

# KIC 008505072

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008505072-01	OBS	No	339.024006	185.718256	305.5	1.473	66.3	2.5	5.42	4762	9.77	16.07
008505072-02	OBS	No	181.750622	205.974689	2616.2	0.799	61.0	23.8	5.42	4762	27.34	36.90

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008505072-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_ZUMA—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
008505072-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED

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

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

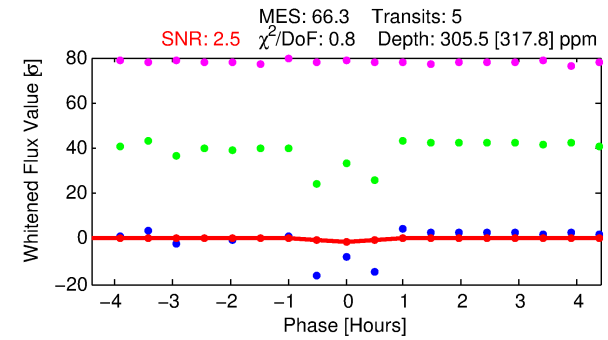
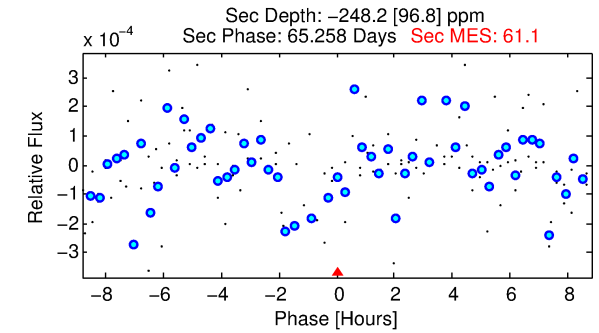
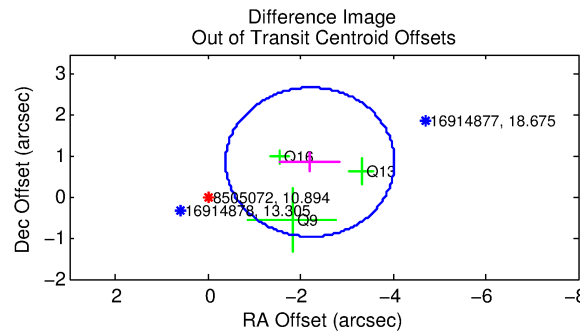
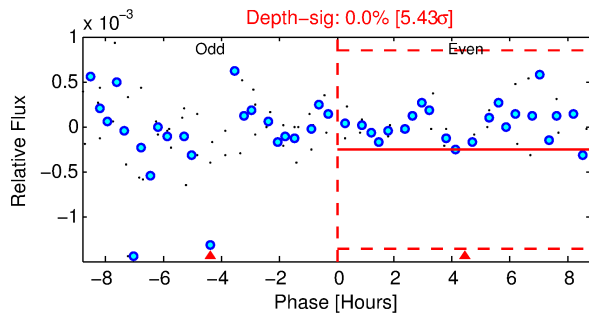
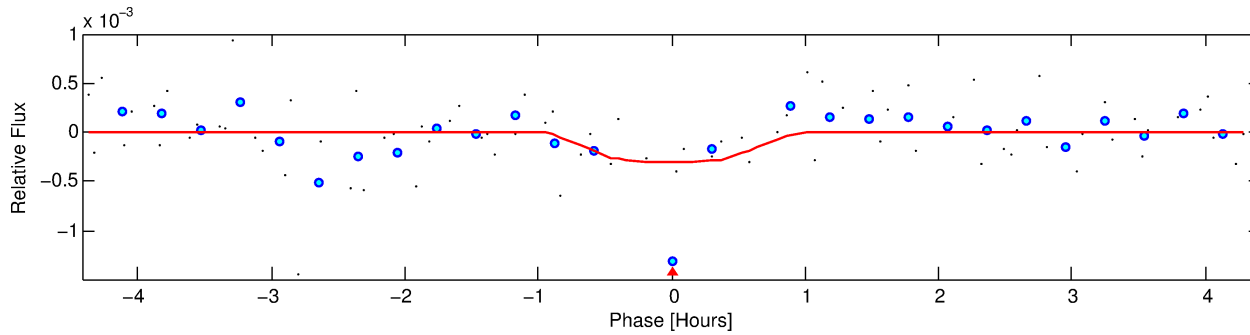
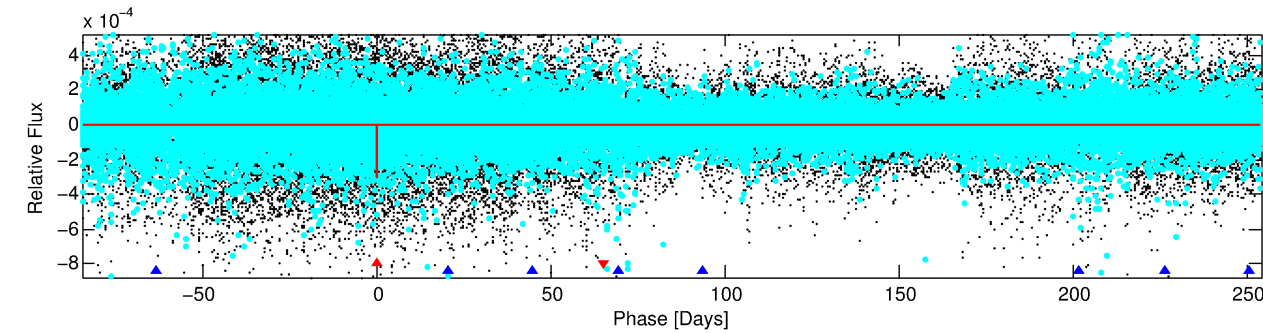
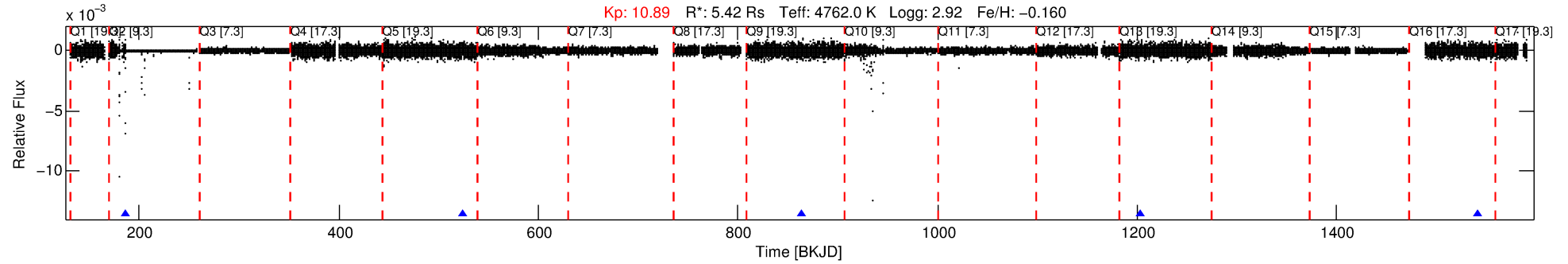
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 008505072-01

No Significant Match Found

# DV One-Page Summary

KIC: 8505072 Candidate: 1 of 2 Period: 339.024 d



## DV Fit Results:

Period = 339.02401 [0.01212] d  
Epoch = 185.7183 [0.0256] BKJD  
Rp/R\* = 0.0165 [0.1553]  
a/R\* = 1472.55 [46103.86]  
b = 0.58 [36.88]  
Seff = 16.07 [2.13]  
Teq = 511 [17] K  
Rp = 9.76 [91.93] Re  
a = 0.9186 [0.0961] AU  
Ag = N/A  
Teffp = N/A

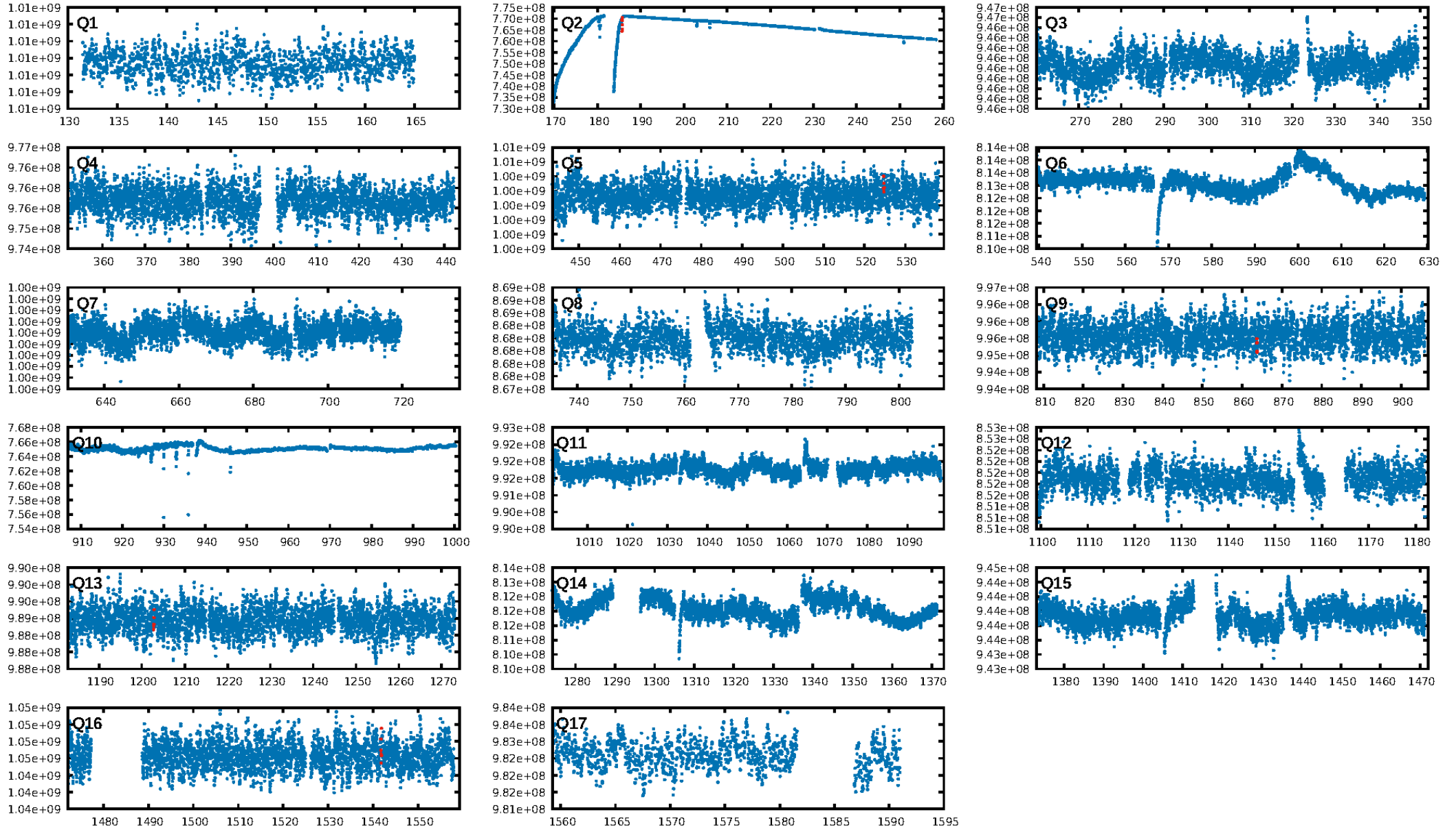
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [2251.68 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 91.5%  
ModelChiSquareGof-sig: 99.6%  
Bootstrap-pfa: 1.74e-78  
RollingBand-fgt: 1.00 [5/5]  
GhostDiagnostic-chr: -1.336  
Centroid-sig: 45.5%  
Centroid-so: 0.875 arcsec [1.77 $\sigma$ ]  
OotOffset-rm: 2.368 arcsec [3.89 $\sigma$ ]  
KicOffset-rm: 1.981 arcsec [5.78 $\sigma$ ]  
OotOffset-st: 0/0/1/2 [3]  
KicOffset-st: 0/0/1/2 [3]  
DiffImageQuality-fgm: 0.33 [1/3]  
DiffImageOverlap-fno: 1.00 [5/5]

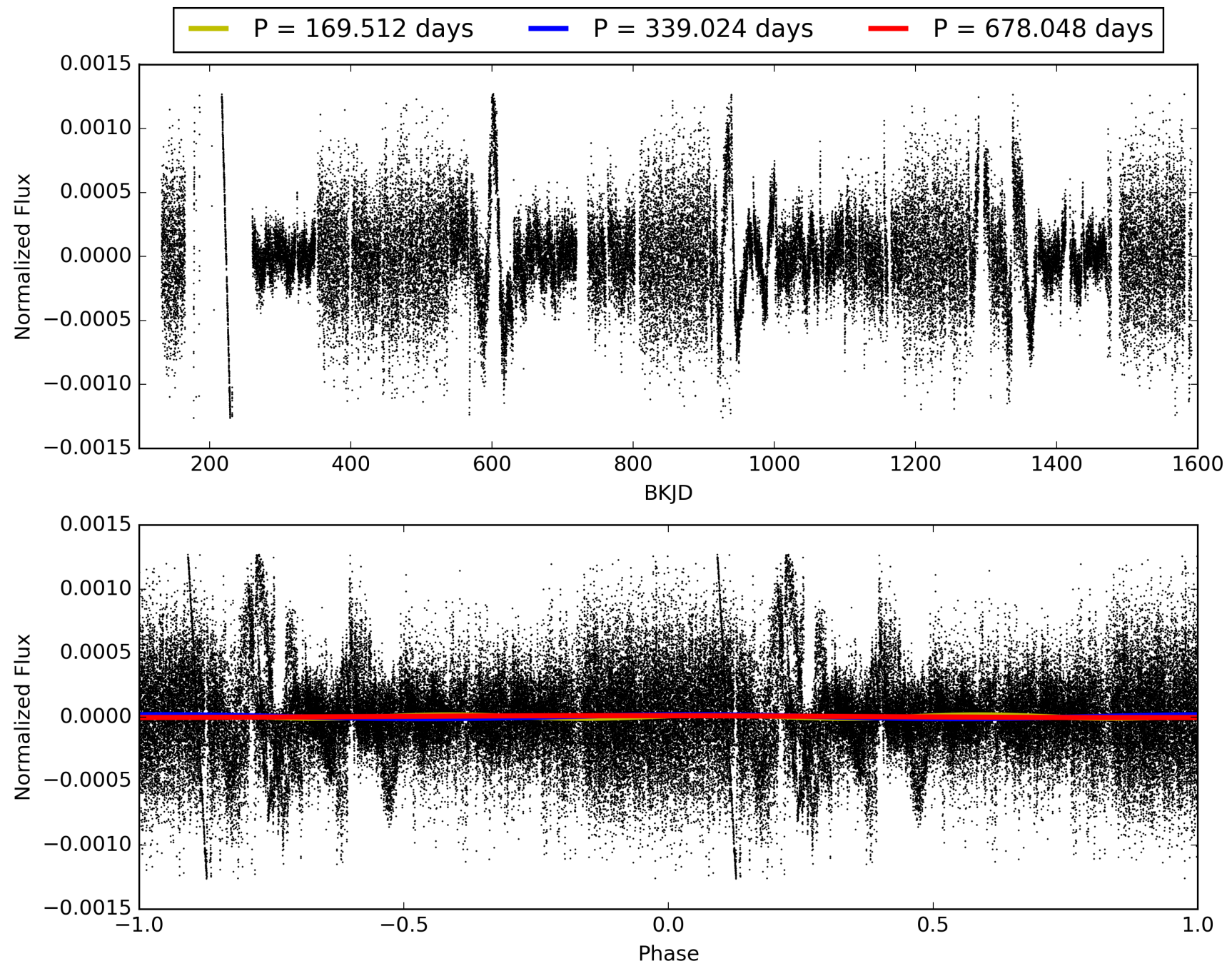
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 008505072-01, PDC Light Curves

