

# KIC 009054553

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009054553-01	OBS	No	0.657599	131.942840	64.9	3.577	20.1	12.2	1.98	7277	1.63	33176.04
009054553-02	OBS	No	0.657619	131.610085	95.5	2.004	17.1	17.8	1.98	7277	1.97	33174.74

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009054553-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
009054553-02	OBS	FP	0.00	1	0	0	0	LPP_DV—SAME_NTL_PERIOD

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

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

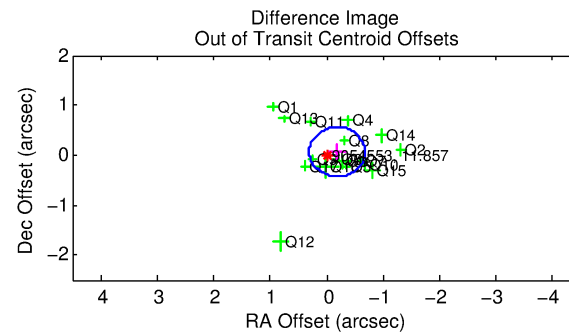
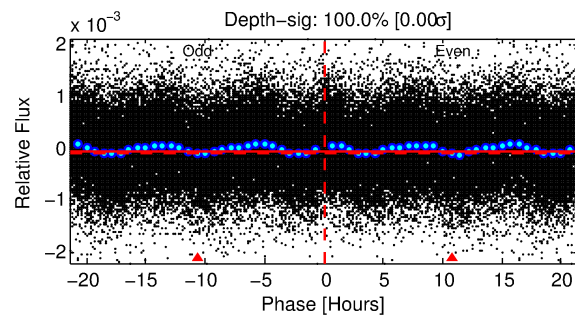
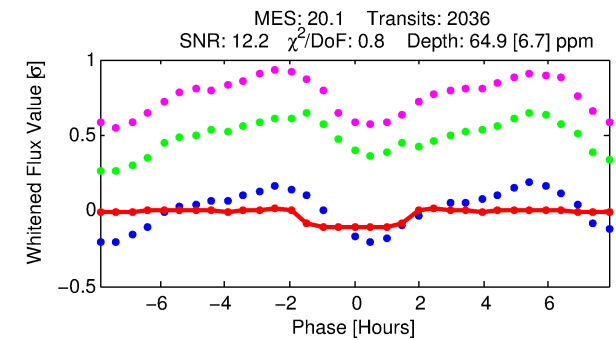
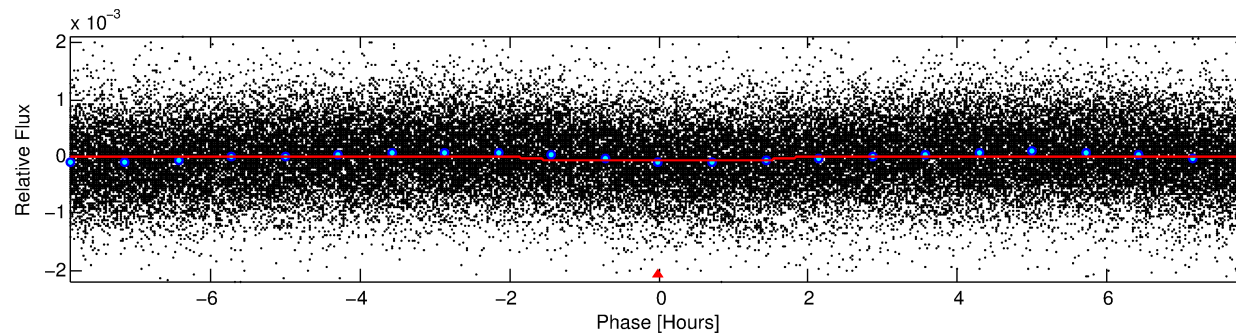
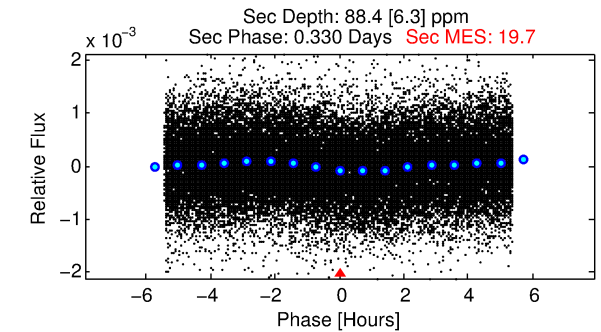
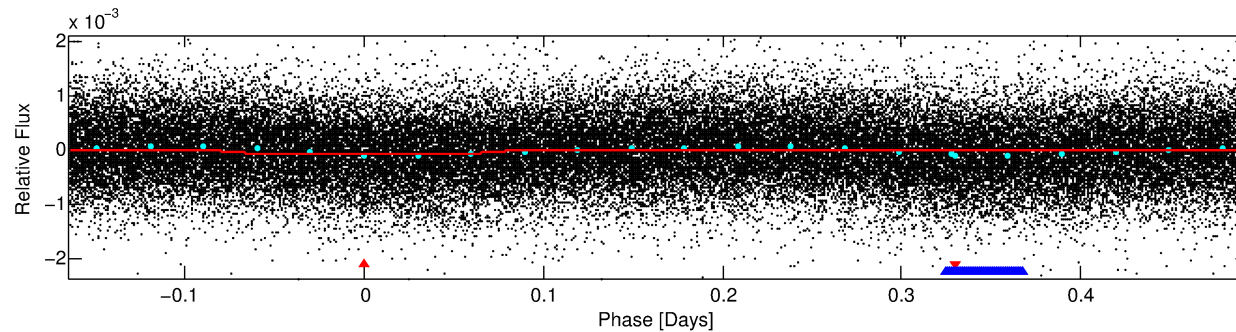
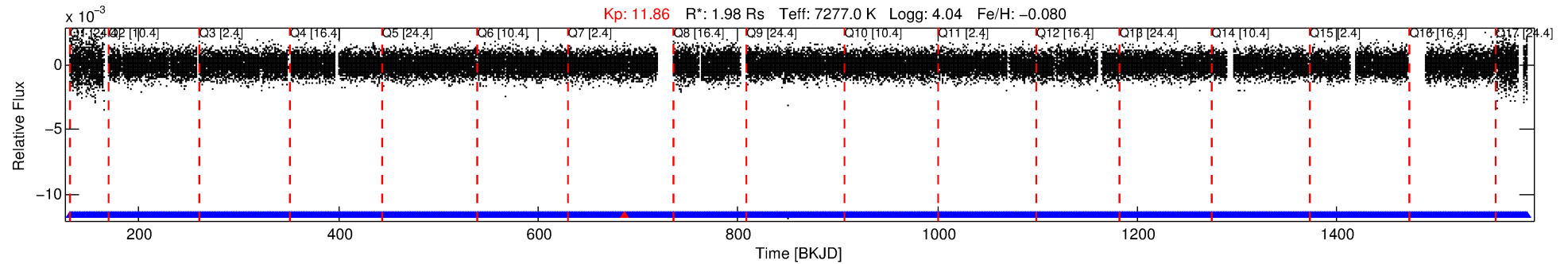
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009054553-01

No Significant Match Found

# DV One-Page Summary

KIC: 9054553 Candidate: 1 of 2 Period: 0.658 d



## DV Fit Results:

Period = 0.65760 [0.00001] d  
Epoch = 131.9428 [0.0031] BKJD  
Rp/R\* = 0.0076 [0.0043]  
a/R\* = 1.50 [2.81]  
b = 0.32 [9.61]  
Seff = 33176.04 [13046.76]  
Teq = 3441 [338] K  
Rp = 1.63 [1.04] Re  
a = 0.0172 [0.0041] AU  
Ag = 5.42 [6.51] [0.68σ]  
Teffp = 8120 [2353] K [1.97σ]

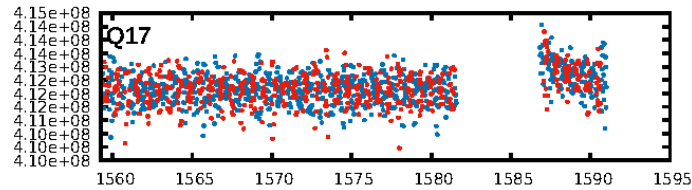
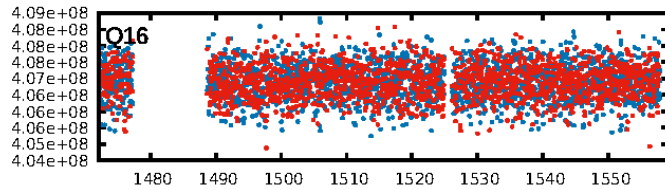
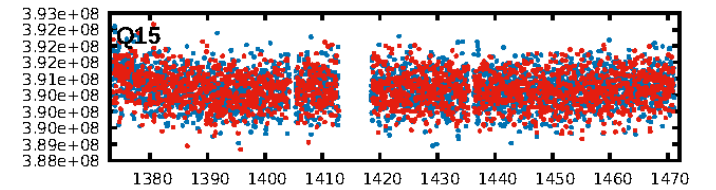
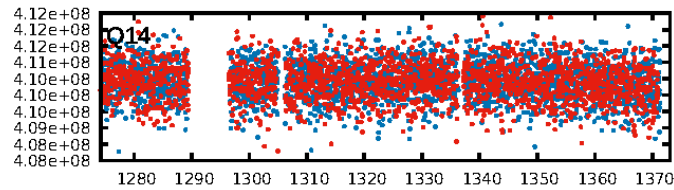
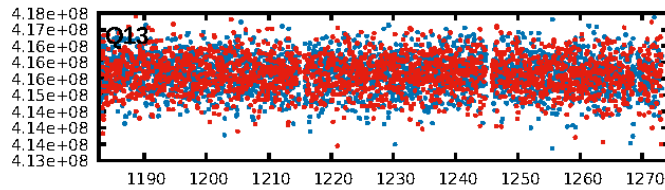
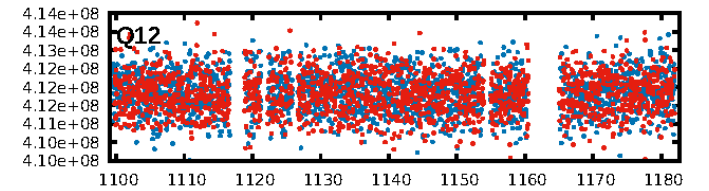
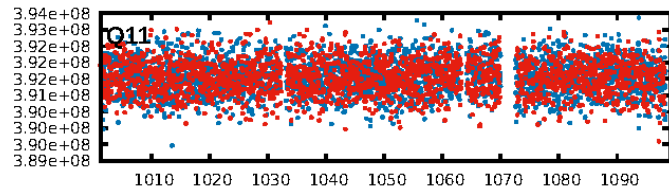
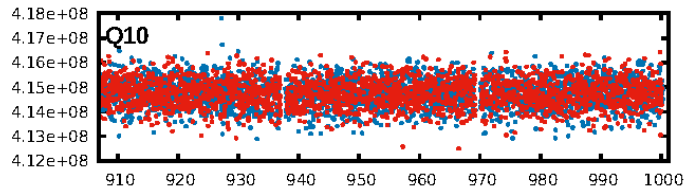
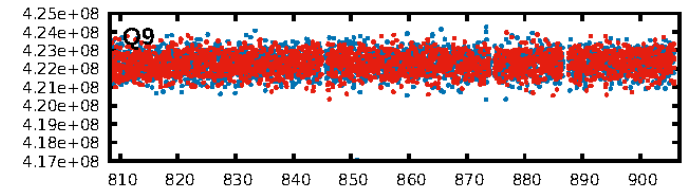
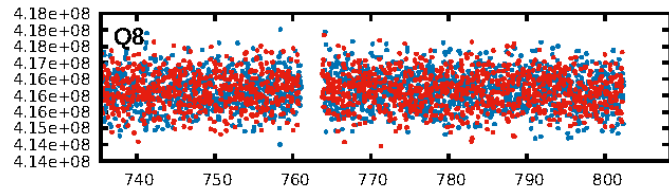
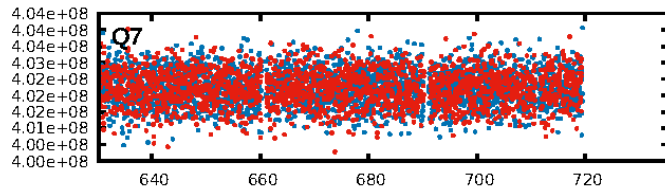
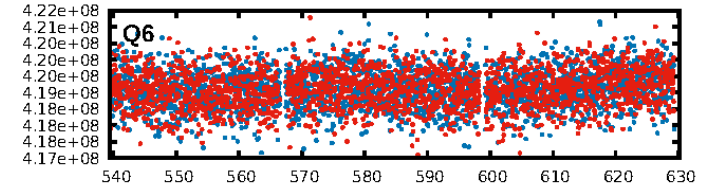
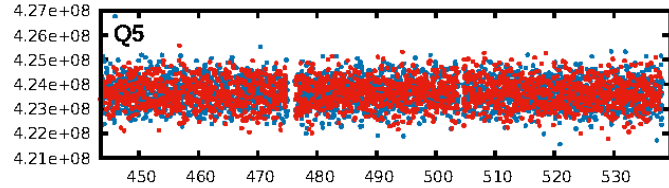
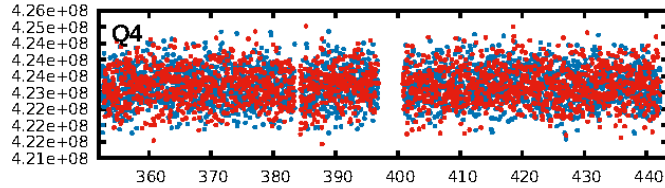
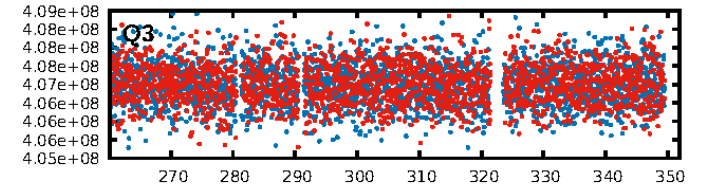
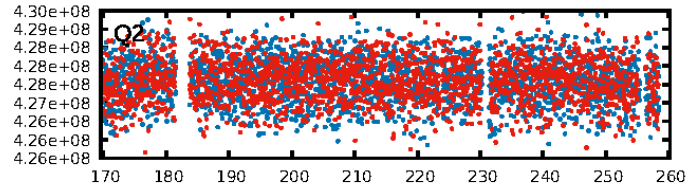
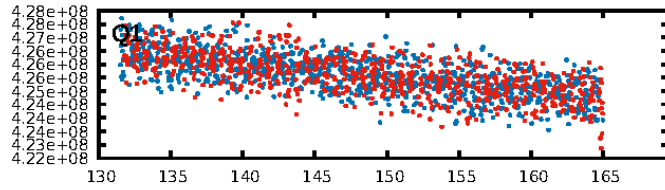
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
**LongPeriod-sig: 0.0% [0.00σ]**  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [1944/1945]  
GhostDiagnostic-chr: 1.655  
Centroid-sig: 32.7%  
Centroid-so: 0.335 arcsec [1.48σ]  
OotOffset-rm: 0.193 arcsec [1.17σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-rm: 0.194 arcsec [1.18σ]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 1.00 [17/17]  
DiffImageOverlap-fno: 0.00 [0/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 14:16:24 Z

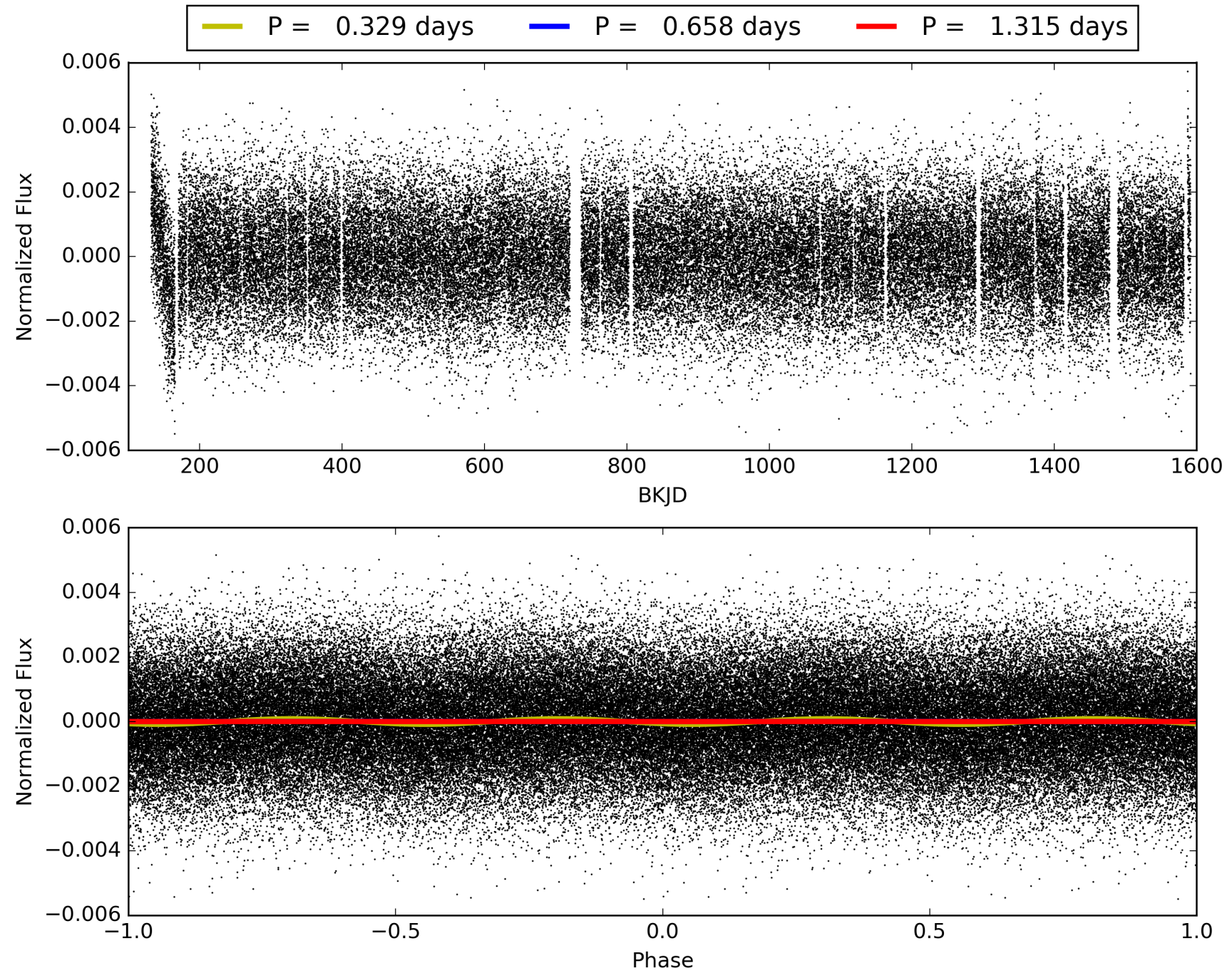
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

