

# KIC 010710753

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010710753-01	OBS	No	1.297891	132.767753	278.9	7.074	31.0	8.8	0.59	3991	1.05	206.61
010710753-02	OBS	No	280.145375	254.271868	8073.9	5.355	9.9	8.5	0.59	3991	6.30	0.16

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010710753-01	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV—MOD_NONUNIQ_ALT
010710753-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_ALT—ALL_TRANS_CHASES—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.

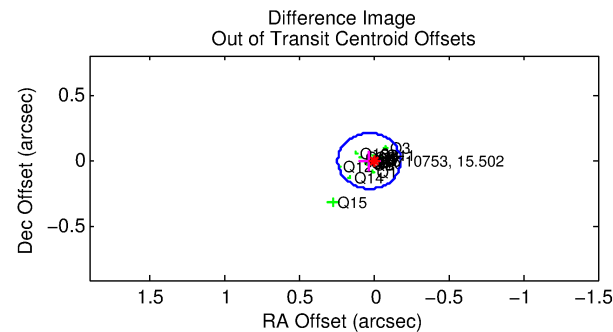
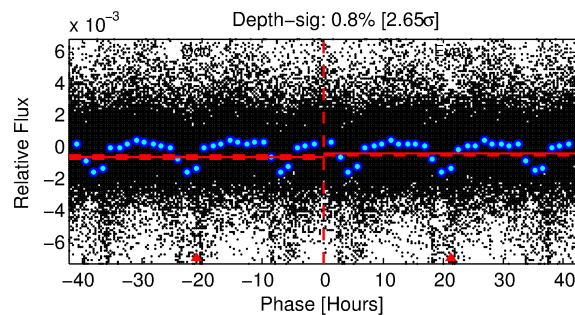
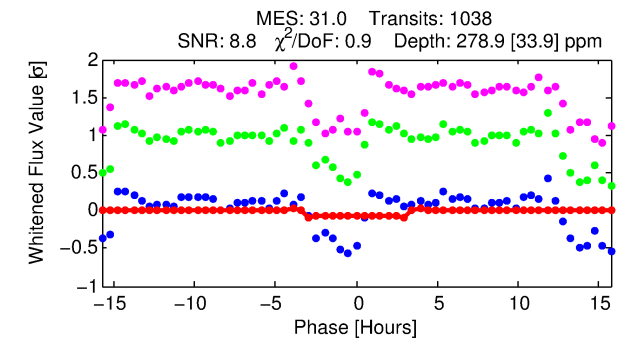
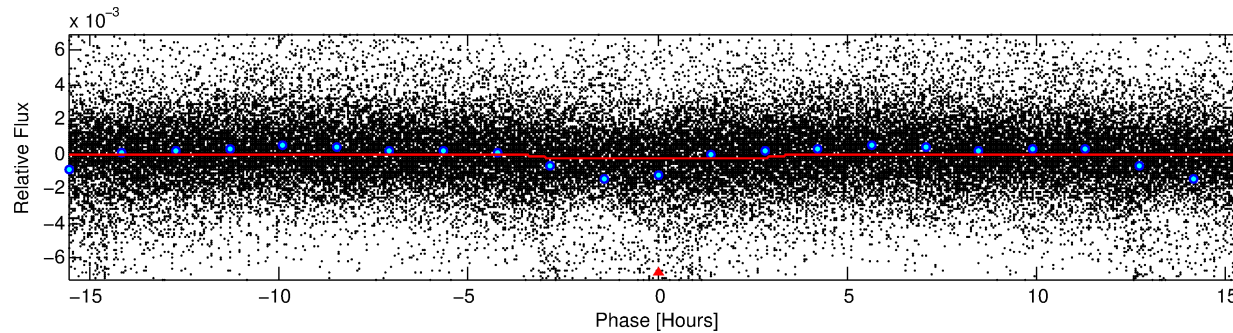
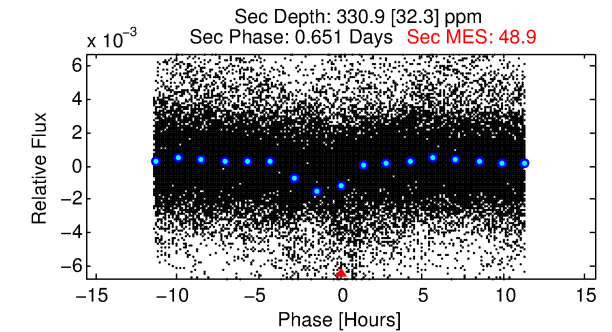
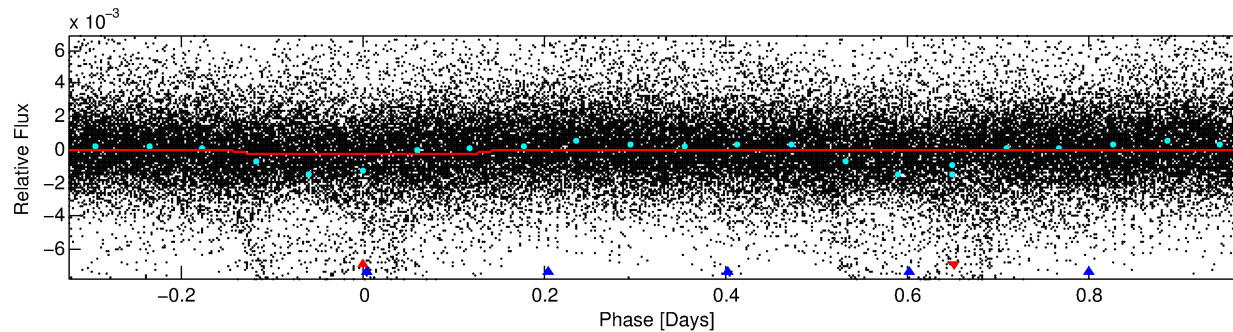
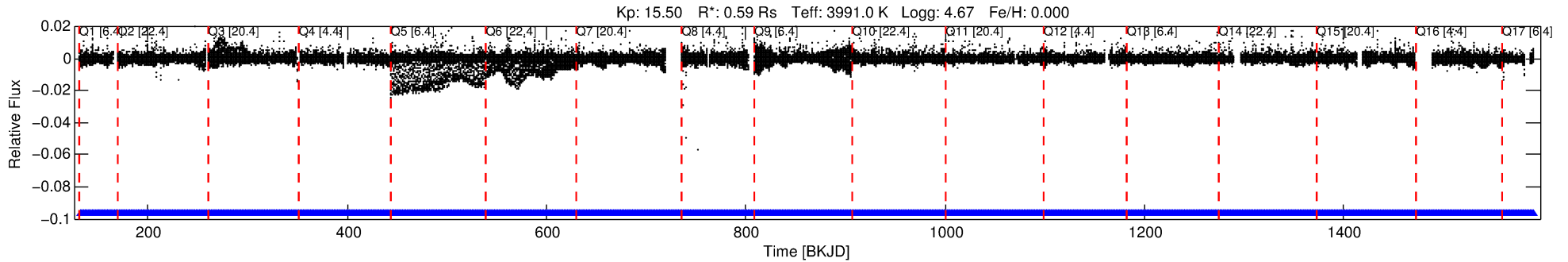
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 010710753-01

No Significant Match Found

# DV One-Page Summary

KIC: 10710753 Candidate: 1 of 2 Period: 1.298 d



## DV Fit Results:

Period = 1.29789 [0.00001] d  
Epoch = 132.7678 [0.0032] BKJD  
Rp/R\* = 0.0164 [0.0058]  
a/R\* = 1.31 [0.74]  
b = 0.72 [0.91]  
Seff = 206.61 [24.64]  
Teq = 967 [29] K  
Rp = 1.06 [0.38] Re  
a = 0.0195 [0.0009] AU  
Ag = 62.20 [44.30] [1.38σ]  
**Teffp = 4198 [752] K [4.30σ]**

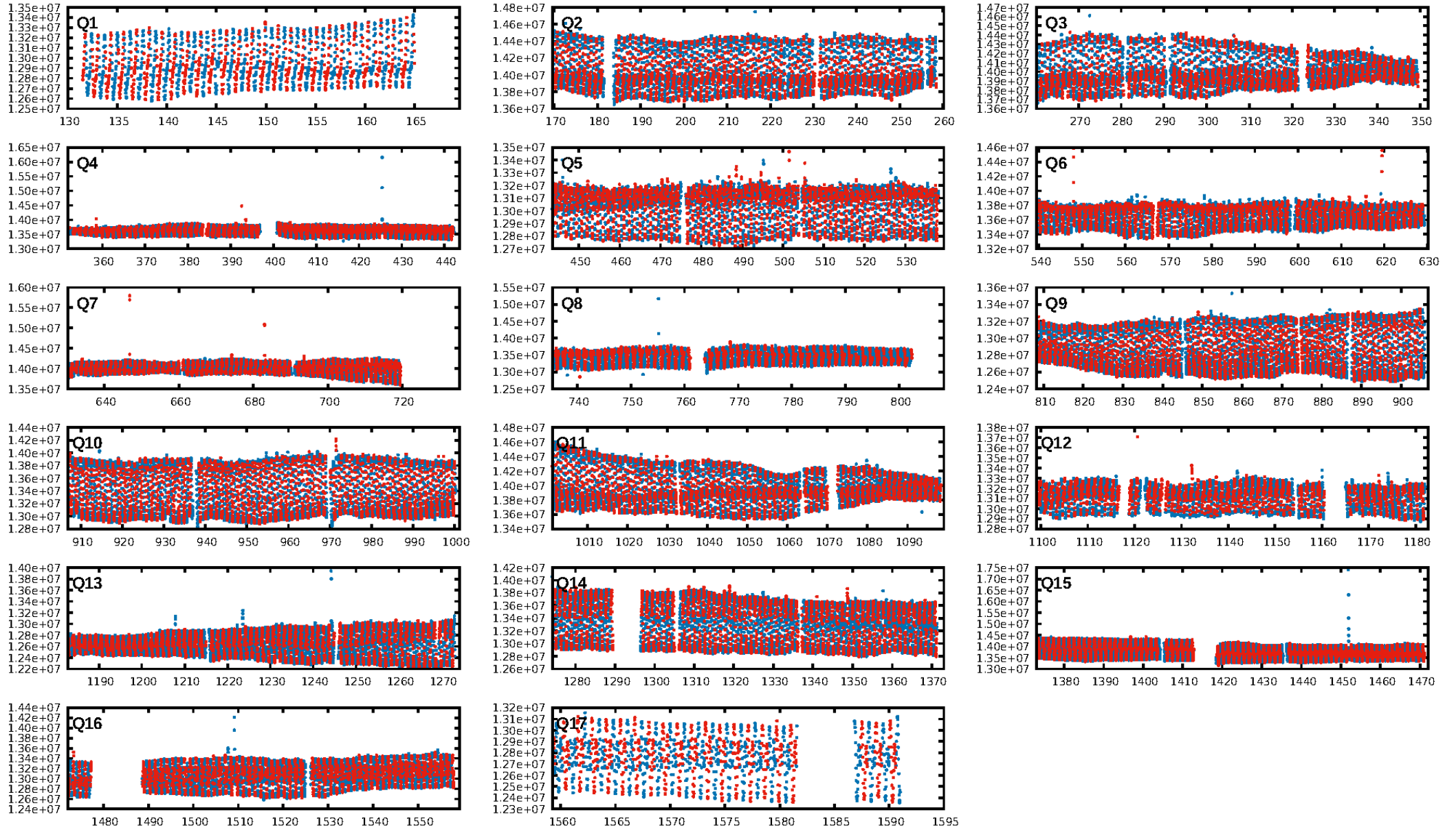
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [754.29σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 1.56e-77  
RollingBand-fgt: 1.00 [991/991]  
GhostDiagnostic-chr: 7.291  
Centroid-sig: 2.7%  
Centroid-so: 0.929 arcsec [2.97σ]  
OotOffset-rm: 0.029 arcsec [0.41σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-rm: 0.188 arcsec [2.63σ]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 0.82 [14/17]  
DiffImageOverlap-fno: 1.00 [17/17]

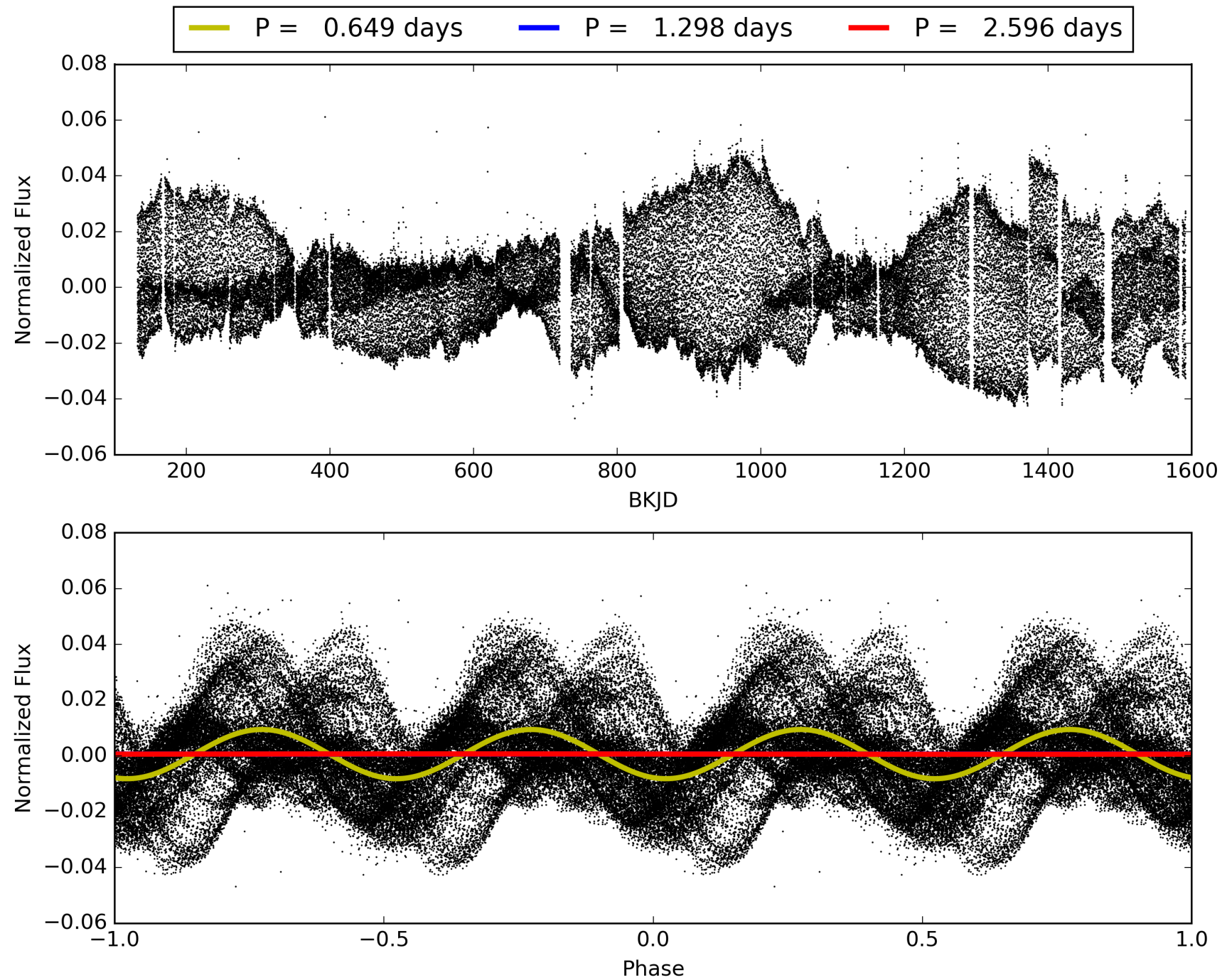
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 09:10:15 Z

