

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006138551-01	OBS	No	0.903264	132.276864	60.2	3.755	7.8	9.6	0.74	4987	0.58	1092.39
006138551-02	OBS	No	562.854767	235.373574	932.2	6.266	16.6	4.6	0.74	4987	2.58	0.20
006138551-03	OBS	No	530.761276	479.223857	4353.4	42.694	16.7	8.6	0.74	4987	6.18	0.22
006138551-04	OBS	No	228.013194	343.175015	1171.4	13.680	15.1	6.7	0.74	4987	5.12	0.69
006138551-05	OBS	No	464.265857	586.087268	1073.6	6.635	13.9	7.7	0.74	4987	2.51	0.27
006138551-06	OBS	No	576.302885	273.589413	1404.5	14.591	12.2	7.4	0.74	4987	3.24	0.20
006138551-07	OBS	No	207.671057	239.280791	614.0	3.898	11.6	4.3	0.74	4987	2.13	0.78
006138551-08	OBS	No	405.523905	211.416753	1420.6	13.319	11.5	8.4	0.74	4987	3.42	0.32
006138551-09	OBS	No	278.937876	305.513027	390.8	6.513	11.0	2.9	0.74	4987	1.74	0.52
006138551-10	OBS	No	464.292287	584.958197	3505.3	46.997	9.5	5.4	0.74	4987	5.35	0.27

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006138551-01	OBS	FP	0.00	1	0	0	0	LPP_DV
006138551-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_TRACKER—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
006138551-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
006138551-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV
006138551-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
006138551-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS
006138551-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_TRACKER—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
006138551-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—INCONSISTENT_TRANS
006138551-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—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
006138551-10	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—SAME_NTL_PERIOD—CENT_FEW_DIFFS

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

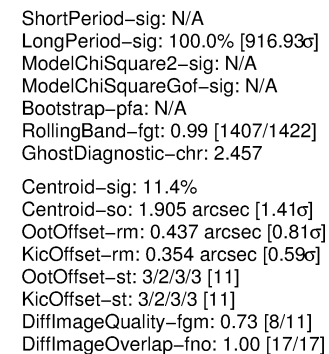
N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

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.

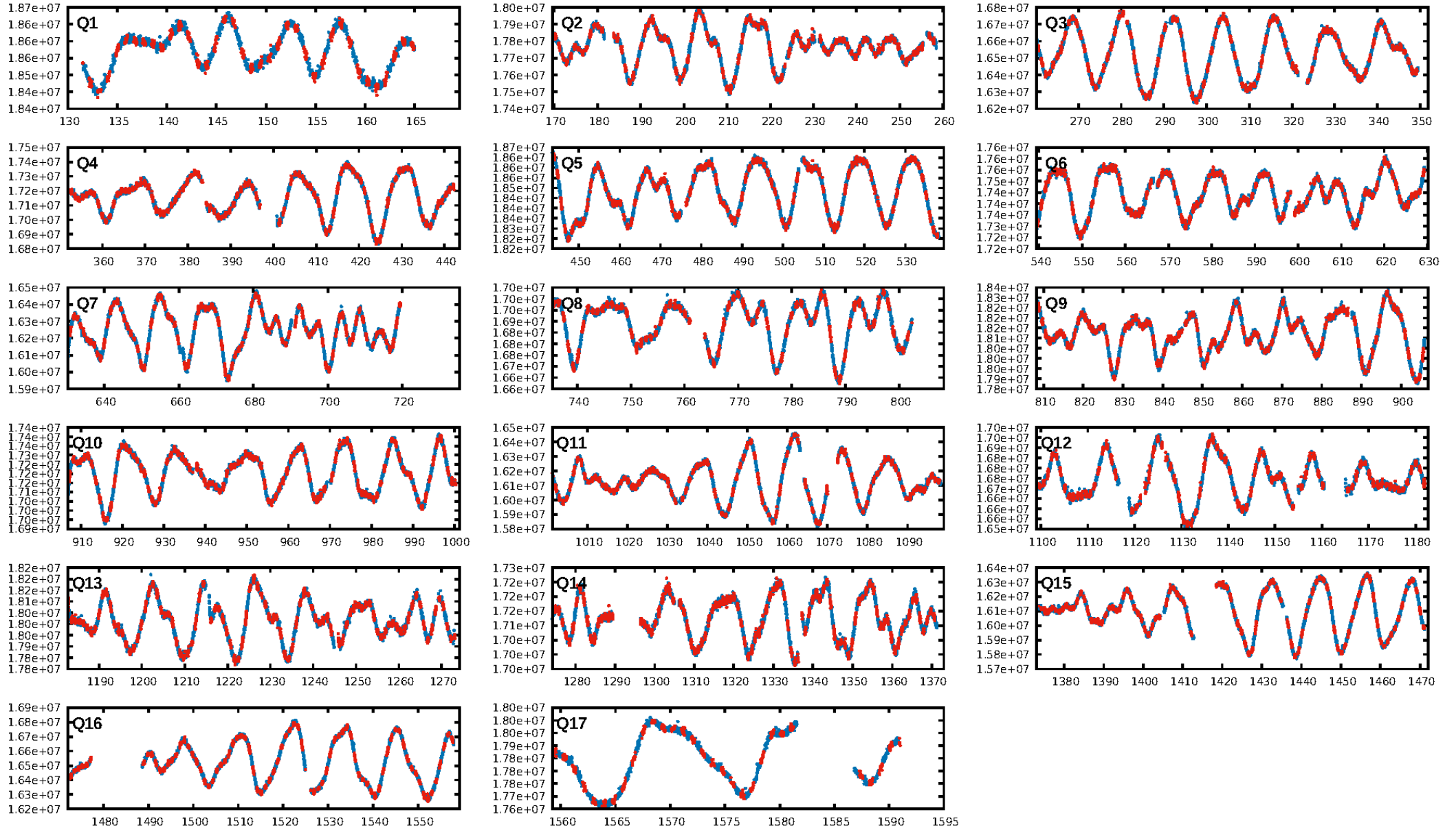
Ephemeris Match Information For 006138551-01

No Significant Match Found

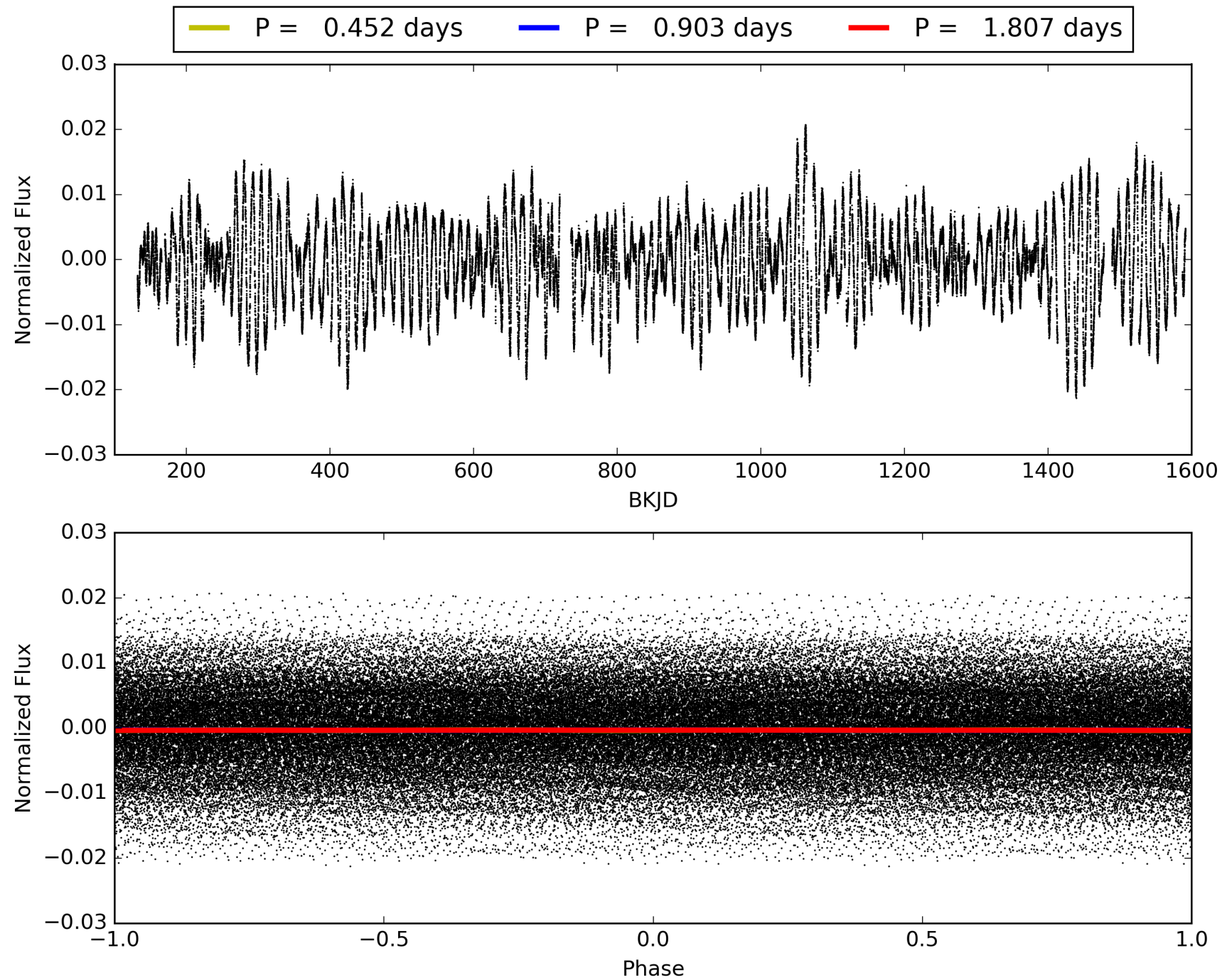
## KIC: 6138551    Candidate: 1 of 10    Period: 0.903 d



# TCE 006138551-01, PDC Light Curves



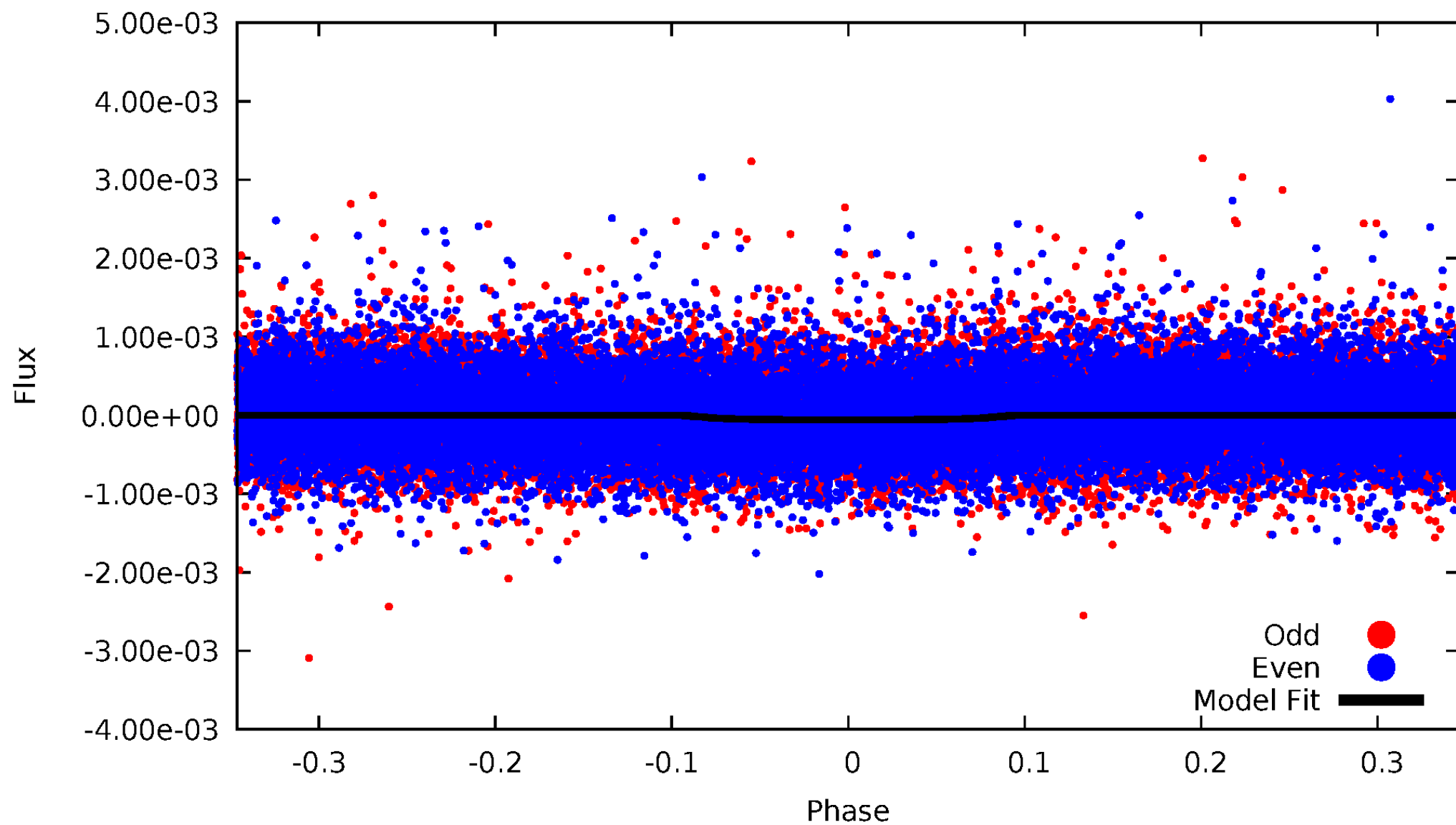
TCE 006138551-01





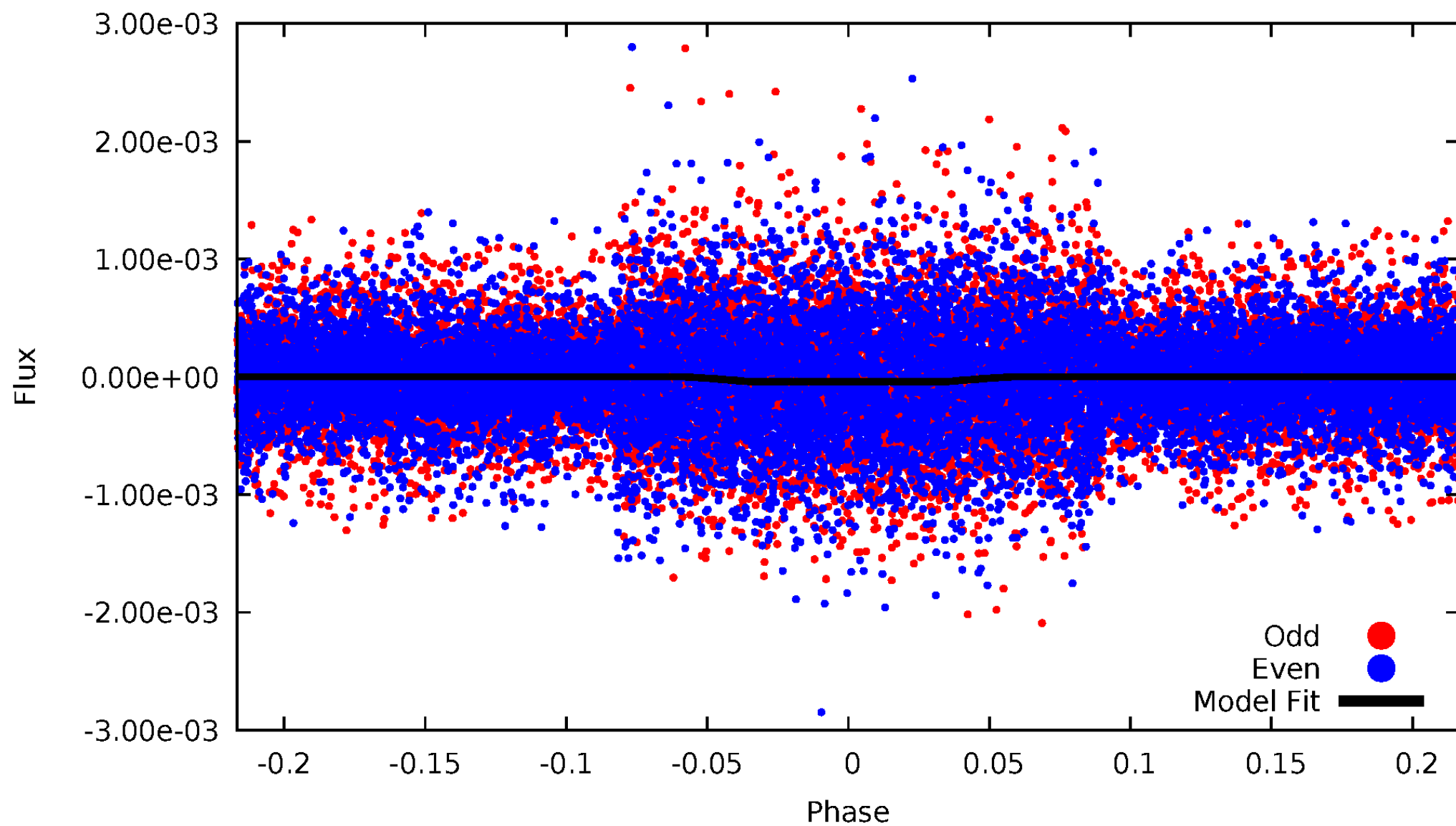
# DV Odd/Even

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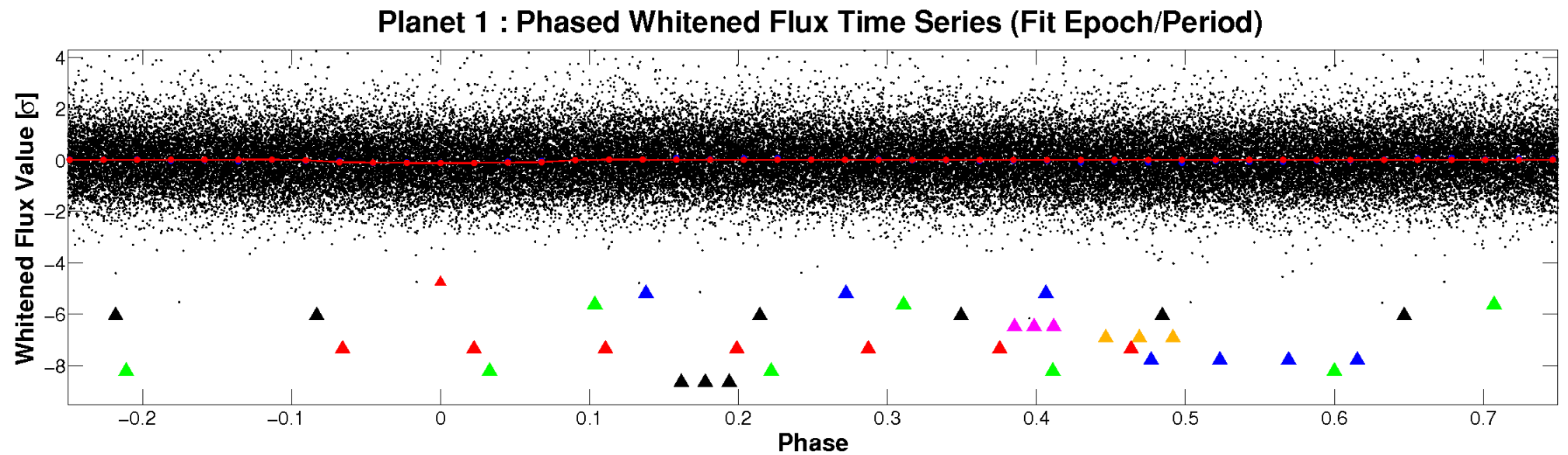
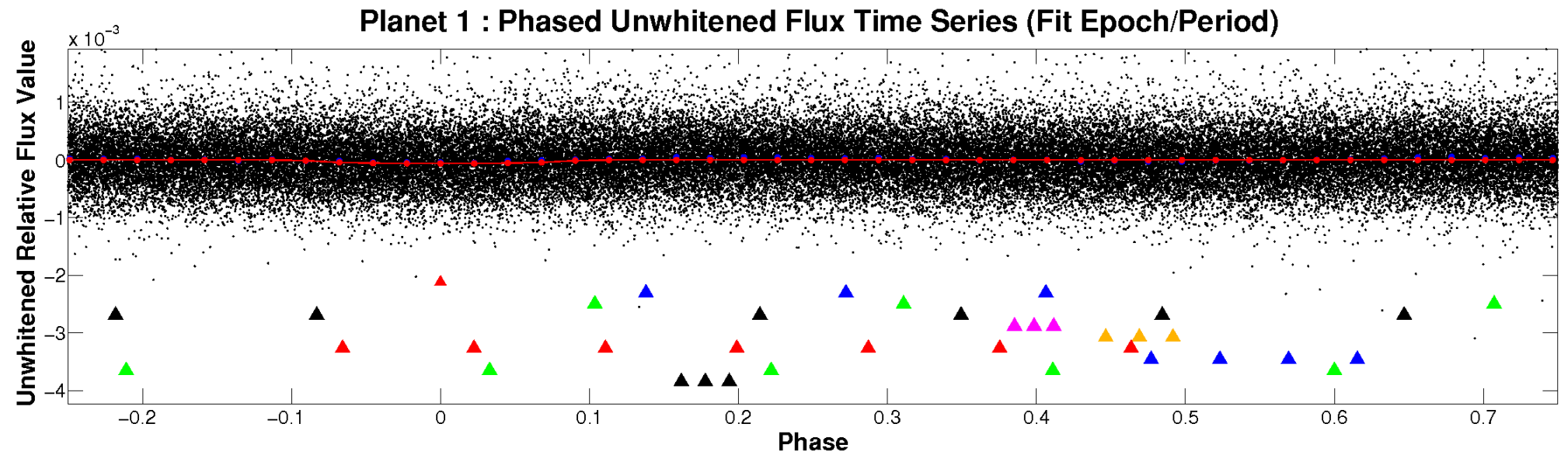


