

# KIC 011560037

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
011560037-01	OBS	3874.01	0.733275	131.989477	783.7	0.860	37.9	72.1	1.02	5888	3.43	4657.40
011560037-02	OBS	No	1.467090	132.447648	64.7	13.246	9.9	10.3	1.02	5888	0.83	1847.38

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
011560037-01	OBS	FP	0.00	0	1	0	0	MOD_ODDEVEN_DV—MOD_ODDEVEN_ALT
011560037-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—LPP_DV—CENT_FEW_MEAS

**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 011560037-01

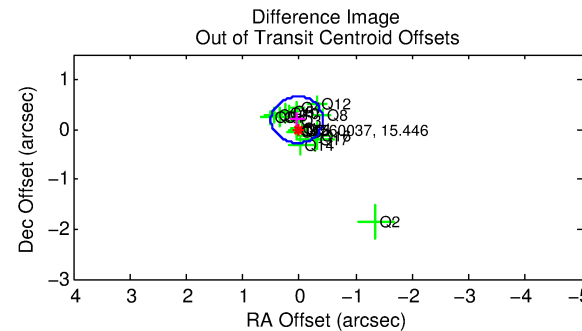
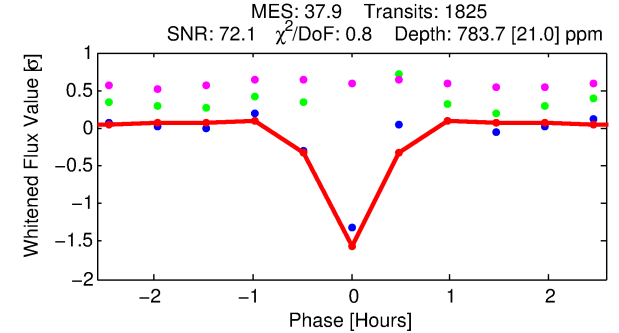
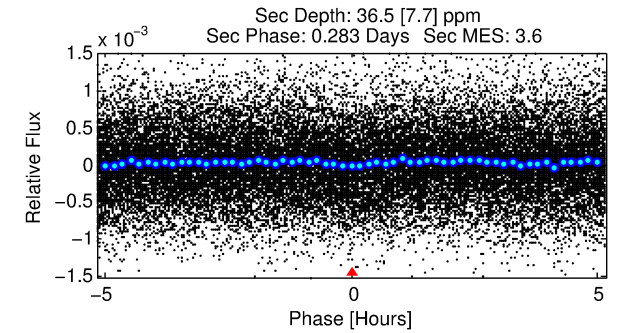
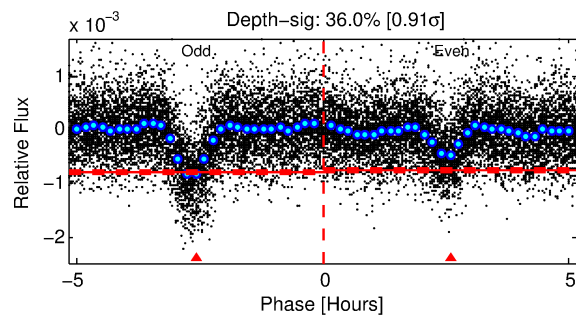
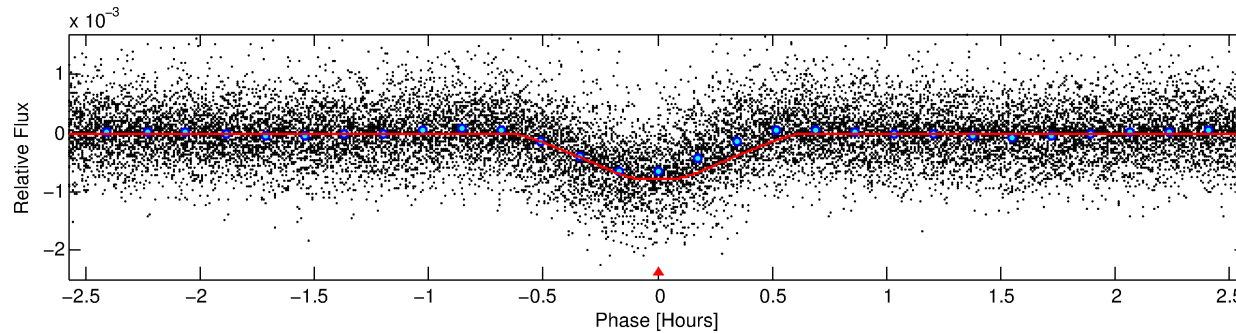
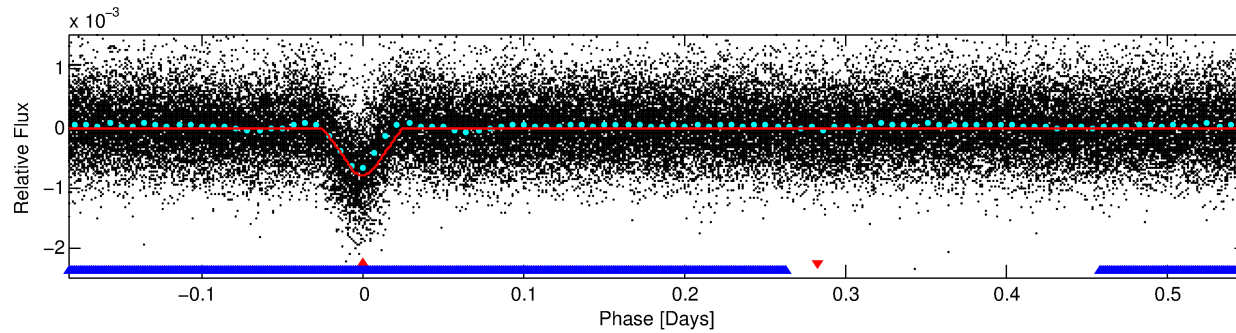
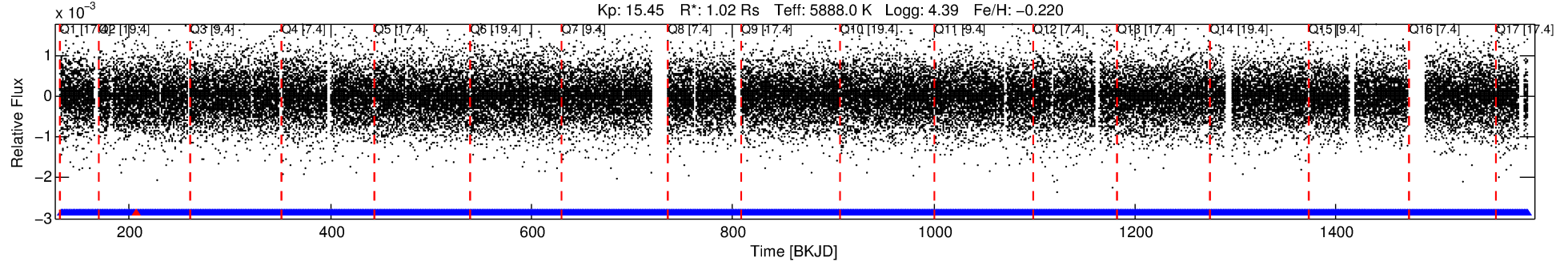
No Significant Match Found

# DV One-Page Summary

KIC: 11560037 Candidate: 1 of 2 Period: 0.733 d

KOI: K03874 Corr: No Ephemeris Match

Kp: 15.45 R\*: 1.02 Rs Teff: 5888.0 K Logg: 4.39 Fe/H: -0.220



## DV Fit Results:

Period = 0.73327 [0.00000] d  
Epoch = 131.9895 [0.0002] BKJD  
Rp/R\* = 0.0308 [0.0028]  
a/R\* = 3.41 [1.33]  
b = 0.90 [0.09]  
Seff = 4657.40 [1734.86]  
Teq = 2107 [196] K  
Rp = 3.43 [1.04] Re  
a = 0.0155 [0.0038] AU  
Ag = 0.41 [0.19] [-3.19σ]  
Teffp = 2607 [199] K [1.79σ]

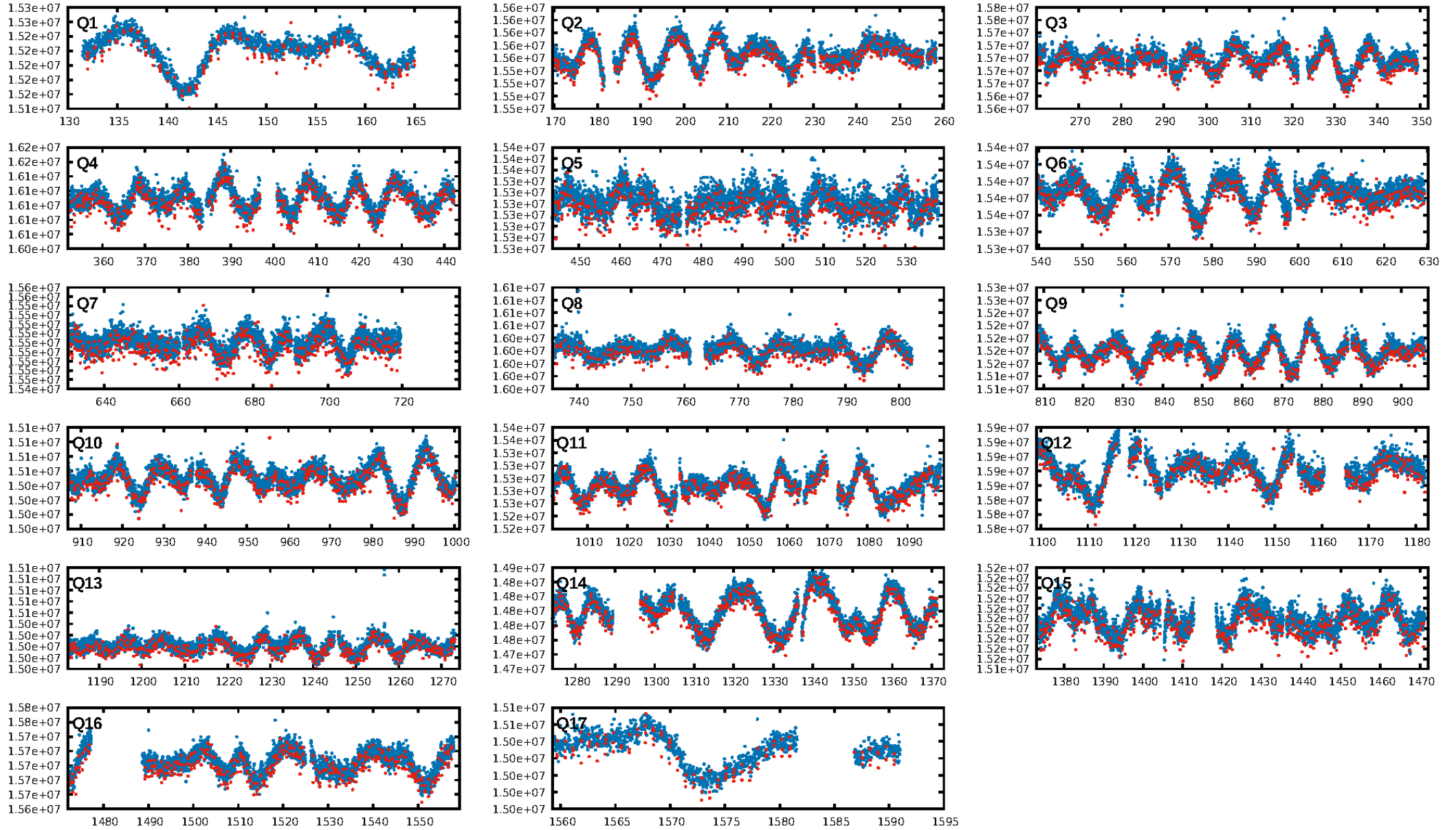
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 81.5% [1.33σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [1742/1743]  
GhostDiagnostic-chr: 2.456  
Centroid-sig: 5.2%  
Centroid-so: 0.350 arcsec [1.81σ]  
OotOffset-rm: 0.192 arcsec [1.24σ]  
KicOffset-rm: 0.145 arcsec [0.88σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 1.00 [17/17]  
DiffImageOverlap-fno: 0.88 [15/17]

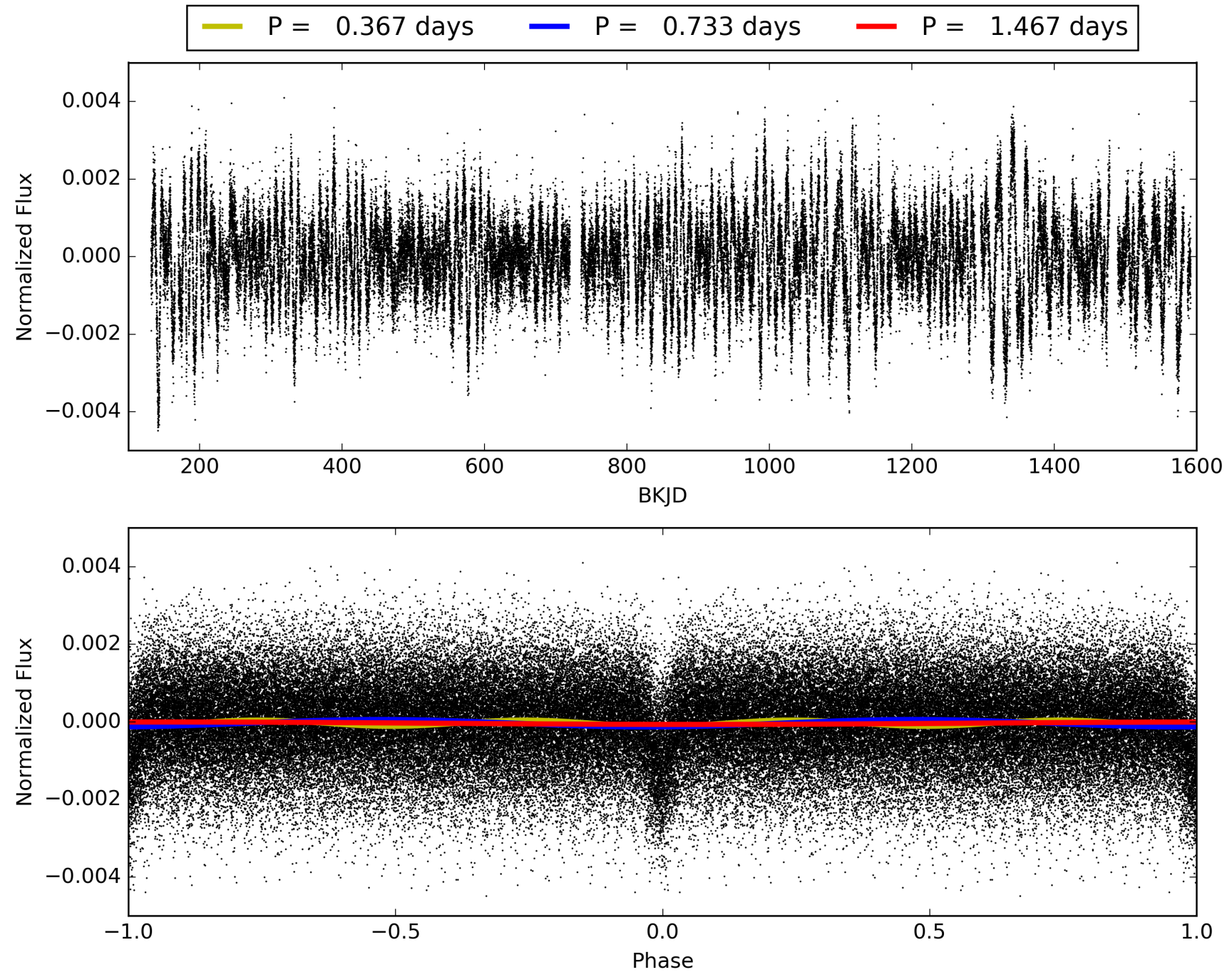
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 07:36:40 Z

