

# KIC 011033205

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
011033205-01	OBS	No	472.742341	377.854877	1522.2	2.337	14.9	6.7	0.68	4233	2.83	0.12
011033205-02	OBS	No	312.450613	410.688397	1697.1	2.812	15.3	5.7	0.68	4233	2.75	0.21
011033205-03	OBS	No	602.506054	197.071489	1487.4	4.870	15.9	4.9	0.68	4233	2.88	0.09
011033205-04	OBS	No	551.897453	458.995759	1404.1	5.015	15.3	4.8	0.68	4233	2.72	0.10

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
011033205-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
011033205-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES
011033205-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
011033205-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS

**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.

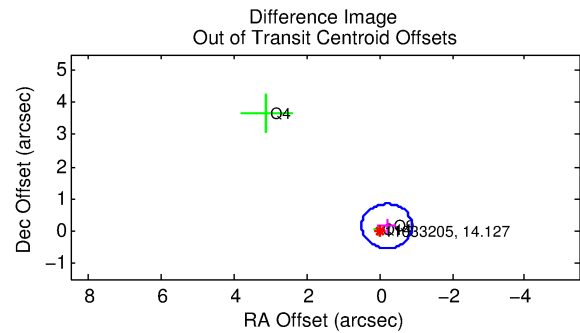
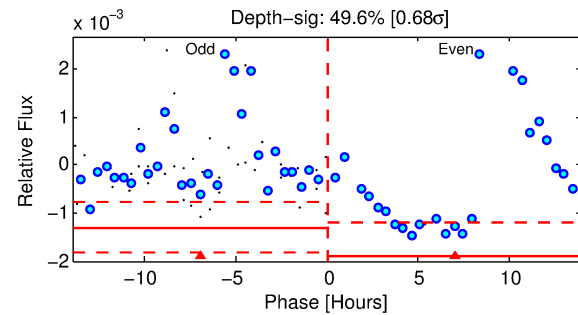
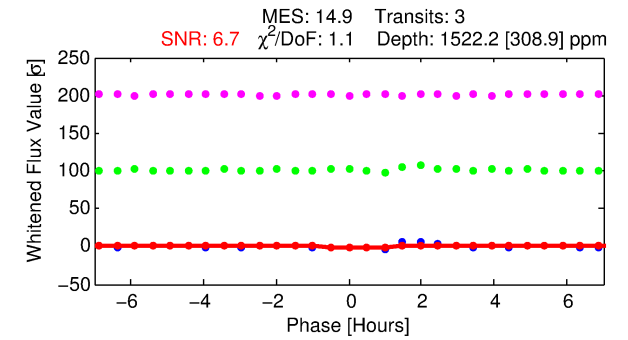
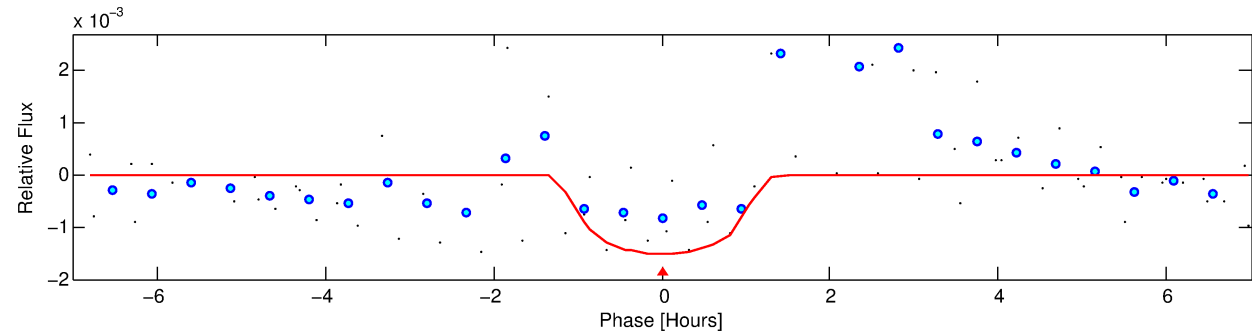
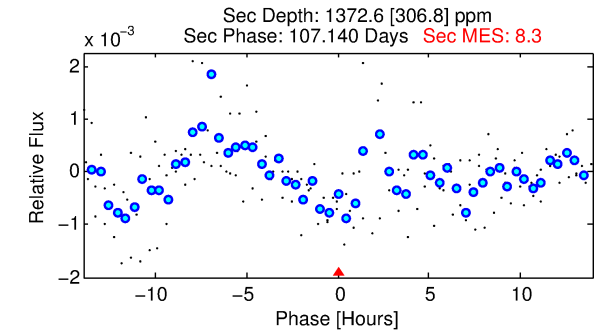
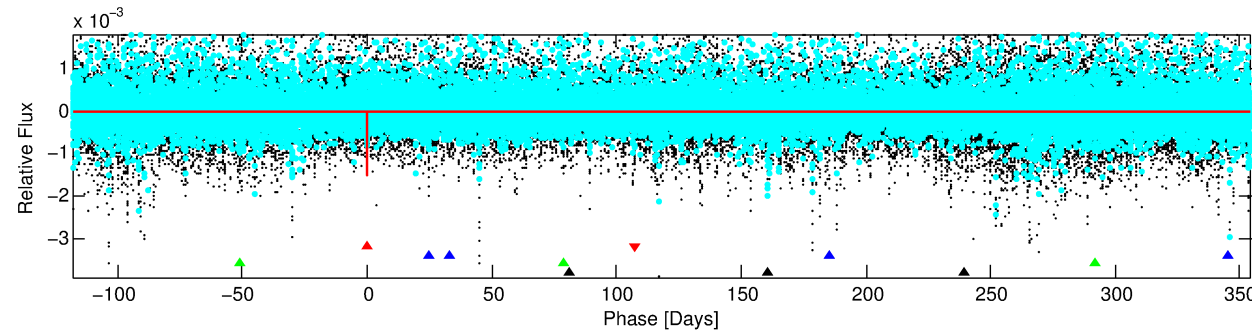
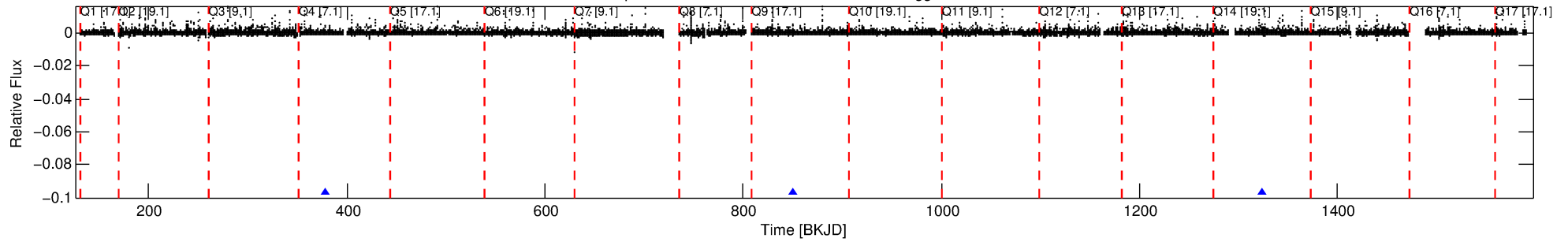
## Ephemeris Match Information For 011033205-01

No Significant Match Found

# DV One-Page Summary

KIC: 11033205 Candidate: 1 of 4 Period: 472.742 d

Kp: 14.13 R\*: 0.68 Rs Teff: 4233.0 K Logg: 4.61 Fe/H: 0.220



## DV Fit Results:

Period = 472.74234 [0.00519] d  
Epoch = 377.8549 [0.0043] BKJD  
Rp/R\* = 0.0384 [0.0818]  
a/R\* = 1176.37 [7481.06]  
b = 0.71 [4.69]  
Seff = 0.12 [0.02]  
Teq = 150 [6] K  
Rp = 2.83 [6.03] Re  
a = 1.0399 [0.0722] AU  
Ag = 102170.02 [435979.67] [0.23σ]  
Teffp = 4159 [4438] K [0.90σ]

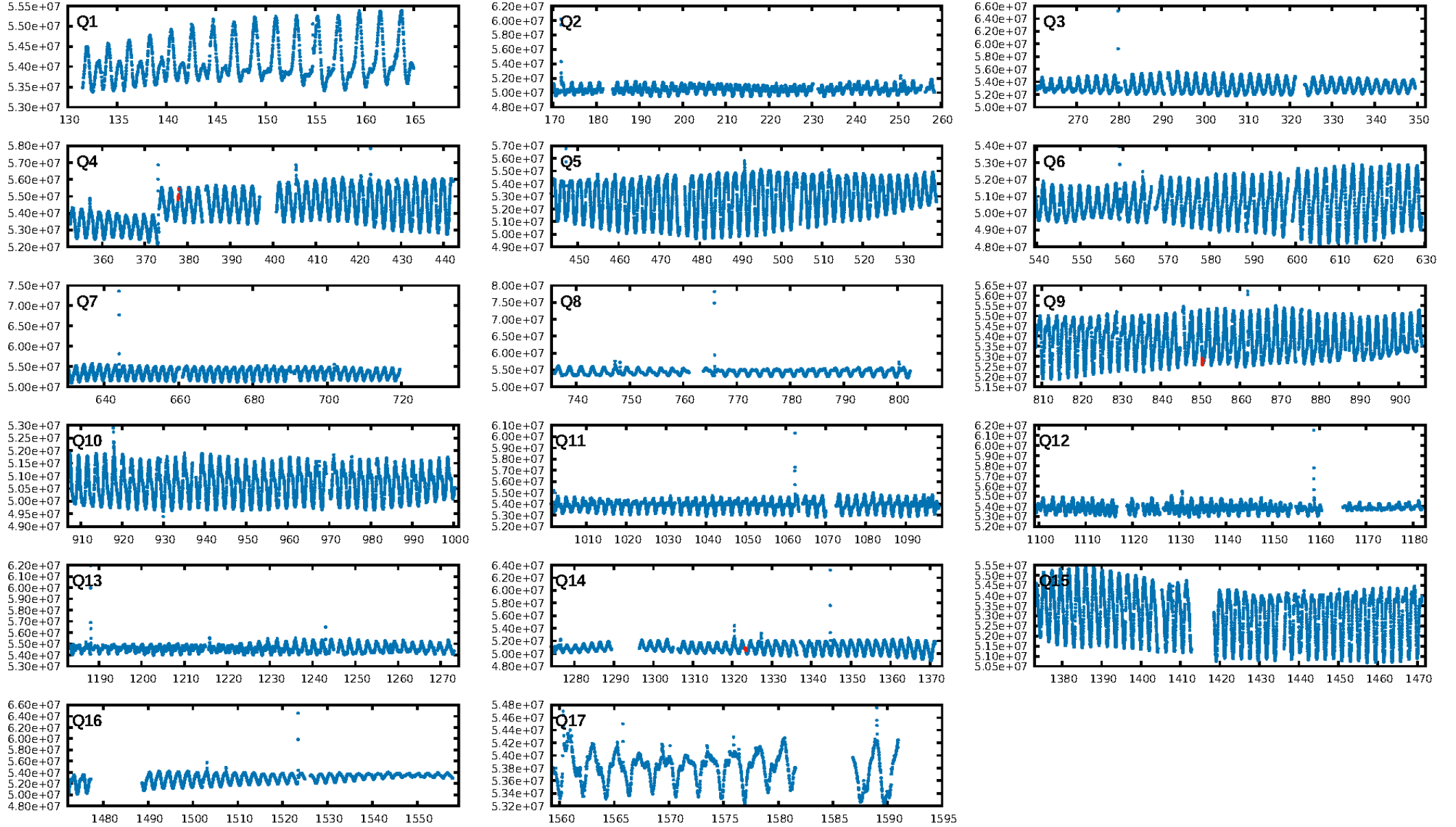
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [1052.17σ]  
LongPeriod-sig: 100.0% [343.38σ]  
ModelChiSquare2-sig: 4.0%  
ModelChiSquareGof-sig: 41.5%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 1.933  
Centroid-sig: 18.6%  
Centroid-so: 1.942 arcsec [1.53σ]  
OotOffset-rm: 0.250 arcsec [1.08σ]  
KicOffset-rm: 0.230 arcsec [0.29σ]  
OotOffset-st: 1/0/1/1 [3]  
KicOffset-st: 1/0/1/1 [3]  
DiffImageQuality-fgm: 0.33 [1/3]  
DiffImageOverlap-fno: 1.00 [3/3]

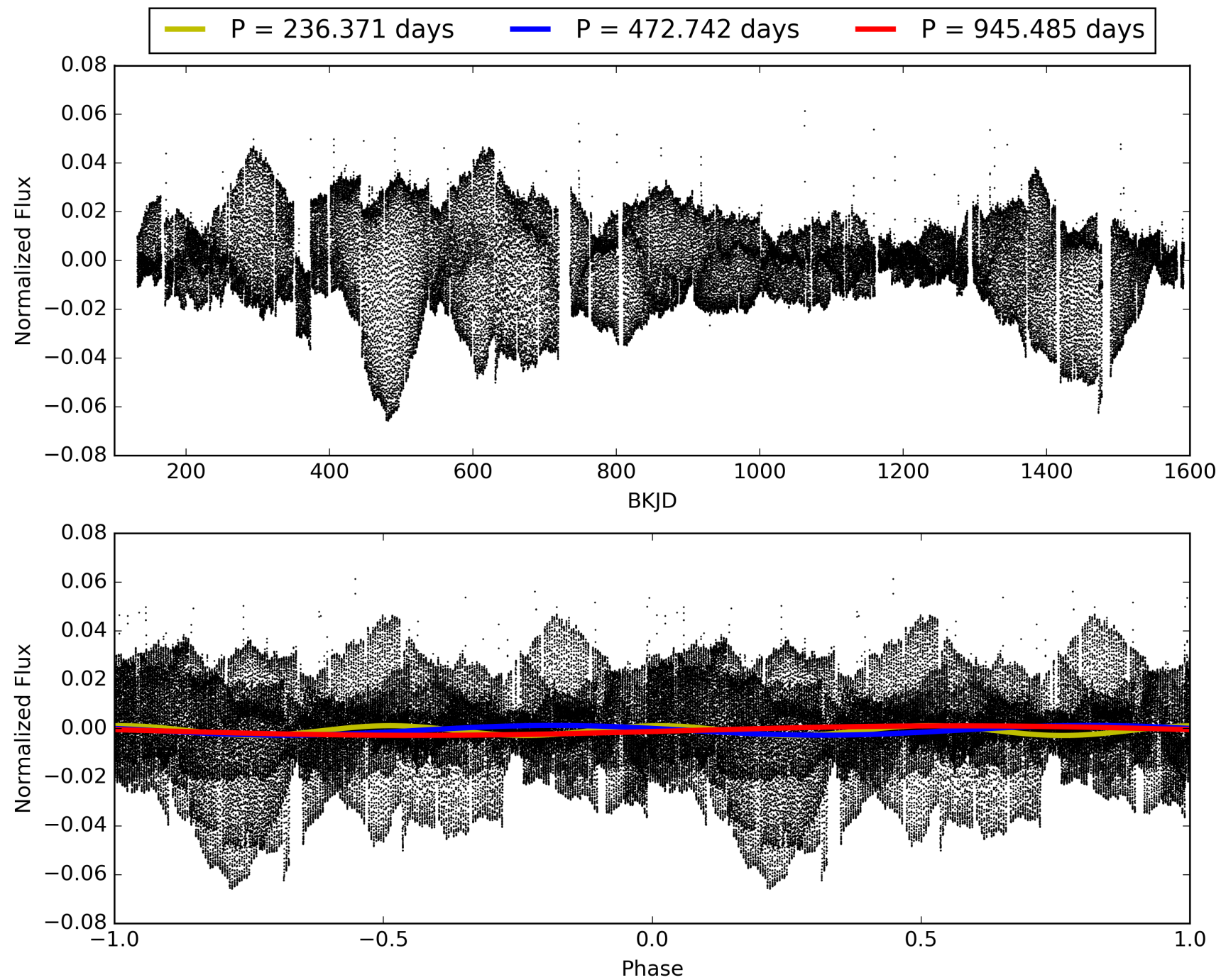
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 05:35:12 Z

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

# TCE 011033205-01, PDC Light Curves

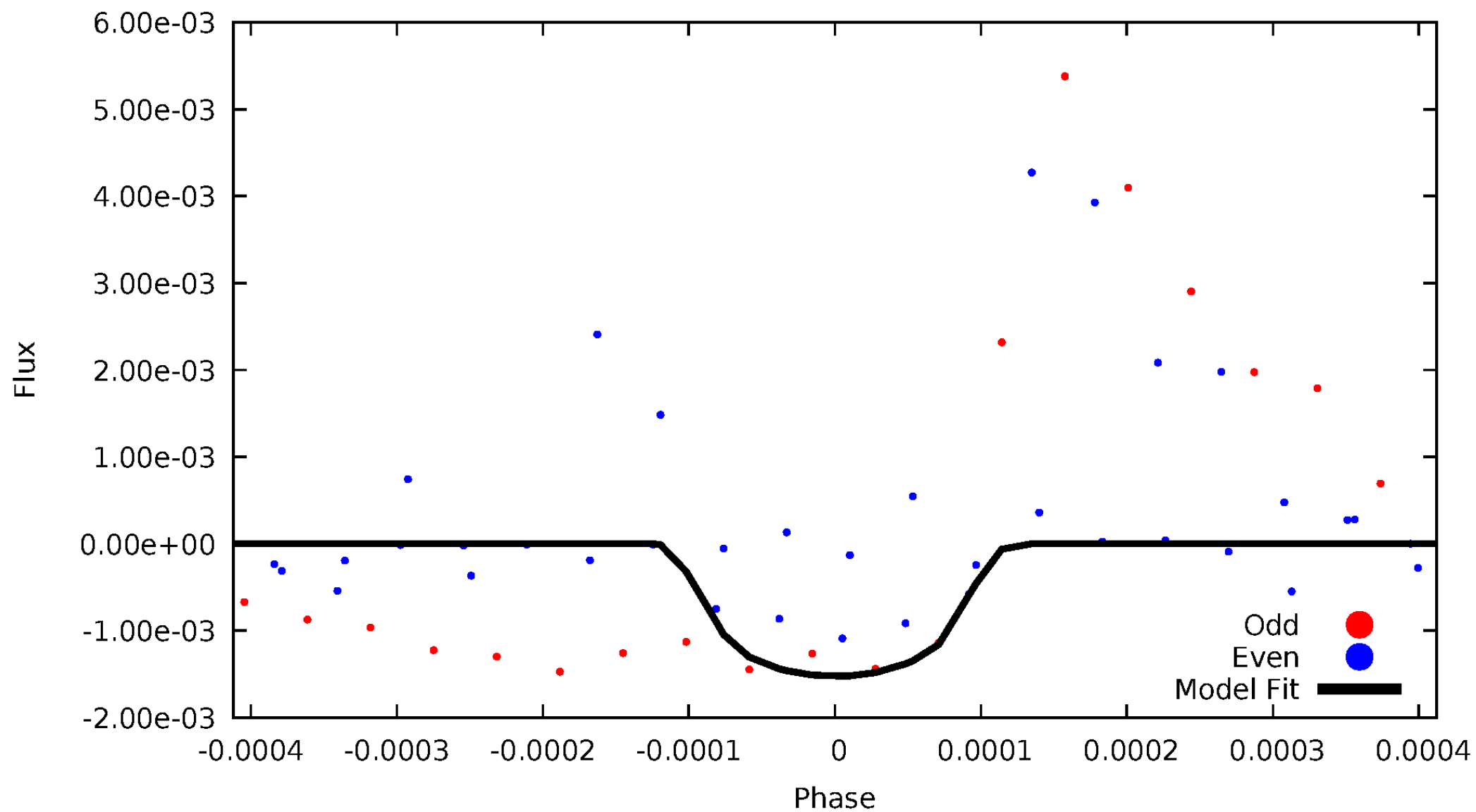


TCE 011033205-01



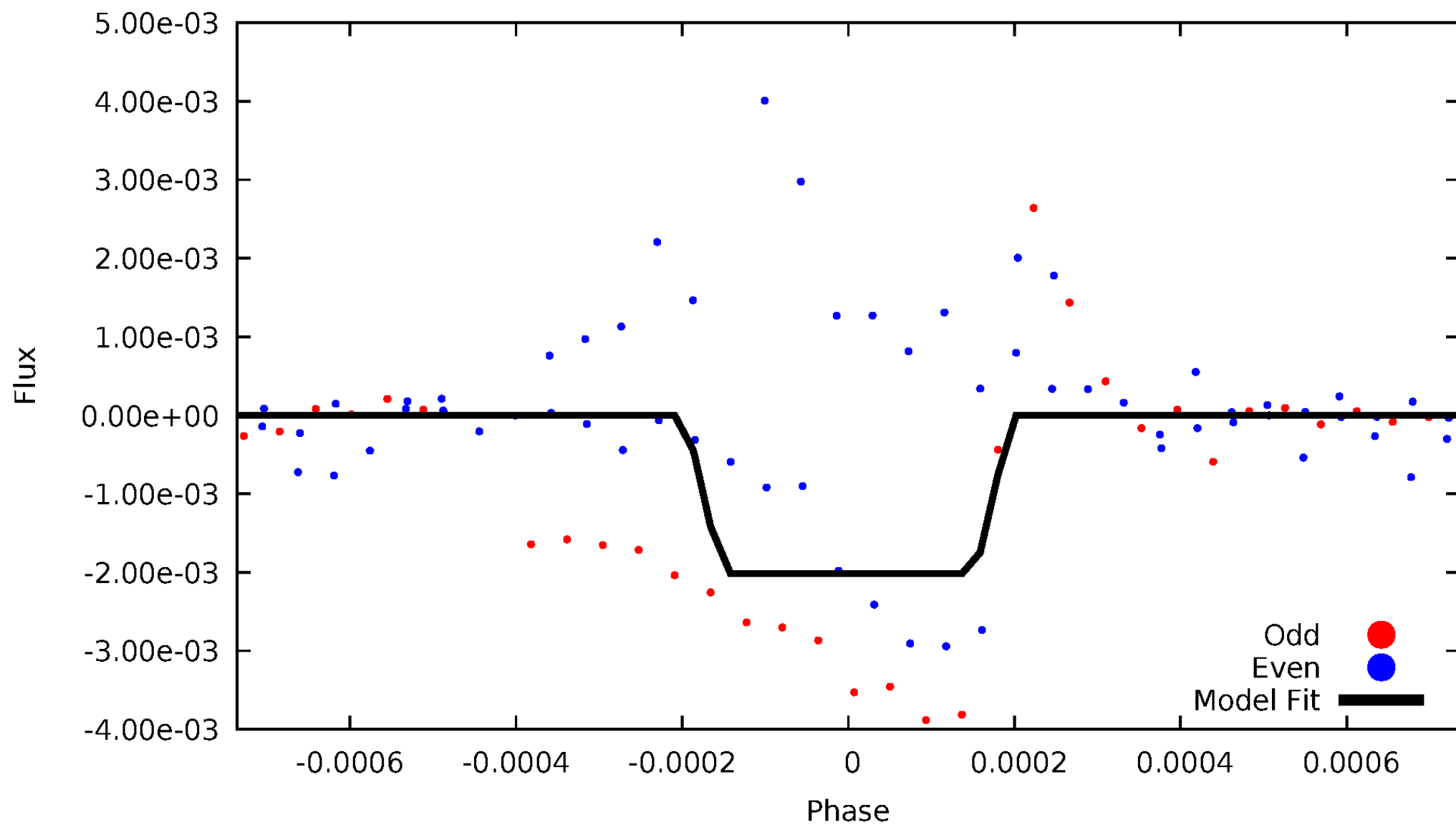
# DV Odd/Even

TCE 011033205-01

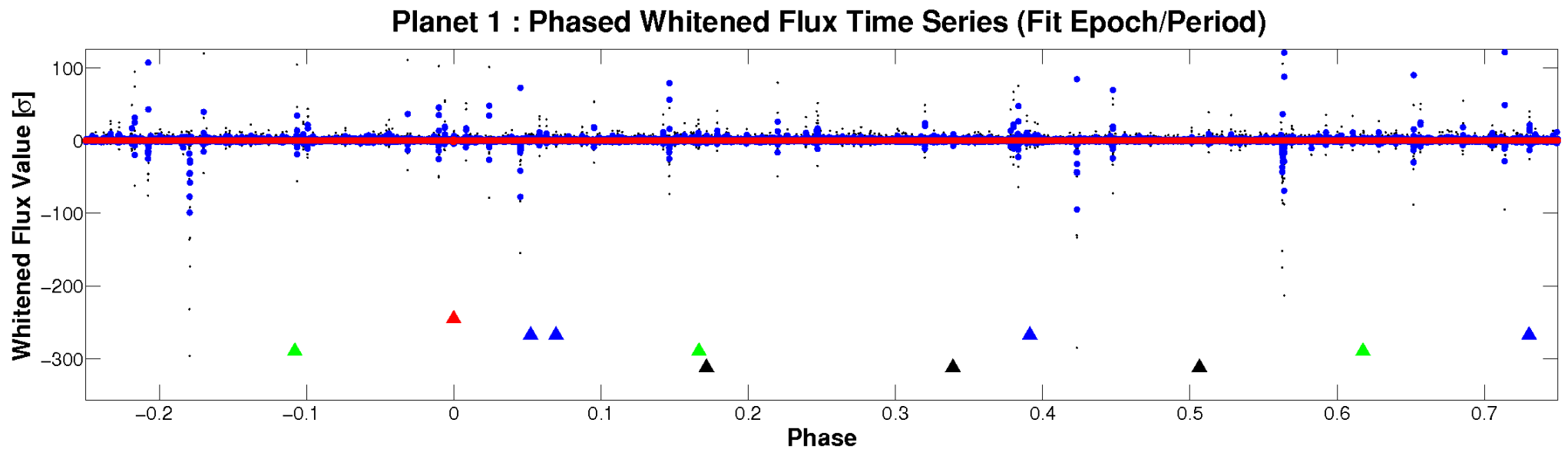
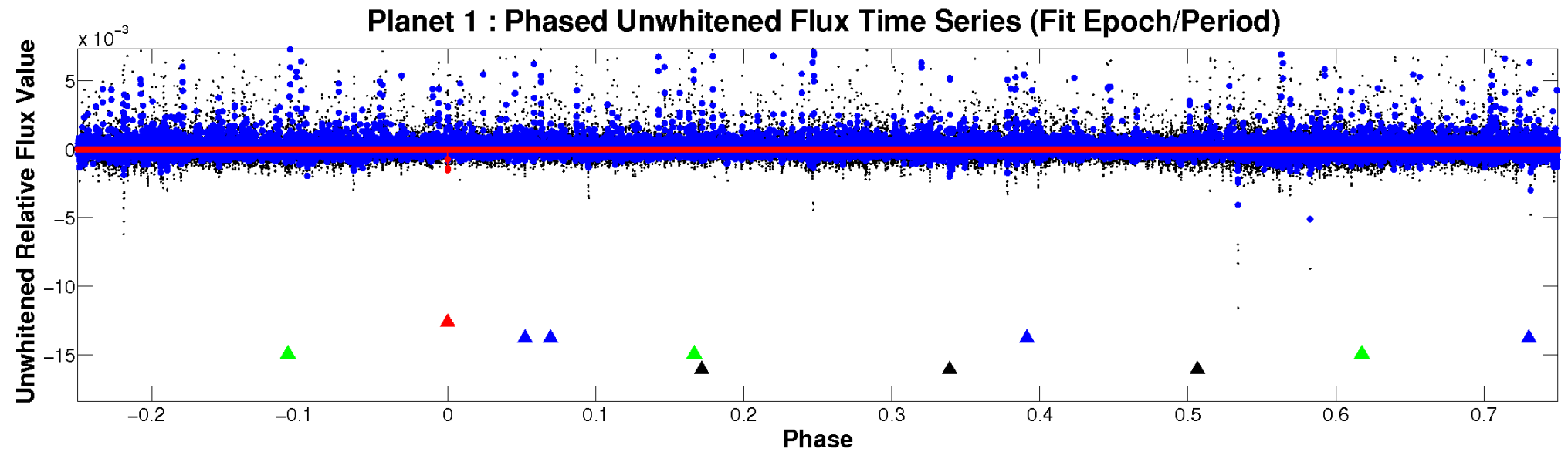


# ALT Odd/Even

TCE 011033205-01

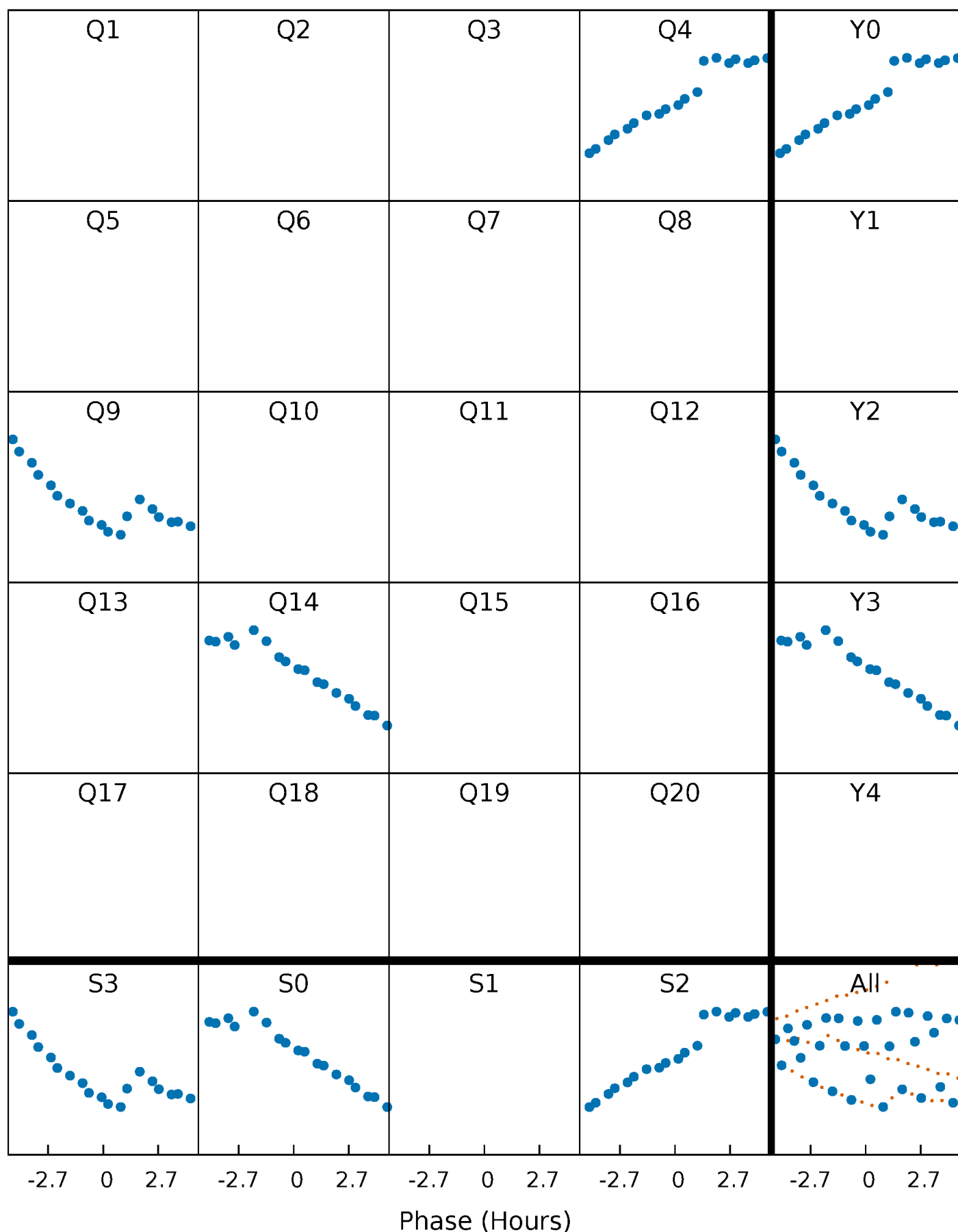


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

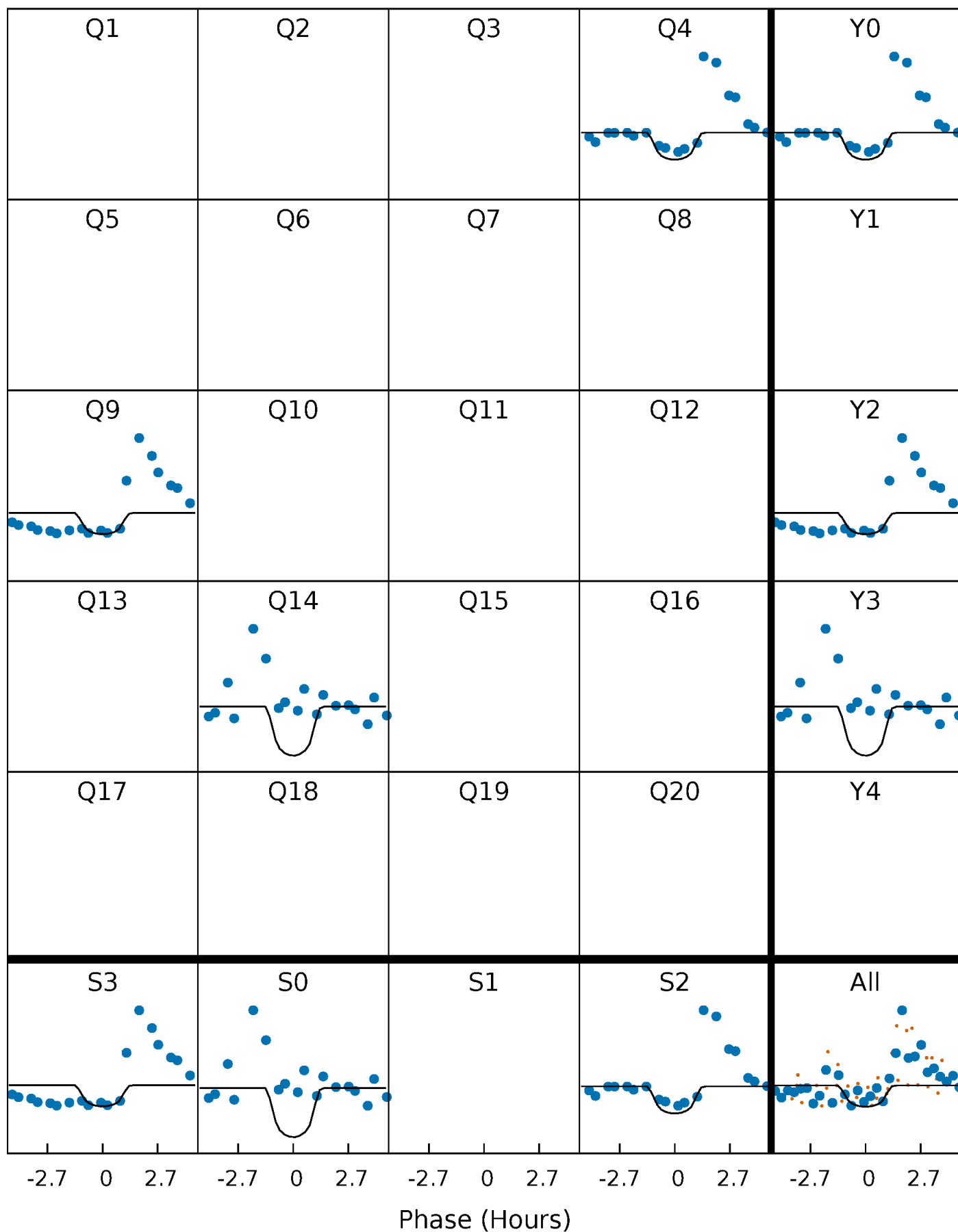
TCE 011033205-01 P=472.742341 Days  $T_0=377.854876$  (BKJD)