# ALT Odd/Even

TCE 006138551-01

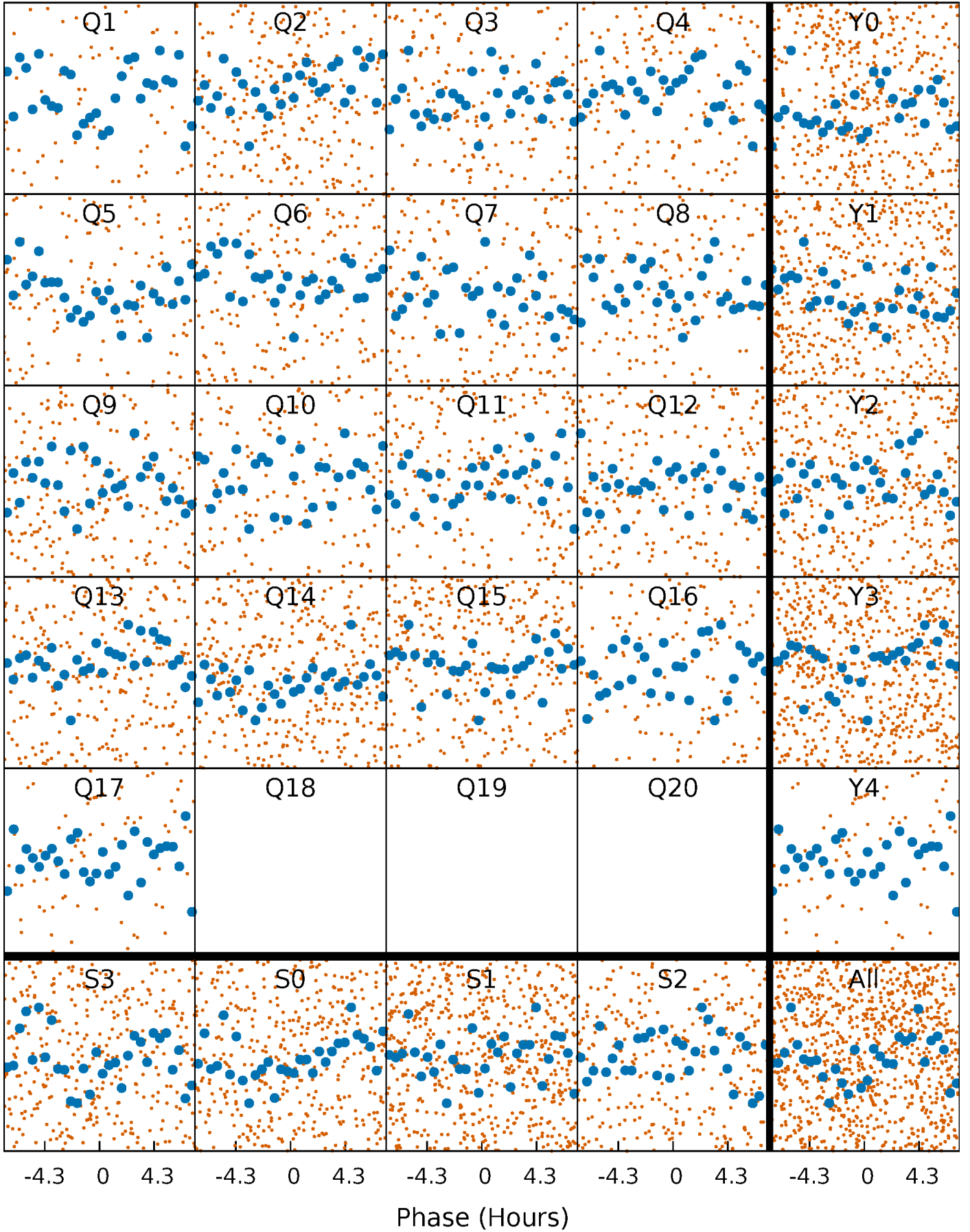


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

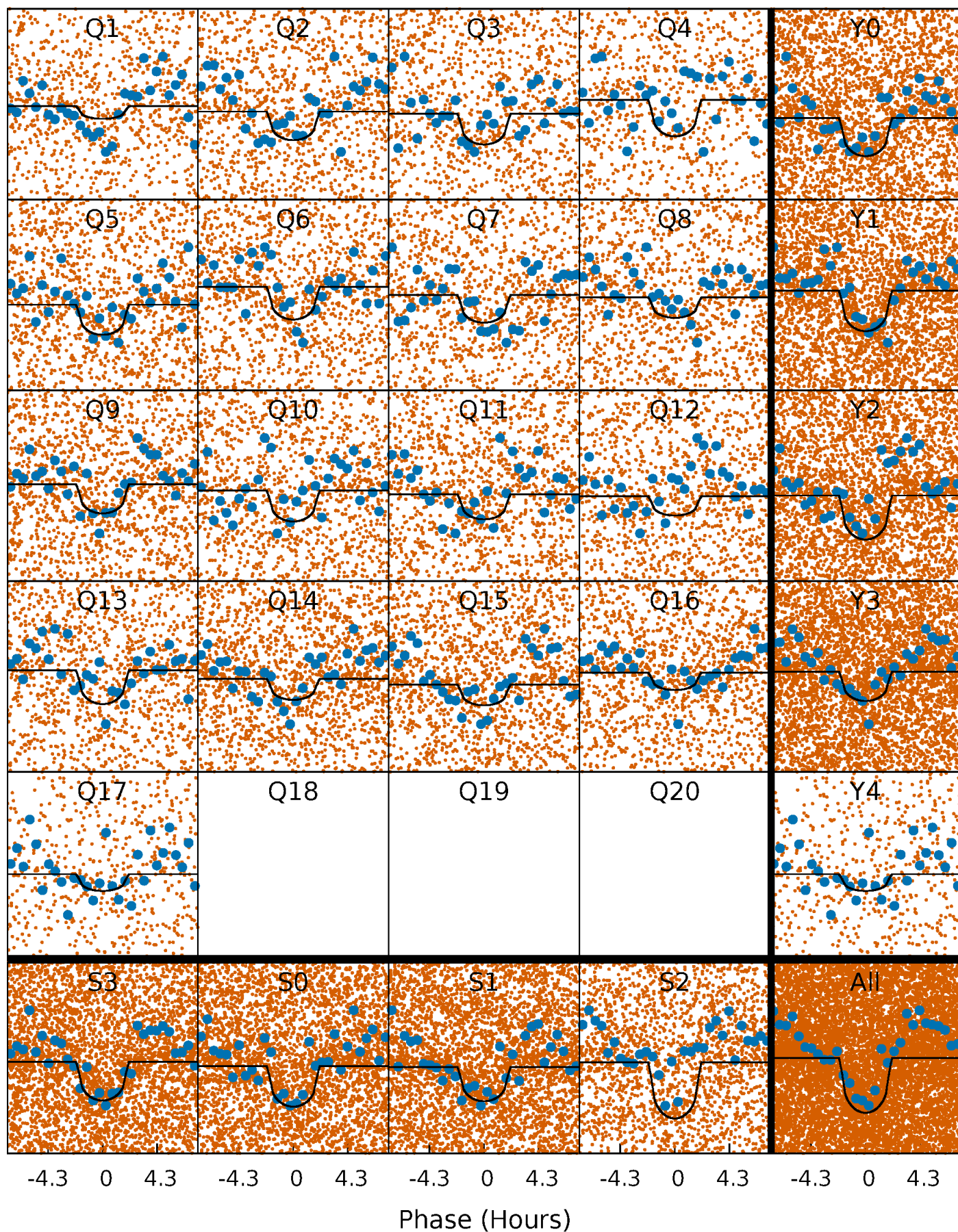
TCE 006138551-01   P= 0.903264 Days    $T_0=132.276864$  (BKJD)





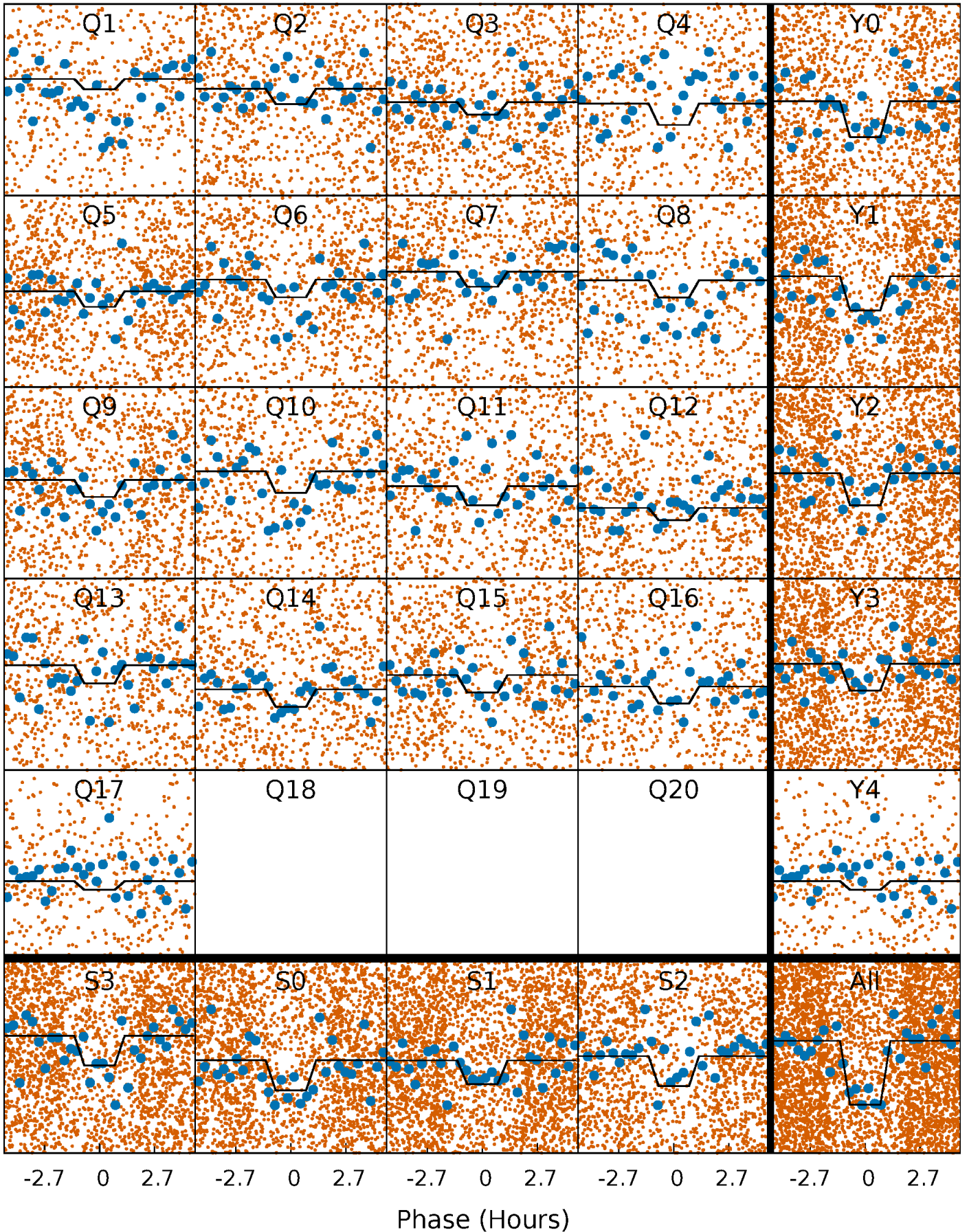
# DV Quarter-Phased Transit Curves

TCE 006138551-01   P= 0.903264 Days    $T_0=132.276864$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 006138551-01 P= 0.903270 Days  $T_0=132.264705$  (BKJD)

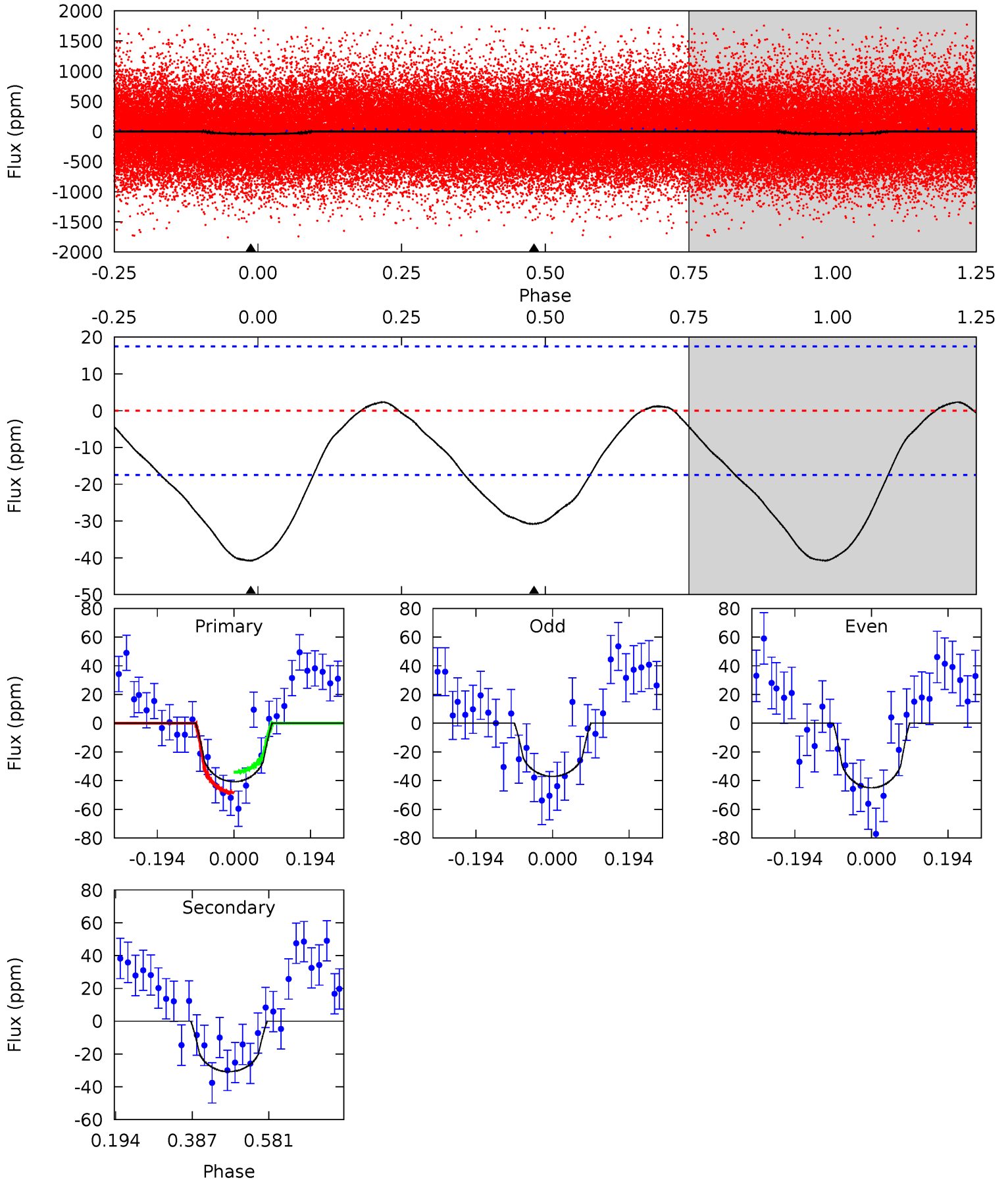




# DV Model-Shift Uniqueness Test

006138551-01, P = 0.903264 Days, E = 131.373600 Days

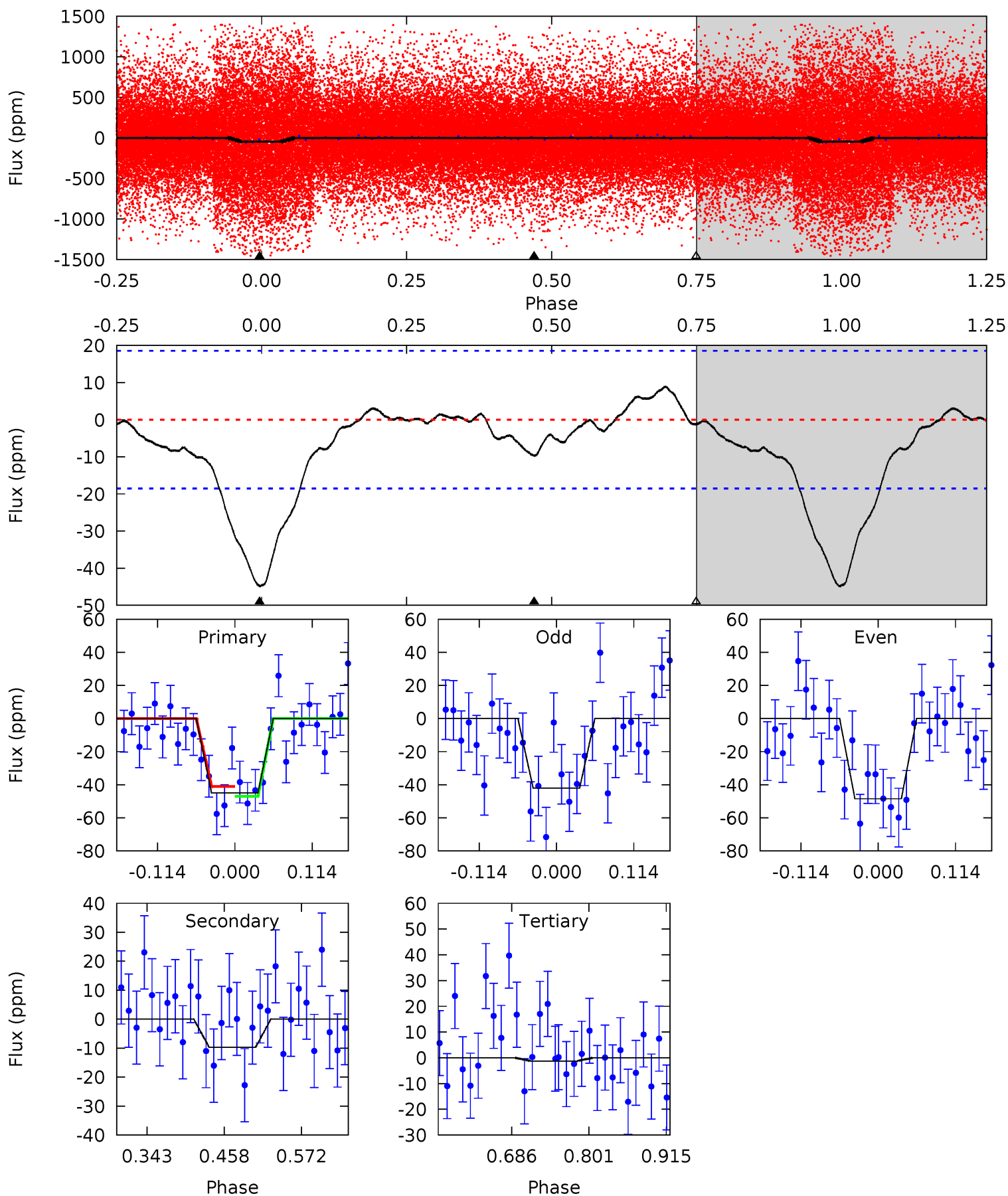
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.3	7.79	0	0	4.42	1.30	0.96	10.3	10.3	7.79	7.79	1.01	0.80	0.05	1.80



# Alt Model-Shift Uniqueness Test

006138551-01, P = 0.903270 Days, E = 131.361435 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.0	2.38	0.31	0	4.54	1.58	1.07	10.7	11.0	2.07	2.38	0.79	1.05	0.17	0.72





### Stellar Parameters For KIC 006138551

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4987^{+151}_{-136}$	$4.579^{+0.045}_{-0.050}$	$-0.100^{+0.300}_{-0.300}$	$0.741^{+0.071}_{-0.065}$	$0.760^{+0.078}_{-0.064}$	$2.633^{+0.538}_{-0.491}$
	+3%/-3%	+1%/-1%	+300%/-300%	+10%/-9%	+10%/-8%	+20%/-19%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 006138551-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-31 \pm 4$	$0.63^{+0.42}_{-0.36}$	$2051^{+73}_{-65}$	$4318^{+1995}_{-735}$	$11^{+55}_{-7}$
Alt.	$-10 \pm 4$	$0.60^{+0.42}_{-0.37}$	$2052^{+70}_{-66}$	$3570^{+1614}_{-704}$	$4.103^{+23.664}_{-2.937}$

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

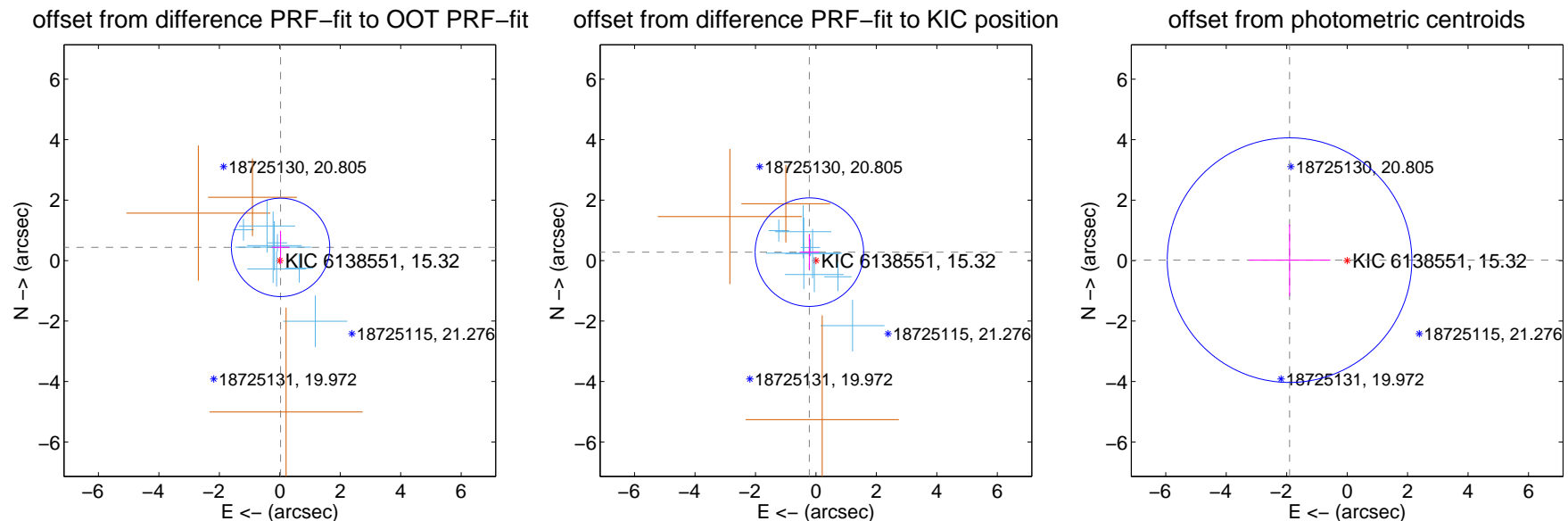
## DV Centroid Data

Supplemental centroid analysis for 006138551-01. Kepler magnitude: 15.32. Transit SNR 9.56

