

# KIC 011136970

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
011136970-01	OBS	No	437.854995	240.920510	444.4	3.348	9.7	5.5	0.68	5123	1.51	0.30
011136970-02	OBS	No	316.543698	222.441546	493.7	4.450	9.5	5.3	0.68	5123	1.78	0.46

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
011136970-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—CENT_FEW_DIFFS
011136970-02	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST

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

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

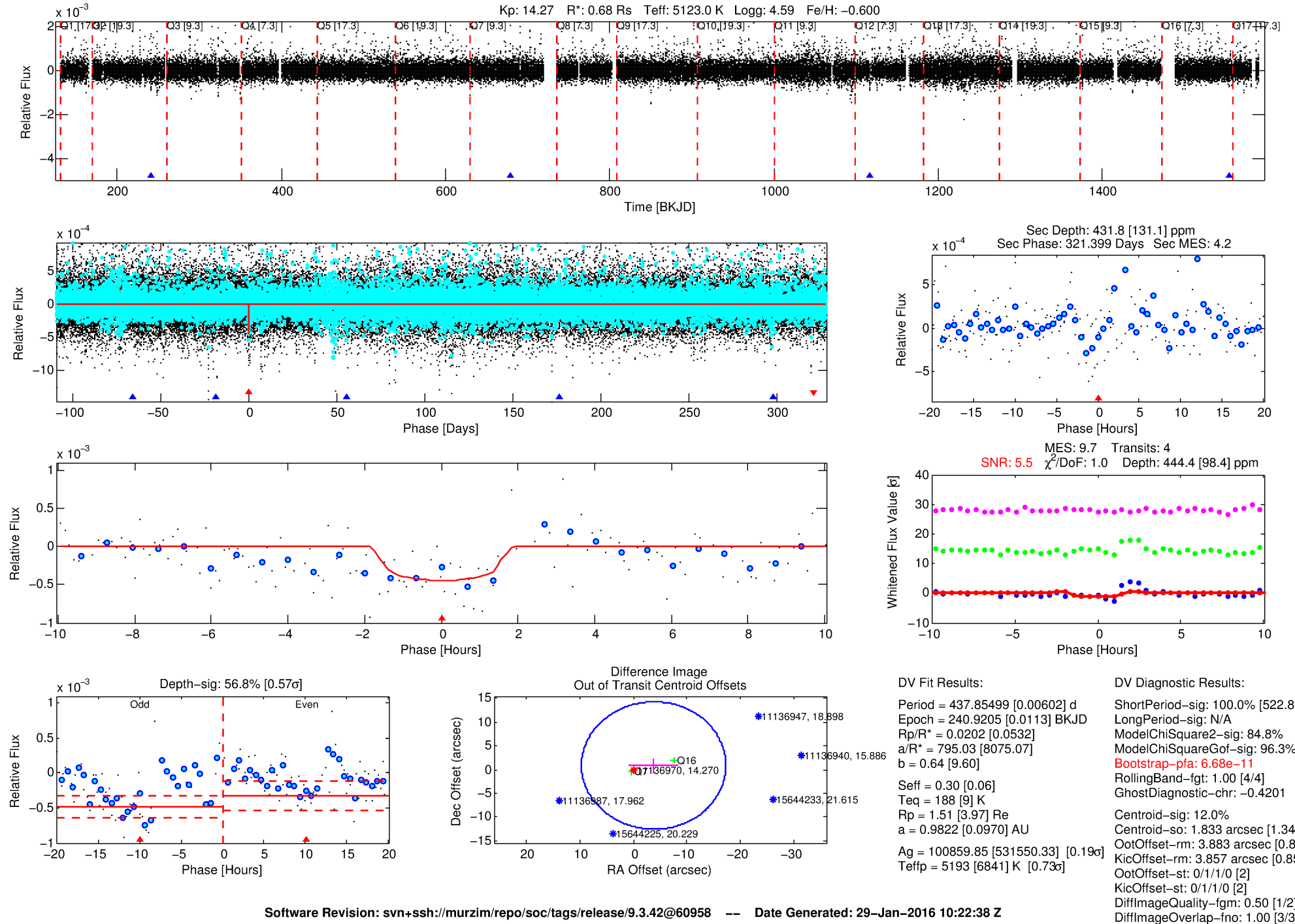
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 011136970-01

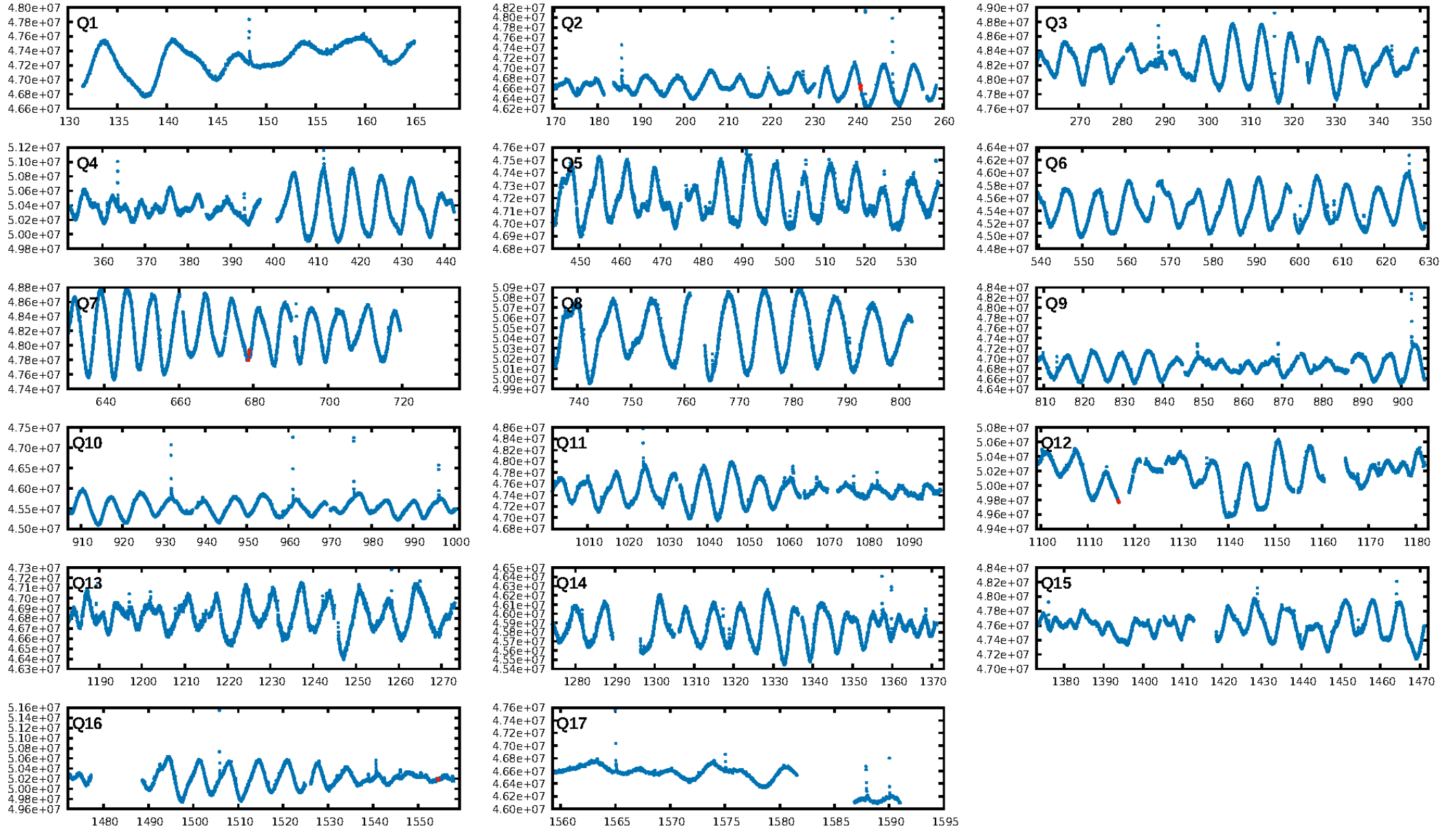
No Significant Match Found

# DV One-Page Summary

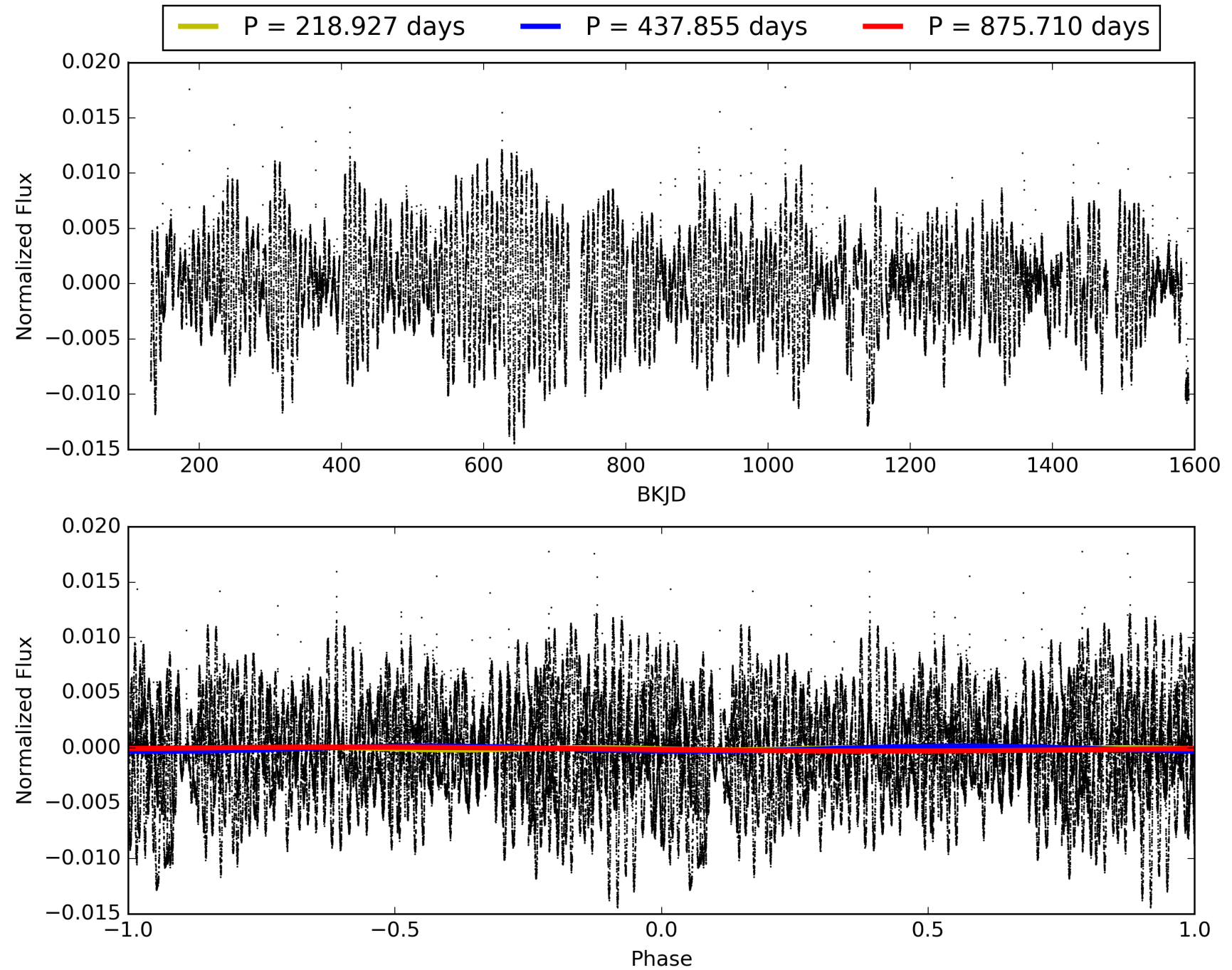
KIC: 11136970 Candidate: 1 of 2 Period: 437.855 d



