

# KIC 009535171

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009535171-02	OBS	No	220.639366	188.607163	1609.9	4.166	10.1	7.4	0.58	4523	2.49	0.36
009535171-03	OBS	No	427.360621	469.366835	1690.9	4.622	12.1	8.4	0.58	4523	3.02	0.15
009535171-04	OBS	No	511.061408	388.660897	2476.9	4.301	11.3	10.6	0.58	4523	2.85	0.12
009535171-05	OBS	No	145.603156	156.595124	821.6	7.873	8.4	6.0	0.58	4523	2.14	0.63
009535171-06	OBS	No	311.646432	332.735191	1228.6	8.727	12.3	5.4	0.58	4523	2.48	0.23
009535171-07	OBS	No	482.286505	403.066195	662.1	15.000	11.2	-1.0	0.58	4523	1.45	0.13
009535171-08	OBS	No	248.293280	333.065876	478.8	4.547	9.2	3.1	0.58	4523	1.50	0.31

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009535171-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS
009535171-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009535171-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009535171-05	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—INCONSISTENT_TRANS
009535171-06	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_MARSHALL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
009535171-07	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_TER_ALT—MOD_POS_ALT—CENT_NOFITS—HALO_GHOST
009535171-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—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.

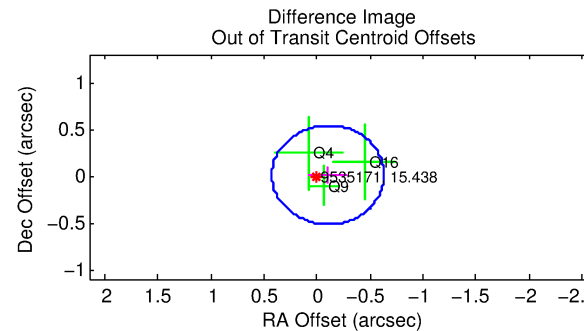
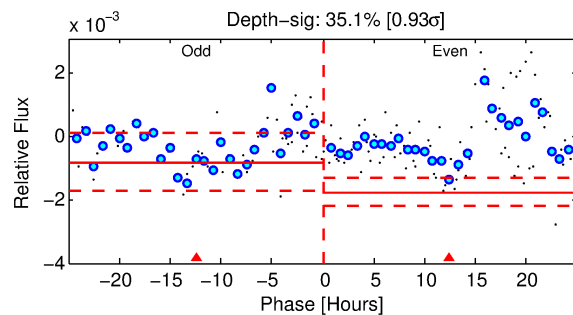
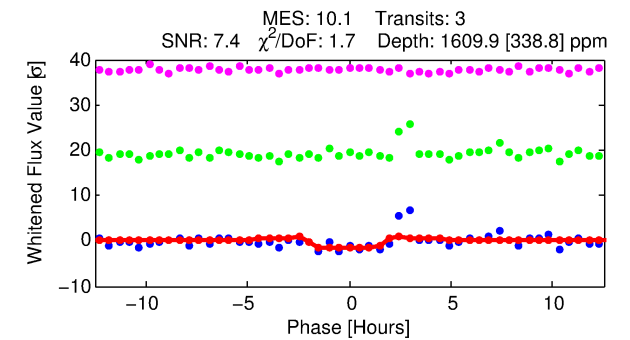
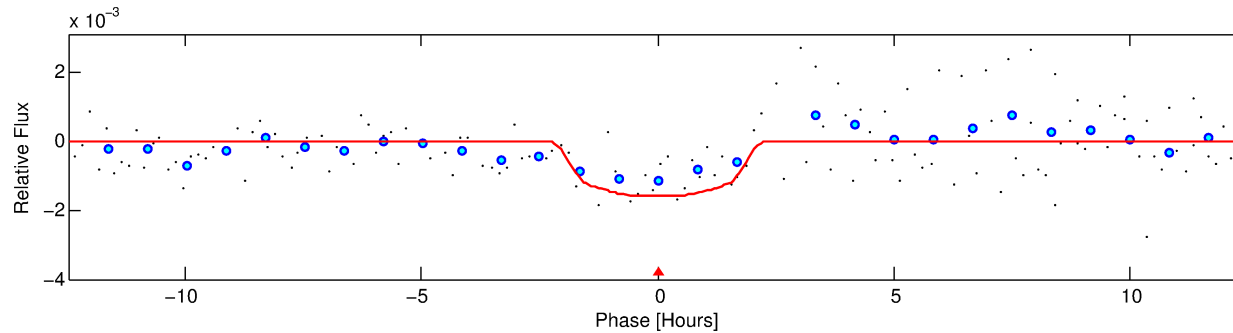
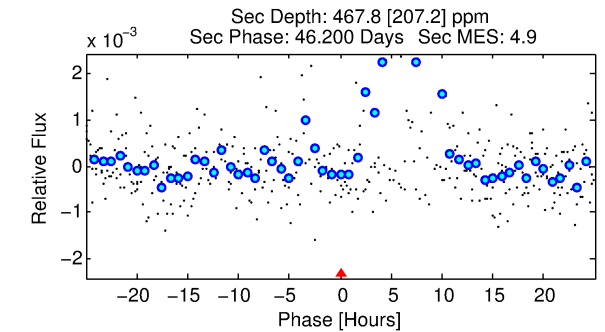
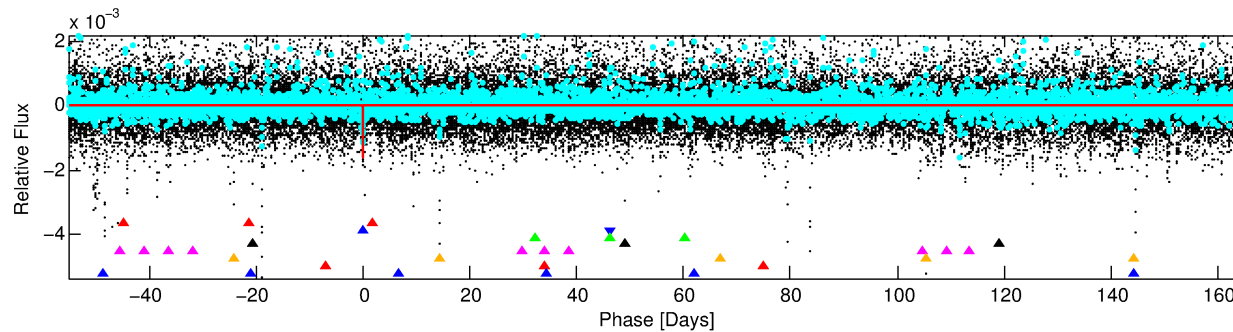
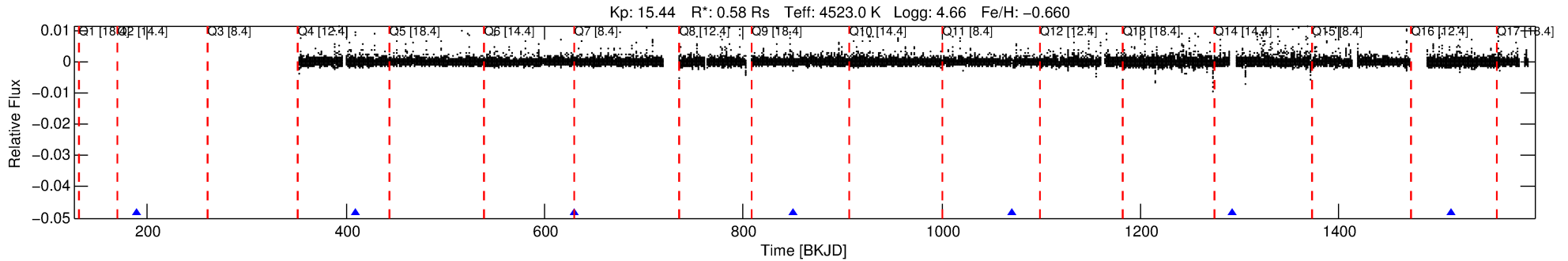
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 009535171-02

No Significant Match Found

# DV One-Page Summary

KIC: 9535171 Candidate: 2 of 8 Period: 220.639 d



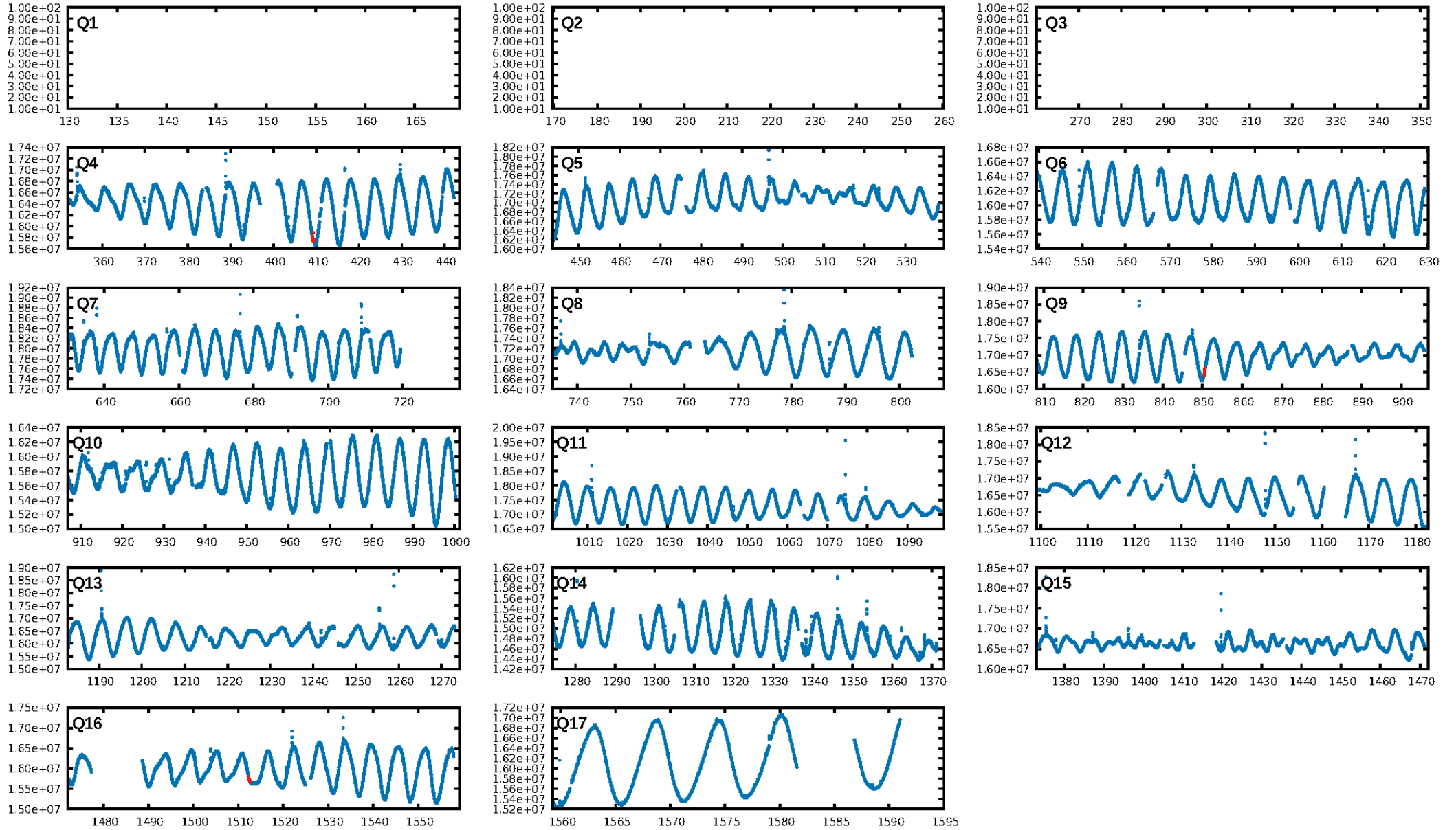
## DV Fit Results:

Period = 220.63937 [0.00357] d  
Epoch = 188.6072 [0.0127] BKJD  
Rp/R\* = 0.0391 [0.0475]  
a/R\* = 313.33 [1259.47]  
b = 0.69 [3.08]  
Seff = 0.36 [0.06]  
Teq = 198 [9] K  
Rp = 2.49 [3.04] Re  
a = 0.5935 [0.0424] AU  
Ag = 14588.19 [36076.57] [0.40σ]  
Teffp = 3363 [2081] K [1.52σ]

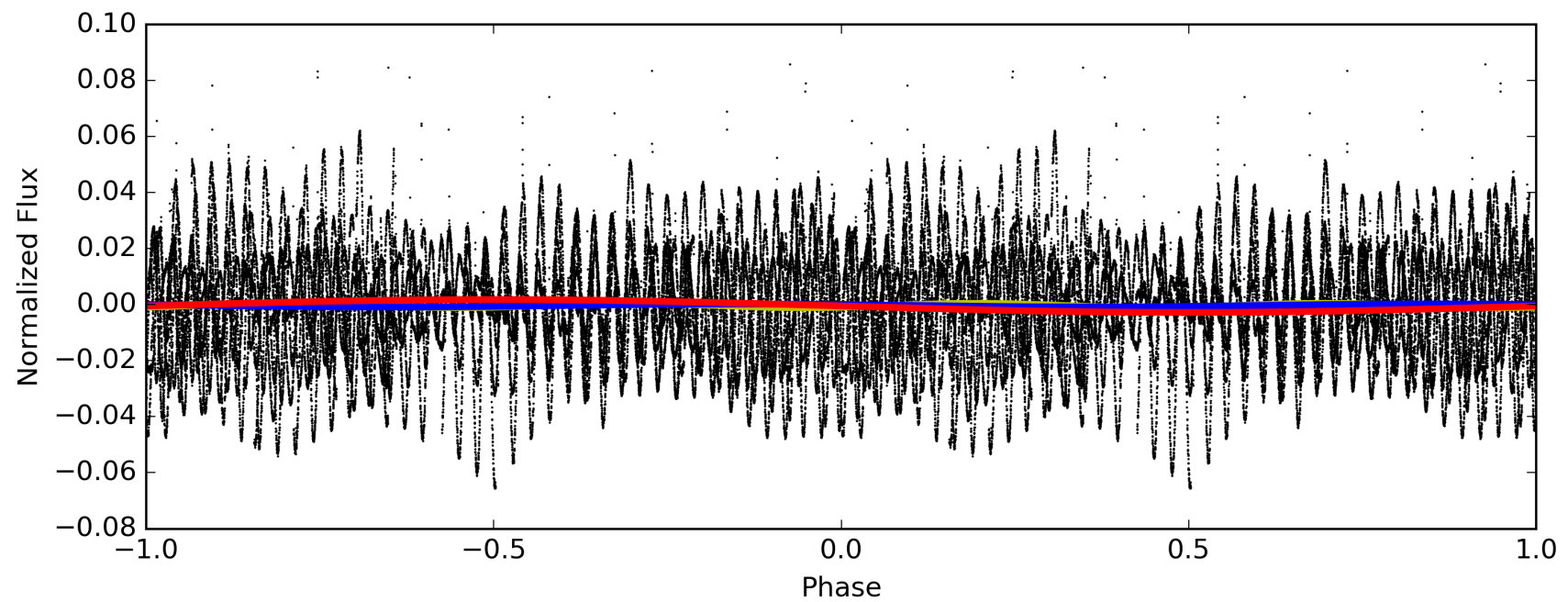
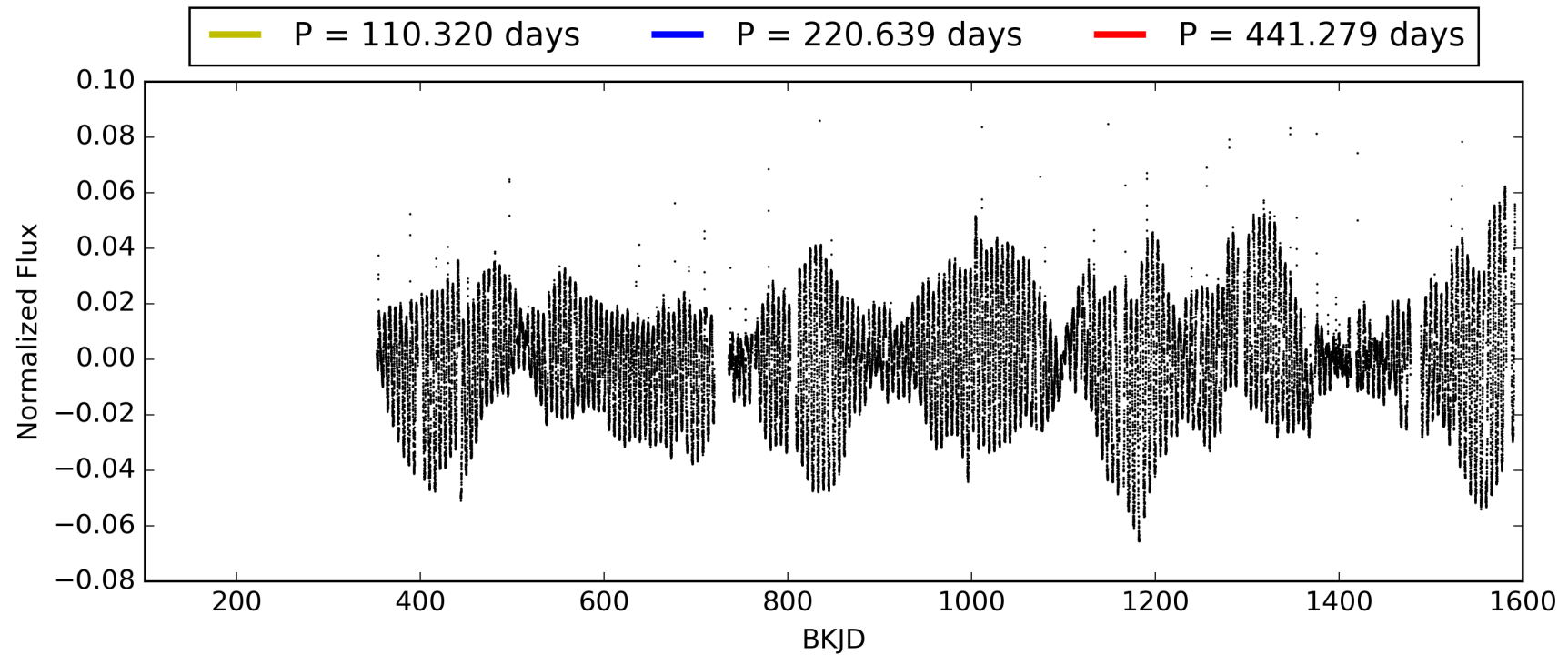
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [202.18σ]  
LongPeriod-sig: 100.0% [107.63σ]  
ModelChiSquare2-sig: 14.4%  
ModelChiSquareGof-sig: 48.9%  
**Bootstrap-pfa: 7.13e-11**  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 10.27  
Centroid-sig: 73.5%  
Centroid-so: 0.619 arcsec [0.48σ]  
OotOffset-rm: 0.104 arcsec [0.59σ]  
KicOffset-rm: 0.298 arcsec [1.41σ]  
OotOffset-st: 0/0/2/1 [3]  
KicOffset-st: 0/0/2/1 [3]  
DiffImageQuality-fgm: 1.00 [3/3]  
DiffImageOverlap-fno: 1.00 [3/3]

# TCE 009535171-02, PDC Light Curves



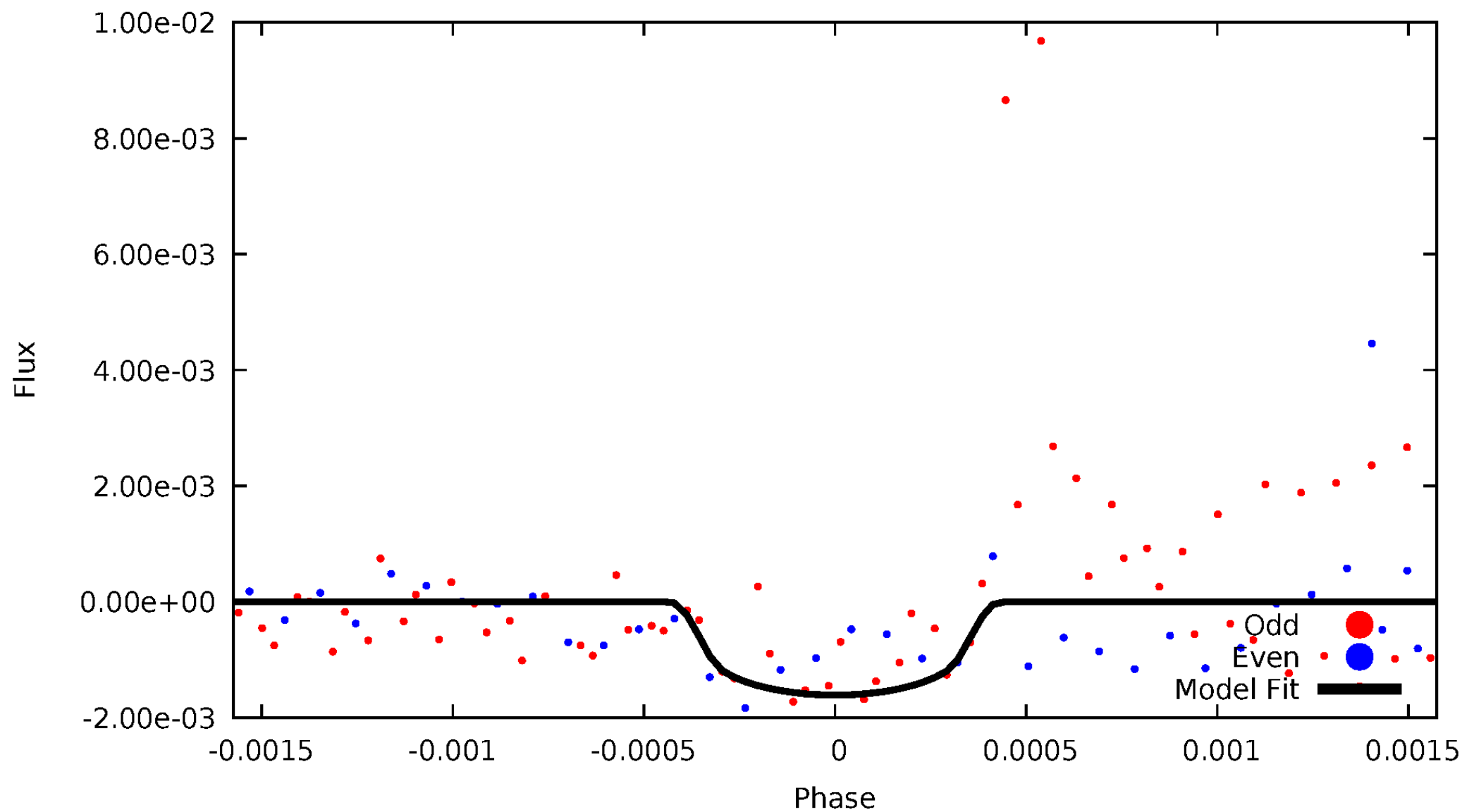
TCE 009535171-02





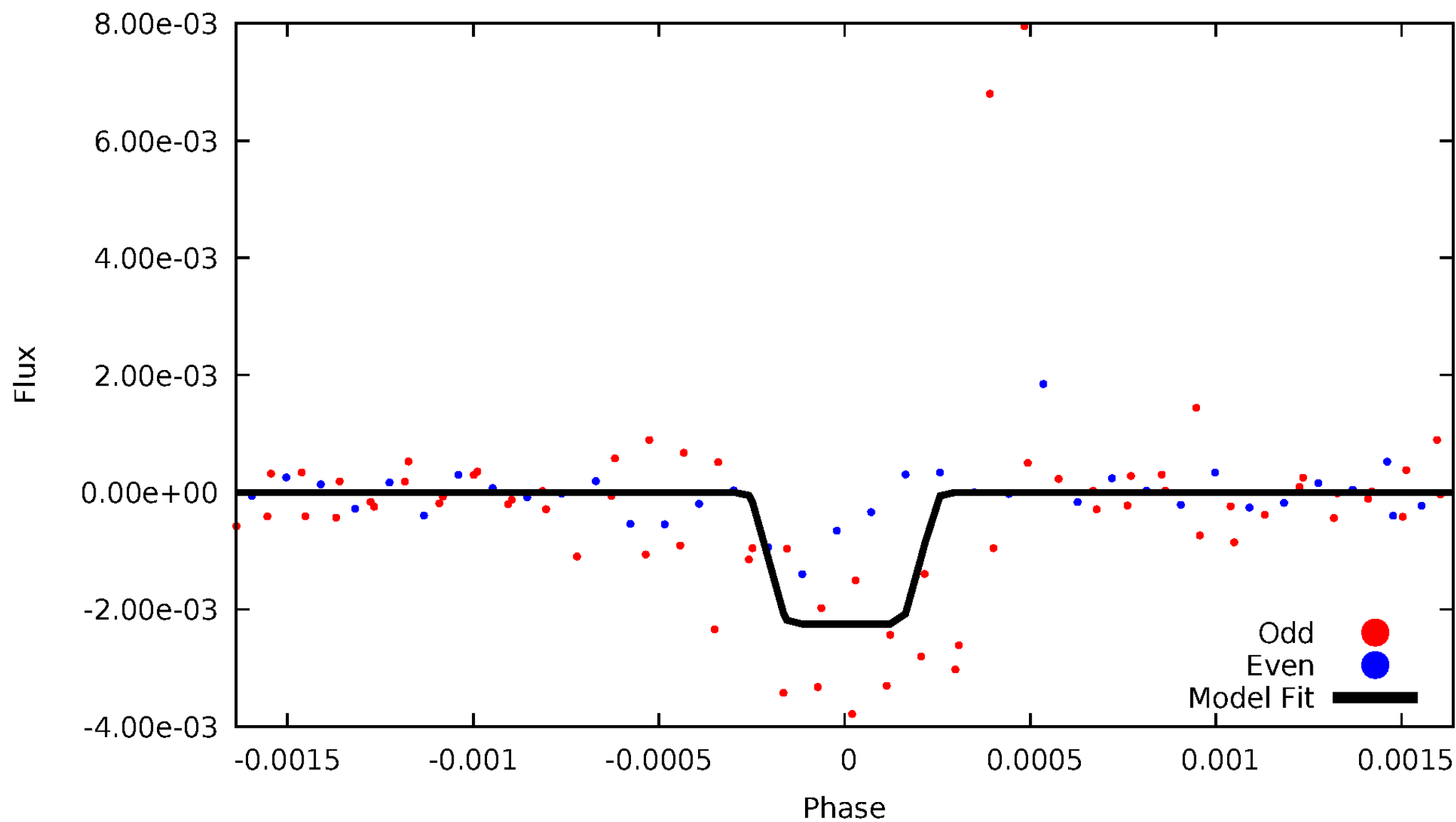
# DV Odd/Even

TCE 009535171-02



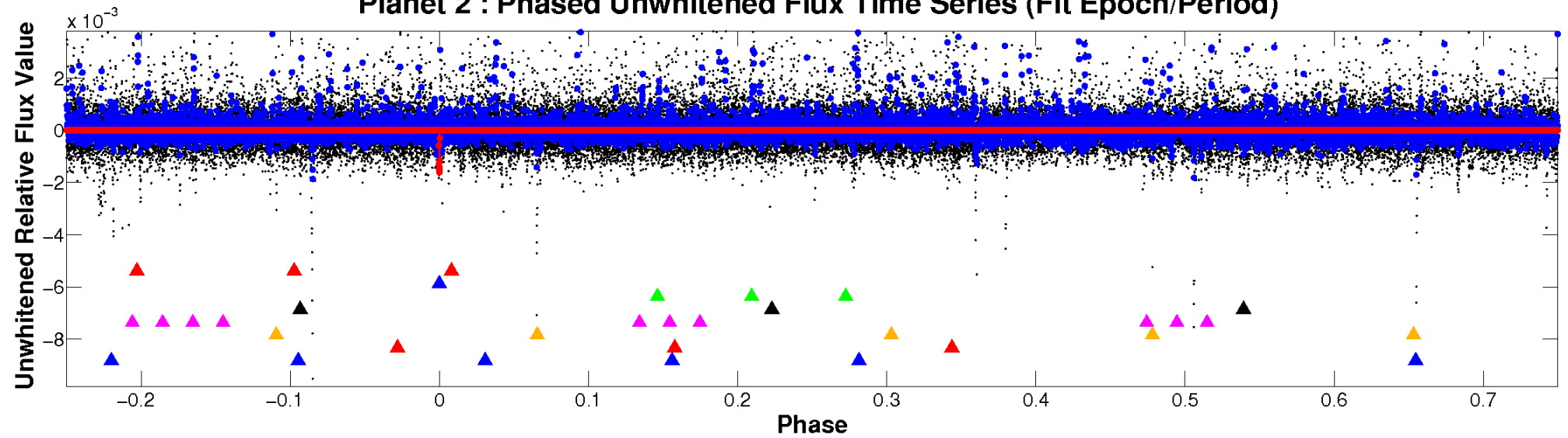
# ALT Odd/Even

TCE 009535171-02

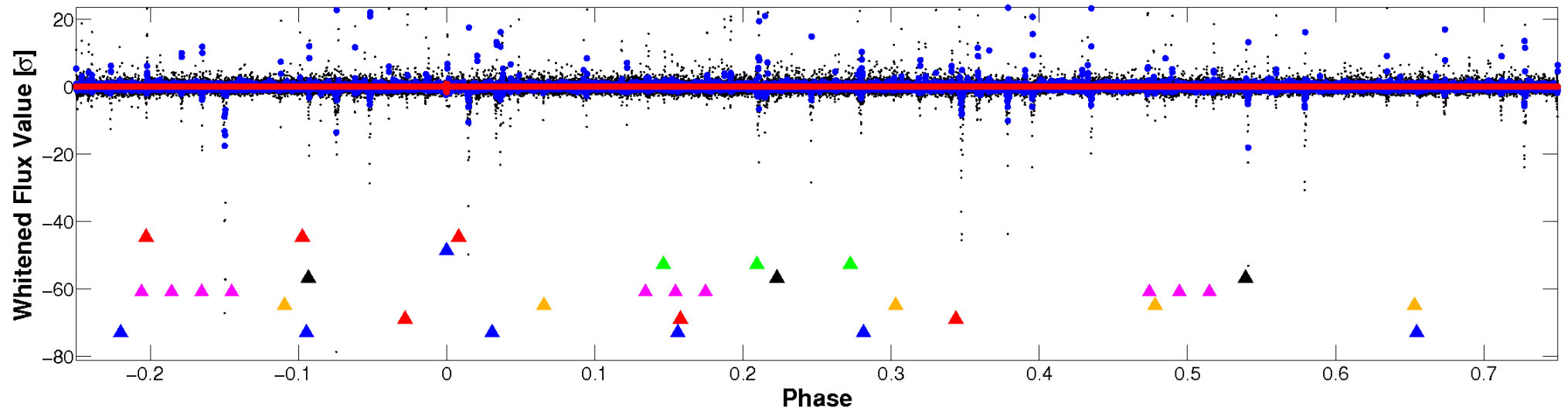


# Non-Whitened Vs. Whitened Light Curve

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

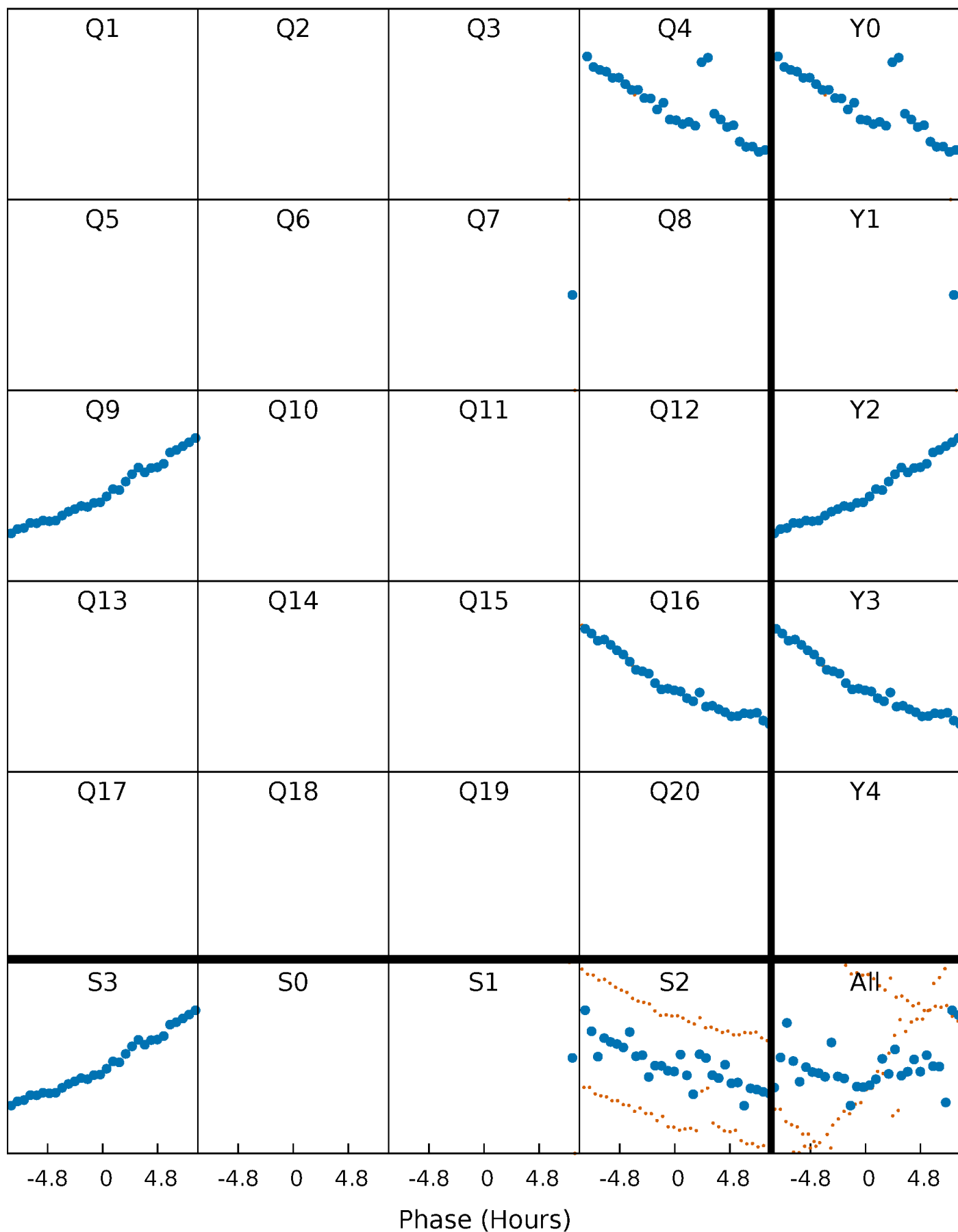


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



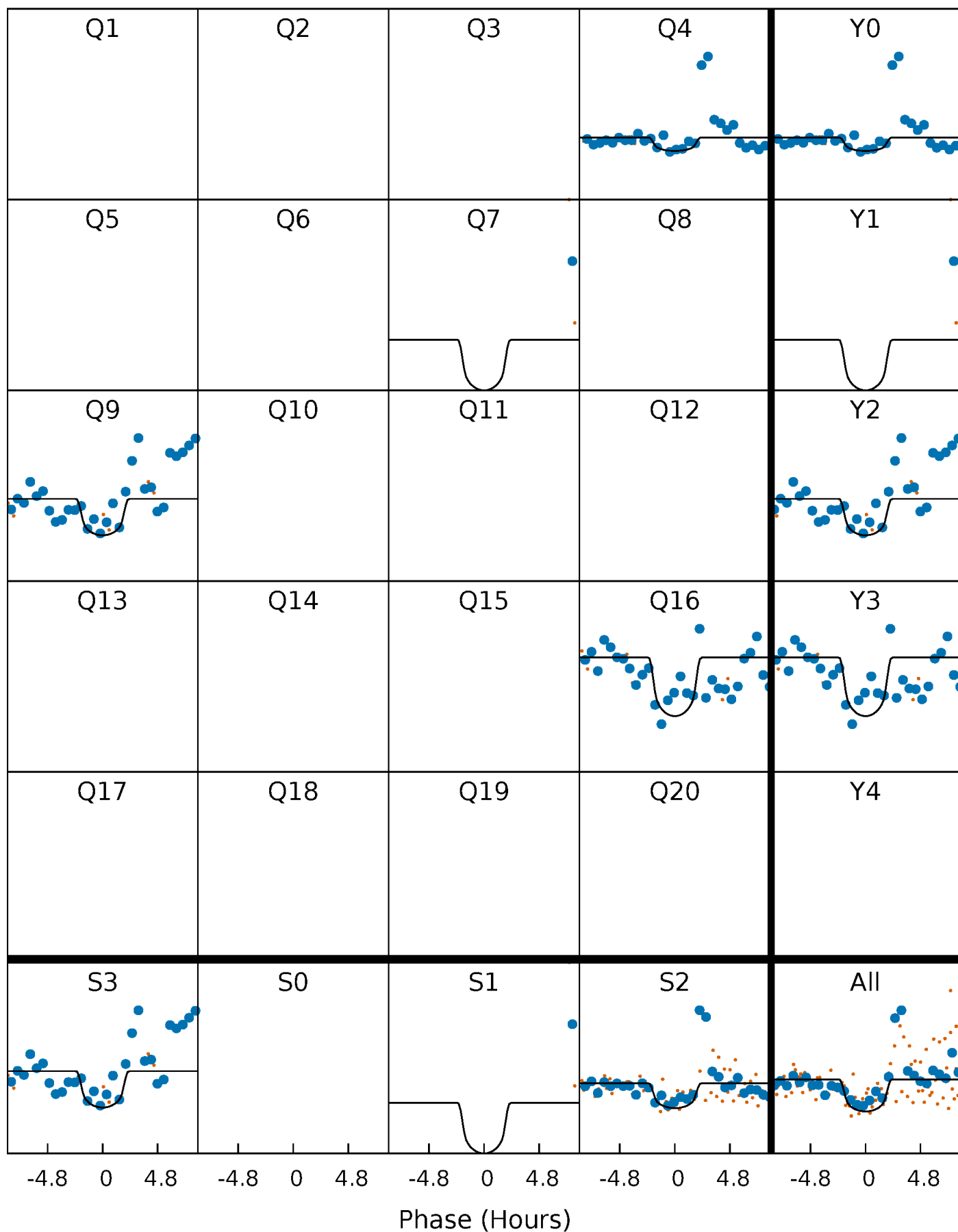
# PDC Quarter-Phased Transit Curves

TCE 009535171-02 P=220.639366 Days  $T_0=188.607163$  (BKJD)



# DV Quarter-Phased Transit Curves

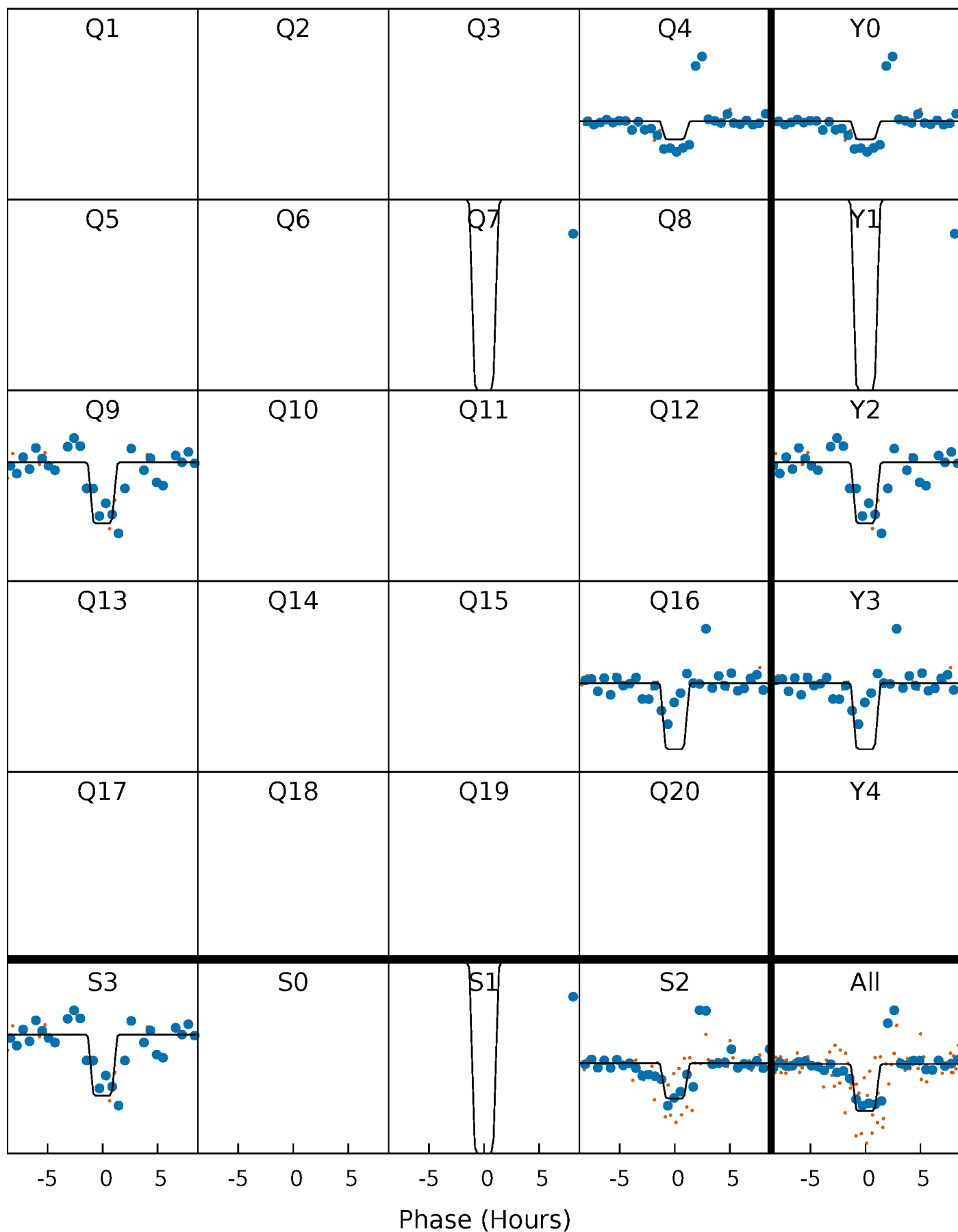
TCE 009535171-02     $P=220.639366$  Days     $T_0=188.607163$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

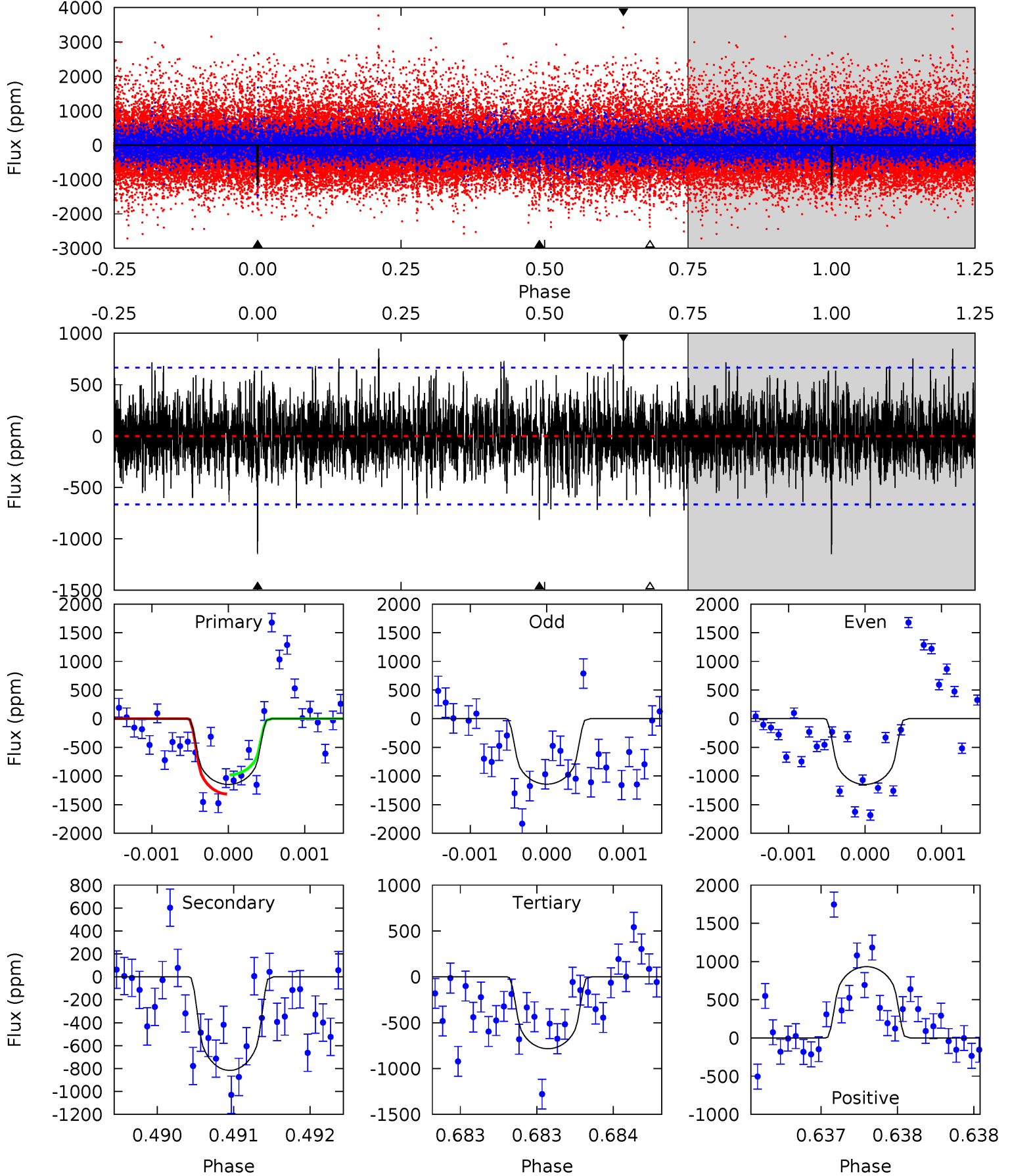
TCE 009535171-02 P=220.631574 Days  $T_0=188.627151$  (BKJD)



# DV Model-Shift Uniqueness Test

009535171-02, P = 220.639366 Days, E = 188.607163 Days

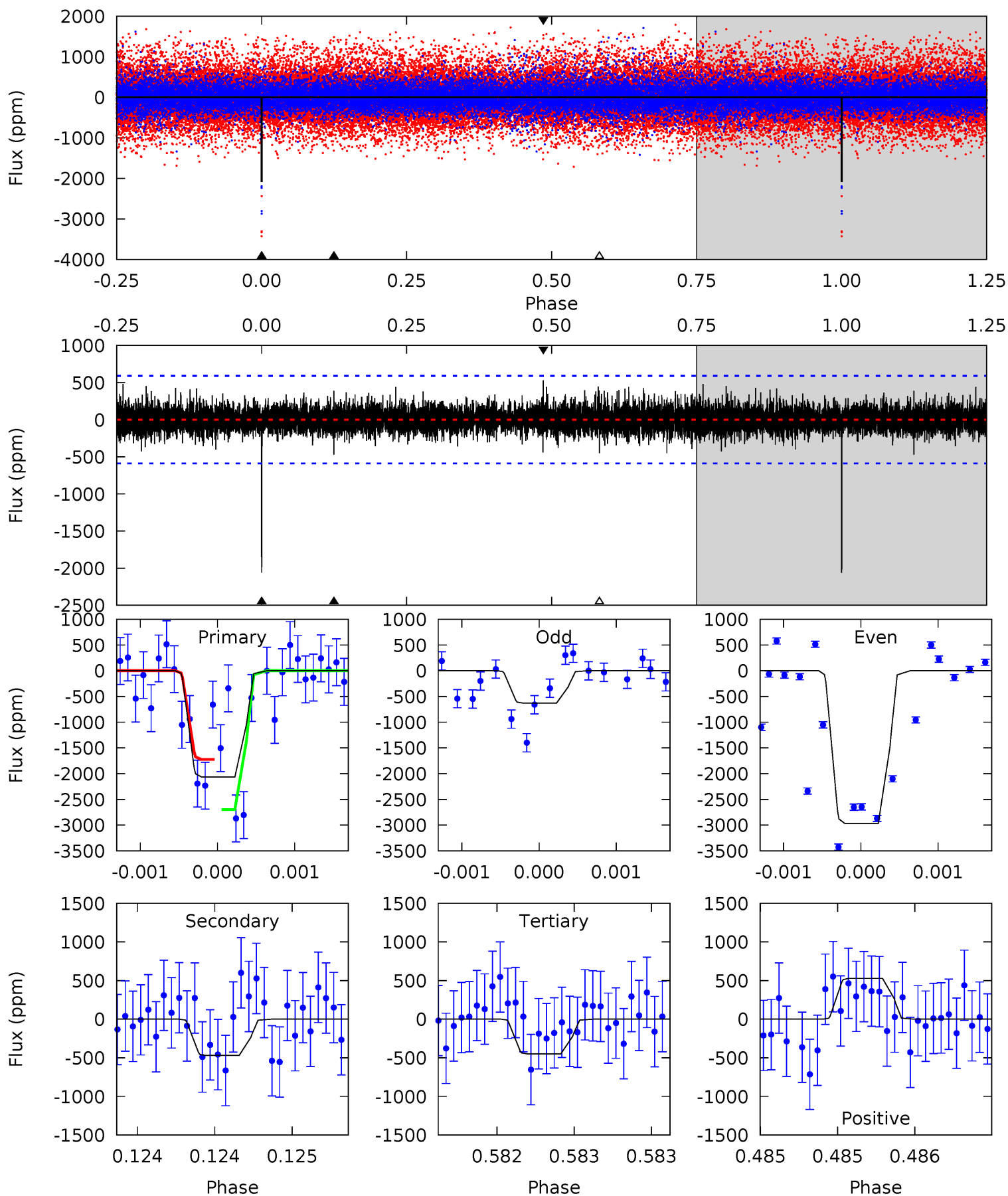
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.46	6.73	6.46	7.69	5.48	3.34	1.69	3.00	1.77	0.27	-0.96	0.02	1.00	0.45	1.39



# Alt Model-Shift Uniqueness Test

009535171-02, P = 220.631574 Days, E = 188.627151 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
19.4	4.43	4.23	4.98	5.56	3.46	1.01	15.2	14.5	0.20	-0.55	11.2	1.12	0.20	4.27



### Stellar Parameters For KIC 009535171

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$4523^{+162}_{-162}$	$4.663^{+0.054}_{-0.032}$	$-0.660^{+0.300}_{-0.300}$	$0.584^{+0.051}_{-0.051}$	$0.572^{+0.062}_{-0.038}$	$4.047^{+0.935}_{-0.524}$
	+4%/-4%	+1%/-1%	+45%/-45%	+9%/-9%	+11%/-7%	+23%/-13%
Source	KIC0	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 009535171-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-816 \pm 121$	$3.20^{+2.70}_{-2.04}$	$276^{+10}_{-12}$	$3671^{+1807}_{-625}$	$15254^{+103260}_{-10916}$
Alt.	$-470 \pm 106$	$3.52^{+2.63}_{-2.17}$	$275^{+11}_{-11}$	$3257^{+1240}_{-486}$	$7060^{+41721}_{-4692}$

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

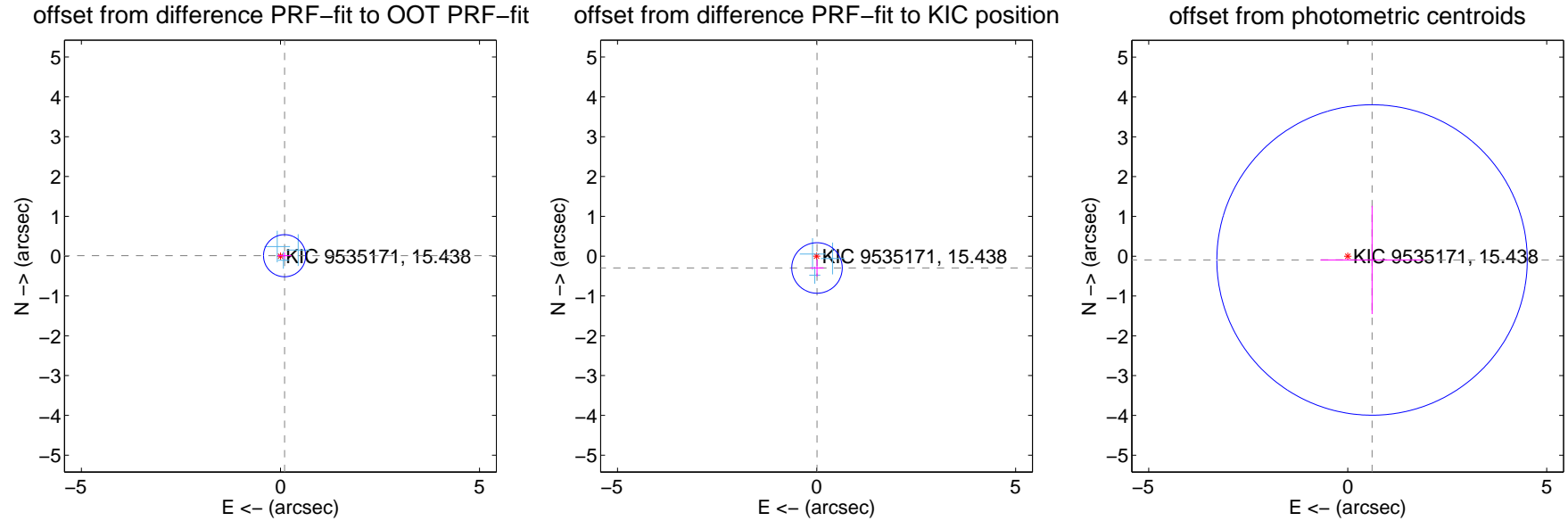
## DV Centroid Data

Supplemental centroid analysis for 009535171-02. Kepler magnitude: 15.44. Transit SNR 7.36

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	$0.104 \pm 0.176$	0.59	$-0.103 \pm 0.175$	$0.011 \pm 0.083$
PRF-fit source offset from KIC position	$0.298 \pm 0.212$	1.41	$-0.010 \pm 0.166$	$-0.298 \pm 0.212$
photometric centroid source offset	$0.62 \pm 1.30$	0.48	$-0.61 \pm 1.30$	$-0.09 \pm 1.36$



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.

Q1 no difference image



Q1 no OOT image



Q2 no difference image



Q2 no OOT image



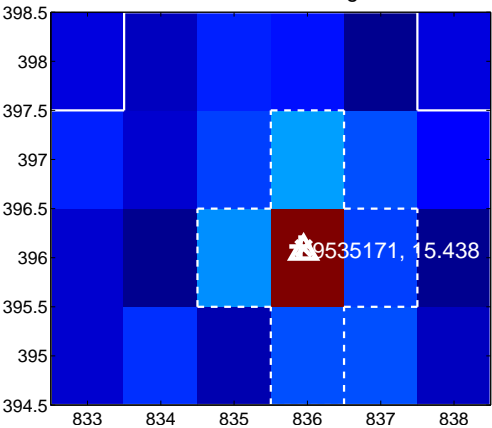
Q3 no difference image



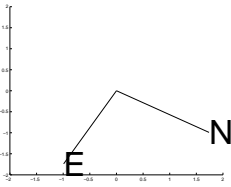
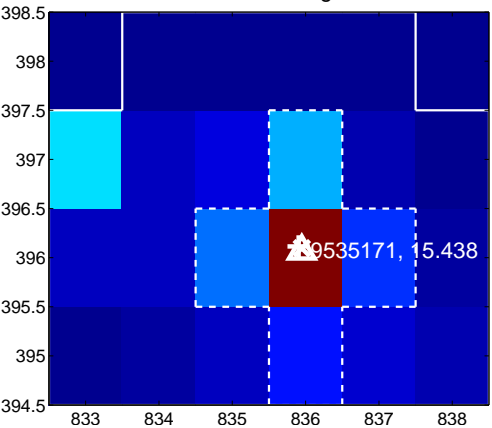
Q3 no OOT image



Q4 difference image



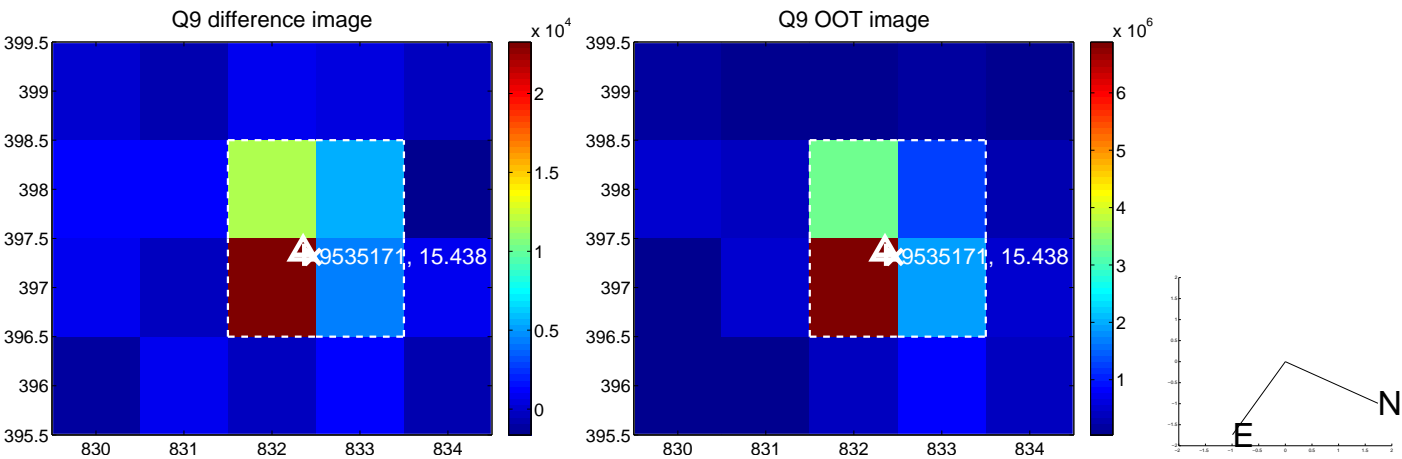
Q4 OOT image



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.



