

# KIC 004072582

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004072582-01	OBS	No	0.794246	132.199377	226.0	1.690	9.0	9.4	2.63	7821	4.61	53425.38
004072582-02	OBS	No	2.671307	133.914539	201.2	26.375	8.8	13.7	2.63	7821	3.86	10602.03

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004072582-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT
004072582-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—LPP_DV—LPP_ALT—CENT_FEW_DIFS

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

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

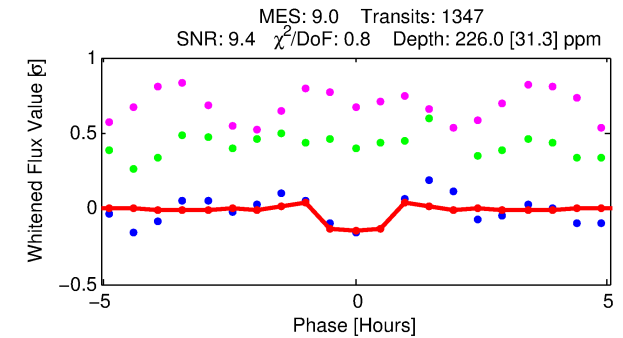
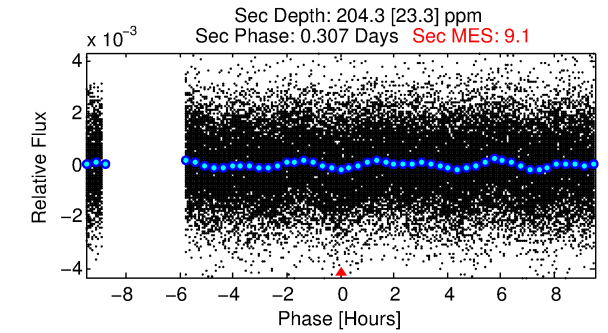
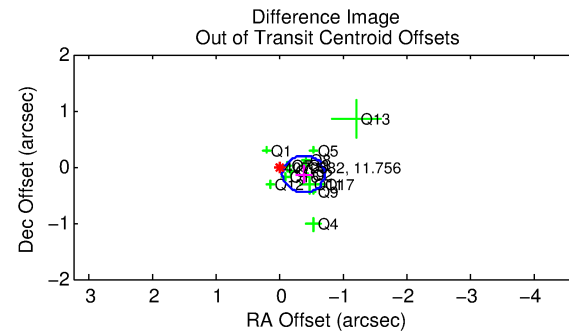
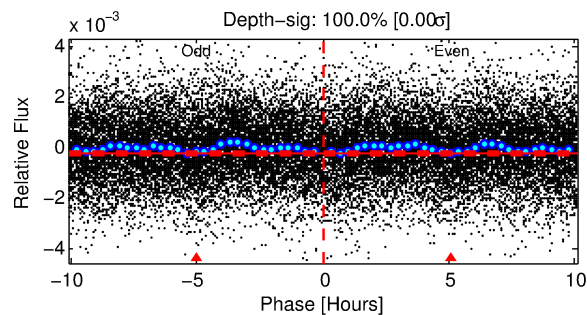
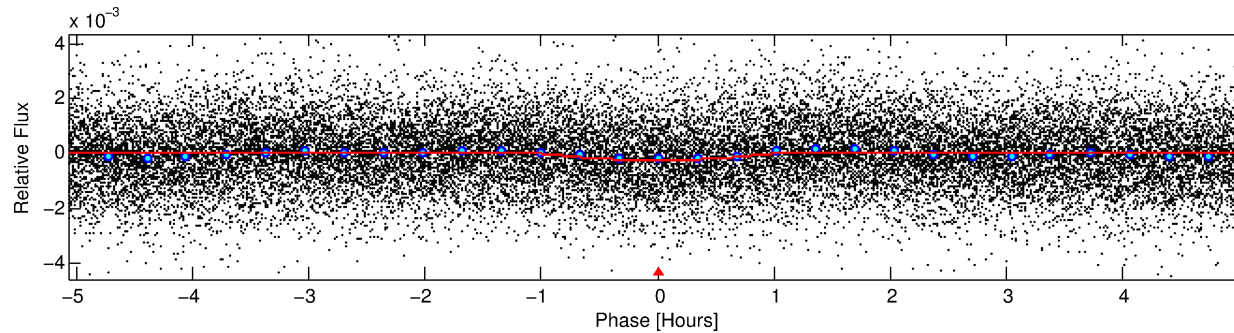
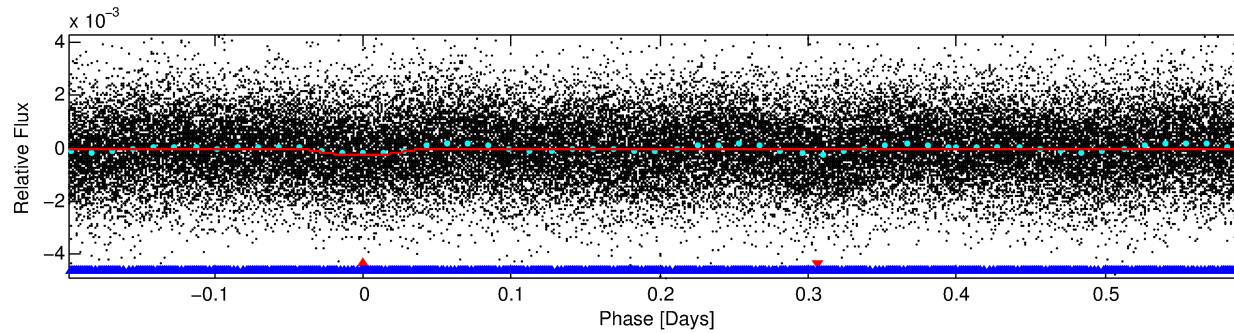
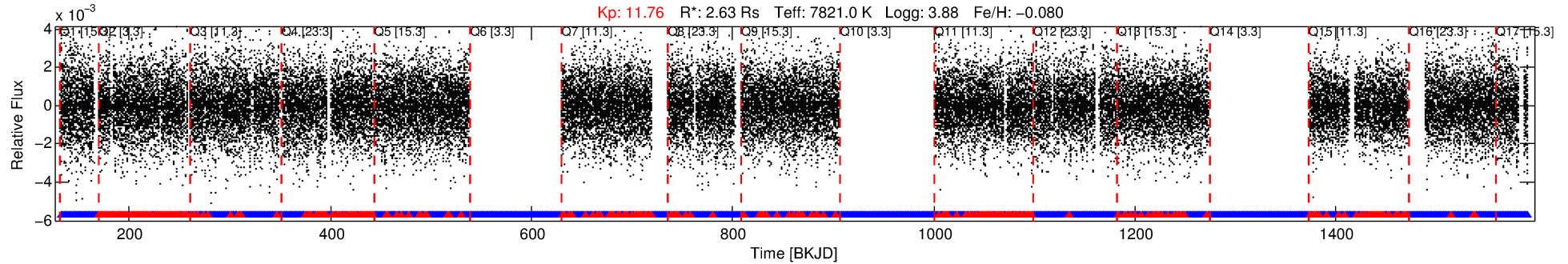
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 004072582-01

No Significant Match Found

# DV One-Page Summary

KIC: 4072582 Candidate: 1 of 2 Period: 0.794 d



## DV Fit Results:

Period = 0.79425 [0.00001] d  
Epoch = 132.1994 [0.0016] BKJD  
Rp/R\* = 0.0160 [0.0046]  
a/R\* = 1.94 [2.42]  
b = 0.90 [0.36]  
Seff = 53425.38 [19078.62]  
Teq = 3877 [346] K  
Rp = 4.61 [1.75] Re  
a = 0.0209 [0.0048] AU  
Ag = 2.30 [1.57] [0.83σ]  
Teffp = 7385 [1077] K [3.10σ]

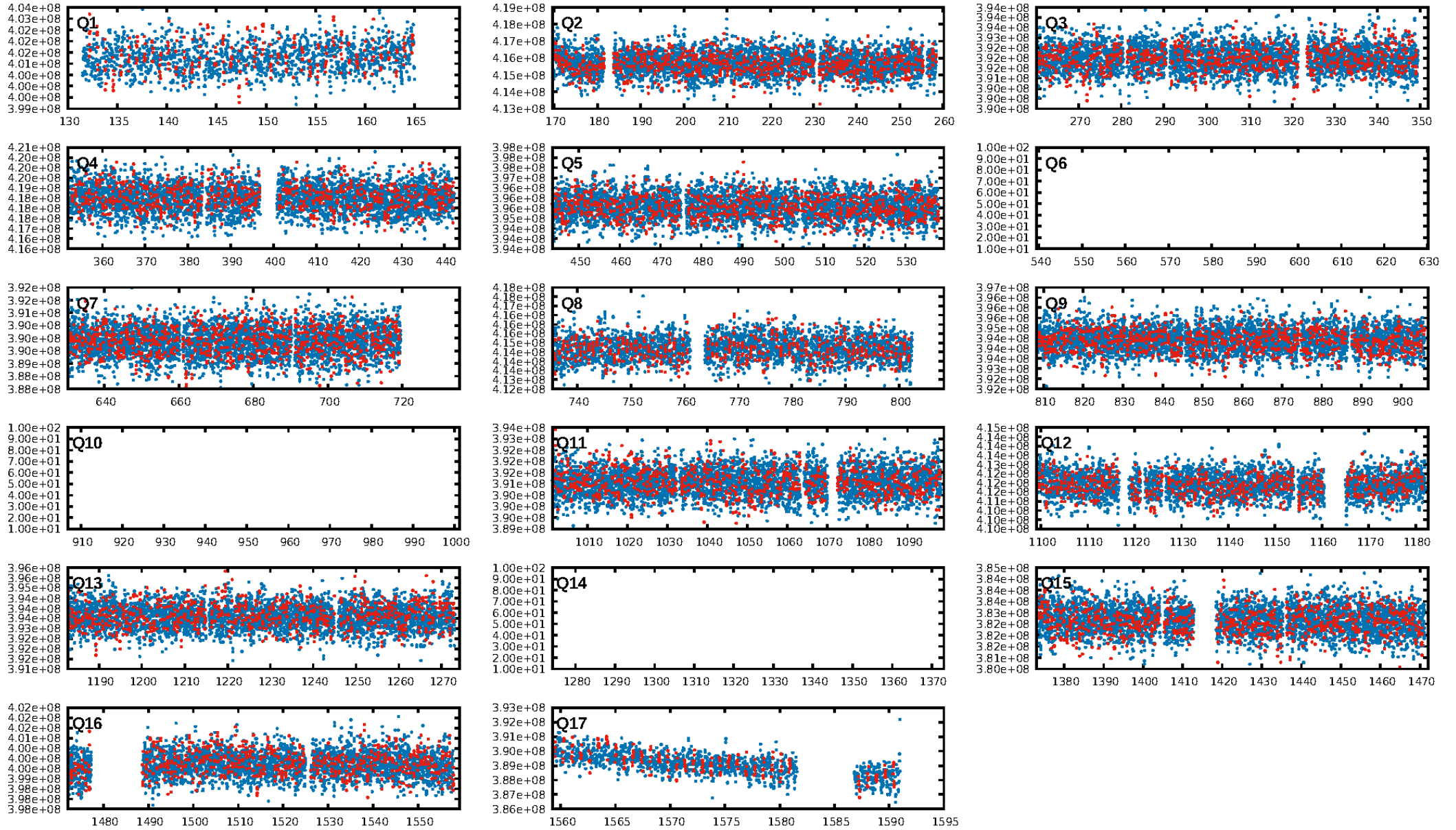
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 91.2% [1.70σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 0.72 [921/1272]  
GhostDiagnostic-chr: 1.021  
Centroid-sig: 0.0%  
Centroid-so: 0.274 arcsec [1.72σ]  
OotOffset-rm: 0.395 arcsec [3.58σ]  
KicOffset-rm: 0.092 arcsec [0.80σ]  
OotOffset-st: 1/4/4/5 [14]  
KicOffset-st: 1/4/4/5 [14]  
DiffImageQuality-fgm: 0.50 [7/14]  
DiffImageOverlap-fno: 1.00 [14/14]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 19:40:53 Z

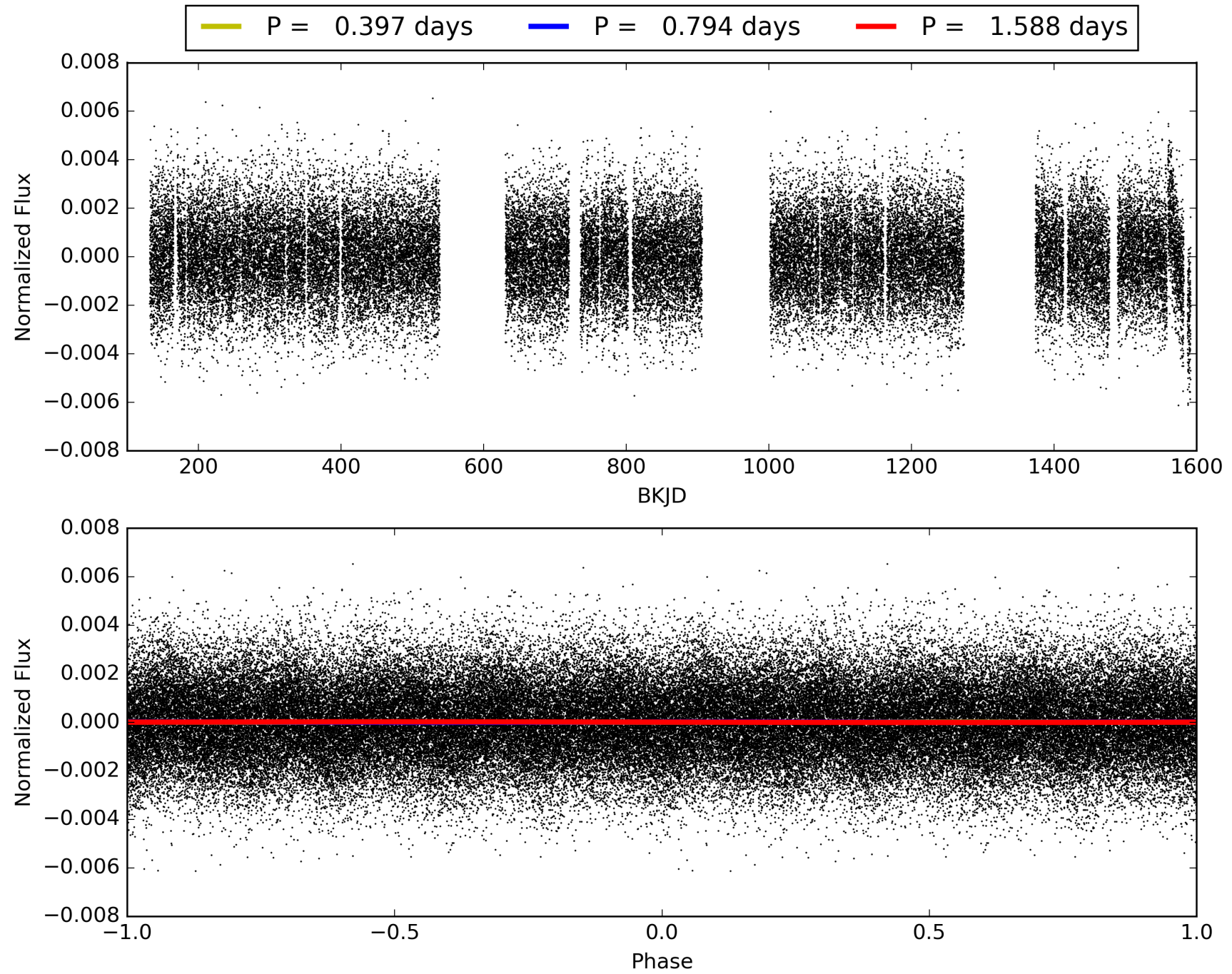
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 004072582-01, PDC Light Curves



