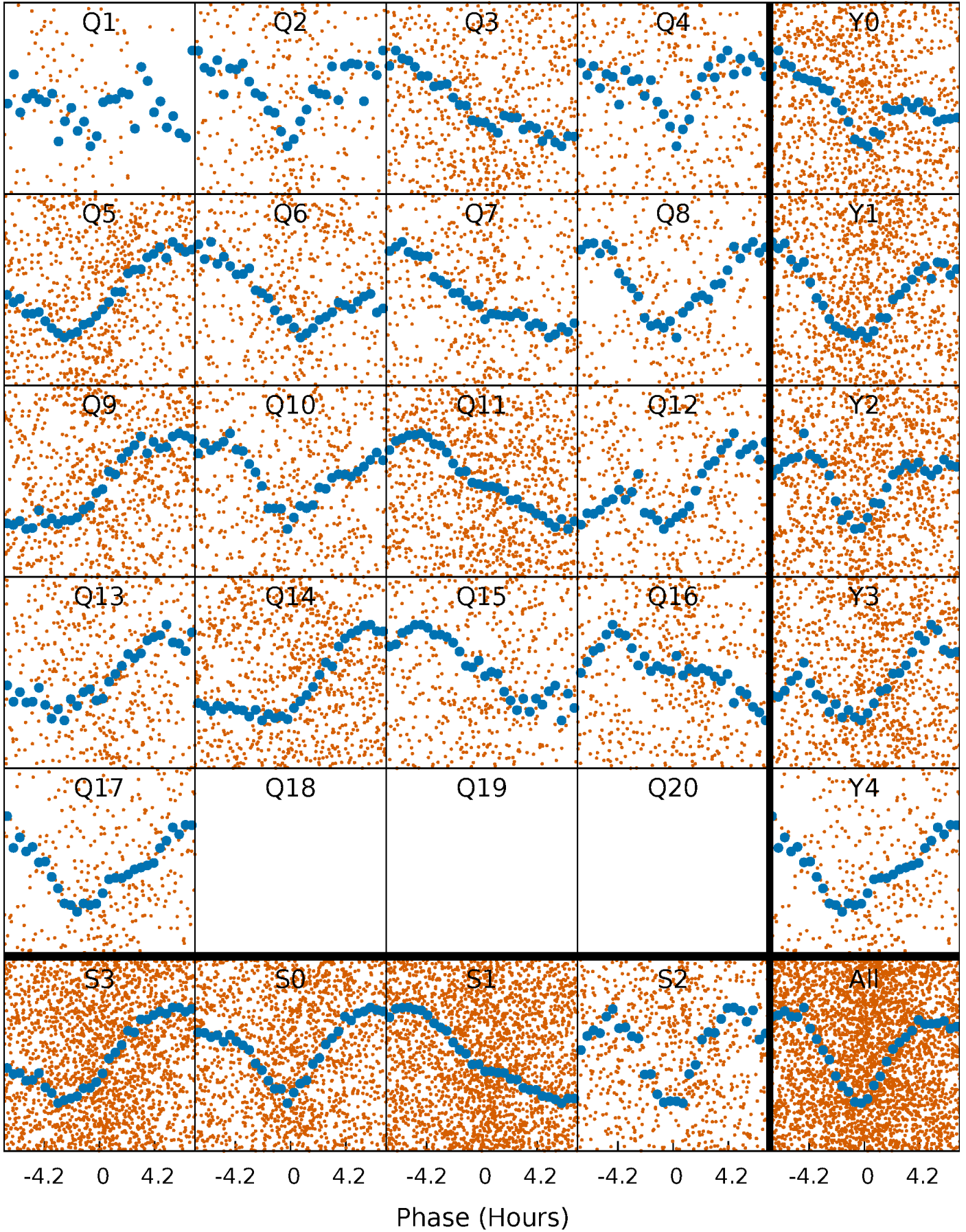
## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)





# PDC Quarter-Phased Transit Curves

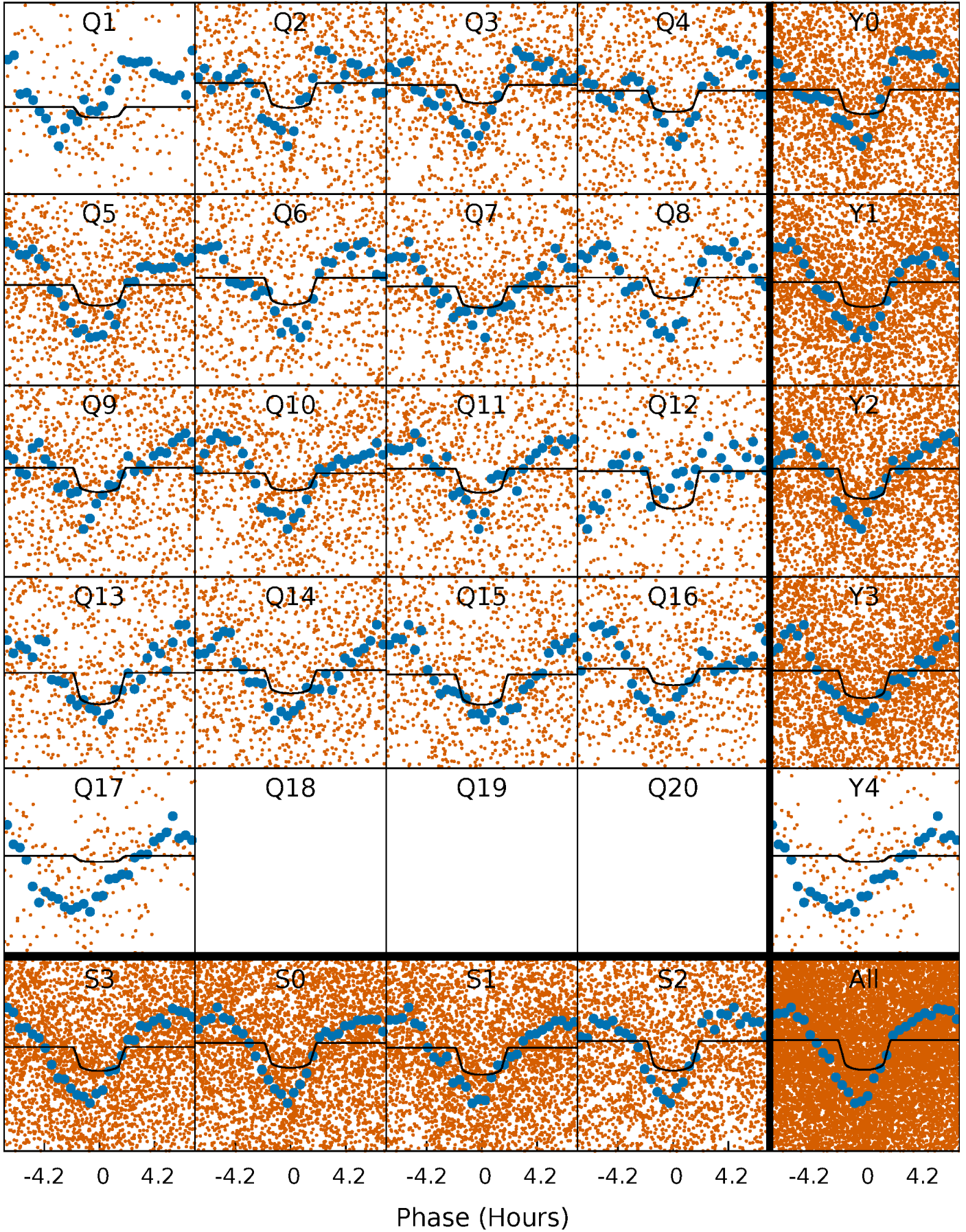
TCE 009300946-02   P= 0.950368 Days    $T_0=131.797417$  (BKJD)





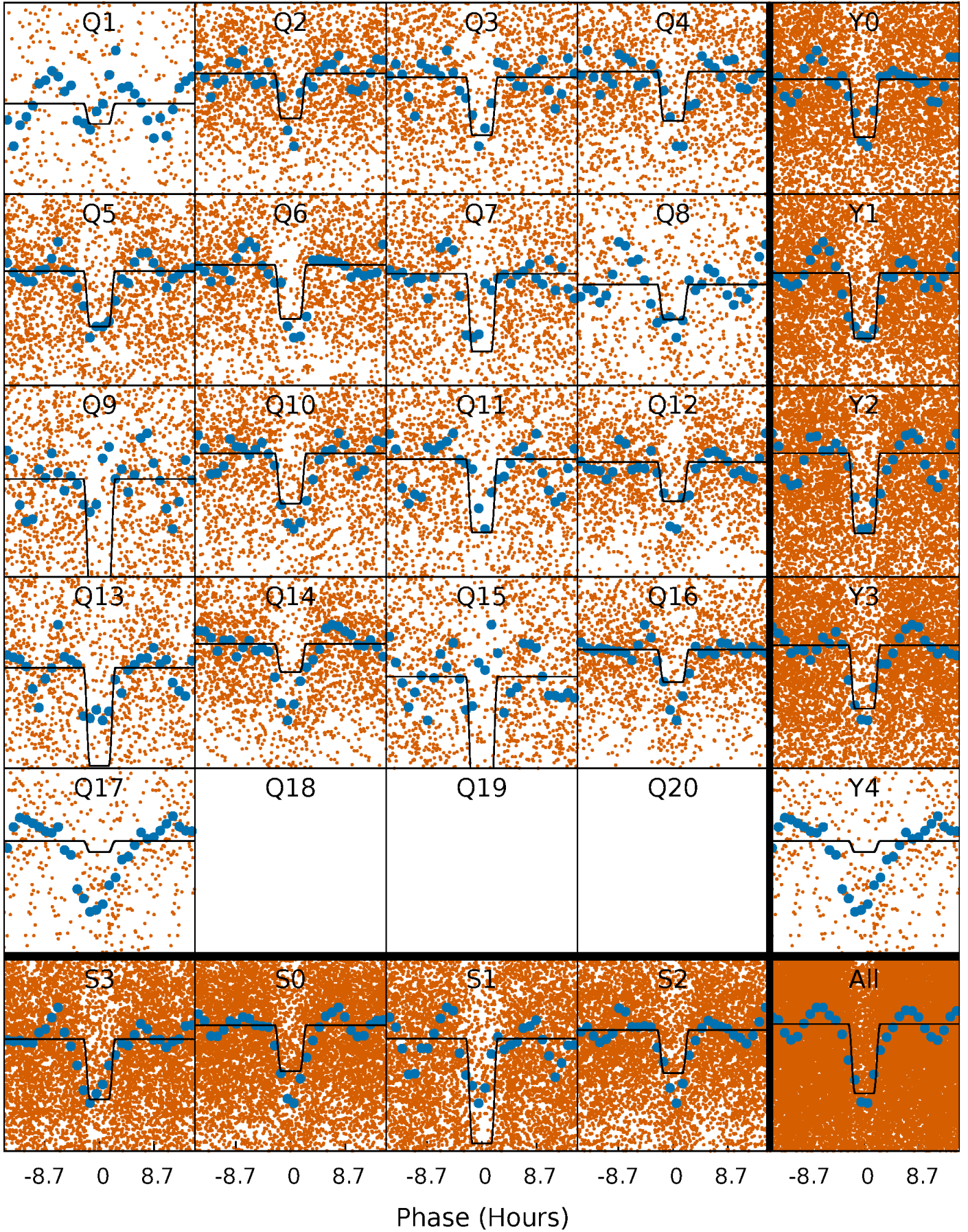
# DV Quarter-Phased Transit Curves

TCE 009300946-02   P= 0.950368 Days    $T_0=131.797417$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 009300946-02   P= 0.950339 Days    $T_0=131.790200$  (BKJD)

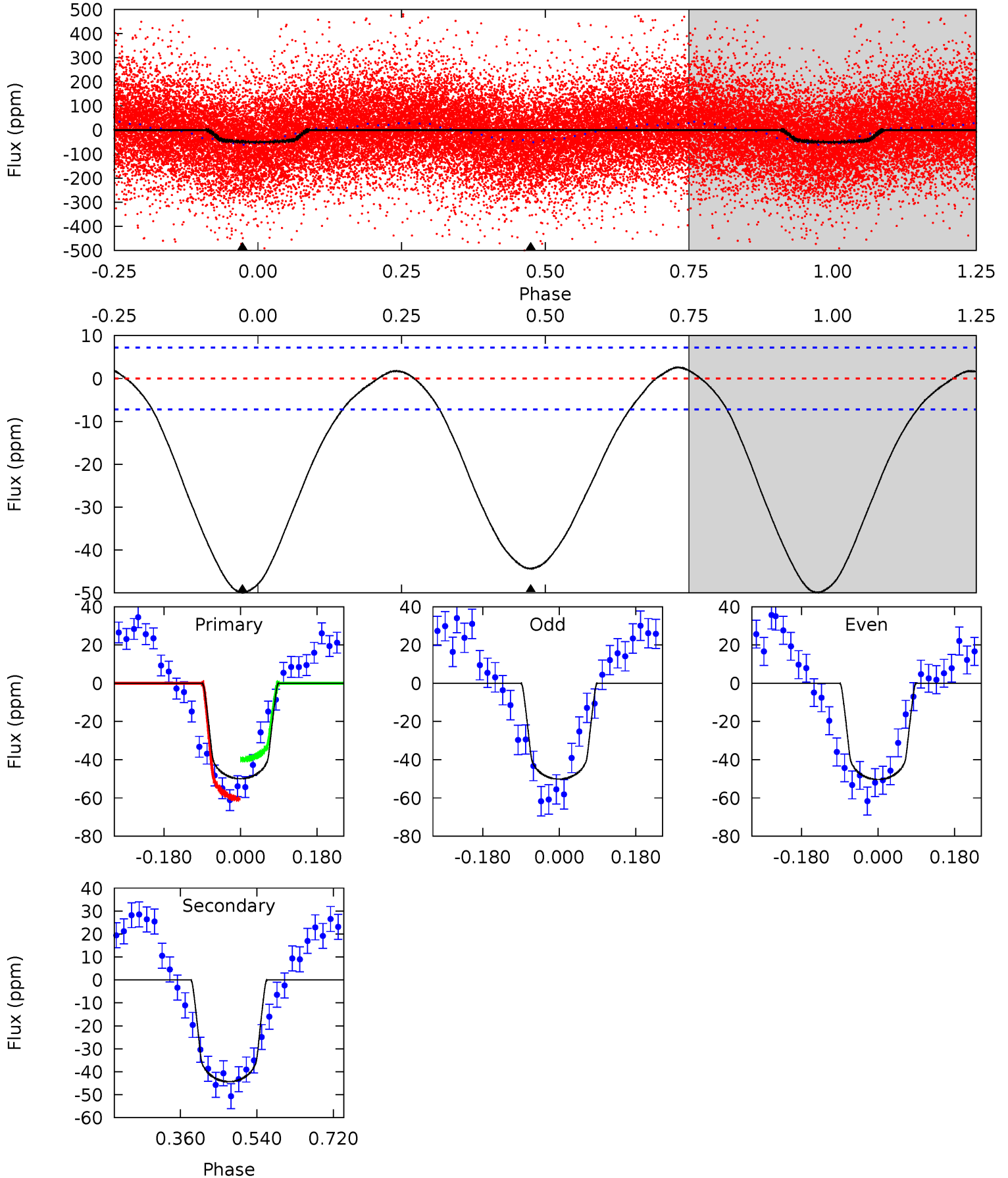




# DV Model-Shift Uniqueness Test

009300946-02, P = 0.950368 Days, E = 130.847049 Days

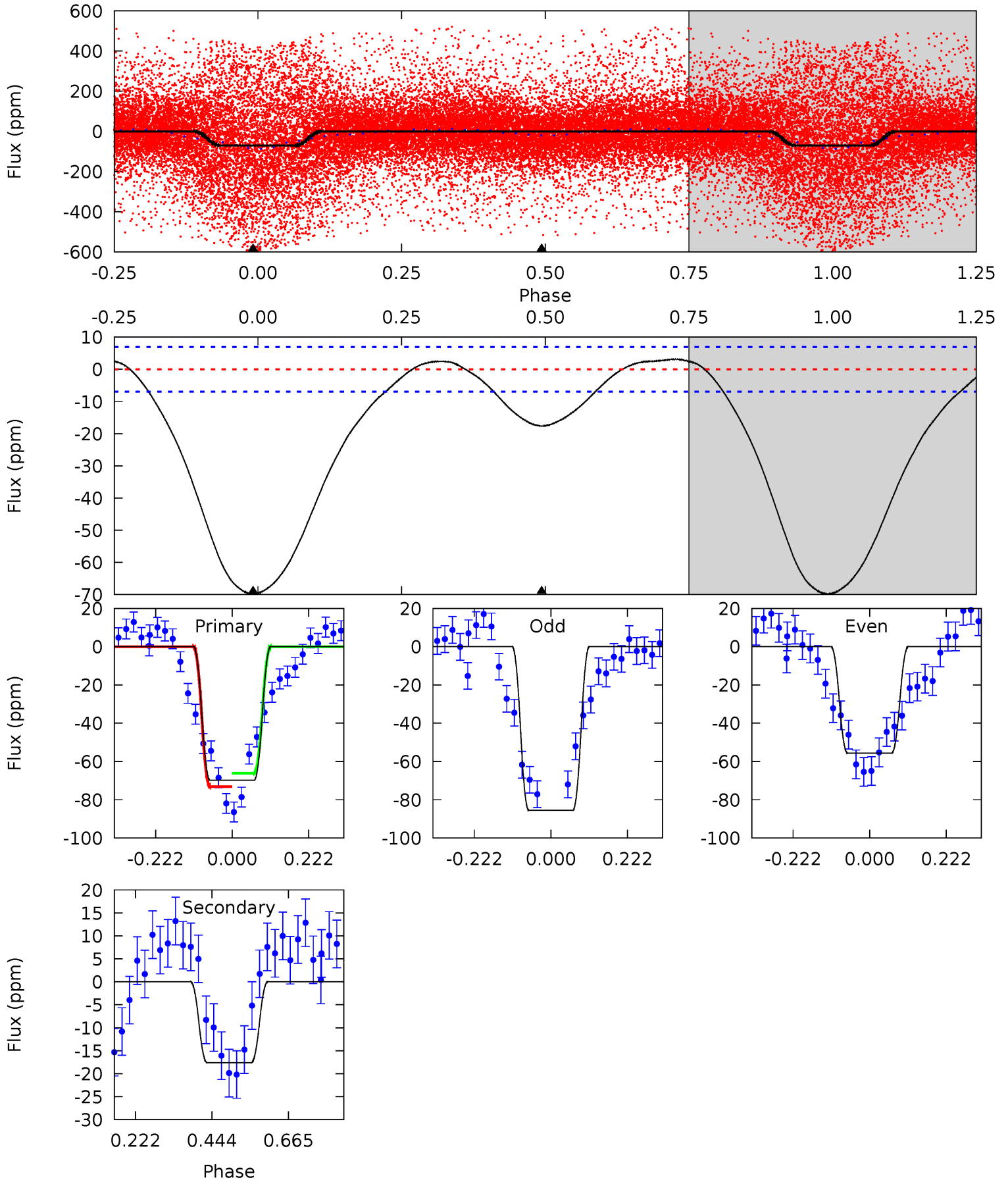
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
30.6	27.2	0	0	4.44	1.34	1.39	30.6	30.6	27.2	27.2	0.06	0.97	0.05	6.32



# Alt Model-Shift Uniqueness Test

009300946-02, P = 0.950339 Days, E = 130.839861 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
44.2	11.2	0	0	4.39	1.22	2.36	44.2	44.2	11.2	11.2	9.65	0.96	0.04	2.21





### Stellar Parameters For KIC 009300946

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6735^{+167}_{-184}$	$3.594^{+0.315}_{-0.053}$	$-0.020^{+0.250}_{-0.250}$	$3.542^{+0.412}_{-1.236}$	$1.799^{+0.173}_{-0.321}$	$0.057^{+0.120}_{-0.010}$
	+2%/-3%	+9%/-1%	+1250%/-1250%	+12%/-35%	+10%/-18%	+210%/-18%
Source	PHO1	FLK73	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 009300946-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-44 \pm 2$	$2.12^{+0.59}_{-0.59}$	$5004^{+273}_{-445}$	$6935^{+1211}_{-814}$	$2.862^{+2.543}_{-1.075}$
Alt.	$-18 \pm 2$	$2.94^{+0.68}_{-0.63}$	$5029^{+249}_{-450}$	$4267^{+540}_{-706}$	$0.593^{+0.343}_{-0.199}$

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

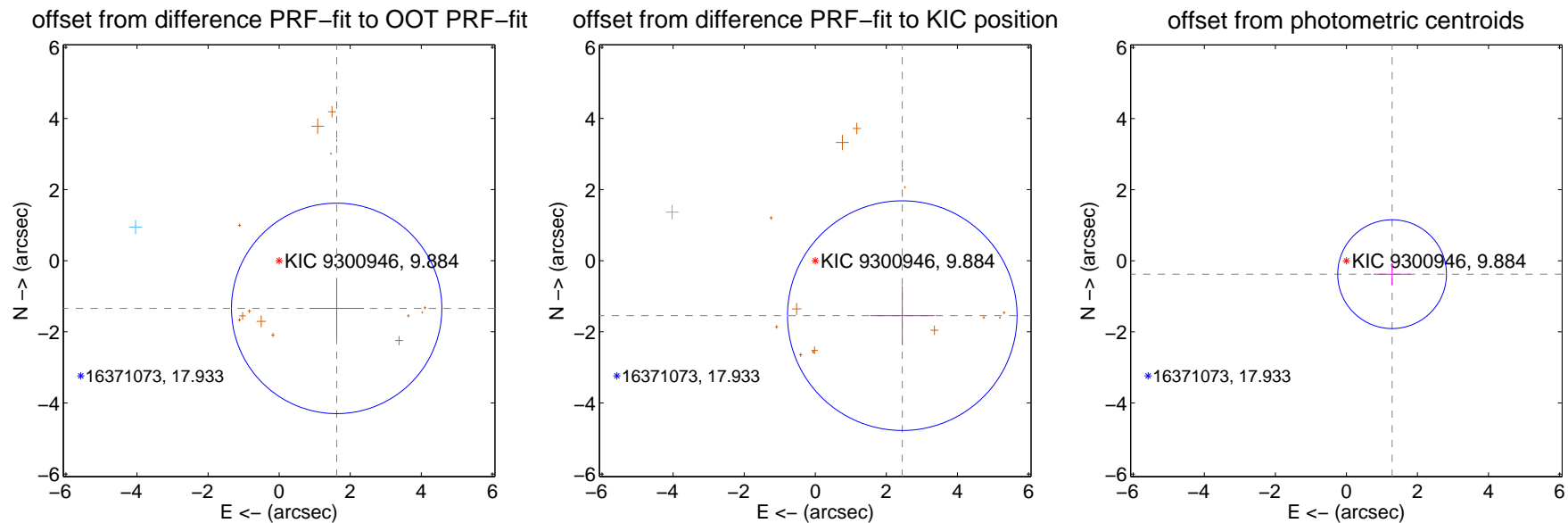
## DV Centroid Data

Supplemental centroid analysis for 009300946-02. **Kepler magnitude: 9.88.** Transit SNR 12.36