There are 8 quarters with good PRF difference image offsets

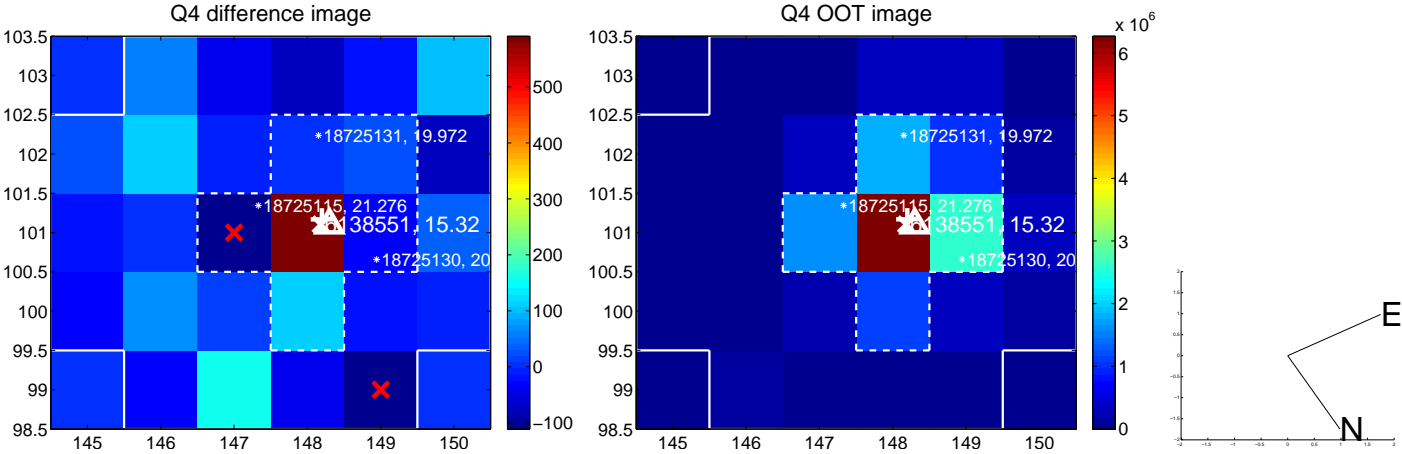
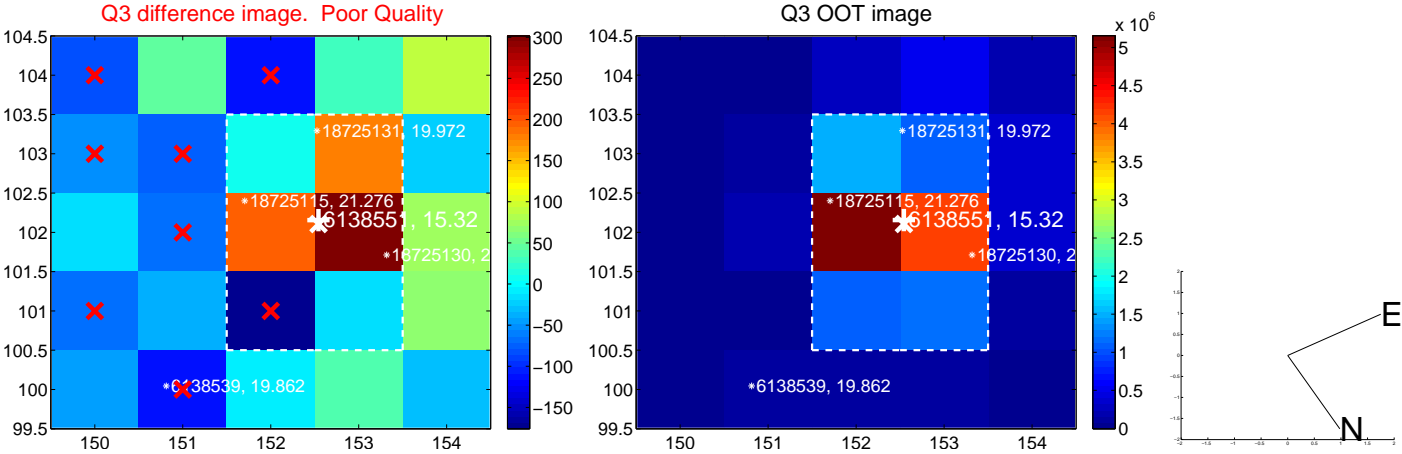
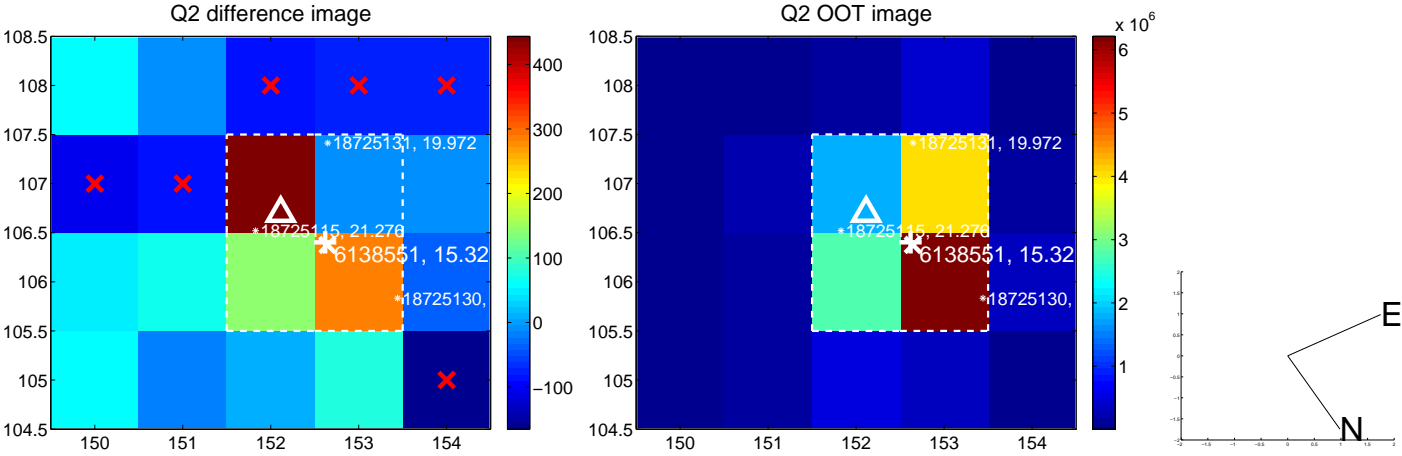
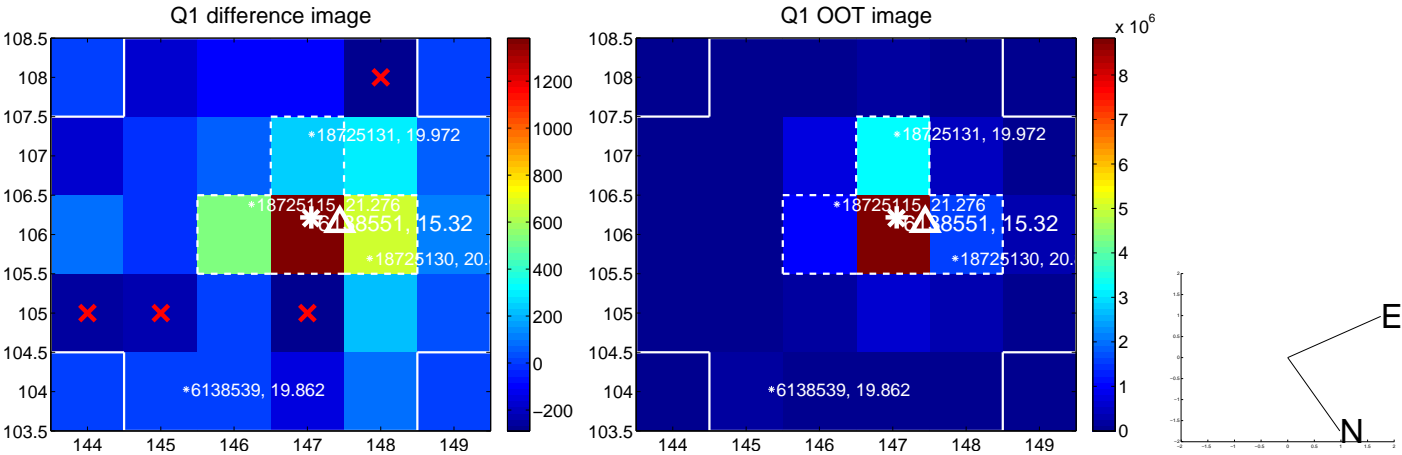
The direct PRF centroid is offset from the target star catalog position by about 0.18 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.437 \pm 0.542$	0.81	$-0.026 \pm 0.291$	$0.436 \pm 0.550$
PRF-fit source offset from KIC position	$0.354 \pm 0.598$	0.59	$0.217 \pm 0.322$	$0.279 \pm 0.582$
photometric centroid source offset	$1.91 \pm 1.35$	1.41	$1.91 \pm 1.35$	$0.01 \pm 1.18$

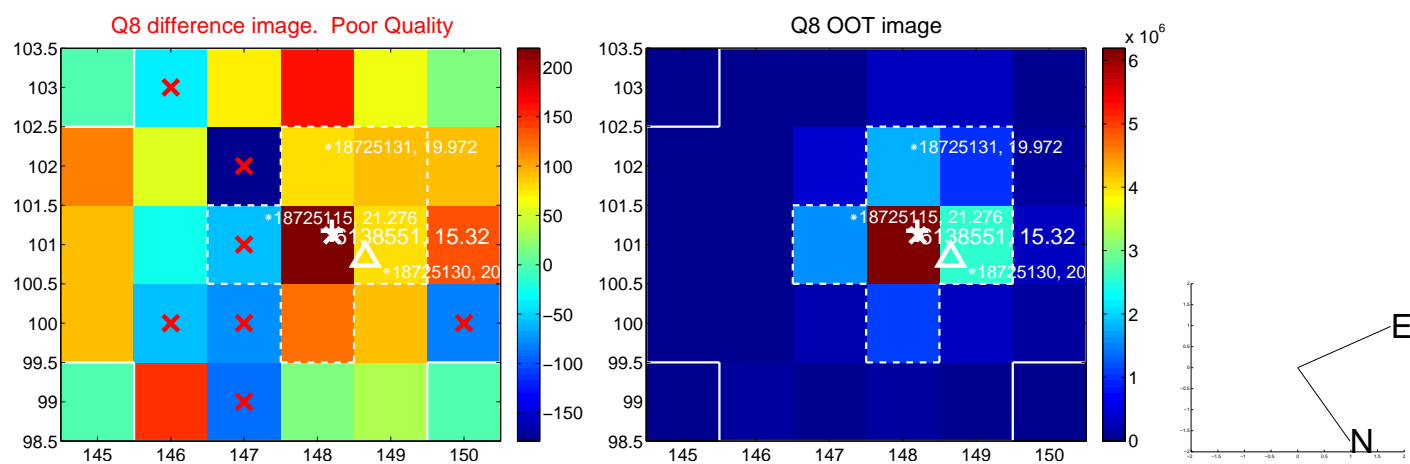
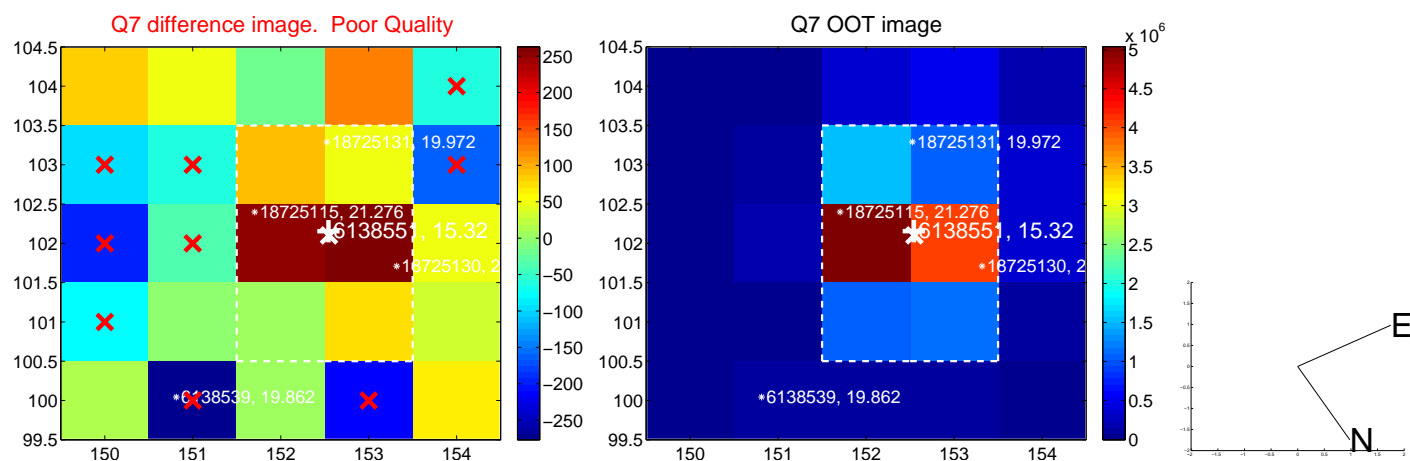
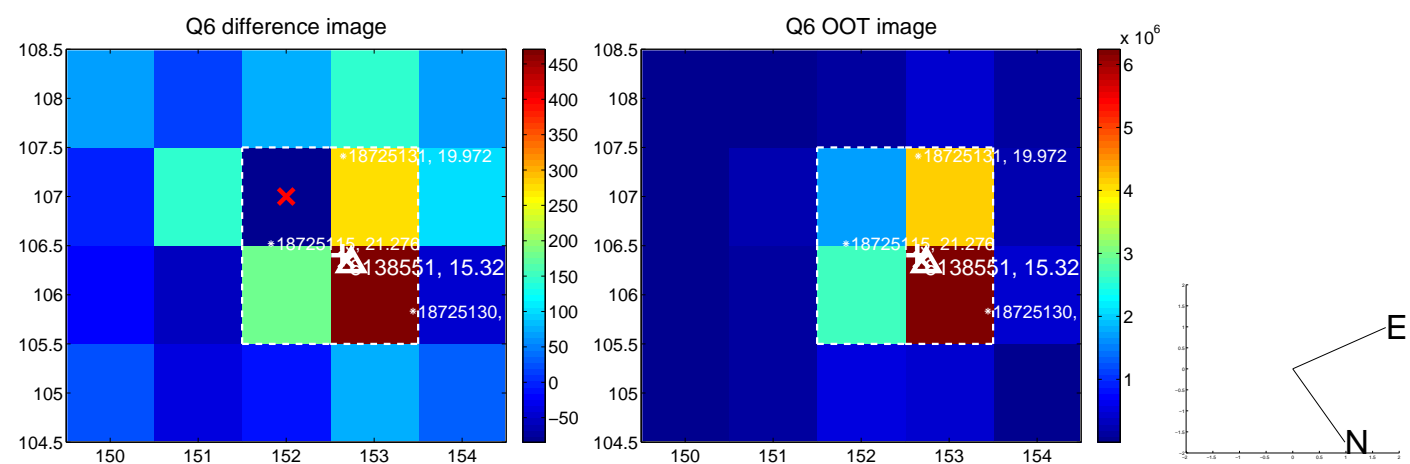
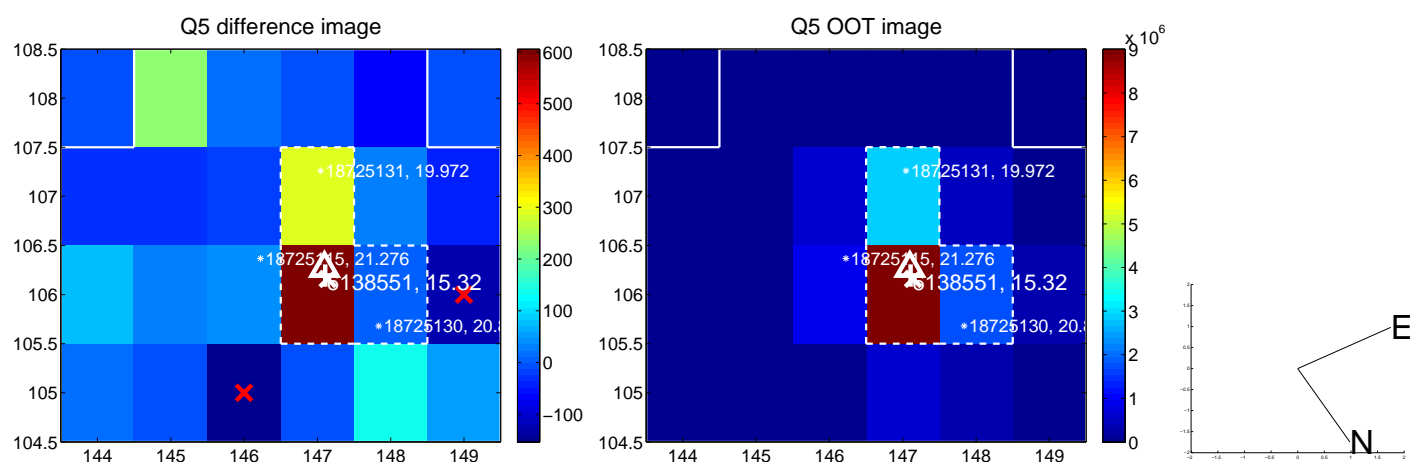


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

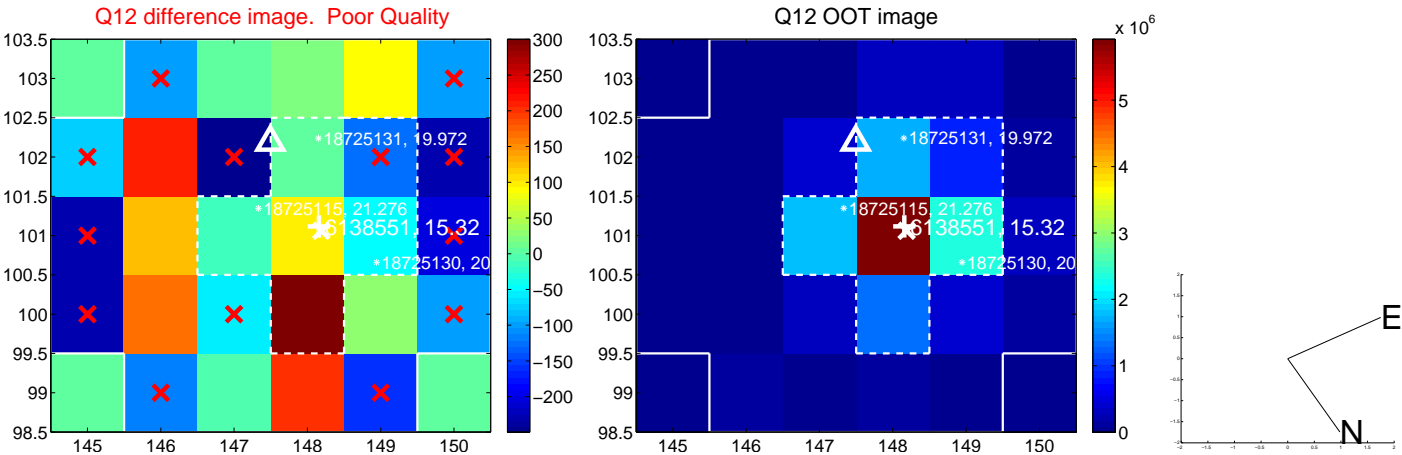
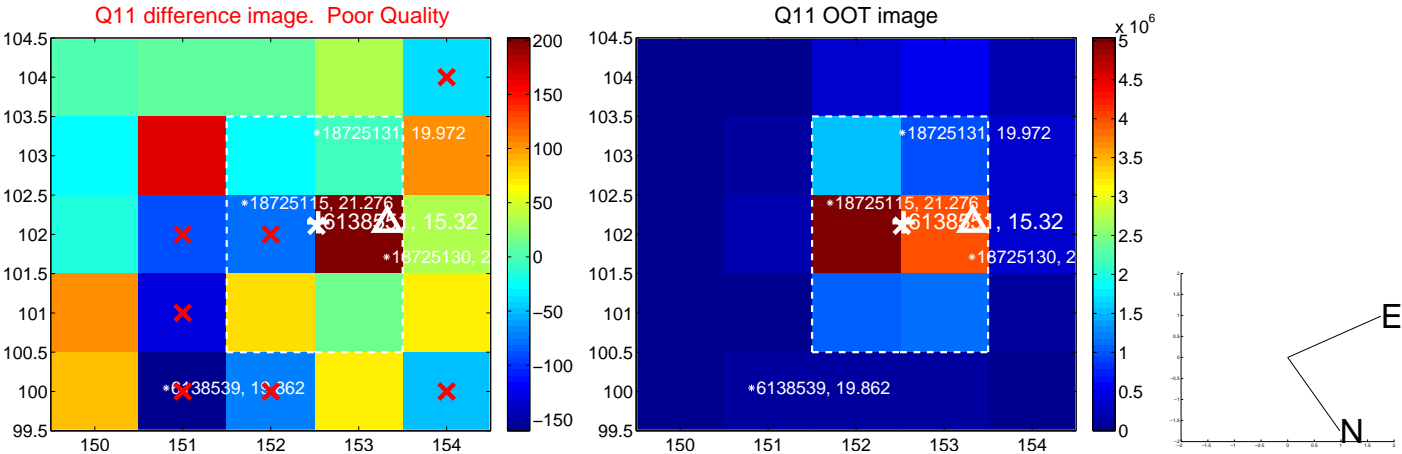
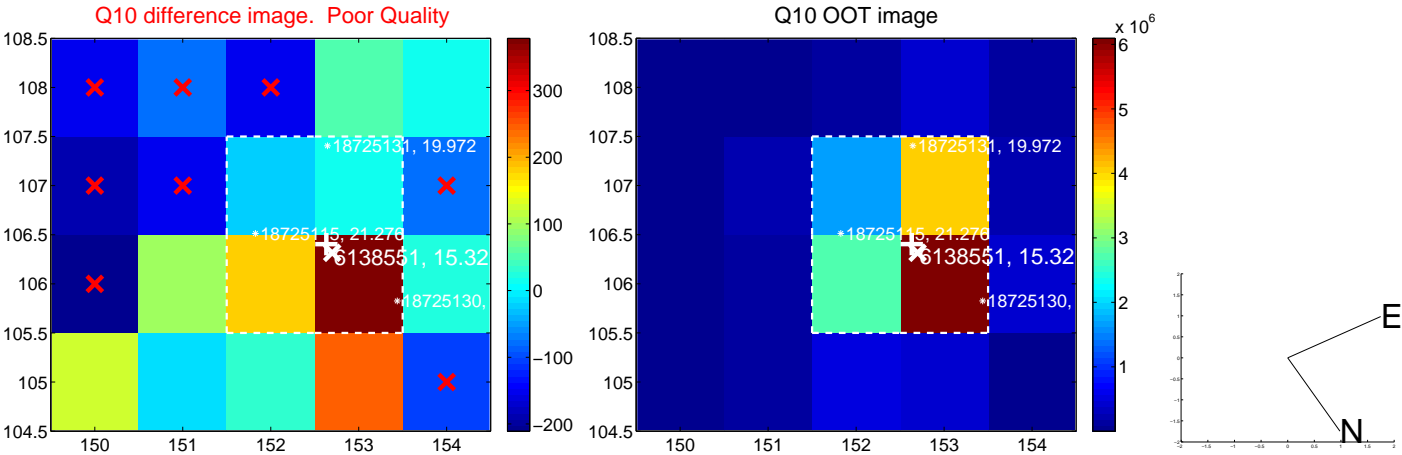
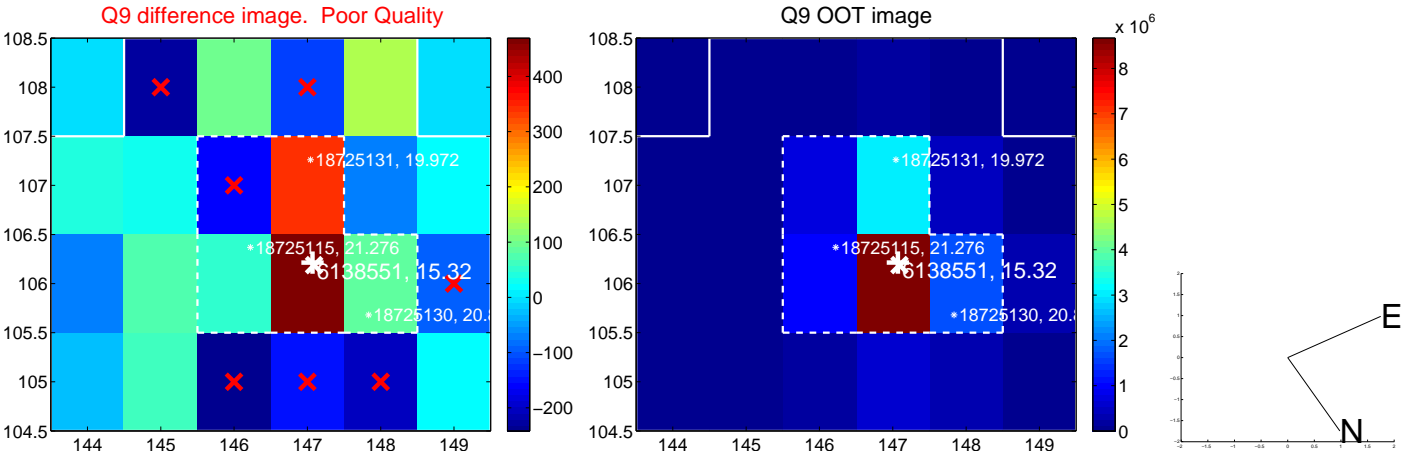