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

# TCE 010710753-01, PDC Light Curves



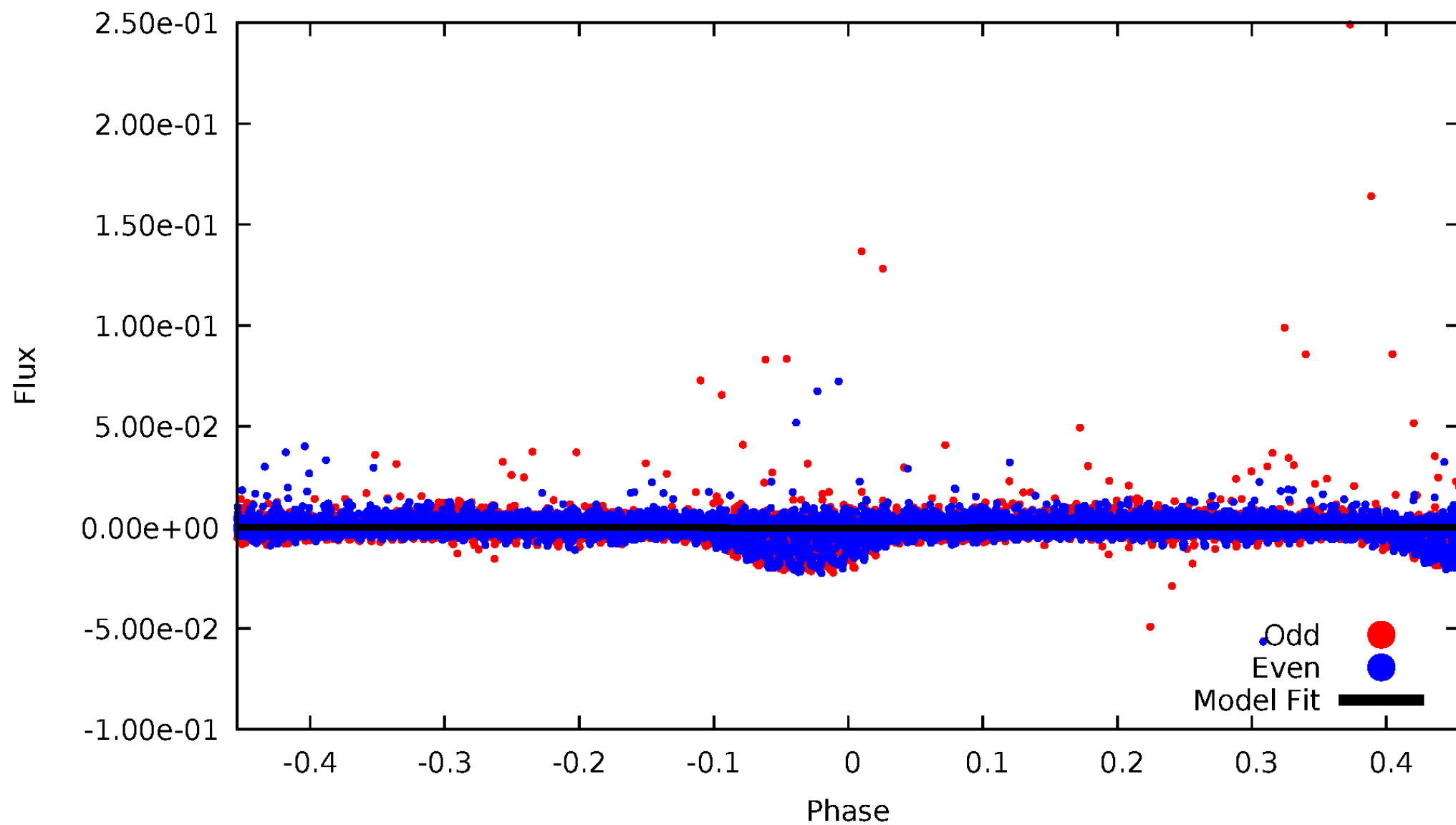
TCE 010710753-01





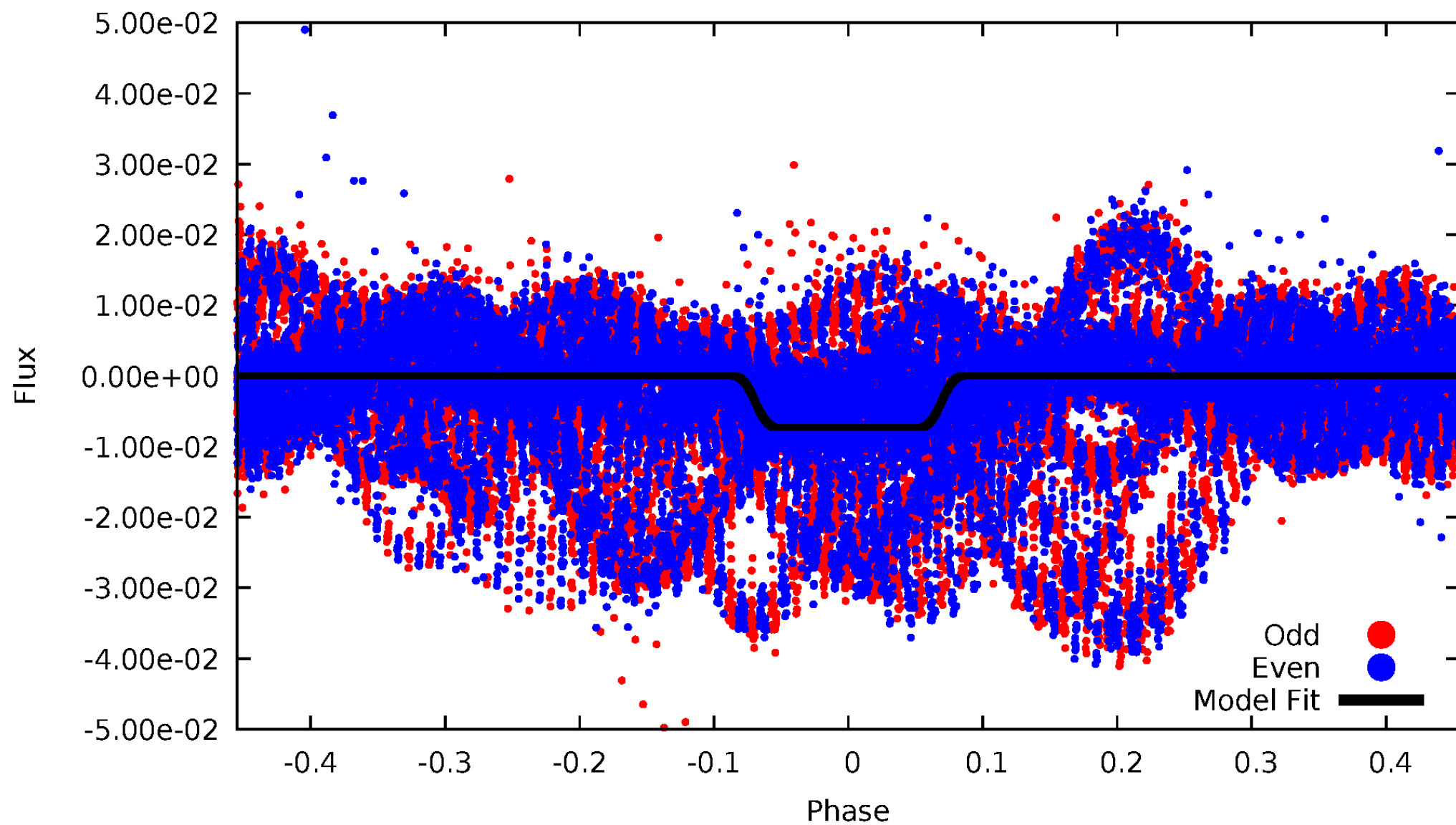
DV Odd/Even

TCE 010710753-01



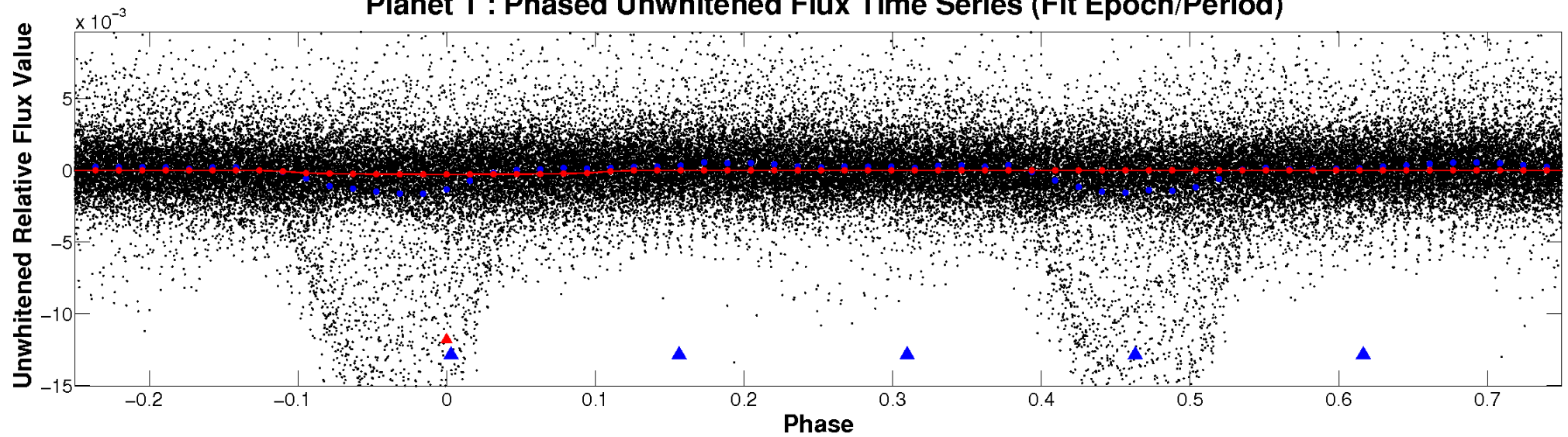
# ALT Odd/Even

TCE 010710753-01

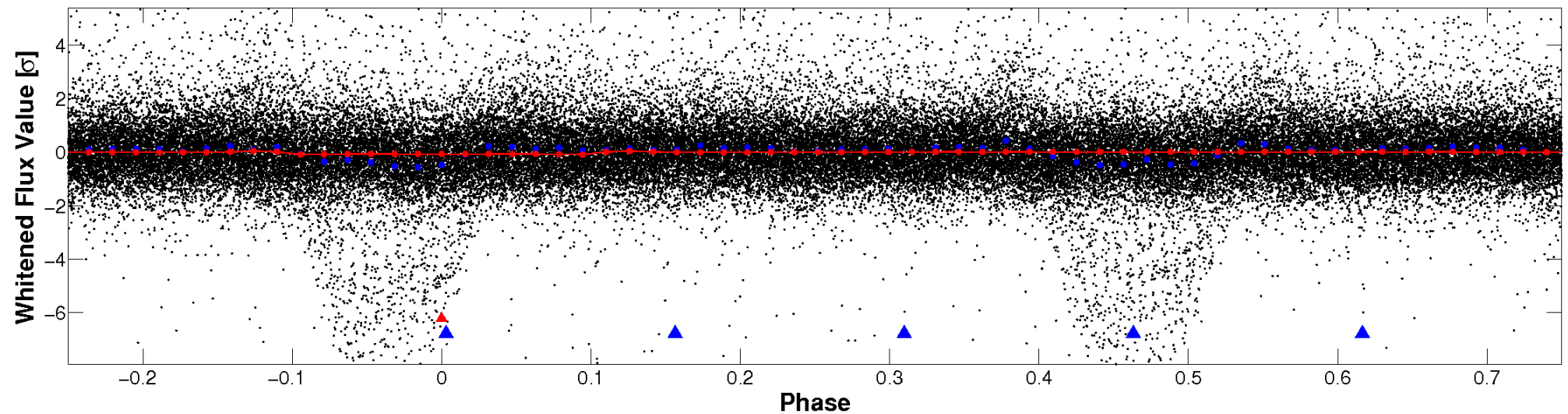


# Non-Whitened Vs. Whitened Light Curve

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

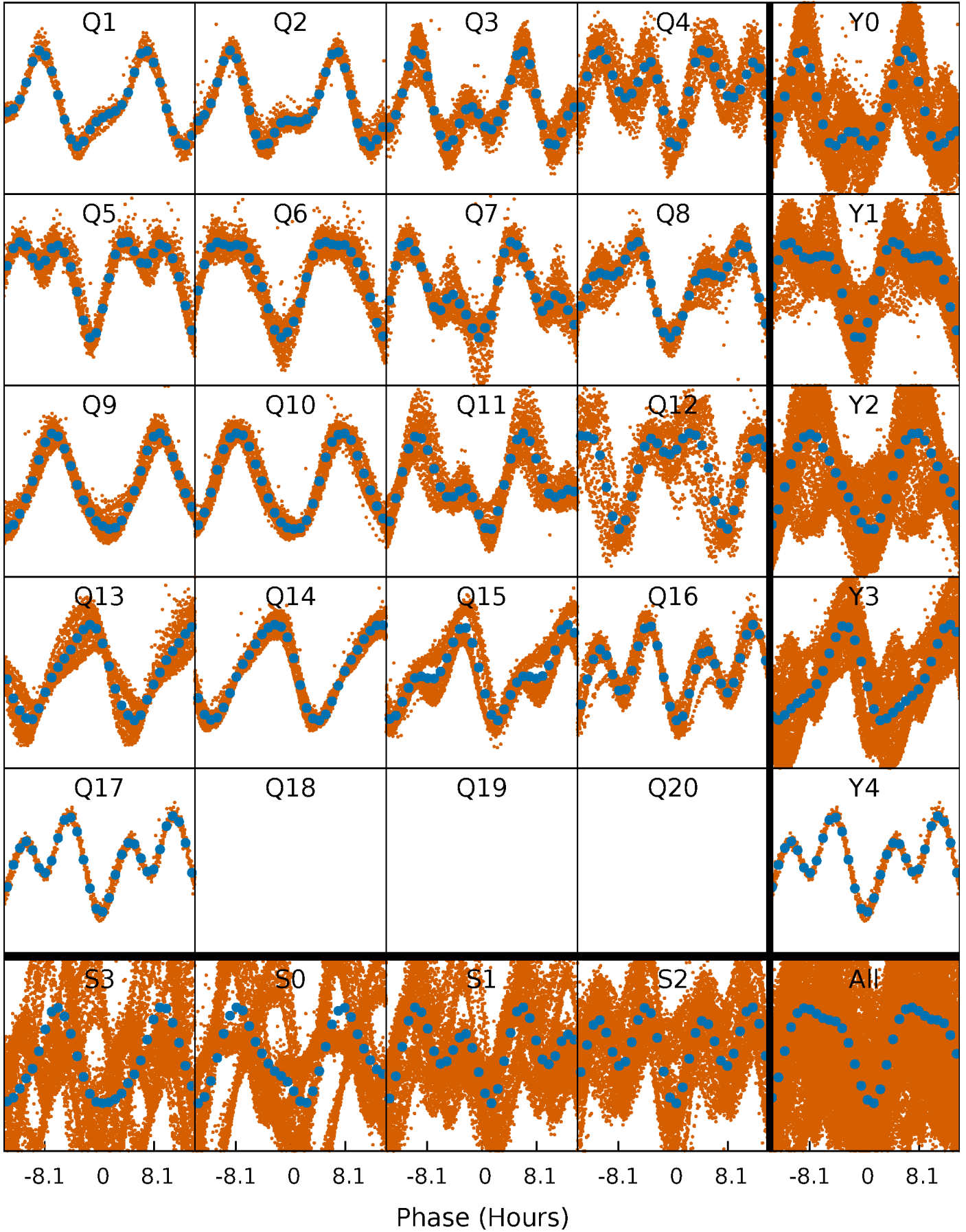


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

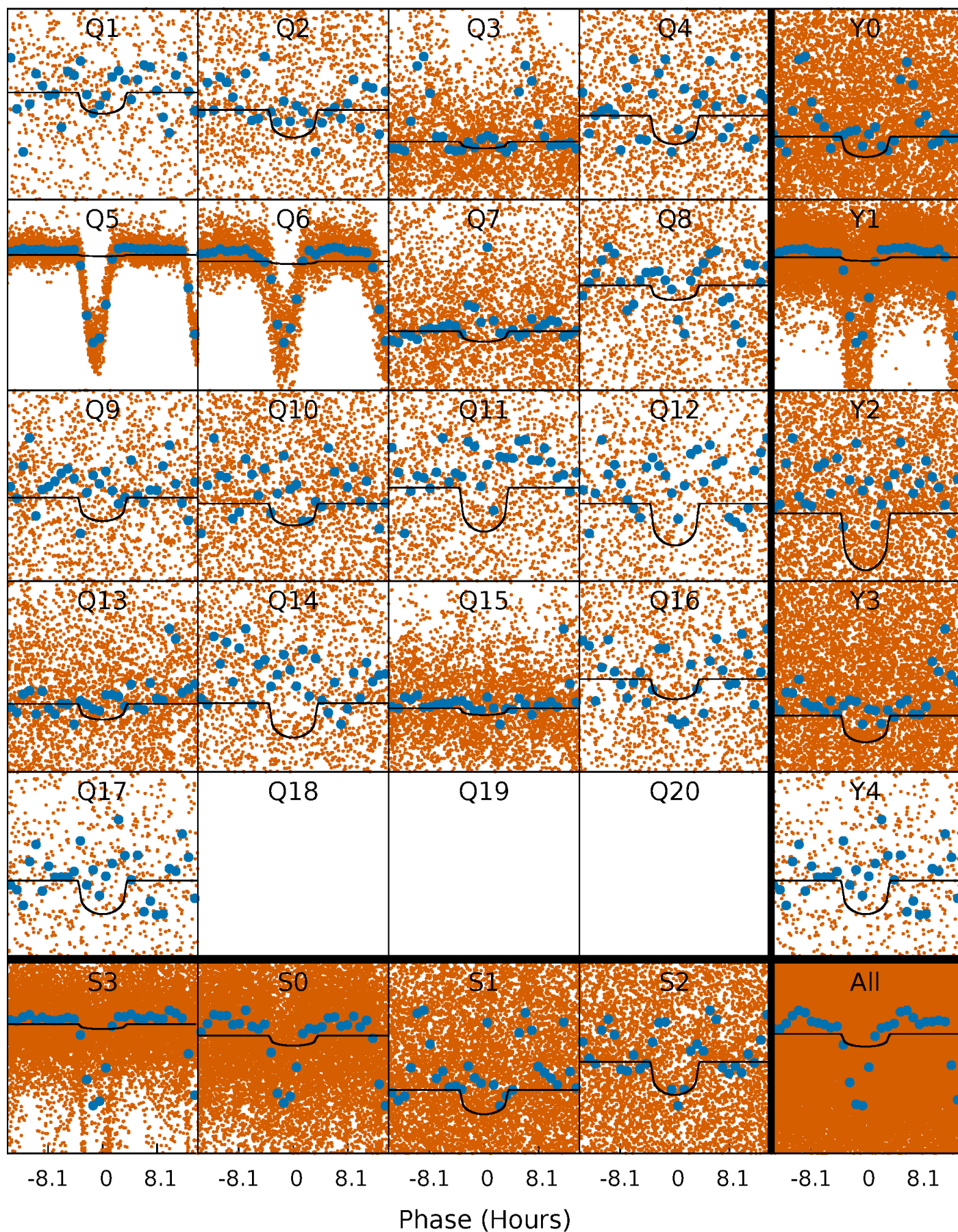
TCE 010710753-01 P= 1.297891 Days  $T_0=132.767753$  (BKJD)