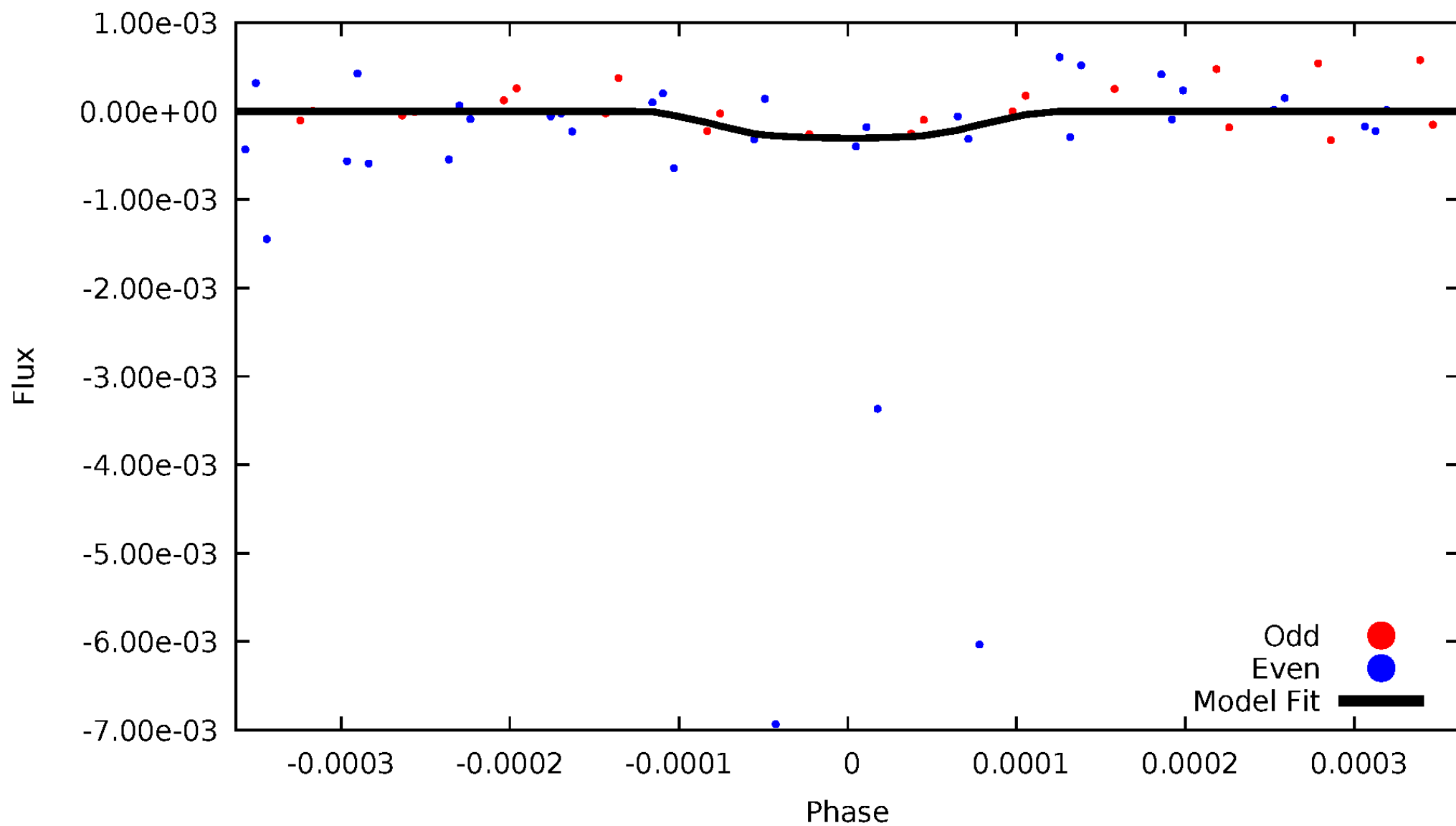


TCE 008505072-01



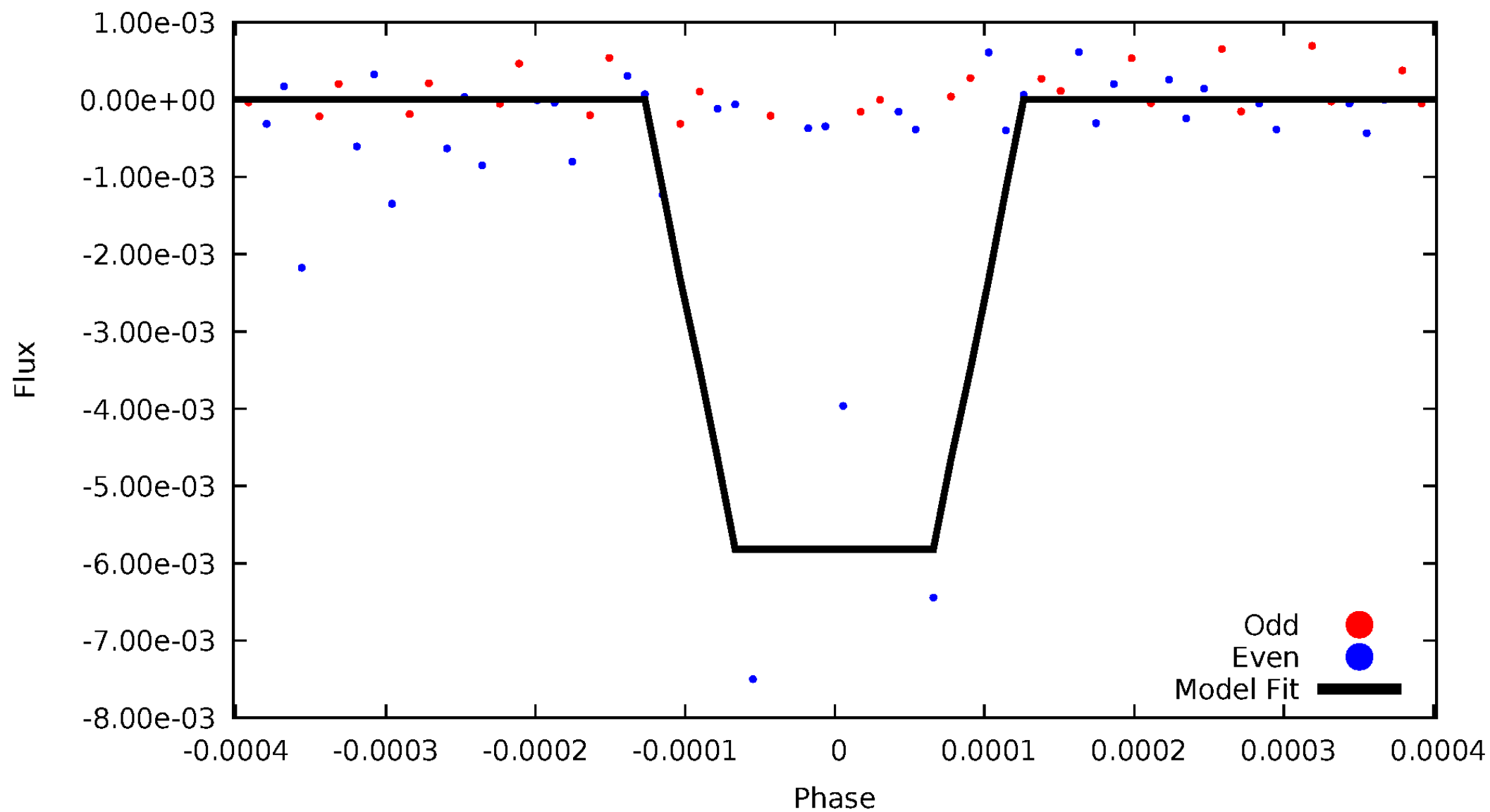
# DV Odd/Even

TCE 008505072-01



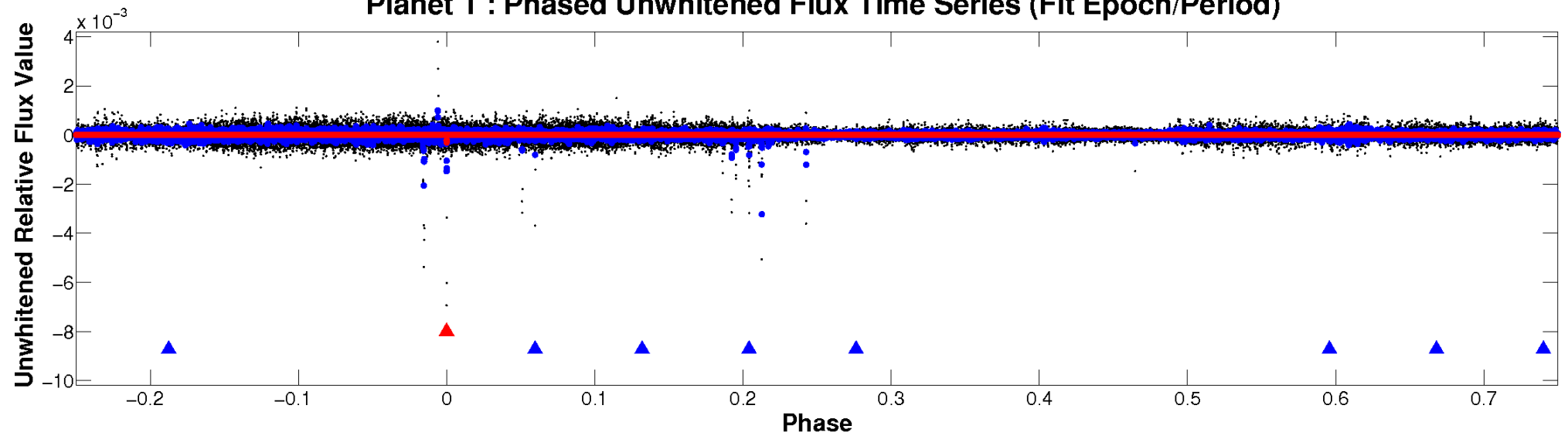
# ALT Odd/Even

TCE 008505072-01

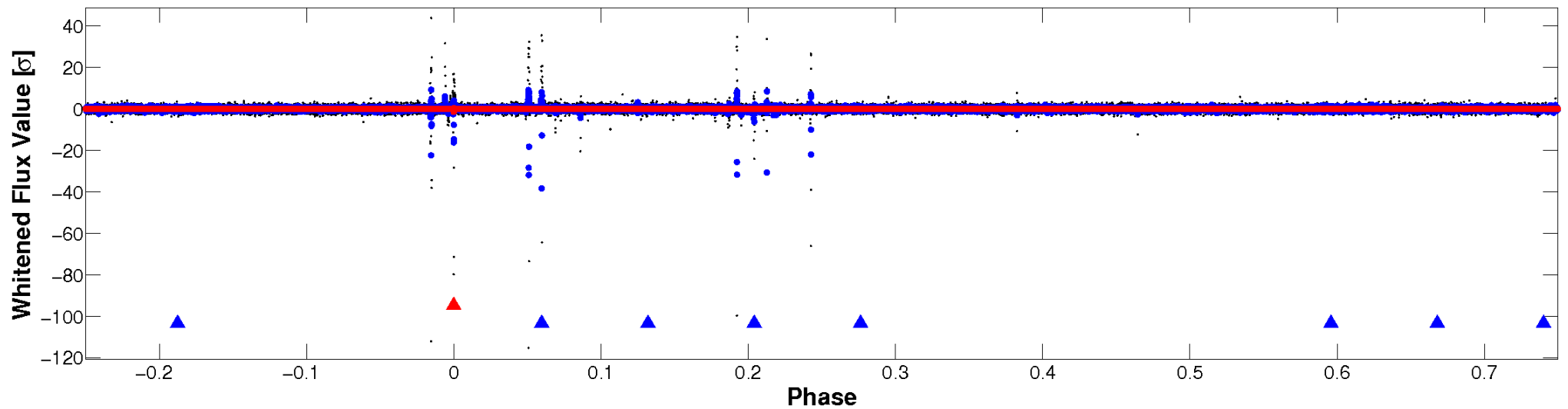


# Non-Whitened Vs. Whitened Light Curve

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

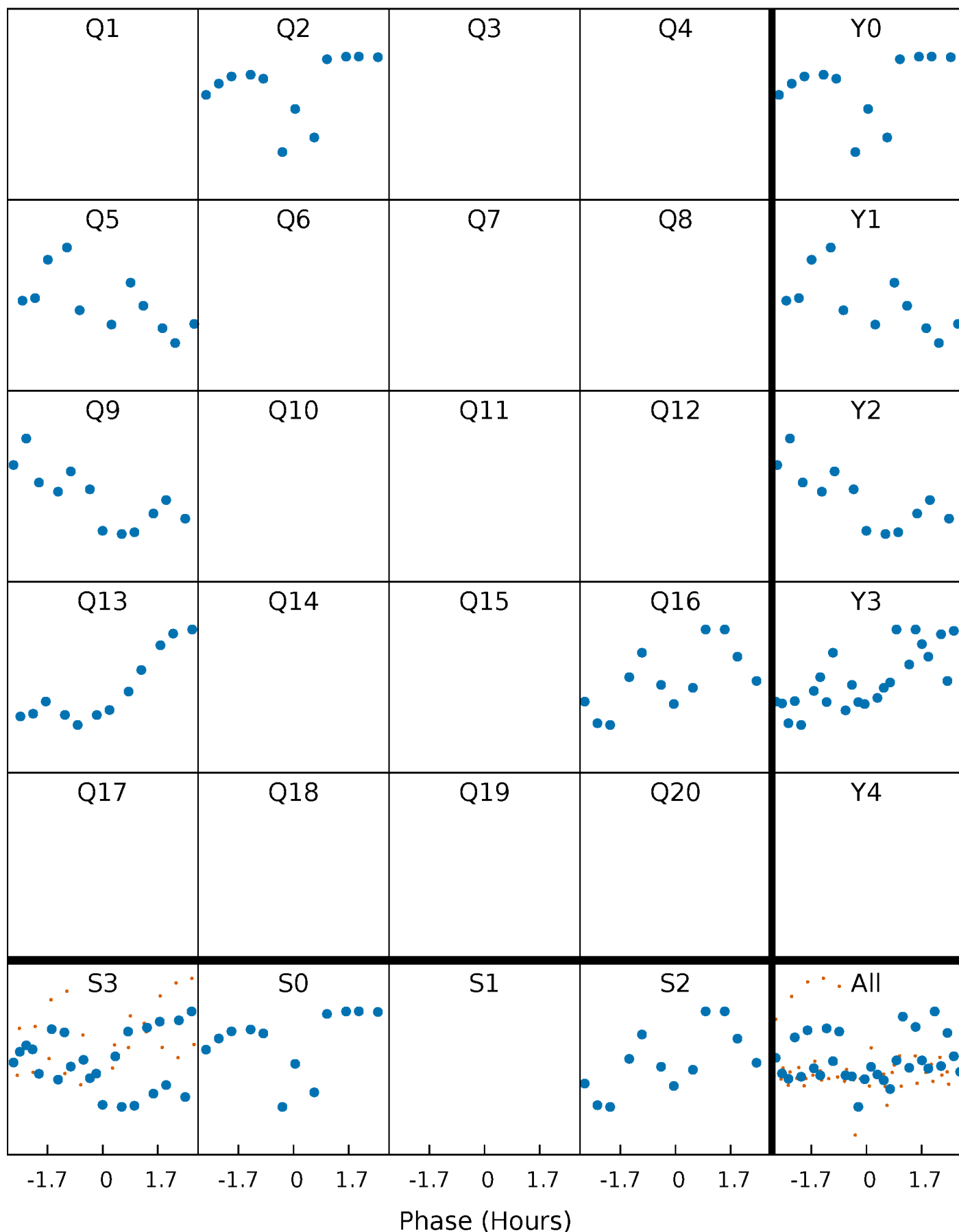


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

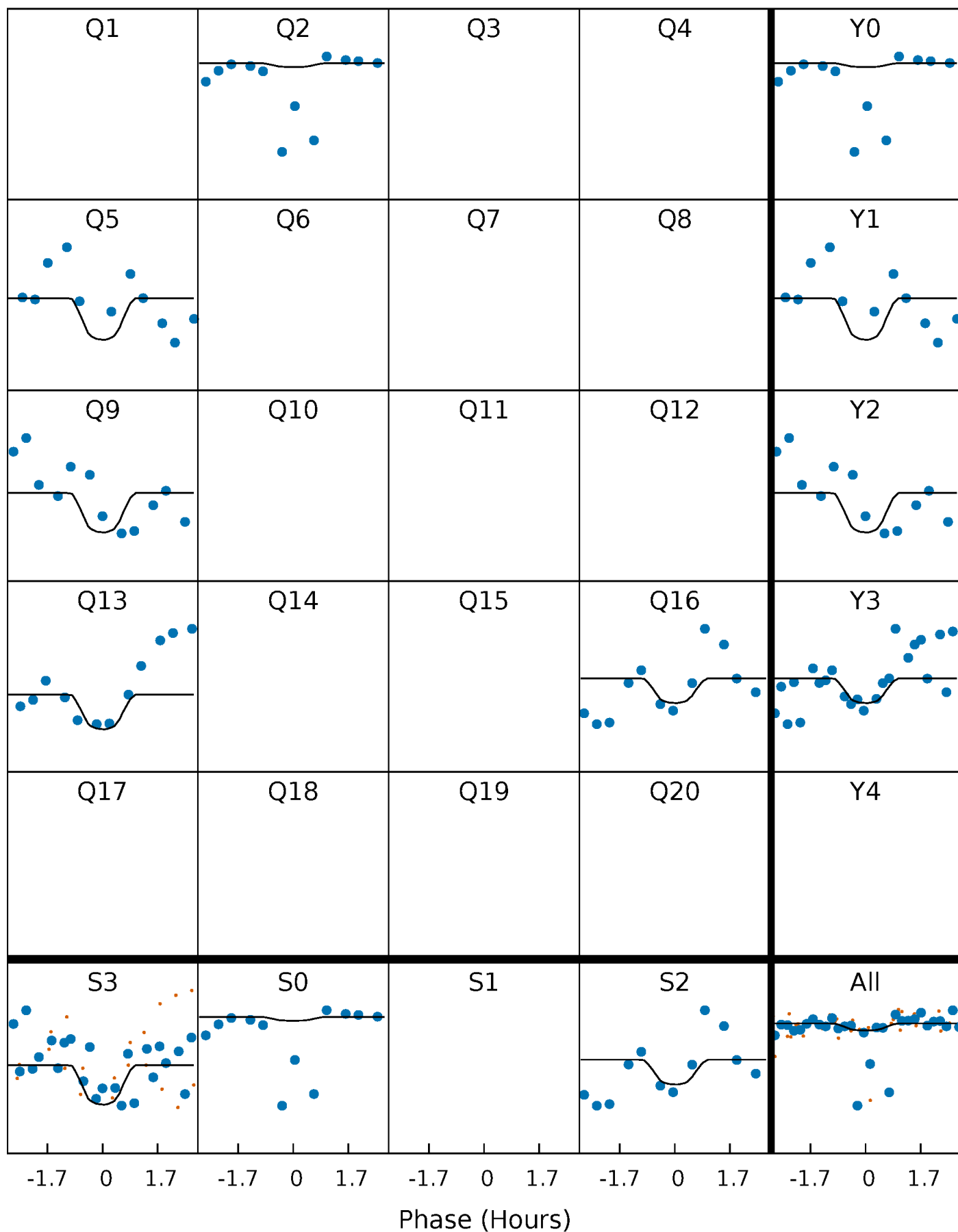
TCE 008505072-01 P=339.024006 Days  $T_0=185.718256$  (BKJD)