# DV Quarter-Phased Transit Curves

TCE 011033205-01 P=472.742341 Days  $T_0=377.854876$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

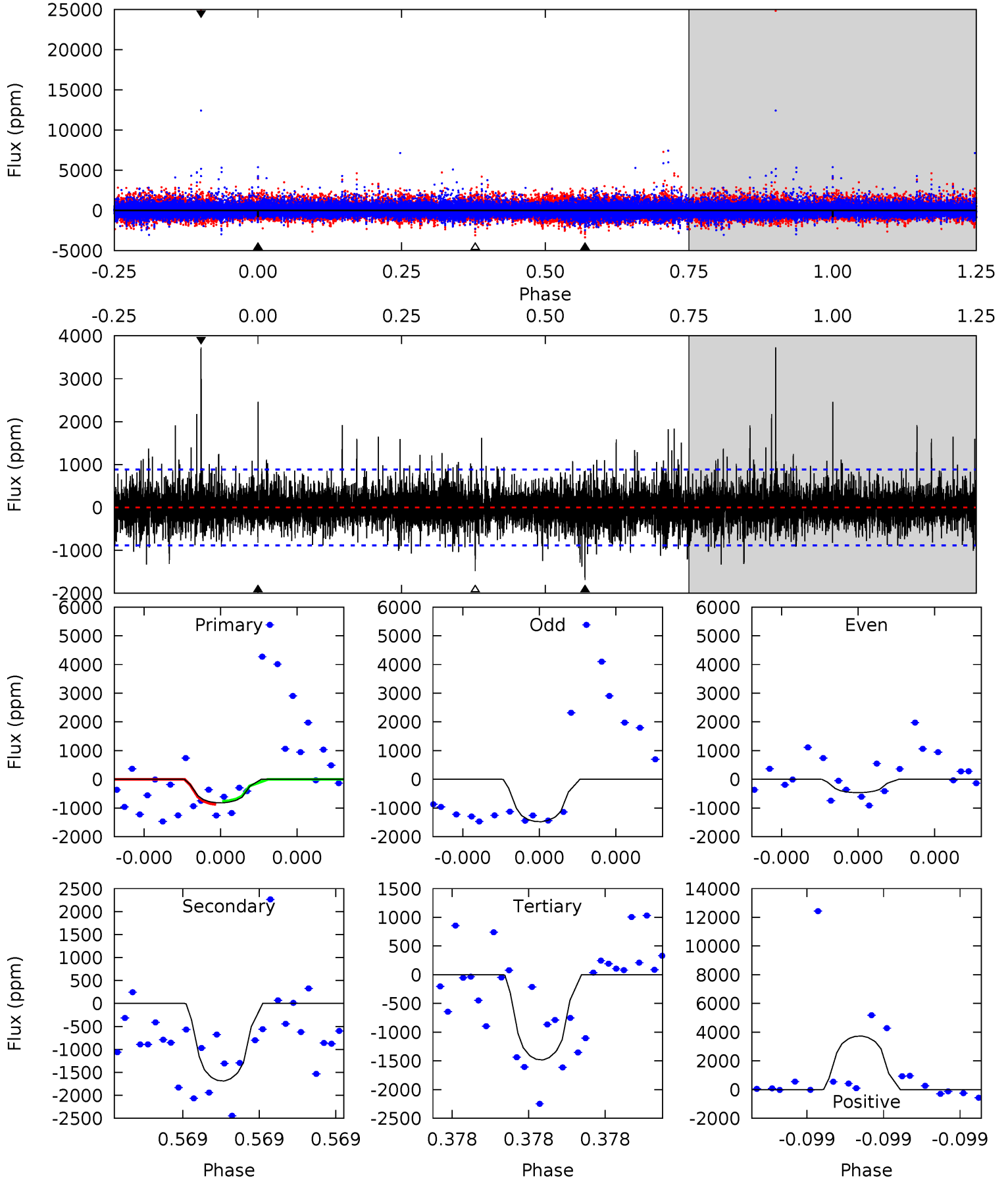
TCE 011033205-01 P=472.744033 Days  $T_0=377.822106$  (BKJD)



# DV Model-Shift Uniqueness Test

011033205-01, P = 472.742341 Days, E = 377.854876 Days

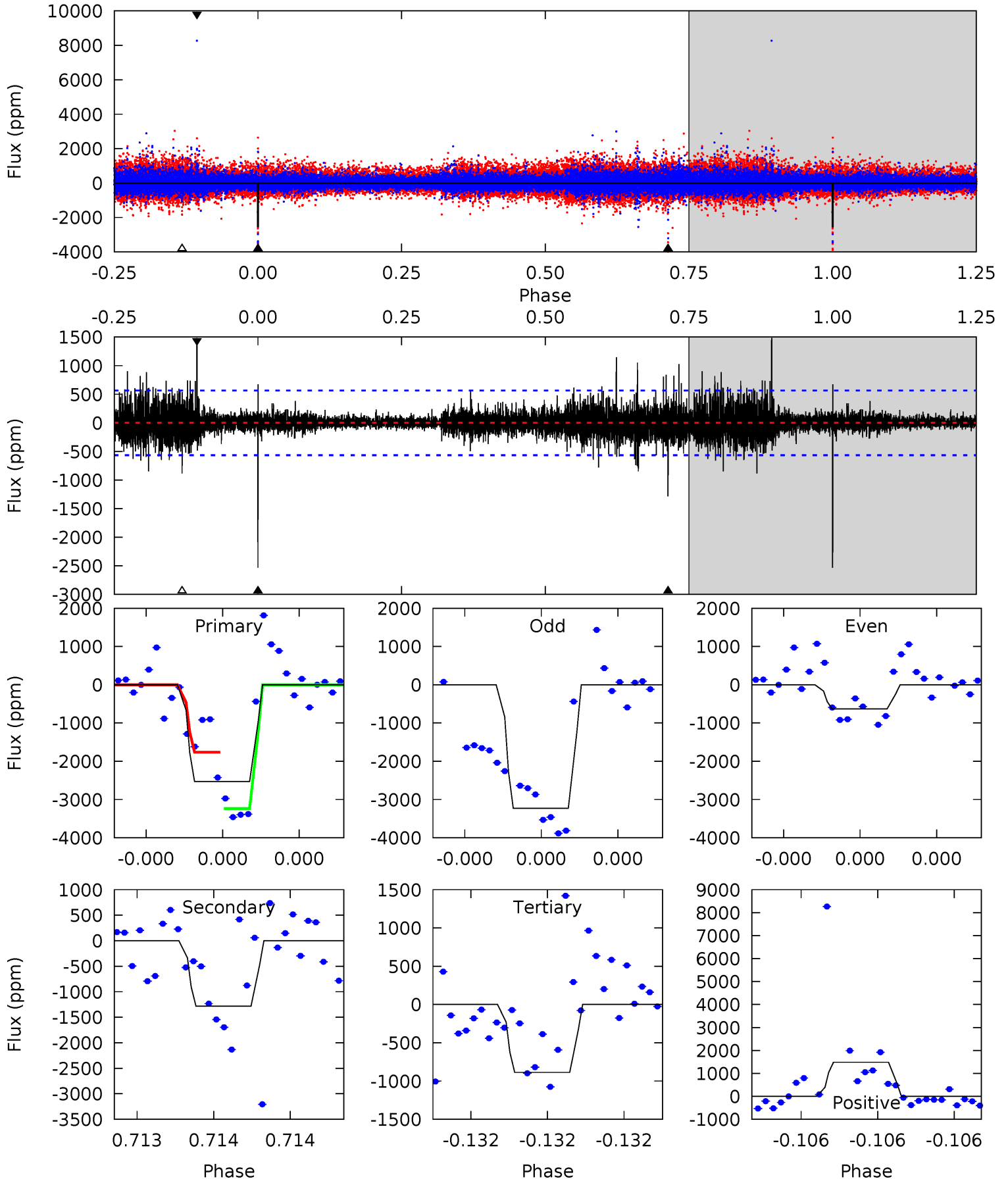
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.27	10.9	9.54	24.0	5.69	3.66	2.01	-4.26	-18.7	1.31	-13.1	0.78	0.77	0.69	0.34



# Alt Model-Shift Uniqueness Test

011033205-01, P = 472.744033 Days, E = 377.822106 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
25.2	12.8	8.82	14.8	5.62	3.55	1.49	16.4	10.4	3.94	-2.00	8.46	0.58	0.37	6.91



### Stellar Parameters For KIC 011033205

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4233^{+142}_{-142}$	$4.606^{+0.053}_{-0.018}$	$0.220^{+0.200}_{-0.300}$	$0.675^{+0.028}_{-0.057}$	$0.671^{+0.047}_{-0.052}$	$3.072^{+0.658}_{-0.245}$
	+3%/-3%	+1%/-0%	+91%/-136%	+4%/-8%	+7%/-8%	+21%/-8%
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 011033205-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-1688 \pm 156$	$5.37^{+4.94}_{-3.48}$	$209^{+7}_{-8}$	$3463^{+1693}_{-609}$	$34733^{+246802}_{-25596}$
Alt.	$-1282 \pm 101$	$5.46^{+5.11}_{-3.57}$	$209^{+8}_{-8}$	$3309^{+1611}_{-557}$	$25663^{+186999}_{-18725}$

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

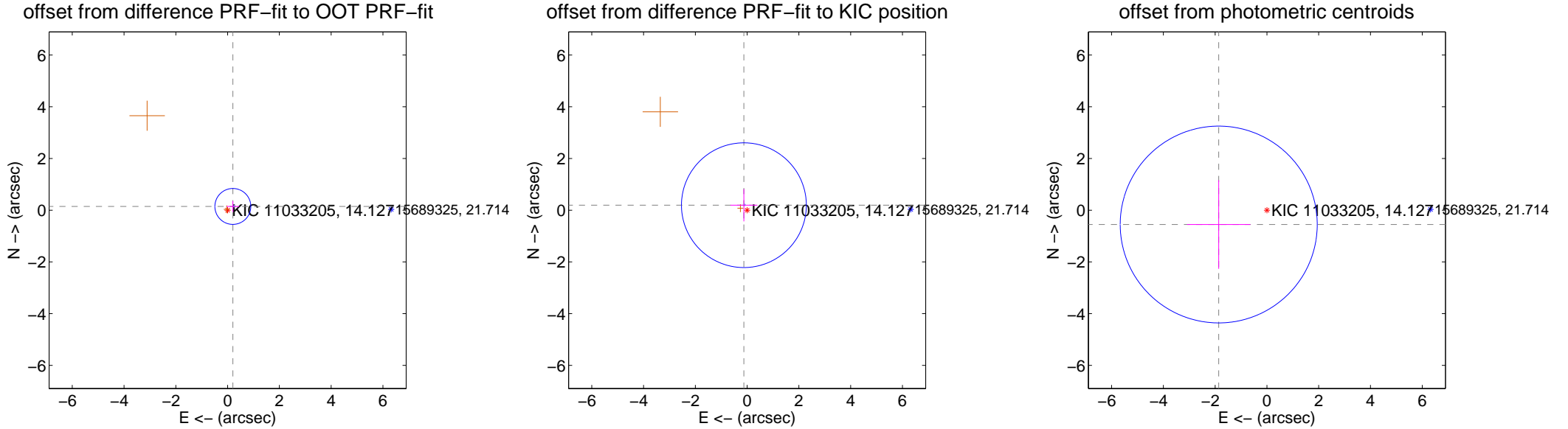
## DV Centroid Data

Supplemental centroid analysis for 011033205-01. Kepler magnitude: 14.13. Transit SNR 6.74

There are 1 quarters with good PRF difference image offsets

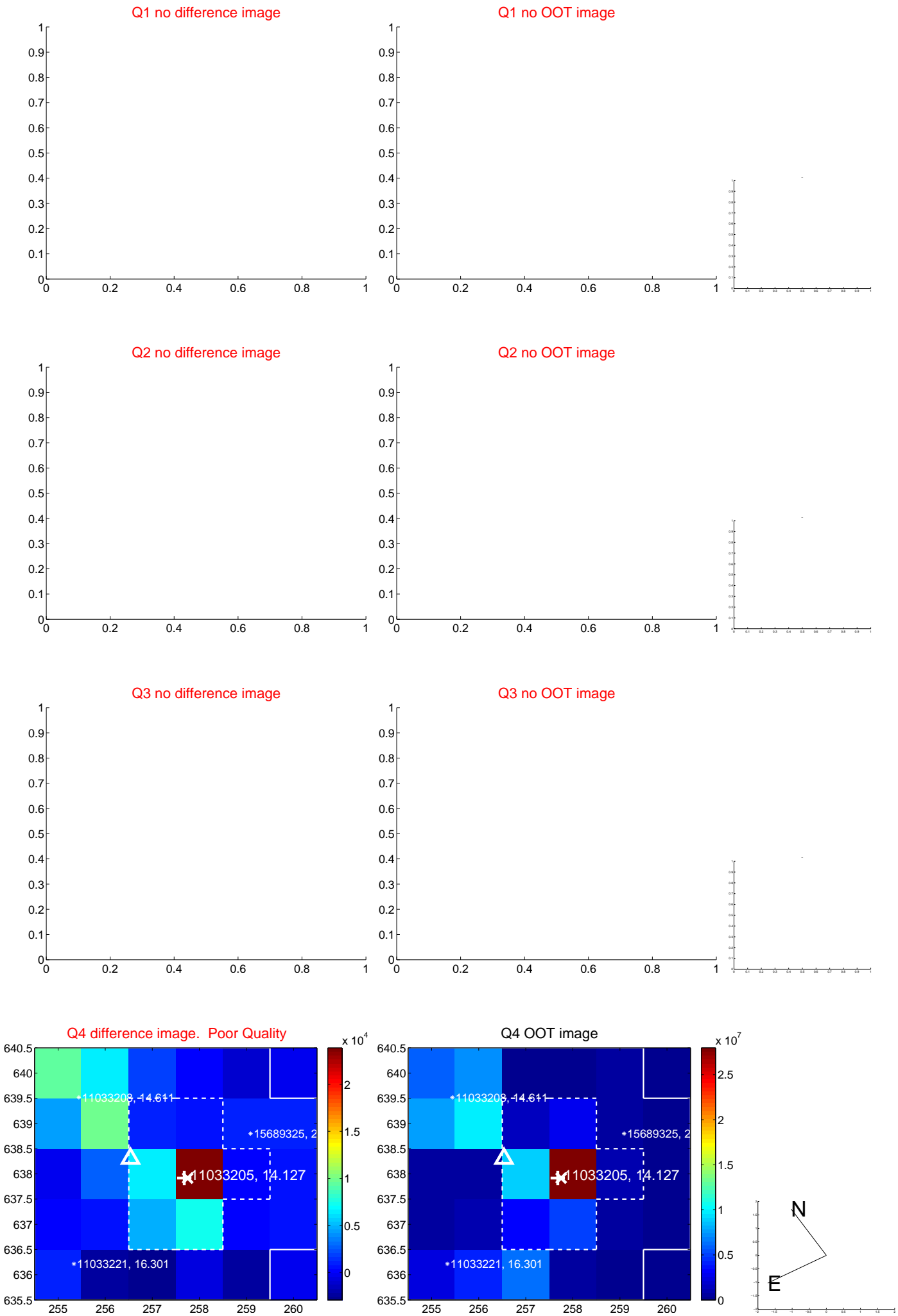
The direct PRF centroid is offset from the target star catalog position by about 0.23 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.250 \pm 0.231$	1.08	$-0.203 \pm 0.241$	$0.146 \pm 0.211$
PRF-fit source offset from KIC position	$0.230 \pm 0.804$	0.29	$0.124 \pm 0.520$	$0.194 \pm 0.625$
photometric centroid source offset	$1.94 \pm 1.27$	1.53	$1.86 \pm 1.22$	$-0.55 \pm 1.71$



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.

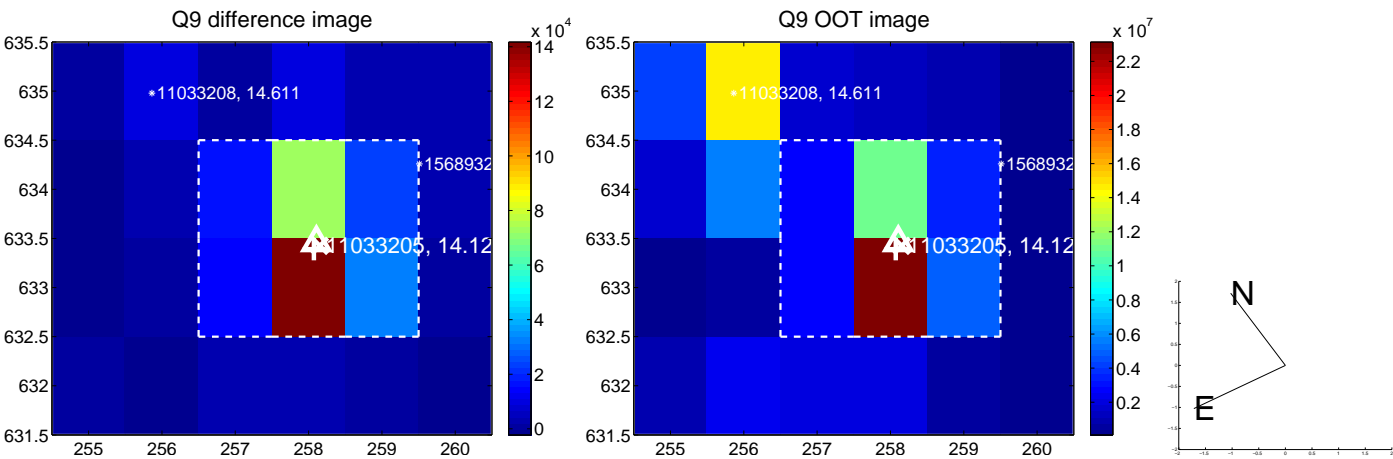


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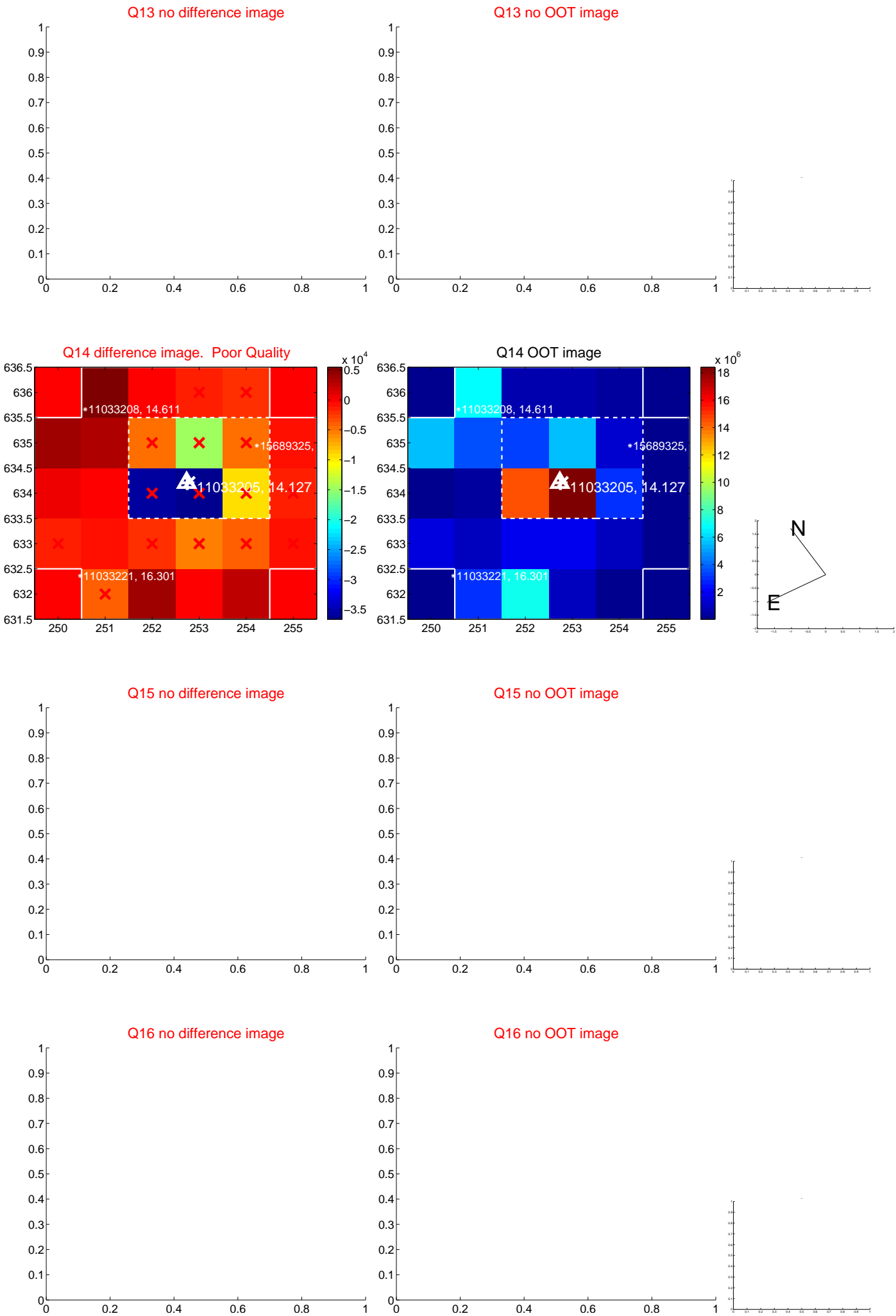




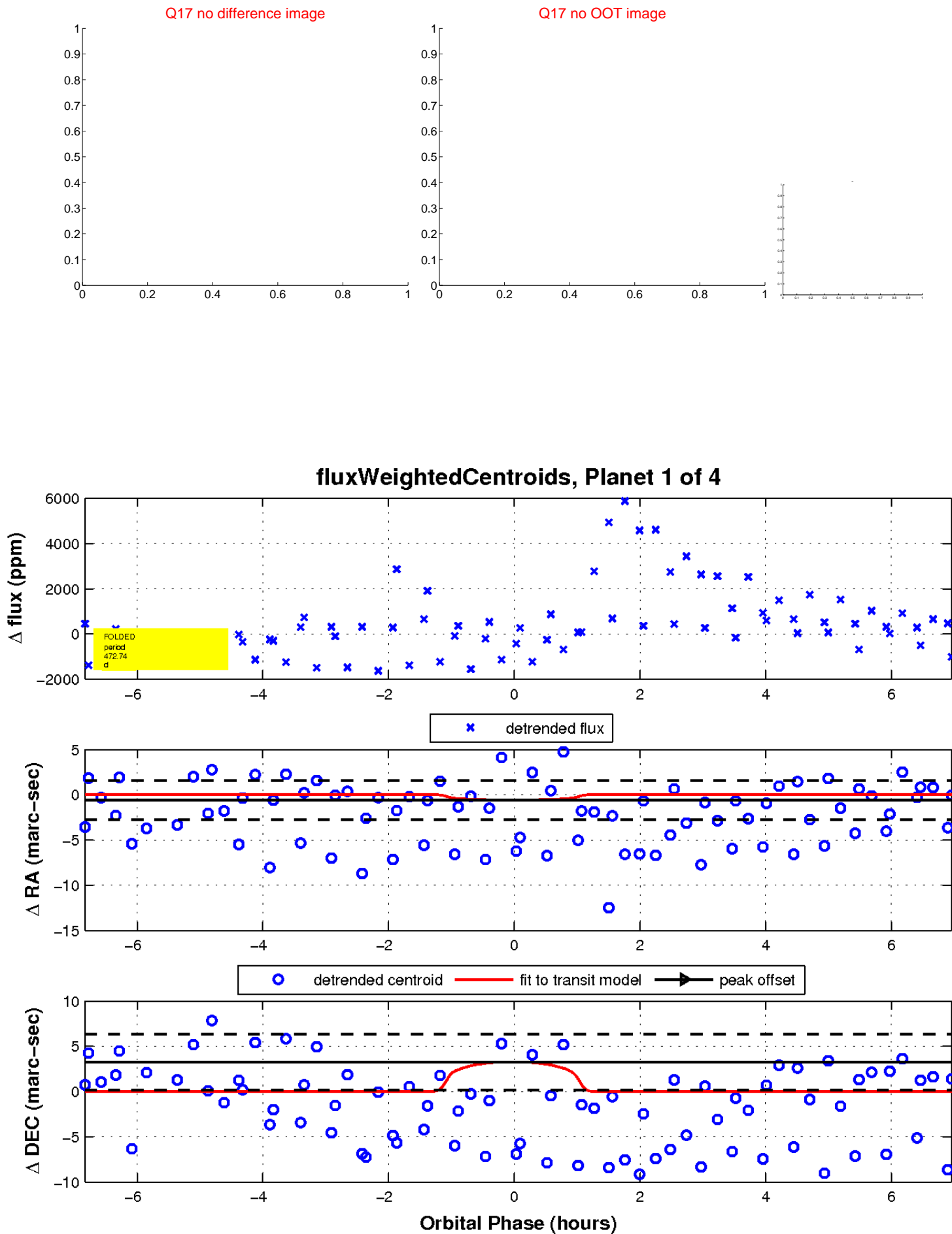
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

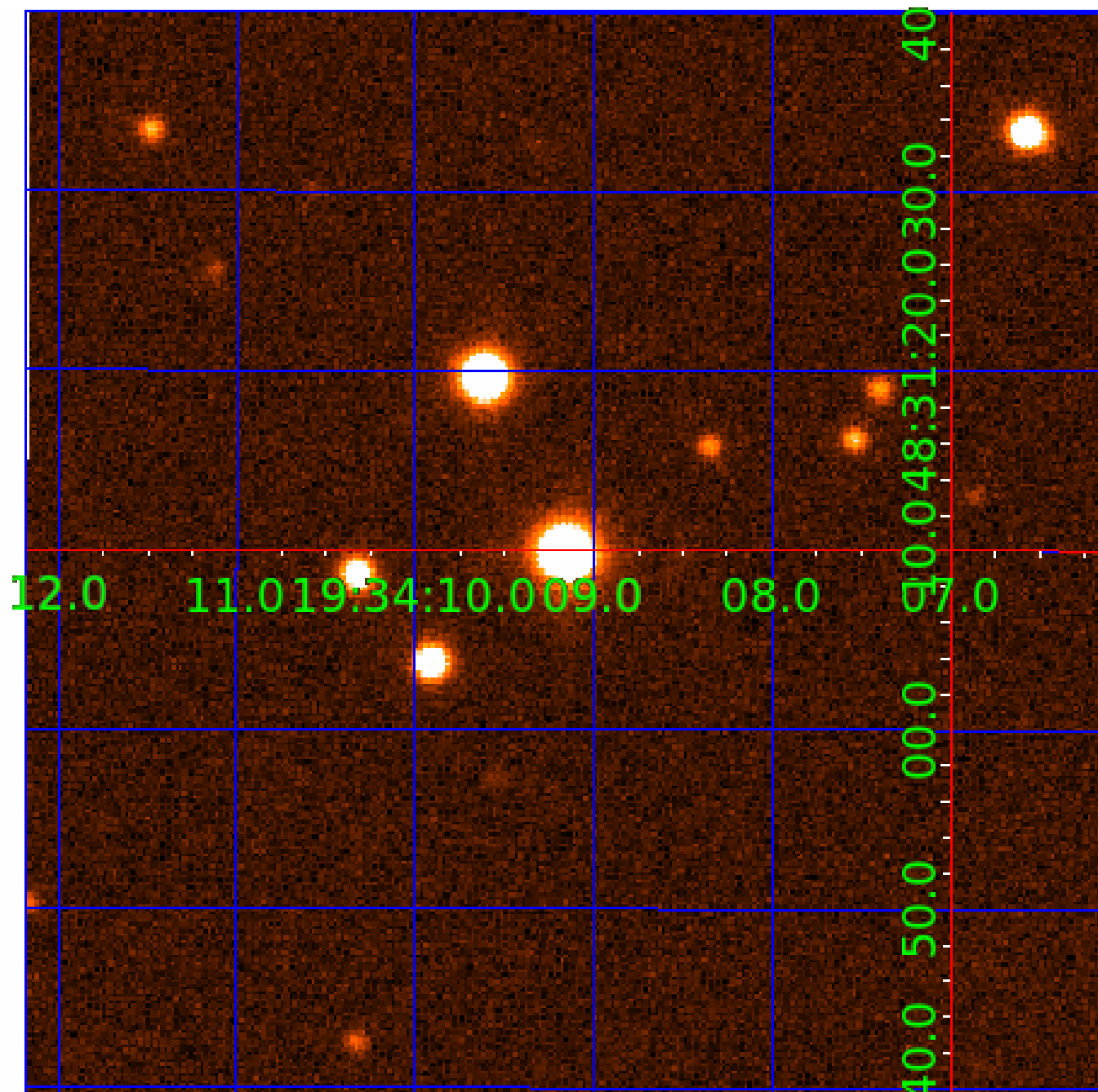


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 011033205

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
011033205-01	OBS	No	472.742341	377.854877	1522.2	2.337	14.9	6.7	0.68	4233	2.83	0.12
011033205-02	OBS	No	312.450613	410.688397	1697.1	2.812	15.3	5.7	0.68	4233	2.75	0.21
011033205-03	OBS	No	602.506054	197.071489	1487.4	4.870	15.9	4.9	0.68	4233	2.88	0.09
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## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
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011033205-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES
011033205-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
011033205-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