## TCE 009054553-01, PDC Light Curves



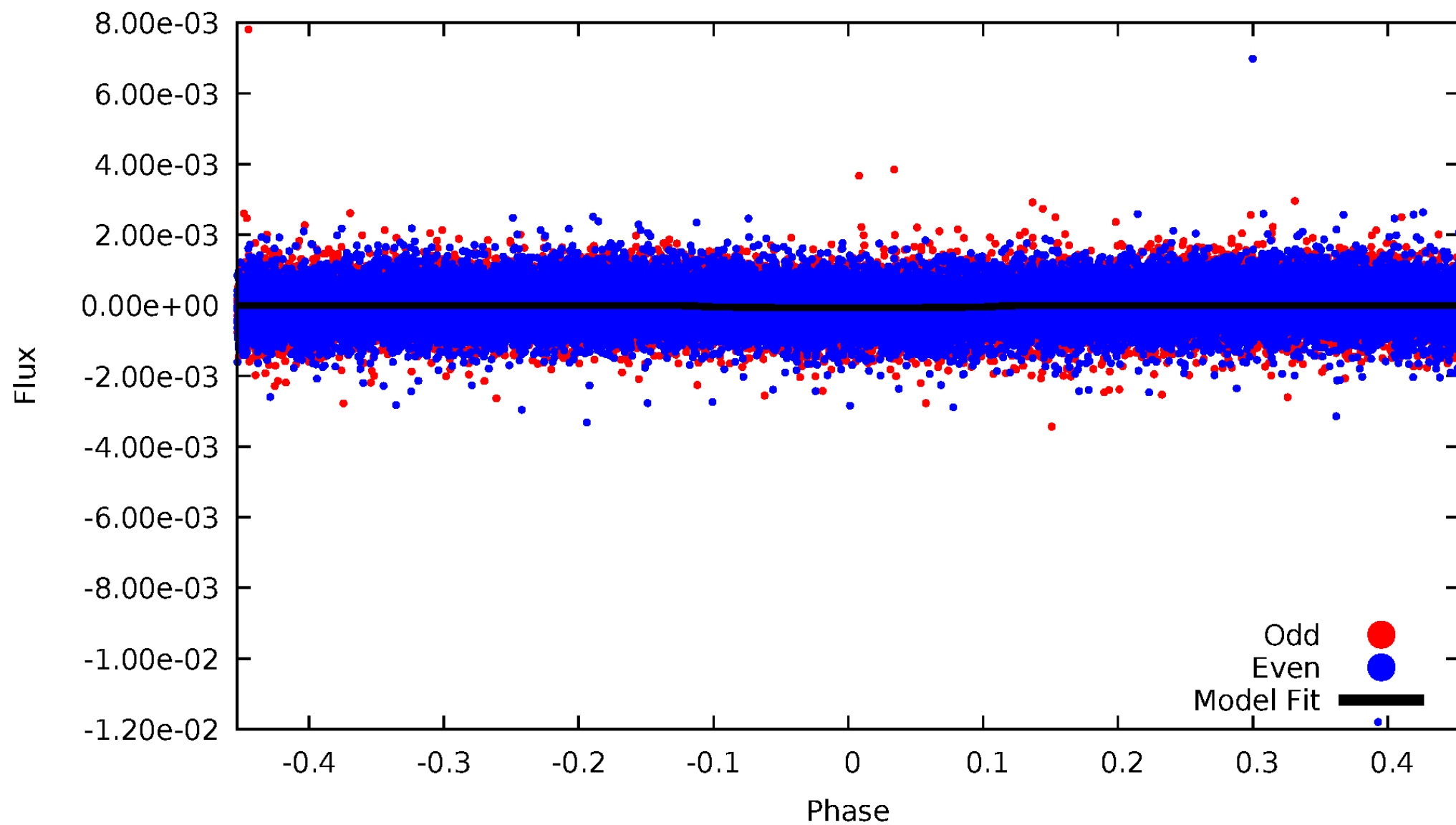


TCE 009054553-01



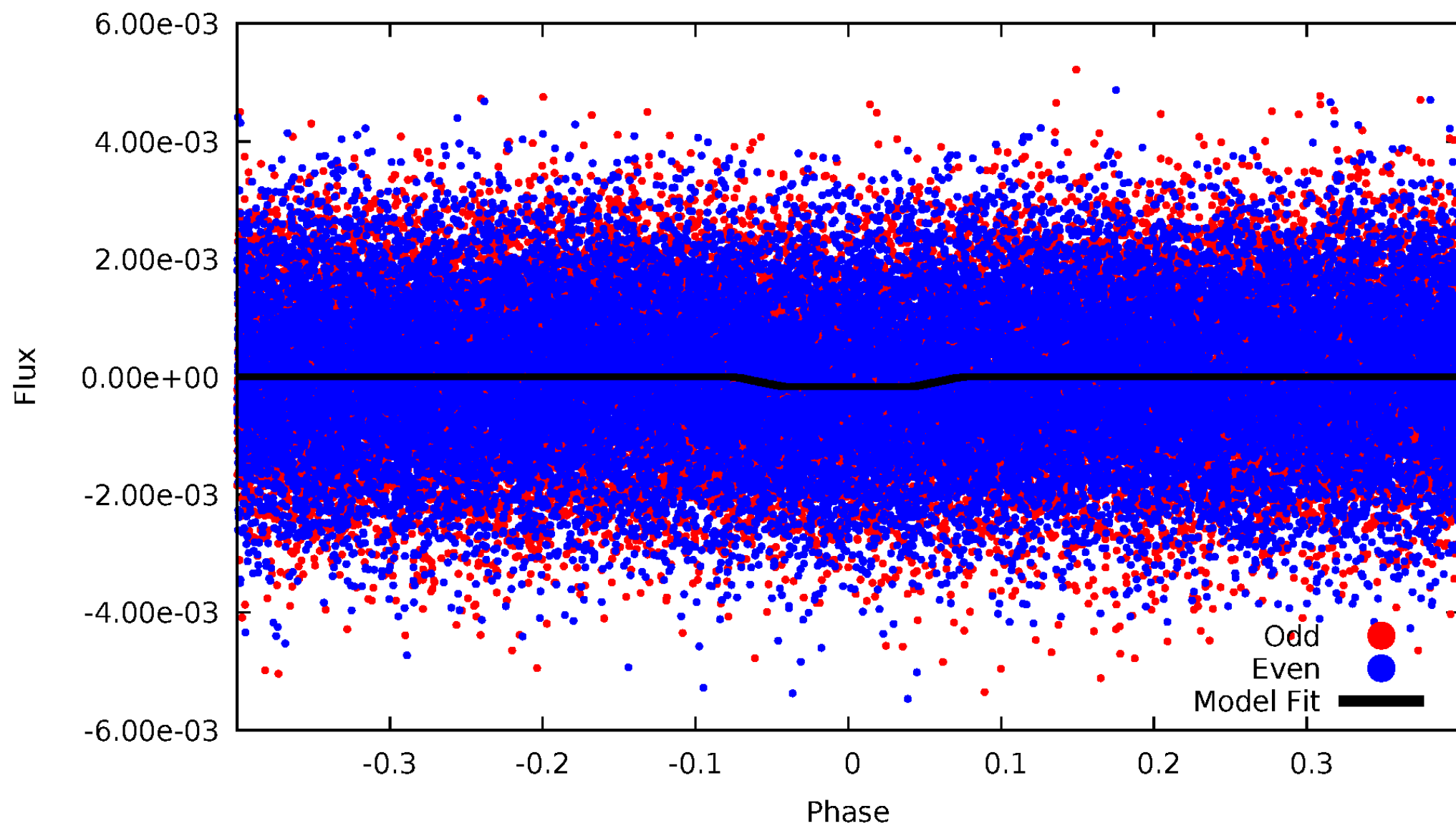
# DV Odd/Even

TCE 009054553-01



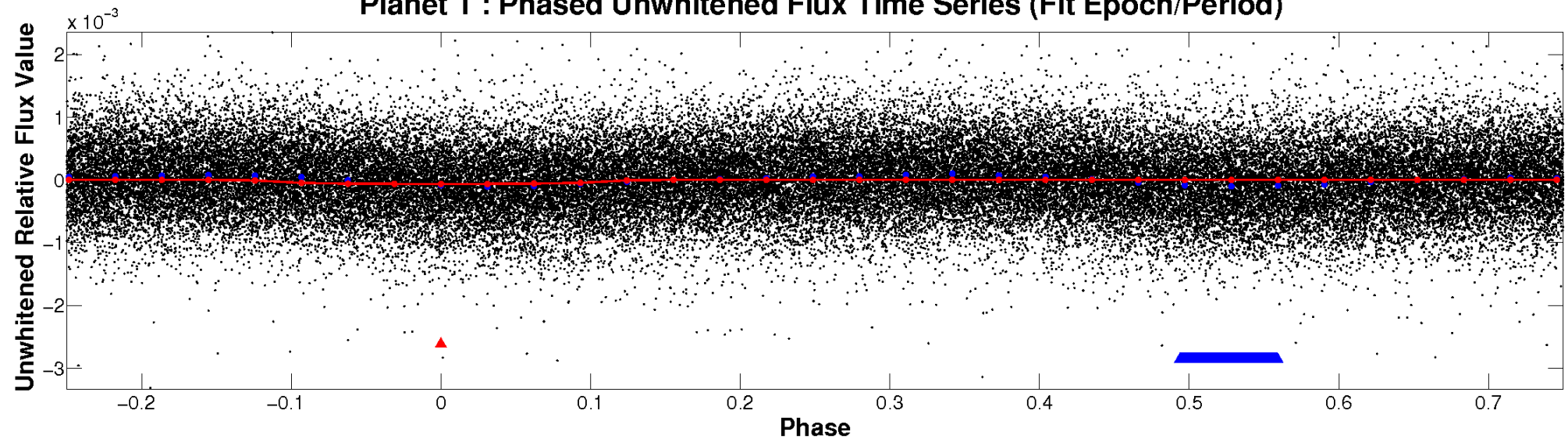
# ALT Odd/Even

TCE 009054553-01

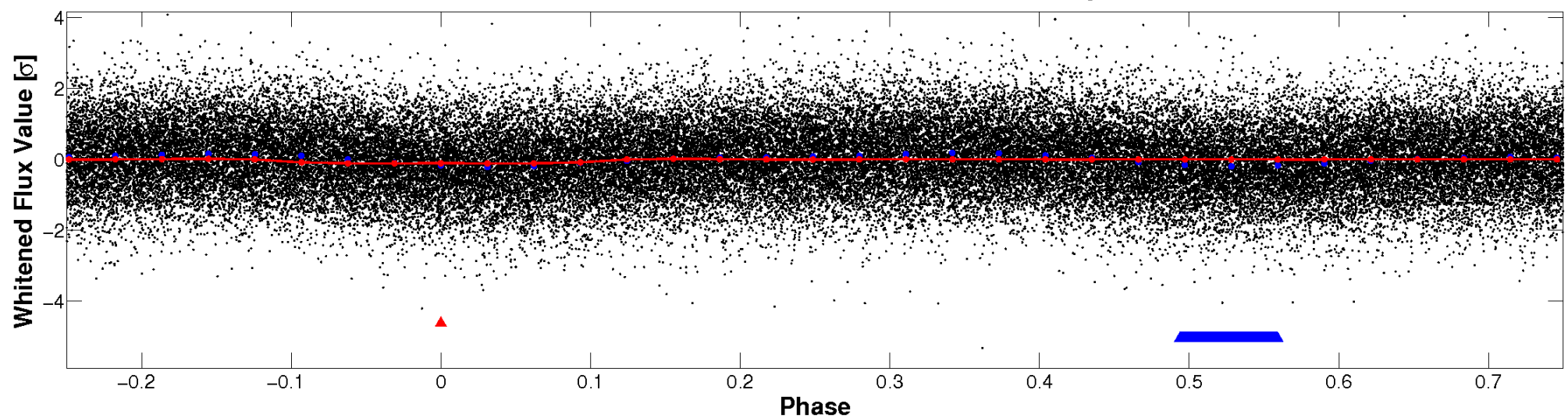


# Non-Whitened Vs. Whitened Light Curve

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



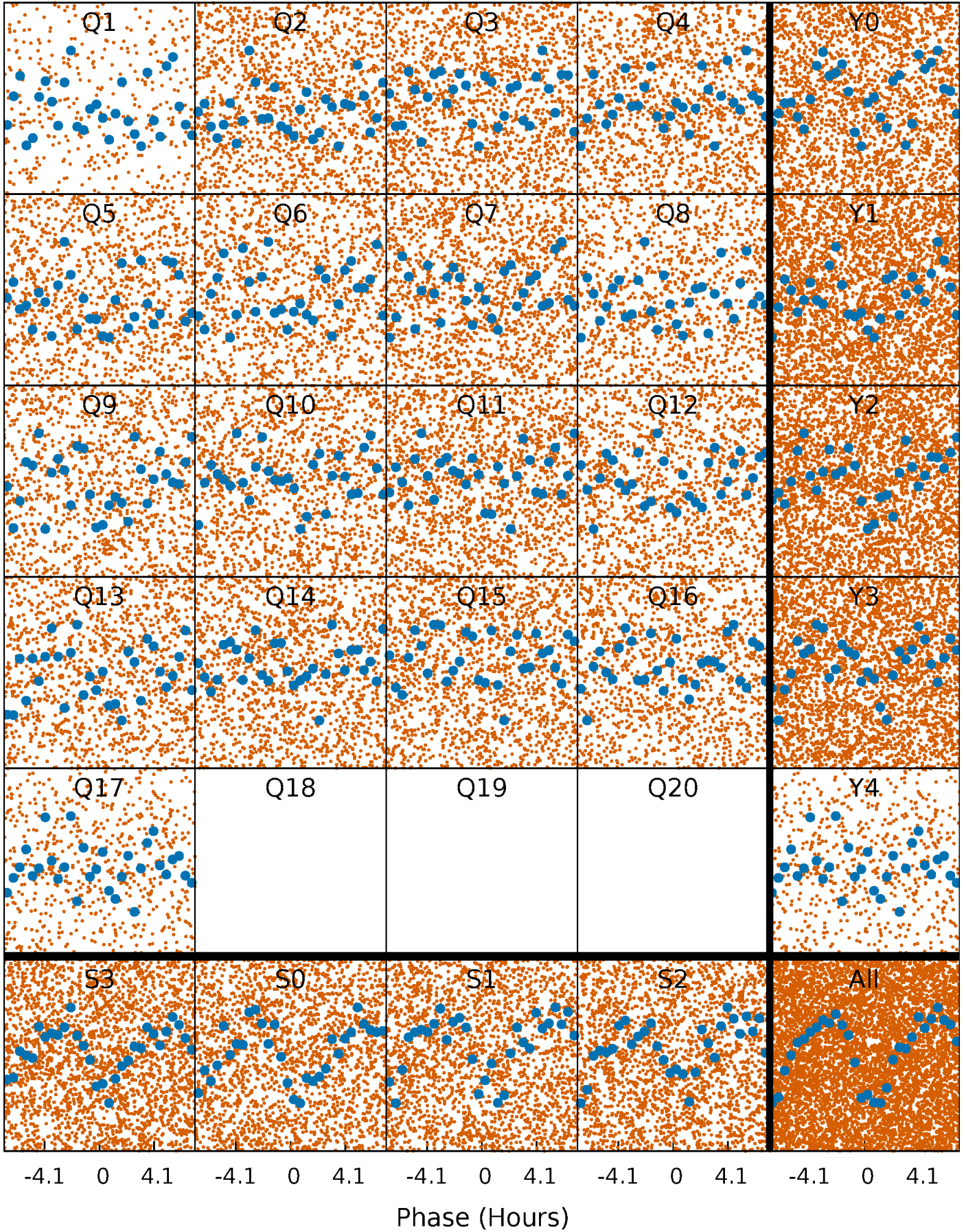
**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**





