

# KIC 005649837

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005649837-01	OBS	4078.01	0.598074	132.044728	0.0	0.802	15.4	0.0	0.86	6052	0.02	4832.34
005649837-02	OBS	No	0.597888	132.003414	30.0	3.477	15.2	5.7	0.86	6052	0.48	4834.34

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005649837-01	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—CENT_RESOLVED_OFFSET
005649837-02	OBS	FP	0.00	1	0	1	0	LPP_DV—SAME_NTL_PERIOD—CENT_RESOLVED_OFFSET

**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 005649837-01

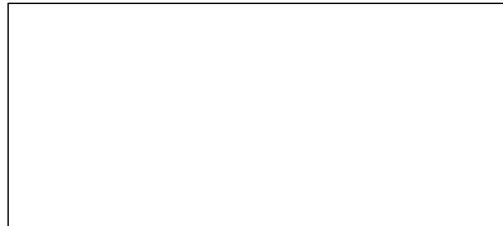
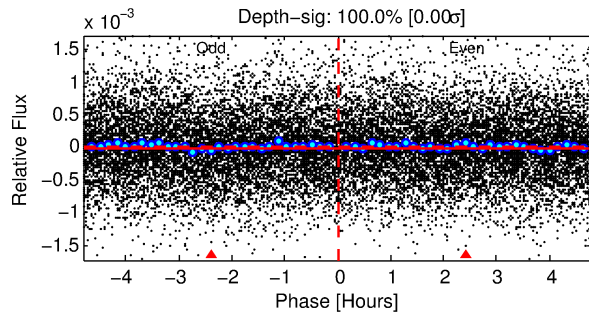
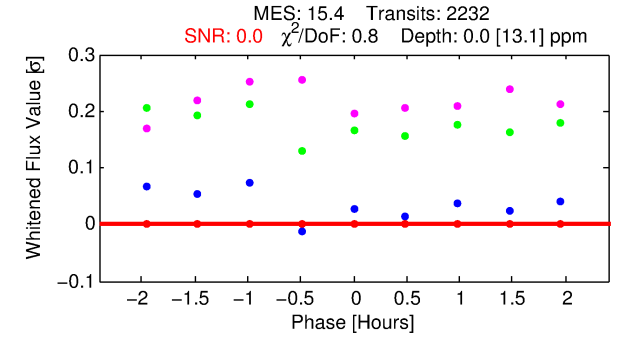
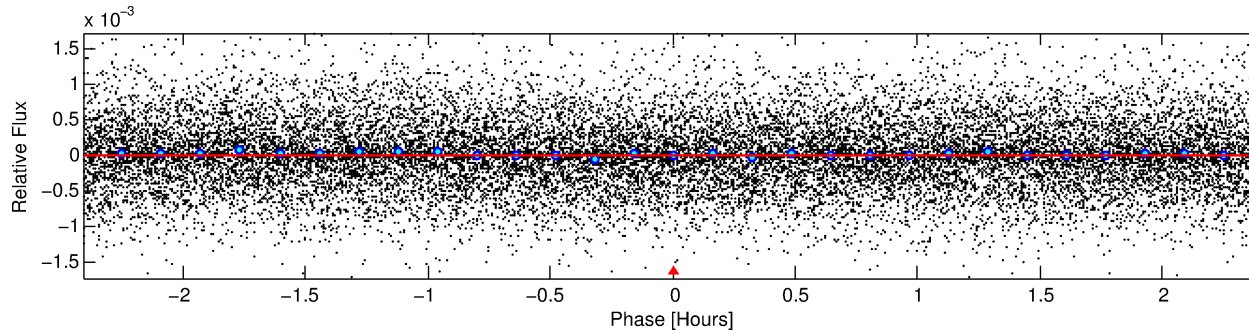
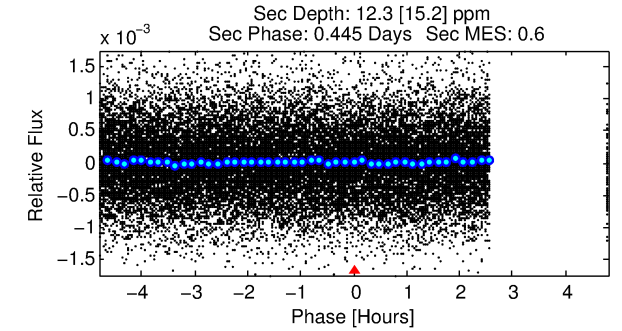
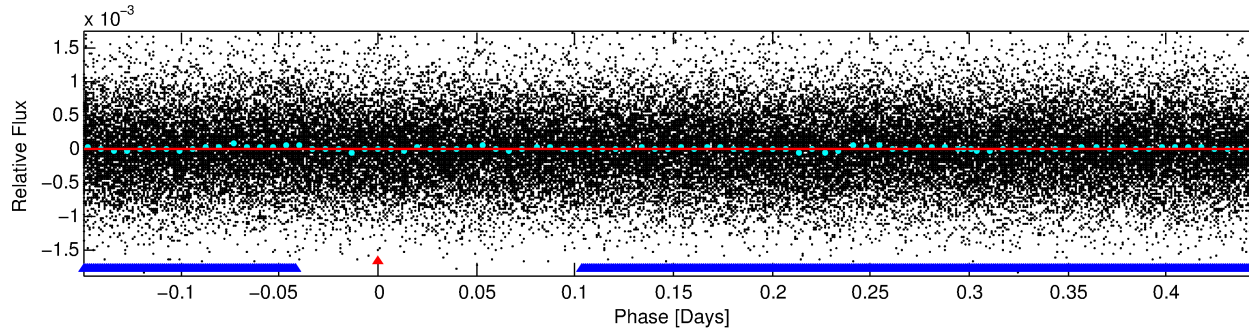
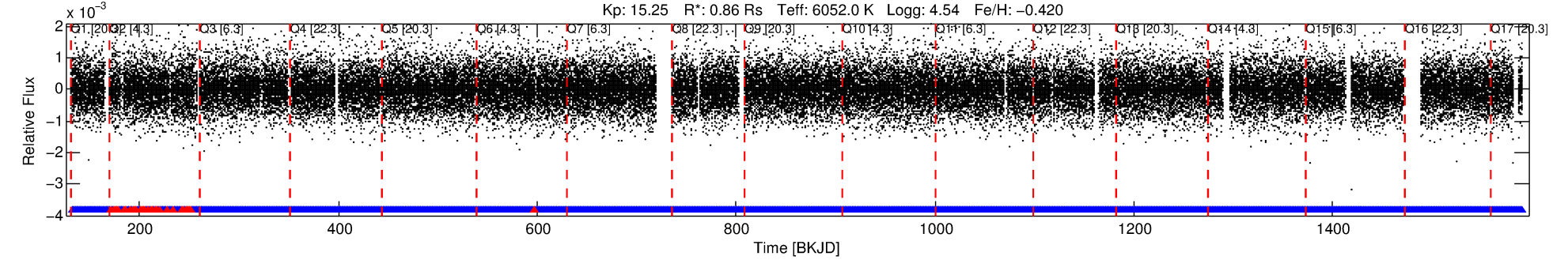
No Significant Match Found

# DV One-Page Summary

KIC: 5649837 Candidate: 1 of 2 Period: 0.598 d

KOI: K04078 Corr: No Ephemeris Match

Kp: 15.25 R\*: 0.86 Rs Teff: 6052.0 K Logg: 4.54 Fe/H: -0.420



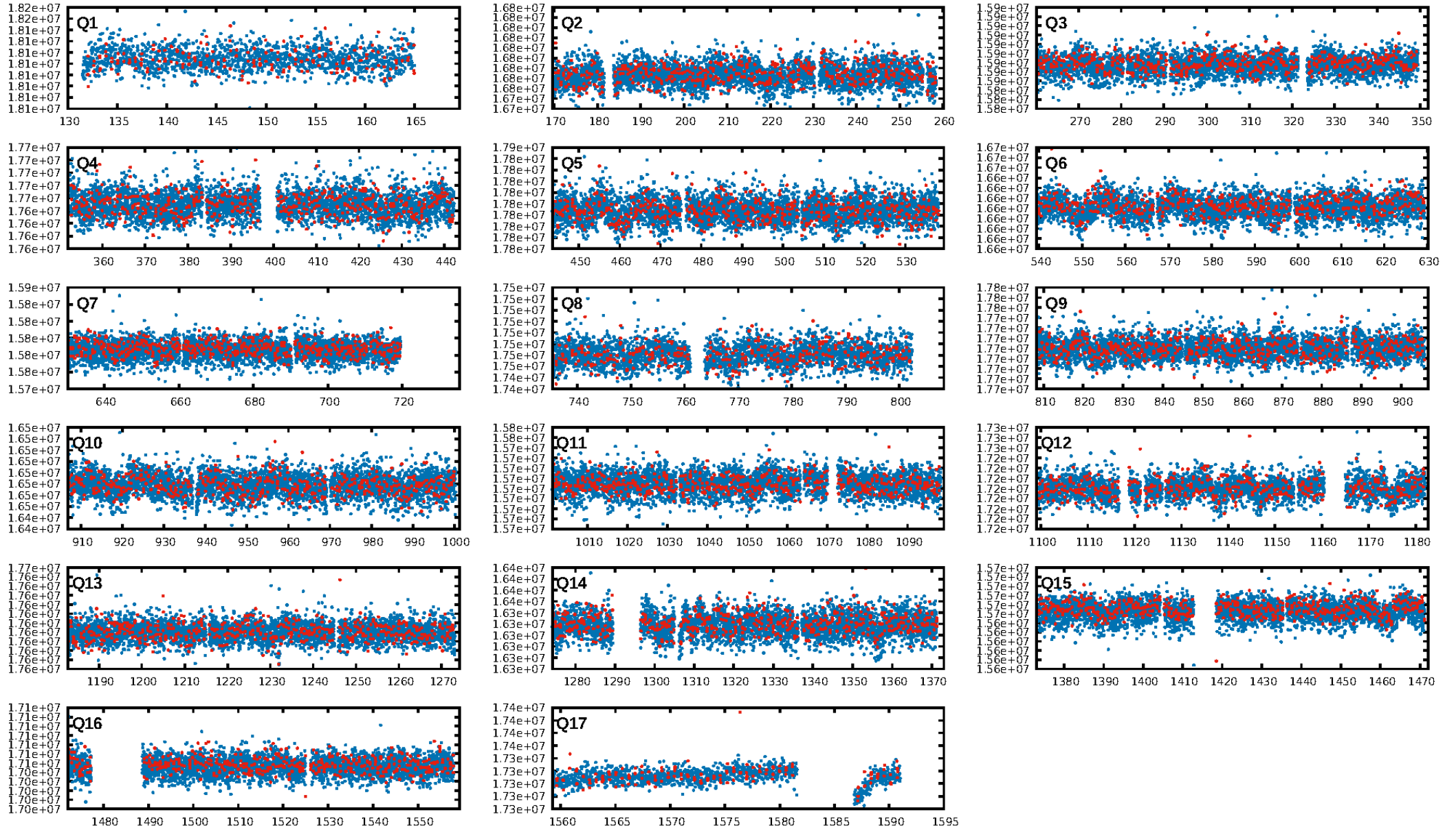
## DV Fit Results:

Period = 0.59807 [0.01949] d  
Epoch = 132.0447 [3.1175] BKJD  
Rp/R\* = 0.0003 [0.0353]  
a/R\* = 1.95 [154.01]  
b = 0.96 [10.54]  
Seff = 4832.34 [1892.88]  
Teq = 2126 [208] K  
Rp = 0.02 [3.33] Re  
a = 0.0136 [0.0035] AU  
Ag = 2137.18 [586342.83] [0.00σ]  
Teffp = 22349 [1533068] K [0.01σ]

## DV Diagnostic Results:

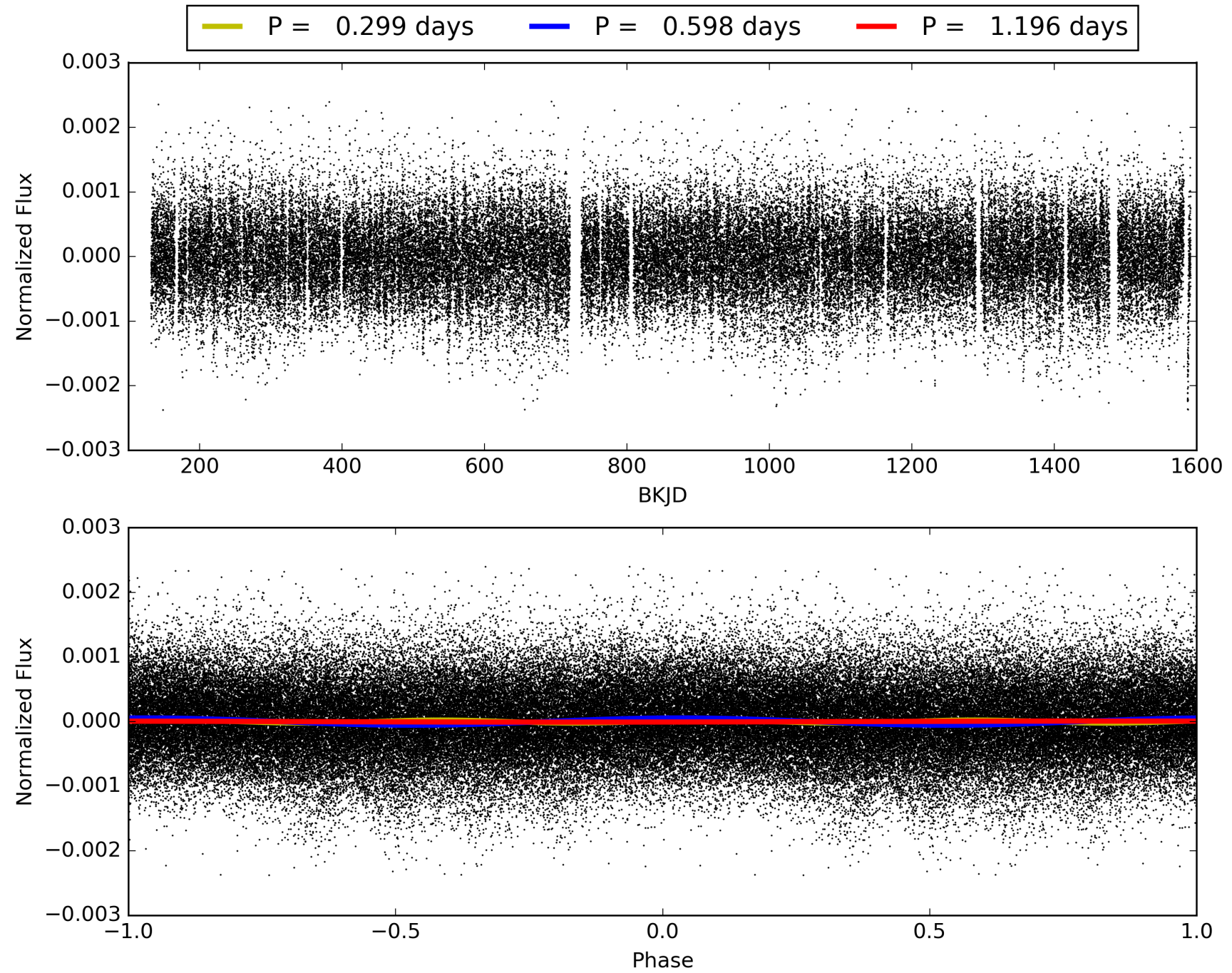
ShortPeriod-sig: 0.1% [0.00σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 5.07e-32  
RollingBand-fgt: 0.98 [2098/2132]  
GhostDiagnostic-chr: N/A  
Centroid-sig: N/A  
Centroid-so: N/A  
OotOffset-rm: N/A  
KicOffset-rm: N/A  
OotOffset-st: 0/0/0/0 [0]  
KicOffset-st: 0/0/0/0 [0]  
DiffImageQuality-fgm: N/A  
DiffImageOverlap-fno: 0.06 [1/17]