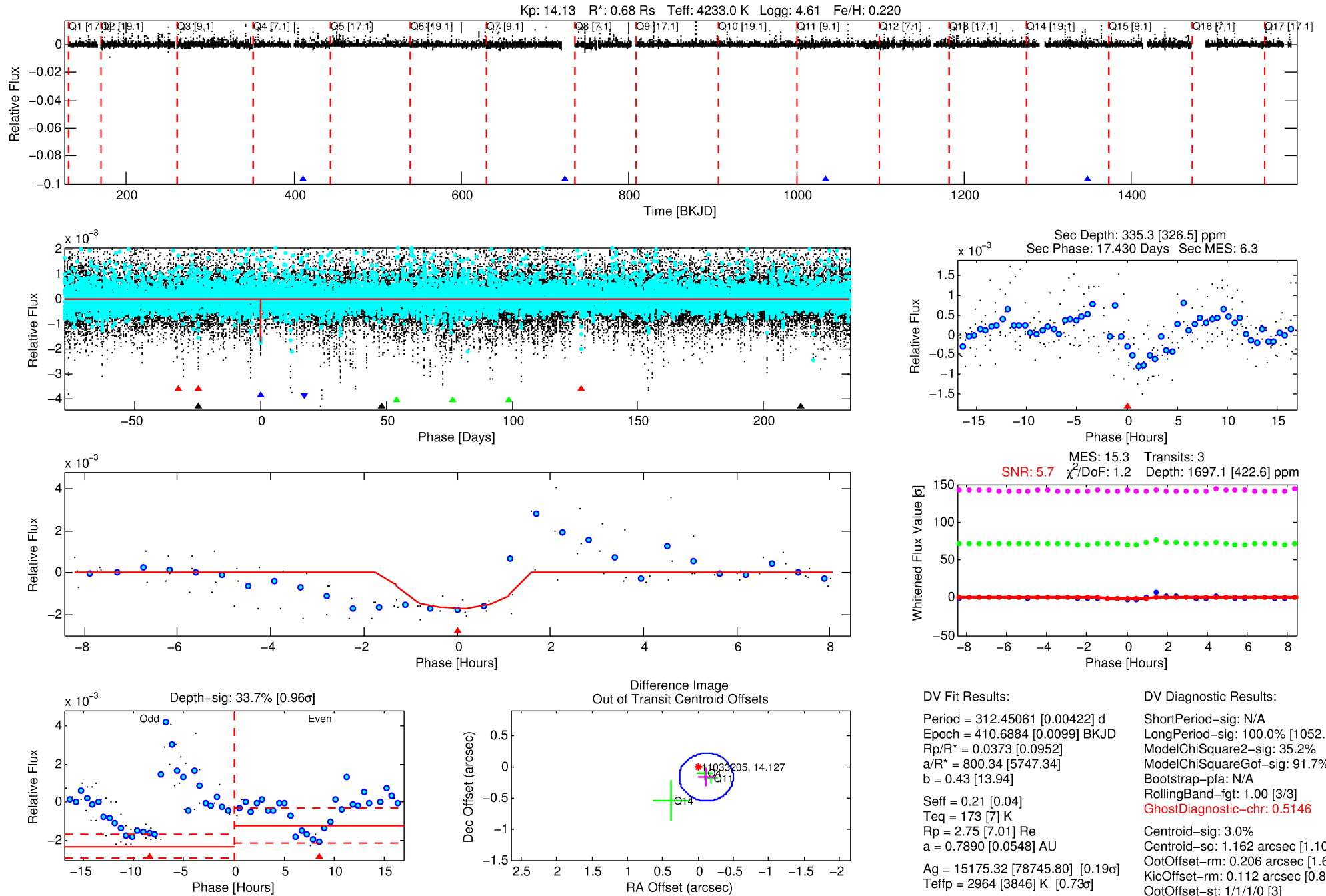
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 011033205-02

No Significant Match Found

# DV One-Page Summary

KIC: 11033205 Candidate: 2 of 4 Period: 312.451 d



## DV Fit Results:

Period = 312.45061 [0.00422] d  
Epoch = 410.6884 [0.0099] BKJD  
Rp/R\* = 0.0373 [0.0952]  
a/R\* = 800.34 [5747.34]  
b = 0.43 [13.94]  
Seff = 0.21 [0.04]  
Teq = 173 [7] K  
Rp = 2.75 [7.01] Re  
a = 0.7890 [0.0548] AU  
Ag = 15175.32 [78745.80] [0.19σ]  
Teffp = 2964 [3846] K [0.73σ]

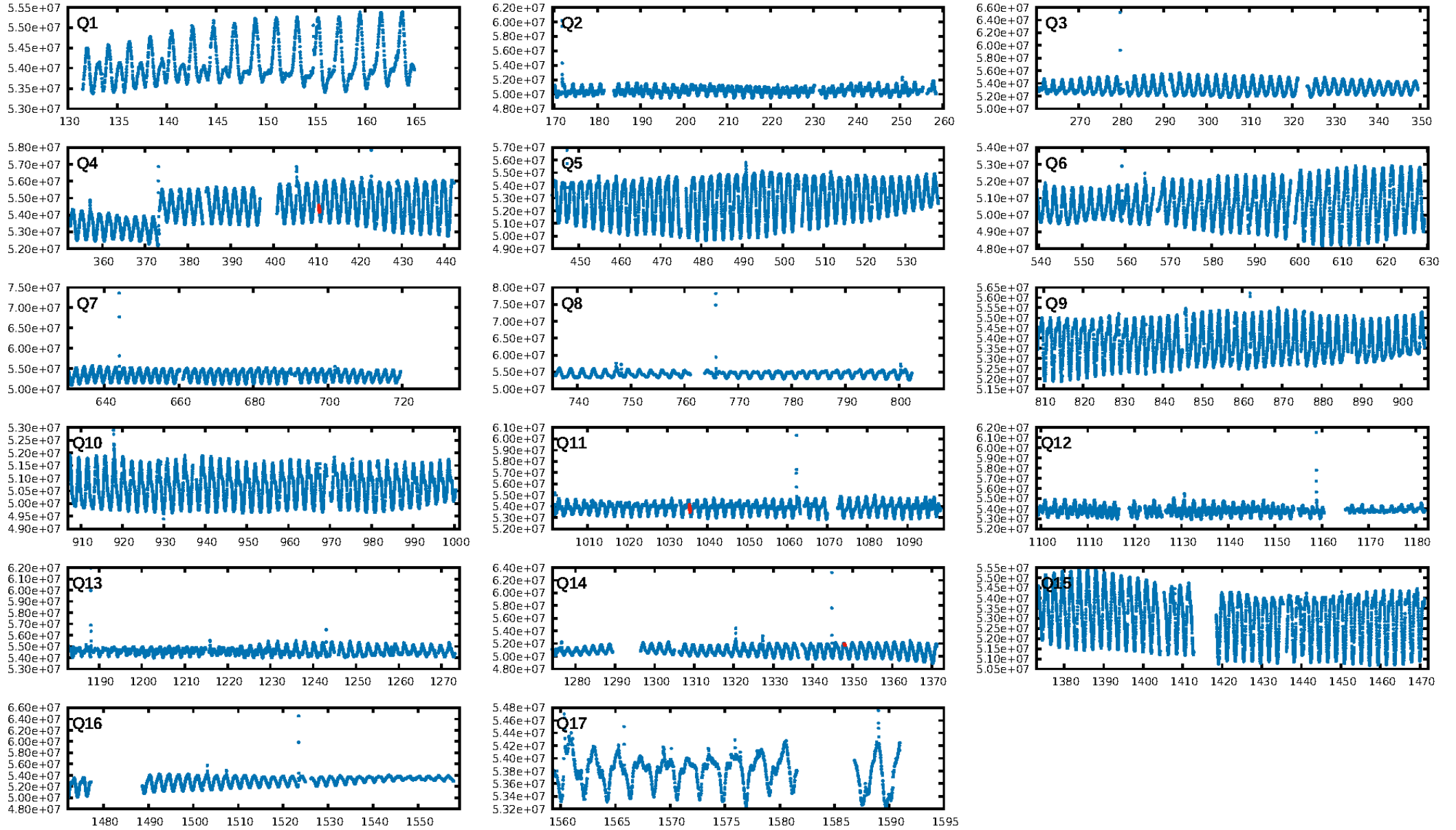
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [1052.17σ]  
ModelChiSquare2-sig: 35.2%  
ModelChiSquareGof-sig: 91.7%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 0.5146  
Centroid-sig: 3.0%  
Centroid-so: 1.162 arcsec [1.10σ]  
OotOffset-rm: 0.206 arcsec [1.62σ]  
KicOffset-rm: 0.112 arcsec [0.84σ]  
OotOffset-st: 1/1/1/0 [3]  
KicOffset-st: 1/1/1/0 [3]  
DiffImageQuality-fgm: 1.00 [3/3]  
DiffImageOverlap-fno: 1.00 [3/3]

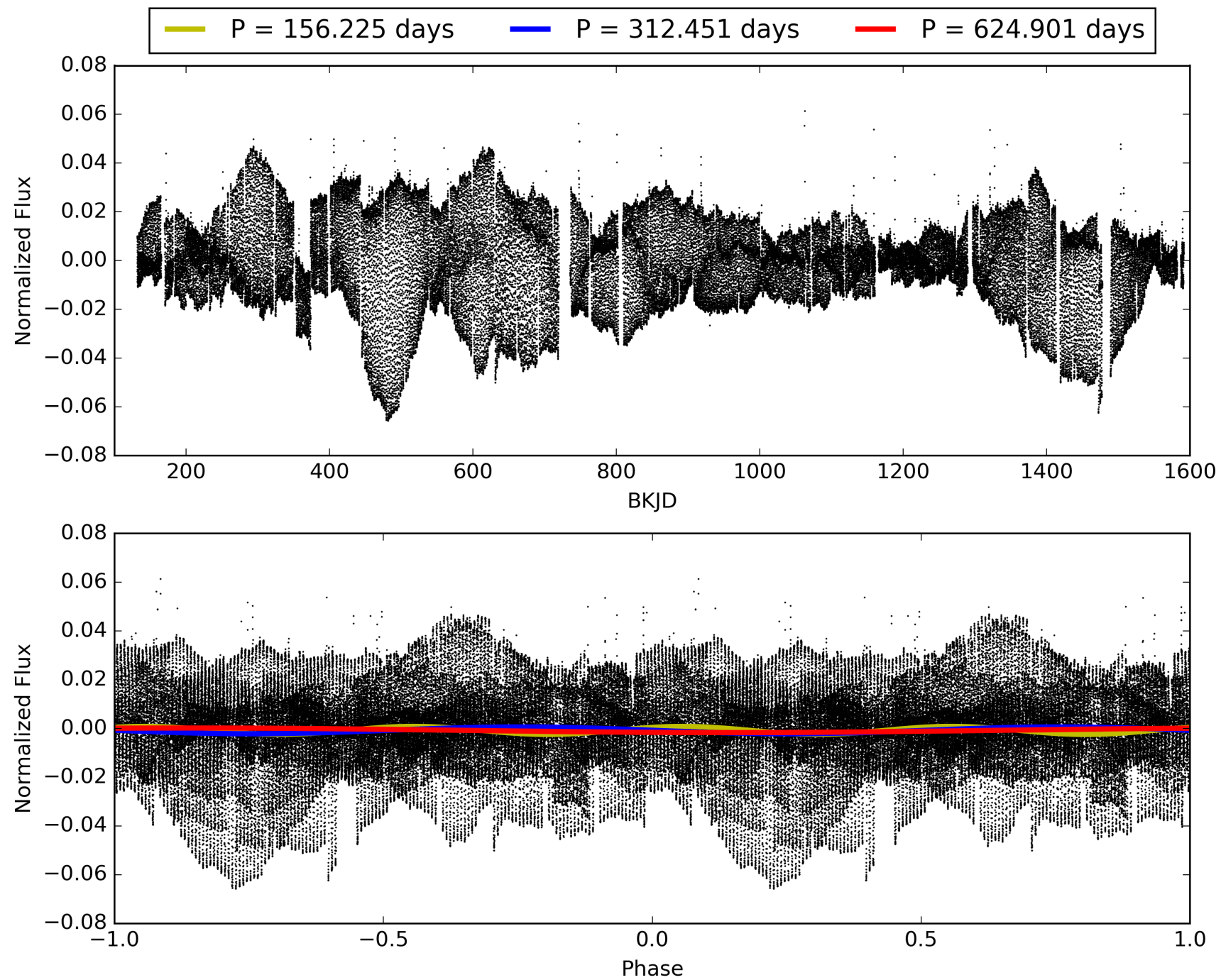
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 05:35:29 Z

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

# TCE 011033205-02, PDC Light Curves



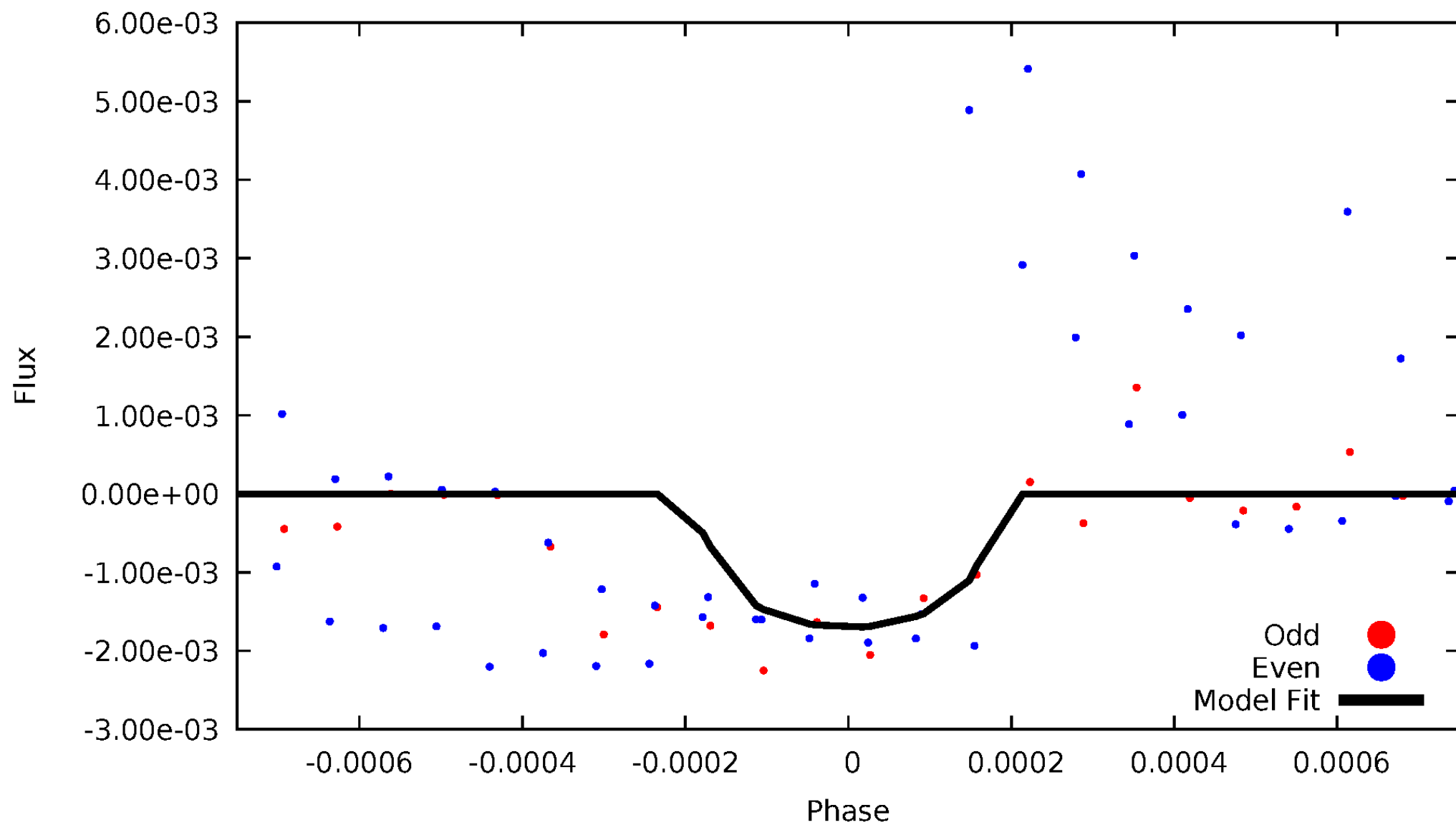
TCE 011033205-02





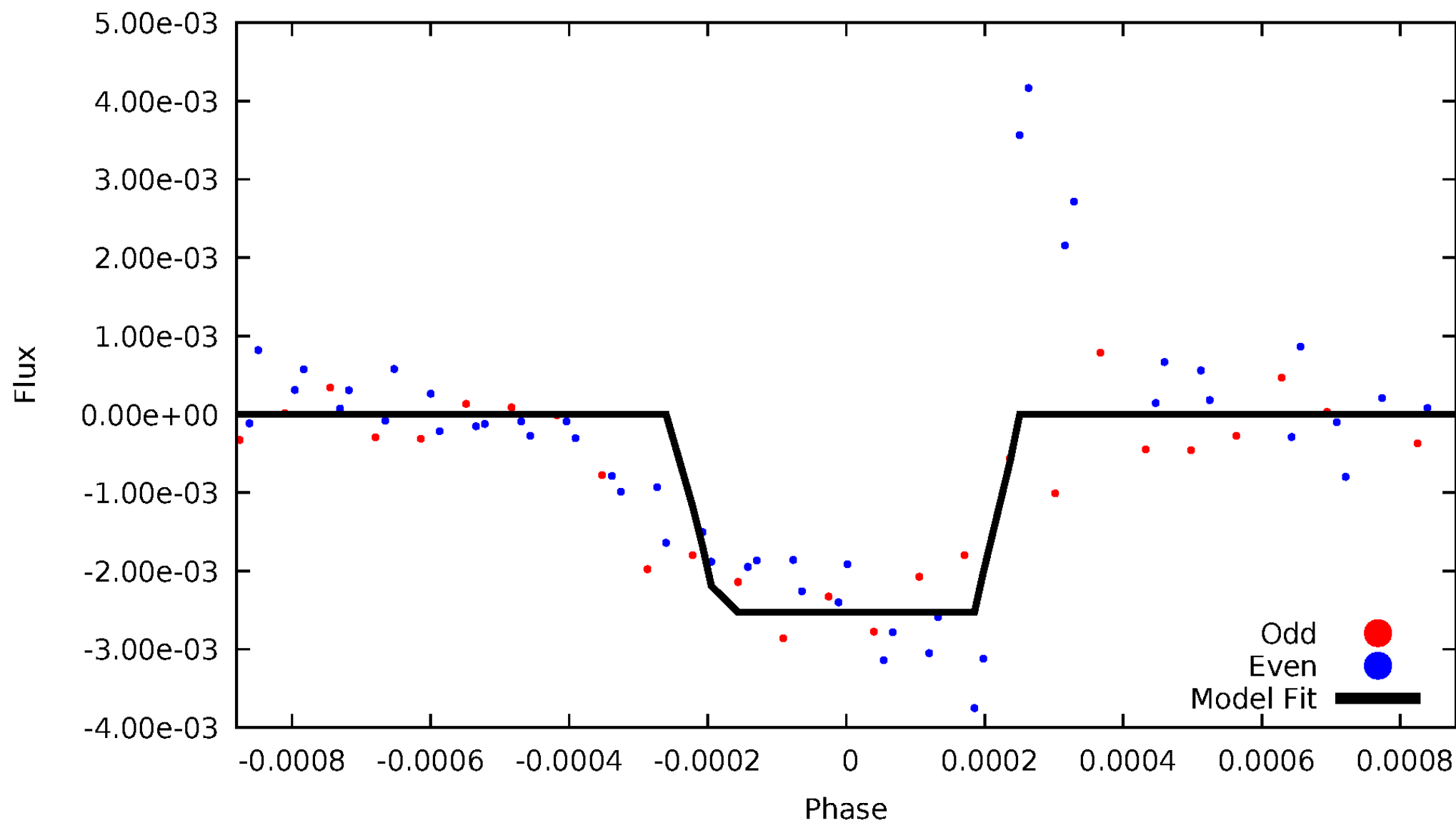
# DV Odd/Even

TCE 011033205-02



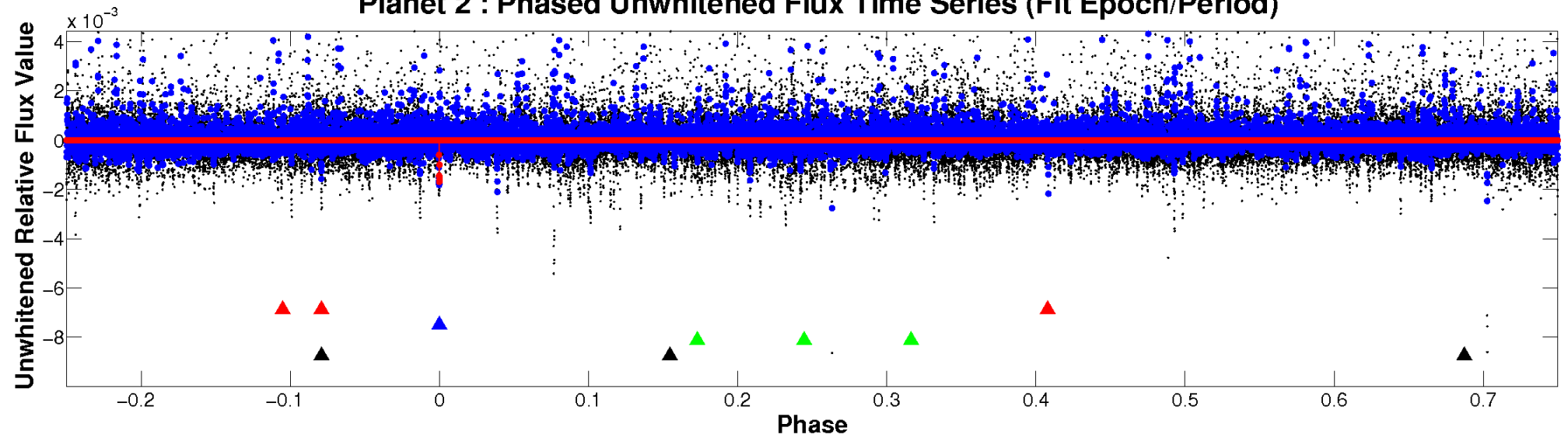
# ALT Odd/Even

TCE 011033205-02

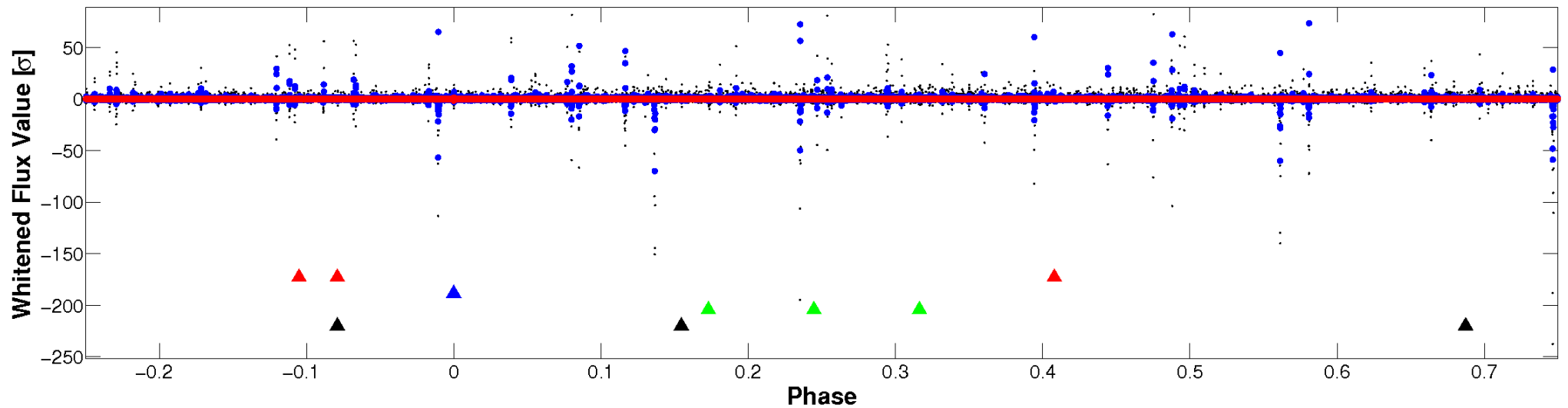


# Non-Whitened Vs. Whitened Light Curve

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

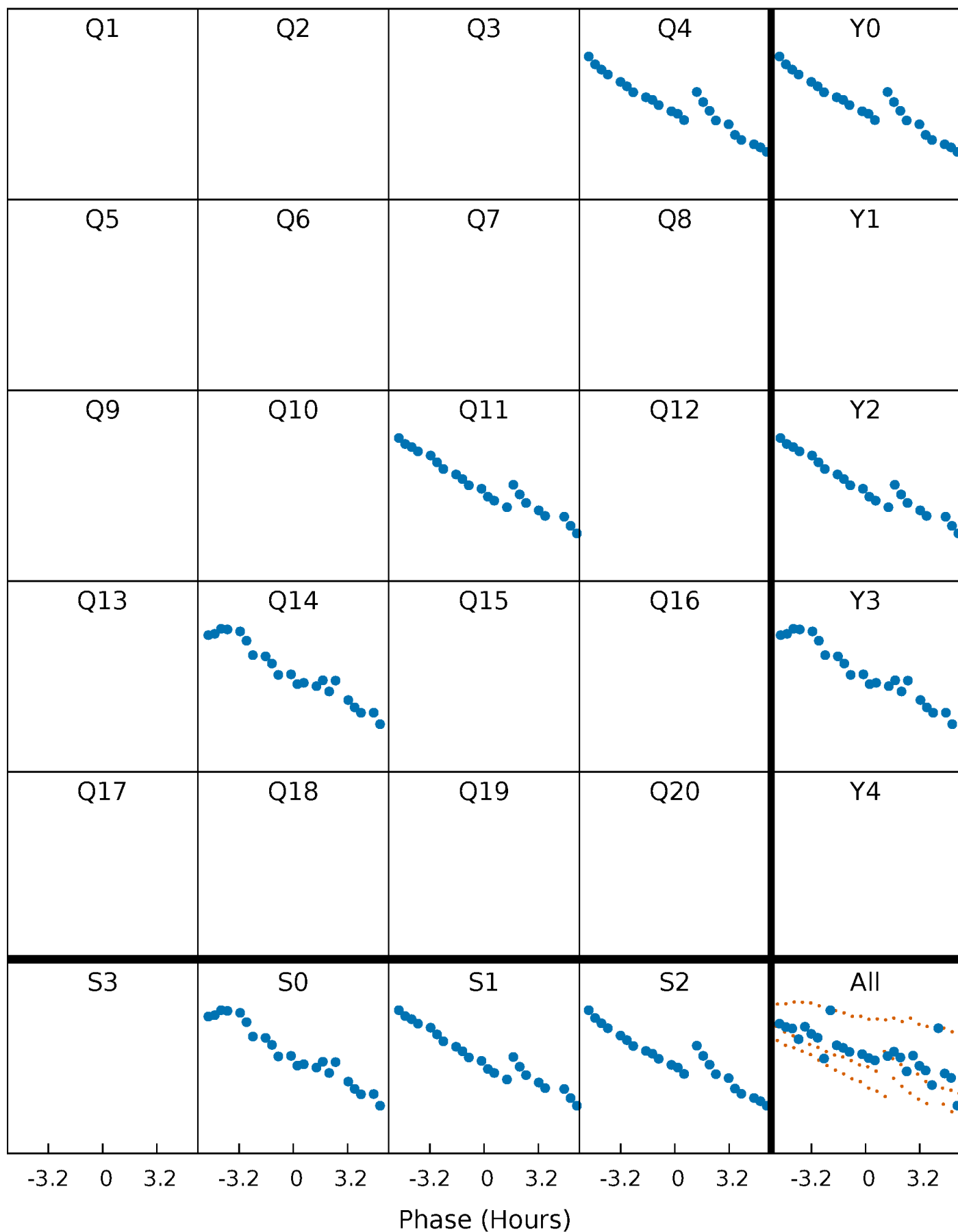


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



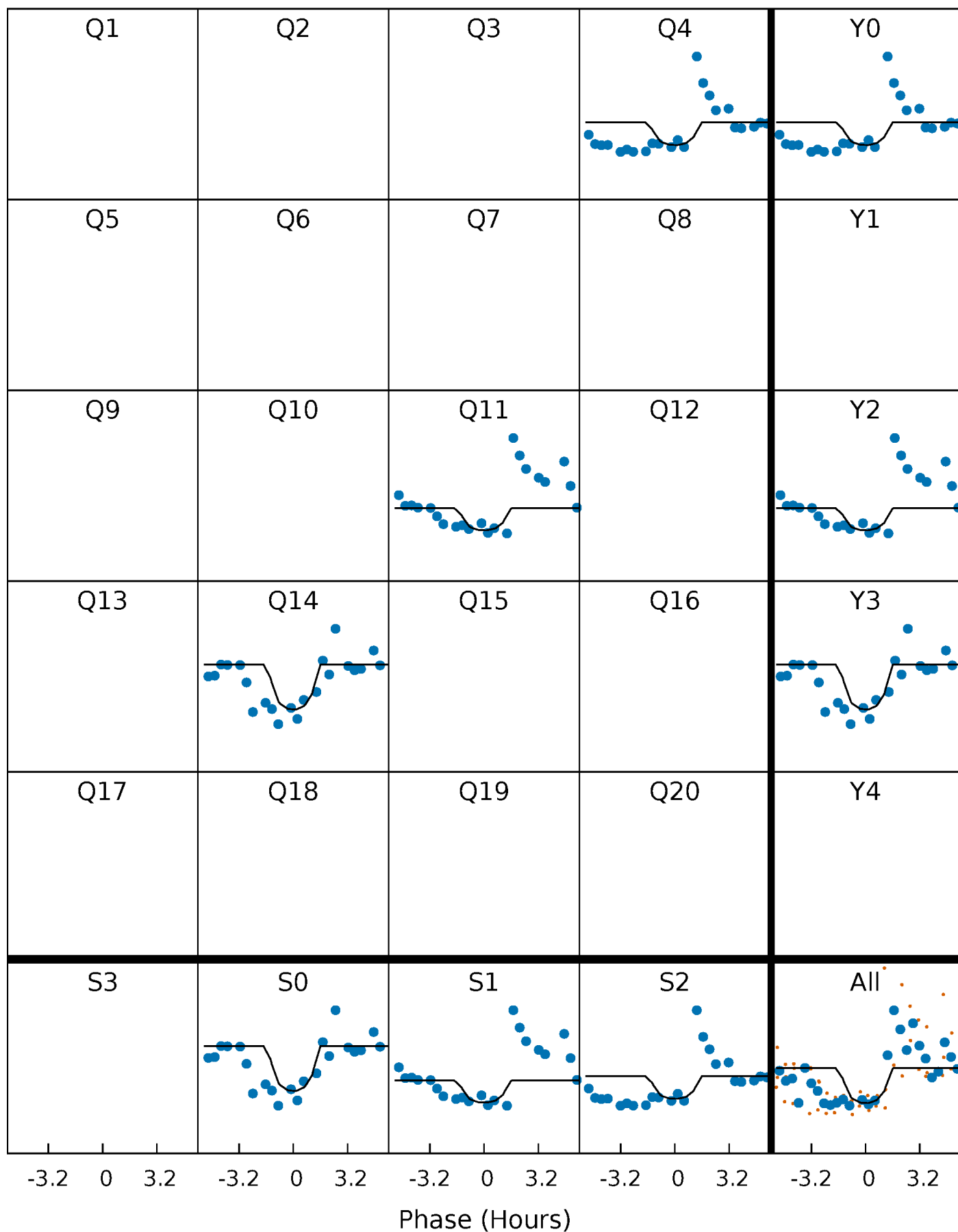
# PDC Quarter-Phased Transit Curves

TCE 011033205-02 P=312.450613 Days  $T_0=410.688397$  (BKJD)



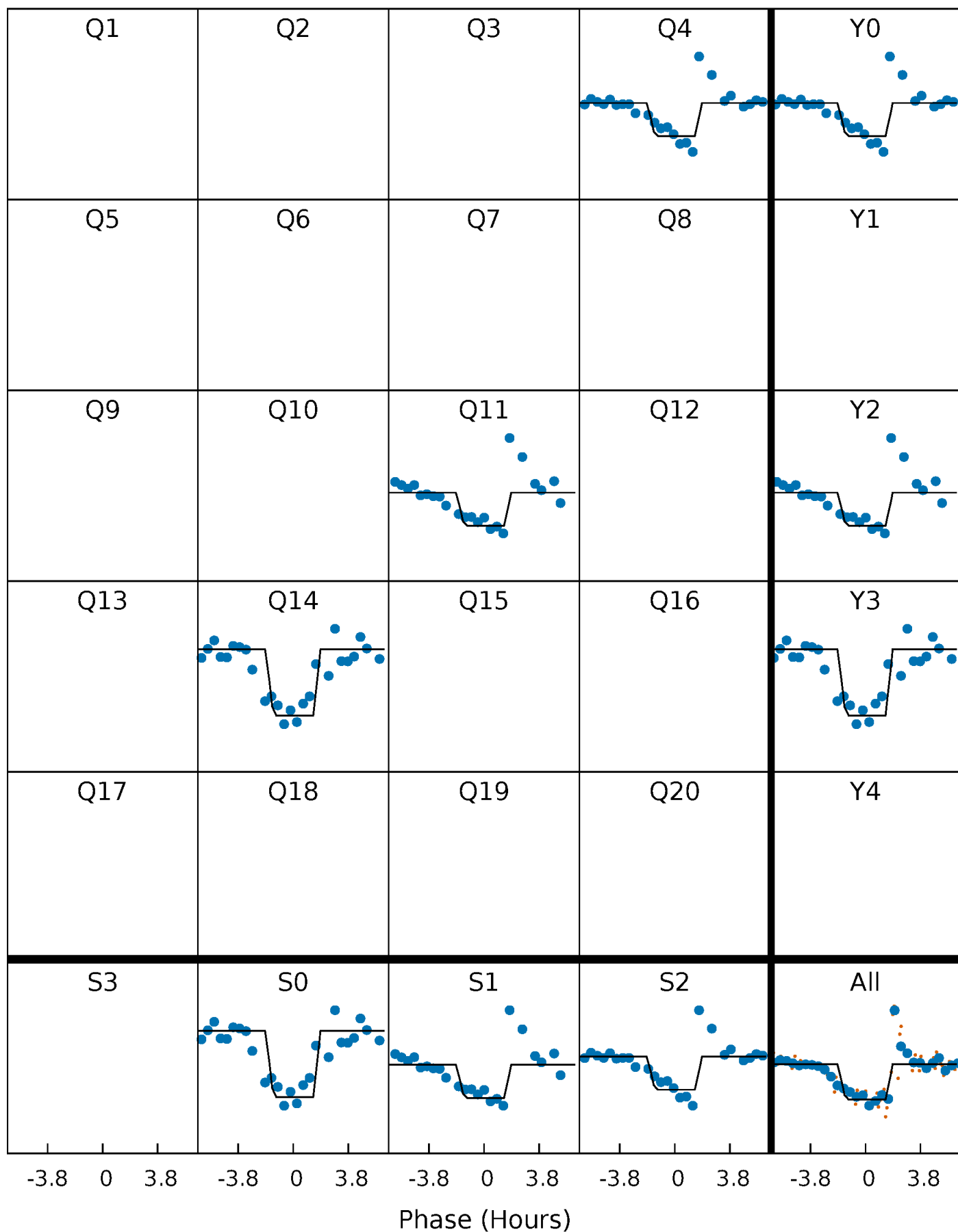
# DV Quarter-Phased Transit Curves

TCE 011033205-02 P=312.450613 Days  $T_0=410.688397$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