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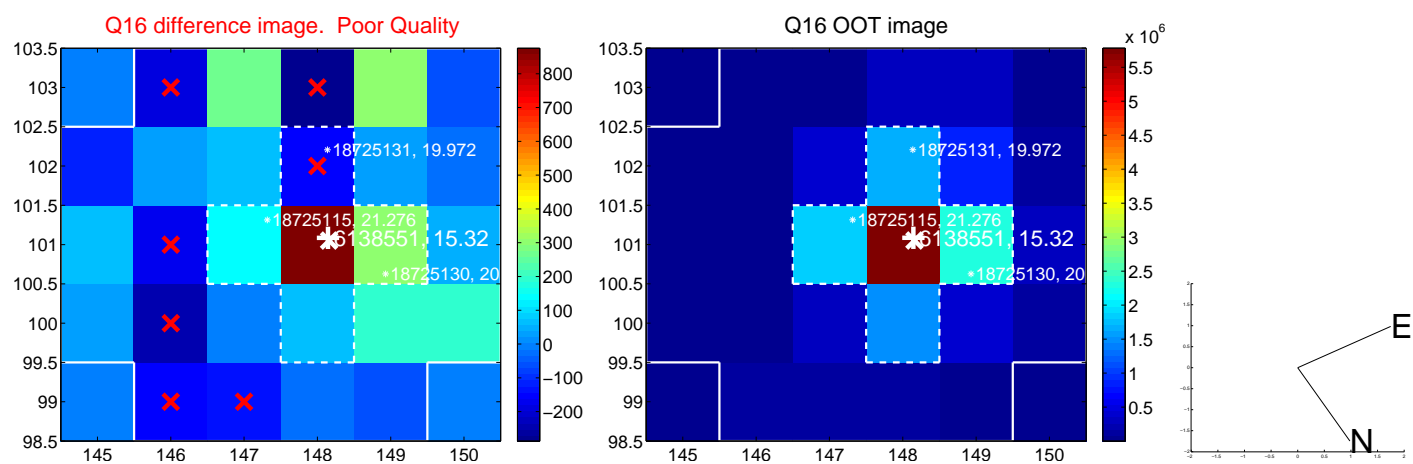
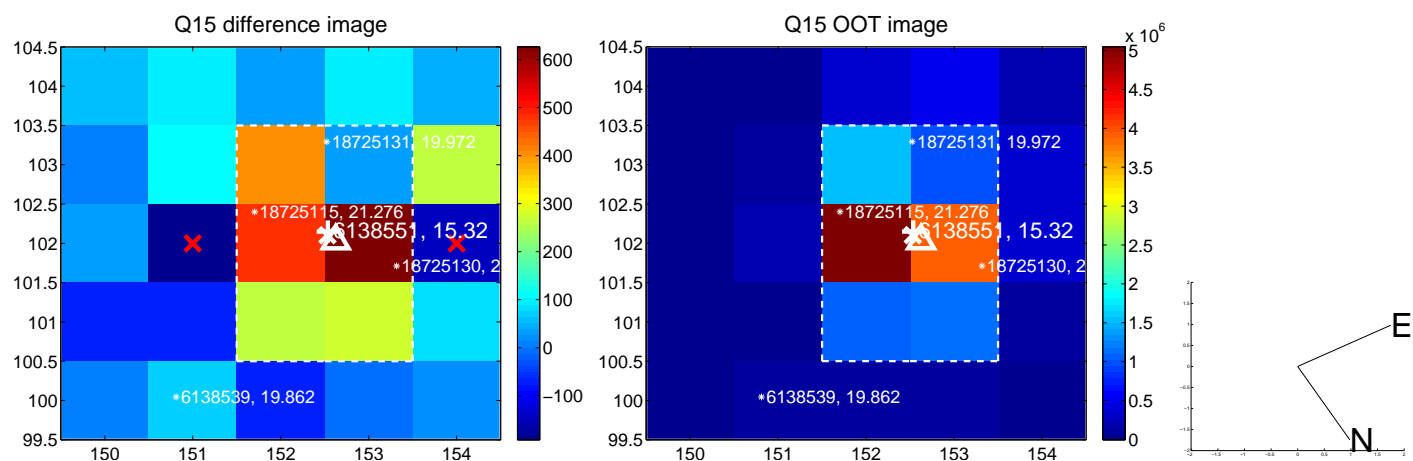
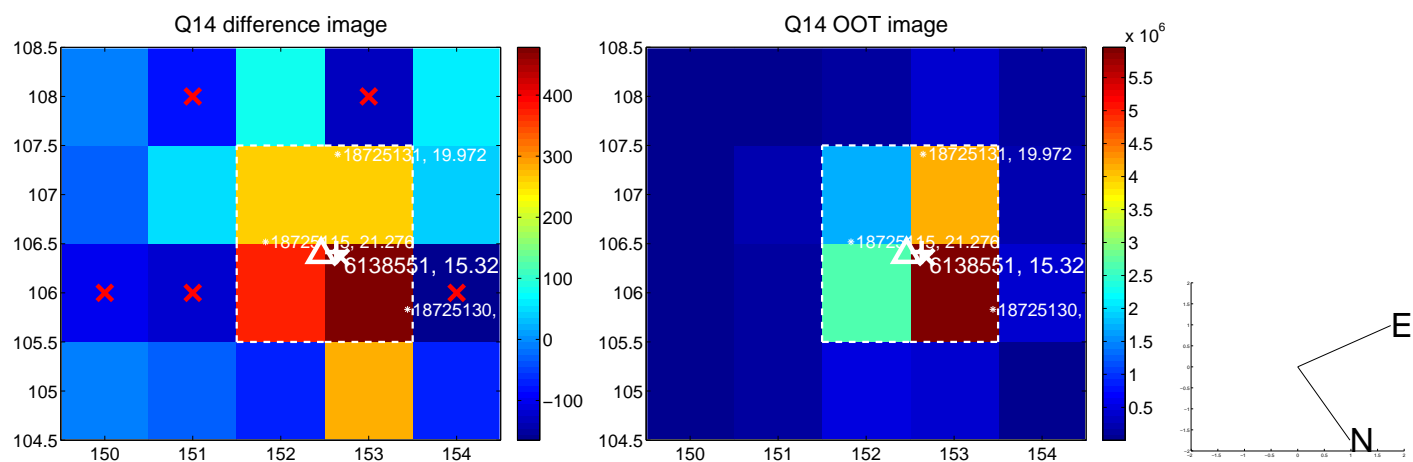
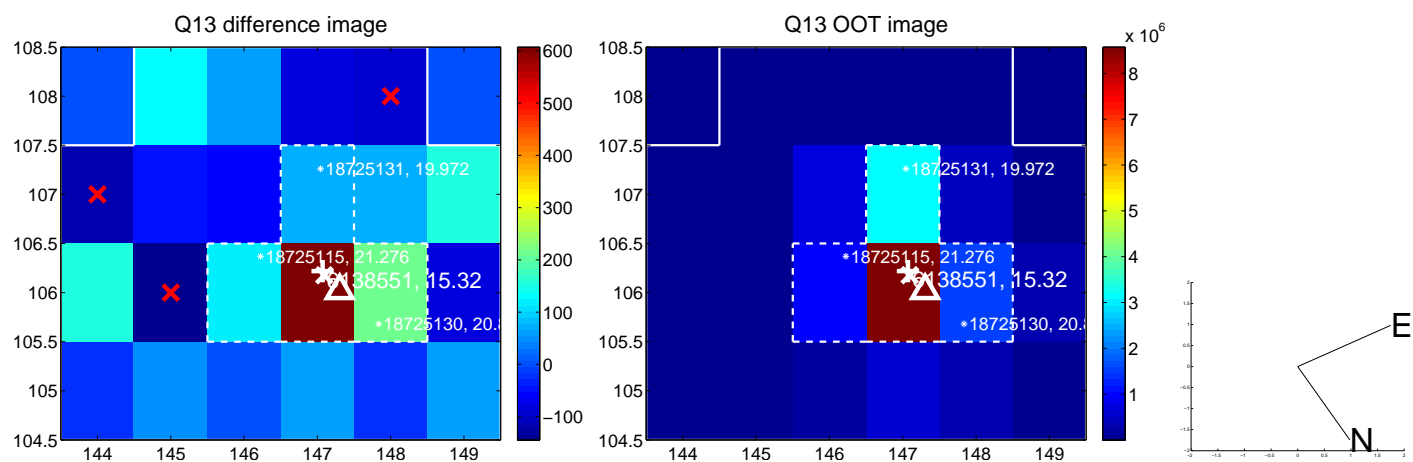




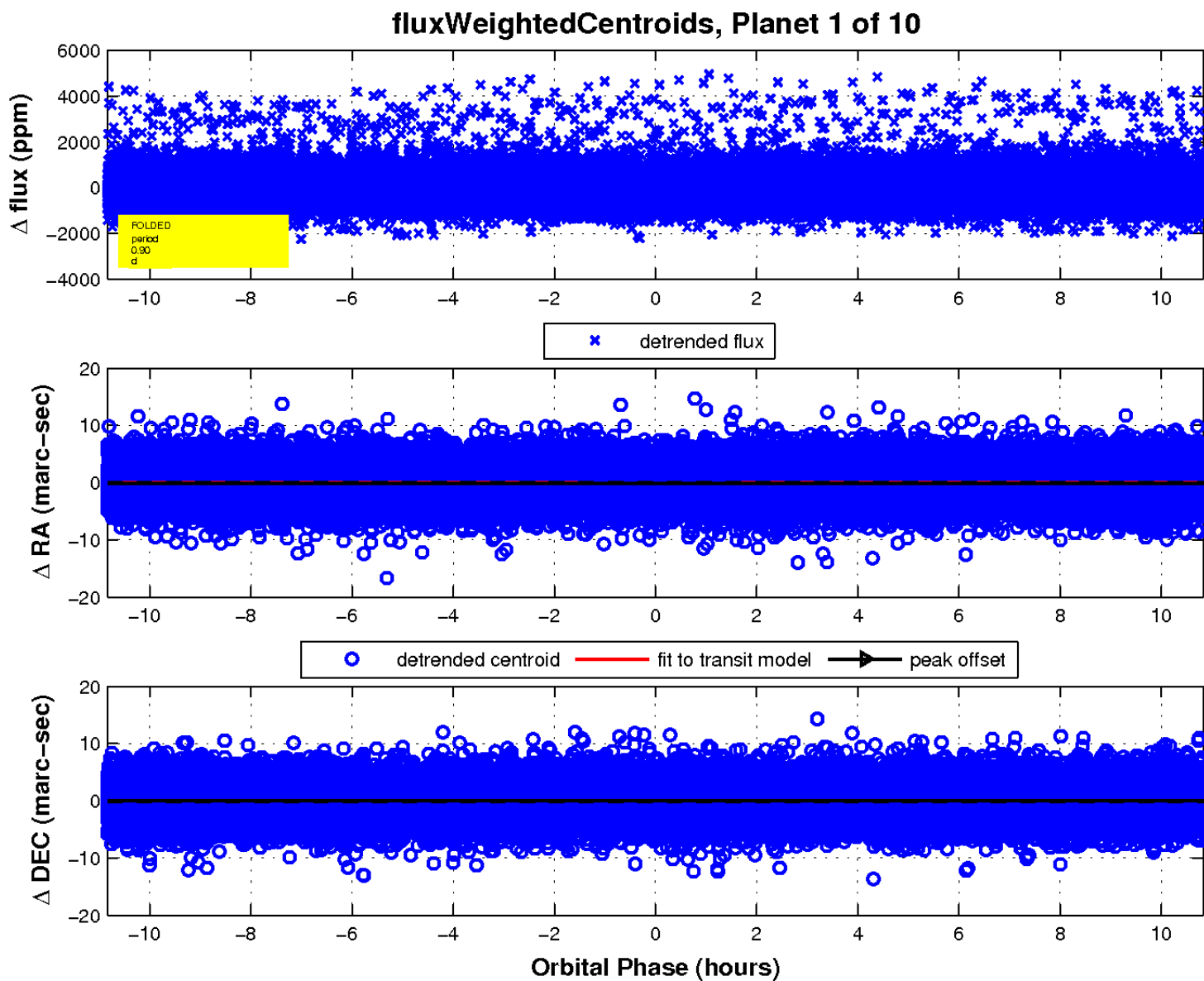
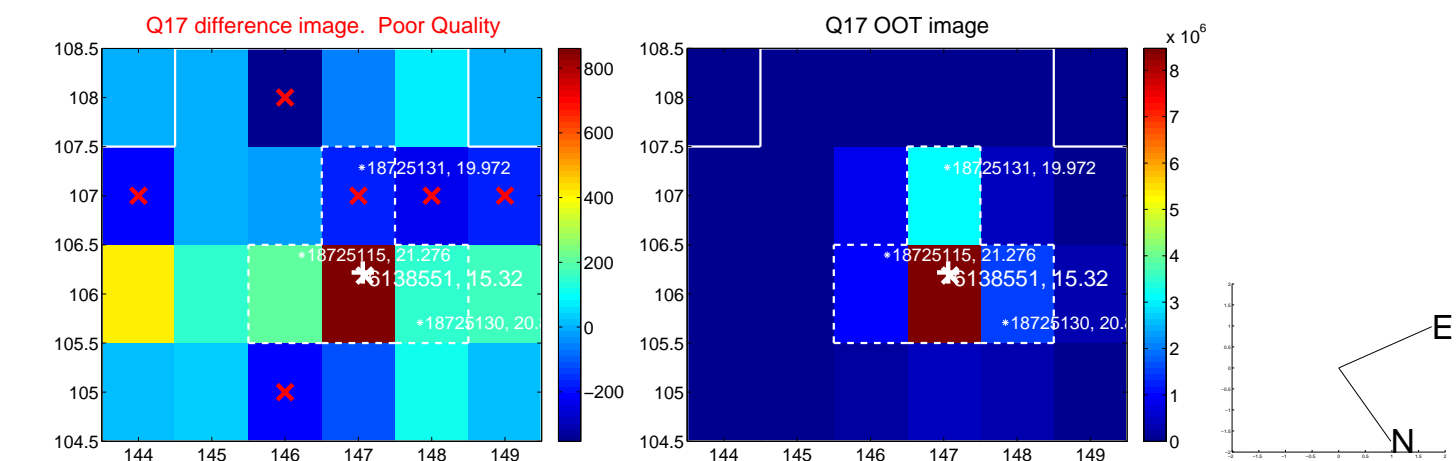
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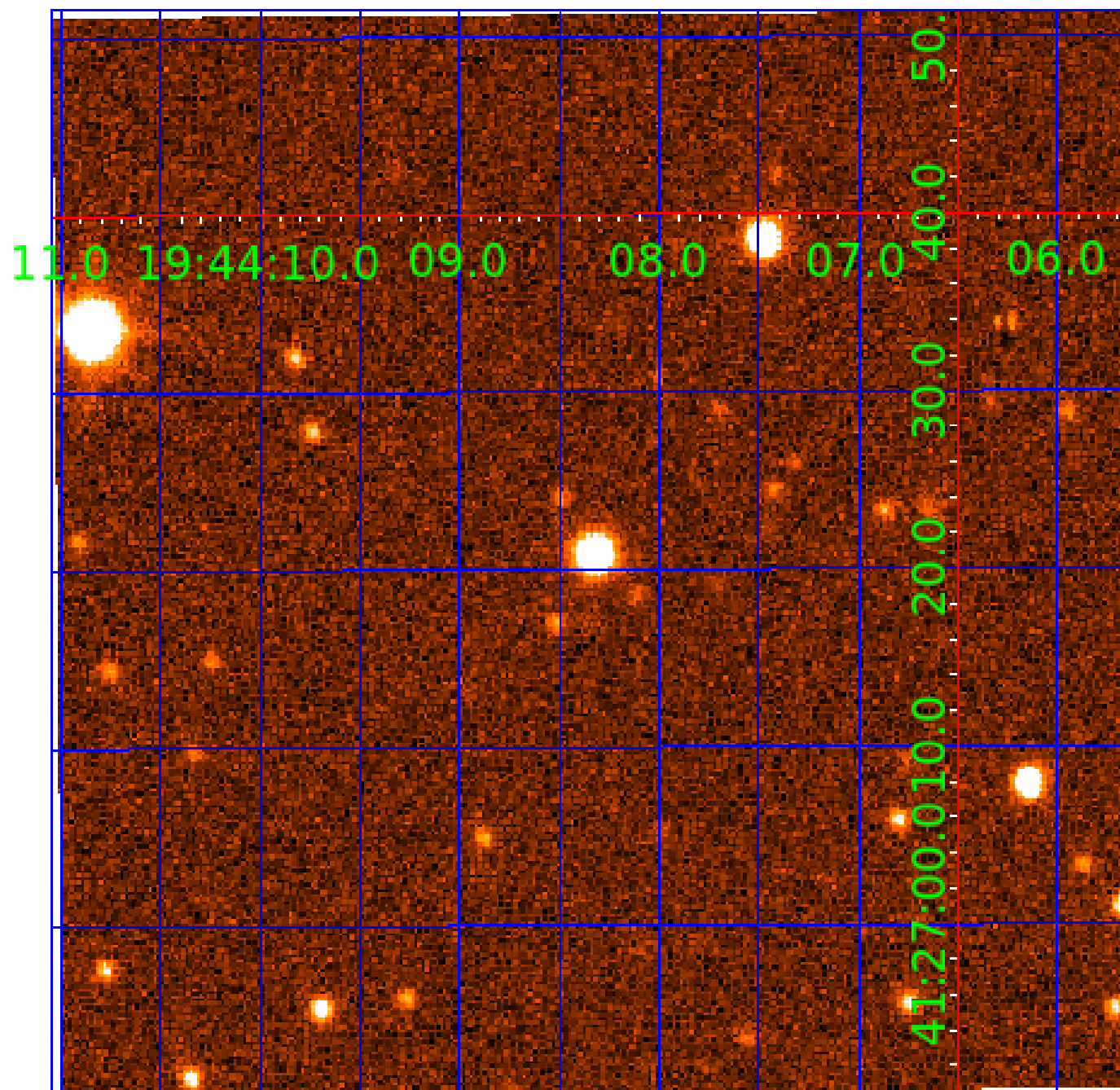


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# UKIRT Image

Declination





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006138551-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV
006138551-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
006138551-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS
006138551-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_TRACKER—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
006138551-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—INCONSISTENT_TRANS
006138551-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—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
006138551-10	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—SAME_NTL_PERIOD—CENT_FEW_DIFFS

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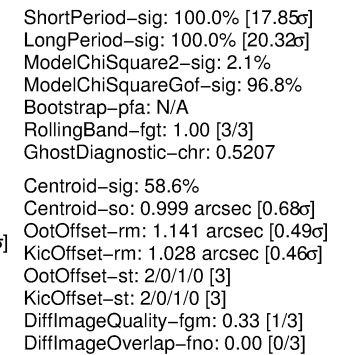
N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

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.