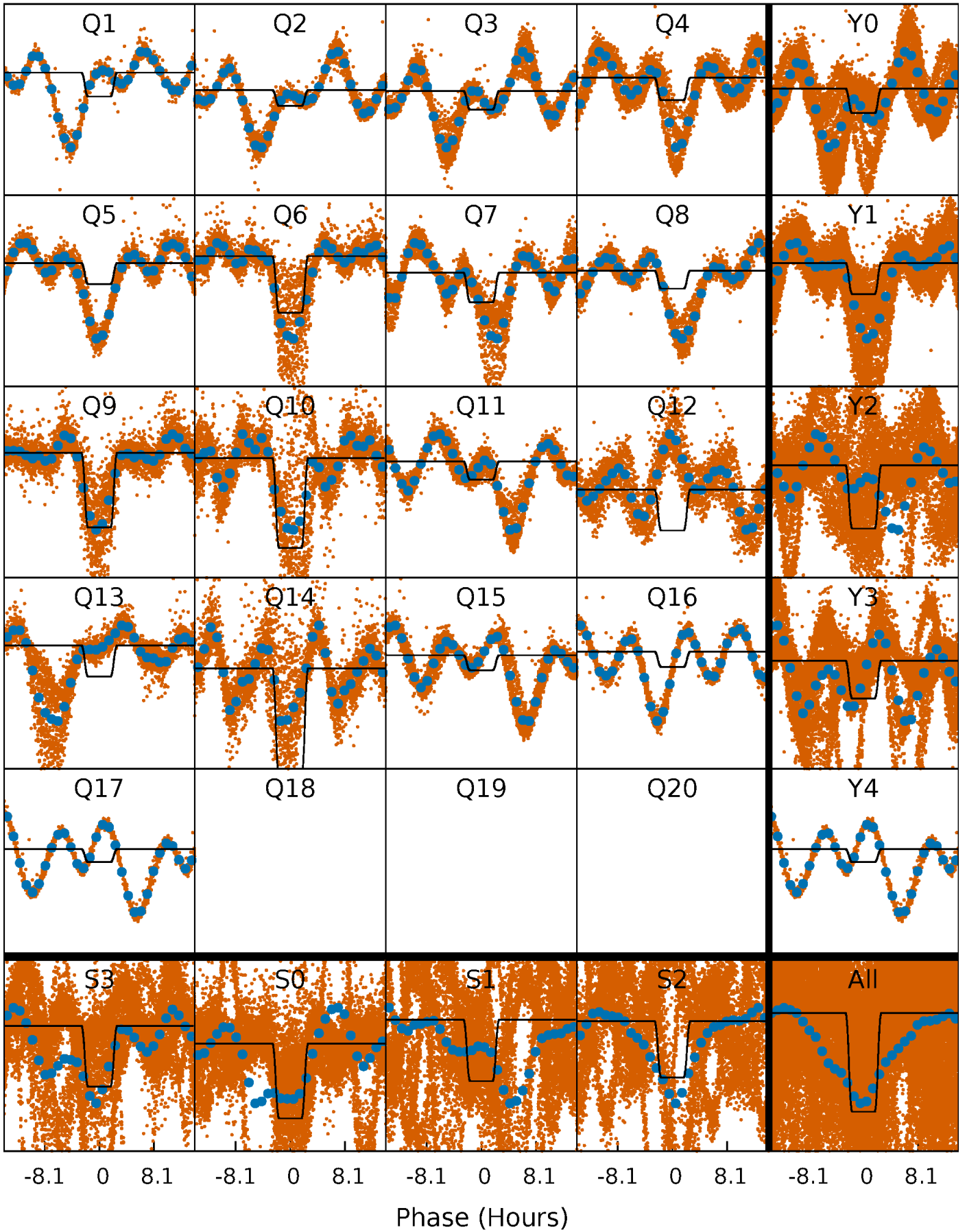
# DV Quarter-Phased Transit Curves

TCE 010710753-01 P= 1.297891 Days  $T_0=132.767753$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

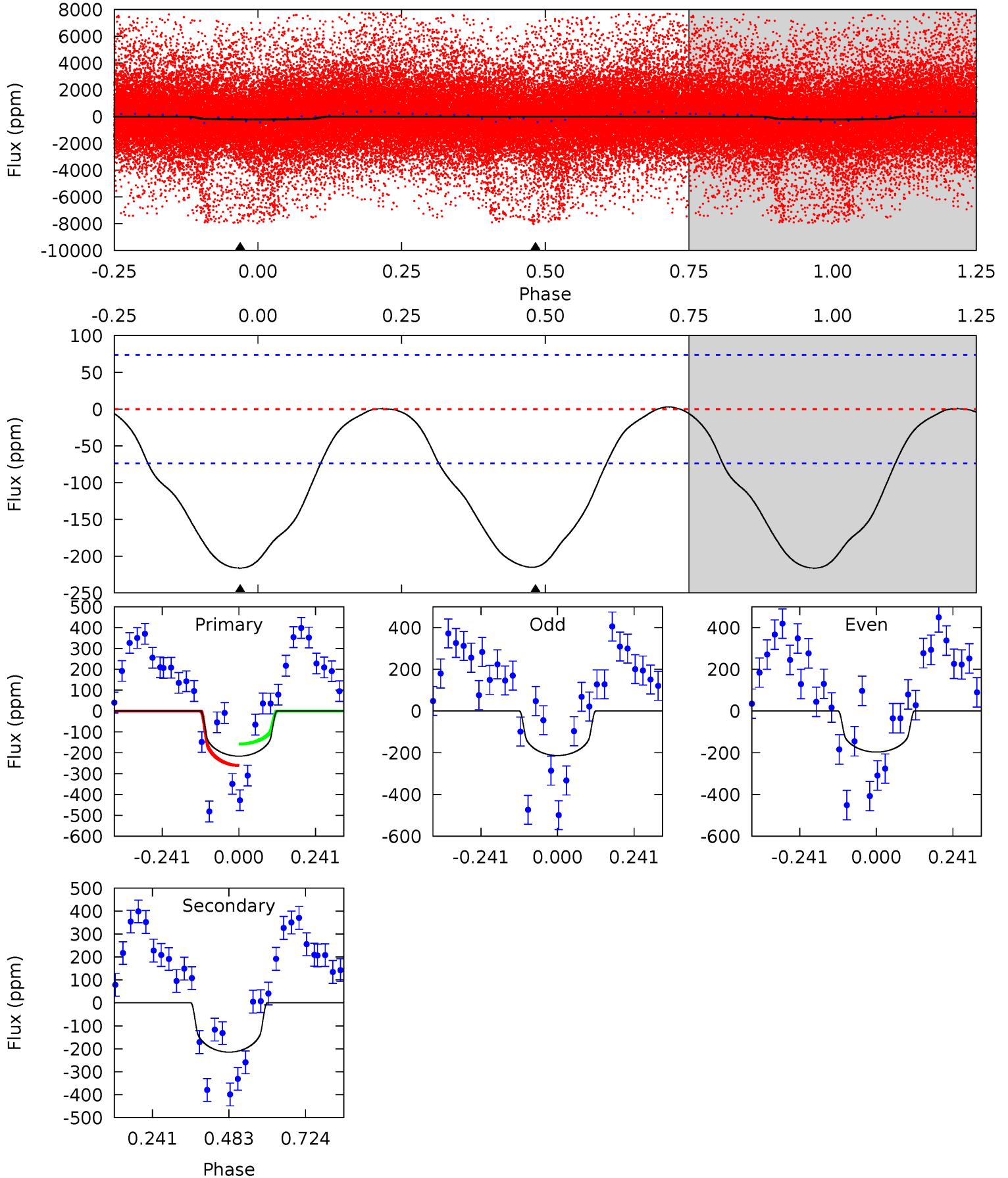
TCE 010710753-01 P= 1.297670 Days  $T_0=132.785267$  (BKJD)



# DV Model-Shift Uniqueness Test

010710753-01, P = 1.297891 Days, E = 131.469862 Days

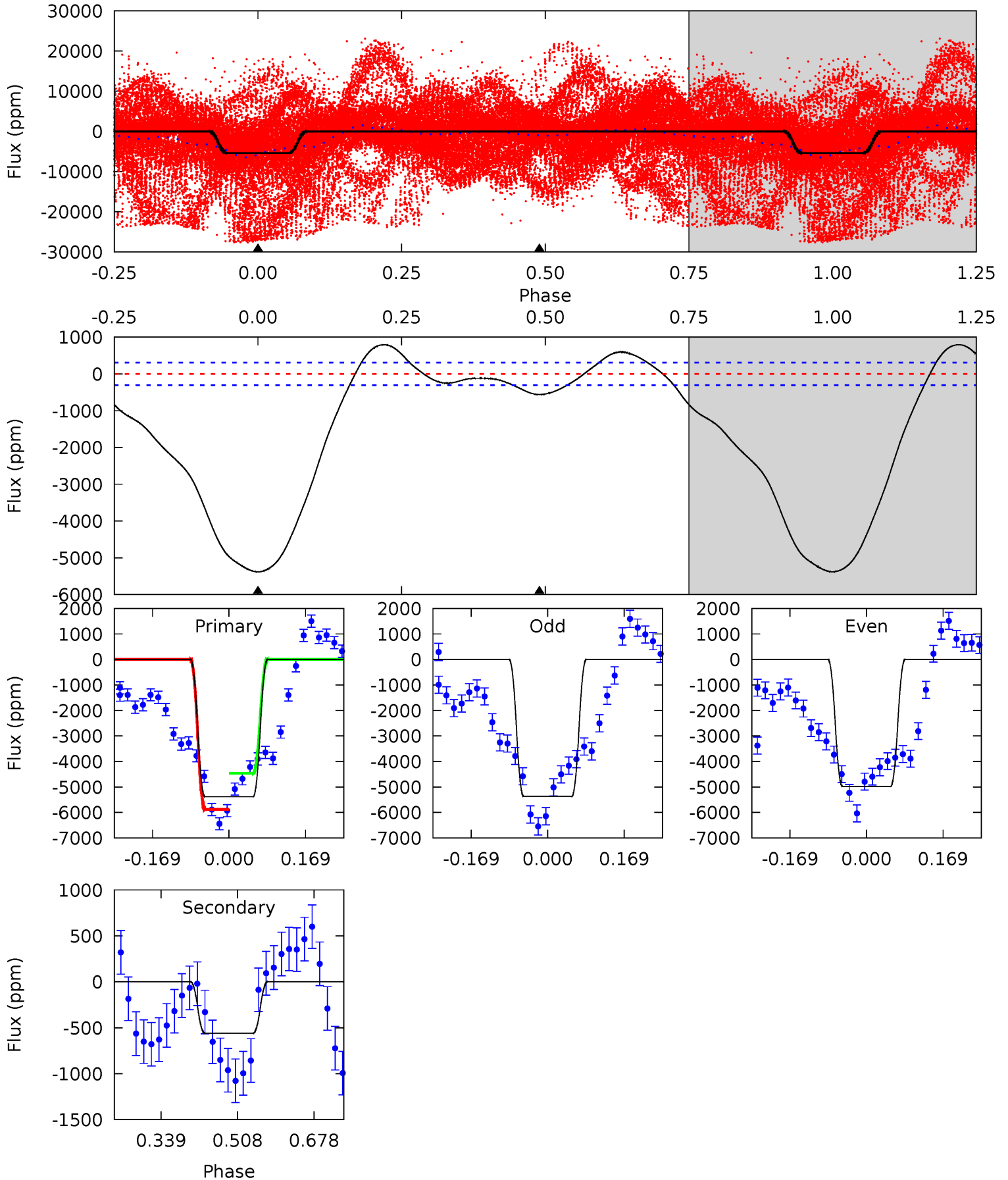
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.8	12.7	0	0	4.38	1.17	0.14	12.8	12.8	12.7	12.7	0.49	3.96	0.01	3.04



# Alt Model-Shift Uniqueness Test

010710753-01, P = 1.297670 Days, E = 131.487597 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
77.8	8.11	0	0	4.45	1.37	11.0	77.8	77.8	8.11	8.11	2.86	1.46	0.13	10.4





### Stellar Parameters For KIC 010710753

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$3991^{+99}_{-1}$	$4.668^{+0.035}_{-0.017}$	$0.000^{+0.100}_{-0.100}$	$0.588^{+0.026}_{-0.034}$	$0.587^{+0.033}_{-0.027}$	$4.066^{+0.632}_{-0.283}$
	+2%/-0%	+1%/-0%	+inf%/-inf%	+4%/-6%	+6%/-5%	+16%/-7%
Source	PHO2	PHO2	PHO2	DSEP		

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

### Secondary Eclipse Parameters for KIC 010710753-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-215 \pm 17$	$1.07^{+0.33}_{-0.38}$	$1339^{+42}_{-66}$	$3776^{+635}_{-363}$	$40^{+52}_{-17}$
Alt.	$-561 \pm 69$	$5.43^{+0.43}_{-0.39}$	$1343^{+40}_{-65}$	$2673^{+91}_{-108}$	$3.985^{+0.790}_{-0.699}$

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



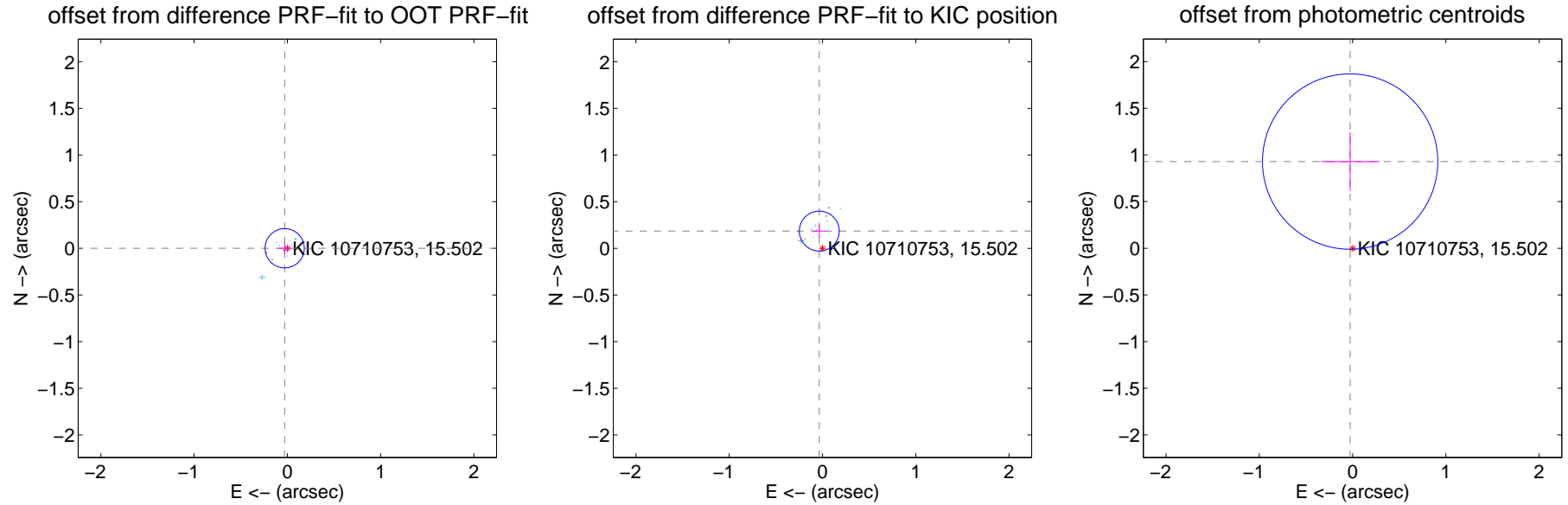
## DV Centroid Data

Supplemental centroid analysis for 010710753-01. Kepler magnitude: 15.50. Transit SNR 8.84

There are 14 quarters with good PRF difference image offsets

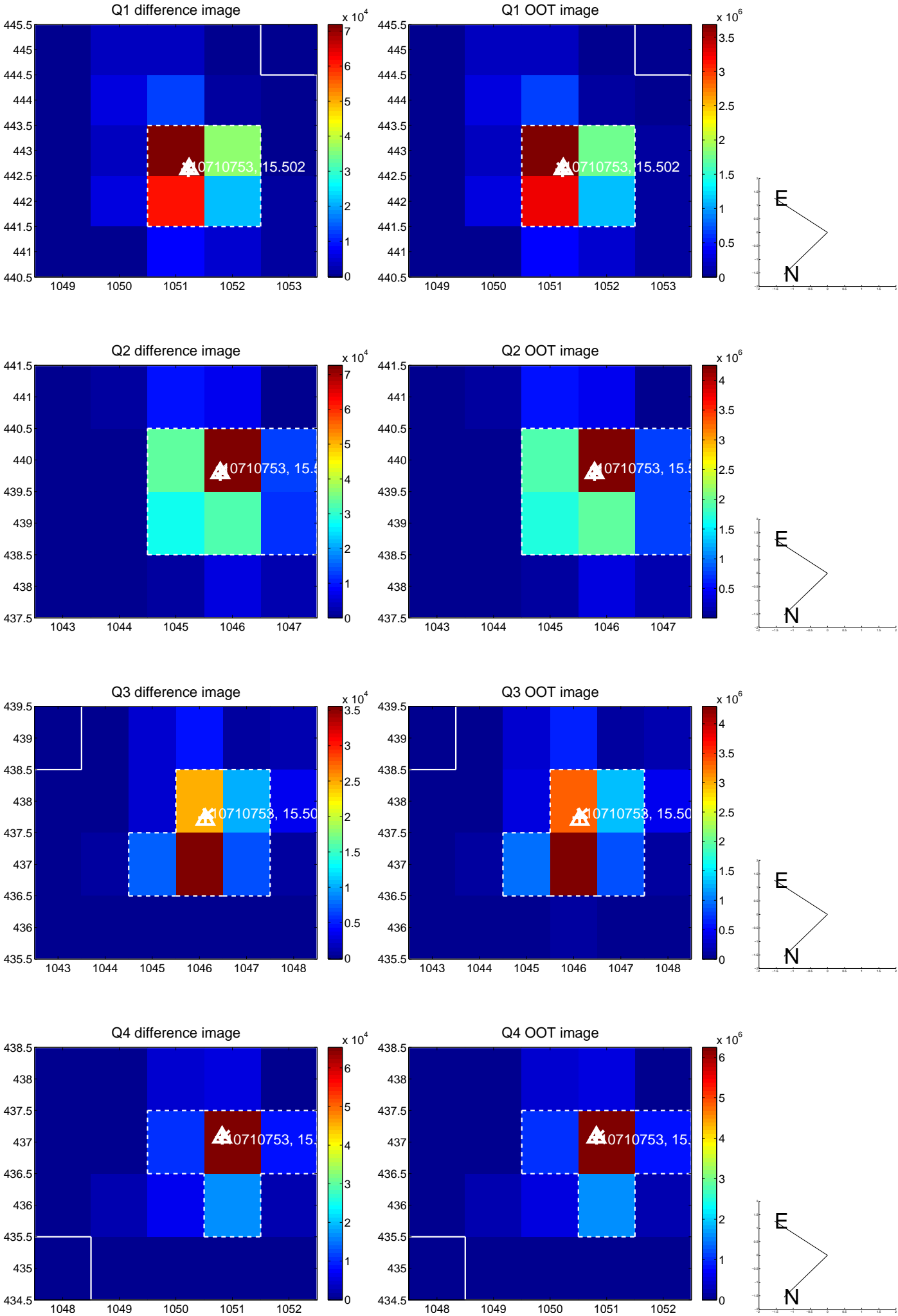
The direct PRF centroid is offset from the target star catalog position by about 0.22 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.029 \pm 0.070$	0.41	$0.029 \pm 0.070$	$0.001 \pm 0.070$
PRF-fit source offset from KIC position	$0.188 \pm 0.071$	2.63	$0.034 \pm 0.073$	$0.185 \pm 0.072$
photometric centroid source offset	$0.93 \pm 0.31$	2.97	$0.03 \pm 0.31$	$0.93 \pm 0.31$

