

# KIC 004649476

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004649476-01	OBS	No	1.448706	132.243250	75.2	3.028	9.5	10.5	2.91	8560	2.88	41157.20
004649476-02	OBS	No	1.448717	132.744281	74.7	2.973	9.5	10.5	2.91	8560	2.96	41156.79
004649476-03	OBS	No	1.448847	131.693174	64.1	5.725	10.5	12.8	2.91	8560	2.44	41151.87

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004649476-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
004649476-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD—CENT_SATURATED
004649476-03	OBS	FP	0.00	1	0	0	0	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.

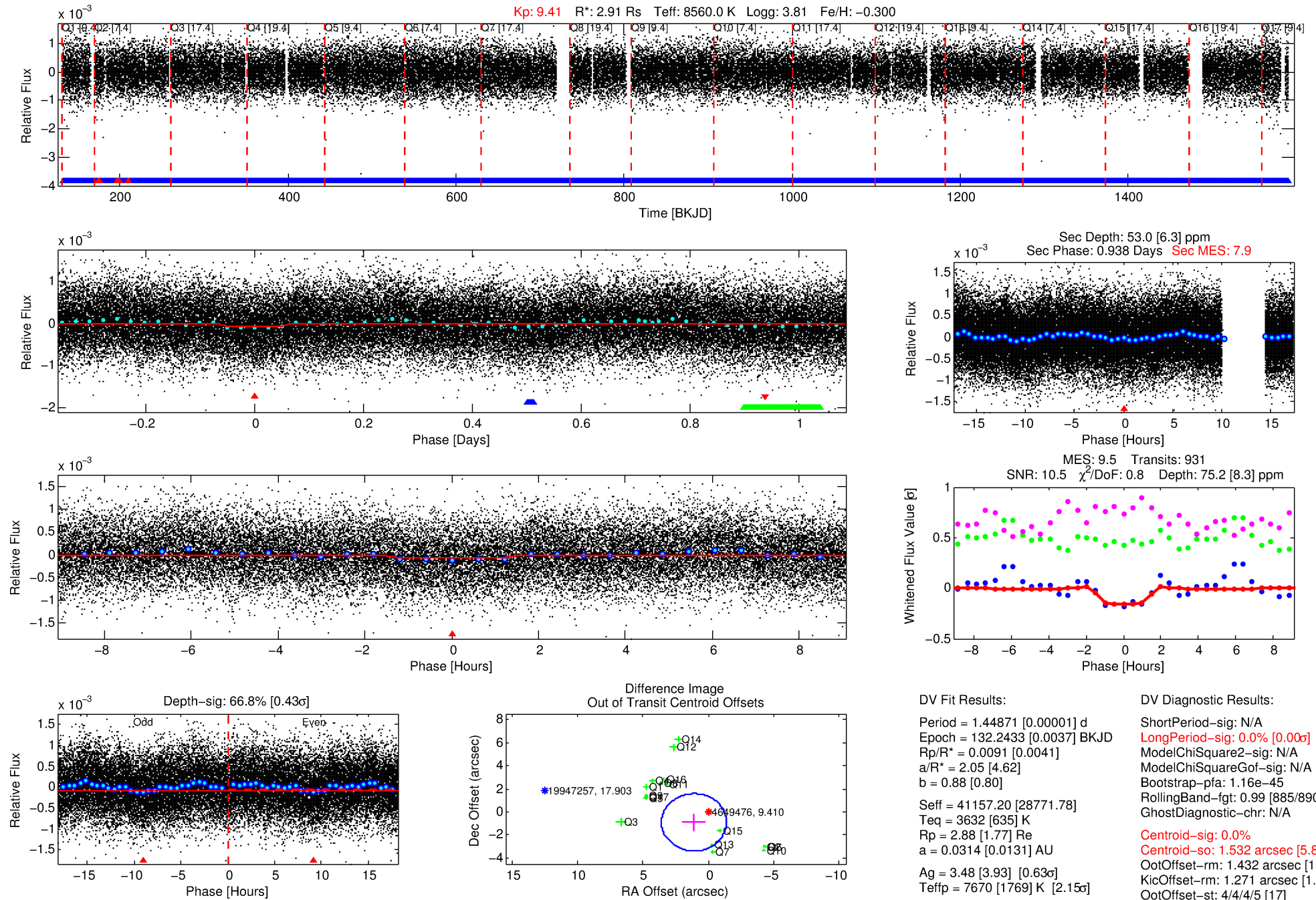
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 004649476-01

No Significant Match Found

# DV One-Page Summary

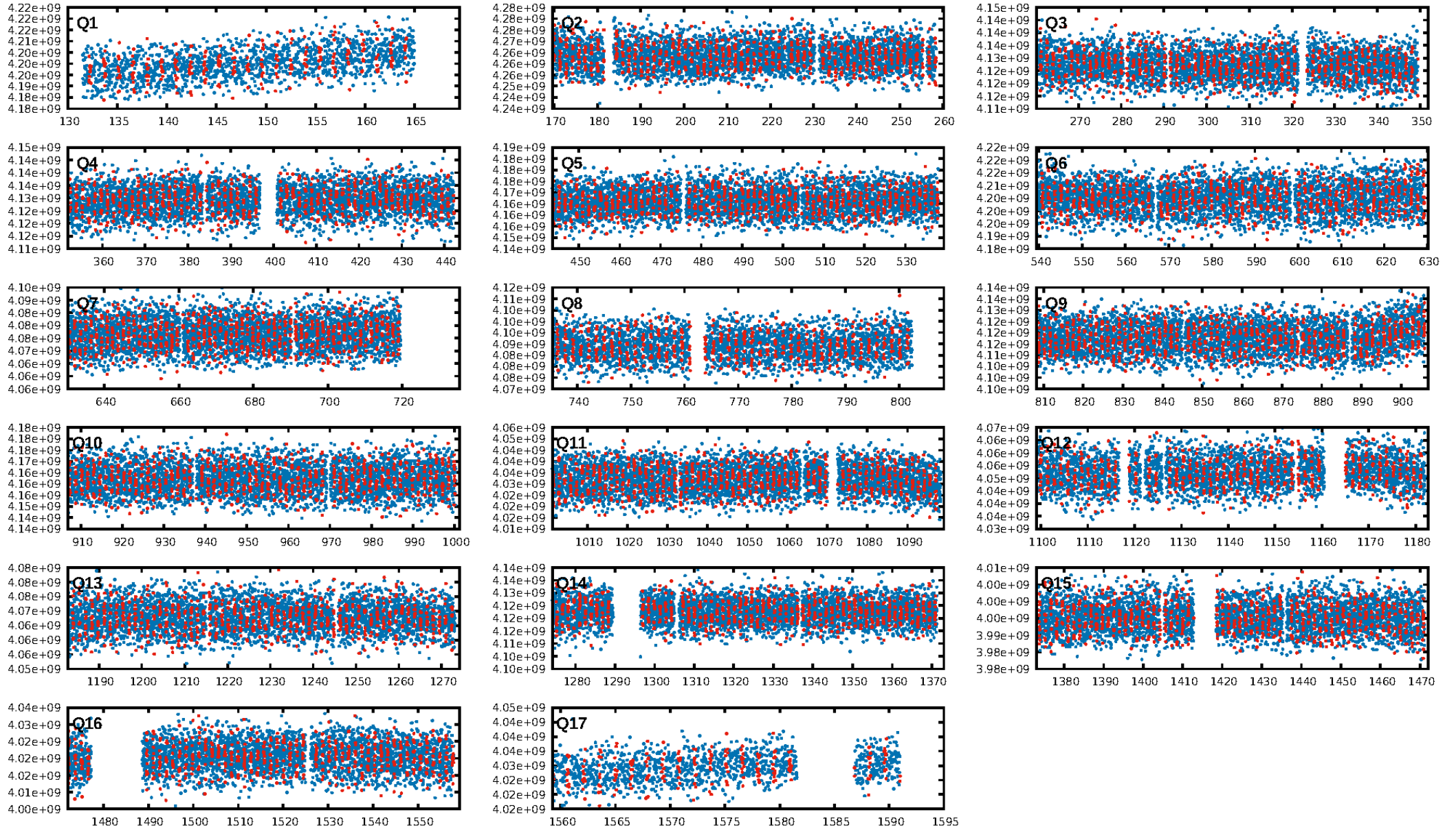
KIC: 4649476 Candidate: 1 of 3 Period: 1.449 d



Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 05:10:34 Z

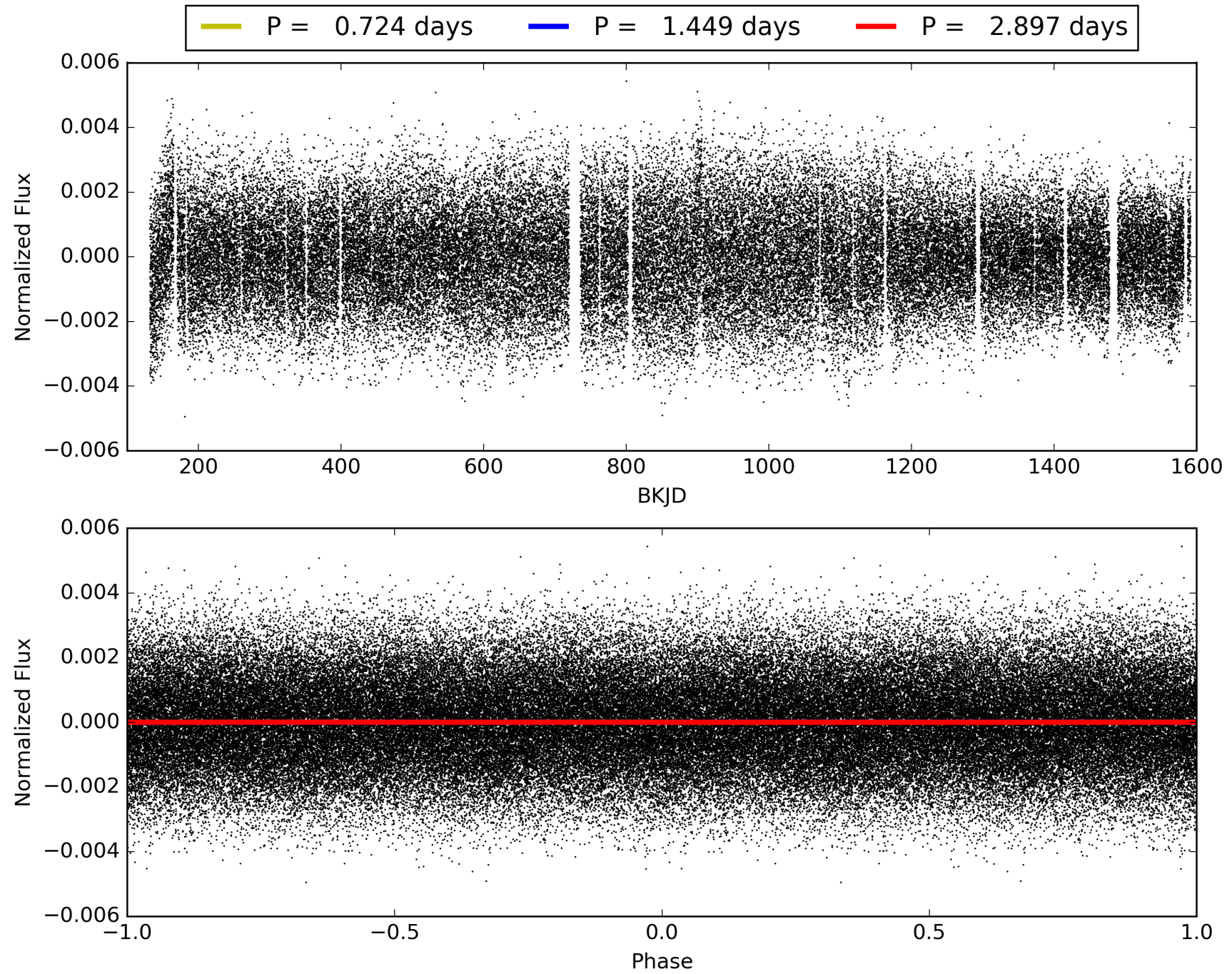
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 004649476-01, PDC Light Curves





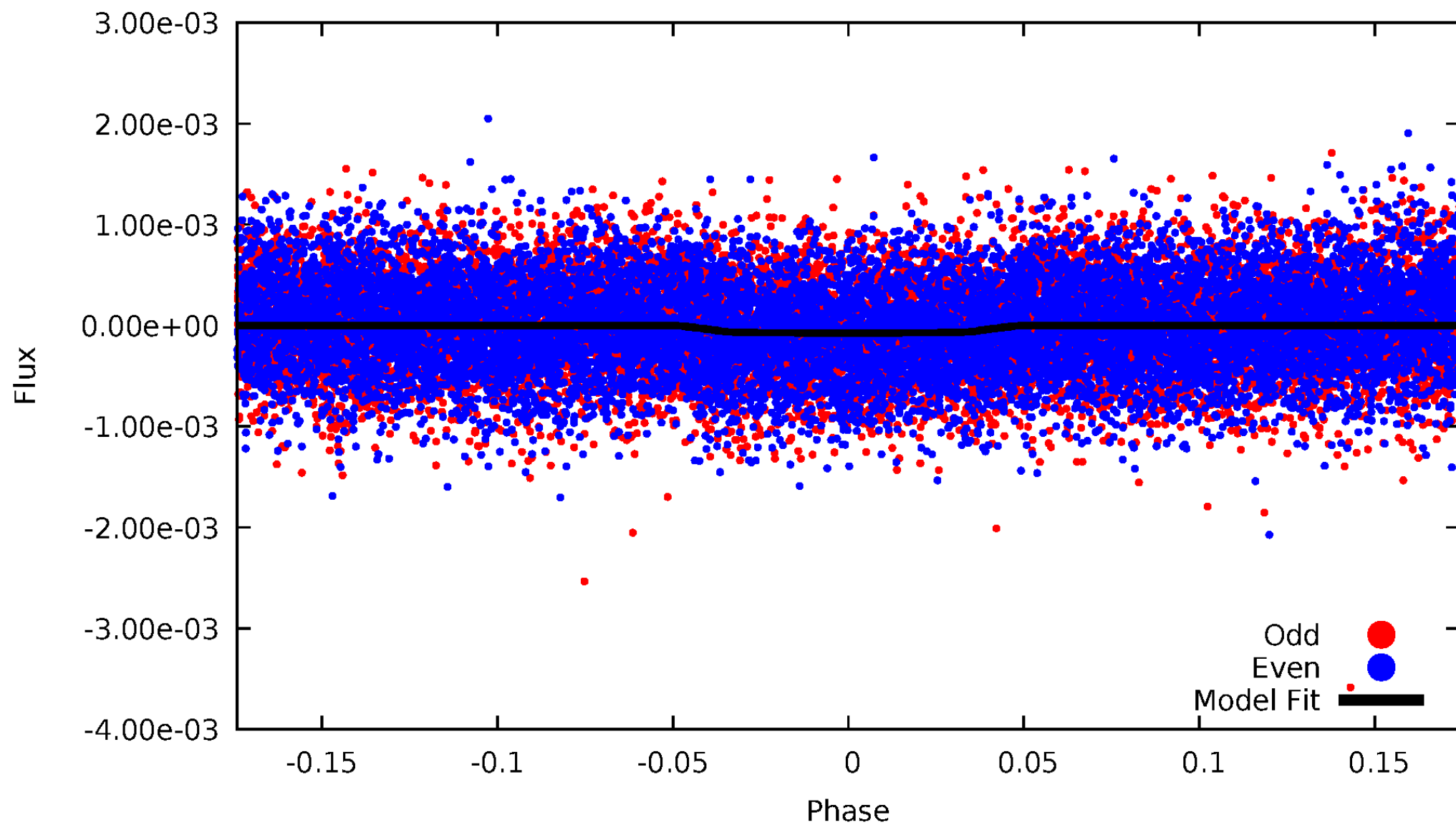
TCE 004649476-01





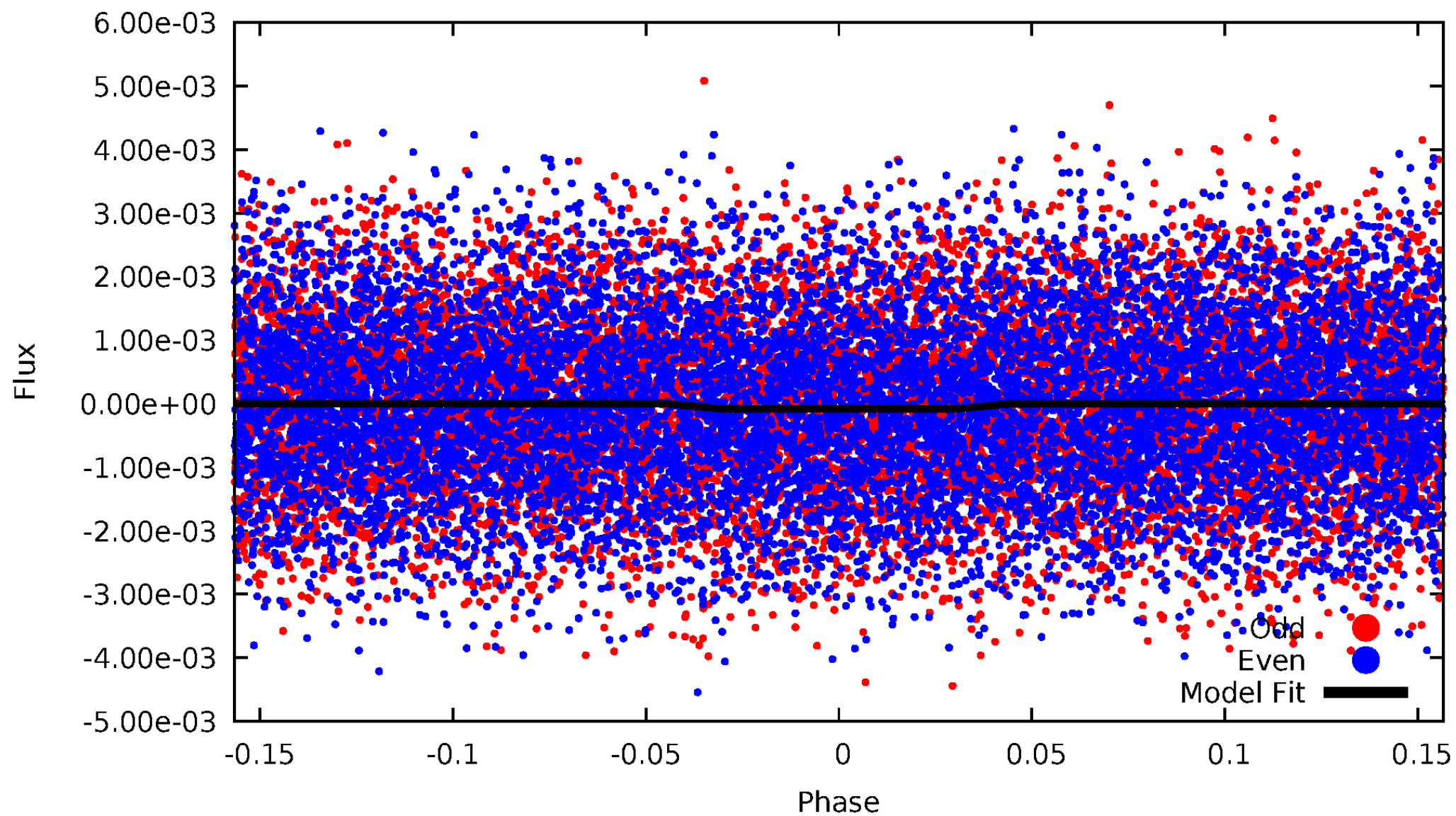
# DV Odd/Even

TCE 004649476-01

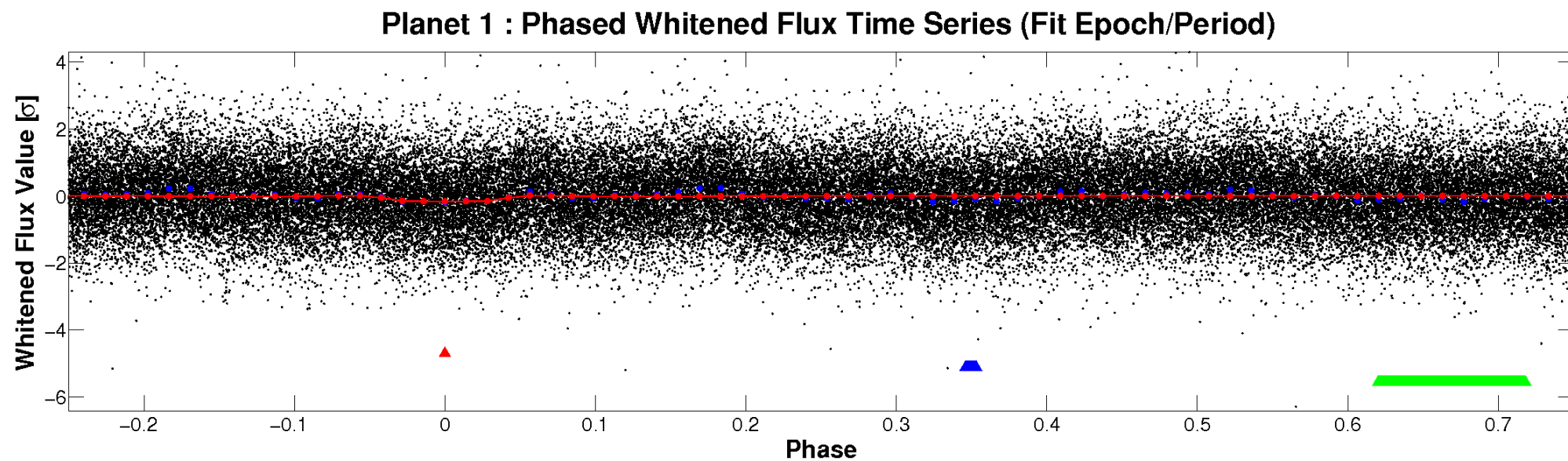
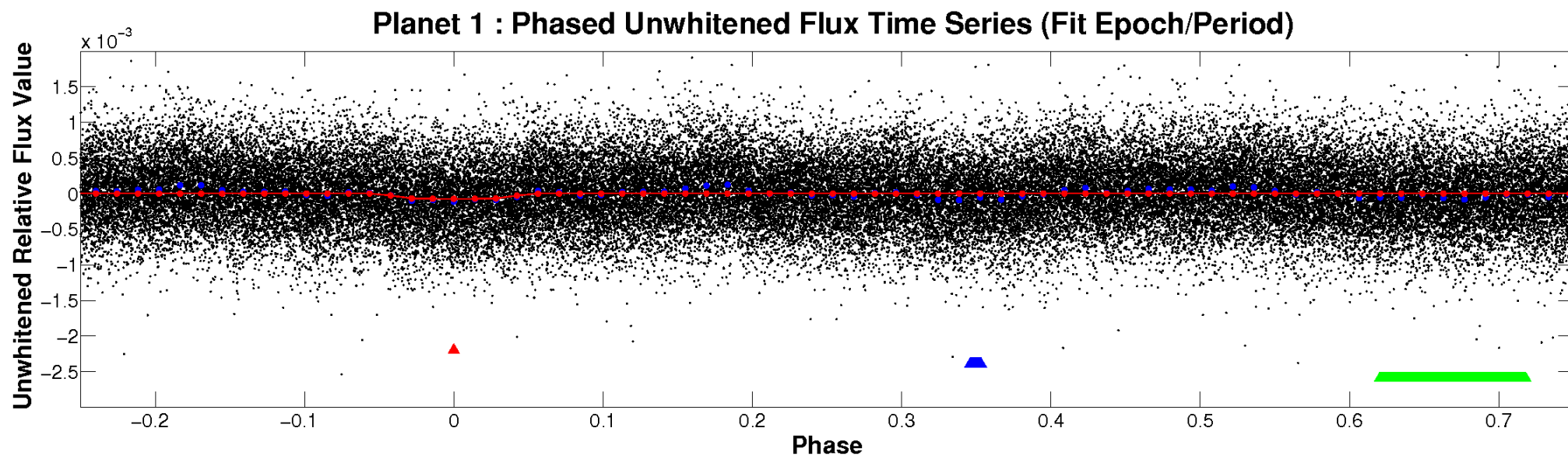


# ALT Odd/Even

TCE 004649476-01



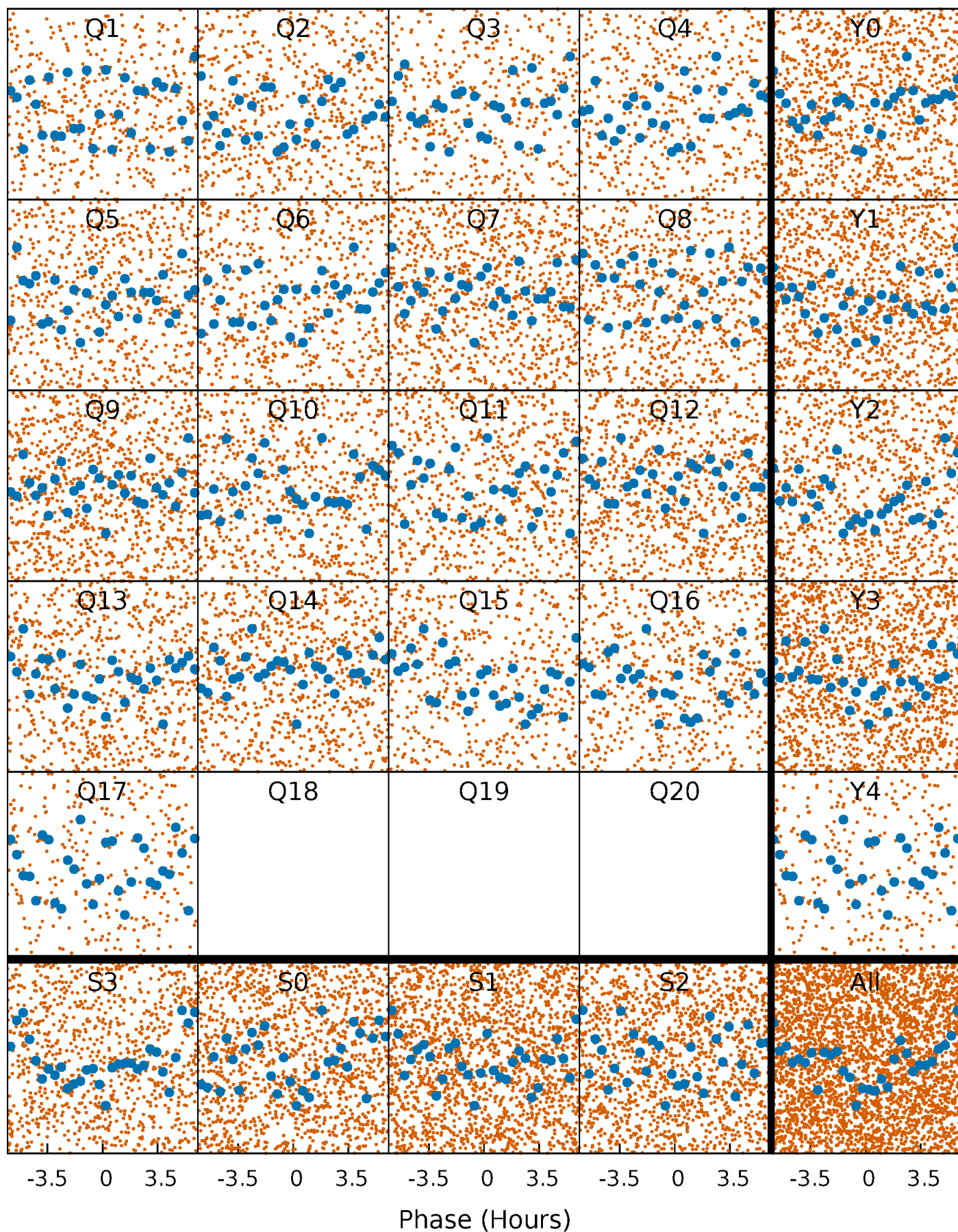
# Non-Whitened Vs. Whitened Light Curve





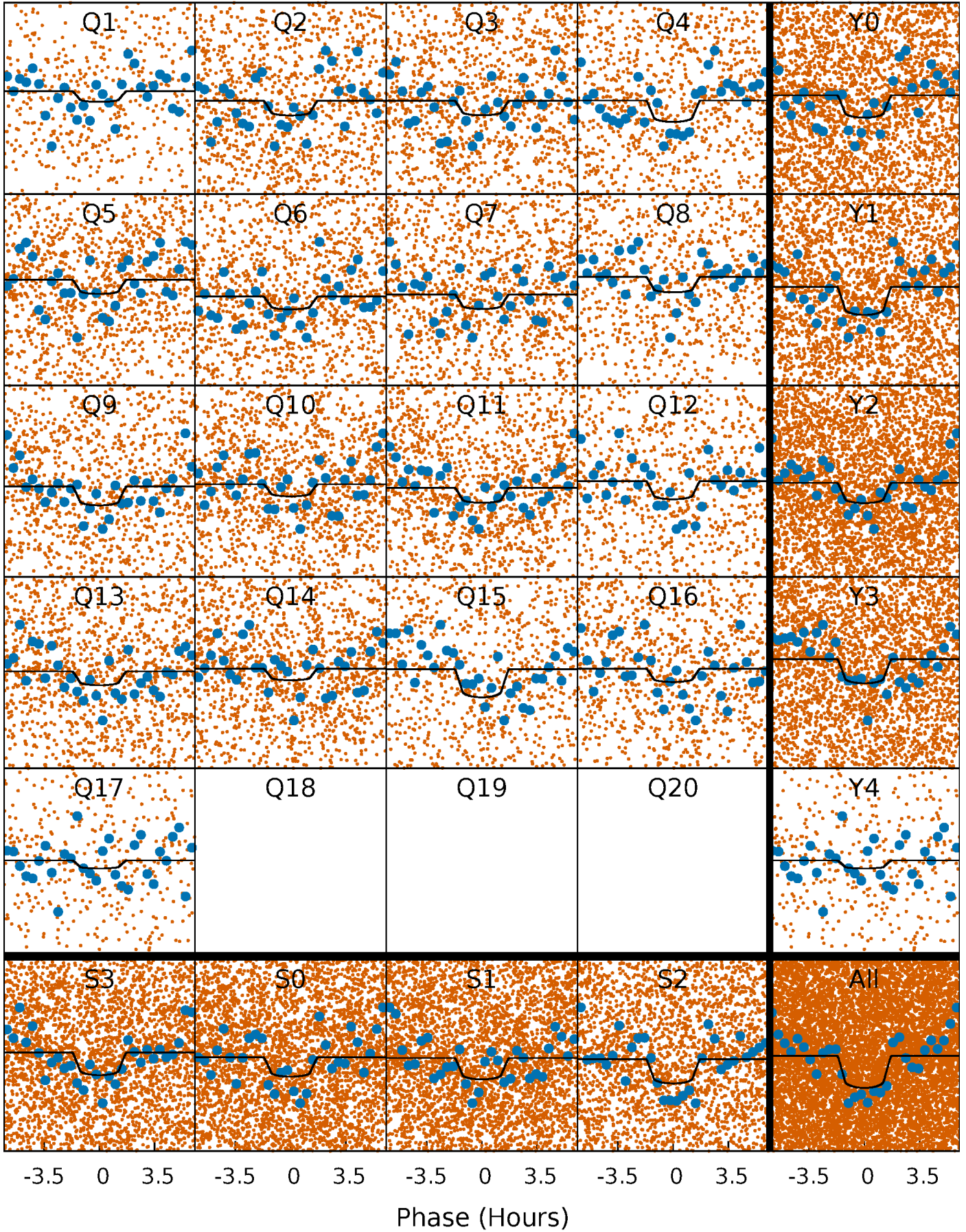
# PDC Quarter-Phased Transit Curves

TCE 004649476-01 P= 1.448706 Days  $T_0=132.243250$  (BKJD)