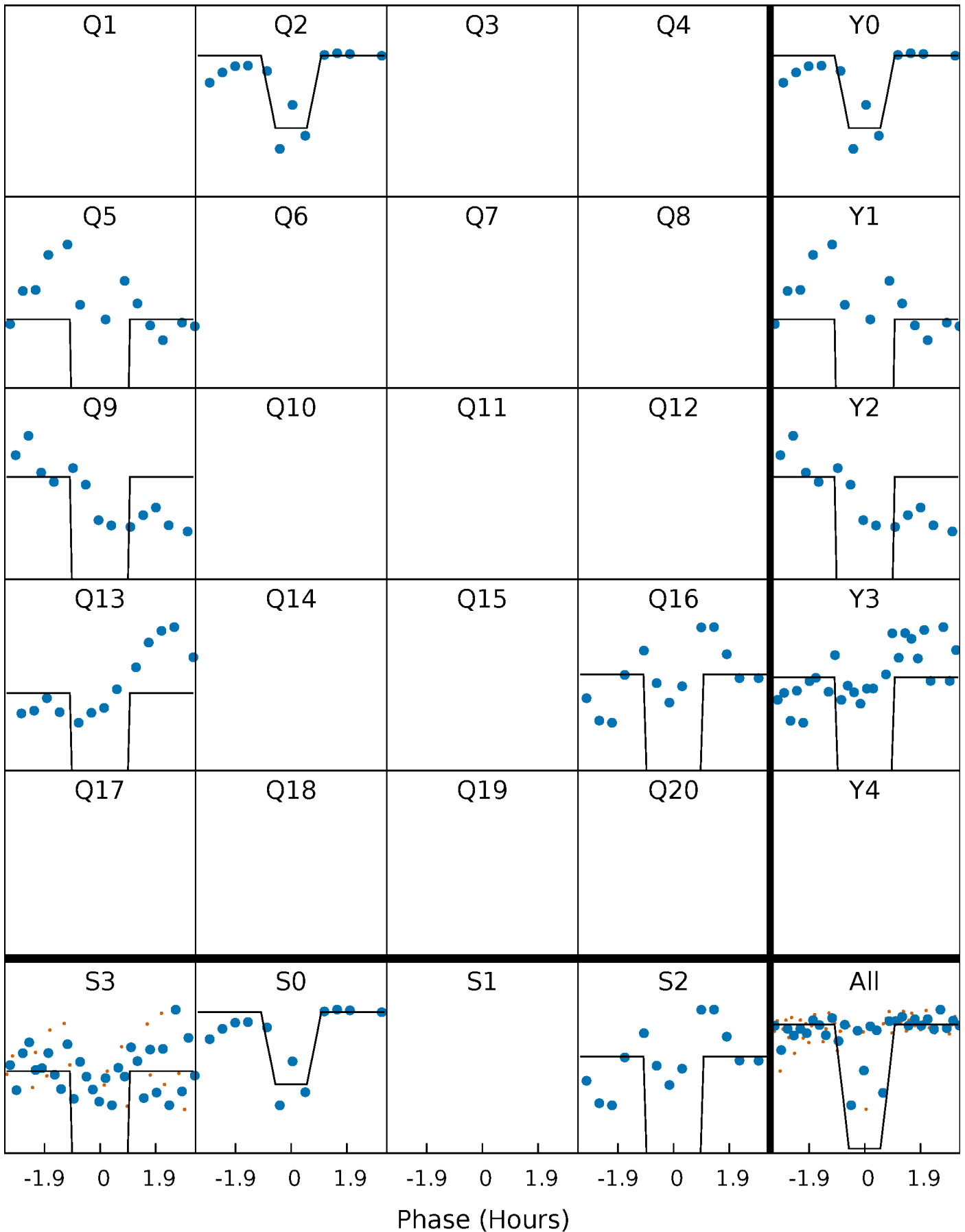
# DV Quarter-Phased Transit Curves

TCE 008505072-01 P=339.024006 Days  $T_0=185.718256$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

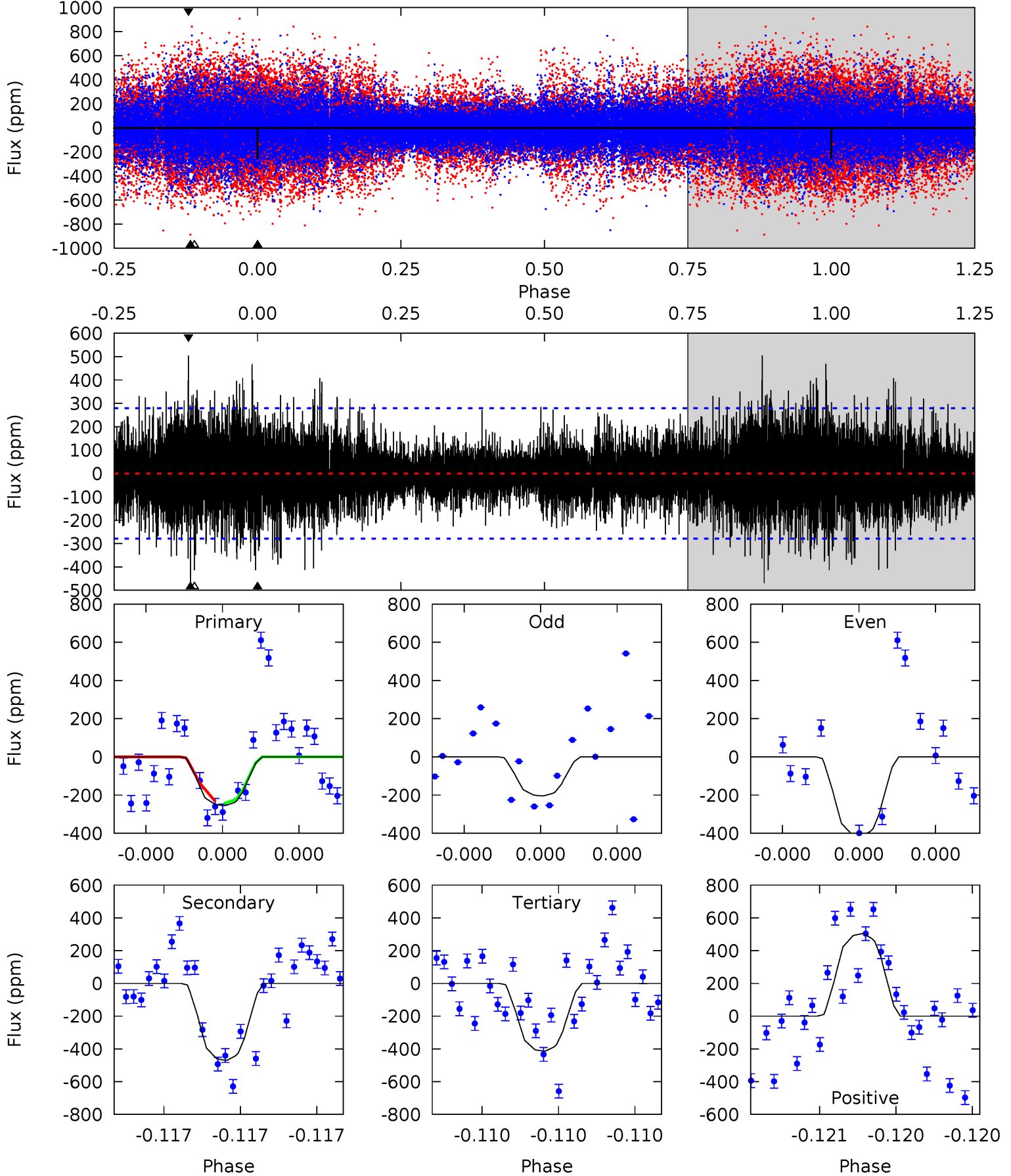
TCE 008505072-01 P=339.024907 Days  $T_0=185.722382$  (BKJD)



# DV Model-Shift Uniqueness Test

008505072-01, P = 339.024006 Days, E = 185.718256 Days

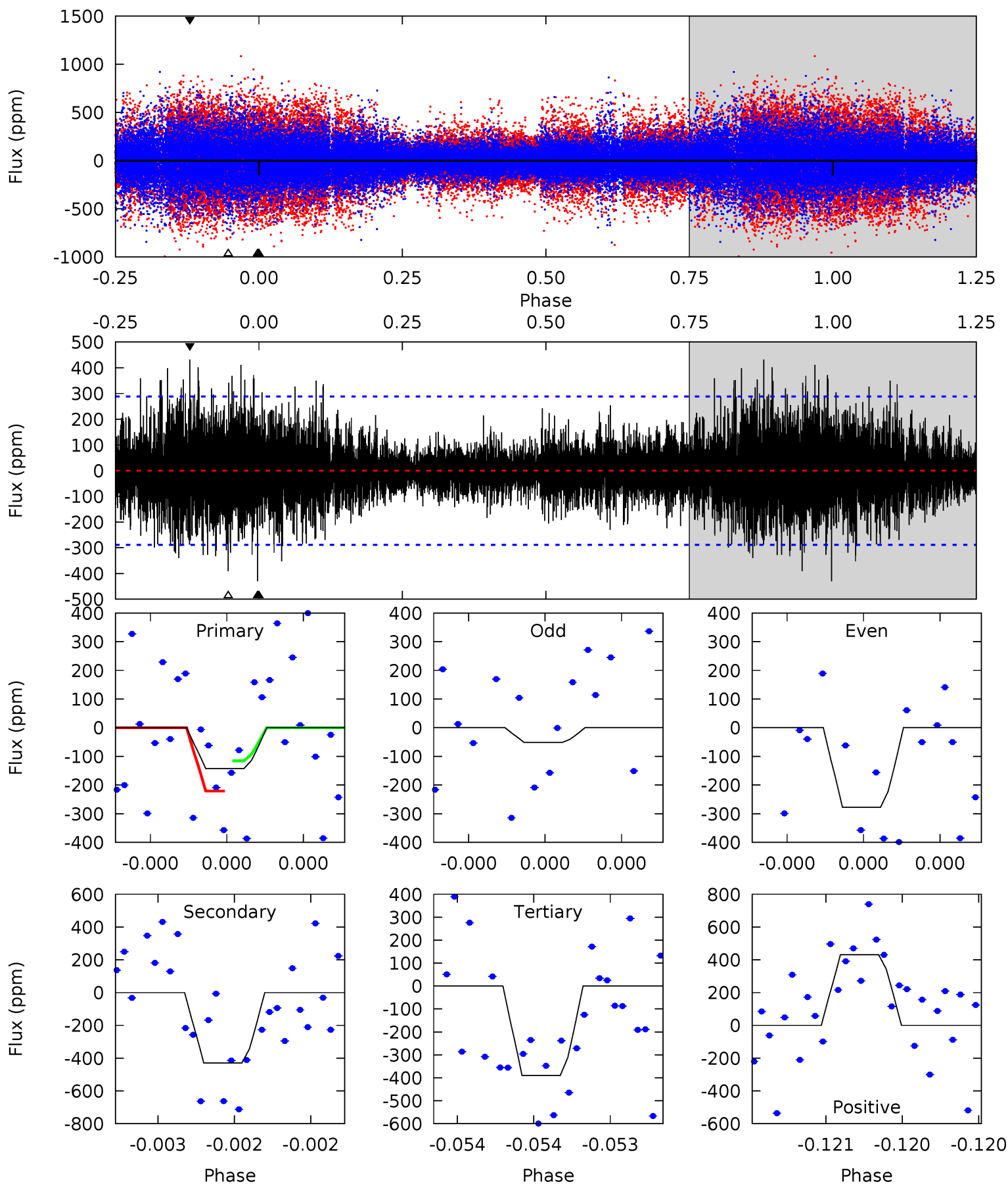
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.21	9.60	8.45	10.3	5.70	3.67	1.85	-3.24	-5.07	1.15	-0.68	1.75	4.85	0.52	0.07



# Alt Model-Shift Uniqueness Test

008505072-01, P = 339.024907 Days, E = 185.722382 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
2.82	8.48	7.71	8.52	5.70	3.67	1.68	-4.89	-5.69	0.77	-0.04	2.04	7.81	0.50	1.01



### Stellar Parameters For KIC 008505072

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$4762^{+78}_{-42}$	$2.923^{+0.036}_{-0.027}$	$-0.160^{+0.150}_{-0.100}$	$5.425^{+0.821}_{-0.164}$	$0.901^{+0.283}_{-0.015}$	$0.008^{+0.001}_{-0.001}$
	+2%/-1%	+1%/-1%	+94%/-62%	+15%/-3%	+31%/-2%	+10%/-16%
Source	SPE74	AST9	SPE74	DSEP		

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

### Secondary Eclipse Parameters for KIC 008505072-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-470 \pm 49$	$69.34^{+65.45}_{-49.06}$	$713^{+14}_{-11}$	$2758^{+1245}_{-422}$	$45^{+482}_{-33}$
Alt.	$-429 \pm 51$	$82.05^{+76.03}_{-55.11}$	$713^{+15}_{-11}$	$2612^{+967}_{-390}$	$30^{+234}_{-22}$

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

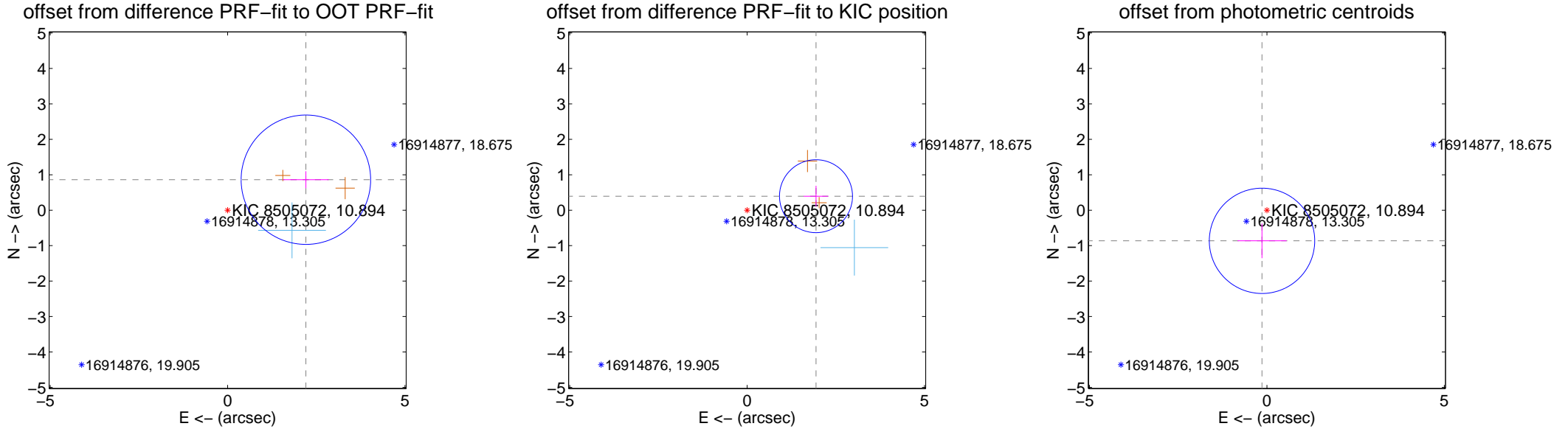
## DV Centroid Data

Supplemental centroid analysis for 008505072-01. **Kepler magnitude: 10.89.** Transit SNR 2.55

**There are 1 quarters with good PRF difference image offsets**

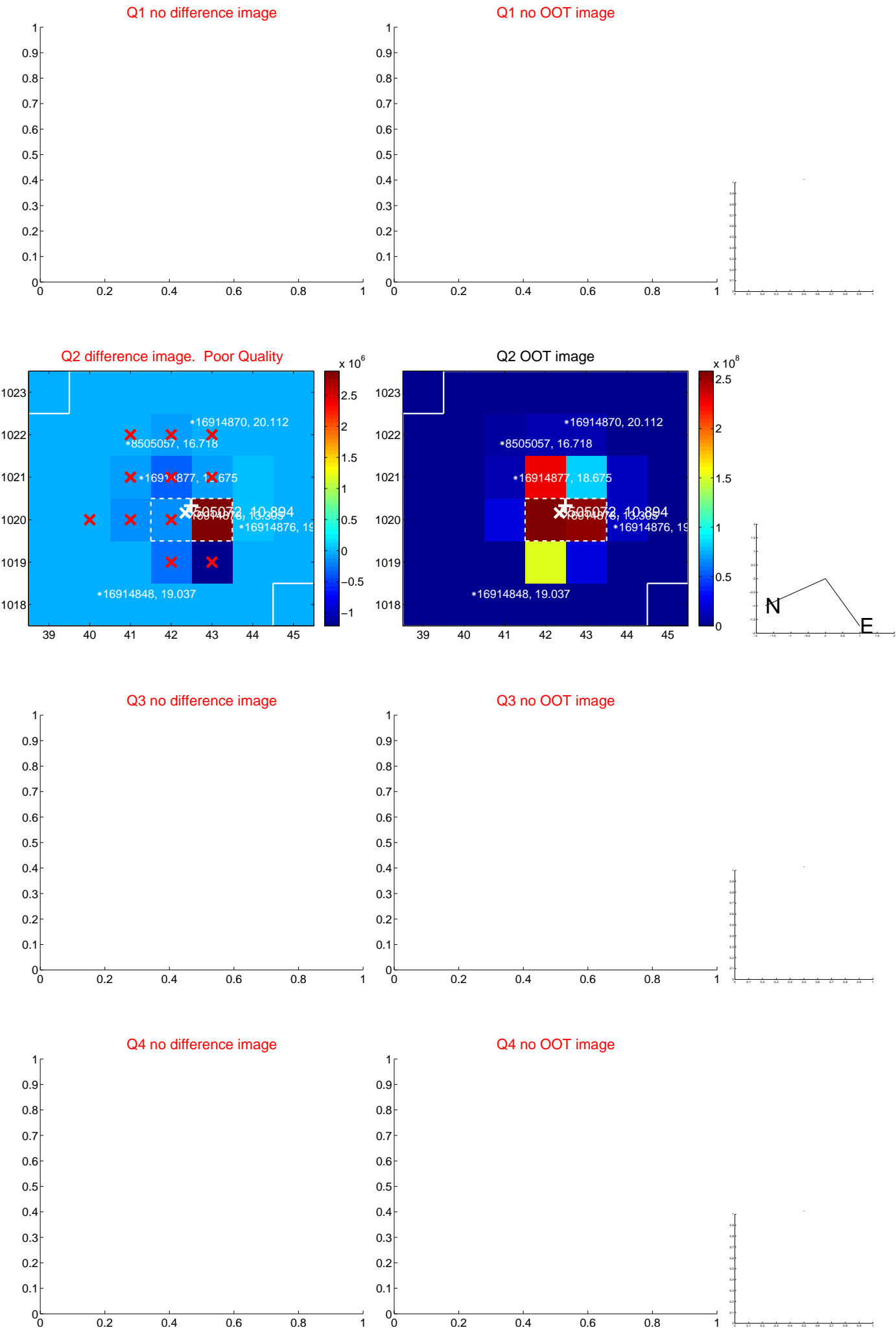
The direct PRF centroid is offset from the target star catalog position by about 0.90 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b>2.368 <math>\pm</math> 0.608</b>	<b>3.89</b>	-2.206 $\pm$ 0.646	0.860 $\pm$ 0.239
PRF-fit source offset from KIC position	<b>1.981 <math>\pm</math> 0.343</b>	<b>5.78</b>	-1.941 $\pm$ 0.345	0.395 $\pm$ 0.295
photometric centroid source offset	0.88 $\pm$ 0.50	1.77	0.14 $\pm$ 0.69	-0.86 $\pm$ 0.49

