

# KIC 007368999

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
007368999-01	OBS	No	0.921733	132.431983	260.0	2.798	10.5	11.2	0.67	4827	1.05	852.25
007368999-02	OBS	No	1.846742	132.844401	130.5	17.185	8.3	4.0	0.67	4827	0.92	337.42

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007368999-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV
007368999-02	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—SWEET_NTL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—HALO_GHOST

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

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

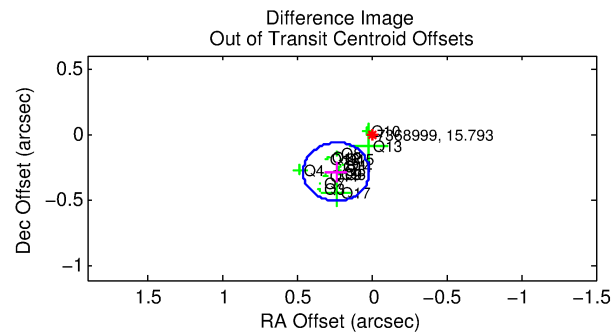
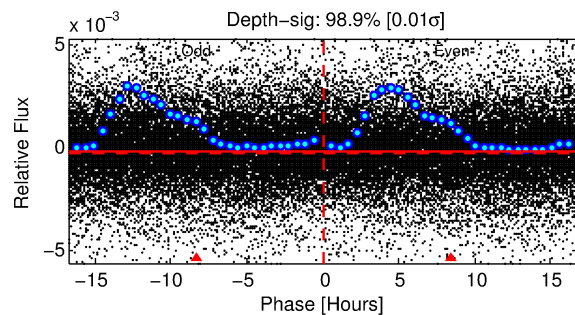
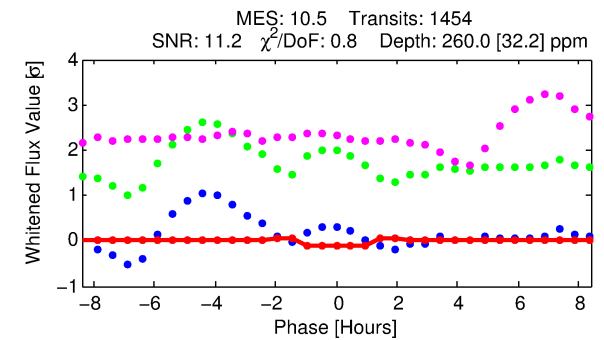
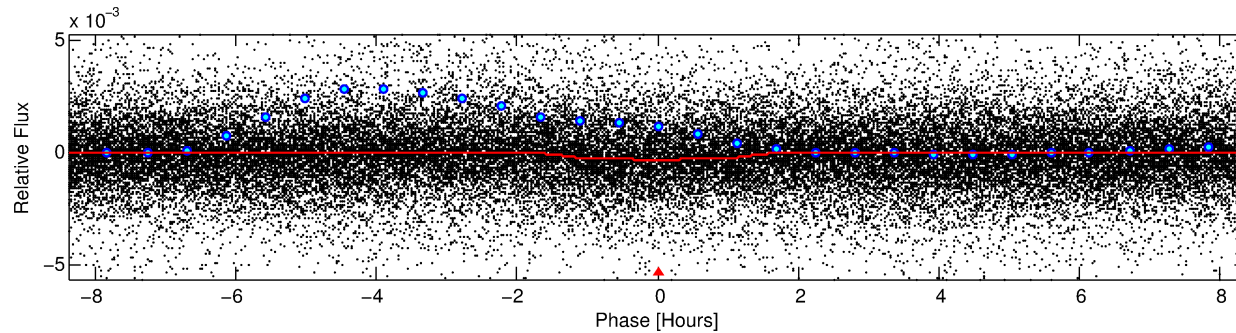
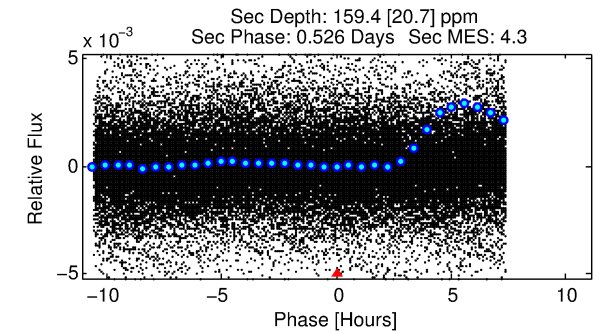
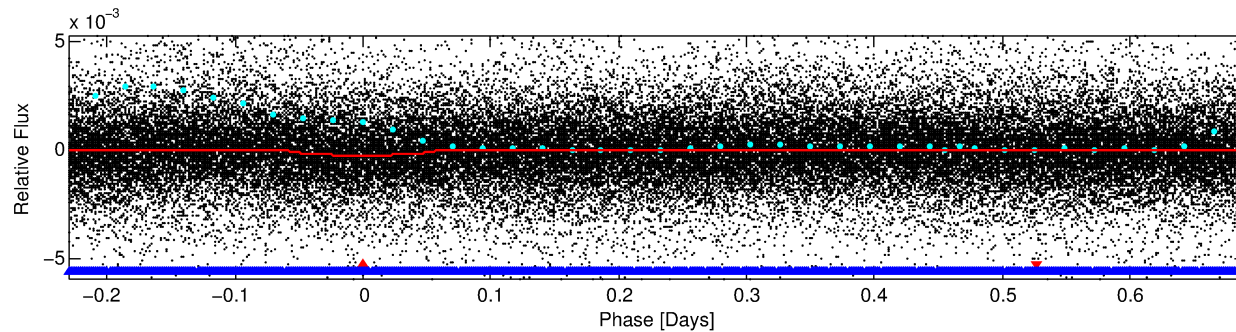
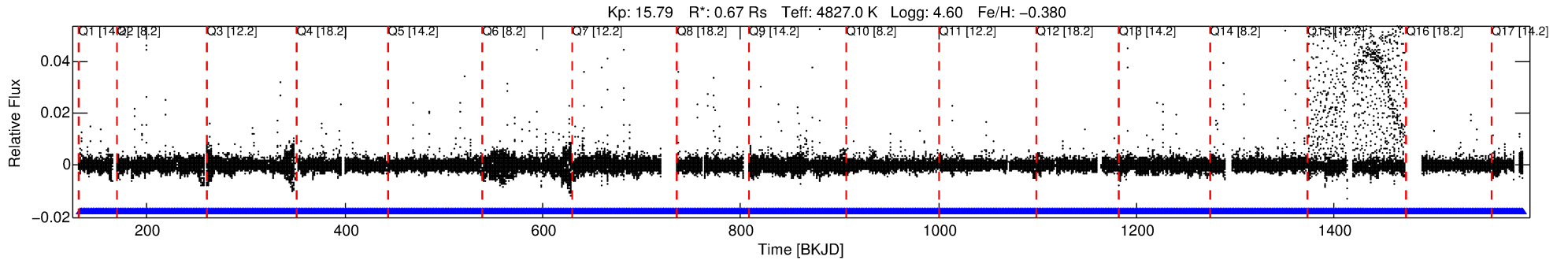
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 007368999-01

No Significant Match Found

# DV One-Page Summary

KIC: 7368999 Candidate: 1 of 2 Period: 0.922 d



## DV Fit Results:

Period = 0.92173 [0.00001] d  
Epoch = 132.4320 [0.0017] BKJD  
Rp/R\* = 0.0143 [0.0110]  
a/R\* = 2.61 [5.72]  
b = 0.10 [26.55]  
Seff = 852.26 [142.24]  
Teff = 1378 [57] K  
Rp = 1.05 [0.81] Re  
a = 0.0161 [0.0013] AU  
Ag = 20.52 [31.62] [0.62σ]  
Teffp = 4534 [1746] K [1.81σ]

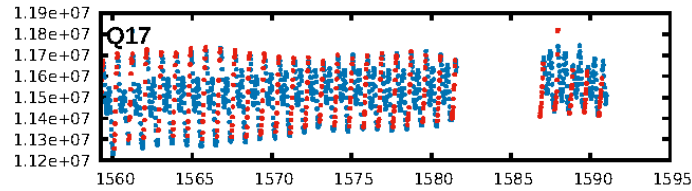
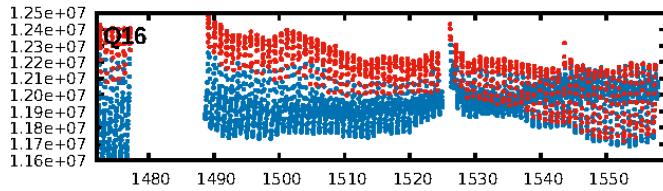
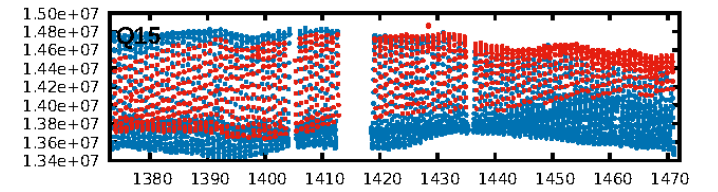
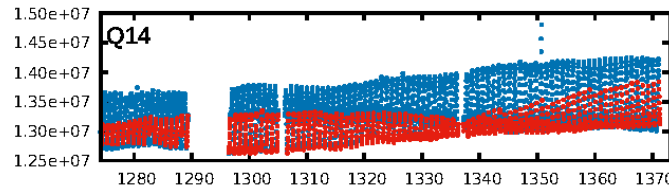
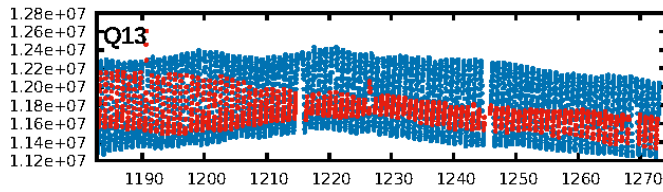
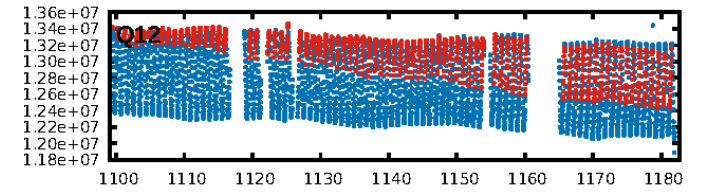
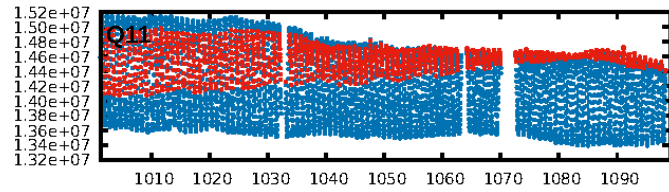
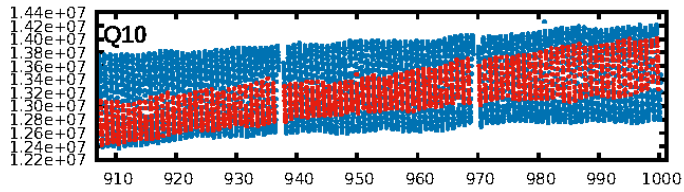
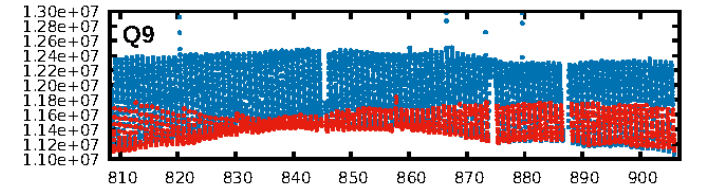
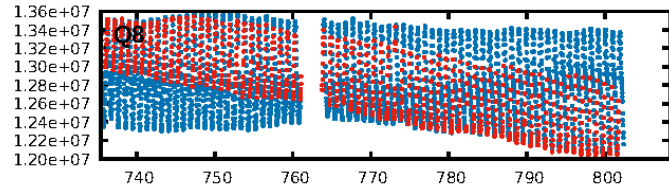
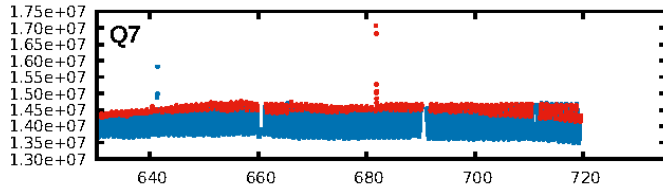
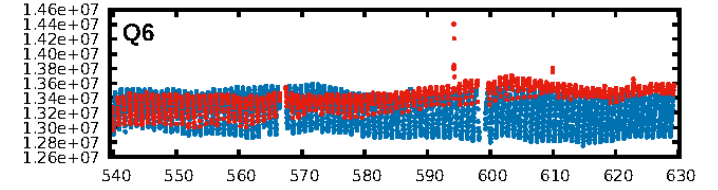
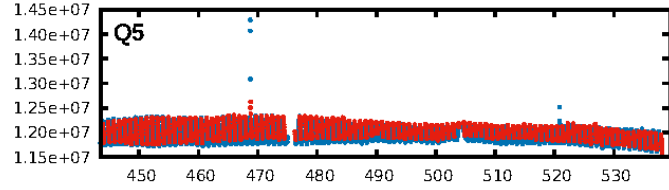
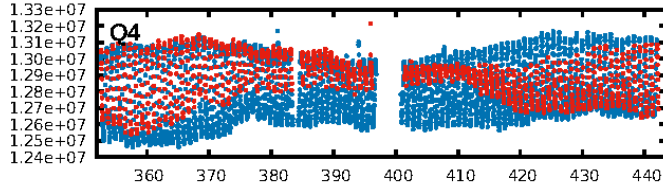
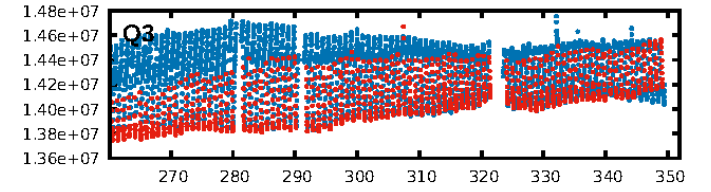
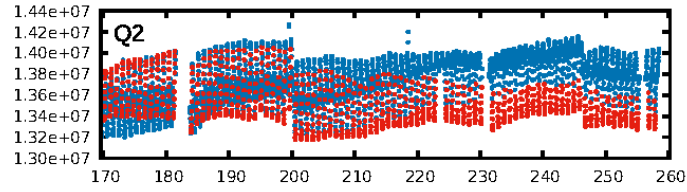
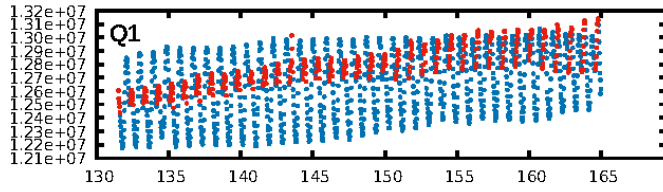
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 79.8% [1.28σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [1387/1387]  
GhostDiagnostic-chr: -1.374  
Centroid-sig: 18.5%  
Centroid-so: 0.637 arcsec [1.36σ]  
OotOffset-rm: 0.367 arcsec [4.98σ]  
KicOffset-rm: 0.151 arcsec [2.07σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 0.41 [7/17]  
DiffImageOverlap-fno: 0.71 [12/17]

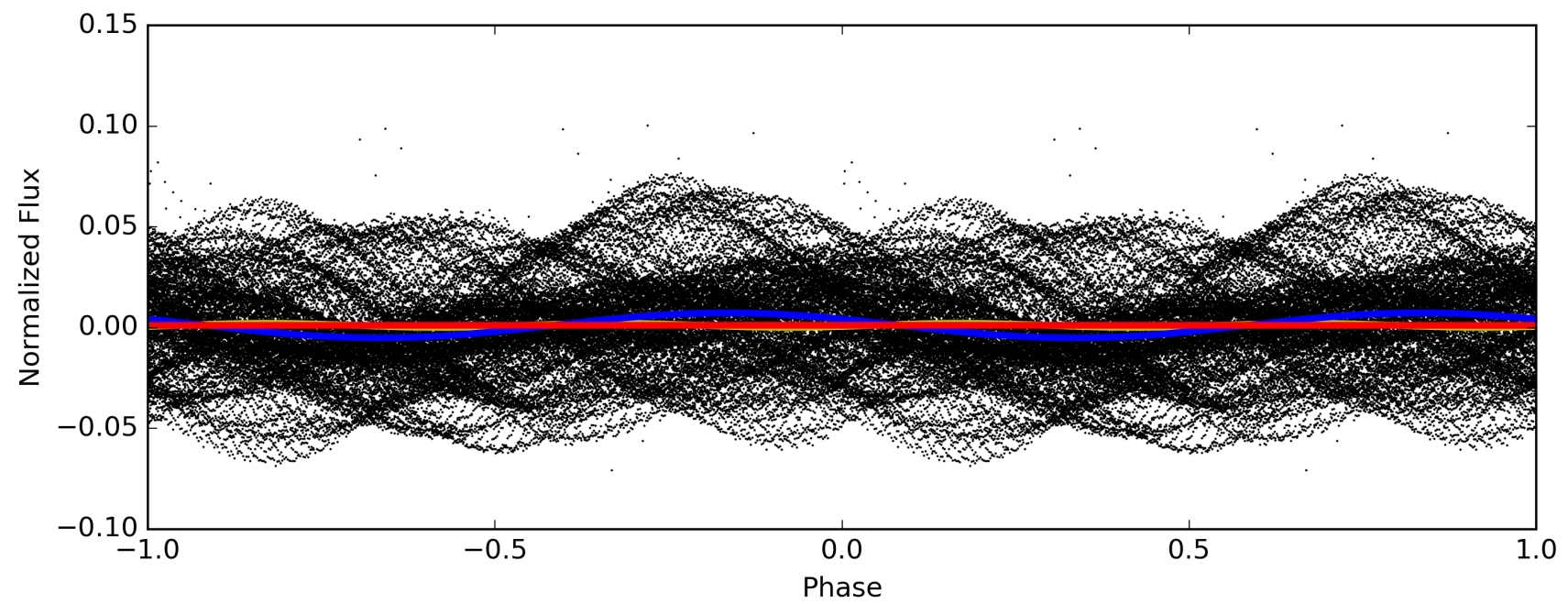
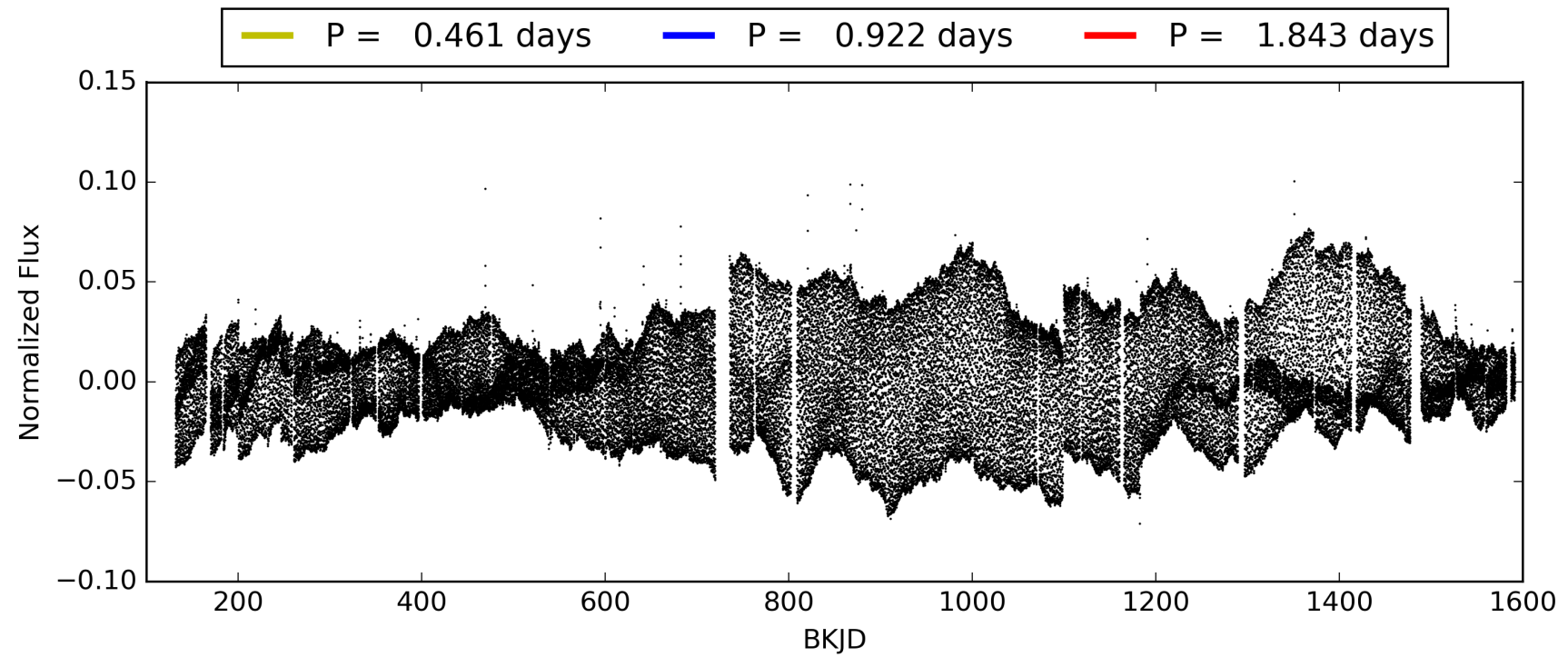
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 03:30:48 Z