# DV Quarter-Phased Transit Curves

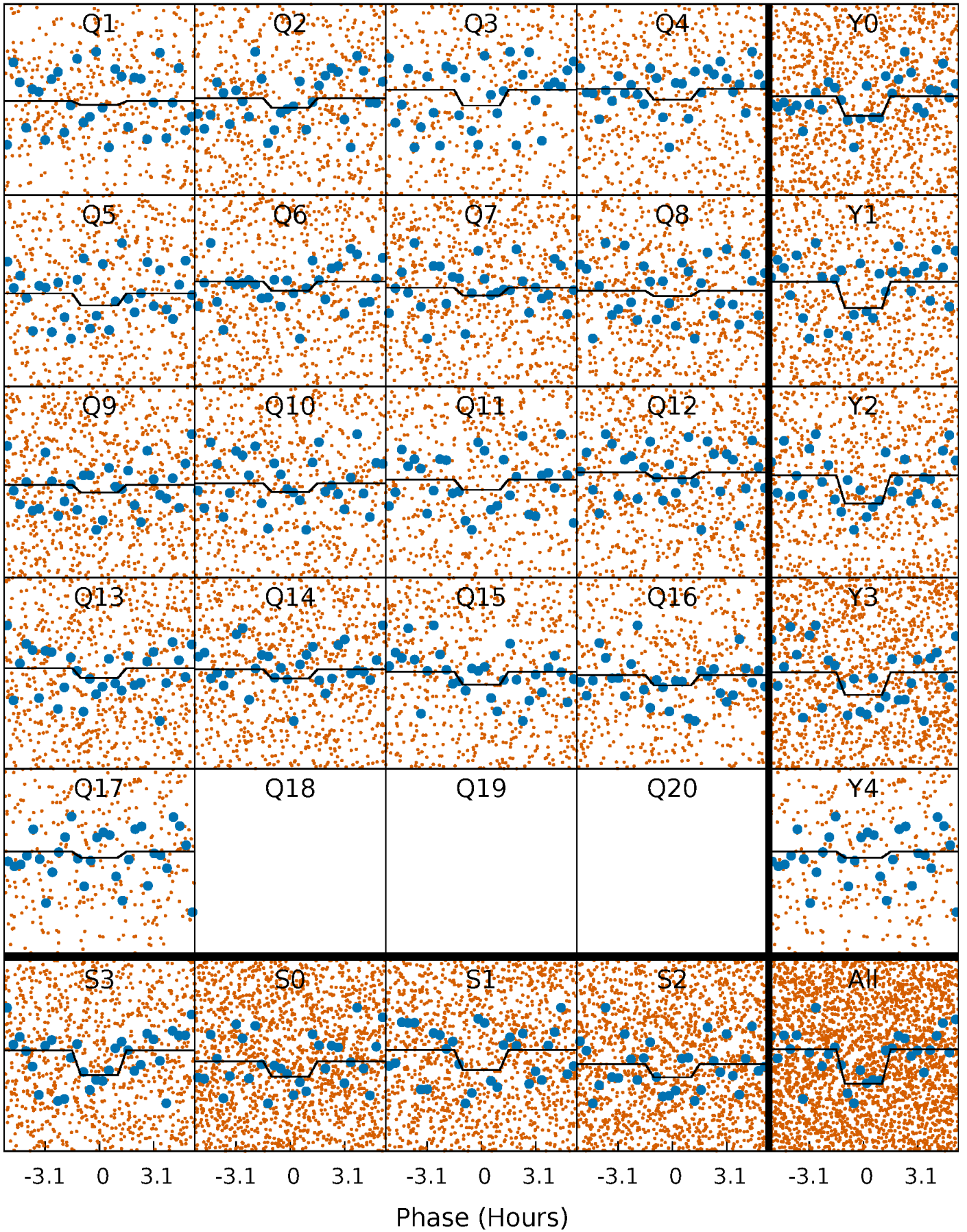
TCE 004649476-01 P= 1.448706 Days  $T_0=132.243250$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

TCE 004649476-01 P= 1.448703 Days  $T_0=132.254474$  (BKJD)

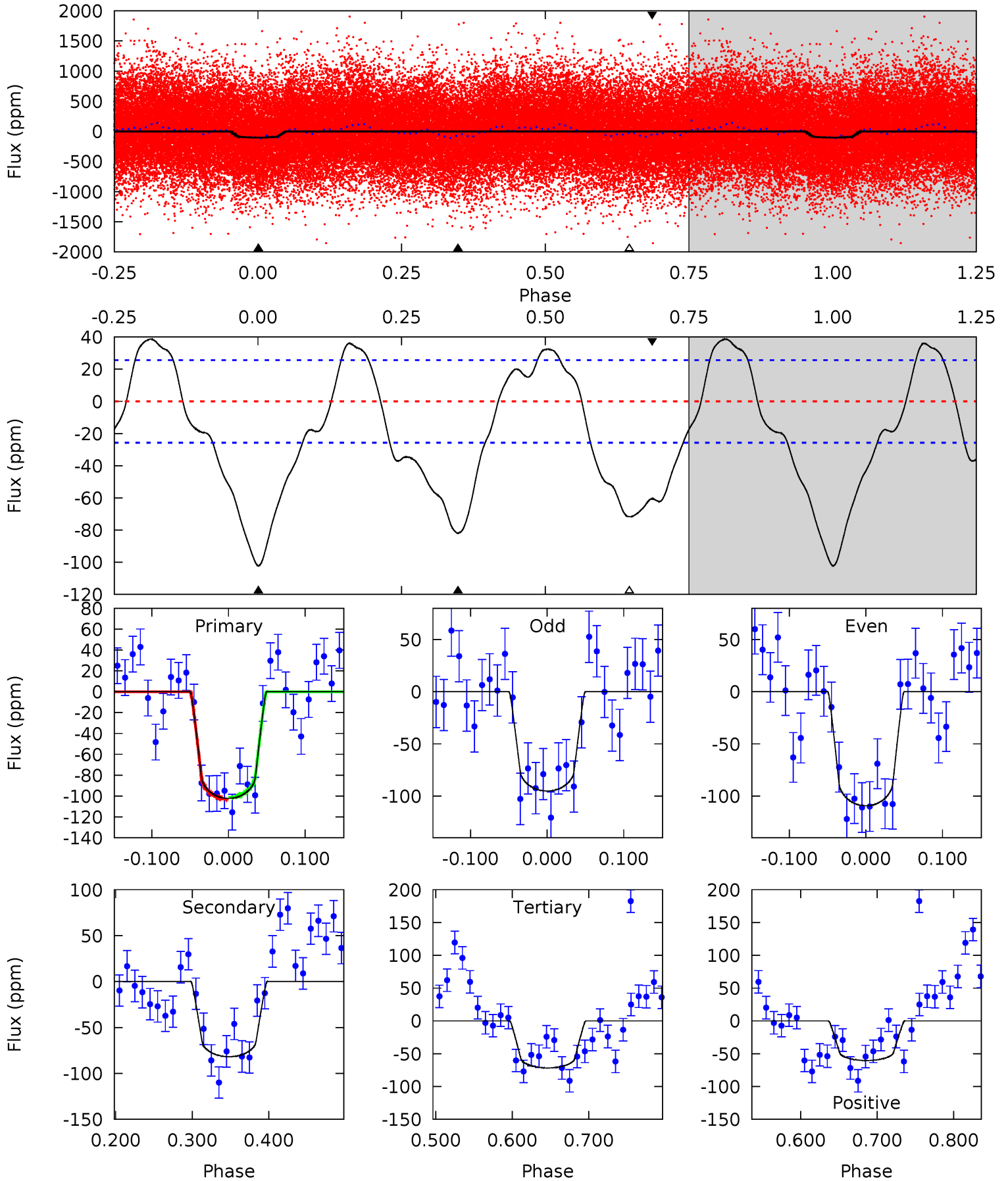




# DV Model-Shift Uniqueness Test

004649476-01, P = 1.448706 Days, E = 130.794544 Days

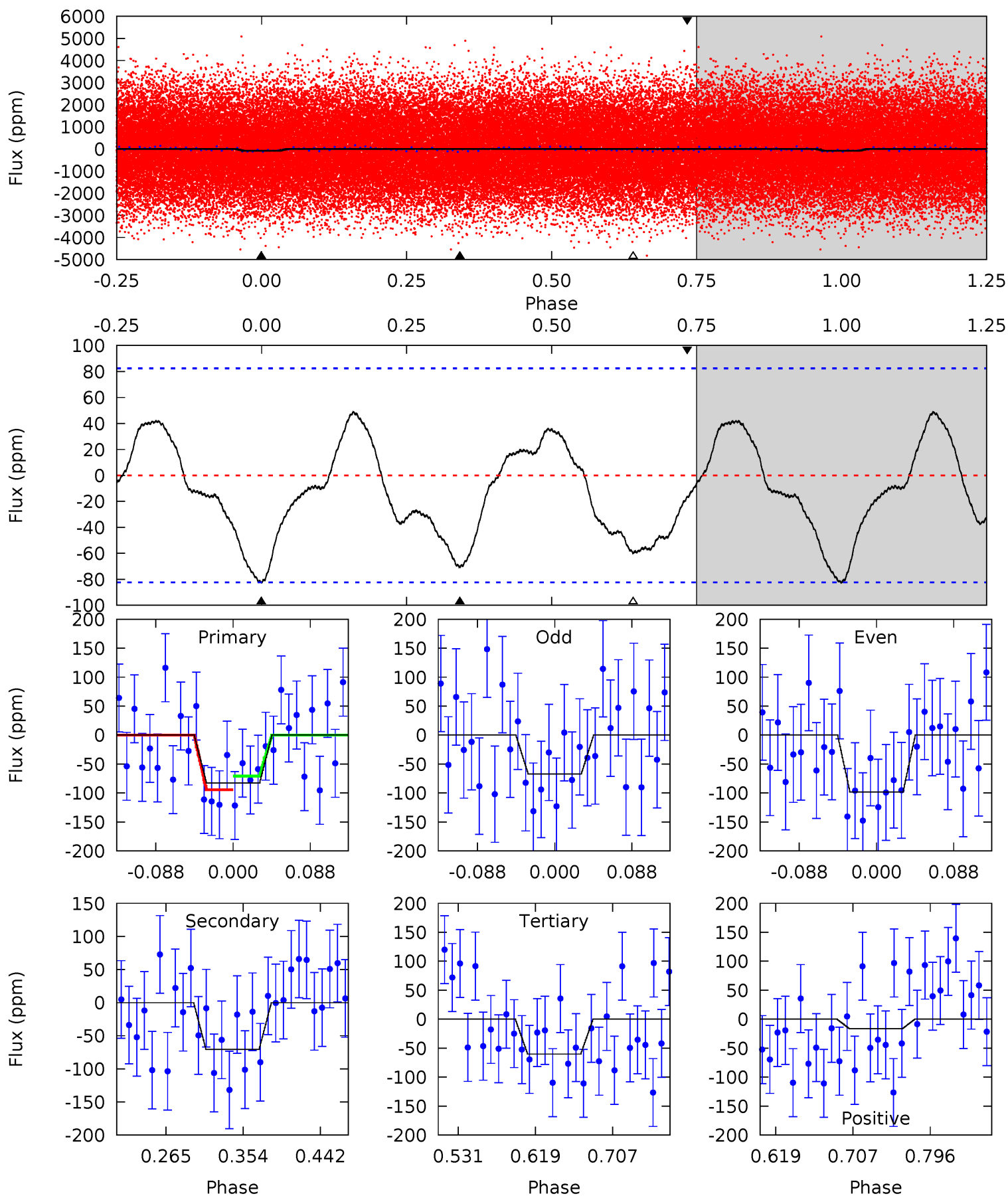
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
18.2	14.6	12.8	-10.7	4.56	1.65	6.26	5.43	28.9	1.80	25.3	1.26	0.94	0.27	0.15



# Alt Model-Shift Uniqueness Test

004649476-01, P = 1.448703 Days, E = 130.805771 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
4.60	3.94	3.35	-0.92	4.59	1.70	1.77	1.25	5.52	0.59	4.86	0.87	0.93	0.37	0.66



### Stellar Parameters For KIC 004649476

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$8560^{+237}_{-385}$	$3.806^{+0.400}_{-0.071}$	$-0.300^{+0.200}_{-0.350}$	$2.907^{+0.351}_{-1.228}$	$1.972^{+0.352}_{-0.470}$	$0.113^{+0.412}_{-0.027}$
	+3%/-4%	+11%/-2%	+67%/-117%	+12%/-42%	+18%/-24%	+365%/-24%
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 004649476-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-82 \pm 6$	$2.66^{+1.30}_{-1.18}$	$4895^{+313}_{-509}$	$8280^{+4169}_{-1628}$	$6.485^{+14.013}_{-3.547}$
Alt.	$-71 \pm 18$	$2.69^{+1.47}_{-1.23}$	$4897^{+299}_{-478}$	$7786^{+3947}_{-1683}$	$5.176^{+12.751}_{-2.977}$

$T_{\text{max}}$  = 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

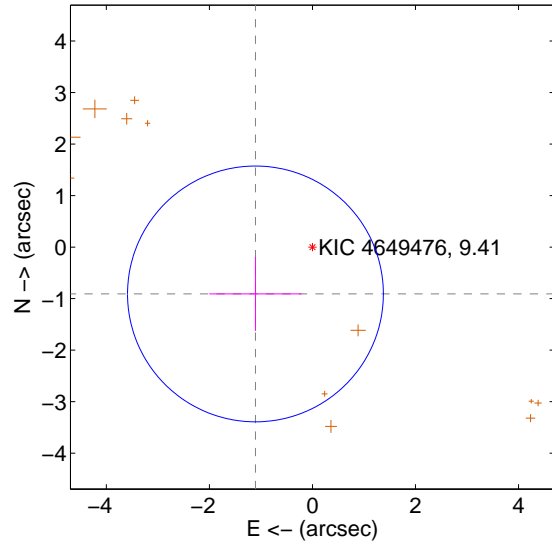
Supplemental centroid analysis for 004649476-01. **Kepler magnitude: 9.41.** Transit SNR 10.53

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

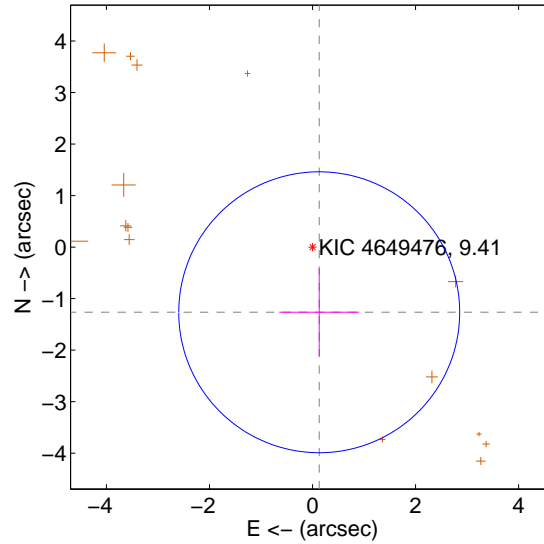
The direct PRF centroid is offset from the target star catalog position by about 1.44 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.432 \pm 0.827$	1.73	$1.106 \pm 0.895$	$-0.909 \pm 0.716$
PRF-fit source offset from KIC position	$1.271 \pm 0.909$	1.40	$-0.130 \pm 0.775$	$-1.265 \pm 0.851$
photometric centroid source offset	<b><math>1.53 \pm 0.26</math></b>	<b>5.83</b>	$1.41 \pm 0.25$	$-0.61 \pm 0.33$

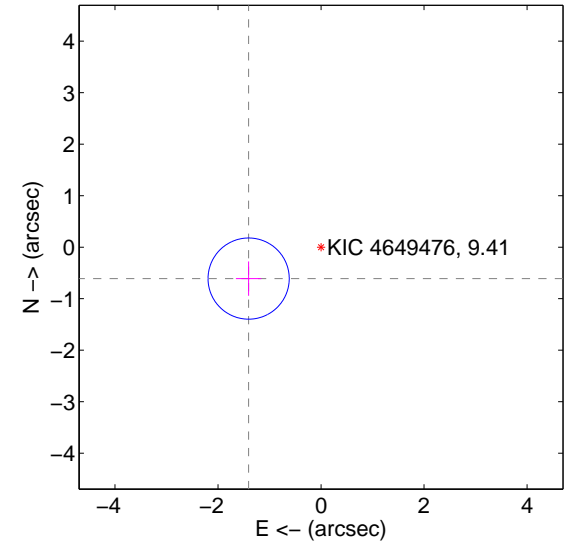
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

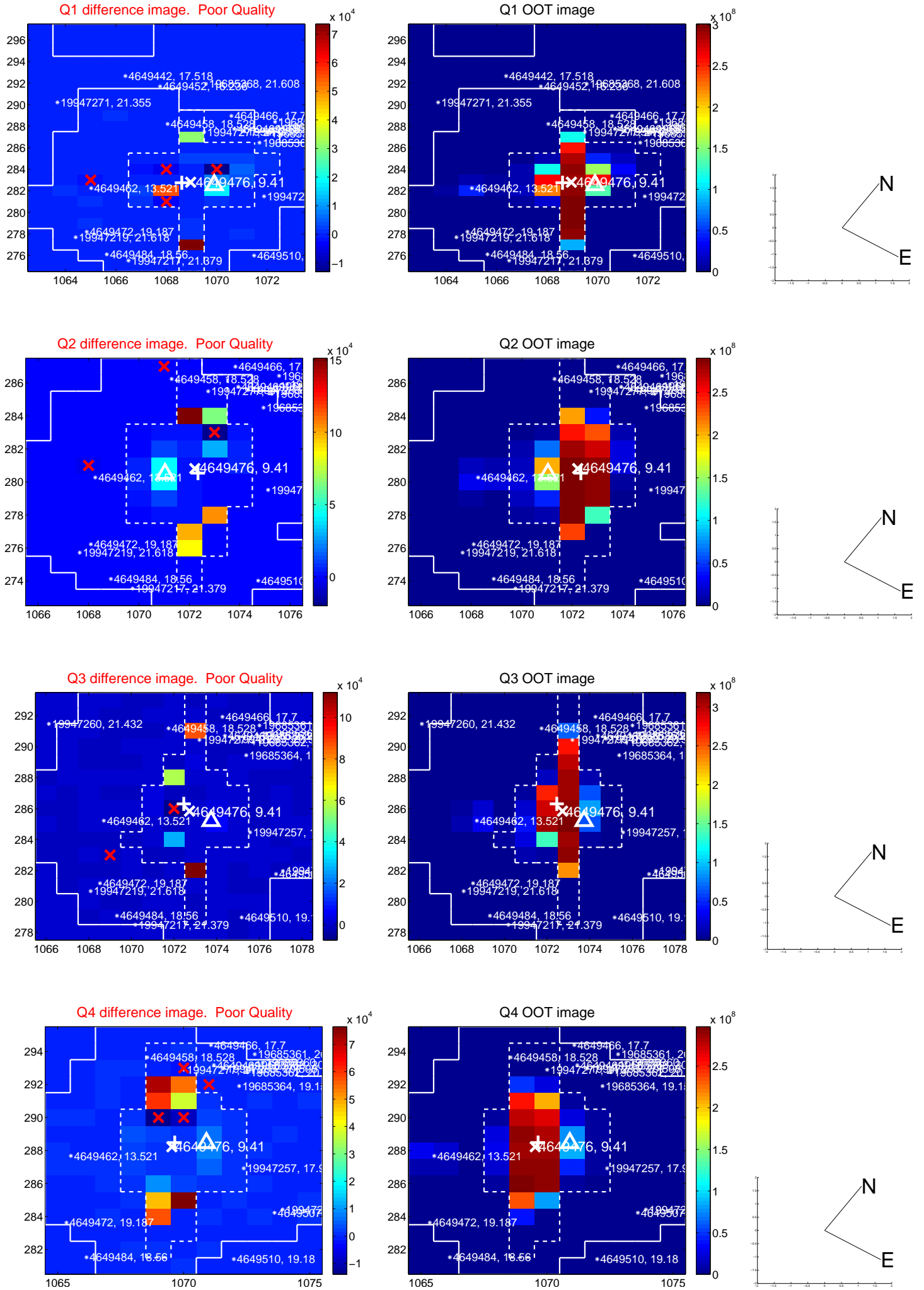


offset from photometric centroids

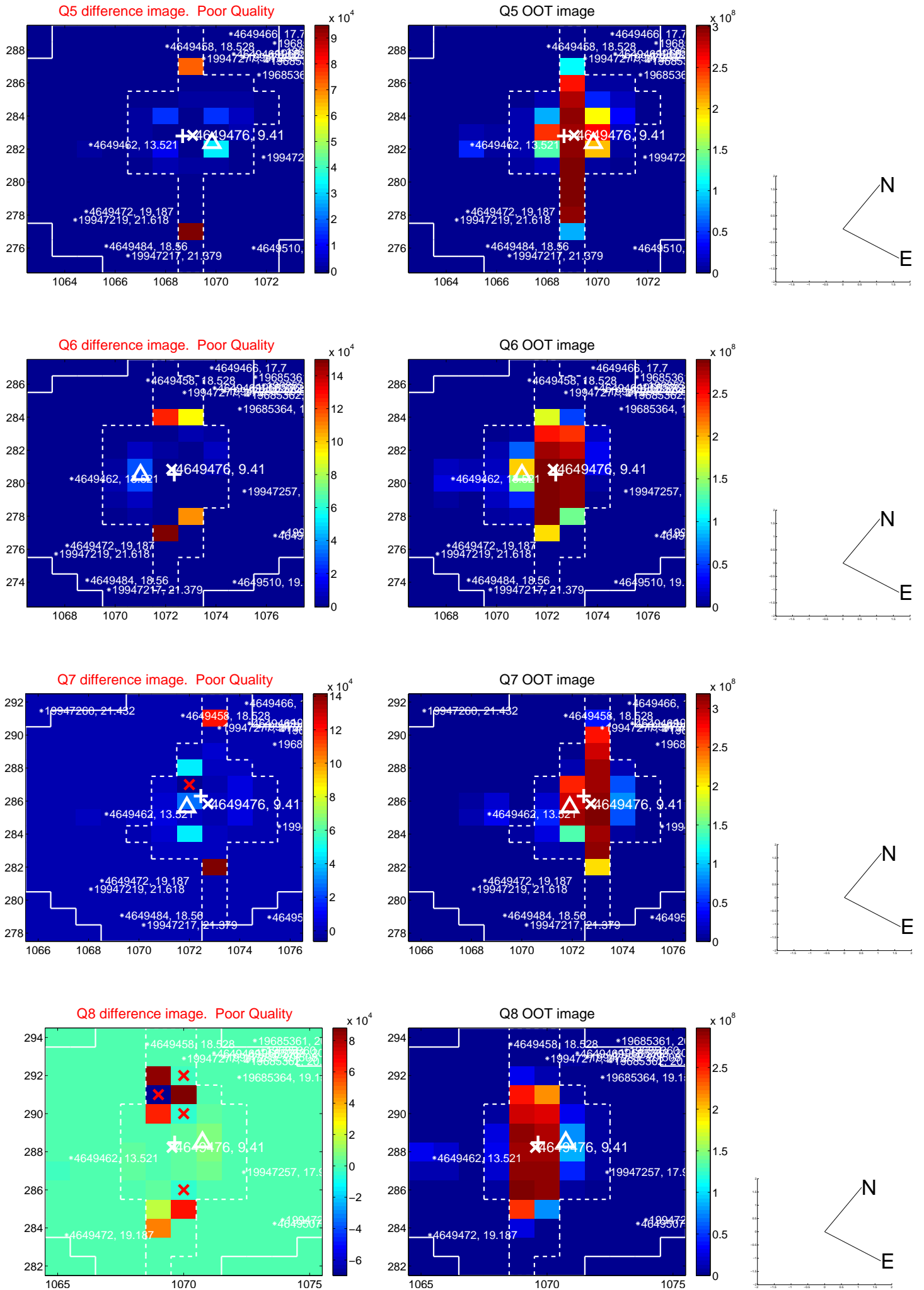


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

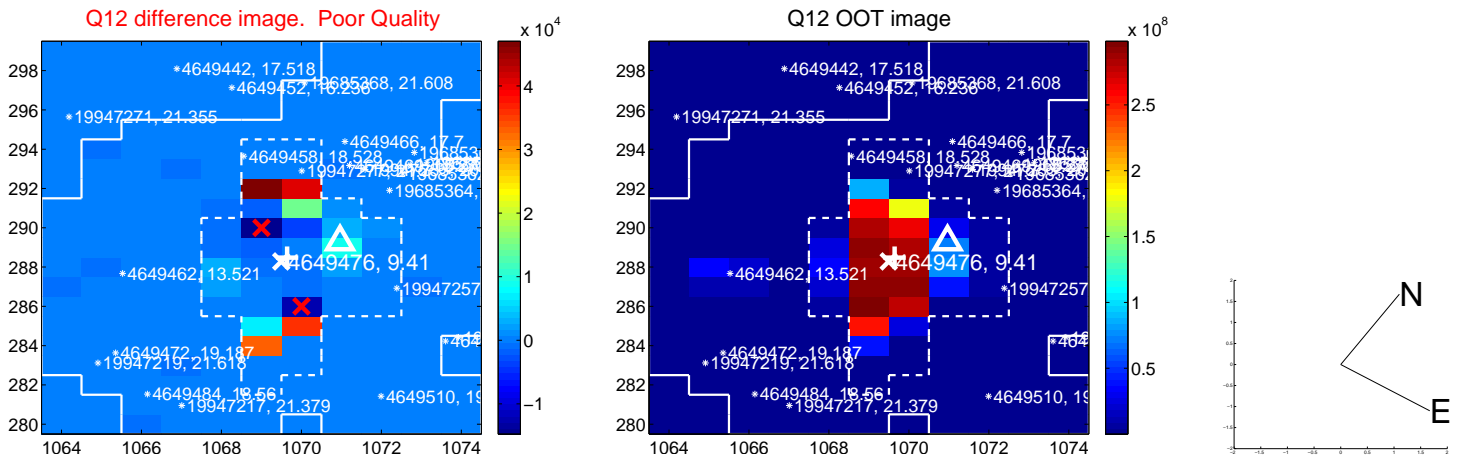
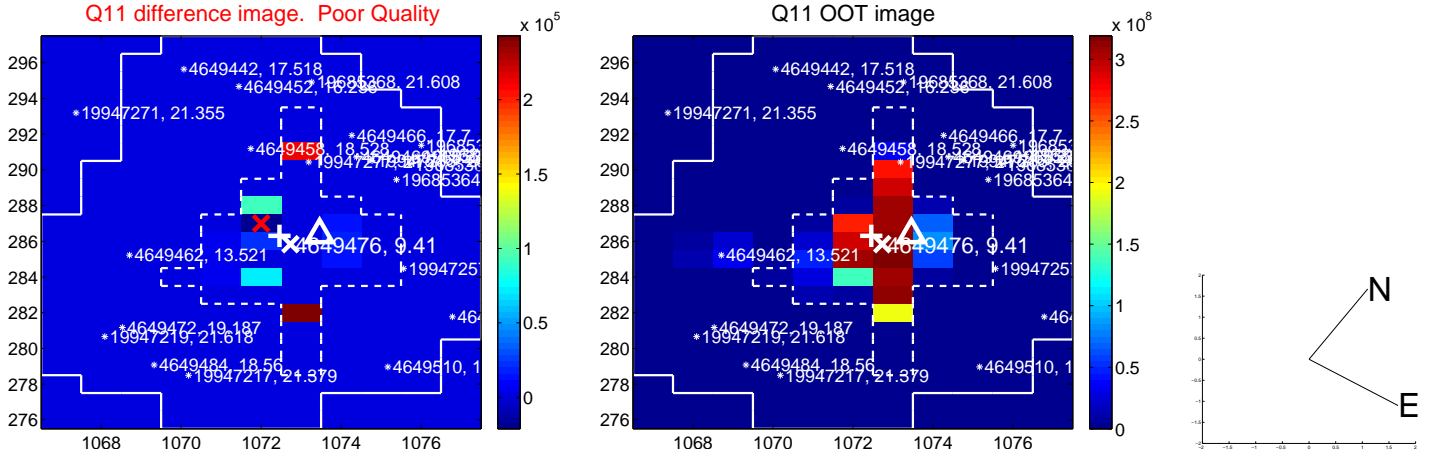
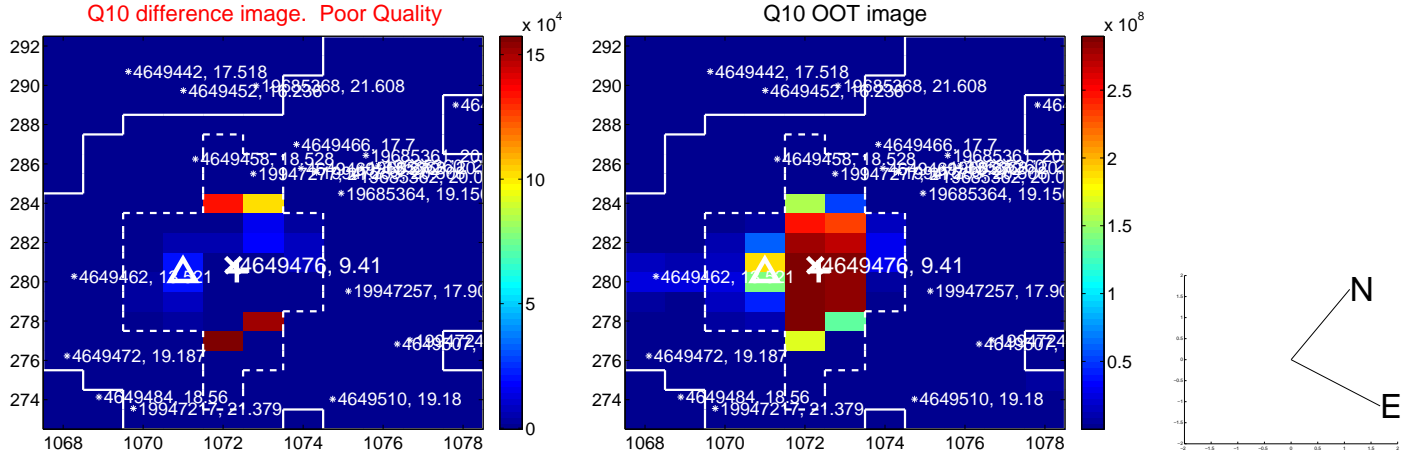
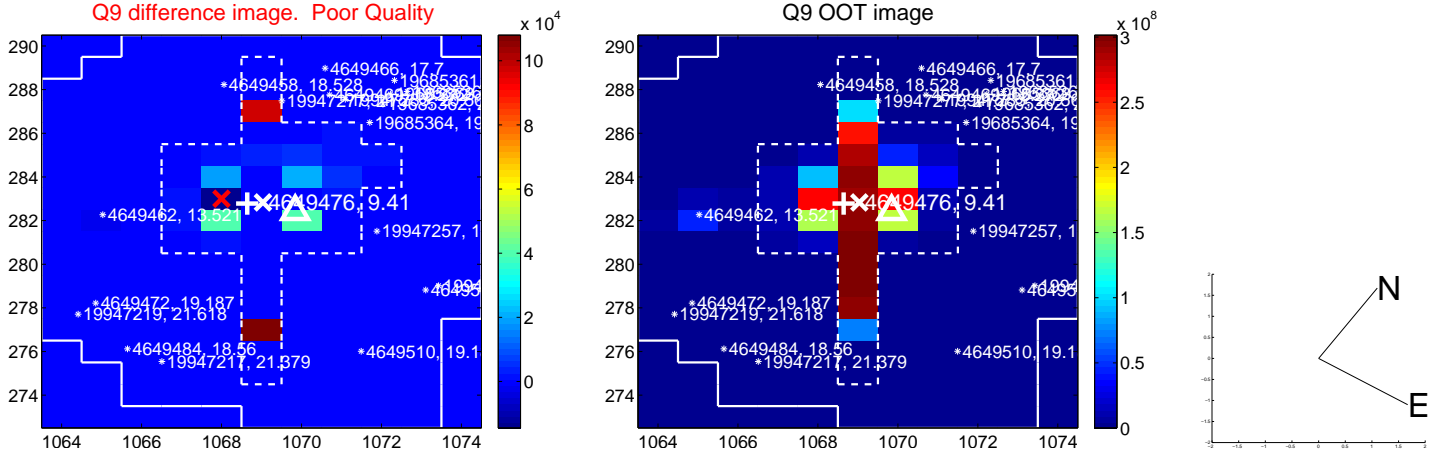