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

# TCE 011560037-01, PDC Light Curves



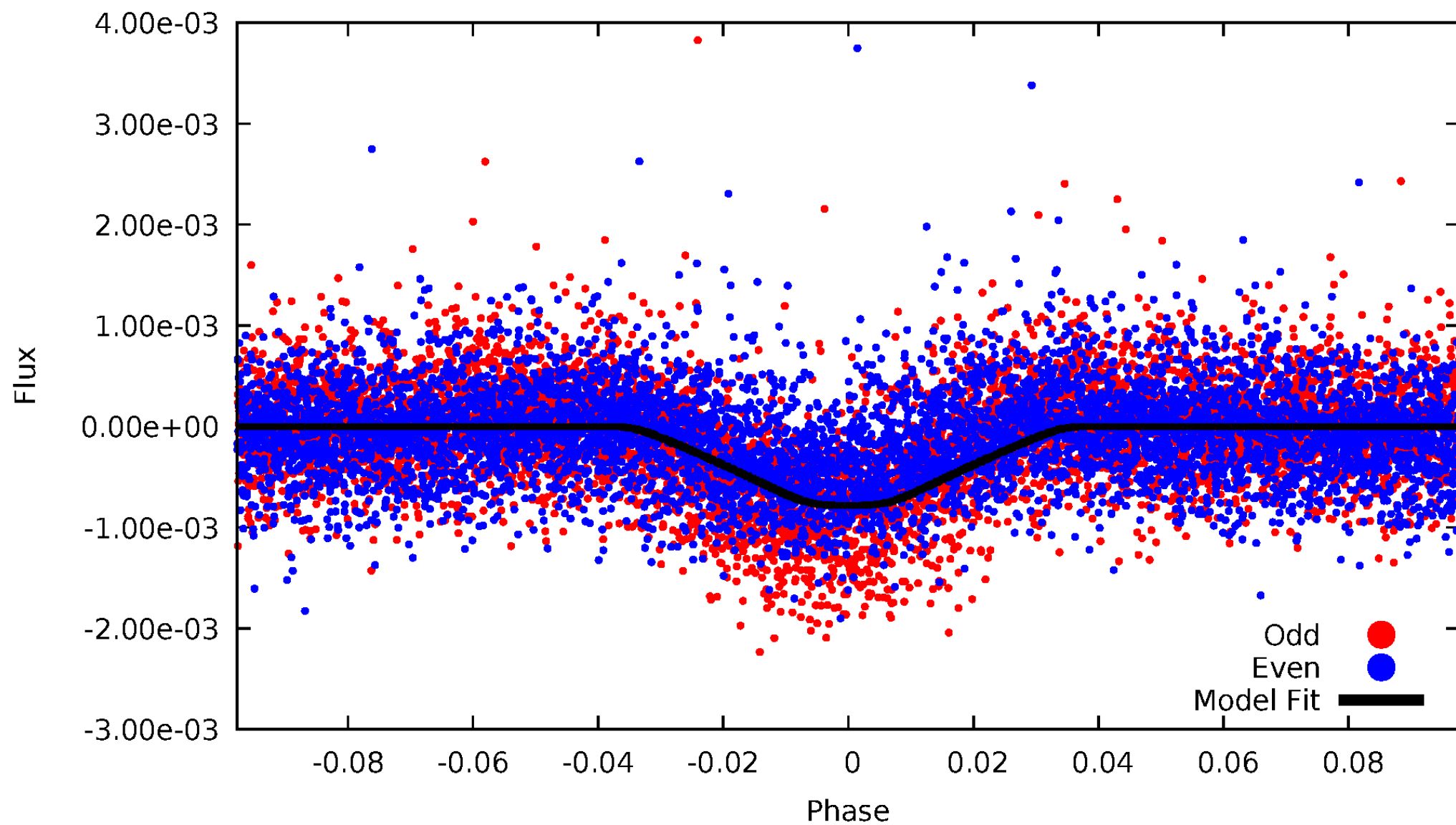
TCE 011560037-01





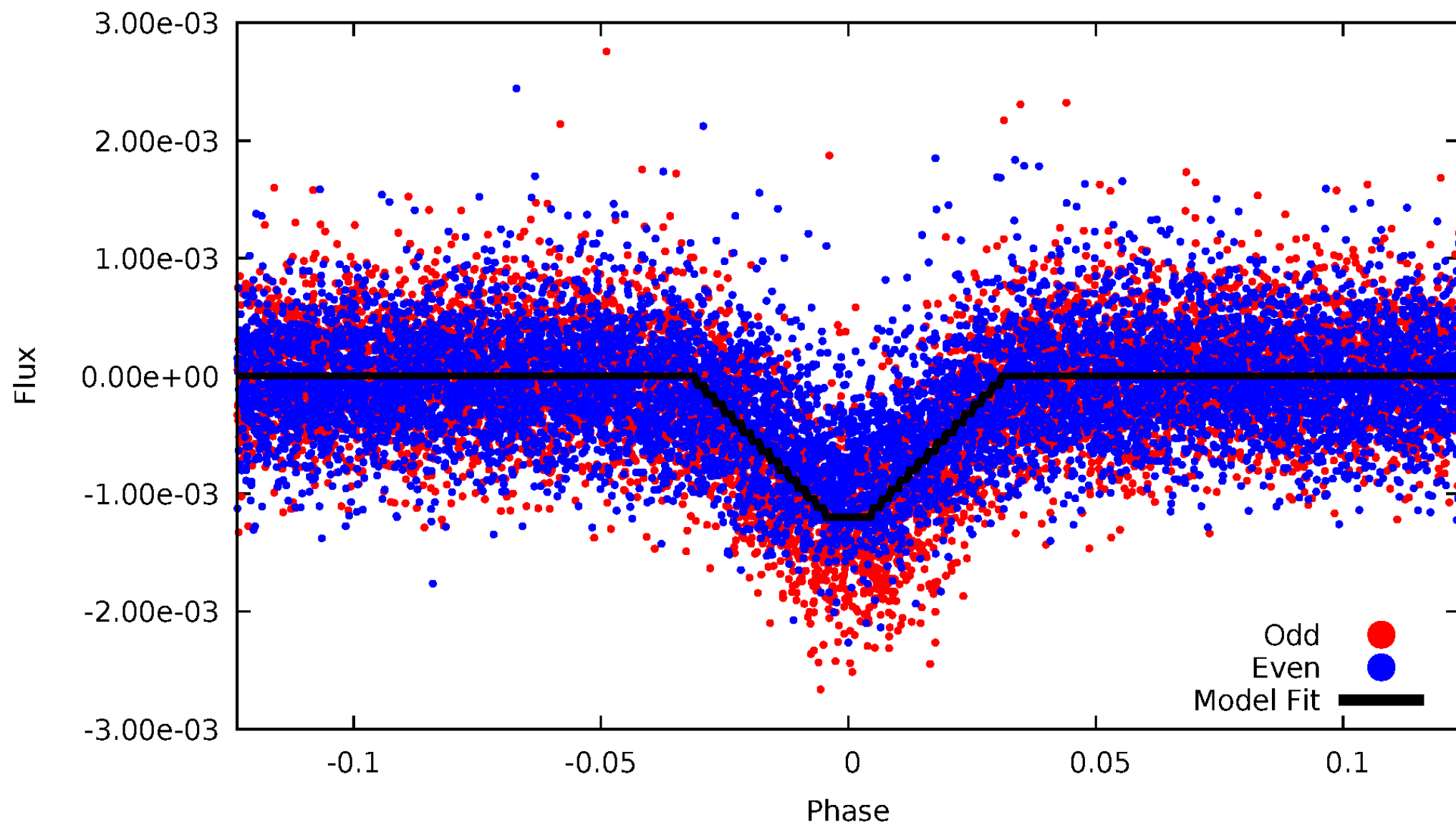
# DV Odd/Even

TCE 011560037-01

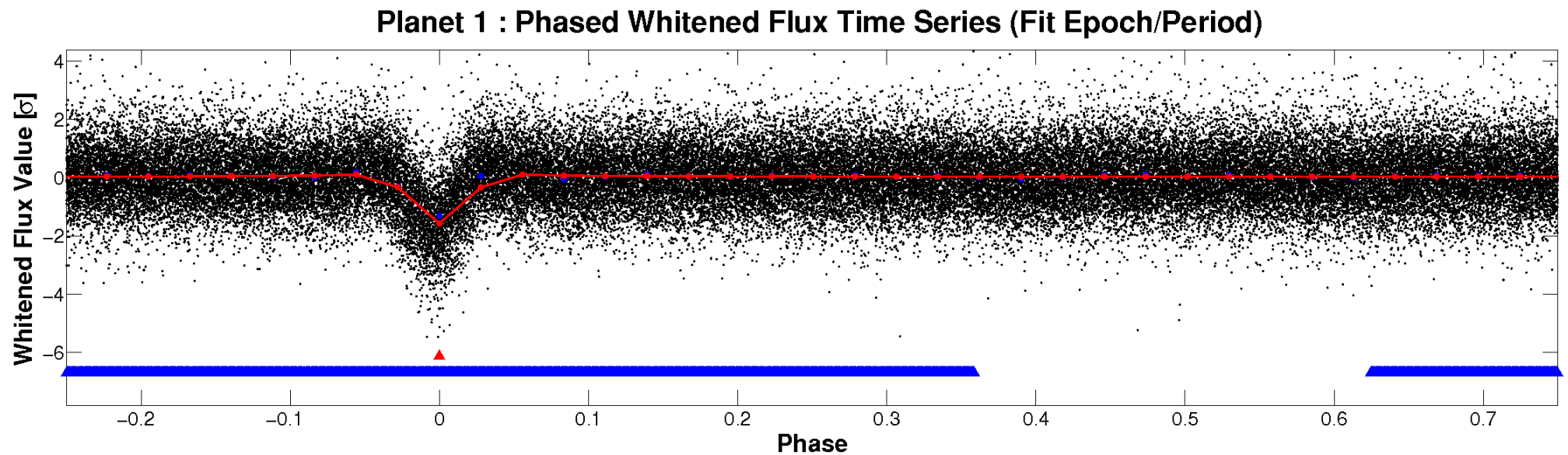
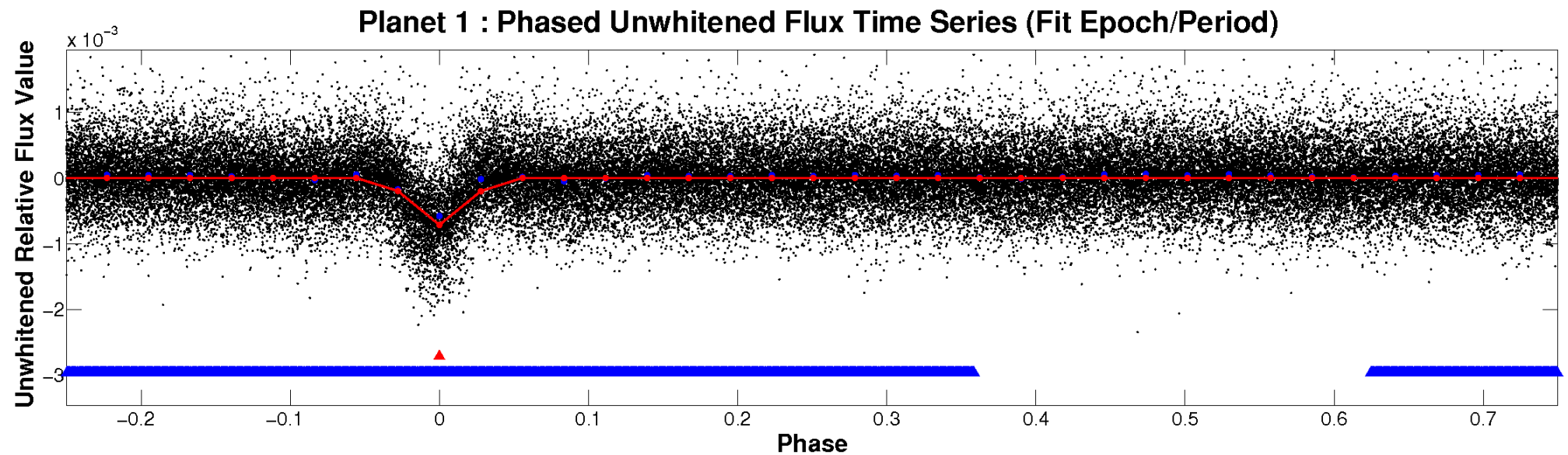


# ALT Odd/Even

TCE 011560037-01

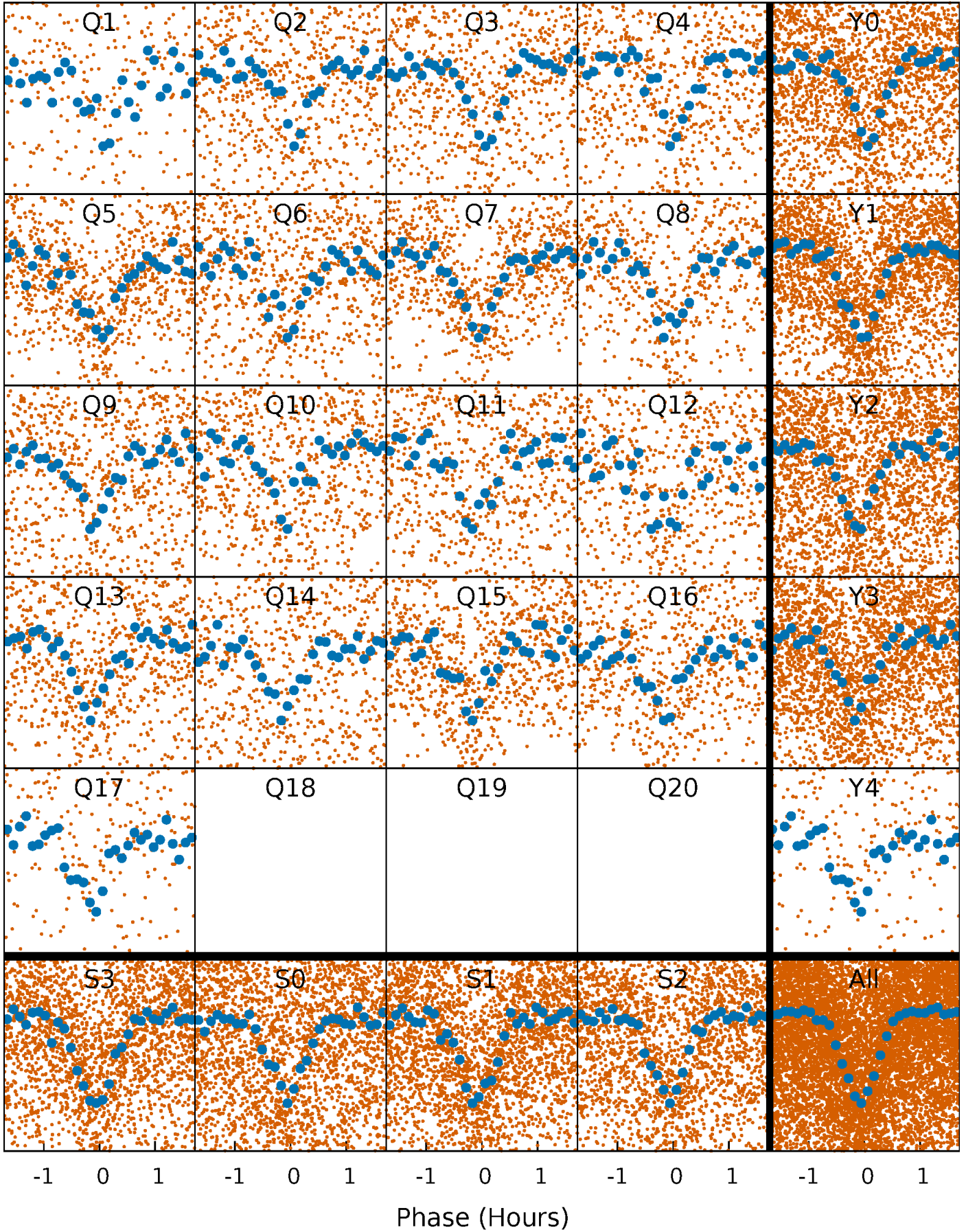


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

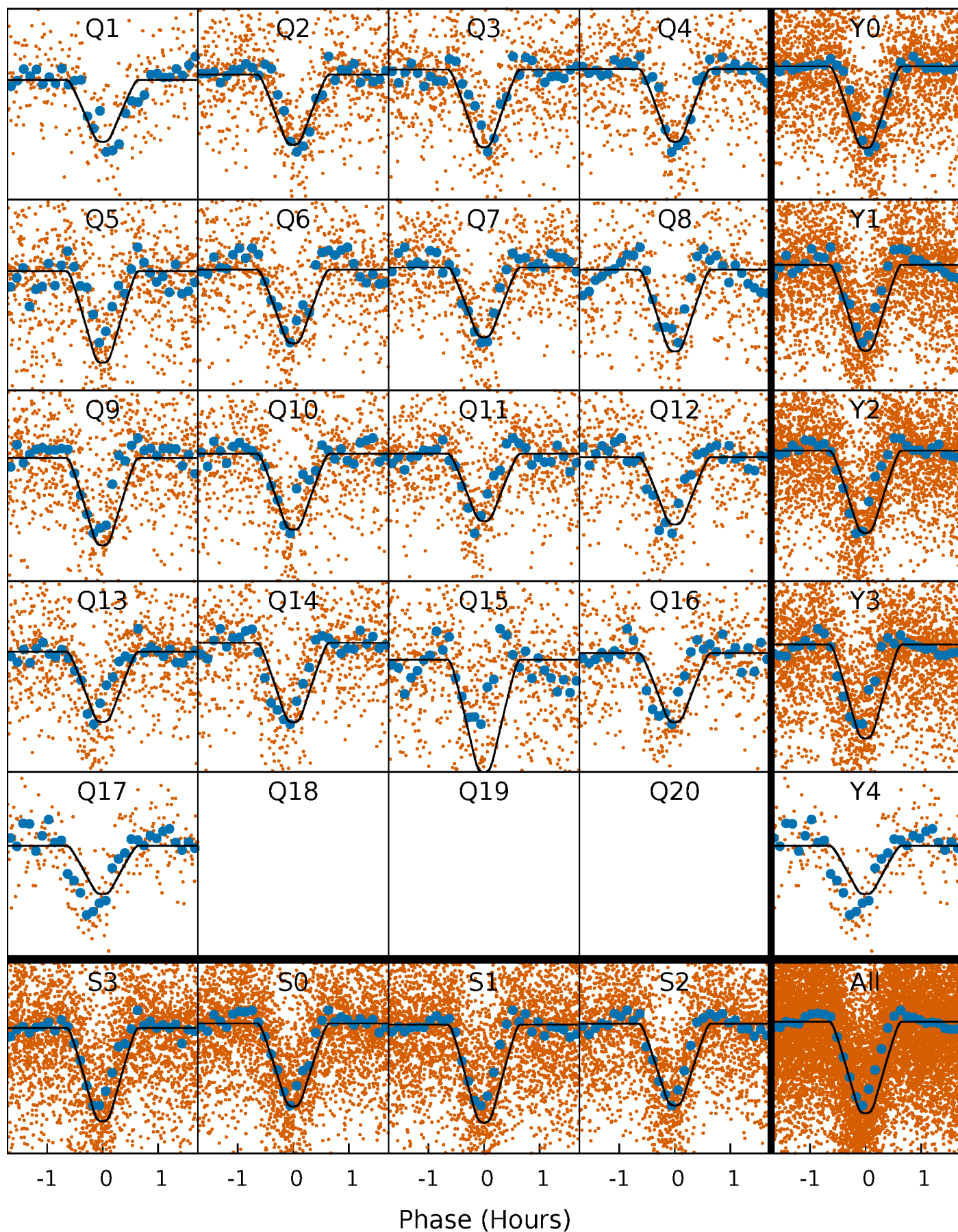
TCE 011560037-01 P= 0.733274 Days  $T_0=131.989477$  (BKJD)





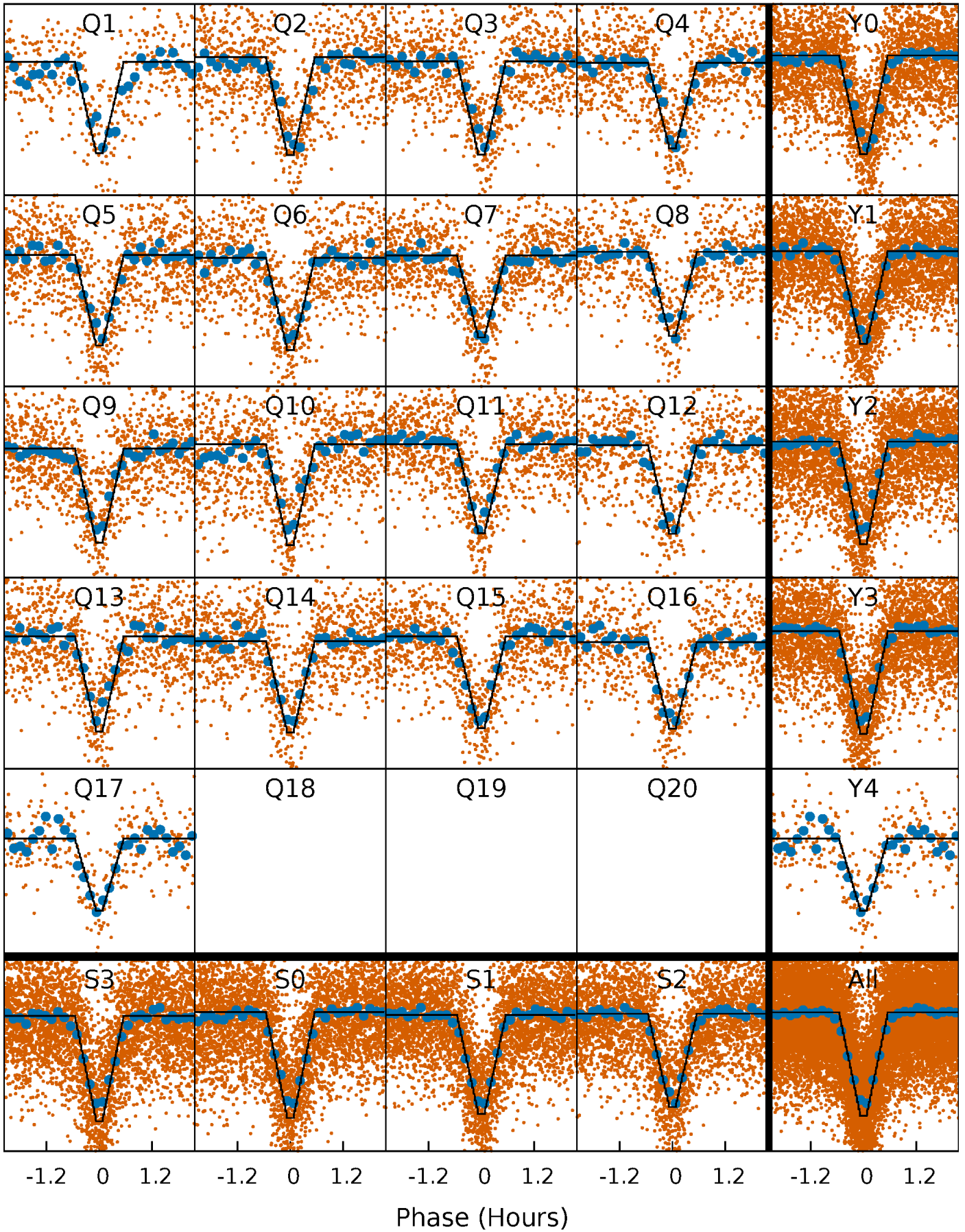
# DV Quarter-Phased Transit Curves

TCE 011560037-01   P= 0.733274 Days    $T_0=131.989477$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

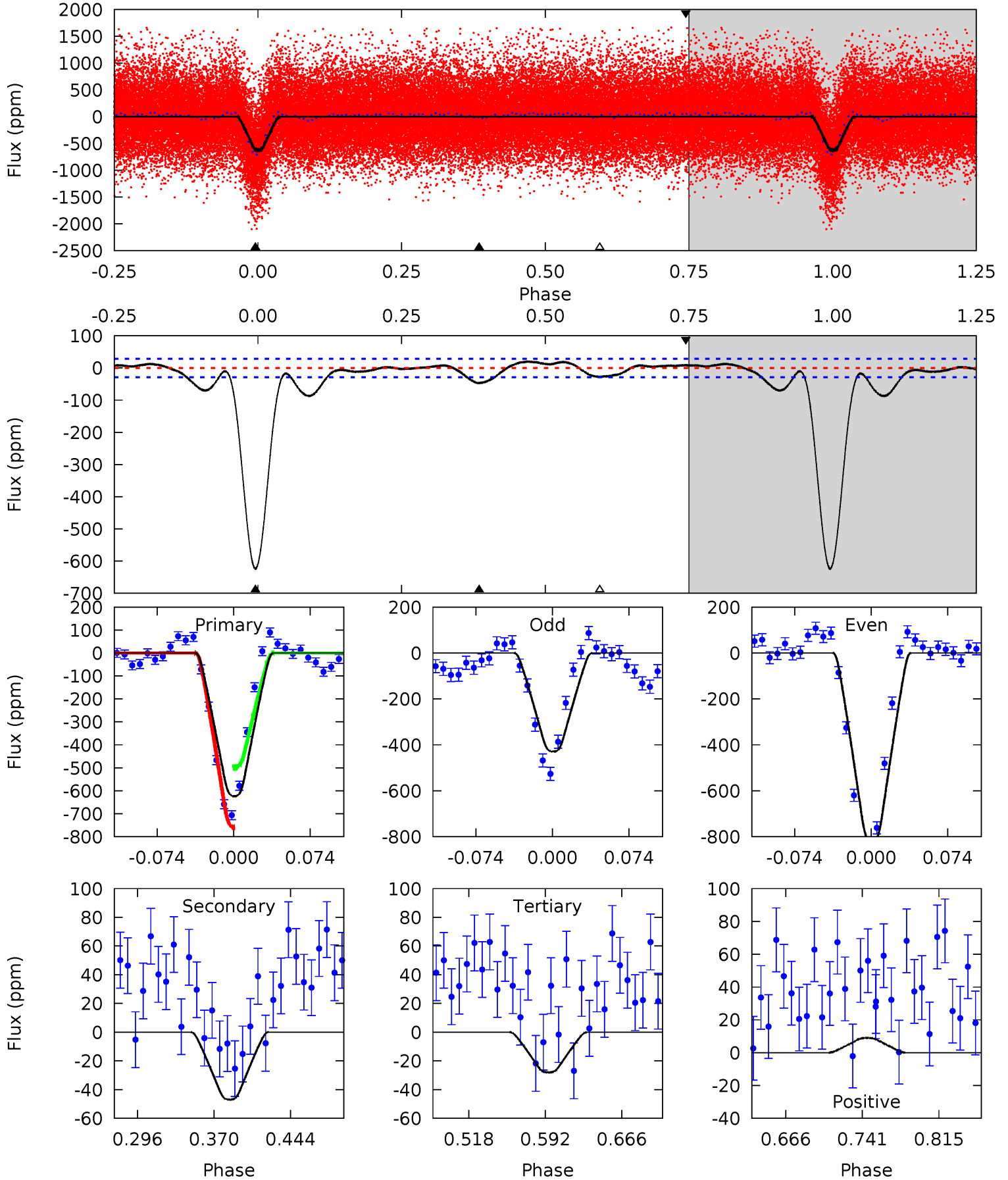
TCE 011560037-01 P= 0.733271 Days  $T_0=131.989593$  (BKJD)



# DV Model-Shift Uniqueness Test

011560037-01, P = 0.733274 Days, E = 131.256203 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
100.4	7.56	4.51	1.44	4.63	1.79	4.05	95.9	98.9	3.05	6.12	31.6	0.95	0.03	21.1

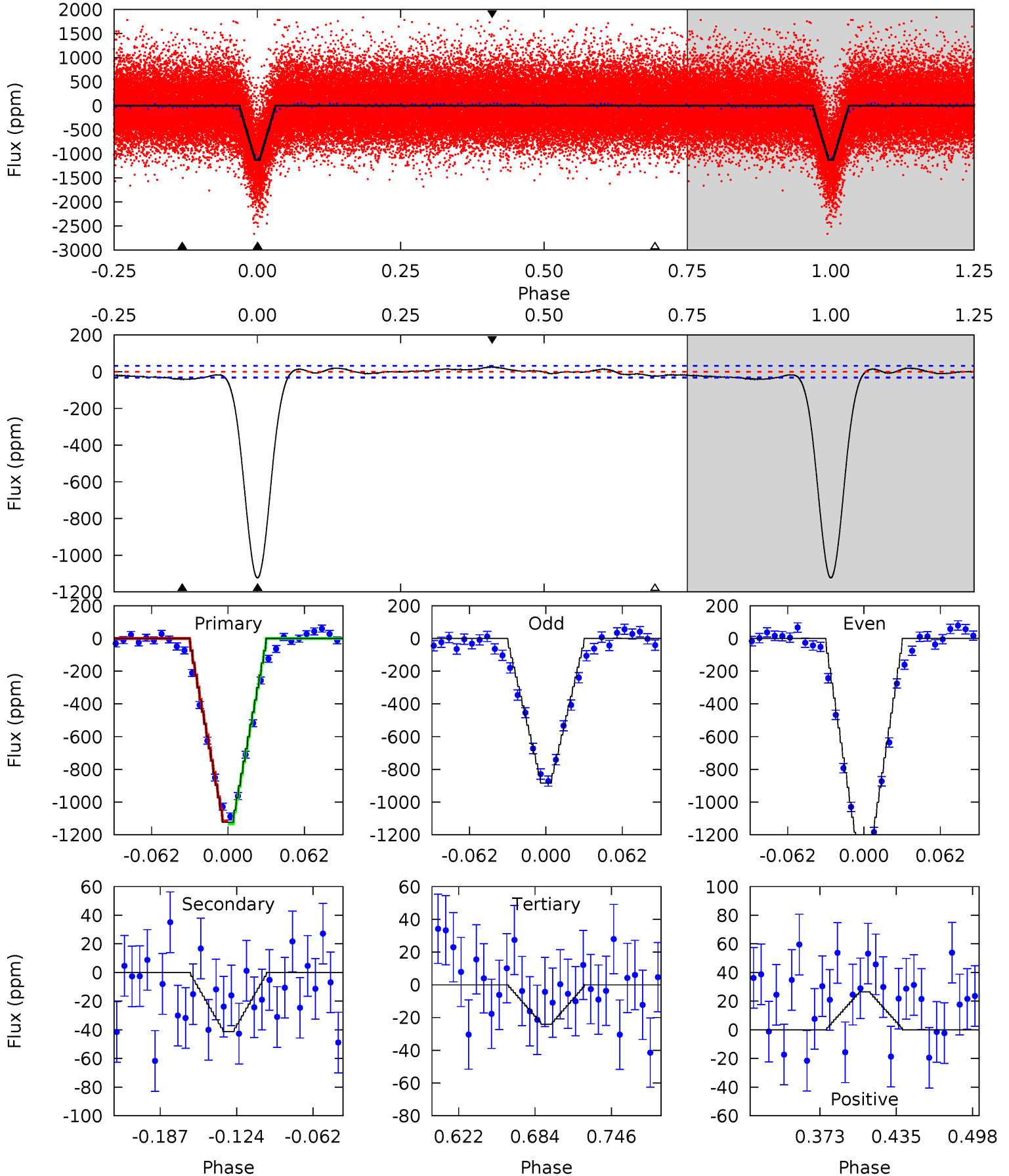




# Alt Model-Shift Uniqueness Test

011560037-01, P = 0.733271 Days, E = 131.256322 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
163.4	6.00	3.49	3.86	4.66	1.86	1.94	159.9	159.6	2.51	2.14	35.1	0.99	0.02	1.26