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

# TCE 007368999-01, PDC Light Curves



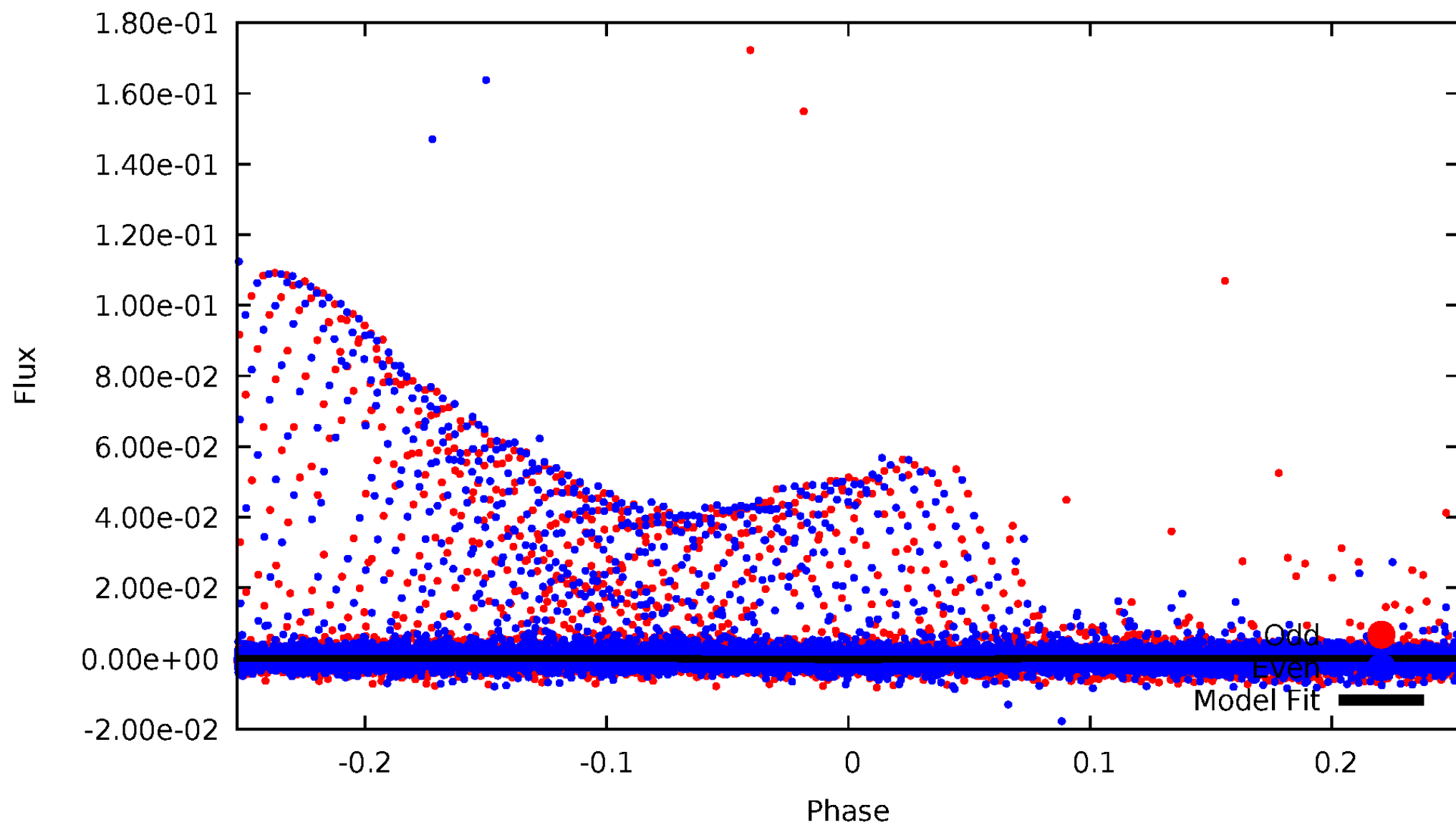
TCE 007368999-01





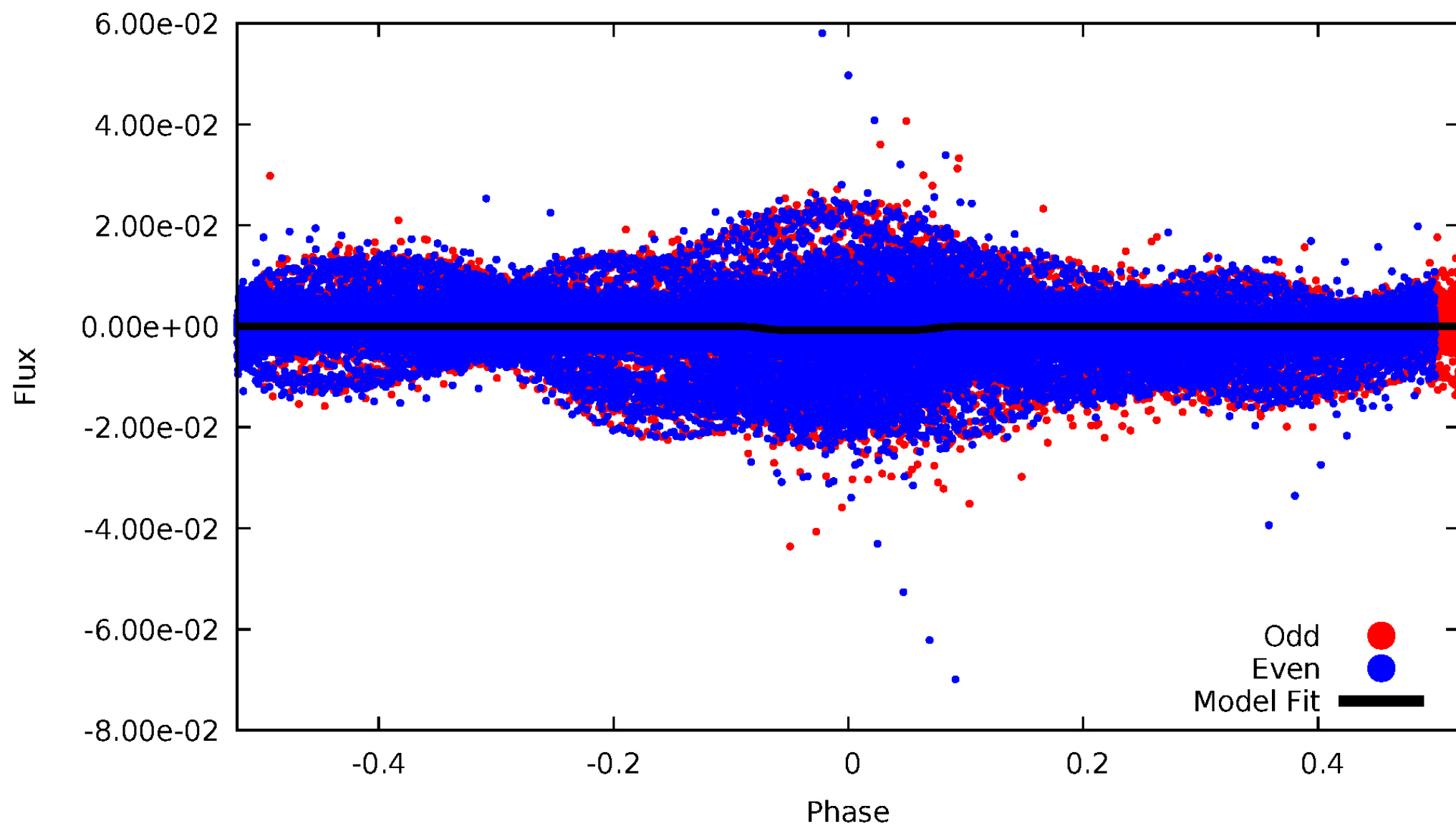
# DV Odd/Even

TCE 007368999-01



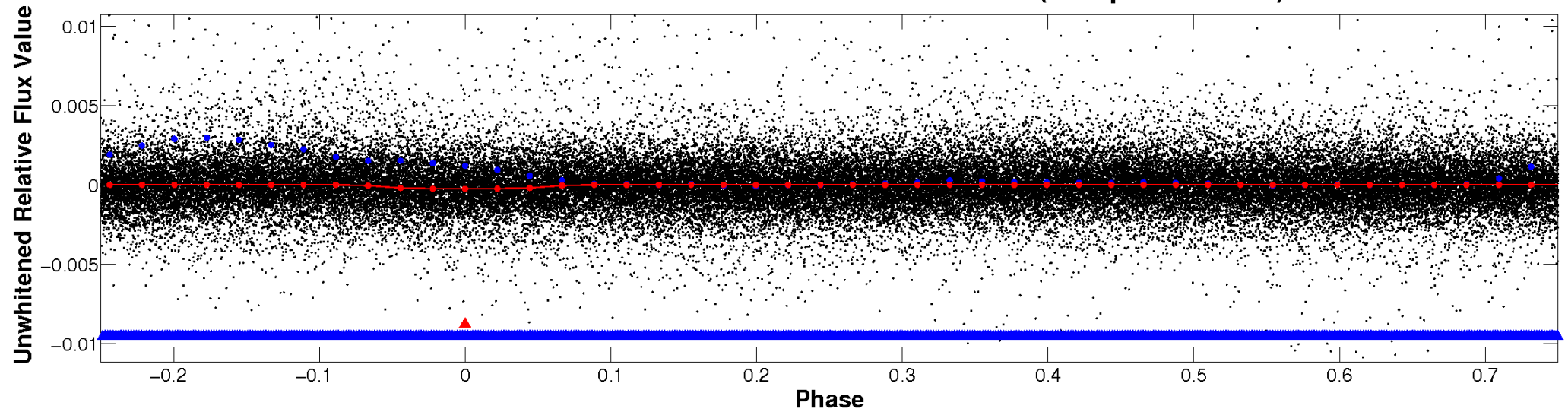
# ALT Odd/Even

TCE 007368999-01

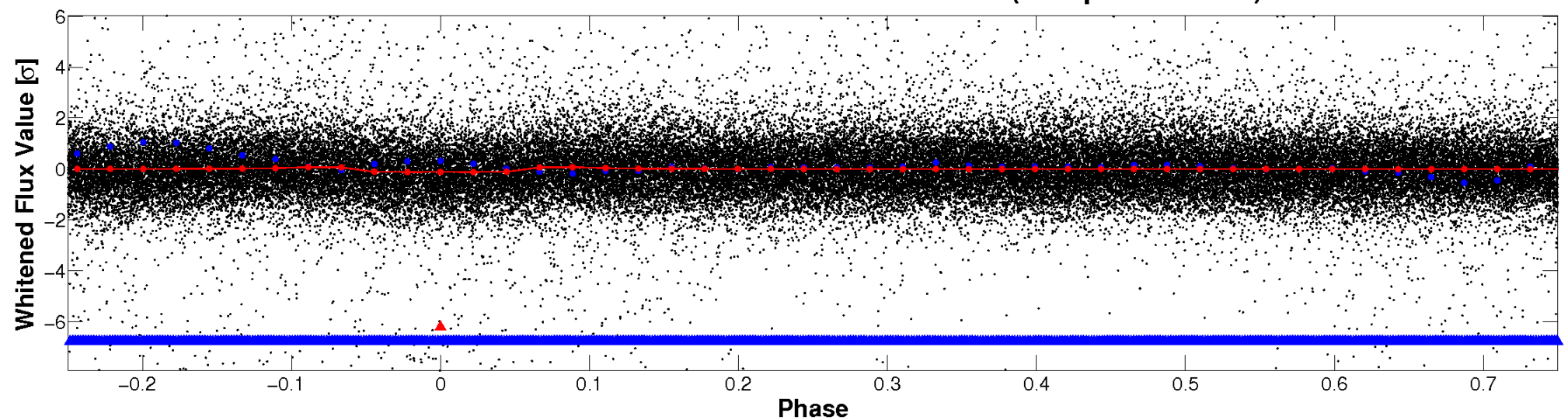


# Non-Whitened Vs. Whitened Light Curve

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

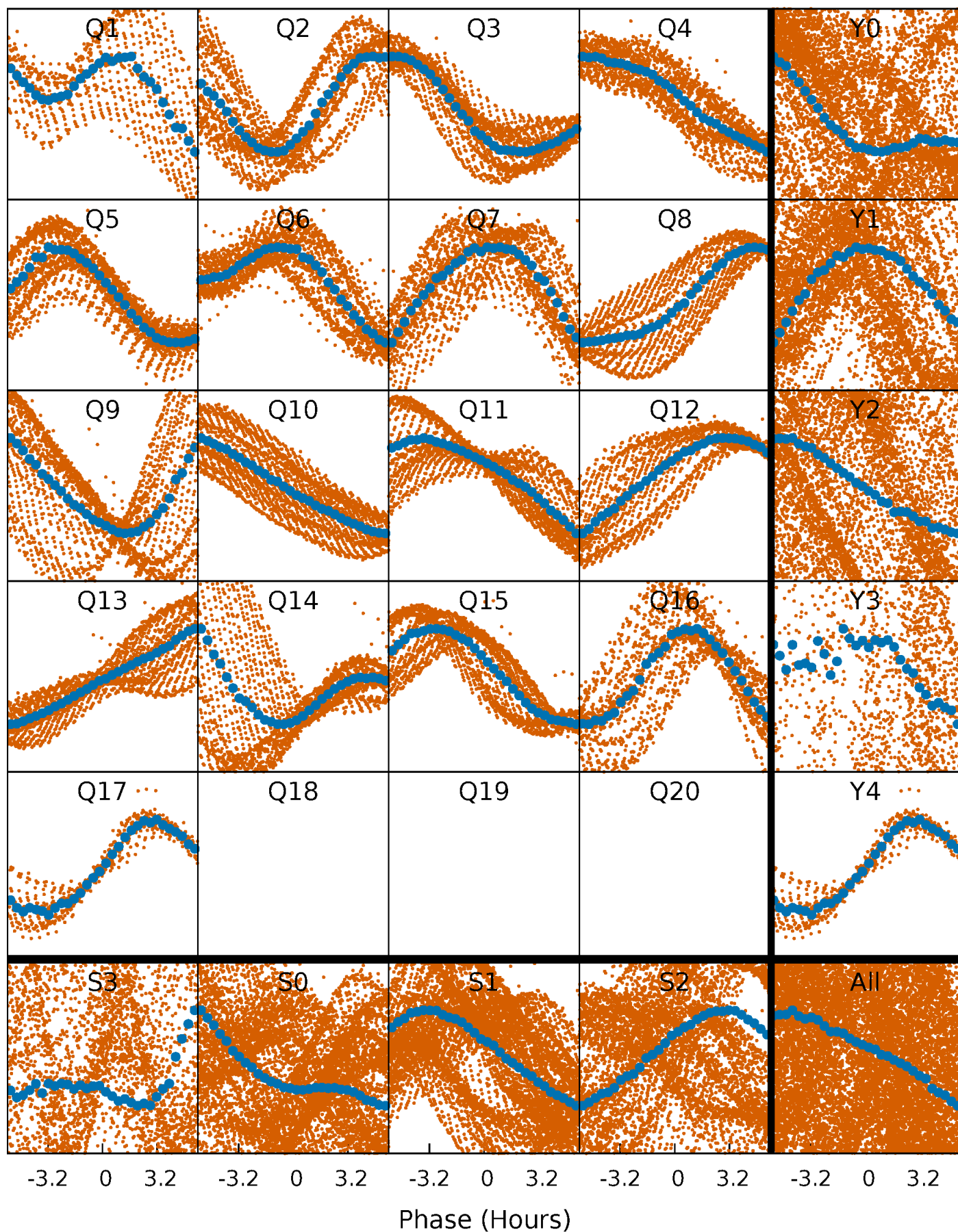


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

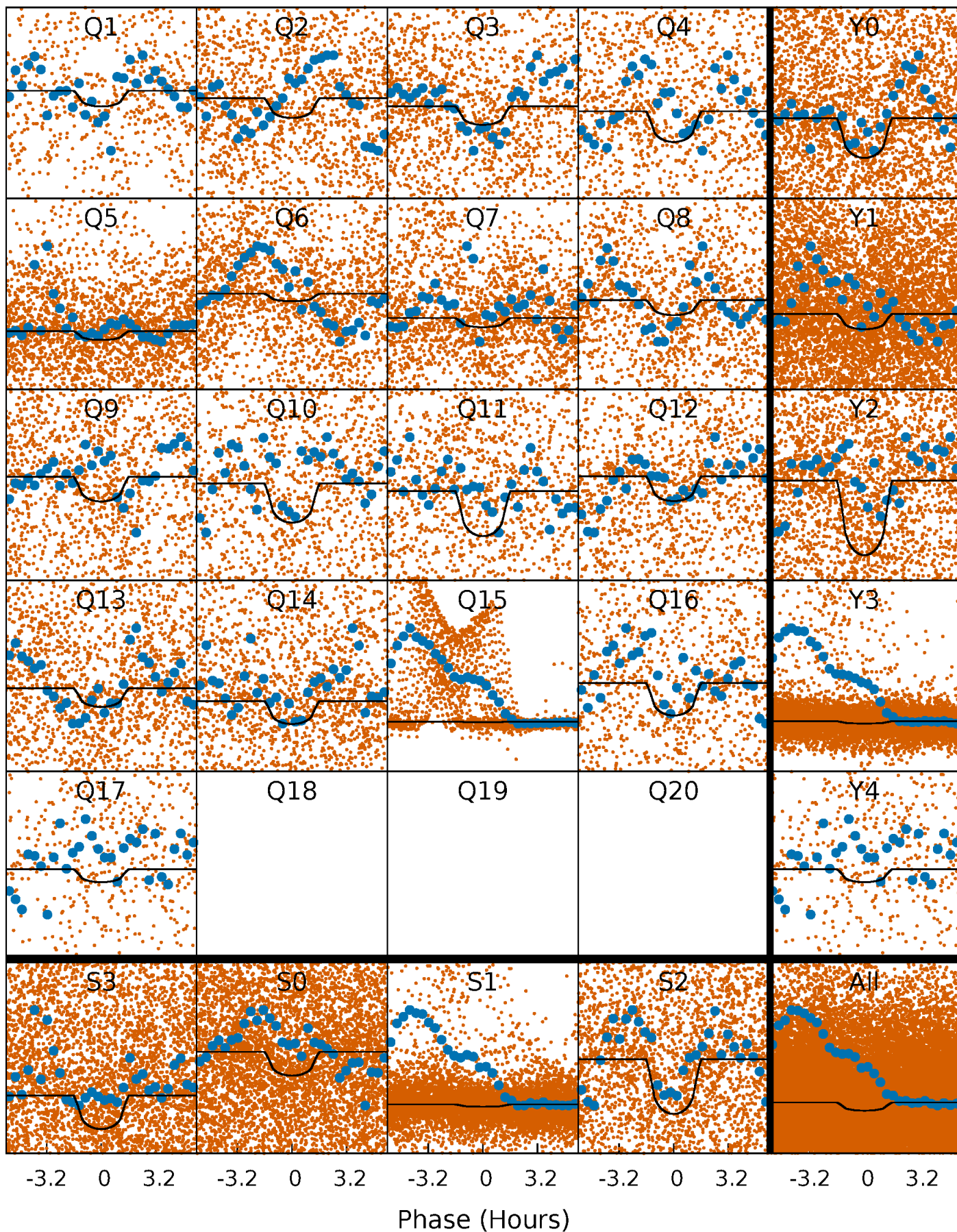
TCE 007368999-01 P= 0.921733 Days  $T_0=132.431983$  (BKJD)





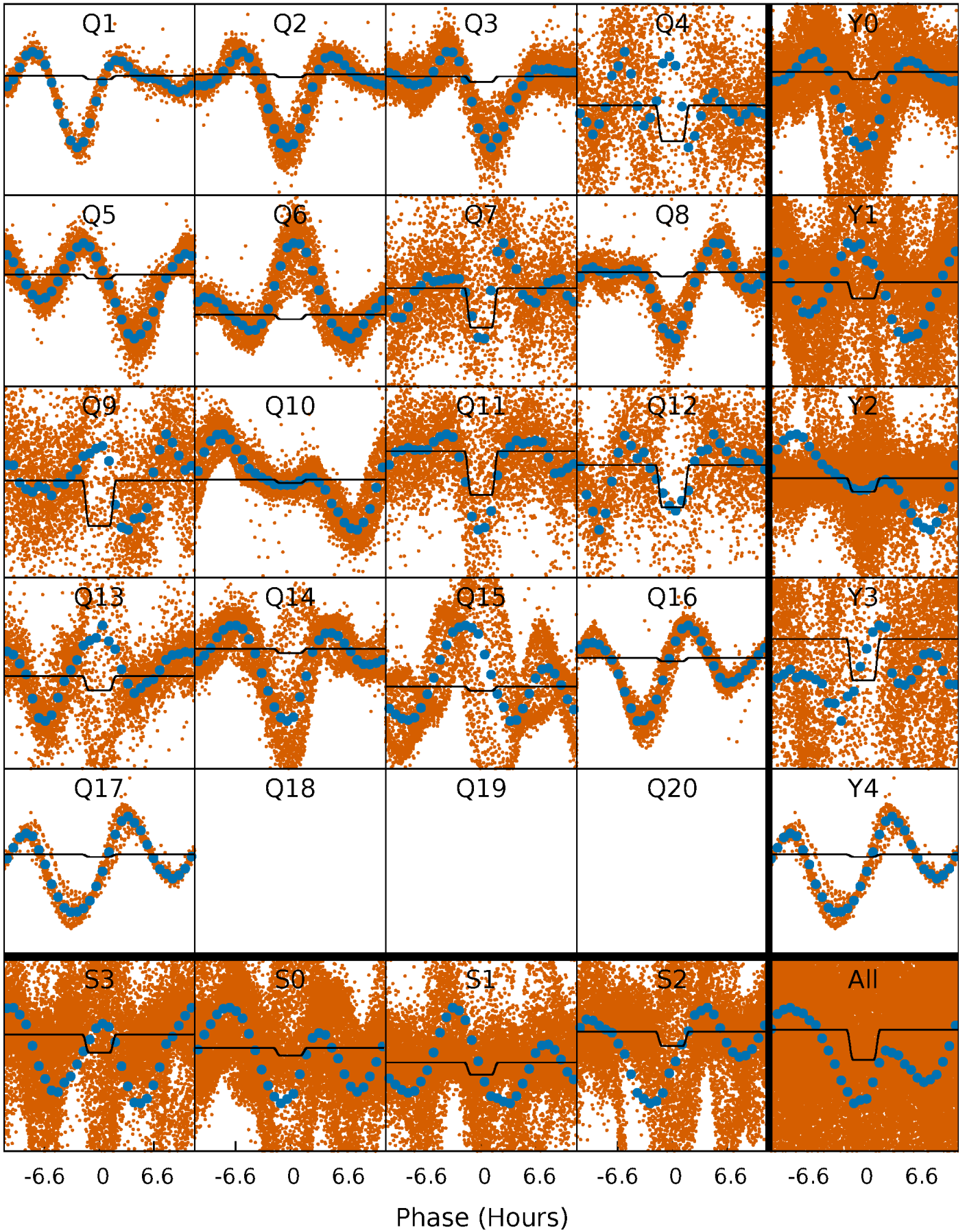
# DV Quarter-Phased Transit Curves

TCE 007368999-01 P= 0.921733 Days  $T_0=132.431983$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

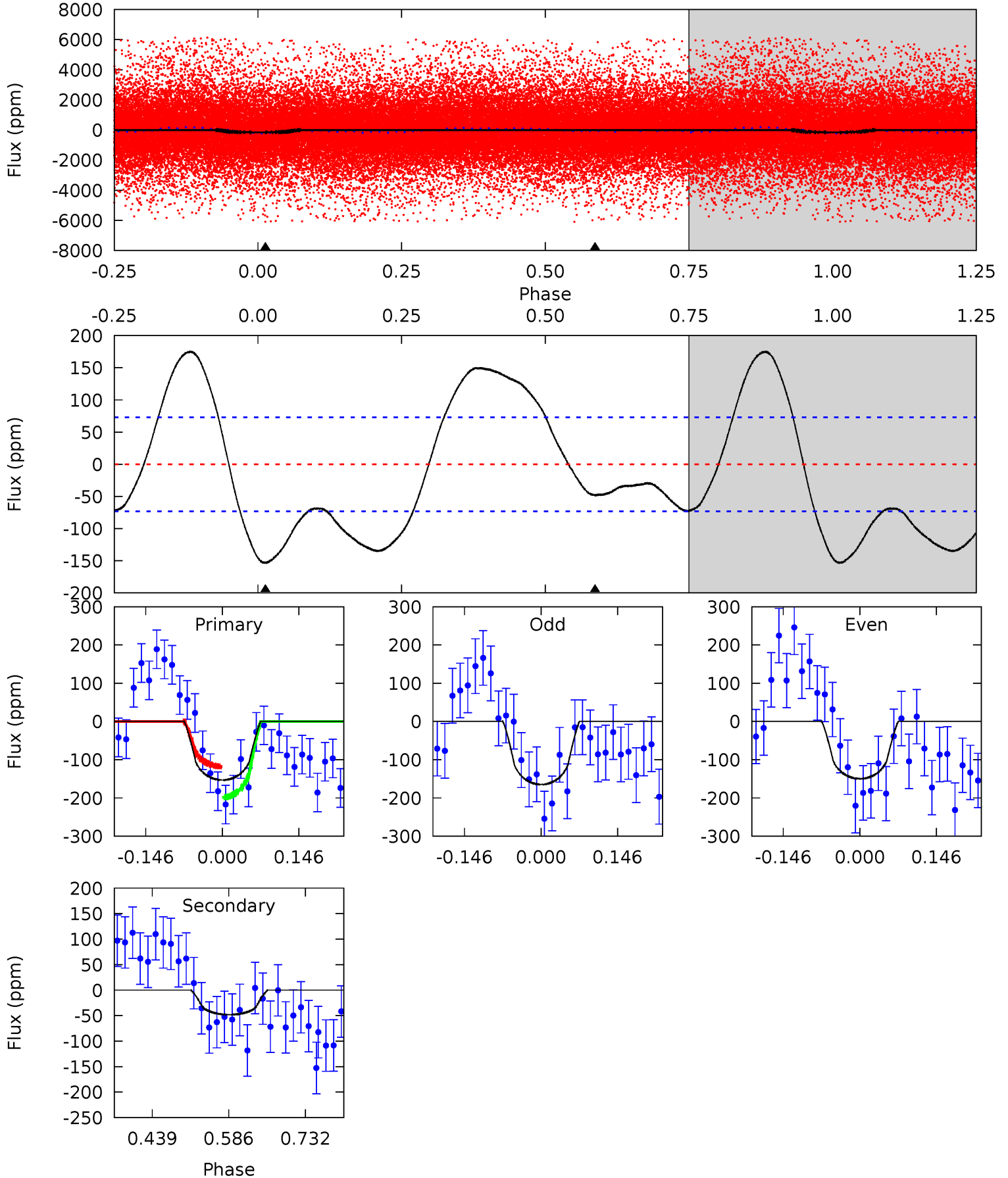
TCE 007368999-01   P= 0.921733 Days    $T_0=132.409423$  (BKJD)