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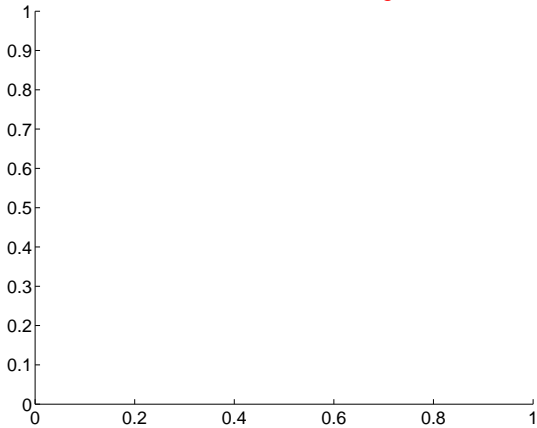
Q13 no difference image



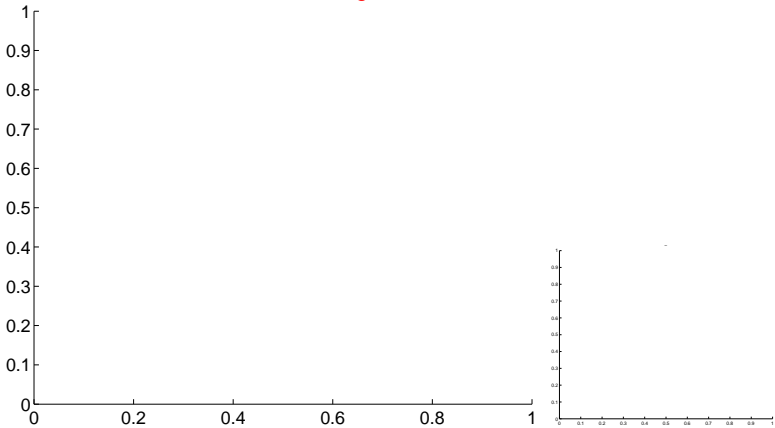
Q13 no OOT image



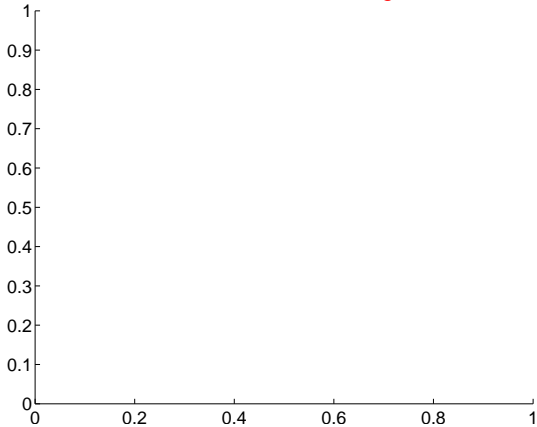
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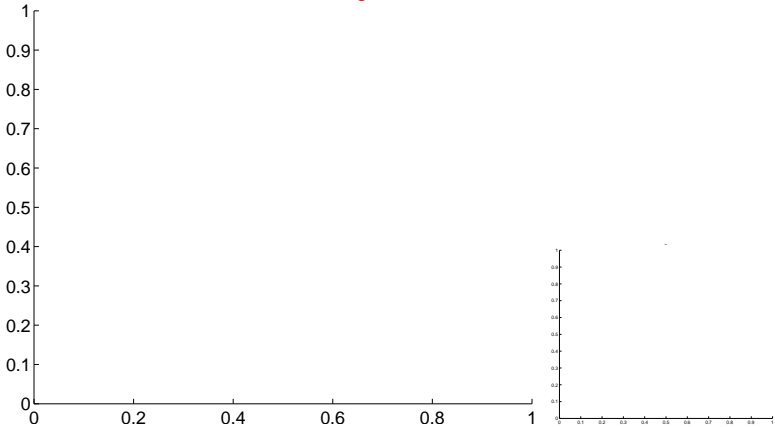
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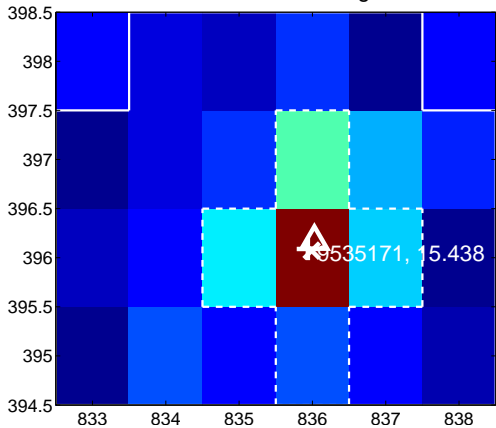
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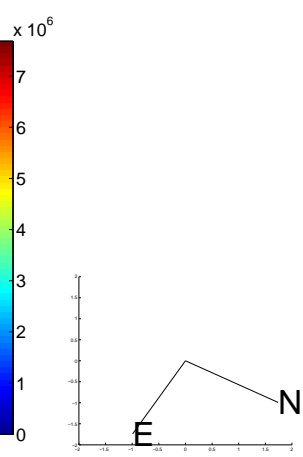
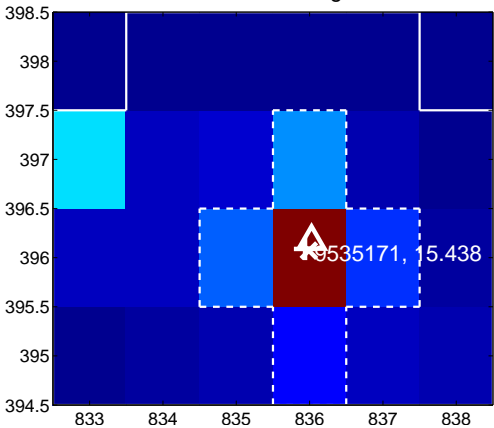
Q15 no OOT image



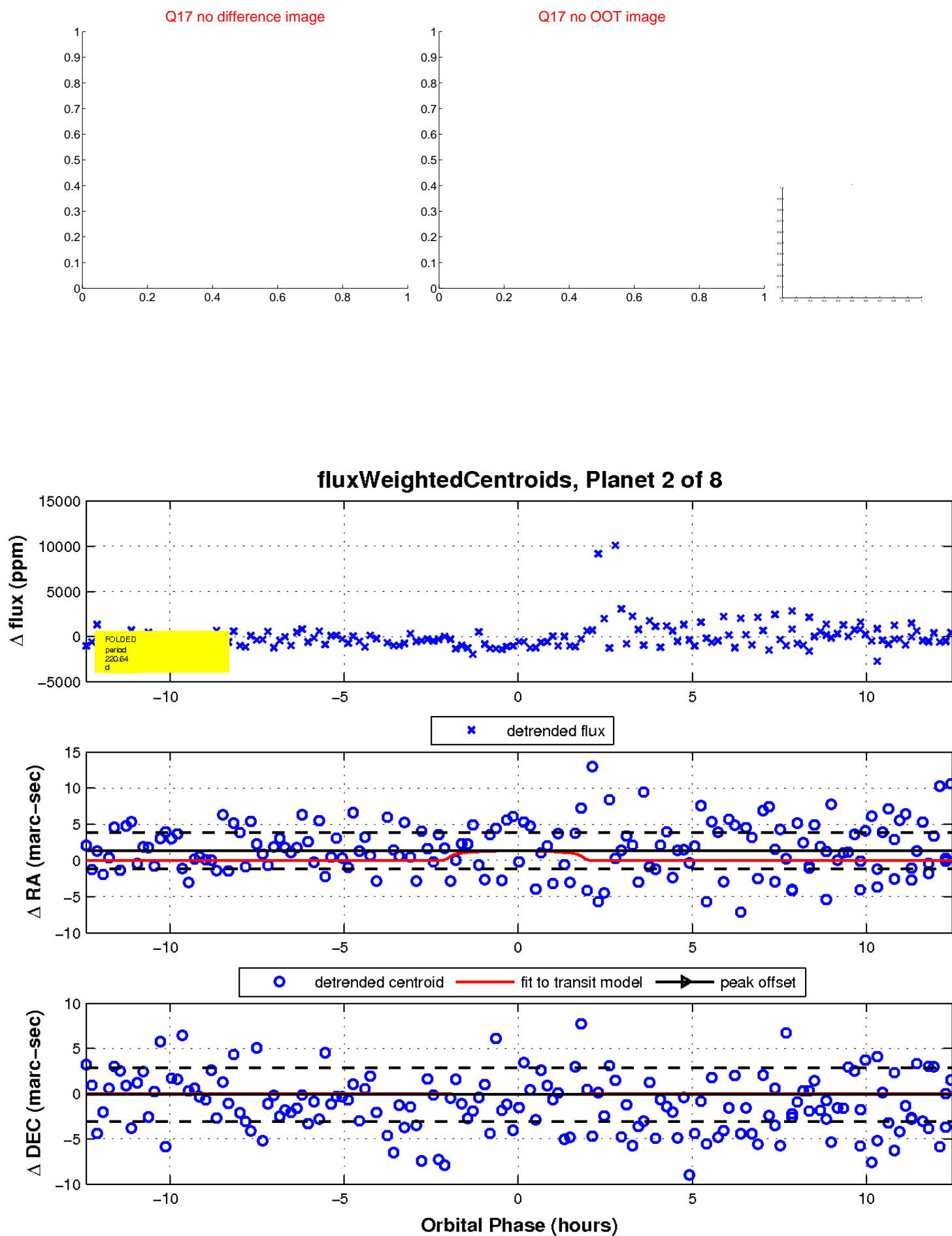
Q16 difference image



Q16 OOT image



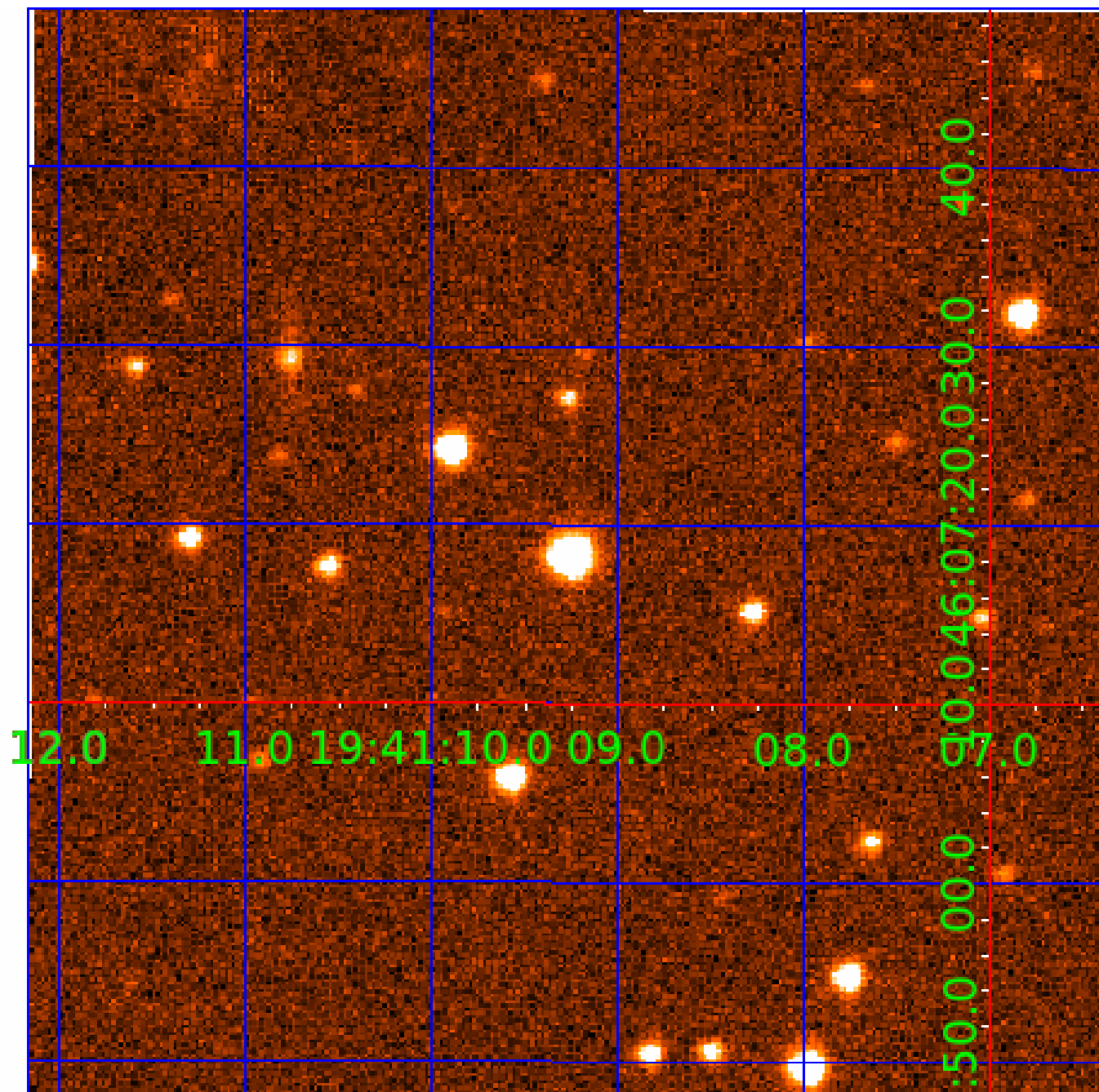
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





UKIRT Image

Declination



# KIC 009535171

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
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009535171-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009535171-05	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—INCONSISTENT_TRANS
009535171-06	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_MARSHALL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
009535171-07	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_TER_ALT—MOD_POS_ALT—CENT_NOFITS—HALO_GHOST
009535171-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—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.

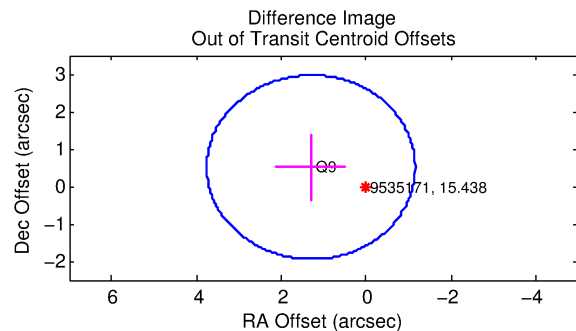
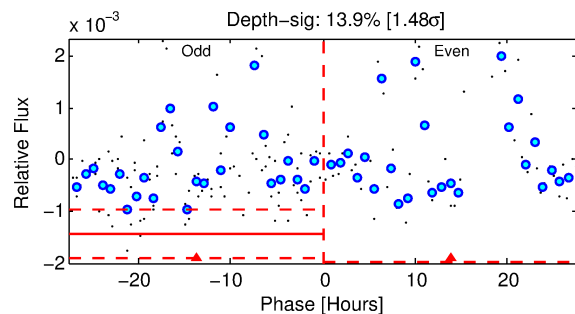
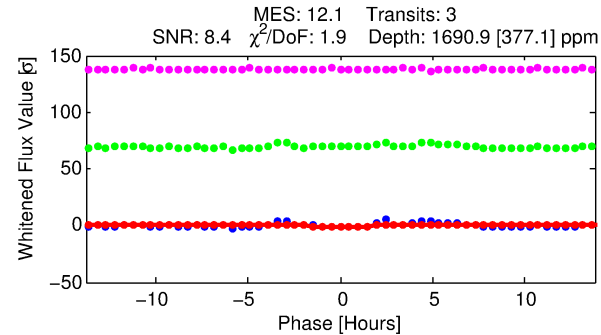
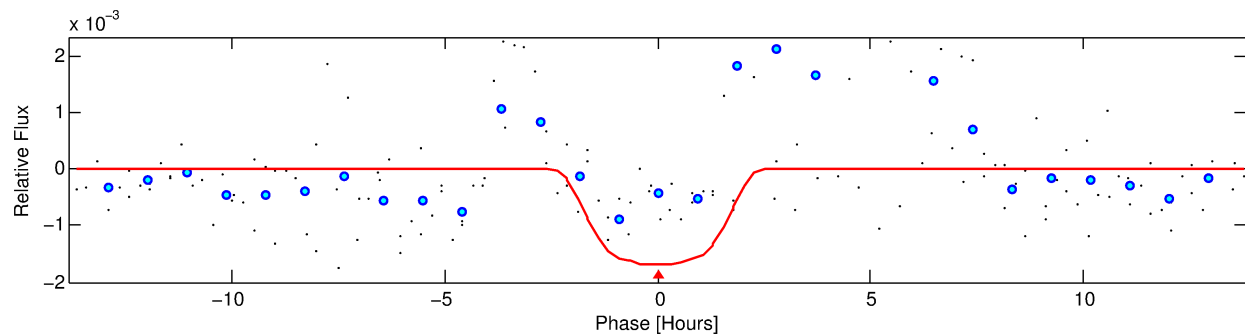
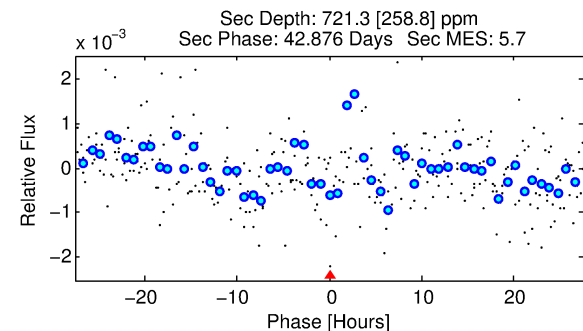
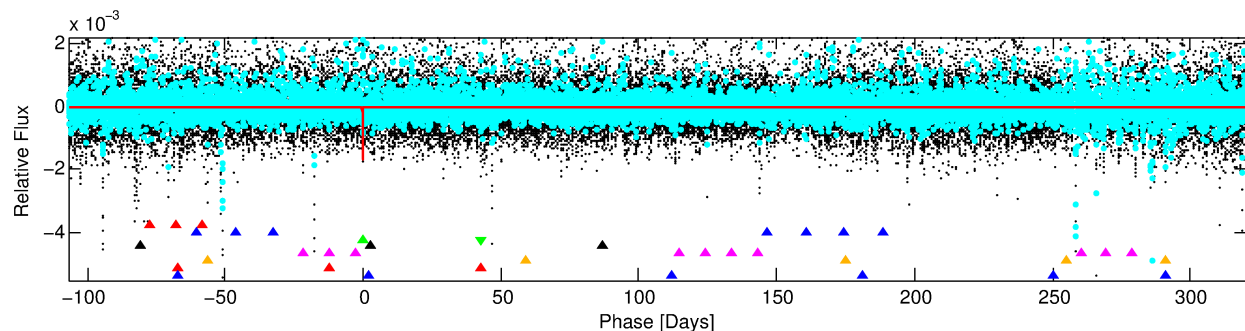
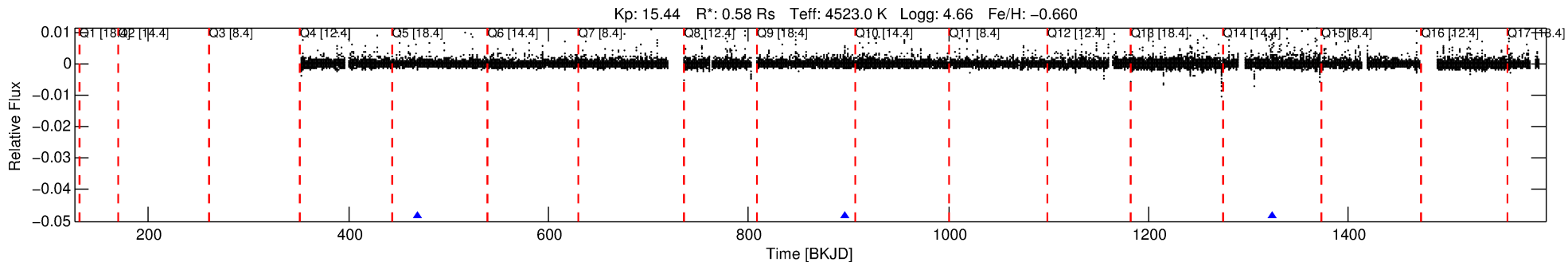
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## Ephemeris Match Information For 009535171-03

No Significant Match Found

# DV One-Page Summary

KIC: 9535171 Candidate: 3 of 8 Period: 427.361 d



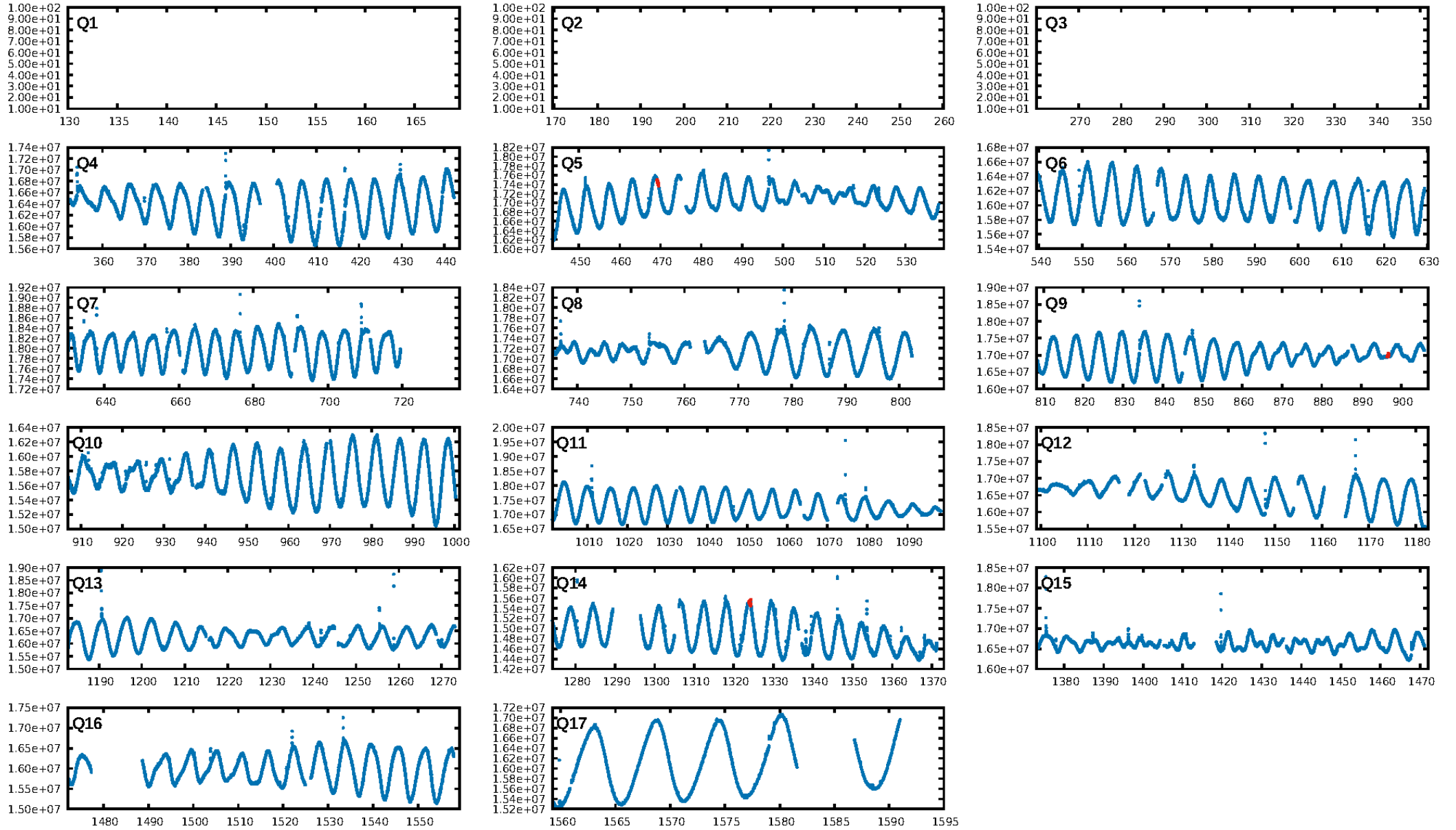
## DV Fit Results:

Period = 427.36062 [0.01066] d  
Epoch = 469.3668 [0.0121] BKJD  
Rp/R\* = 0.0474 [0.0107]  
a/R\* = 355.24 [208.33]  
b = 0.92 [0.11]  
Seff = 0.15 [0.03]  
Teq = 159 [7] K  
Rp = 3.02 [0.73] Re  
a = 0.9222 [0.0659] AU  
Ag = 36971.41 [21686.74] [1.70σ]  
Teffp = 3404 [507] K [6.41σ]

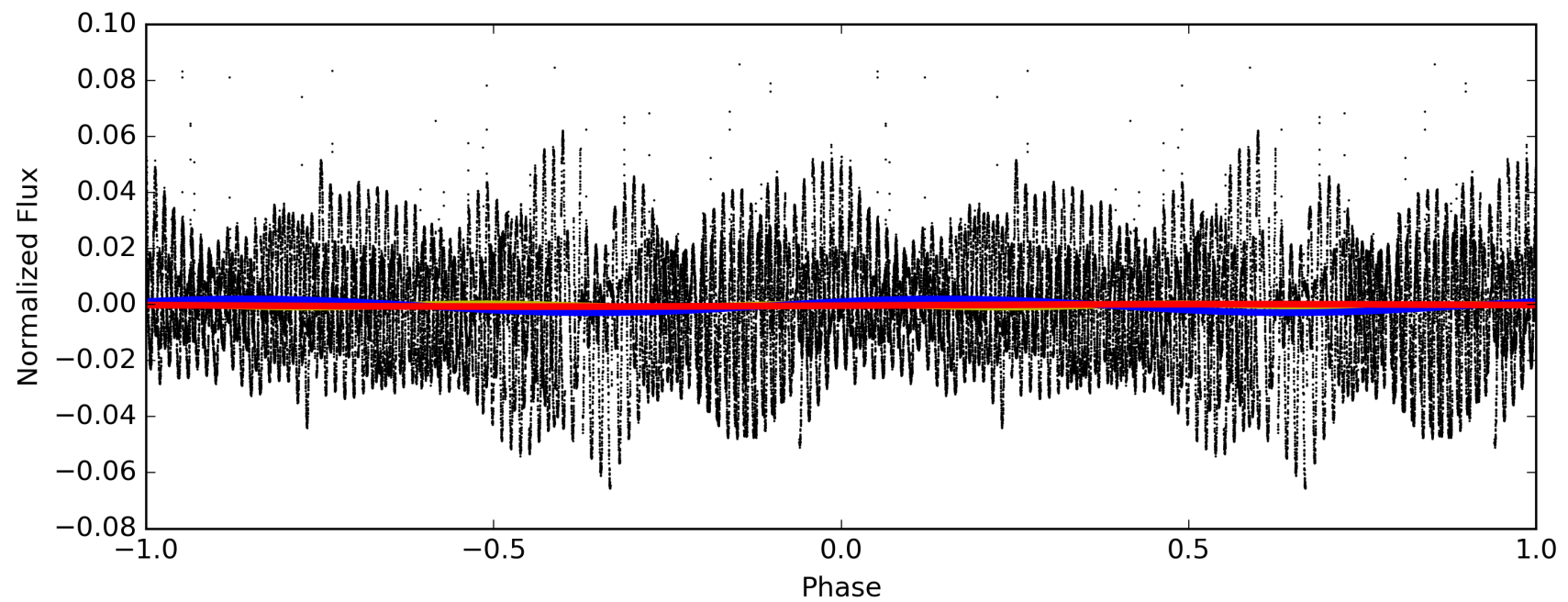
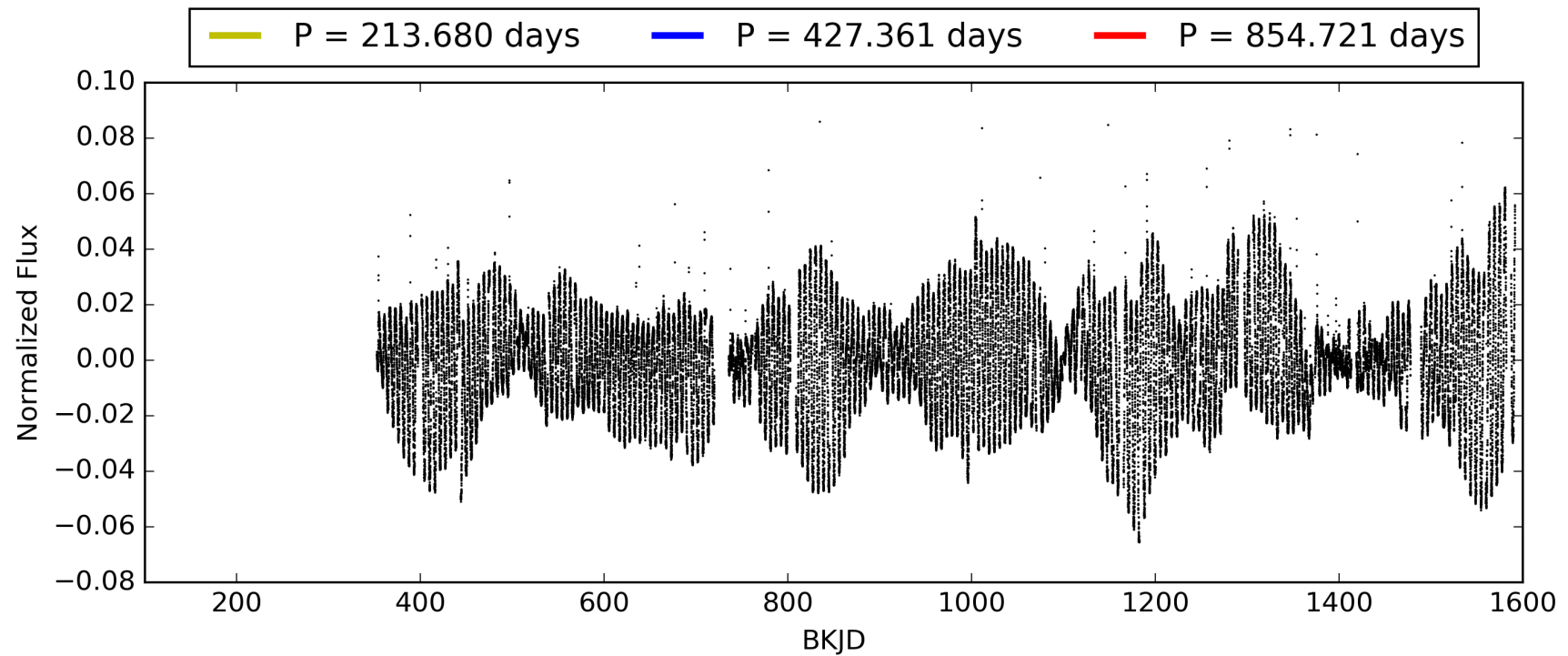
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [35.14σ]  
LongPeriod-sig: 100.0% [83.98σ]  
ModelChiSquare2-sig: 11.1%  
ModelChiSquareGof-sig: 74.4%  
**Bootstrap-pfa: 1.31e-11**  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 1.082  
Centroid-sig: 15.6%  
Centroid-so: 1.233 arcsec [1.05σ]  
OotOffset-rm: 1.393 arcsec [1.70σ]  
KicOffset-rm: 1.420 arcsec [1.75σ]  
OotOffset-st: 0/0/0/1 [1]  
KicOffset-st: 0/0/0/1 [1]  
DiffImageQuality-fgm: 1.00 [1/1]  
DiffImageOverlap-fno: 1.00 [3/3]

# TCE 009535171-03, PDC Light Curves



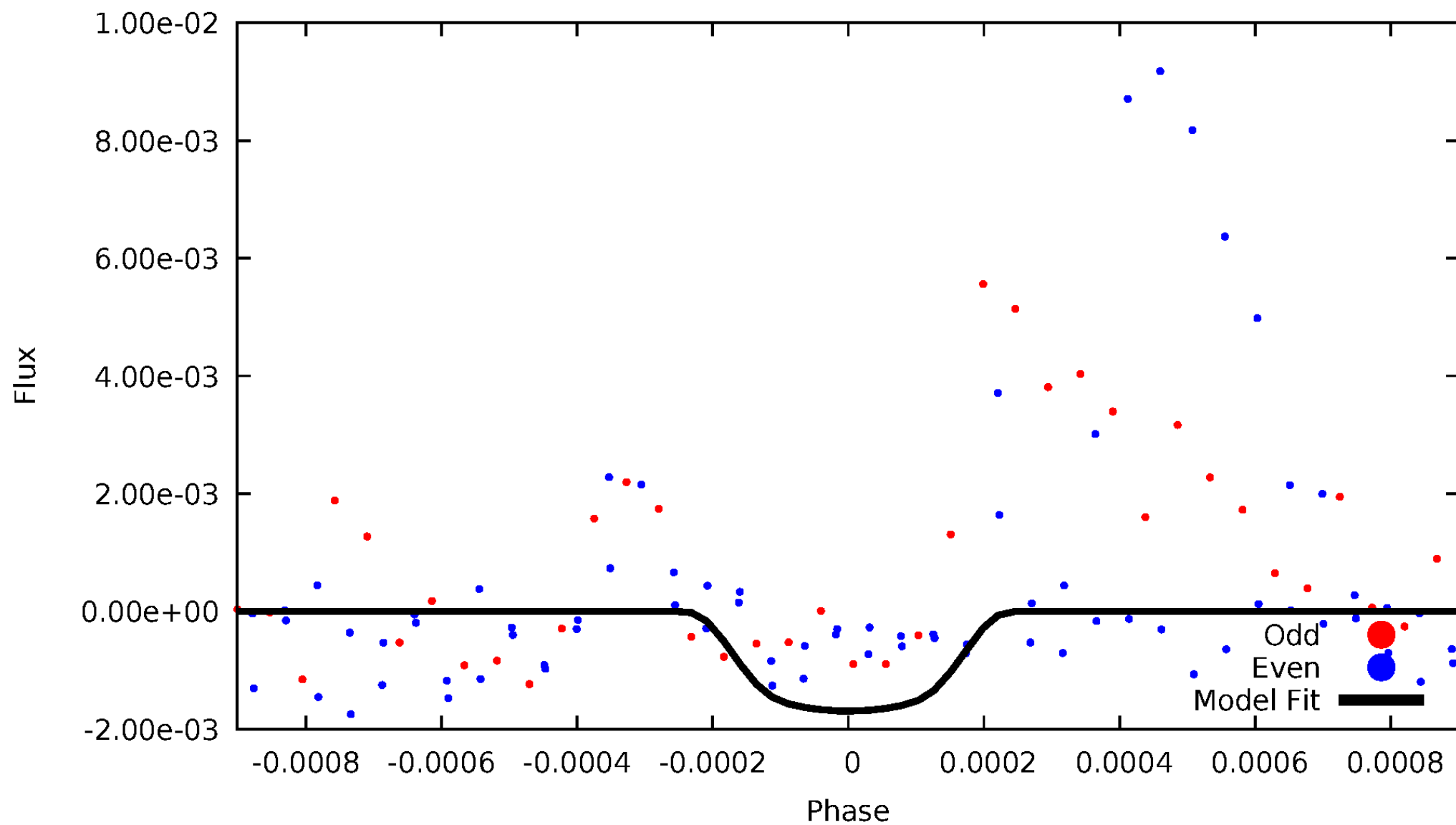
TCE 009535171-03





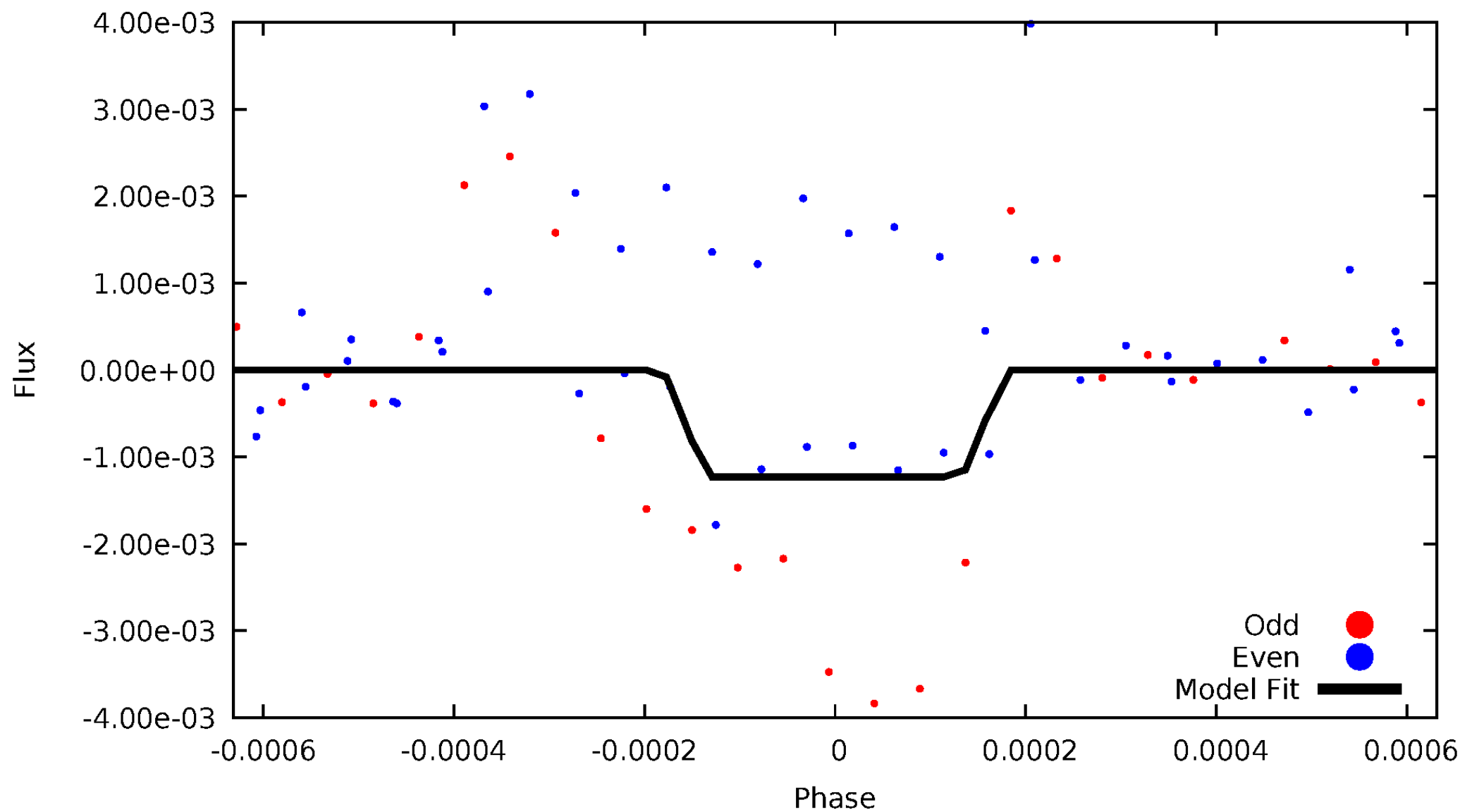
# DV Odd/Even

TCE 009535171-03



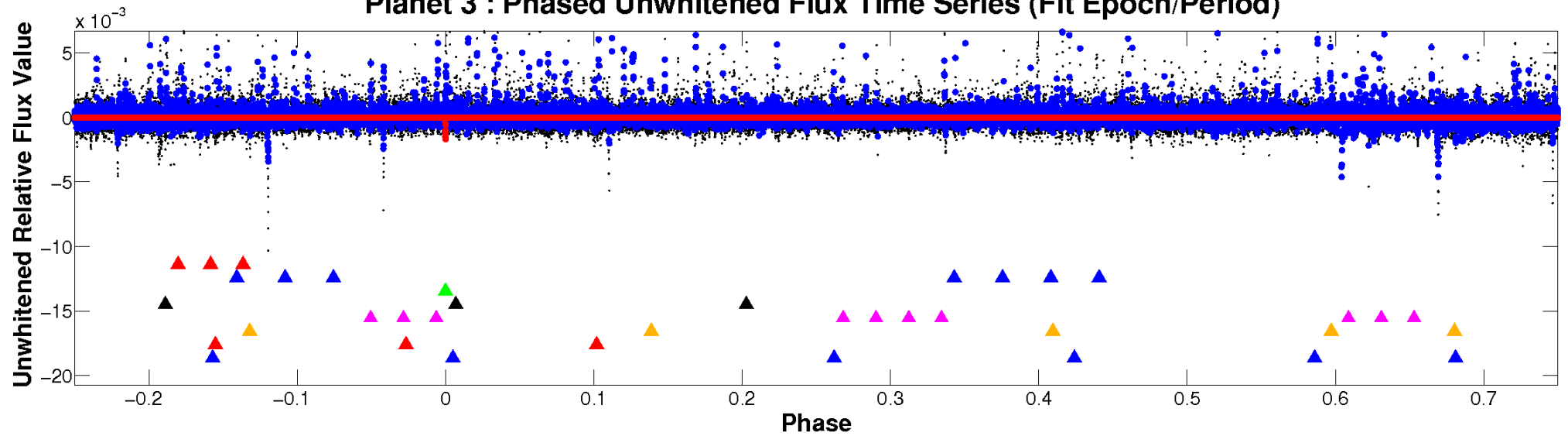
# ALT Odd/Even

TCE 009535171-03

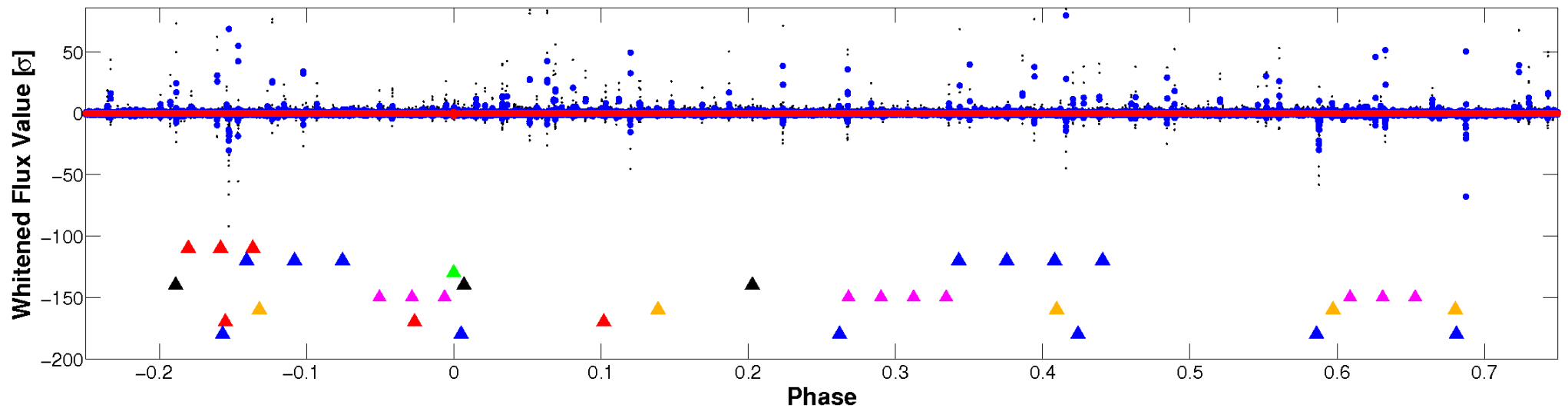


# Non-Whitened Vs. Whitened Light Curve

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

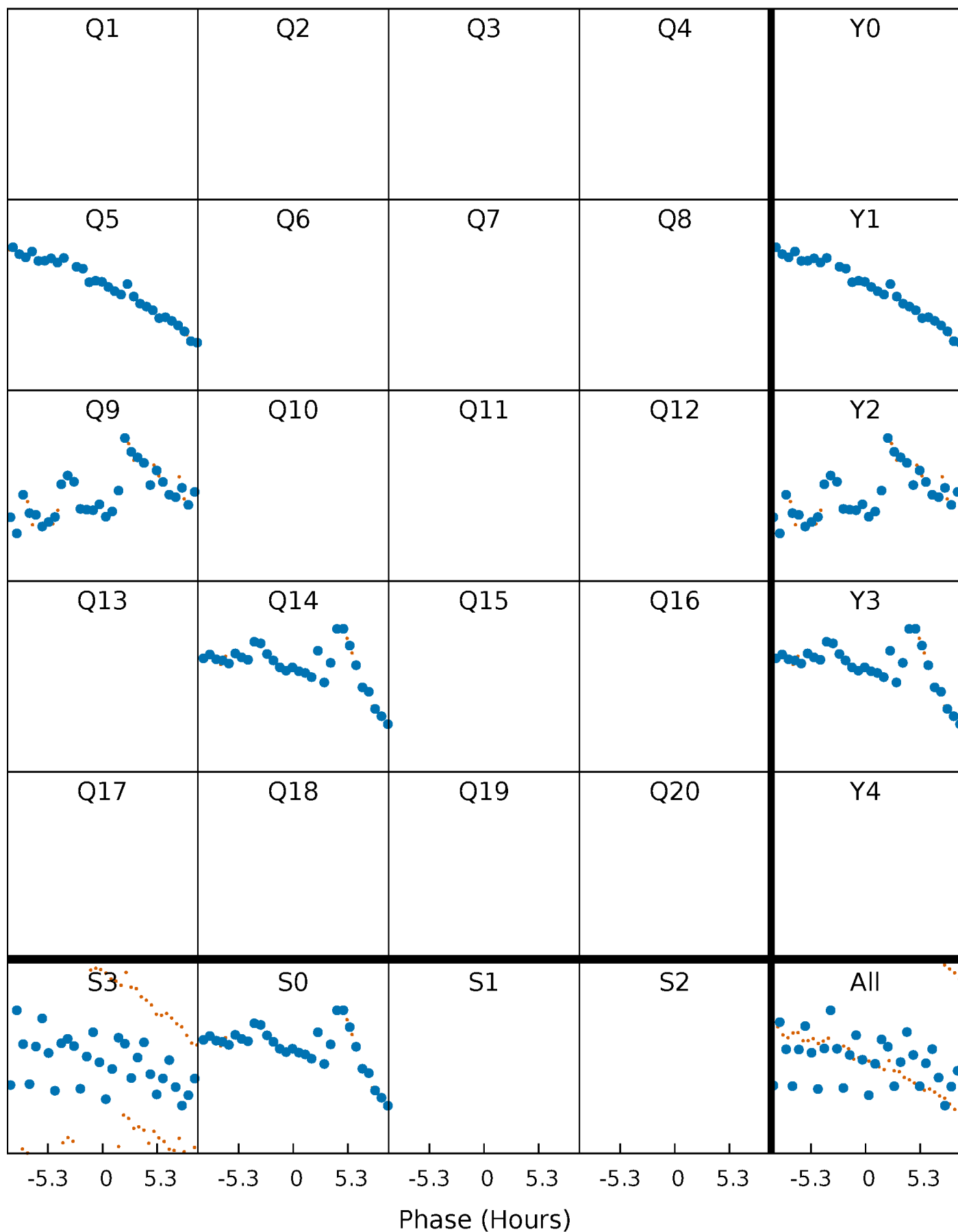


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



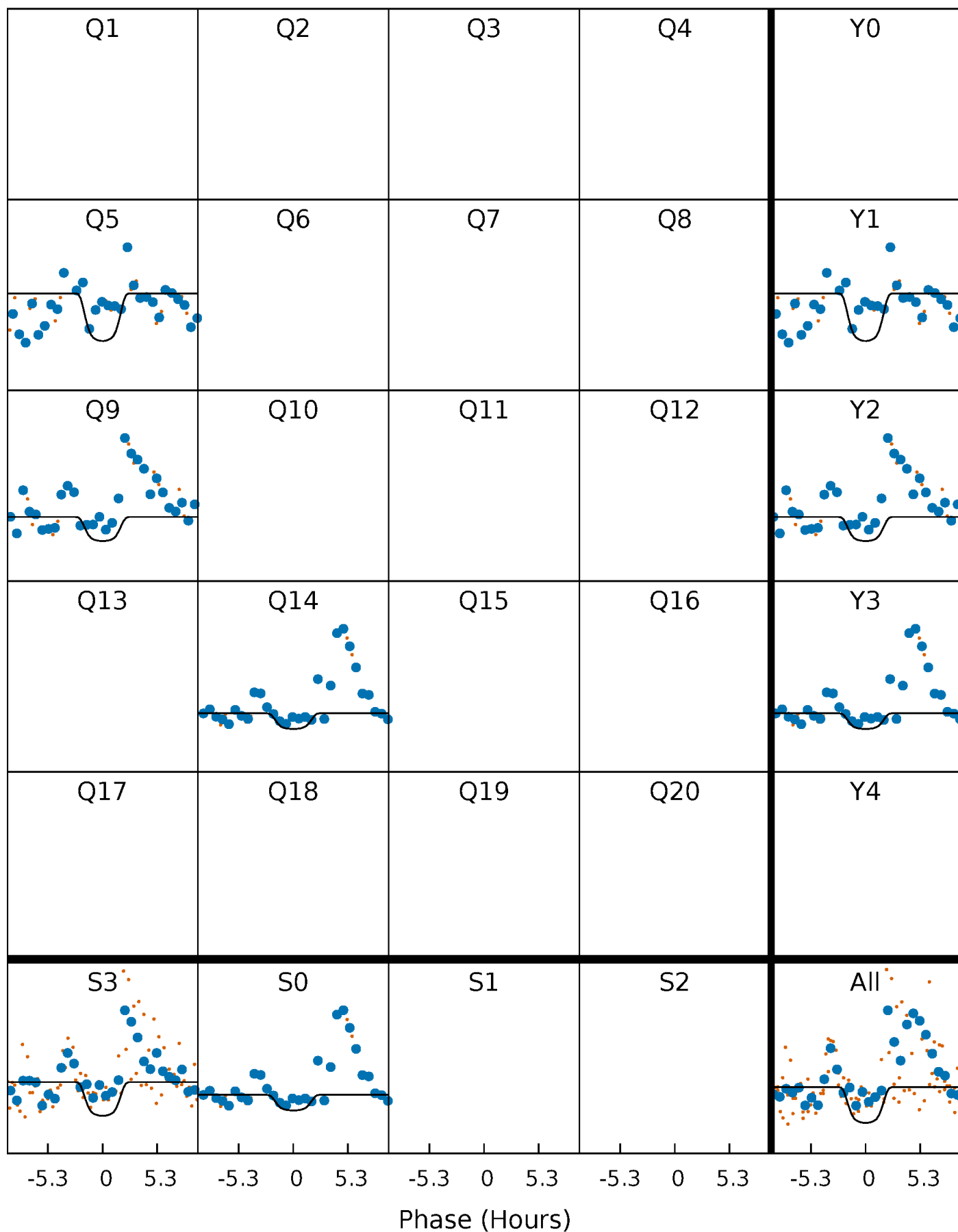
# PDC Quarter-Phased Transit Curves

TCE 009535171-03     $P=427.360621$  Days     $T_0=469.366835$  (BKJD)



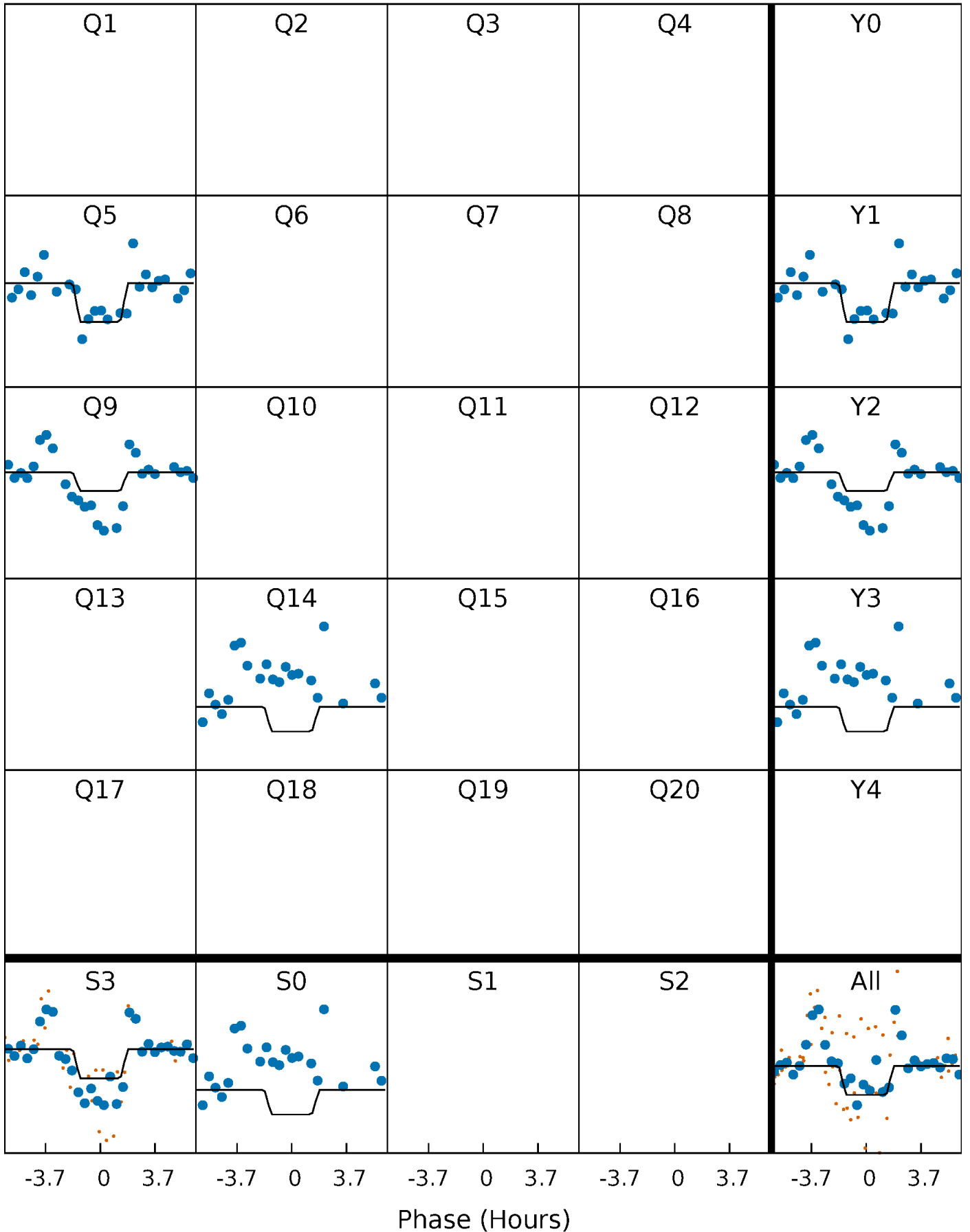
# DV Quarter-Phased Transit Curves

TCE 009535171-03     $P=427.360621$  Days     $T_0=469.366835$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

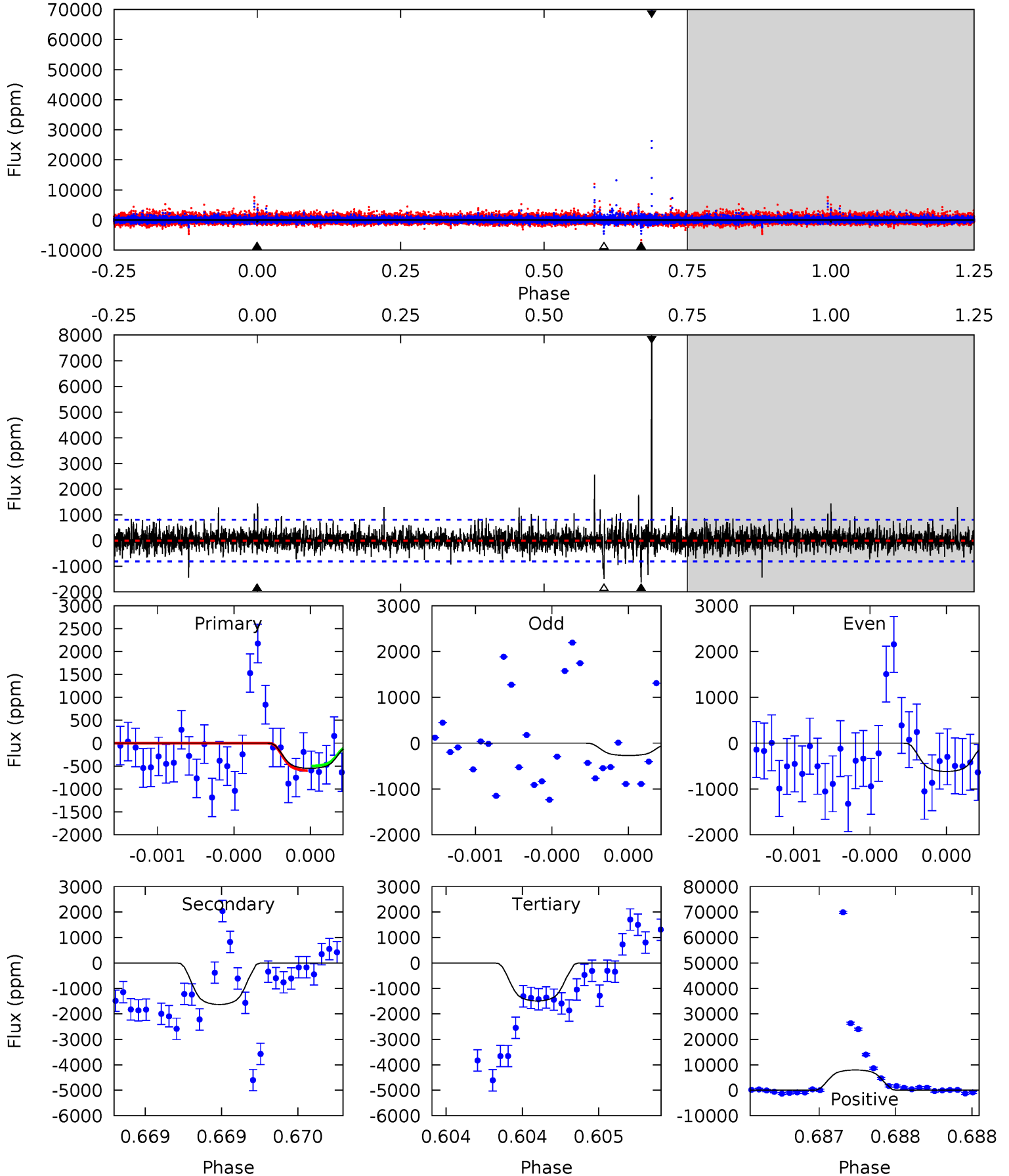
TCE 009535171-03     $P=427.361096$  Days     $T_0=469.372398$  (BKJD)



# DV Model-Shift Uniqueness Test

009535171-03, P = 427.360621 Days, E = 42.006214 Days

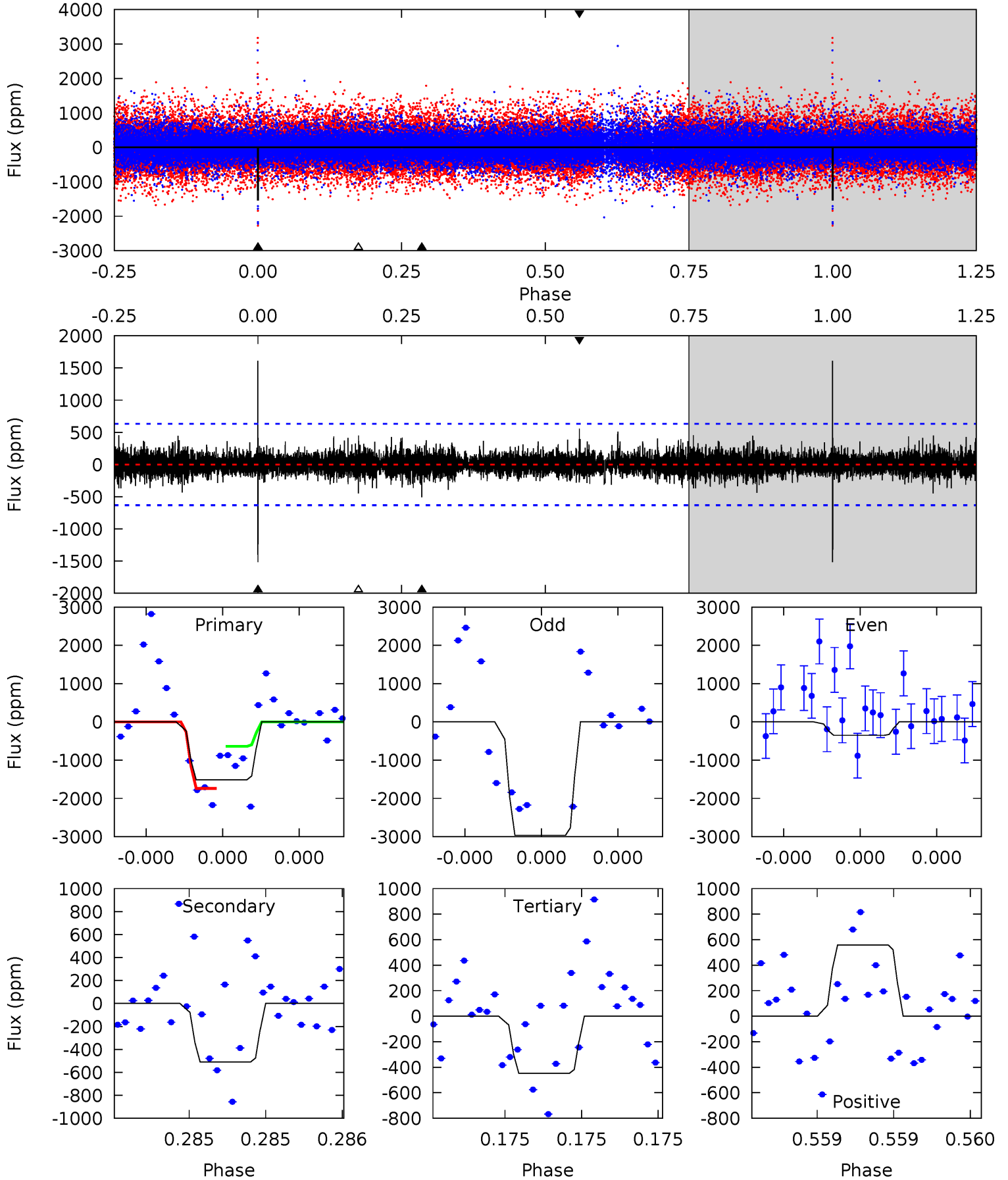
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
3.79	11.2	10.3	54.9	5.59	3.51	1.97	-6.49	-51.1	0.97	-43.7	0.72	0.90	0.83	0.33



# Alt Model-Shift Uniqueness Test

009535171-03, P = 427.361096 Days, E = 42.011302 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	4.52	3.98	4.96	5.63	3.57	0.84	9.50	8.52	0.55	-0.44	13.6	0.75	0.52	0





### Stellar Parameters For KIC 009535171

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$4523^{+162}_{-162}$	$4.663^{+0.054}_{-0.032}$	$-0.660^{+0.300}_{-0.300}$	$0.584^{+0.051}_{-0.051}$	$0.572^{+0.062}_{-0.038}$	$4.047^{+0.935}_{-0.524}$
	+4%/-4%	+1%/-1%	+45%/-45%	+9%/-9%	+11%/-7%	+23%/-13%
Source	KIC0	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 009535171-03 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-1633 \pm 145$	$2.97^{+0.72}_{-0.68}$	$222^{+8}_{-10}$	$4282^{+484}_{-336}$	$87095^{+60633}_{-30650}$
Alt.	$-509 \pm 112$	$2.26^{+0.63}_{-0.69}$	$221^{+8}_{-9}$	$3838^{+549}_{-381}$	$47270^{+51338}_{-21462}$

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

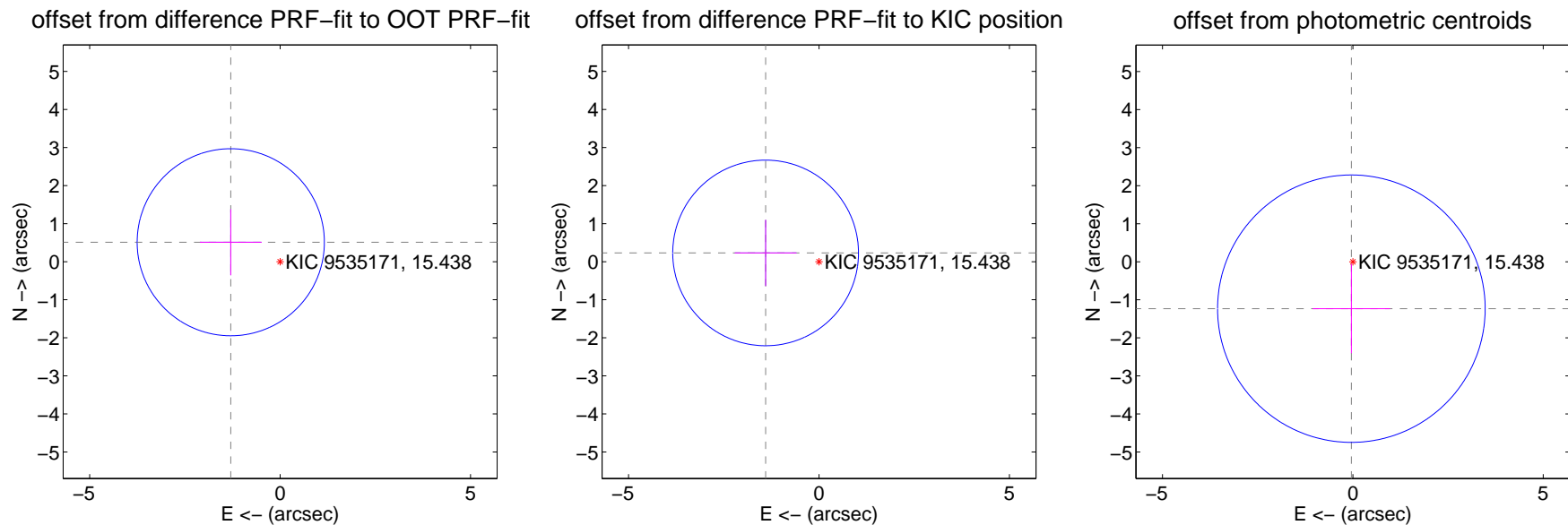
## DV Centroid Data

Supplemental centroid analysis for 009535171-03. Kepler magnitude: 15.44. Transit SNR 8.39

There are 1 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.30 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.393 \pm 0.819$	1.70	$1.296 \pm 0.811$	$0.511 \pm 0.868$
PRF-fit source offset from KIC position	$1.420 \pm 0.813$	1.75	$1.402 \pm 0.811$	$0.230 \pm 0.868$
photometric centroid source offset	$1.23 \pm 1.17$	1.05	$0.04 \pm 1.01$	$-1.23 \pm 1.17$

