

# KIC 006631188

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006631188-01	OBS	No	2.515936	133.436395	40.7	6.021	14.6	11.6	2.03	7714	1.32	6828.35
006631188-02	OBS	No	5.030954	131.664246	188.8	6.000	8.5	-1.0	2.03	7714	2.83	2710.49

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006631188-01	OBS	FP	0.00	1	0	0	0	<del>SWEET_NTL</del> <del>—LPP_DV</del> <del>—MOD_NONUNIQ_DV</del>
006631188-02	OBS	FP	0.00	1	0	1	0	<del>LPP_DV</del> <del>—LPP_ALT</del> <del>—SAME_NTL_PERIOD</del> <del>—CENT_NOFITS</del> <del>—HALO_GHOST</del>

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

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

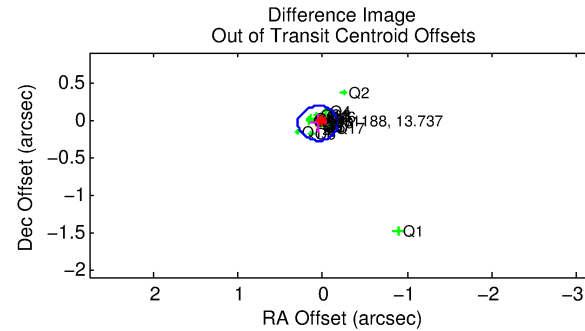
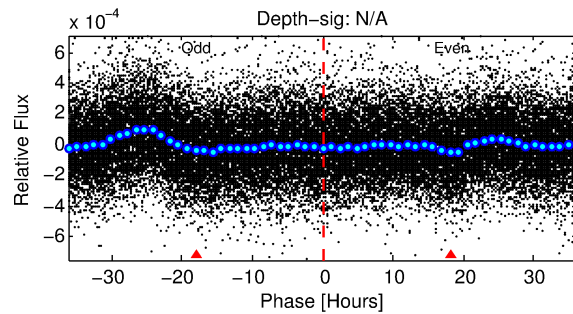
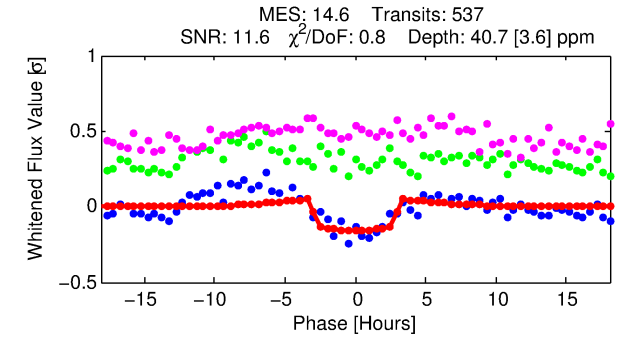
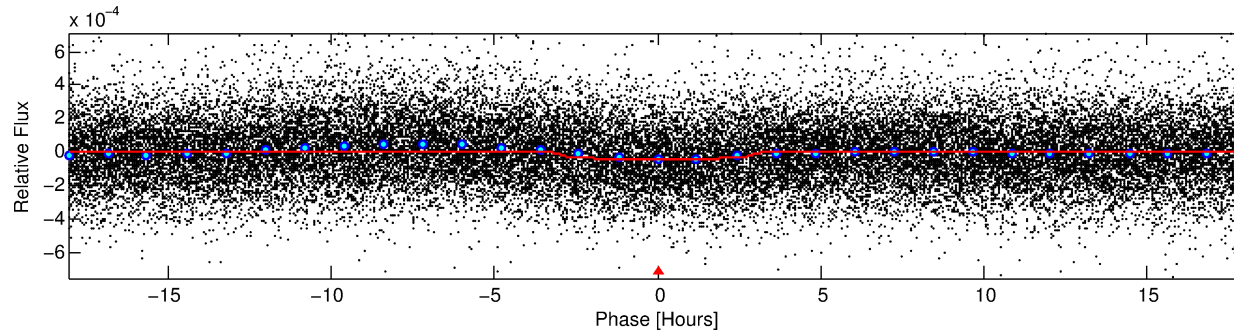
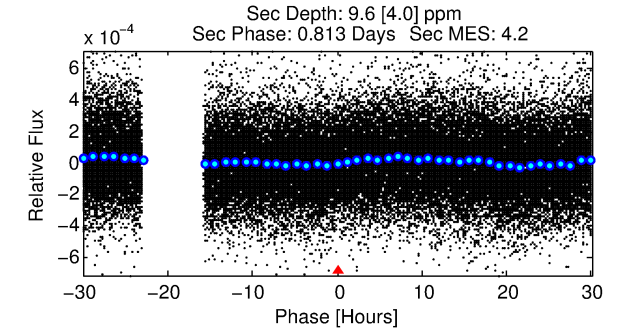
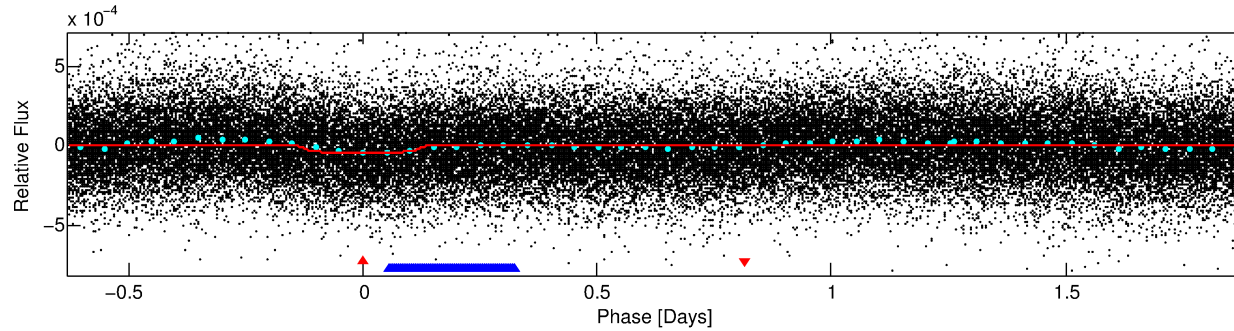
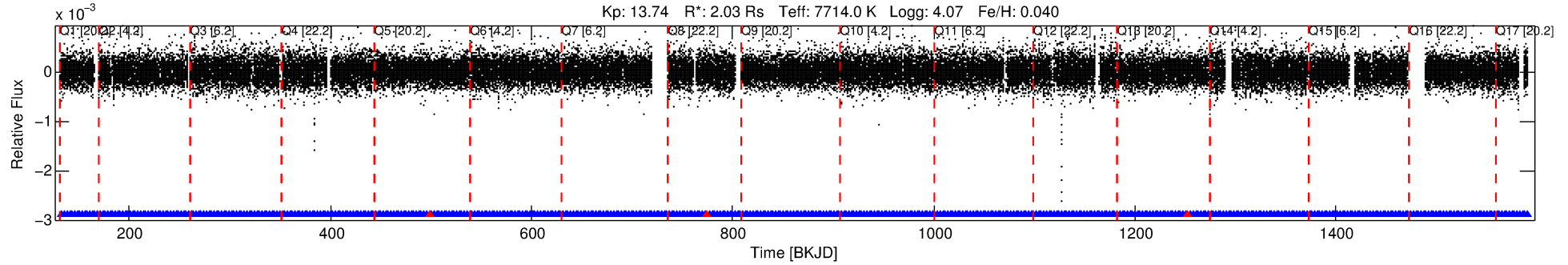
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 006631188-01

No Significant Match Found

# DV One-Page Summary

KIC: 6631188 Candidate: 1 of 2 Period: 2.516 d



## DV Fit Results:

Period = 2.51594 [0.00002] d  
Epoch = 133.4364 [0.0045] BKJD  
Rp/R\* = 0.0060 [0.0027]  
a/R\* = 3.15 [7.79]  
b = 0.27 [9.33]  
Seff = 6828.35 [2317.83]  
Teff = 2318 [197] K  
Rp = 1.32 [0.69] Re  
a = 0.0437 [0.0093] AU  
Ag = 5.76 [6.01] [0.79σ]  
Teffp = 5551 [1410] K [2.27σ]

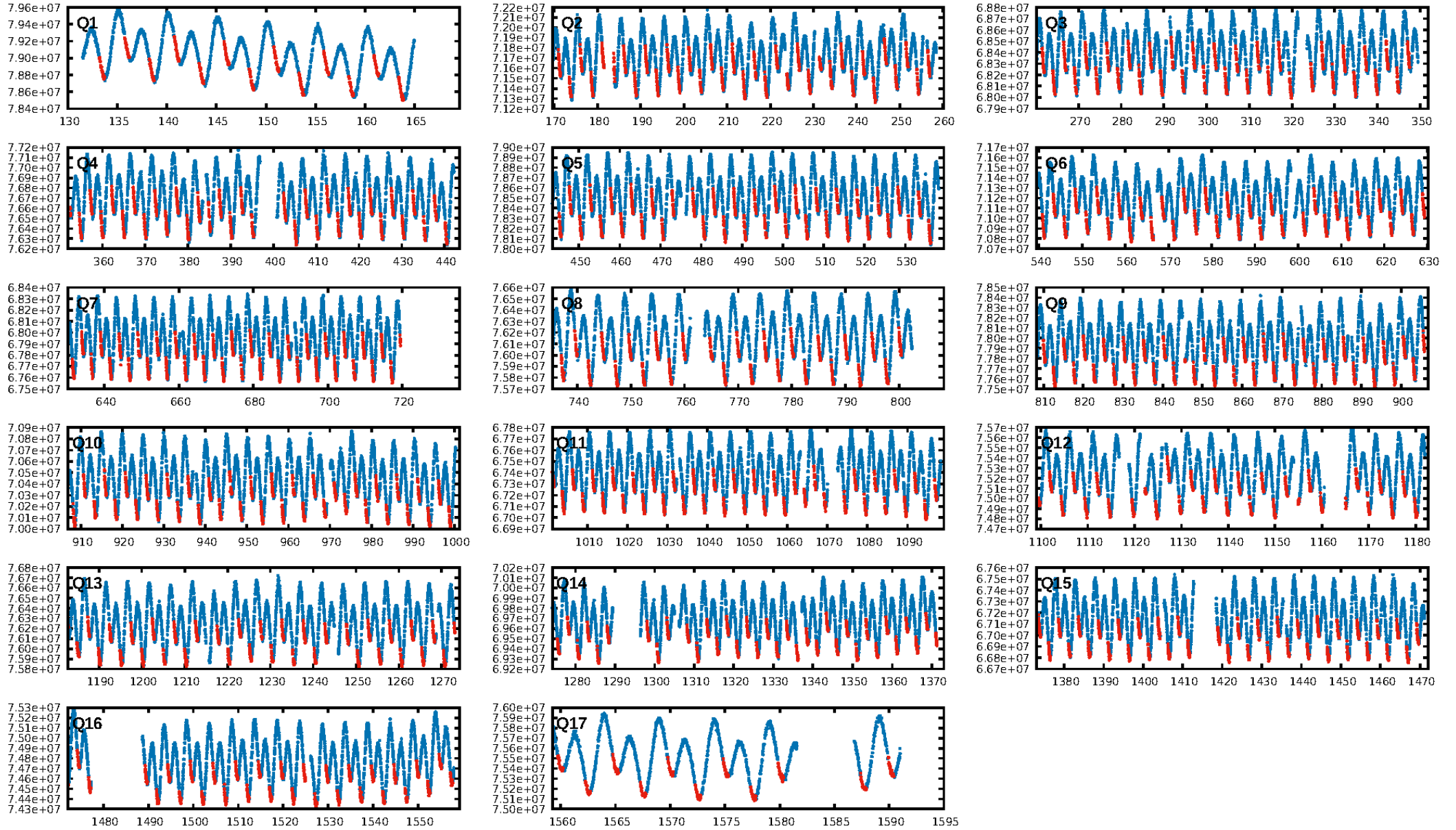
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [7.10σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 1.21e-41  
RollingBand-fgt: 0.99 [510/513]  
GhostDiagnostic-chr: 2.087  
Centroid-sig: 0.0%  
Centroid-so: 2.275 arcsec [2.18σ]  
OotOffset-rm: 0.072 arcsec [0.93σ]  
KicOffset-rm: 0.038 arcsec [0.33σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 1.00 [17/17]  
DiffImageOverlap-fno: 1.00 [17/17]

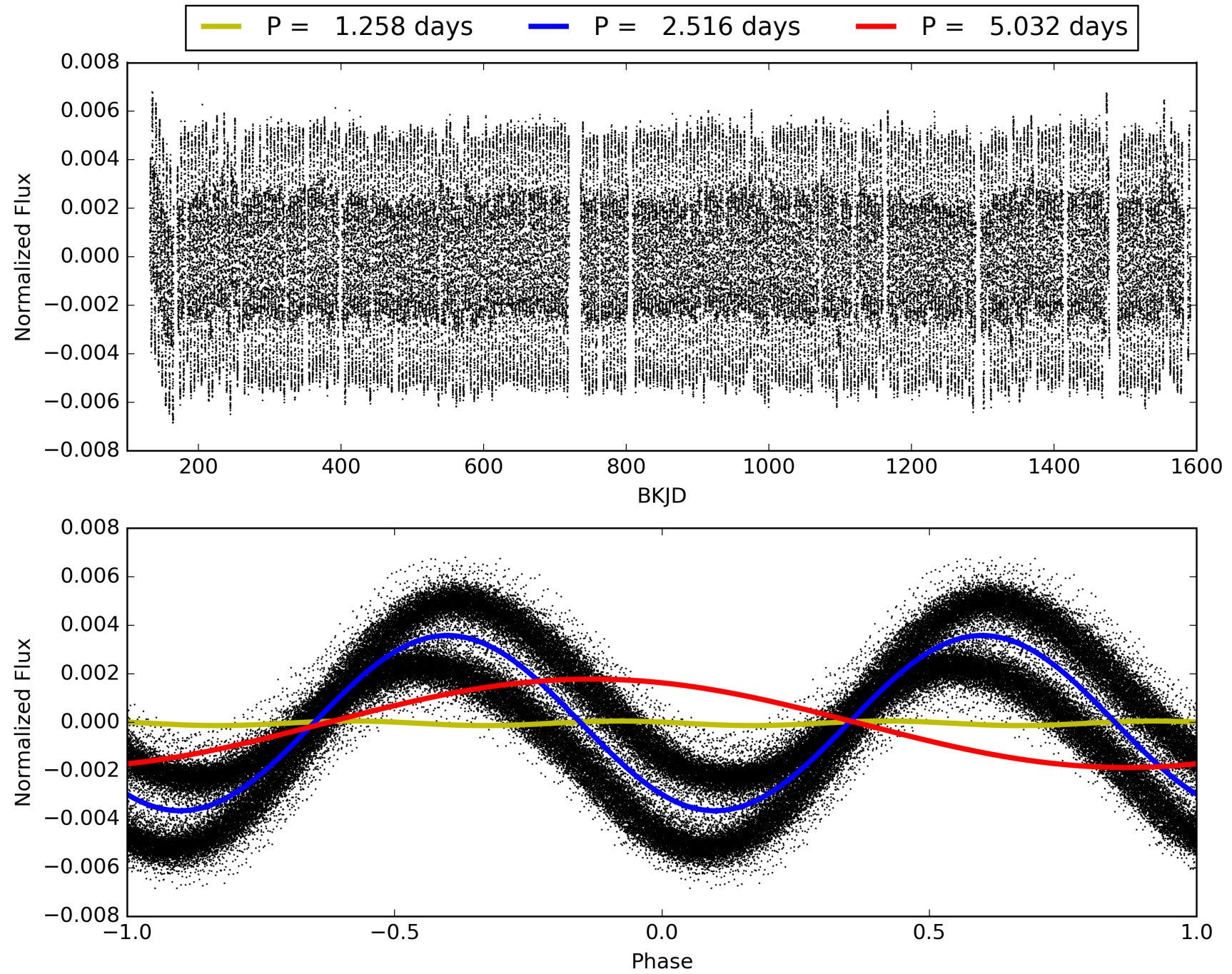
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 006631188-01, PDC Light Curves