# TCE 005649837-01, PDC Light Curves



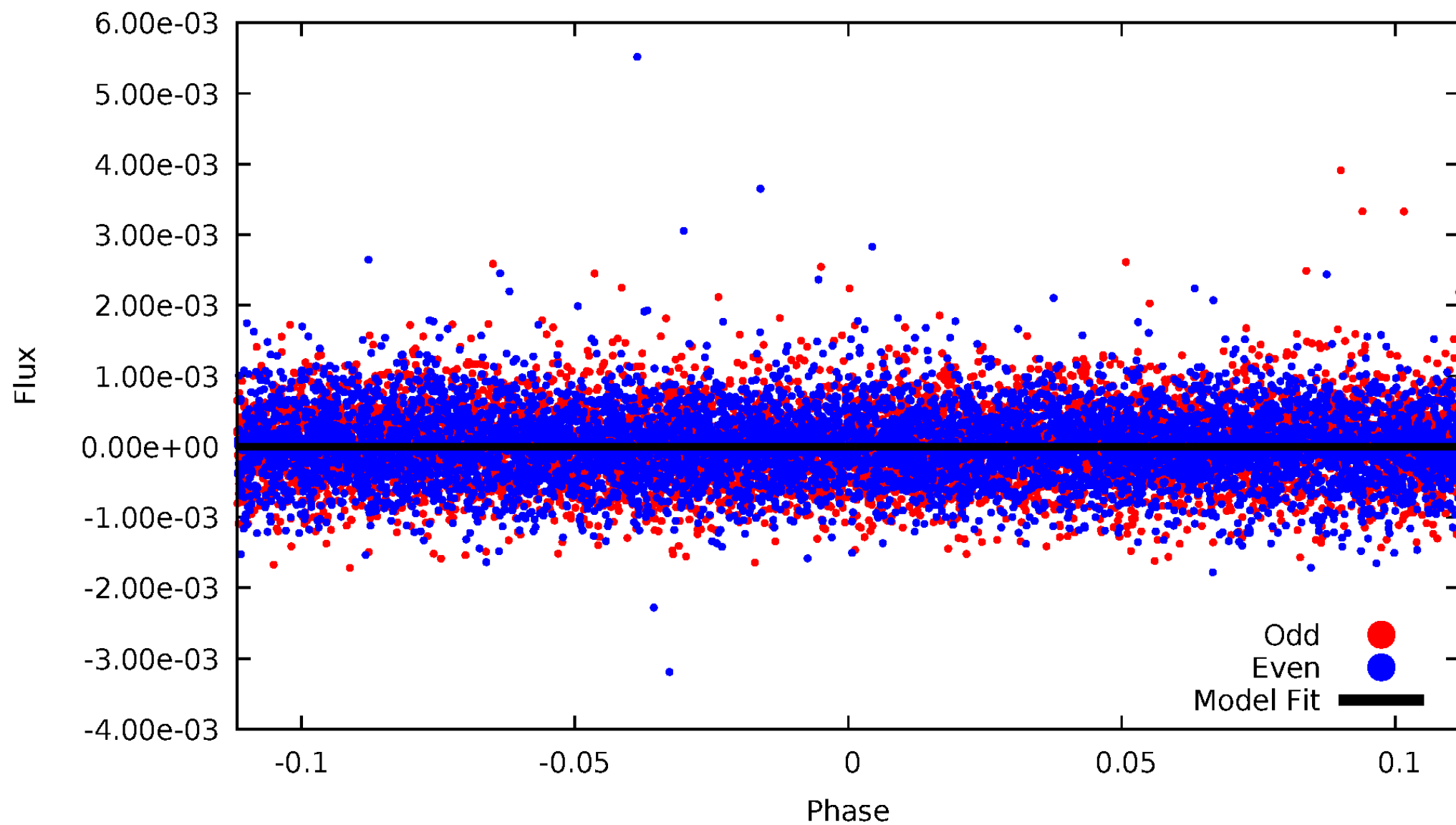


TCE 005649837-01



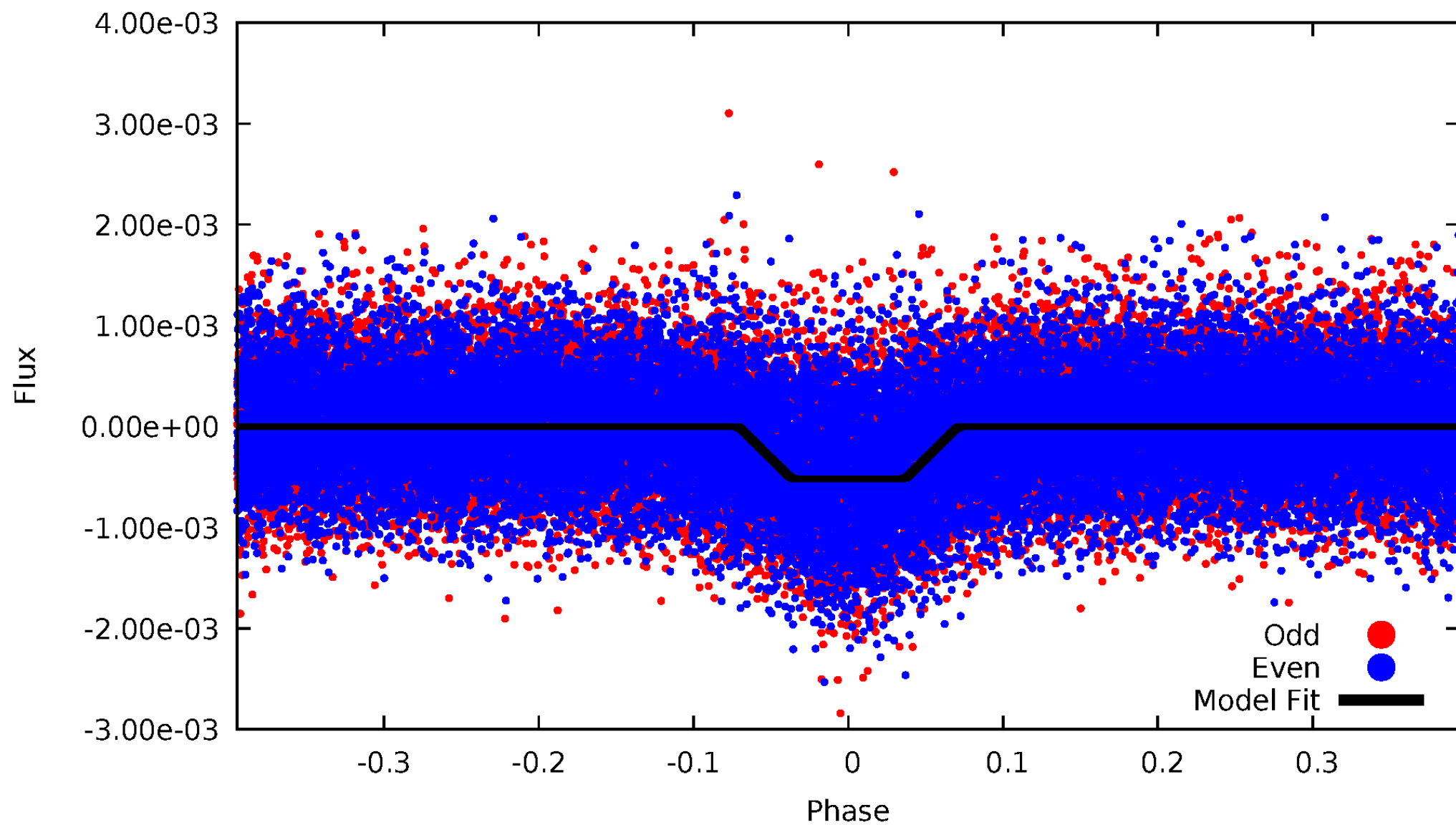
# DV Odd/Even

TCE 005649837-01



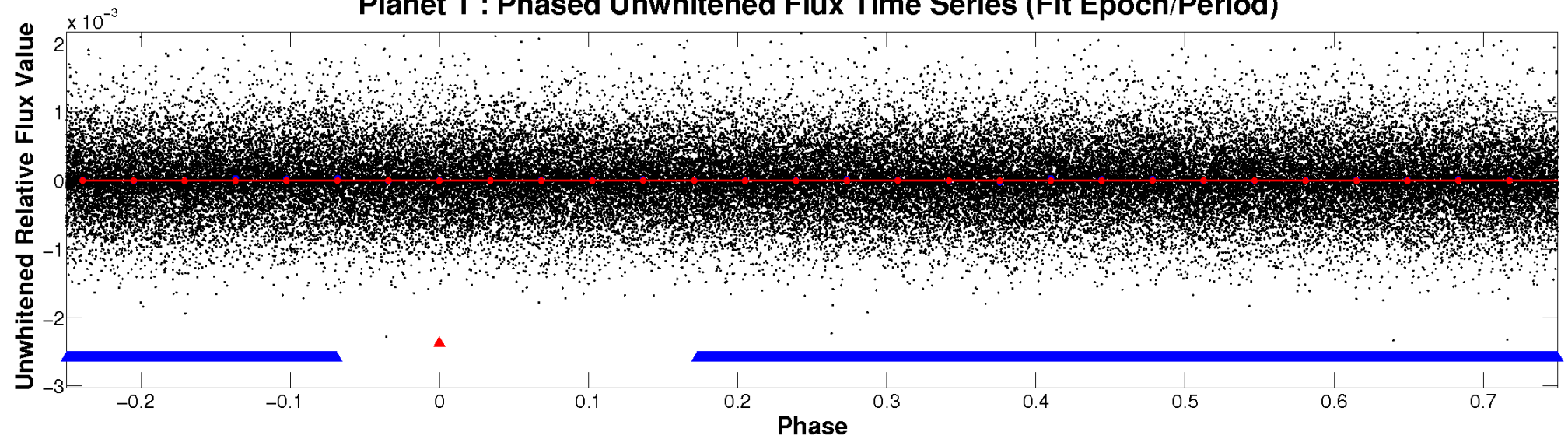
# ALT Odd/Even

TCE 005649837-01

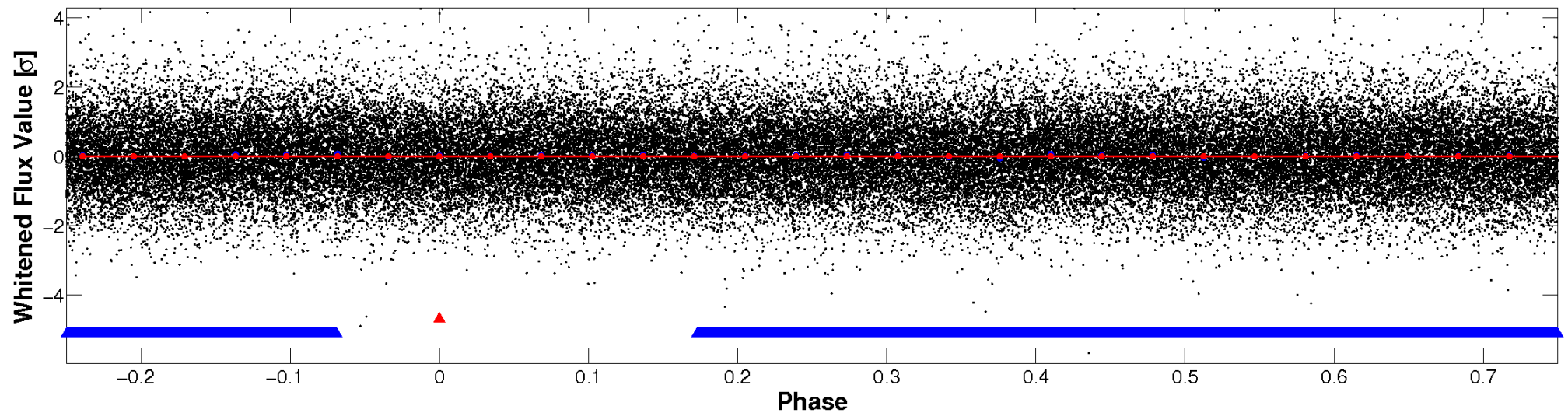


# Non-Whitened Vs. Whitened Light Curve

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



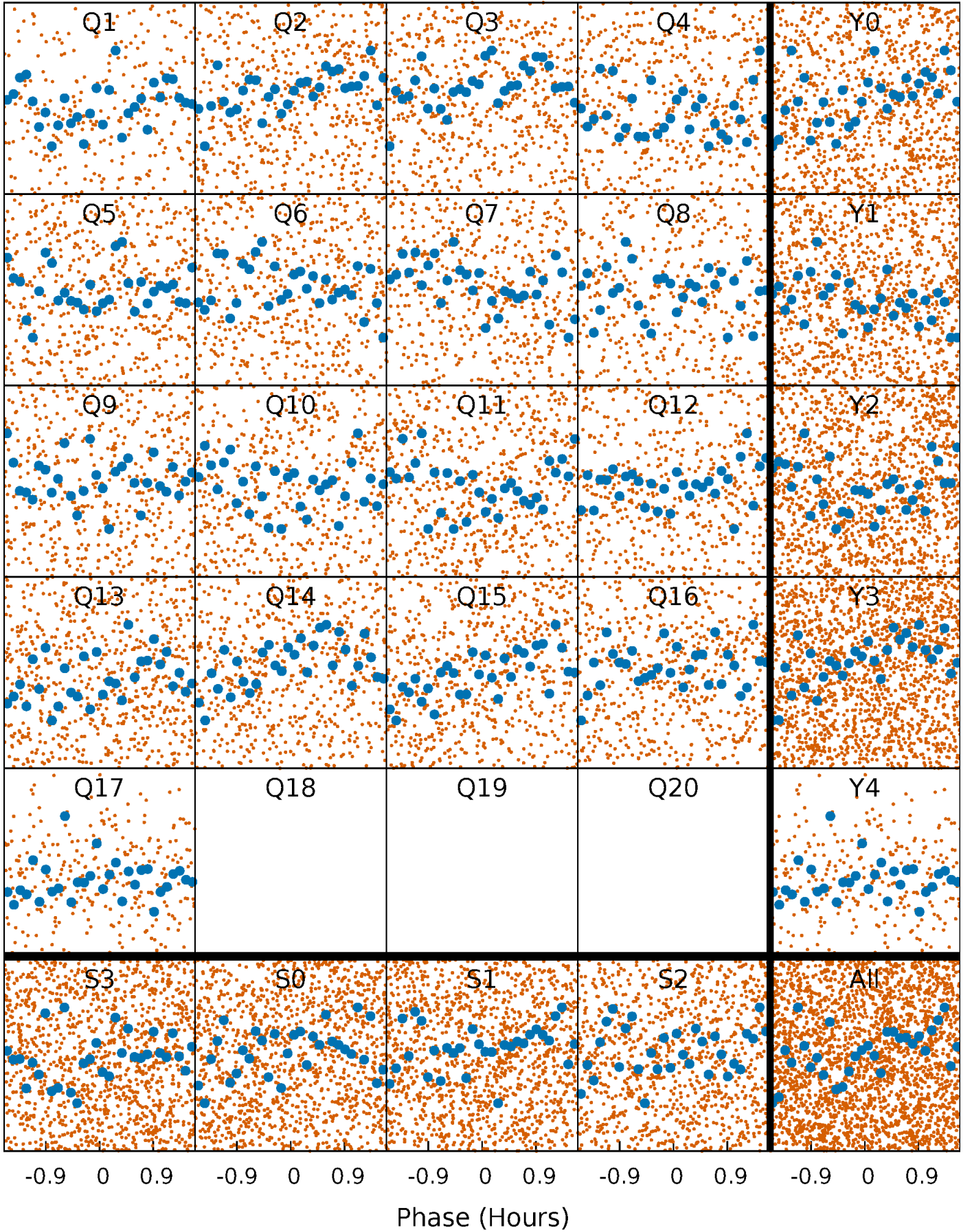
**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**





# PDC Quarter-Phased Transit Curves

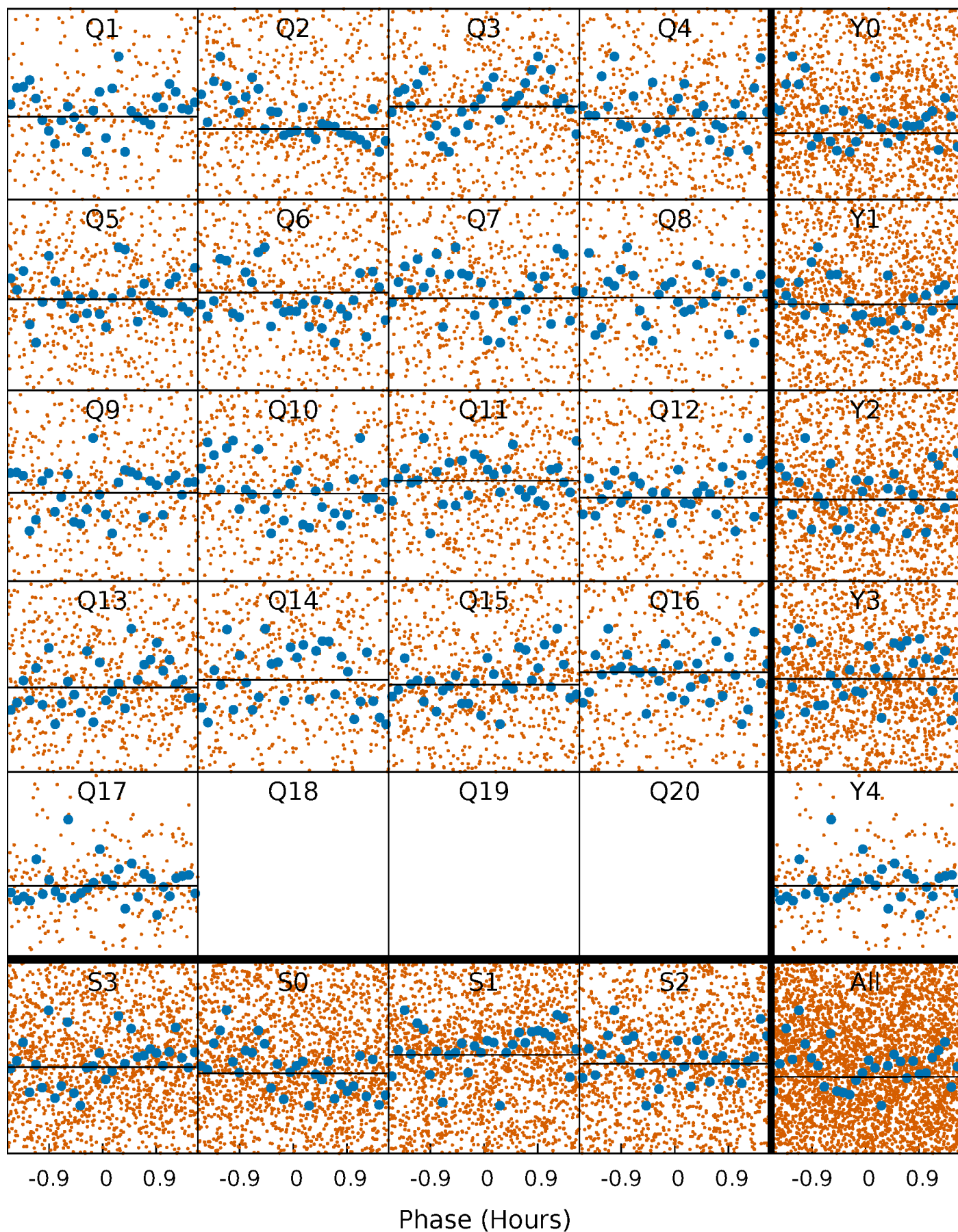
TCE 005649837-01   P= 0.598074 Days    $T_0=132.044728$  (BKJD)





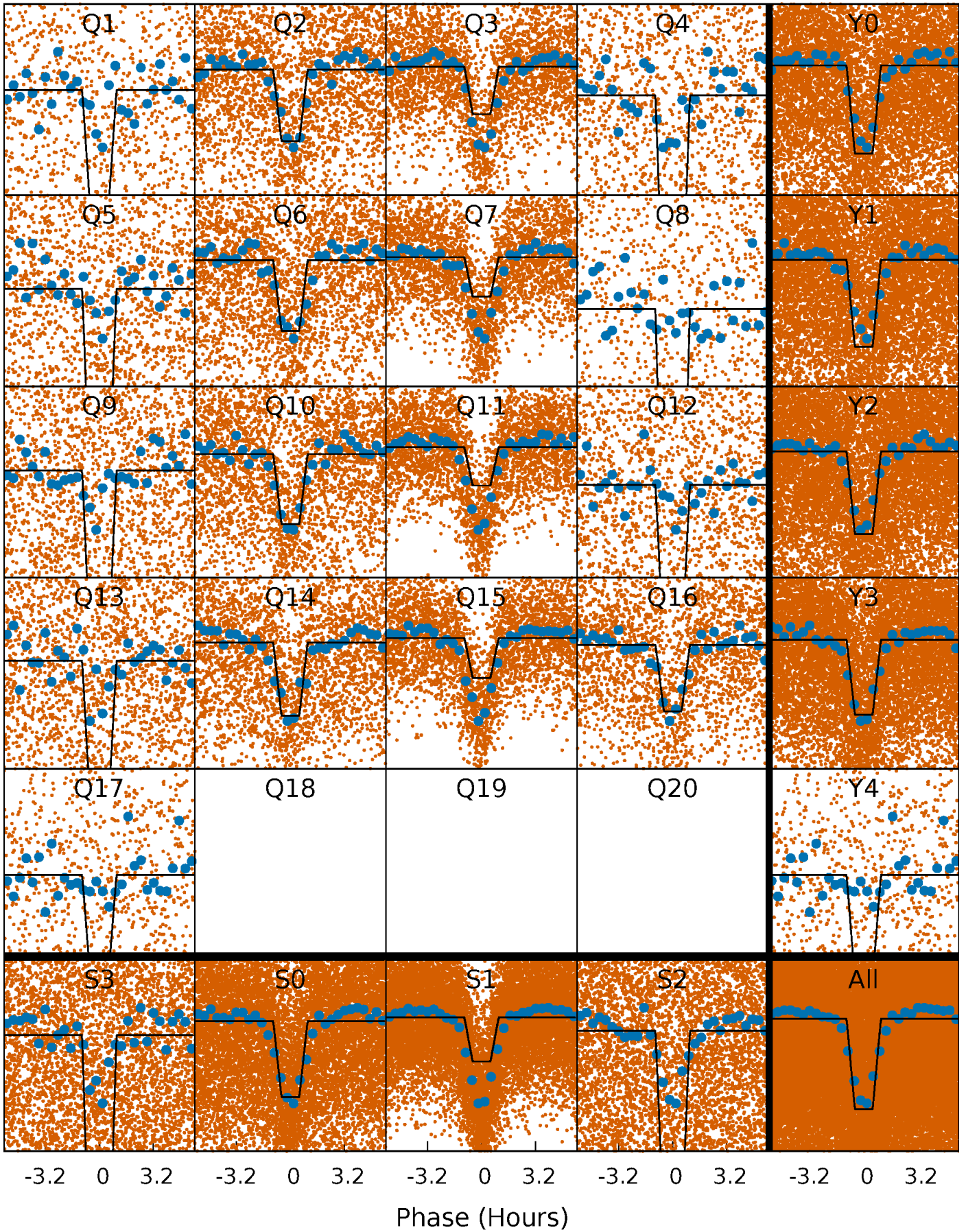
# DV Quarter-Phased Transit Curves

TCE 005649837-01 P= 0.598074 Days  $T_0=132.044728$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

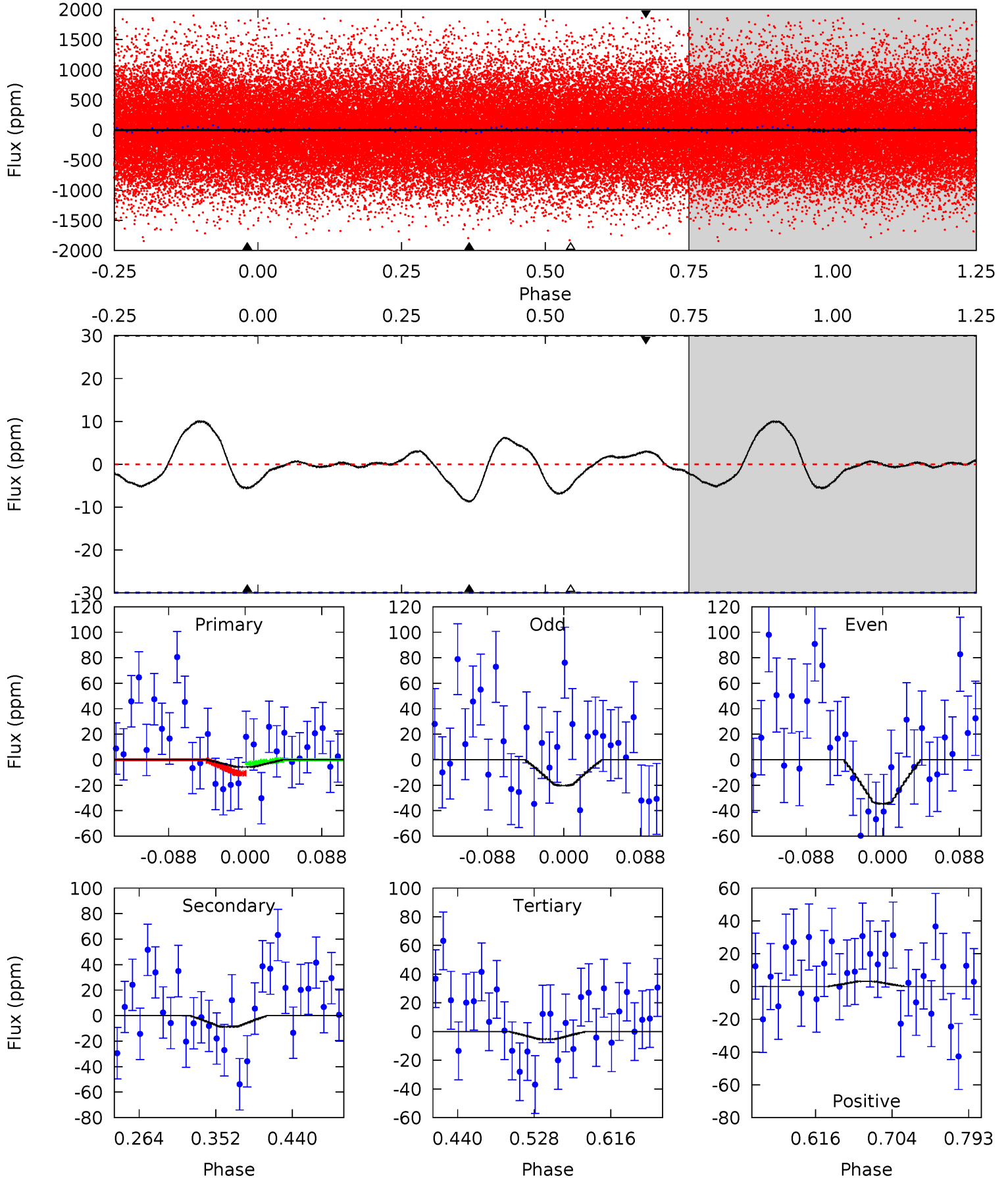
TCE 005649837-01 P= 0.597938 Days  $T_0=131.951014$  (BKJD)



# DV Model-Shift Uniqueness Test

005649837-01, P = 0.598074 Days, E = 131.446654 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
0.88	1.35	0.82	0.48	4.59	1.71	0.49	0.06	0.40	0.54	0.88	1.10	-0.02	0.53	0.59