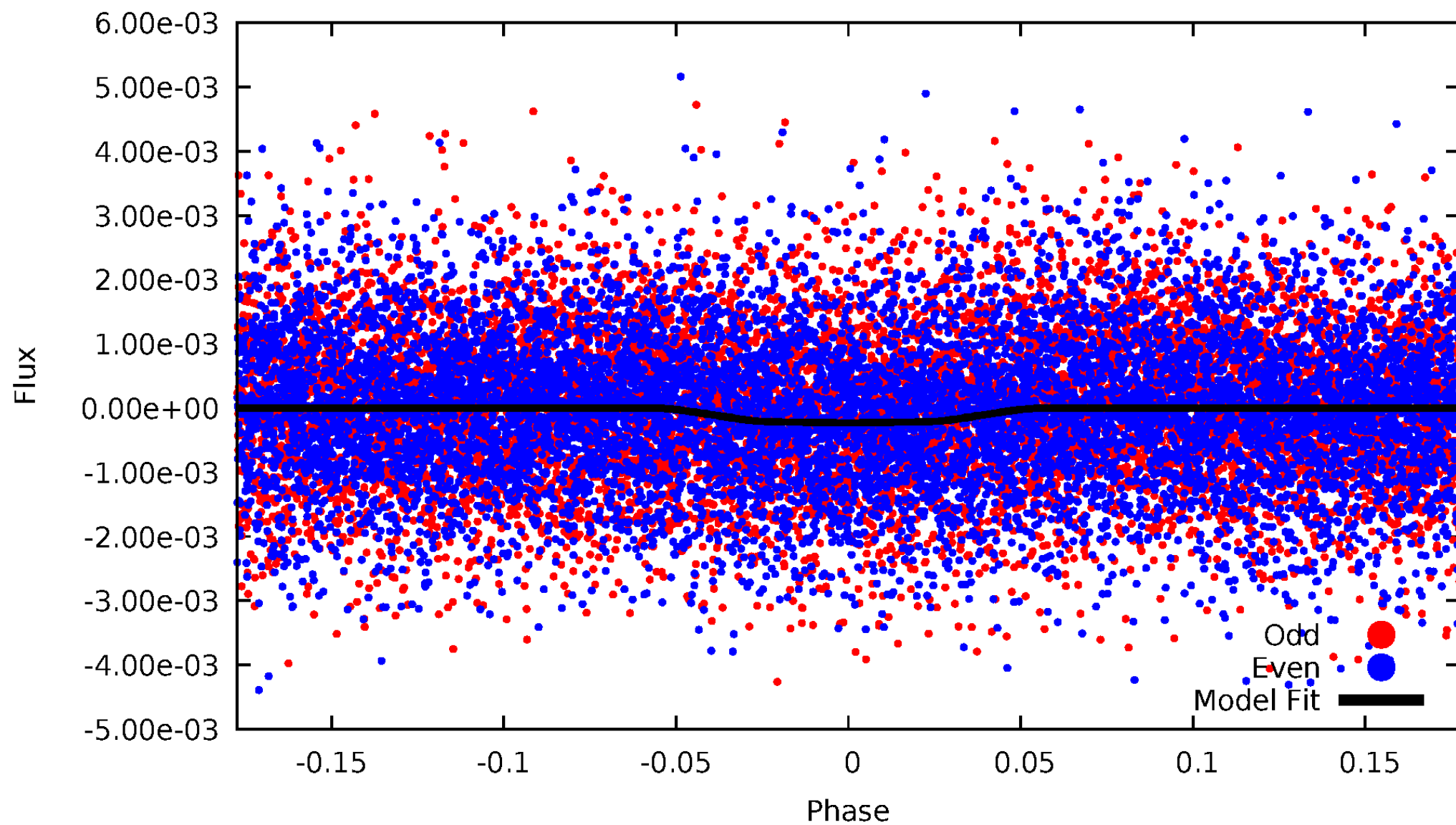


TCE 004072582-01



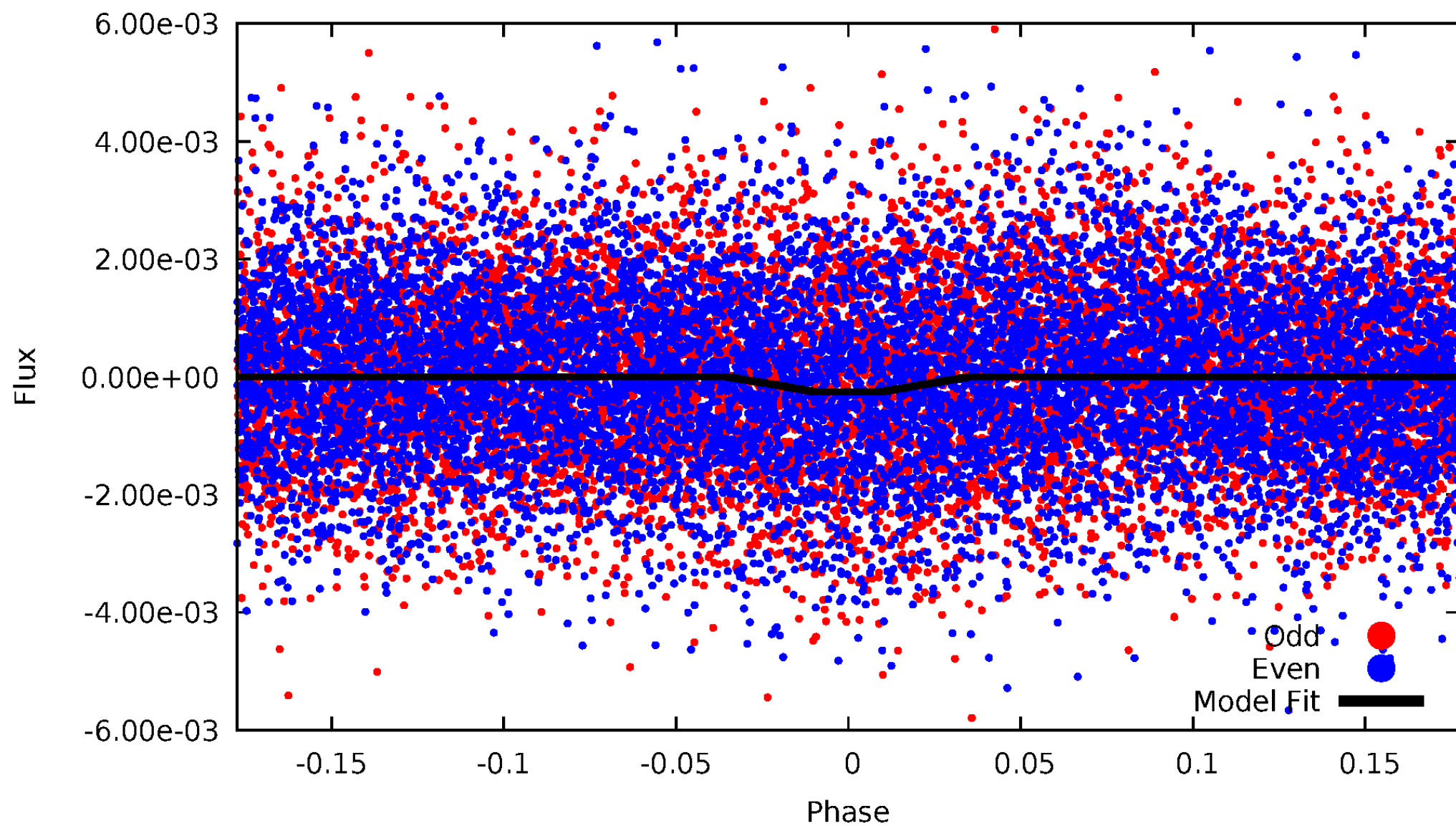
# DV Odd/Even

TCE 004072582-01

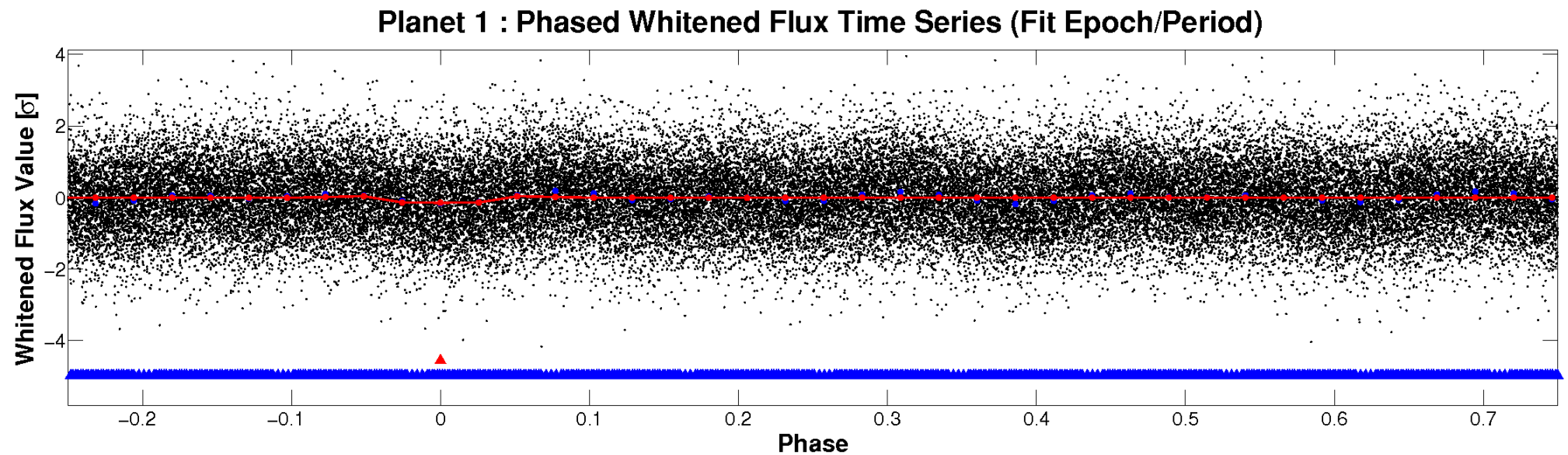
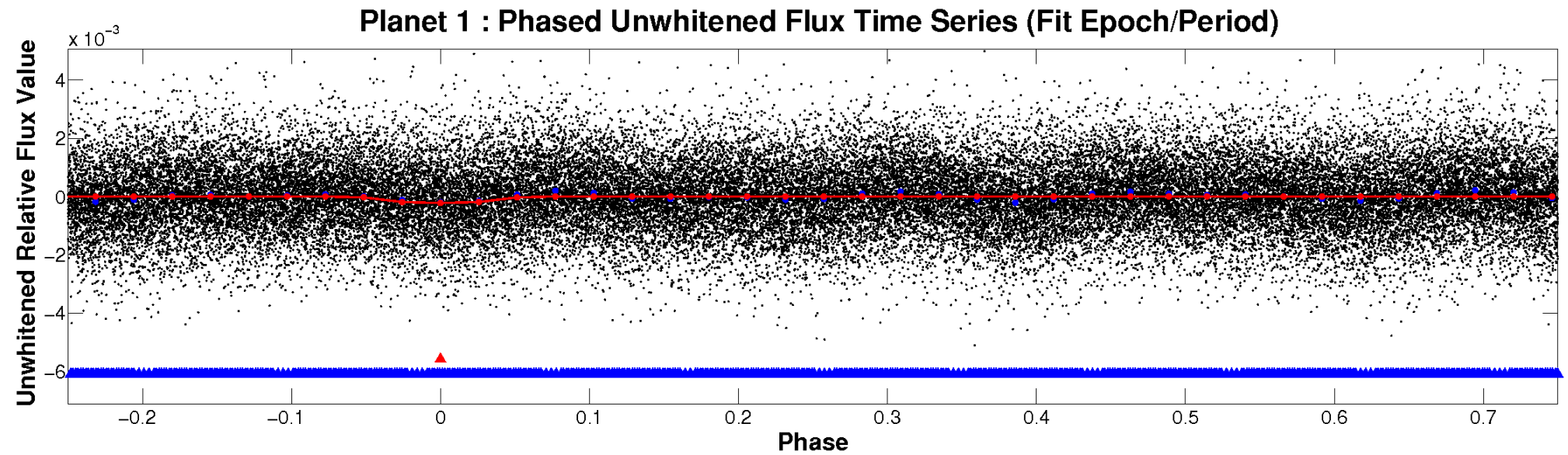


# ALT Odd/Even

TCE 004072582-01



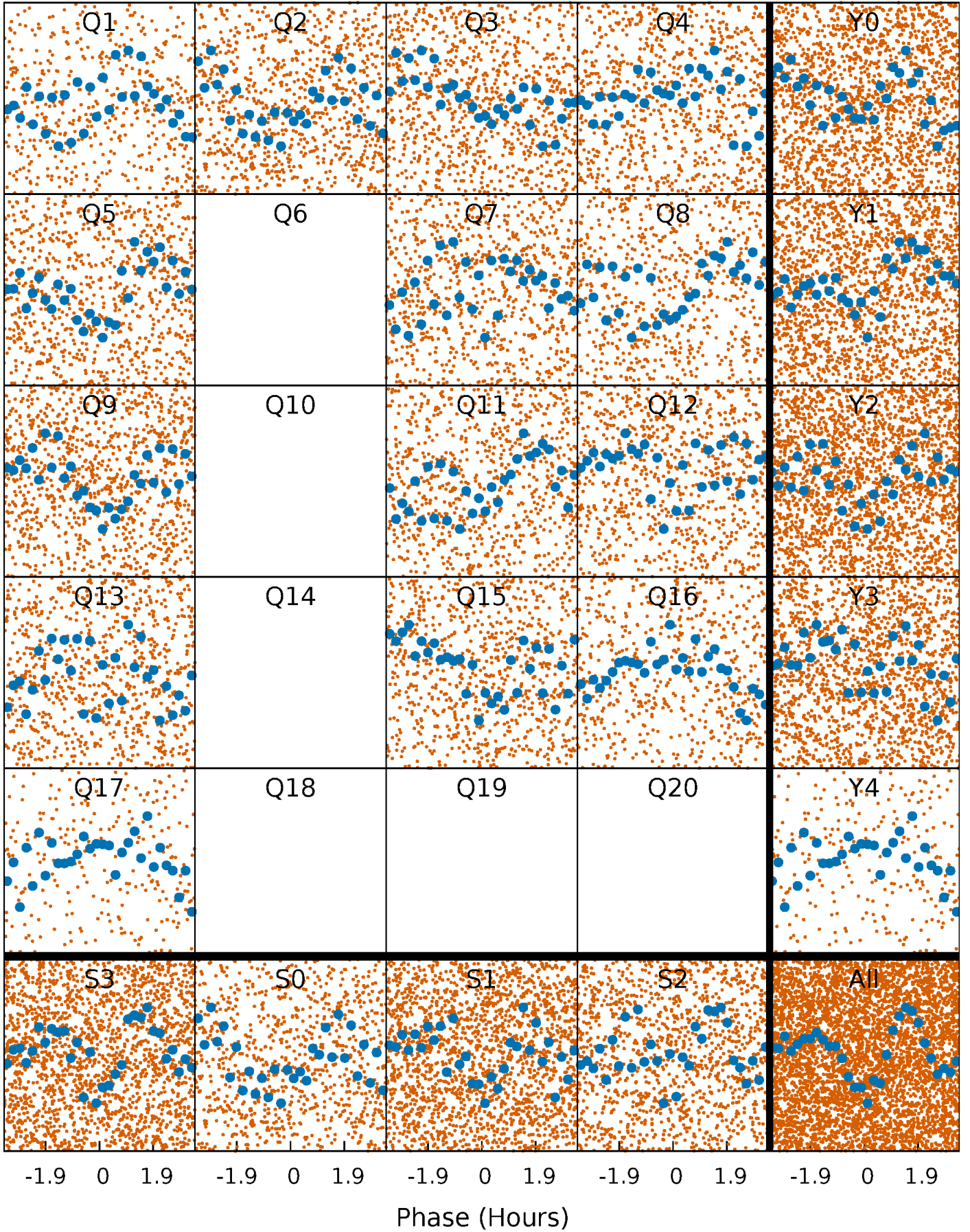
# Non-Whitened Vs. Whitened Light Curve





# PDC Quarter-Phased Transit Curves

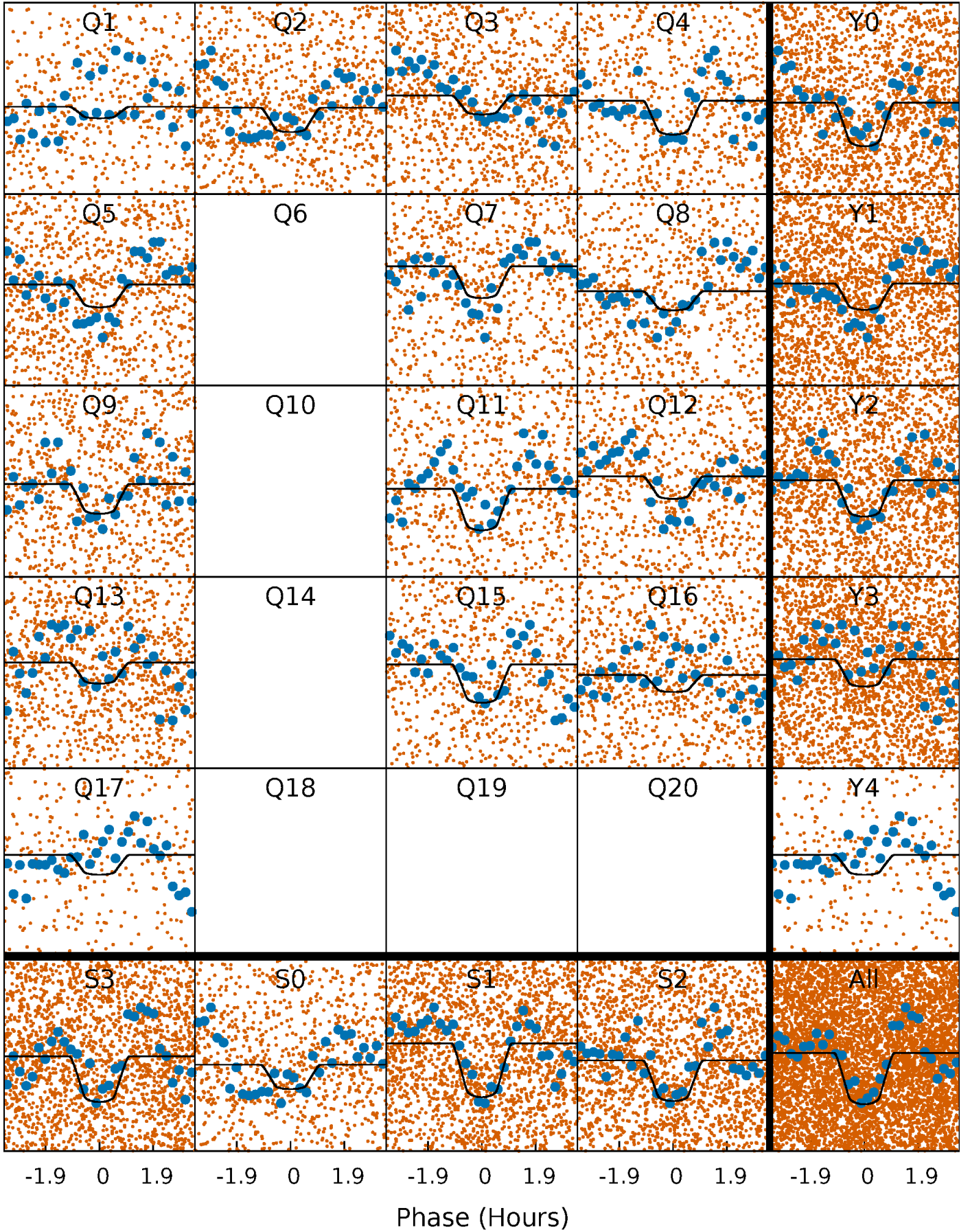
TCE 004072582-01   P= 0.794246 Days    $T_0=132.199377$  (BKJD)





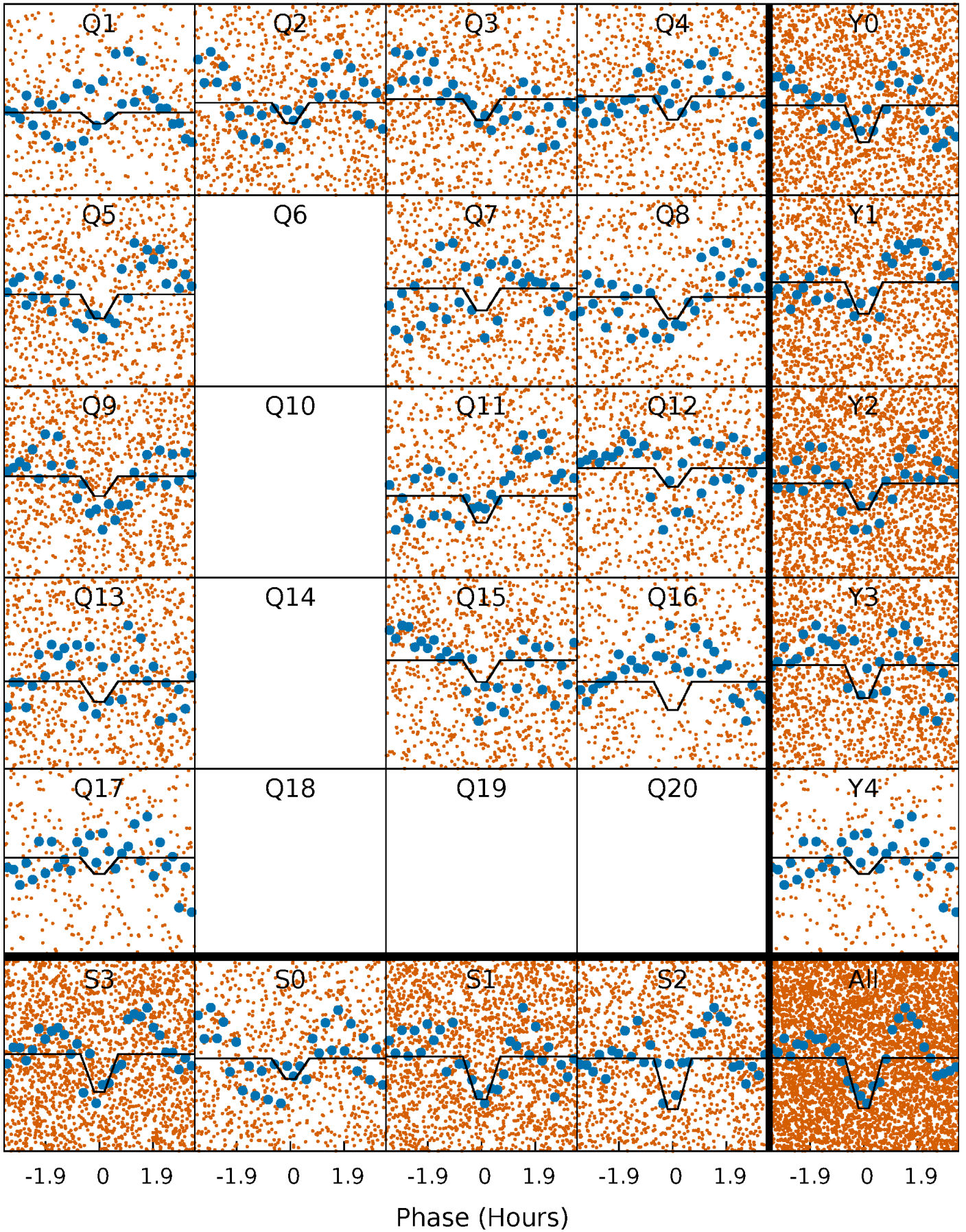
# DV Quarter-Phased Transit Curves

TCE 004072582-01 P= 0.794246 Days  $T_0=132.199377$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

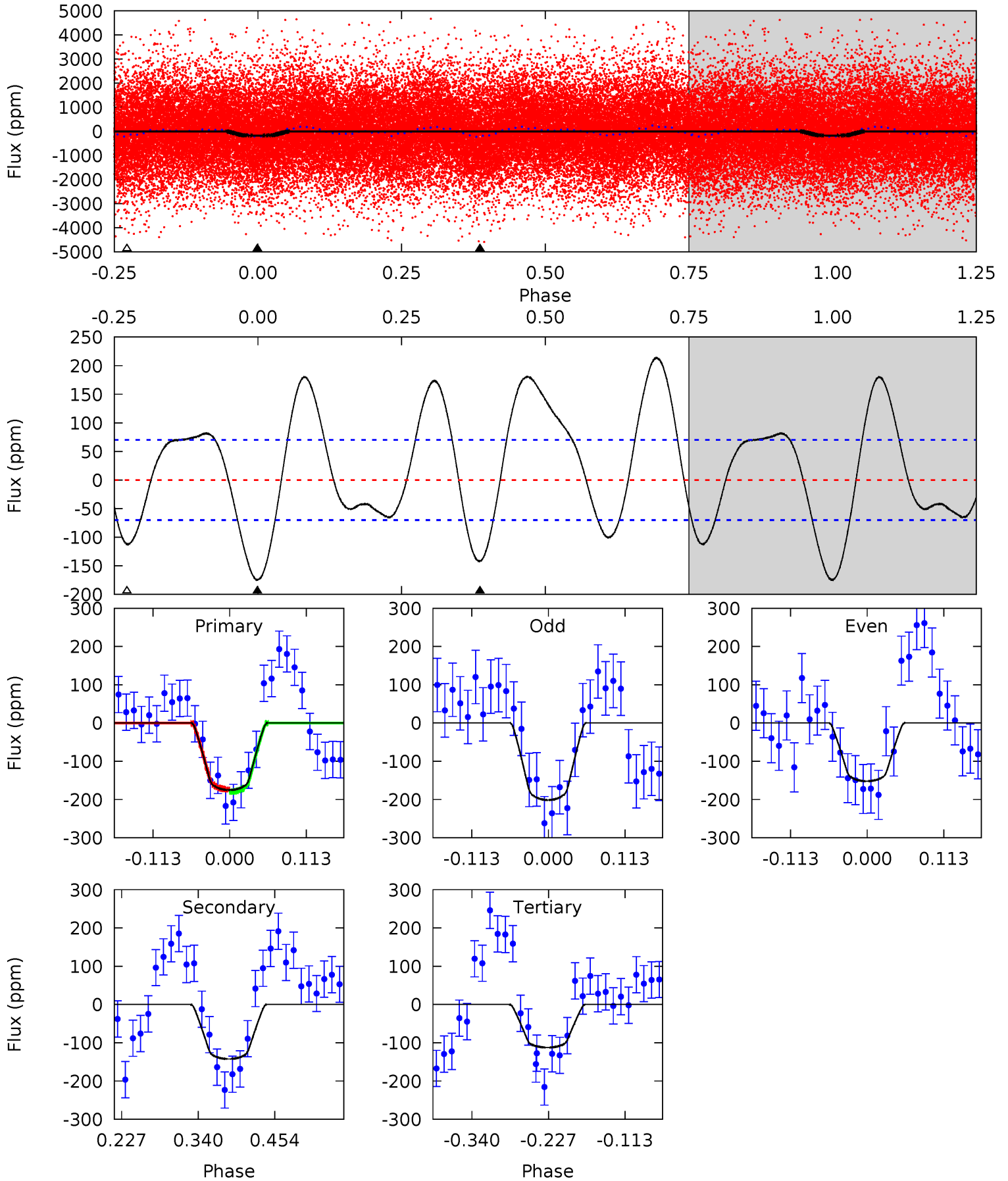
TCE 004072582-01 P= 0.794246 Days  $T_0=132.199377$  (BKJD)