# TCE 011136970-01, PDC Light Curves

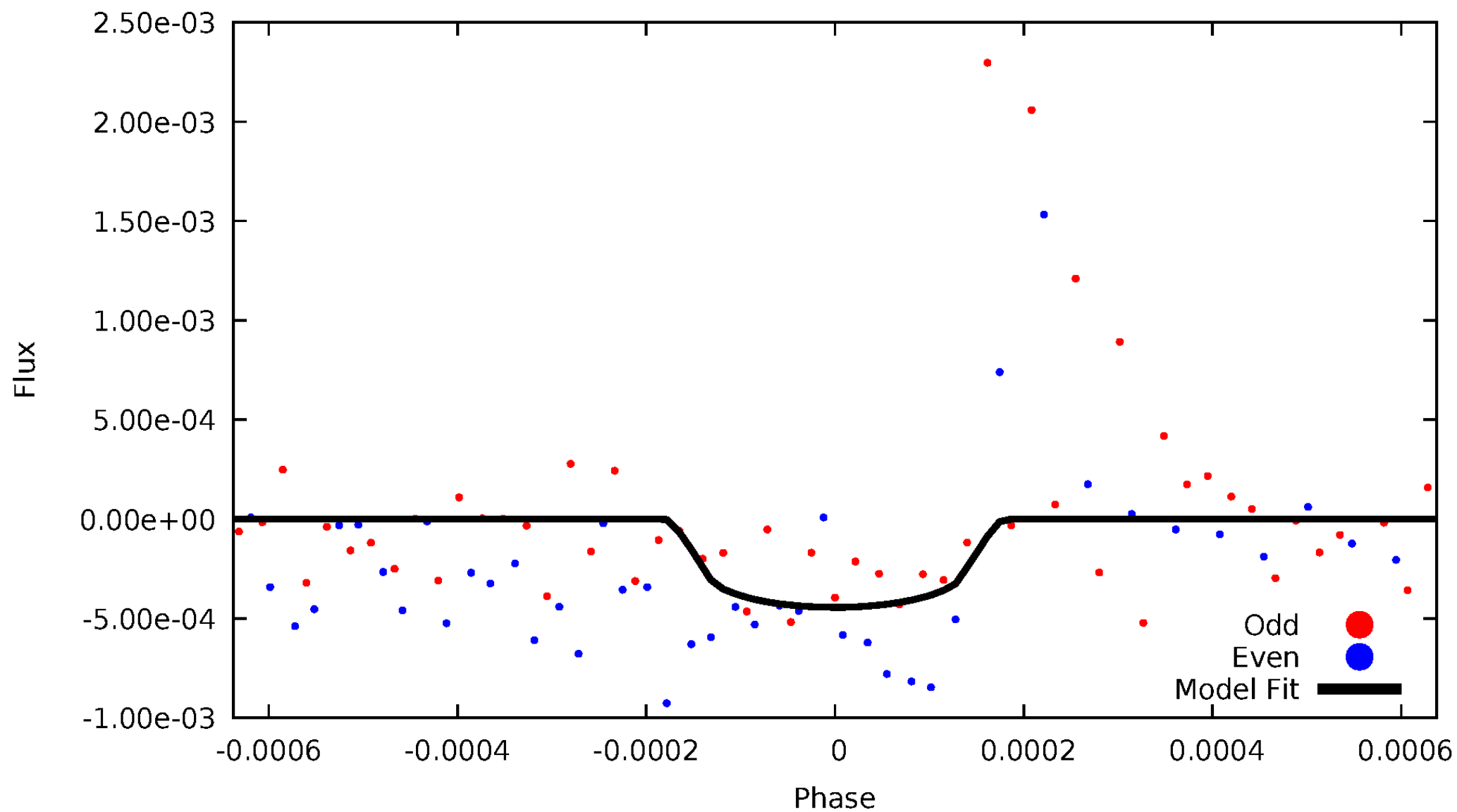


# TCE 011136970-01



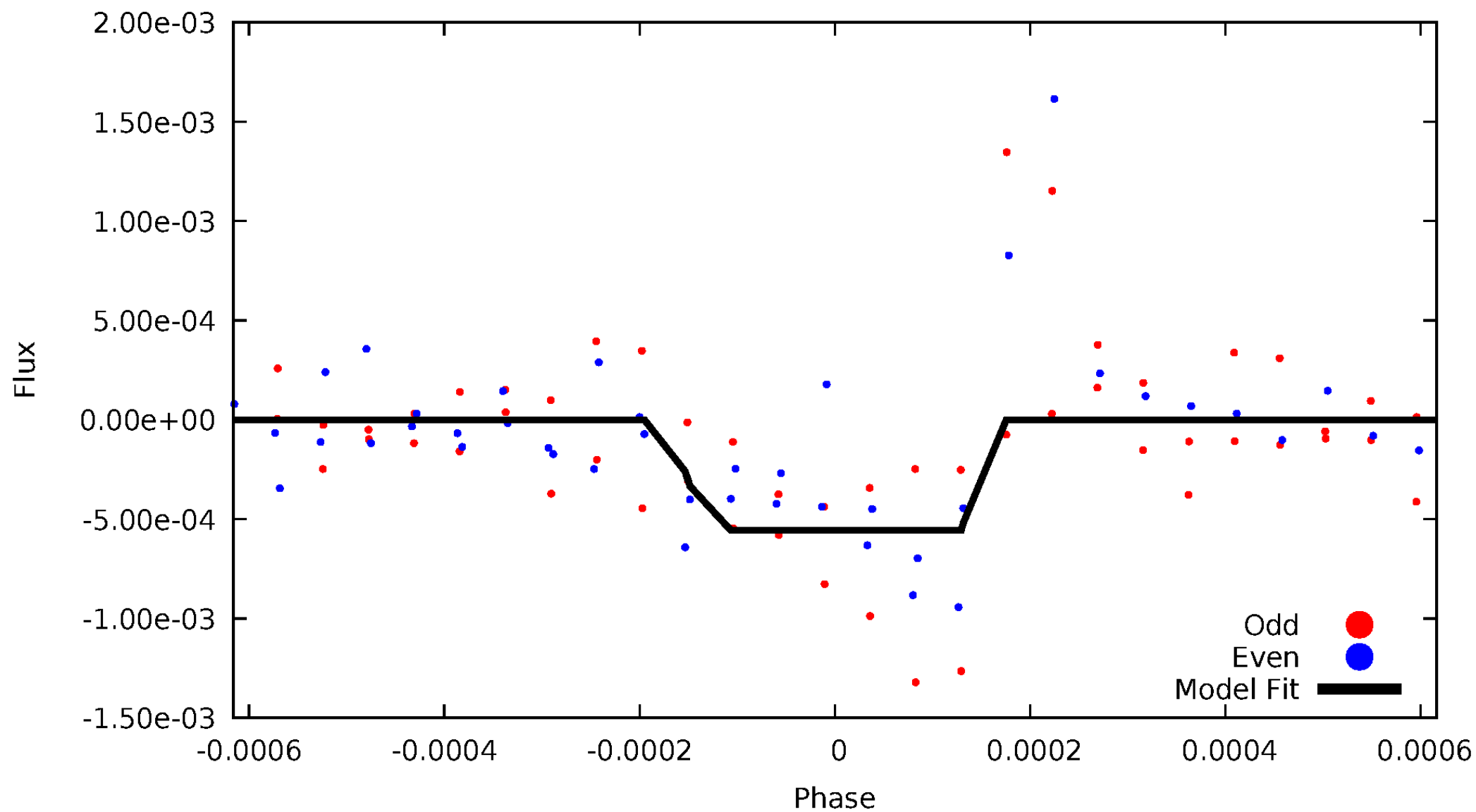
# DV Odd/Even

TCE 011136970-01

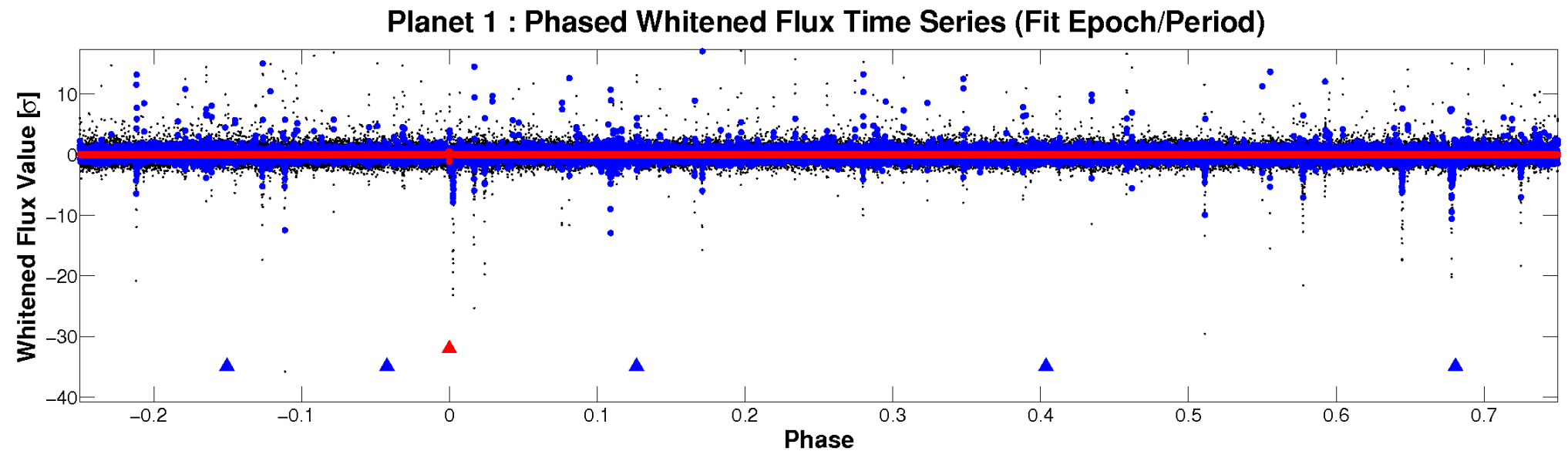
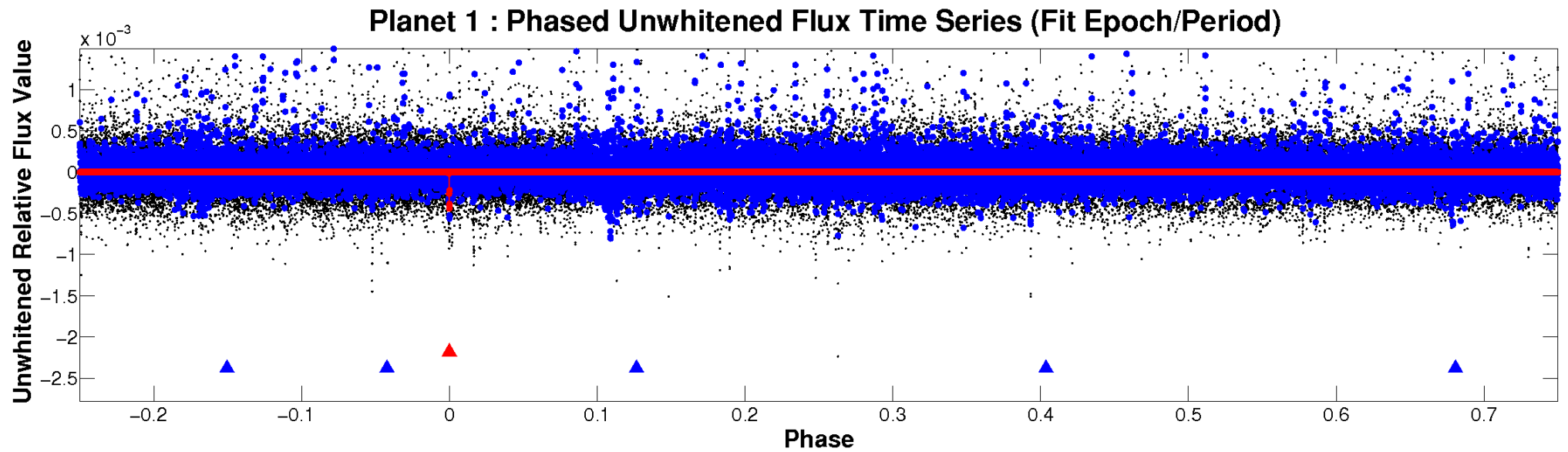


# ALT Odd/Even

TCE 011136970-01

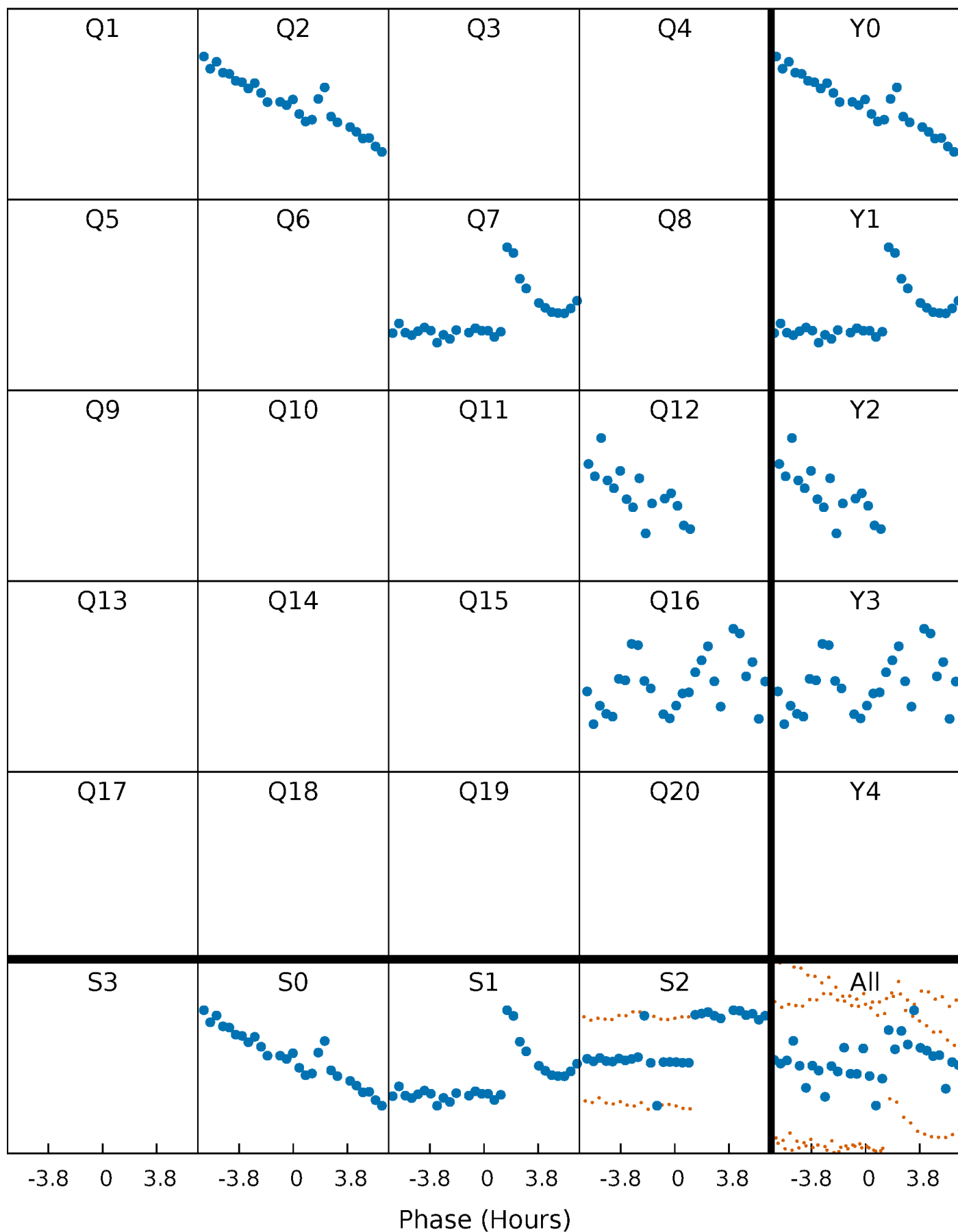


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

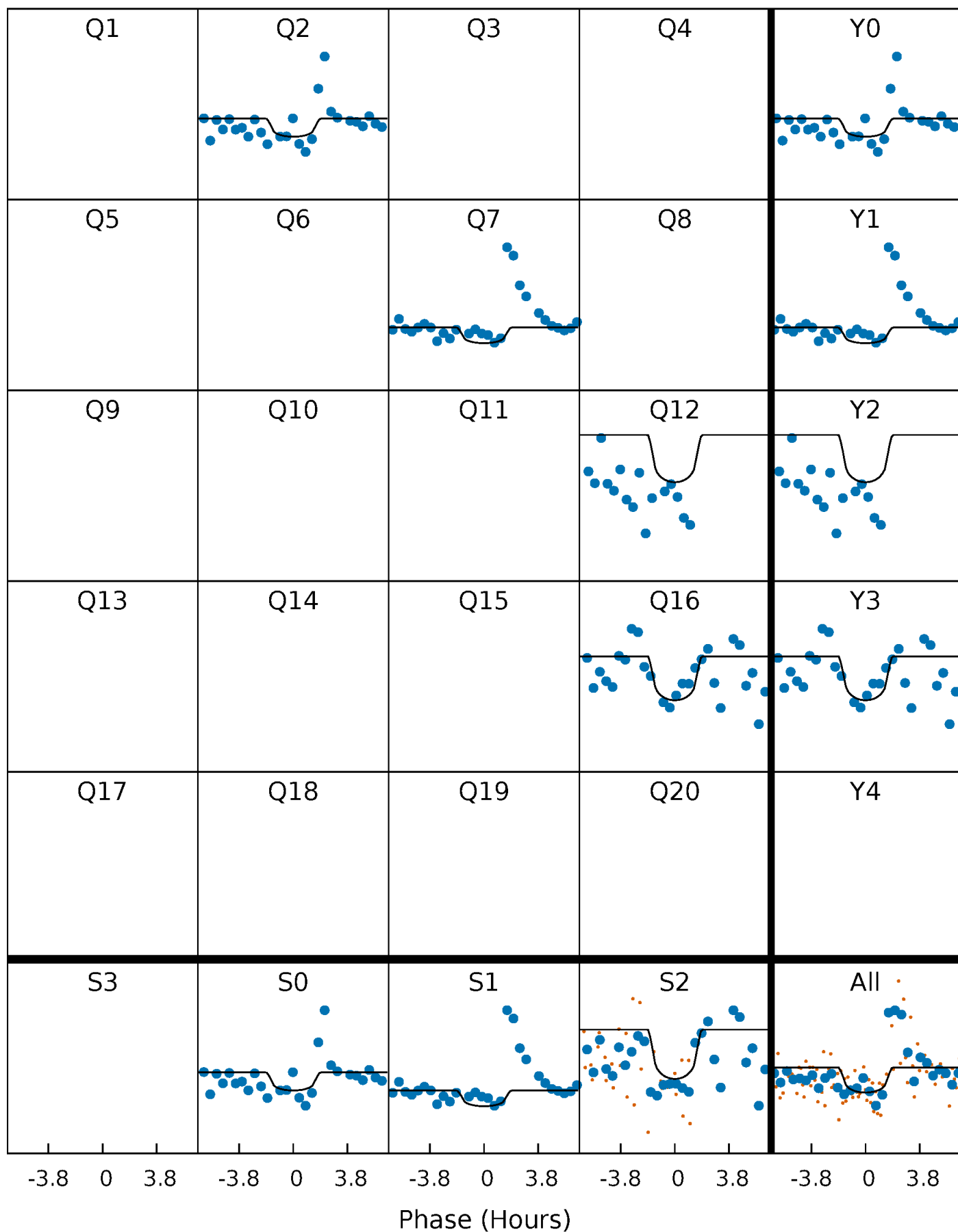
TCE 011136970-01 P=437.854995 Days  $T_0=240.920510$  (BKJD)