# PDC Quarter-Phased Transit Curves

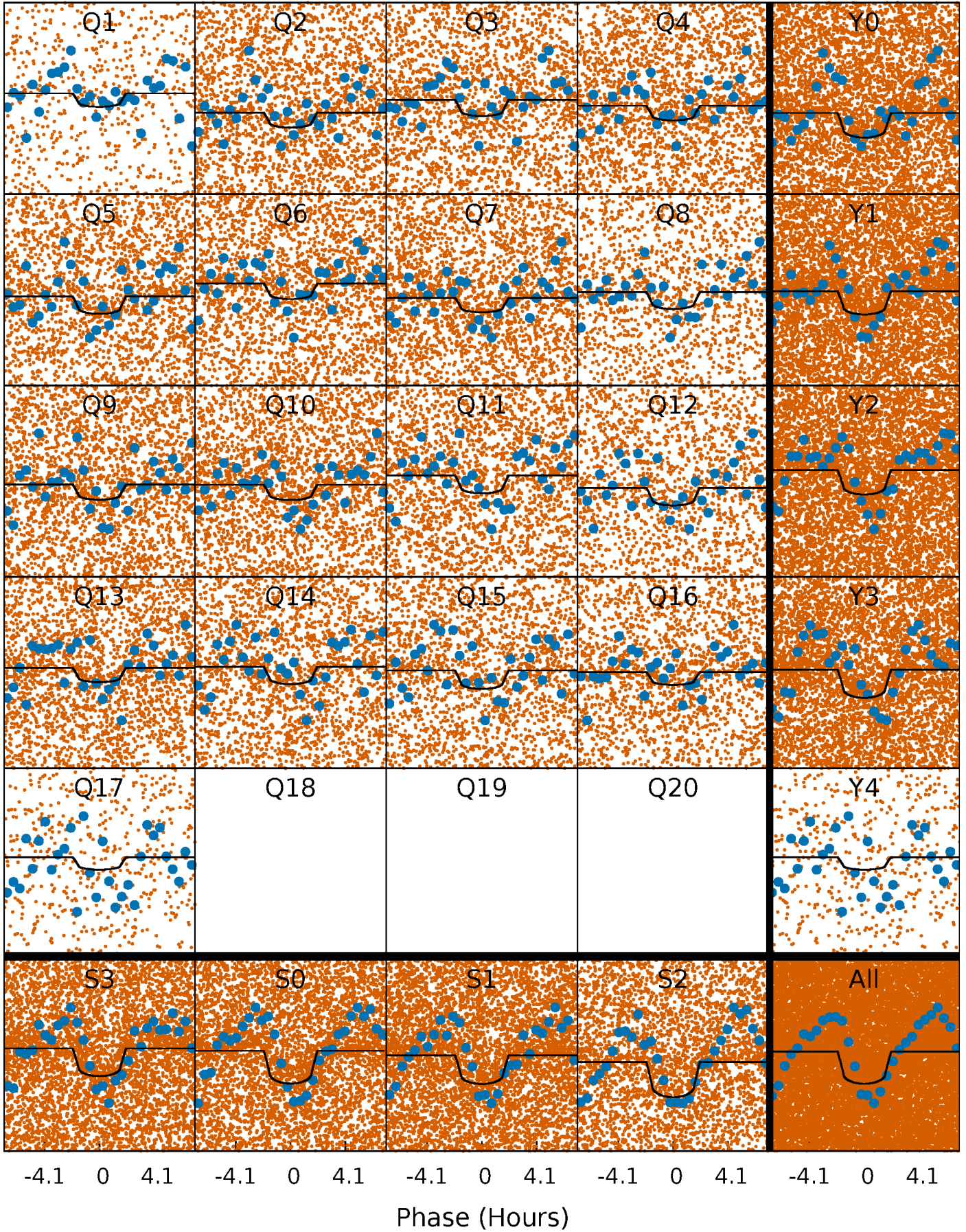
TCE 009054553-01 P= 0.657599 Days  $T_0=131.942840$  (BKJD)





# DV Quarter-Phased Transit Curves

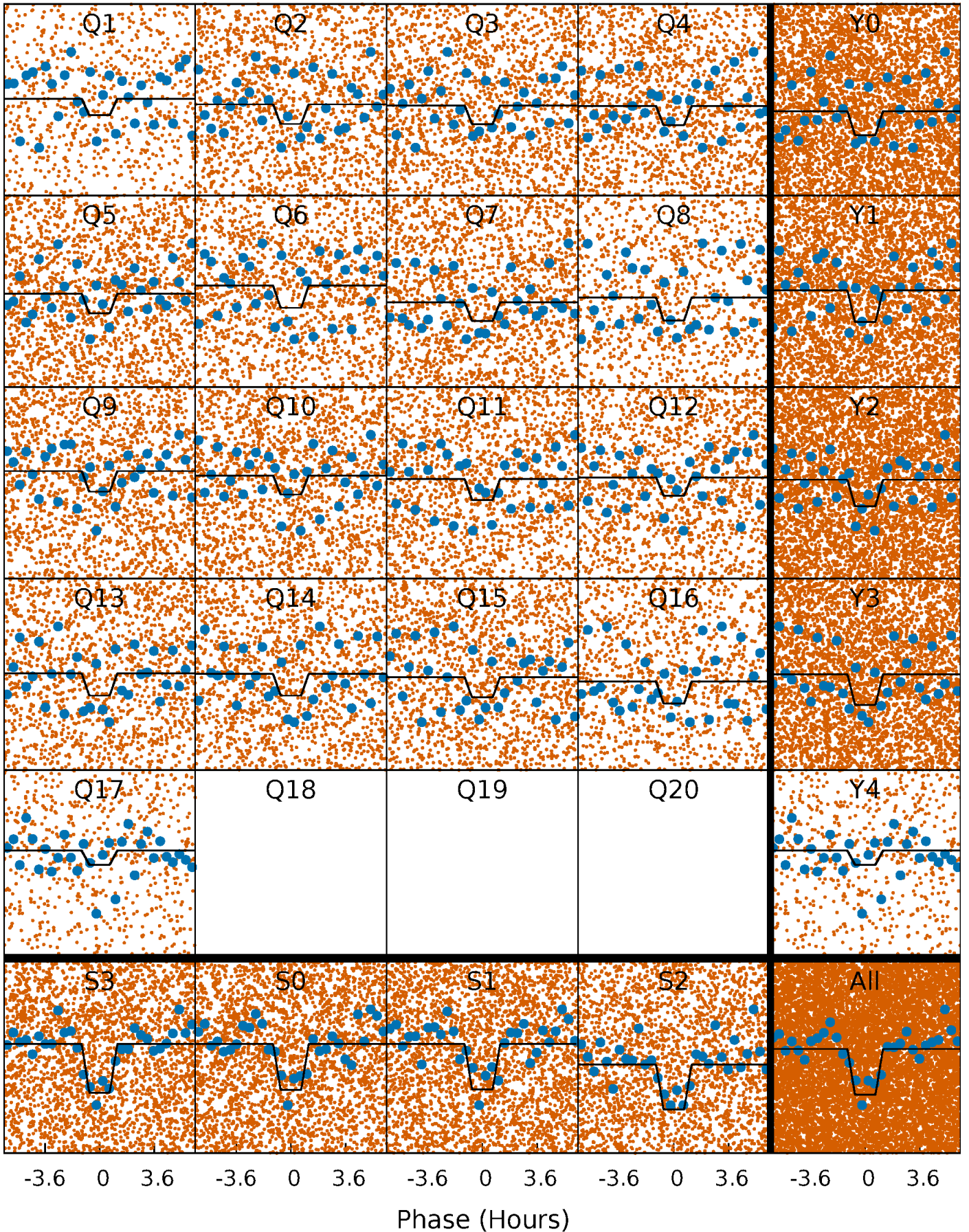
TCE 009054553-01 P= 0.657599 Days  $T_0=131.942840$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

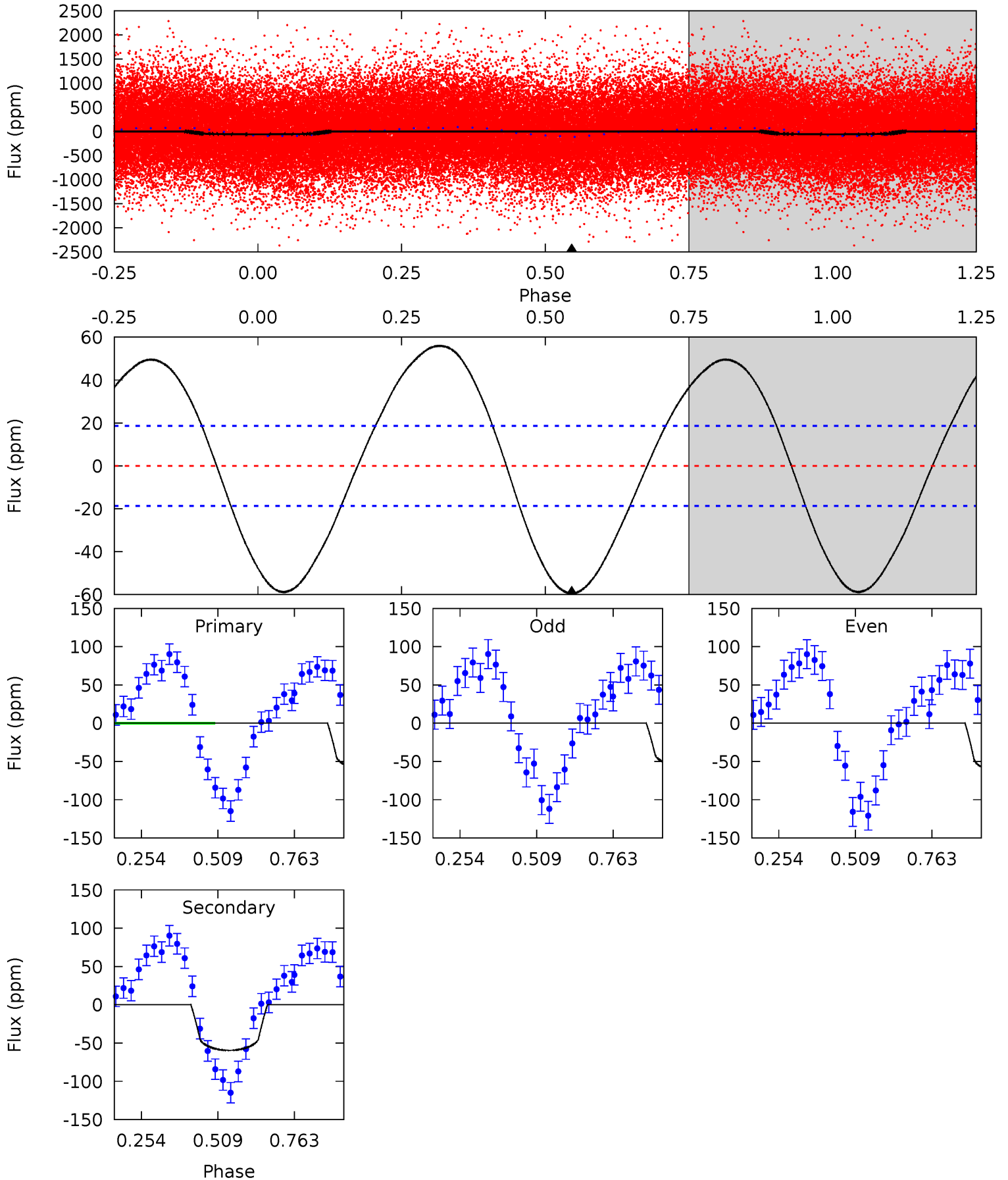
TCE 009054553-01 P= 0.657634 Days  $T_0=131.929064$  (BKJD)



# DV Model-Shift Uniqueness Test

009054553-01, P = 0.657599 Days, E = 131.285241 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	14.0	0	0	4.36	1.14	9.05	14.0	14.0	14.0	14.0	0.90	1.03	0.48	9.09

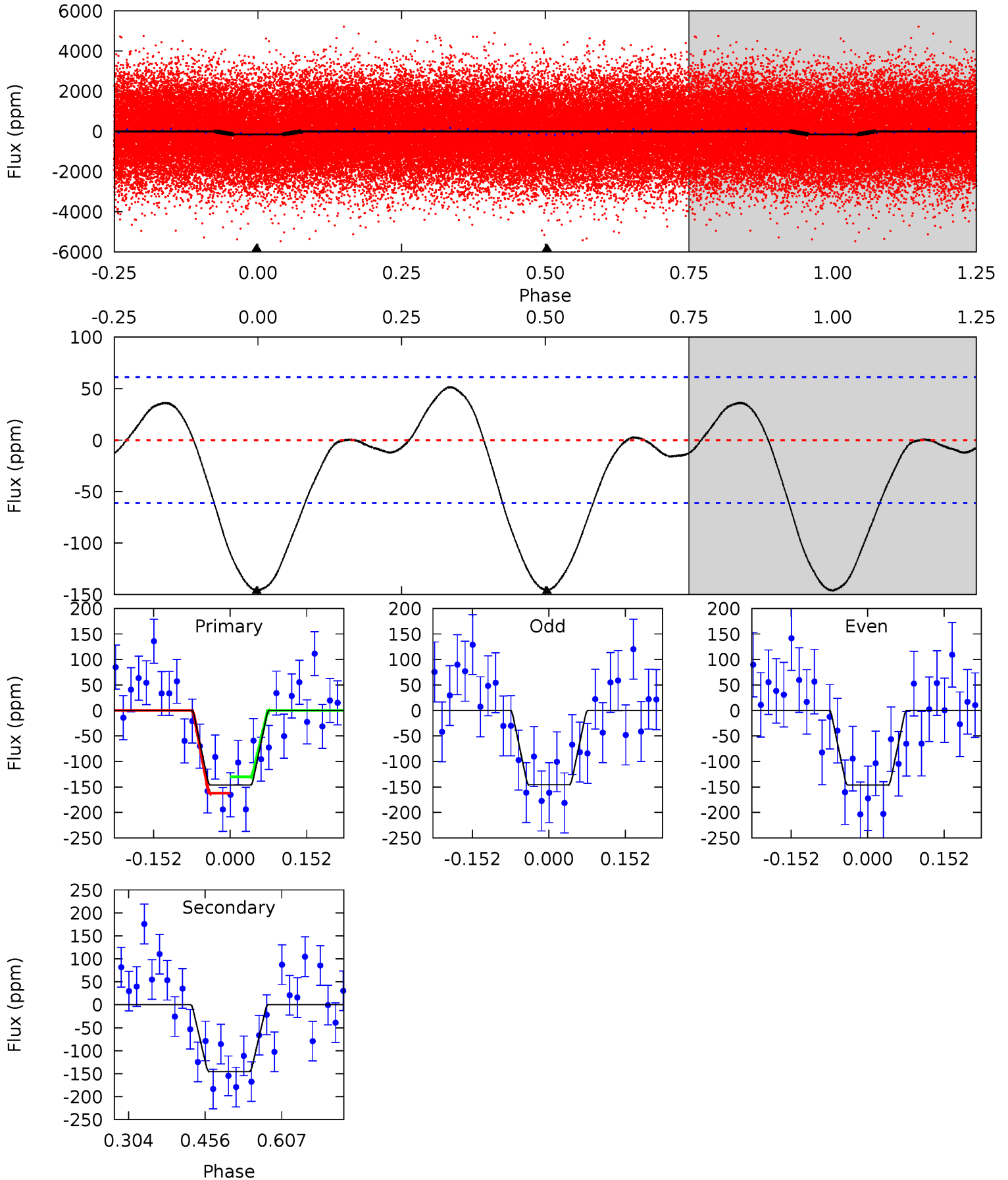




# Alt Model-Shift Uniqueness Test

009054553-01, P = 0.657634 Days, E = 131.271430 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
10.7	10.6	0	0	4.48	1.43	1.53	10.7	10.7	10.6	10.6	0.02	0.95	0.26	1.18



### Stellar Parameters For KIC 009054553

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7277^{+228}_{-304}$	$4.043^{+0.198}_{-0.162}$	$-0.080^{+0.250}_{-0.350}$	$1.982^{+0.551}_{-0.496}$	$1.581^{+0.211}_{-0.257}$	$0.286^{+0.311}_{-0.140}$
	+3%/-4%	+5%/-4%	+312%/-438%	+28%/-25%	+13%/-16%	+109%/-49%
Source	PHO1	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 009054553-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-60 \pm 4$	$1.64^{+0.86}_{-0.86}$	$4773^{+356}_{-363}$	$7124^{+4910}_{-1613}$	$3.512^{+11.739}_{-1.963}$
Alt.	$-145 \pm 14$	$2.72^{+1.04}_{-0.90}$	$4747^{+367}_{-328}$	$6752^{+1992}_{-997}$	$3.132^{+4.025}_{-1.468}$