### Stellar Parameters For KIC 011560037

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5888^{+159}_{-177}$	$4.387^{+0.128}_{-0.192}$	$-0.220^{+0.300}_{-0.300}$	$1.020^{+0.296}_{-0.182}$	$0.924^{+0.131}_{-0.098}$	$1.227^{+0.716}_{-0.618}$
	+3%/-3%	+3%/-4%	+136%/-136%	+29%/-18%	+14%/-11%	+58%/-50%
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 011560037-01 / KOI 3874.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-47 \pm 6$	$3.48^{+0.61}_{-0.50}$	$2971^{+200}_{-176}$	$2915^{+232}_{-367}$	$0.507^{+0.200}_{-0.142}$
Alt.	$-41 \pm 7$	$3.88^{+0.71}_{-0.49}$	$2962^{+211}_{-157}$	$2428^{+377}_{-4919}$	$0.352^{+0.120}_{-0.106}$

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

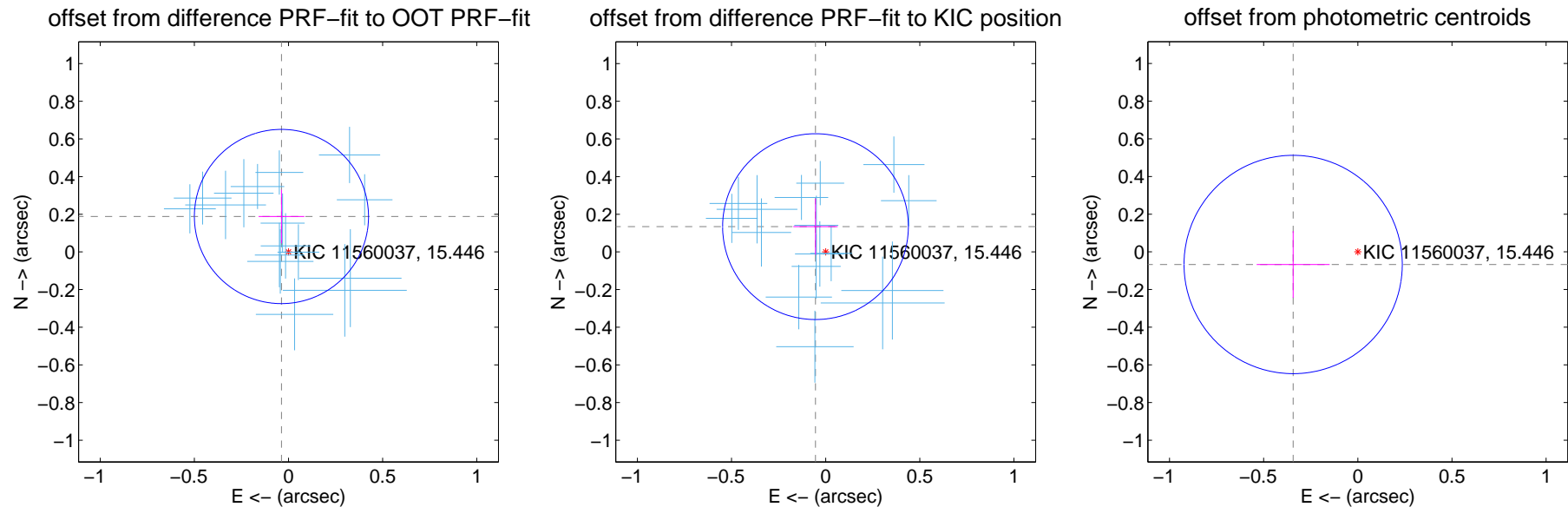
## DV Centroid Data

Supplemental centroid analysis for 011560037-01. Kepler magnitude: 15.45. Transit SNR 72.06

There are 17 quarters with good PRF difference image offsets

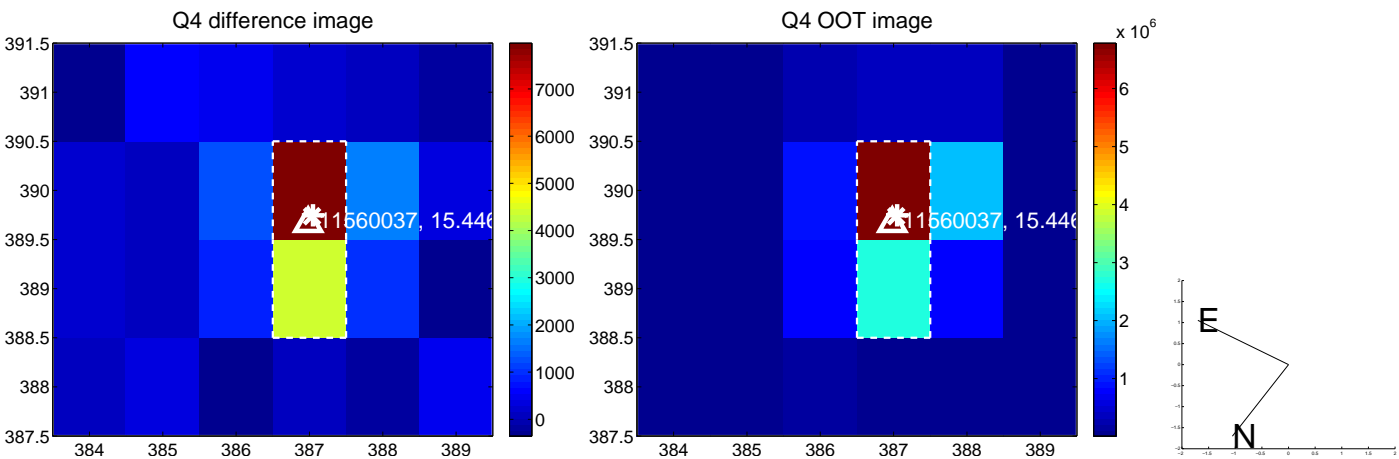
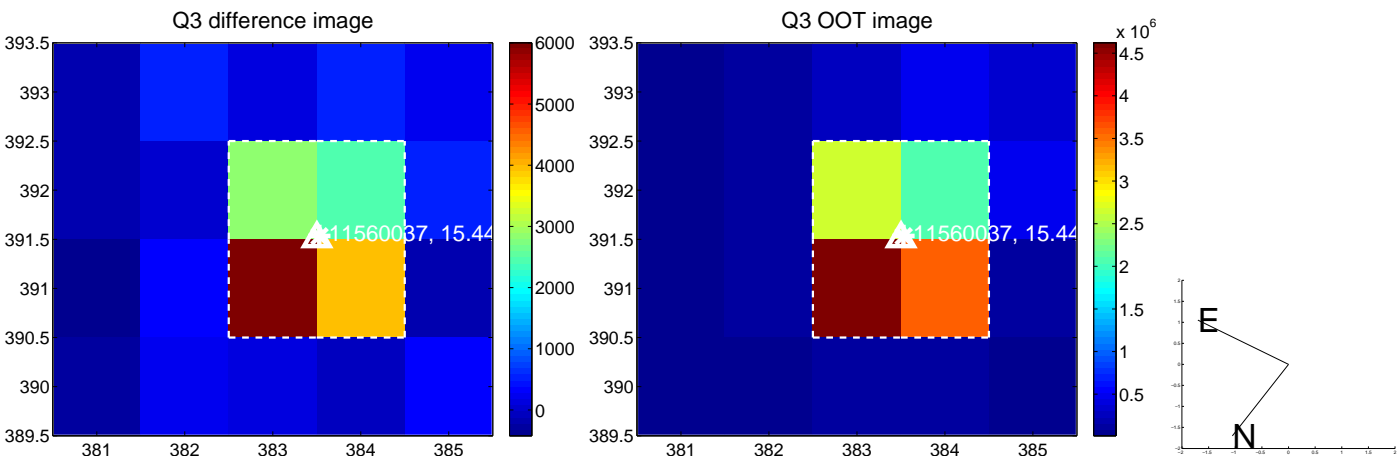
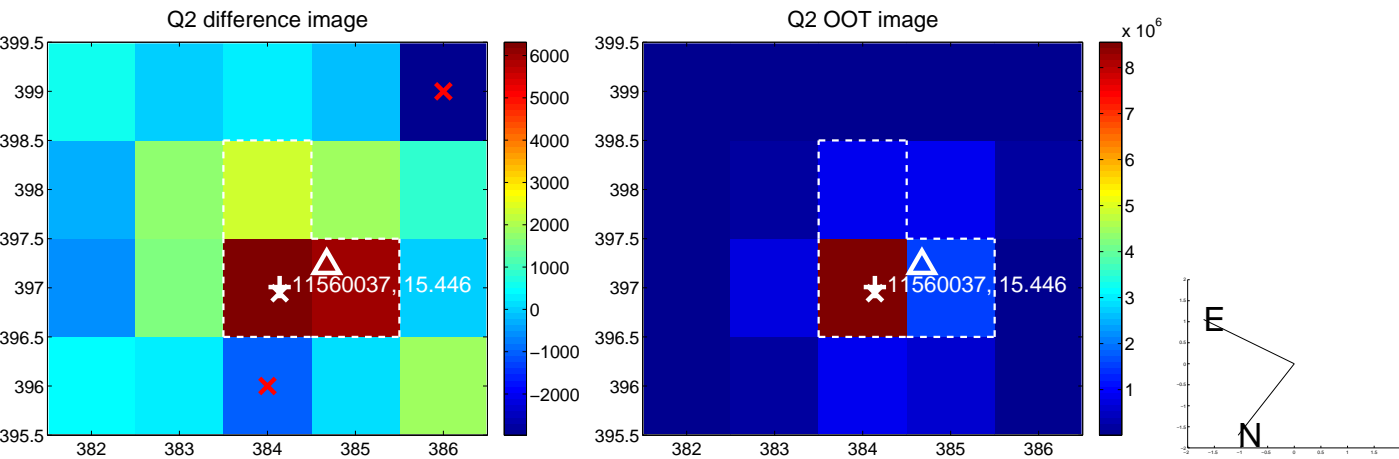
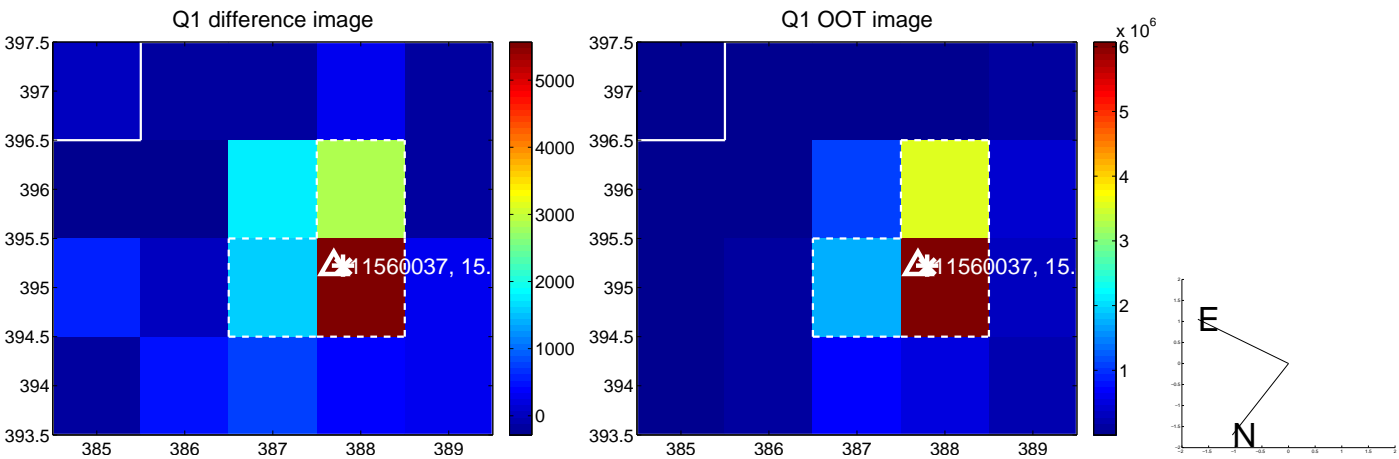
The direct PRF centroid is offset from the target star catalog position by about 0.07 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.192 \pm 0.154$	1.24	$0.037 \pm 0.121$	$0.188 \pm 0.142$
PRF-fit source offset from KIC position	$0.145 \pm 0.164$	0.88	$0.054 \pm 0.118$	$0.134 \pm 0.149$
photometric centroid source offset	$0.35 \pm 0.19$	1.81	$0.34 \pm 0.19$	$-0.07 \pm 0.18$

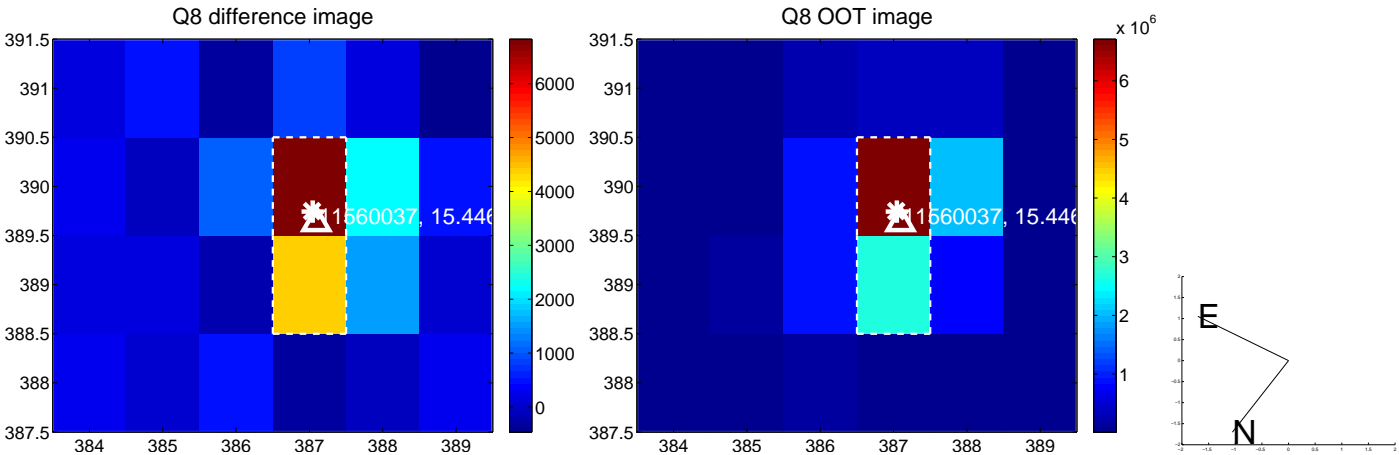
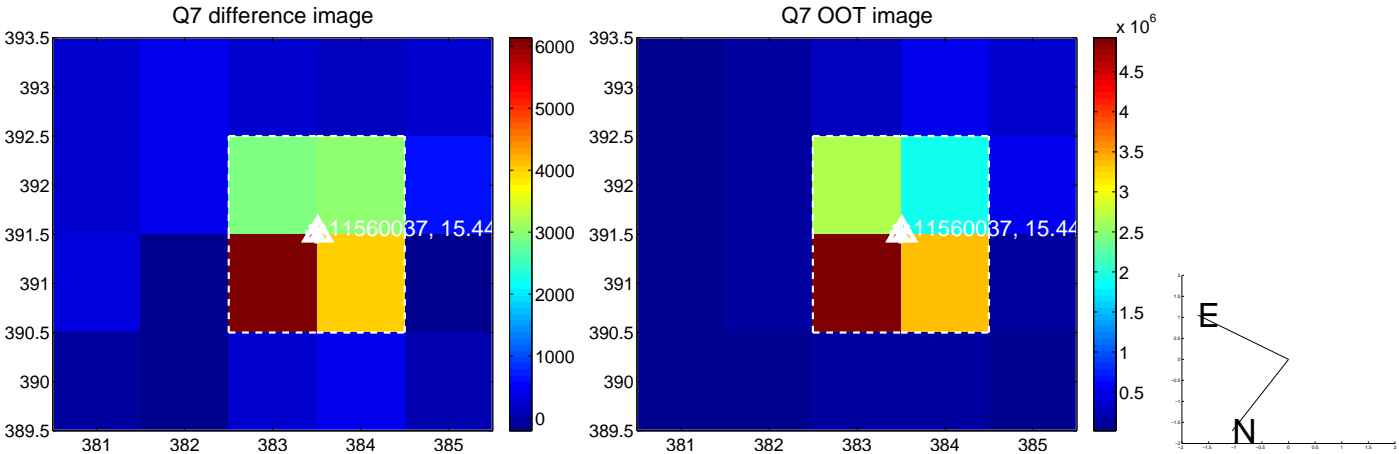
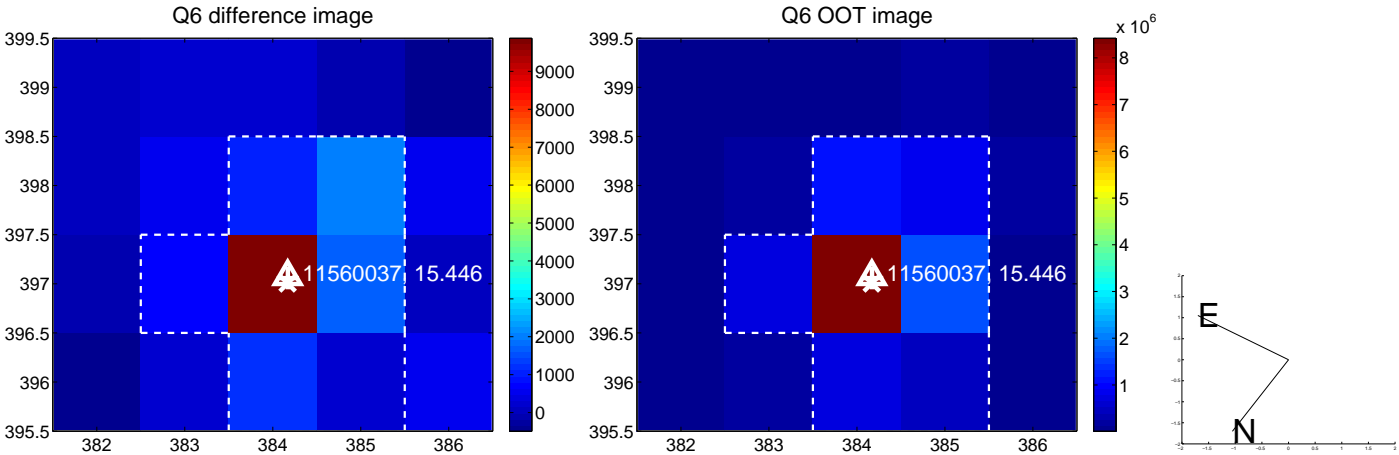
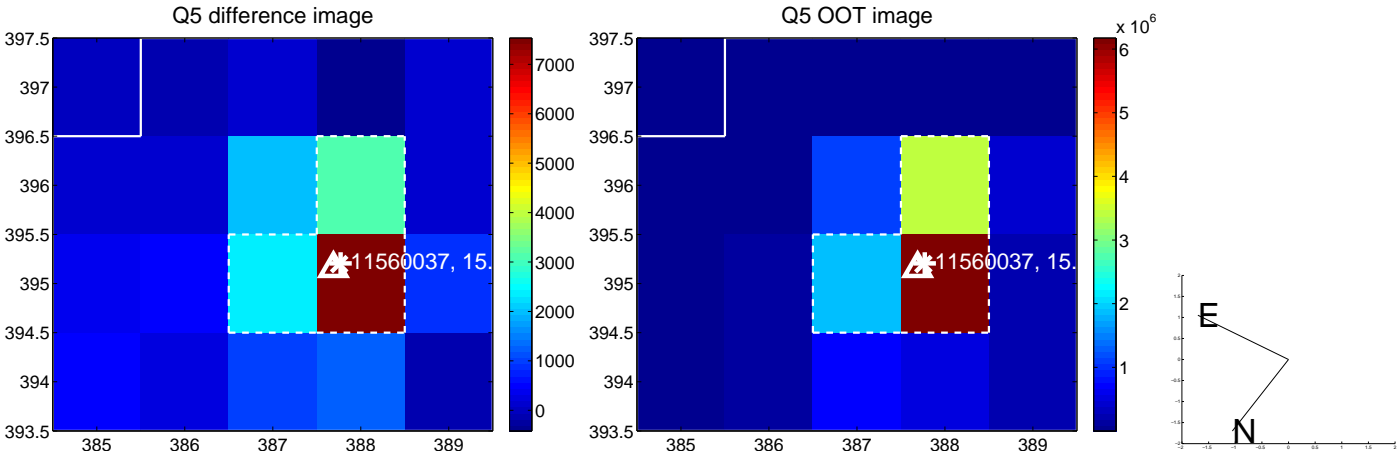


