

# KIC 003757407

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003757407-01	OBS	4057.01	9.089171	132.054147	126.9	3.616	13.7	14.8	4.10	6729	5.54	2761.32
003757407-02	OBS	No	1.300815	132.574630	39.5	5.006	9.9	11.2	4.10	6729	4.47	36885.94

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003757407-01	OBS	FP	0.00	0	0	1	0	CENT_RESOLVED_OFFSET—HALO_GHOST
003757407-02	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV

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

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

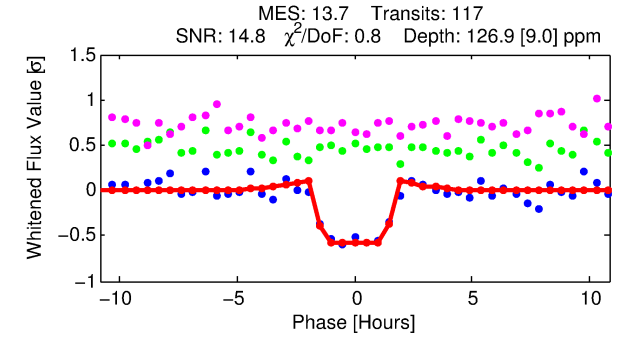
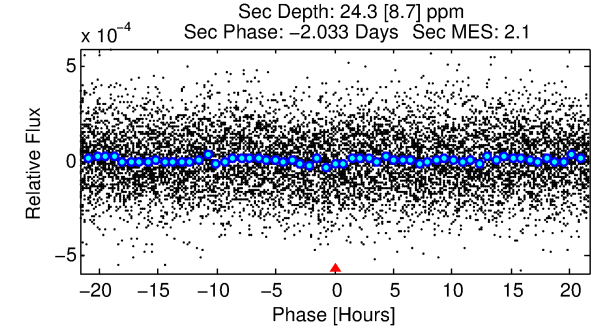
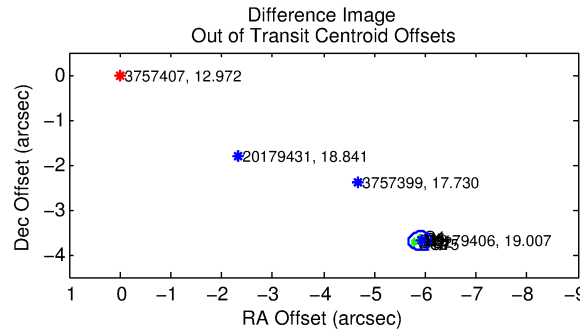
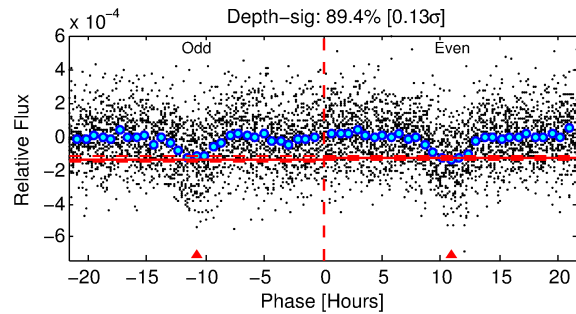
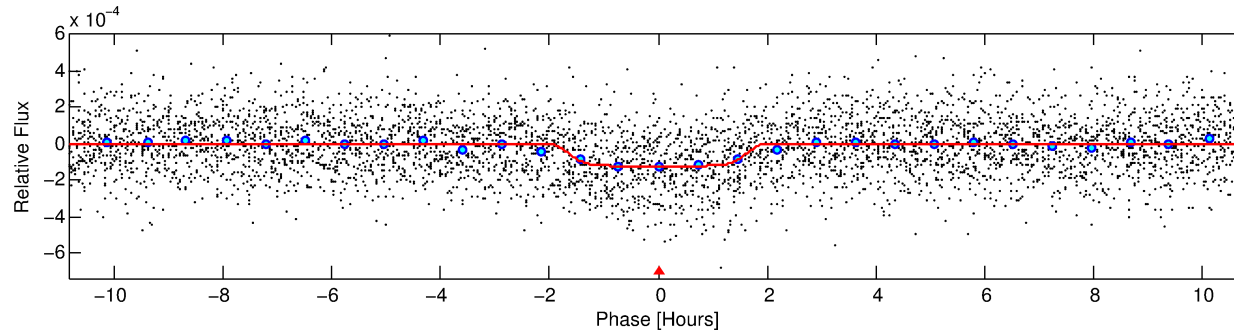
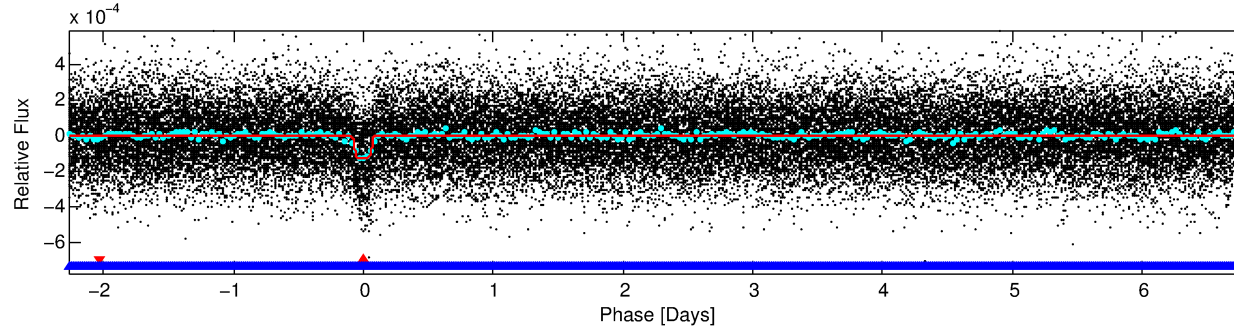
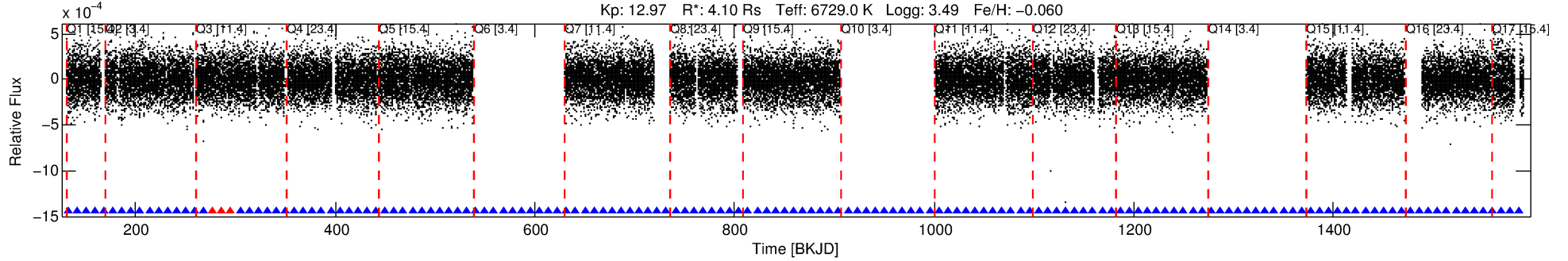
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 003757407-01

No Significant Match Found

# DV One-Page Summary

KIC: 3757407 Candidate: 1 of 2 Period: 9.089 d  
KOI: K04057.01 Corr: 0.938



## DV Fit Results:

Period = 9.08917 [0.00004] d  
Epoch = 132.0541 [0.0035] BKJD  
Rp/R\* = 0.0124 [0.0017]  
a/R\* = 7.69 [5.79]  
b = 0.93 [0.11]  
Seff = 2761.32 [1725.09]  
Teq = 1848 [289] K  
Rp = 5.54 [2.33] Re  
a = 0.1057 [0.0405] AU  
Ag = 4.88 [3.70] [1.05 $\sigma$ ]  
Teffp = 4247 [491] K [4.21 $\sigma$ ]

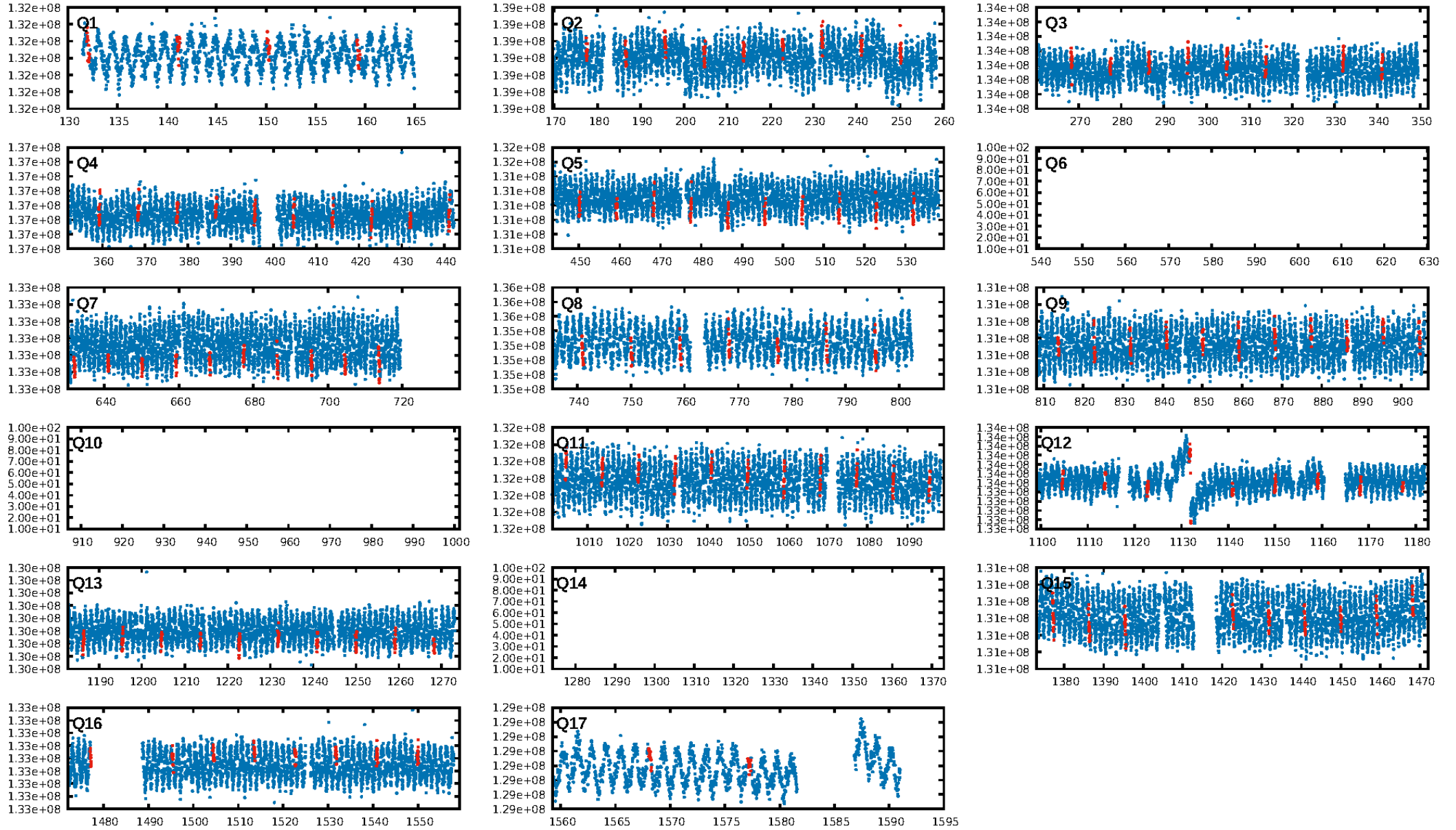
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [30.27 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 8.4%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 1.95e-31  
RollingBand-fgt: 0.97 [108/111]  
GhostDiagnostic-chr: -0.1671  
Centroid-sig: 0.0%  
Centroid-so: 26.903 arcsec [40.49 $\sigma$ ]  
OotOffset-rm: 6.960 arcsec [95.85 $\sigma$ ]  
KicOffset-rm: 6.975 arcsec [98.36 $\sigma$ ]  
OotOffset-st: 1/2/3/4 [10]  
KicOffset-st: 1/2/3/4 [10]  
DiffImageQuality-fgm: 1.00 [10/10]  
DiffImageOverlap-fno: 0.50 [7/14]

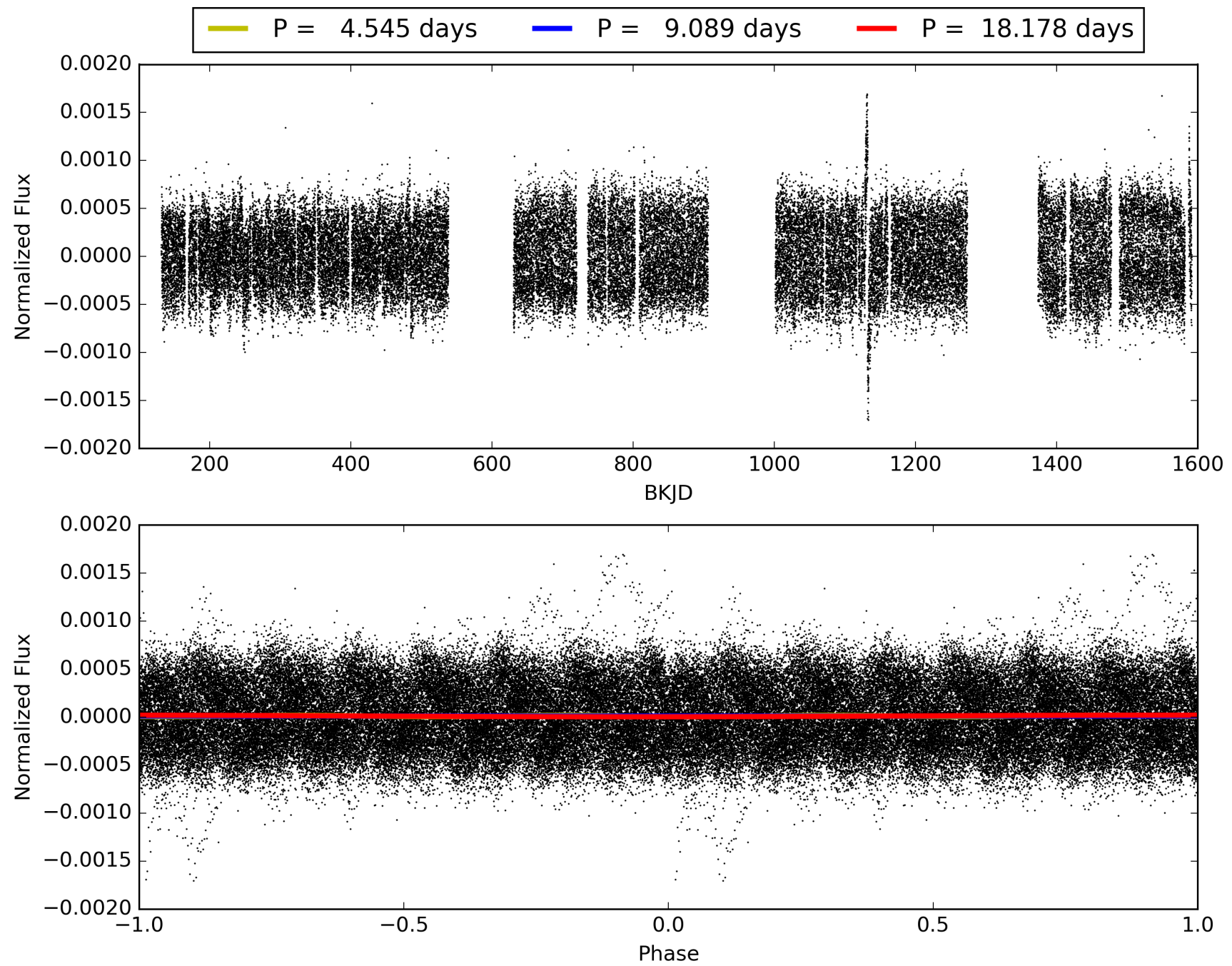
Software Revision: svn-ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 22:39:25 Z