**There are 1 quarters with good PRF difference image offsets**

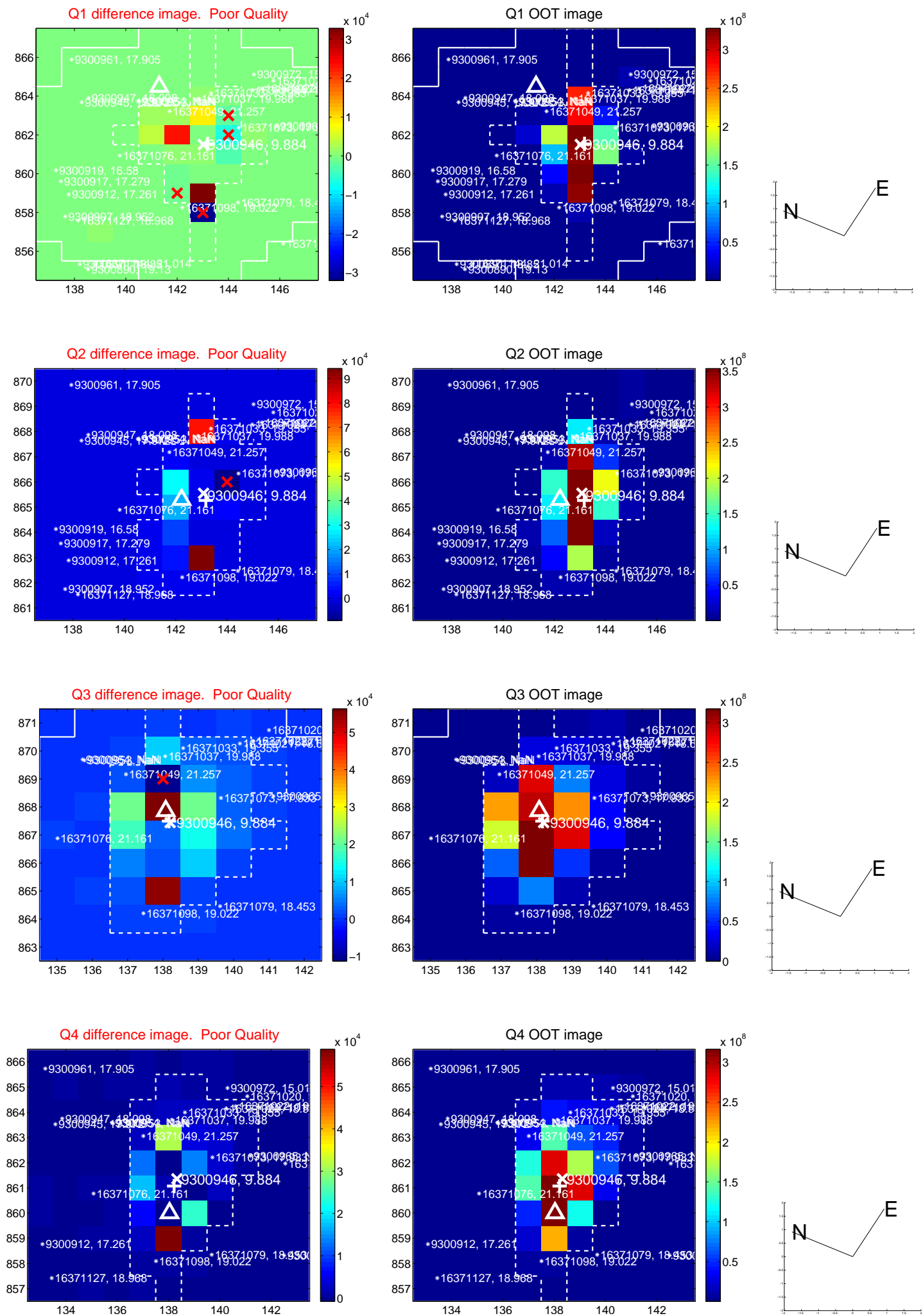
The direct PRF centroid is offset from the target star catalog position by about 0.51 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.102 \pm 0.986$	2.13	$-1.618 \pm 0.765$	$-1.341 \pm 0.848$
PRF-fit source offset from KIC position	$2.895 \pm 1.076$	2.69	$-2.448 \pm 0.904$	$-1.545 \pm 0.833$
photometric centroid source offset	$1.34 \pm 0.51$	2.63	$-1.29 \pm 0.52$	$-0.38 \pm 0.31$

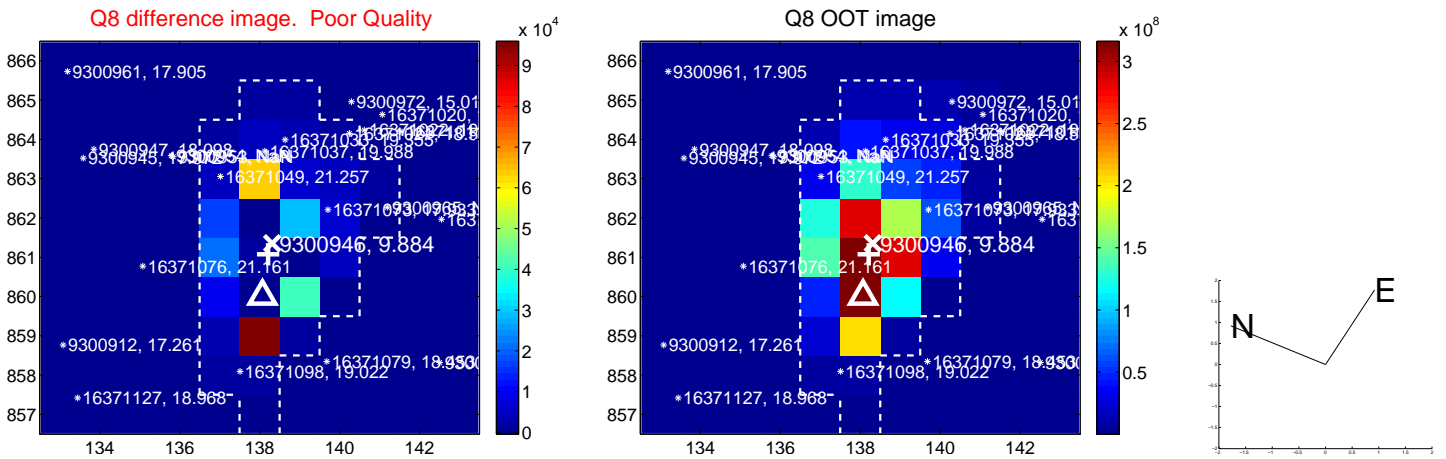
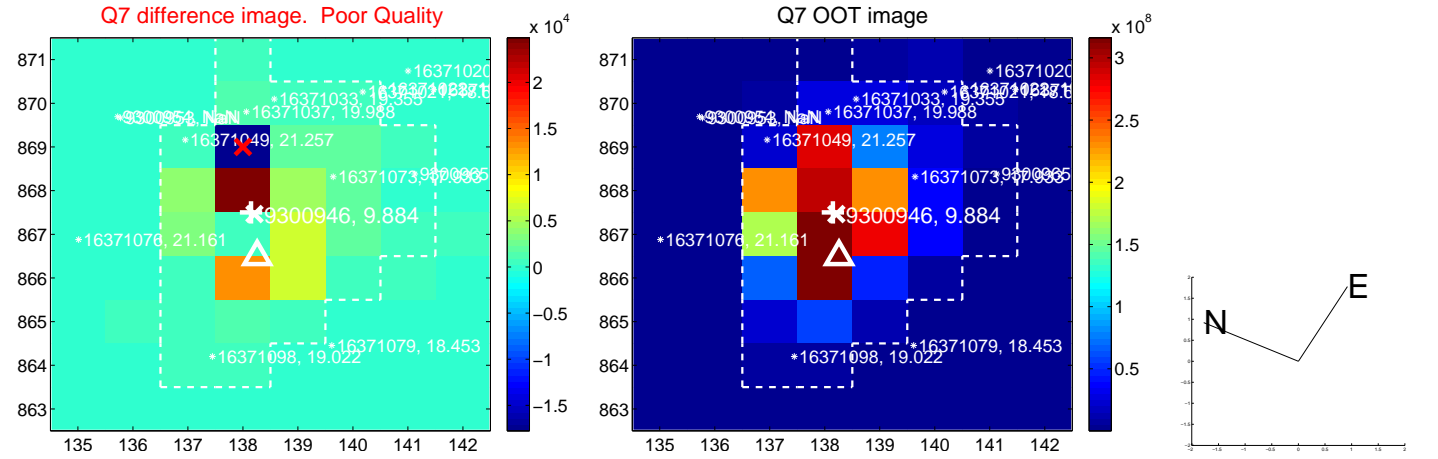
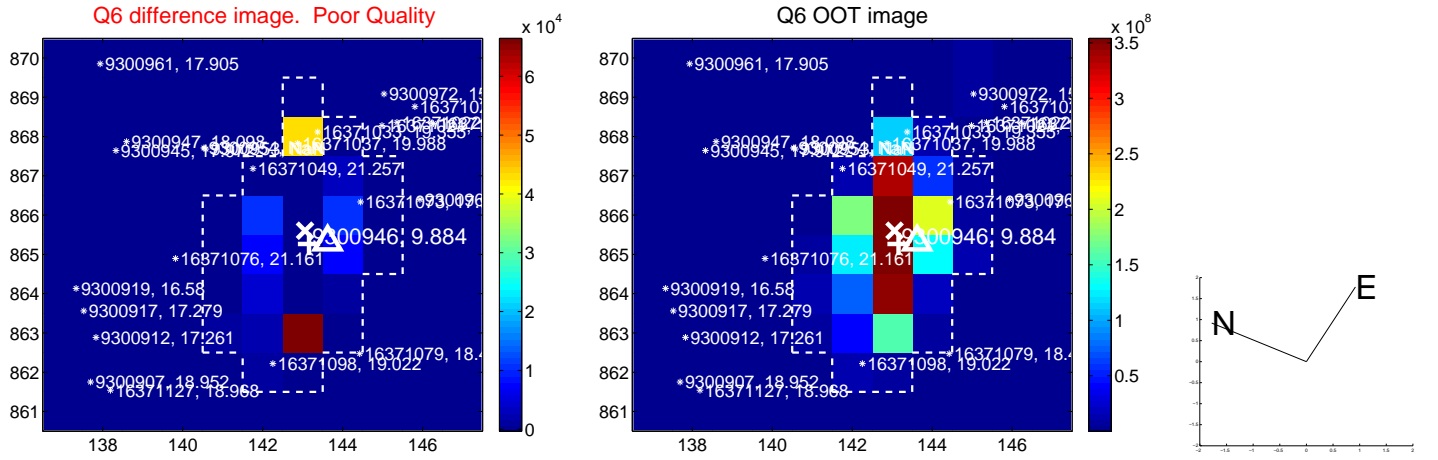
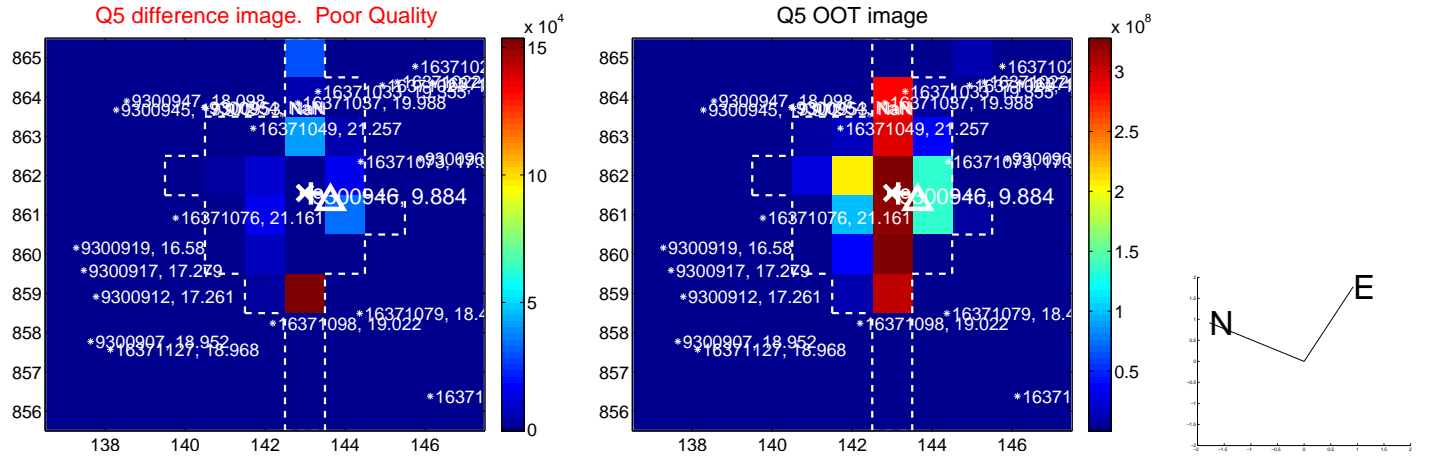


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



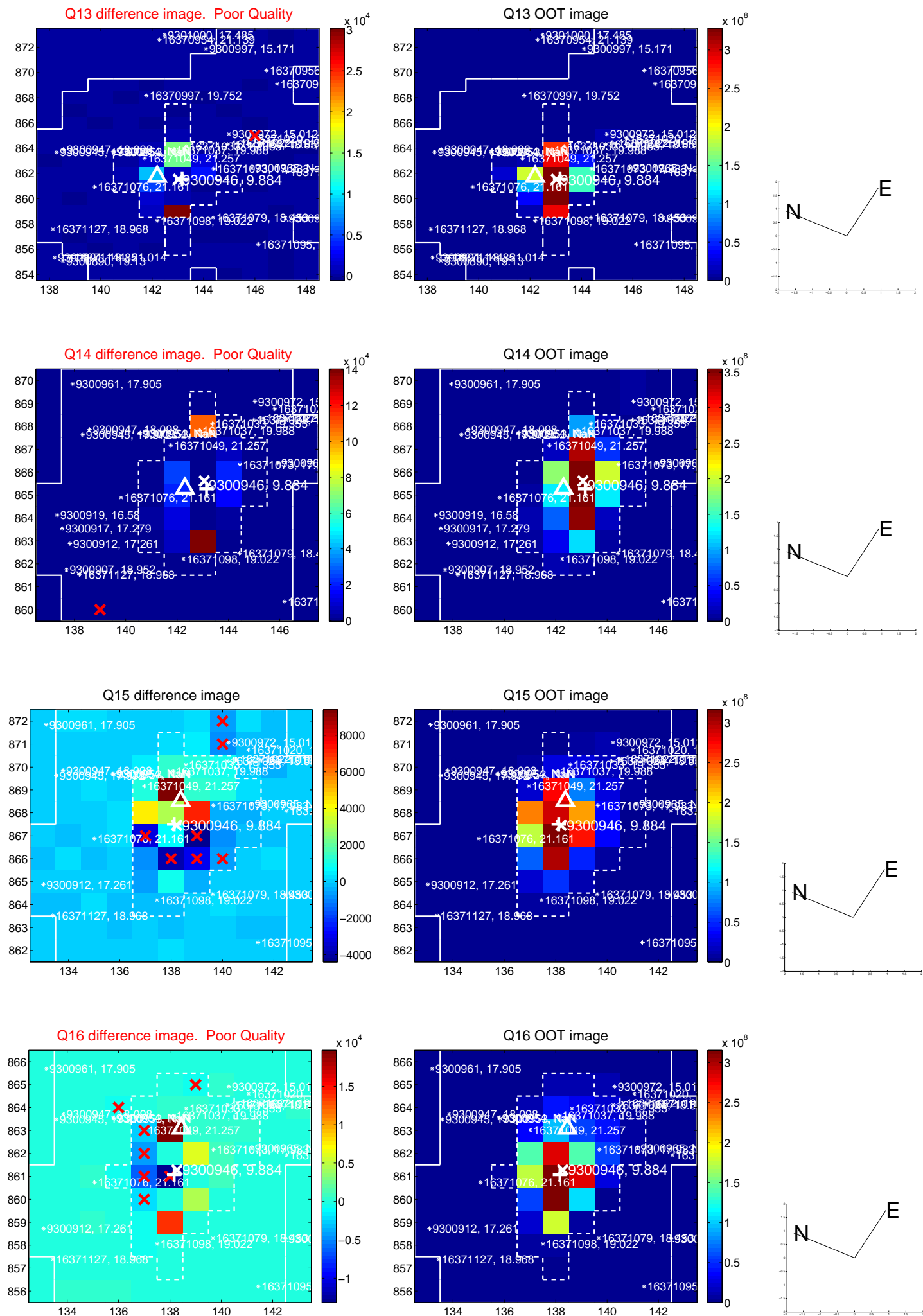
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





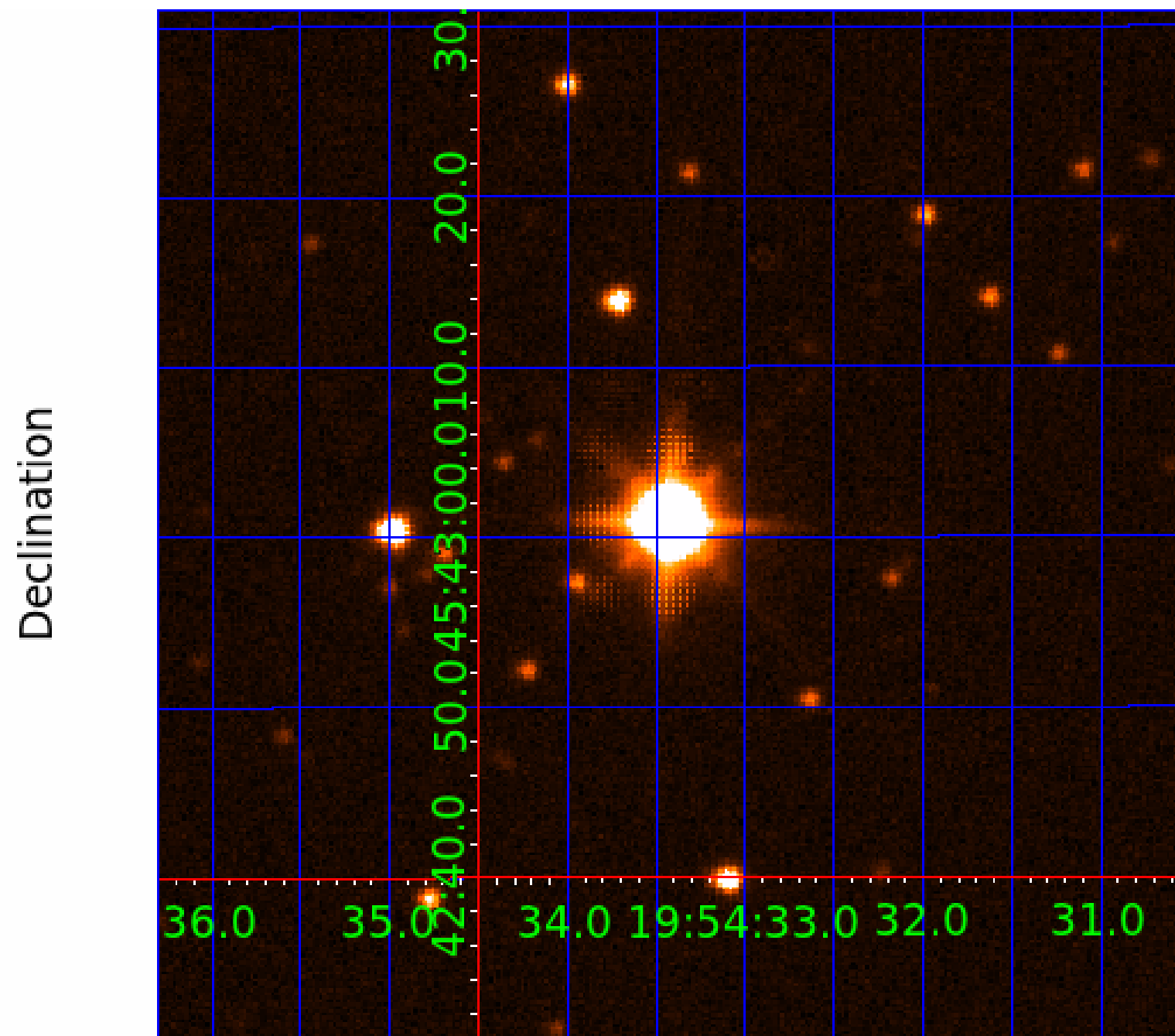


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





UKIRT Image





# KIC 009300946

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009300946-01	OBS	No	3.471798	133.112338	32.5	14.594	10.7	9.7	3.54	6735	2.80	7768.51
009300946-02	OBS	No	0.950368	131.797417	28.6	3.641	13.6	12.4	3.54	6735	2.27	43707.40
009300946-03	OBS	No	356.671301	141.718763	584.2	9.682	14.4	12.2	3.54	6735	9.35	16.15
009300946-04	OBS	No	0.950302	132.312671	26.9	6.076	13.1	13.1	3.54	6735	1.90	43711.43

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009300946-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—CENT_SATURATED
009300946-02	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—CENT_SATURATED
009300946-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
009300946-04	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—LPP_ALT—SAME_NTL_PERIOD—CENT_SATURATED

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

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

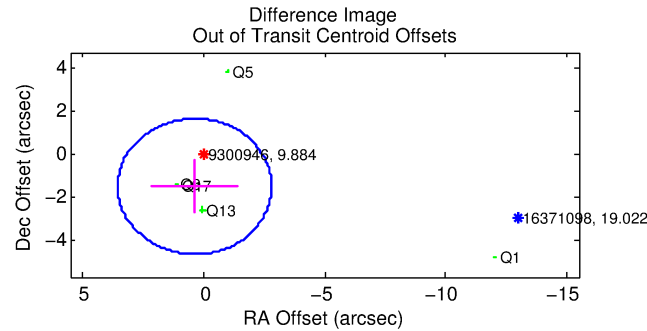
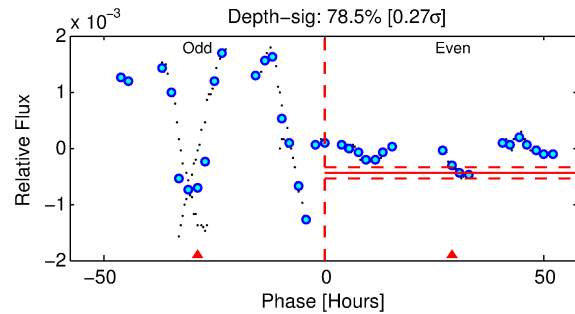
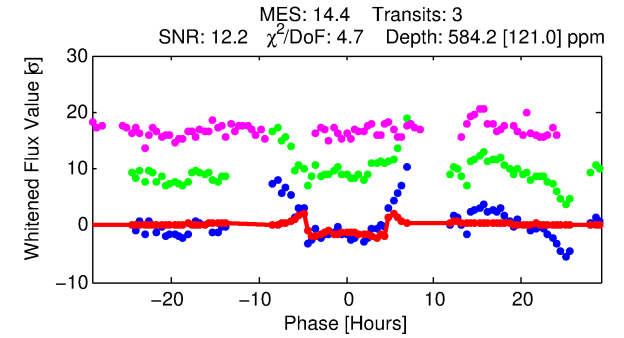
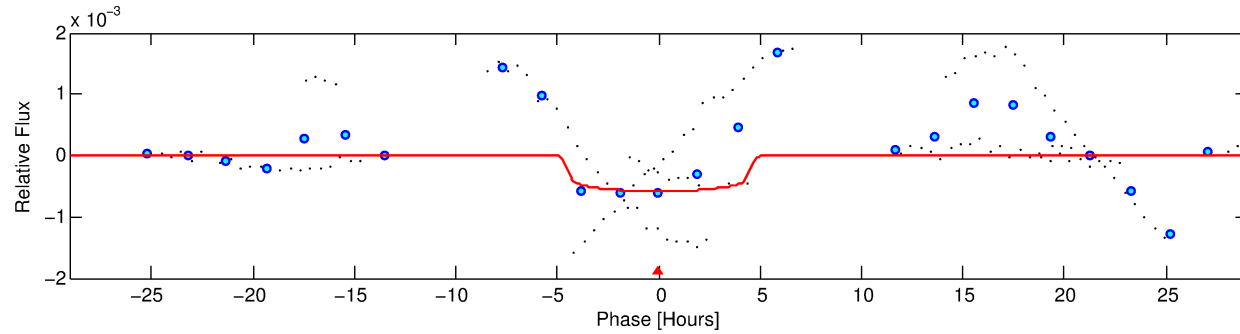
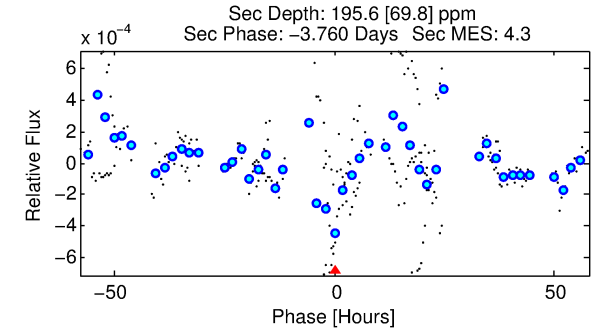
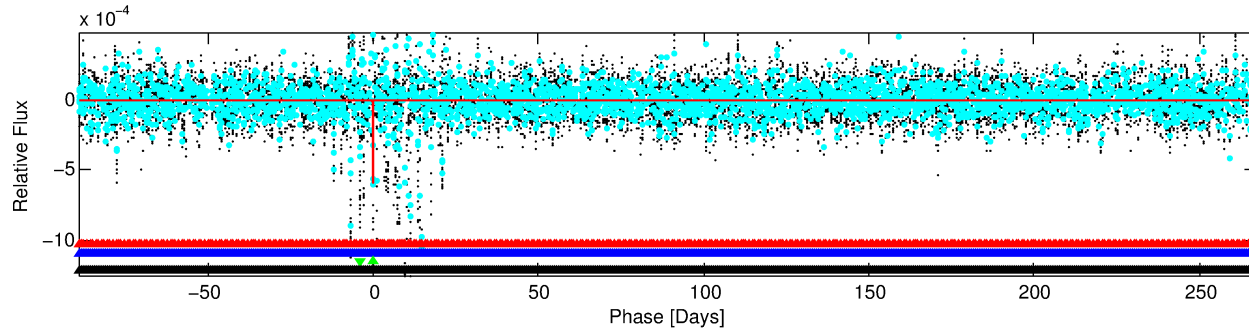
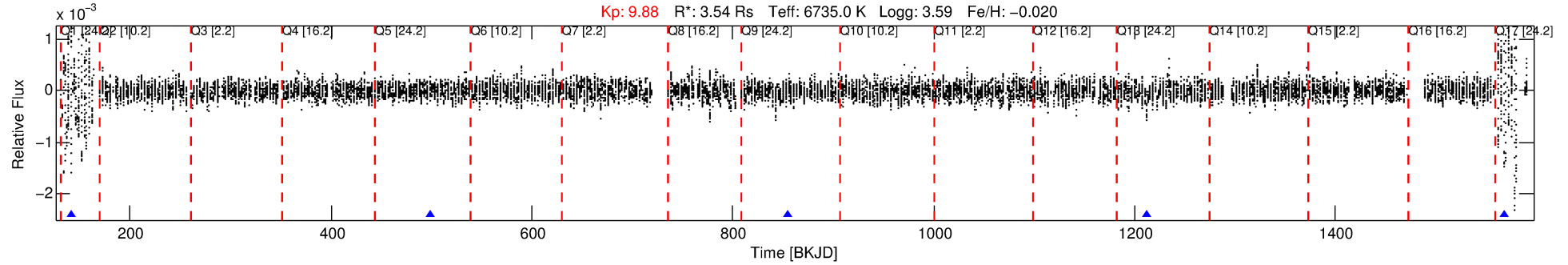
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009300946-03