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

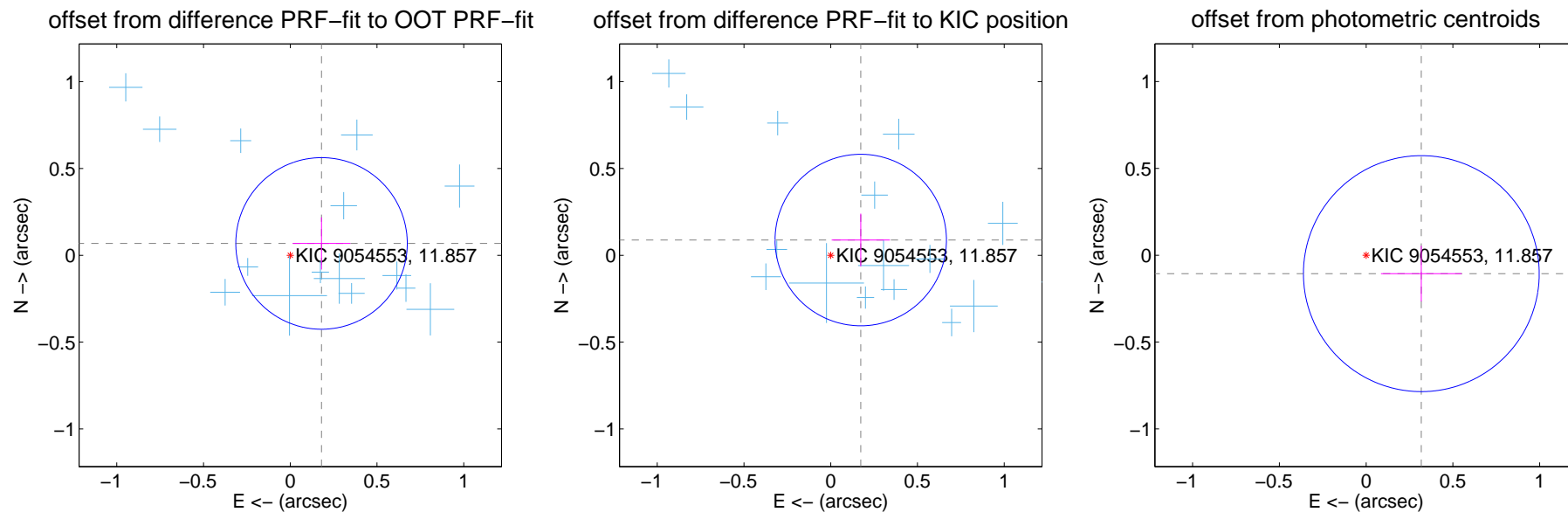
## DV Centroid Data

Supplemental centroid analysis for 009054553-01. **Kepler magnitude: 11.86.** Transit SNR 12.24

There are 17 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.09 arcsec

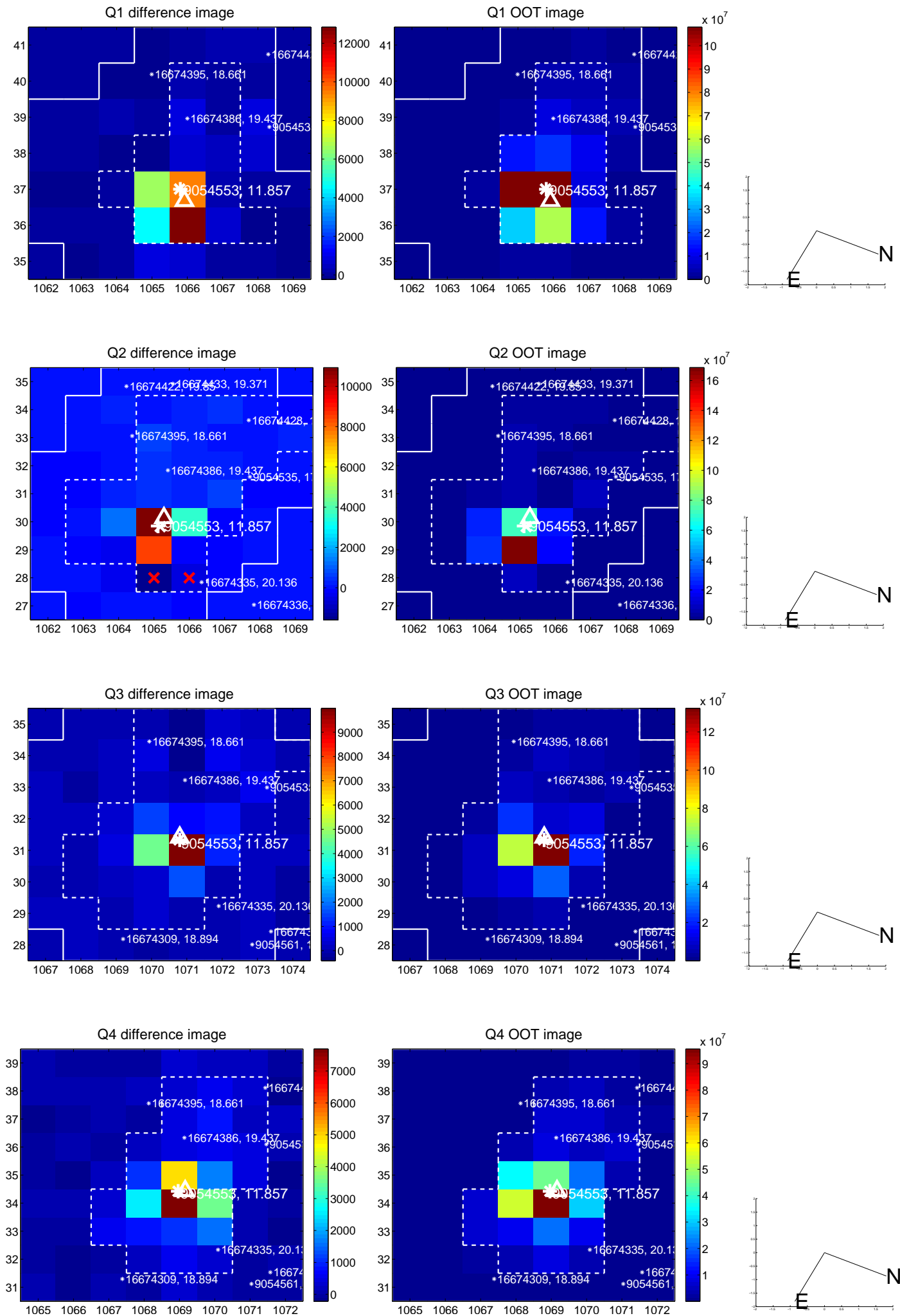
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.193 \pm 0.165$	1.17	$-0.180 \pm 0.166$	$0.068 \pm 0.150$
PRF-fit source offset from KIC position	$0.194 \pm 0.165$	1.18	$-0.173 \pm 0.168$	$0.088 \pm 0.152$
photometric centroid source offset	$0.34 \pm 0.23$	1.48	$-0.32 \pm 0.23$	$-0.11 \pm 0.16$



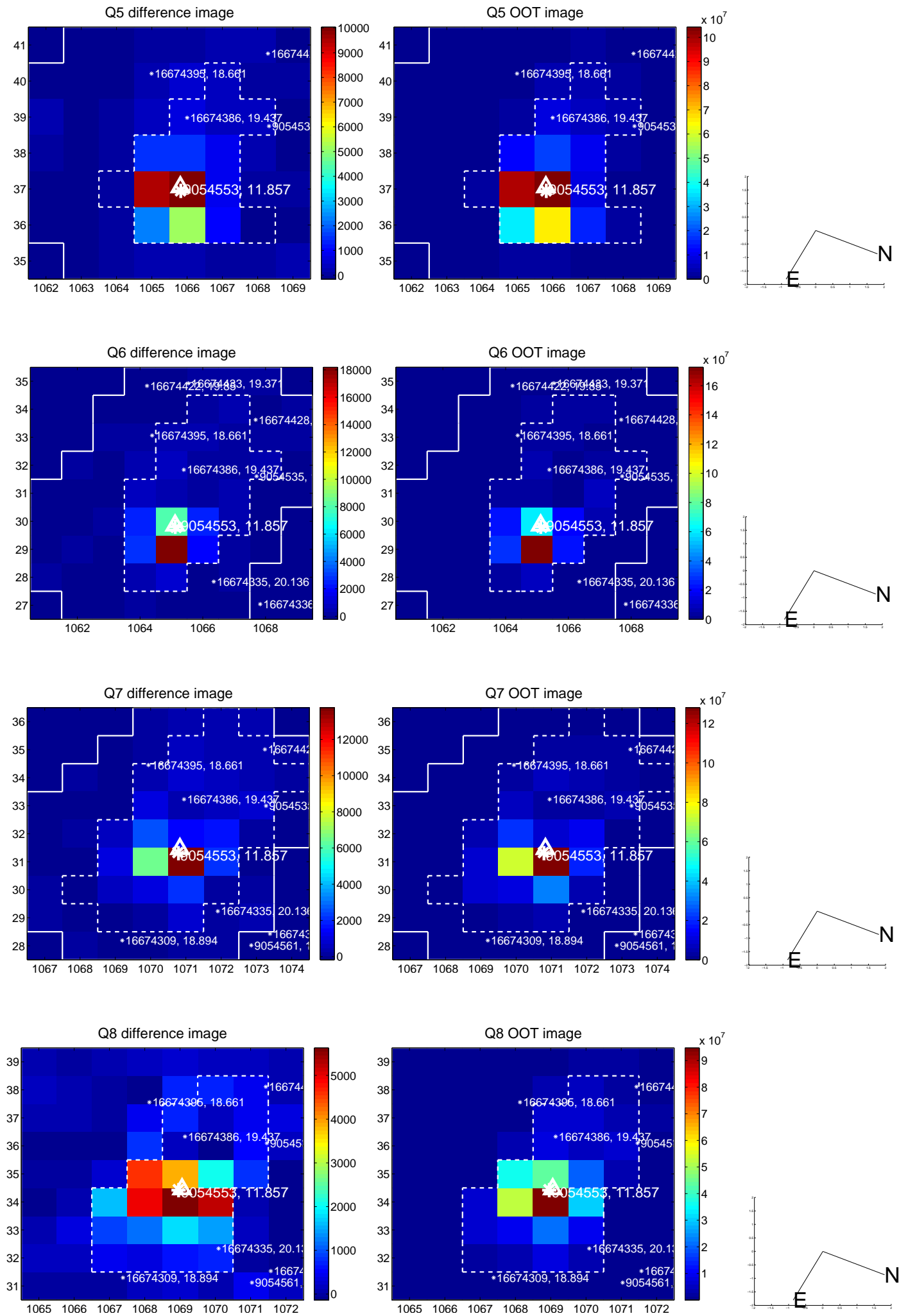
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



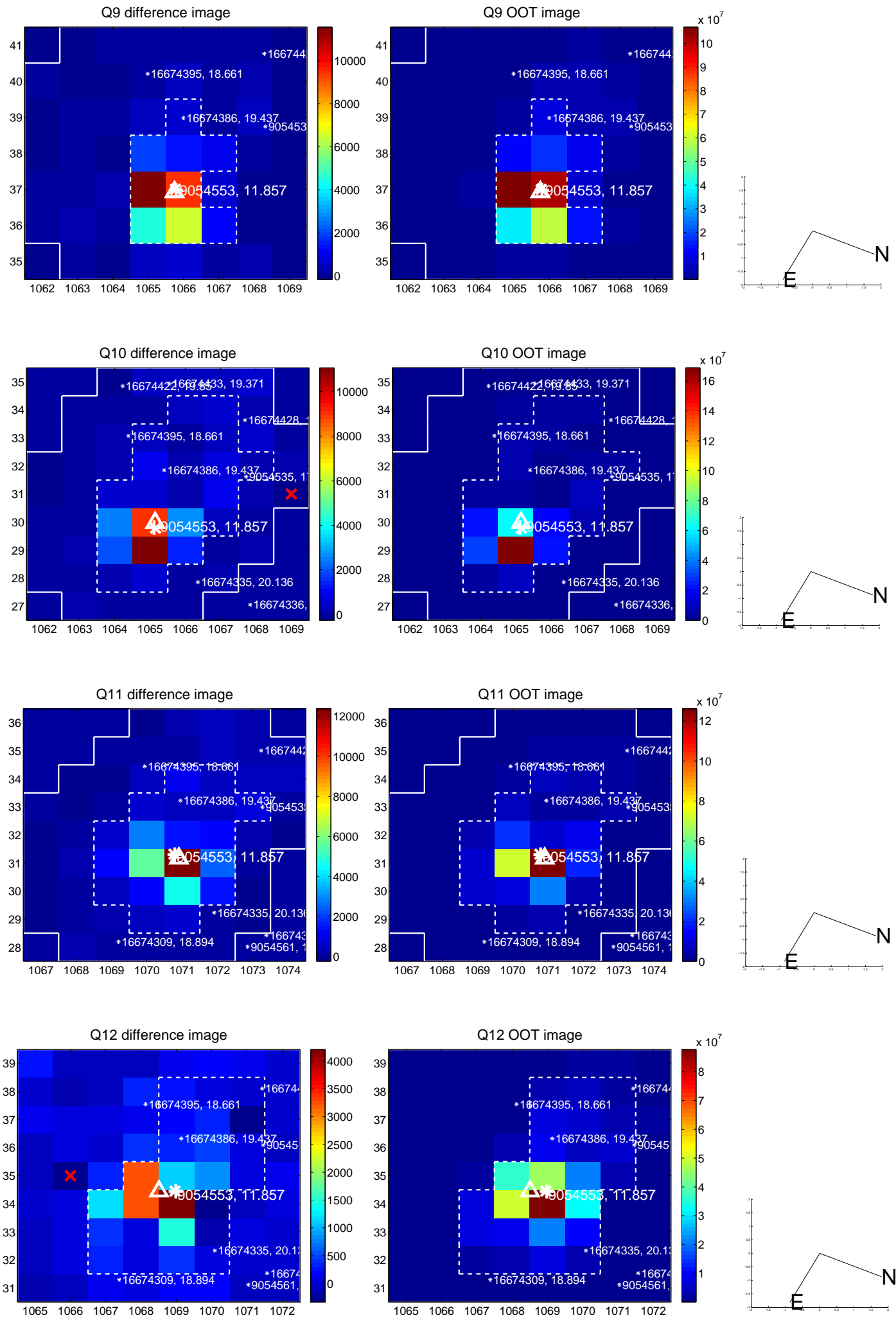
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