# DV Model-Shift Uniqueness Test

007368999-01, P = 0.921733 Days, E = 131.510250 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.41	2.96	0	0	4.48	1.45	6.53	9.41	9.41	2.96	2.96	0.47	-30.1	0.53	2.47

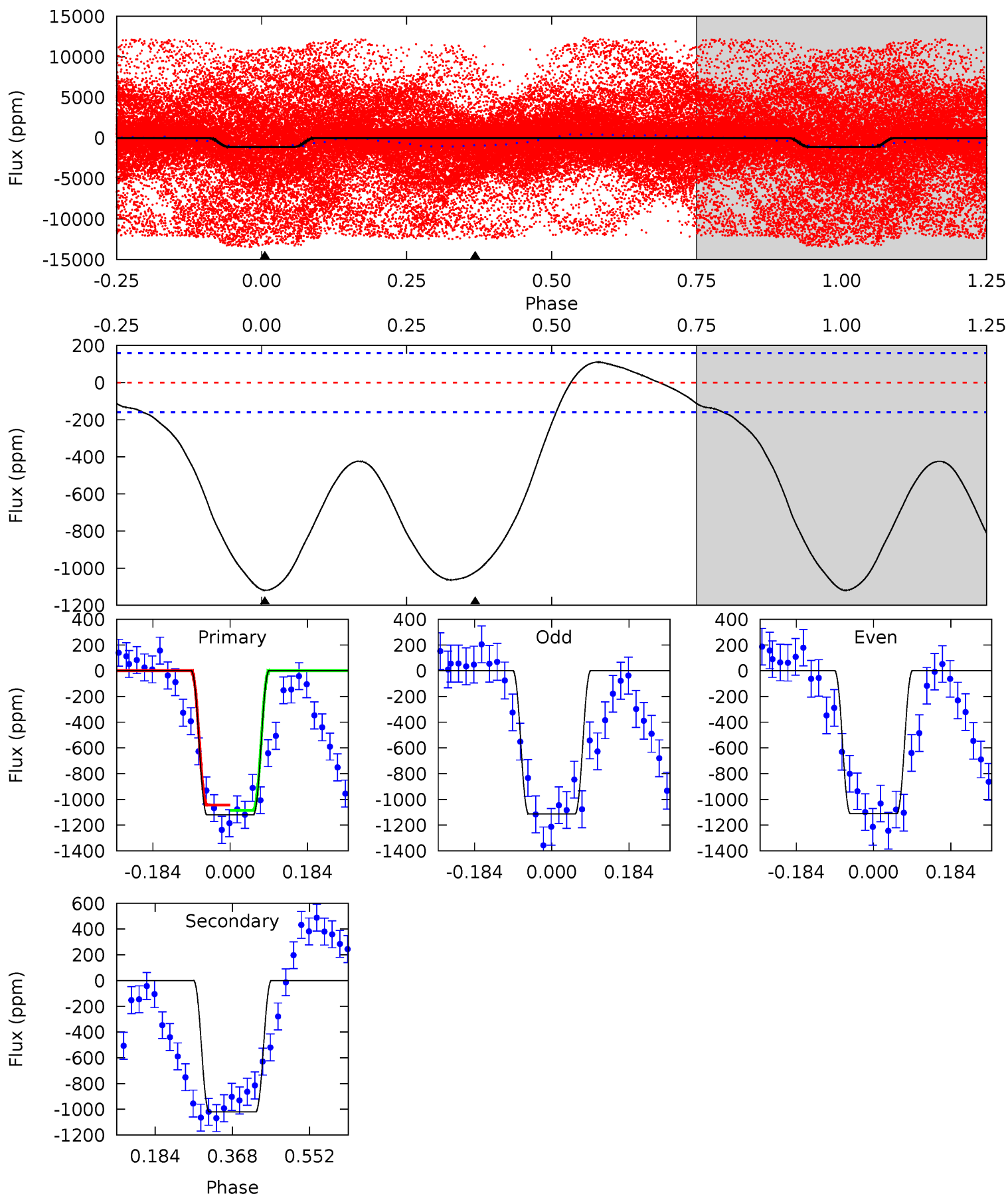




# Alt Model-Shift Uniqueness Test

007368999-01, P = 0.921733 Days, E = 131.487690 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
31.1	28.4	0	0	4.44	1.33	2.75	31.1	31.1	28.4	28.4	0.04	1.66	0.09	0.45





### Stellar Parameters For KIC 007368999

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$4827^{+144}_{-144}$	$4.597^{+0.063}_{-0.036}$	$-0.380^{+0.300}_{-0.300}$	$0.674^{+0.060}_{-0.066}$	$0.656^{+0.086}_{-0.046}$	$3.014^{+0.804}_{-0.440}$
	+3%/-3%	+1%/-1%	+79%/-79%	+9%/-10%	+13%/-7%	+27%/-15%
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 007368999-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-48 \pm 16$	$1.13^{+0.71}_{-0.65}$	$1915^{+74}_{-63}$	$3568^{+1422}_{-593}$	$5.318^{+24.936}_{-3.468}$
Alt.	$-1021 \pm 36$	$2.02^{+0.80}_{-0.78}$	$1914^{+72}_{-76}$	$5128^{+1393}_{-642}$	$36^{+61}_{-18}$

$T_{max}$  = 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

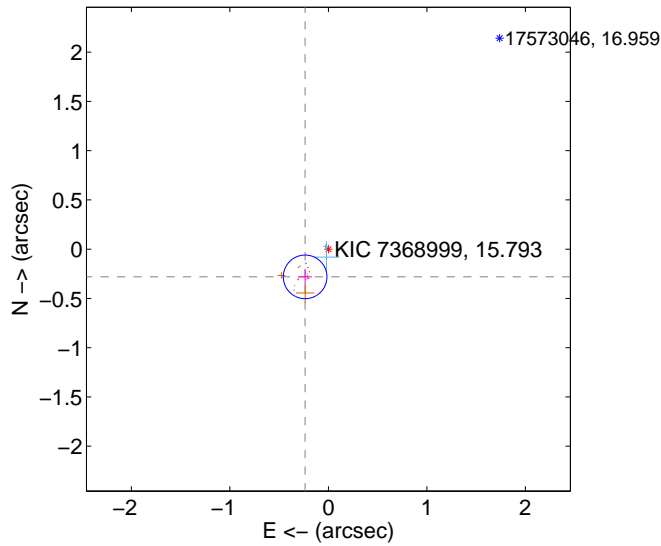
Supplemental centroid analysis for 007368999-01. Kepler magnitude: 15.79. Transit SNR 11.16

There are 7 quarters with good PRF difference image offsets

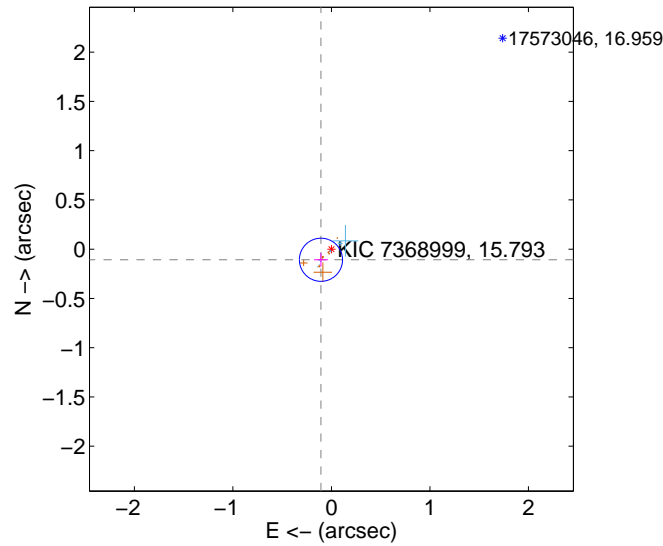
The direct PRF centroid is offset from the target star catalog position by about 0.26 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b><math>0.367 \pm 0.074</math></b>	<b>4.98</b>	$0.236 \pm 0.071$	$-0.281 \pm 0.072$
PRF-fit source offset from KIC position	$0.151 \pm 0.073$	2.07	$0.106 \pm 0.070$	$-0.108 \pm 0.070$
photometric centroid source offset	$0.64 \pm 0.47$	1.36	$0.26 \pm 0.49$	$0.58 \pm 0.47$

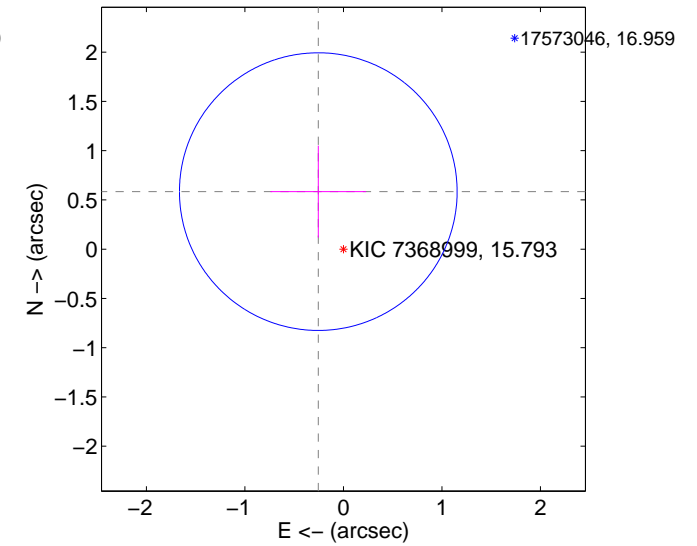
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

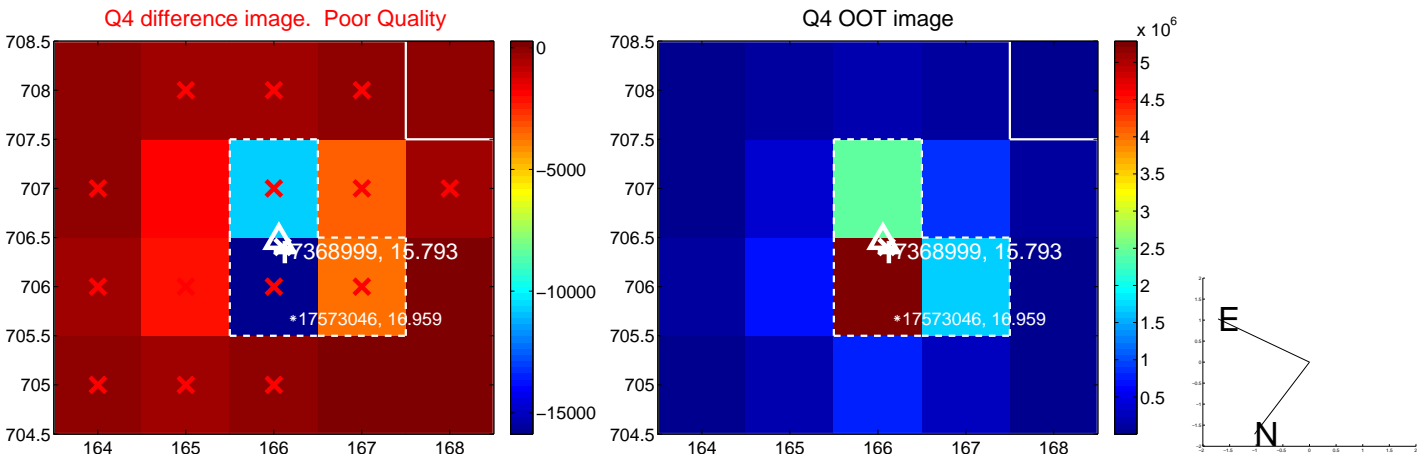
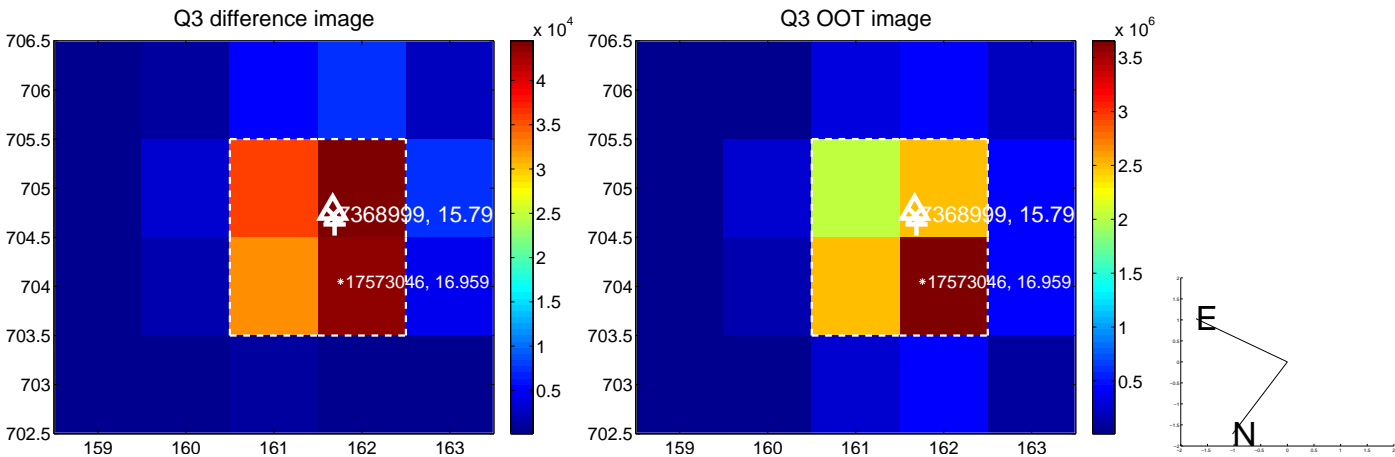
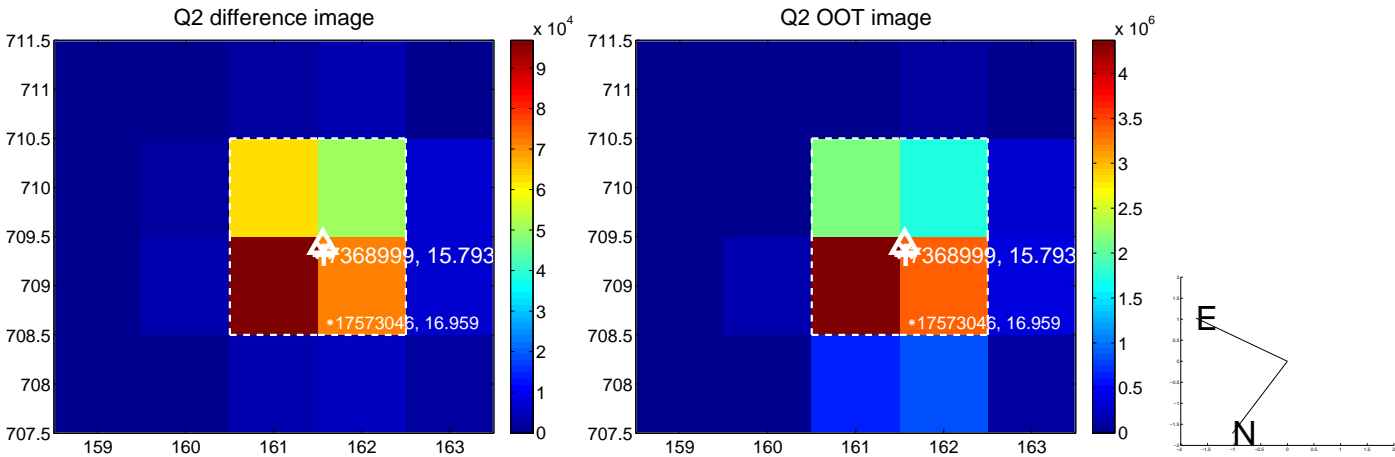
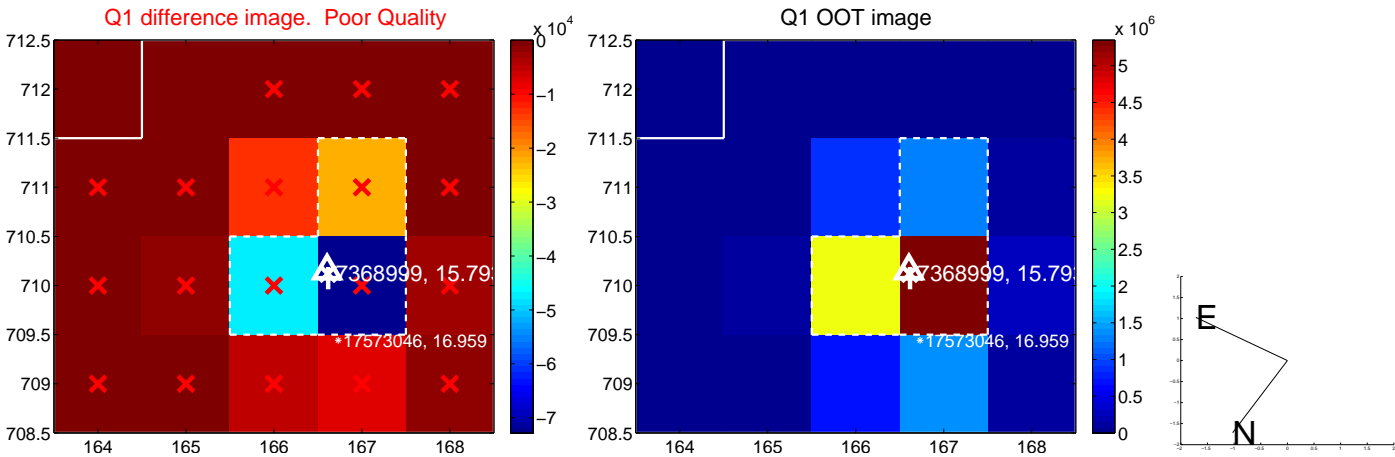


offset from photometric centroids

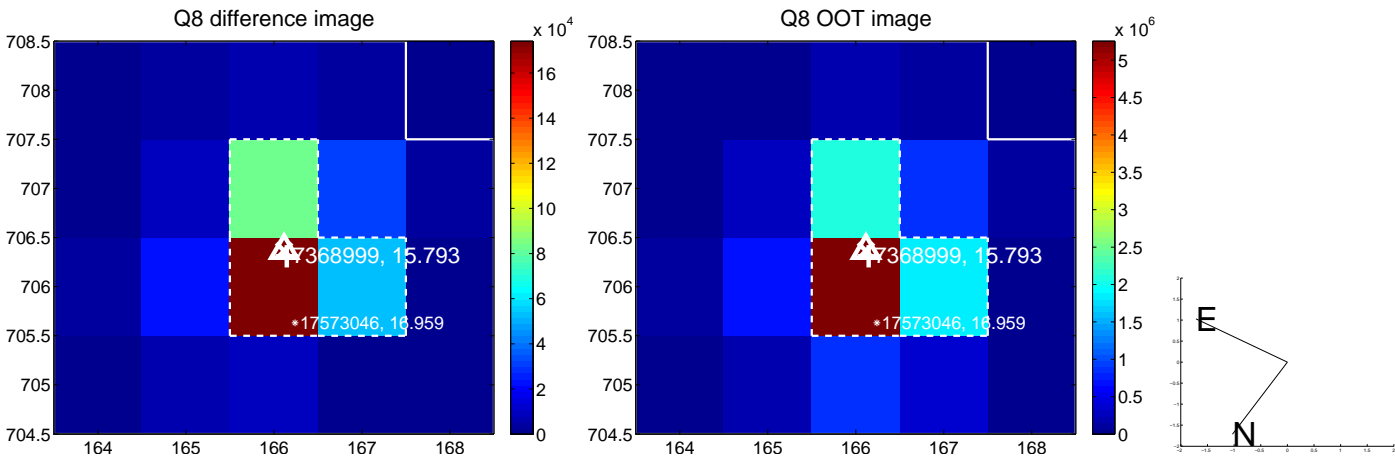
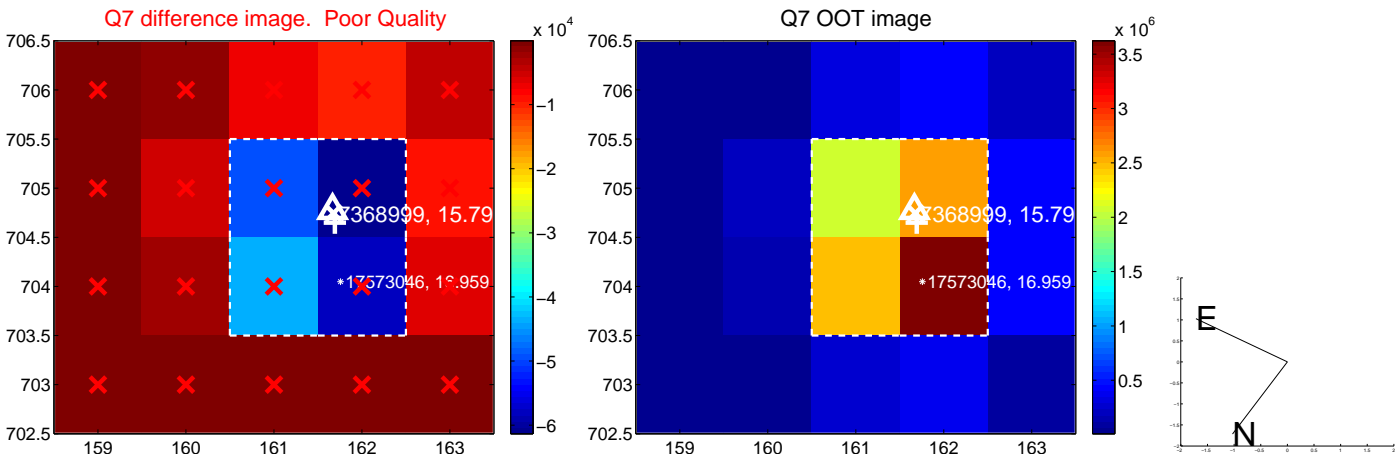
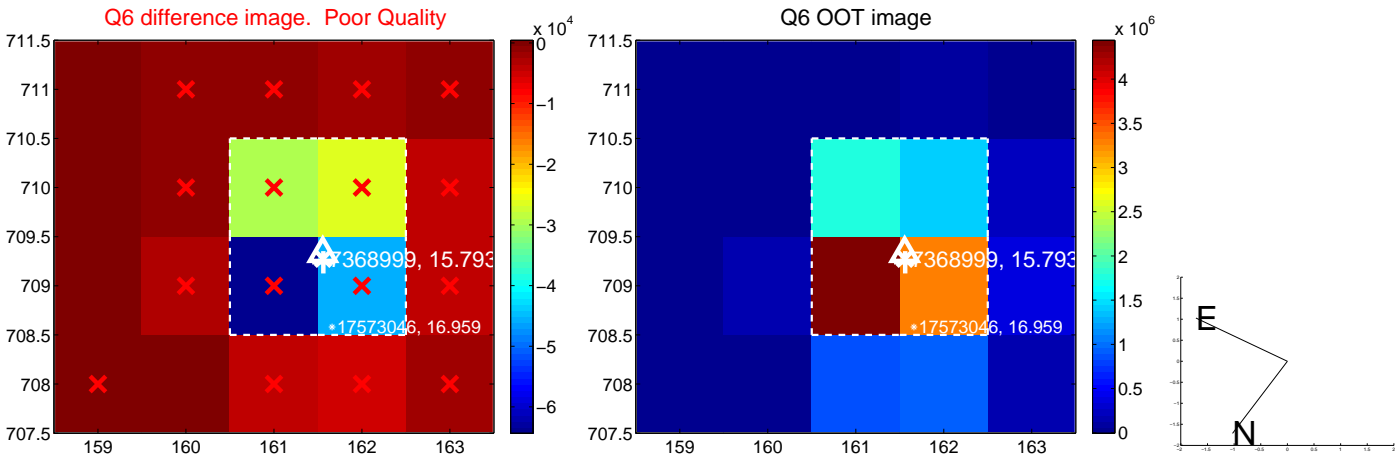
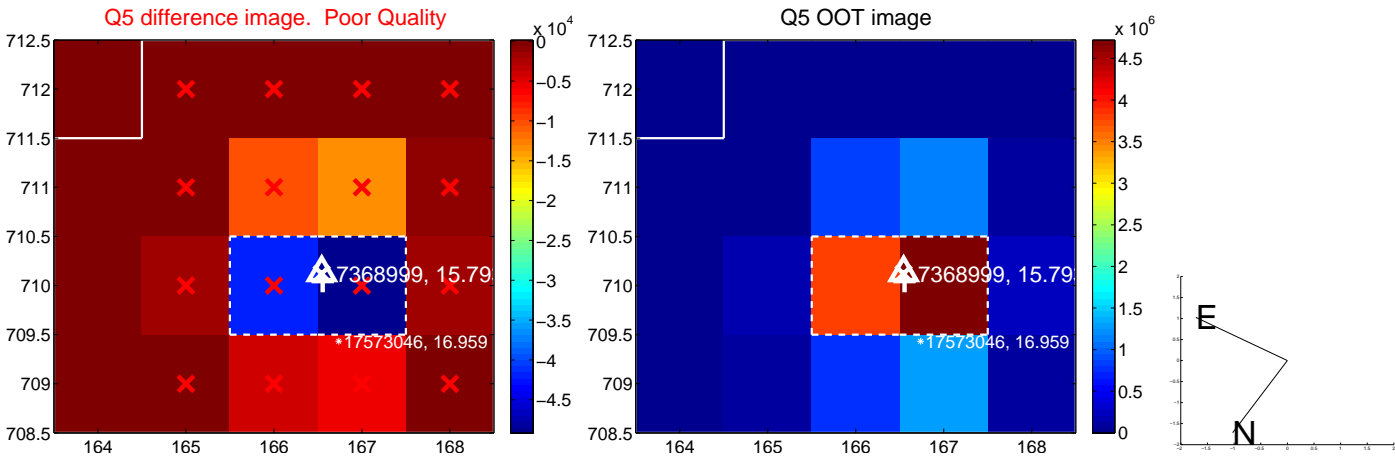