No Significant Match Found

# DV One-Page Summary

KIC: 9300946 Candidate: 3 of 4 Period: 356.671 d



## DV Fit Results:

Period = 356.67130 [0.00818] d  
Epoch = 141.7188 [0.0250] BKJD  
Rp/R\* = 0.0242 [0.0097]  
a/R\* = 189.56 [404.11]  
b = 0.77 [1.09]  
Seff = 16.15 [8.84]  
Teq = 511 [70] K  
Rp = 9.35 [4.96] Re  
a = 1.1969 [0.4016] AU  
Ag = 1762.23 [1808.77] [0.97 $\sigma$ ]  
Teff = 5120 [1129] K [4.08 $\sigma$ ]

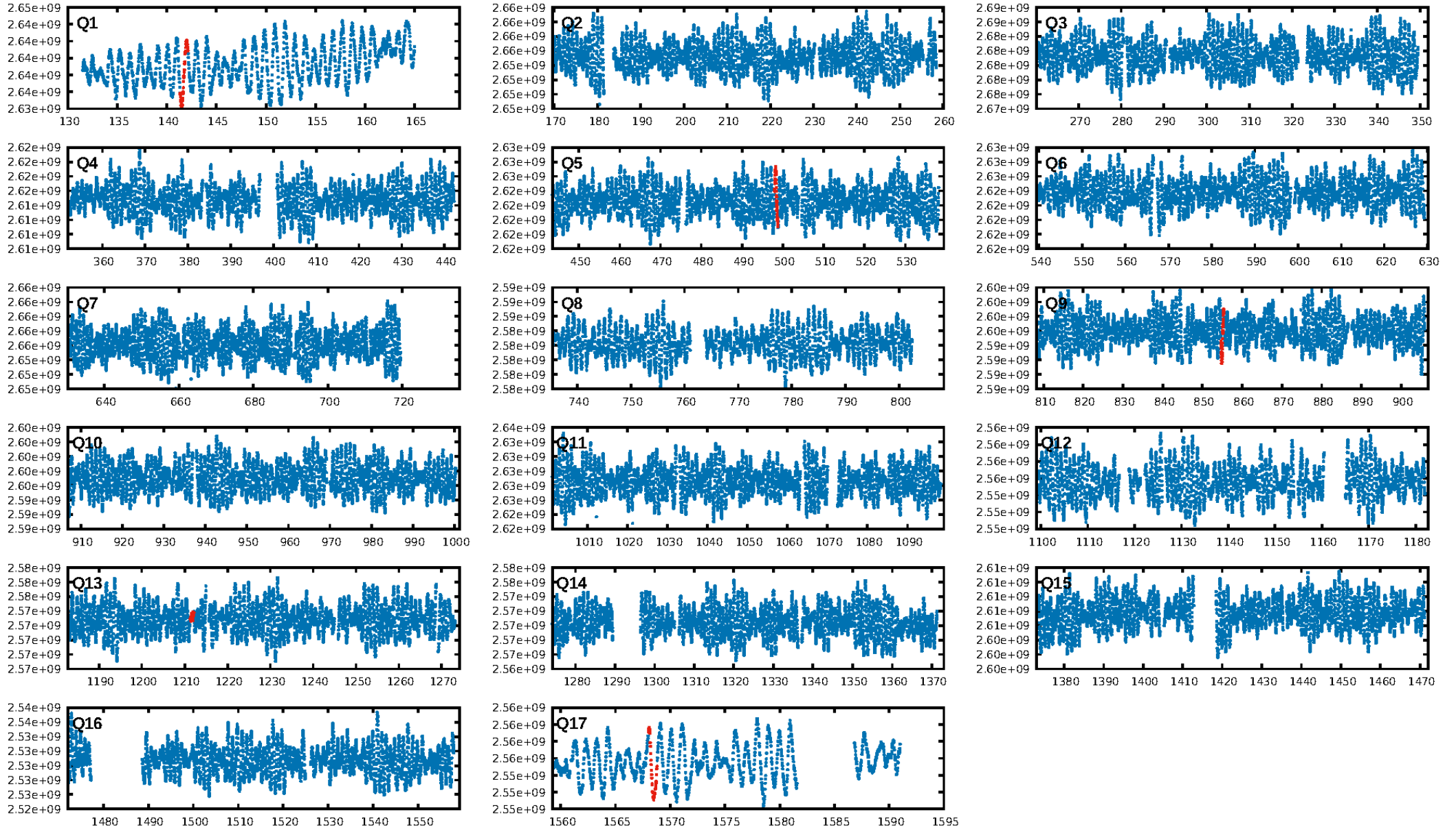
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [484.00 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 0.6%  
ModelChiSquareGof-sig: 0.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [1/1]  
GhostDiagnostic-chr: N/A  
Centroid-sig: 33.6%  
Centroid-so: 0.363 arcsec [0.88 $\sigma$ ]  
OotOffset-rm: 1.566 arcsec [1.48 $\sigma$ ]  
OotOffset-st: 0/0/0/5 [5]  
KicOffset-rm: 2.073 arcsec [2.27 $\sigma$ ]  
KicOffset-st: 0/0/0/5 [5]  
DiffImageQuality-fgm: 0.00 [0/5]  
DiffImageOverlap-fno: 0.00 [0/5]

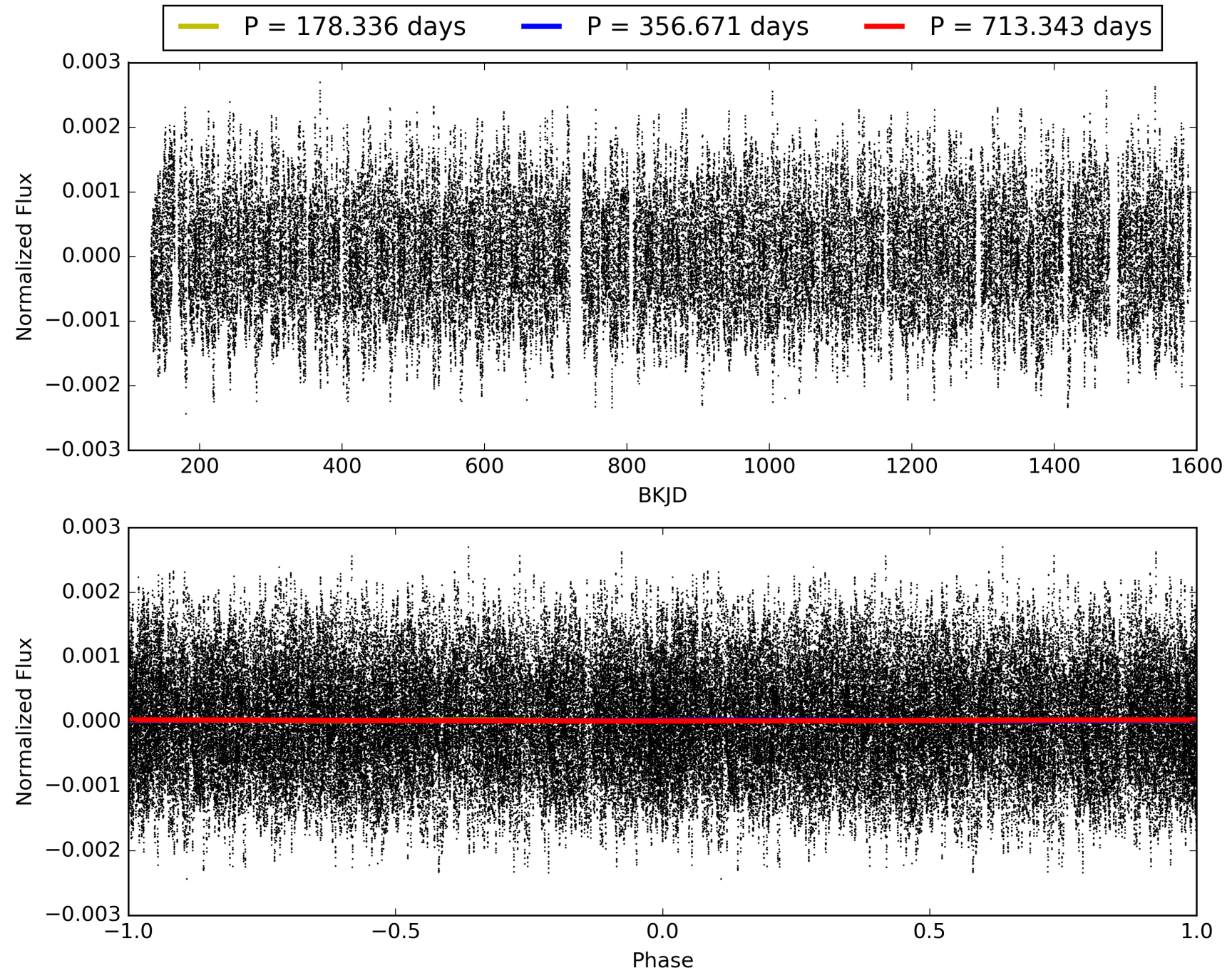
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 18:49:53 Z

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

# TCE 009300946-03, PDC Light Curves



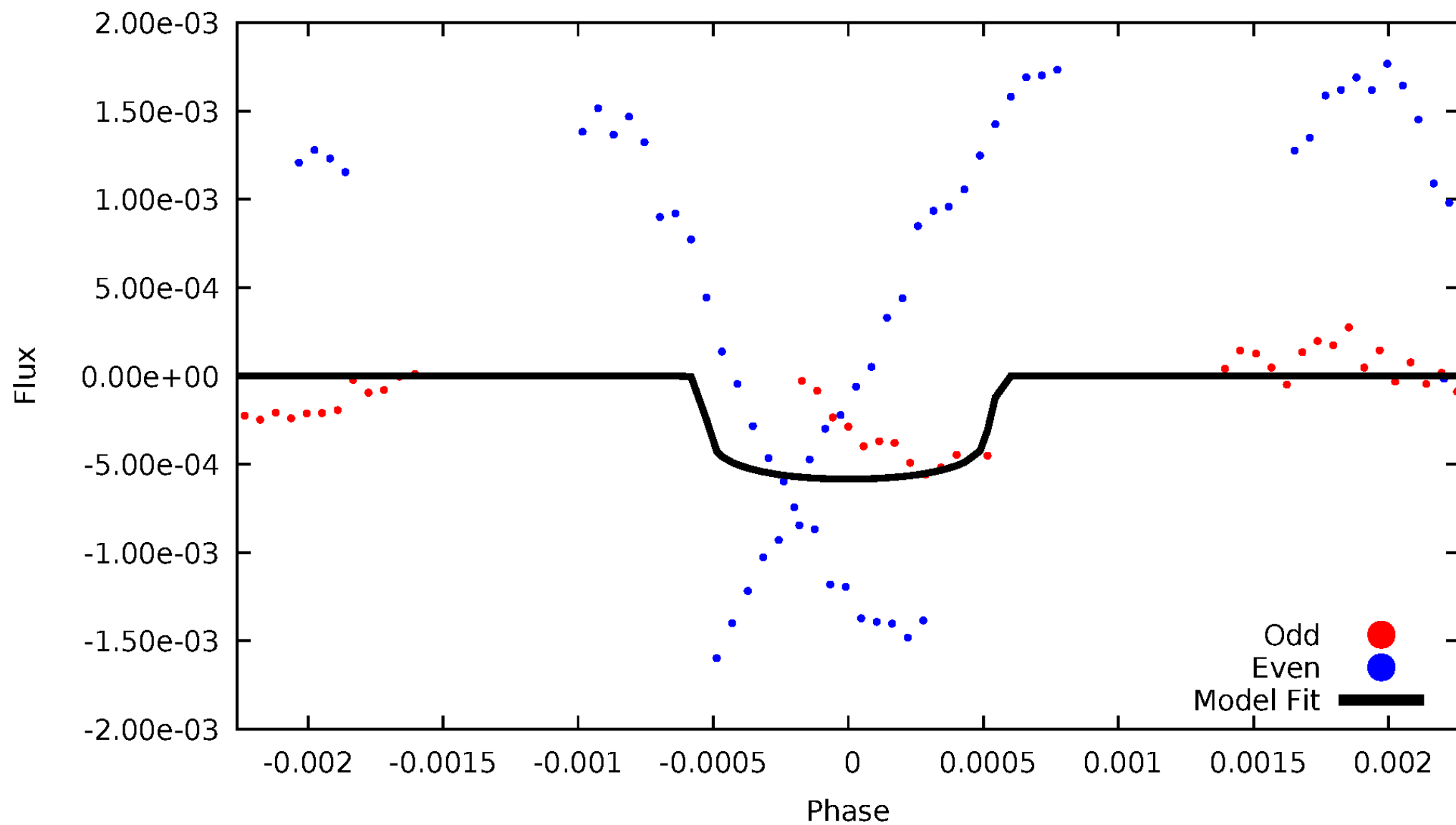
TCE 009300946-03





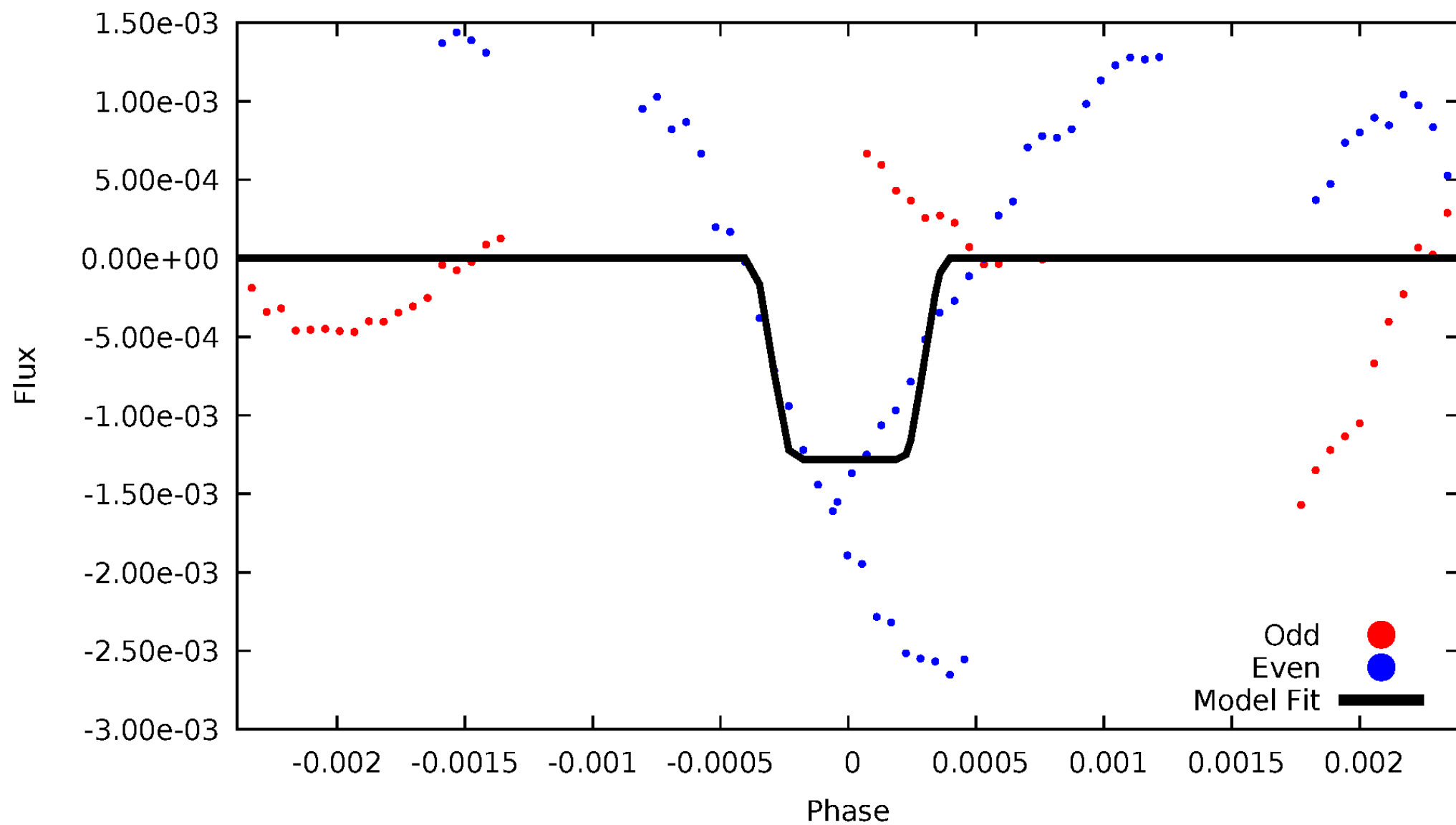
# DV Odd/Even

TCE 009300946-03



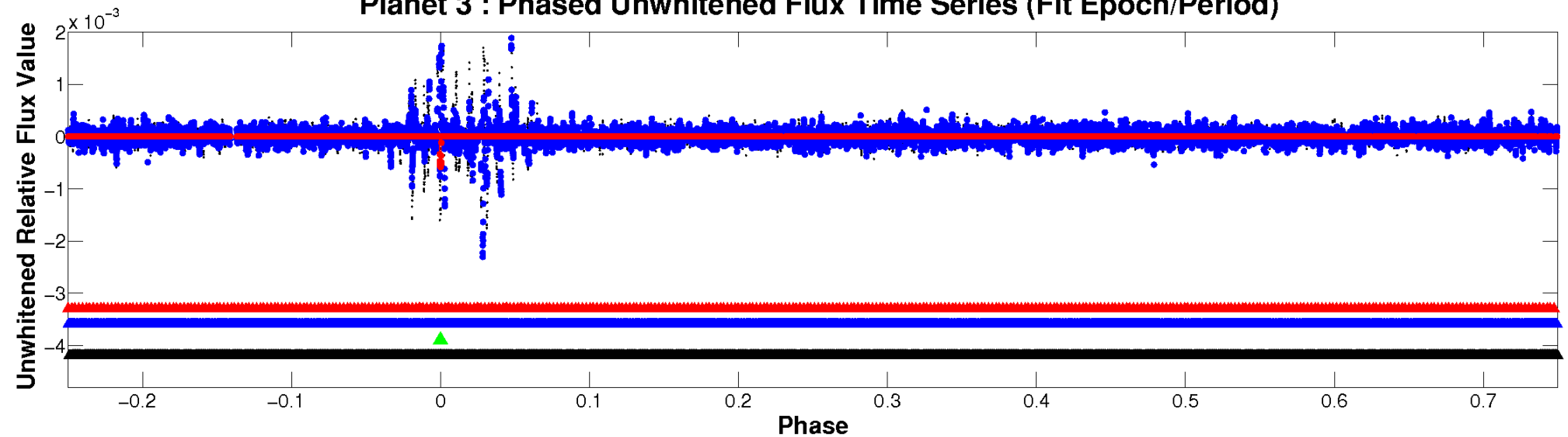
# ALT Odd/Even

TCE 009300946-03

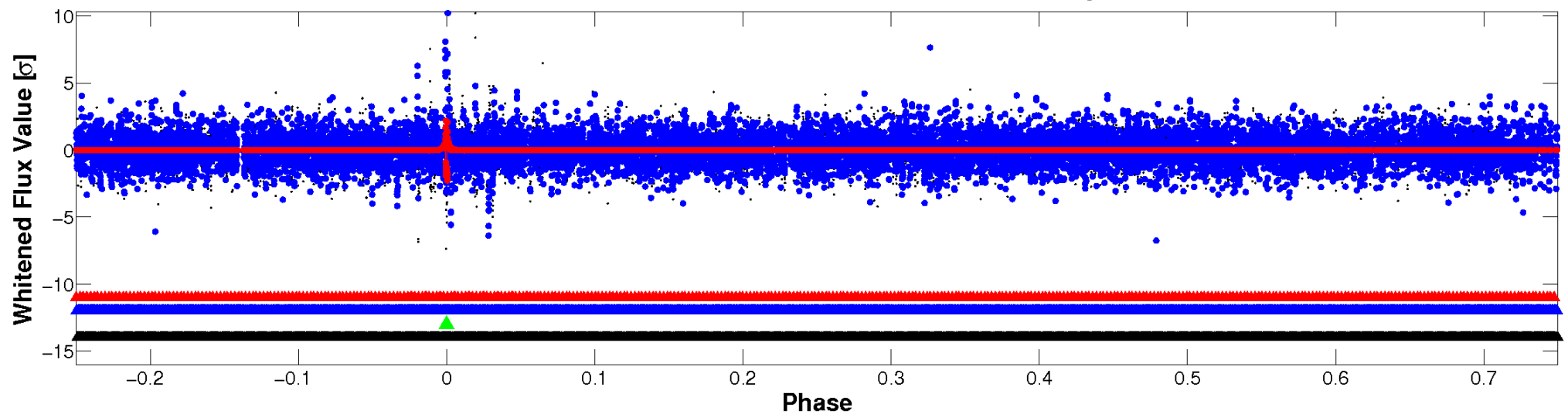


# Non-Whitened Vs. Whitened Light Curve

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

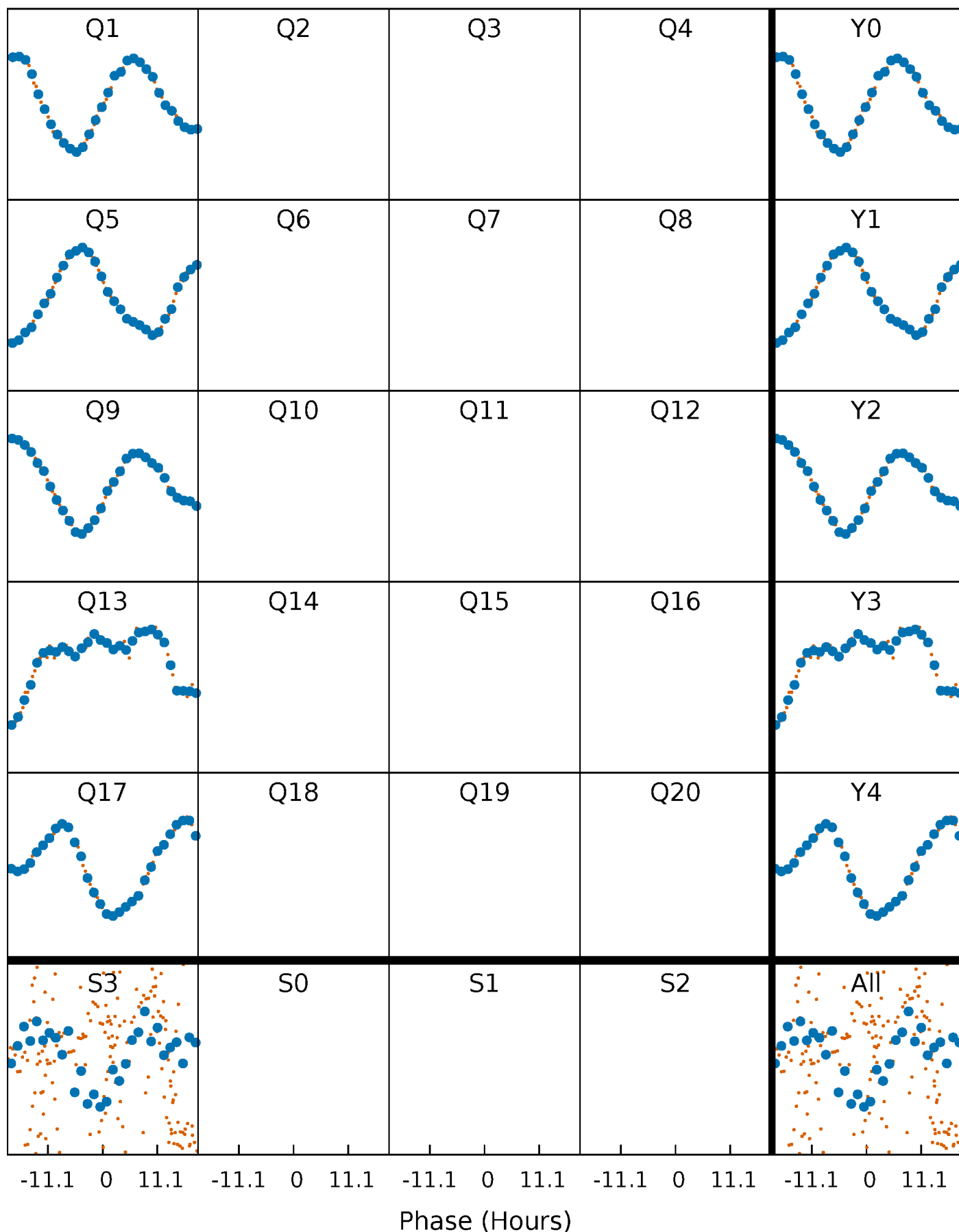


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

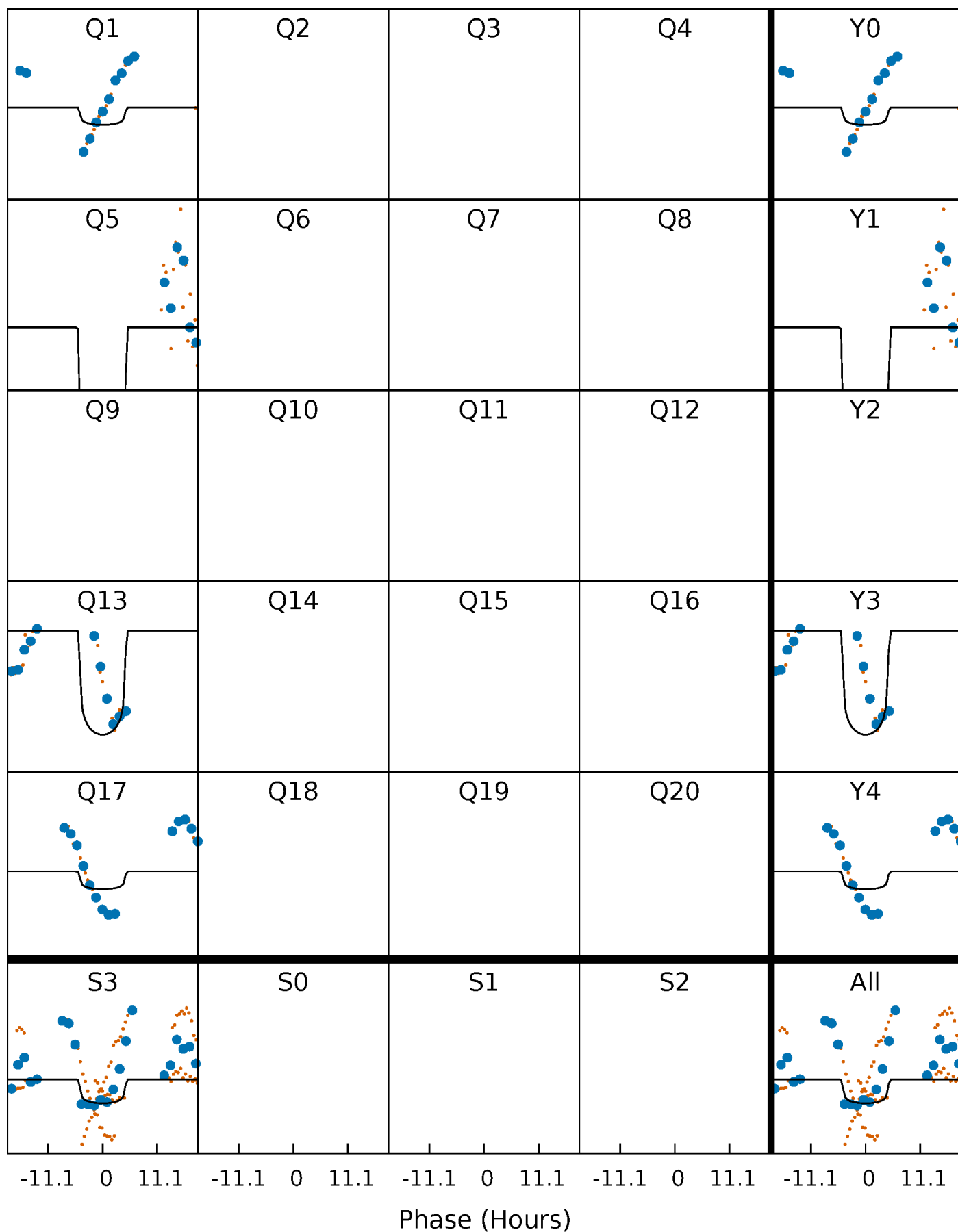
TCE 009300946-03     $P=356.671301$  Days     $T_0=141.718763$  (BKJD)