# DV Model-Shift Uniqueness Test

004072582-01, P = 0.794246 Days, E = 131.405131 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
11.4	9.23	7.28	0	4.54	1.58	5.54	4.07	11.4	1.94	9.23	1.61	0.83	0.55	0.20

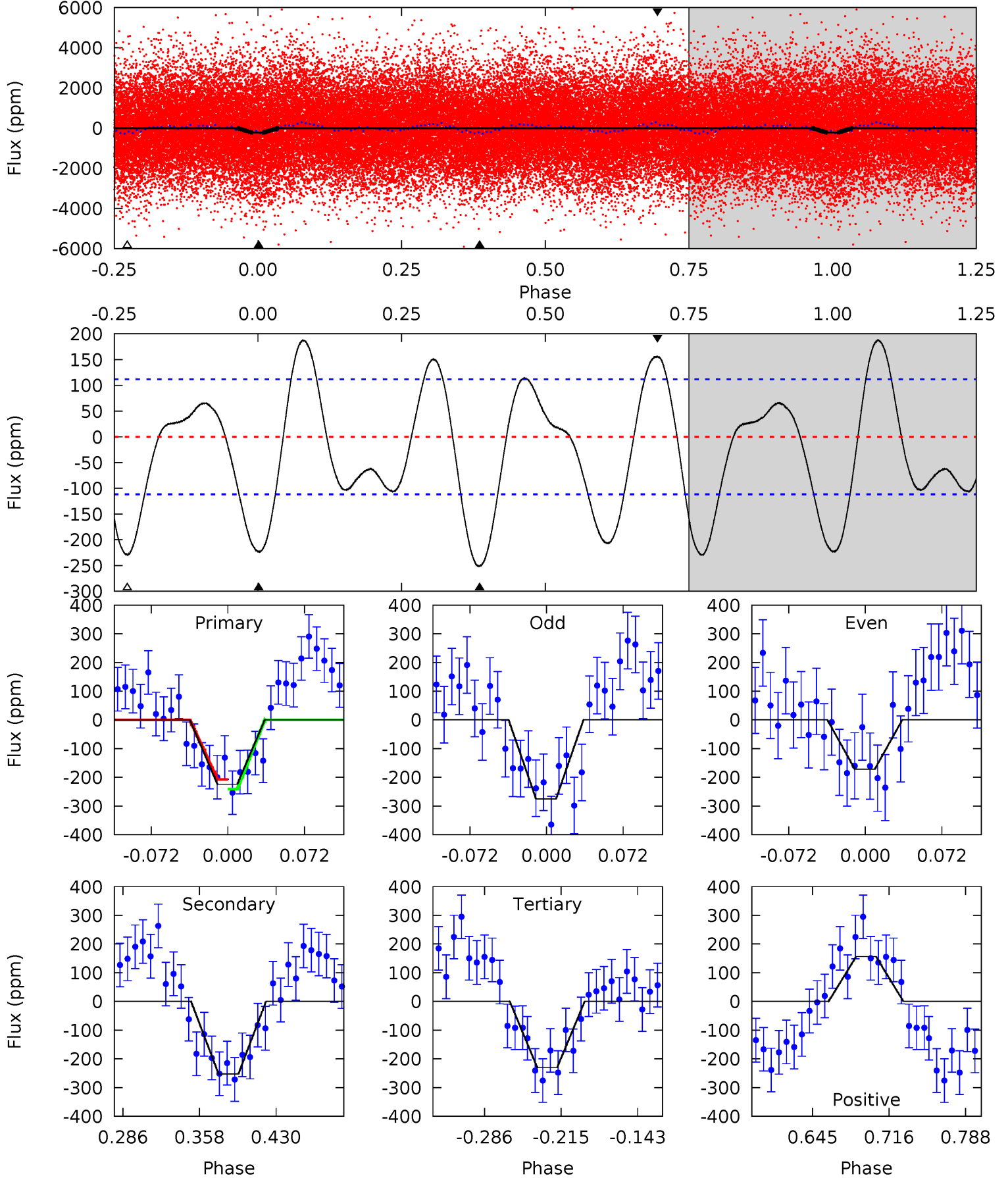




# Alt Model-Shift Uniqueness Test

004072582-01, P = 0.794246 Days, E = 131.405131 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
9.29	10.5	9.56	6.49	4.63	1.80	4.47	-0.27	2.80	0.91	3.97	2.15	1.39	0.43	0.68





### Stellar Parameters For KIC 004072582

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7821^{+70}_{-93}$	$3.880^{+0.203}_{-0.068}$	$-0.080^{+0.100}_{-0.150}$	$2.634^{+0.237}_{-0.663}$	$1.920^{+0.031}_{-0.260}$	$0.148^{+0.165}_{-0.033}$
	+1%/-1%	+5%/-2%	+125%/-188%	+9%/-25%	+2%/-14%	+112%/-22%
Source	SPE68	SPE68	SPE68	DSEP		

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

### Secondary Eclipse Parameters for KIC 004072582-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-142 \pm 15$	$4.37^{+1.42}_{-1.25}$	$5379^{+179}_{-356}$	$6295^{+1422}_{-976}$	$1.761^{+1.697}_{-0.774}$
Alt.	$-252 \pm 24$	$4.44^{+1.29}_{-1.29}$	$5388^{+165}_{-338}$	$7533^{+1928}_{-1164}$	$3.013^{+2.901}_{-1.255}$

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

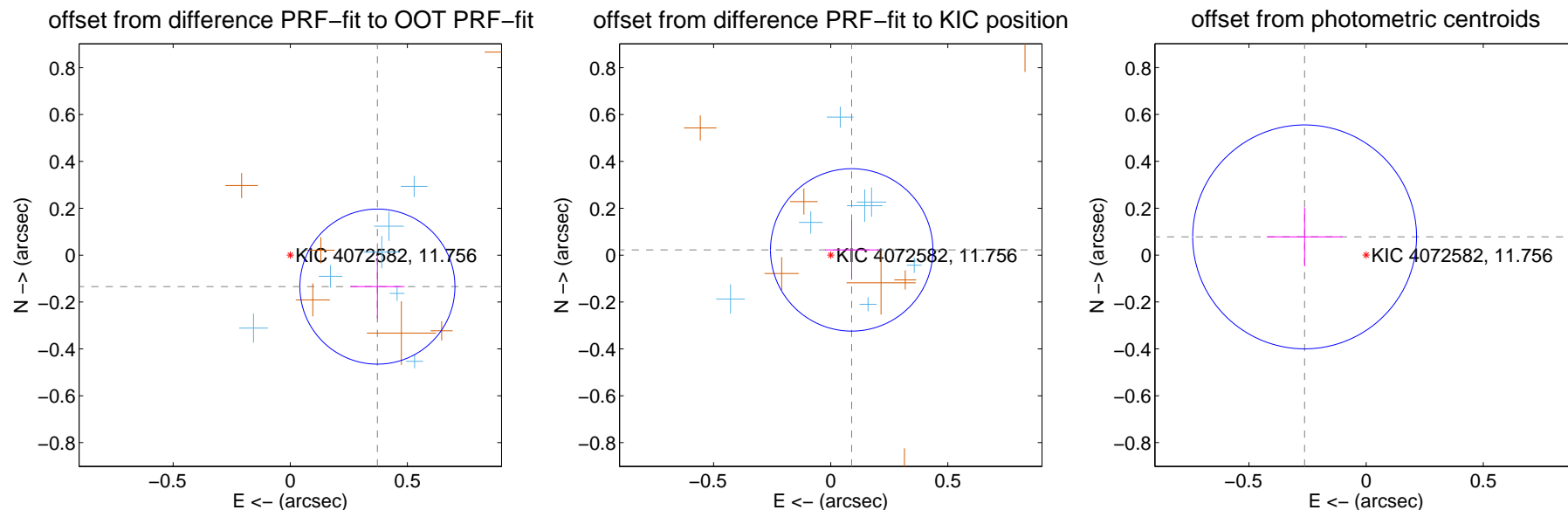
## DV Centroid Data

Supplemental centroid analysis for 004072582-01. **Kepler magnitude: 11.76.** Transit SNR 9.38

There are 7 quarters with good PRF difference image offsets

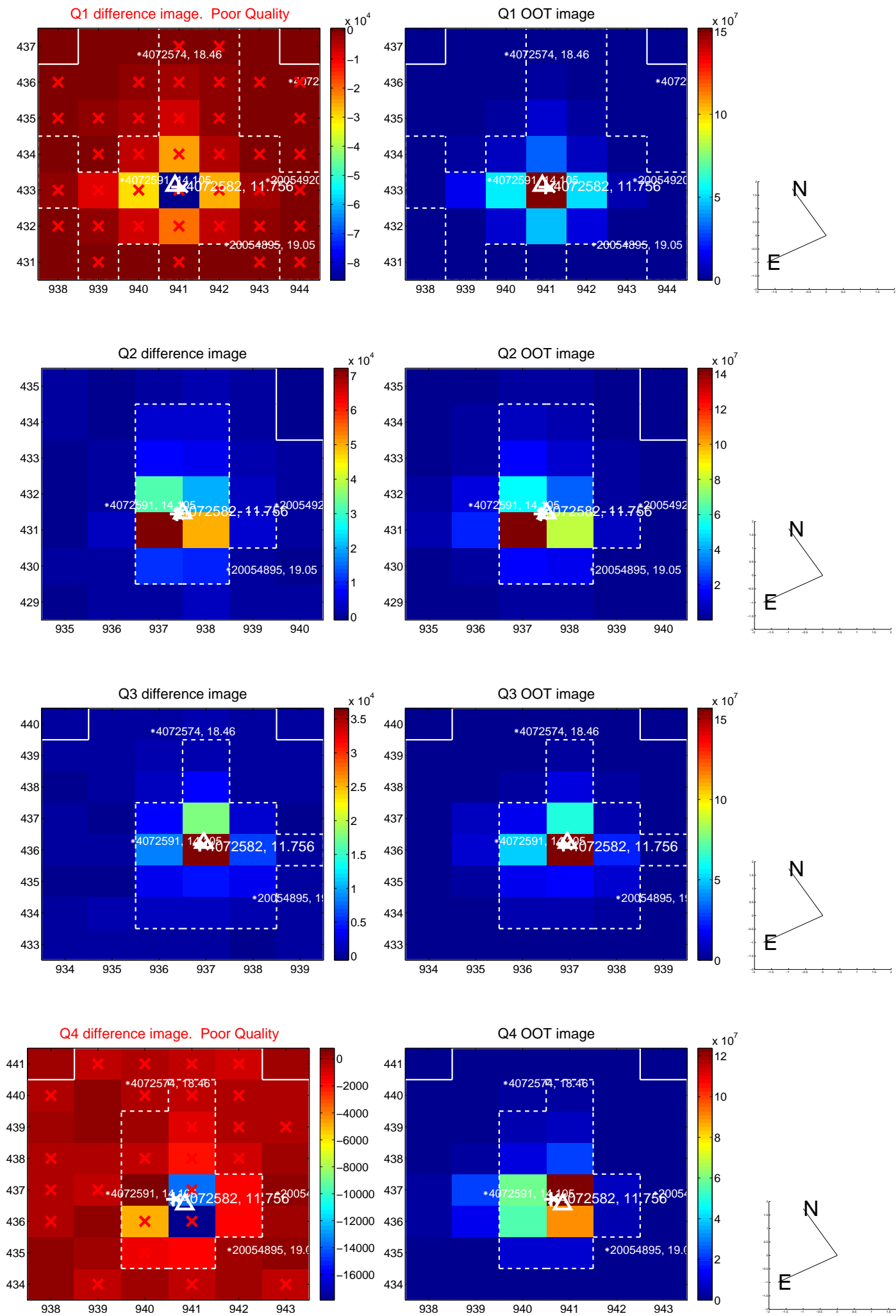
The direct PRF centroid is offset from the target star catalog position by about 0.39 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b><math>0.395 \pm 0.110</math></b>	<b>3.58</b>	$-0.372 \pm 0.116$	$-0.134 \pm 0.136$
PRF-fit source offset from KIC position	$0.092 \pm 0.116$	0.80	$-0.090 \pm 0.114$	$0.022 \pm 0.127$
photometric centroid source offset	$0.27 \pm 0.16$	1.72	$0.26 \pm 0.16$	$0.08 \pm 0.13$

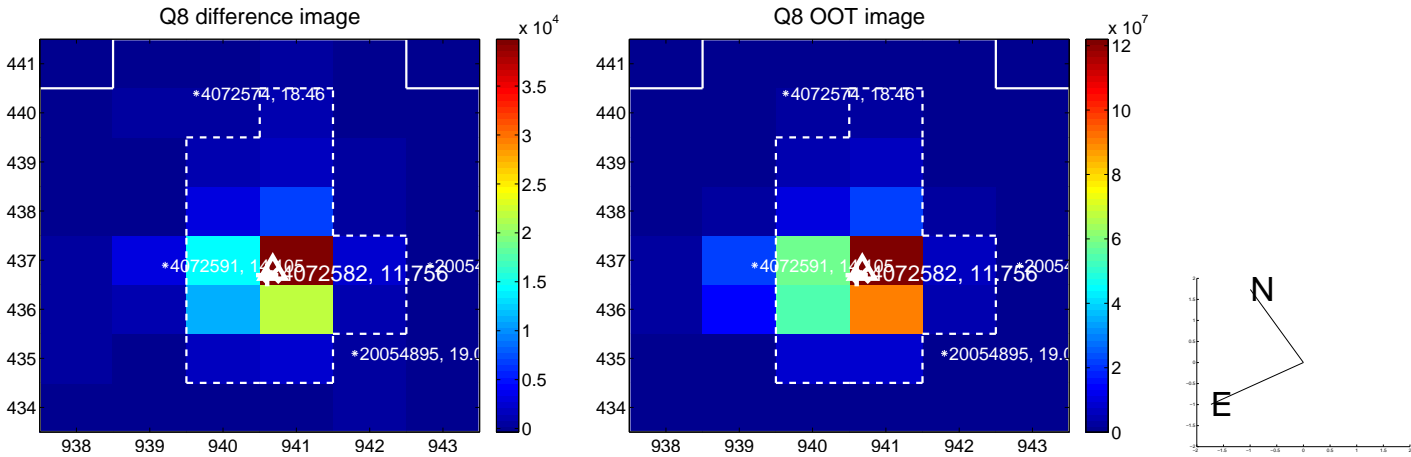
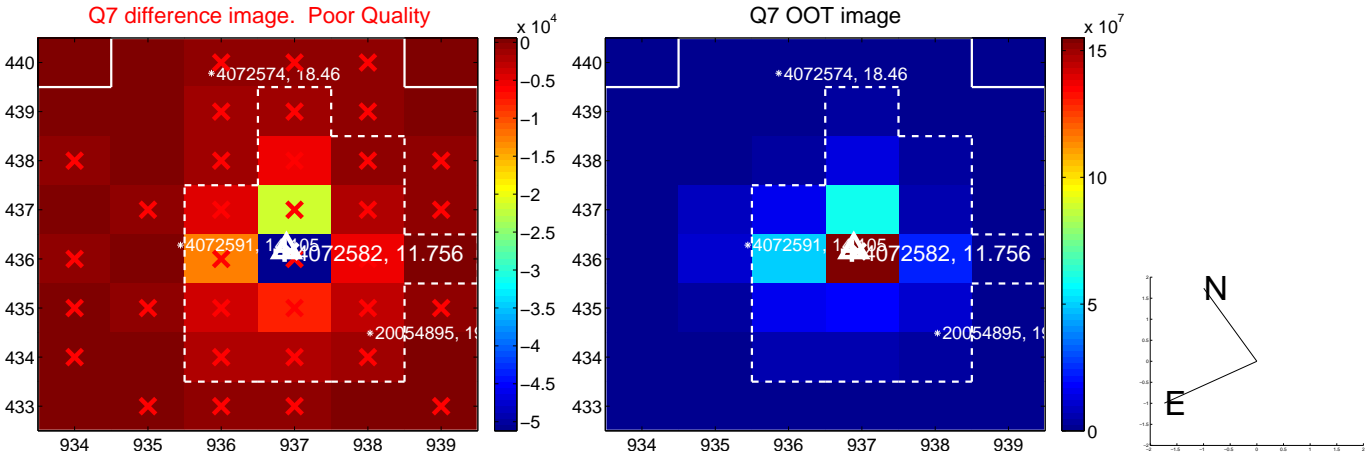
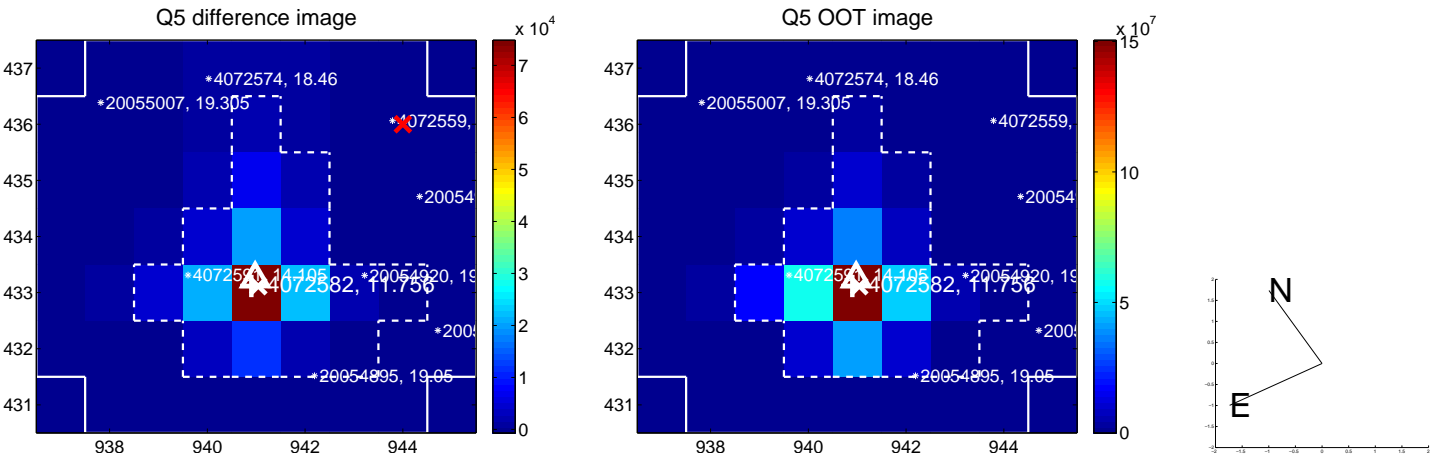