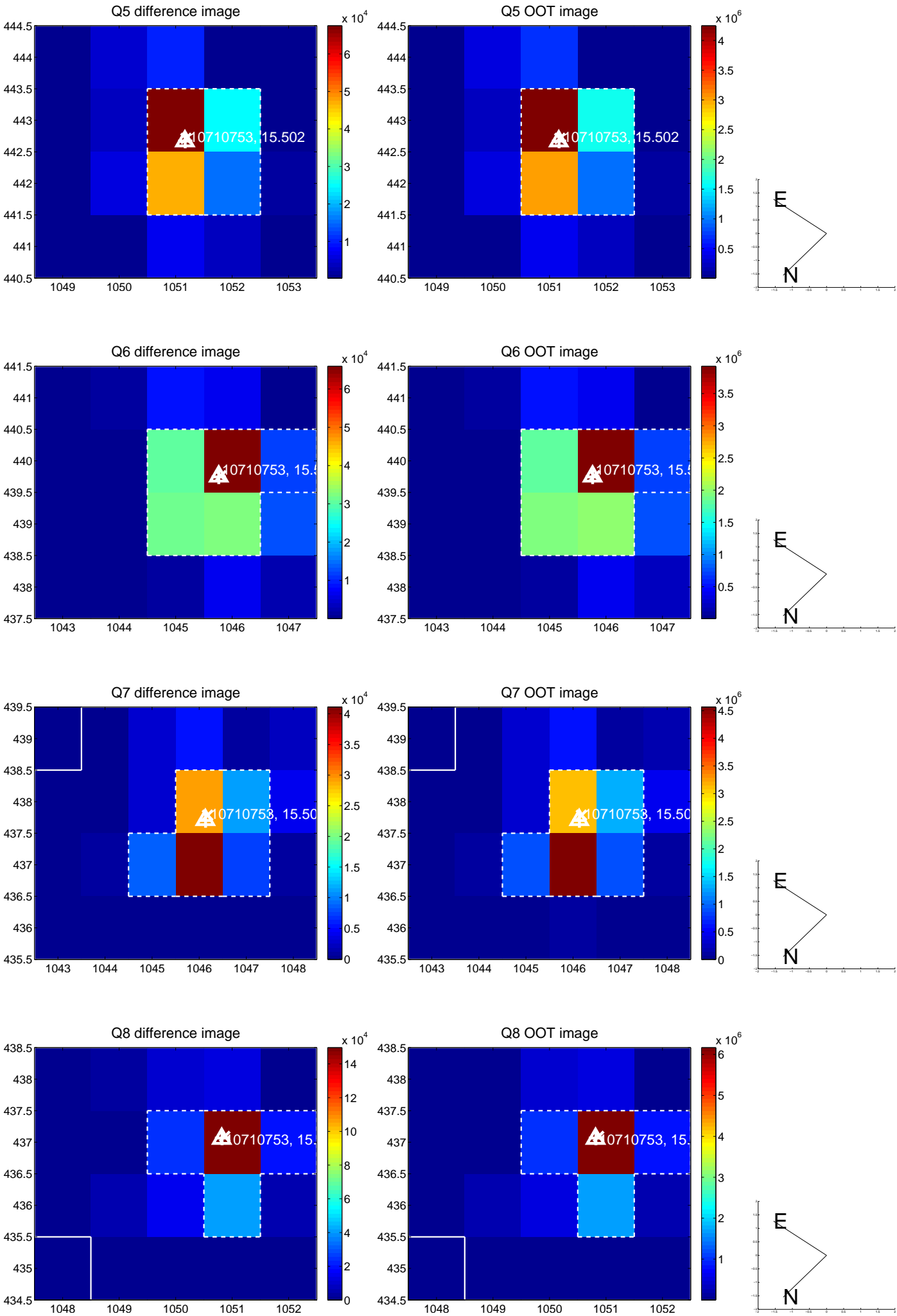


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

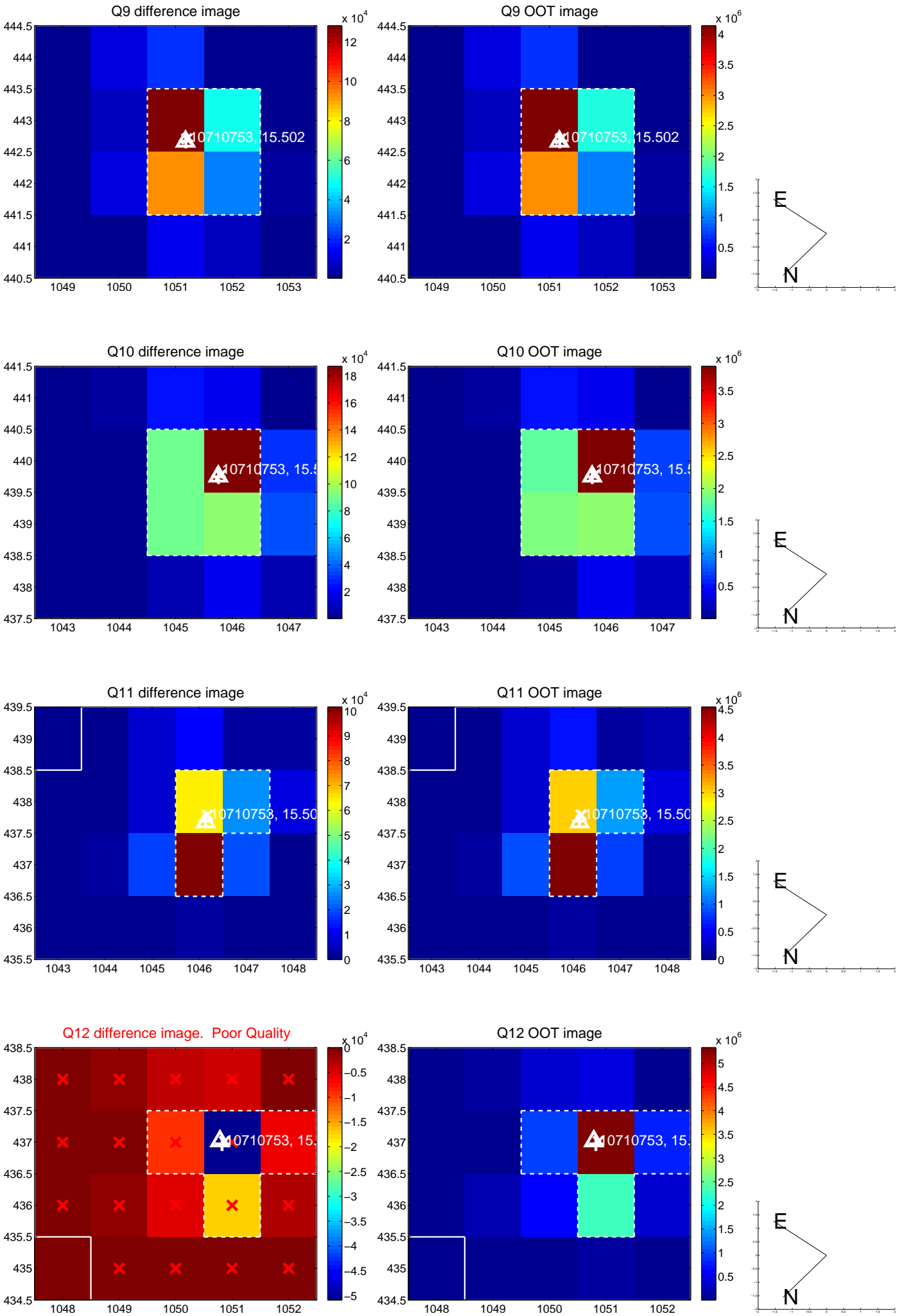
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



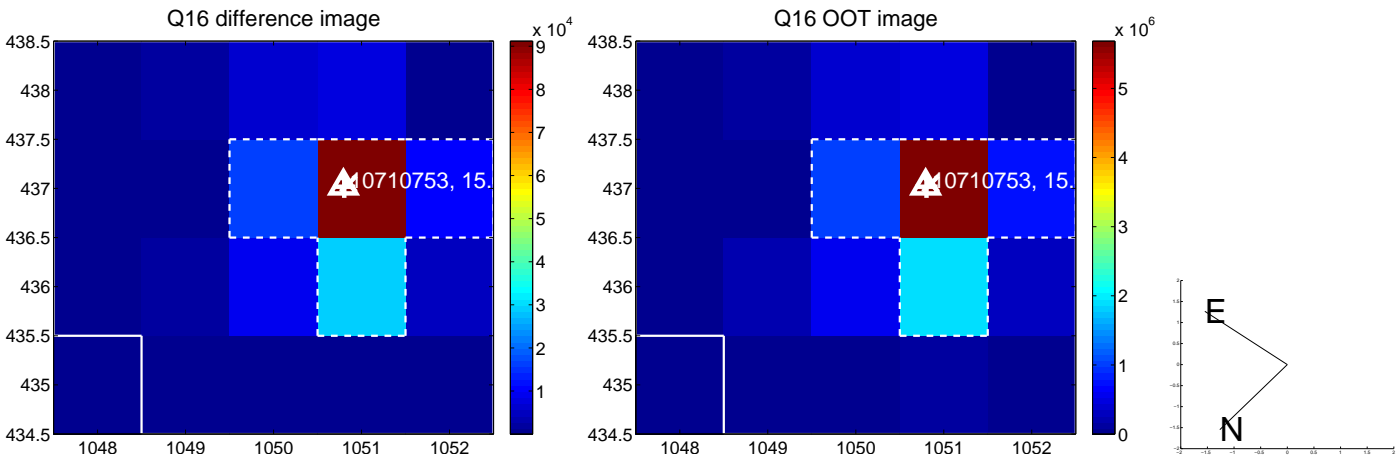
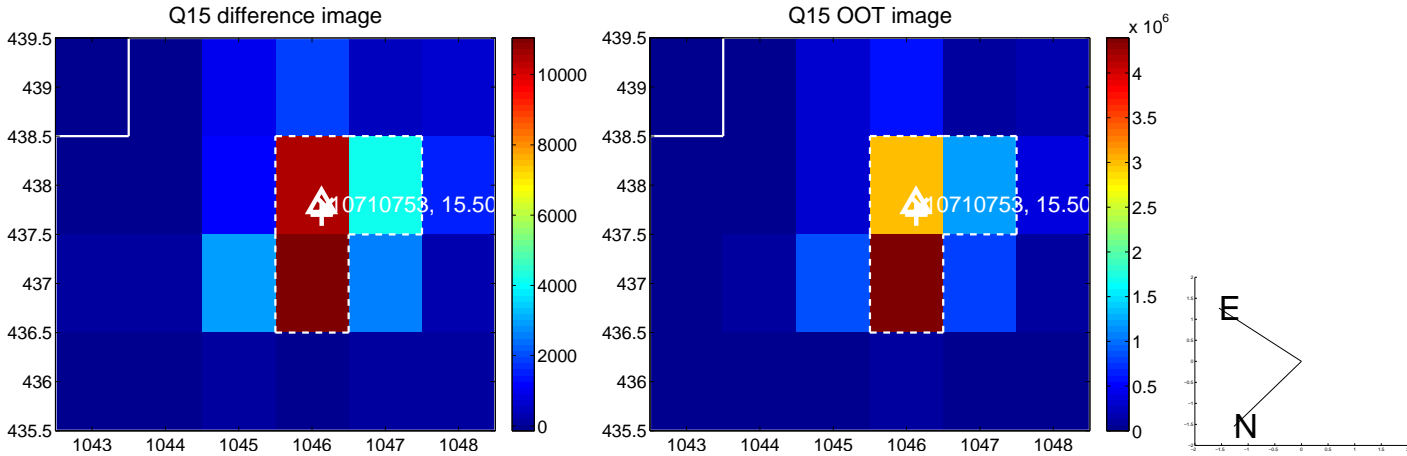
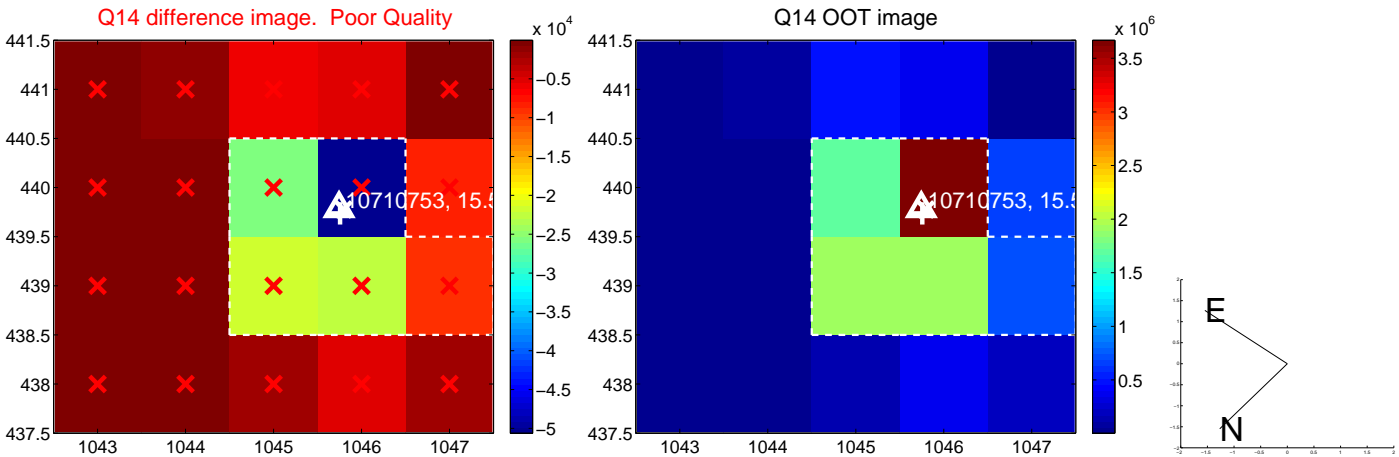
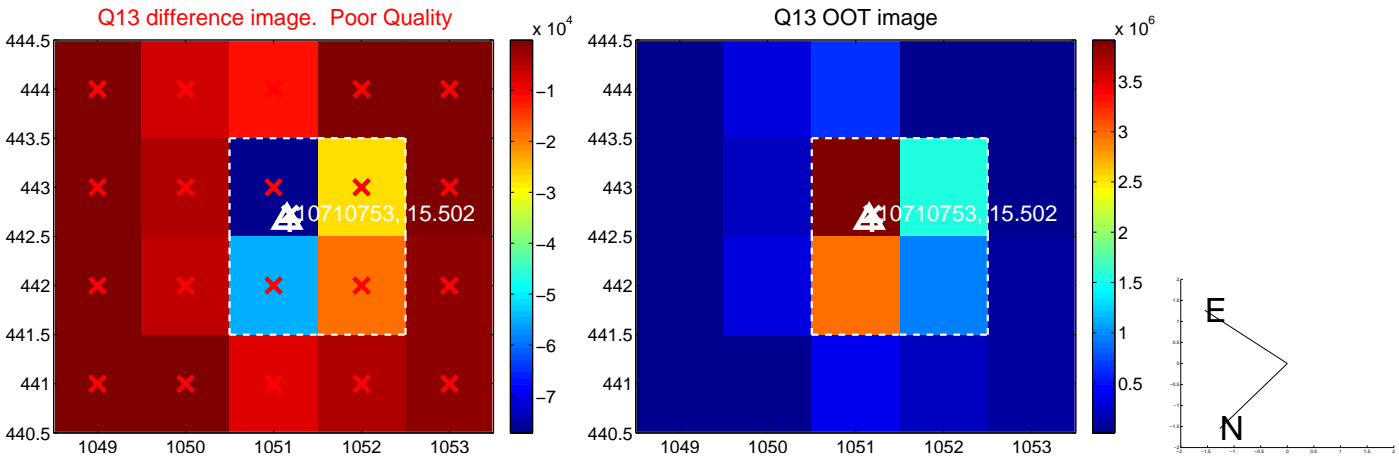
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