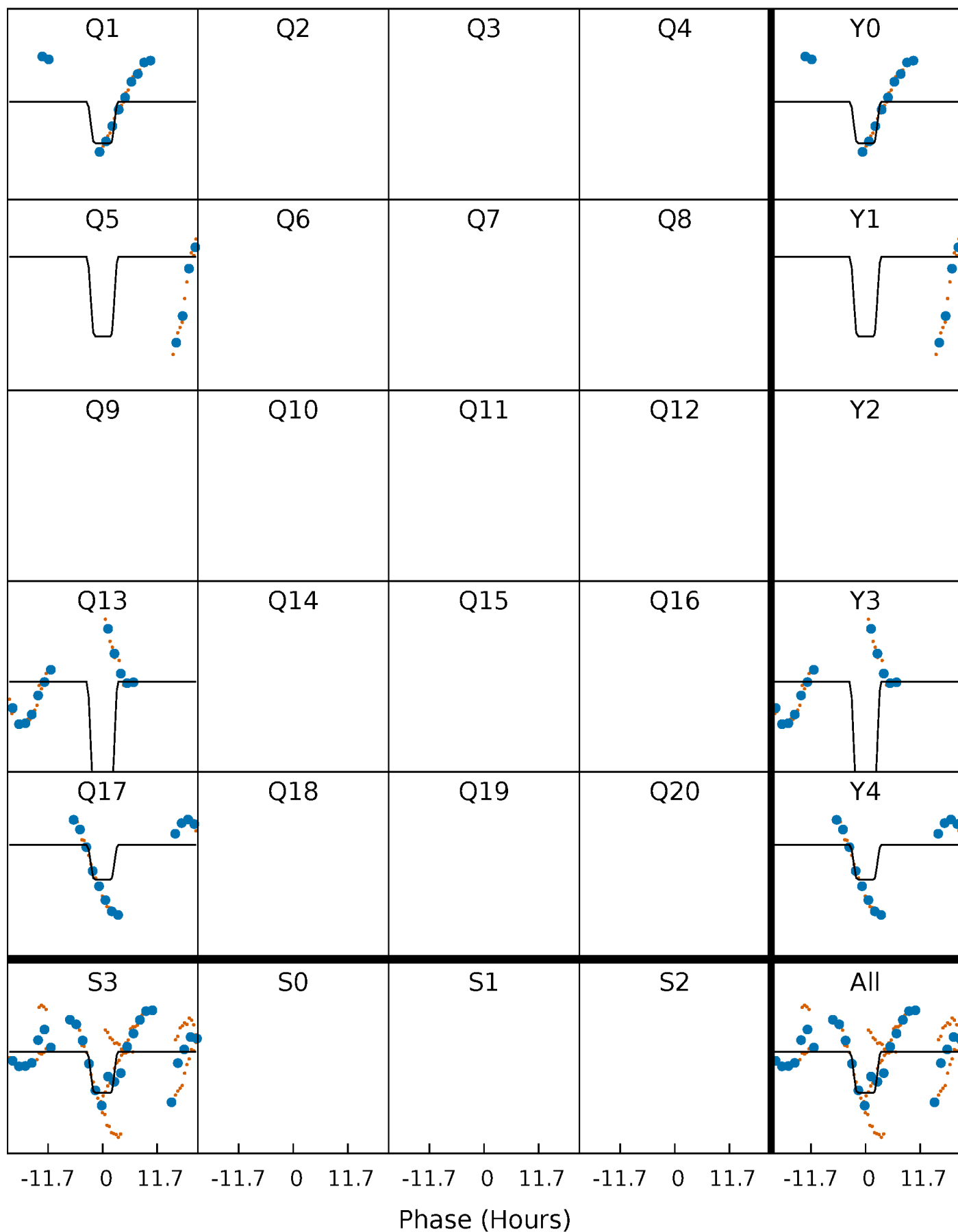
# DV Quarter-Phased Transit Curves

TCE 009300946-03     $P=356.671301$  Days     $T_0=141.718763$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

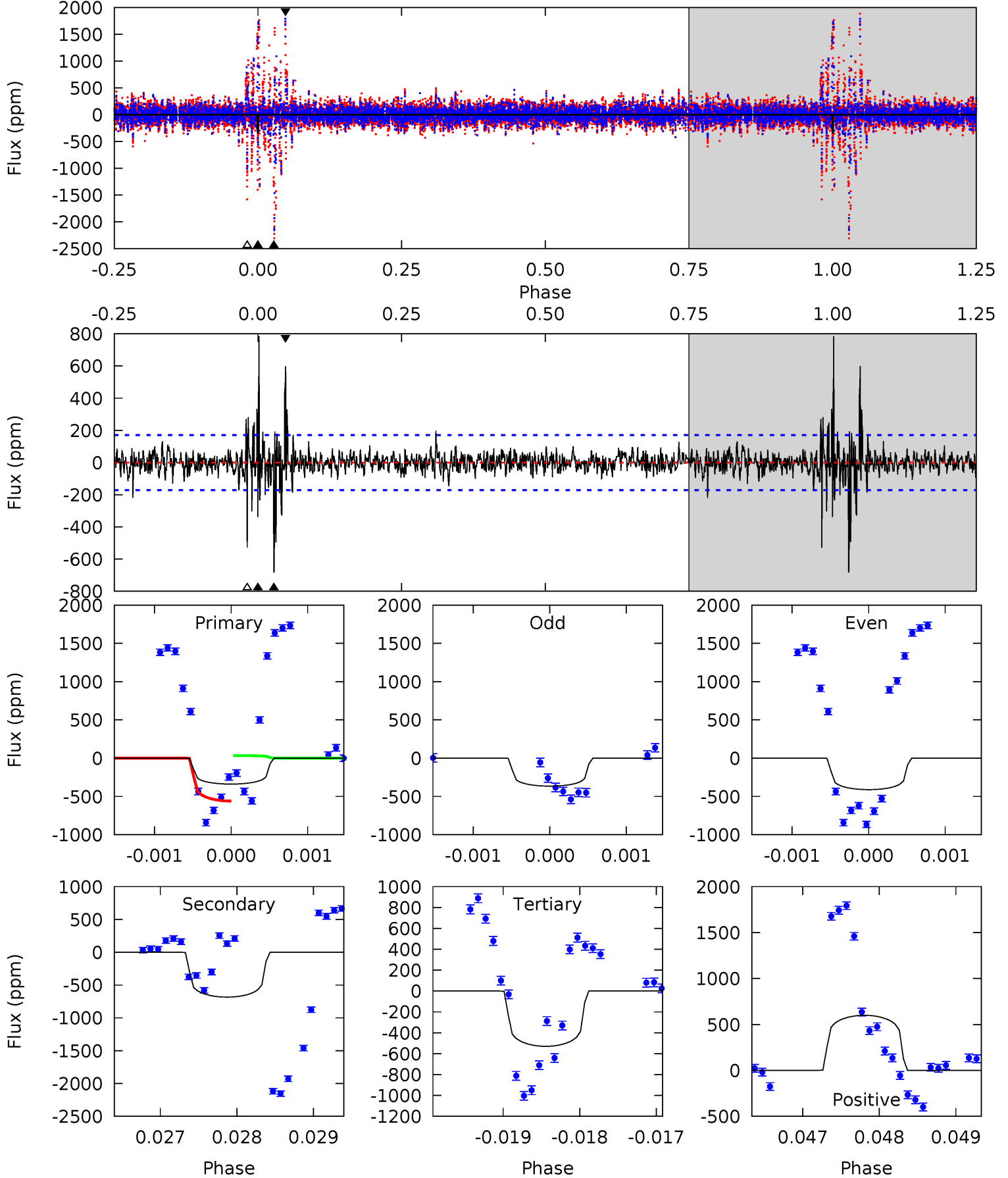
TCE 009300946-03     $P=356.695035$  Days     $T_0=141.560440$  (BKJD)



# DV Model-Shift Uniqueness Test

009300946-03, P = 356.671301 Days, E = 141.718763 Days

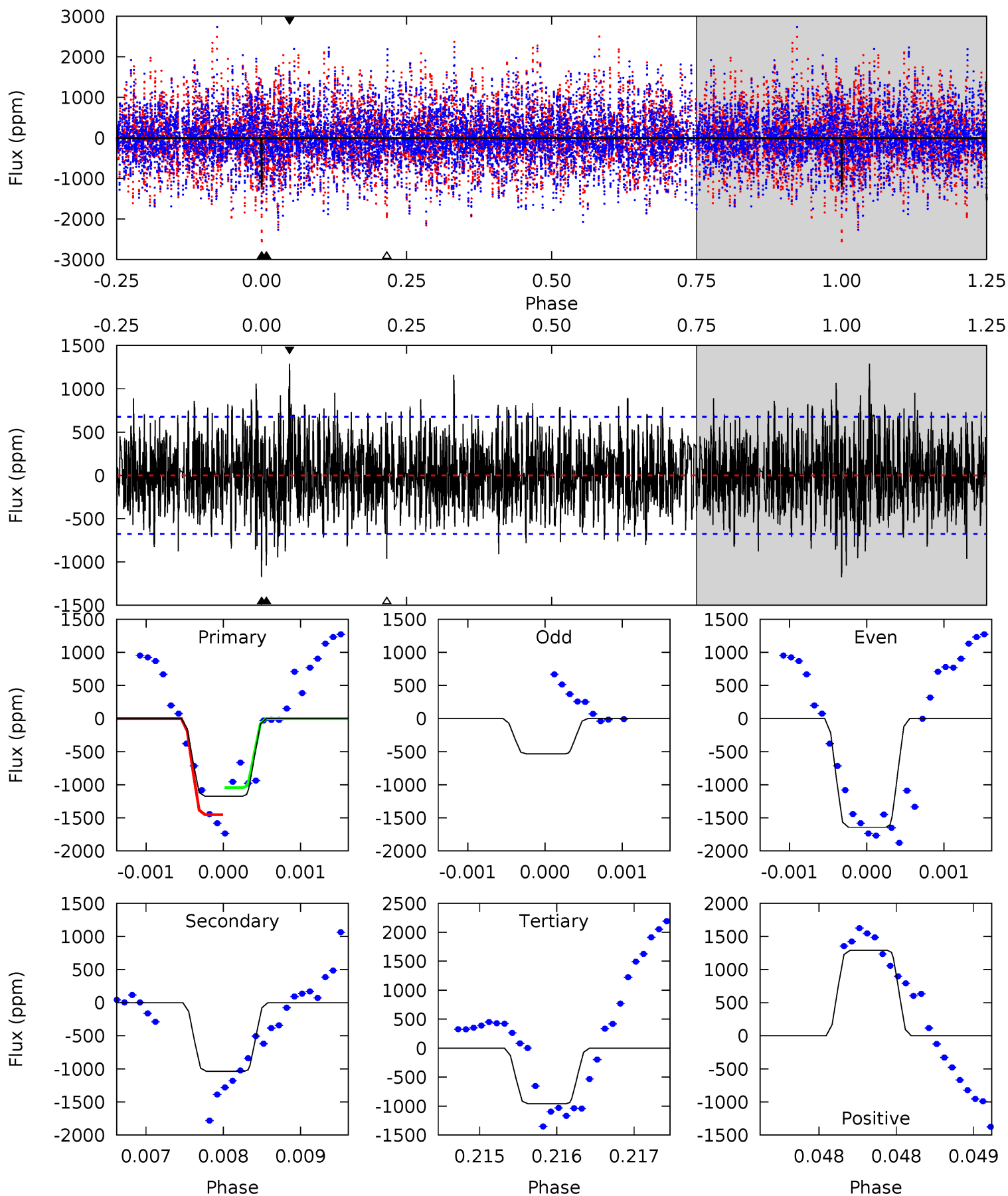
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.8	21.7	16.8	19.1	5.44	3.27	2.19	-6.06	-8.27	4.90	2.69	0.83	1.27	0.53	8.14



# Alt Model-Shift Uniqueness Test

009300946-03, P = 356.695035 Days, E = 141.560440 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.55	8.45	7.82	10.5	5.50	3.37	2.68	1.73	-0.93	0.63	-2.03	3.90	0.73	0.52	1.50





### Stellar Parameters For KIC 009300946

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6735^{+167}_{-184}$	$3.594^{+0.315}_{-0.053}$	$-0.020^{+0.250}_{-0.250}$	$3.542^{+0.412}_{-1.236}$	$1.799^{+0.173}_{-0.321}$	$0.057^{+0.120}_{-0.010}$
	+2%/-3%	+9%/-1%	+1250%/-1250%	+12%/-35%	+10%/-18%	+210%/-18%
Source	PHO1	FLK73	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 009300946-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-683 \pm 31$	$8.32^{+3.93}_{-3.24}$	$695^{+38}_{-59}$	$7073^{+2654}_{-1198}$	$7790^{+13137}_{-4272}$
Alt.	$-1039 \pm 123$	$12.55^{+4.61}_{-3.95}$	$697^{+34}_{-60}$	$6337^{+1417}_{-696}$	$5280^{+5543}_{-2456}$

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

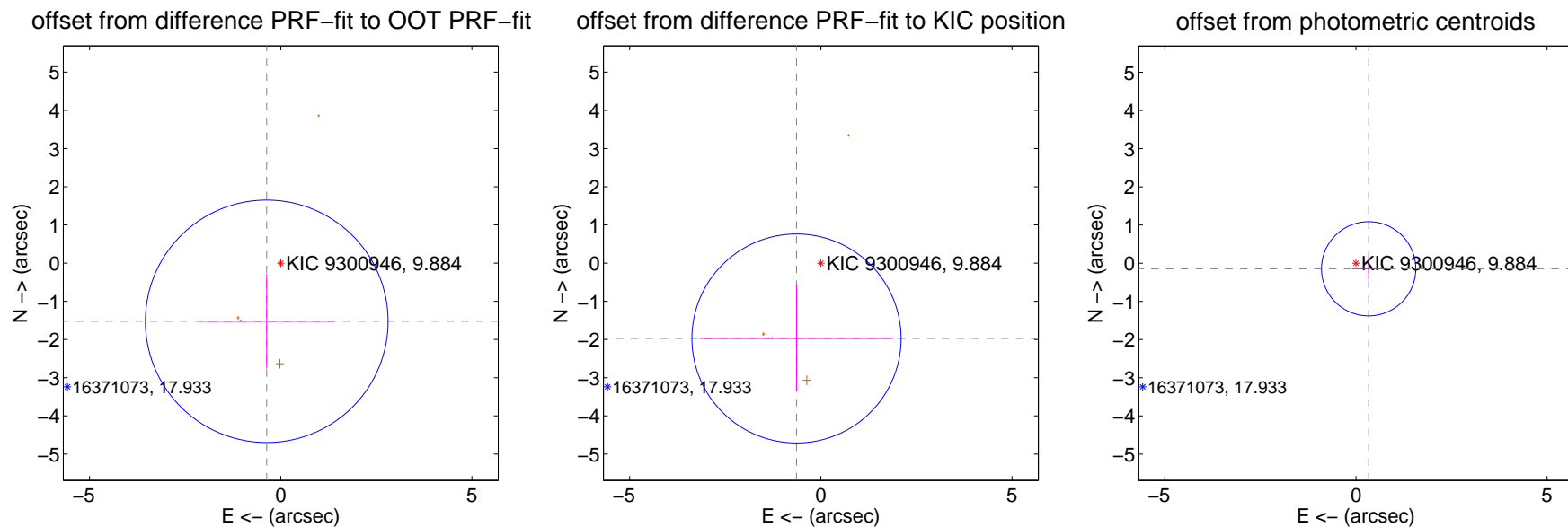
## DV Centroid Data

Supplemental centroid analysis for 009300946-03. **Kepler magnitude: 9.88.** Transit SNR 12.23

**There are 0 quarters with good PRF difference image offsets**

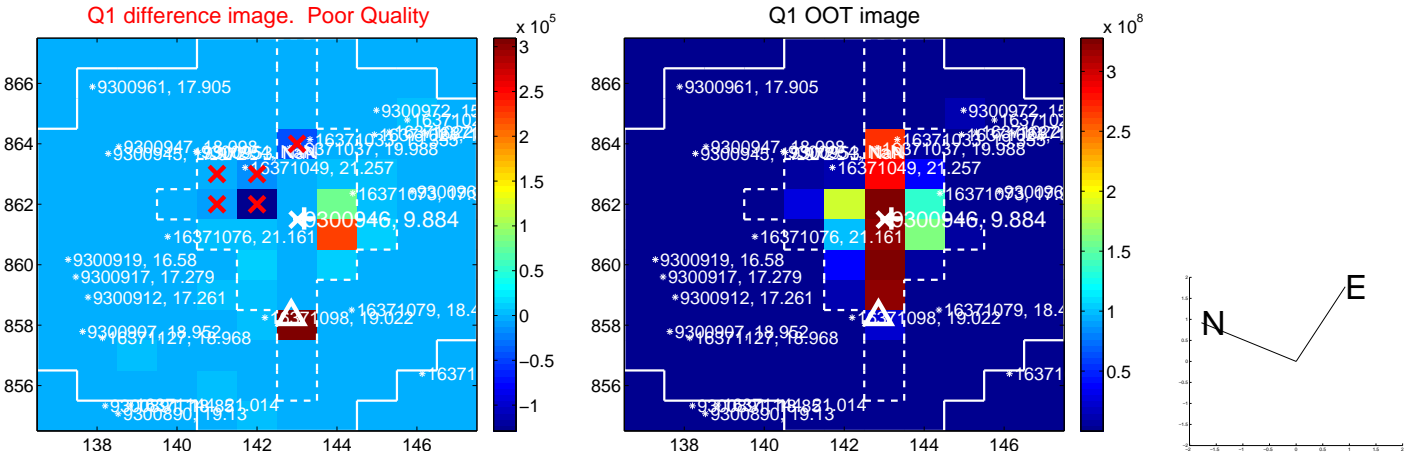
The direct PRF centroid is offset from the target star catalog position by about 0.51 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.566 \pm 1.058$	1.48	$0.366 \pm 1.770$	$-1.523 \pm 1.239$
PRF-fit source offset from KIC position	$2.073 \pm 0.912$	2.27	$0.637 \pm 2.538$	$-1.972 \pm 1.389$
photometric centroid source offset	$0.36 \pm 0.41$	0.88	$-0.33 \pm 0.43$	$-0.15 \pm 0.27$