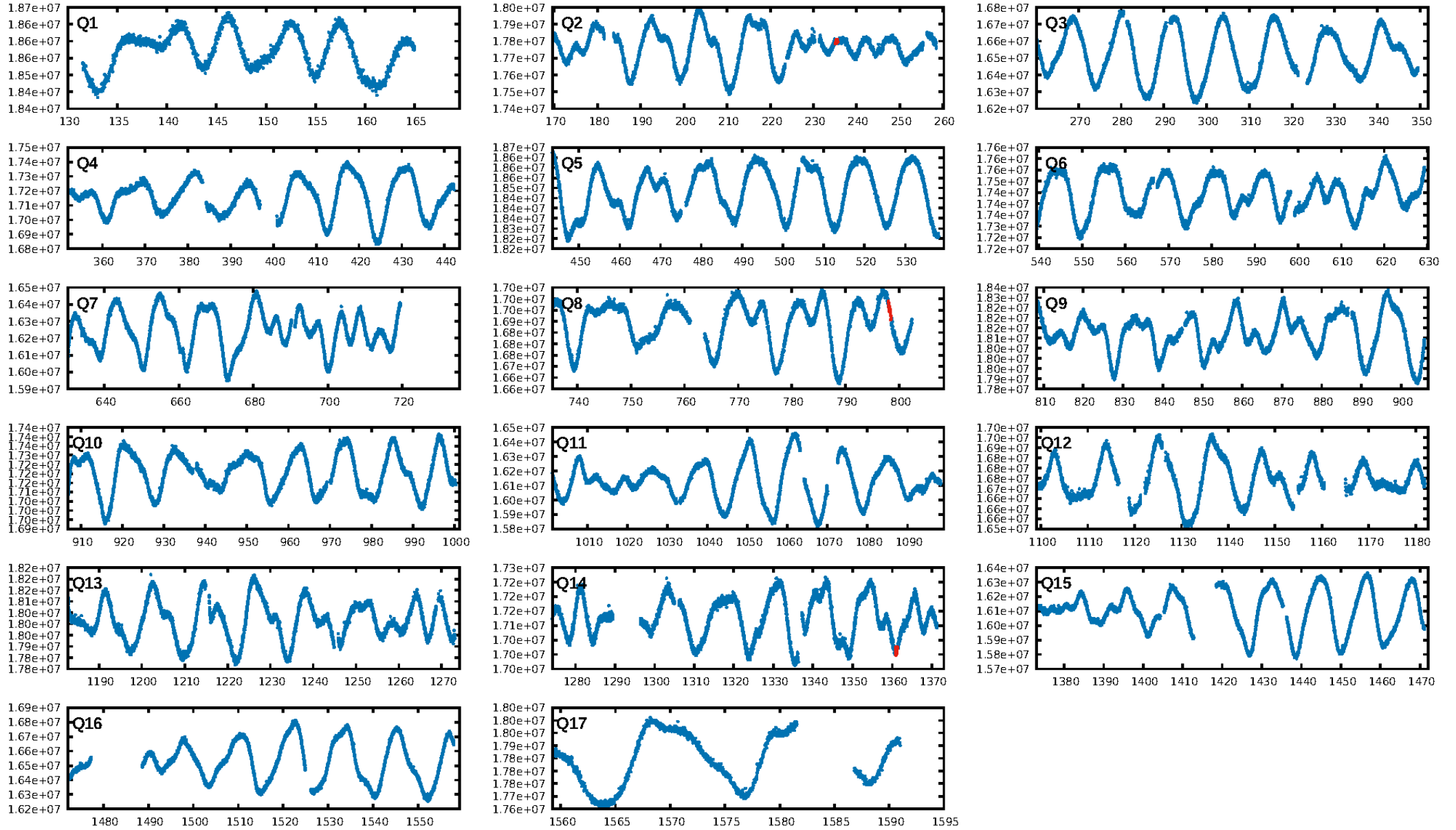
Ephemeris Match Information For 006138551-02

No Significant Match Found

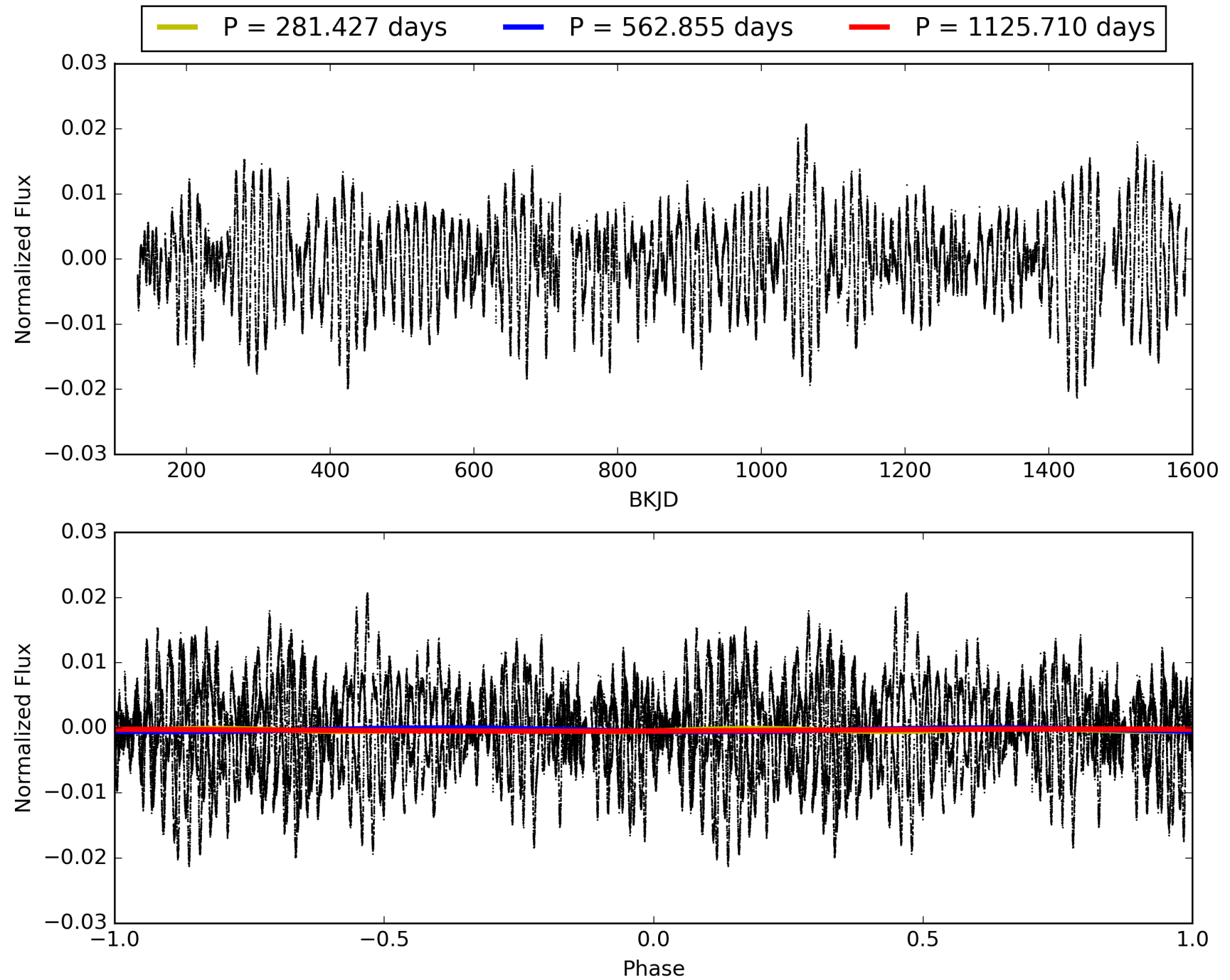
KIC: 6138551    Candidate: 2 of 10    Period: 562.855 d



# TCE 006138551-02, PDC Light Curves

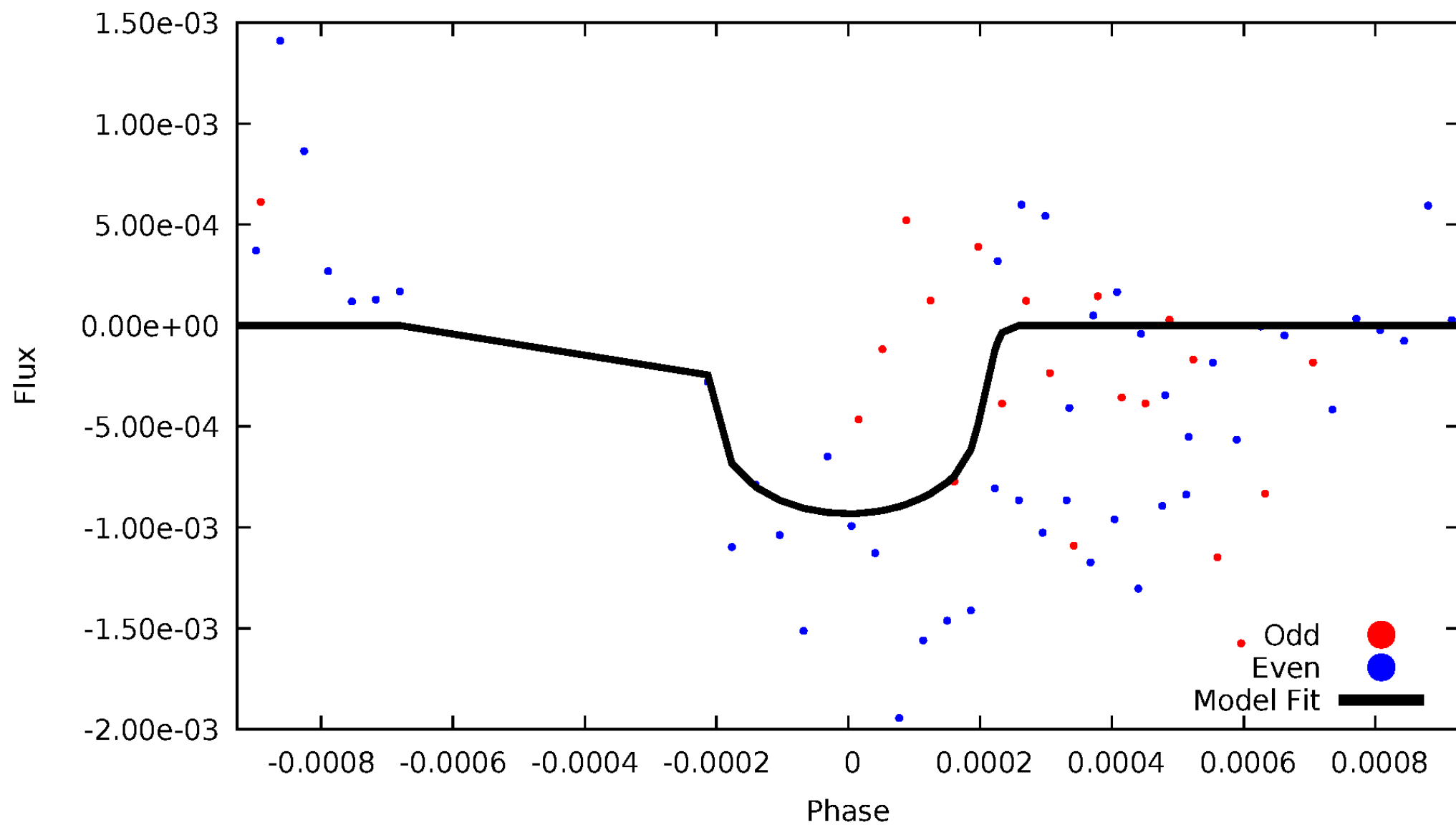


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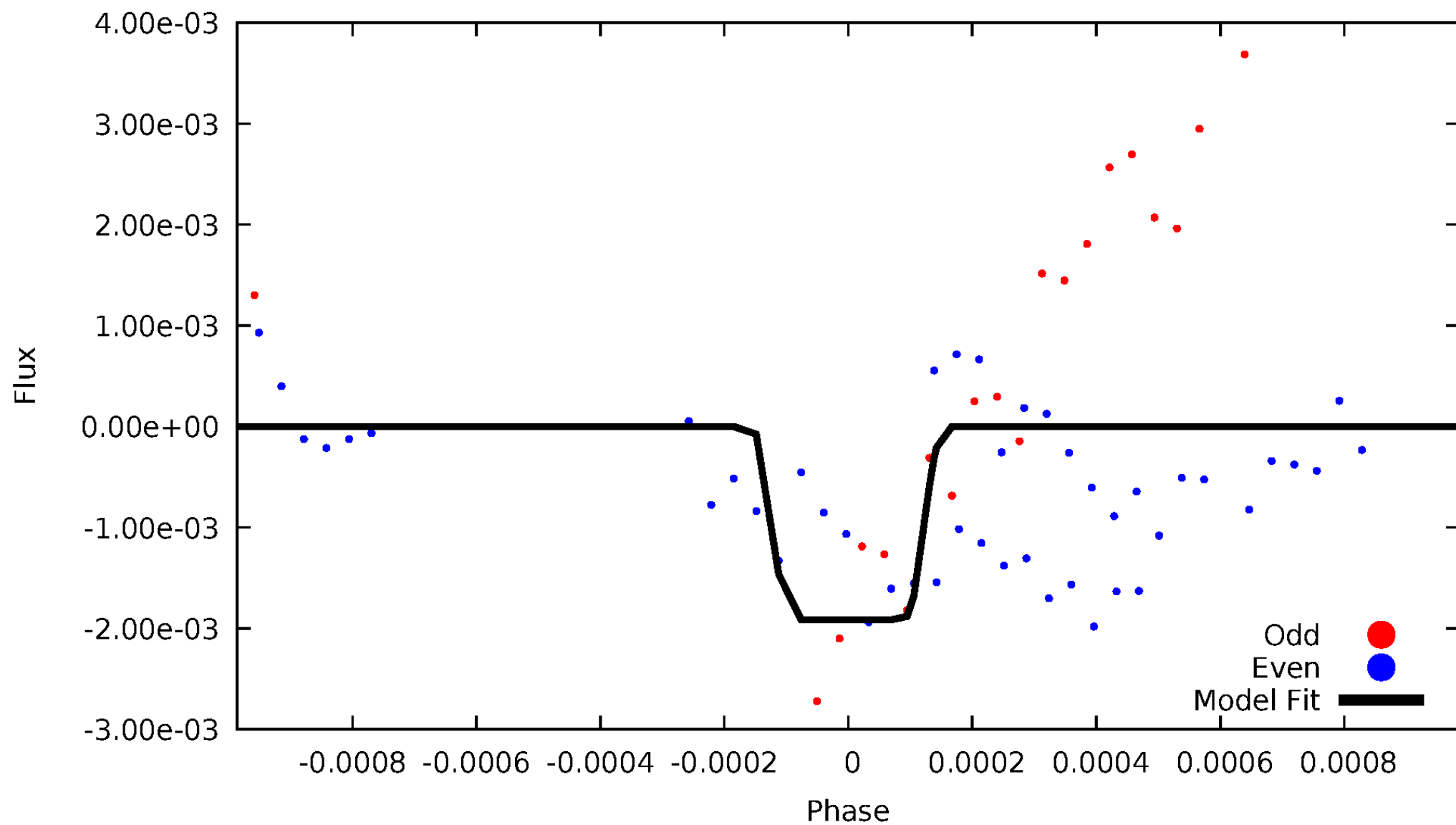
# DV Odd/Even