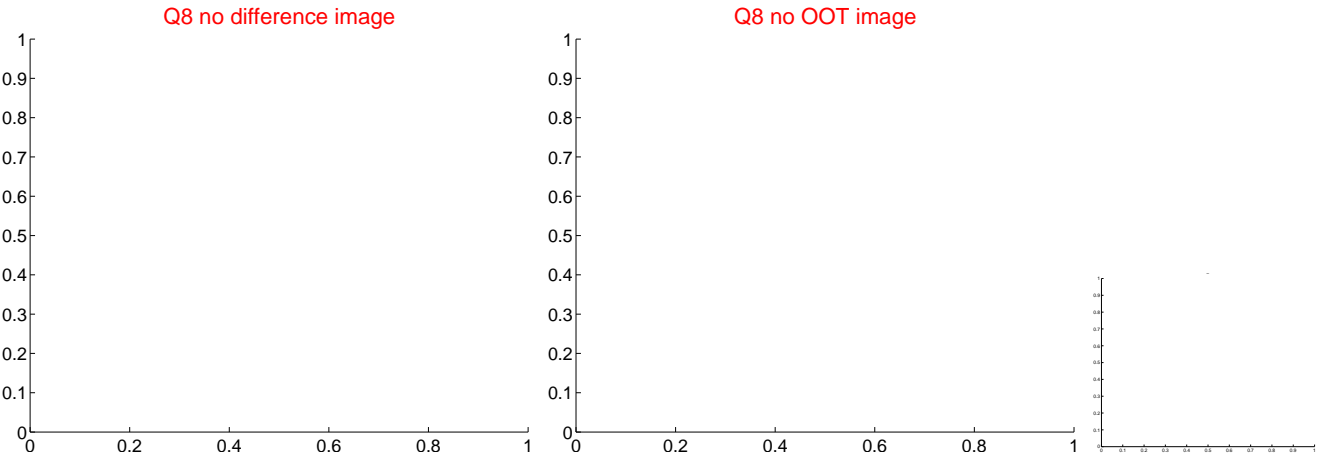
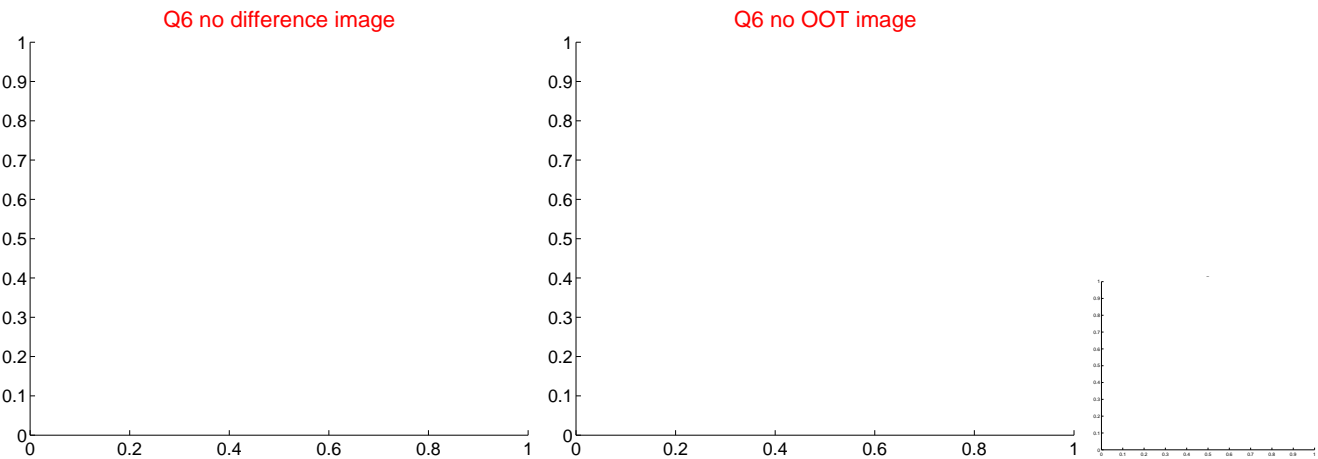
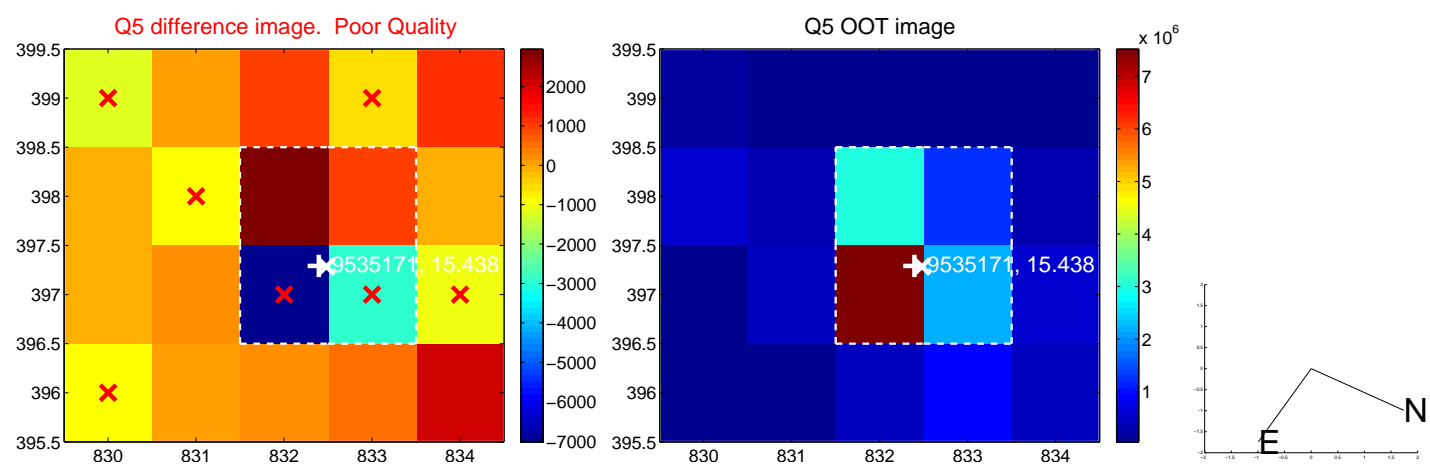


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

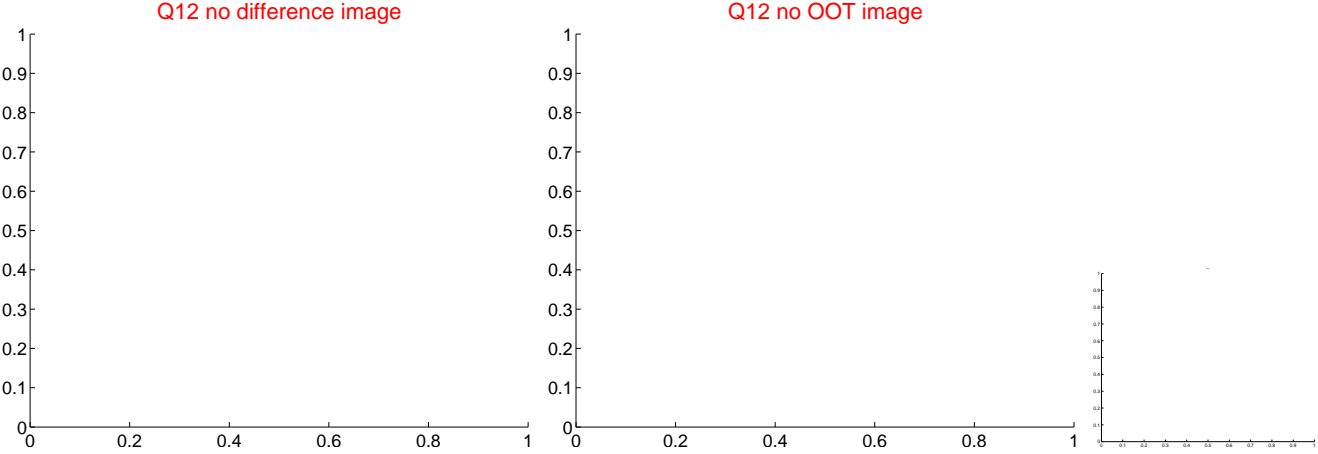
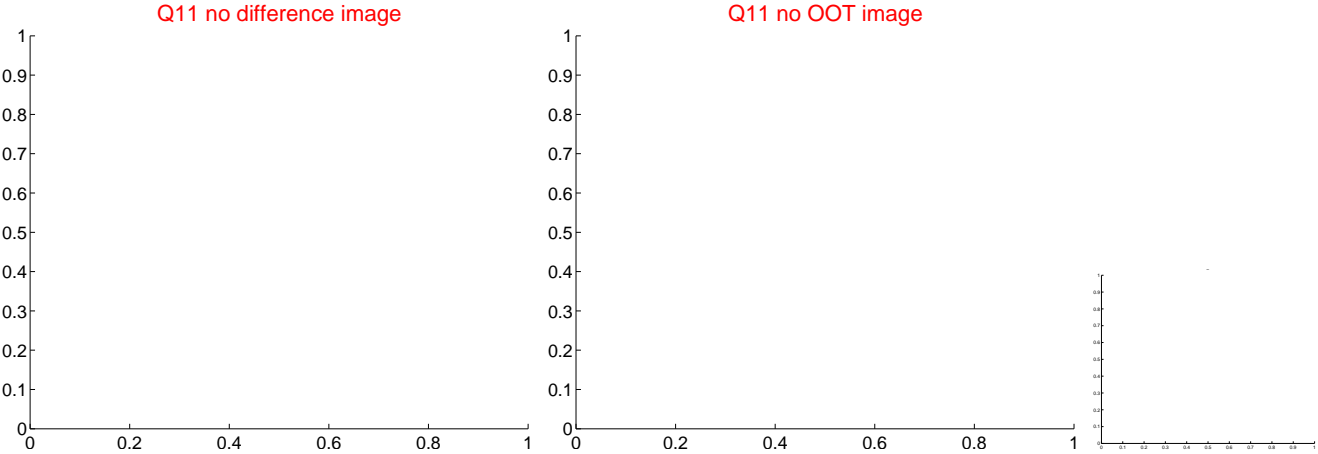
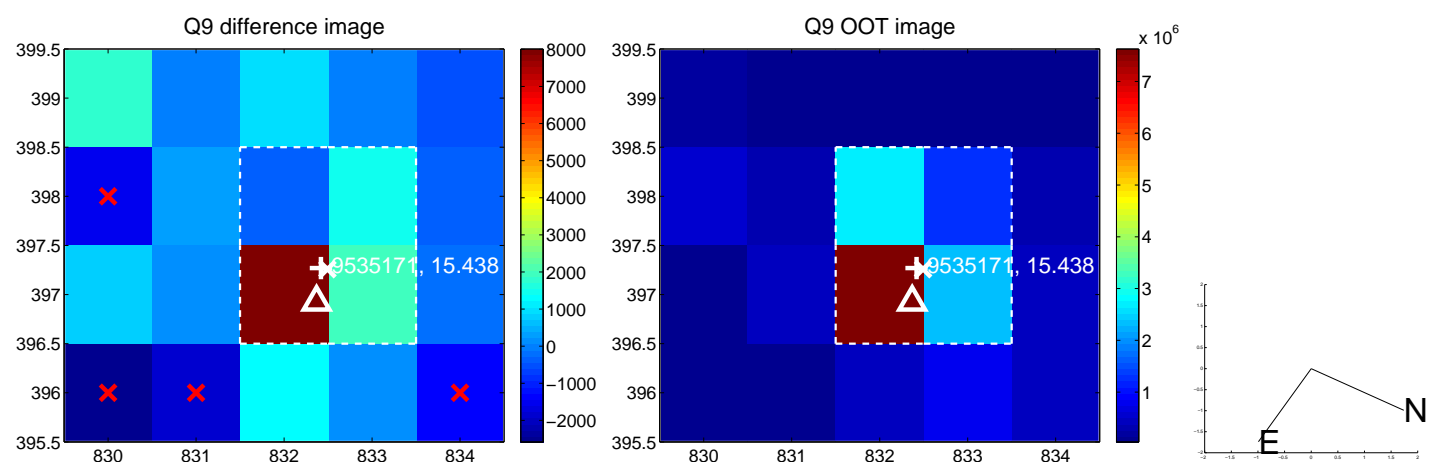
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

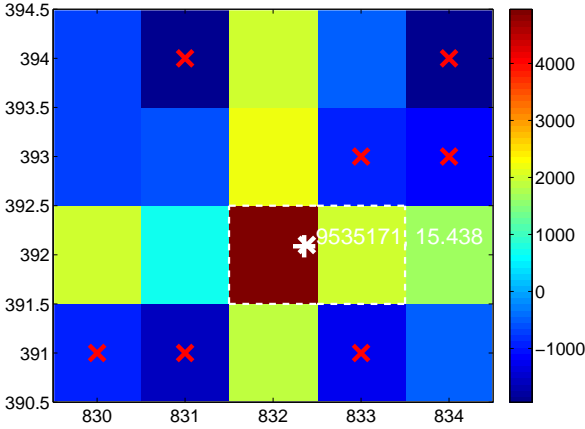
Q13 no difference image



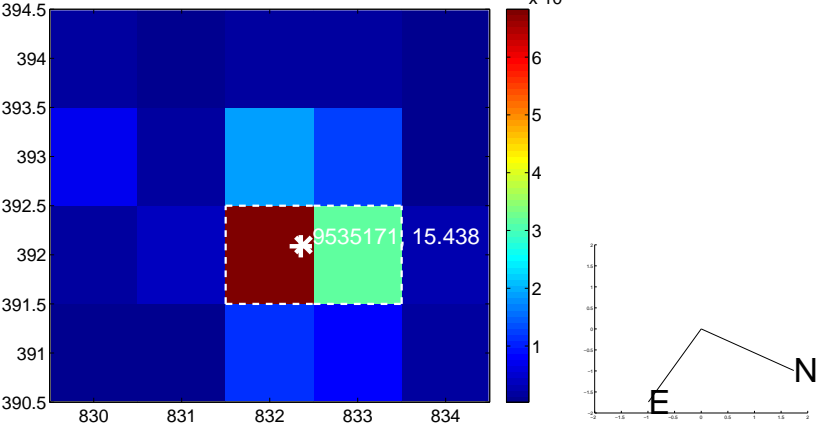
Q13 no OOT image



Q14 difference image. Poor Quality



Q14 OOT image



Q15 no difference image



Q15 no OOT image



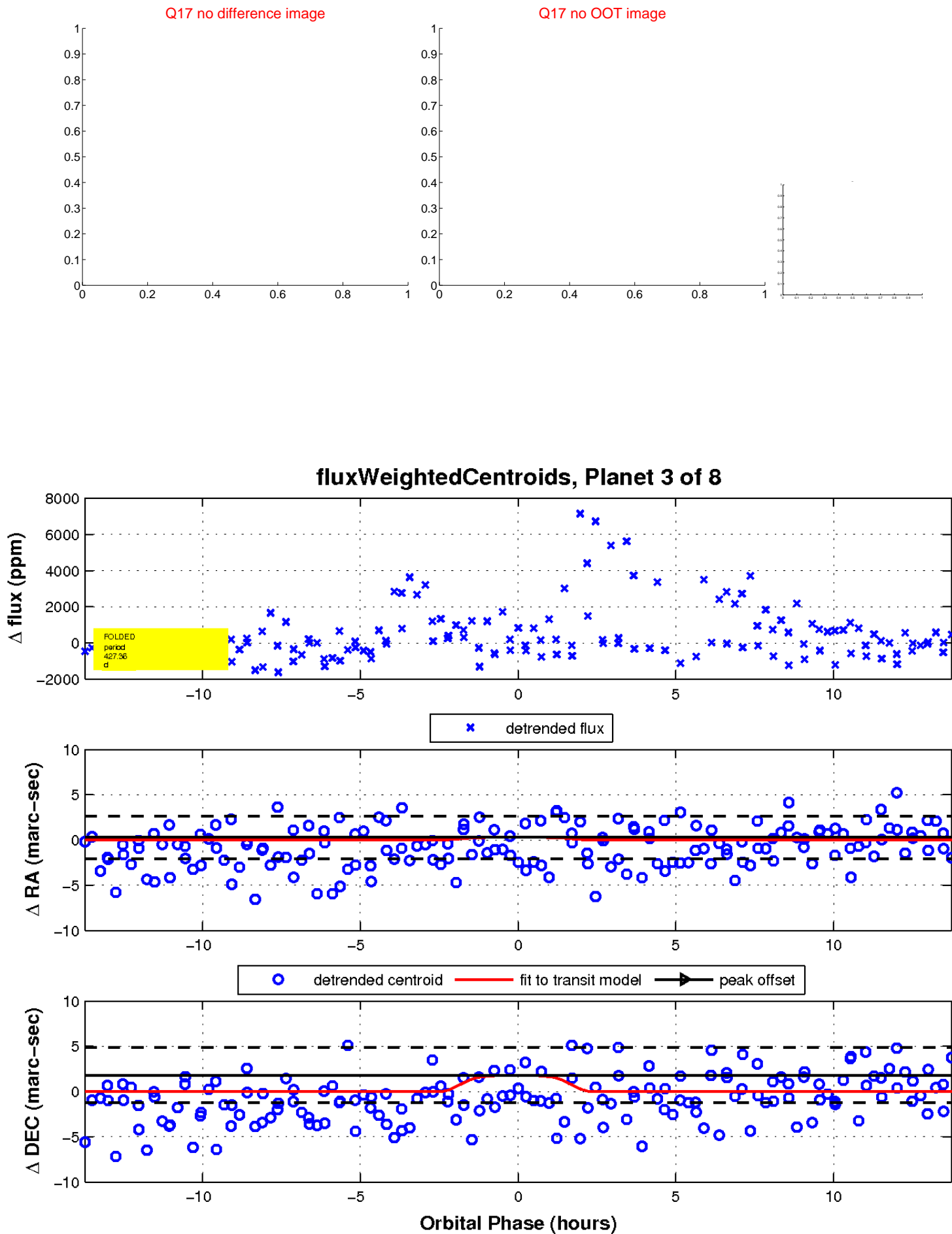
Q16 no difference image



Q16 no OOT image

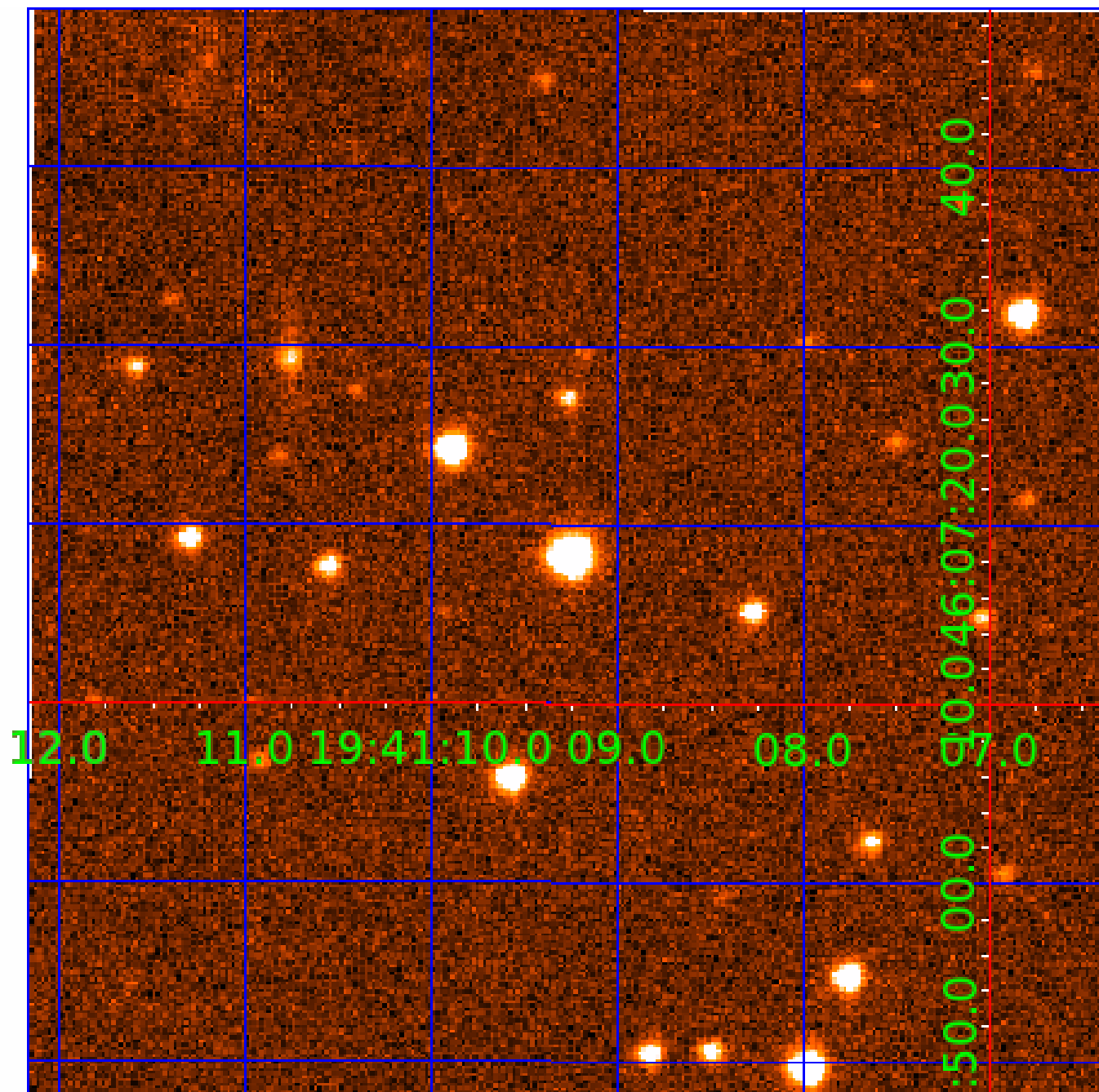


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 009535171

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009535171-02	OBS	No	220.639366	188.607163	1609.9	4.166	10.1	7.4	0.58	4523	2.49	0.36
009535171-03	OBS	No	427.360621	469.366835	1690.9	4.622	12.1	8.4	0.58	4523	3.02	0.15
009535171-04	OBS	No	511.061408	388.660897	2476.9	4.301	11.3	10.6	0.58	4523	2.85	0.12
009535171-05	OBS	No	145.603156	156.595124	821.6	7.873	8.4	6.0	0.58	4523	2.14	0.63
009535171-06	OBS	No	311.646432	332.735191	1228.6	8.727	12.3	5.4	0.58	4523	2.48	0.23
009535171-07	OBS	No	482.286505	403.066195	662.1	15.000	11.2	-1.0	0.58	4523	1.45	0.13
009535171-08	OBS	No	248.293280	333.065876	478.8	4.547	9.2	3.1	0.58	4523	1.50	0.31

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009535171-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS
009535171-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009535171-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009535171-05	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—INCONSISTENT_TRANS
009535171-06	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_MARSHALL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
009535171-07	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_TER_ALT—MOD_POS_ALT—CENT_NOFITS—HALO_GHOST
009535171-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—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.

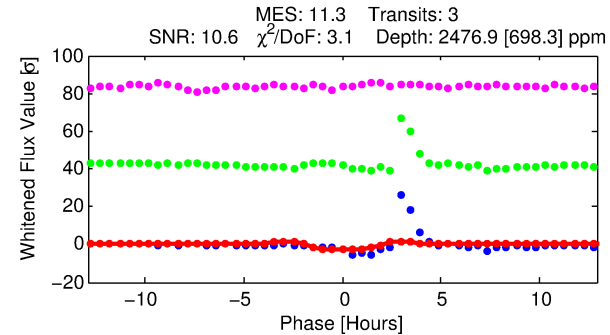
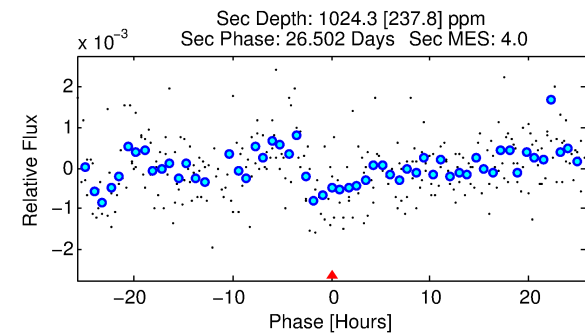
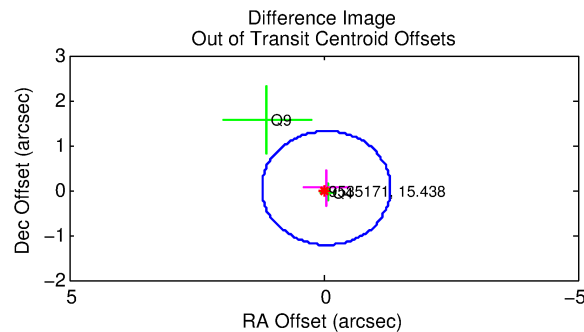
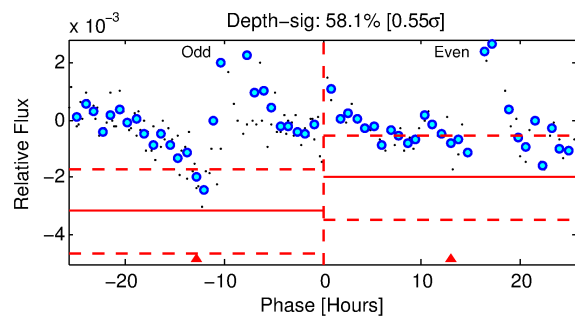
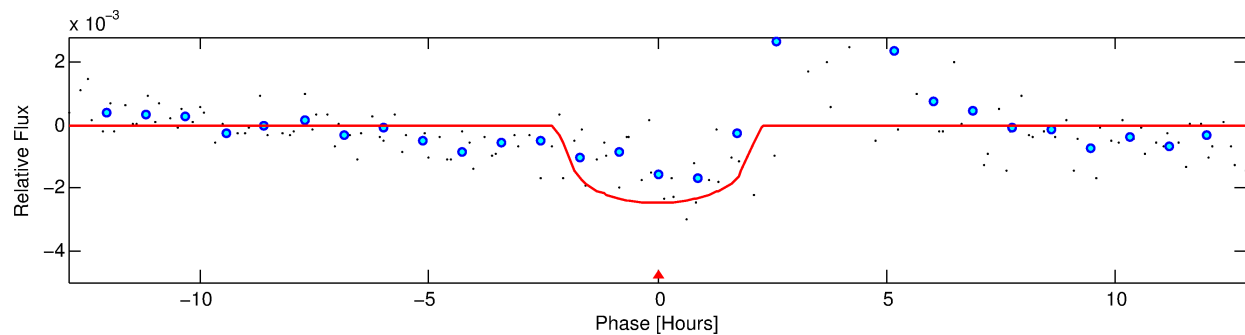
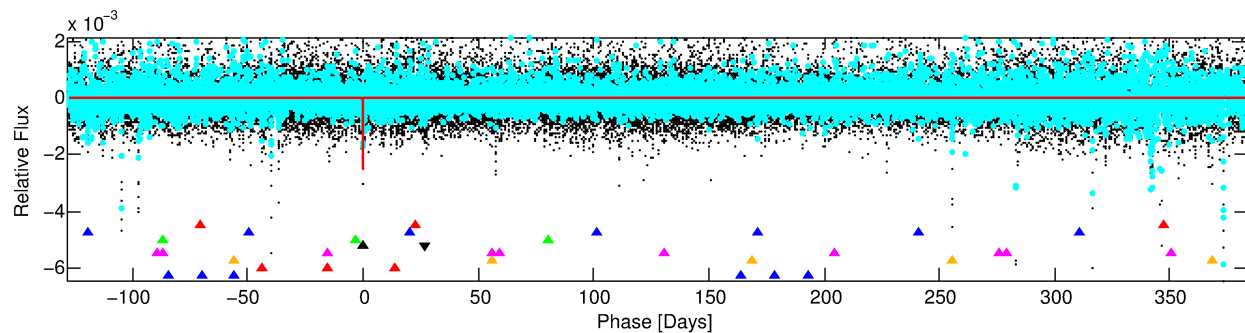
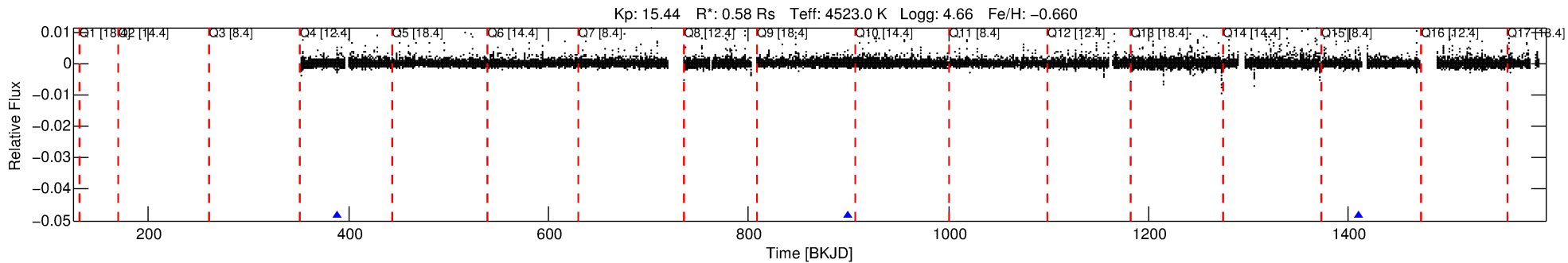
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 009535171-04

No Significant Match Found

# DV One-Page Summary

KIC: 9535171 Candidate: 4 of 8 Period: 511.061 d



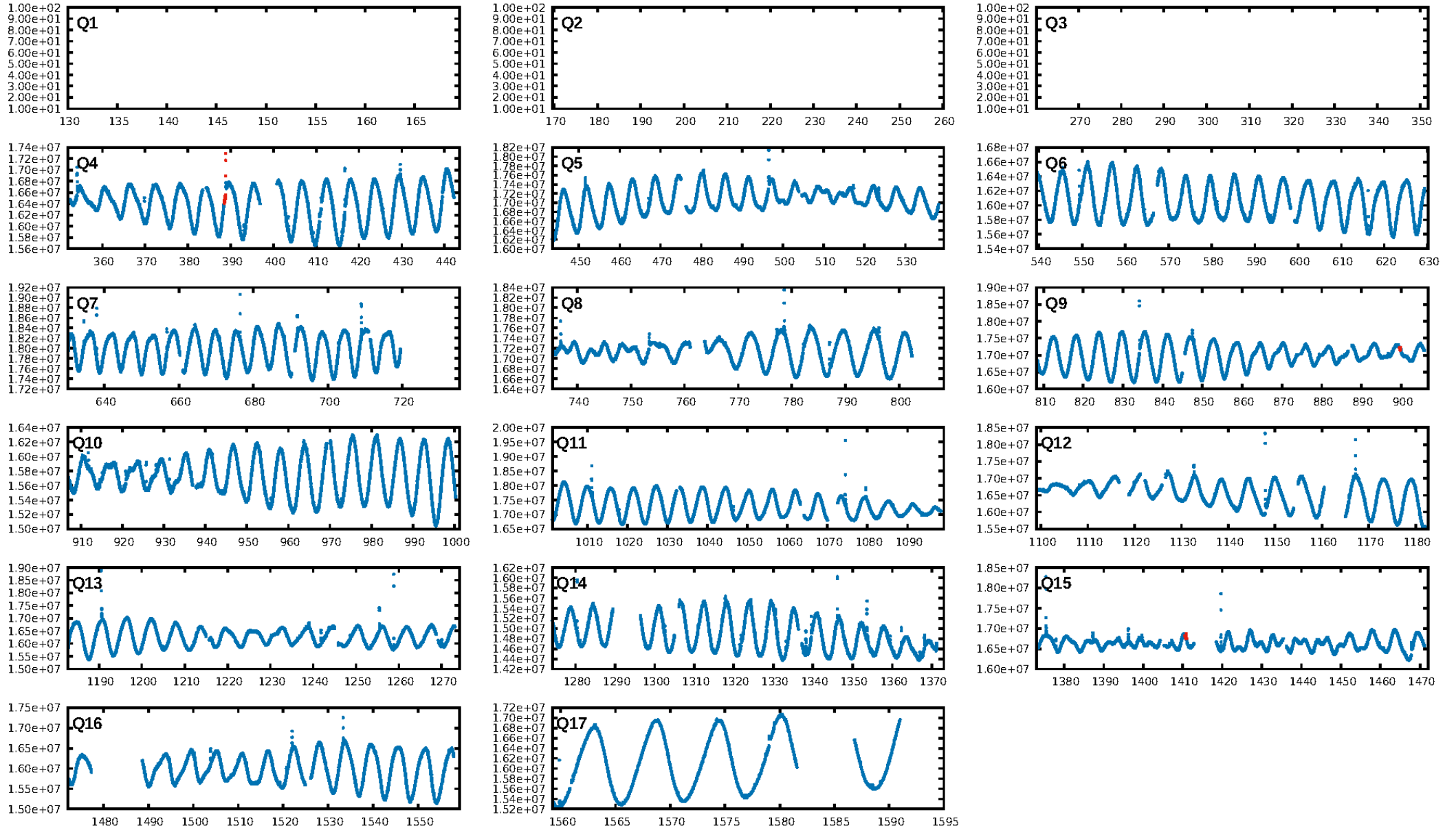
## DV Fit Results:

Period = 511.06141 [0.01037] d  
Epoch = 388.6609 [0.0159] BKJD  
Rp/R\* = 0.0446 [0.1363]  
a/R\* = 905.82 [8923.71]  
b = 0.31 [29.25]  
Seff = 0.12 [0.02]  
Teq = 150 [7] K  
Rp = 2.85 [8.69] Re  
a = 1.0390 [0.0743] AU  
Ag = 75138.25 [459017.55] [0.16 $\sigma$ ]  
Teffp = 3829 [5849] K [0.63 $\sigma$ ]

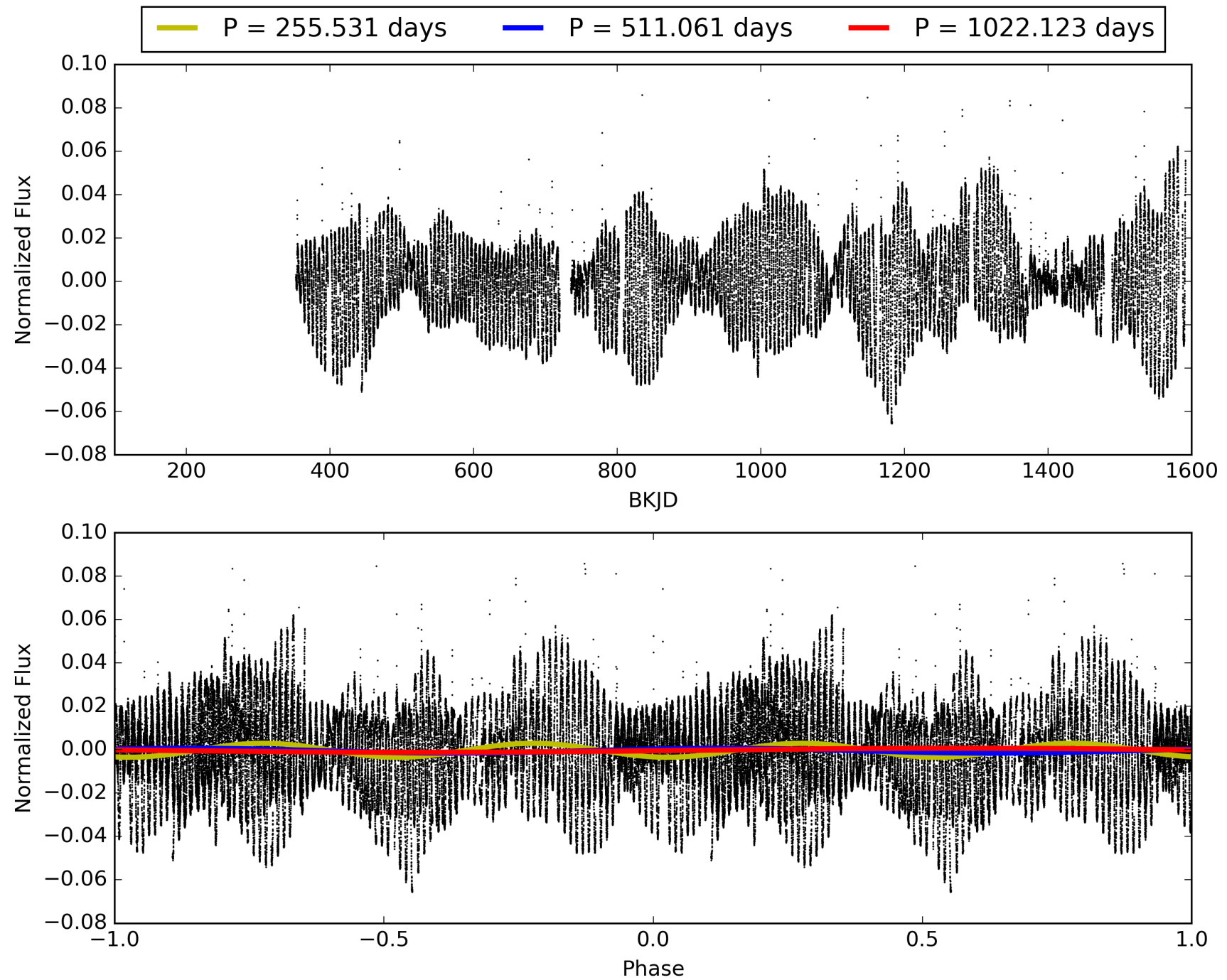
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [44.26 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 0.0%  
Bootstrap-pfa: 1.61e-10  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 2.047  
Centroid-sig: 82.7%  
Centroid-so: 0.480 arcsec [0.62 $\sigma$ ]  
OotOffset-rm: 0.069 arcsec [0.16 $\sigma$ ]  
OotOffset-st: 0/0/1/1 [2]  
KicOffset-rm: 0.100 arcsec [0.24 $\sigma$ ]  
KicOffset-st: 0/0/1/1 [2]  
DiffImageQuality-fgm: 1.00 [2/2]  
DiffImageOverlap-fno: 1.00 [3/3]

# TCE 009535171-04, PDC Light Curves

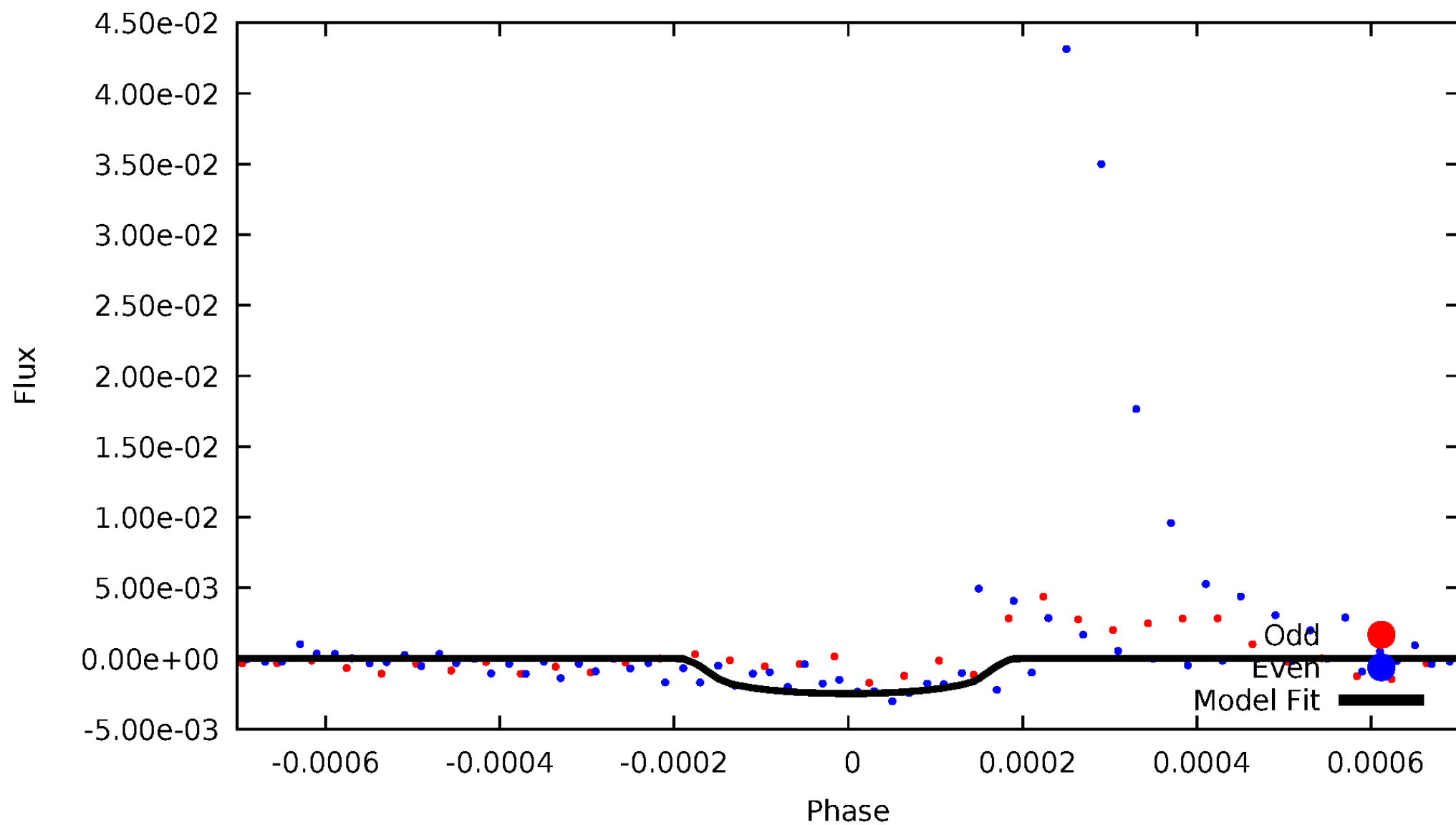


TCE 009535171-04



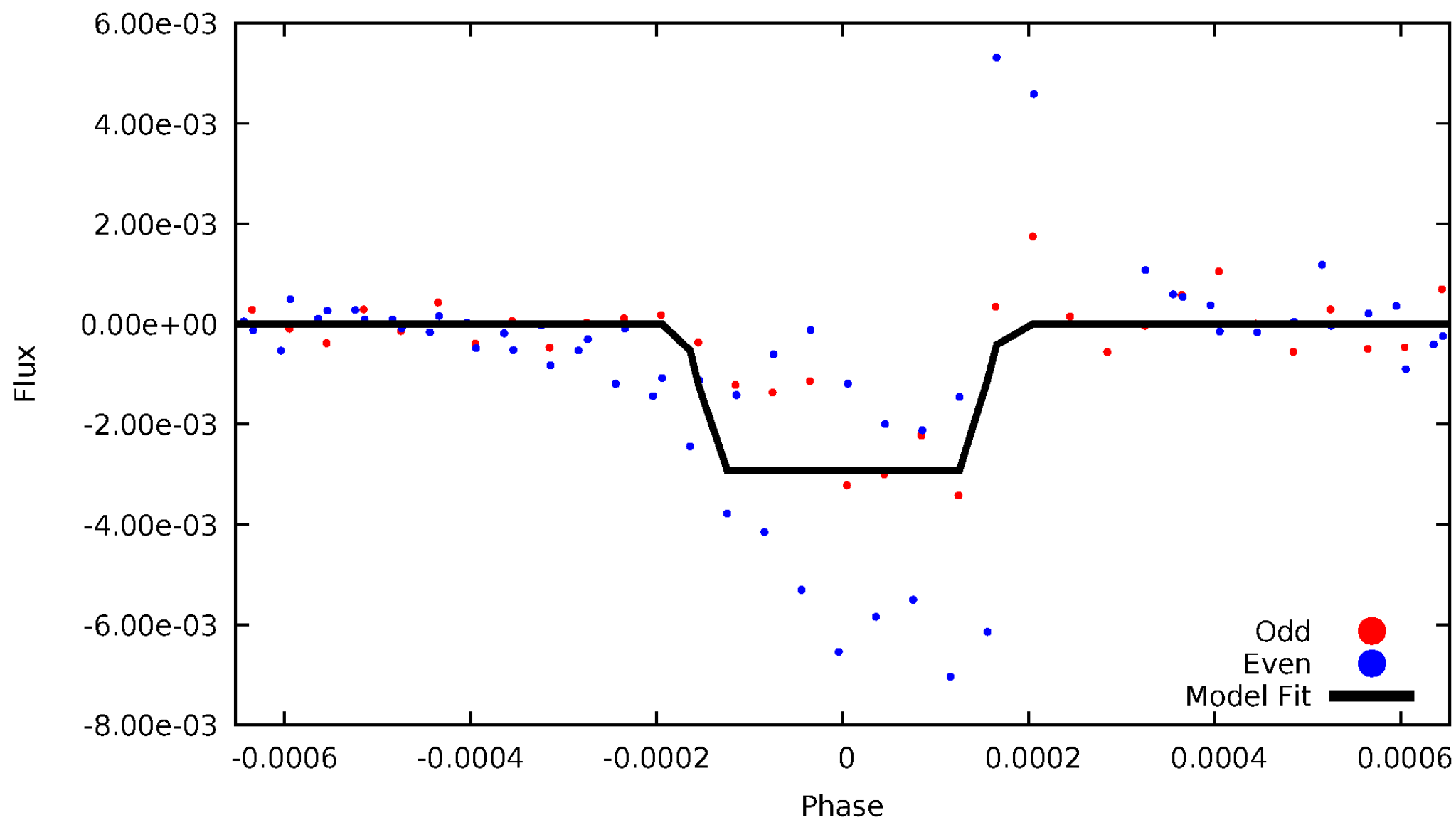
# DV Odd/Even

TCE 009535171-04



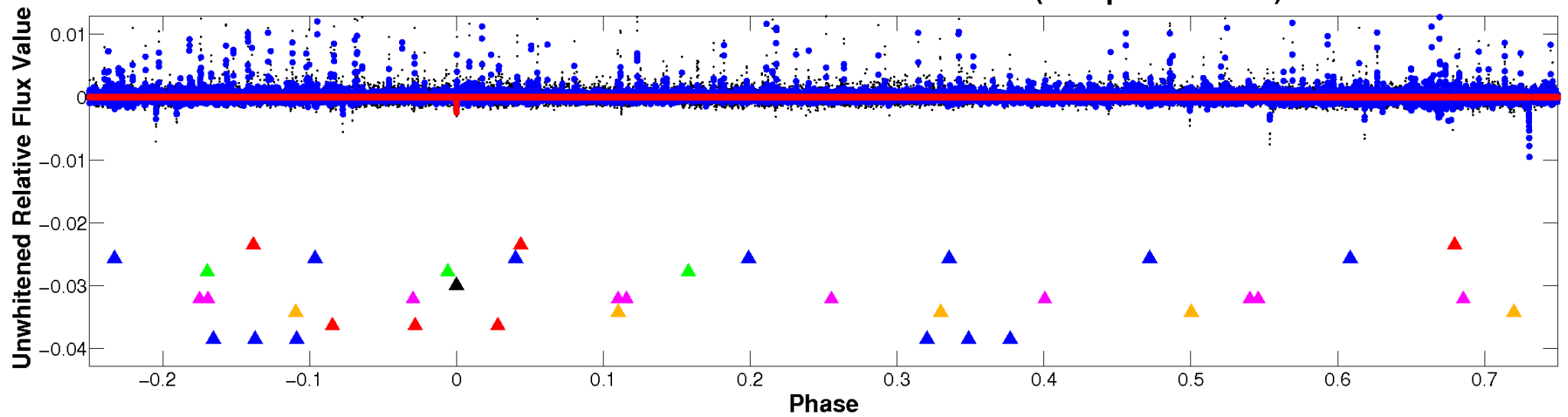
# ALT Odd/Even

TCE 009535171-04

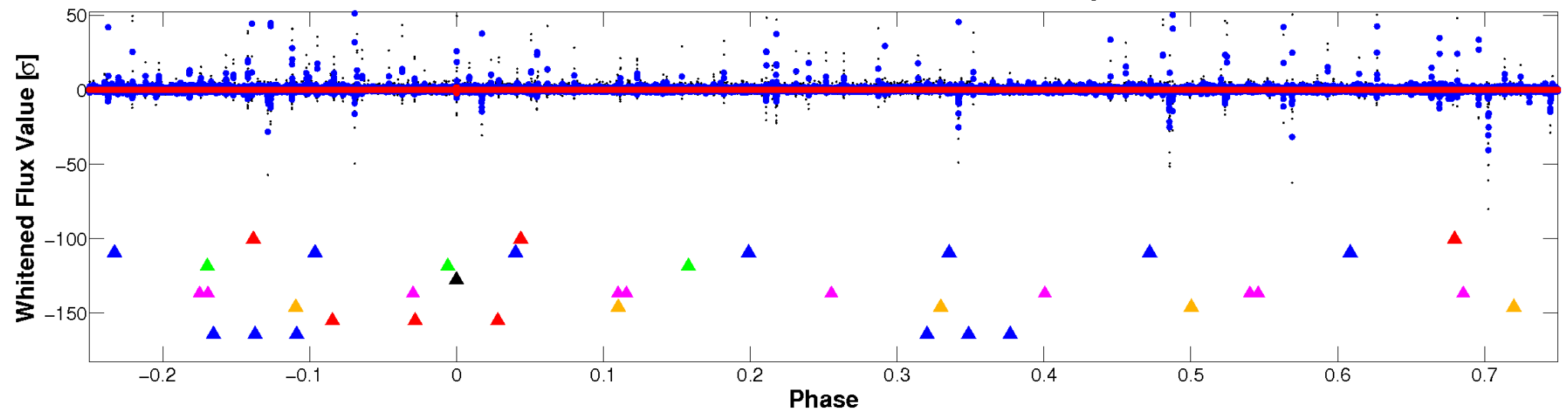


# Non-Whitened Vs. Whitened Light Curve

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

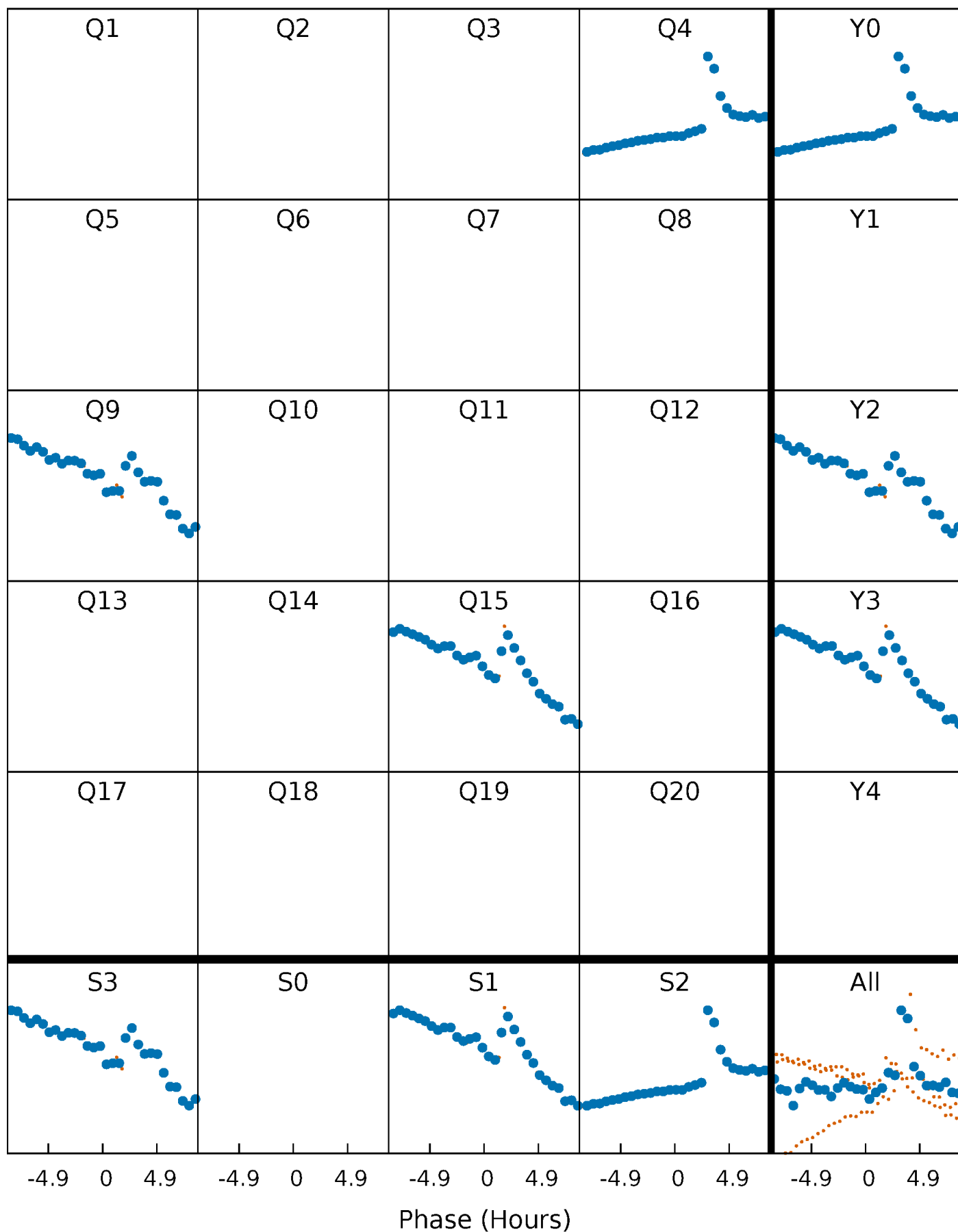


## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

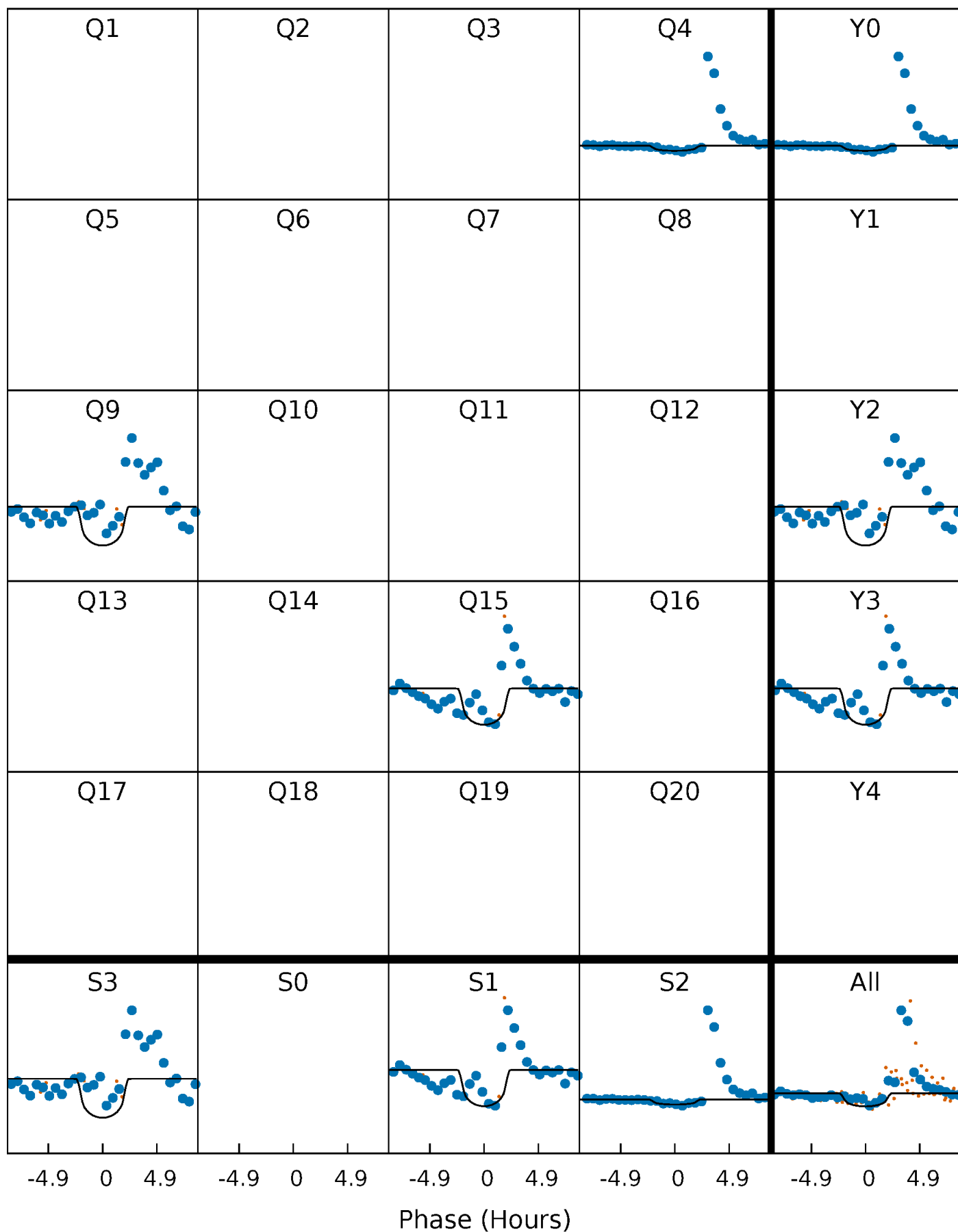
TCE 009535171-04 P=511.061408 Days  $T_0=388.660897$  (BKJD)





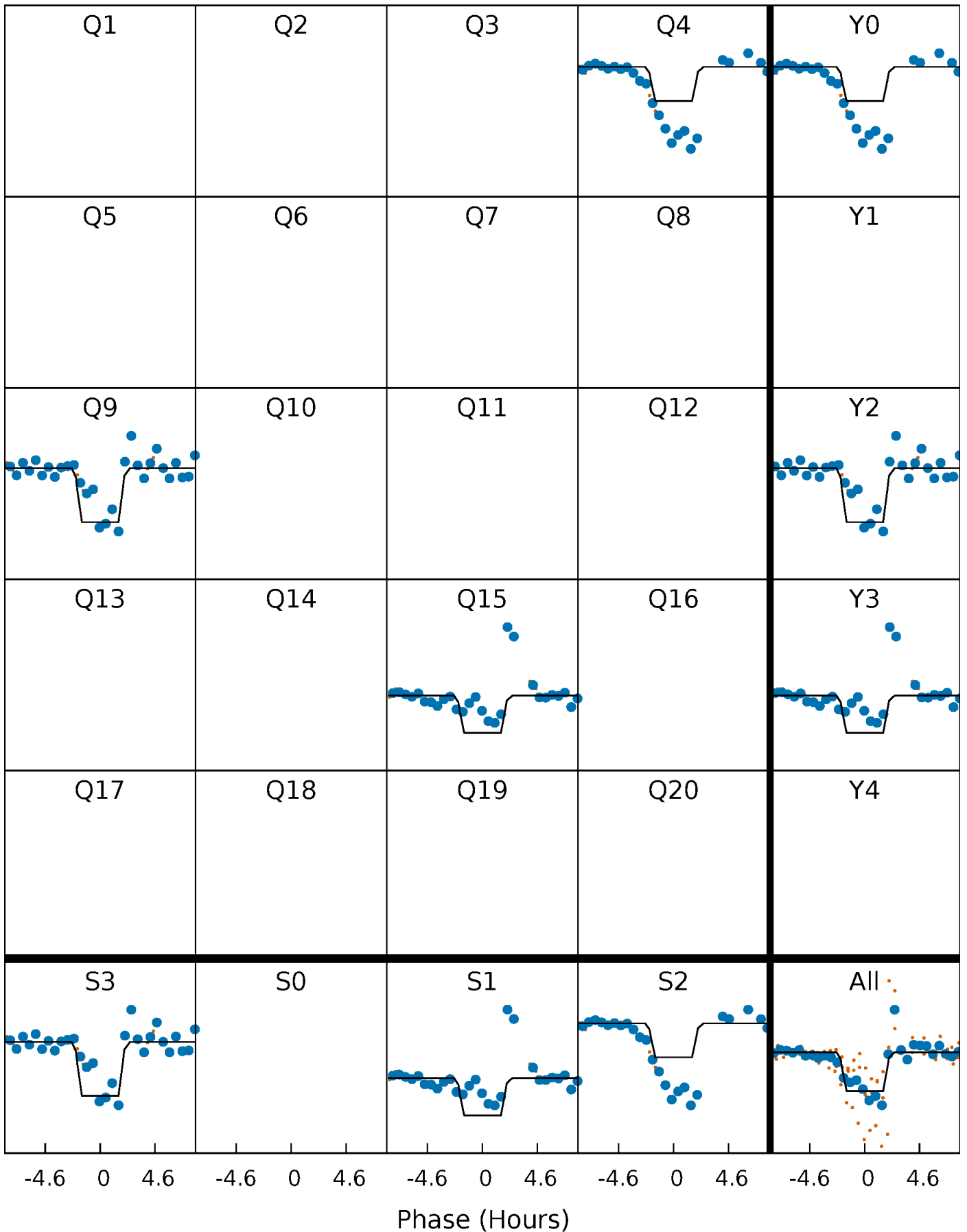
# DV Quarter-Phased Transit Curves

TCE 009535171-04 P=511.061408 Days  $T_0=388.660897$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

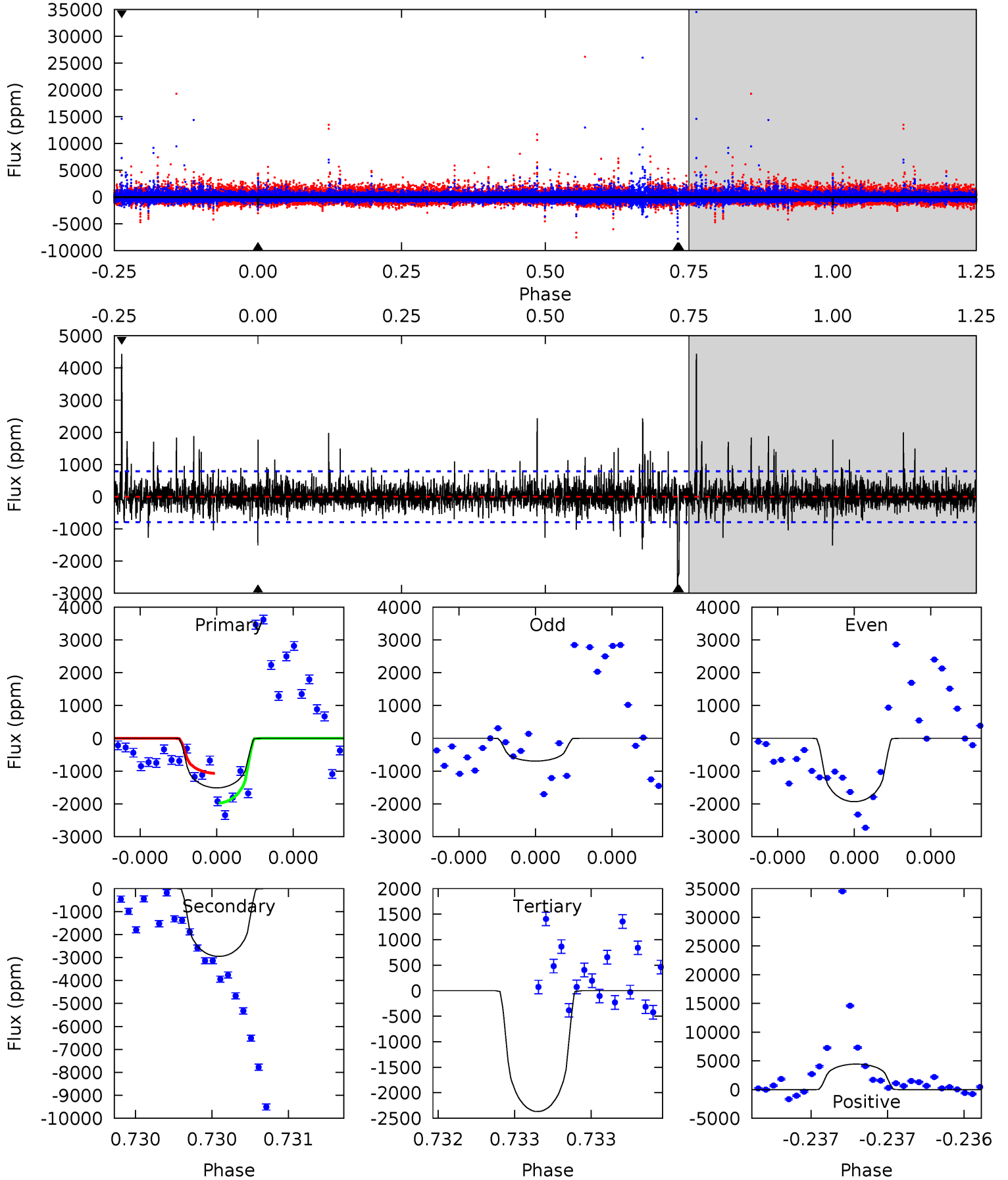
TCE 009535171-04 P=511.043336 Days  $T_0=388.688768$  (BKJD)