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

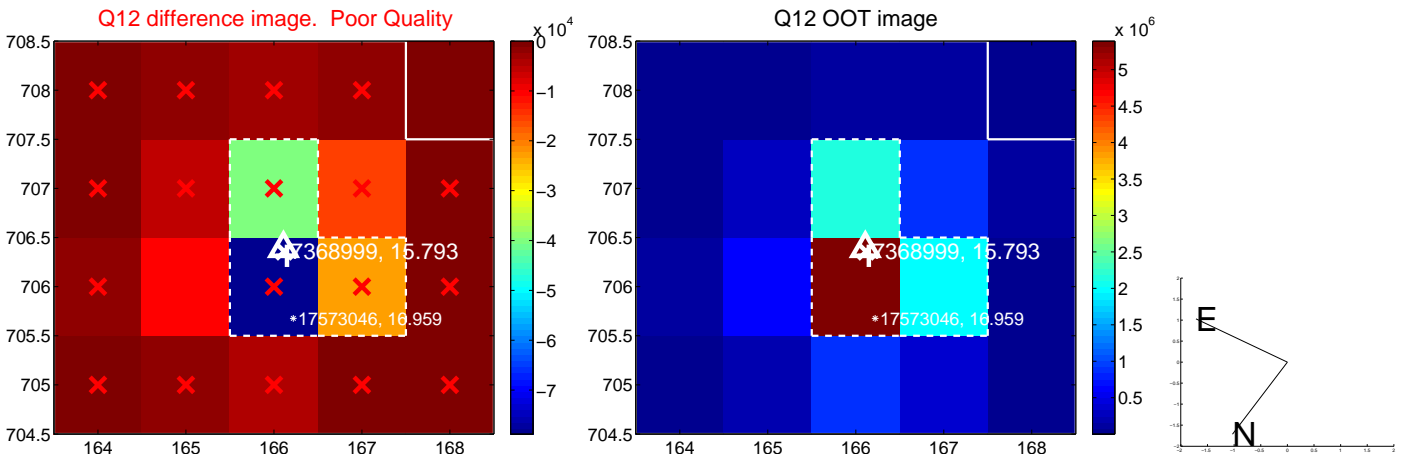
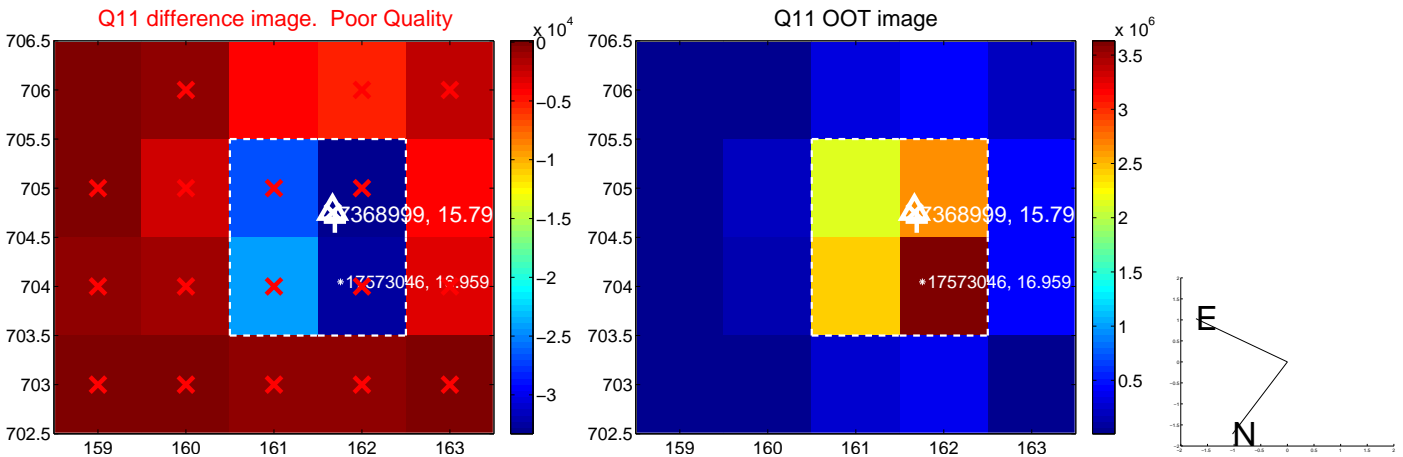
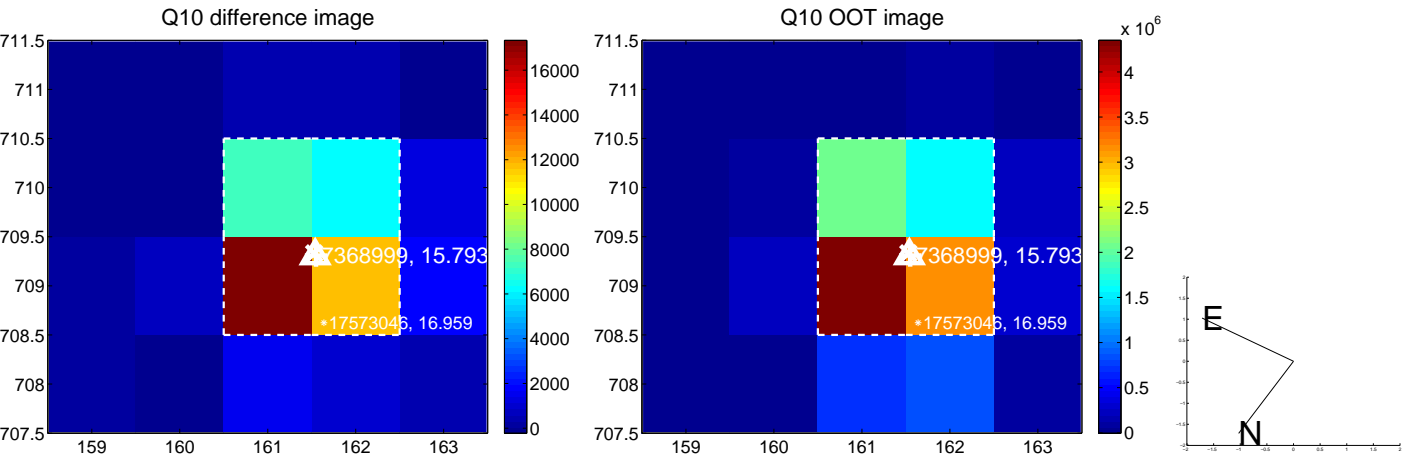
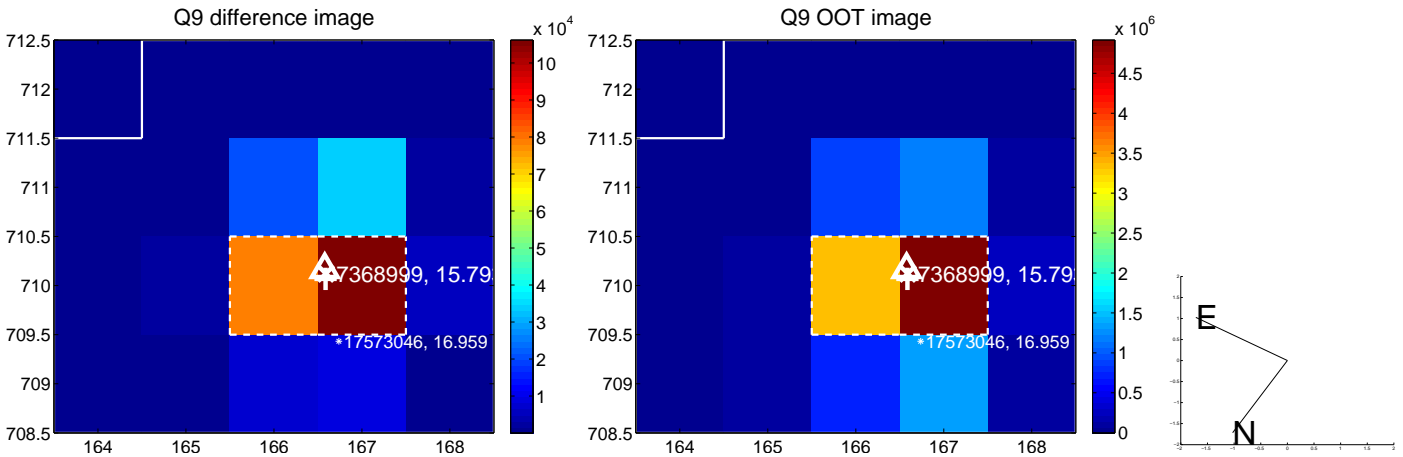


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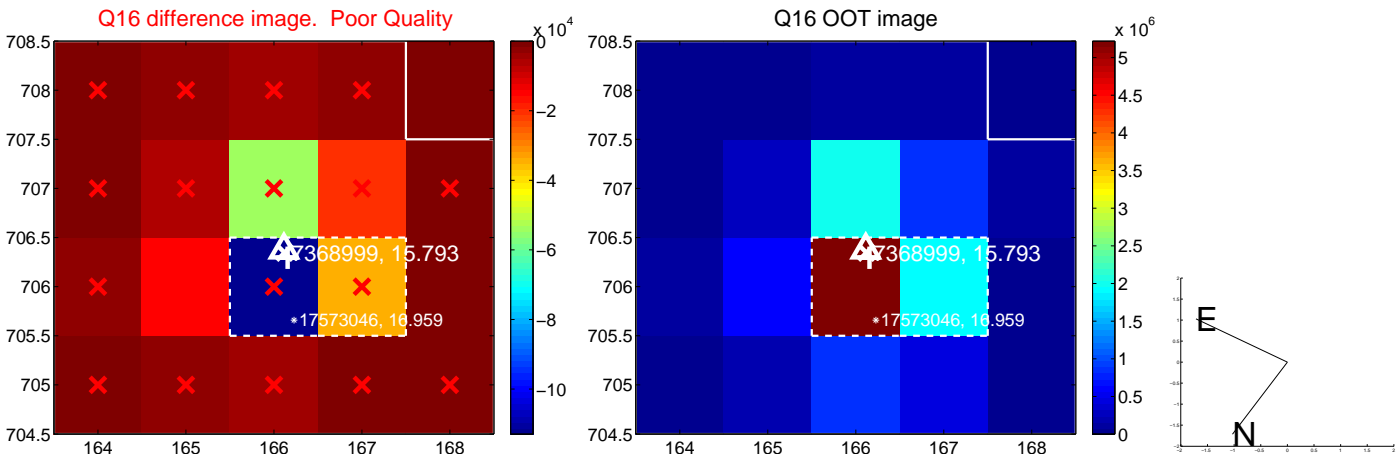
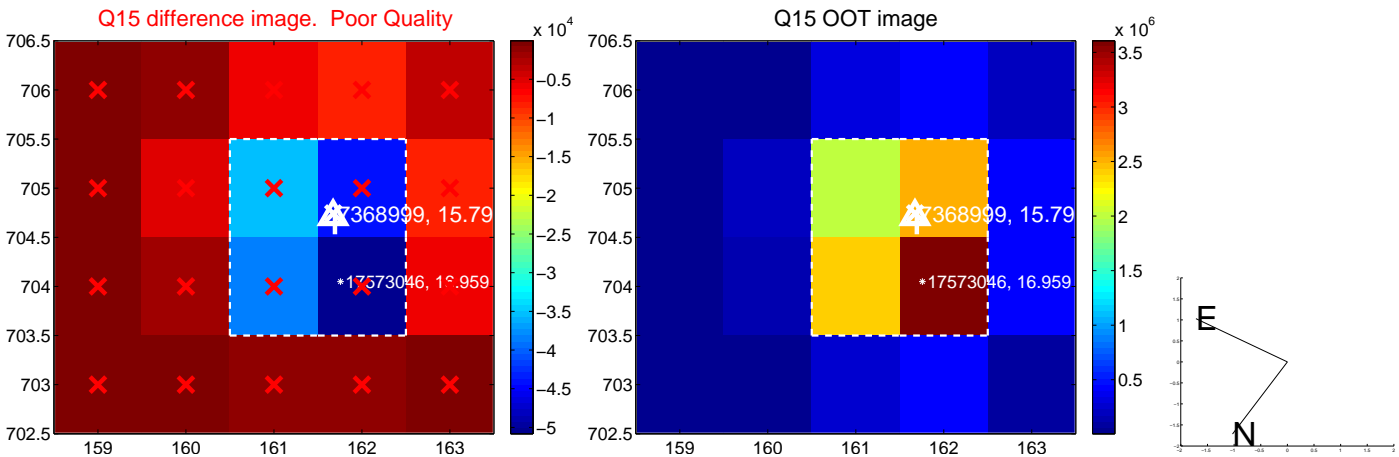
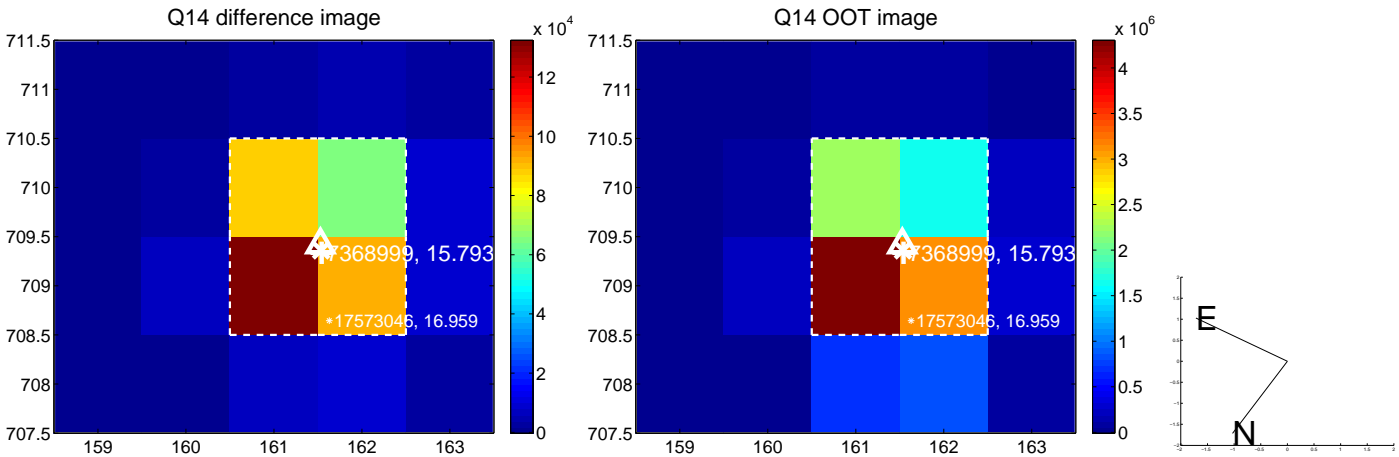
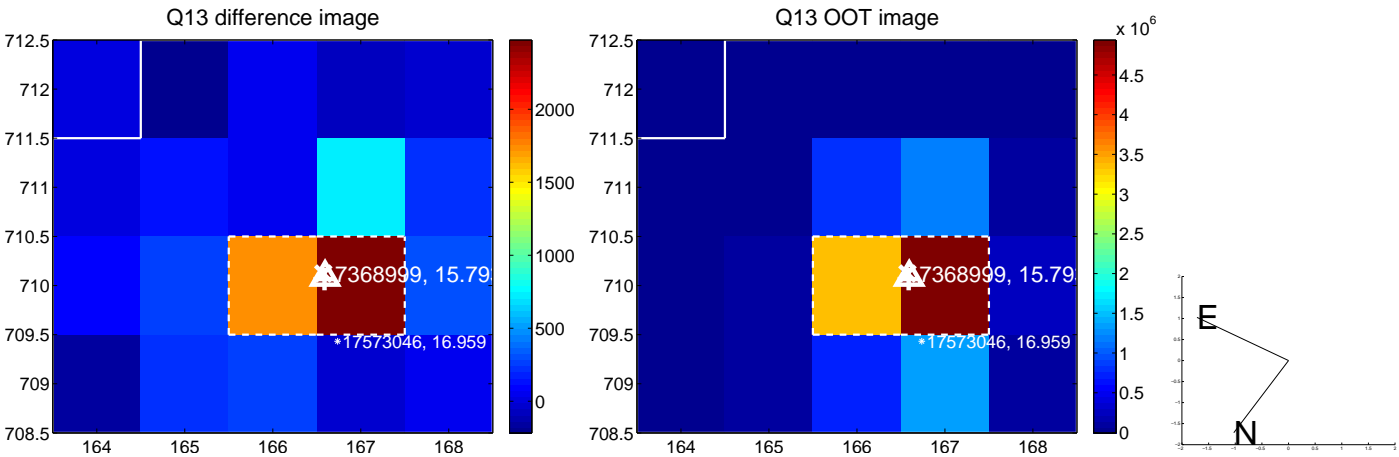




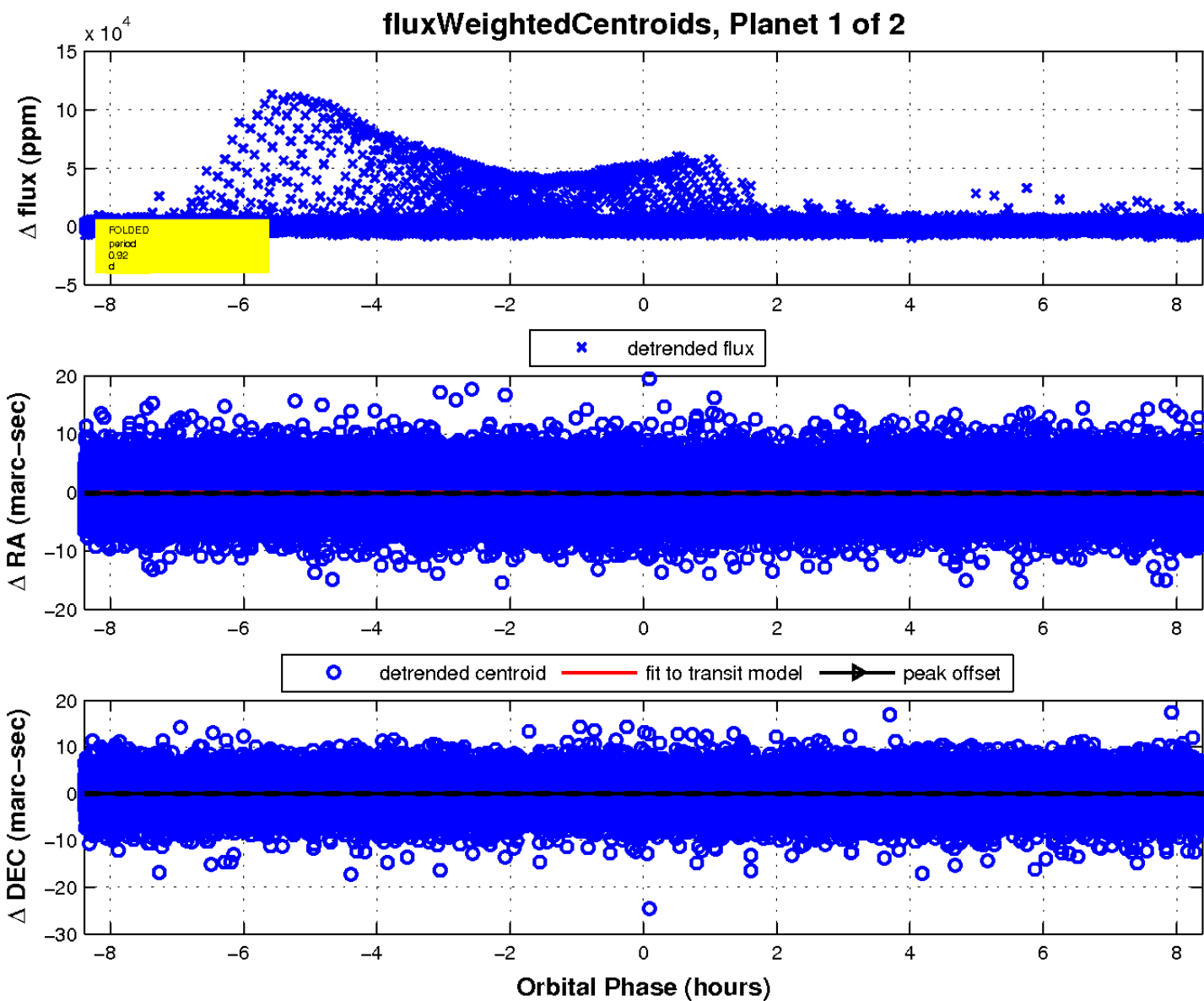
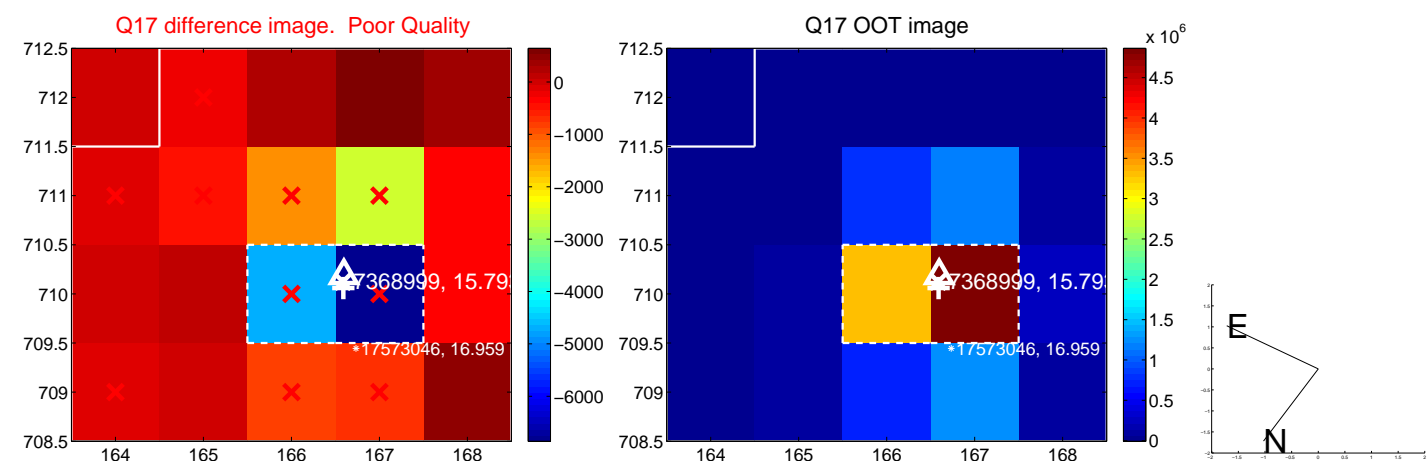
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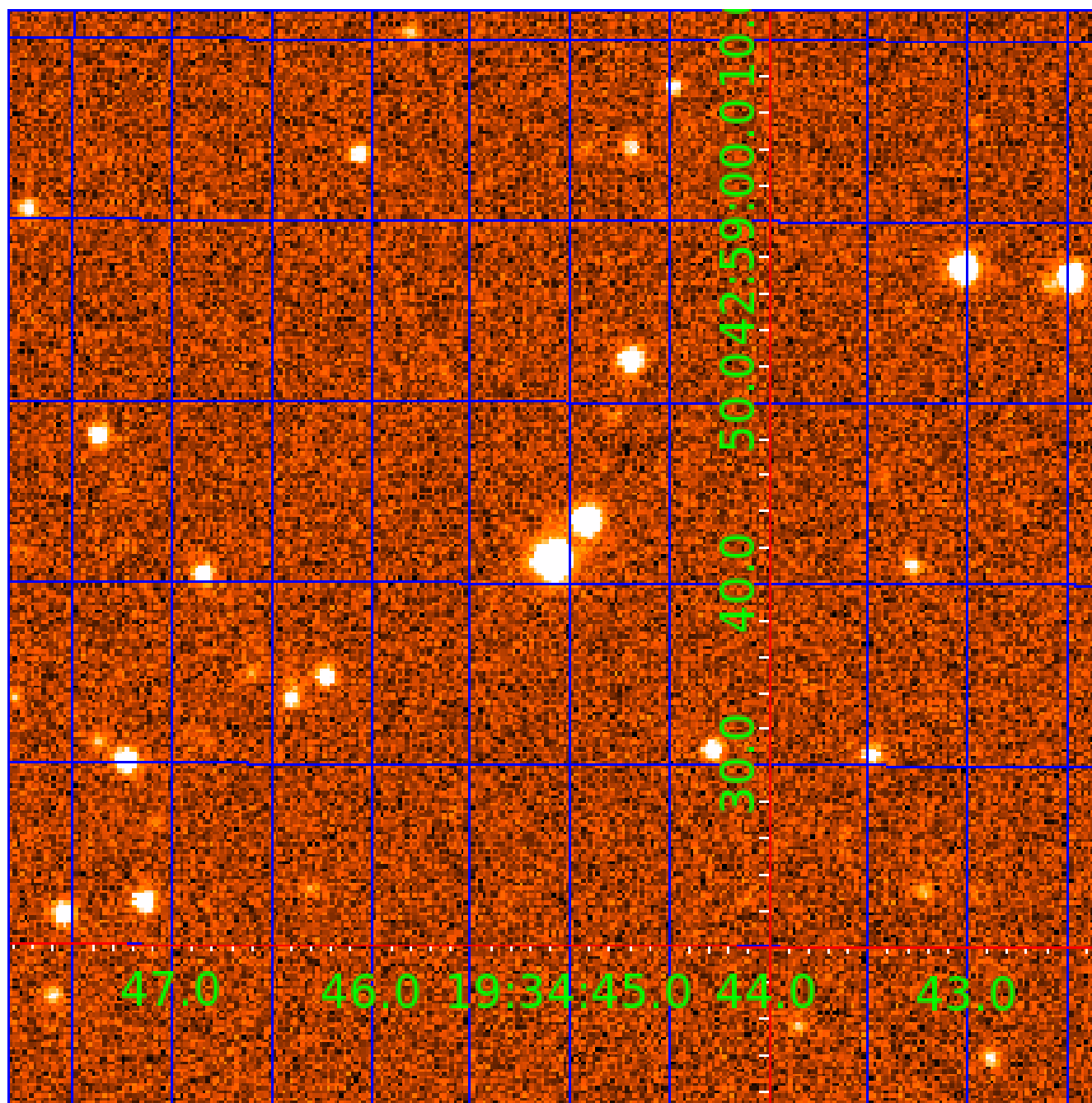