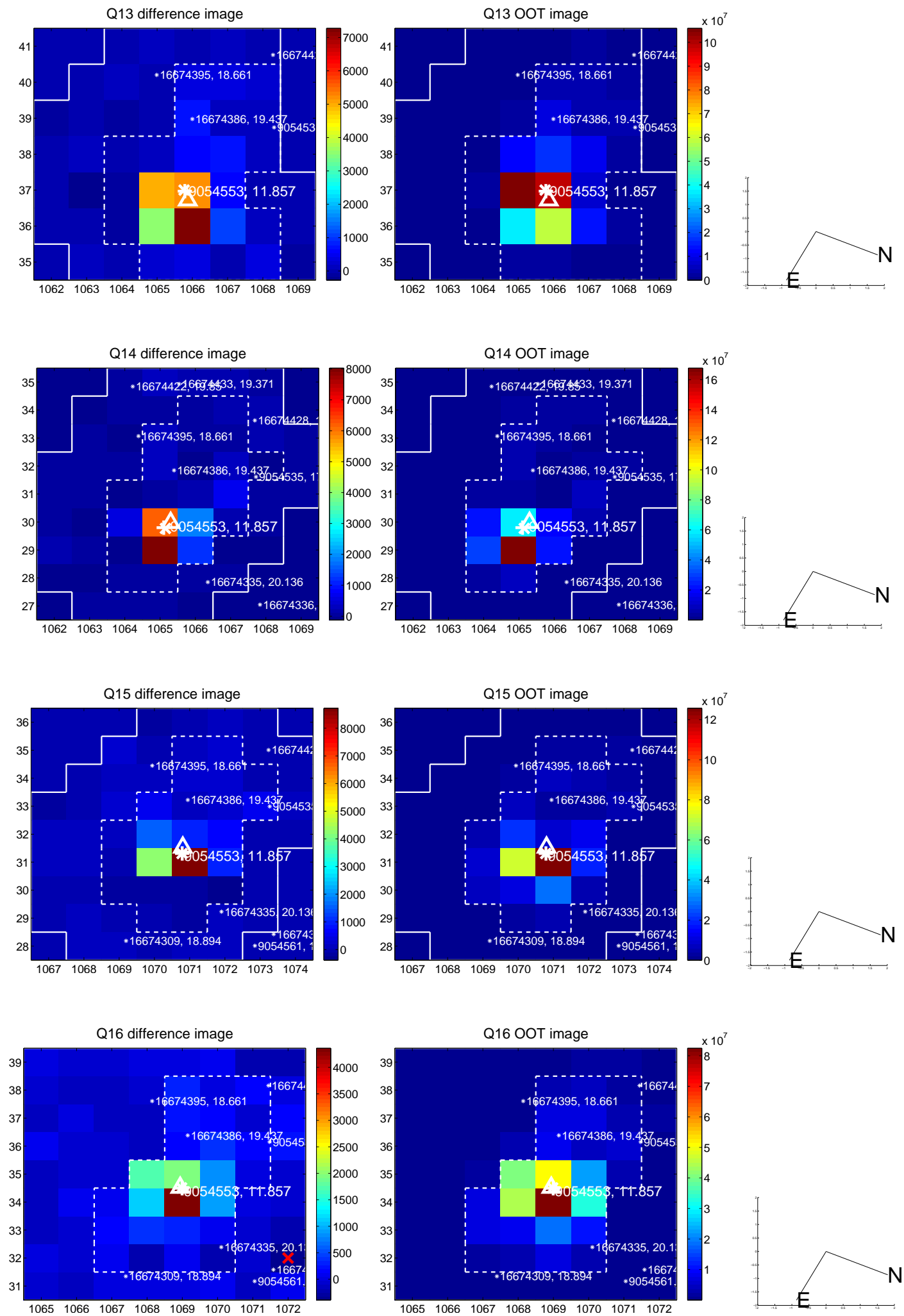


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

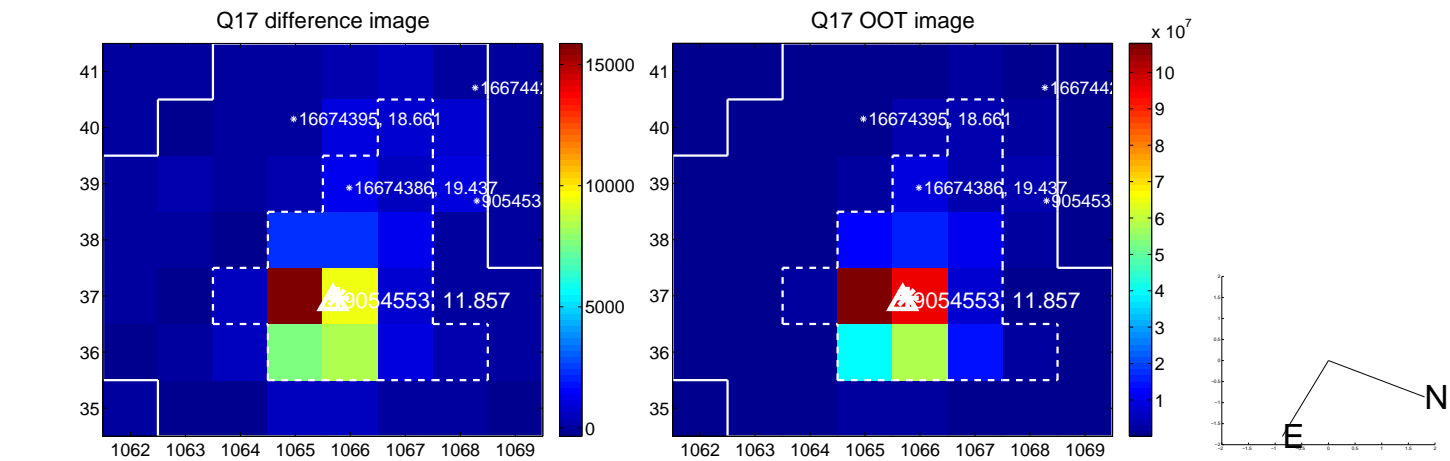




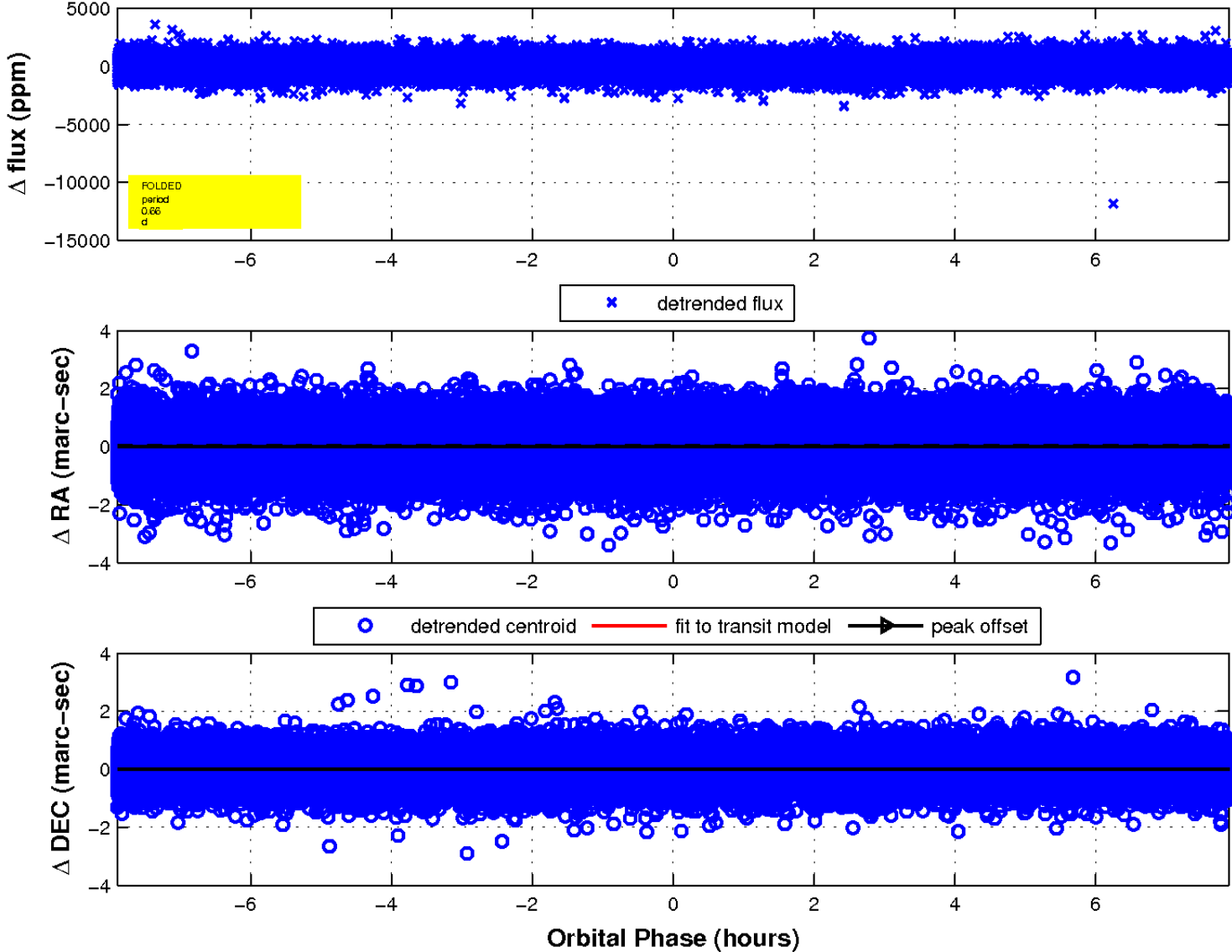
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

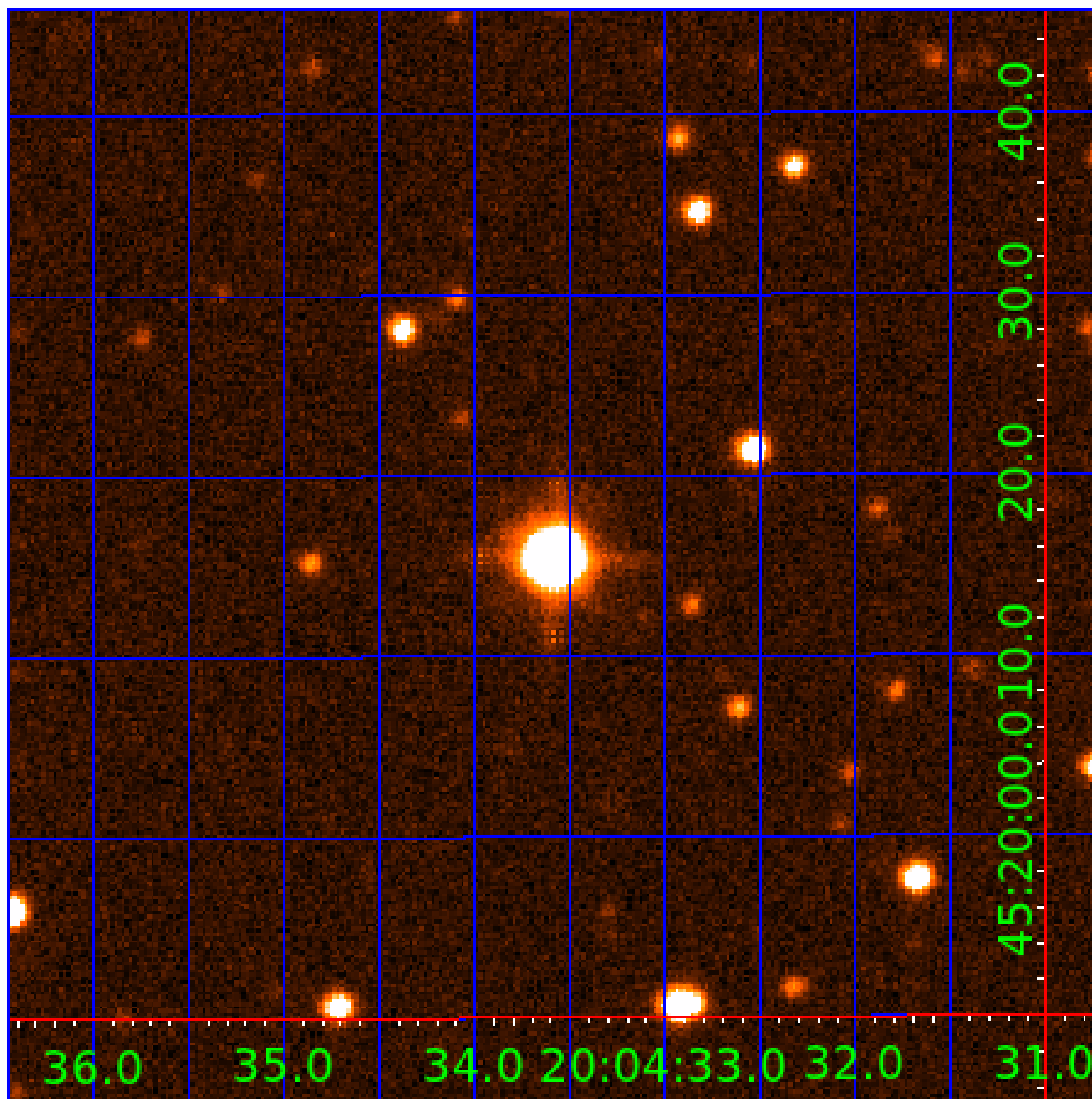


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination





# KIC 009054553

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009054553-01	OBS	No	0.657599	131.942840	64.9	3.577	20.1	12.2	1.98	7277	1.63	33176.04
009054553-02	OBS	No	0.657619	131.610085	95.5	2.004	17.1	17.8	1.98	7277	1.97	33174.74

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009054553-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
009054553-02	OBS	FP	0.00	1	0	0	0	LPP_DV—SAME_NTL_PERIOD

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

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

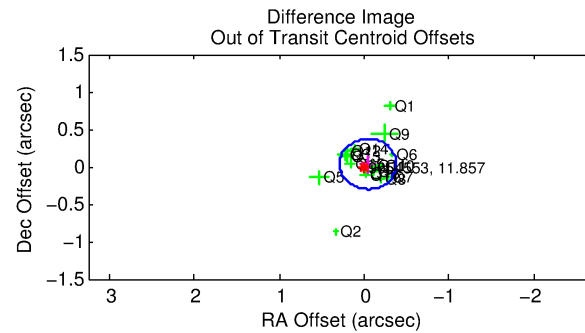
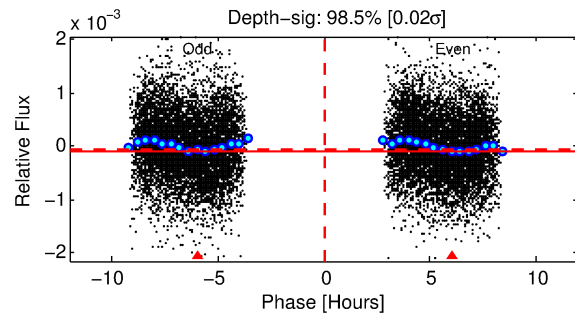
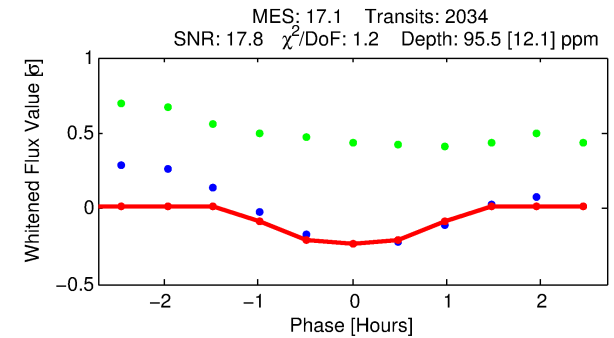
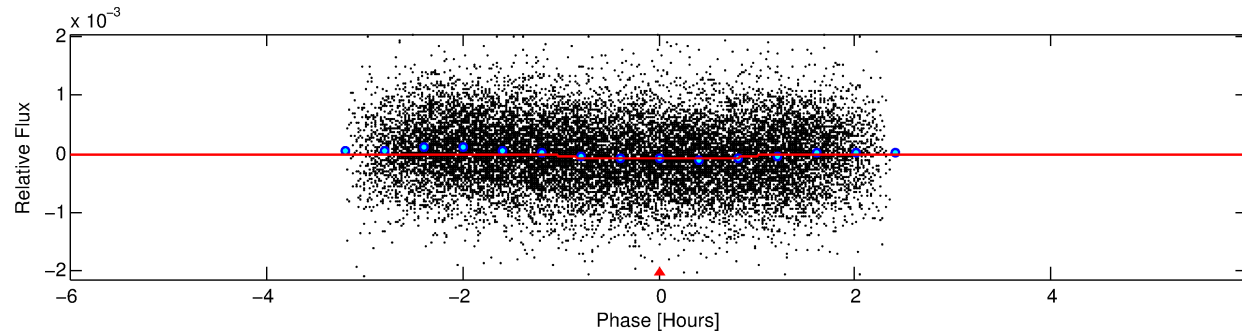
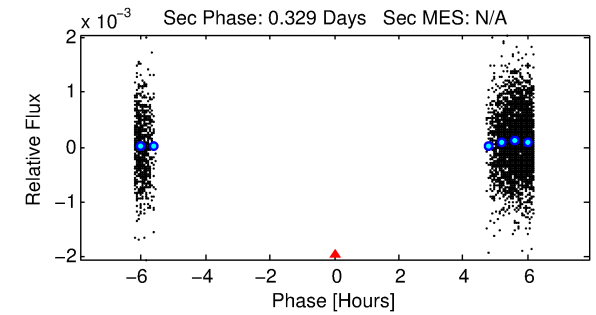
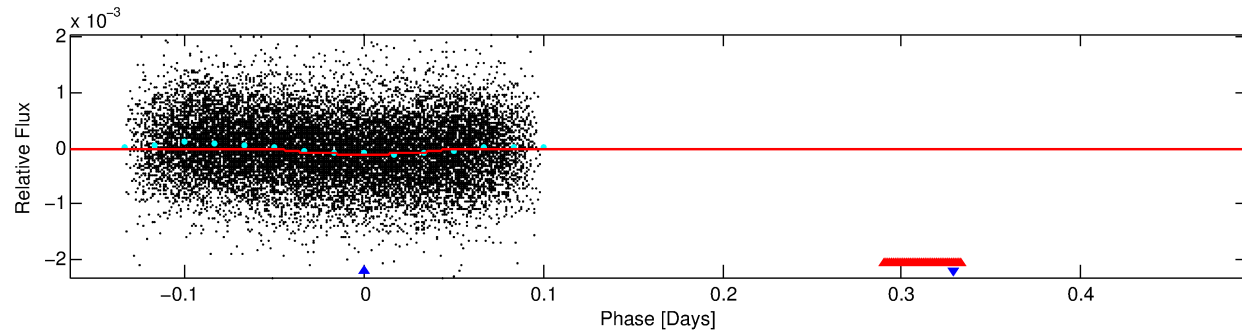
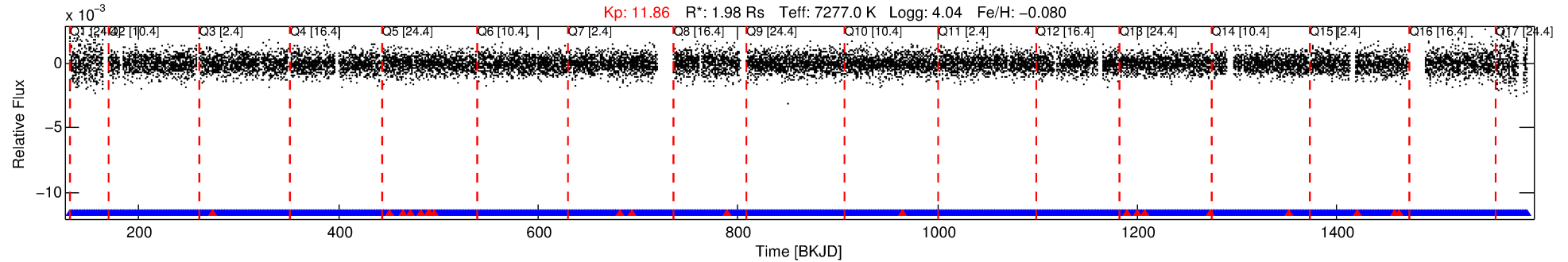
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009054553-02