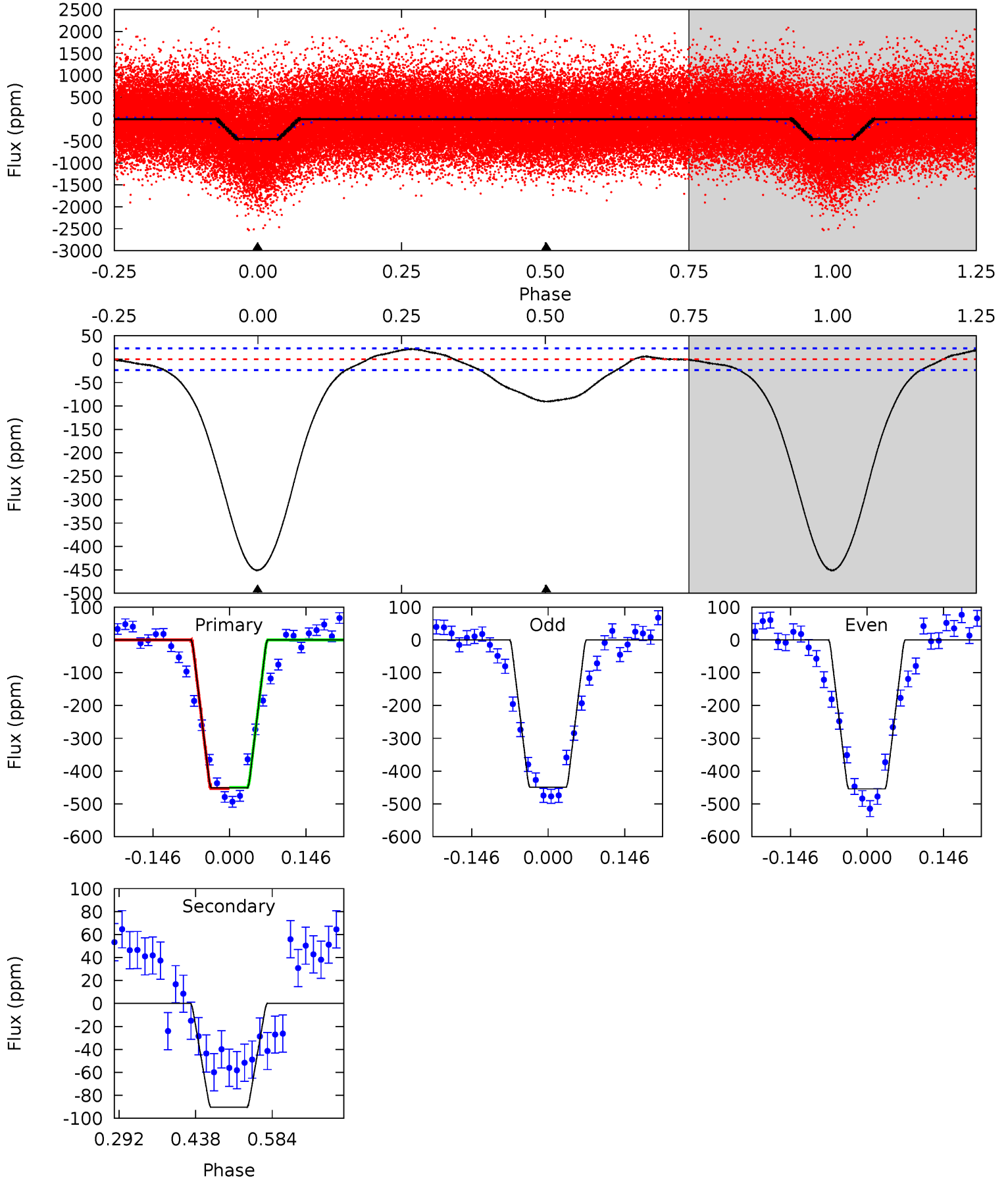




# Alt Model-Shift Uniqueness Test

005649837-01, P = 0.597938 Days, E = 131.353076 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
87.3	17.5	0	0	4.48	1.45	2.54	87.3	87.3	17.5	17.5	0.48	1.04	0.05	0.28





### Stellar Parameters For KIC 005649837

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6052^{+179}_{-197}$	$4.539^{+0.050}_{-0.200}$	$-0.420^{+0.300}_{-0.300}$	$0.863^{+0.260}_{-0.087}$	$0.940^{+0.109}_{-0.120}$	$2.062^{+0.435}_{-1.109}$
	+3%/-3%	+1%/-4%	+71%/-71%	+30%/-10%	+12%/-13%	+21%/-54%
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 005649837-01 / KOI 4078.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-9 \pm 7$	$2.46^{+2.76}_{-1.73}$	$3032^{+205}_{-144}$	$-2887^{+6744}_{-254}$	$0.112^{+1.307}_{-0.098}$
Alt.	$-90 \pm 5$	$3.23^{+2.82}_{-2.20}$	$3034^{+189}_{-144}$	$3412^{+2276}_{-5906}$	$0.856^{+7.732}_{-0.614}$

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

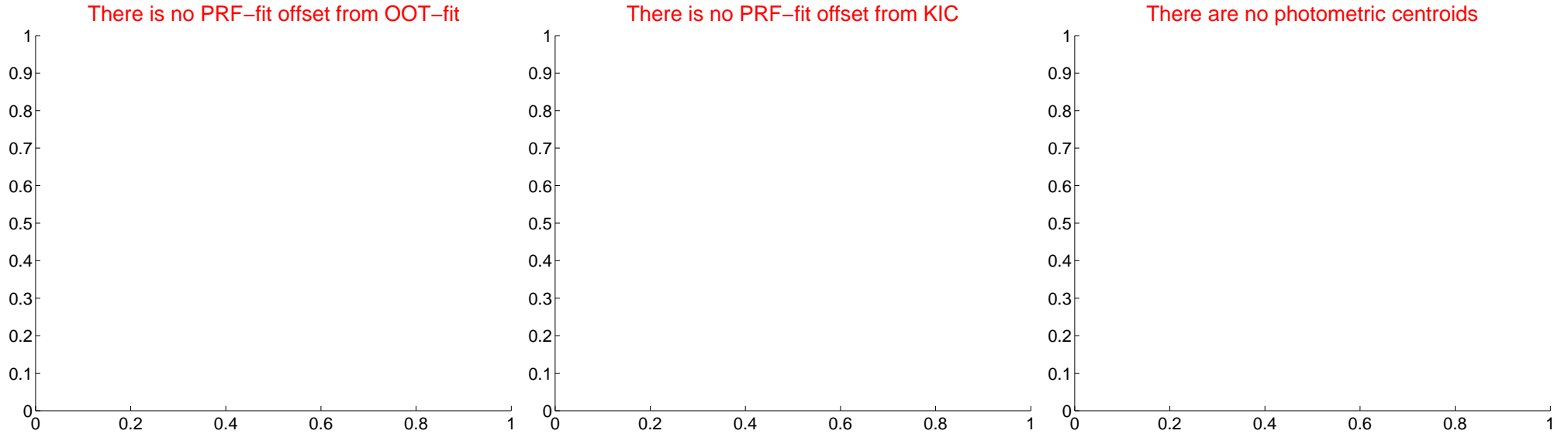
## DV Centroid Data

Supplemental centroid analysis for 005649837-01. Kepler magnitude: 15.25. Transit SNR 0.00

There are 0 quarters with good PRF difference image offsets

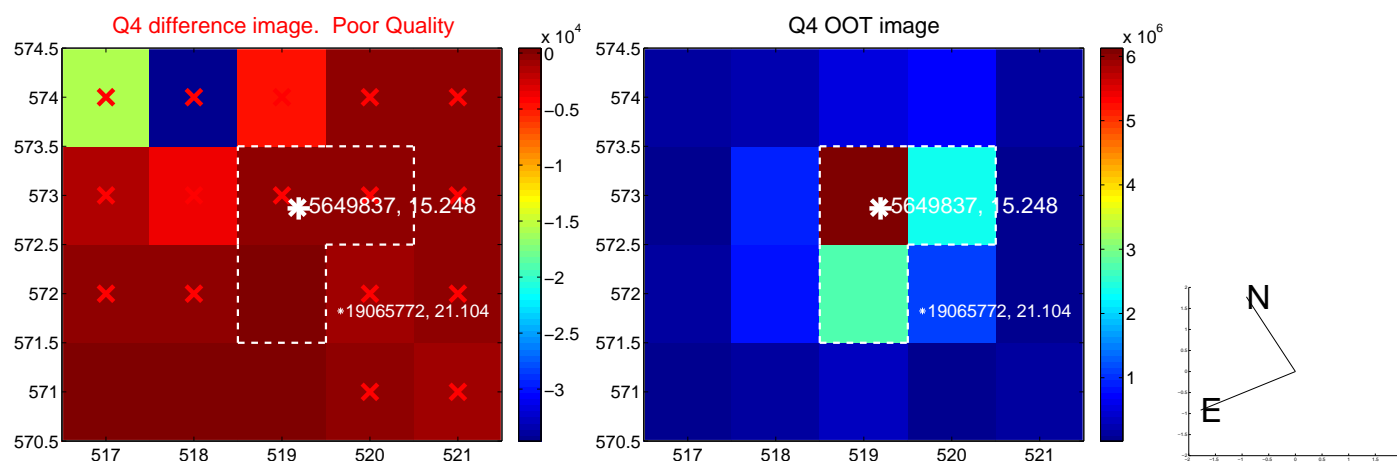
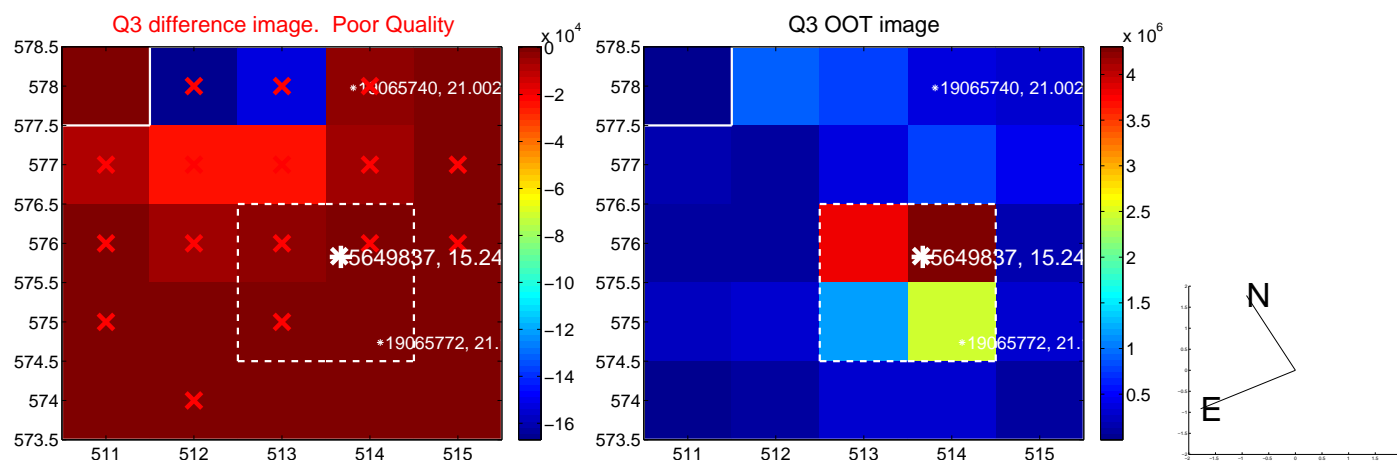
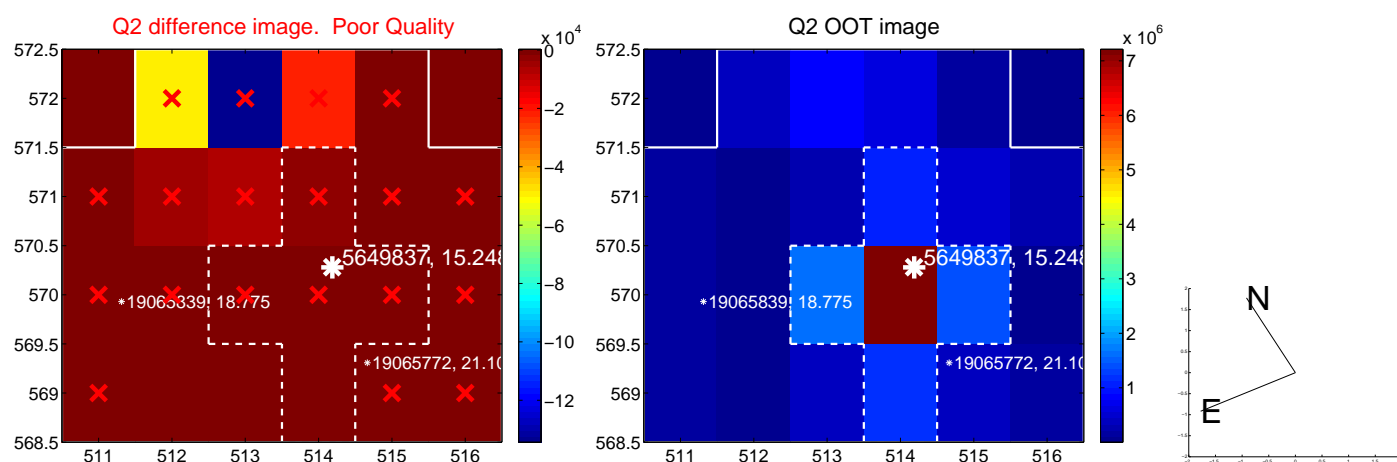
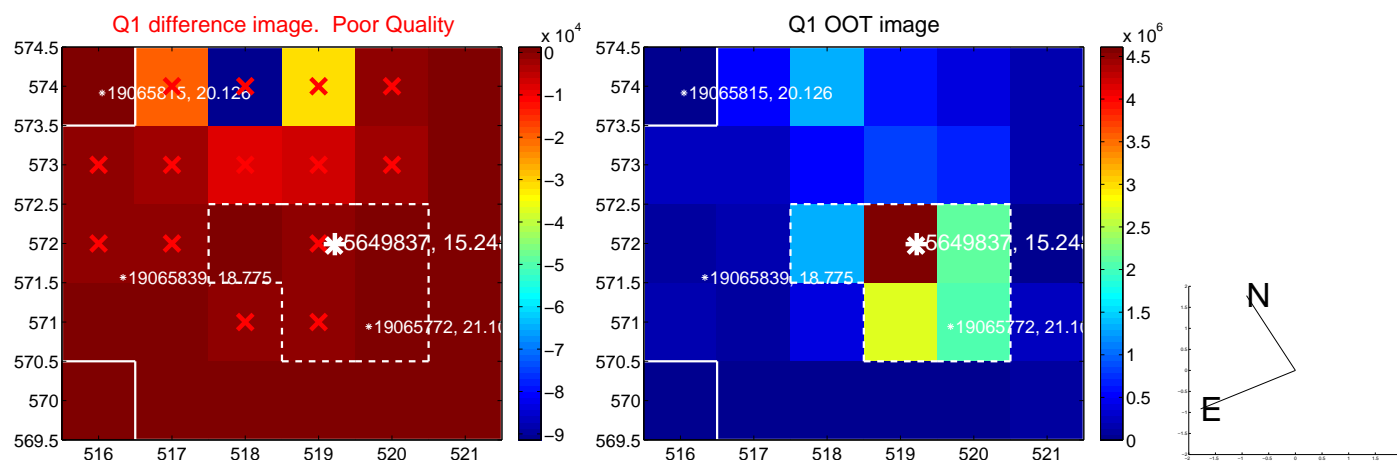
The direct PRF centroid is offset from the target star catalog position by about NaN arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	—	—	—	—
PRF-fit source offset from KIC position	—	—	—	—
photometric centroid source offset	—	—	—	—

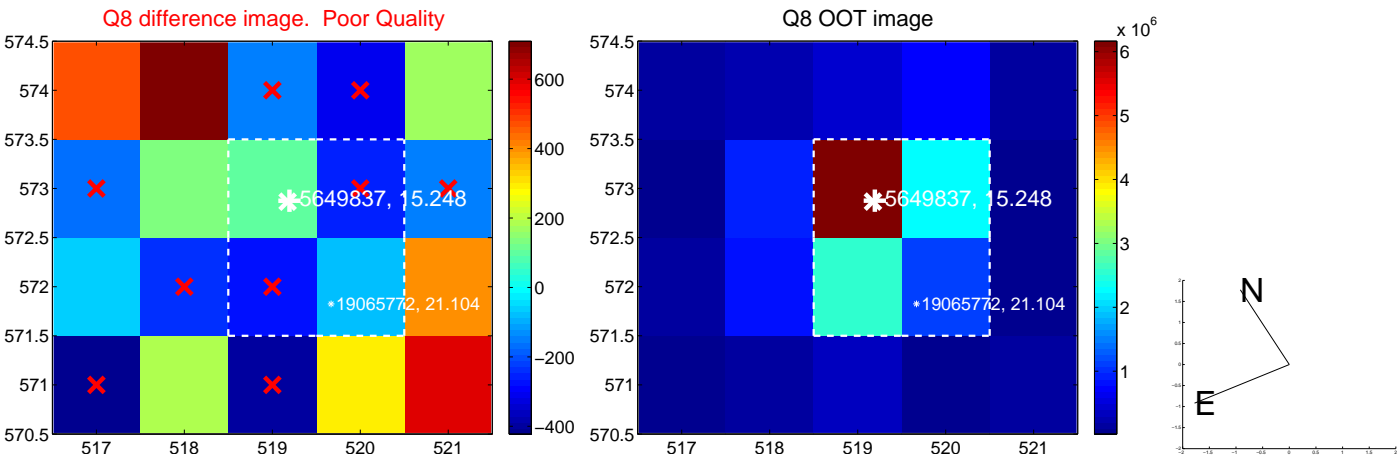
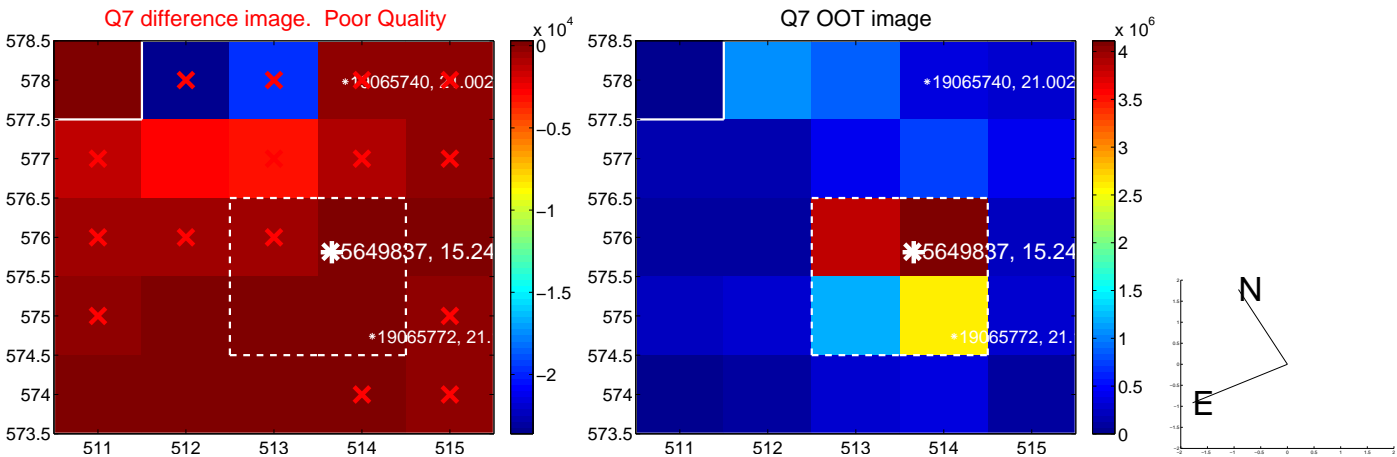
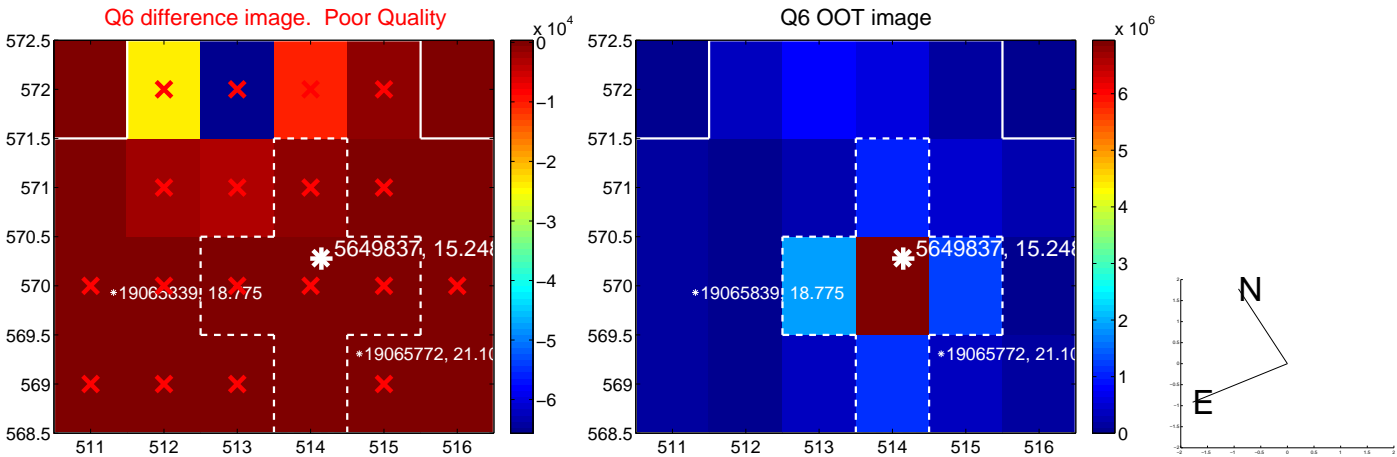
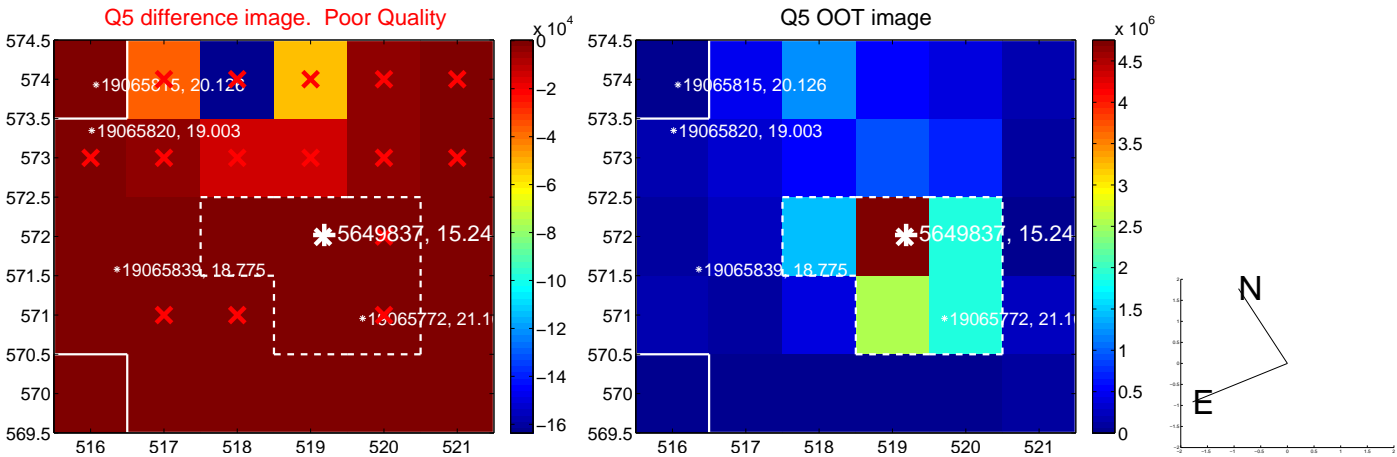