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UKIRT Image

Declination





# KIC 007368999

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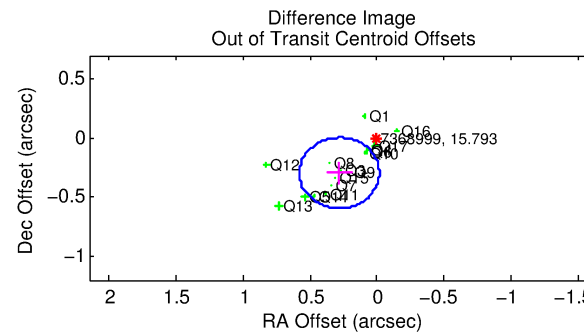
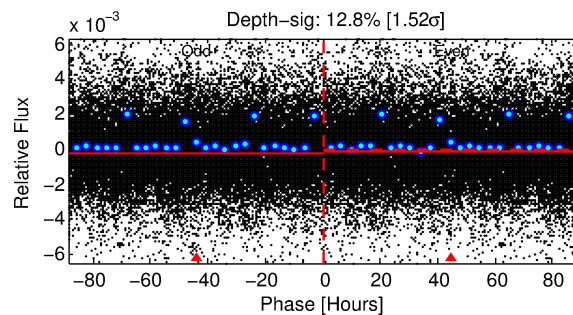
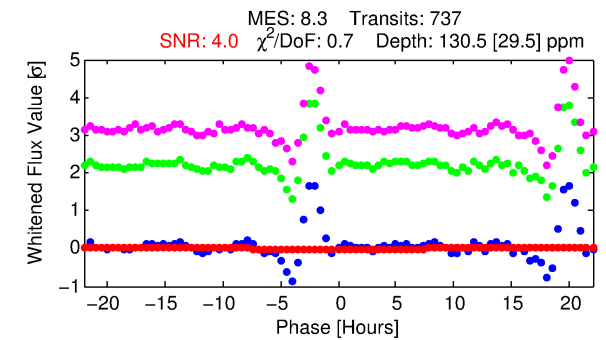
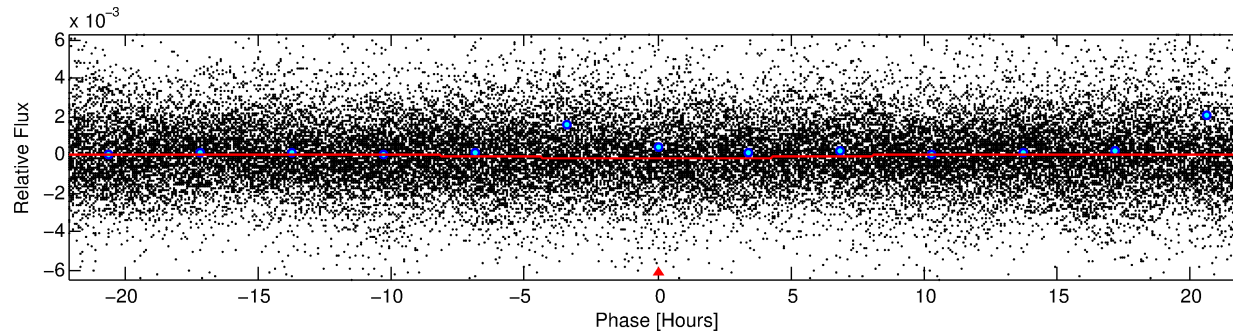
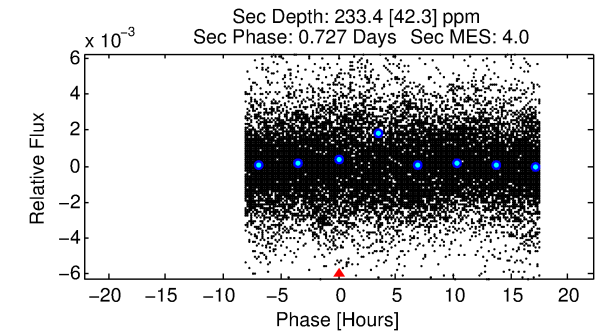
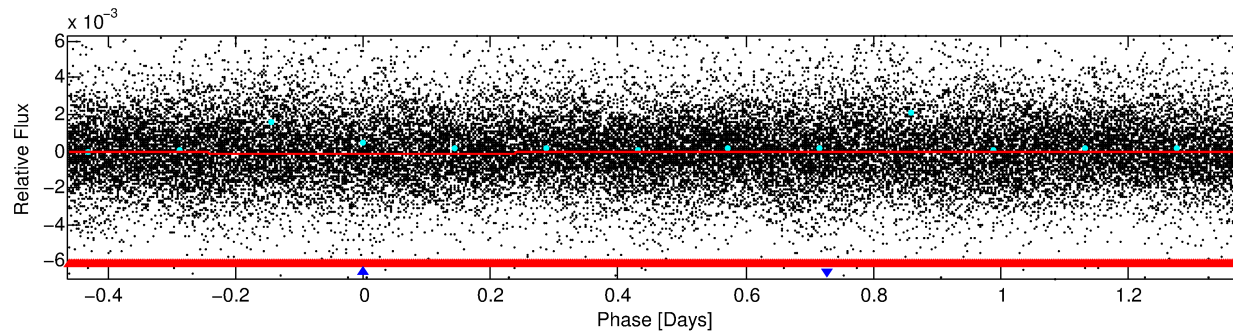
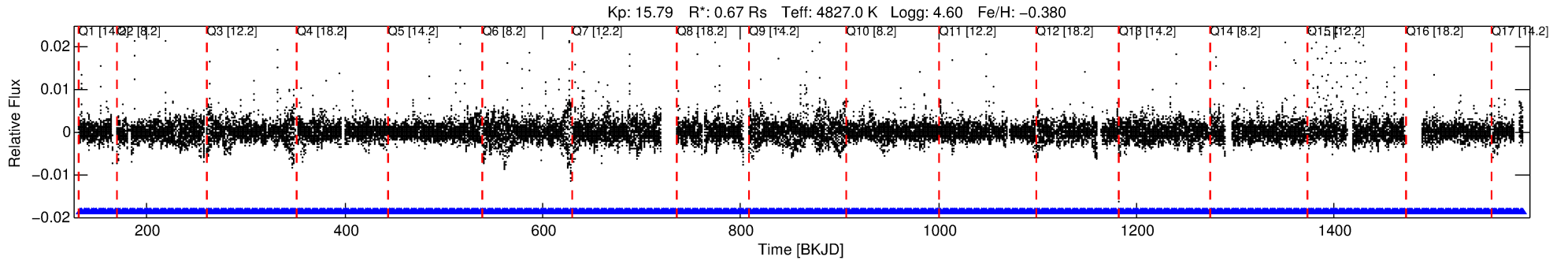
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 007368999-02

No Significant Match Found

# DV One-Page Summary

KIC: 7368999 Candidate: 2 of 2 Period: 1.847 d



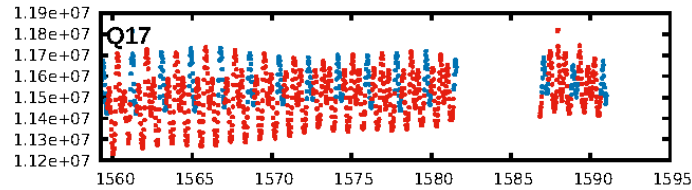
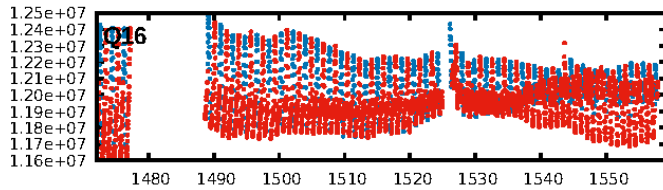
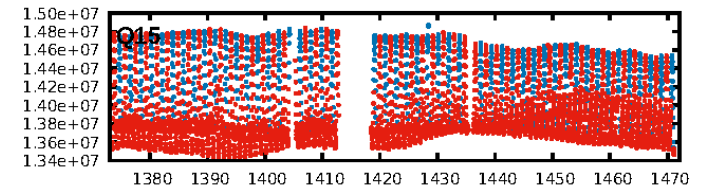
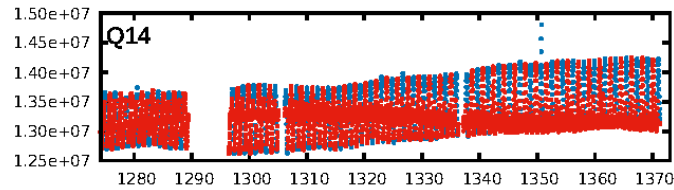
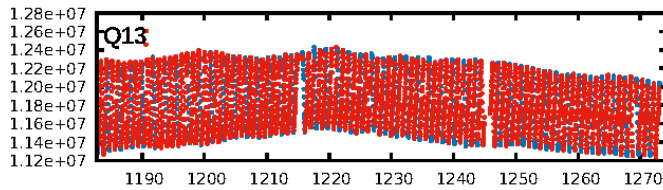
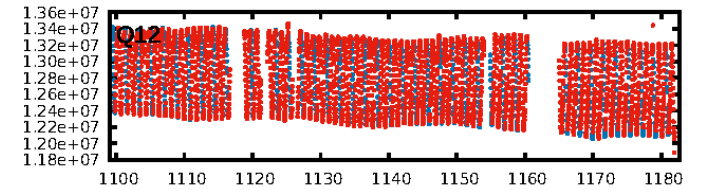
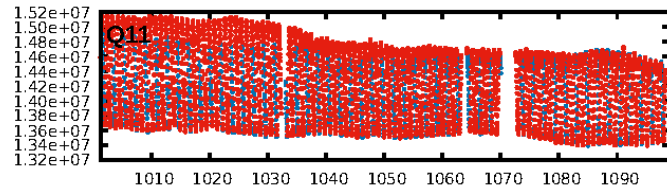
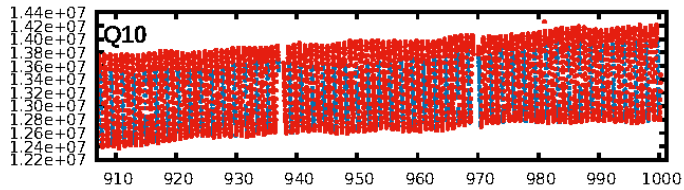
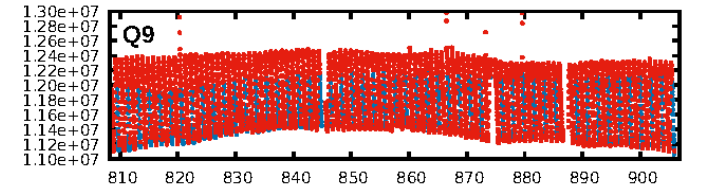
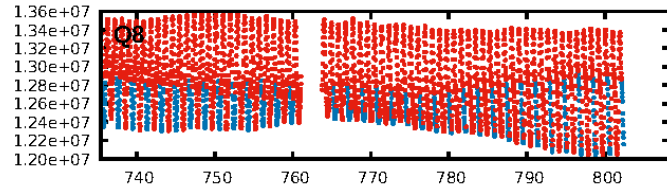
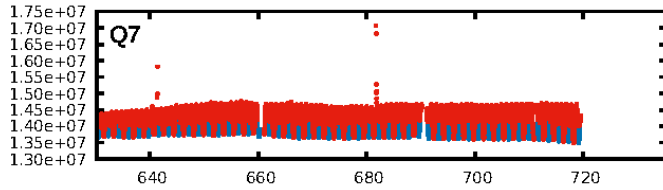
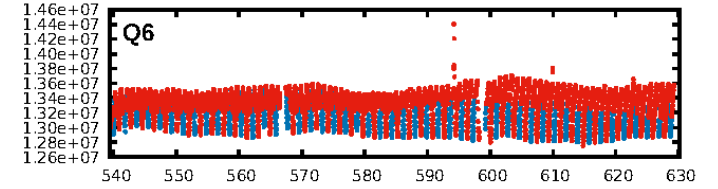
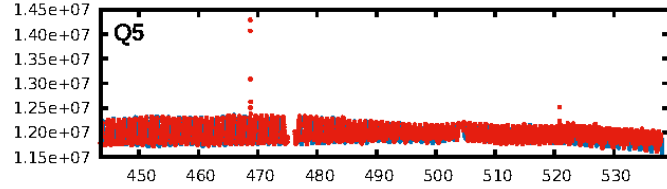
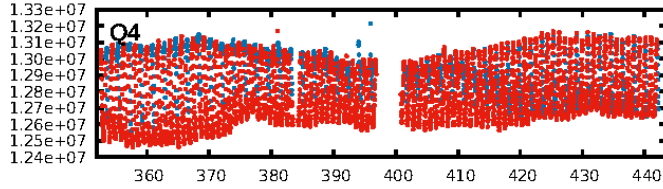
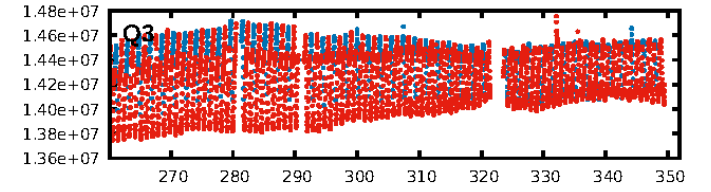
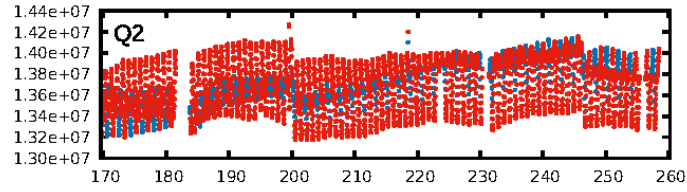
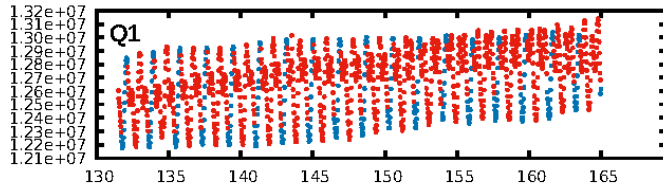
## DV Fit Results:

Period = 1.84674 [0.00007] d  
Epoch = 132.8444 [0.0220] BKJD  
Rp/R\* = 0.0124 [0.0021]  
a/R\* = 1.03 [0.03]  
b = 0.88 [0.14]  
Seff = 337.42 [56.31]  
Teff = 1093 [46] K  
Rp = 0.92 [0.18] Re  
a = 0.0256 [0.0021] AU  
Ag = 100.38 [40.65] [2.44σ]  
Teffp = 5348 [542] K [7.82σ]

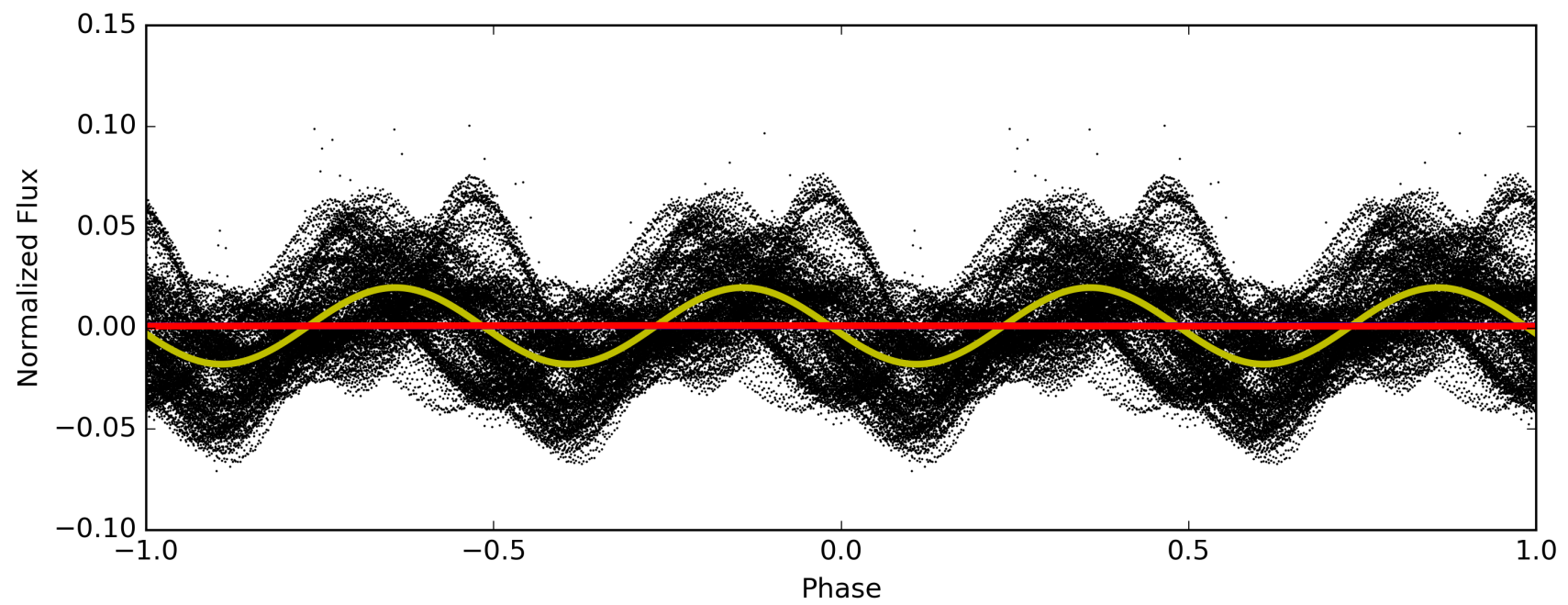
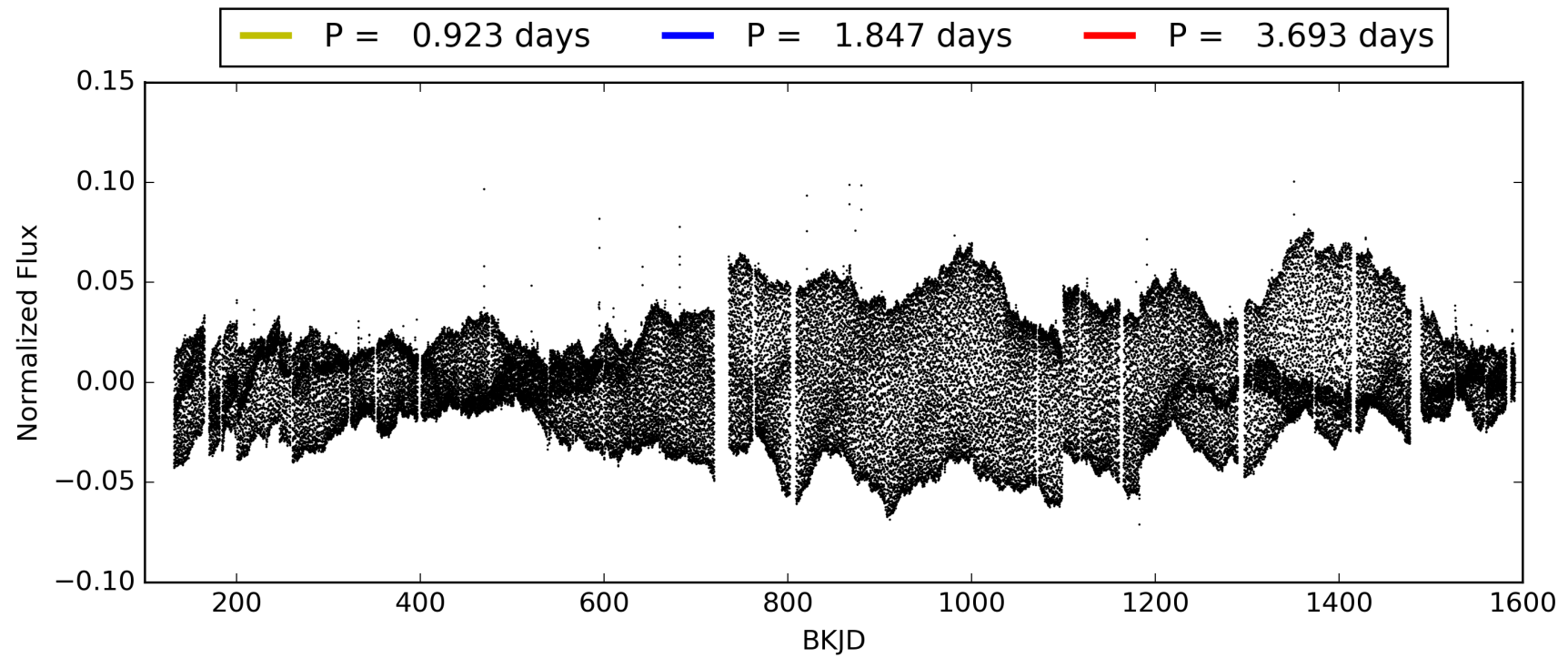
## DV Diagnostic Results:

ShortPeriod-sig: 79.8% [1.28σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [705/705]  
GhostDiagnostic-chr: 0.1449  
Centroid-sig: 13.8%  
Centroid-so: 0.275 arcsec [0.46σ]  
OotOffset-rm: 0.408 arcsec [4.09σ]  
KicOffset-rm: 0.112 arcsec [1.11σ]  
OotOffset-st: 3/4/4/5 [16]  
KicOffset-st: 3/4/4/5 [16]  
DiffImageQuality-fgm: 0.50 [8/16]  
DiffImageOverlap-fno: 0.00 [0/17]

# TCE 007368999-02, PDC Light Curves



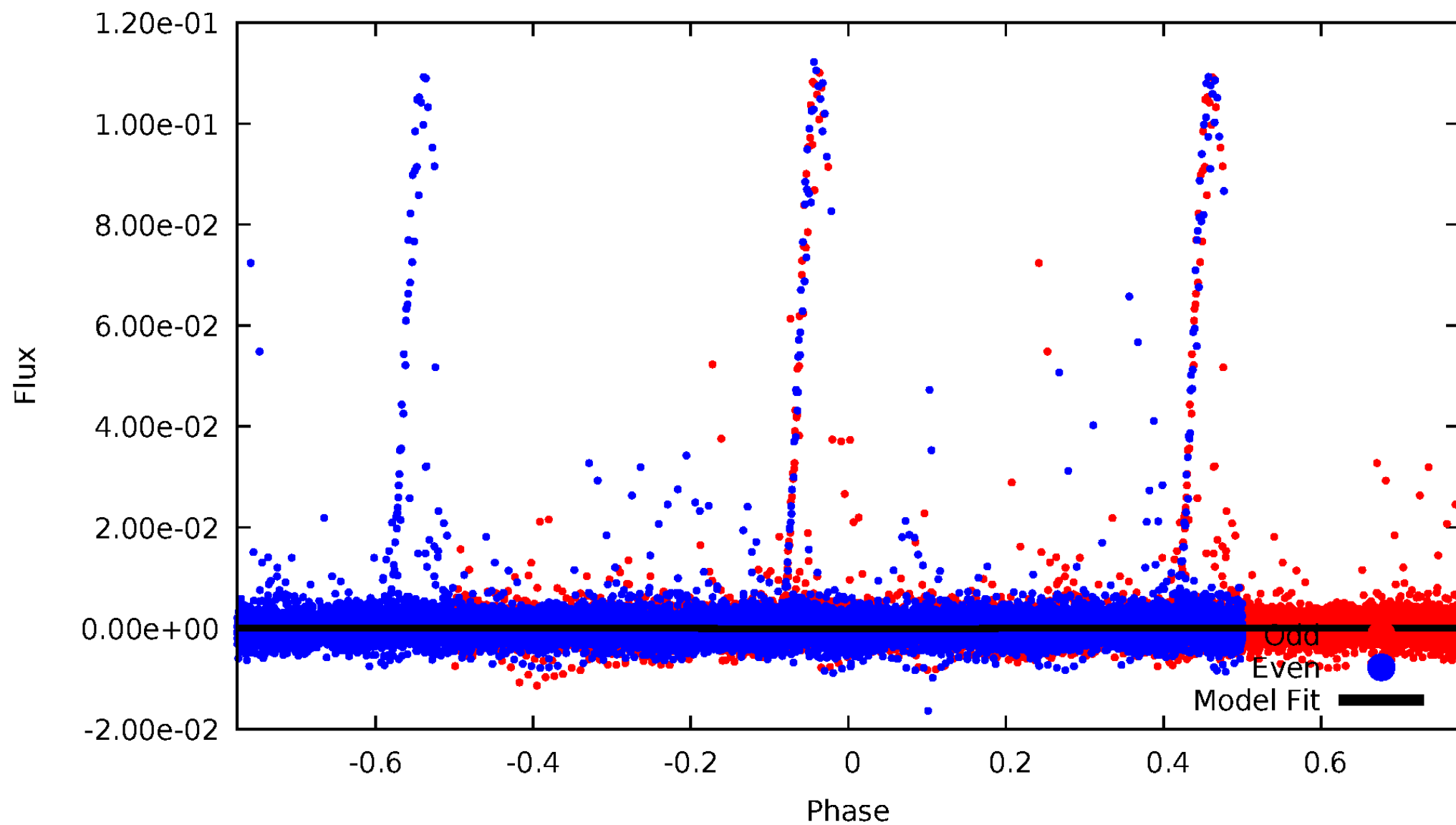
TCE 007368999-02





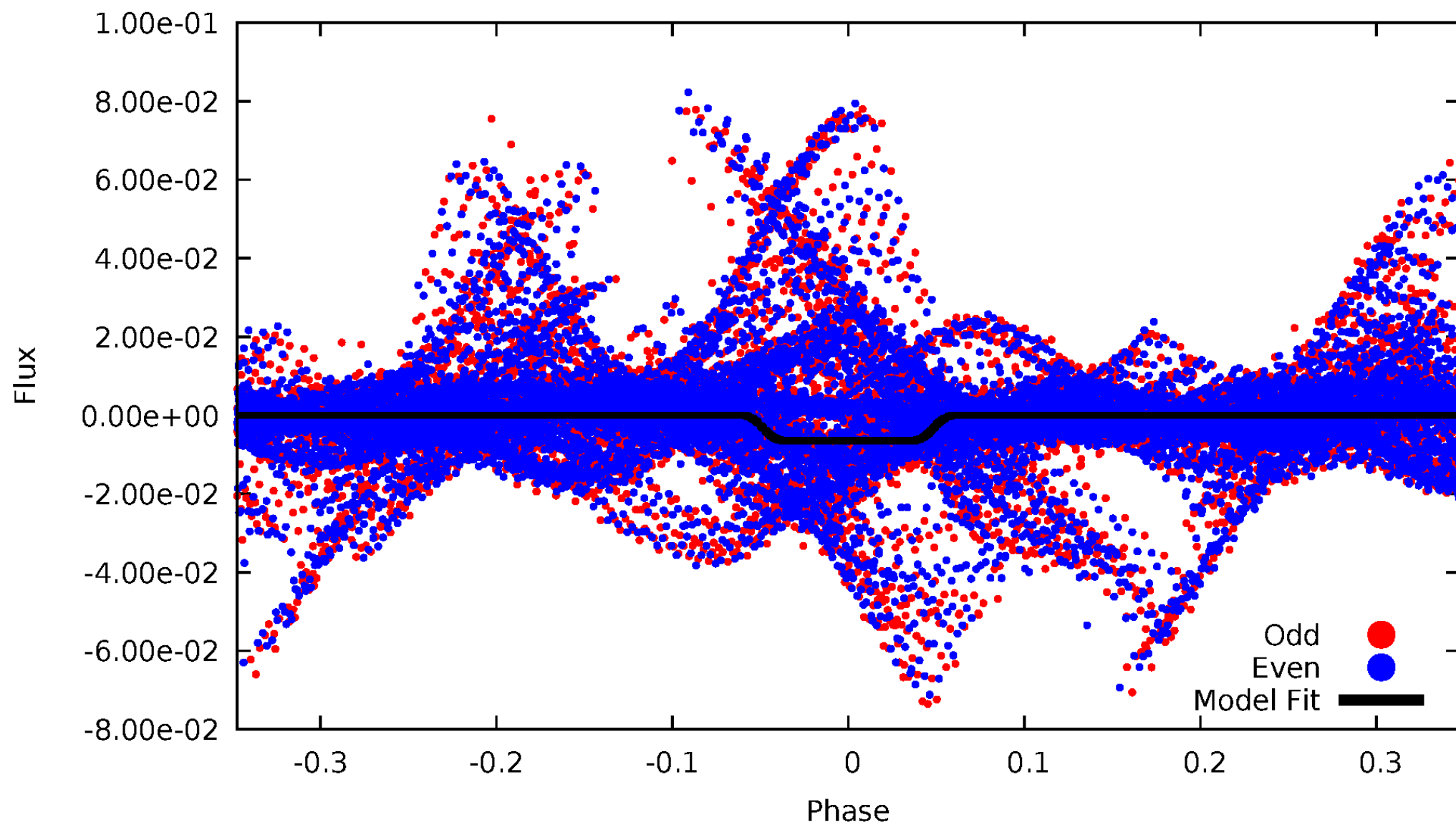
# DV Odd/Even

TCE 007368999-02



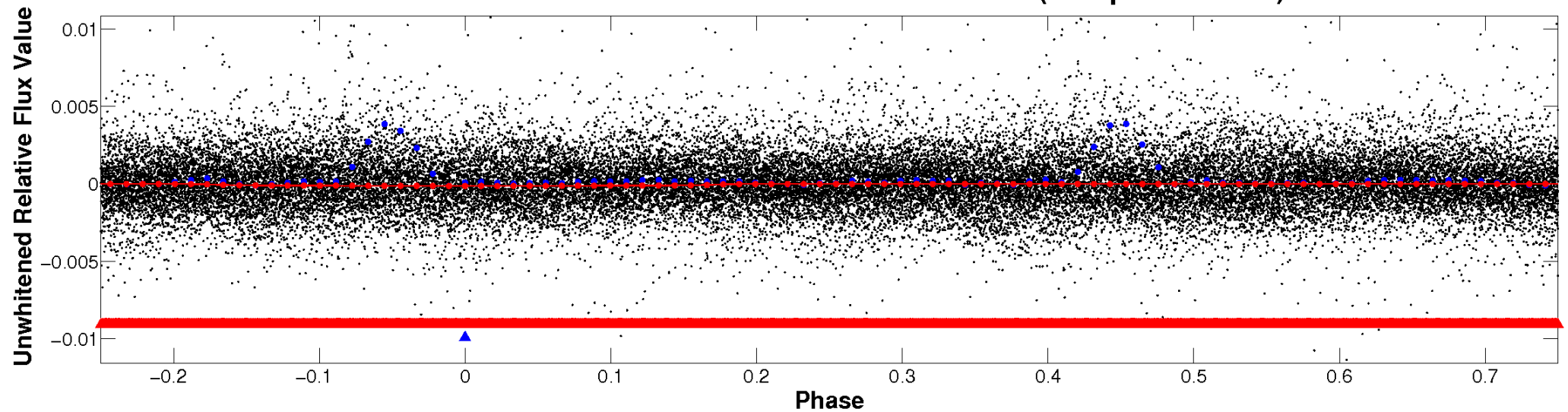
# ALT Odd/Even

TCE 007368999-02

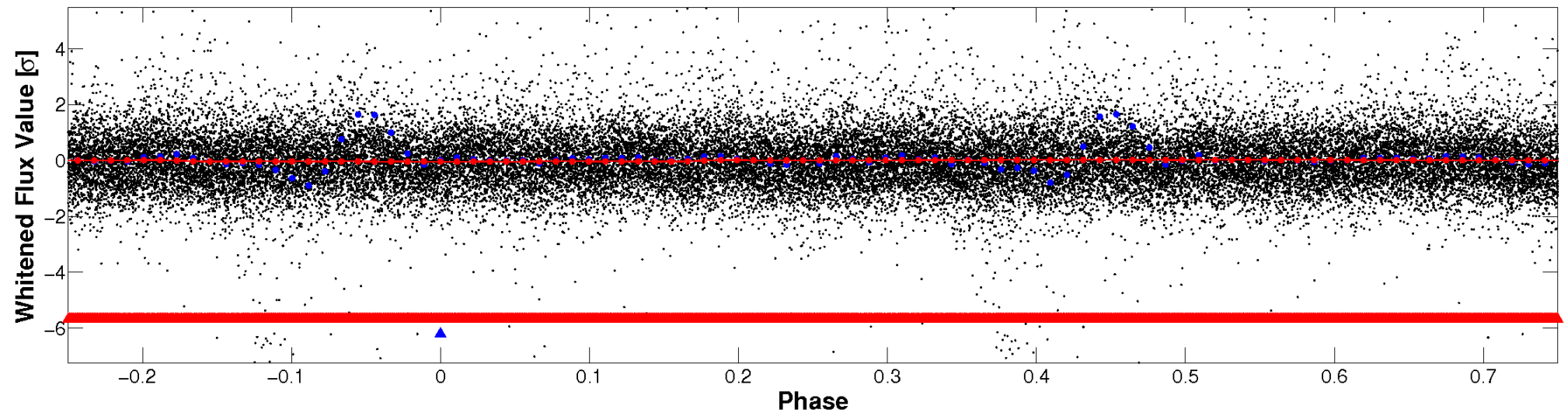


# Non-Whitened Vs. Whitened Light Curve

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

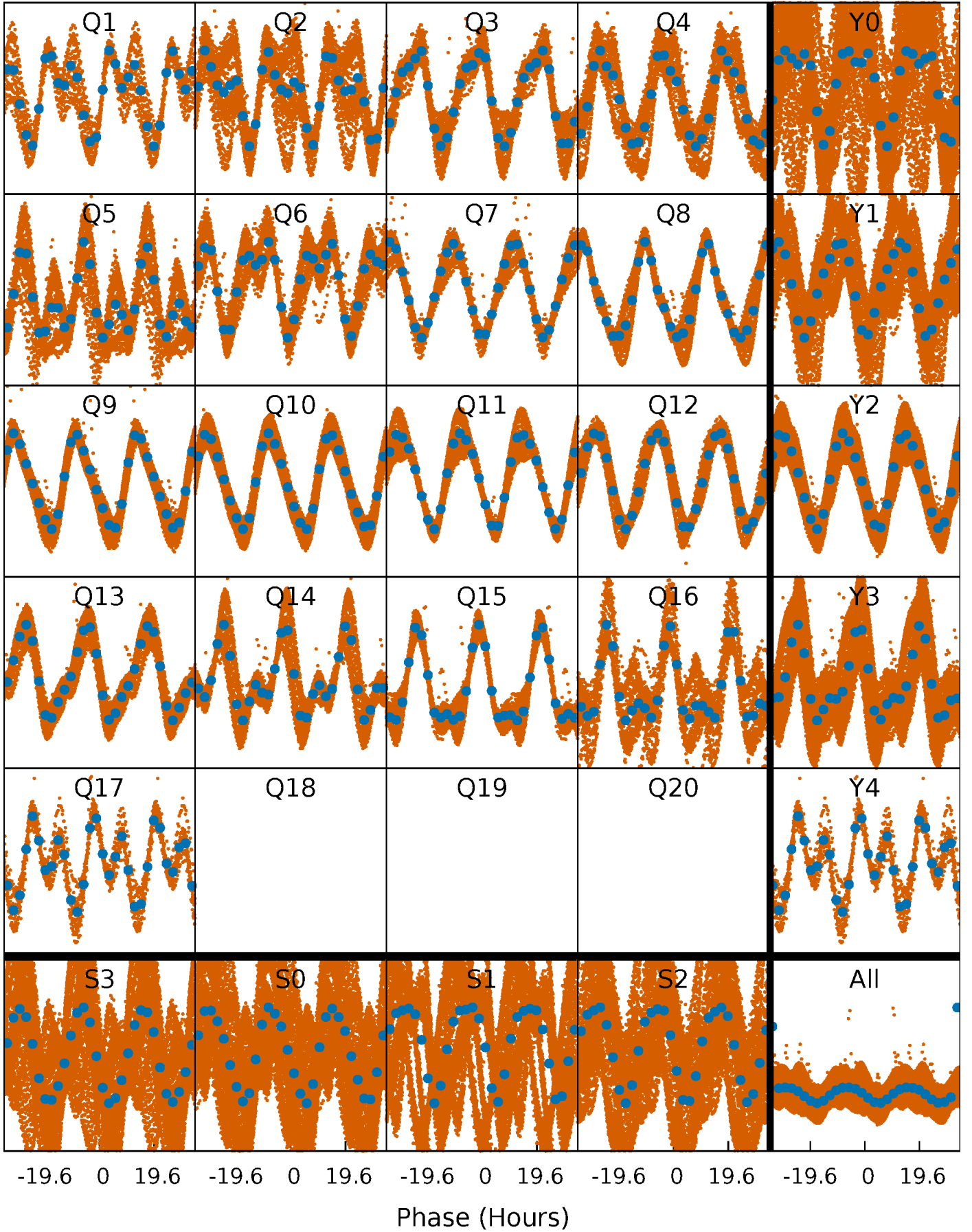


**Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



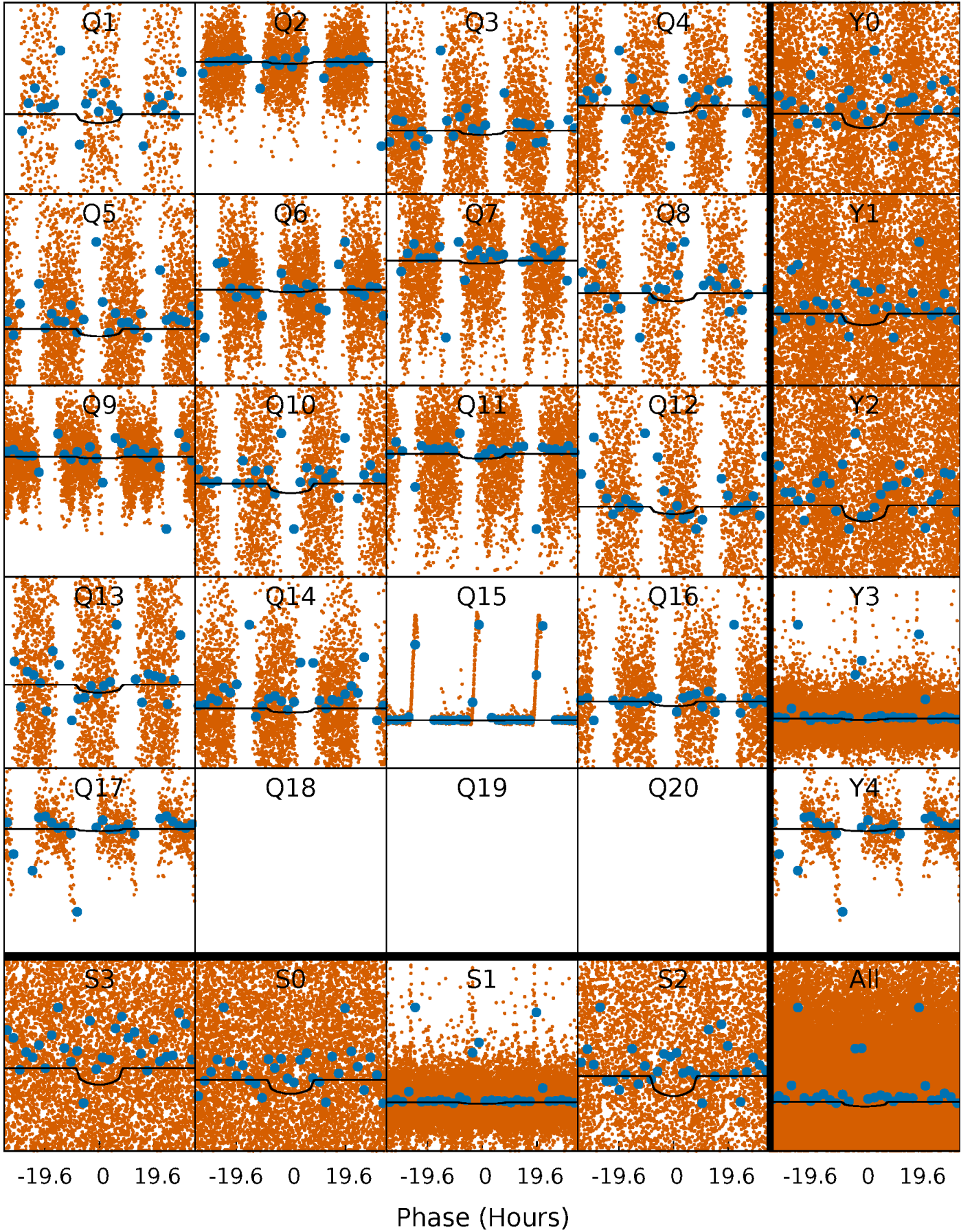
# PDC Quarter-Phased Transit Curves

TCE 007368999-02   P= 1.846742 Days    $T_0=132.844402$  (BKJD)



# DV Quarter-Phased Transit Curves

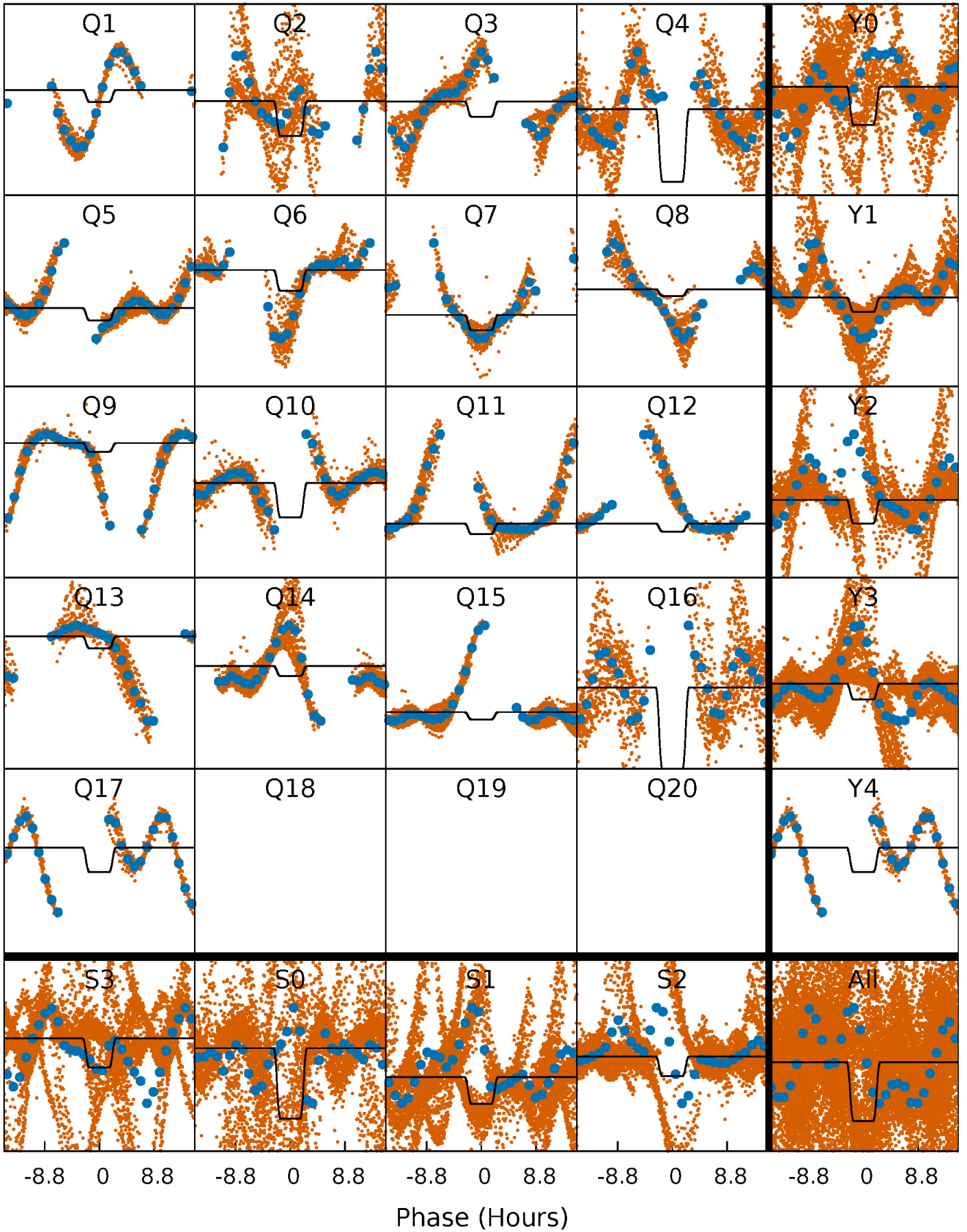
TCE 007368999-02   P= 1.846742 Days    $T_0=132.844402$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