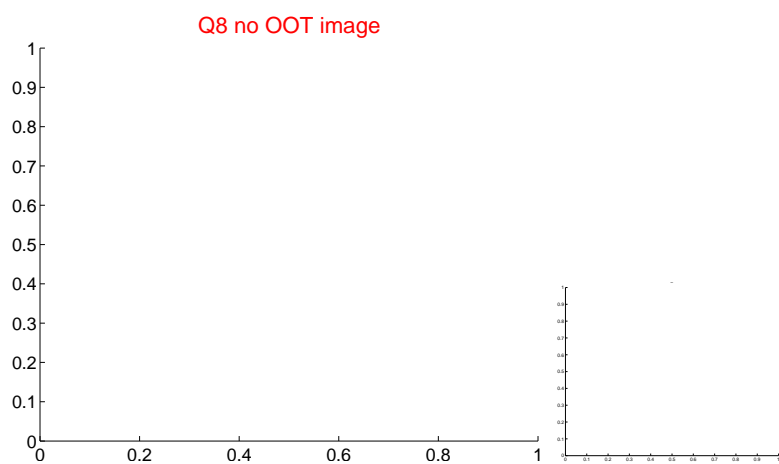
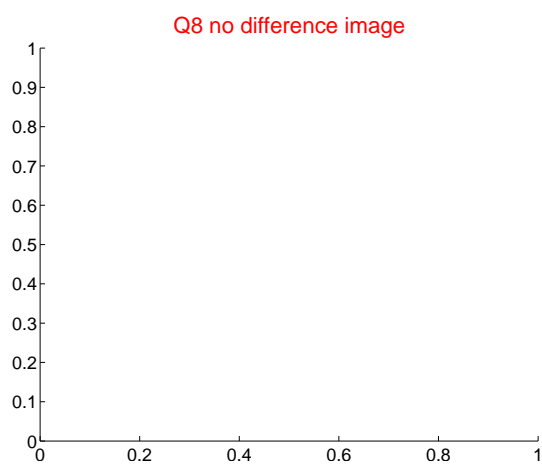
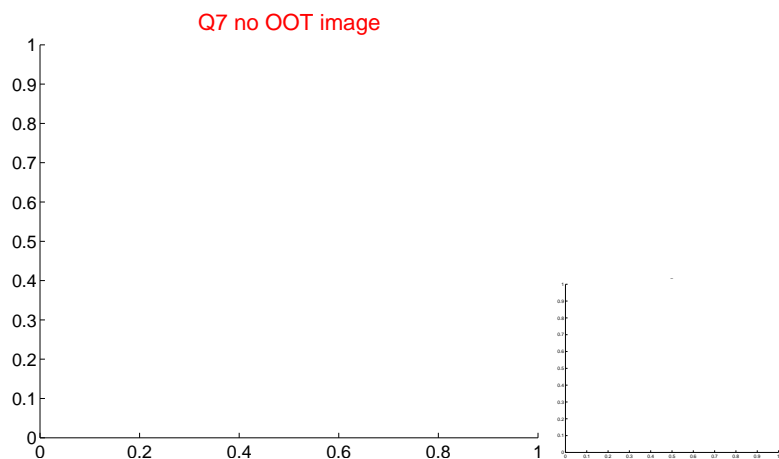
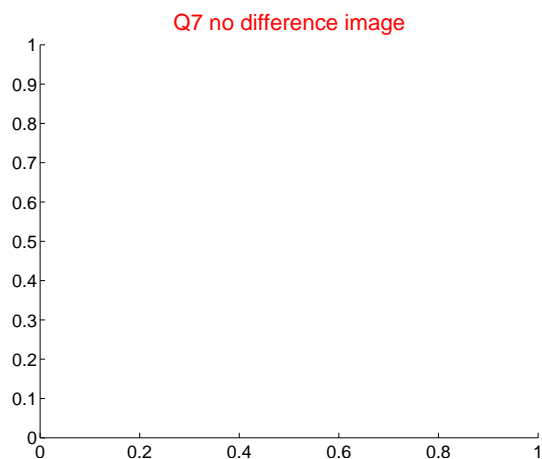
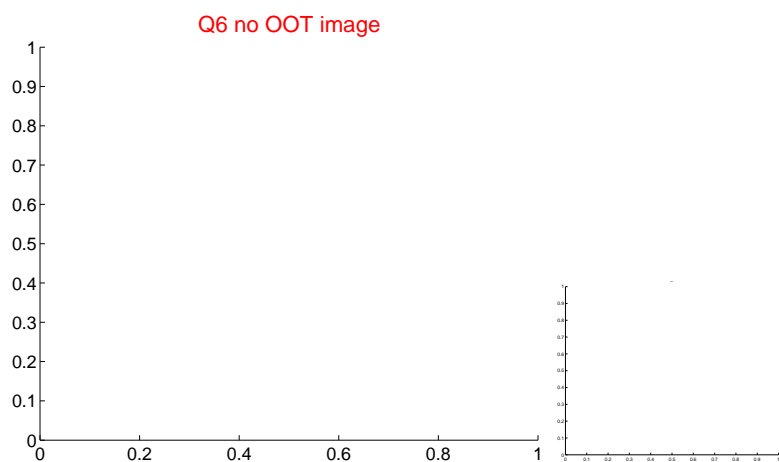
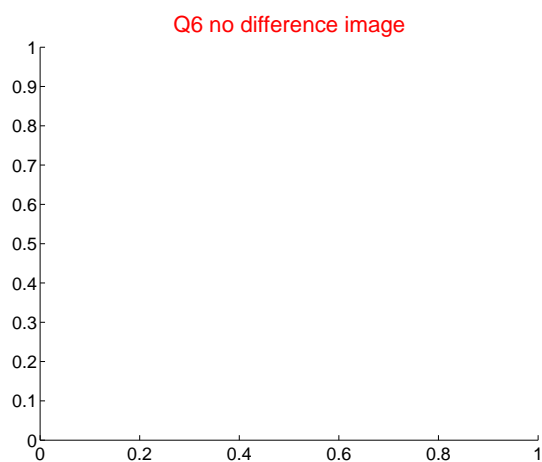
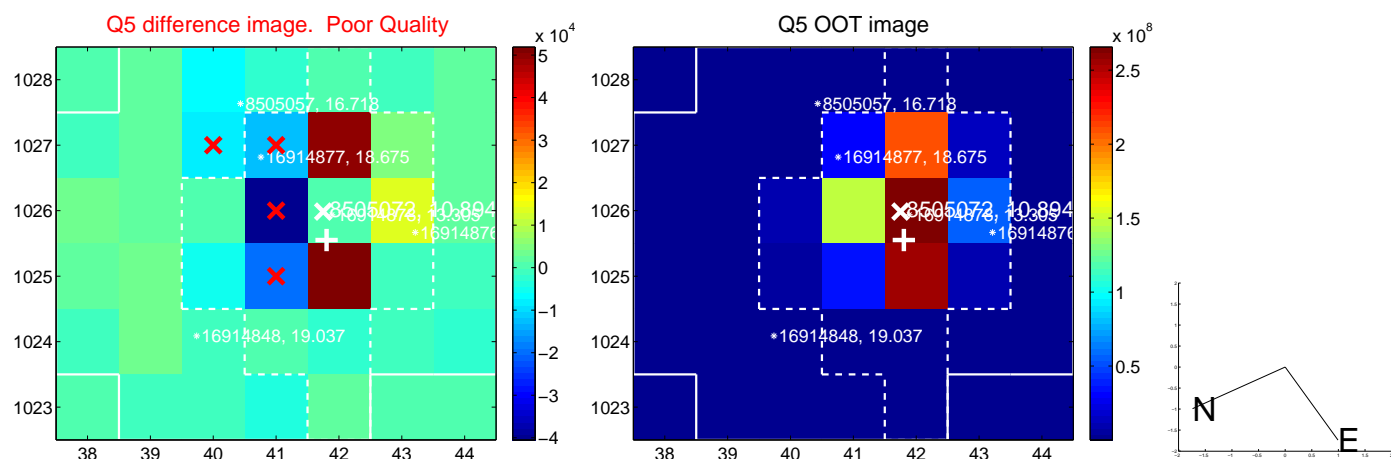


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

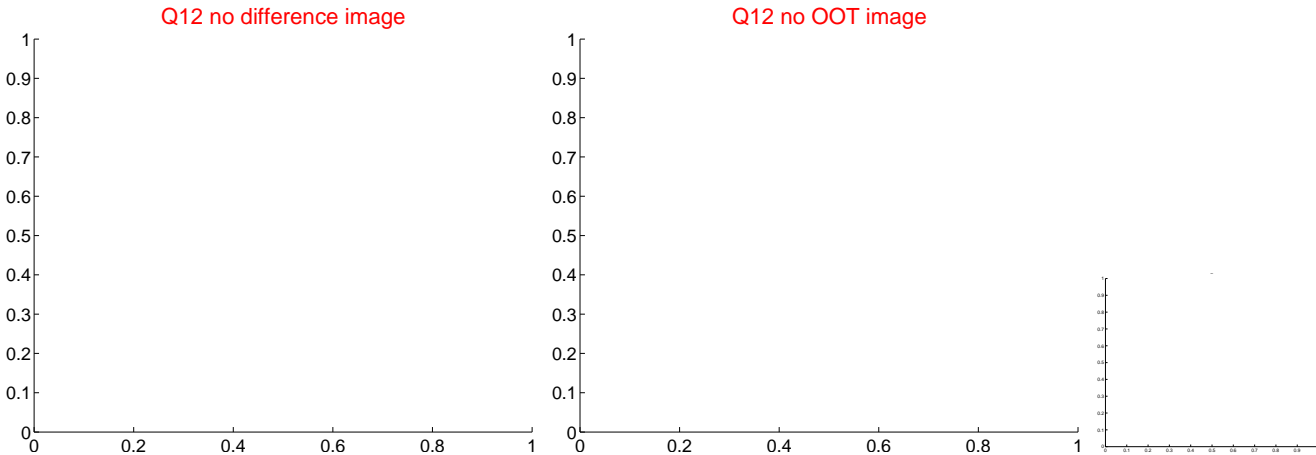
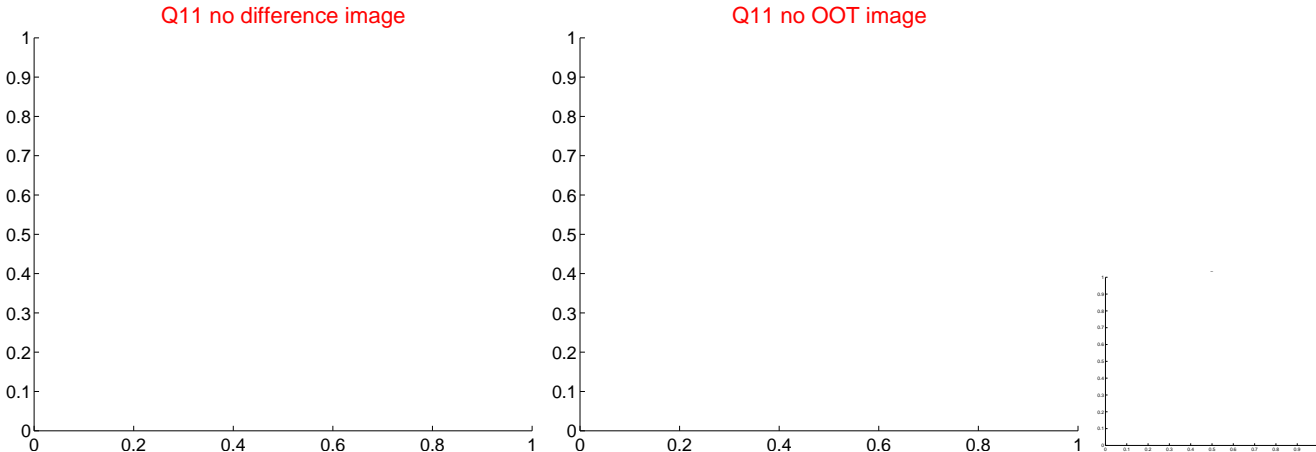
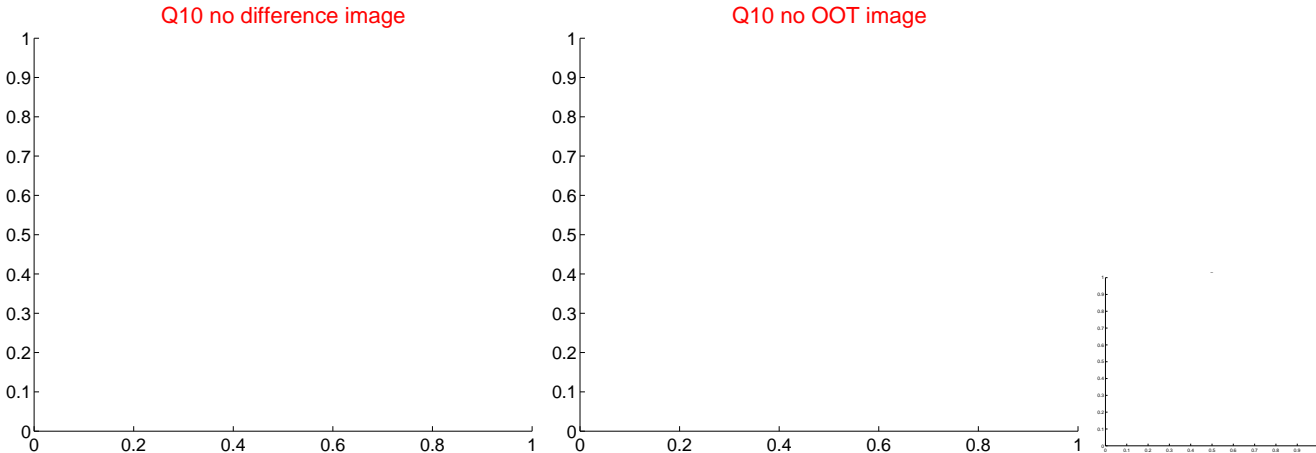
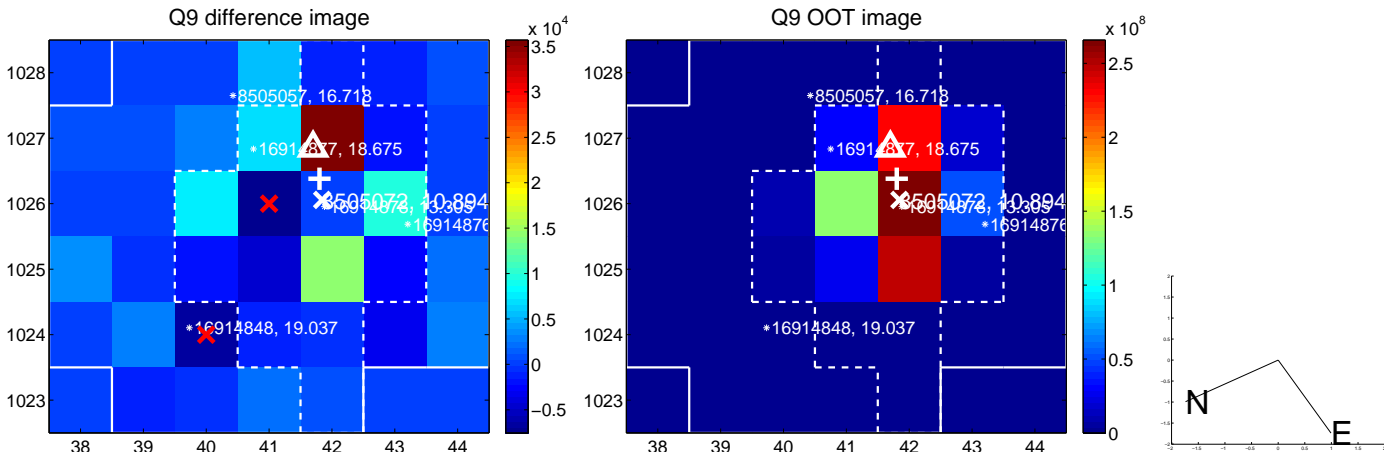


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

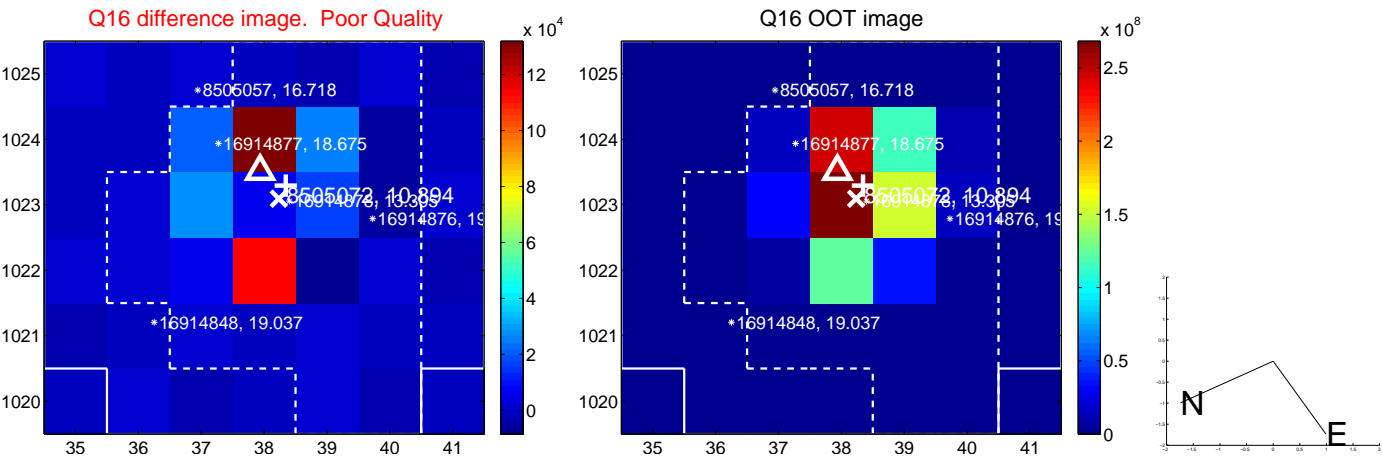
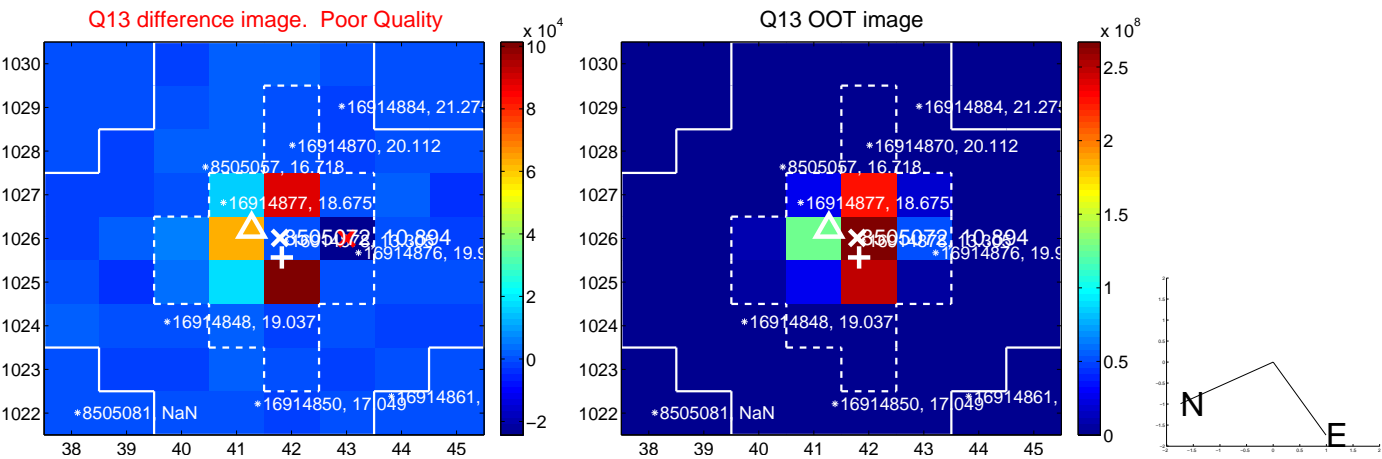




