

# KIC 005869301

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005869301-01	OBS	No	251.068109	305.580181	1060.0	5.232	11.8	5.5	0.76	4893	2.65	0.60
005869301-02	OBS	No	161.720109	141.954502	1106.9	4.579	10.7	6.5	0.76	4893	3.29	1.08
005869301-03	OBS	No	327.969179	394.156197	1436.1	3.838	9.9	6.6	0.76	4893	3.23	0.42
005869301-04	OBS	No	393.927445	419.471147	1868.0	6.283	15.9	8.7	0.76	4893	3.24	0.33

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005869301-01	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
005869301-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005869301-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
005869301-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

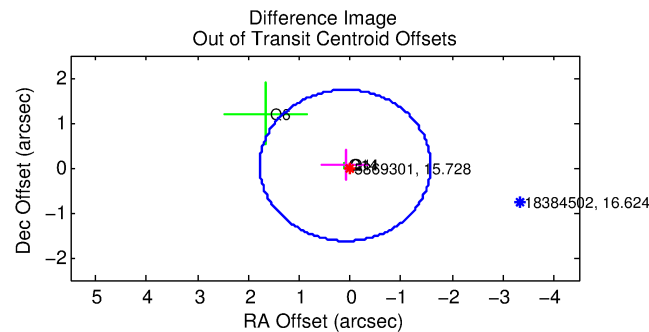
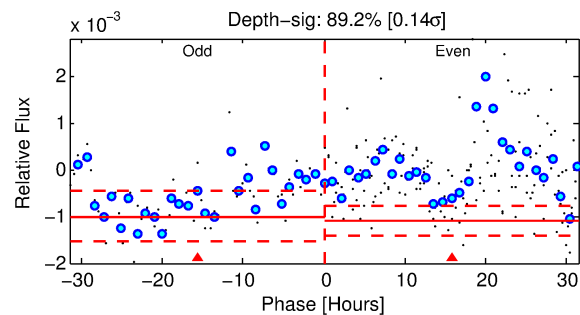
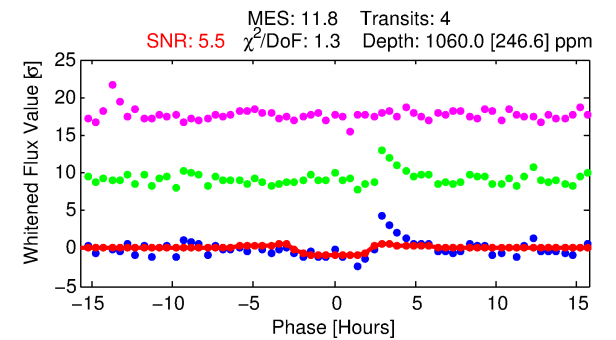
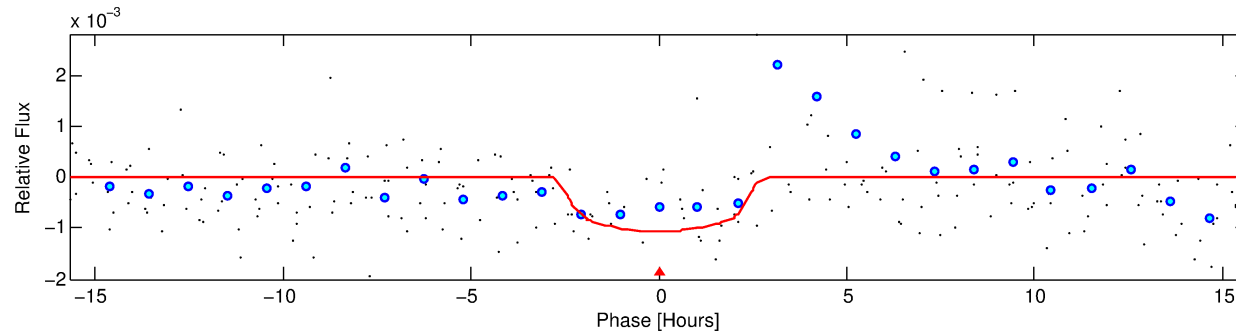
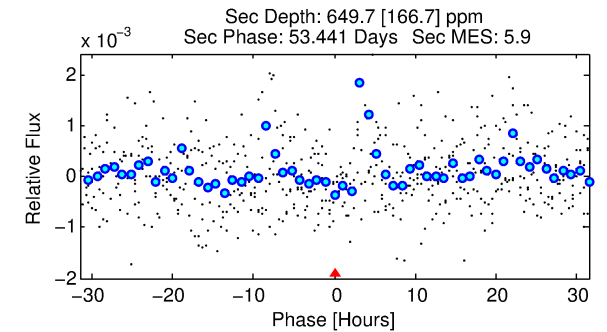
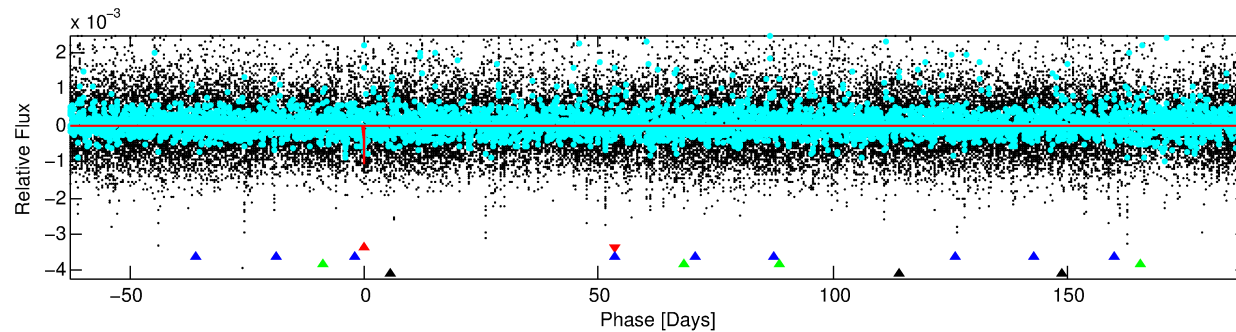
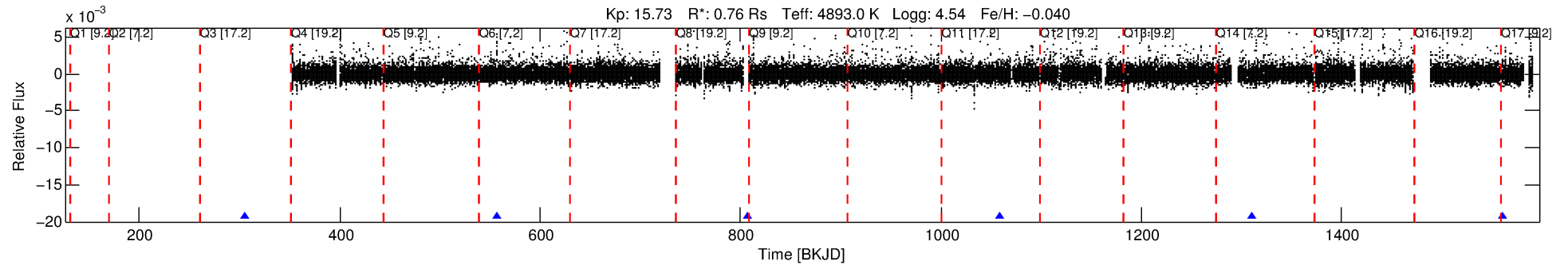
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 005869301-01

No Significant Match Found

# DV One-Page Summary

KIC: 5869301 Candidate: 1 of 4 Period: 251.068 d



## DV Fit Results:

Period = 251.06811 [0.00579] d  
Epoch = 305.5802 [0.0203] BKJD  
Rp/R\* = 0.0319 [0.0459]  
a/R\* = 277.06 [1347.33]  
b = 0.70 [3.59]  
Seff = 0.60 [0.11]  
Teq = 225 [11] K  
Rp = 2.65 [3.82] Re  
a = 0.7033 [0.0604] AU  
Ag = 25261.41 [73232.94] [0.34 $\sigma$ ]  
Teffp = 4377 [3173] K [1.31 $\sigma$ ]

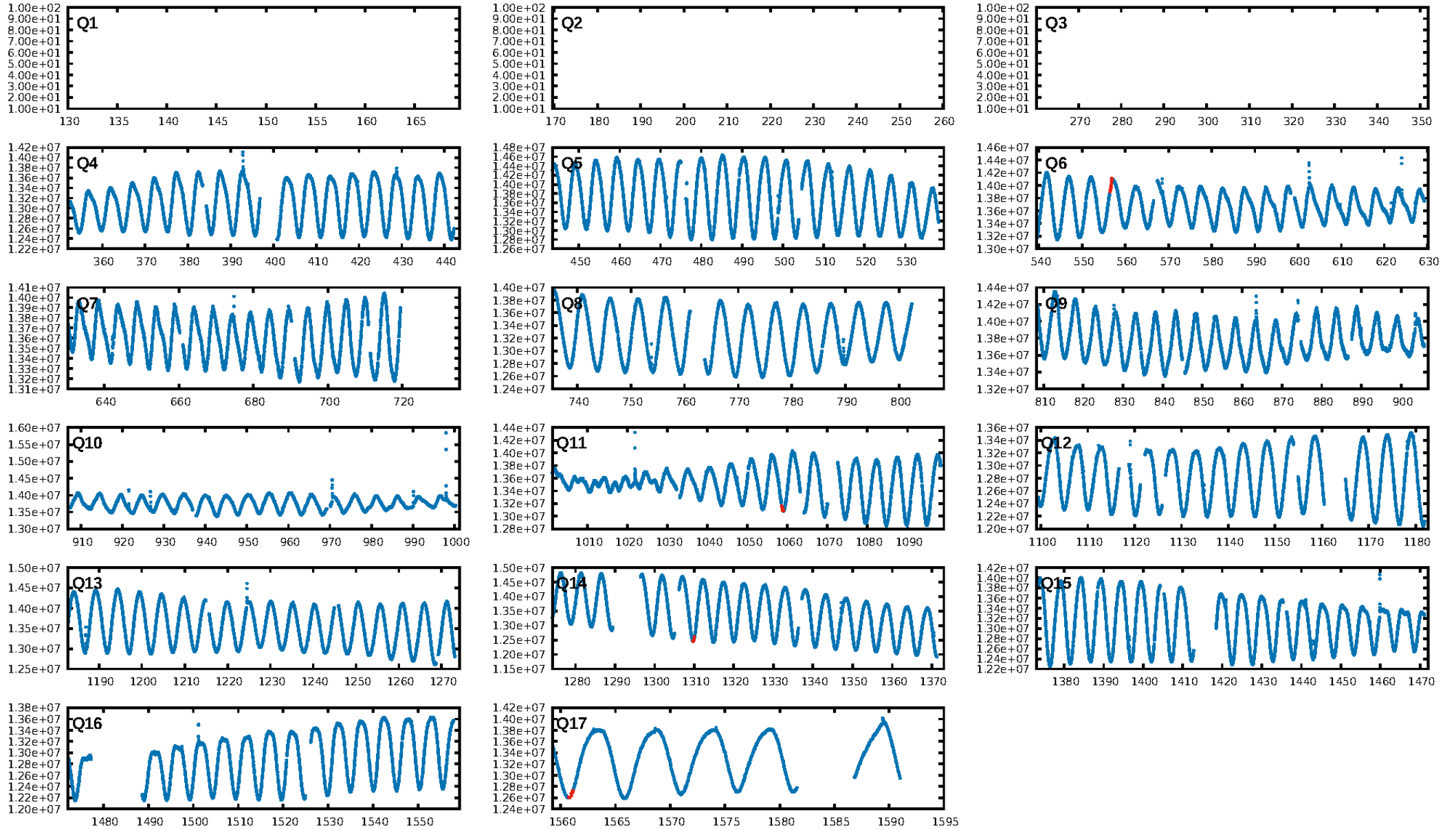
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [308.40 $\sigma$ ]  
LongPeriod-sig: 100.0% [284.42 $\sigma$ ]  
ModelChiSquare2-sig: 24.1%  
ModelChiSquareGof-sig: 81.3%  
Bootstrap-pfa: 2.08e-13  
RollingBand-fgt: 1.00 [3/3]  
**GhostDiagnostic-chr: 0.01234**  
Centroid-sig: 14.4%  
Centroid-so: 2.457 arcsec [1.22 $\sigma$ ]  
OotOffset-rm: 0.106 arcsec [0.19 $\sigma$ ]  
OotOffset-st: 2/1/0/0 [3]  
KicOffset-rm: 0.171 arcsec [0.52 $\sigma$ ]  
KicOffset-st: 2/1/0/0 [3]  
DiffImageQuality-fgm: 1.00 [3/3]  
DiffImageOverlap-fno: 1.00 [3/3]

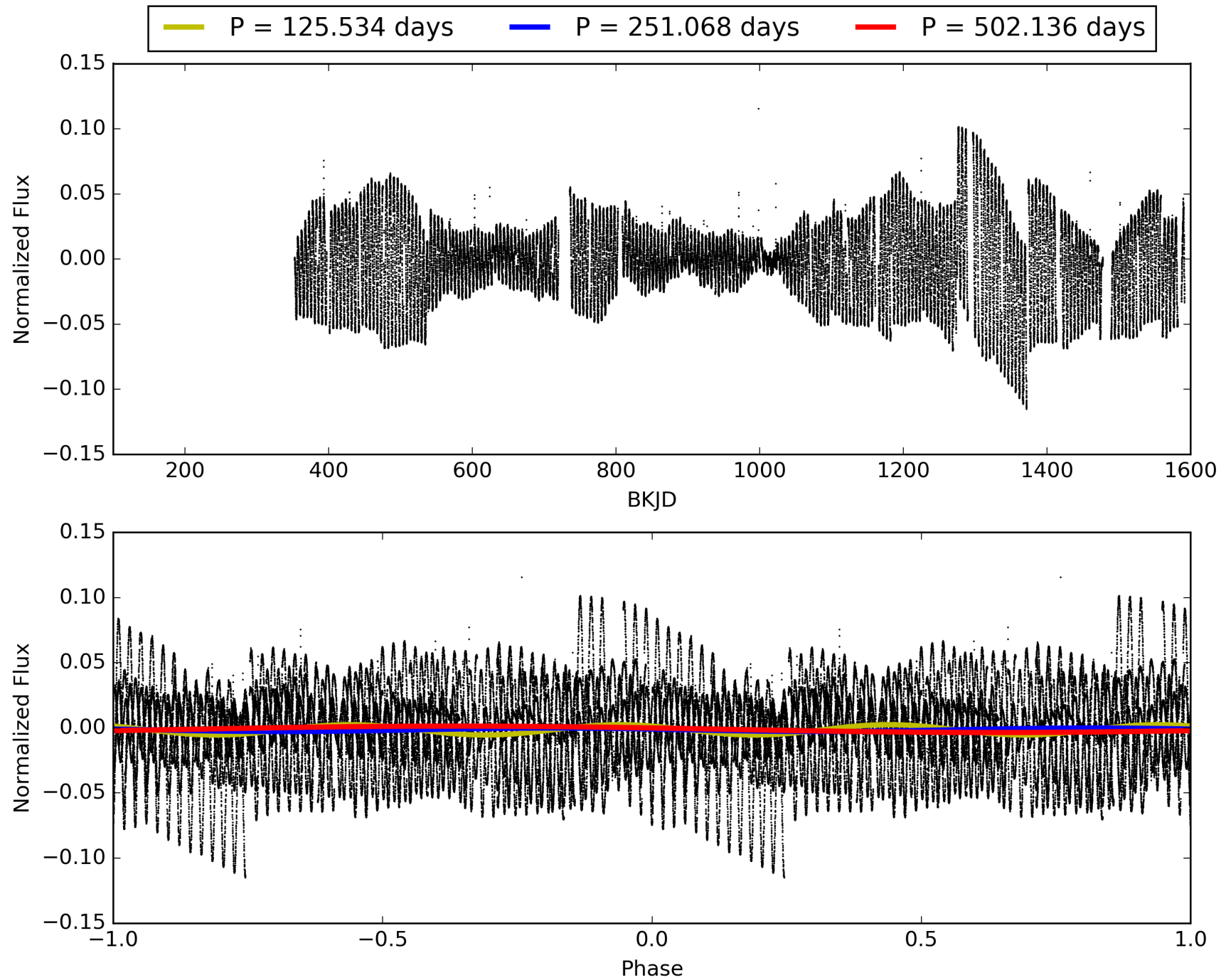
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 12:09:14 Z

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

# TCE 005869301-01, PDC Light Curves



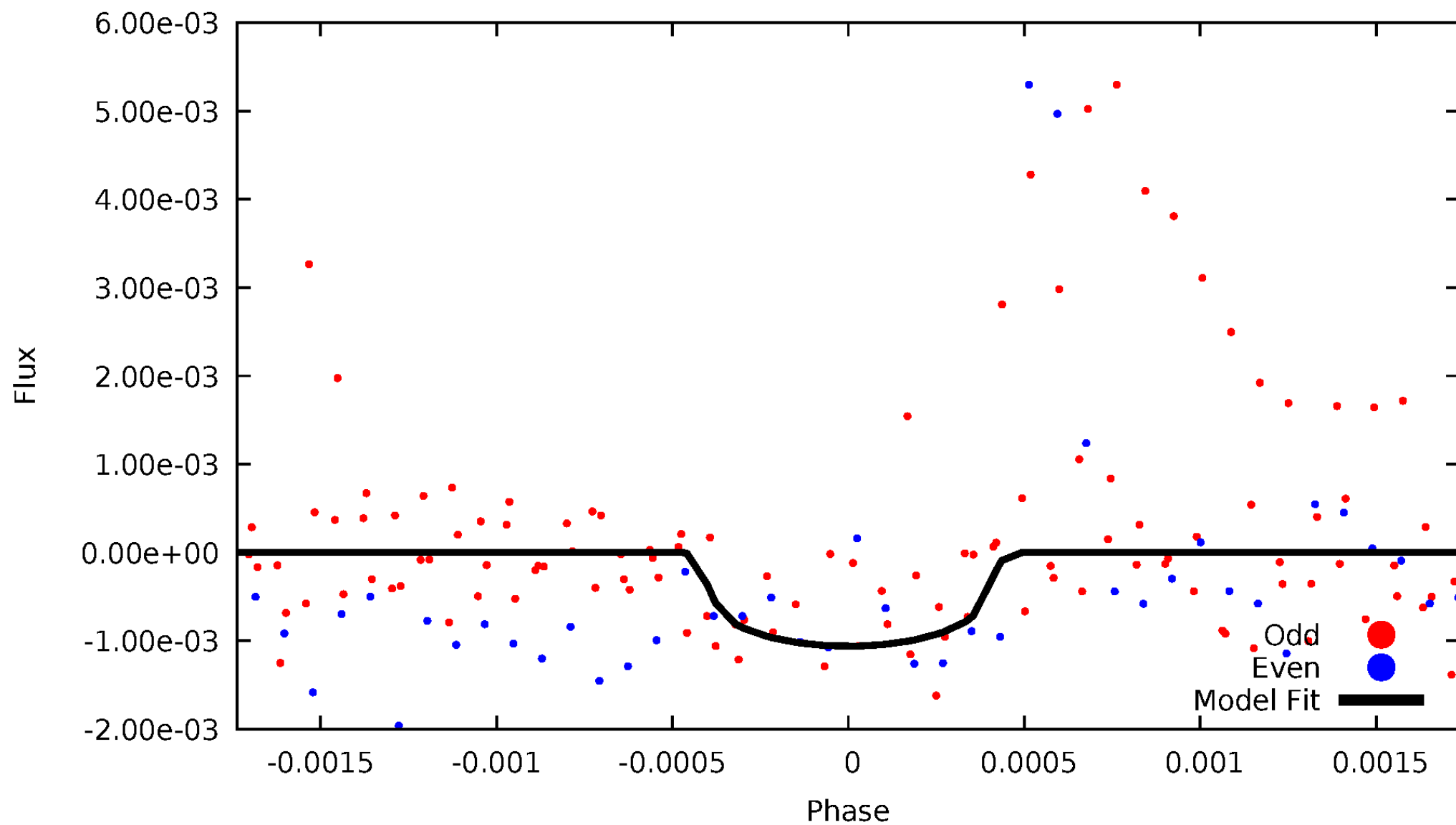
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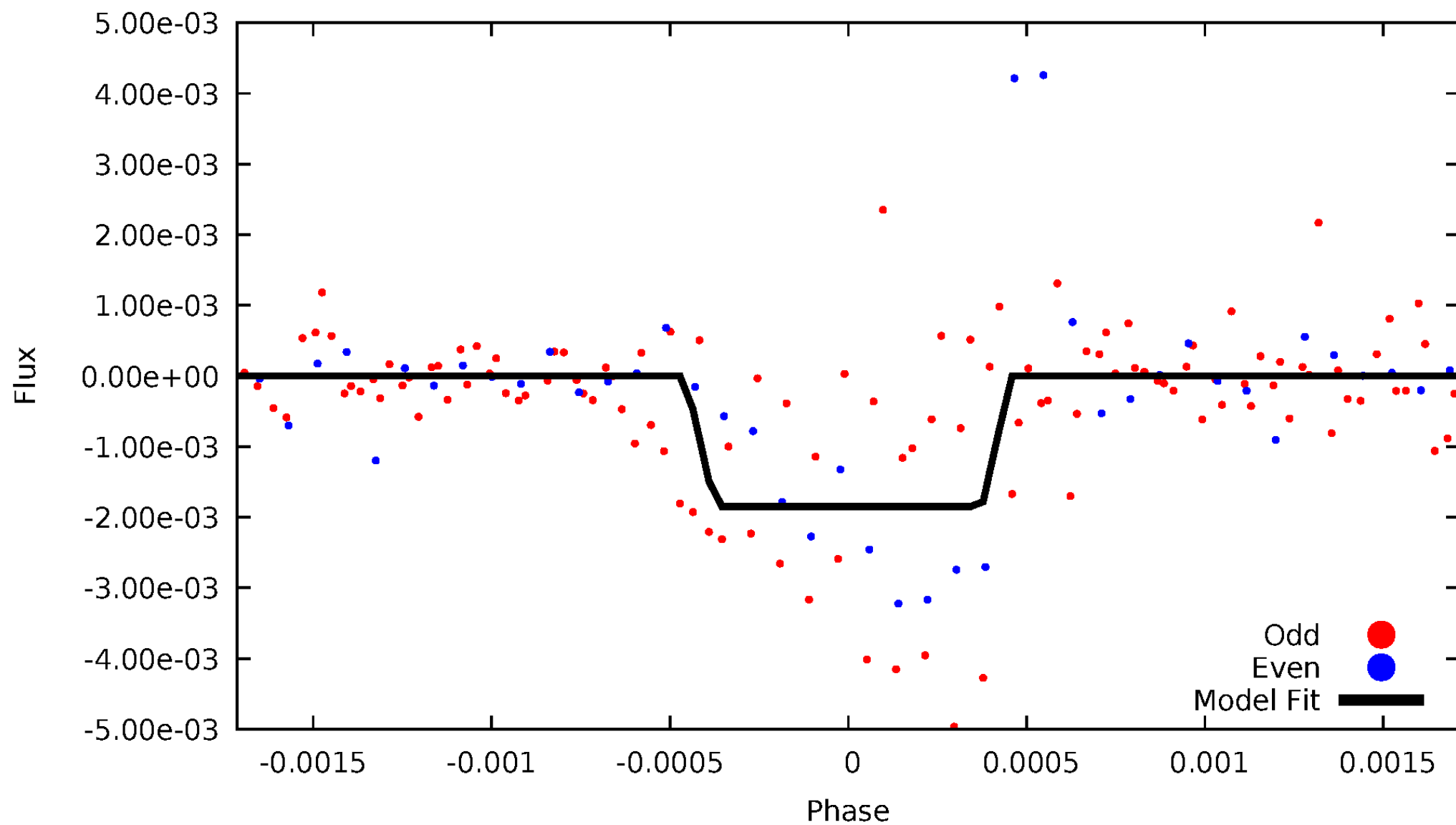
# DV Odd/Even

TCE 005869301-01



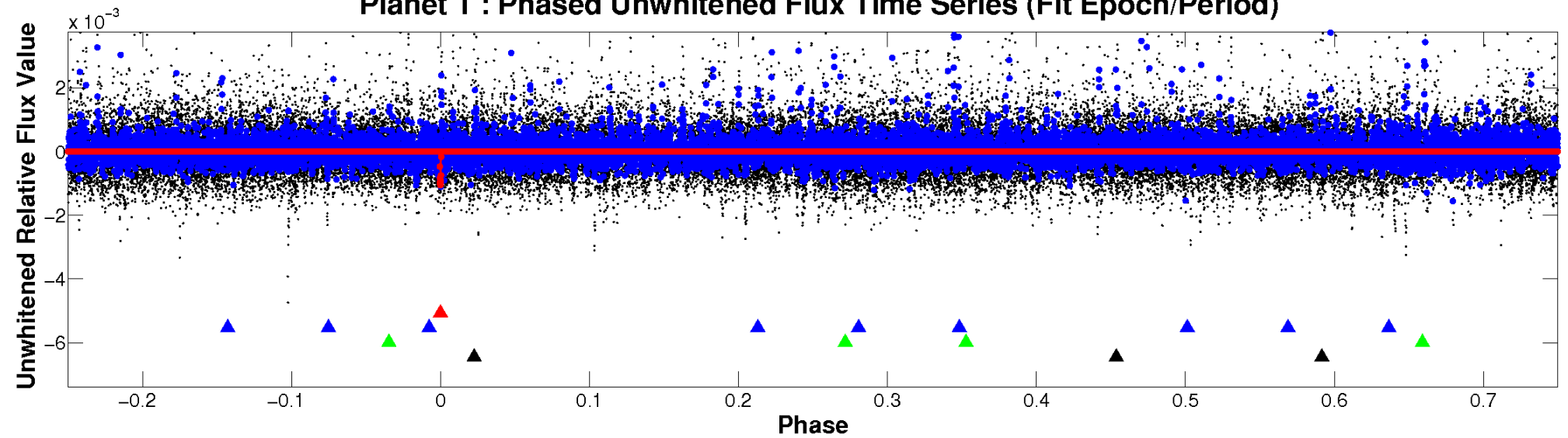
# ALT Odd/Even

TCE 005869301-01

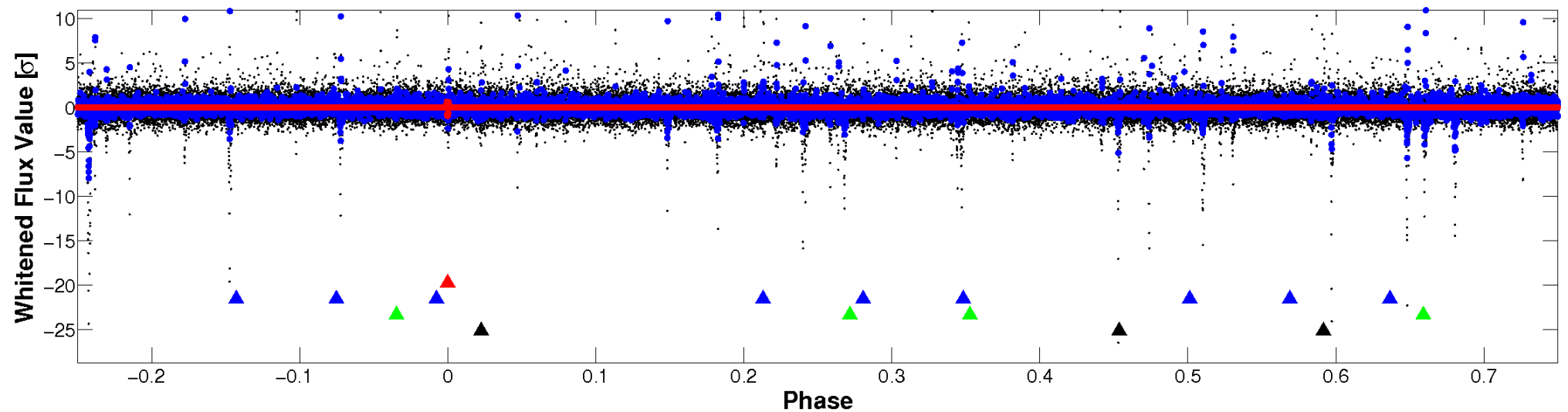


# Non-Whitened Vs. Whitened Light Curve

Planet 1 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

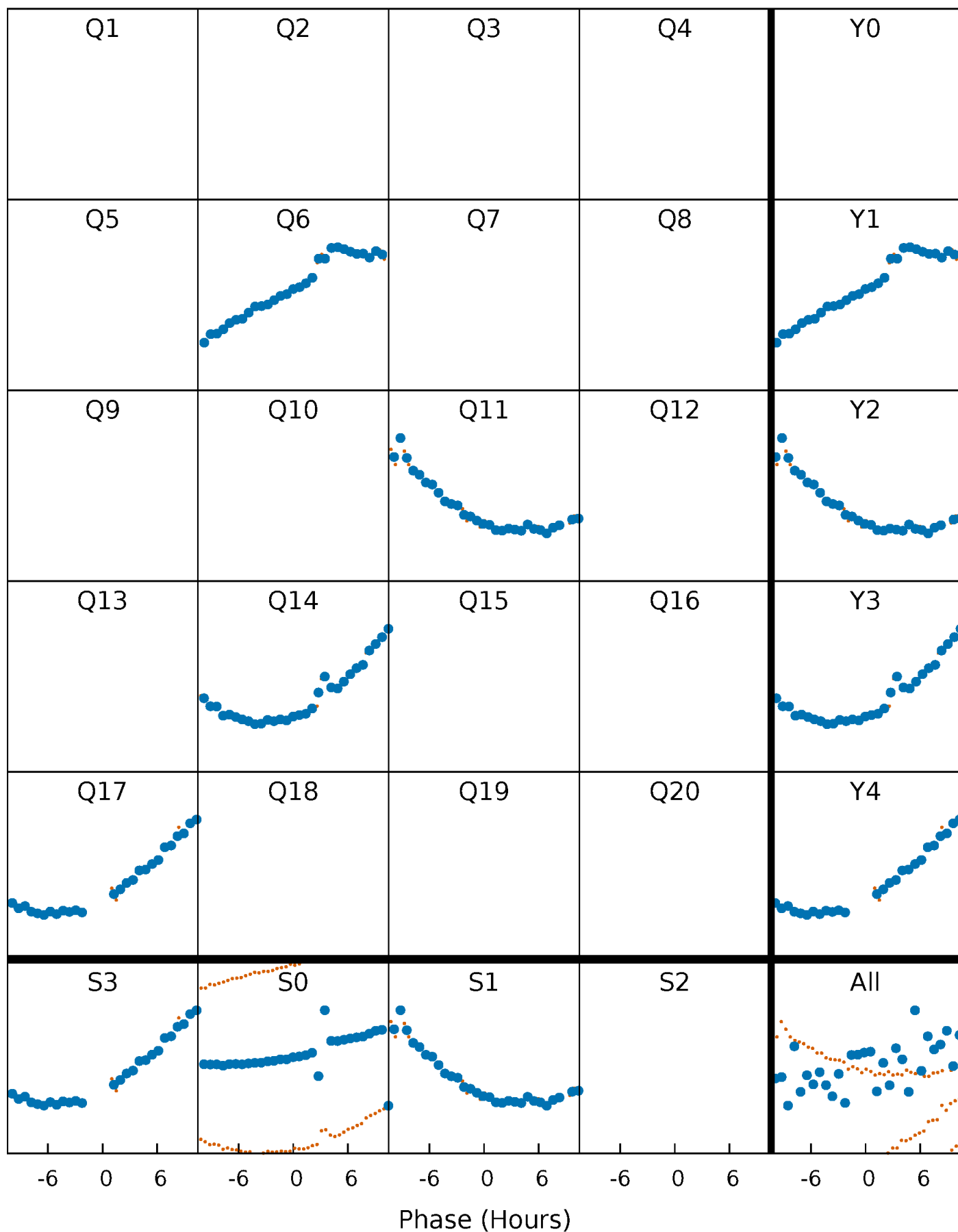


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



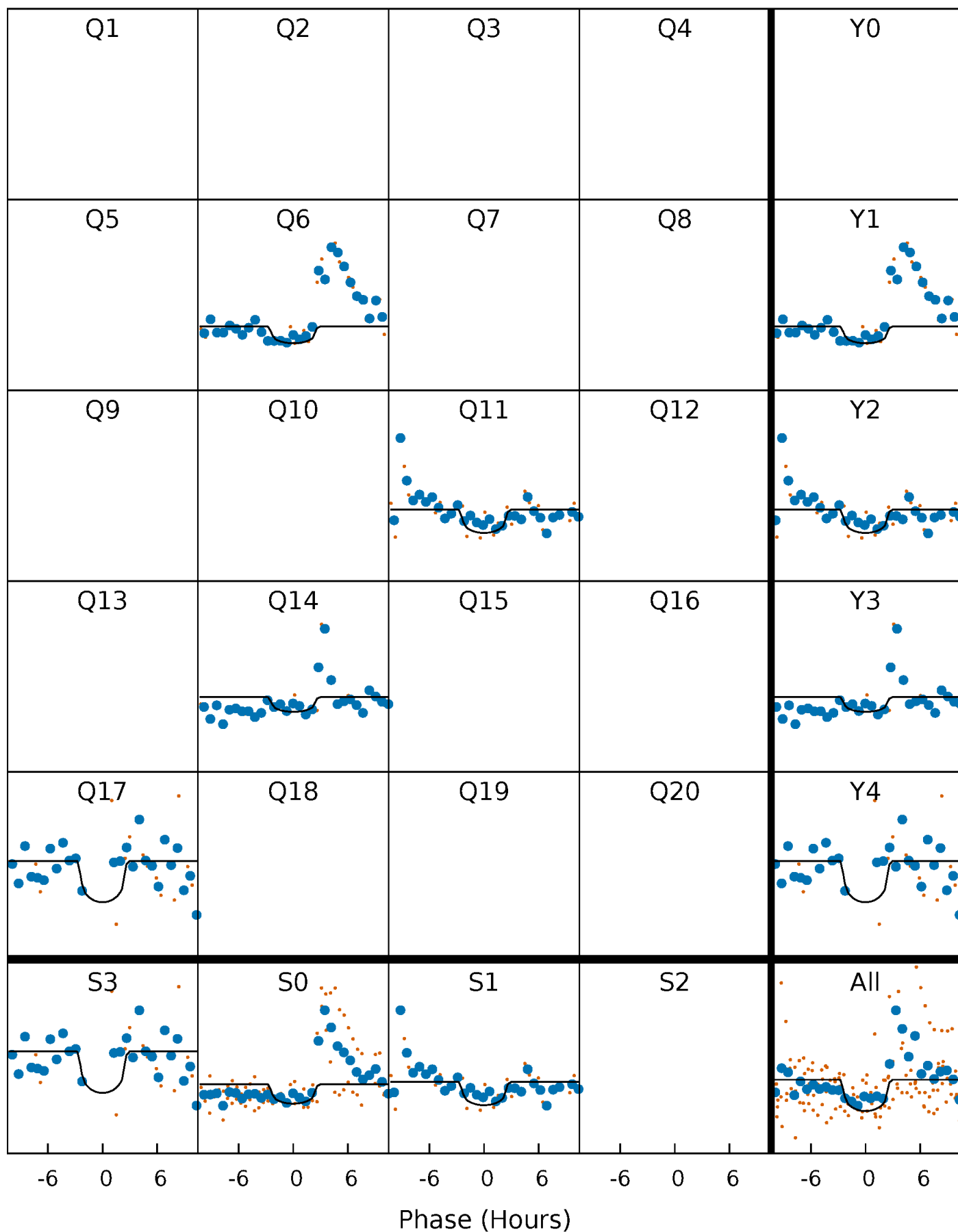
# PDC Quarter-Phased Transit Curves

TCE 005869301-01 P=251.068109 Days  $T_0=305.580181$  (BKJD)