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

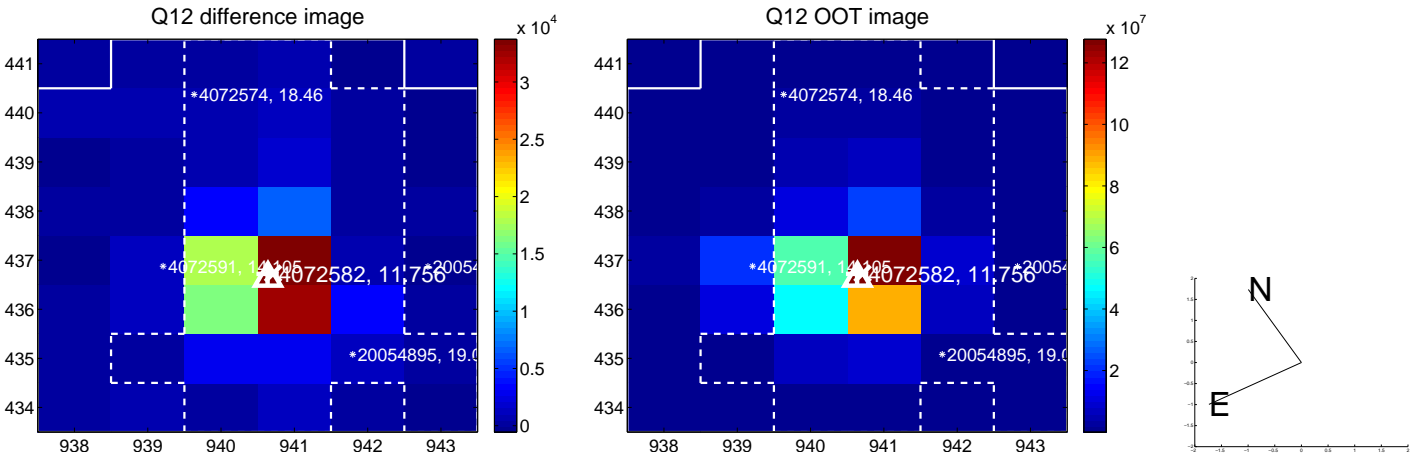
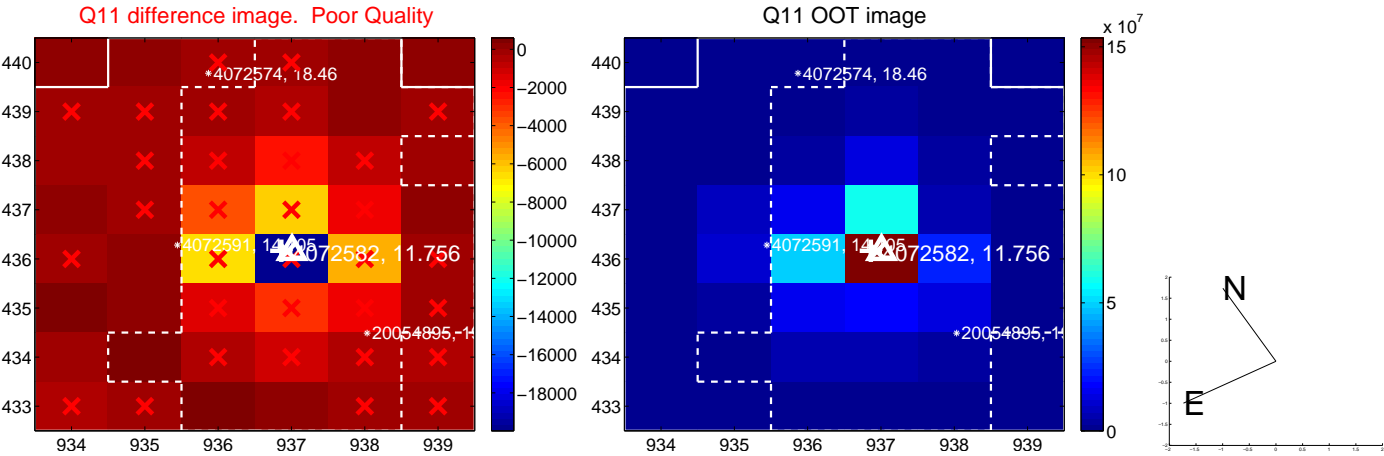
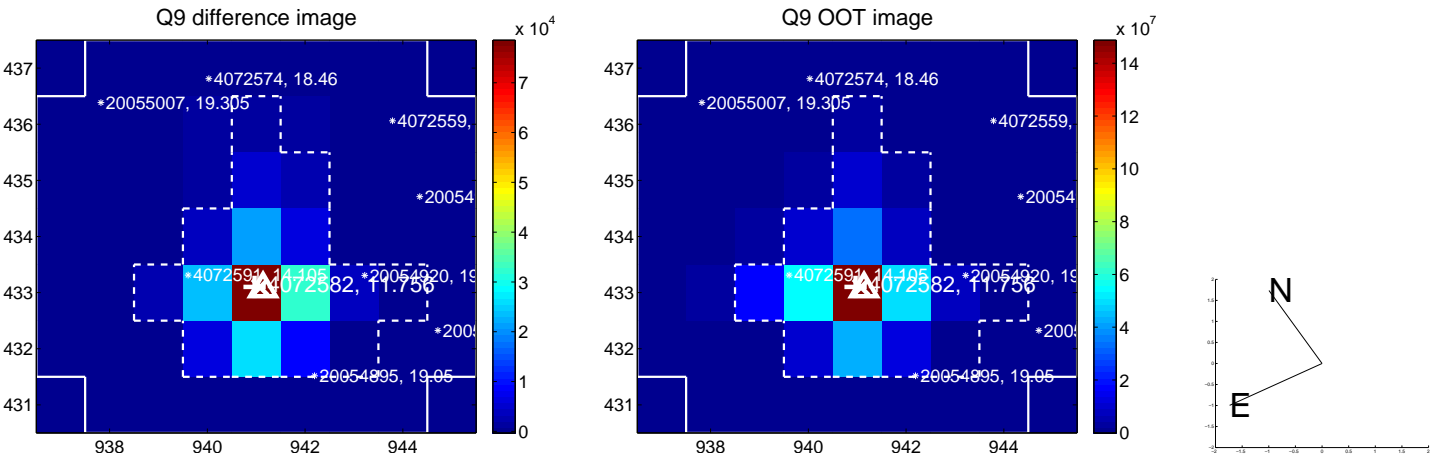


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

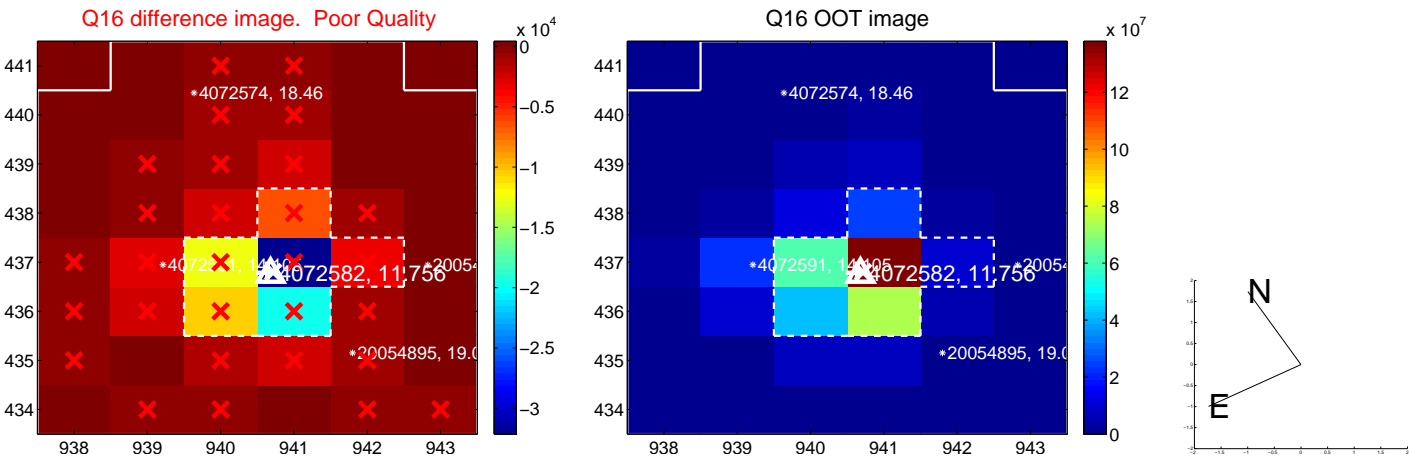
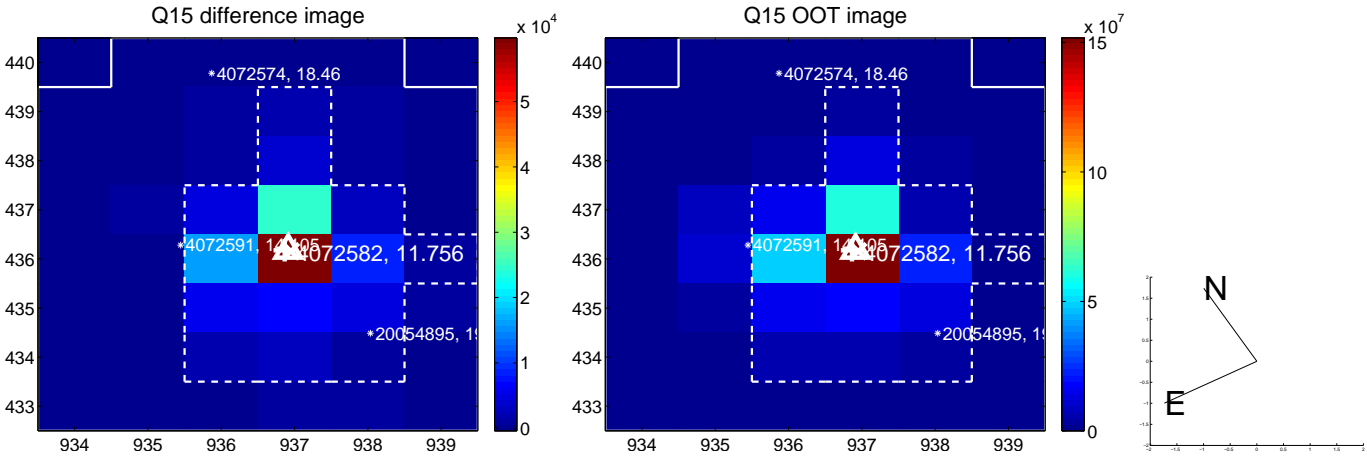
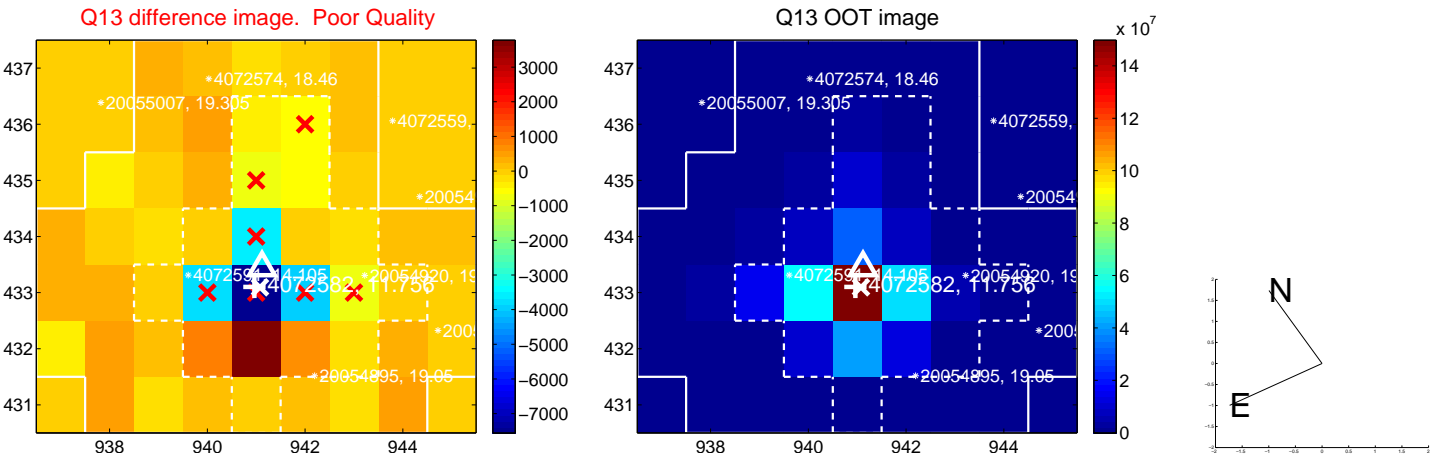




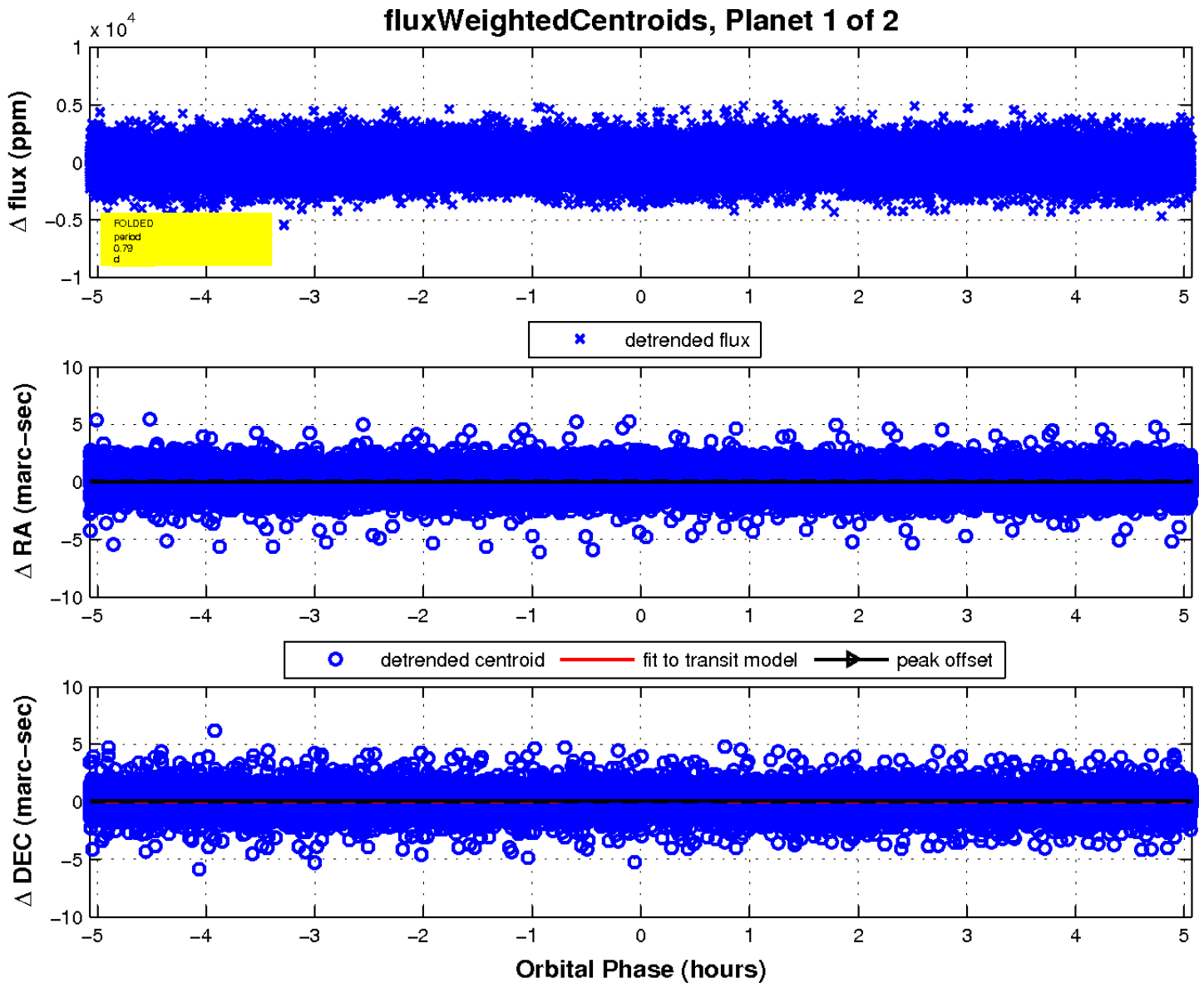
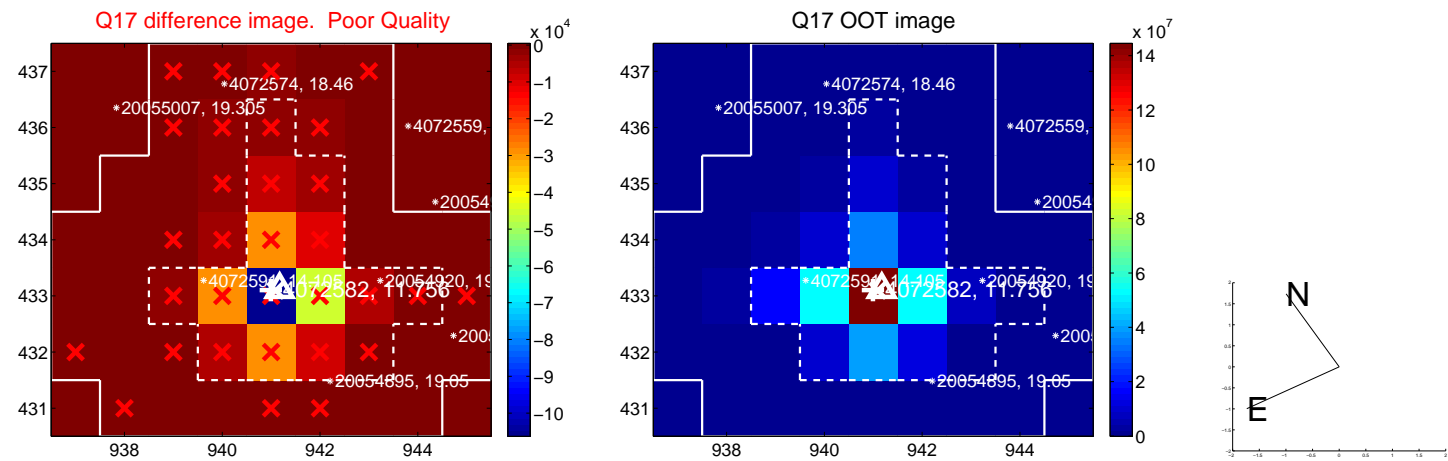
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

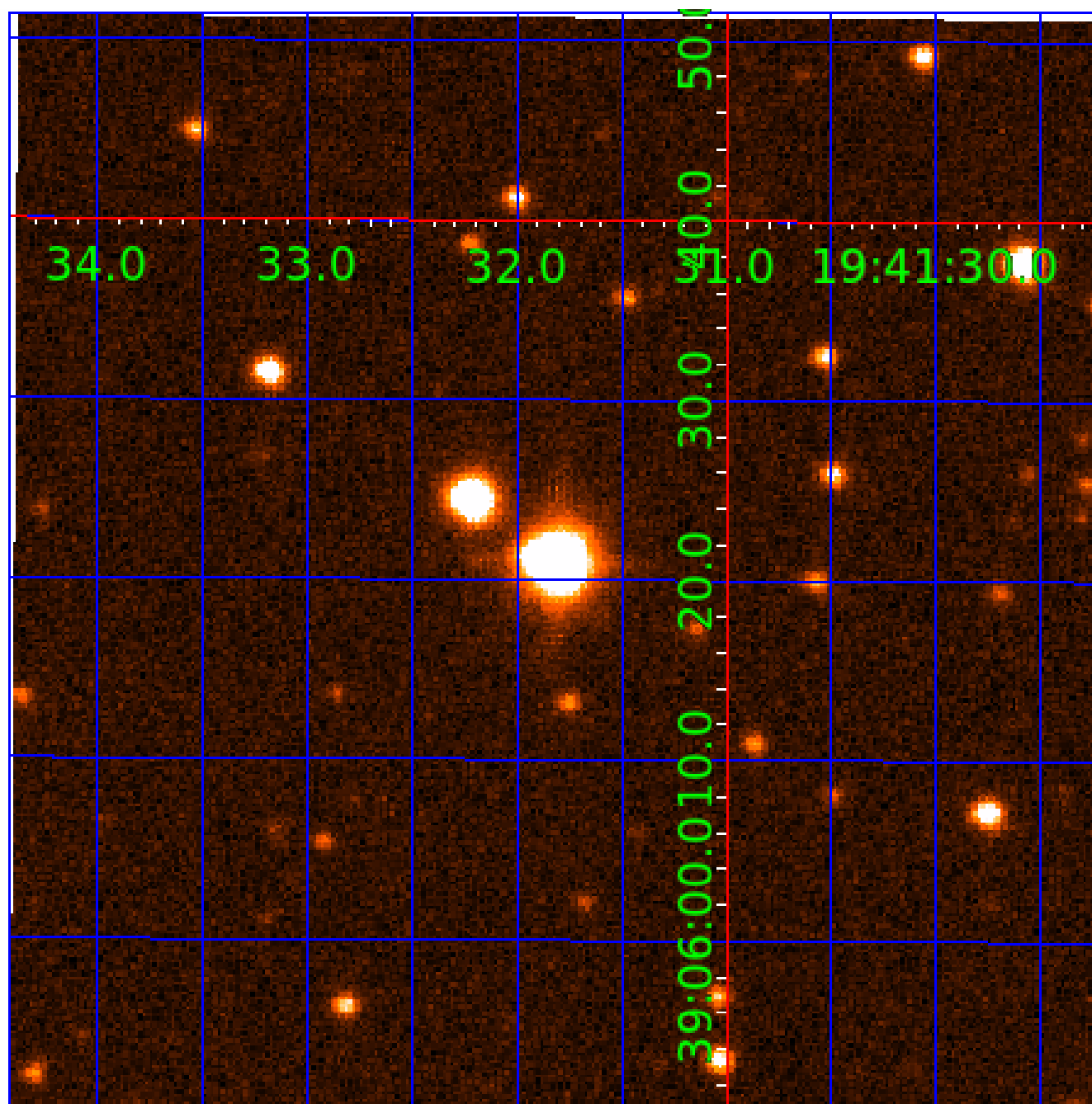


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 004072582

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004072582-01	OBS	No	0.794246	132.199377	226.0	1.690	9.0	9.4	2.63	7821	4.61	53425.38
004072582-02	OBS	No	2.671307	133.914539	201.2	26.375	8.8	13.7	2.63	7821	3.86	10602.03