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

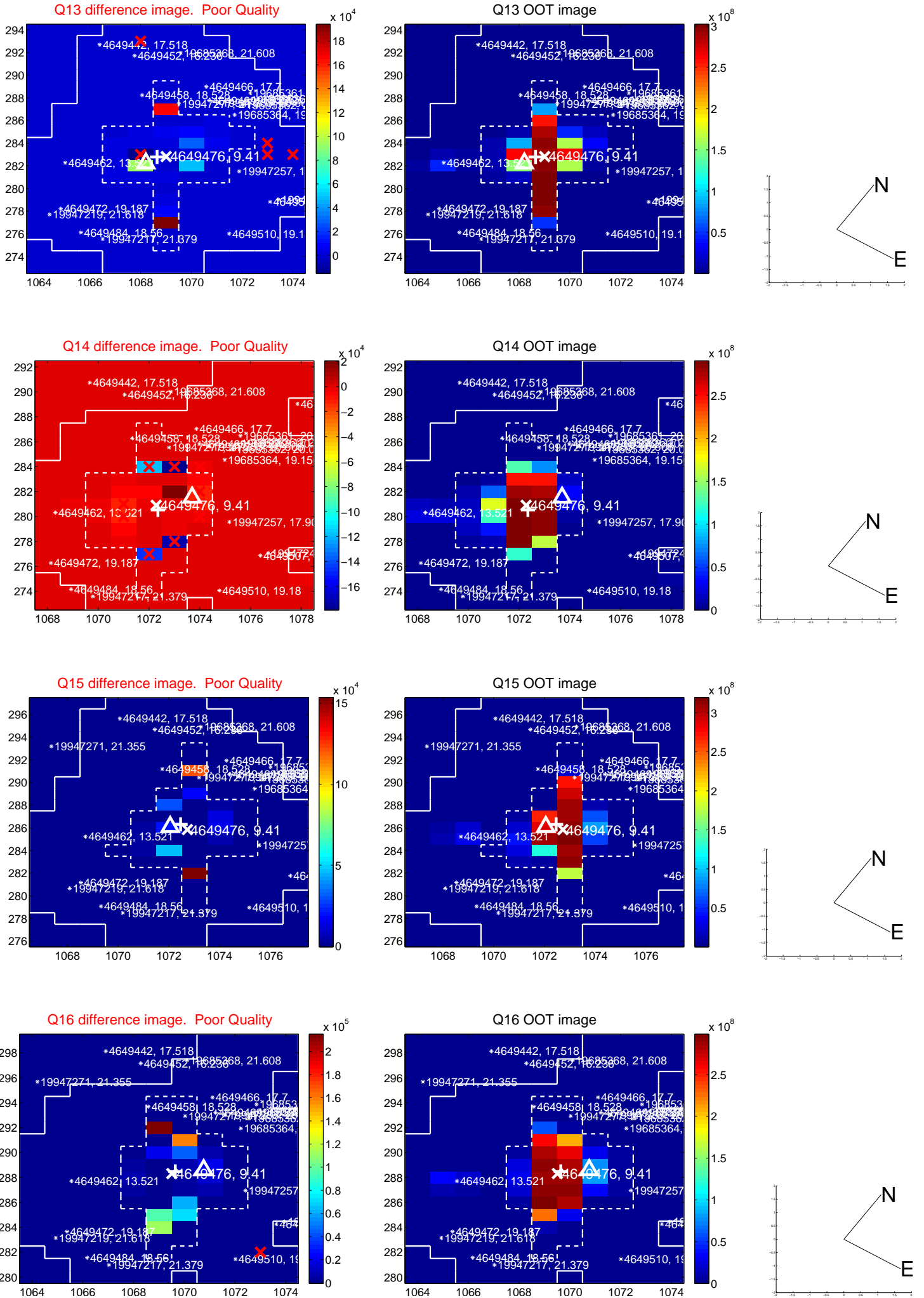




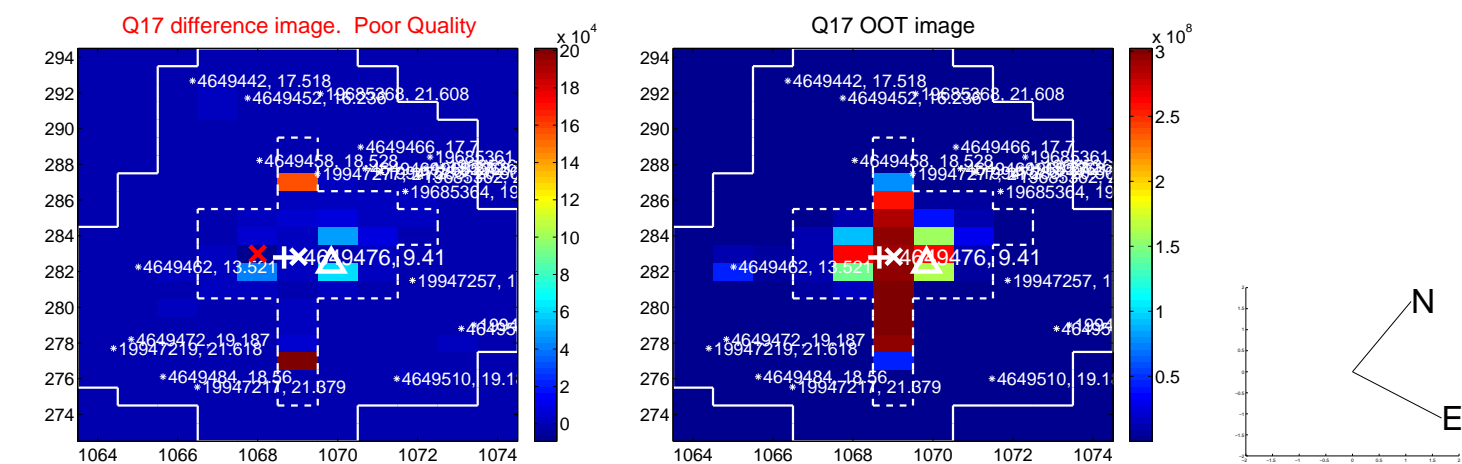
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



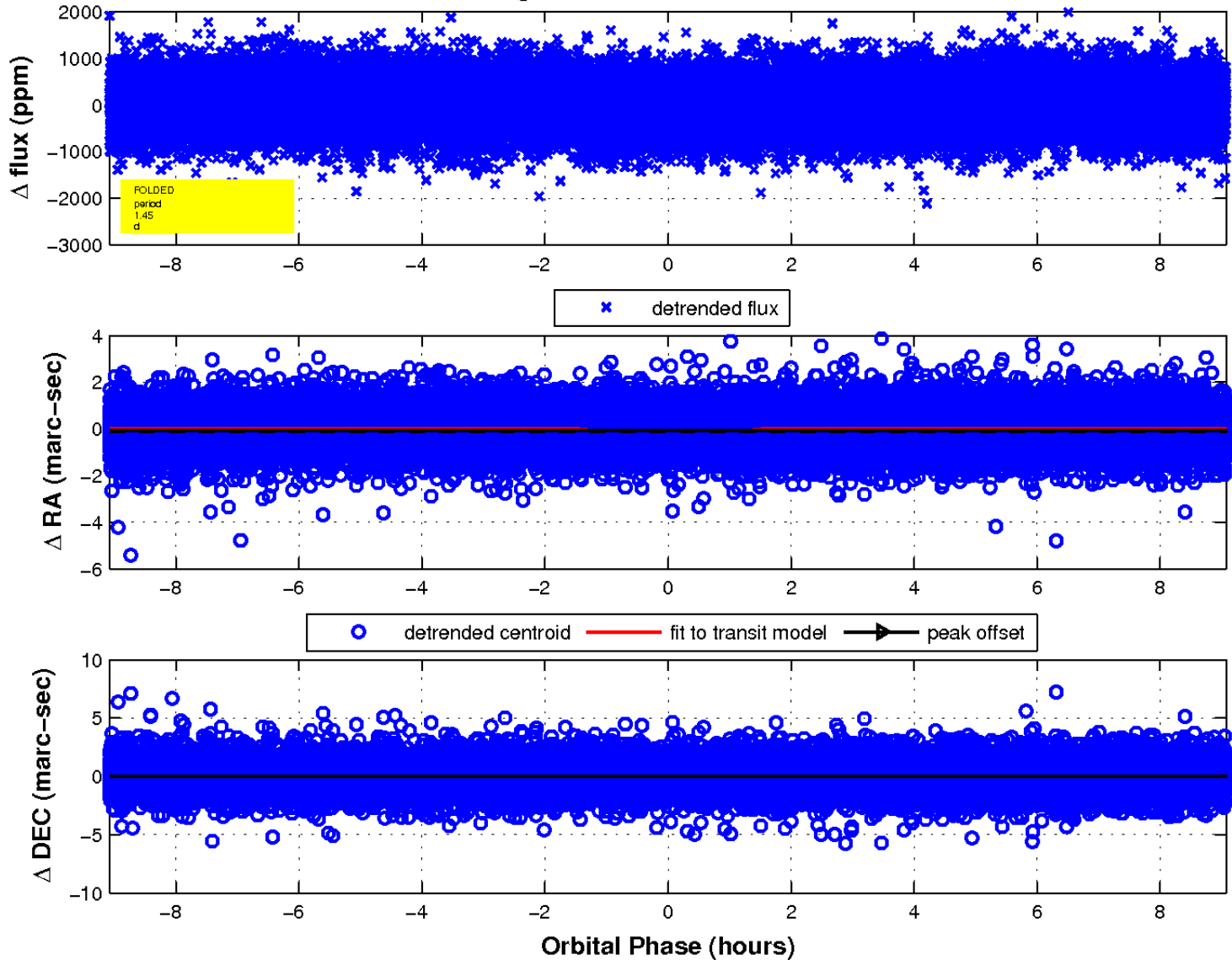
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

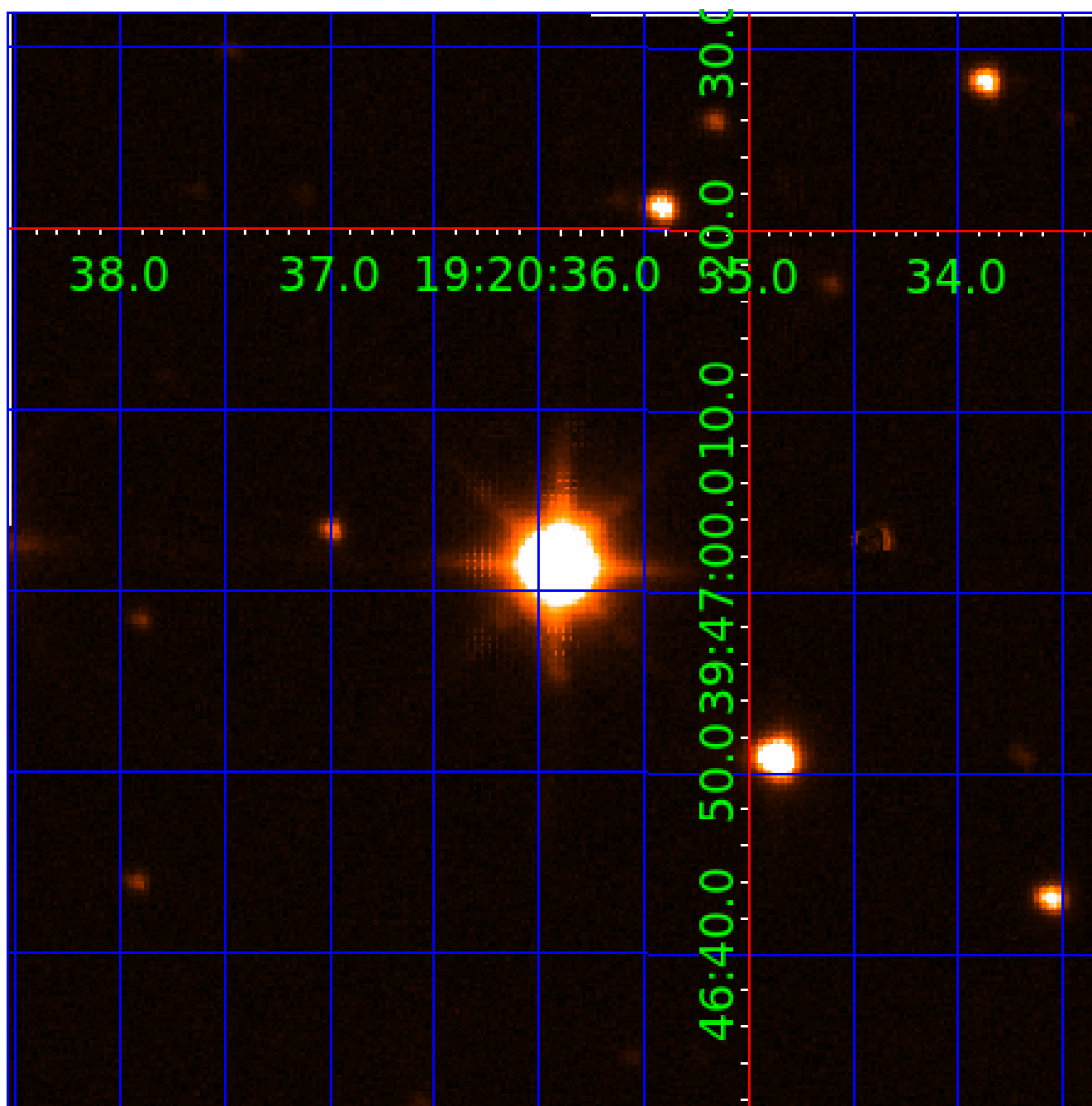


fluxWeightedCentroids, Planet 1 of 3



UKIRT Image

Declination



# KIC 004649476

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004649476-01	OBS	No	1.448706	132.243250	75.2	3.028	9.5	10.5	2.91	8560	2.88	41157.20
004649476-02	OBS	No	1.448717	132.744281	74.7	2.973	9.5	10.5	2.91	8560	2.96	41156.79
004649476-03	OBS	No	1.448847	131.693174	64.1	5.725	10.5	12.8	2.91	8560	2.44	41151.87

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004649476-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
004649476-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD—CENT_SATURATED
004649476-03	OBS	FP	0.00	1	0	0	0	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.

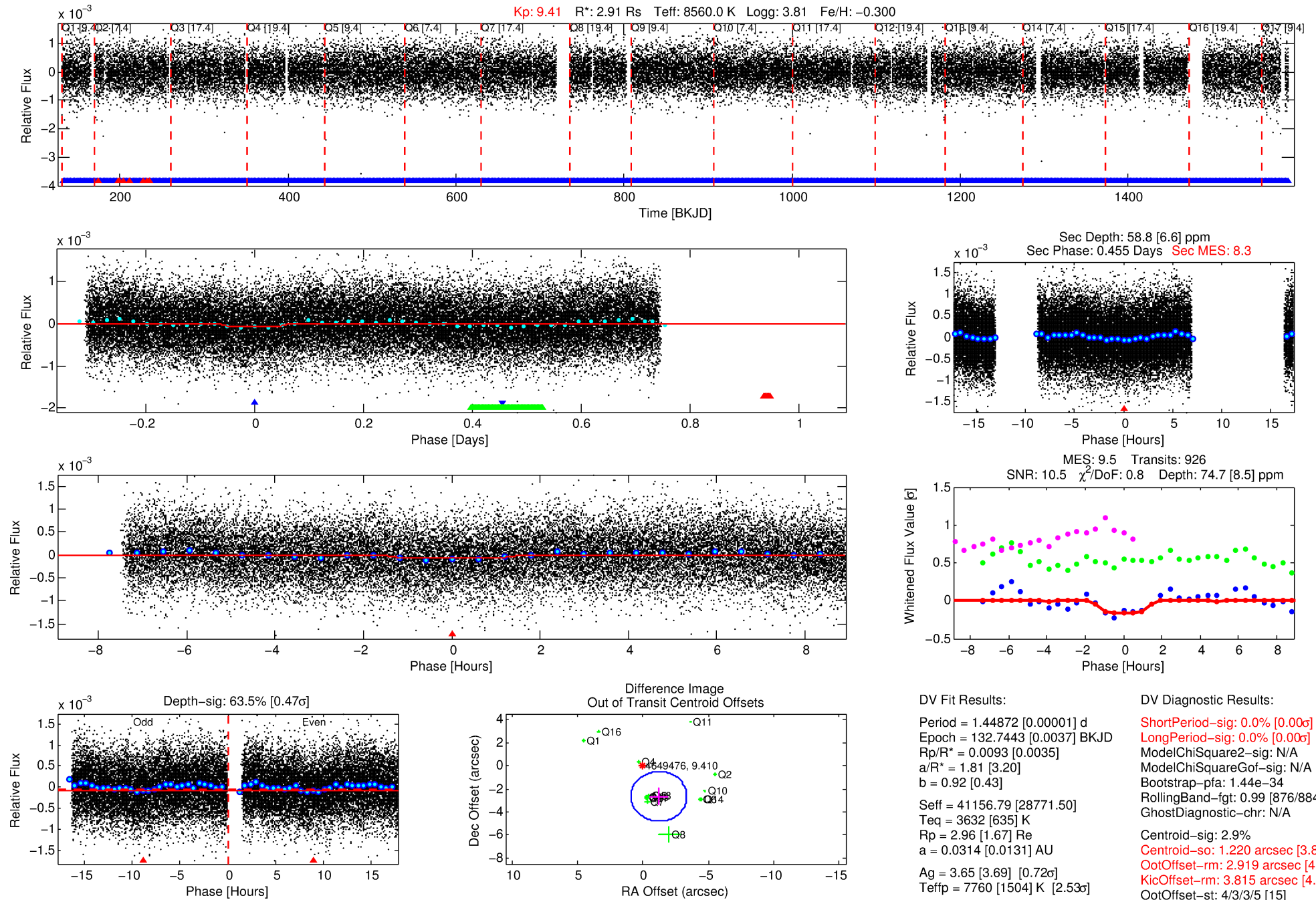
## Ephemeris Match Information For 004649476-02

No Significant Match Found



# DV One-Page Summary

KIC: 4649476 Candidate: 2 of 3 Period: 1.449 d



## DV Fit Results:

Period = 1.44872 [0.00001] d  
Epoch = 132.7443 [0.0037] BKJD  
Rp/R\* = 0.0093 [0.0035]  
a/R\* = 1.81 [3.20]  
b = 0.92 [0.43]  
Seff = 41156.79 [28771.50]  
Teq = 3632 [635] K  
Rp = 2.96 [1.67] Re  
a = 0.0314 [0.0131] AU  
Ag = 3.65 [3.69] [0.72σ]  
Teffp = 7760 [1504] K [2.53σ]

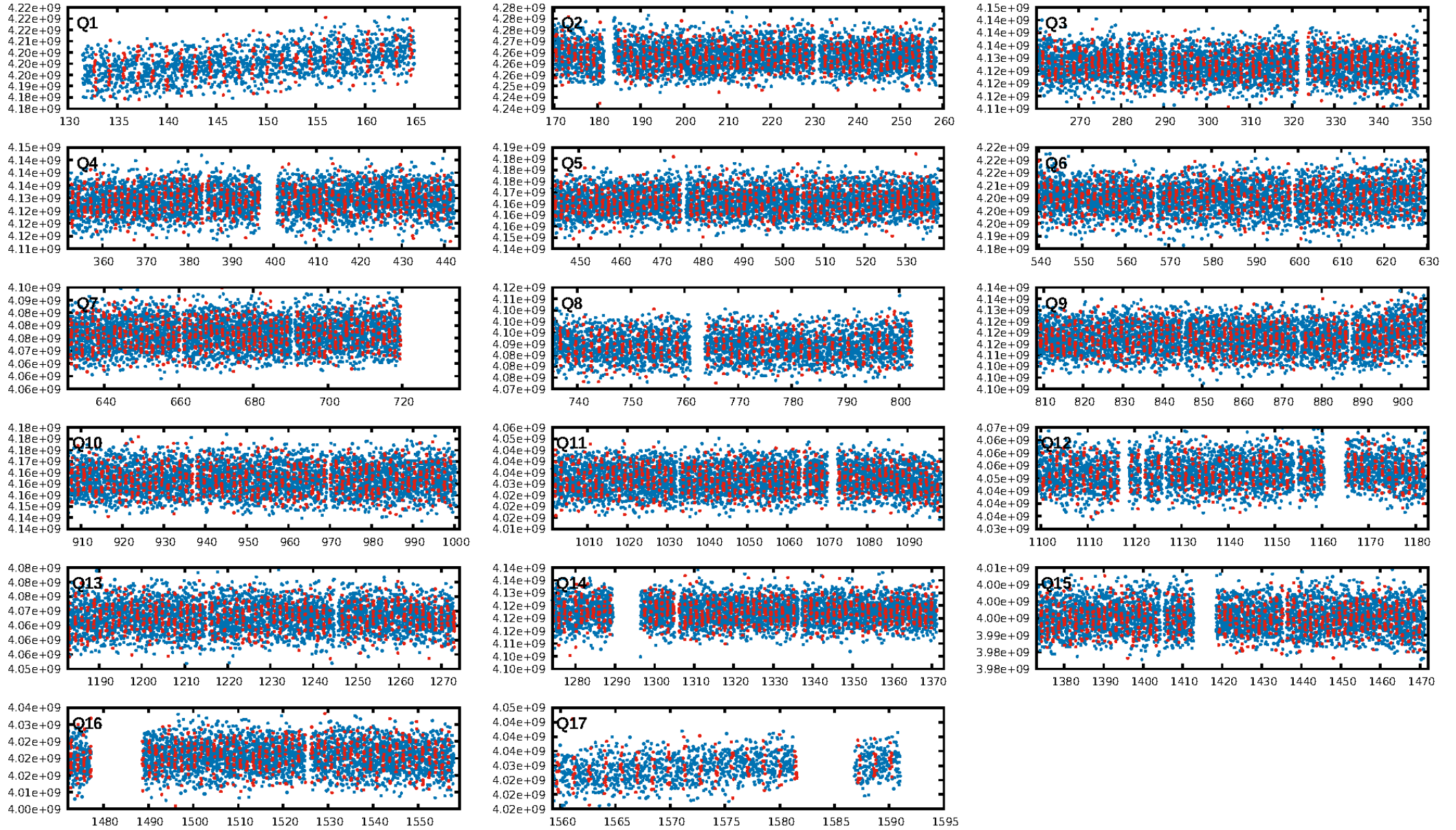
## DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]  
LongPeriod-sig: 0.0% [0.00σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 1.44e-34  
RollingBand-fgt: 0.99 [876/884]  
GhostDiagnostic-chr: N/A  
Centroid-sig: 2.9%  
Centroid-so: 1.220 arcsec [3.81σ]  
OotOffset-rm: 2.919 arcsec [4.08σ]  
KicOffset-rm: 3.815 arcsec [4.81σ]  
OotOffset-st: 4/3/3/5 [15]  
KicOffset-st: 4/3/3/5 [15]  
DiffImageQuality-fgm: 0.00 [0/15]  
DiffImageOverlap-fno: 0.76 [13/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 05:10:44 Z

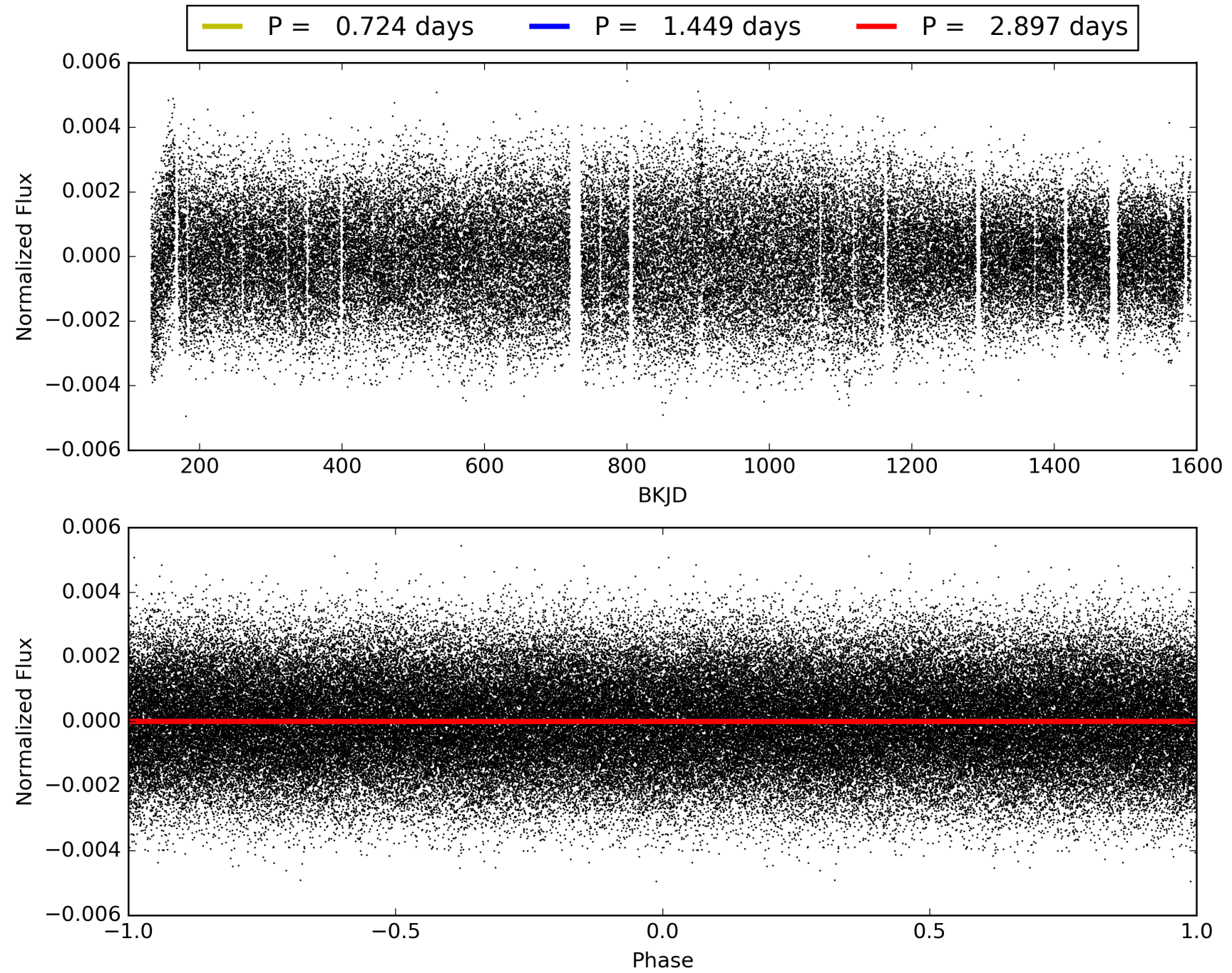
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 004649476-02, PDC Light Curves