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

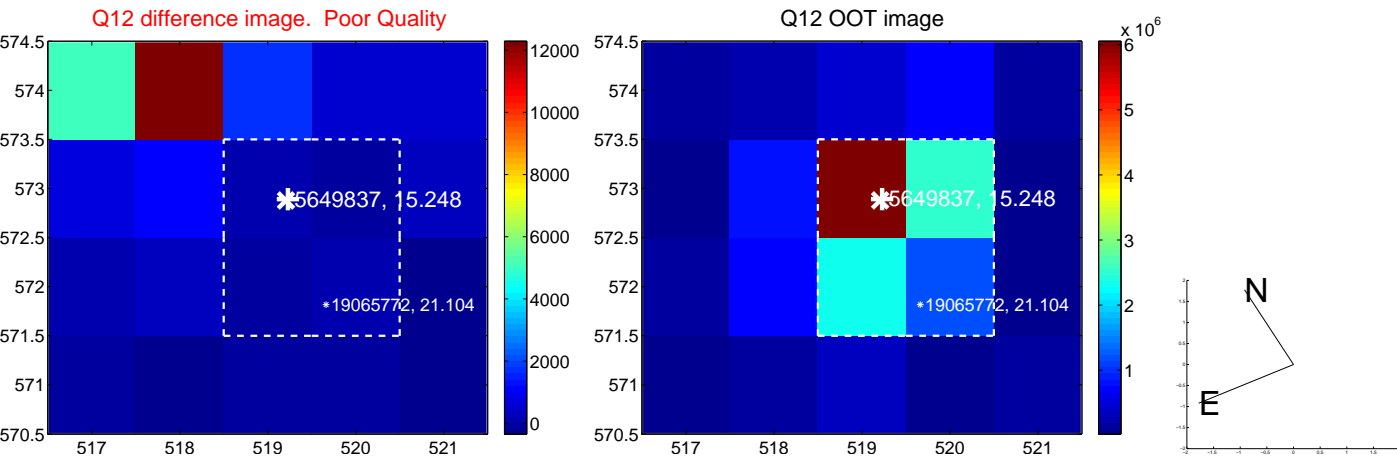
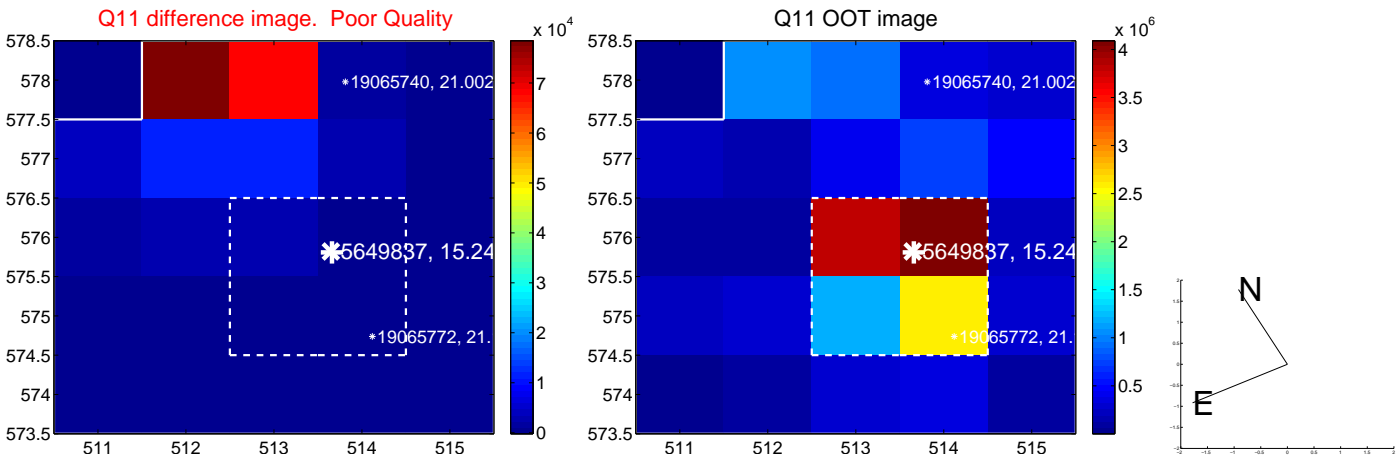
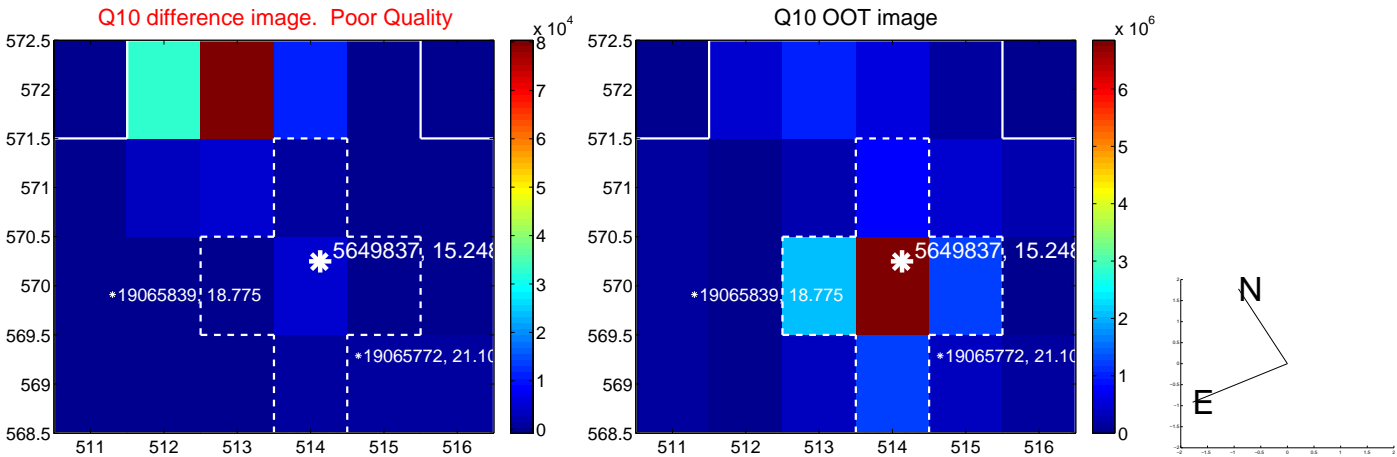
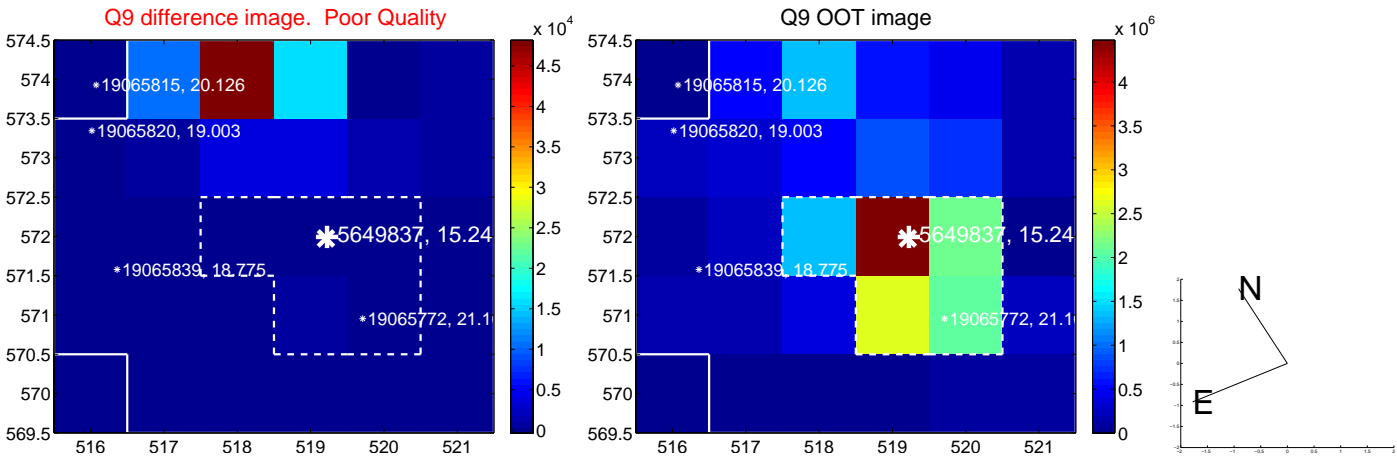


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

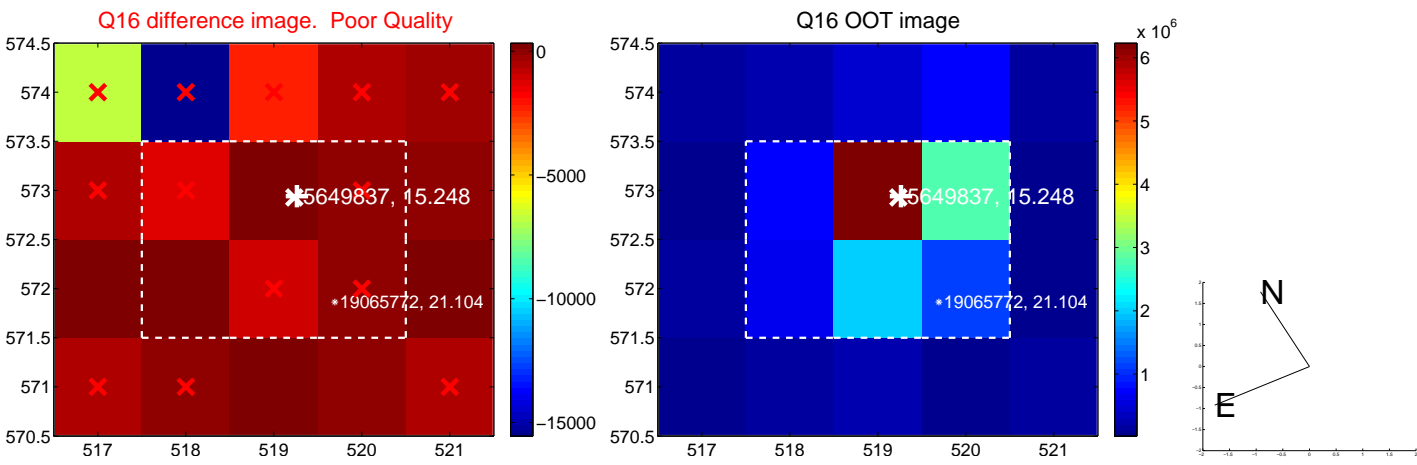
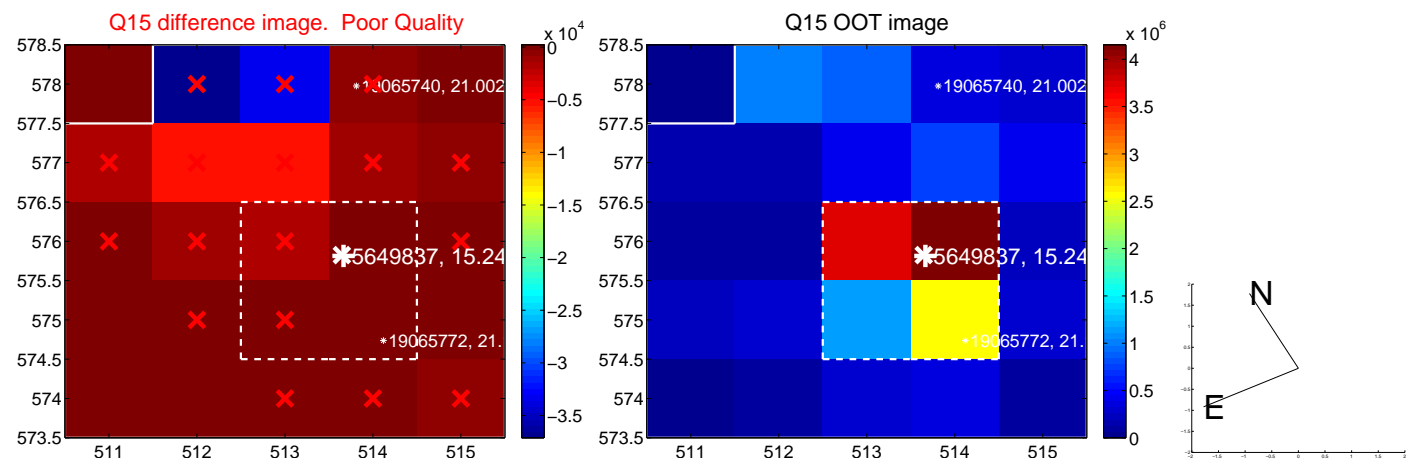
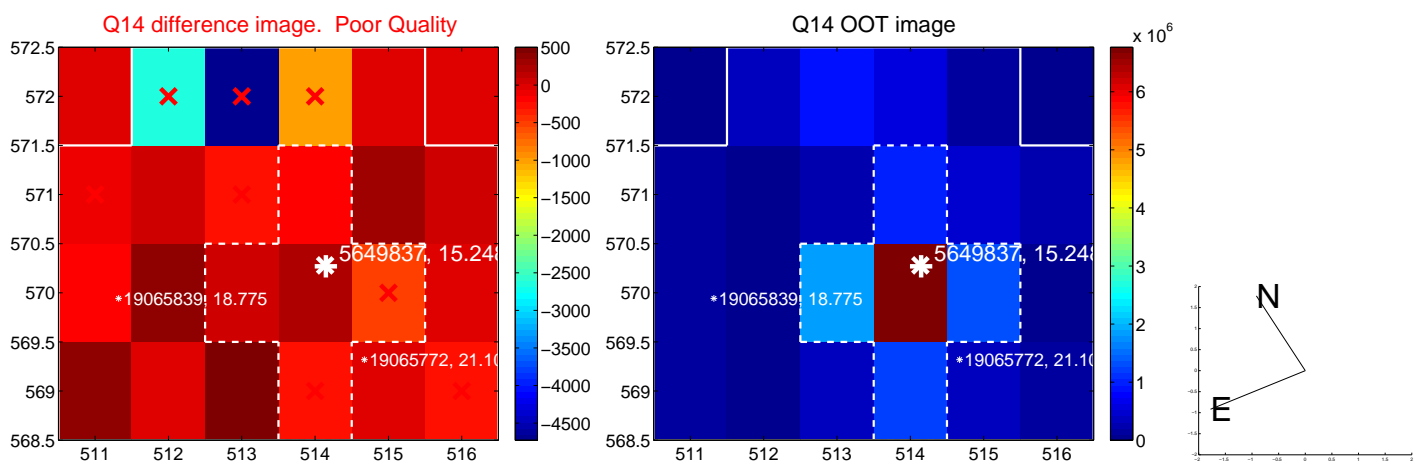
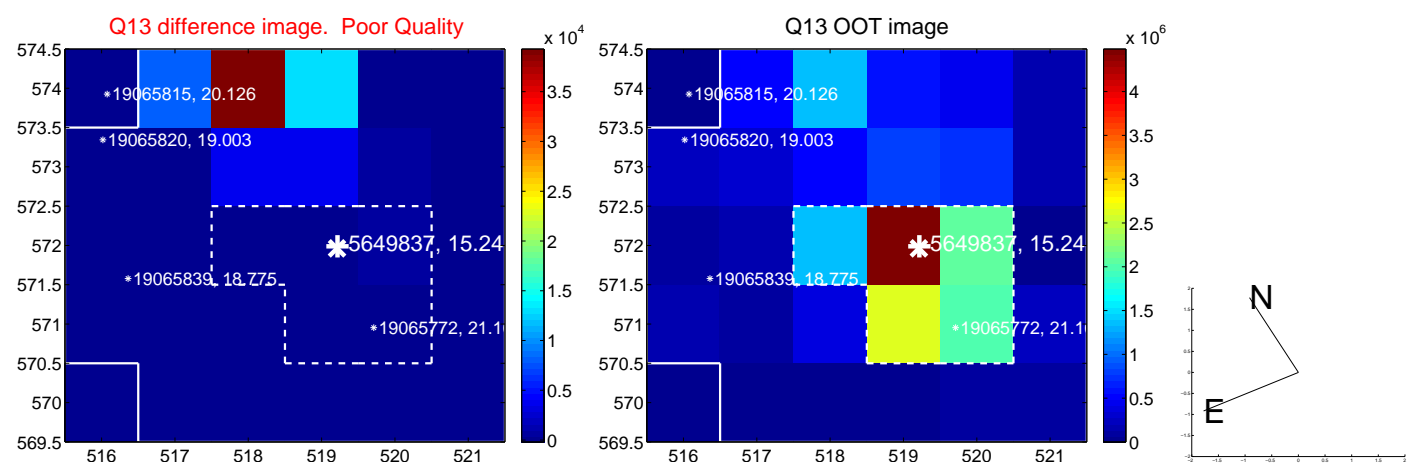




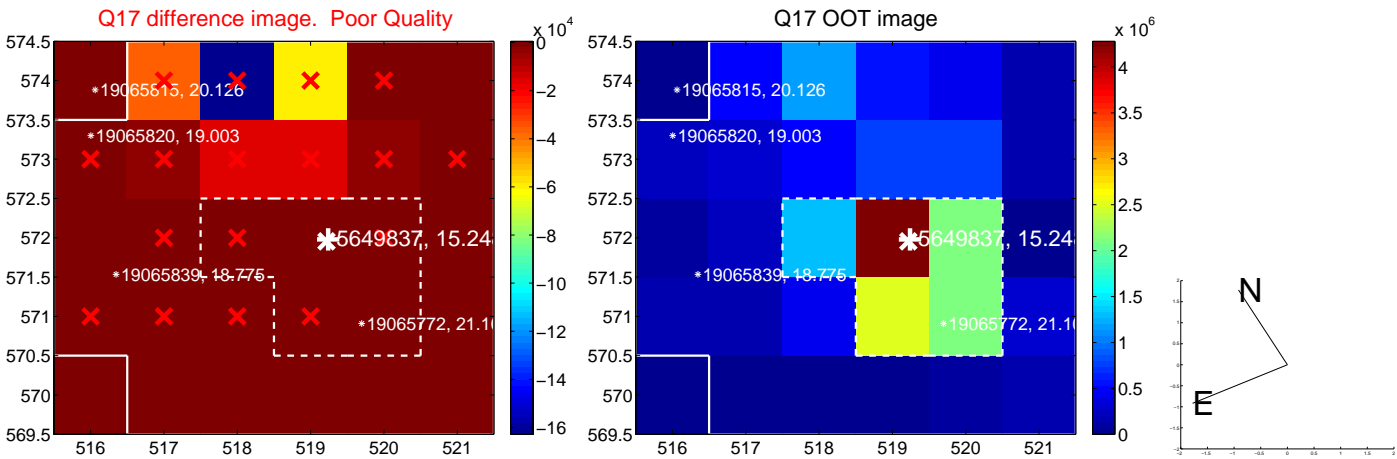
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



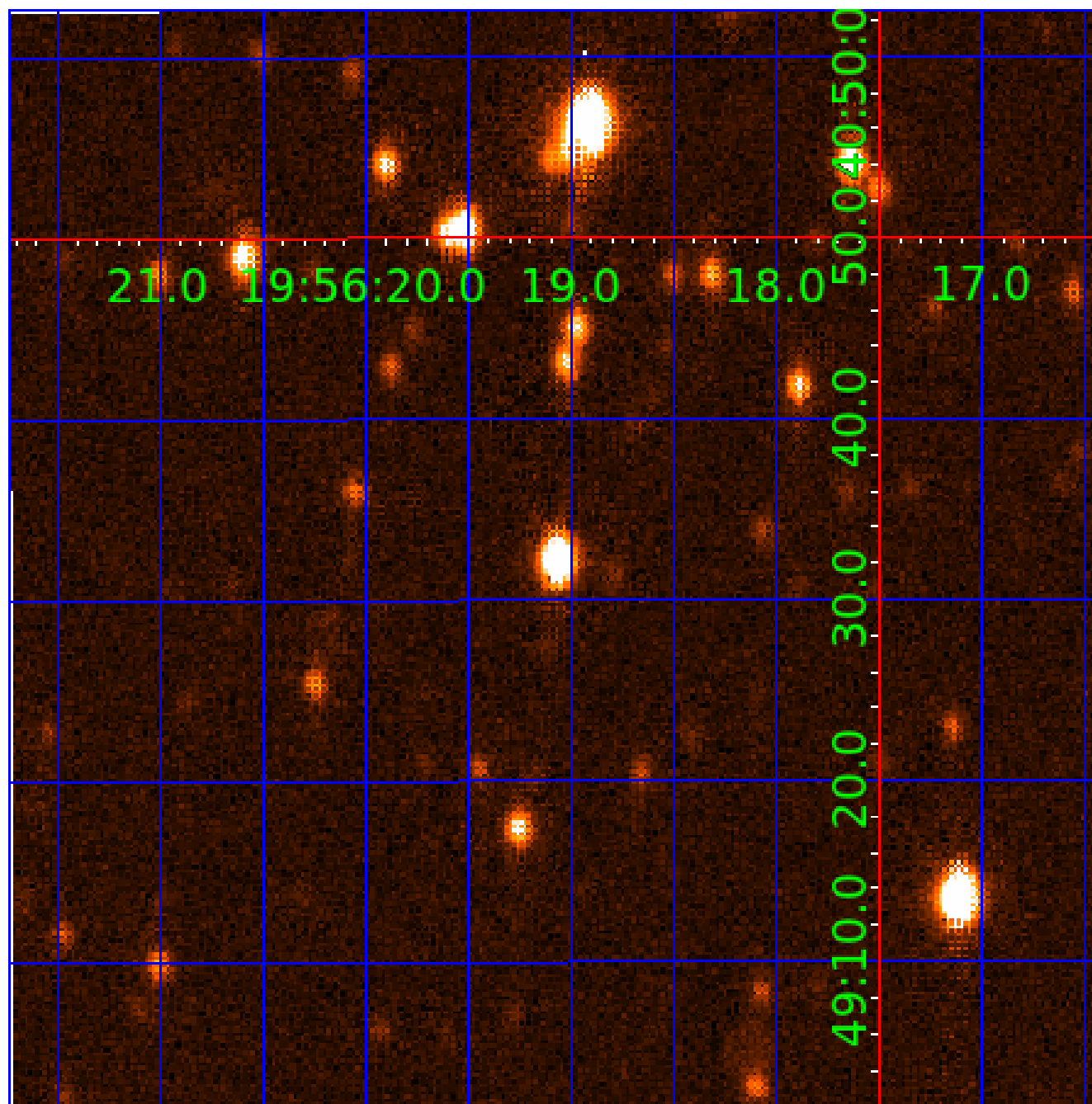
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



folded centroid time series figure for this object.