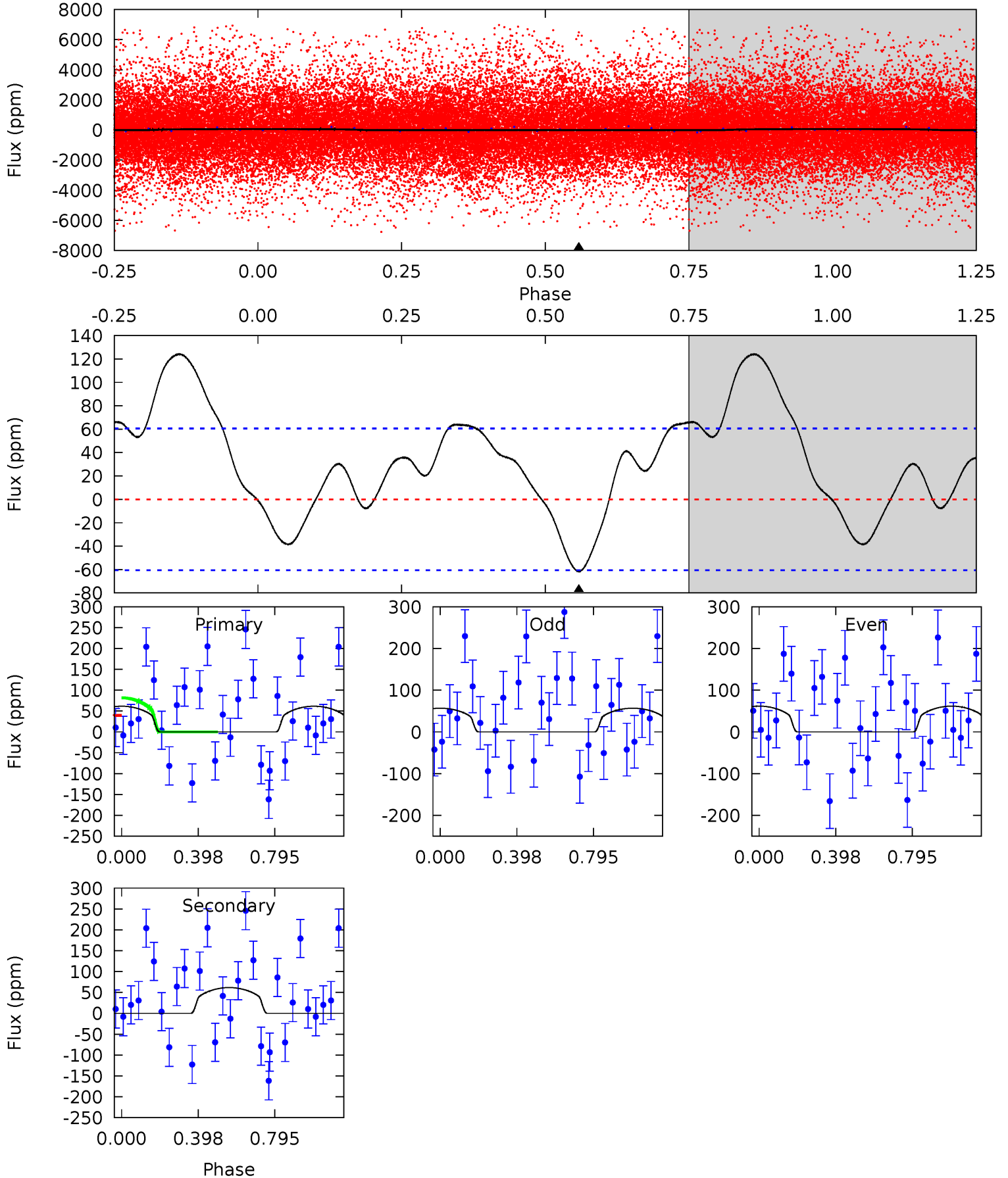
TCE 007368999-02   P= 1.846576 Days    $T_0=132.881114$  (BKJD)



# DV Model-Shift Uniqueness Test

007368999-02, P = 1.846742 Days, E = 130.997660 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
4.34	4.34	0	0	4.27	0.85	1.60	4.34	4.34	4.34	4.34	0.18	14.9	0.67	1.44

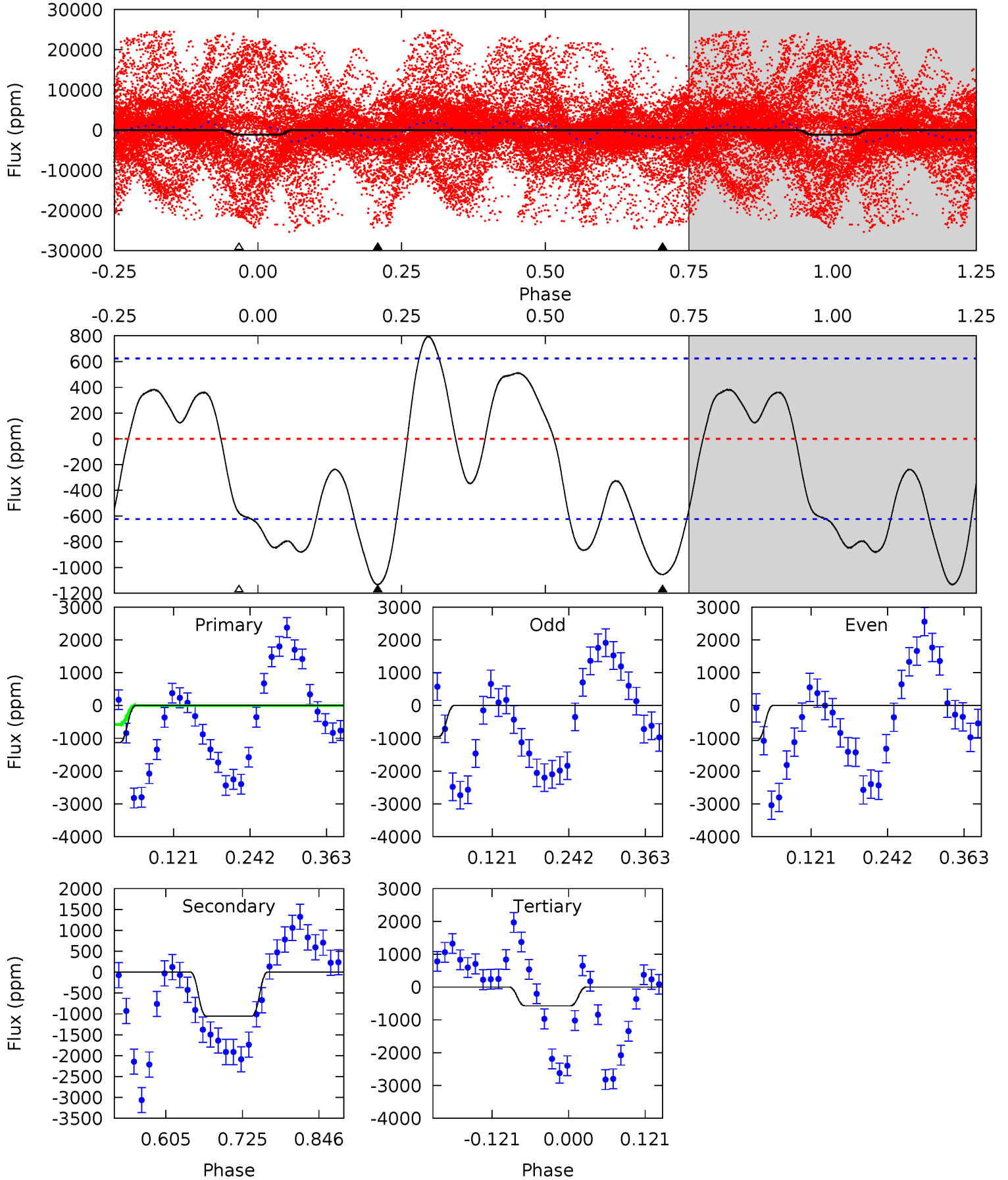




# Alt Model-Shift Uniqueness Test

007368999-02, P = 1.846576 Days, E = 131.034538 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
8.22	7.65	4.16	0	4.52	1.55	3.45	4.06	8.22	3.49	7.65	0.42	-186.3	0.41	5.62



### Stellar Parameters For KIC 007368999

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$4827^{+144}_{-144}$	$4.597^{+0.063}_{-0.036}$	$-0.380^{+0.300}_{-0.300}$	$0.674^{+0.060}_{-0.066}$	$0.656^{+0.086}_{-0.046}$	$3.014^{+0.804}_{-0.440}$
	+3%/-3%	+1%/-1%	+79%/-79%	+9%/-10%	+13%/-7%	+27%/-15%
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 007368999-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-62 \pm 14$	$0.91^{+0.19}_{-0.16}$	$1521^{+51}_{-59}$	$4029^{+349}_{-303}$	$26^{+15}_{-9}$
Alt.	$-1054 \pm 138$	$5.94^{+0.35}_{-0.35}$	$1521^{+55}_{-55}$	$3460^{+117}_{-114}$	$11^{+2}_{-2}$

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

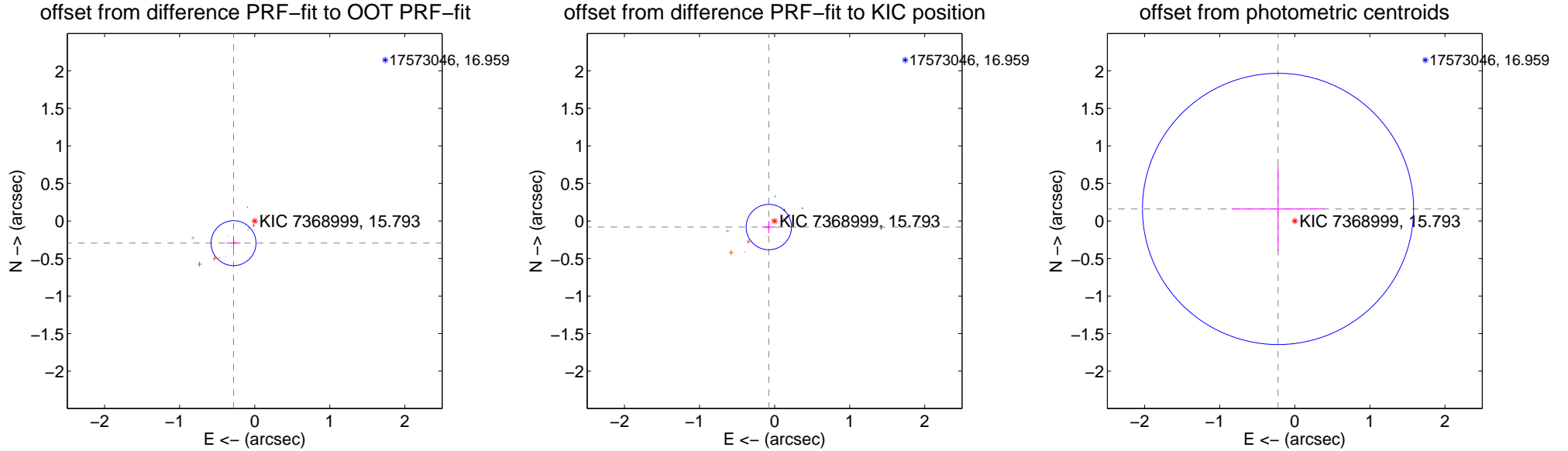
## DV Centroid Data

Supplemental centroid analysis for 007368999-02. Kepler magnitude: 15.79. Transit SNR 4.03

There are 8 quarters with good PRF difference image offsets

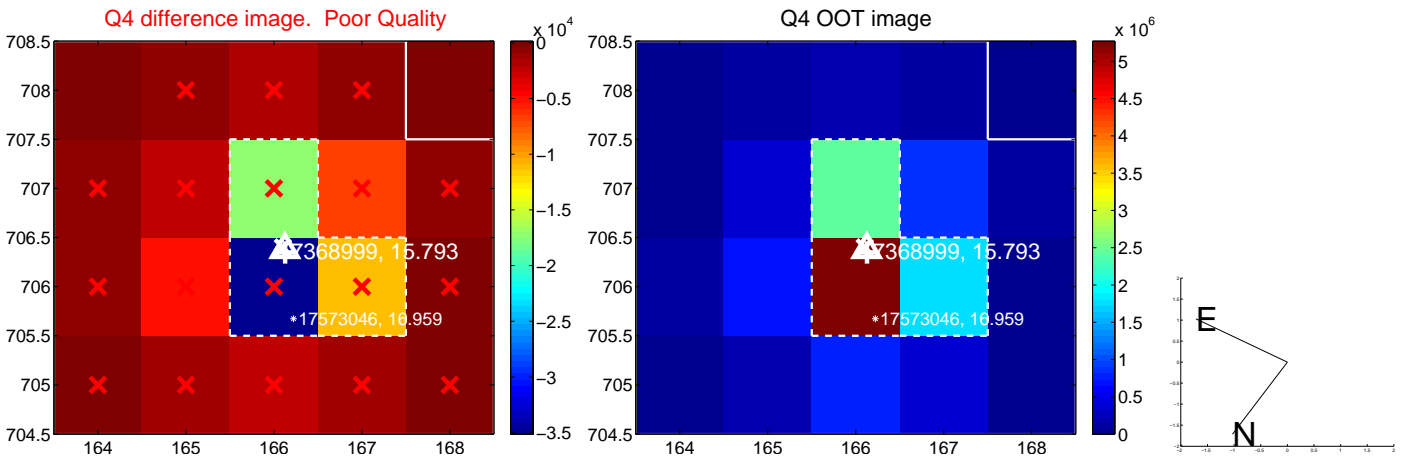
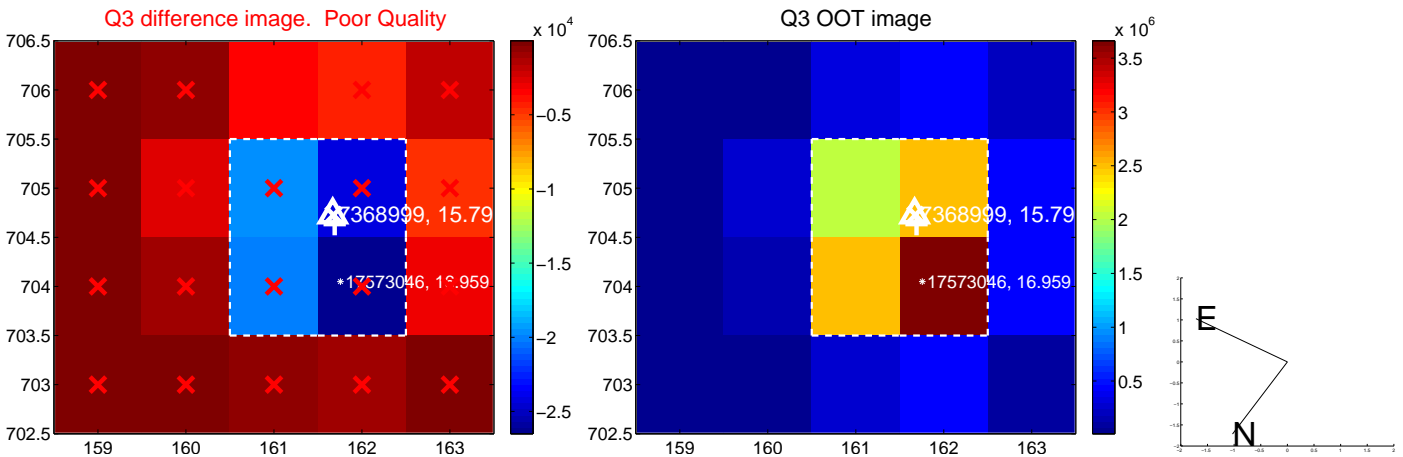
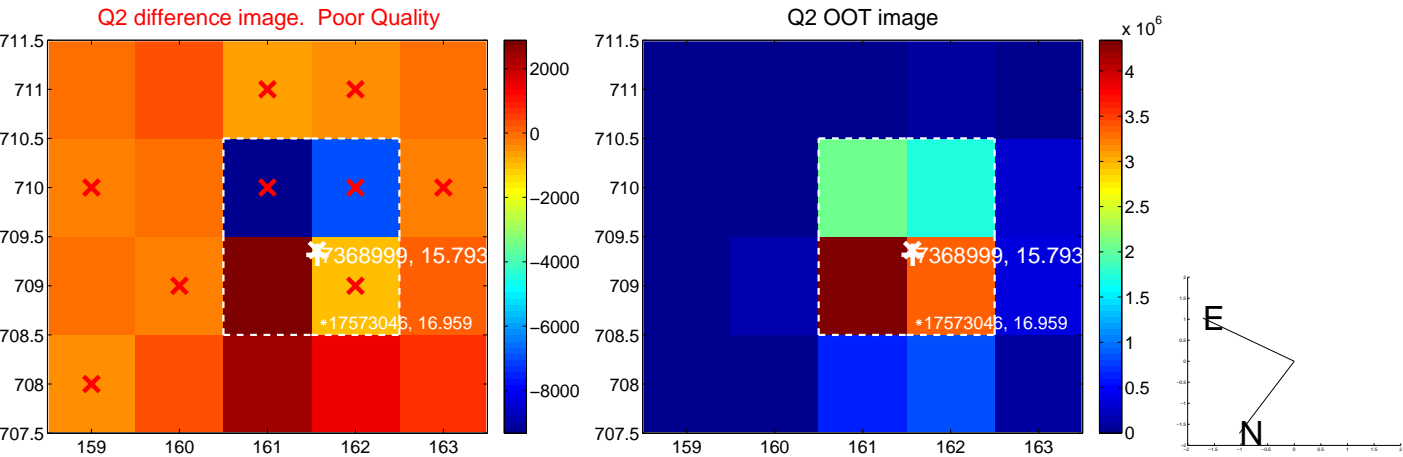
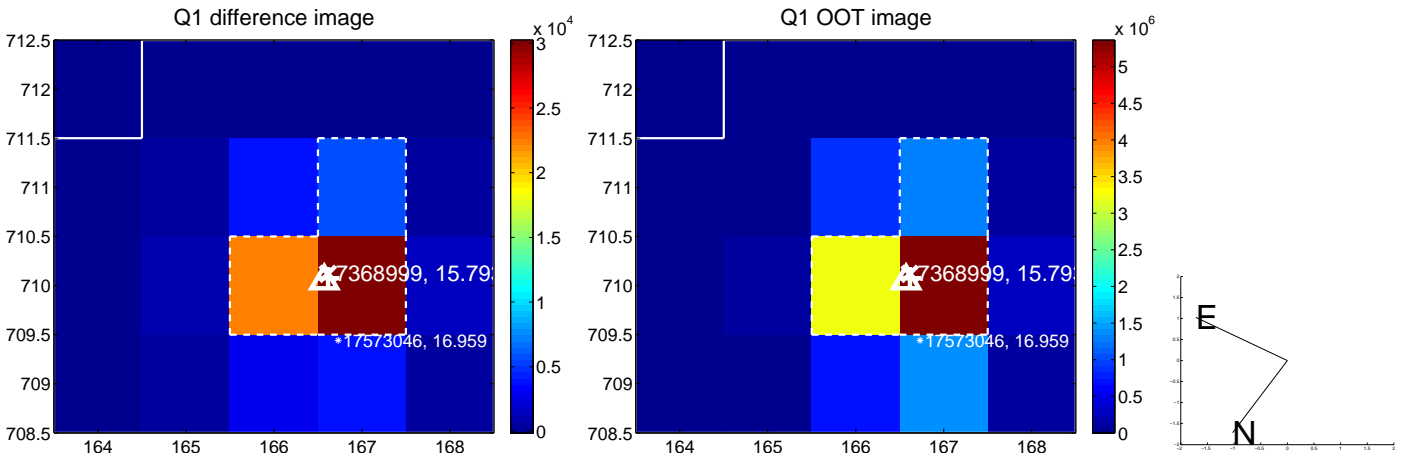
The direct PRF centroid is offset from the target star catalog position by about 0.25 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b><math>0.408 \pm 0.100</math></b>	<b>4.09</b>	$0.282 \pm 0.093$	$-0.295 \pm 0.083$
PRF-fit source offset from KIC position	$0.112 \pm 0.101$	1.11	$0.077 \pm 0.094$	$-0.081 \pm 0.082$
photometric centroid source offset	$0.27 \pm 0.60$	0.46	$0.22 \pm 0.62$	$0.16 \pm 0.57$