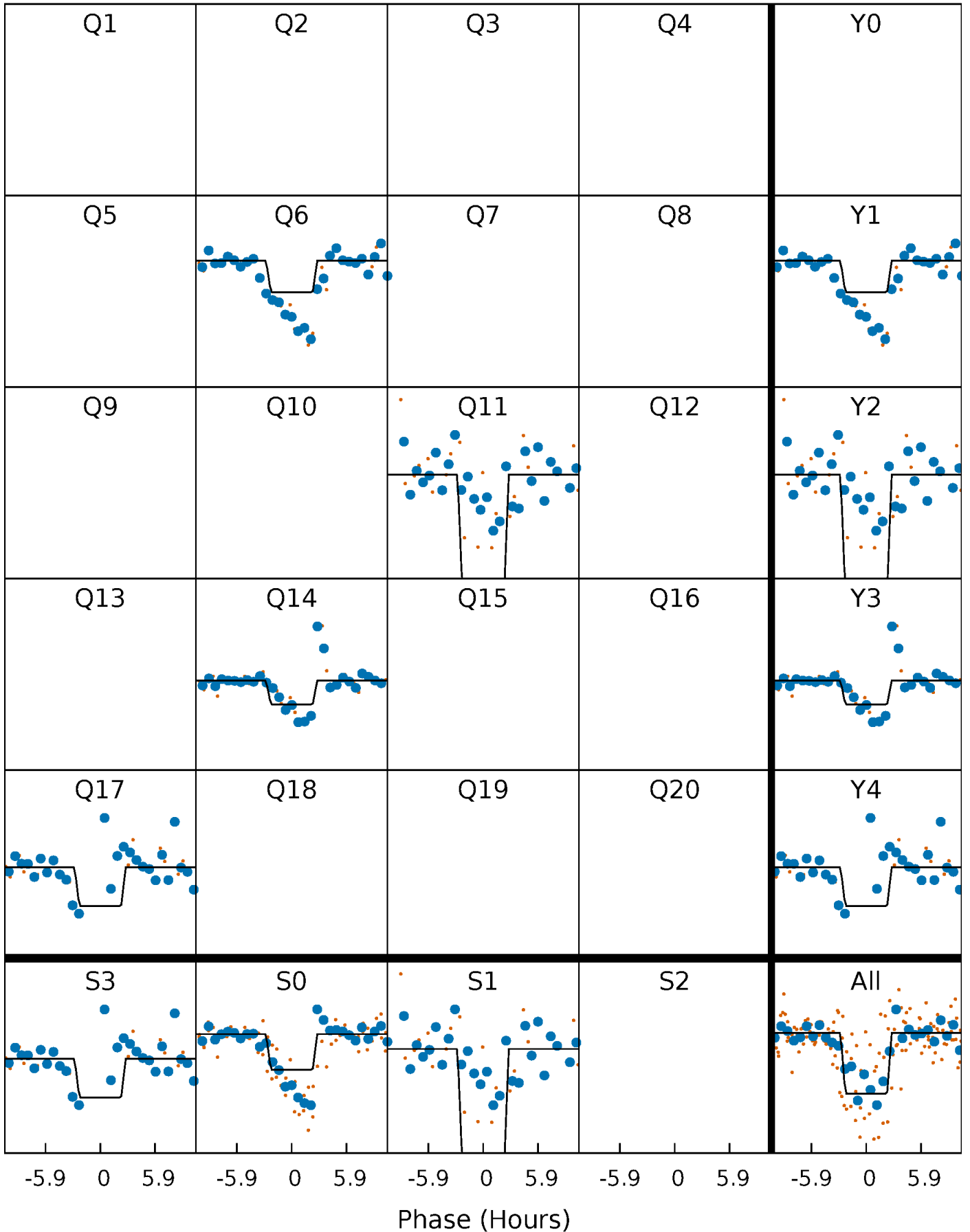
# DV Quarter-Phased Transit Curves

TCE 005869301-01 P=251.068109 Days  $T_0=305.580181$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 005869301-01 P=251.073963 Days  $T_0=305.568640$  (BKJD)

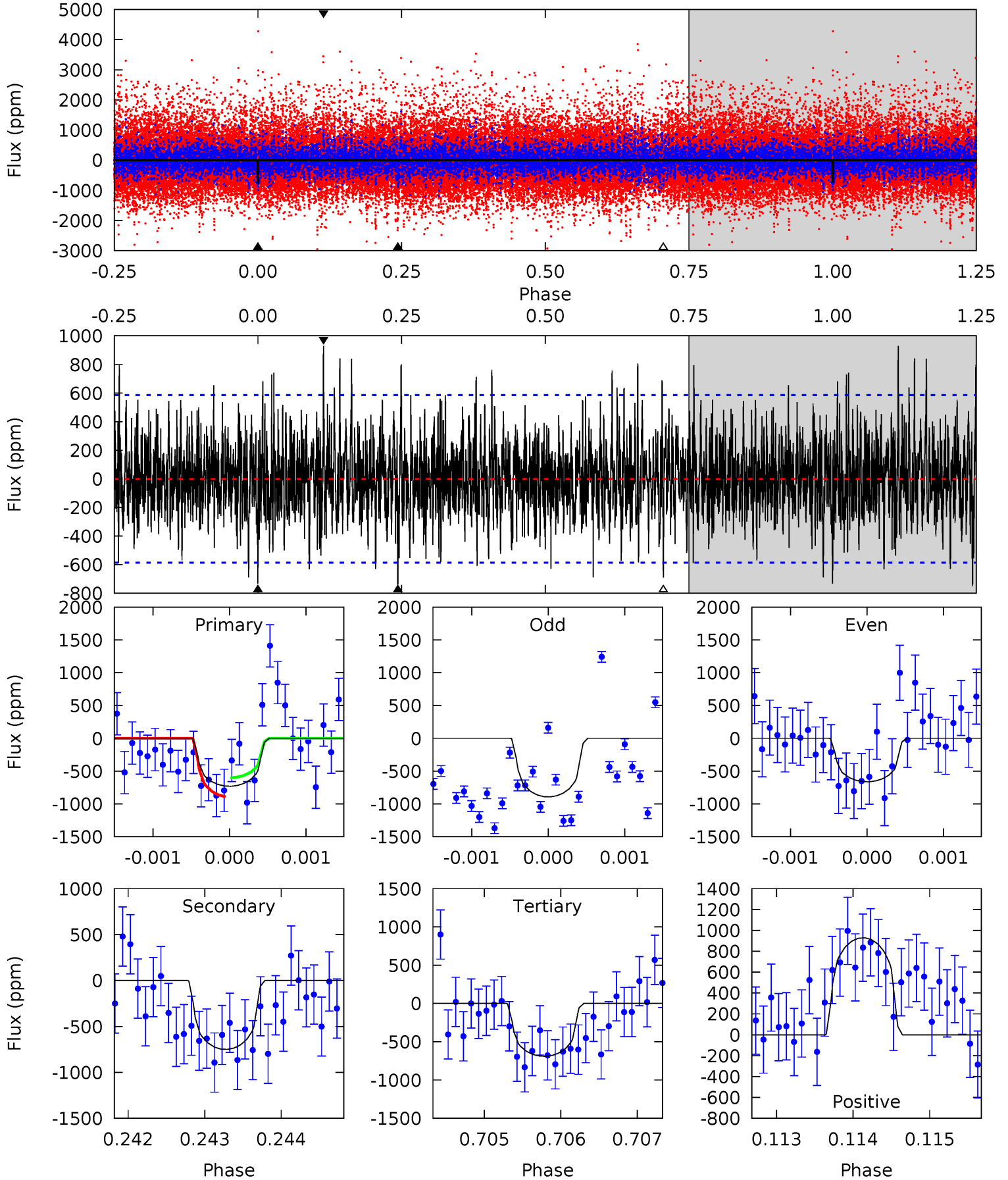




# DV Model-Shift Uniqueness Test

005869301-01, P = 251.068109 Days, E = 305.580181 Days

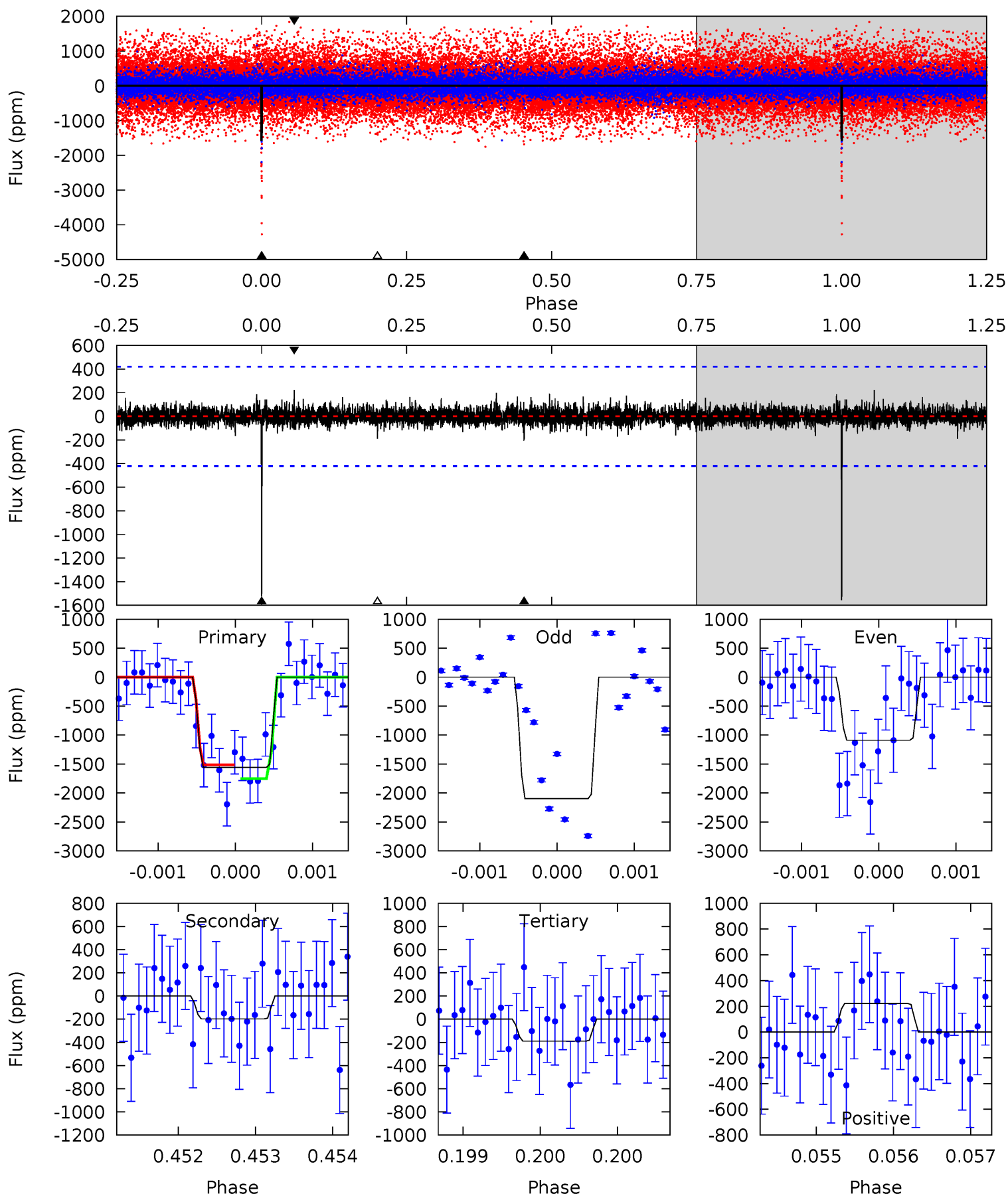
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.81	6.99	6.43	8.66	5.46	3.30	1.98	0.38	-1.84	0.56	-1.67	0.84	0.89	0.55	1.34



# Alt Model-Shift Uniqueness Test

005869301-01, P = 251.073963 Days, E = 305.568640 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
20.3	2.58	2.47	2.90	5.48	3.34	0.55	17.9	17.4	0.12	-0.32	6.15	1.12	0.12	1.45



### Stellar Parameters For KIC 005869301

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4893^{+170}_{-170}$	$4.542^{+0.072}_{-0.048}$	$-0.040^{+0.300}_{-0.300}$	$0.761^{+0.068}_{-0.075}$	$0.735^{+0.083}_{-0.060}$	$2.353^{+0.746}_{-0.394}$
	+3%/-3%	+2%/-1%	+750%/-750%	+9%/-10%	+11%/-8%	+32%/-17%
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 005869301-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-750 \pm 107$	$3.67^{+3.09}_{-2.54}$	$313^{+14}_{-14}$	$4082^{+2574}_{-795}$	$15638^{+130955}_{-11214}$
Alt.	$-198 \pm 77$	$4.18^{+3.53}_{-2.55}$	$312^{+13}_{-13}$	$3107^{+1188}_{-484}$	$2866^{+17233}_{-2038}$

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

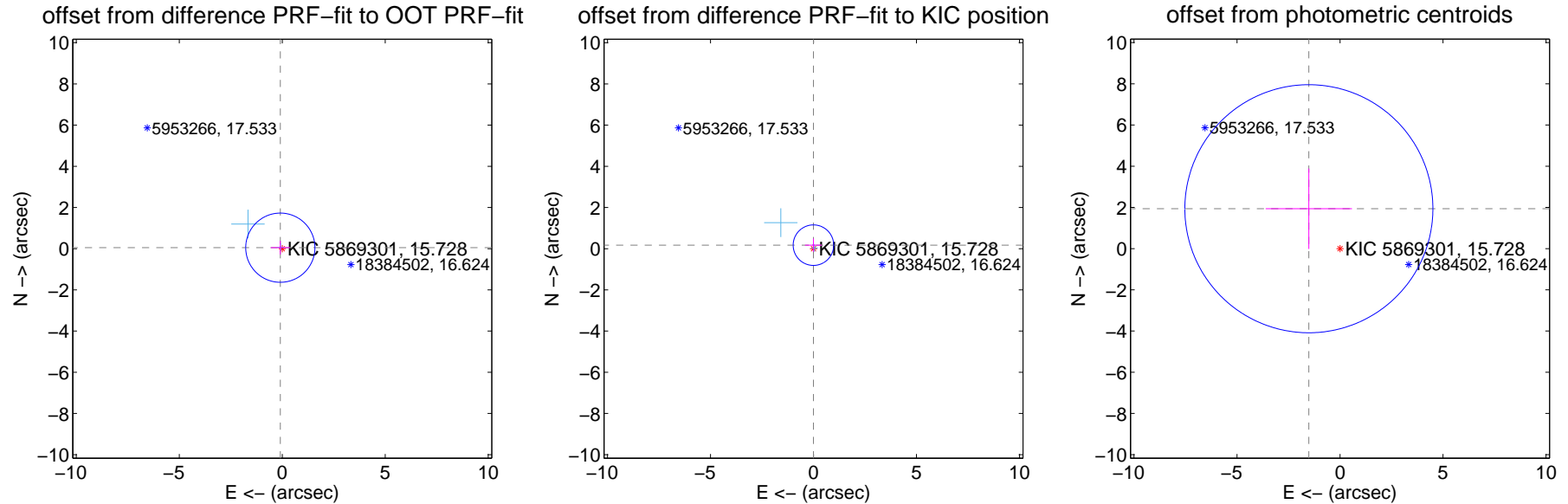
## DV Centroid Data

Supplemental centroid analysis for 005869301-01. Kepler magnitude: 15.73. Transit SNR 5.47

There are 3 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.16 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.106 \pm 0.560$	0.19	$0.094 \pm 0.463$	$0.049 \pm 0.332$
PRF-fit source offset from KIC position	$0.171 \pm 0.328$	0.52	$0.002 \pm 0.410$	$0.171 \pm 0.323$
photometric centroid source offset	$2.46 \pm 2.01$	1.22	$1.51 \pm 2.09$	$1.94 \pm 1.95$

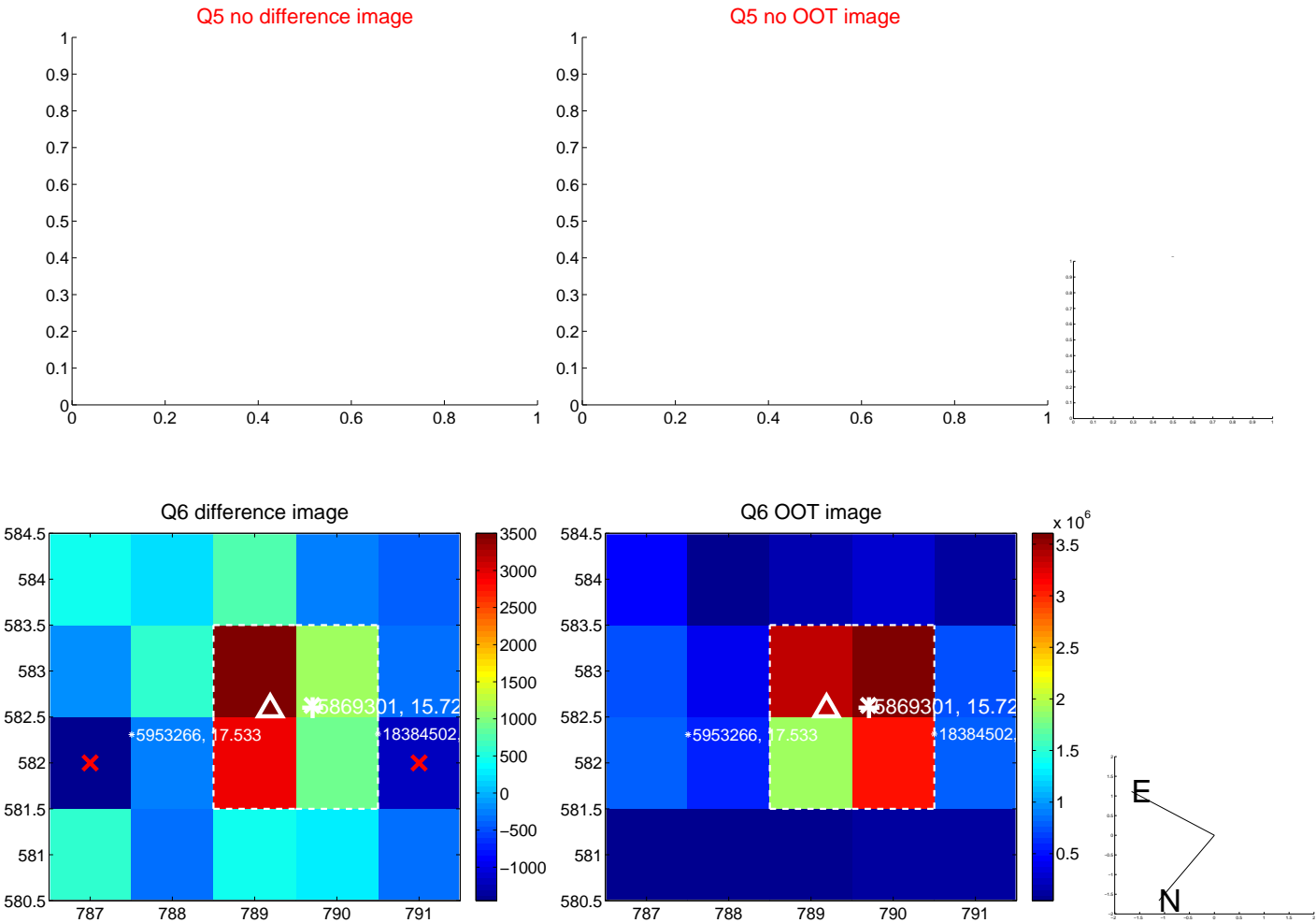


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

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

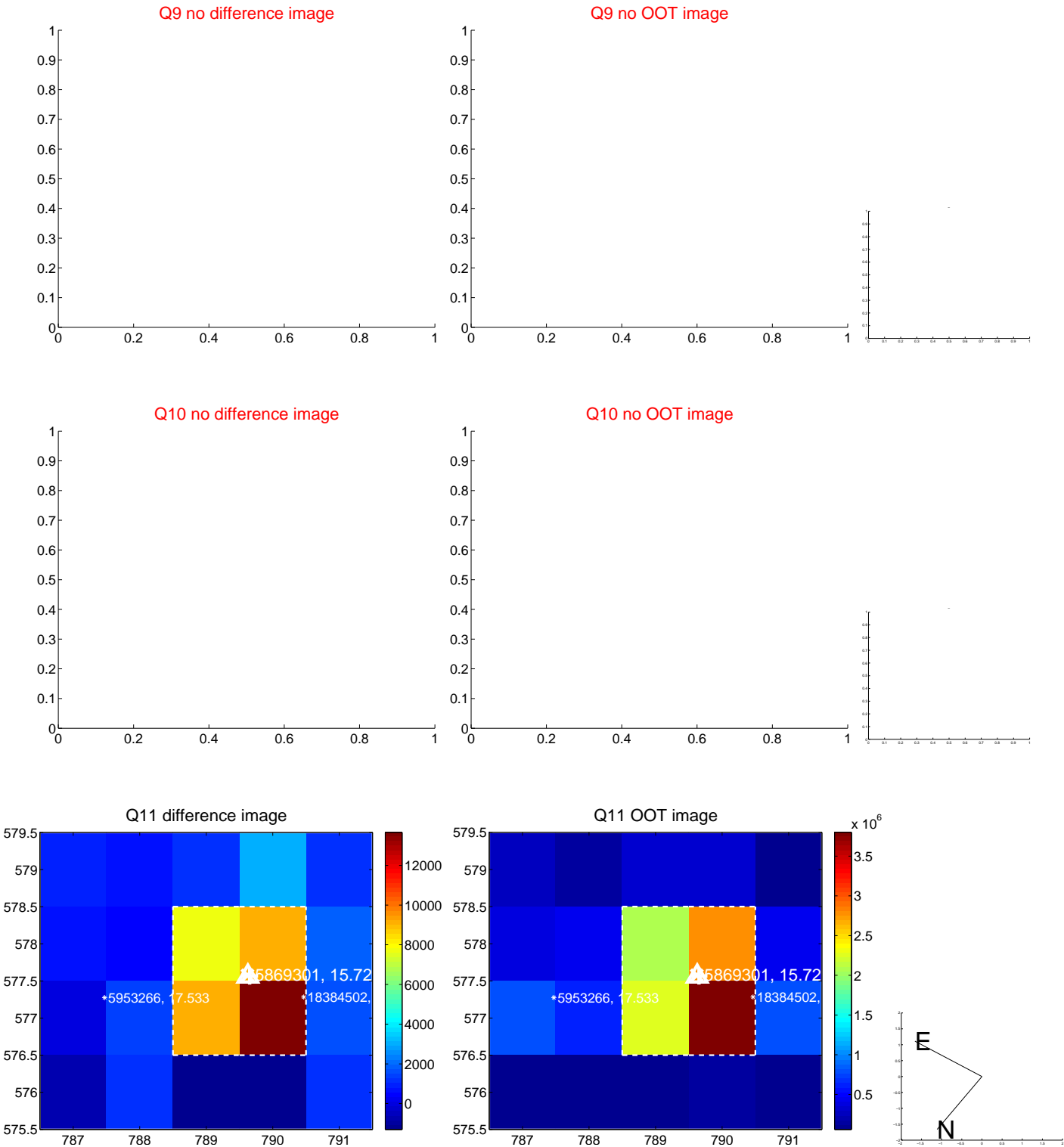


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white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



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

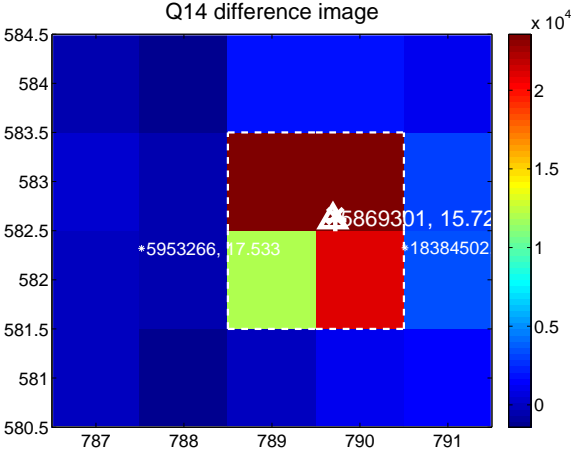
Q13 no difference image



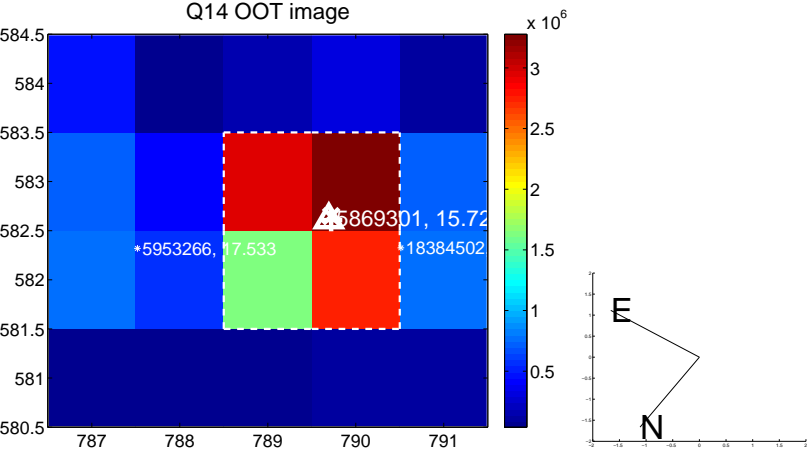
Q13 no OOT image



Q14 difference image



Q14 OOT image



Q15 no difference image



Q15 no OOT image



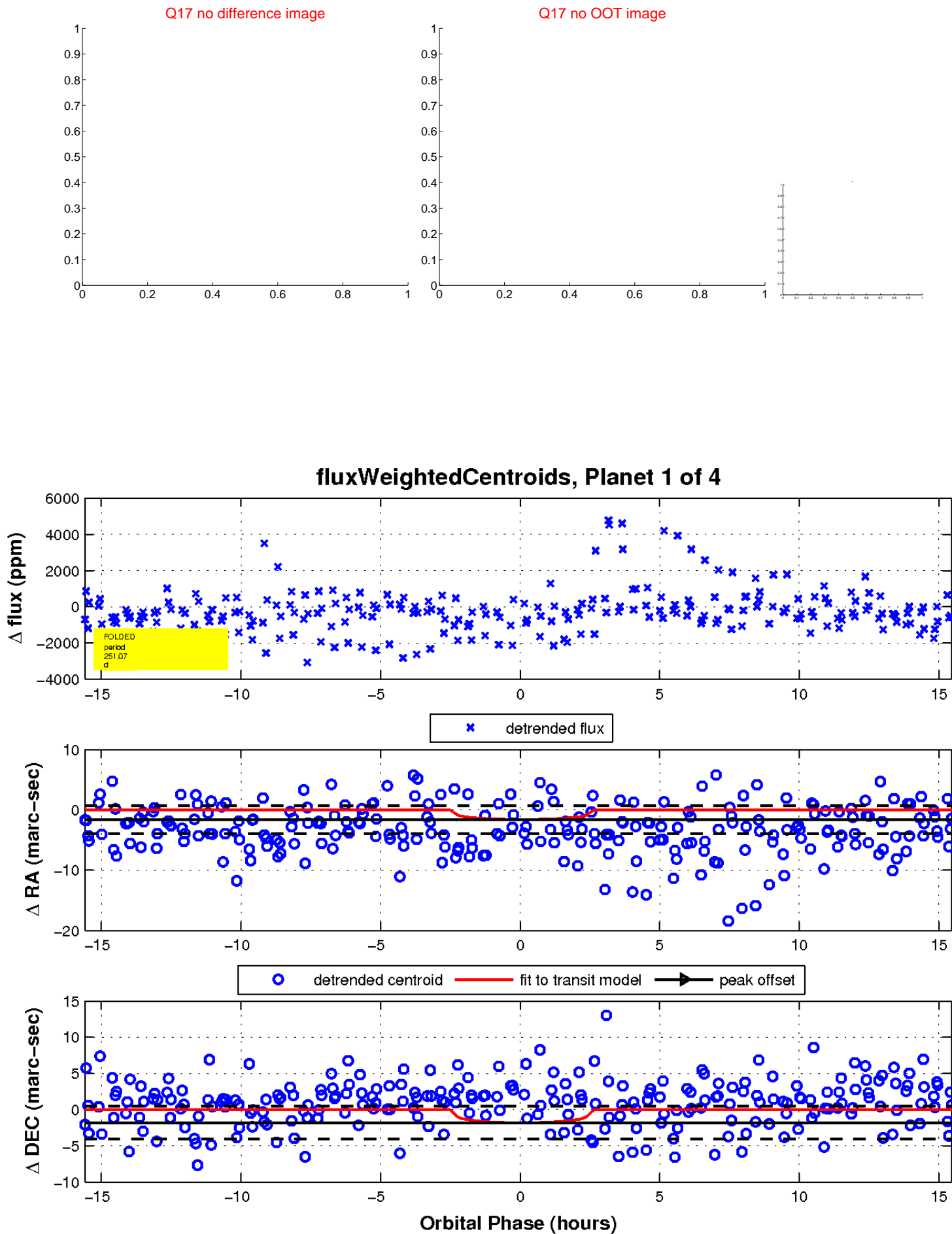
Q16 no difference image



Q16 no OOT image

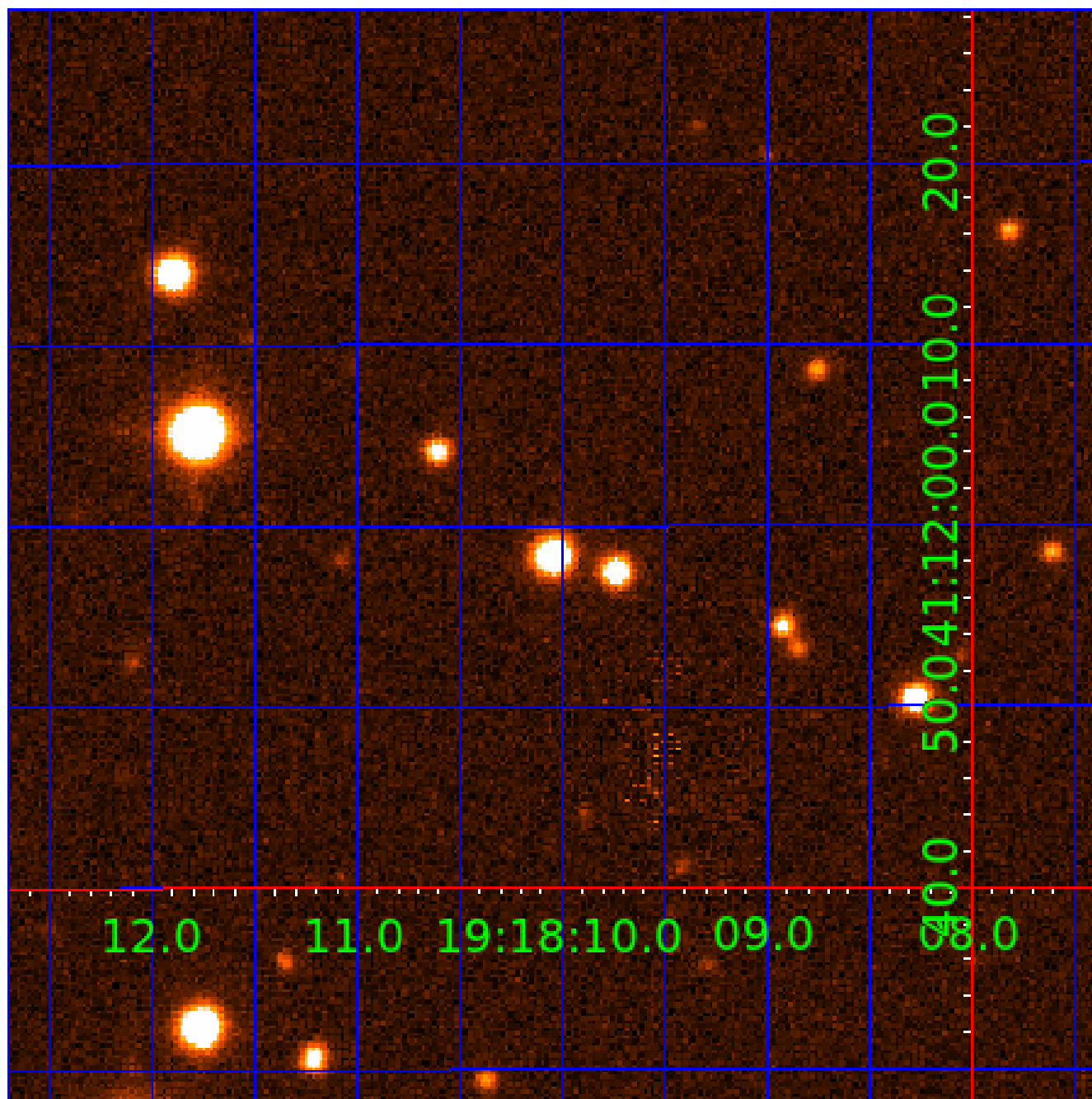


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 005869301

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005869301-01	OBS	No	251.068109	305.580181	1060.0	5.232	11.8	5.5	0.76	4893	2.65	0.60
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005869301-04	OBS	No	393.927445	419.471147	1868.0	6.283	15.9	8.7	0.76	4893	3.24	0.33

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005869301-01	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
005869301-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005869301-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
005869301-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