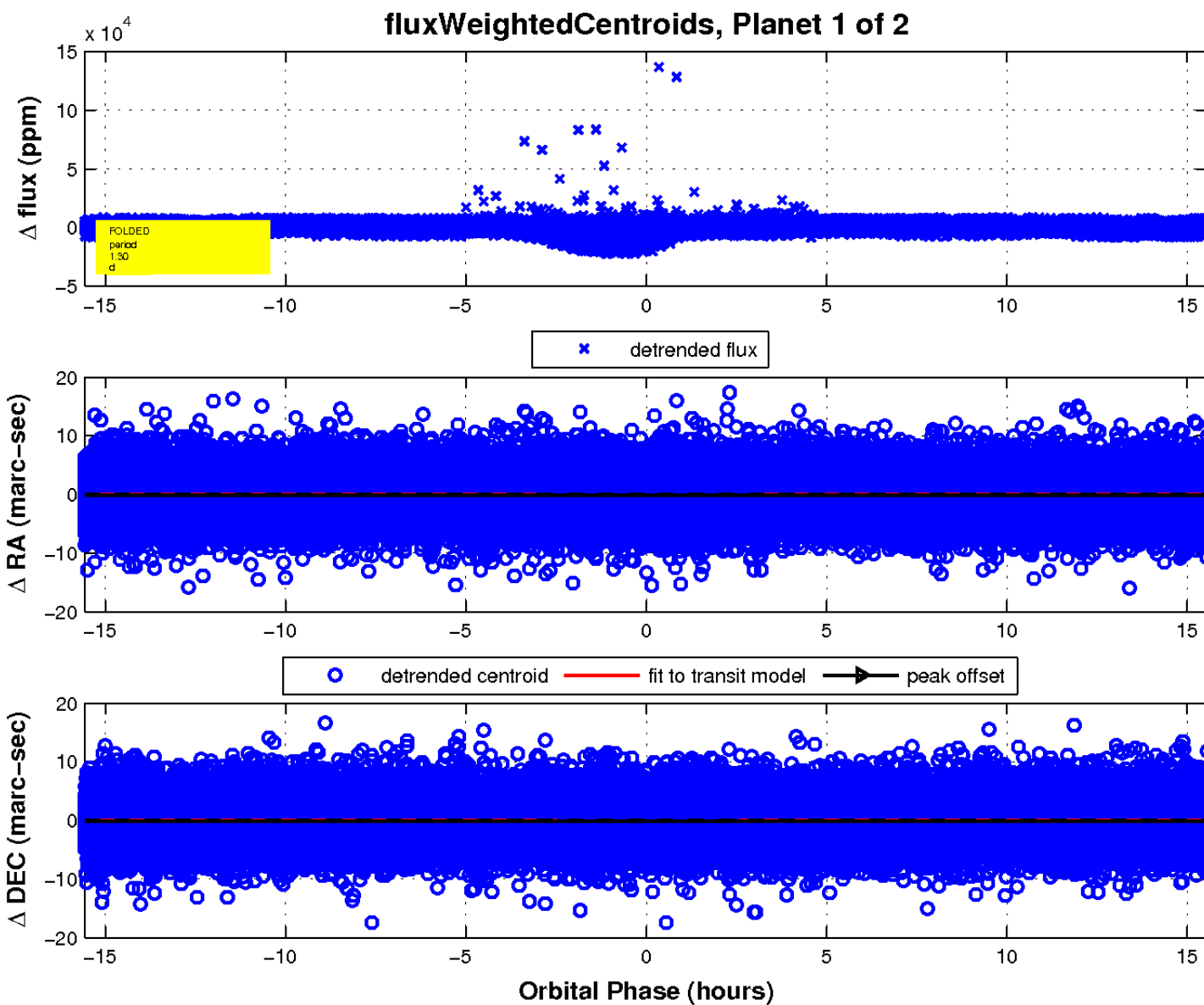
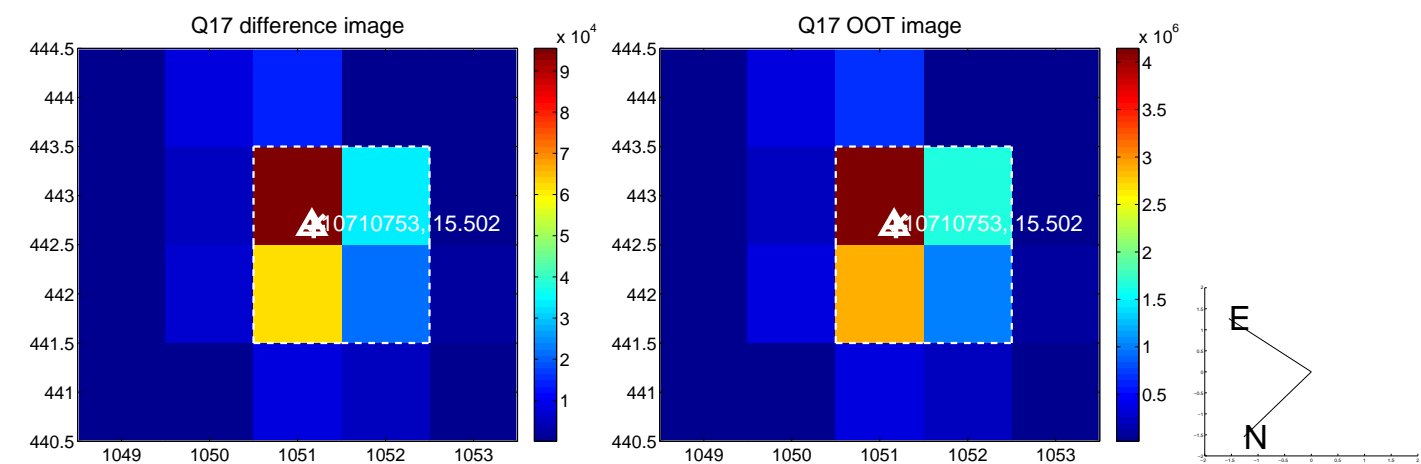


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



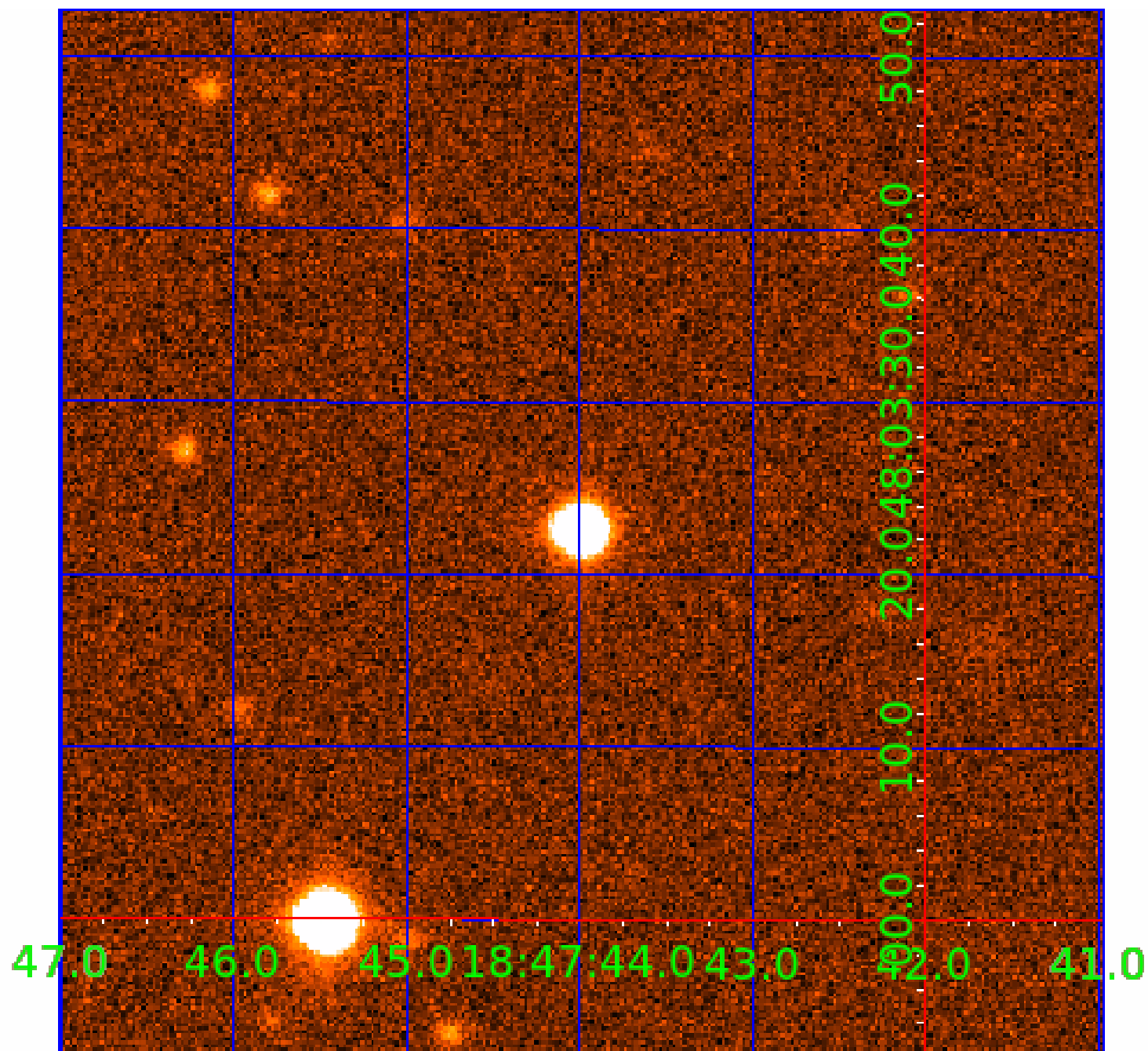


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 010710753

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
010710753-01	OBS	No	1.297891	132.767753	278.9	7.074	31.0	8.8	0.59	3991	1.05	206.61
010710753-02	OBS	No	280.145375	254.271868	8073.9	5.355	9.9	8.5	0.59	3991	6.30	0.16

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010710753-01	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV—MOD_NONUNIQ_ALT
010710753-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_ALT—ALL_TRANS_CHASES—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.

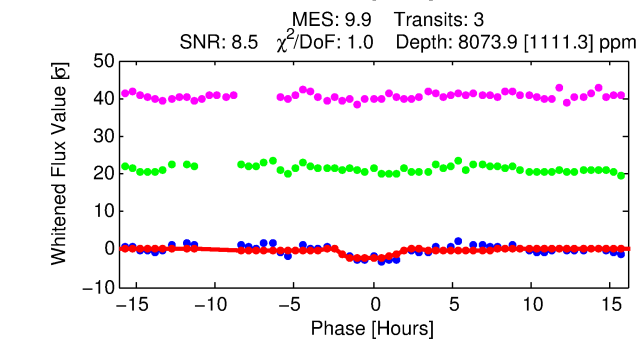
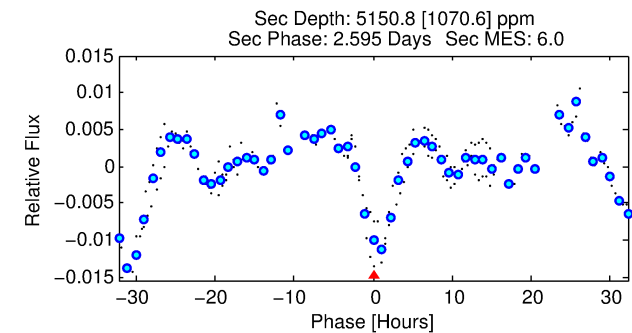
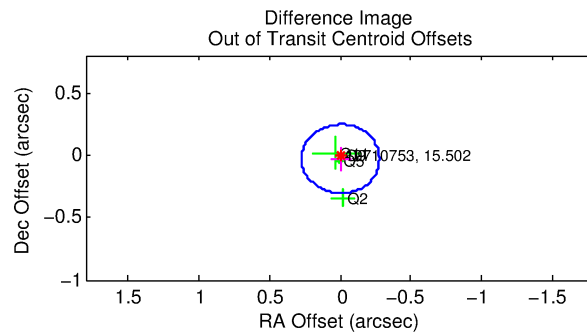
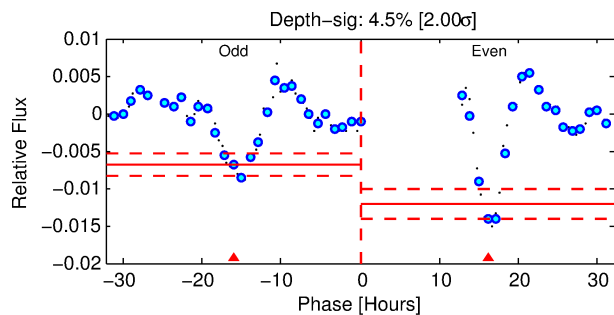
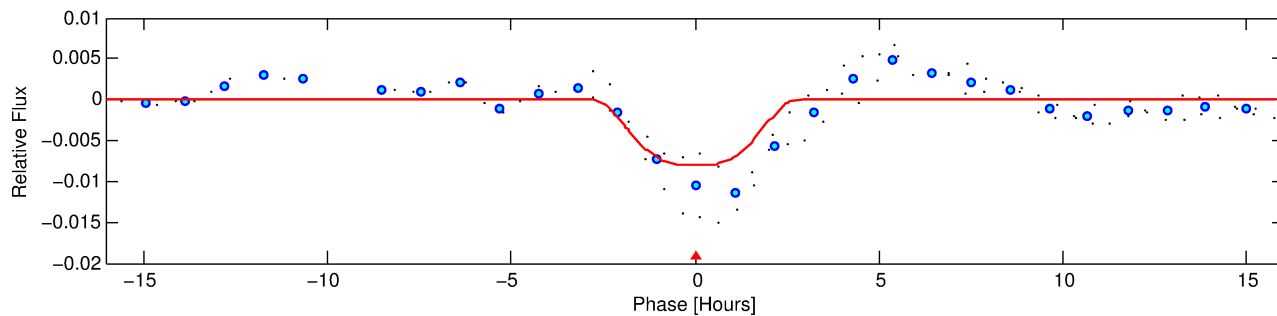
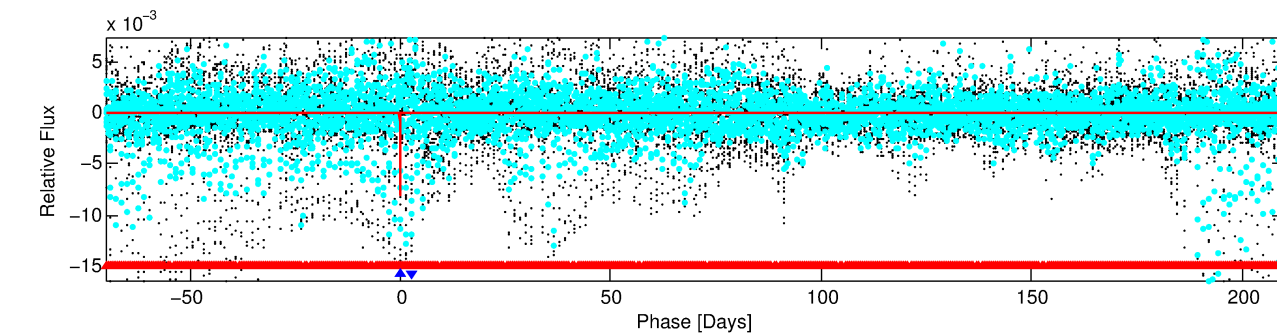
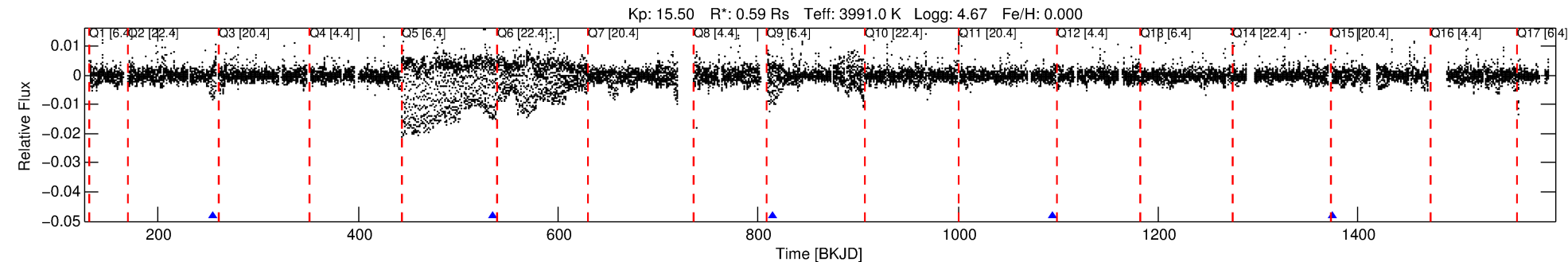
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 010710753-02

No Significant Match Found

# DV One-Page Summary

KIC: 10710753 Candidate: 2 of 2 Period: 280.145 d



## DV Fit Results:

Period = 280.14537 [0.01297] d  
Epoch = 254.2719 [0.0135] BKJD  
Rp/R\* = 0.0982 [0.0088]  
a/R\* = 262.93 [38.95]  
b = 0.88 [0.04]  
Seff = 0.16 [0.02]  
Teq = 161 [5] K  
Rp = 6.30 [0.67] Re  
a = 0.7018 [0.0330] AU  
Ag = 35185.12 [9915.78] [3.55σ]  
Teffp = 3413 [249] K [13.08σ]

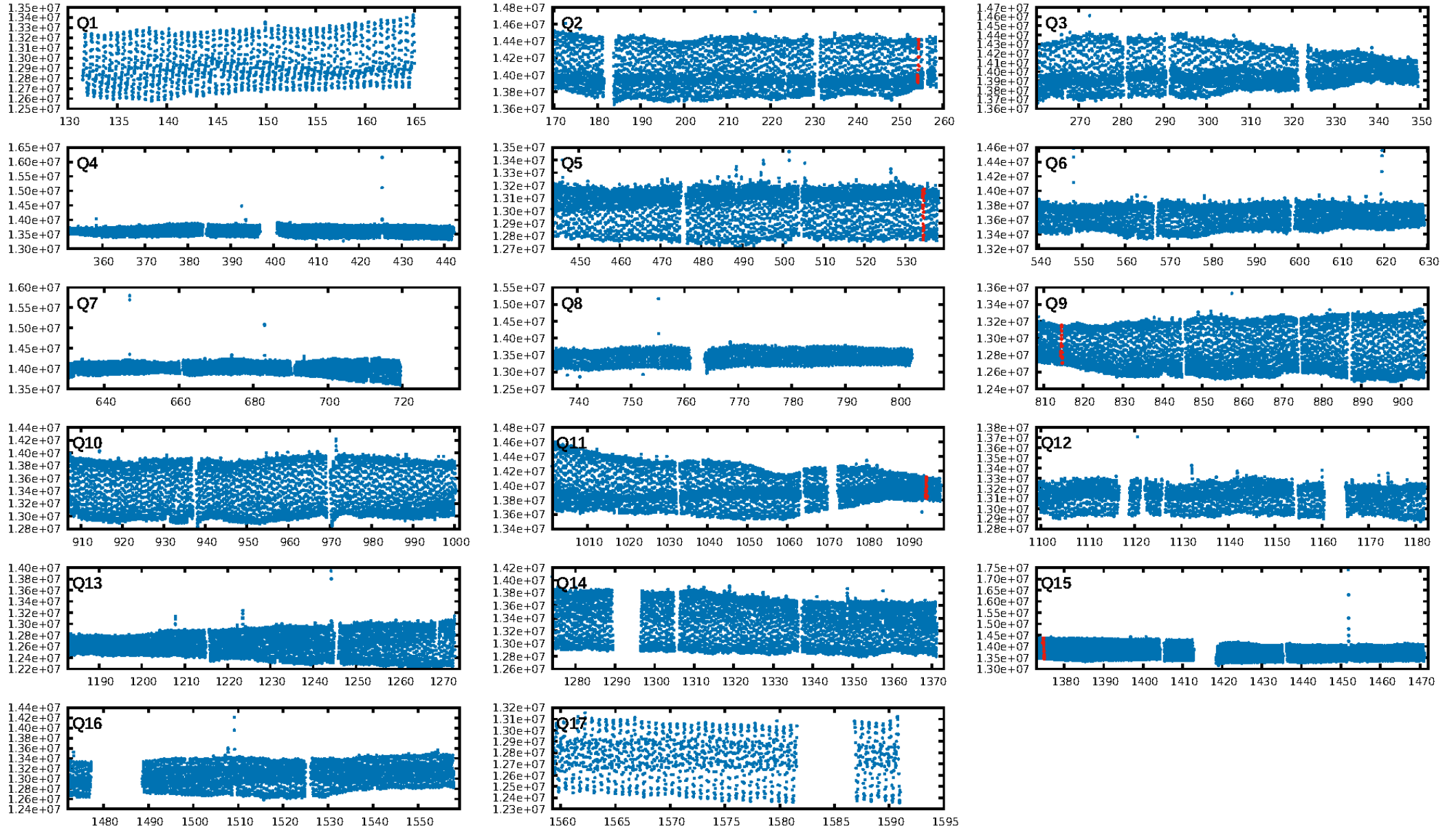
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [754.29σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 8.1%  
ModelChiSquareGof-sig: 100.0%  
**Bootstrap-pfa: 3.47e-07**  
RollingBand-fgt: 1.00 [3/3]  
**GhostDiagnostic-chr: 4.459**  
Centroid-sig: 50.0%  
**Centroid-so: 0.757 arcsec [3.61σ]**  
OotOffset-rm: 0.030 arcsec [0.32σ]  
KicOffset-rm: 0.142 arcsec [1.43σ]  
OotOffset-st: 1/1/0/2 [4]  
KicOffset-st: 1/1/0/2 [4]  
DiffImageQuality-fgm: 0.25 [1/4]  
DiffImageOverlap-fno: 0.00 [0/4]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 02-Feb-2016 09:10:26 Z