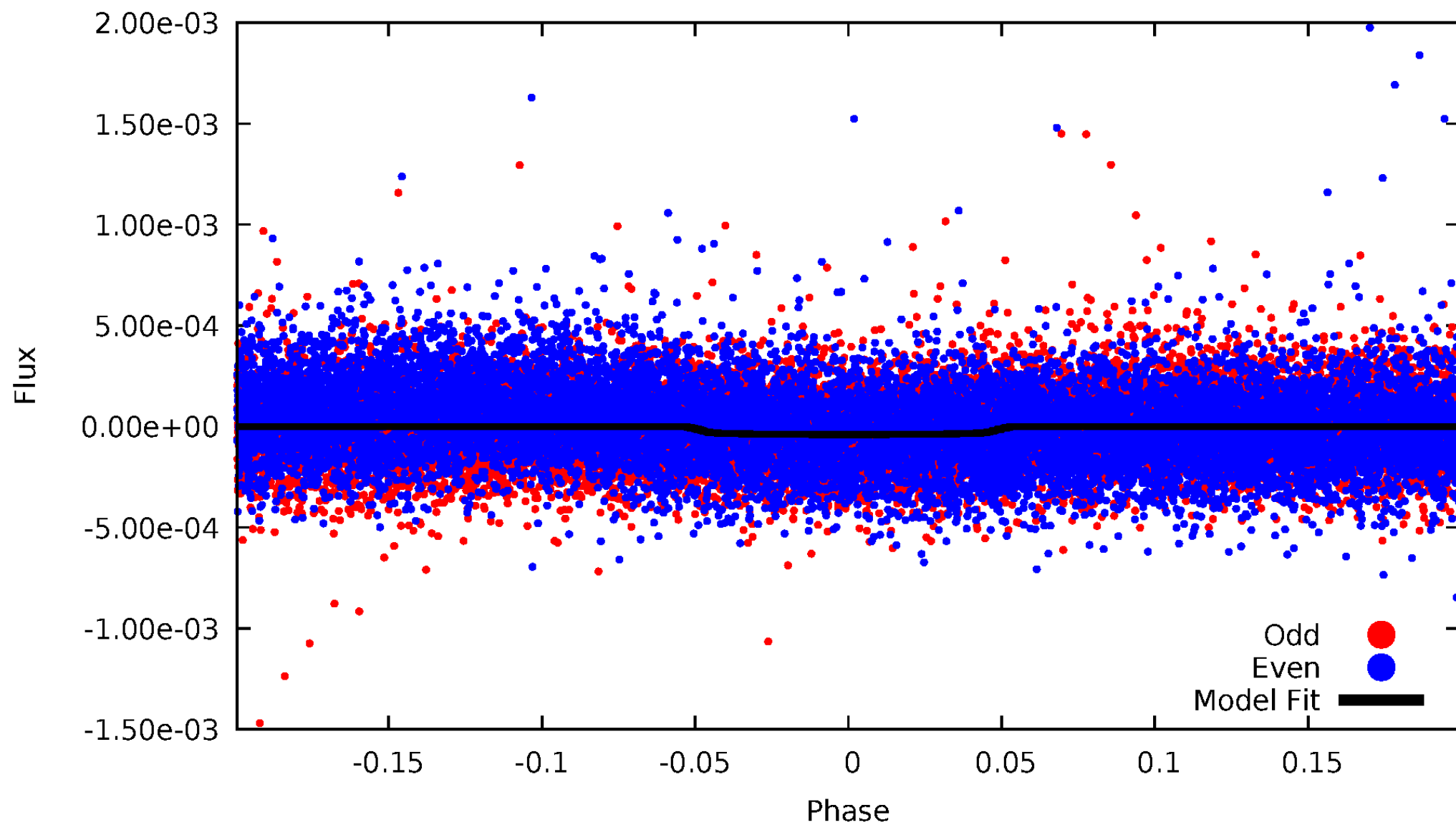
TCE 006631188-01





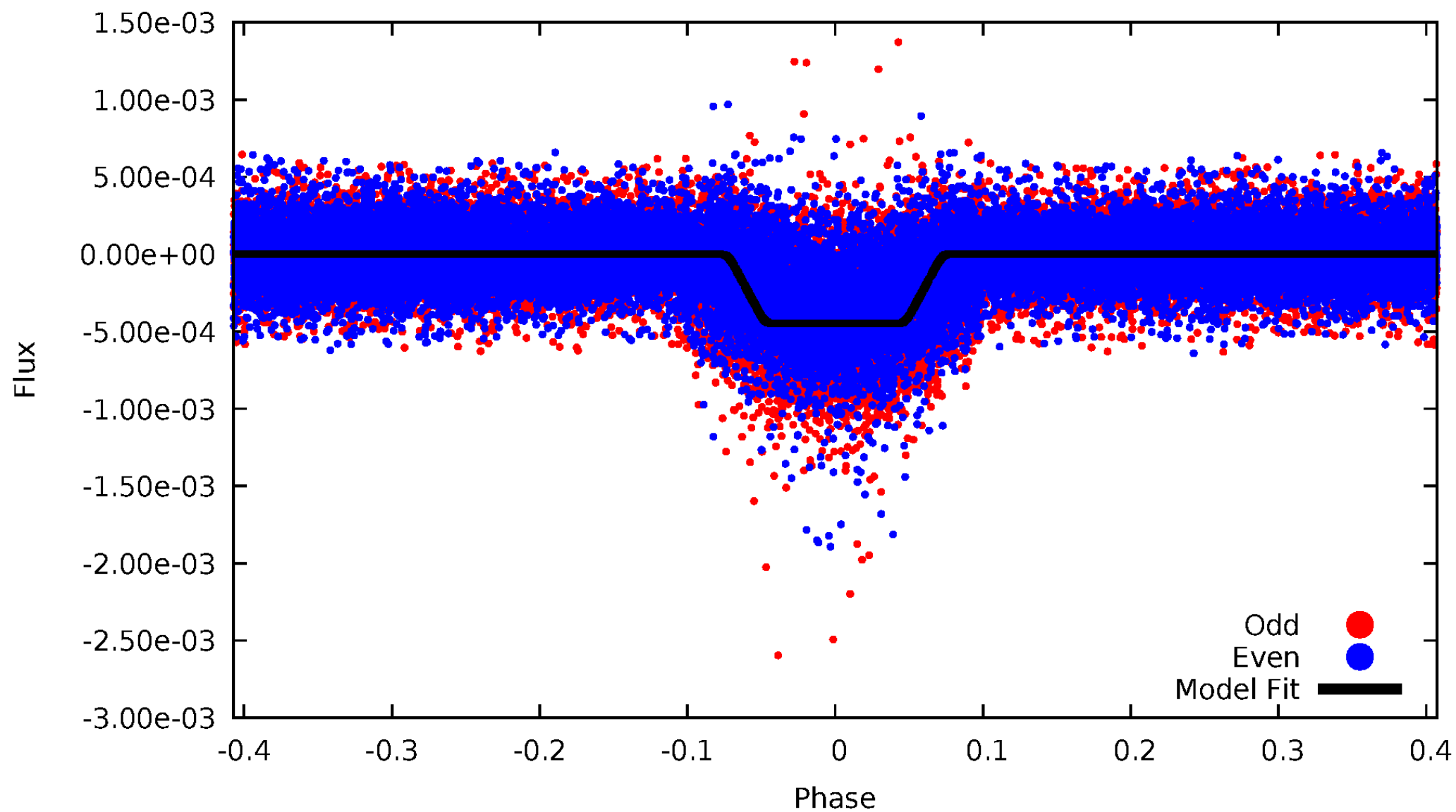
# DV Odd/Even

TCE 006631188-01

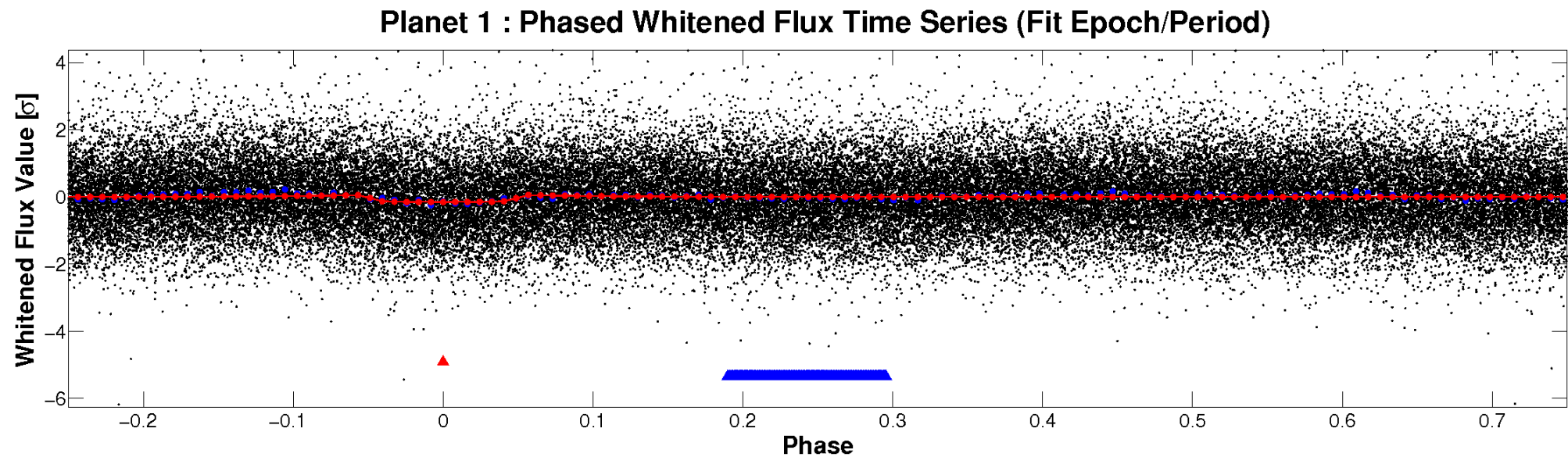
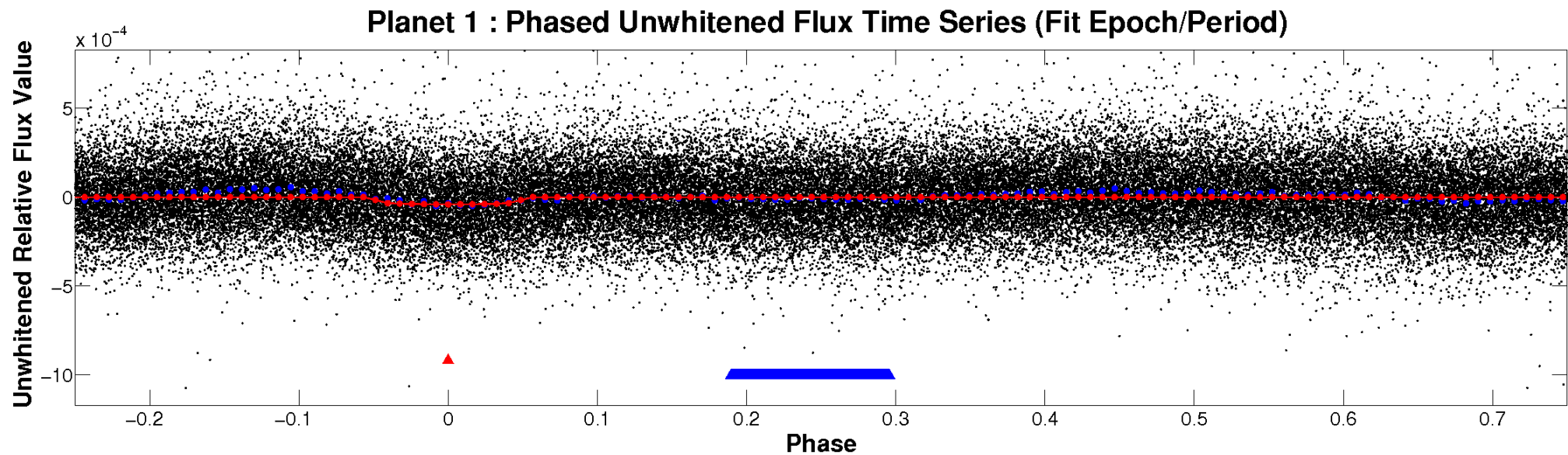


# ALT Odd/Even

TCE 006631188-01

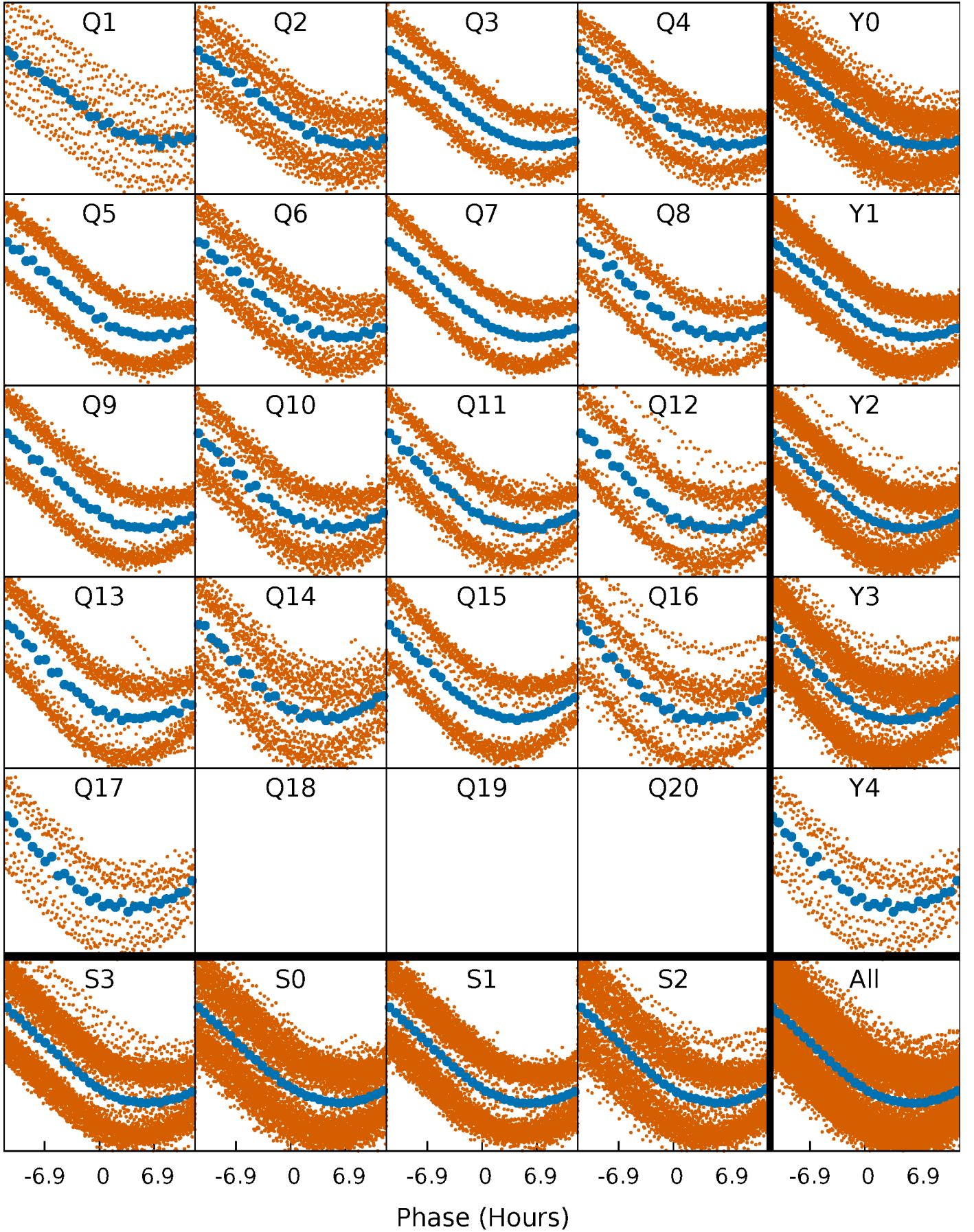


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

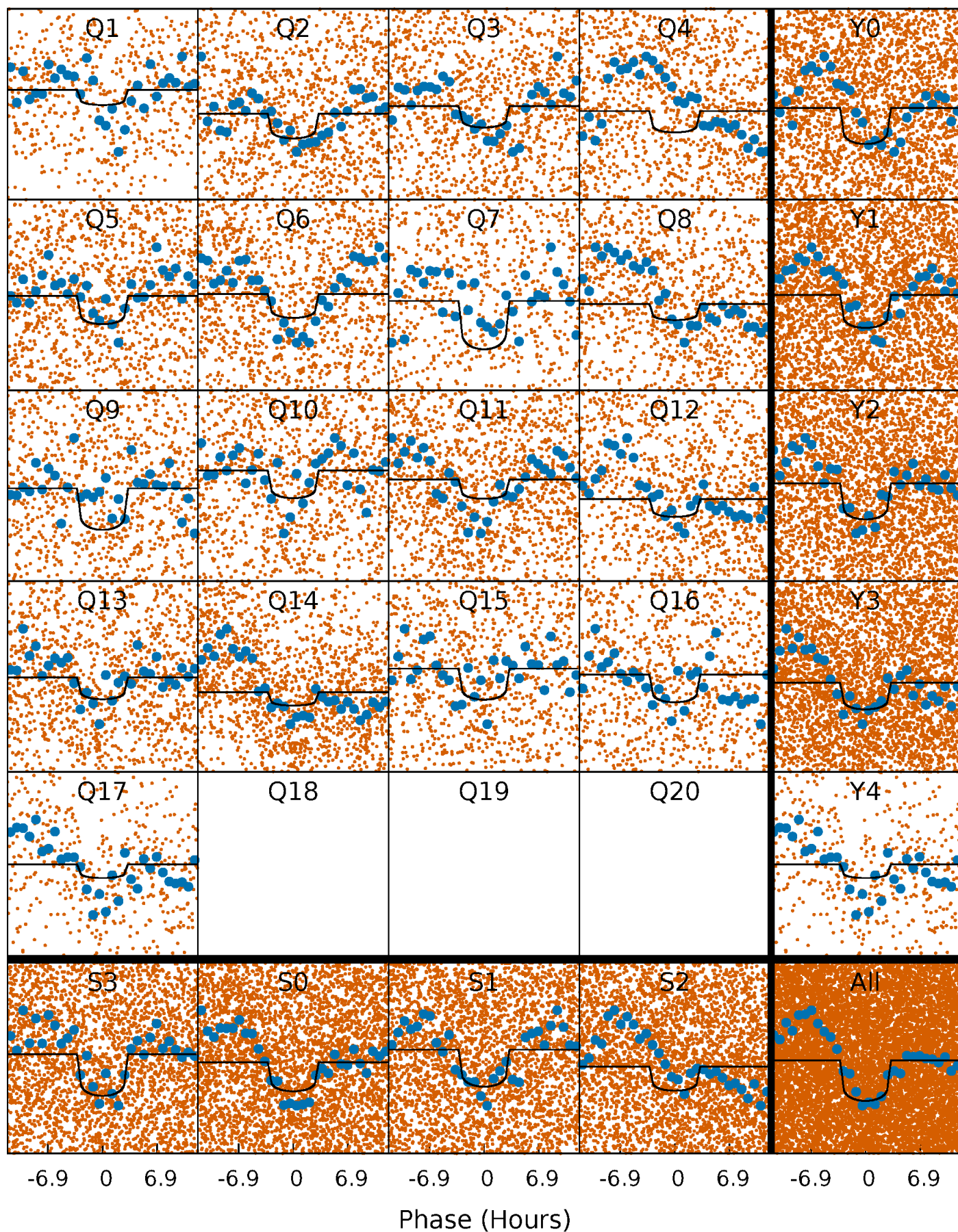
TCE 006631188-01 P= 2.515936 Days  $T_0=133.436395$  (BKJD)





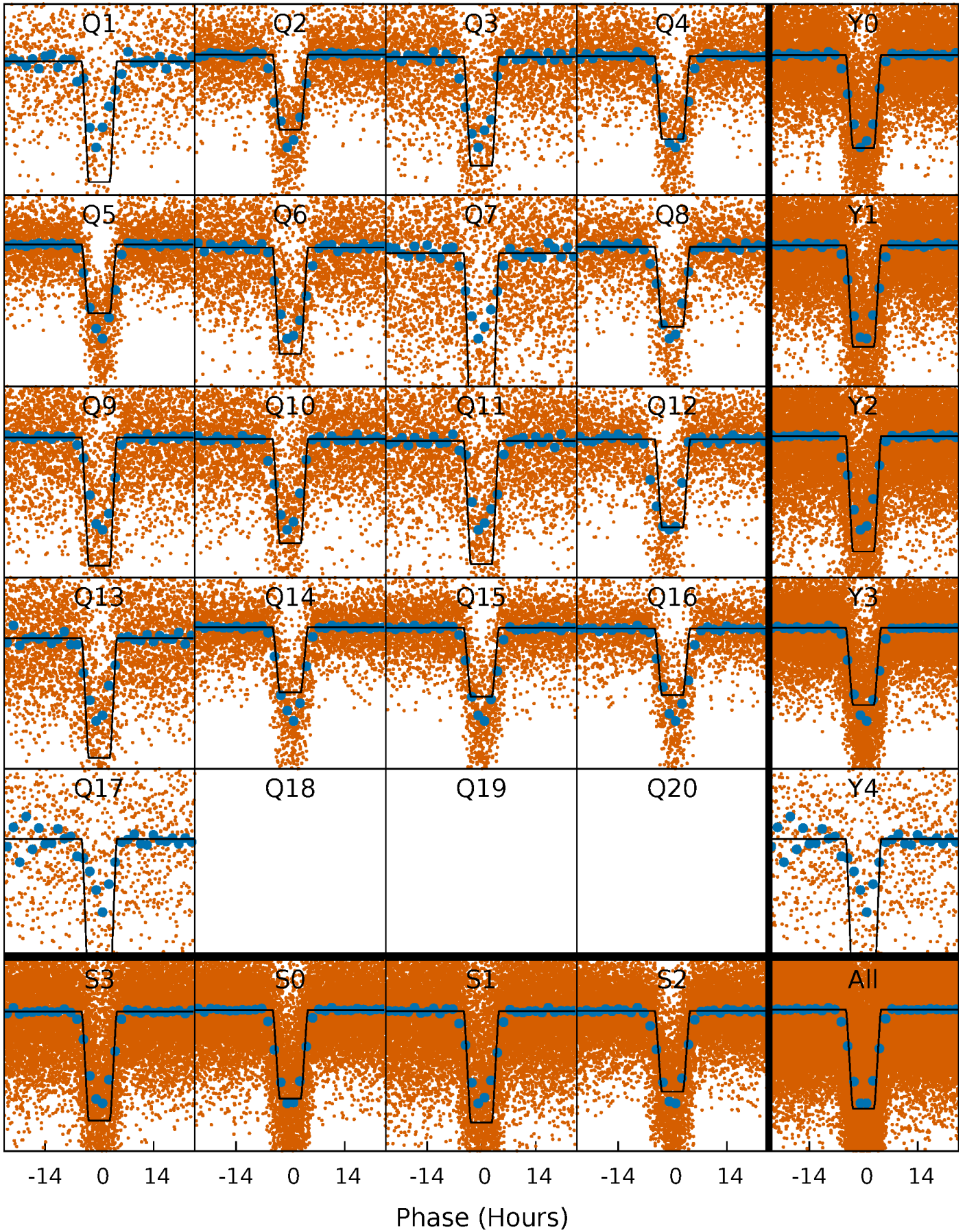
# DV Quarter-Phased Transit Curves

TCE 006631188-01 P= 2.515936 Days  $T_0=133.436395$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 006631188-01 P= 2.515643 Days  $T_0=133.539607$  (BKJD)

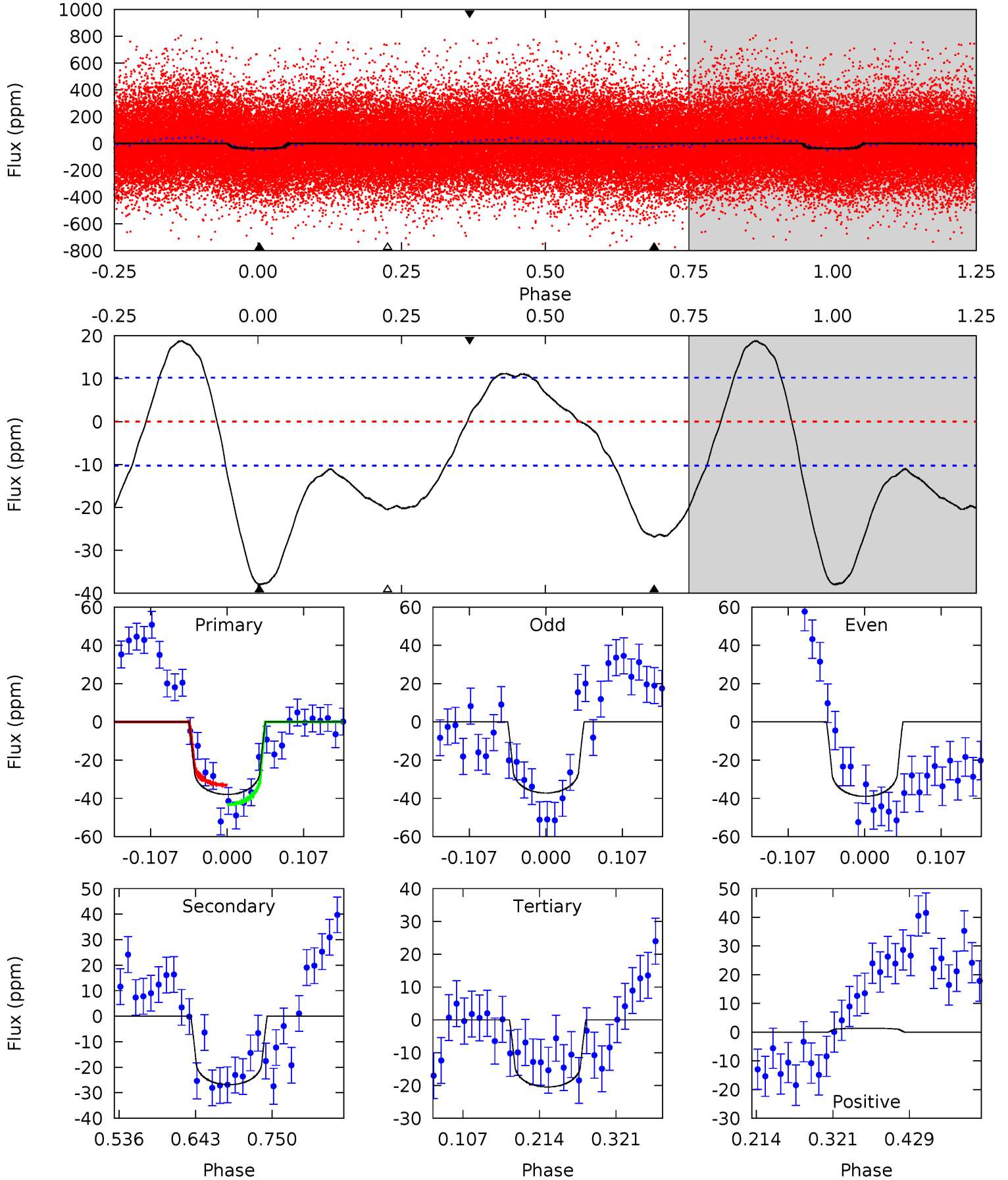




# DV Model-Shift Uniqueness Test

006631188-01, P = 2.515936 Days, E = 130.920459 Days

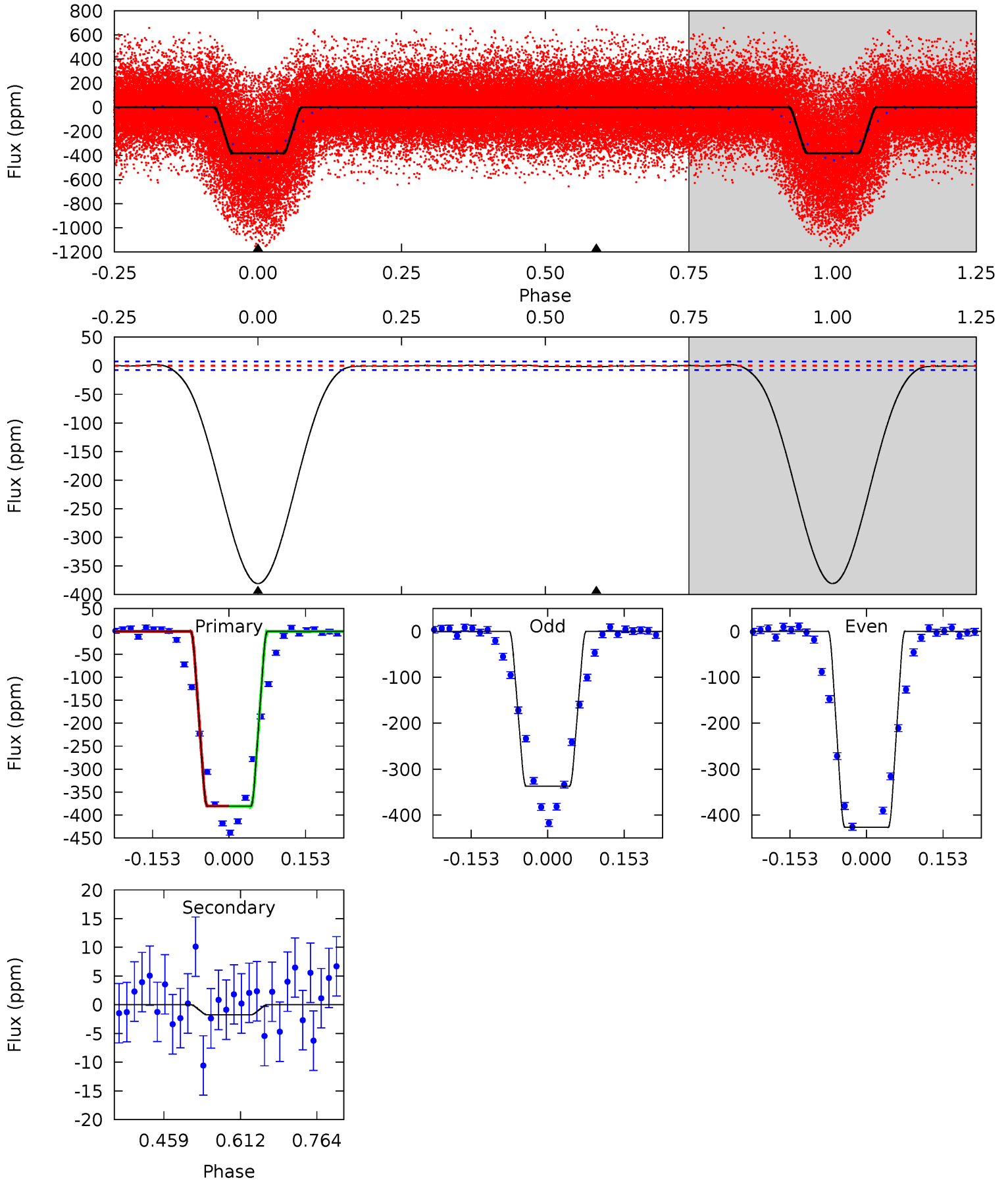
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
16.8	11.9	9.07	0.60	4.55	1.61	5.63	7.77	16.2	2.84	11.3	0.38	0.91	0.33	2.26