No Significant Match Found

# DV One-Page Summary

KIC: 9054553 Candidate: 2 of 2 Period: 0.658 d



## DV Fit Results:

Period = 0.65762 [0.00001] d  
Epoch = 131.6101 [0.0020] BKJD  
Rp/R\* = 0.0091 [0.0066]  
a/R\* = 2.57 [9.33]  
b = 0.16 [26.84]  
Seff = 33174.74 [13046.25]  
Teq = 3441 [338] K  
Rp = 1.97 [1.53] Re  
a = 0.0172 [0.0041] AU

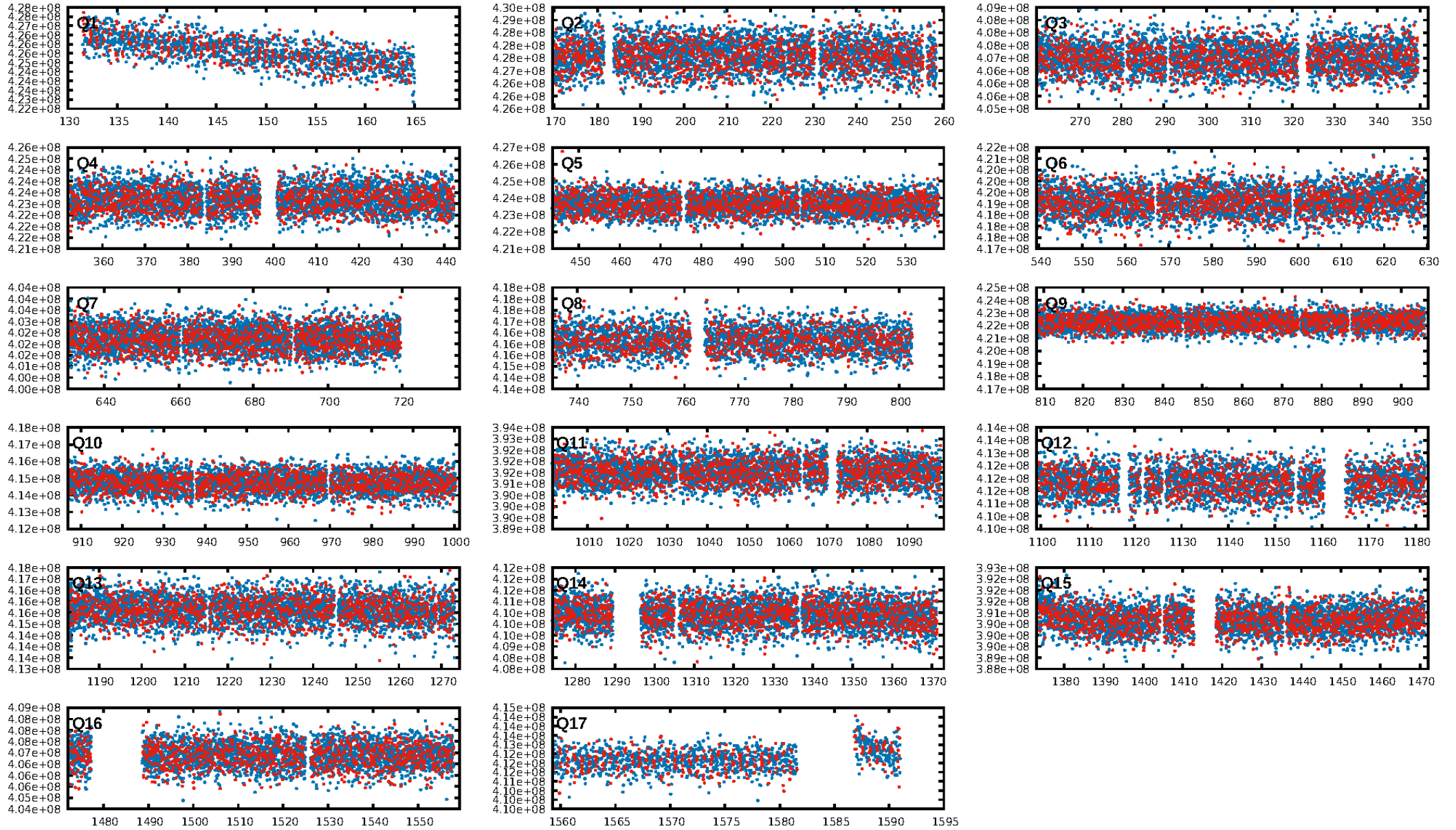
## DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 0.99 [1922/1942]  
GhostDiagnostic-chr: 1.14  
Centroid-sig: 37.0%  
Centroid-so: 0.198 arcsec [0.99σ]  
OotOffset-rm: 0.058 arcsec [0.52σ]  
KicOffset-rm: 0.051 arcsec [0.48σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 1.00 [17/17]  
DiffImageOverlap-fno: 0.00 [0/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 14:16:37 Z

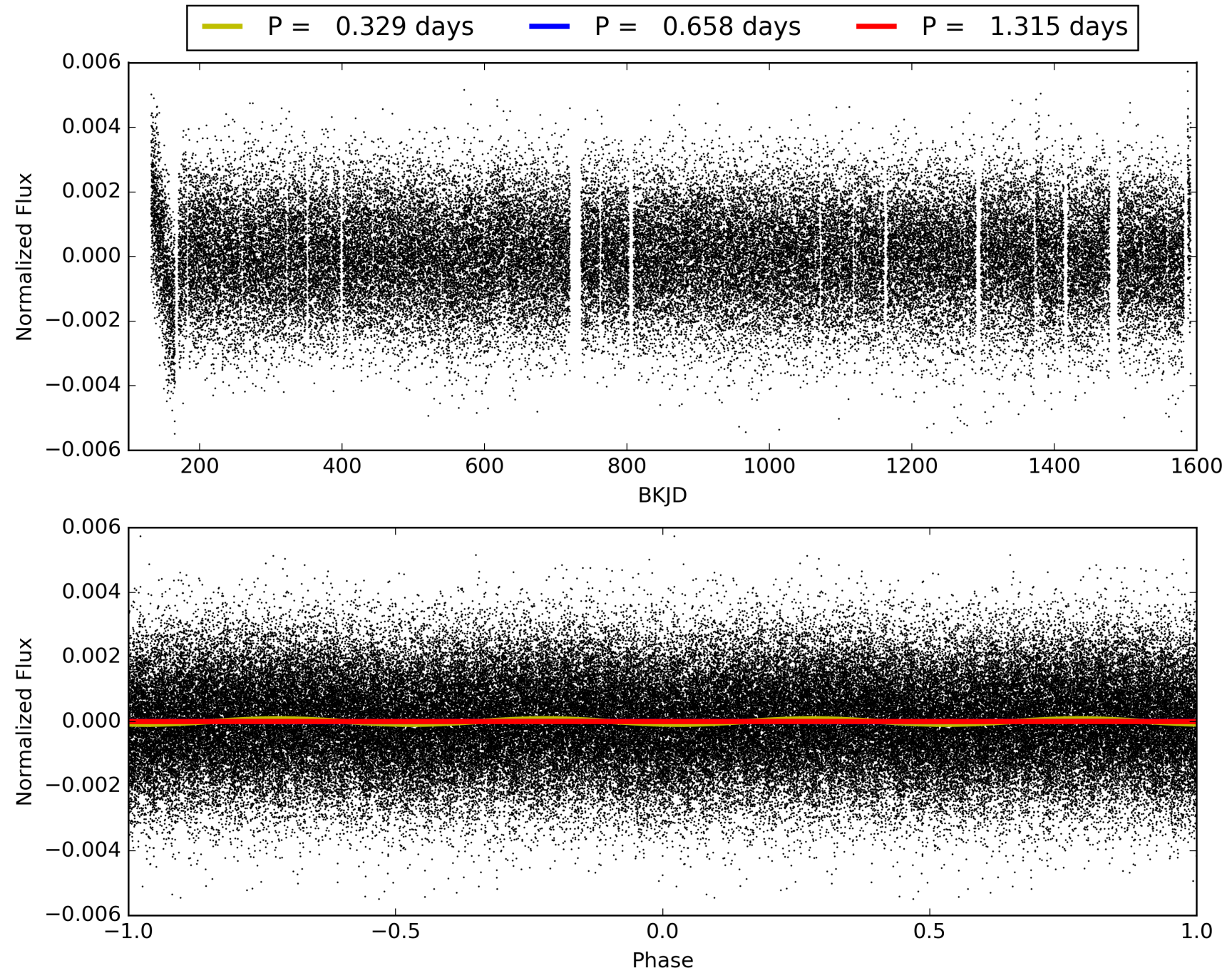
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 009054553-02, PDC Light Curves





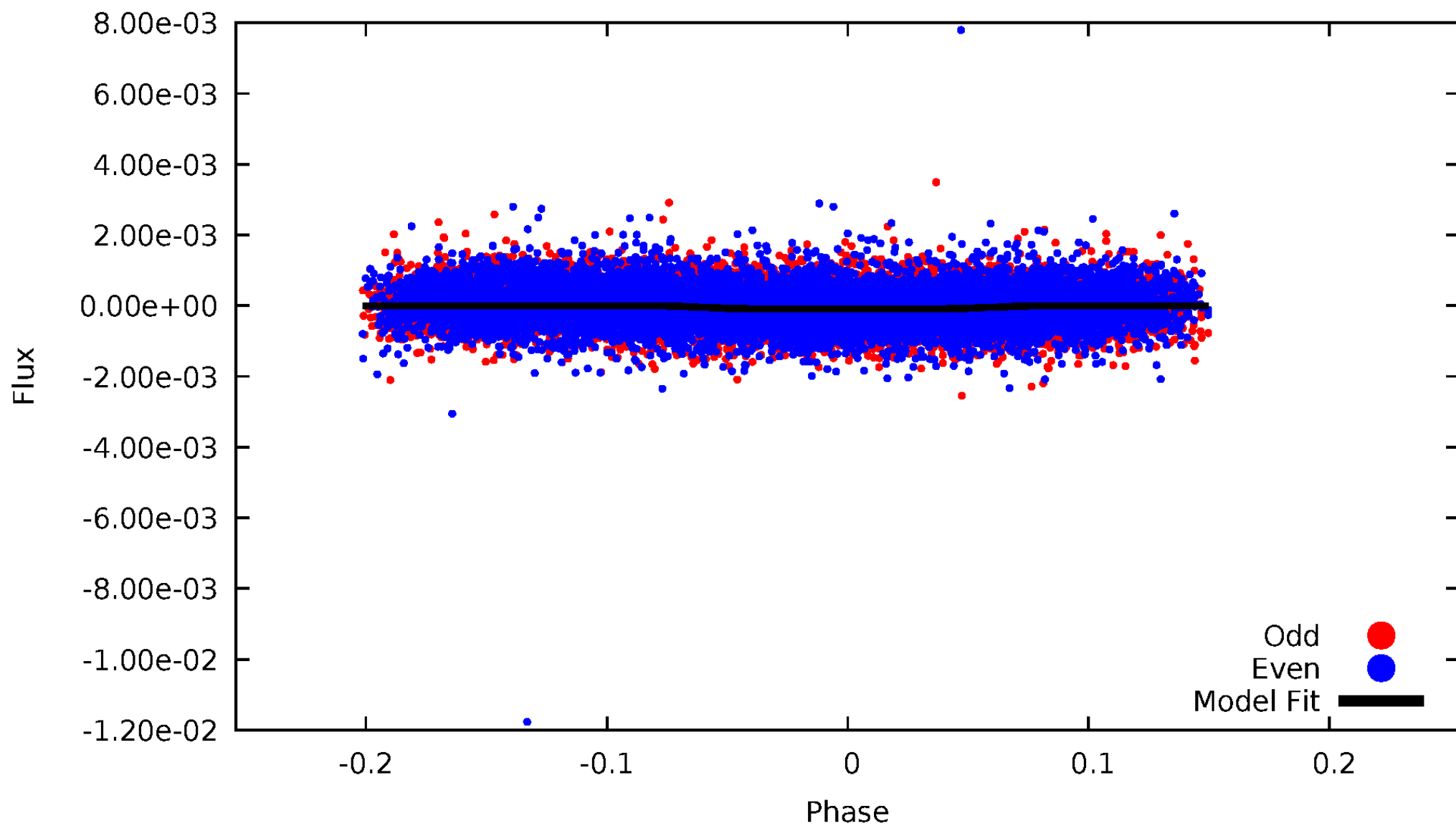
TCE 009054553-02





# DV Odd/Even

TCE 009054553-02



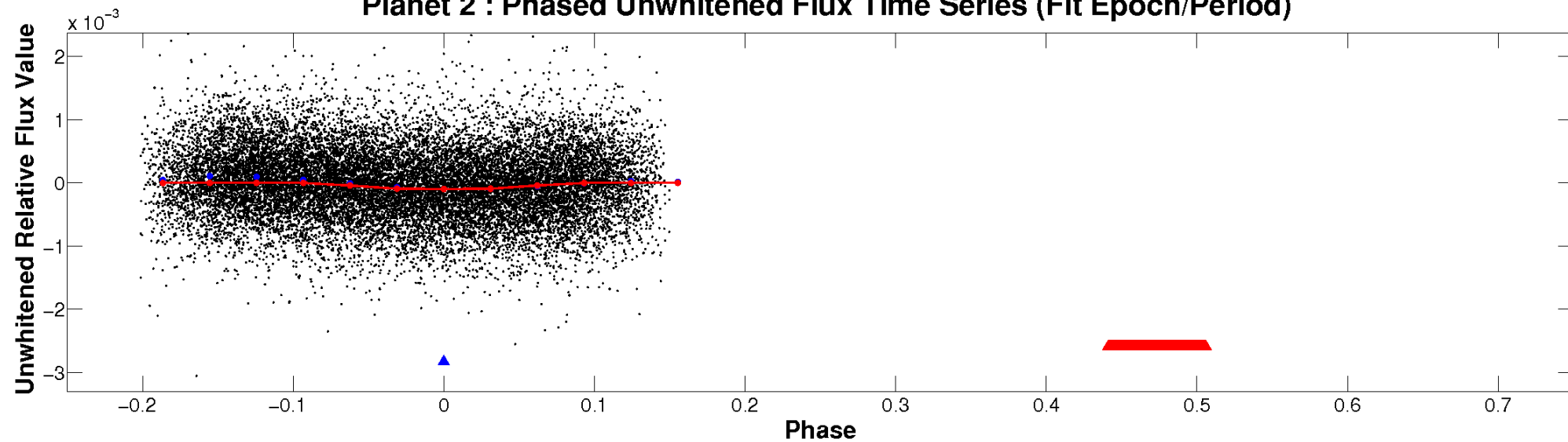


ALT Odd/Even

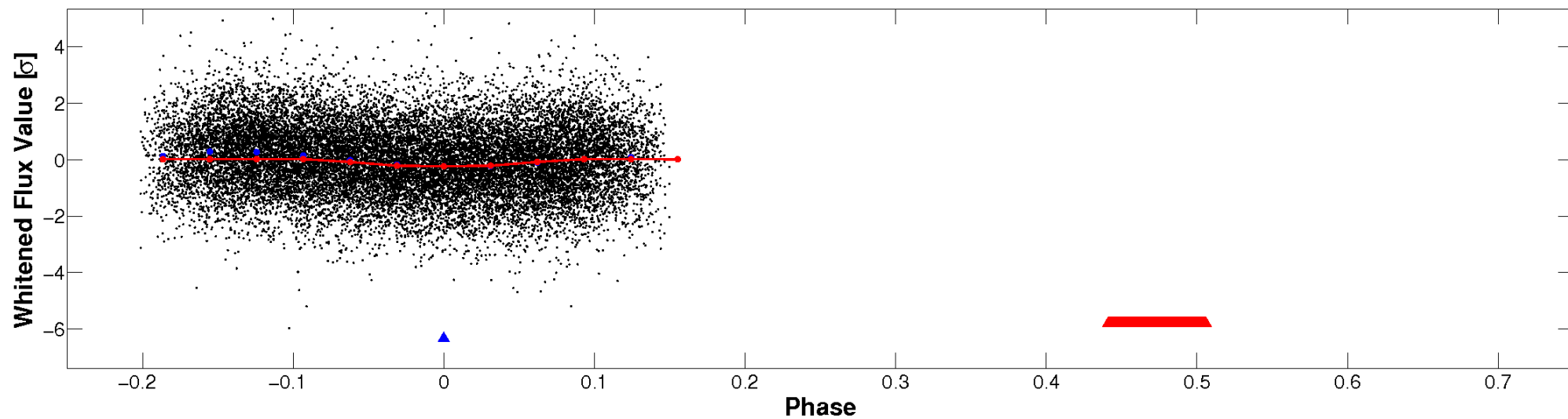
This plot does not exist for this TCE.