UKIRT Image

Declination





# KIC 005649837

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005649837-01	OBS	4078.01	0.598074	132.044728	0.0	0.802	15.4	0.0	0.86	6052	0.02	4832.34
005649837-02	OBS	No	0.597888	132.003414	30.0	3.477	15.2	5.7	0.86	6052	0.48	4834.34

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005649837-01	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—CENT_RESOLVED_OFFSET
005649837-02	OBS	FP	0.00	1	0	1	0	LPP_DV—SAME_NTL_PERIOD—CENT_RESOLVED_OFFSET

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

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

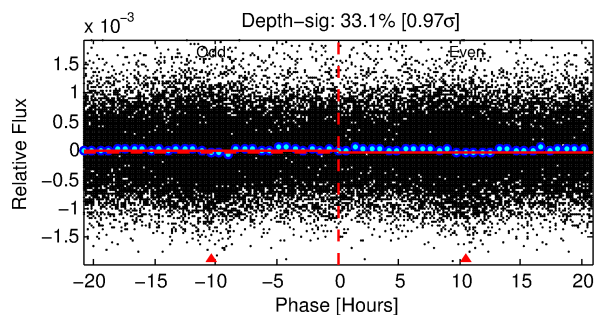
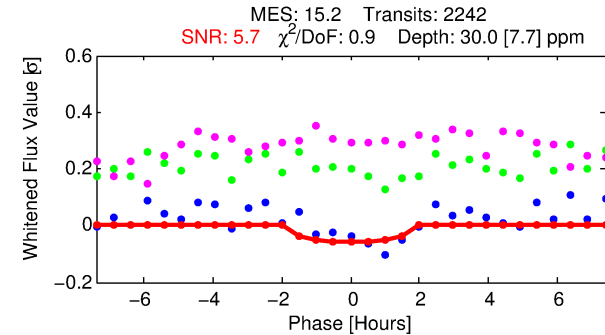
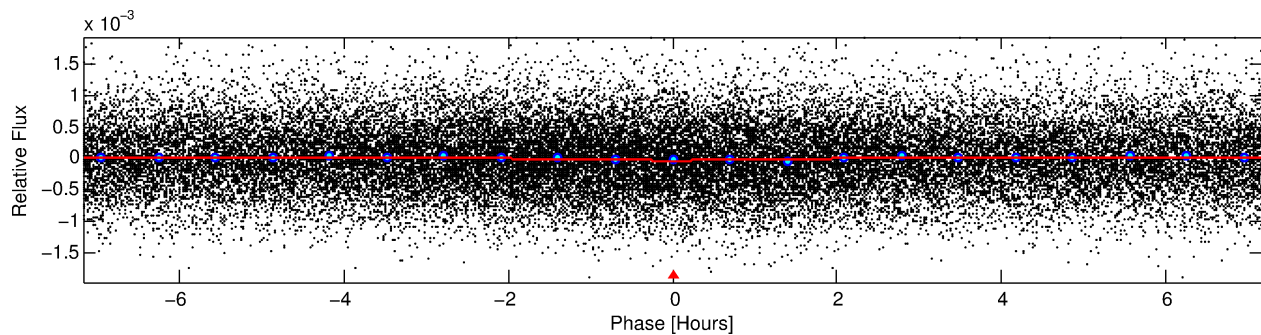
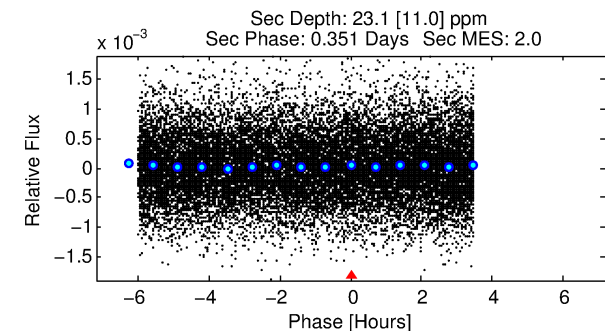
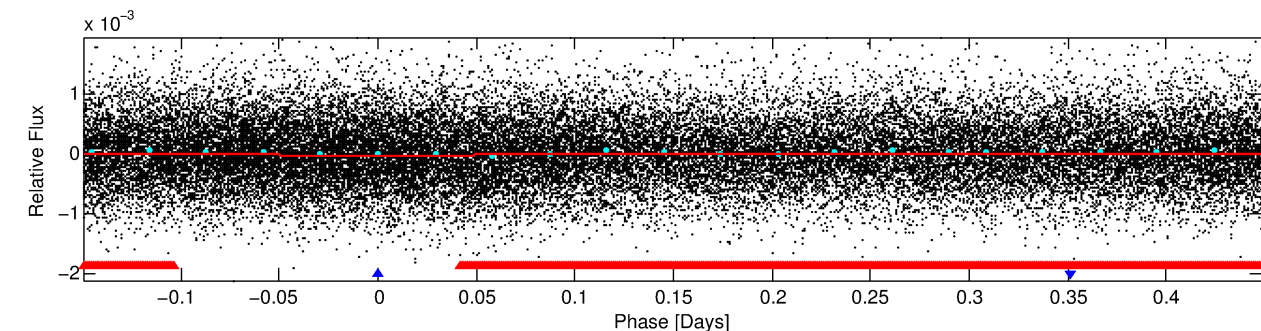
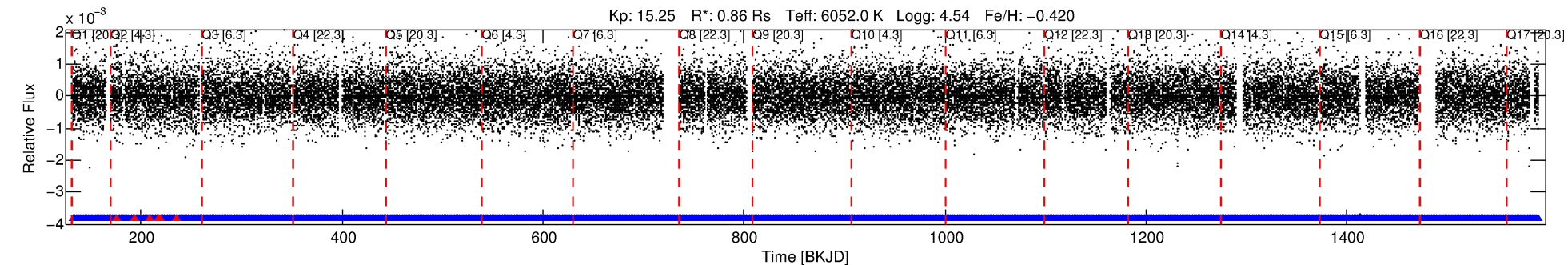
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 005649837-02

No Significant Match Found

# DV One-Page Summary

KIC: 5649837 Candidate: 2 of 2 Period: 0.598 d  
KOI: K04078.01 Corr: 0.791



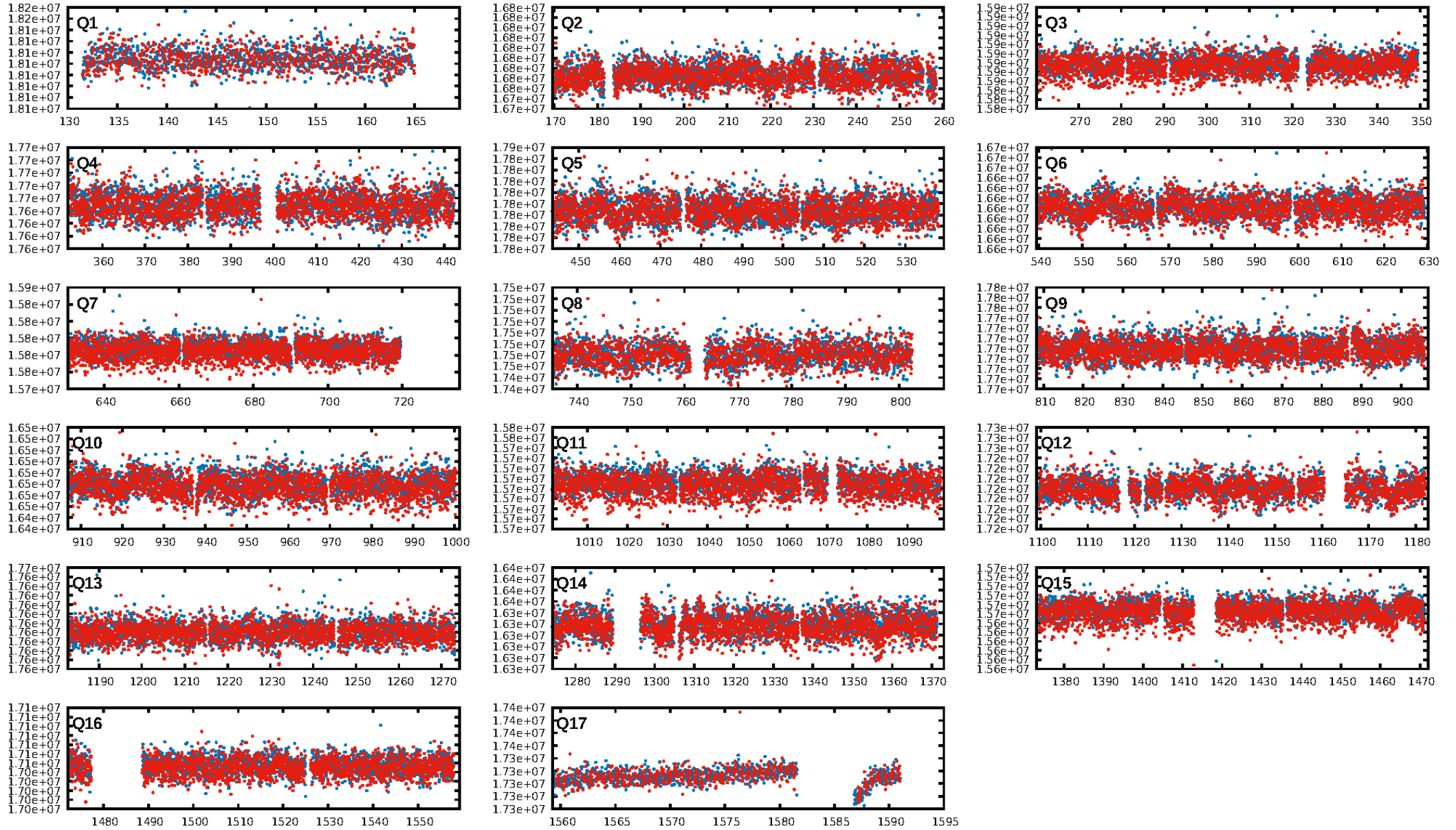
## DV Fit Results:

Period = 0.59789 [0.00002] d  
Epoch = 132.0034 [0.0075] BKJD  
Rp/R\* = 0.0051 [0.0098]  
a/R\* = 1.43 [7.08]  
b = 0.28 [32.75]  
Seff = 4834.34 [1881.98]  
Teq = 2126 [207] K  
Rp = 0.48 [0.94] Re  
a = 0.0136 [0.0034] AU  
Ag = 10.34 [40.61] [0.23σ]  
Teffp = 5895 [5765] K [0.65σ]

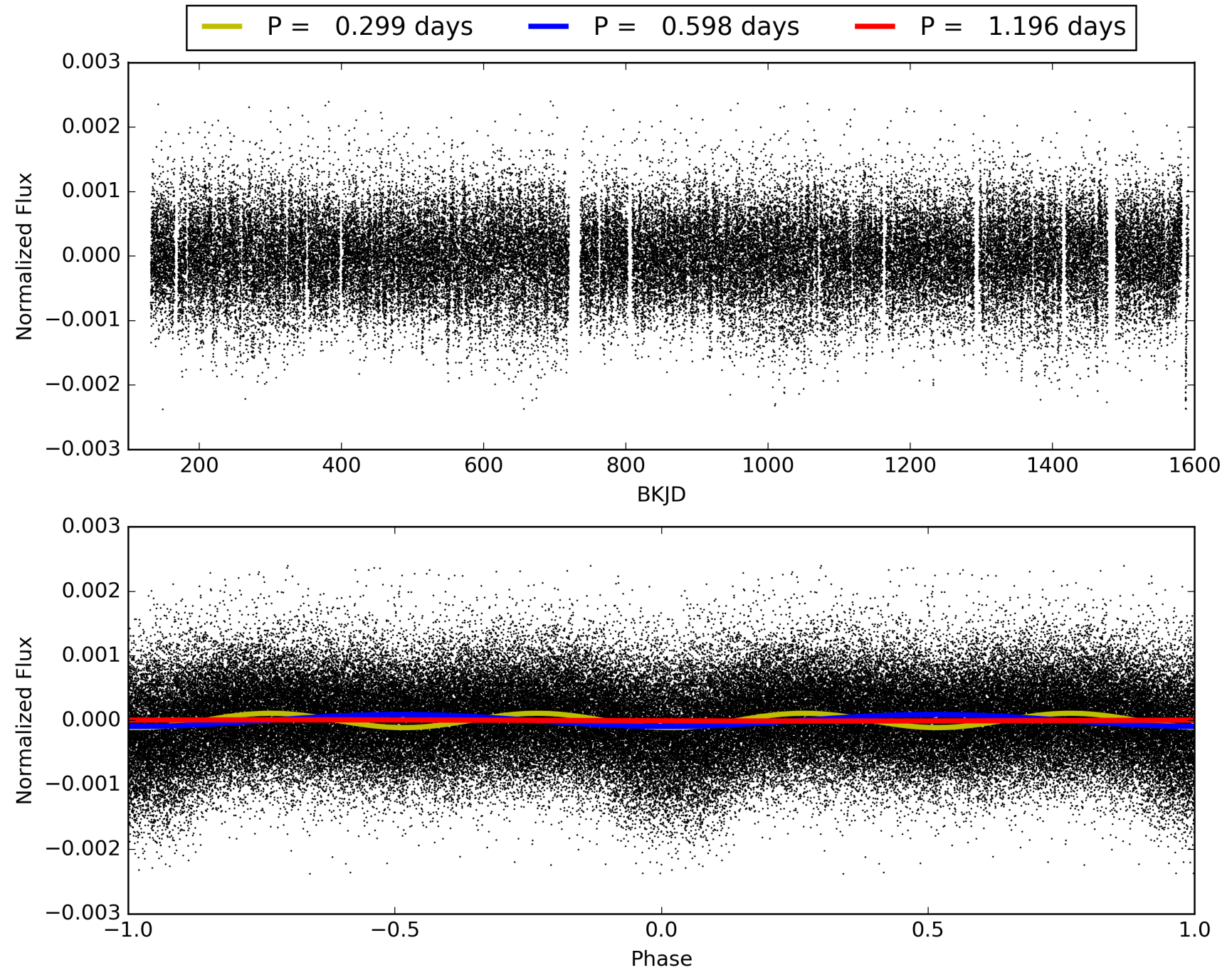
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.1% [0.00σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 3.30e-31  
RollingBand-fgt: 1.00 [2137/2144]  
GhostDiagnostic-chr: -0.3738  
Centroid-sig: 0.0%  
Centroid-so: N/A  
OotOffset-rm: N/A  
KicOffset-rm: N/A  
OotOffset-st: 0/0/0/0 [0]  
KicOffset-st: 0/0/0/0 [0]  
DiffImageQuality-fgm: N/A  
DiffImageOverlap-fno: 0.00 [0/17]