# Alt Model-Shift Uniqueness Test

006631188-01, P = 2.515643 Days, E = 131.023964 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
228.9	1.05	0	0	4.47	1.43	0.53	228.9	228.9	1.05	1.05	26.7	1.02	0.00	0.09





### Stellar Parameters For KIC 006631188

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7714^{+214}_{-322}$	$4.069^{+0.155}_{-0.155}$	$0.040^{+0.150}_{-0.350}$	$2.027^{+0.533}_{-0.436}$	$1.756^{+0.194}_{-0.291}$	$0.297^{+0.239}_{-0.131}$
	+3%/-4%	+4%/-4%	+375%/-875%	+26%/-22%	+11%/-17%	+80%/-44%
Source	KIC0	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 006631188-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-27 \pm 2$	$1.30^{+0.69}_{-0.55}$	$3225^{+239}_{-215}$	$7019^{+2984}_{-1297}$	$16^{+31}_{-9}$
Alt.	$-2 \pm 2$	$4.67^{+0.88}_{-0.86}$	$3222^{+210}_{-212}$	$-3040^{+289}_{-196}$	$0.078^{+0.103}_{-0.072}$

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

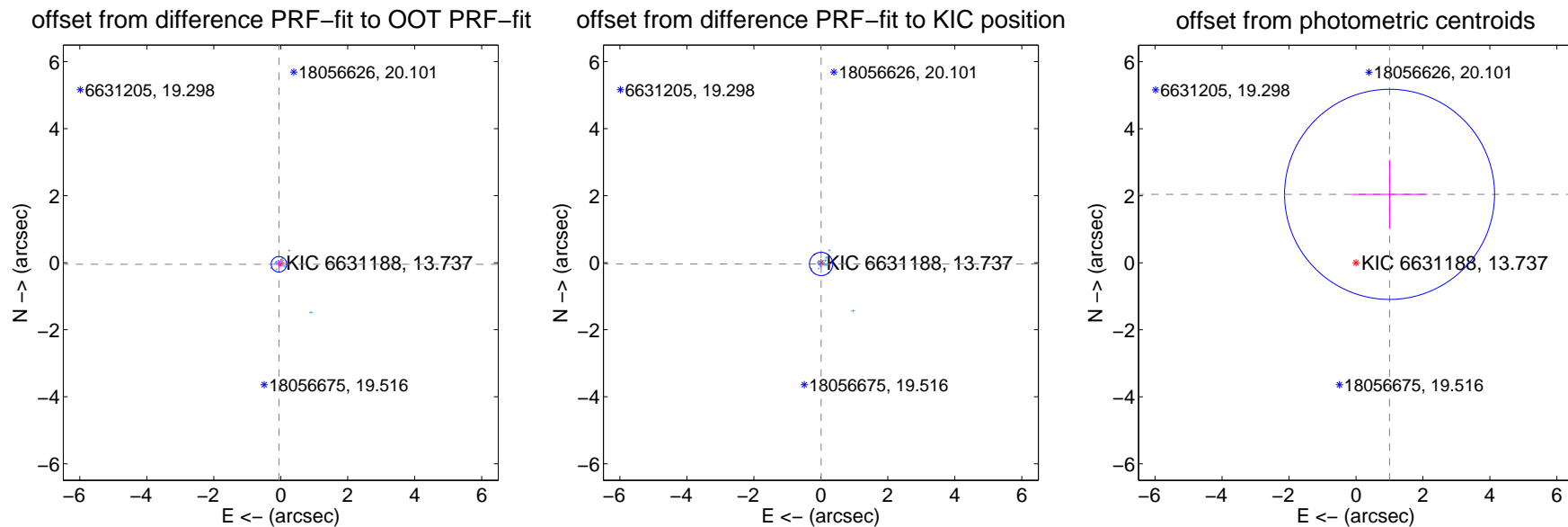
## DV Centroid Data

Supplemental centroid analysis for 006631188-01. Kepler magnitude: 13.74. Transit SNR 11.63

There are 17 quarters with good PRF difference image offsets

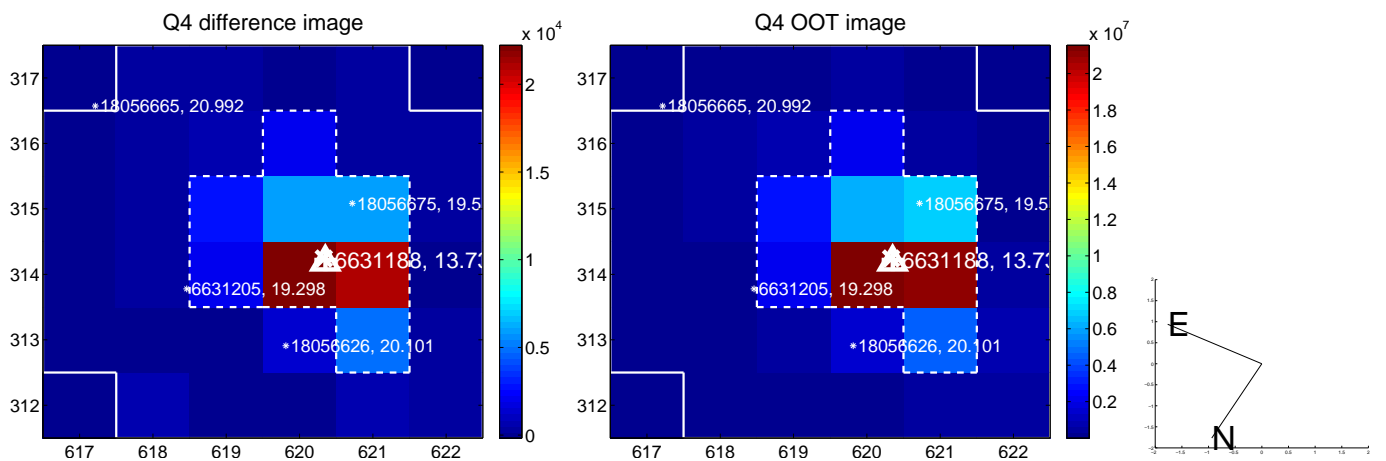
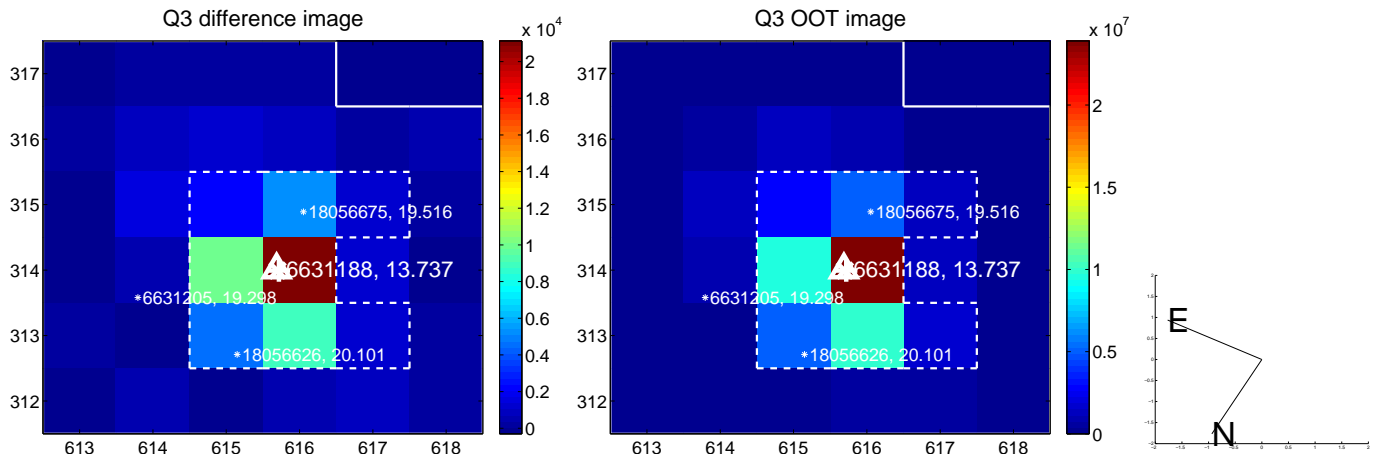
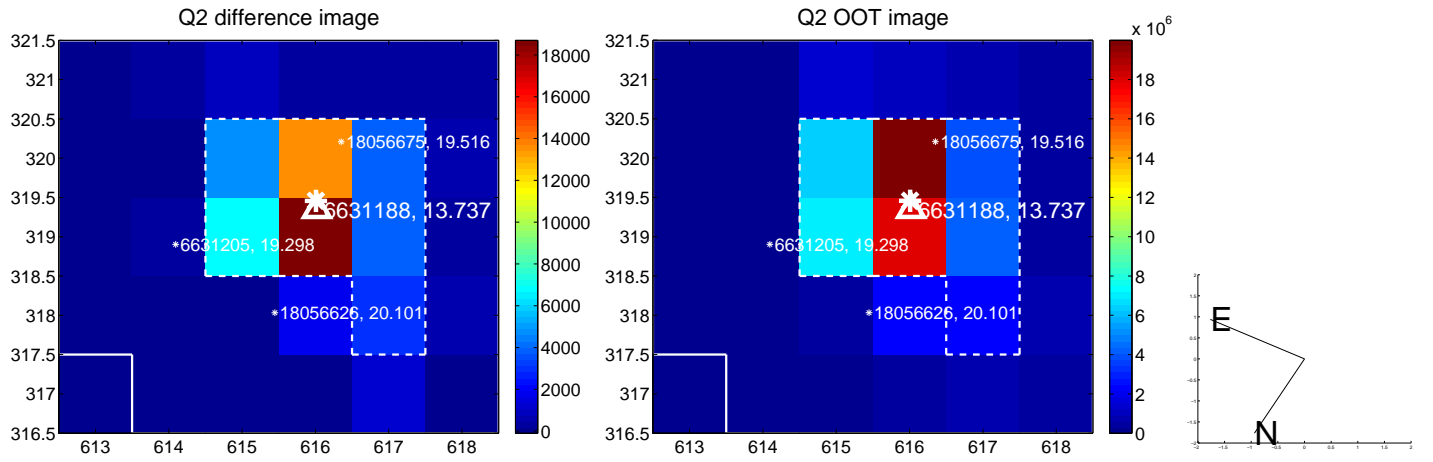
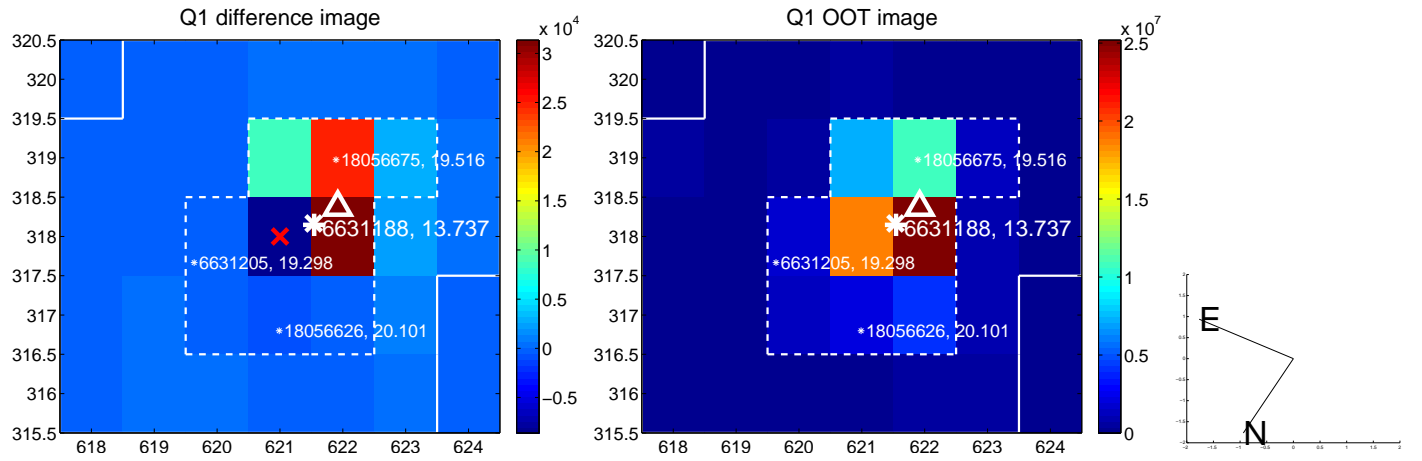
The direct PRF centroid is offset from the target star catalog position by about 0.07 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.072 \pm 0.077$	0.93	$0.054 \pm 0.088$	$-0.047 \pm 0.106$
PRF-fit source offset from KIC position	$0.038 \pm 0.116$	0.33	$-0.008 \pm 0.090$	$-0.037 \pm 0.110$
photometric centroid source offset	$2.28 \pm 1.05$	2.18	$-1.00 \pm 1.13$	$2.04 \pm 1.02$

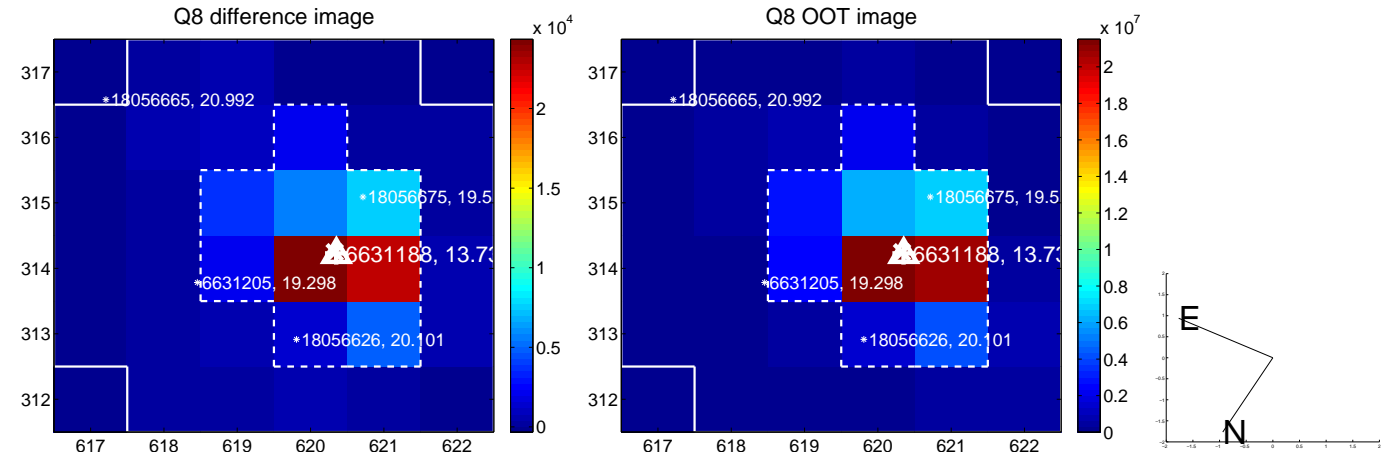
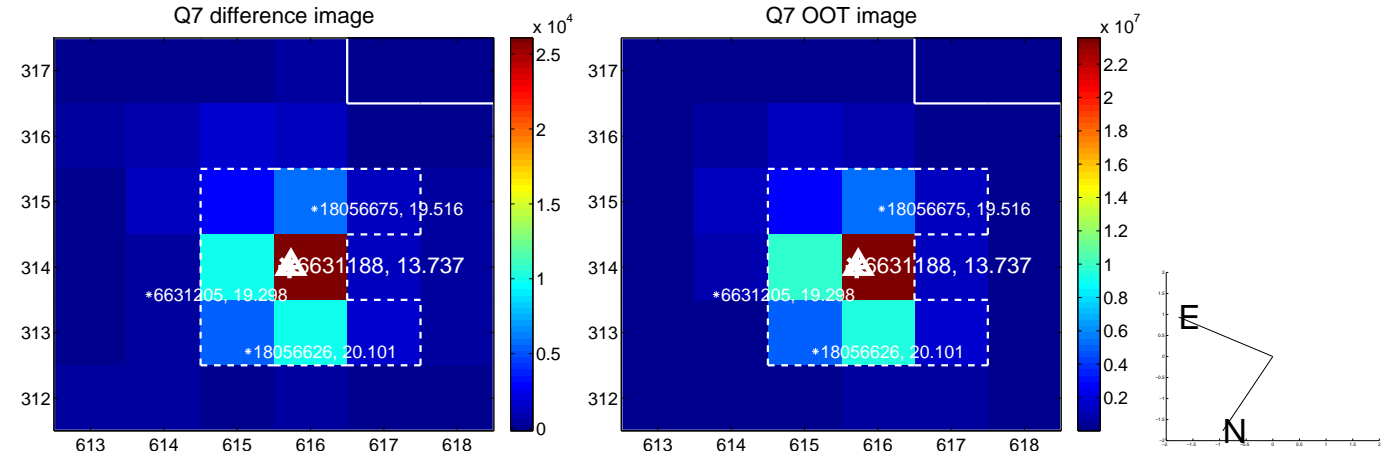
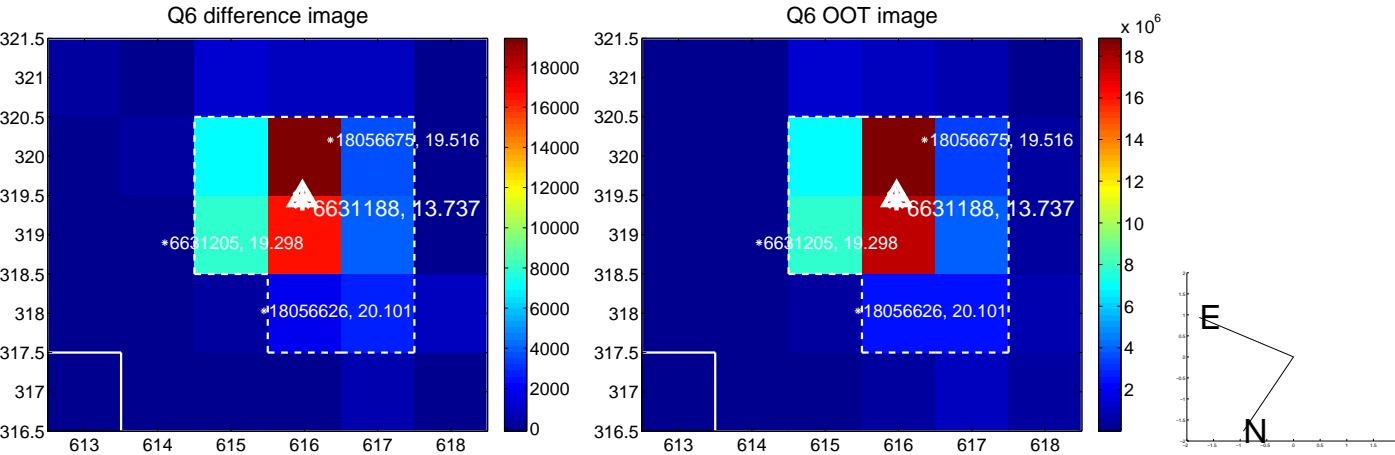
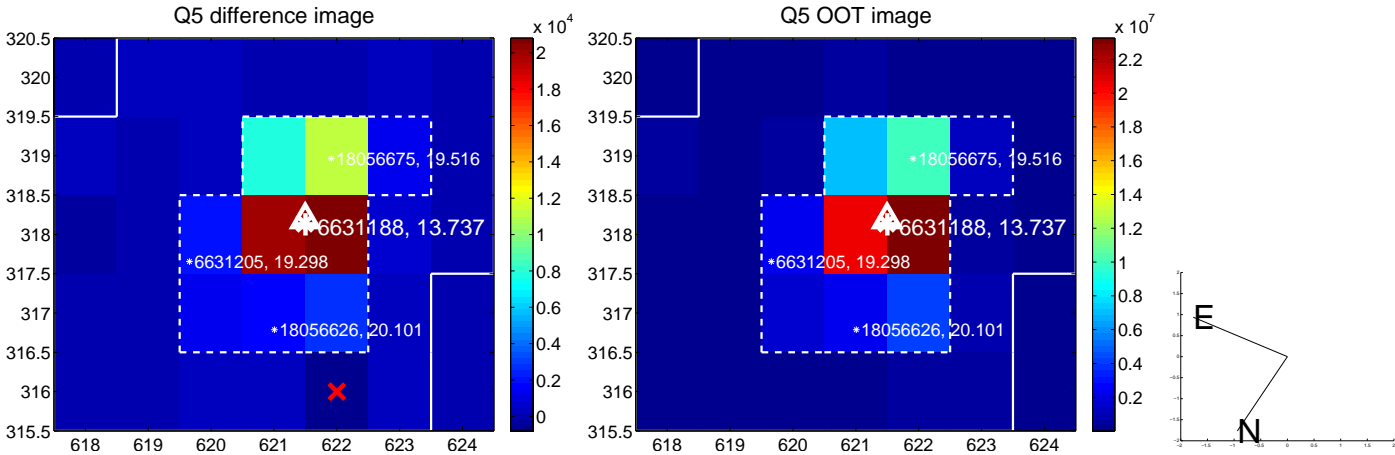