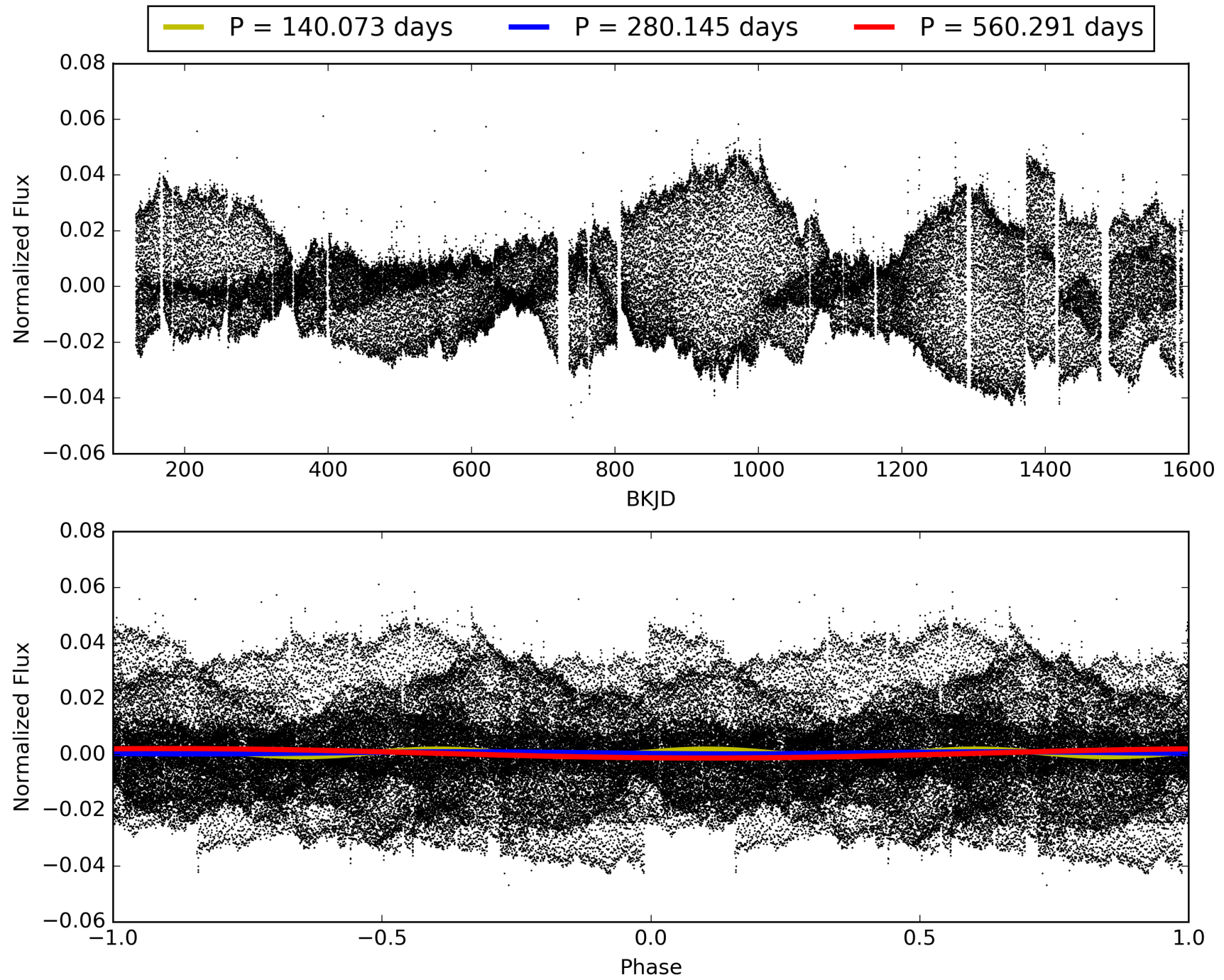
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 010710753-02, PDC Light Curves