# DV Model-Shift Uniqueness Test

009535171-04, P = 511.061408 Days, E = 388.660897 Days

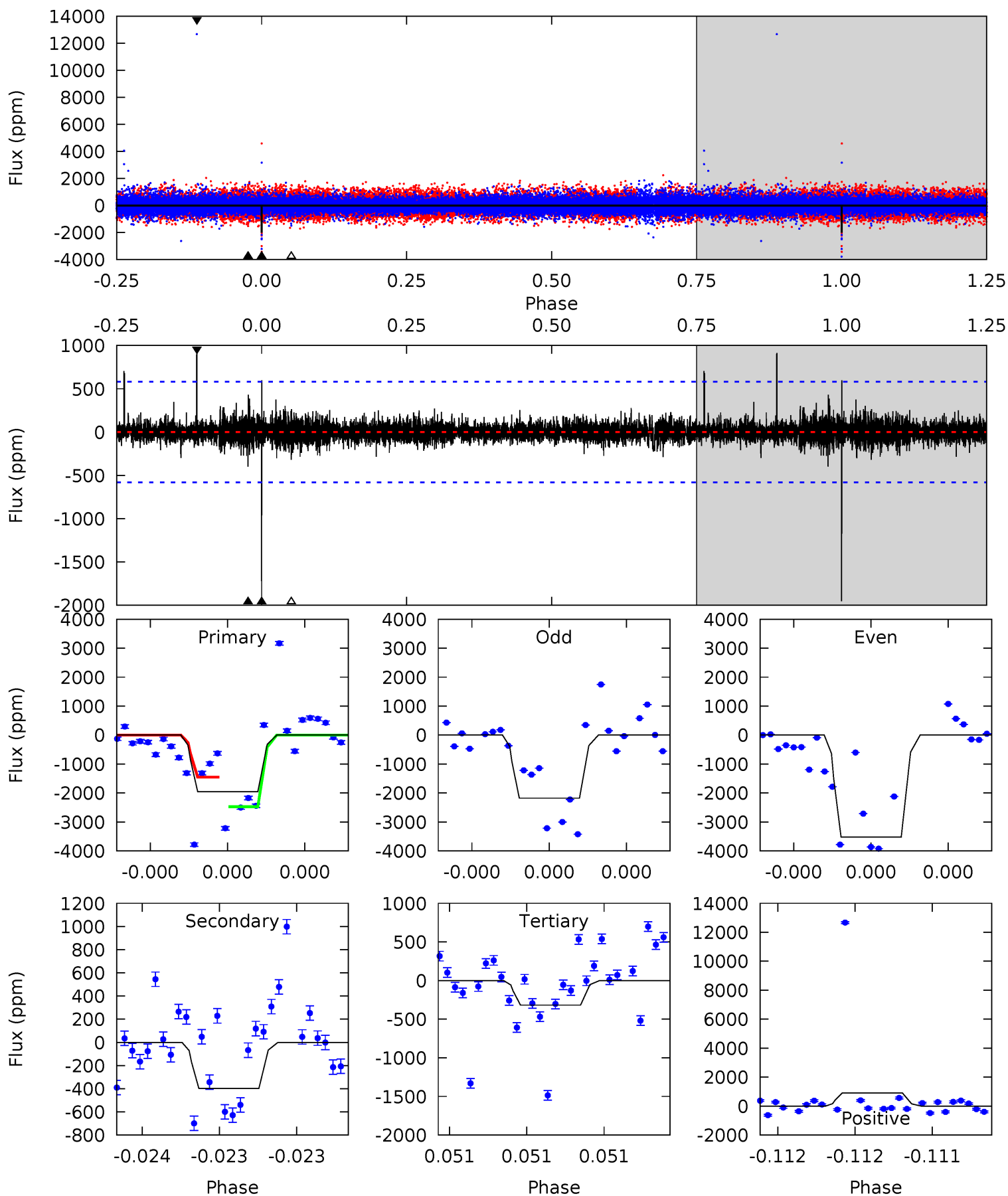
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.7	20.9	16.8	31.4	5.62	3.55	2.00	-6.07	-20.7	4.13	-10.5	1.96	1.07	0.60	3.17



# Alt Model-Shift Uniqueness Test

009535171-04, P = 511.043336 Days, E = 388.688768 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
19.0	3.86	3.09	8.88	5.65	3.60	0.65	15.9	10.1	0.77	-5.02	6.78	1.39	0.32	0



### Stellar Parameters For KIC 009535171

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$4523^{+162}_{-162}$	$4.663^{+0.054}_{-0.032}$	$-0.660^{+0.300}_{-0.300}$	$0.584^{+0.051}_{-0.051}$	$0.572^{+0.062}_{-0.038}$	$4.047^{+0.935}_{-0.524}$
	+4%/-4%	+1%/-1%	+45%/-45%	+9%/-9%	+11%/-7%	+23%/-13%
Source	KIC0	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 009535171-04 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-2950 \pm 141$	$7.02^{+6.85}_{-4.83}$	$208^{+9}_{-9}$	$3525^{+1930}_{-644}$	$36039^{+341357}_{-26946}$
Alt.	$-397 \pm 103$	$7.04^{+7.51}_{-4.75}$	$208^{+8}_{-9}$	$2644^{+950}_{-425}$	$4591^{+38285}_{-3519}$

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

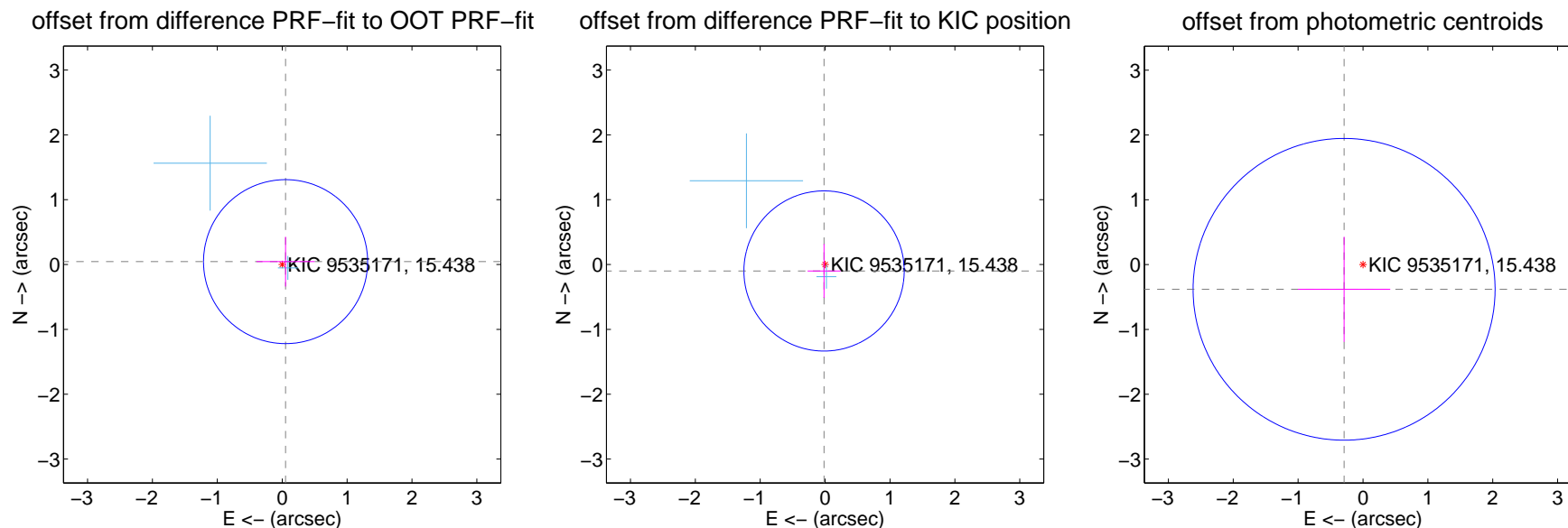
## DV Centroid Data

Supplemental centroid analysis for 009535171-04. Kepler magnitude: 15.44. Transit SNR 10.63

There are 2 quarters with good PRF difference image offsets

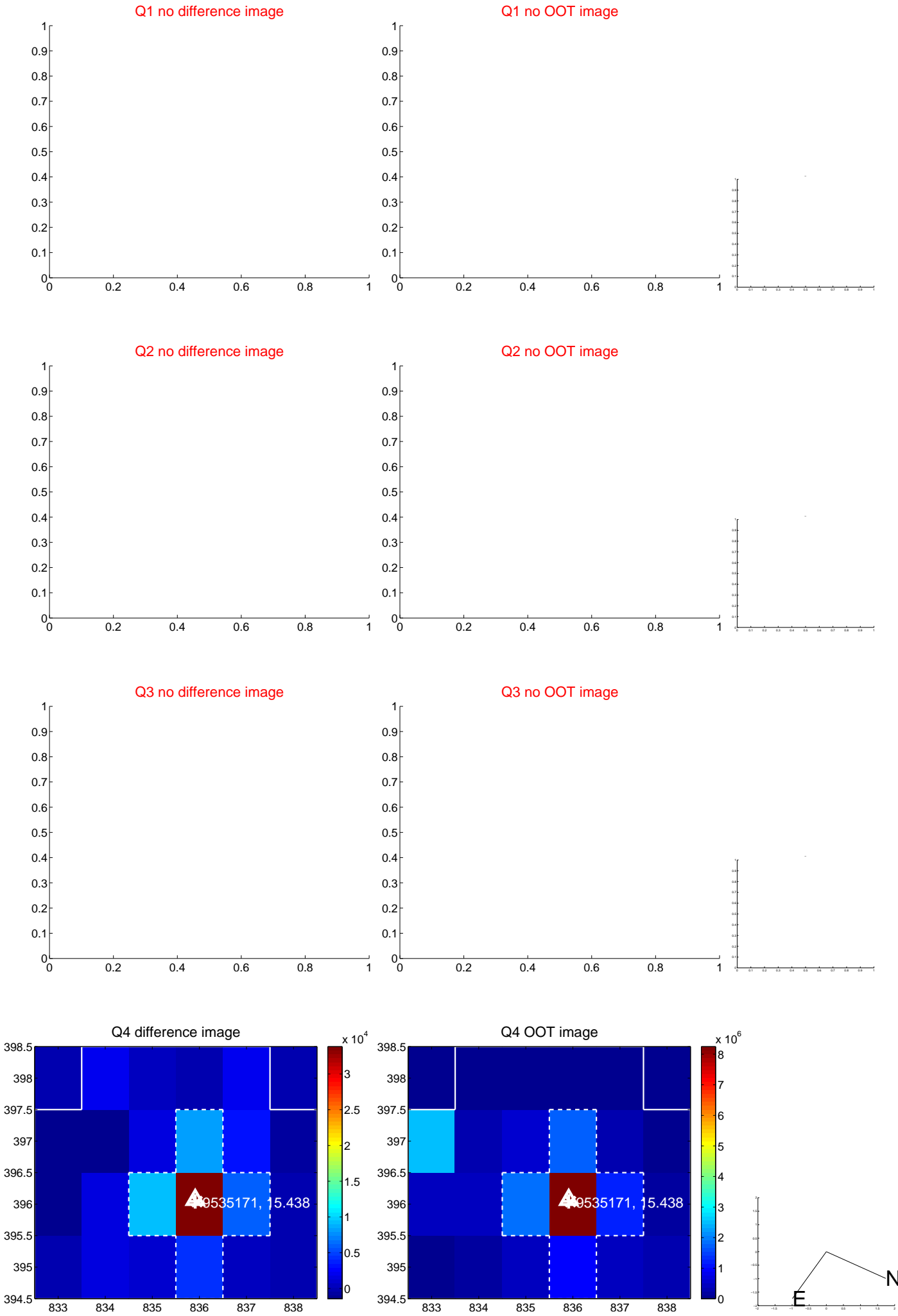
The direct PRF centroid is offset from the target star catalog position by about 0.29 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.069 \pm 0.422$	0.16	$-0.052 \pm 0.448$	$0.045 \pm 0.383$
PRF-fit source offset from KIC position	$0.100 \pm 0.412$	0.24	$0.016 \pm 0.254$	$-0.099 \pm 0.415$
photometric centroid source offset	$0.48 \pm 0.78$	0.62	$0.29 \pm 0.71$	$-0.38 \pm 0.81$



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.

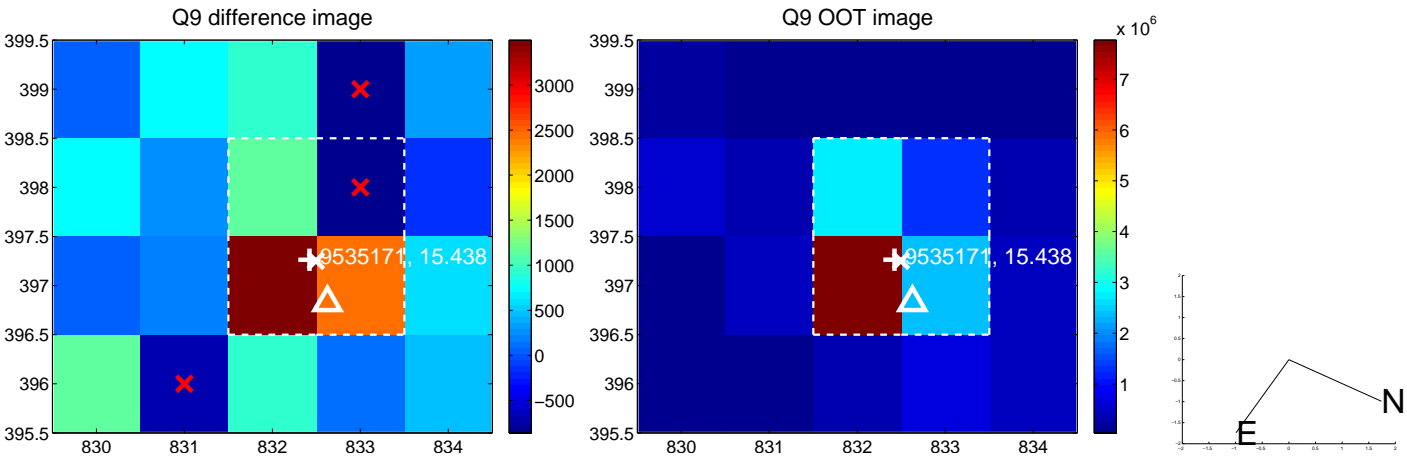


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





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

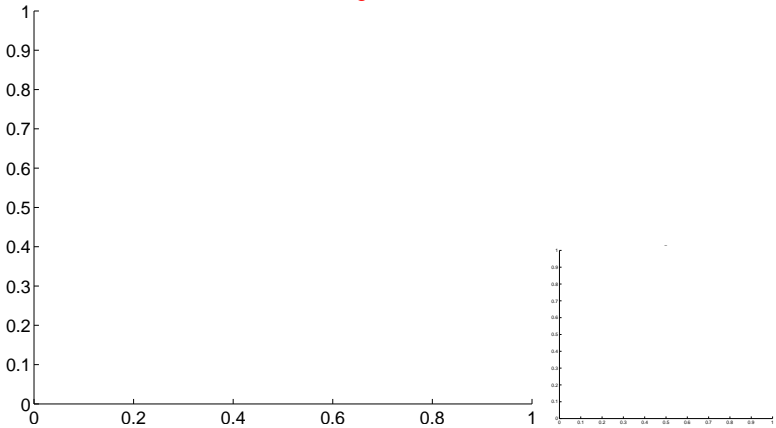


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

Q13 no difference image



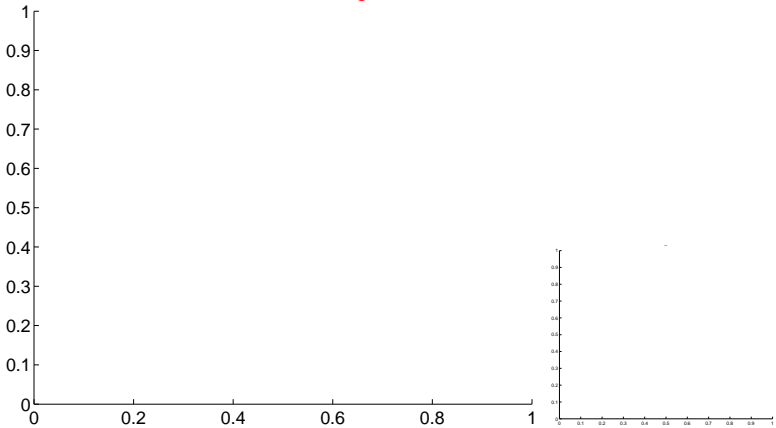
Q13 no OOT image



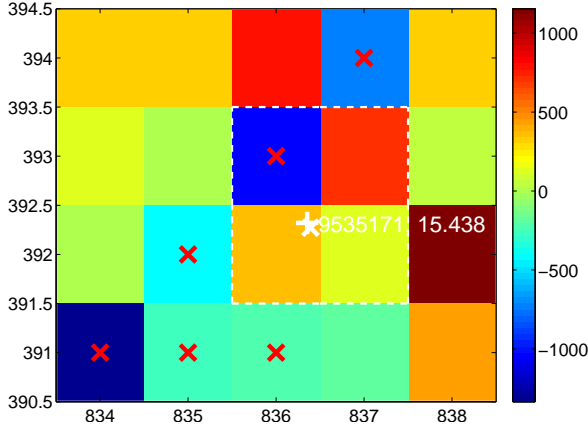
Q14 no difference image



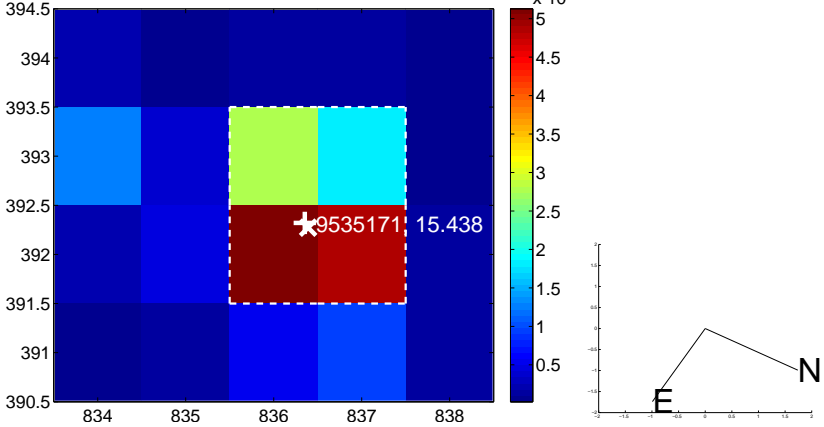
Q14 no OOT image



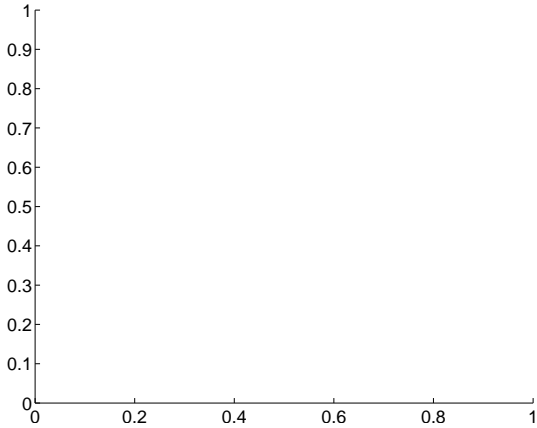
Q15 difference image. Poor Quality



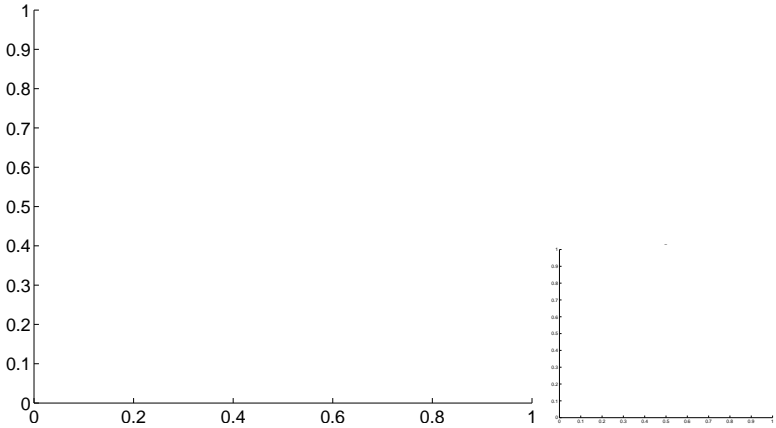
Q15 OOT image



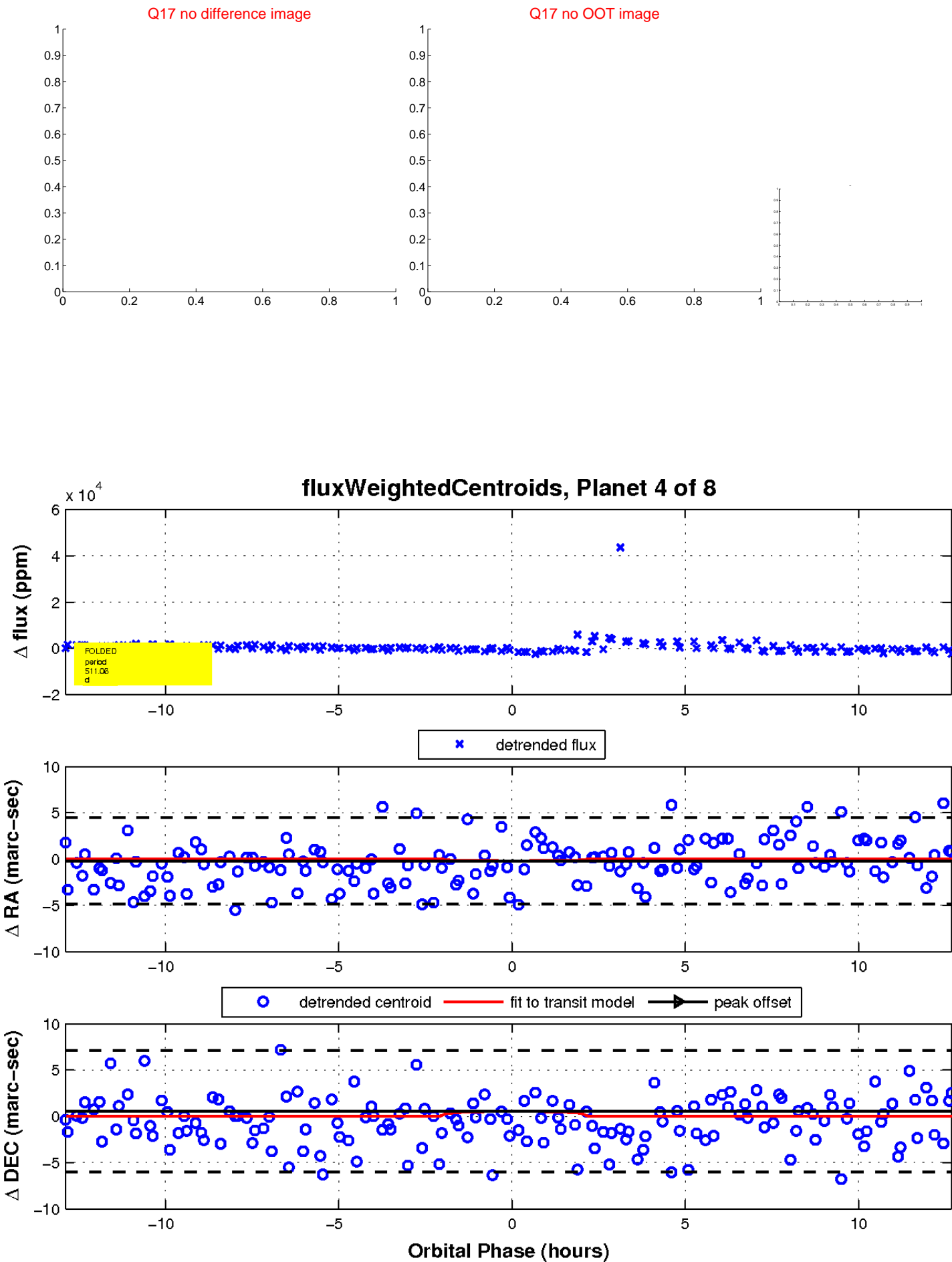
Q16 no difference image



Q16 no OOT image

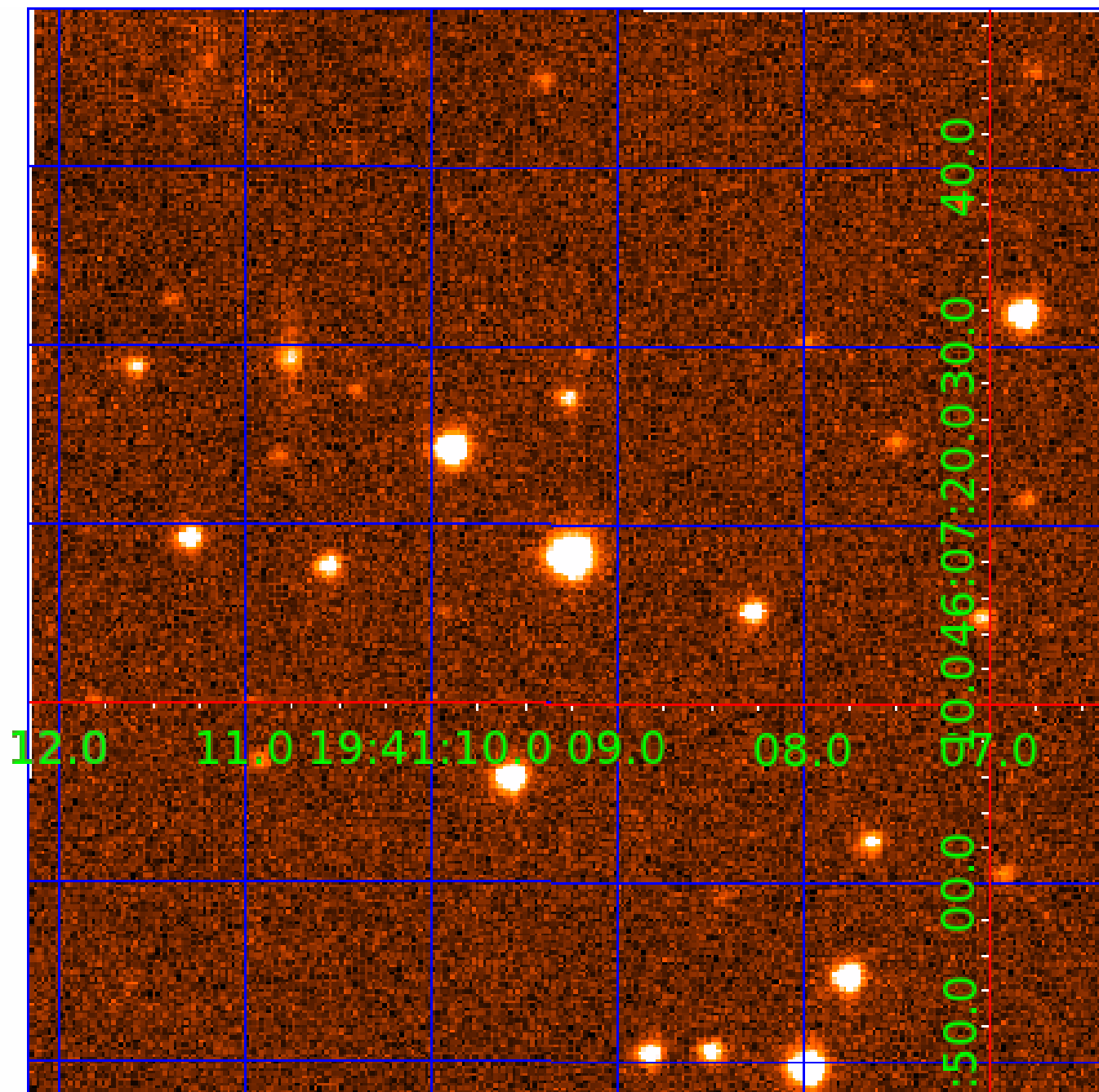


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 009535171

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009535171-02	OBS	No	220.639366	188.607163	1609.9	4.166	10.1	7.4	0.58	4523	2.49	0.36
009535171-03	OBS	No	427.360621	469.366835	1690.9	4.622	12.1	8.4	0.58	4523	3.02	0.15
009535171-04	OBS	No	511.061408	388.660897	2476.9	4.301	11.3	10.6	0.58	4523	2.85	0.12
009535171-05	OBS	No	145.603156	156.595124	821.6	7.873	8.4	6.0	0.58	4523	2.14	0.63
009535171-06	OBS	No	311.646432	332.735191	1228.6	8.727	12.3	5.4	0.58	4523	2.48	0.23
009535171-07	OBS	No	482.286505	403.066195	662.1	15.000	11.2	-1.0	0.58	4523	1.45	0.13
009535171-08	OBS	No	248.293280	333.065876	478.8	4.547	9.2	3.1	0.58	4523	1.50	0.31

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009535171-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS
009535171-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009535171-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009535171-05	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—INCONSISTENT_TRANS
009535171-06	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_MARSHALL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
009535171-07	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_TER_ALT—MOD_POS_ALT—CENT_NOFITS—HALO_GHOST
009535171-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—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.

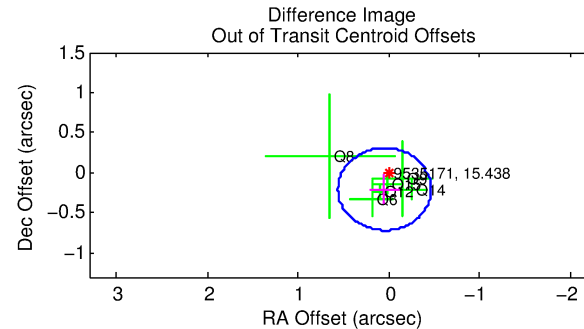
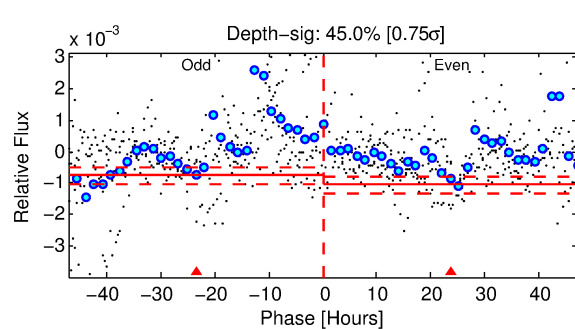
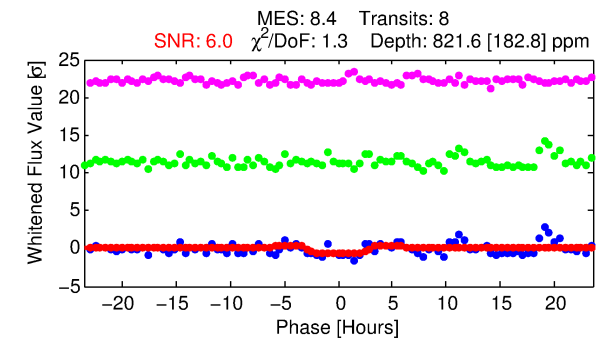
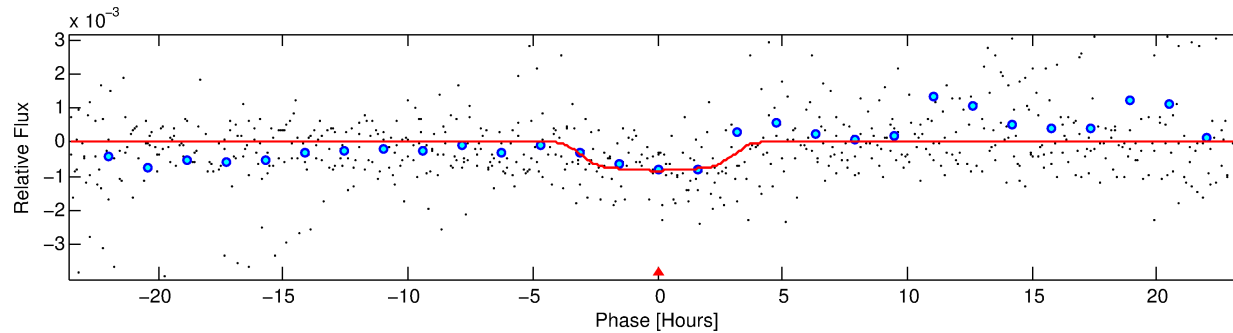
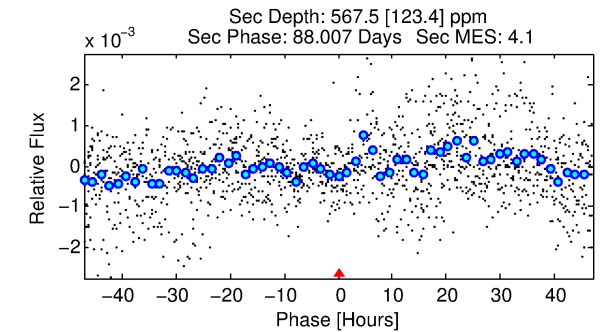
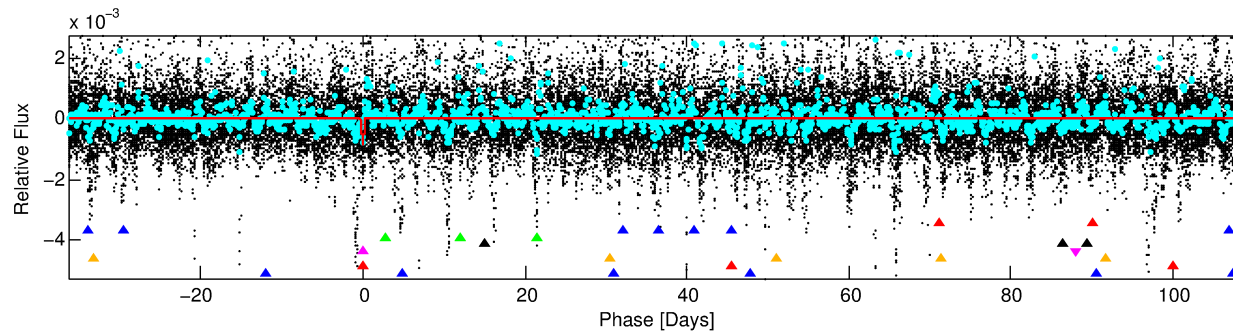
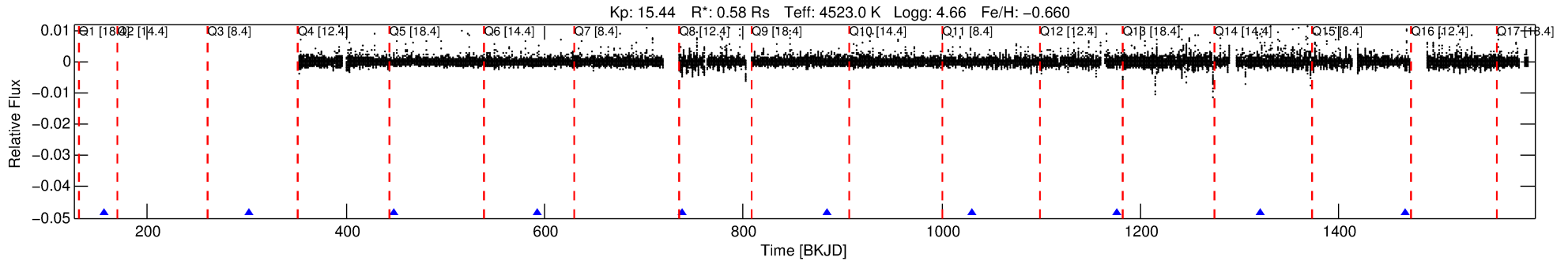
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 009535171-05

No Significant Match Found

# DV One-Page Summary

KIC: 9535171 Candidate: 5 of 8 Period: 145.603 d



## DV Fit Results:

Period = 145.60316 [0.00495] d  
Epoch = 156.5951 [0.0292] BKJD  
Rp/R\* = 0.0336 [0.0054]  
a/R\* = 63.43 [22.96]  
b = 0.93 [0.05]  
Seff = 0.63 [0.11]  
Teq = 227 [10] K  
Rp = 2.14 [0.39] Re  
a = 0.4499 [0.0322] AU  
Ag = 13774.90 [5500.71] [2.50σ]  
Teffp = 3808 [392] K [9.13σ]

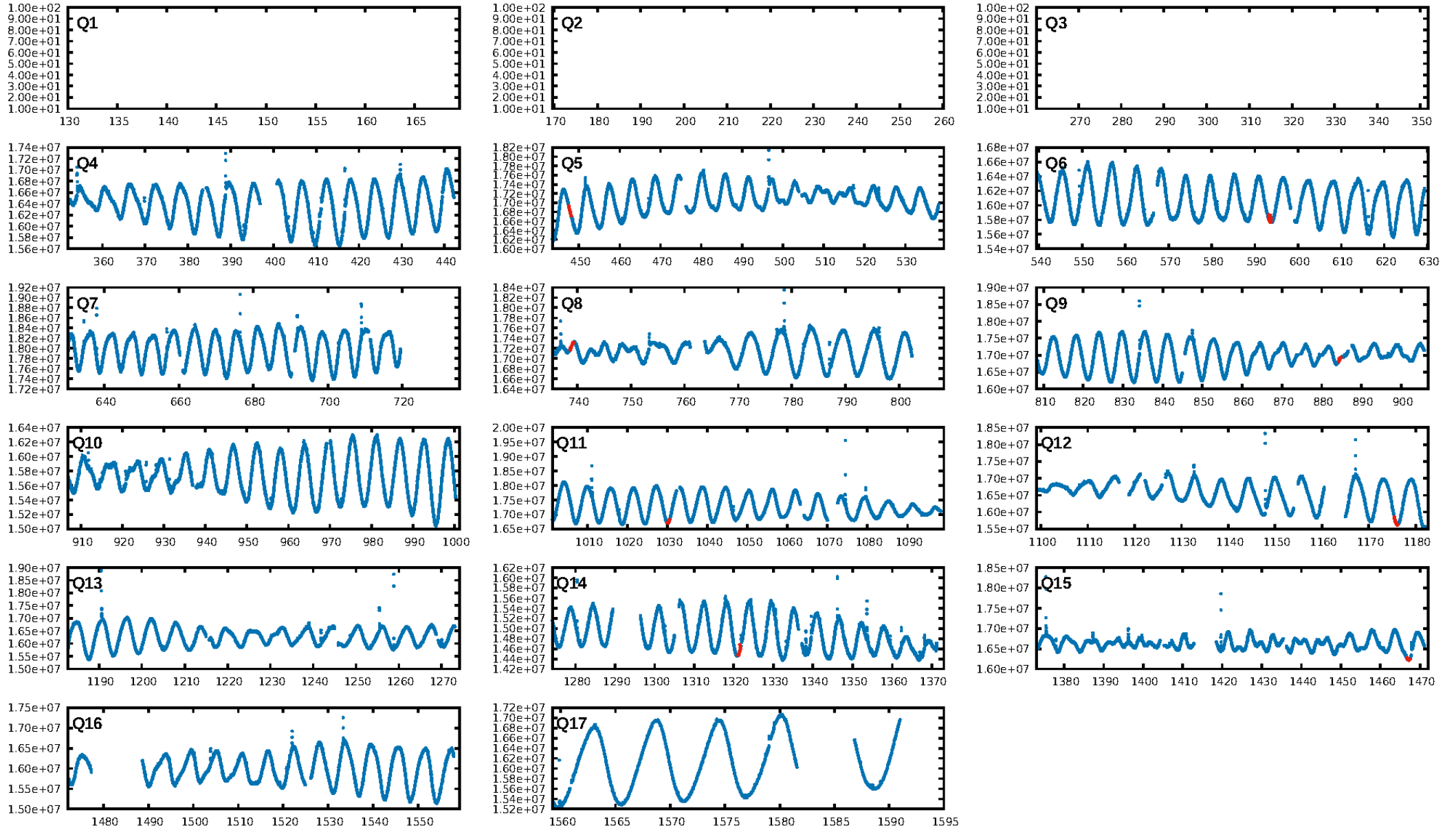
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [202.18σ]  
ModelChiSquare2-sig: 0.9%  
ModelChiSquareGof-sig: 99.7%  
**Bootstrap-pfa: 3.17e-09**  
RollingBand-fgt: 1.00 [8/8]  
GhostDiagnostic-chr: 0.4966  
Centroid-sig: 40.5%  
Centroid-so: 1.429 arcsec [1.22σ]  
OotOffset-rm: 0.212 arcsec [1.24σ]  
KicOffset-rm: 0.315 arcsec [1.85σ]  
OotOffset-st: 2/1/2/1 [6]  
KicOffset-st: 2/1/2/1 [6]  
DiffImageQuality-fgm: 0.67 [4/6]  
DiffImageOverlap-fno: 0.86 [6/7]

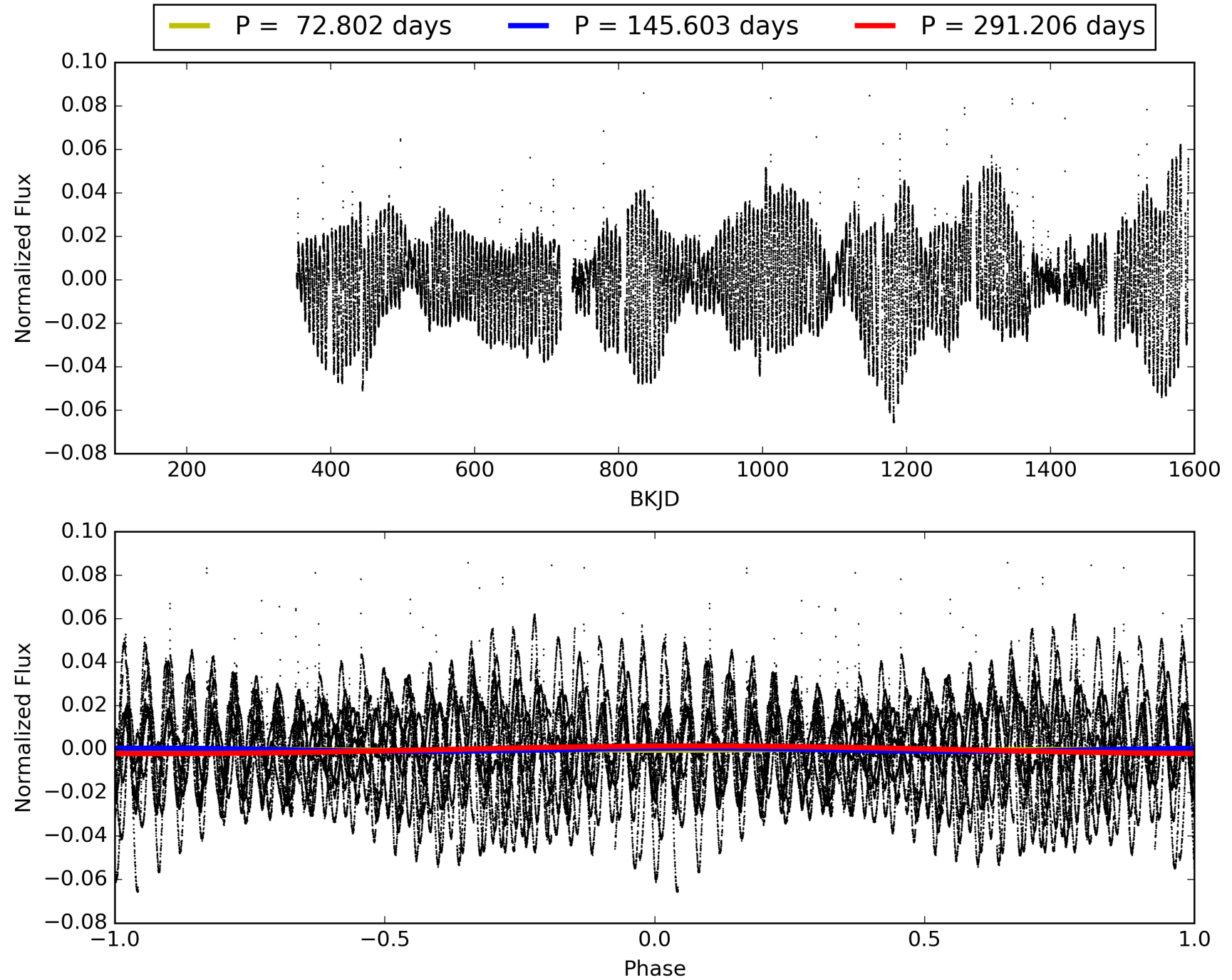
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 03-Feb-2016 08:04:06 Z

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

# TCE 009535171-05, PDC Light Curves



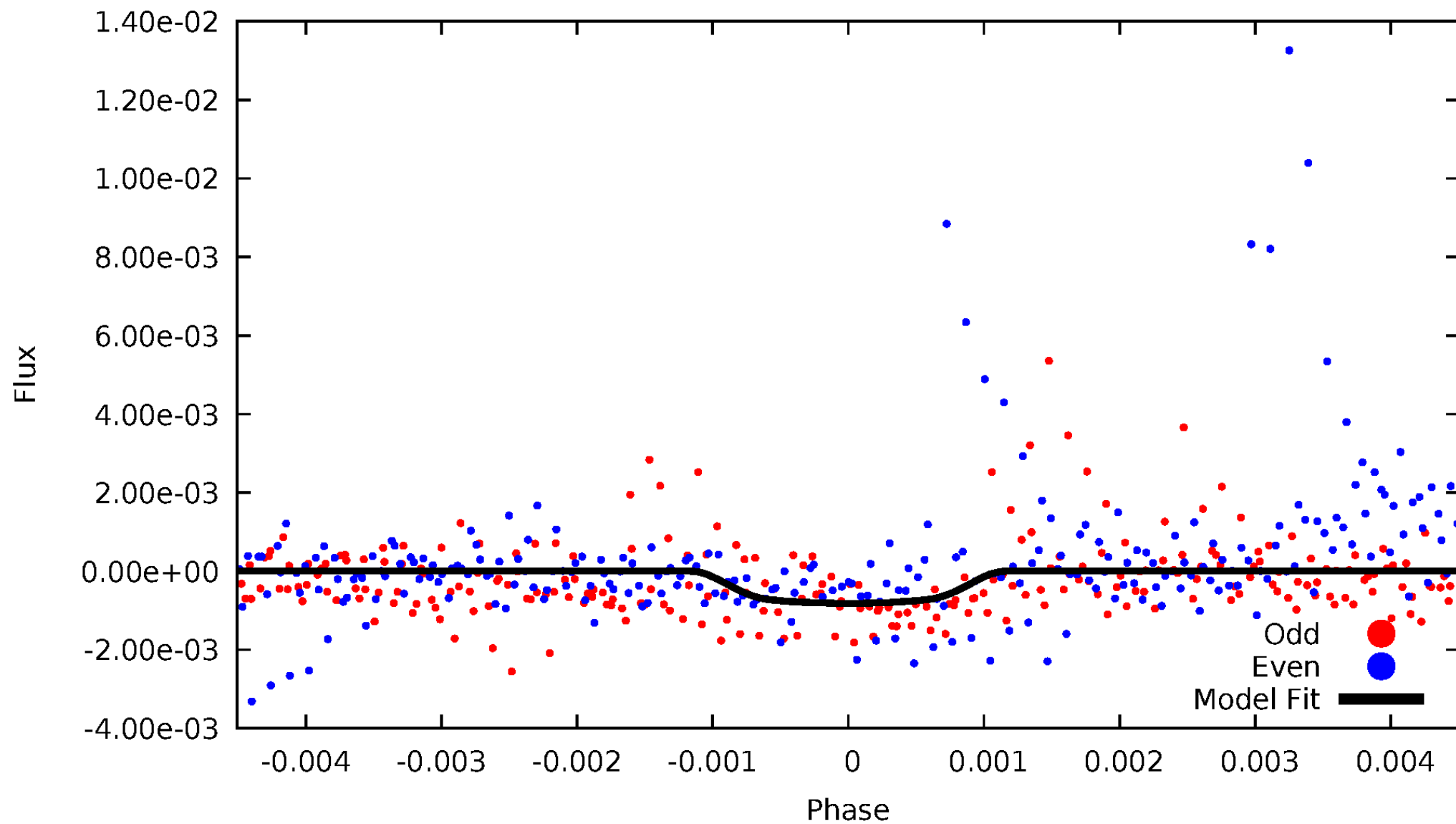
# TCE 009535171-05





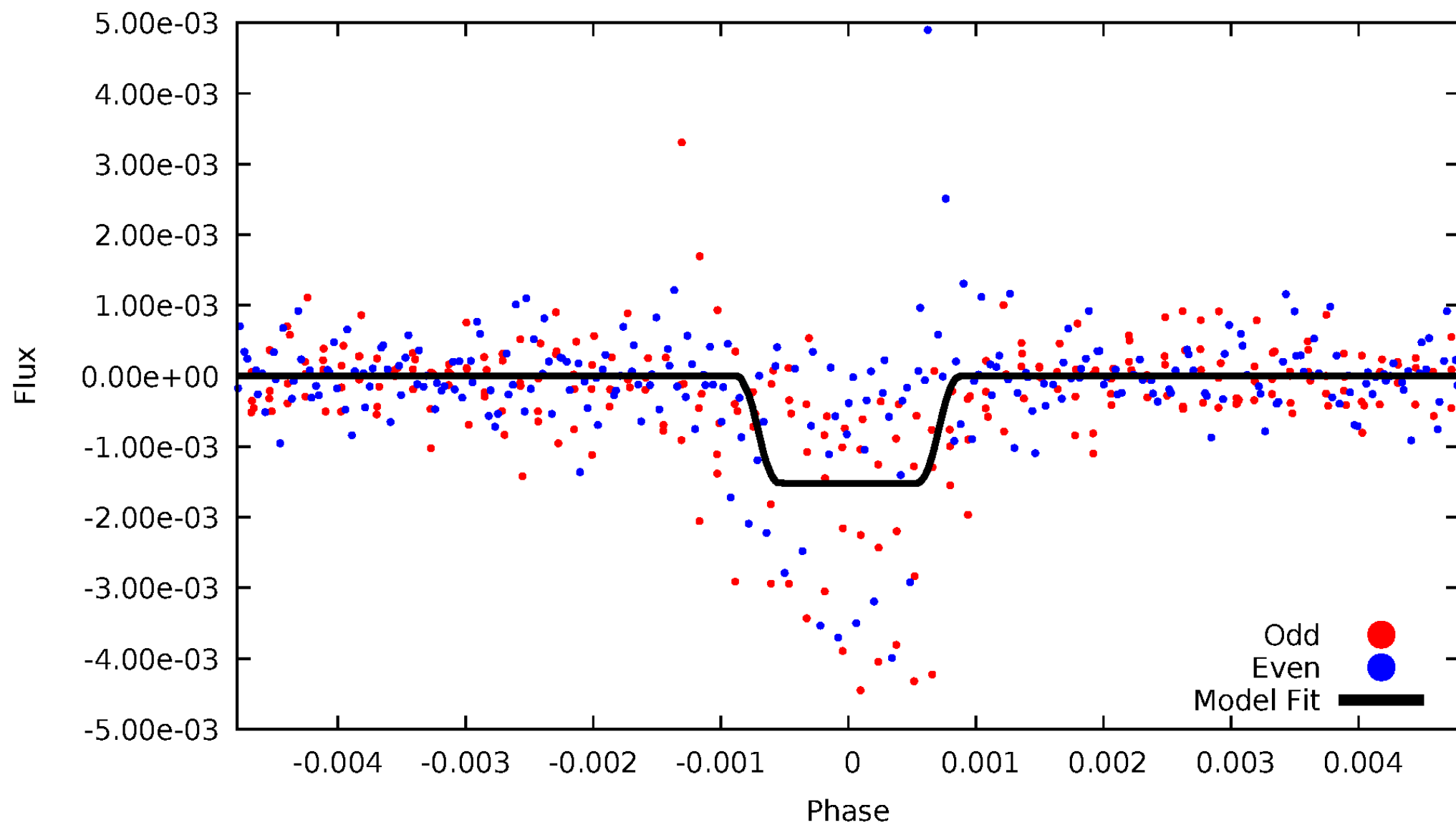
# DV Odd/Even

TCE 009535171-05



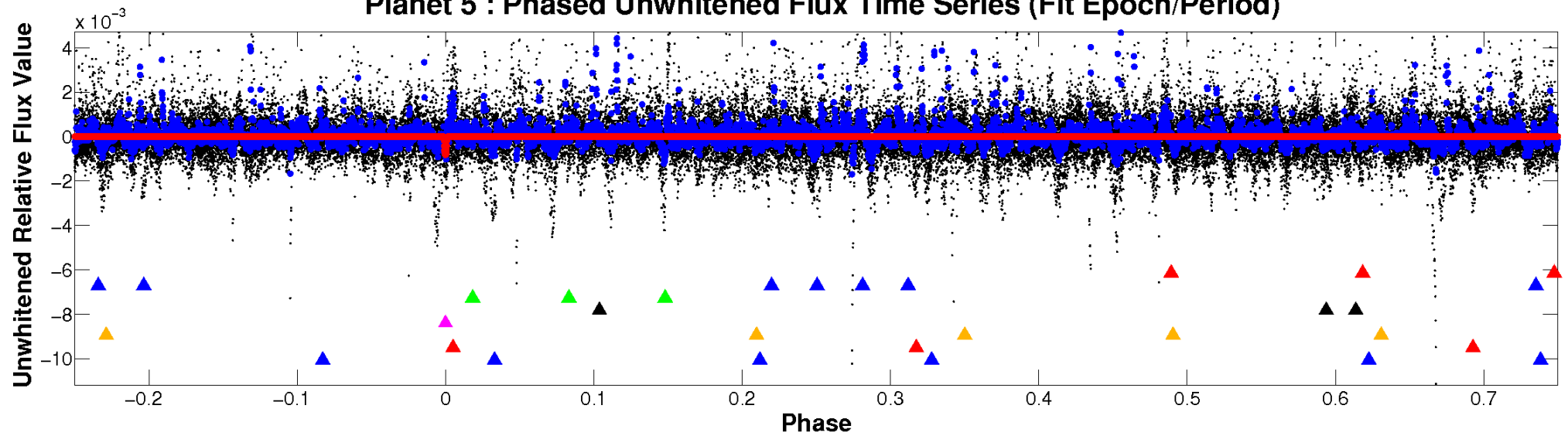
# ALT Odd/Even

TCE 009535171-05

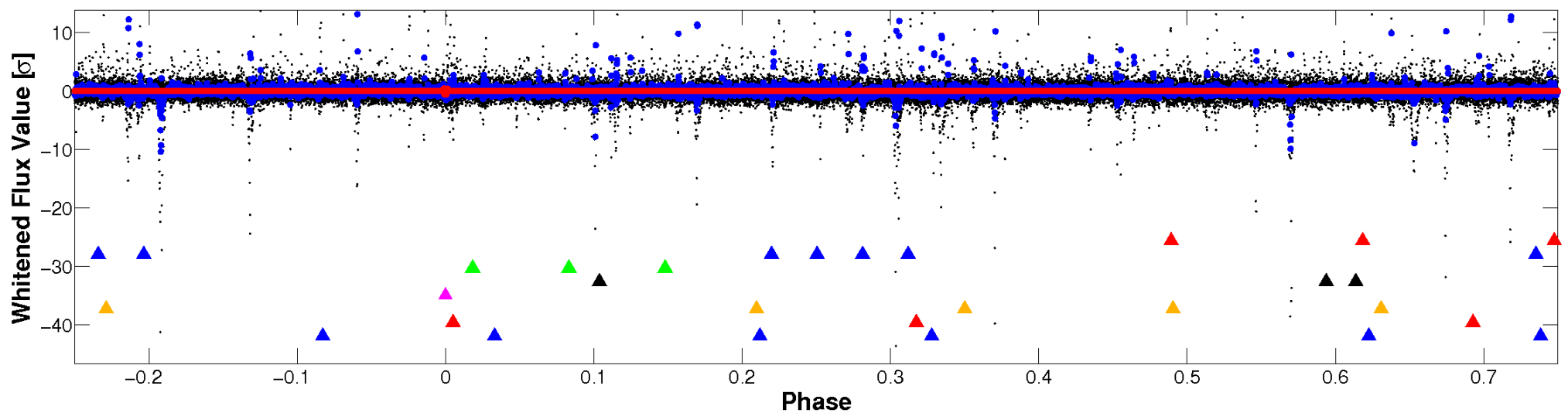


# Non-Whitened Vs. Whitened Light Curve

## Planet 5 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

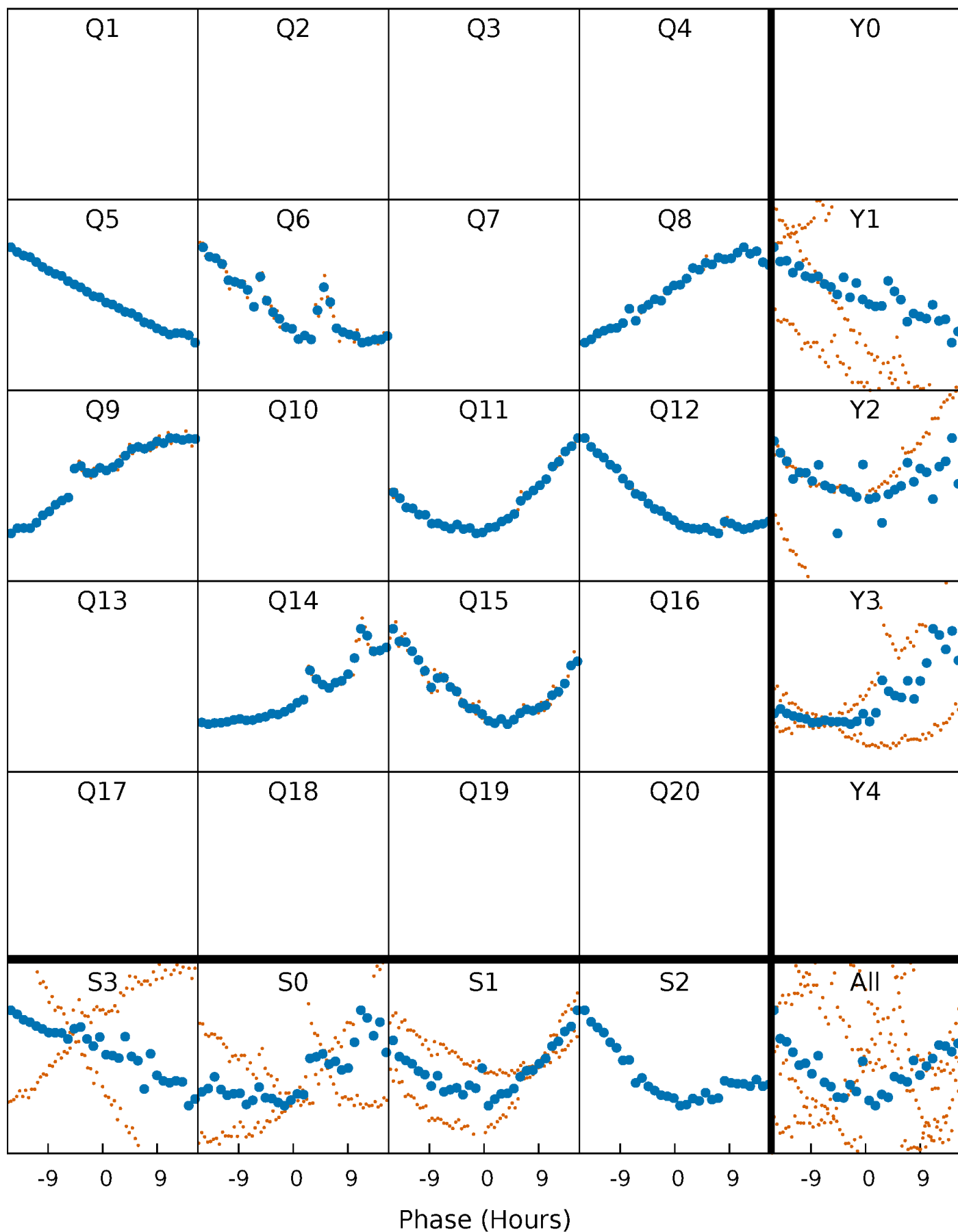


## Planet 5 : Phased Whitened Flux Time Series (Fit Epoch/Period)



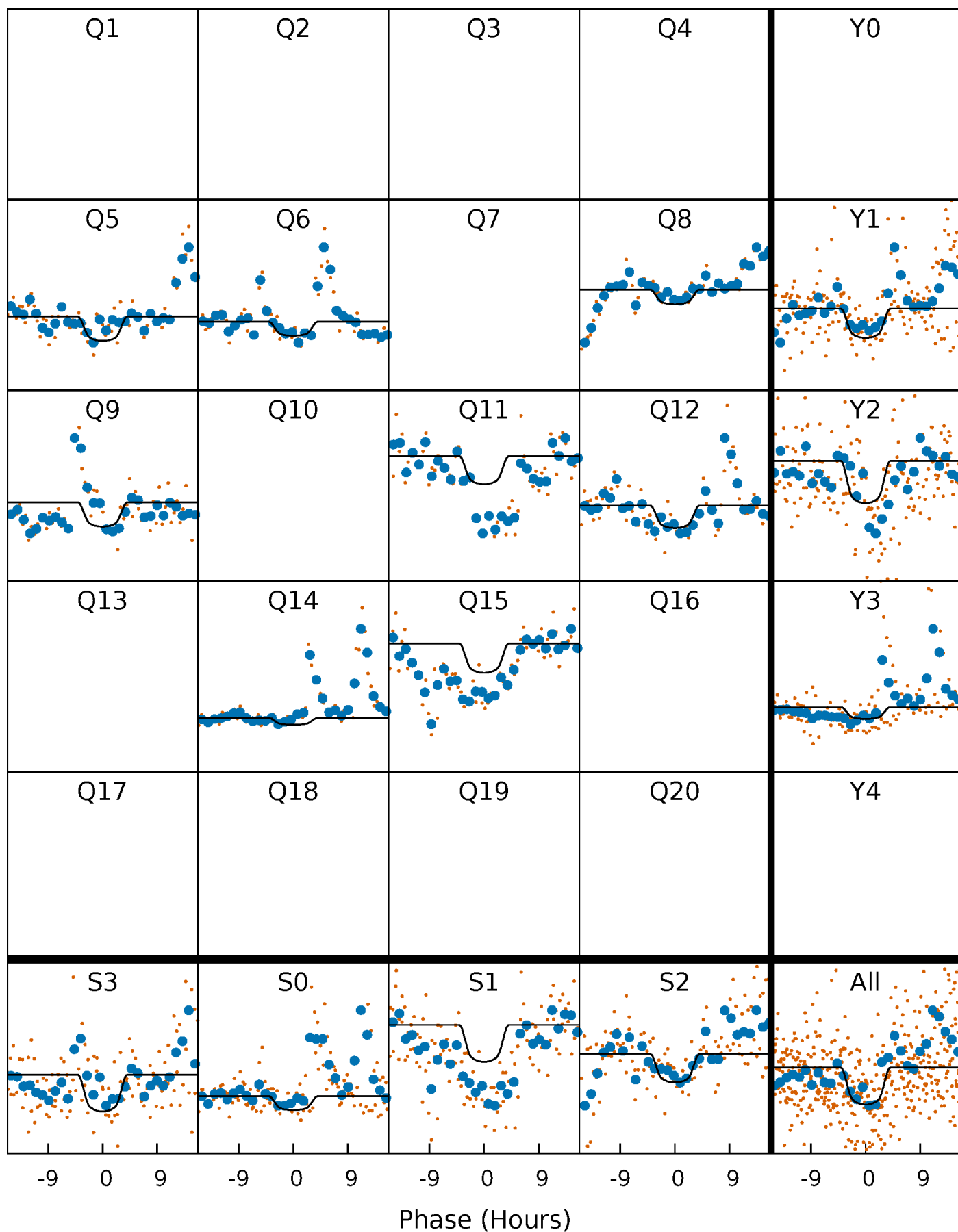
# PDC Quarter-Phased Transit Curves

TCE 009535171-05     $P=145.603156$  Days     $T_0=156.595124$  (BKJD)