# Non-Whitened Vs. Whitened Light Curve

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



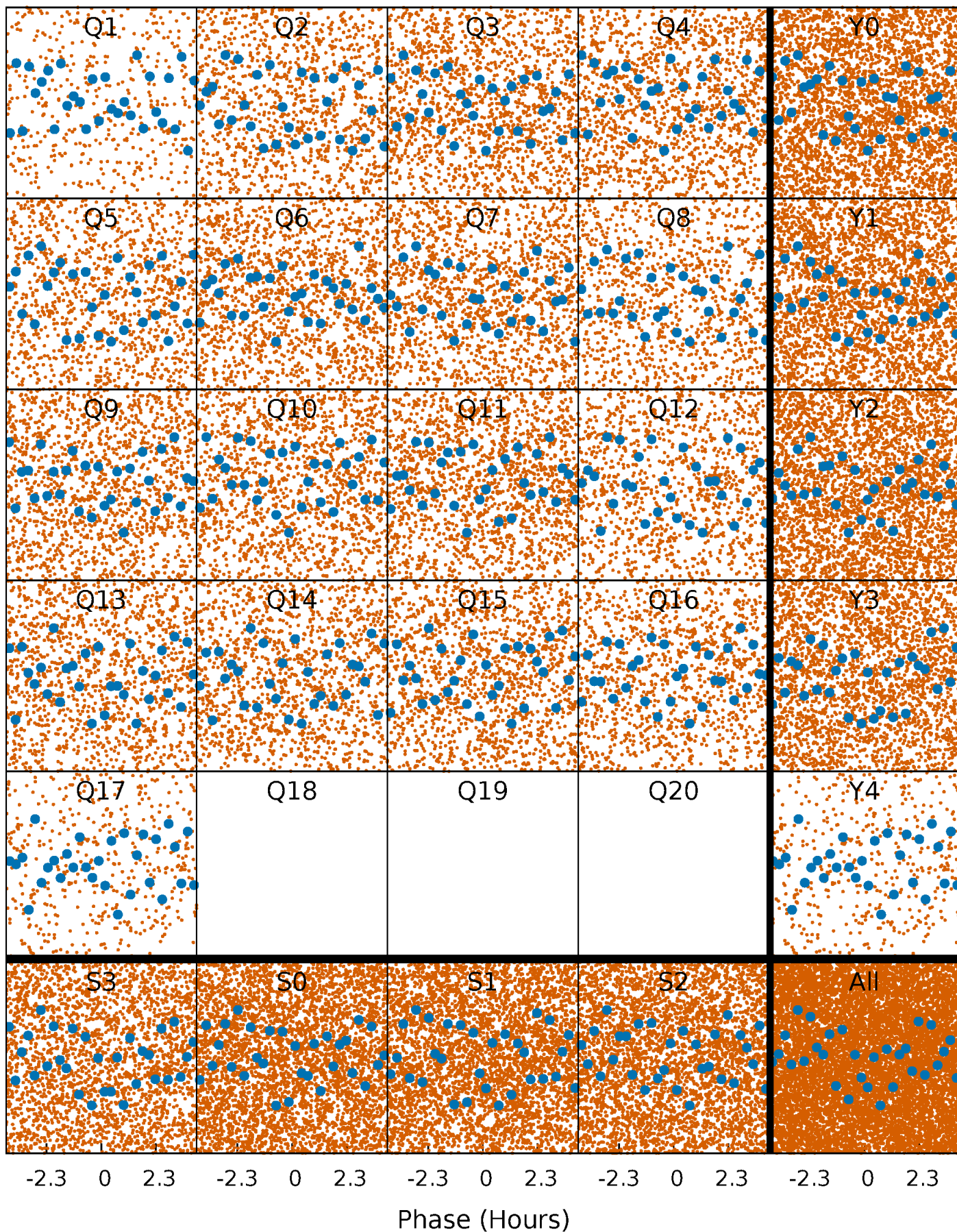
## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)





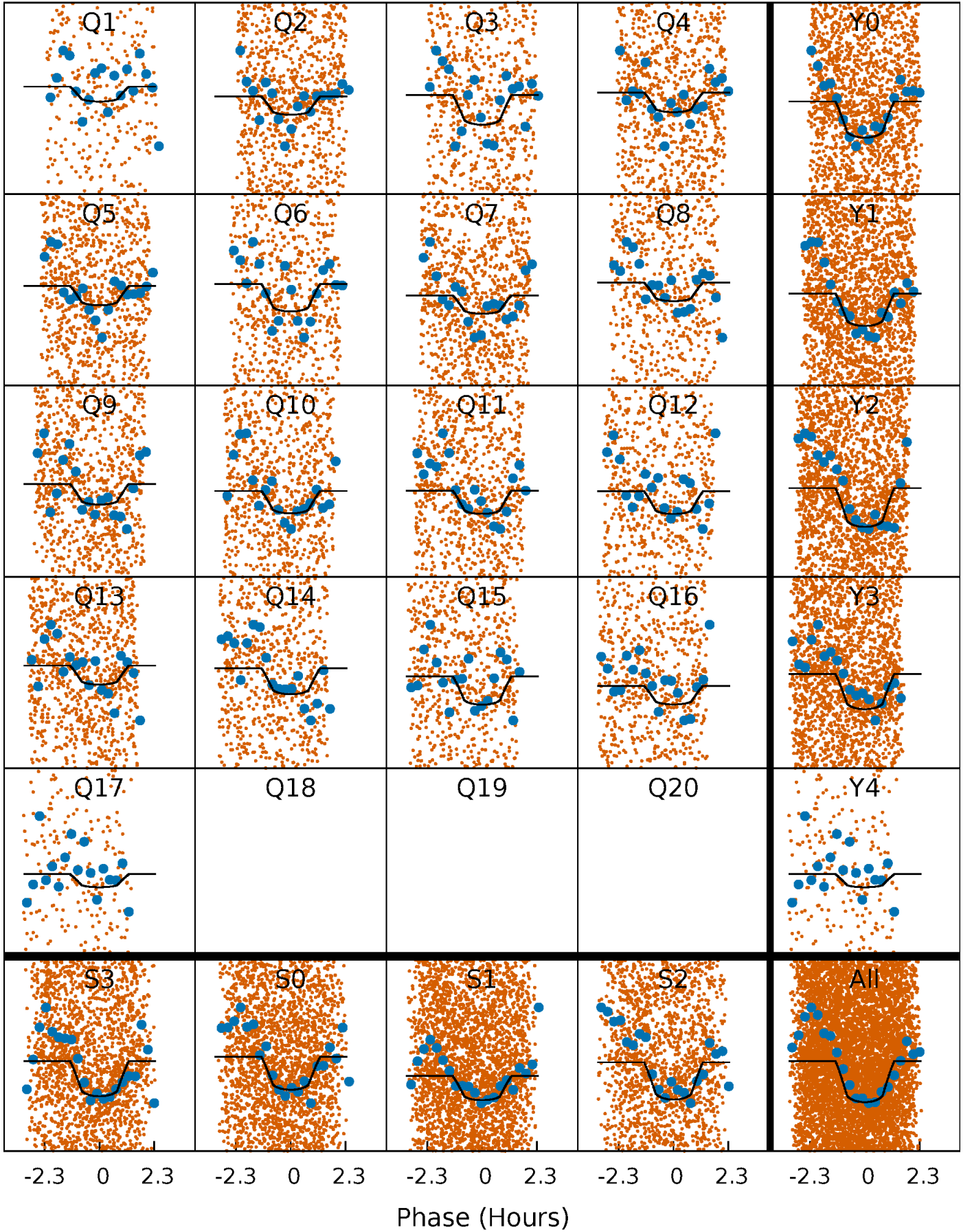
# PDC Quarter-Phased Transit Curves

TCE 009054553-02 P= 0.657619 Days  $T_0=131.610084$  (BKJD)



# DV Quarter-Phased Transit Curves

TCE 009054553-02   P= 0.657619 Days    $T_0=131.610084$  (BKJD)

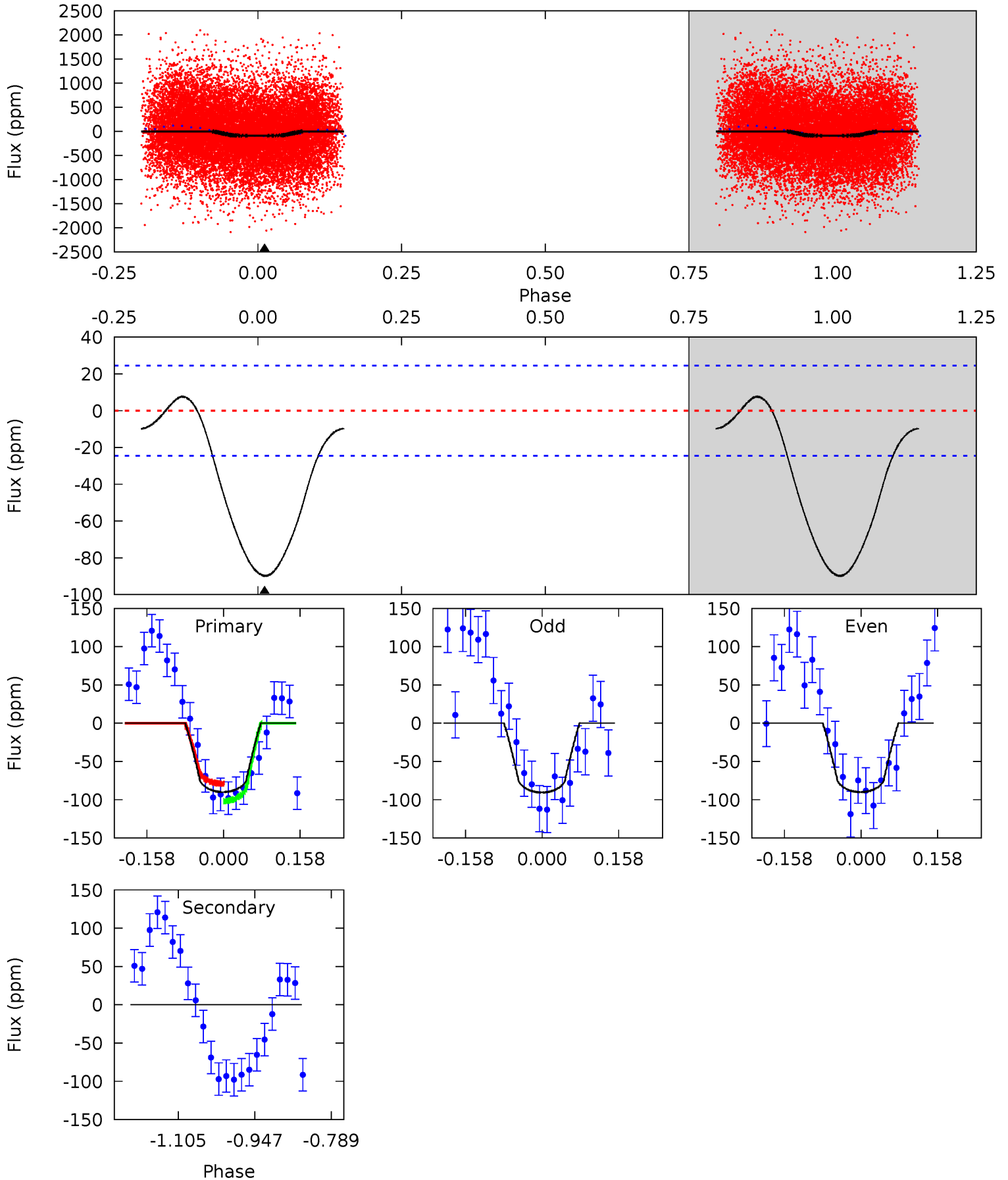


This plot does not exist for this TCE.

# DV Model-Shift Uniqueness Test

009054553-02, P = 0.657619 Days, E = 130.952465 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
16.4	0	0	0	4.47	1.41	0.85	16.4	16.4	0	0	0.05	1.06	0.08	2.08





## Alt Model-Shift Uniqueness Test

This plot does not exist for this TCE.

### Stellar Parameters For KIC 009054553

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7277^{+228}_{-304}$	$4.043^{+0.198}_{-0.162}$	$-0.080^{+0.250}_{-0.350}$	$1.982^{+0.551}_{-0.496}$	$1.581^{+0.211}_{-0.257}$	$0.286^{+0.311}_{-0.140}$
	+3%/-4%	+5%/-4%	+312%/-438%	+28%/-25%	+13%/-16%	+109%/-49%
Source	PHO1	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 009054553-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$0 \pm 5$	$2.11^{+1.44}_{-1.22}$	$4791^{+358}_{-358}$	$-4154^{+1335}_{-672}$	$0.010^{+0.265}_{-0.365}$
Alt.	N/A	N/A	N/A	N/A	N/A

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

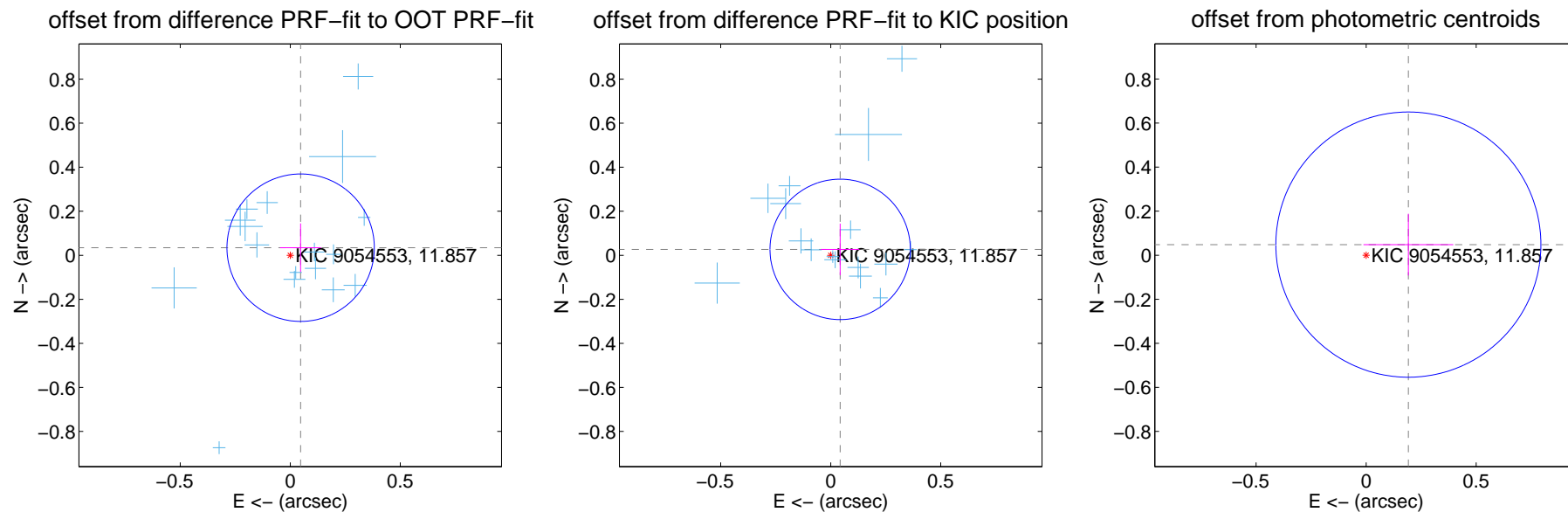
## DV Centroid Data

Supplemental centroid analysis for 009054553-02. **Kepler magnitude: 11.86.** Transit SNR 17.78