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

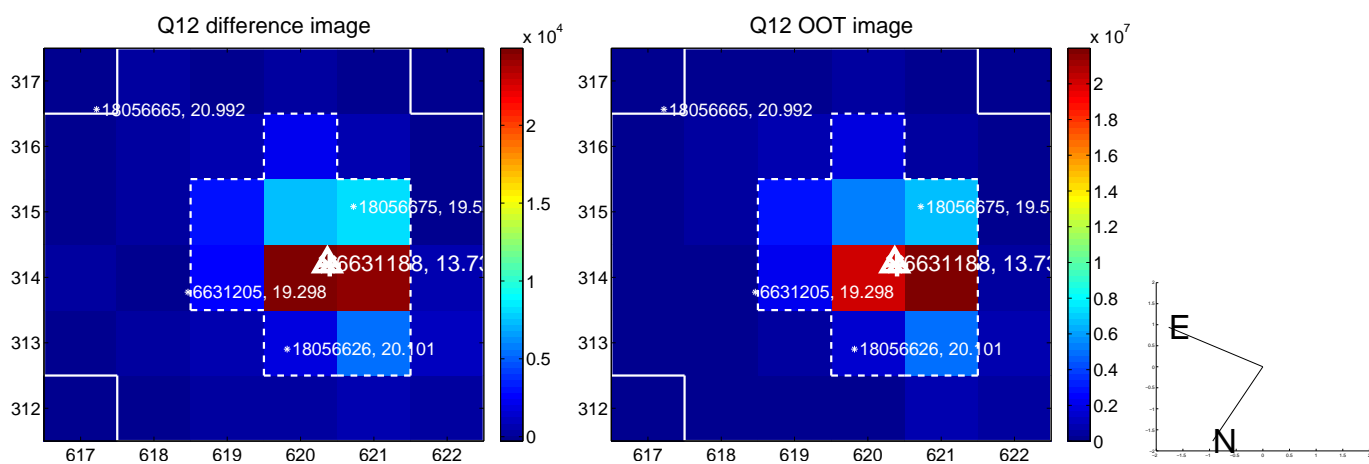
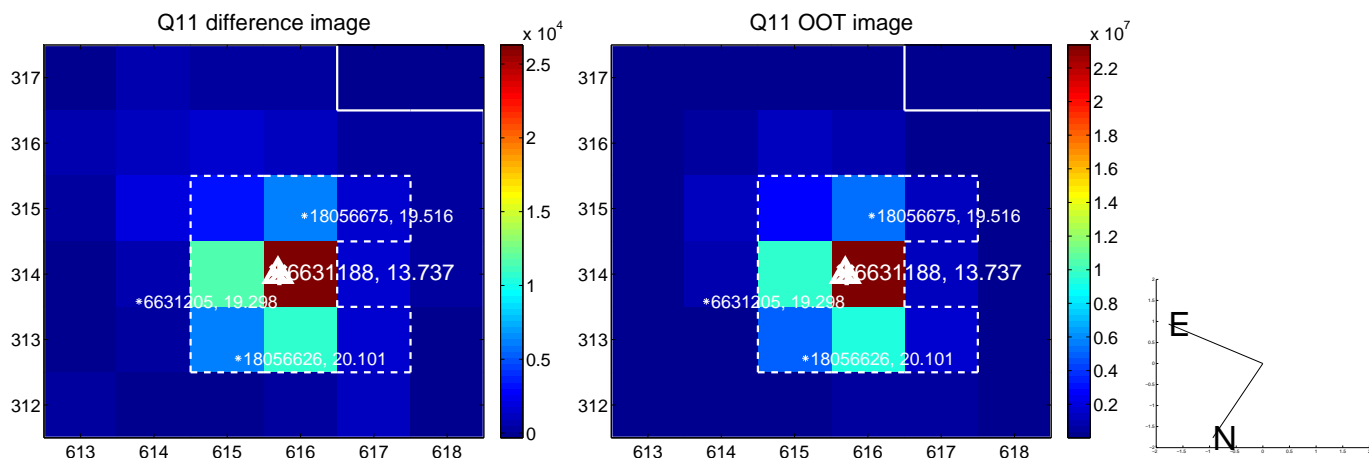
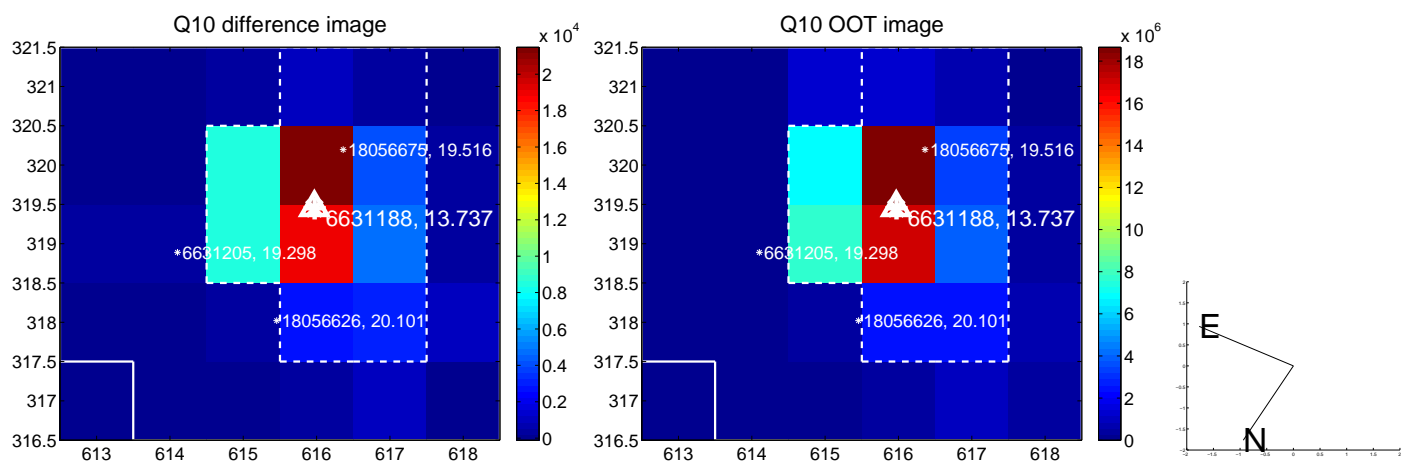
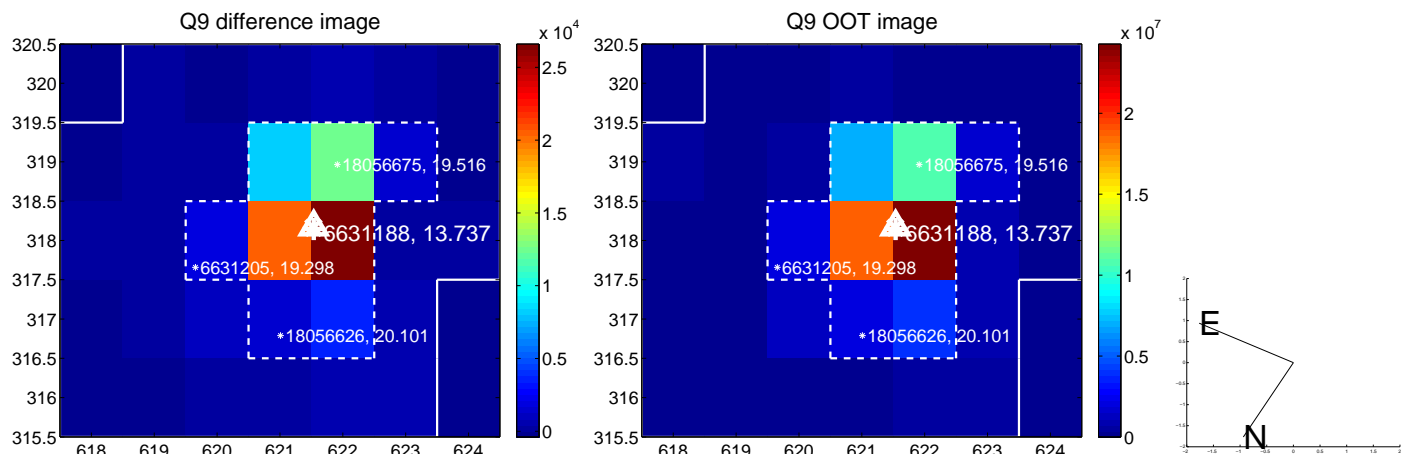


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

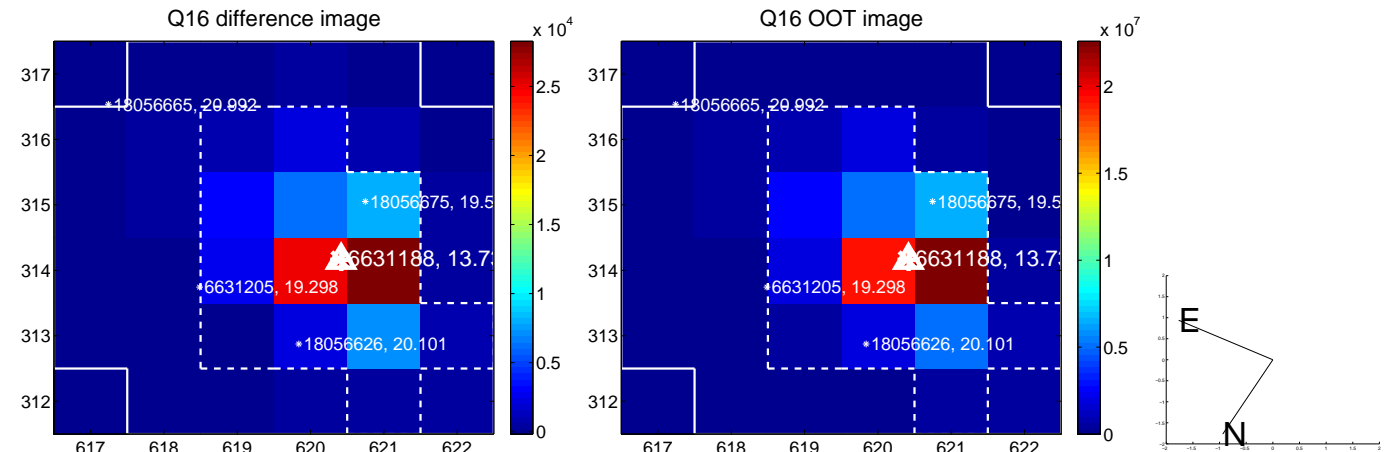
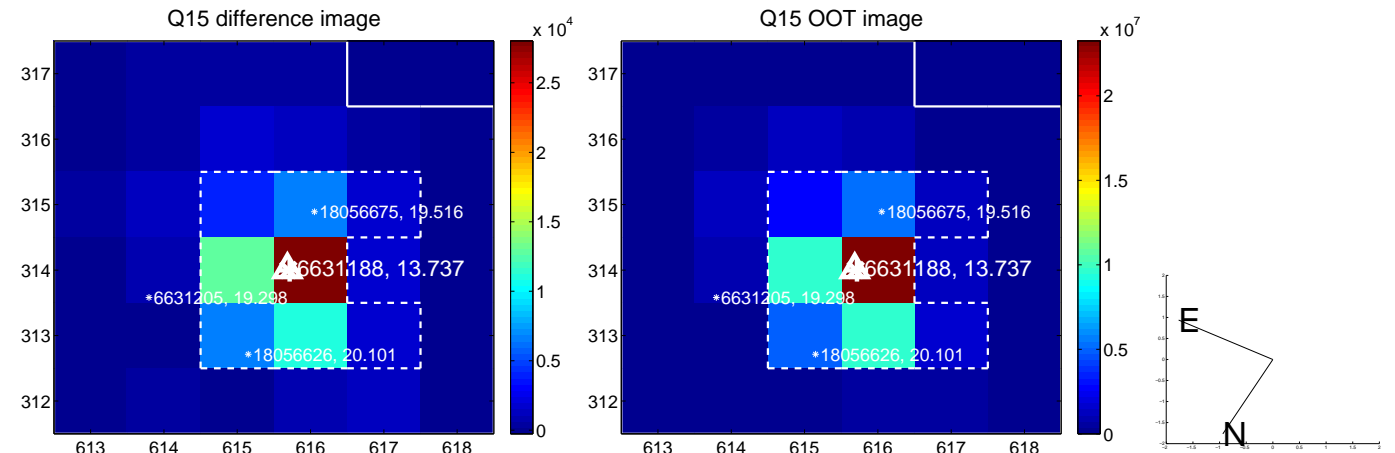
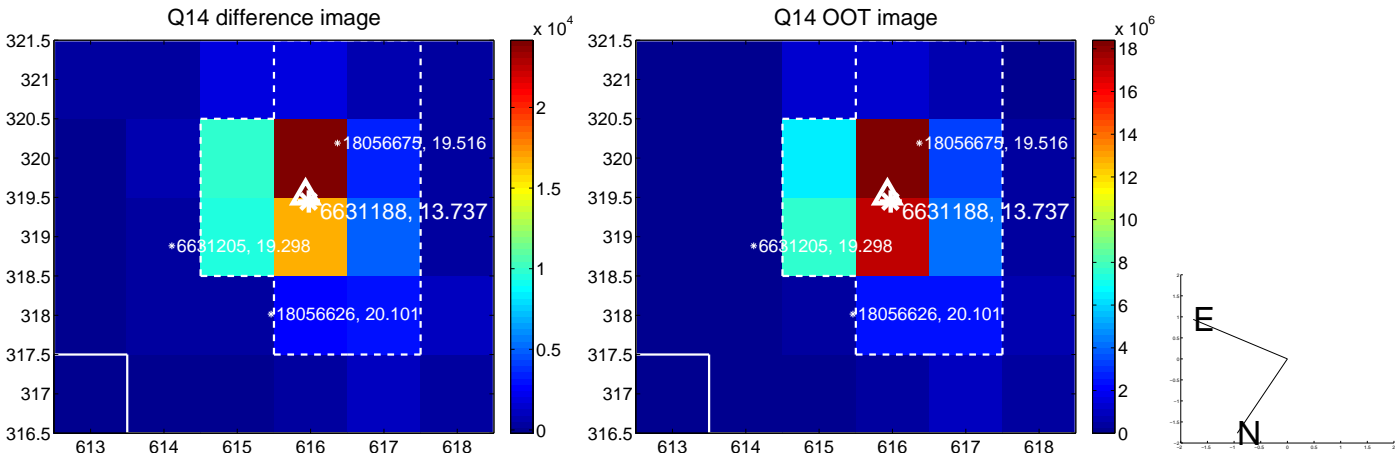
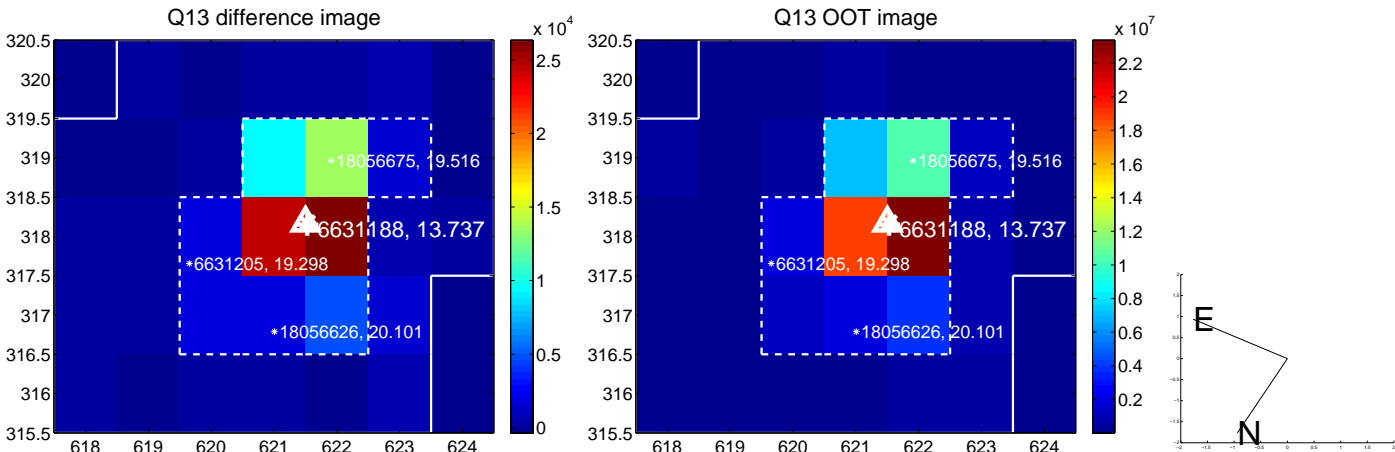




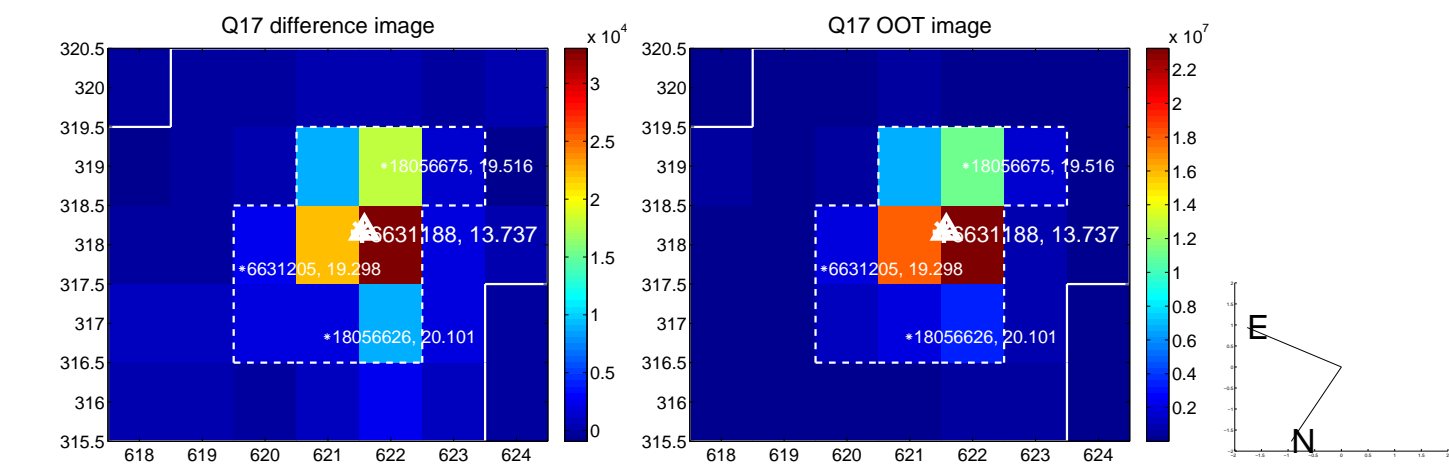
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



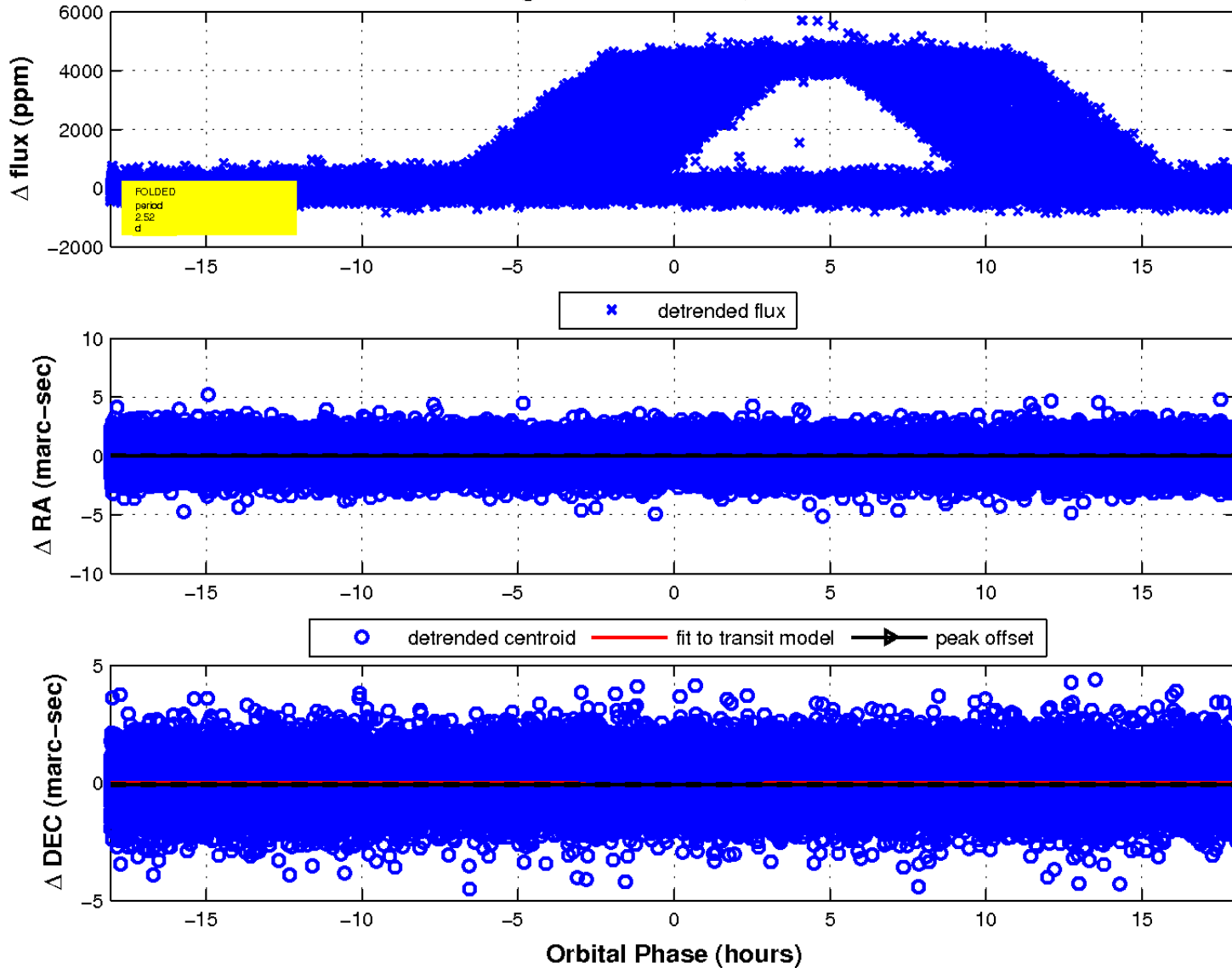
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