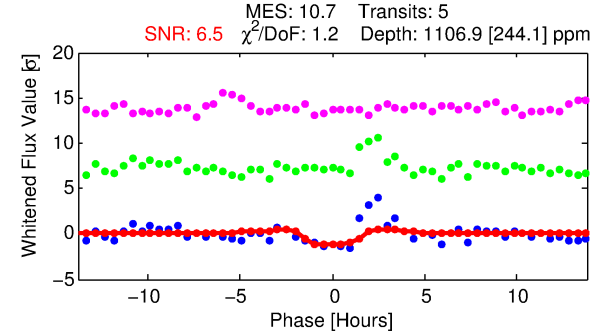
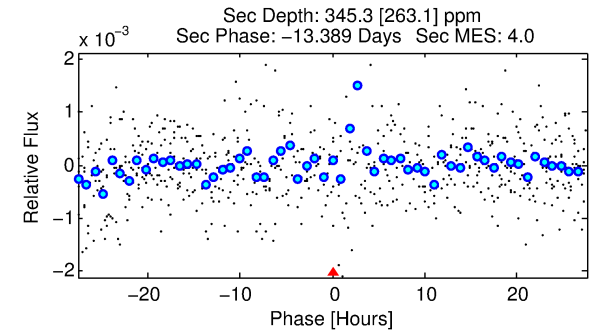
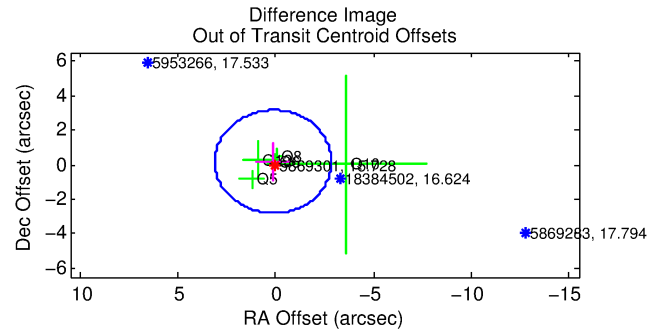
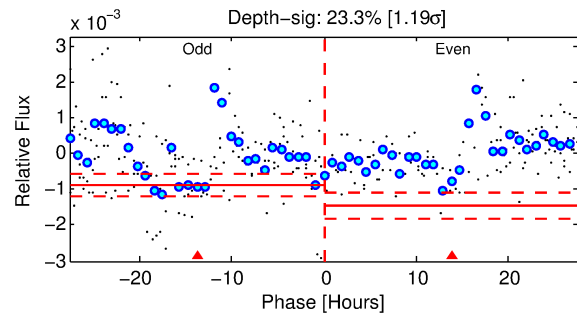
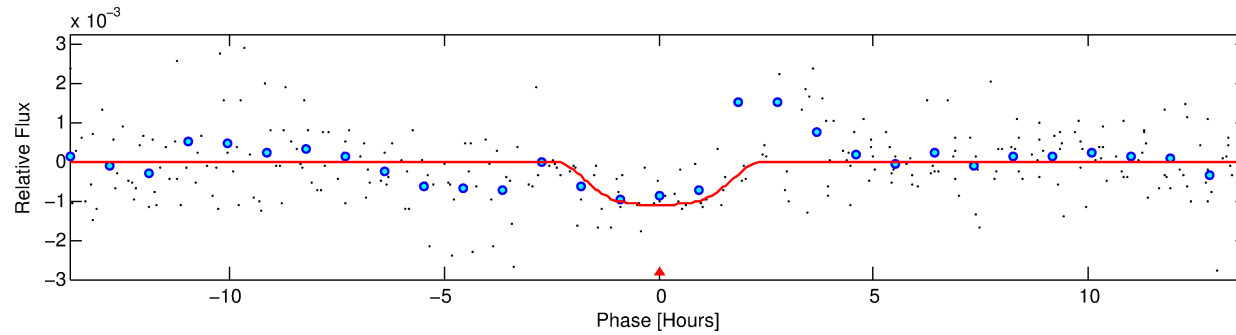
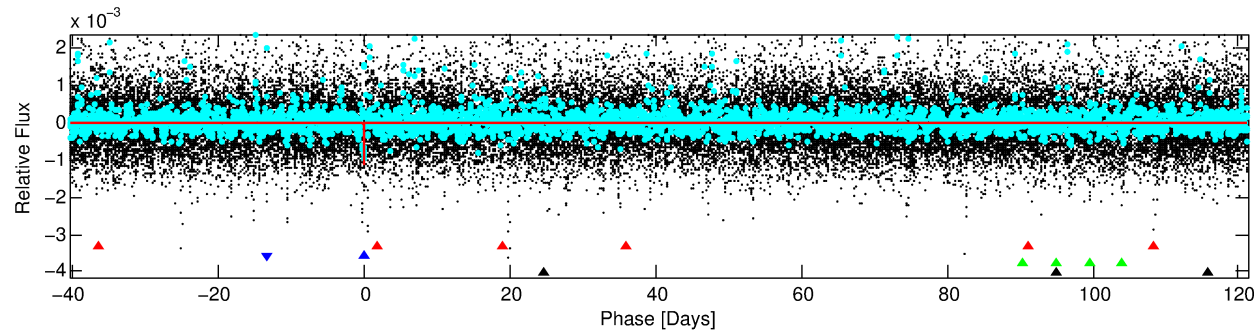
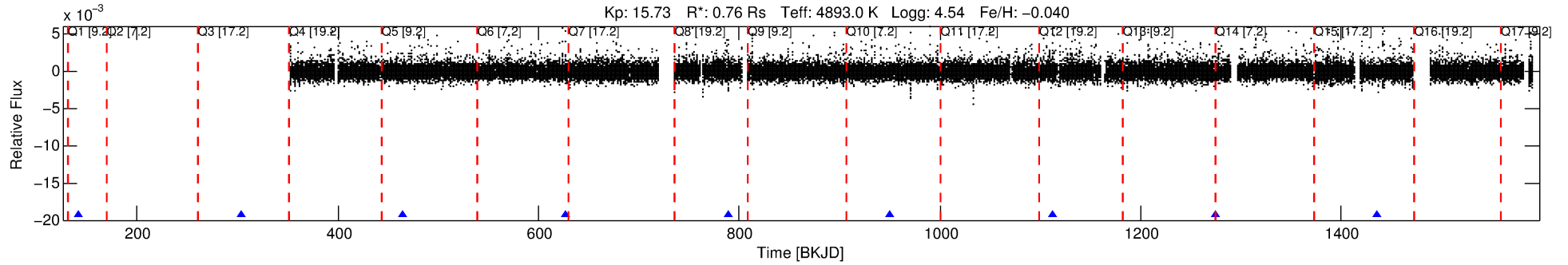
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 005869301-02

No Significant Match Found

# DV One-Page Summary

KIC: 5869301 Candidate: 2 of 4 Period: 161.720 d



## DV Fit Results:

Period = 161.72011 [0.00582] d  
Epoch = 141.9545 [0.0249] BKJD  
Rp/R\* = 0.0397 [0.0075]  
a/R\* = 119.53 [53.87]  
b = 0.94 [0.06]  
Seff = 1.08 [0.20]  
Teq = 260 [12] K  
Rp = 3.30 [0.70] Re  
a = 0.5246 [0.0450] AU  
Ag = 4813.79 [4141.48] [1.16σ]  
Teffp = 3348 [722] K [4.28σ]

## DV Diagnostic Results:

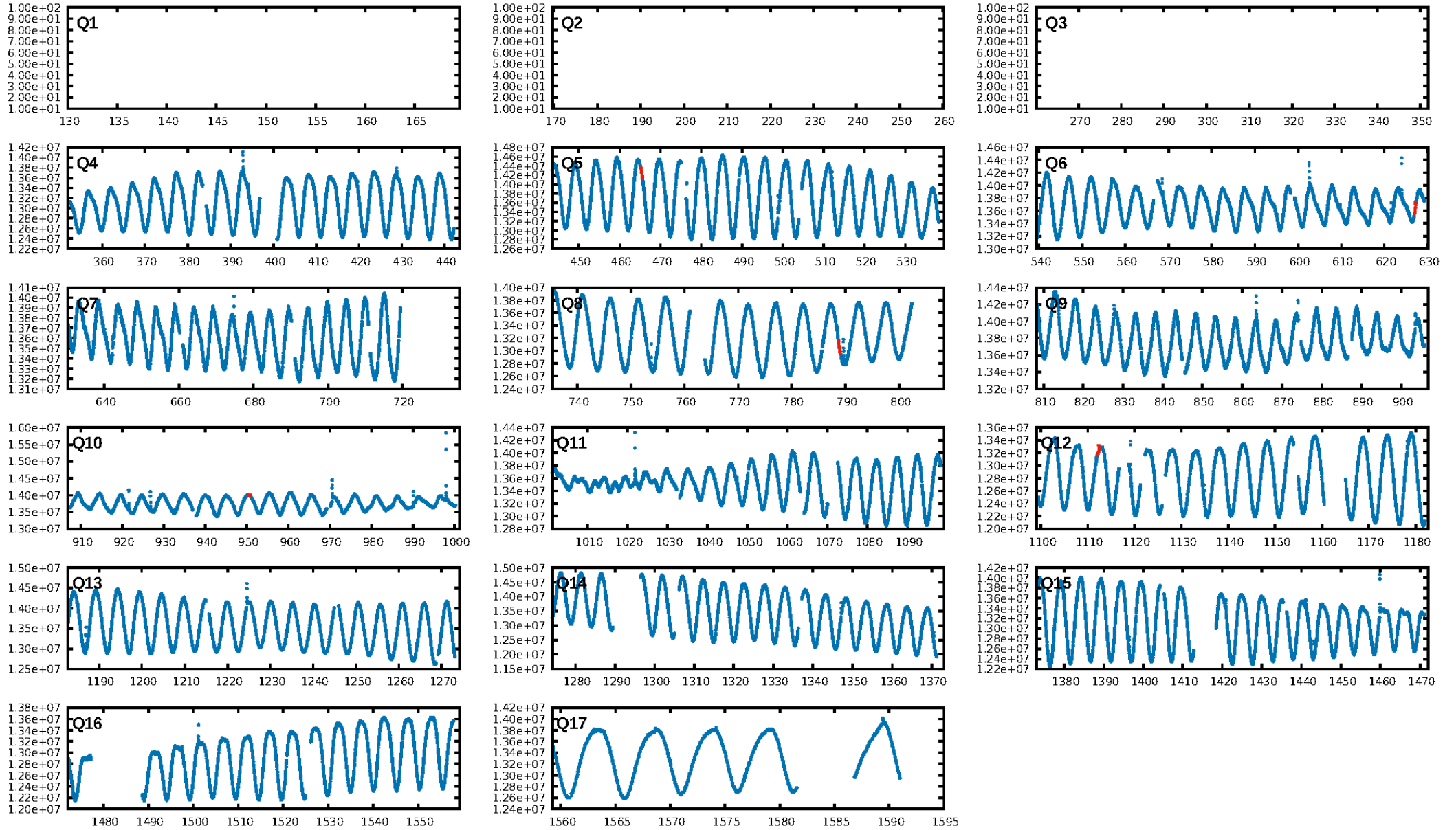
ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [308.40σ]  
ModelChiSquare2-sig: 4.4%  
ModelChiSquareGof-sig: 99.8%  
**Bootstrap-pfa: 1.58e-12**  
RollingBand-fgt: 1.00 [5/5]  
GhostDiagnostic-chr: -13.1  
Centroid-sig: 12.8%  
Centroid-so: 2.522 arcsec [1.42σ]  
OotOffset-rm: 0.219 arcsec [0.22σ]  
KicOffset-rm: 0.315 arcsec [0.30σ]  
OotOffset-st: 2/0/2/1 [5]  
KicOffset-st: 2/0/2/1 [5]  
DiffImageQuality-fgm: 0.40 [2/5]  
DiffImageOverlap-fno: 1.00 [5/5]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 12:09:23 Z

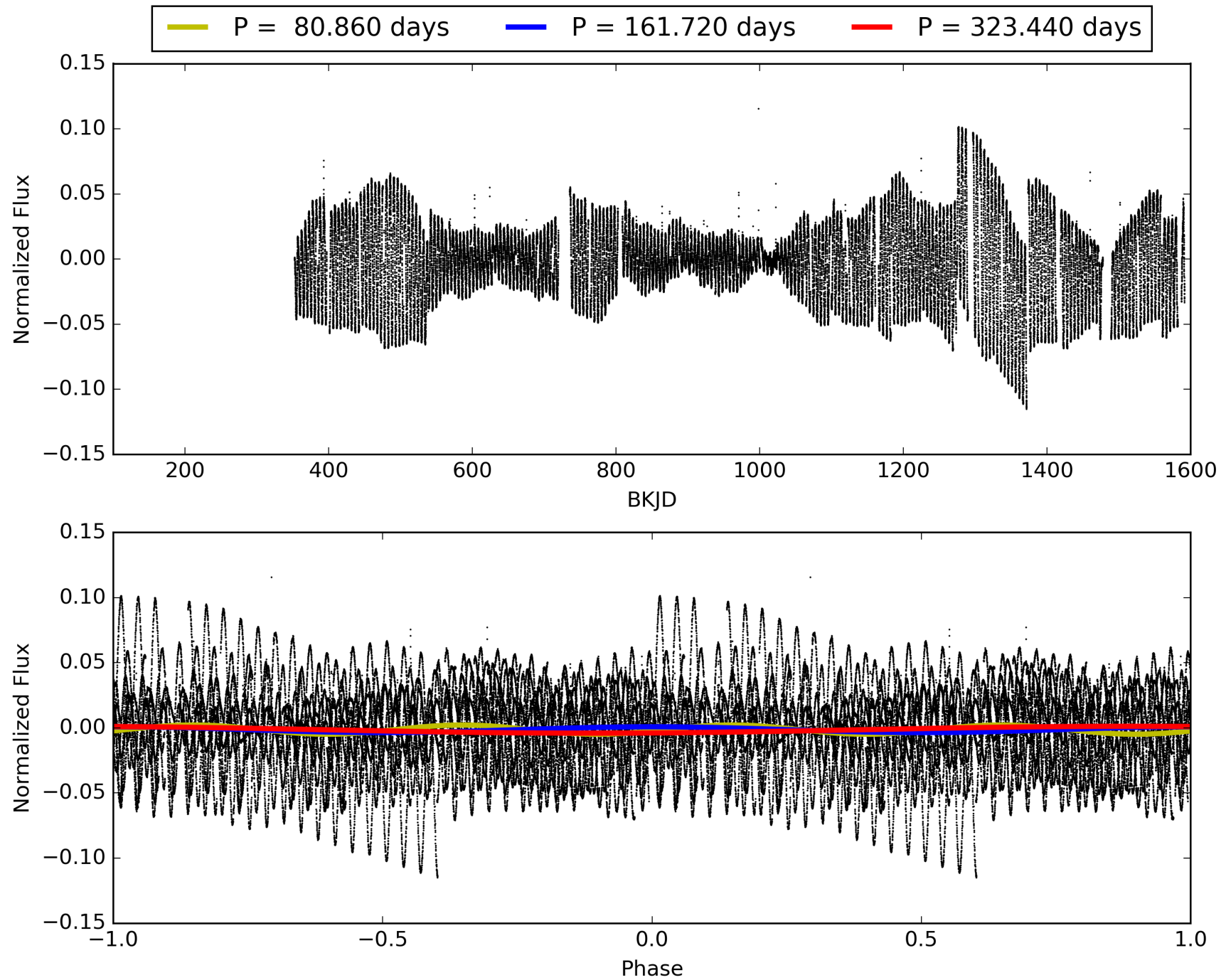
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 005869301-02, PDC Light Curves

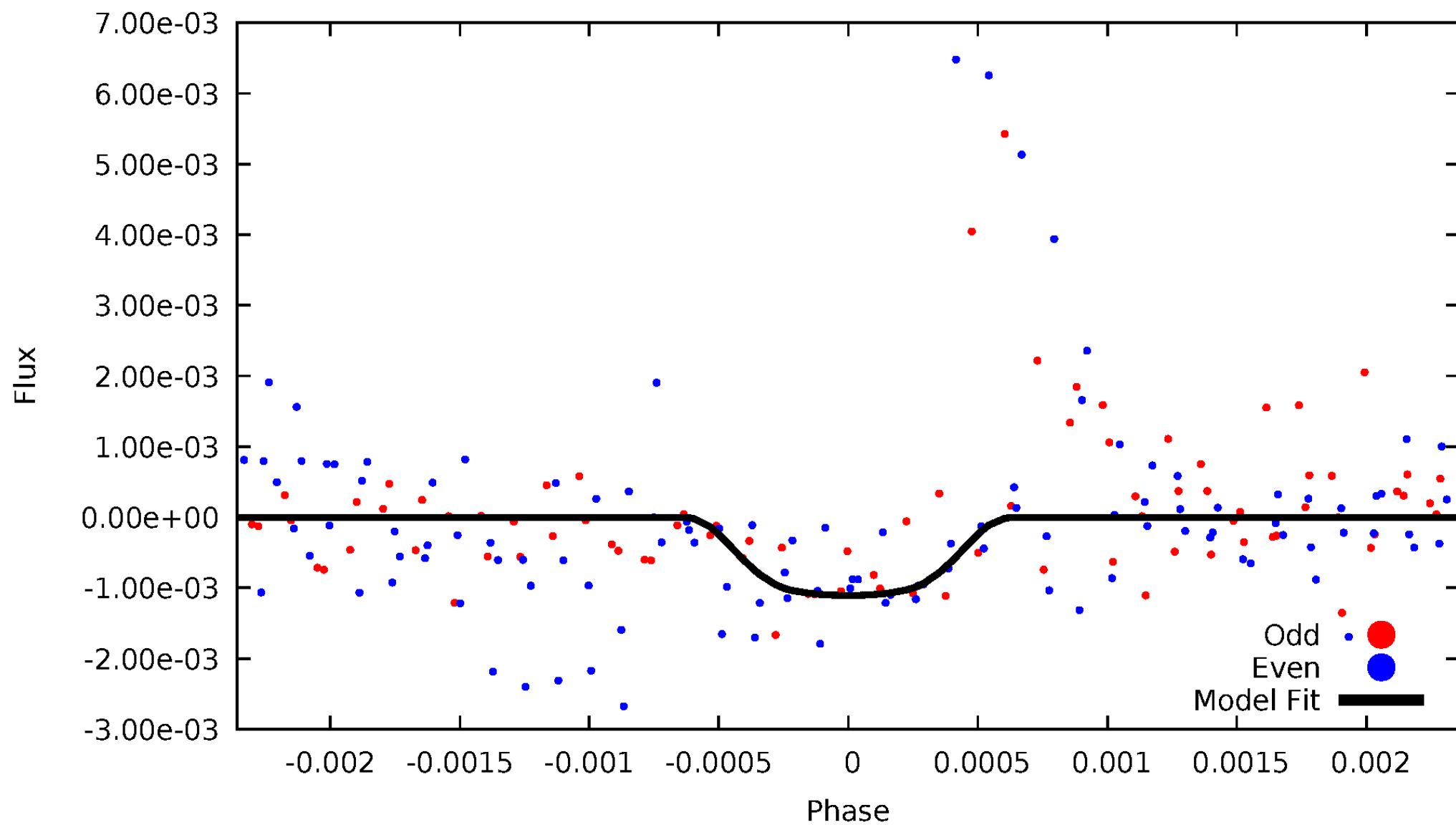


# TCE 005869301-02



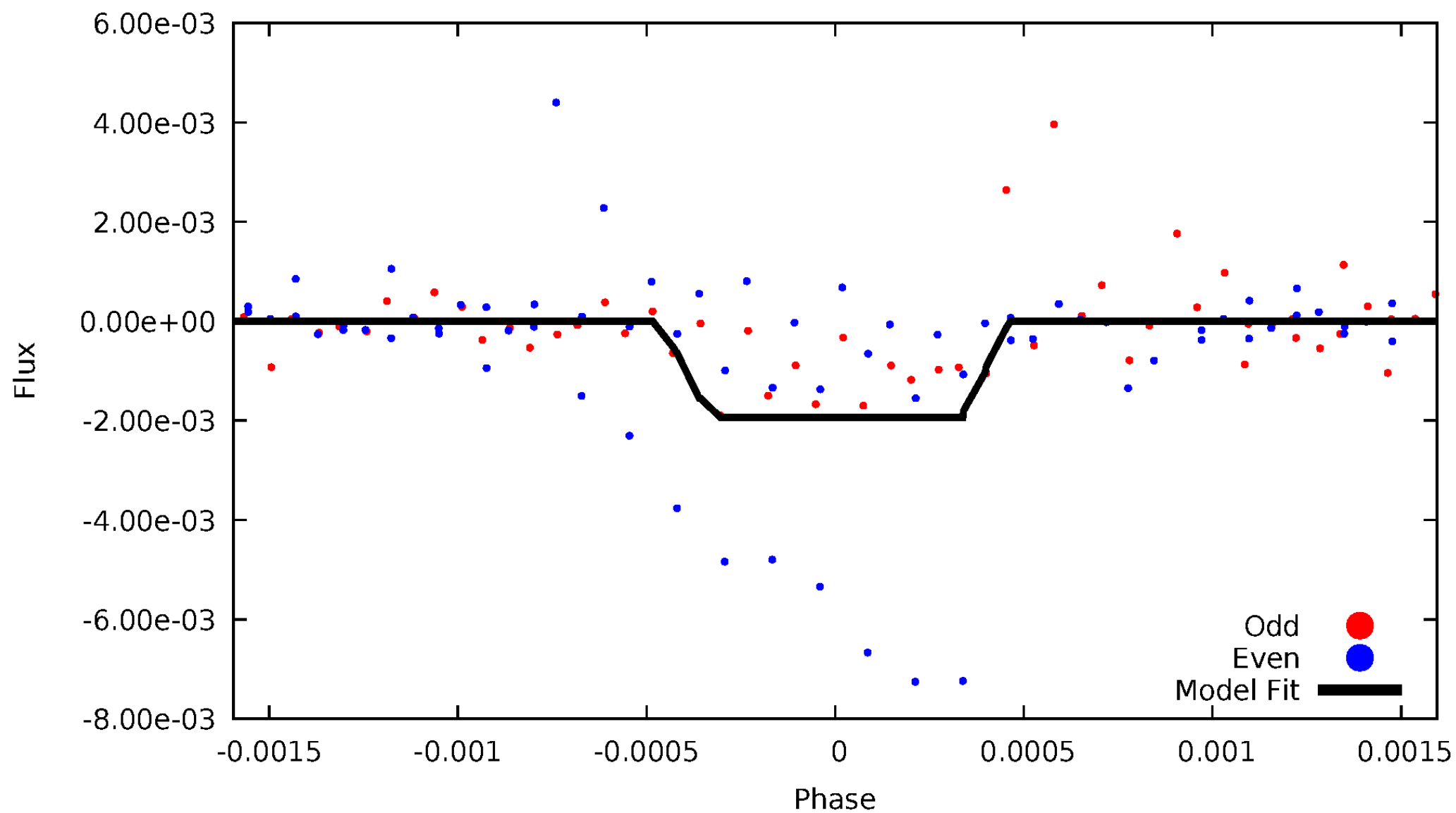
# DV Odd/Even

TCE 005869301-02



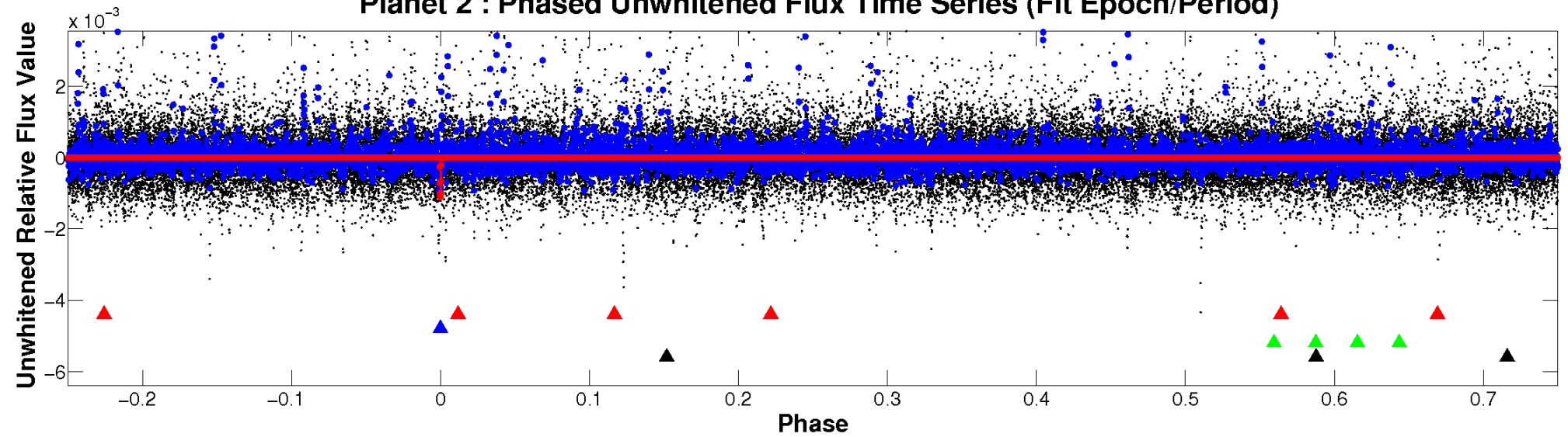
# ALT Odd/Even

TCE 005869301-02

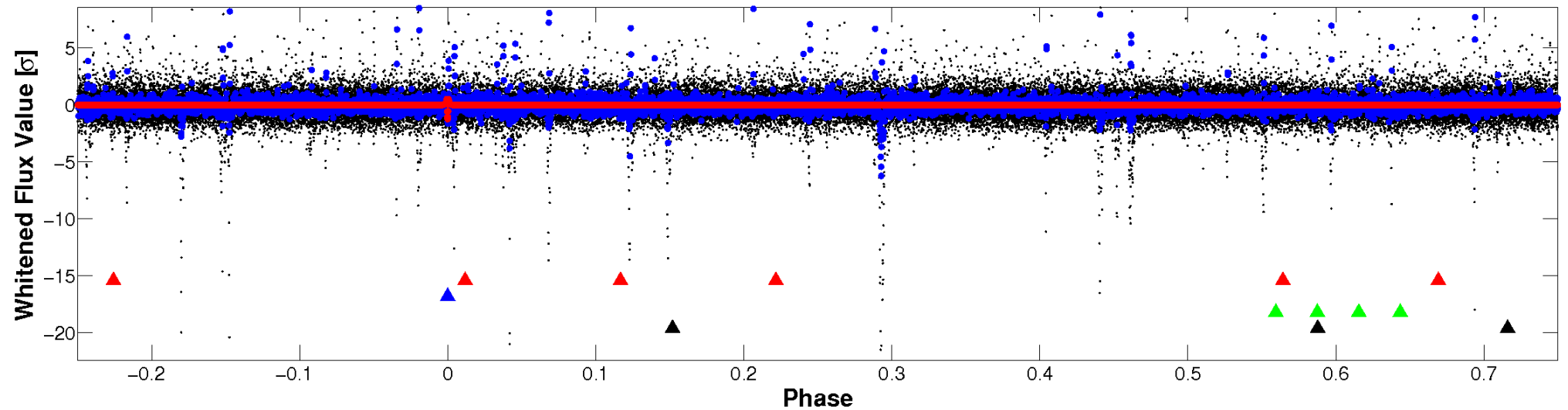


# Non-Whitened Vs. Whitened Light Curve

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

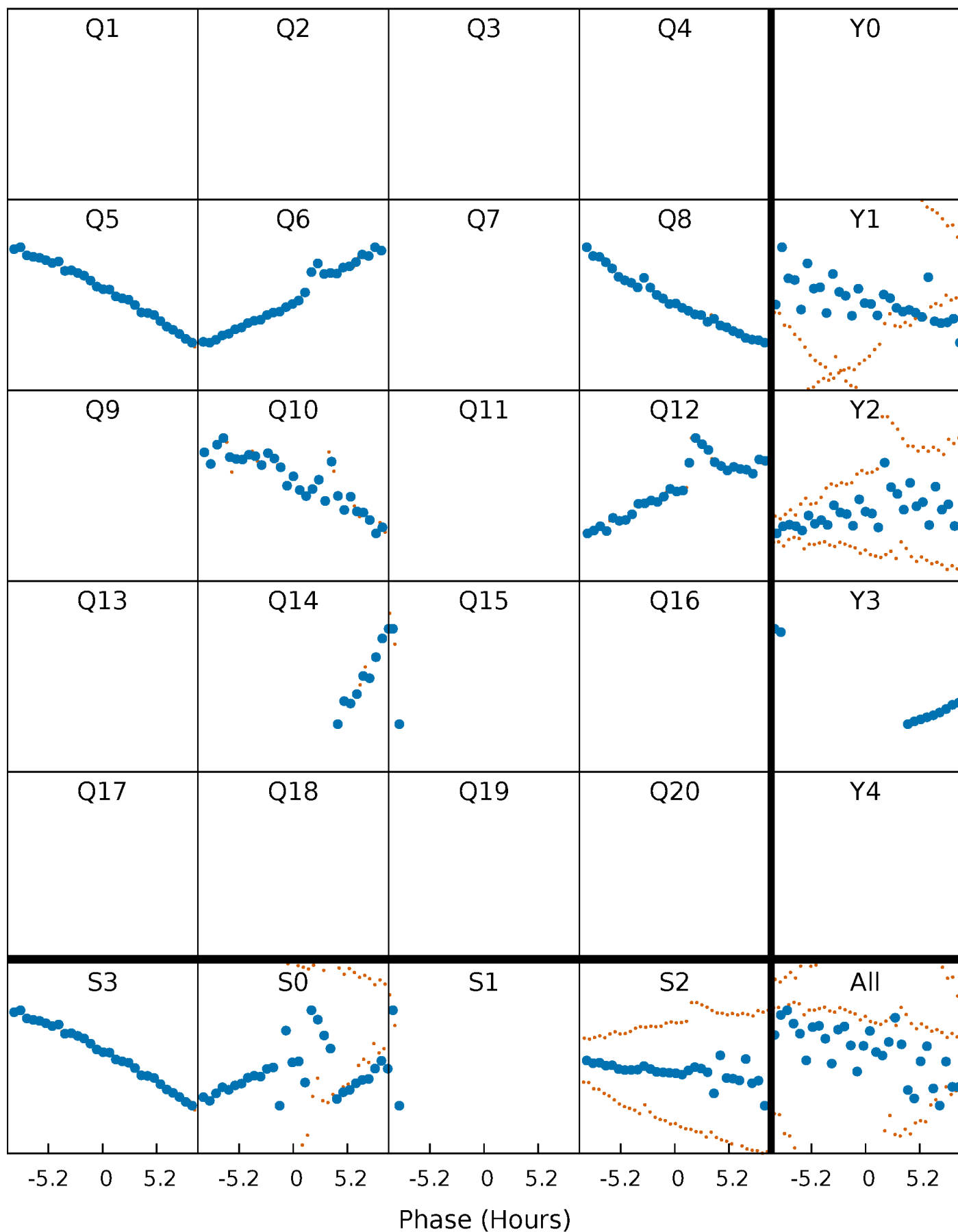


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

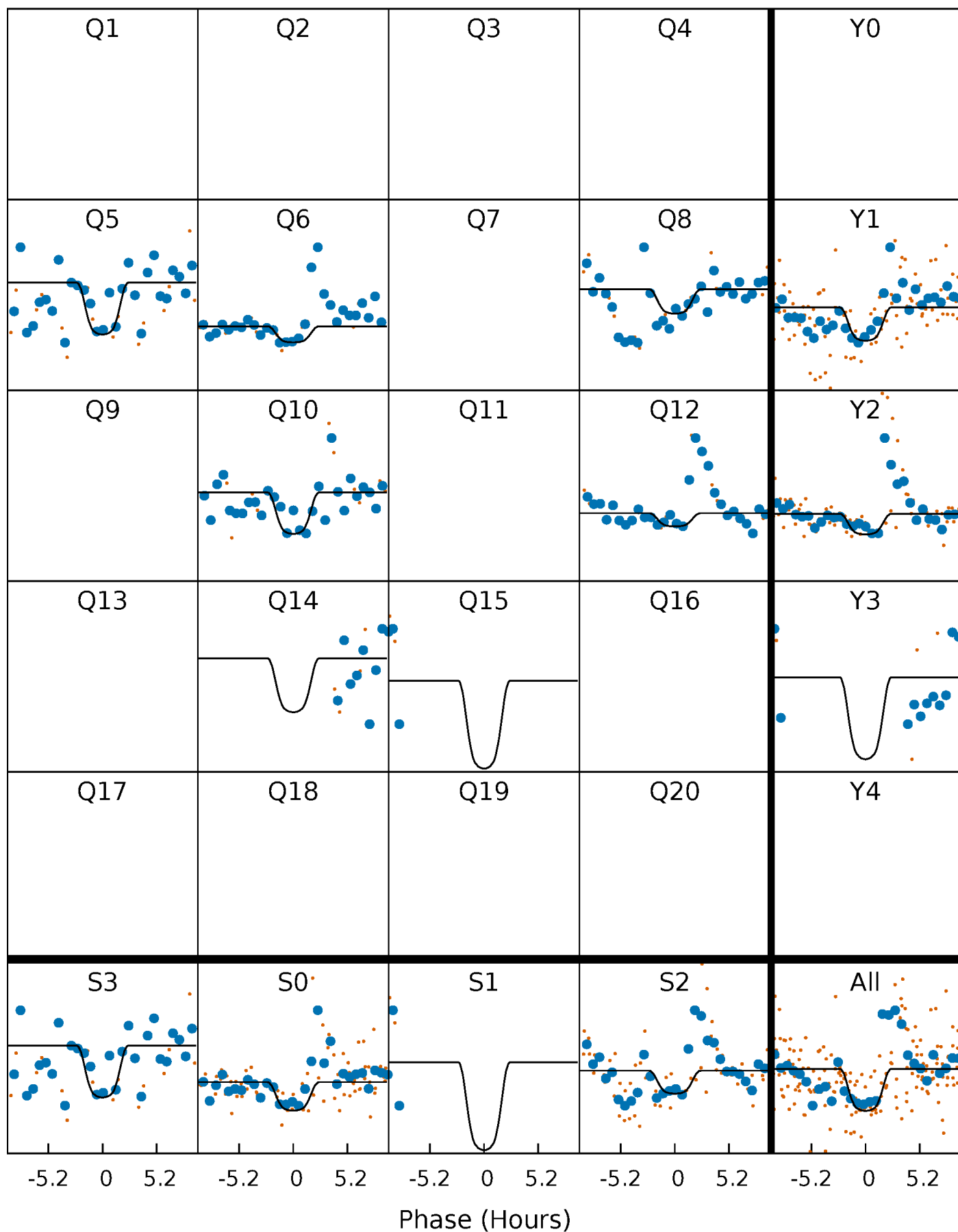
TCE 005869301-02     $P=161.720109$  Days     $T_0=141.954502$  (BKJD)