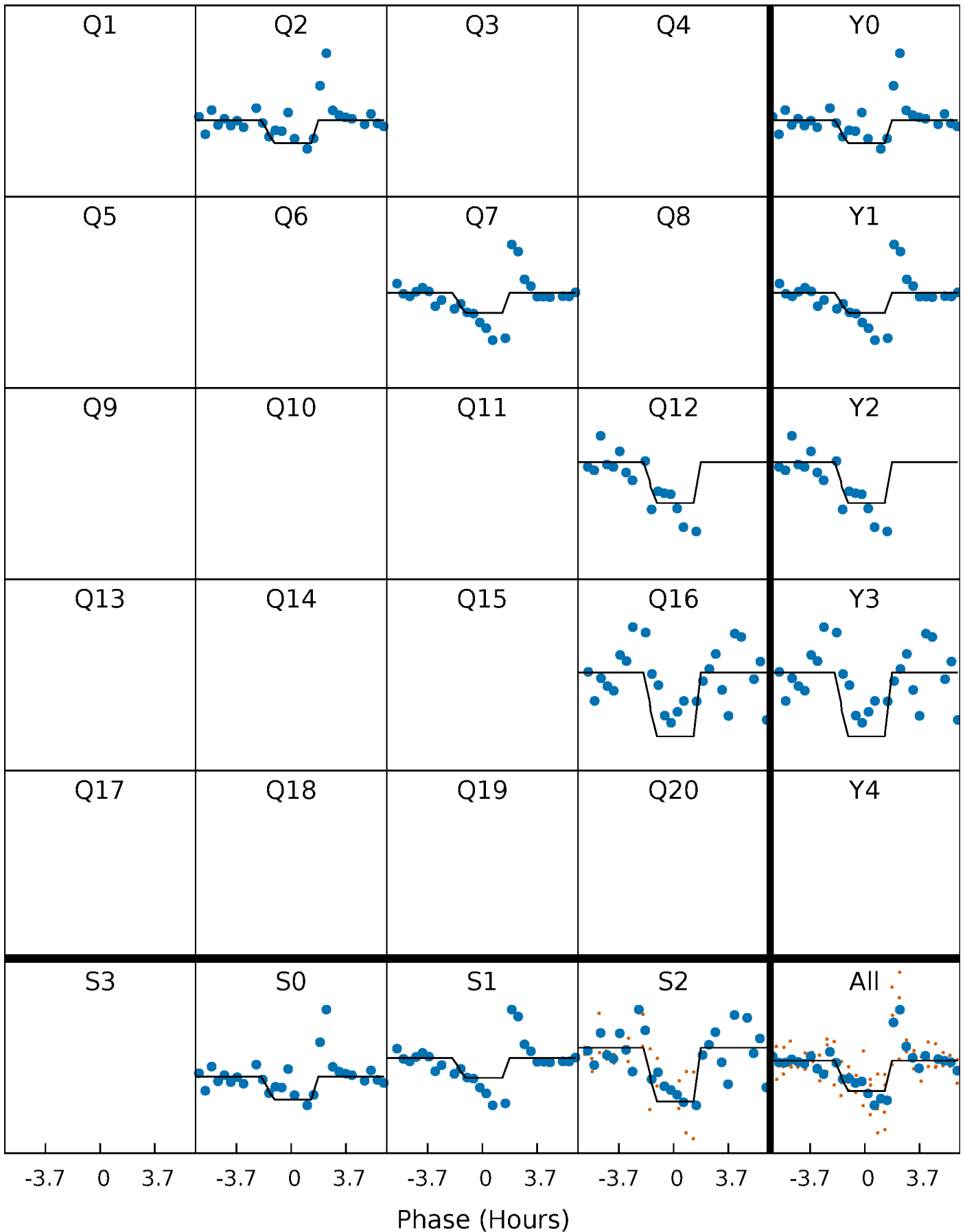
# DV Quarter-Phased Transit Curves

TCE 011136970-01 P=437.854995 Days  $T_0=240.920510$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

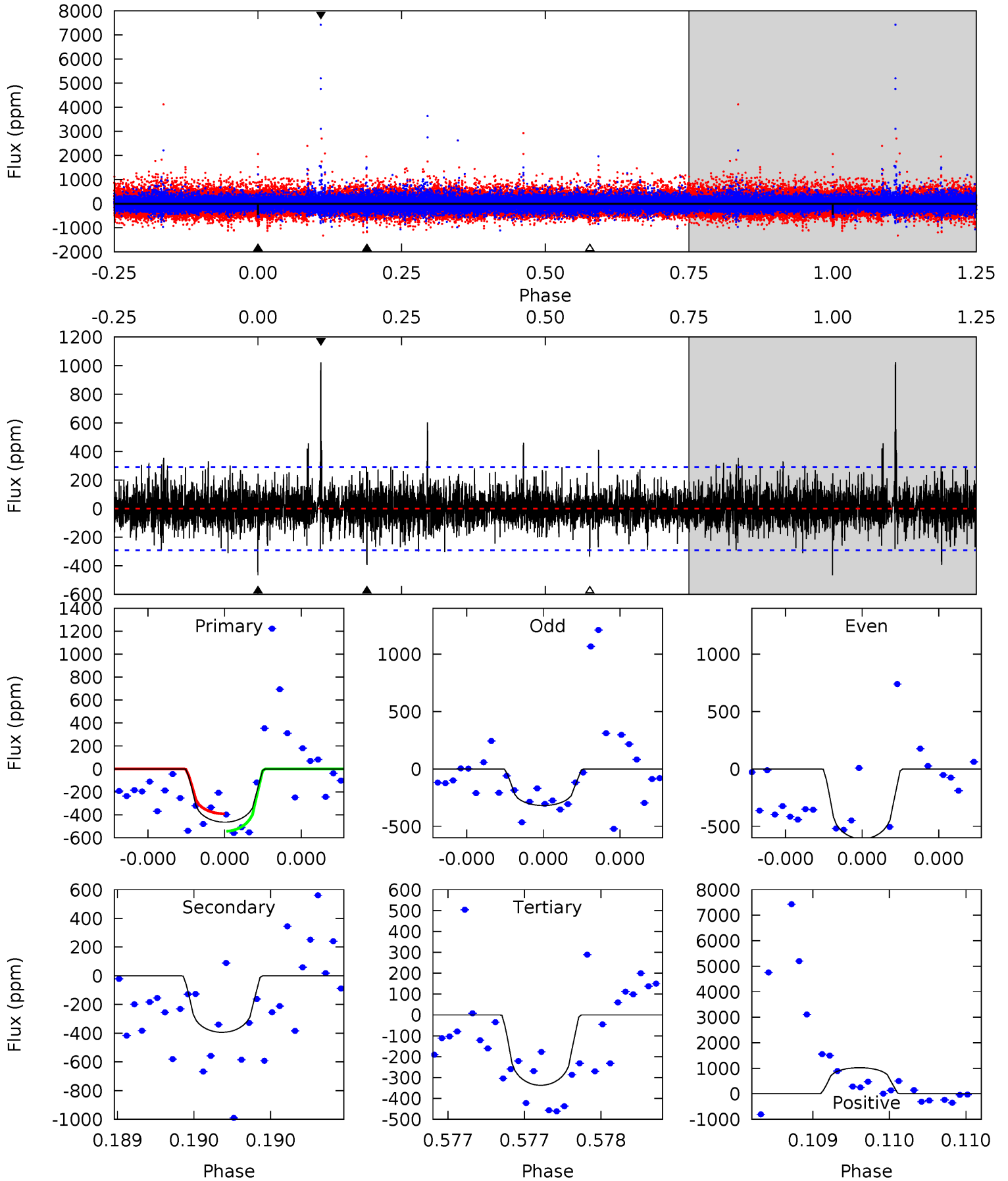
TCE 011136970-01 P=437.850324 Days  $T_0=240.918932$  (BKJD)



# DV Model-Shift Uniqueness Test

011136970-01, P = 437.854995 Days, E = 240.920510 Days

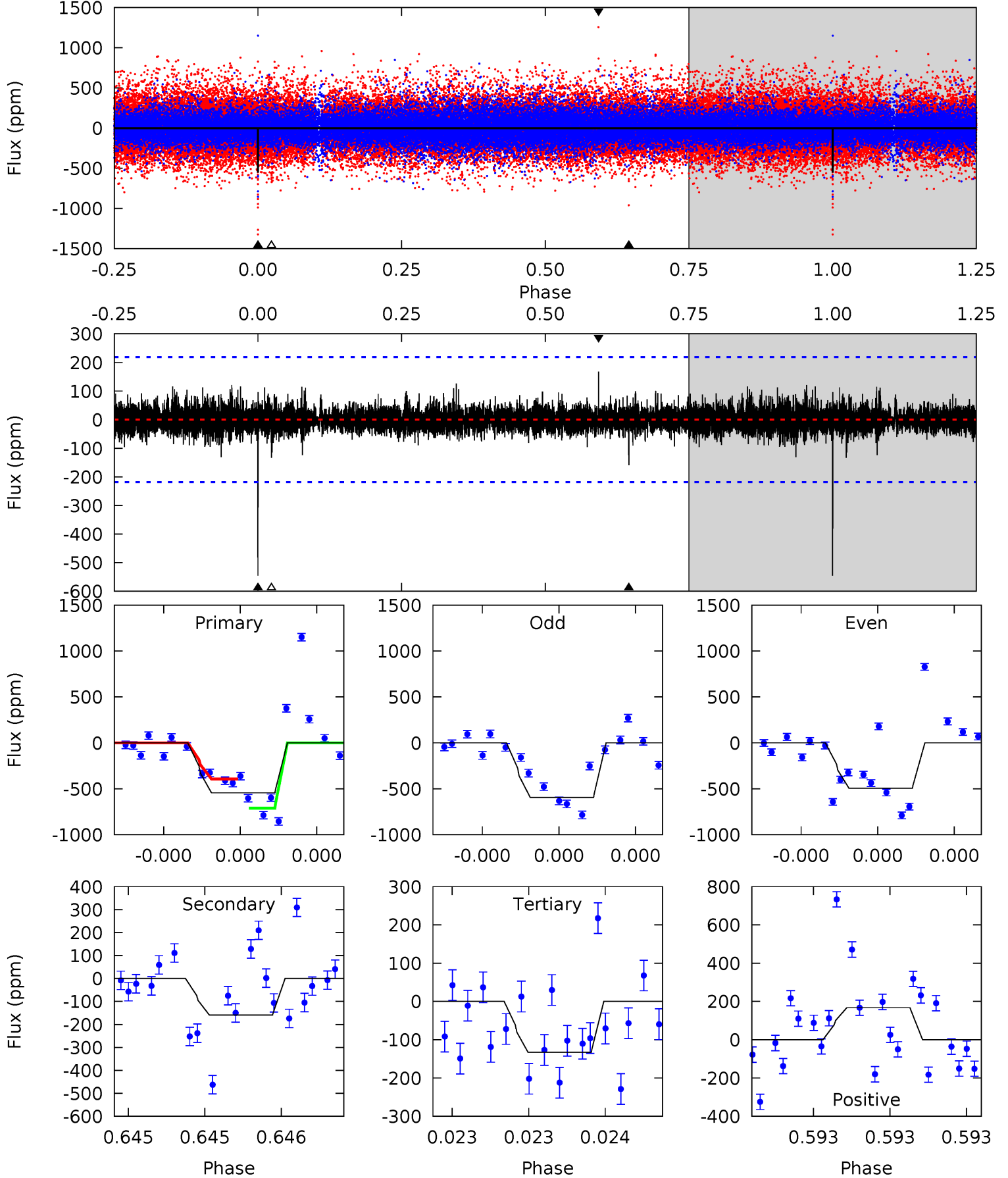
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.98	7.62	6.52	19.8	5.63	3.57	1.63	2.45	-10.8	1.10	-12.2	1.72	0.96	0.69	1.47



# Alt Model-Shift Uniqueness Test

011136970-01, P = 437.850324 Days, E = 240.918932 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
14.1	4.12	3.44	4.34	5.67	3.63	0.68	10.7	9.79	0.68	-0.22	1.27	1.10	0.23	4.07



### Stellar Parameters For KIC 011136970

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5123^{+154}_{-138}$	$4.588^{+0.077}_{-0.070}$	$-0.600^{+0.300}_{-0.300}$	$0.683^{+0.081}_{-0.066}$	$0.658^{+0.089}_{-0.033}$	$2.910^{+0.880}_{-0.675}$
	+3%/-3%	+2%/-2%	+50%/-50%	+12%/-10%	+14%/-5%	+30%/-23%
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 011136970-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-394 \pm 52$	$3.30^{+3.39}_{-2.28}$	$263^{+11}_{-9}$	$3760^{+2369}_{-710}$	$18916^{+178088}_{-14166}$
Alt.	$-159 \pm 39$	$3.44^{+3.56}_{-2.24}$	$263^{+10}_{-10}$	$3221^{+1409}_{-581}$	$7110^{+51883}_{-5473}$

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

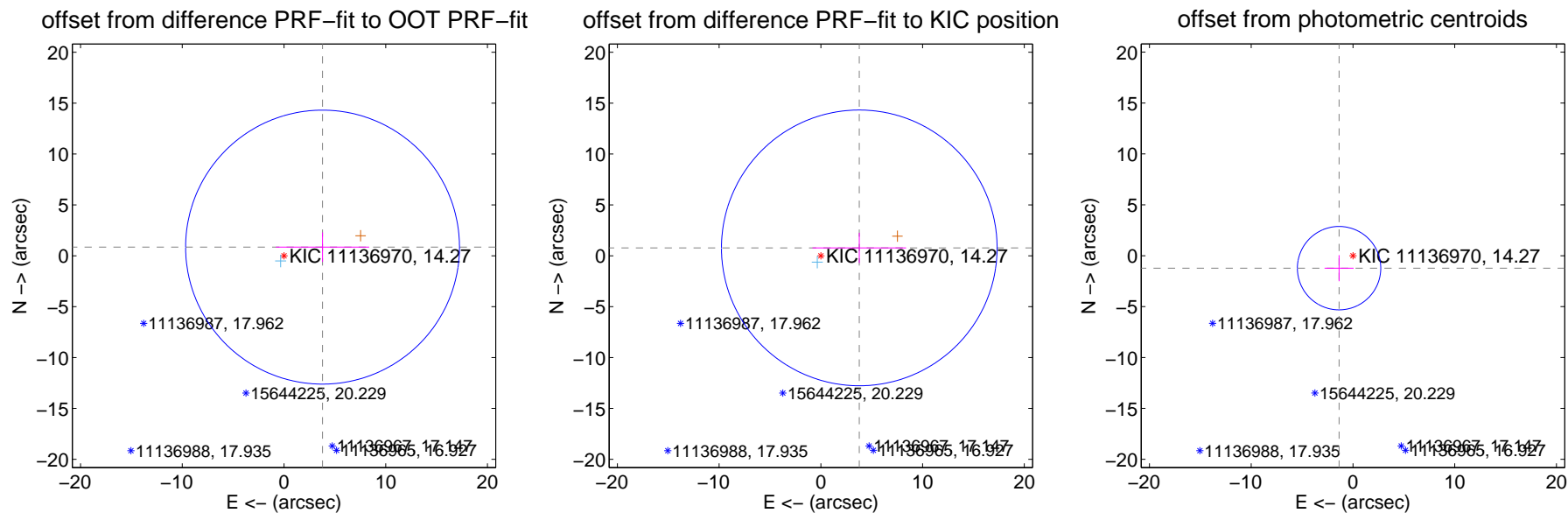
## DV Centroid Data

Supplemental centroid analysis for 011136970-01. Kepler magnitude: 14.27. Transit SNR 5.50