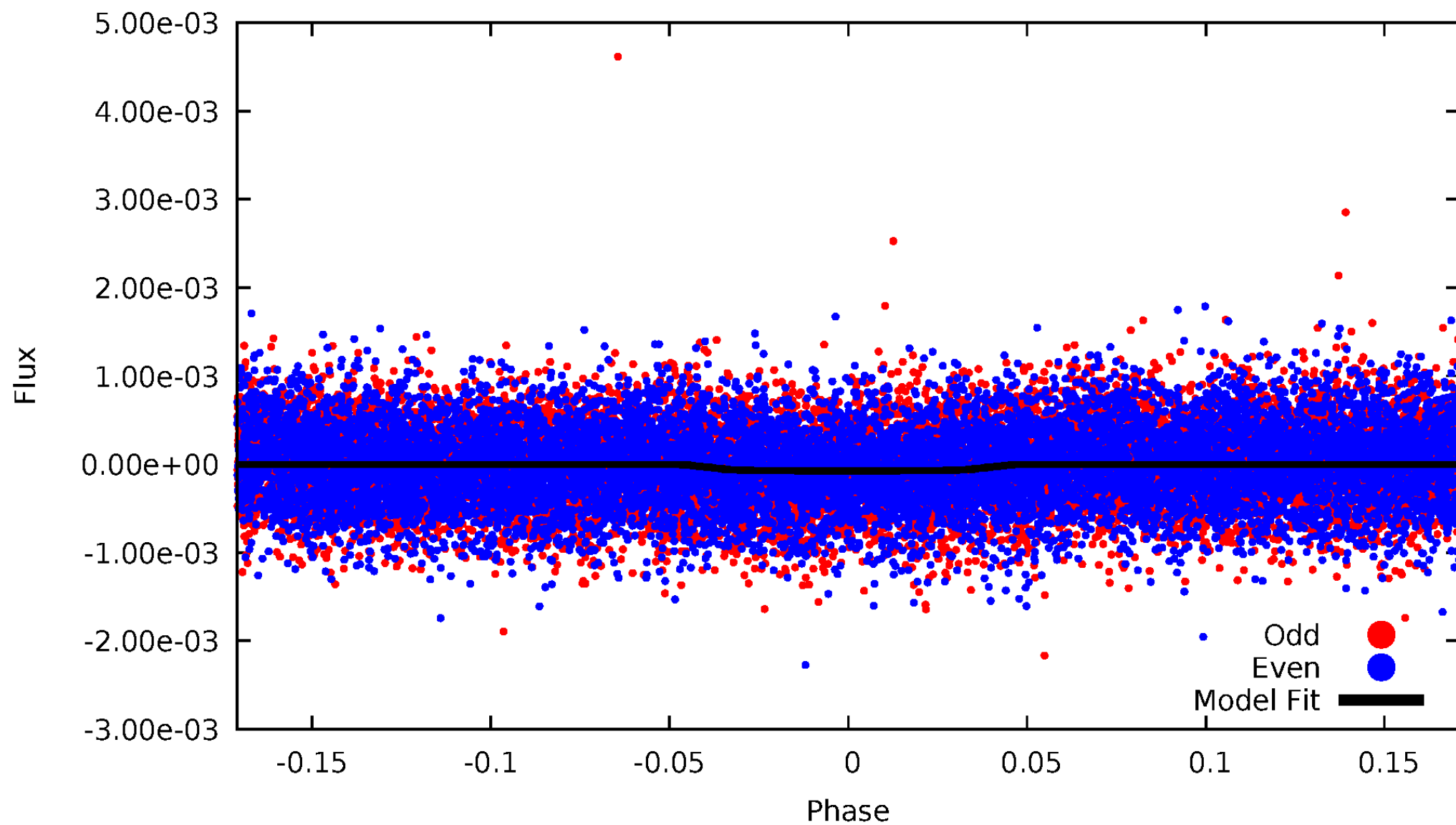


TCE 004649476-02



# DV Odd/Even

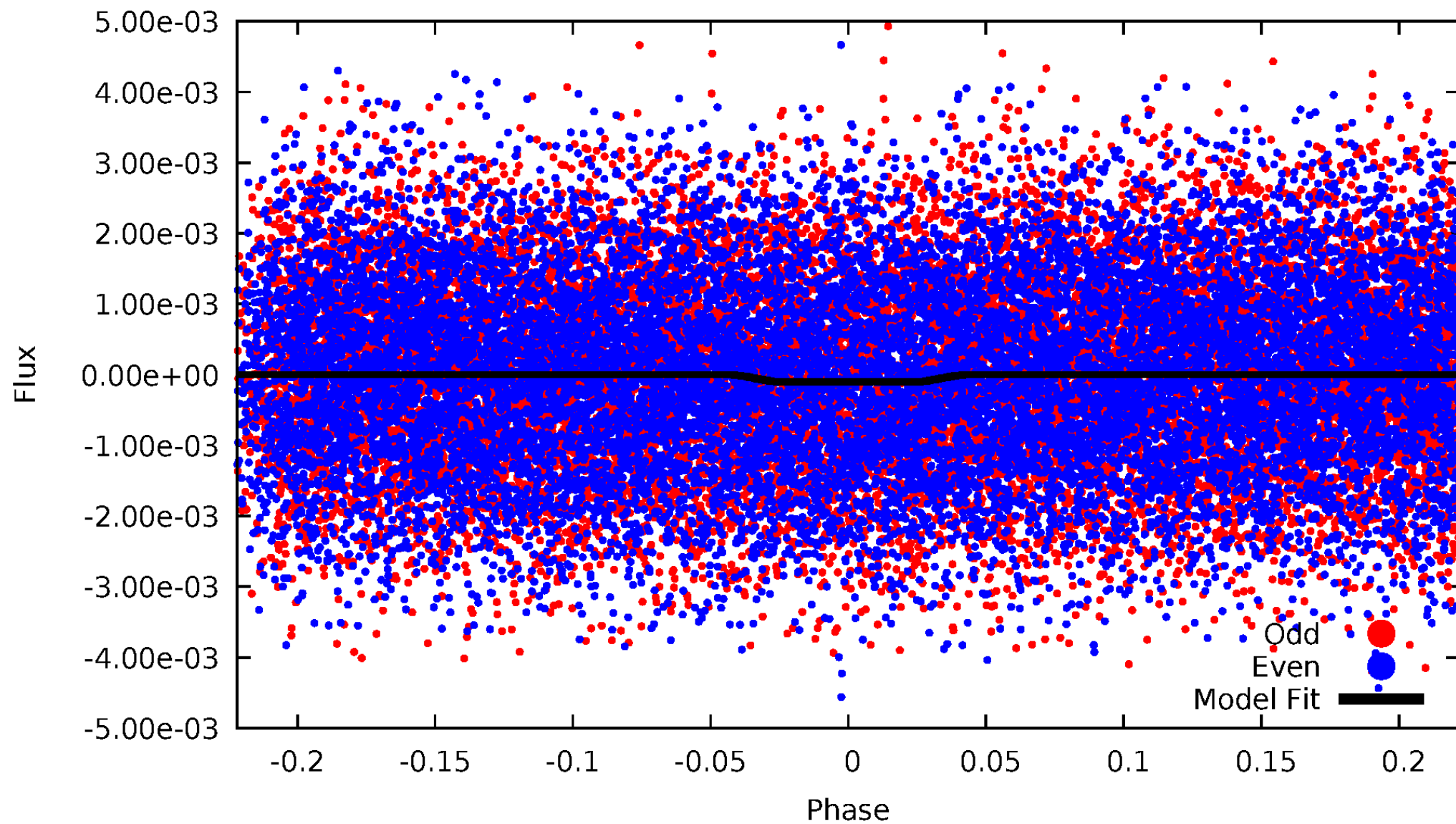
TCE 004649476-02





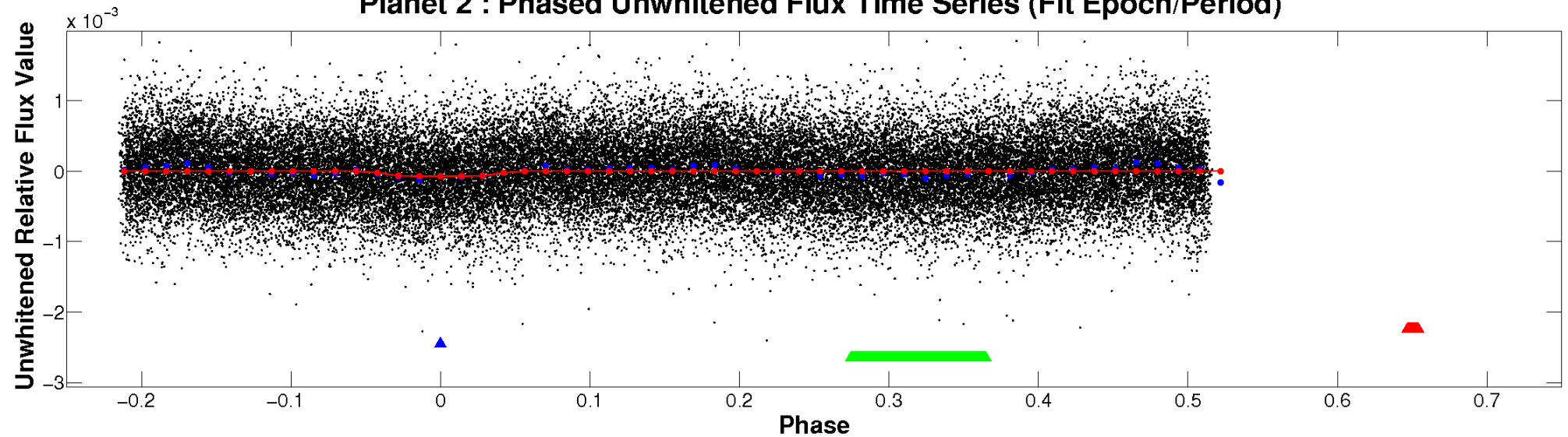
# ALT Odd/Even

TCE 004649476-02

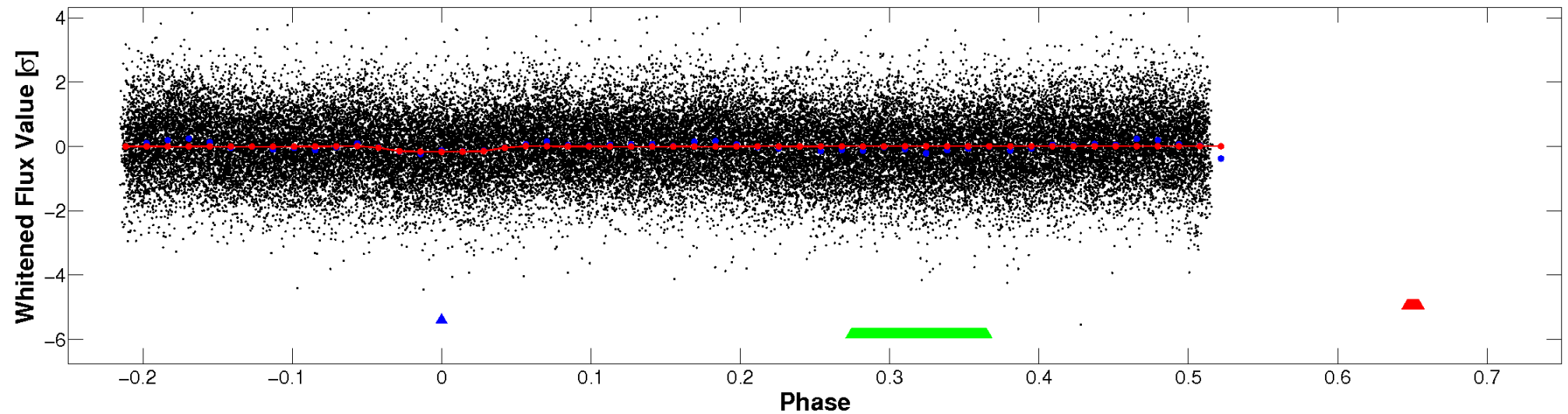


# Non-Whitened Vs. Whitened Light Curve

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

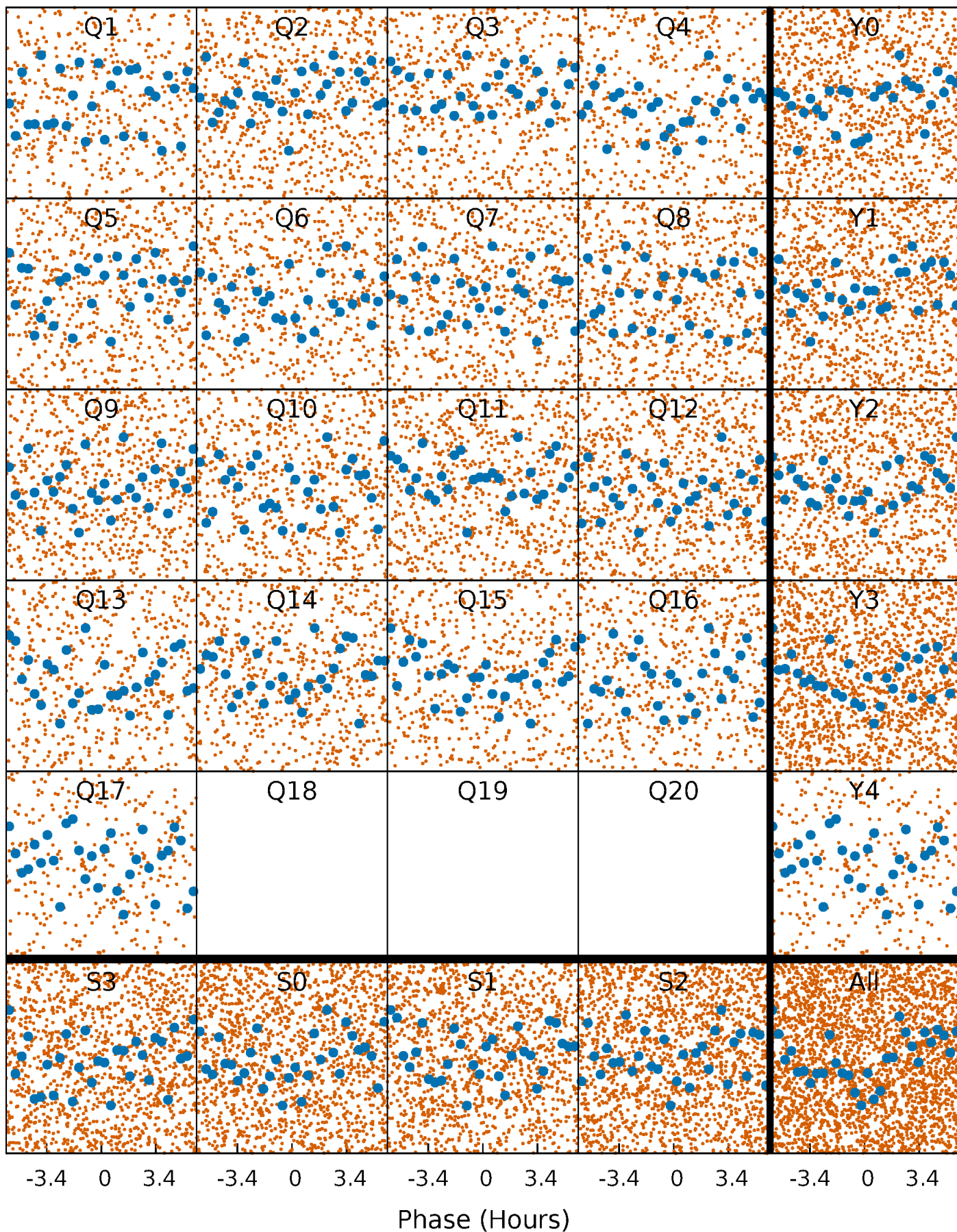


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

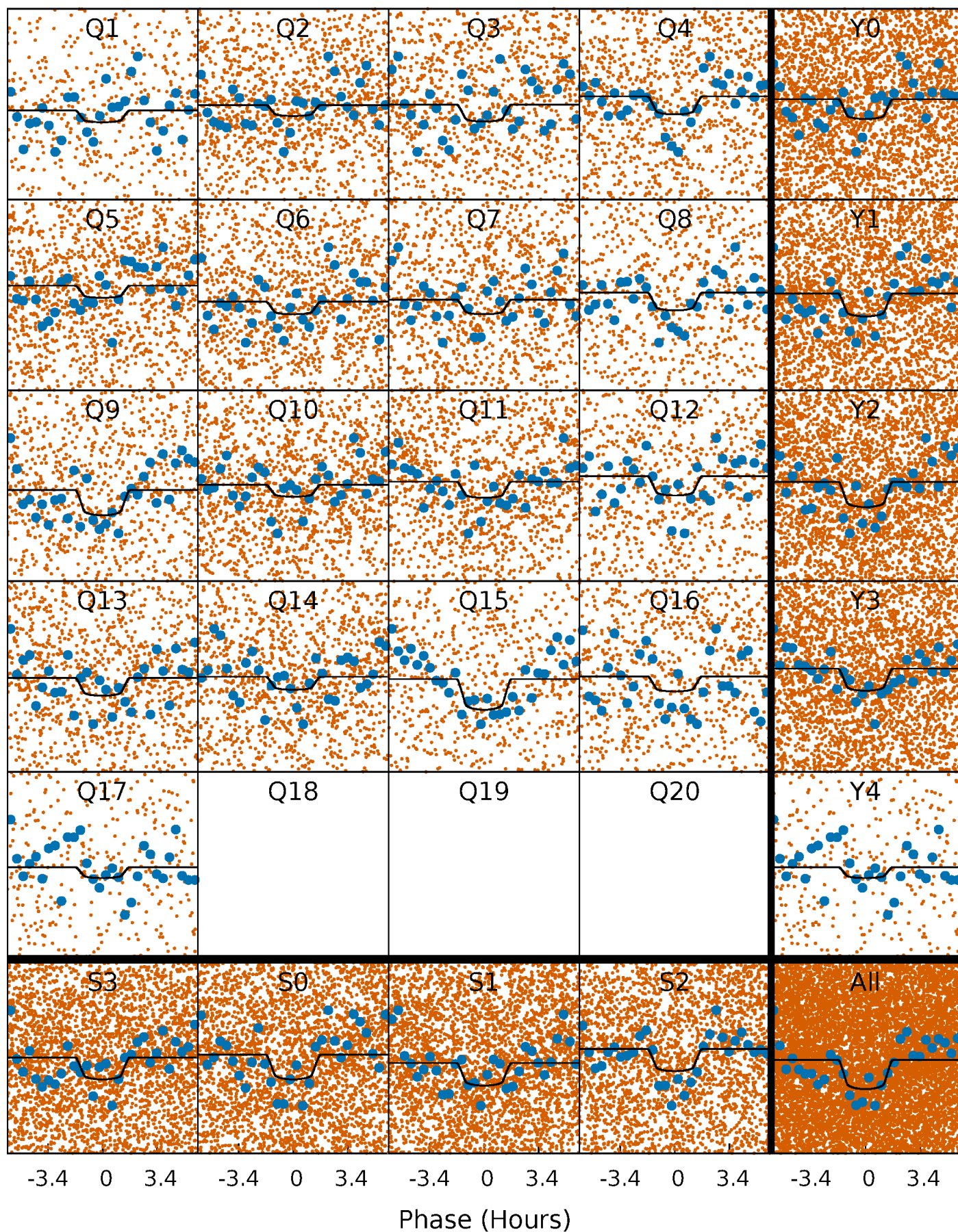
TCE 004649476-02 P= 1.448717 Days  $T_0=132.744281$  (BKJD)





# DV Quarter-Phased Transit Curves

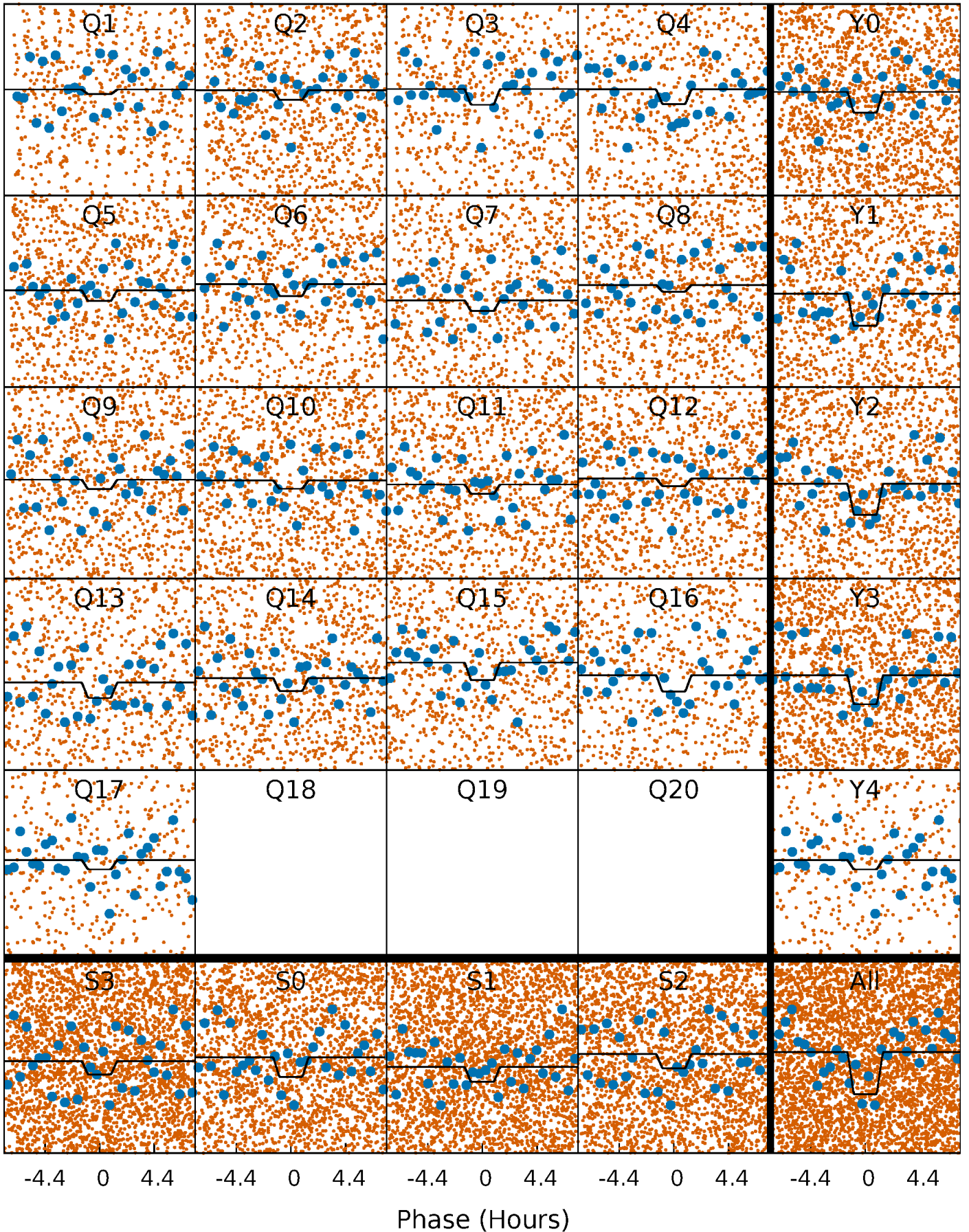
TCE 004649476-02 P= 1.448717 Days  $T_0=132.744281$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

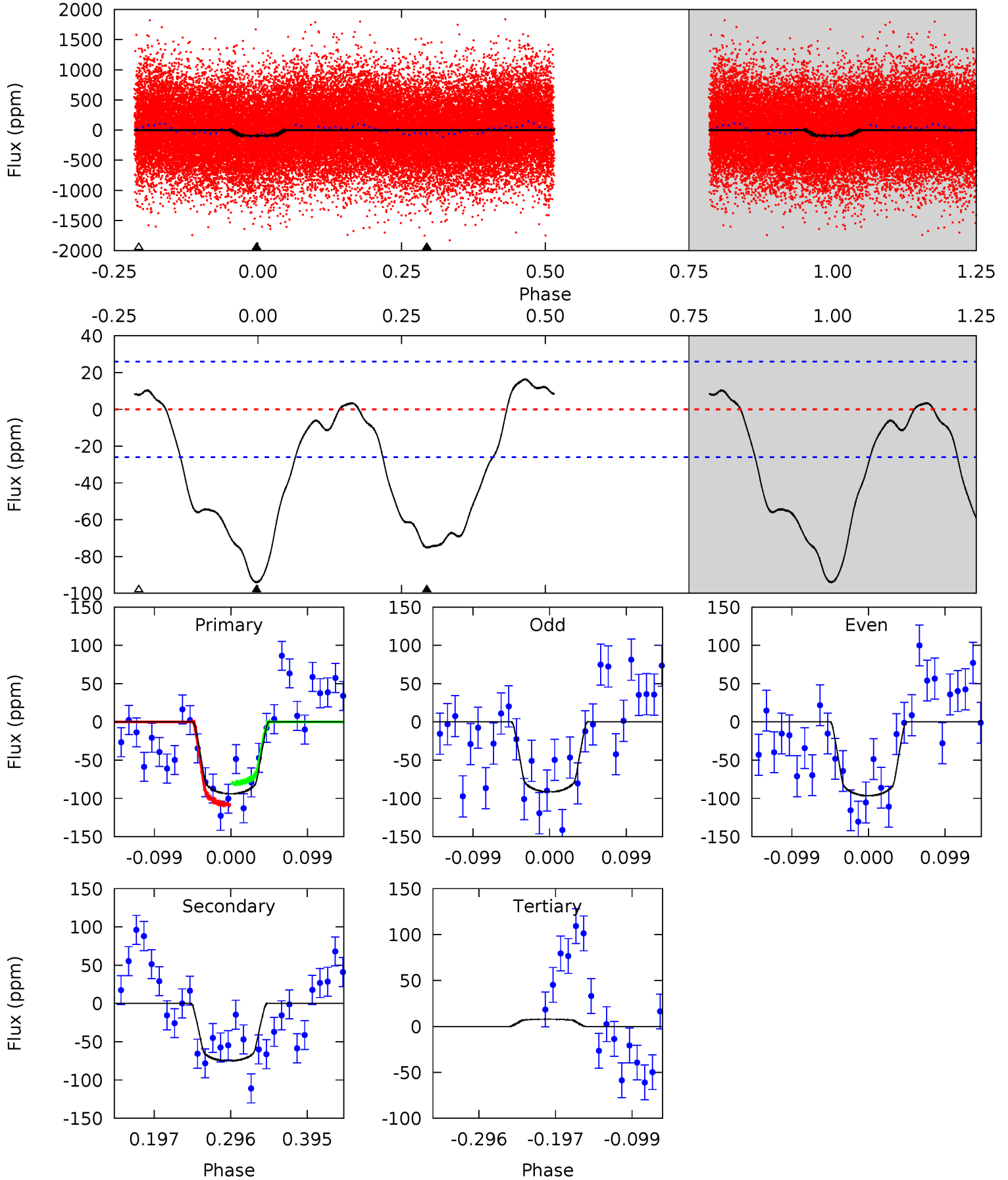
TCE 004649476-02   P= 1.448748 Days    $T_0=132.729497$  (BKJD)



# DV Model-Shift Uniqueness Test

004649476-02, P = 1.448717 Days, E = 131.295564 Days

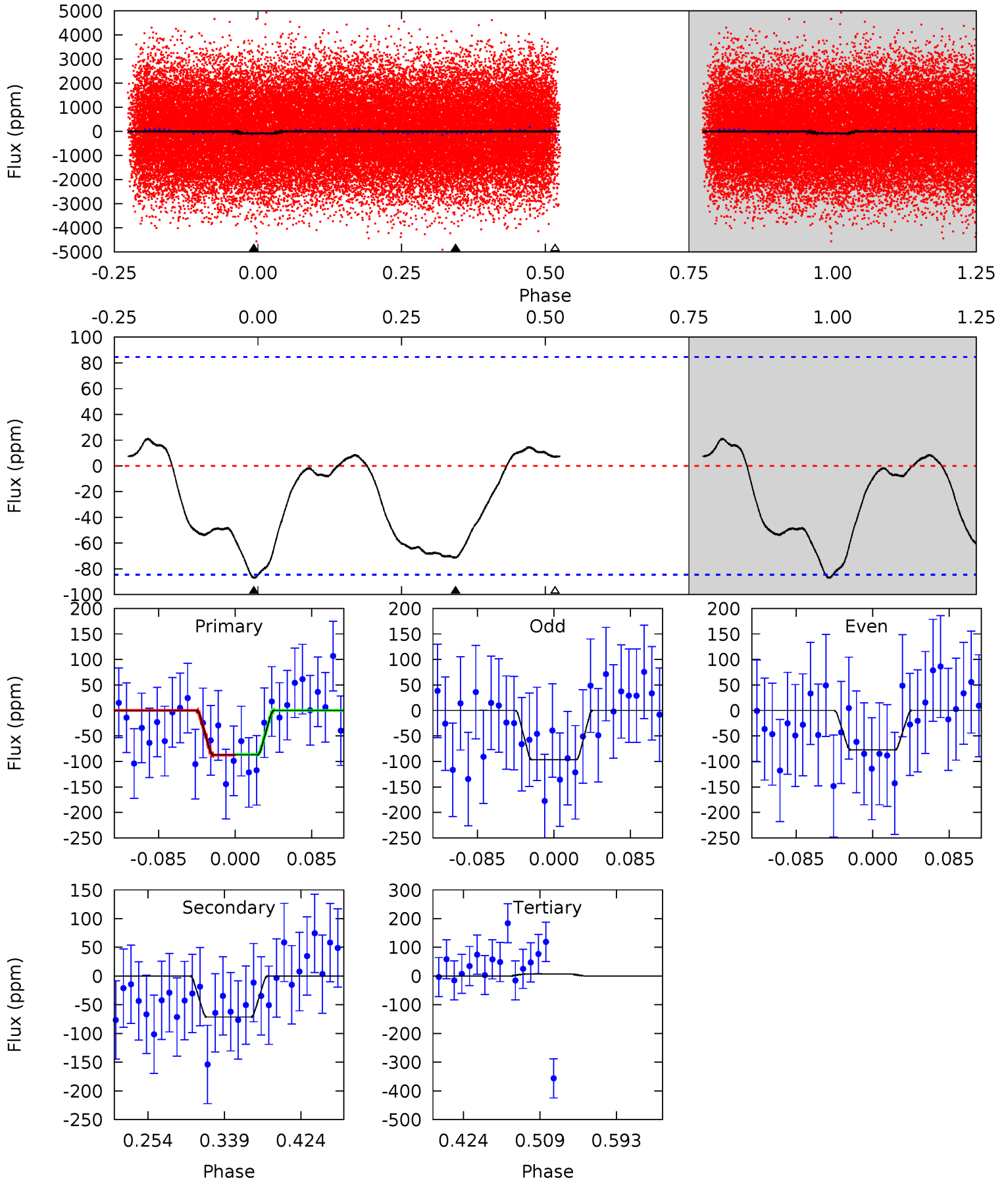
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
16.5	13.2	-1.38	0	4.57	1.65	3.24	17.9	16.5	14.6	13.2	0.44	1.00	0.15	2.47