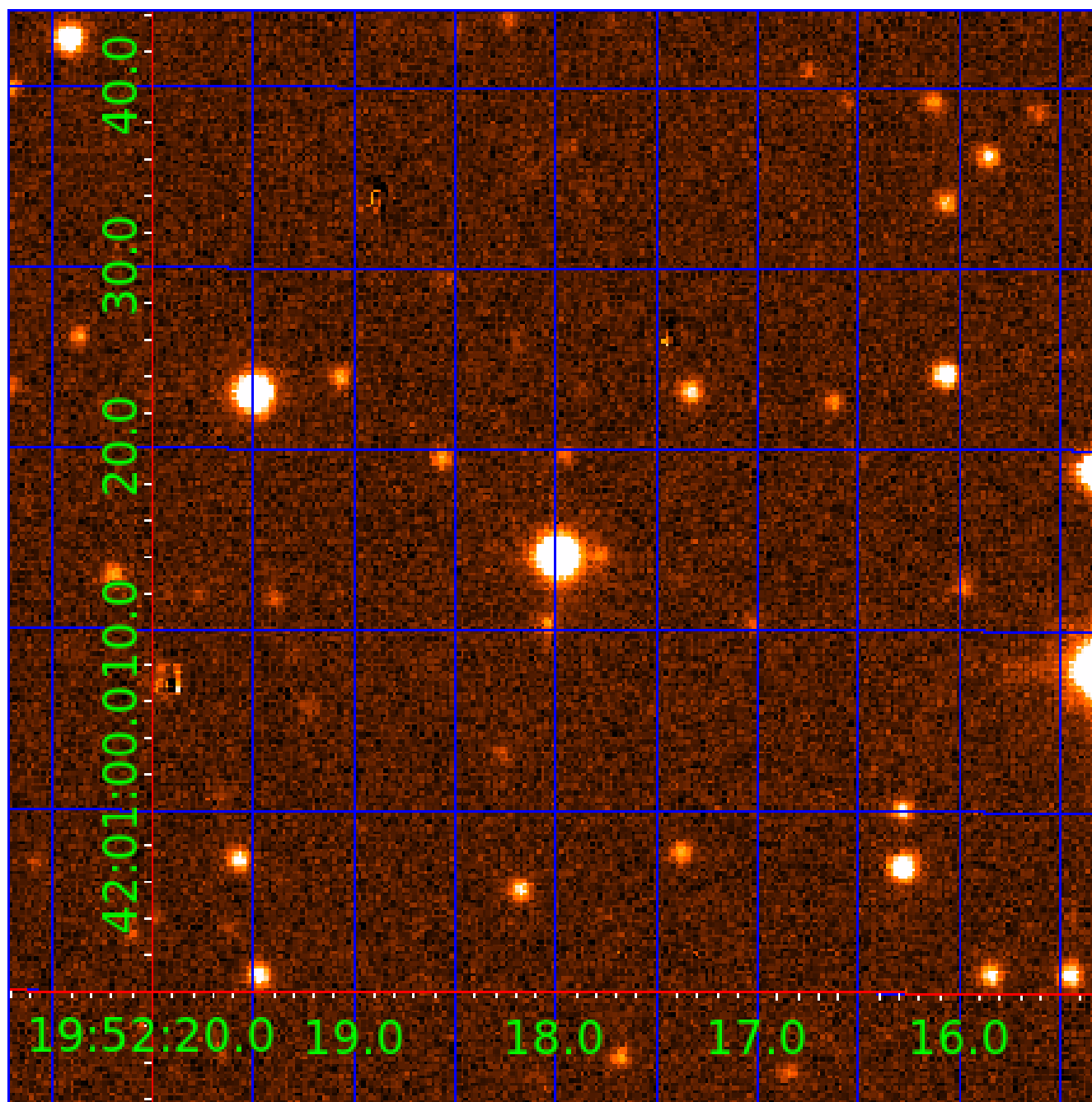


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination





# KIC 006631188

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006631188-01	OBS	No	2.515936	133.436395	40.7	6.021	14.6	11.6	2.03	7714	1.32	6828.35
006631188-02	OBS	No	5.030954	131.664246	188.8	6.000	8.5	-1.0	2.03	7714	2.83	2710.49

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006631188-01	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV—MOD_NONUNIQ_DV
006631188-02	OBS	FP	0.00	1	0	1	0	LPP_DV—LPP_ALT—SAME_NTL_PERIOD—CENT_NOFITS—HALO_GHOST

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

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

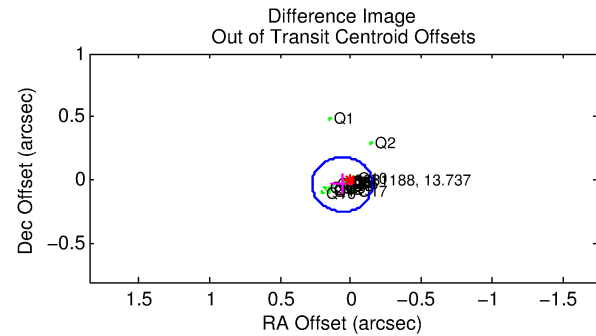
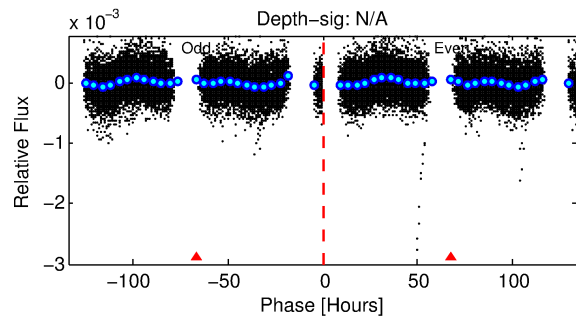
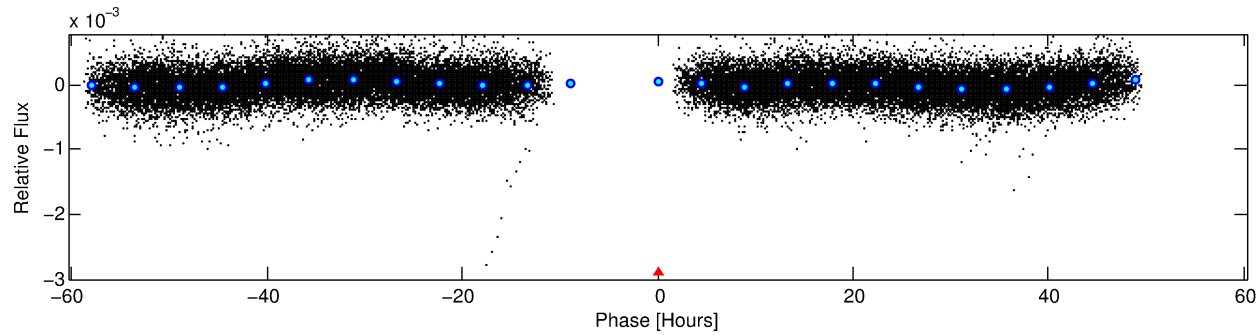
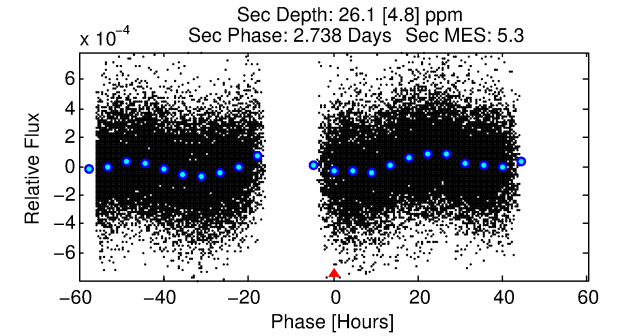
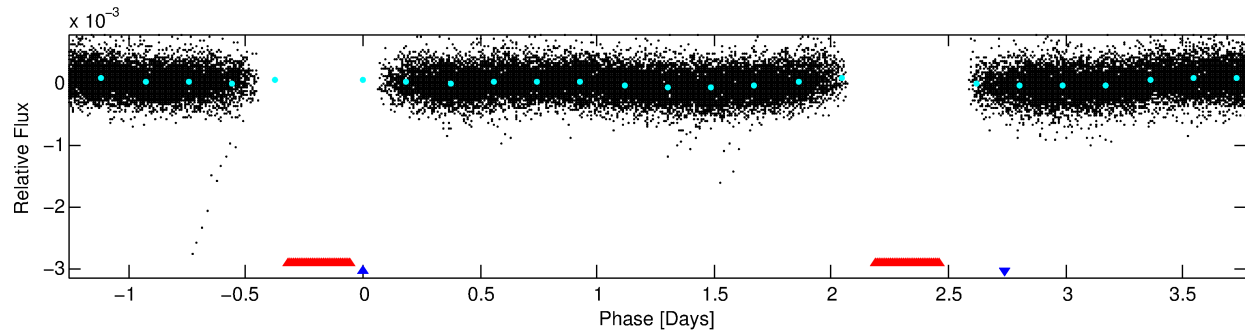
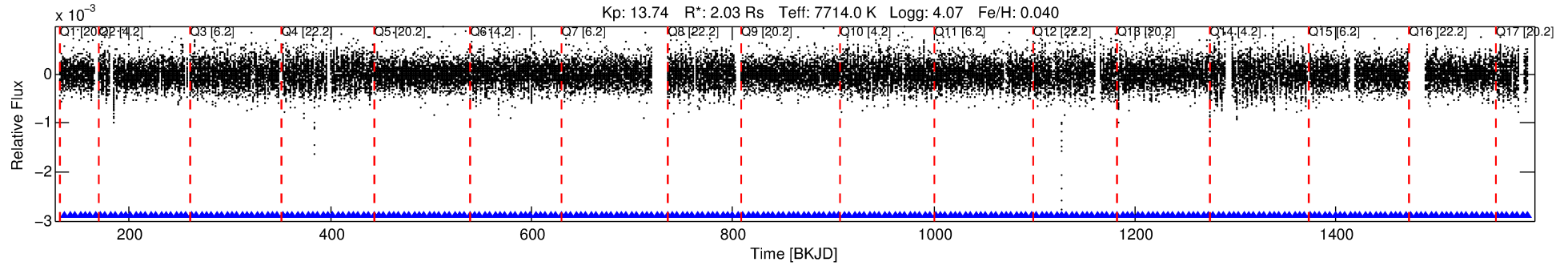
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 006631188-02

No Significant Match Found

# DV One-Page Summary

KIC: 6631188 Candidate: 2 of 2 Period: 5.031 d



## TPS TCE Results:

Period = 5.03095 d  
Epoch = 131.6642 BKJD

DV fit results are unavailable

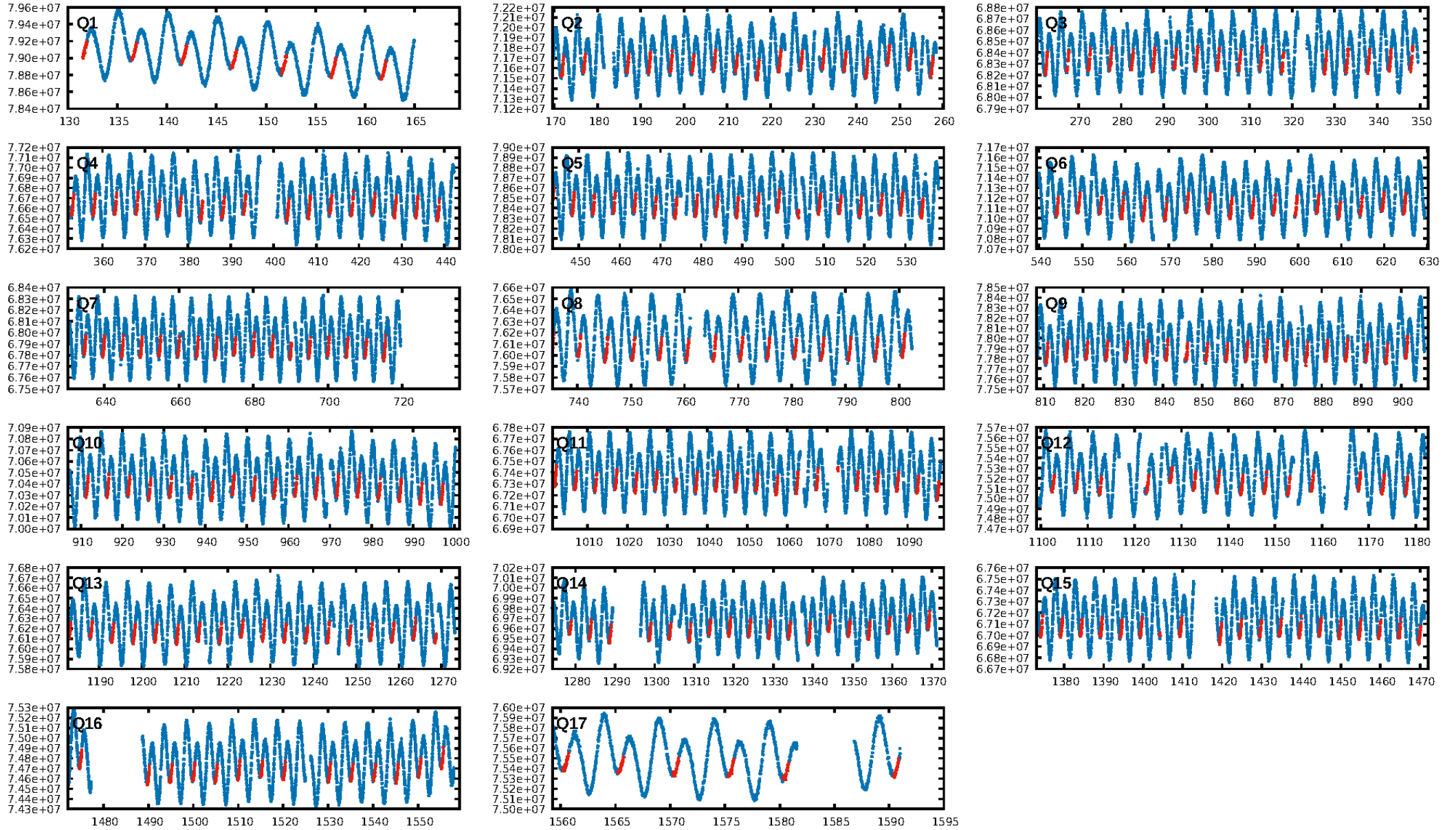
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [7.10 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 1.00e-15  
RollingBand-fgt: 1.00 [256/256]  
GhostDiagnostic-chr: -0.08118  
Centroid-sig: 0.0%  
Centroid-so: 0.123 arcsec [9.95 $\sigma$ ]  
OotOffset-rm: 0.068 arcsec [0.95 $\sigma$ ]  
KicOffset-rm: 0.025 arcsec [0.33 $\sigma$ ]  
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]

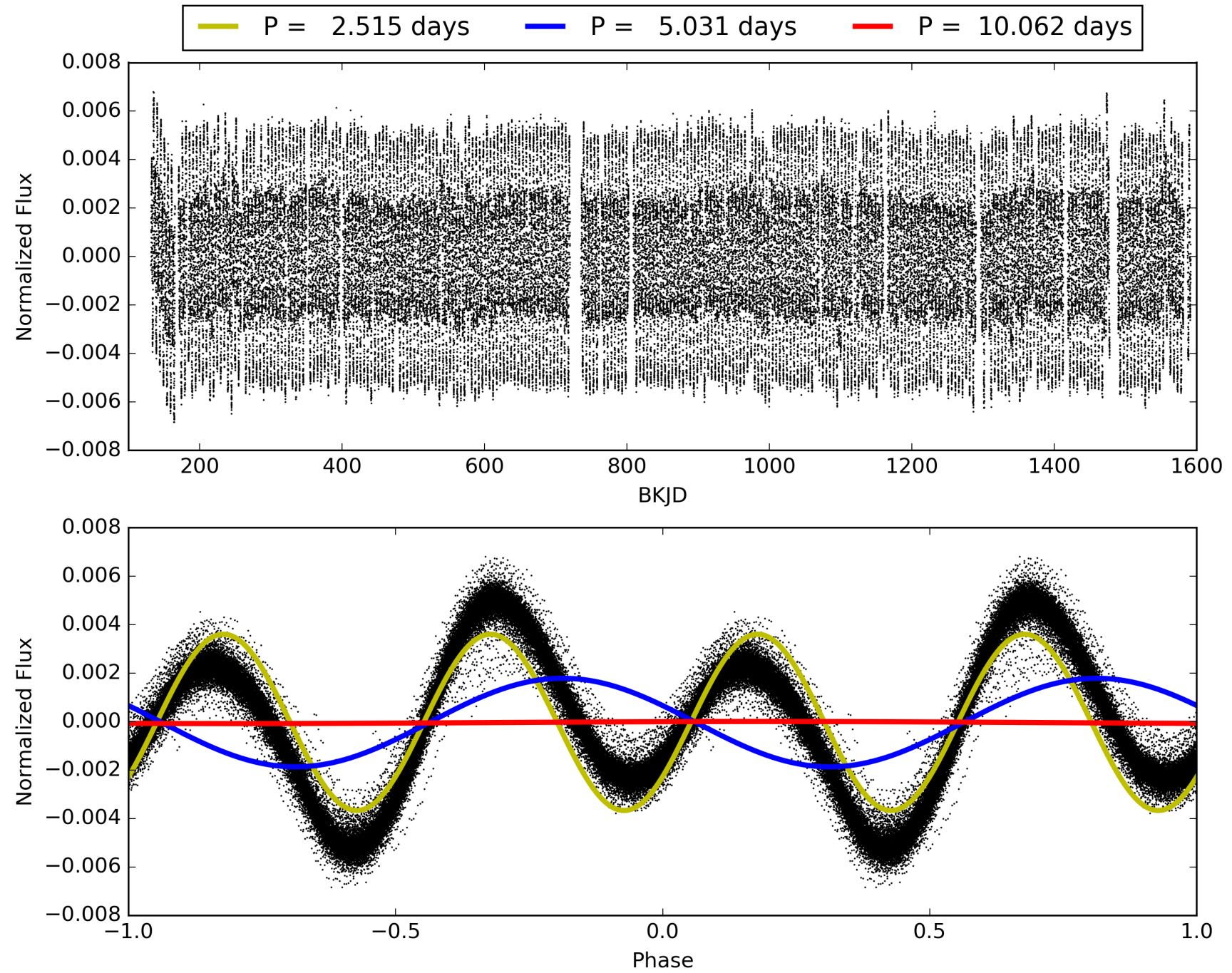
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 01:56:55 Z