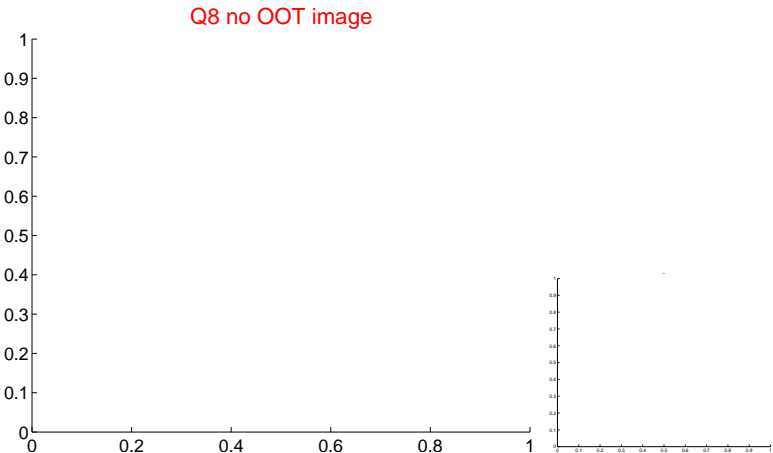
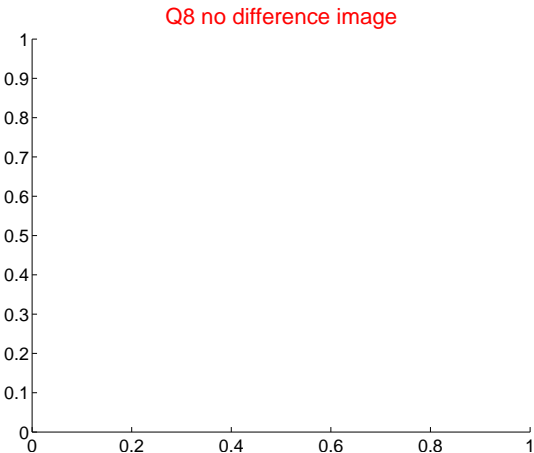
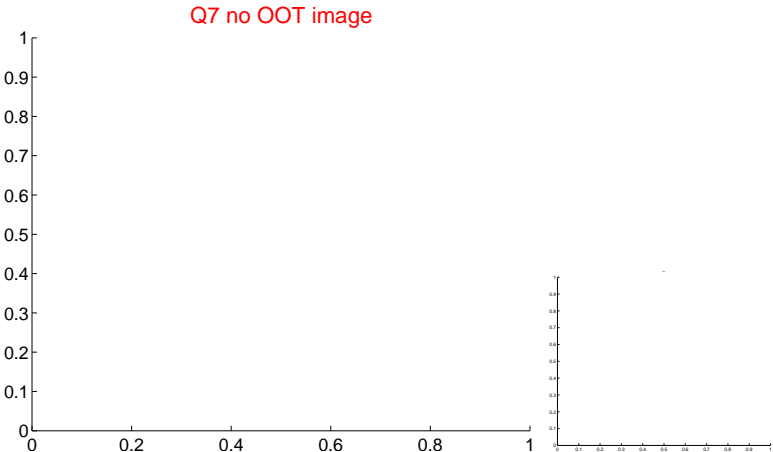
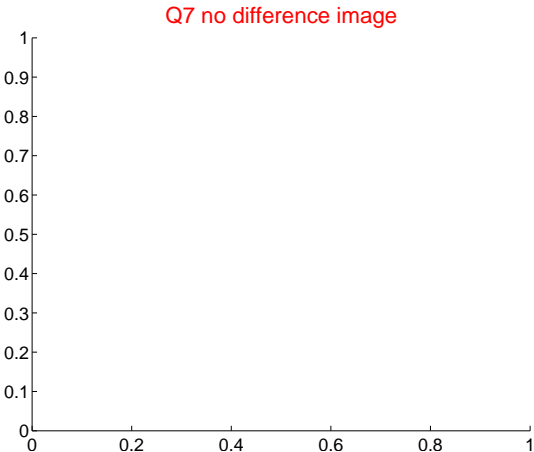
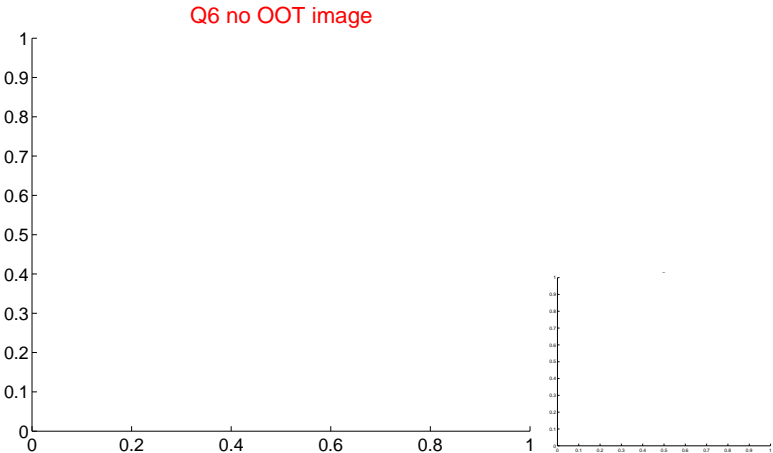
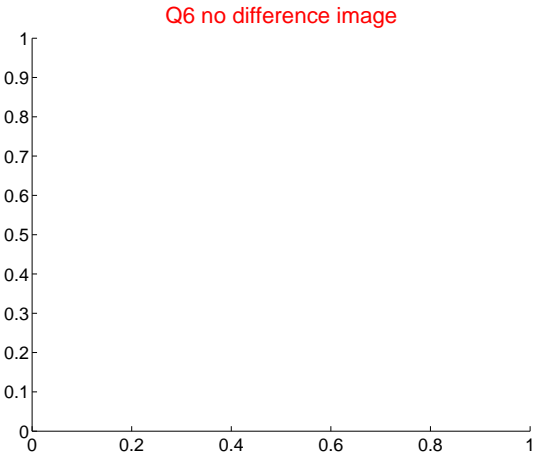
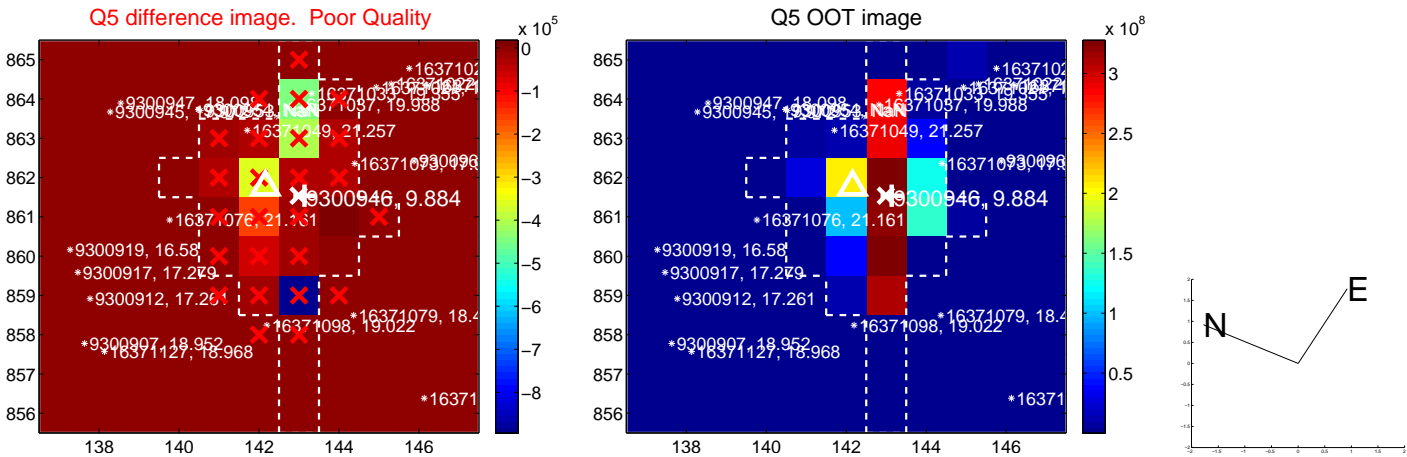


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

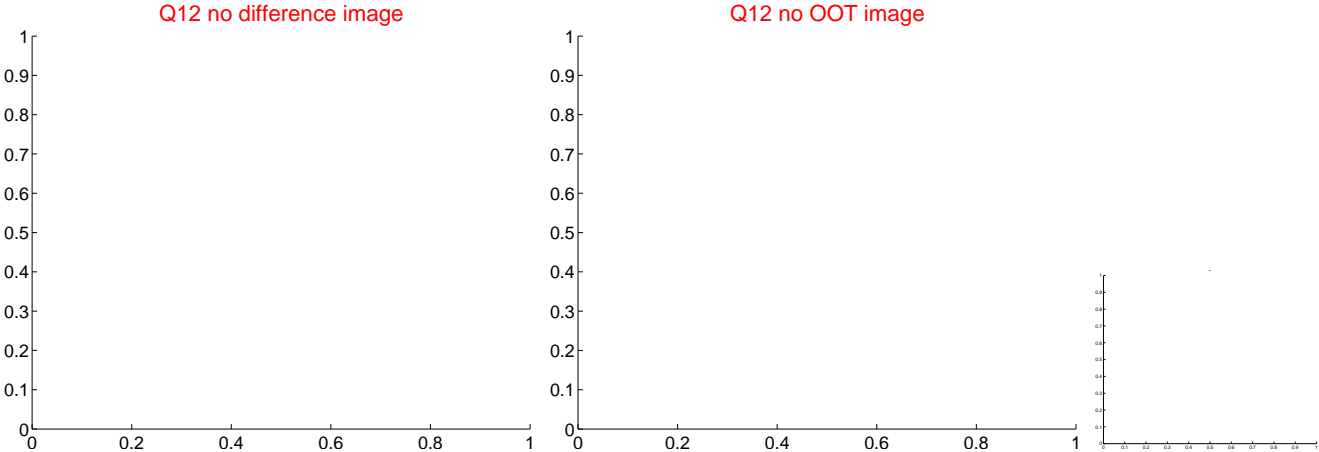
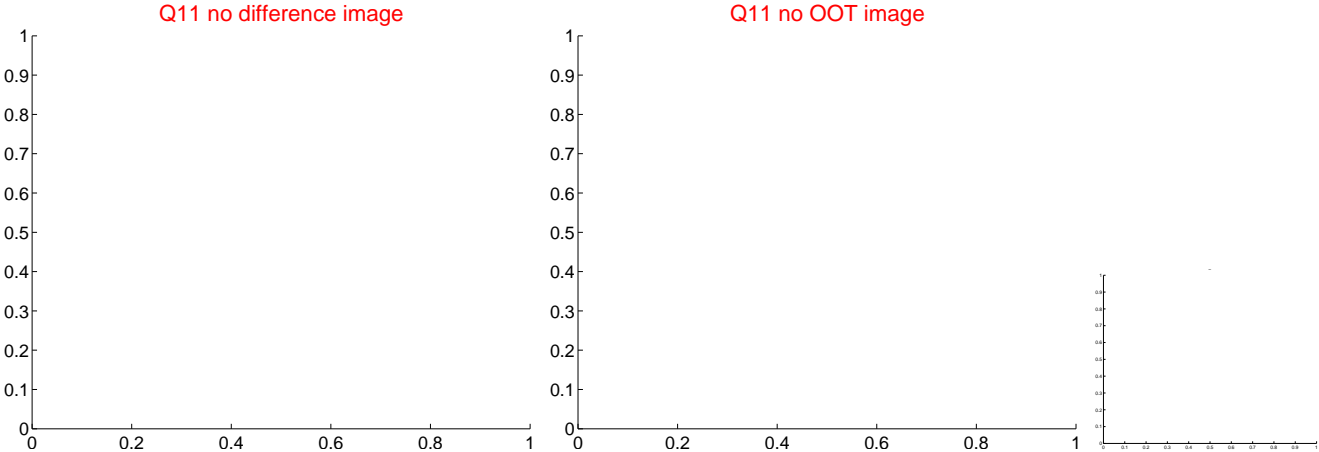
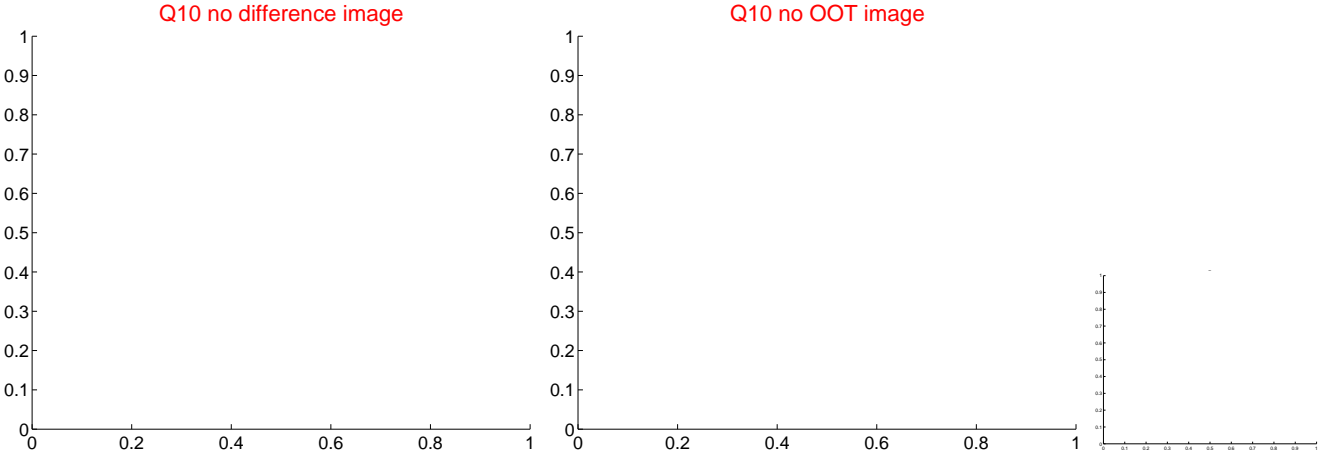
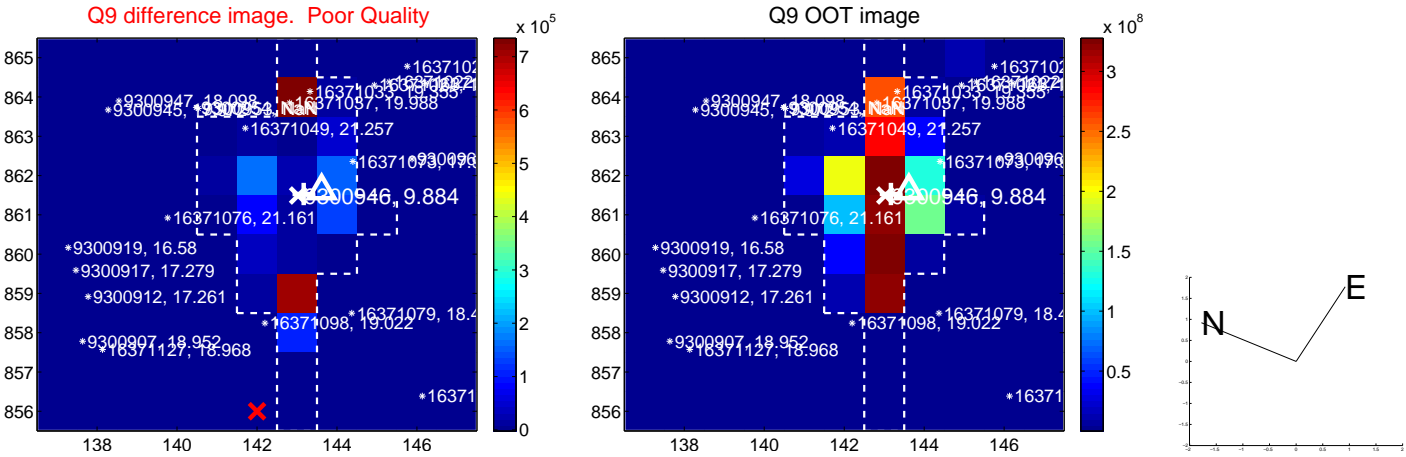


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

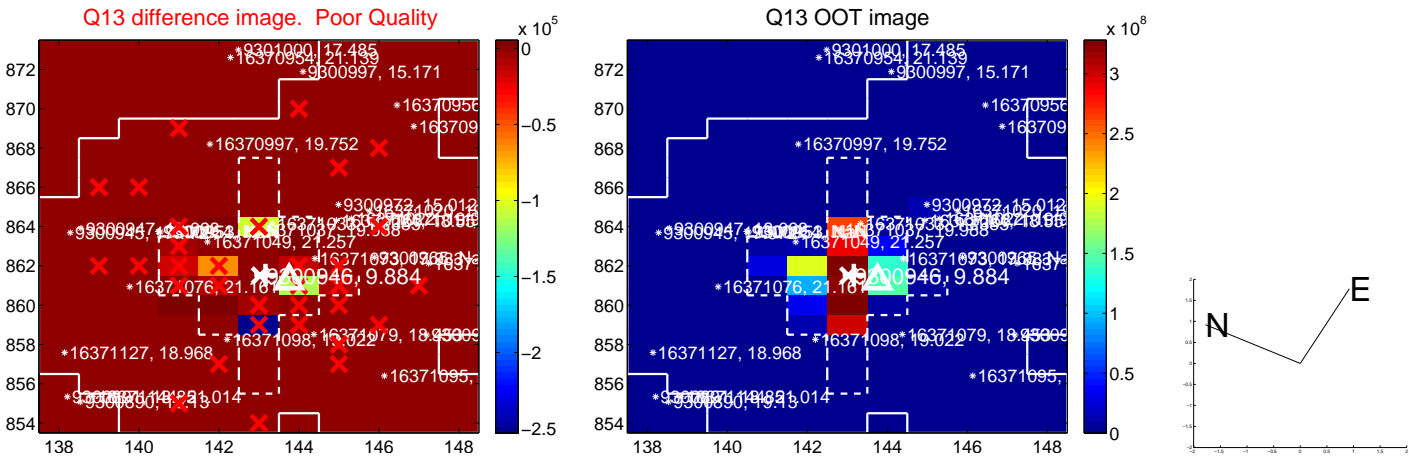




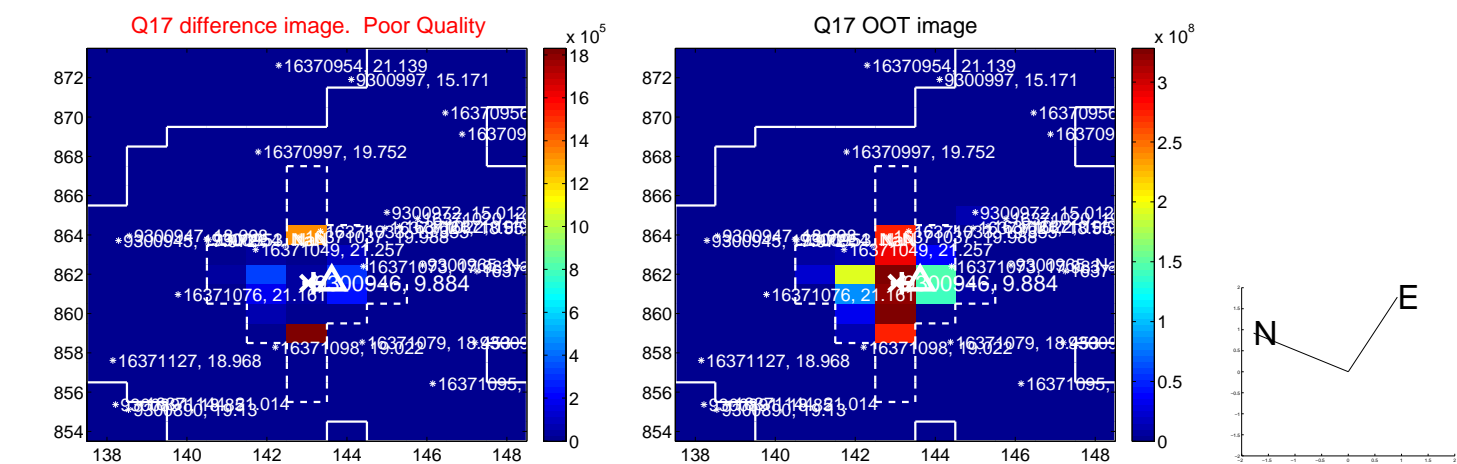
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.



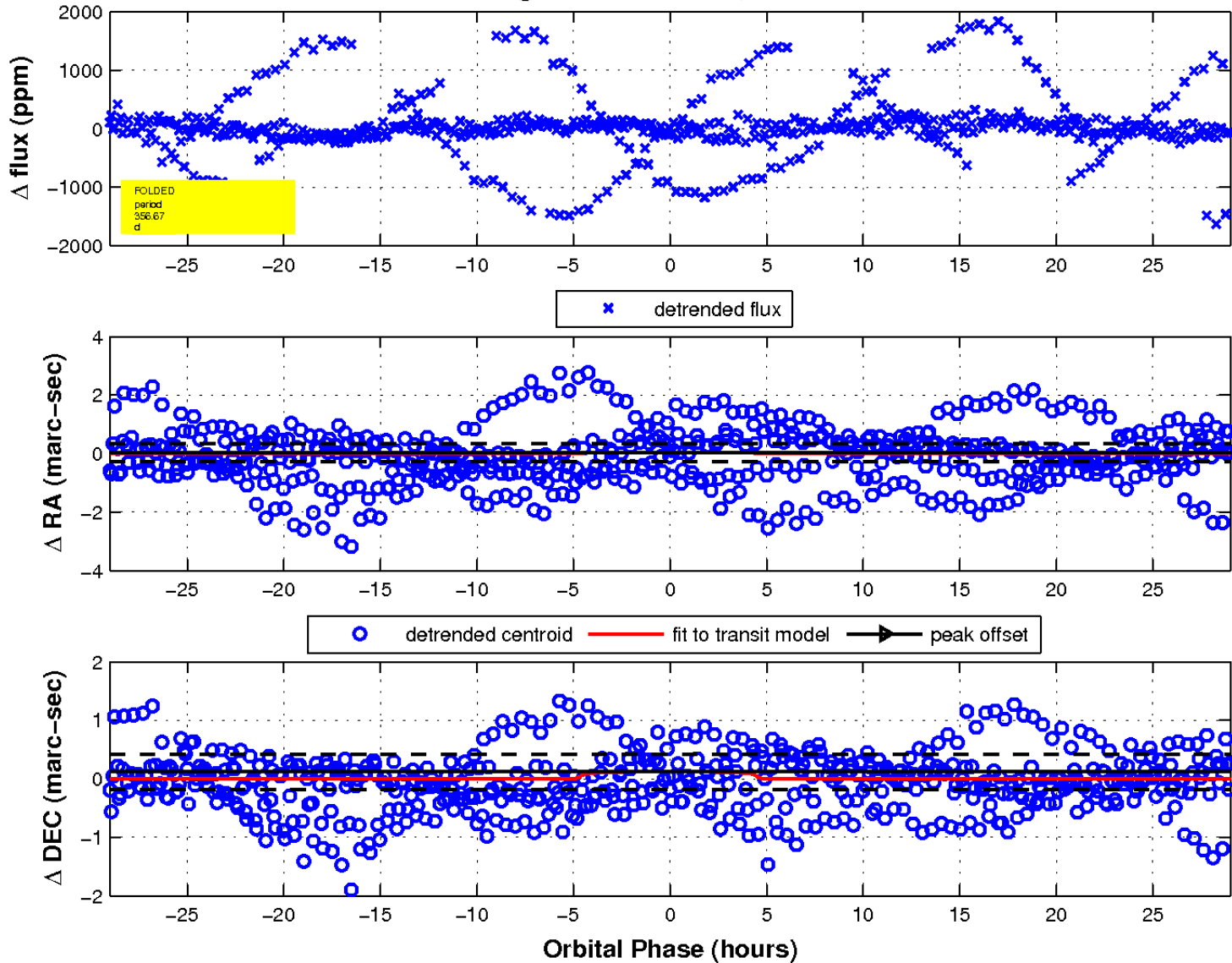
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



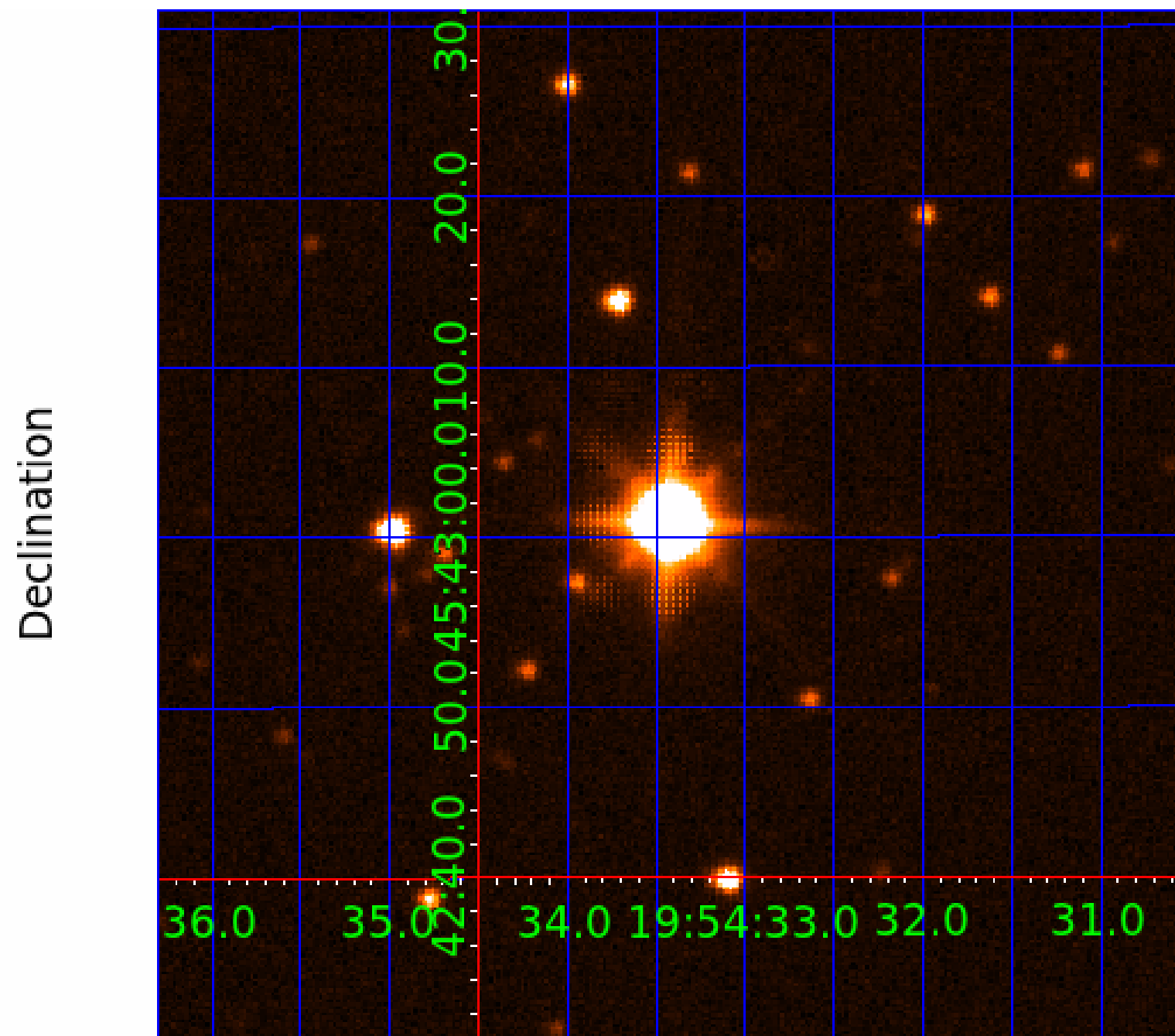
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\Delta$ : difference centroid. red  $\times$ : large negative pixel value.



fluxWeightedCentroids, Planet 3 of 4



UKIRT Image



# KIC 009300946

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009300946-01	OBS	No	3.471798	133.112338	32.5	14.594	10.7	9.7	3.54	6735	2.80	7768.51
009300946-02	OBS	No	0.950368	131.797417	28.6	3.641	13.6	12.4	3.54	6735	2.27	43707.40
009300946-03	OBS	No	356.671301	141.718763	584.2	9.682	14.4	12.2	3.54	6735	9.35	16.15
009300946-04	OBS	No	0.950302	132.312671	26.9	6.076	13.1	13.1	3.54	6735	1.90	43711.43