TCE 006138551-02



# ALT Odd/Even

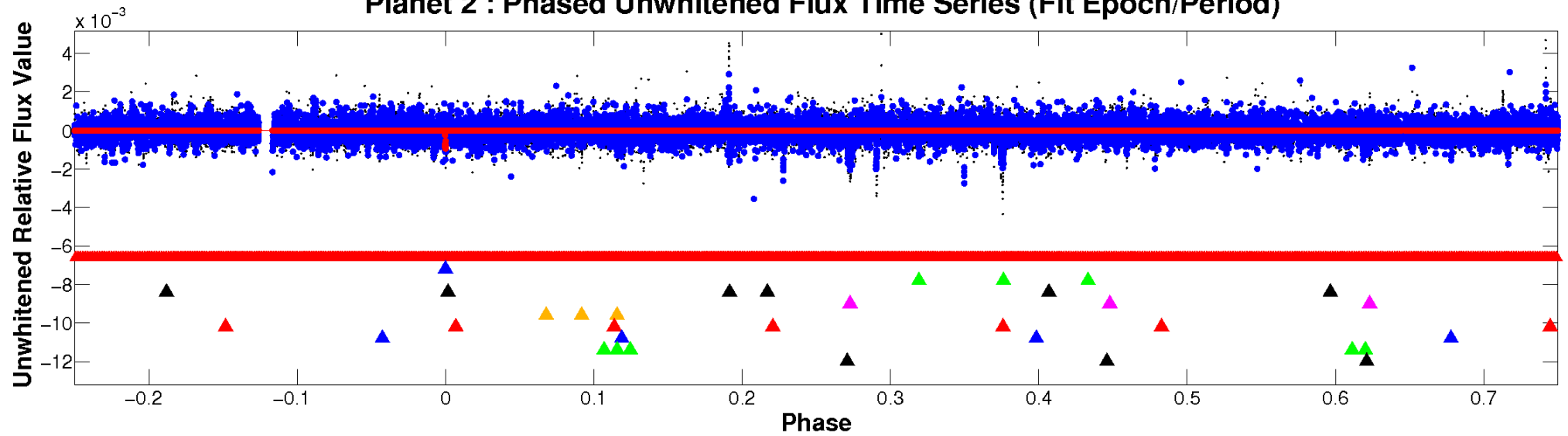
TCE 006138551-02



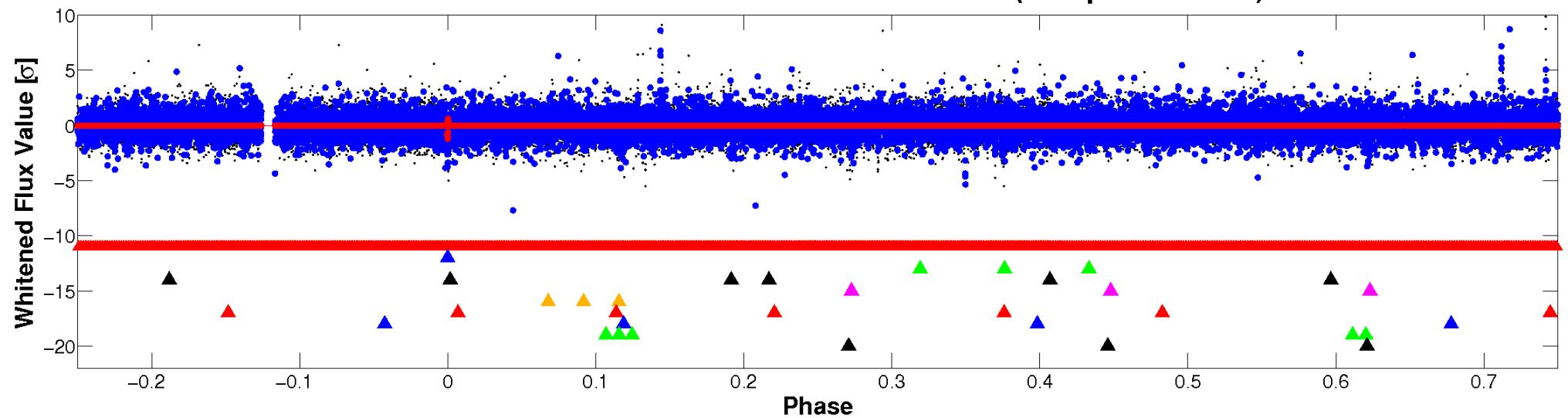


# Non-Whitened Vs. Whitened Light Curve

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

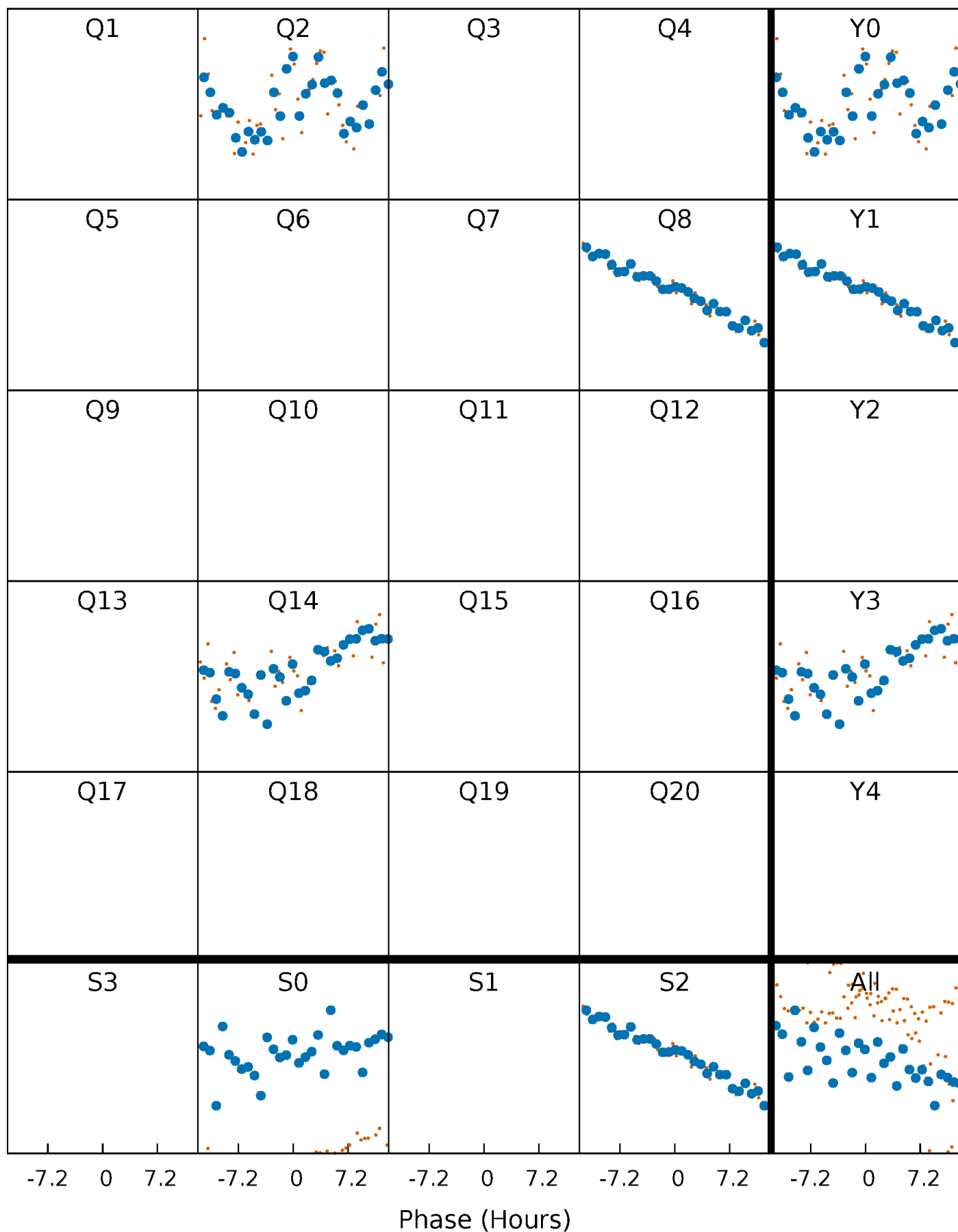


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



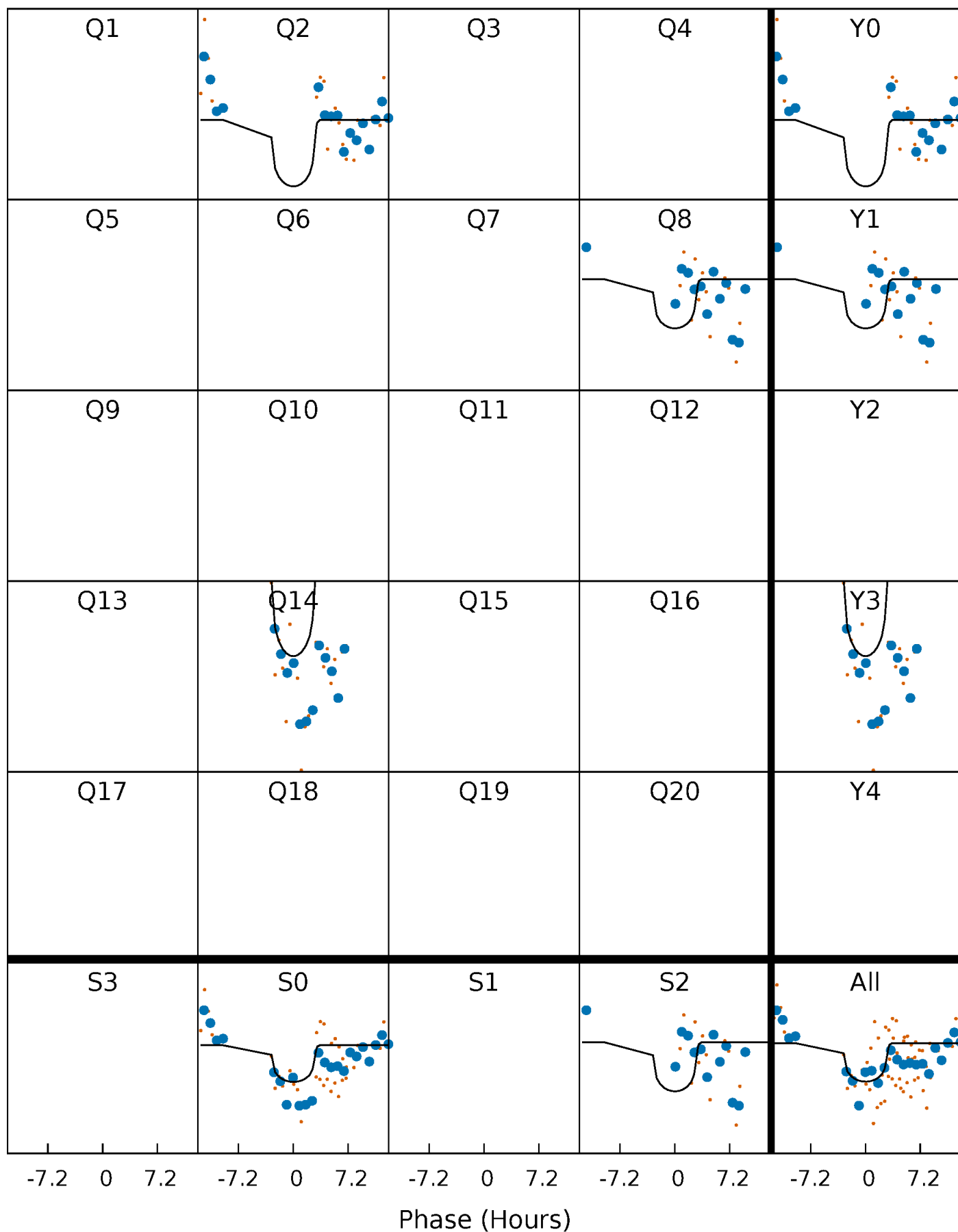
# PDC Quarter-Phased Transit Curves

TCE 006138551-02 P=562.854767 Days  $T_0=235.373574$  (BKJD)



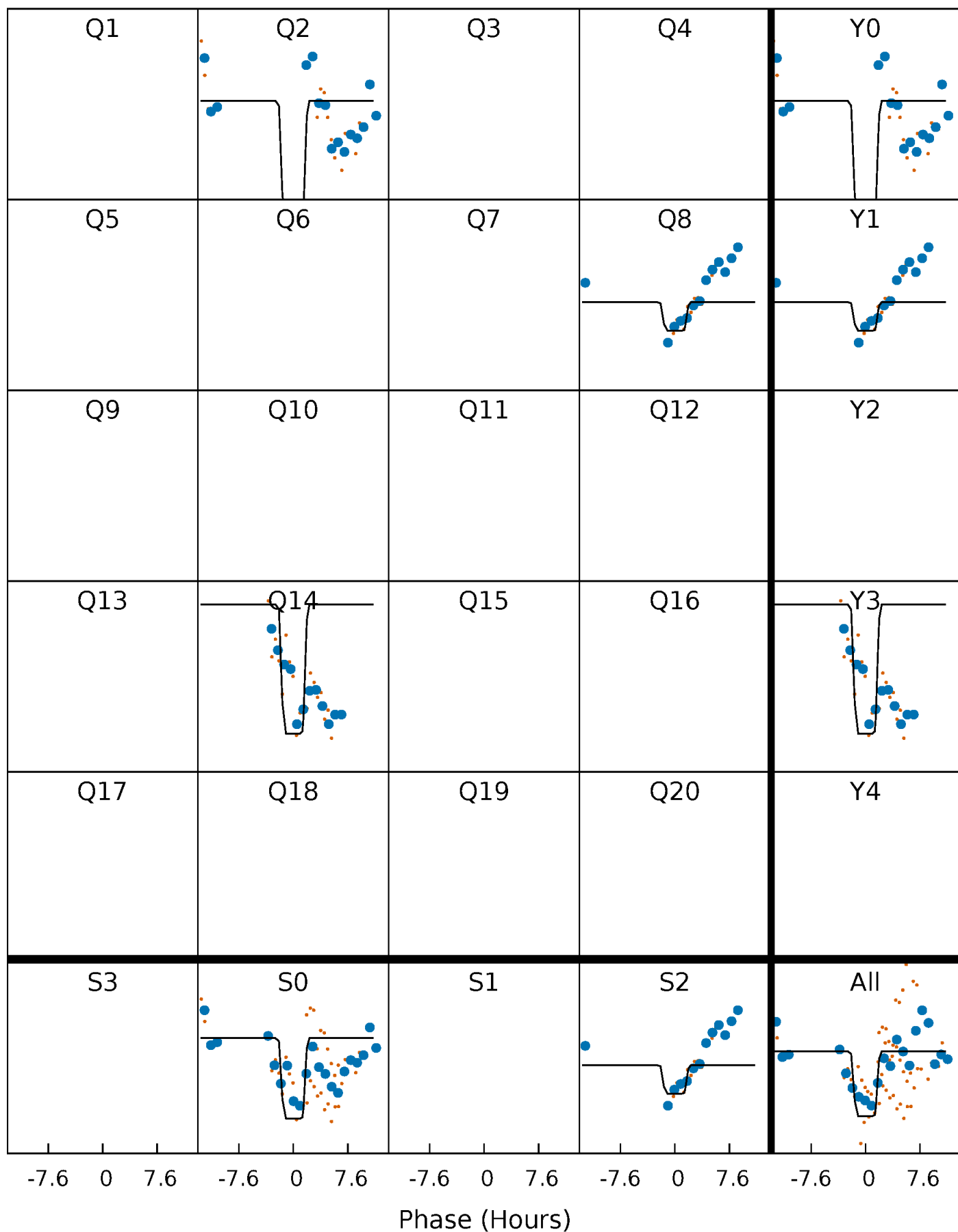
# DV Quarter-Phased Transit Curves

TCE 006138551-02 P=562.854767 Days  $T_0=235.373574$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

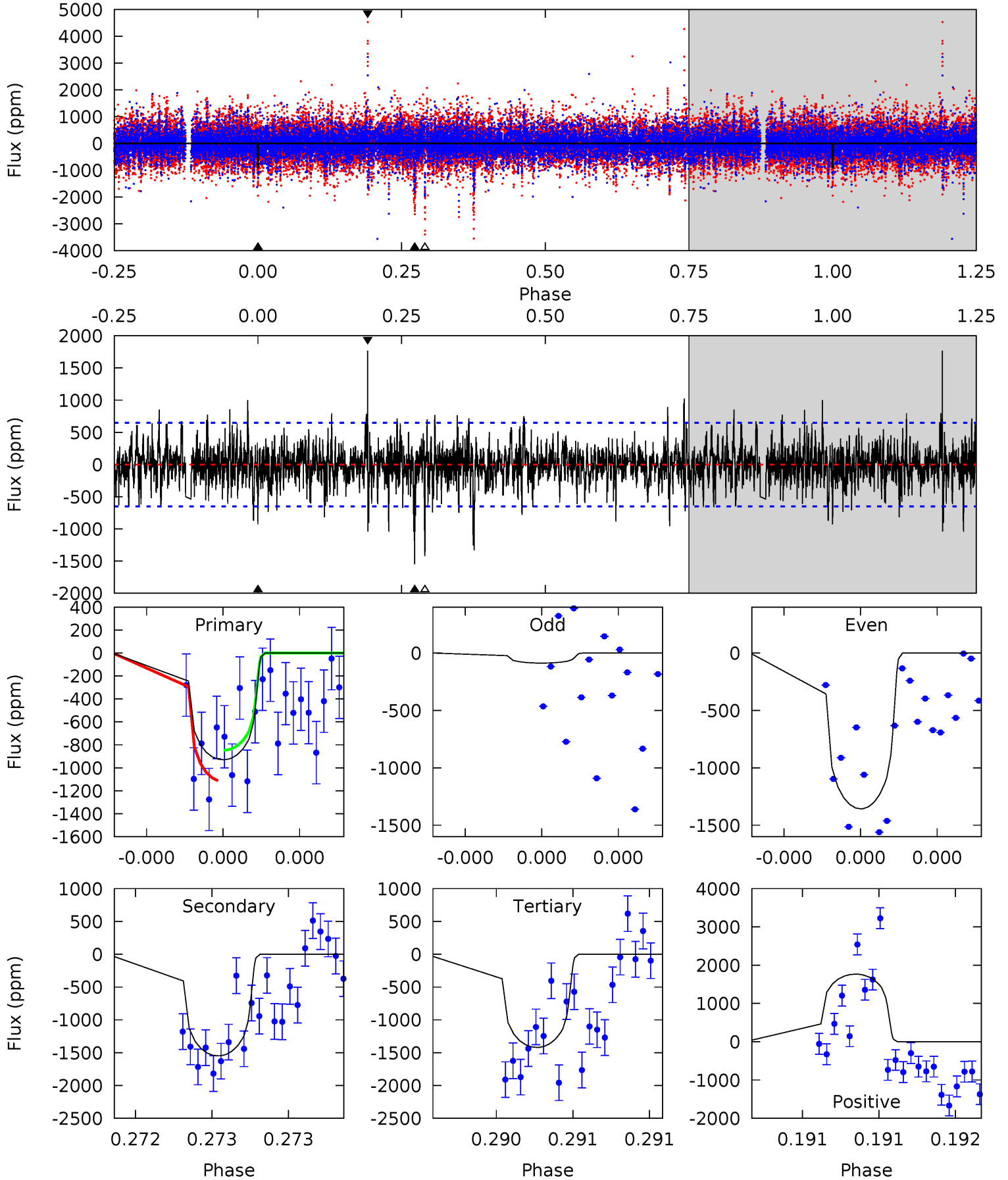
TCE 006138551-02 P=562.842410 Days  $T_0=235.423182$  (BKJD)



# DV Model-Shift Uniqueness Test

006138551-02, P = 562.854767 Days, E = 235.373574 Days

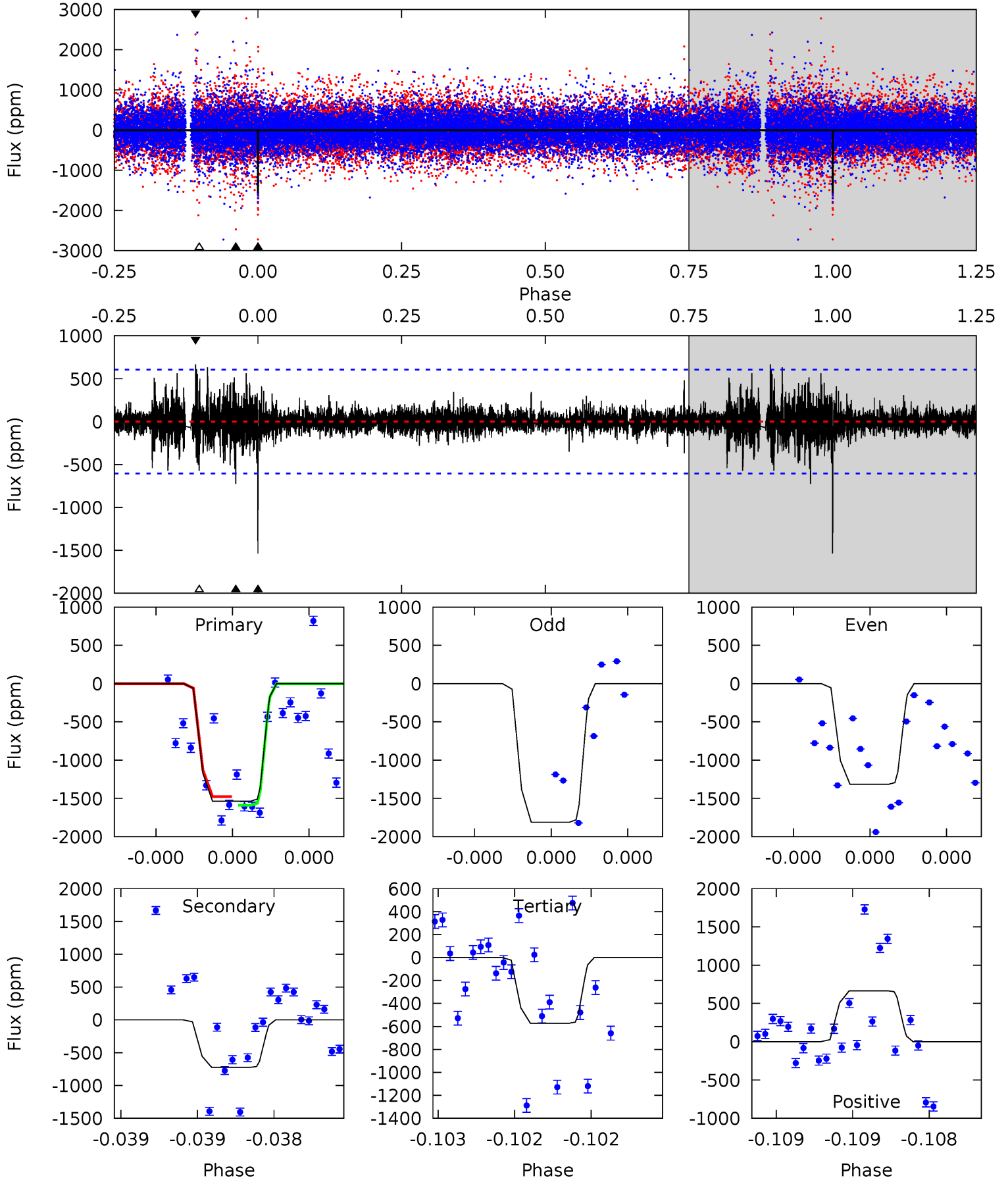
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.00	13.3	12.2	15.2	5.58	3.50	2.08	-4.21	-7.20	1.10	-1.88	5.24	1.00	0.53	1.01



# Alt Model-Shift Uniqueness Test

006138551-02, P = 562.842410 Days, E = 235.423182 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
14.4	6.78	5.36	6.23	5.67	3.62	0.94	9.01	8.14	1.42	0.55	2.28	1.00	0.30	0.52



### Stellar Parameters For KIC 006138551

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4987^{+151}_{-136}$	$4.579^{+0.045}_{-0.050}$	$-0.100^{+0.300}_{-0.300}$	$0.741^{+0.071}_{-0.065}$	$0.760^{+0.078}_{-0.064}$	$2.633^{+0.538}_{-0.491}$
	+3%/-3%	+1%/-1%	+300%/-300%	+10%/-9%	+10%/-8%	+20%/-19%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 006138551-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-1549 \pm 116$	$2.69^{+1.96}_{-1.44}$	$240^{+9}_{-8}$	$5355^{+2671}_{-1052}$	$177496^{+620972}_{-118454}$
Alt.	$-724 \pm 107$	$3.63^{+1.82}_{-1.79}$	$241^{+9}_{-8}$	$4117^{+1231}_{-548}$	$44254^{+127841}_{-24746}$

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



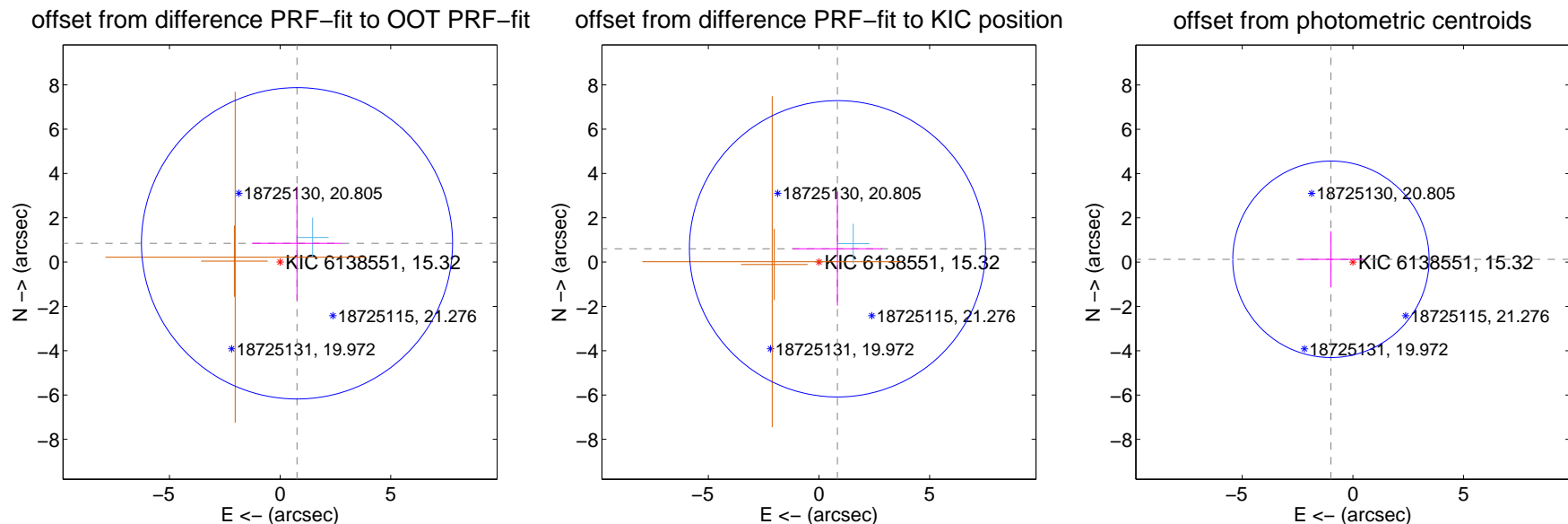
## DV Centroid Data

Supplemental centroid analysis for 006138551-02. Kepler magnitude: 15.32. Transit SNR 4.65