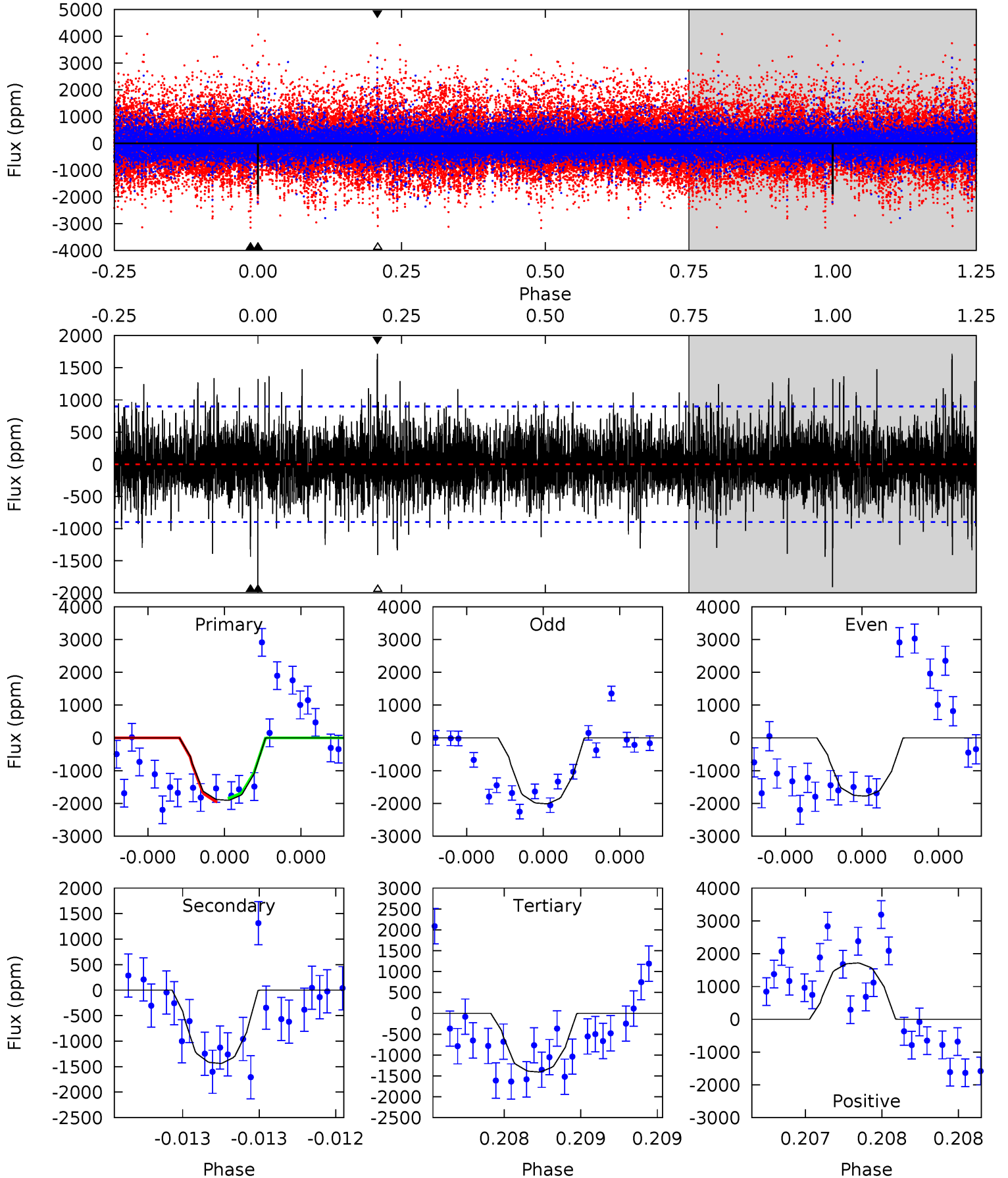
TCE 011033205-02 P=312.459901 Days  $T_0=410.656480$  (BKJD)



# DV Model-Shift Uniqueness Test

011033205-02, P = 312.450613 Days, E = 98.237784 Days

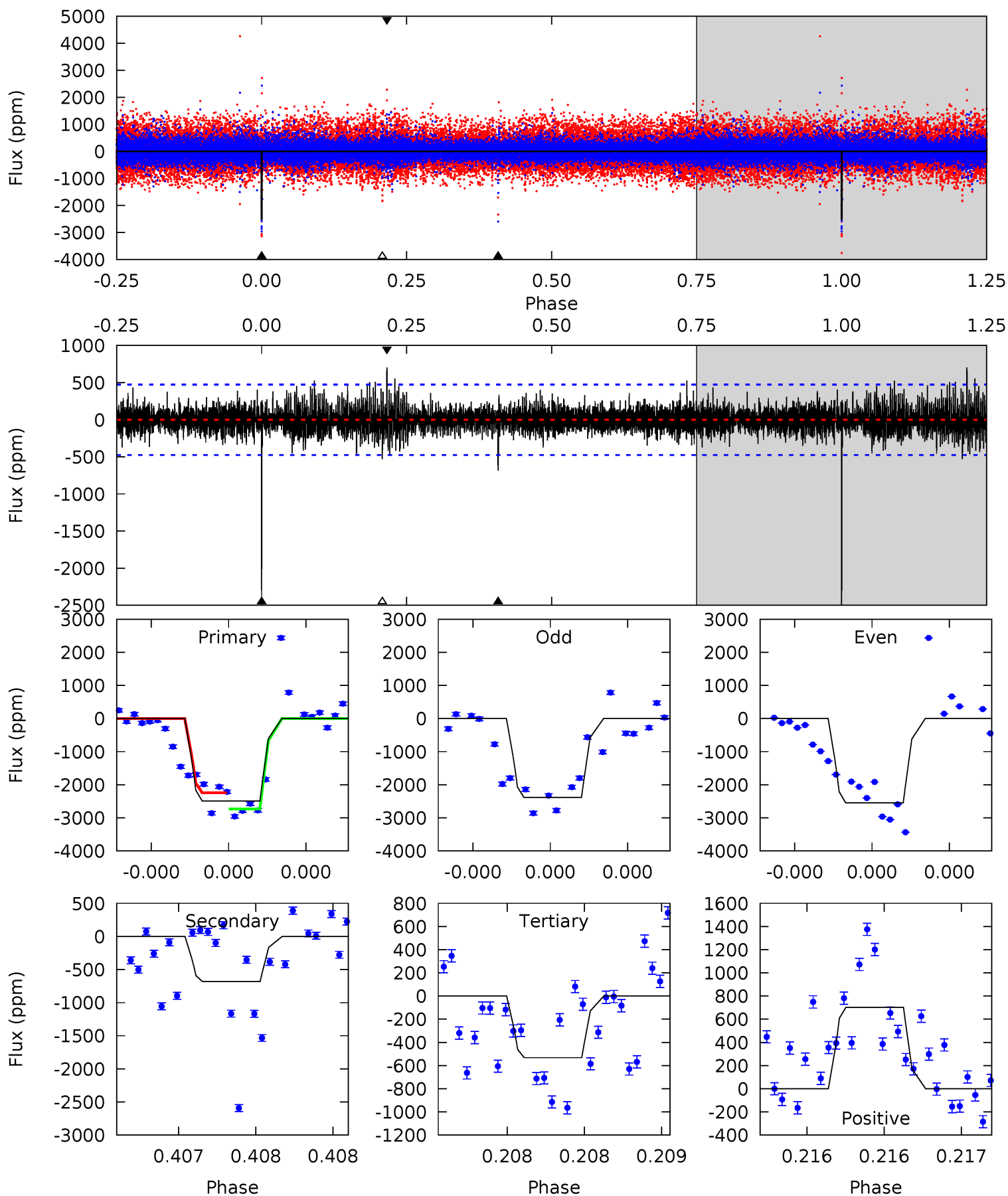
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.9	8.99	8.80	10.7	5.61	3.54	1.97	3.13	1.19	0.20	-1.74	0.24	0.85	0.47	0.35



# Alt Model-Shift Uniqueness Test

011033205-02, P = 312.459901 Days, E = 98.196579 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
29.4	8.04	6.26	8.27	5.59	3.50	1.37	23.1	21.1	1.78	-0.23	0.76	1.02	0.22	2.90





### Stellar Parameters For KIC 011033205

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4233^{+142}_{-142}$	$4.606^{+0.053}_{-0.018}$	$0.220^{+0.200}_{-0.300}$	$0.675^{+0.028}_{-0.057}$	$0.671^{+0.047}_{-0.052}$	$3.072^{+0.658}_{-0.245}$
	+3%/-3%	+1%/-0%	+91%/-136%	+4%/-8%	+7%/-8%	+21%/-8%
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 011033205-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-1438 \pm 160$	$5.43^{+5.65}_{-3.77}$	$239^{+9}_{-8}$	$3367^{+1880}_{-627}$	$16890^{+186807}_{-12947}$
Alt.	$-683 \pm 85$	$6.38^{+5.41}_{-4.50}$	$239^{+9}_{-9}$	$2886^{+1404}_{-438}$	$5678^{+61233}_{-4019}$

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

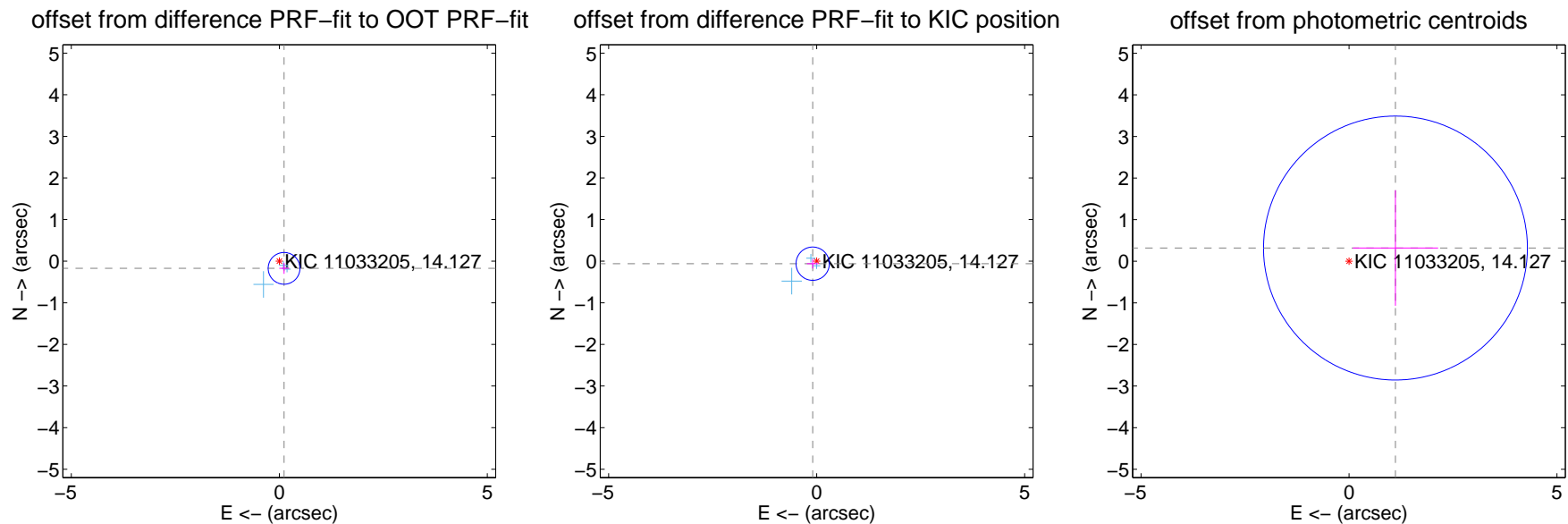
## DV Centroid Data

Supplemental centroid analysis for 011033205-02. Kepler magnitude: 14.13. Transit SNR 5.69

There are 3 quarters with good PRF difference image offsets

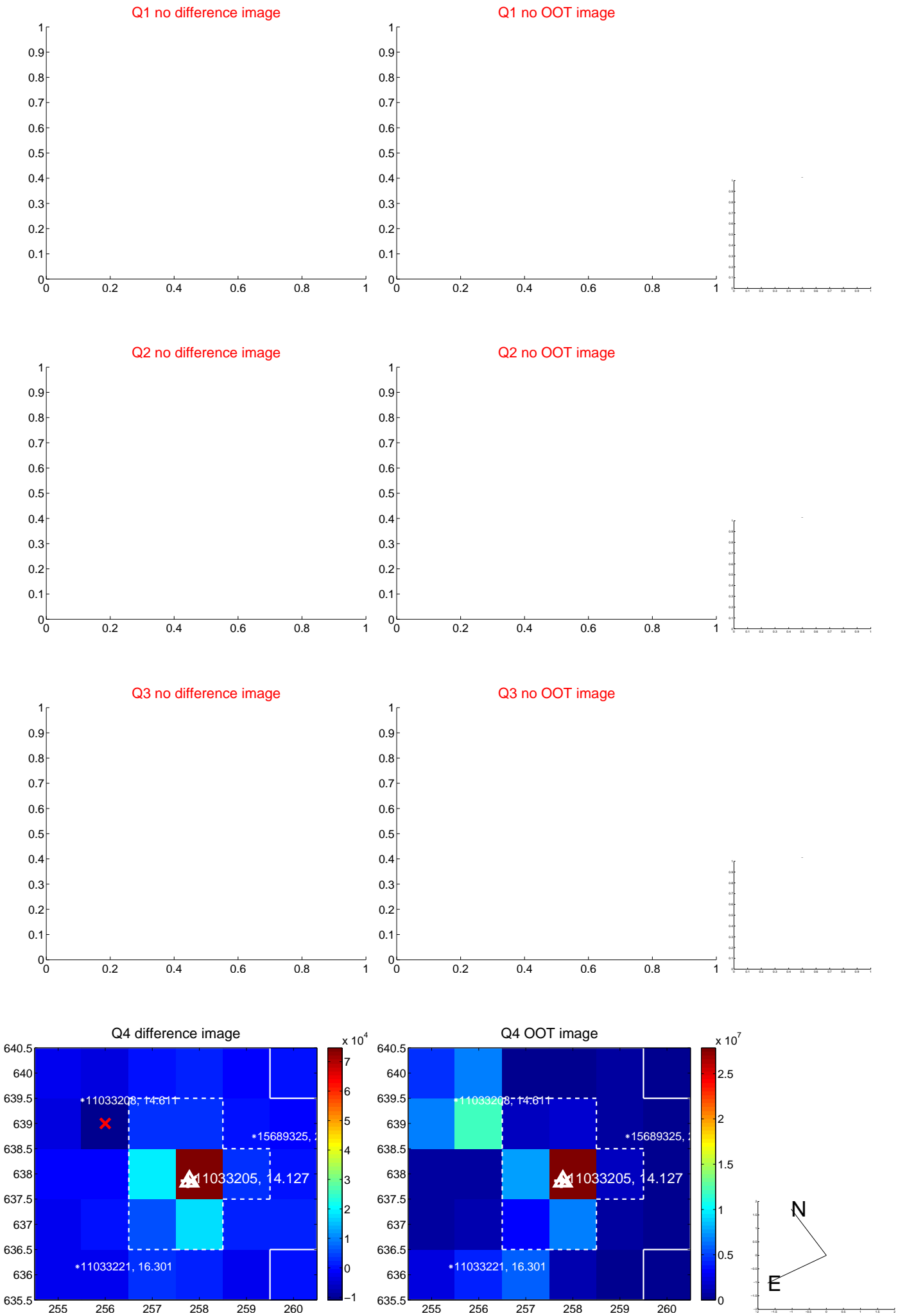
The direct PRF centroid is offset from the target star catalog position by about 0.23 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.206 \pm 0.127$	1.62	$-0.115 \pm 0.115$	$-0.172 \pm 0.132$
PRF-fit source offset from KIC position	$0.112 \pm 0.133$	0.84	$0.095 \pm 0.140$	$-0.060 \pm 0.116$
photometric centroid source offset	$1.16 \pm 1.06$	1.10	$-1.12 \pm 1.03$	$0.32 \pm 1.39$



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.

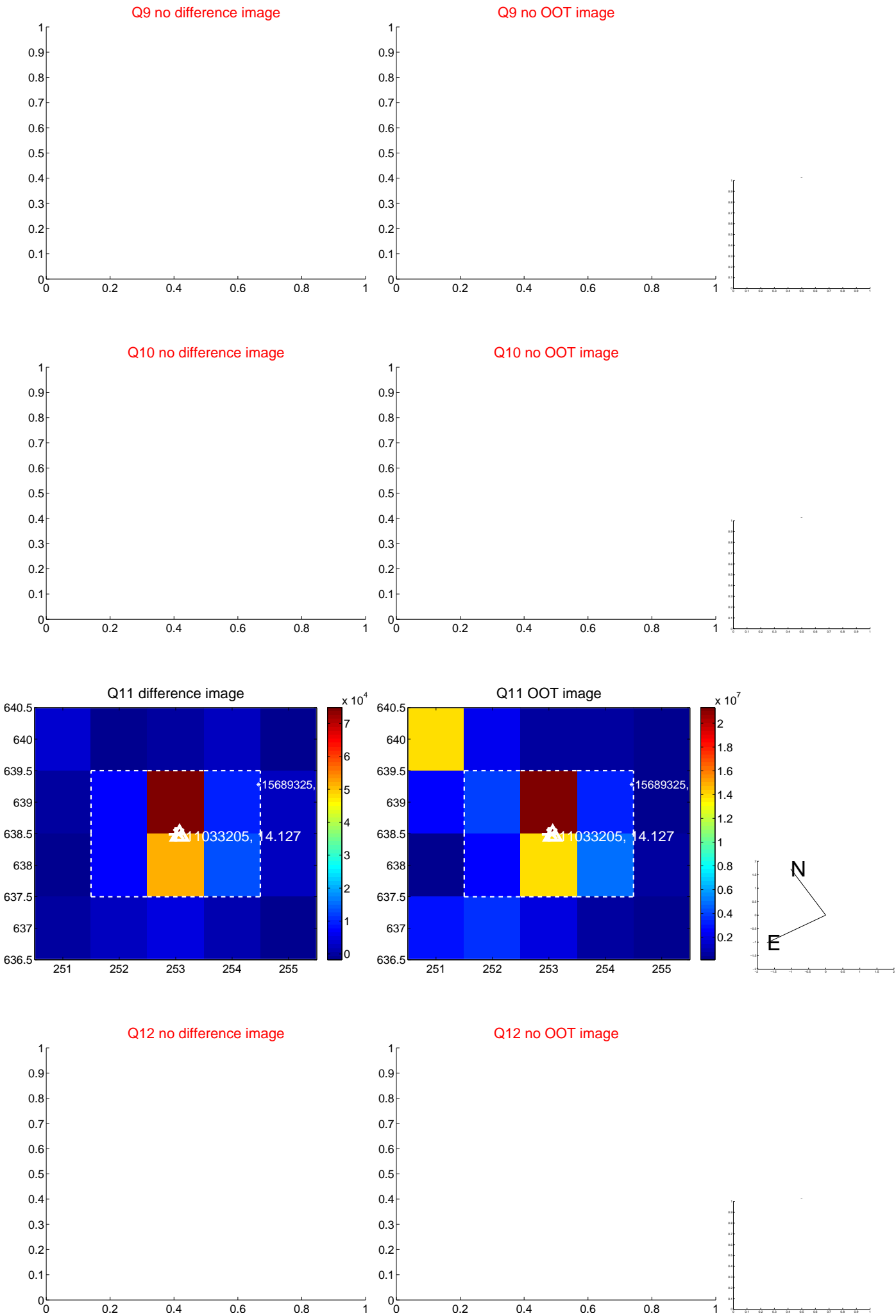
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



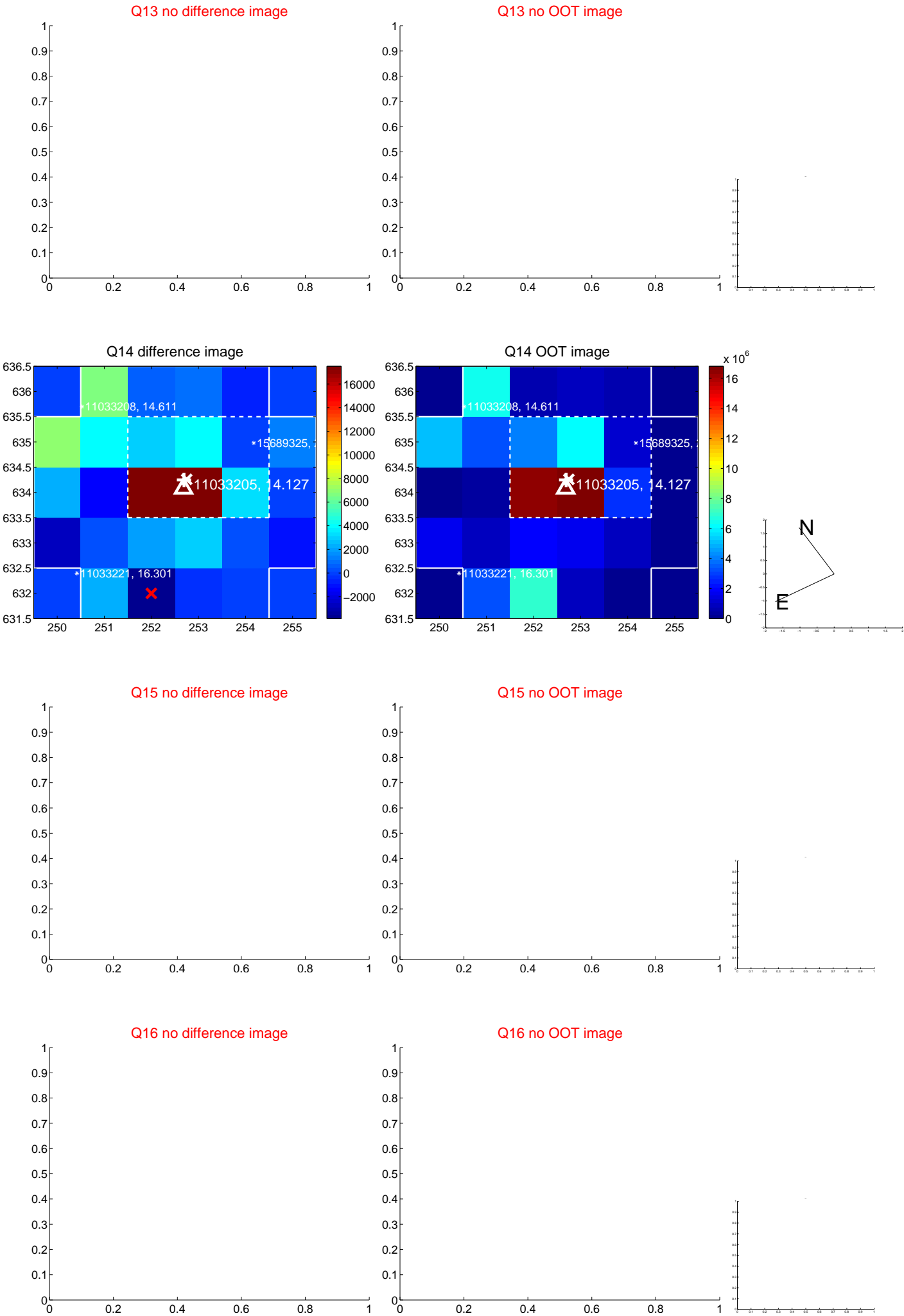
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



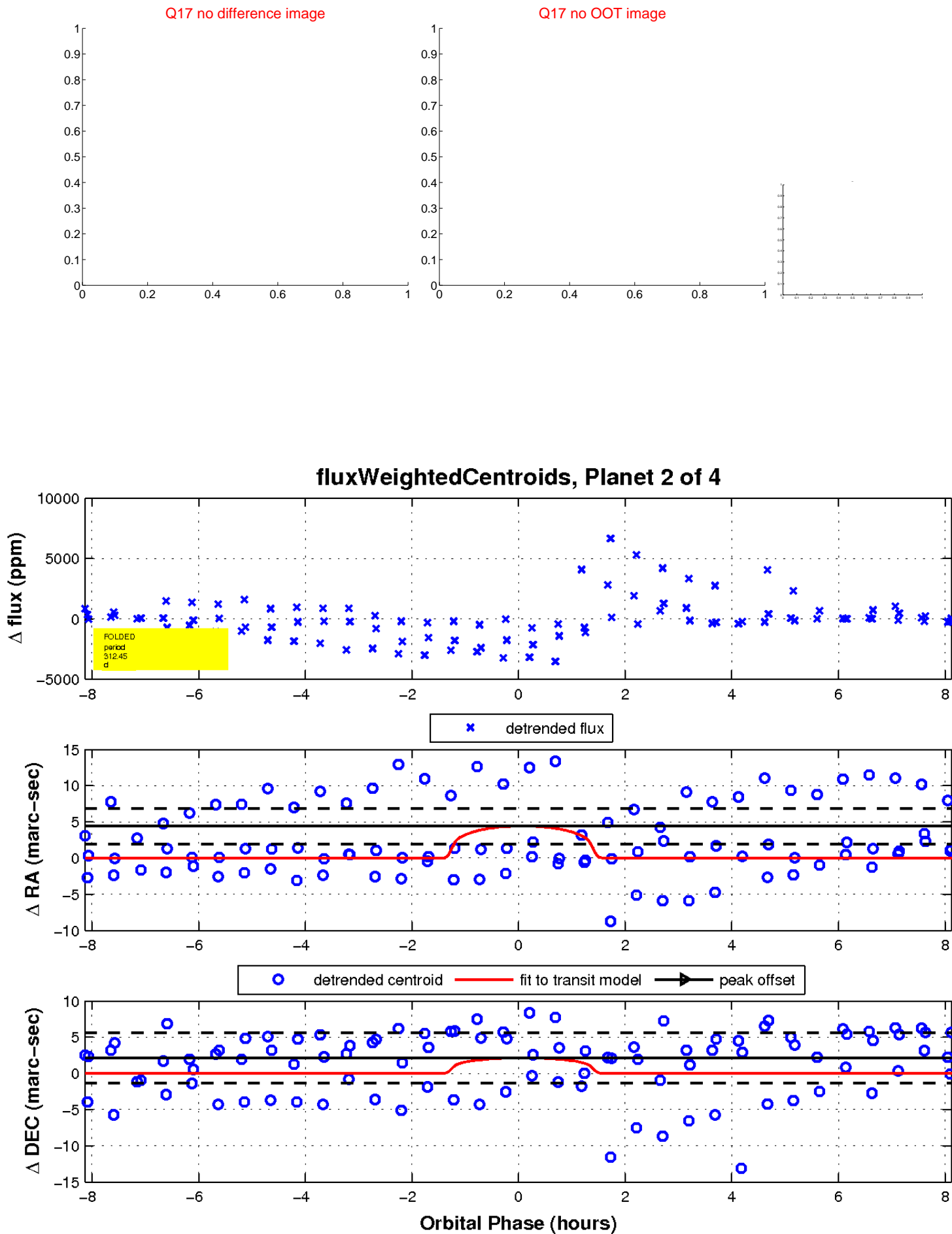
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

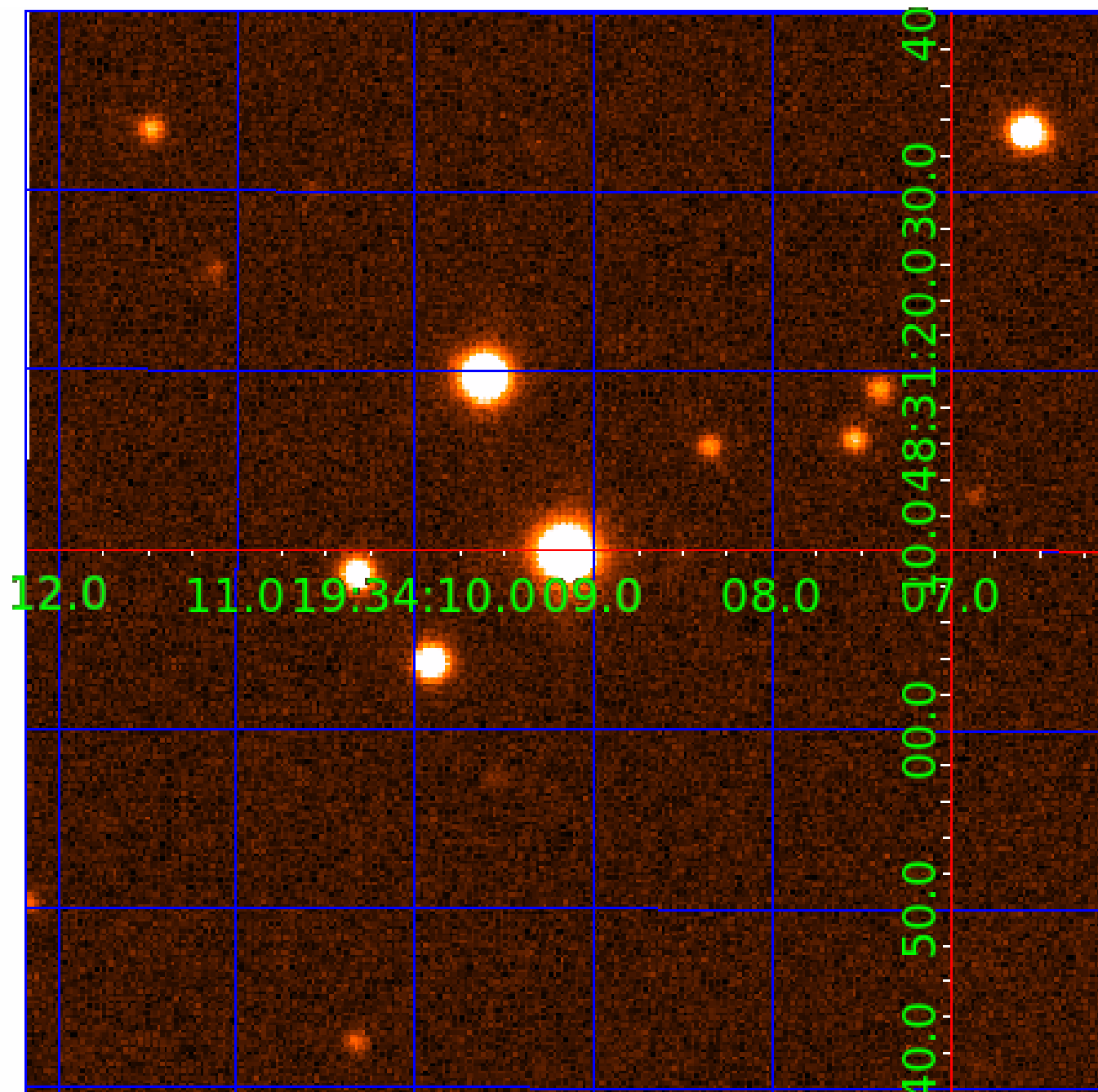


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 011033205

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
011033205-01	OBS	No	472.742341	377.854877	1522.2	2.337	14.9	6.7	0.68	4233	2.83	0.12
011033205-02	OBS	No	312.450613	410.688397	1697.1	2.812	15.3	5.7	0.68	4233	2.75	0.21
011033205-03	OBS	No	602.506054	197.071489	1487.4	4.870	15.9	4.9	0.68	4233	2.88	0.09
011033205-04	OBS	No	551.897453	458.995759	1404.1	5.015	15.3	4.8	0.68	4233	2.72	0.10