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

# TCE 003757407-01, PDC Light Curves

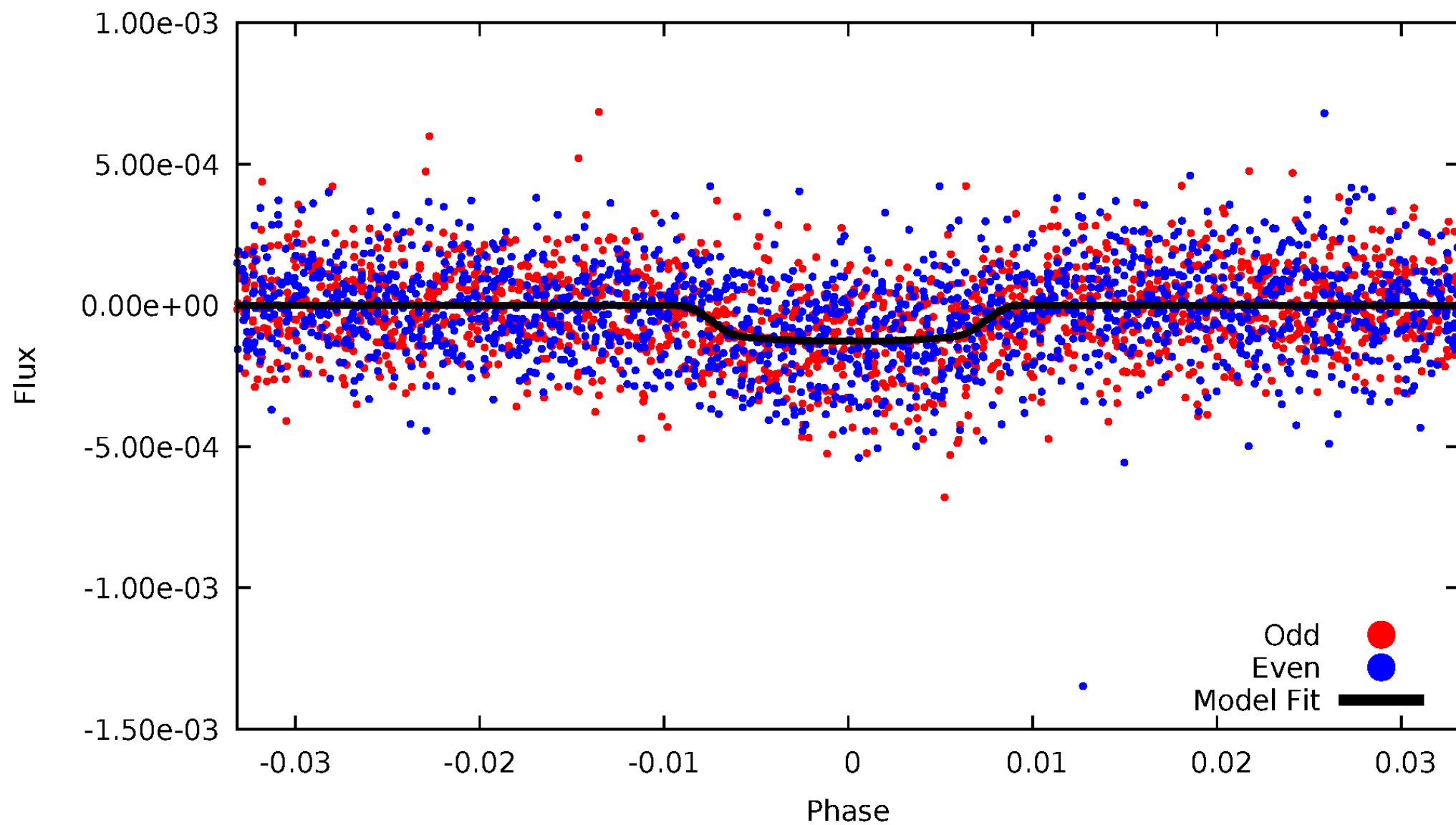


TCE 003757407-01



# DV Odd/Even

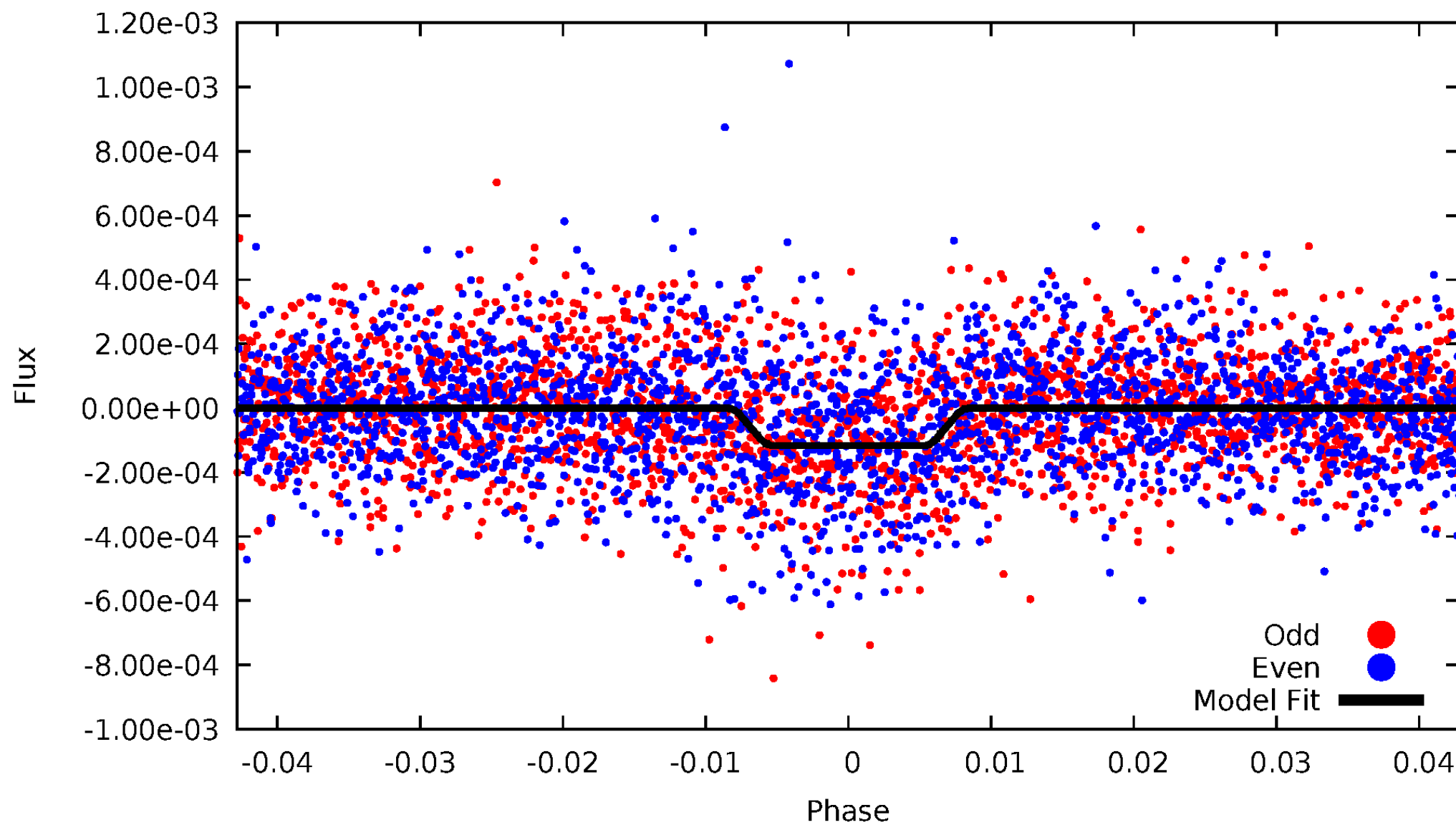
TCE 003757407-01





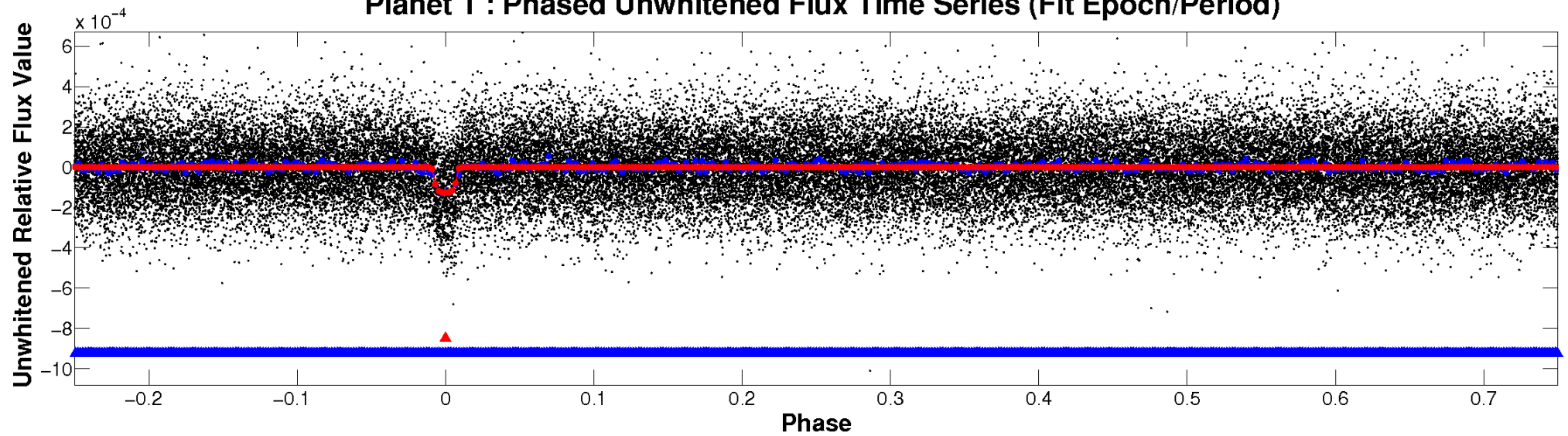
# ALT Odd/Even

TCE 003757407-01

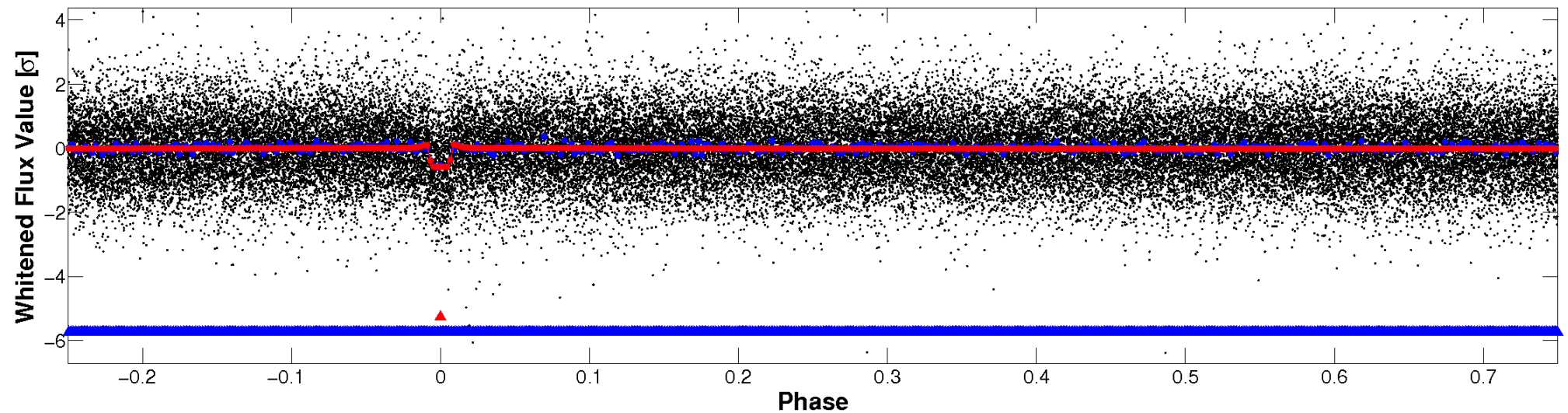


# Non-Whitened Vs. Whitened Light Curve

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

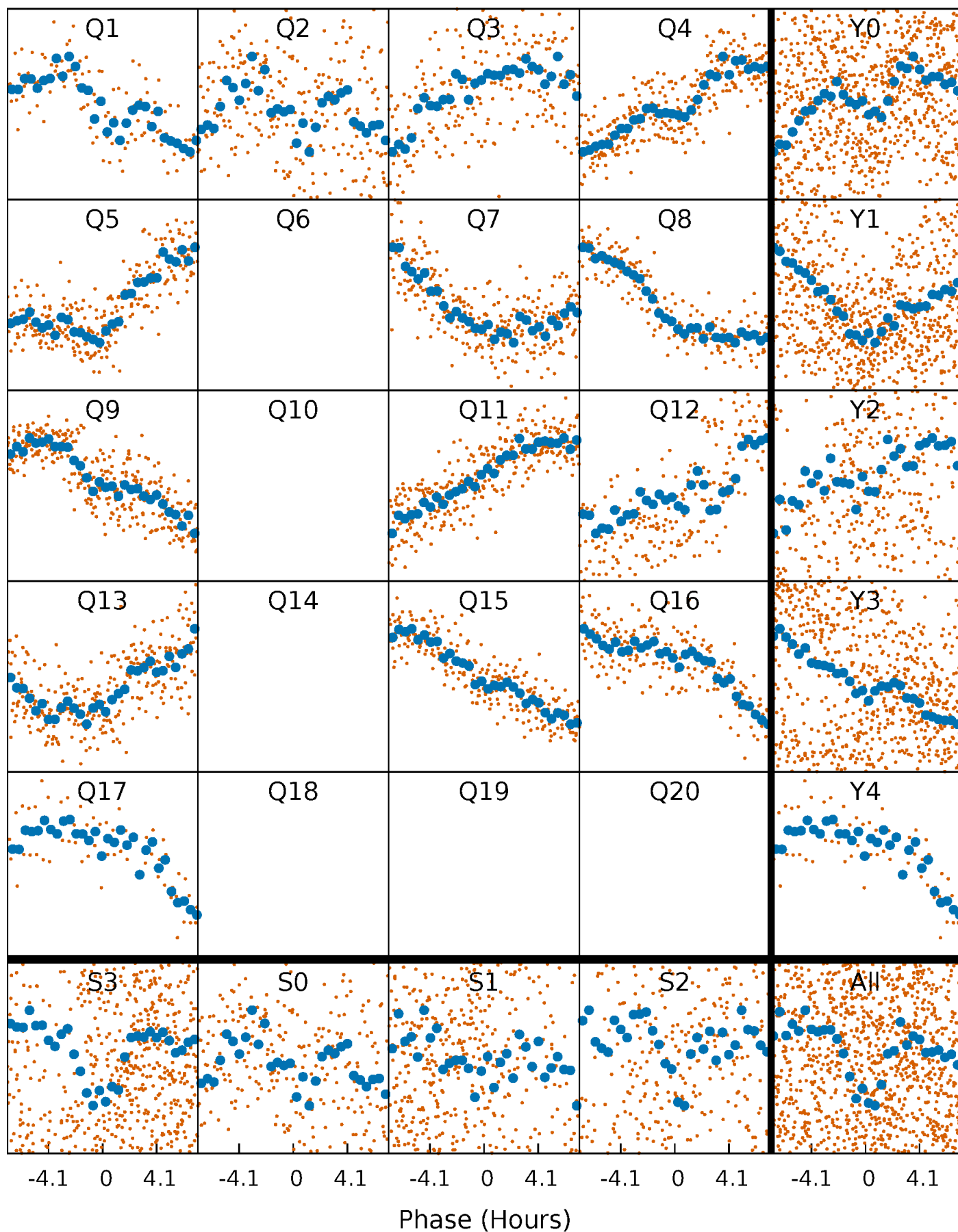


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

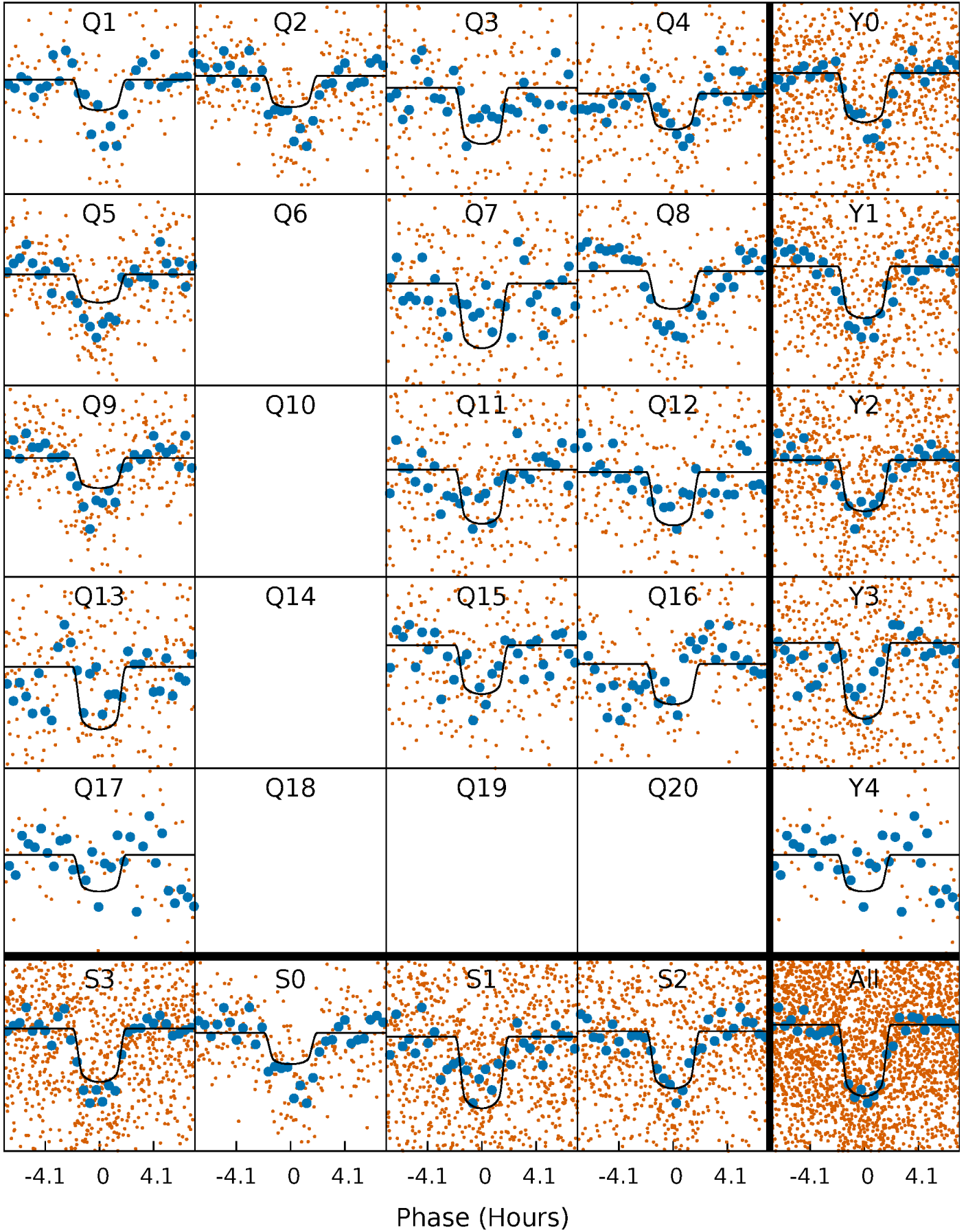
TCE 003757407-01   P= 9.089171 Days    $T_0=132.054147$  (BKJD)





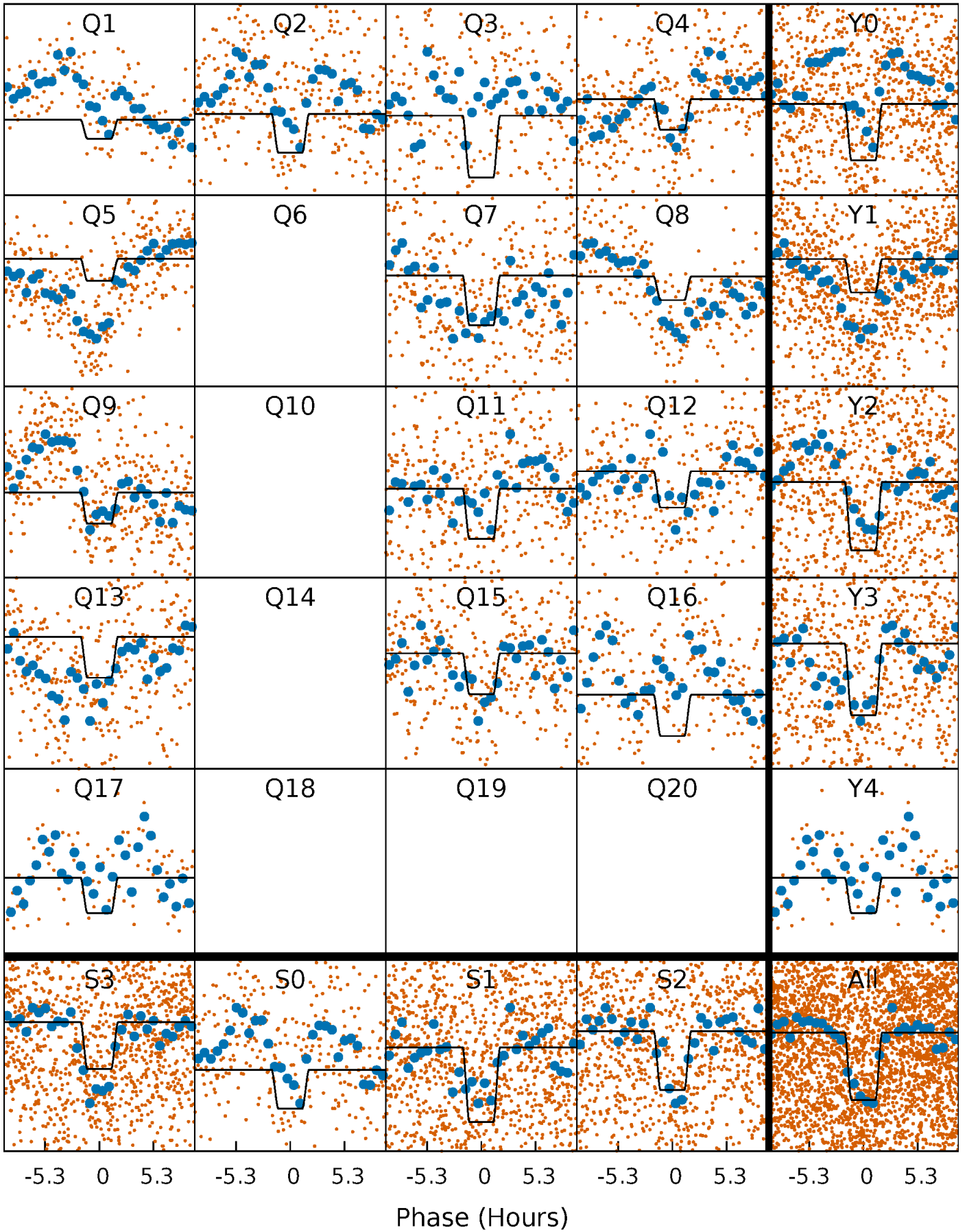
# DV Quarter-Phased Transit Curves

TCE 003757407-01 P= 9.089171 Days  $T_0=132.054147$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