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

# TCE 006631188-02, PDC Light Curves

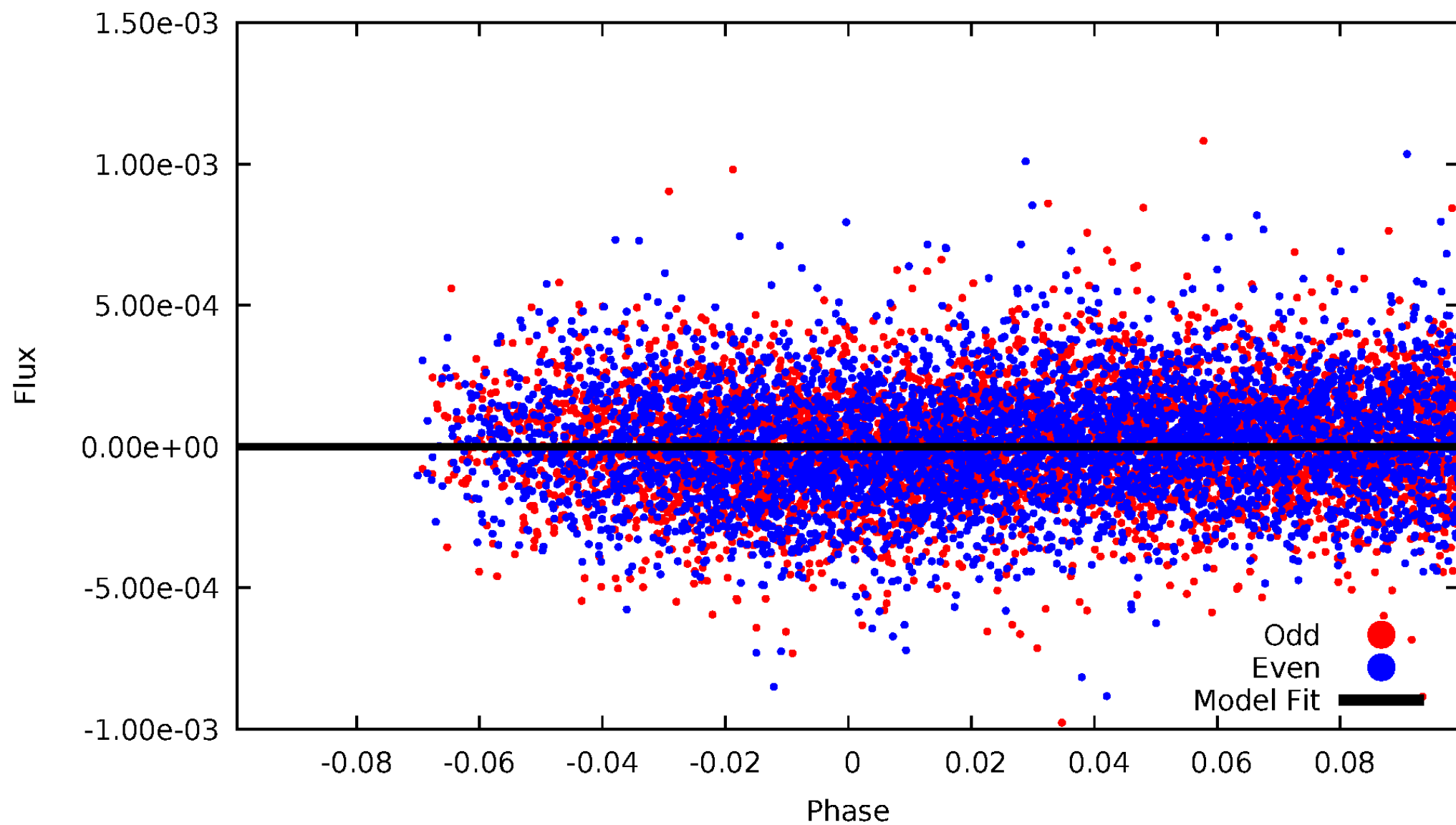


# TCE 006631188-02



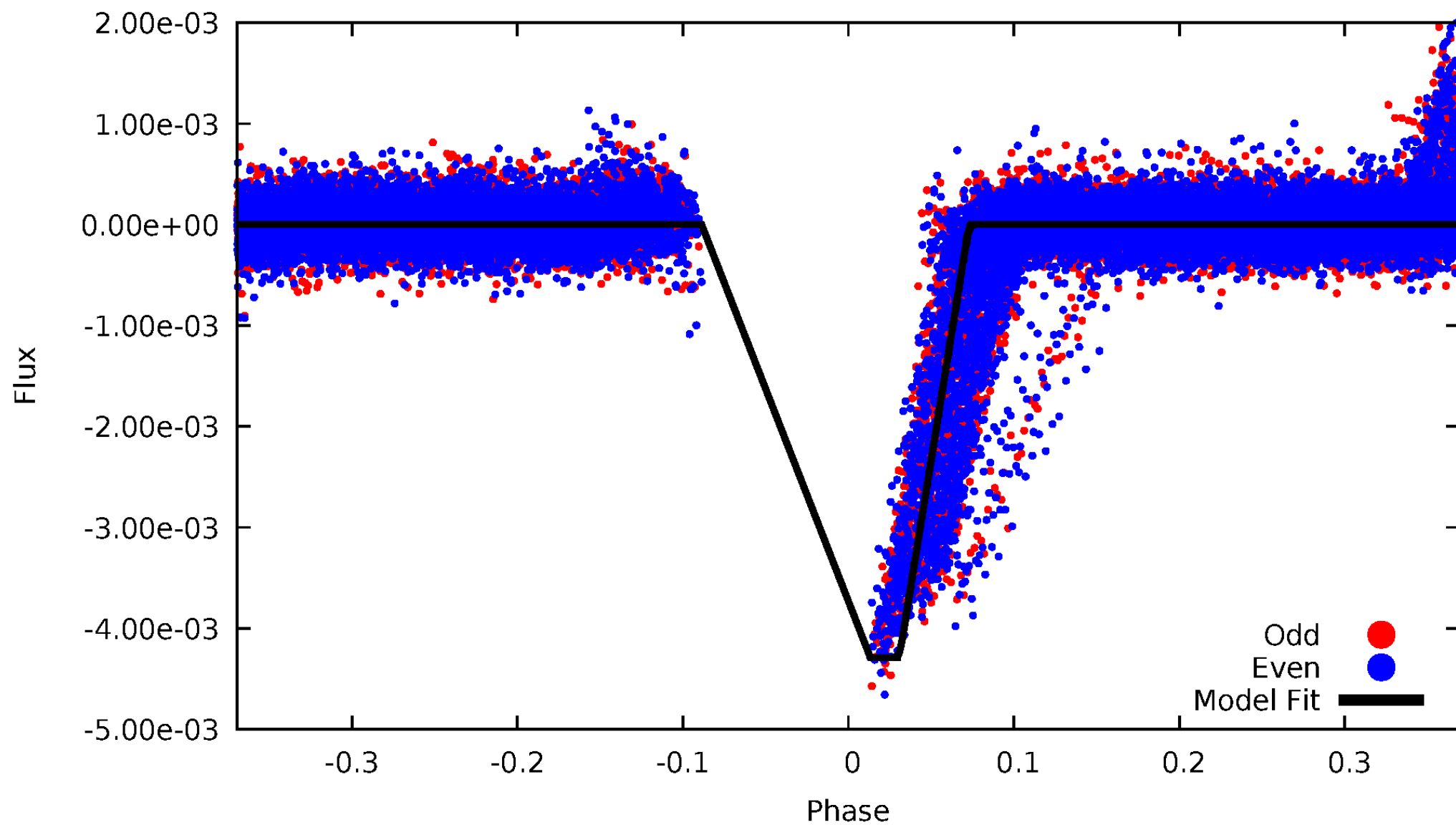
# DV Odd/Even

TCE 006631188-02



# ALT Odd/Even

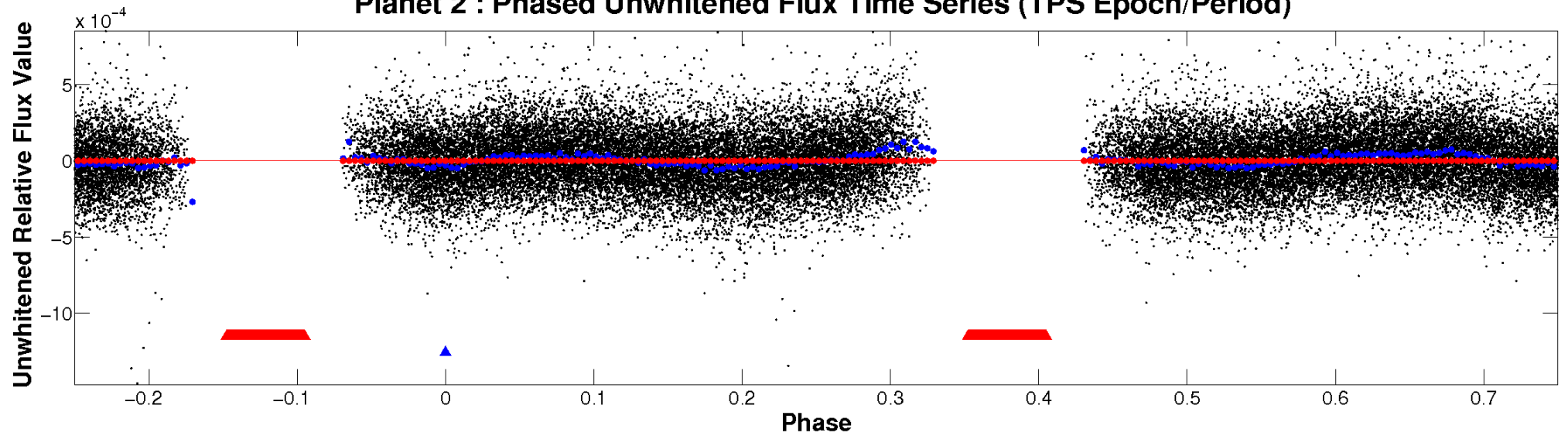
TCE 006631188-02



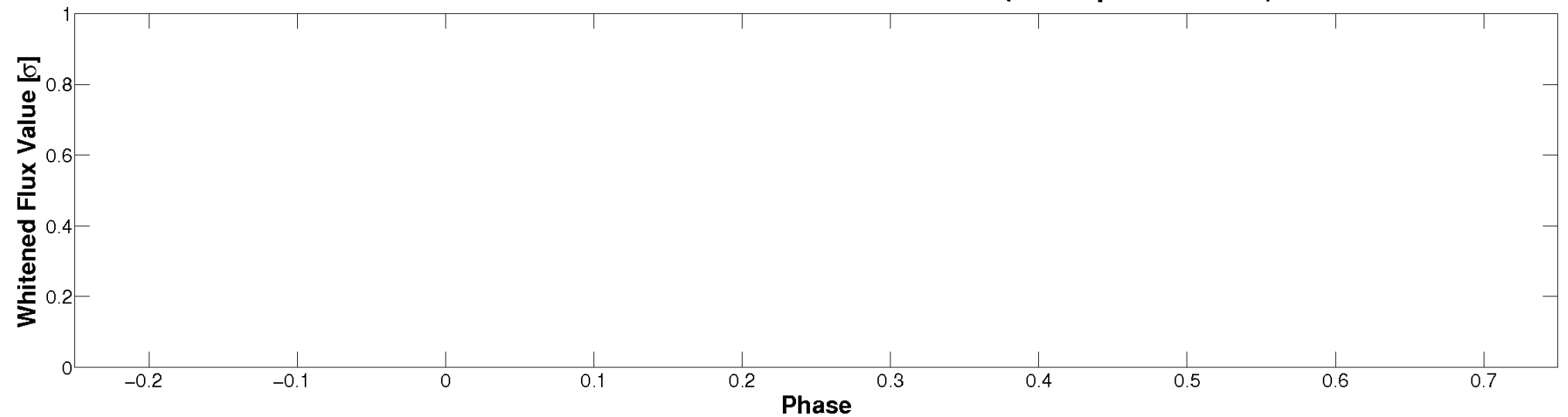


# Non-Whitened Vs. Whitened Light Curve

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

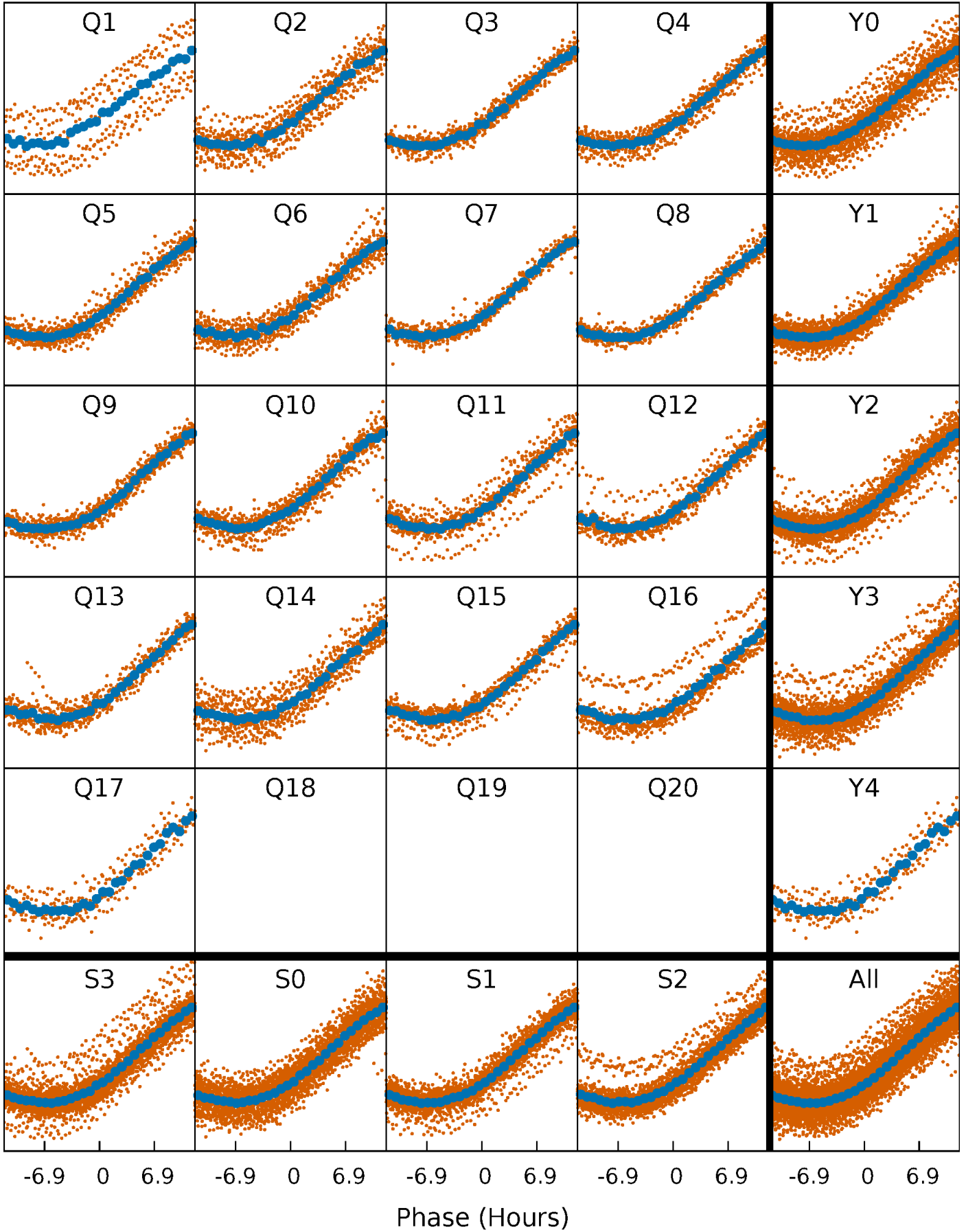


**Planet 2 : Phased Whitened Flux Time Series (TPS Epoch/Period)**



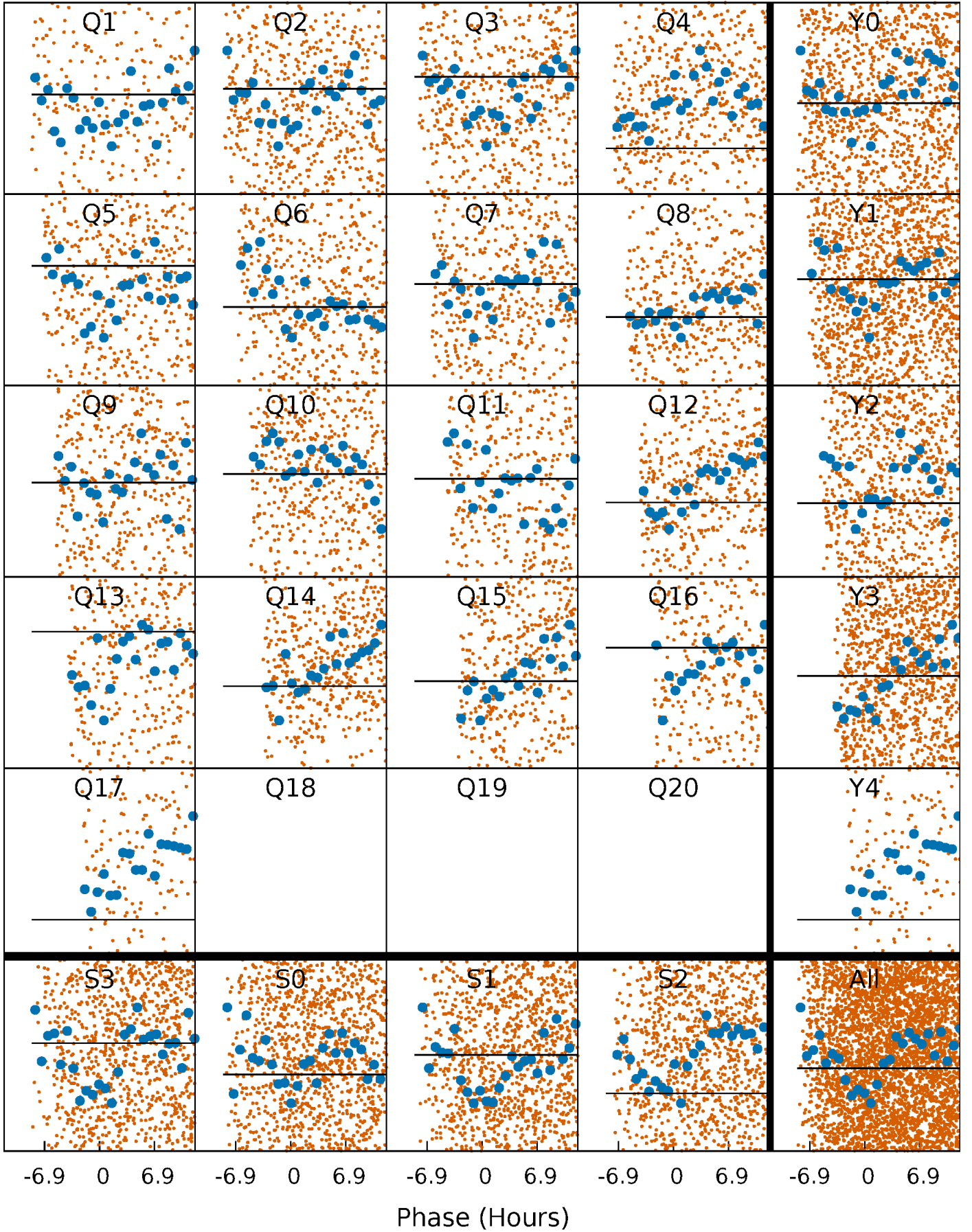
# PDC Quarter-Phased Transit Curves

TCE 006631188-02 P= 5.030954 Days  $T_0=131.664245$  (BKJD)



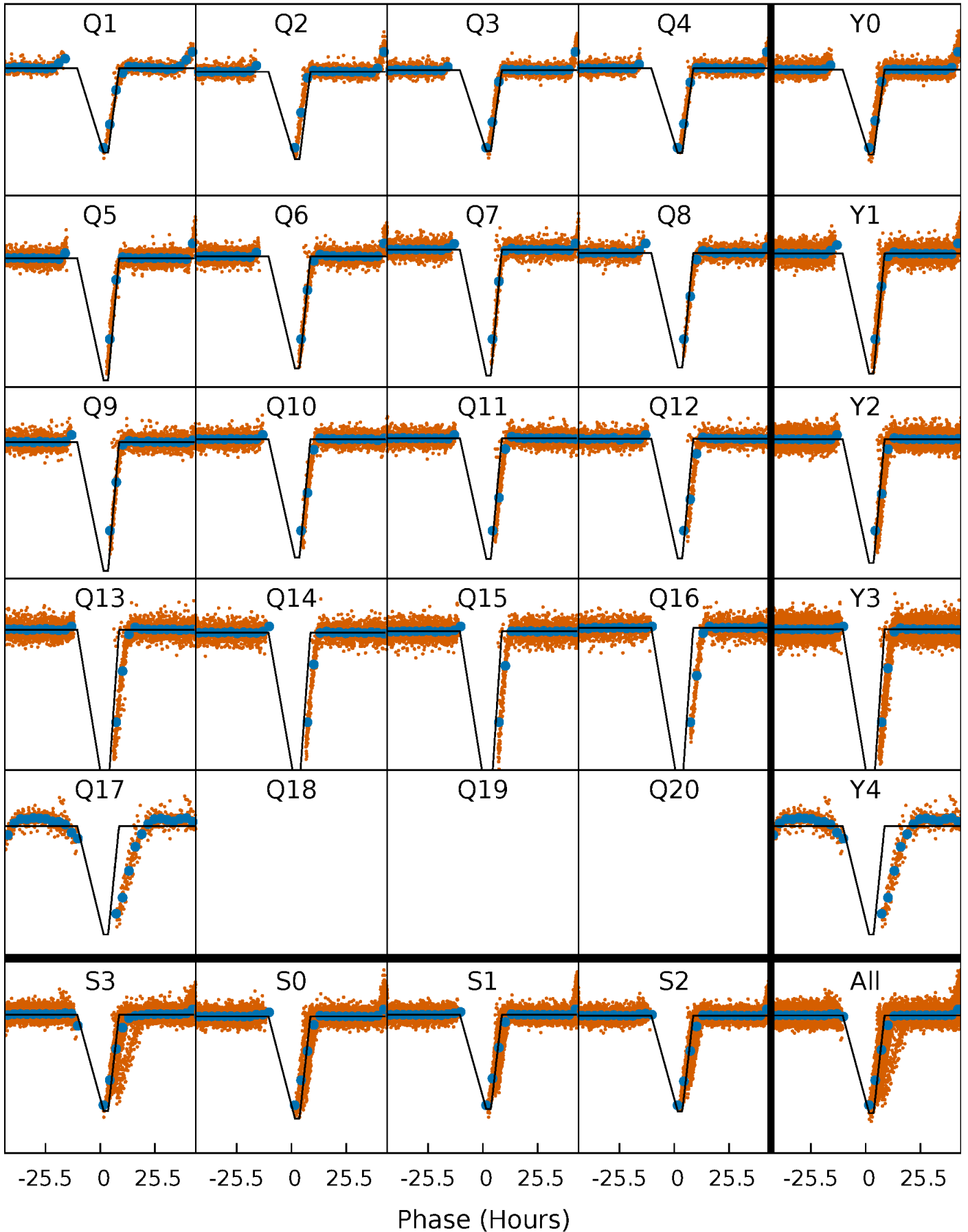
# DV Quarter-Phased Transit Curves

TCE 006631188-02   P= 5.030954 Days    $T_0=131.664245$  (BKJD)



## Alt. Detrend Quarter-Phased Transit Curves

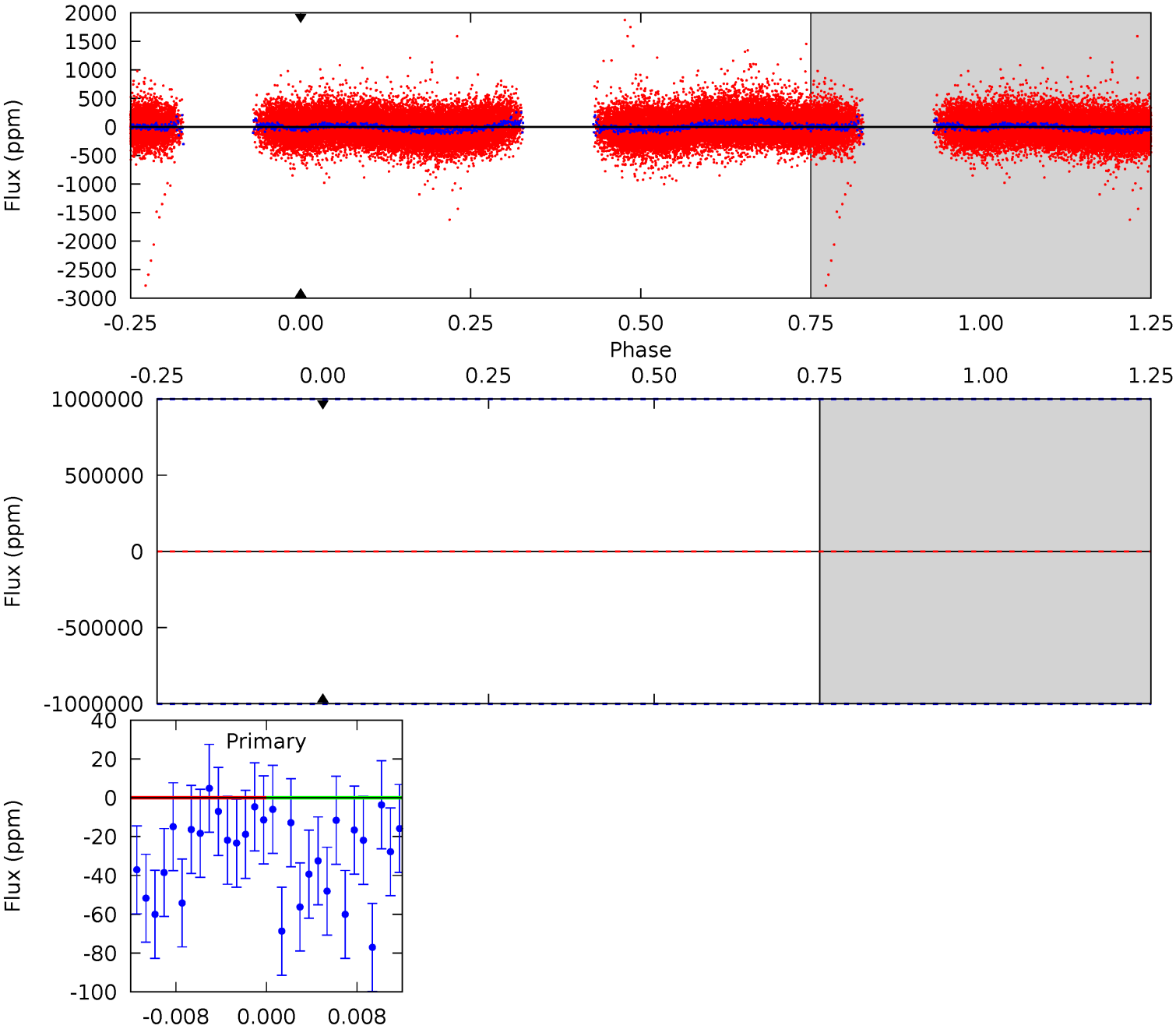
TCE 006631188-02   P= 5.030954 Days    $T_0=136.275406$  (BKJD)