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004072582-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT
004072582-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—LPP_DV—LPP_ALT—CENT_FEW_DIFS

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

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

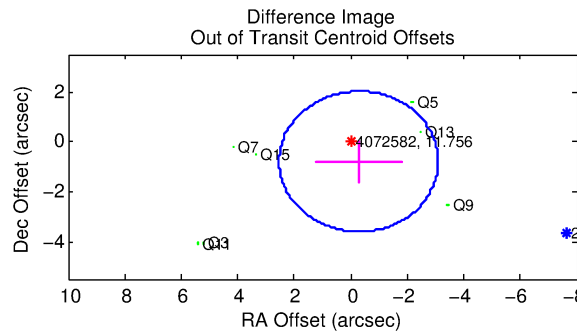
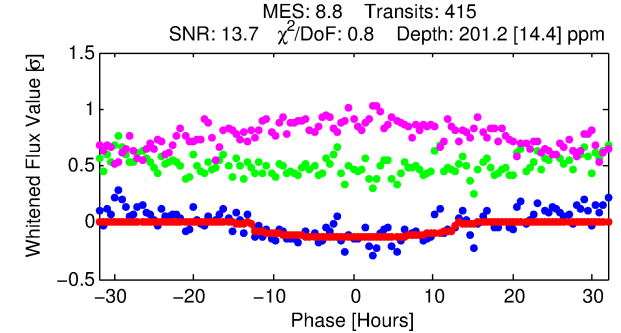
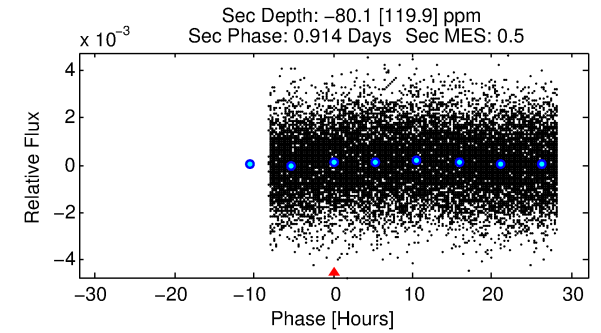
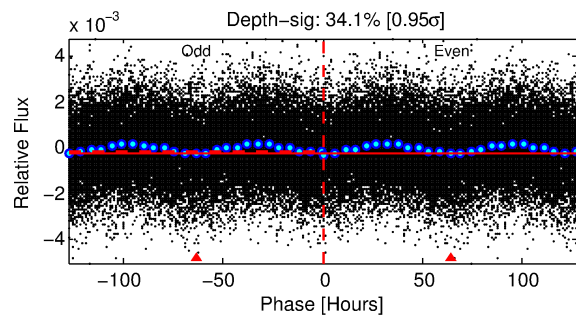
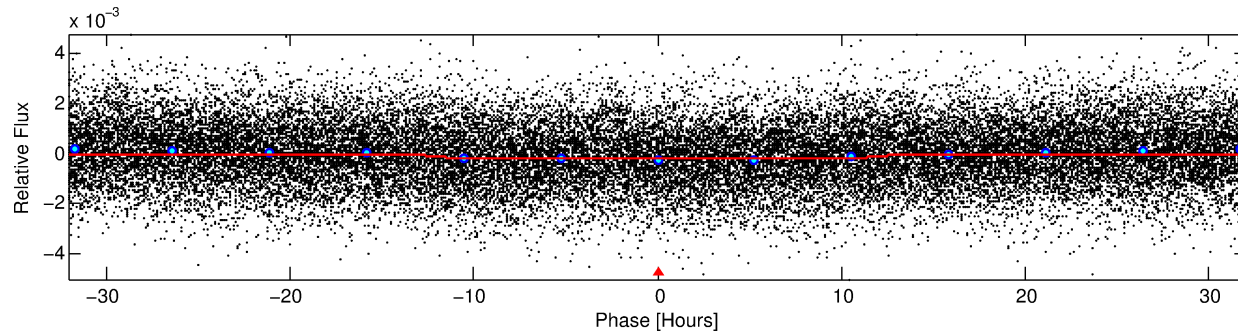
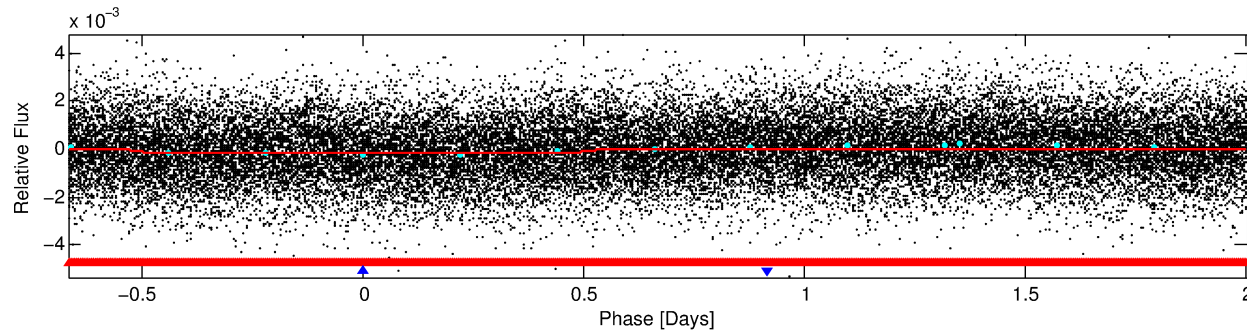
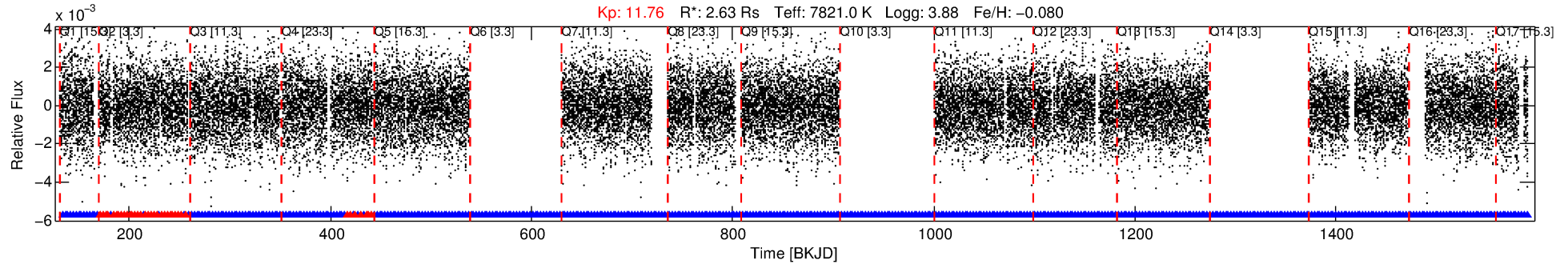
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 004072582-02

No Significant Match Found

# DV One-Page Summary

KIC: 4072582 Candidate: 2 of 2 Period: 2.671 d



## DV Fit Results:

Period = 2.67131 [0.00006] d  
Epoch = 133.9145 [0.0145] BKJD  
Rp/R\* = 0.0134 [0.0014]  
a/R\* = 1.05 [0.05]  
b = 0.47 [0.96]  
Seff = 10602.03 [3786.07]  
Teq = 2587 [231] K  
Rp = 3.86 [1.05] Re  
a = 0.0468 [0.0107] AU  
Ag = N/A  
Teffp = N/A

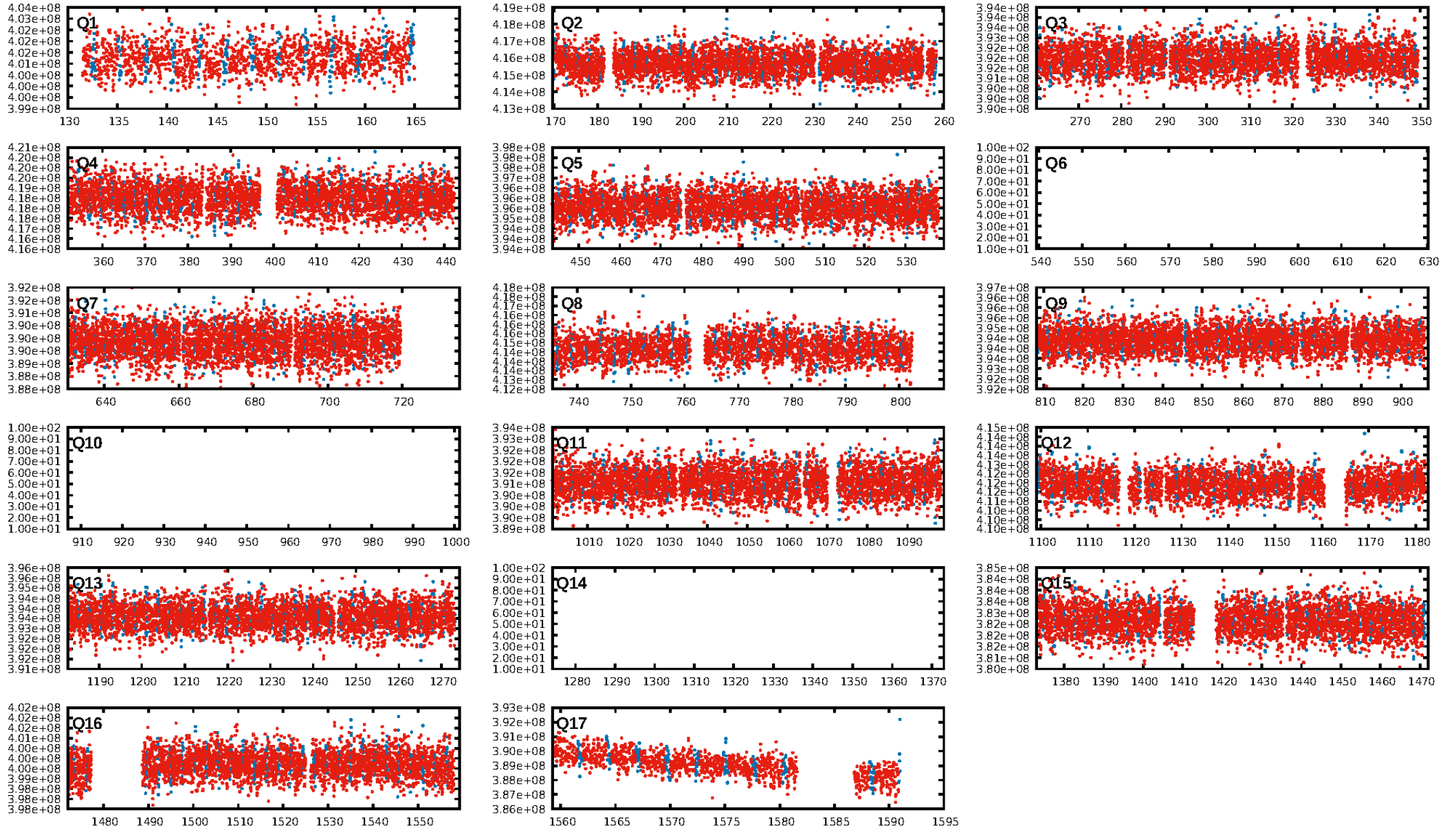
## DV Diagnostic Results:

ShortPeriod-sig: 91.2% [1.70 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 0.91 [355/391]  
GhostDiagnostic-chr: 2.003  
Centroid-sig: 0.0%  
Centroid-so: 0.270 arcsec [1.73 $\sigma$ ]  
OotOffset-rm: 0.840 arcsec [0.90 $\sigma$ ]  
KicOffset-rm: 0.553 arcsec [0.64 $\sigma$ ]  
OotOffset-st: 0/4/0/3 [7]  
KicOffset-st: 0/4/0/3 [7]  
DiffImageQuality-fgm: 0.00 [0/7]  
DiffImageOverlap-fno: 0.00 [0/14]

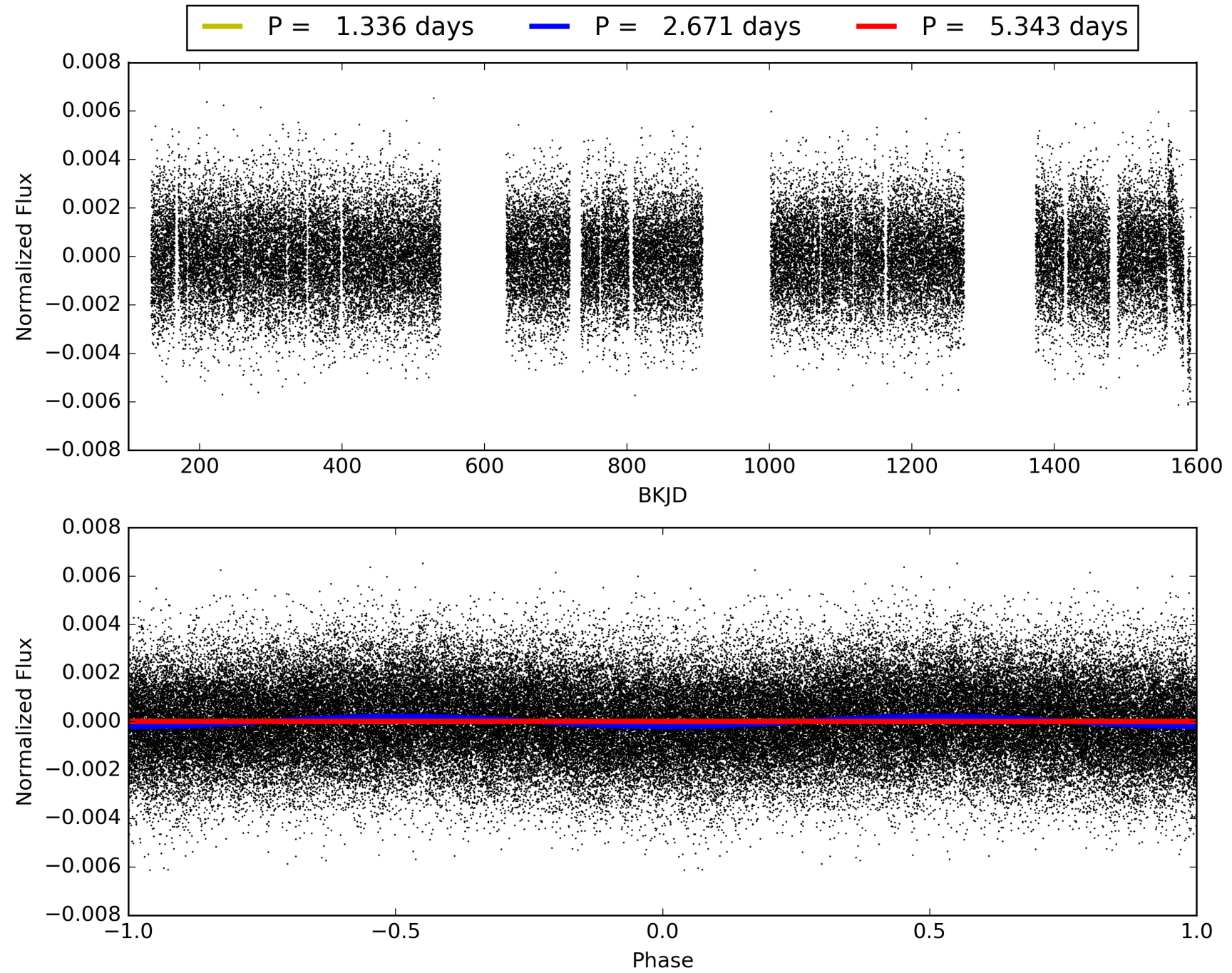
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 19:41:07 Z