There are 17 quarters with good PRF difference image offsets

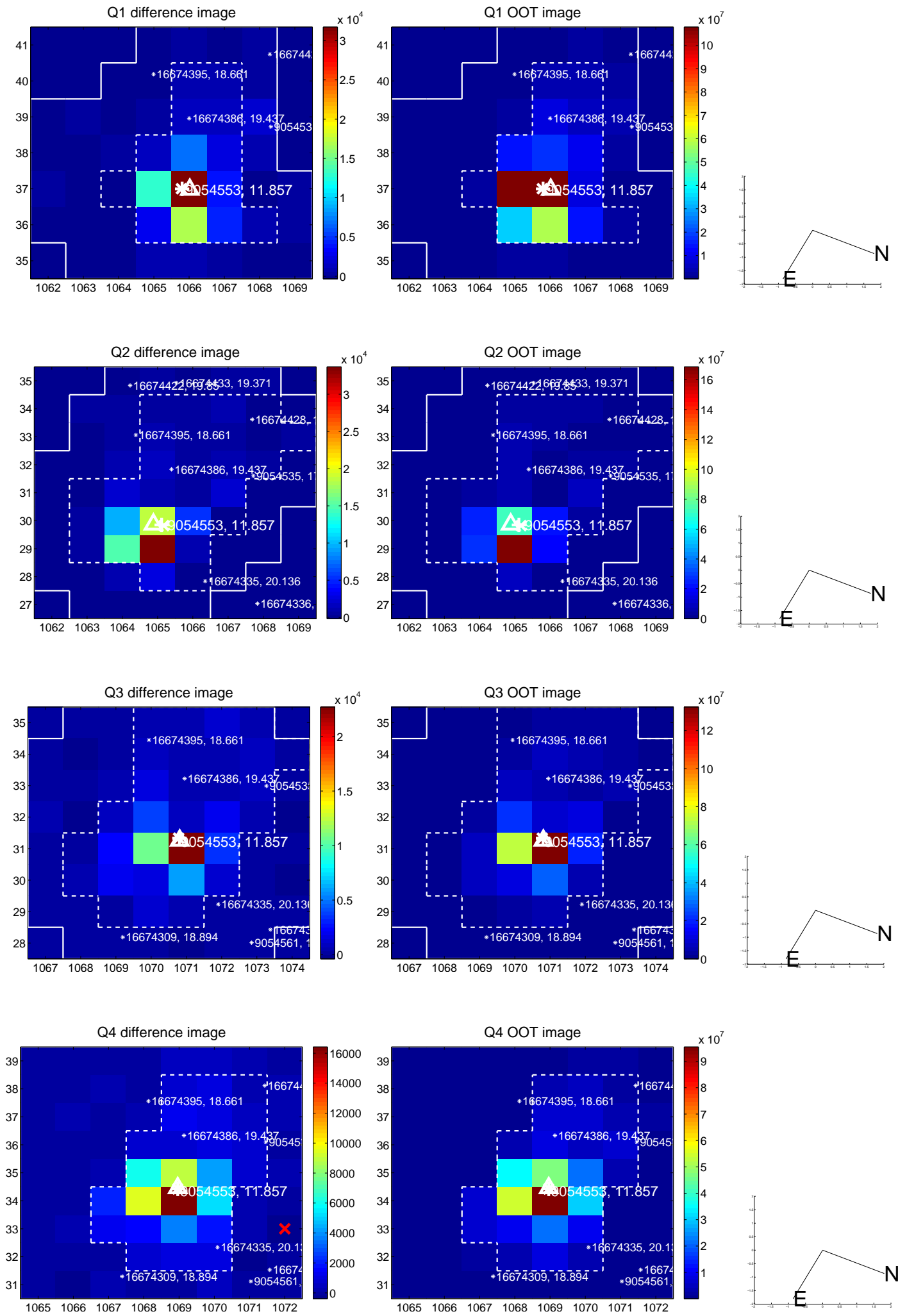
The direct PRF centroid is offset from the target star catalog position by about 0.09 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.058 \pm 0.112$	0.52	$-0.047 \pm 0.093$	$0.034 \pm 0.110$
PRF-fit source offset from KIC position	$0.051 \pm 0.106$	0.48	$-0.043 \pm 0.088$	$0.027 \pm 0.117$
photometric centroid source offset	$0.20 \pm 0.20$	0.99	$-0.19 \pm 0.20$	$0.05 \pm 0.14$



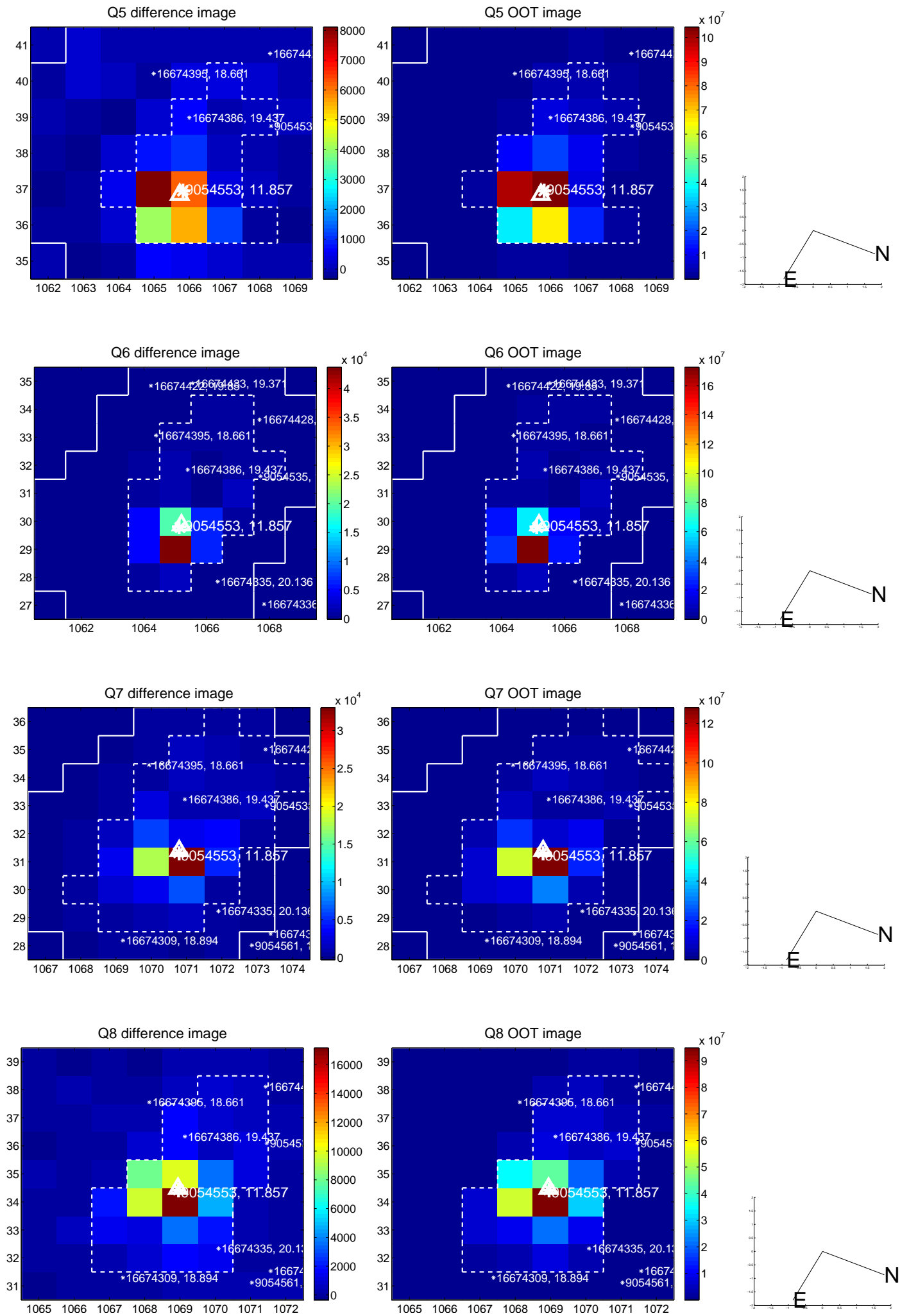
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

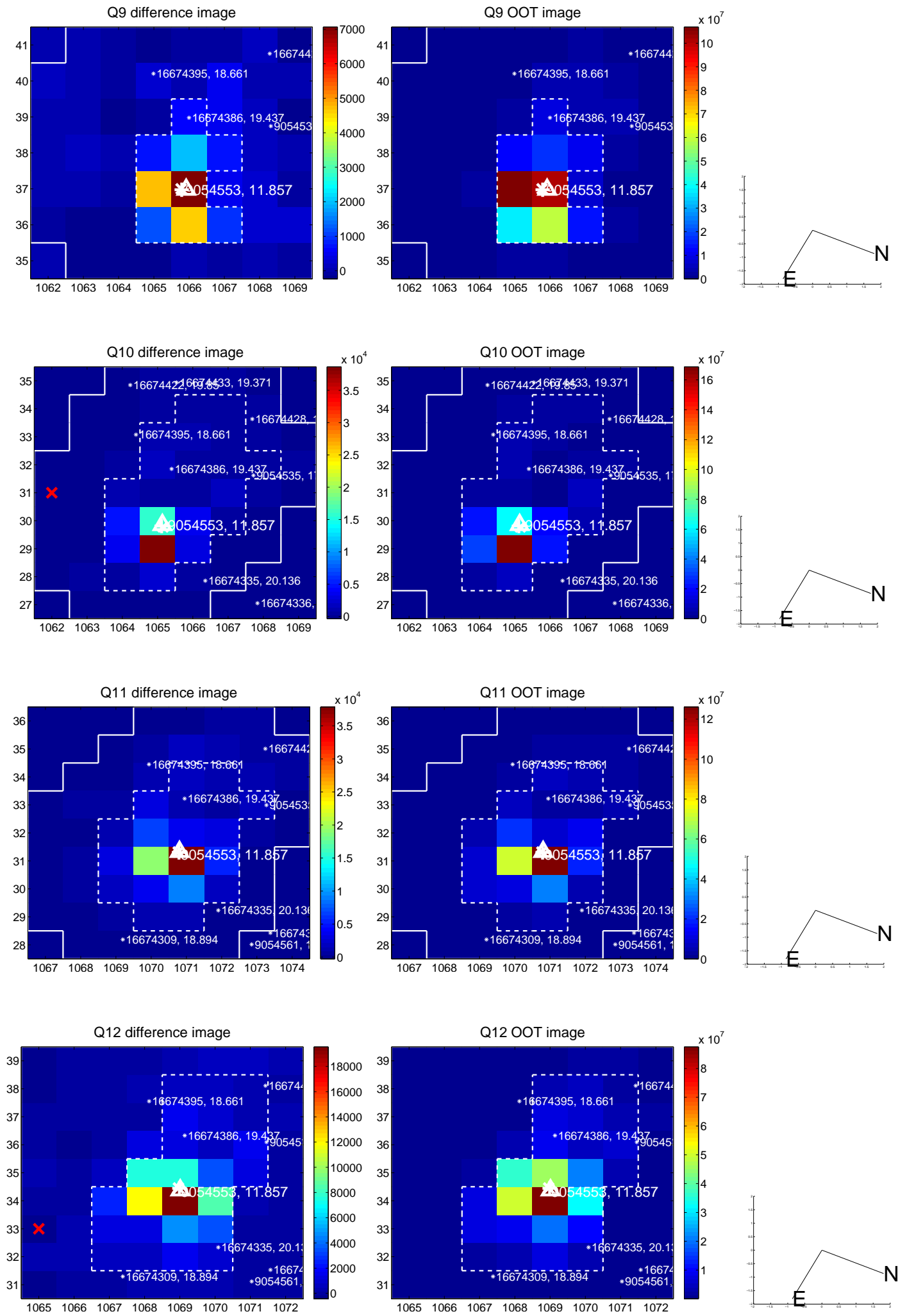




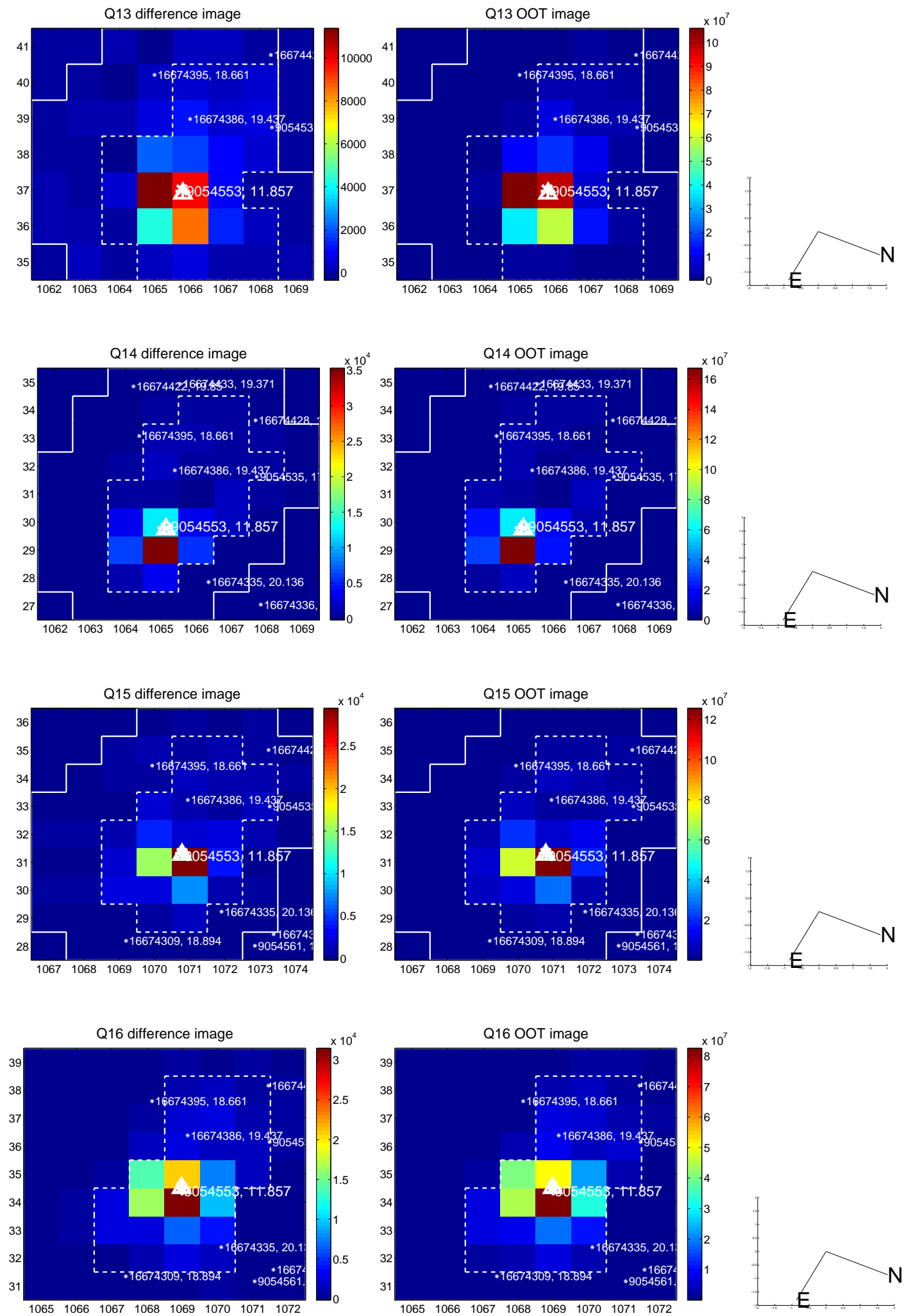
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



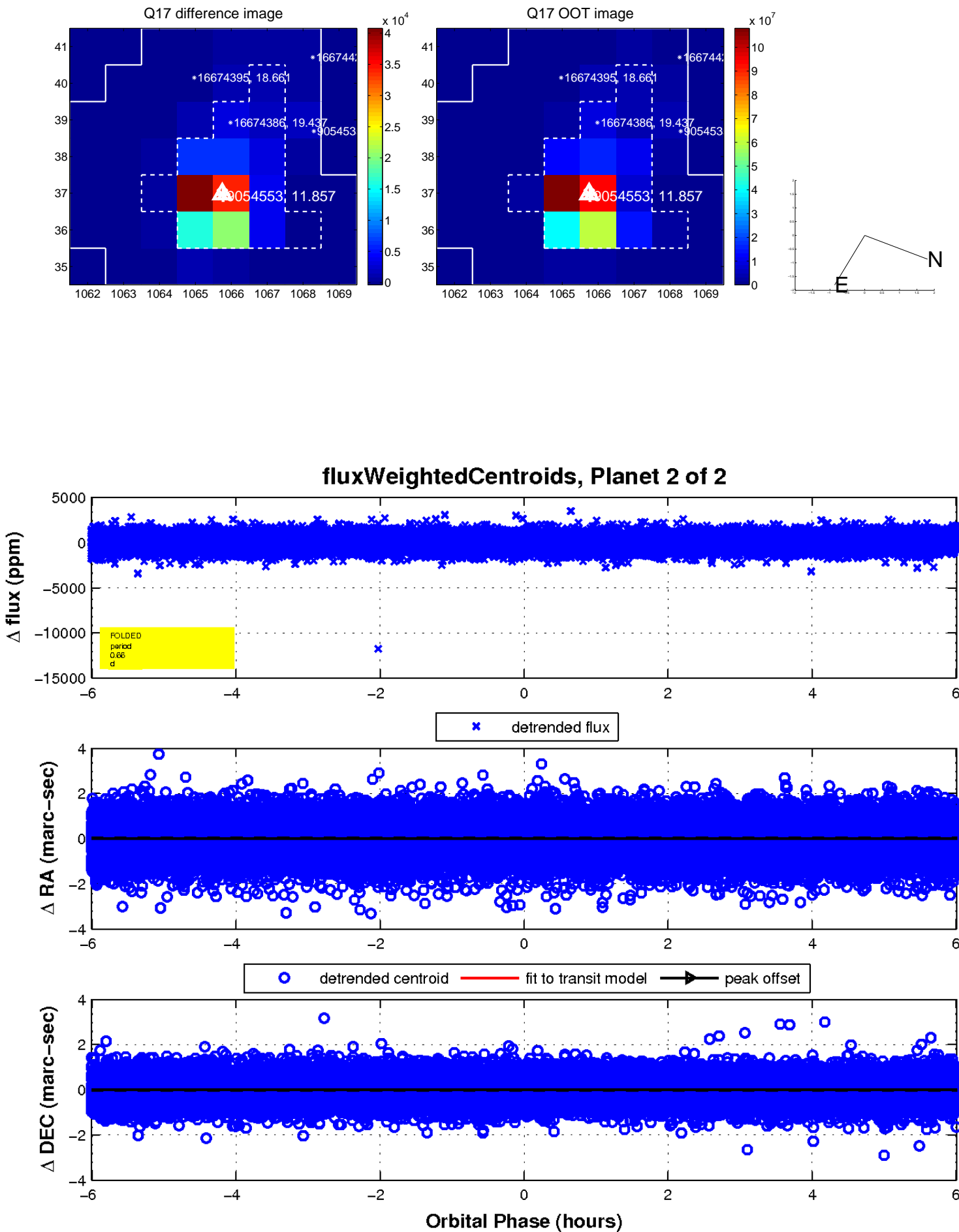
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