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

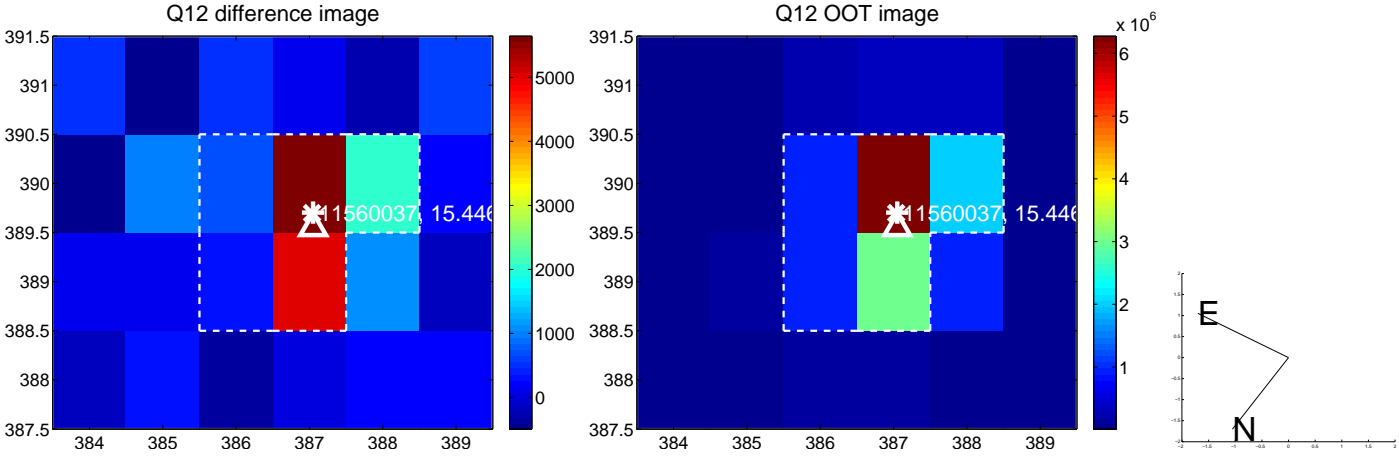
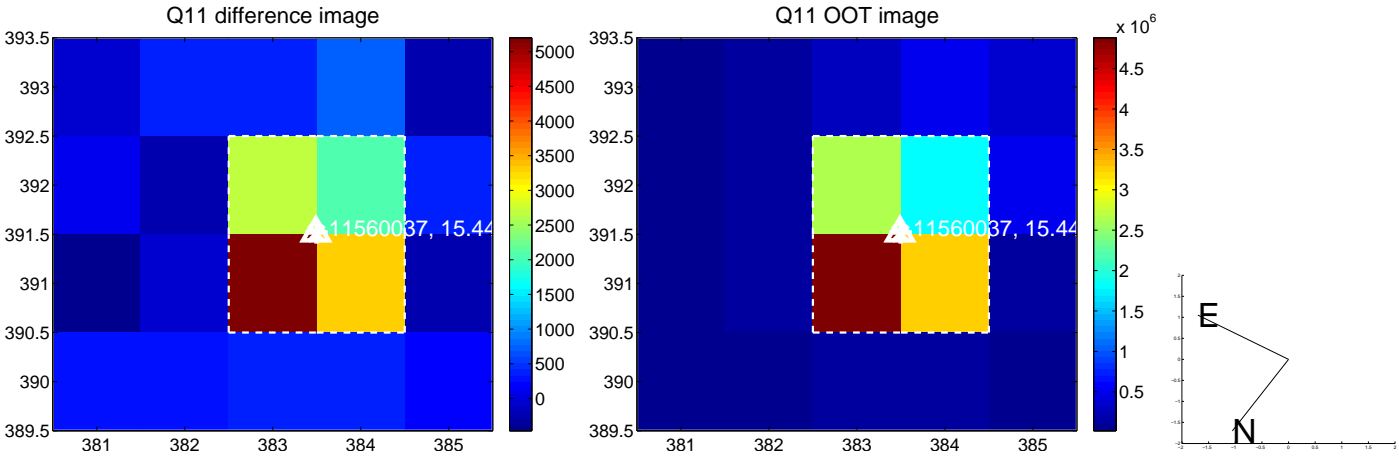
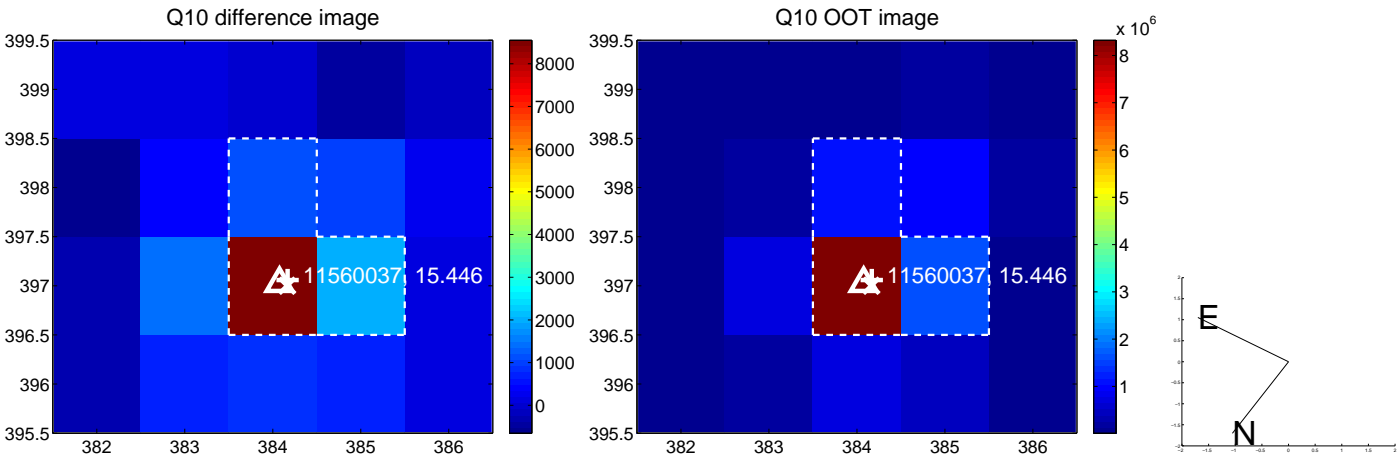
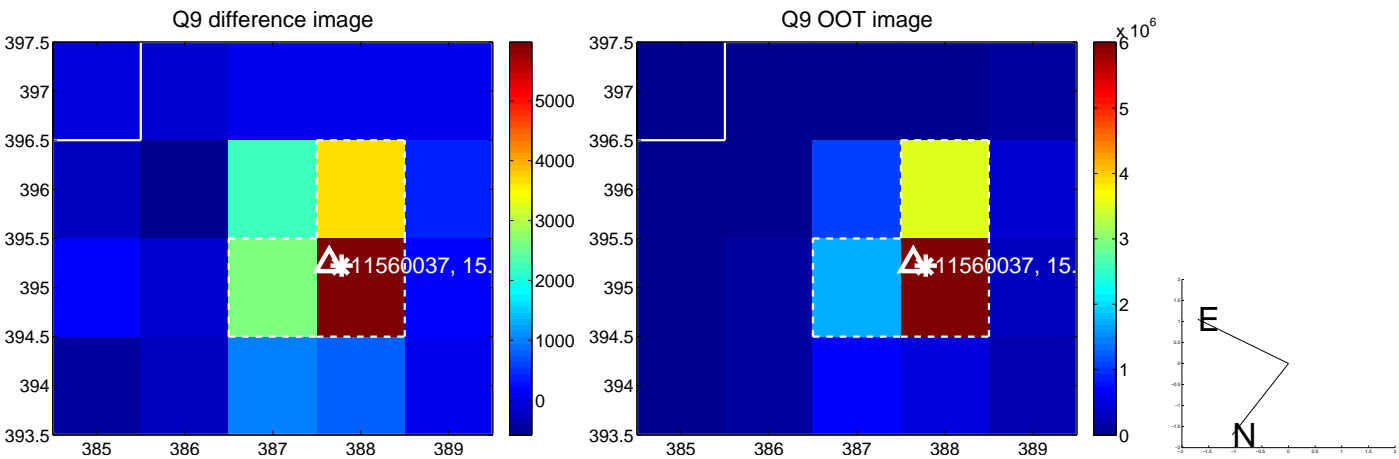


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

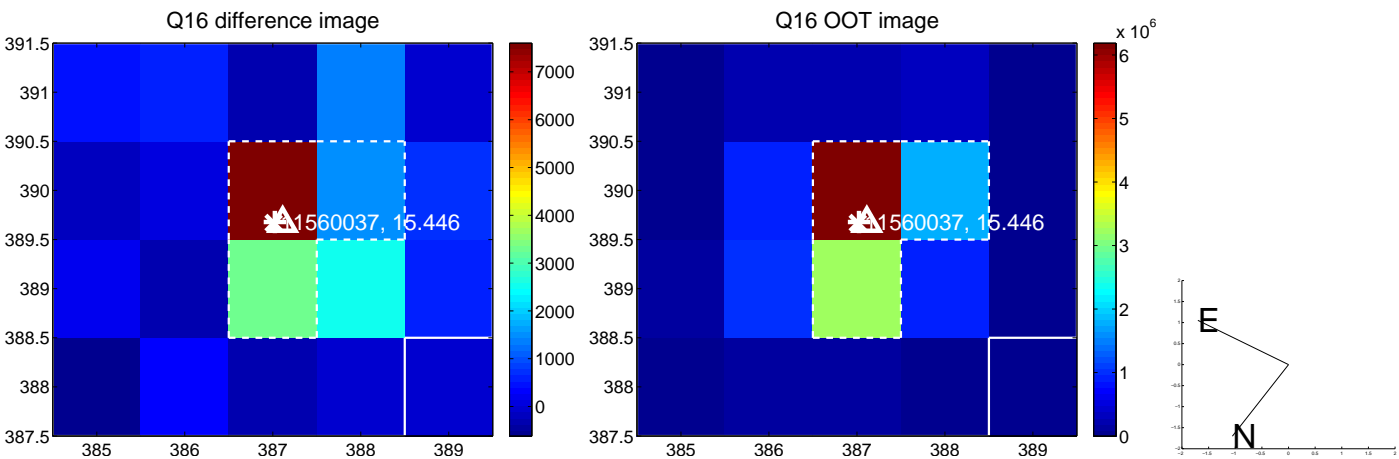
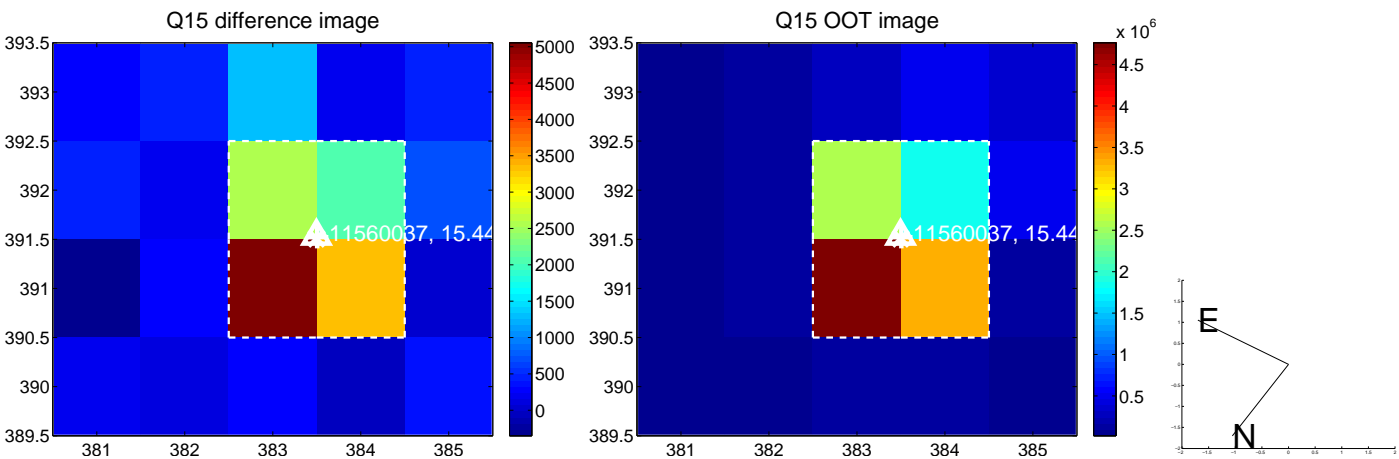
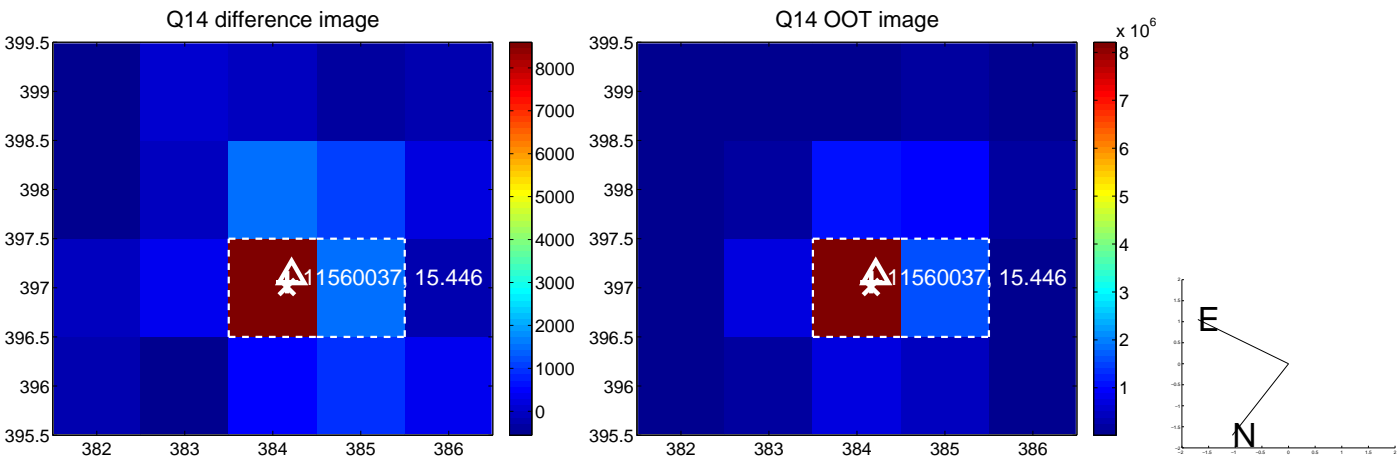
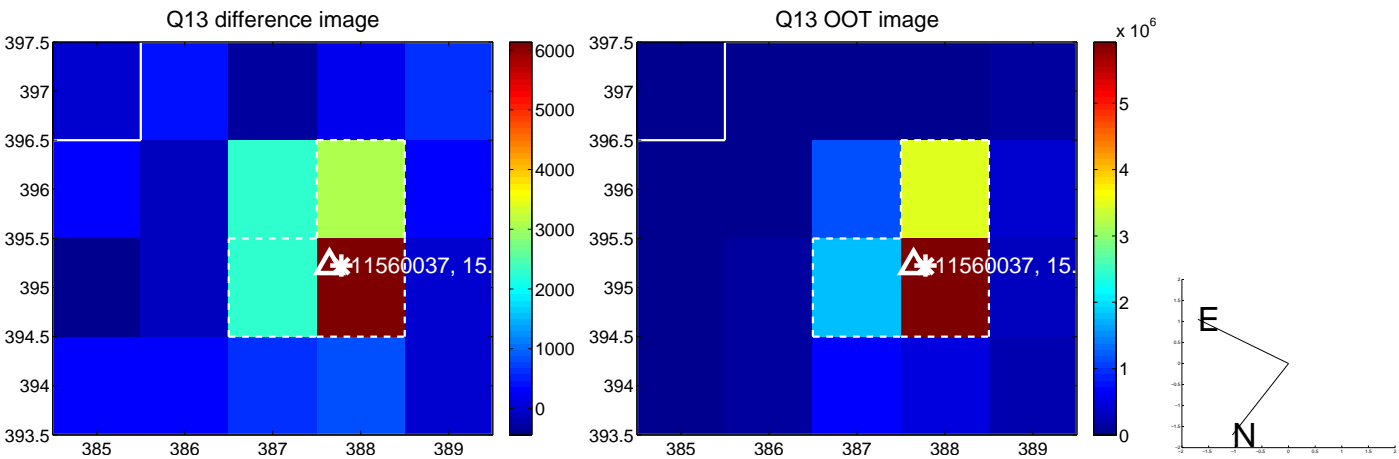




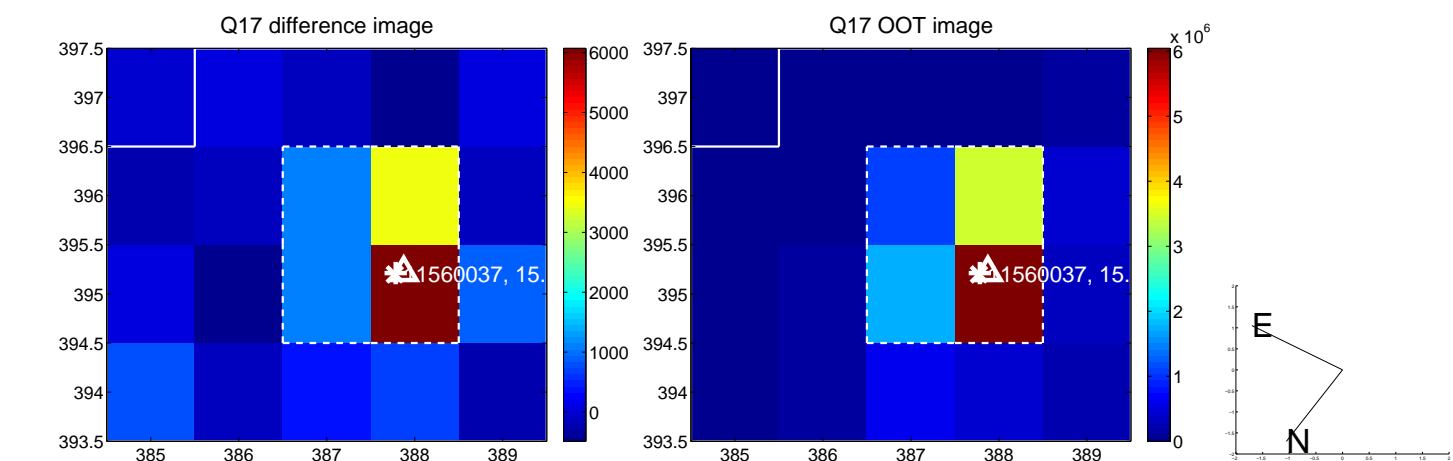
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



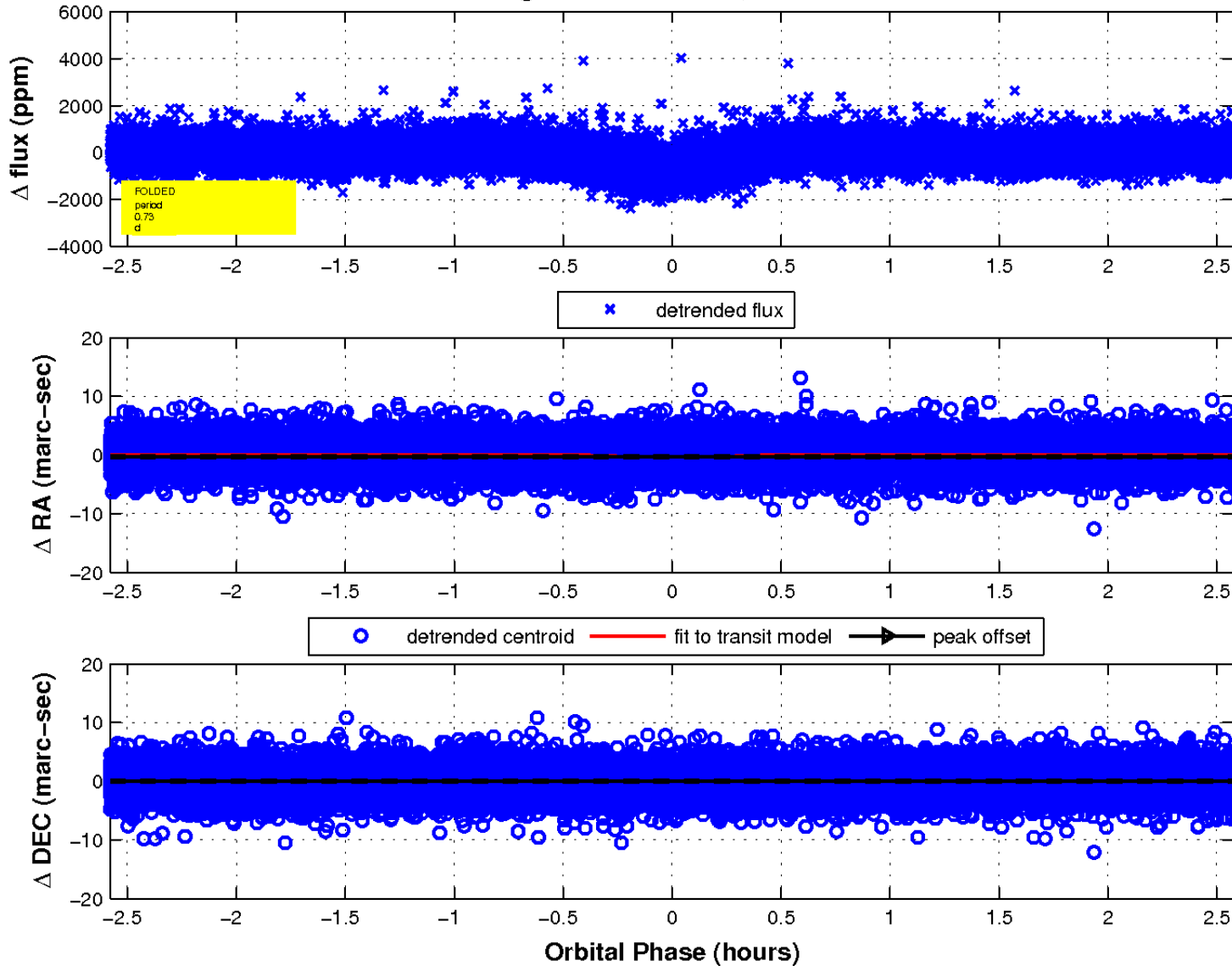
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

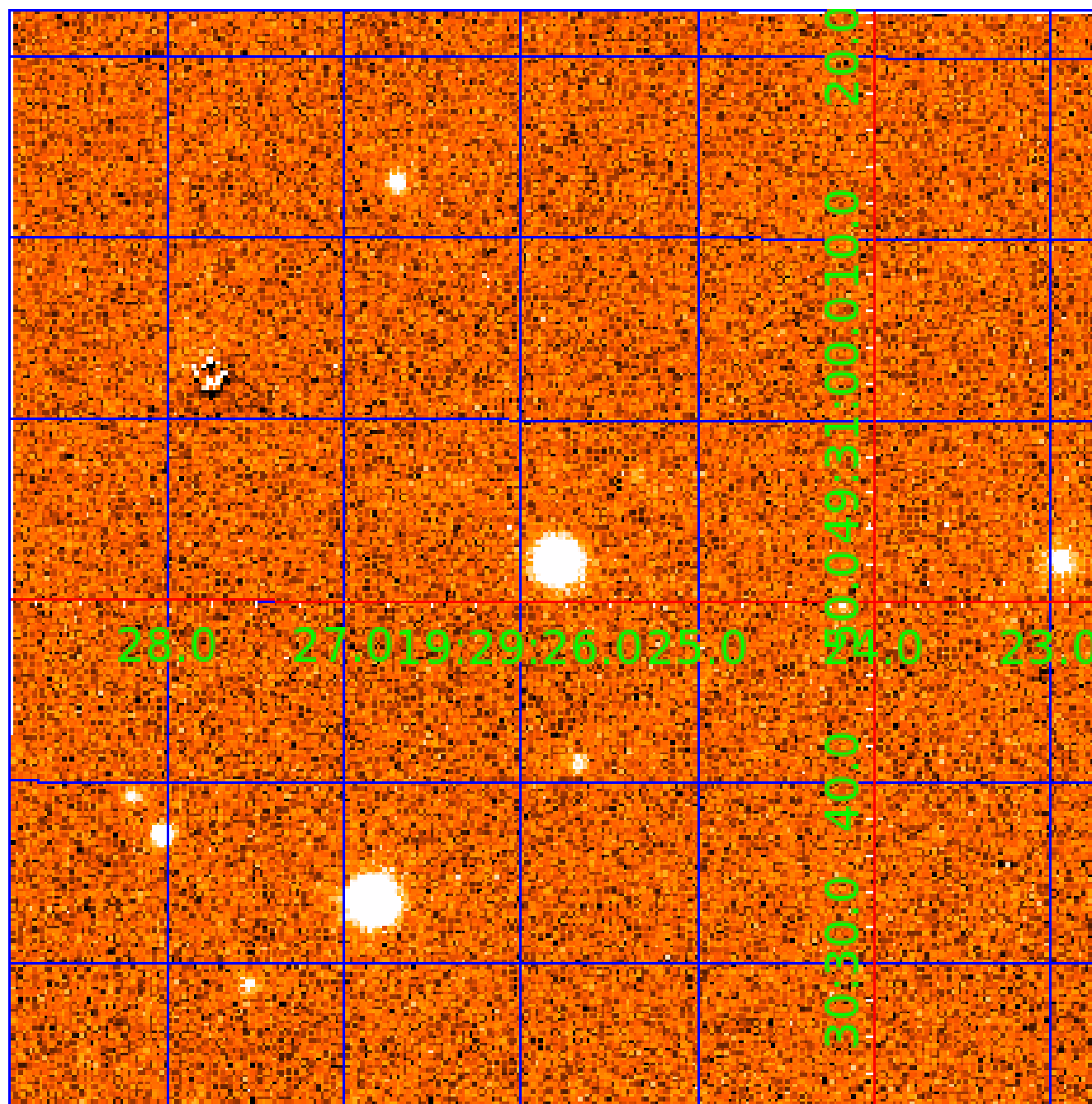


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination





# KIC 011560037

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
011560037-01	OBS	3874.01	0.733275	131.989477	783.7	0.860	37.9	72.1	1.02	5888	3.43	4657.40
011560037-02	OBS	No	1.467090	132.447648	64.7	13.246	9.9	10.3	1.02	5888	0.83	1847.38