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

# TCE 004072582-02, PDC Light Curves



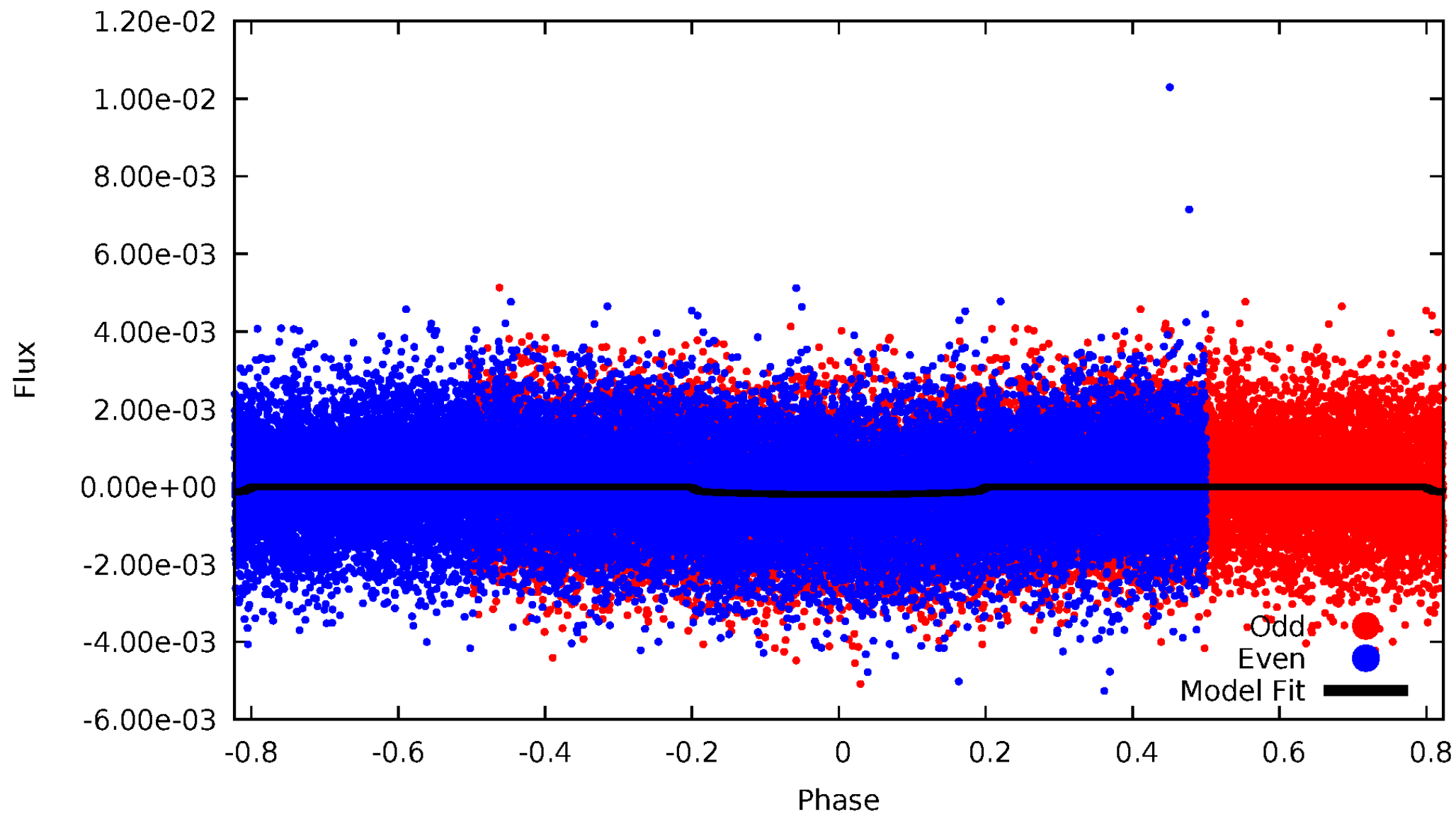
TCE 004072582-02





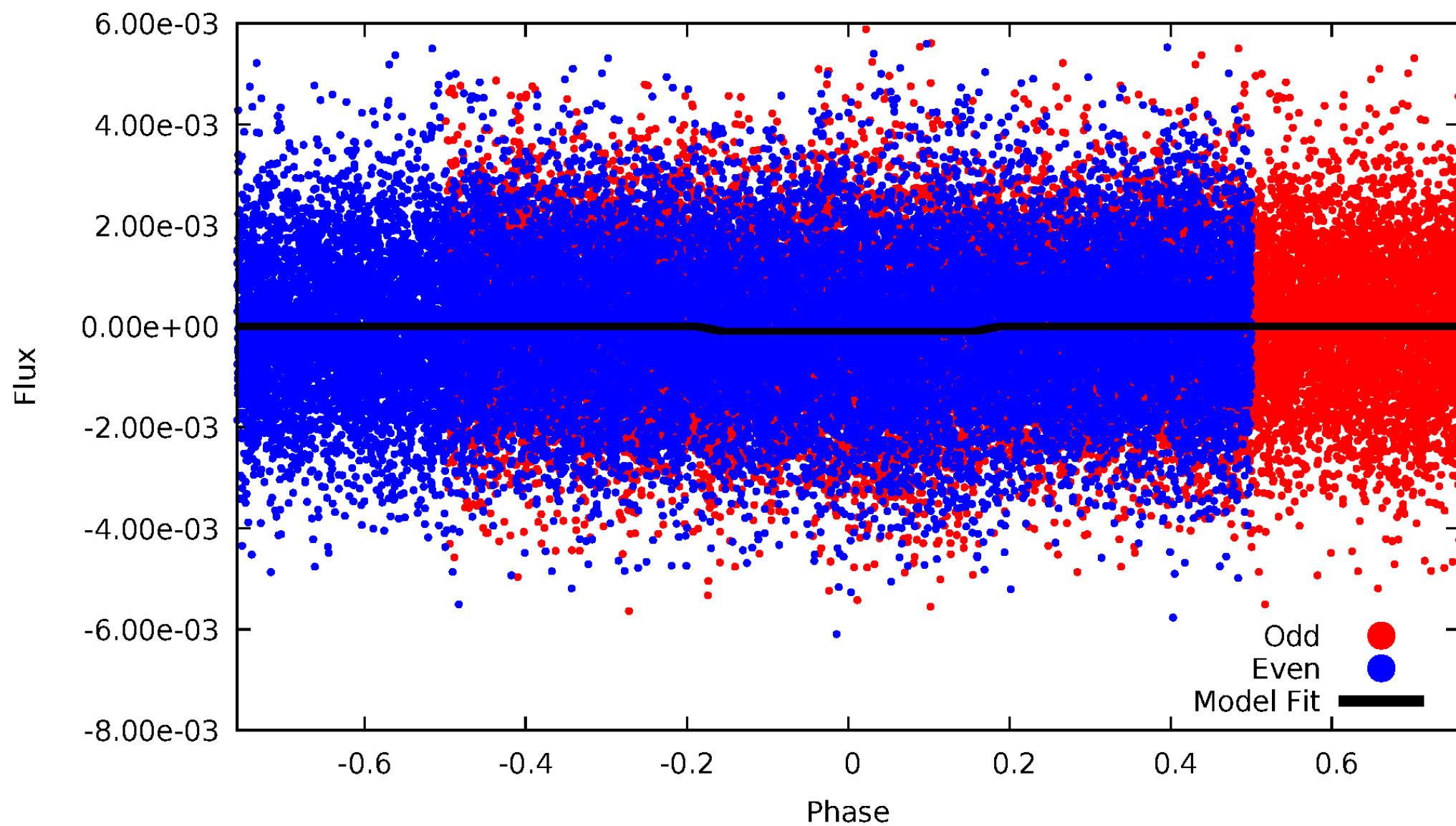
# DV Odd/Even

TCE 004072582-02



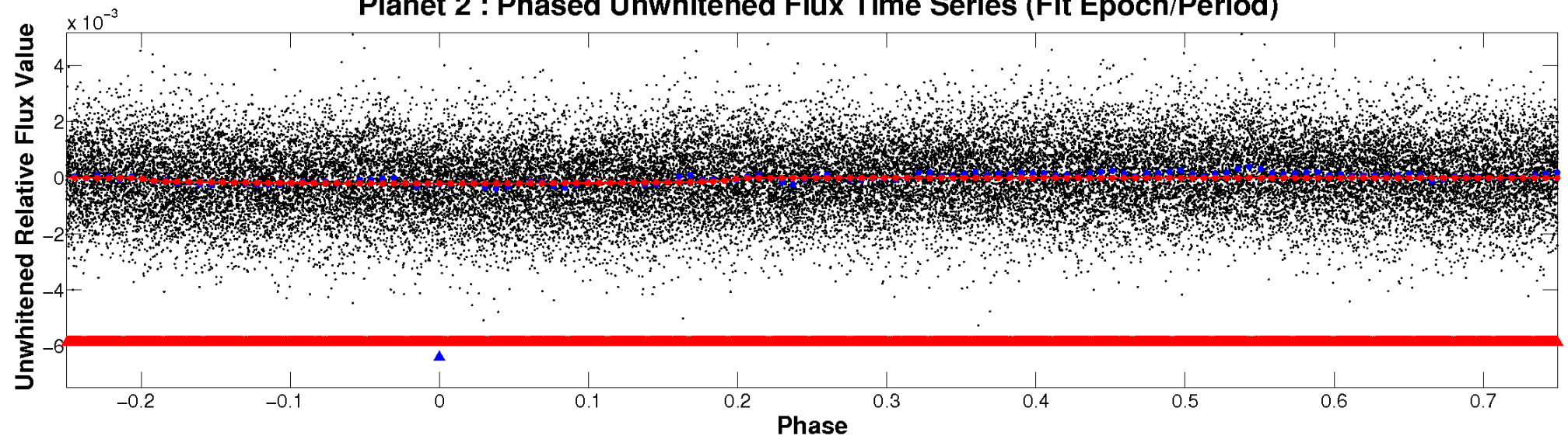
# ALT Odd/Even

TCE 004072582-02

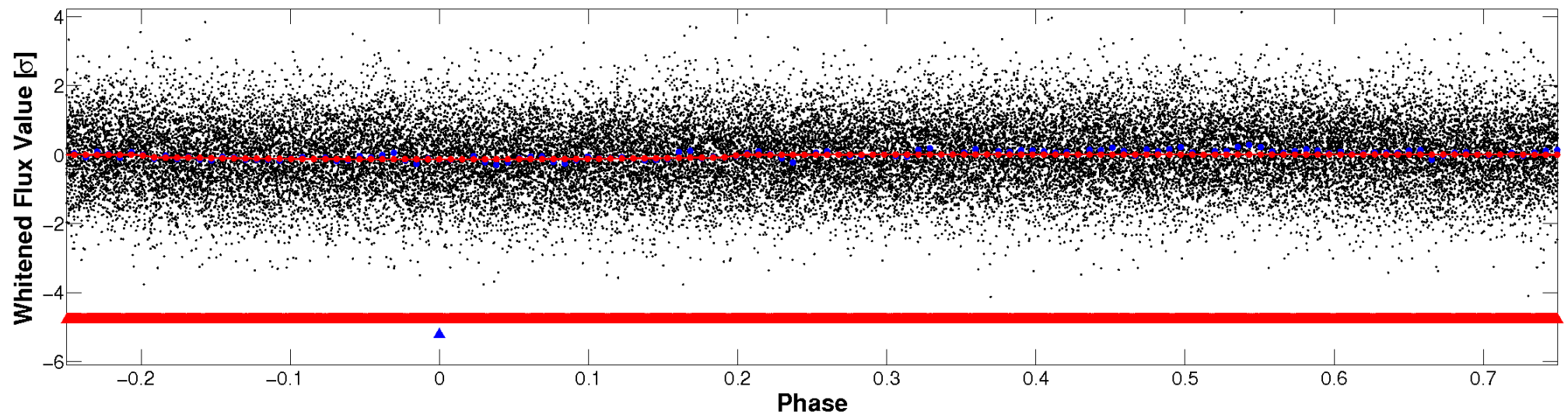


# Non-Whitened Vs. Whitened Light Curve

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

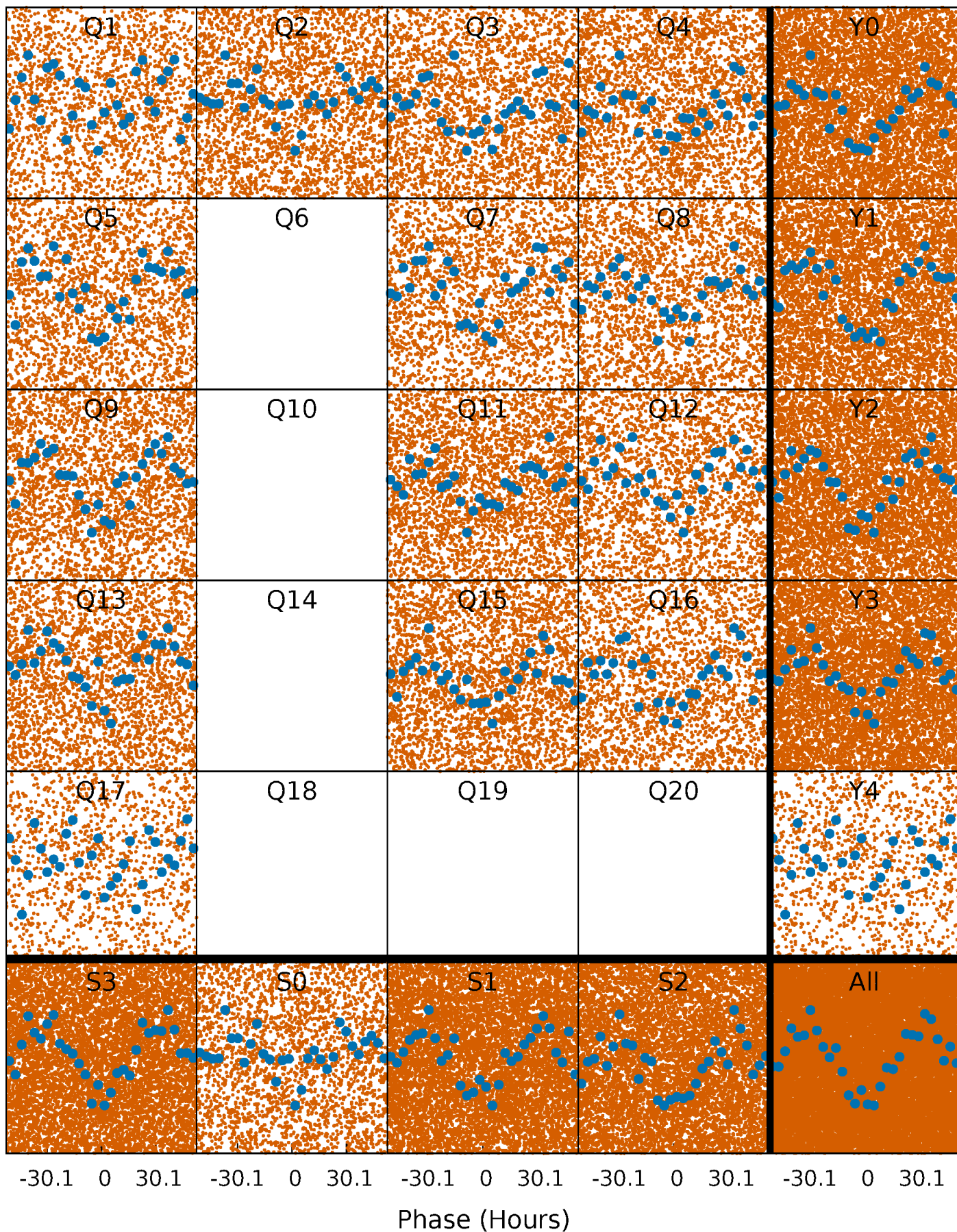


**Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

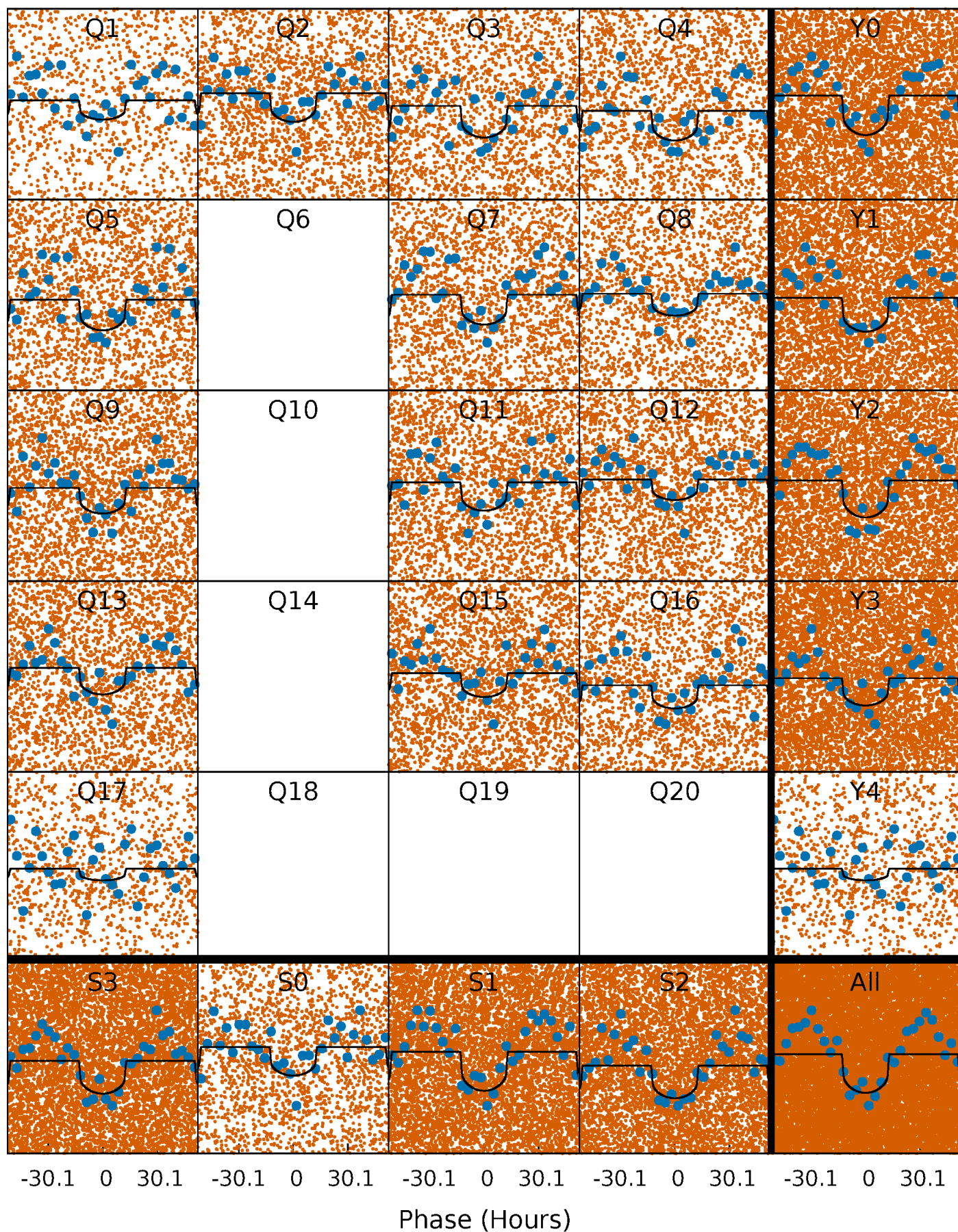
TCE 004072582-02   P= 2.671307 Days    $T_0=133.914539$  (BKJD)





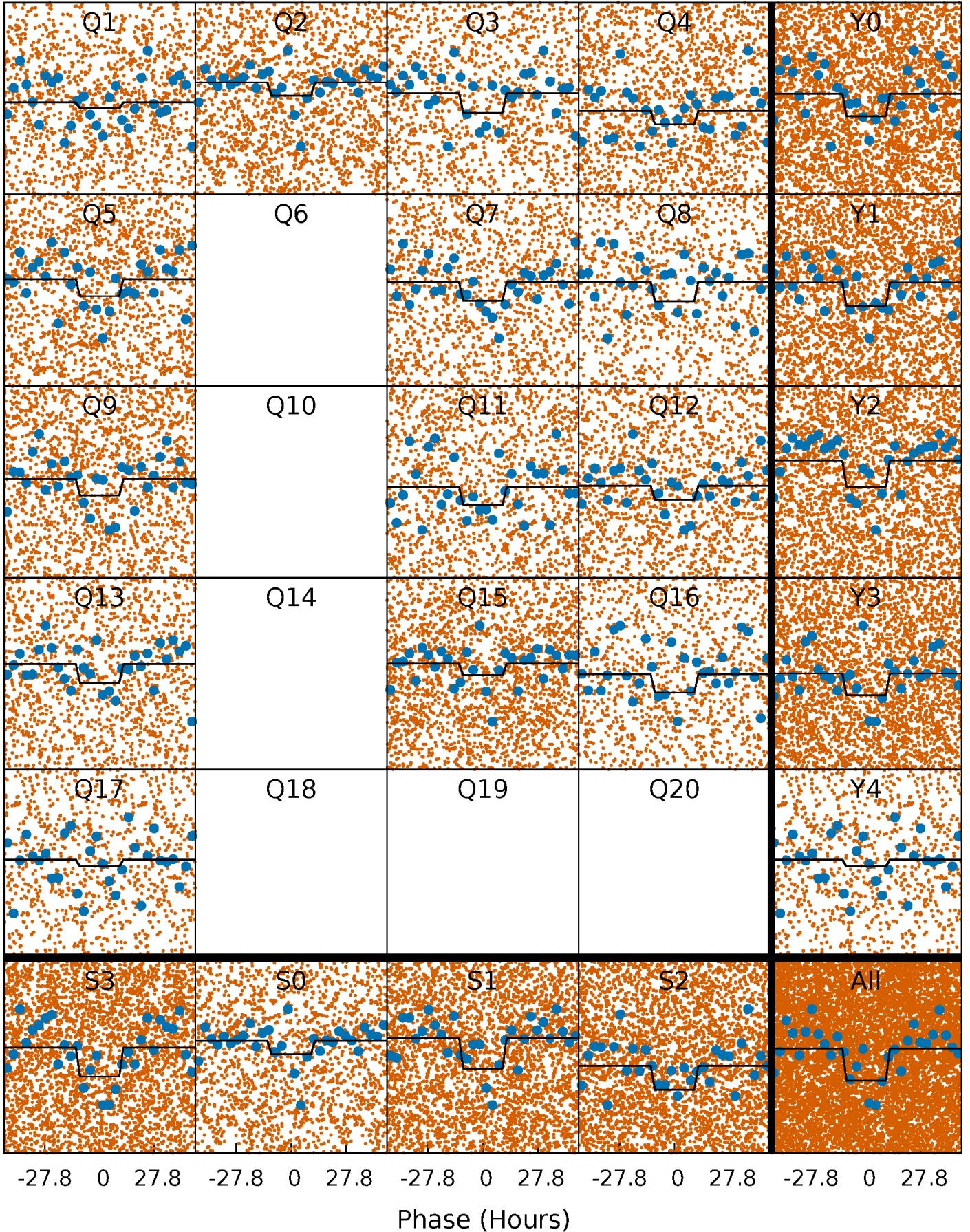
# DV Quarter-Phased Transit Curves

TCE 004072582-02   P= 2.671307 Days    $T_0=133.914539$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 004072582-02 P= 2.671453 Days  $T_0=133.811724$  (BKJD)