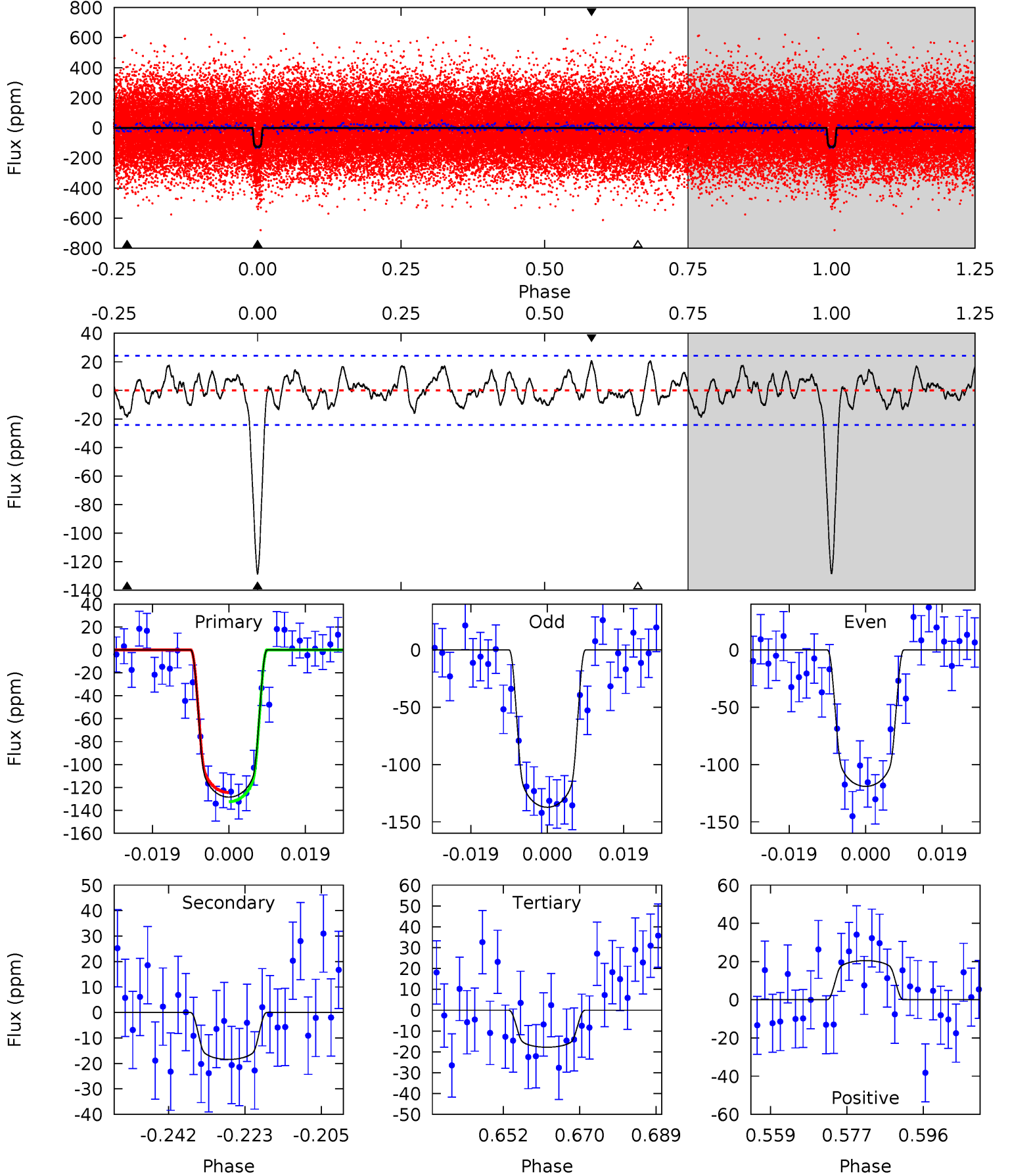
TCE 003757407-01 P= 9.088904 Days  $T_0=132.073539$  (BKJD)



# DV Model-Shift Uniqueness Test

003757407-01, P = 9.089171 Days, E = 122.964976 Days

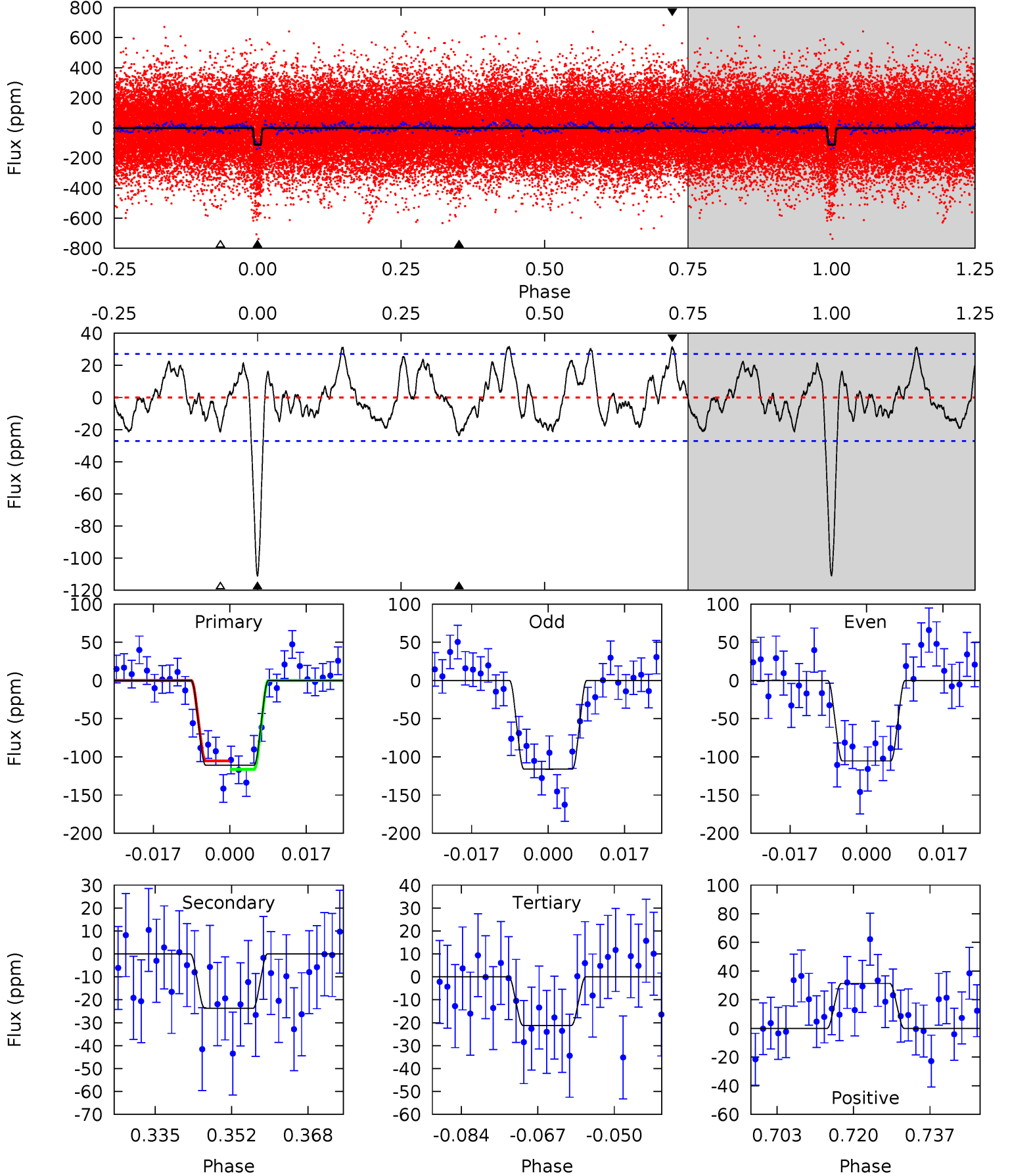
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
26.0	3.73	3.60	4.15	4.91	2.35	1.57	22.4	21.9	0.13	-0.42	1.84	1.05	0.14	0.81



# Alt Model-Shift Uniqueness Test

003757407-01, P = 9.088904 Days, E = 122.984635 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
20.1	4.30	3.85	5.70	4.93	2.39	2.29	16.3	14.4	0.46	-1.40	0.97	1.20	0.22	1.00



### Stellar Parameters For KIC 003757407

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6729^{+184}_{-201}$	$3.493^{+0.360}_{-0.090}$	$-0.060^{+0.300}_{-0.250}$	$4.099^{+0.192}_{-1.634}$	$1.907^{+0.171}_{-0.371}$	$0.039^{+0.120}_{-0.011}$
	+3%/-3%	+10%/-3%	+500%/-417%	+5%/-40%	+9%/-19%	+308%/-28%
Source	PHO1	FLK73	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 003757407-01 / KOI 4057.01

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-18 \pm 5$	$5.30^{+0.96}_{-1.07}$	$2549^{+111}_{-227}$	$4129^{+334}_{-293}$	$4.088^{+2.391}_{-1.469}$
Alt.	$-24 \pm 6$	$4.58^{+0.93}_{-1.01}$	$2546^{+120}_{-223}$	$4603^{+438}_{-333}$	$7.038^{+4.701}_{-2.550}$

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



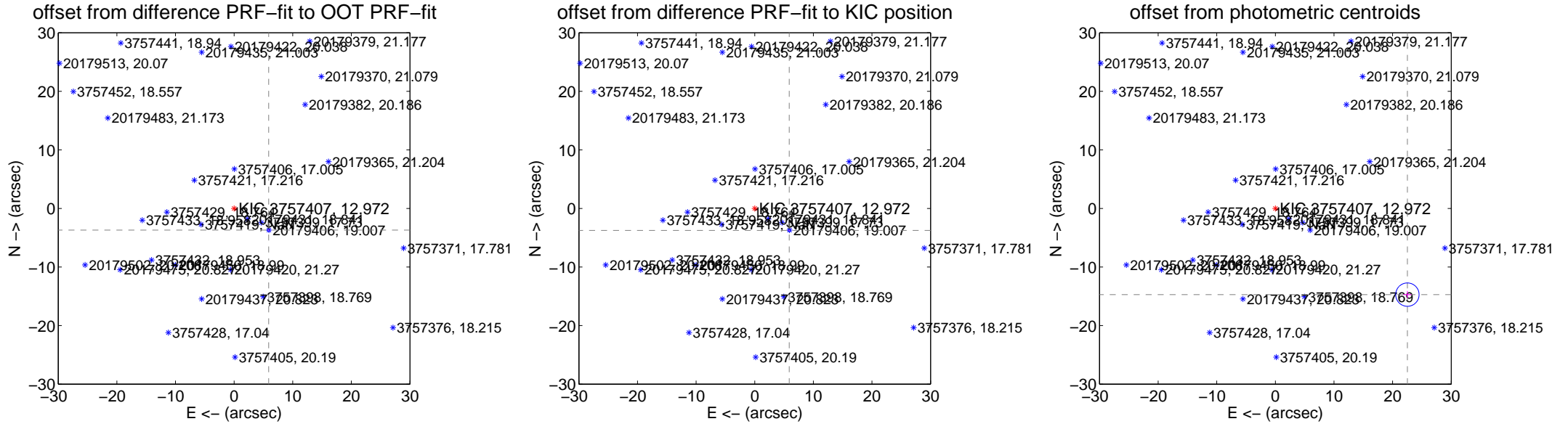
## DV Centroid Data

Supplemental centroid analysis for 003757407-01. Kepler magnitude: 12.97. Transit SNR 14.80

There are 10 quarters with good PRF difference image offsets

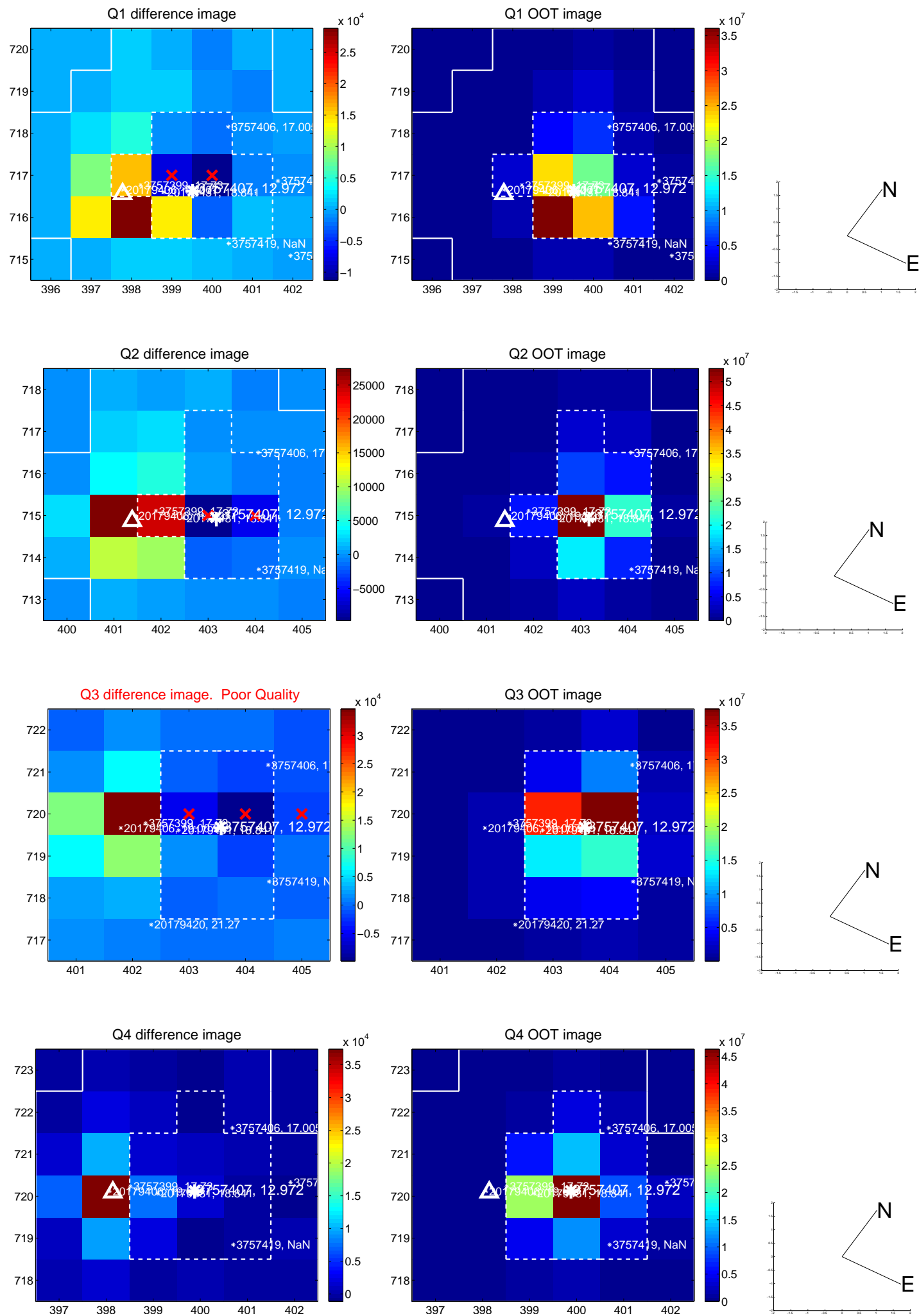
The direct PRF centroid is offset from the target star catalog position by about 0.09 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b>6.960 <math>\pm</math> 0.073</b>	<b>95.85</b>	-5.895 $\pm$ 0.074	-3.699 $\pm$ 0.069
PRF-fit source offset from KIC position	<b>6.975 <math>\pm</math> 0.071</b>	<b>98.36</b>	-5.883 $\pm$ 0.070	-3.749 $\pm$ 0.071
photometric centroid source offset	<b>26.90 <math>\pm</math> 0.66</b>	<b>40.49</b>	-22.52 $\pm$ 0.68	-14.71 $\pm$ 0.62

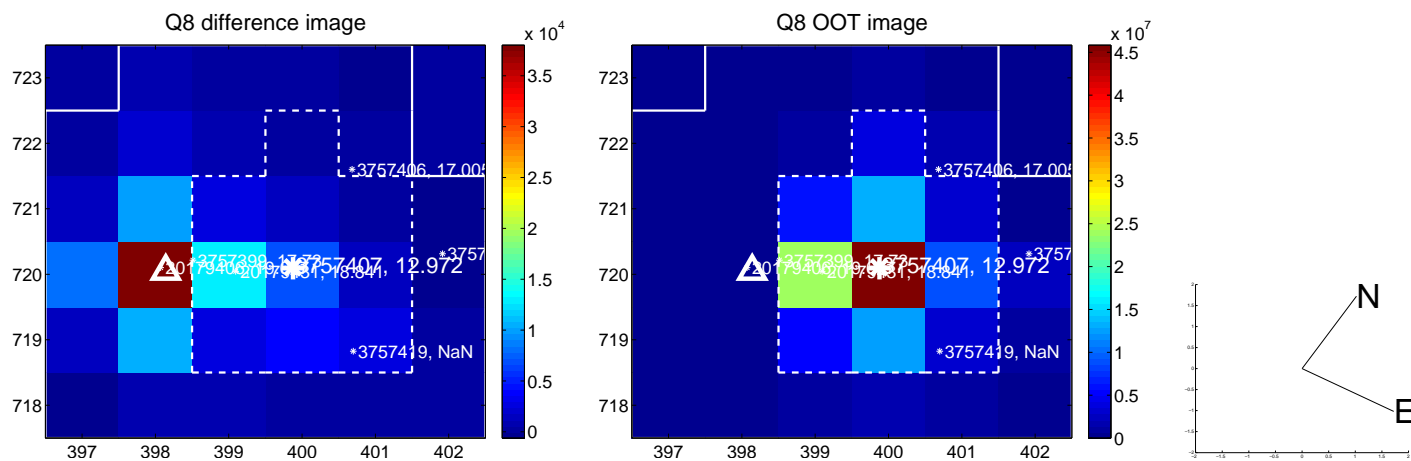
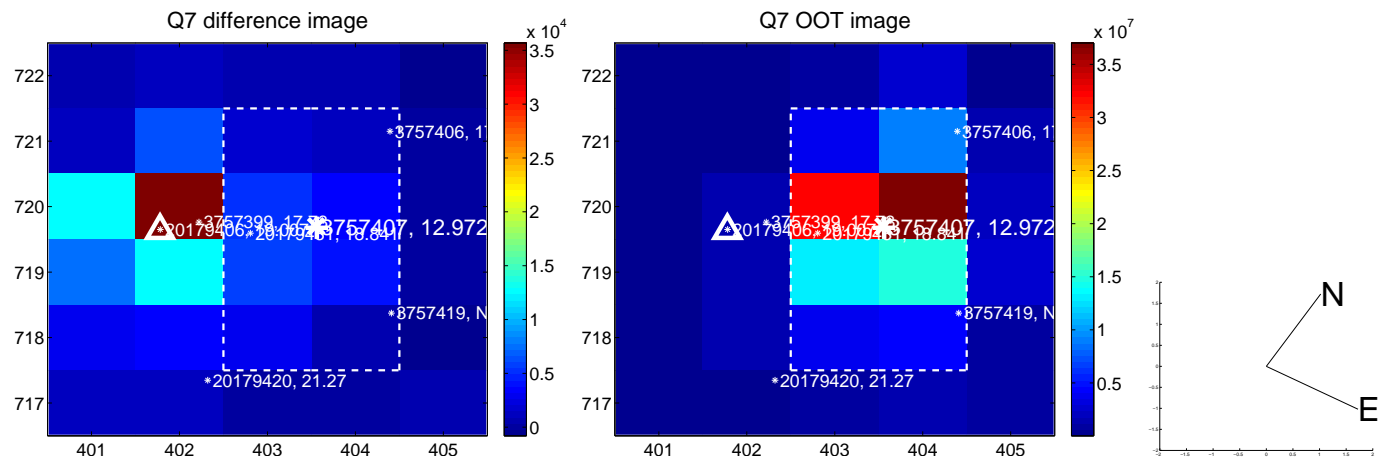
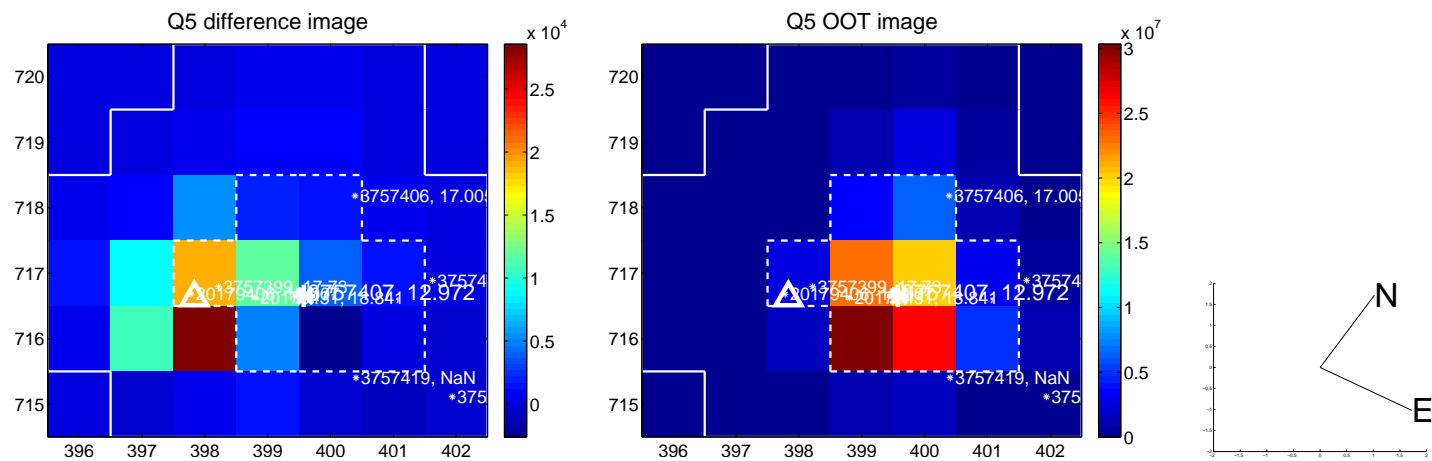