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
011560037-01	OBS	FP	0.00	0	1	0	0	MOD_ODDEVEN_DV—MOD_ODDEVEN_ALT
011560037-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—LPP_DV—CENT_FEW_MEAS

**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.

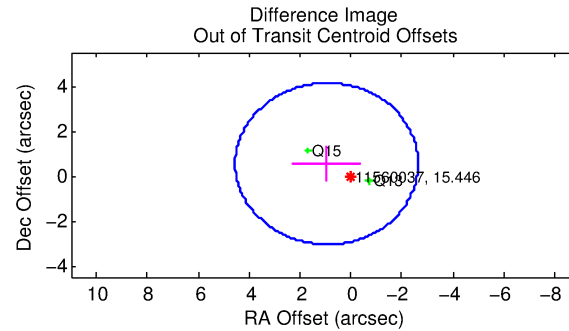
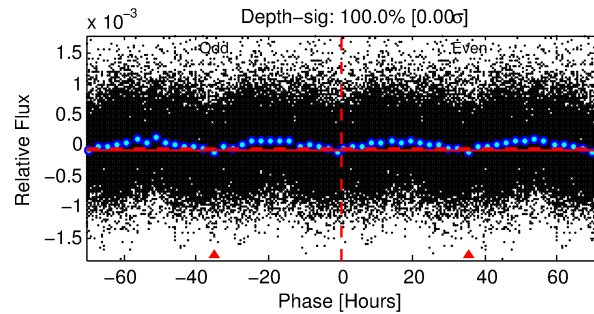
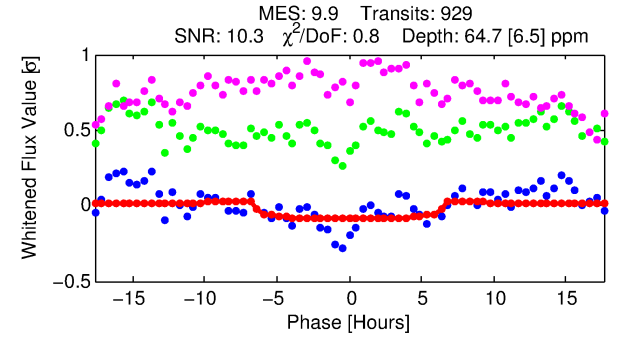
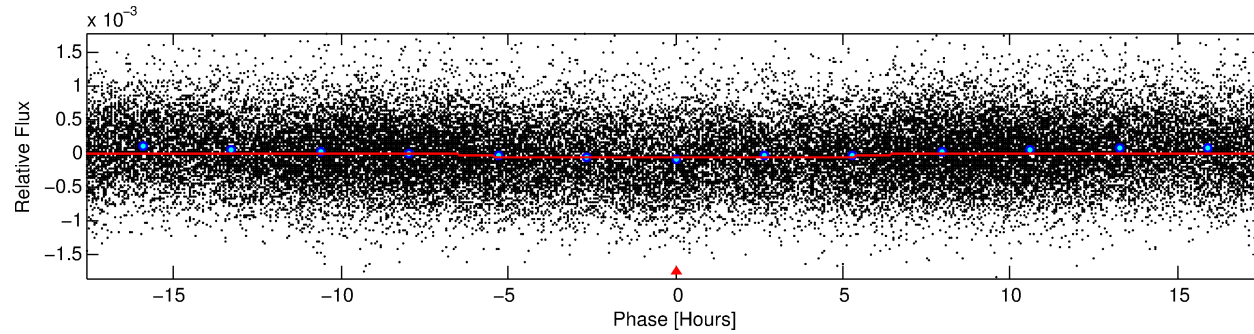
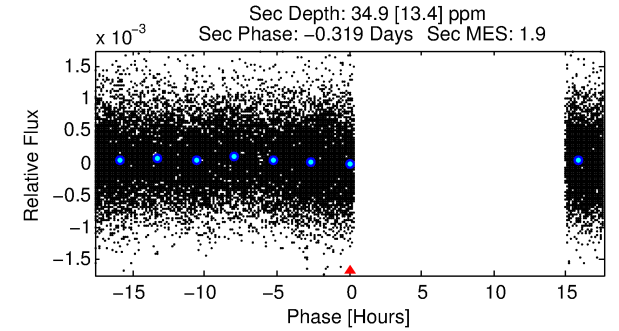
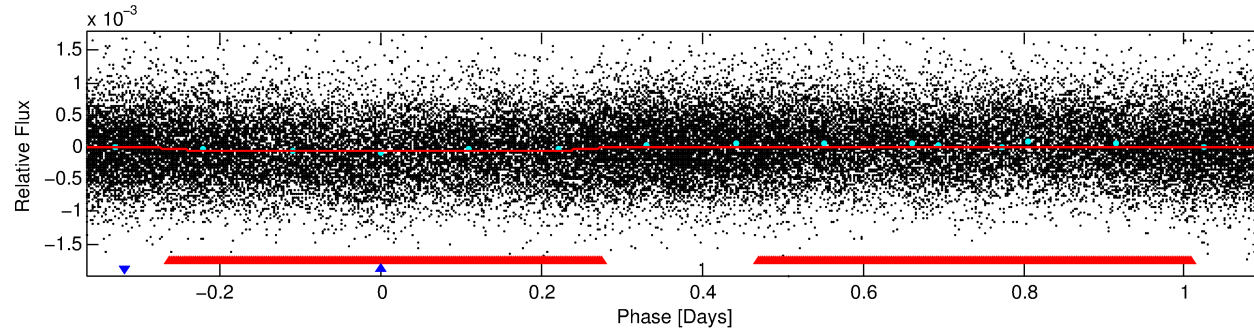
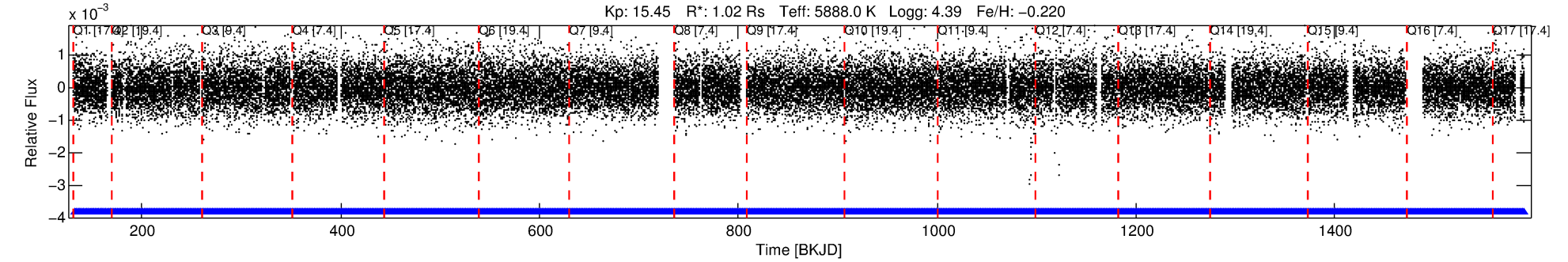
## Ephemeris Match Information For 011560037-02

No Significant Match Found

# DV One-Page Summary

KIC: 11560037 Candidate: 2 of 2 Period: 1.467 d

KOI: K03874 Corr: No Ephemeris Match



## DV Fit Results:

Period = 1.46709 [0.00002] d  
Epoch = 132.4476 [0.0083] BKJD  
Rp/R\* = 0.0075 [0.0060]  
a/R\* = 1.08 [0.55]  
b = 0.40 [7.94]  
Seff = 1847.38 [688.14]  
Teff = 1672 [156] K  
Rp = 0.83 [0.71] Re  
a = 0.0246 [0.0060] AU  
Ag = 16.84 [28.28] [0.56σ]  
Teffp = 5236 [2155] K [1.65σ]

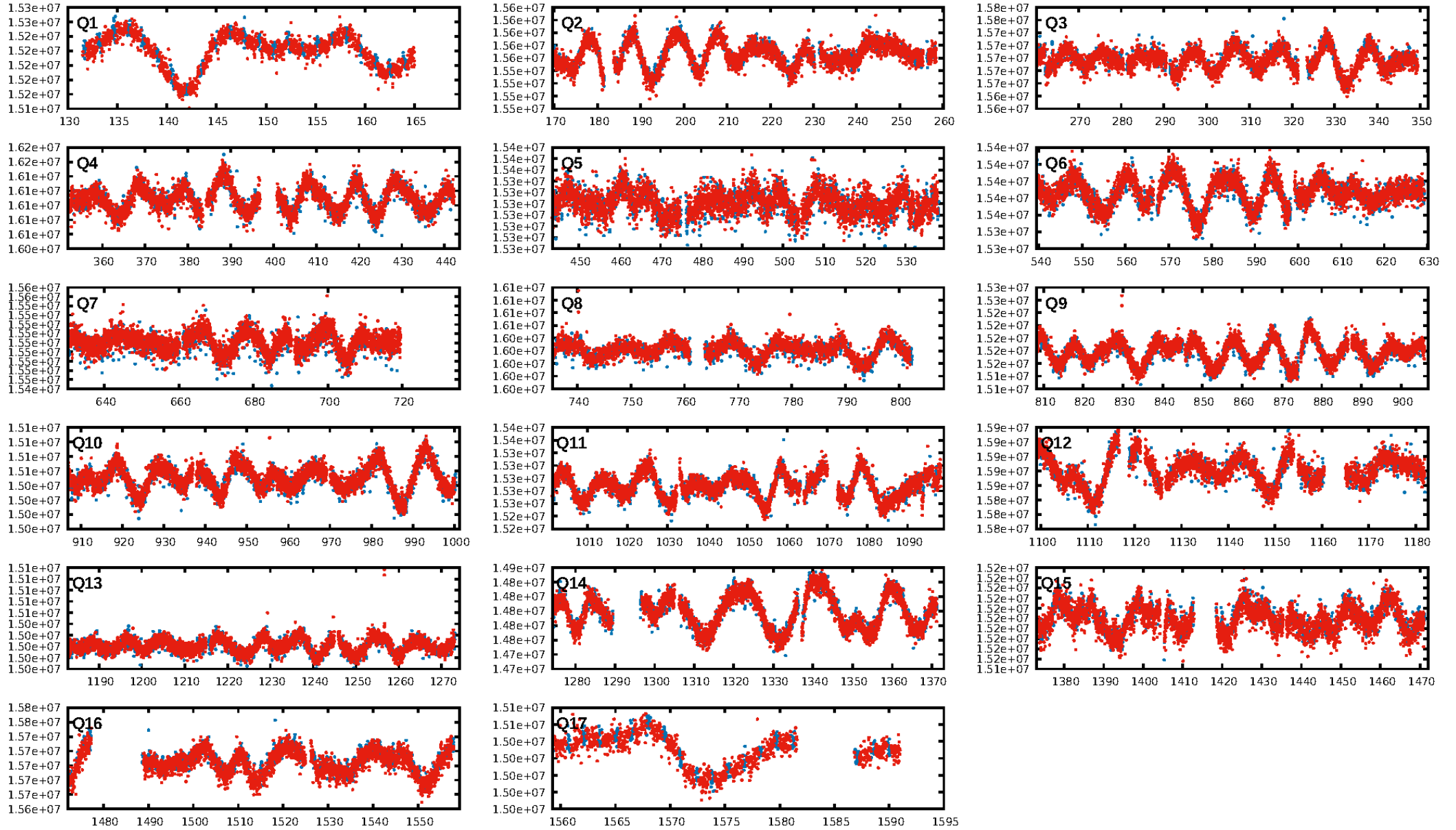
## DV Diagnostic Results:

ShortPeriod-sig: 81.5% [1.33σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [888/888]  
GhostDiagnostic-chr: 1.142  
Centroid-sig: 1.1%  
Centroid-so: 1.467 arcsec [1.93σ]  
OotOffset-rm: 1.088 arcsec [0.91σ]  
KicOffset-rm: 1.069 arcsec [0.88σ]  
OotOffset-st: 0/1/0/1 [2]  
KicOffset-st: 0/1/0/1 [2]  
DiffImageQuality-fgm: 1.00 [2/2]  
DiffImageOverlap-fno: 0.00 [0/17]

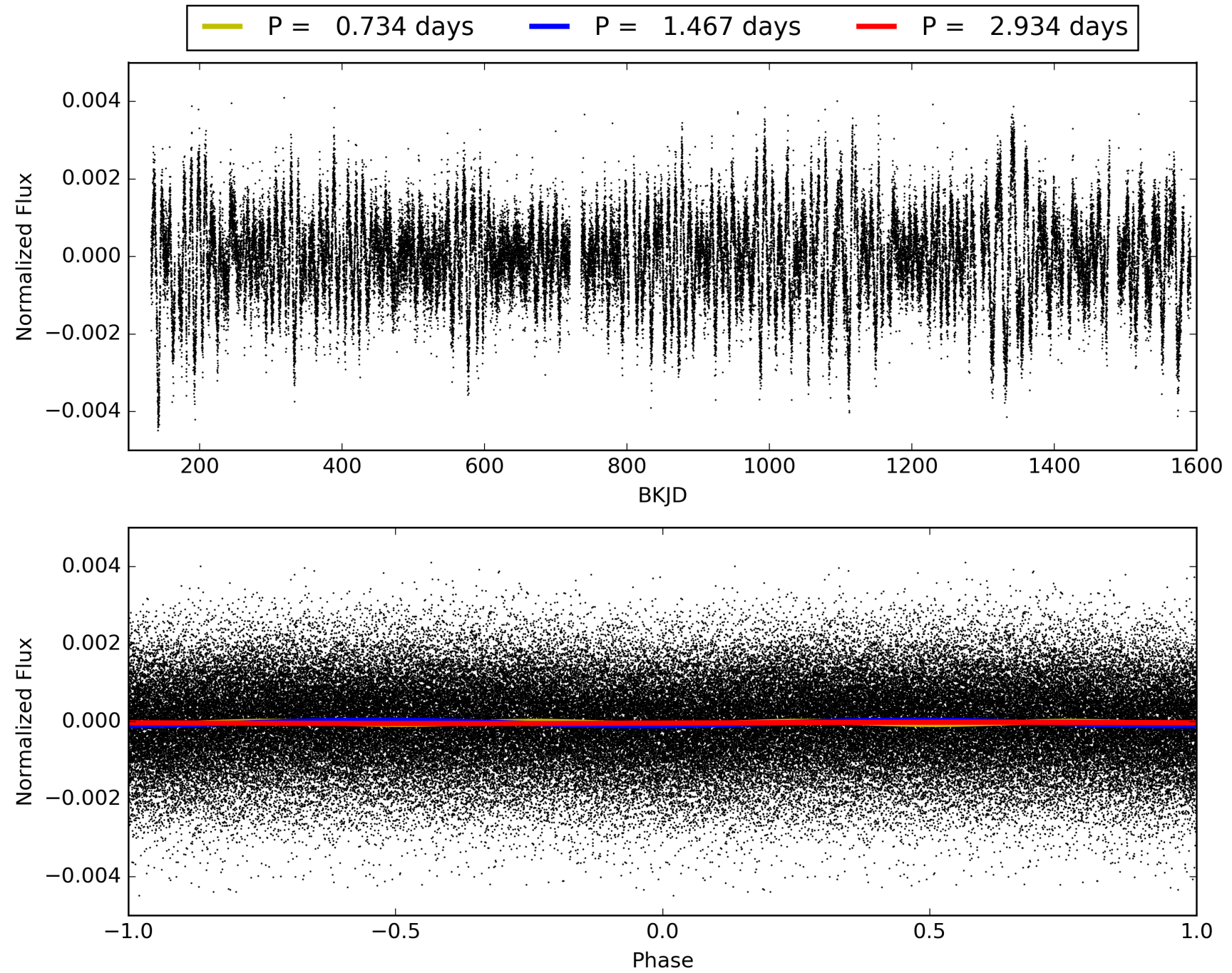
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 07:36:58 Z