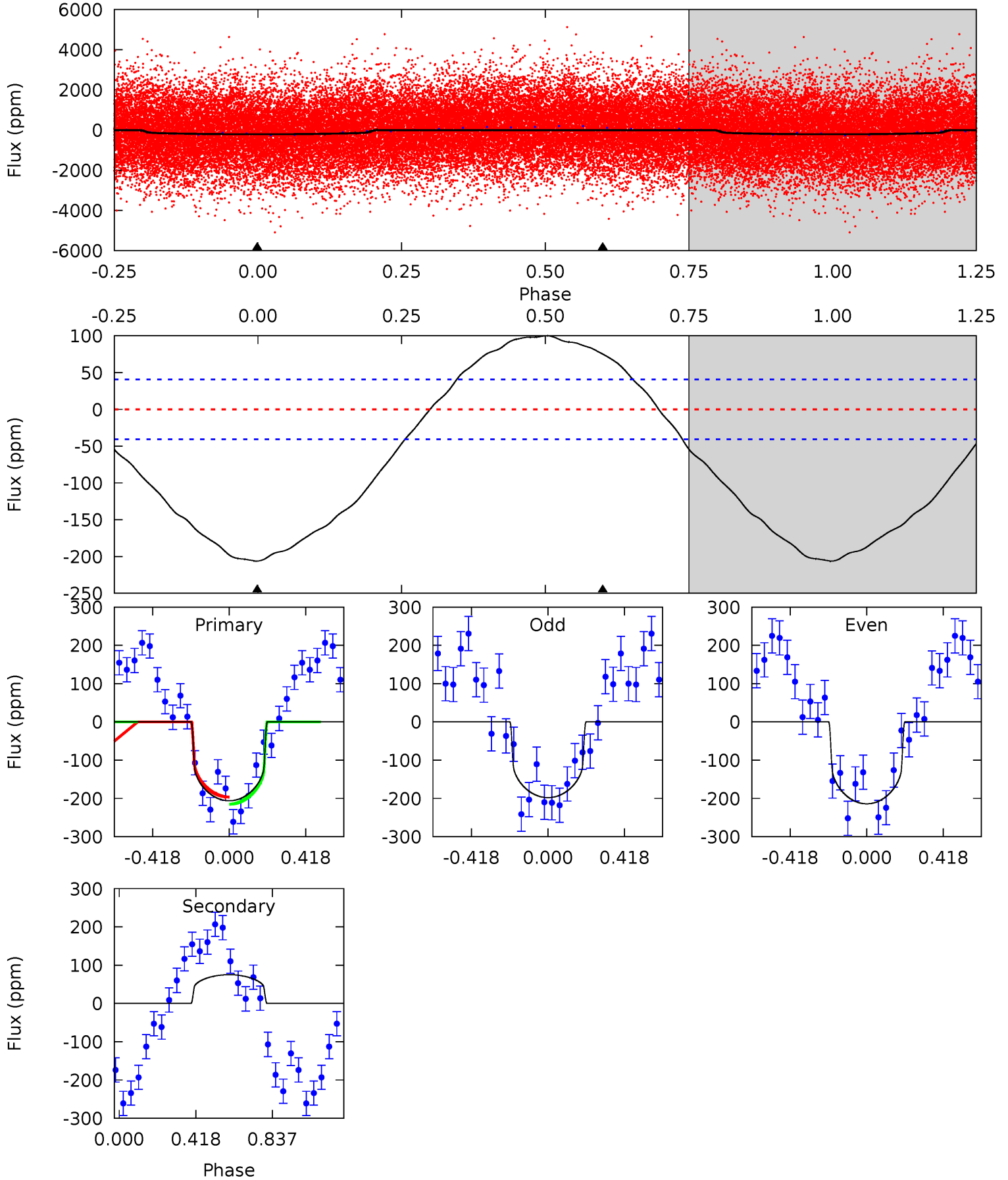




# DV Model-Shift Uniqueness Test

004072582-02, P = 2.671307 Days, E = 131.243232 Days

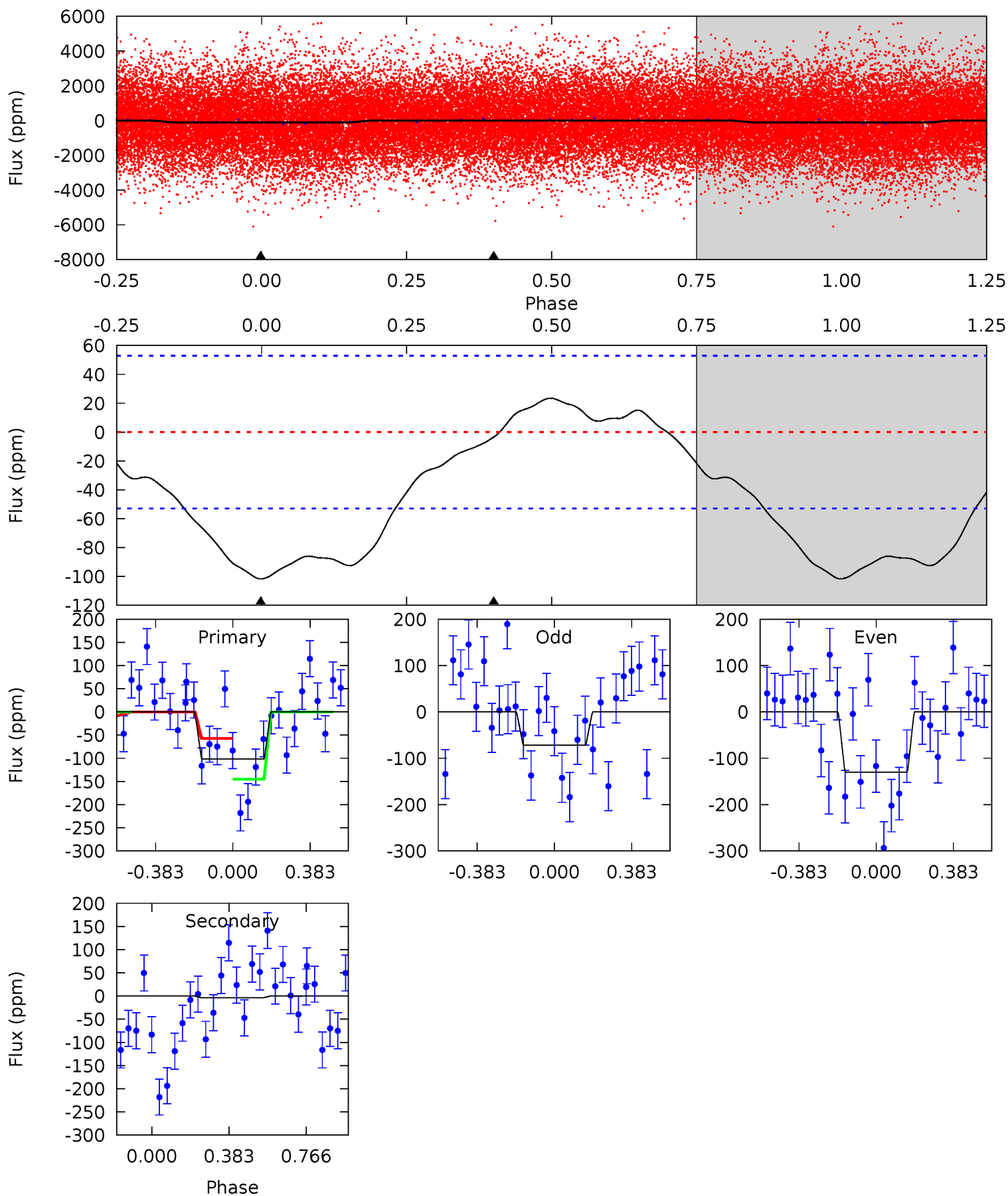
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
21.6	-7.88	0	0	4.25	0.81	2.80	21.6	21.6	-7.88	-7.88	0.85	0.98	0.33	0.97



# Alt Model-Shift Uniqueness Test

004072582-02, P = 2.671453 Days, E = 131.140271 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.21	0.29	0	0	4.27	0.87	0.88	8.21	8.21	0.29	0.29	2.37	1.03	0.19	3.66



### Stellar Parameters For KIC 004072582

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7821^{+70}_{-93}$	$3.880^{+0.203}_{-0.068}$	$-0.080^{+0.100}_{-0.150}$	$2.634^{+0.237}_{-0.663}$	$1.920^{+0.031}_{-0.260}$	$0.148^{+0.165}_{-0.033}$
	+1%/-1%	+5%/-2%	+125%/-188%	+9%/-25%	+2%/-14%	+112%/-22%
Source	SPE68	SPE68	SPE68	DSEP		

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

### Secondary Eclipse Parameters for KIC 004072582-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$75 \pm 10$	$3.69^{+0.51}_{-0.56}$	$3583^{+115}_{-226}$	$-6213^{+333}_{-427}$	$-6.502^{+1.710}_{-2.637}$
Alt.	$-4 \pm 12$	$2.74^{+0.49}_{-0.45}$	$3583^{+126}_{-238}$	$3110^{+1743}_{-7600}$	$0.482^{+2.164}_{-1.795}$

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

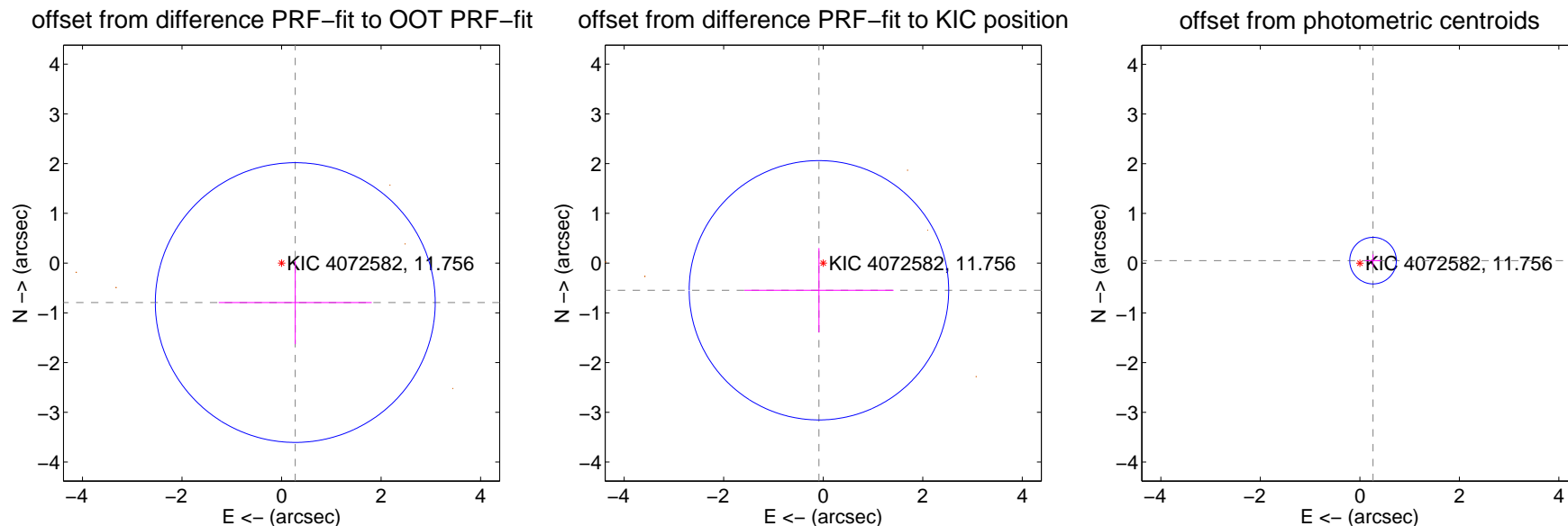
## DV Centroid Data

Supplemental centroid analysis for 004072582-02. **Kepler magnitude: 11.76.** Transit SNR 13.66

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

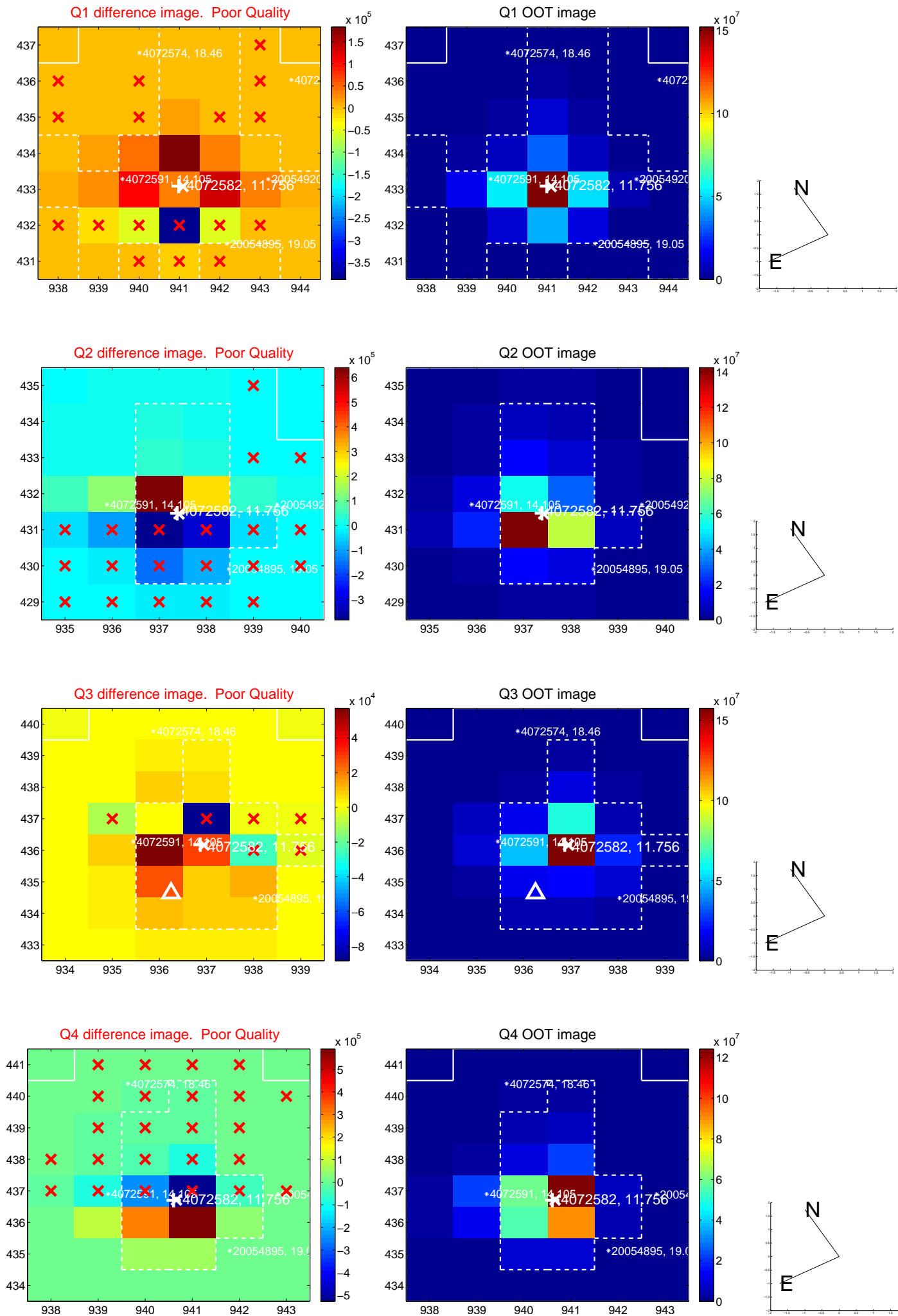
The direct PRF centroid is offset from the target star catalog position by about 0.34 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.840 \pm 0.938$	0.90	$-0.276 \pm 1.537$	$-0.794 \pm 0.837$
PRF-fit source offset from KIC position	$0.553 \pm 0.869$	0.64	$0.086 \pm 1.500$	$-0.547 \pm 0.847$
photometric centroid source offset	$0.27 \pm 0.16$	1.73	$-0.27 \pm 0.16$	$0.05 \pm 0.12$

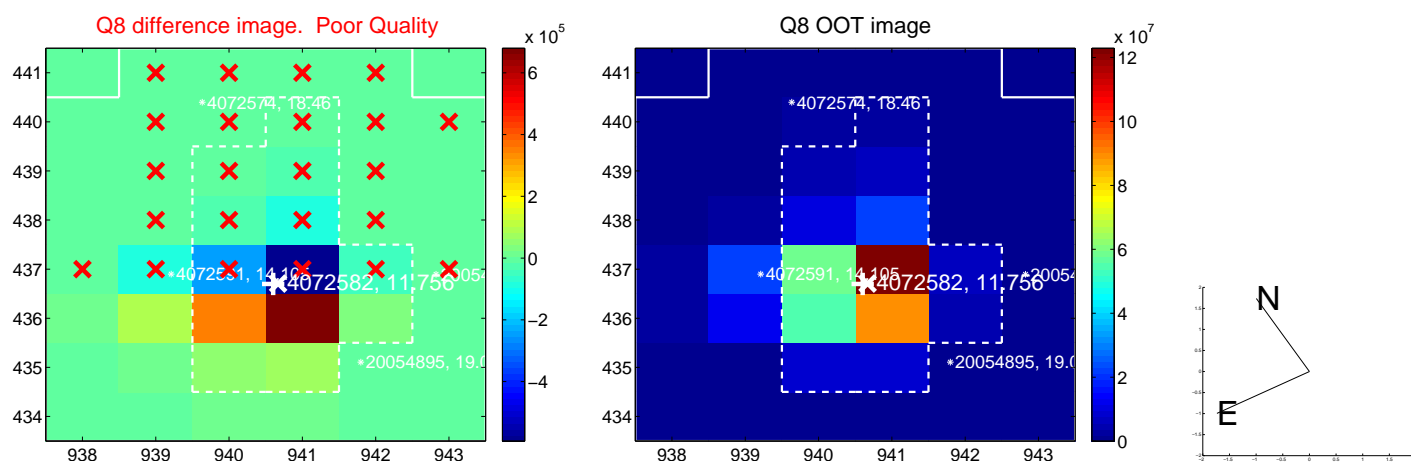
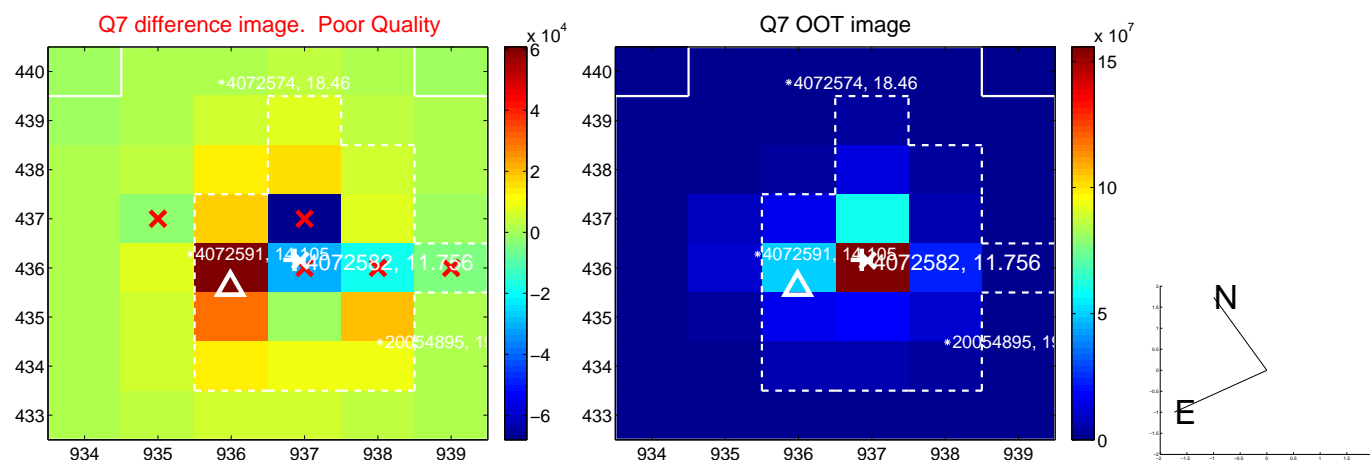
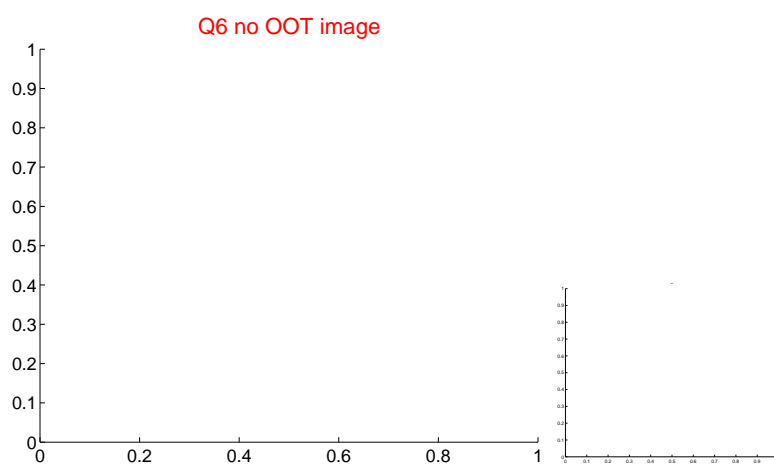
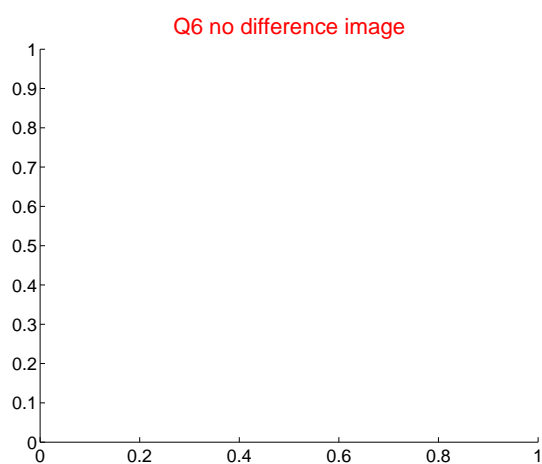
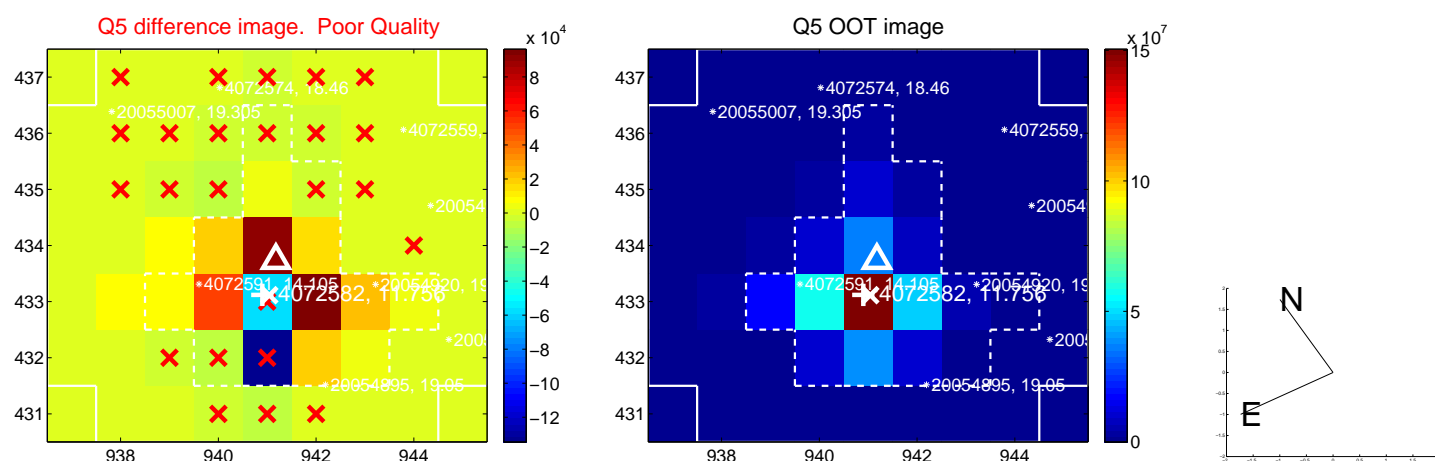