# TCE 005649837-02, PDC Light Curves



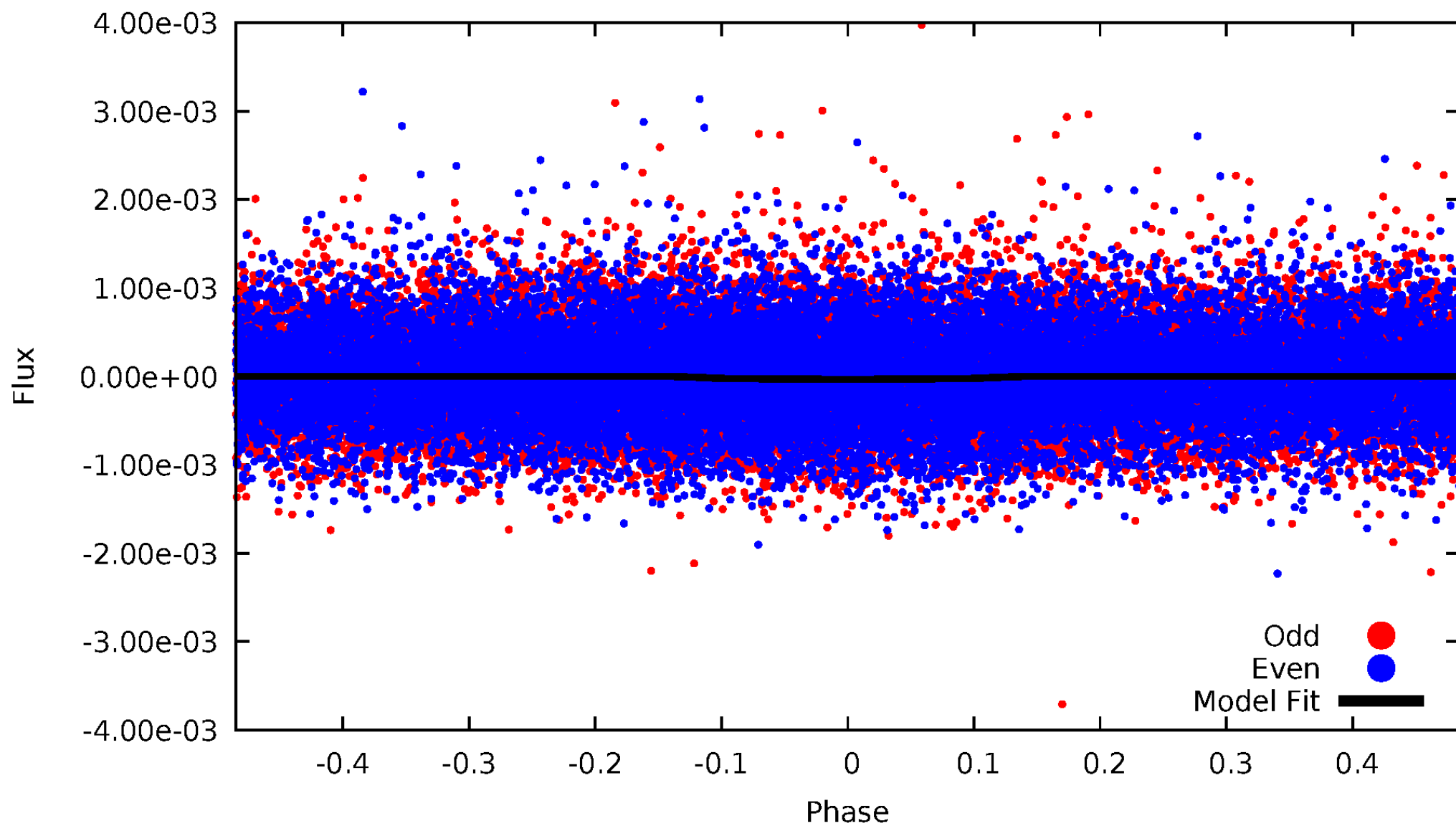
# TCE 005649837-02





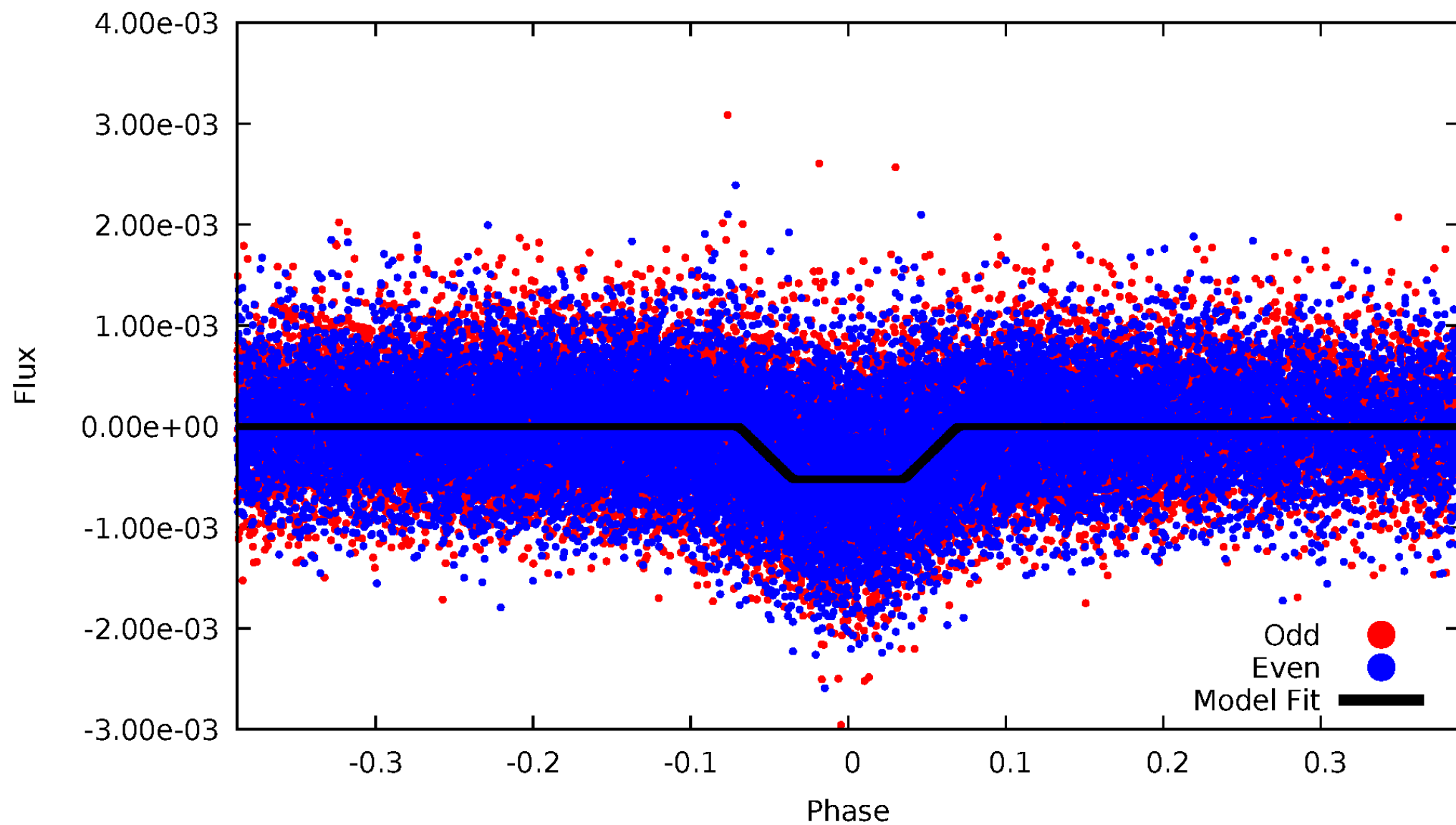
DV Odd/Even

TCE 005649837-02



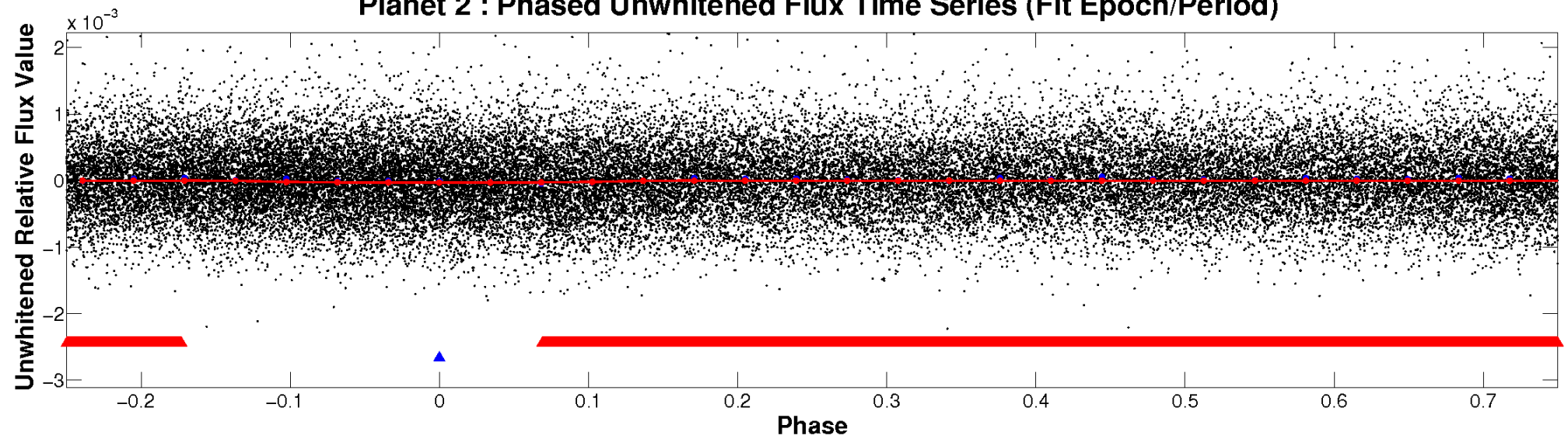
# ALT Odd/Even

TCE 005649837-02

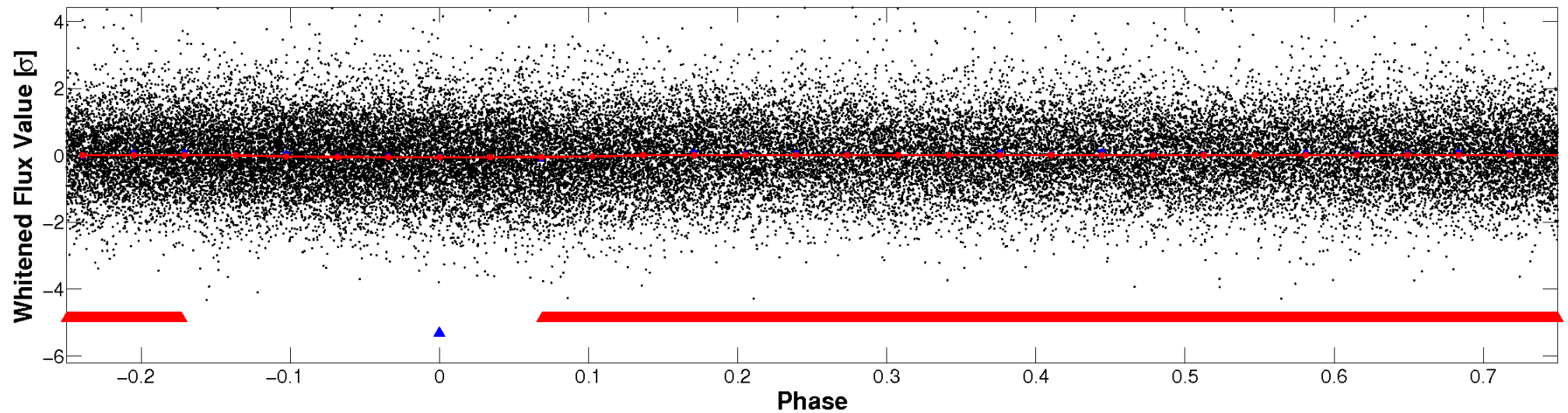


# Non-Whitened Vs. Whitened Light Curve

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

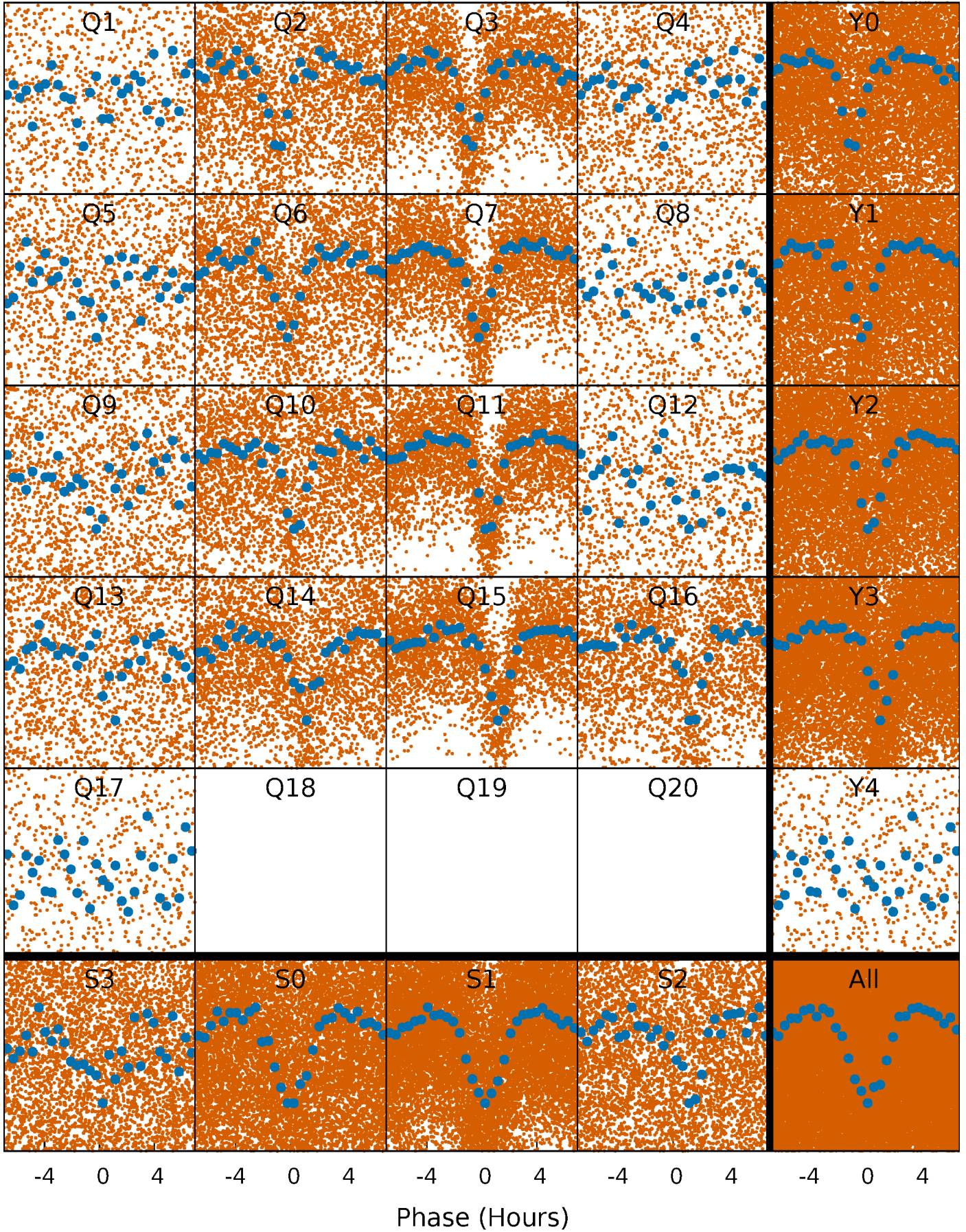


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

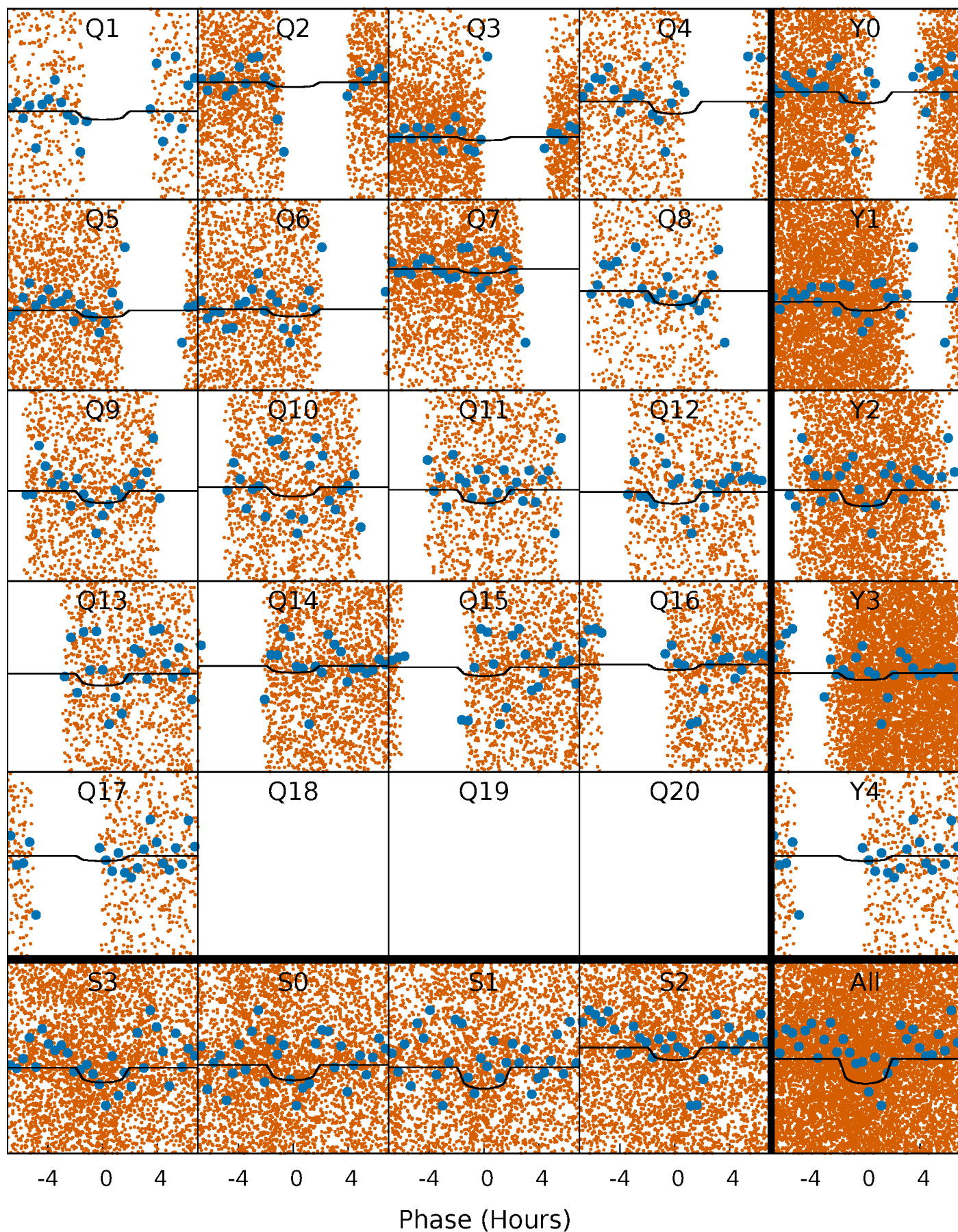
TCE 005649837-02   P= 0.597888 Days    $T_0=132.003414$  (BKJD)





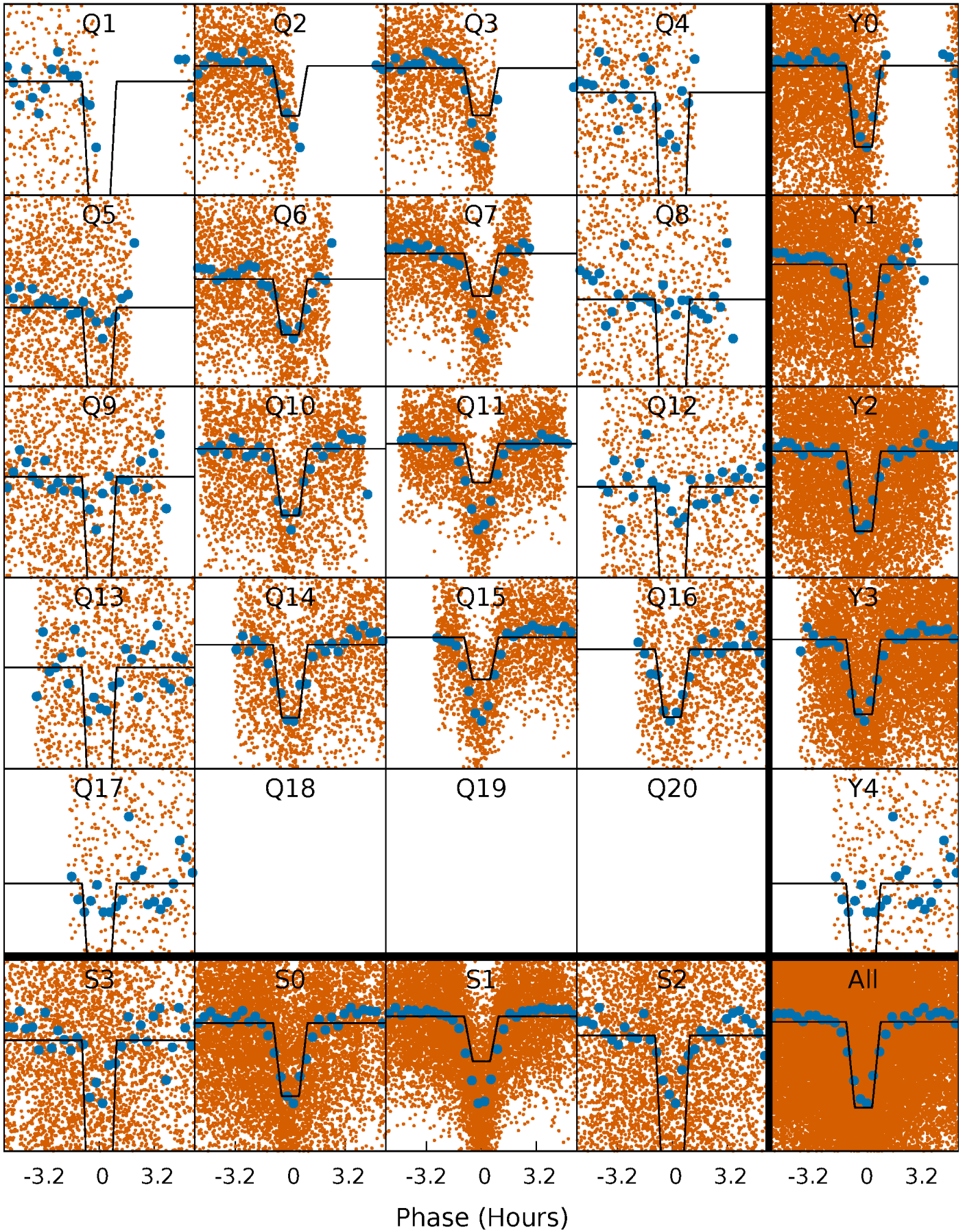
# DV Quarter-Phased Transit Curves

TCE 005649837-02   P= 0.597888 Days    $T_0=132.003414$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 005649837-02   P= 0.597938 Days    $T_0=131.950688$  (BKJD)

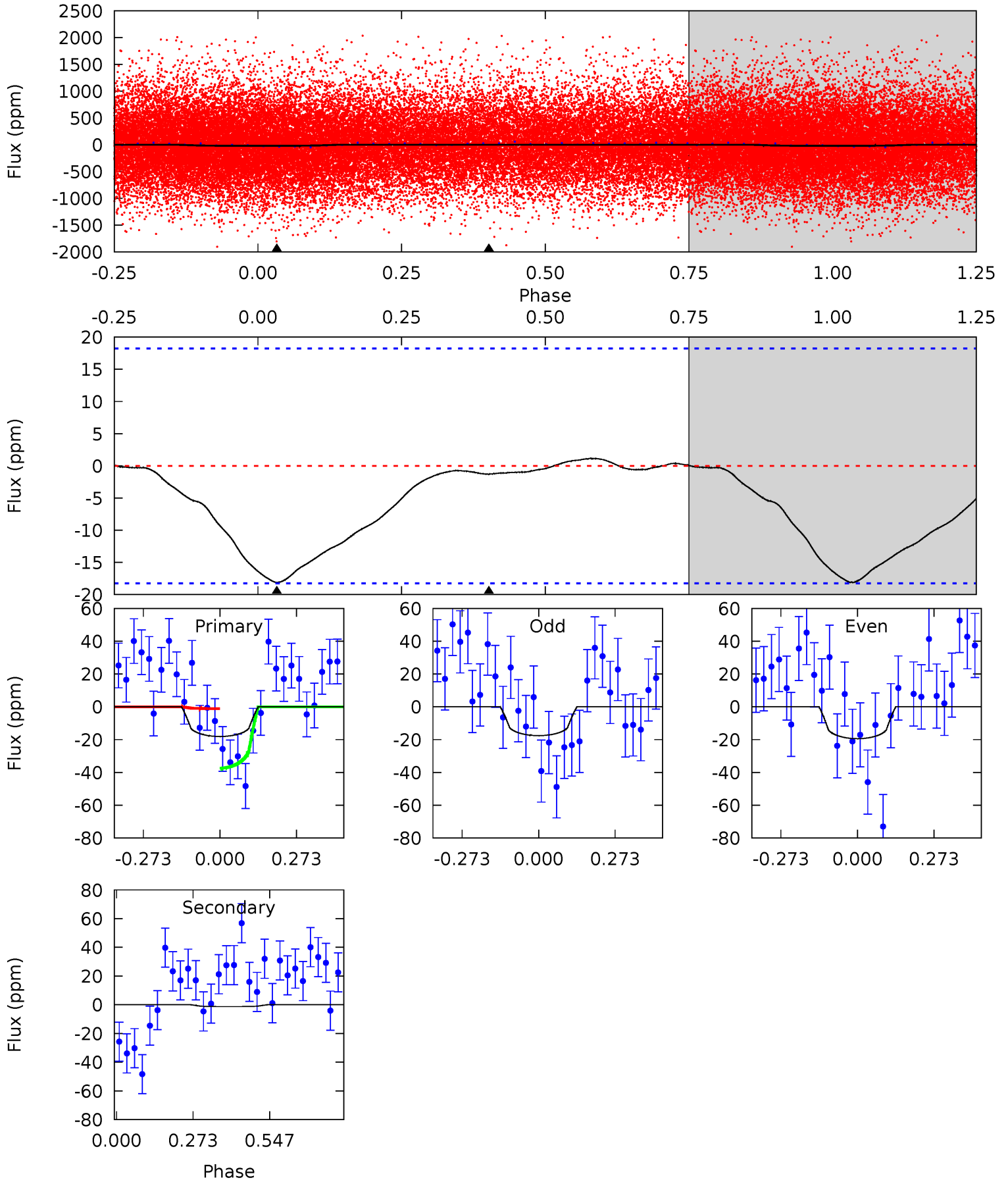




# DV Model-Shift Uniqueness Test

005649837-02, P = 0.597888 Days, E = 131.405526 Days

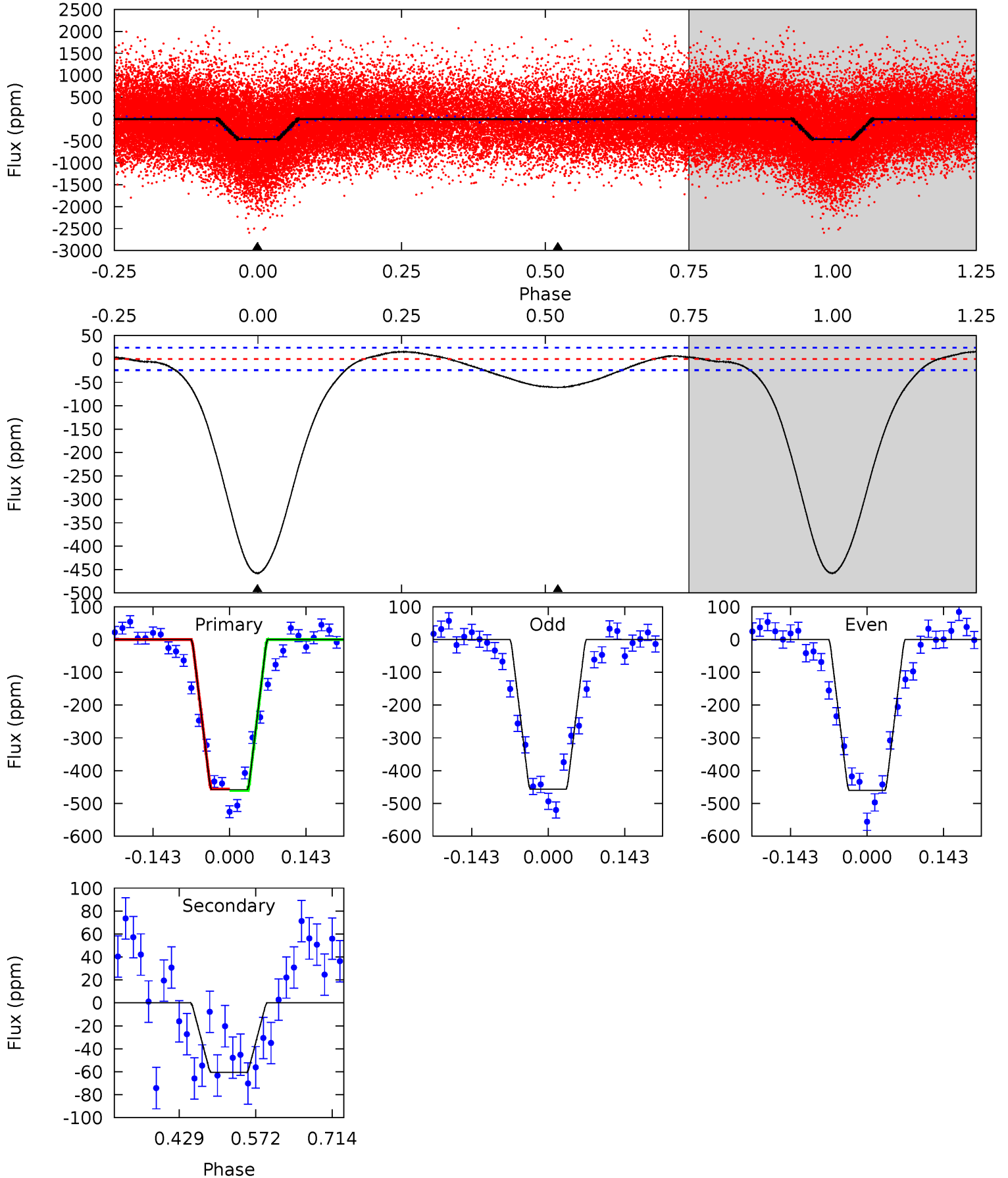
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
4.32	0.31	0	0	4.35	1.10	0.07	4.32	4.32	0.31	0.31	0.23	1.52	0.06	4.31