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009300946-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—CENT_SATURATED
009300946-02	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—CENT_SATURATED
009300946-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
009300946-04	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—LPP_ALT—SAME_NTL_PERIOD—CENT_SATURATED

**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.

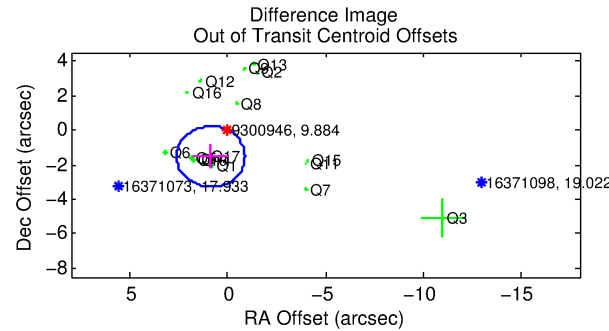
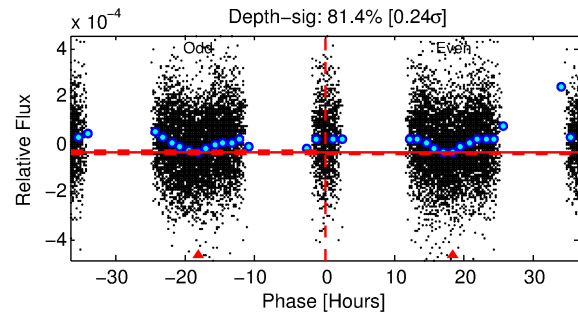
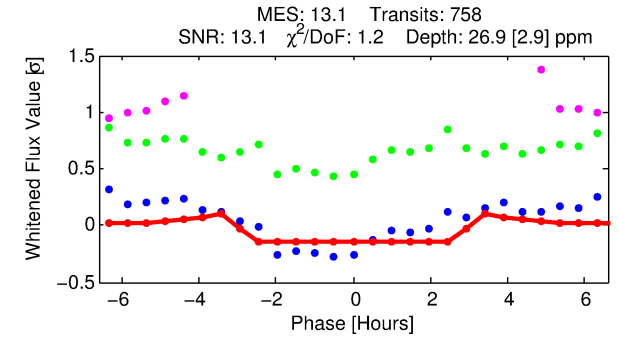
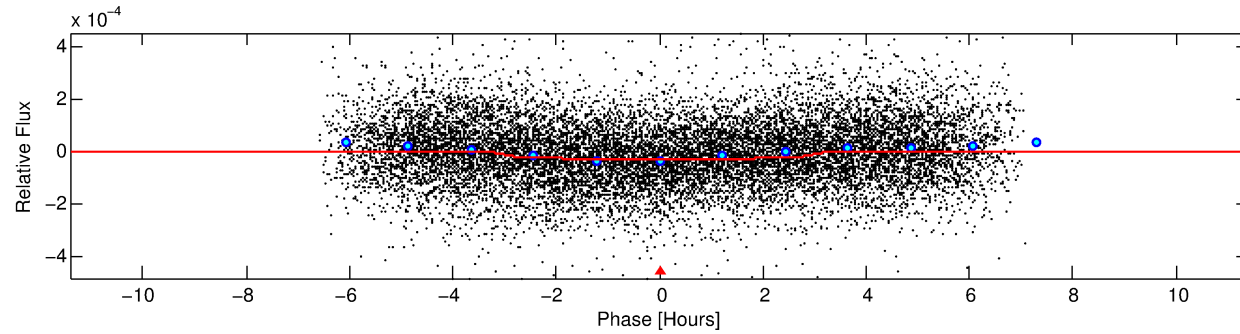
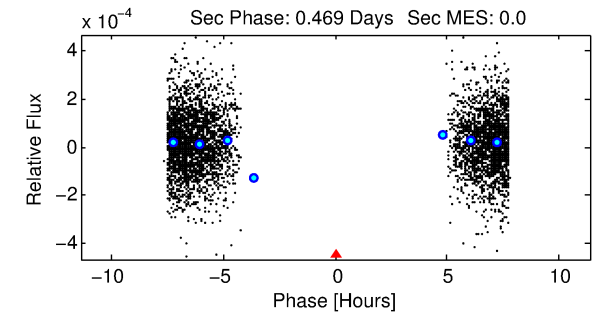
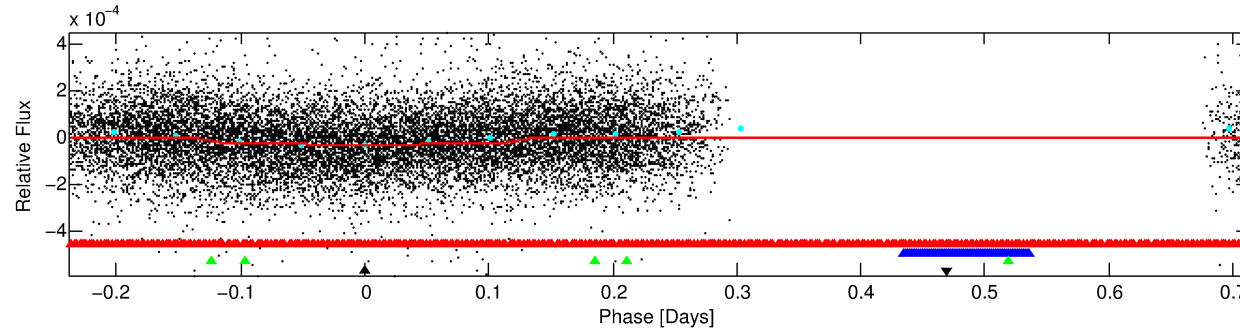
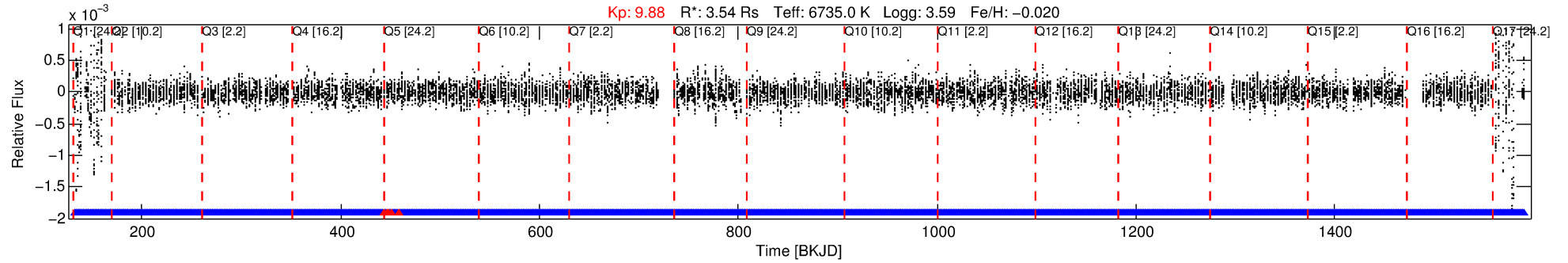
## Ephemeris Match Information For 009300946-04

No Significant Match Found



# DV One-Page Summary

KIC: 9300946 Candidate: 4 of 4 Period: 0.950 d



## DV Fit Results:

Period = 0.95030 [0.00001] d  
Epoch = 132.3127 [0.0028] BKJD  
Rp/R\* = 0.0049 [0.0019]  
a/R\* = 1.28 [1.07]  
b = 0.50 [3.29]  
Seff = 43711.43 [23936.78]  
Teff = 3687 [505] K  
Rp = 1.90 [0.99] Re  
a = 0.0230 [0.0077] AU  
Ag = N/A  
Teffp = N/A

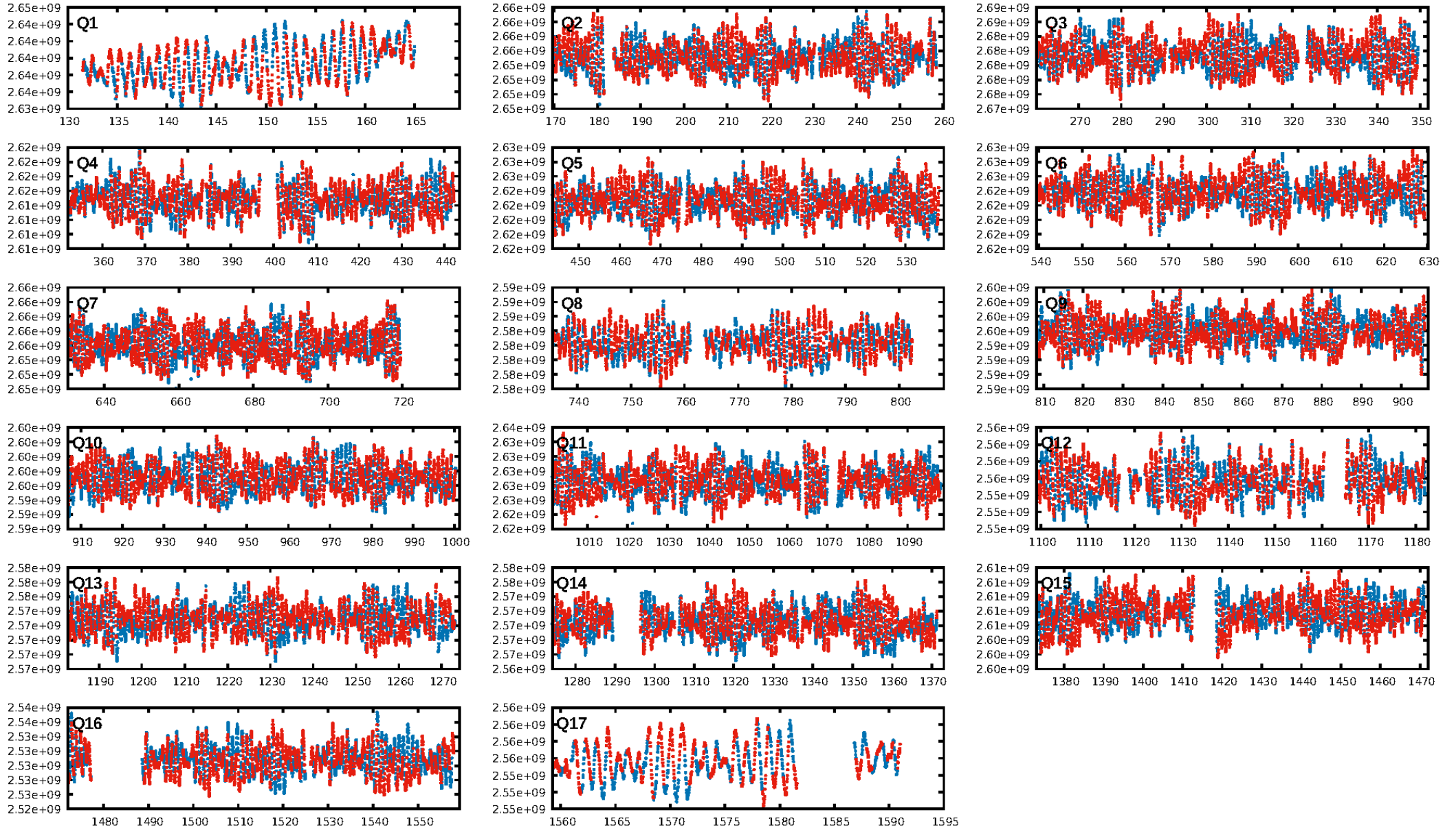
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.0% [0.00σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 0.99 [722/727]  
GhostDiagnostic-chr: N/A  
Centroid-sig: 0.0%  
Centroid-so: 1.920 arcsec [3.69σ]  
OotOffset-rm: 1.757 arcsec [3.01σ]  
KicOffset-rm: 1.070 arcsec [1.80σ]  
OotOffset-st: 4/4/3/5 [16]  
KicOffset-st: 4/4/3/5 [16]  
DiffImageQuality-fgm: 0.00 [0/16]  
DiffImageOverlap-fno: 0.00 [0/17]

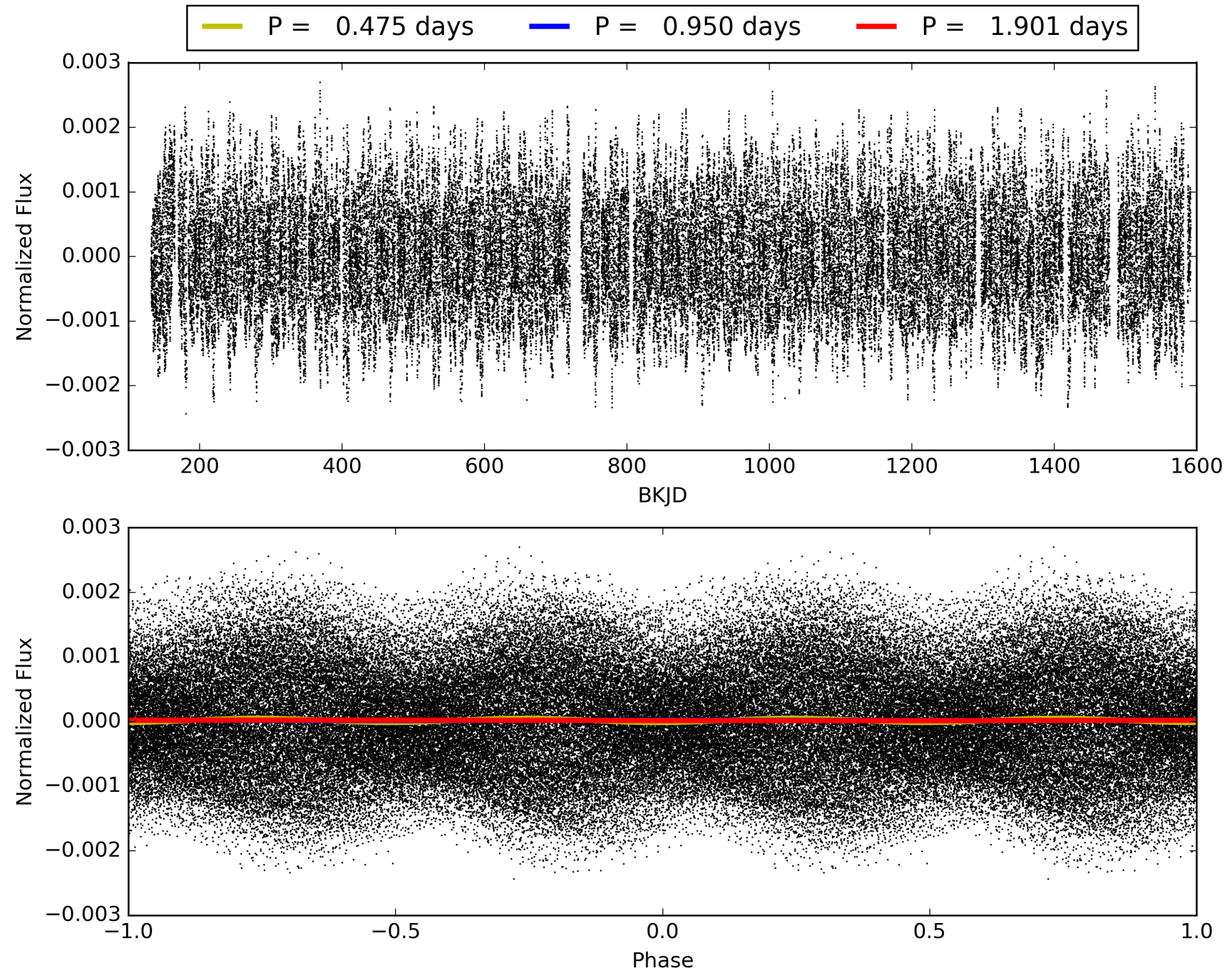
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 18:50:00 Z