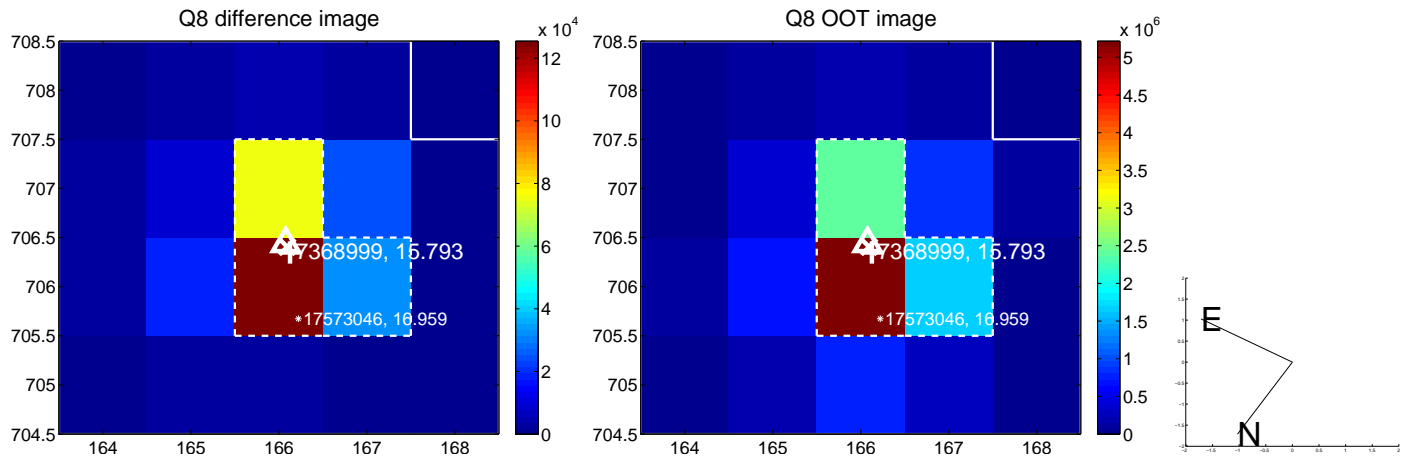
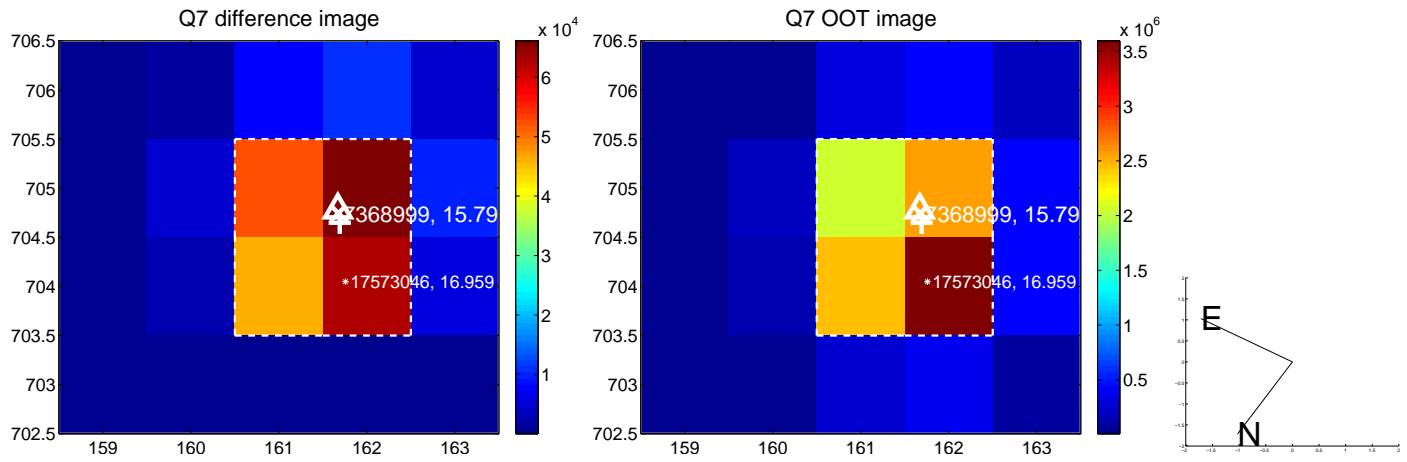
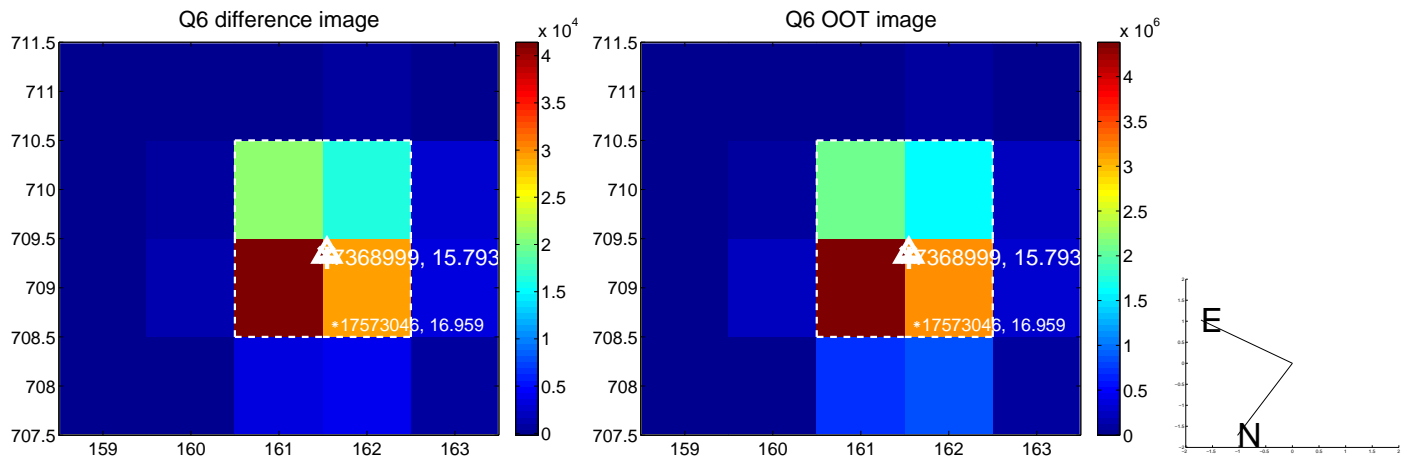
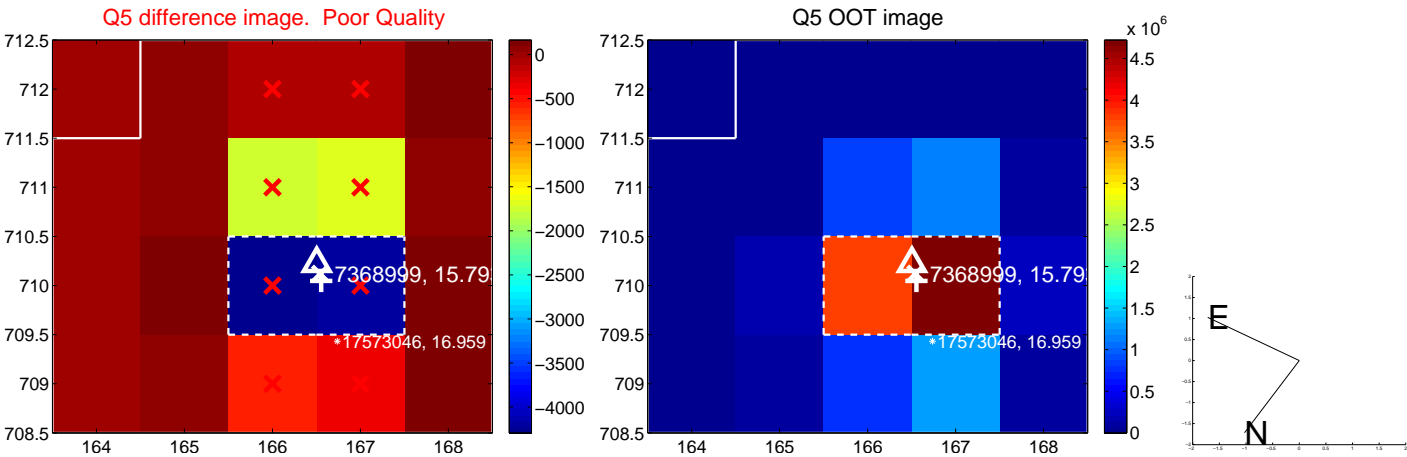


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

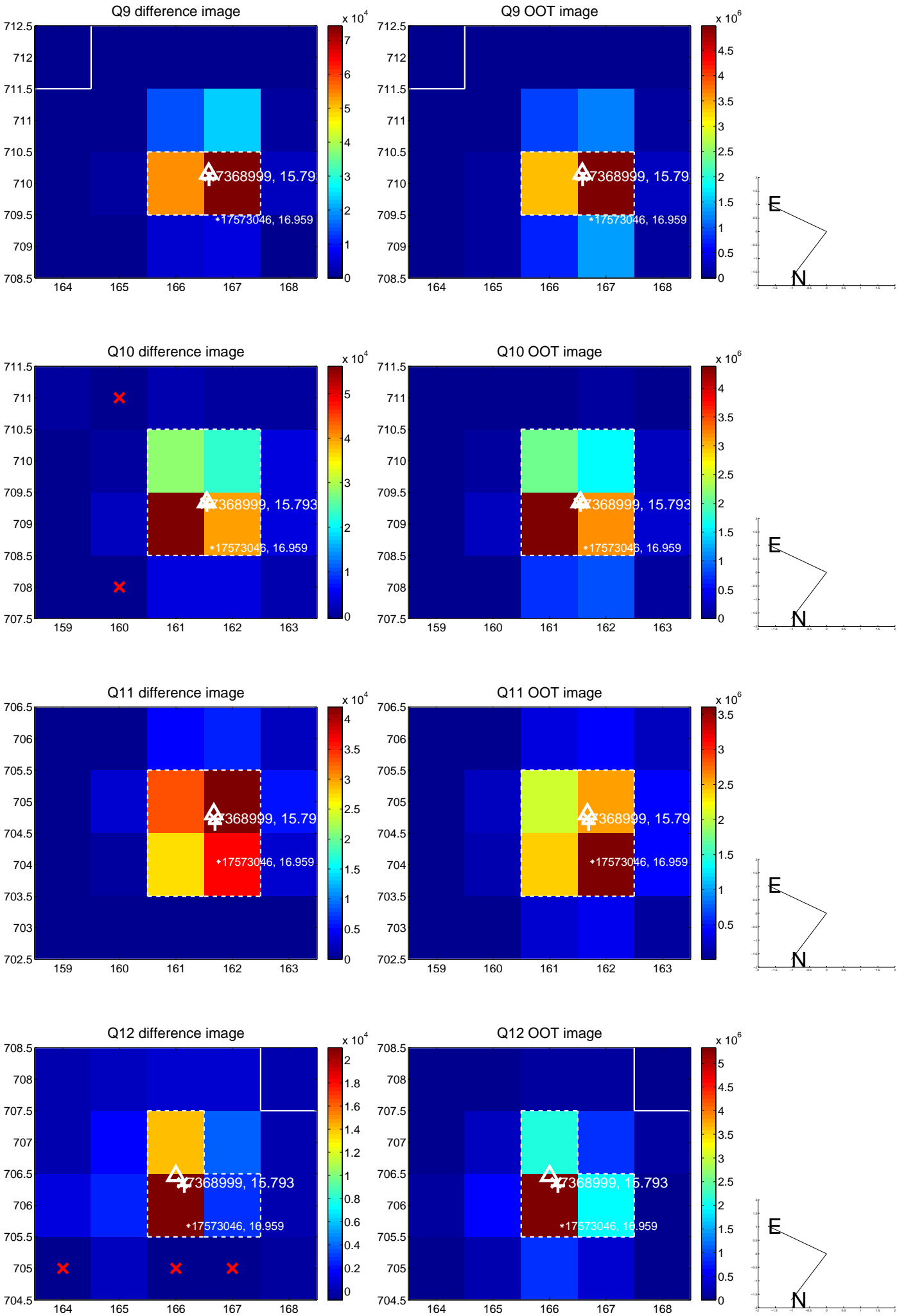
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



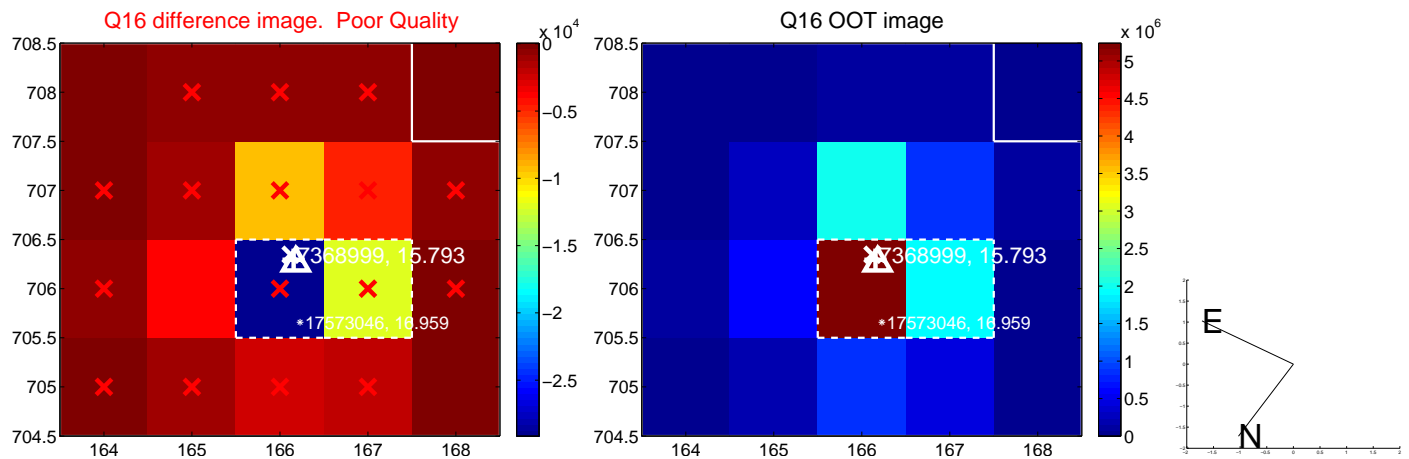
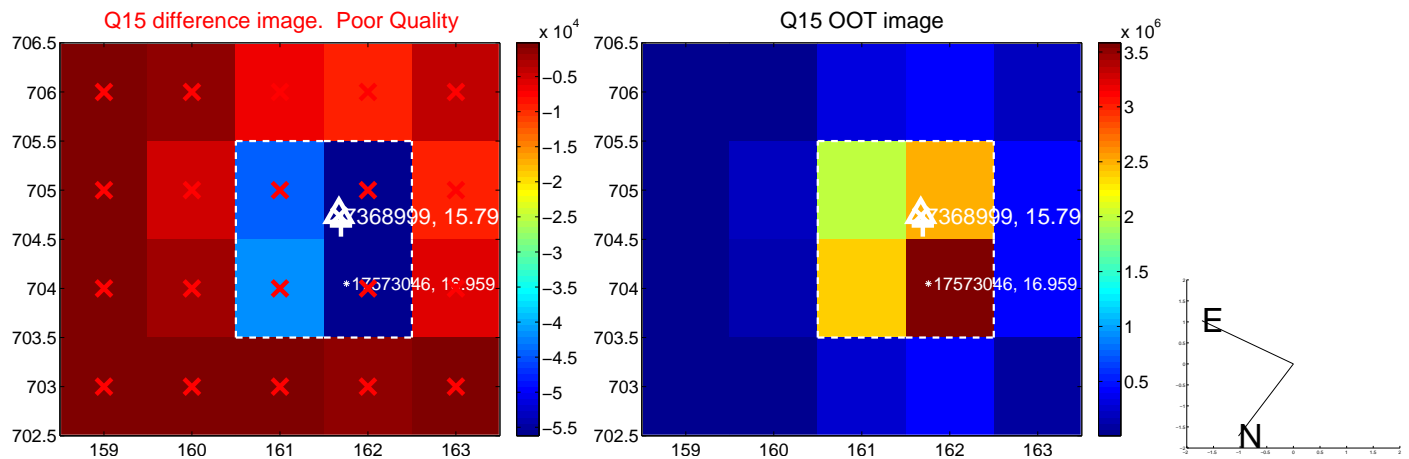
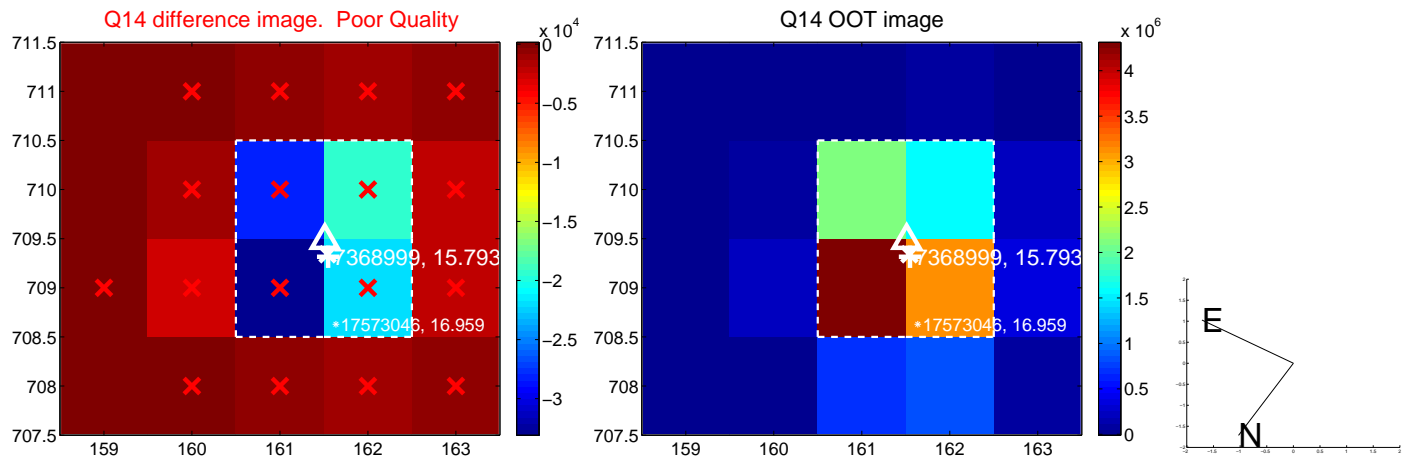
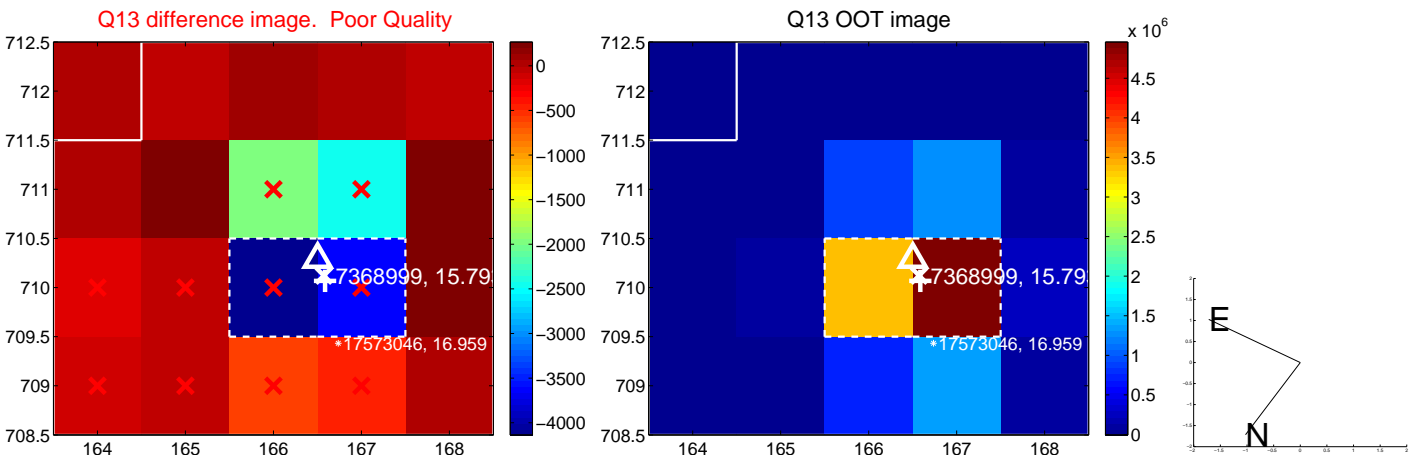
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

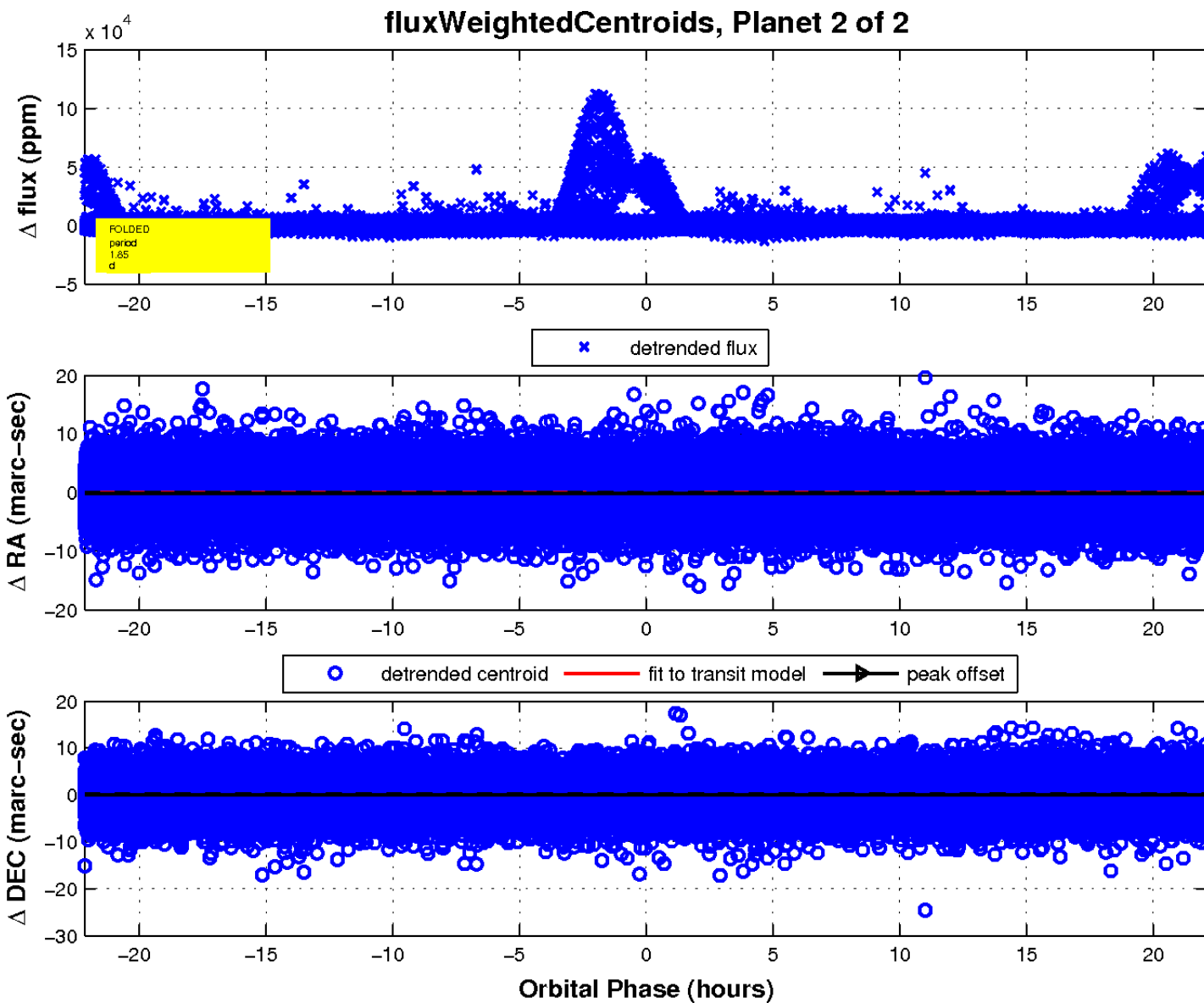
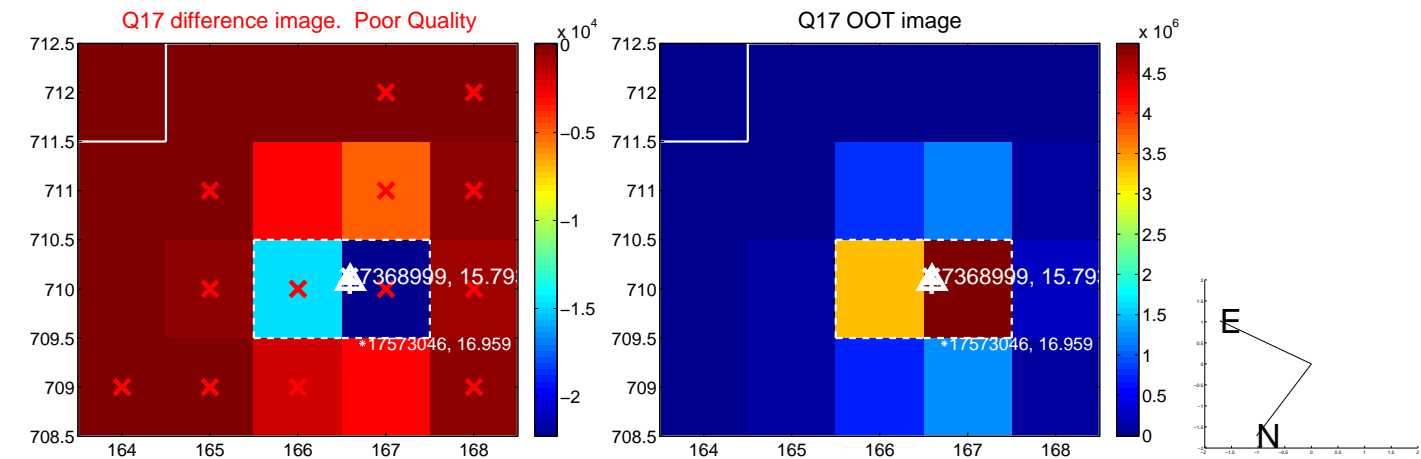


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





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



UKIRT Image

Declination