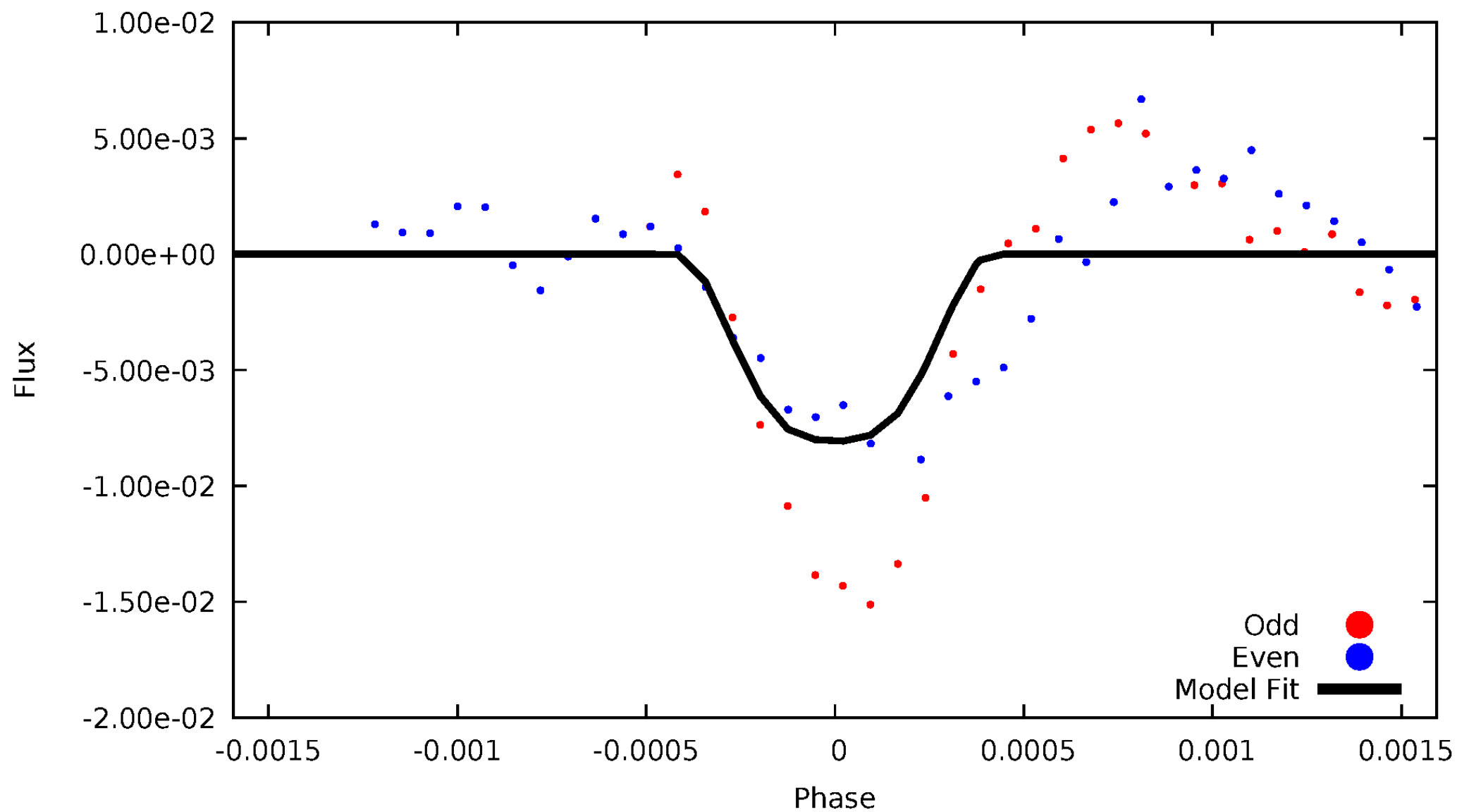


TCE 010710753-02



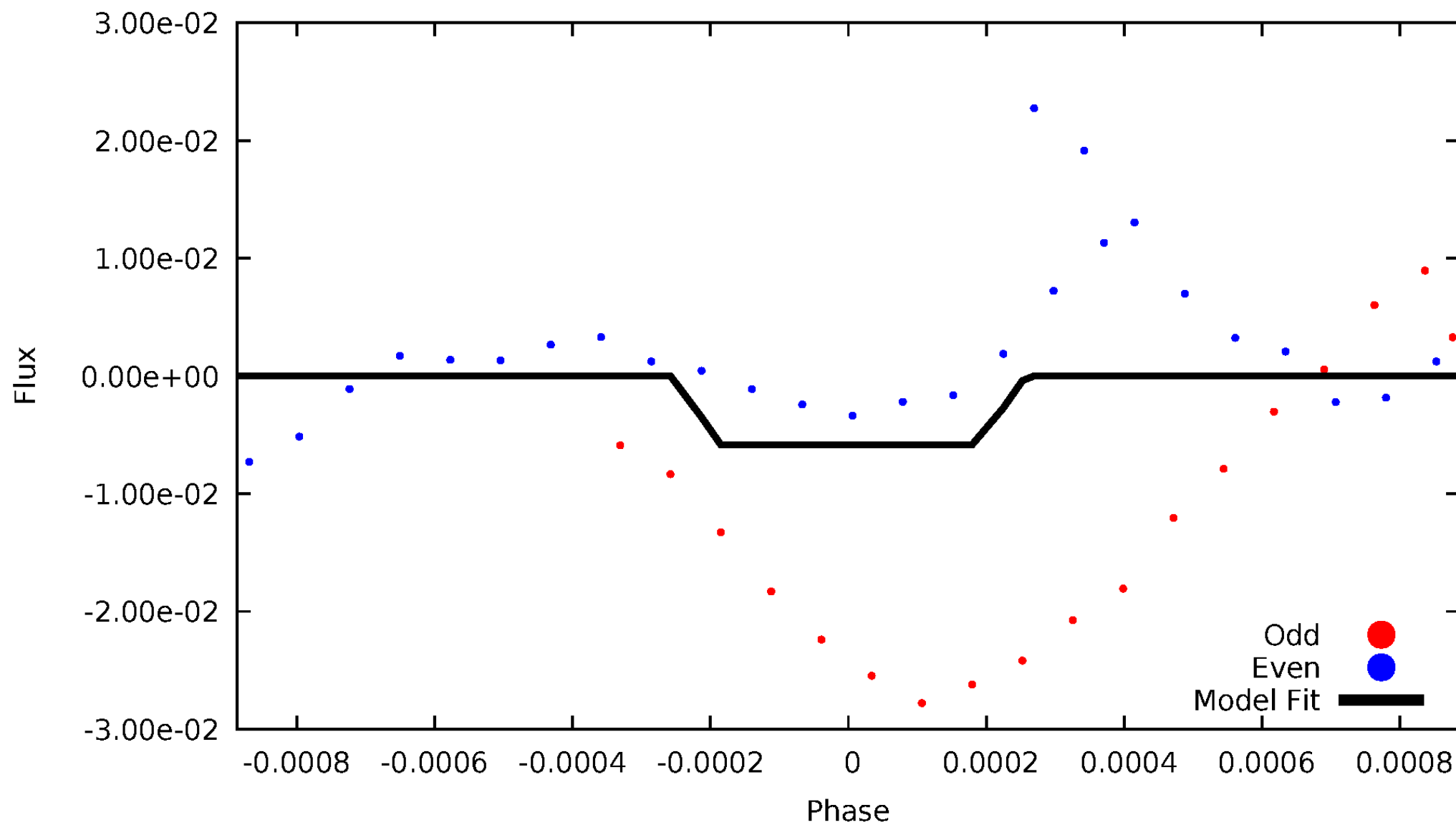
# DV Odd/Even

TCE 010710753-02



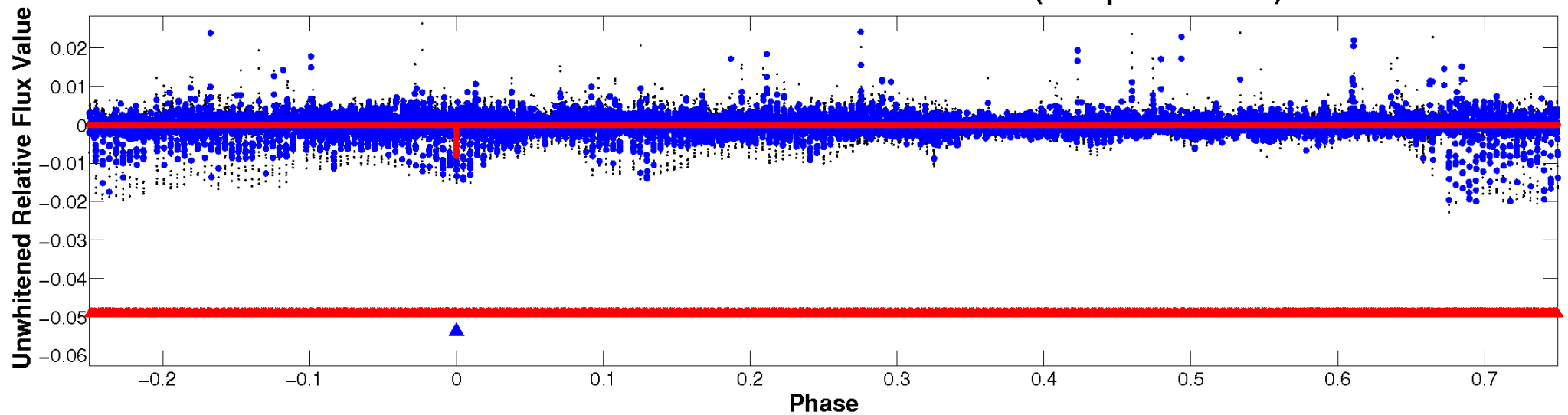
# ALT Odd/Even

TCE 010710753-02

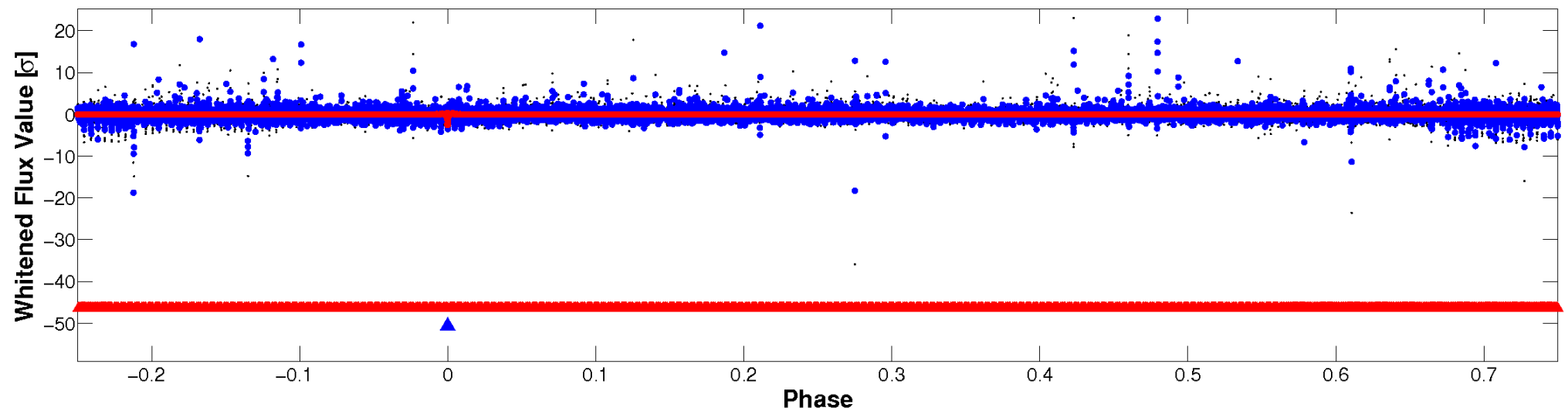


# Non-Whitened Vs. Whitened Light Curve

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

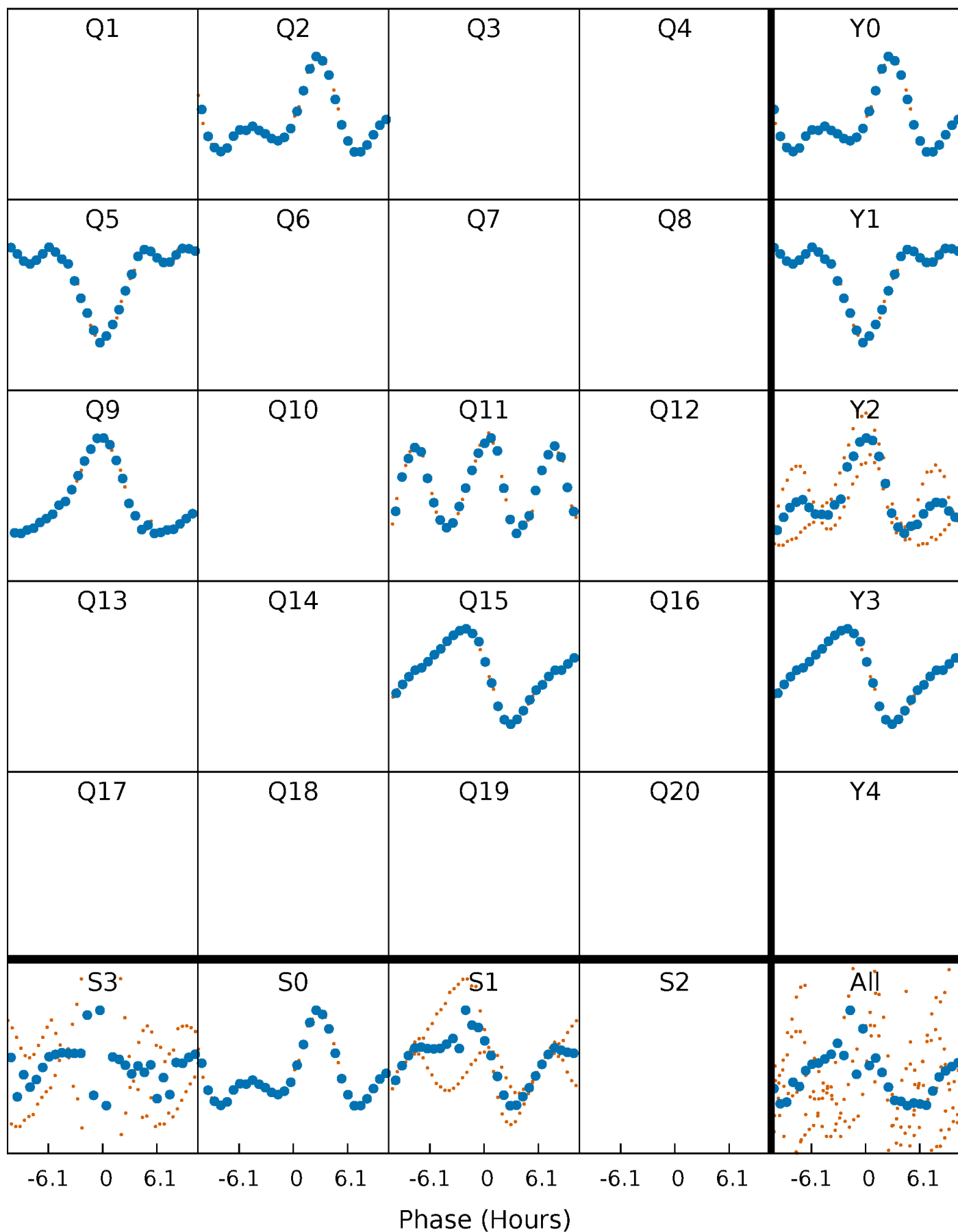


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



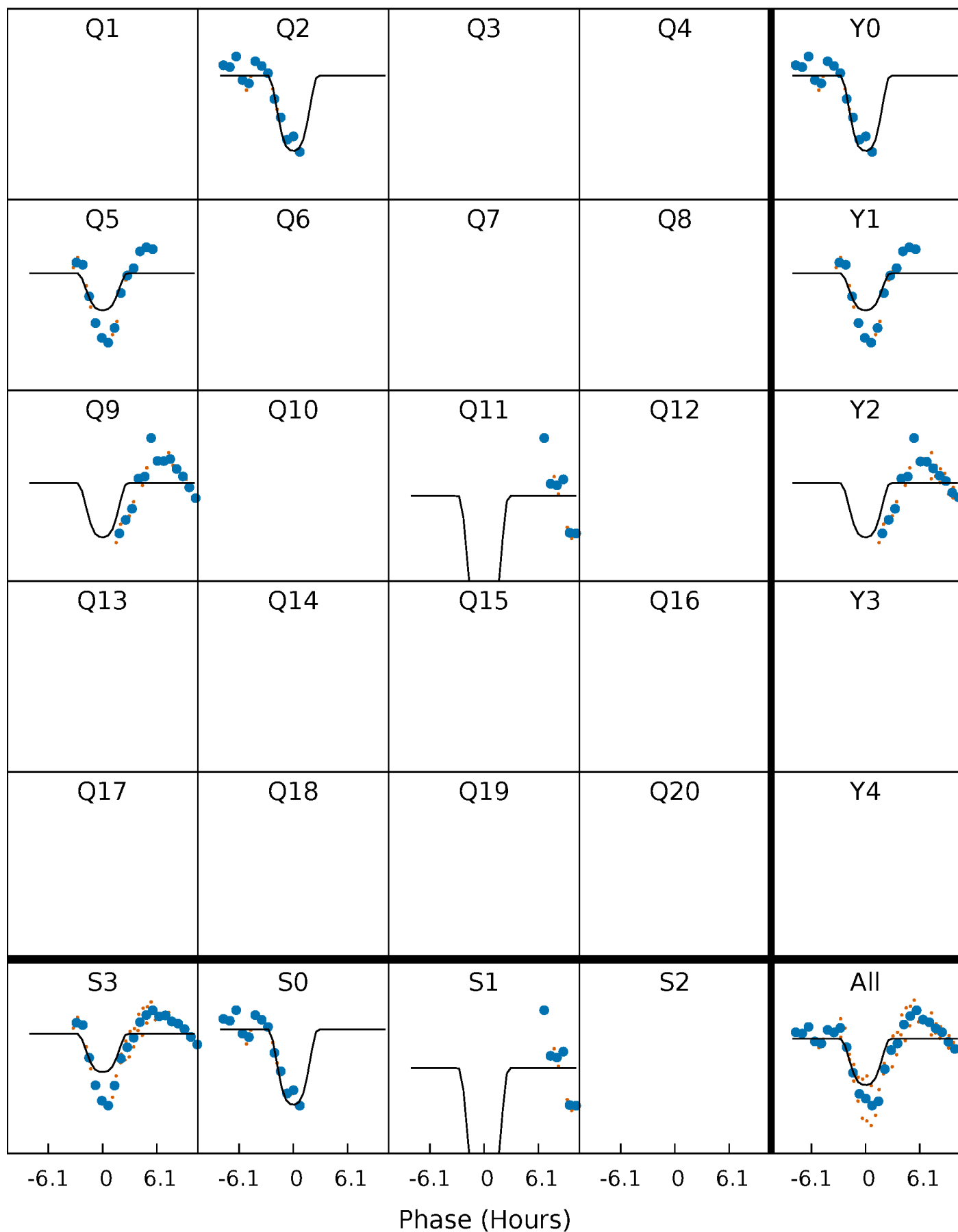
# PDC Quarter-Phased Transit Curves

TCE 010710753-02 P=280.145375 Days  $T_0=254.271868$  (BKJD)



# DV Quarter-Phased Transit Curves

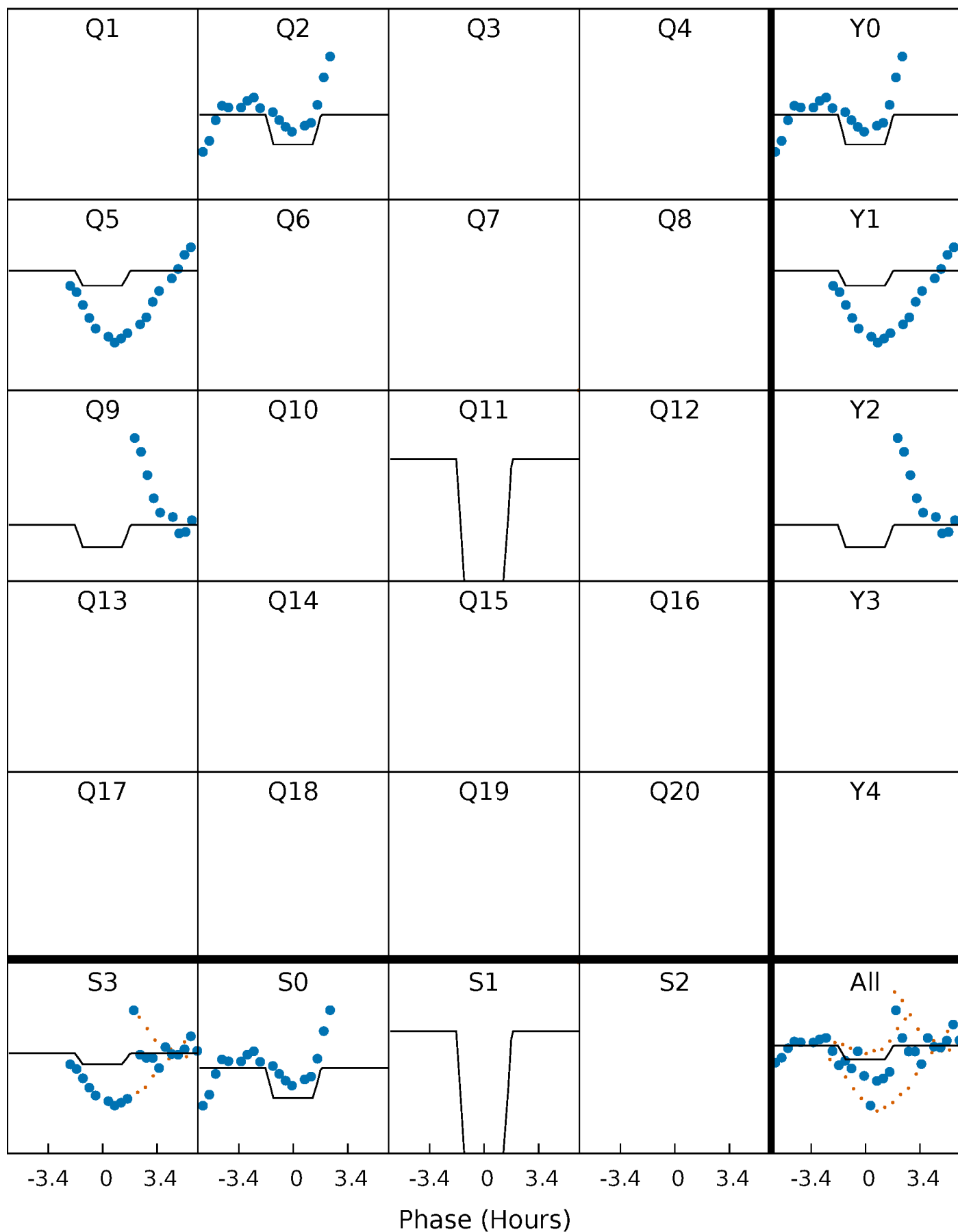
TCE 010710753-02 P=280.145375 Days  $T_0=254.271868$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

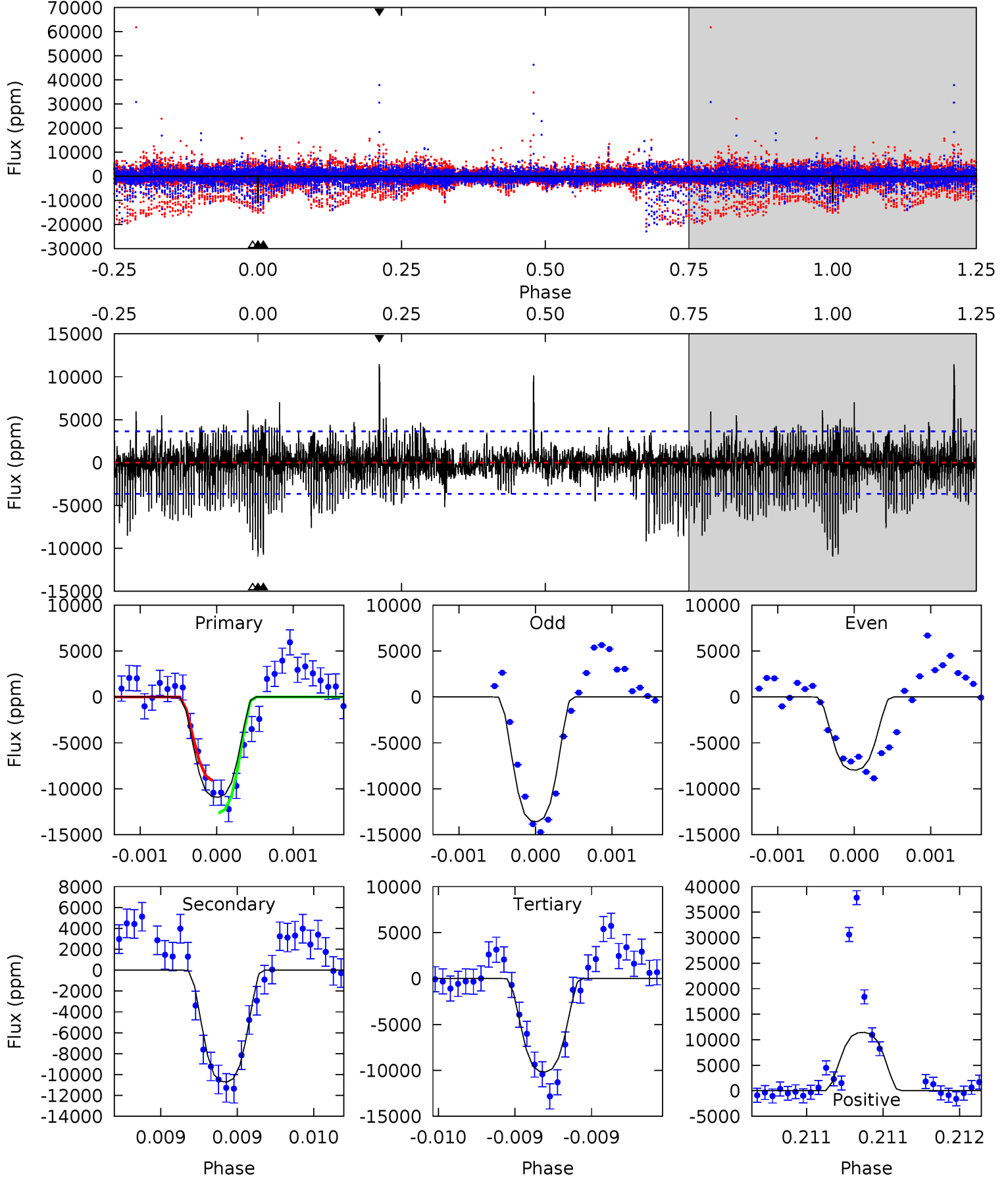
TCE 010710753-02 P=280.178163 Days  $T_0=254.194625$  (BKJD)



# DV Model-Shift Uniqueness Test

010710753-02, P = 280.145375 Days, E = 254.271868 Days

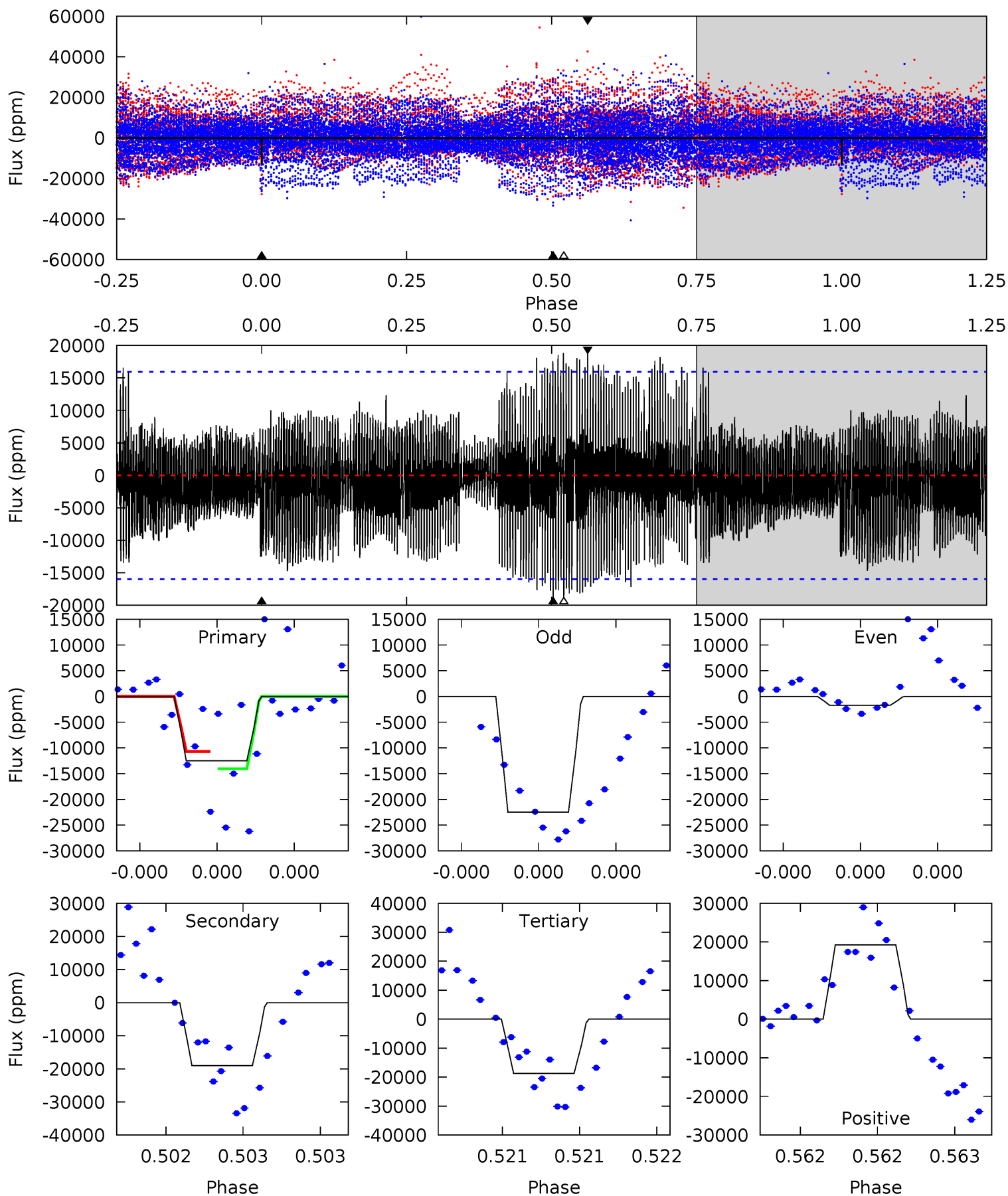
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
16.5	16.1	15.3	17.2	5.48	3.33	2.70	1.15	-0.77	0.82	-1.09	3.54	0.88	0.51	2.70