# Alt Model-Shift Uniqueness Test

005649837-02, P = 0.597938 Days, E = 131.352750 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
85.8	11.3	0	0	4.49	1.47	1.94	85.8	85.8	11.3	11.3	0.33	1.04	0.03	0.46



### Stellar Parameters For KIC 005649837

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6052^{+179}_{-197}$	$4.539^{+0.050}_{-0.200}$	$-0.420^{+0.300}_{-0.300}$	$0.863^{+0.260}_{-0.087}$	$0.940^{+0.109}_{-0.120}$	$2.062^{+0.435}_{-1.109}$
	+3%/-3%	+1%/-4%	+71%/-71%	+30%/-10%	+12%/-13%	+21%/-54%
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 005649837-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-1 \pm 4$	$0.84^{+0.89}_{-0.54}$	$3032^{+201}_{-143}$	$-2918^{+6936}_{-636}$	$0.107^{+1.648}_{-0.477}$
Alt.	$-60 \pm 5$	$2.23^{+1.03}_{-0.98}$	$3030^{+201}_{-144}$	$3708^{+1048}_{-648}$	$1.221^{+2.715}_{-0.650}$

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

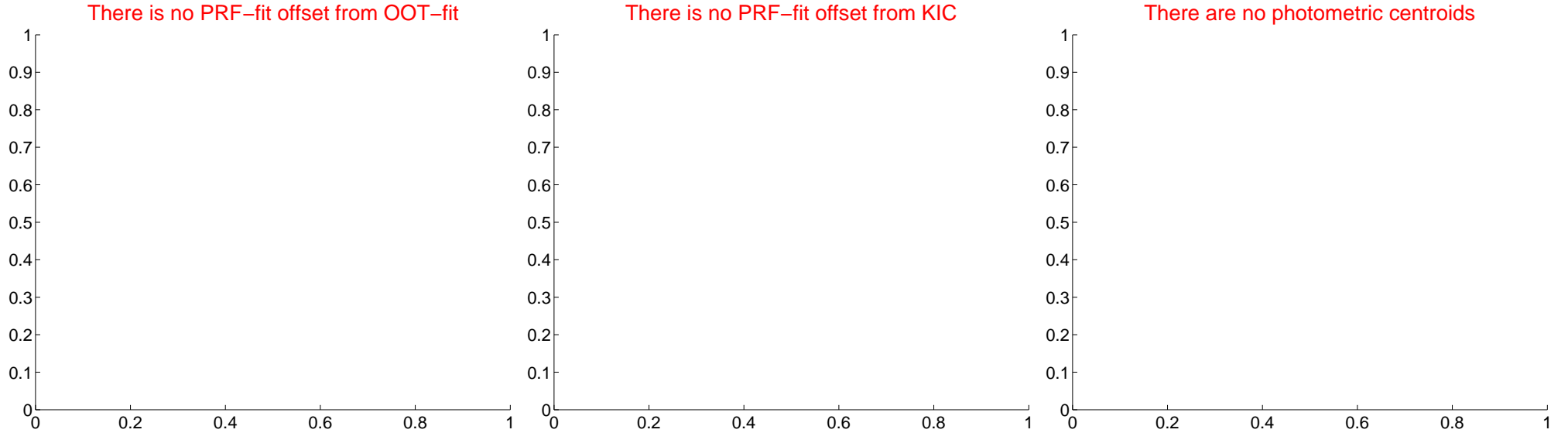
## DV Centroid Data

Supplemental centroid analysis for 005649837-02. Kepler magnitude: 15.25. Transit SNR 5.66

There are 0 quarters with good PRF difference image offsets

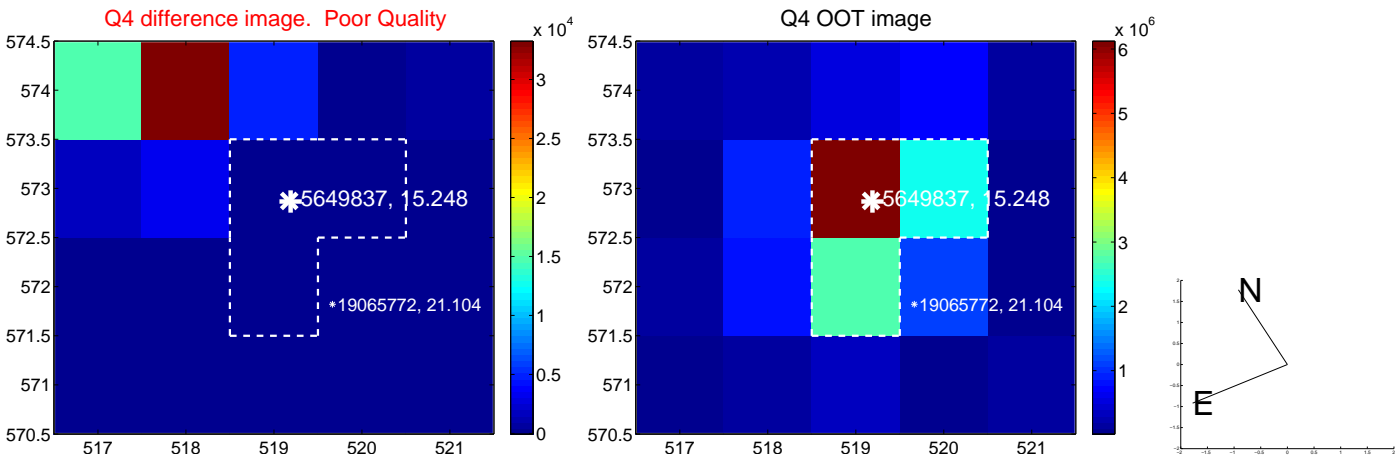
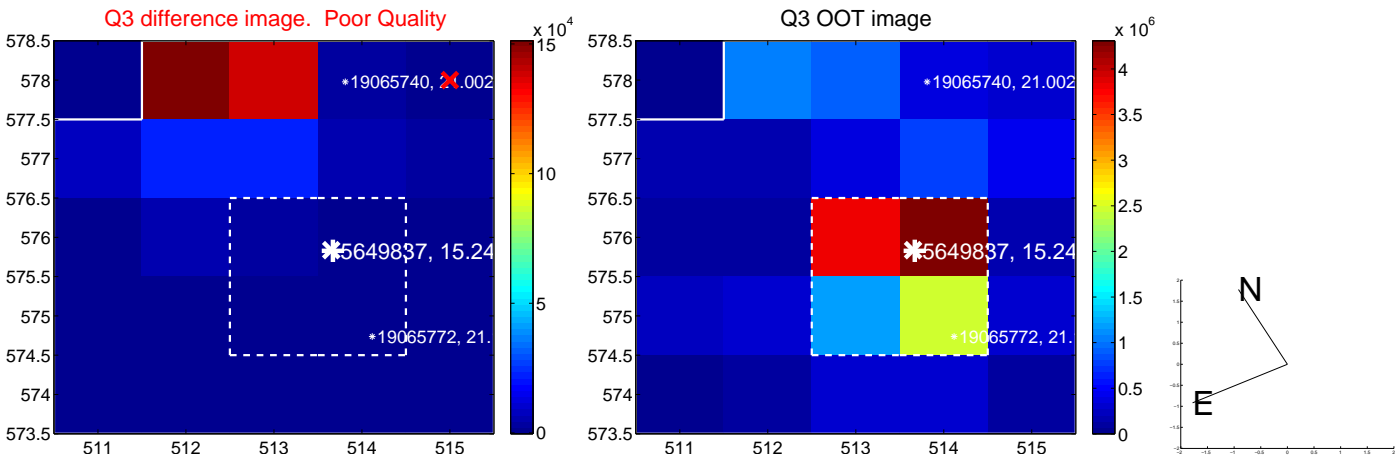
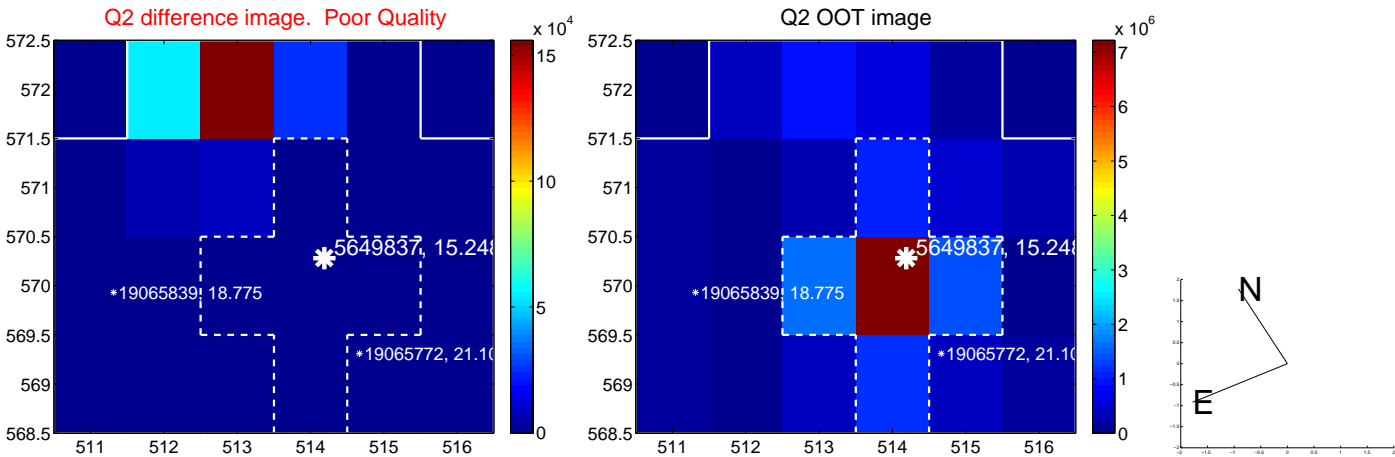
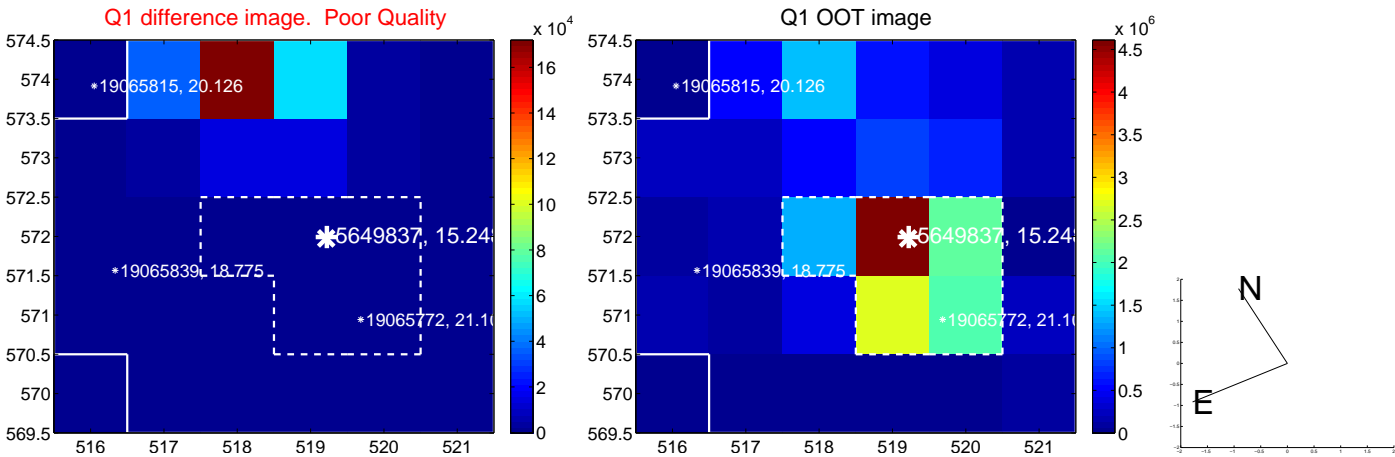
The direct PRF centroid is offset from the target star catalog position by about NaN arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	—	—	—	—
PRF-fit source offset from KIC position	—	—	—	—
photometric centroid source offset	—	—	—	—

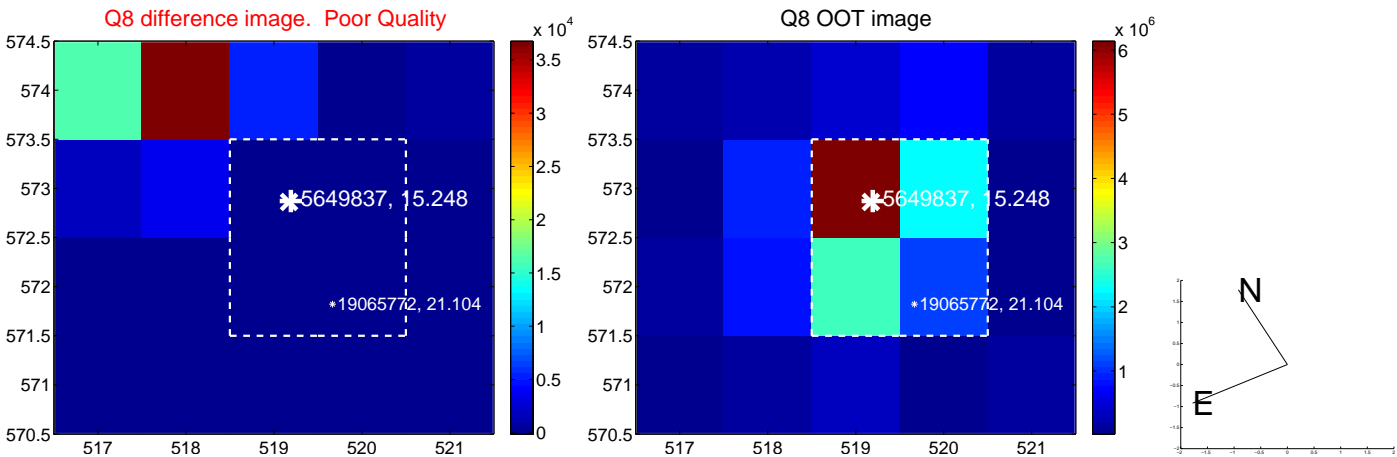
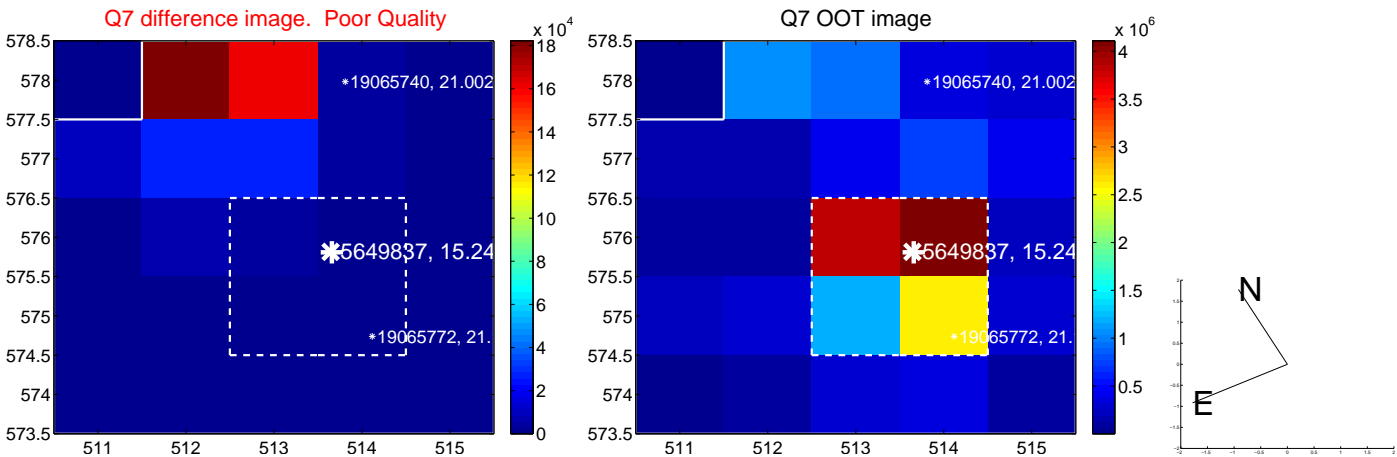
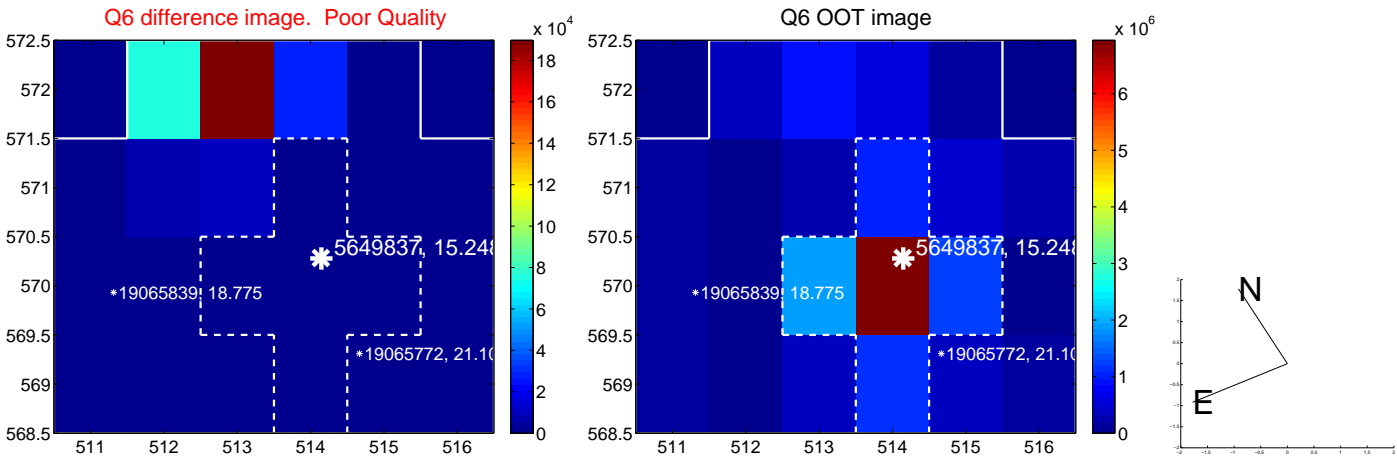
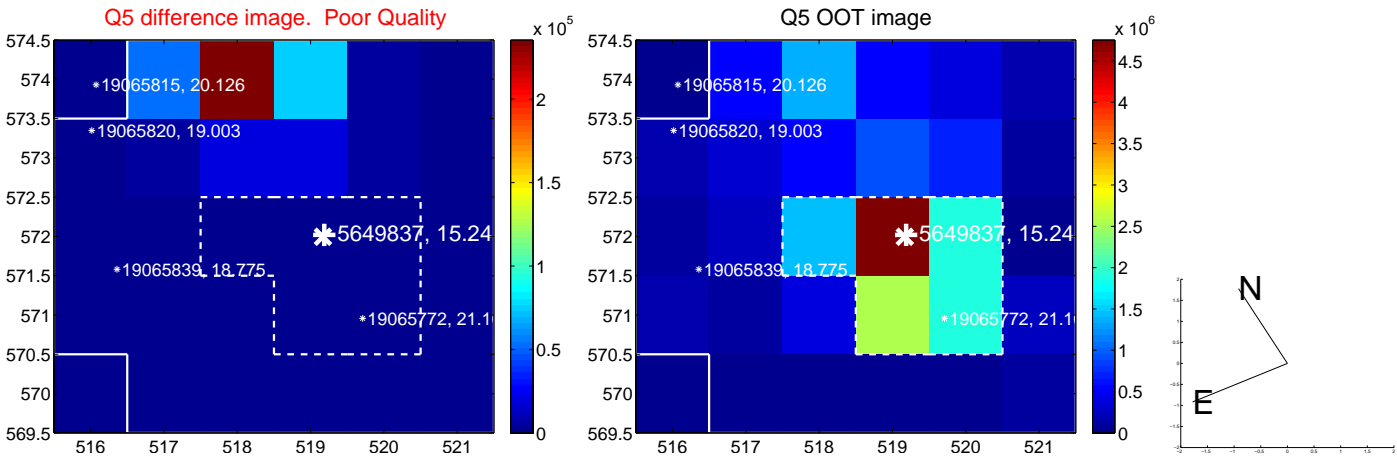