# Alt Model-Shift Uniqueness Test

004649476-02, P = 1.448748 Days, E = 131.280749 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
4.72	3.88	-0.38	0	4.60	1.72	1.30	5.10	4.72	4.26	3.88	0.52	0.97	0.19	0.04



### Stellar Parameters For KIC 004649476

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$8560^{+237}_{-385}$	$3.806^{+0.400}_{-0.071}$	$-0.300^{+0.200}_{-0.350}$	$2.907^{+0.351}_{-1.228}$	$1.972^{+0.352}_{-0.470}$	$0.113^{+0.412}_{-0.027}$
	+3%/-4%	+11%/-2%	+67%/-117%	+12%/-42%	+18%/-24%	+365%/-24%
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 004649476-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-75 \pm 6$	$2.67^{+1.33}_{-1.04}$	$4880^{+360}_{-463}$	$8037^{+2977}_{-1485}$	$5.693^{+9.090}_{-3.067}$
Alt.	$-71 \pm 18$	$2.90^{+1.26}_{-1.14}$	$4899^{+331}_{-545}$	$7383^{+2722}_{-1268}$	$4.539^{+7.582}_{-2.292}$

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



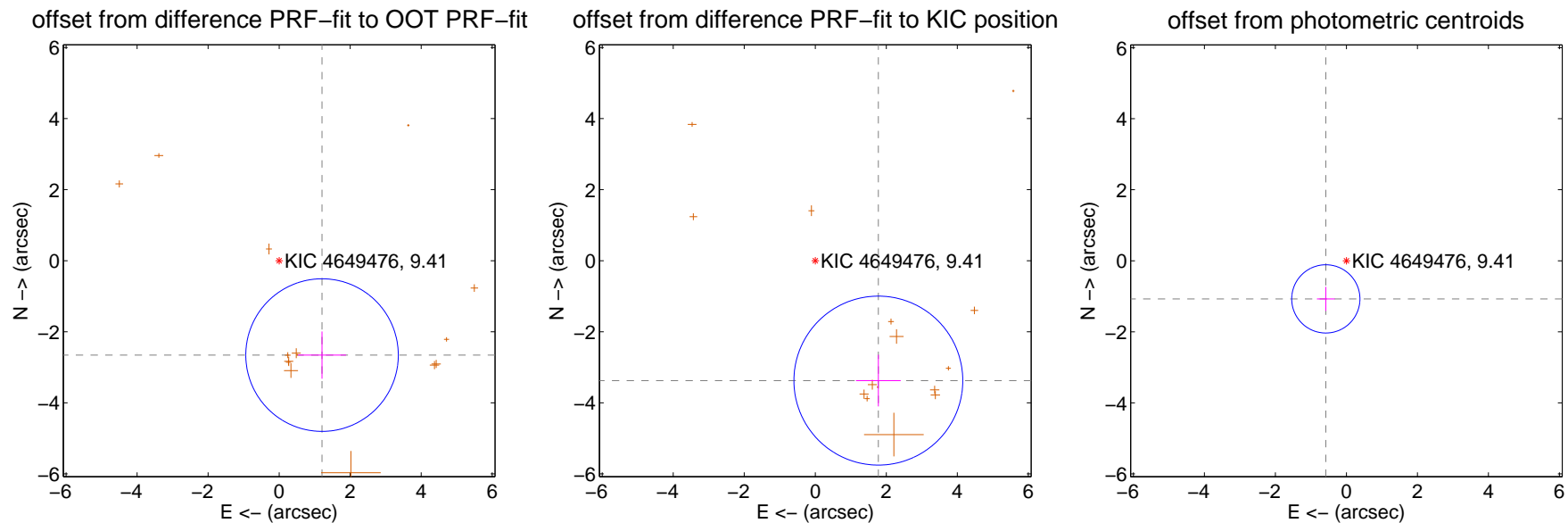
## DV Centroid Data

Supplemental centroid analysis for 004649476-02. **Kepler magnitude: 9.41.** Transit SNR 10.54

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

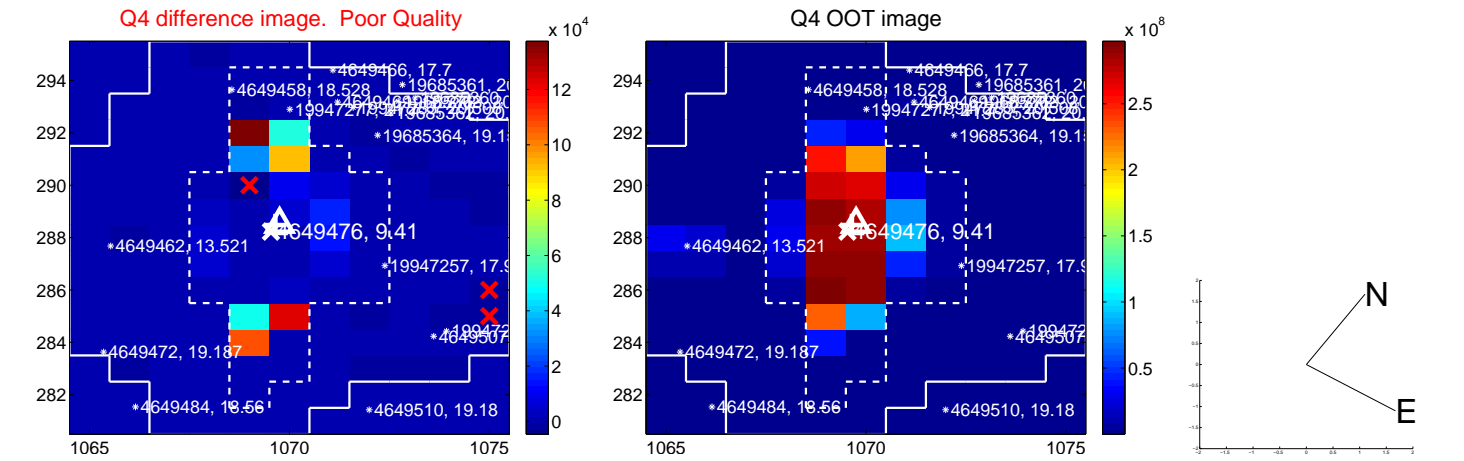
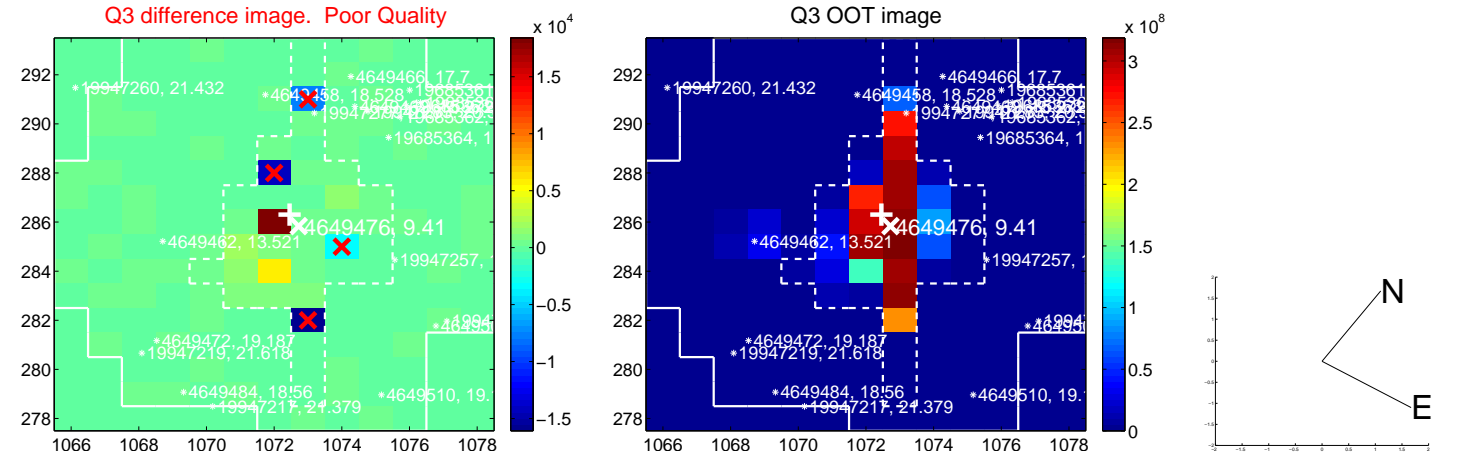
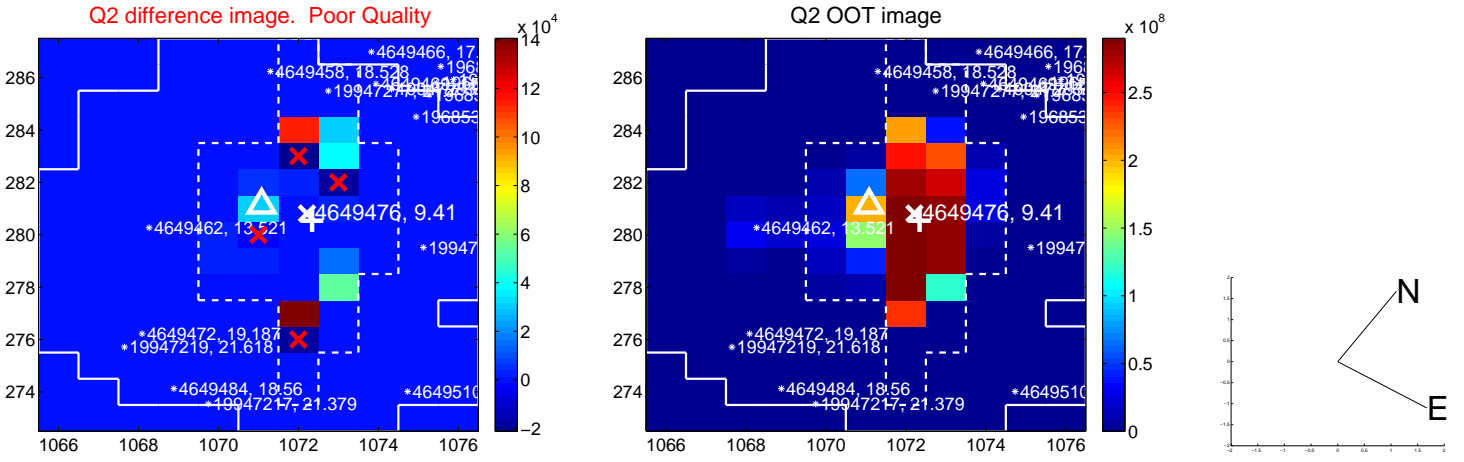
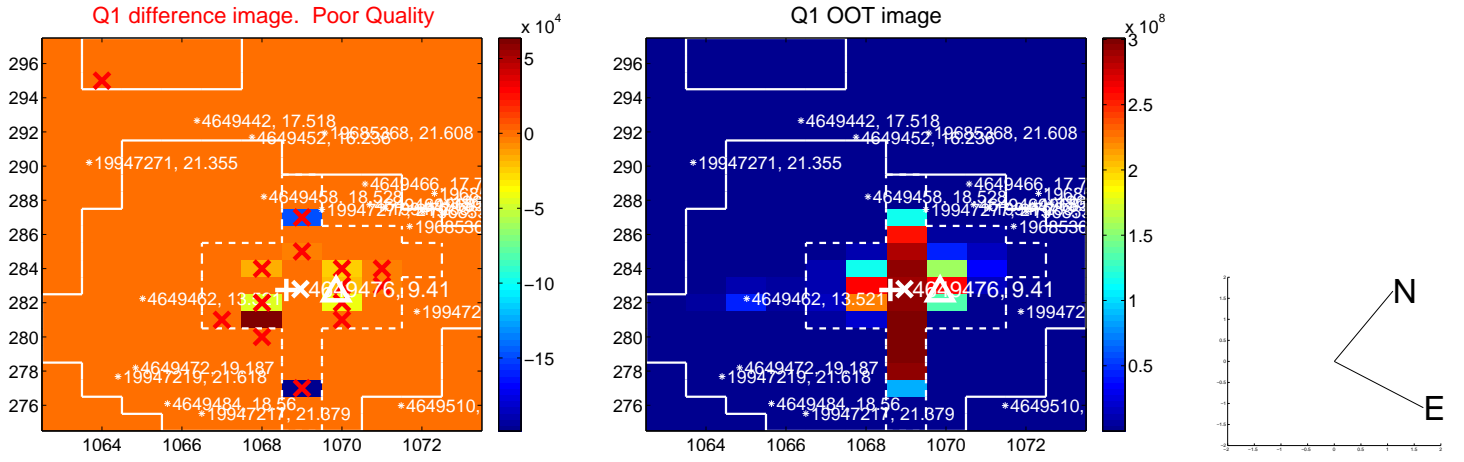
The direct PRF centroid is offset from the target star catalog position by about 1.44 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b><math>2.919 \pm 0.716</math></b>	<b>4.08</b>	$-1.208 \pm 0.676$	$-2.657 \pm 0.664$
PRF-fit source offset from KIC position	<b><math>3.815 \pm 0.793</math></b>	<b>4.81</b>	$-1.777 \pm 0.630$	$-3.375 \pm 0.727$
photometric centroid source offset	<b><math>1.22 \pm 0.32</math></b>	<b>3.81</b>	$0.58 \pm 0.25$	$-1.07 \pm 0.34$

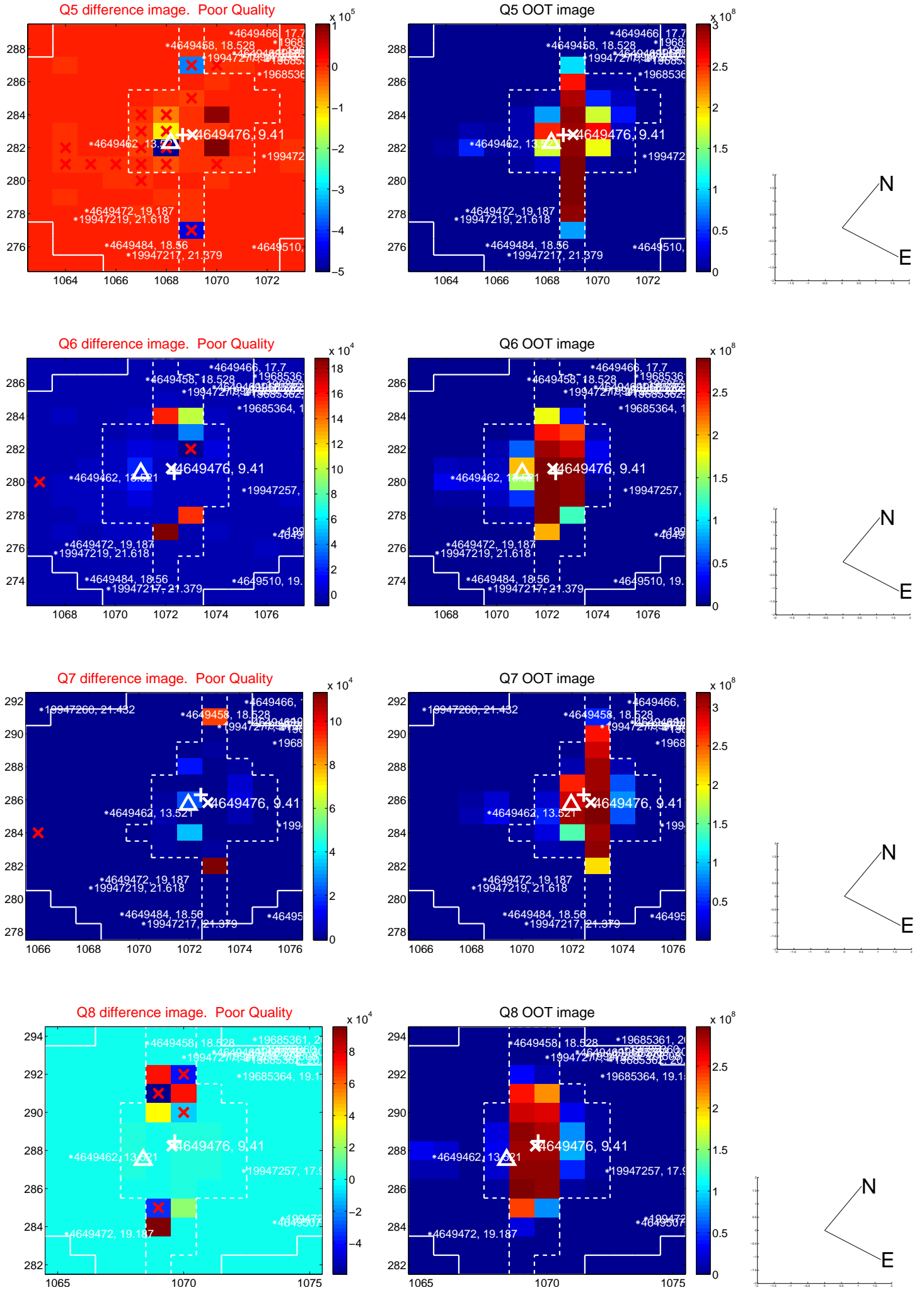


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

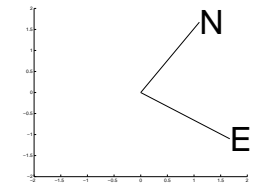
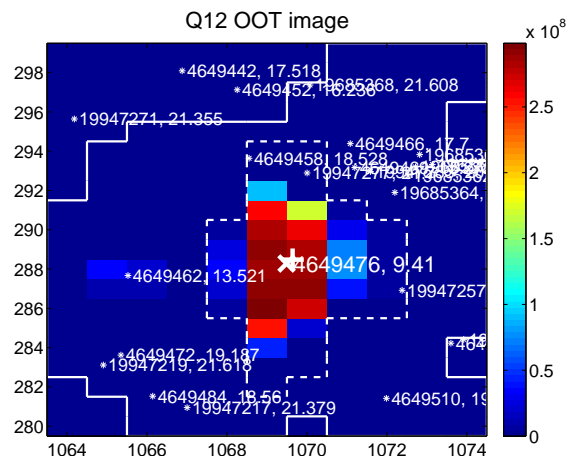
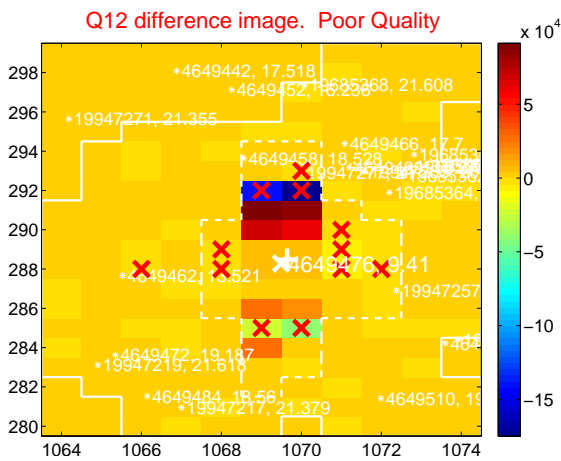
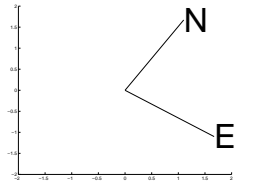
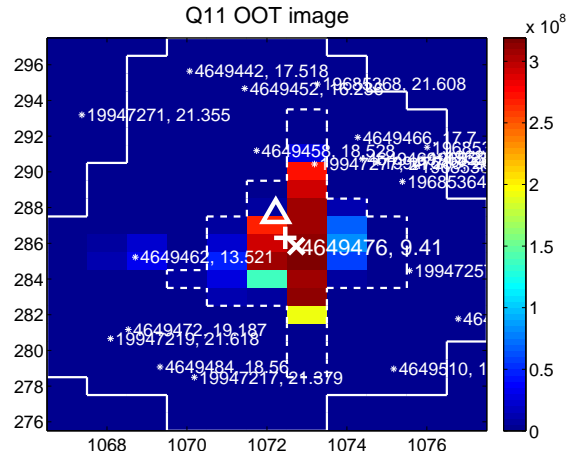
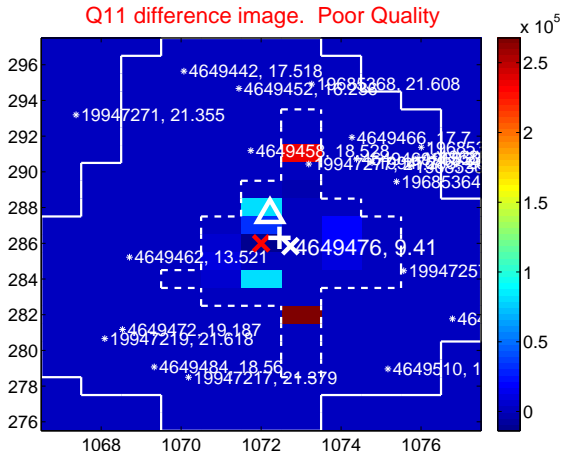
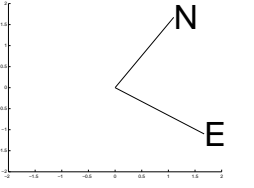
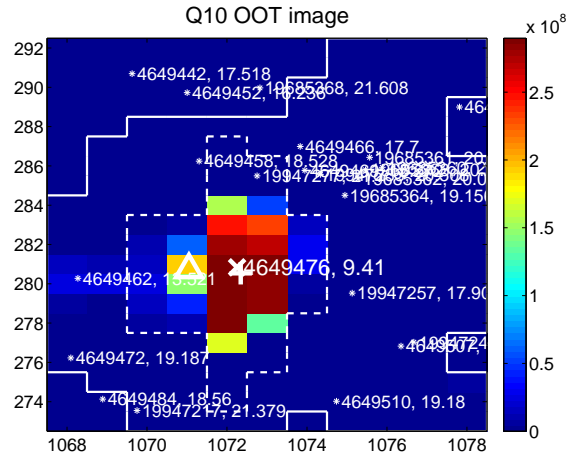
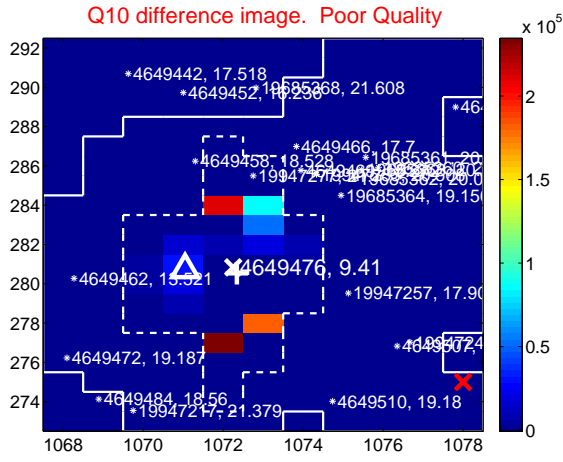
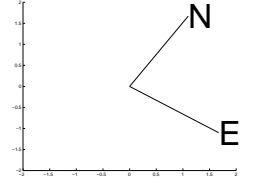
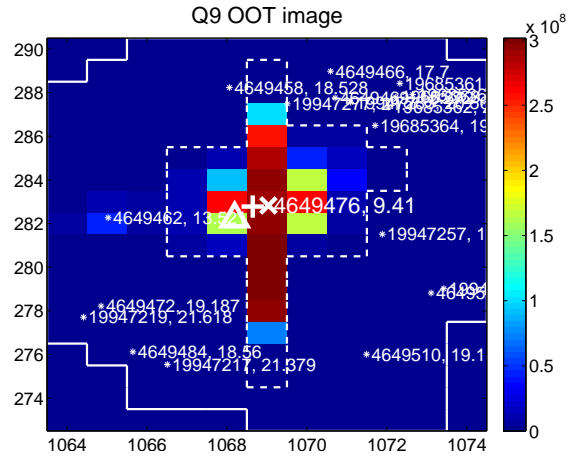
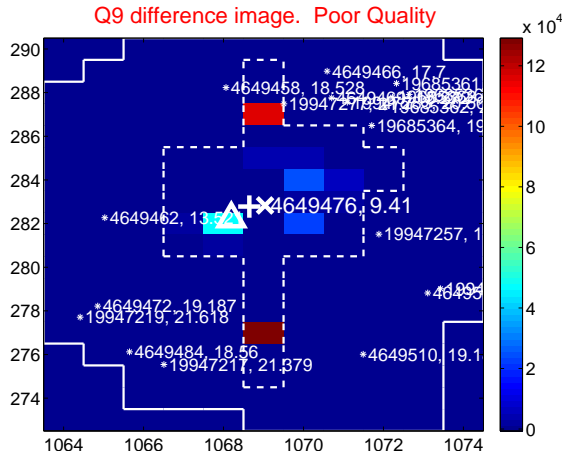
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