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

# TCE 009300946-04, PDC Light Curves



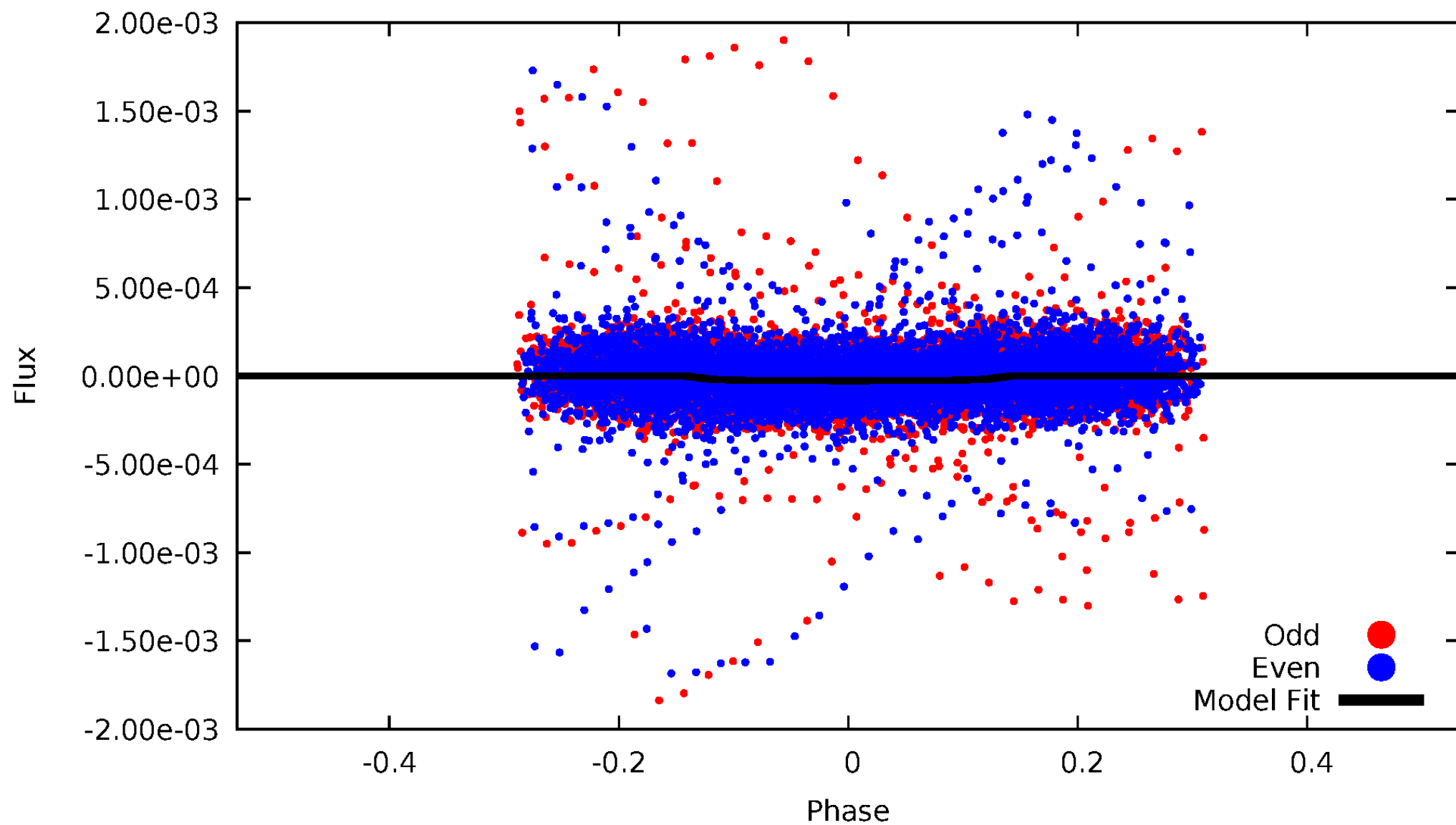
TCE 009300946-04





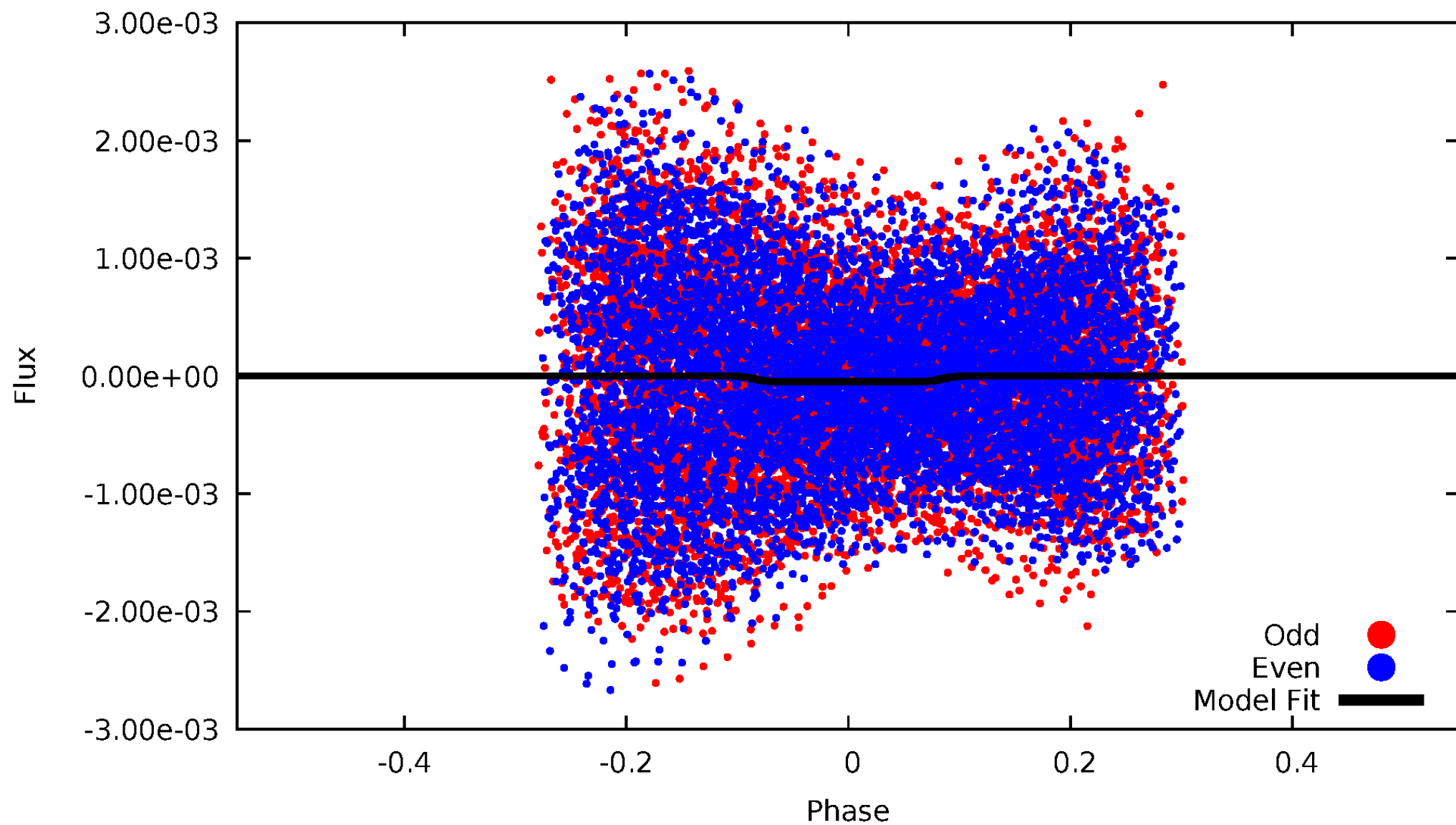
# DV Odd/Even

TCE 009300946-04



# ALT Odd/Even

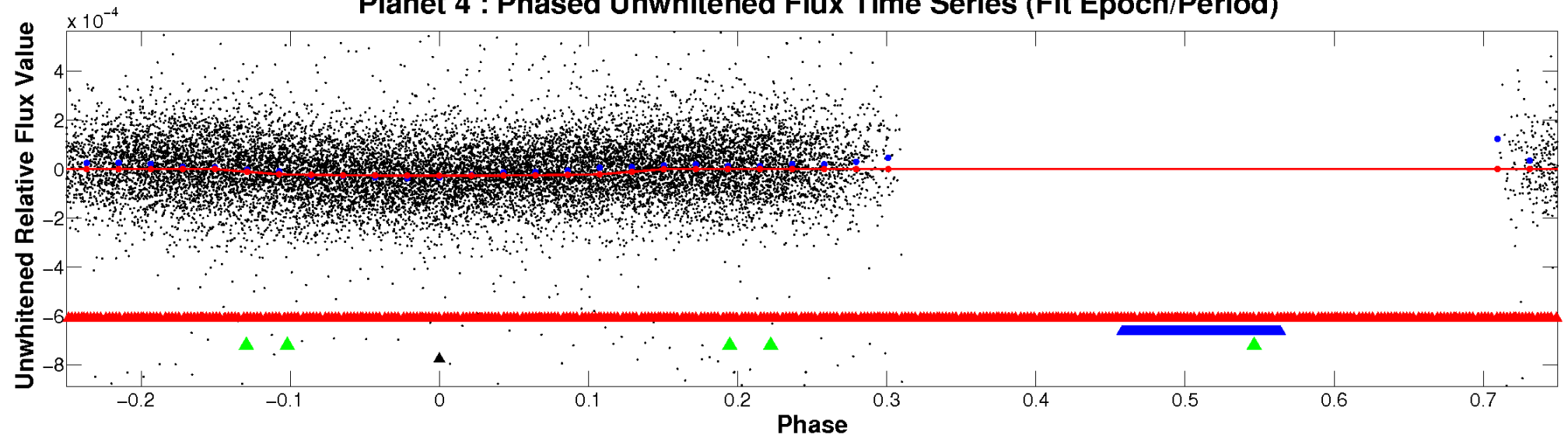
TCE 009300946-04



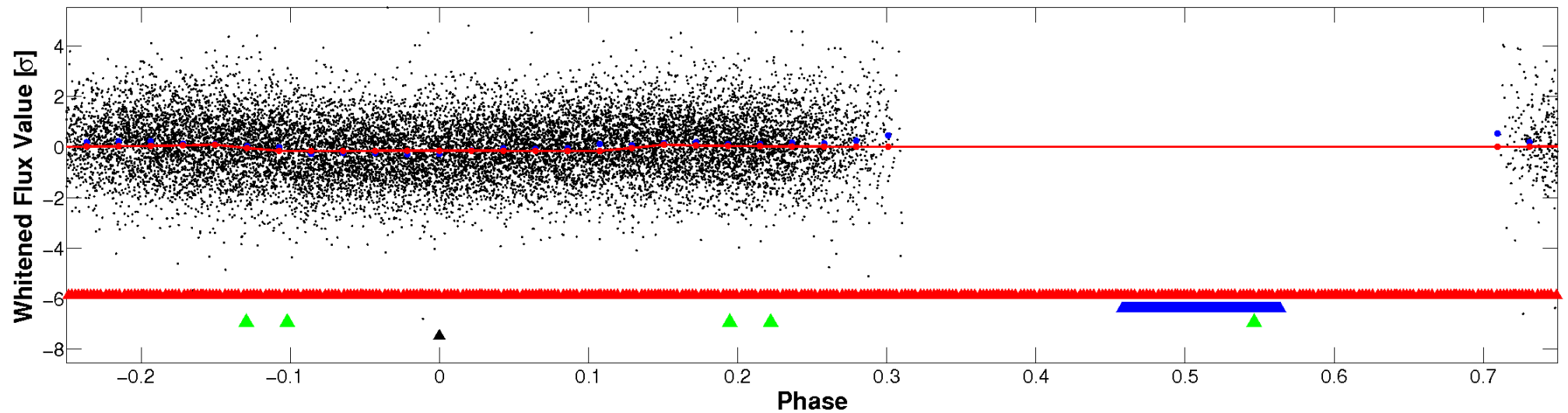


# Non-Whitened Vs. Whitened Light Curve

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

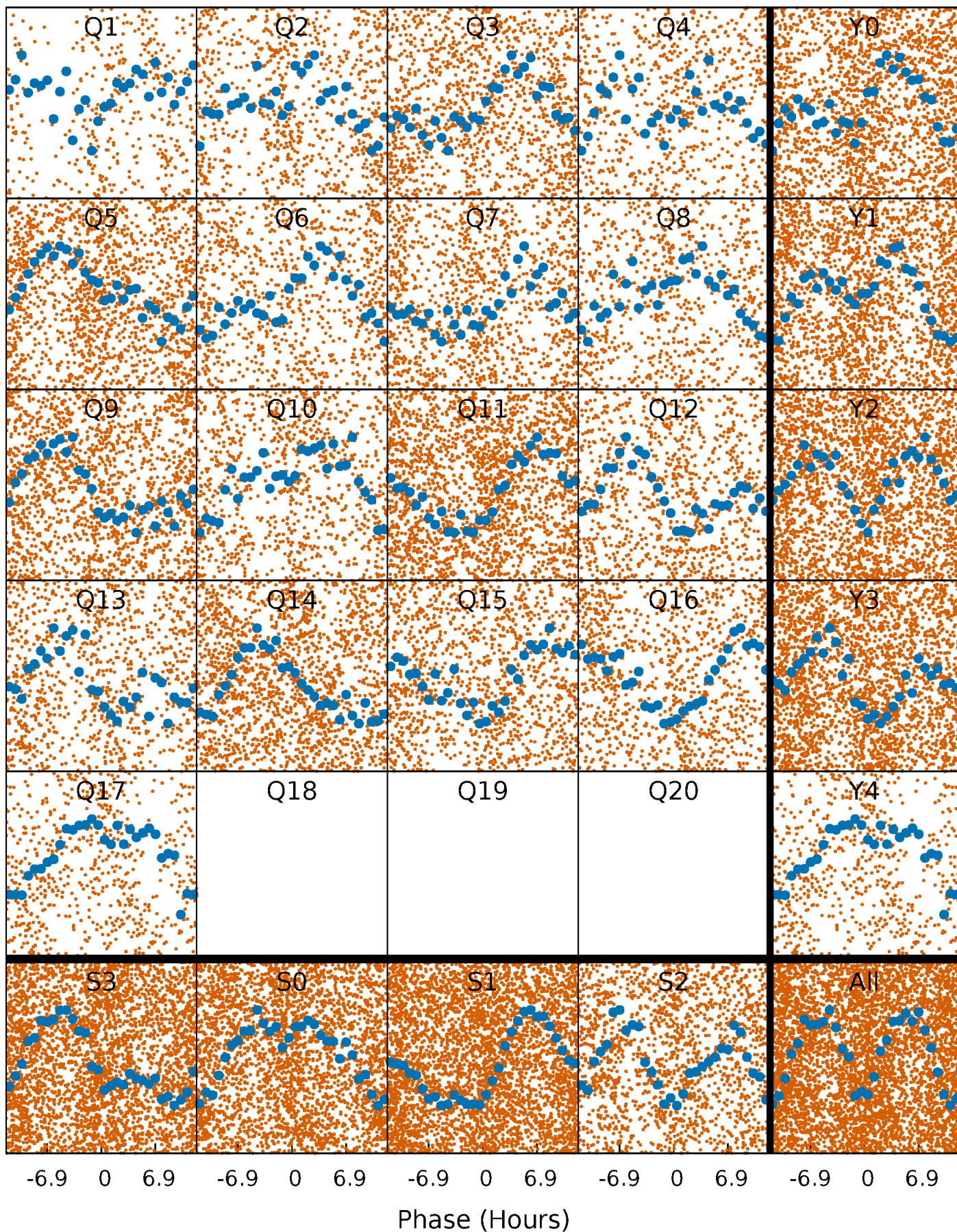


## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



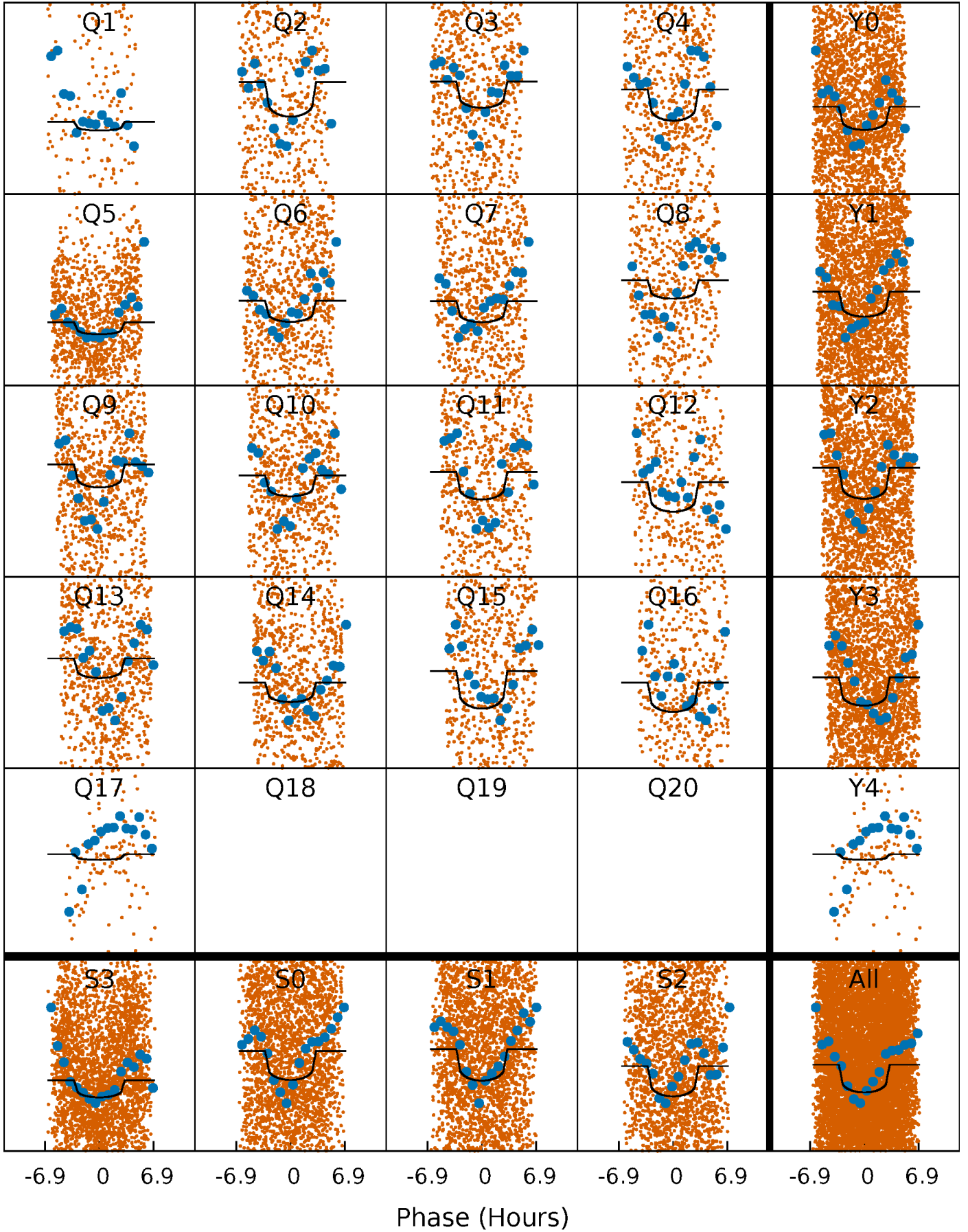
# PDC Quarter-Phased Transit Curves

TCE 009300946-04 P= 0.950302 Days  $T_0=132.312671$  (BKJD)



# DV Quarter-Phased Transit Curves

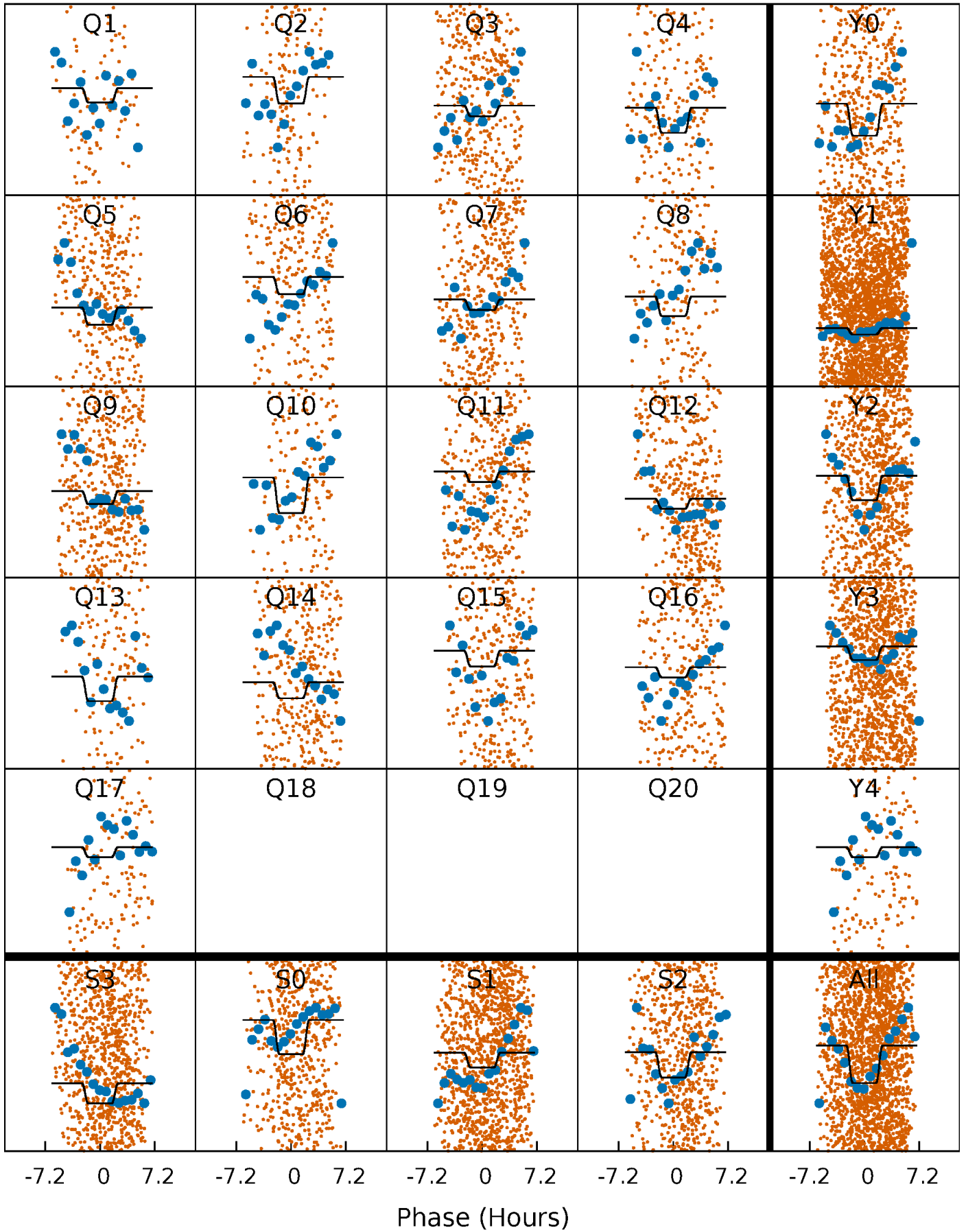
TCE 009300946-04     $P = 0.950302$  Days     $T_0 = 132.312671$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

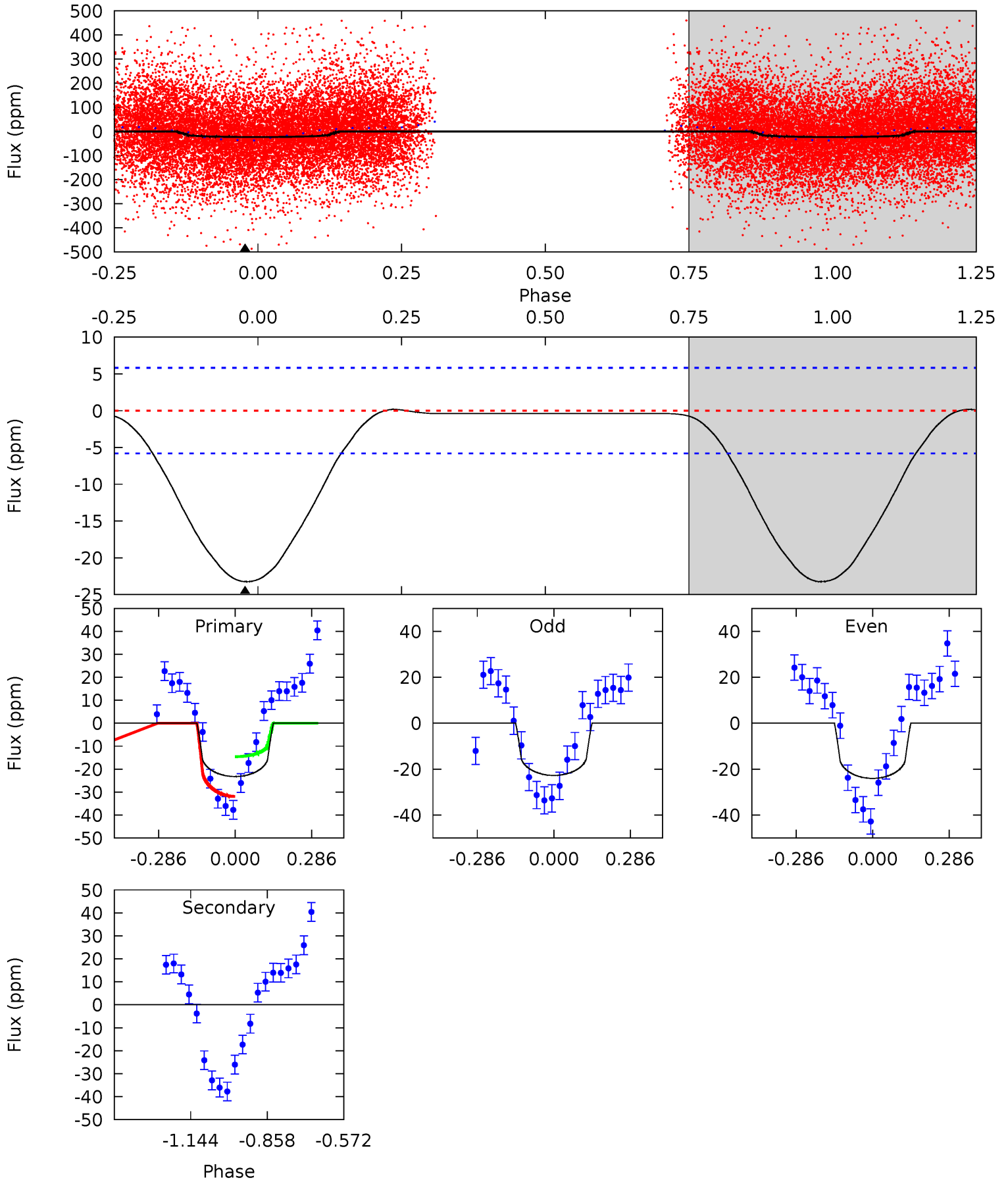
TCE 009300946-04     $P = 0.950314$  Days     $T_0 = 132.302943$  (BKJD)



# DV Model-Shift Uniqueness Test

009300946-04, P = 0.950302 Days, E = 131.362369 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
17.3	0	0	0	4.34	1.07	0.15	17.3	17.3	0	0	0.49	1.03	0.01	6.55

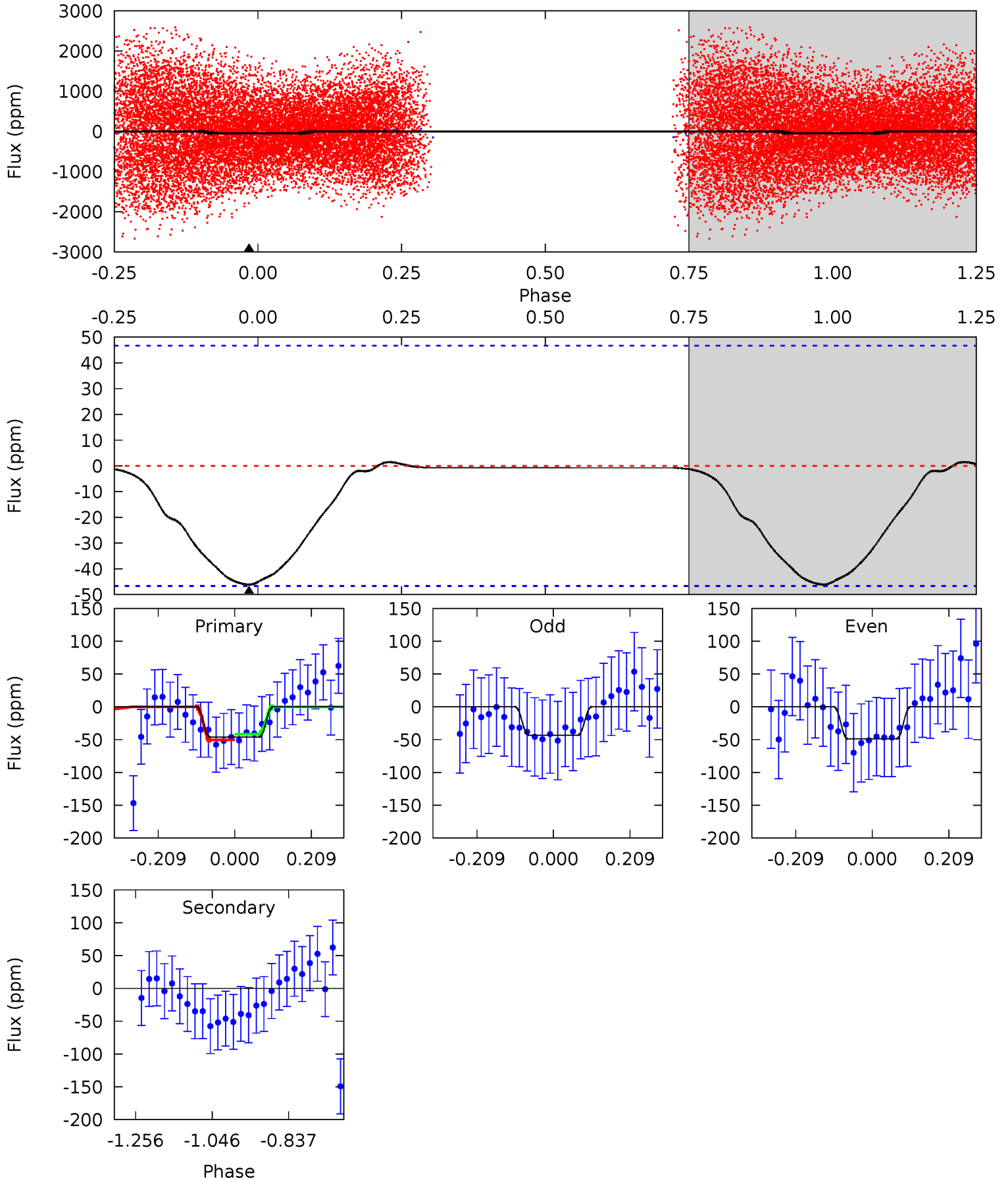




# Alt Model-Shift Uniqueness Test

009300946-04, P = 0.950314 Days, E = 131.352629 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
4.36	0	0	0	4.41	1.26	0.12	4.36	4.36	0	0	0.26	0.86	0.03	0.54



### Stellar Parameters For KIC 009300946

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6735^{+167}_{-184}$	$3.594^{+0.315}_{-0.053}$	$-0.020^{+0.250}_{-0.250}$	$3.542^{+0.412}_{-1.236}$	$1.799^{+0.173}_{-0.321}$	$0.057^{+0.120}_{-0.010}$
	+2%/-3%	+9%/-1%	+1250%/-1250%	+12%/-35%	+10%/-18%	+210%/-18%
Source	PHO1	FLK73	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 009300946-04 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$0\pm 1$	$1.72^{+0.76}_{-0.73}$	$5014^{+257}_{-431}$	$-4290^{+610}_{-415}$	$0.004^{+0.142}_{-0.164}$
Alt.	$0\pm 11$	$2.42^{+0.82}_{-0.77}$	$4996^{+262}_{-416}$	$-4287^{+8696}_{-985}$	$0.003^{+0.670}_{-0.555}$

$T_{\text{max}}$  = 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

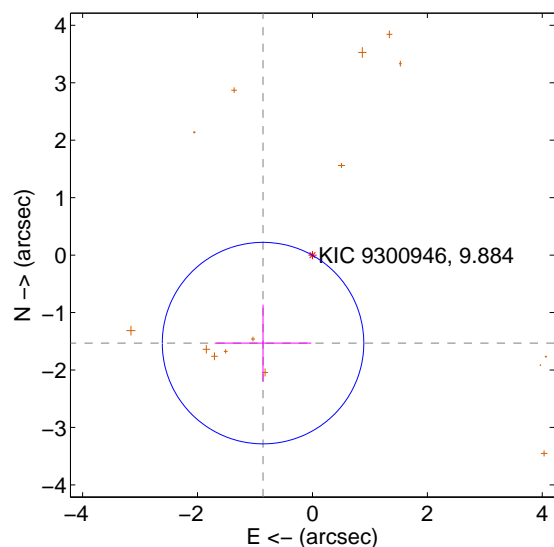
Supplemental centroid analysis for 009300946-04. **Kepler magnitude: 9.88.** Transit SNR 13.13

**There are 0 quarters with good PRF difference image offsets**

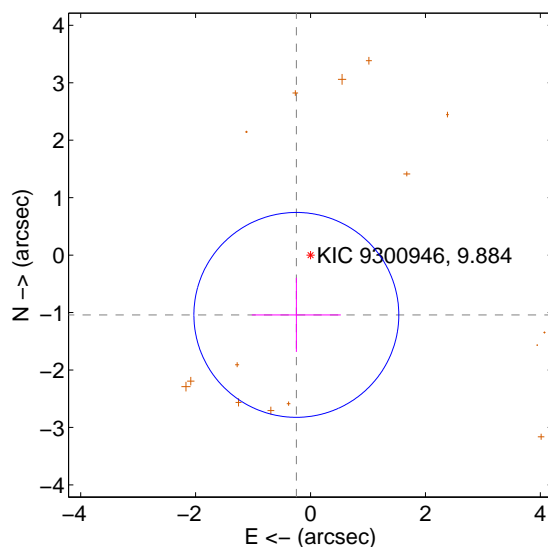
The direct PRF centroid is offset from the target star catalog position by about 0.51 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b><math>1.757 \pm 0.585</math></b>	<b>3.01</b>	$0.860 \pm 0.842$	$-1.532 \pm 0.669$
PRF-fit source offset from KIC position	$1.070 \pm 0.594$	1.80	$0.247 \pm 0.775$	$-1.041 \pm 0.644$
photometric centroid source offset	<b><math>1.92 \pm 0.52</math></b>	<b>3.69</b>	$-1.53 \pm 0.60$	$-1.16 \pm 0.34$