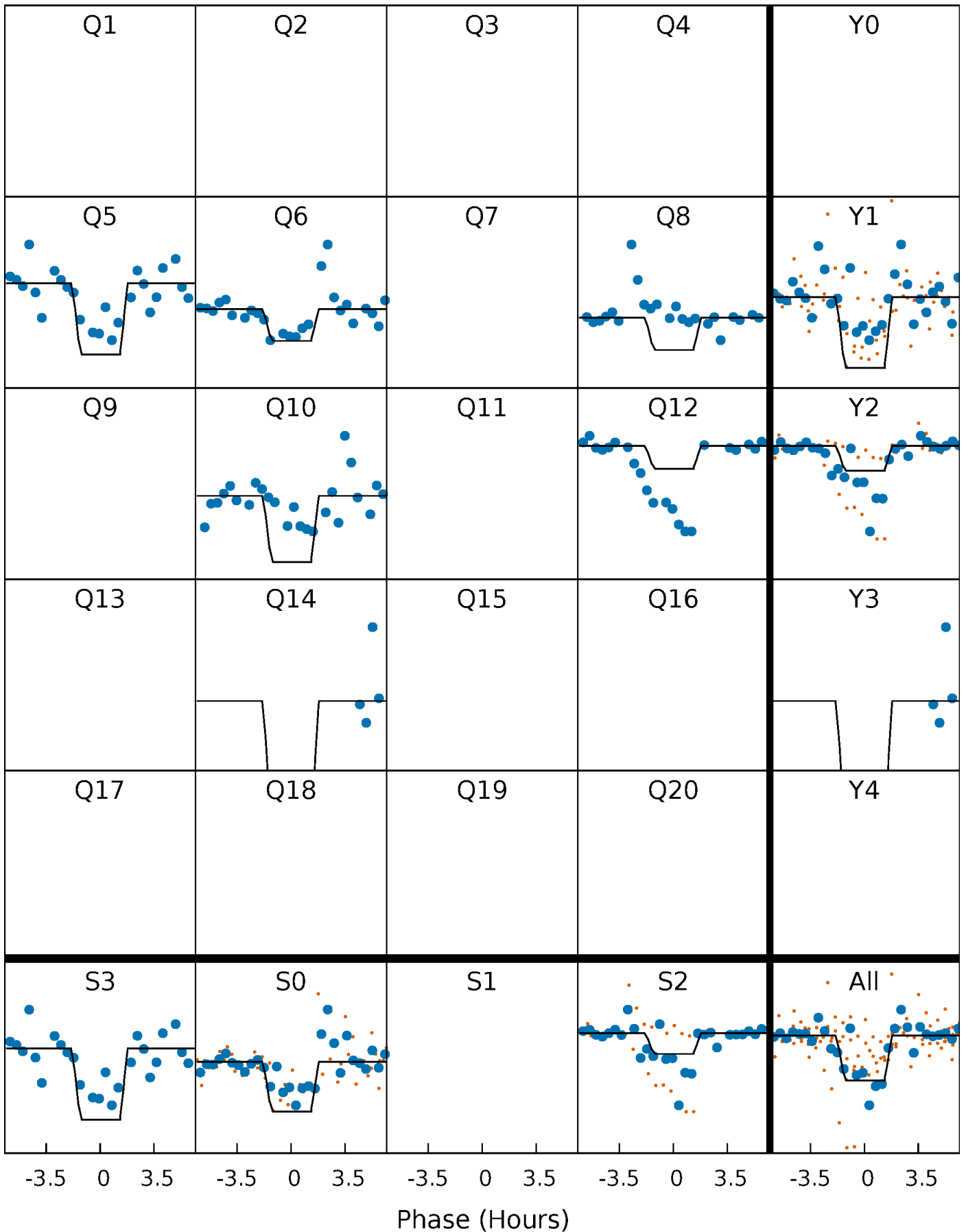
# DV Quarter-Phased Transit Curves

TCE 005869301-02     $P=161.720109$  Days     $T_0=141.954502$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

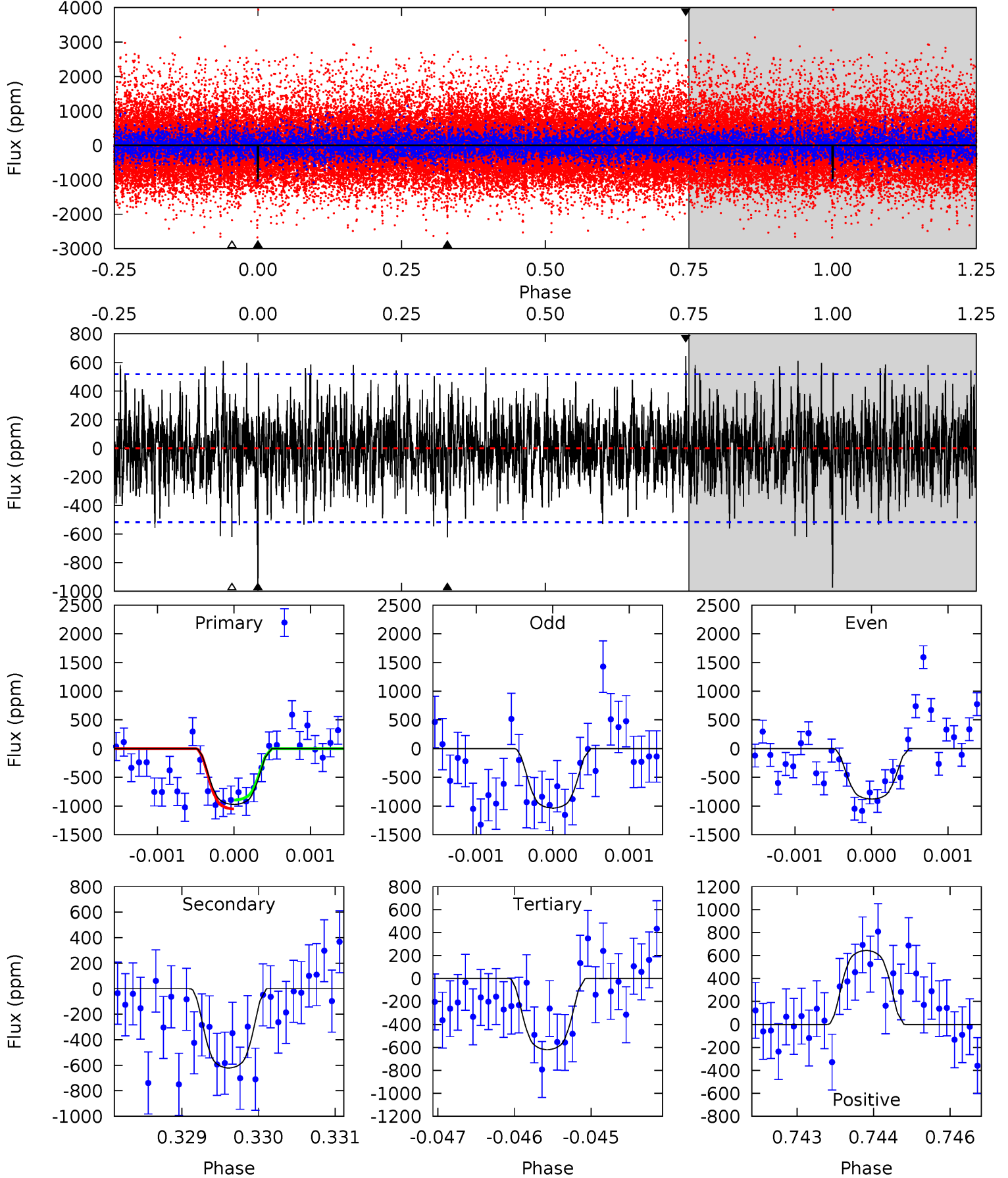
TCE 005869301-02 P=161.716219 Days  $T_0=141.969895$  (BKJD)



# DV Model-Shift Uniqueness Test

005869301-02, P = 161.720109 Days, E = 141.954502 Days

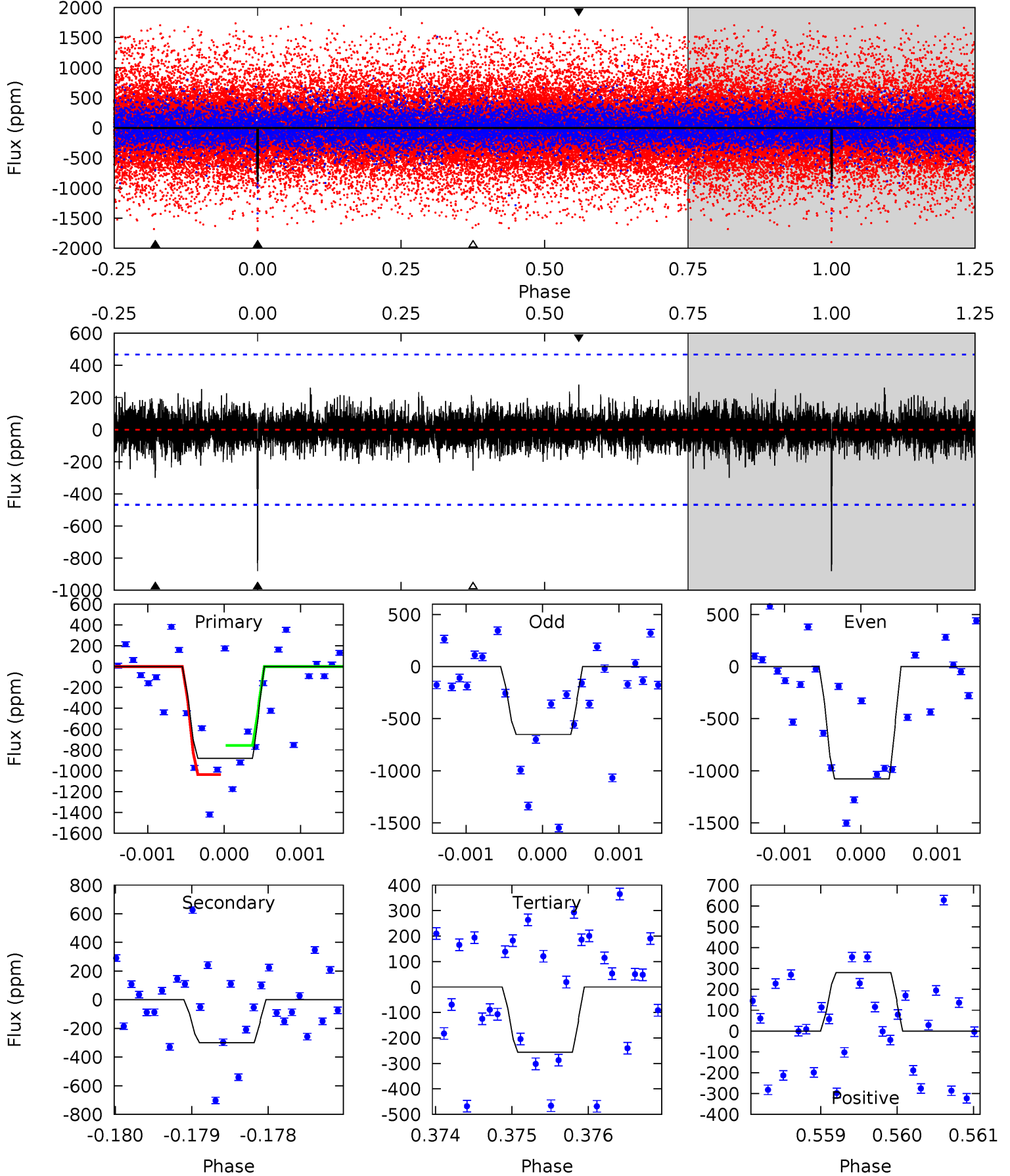
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.2	6.49	6.48	6.72	5.41	3.22	1.84	3.68	3.44	0.01	-0.23	0.80	0.91	0.40	0.81



# Alt Model-Shift Uniqueness Test

005869301-02, P = 161.716219 Days, E = 141.969895 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
10.3	3.50	2.99	3.29	5.47	3.32	0.73	7.32	7.02	0.51	0.22	2.50	1.56	0.24	1.63



### Stellar Parameters For KIC 005869301

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4893^{+170}_{-170}$	$4.542^{+0.072}_{-0.048}$	$-0.040^{+0.300}_{-0.300}$	$0.761^{+0.068}_{-0.075}$	$0.735^{+0.083}_{-0.060}$	$2.353^{+0.746}_{-0.394}$
	+3%/-3%	+2%/-1%	+750%/-750%	+9%/-10%	+11%/-8%	+32%/-17%
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 005869301-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-621 \pm 96$	$3.23^{+0.63}_{-0.66}$	$363^{+14}_{-16}$	$4094^{+411}_{-277}$	$8826^{+5808}_{-2804}$
Alt.	$-299 \pm 85$	$3.63^{+0.64}_{-0.62}$	$362^{+15}_{-15}$	$3483^{+270}_{-250}$	$3409^{+1923}_{-1310}$

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

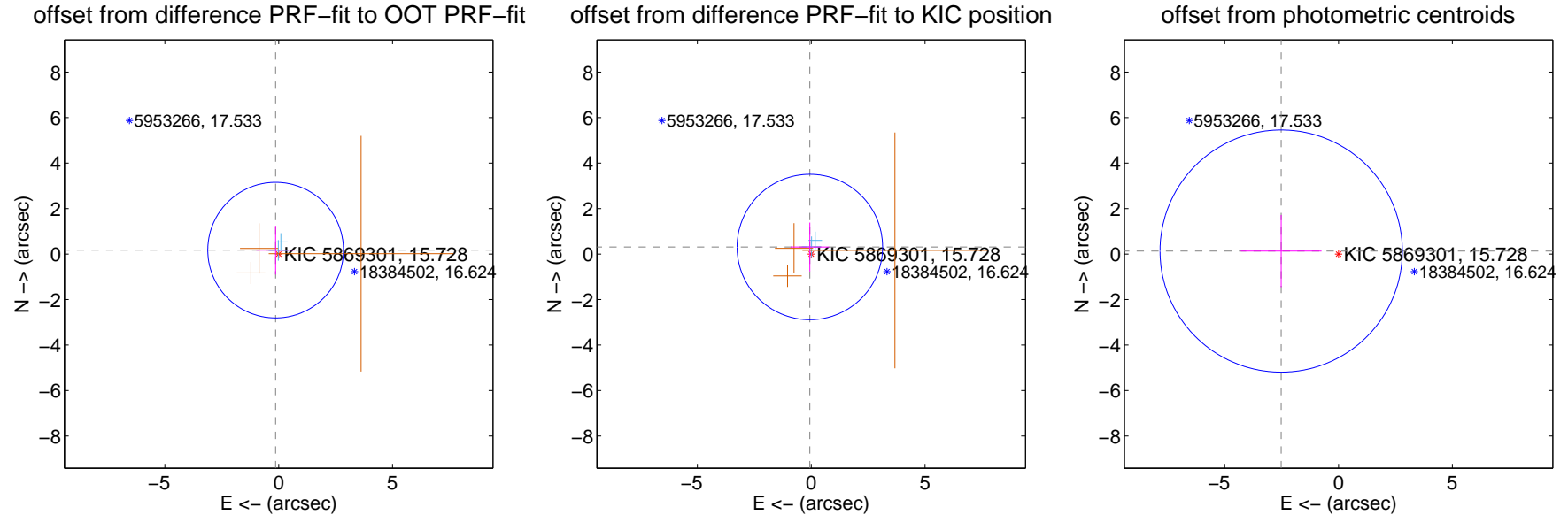
## DV Centroid Data

Supplemental centroid analysis for 005869301-02. Kepler magnitude: 15.73. Transit SNR 6.47

There are 2 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.11 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.219 \pm 0.993$	0.22	$0.135 \pm 0.848$	$0.172 \pm 1.073$
PRF-fit source offset from KIC position	$0.315 \pm 1.065$	0.30	$0.060 \pm 0.848$	$0.310 \pm 1.073$
photometric centroid source offset	$2.52 \pm 1.77$	1.42	$2.52 \pm 1.77$	$0.13 \pm 1.58$

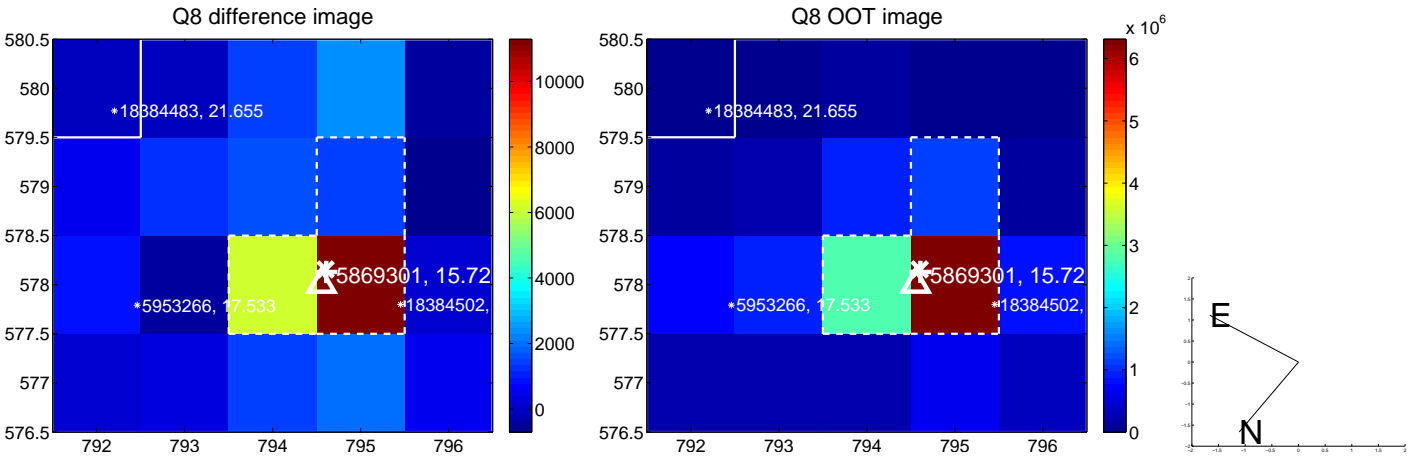
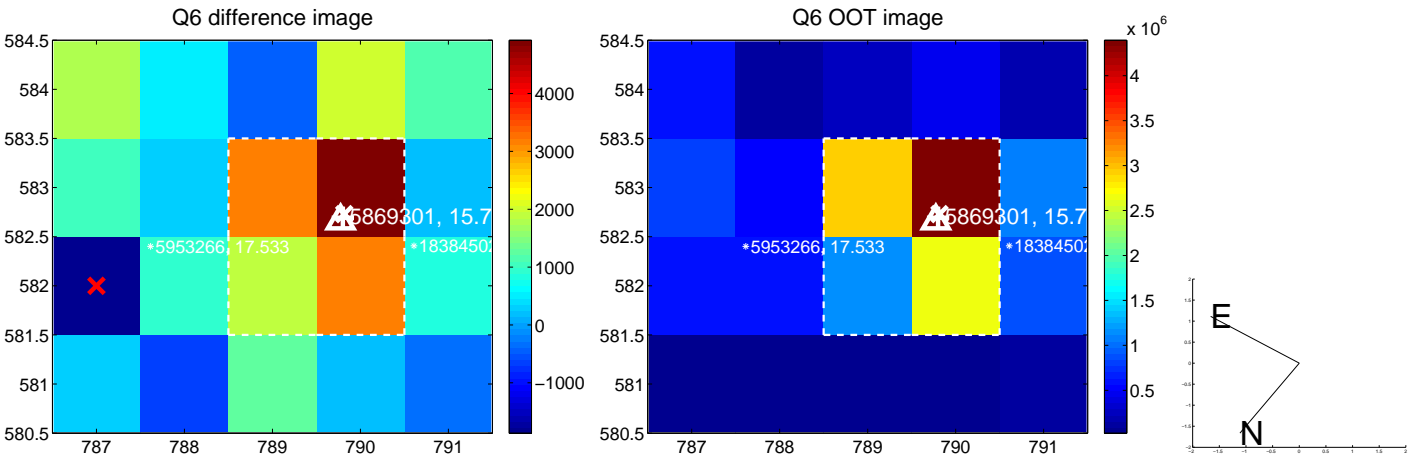
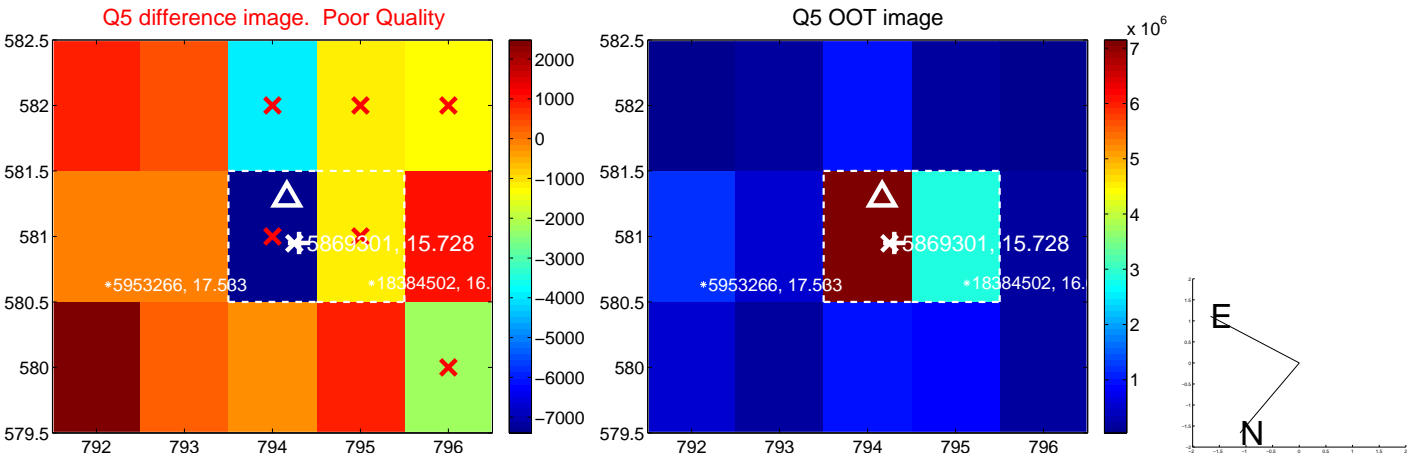


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

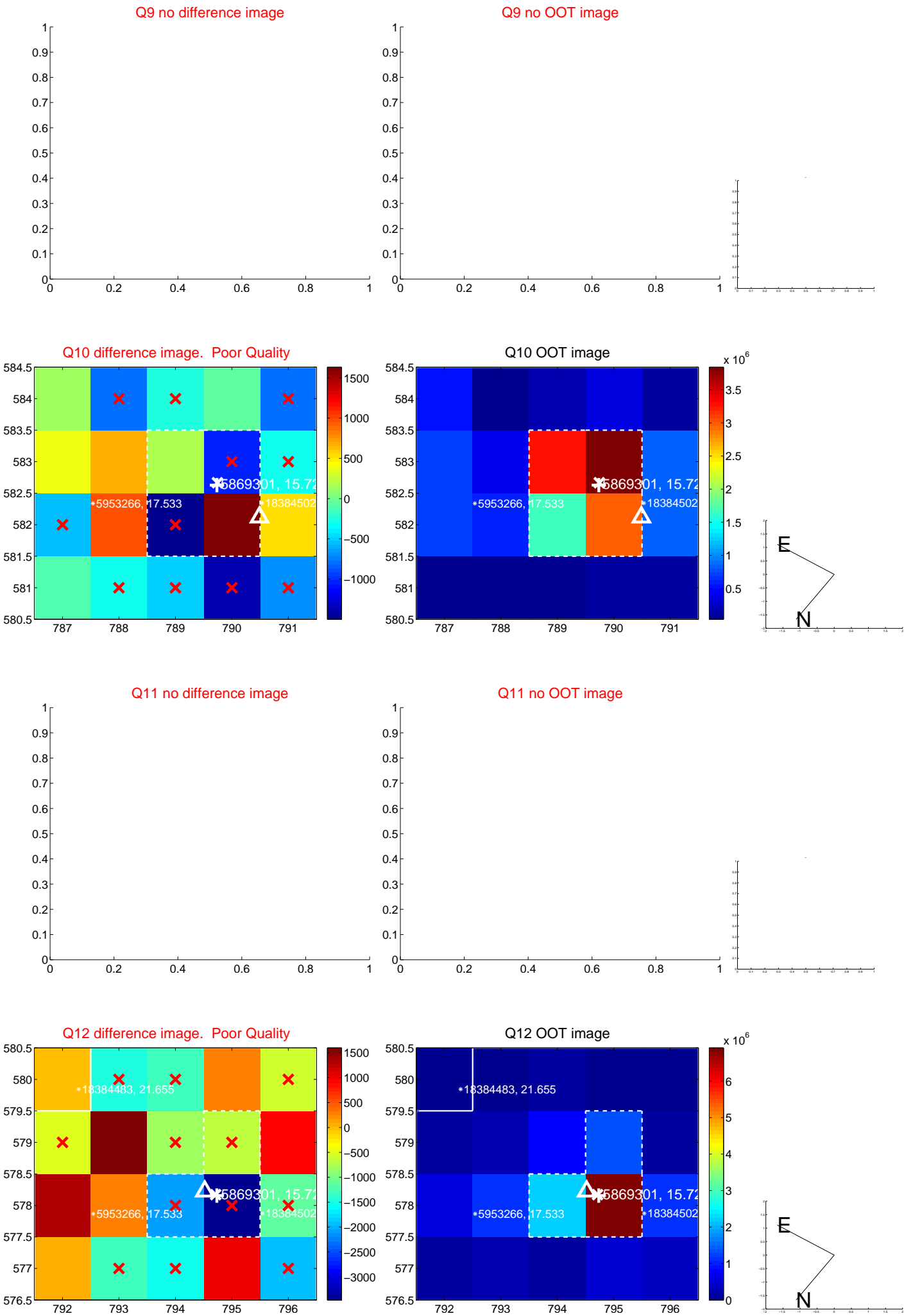


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





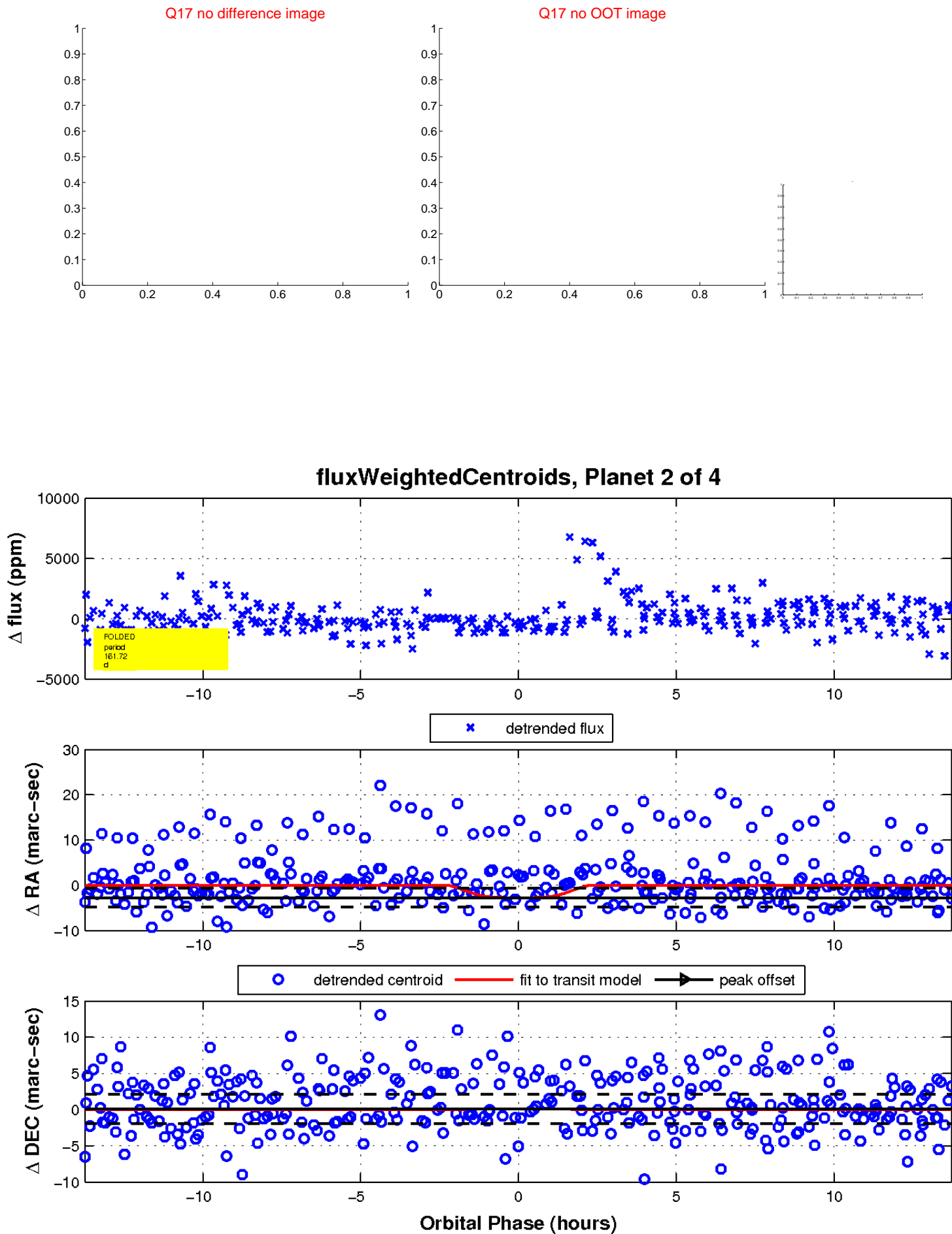
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

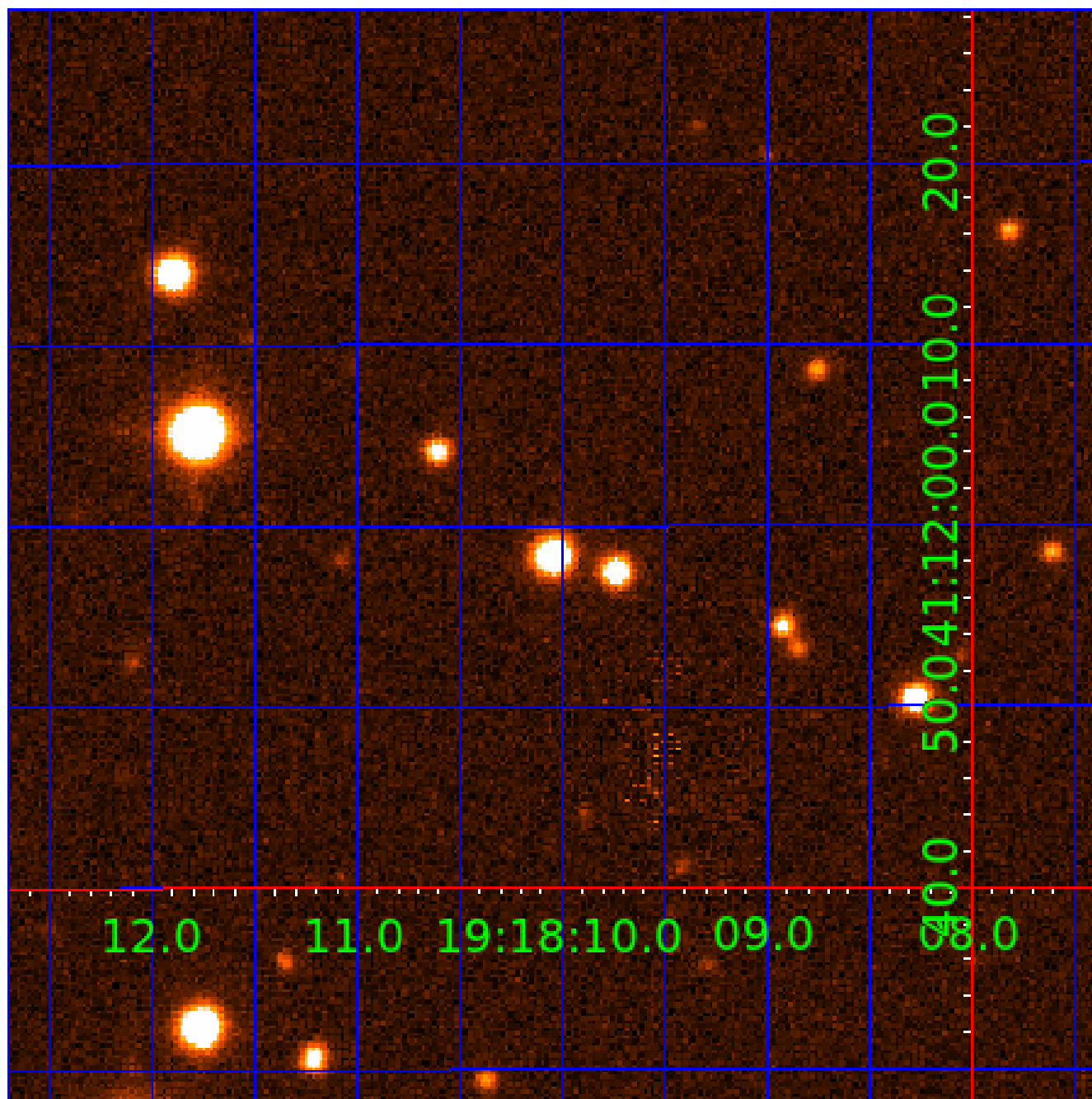


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 005869301

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005869301-01	OBS	No	251.068109	305.580181	1060.0	5.232	11.8	5.5	0.76	4893	2.65	0.60
005869301-02	OBS	No	161.720109	141.954502	1106.9	4.579	10.7	6.5	0.76	4893	3.29	1.08
005869301-03	OBS	No	327.969179	394.156197	1436.1	3.838	9.9	6.6	0.76	4893	3.23	0.42
005869301-04	OBS	No	393.927445	419.471147	1868.0	6.283	15.9	8.7	0.76	4893	3.24	0.33

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005869301-01	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
005869301-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005869301-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
005869301-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