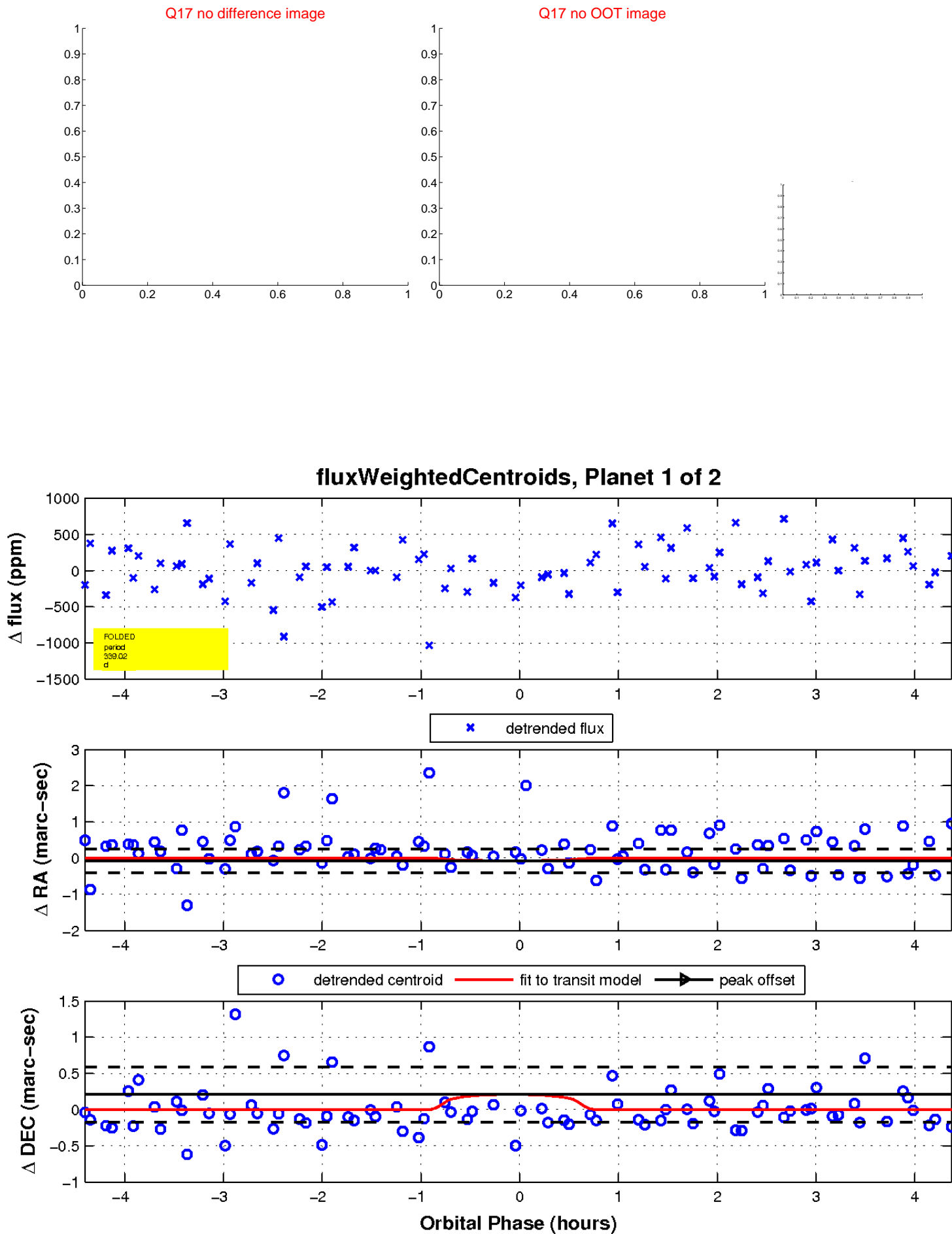
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value



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

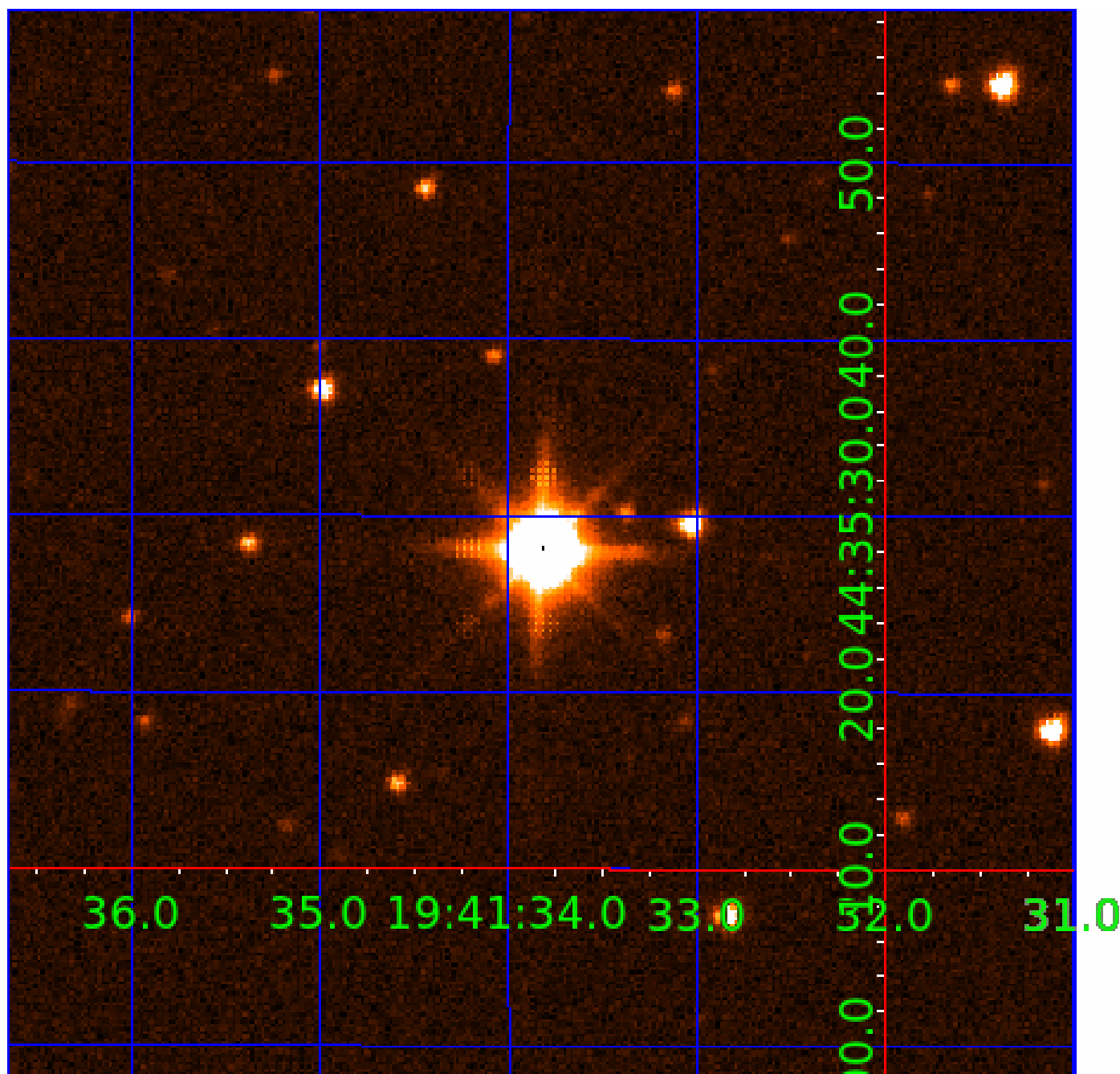


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 008505072

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008505072-01	OBS	No	339.024006	185.718256	305.5	1.473	66.3	2.5	5.42	4762	9.77	16.07
008505072-02	OBS	No	181.750622	205.974689	2616.2	0.799	61.0	23.8	5.42	4762	27.34	36.90

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
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008505072-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED

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

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

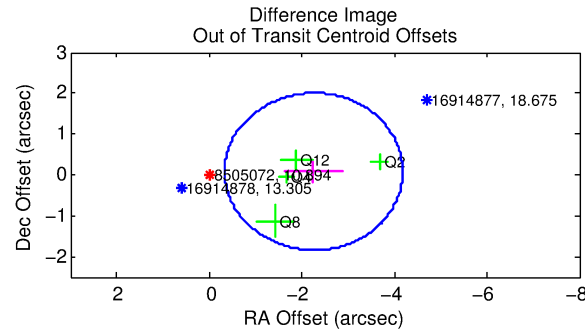
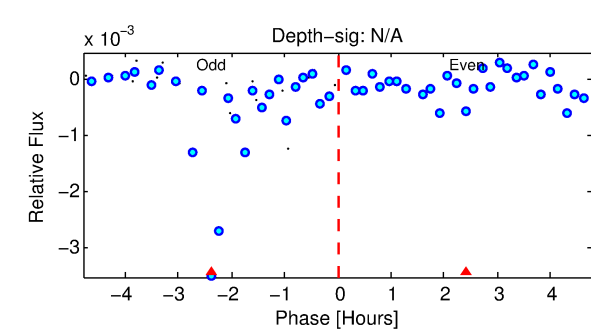
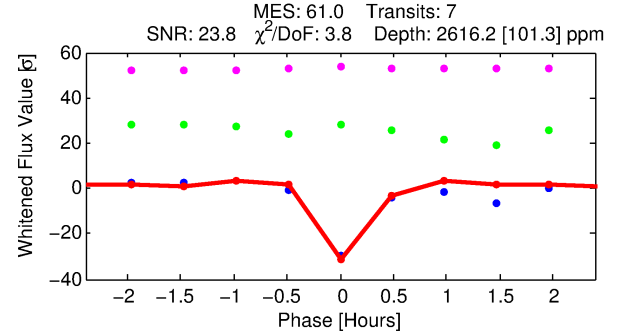
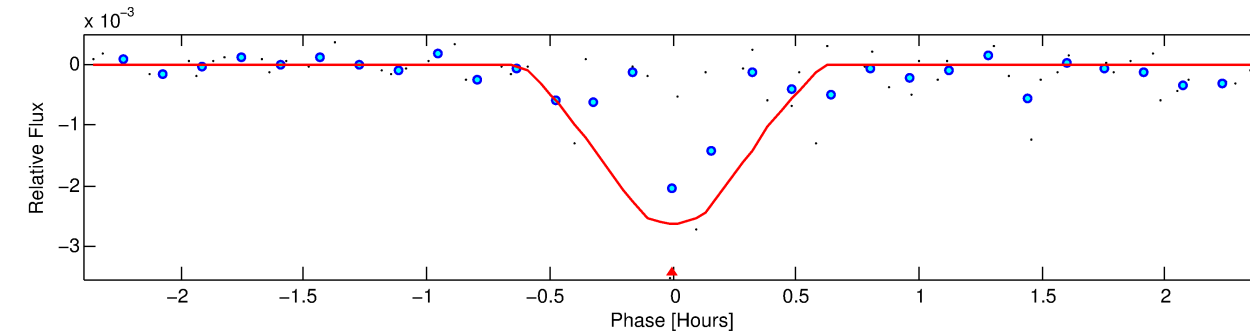
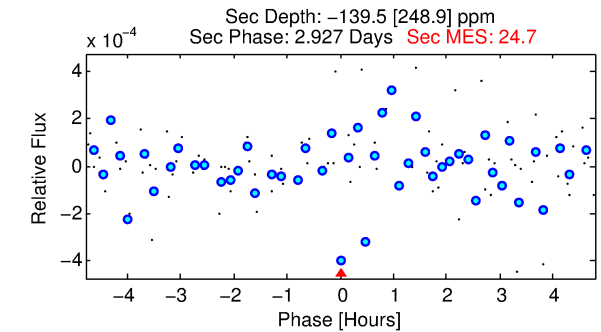
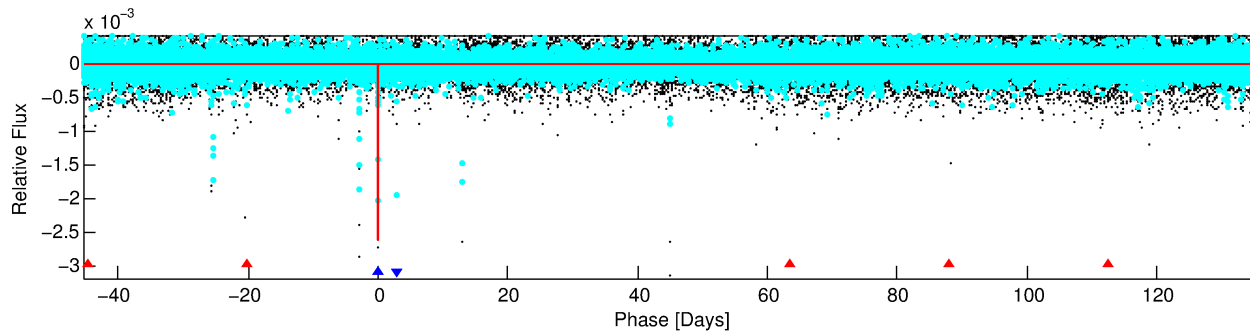
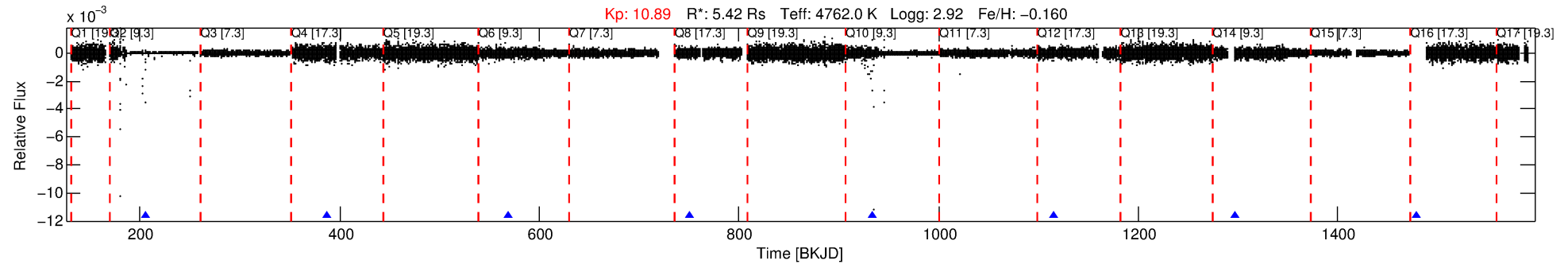
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 008505072-02

No Significant Match Found

# DV One-Page Summary

KIC: 8505072 Candidate: 2 of 2 Period: 181.751 d



## DV Fit Results:

Period = 181.75062 [0.00056] d  
Epoch = 205.9747 [0.0014] BKJD  
Rp/R\* = 0.0462 [0.0344]  
a/R\* = 1817.00 [4242.06]  
b = 0.01 [261.08]  
Seff = 36.90 [4.88]  
Teq = 628 [21] K  
Rp = 27.34 [20.77] Re  
a = 0.6062 [0.0634] AU  
Ag = N/A  
Teffp = N/A

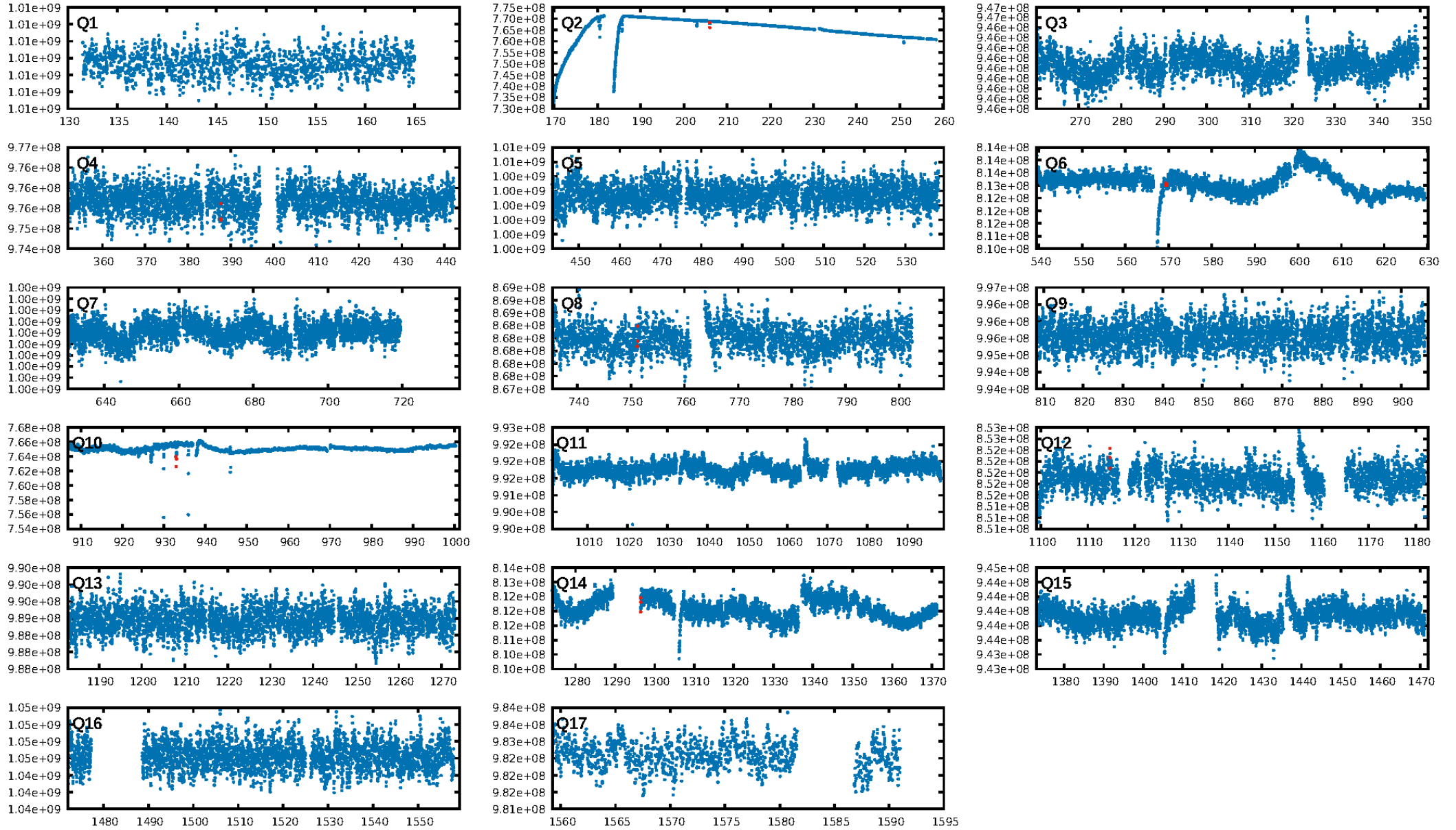
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [2251.68σ]  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 2.4%  
Bootstrap-pfa: 1.19e-48  
RollingBand-fgt: 1.00 [7/7]  
GhostDiagnostic-chr: 75.53  
Centroid-sig: 0.1%  
Centroid-so: 0.624 arcsec [5.45σ]  
OotOffset-rm: 2.257 arcsec [3.52σ]  
KicOffset-rm: 2.712 arcsec [6.16σ]  
OotOffset-st: 1/0/3/0 [4]  
KicOffset-st: 1/0/3/0 [4]  
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DiffImageOverlap-fno: 1.00 [5/5]