# DV Model-Shift Uniqueness Test

006631188-02, P = 5.030954 Days, E = 126.633291 Days

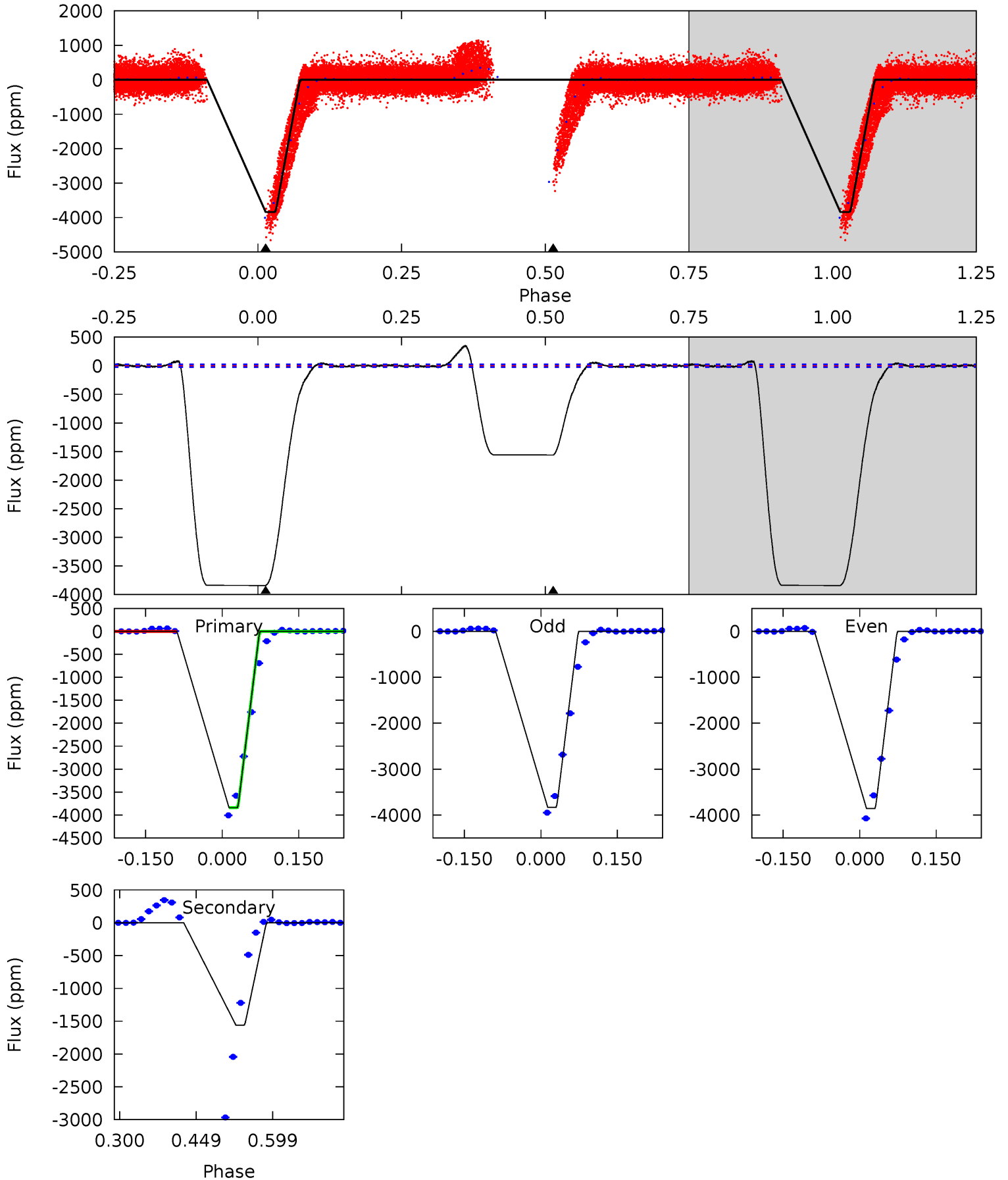
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



# Alt Model-Shift Uniqueness Test

006631188-02, P = 5.030954 Days, E = 131.244452 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
766.5	311.3	0	0	4.48	1.44	12.8	766.5	766.5	311.3	311.3	2.58	1.43	0.08	0



### Stellar Parameters For KIC 006631188

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7714^{+214}_{-322}$	$4.069^{+0.155}_{-0.155}$	$0.040^{+0.150}_{-0.350}$	$2.027^{+0.533}_{-0.436}$	$1.756^{+0.194}_{-0.291}$	$0.297^{+0.239}_{-0.131}$
	+3%/-4%	+4%/-4%	+375%/-875%	+26%/-22%	+11%/-17%	+80%/-44%
Source	KIC0	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 006631188-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$0 \pm 1000000$	$15.31^{+16.85}_{-10.66}$	$2560^{+194}_{-172}$	$6589^{+51260}_{-47438}$	$32^{+2466}_{-1554}$
Alt.	$-1560 \pm 5$	$20.69^{+21.15}_{-13.44}$	$2563^{+169}_{-168}$	$4939^{+3441}_{-1180}$	$9.485^{+64.874}_{-7.160}$

$T_{max}$  = 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

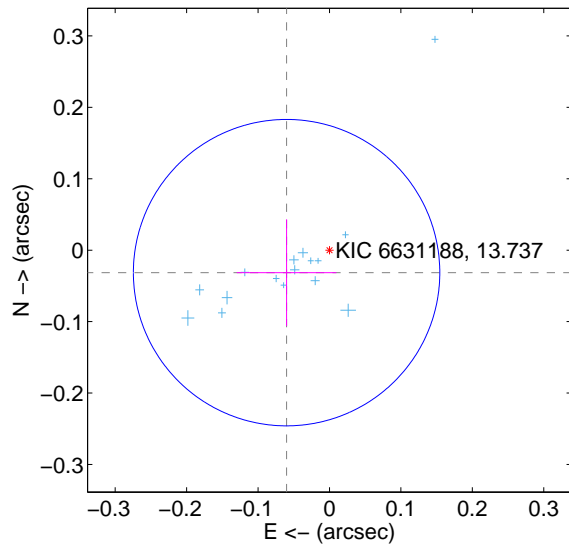
Supplemental centroid analysis for 006631188-02. Kepler magnitude: 13.74. Transit SNR -1.00

There are 17 quarters with good PRF difference image offsets

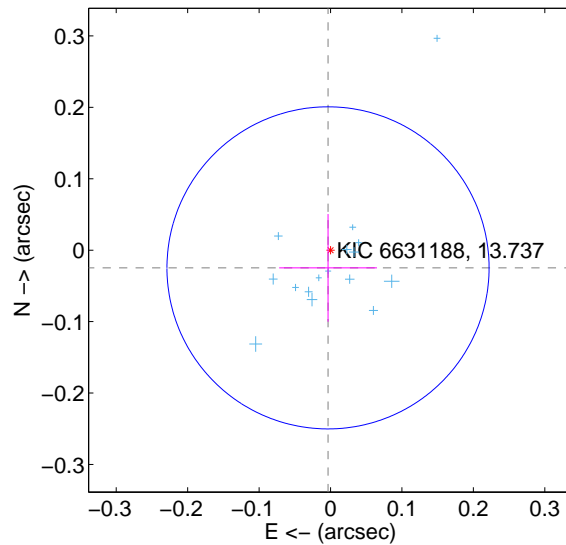
The direct PRF centroid is offset from the target star catalog position by about 0.07 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.068 \pm 0.072$	0.95	$0.060 \pm 0.070$	$-0.031 \pm 0.075$
PRF-fit source offset from KIC position	$0.025 \pm 0.075$	0.33	$0.004 \pm 0.068$	$-0.025 \pm 0.075$
photometric centroid source offset	$0.12 \pm 0.01$	9.95	$-0.11 \pm 0.01$	$0.05 \pm 0.01$

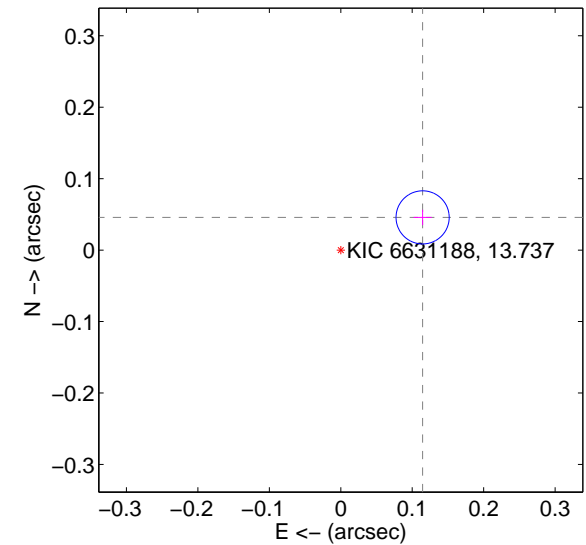
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

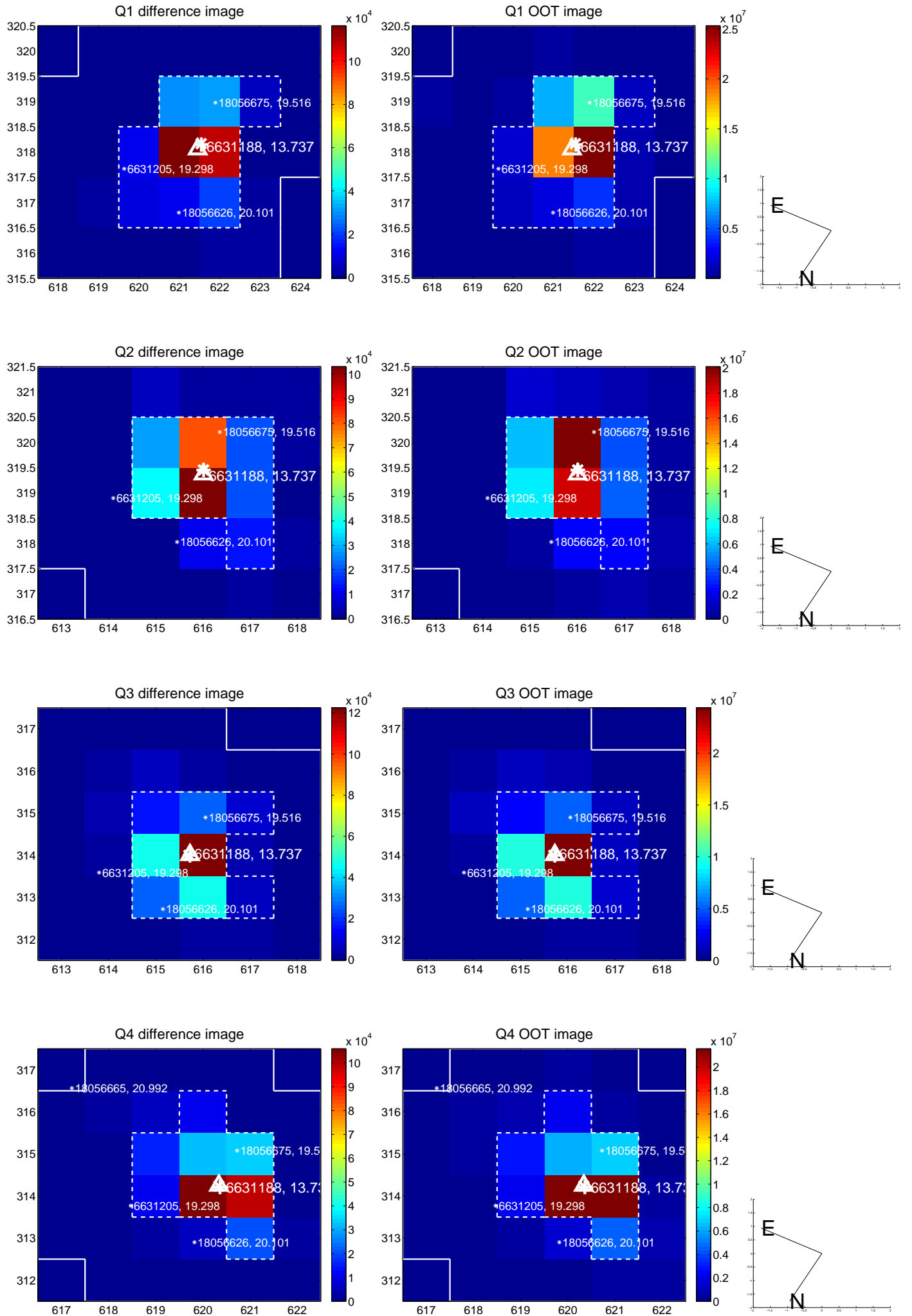


offset from photometric centroids

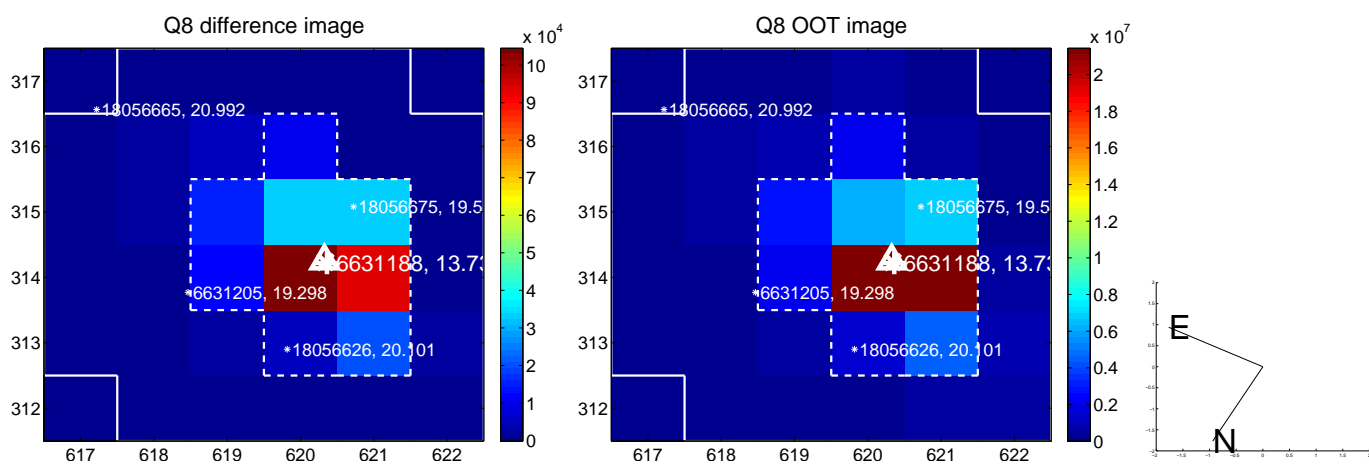
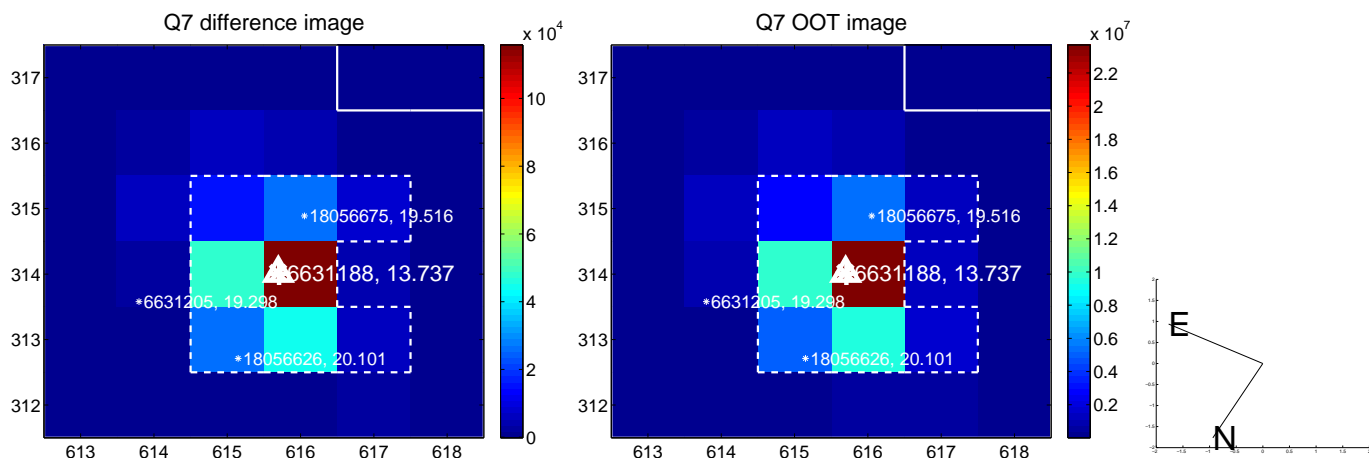
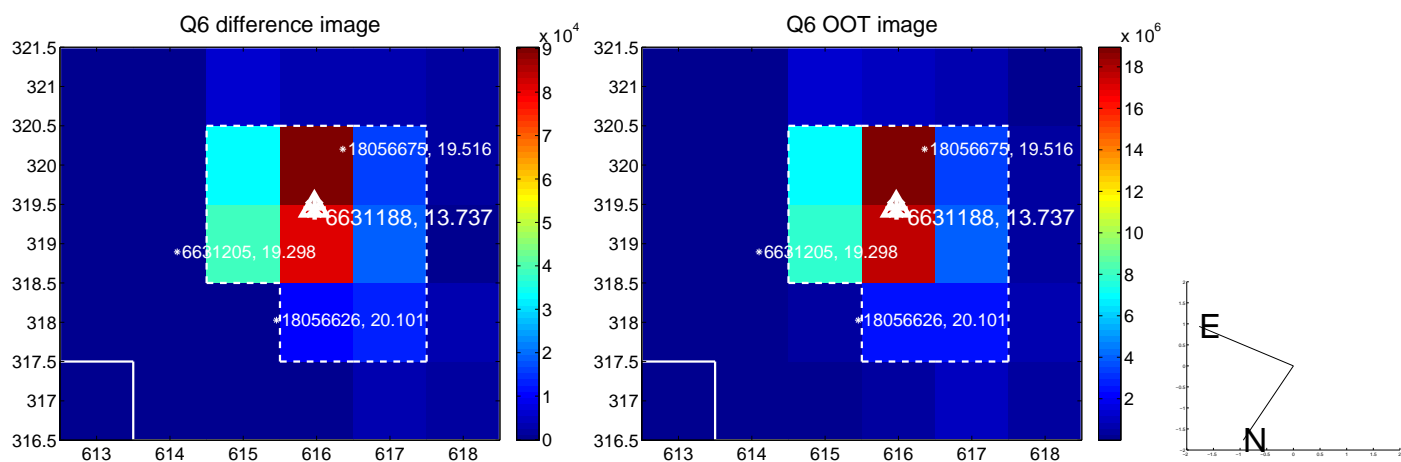
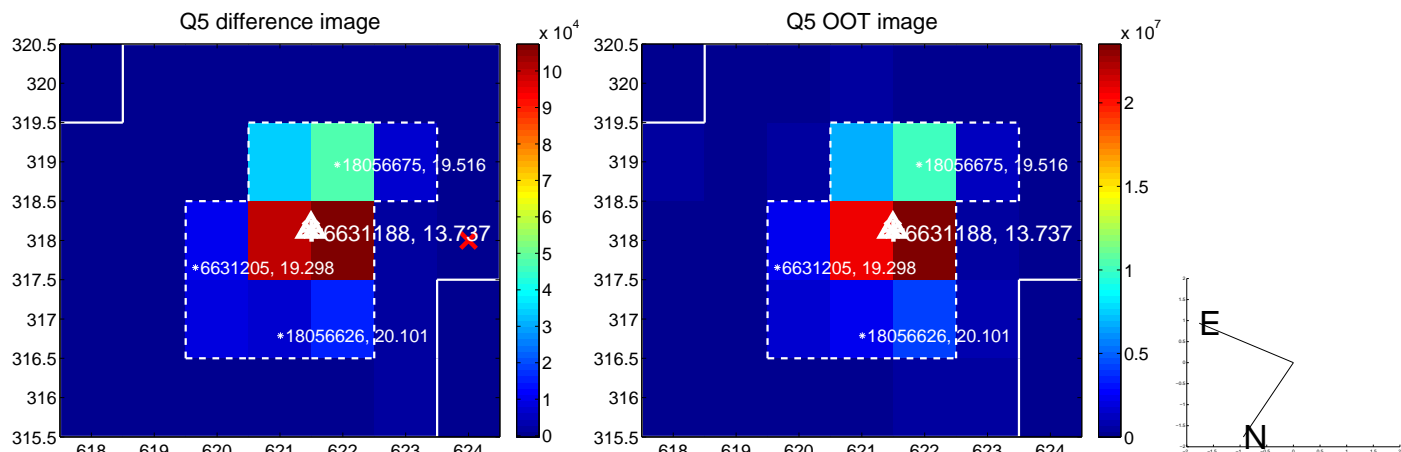


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three- $\sigma$ . Red \*: target star. Blue \*: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.