There are 1 quarters with good PRF difference image offsets

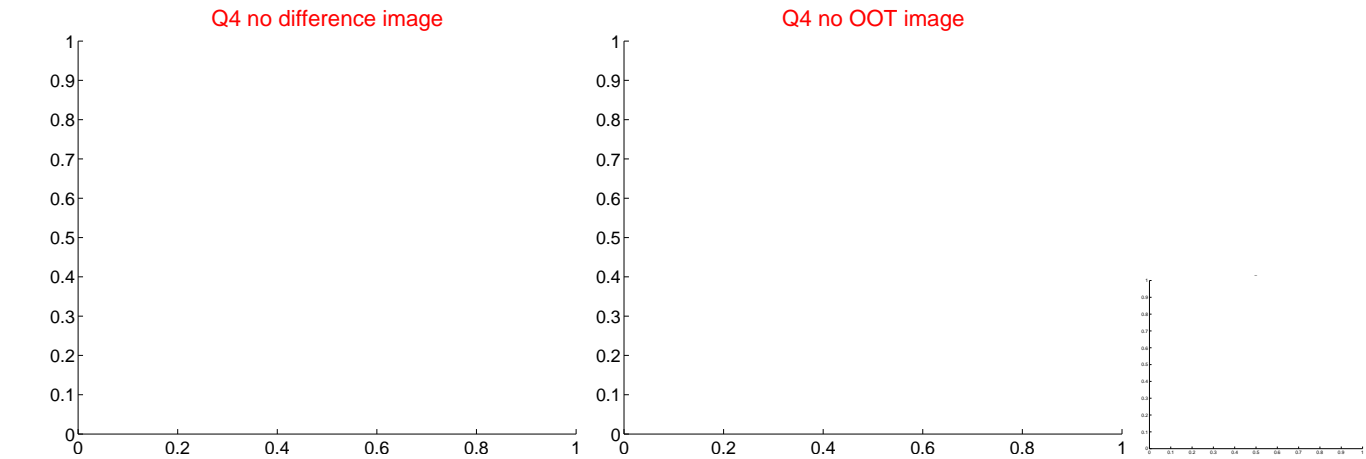
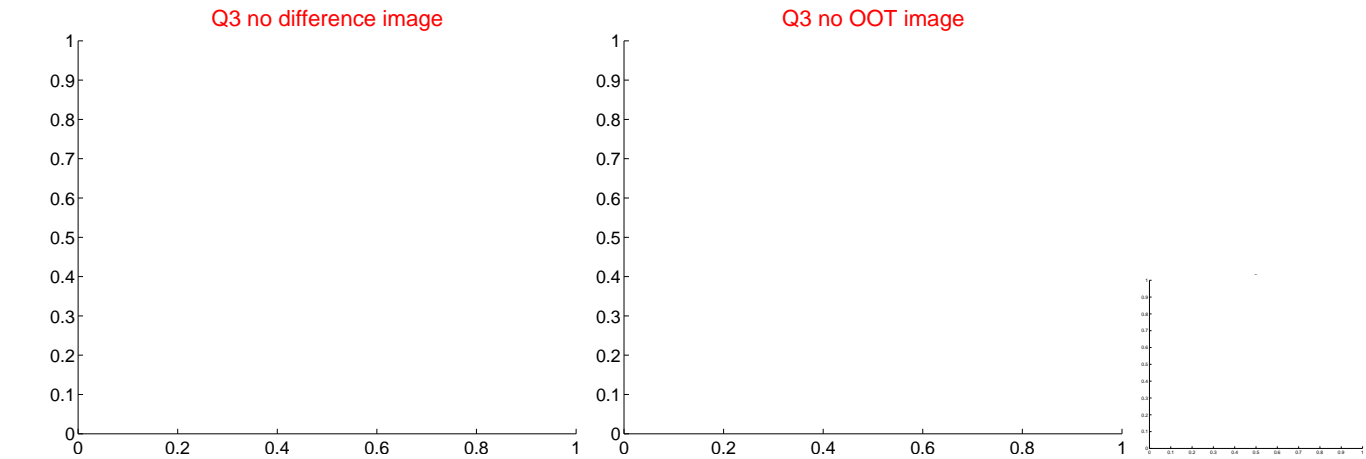
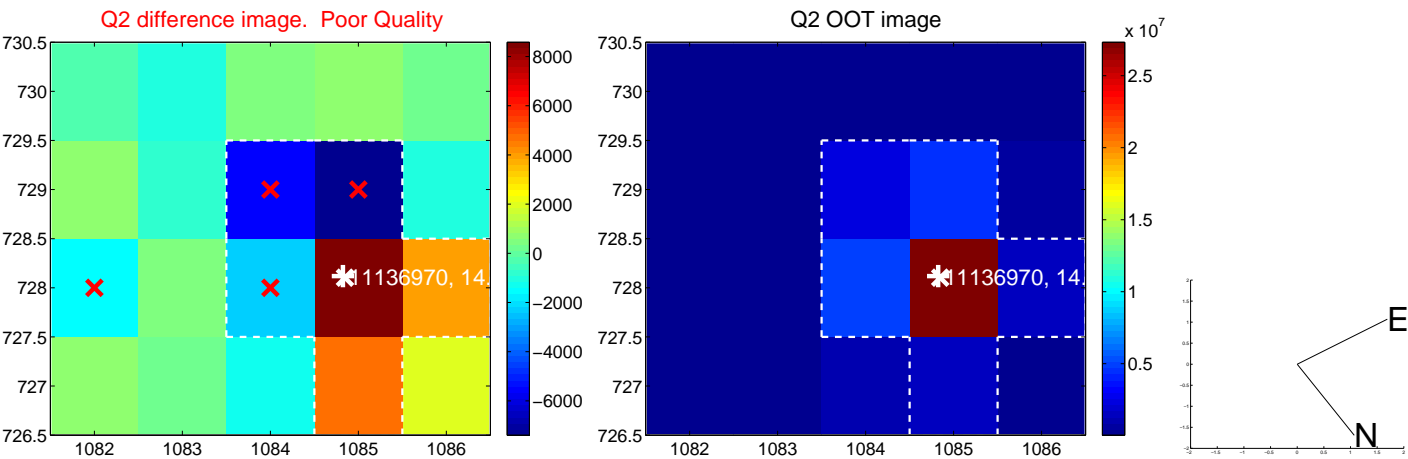
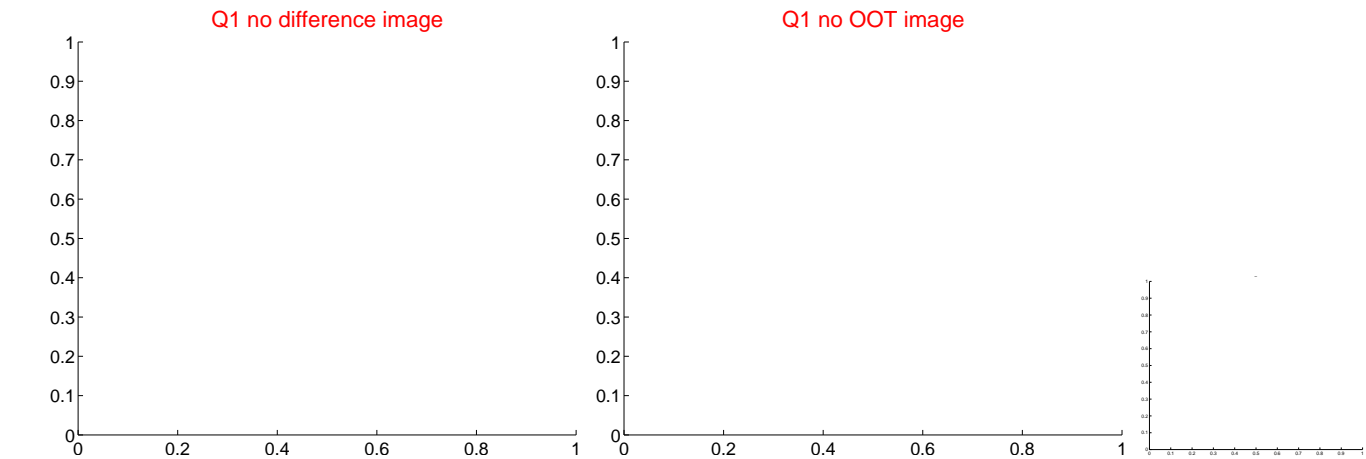
The direct PRF centroid is offset from the target star catalog position by about 0.04 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$3.883 \pm 4.487$	0.87	$-3.789 \pm 4.587$	$0.851 \pm 1.444$
PRF-fit source offset from KIC position	$3.857 \pm 4.516$	0.85	$-3.778 \pm 4.600$	$0.775 \pm 1.485$
photometric centroid source offset	$1.83 \pm 1.37$	1.34	$1.37 \pm 1.43$	$-1.22 \pm 1.28$

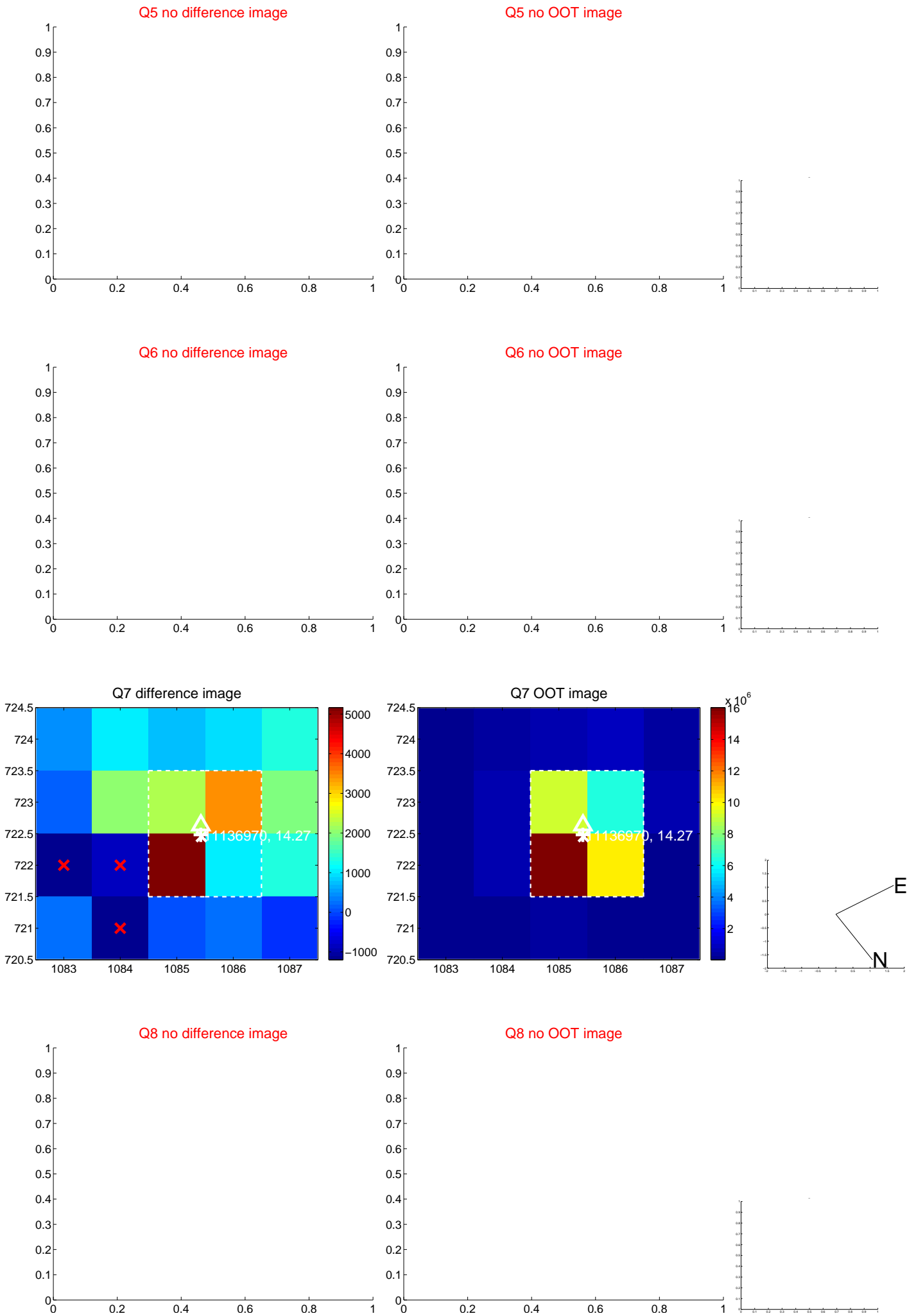


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

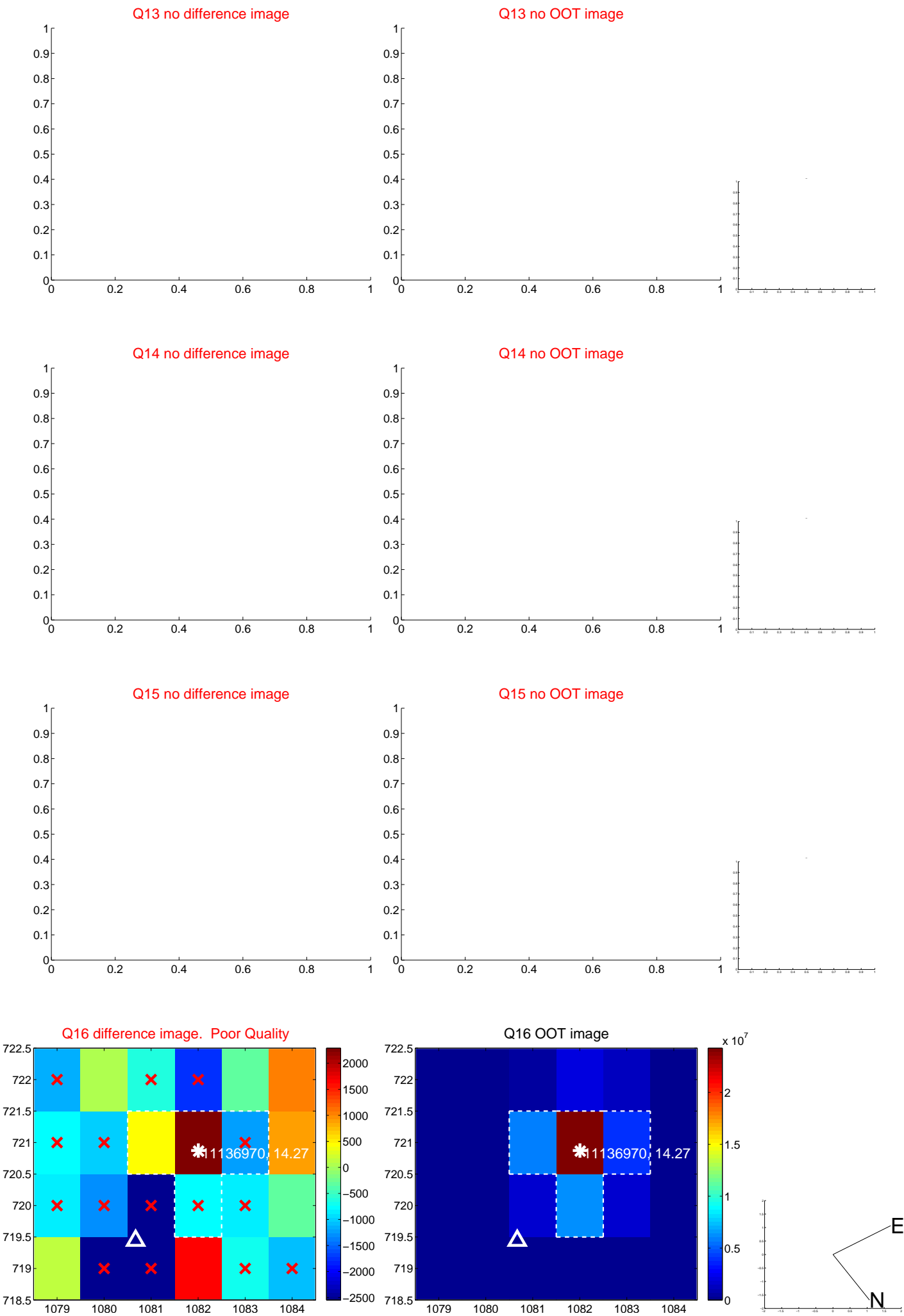




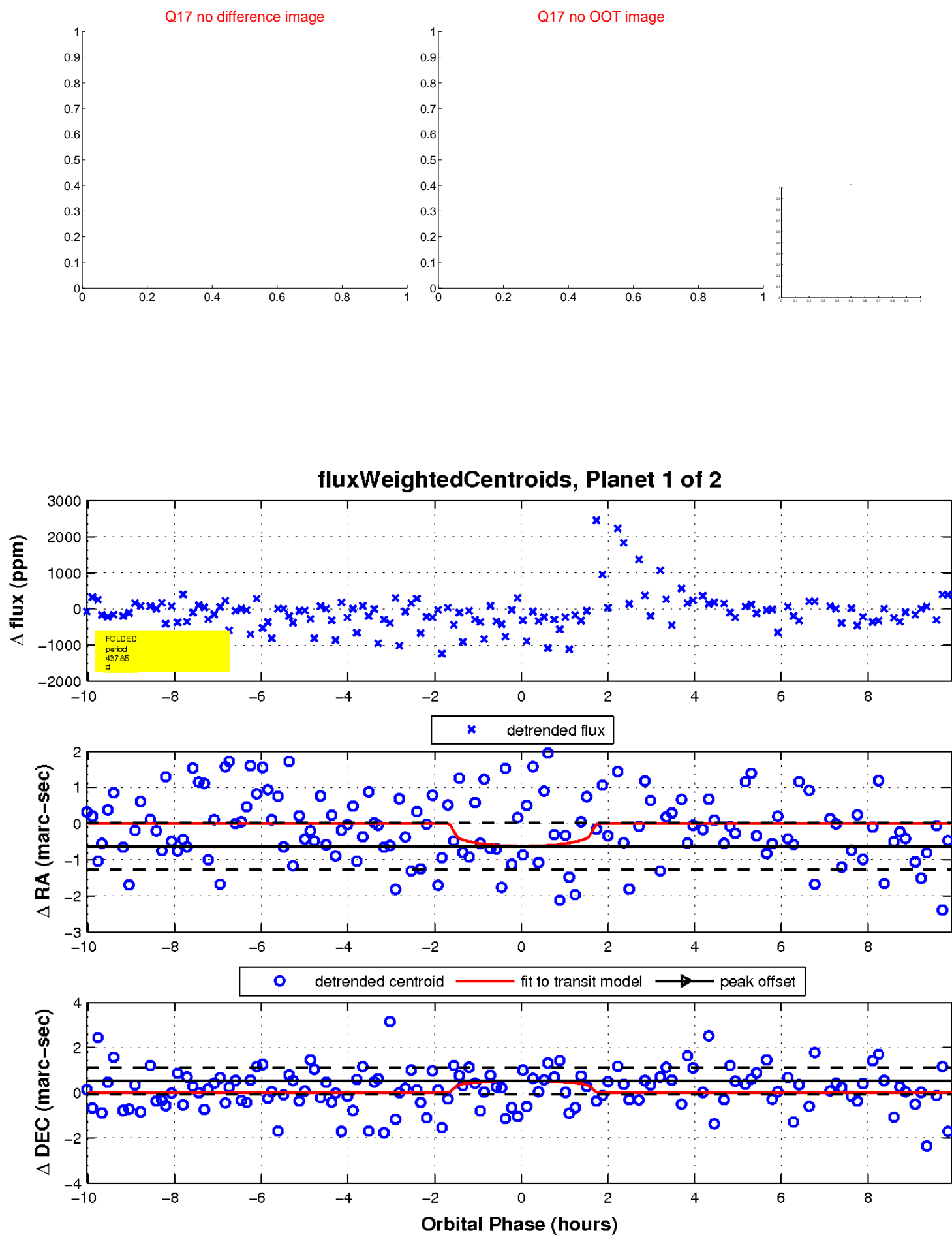
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