There are 1 quarters with good PRF difference image offsets

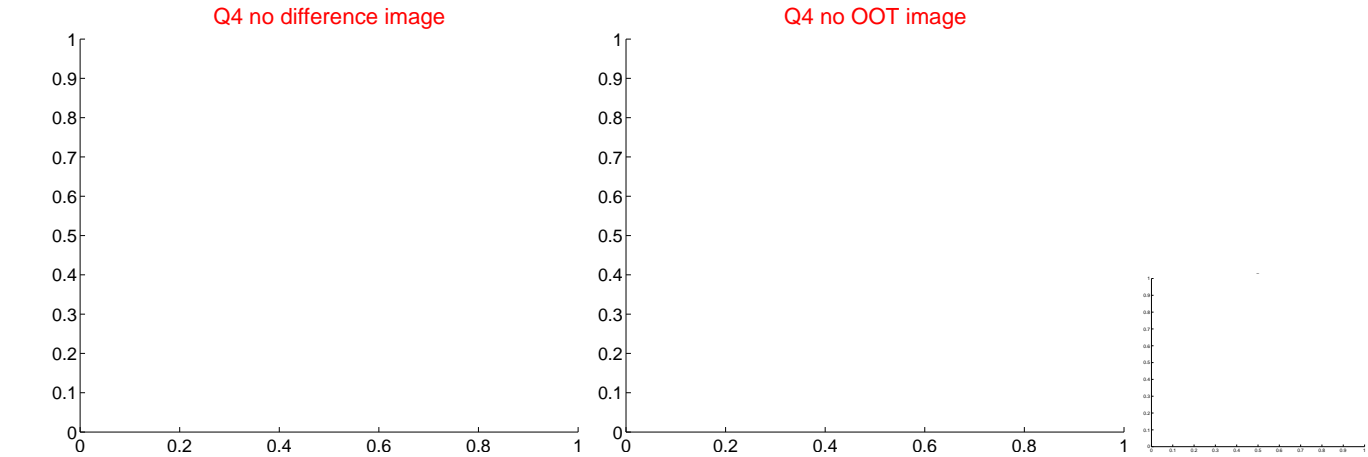
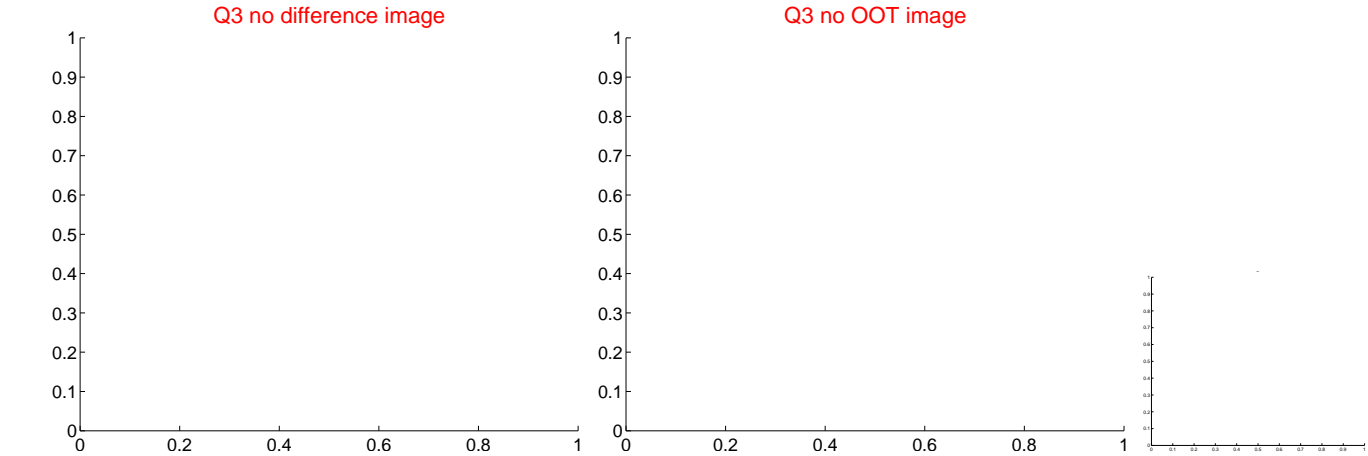
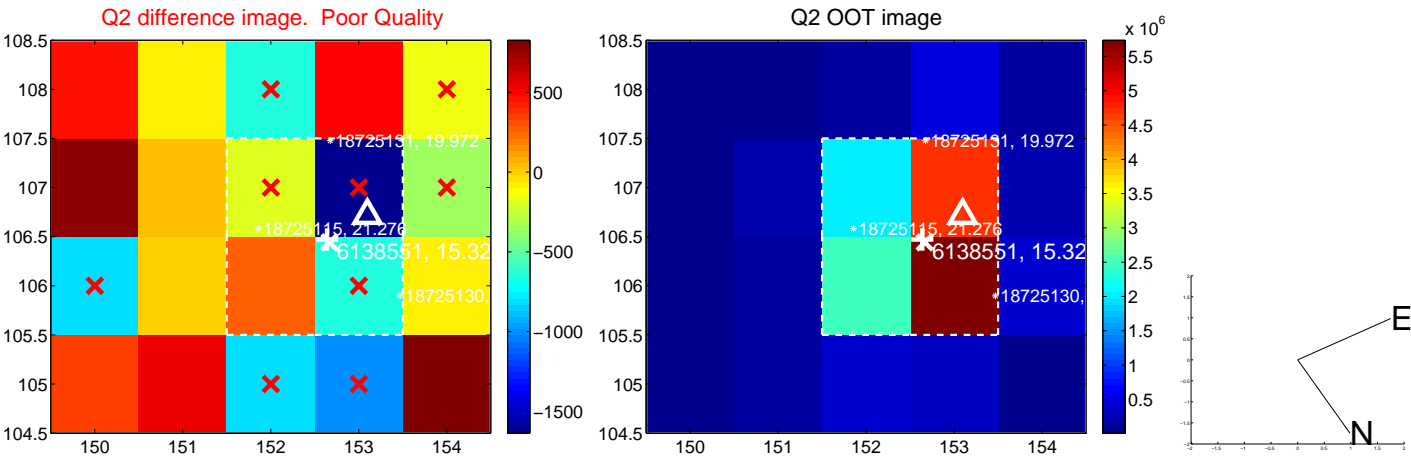
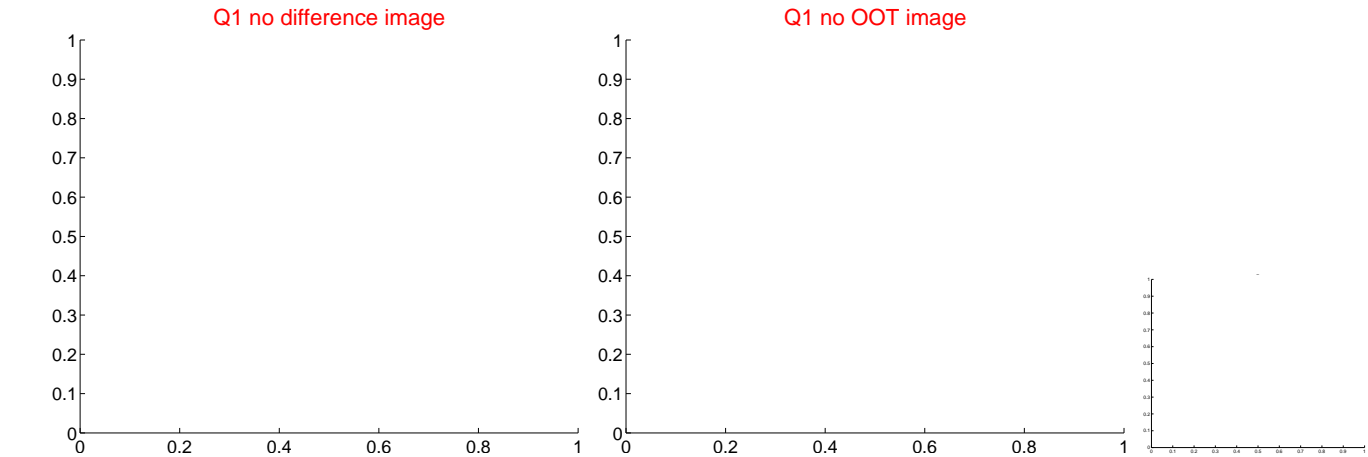
The direct PRF centroid is offset from the target star catalog position by about 0.29 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.141 \pm 2.343$	0.49	$-0.764 \pm 2.034$	$0.848 \pm 2.566$
PRF-fit source offset from KIC position	$1.028 \pm 2.230$	0.46	$-0.834 \pm 2.034$	$0.600 \pm 2.566$
photometric centroid source offset	$1.00 \pm 1.48$	0.68	$0.99 \pm 1.48$	$0.13 \pm 1.27$

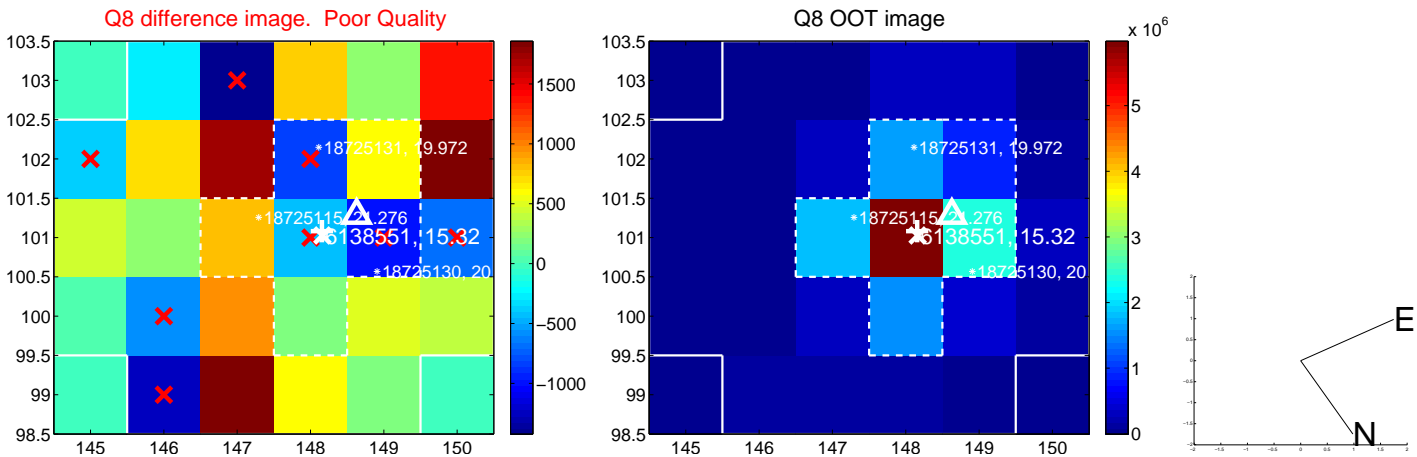
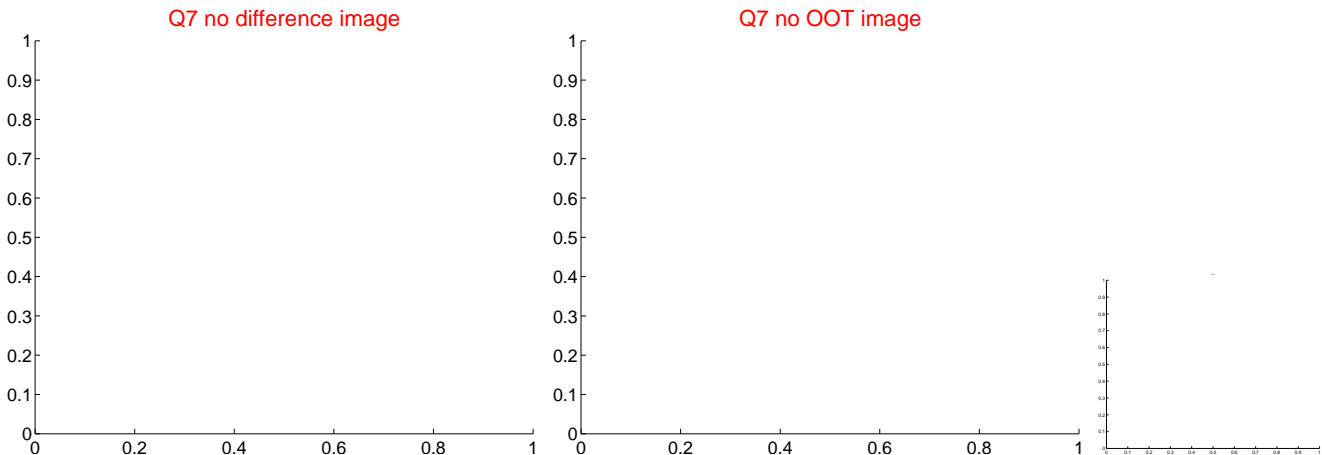
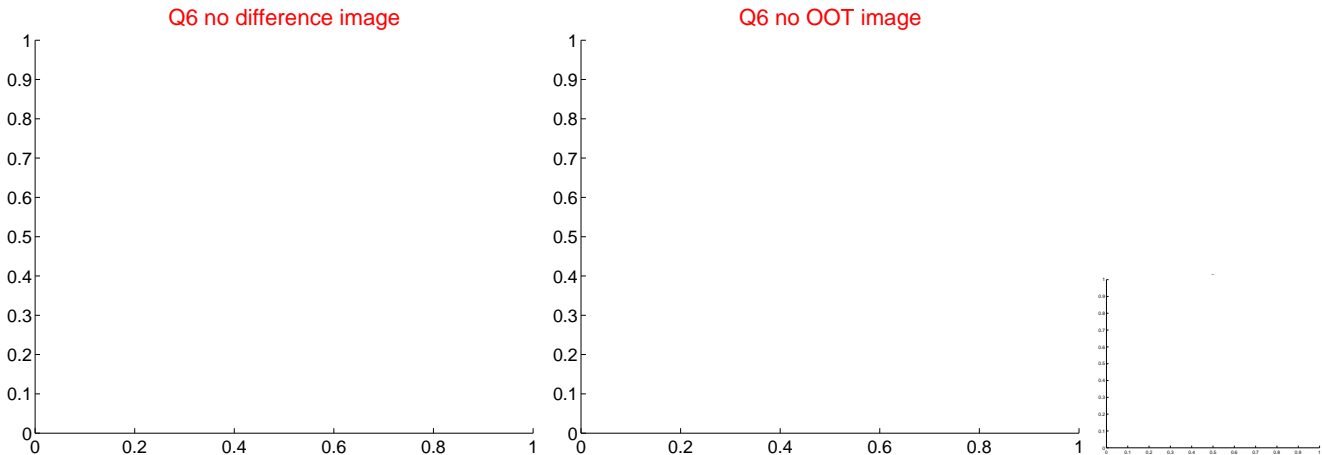
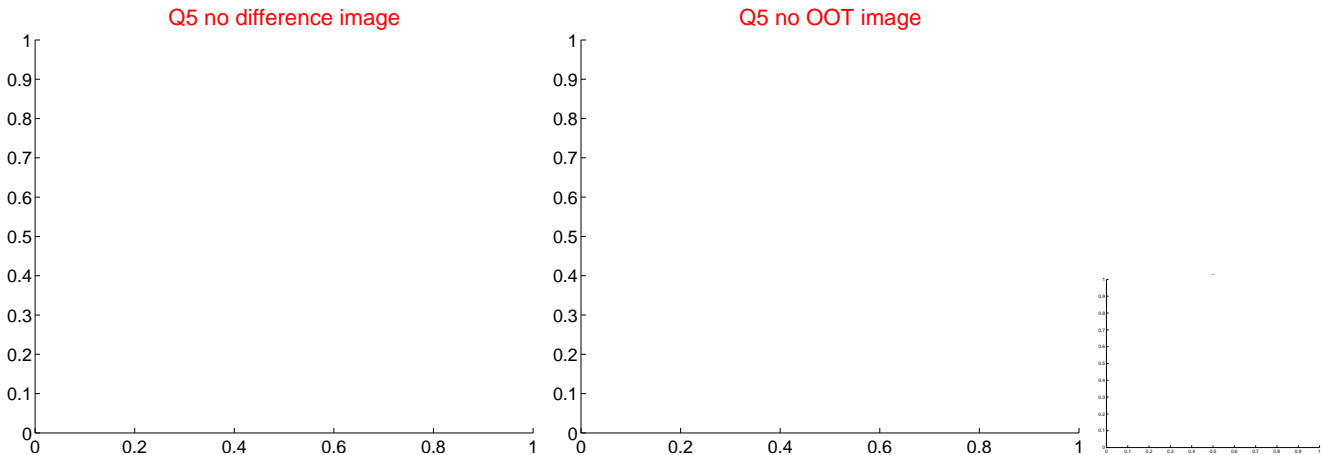


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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



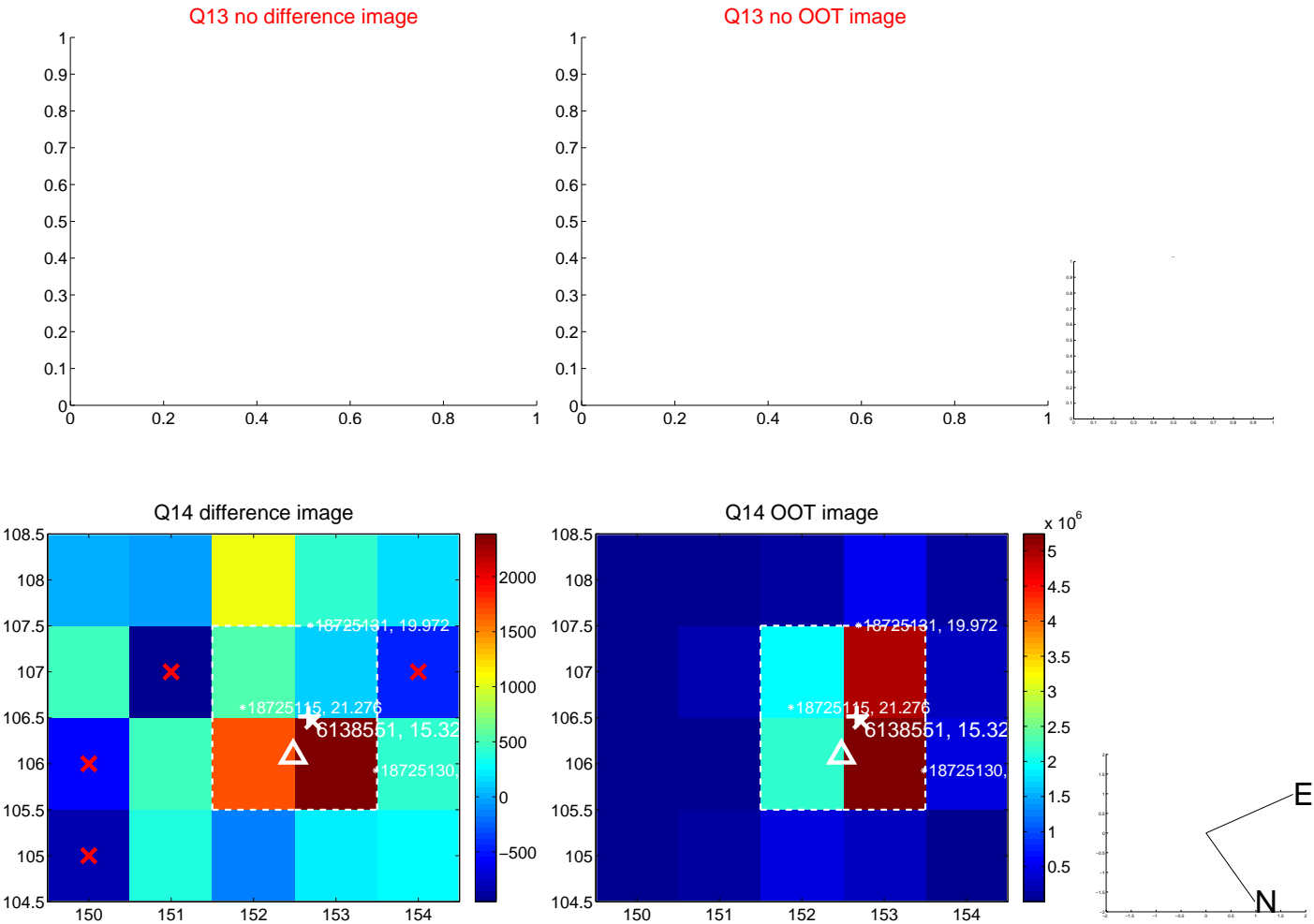
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value