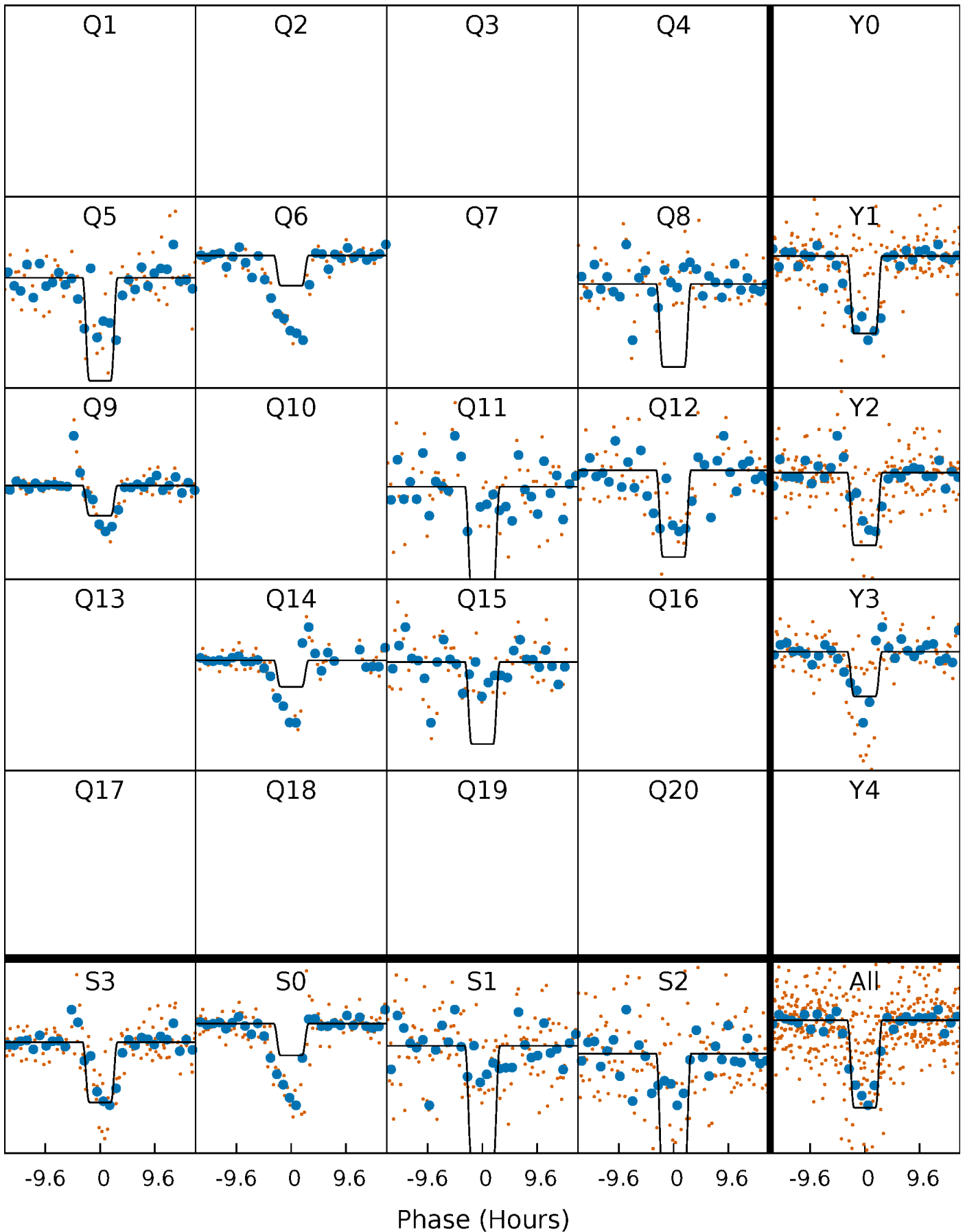
# DV Quarter-Phased Transit Curves

TCE 009535171-05     $P=145.603156$  Days     $T_0=156.595124$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

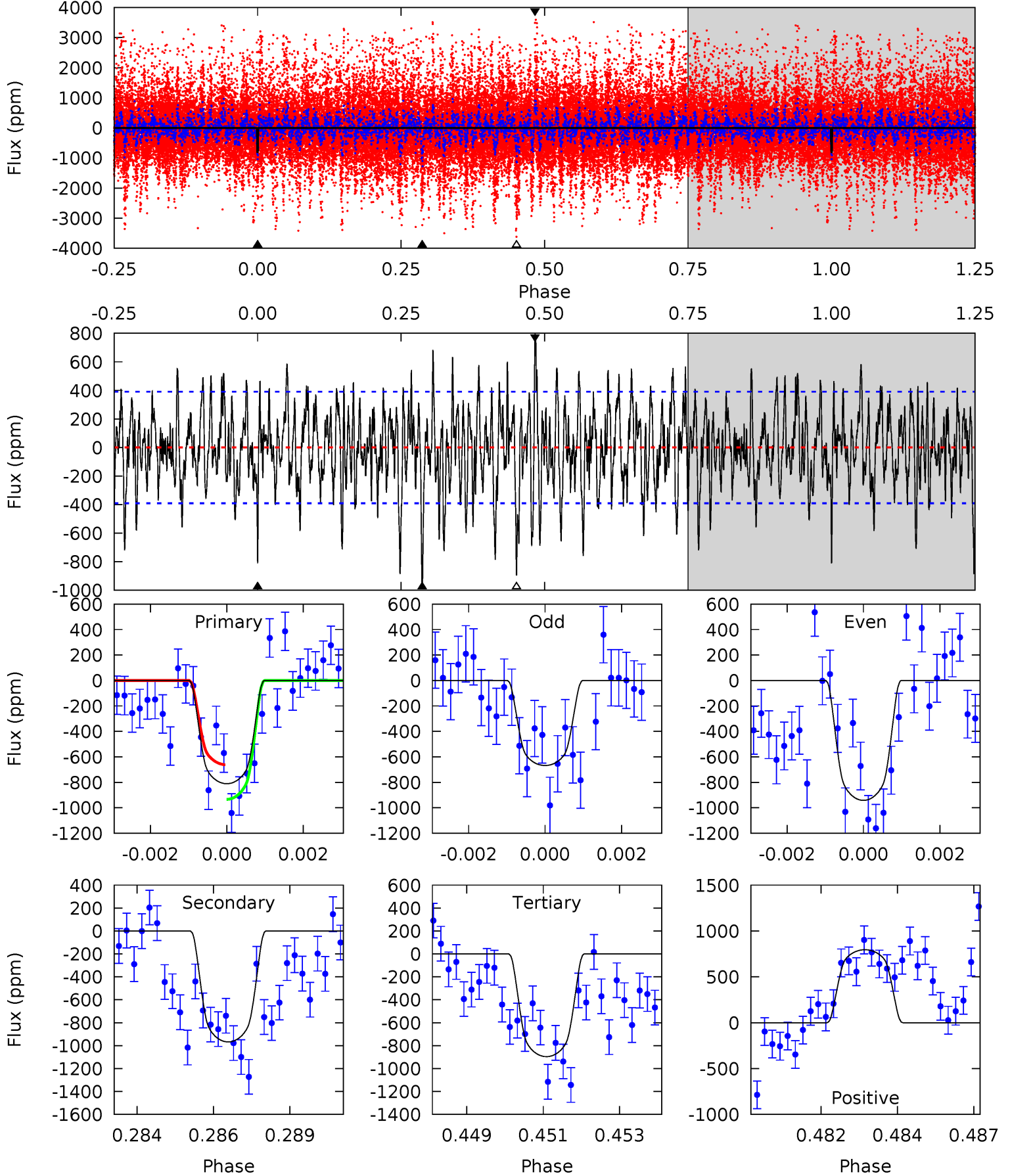
TCE 009535171-05     $P=145.598541$  Days     $T_0=156.647055$  (BKJD)



# DV Model-Shift Uniqueness Test

009535171-05, P = 145.603156 Days, E = 156.595124 Days

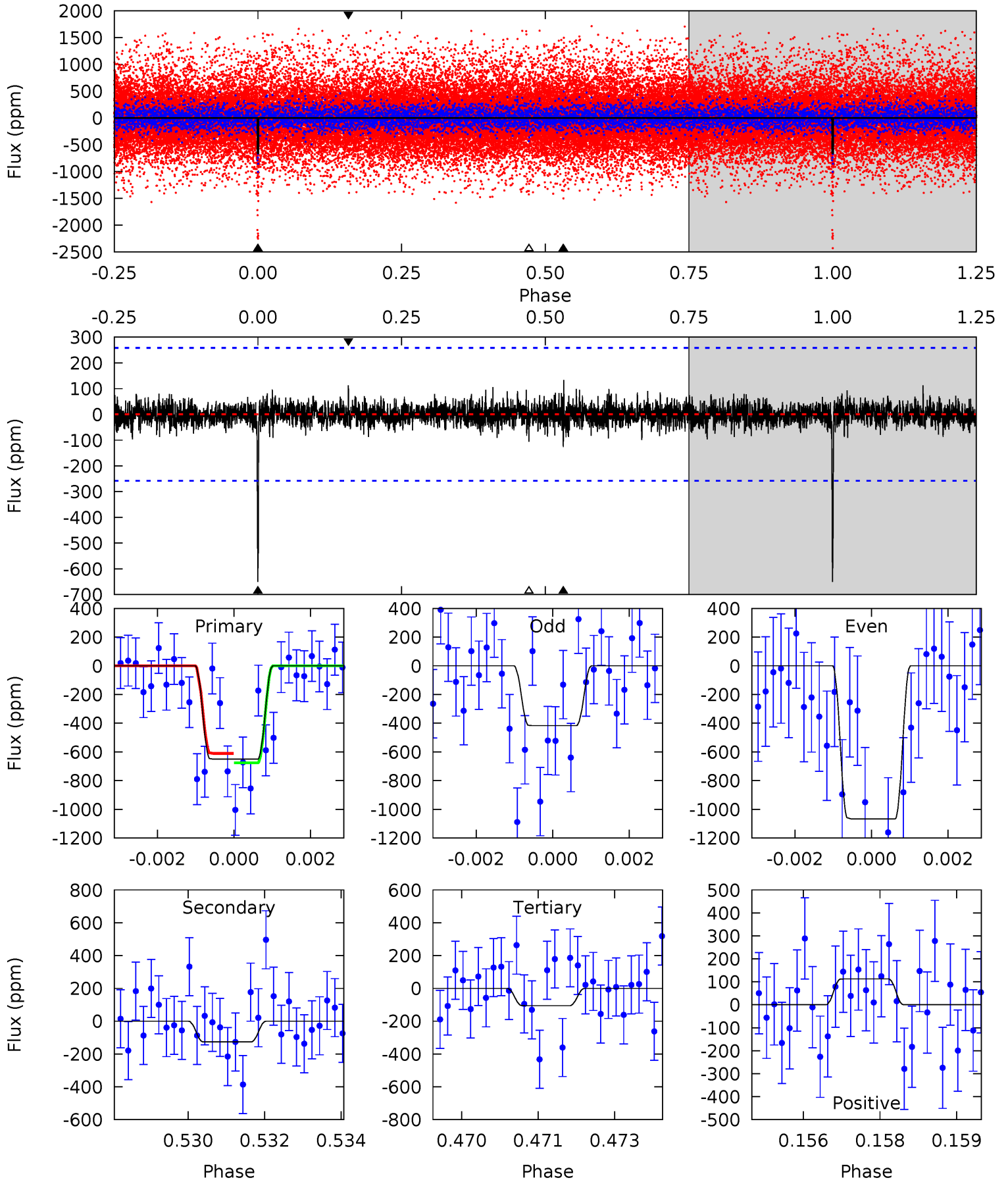
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.0	13.1	12.1	10.8	5.29	3.04	3.48	-1.16	0.21	0.97	2.34	1.83	1.14	0.45	1.86



# Alt Model-Shift Uniqueness Test

009535171-05, P = 145.598541 Days, E = 156.647055 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	2.63	2.19	2.34	5.35	3.13	0.57	11.3	11.2	0.44	0.30	6.91	1.54	0.17	0.68





### Stellar Parameters For KIC 009535171

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$4523^{+162}_{-162}$	$4.663^{+0.054}_{-0.032}$	$-0.660^{+0.300}_{-0.300}$	$0.584^{+0.051}_{-0.051}$	$0.572^{+0.062}_{-0.038}$	$4.047^{+0.935}_{-0.524}$
	+4%/-4%	+1%/-1%	+45%/-45%	+9%/-9%	+11%/-7%	+23%/-13%
Source	KIC0	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 009535171-05 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-968 \pm 74$	$2.13^{+0.40}_{-0.37}$	$317^{+12}_{-13}$	$4396^{+382}_{-305}$	$23772^{+11368}_{-6630}$
Alt.	$-127 \pm 48$	$2.47^{+0.36}_{-0.35}$	$317^{+12}_{-13}$	$2995^{+221}_{-205}$	$2331^{+1351}_{-947}$

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

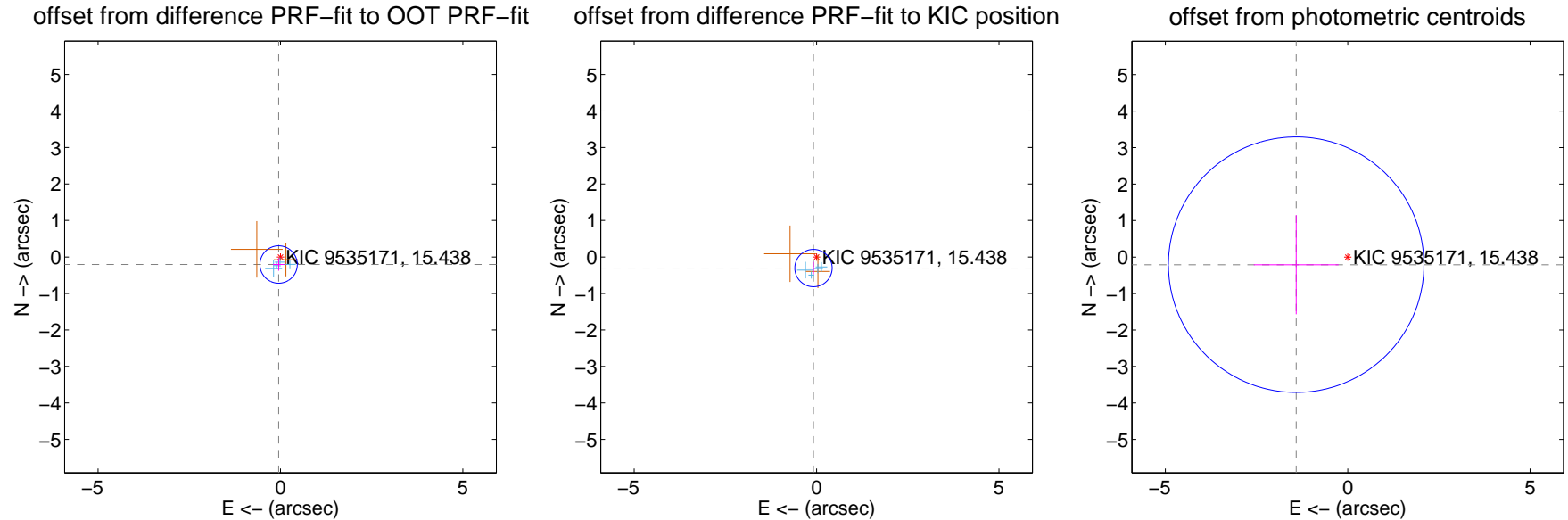
## DV Centroid Data

Supplemental centroid analysis for 009535171-05. Kepler magnitude: 15.44. Transit SNR 6.01

There are 4 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.18 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.212 \pm 0.171$	1.24	$0.050 \pm 0.156$	$-0.206 \pm 0.172$
PRF-fit source offset from KIC position	$0.315 \pm 0.171$	1.85	$0.085 \pm 0.156$	$-0.304 \pm 0.172$
photometric centroid source offset	$1.43 \pm 1.17$	1.22	$1.41 \pm 1.16$	$-0.21 \pm 1.36$

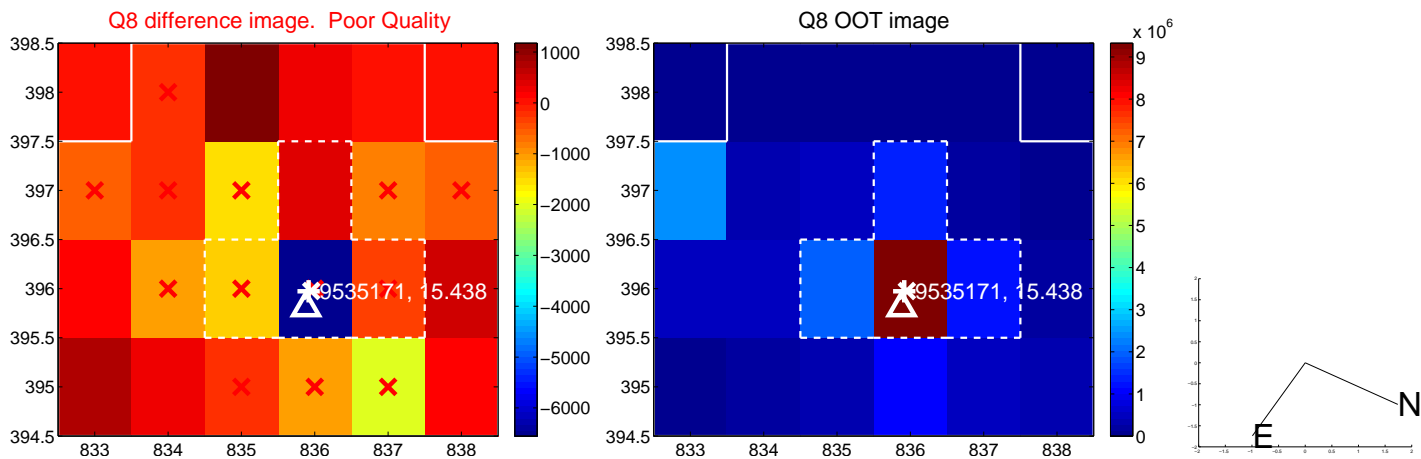
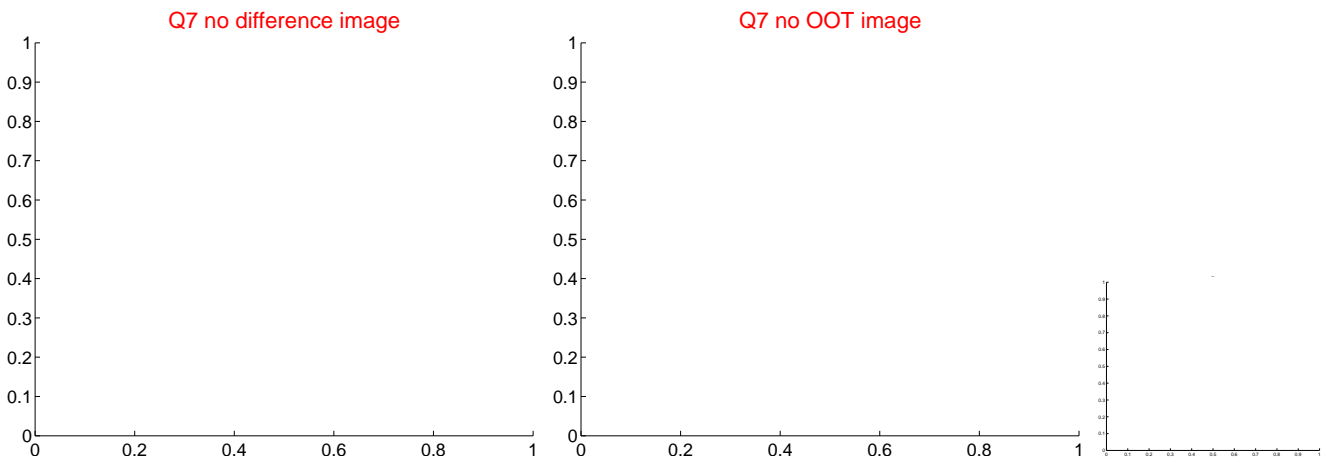
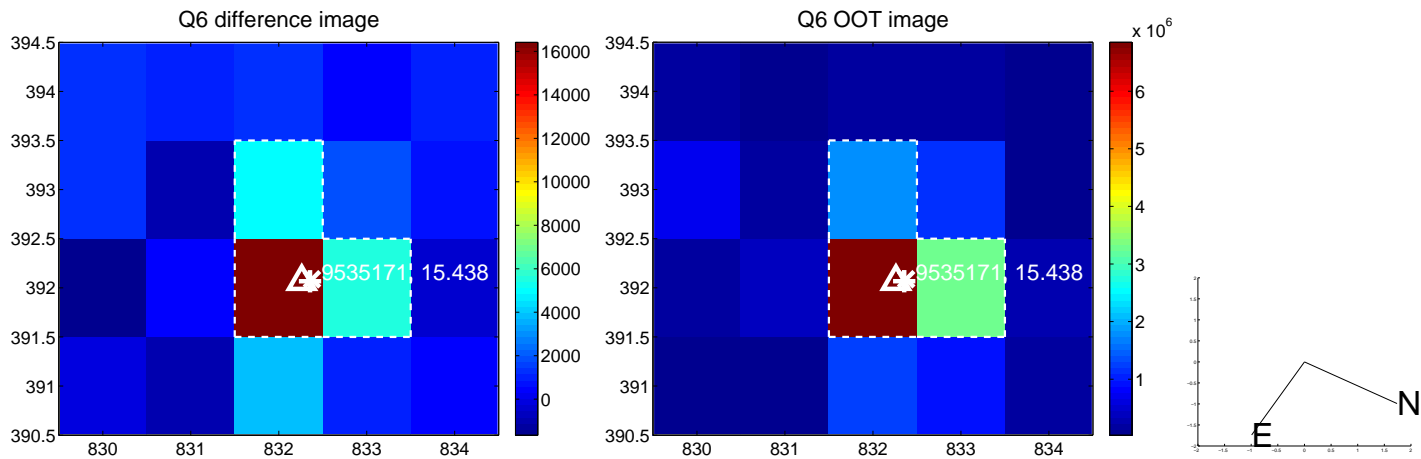
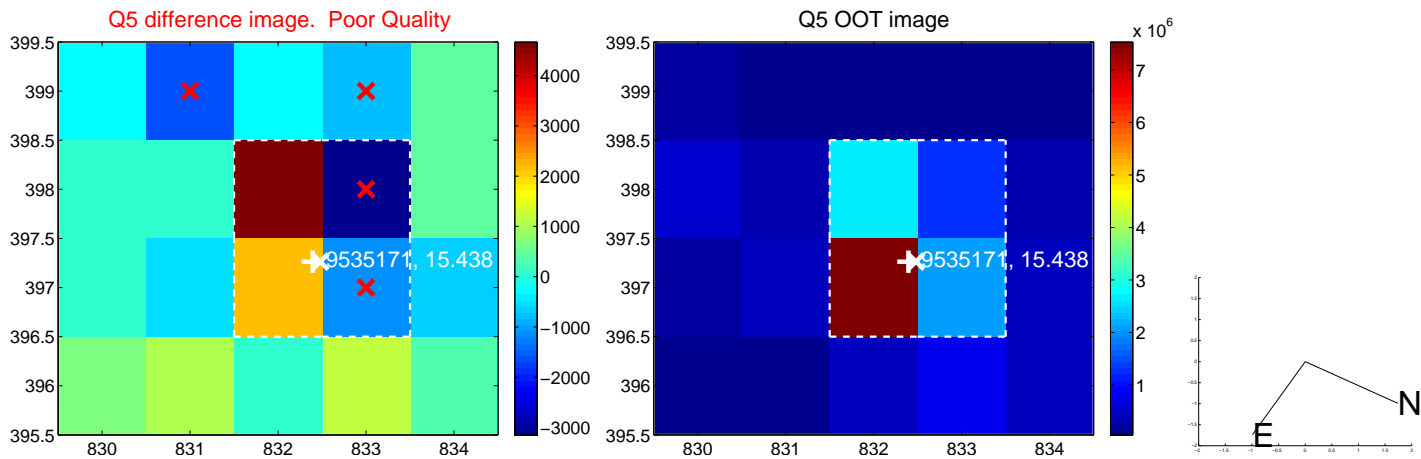


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

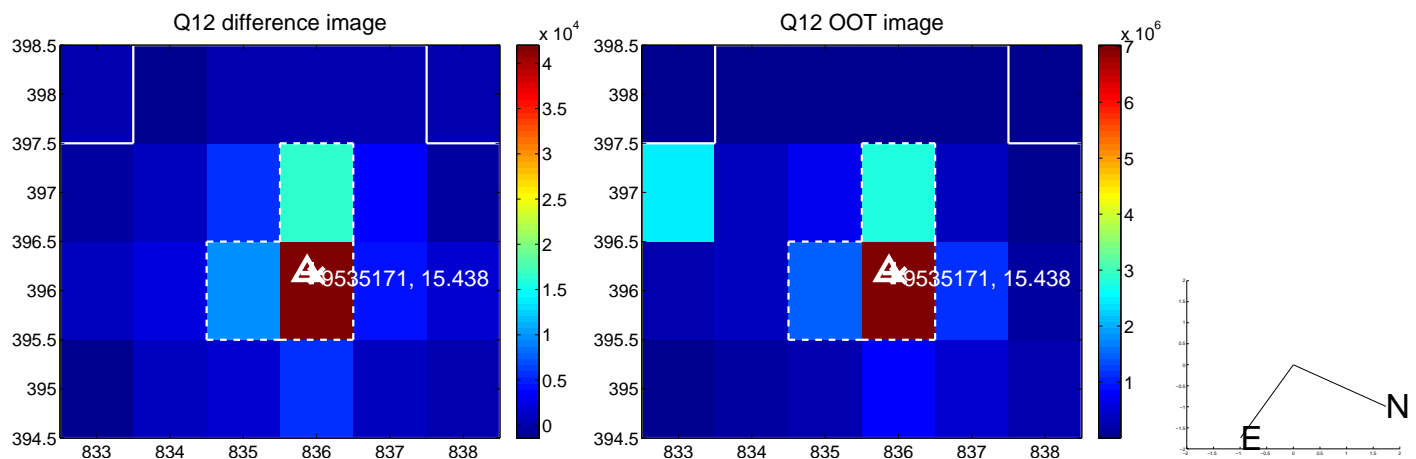
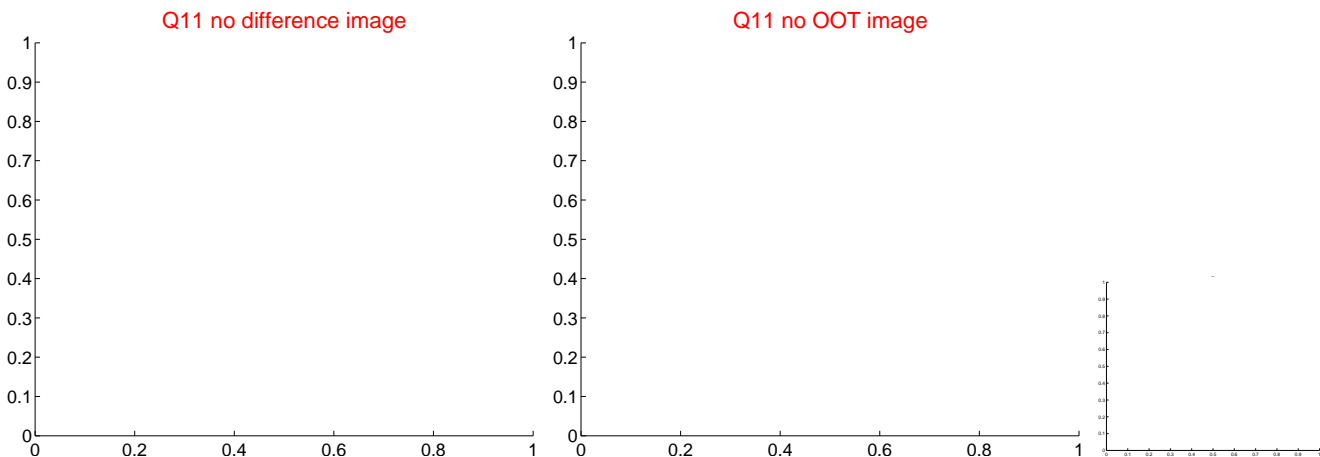
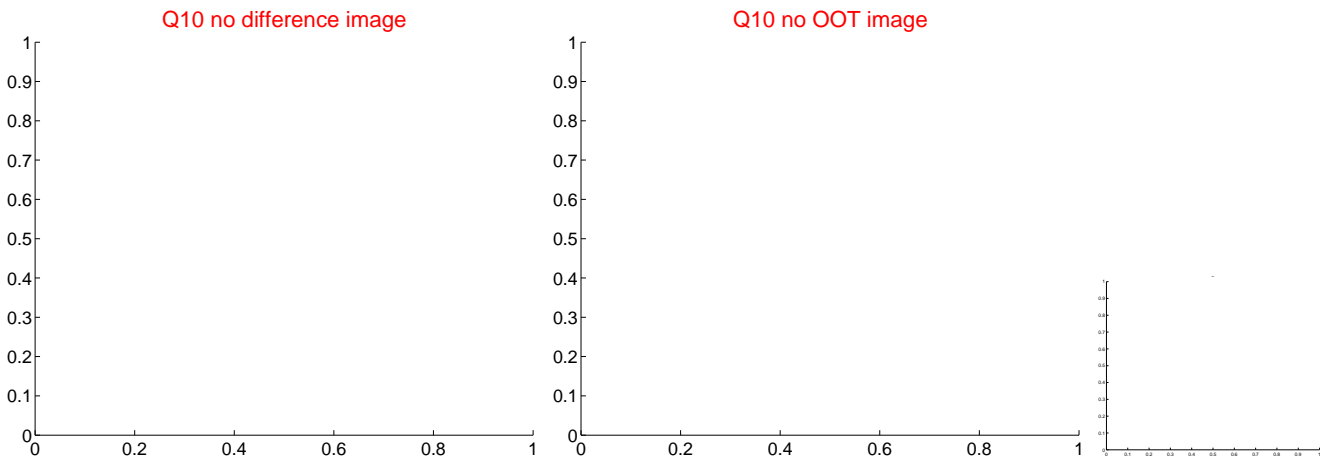
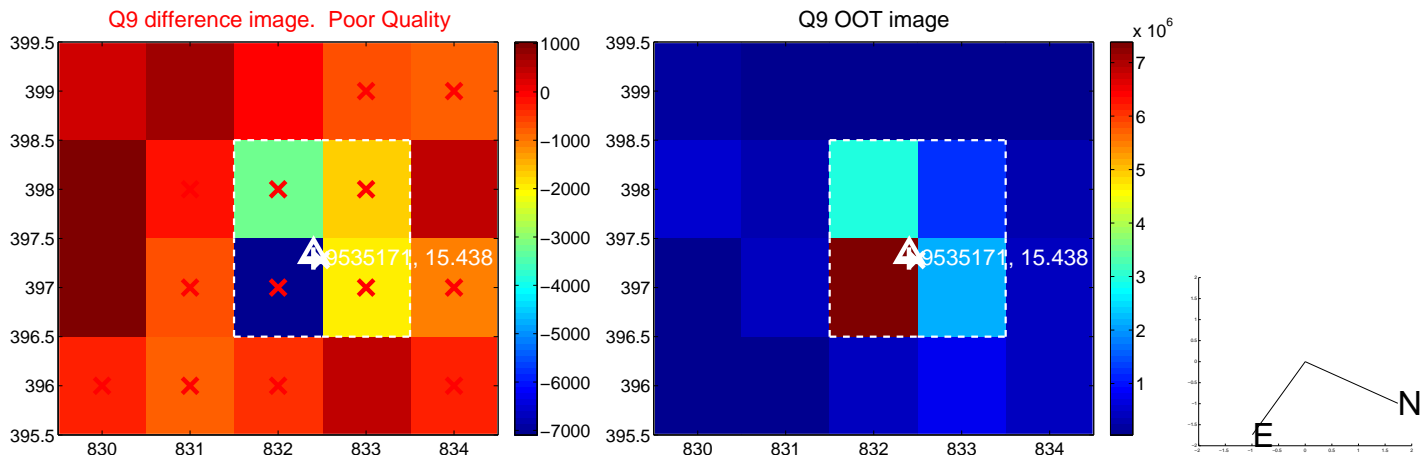
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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.

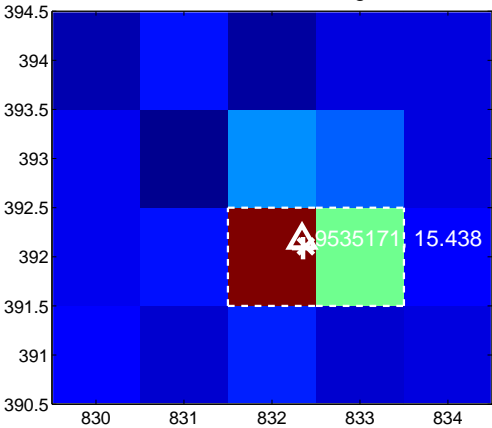
Q13 no difference image



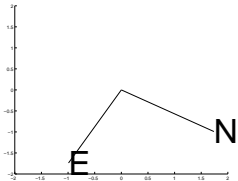
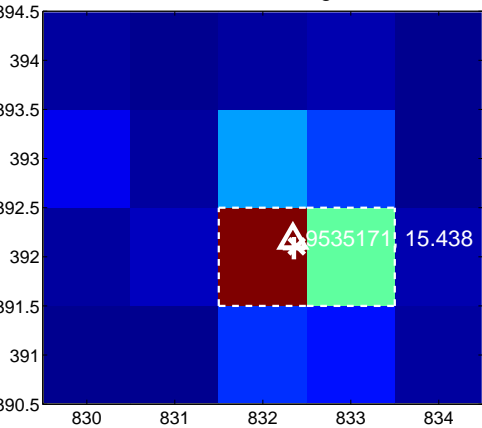
Q13 no OOT image



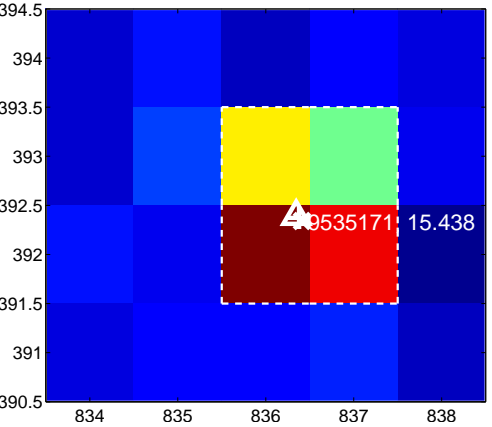
Q14 difference image



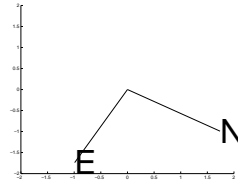
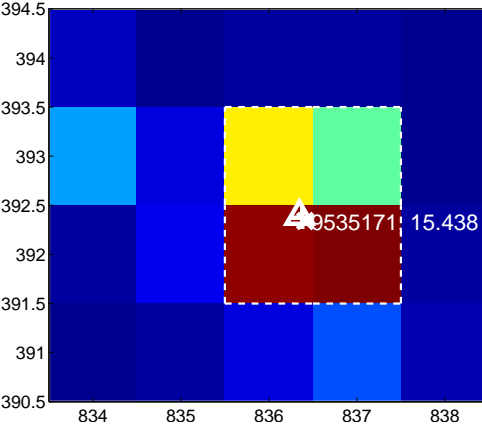
Q14 OOT image



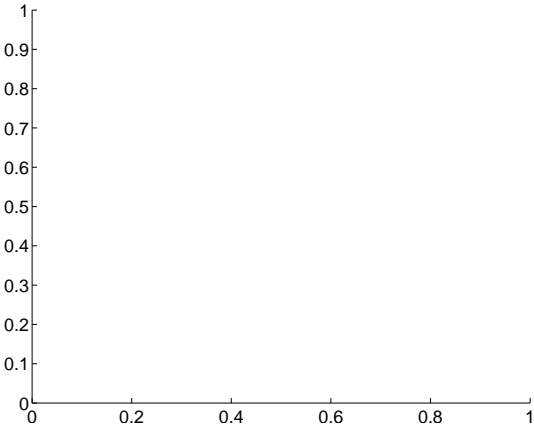
Q15 difference image



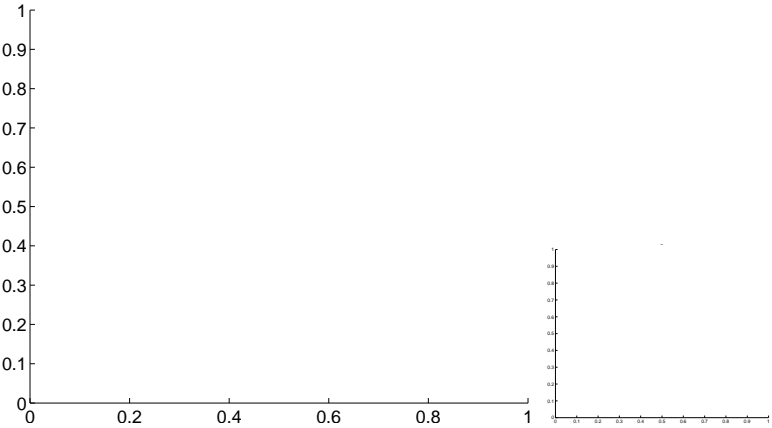
Q15 OOT image



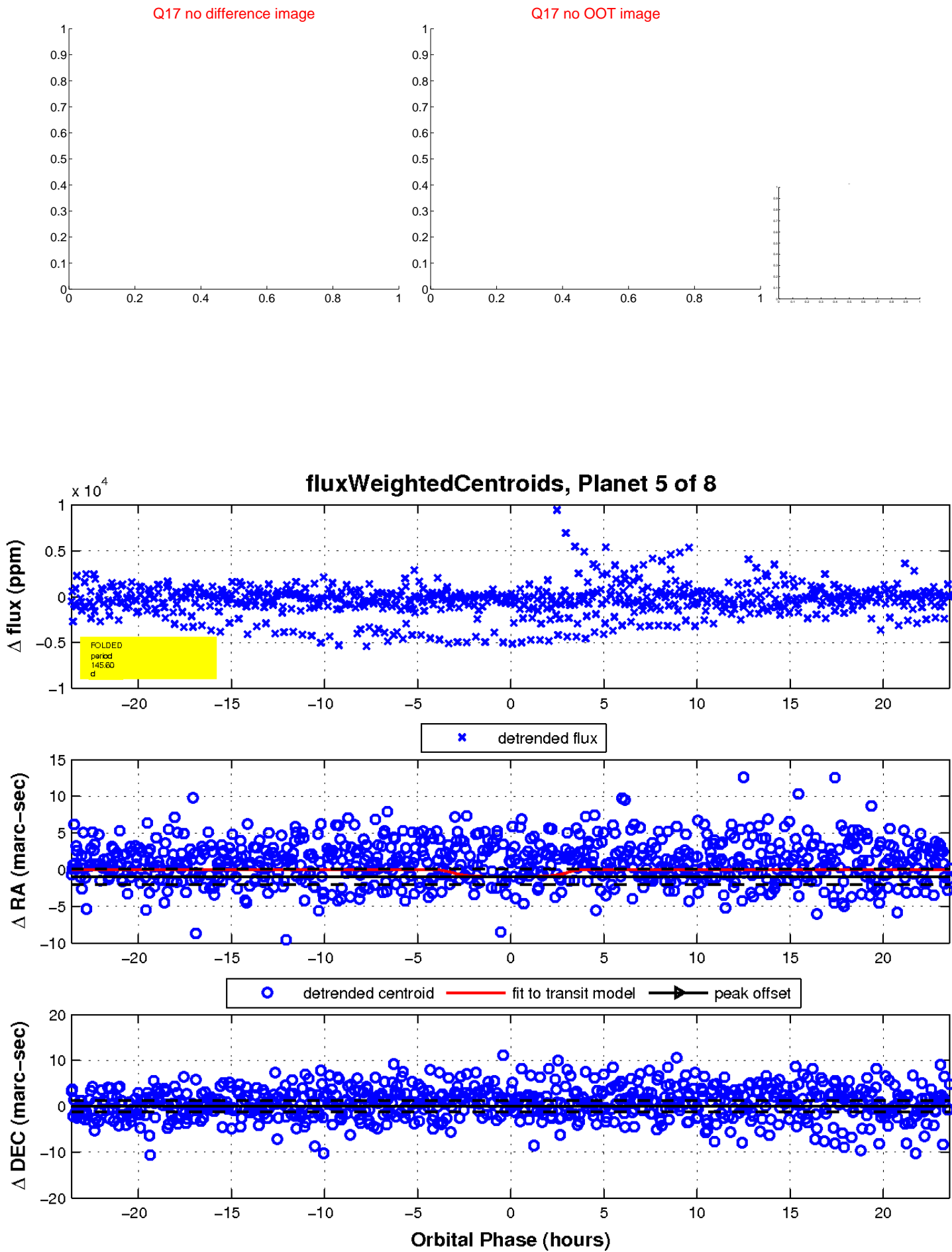
Q16 no difference image



Q16 no OOT image

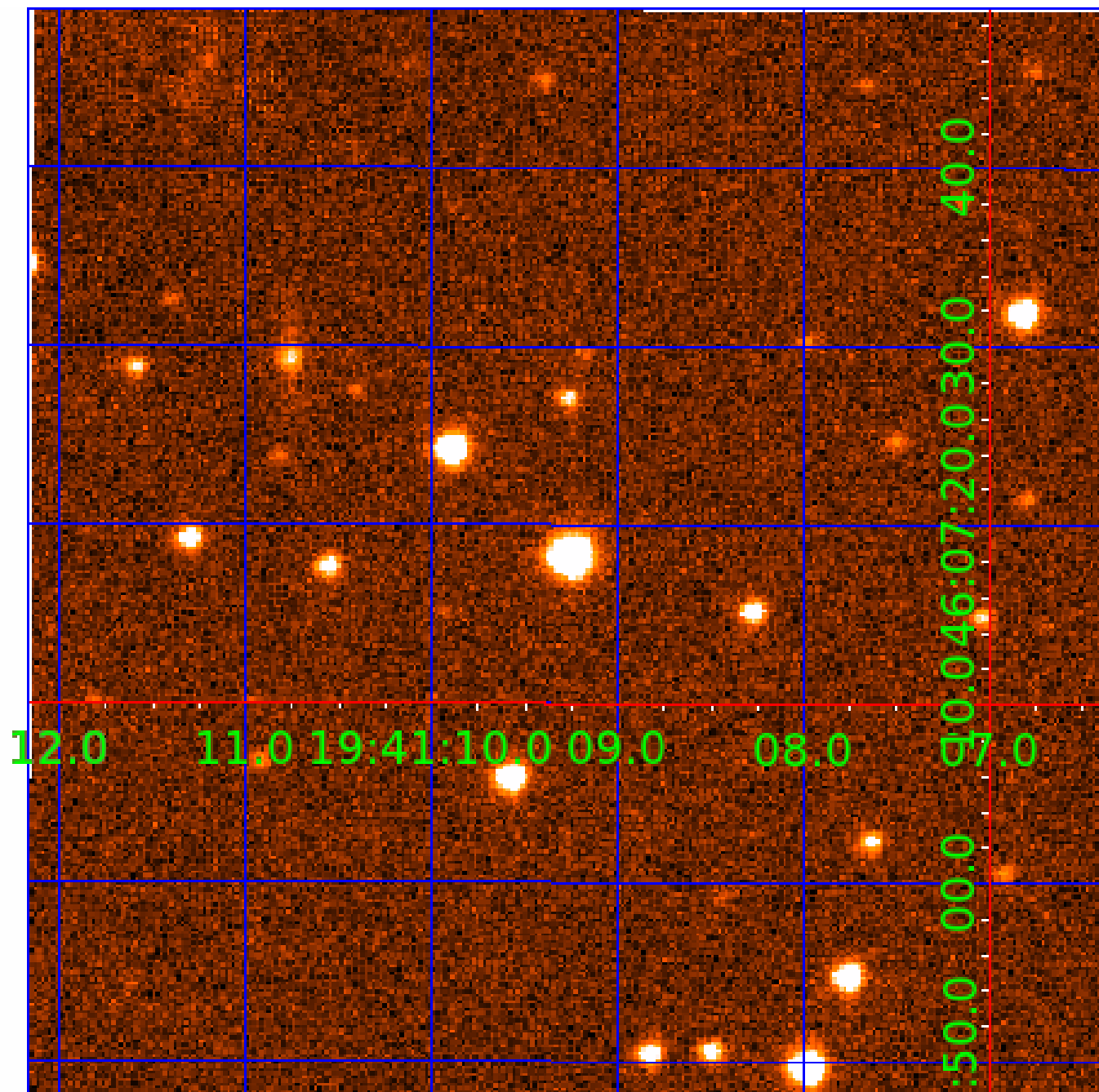


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 009535171

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009535171-02	OBS	No	220.639366	188.607163	1609.9	4.166	10.1	7.4	0.58	4523	2.49	0.36
009535171-03	OBS	No	427.360621	469.366835	1690.9	4.622	12.1	8.4	0.58	4523	3.02	0.15
009535171-04	OBS	No	511.061408	388.660897	2476.9	4.301	11.3	10.6	0.58	4523	2.85	0.12
009535171-05	OBS	No	145.603156	156.595124	821.6	7.873	8.4	6.0	0.58	4523	2.14	0.63
009535171-06	OBS	No	311.646432	332.735191	1228.6	8.727	12.3	5.4	0.58	4523	2.48	0.23
009535171-07	OBS	No	482.286505	403.066195	662.1	15.000	11.2	-1.0	0.58	4523	1.45	0.13
009535171-08	OBS	No	248.293280	333.065876	478.8	4.547	9.2	3.1	0.58	4523	1.50	0.31

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009535171-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS
009535171-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009535171-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009535171-05	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—INCONSISTENT_TRANS
009535171-06	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_MARSHALL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
009535171-07	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_TER_ALT—MOD_POS_ALT—CENT_NOFITS—HALO_GHOST
009535171-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—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.

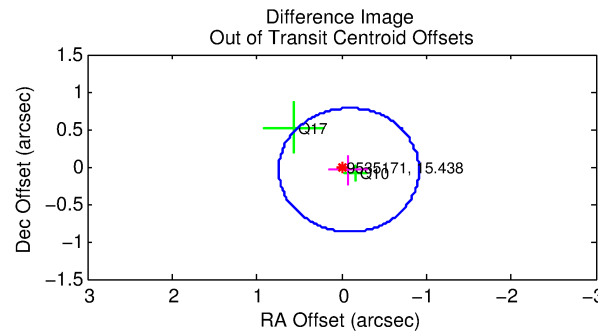
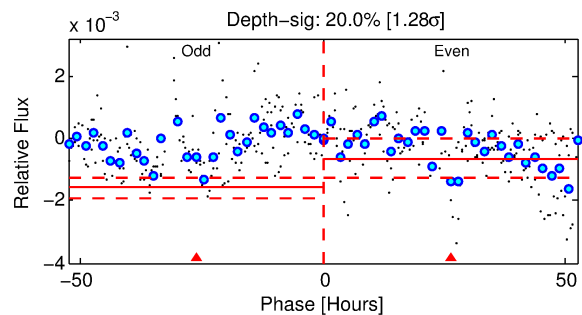
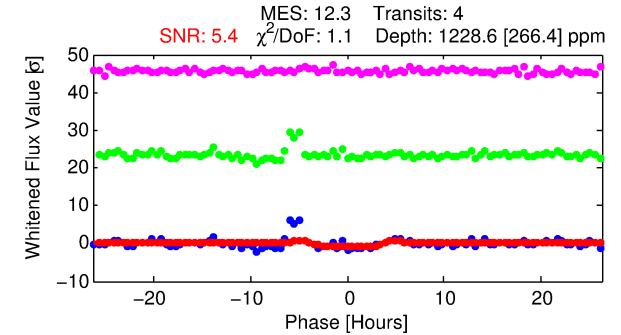
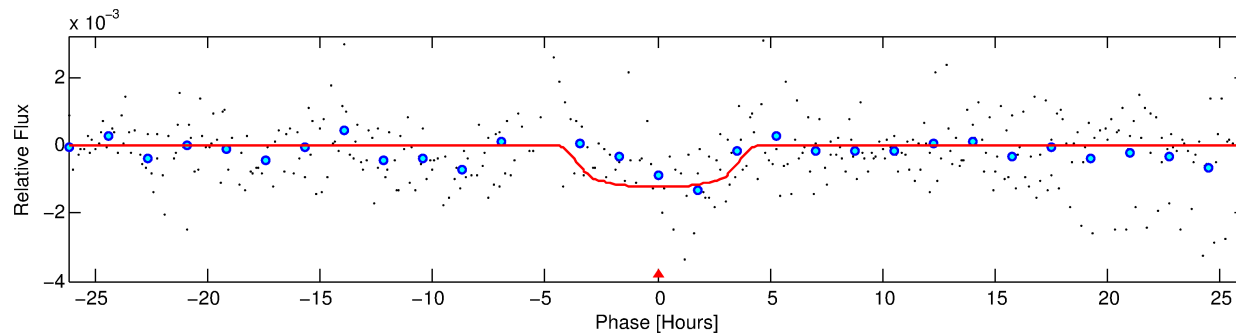
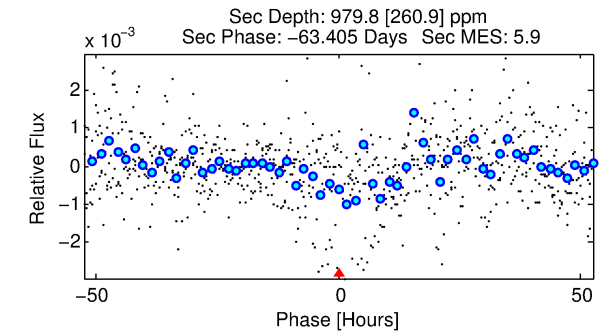
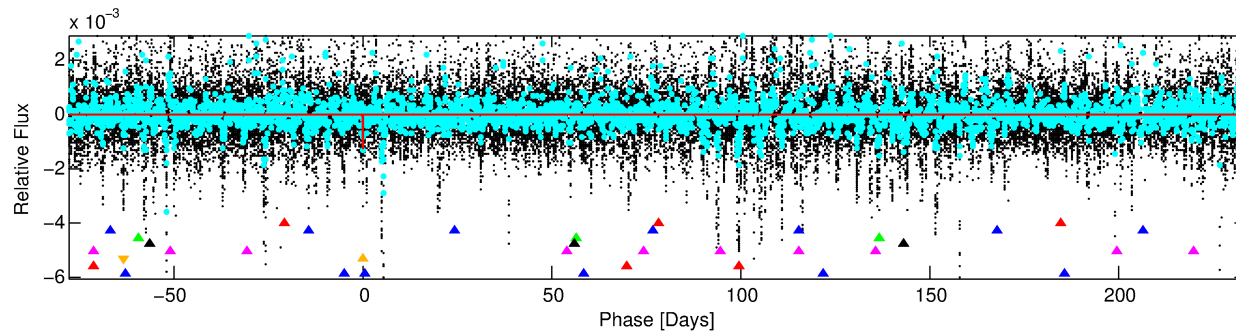
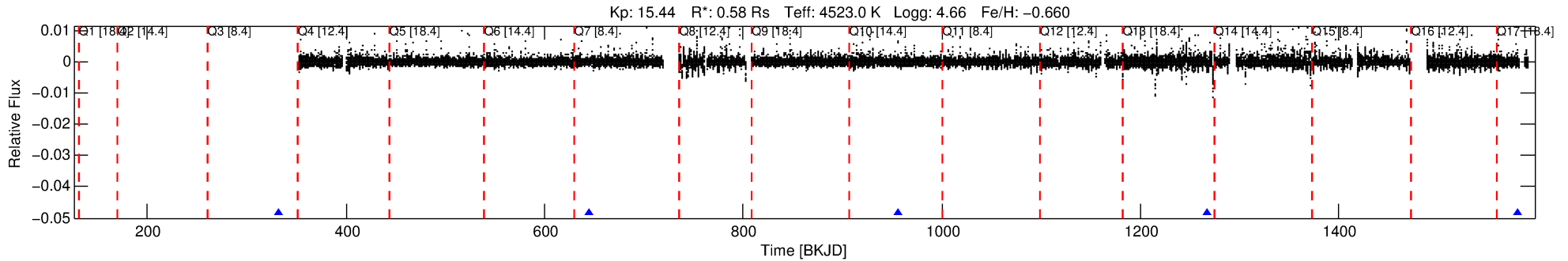
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 009535171-06

No Significant Match Found

# DV One-Page Summary

KIC: 9535171 Candidate: 6 of 8 Period: 311.646 d



## DV Fit Results:

Period = 311.64643 [0.01072] d  
Epoch = 332.7352 [0.0307] BKJD  
Rp/R\* = 0.0389 [0.0066]  
a/R\* = 145.57 [62.31]  
b = 0.89 [0.10]  
Seff = 0.23 [0.04]  
Teq = 176 [8] K  
Rp = 2.48 [0.47] Re  
a = 0.7472 [0.0534] AU  
Ag = 48926.21 [21714.73] [2.25σ]  
Teffp = 4056 [462] K [8.40σ]

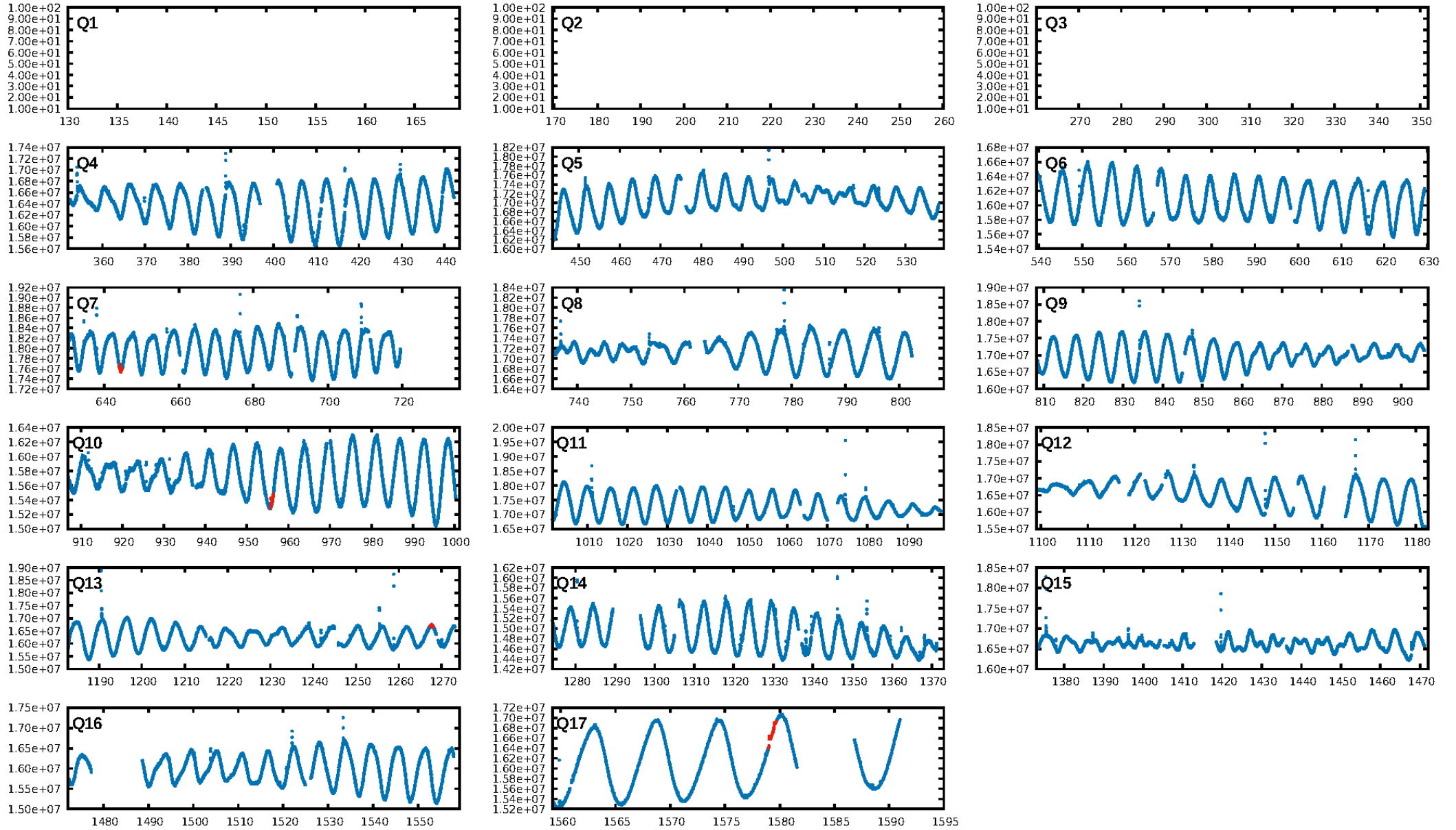
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [154.52σ]  
LongPeriod-sig: 100.0% [261.07σ]  
ModelChiSquare2-sig: 5.2%  
ModelChiSquareGof-sig: 99.9%  
Bootstrap-pfa: 6.54e-13  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 0.143  
Centroid-sig: 0.7%  
Centroid-so: 2.484 arcsec [1.83σ]  
OotOffset-rm: 0.097 arcsec [0.35σ]  
KicOffset-rm: 0.128 arcsec [0.68σ]  
OotOffset-st: 1/0/0/1 [2]  
KicOffset-st: 1/0/0/1 [2]  
DiffImageQuality-fgm: 0.50 [1/2]  
DiffImageOverlap-fno: 1.00 [2/2]

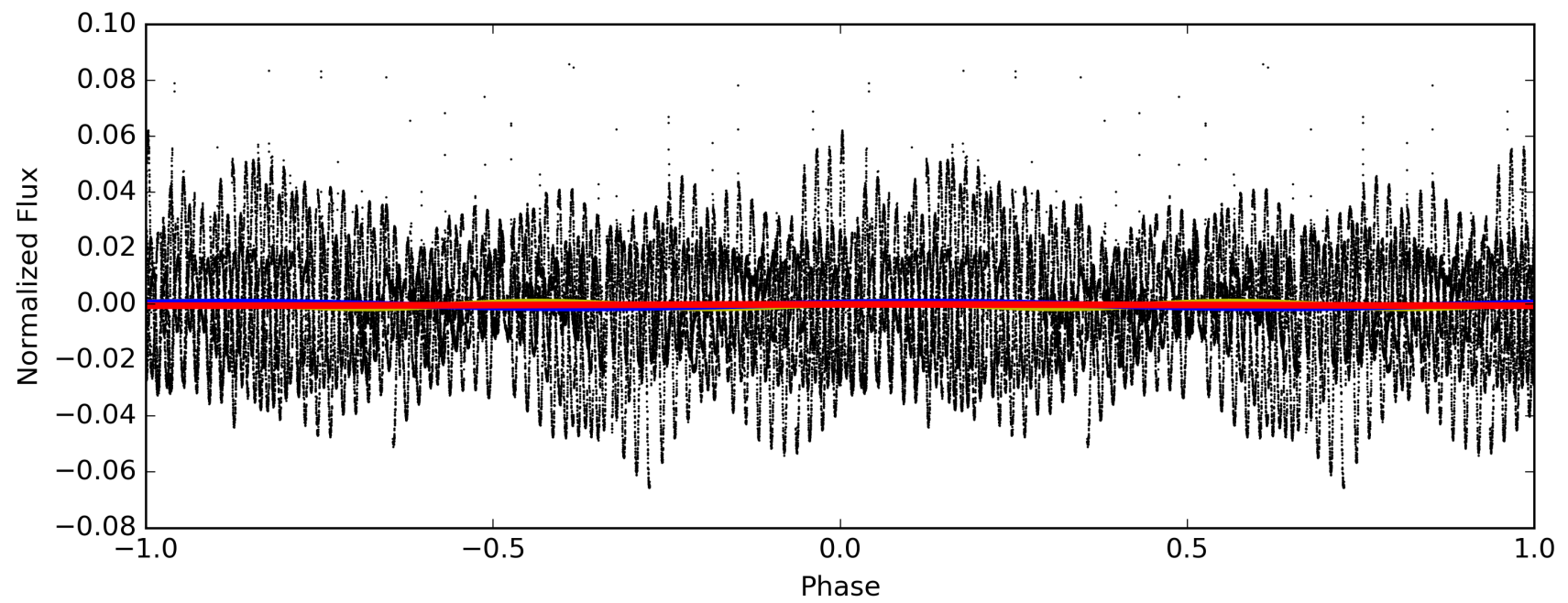
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 03-Feb-2016 08:04:14 Z