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

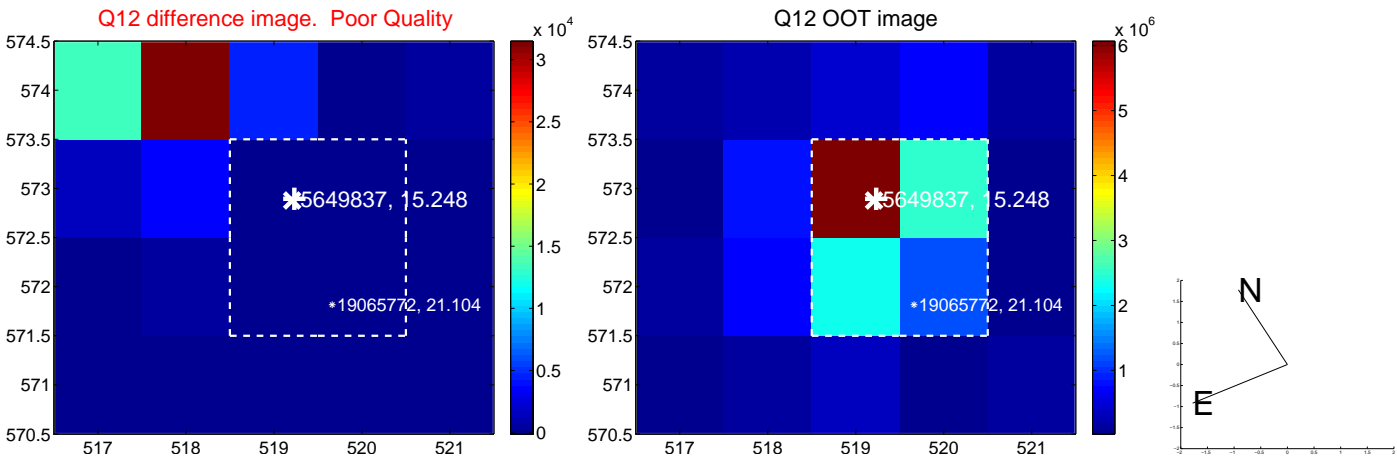
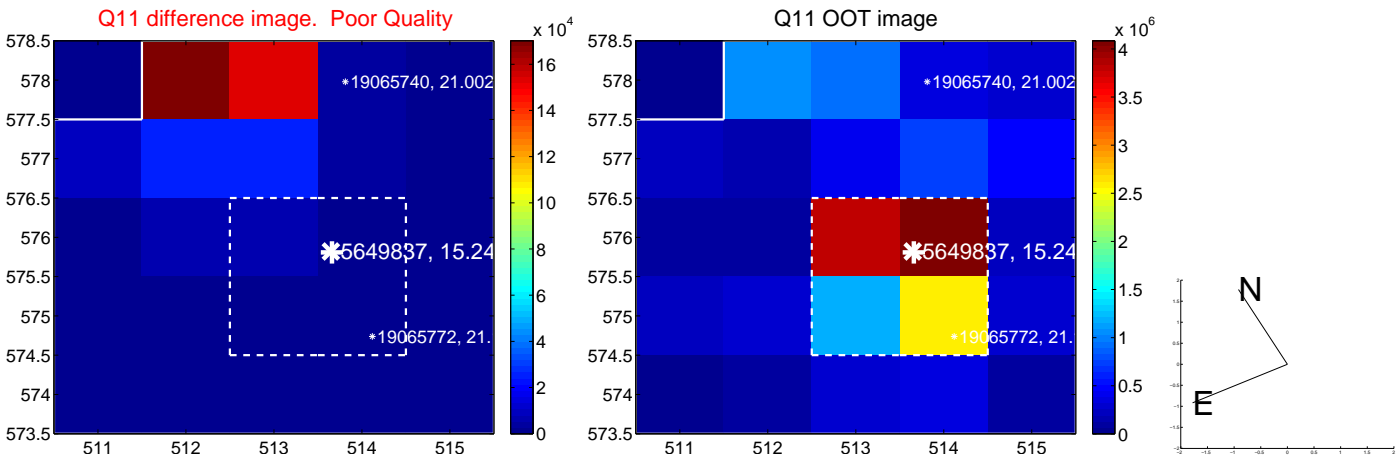
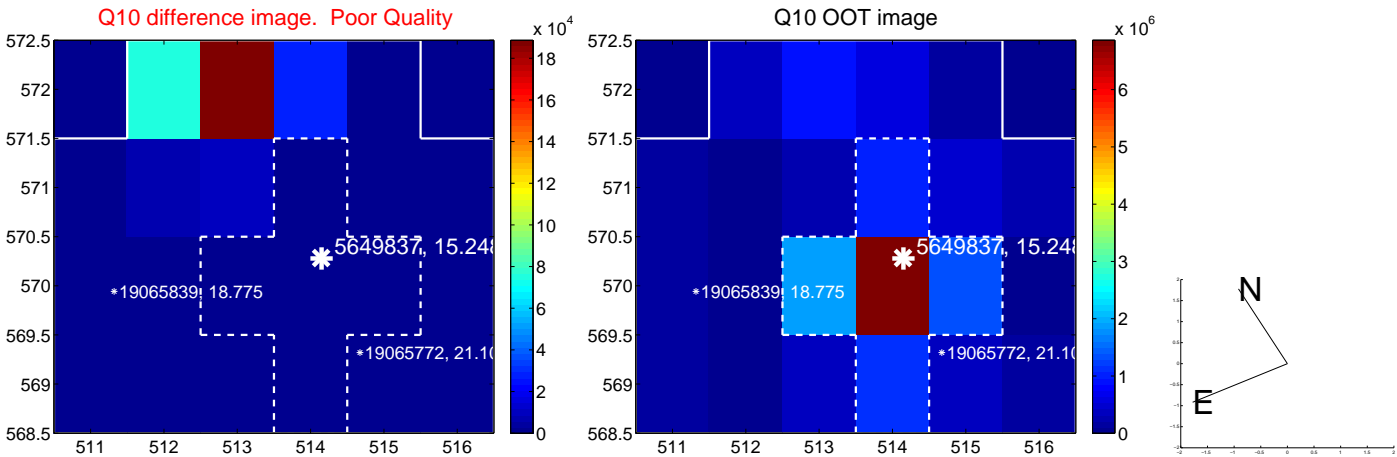
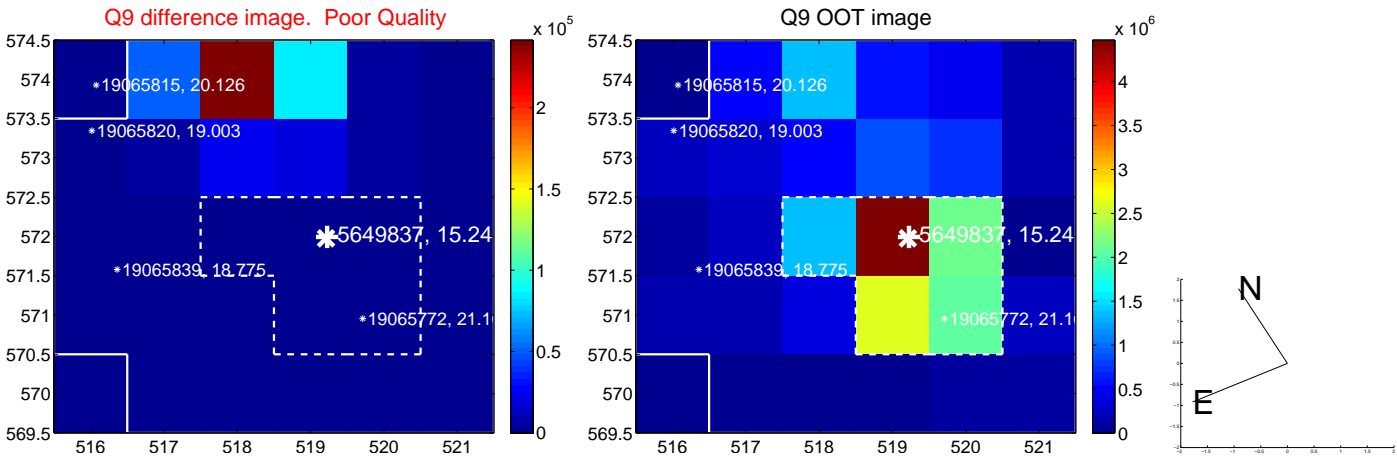


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

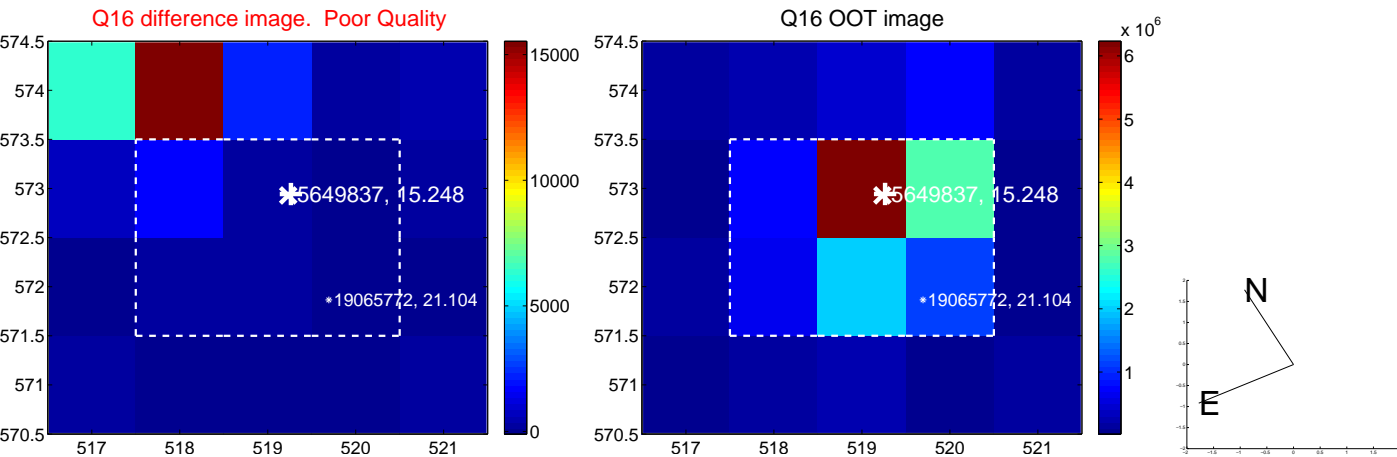
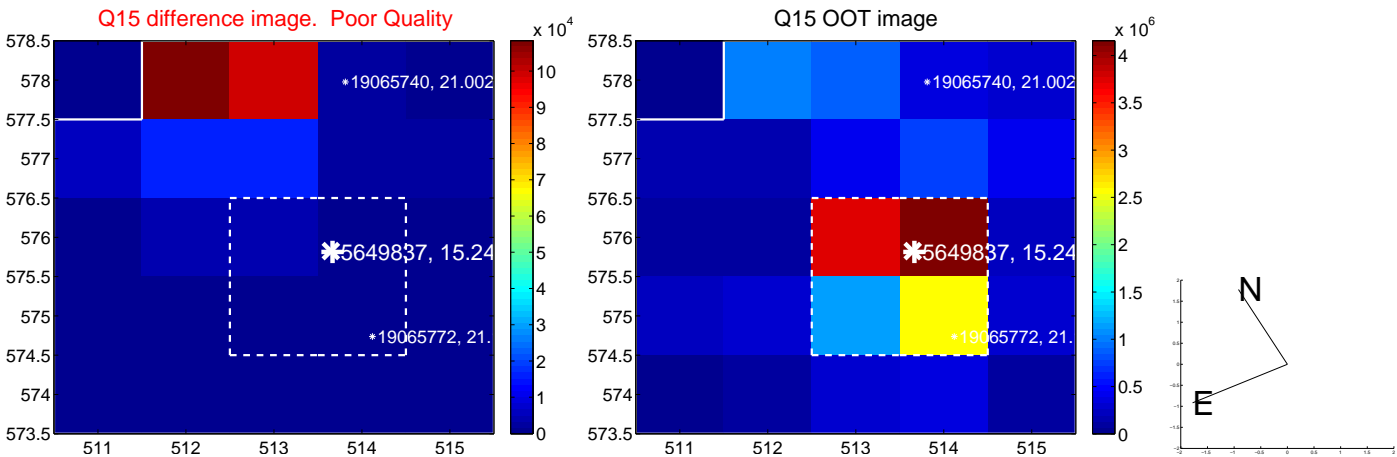
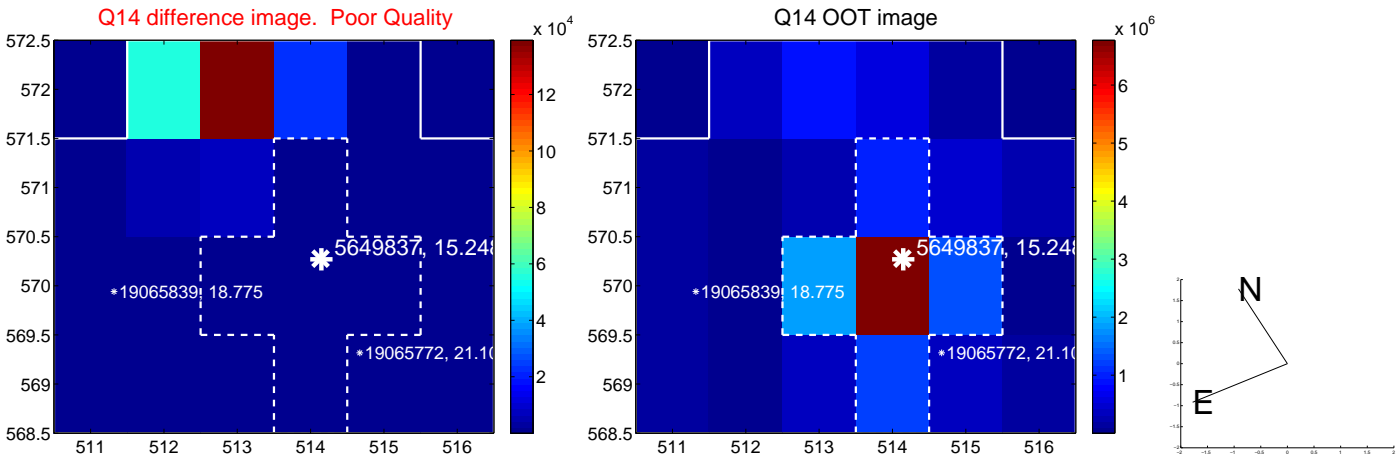
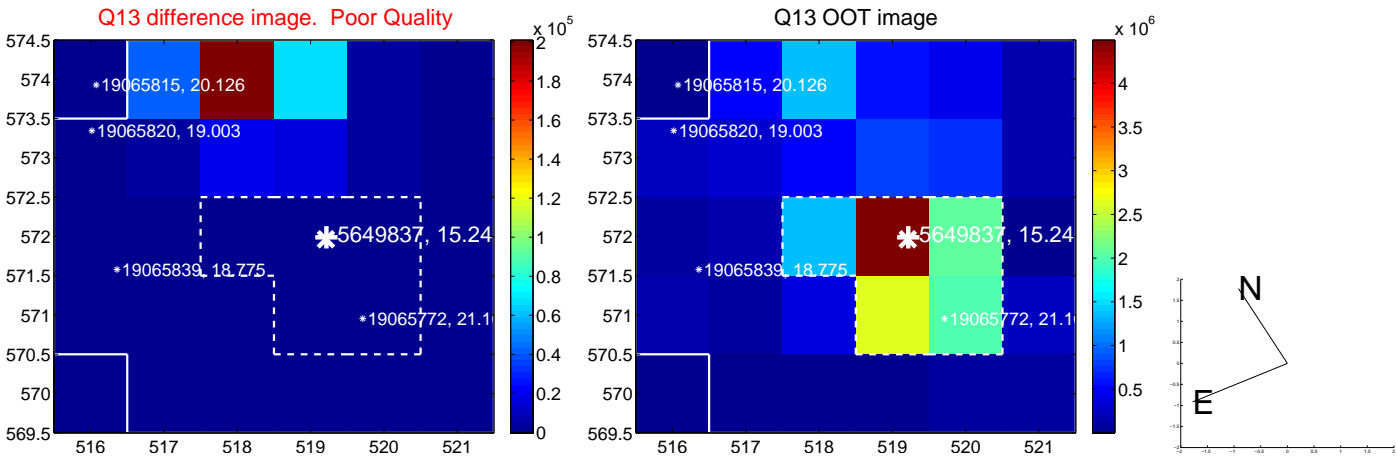




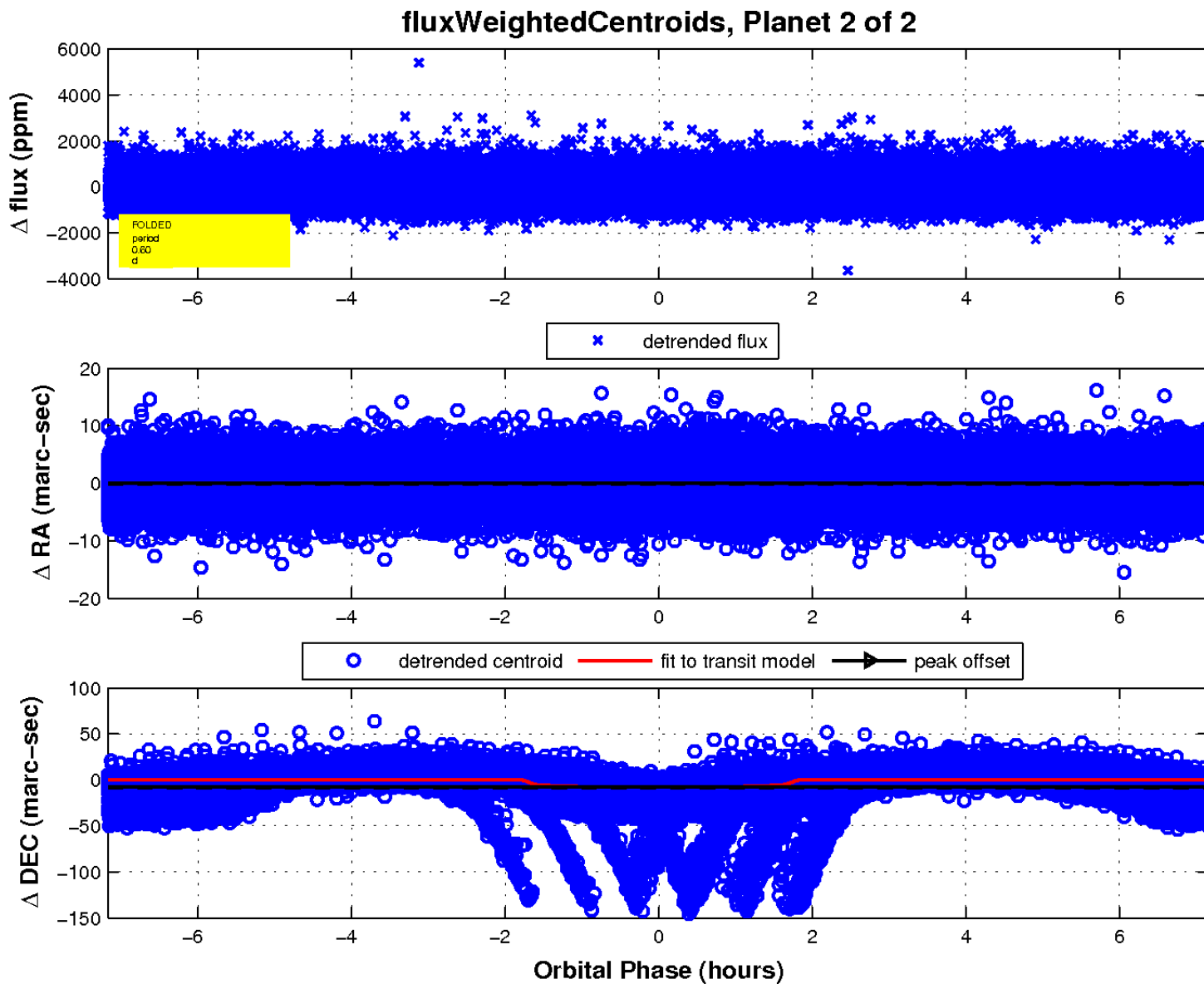
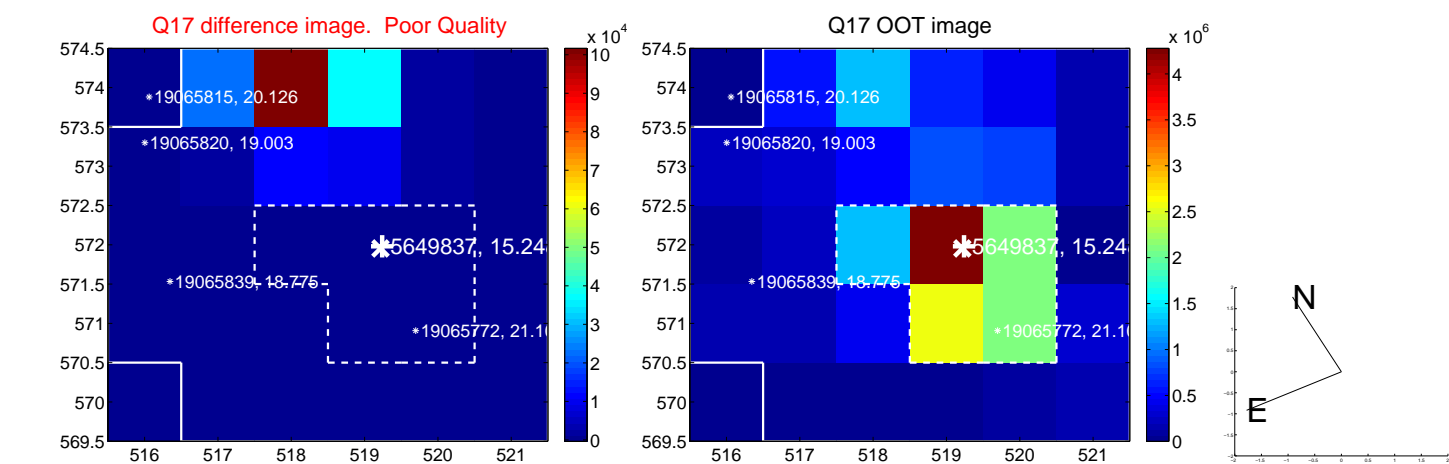
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