# Alt Model-Shift Uniqueness Test

010710753-02, P = 280.178163 Days, E = 254.194625 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
4.37	6.66	6.55	6.73	5.59	3.50	1.83	-2.18	-2.36	0.10	-0.07	3.76	1.00	0.50	0.58



### Stellar Parameters For KIC 010710753

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$3991^{+99}_{-1}$	$4.668^{+0.035}_{-0.017}$	$0.000^{+0.100}_{-0.100}$	$0.588^{+0.026}_{-0.034}$	$0.587^{+0.033}_{-0.027}$	$4.066^{+0.632}_{-0.283}$
	+2%/-0%	+1%/-0%	+inf%/-inf%	+4%/-6%	+6%/-5%	+16%/-7%
Source	PHO2	PHO2	PHO2	DSEP		

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

### Secondary Eclipse Parameters for KIC 010710753-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-10719 \pm 664$	$6.29^{+0.58}_{-0.61}$	$224^{+7}_{-11}$	$4045^{+213}_{-207}$	$74608^{+17662}_{-12933}$
Alt.	$-19008 \pm 2856$	$4.87^{+0.58}_{-0.58}$	$224^{+7}_{-11}$	$5005^{+350}_{-368}$	$225431^{+71835}_{-56047}$

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

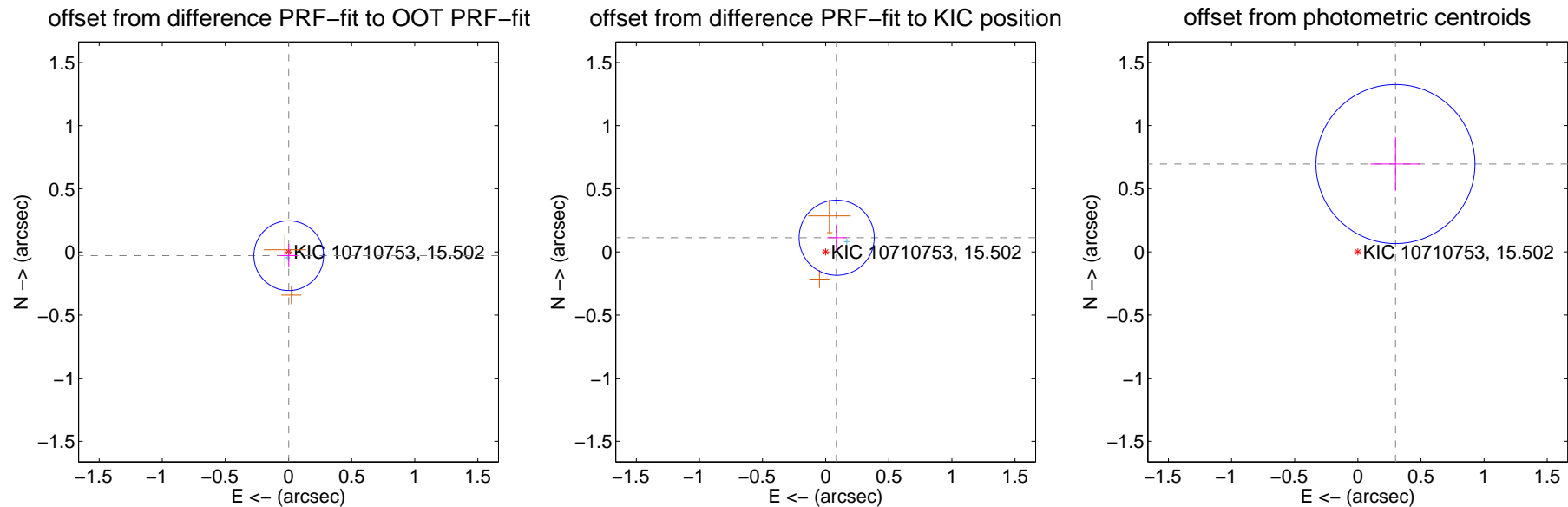
## DV Centroid Data

Supplemental centroid analysis for 010710753-02. Kepler magnitude: 15.50. Transit SNR 8.52

There are 1 quarters with good PRF difference image offsets

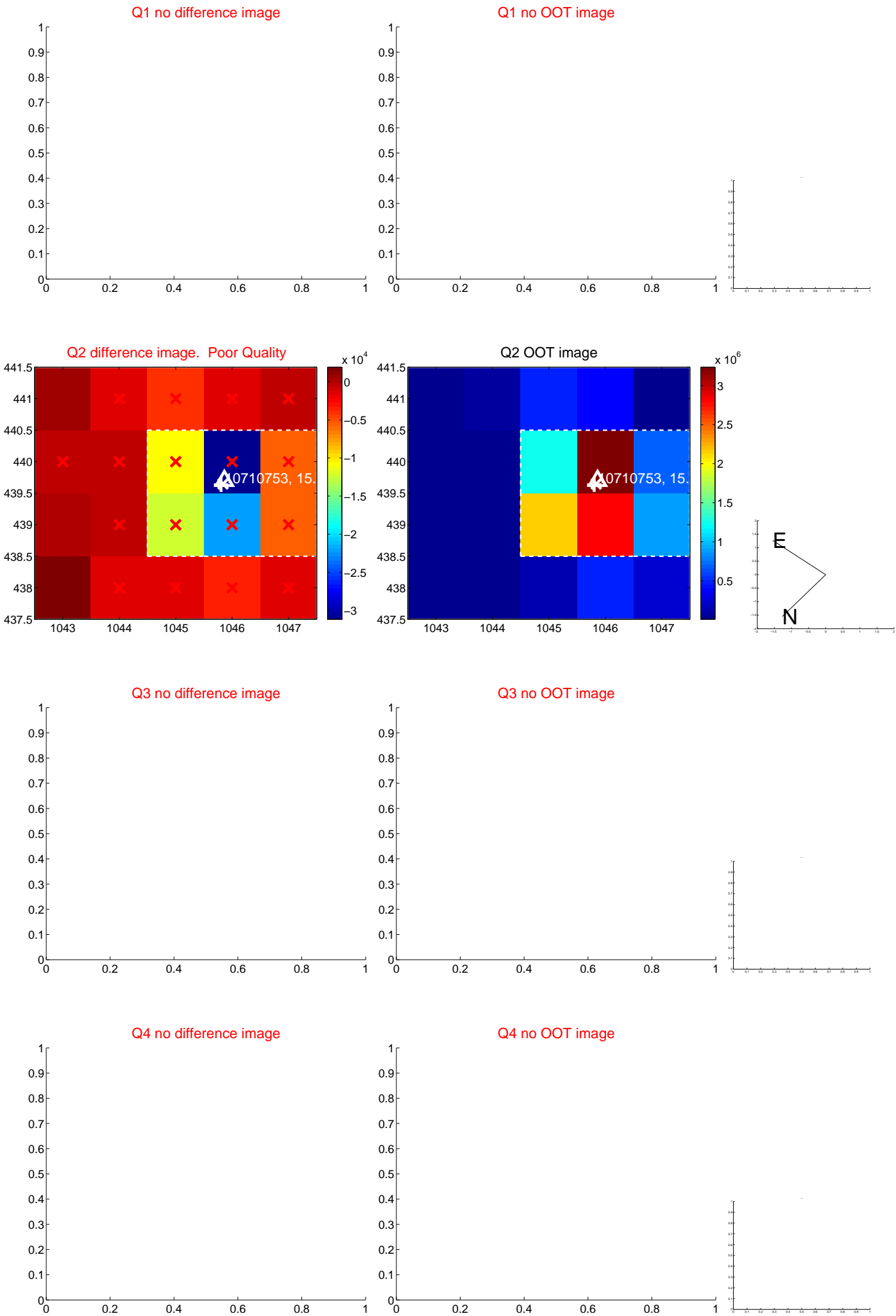
The direct PRF centroid is offset from the target star catalog position by about 0.27 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.030 \pm 0.092$	0.32	$-0.002 \pm 0.068$	$-0.030 \pm 0.092$
PRF-fit source offset from KIC position	$0.142 \pm 0.099$	1.43	$-0.087 \pm 0.076$	$0.112 \pm 0.103$
photometric centroid source offset	$0.76 \pm 0.21$	3.61	$-0.30 \pm 0.20$	$0.70 \pm 0.21$



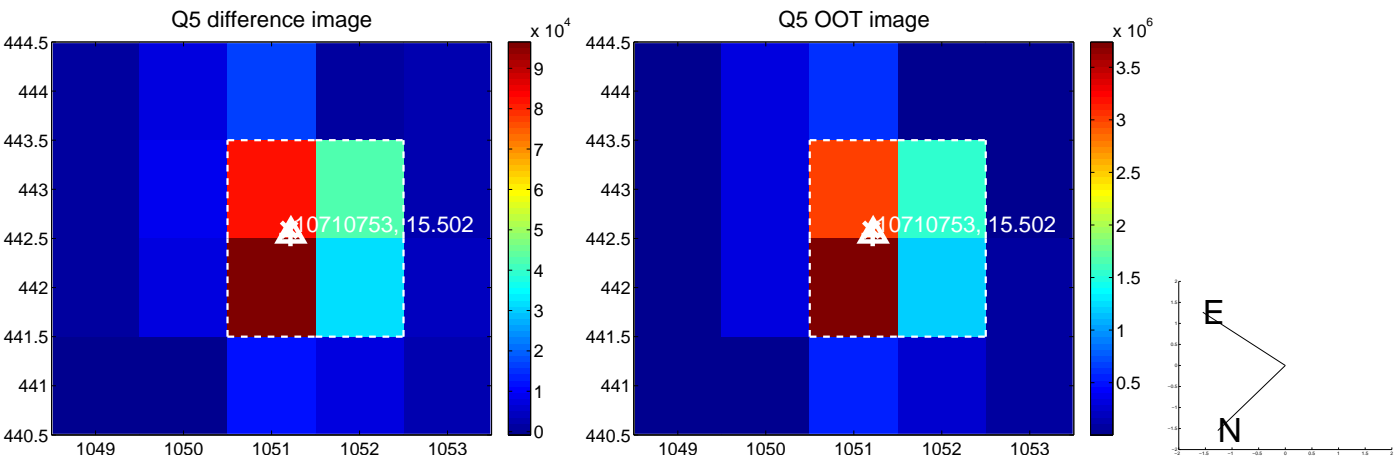
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

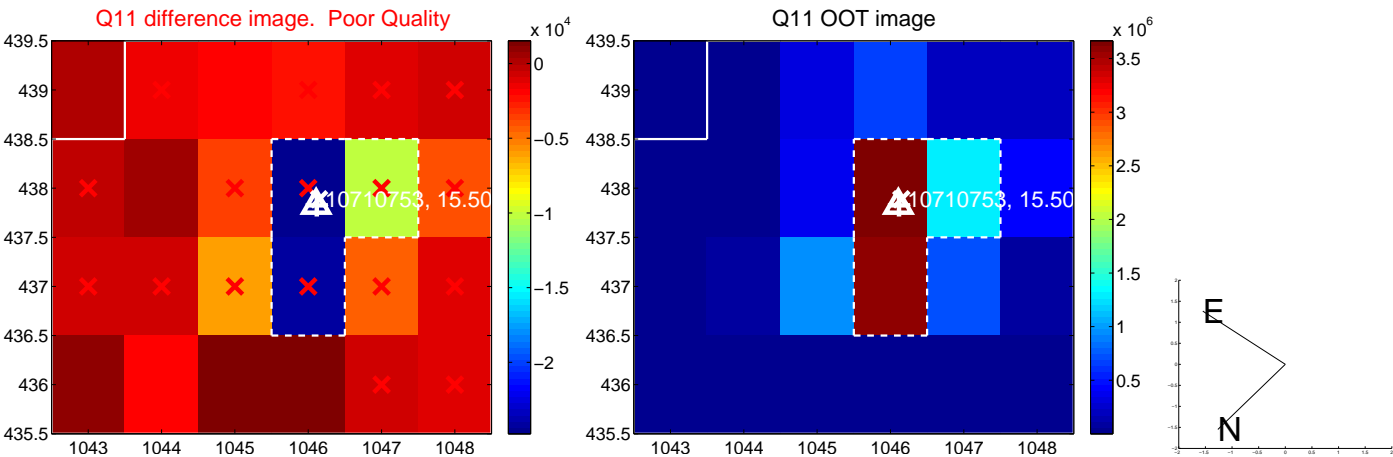
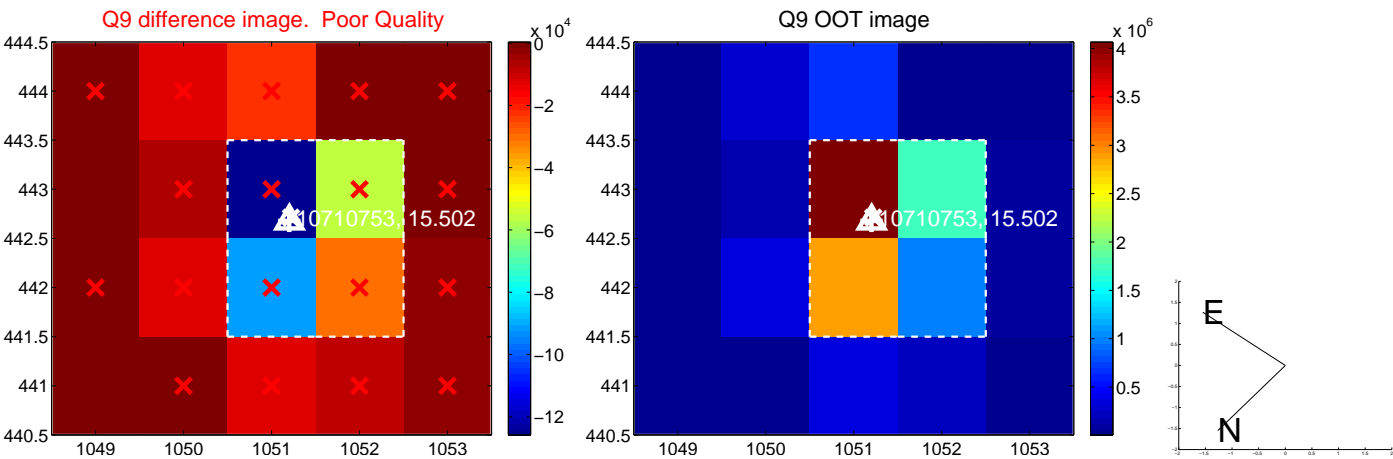




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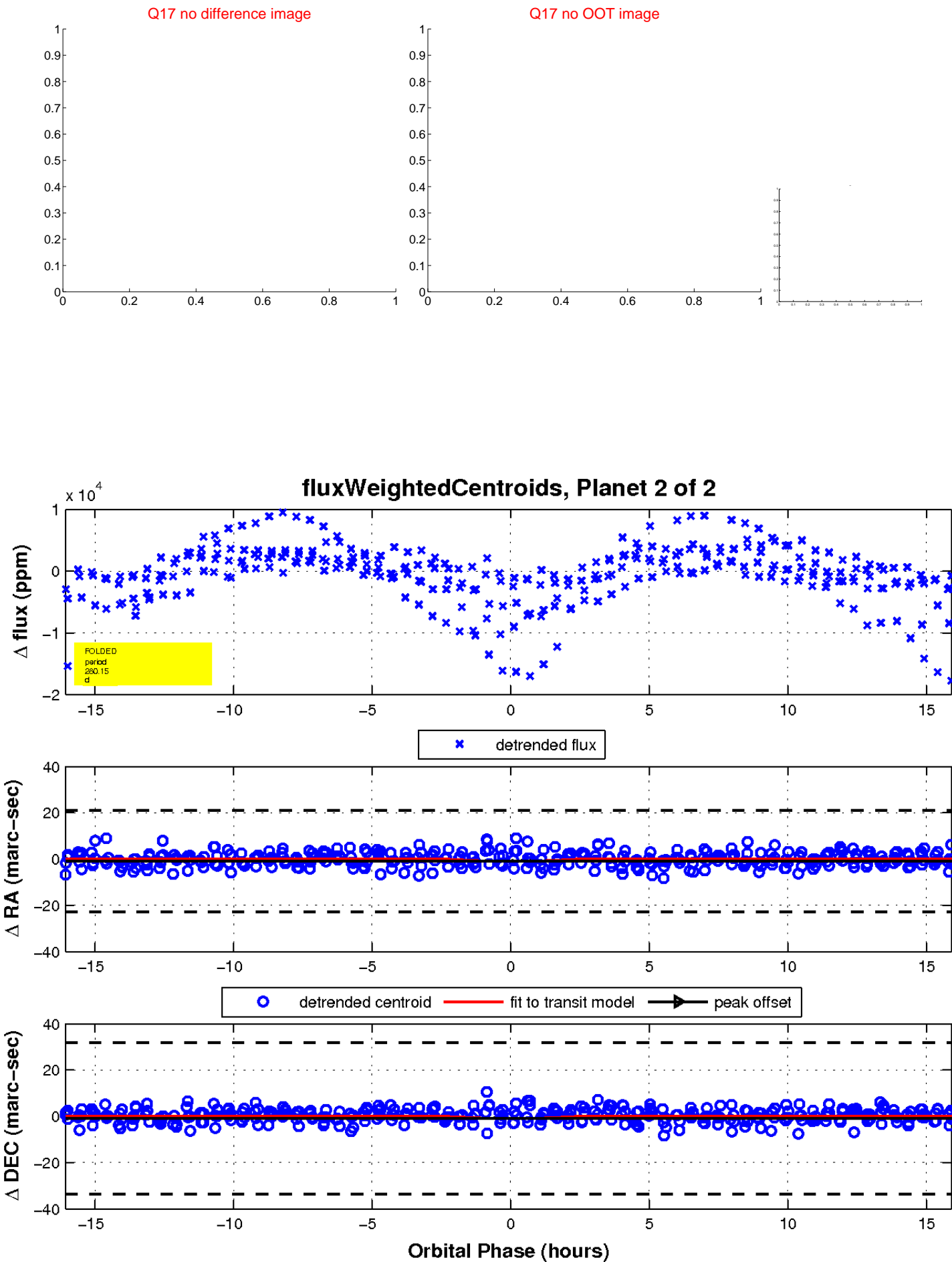
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UKIRT Image

Declination