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

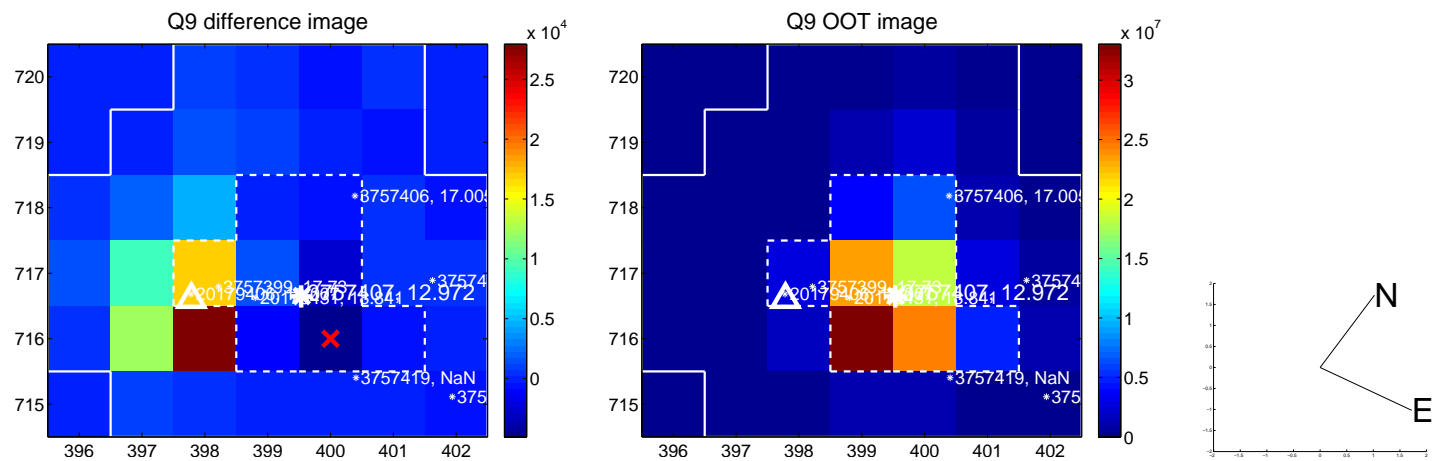
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



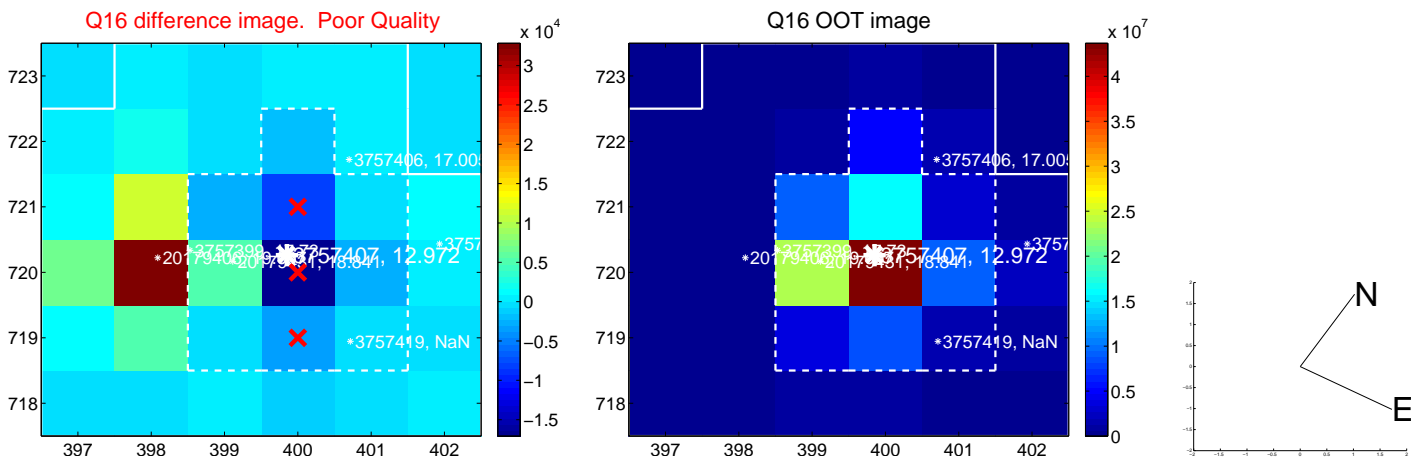
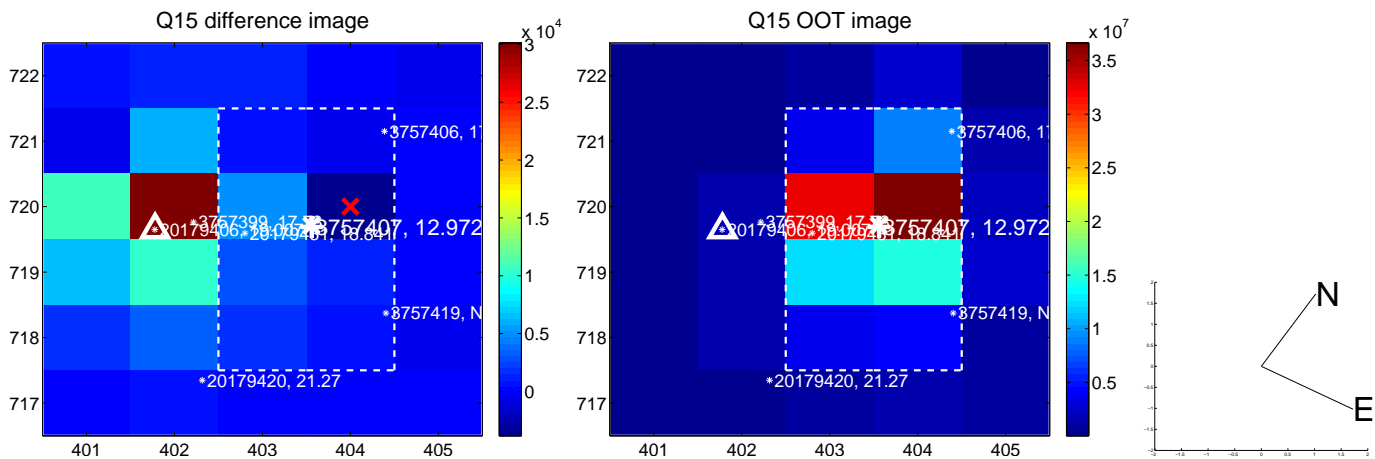
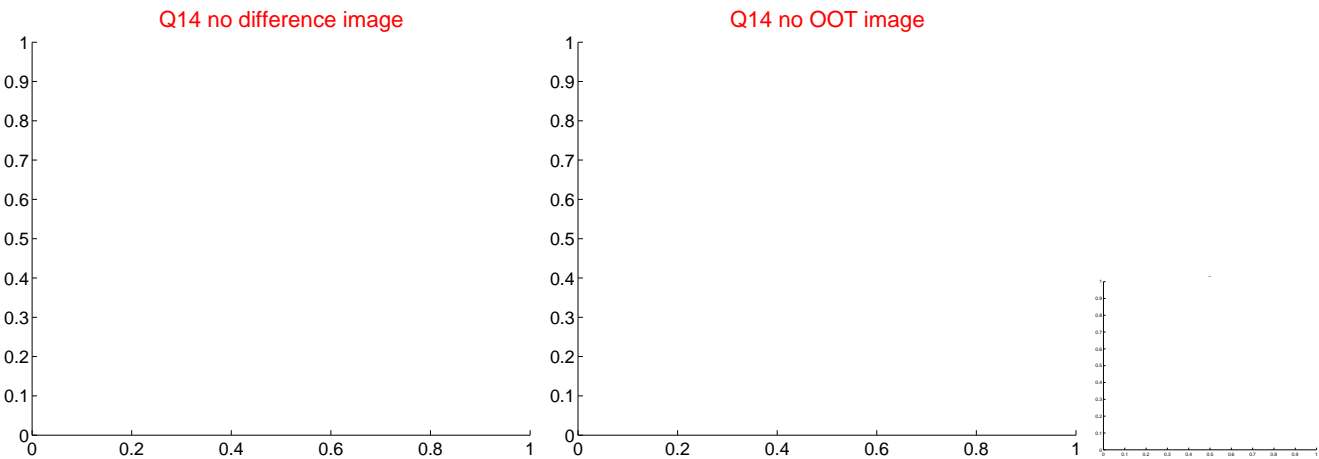
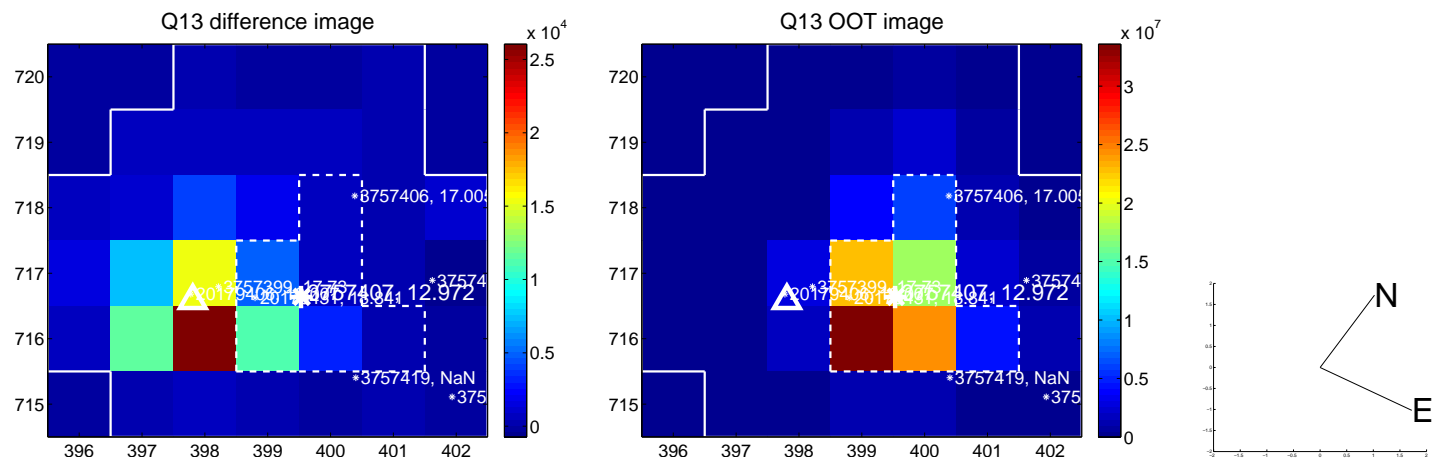
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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.

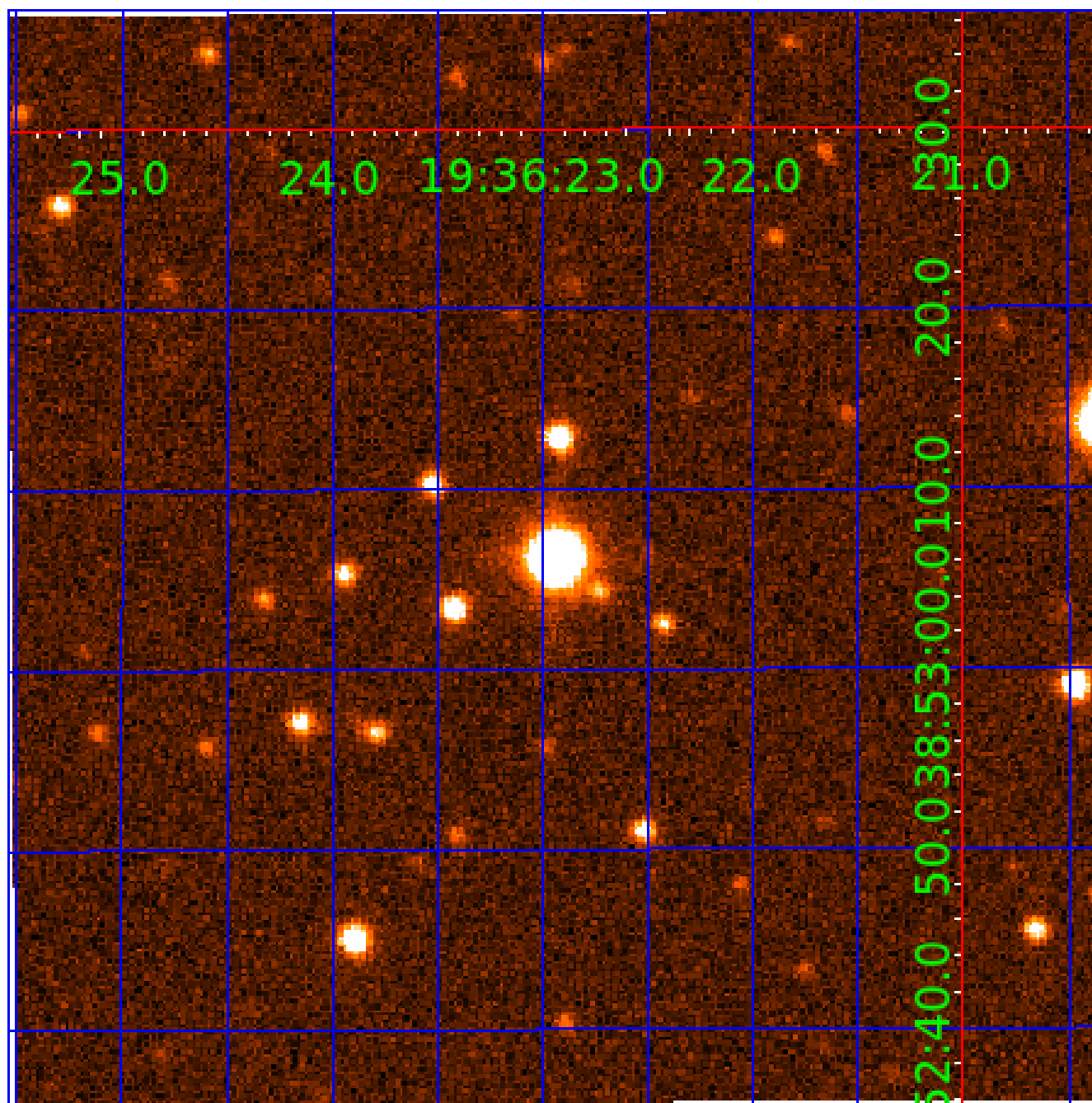






UKIRT Image

Declination



# KIC 003757407

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
003757407-01	OBS	4057.01	9.089171	132.054147	126.9	3.616	13.7	14.8	4.10	6729	5.54	2761.32
003757407-02	OBS	No	1.300815	132.574630	39.5	5.006	9.9	11.2	4.10	6729	4.47	36885.94

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
003757407-01	OBS	FP	0.00	0	0	1	0	CENT_RESOLVED_OFFSET—HALO_GHOST
003757407-02	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV

**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 003757407-02

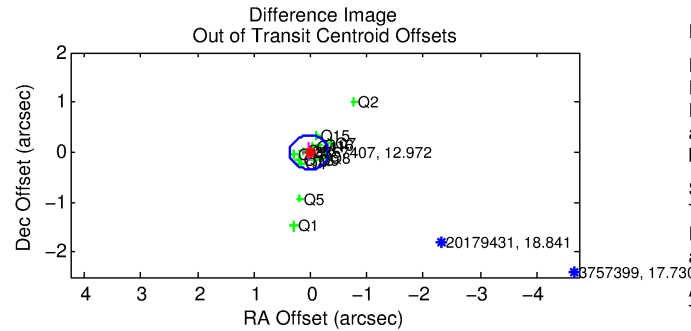
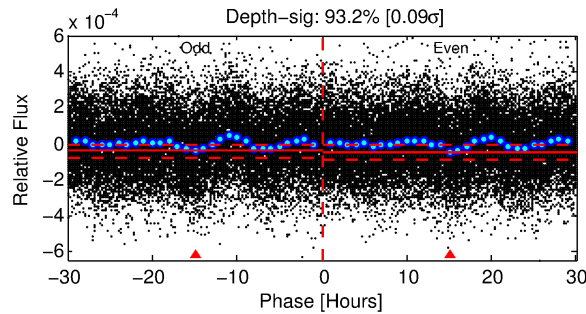
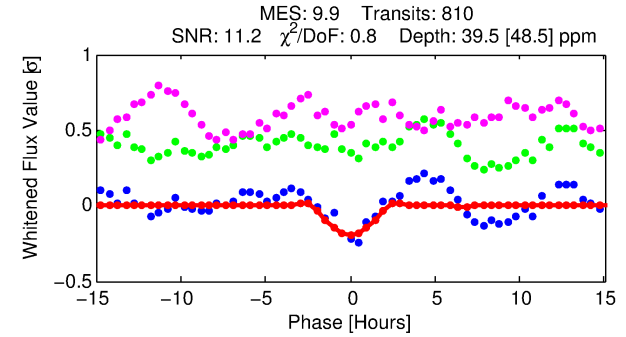
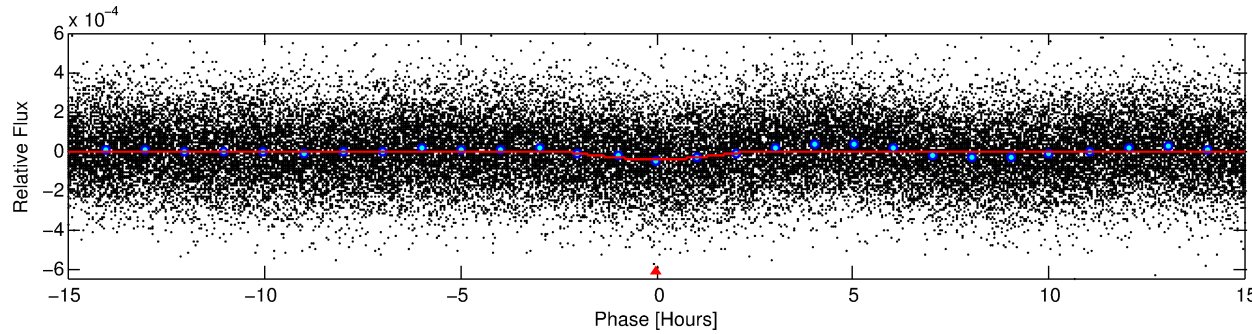
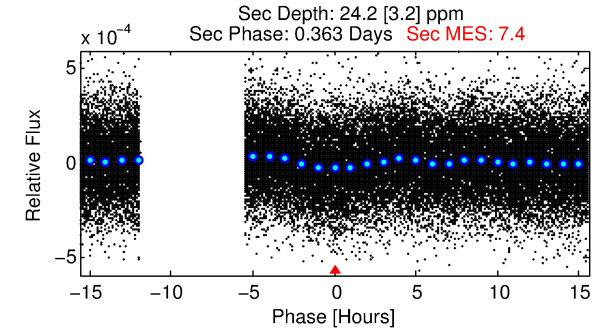
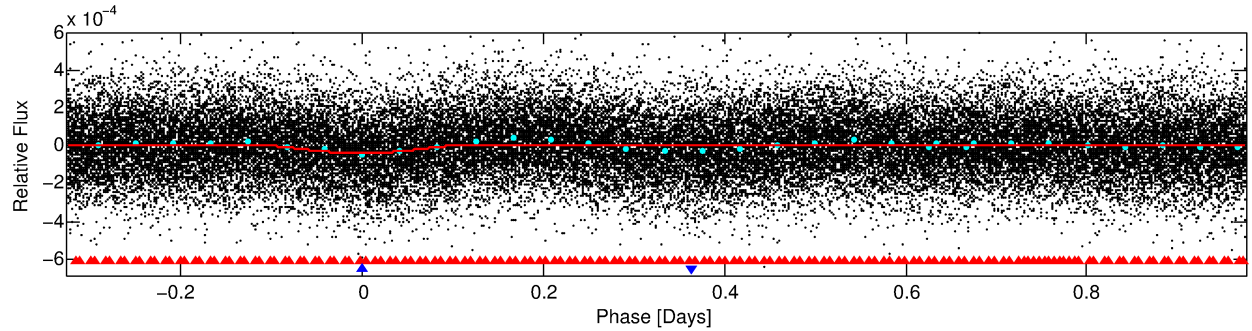
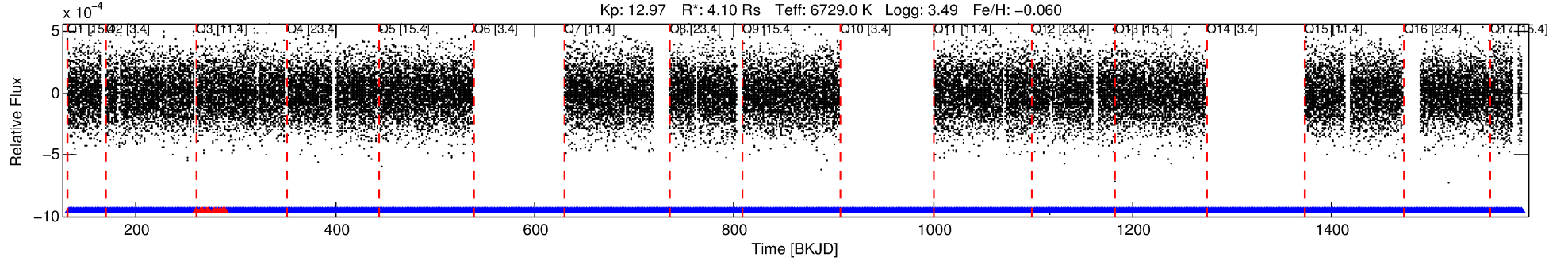
No Significant Match Found