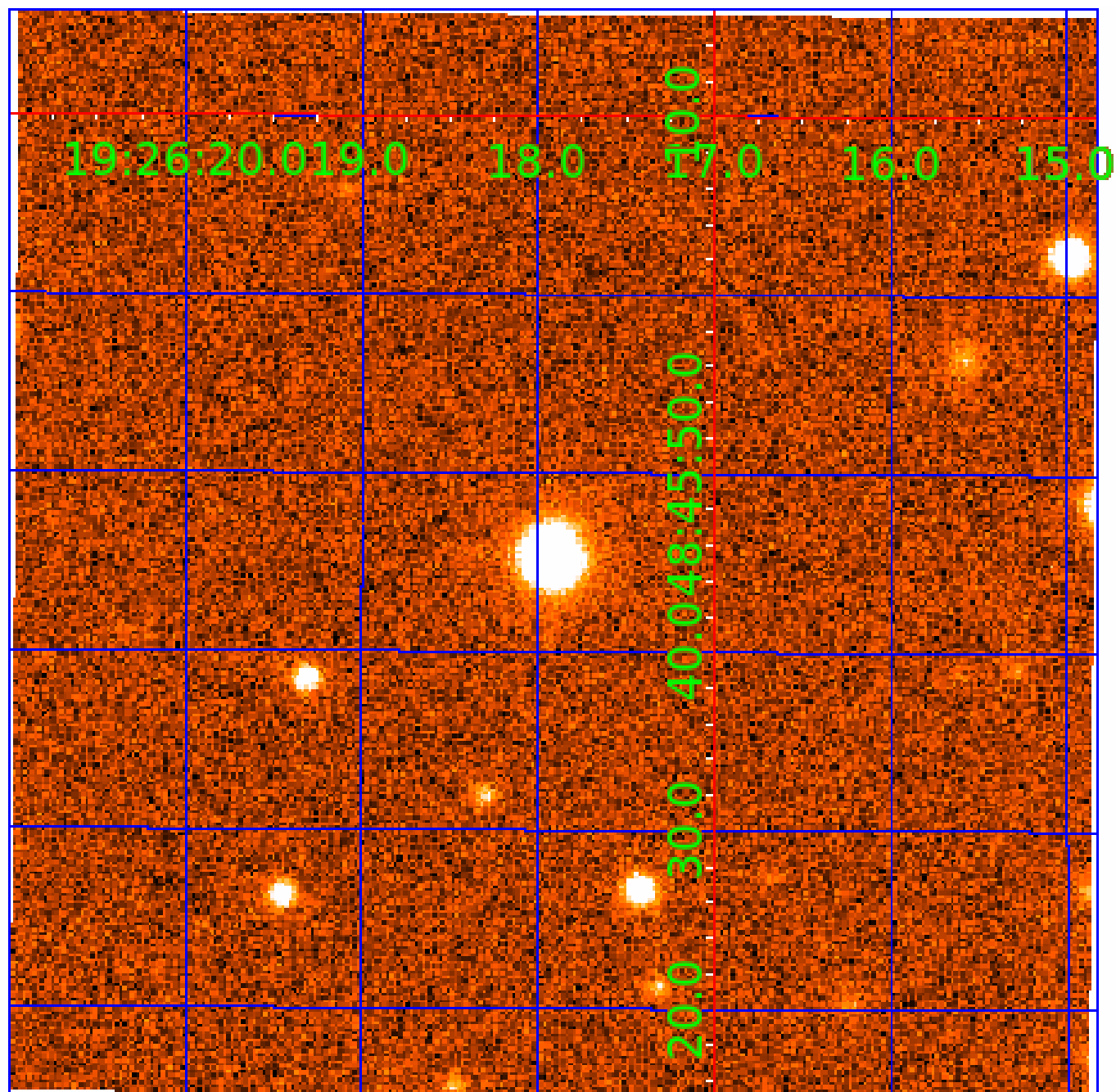


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 011136970

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
011136970-01	OBS	No	437.854995	240.920510	444.4	3.348	9.7	5.5	0.68	5123	1.51	0.30
011136970-02	OBS	No	316.543698	222.441546	493.7	4.450	9.5	5.3	0.68	5123	1.78	0.46

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
011136970-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—CENT_FEW_DIFFS
011136970-02	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST

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

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

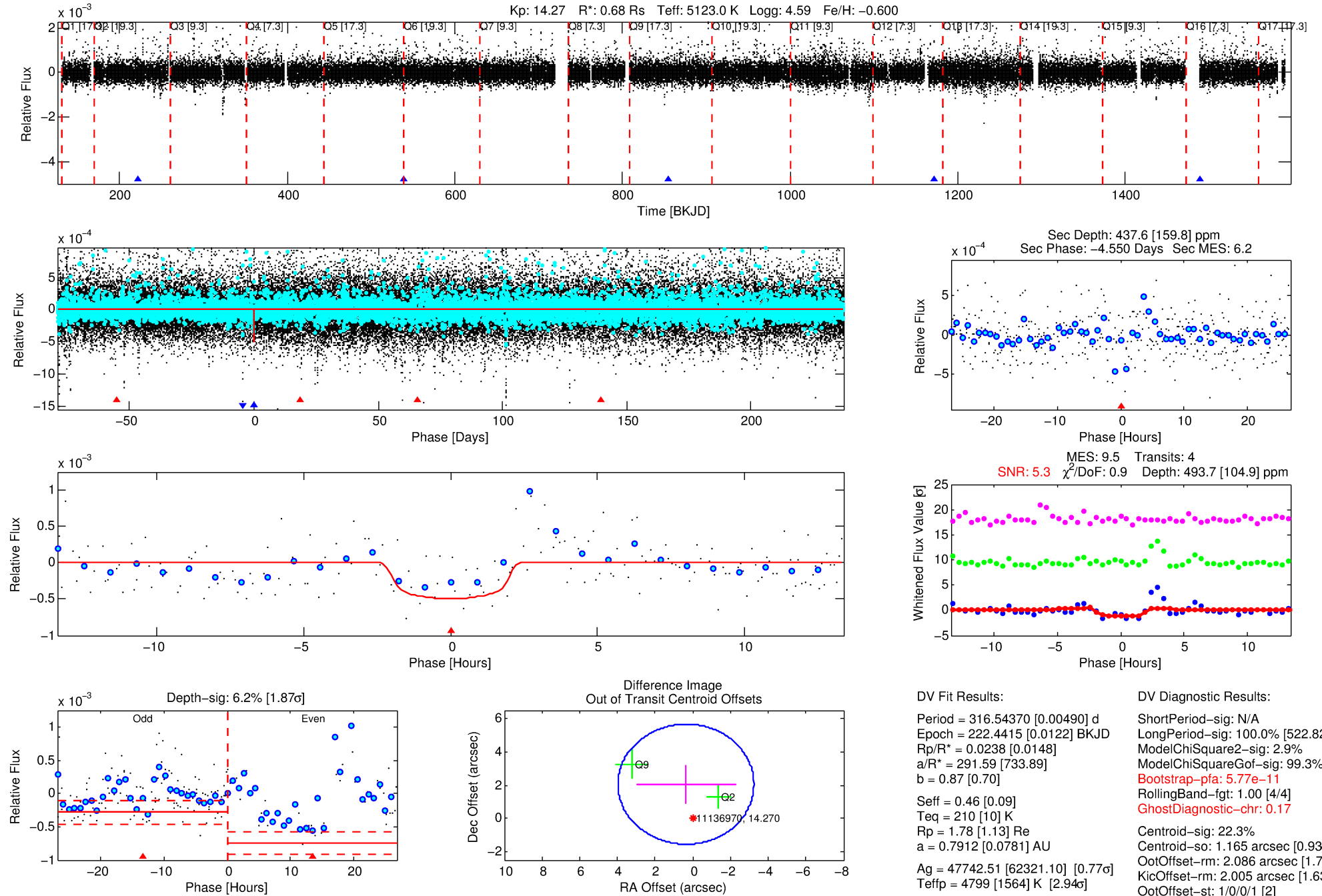
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 011136970-02

No Significant Match Found

# DV One-Page Summary

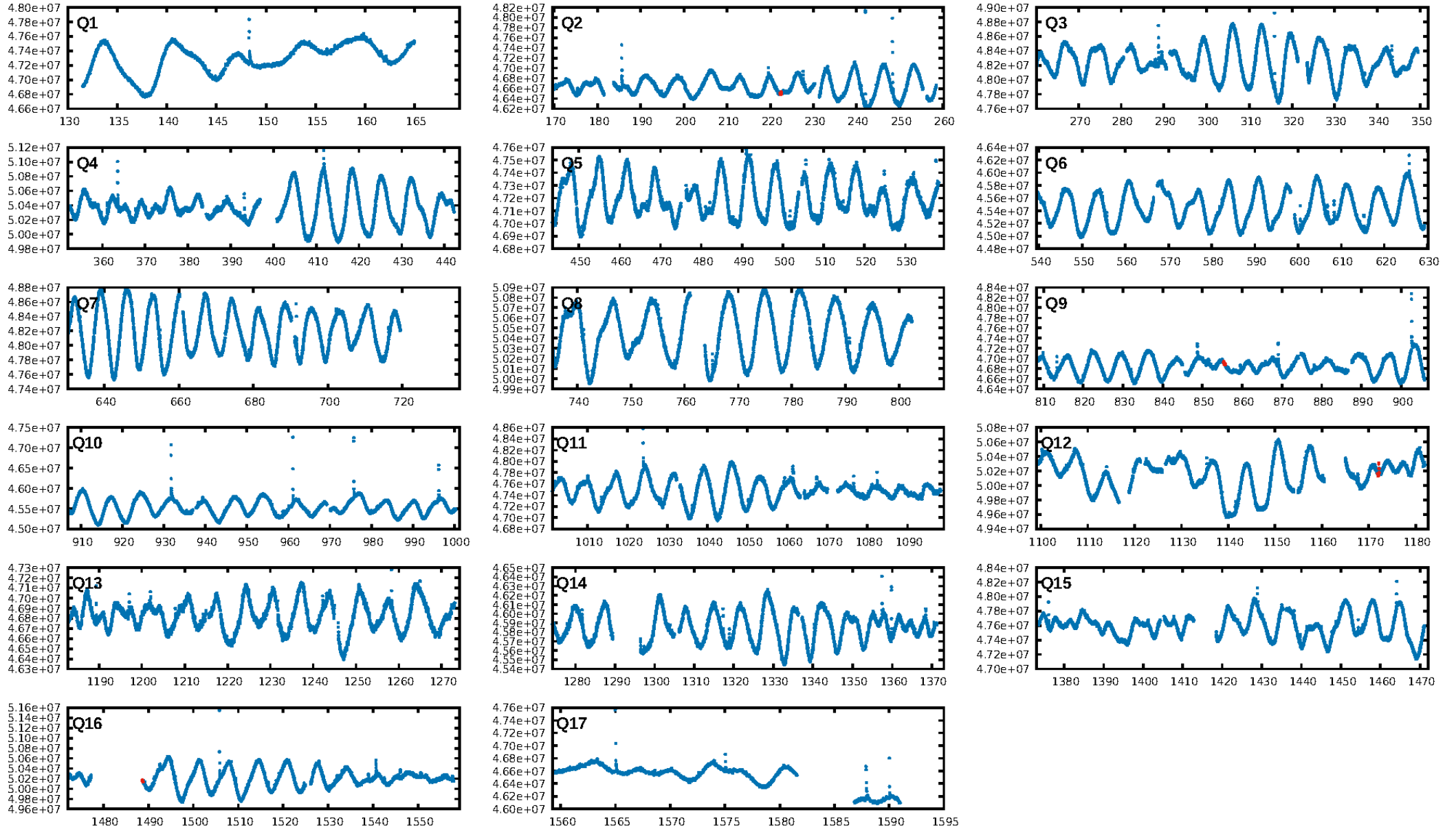
KIC: 11136970 Candidate: 2 of 2 Period: 316.544 d



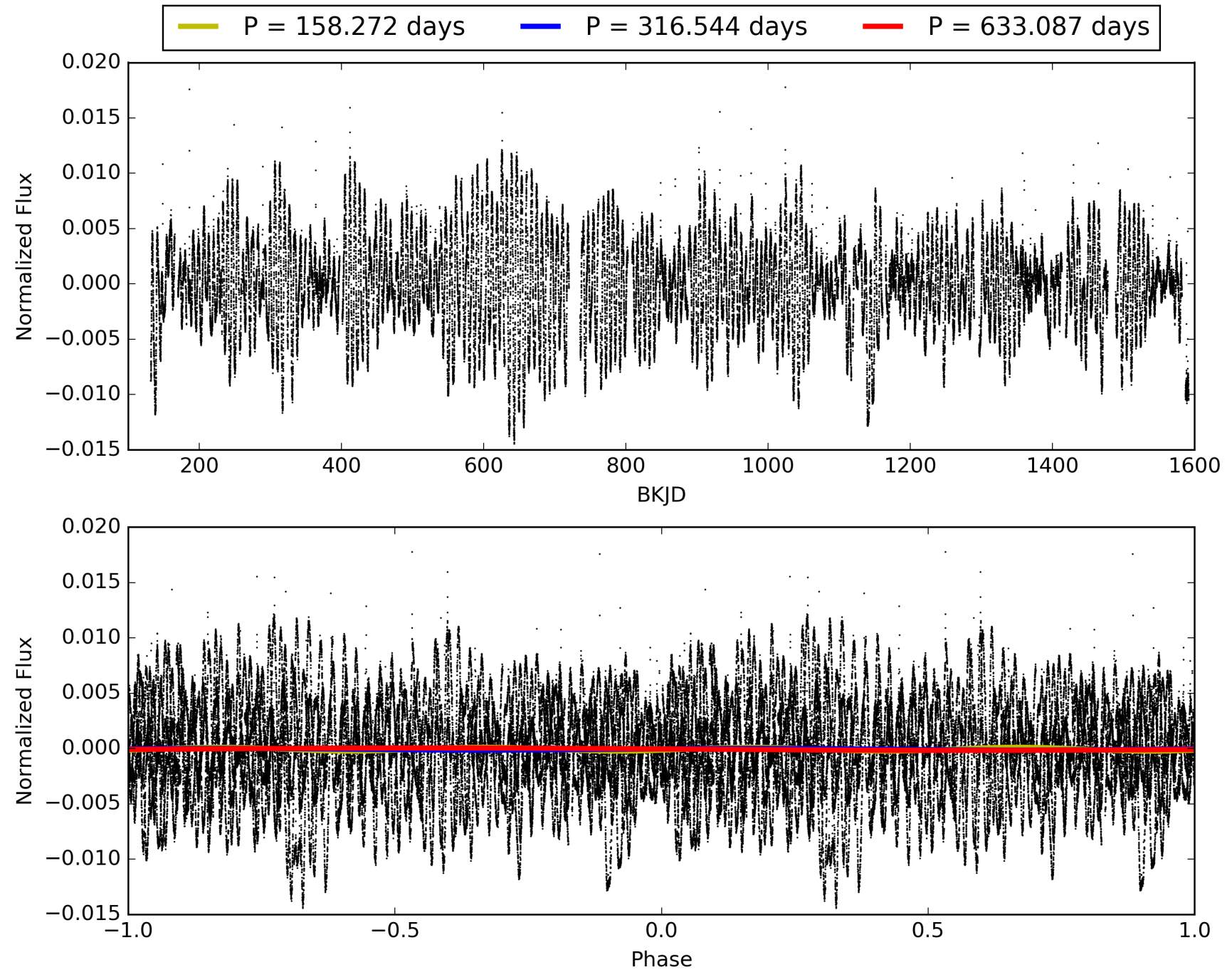
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 10:22:51 Z