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

# TCE 011560037-02, PDC Light Curves



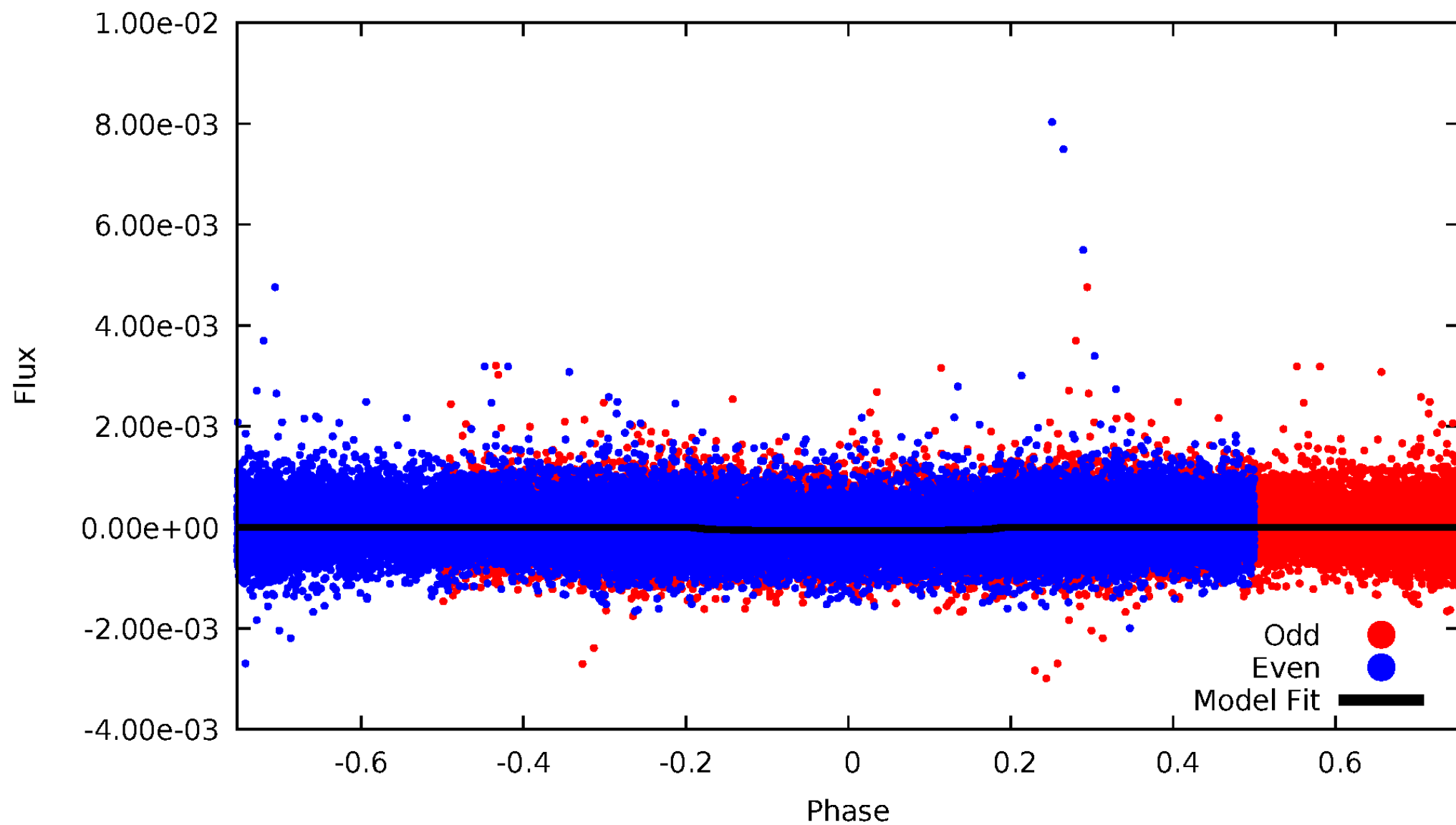
TCE 011560037-02





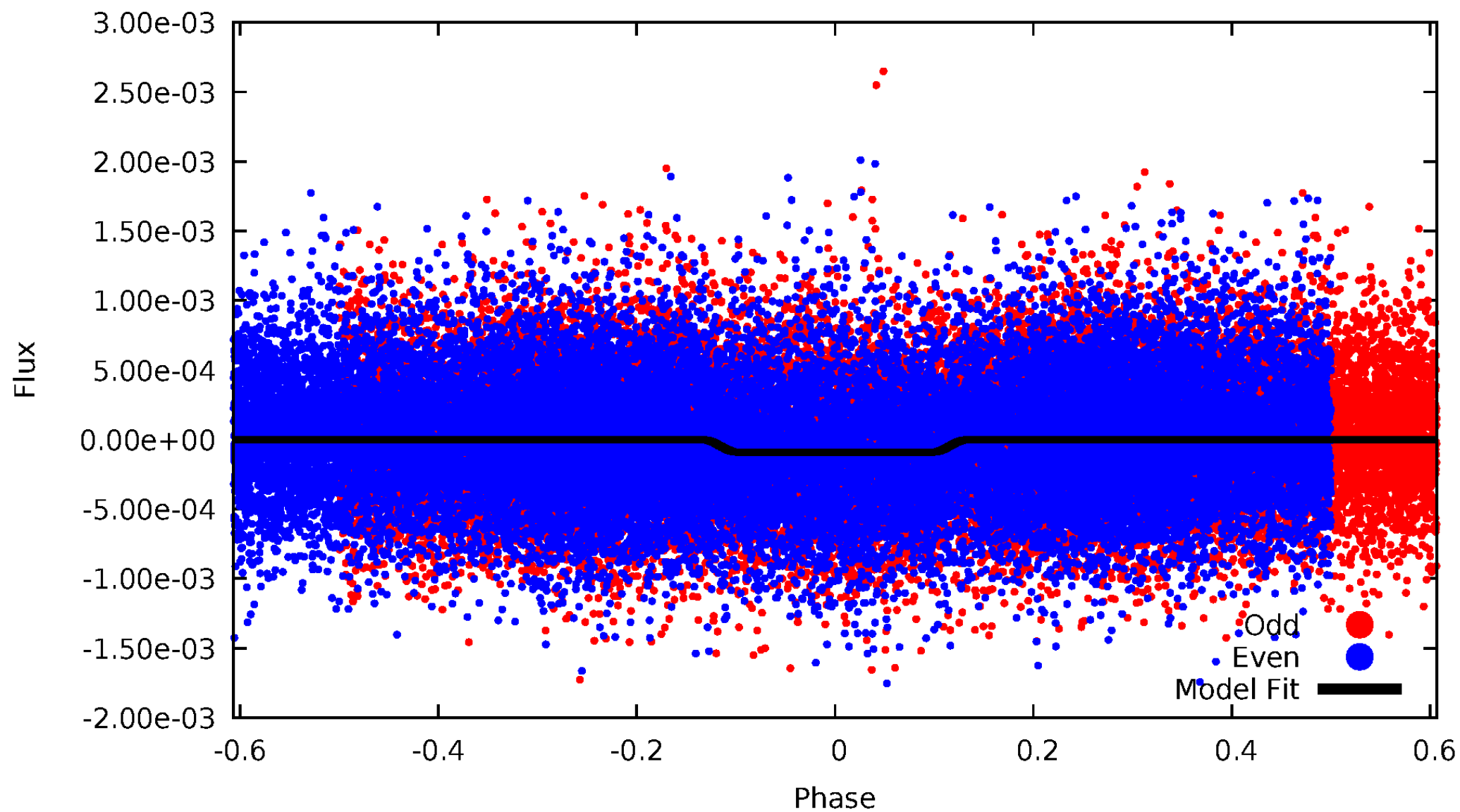
# DV Odd/Even

TCE 011560037-02



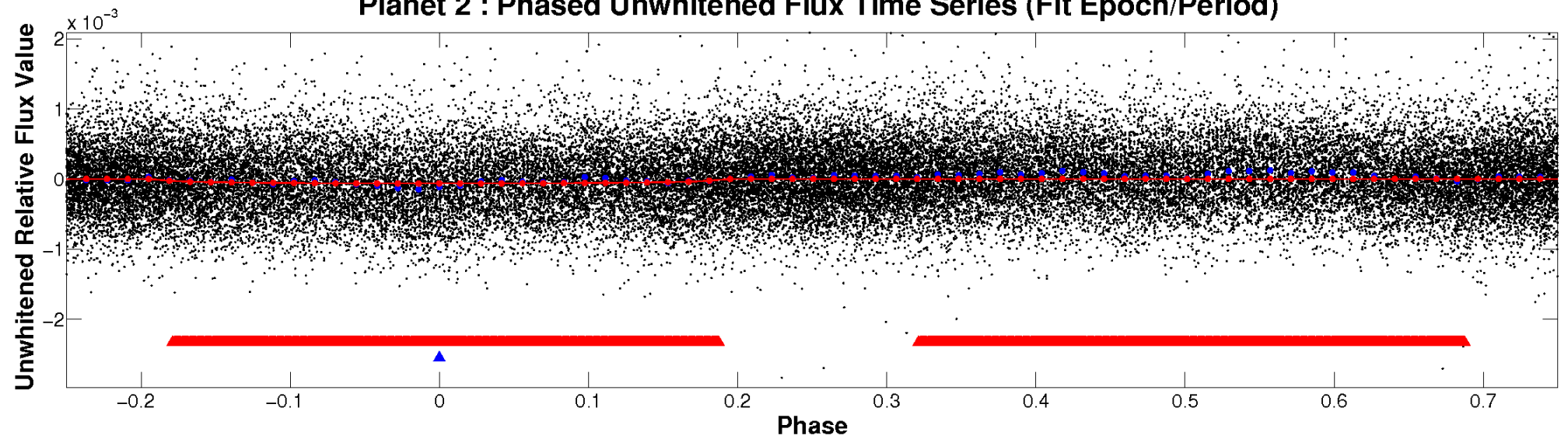
# ALT Odd/Even

TCE 011560037-02

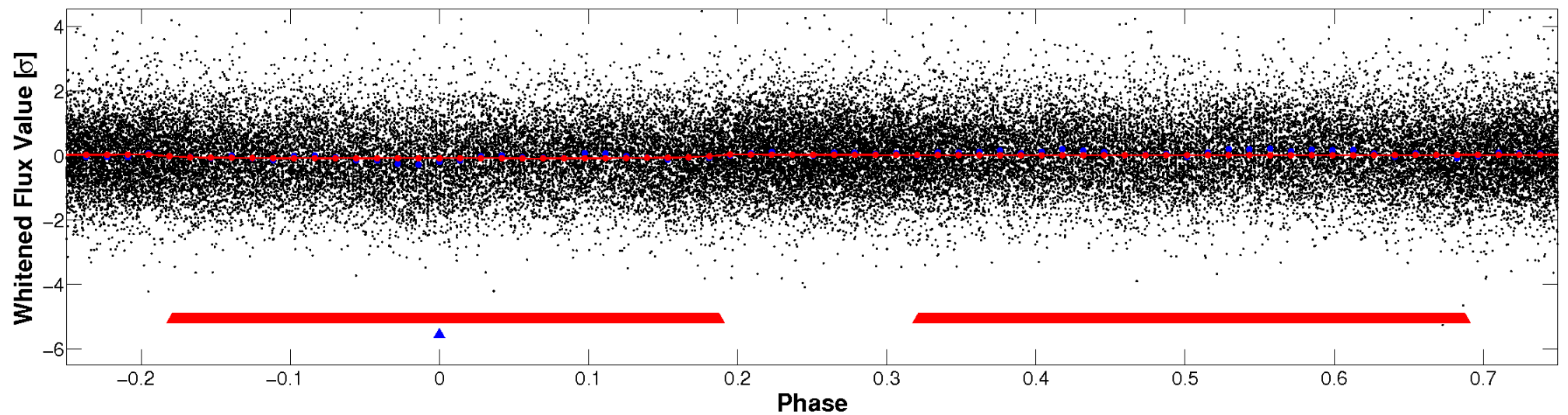


# Non-Whitened Vs. Whitened Light Curve

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

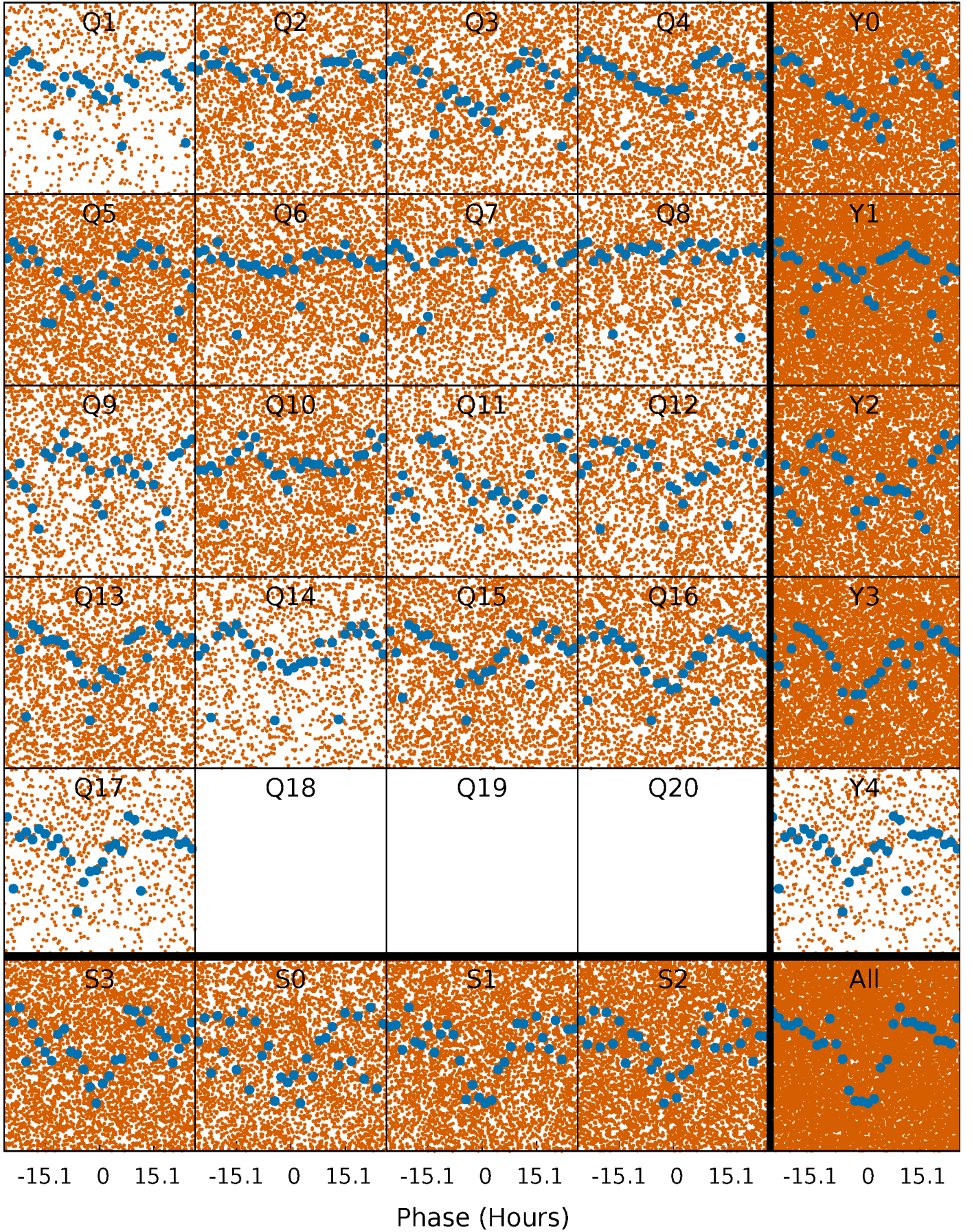


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

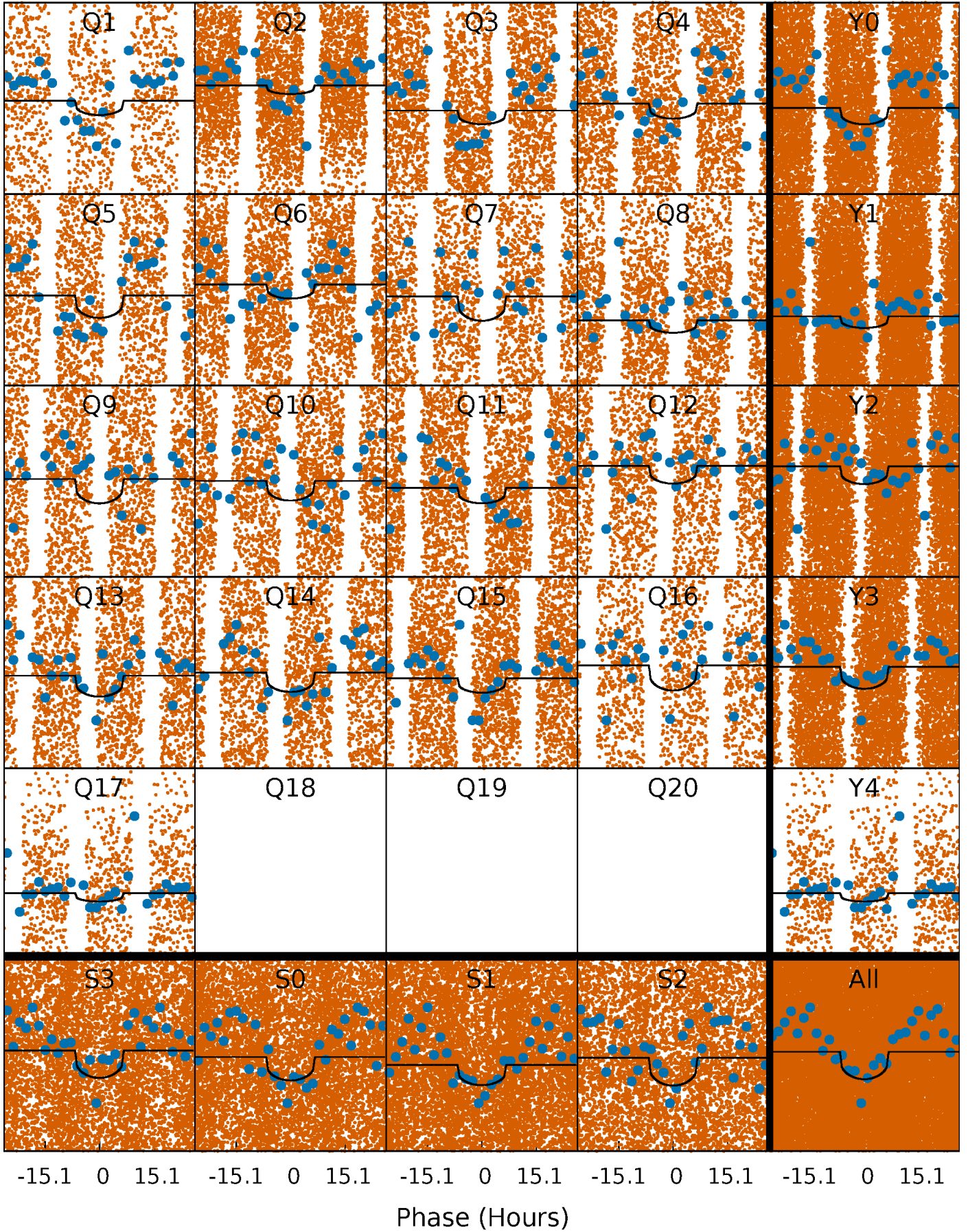
TCE 011560037-02   P= 1.467090 Days    $T_0=132.447648$  (BKJD)





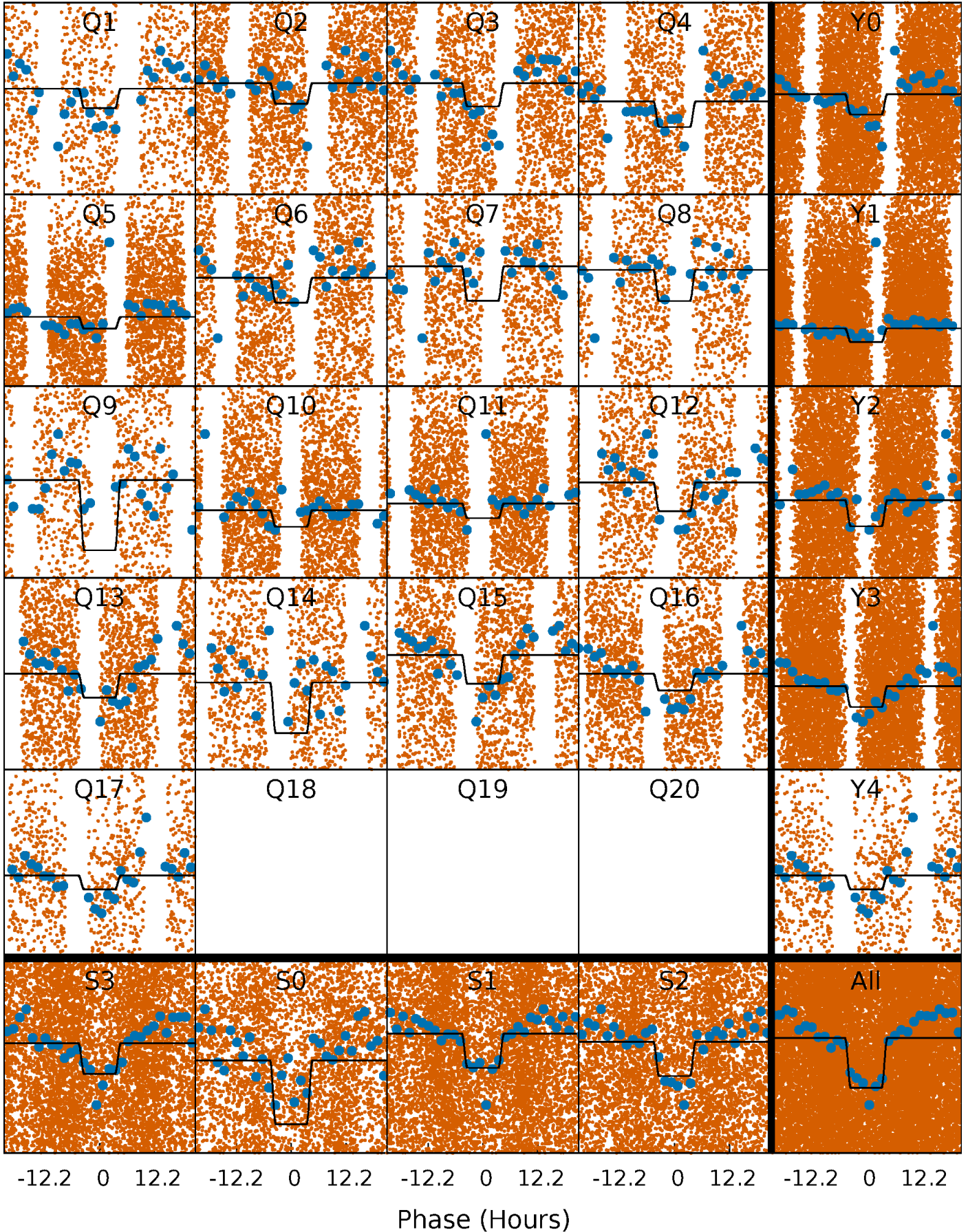
# DV Quarter-Phased Transit Curves

TCE 011560037-02   P= 1.467090 Days    $T_0=132.447648$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 011560037-02     $P = 1.467043$  Days     $T_0 = 132.448213$  (BKJD)

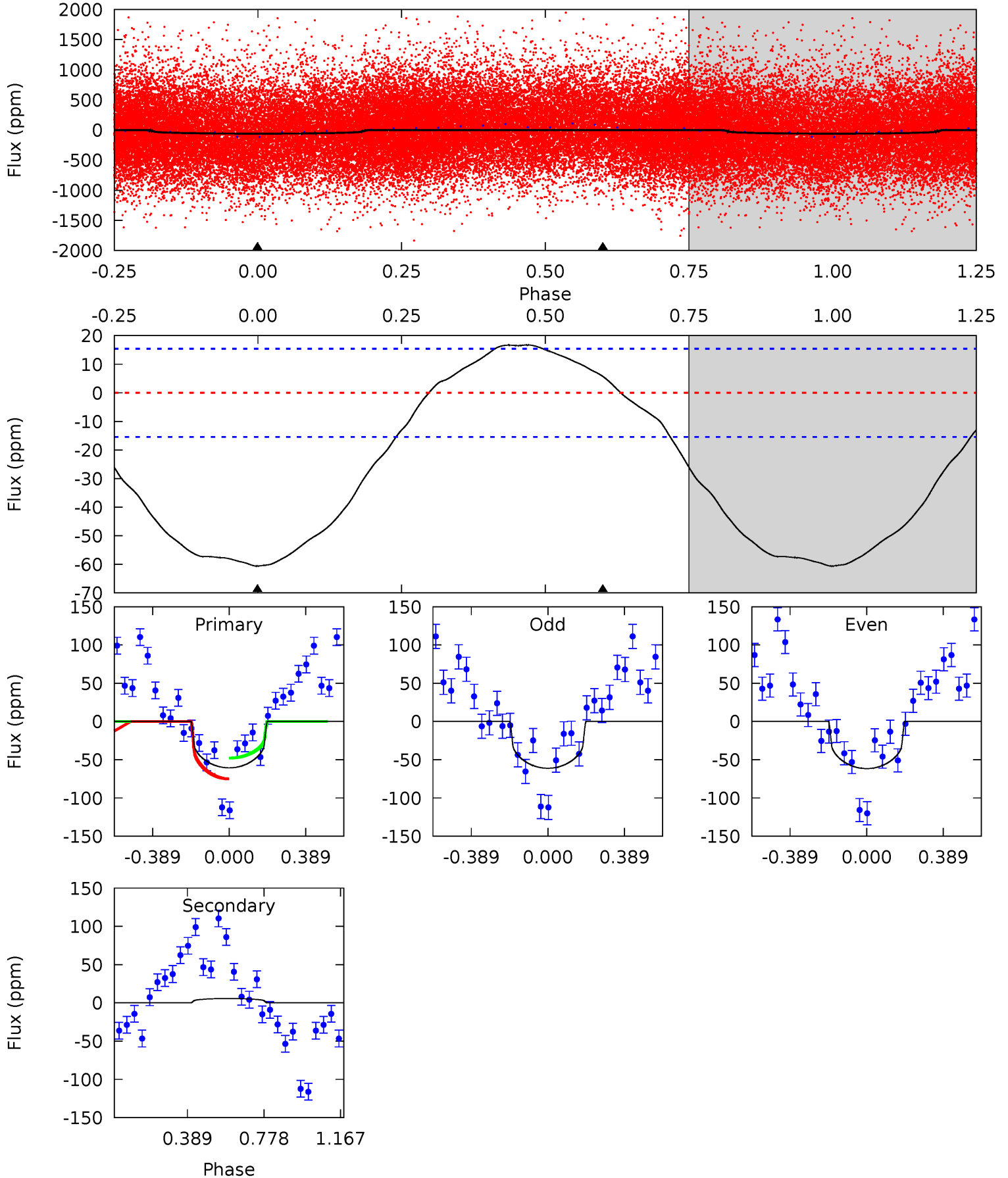




# DV Model-Shift Uniqueness Test

011560037-02, P = 1.467090 Days, E = 130.980558 Days

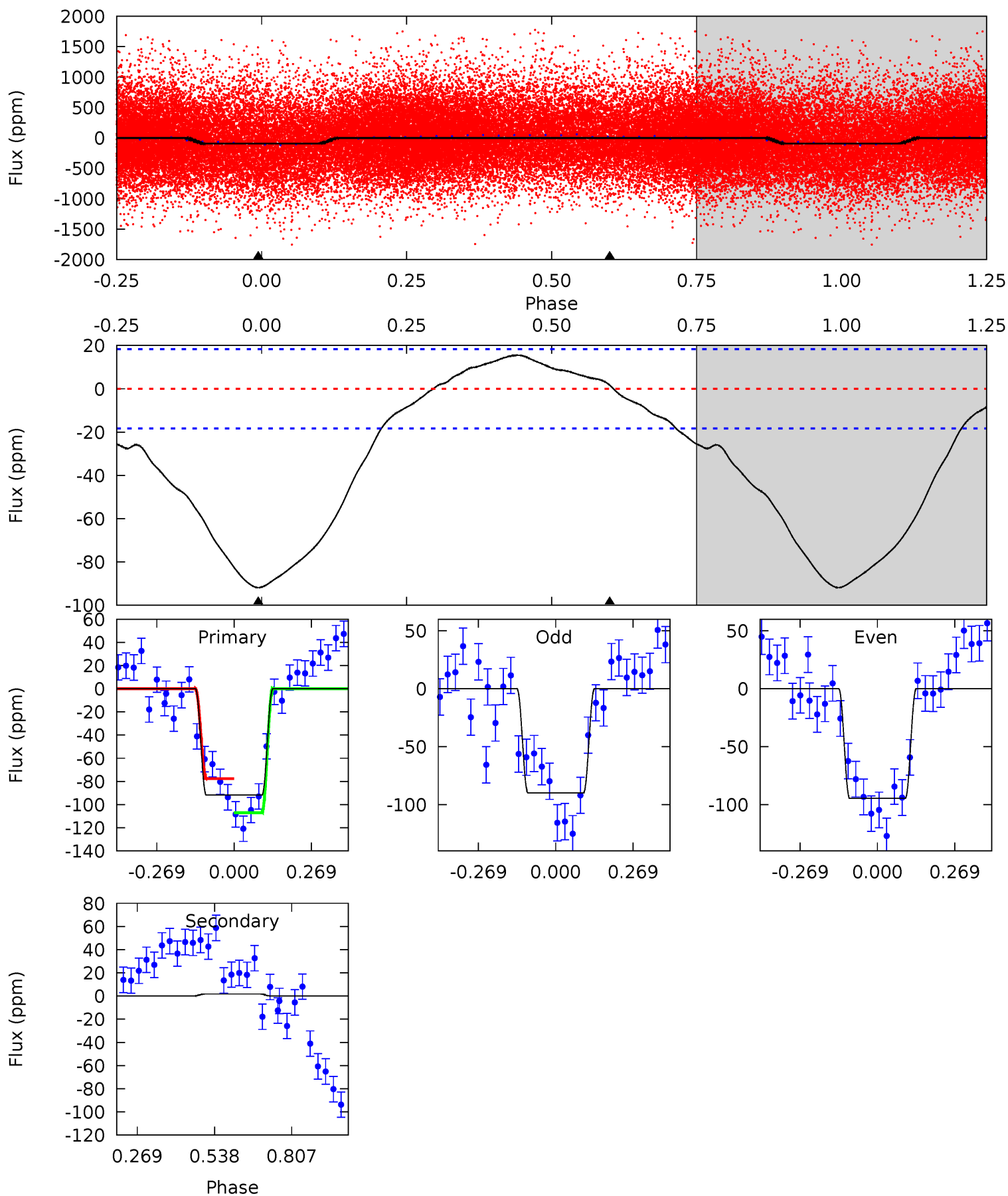
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
16.8	-1.60	0	0	4.27	0.86	1.45	16.8	16.8	-1.60	-1.60	0.07	0.91	0.22	3.76



# Alt Model-Shift Uniqueness Test

011560037-02, P = 1.467043 Days, E = 130.981170 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
21.9	-0.41	0	0	4.35	1.11	0.90	21.9	21.9	-0.41	-0.41	0.57	0.98	0.14	3.44



### Stellar Parameters For KIC 011560037

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5888^{+159}_{-177}$	$4.387^{+0.128}_{-0.192}$	$-0.220^{+0.300}_{-0.300}$	$1.020^{+0.296}_{-0.182}$	$0.924^{+0.131}_{-0.098}$	$1.227^{+0.716}_{-0.618}$
	+3%/-3%	+3%/-4%	+136%/-136%	+29%/-18%	+14%/-11%	+58%/-50%
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 011560037-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$6\pm4$	$0.97^{+0.63}_{-0.57}$	$2358^{+172}_{-143}$	$-3578^{+562}_{-1347}$	$-1.708^{+1.364}_{-10.017}$
Alt.	$2\pm4$	$1.15^{+0.71}_{-0.63}$	$2359^{+181}_{-137}$	$-2998^{+5826}_{-816}$	$-0.272^{+0.938}_{-2.376}$

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

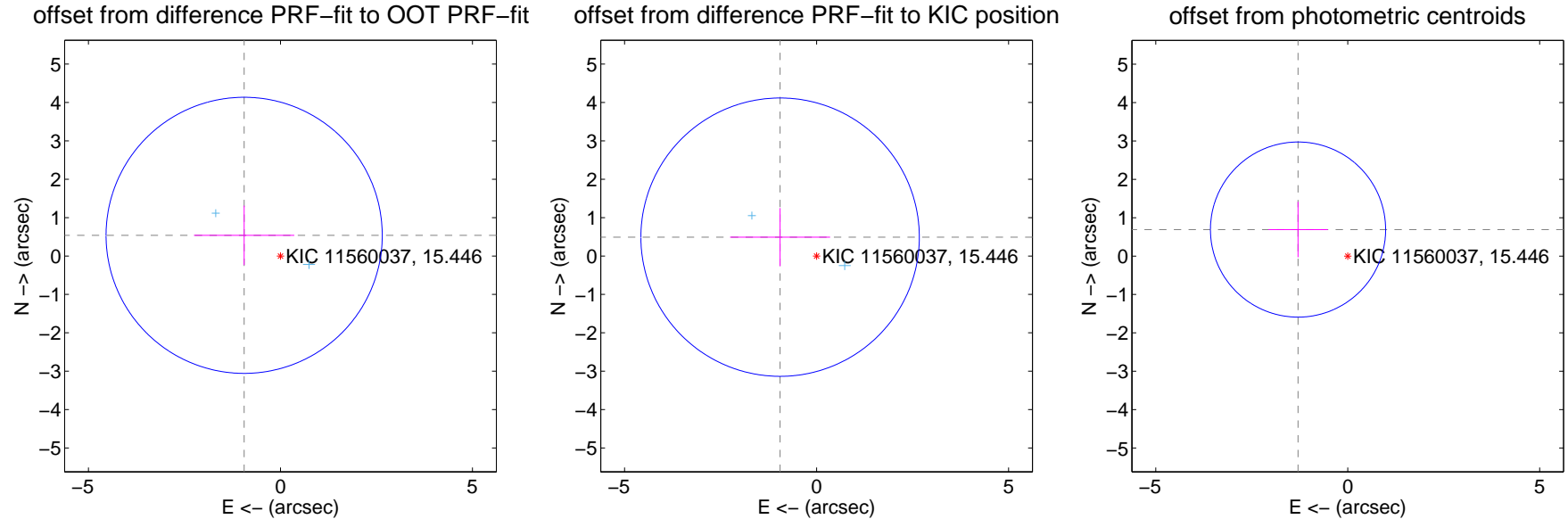
## DV Centroid Data

Supplemental centroid analysis for 011560037-02. Kepler magnitude: 15.45. Transit SNR 10.34

There are 2 quarters with good PRF difference image offsets

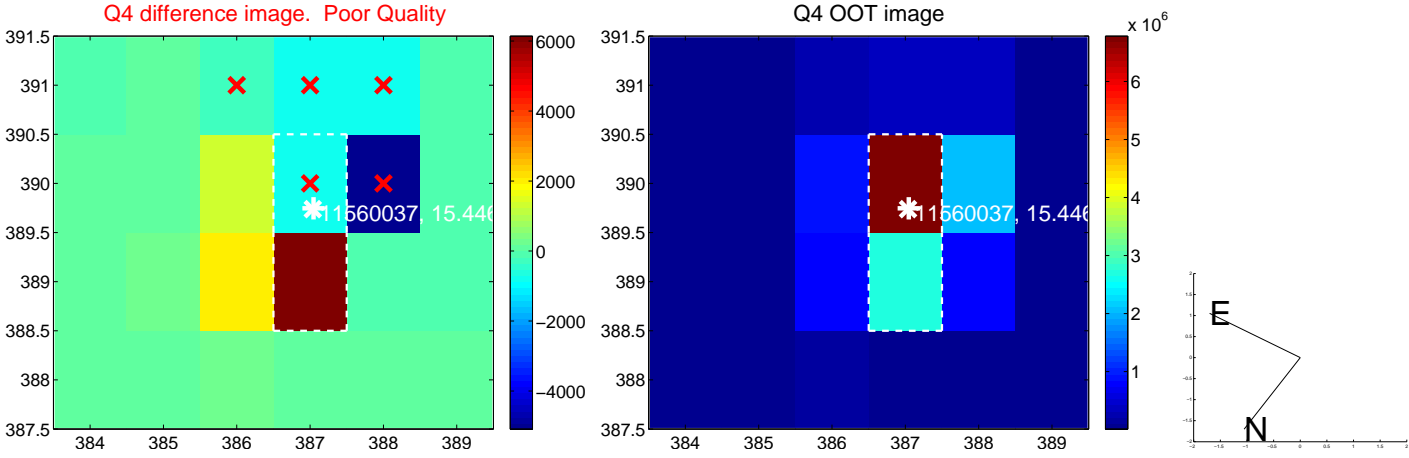
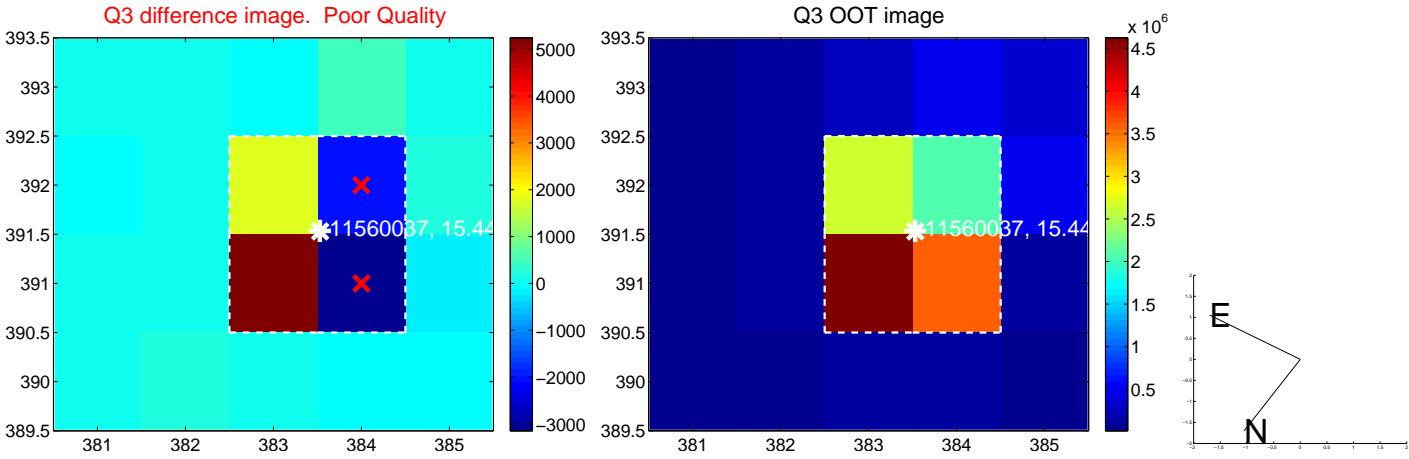
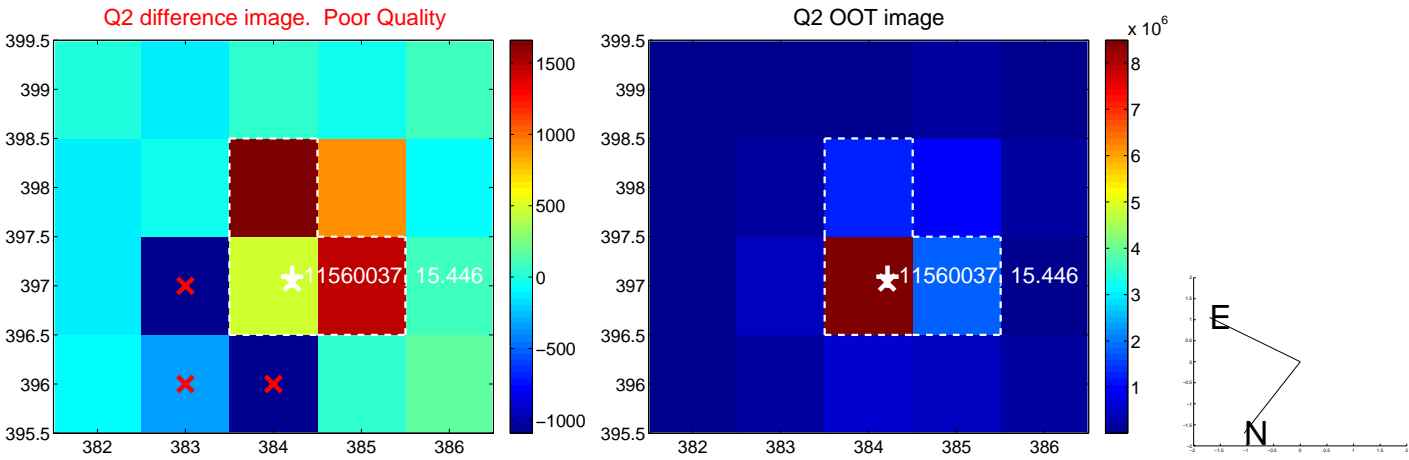
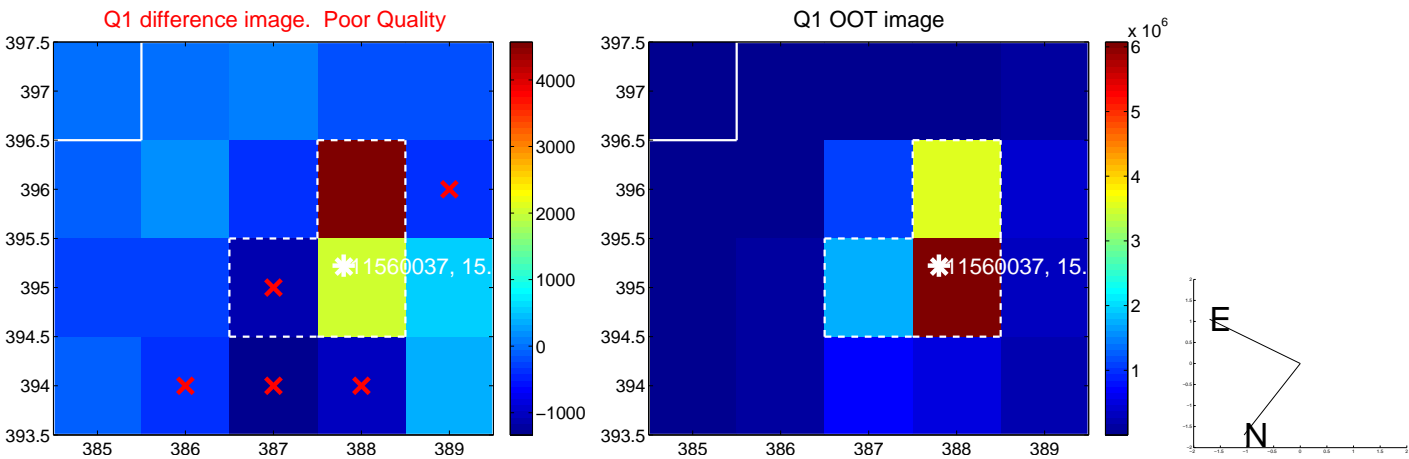
The direct PRF centroid is offset from the target star catalog position by about 0.06 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.088 \pm 1.198$	0.91	$0.945 \pm 1.307$	$0.539 \pm 0.775$
PRF-fit source offset from KIC position	$1.069 \pm 1.208$	0.88	$0.950 \pm 1.303$	$0.491 \pm 0.757$
photometric centroid source offset	$1.47 \pm 0.76$	1.93	$1.29 \pm 0.77$	$0.69 \pm 0.72$

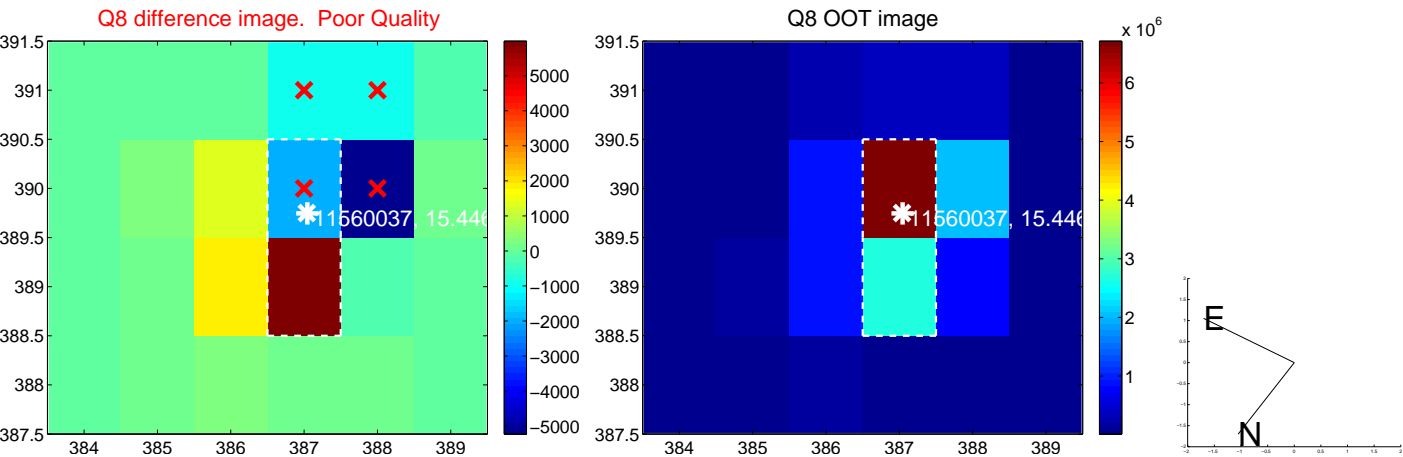
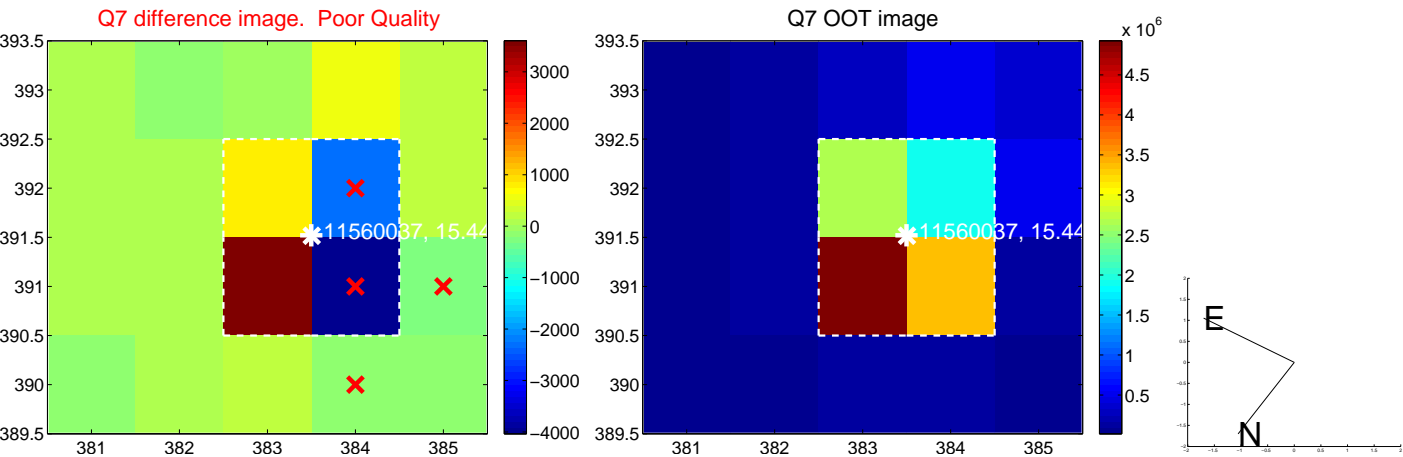
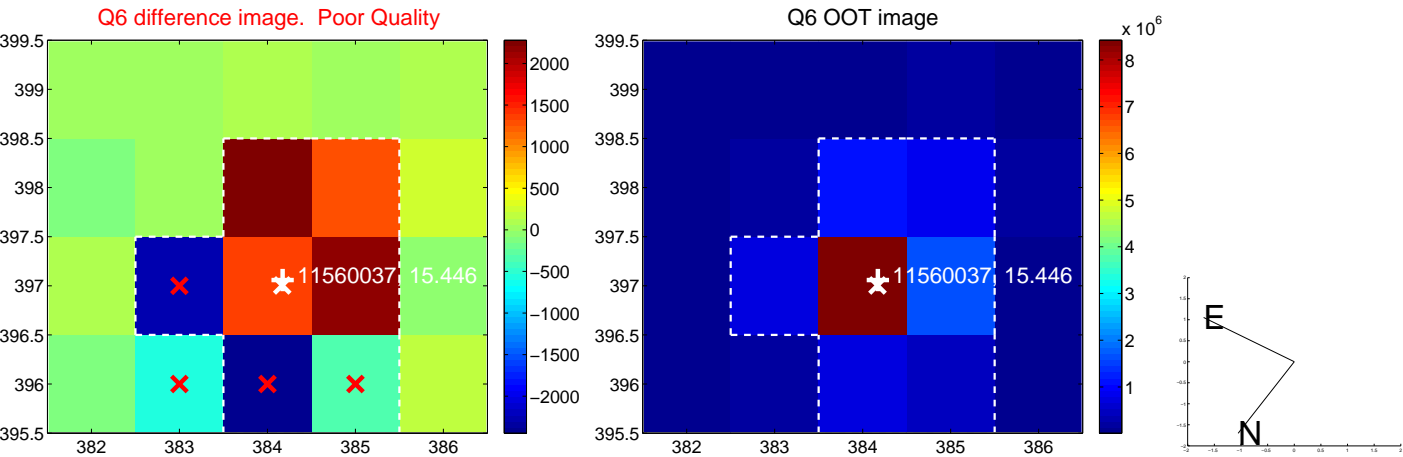
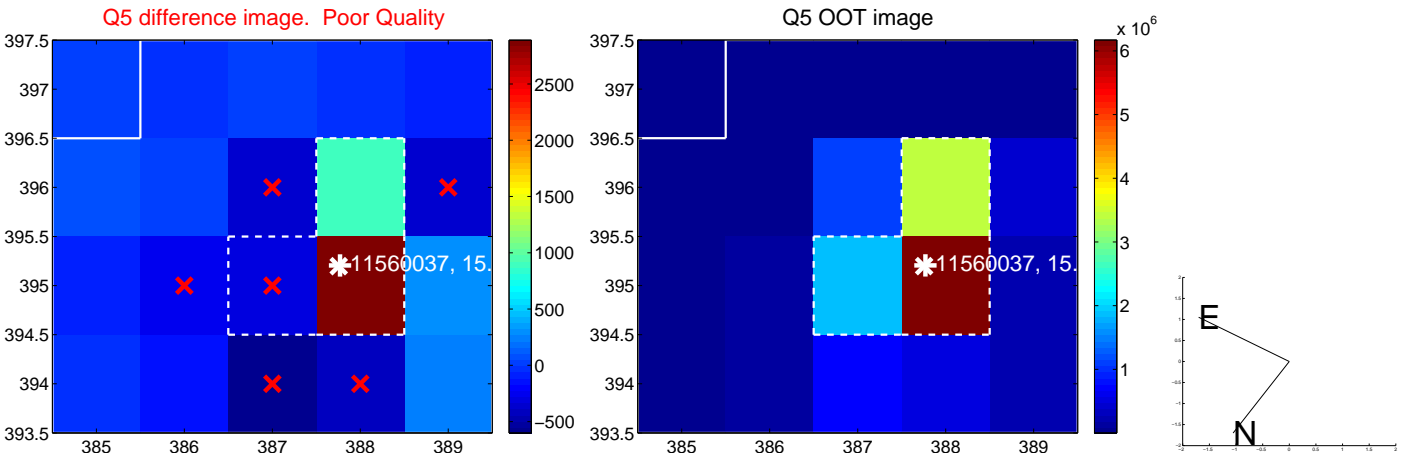