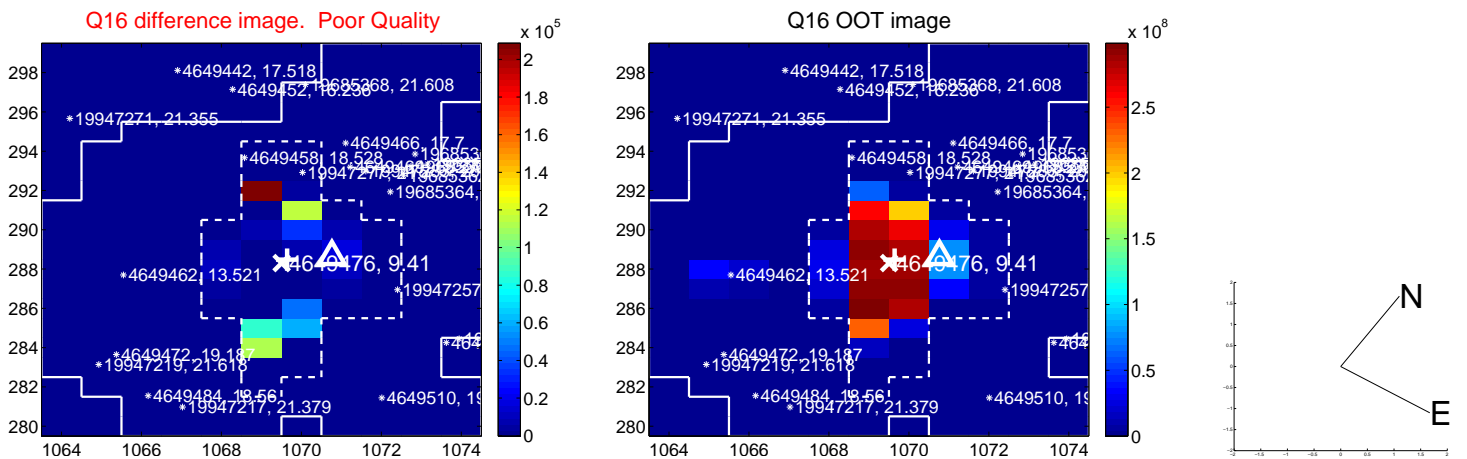
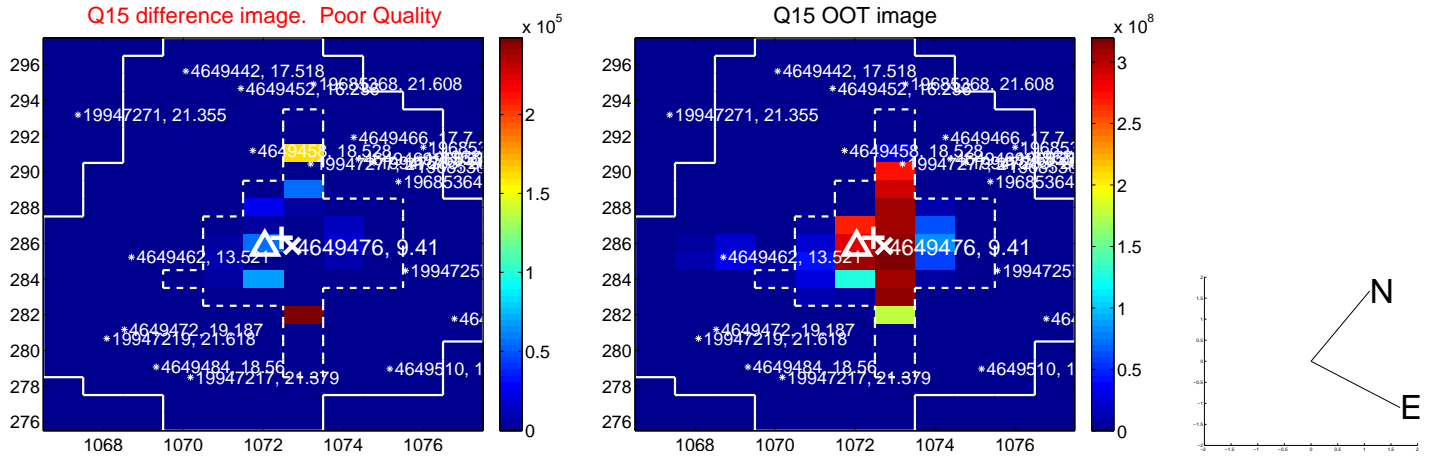
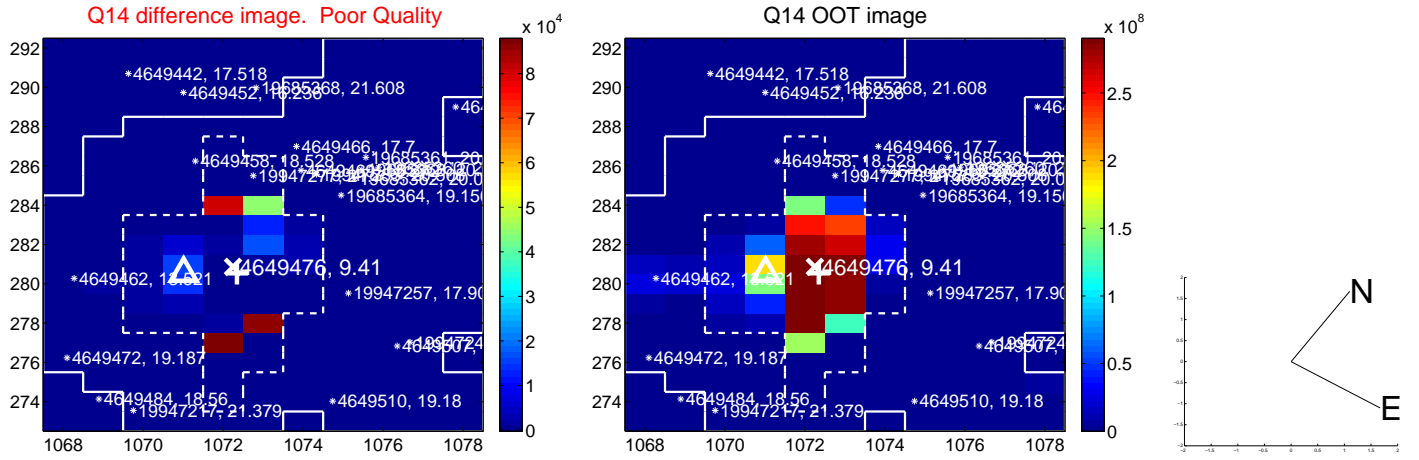
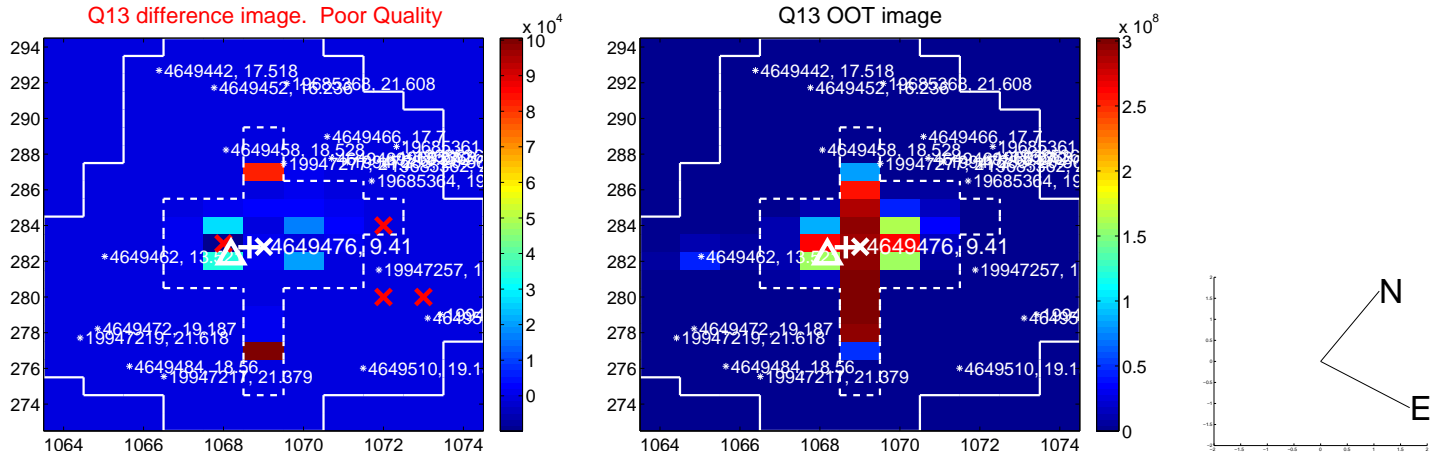
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

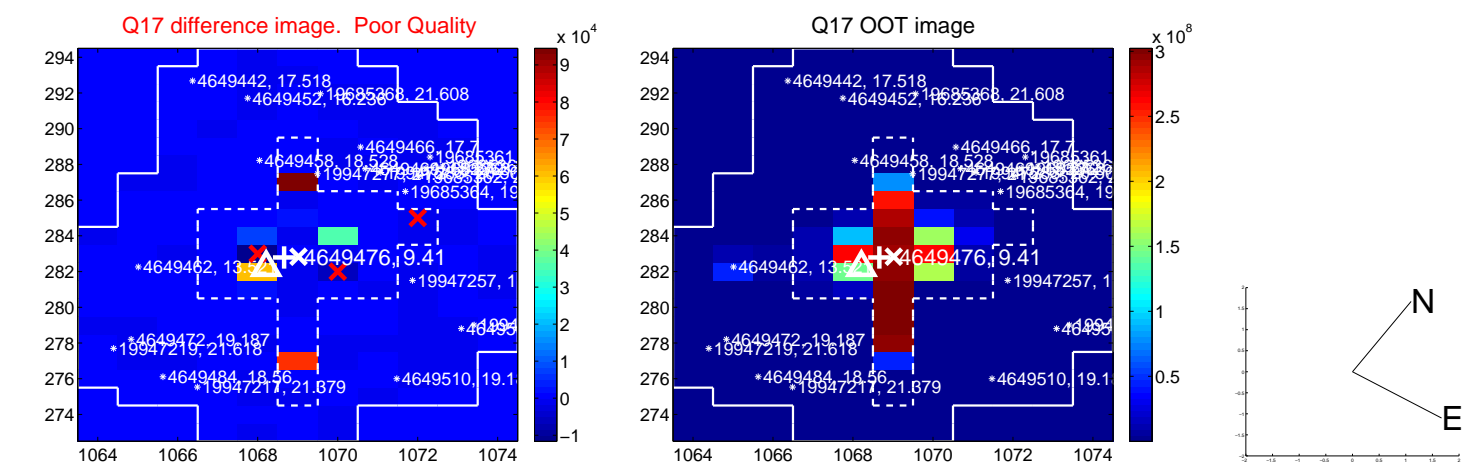


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

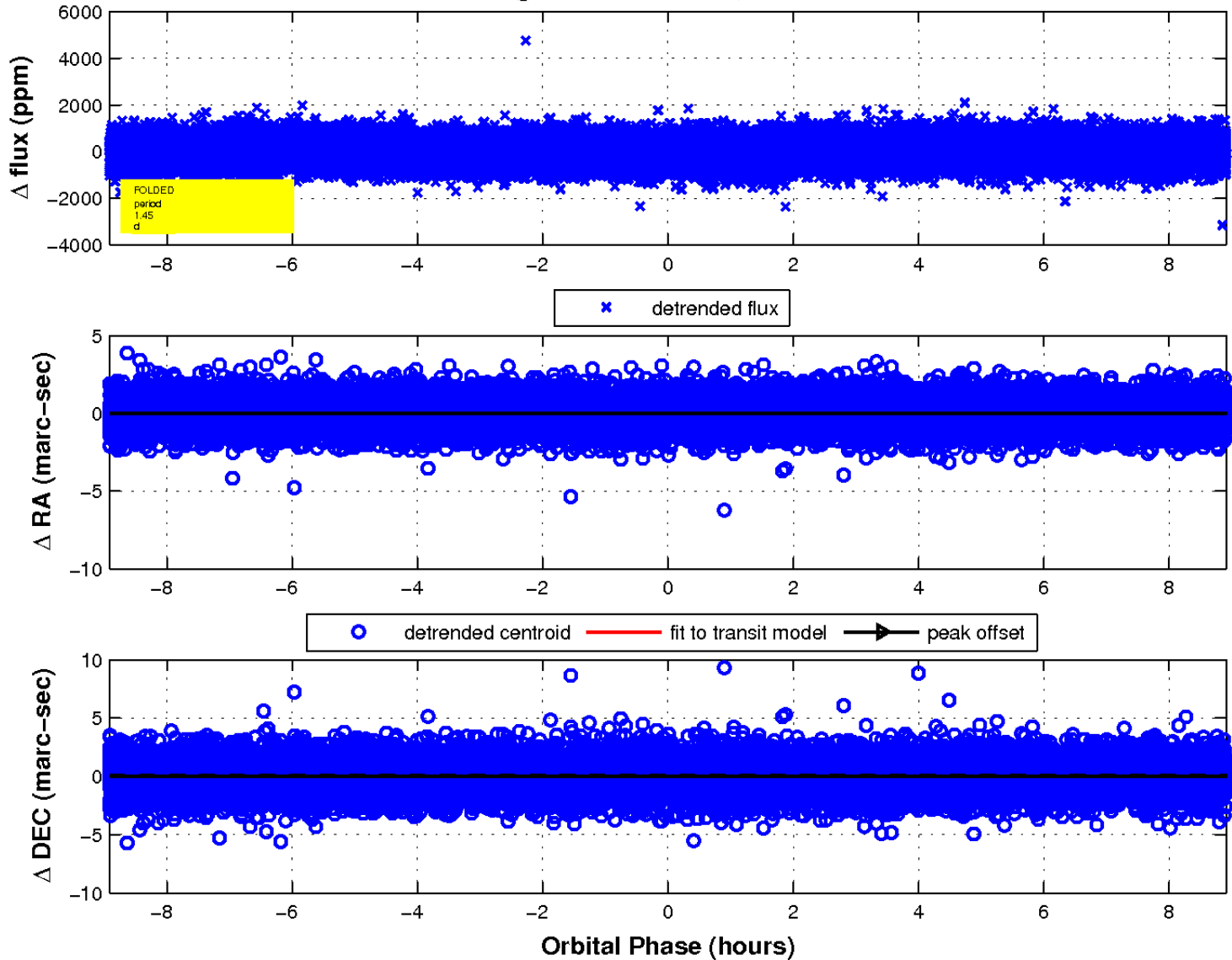




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\Delta$ : difference centroid. red  $\times$ : large negative pixel value.



fluxWeightedCentroids, Planet 2 of 3



Declination

# KIC 004649476

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004649476-01	OBS	No	1.448706	132.243250	75.2	3.028	9.5	10.5	2.91	8560	2.88	41157.20
004649476-02	OBS	No	1.448717	132.744281	74.7	2.973	9.5	10.5	2.91	8560	2.96	41156.79
004649476-03	OBS	No	1.448847	131.693174	64.1	5.725	10.5	12.8	2.91	8560	2.44	41151.87

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004649476-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
004649476-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD—CENT_SATURATED
004649476-03	OBS	FP	0.00	1	0	0	0	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.

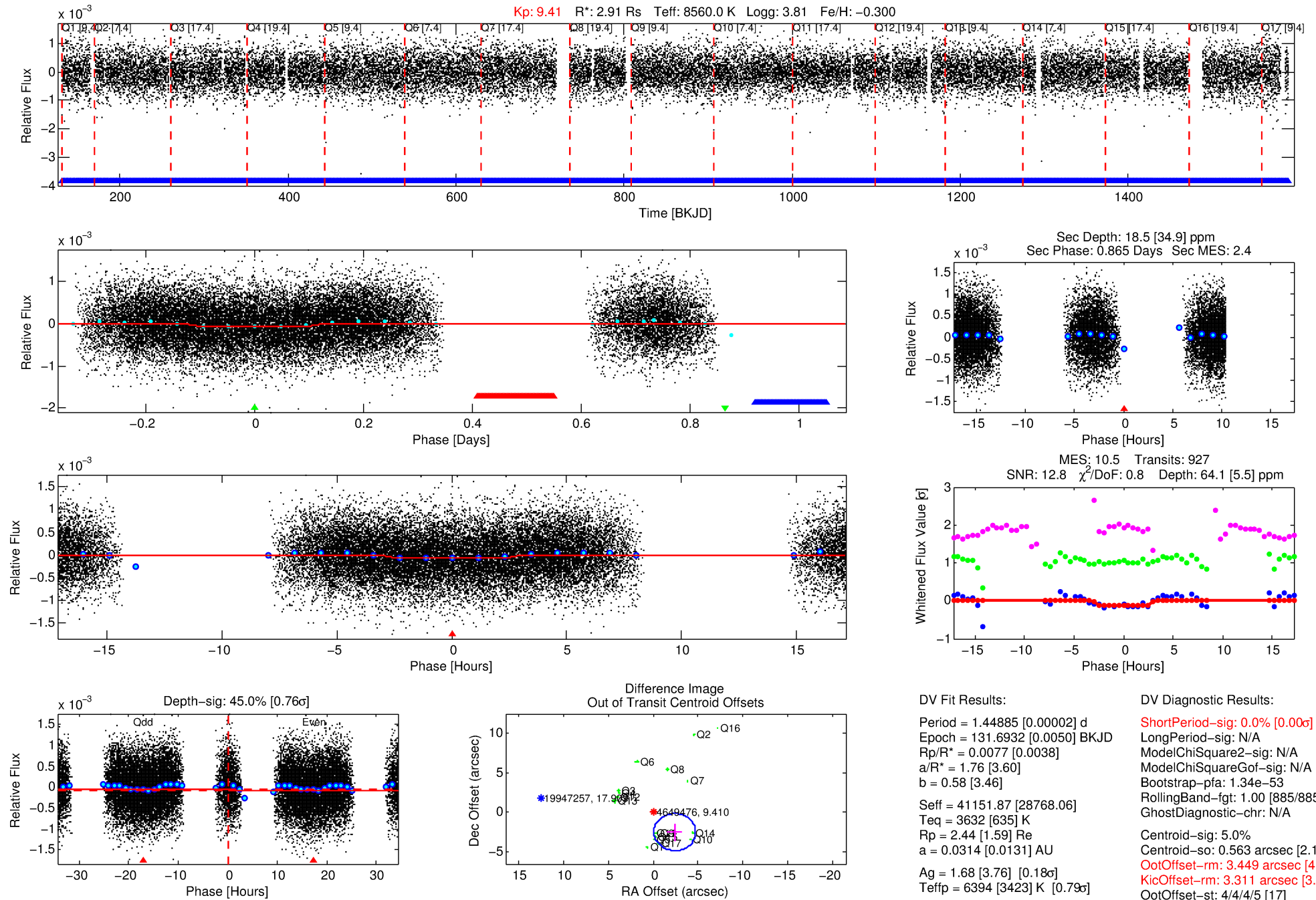
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 004649476-03

No Significant Match Found

# DV One-Page Summary

KIC: 4649476 Candidate: 3 of 3 Period: 1.449 d



## DV Fit Results:

Period = 1.44885 [0.00002] d  
Epoch = 131.6932 [0.0050] BKJD  
Rp/R\* = 0.0077 [0.0038]  
a/R\* = 1.76 [3.60]  
b = 0.58 [3.46]  
Seff = 41151.87 [28768.06]  
Teff = 3632 [635] K  
Rp = 2.44 [1.59] Re  
a = 0.0314 [0.0131] AU  
Ag = 1.68 [3.76] [0.18 $\sigma$ ]  
Teffp = 6394 [3423] K [0.79 $\sigma$ ]

## DV Diagnostic Results:

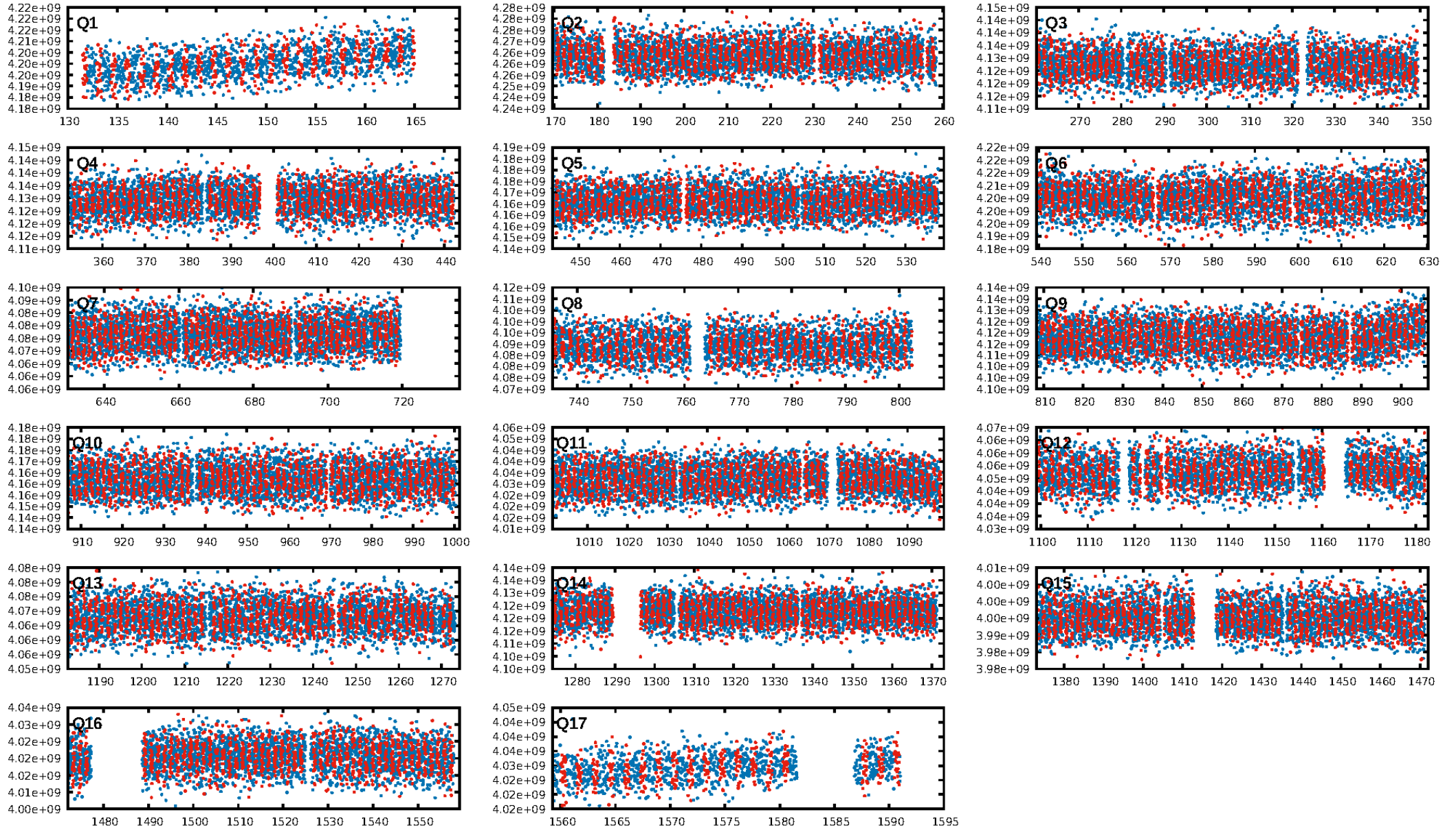
ShortPeriod-sig: 0.0% [0.00 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 1.34e-53  
RollingBand-fgt: 1.00 [885/885]  
GhostDiagnostic-chr: N/A  
Centroid-sig: 5.0%  
Centroid-so: 0.563 arcsec [2.17 $\sigma$ ]  
OotOffset-rm: 3.449 arcsec [4.42 $\sigma$ ]  
KicOffset-rm: 3.311 arcsec [3.10 $\sigma$ ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 0.00 [0/17]  
DiffImageOverlap-fno: 0.00 [0/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 05:10:54 Z

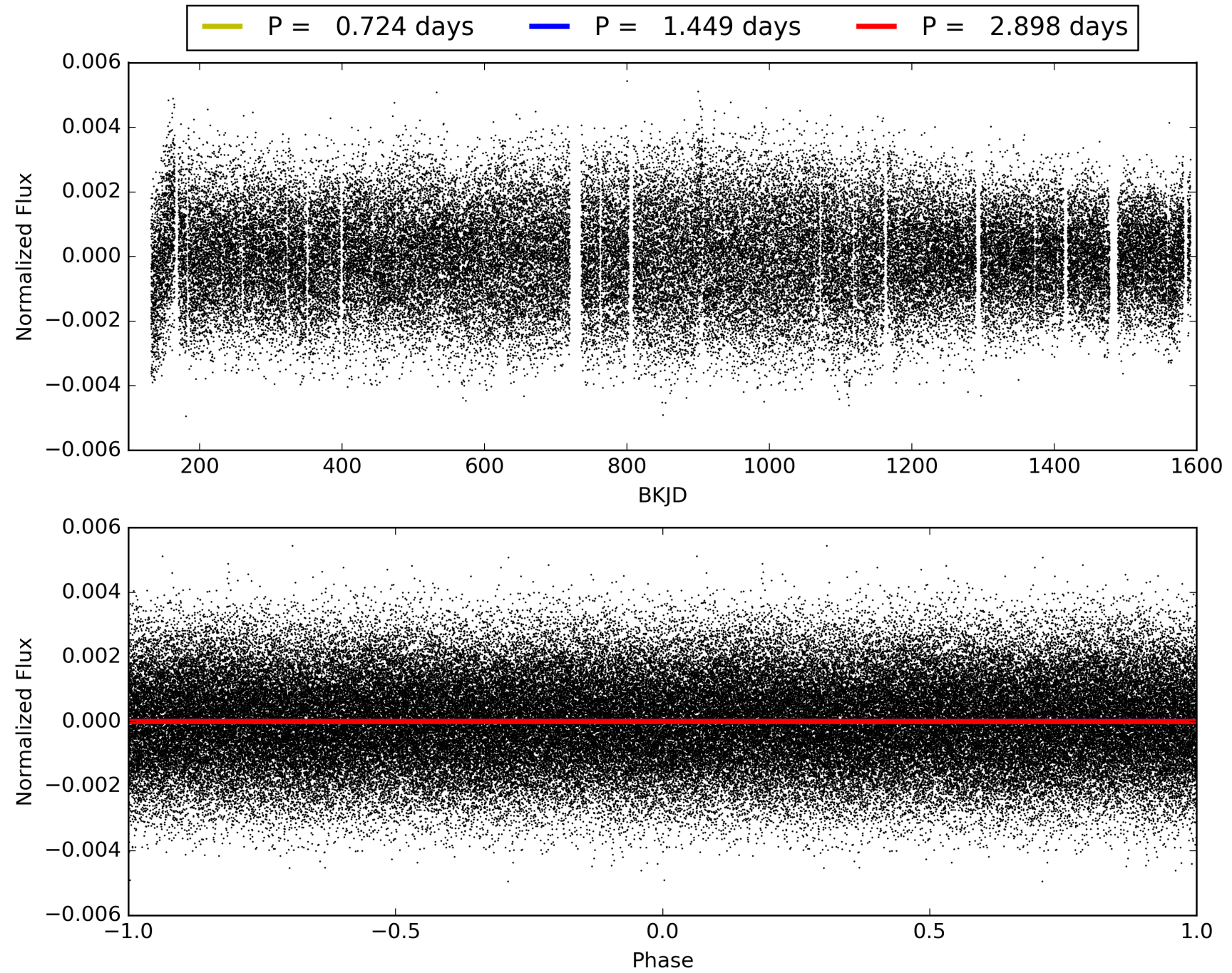
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 004649476-03, PDC Light Curves