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

# TCE 009535171-06, PDC Light Curves

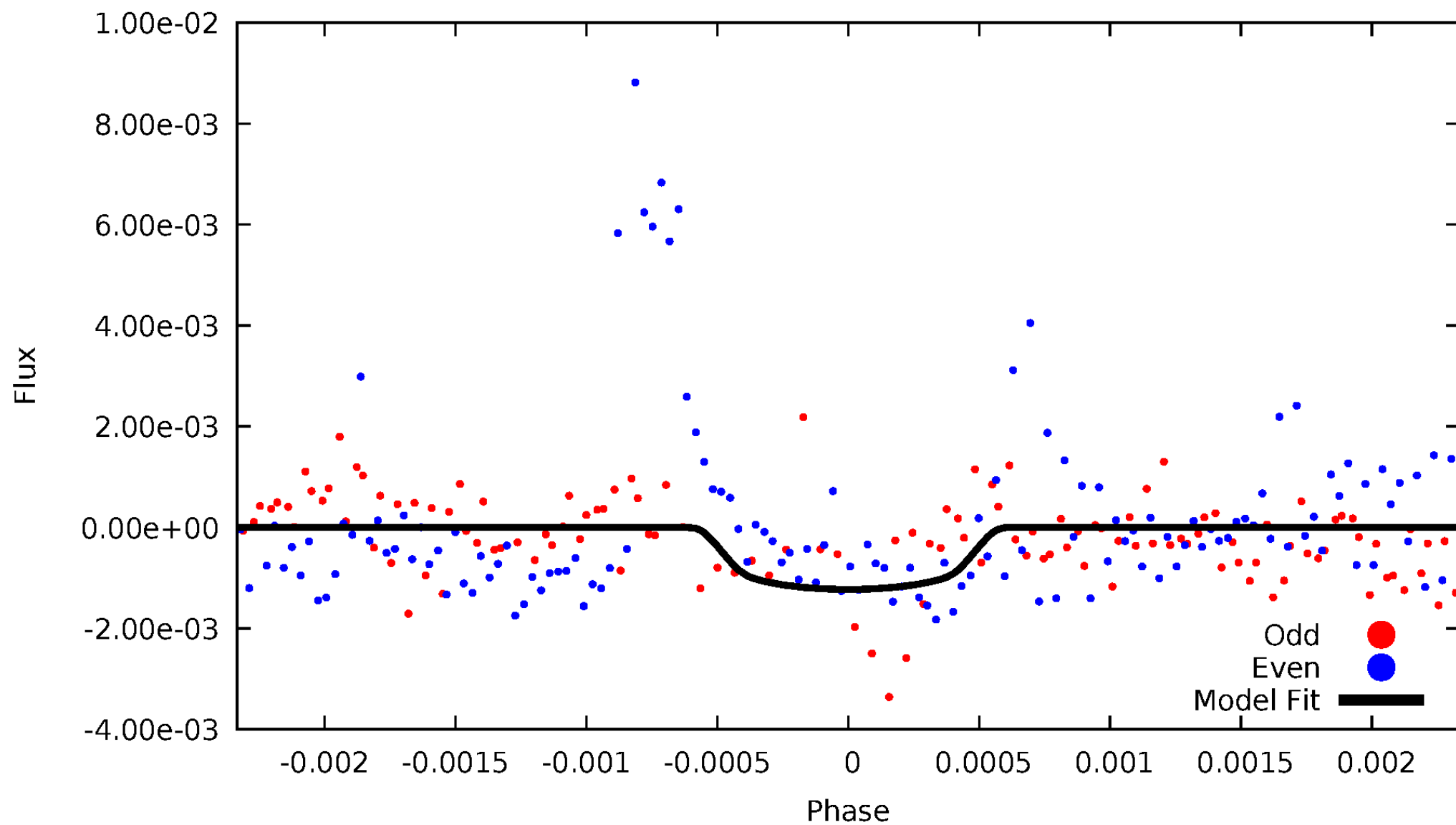


— P = 155.823 days      — P = 311.646 days      — P = 623.293 days



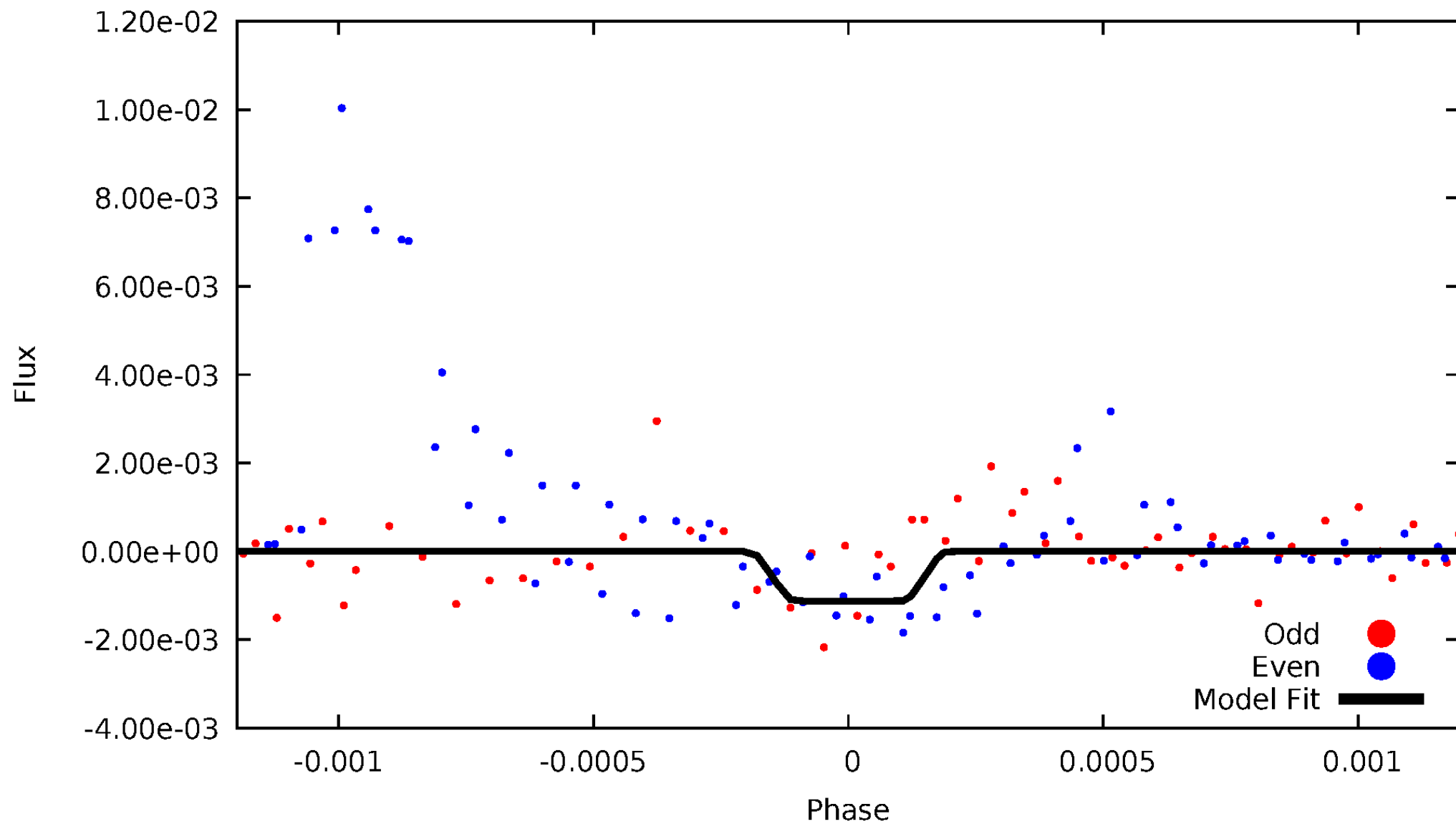
# DV Odd/Even

TCE 009535171-06



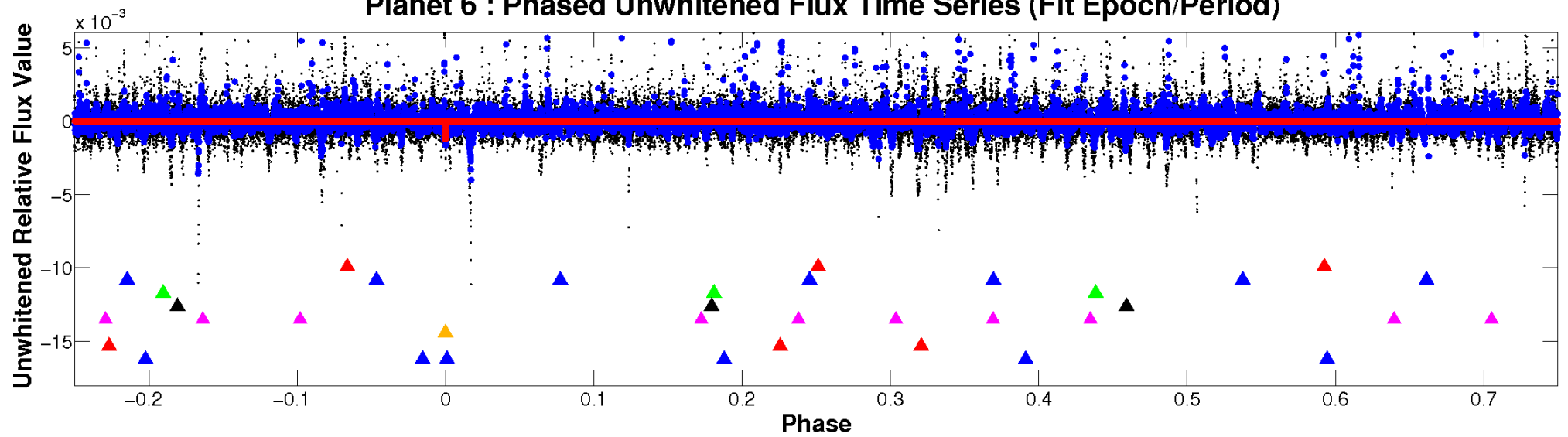
# ALT Odd/Even

TCE 009535171-06

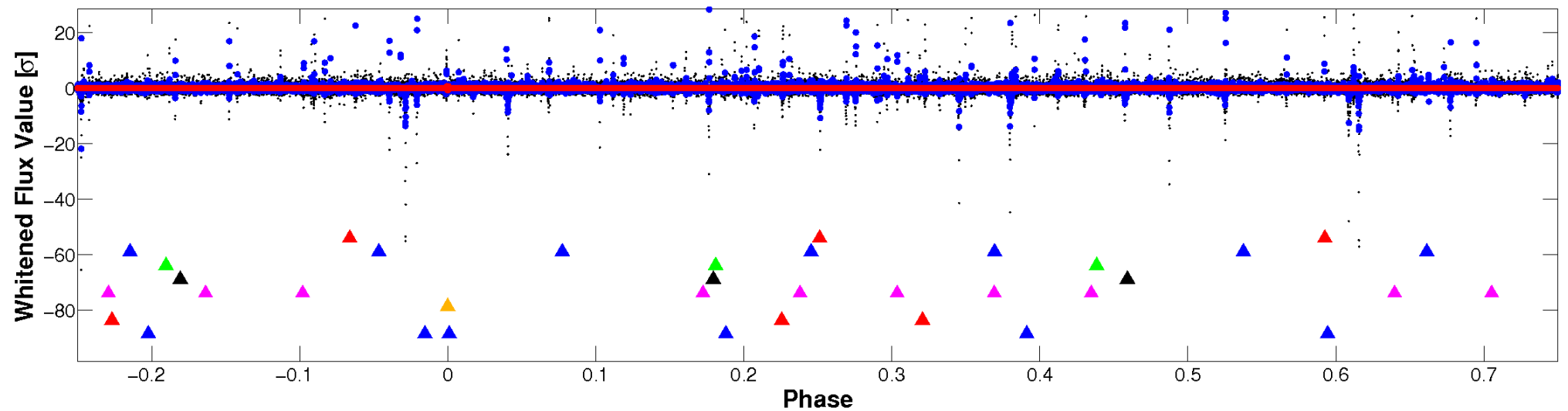


# Non-Whitened Vs. Whitened Light Curve

## Planet 6 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

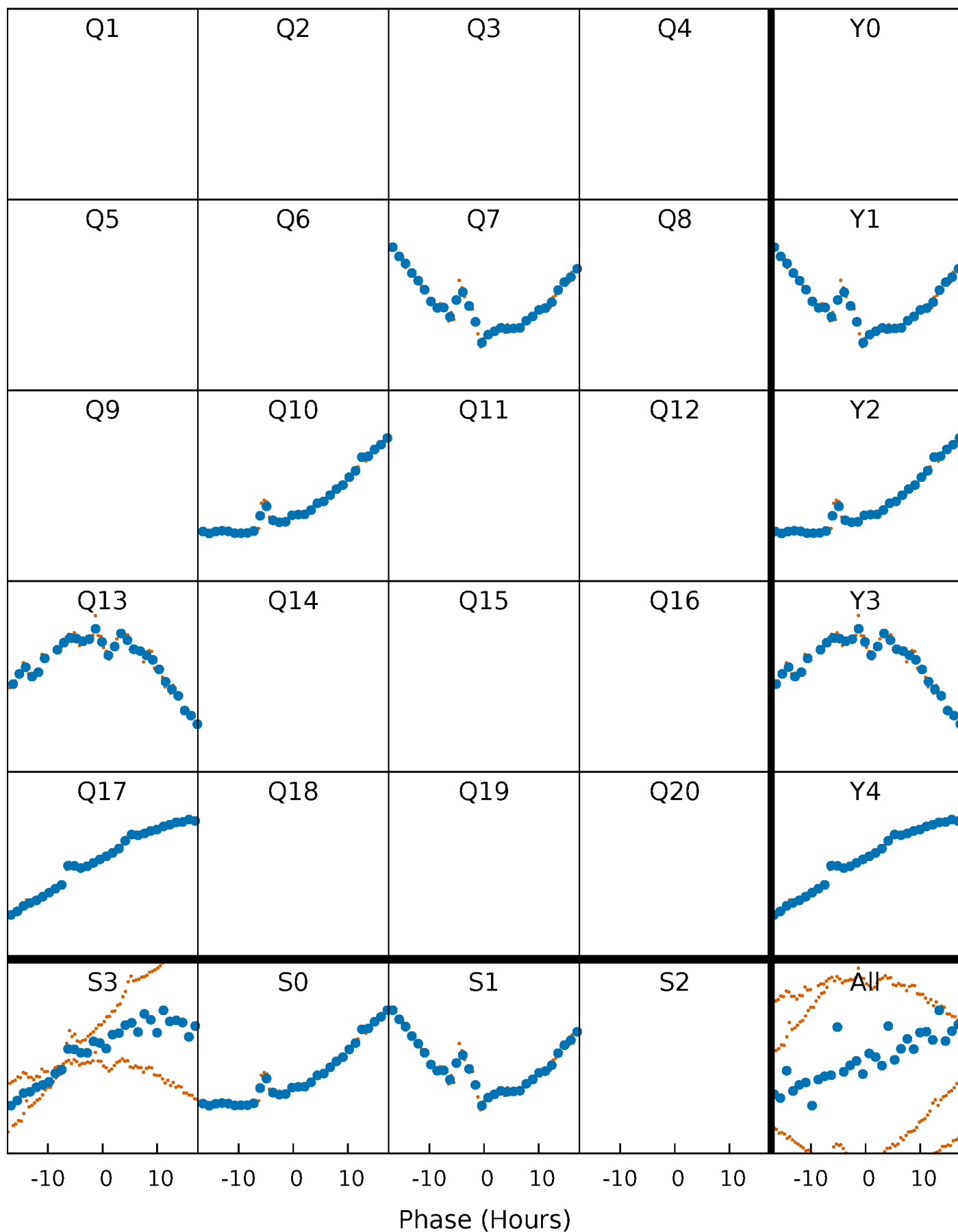


## Planet 6 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

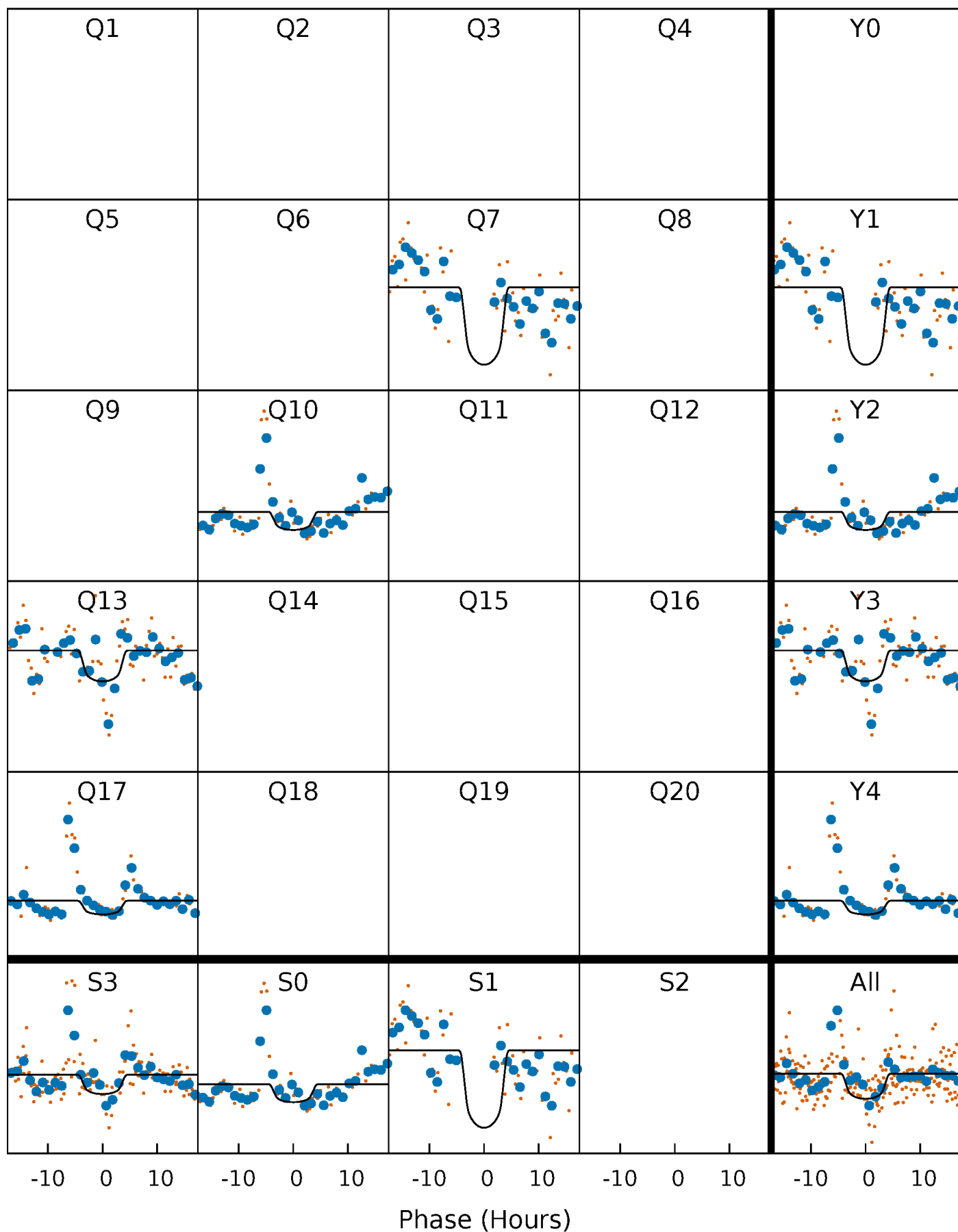
TCE 009535171-06     $P=311.646432$  Days     $T_0=332.735191$  (BKJD)





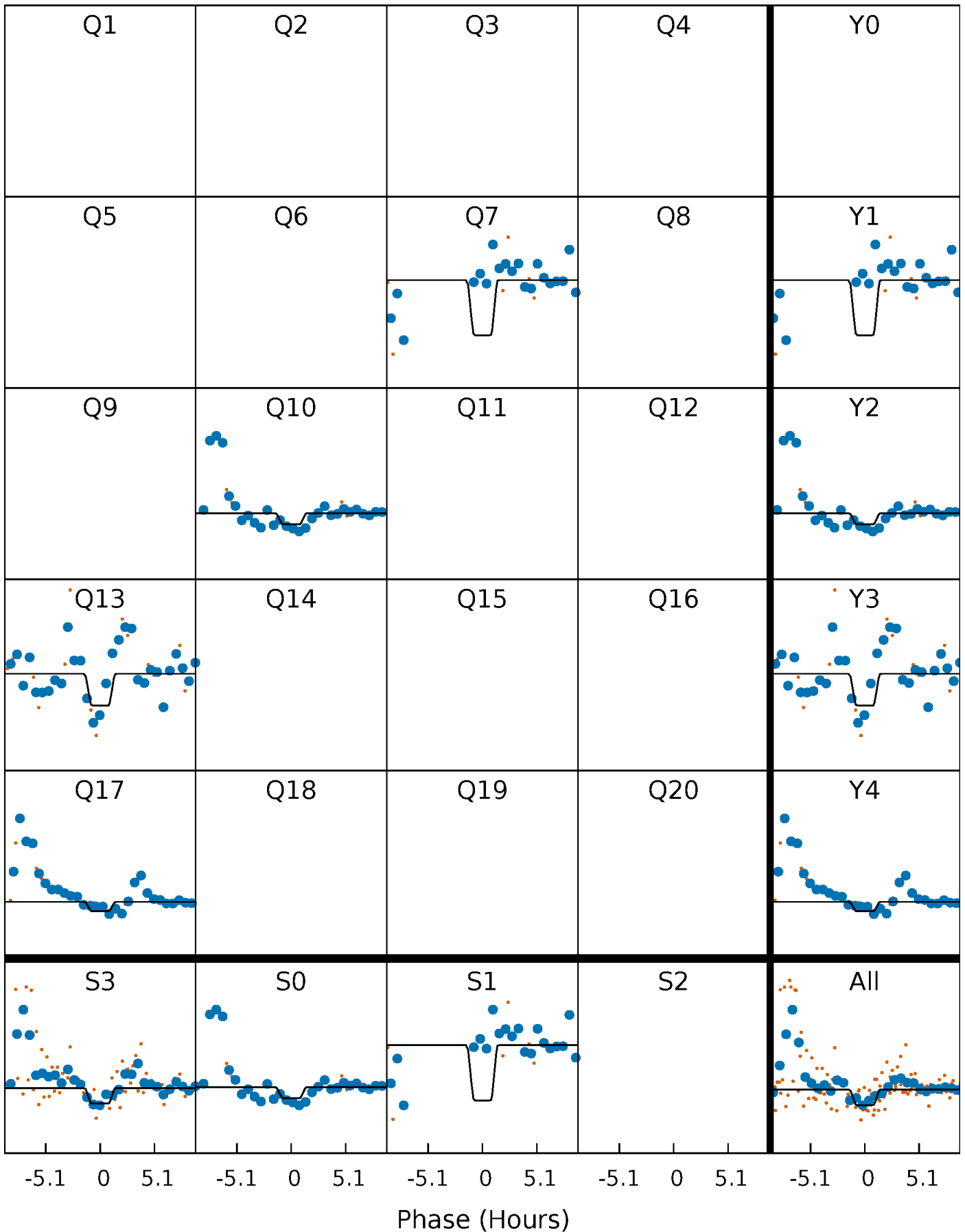
# DV Quarter-Phased Transit Curves

TCE 009535171-06 P=311.646432 Days  $T_0=332.735191$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

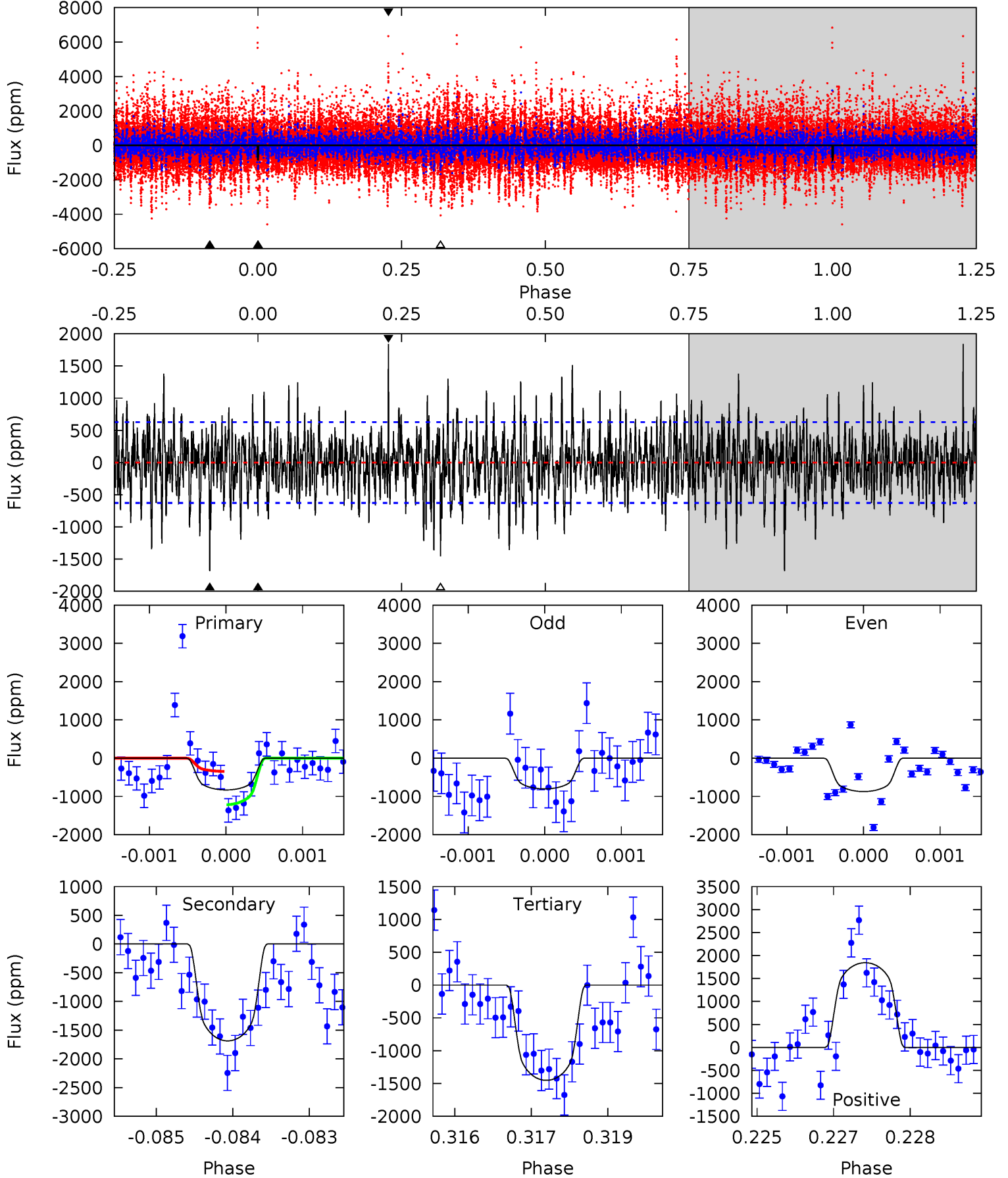
TCE 009535171-06 P=311.639035 Days  $T_0=332.820912$  (BKJD)



# DV Model-Shift Uniqueness Test

009535171-06, P = 311.646432 Days, E = 332.735191 Days

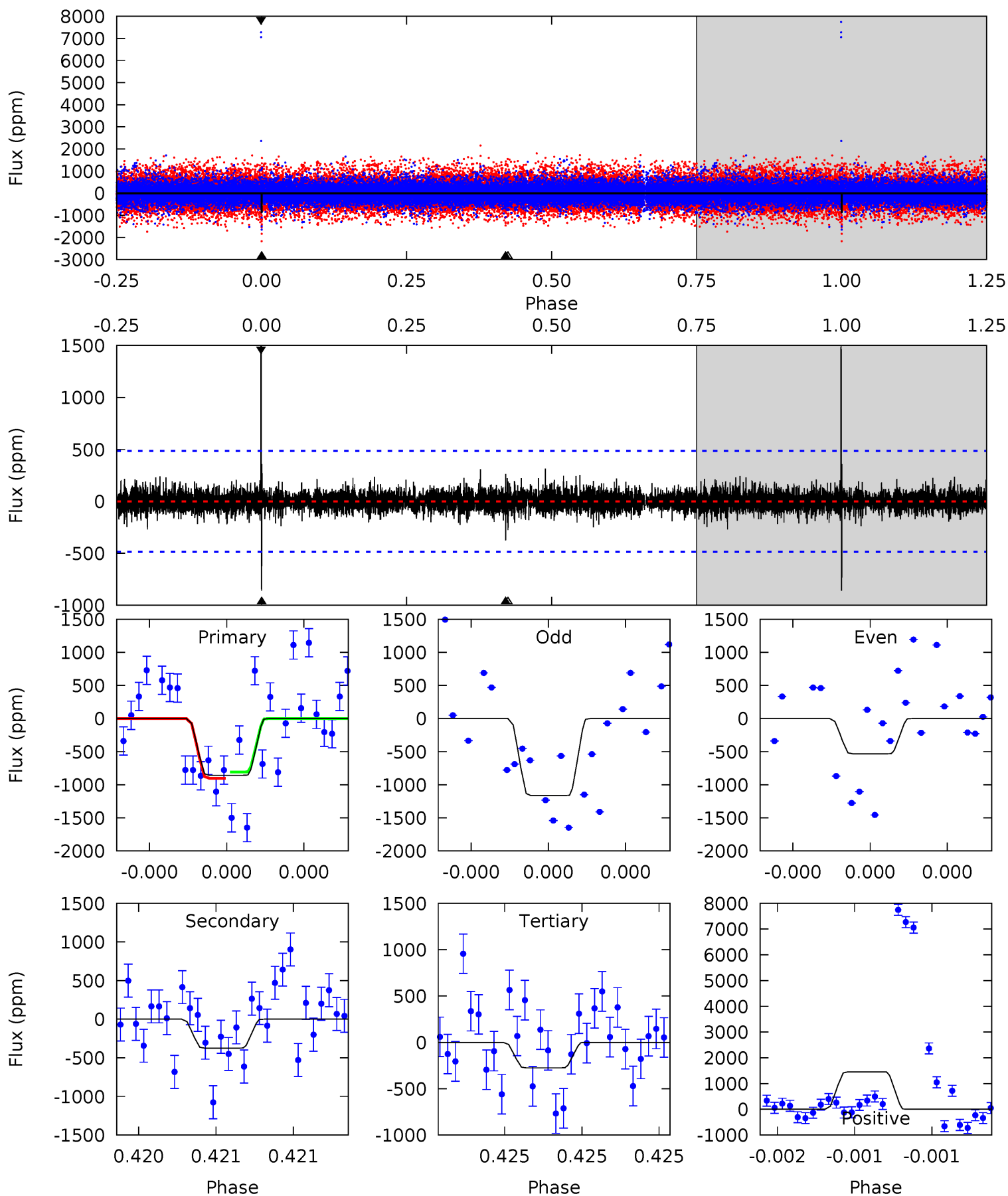
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.17	14.6	12.5	15.9	5.42	3.24	3.45	-5.36	-8.74	2.02	-1.35	0.22	0.89	0.52	3.76



# Alt Model-Shift Uniqueness Test

009535171-06, P = 311.639035 Days, E = 332.820912 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.92	4.33	3.18	16.9	5.61	3.54	0.76	6.74	-6.93	1.15	-12.5	3.55	0.85	0.64	0.54



### Stellar Parameters For KIC 009535171

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$4523^{+162}_{-162}$	$4.663^{+0.054}_{-0.032}$	$-0.660^{+0.300}_{-0.300}$	$0.584^{+0.051}_{-0.051}$	$0.572^{+0.062}_{-0.038}$	$4.047^{+0.935}_{-0.524}$
	+4%/-4%	+1%/-1%	+45%/-45%	+9%/-9%	+11%/-7%	+23%/-13%
Source	KIC0	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 009535171-06 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-1687 \pm 116$	$2.43^{+0.42}_{-0.40}$	$245^{+10}_{-10}$	$4647^{+414}_{-323}$	$88961^{+41485}_{-25063}$
Alt.	$-374 \pm 86$	$2.12^{+0.42}_{-0.44}$	$245^{+10}_{-10}$	$3699^{+364}_{-266}$	$25674^{+15746}_{-9042}$

$T_{max}$  = 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

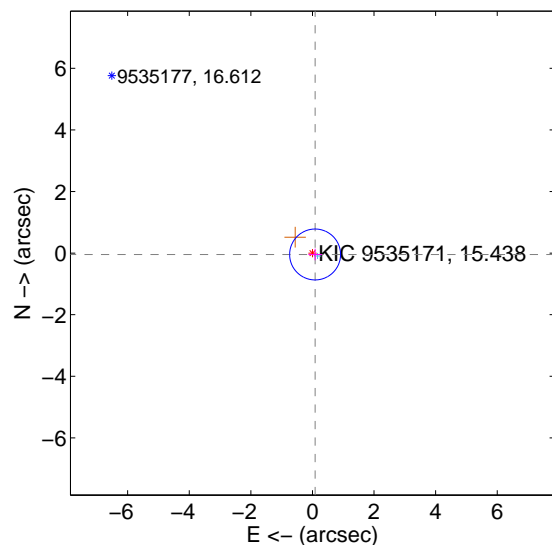
Supplemental centroid analysis for 009535171-06. Kepler magnitude: 15.44. Transit SNR 5.38

There are 1 quarters with good PRF difference image offsets

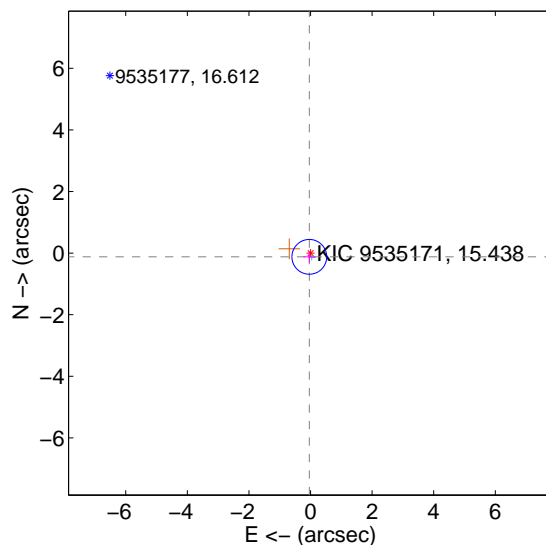
The direct PRF centroid is offset from the target star catalog position by about 0.40 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.097 \pm 0.275$	0.35	$-0.086 \pm 0.220$	$-0.045 \pm 0.188$
PRF-fit source offset from KIC position	$0.128 \pm 0.188$	0.68	$0.040 \pm 0.196$	$-0.121 \pm 0.187$
photometric centroid source offset	$2.48 \pm 1.35$	1.83	$1.21 \pm 1.20$	$2.17 \pm 1.40$

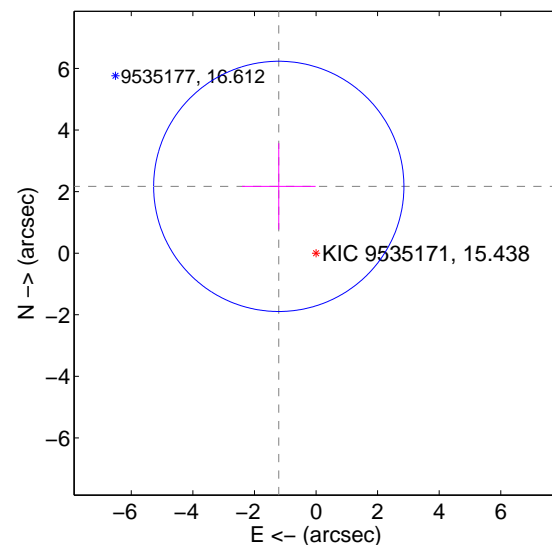
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



offset from photometric centroids



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

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

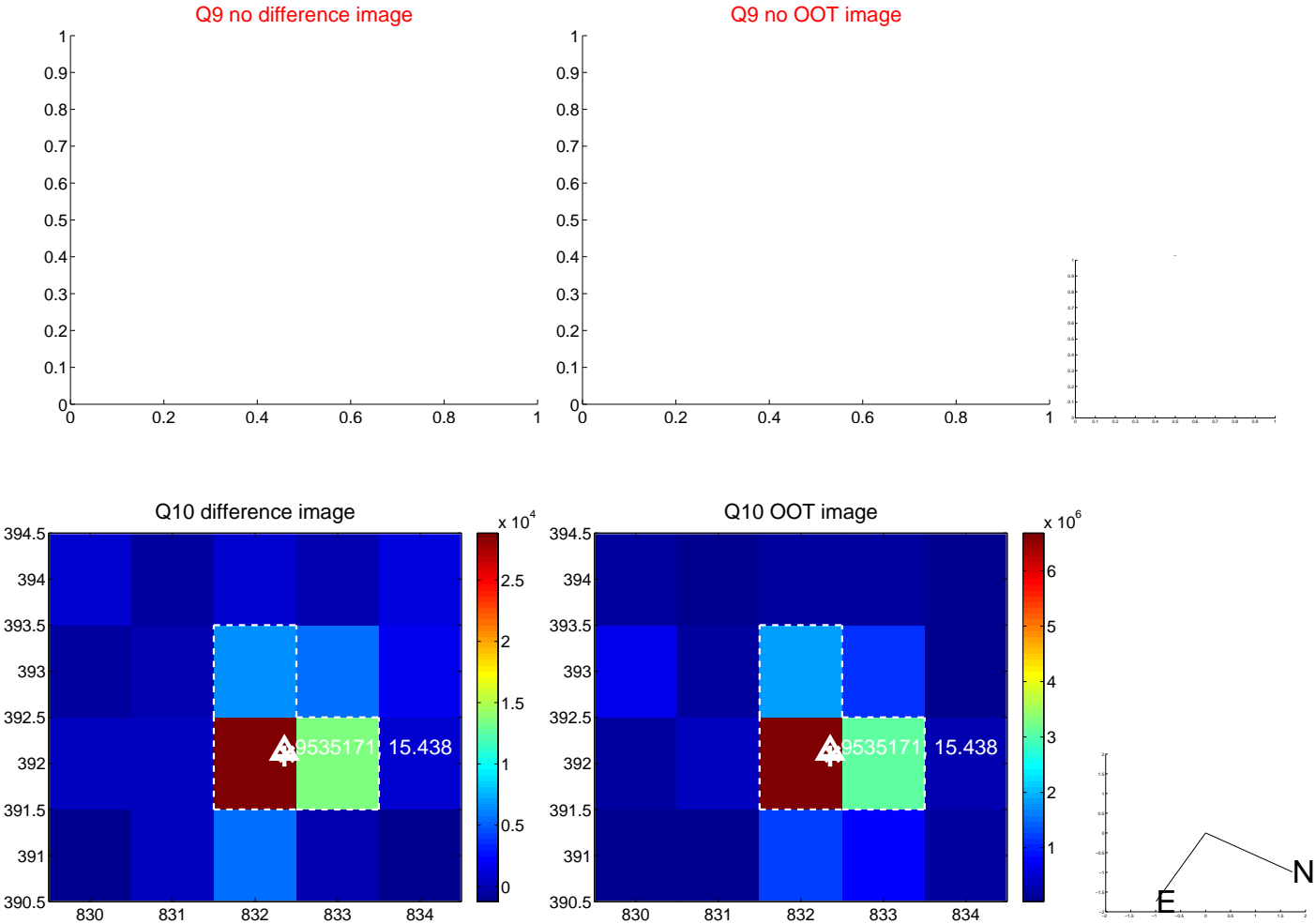


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





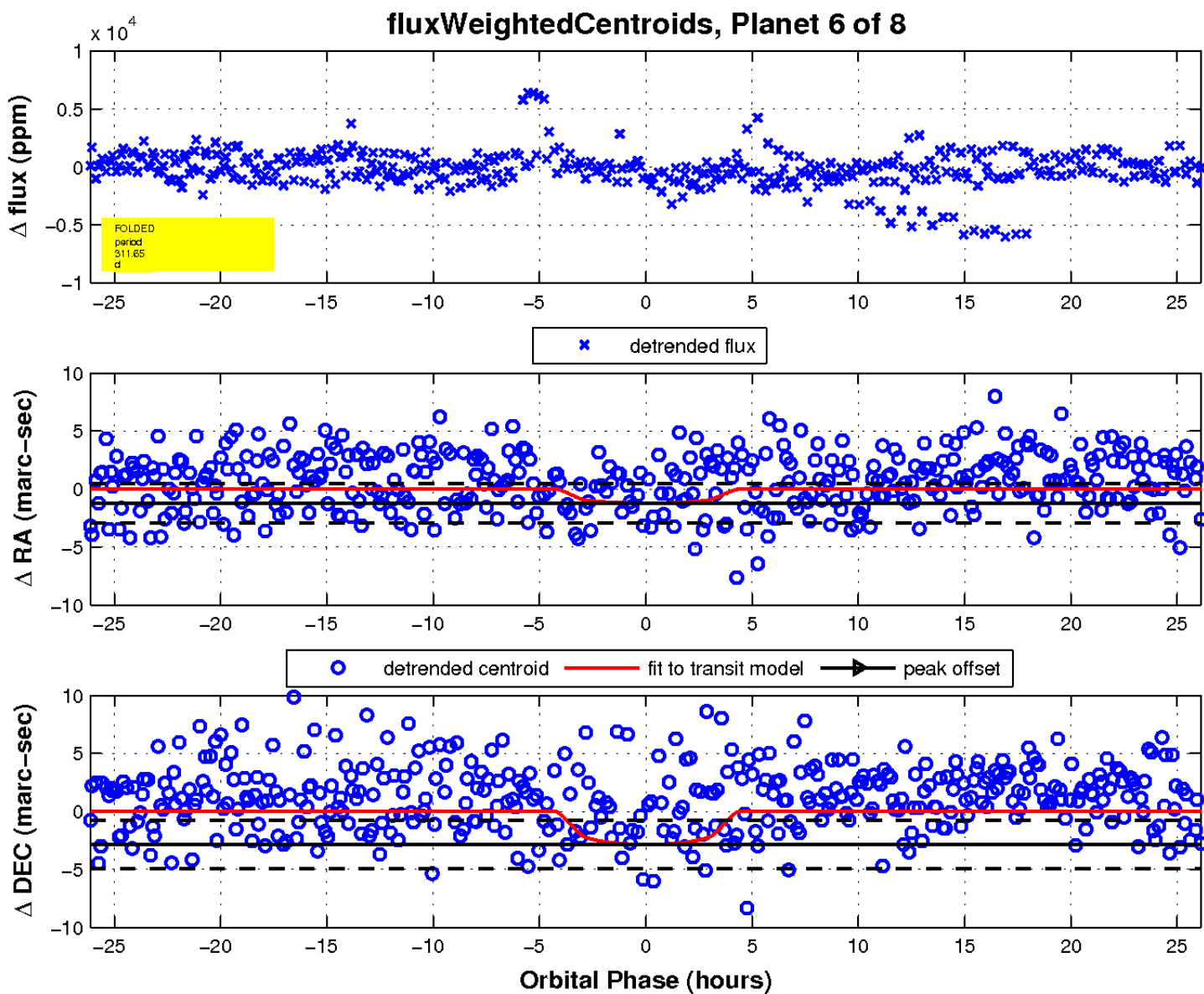
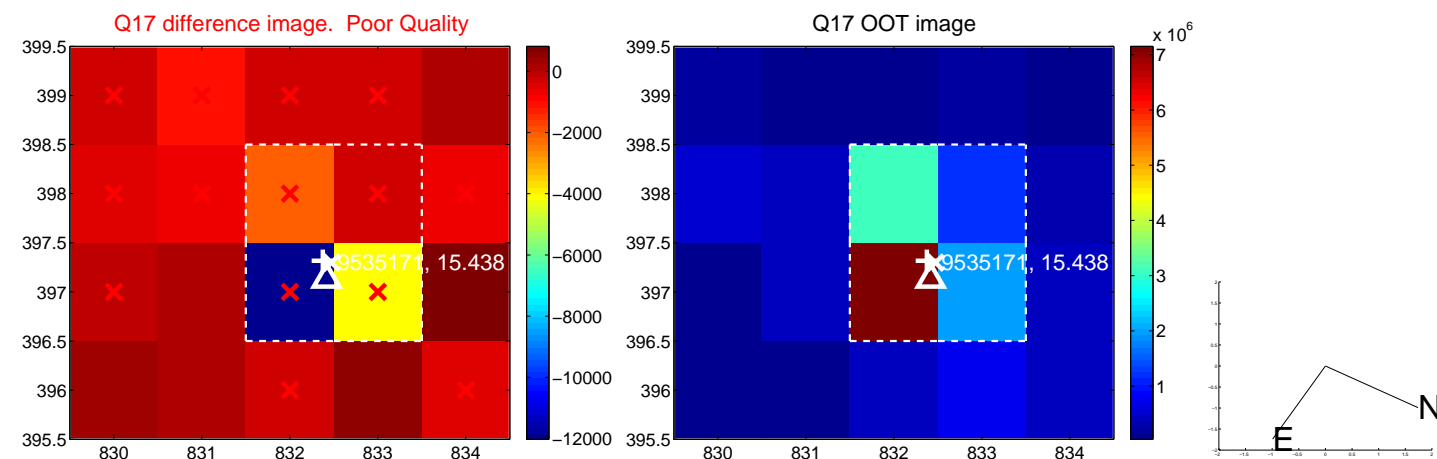
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

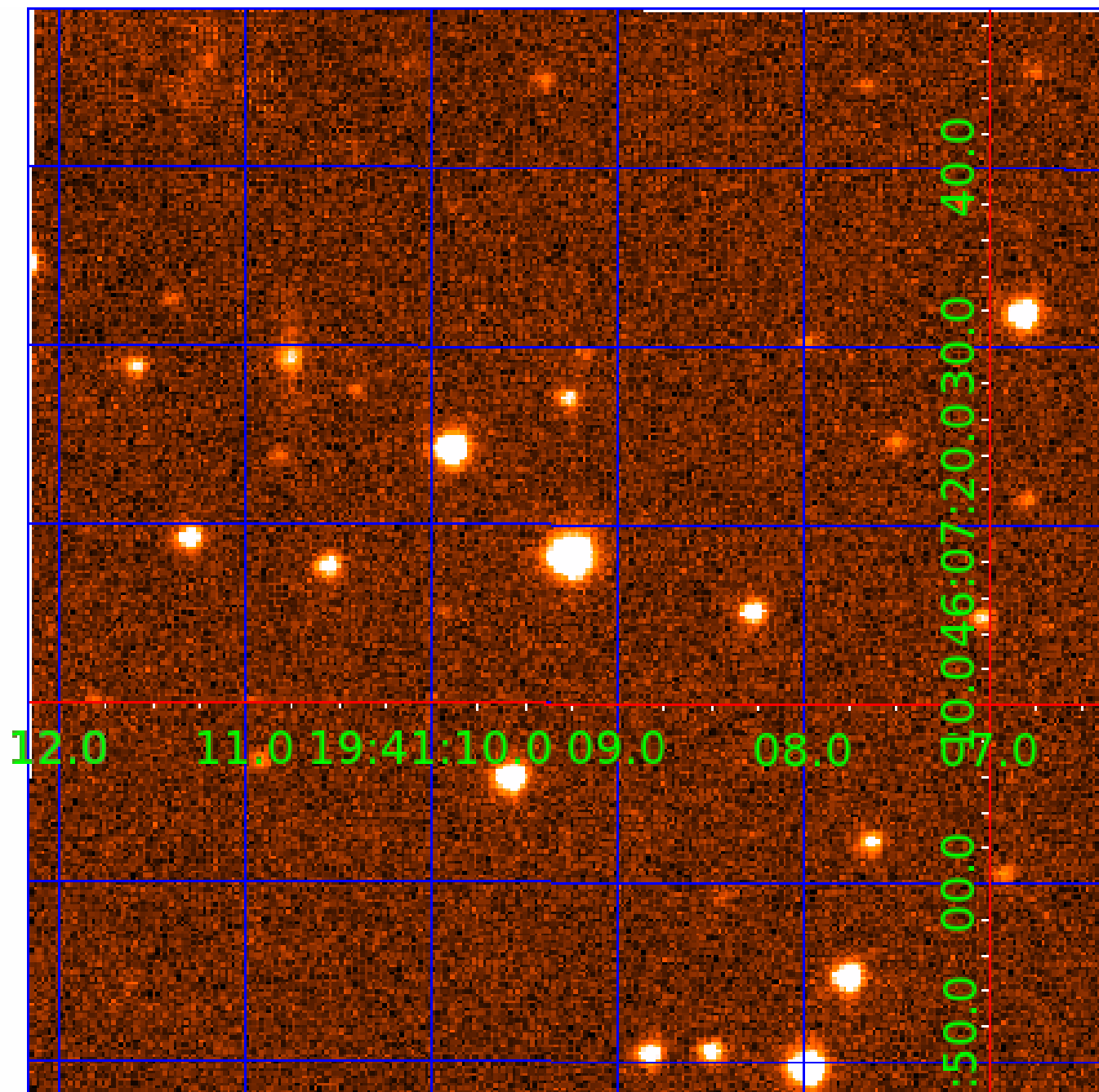


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 009535171

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009535171-02	OBS	No	220.639366	188.607163	1609.9	4.166	10.1	7.4	0.58	4523	2.49	0.36
009535171-03	OBS	No	427.360621	469.366835	1690.9	4.622	12.1	8.4	0.58	4523	3.02	0.15
009535171-04	OBS	No	511.061408	388.660897	2476.9	4.301	11.3	10.6	0.58	4523	2.85	0.12
009535171-05	OBS	No	145.603156	156.595124	821.6	7.873	8.4	6.0	0.58	4523	2.14	0.63
009535171-06	OBS	No	311.646432	332.735191	1228.6	8.727	12.3	5.4	0.58	4523	2.48	0.23
009535171-07	OBS	No	482.286505	403.066195	662.1	15.000	11.2	-1.0	0.58	4523	1.45	0.13
009535171-08	OBS	No	248.293280	333.065876	478.8	4.547	9.2	3.1	0.58	4523	1.50	0.31

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009535171-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS
009535171-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009535171-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009535171-05	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—INCONSISTENT_TRANS
009535171-06	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_MARSHALL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
009535171-07	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_TER_ALT—MOD_POS_ALT—CENT_NOFITS—HALO_GHOST
009535171-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—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.

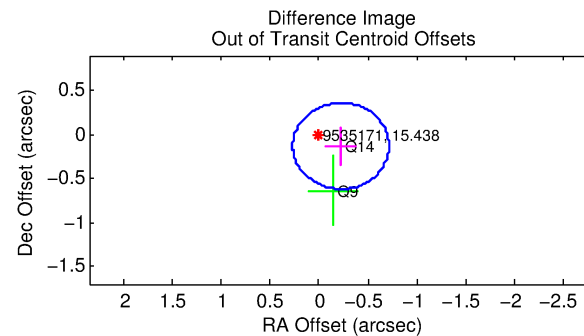
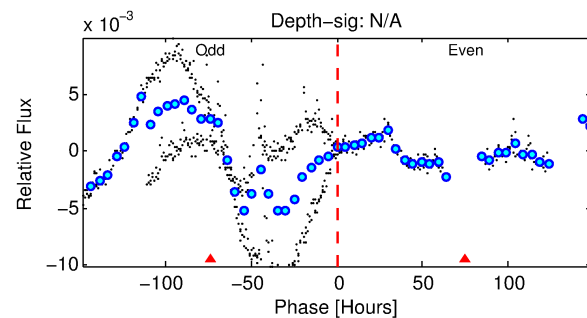
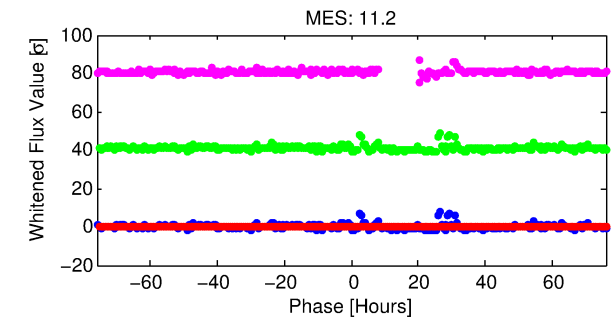
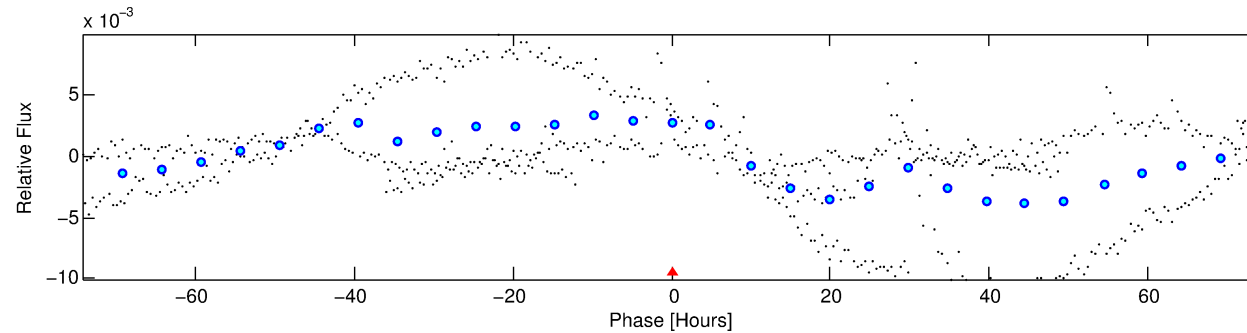
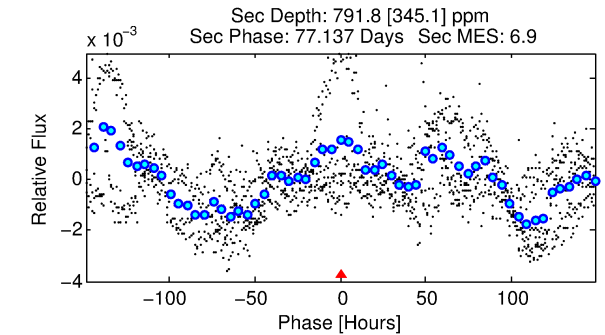
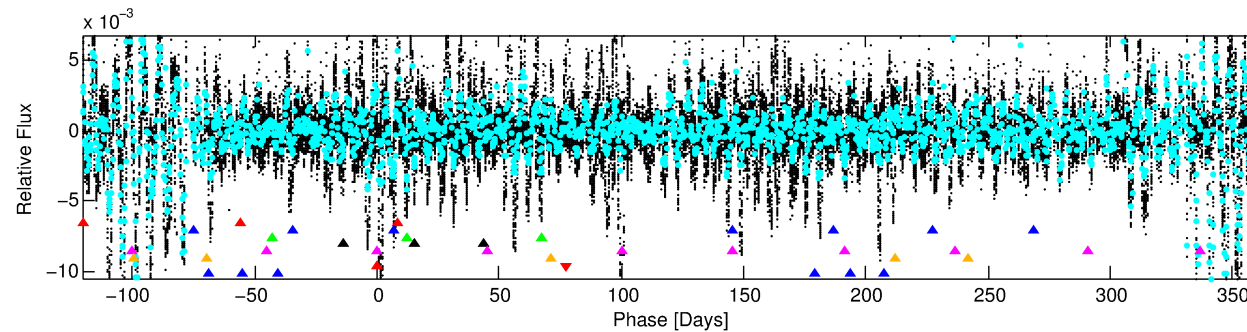
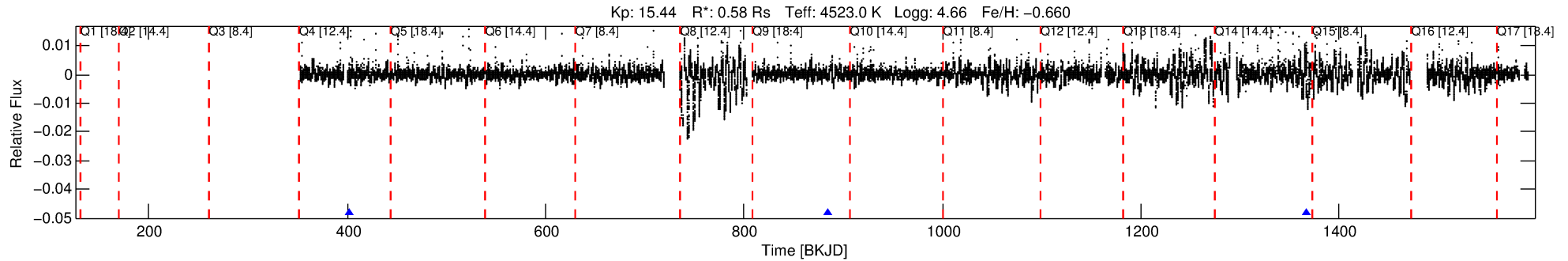
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 009535171-07

No Significant Match Found

# DV One-Page Summary

KIC: 9535171 Candidate: 7 of 8 Period: 482.287 d



## TPS TCE Results:

Period = 482.28651 d  
Epoch = 403.0662 BKJD

DV fit results are unavailable

## DV Diagnostic Results:

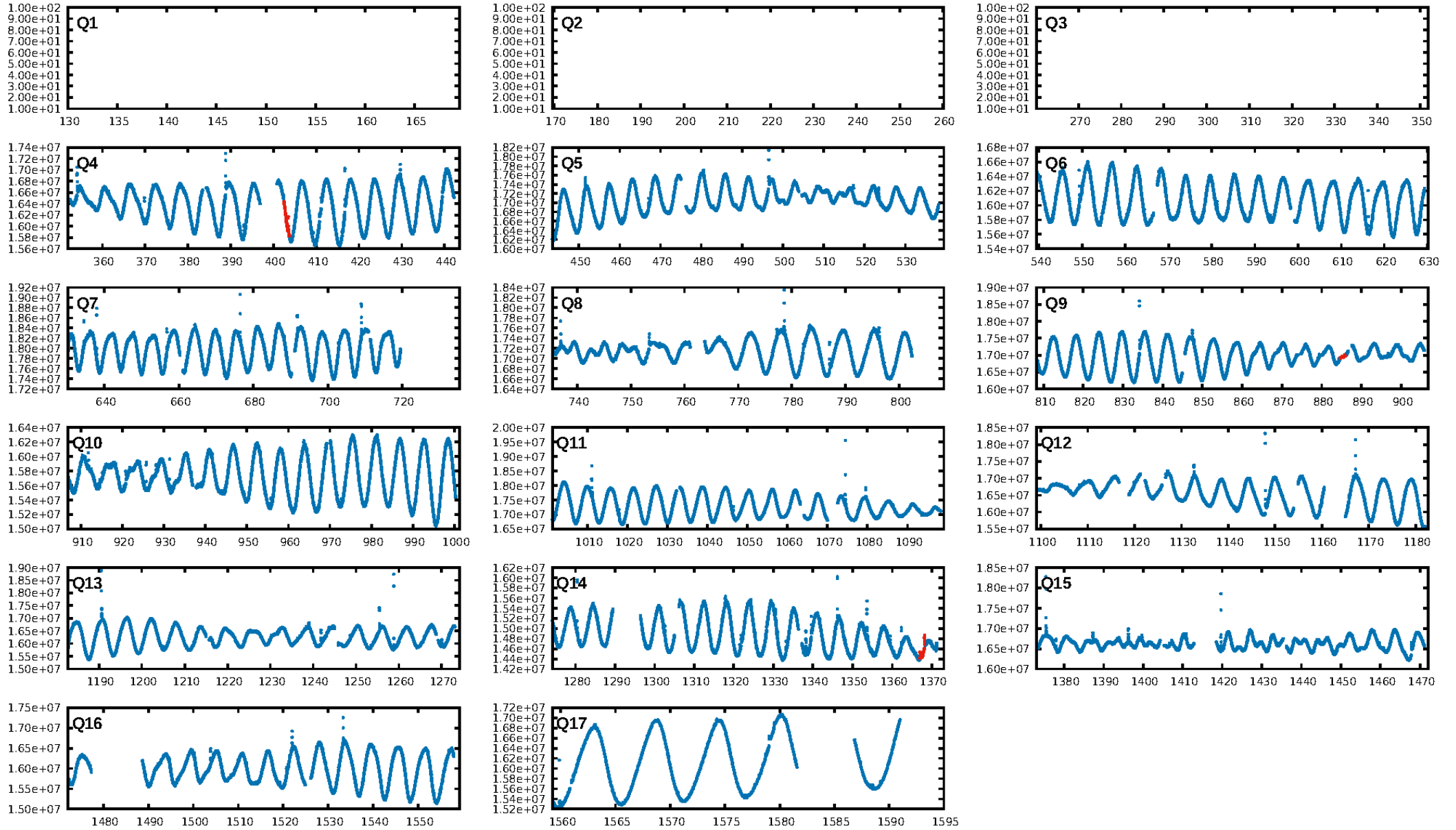
ShortPeriod-sig: 100.0% [83.98σ]  
LongPeriod-sig: 100.0% [44.26σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 3.16e-11  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: -0.2347

Centroid-sig: 72.0%  
Centroid-so: 30.129 arcsec [0.59σ]  
OotOffset-rm: 0.257 arcsec [1.57σ]  
KicOffset-rm: 0.256 arcsec [1.35σ]  
OotOffset-st: 1/0/0/1 [2]  
KicOffset-st: 1/0/0/1 [2]  
DiffImageQuality-fgm: 0.50 [1/2]  
DiffImageOverlap-fno: 0.50 [1/2]

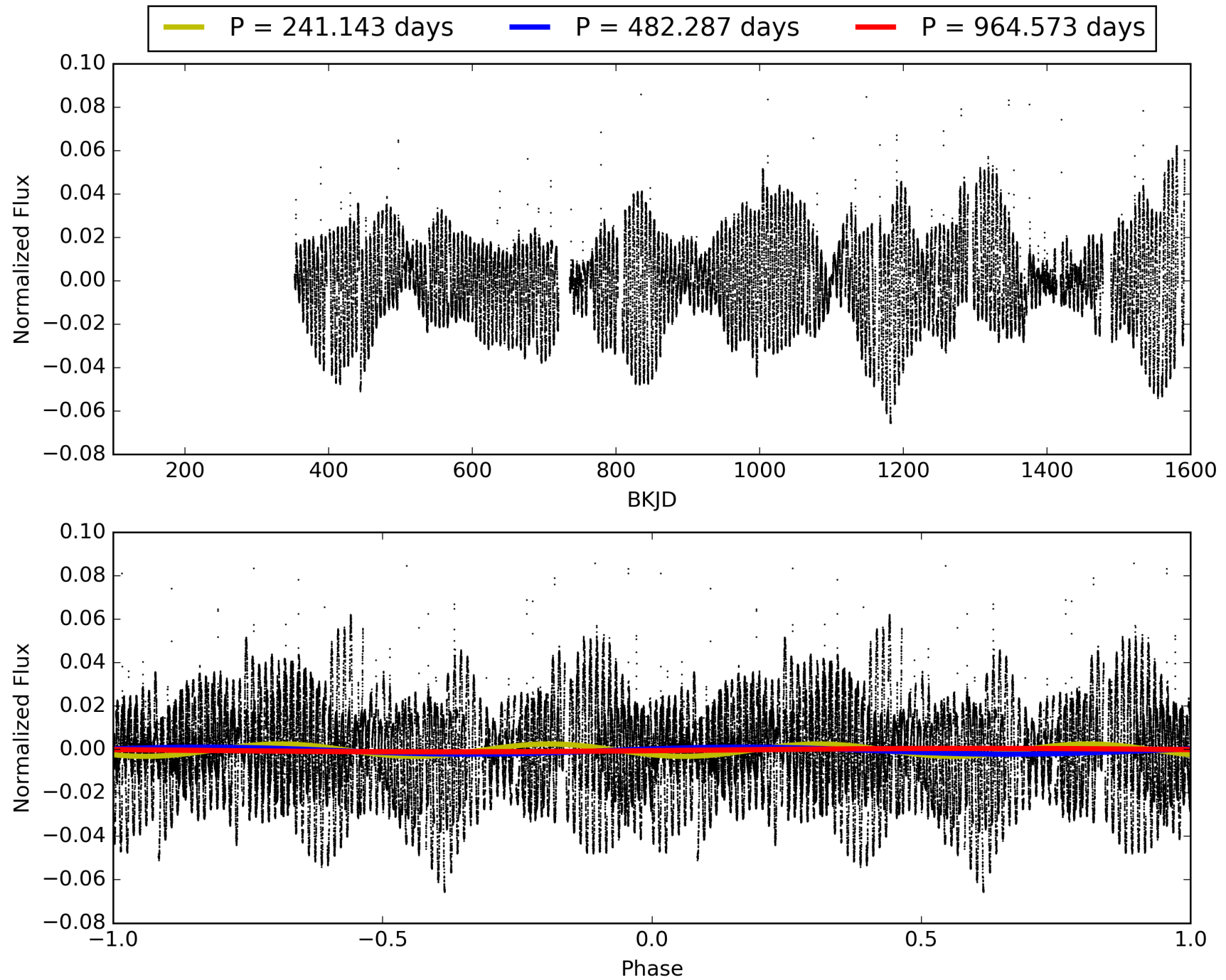
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 03-Feb-2016 08:04:21 Z