# DV One-Page Summary

KIC: 3757407 Candidate: 2 of 2 Period: 1.301 d

KOI: K04057 Corr: No Ephemeris Match

Kp: 12.97 R\*: 4.10 Rs Teff: 6729.0 K Logg: 3.49 Fe/H: -0.060



## DV Fit Results:

Period = 1.30082 [0.00001] d  
Epoch = 132.5746 [0.0062] BKJD  
Rp/R\* = 0.0100 [0.0117]  
a/R\* = 1.05 [0.03]  
b = 1.00 [0.02]  
Seff = 36885.94 [23043.87]  
Teq = 3534 [552] K  
Rp = 4.47 [5.54] Re  
a = 0.0289 [0.0111] AU  
Ag = 0.56 [1.35] [-0.33σ]  
Teffp = 4719 [2771] K [0.42σ]

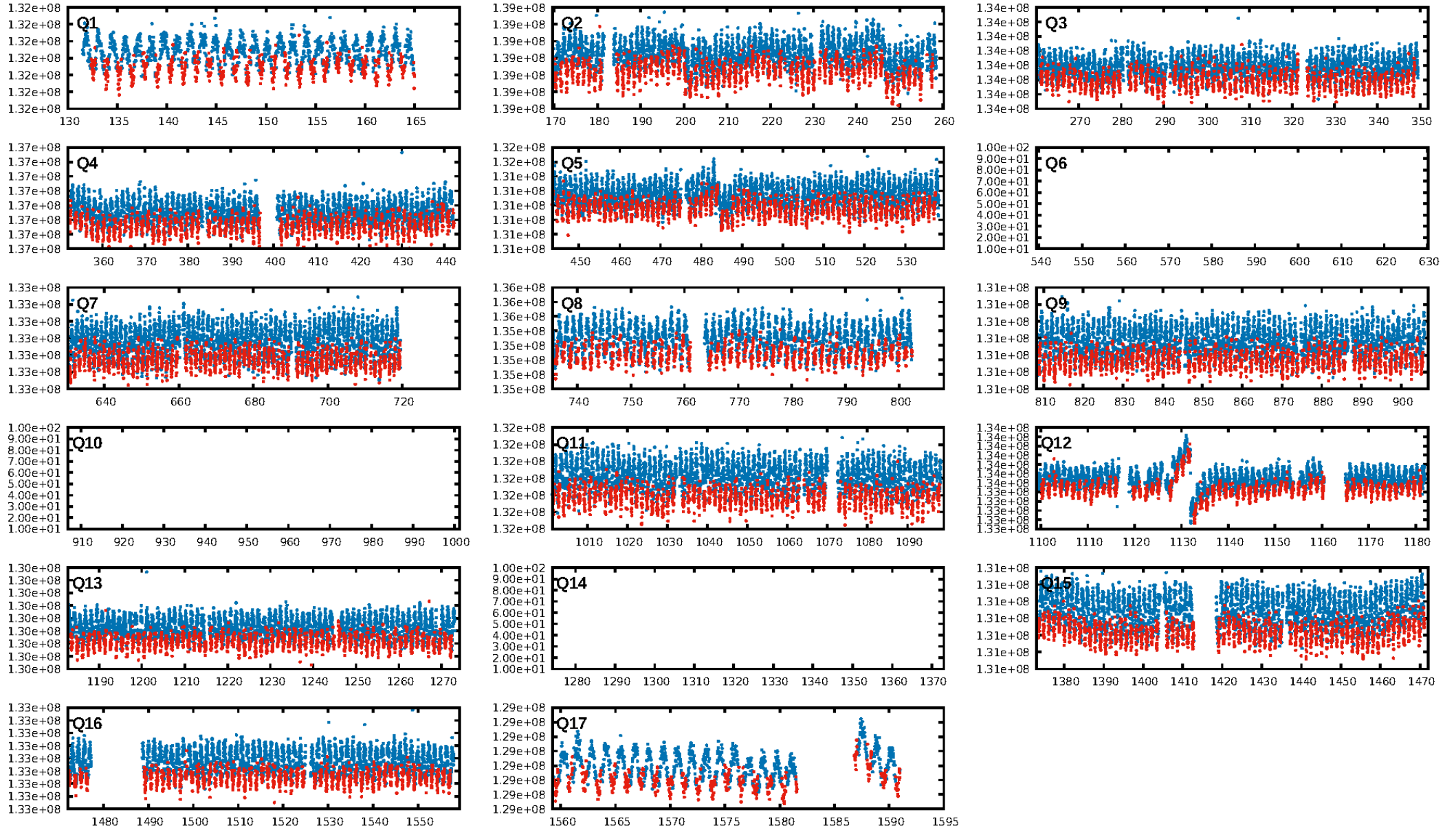
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [30.27σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 1.92e-18  
RollingBand-fgt: 0.99 [751/762]  
GhostDiagnostic-chr: 1.28  
Centroid-sig: 0.0%  
Centroid-so: 2.777 arcsec [3.32σ]  
OotOffset-rm: 0.027 arcsec [0.24σ]  
KicOffset-rm: 0.057 arcsec [0.35σ]  
OotOffset-st: 1/4/4/5 [14]  
KicOffset-st: 1/4/4/5 [14]  
DiffImageQuality-fgm: 1.00 [14/14]  
DiffImageOverlap-fno: 1.00 [14/14]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 22:39:37 Z

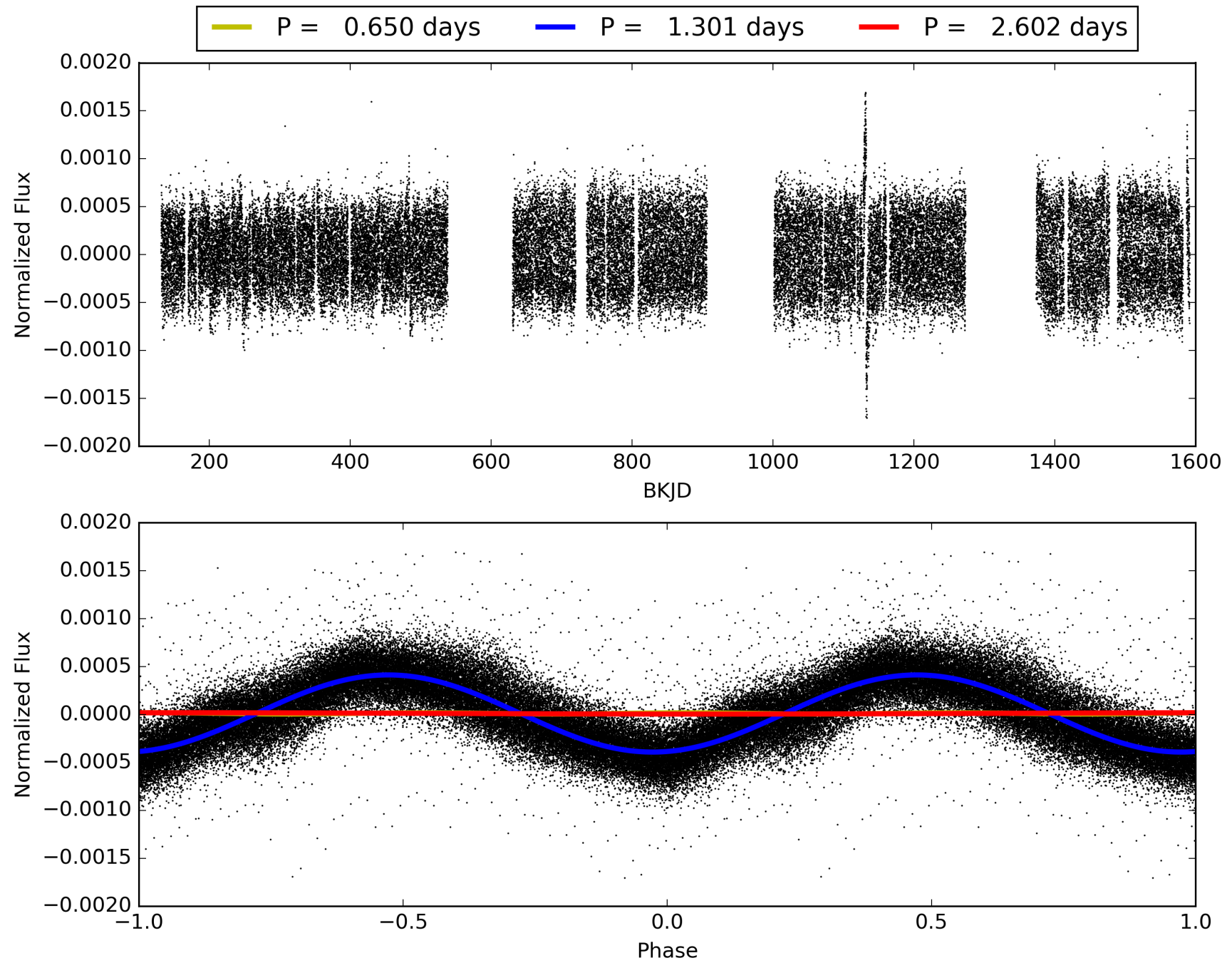
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 003757407-02, PDC Light Curves