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
011033205-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
011033205-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES
011033205-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
011033205-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

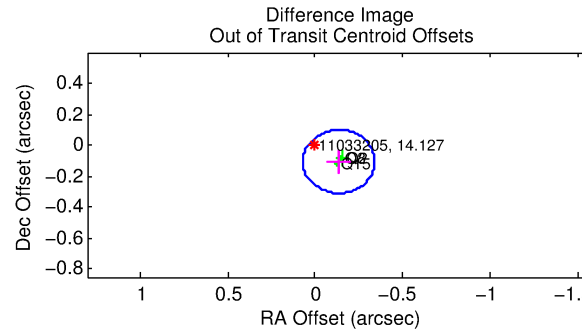
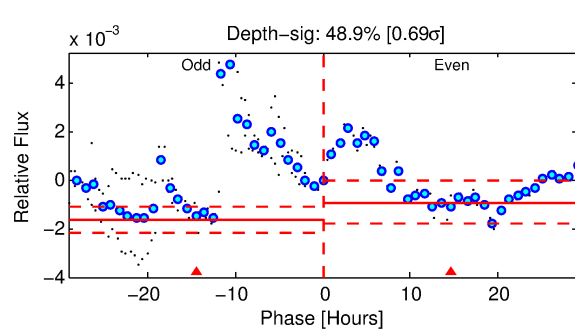
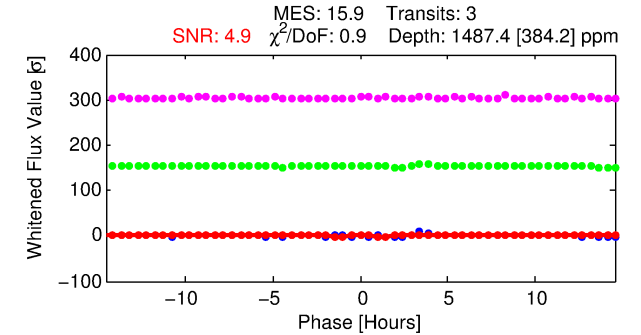
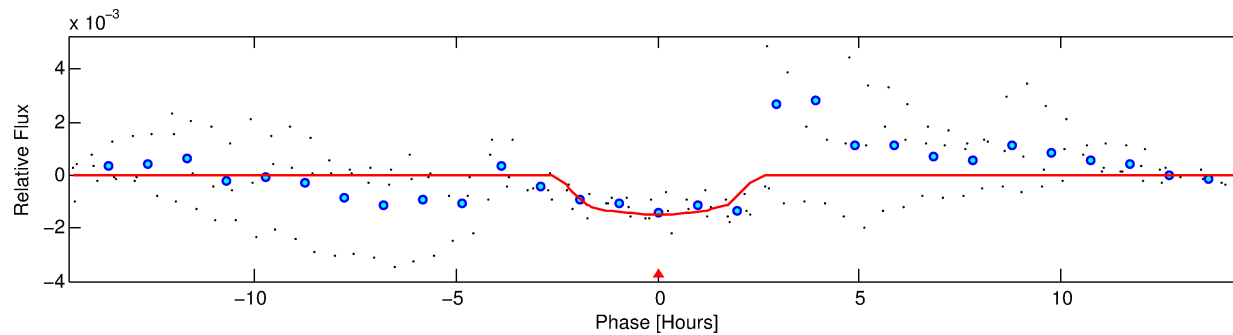
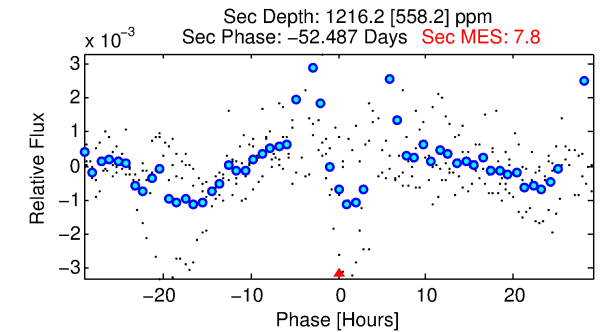
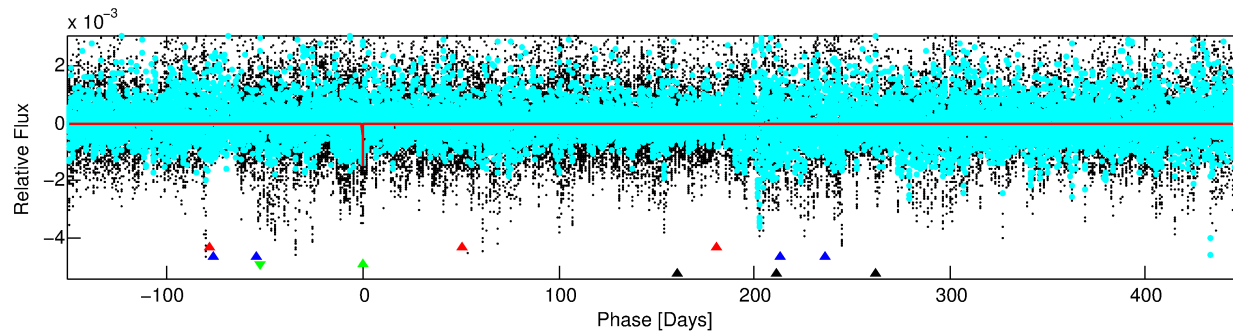
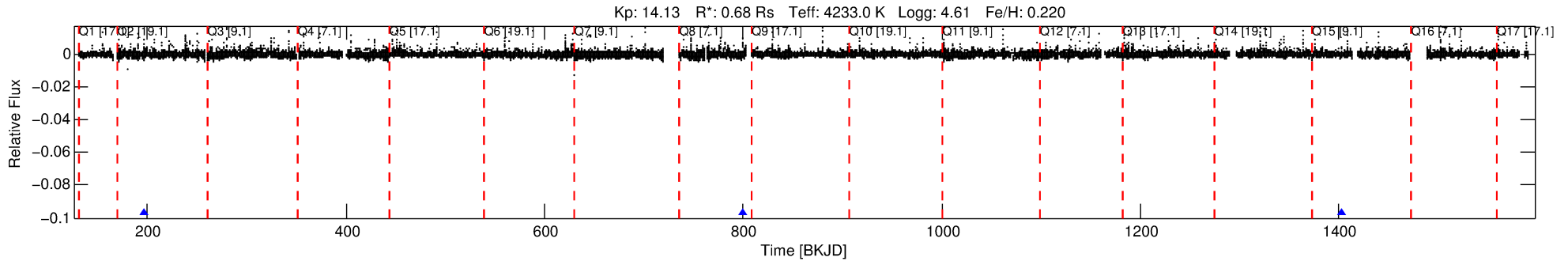
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 011033205-03

No Significant Match Found

# DV One-Page Summary

KIC: 11033205 Candidate: 3 of 4 Period: 602.506 d



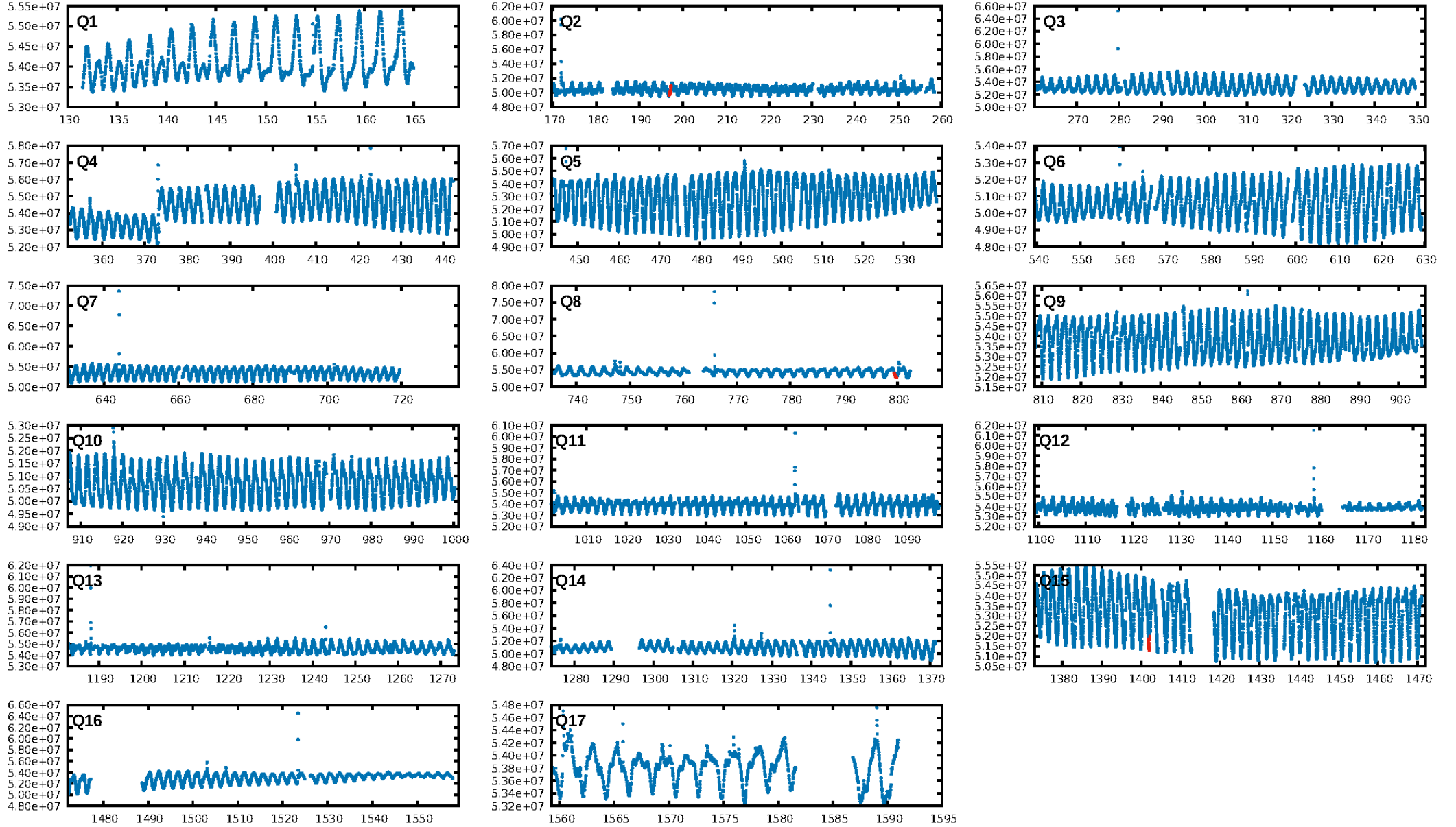
## DV Fit Results:

Period = 602.50605 [0.00567] d  
Epoch = 197.0715 [0.0090] BKJD  
Rp/R\* = 0.0391 [0.0456]  
a/R\* = 661.27 [2471.67]  
b = 0.77 [2.05]  
Seff = 0.09 [0.01]  
Teq = 139 [6] K  
Rp = 2.88 [3.37] Re  
a = 1.2224 [0.0849] AU  
Ag = 120421.36 [286432.33] [0.42 $\sigma$ ]  
Teffp = 3997 [2378] K [1.62 $\sigma$ ]

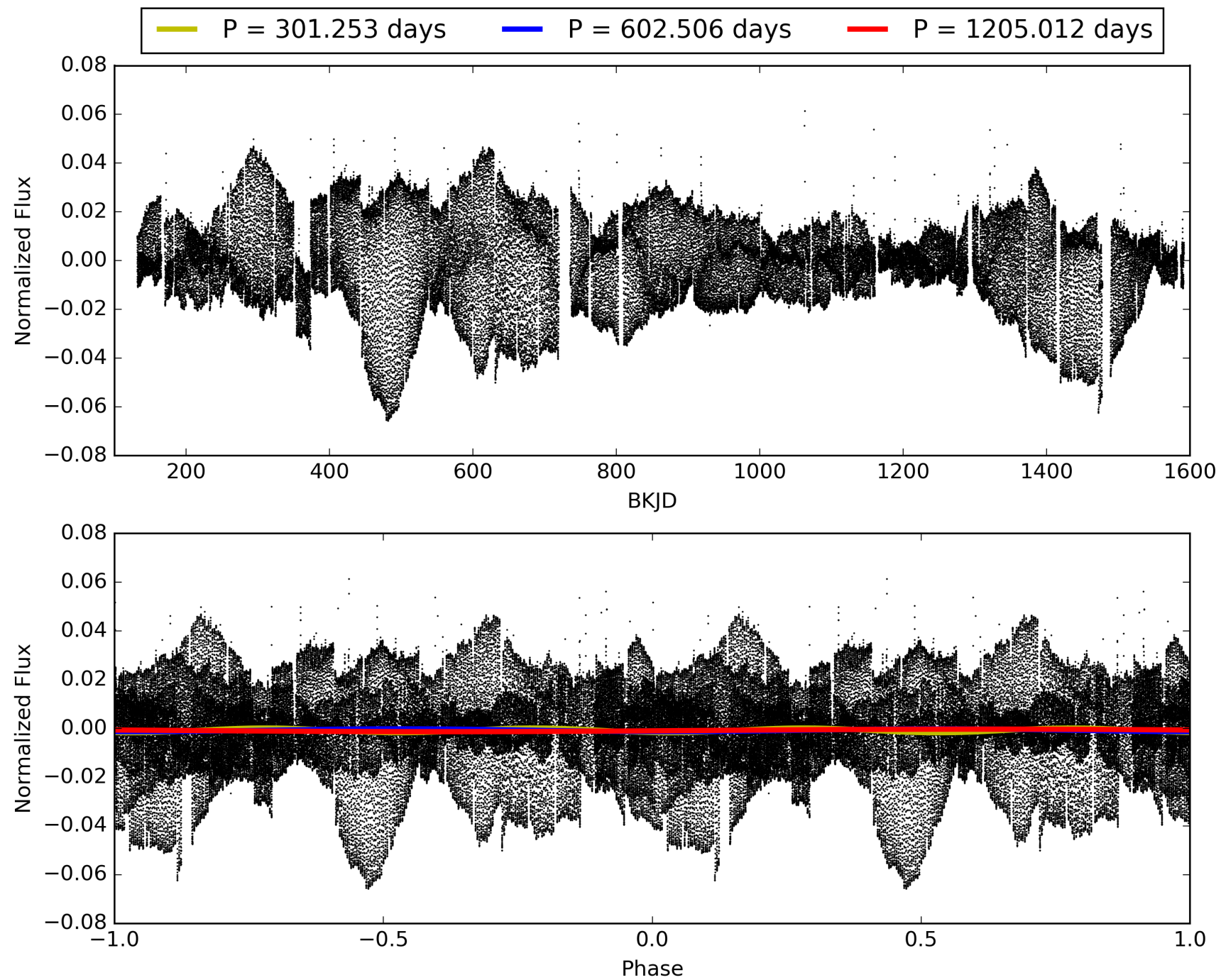
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [173.76 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 75.6%  
ModelChiSquareGof-sig: 94.1%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: -1.265  
Centroid-sig: 0.1%  
Centroid-so: 1.067 arcsec [0.83 $\sigma$ ]  
OotOffset-rm: 0.170 arcsec [2.49 $\sigma$ ]  
KicOffset-rm: 0.103 arcsec [1.42 $\sigma$ ]  
OotOffset-st: 1/1/1/0 [3]  
KicOffset-st: 1/1/1/0 [3]  
DiffImageQuality-fgm: 1.00 [3/3]  
DiffImageOverlap-fno: 1.00 [3/3]

# TCE 011033205-03, PDC Light Curves

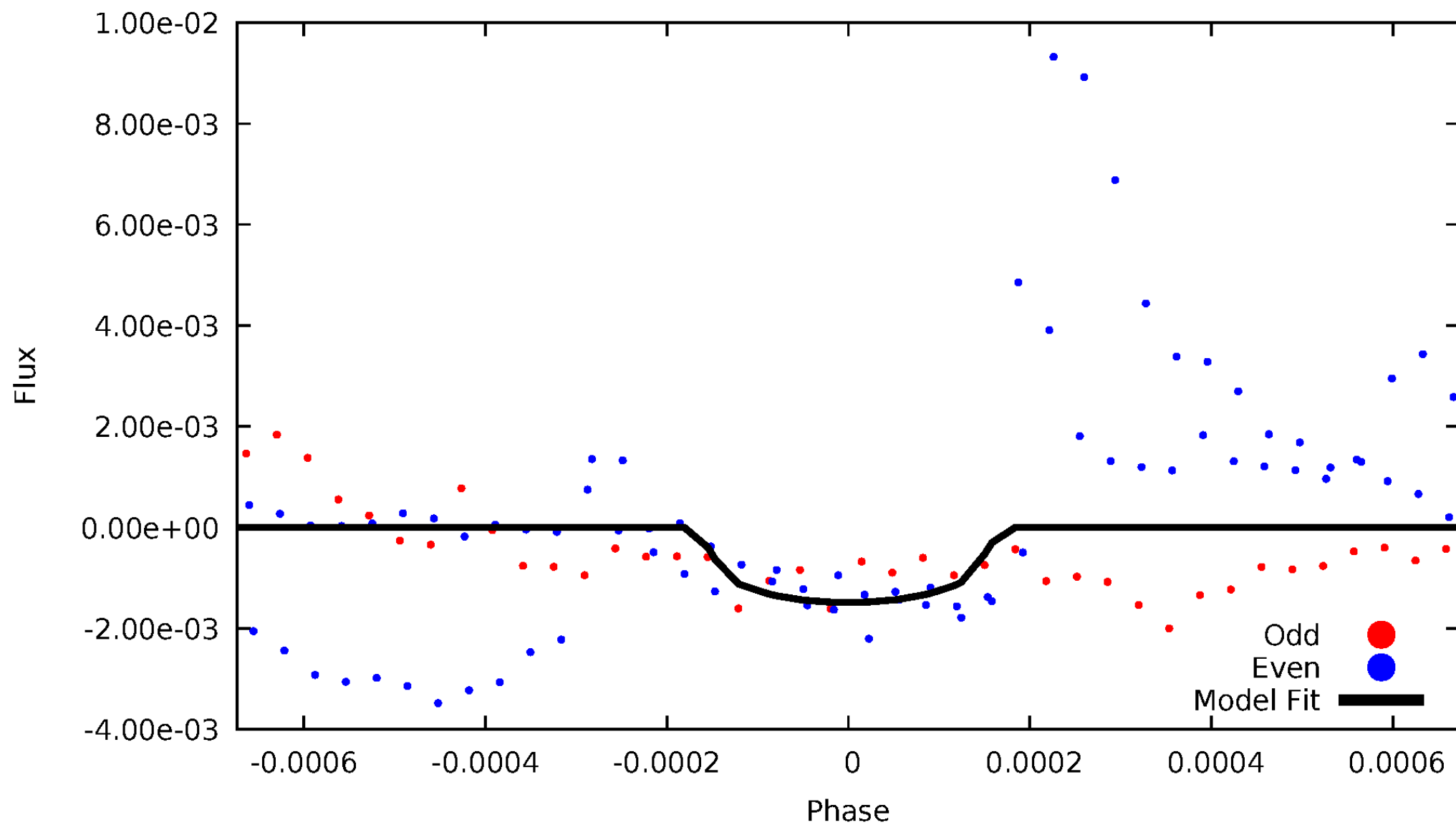


TCE 011033205-03



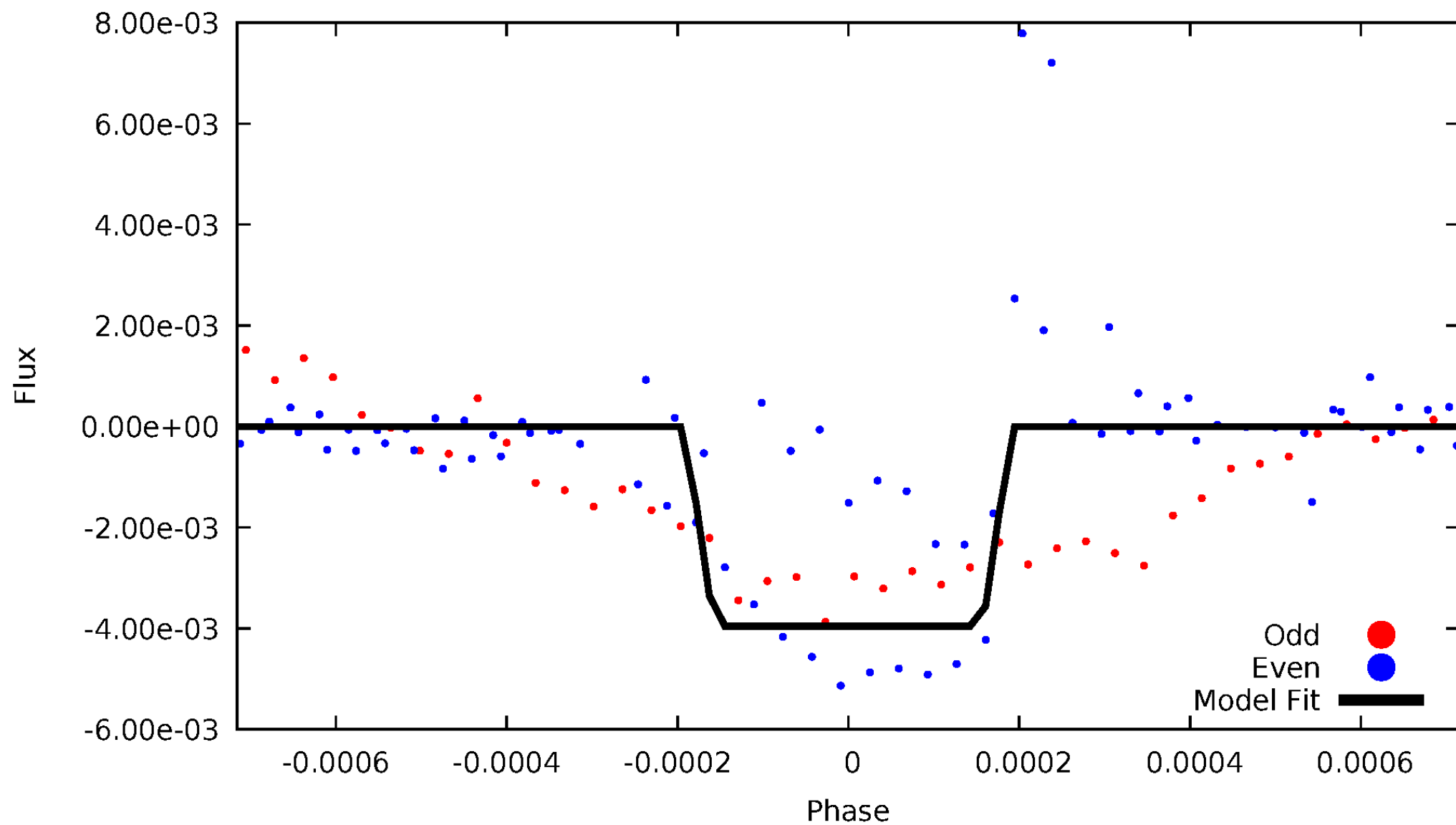
# DV Odd/Even

TCE 011033205-03



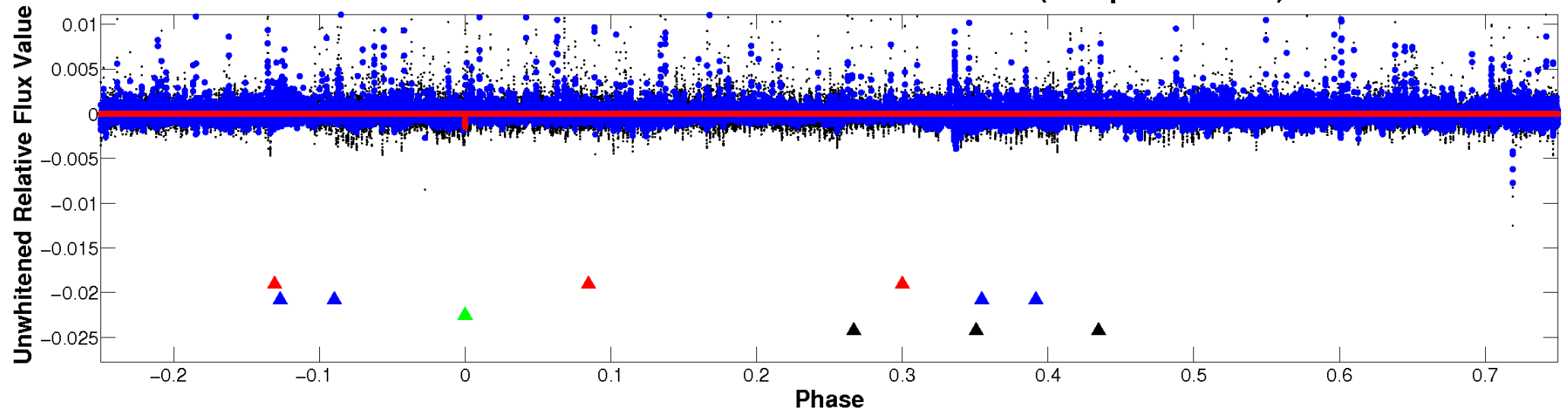
# ALT Odd/Even

TCE 011033205-03

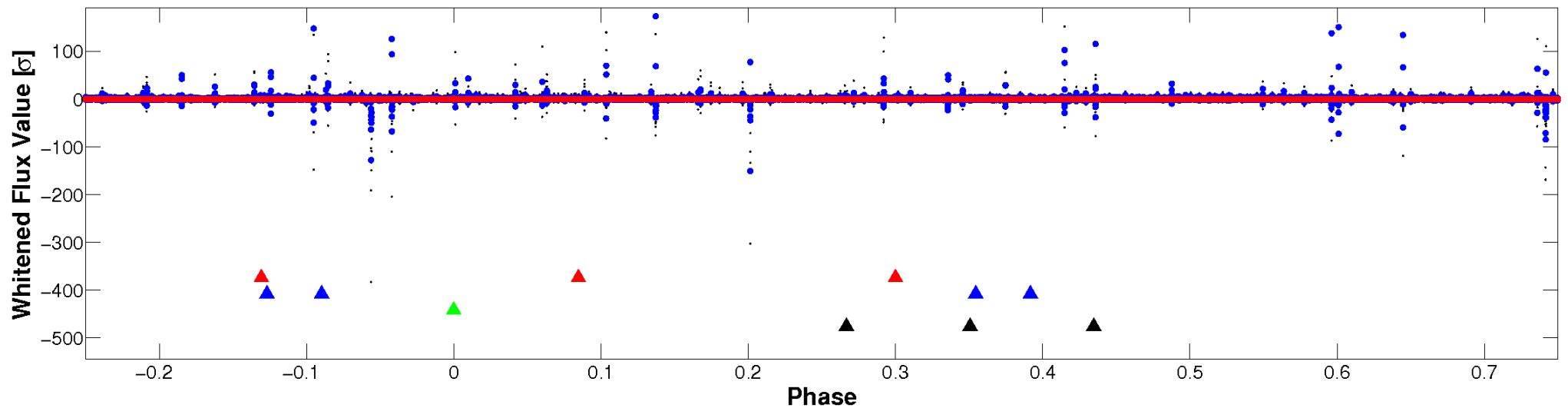


# Non-Whitened Vs. Whitened Light Curve

**Planet 3 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)**

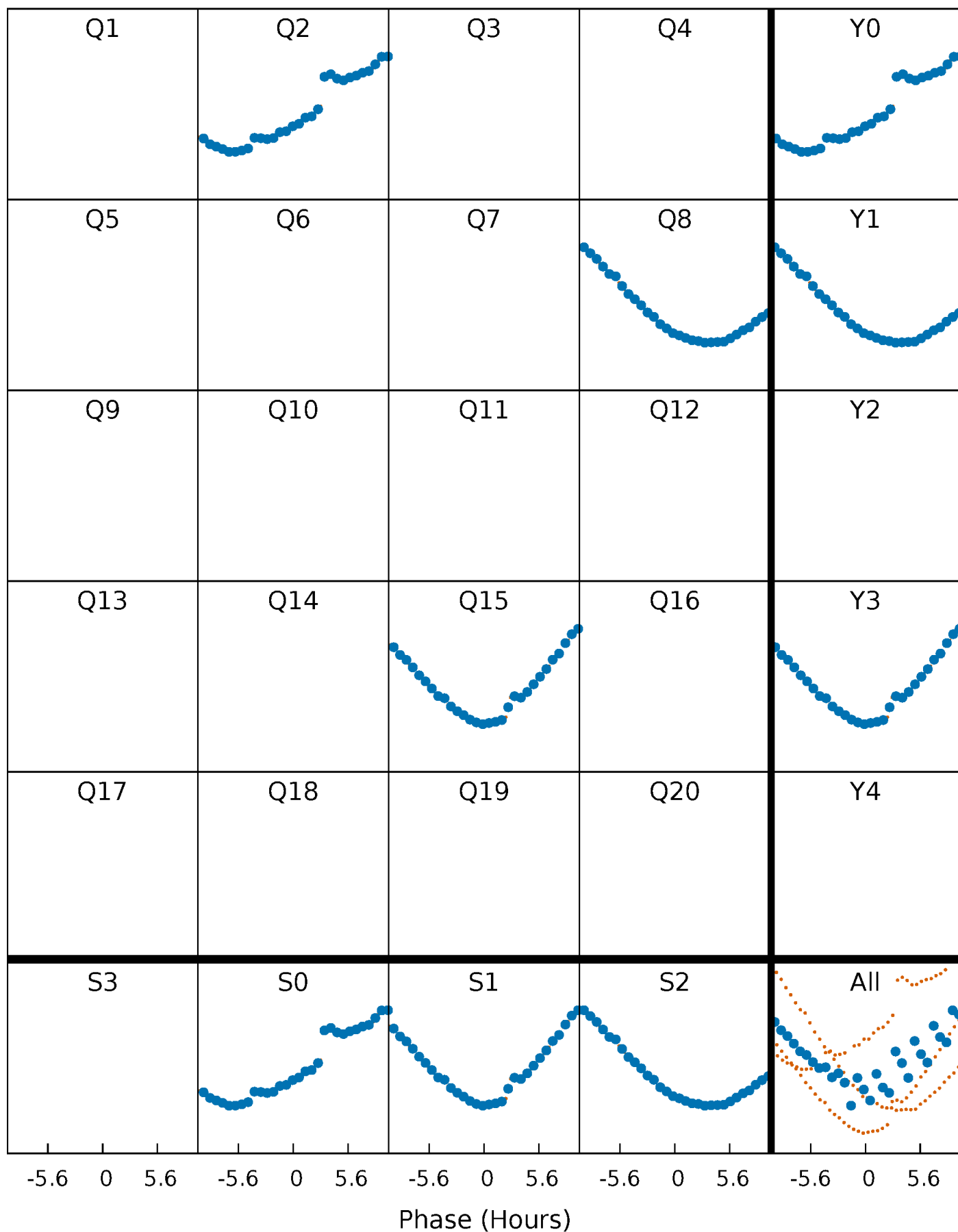


**Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

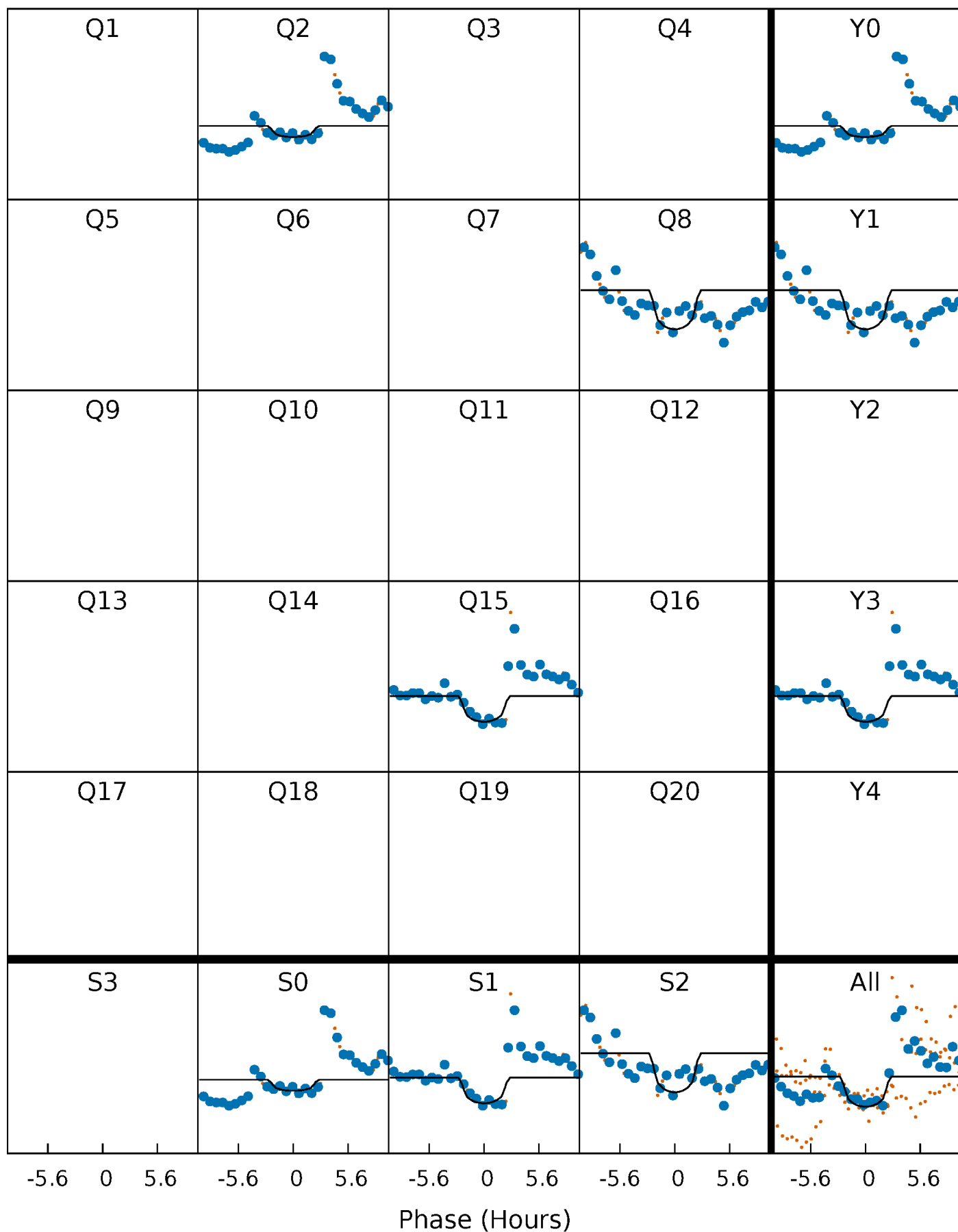
TCE 011033205-03 P=602.506054 Days  $T_0=197.071489$  (BKJD)