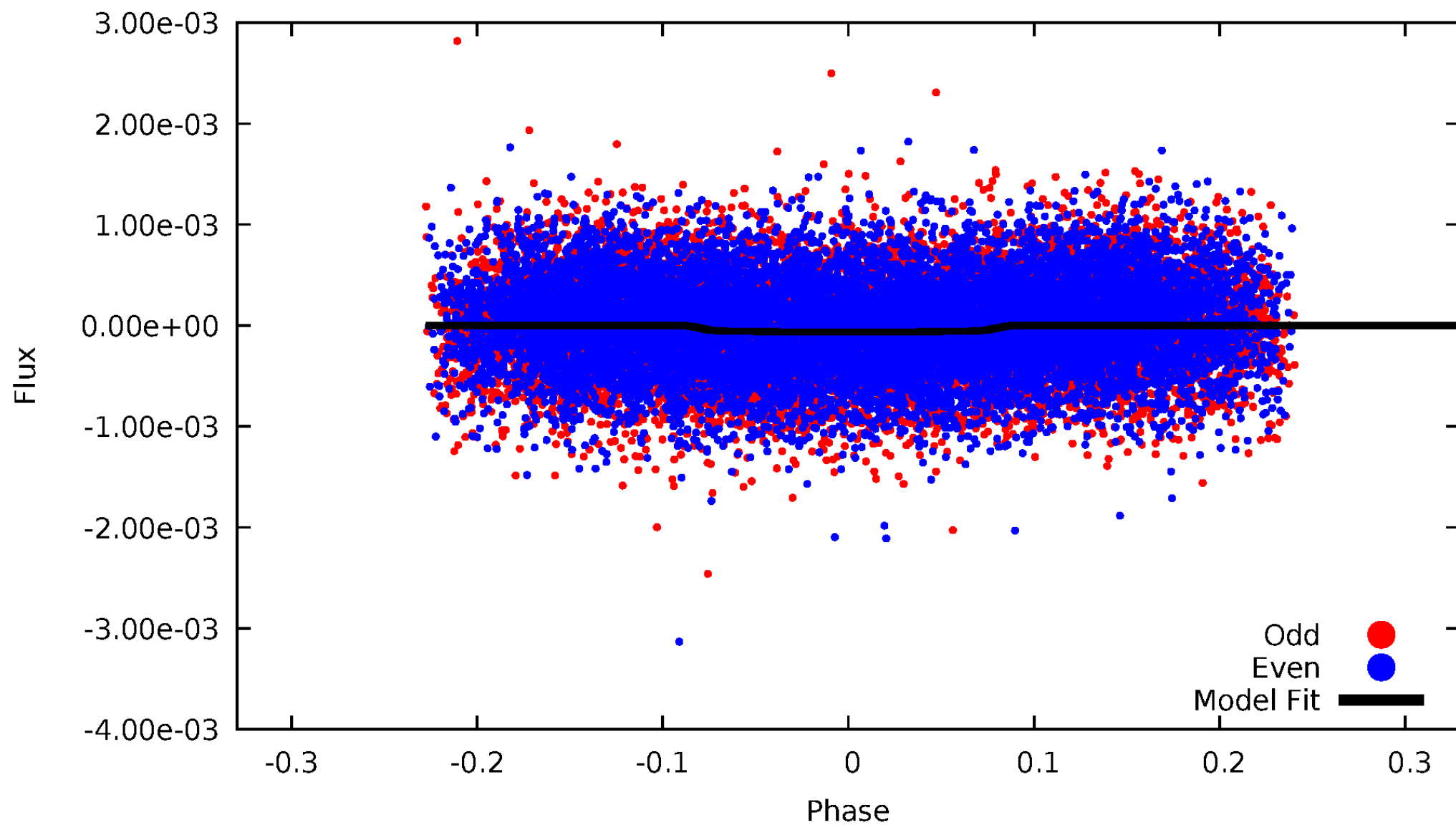


TCE 004649476-03



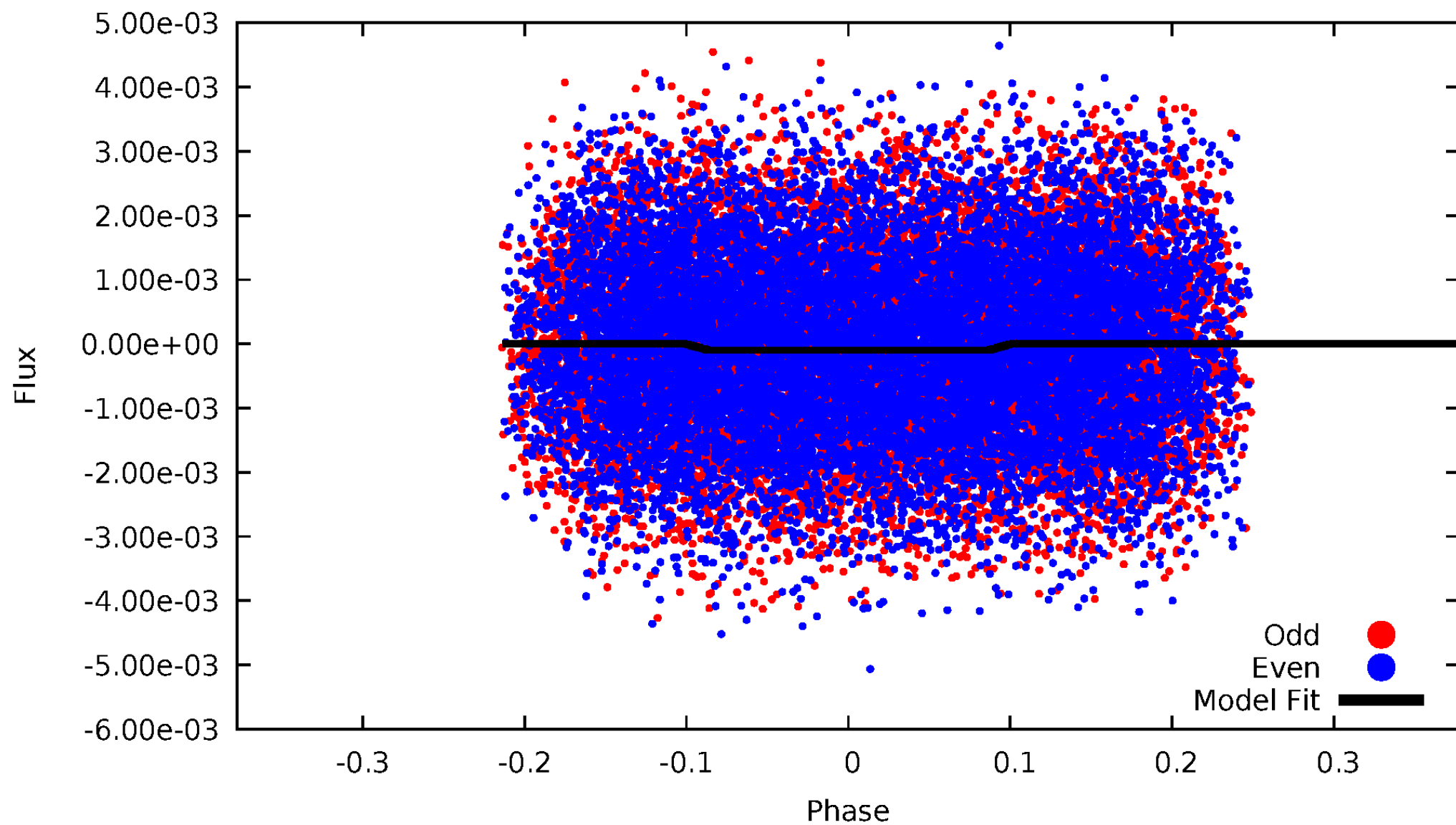
DV Odd/Even

TCE 004649476-03



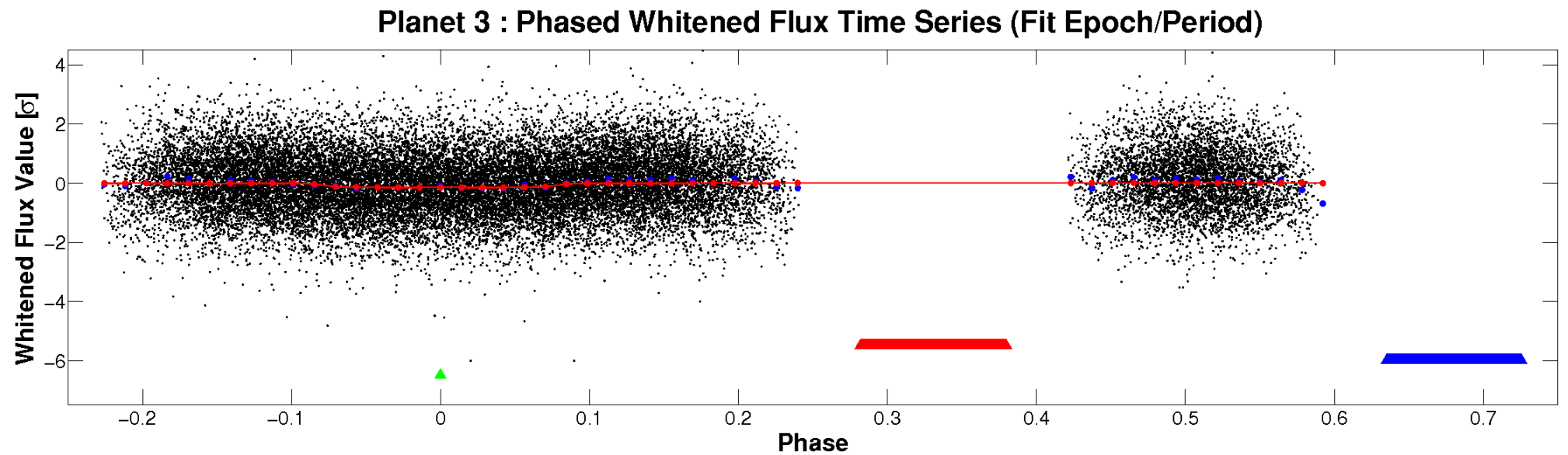
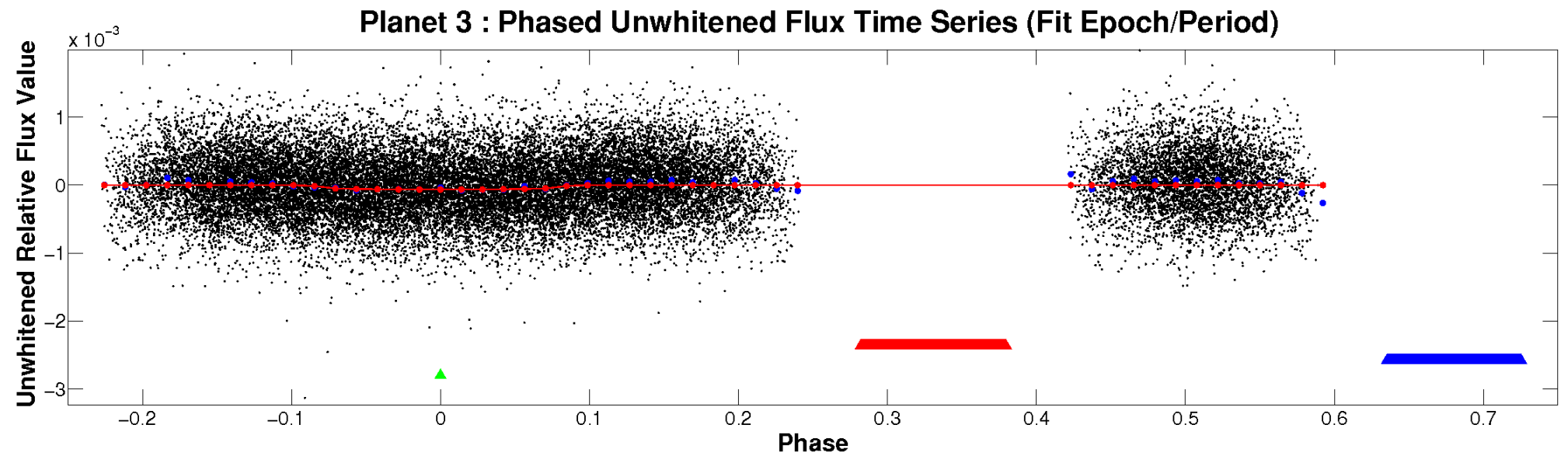
# ALT Odd/Even

TCE 004649476-03



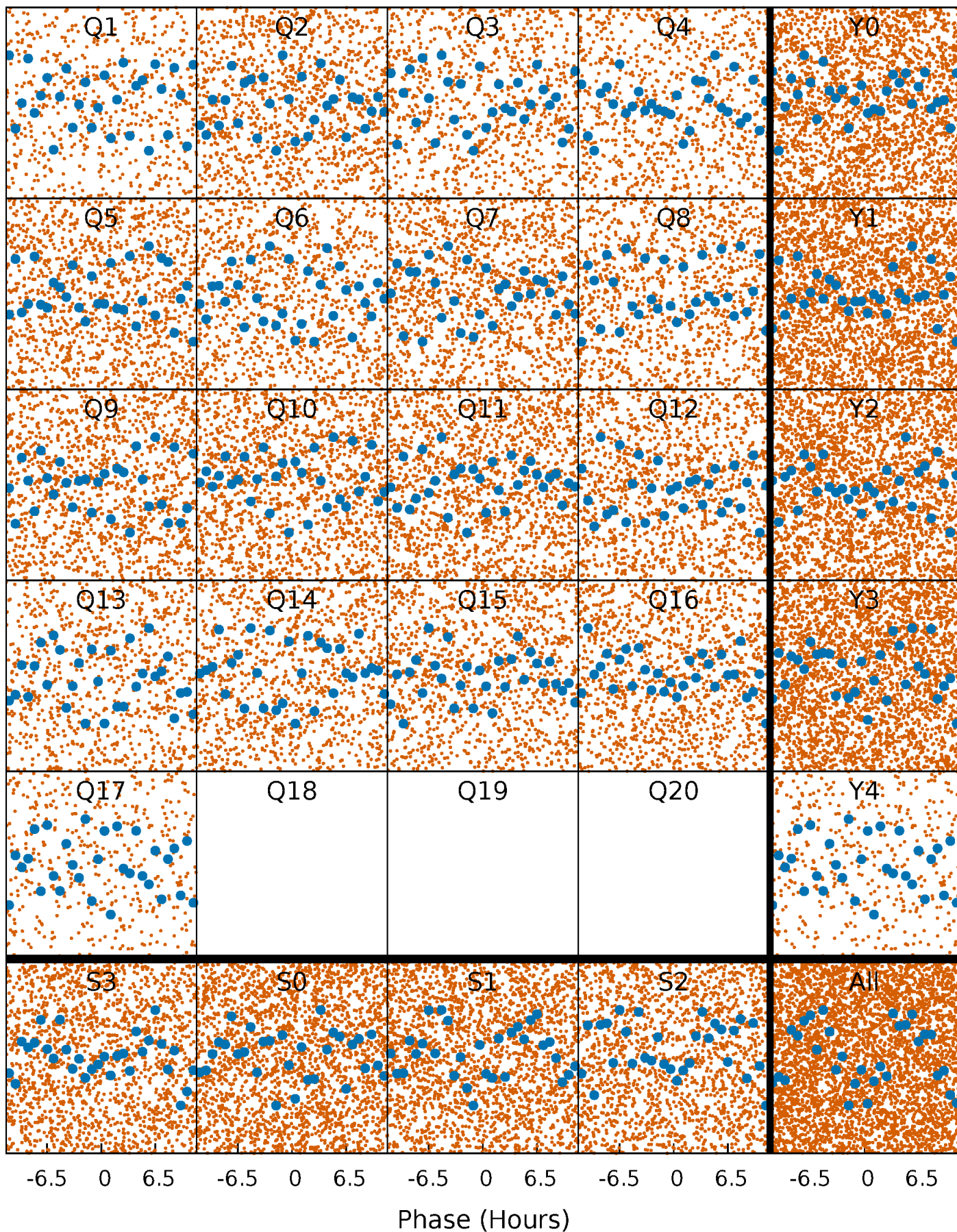


# Non-Whitened Vs. Whitened Light Curve



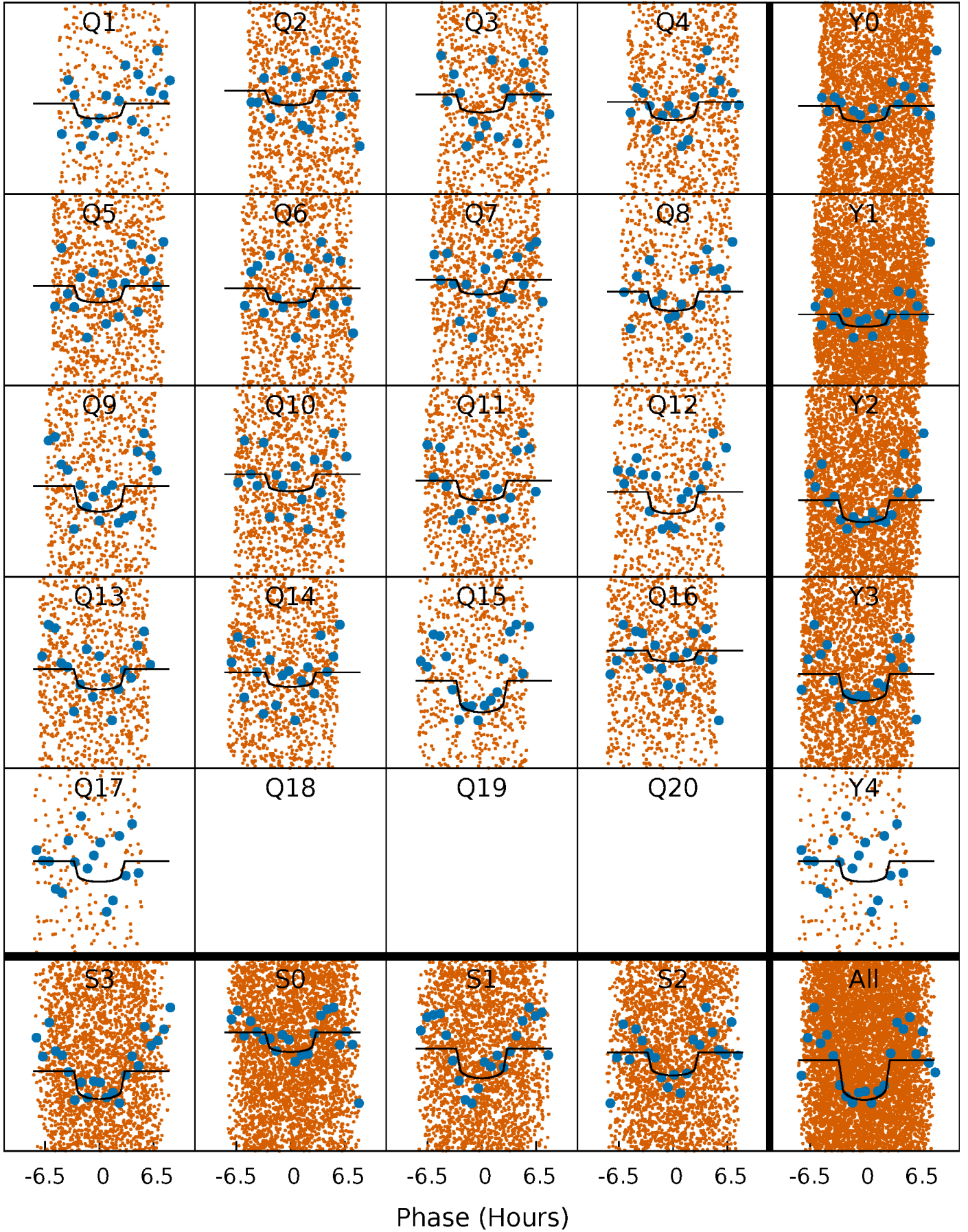
# PDC Quarter-Phased Transit Curves

TCE 004649476-03 P= 1.448847 Days  $T_0=131.693174$  (BKJD)



# DV Quarter-Phased Transit Curves

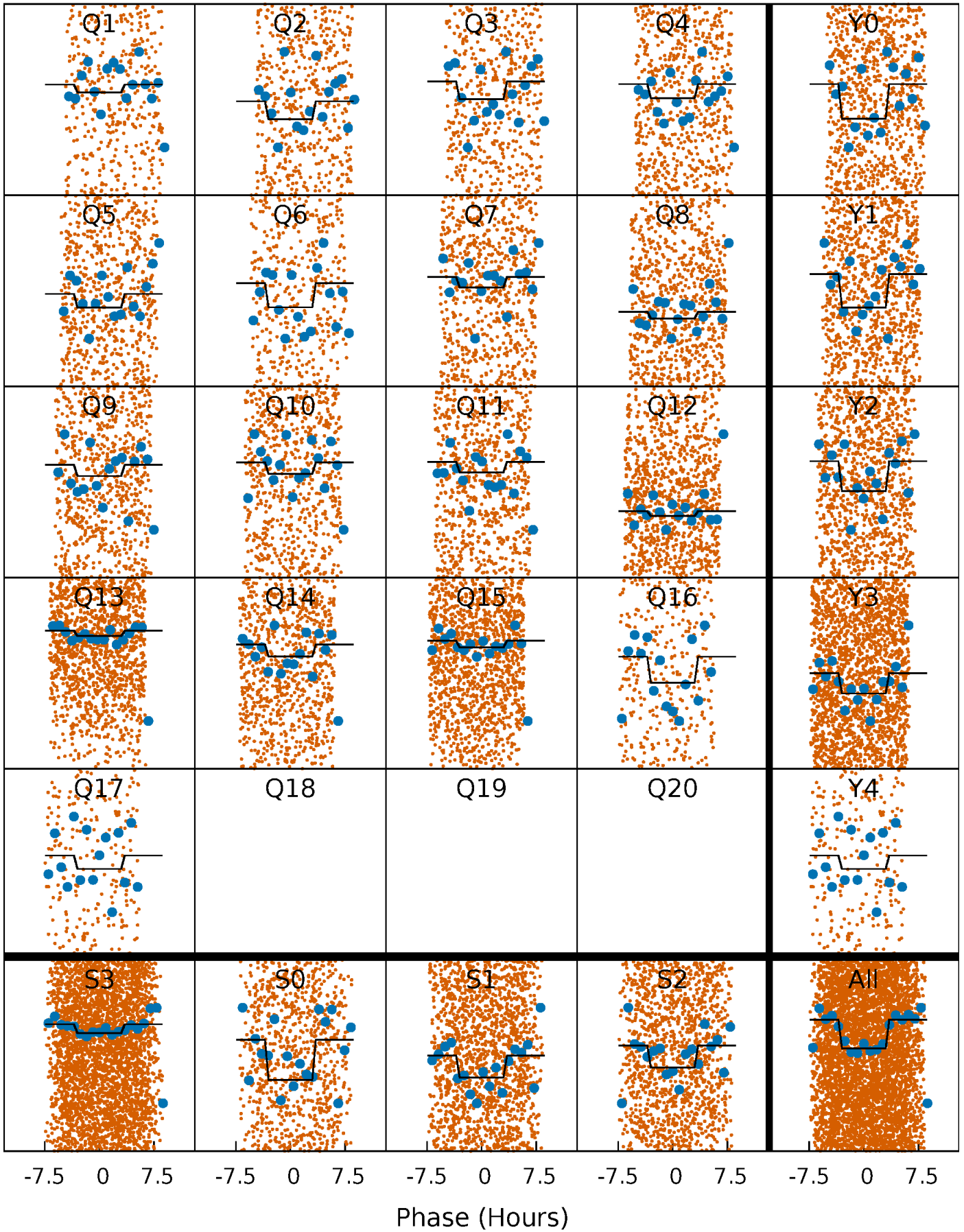
TCE 004649476-03   P= 1.448847 Days    $T_0=131.693174$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

TCE 004649476-03   P= 1.448839 Days    $T_0=131.681143$  (BKJD)

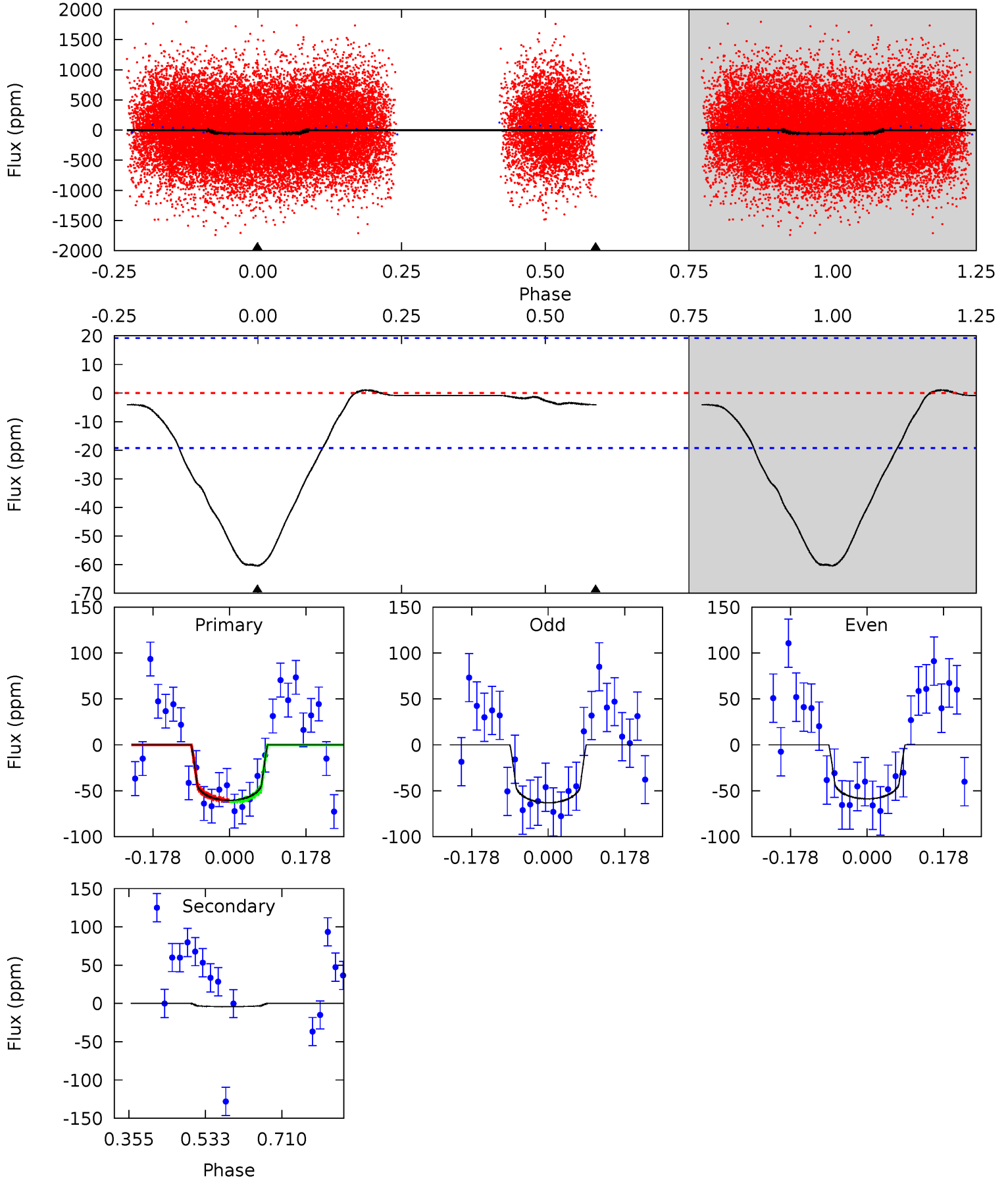




# DV Model-Shift Uniqueness Test

004649476-03, P = 1.448847 Days, E = 130.244327 Days

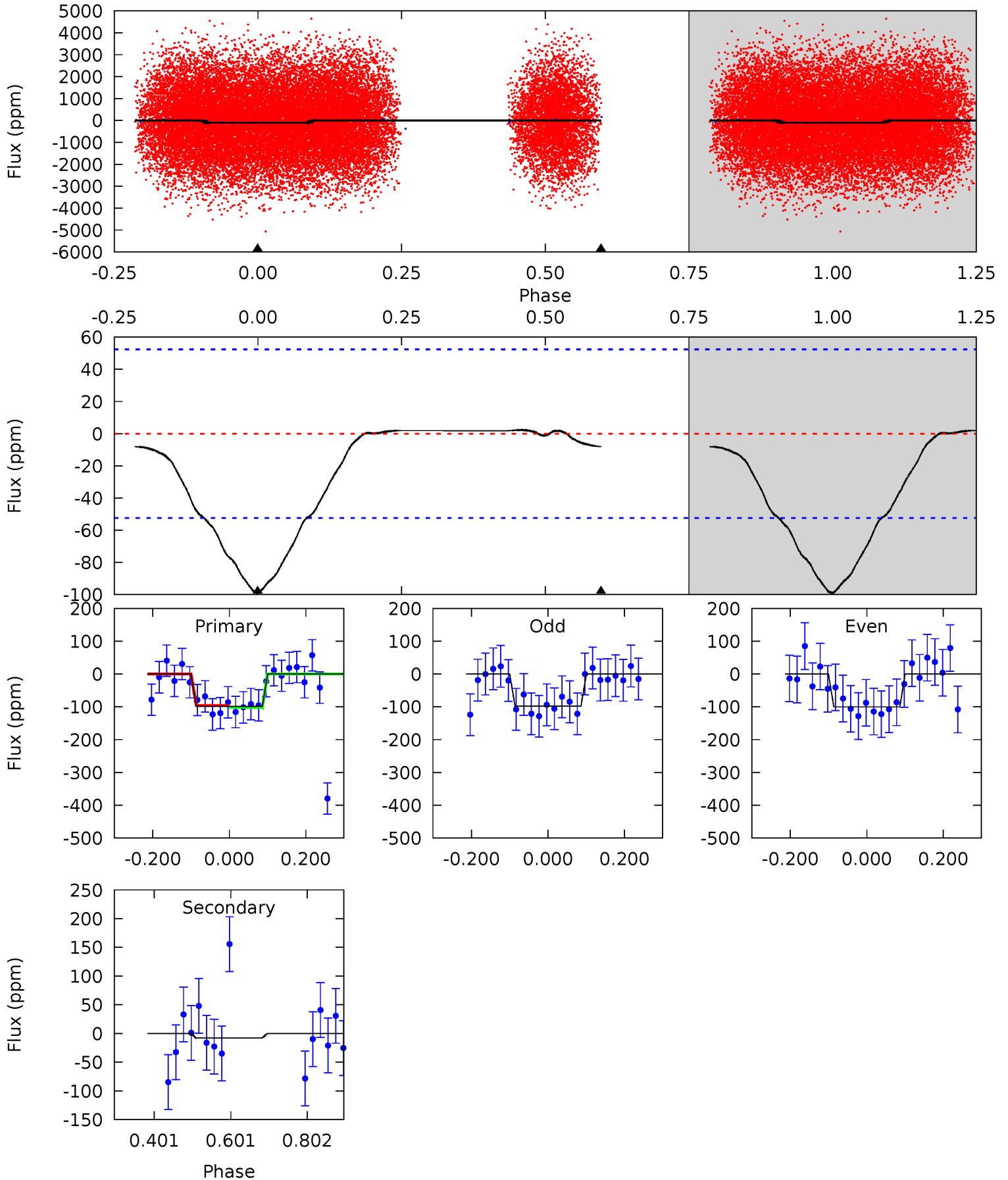
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
14.0	0.94	0	0	4.44	1.35	0.74	14.0	14.0	0.94	0.94	0.50	0.99	0.02	0.20



# Alt Model-Shift Uniqueness Test

004649476-03, P = 1.448839 Days, E = 130.232304 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
8.34	0.68	0	0	4.42	1.28	0.36	8.34	8.34	0.68	0.68	0.10	1.05	0.02	0.27



### Stellar Parameters For KIC 004649476

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$8560^{+237}_{-385}$	$3.806^{+0.400}_{-0.071}$	$-0.300^{+0.200}_{-0.350}$	$2.907^{+0.351}_{-1.228}$	$1.972^{+0.352}_{-0.470}$	$0.113^{+0.412}_{-0.027}$
	+3%/-4%	+11%/-2%	+67%/-117%	+12%/-42%	+18%/-24%	+365%/-24%
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 004649476-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-4 \pm 4$	$2.26^{+1.25}_{-1.10}$	$4886^{+312}_{-510}$	$3246^{+2304}_{-7437}$	$0.374^{+1.350}_{-0.414}$
Alt.	$-8 \pm 12$	$2.85^{+1.27}_{-1.20}$	$4877^{+343}_{-560}$	$3696^{+2109}_{-8346}$	$0.469^{+1.577}_{-0.756}$

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

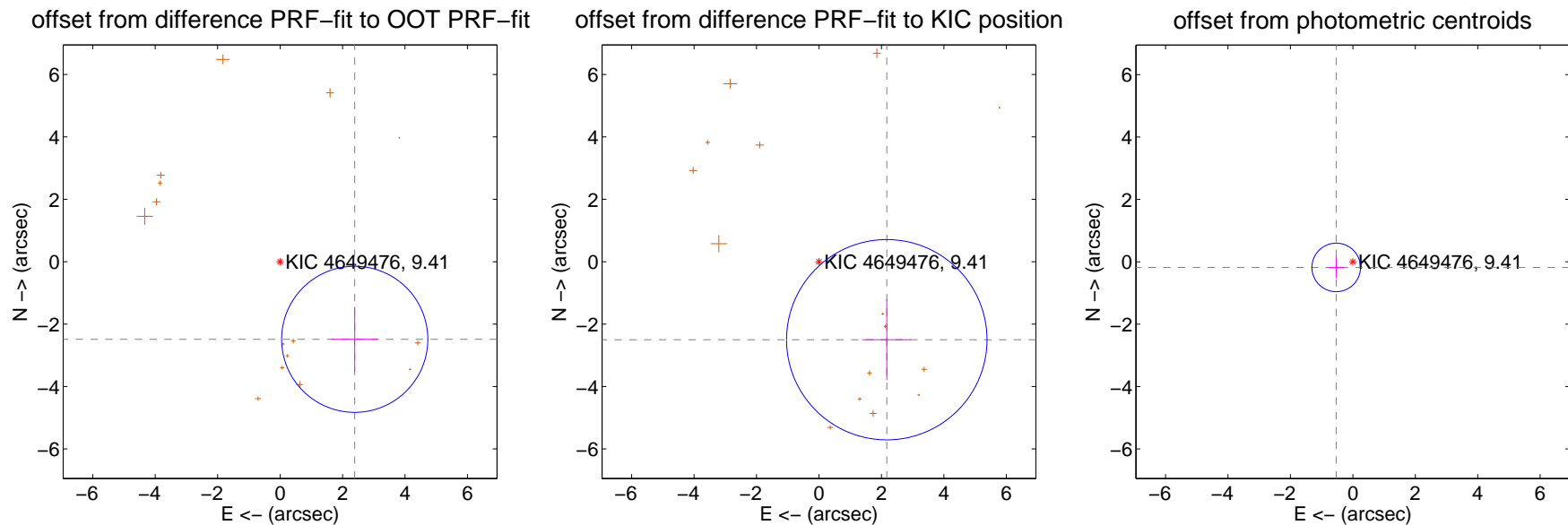
## DV Centroid Data

Supplemental centroid analysis for 004649476-03. **Kepler magnitude: 9.41.** Transit SNR 12.83

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

The direct PRF centroid is offset from the target star catalog position by about 1.44 arcsec