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

# TCE 011136970-02, PDC Light Curves



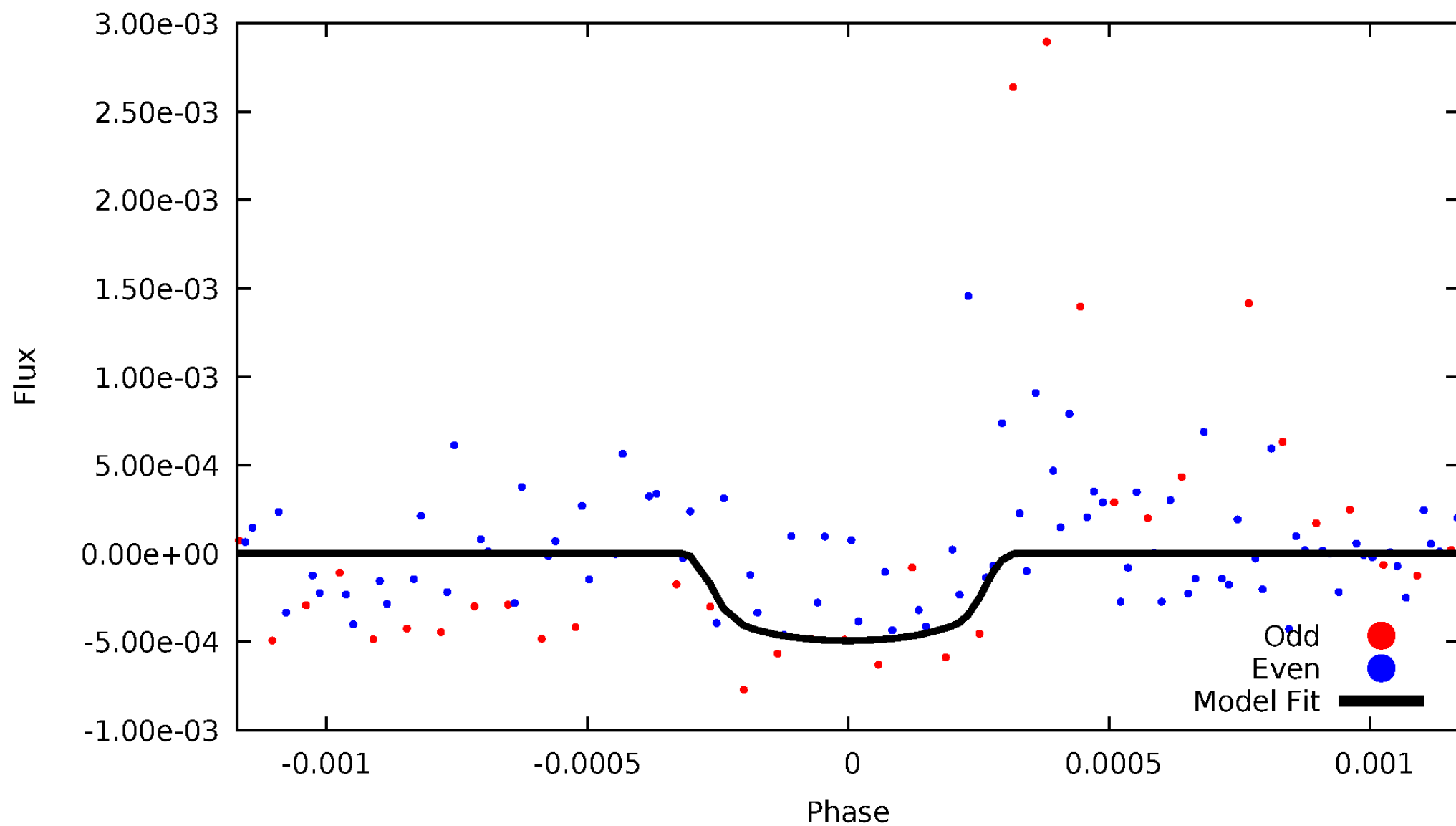
# TCE 011136970-02





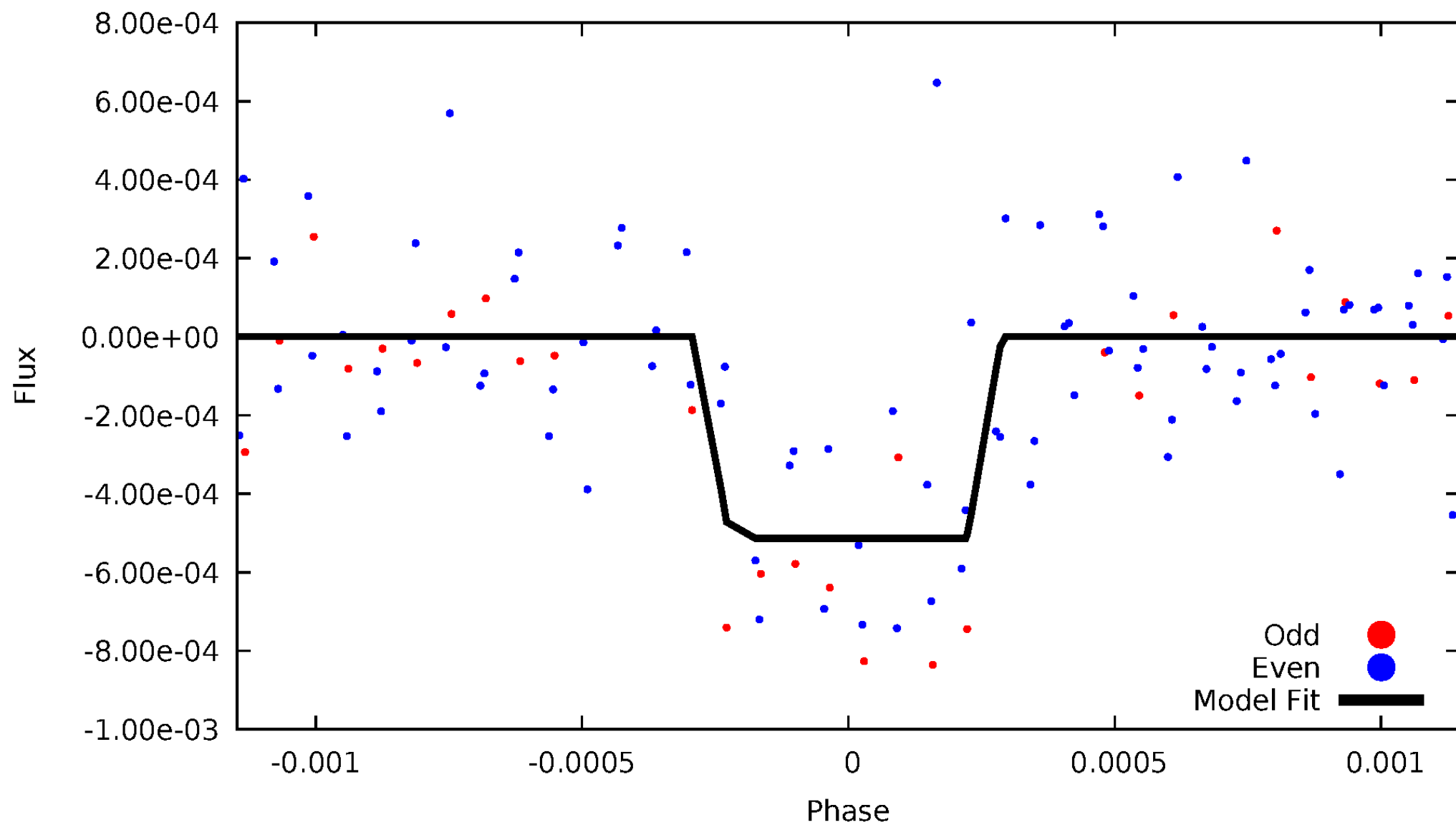
# DV Odd/Even

TCE 011136970-02



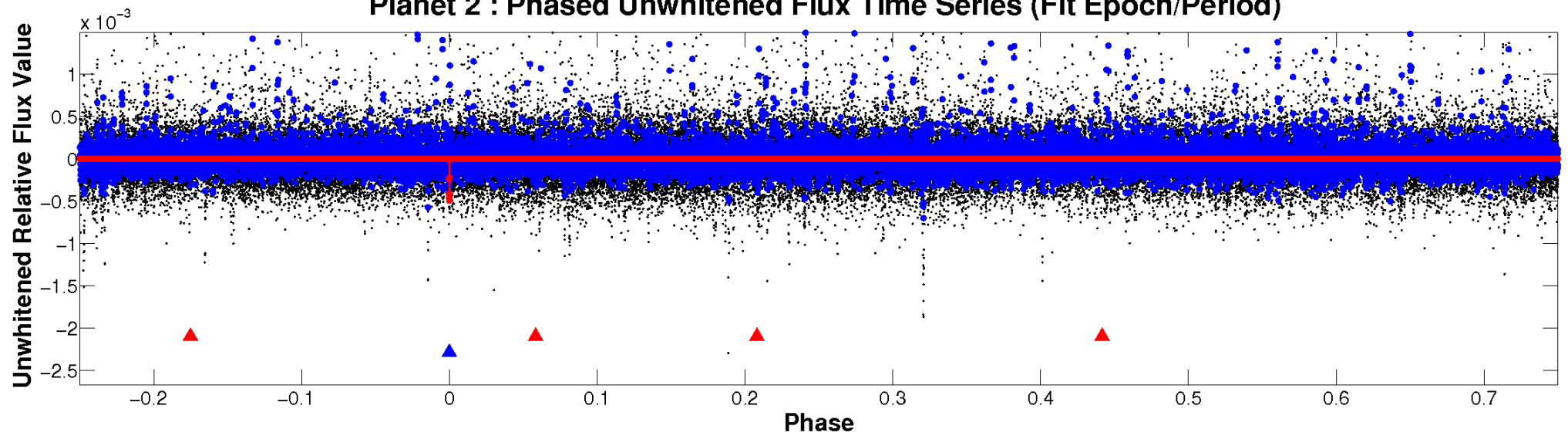
# ALT Odd/Even

TCE 011136970-02

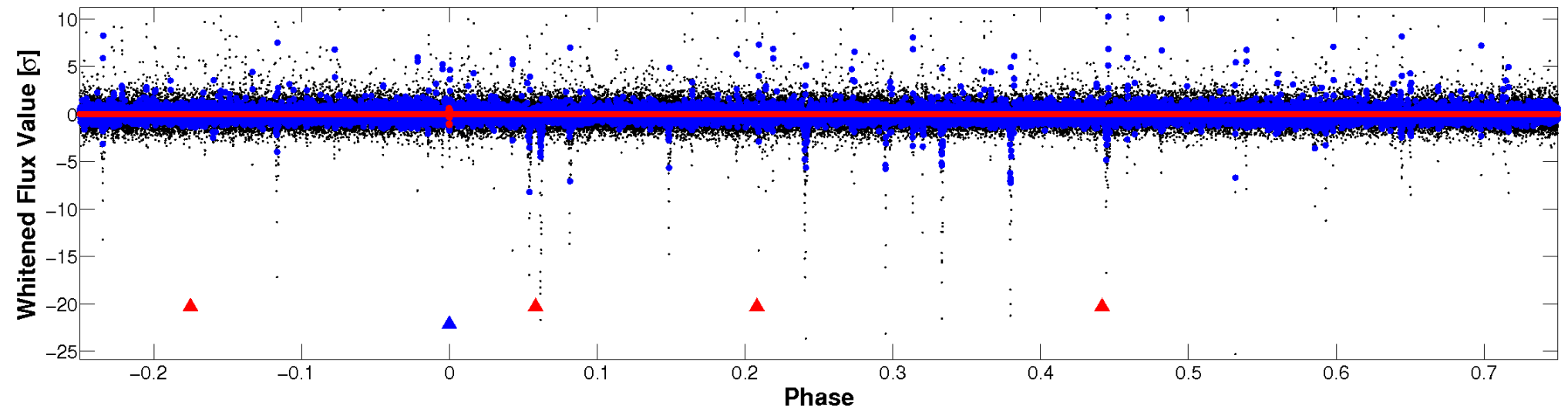


# Non-Whitened Vs. Whitened Light Curve

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

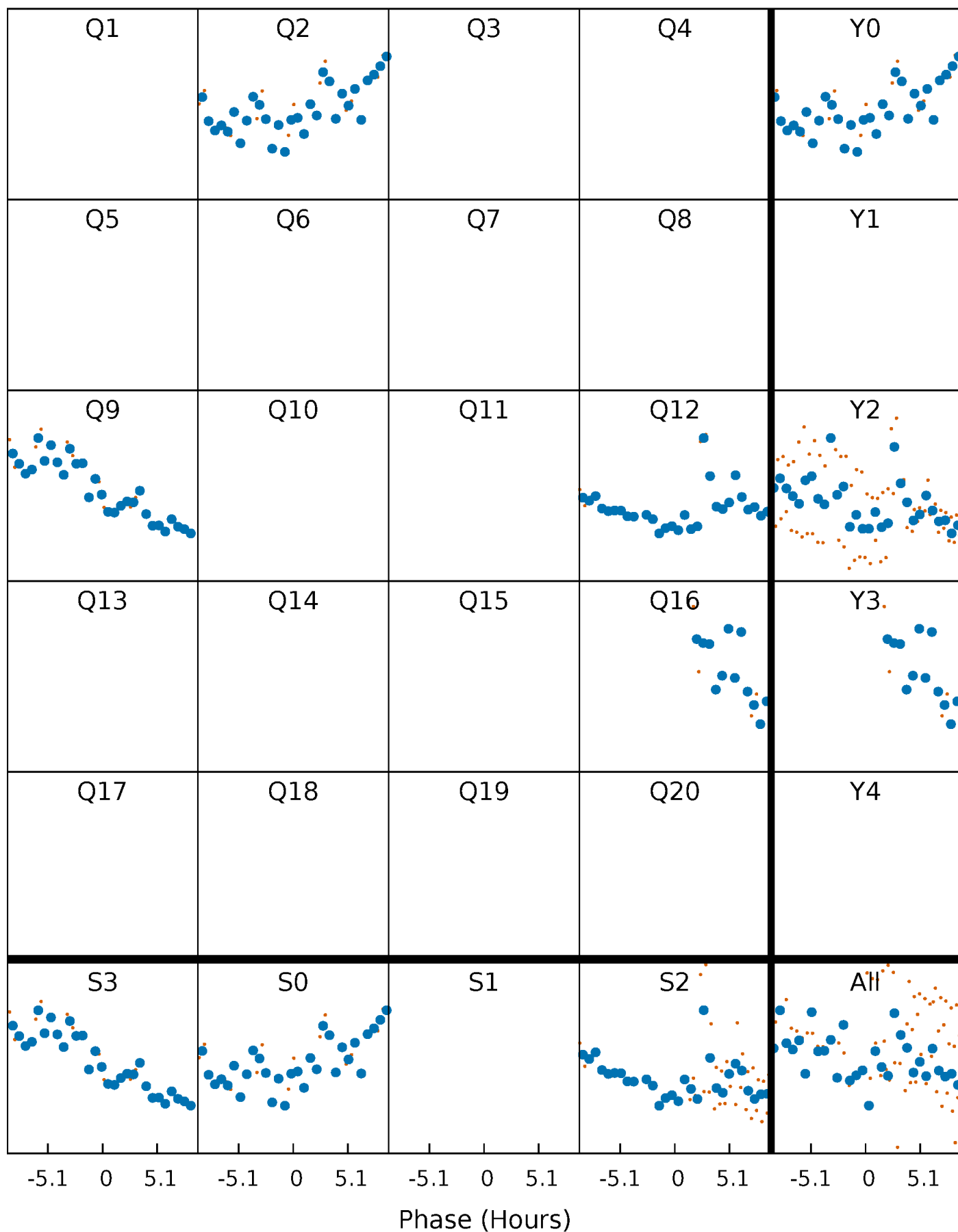


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



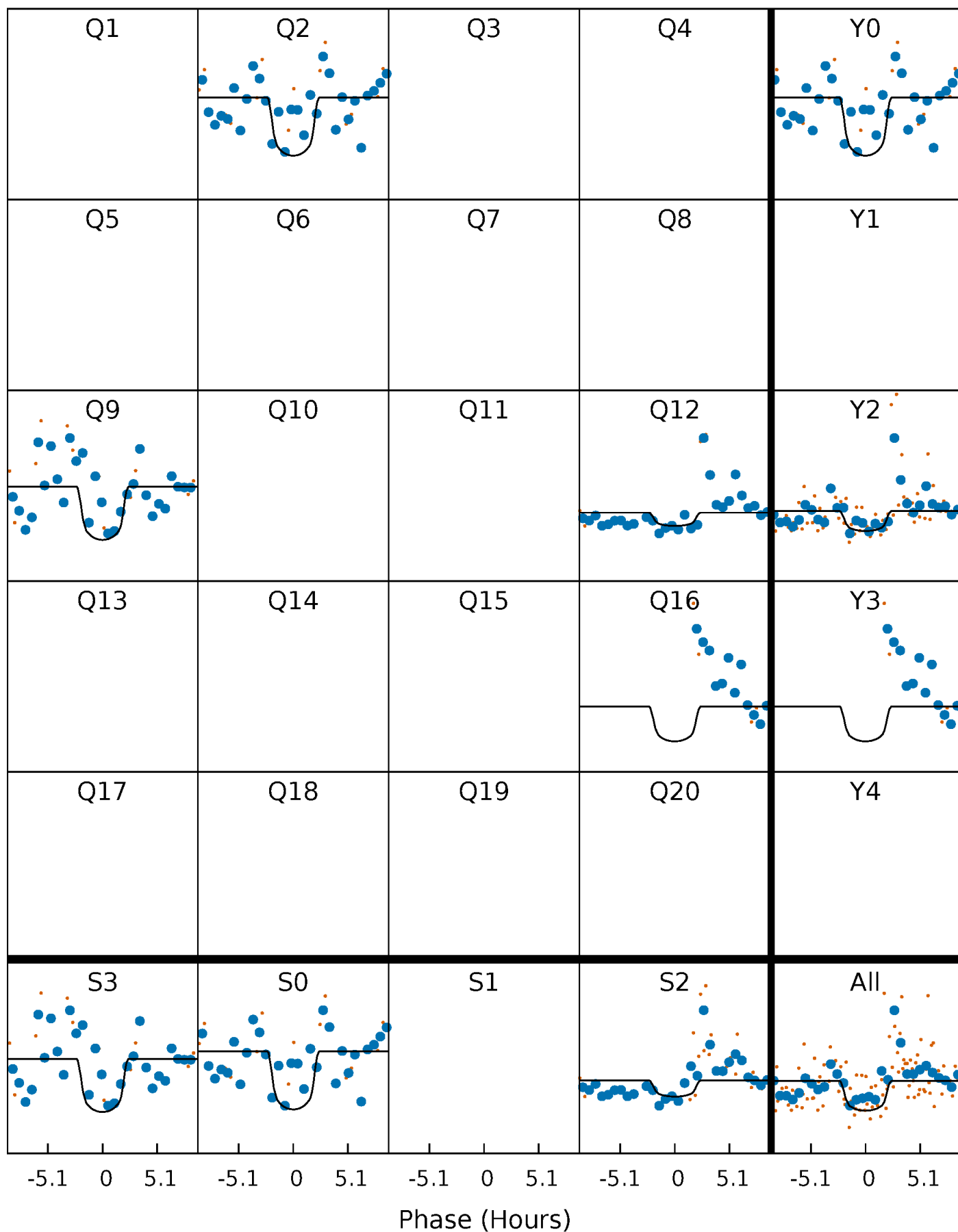
# PDC Quarter-Phased Transit Curves

TCE 011136970-02     $P=316.543698$  Days     $T_0=222.441546$  (BKJD)



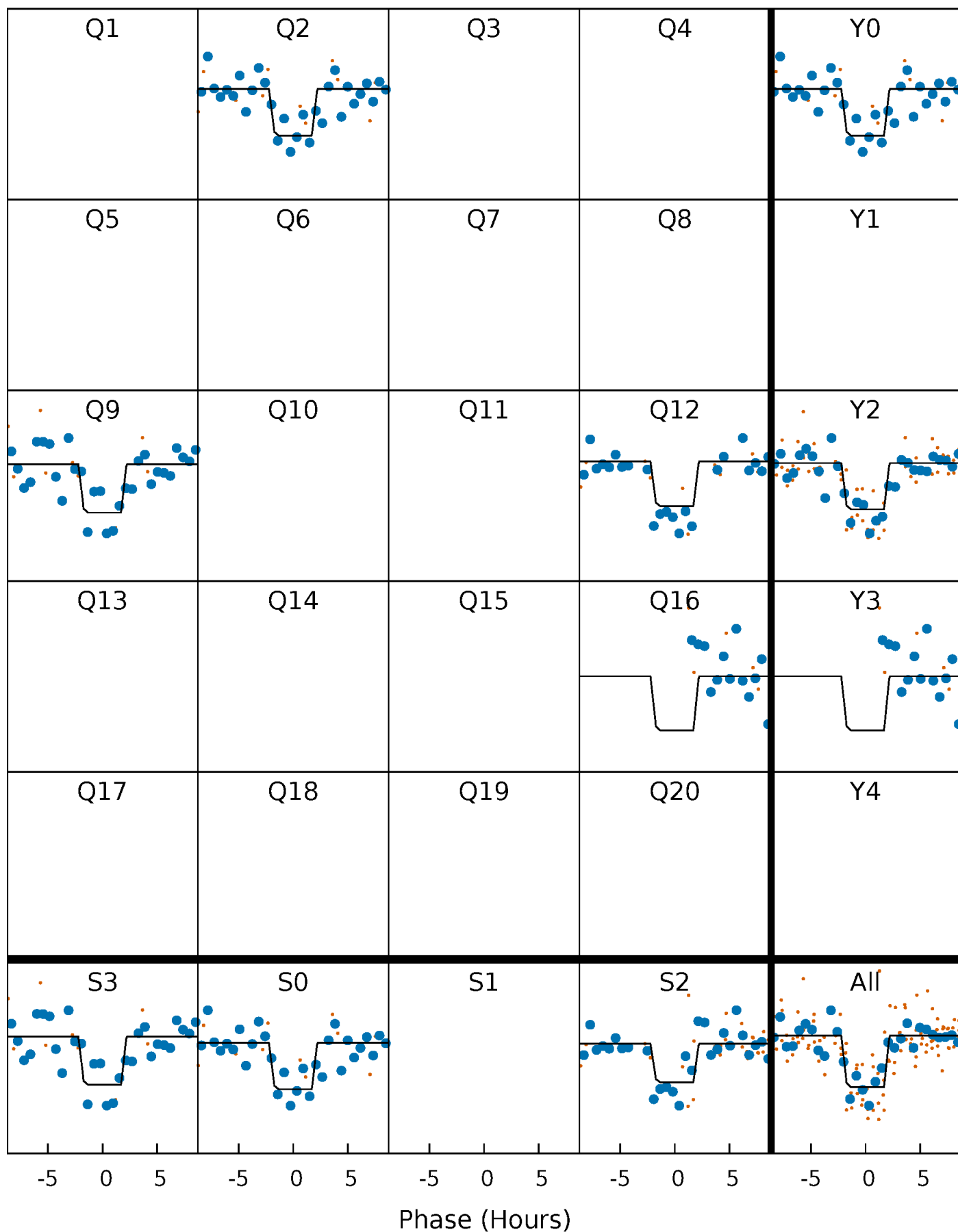
# DV Quarter-Phased Transit Curves

TCE 011136970-02     $P=316.543698$  Days     $T_0=222.441546$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

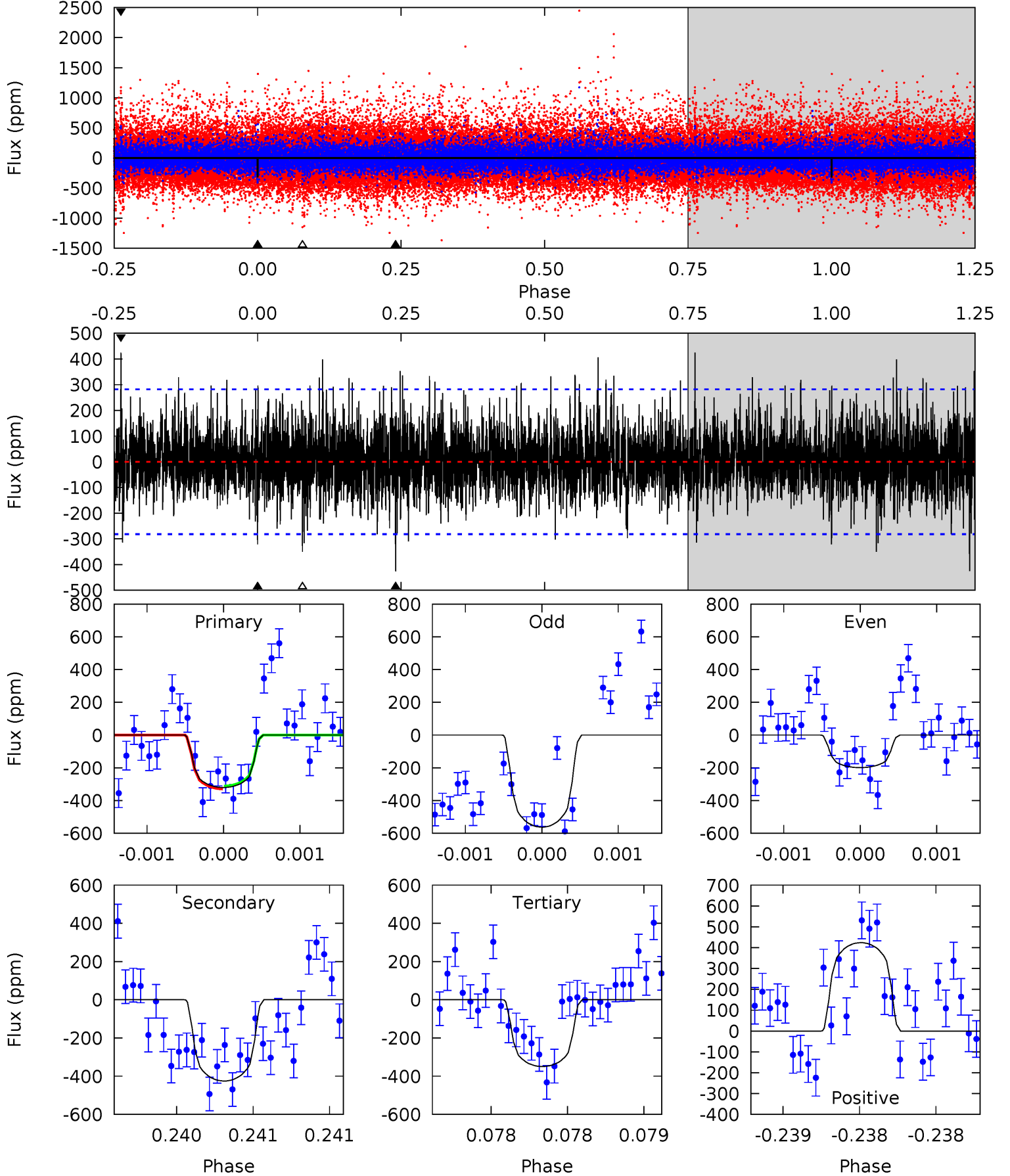
TCE 011136970-02 P=316.554902 Days  $T_0=222.416888$  (BKJD)



# DV Model-Shift Uniqueness Test

011136970-02, P = 316.543698 Days, E = 222.441546 Days

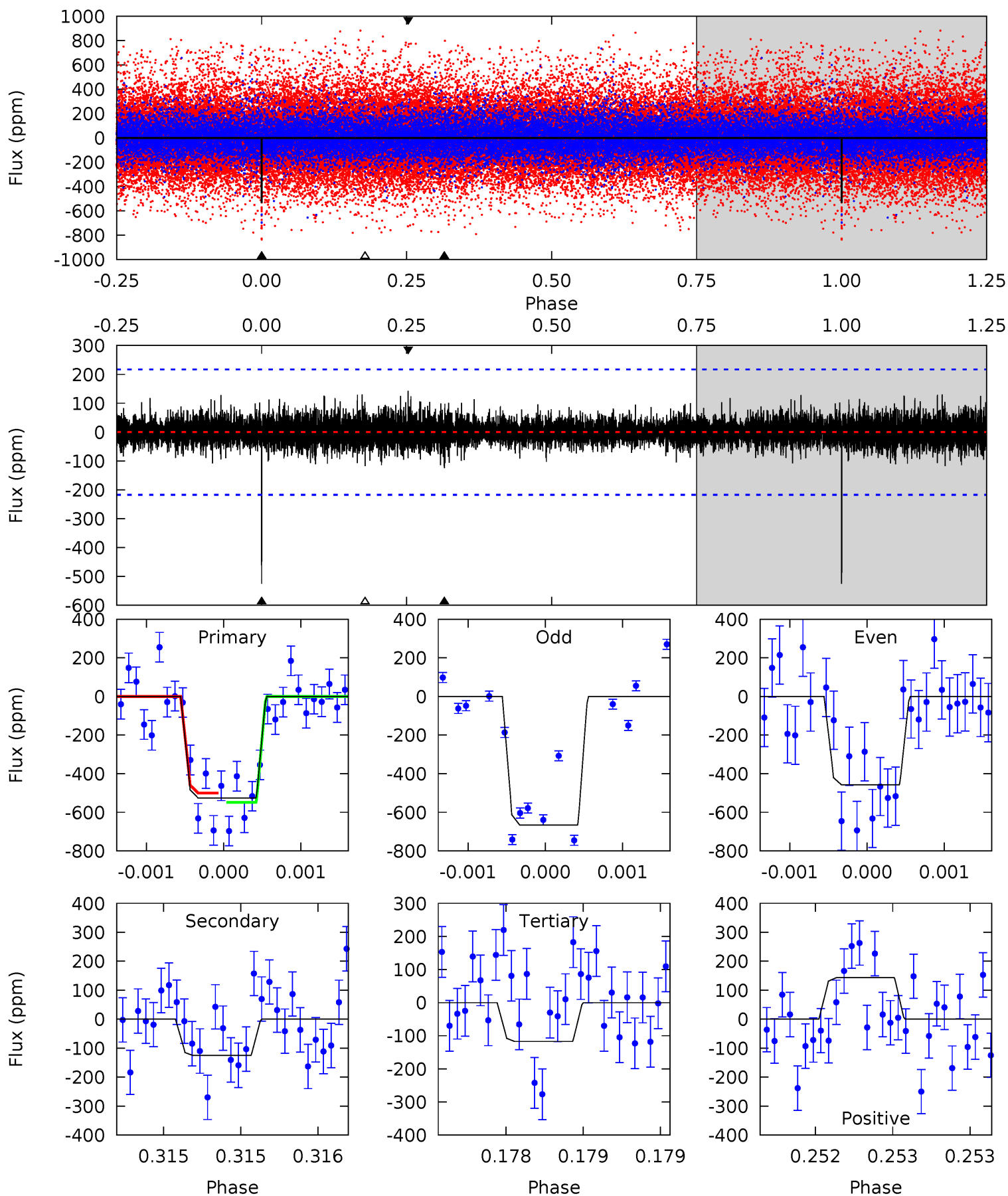