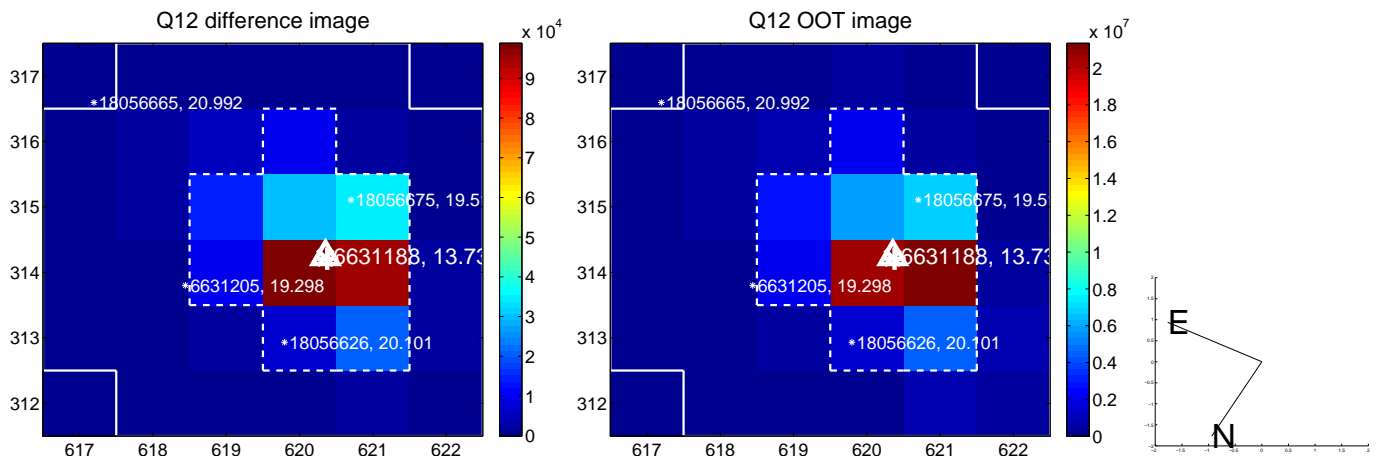
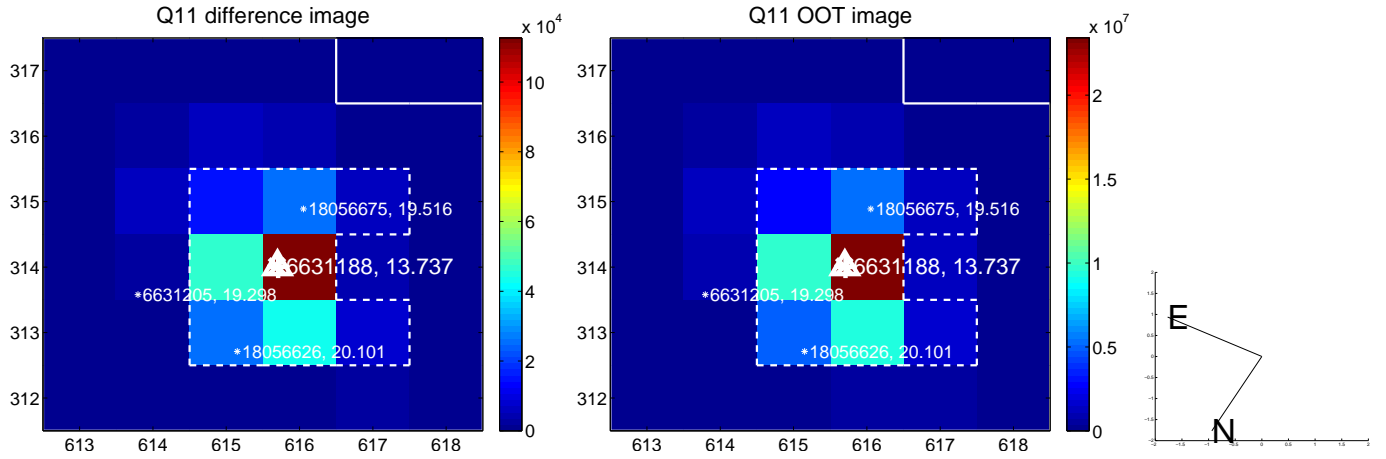
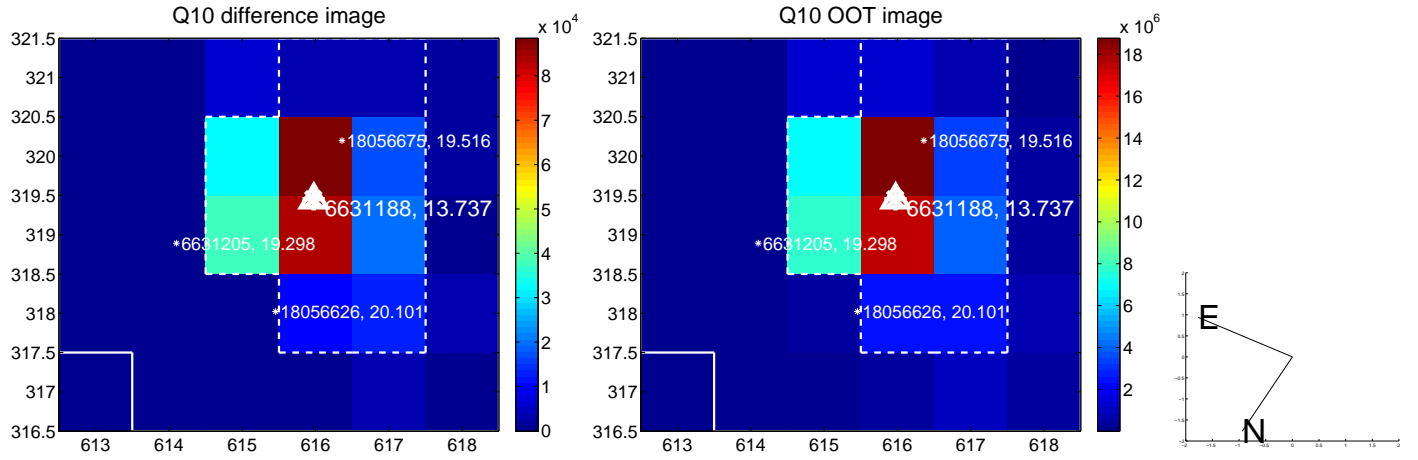
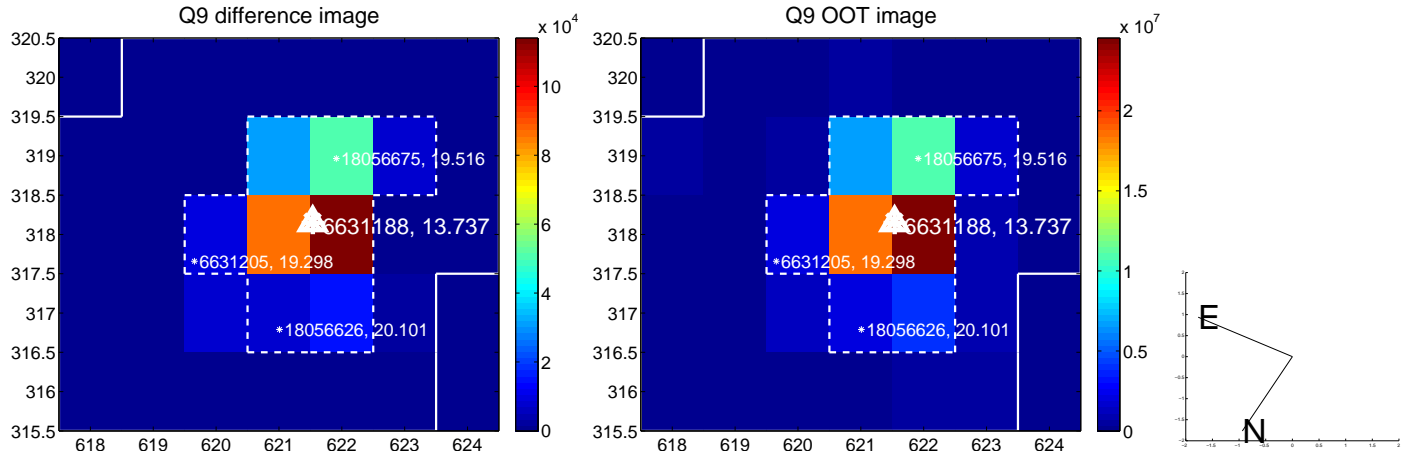
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



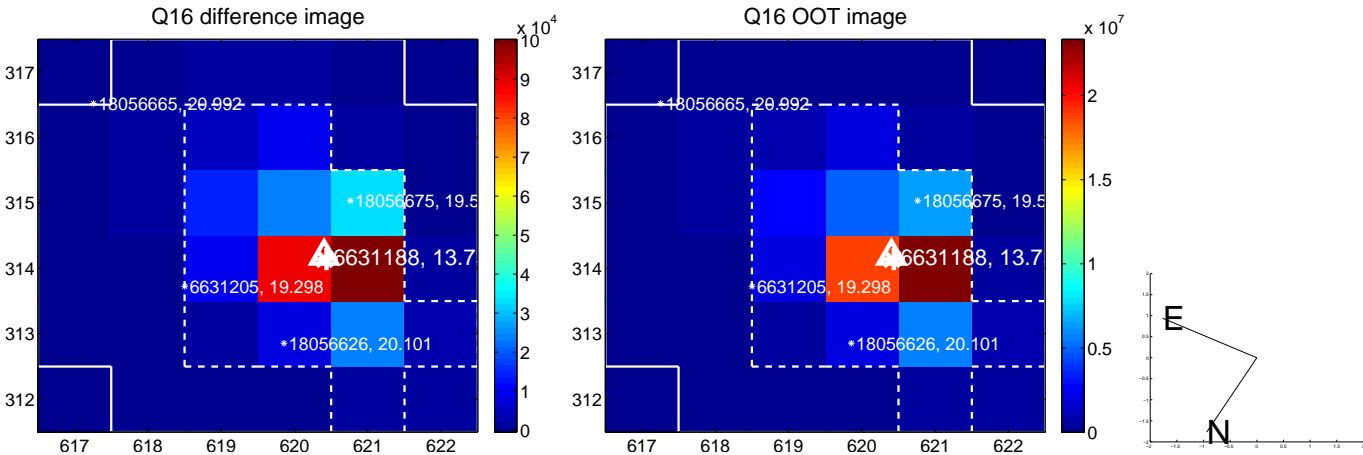
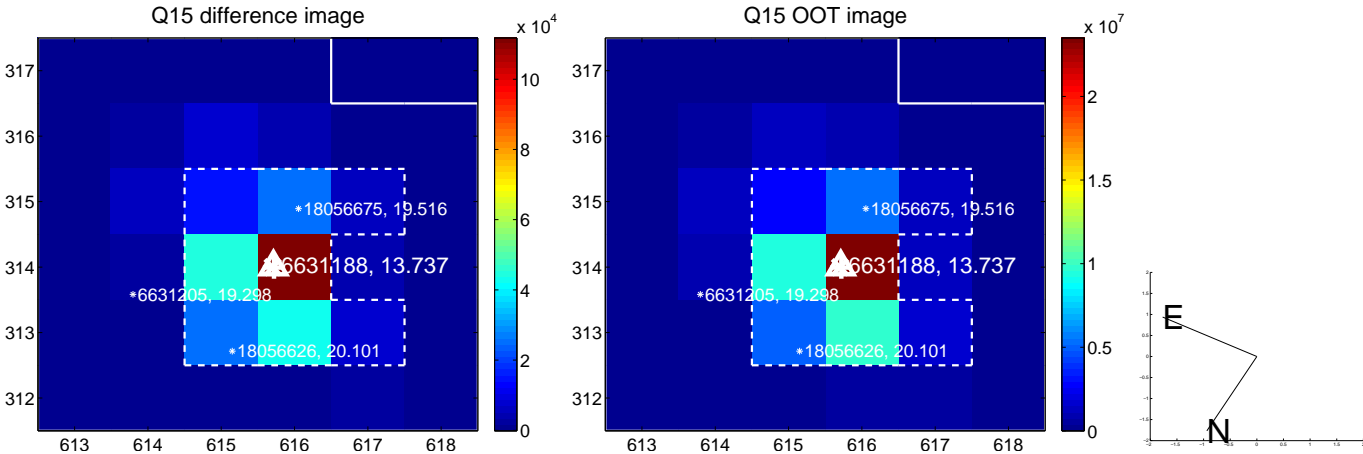
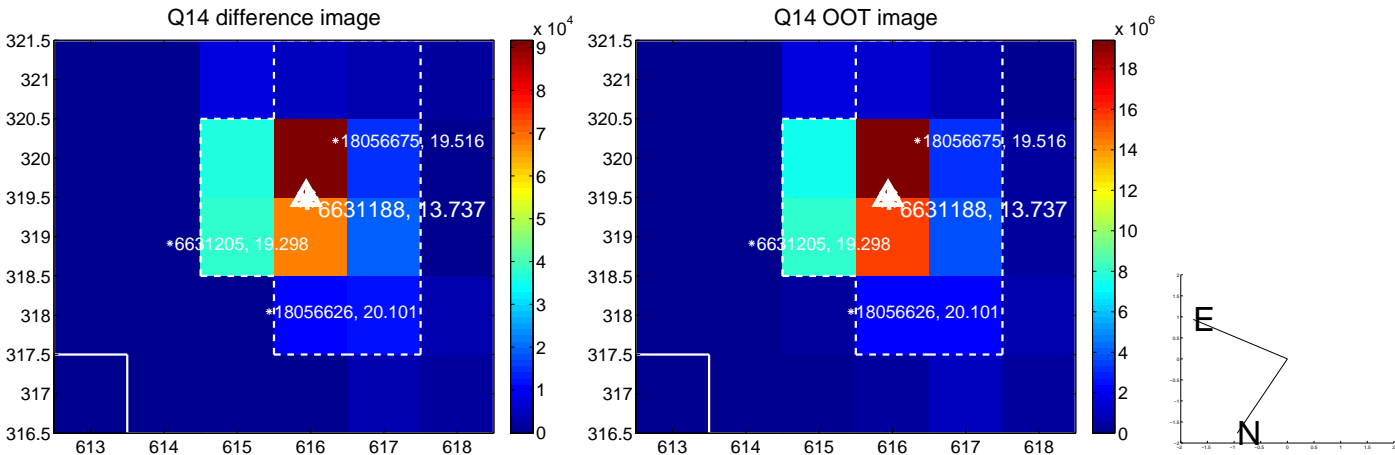
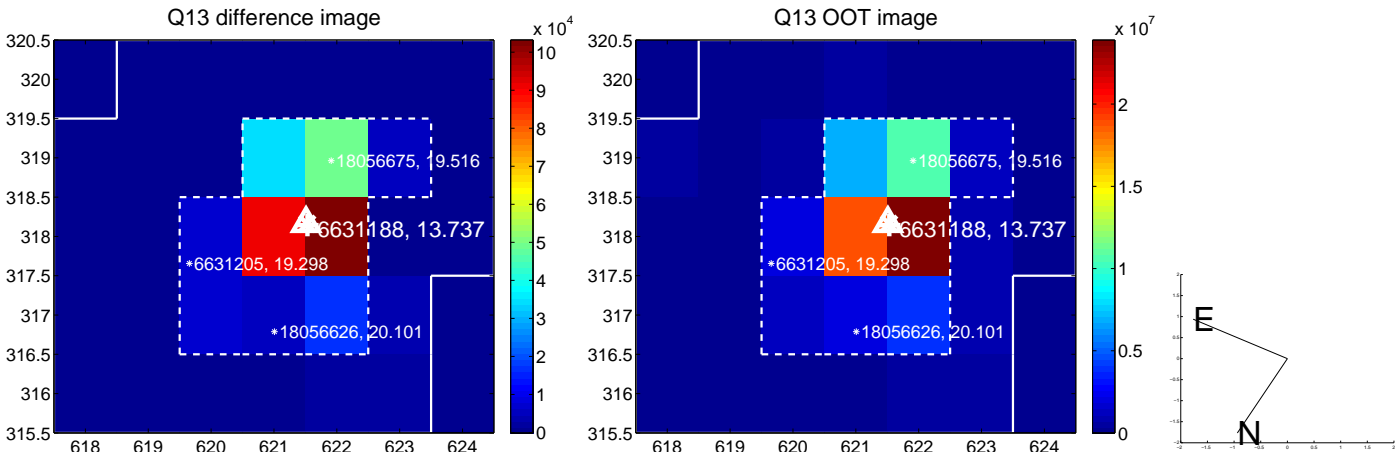
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



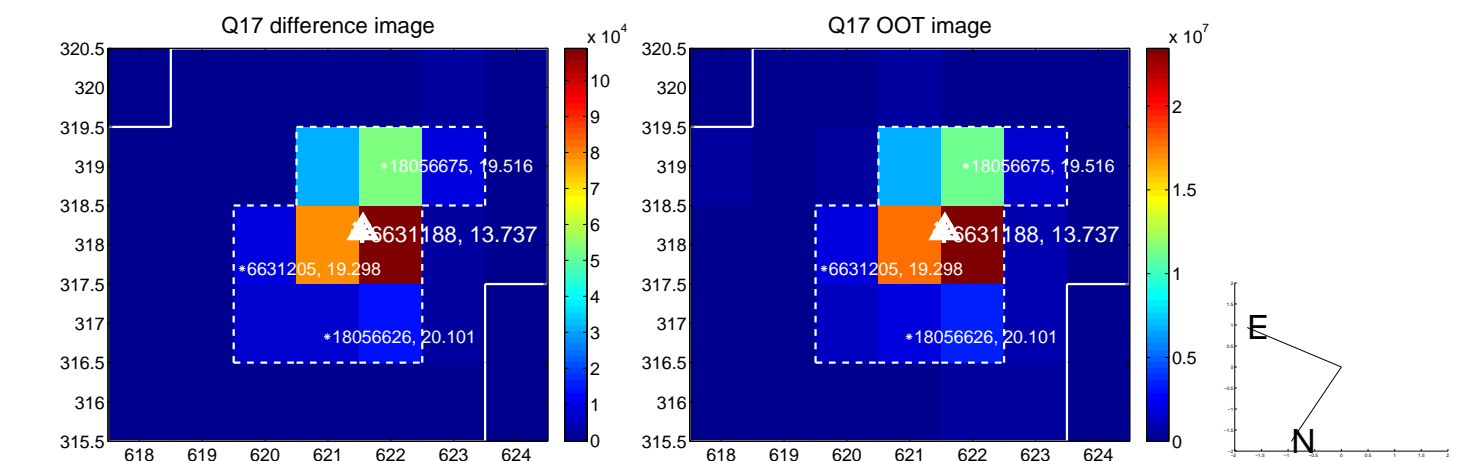
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



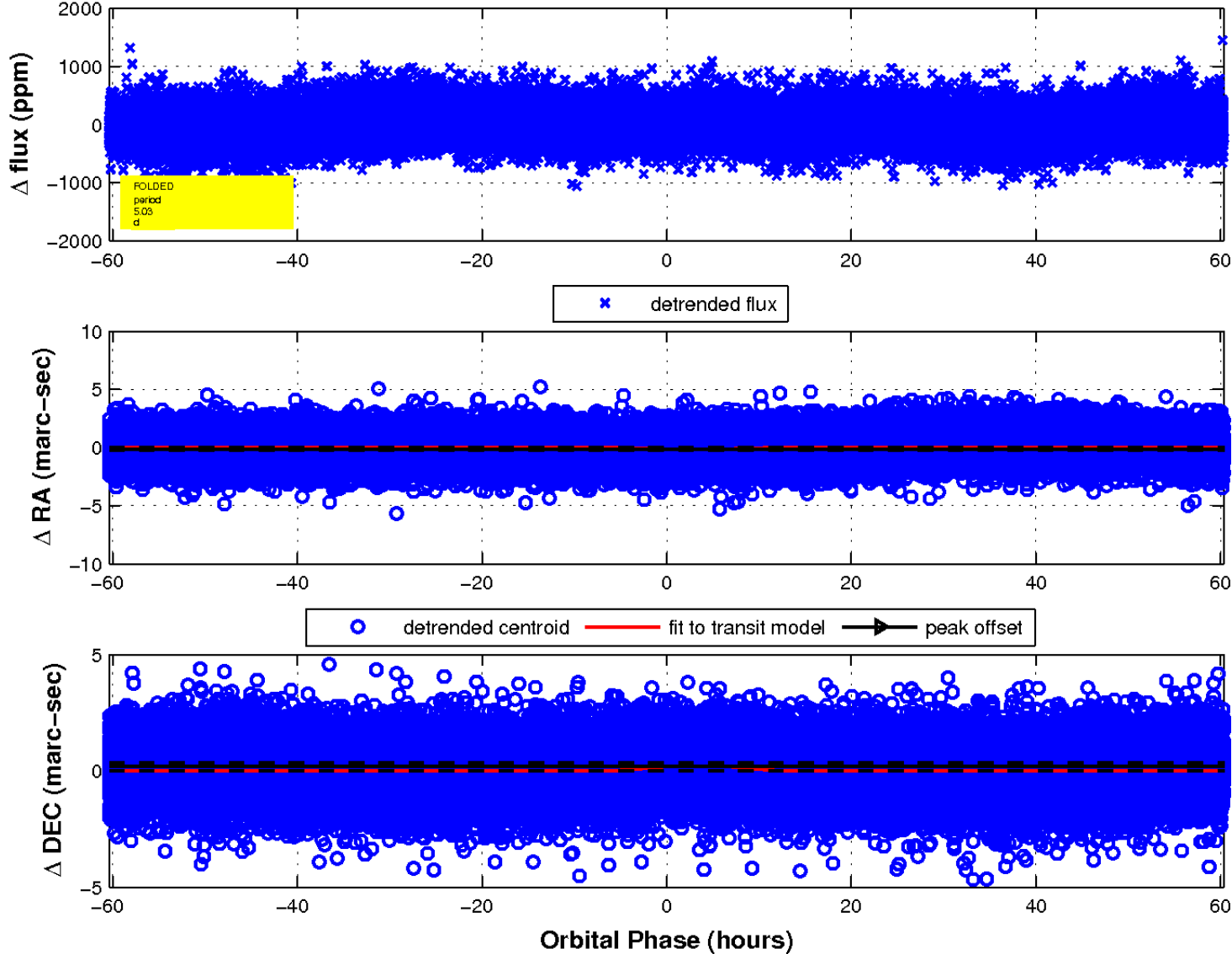
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