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

# TCE 009535171-07, PDC Light Curves



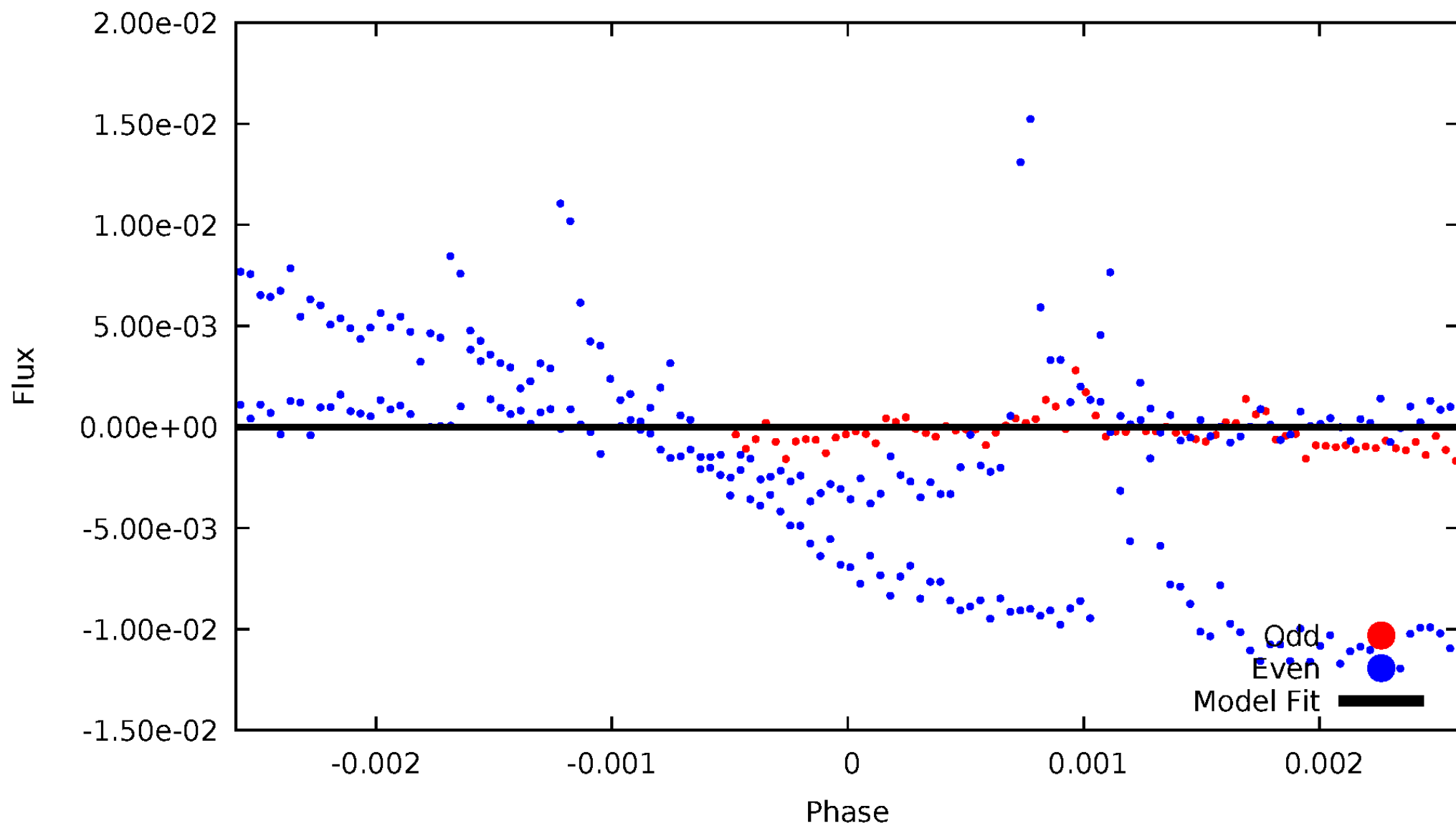
# TCE 009535171-07





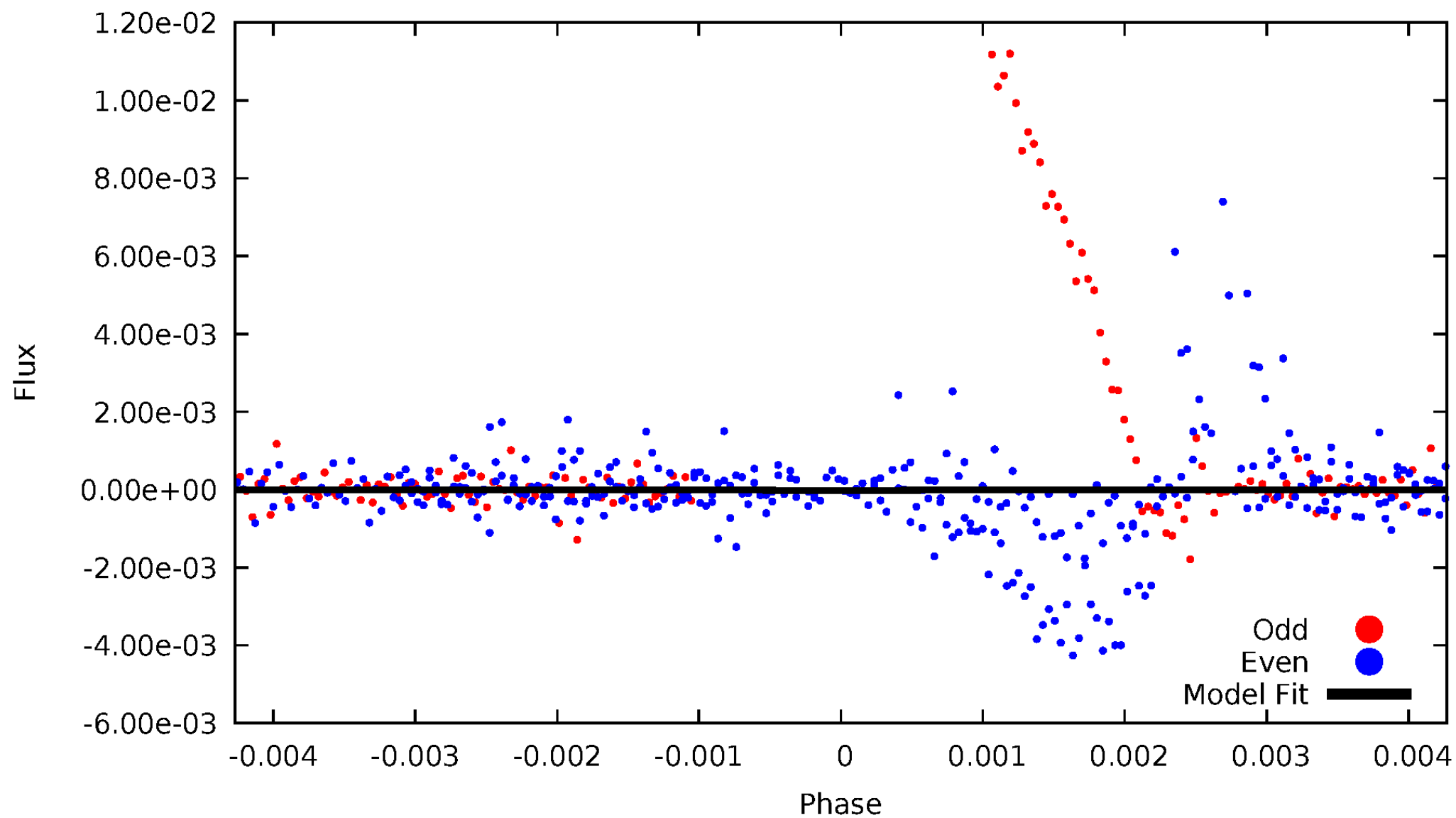
# DV Odd/Even

TCE 009535171-07



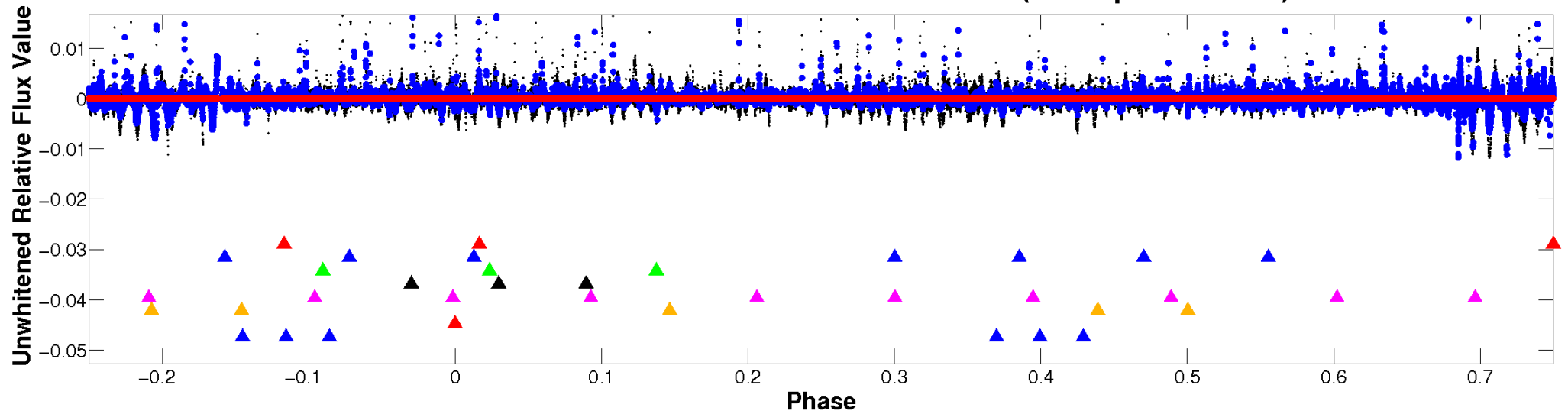
# ALT Odd/Even

TCE 009535171-07

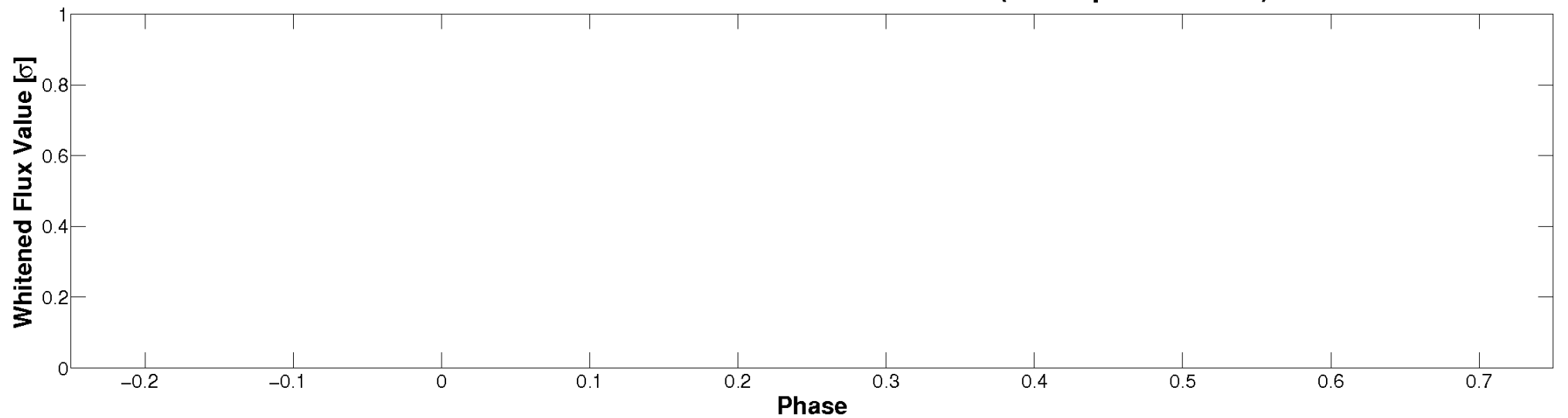


# Non-Whitened Vs. Whitened Light Curve

Planet 7 : Phased Unwhitened Flux Time Series (TPS Epoch/Period)

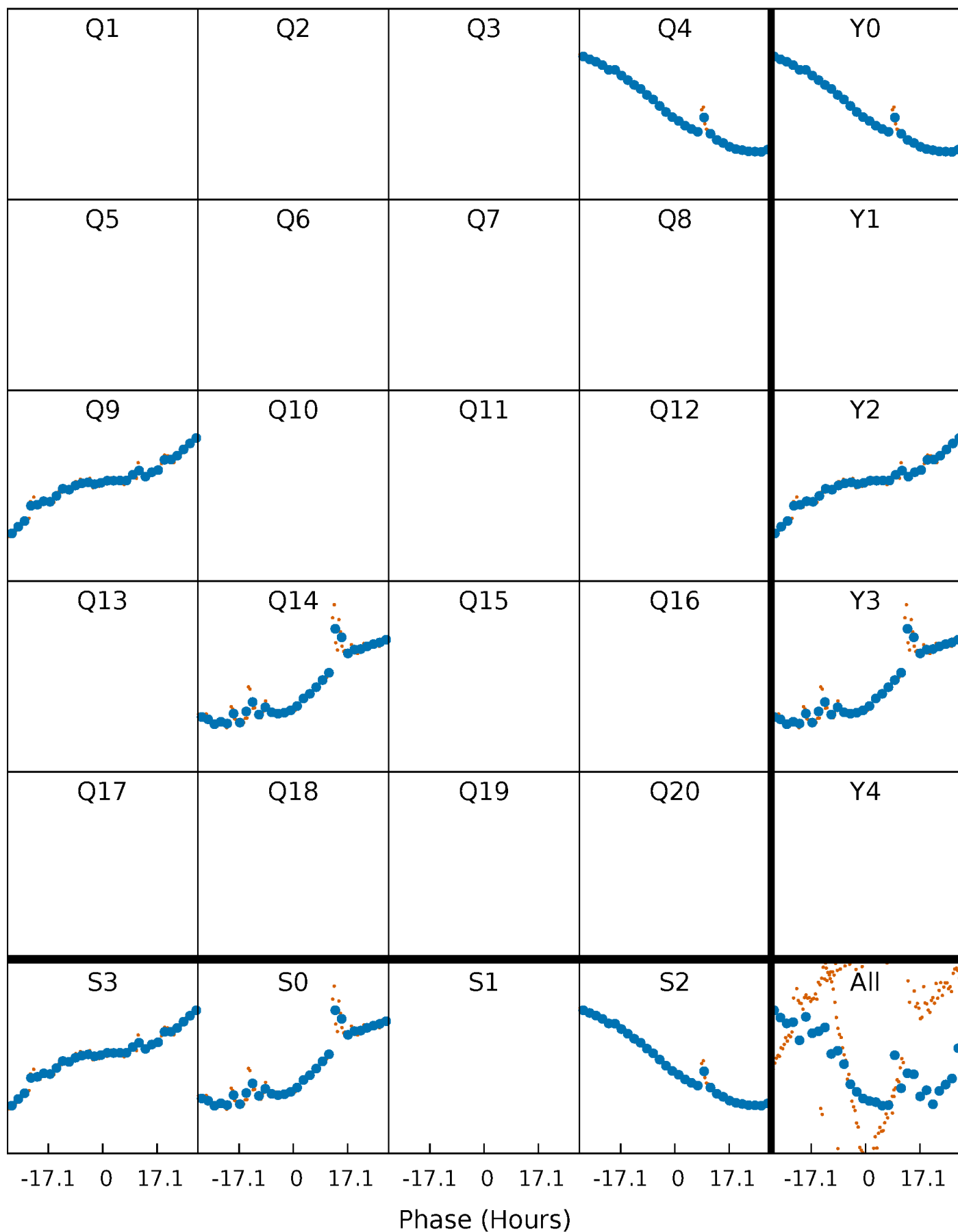


Planet 7 : Phased Whitened Flux Time Series (TPS Epoch/Period)



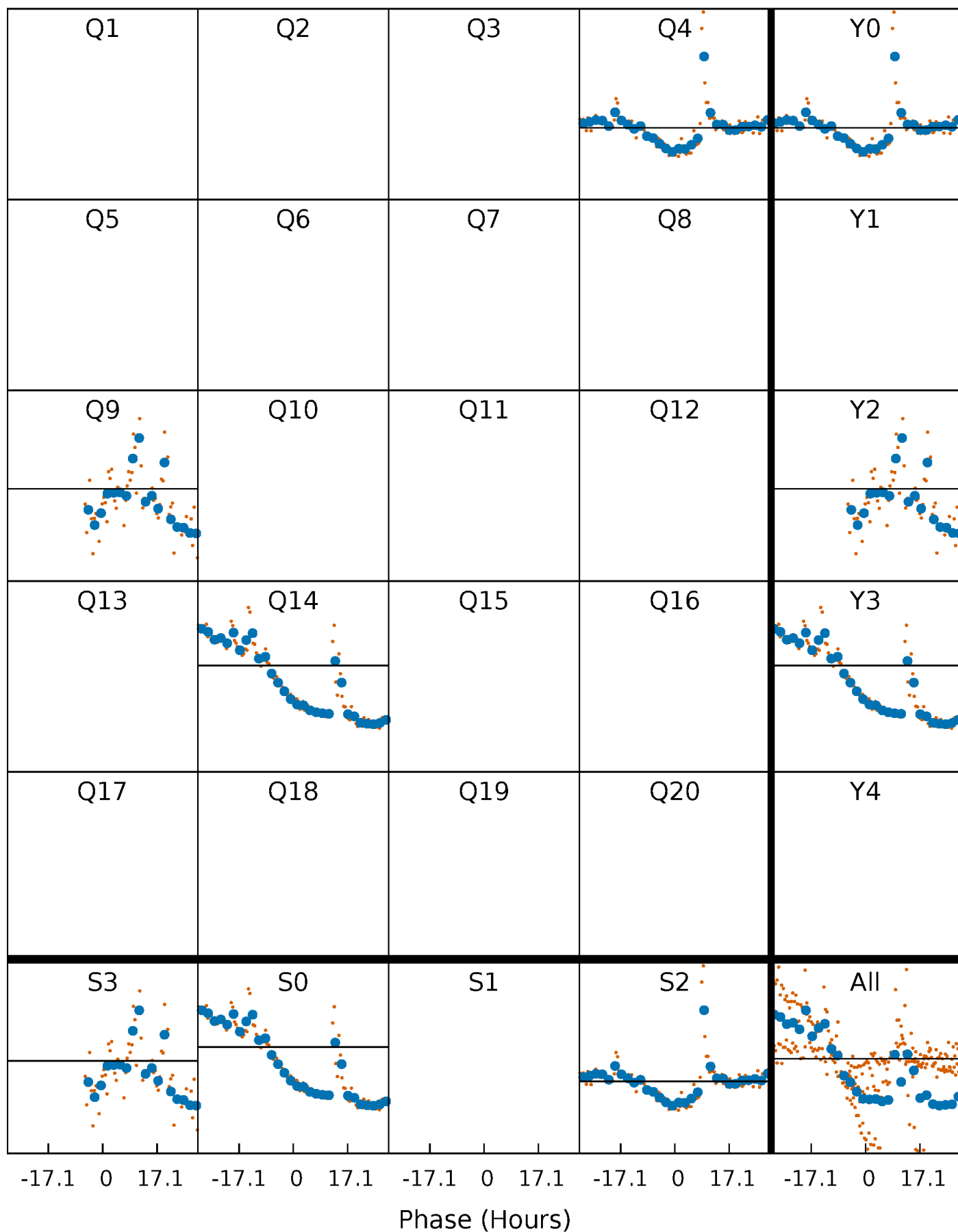
# PDC Quarter-Phased Transit Curves

TCE 009535171-07 P=482.286505 Days  $T_0=403.066195$  (BKJD)



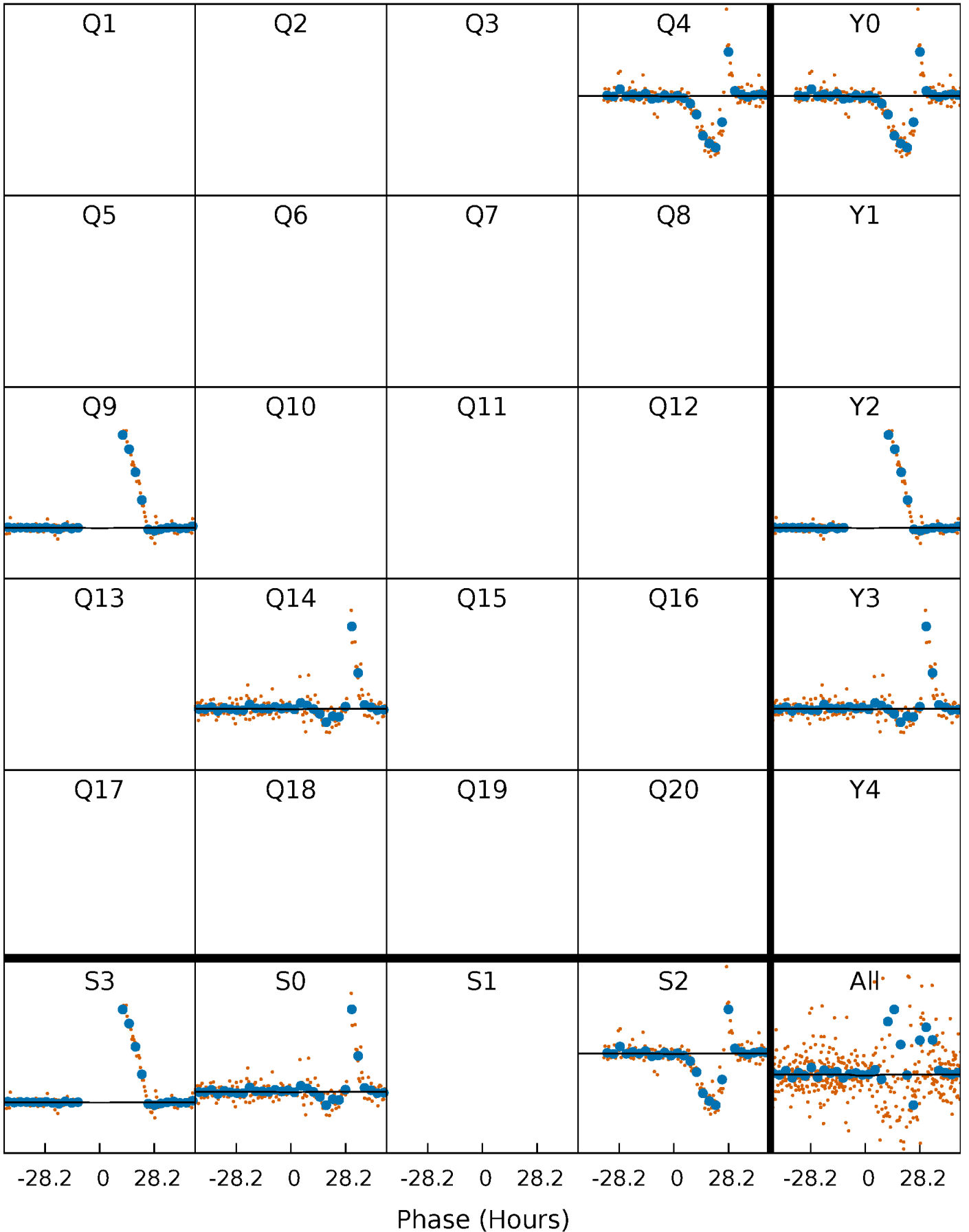
# DV Quarter-Phased Transit Curves

TCE 009535171-07 P=482.286505 Days  $T_0=403.066195$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

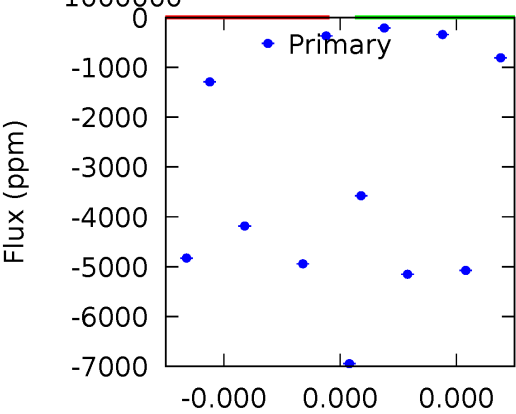
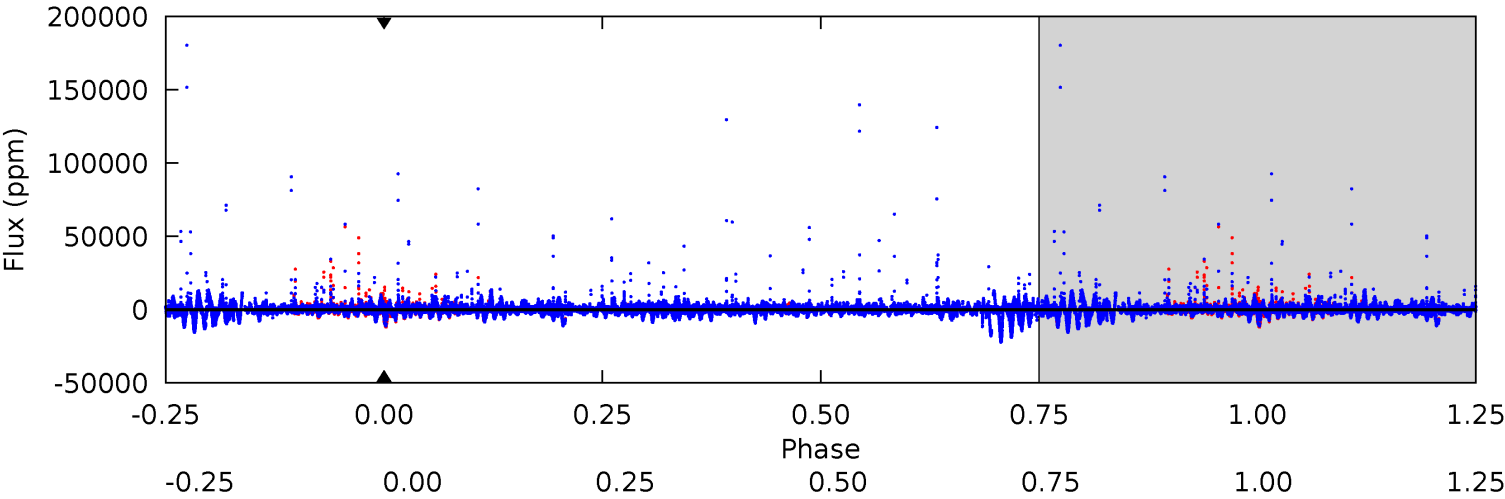
TCE 009535171-07 P=482.286505 Days  $T_0=402.324138$  (BKJD)



# DV Model-Shift Uniqueness Test

009535171-07, P = 482.286505 Days, E = 403.066195 Days

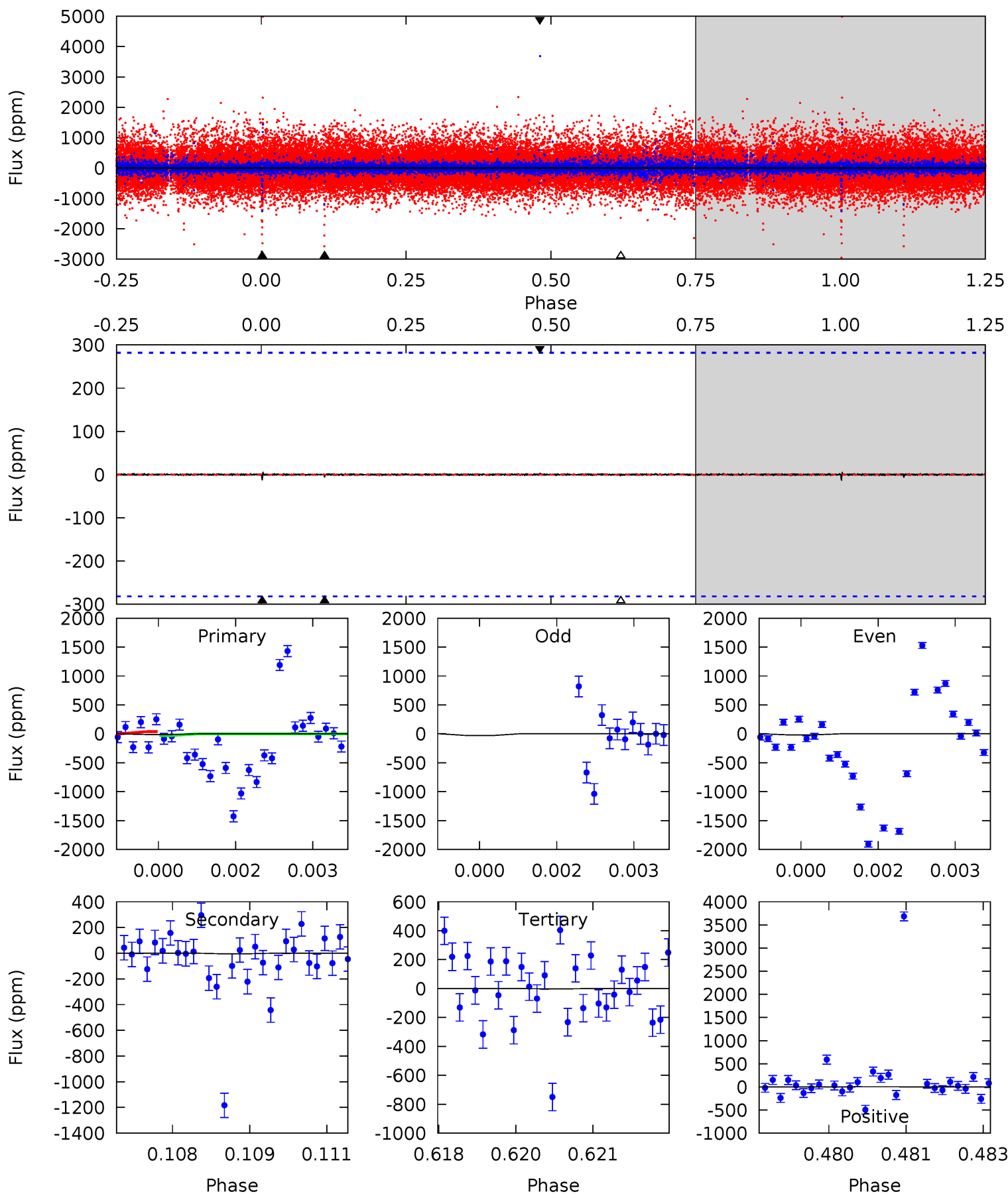
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



# Alt Model-Shift Uniqueness Test

009535171-07, P = 482.286505 Days, E = 402.324138 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0.23	0.09	0.04	0.05	5.37	3.15	0.01	0.20	0.18	0.06	0.04	0.13	1.00	0.32	0.08





### Stellar Parameters For KIC 009535171

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$4523^{+162}_{-162}$	$4.663^{+0.054}_{-0.032}$	$-0.660^{+0.300}_{-0.300}$	$0.584^{+0.051}_{-0.051}$	$0.572^{+0.062}_{-0.038}$	$4.047^{+0.935}_{-0.524}$
	+4%/-4%	+1%/-1%	+45%/-45%	+9%/-9%	+11%/-7%	+23%/-13%
Source	KIC0	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 009535171-07 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$0 \pm 1000000$	$4.69^{+5.06}_{-3.24}$	$212^{+9}_{-8}$	$3437^{+9749}_{-14387}$	$32867^{+5477557}_{-3559637}$
Alt.	$-5 \pm 52$	$4.67^{+4.68}_{-3.35}$	$212^{+8}_{-9}$	$1687^{+841}_{-4083}$	$59^{+2869}_{-2035}$

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

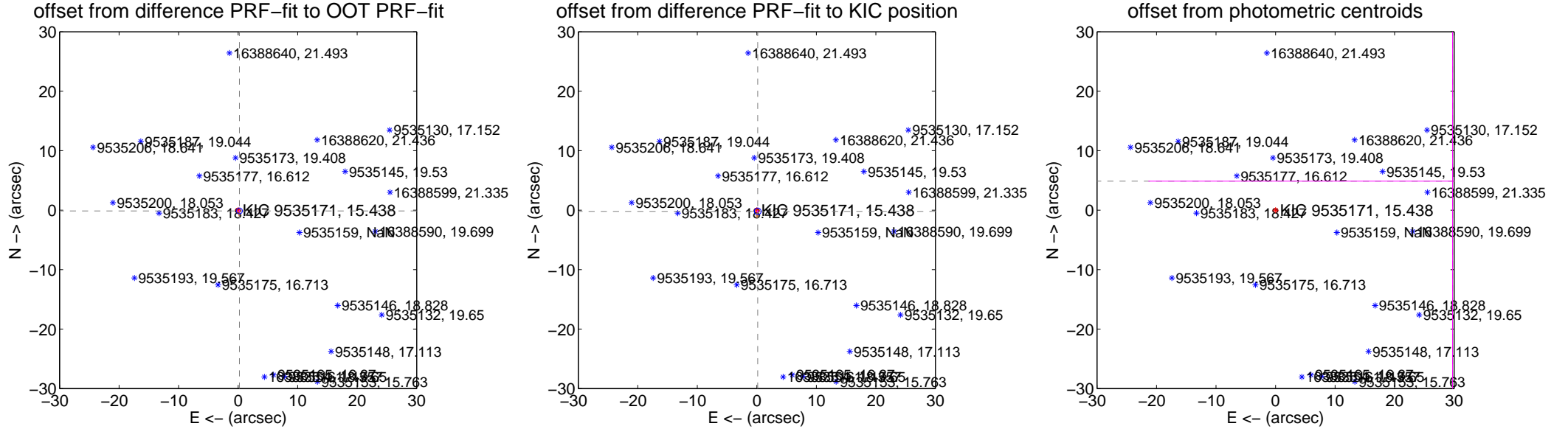
## DV Centroid Data

Supplemental centroid analysis for 009535171-07. Kepler magnitude: 15.44. Transit SNR -1.00

There are 1 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.10 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.257 \pm 0.164$	1.57	$-0.222 \pm 0.145$	$-0.130 \pm 0.209$
PRF-fit source offset from KIC position	$0.256 \pm 0.189$	1.35	$-0.151 \pm 0.145$	$-0.207 \pm 0.209$
photometric centroid source offset	$30.13 \pm 51.27$	0.59	$-29.73 \pm 51.09$	$4.87 \pm 57.72$



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.

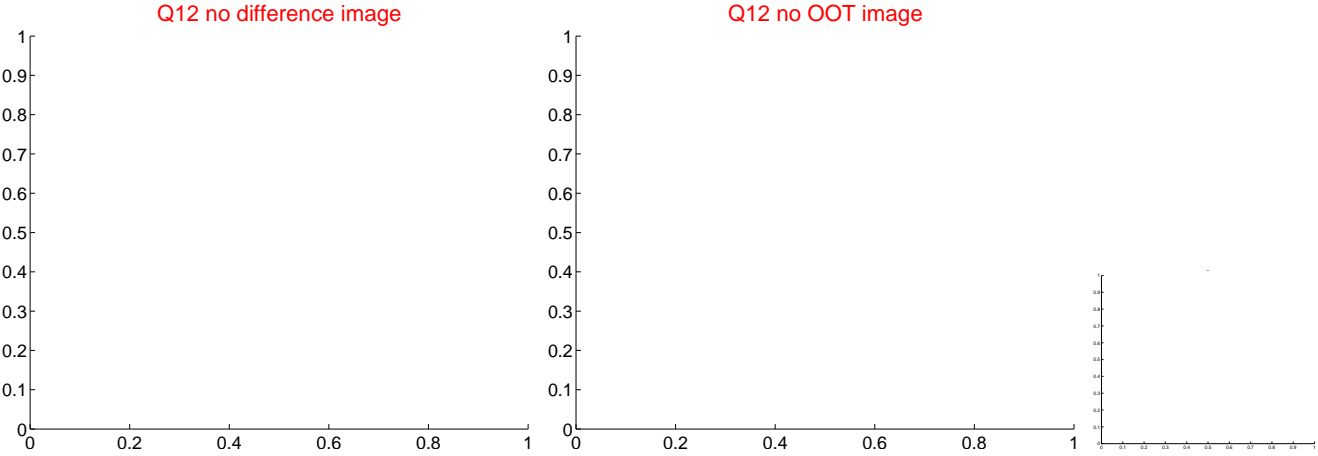
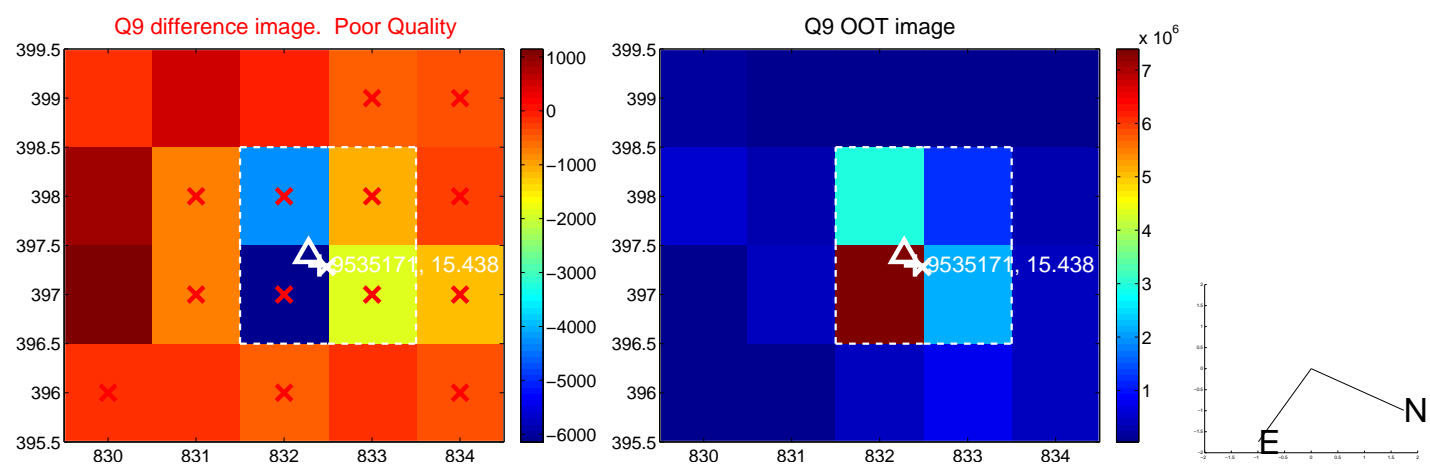
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



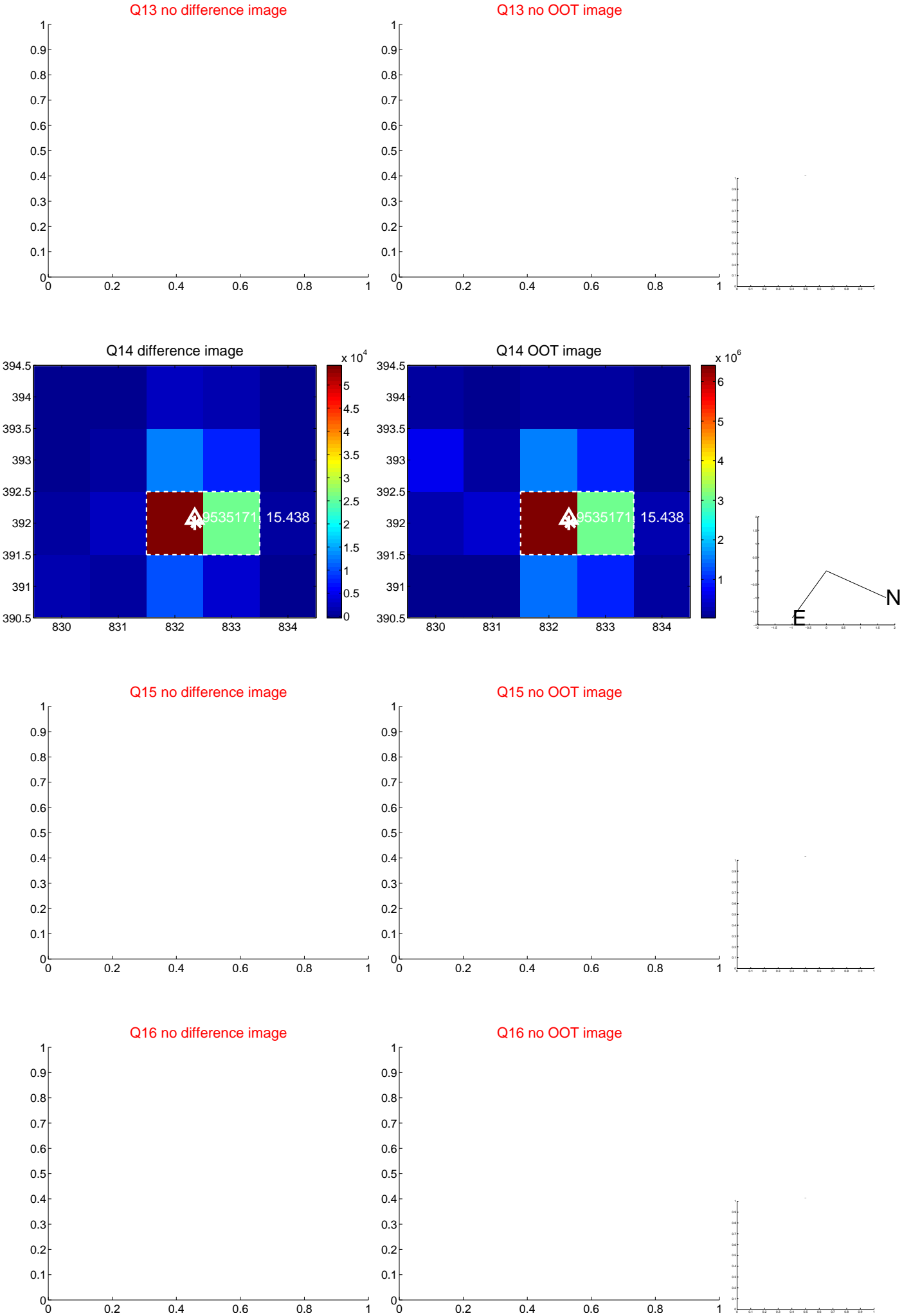
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



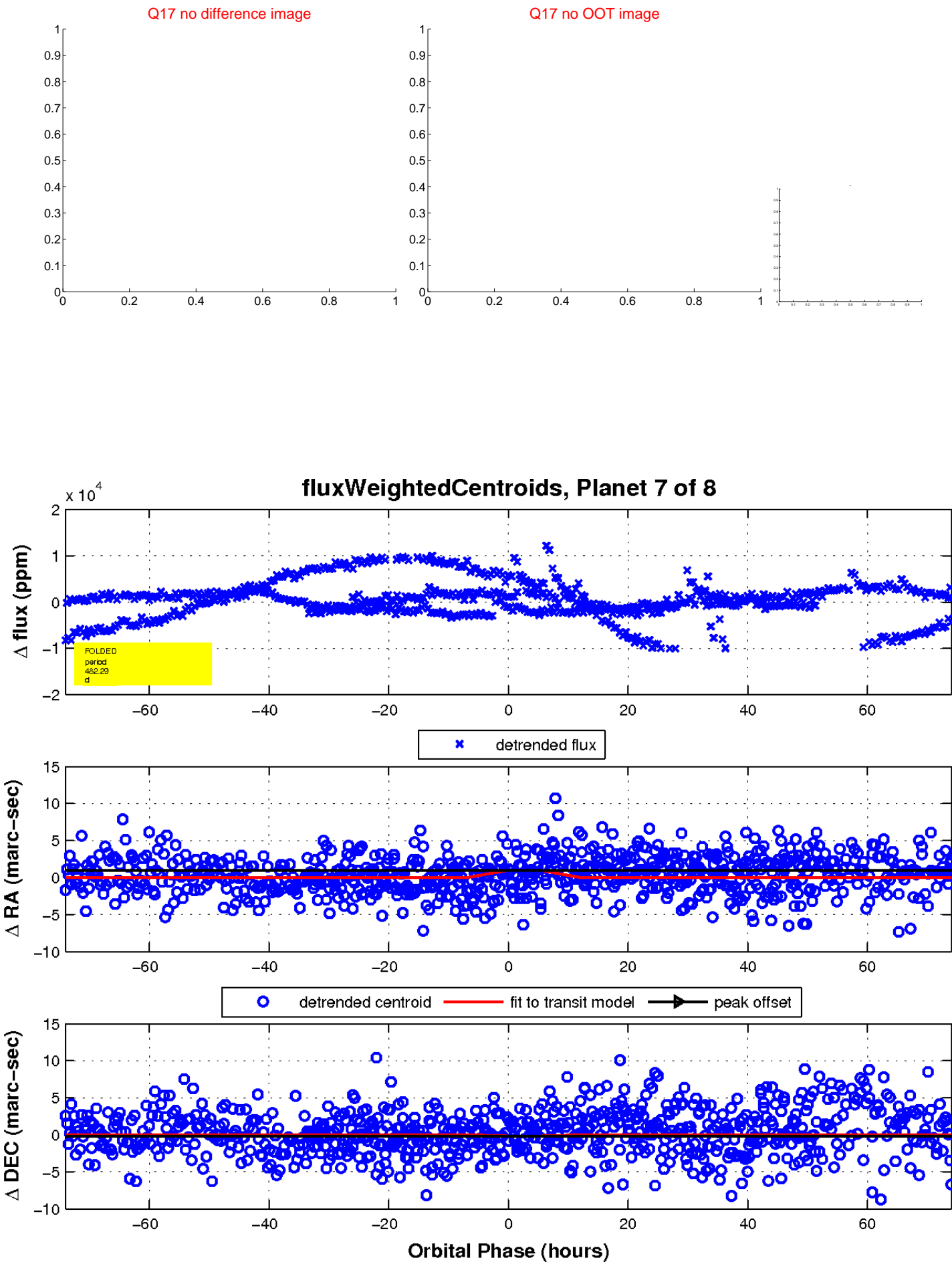
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.



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

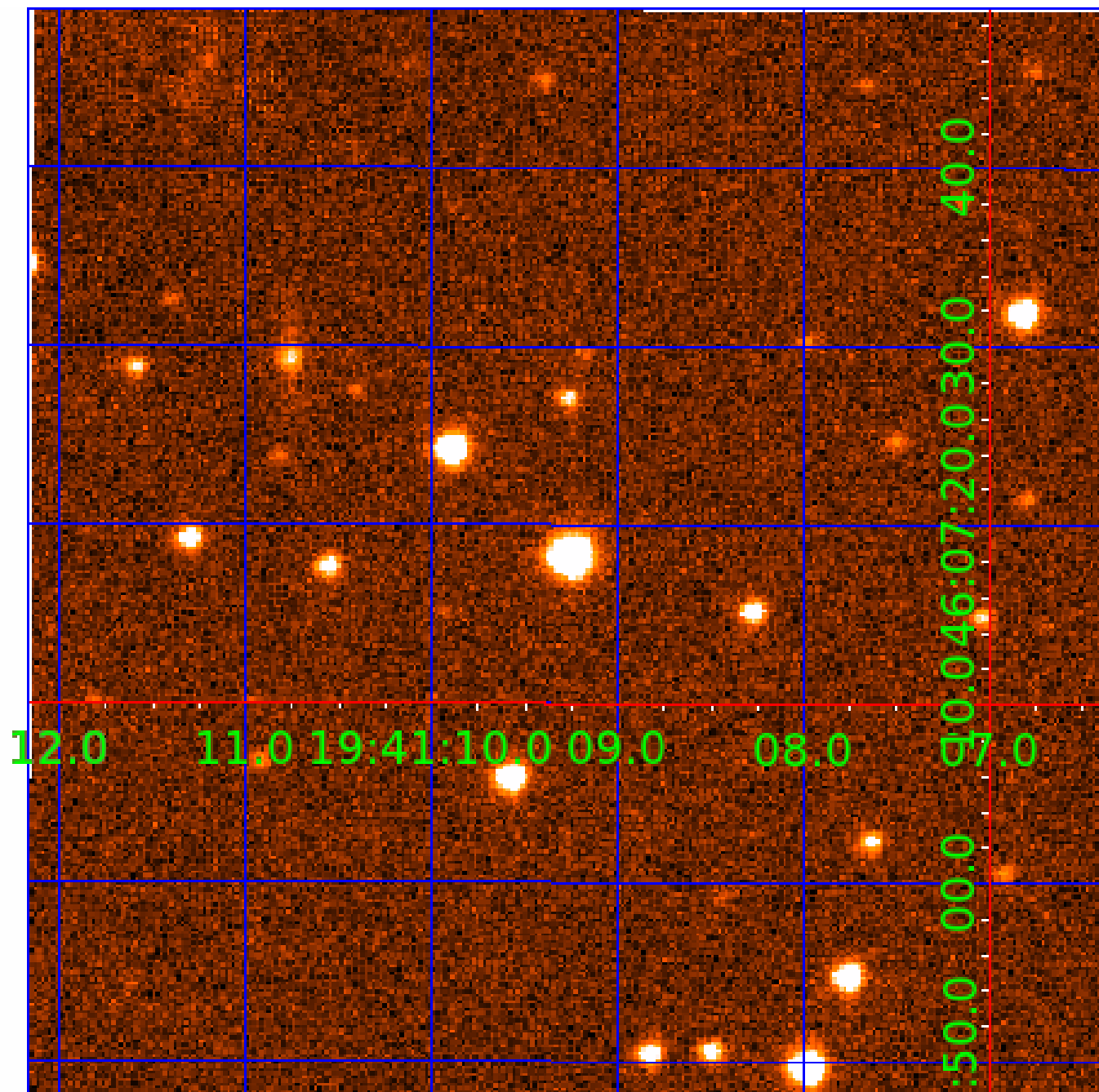


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 009535171

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009535171-02	OBS	No	220.639366	188.607163	1609.9	4.166	10.1	7.4	0.58	4523	2.49	0.36
009535171-03	OBS	No	427.360621	469.366835	1690.9	4.622	12.1	8.4	0.58	4523	3.02	0.15
009535171-04	OBS	No	511.061408	388.660897	2476.9	4.301	11.3	10.6	0.58	4523	2.85	0.12
009535171-05	OBS	No	145.603156	156.595124	821.6	7.873	8.4	6.0	0.58	4523	2.14	0.63
009535171-06	OBS	No	311.646432	332.735191	1228.6	8.727	12.3	5.4	0.58	4523	2.48	0.23
009535171-07	OBS	No	482.286505	403.066195	662.1	15.000	11.2	-1.0	0.58	4523	1.45	0.13
009535171-08	OBS	No	248.293280	333.065876	478.8	4.547	9.2	3.1	0.58	4523	1.50	0.31

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009535171-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS
009535171-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009535171-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
009535171-05	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—INCONSISTENT_TRANS
009535171-06	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_MARSHALL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
009535171-07	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_TER_ALT—MOD_POS_ALT—CENT_NOFITS—HALO_GHOST
009535171-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—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.

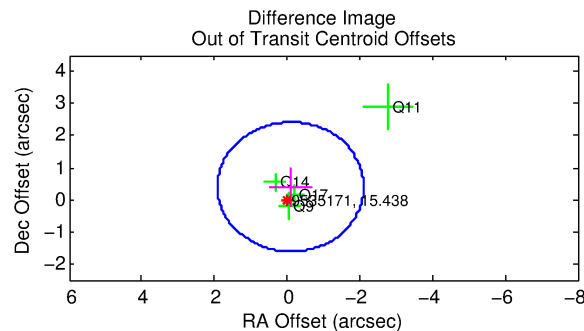
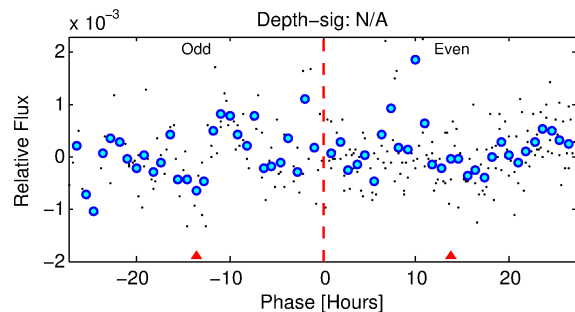
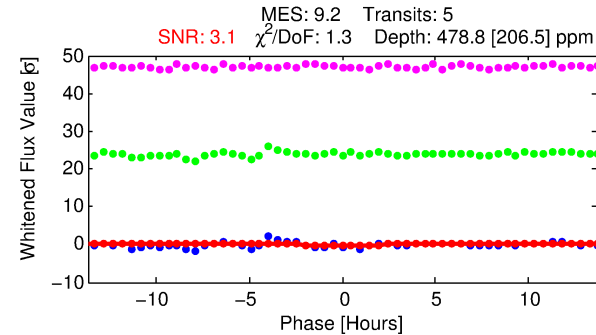
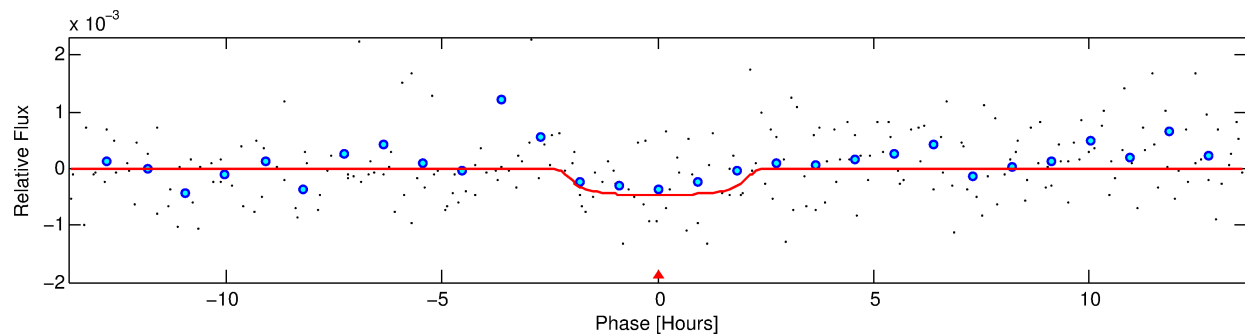
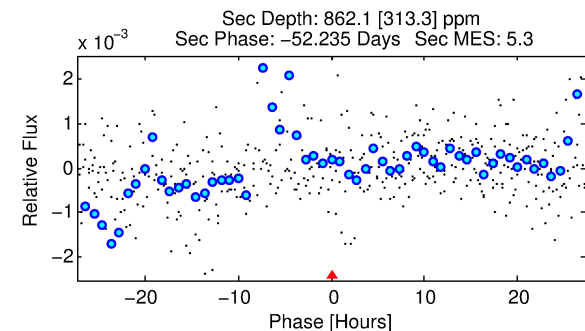
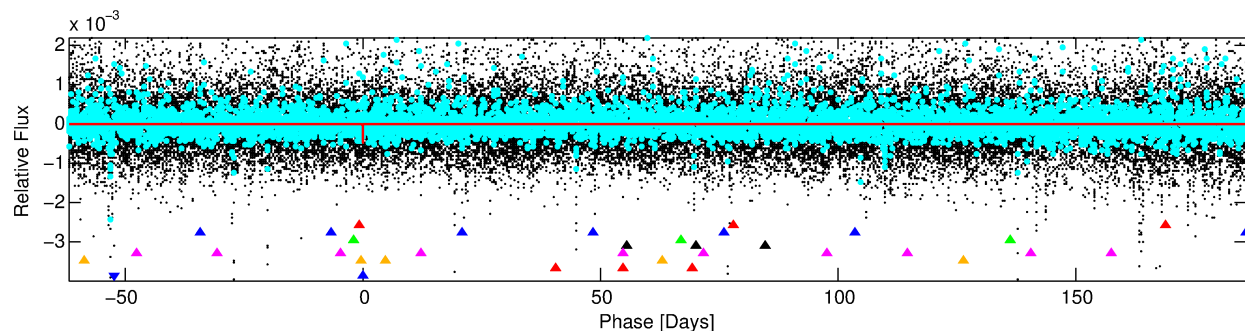
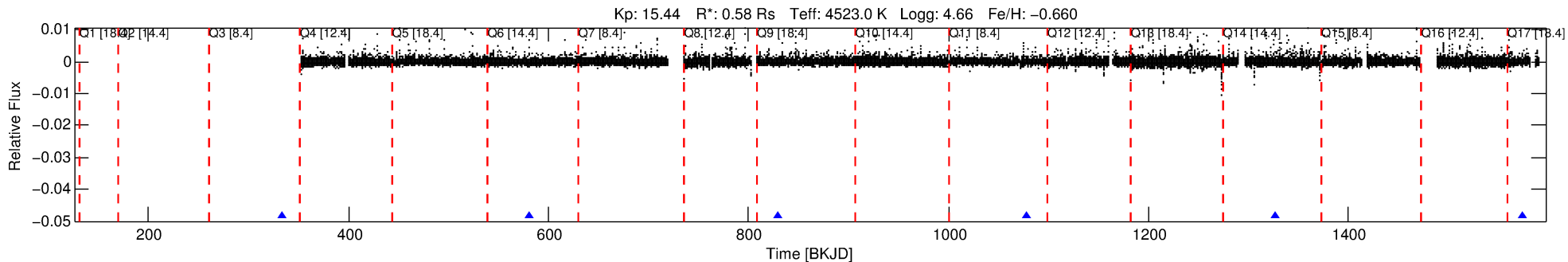
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 009535171-08

No Significant Match Found

# DV One-Page Summary

KIC: 9535171 Candidate: 8 of 8 Period: 248.293 d



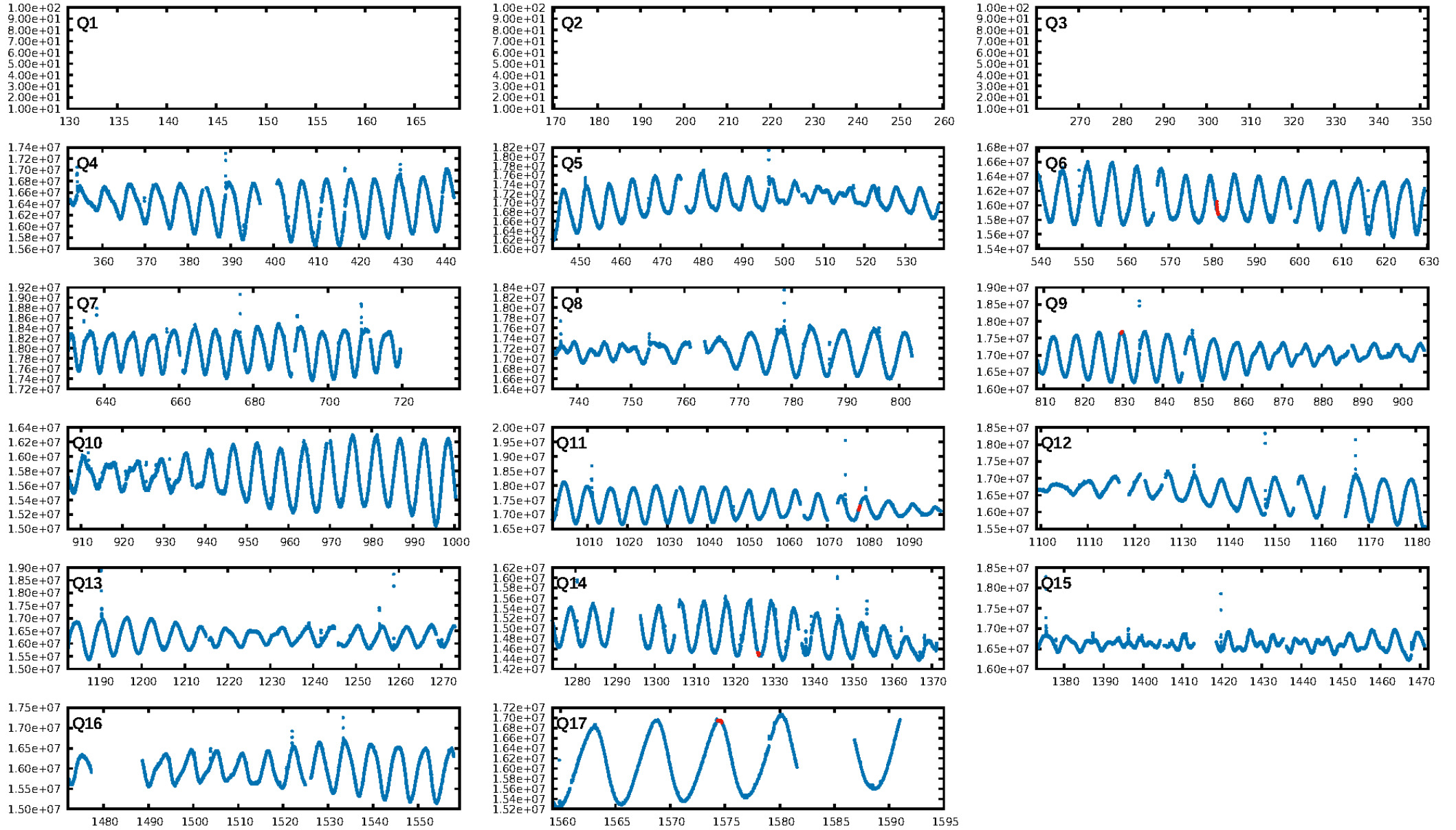
## DV Fit Results:

Period = 248.29328 [0.00989] d  
Epoch = 333.0659 [0.0339] BKJD  
Rp/R\* = 0.0236 [0.0358]  
a/R\* = 229.87 [1249.91]  
b = 0.86 [1.65]  
Seff = 0.31 [0.05]  
Teq = 190 [8] K  
Rp = 1.50 [2.29] Re  
a = 0.6421 [0.0459] AU  
Ag = 86582.71 [265214.24] [0.33σ]  
Teffp = 5047 [3867] K [1.26σ]