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.29	8.35	6.86	8.32	5.53	3.42	1.75	-0.57	-2.04	1.49	0.02	3.19	-1.46	0.50	0.17



# Alt Model-Shift Uniqueness Test

011136970-02, P = 316.554902 Days, E = 222.416888 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
13.5	3.21	3.01	3.67	5.56	3.47	0.75	10.5	9.81	0.20	-0.46	2.49	0.65	0.21	0.61





### Stellar Parameters For KIC 011136970

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5123^{+154}_{-138}$	$4.588^{+0.077}_{-0.070}$	$-0.600^{+0.300}_{-0.300}$	$0.683^{+0.081}_{-0.066}$	$0.658^{+0.089}_{-0.033}$	$2.910^{+0.880}_{-0.675}$
	+3%/-3%	+2%/-2%	+50%/-50%	+12%/-10%	+14%/-5%	+30%/-23%
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 011136970-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-425 \pm 51$	$1.85^{+1.09}_{-1.00}$	$293^{+12}_{-11}$	$4739^{+2121}_{-798}$	$43371^{+162752}_{-27186}$
Alt.	$-125 \pm 39$	$1.78^{+1.11}_{-1.02}$	$293^{+11}_{-11}$	$3824^{+1600}_{-552}$	$13540^{+60375}_{-8634}$

$T_{max}$  = 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

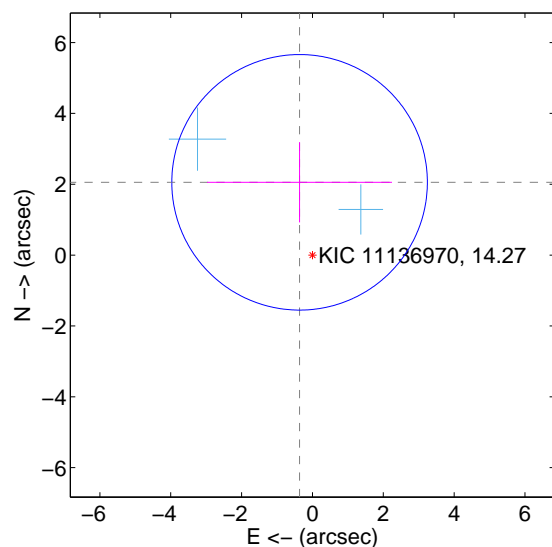
Supplemental centroid analysis for 011136970-02. Kepler magnitude: 14.27. Transit SNR 5.32