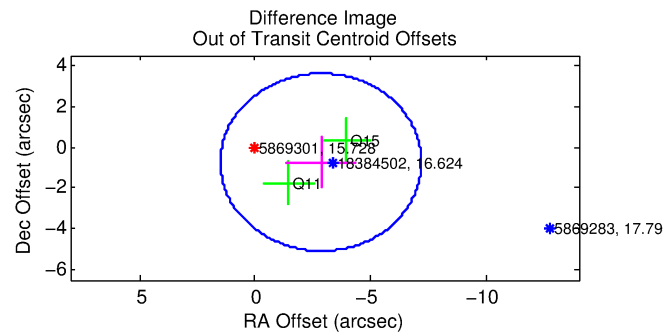
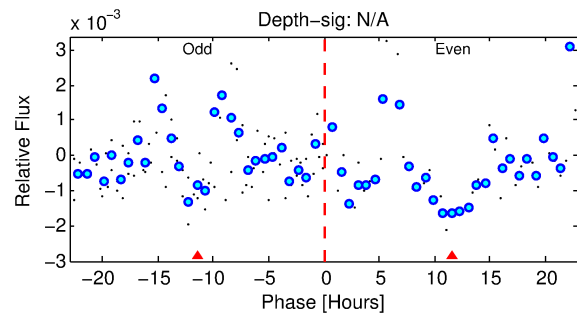
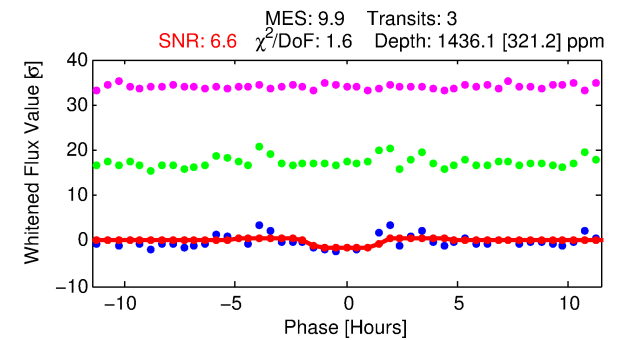
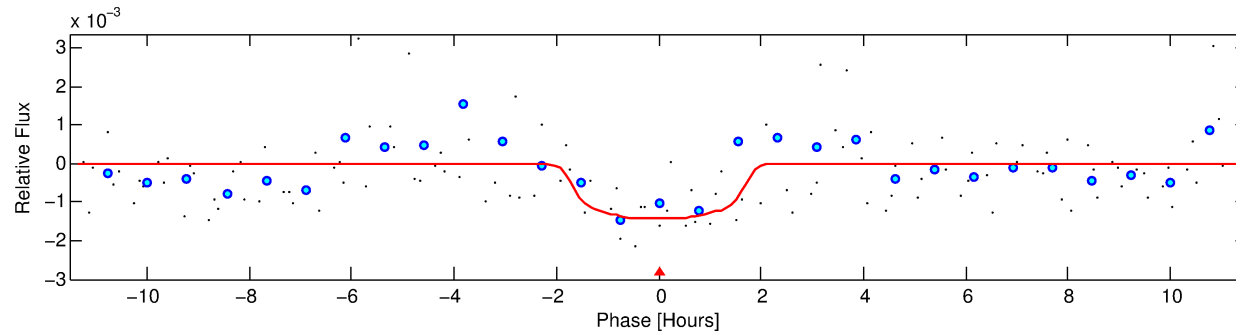
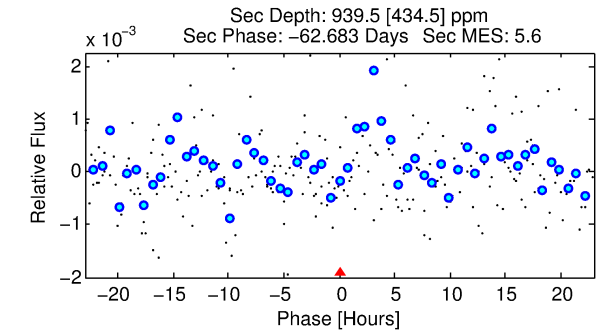
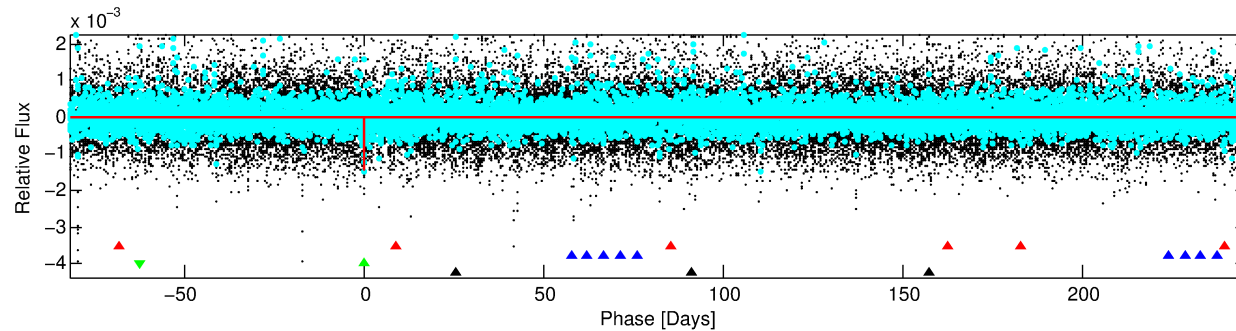
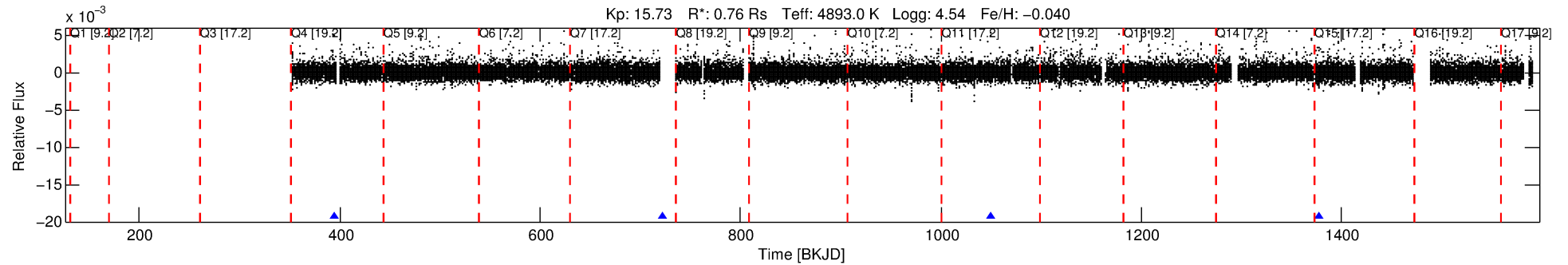
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 005869301-03

No Significant Match Found

# DV One-Page Summary

KIC: 5869301 Candidate: 3 of 4 Period: 327.969 d



## DV Fit Results:

Period = 327.96918 [0.00668] d  
Epoch = 394.1562 [0.0129] BKJD  
Rp/R\* = 0.0388 [0.0381]  
a/R\* = 437.07 [1462.43]  
b = 0.79 [1.60]  
Seff = 0.42 [0.08]  
Teq = 205 [10] K  
Rp = 3.23 [3.18] Re  
a = 0.8404 [0.0722] AU  
Ag = 35092.82 [70828.99] [0.50] $\sigma$   
Teffp = 4347 [2194] K [1.89] $\sigma$

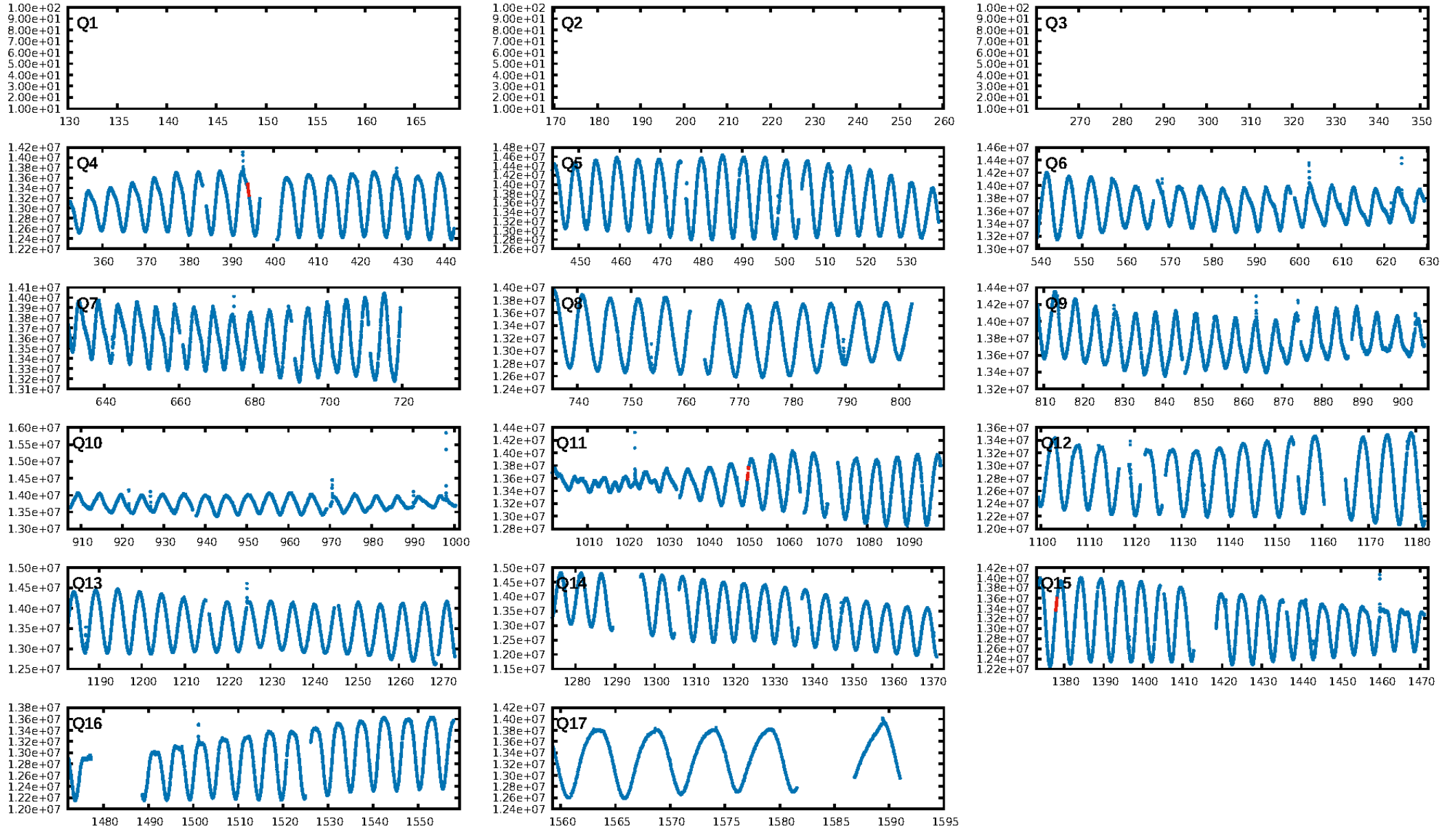
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [284.42 $\sigma$ ]  
LongPeriod-sig: 100.0% [215.02 $\sigma$ ]  
ModelChiSquare2-sig: 74.5%  
ModelChiSquareGof-sig: 95.7%  
**Bootstrap-pfa: 1.90e-09**  
RollingBand-fgt: 1.00 [3/3]  
**GhostDiagnostic-chr: 0.2368**  
Centroid-sig: 60.5%  
Centroid-so: 1.226 arcsec [0.62 $\sigma$ ]  
OotOffset-rm: 2.933 arcsec [2.02 $\sigma$ ]  
OotOffset-st: 0/2/0/0 [2]  
KicOffset-rm: 3.019 arcsec [2.12 $\sigma$ ]  
KicOffset-st: 0/2/0/0 [2]  
DiffImageQuality-fgm: 0.00 [0/2]  
DiffImageOverlap-fno: 1.00 [3/3]

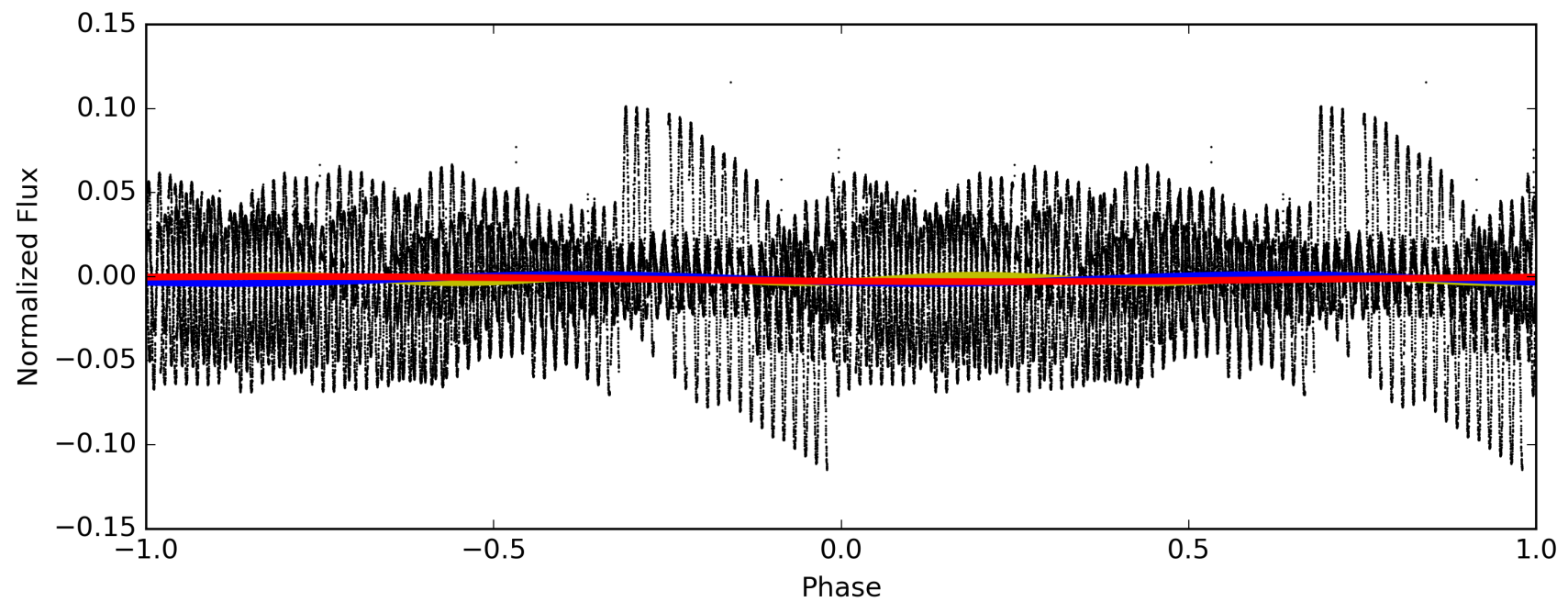
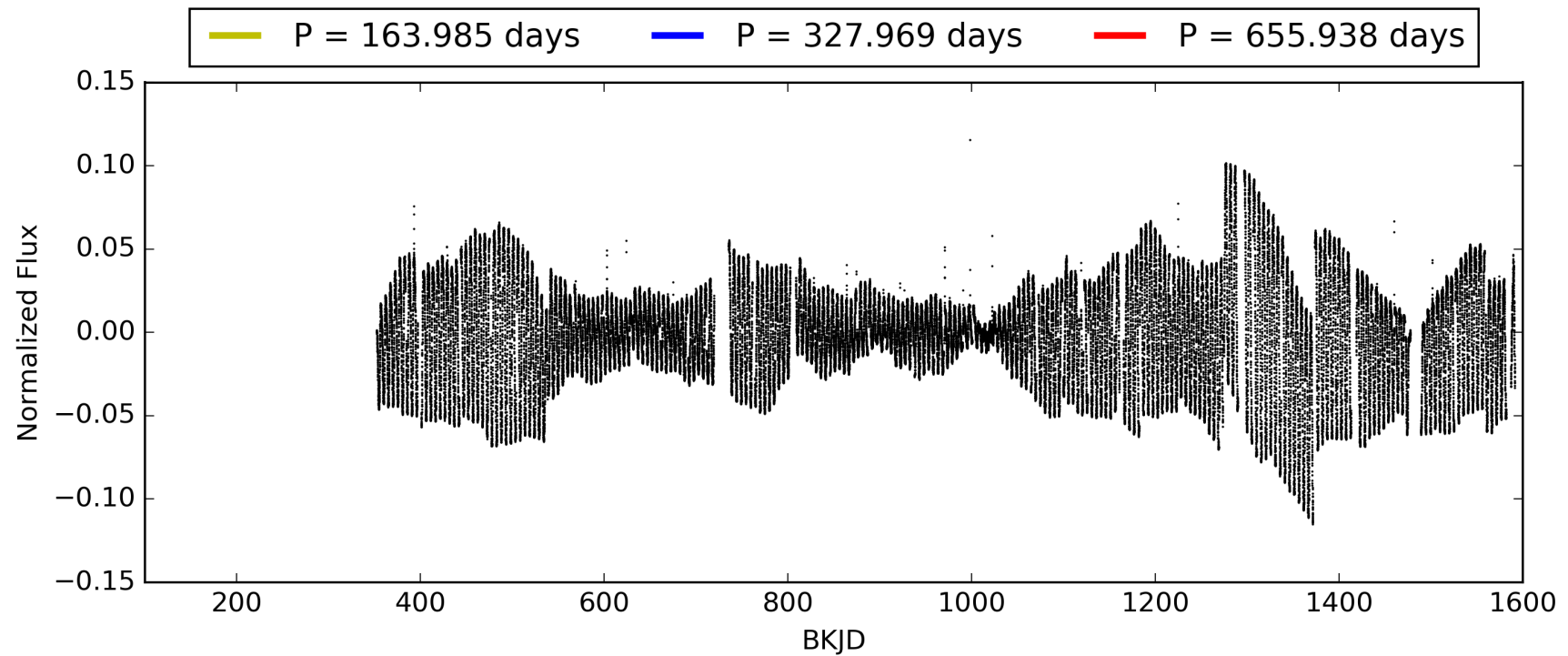
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 12:09:36 Z

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

# TCE 005869301-03, PDC Light Curves



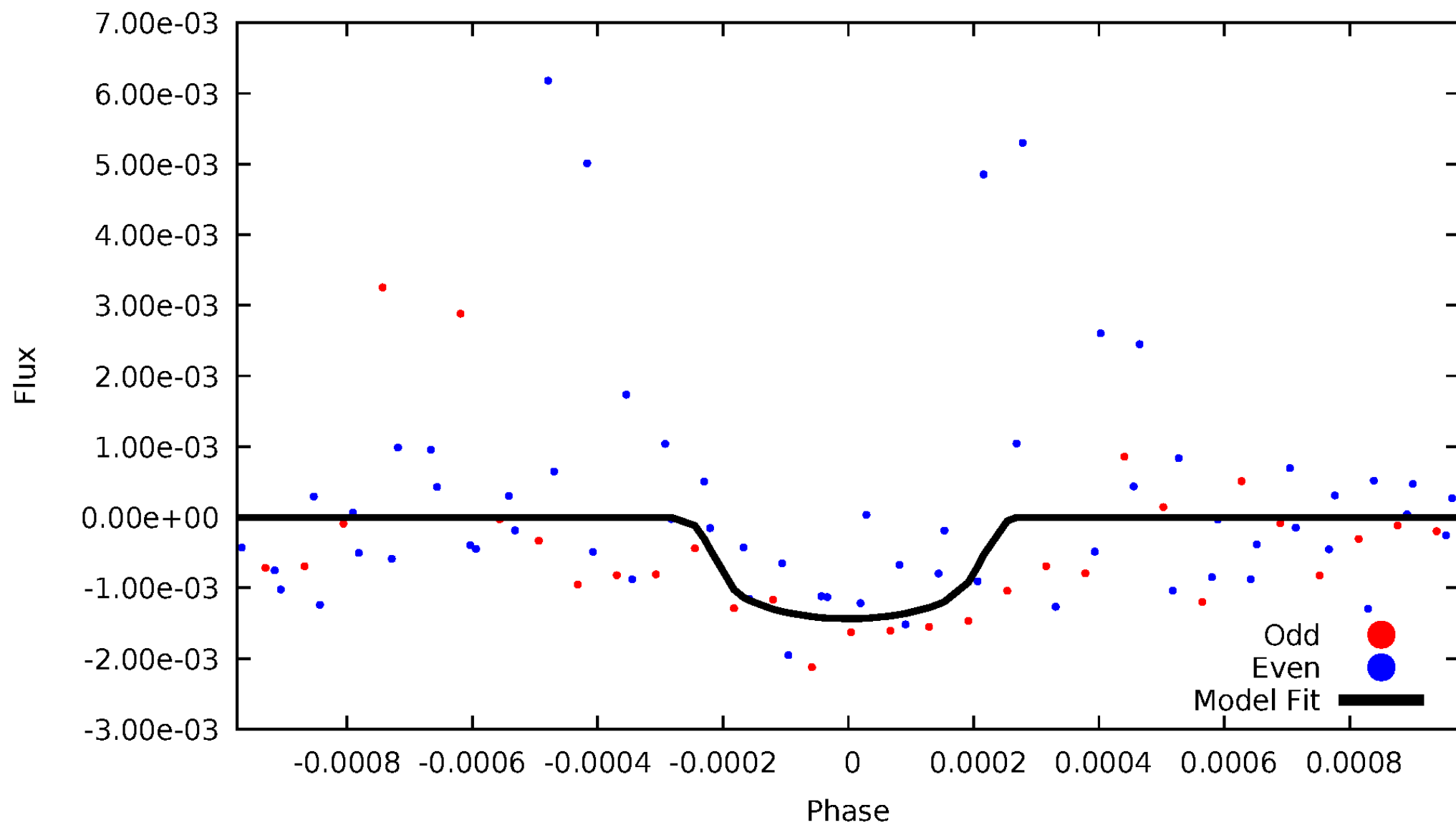
TCE 005869301-03





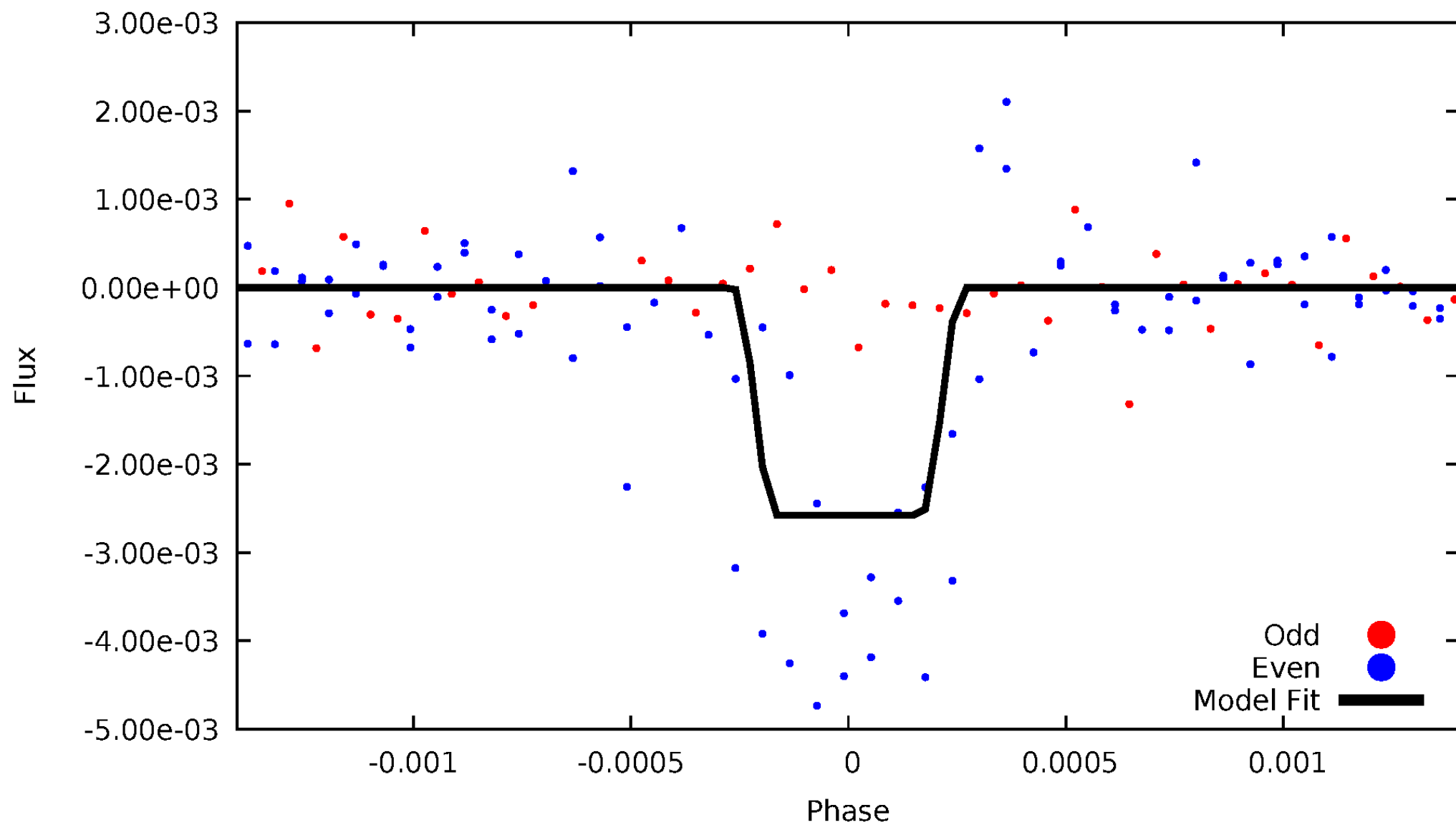
# DV Odd/Even

TCE 005869301-03



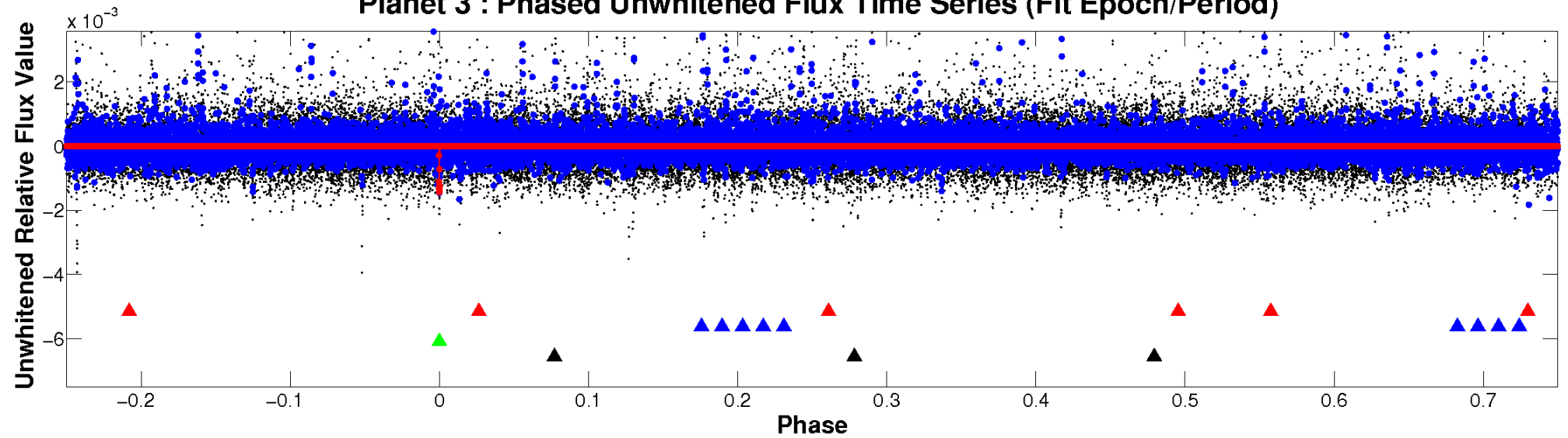
# ALT Odd/Even

TCE 005869301-03

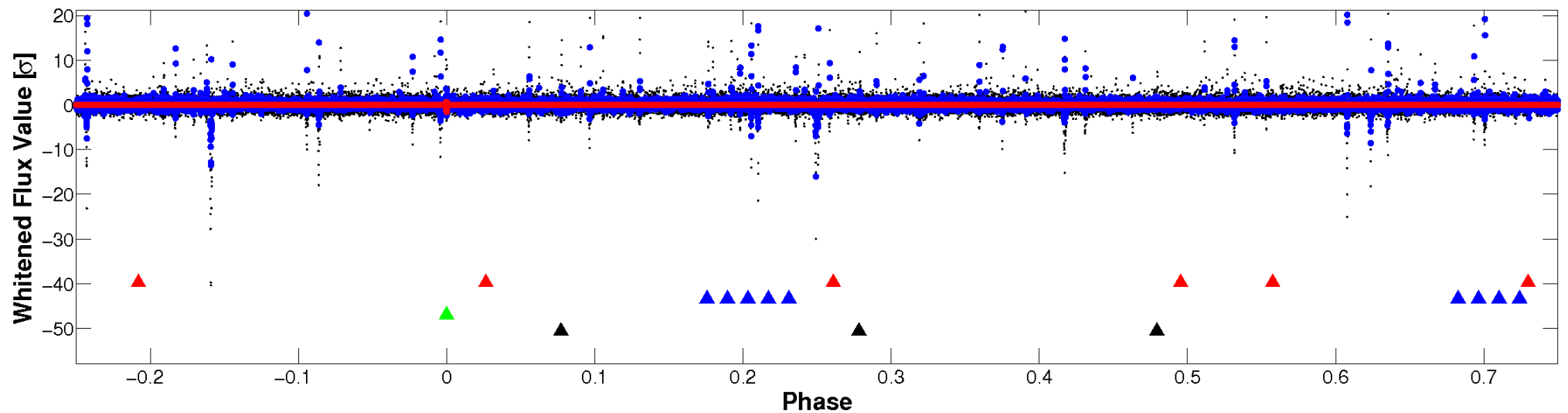


# Non-Whitened Vs. Whitened Light Curve

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

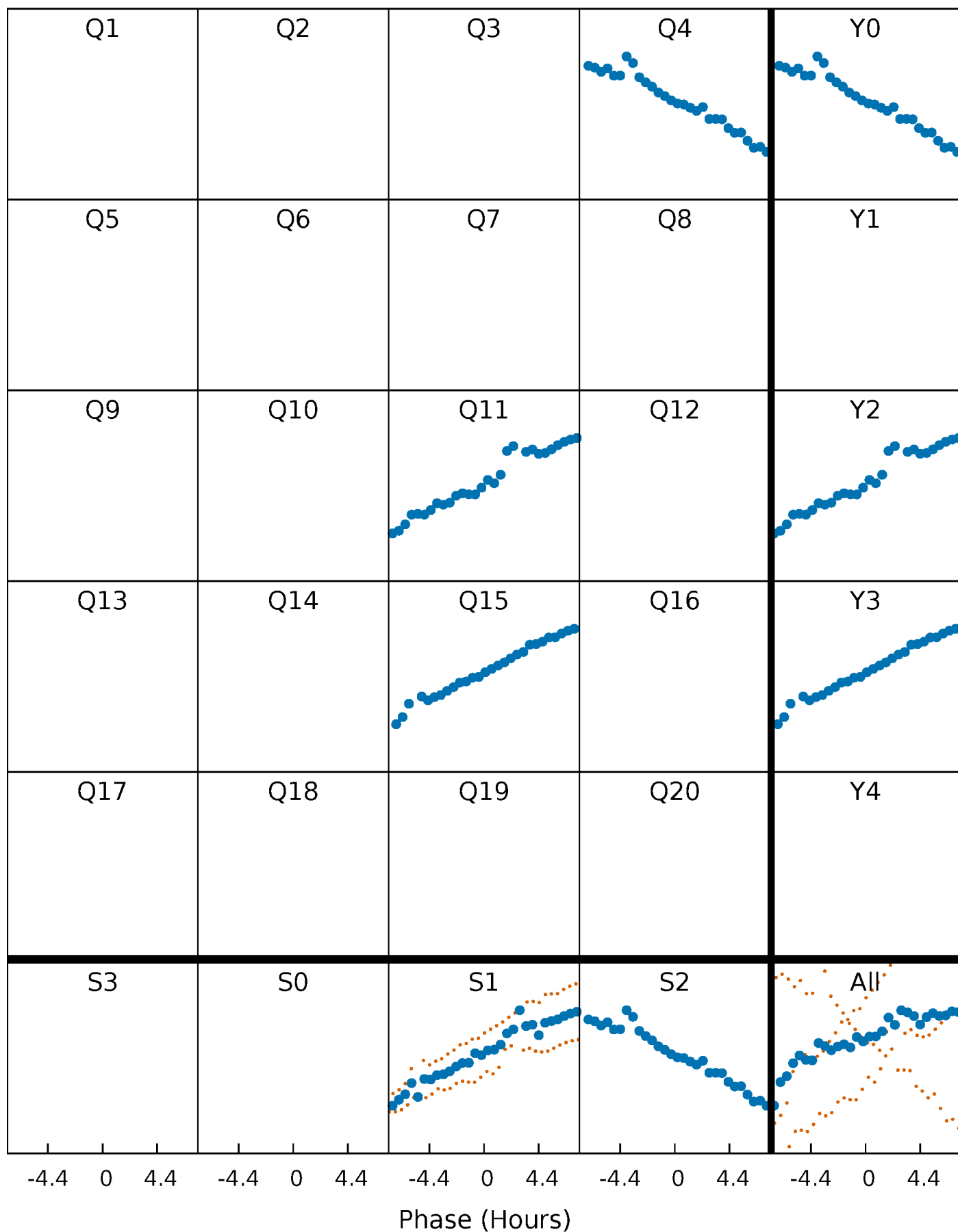


**Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



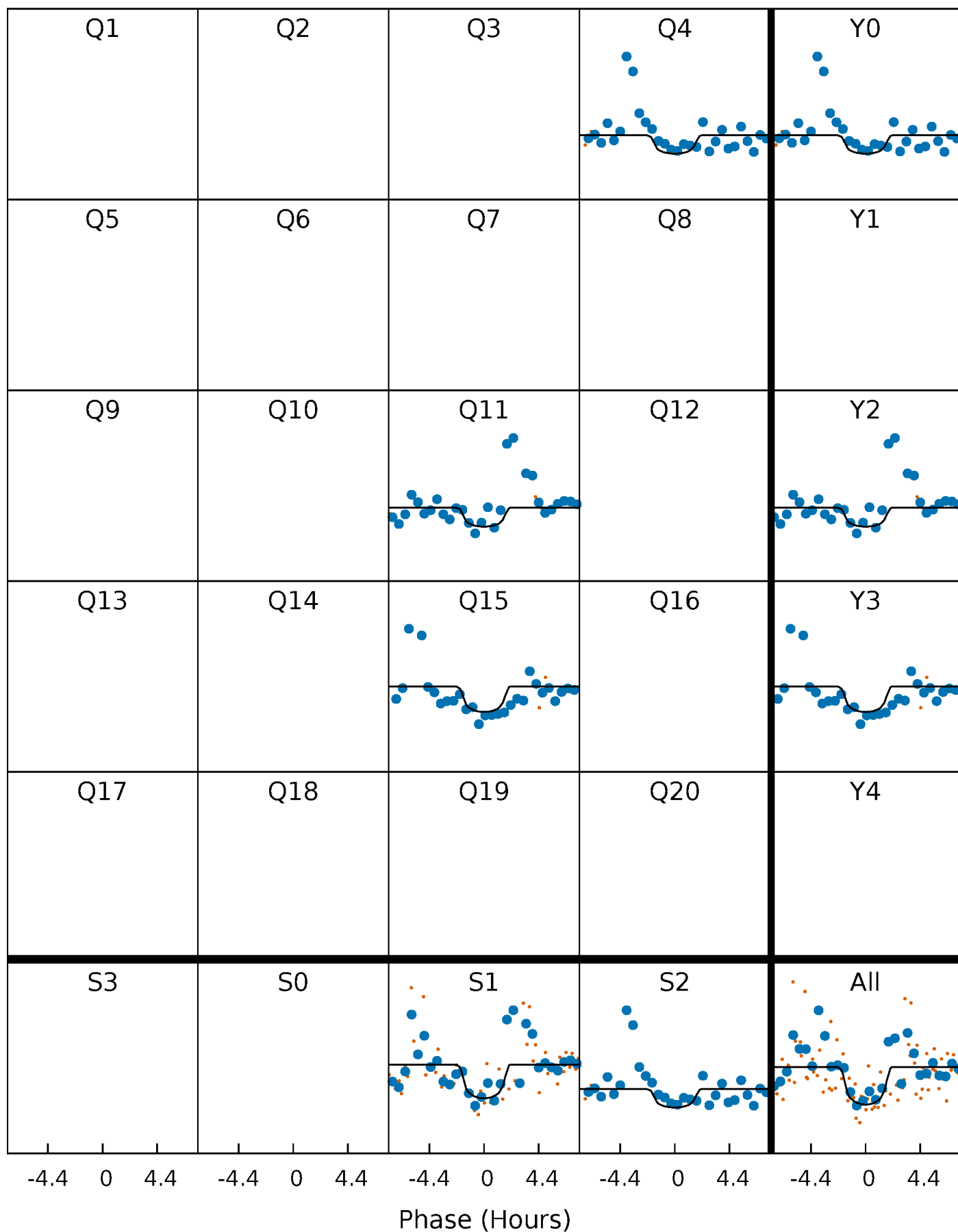
# PDC Quarter-Phased Transit Curves

TCE 005869301-03     $P=327.969179$  Days     $T_0=394.156197$  (BKJD)