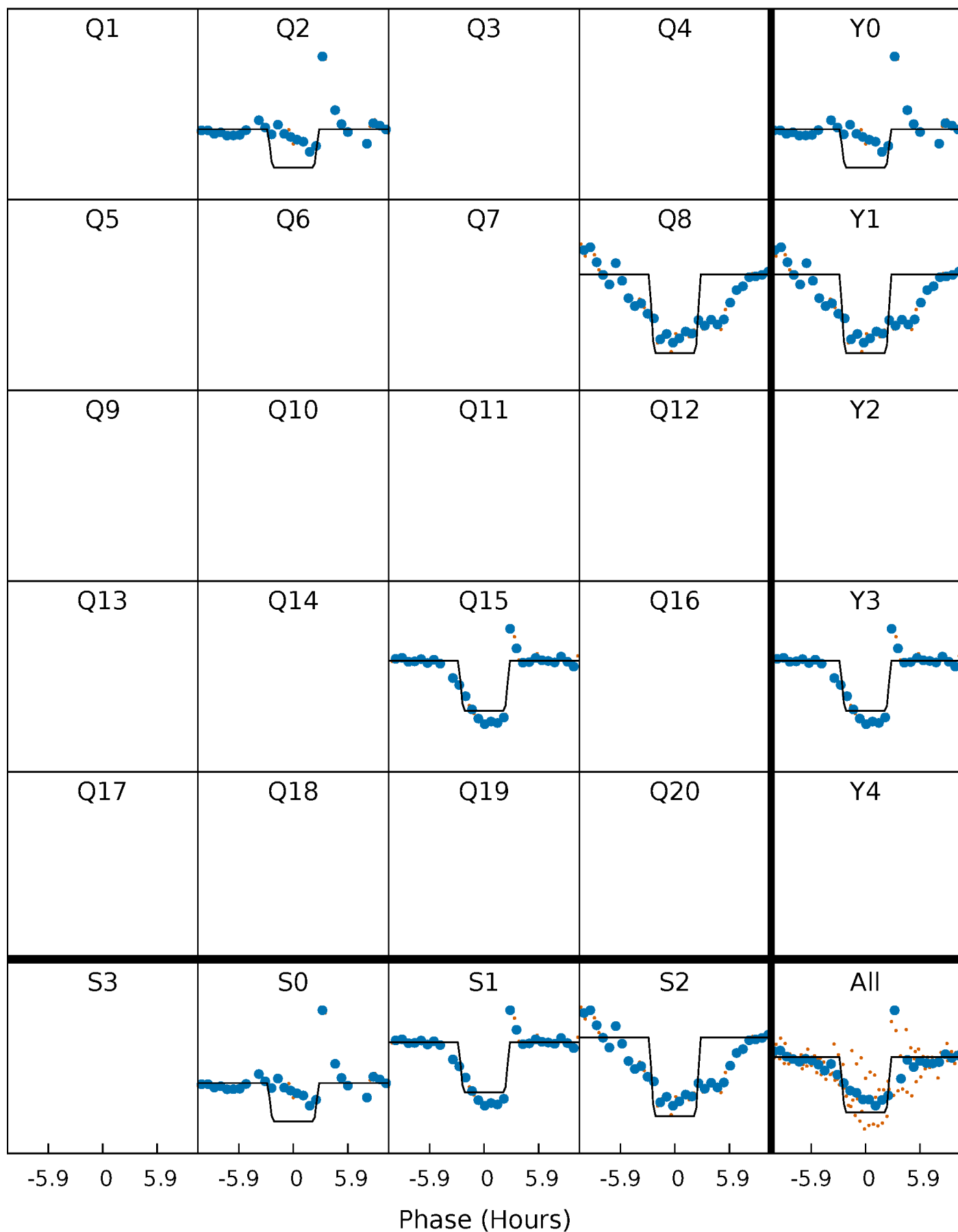
# DV Quarter-Phased Transit Curves

TCE 011033205-03 P=602.506054 Days  $T_0=197.071489$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

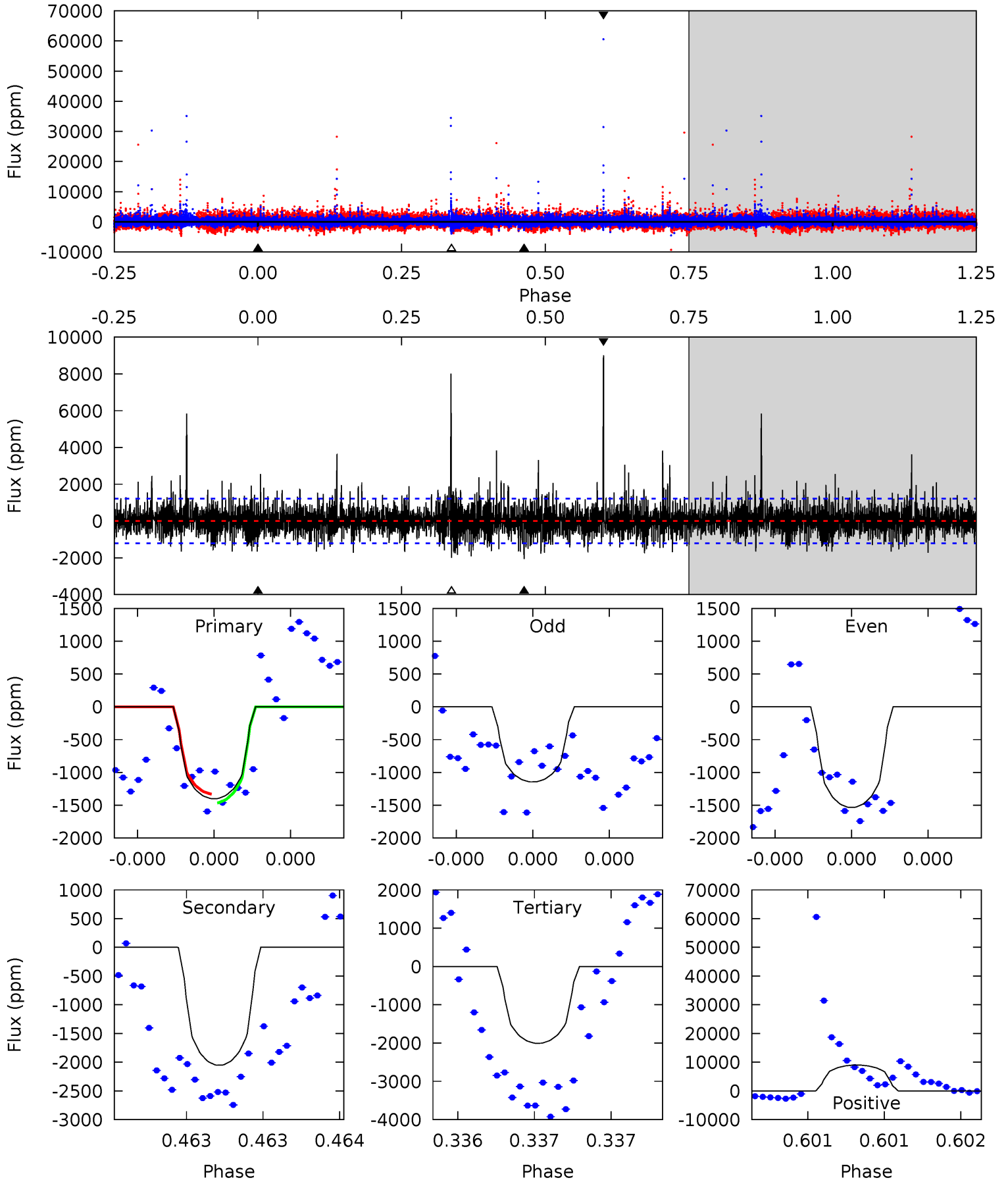
TCE 011033205-03 P=602.497139 Days  $T_0=197.084968$  (BKJD)



# DV Model-Shift Uniqueness Test

011033205-03, P = 602.506054 Days, E = 197.071489 Days

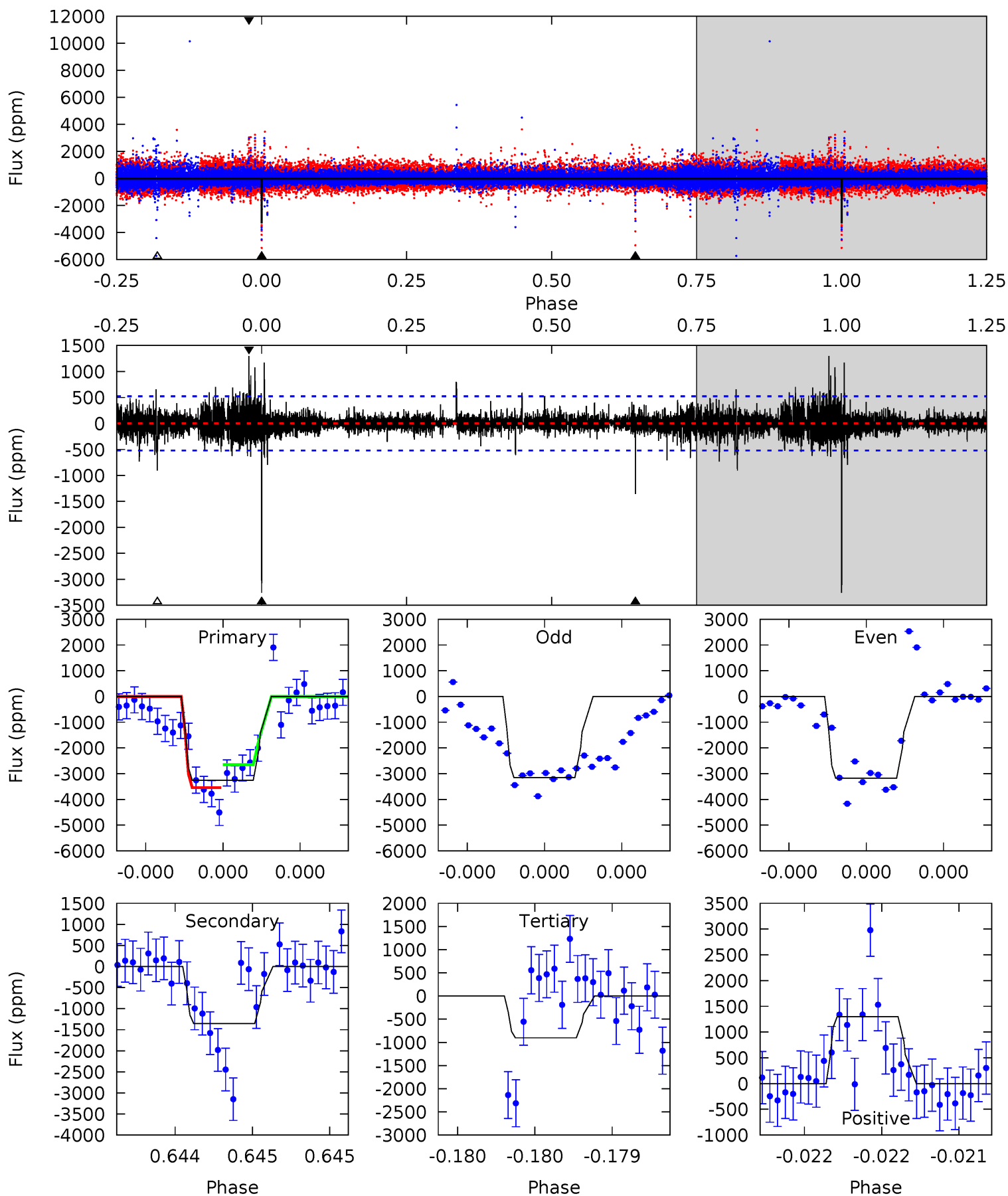
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.50	9.54	9.32	41.8	5.64	3.58	2.89	-2.81	-35.3	0.22	-32.3	0.30	0.96	0.81	0.31



# Alt Model-Shift Uniqueness Test

011033205-03, P = 602.497139 Days, E = 197.084968 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
35.2	14.6	9.76	14.0	5.63	3.56	1.44	25.4	21.2	4.89	0.64	0.11	0.92	0.28	4.76



### Stellar Parameters For KIC 011033205

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4233^{+142}_{-142}$	$4.606^{+0.053}_{-0.018}$	$0.220^{+0.200}_{-0.300}$	$0.675^{+0.028}_{-0.057}$	$0.671^{+0.047}_{-0.052}$	$3.072^{+0.658}_{-0.245}$
	+3%/-3%	+1%/-0%	+91%/-136%	+4%/-8%	+7%/-8%	+21%/-8%
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 011033205-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-2052 \pm 215$	$3.74^{+2.89}_{-2.53}$	$192^{+7}_{-7}$	$4027^{+2460}_{-692}$	$119648^{+980474}_{-81292}$
Alt.	$-1356 \pm 93$	$4.76^{+3.06}_{-2.65}$	$192^{+7}_{-7}$	$3475^{+1133}_{-486}$	$49501^{+200464}_{-31048}$

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

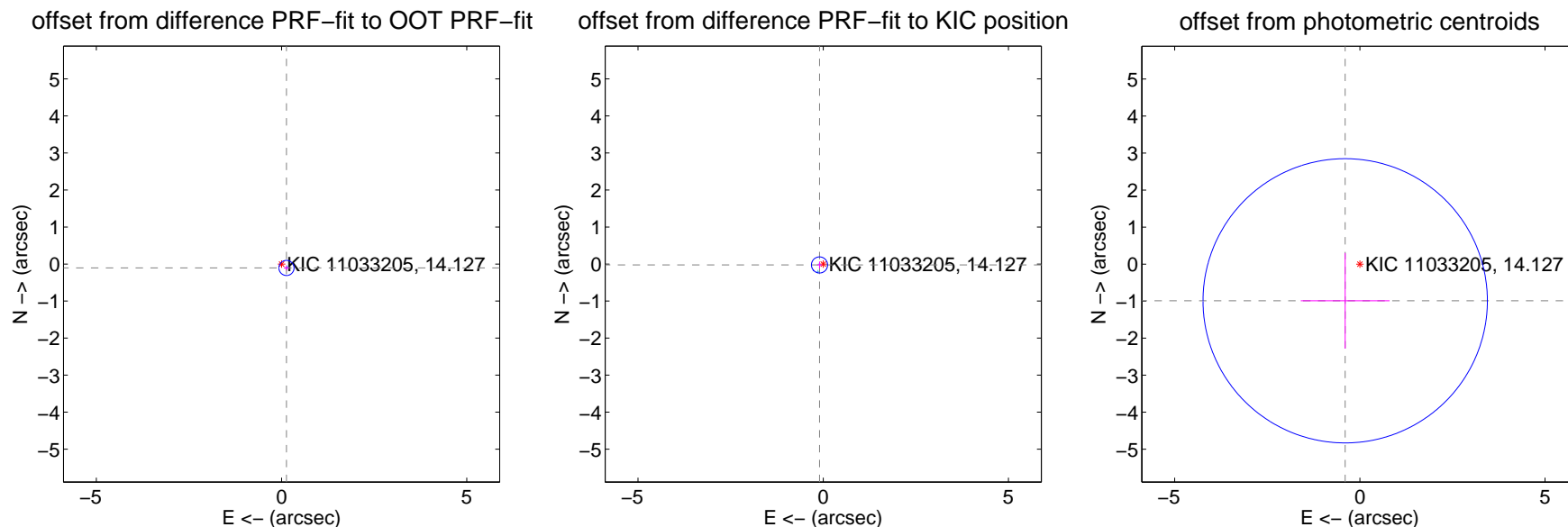
## DV Centroid Data

Supplemental centroid analysis for 011033205-03. Kepler magnitude: 14.13. Transit SNR 4.93

There are 3 quarters with good PRF difference image offsets

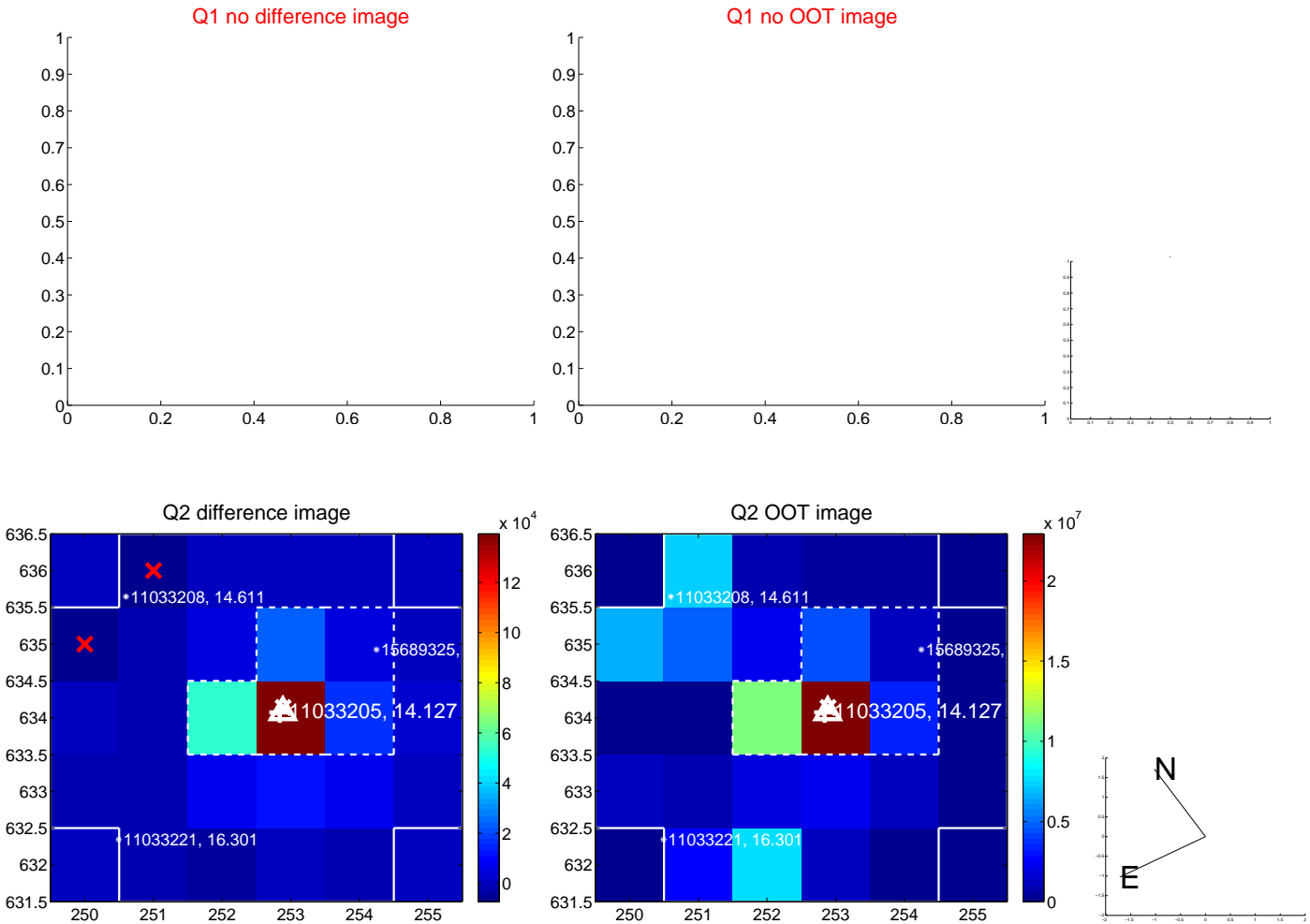
The direct PRF centroid is offset from the target star catalog position by about 0.22 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.170 \pm 0.068$	2.49	$-0.133 \pm 0.068$	$-0.105 \pm 0.069$
PRF-fit source offset from KIC position	$0.103 \pm 0.073$	1.42	$0.100 \pm 0.069$	$-0.024 \pm 0.093$
photometric centroid source offset	$1.07 \pm 1.28$	0.83	$0.40 \pm 1.20$	$-0.99 \pm 1.29$

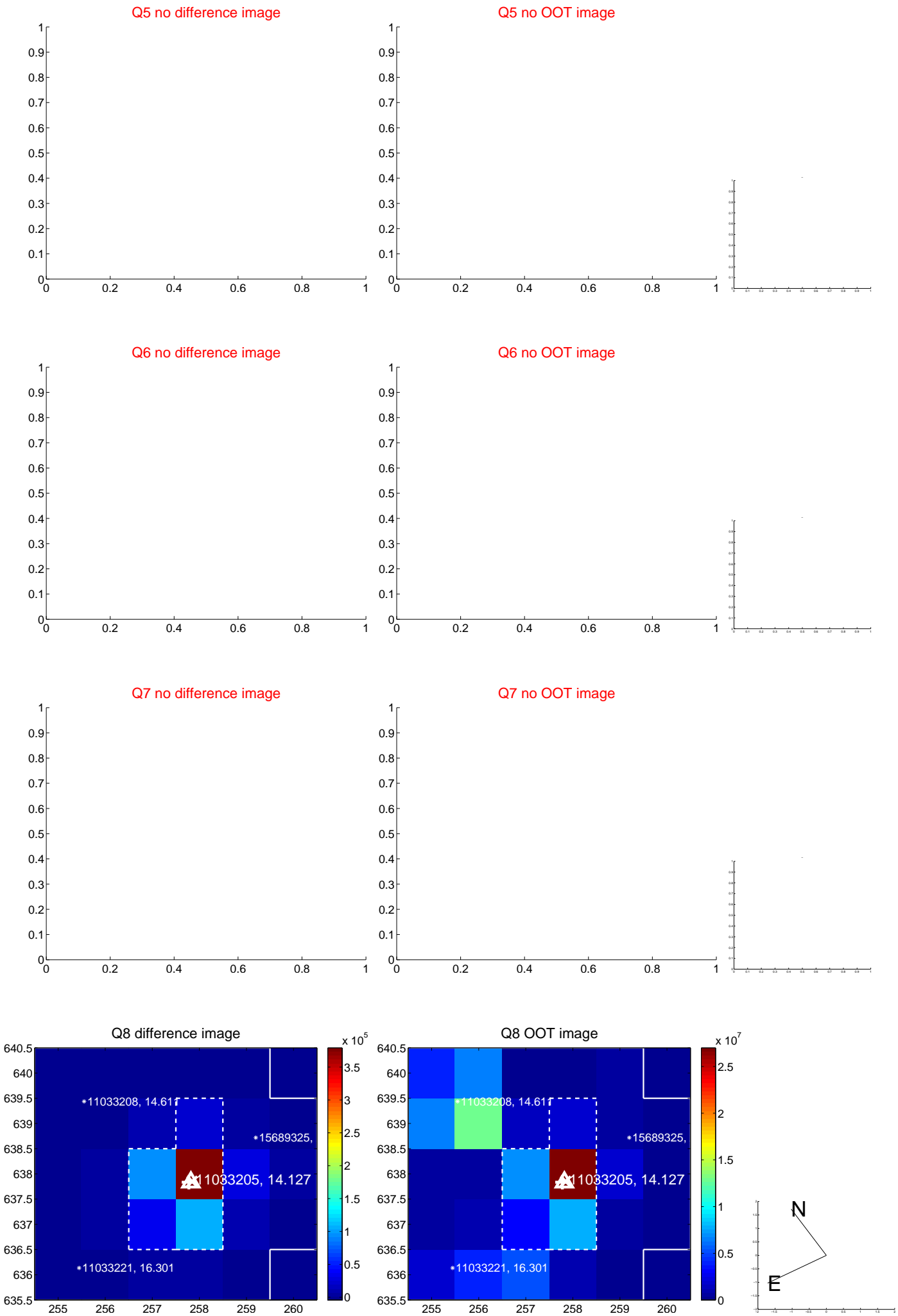


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

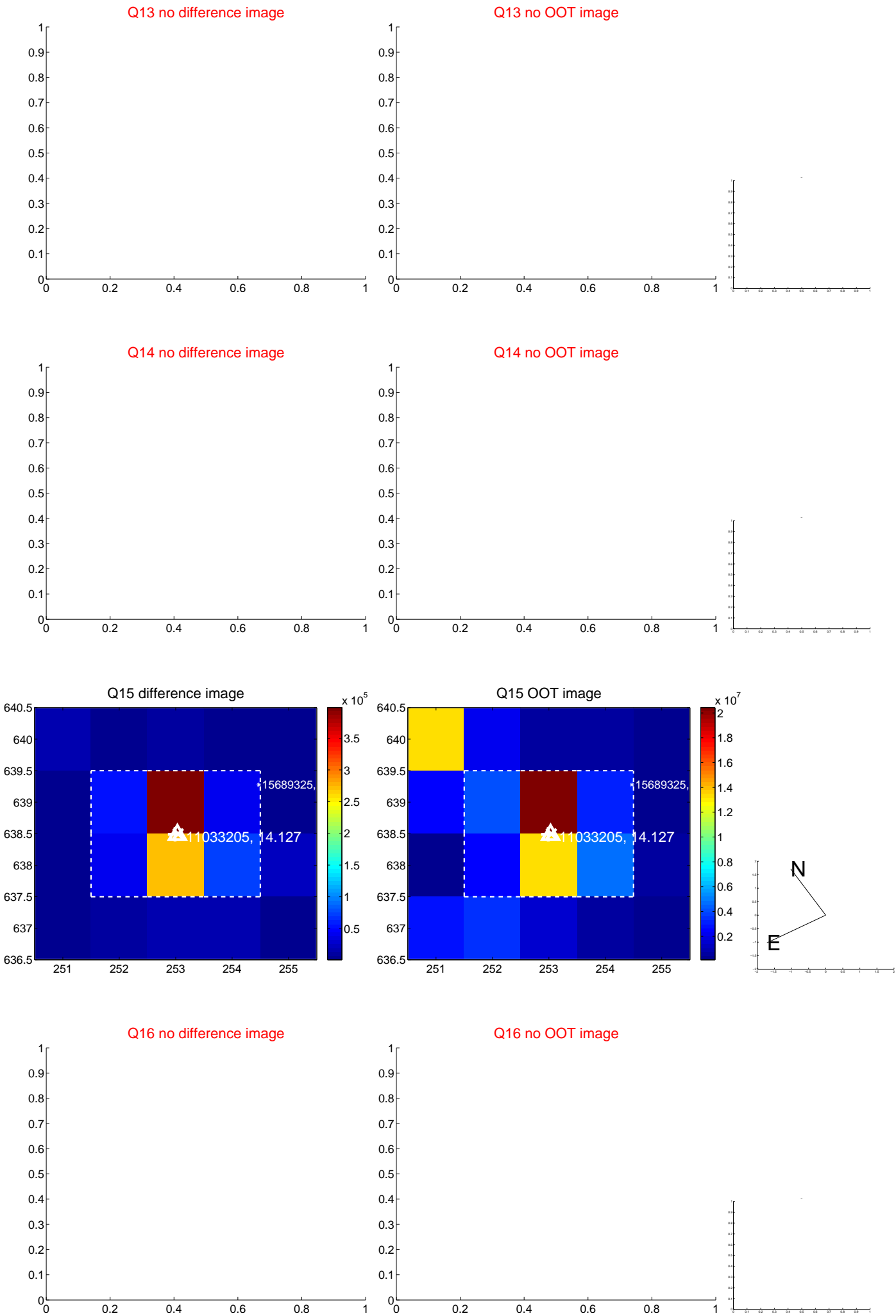




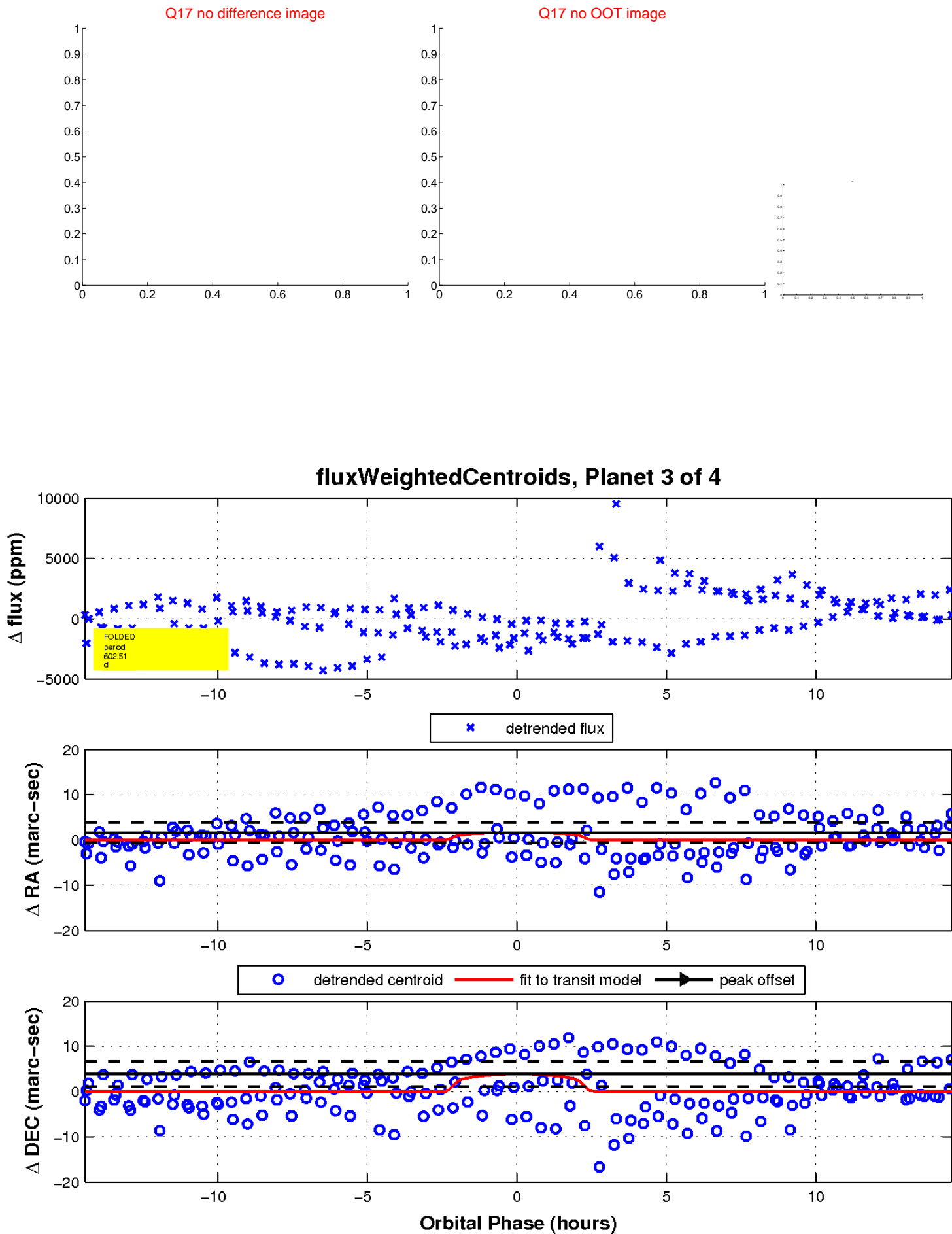
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