There are 2 quarters with good PRF difference image offsets

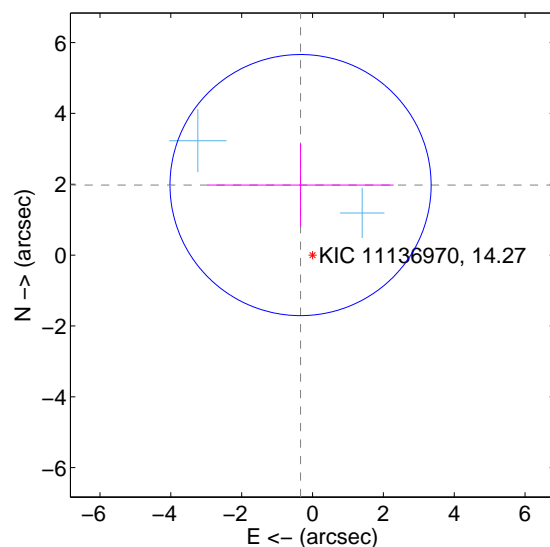
The direct PRF centroid is offset from the target star catalog position by about 0.04 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.086 \pm 1.202$	1.74	$0.363 \pm 2.609$	$2.054 \pm 1.130$
PRF-fit source offset from KIC position	$2.005 \pm 1.228$	1.63	$0.337 \pm 2.626$	$1.976 \pm 1.163$
photometric centroid source offset	$1.16 \pm 1.25$	0.93	$0.24 \pm 1.35$	$-1.14 \pm 1.24$

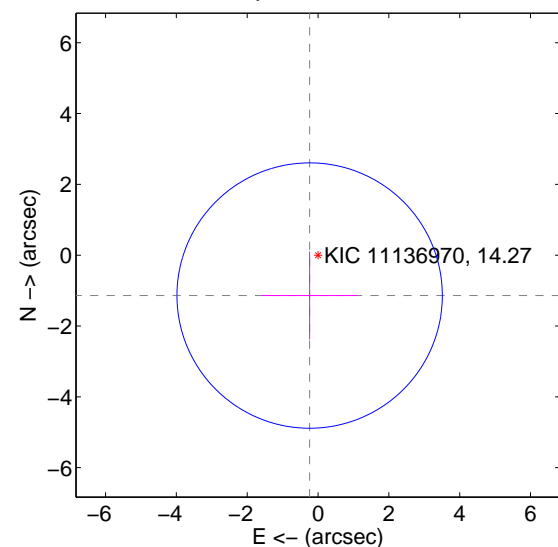
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

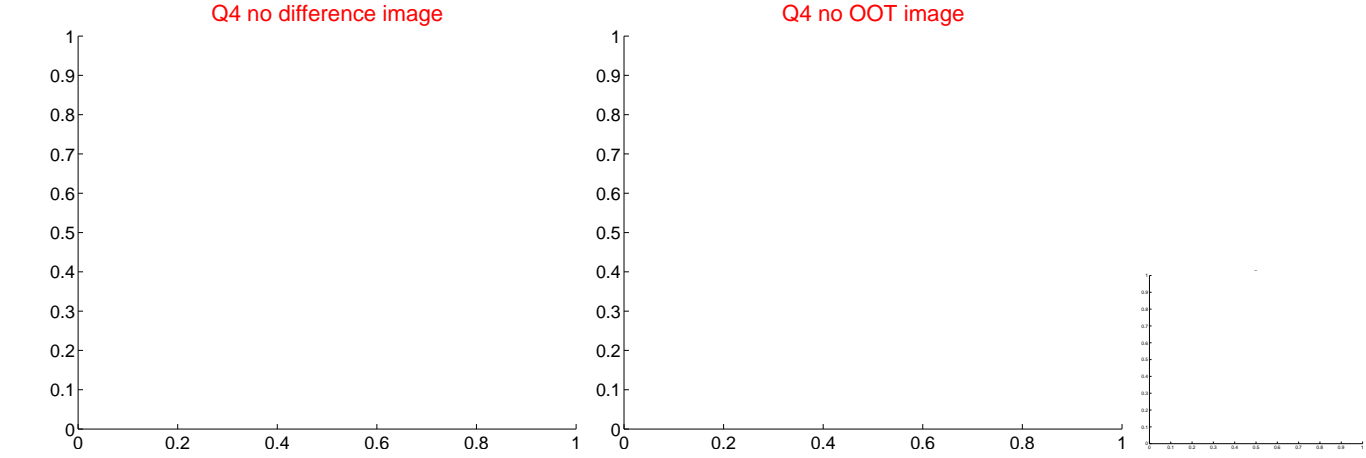
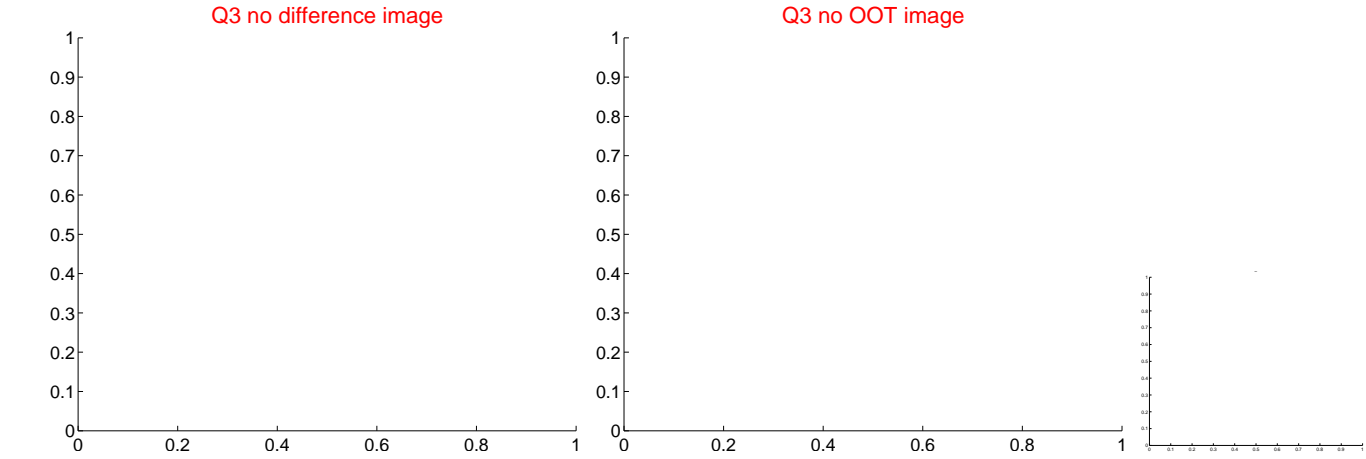
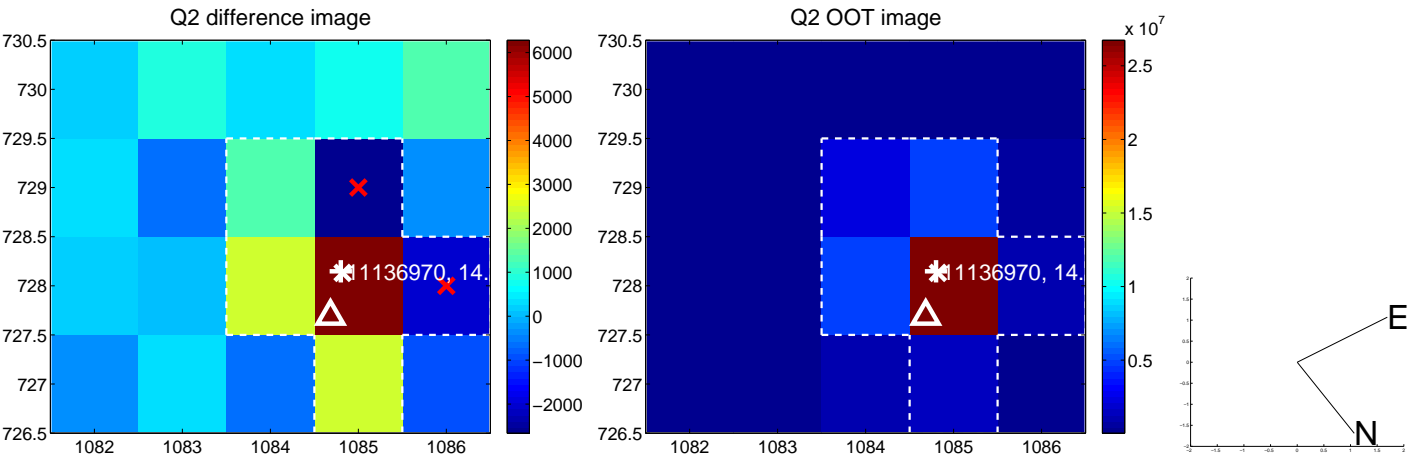
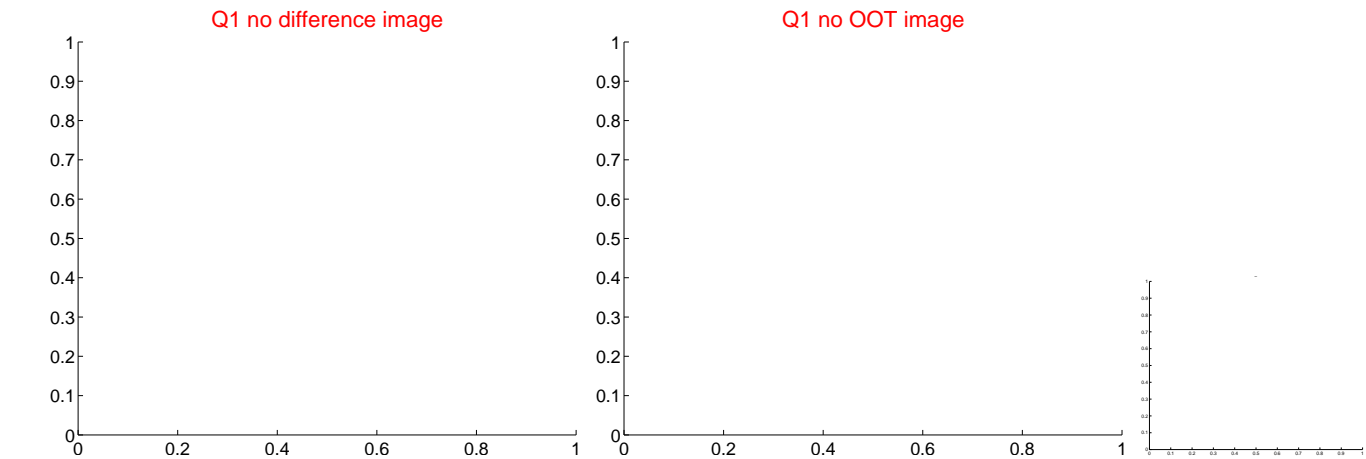


offset from photometric centroids



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.

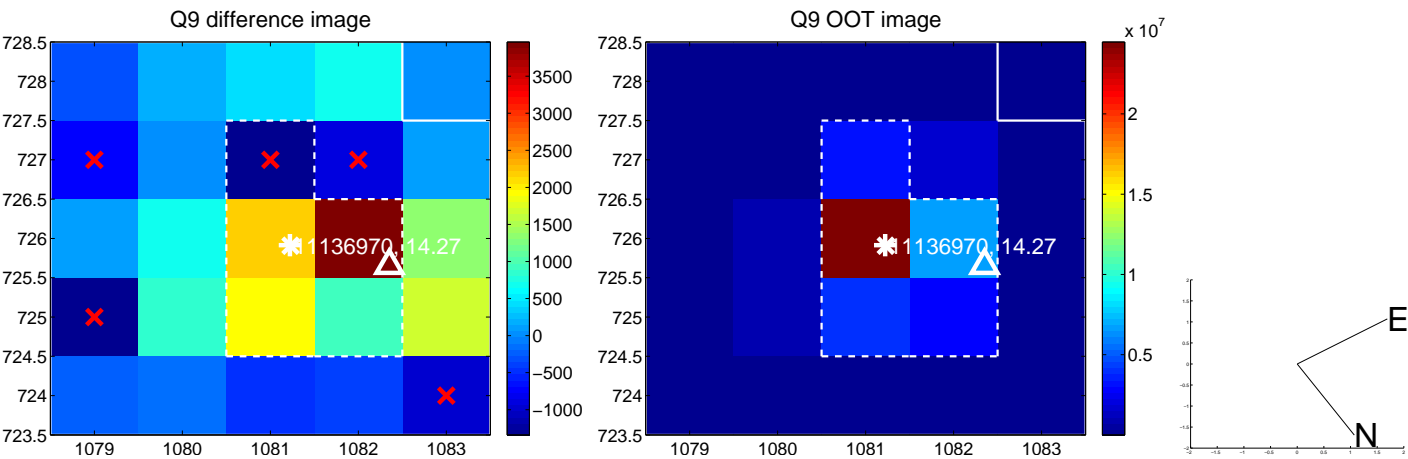
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



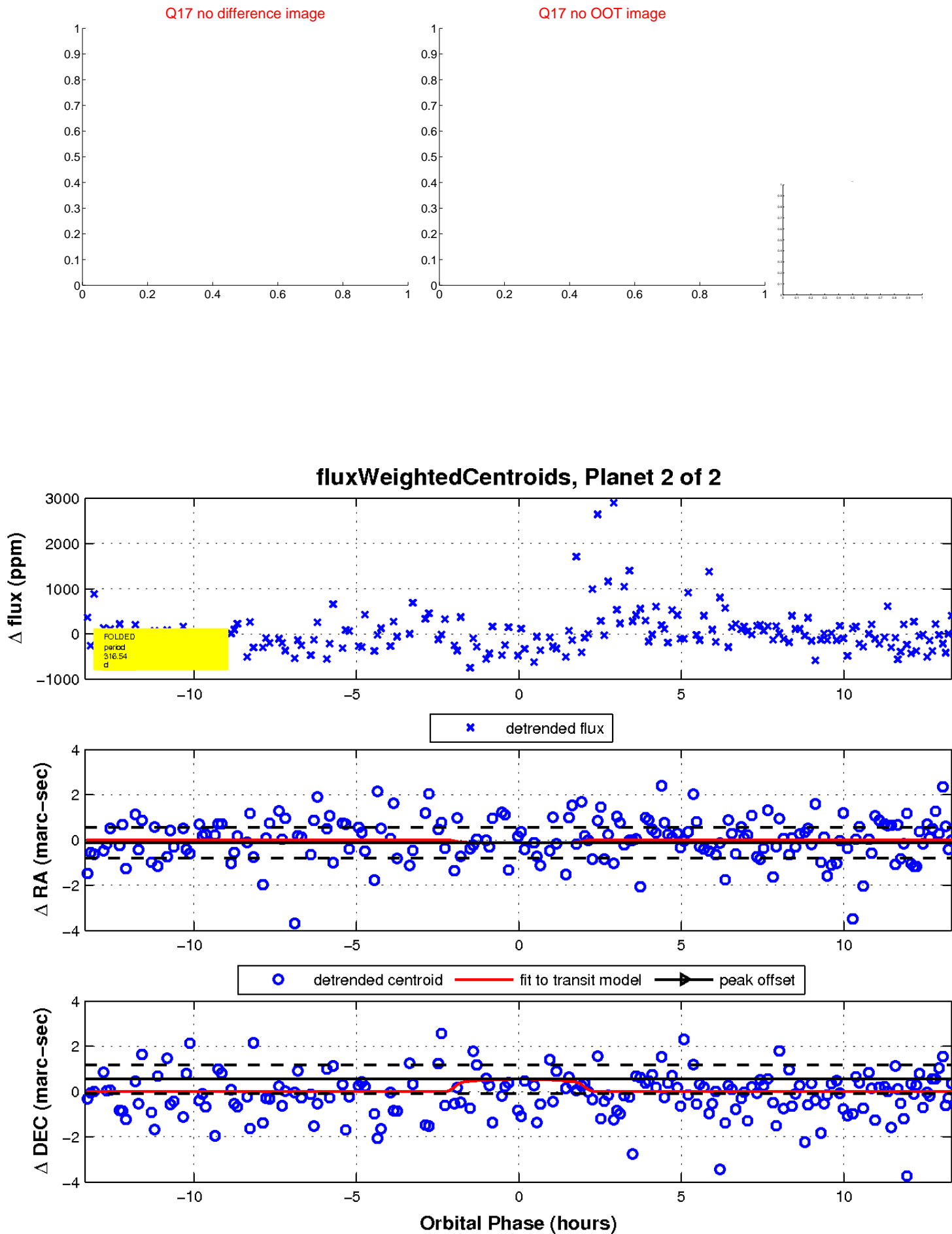
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white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination