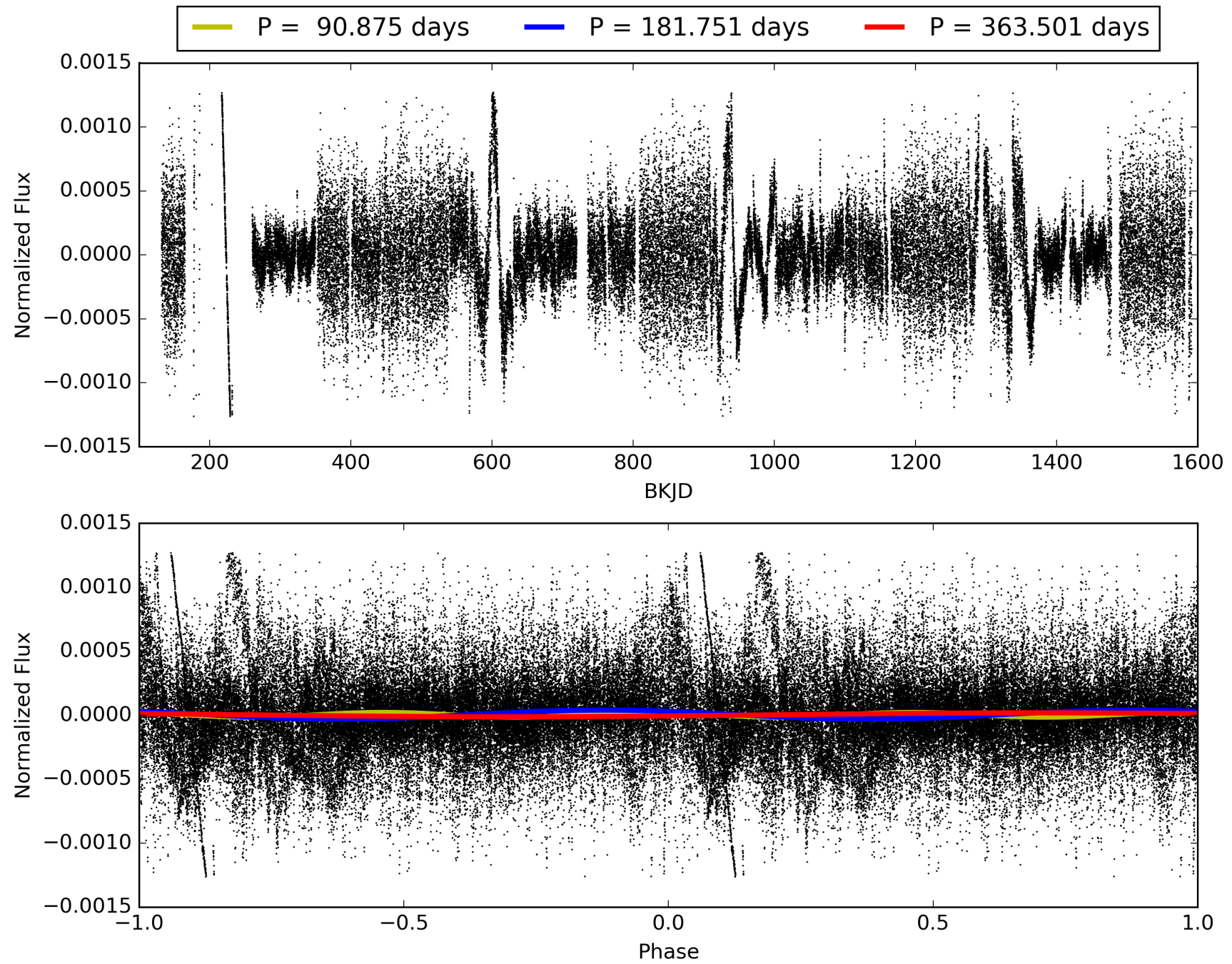
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 008505072-02, PDC Light Curves



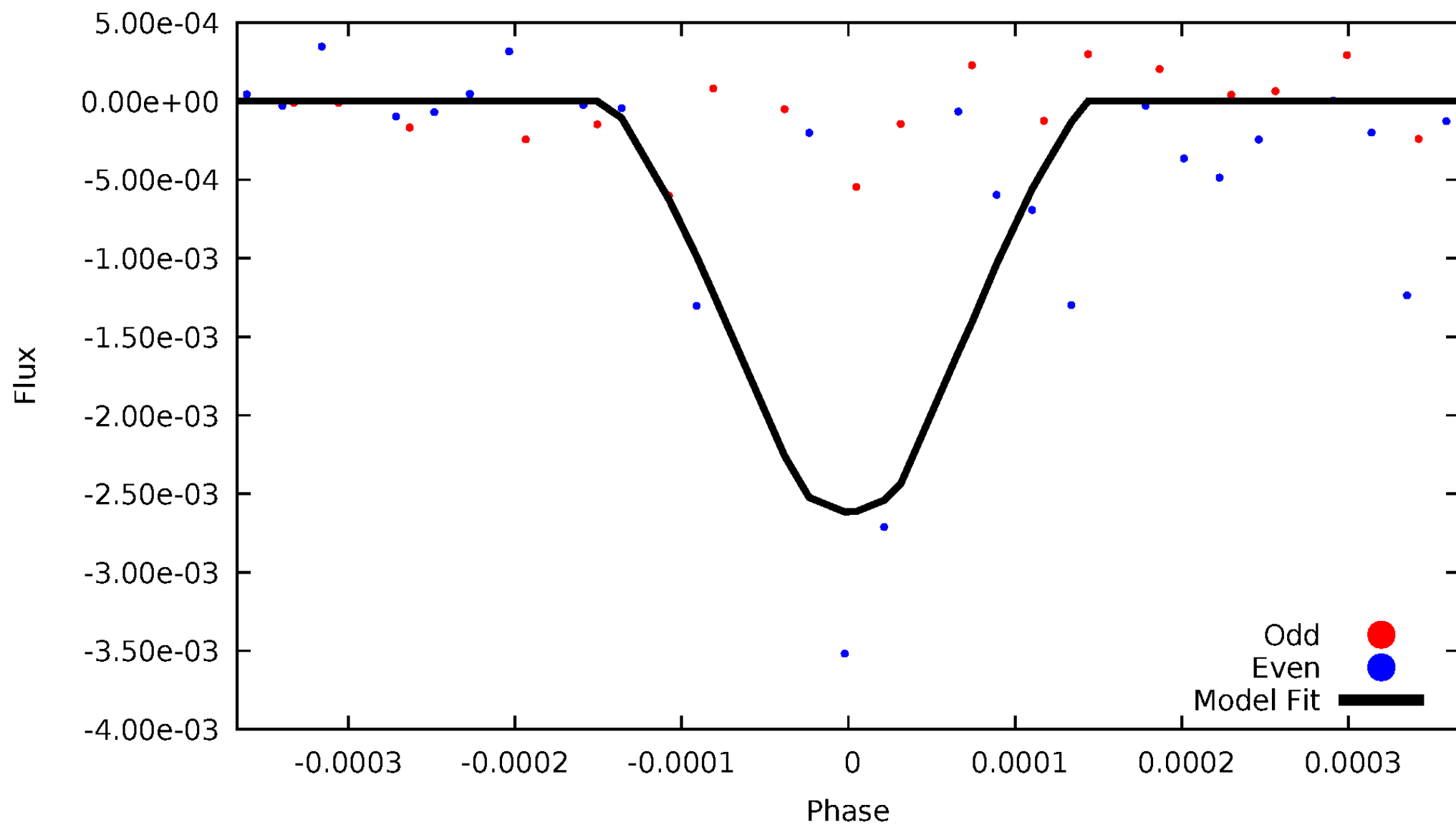
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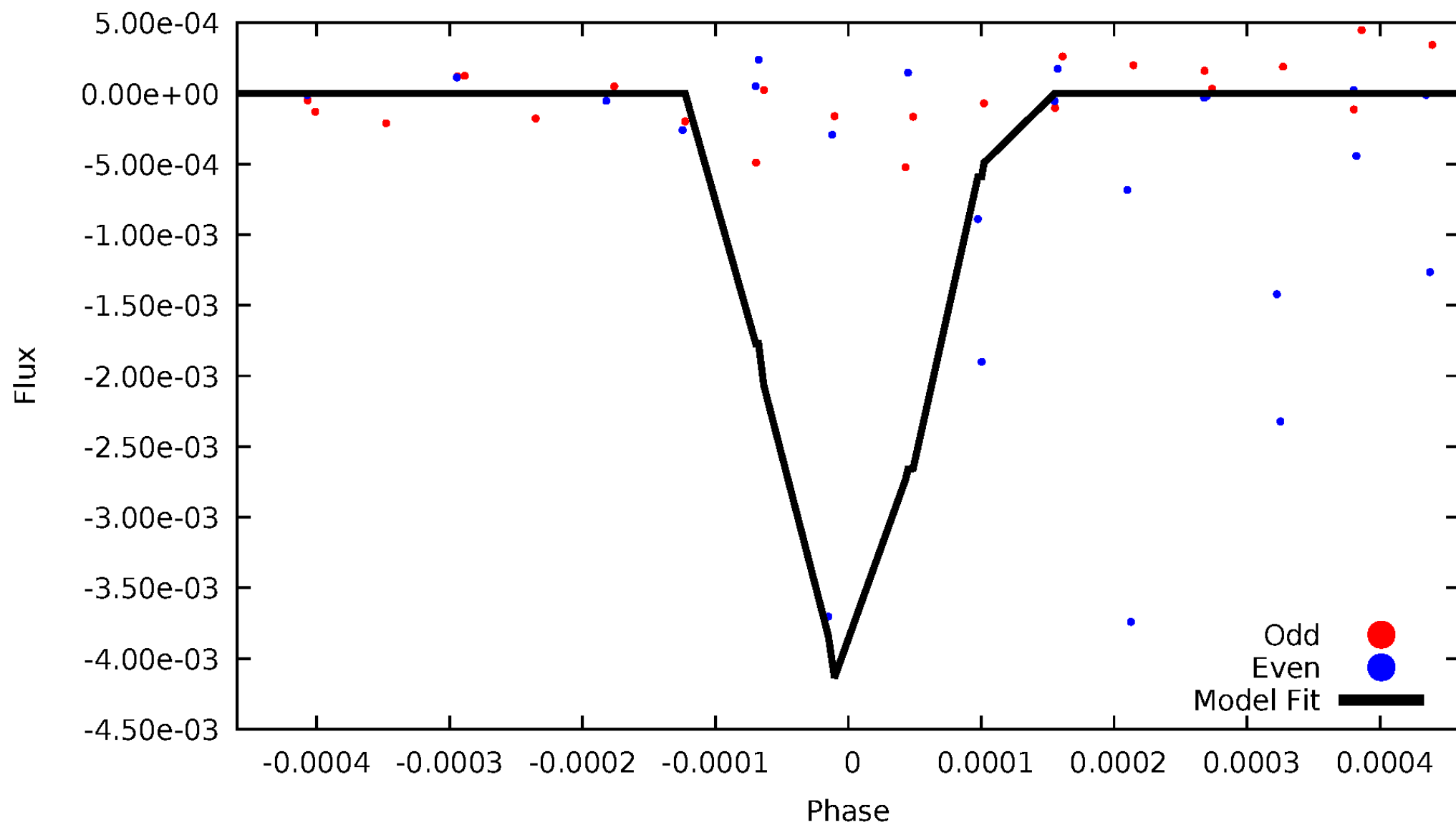
DV Odd/Even

TCE 008505072-02



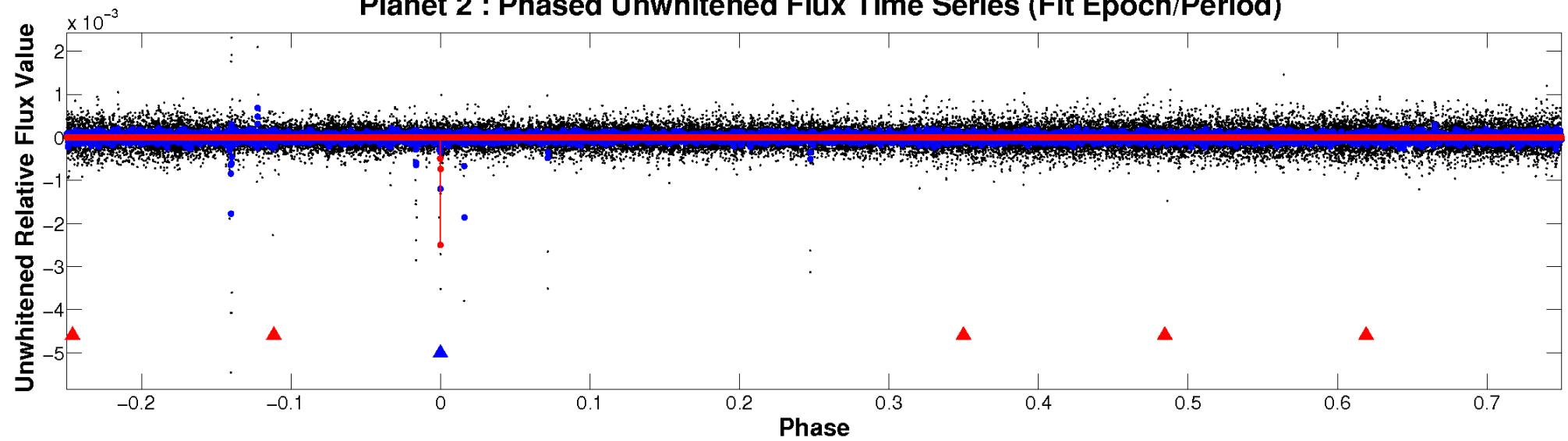
# ALT Odd/Even

TCE 008505072-02

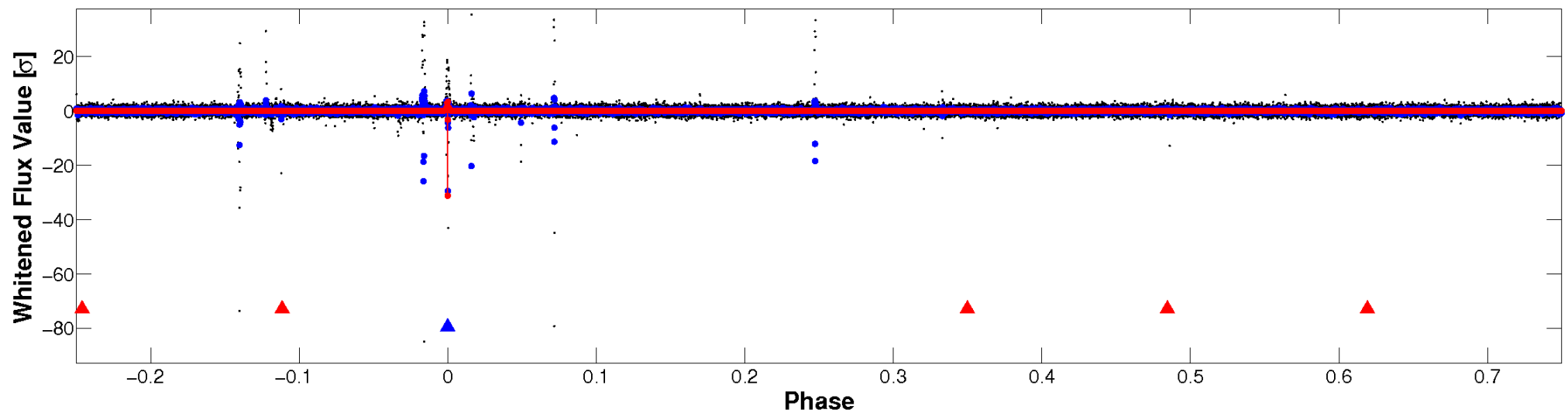


# Non-Whitened Vs. Whitened Light Curve

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

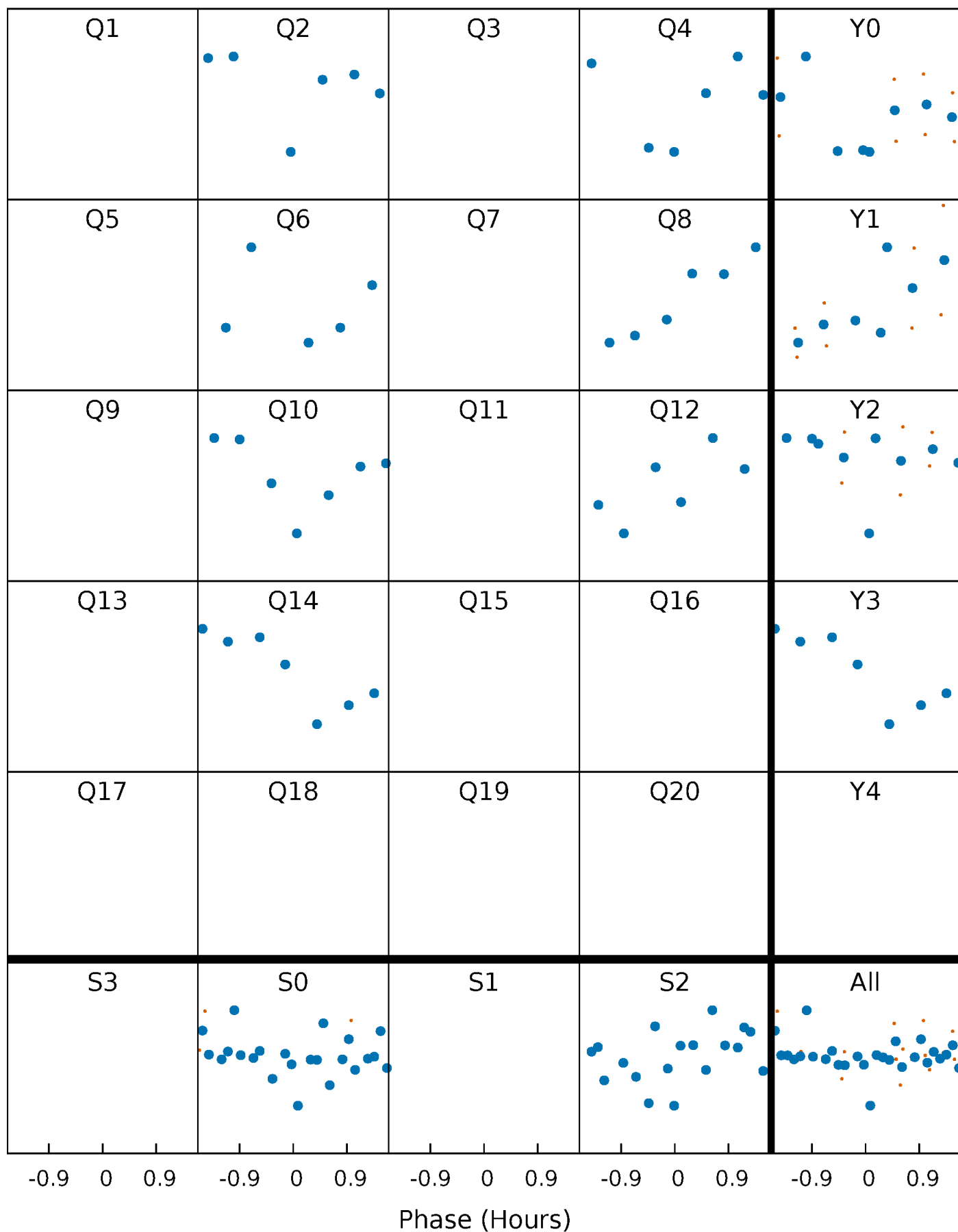


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



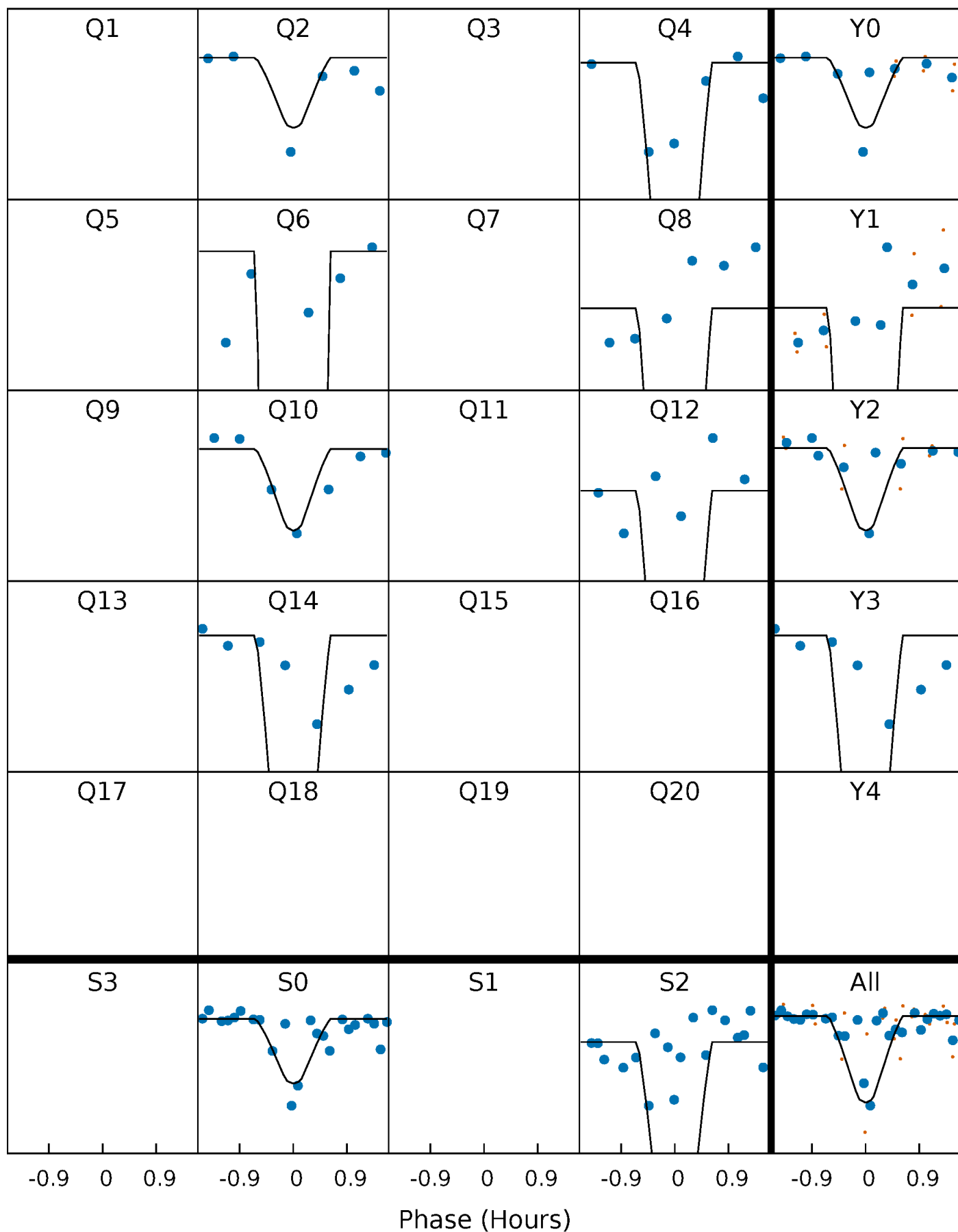
# PDC Quarter-Phased Transit Curves

TCE 008505072-02     $P=181.750622$  Days     $T_0=205.974689$  (BKJD)



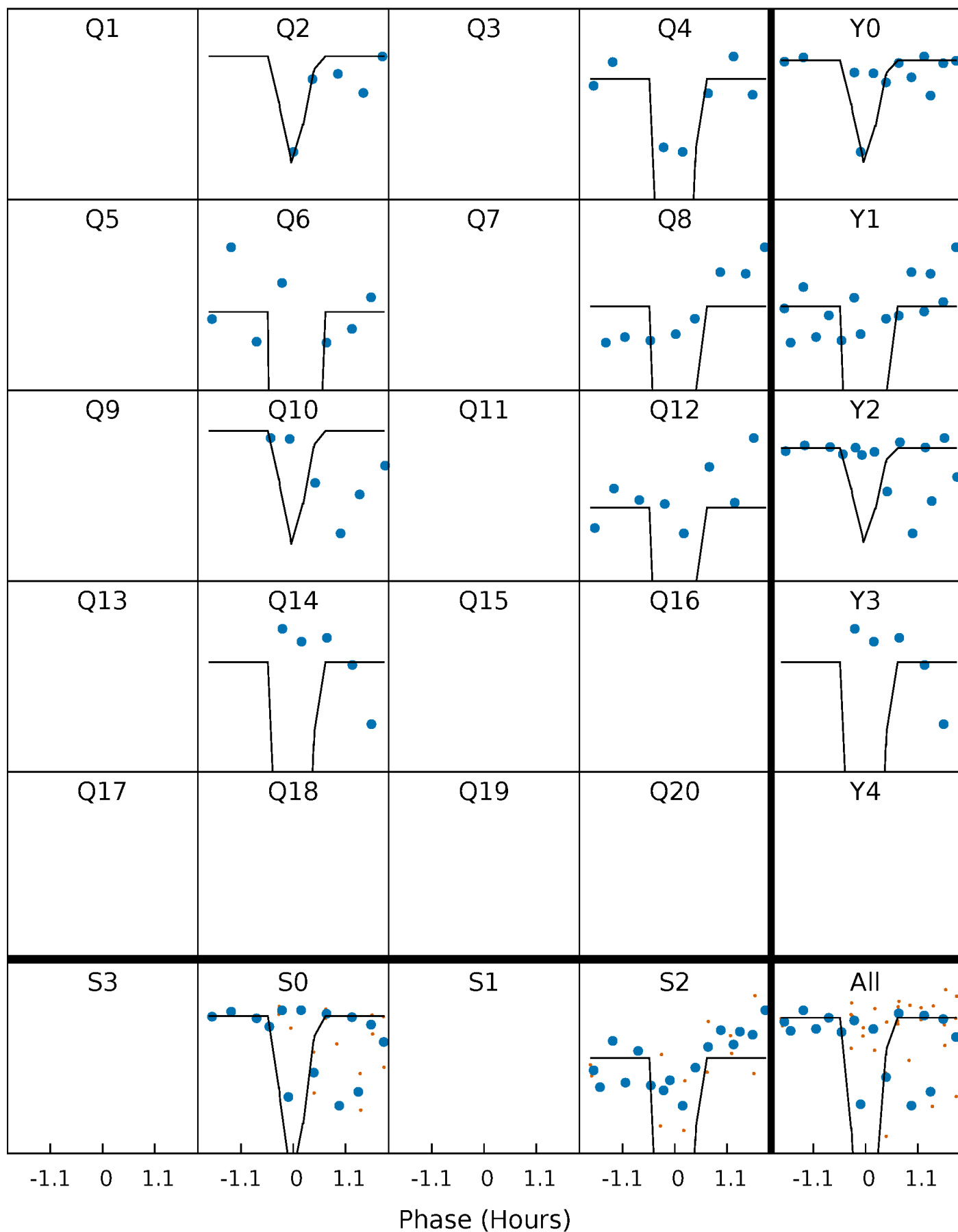
# DV Quarter-Phased Transit Curves

TCE 008505072-02   P=181.750622 Days    $T_0=205.974689$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

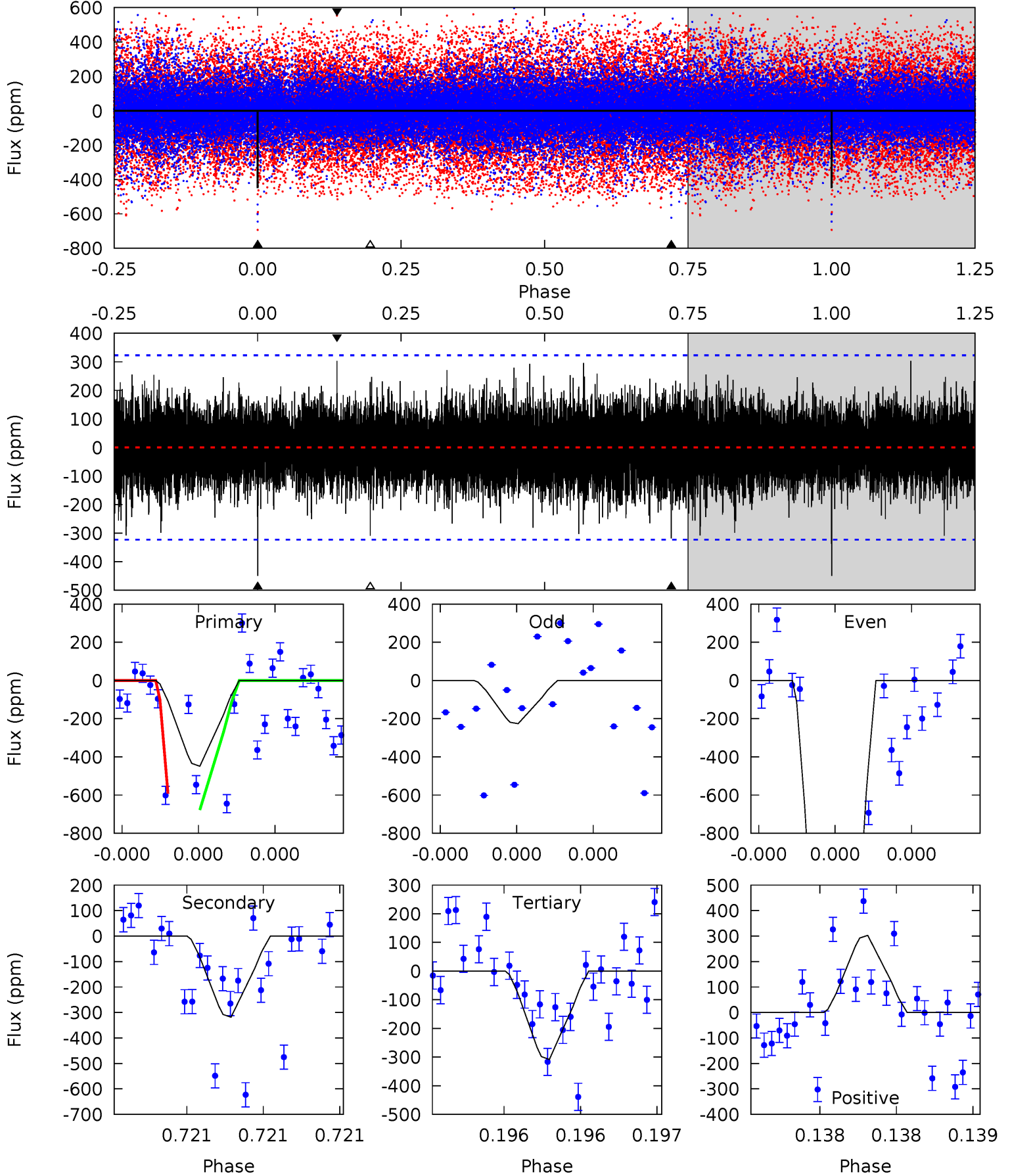
TCE 008505072-02 P=181.741351 Days  $T_0=205.977013$  (BKJD)



# DV Model-Shift Uniqueness Test

008505072-02, P = 181.750622 Days, E = 24.224067 Days

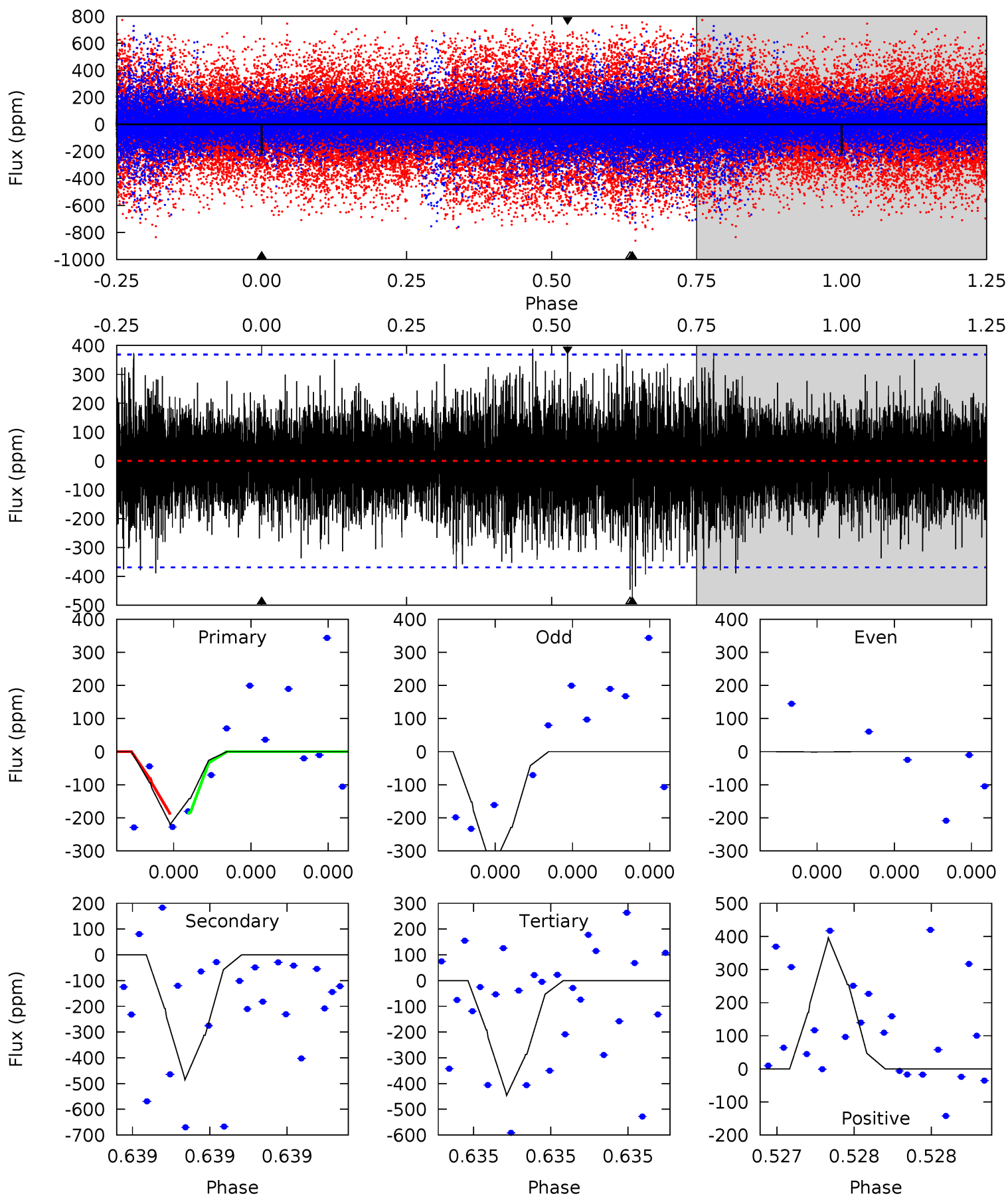
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.91	5.61	5.43	5.33	5.68	3.64	1.18	2.48	2.58	0.17	0.28	20.3	2.38	0.40	0



# Alt Model-Shift Uniqueness Test

008505072-02, P = 181.741351 Days, E = 24.235662 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
3.41	7.52	6.91	6.14	5.71	3.69	1.46	-3.50	-2.72	0.61	1.39	2.24	2.46	0.45	0.00