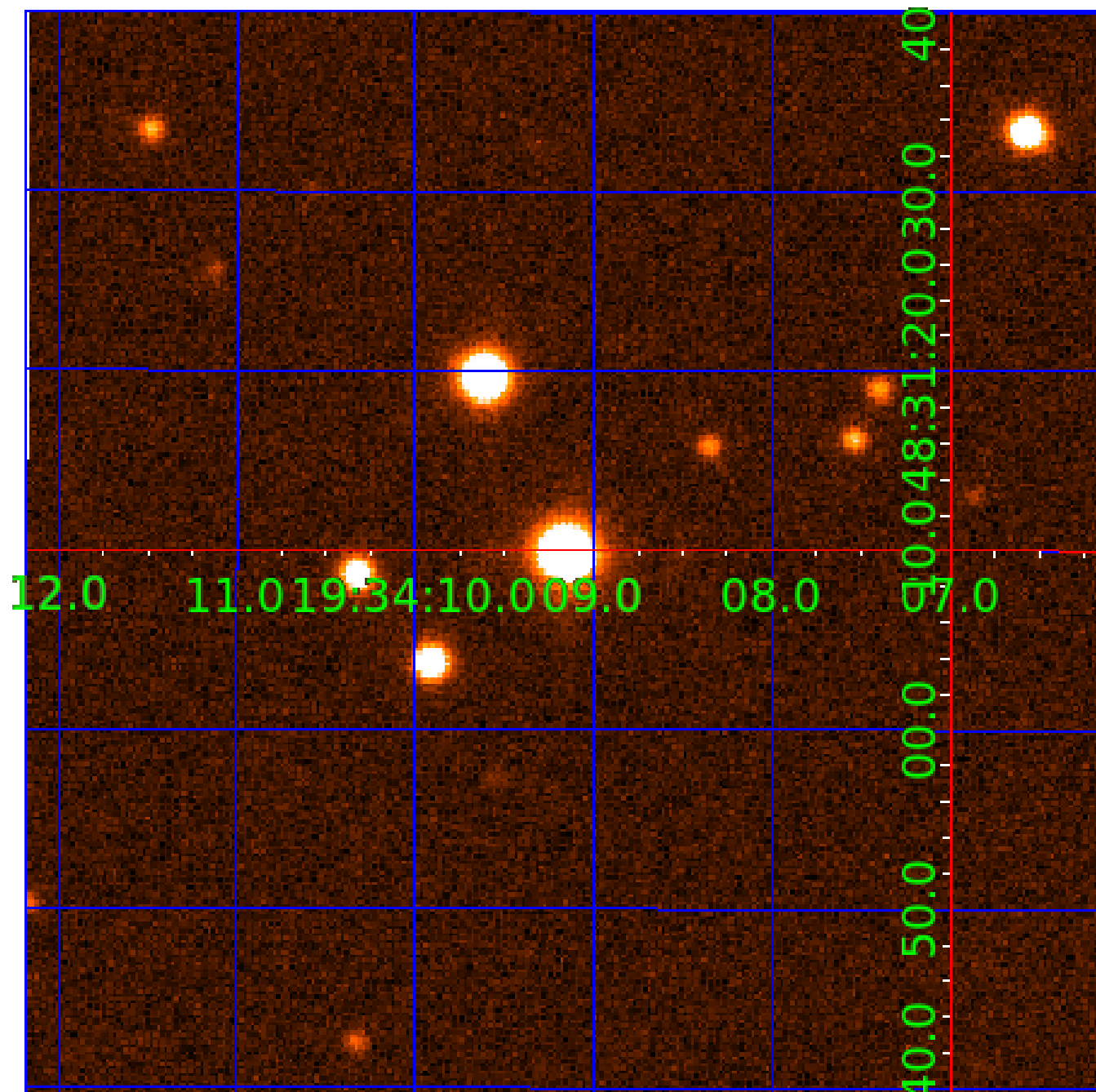


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 011033205

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
011033205-01	OBS	No	472.742341	377.854877	1522.2	2.337	14.9	6.7	0.68	4233	2.83	0.12
011033205-02	OBS	No	312.450613	410.688397	1697.1	2.812	15.3	5.7	0.68	4233	2.75	0.21
011033205-03	OBS	No	602.506054	197.071489	1487.4	4.870	15.9	4.9	0.68	4233	2.88	0.09
011033205-04	OBS	No	551.897453	458.995759	1404.1	5.015	15.3	4.8	0.68	4233	2.72	0.10

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
011033205-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
011033205-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES
011033205-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
011033205-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

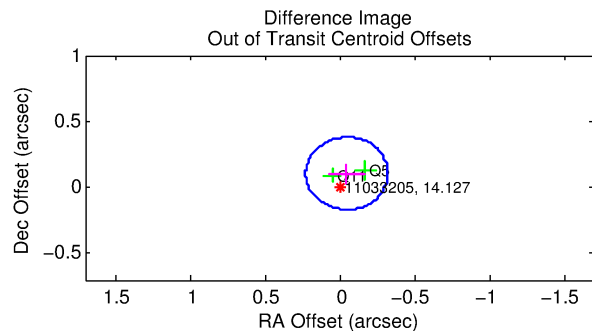
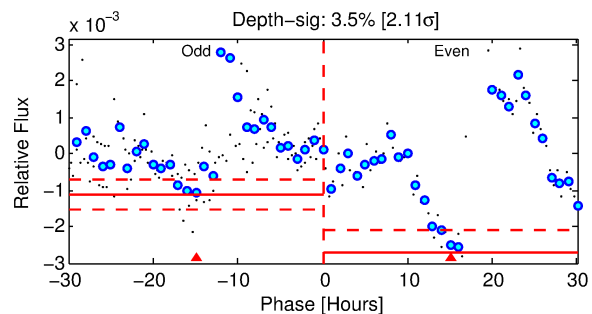
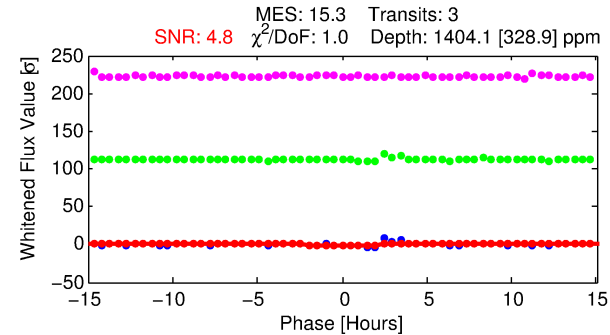
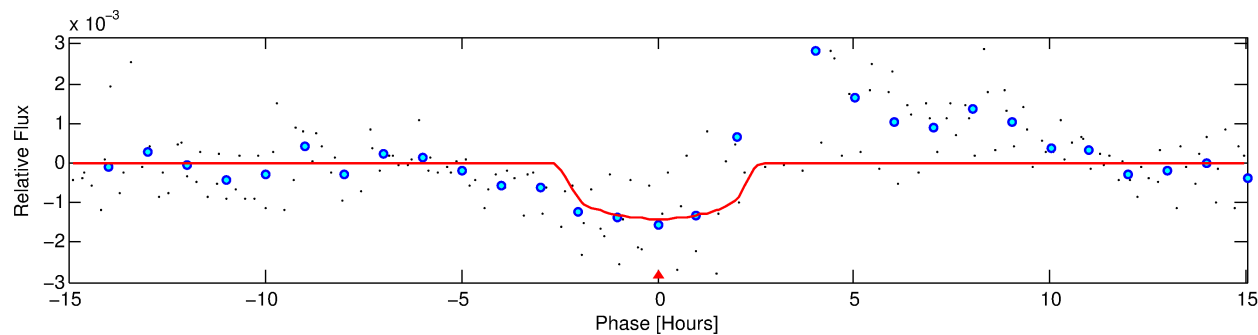
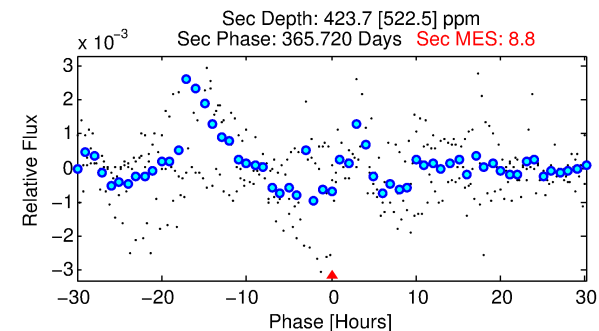
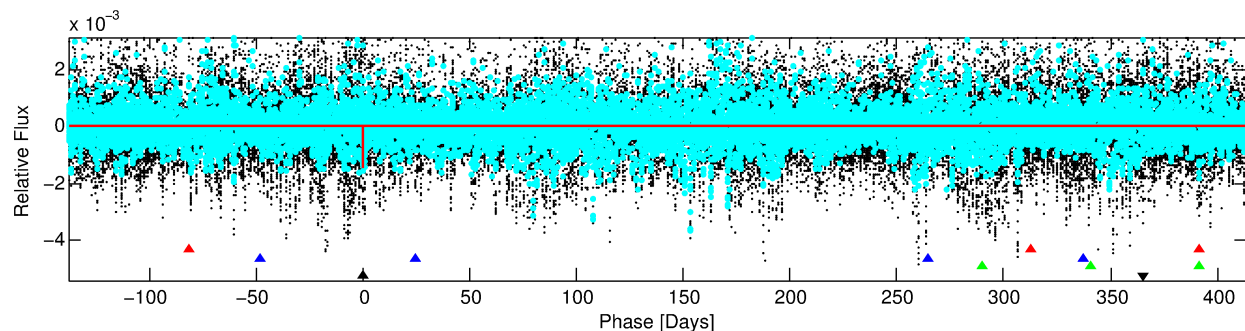
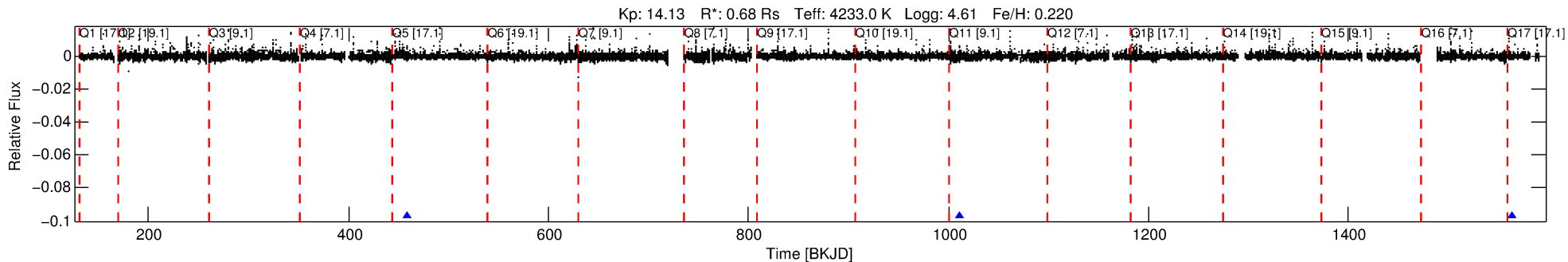
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 011033205-04

No Significant Match Found

# DV One-Page Summary

KIC: 11033205 Candidate: 4 of 4 Period: 551.897 d



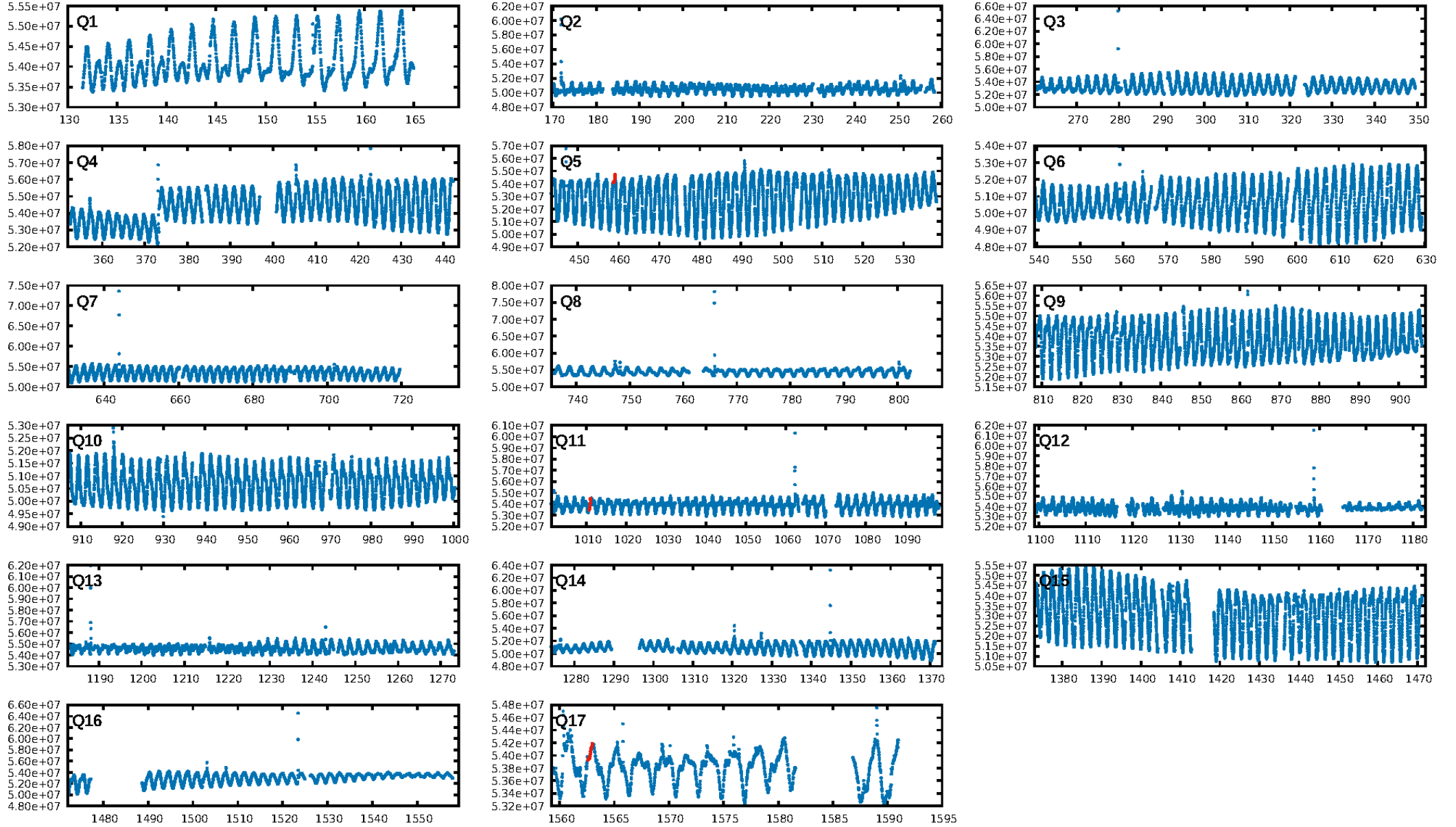
## DV Fit Results:

Period = 551.89745 [0.00681] d  
Epoch = 458.9958 [0.0092] BKJD  
Rp/R\* = 0.0370 [0.0272]  
a/R\* = 628.48 [1368.63]  
b = 0.72 [1.50]  
Seff = 0.10 [0.02]  
Teq = 143 [6] K  
Rp = 2.72 [2.02] Re  
a = 1.1529 [0.0801] AU  
Ag = 41766.68 [80362.34] [0.52σ]  
Teffp = 3158 [1521] K [1.98σ]

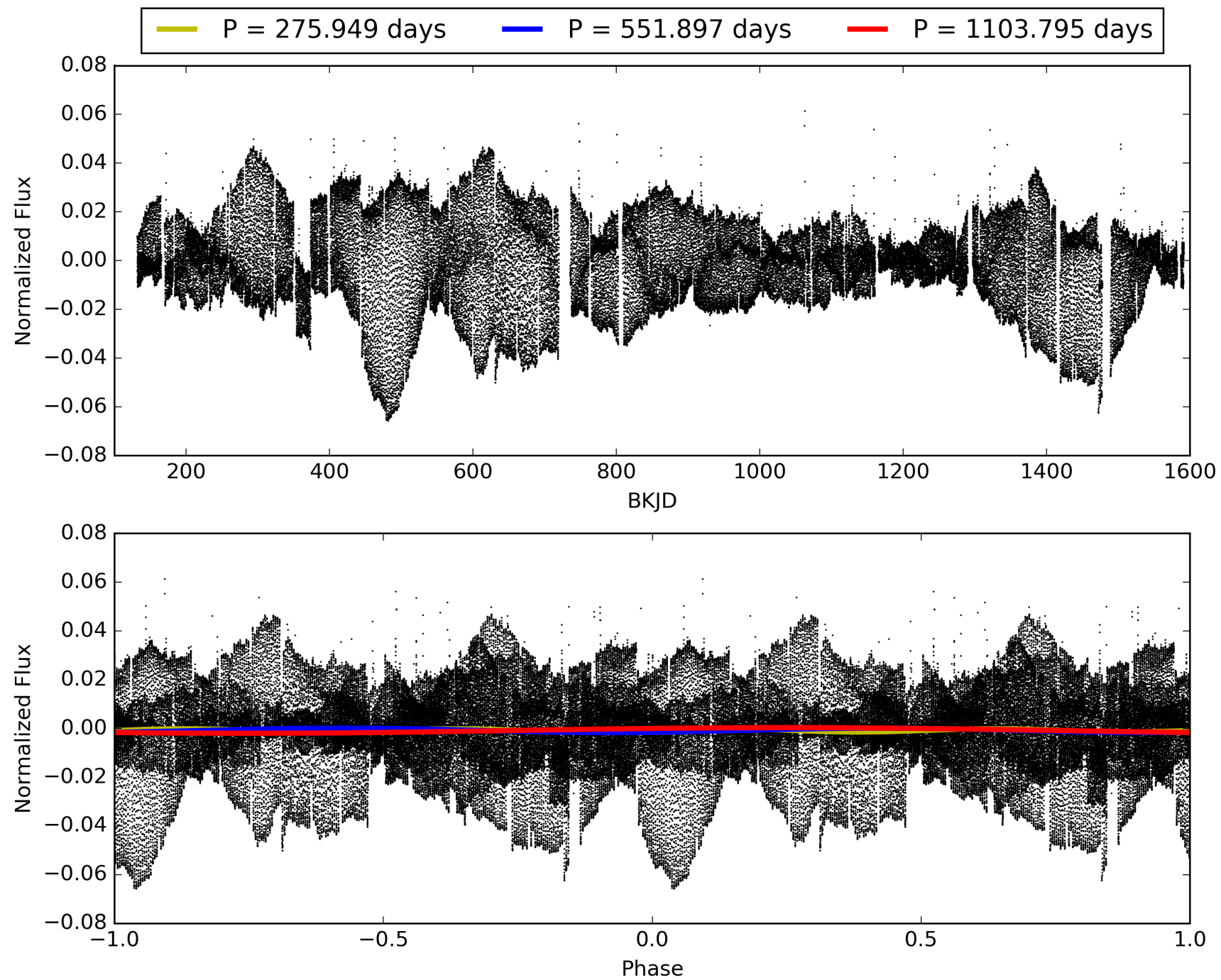
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [343.38σ]  
LongPeriod-sig: 100.0% [173.76σ]  
ModelChiSquare2-sig: 2.1%  
ModelChiSquareGof-sig: 94.5%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [2/2]  
GhostDiagnostic-chr: 1.206  
Centroid-sig: 67.3%  
Centroid-so: 1.002 arcsec [0.50σ]  
OotOffset-rm: 0.117 arcsec [1.28σ]  
**KicOffset-rm: 0.310 arcsec [3.88σ]**  
OotOffset-st: 0/1/0/1 [2]  
KicOffset-st: 0/1/0/1 [2]  
DiffImageQuality-fgm: 0.50 [1/2]  
DiffImageOverlap-fno: 1.00 [3/3]

# TCE 011033205-04, PDC Light Curves



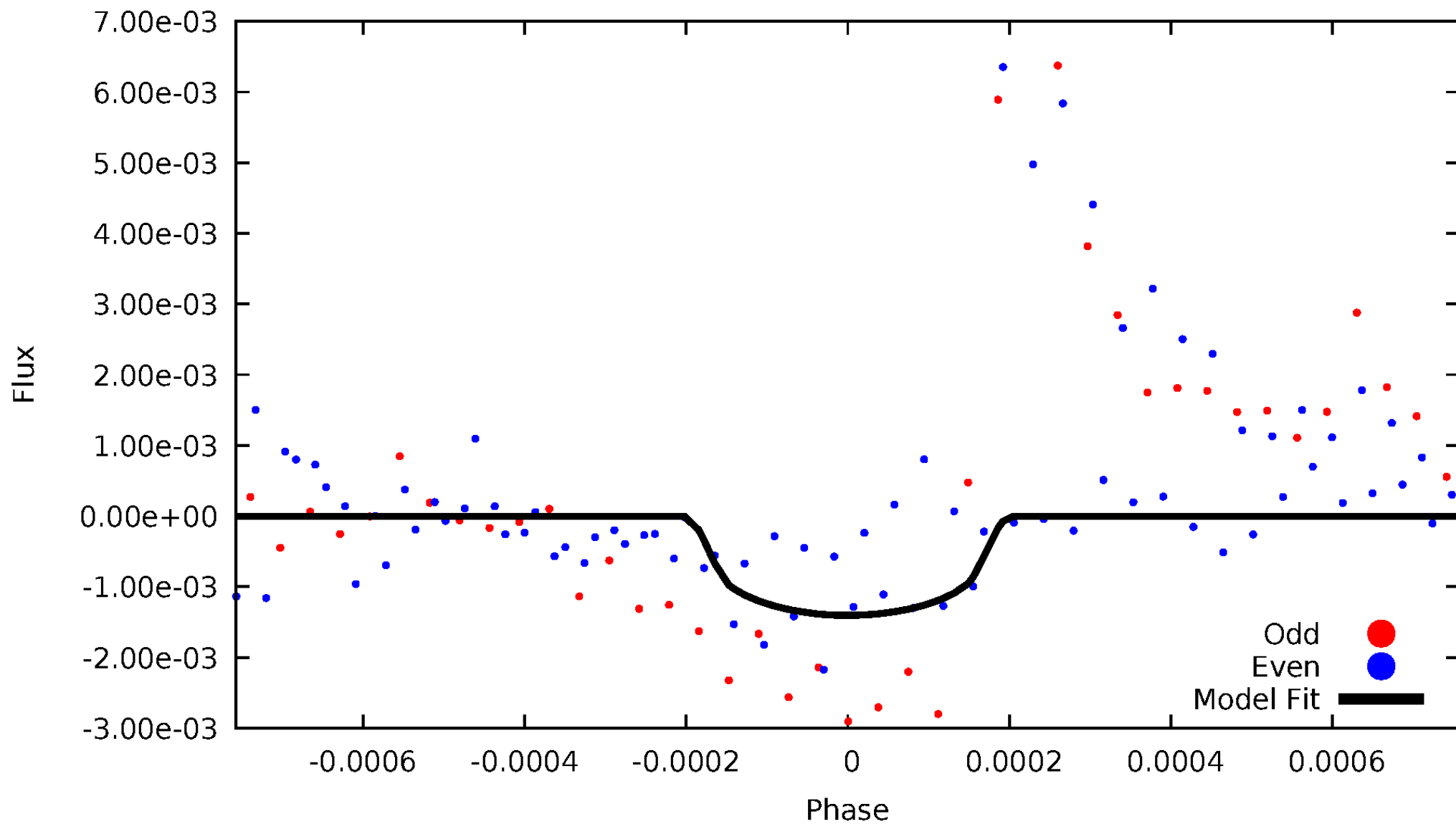
TCE 011033205-04





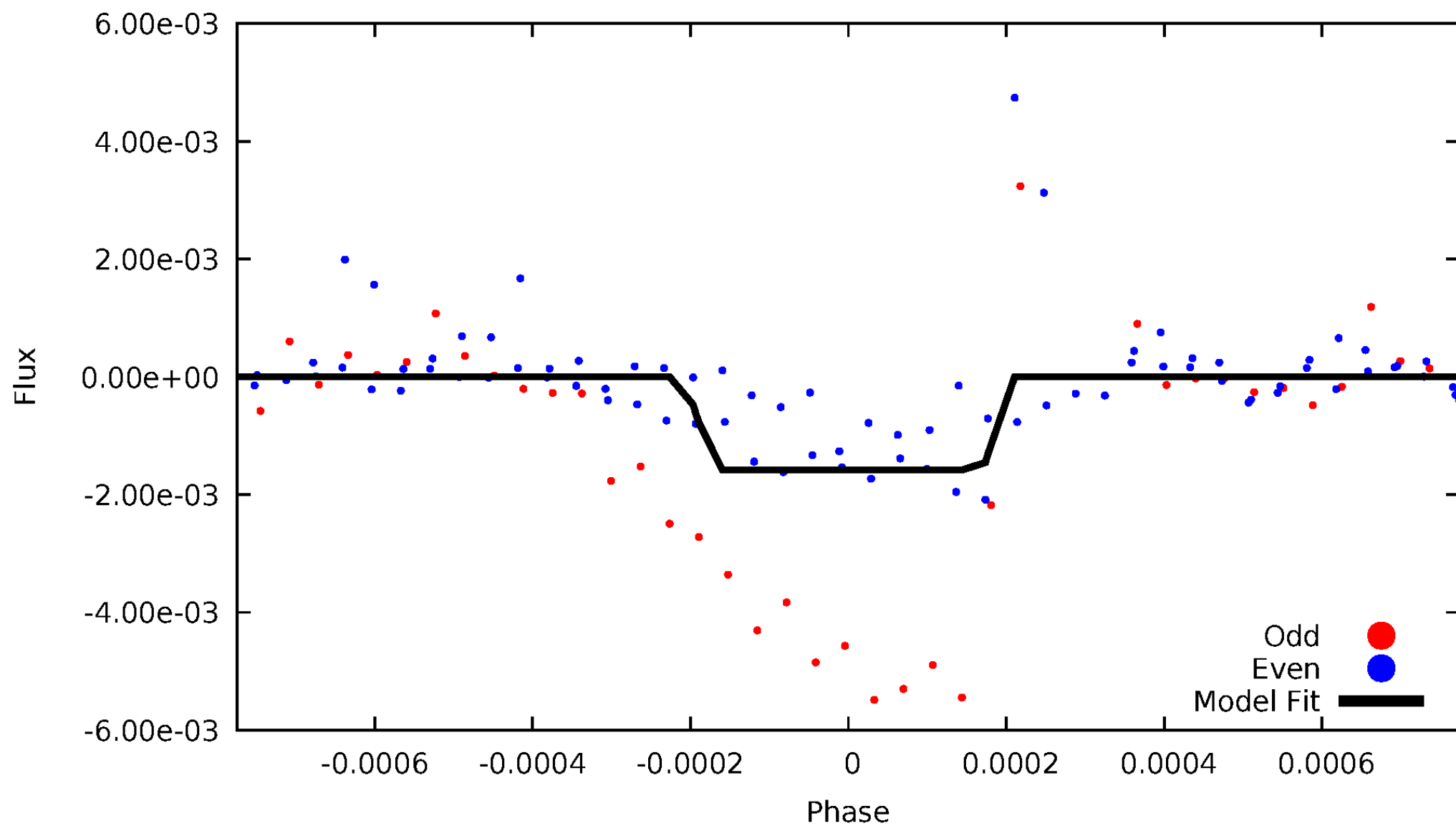
# DV Odd/Even

TCE 011033205-04



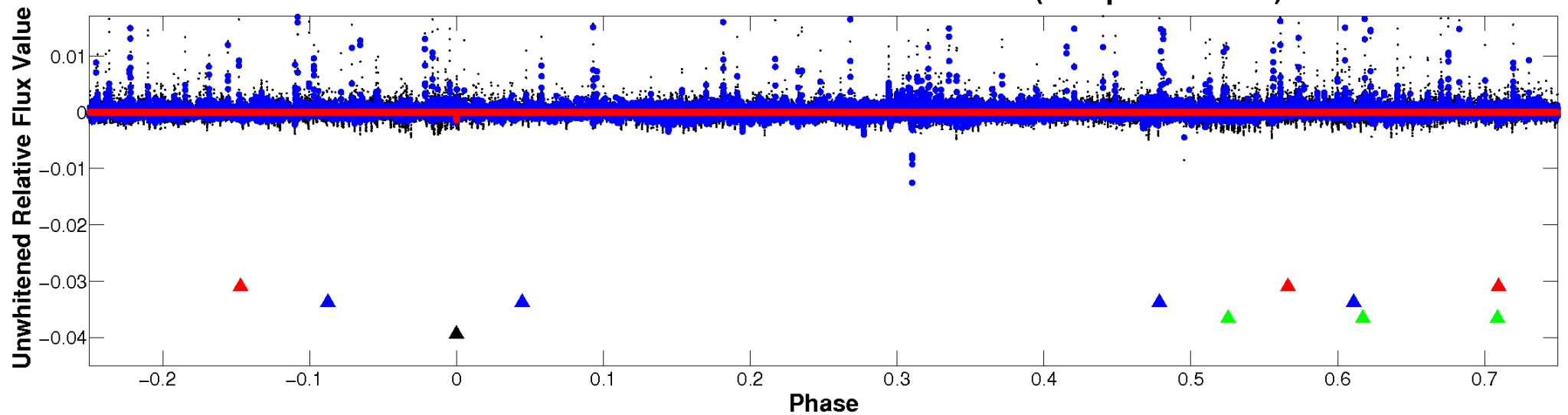
# ALT Odd/Even

TCE 011033205-04

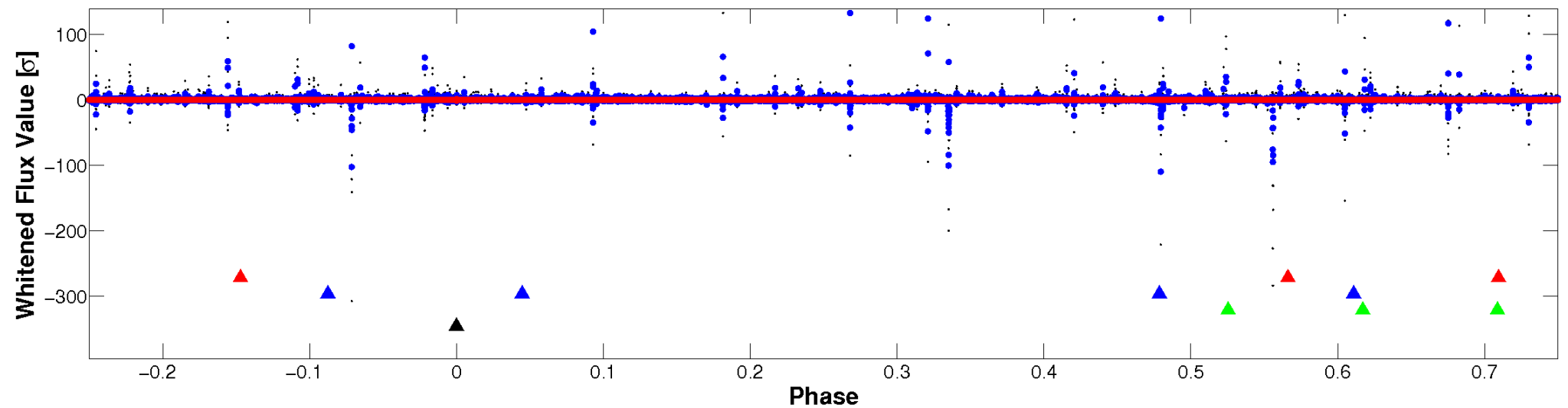


# Non-Whitened Vs. Whitened Light Curve

## Planet 4 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

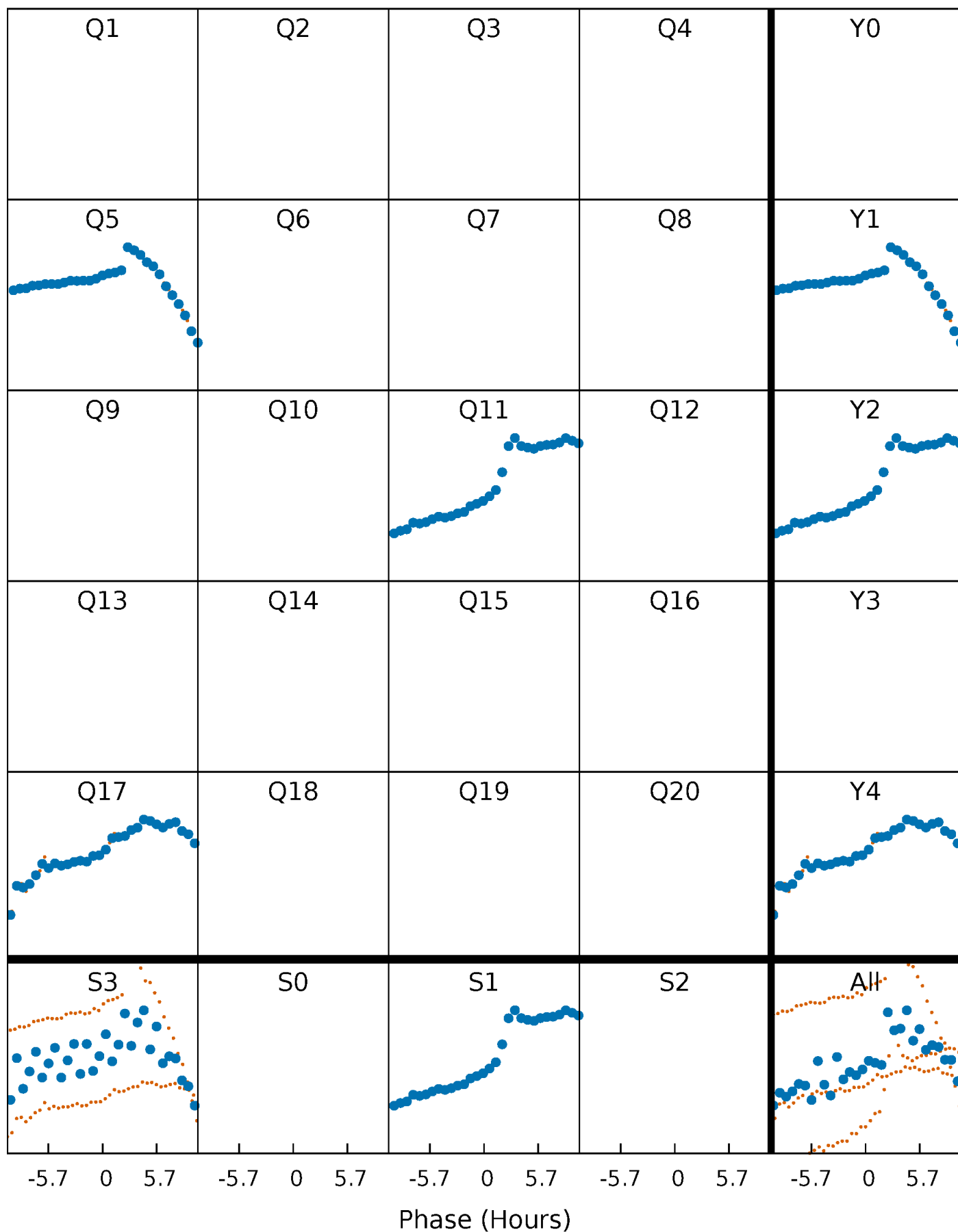


## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



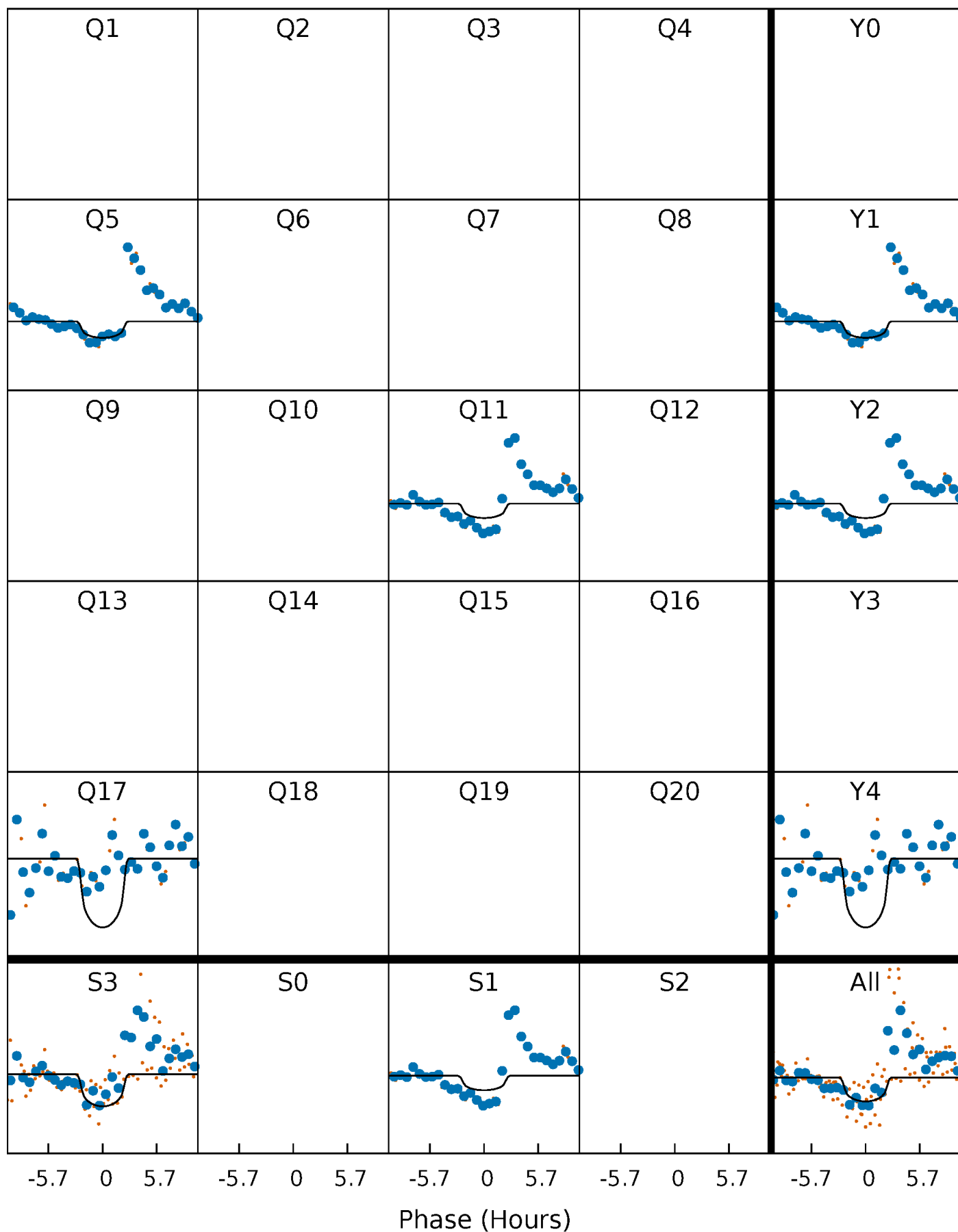
# PDC Quarter-Phased Transit Curves

TCE 011033205-04     $P=551.897453$  Days     $T_0=458.995760$  (BKJD)



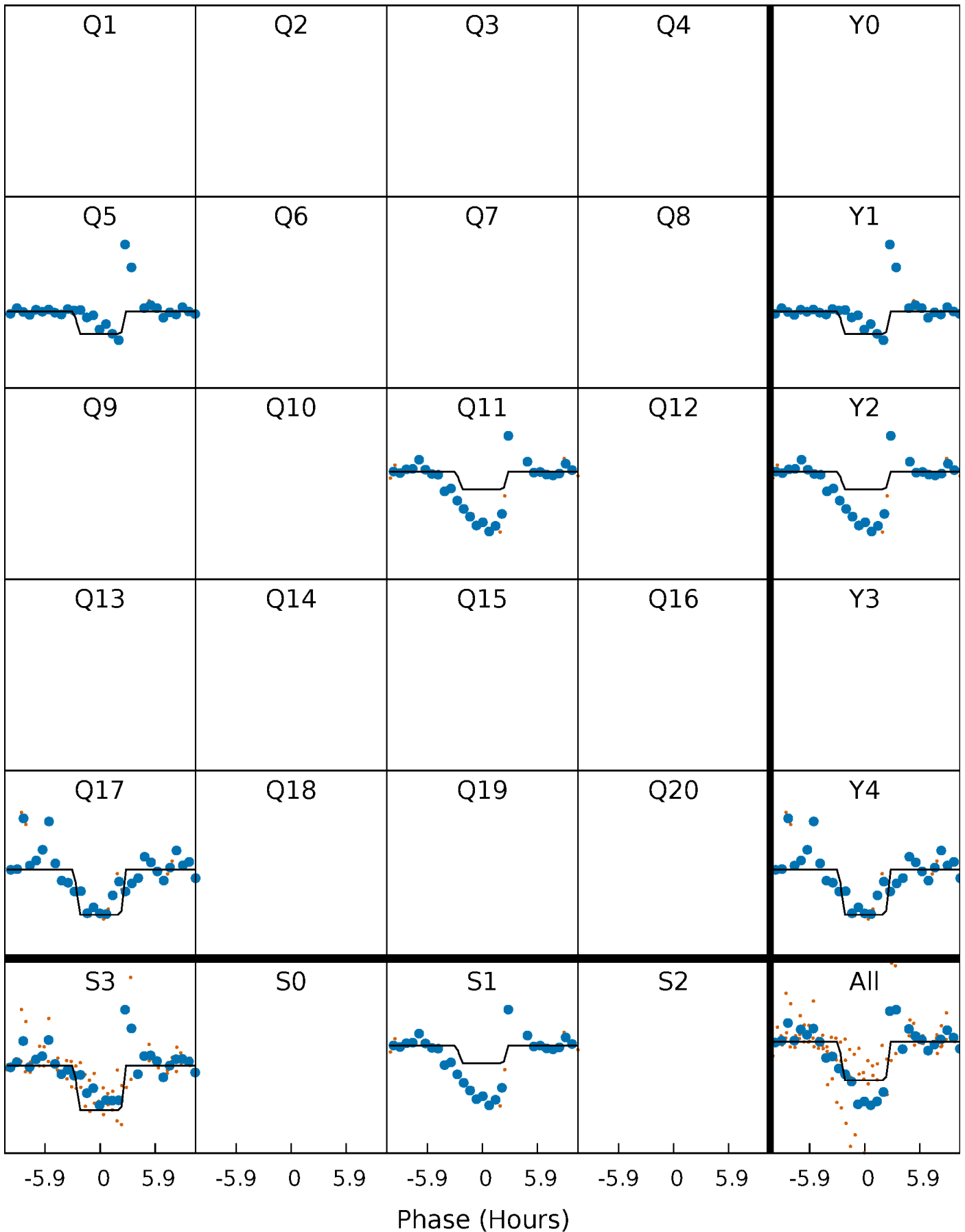
# DV Quarter-Phased Transit Curves

TCE 011033205-04     $P=551.897453$  Days     $T_0=458.995760$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

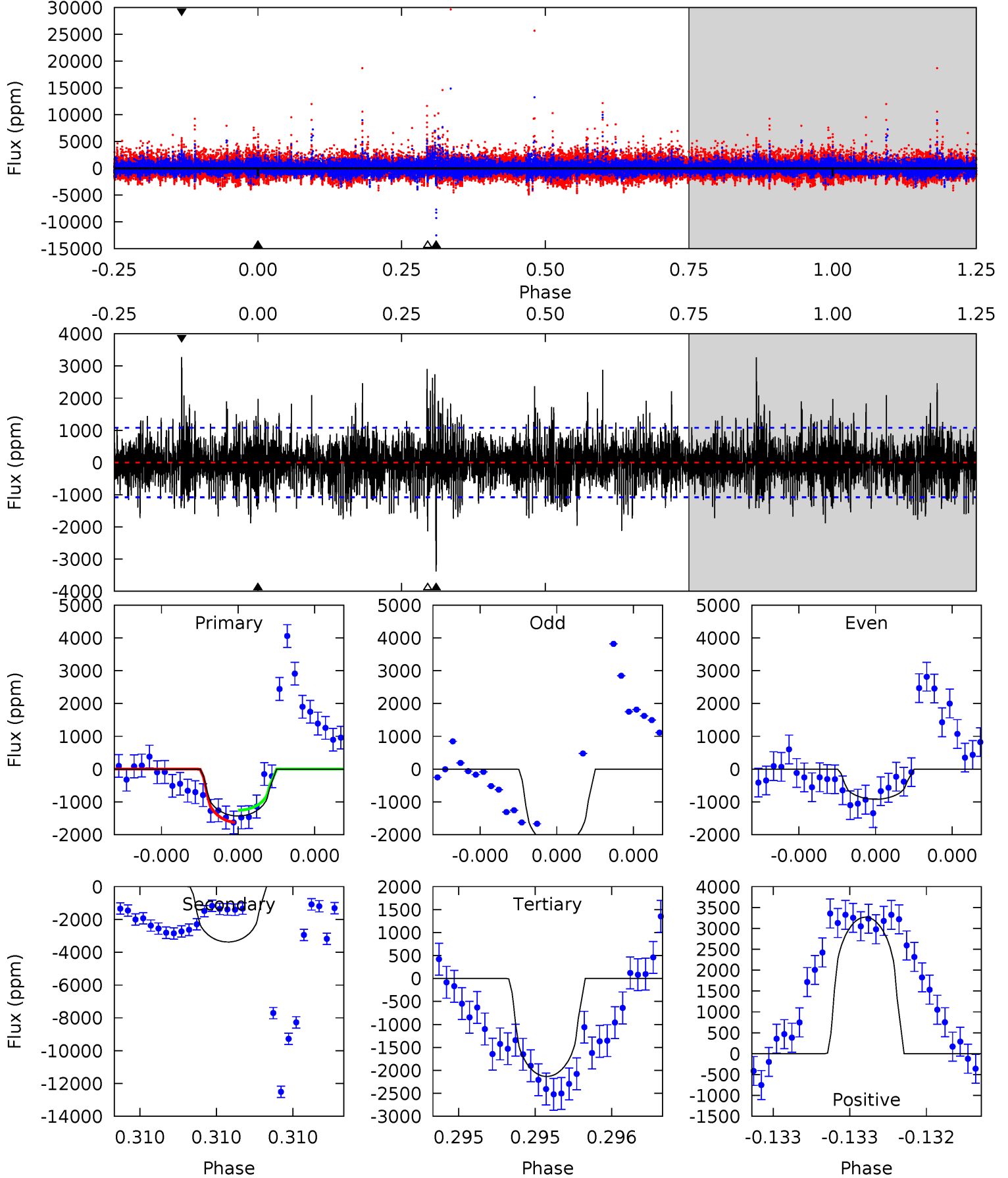
TCE 011033205-04 P=551.890022 Days  $T_0=458.985588$  (BKJD)



# DV Model-Shift Uniqueness Test

011033205-04, P = 551.897453 Days, E = 458.995760 Days

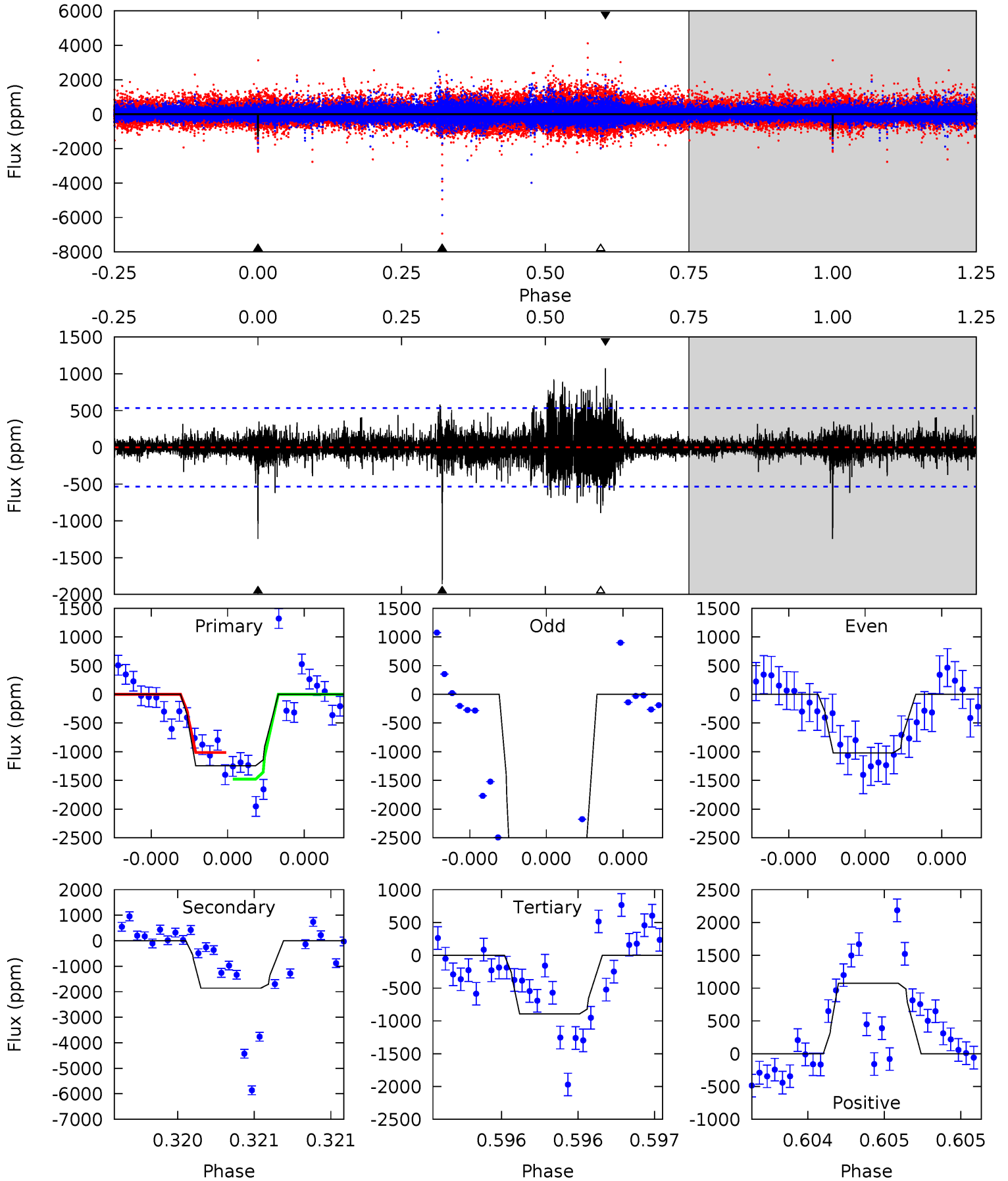
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.44	17.6	11.1	17.0	5.61	3.54	2.88	-3.65	-9.56	6.47	0.57	1.35	0.87	0.49	0.97



# Alt Model-Shift Uniqueness Test

011033205-04, P = 551.890022 Days, E = 458.985588 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
13.1	19.6	9.42	11.3	5.62	3.56	1.55	3.70	1.80	10.2	8.27	14.0	1.88	0.37	0





### Stellar Parameters For KIC 011033205

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4233^{+142}_{-142}$	$4.606^{+0.053}_{-0.018}$	$0.220^{+0.200}_{-0.300}$	$0.675^{+0.028}_{-0.057}$	$0.671^{+0.047}_{-0.052}$	$3.072^{+0.658}_{-0.245}$
	+3%/-3%	+1%/-0%	+91%/-136%	+4%/-8%	+7%/-8%	+21%/-8%
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 011033205-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-3379 \pm 192$	$2.88^{+1.93}_{-1.70}$	$199^{+7}_{-7}$	$4973^{+2688}_{-958}$	$311418^{+1483460}_{-202085}$
Alt.	$-1857 \pm 95$	$2.96^{+2.03}_{-1.57}$	$198^{+8}_{-7}$	$4317^{+1656}_{-709}$	$151637^{+564560}_{-95193}$

$T_{\text{max}}$  = 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

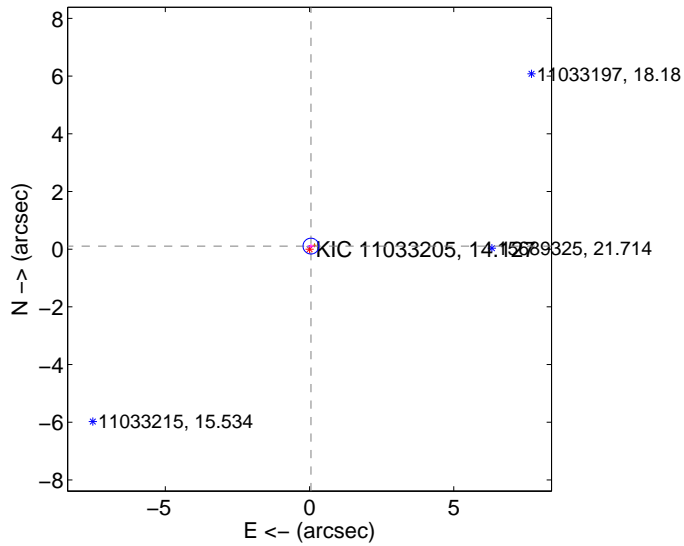
Supplemental centroid analysis for 011033205-04. Kepler magnitude: 14.13. Transit SNR 4.77

There are 1 quarters with good PRF difference image offsets

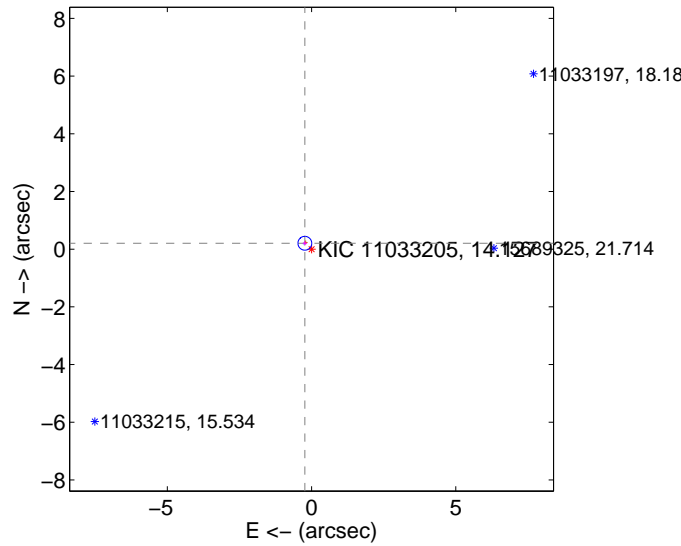
The direct PRF centroid is offset from the target star catalog position by about 0.23 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.117 \pm 0.091$	1.28	$-0.049 \pm 0.124$	$0.106 \pm 0.070$
PRF-fit source offset from KIC position	$0.310 \pm 0.080$	3.88	$0.233 \pm 0.080$	$0.205 \pm 0.080$
photometric centroid source offset	$1.00 \pm 2.00$	0.50	$0.61 \pm 1.64$	$0.80 \pm 2.18$

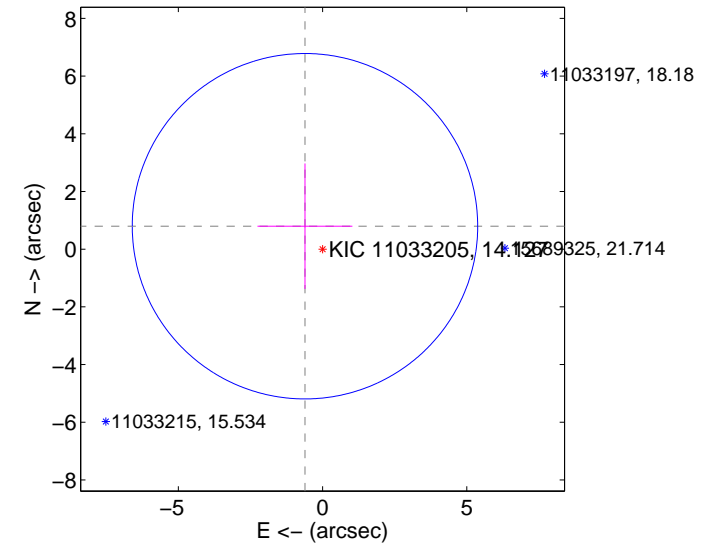
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



offset from photometric centroids

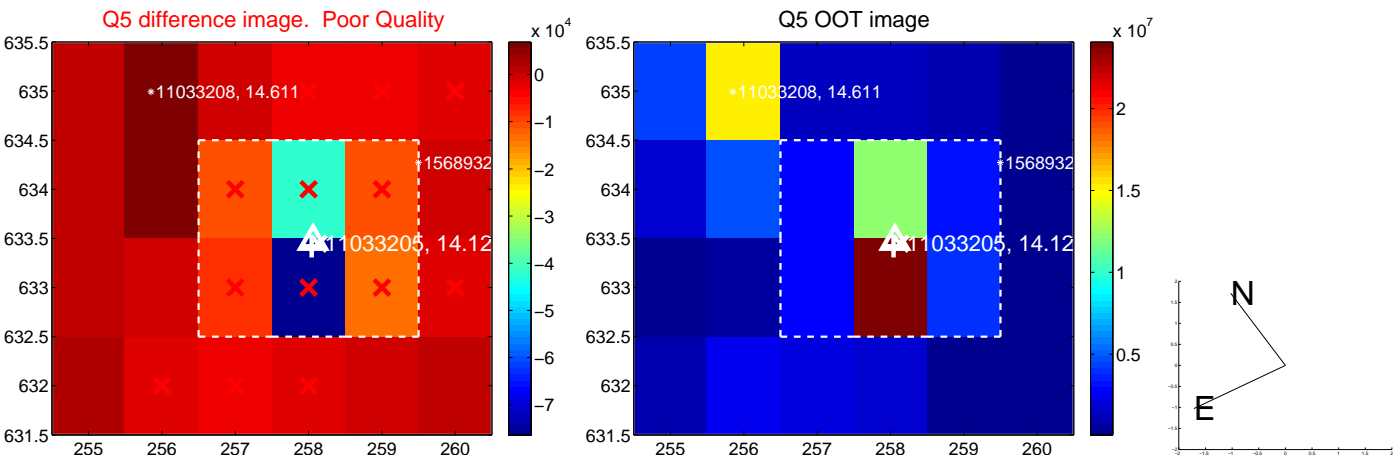


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

Q9 no difference image



Q9 no OOT image



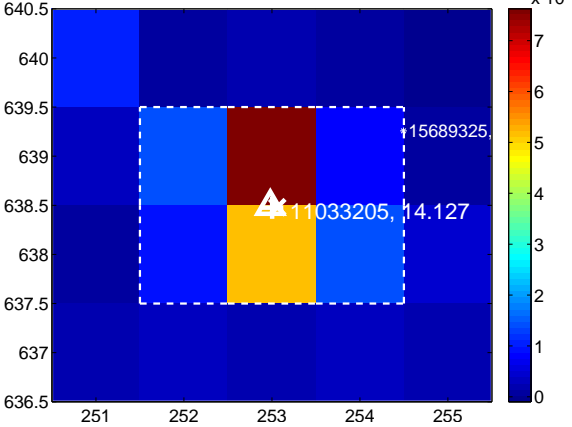
Q10 no difference image



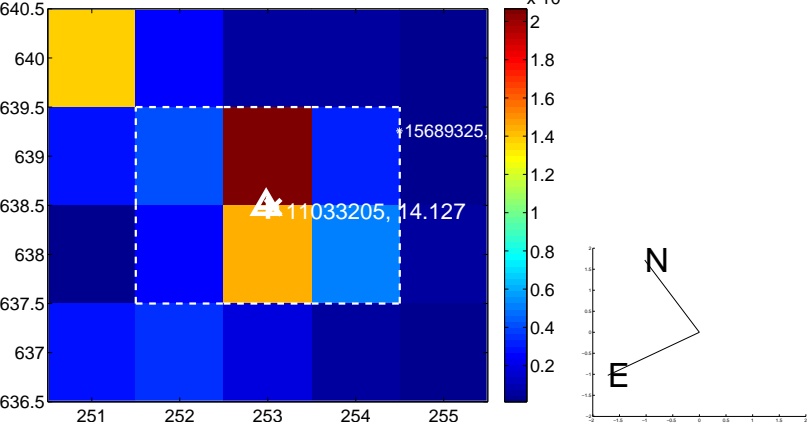
Q10 no OOT image



Q11 difference image



Q11 OOT image



Q12 no difference image



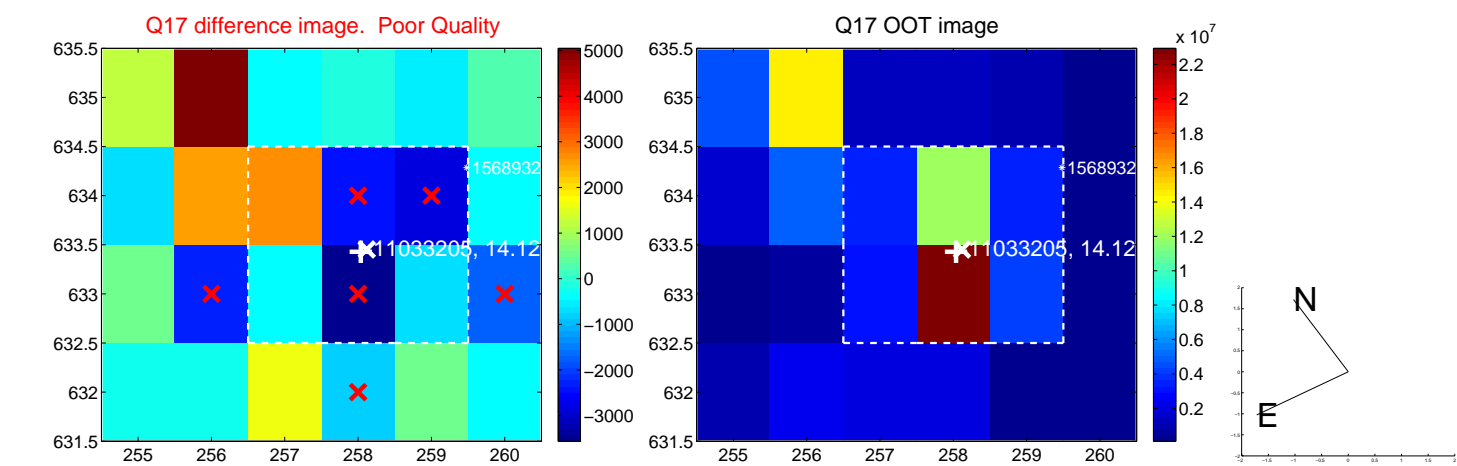
Q12 no OOT image



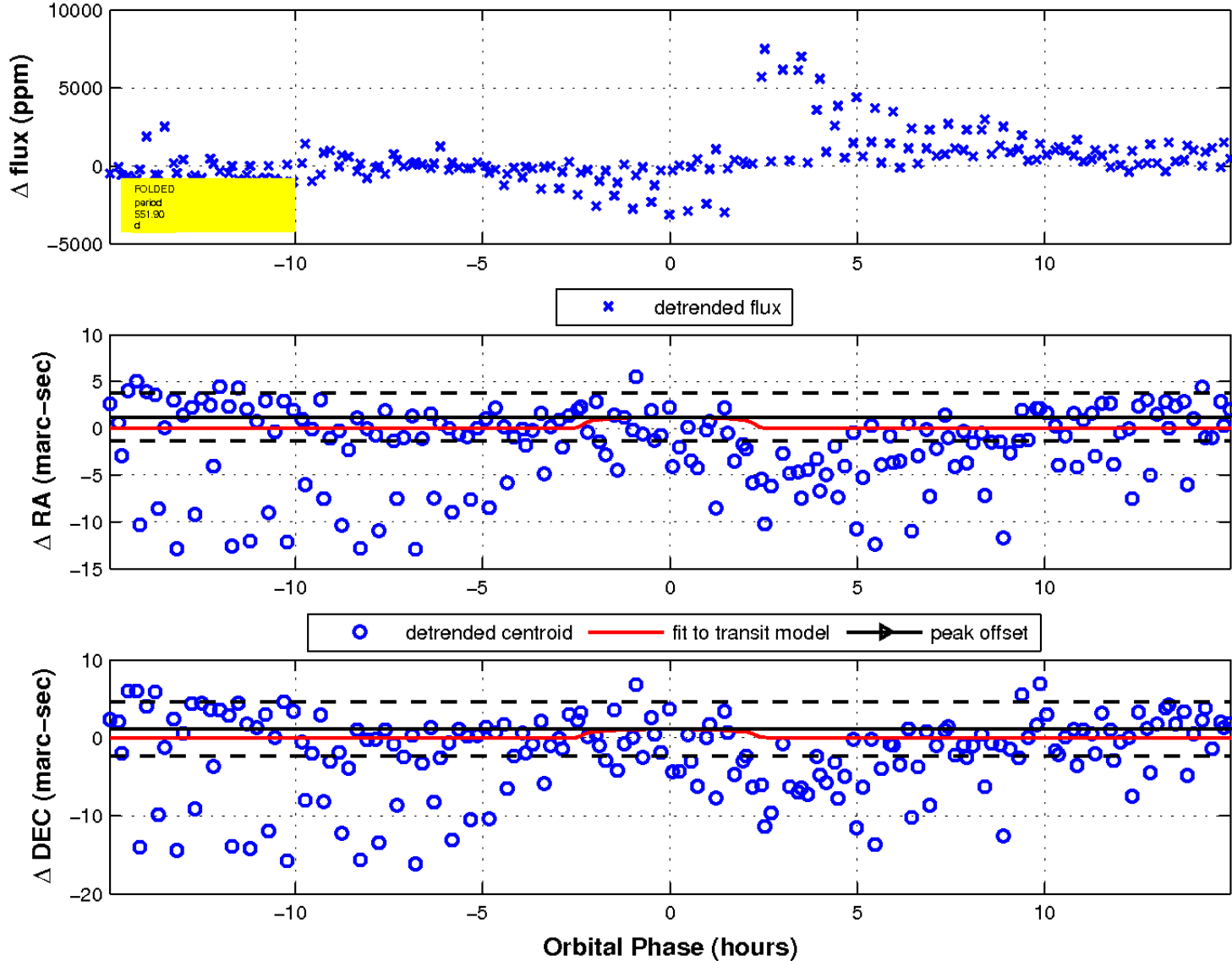
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 4 of 4



UKIRT Image

Declination