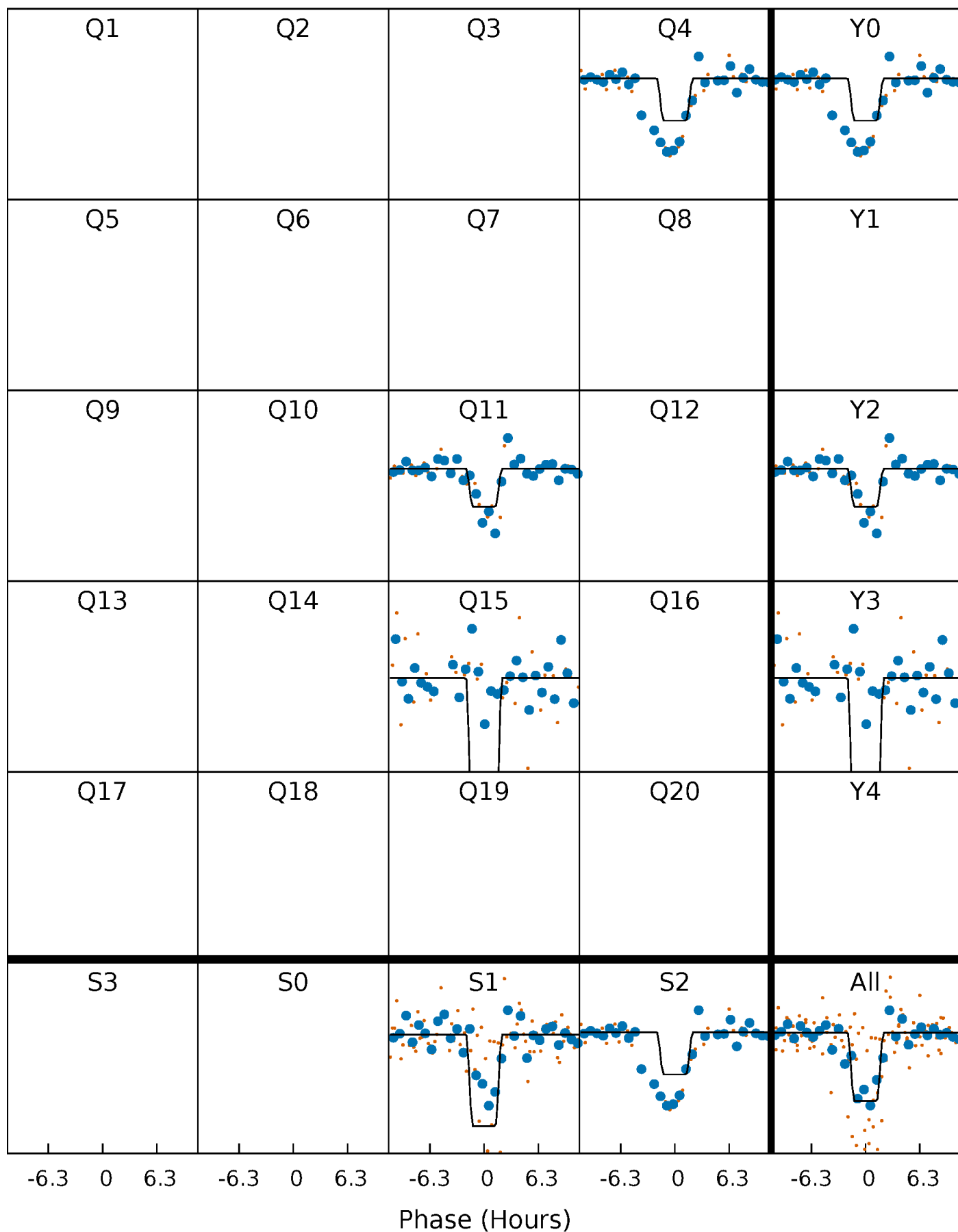
# DV Quarter-Phased Transit Curves

TCE 005869301-03     $P=327.969179$  Days     $T_0=394.156197$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

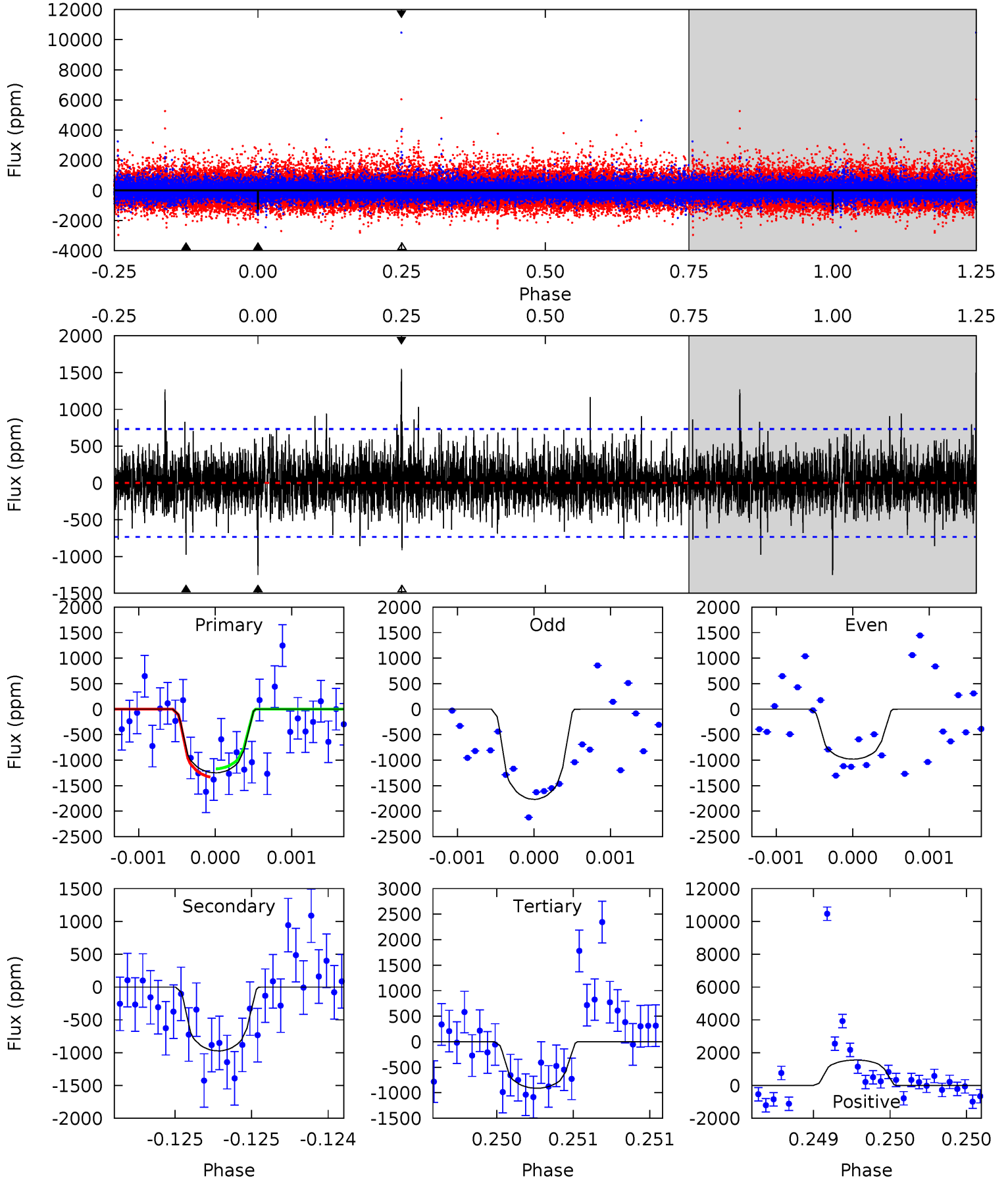
TCE 005869301-03     $P=327.970738$  Days     $T_0=394.124991$  (BKJD)



# DV Model-Shift Uniqueness Test

005869301-03, P = 327.969179 Days, E = 66.187018 Days

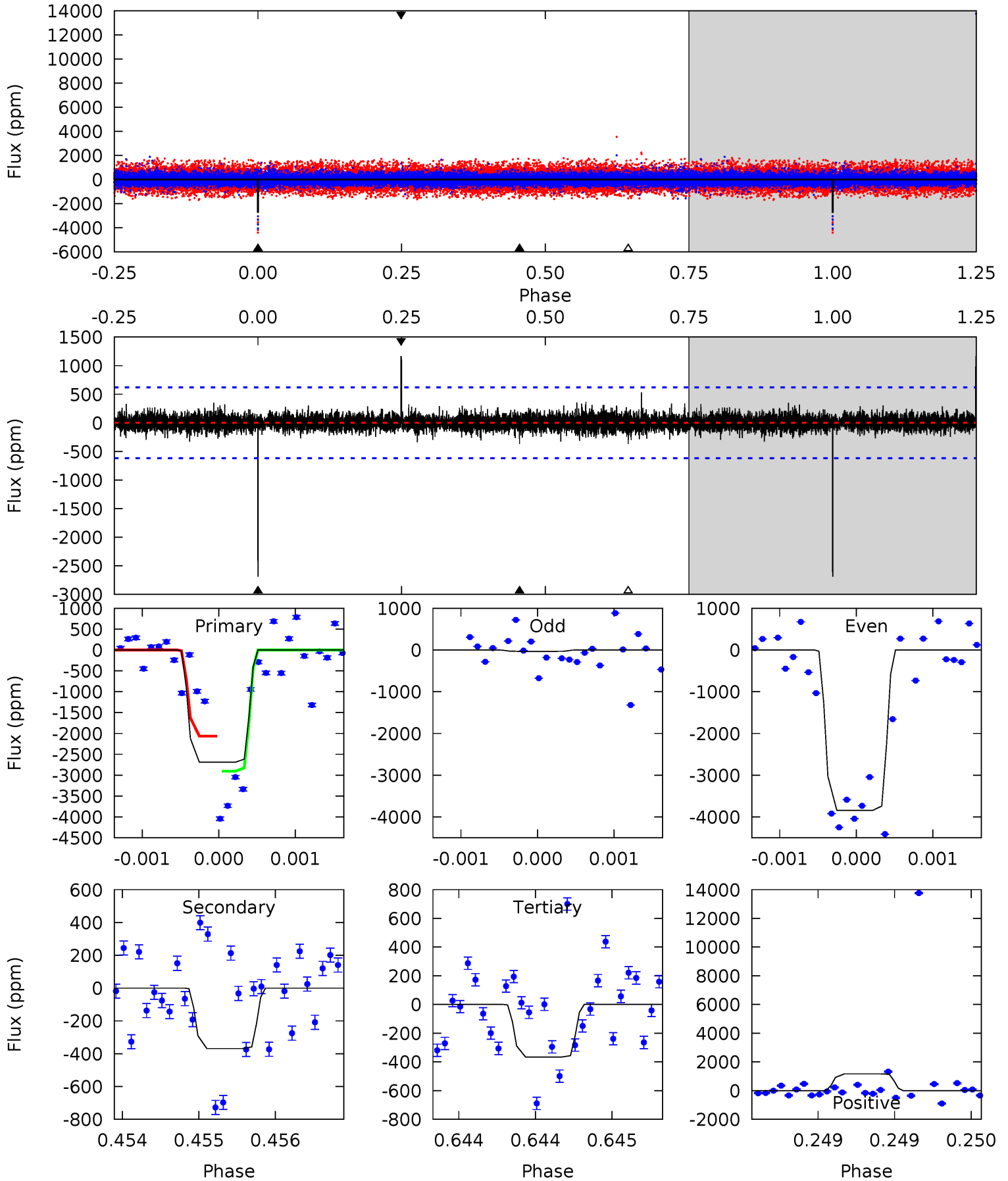
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.49	7.40	6.93	11.8	5.57	3.48	1.64	2.56	-2.30	0.47	-4.39	2.10	1.23	0.55	0.61



# Alt Model-Shift Uniqueness Test

005869301-03, P = 327.970738 Days, E = 66.154253 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
24.2	3.32	3.30	10.5	5.56	3.46	0.73	20.9	13.7	0.02	-7.19	19.2	0.83	0.30	3.90





### Stellar Parameters For KIC 005869301

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4893^{+170}_{-170}$	$4.542^{+0.072}_{-0.048}$	$-0.040^{+0.300}_{-0.300}$	$0.761^{+0.068}_{-0.075}$	$0.735^{+0.083}_{-0.060}$	$2.353^{+0.746}_{-0.394}$
	+3%/-3%	+2%/-1%	+750%/-750%	+9%/-10%	+11%/-8%	+32%/-17%
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 005869301-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-974 \pm 132$	$3.72^{+3.13}_{-2.40}$	$286^{+12}_{-12}$	$4244^{+2395}_{-806}$	$27712^{+181429}_{-19680}$
Alt.	$-369 \pm 111$	$4.68^{+2.93}_{-2.77}$	$286^{+12}_{-12}$	$3341^{+1135}_{-484}$	$6767^{+30662}_{-4441}$

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

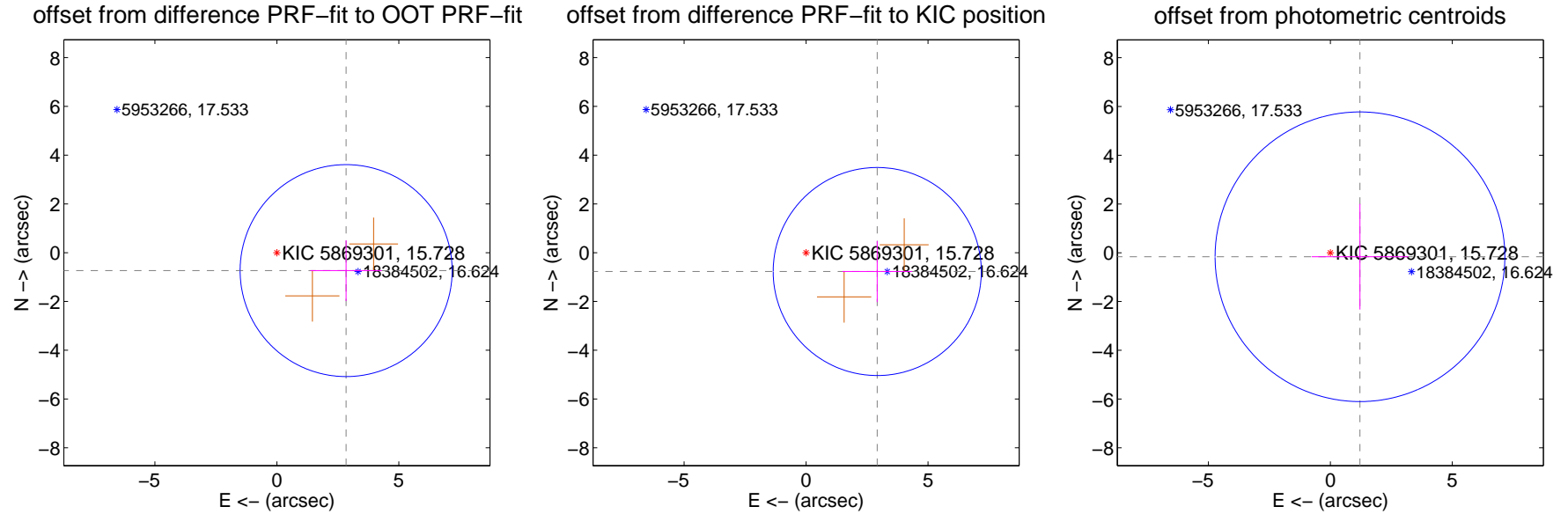
## DV Centroid Data

Supplemental centroid analysis for 005869301-03. Kepler magnitude: 15.73. Transit SNR 6.64

There are 0 quarters with good PRF difference image offsets

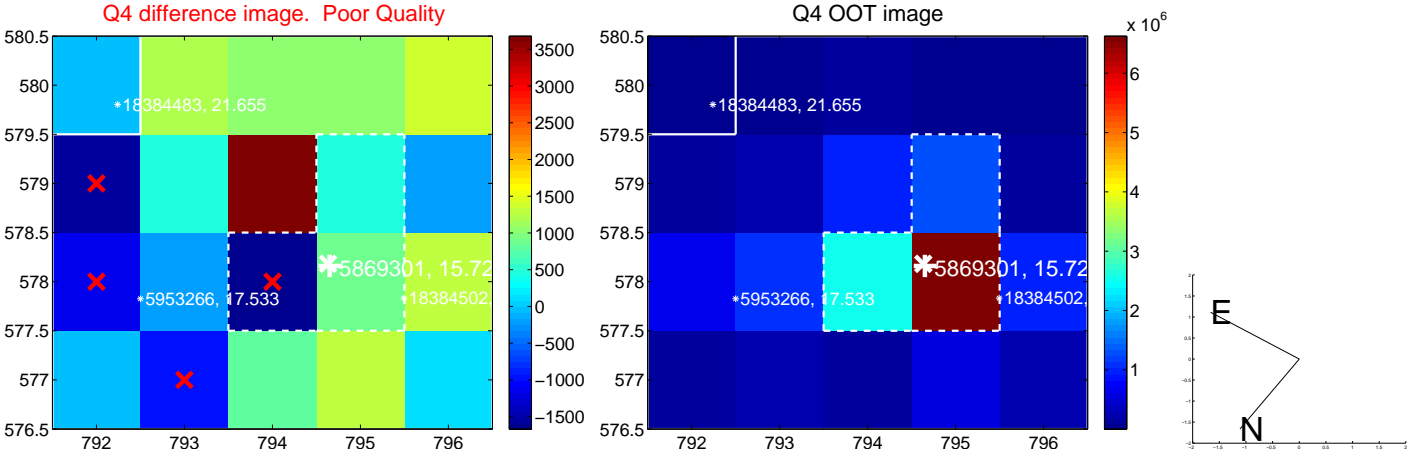
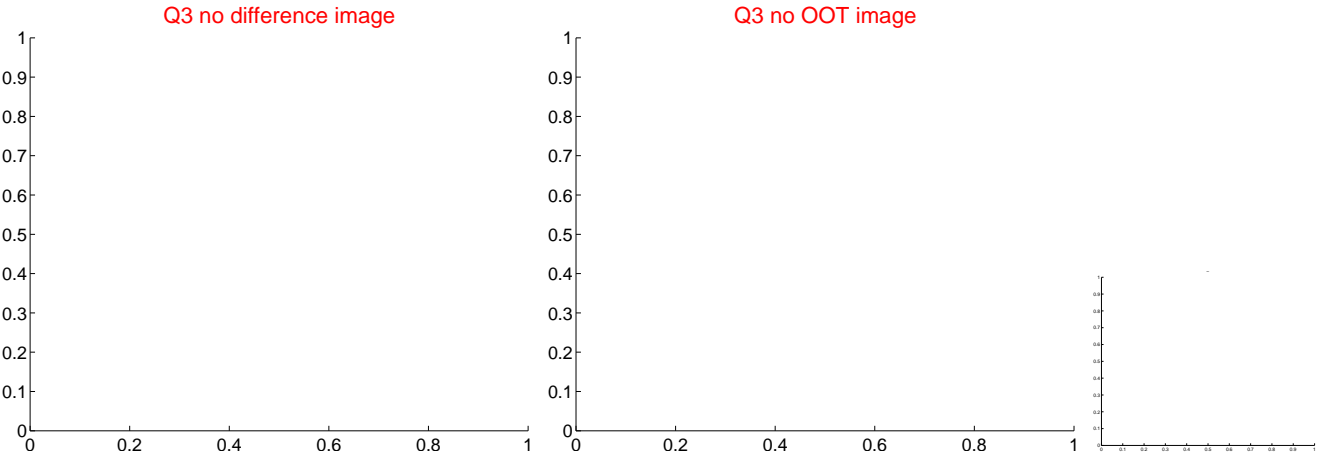
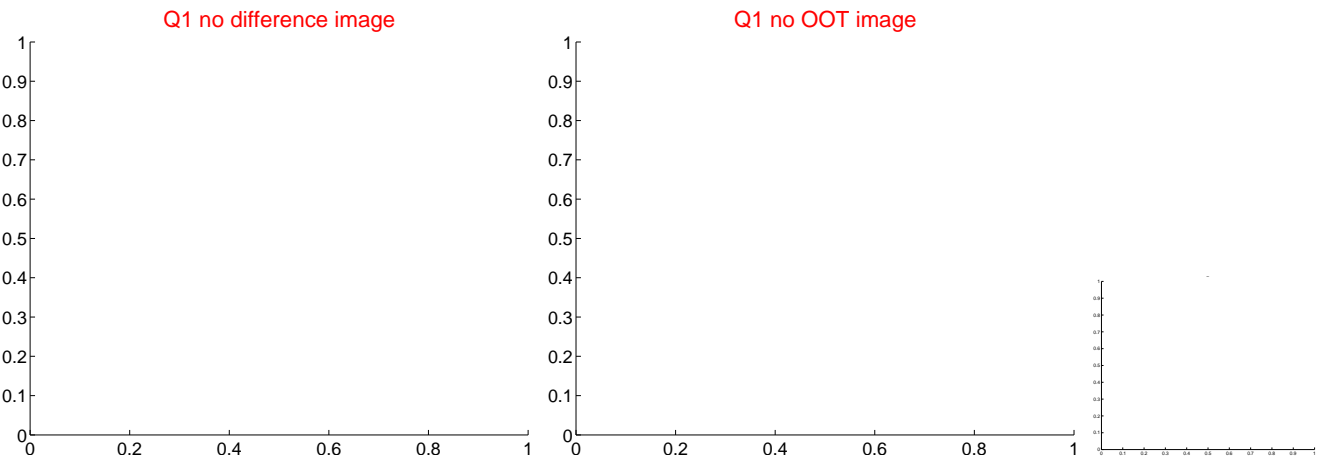
The direct PRF centroid is offset from the target star catalog position by about 0.07 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.933 \pm 1.449$	2.02	$-2.840 \pm 1.461$	$-0.735 \pm 1.246$
PRF-fit source offset from KIC position	$3.019 \pm 1.422$	2.12	$-2.918 \pm 1.433$	$-0.772 \pm 1.250$
photometric centroid source offset	$1.23 \pm 1.98$	0.62	$-1.21 \pm 1.98$	$-0.16 \pm 2.17$



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.

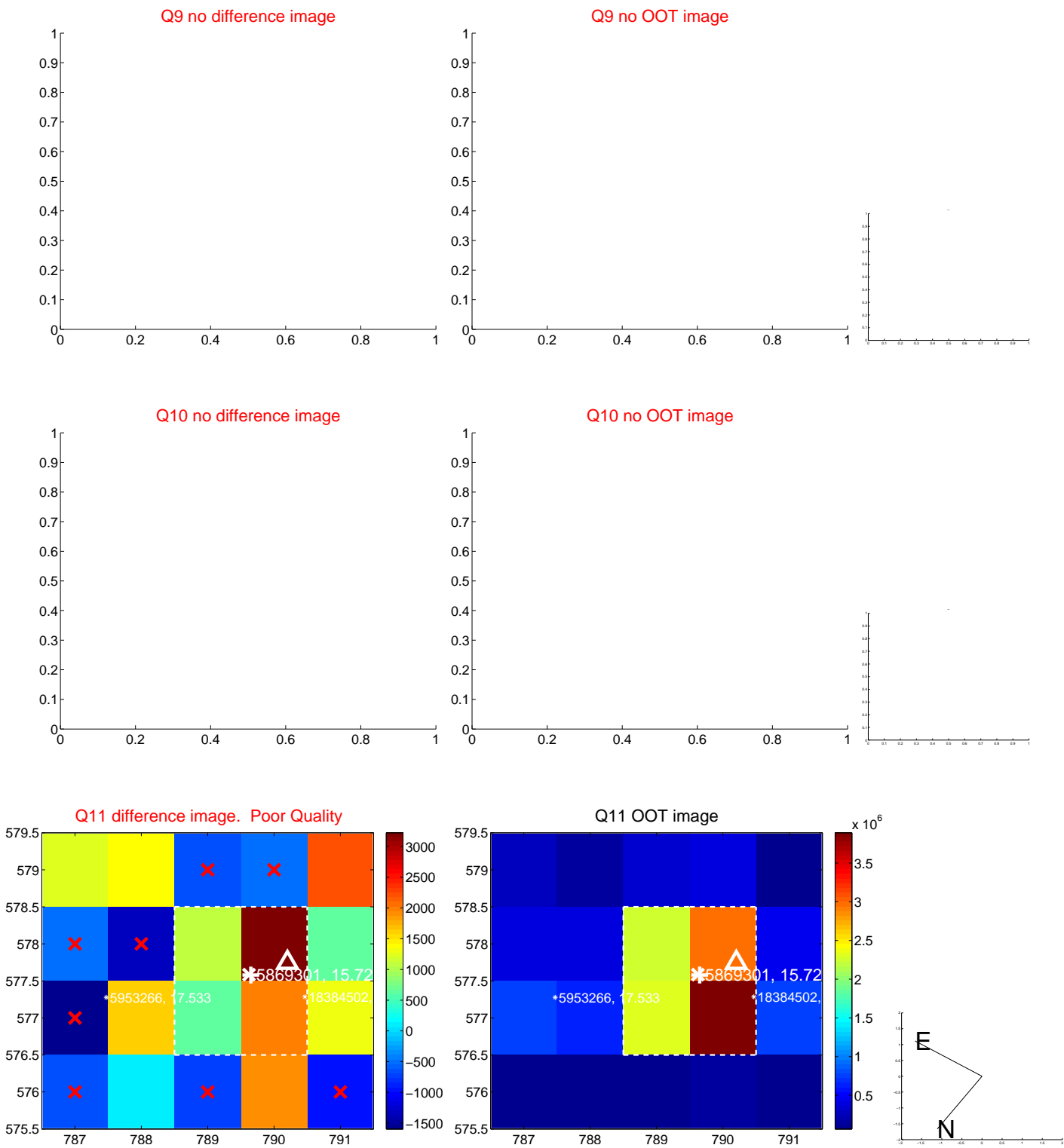
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



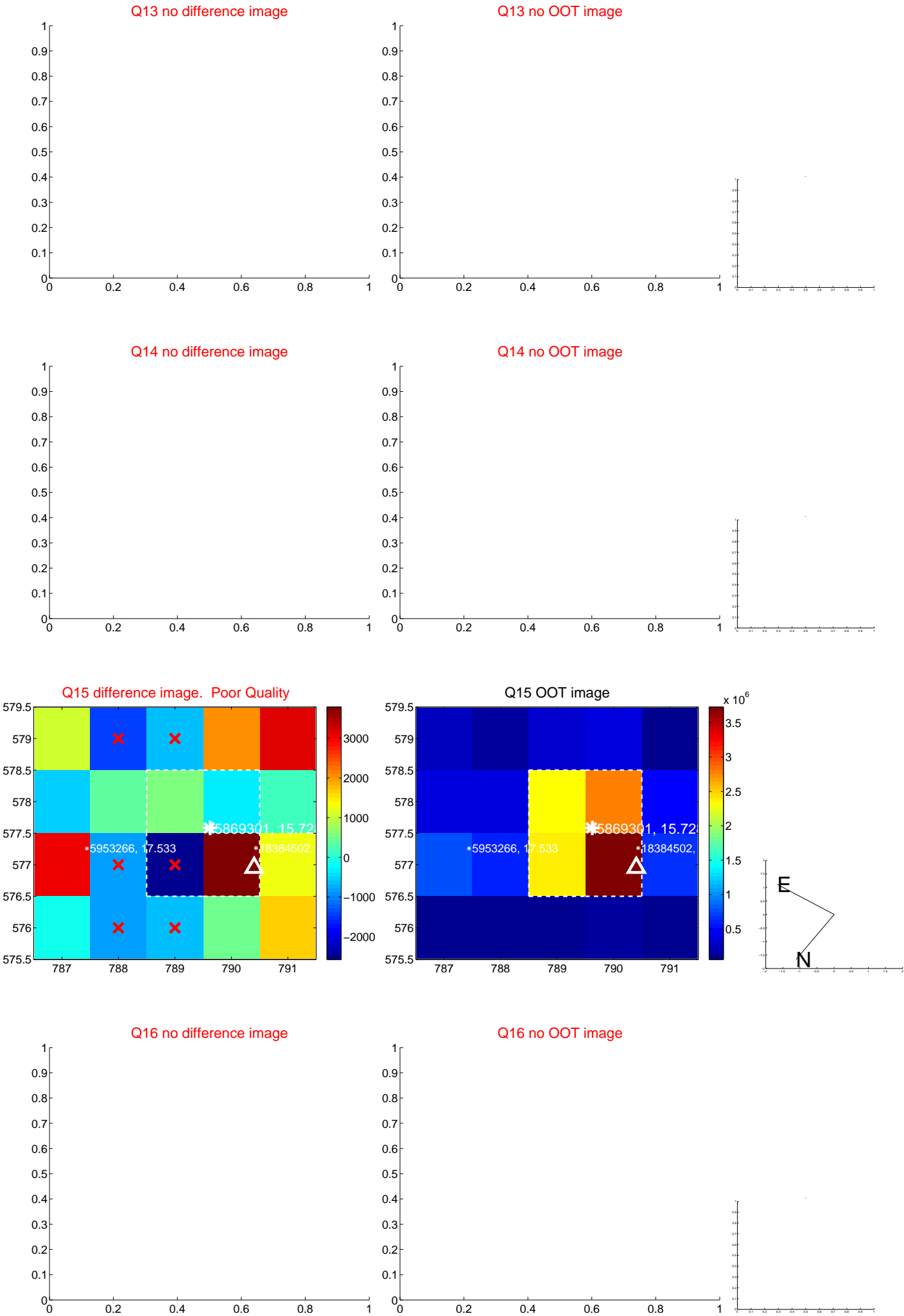
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



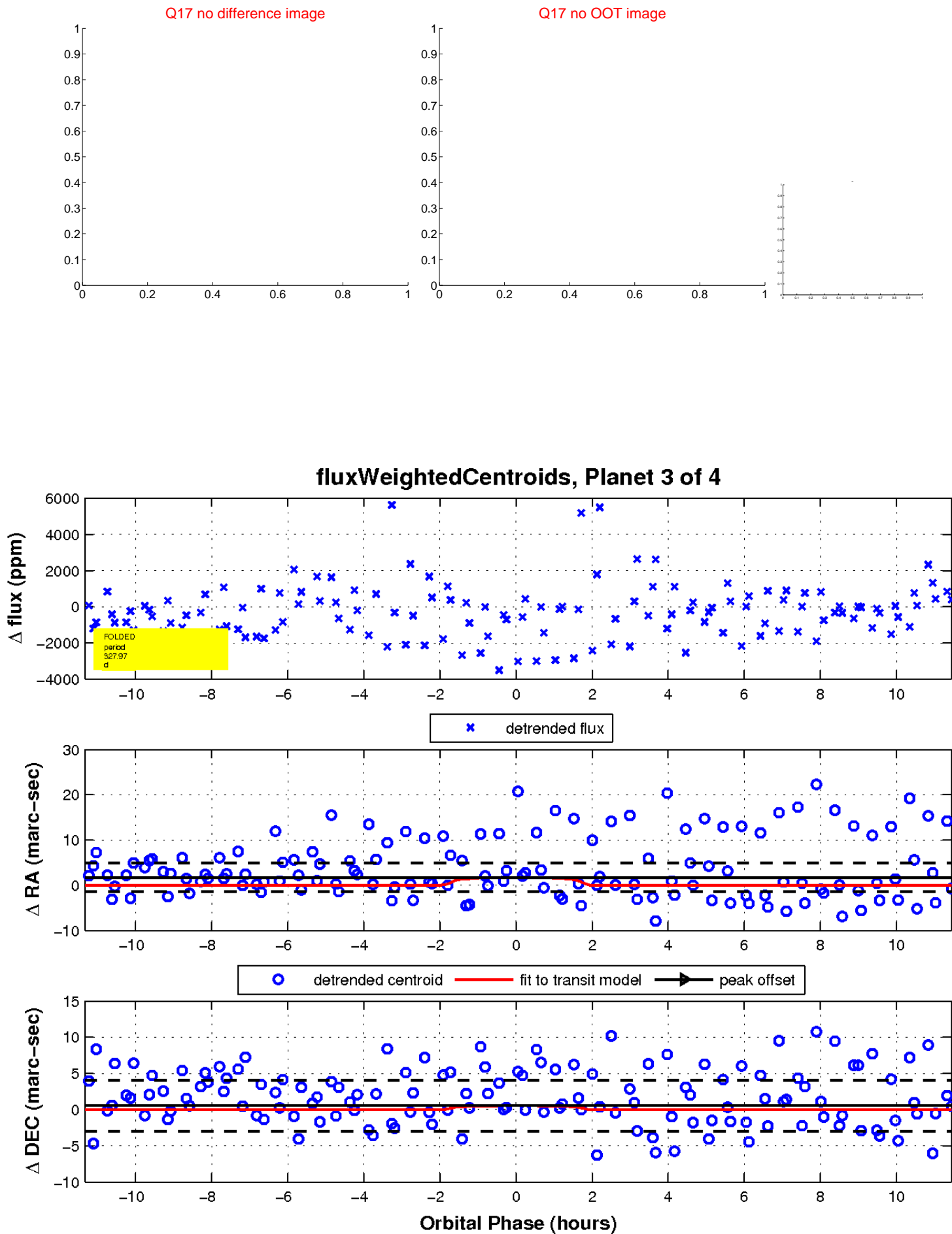
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