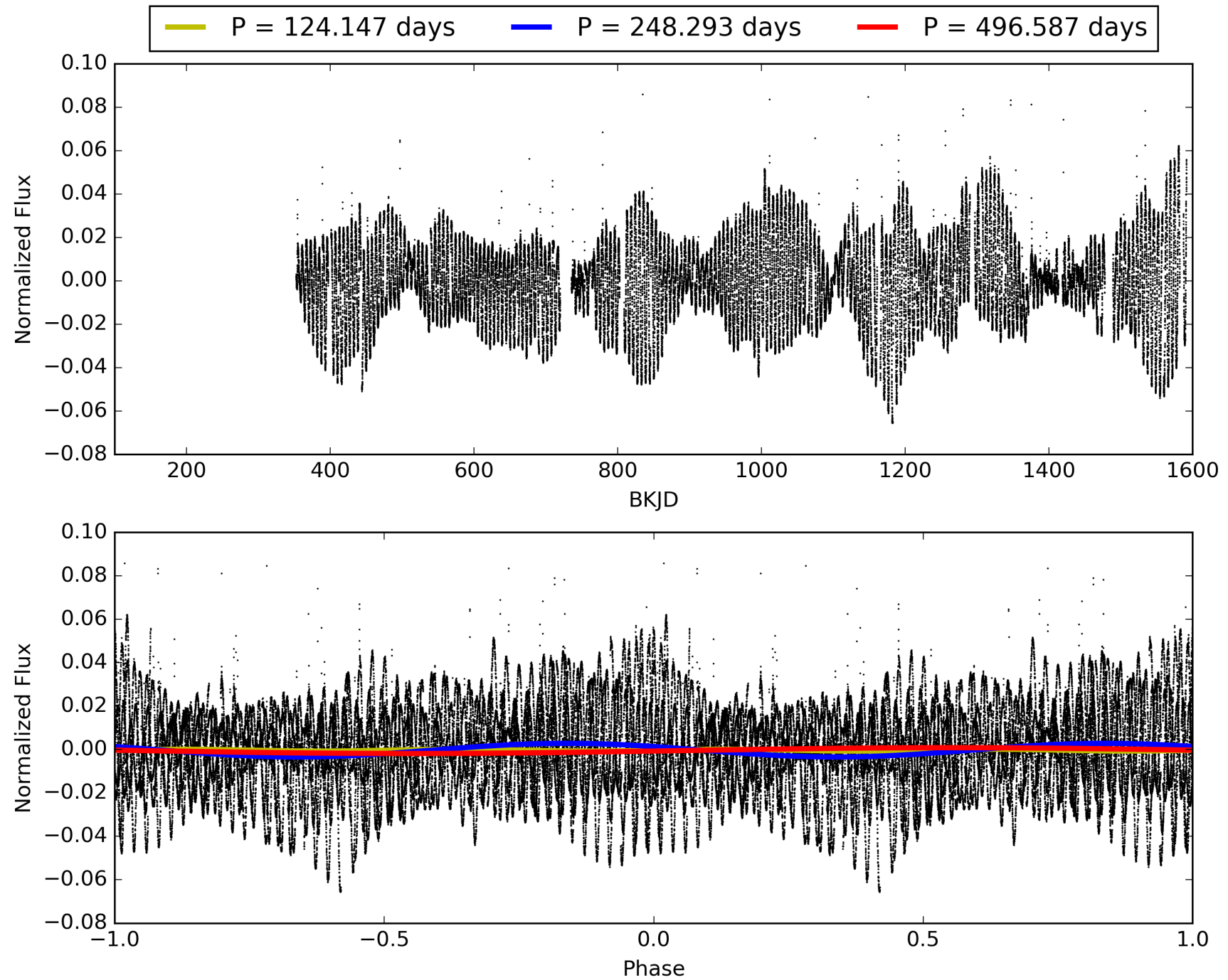
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [107.63σ]  
LongPeriod-sig: 100.0% [154.52σ]  
ModelChiSquare2-sig: 4.7%  
ModelChiSquareGof-sig: 96.6%  
Bootstrap-pfa: 3.32e-09  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: -4.255  
Centroid-sig: 7.9%  
Centroid-so: 4.005 arcsec [1.32σ]  
OotOffset-rm: 0.410 arcsec [0.61σ]  
KicOffset-rm: 0.210 arcsec [0.39σ]  
OotOffset-st: 1/1/0/2 [4]  
KicOffset-st: 1/1/0/2 [4]  
DiffImageQuality-fgm: 0.25 [1/4]  
DiffImageOverlap-fno: 1.00 [5/5]

# TCE 009535171-08, PDC Light Curves

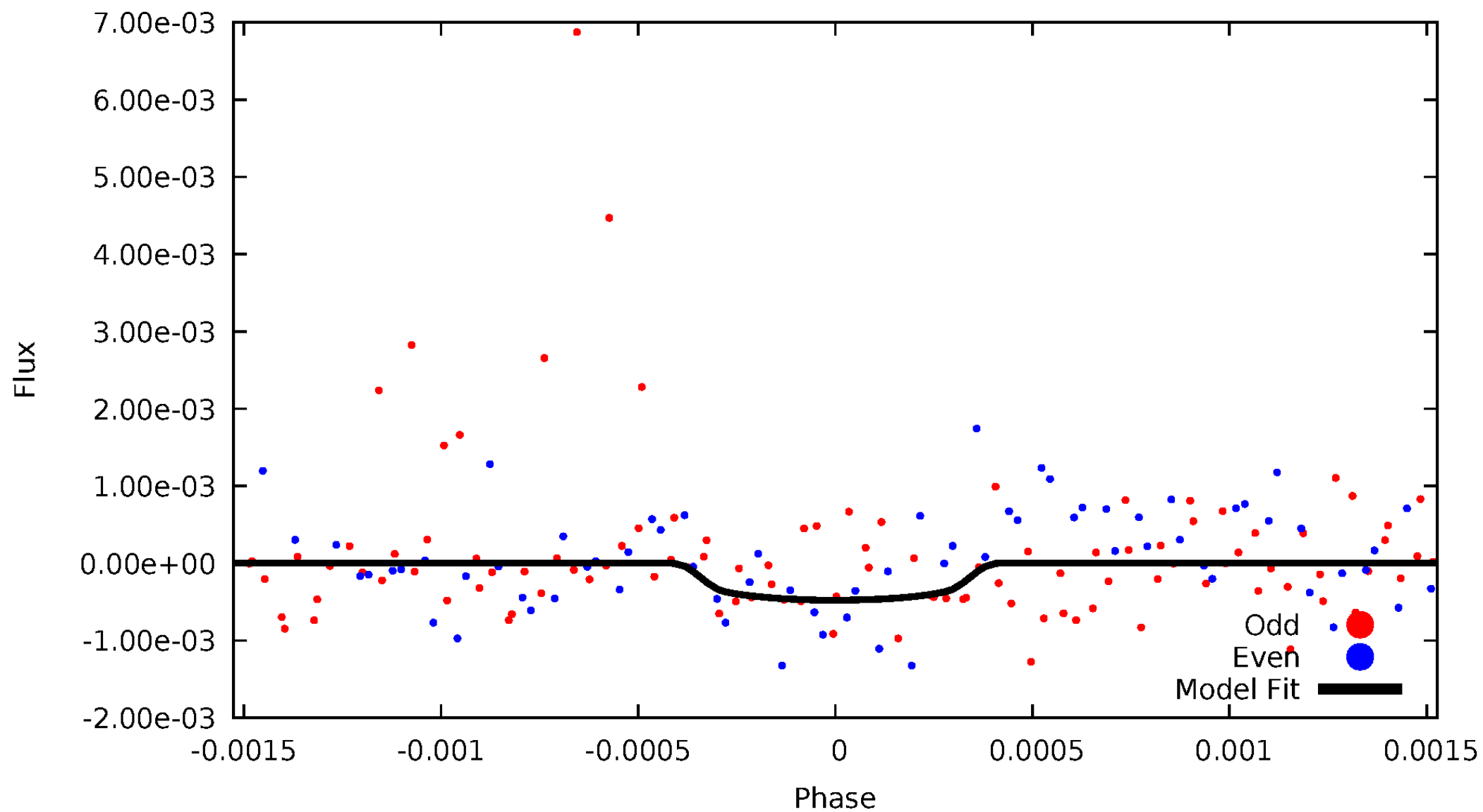


TCE 009535171-08



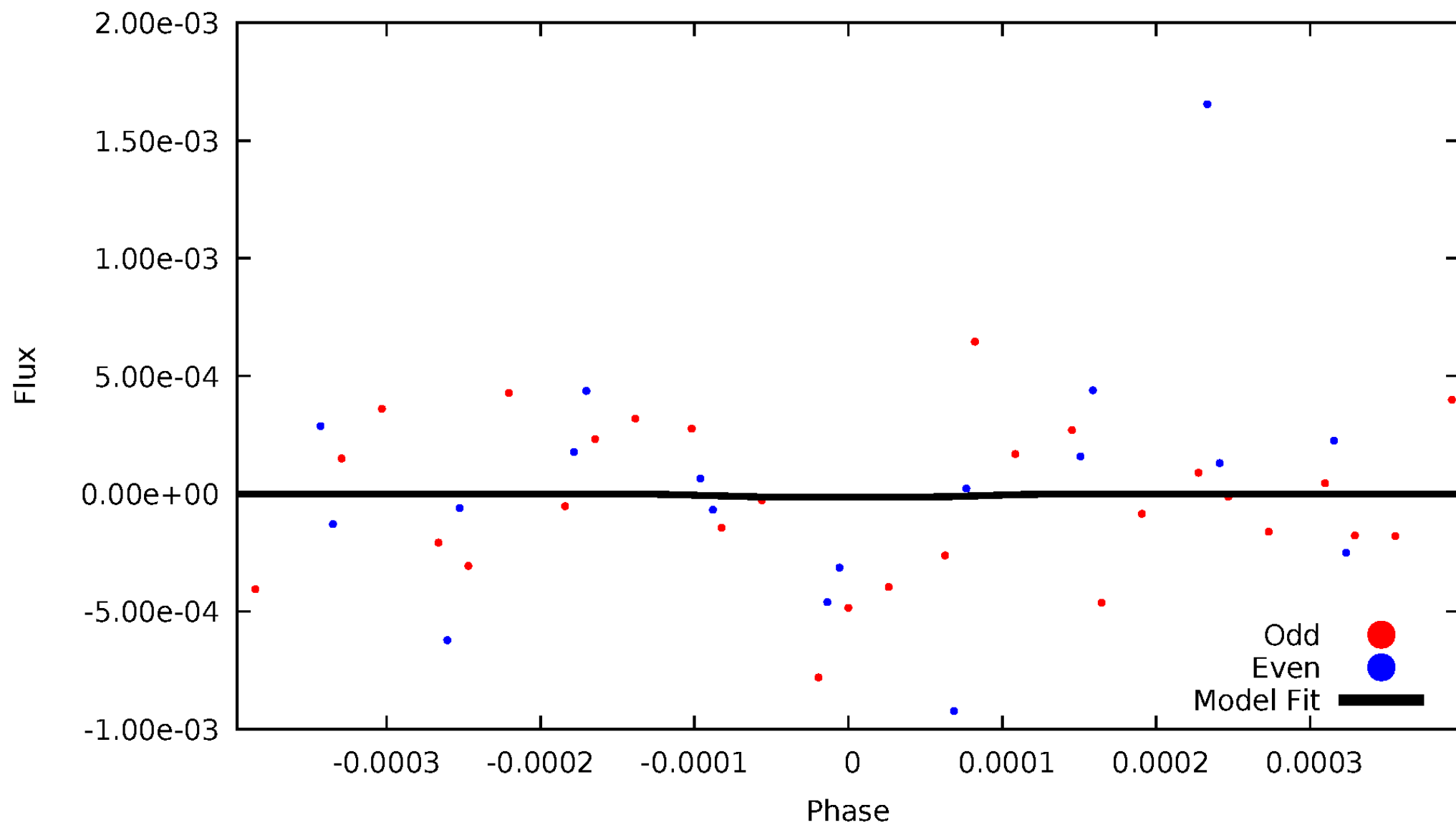
# DV Odd/Even

TCE 009535171-08



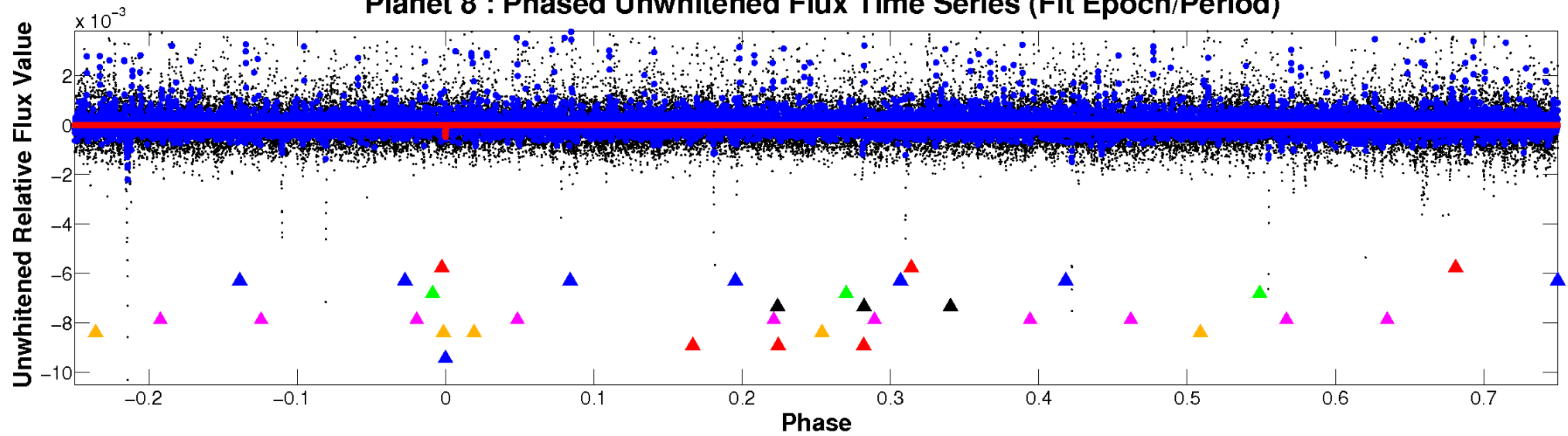
# ALT Odd/Even

TCE 009535171-08

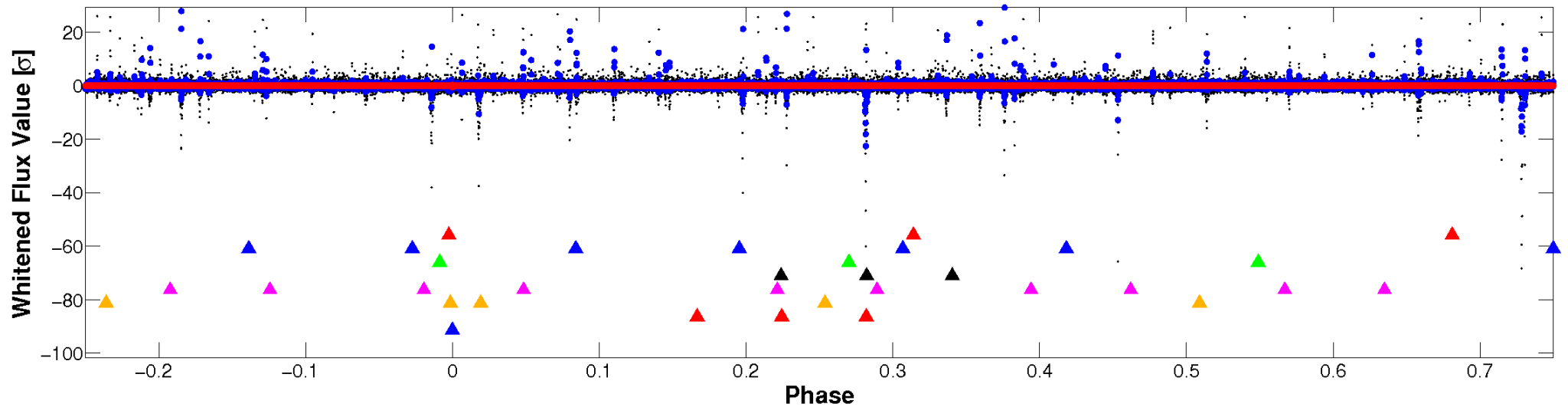


# Non-Whitened Vs. Whitened Light Curve

## Planet 8 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

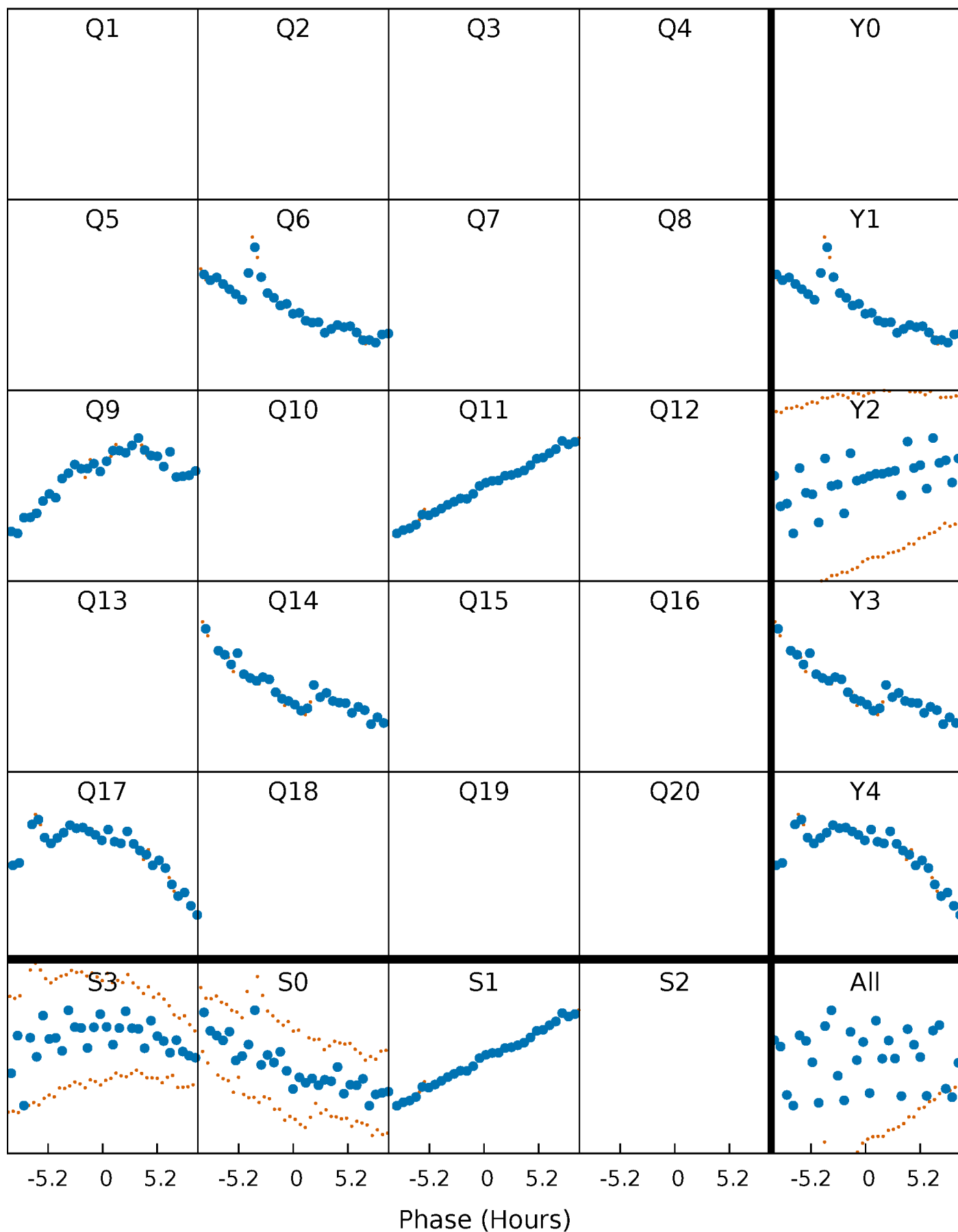


## Planet 8 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

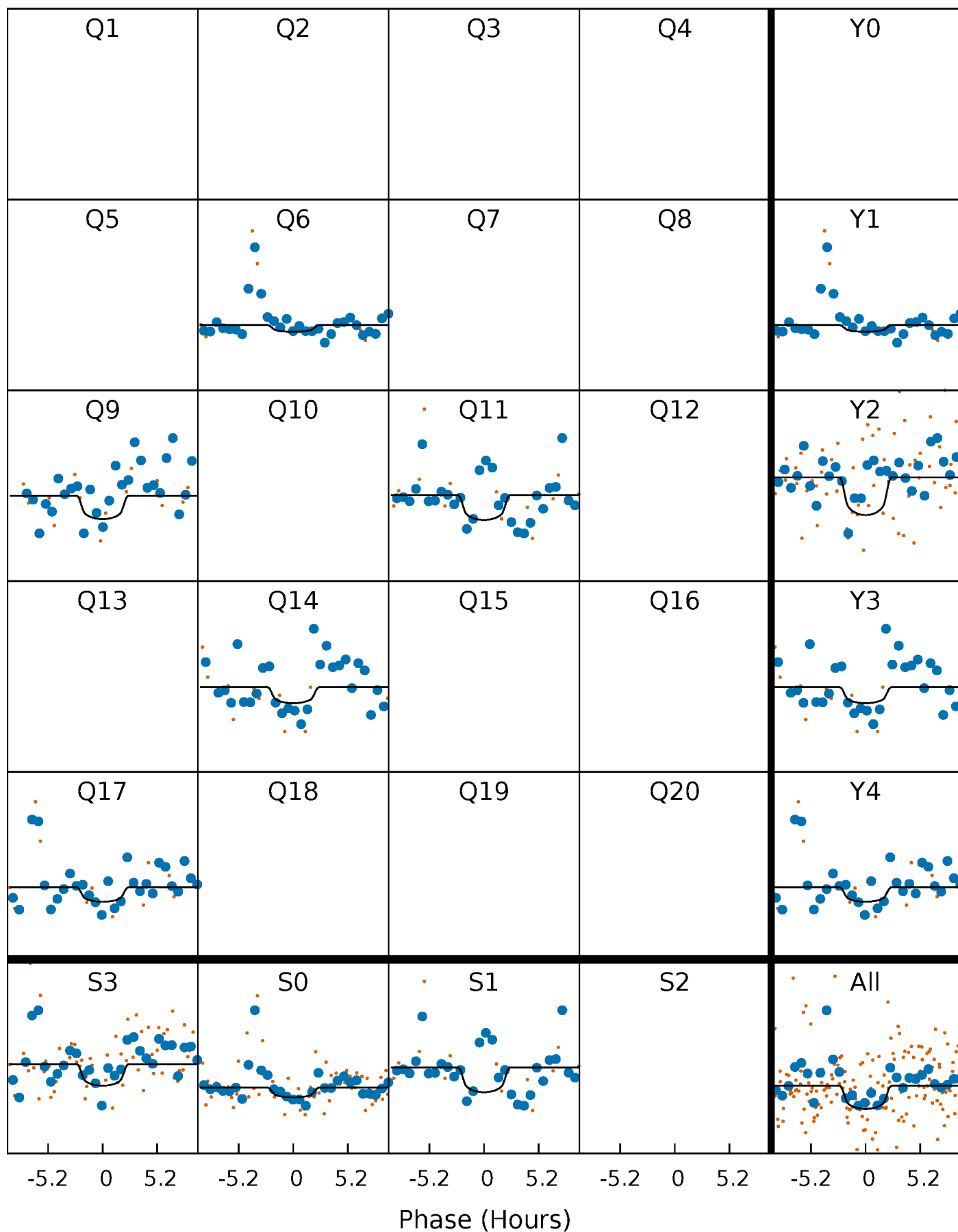
TCE 009535171-08     $P=248.293280$  Days     $T_0=333.065876$  (BKJD)





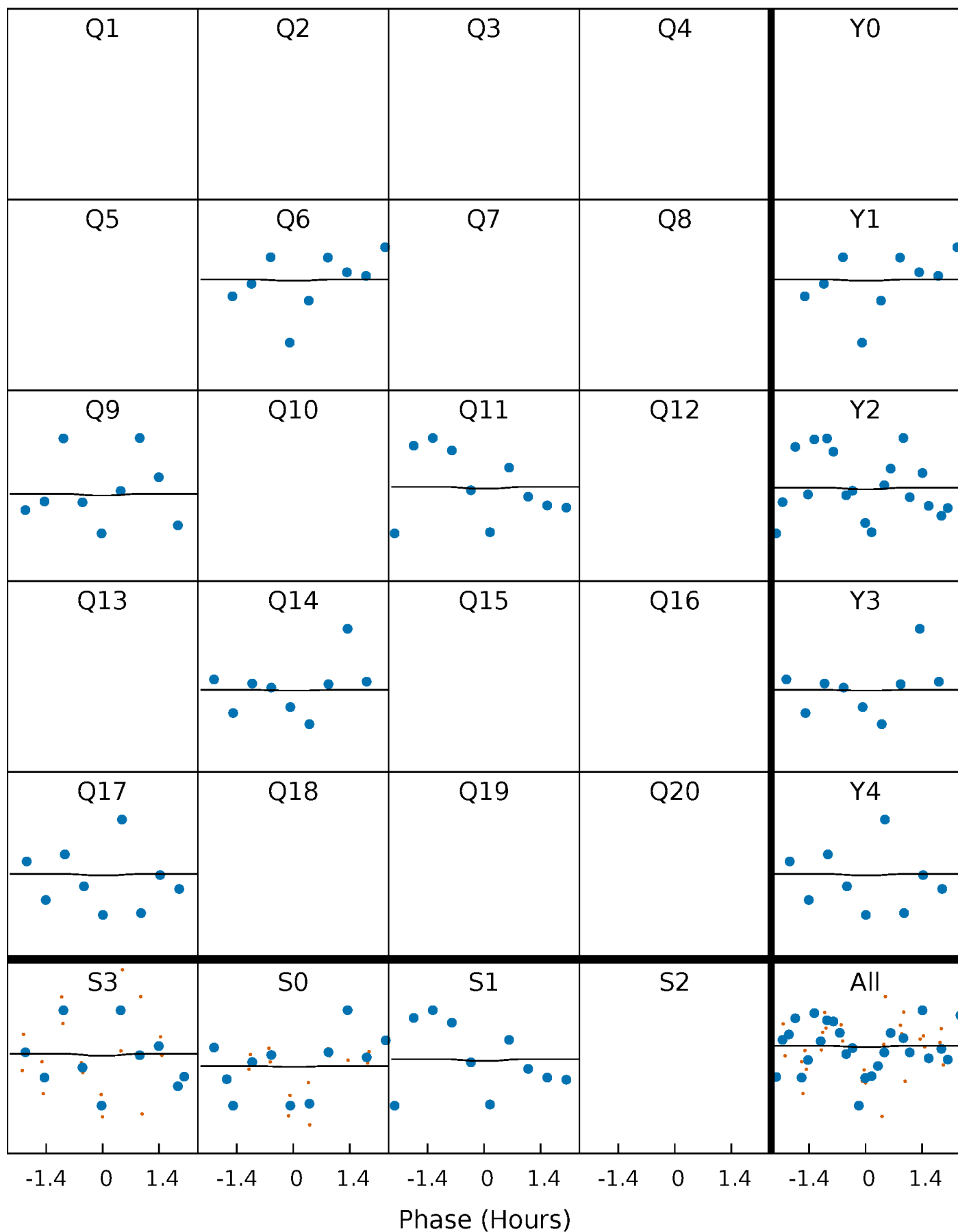
# DV Quarter-Phased Transit Curves

TCE 009535171-08     $P=248.293280$  Days     $T_0=333.065876$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

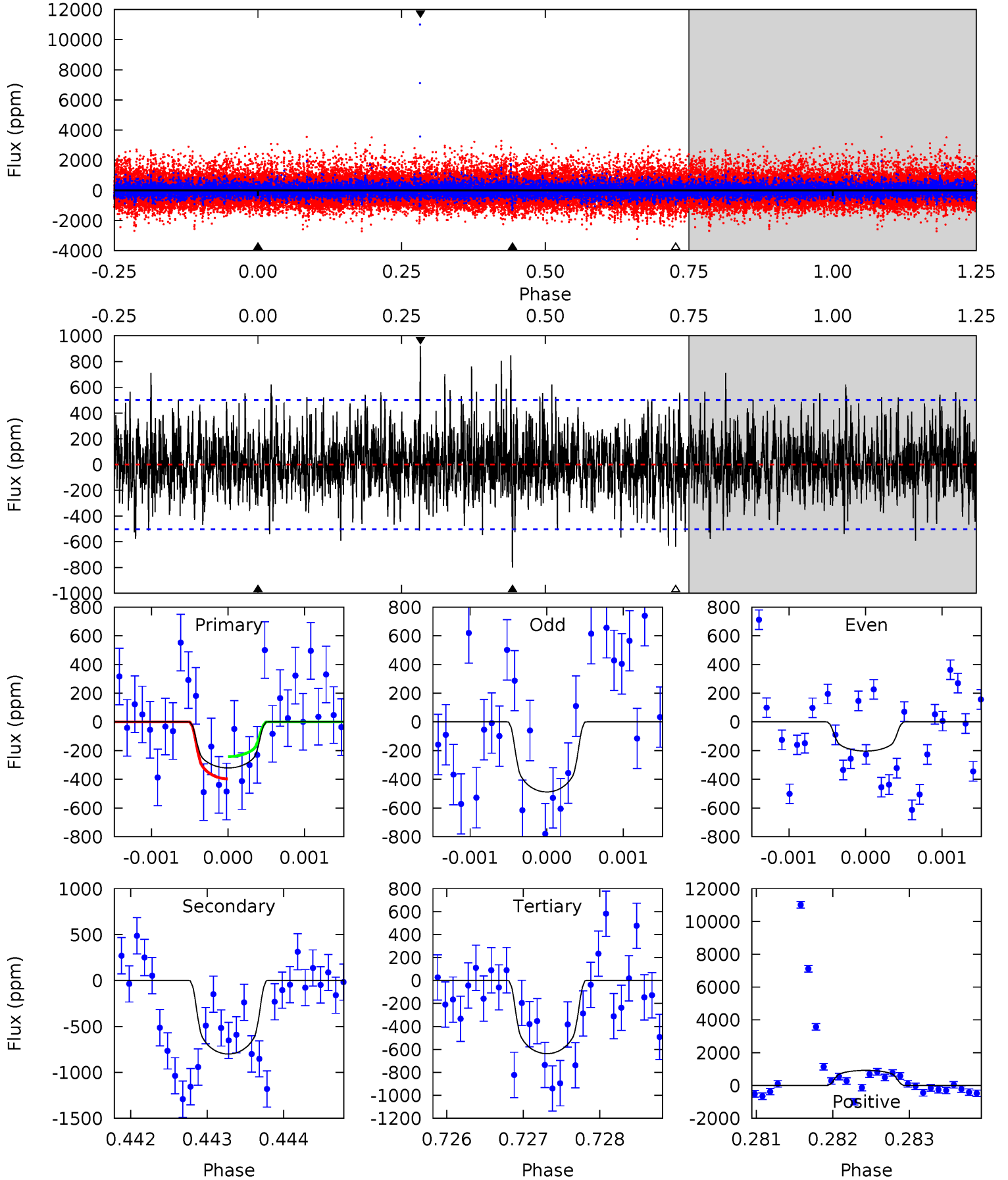
TCE 009535171-08 P=248.260943 Days  $T_0=333.226326$  (BKJD)



# DV Model-Shift Uniqueness Test

009535171-08, P = 248.293280 Days, E = 333.065876 Days

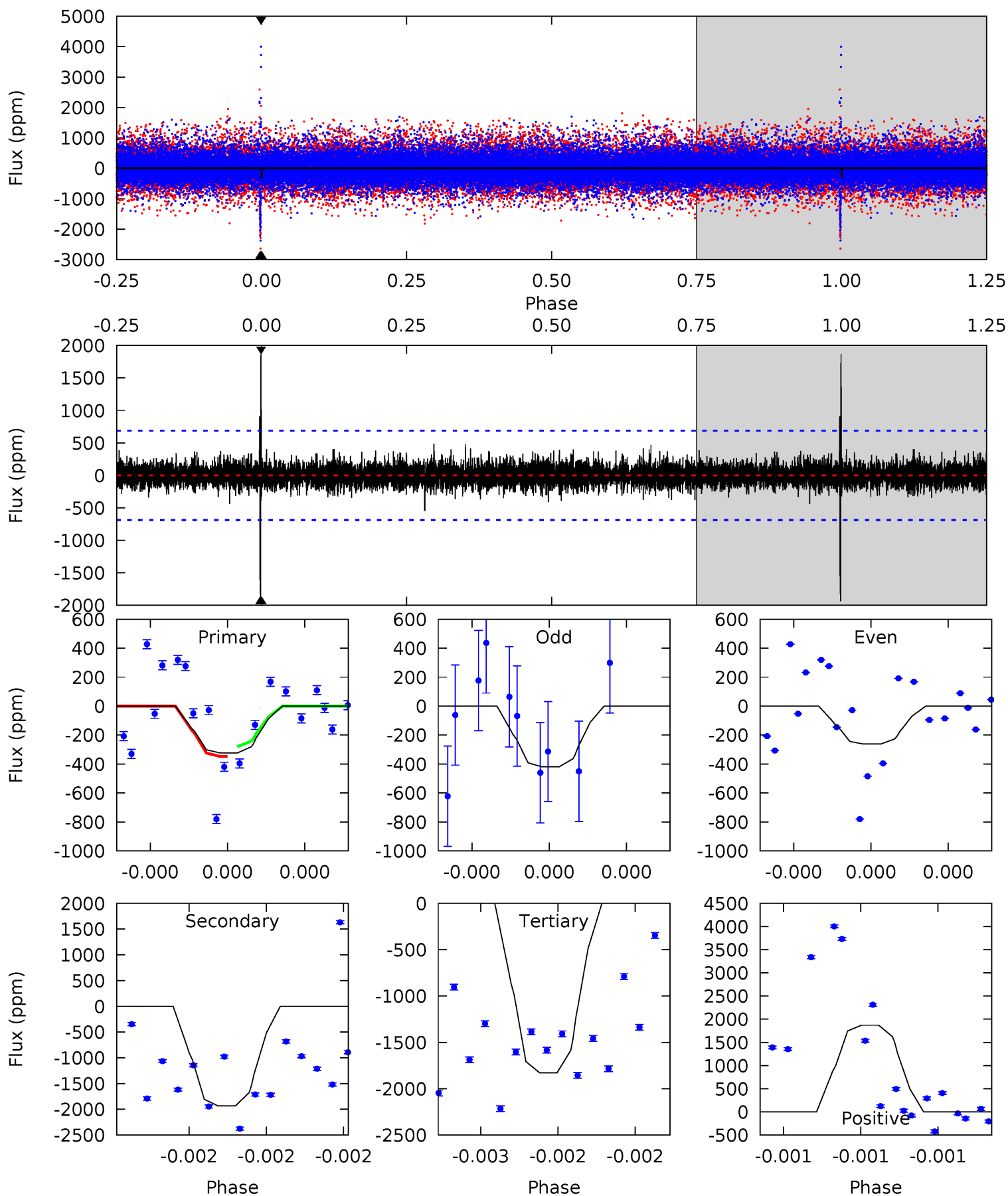
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
3.51	8.75	6.97	10.1	5.49	3.34	2.02	-3.46	-6.55	1.78	-1.32	0.95	1.38	0.54	0.85



# Alt Model-Shift Uniqueness Test

009535171-08, P = 248.260943 Days, E = 333.226326 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
2.69	16.1	15.2	15.6	5.73	3.71	0.96	-12.5	-12.9	0.88	0.53	0.61	1.64	0.49	0.28



### Stellar Parameters For KIC 009535171

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4523^{+162}_{-162}$	$4.663^{+0.054}_{-0.032}$	$-0.660^{+0.300}_{-0.300}$	$0.584^{+0.051}_{-0.051}$	$0.572^{+0.062}_{-0.038}$	$4.047^{+0.935}_{-0.524}$
	+4%/-4%	+1%/-1%	+45%/-45%	+9%/-9%	+11%/-7%	+23%/-13%
Source	KIC0	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 009535171-08 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-800 \pm 92$	$2.17^{+2.01}_{-1.47}$	$265^{+11}_{-11}$	$4204^{+2823}_{-847}$	$37967^{+351873}_{-27645}$
Alt.	$-1935 \pm 120$	$1.67^{+1.62}_{-1.15}$	$265^{+10}_{-10}$	$5652^{+6507}_{-1410}$	$159488^{+1574173}_{-118427}$

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

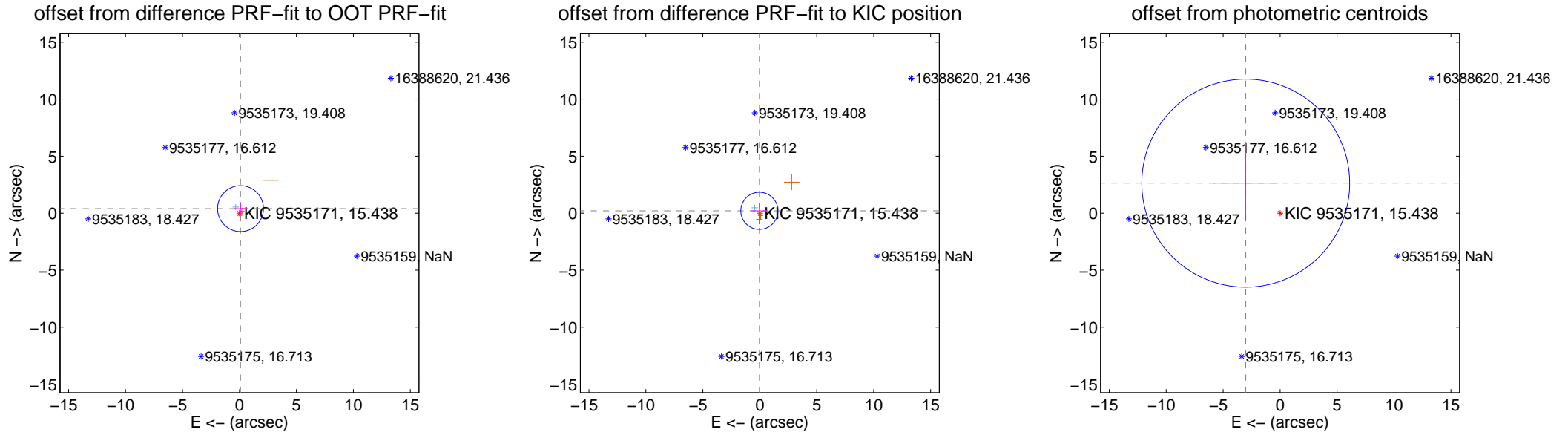
## DV Centroid Data

Supplemental centroid analysis for 009535171-08. Kepler magnitude: 15.44. Transit SNR 3.08

There are 1 quarters with good PRF difference image offsets

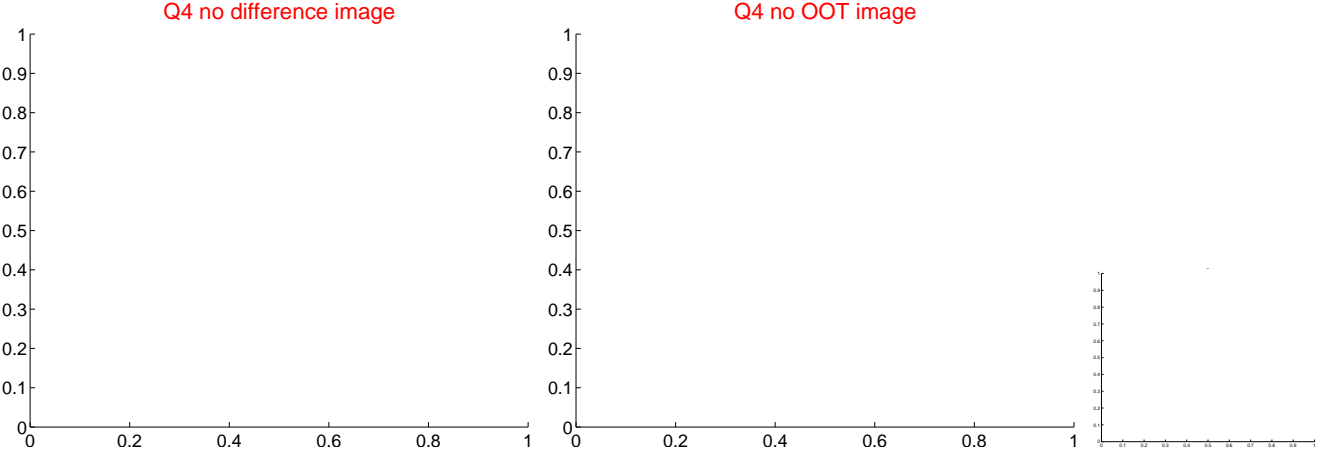
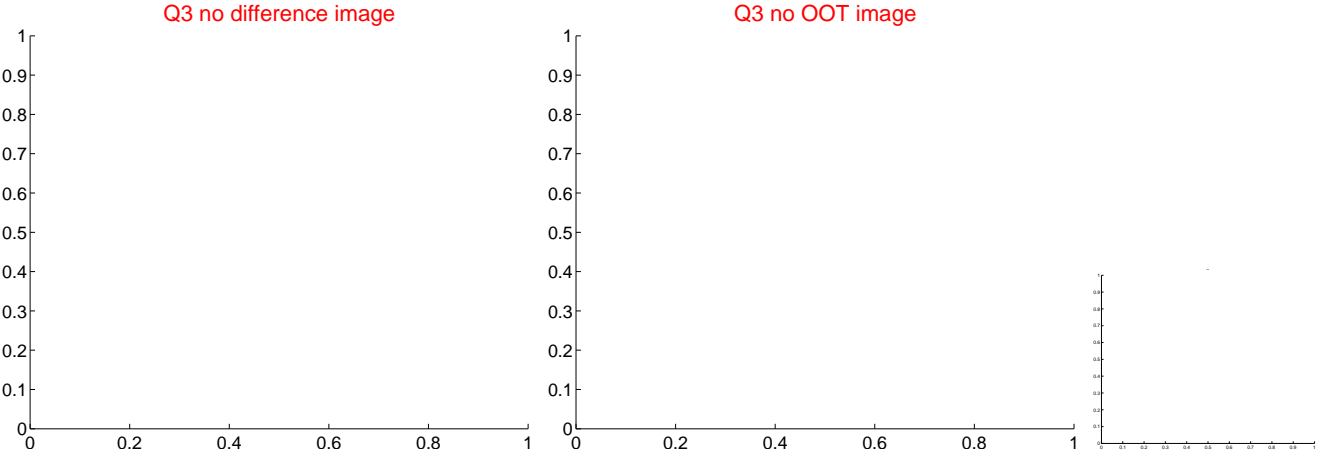
The direct PRF centroid is offset from the target star catalog position by about 0.39 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.410 \pm 0.672$	0.61	$-0.093 \pm 0.552$	$0.400 \pm 0.568$
PRF-fit source offset from KIC position	$0.210 \pm 0.543$	0.39	$0.035 \pm 0.688$	$0.207 \pm 0.659$
photometric centroid source offset	$4.01 \pm 3.04$	1.32	$3.02 \pm 2.84$	$2.63 \pm 3.28$



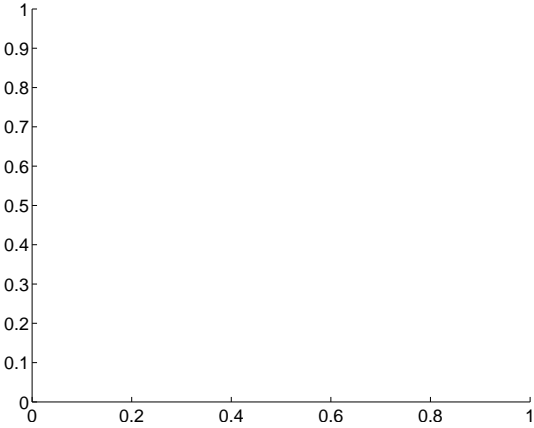
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

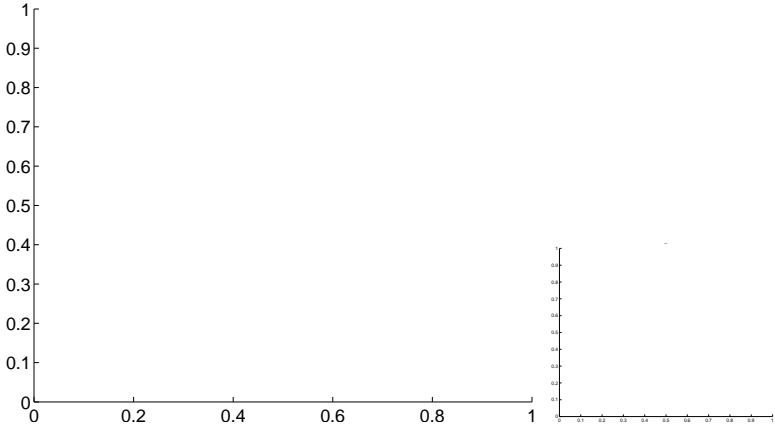


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

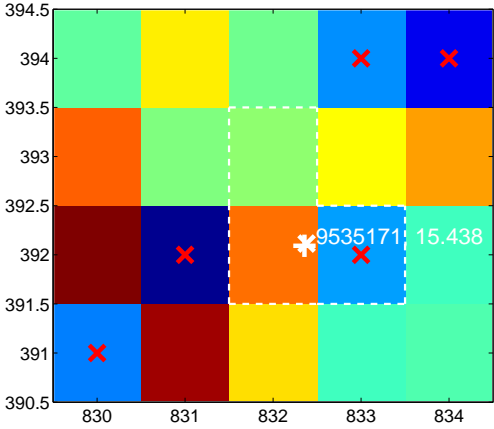
Q5 no difference image



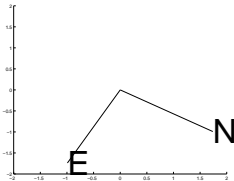
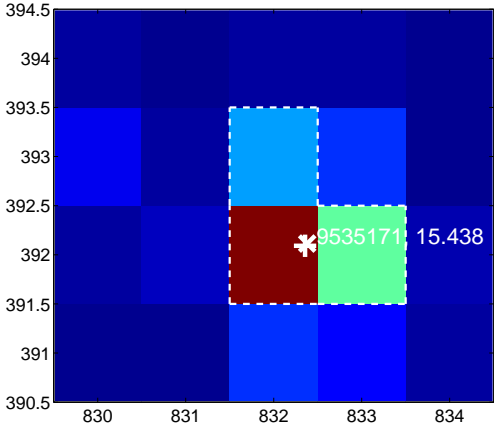
Q5 no OOT image



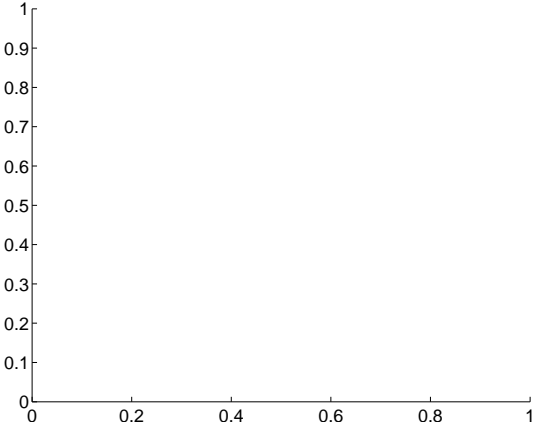
Q6 difference image. Poor Quality



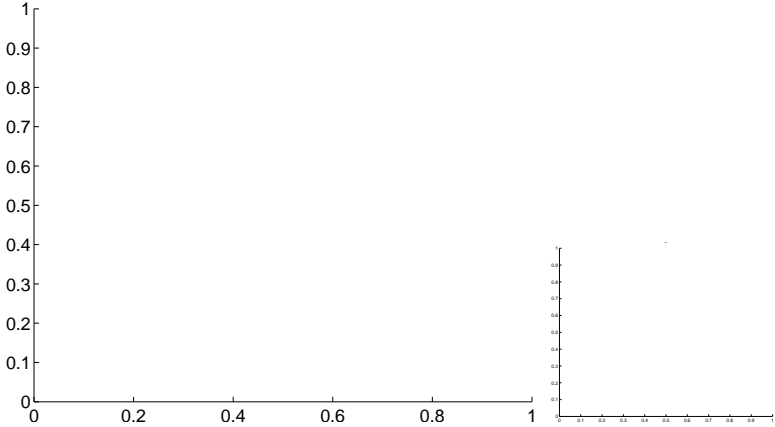
Q6 OOT image



Q7 no difference image



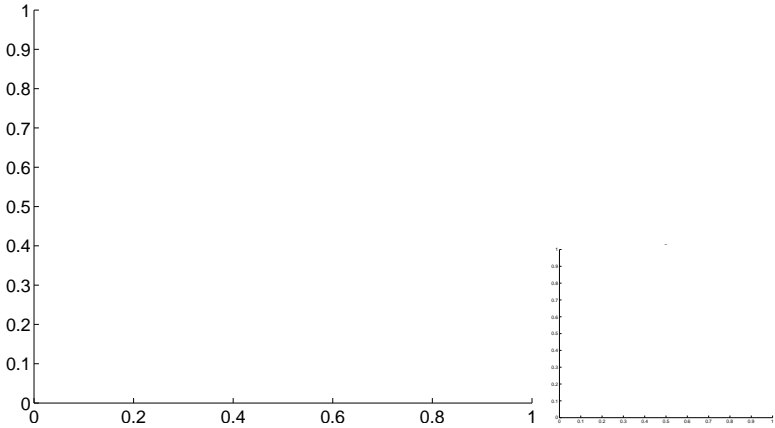
Q7 no OOT image



Q8 no difference image

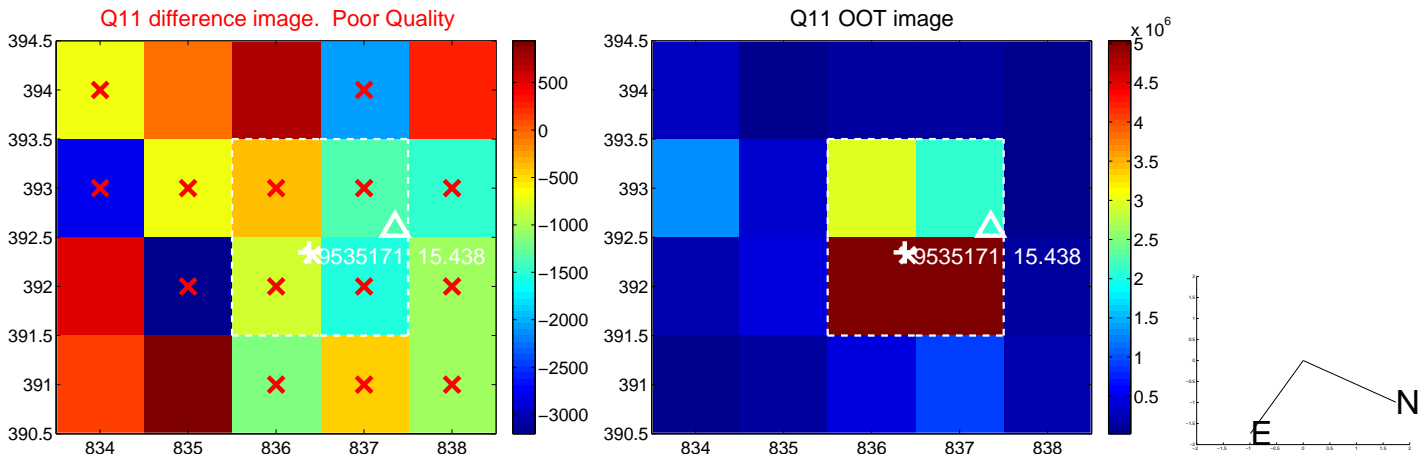
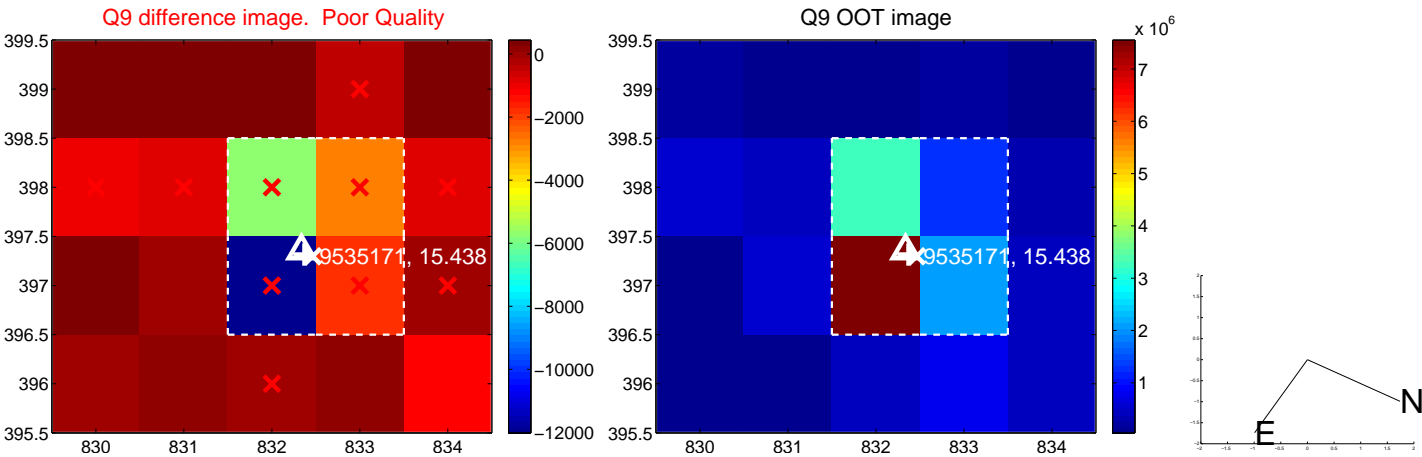


Q8 no OOT image

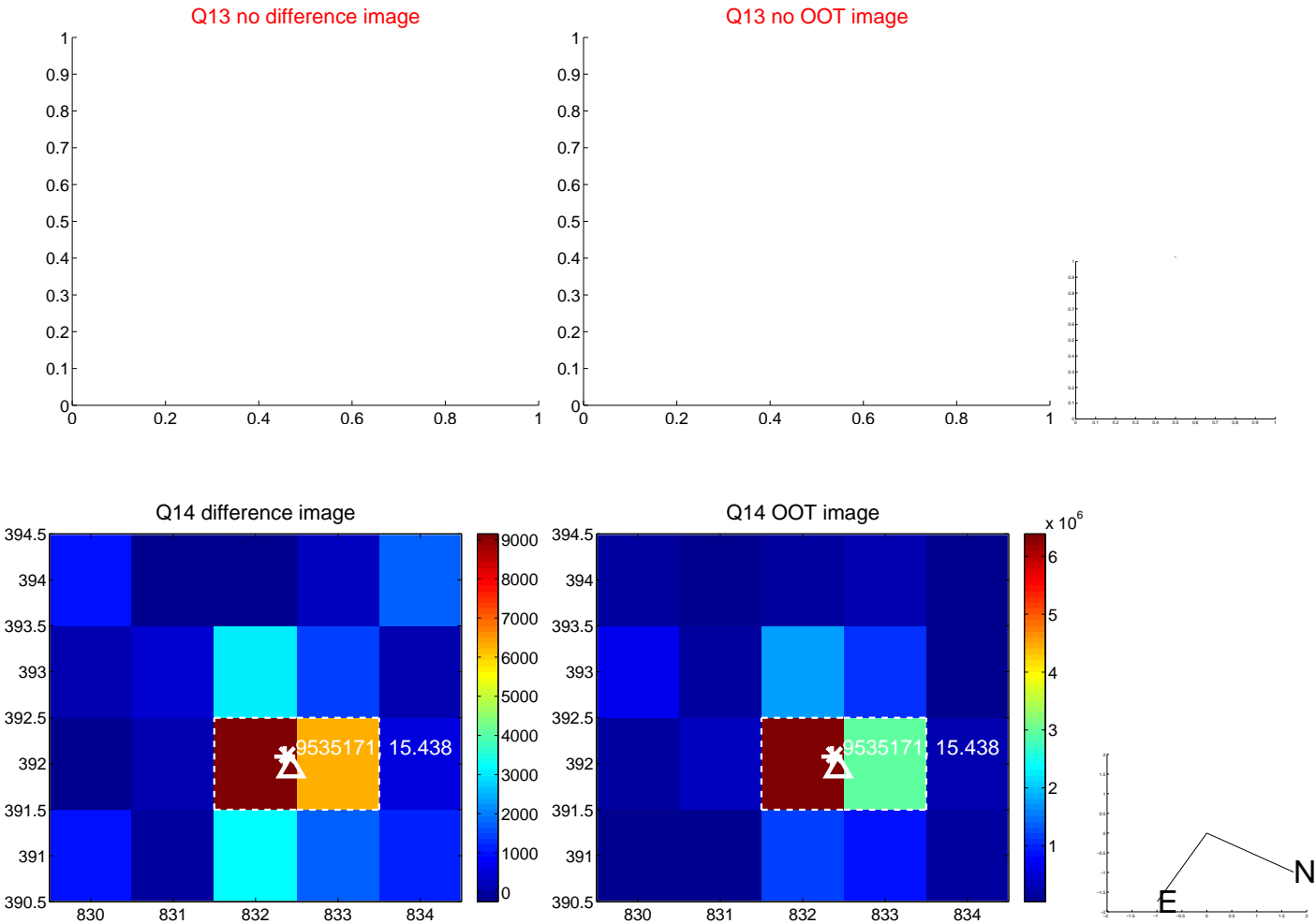




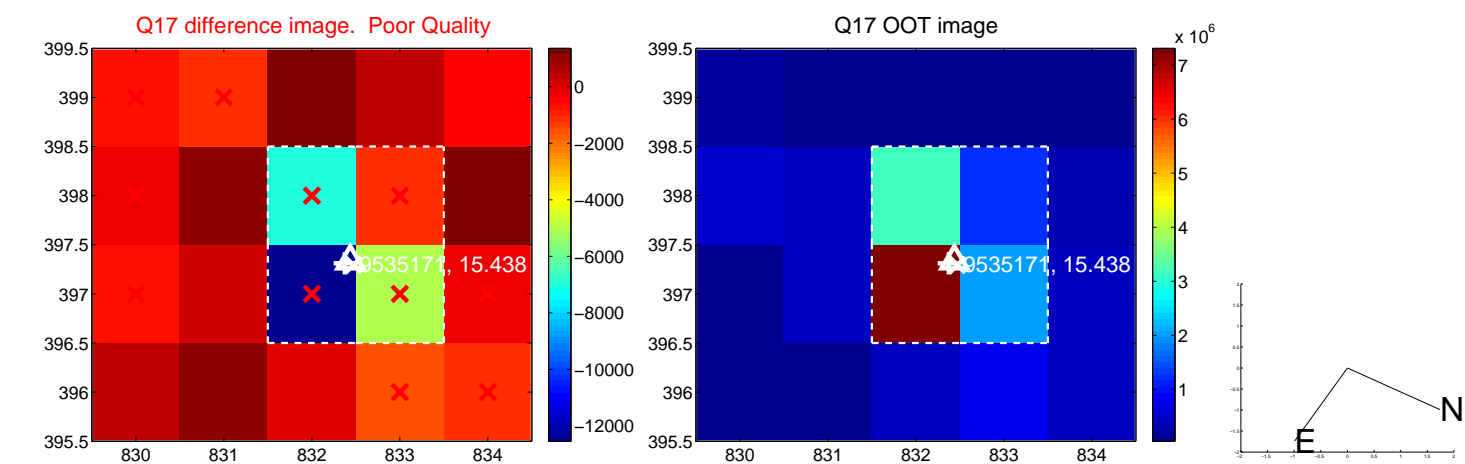
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



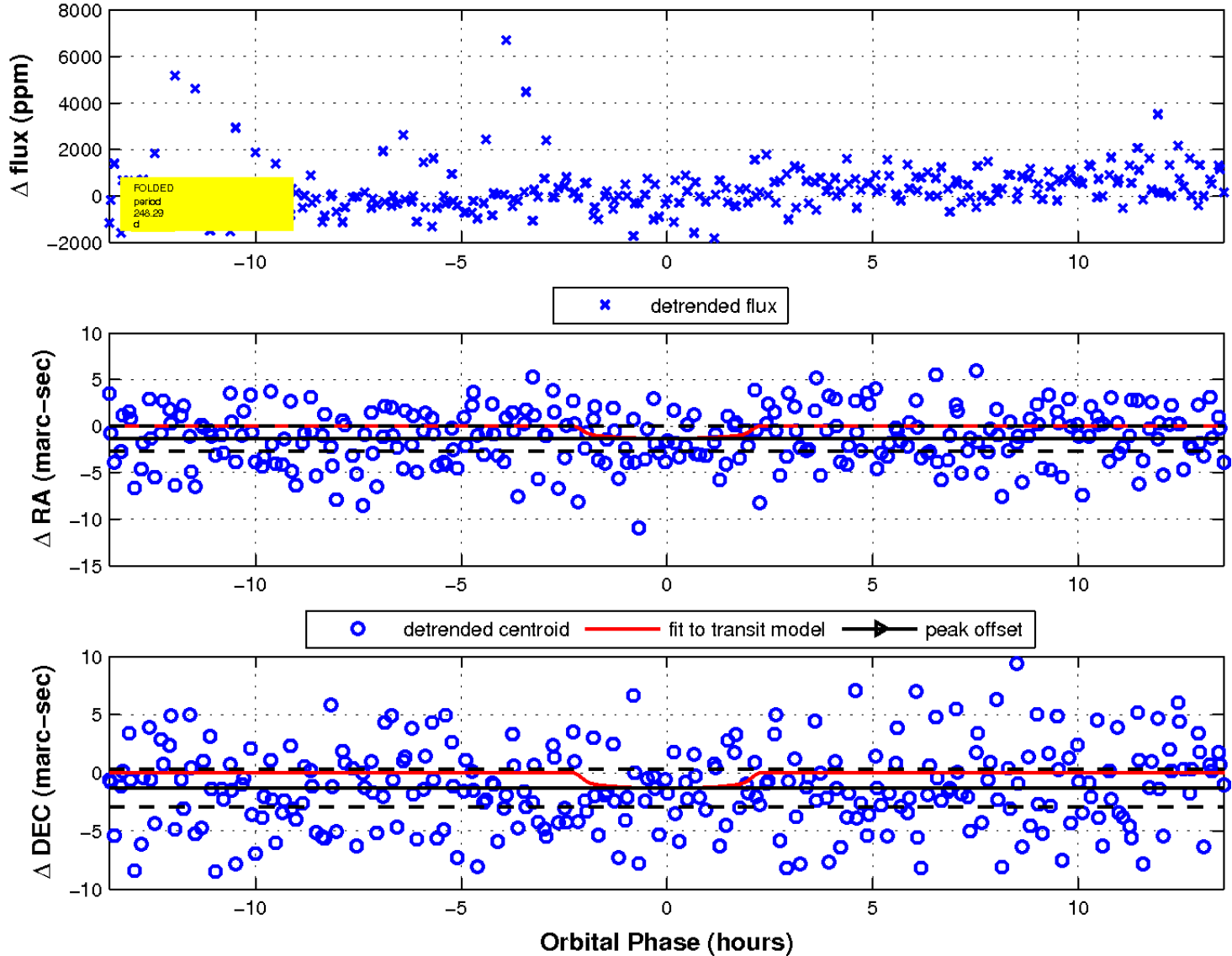
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



fluxWeightedCentroids, Planet 8 of 8



UKIRT Image

Declination