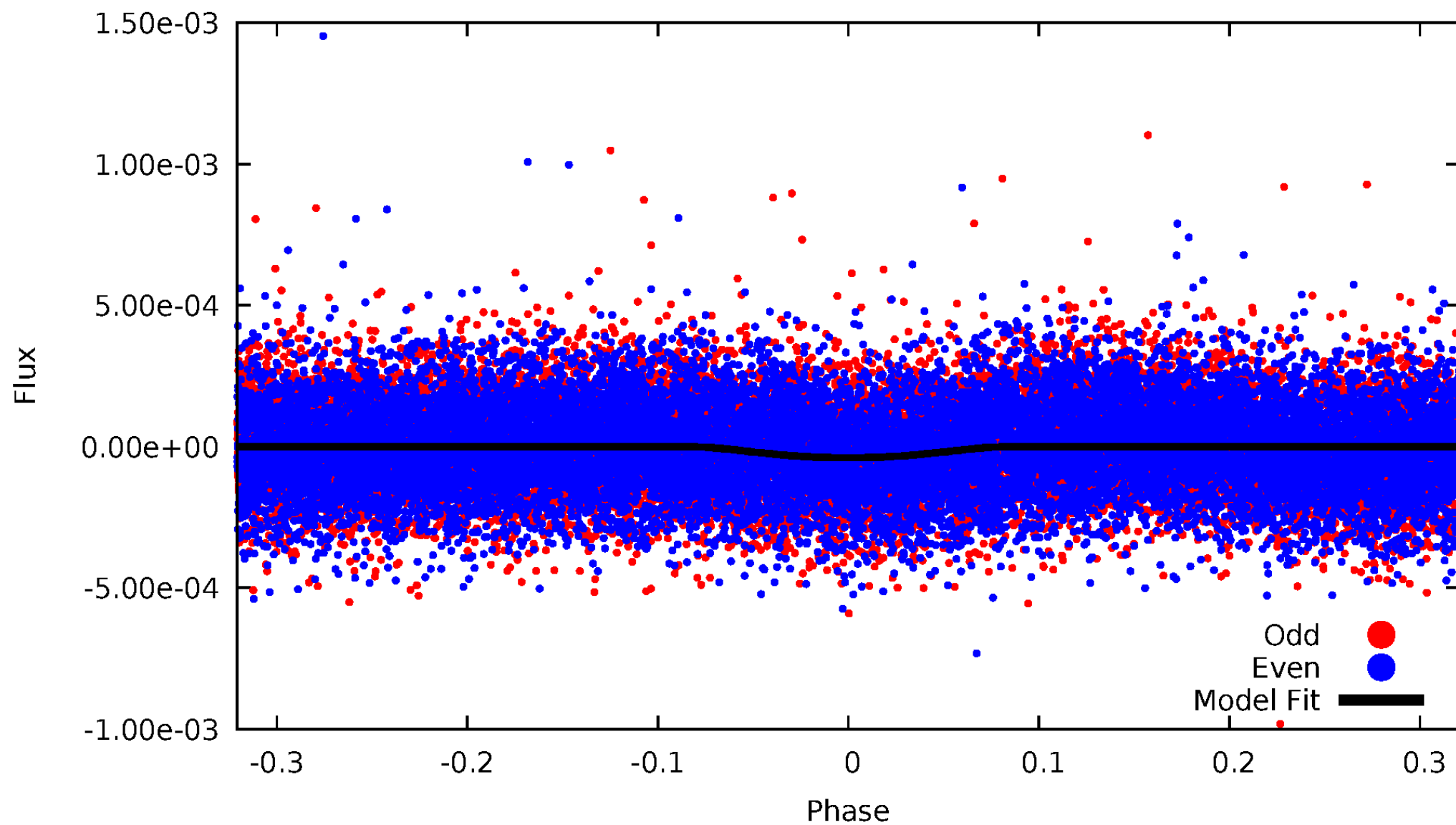


TCE 003757407-02



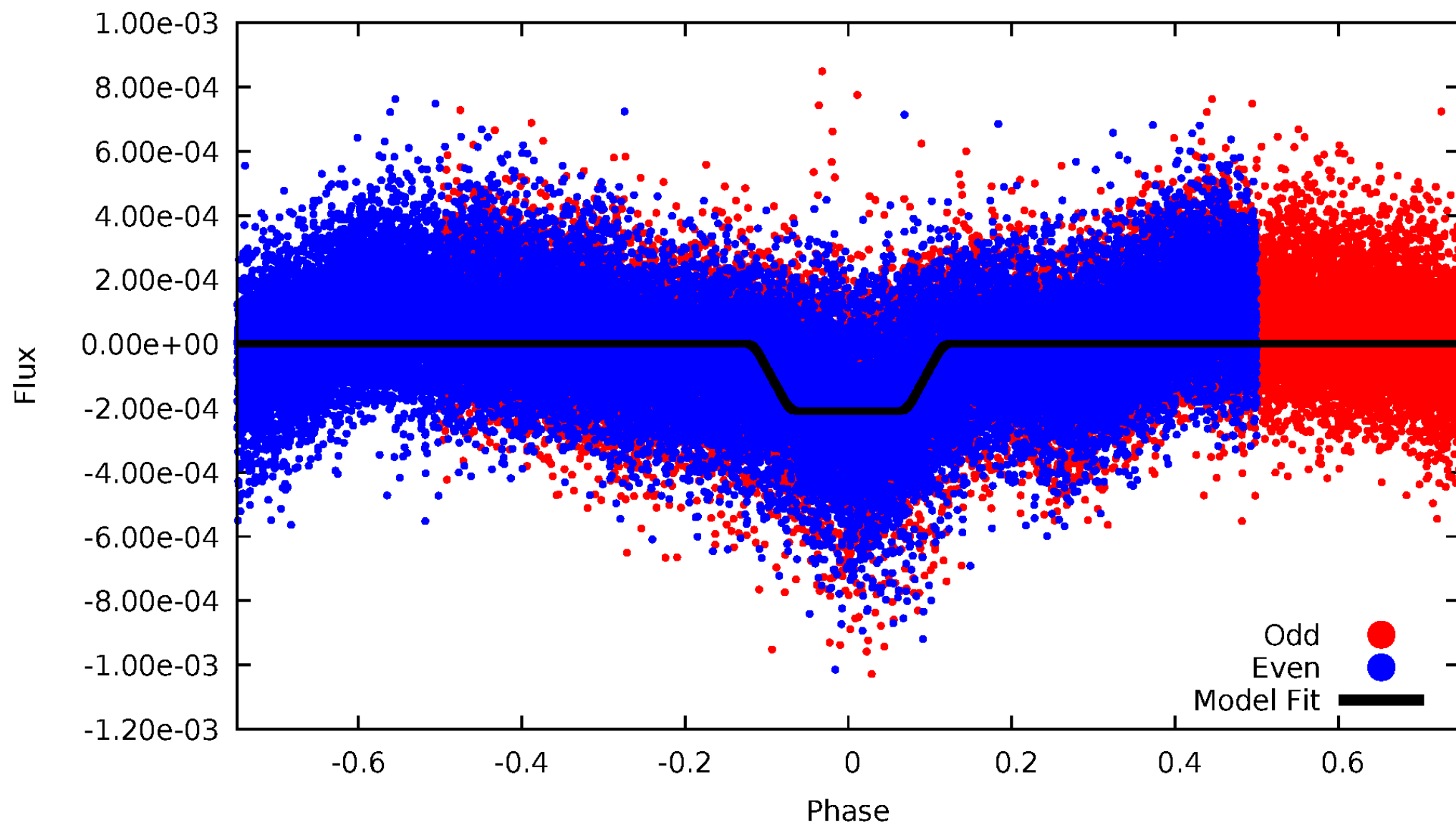
# DV Odd/Even

TCE 003757407-02



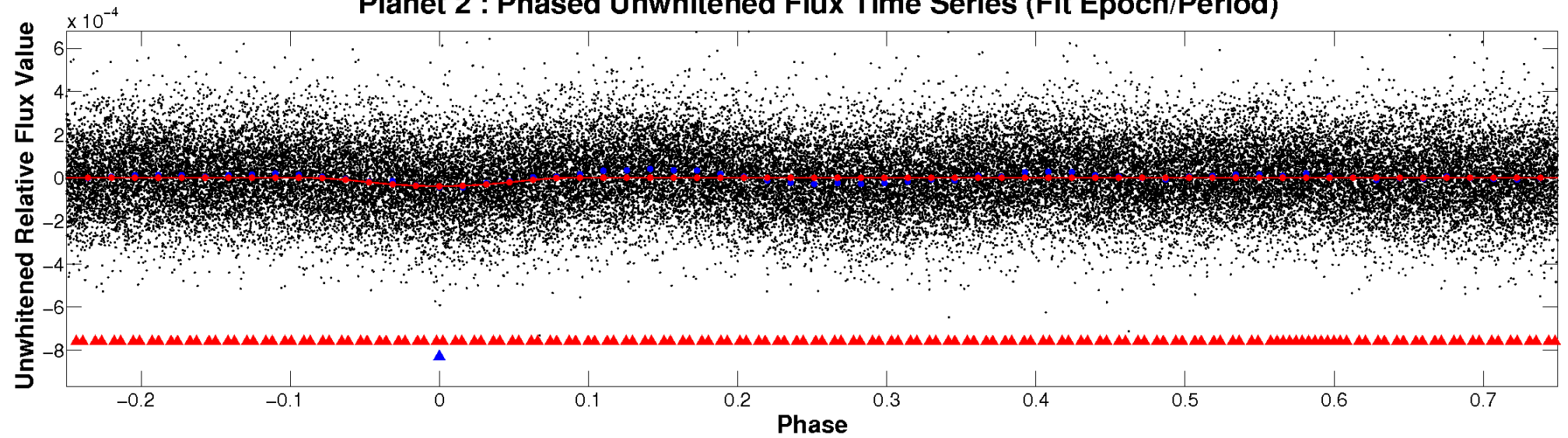
# ALT Odd/Even

TCE 003757407-02

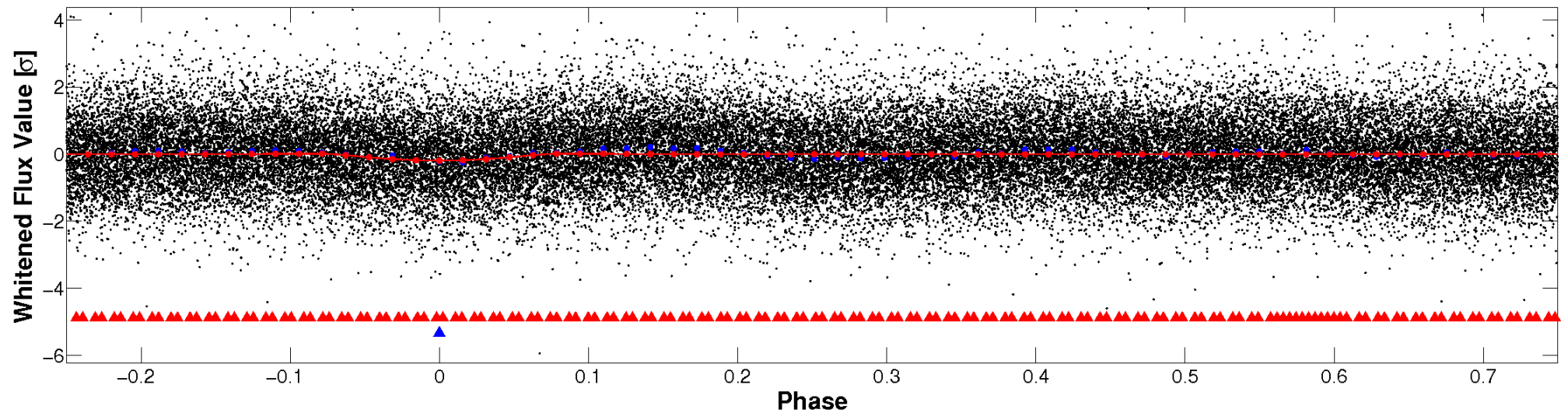


# Non-Whitened Vs. Whitened Light Curve

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

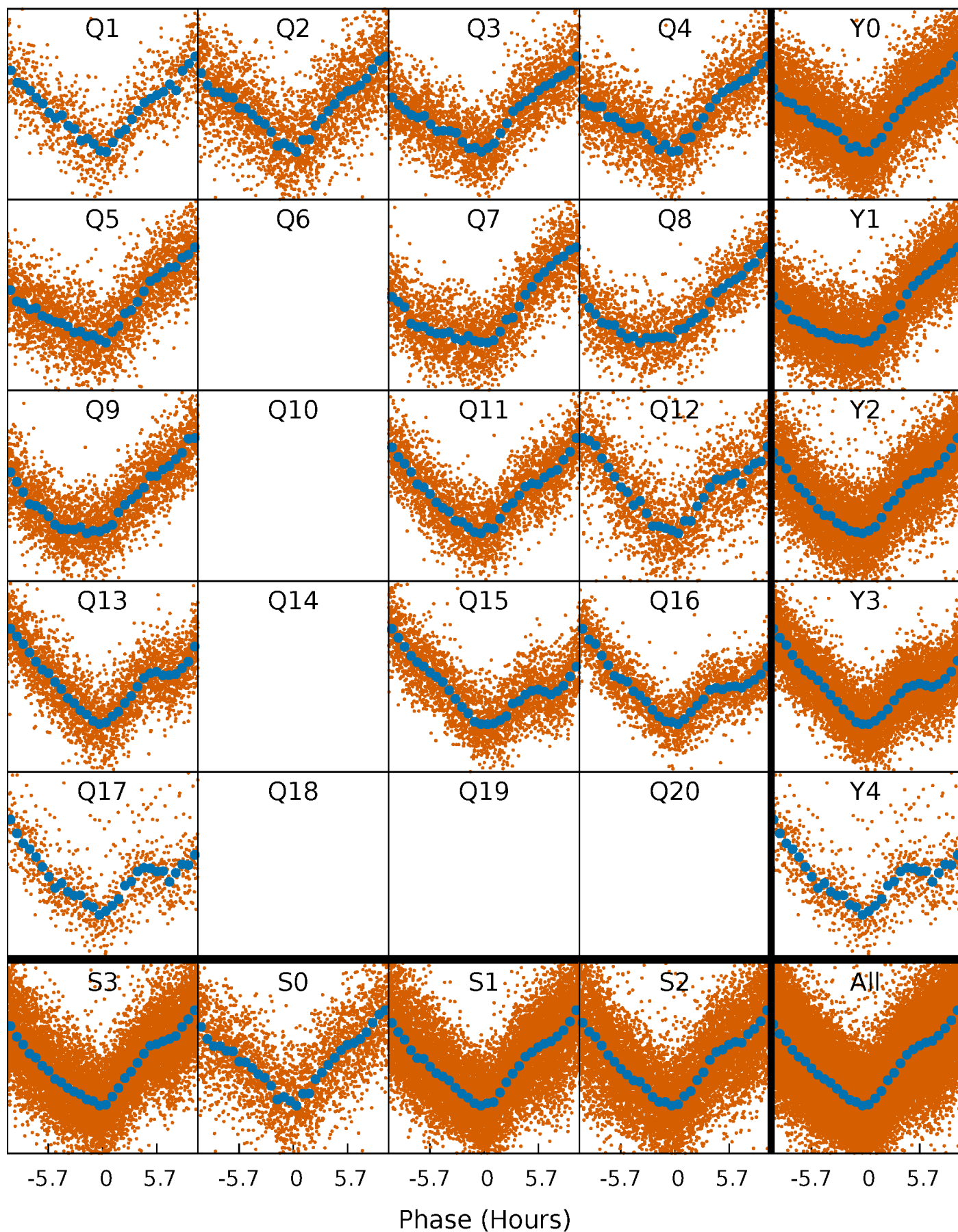


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

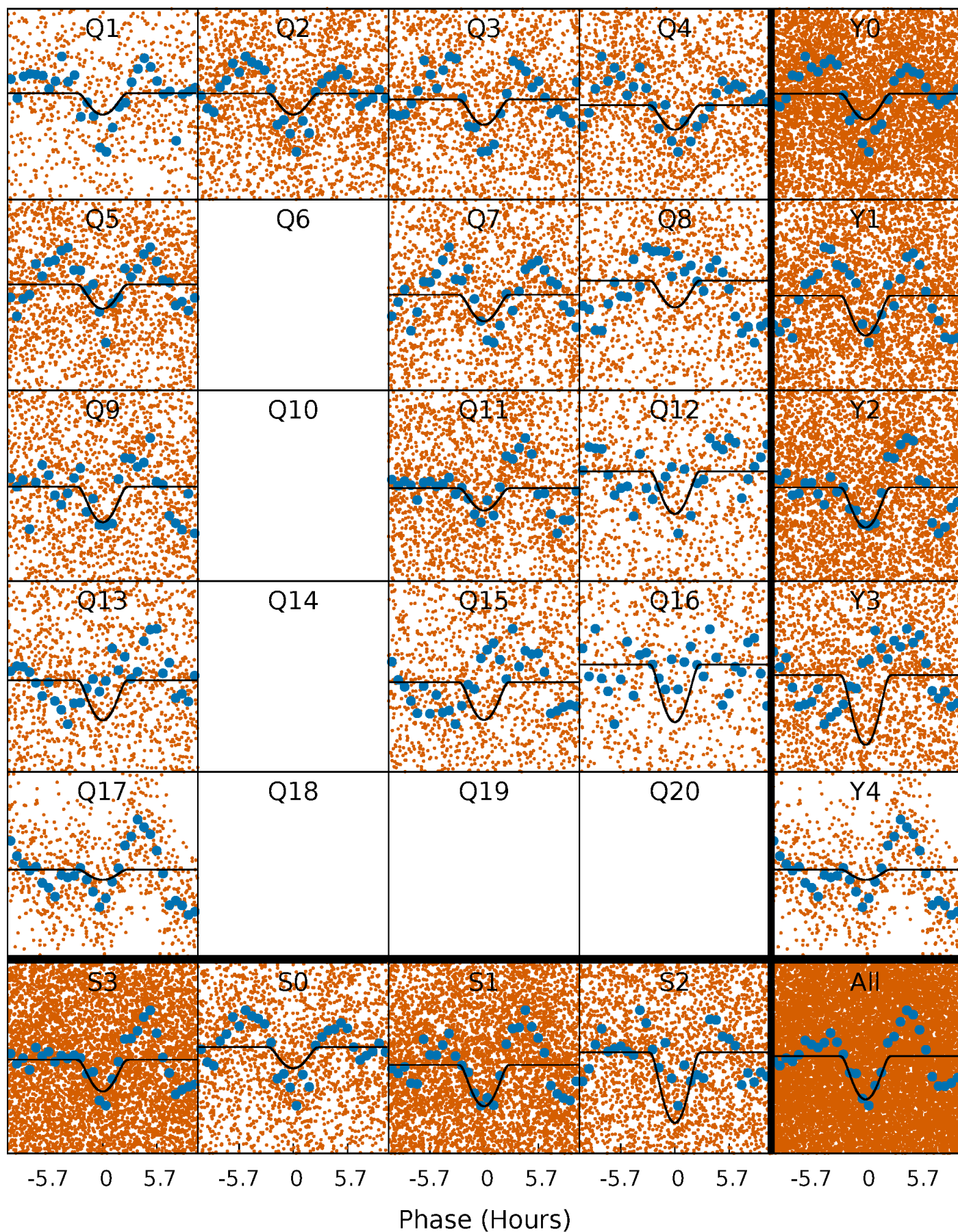
TCE 003757407-02   P= 1.300815 Days    $T_0=132.574630$  (BKJD)





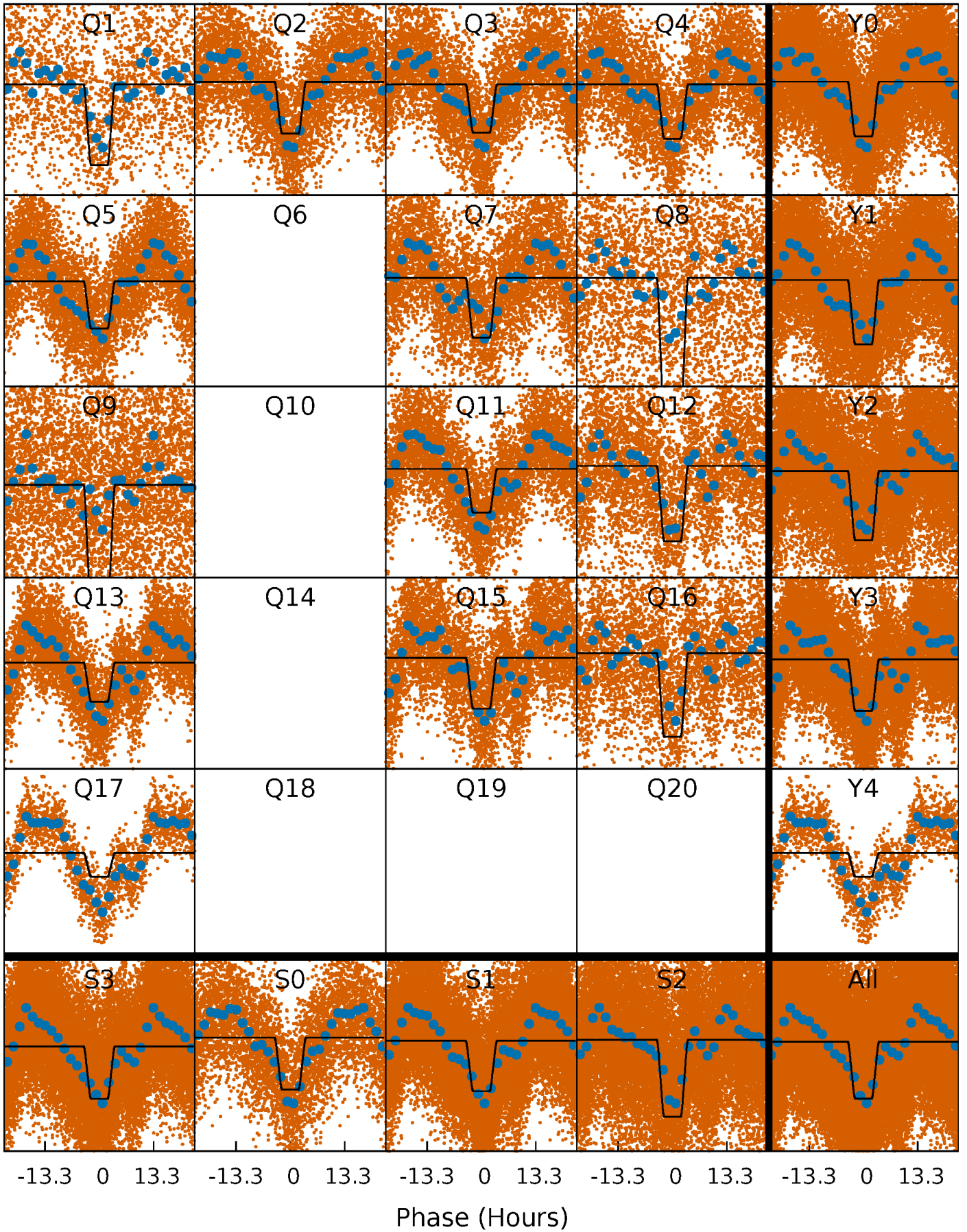
# DV Quarter-Phased Transit Curves

TCE 003757407-02   P= 1.300815 Days    $T_0=132.574630$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

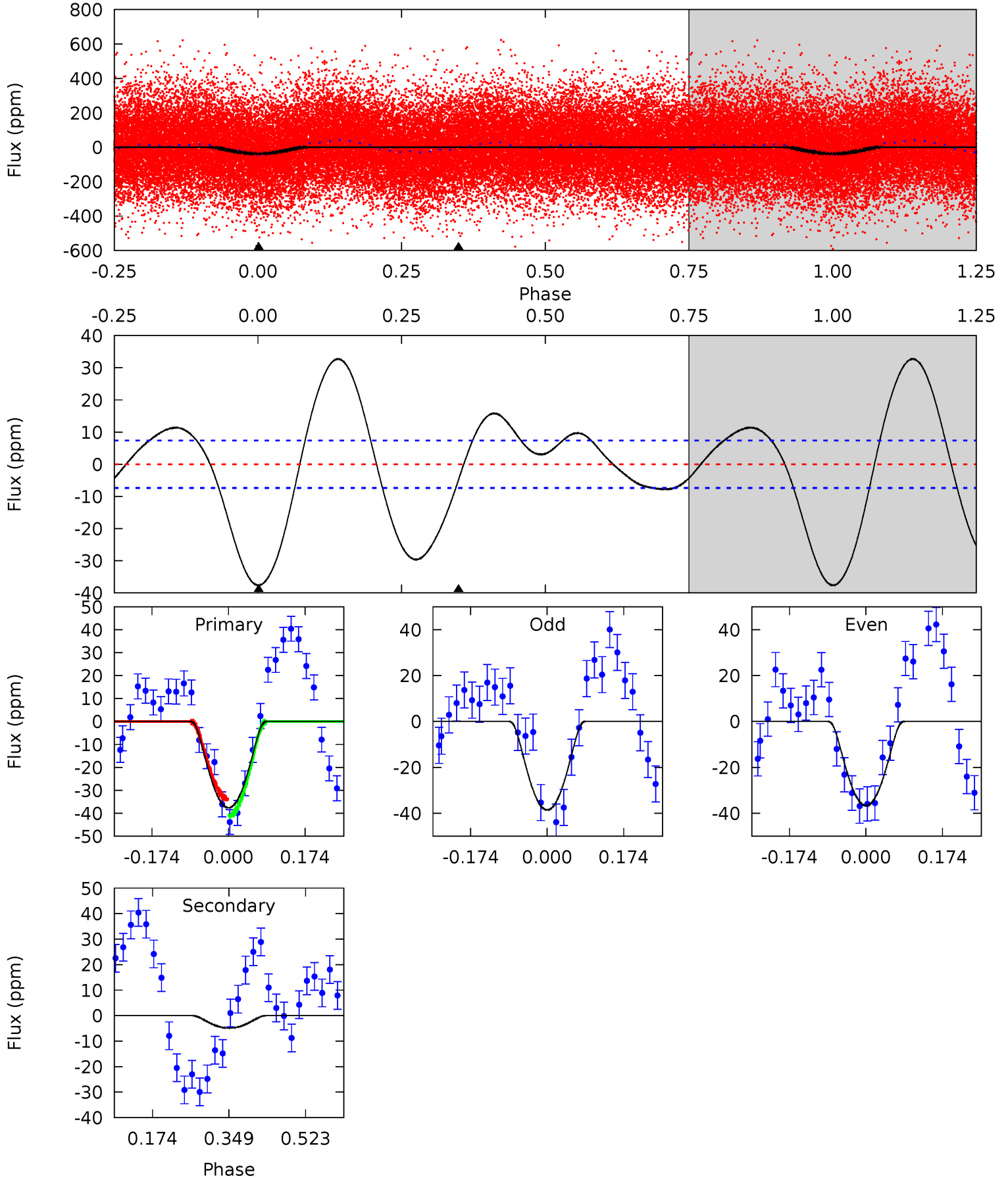
TCE 003757407-02   P= 1.300795 Days    $T_0=132.565601$  (BKJD)



# DV Model-Shift Uniqueness Test

003757407-02, P = 1.300815 Days, E = 131.273815 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
22.7	2.95	0	0	4.45	1.36	3.77	22.7	22.7	2.95	2.95	0.58	0.96	0.47	2.22