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

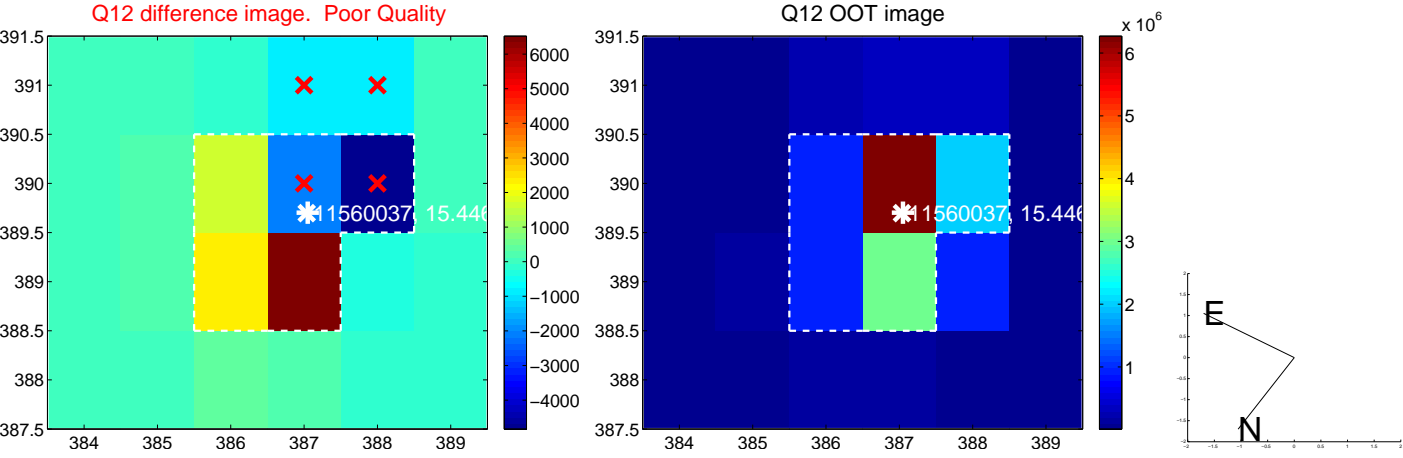
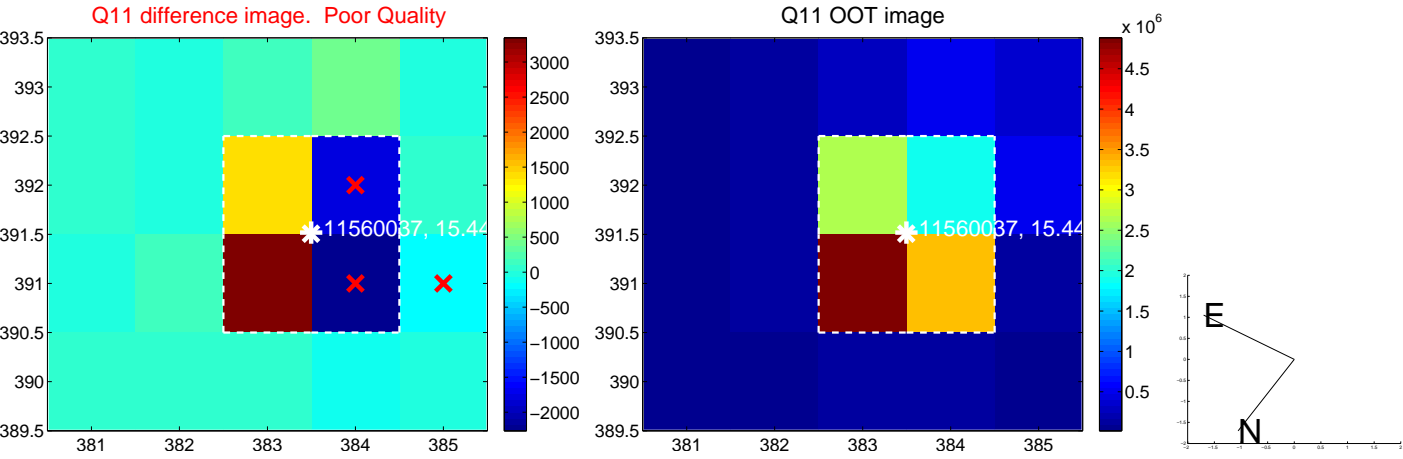
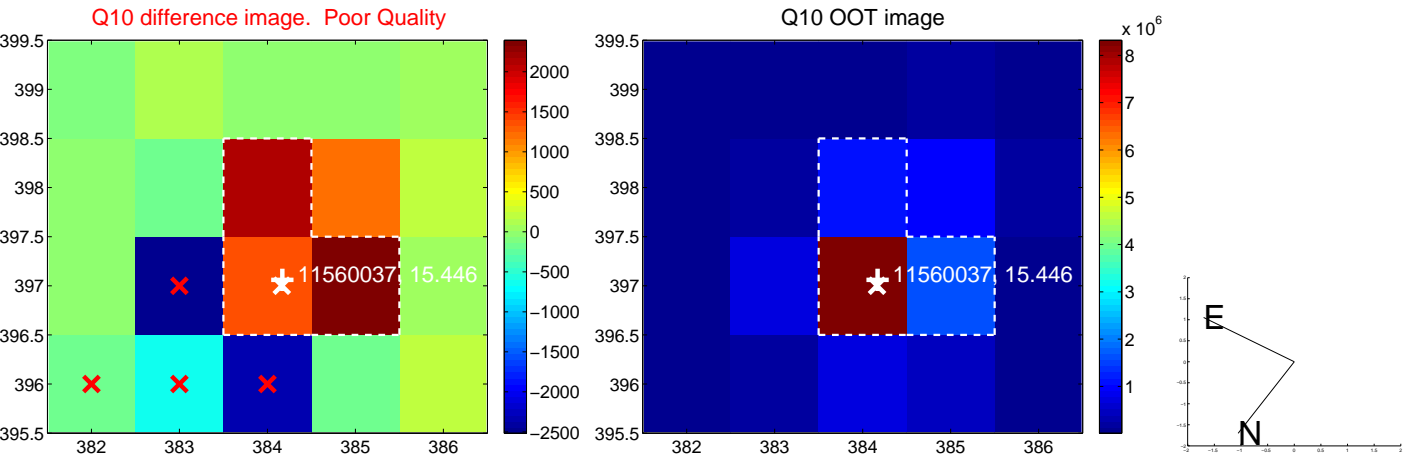
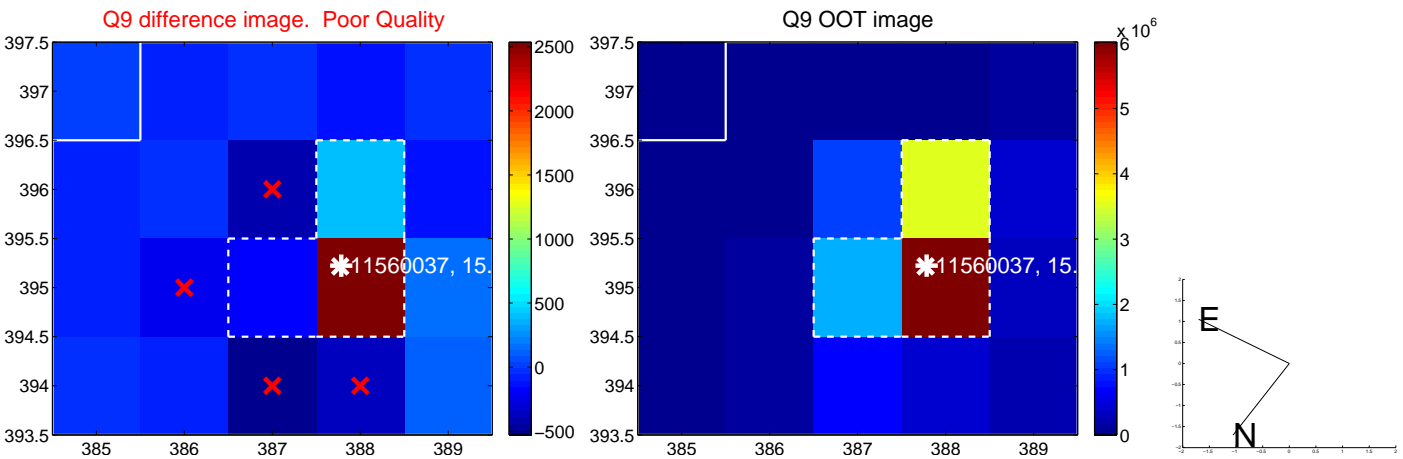


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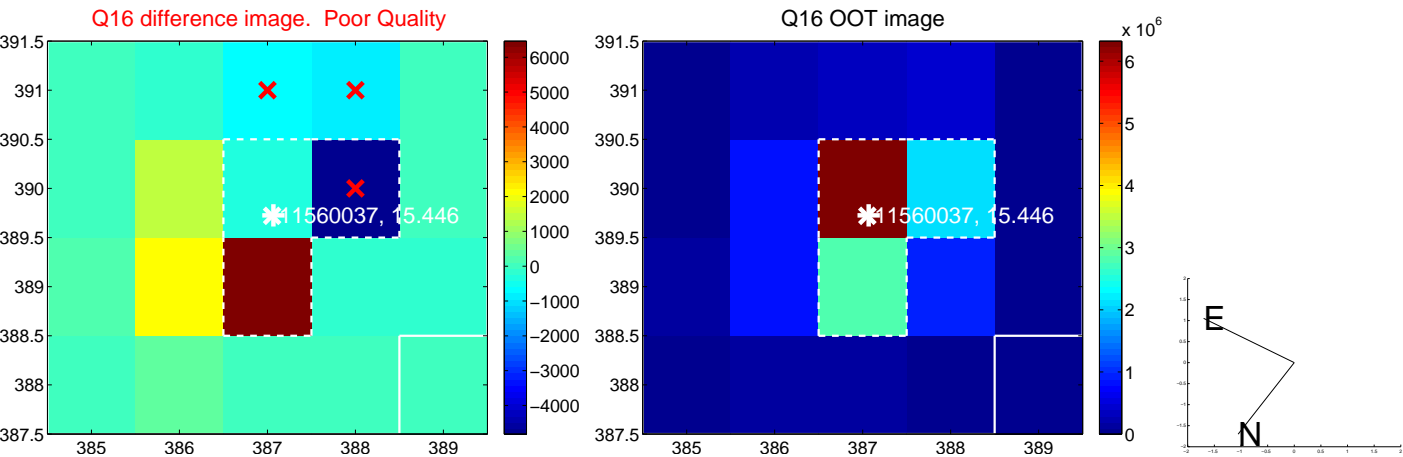
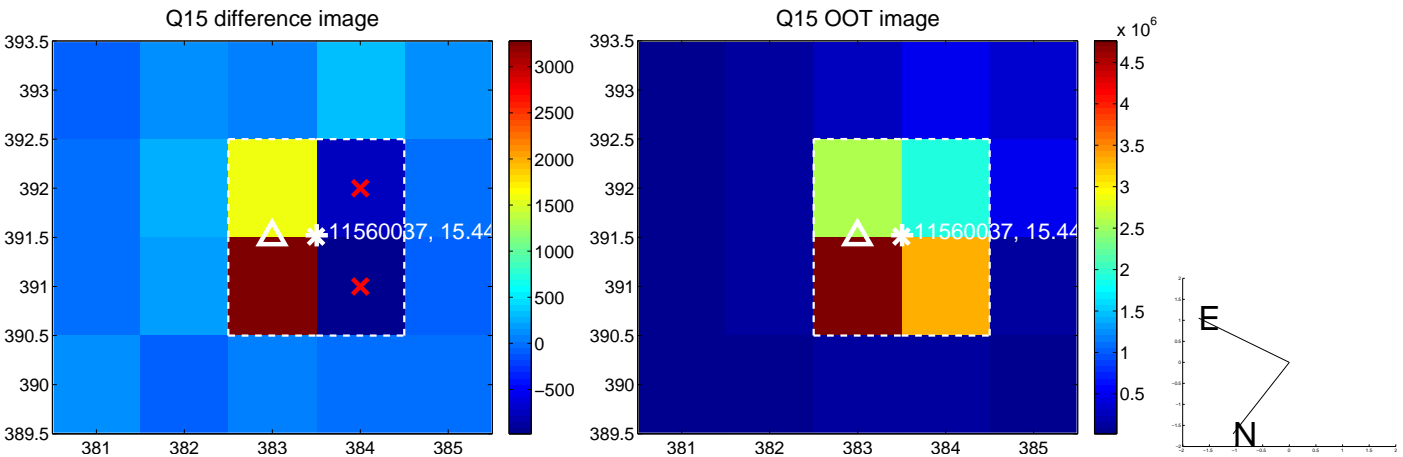
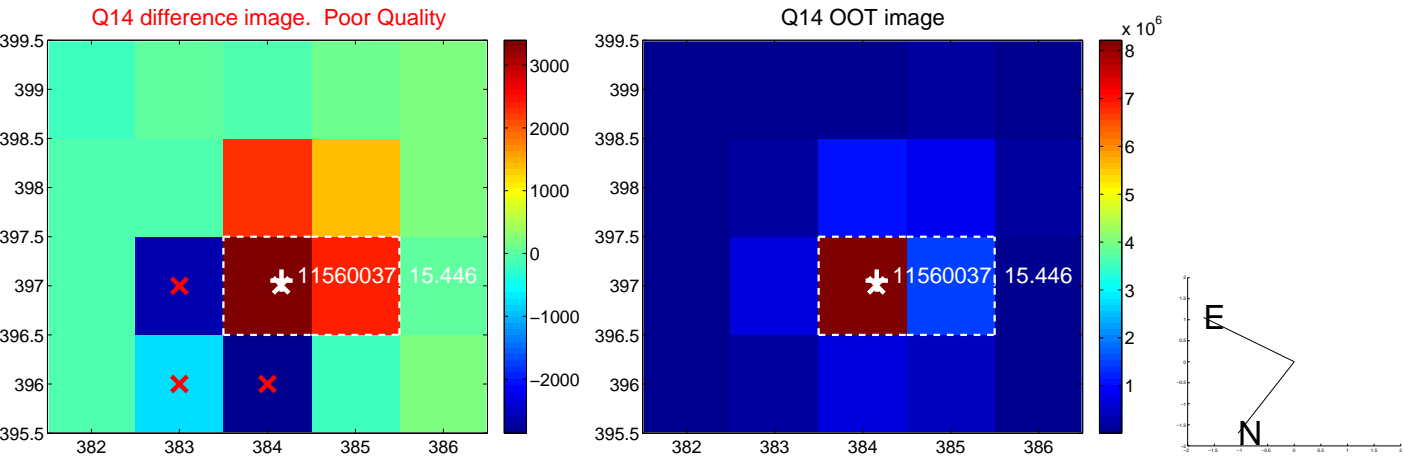
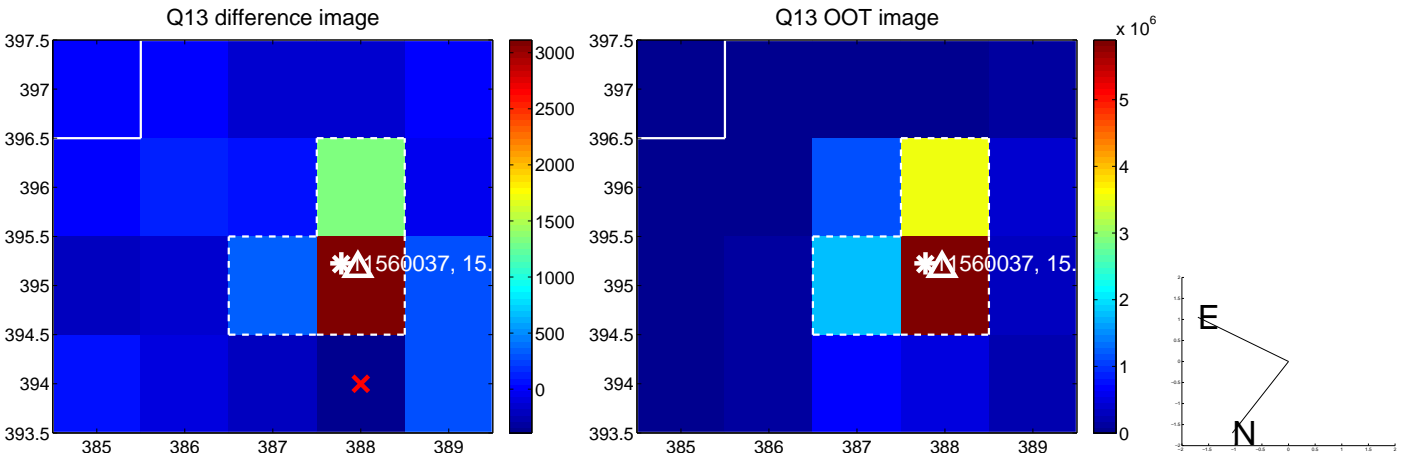




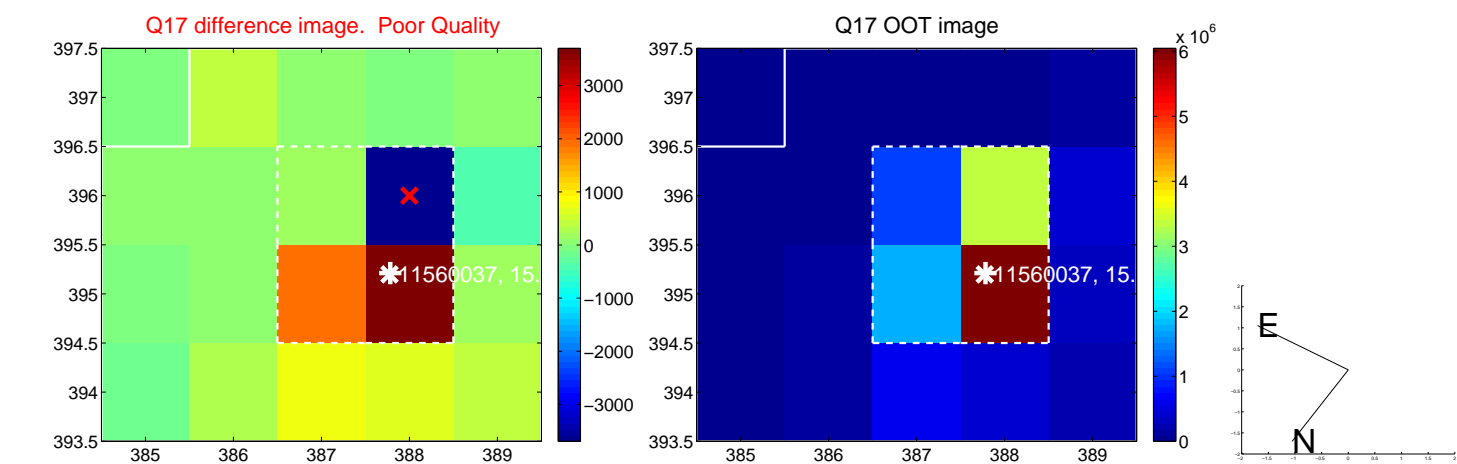
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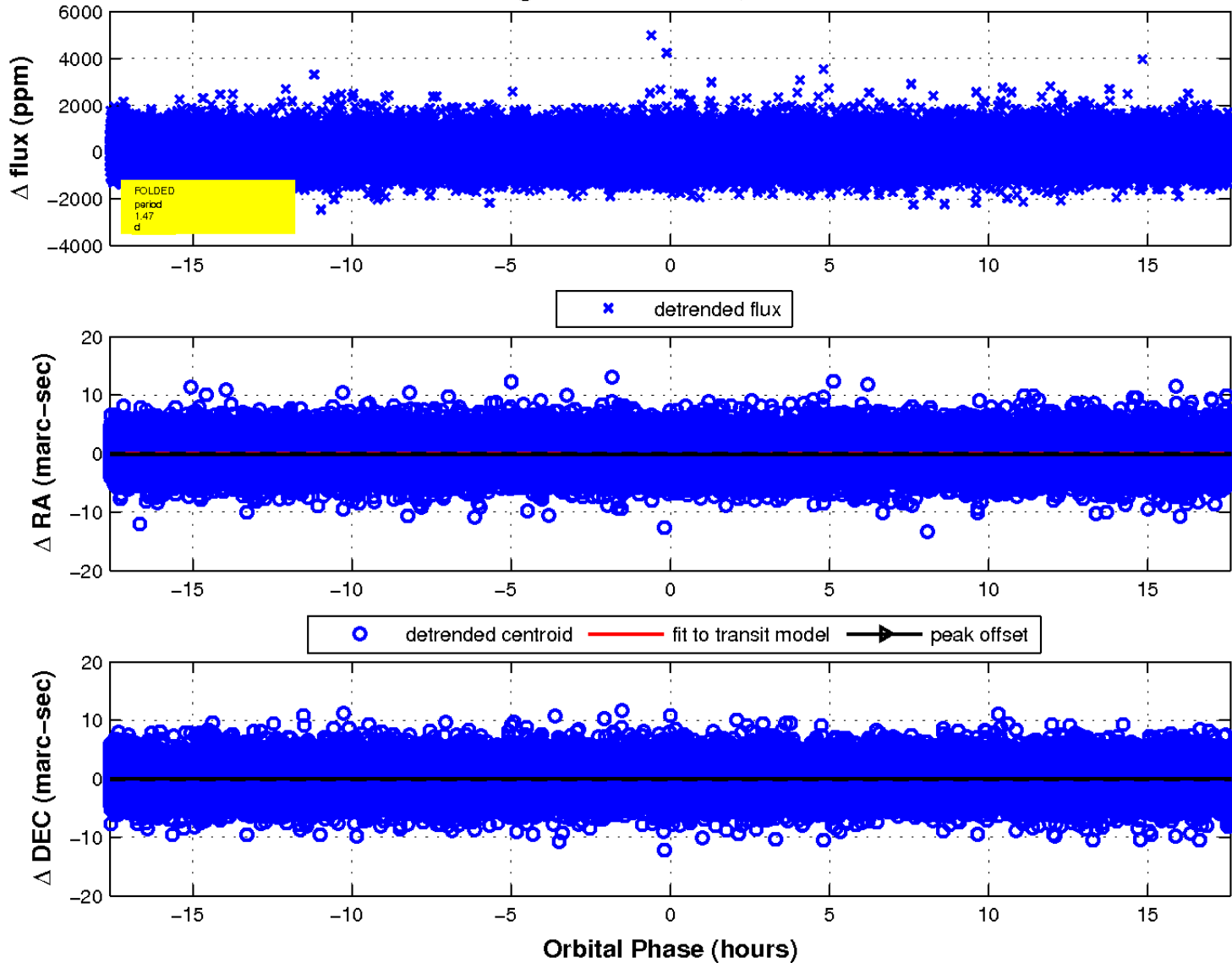
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