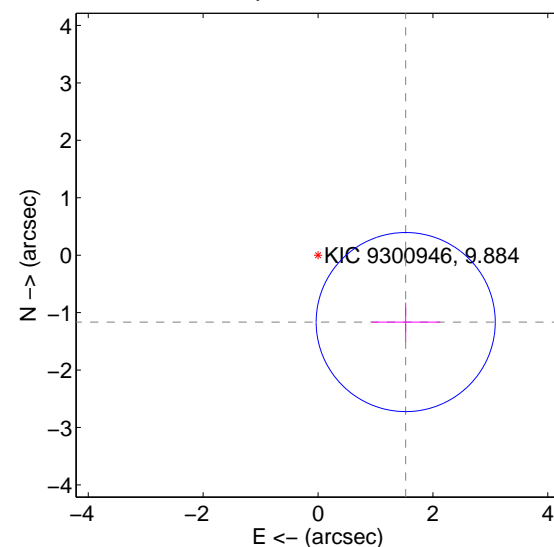
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

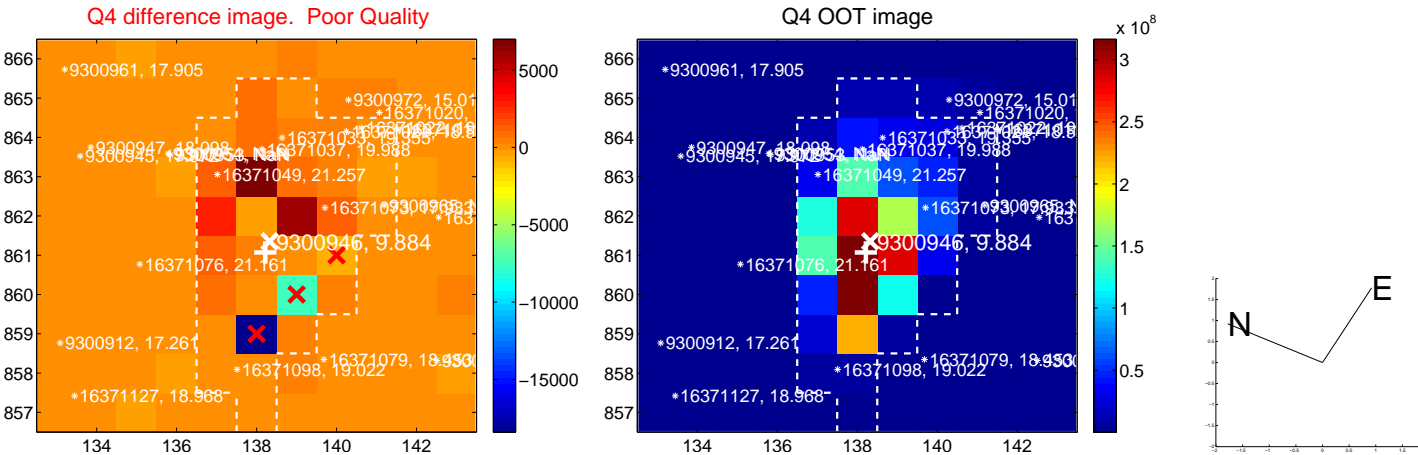
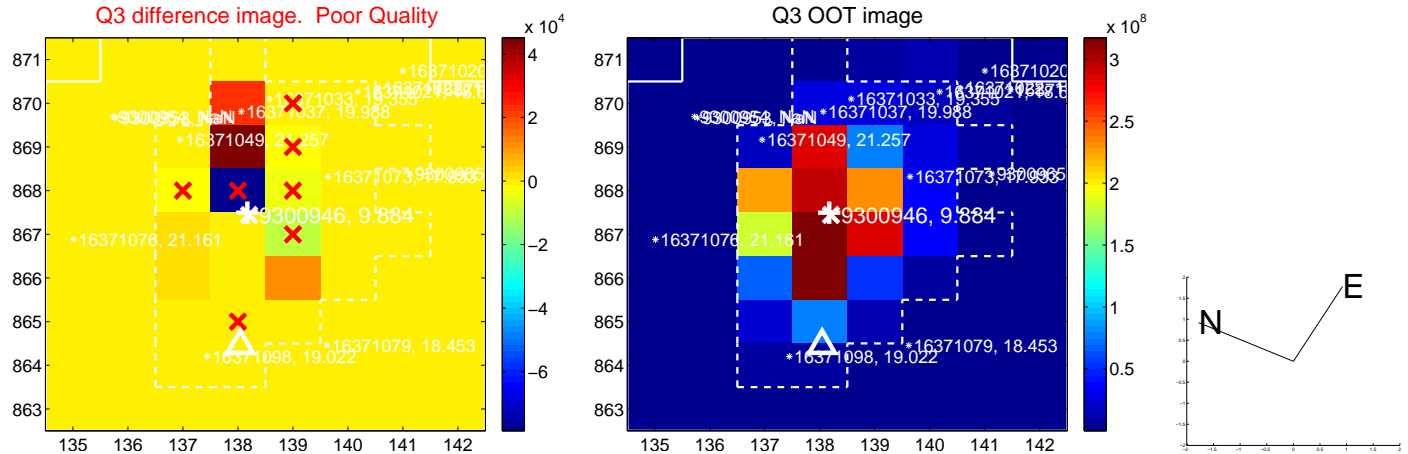
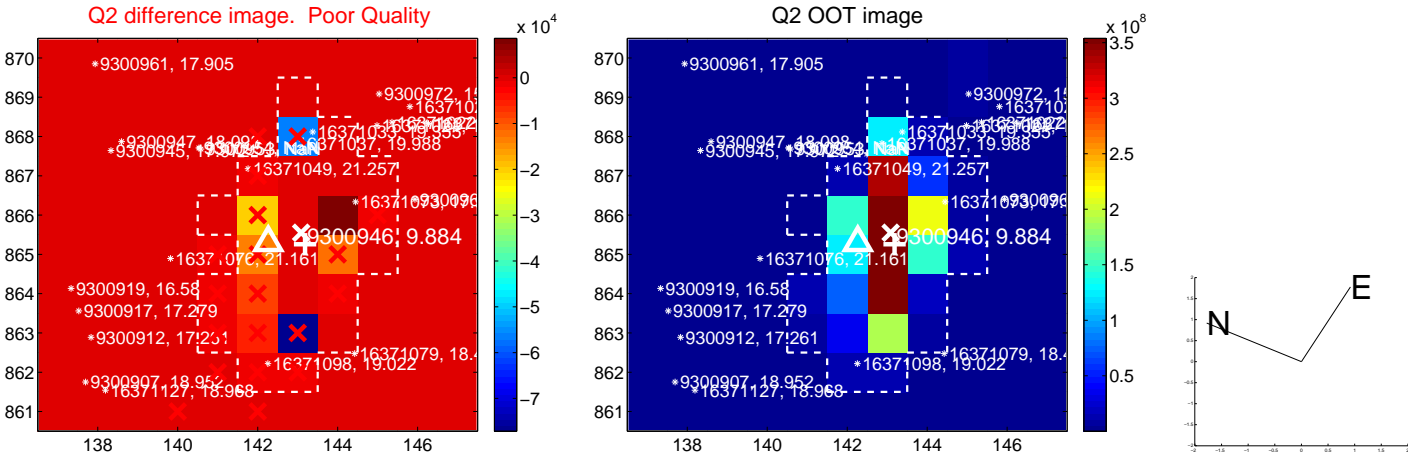
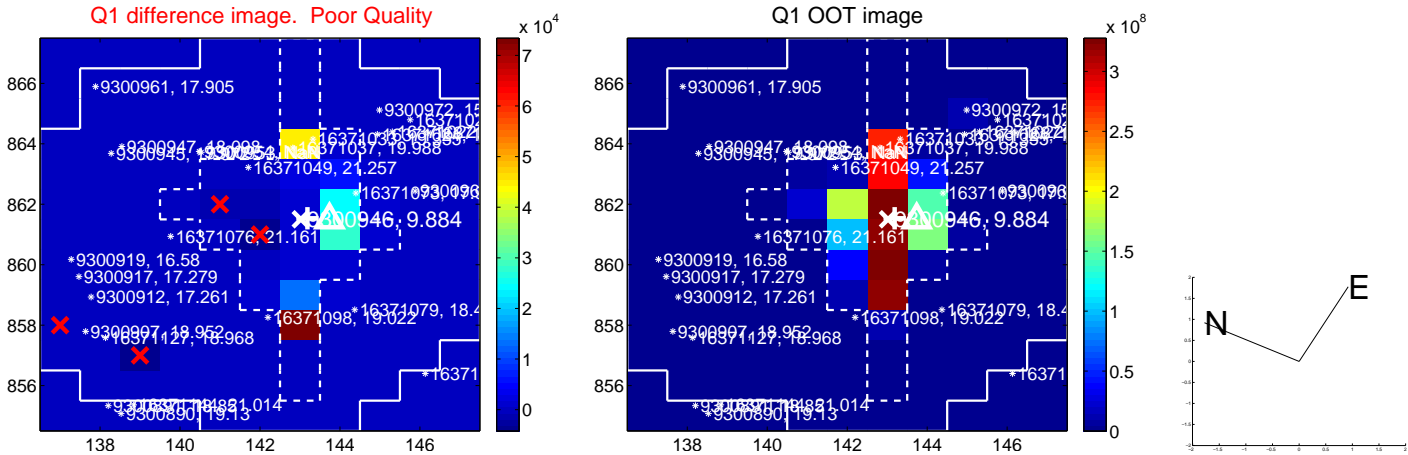


offset from photometric centroids

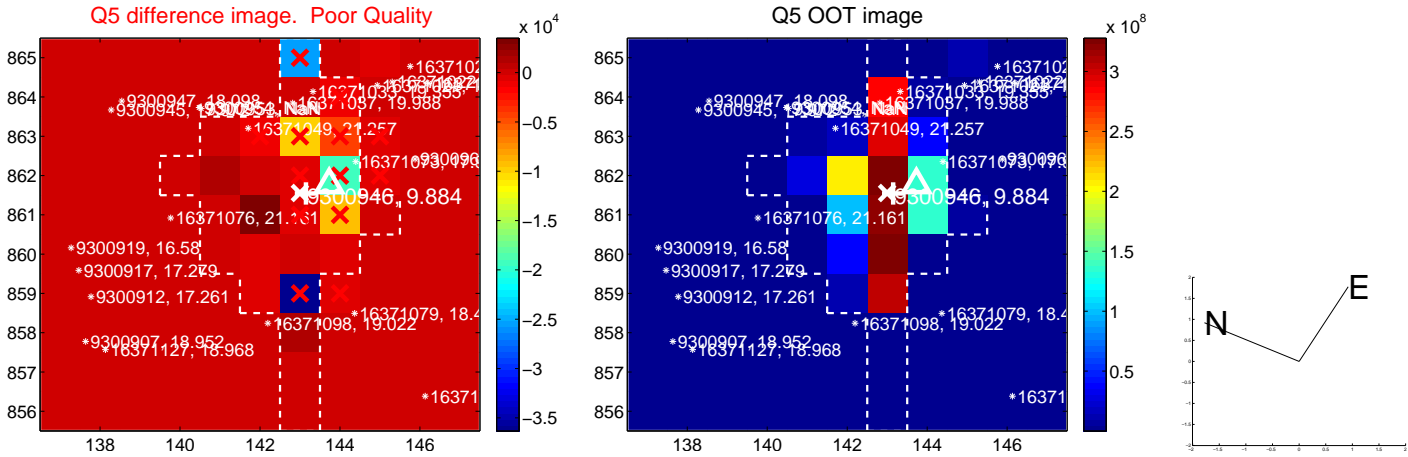


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

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

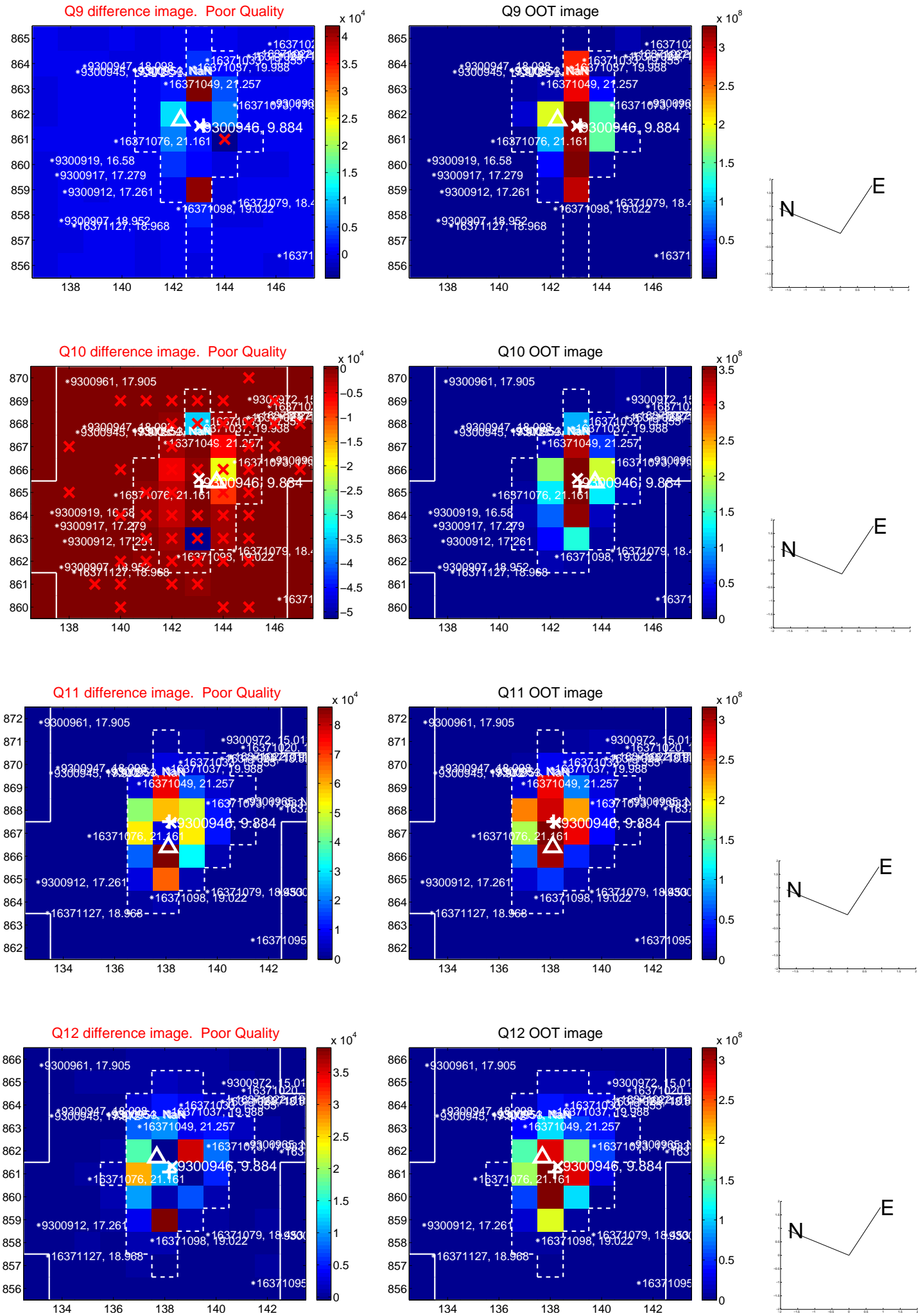


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

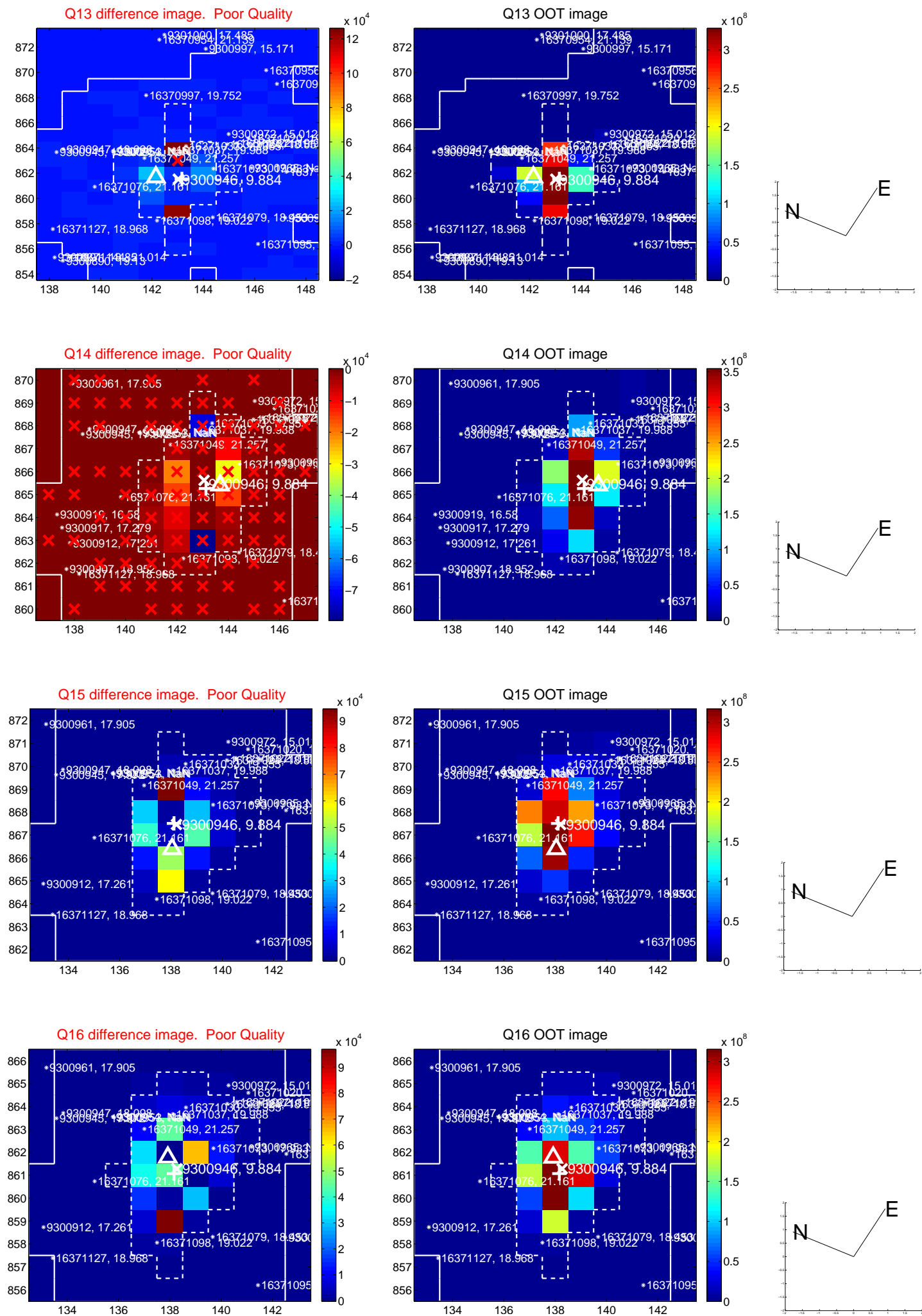




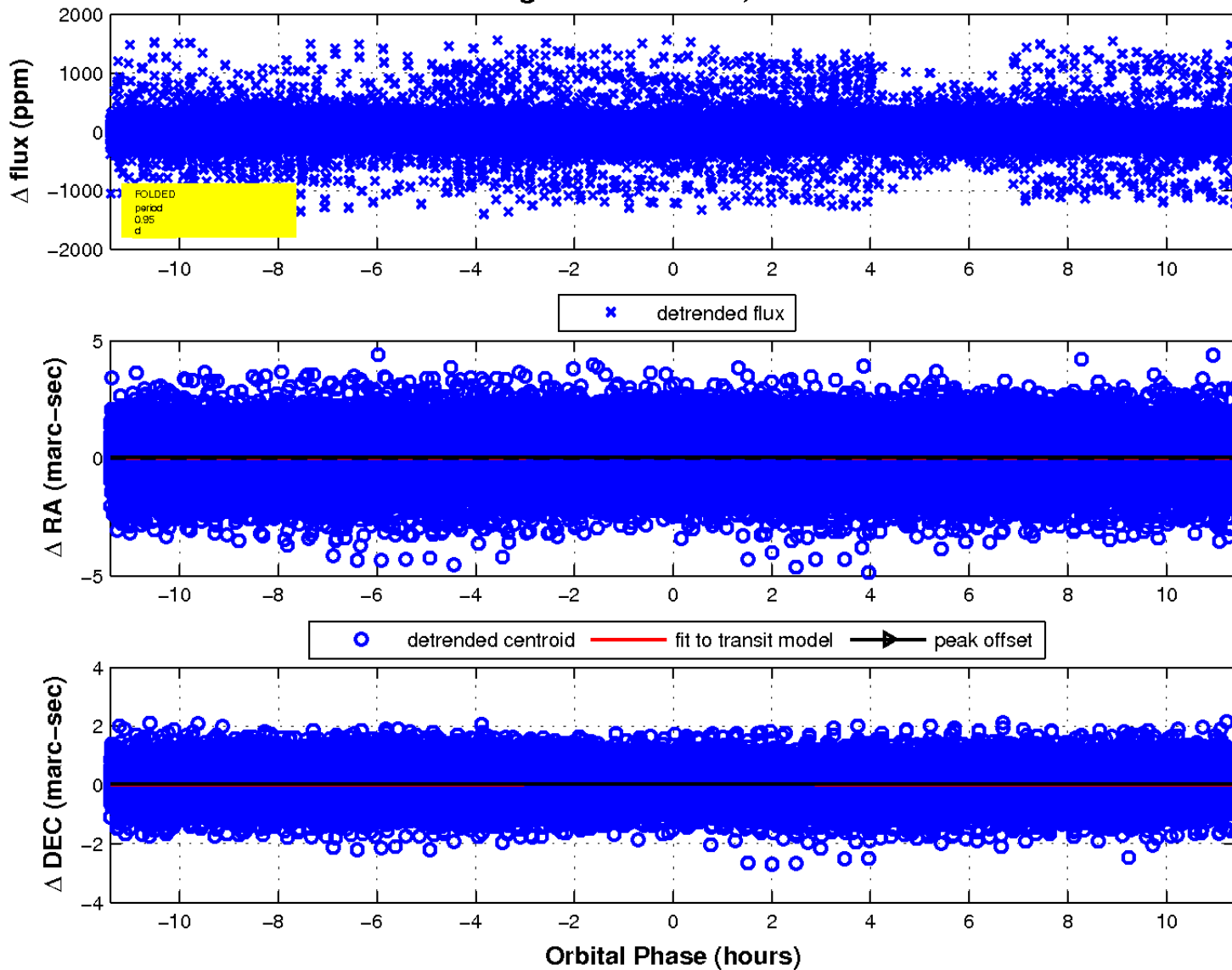
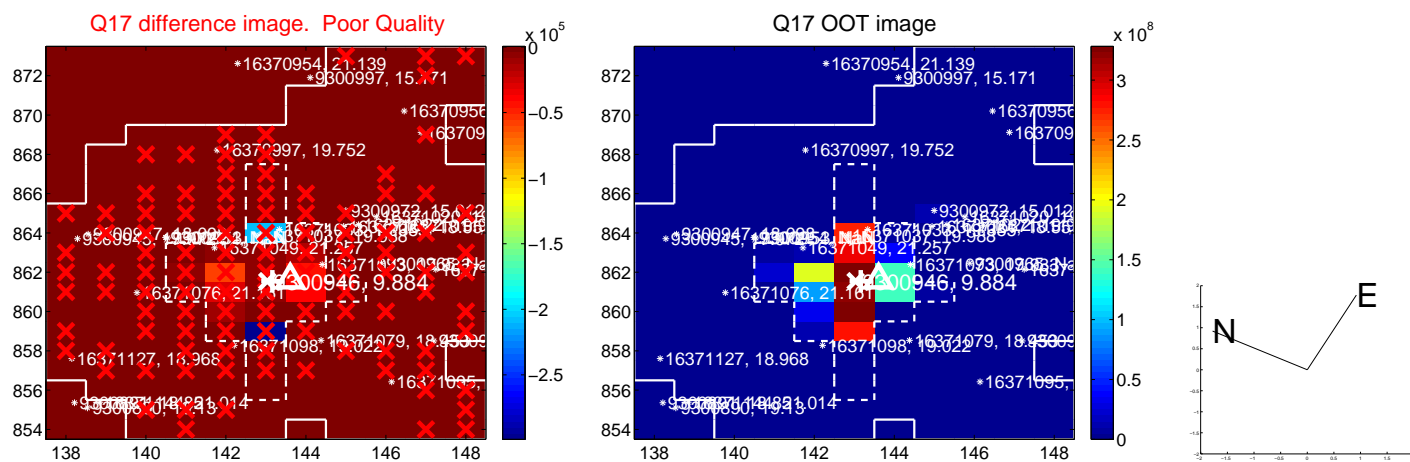
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



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



UKIRT Image