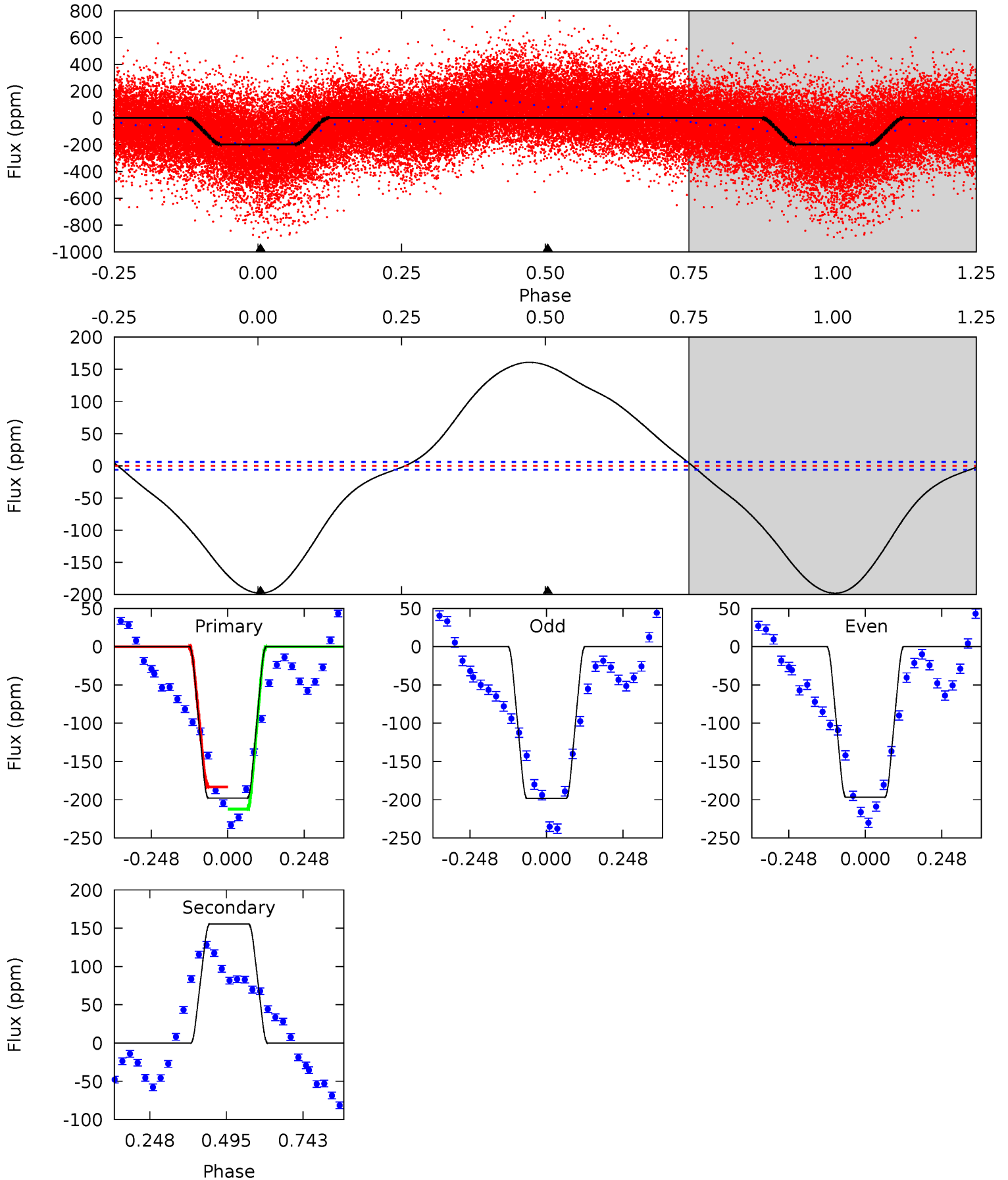




# Alt Model-Shift Uniqueness Test

003757407-02, P = 1.300795 Days, E = 131.264806 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
139.0	-109.2	0	0	4.37	1.16	6.18	139.0	139.0	-109.2	-109.2	0.59	1.06	0.45	10.1



### Stellar Parameters For KIC 003757407

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6729^{+184}_{-201}$	$3.493^{+0.360}_{-0.090}$	$-0.060^{+0.300}_{-0.250}$	$4.099^{+0.192}_{-1.634}$	$1.907^{+0.171}_{-0.371}$	$0.039^{+0.120}_{-0.011}$
	+3%/-3%	+10%/-3%	+500%/-417%	+5%/-40%	+9%/-19%	+308%/-28%
Source	PHO1	FLK73	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 003757407-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-5 \pm 2$	$5.56^{+4.45}_{-3.74}$	$4879^{+226}_{-400}$	$-3938^{+8041}_{-311}$	$0.068^{+0.528}_{-0.049}$
Alt.	$155 \pm 1$	$6.21^{+4.79}_{-3.40}$	$4889^{+214}_{-443}$	$-6299^{+1100}_{-3897}$	$-1.831^{+1.236}_{-7.412}$

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

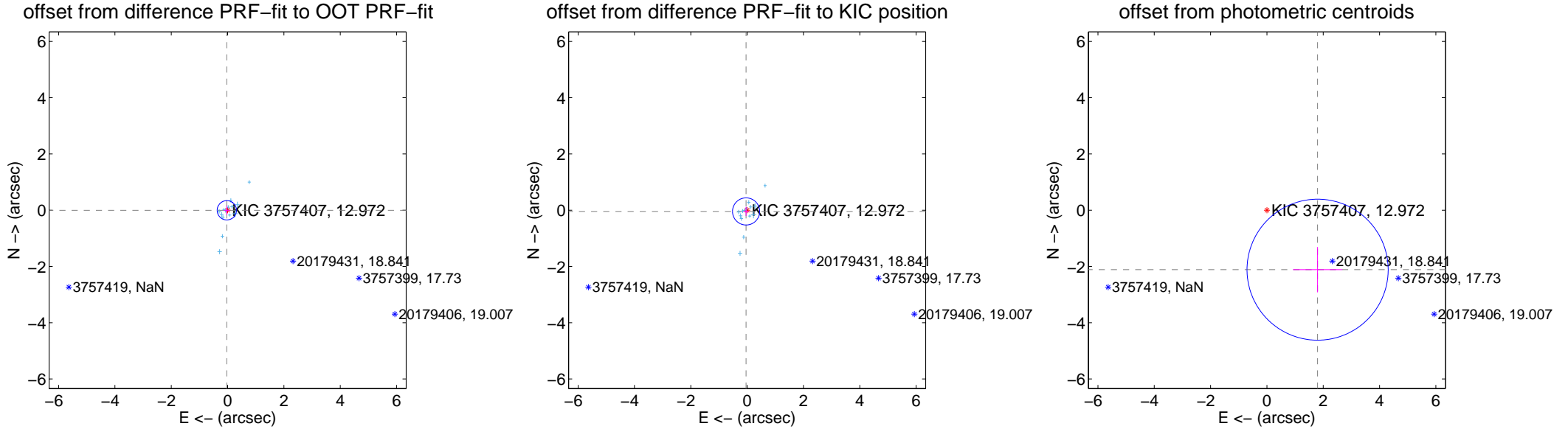
## DV Centroid Data

Supplemental centroid analysis for 003757407-02. Kepler magnitude: 12.97. Transit SNR 11.16

There are 14 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.02 arcsec

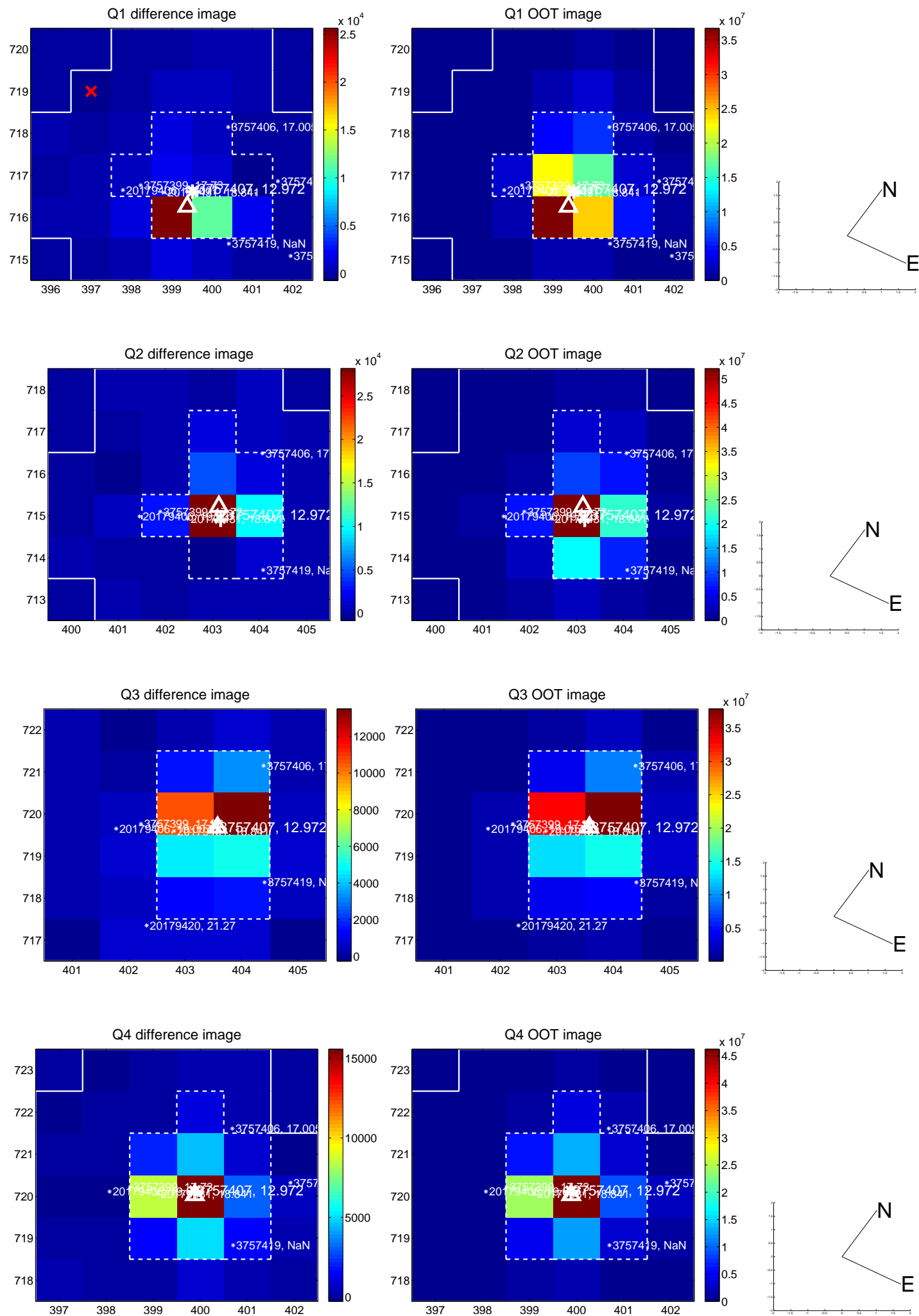
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.027 \pm 0.114$	0.24	$0.027 \pm 0.103$	$-0.003 \pm 0.172$
PRF-fit source offset from KIC position	$0.057 \pm 0.161$	0.35	$0.036 \pm 0.095$	$-0.044 \pm 0.162$
photometric centroid source offset	$2.78 \pm 0.84$	<b>3.32</b>	$-1.80 \pm 0.87$	$-2.11 \pm 0.81$



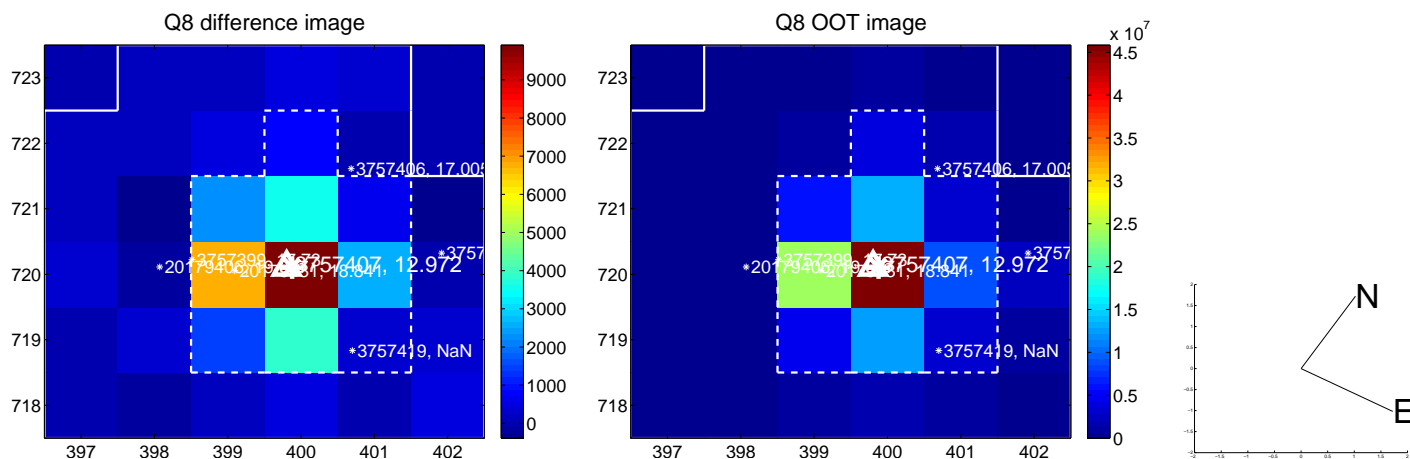
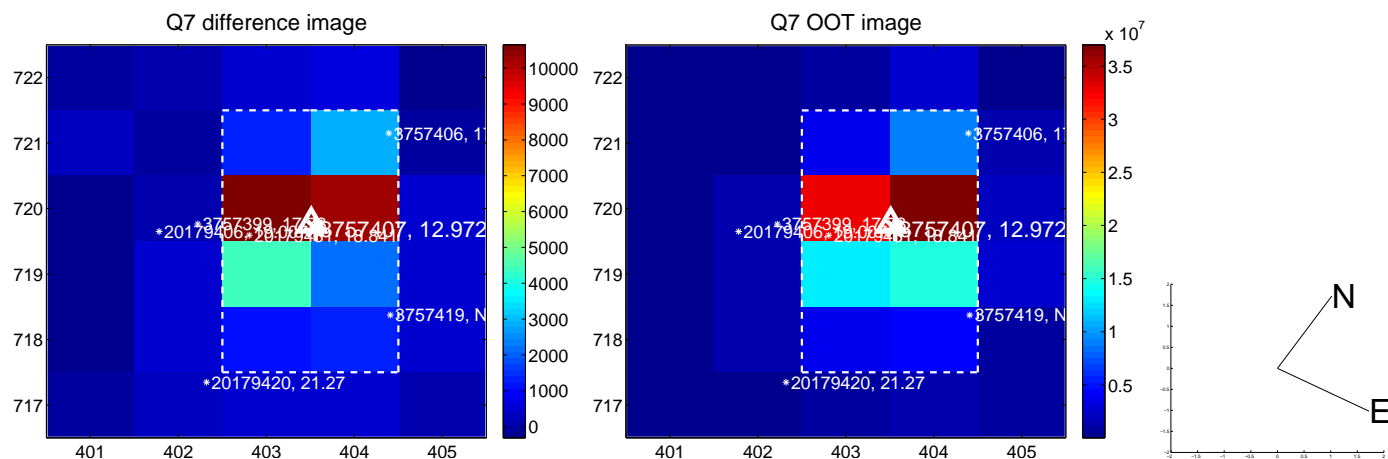
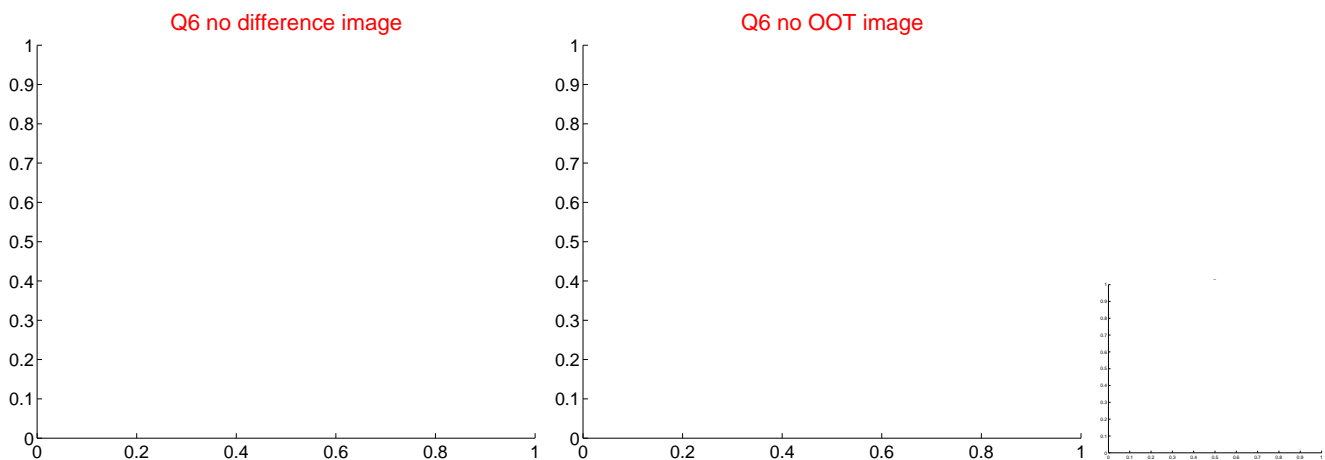
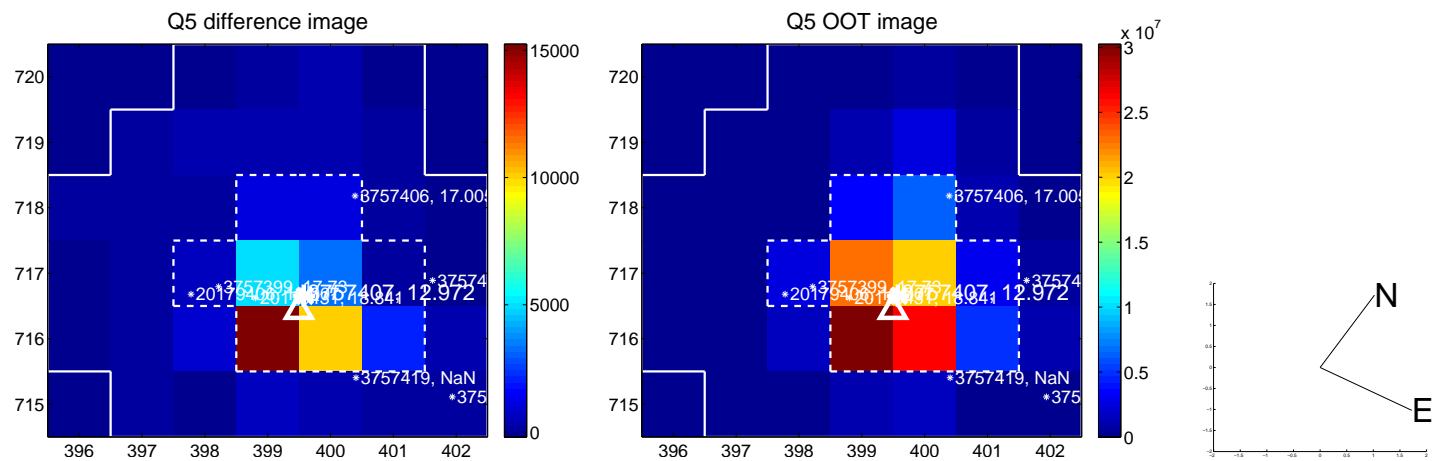
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