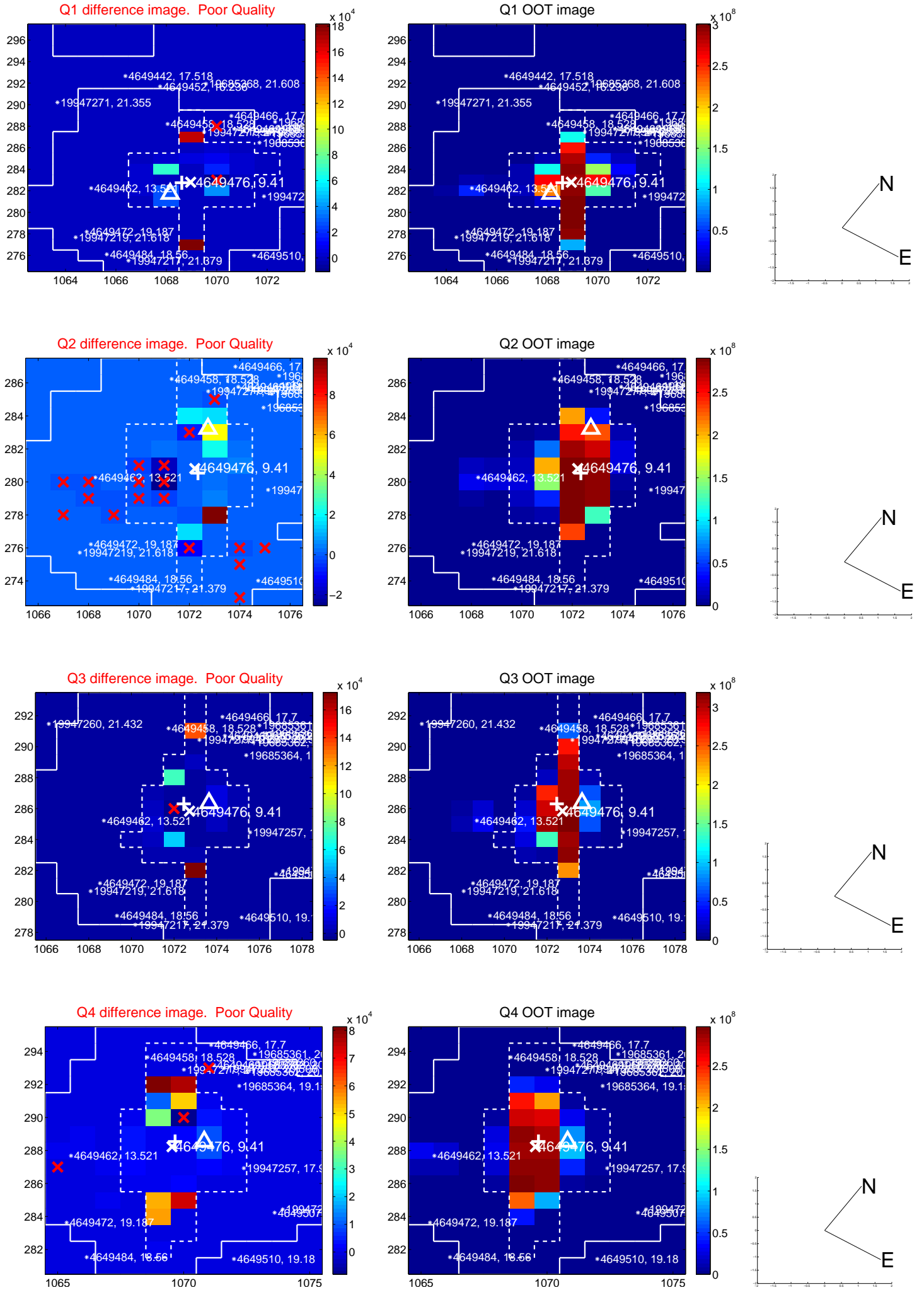
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b><math>3.449 \pm 0.780</math></b>	<b>4.42</b>	$-2.389 \pm 0.749$	$-2.487 \pm 1.039$
PRF-fit source offset from KIC position	<b><math>3.311 \pm 1.070</math></b>	<b>3.10</b>	$-2.171 \pm 0.784$	$-2.500 \pm 1.293$
photometric centroid source offset	$0.56 \pm 0.26$	2.17	$0.53 \pm 0.25$	$-0.18 \pm 0.34$



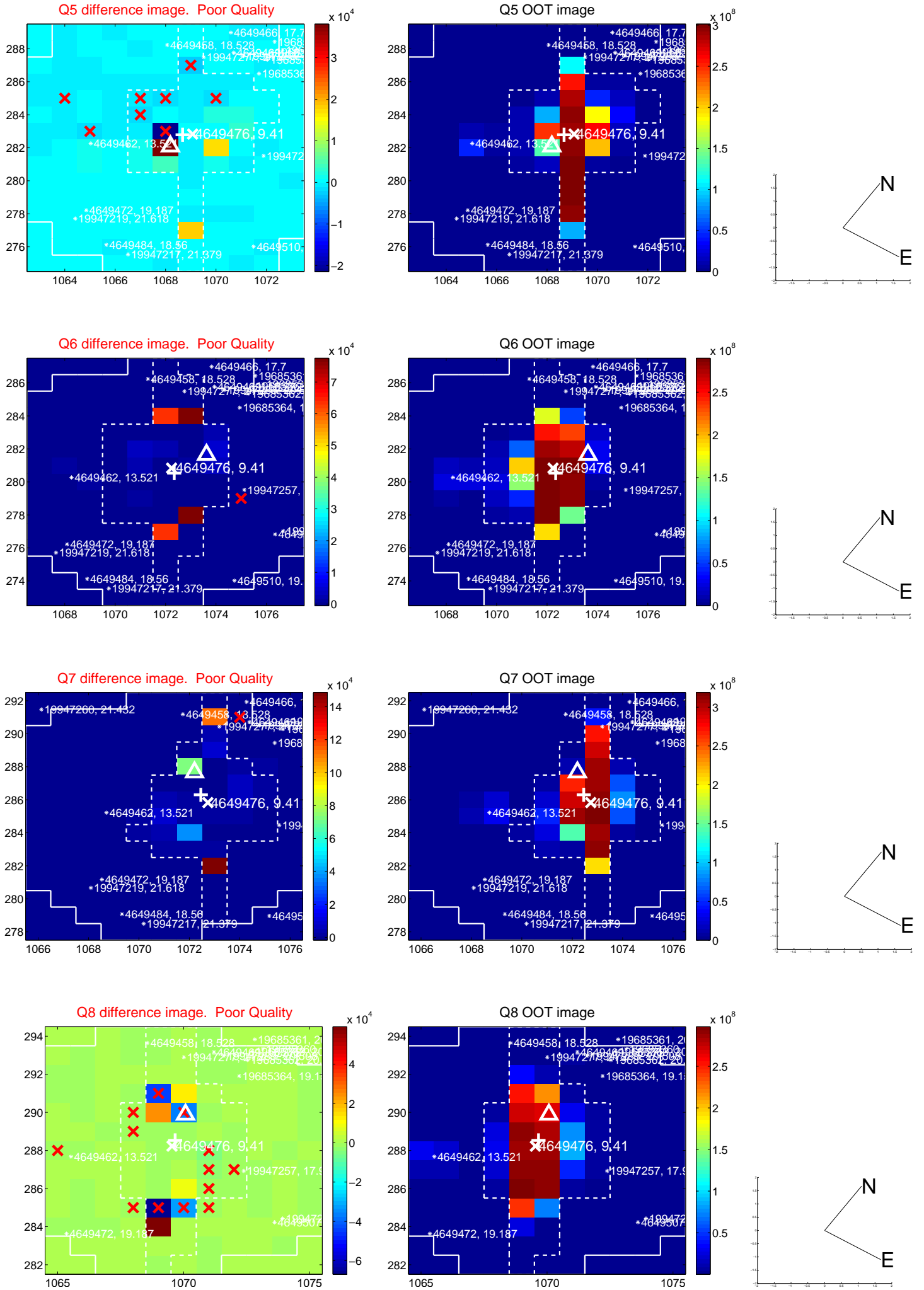
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



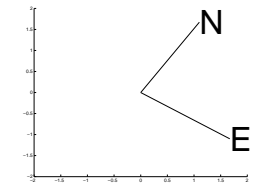
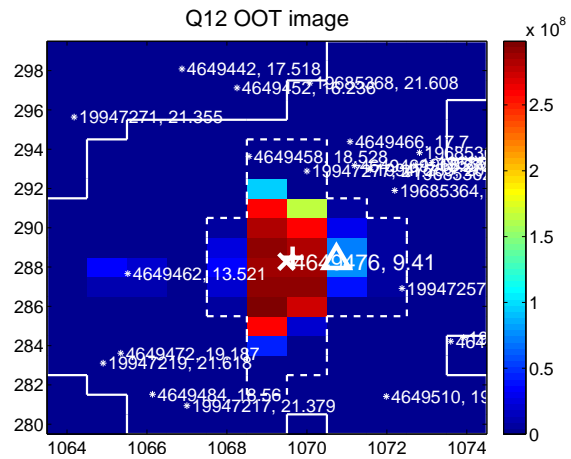
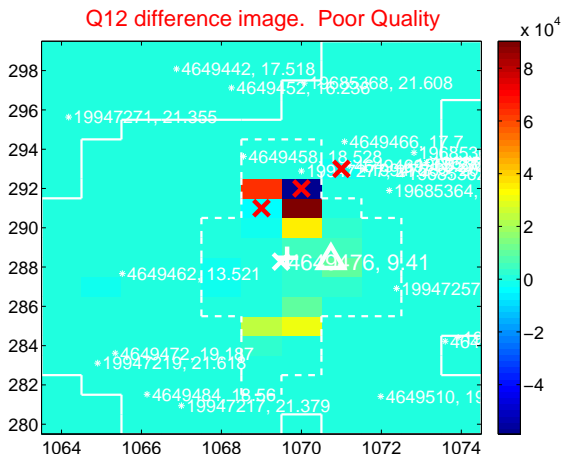
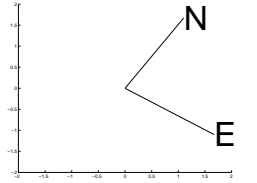
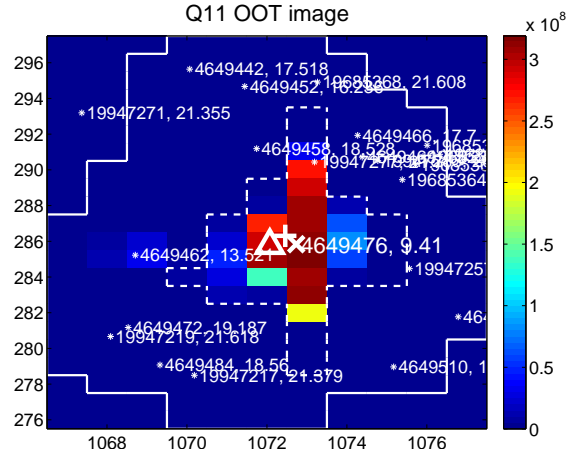
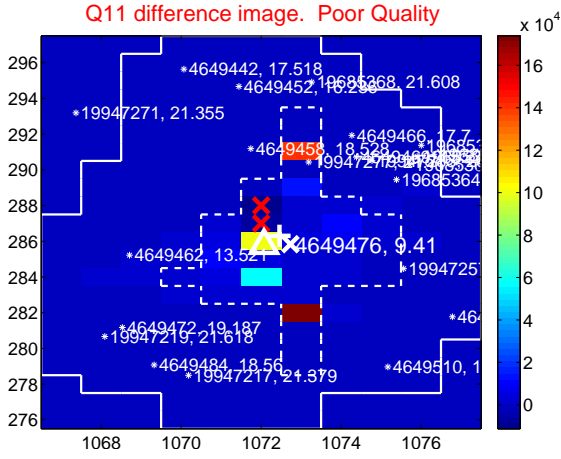
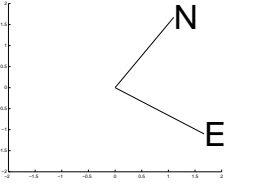
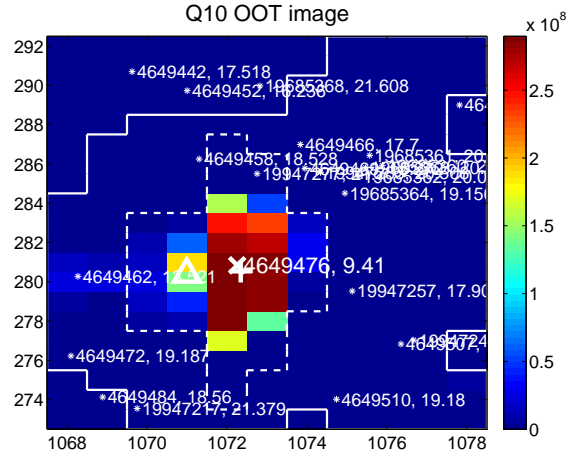
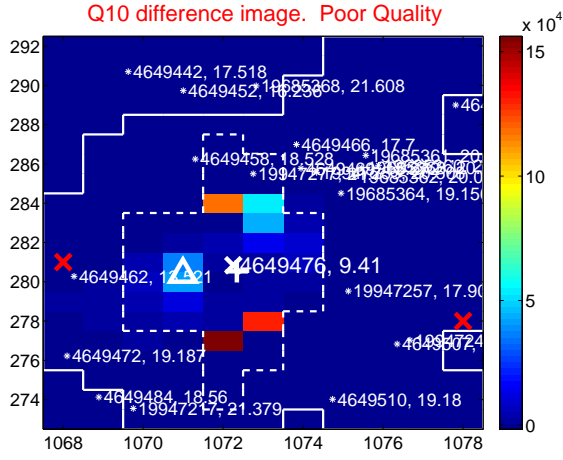
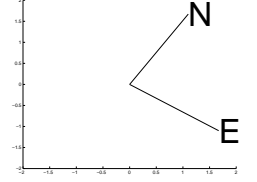
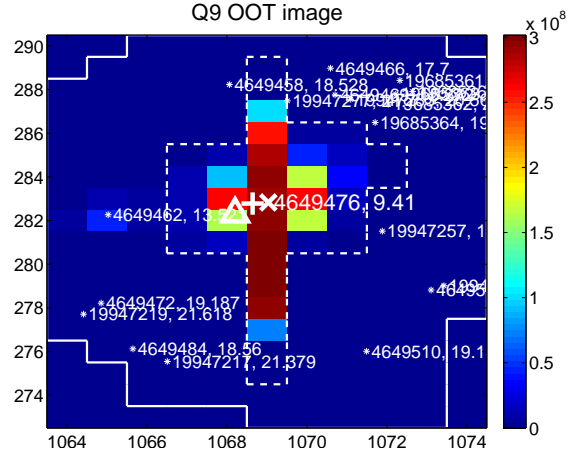
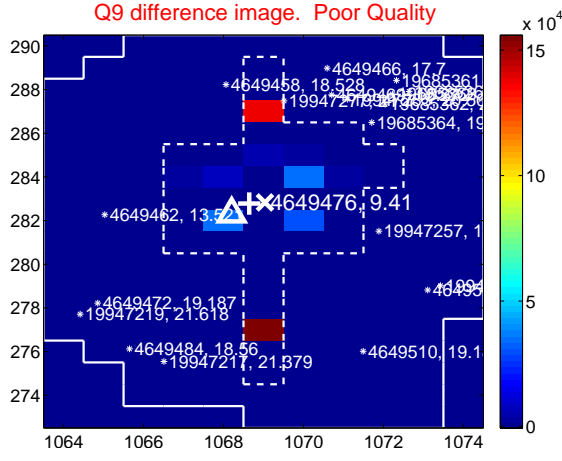
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



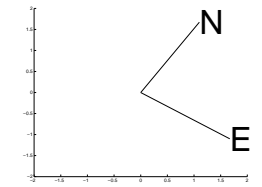
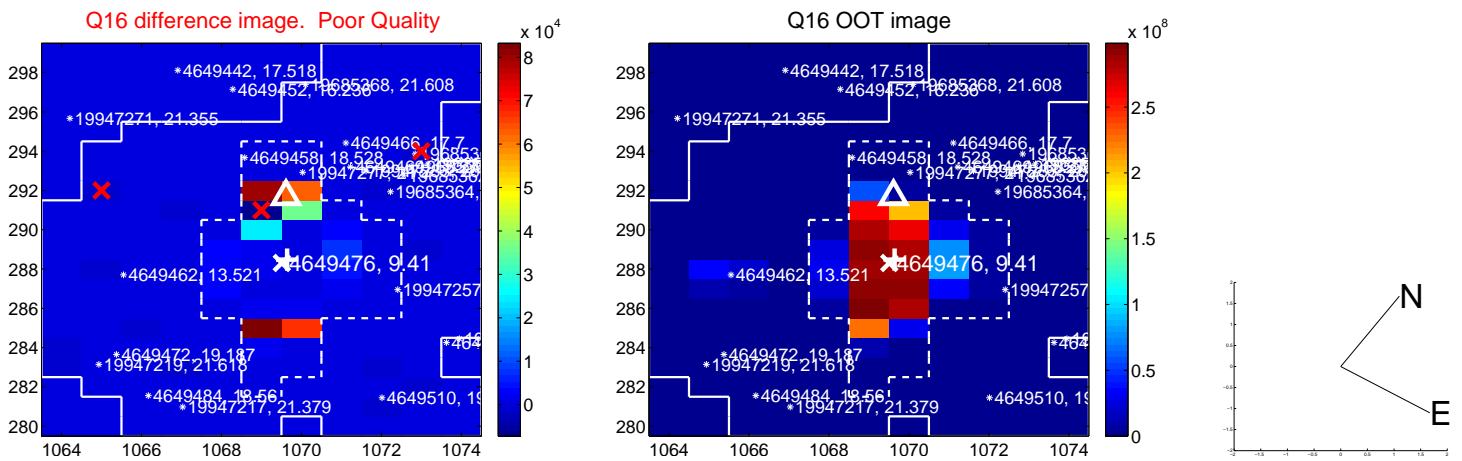
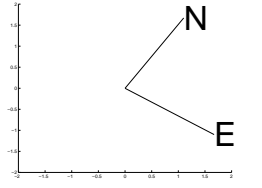
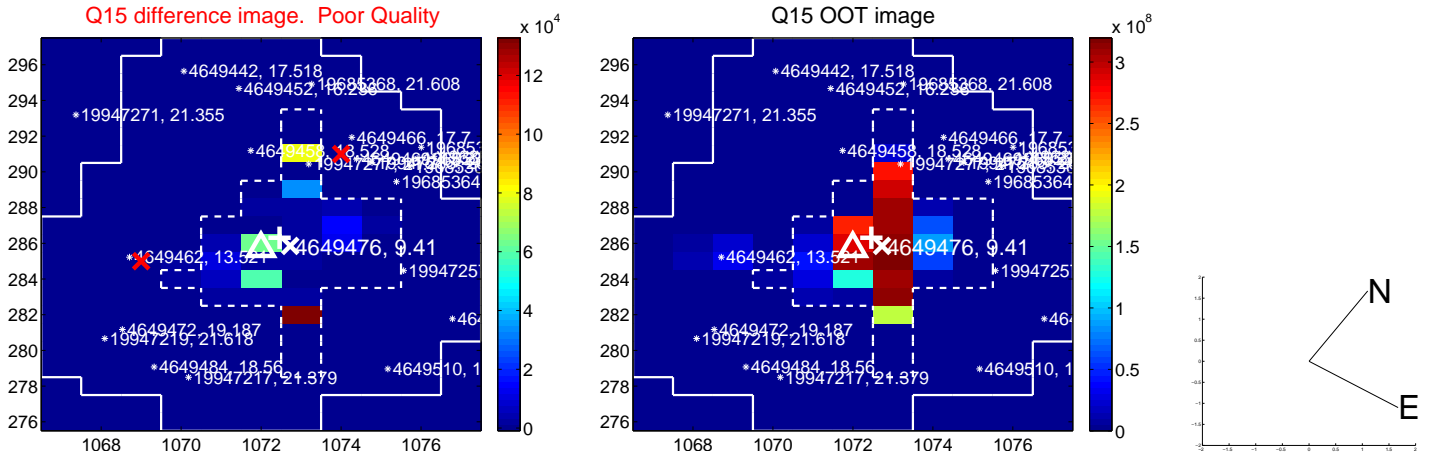
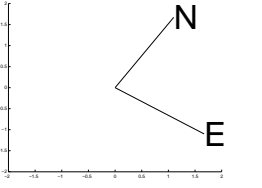
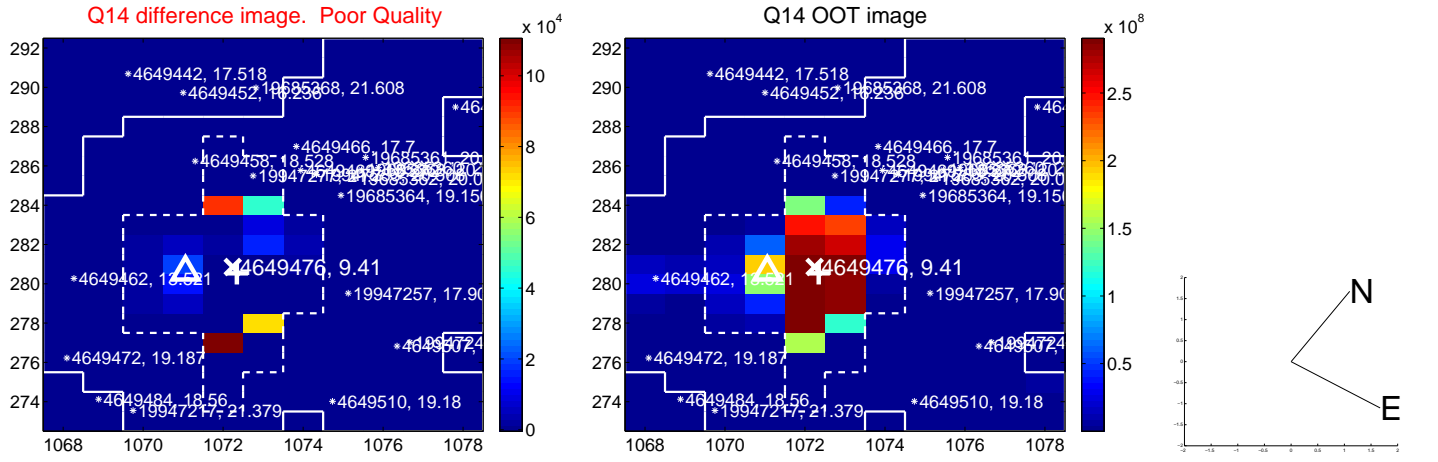
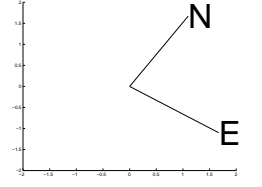
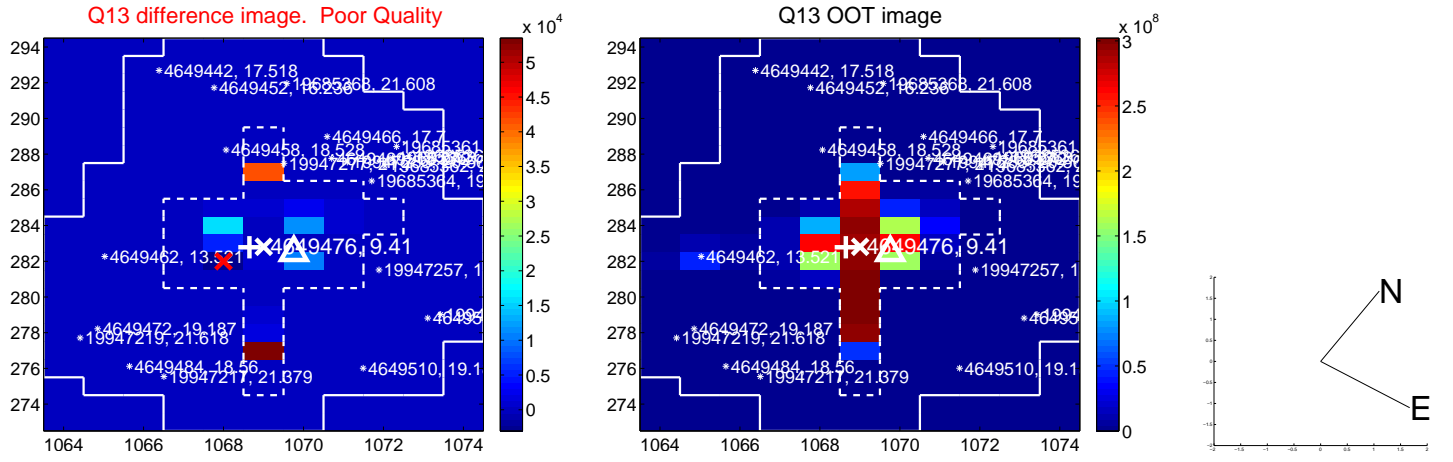
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



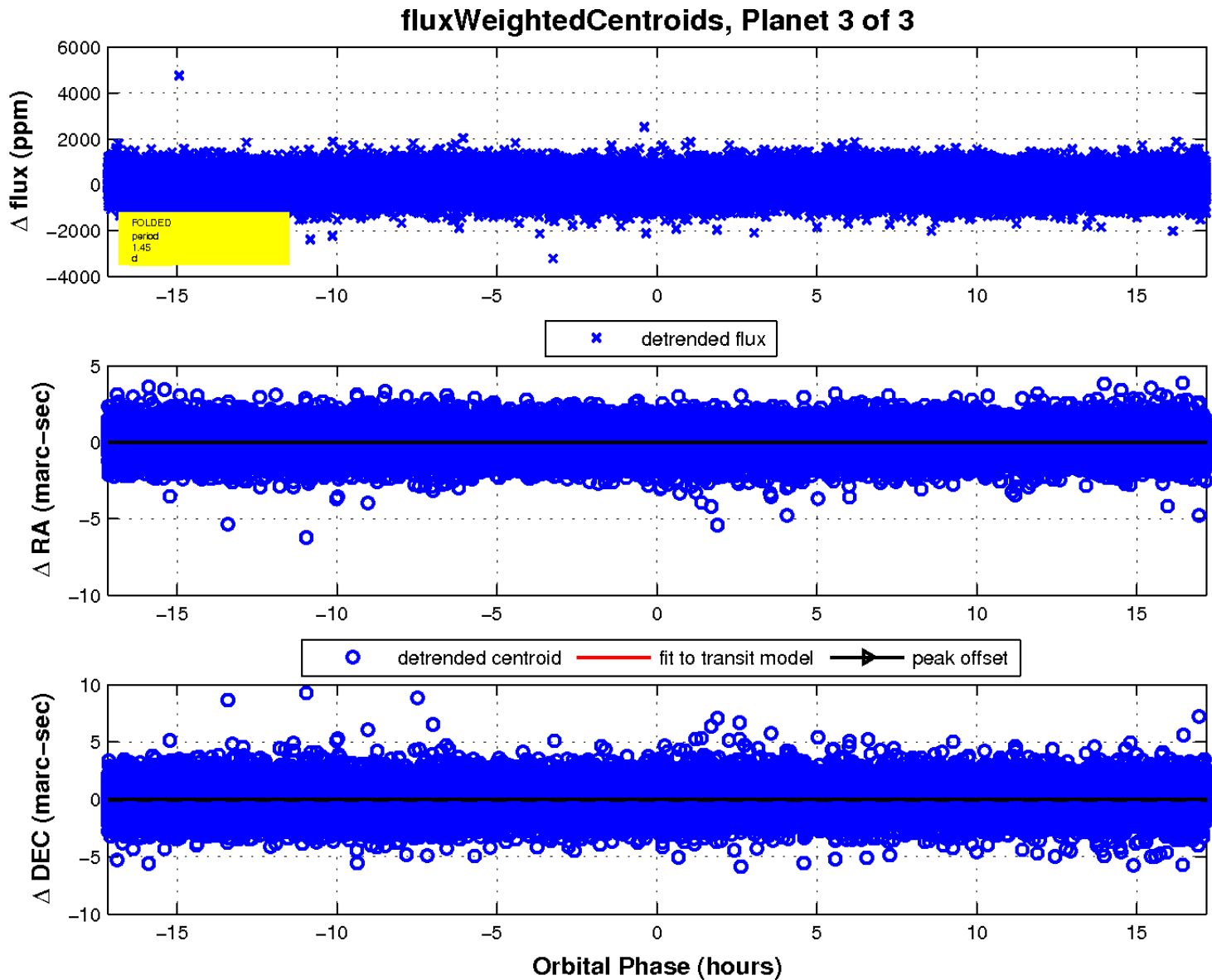
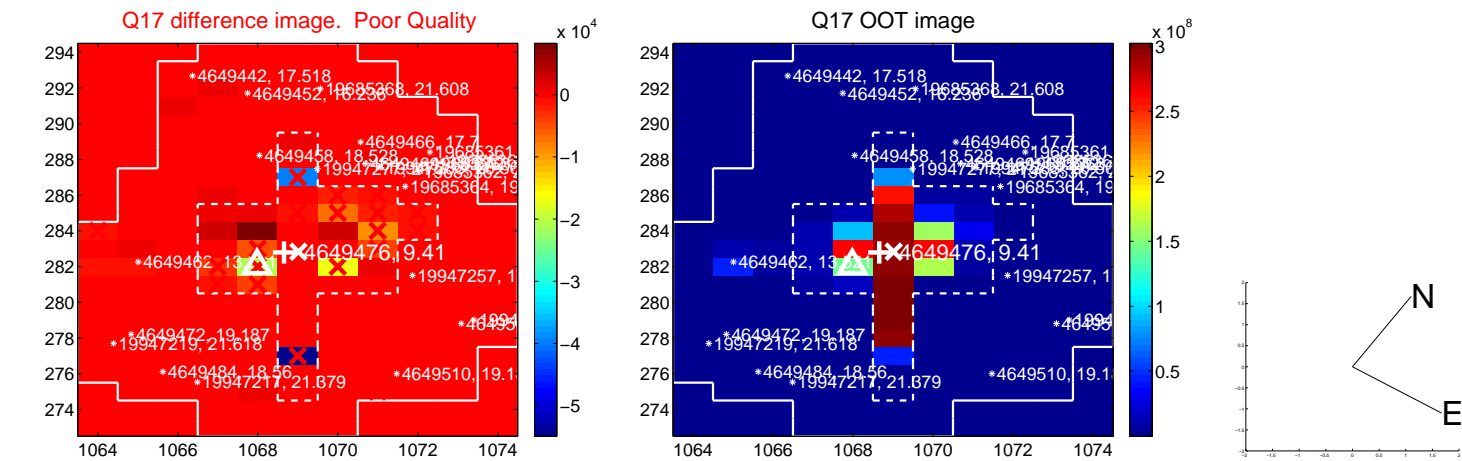
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