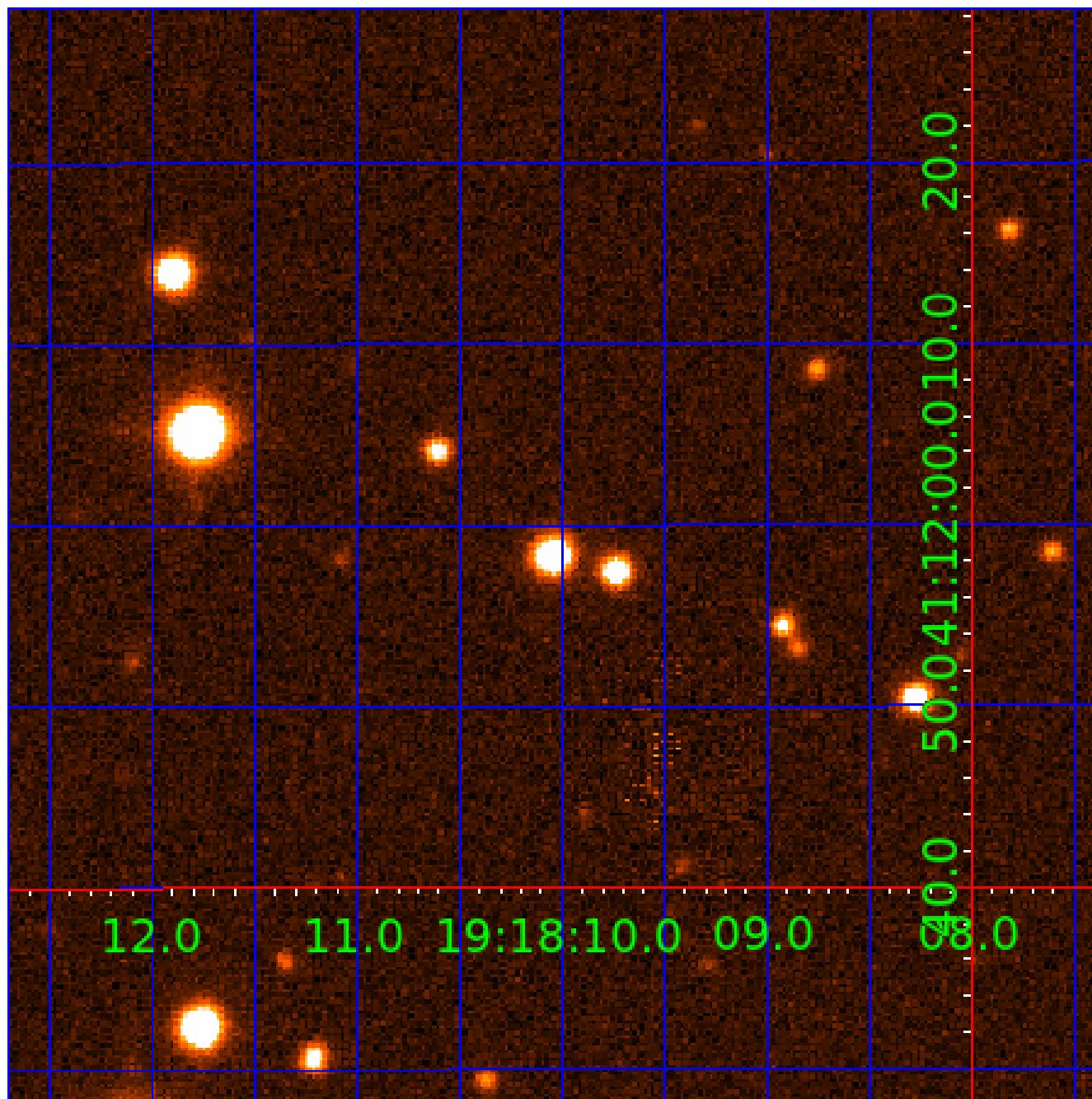


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 005869301

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005869301-01	OBS	No	251.068109	305.580181	1060.0	5.232	11.8	5.5	0.76	4893	2.65	0.60
005869301-02	OBS	No	161.720109	141.954502	1106.9	4.579	10.7	6.5	0.76	4893	3.29	1.08
005869301-03	OBS	No	327.969179	394.156197	1436.1	3.838	9.9	6.6	0.76	4893	3.23	0.42
005869301-04	OBS	No	393.927445	419.471147	1868.0	6.283	15.9	8.7	0.76	4893	3.24	0.33

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005869301-01	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
005869301-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005869301-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
005869301-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

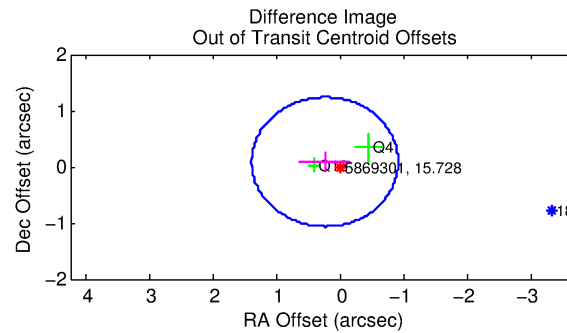
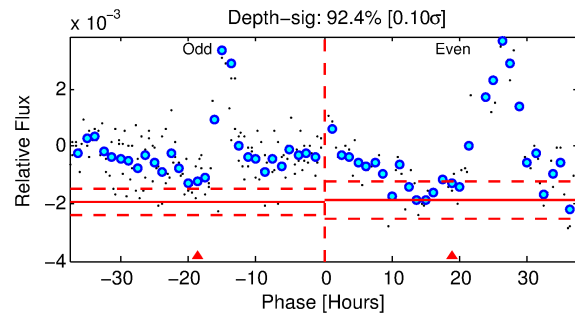
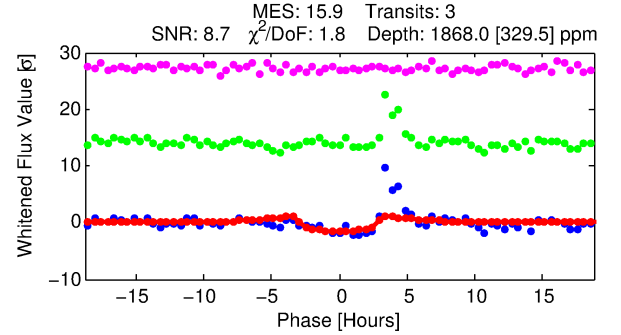
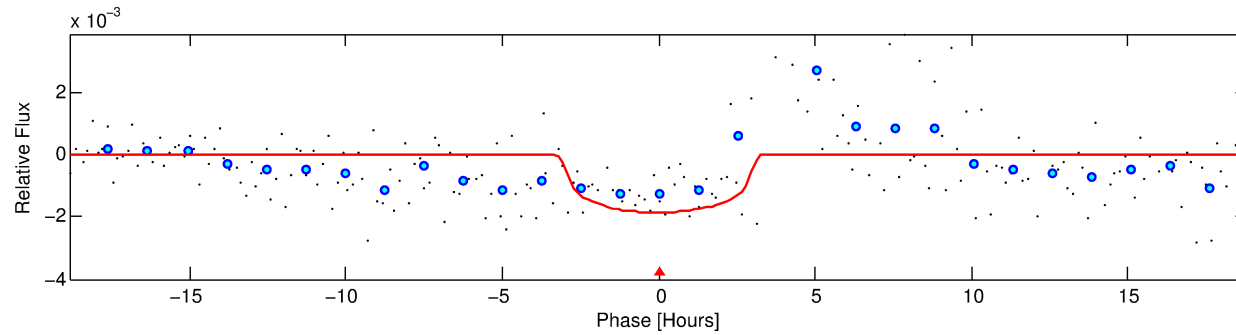
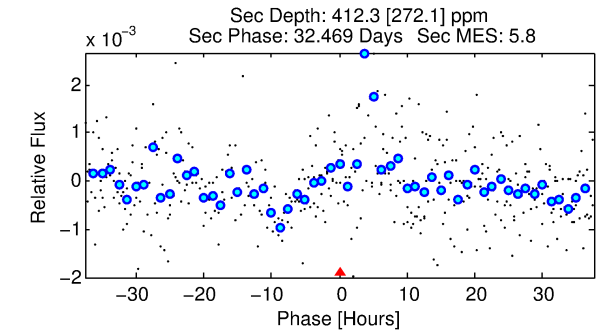
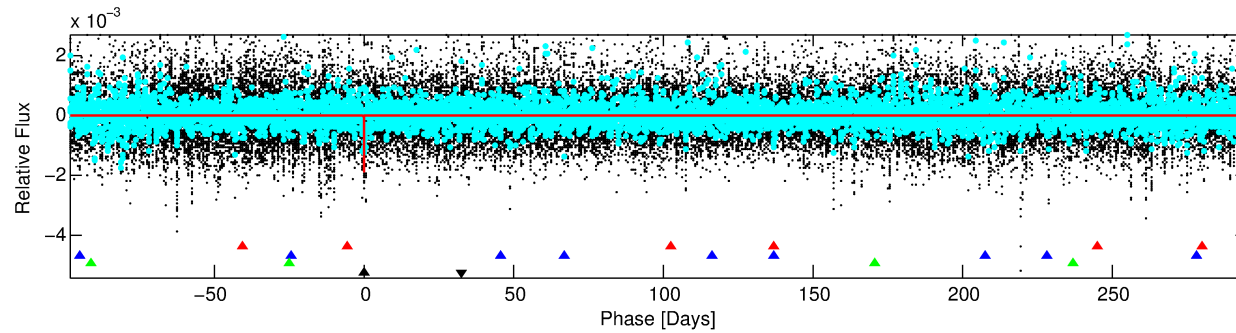
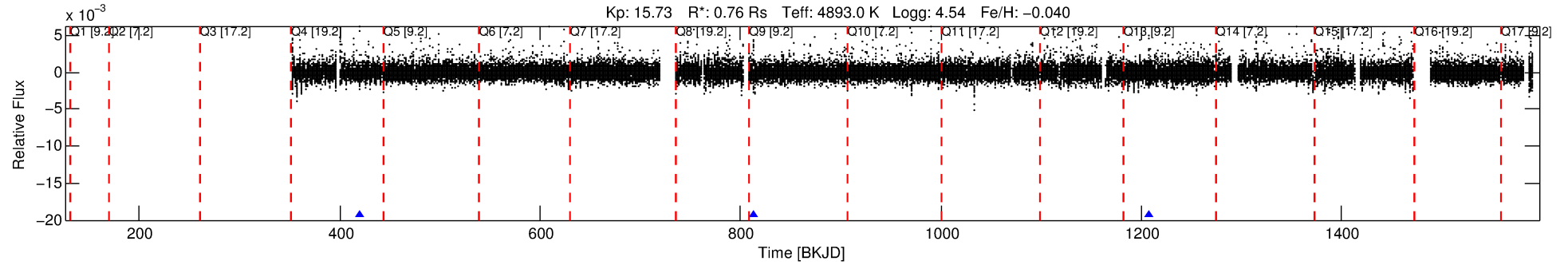
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 005869301-04

No Significant Match Found

# DV One-Page Summary

KIC: 5869301 Candidate: 4 of 4 Period: 393.927 d



## DV Fit Results:

Period = 393.92744 [0.00898] d  
Epoch = 419.4711 [0.0110] BKJD  
Rp/R\* = 0.0390 [0.0549]  
a/R\* = 467.66 [2135.15]  
b = 0.36 [11.40]  
Seff = 0.33 [0.06]  
Teq = 193 [9] K  
Rp = 3.24 [4.57] Re  
a = 0.9497 [0.0815] AU  
Ag = 19531.18 [56527.66] [0.35 $\sigma$ ]  
Teffp = 3532 [2556] K [1.31 $\sigma$ ]

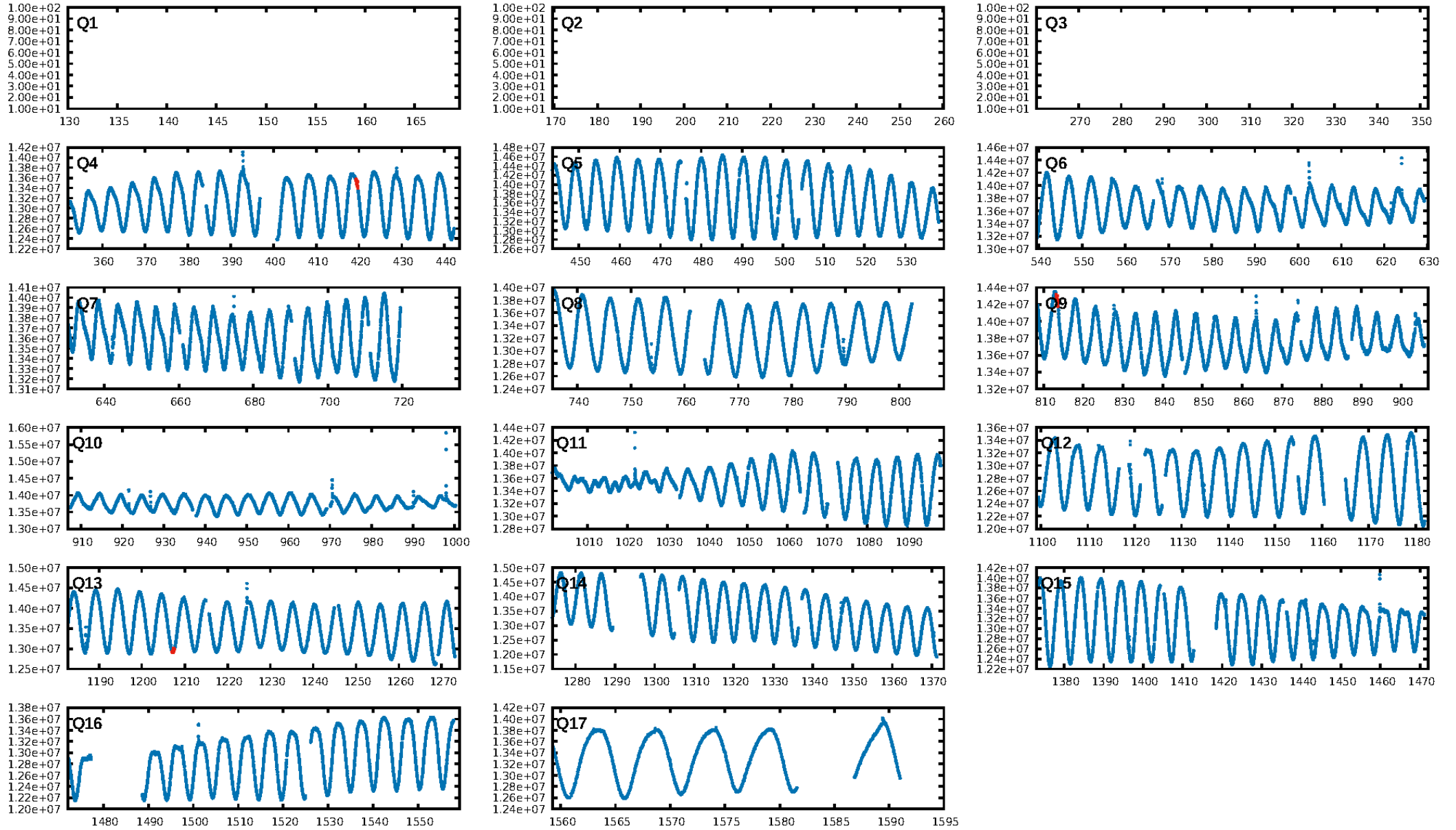
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [215.02 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 71.1%  
ModelChiSquareGof-sig: 80.3%  
Bootstrap-pfa: 6.66e-17  
RollingBand-fgt: 1.00 [3/3]  
**GhostDiagnostic-chr: 0.3229**  
Centroid-sig: 40.3%  
Centroid-so: 0.979 arcsec [0.93 $\sigma$ ]  
OotOffset-rm: 0.261 arcsec [0.68 $\sigma$ ]  
OotOffset-st: 0/0/1/1 [2]  
KicOffset-rm: 0.077 arcsec [0.21 $\sigma$ ]  
KicOffset-st: 0/0/1/1 [2]  
DiffImageQuality-fgm: 0.50 [1/2]  
DiffImageOverlap-fno: 1.00 [3/3]

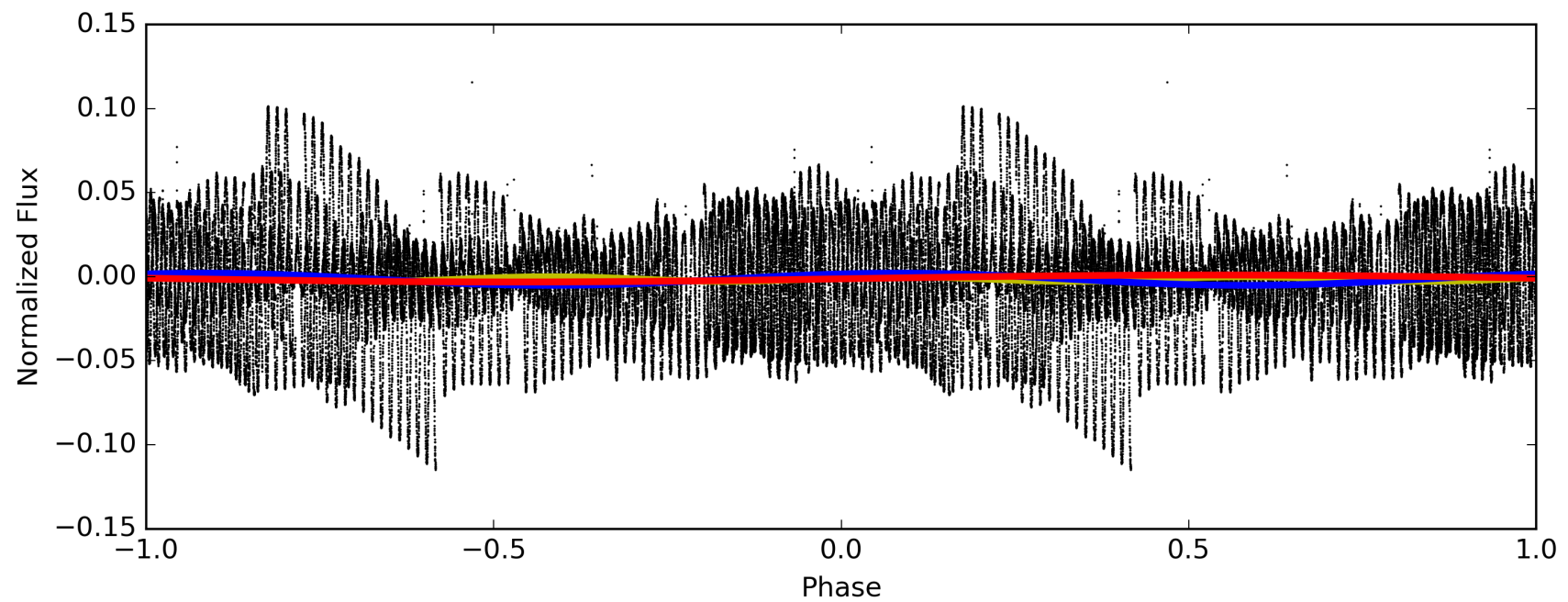
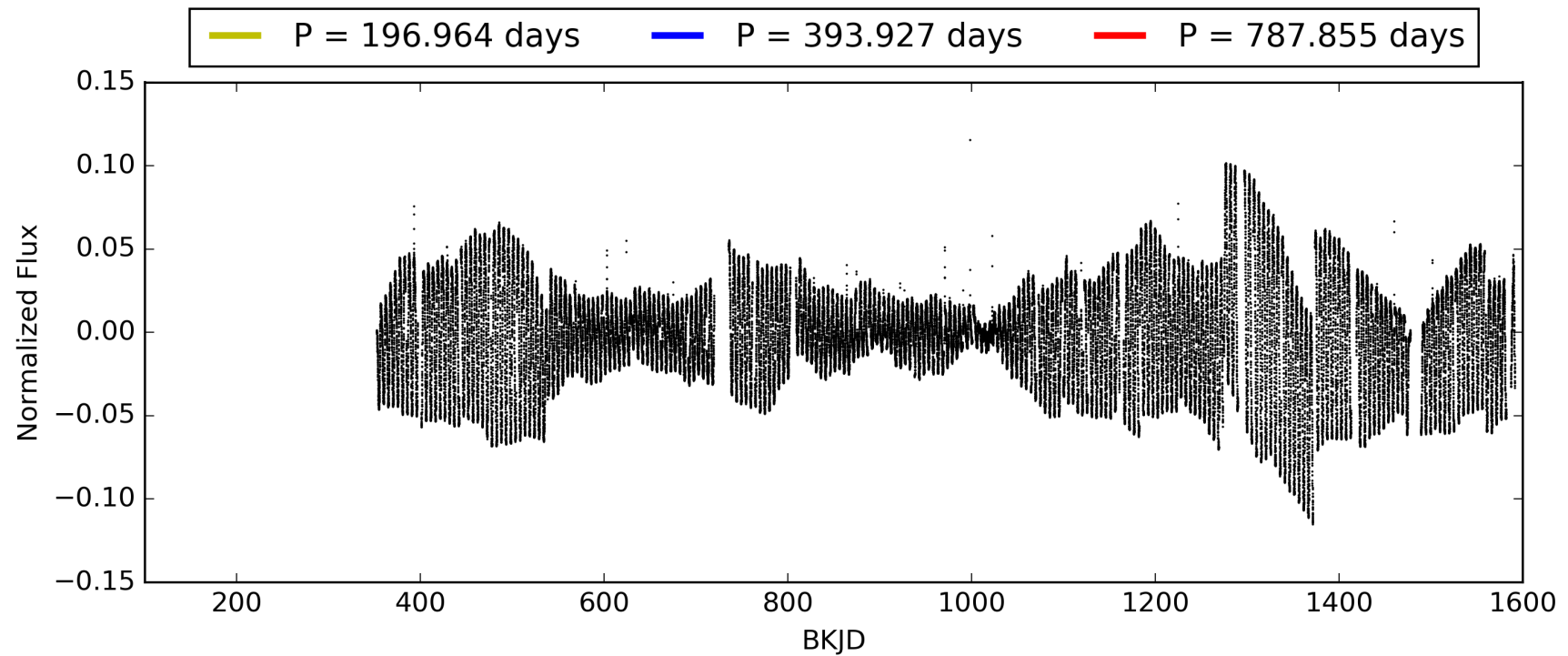
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 12:09:47 Z