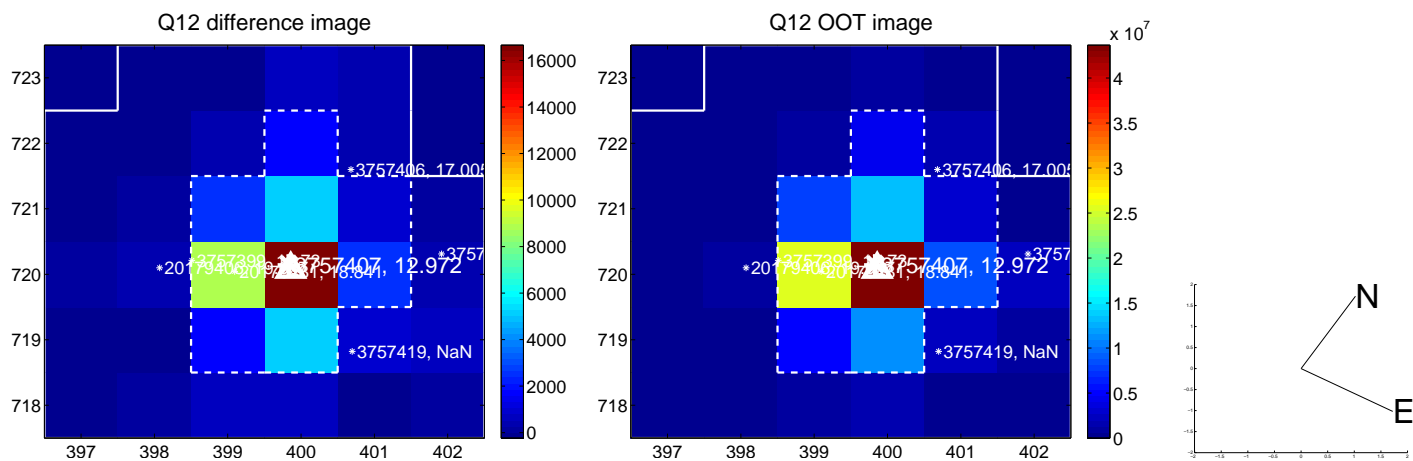
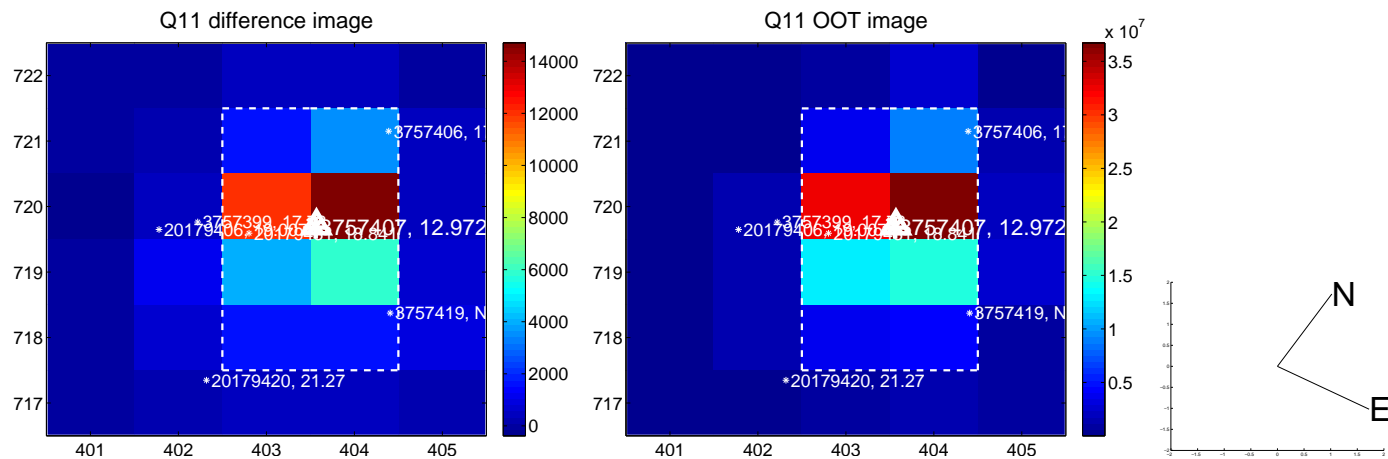
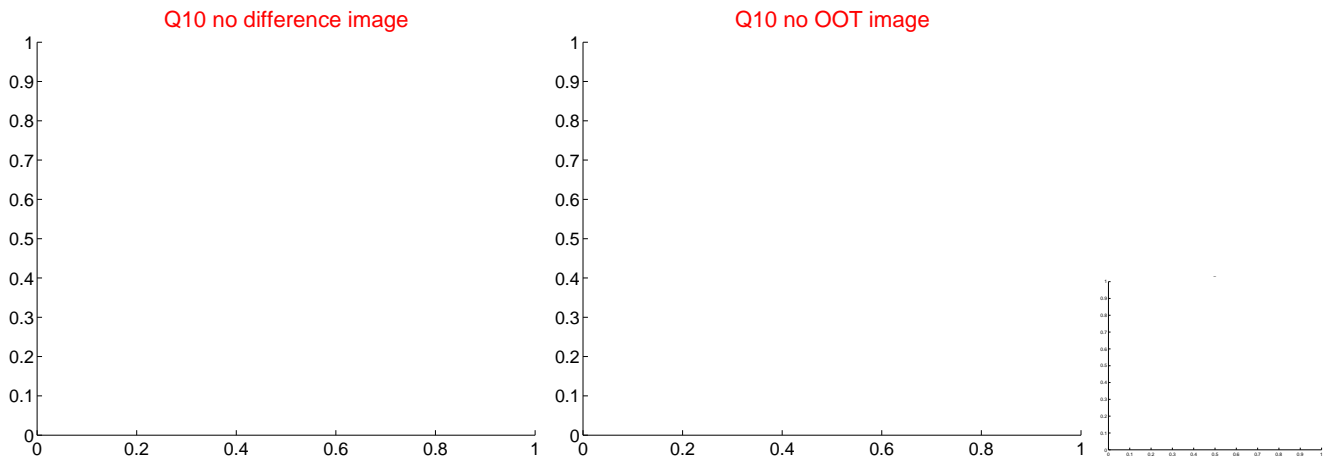
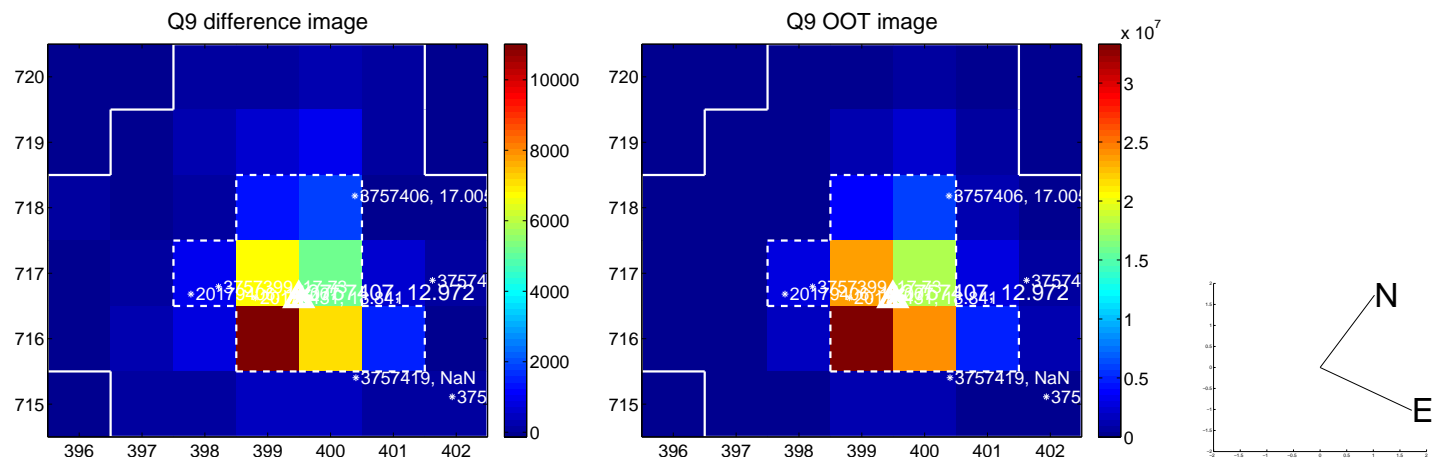
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



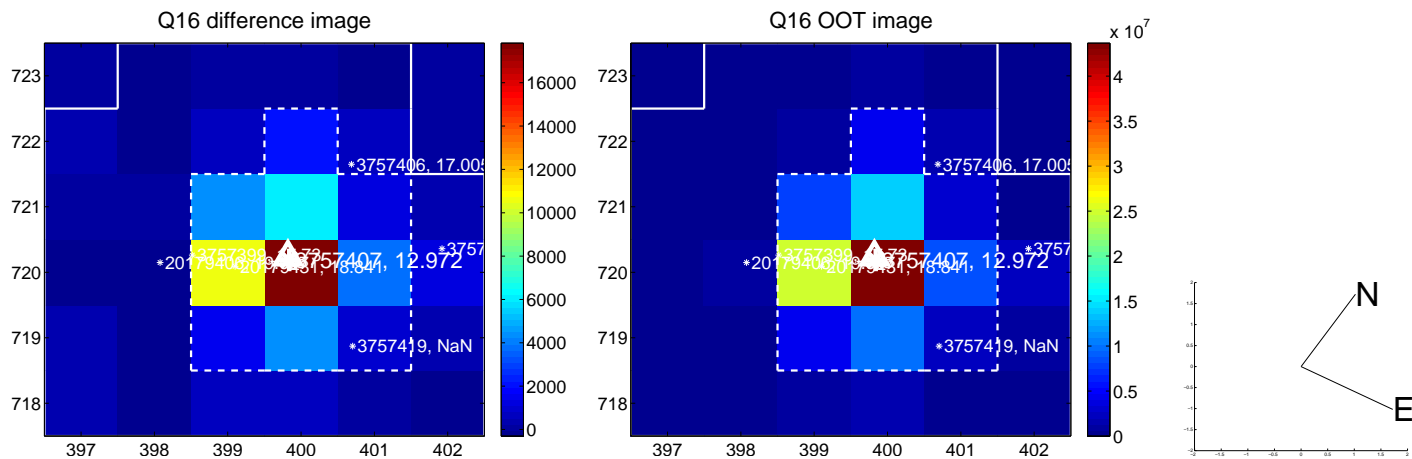
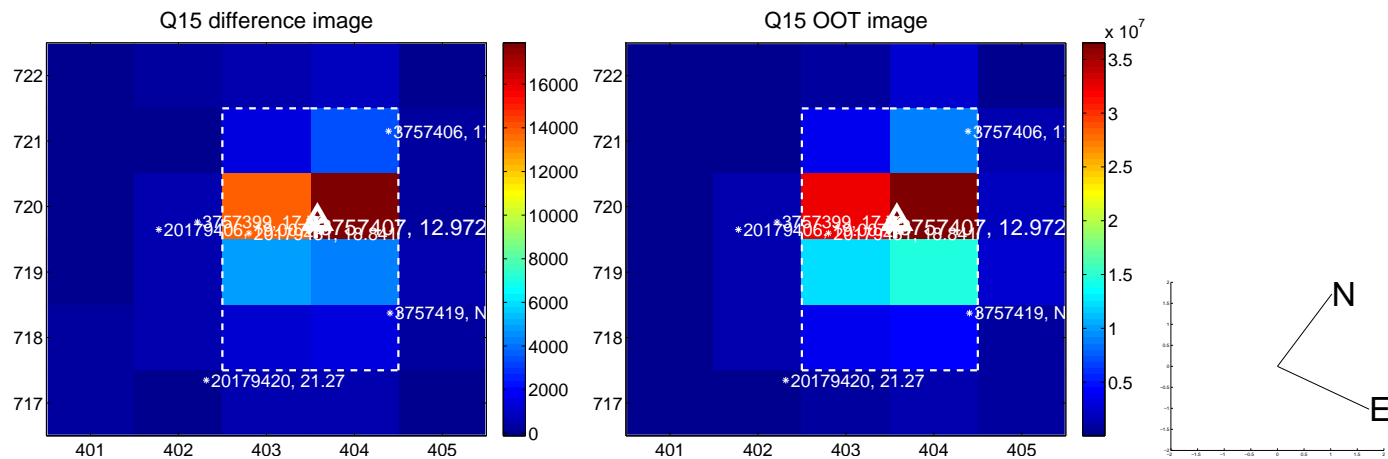
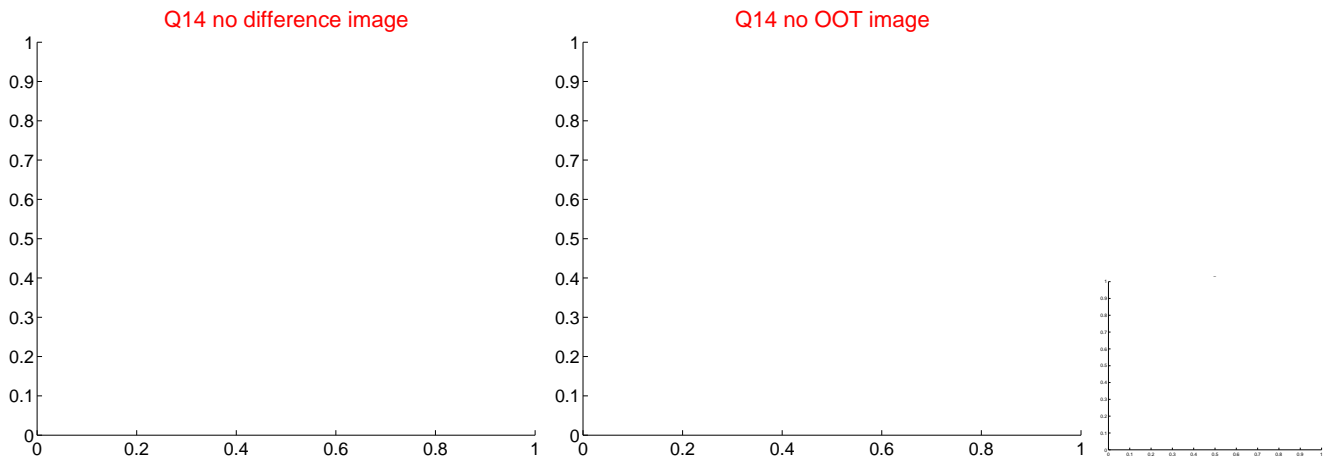
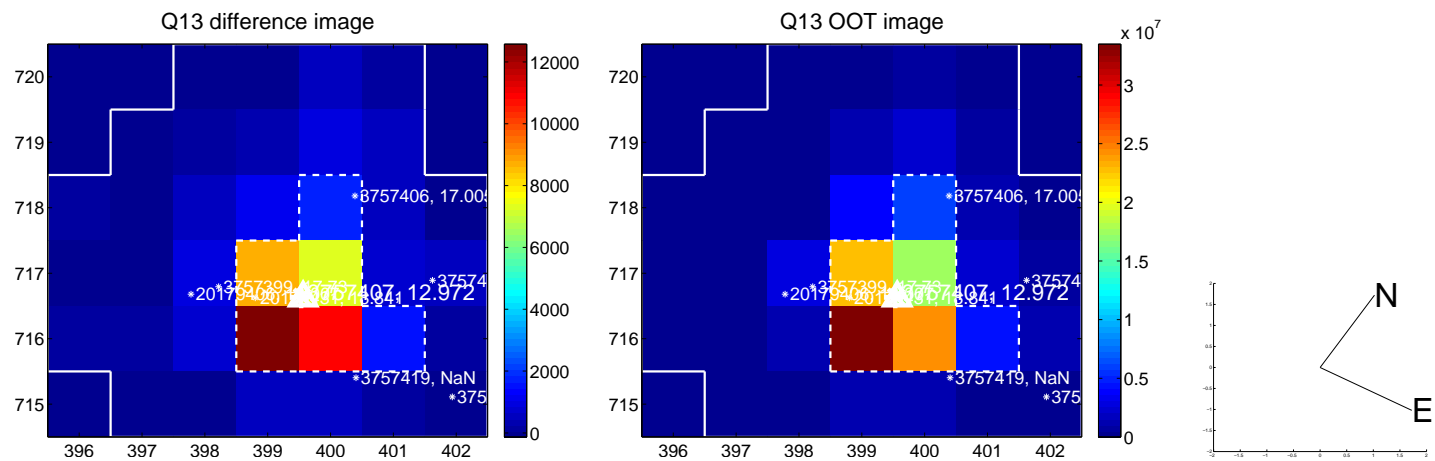
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



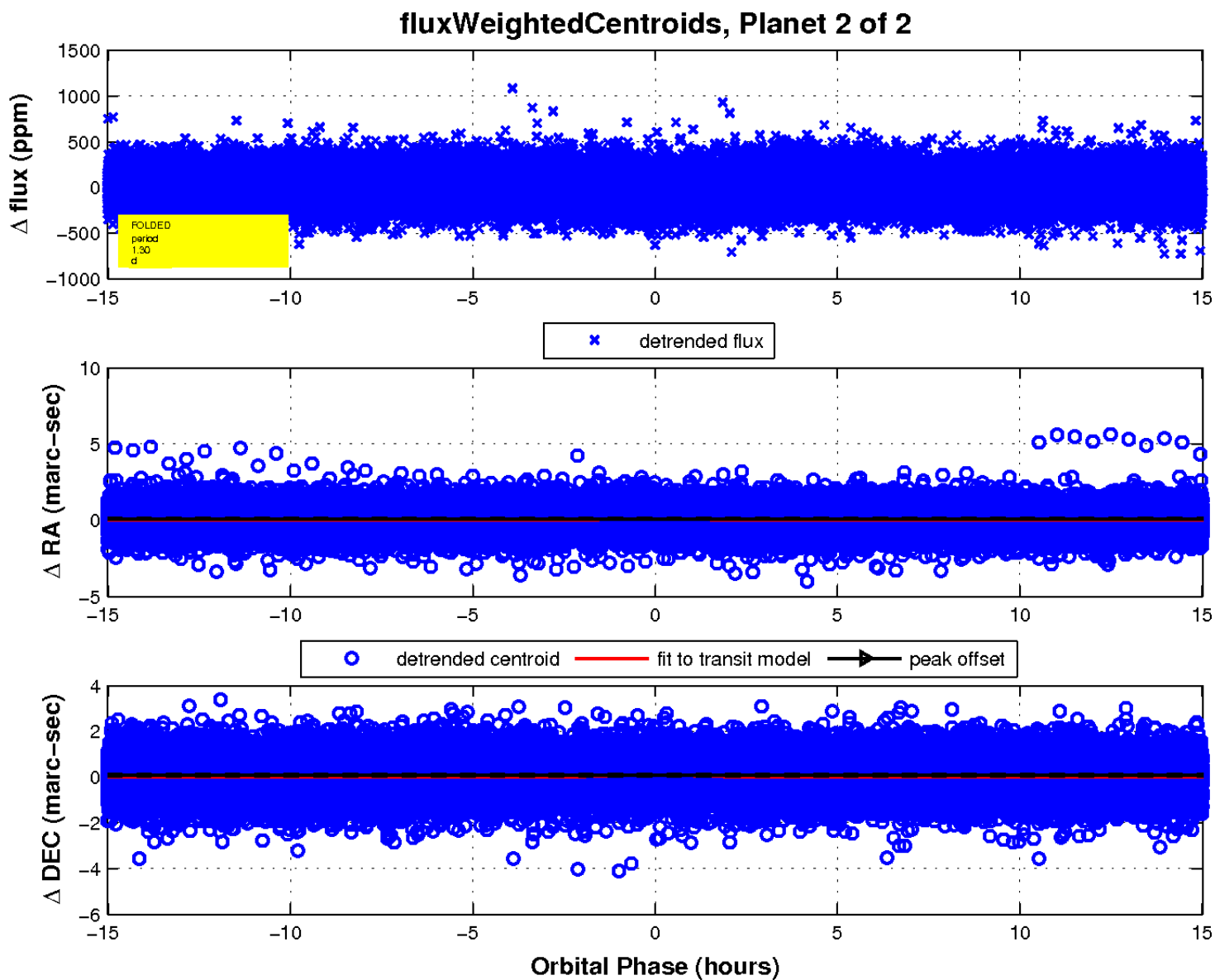
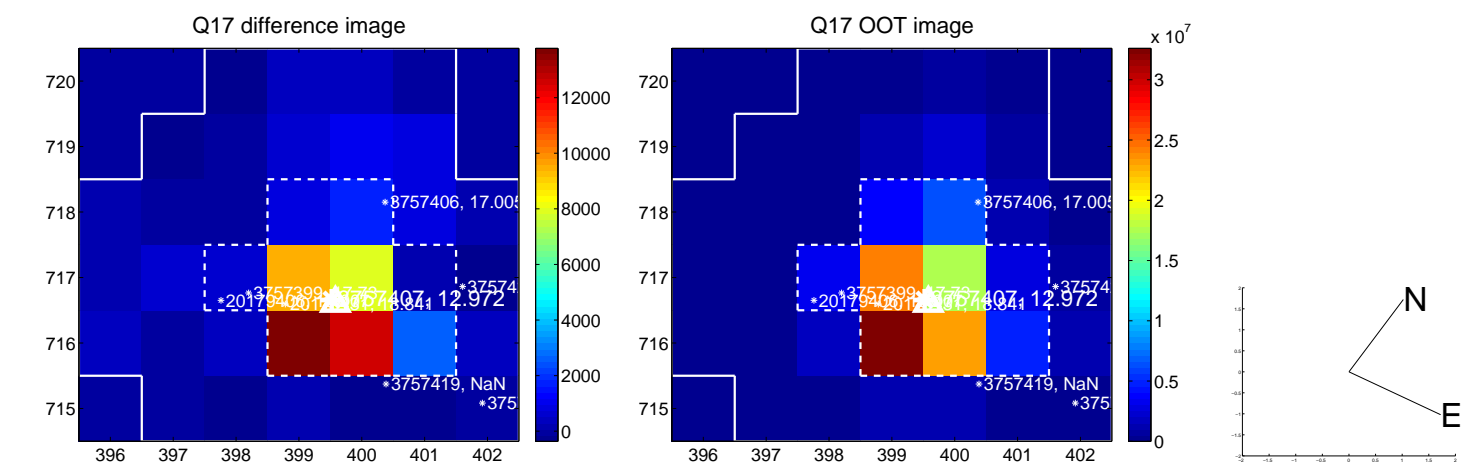
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



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



UKIRT Image

Declination