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

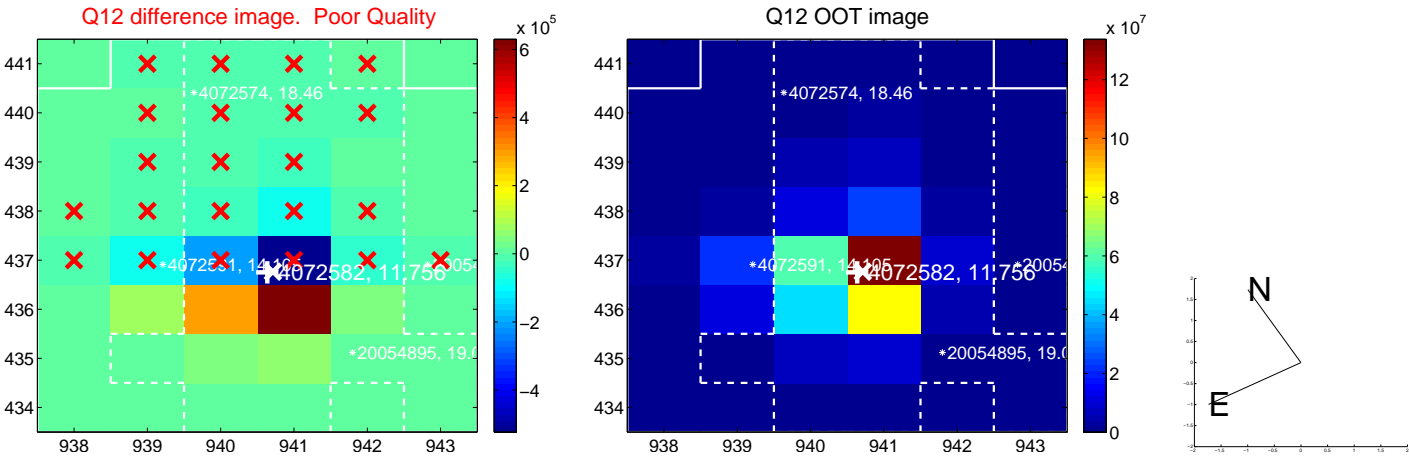
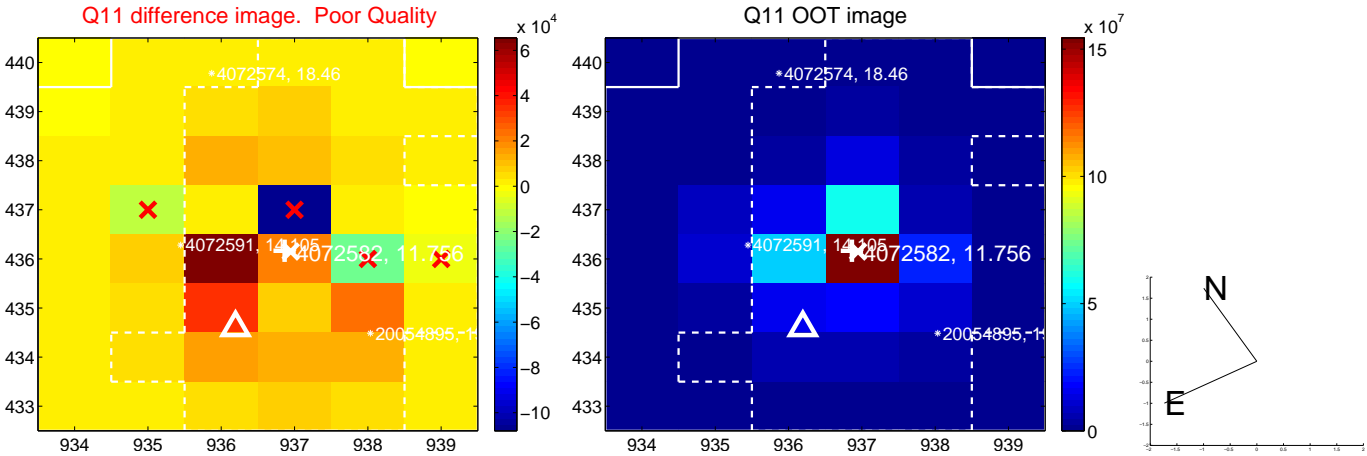
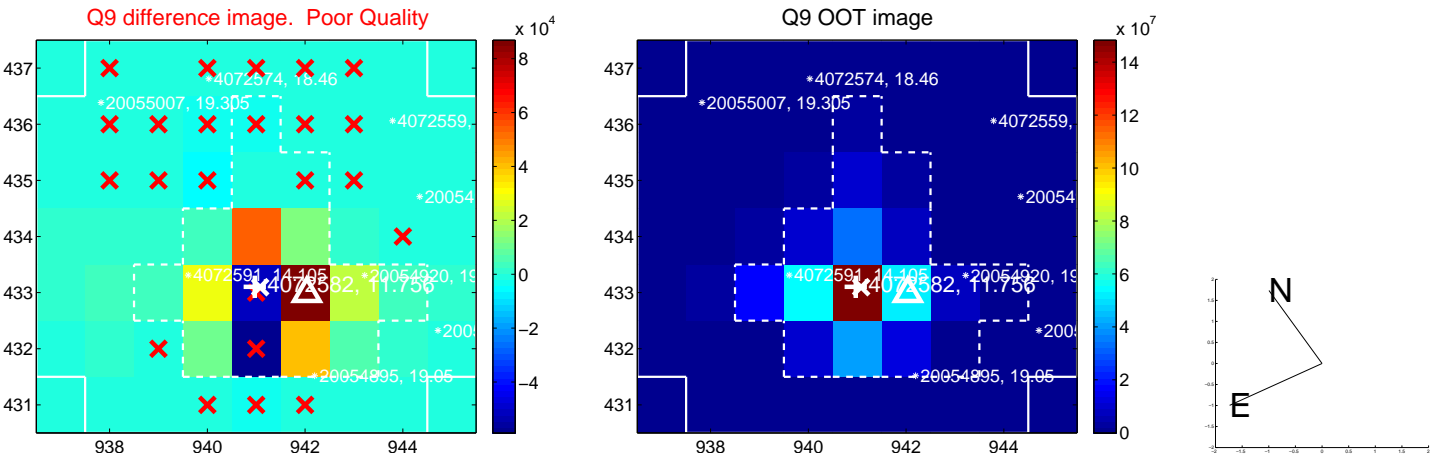


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

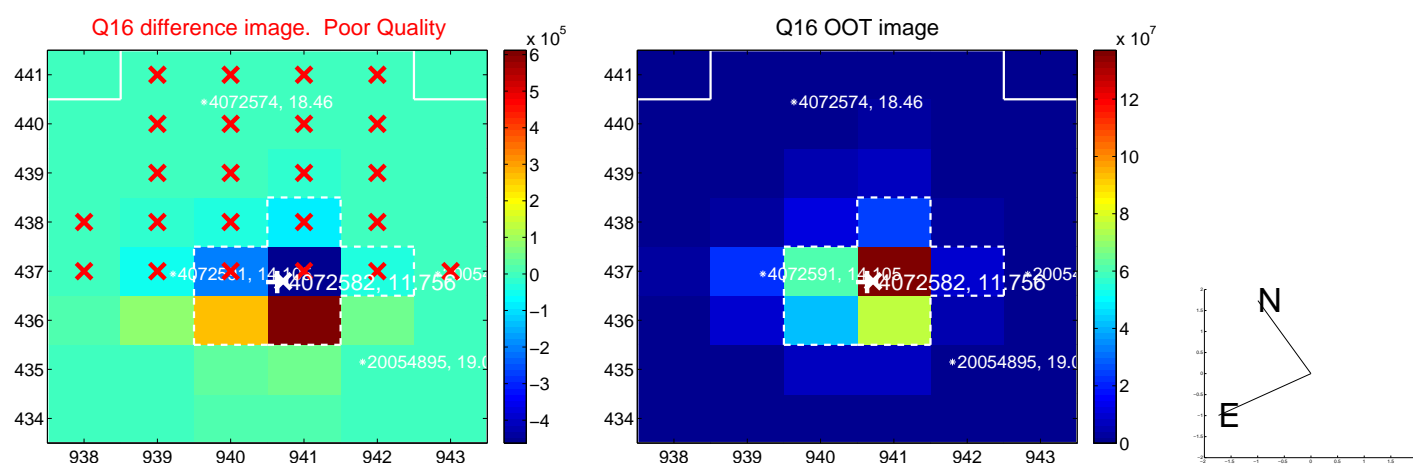
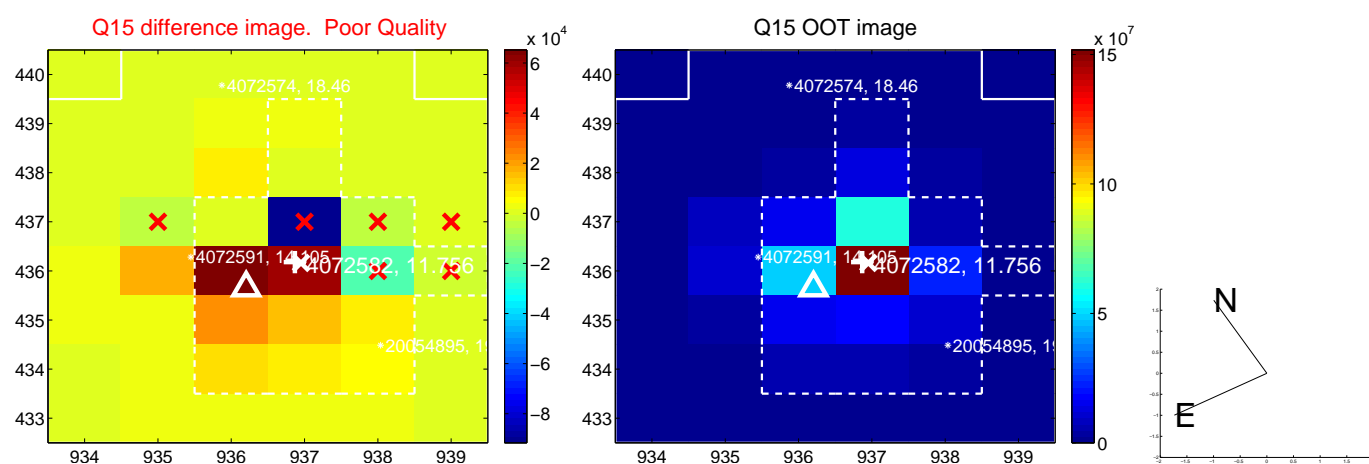
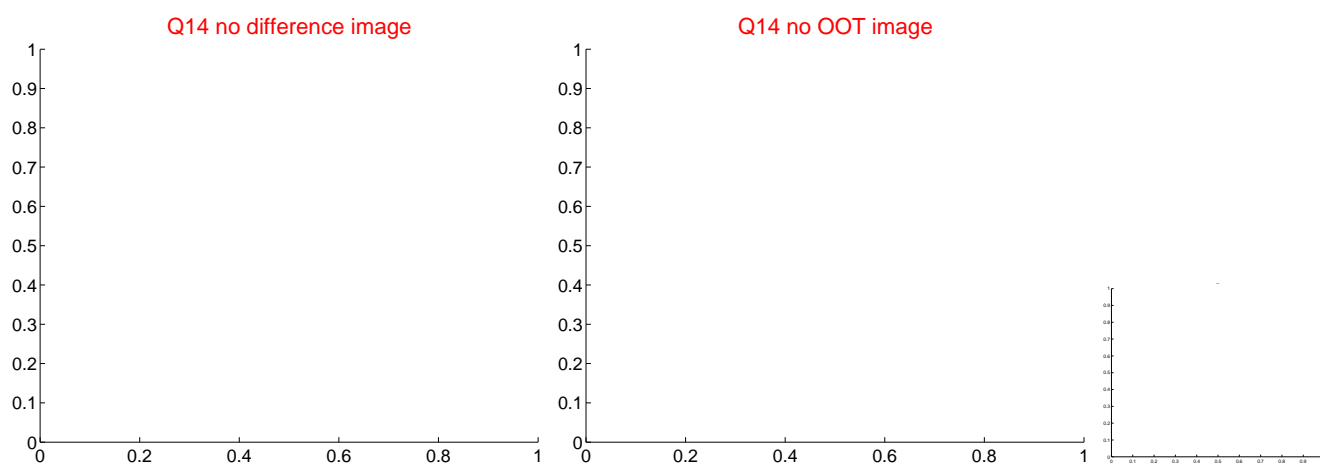
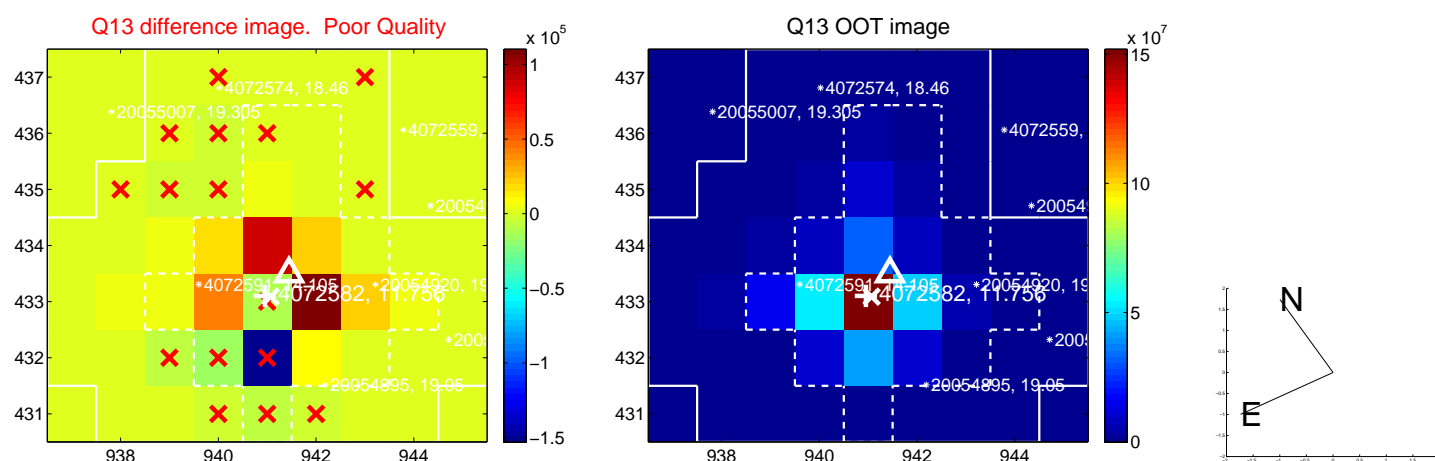




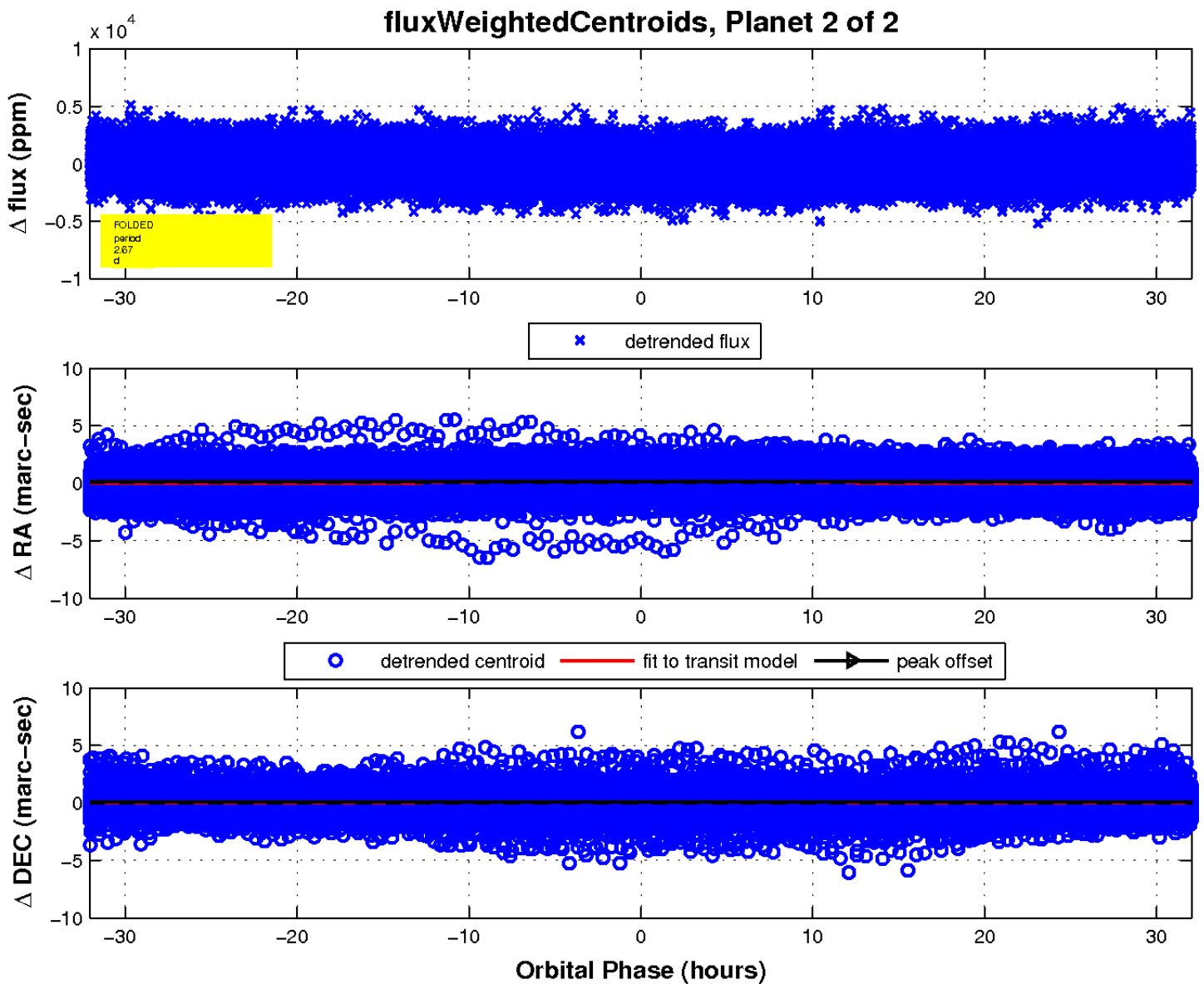
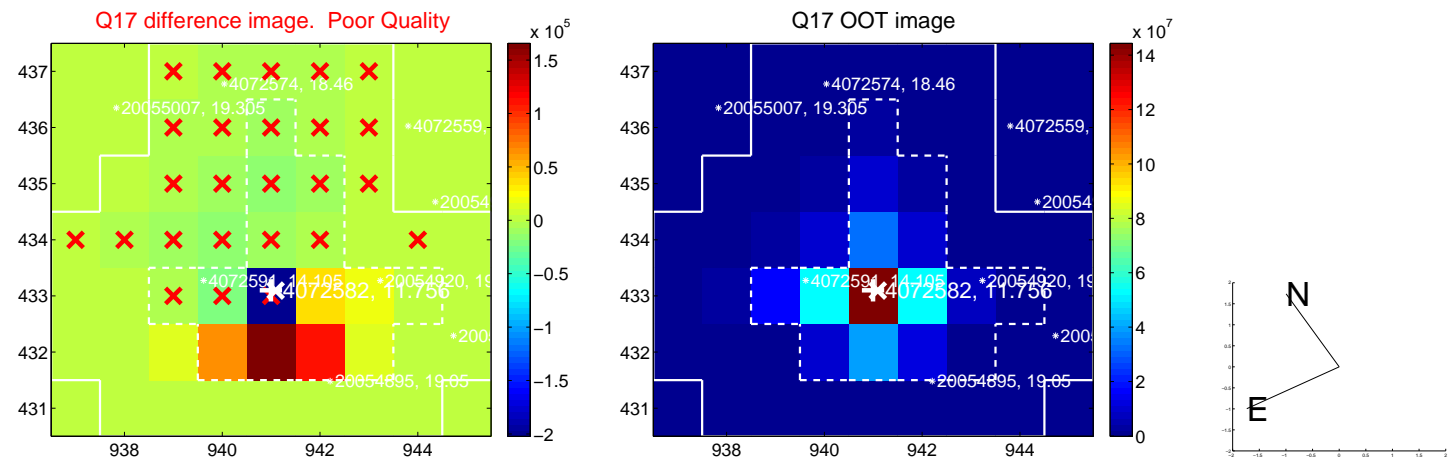
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