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

# TCE 005869301-04, PDC Light Curves

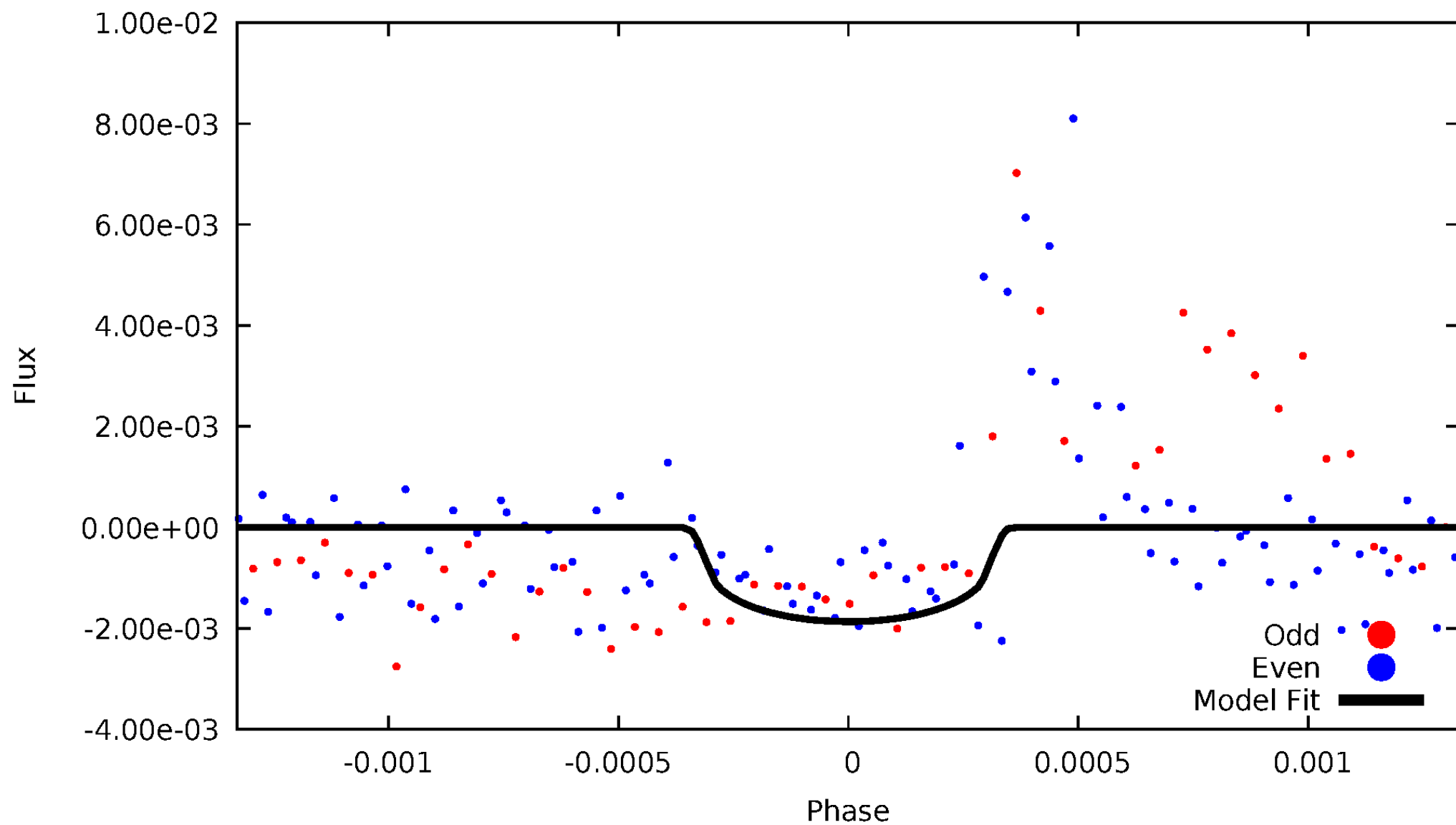


TCE 005869301-04



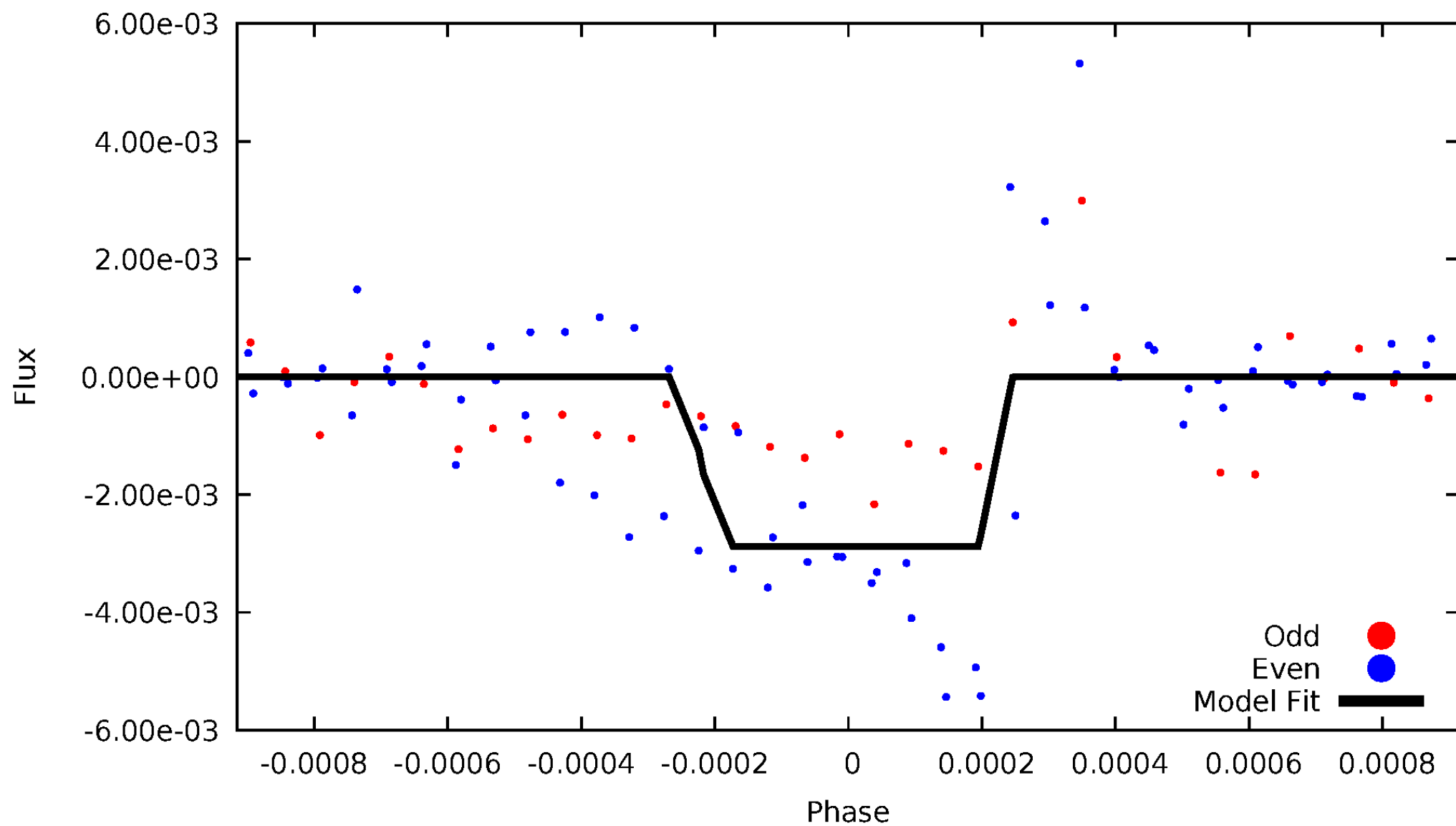
# DV Odd/Even

TCE 005869301-04



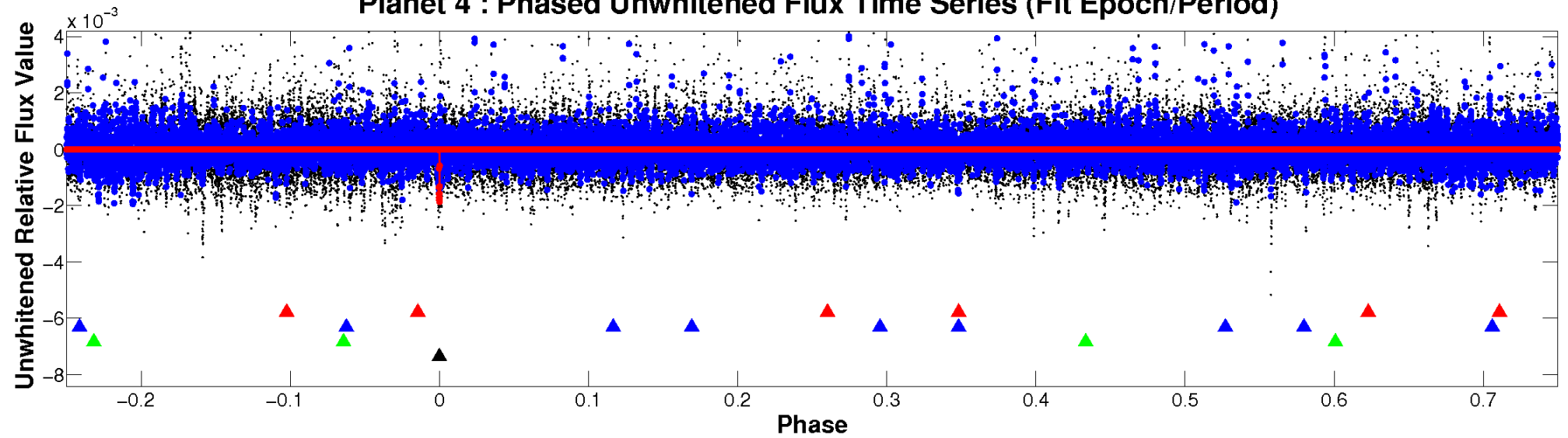
# ALT Odd/Even

TCE 005869301-04

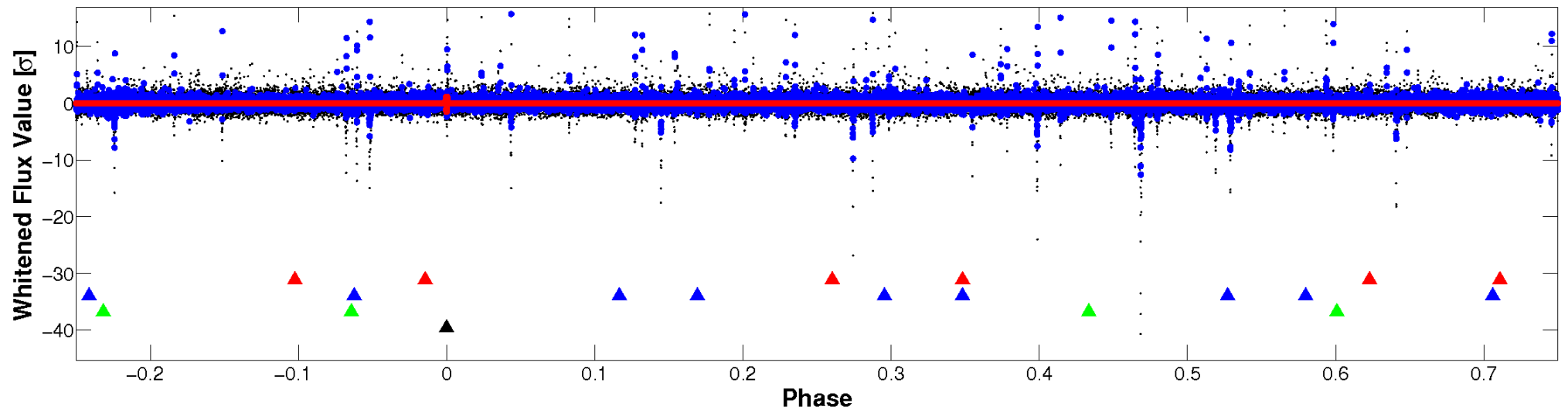


# Non-Whitened Vs. Whitened Light Curve

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

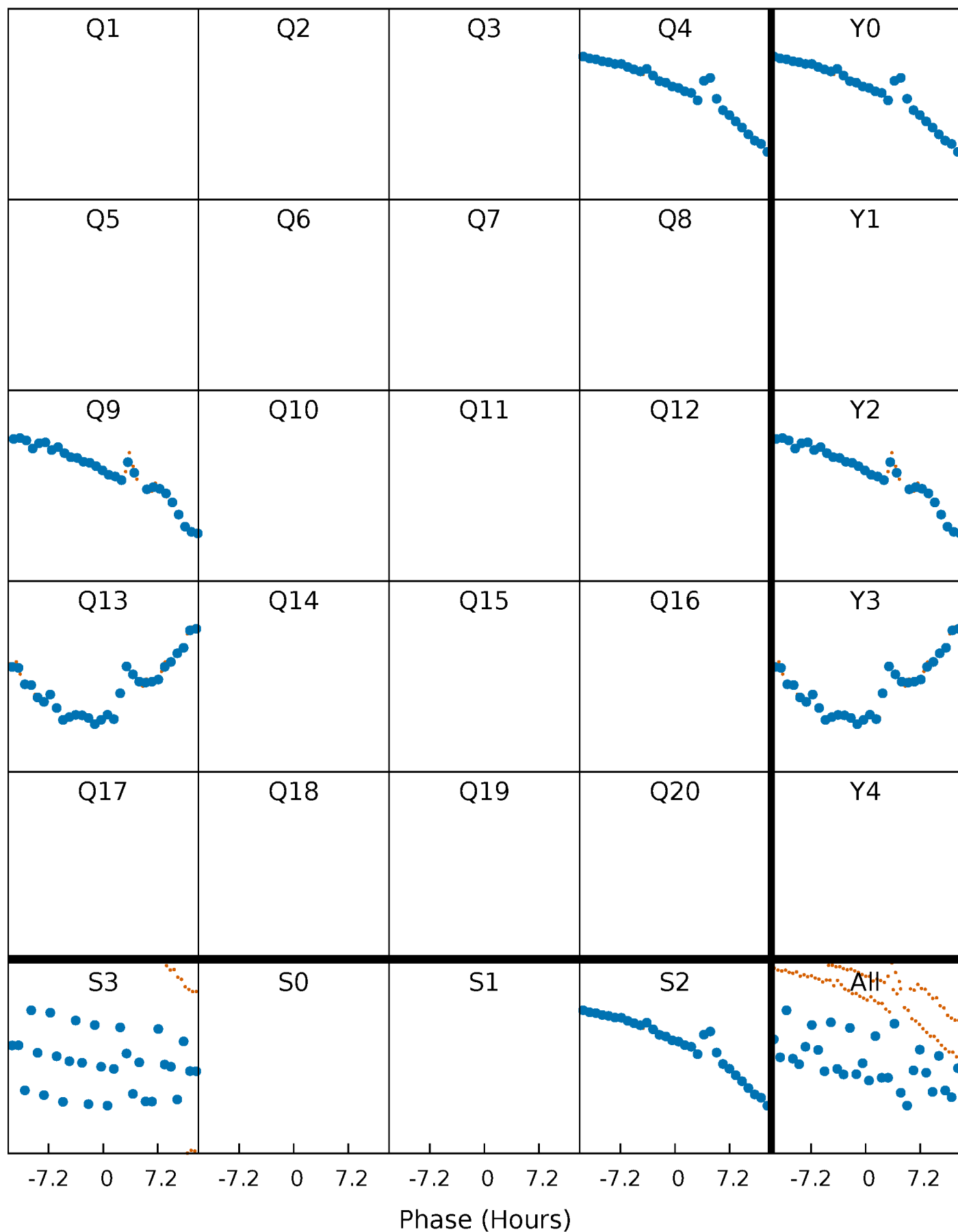


## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

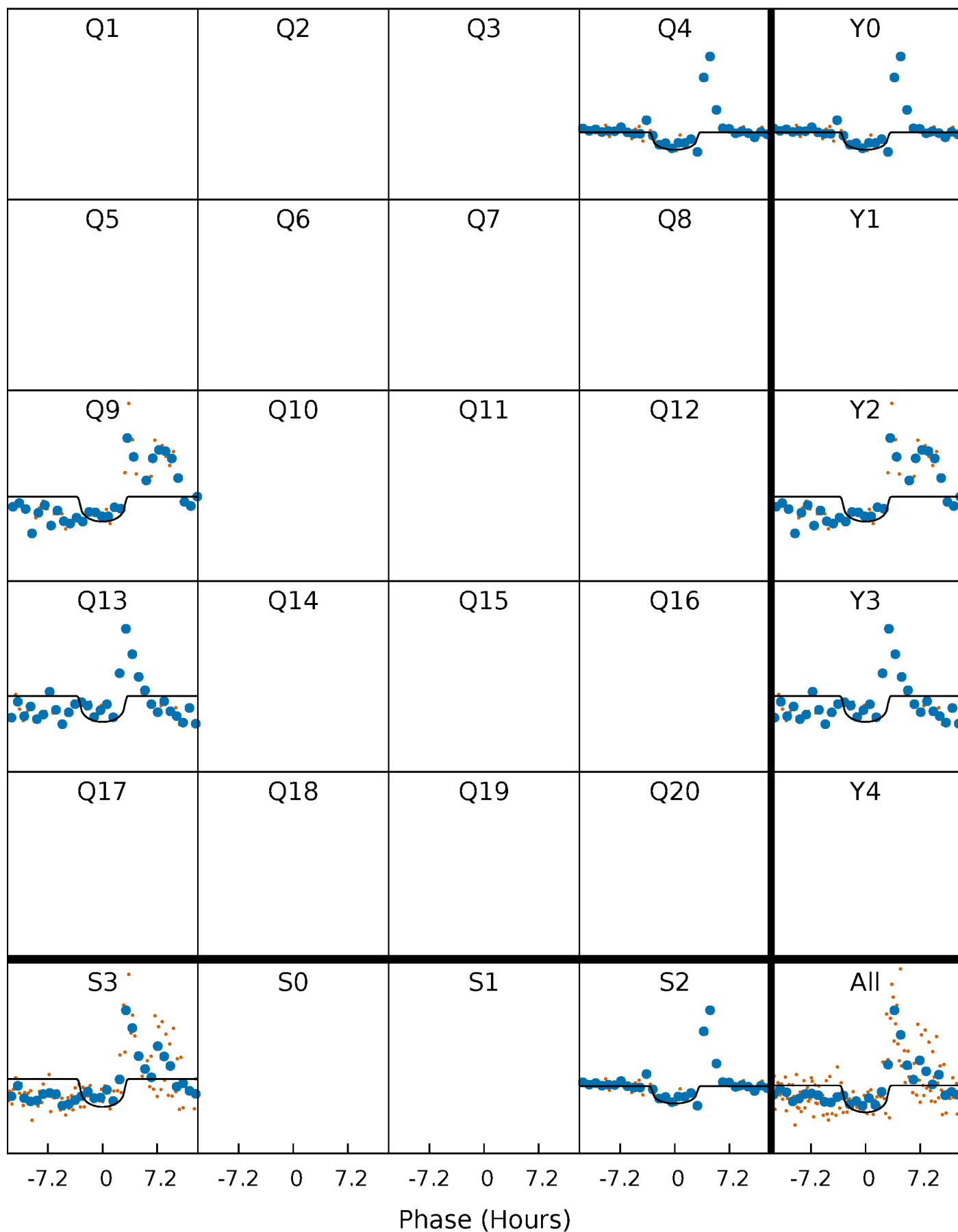
TCE 005869301-04     $P=393.927445$  Days     $T_0=419.471147$  (BKJD)





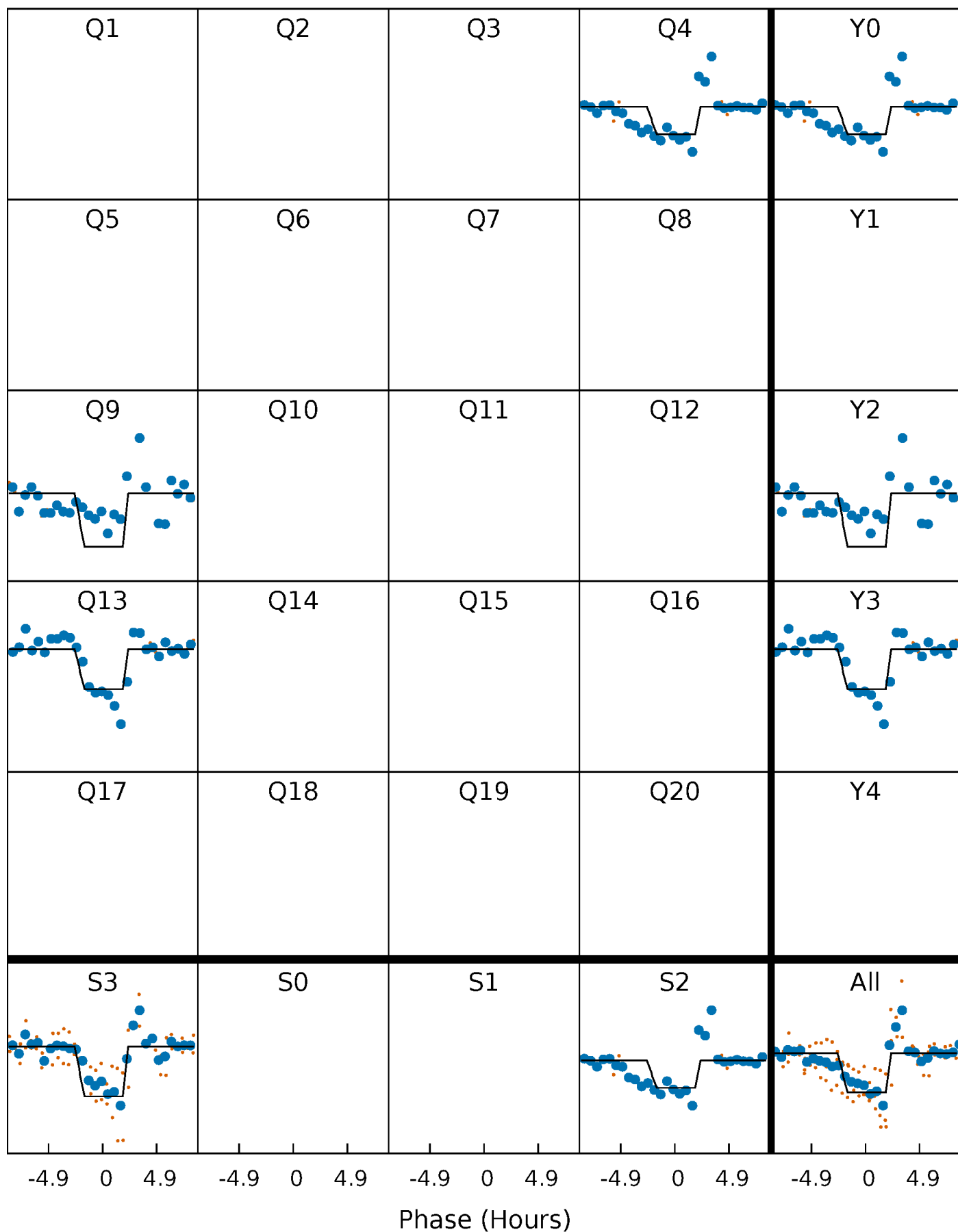
# DV Quarter-Phased Transit Curves

TCE 005869301-04     $P=393.927445$  Days     $T_0=419.471147$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

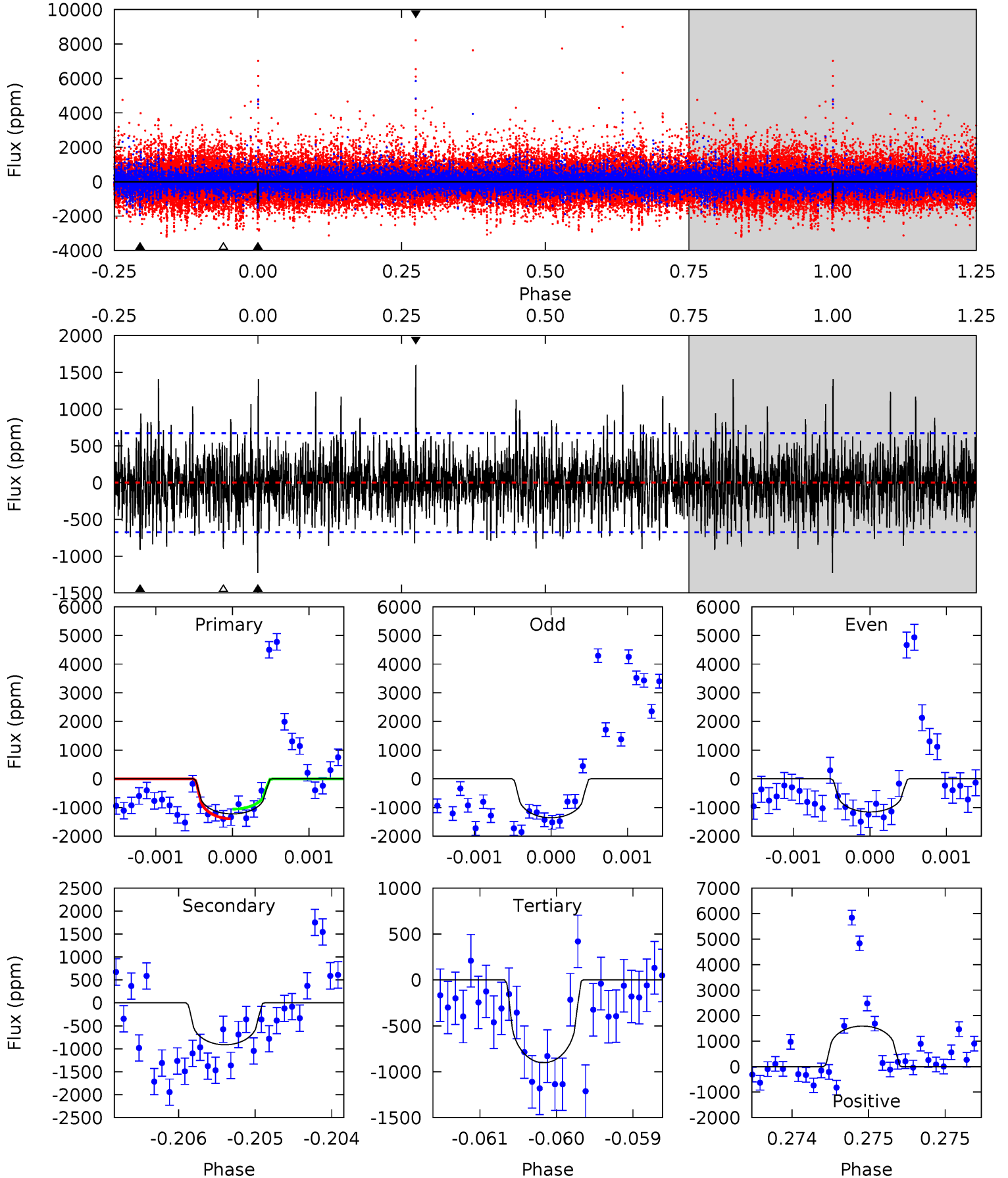
TCE 005869301-04     $P=393.897736$  Days     $T_0=419.527552$  (BKJD)



# DV Model-Shift Uniqueness Test

005869301-04, P = 393.927445 Days, E = 25.543702 Days

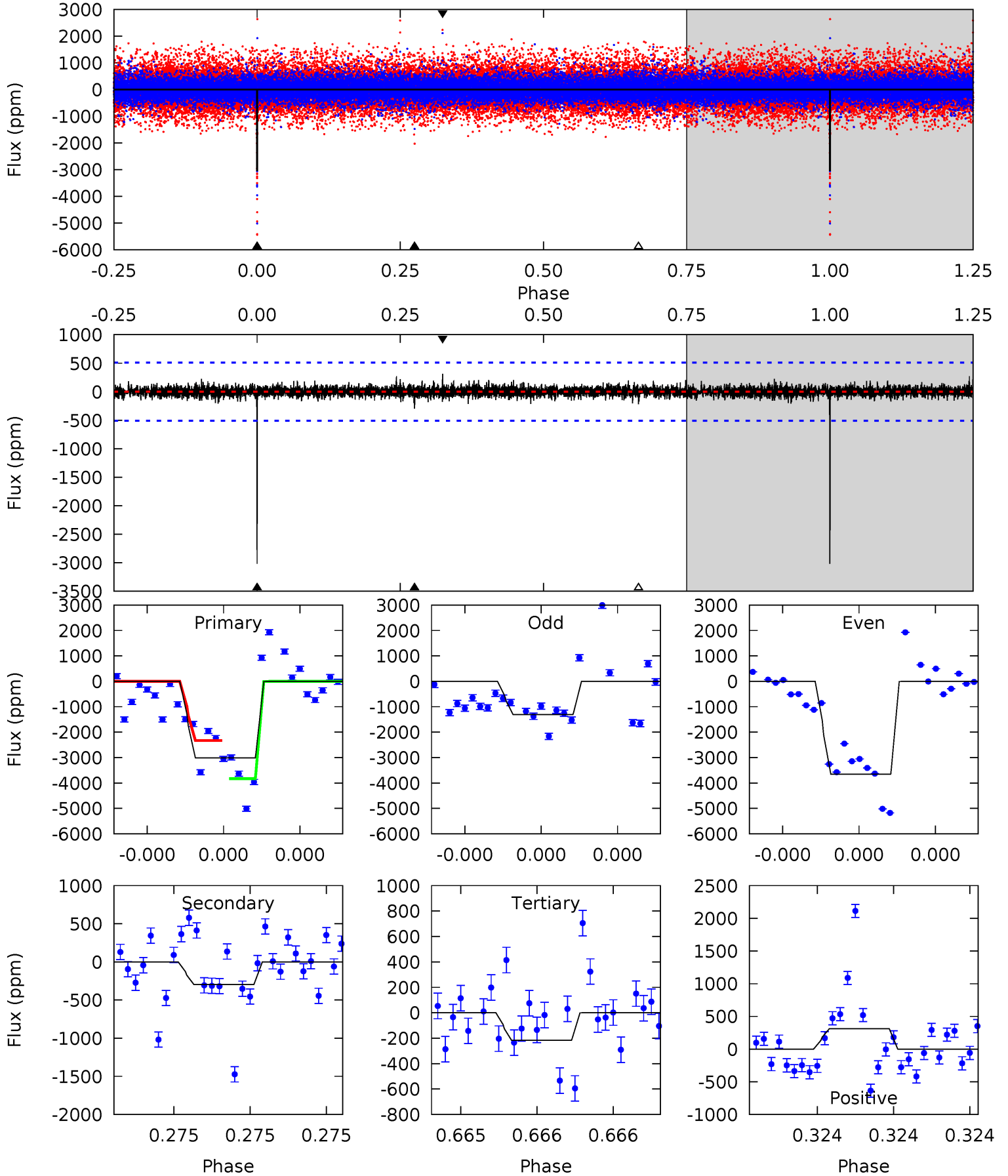
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.0	7.47	7.38	13.0	5.51	3.39	2.42	2.64	-3.00	0.09	-5.55	0.54	0.83	0.57	1.39



# Alt Model-Shift Uniqueness Test

005869301-04, P = 393.897736 Days, E = 25.629816 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
33.1	3.26	2.38	3.42	5.59	3.50	0.54	30.7	29.7	0.88	-0.16	12.2	0.81	0.09	8.25



### Stellar Parameters For KIC 005869301

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4893^{+170}_{-170}$	$4.542^{+0.072}_{-0.048}$	$-0.040^{+0.300}_{-0.300}$	$0.761^{+0.068}_{-0.075}$	$0.735^{+0.083}_{-0.060}$	$2.353^{+0.746}_{-0.394}$
	+3%/-3%	+2%/-1%	+750%/-750%	+9%/-10%	+11%/-8%	+32%/-17%
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 005869301-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-913 \pm 122$	$4.69^{+3.93}_{-3.08}$	$269^{+11}_{-11}$	$3879^{+2135}_{-728}$	$21488^{+157816}_{-15477}$
Alt.	$-297 \pm 91$	$5.26^{+4.30}_{-3.46}$	$269^{+11}_{-11}$	$3080^{+1392}_{-462}$	$4987^{+38600}_{-3515}$

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

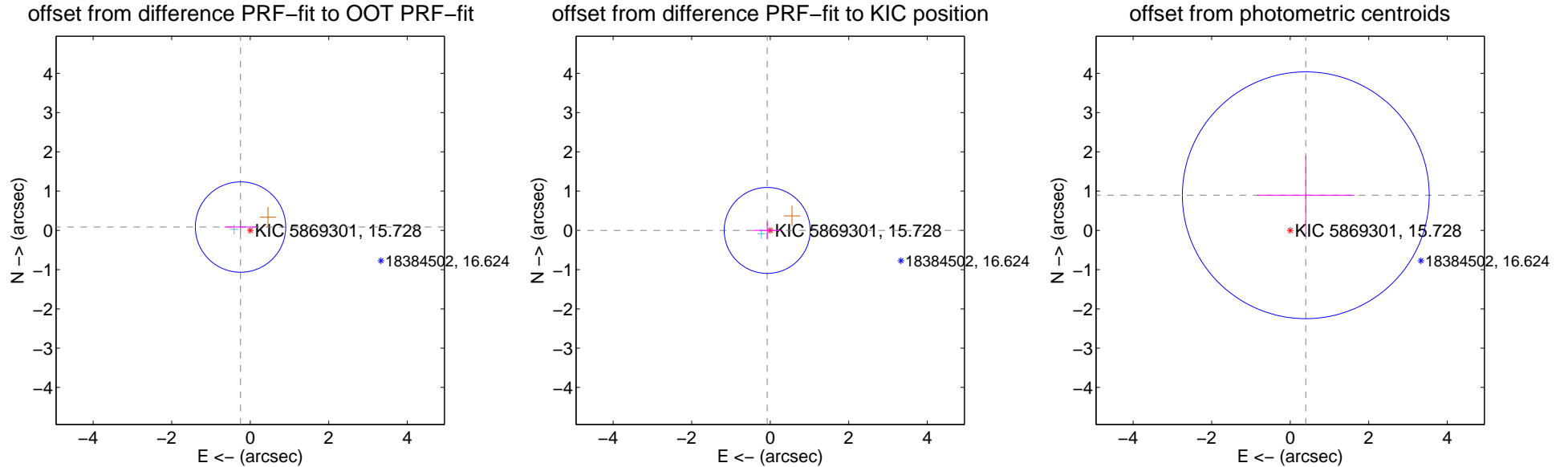
## DV Centroid Data

Supplemental centroid analysis for 005869301-04. Kepler magnitude: 15.73. Transit SNR 8.71

There are 1 quarters with good PRF difference image offsets

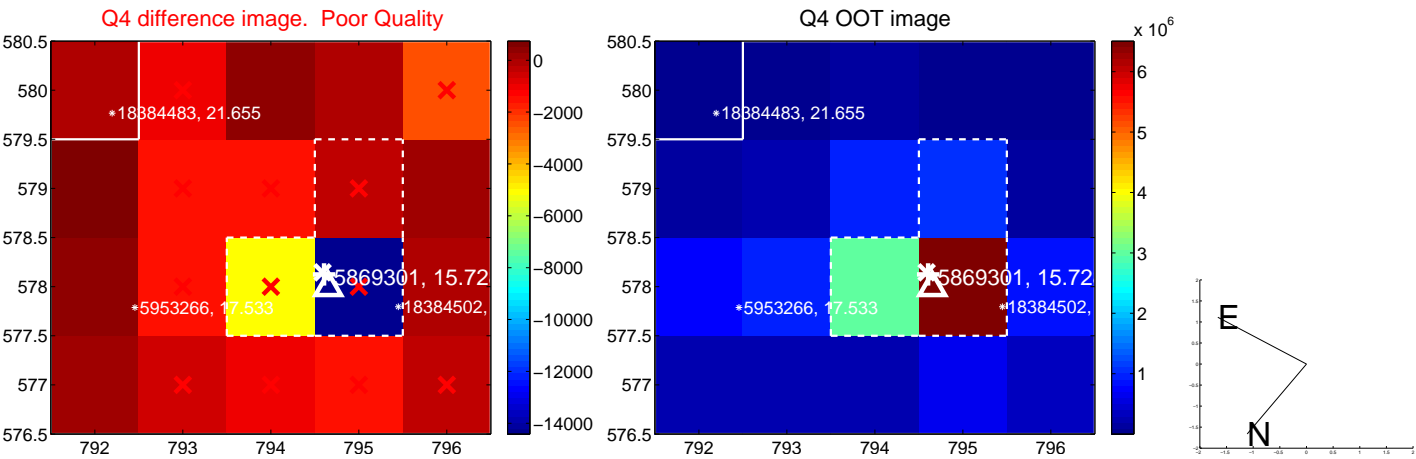
The direct PRF centroid is offset from the target star catalog position by about 0.22 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.261 \pm 0.384$	0.68	$0.247 \pm 0.402$	$0.085 \pm 0.157$
PRF-fit source offset from KIC position	$0.077 \pm 0.365$	0.21	$0.077 \pm 0.365$	$-0.002 \pm 0.218$
photometric centroid source offset	$0.98 \pm 1.05$	0.93	$-0.40 \pm 1.24$	$0.89 \pm 1.01$



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.

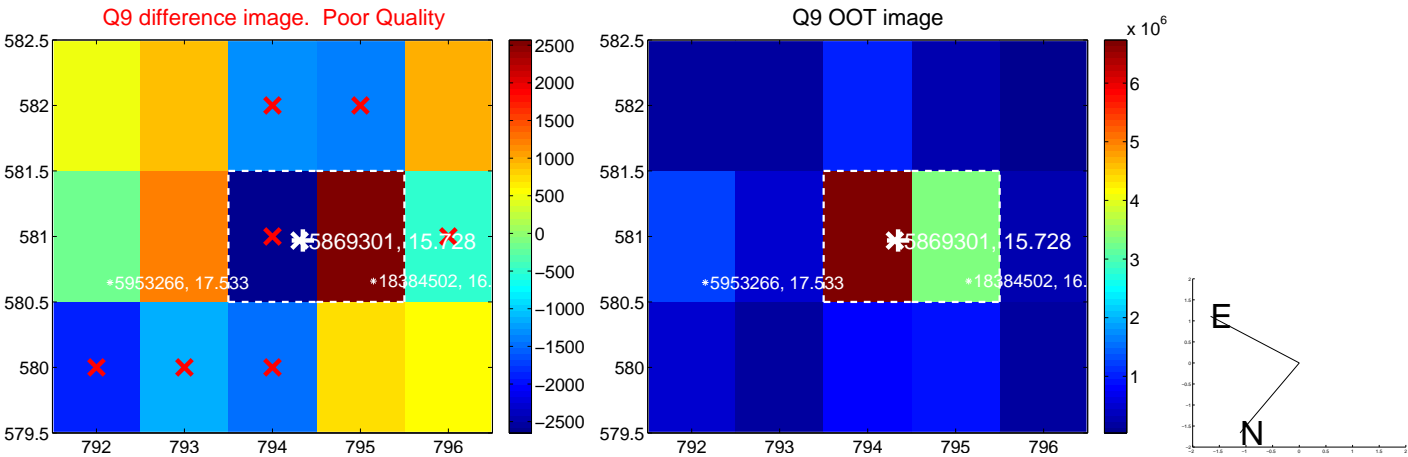


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

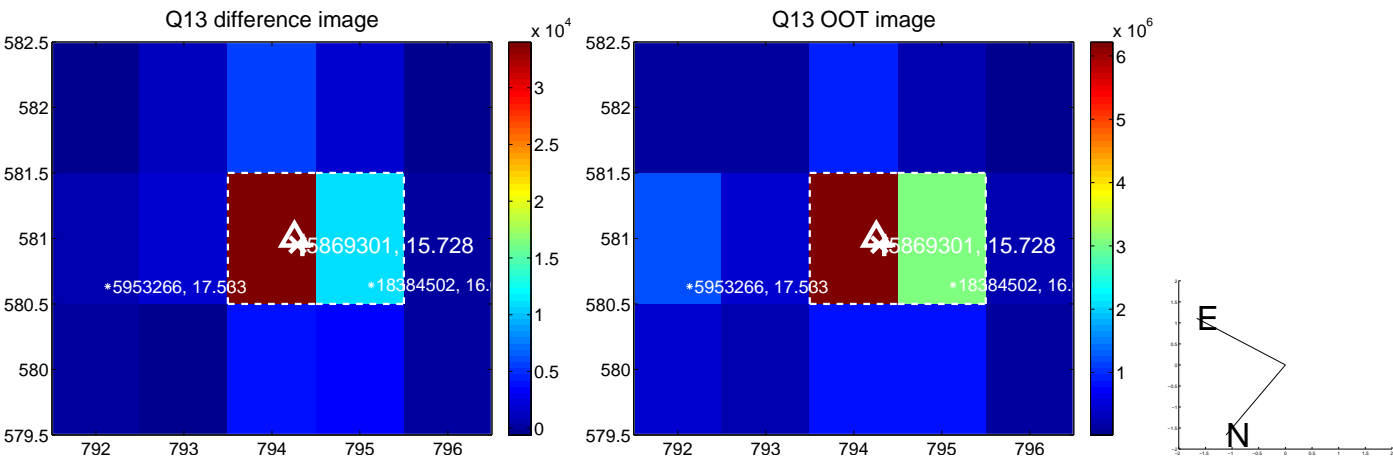




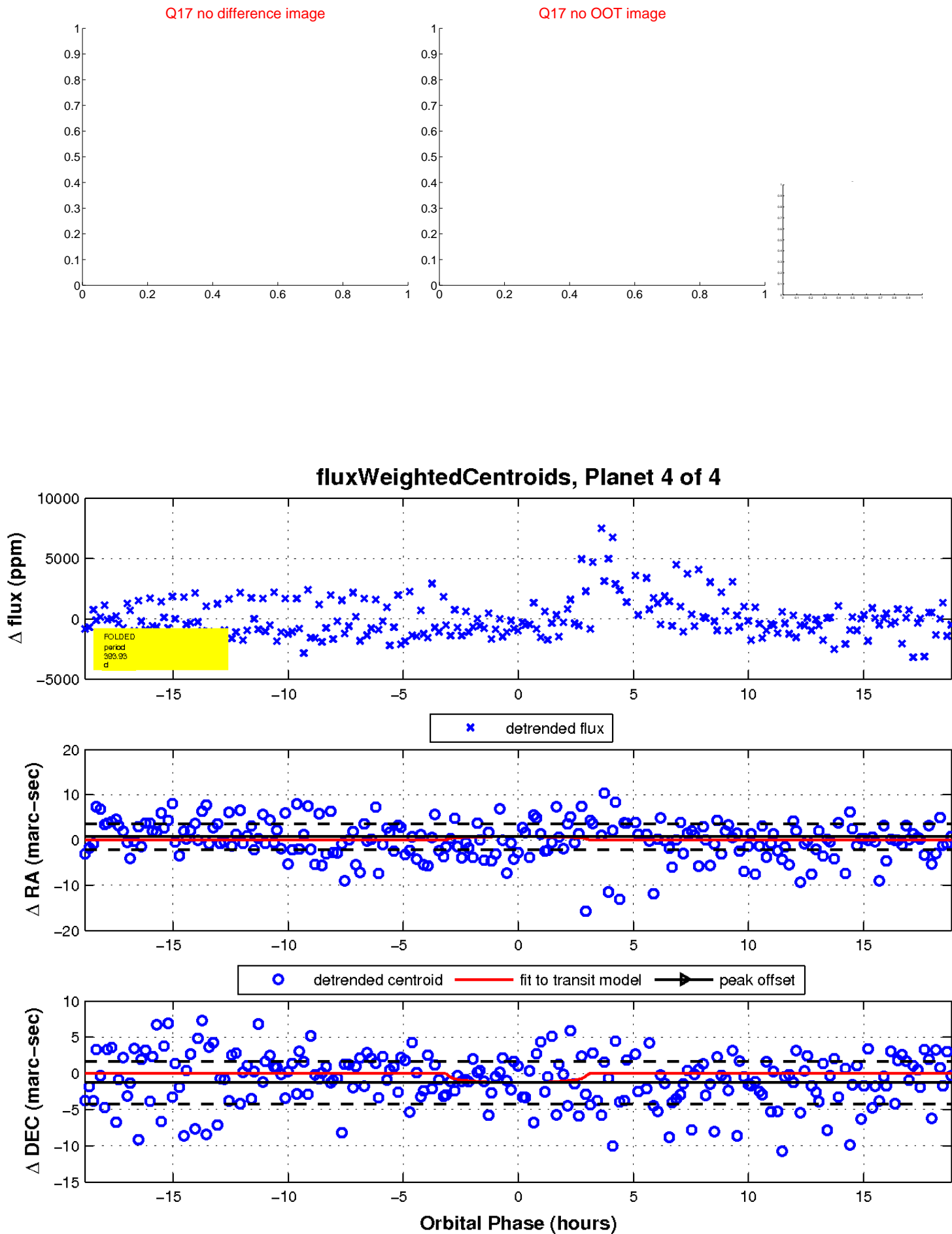
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



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