### Stellar Parameters For KIC 008505072

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$4762^{+78}_{-42}$	$2.923^{+0.036}_{-0.027}$	$-0.160^{+0.150}_{-0.100}$	$5.425^{+0.821}_{-0.164}$	$0.901^{+0.283}_{-0.015}$	$0.008^{+0.001}_{-0.001}$
	+2%/-1%	+1%/-1%	+94%/-62%	+15%/-3%	+31%/-2%	+10%/-16%
Source	SPE74	AST9	SPE74	DSEP		

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

### Secondary Eclipse Parameters for KIC 008505072-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-318 \pm 57$	$30.27^{+19.49}_{-17.08}$	$877^{+18}_{-13}$	$3303^{+1144}_{-443}$	$71^{+321}_{-45}$
Alt.	$-486 \pm 65$	$41.21^{+21.70}_{-19.68}$	$879^{+17}_{-14}$	$3222^{+752}_{-363}$	$60^{+158}_{-35}$

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

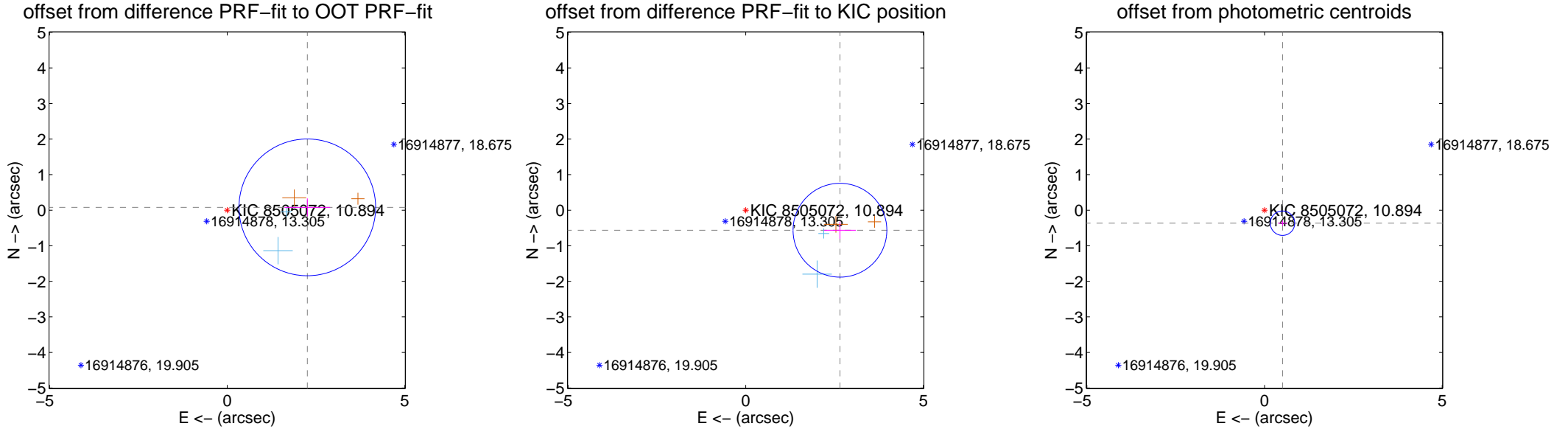
## DV Centroid Data

Supplemental centroid analysis for 008505072-02. **Kepler magnitude: 10.89.** Transit SNR 23.78

**There are 2 quarters with good PRF difference image offsets**

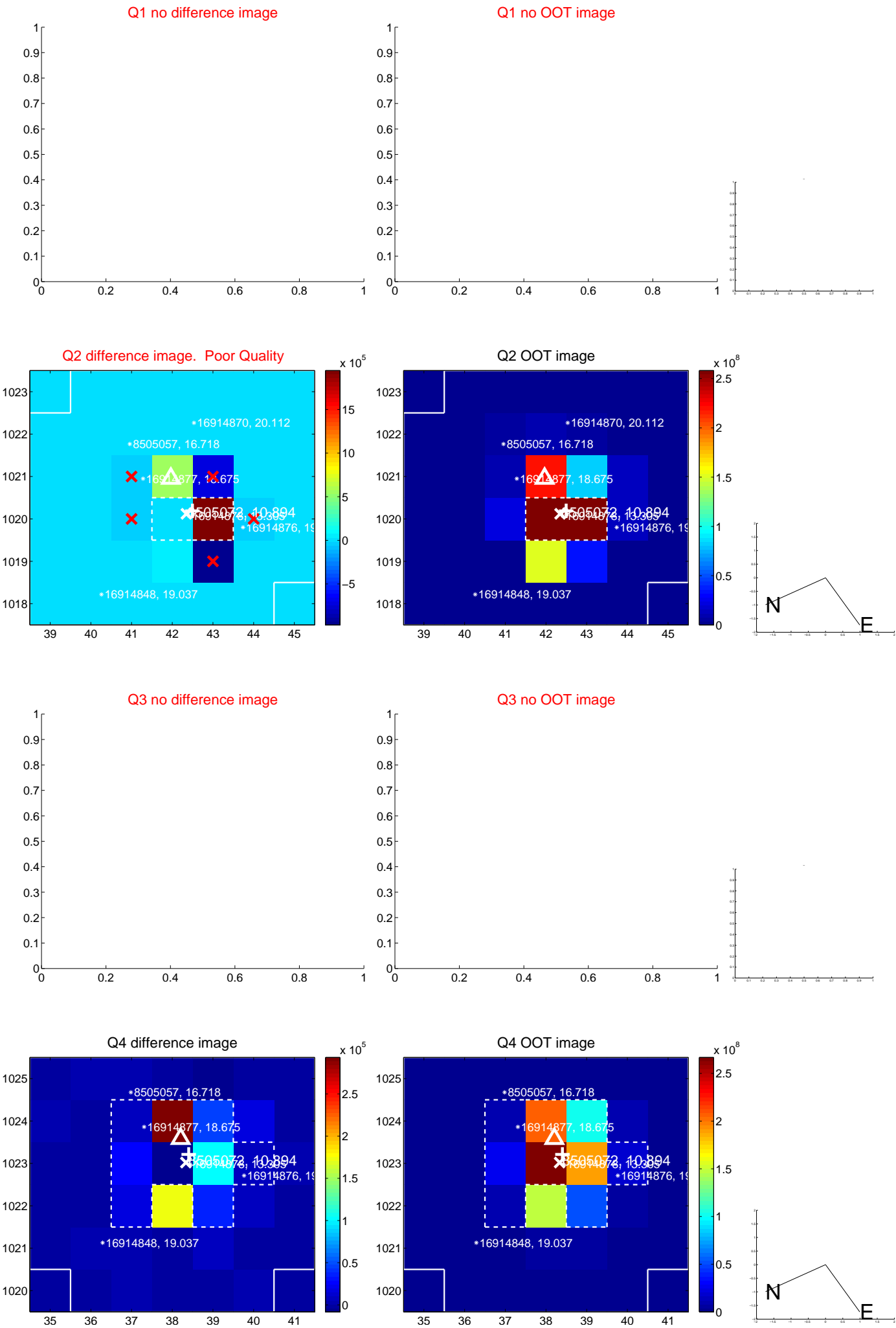
The direct PRF centroid is offset from the target star catalog position by about 0.99 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b><math>2.257 \pm 0.641</math></b>	<b>3.52</b>	$-2.256 \pm 0.641$	$0.080 \pm 0.252$
PRF-fit source offset from KIC position	<b><math>2.712 \pm 0.440</math></b>	<b>6.16</b>	$-2.652 \pm 0.447$	$-0.563 \pm 0.242$
photometric centroid source offset	<b><math>0.62 \pm 0.11</math></b>	<b>5.45</b>	$-0.51 \pm 0.13$	$-0.37 \pm 0.07$

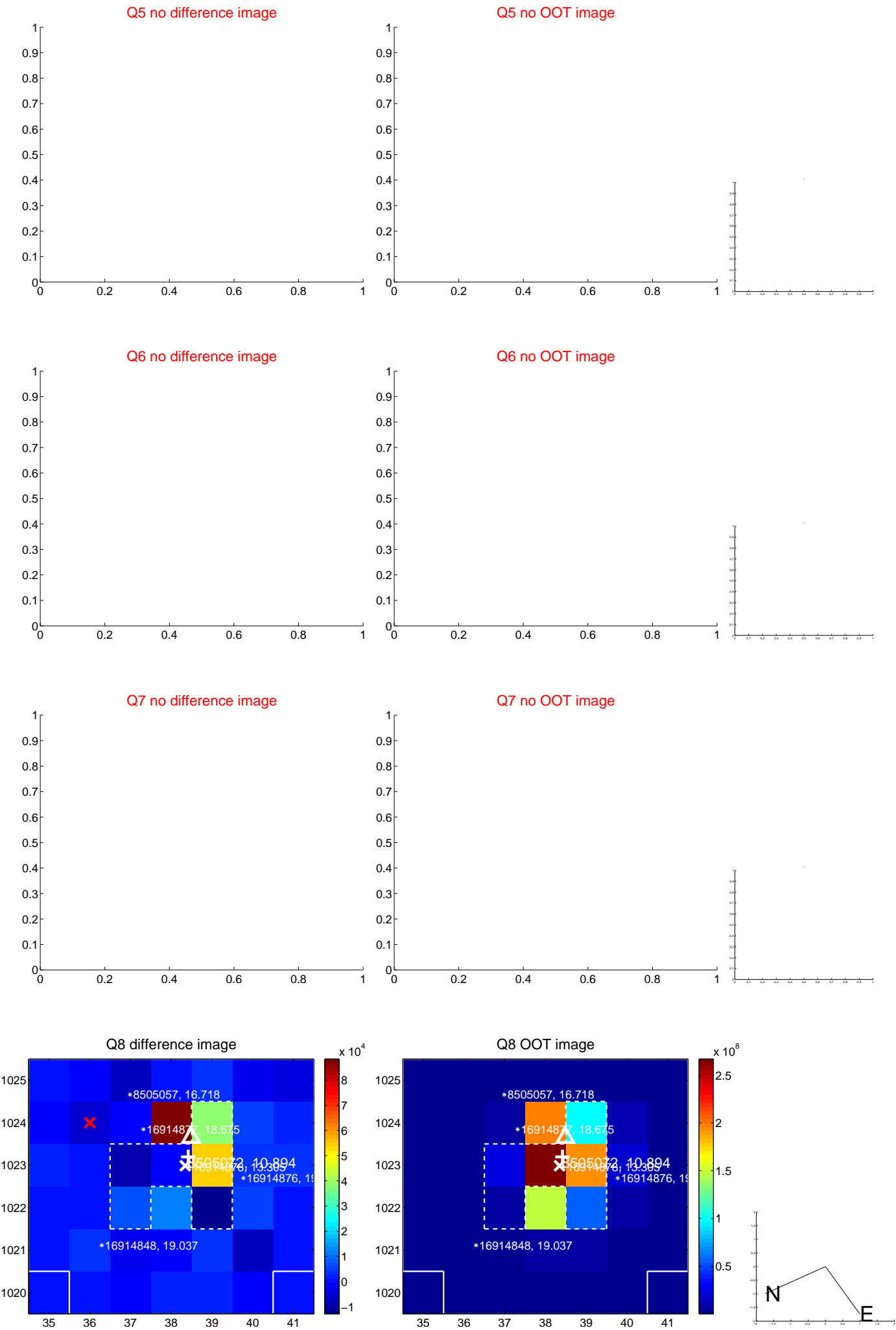


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

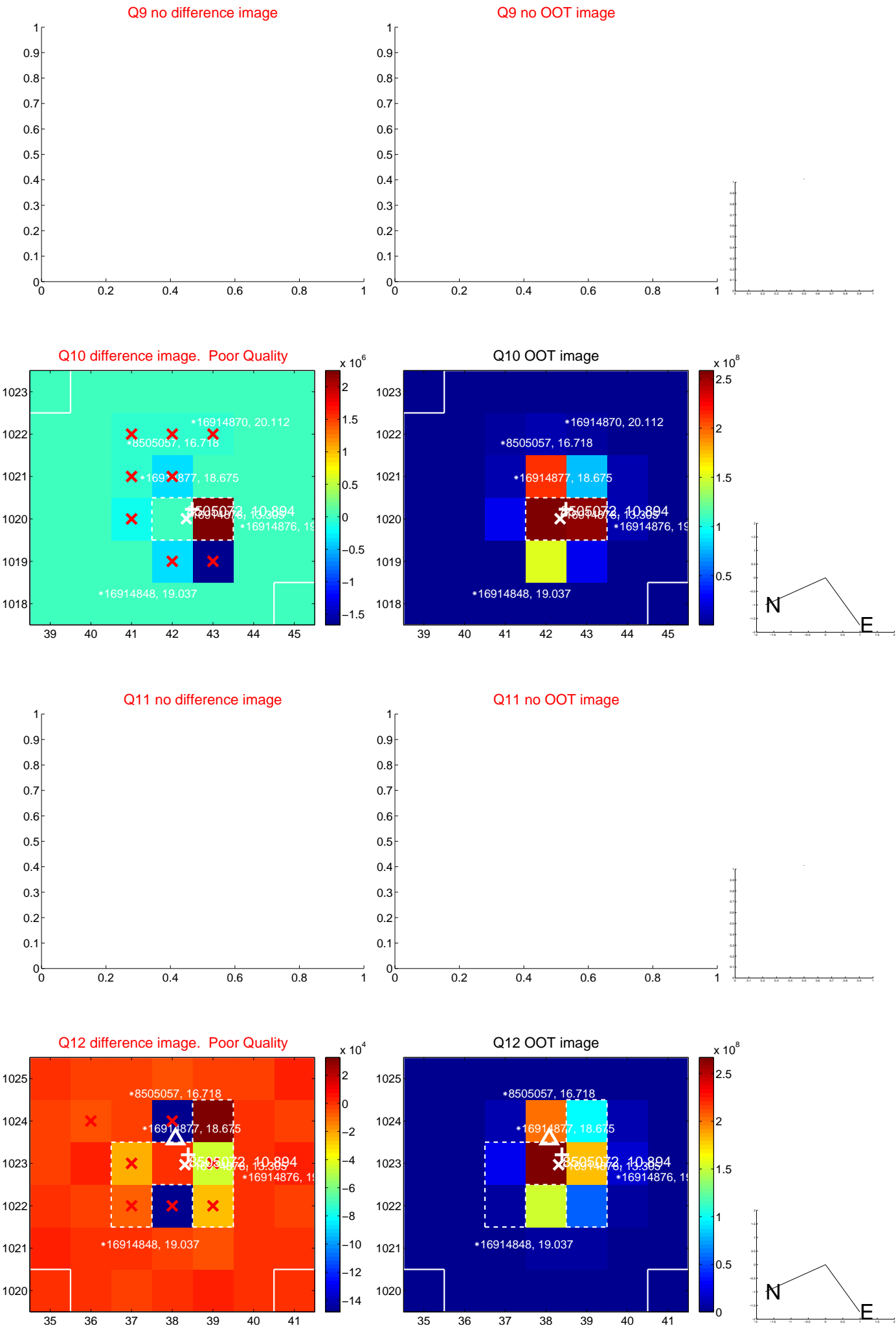
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



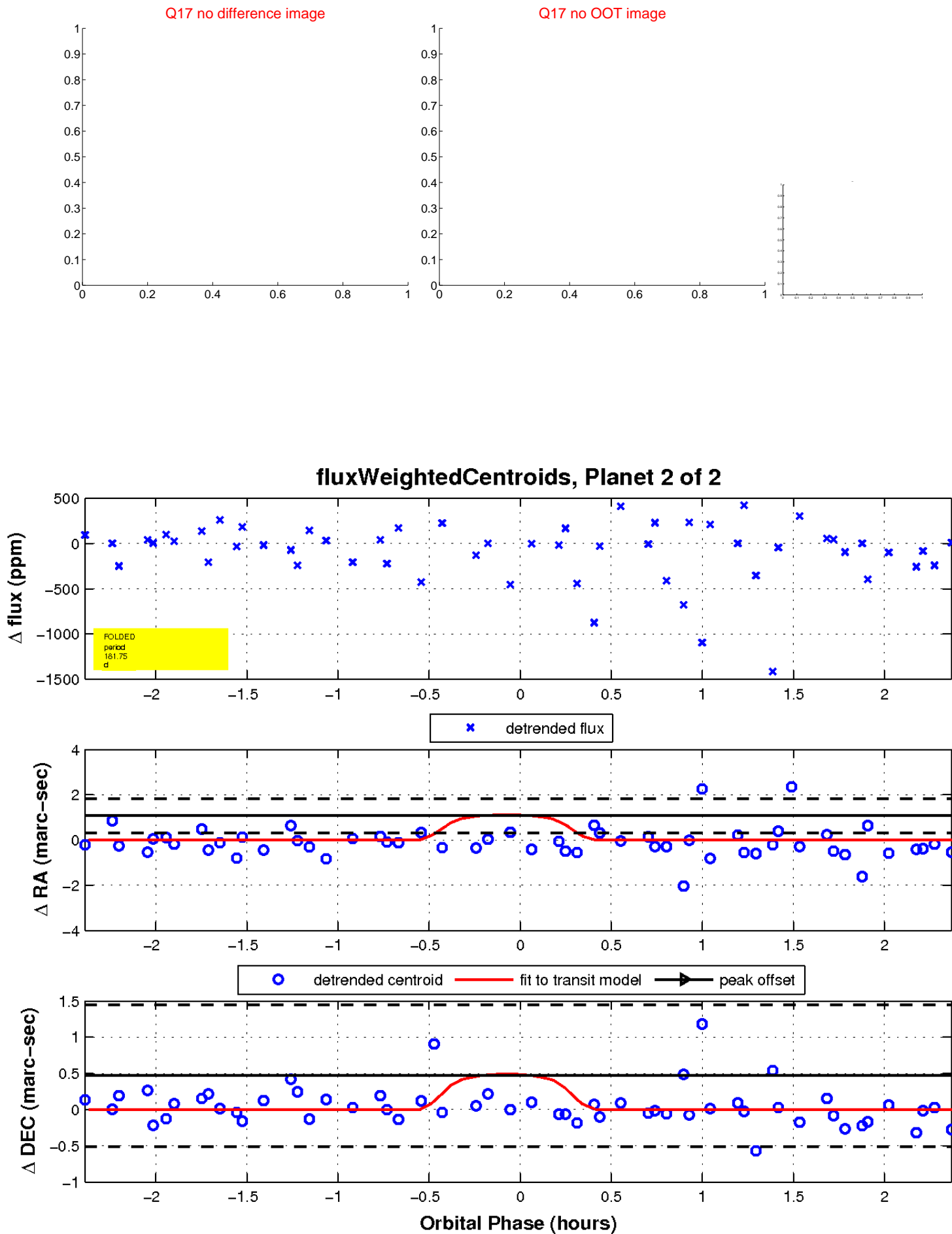
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