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

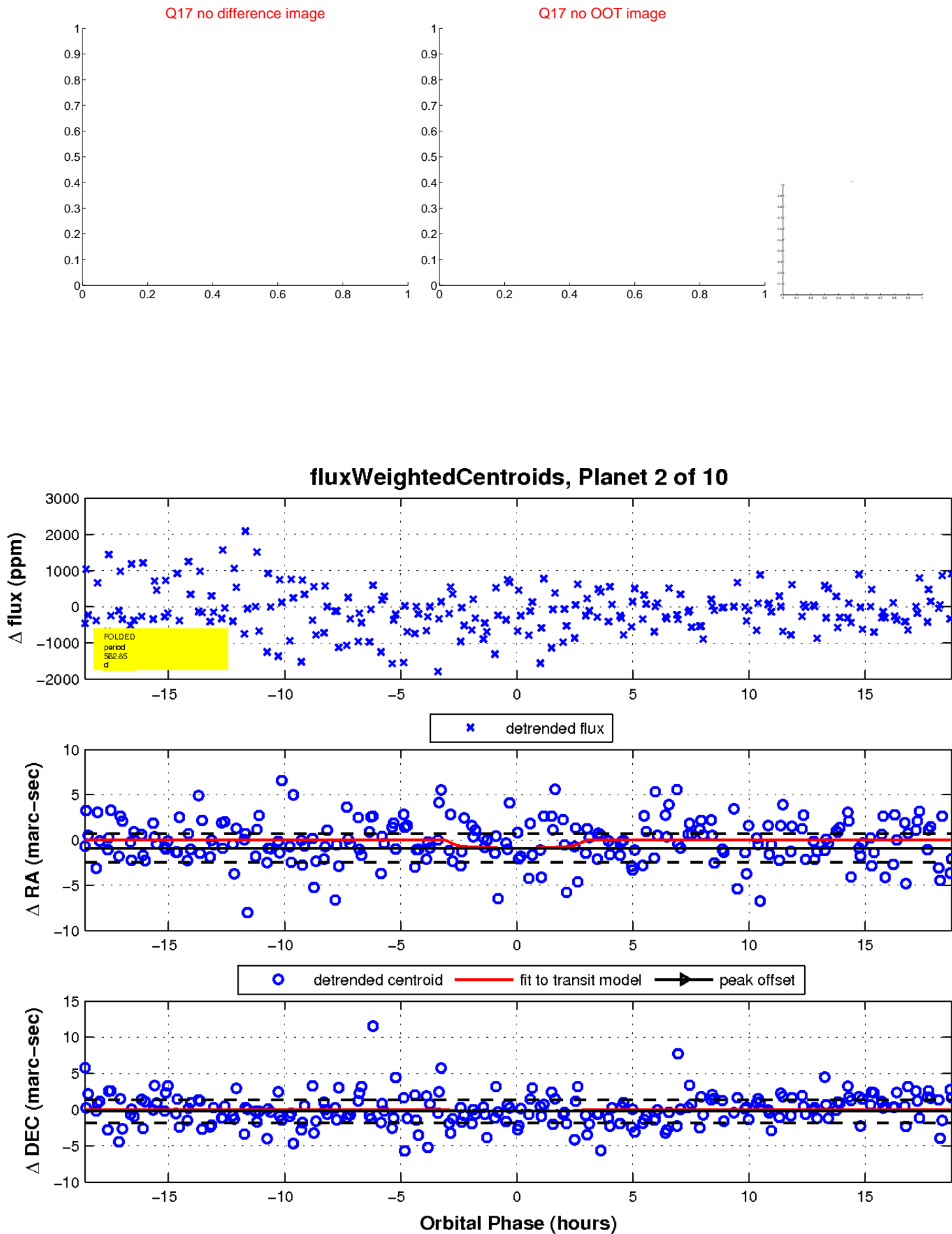


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



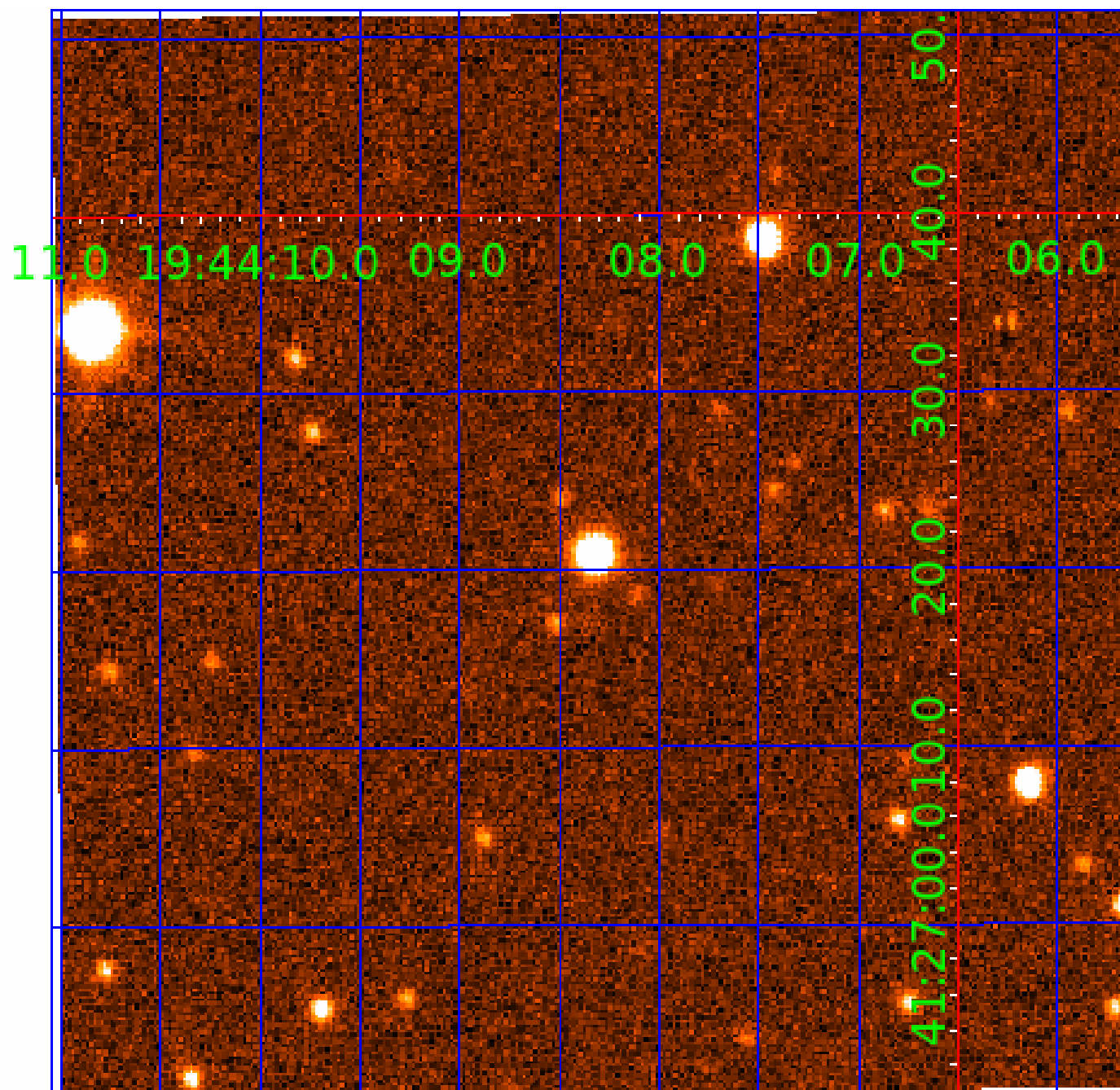


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006138551-01	OBS	No	0.903264	132.276864	60.2	3.755	7.8	9.6	0.74	4987	0.58	1092.39
006138551-02	OBS	No	562.854767	235.373574	932.2	6.266	16.6	4.6	0.74	4987	2.58	0.20
006138551-03	OBS	No	530.761276	479.223857	4353.4	42.694	16.7	8.6	0.74	4987	6.18	0.22
006138551-04	OBS	No	228.013194	343.175015	1171.4	13.680	15.1	6.7	0.74	4987	5.12	0.69
006138551-05	OBS	No	464.265857	586.087268	1073.6	6.635	13.9	7.7	0.74	4987	2.51	0.27
006138551-06	OBS	No	576.302885	273.589413	1404.5	14.591	12.2	7.4	0.74	4987	3.24	0.20
006138551-07	OBS	No	207.671057	239.280791	614.0	3.898	11.6	4.3	0.74	4987	2.13	0.78
006138551-08	OBS	No	405.523905	211.416753	1420.6	13.319	11.5	8.4	0.74	4987	3.42	0.32
006138551-09	OBS	No	278.937876	305.513027	390.8	6.513	11.0	2.9	0.74	4987	1.74	0.52
006138551-10	OBS	No	464.292287	584.958197	3505.3	46.997	9.5	5.4	0.74	4987	5.35	0.27

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006138551-01	OBS	FP	0.00	1	0	0	0	LPP_DV
006138551-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_TRACKER—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
006138551-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
006138551-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV
006138551-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
006138551-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS
006138551-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_TRACKER—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
006138551-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—INCONSISTENT_TRANS
006138551-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—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
006138551-10	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—SAME_NTL_PERIOD—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.

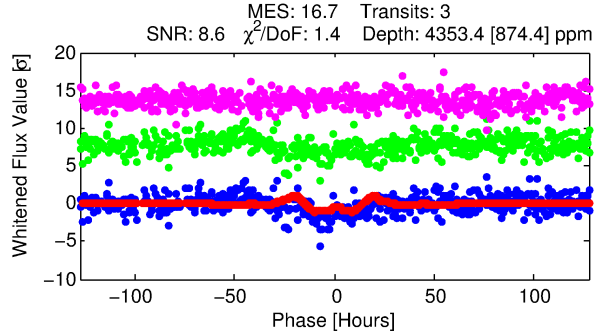
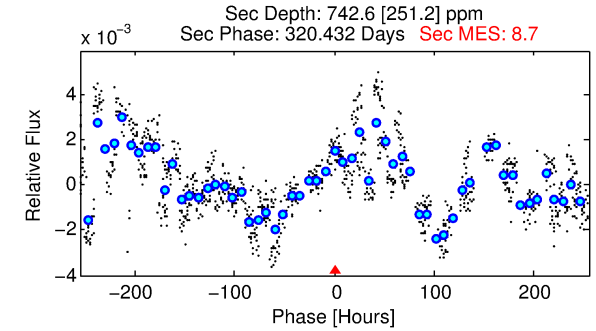
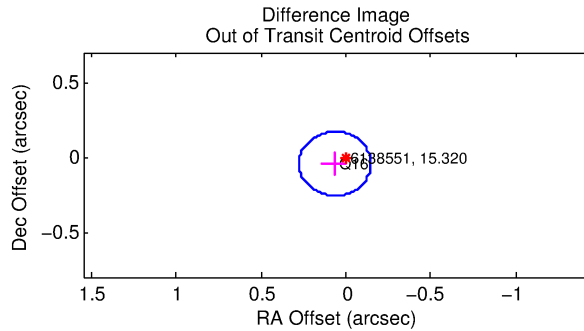
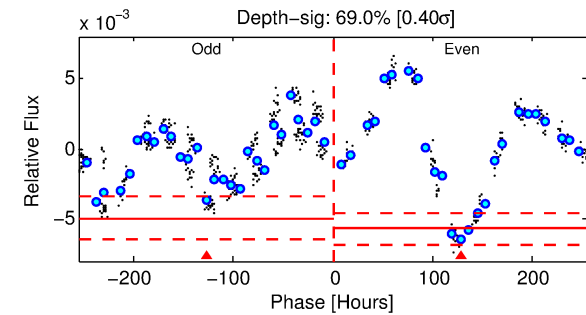
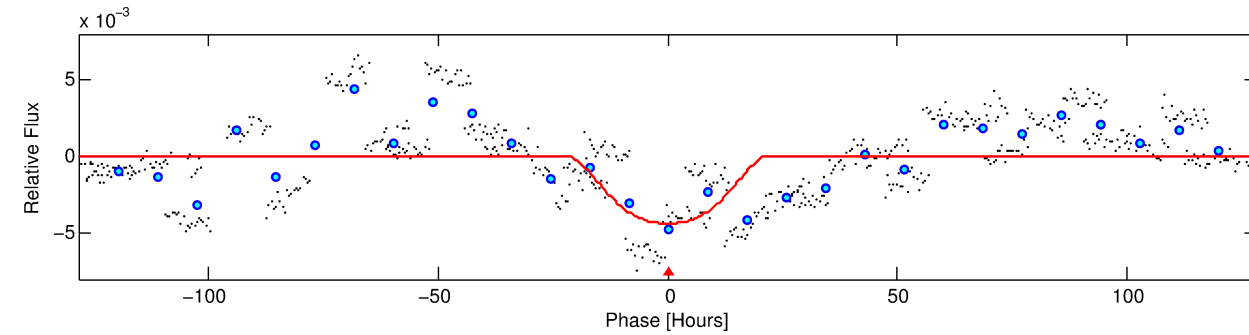
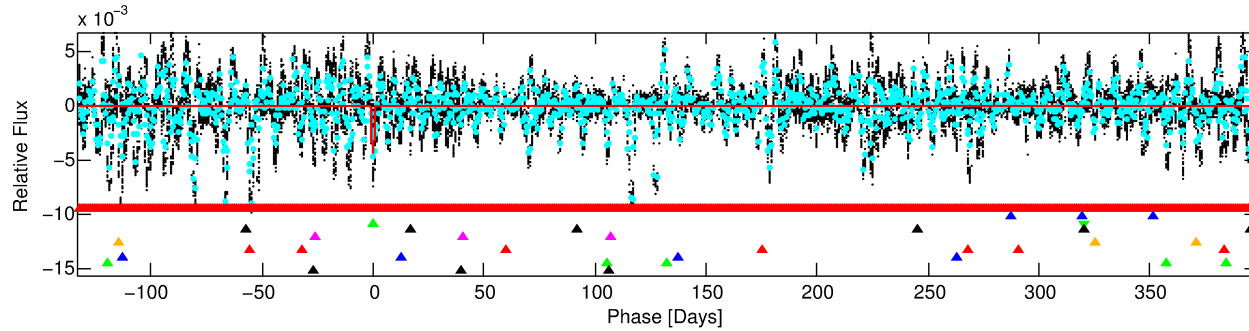
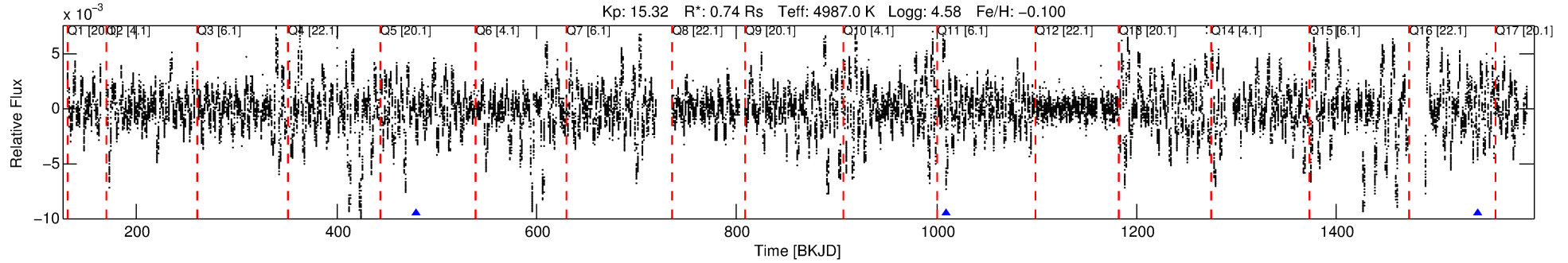
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 006138551-03

No Significant Match Found

# DV One-Page Summary

KIC: 6138551 Candidate: 3 of 10 Period: 530.761 d



## DV Fit Results:

Period = 530.76128 [0.03483] d  
Epoch = 479.2239 [0.0385] BKJD  
Rp/R\* = 0.0764 [0.0087]  
a/R\* = 52.92 [3.21]  
b = 0.92 [0.01]  
Seff = 0.22 [0.03]  
Teq = 175 [7] K  
Rp = 6.18 [0.92] Re  
a = 1.1709 [0.0873] AU  
Ag = 14668.32 [6162.91] [2.38 $\sigma$ ]  
Teffp = 2978 [317] K [8.84 $\sigma$ ]

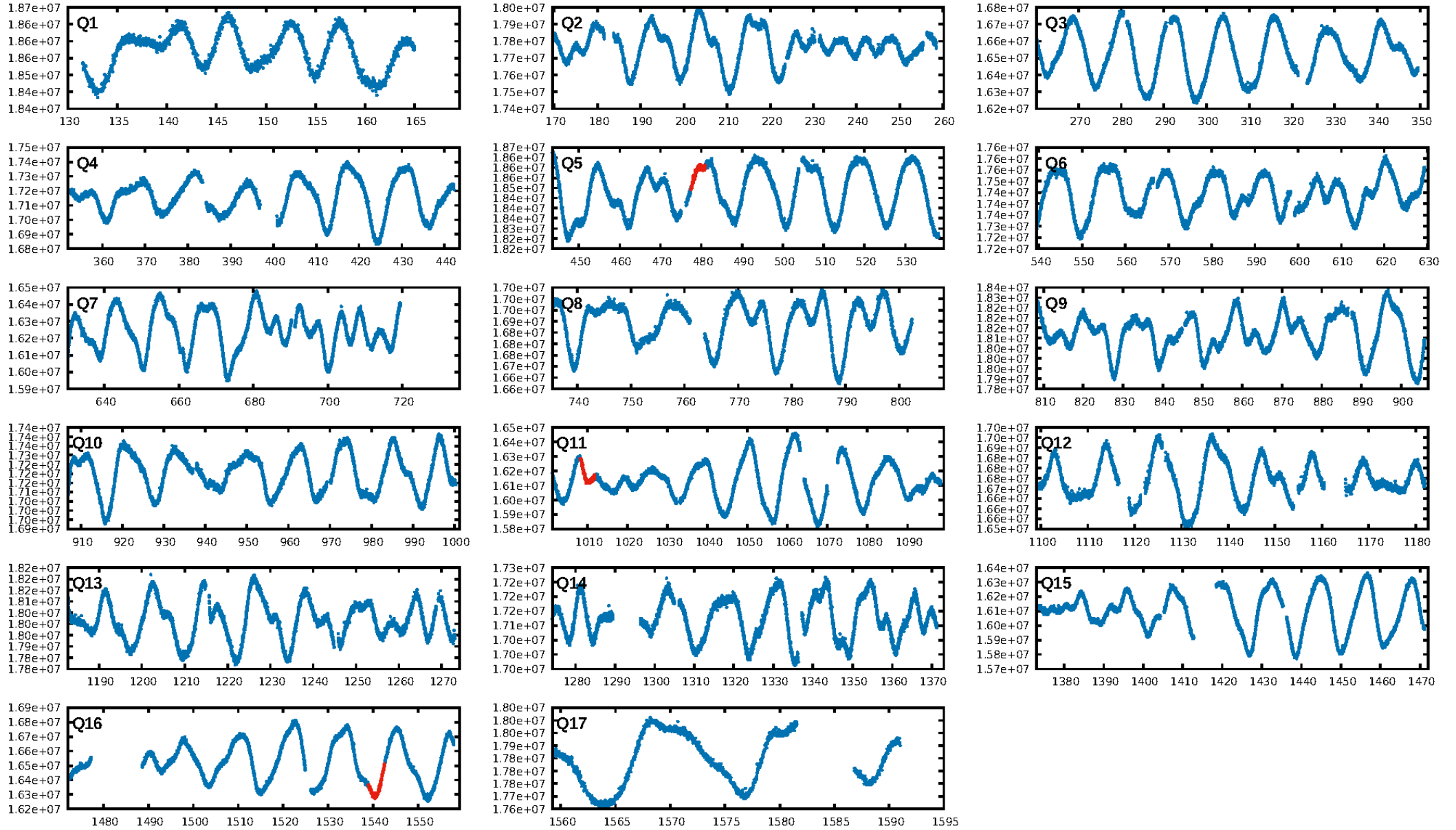
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [25.12 $\sigma$ ]  
LongPeriod-sig: 100.0% [17.85 $\sigma$ ]  
ModelChiSquare2-sig: 57.4%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: -0.05166  
Centroid-sig: 0.3%  
Centroid-so: 0.179 arcsec [1.22 $\sigma$ ]  
OotOffset-rm: 0.081 arcsec [1.14 $\sigma$ ]  
OotOffset-st: 0/0/1/0 [1]  
KicOffset-rm: 0.207 arcsec [2.91 $\sigma$ ]  
KicOffset-st: 0/0/1/0 [1]  
DiffImageQuality-fgm: 1.00 [1/1]  
DiffImageOverlap-fno: 0.00 [0/1]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 03-Feb-2016 04:50:38 Z

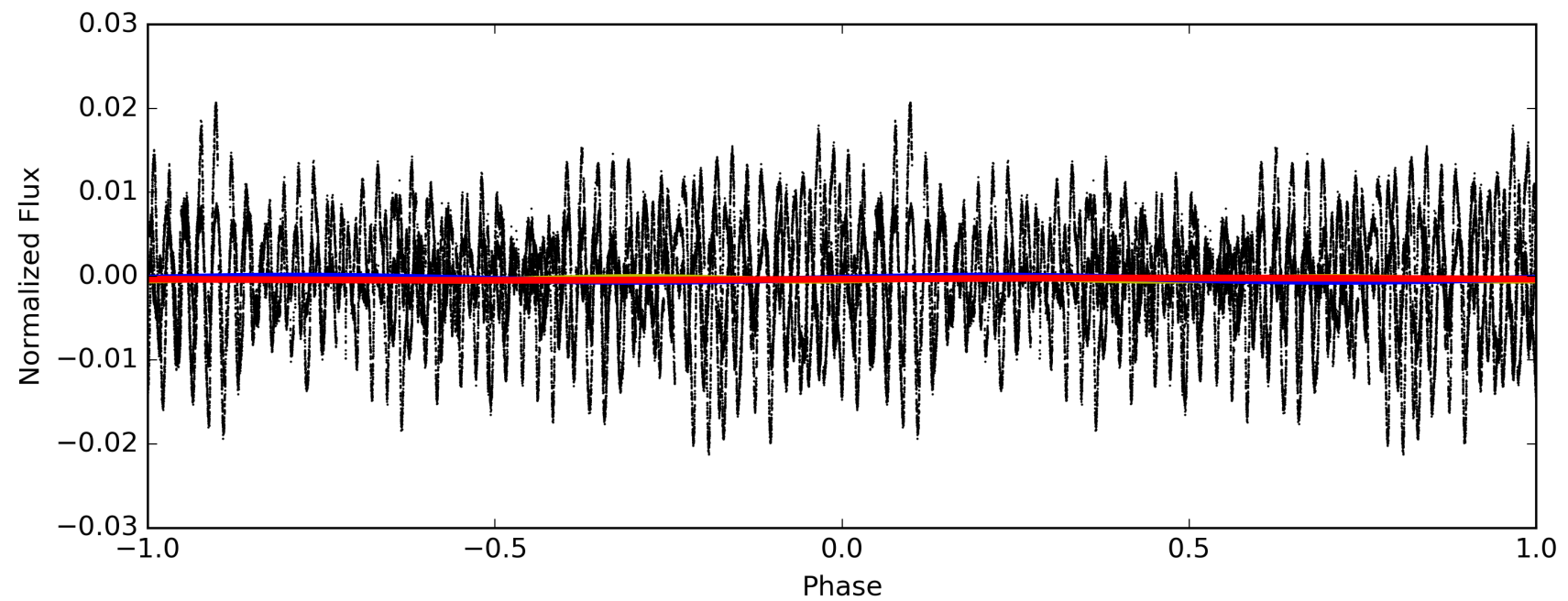
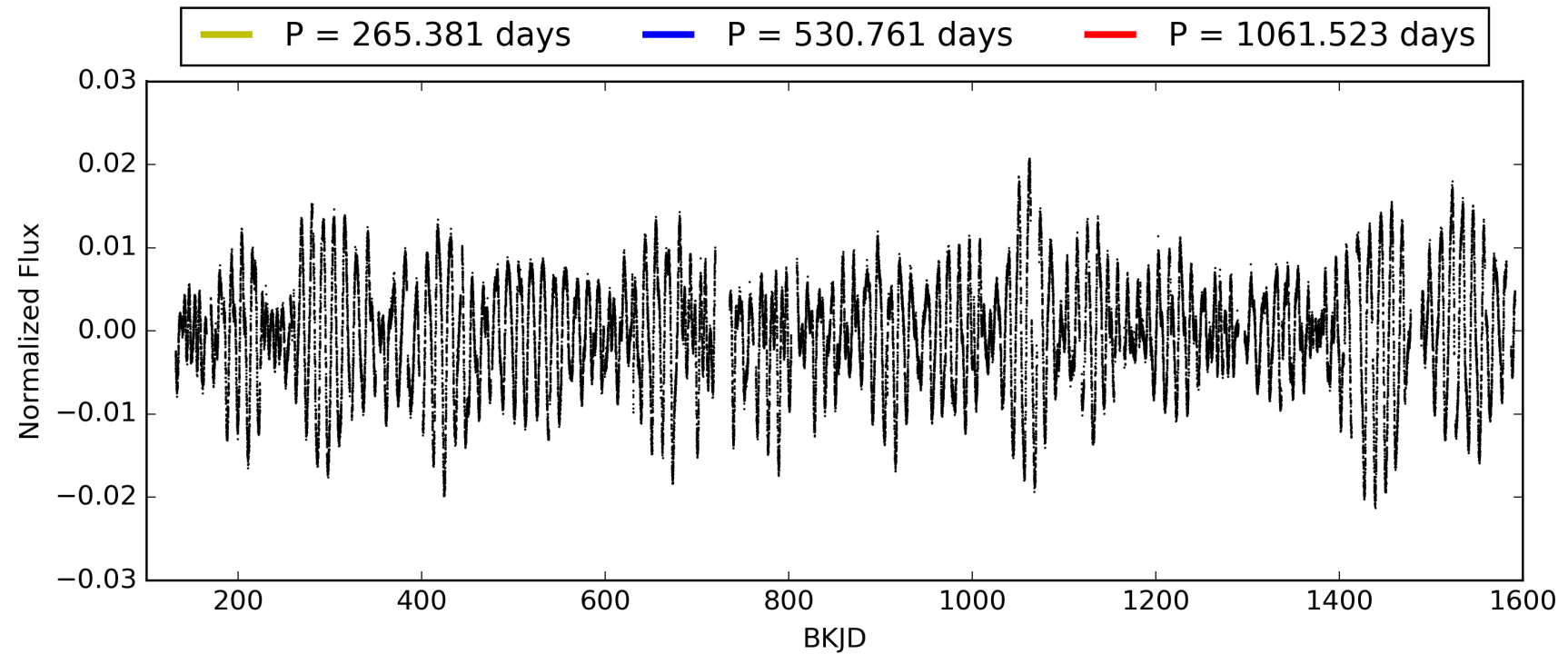
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 006138551-03, PDC Light Curves



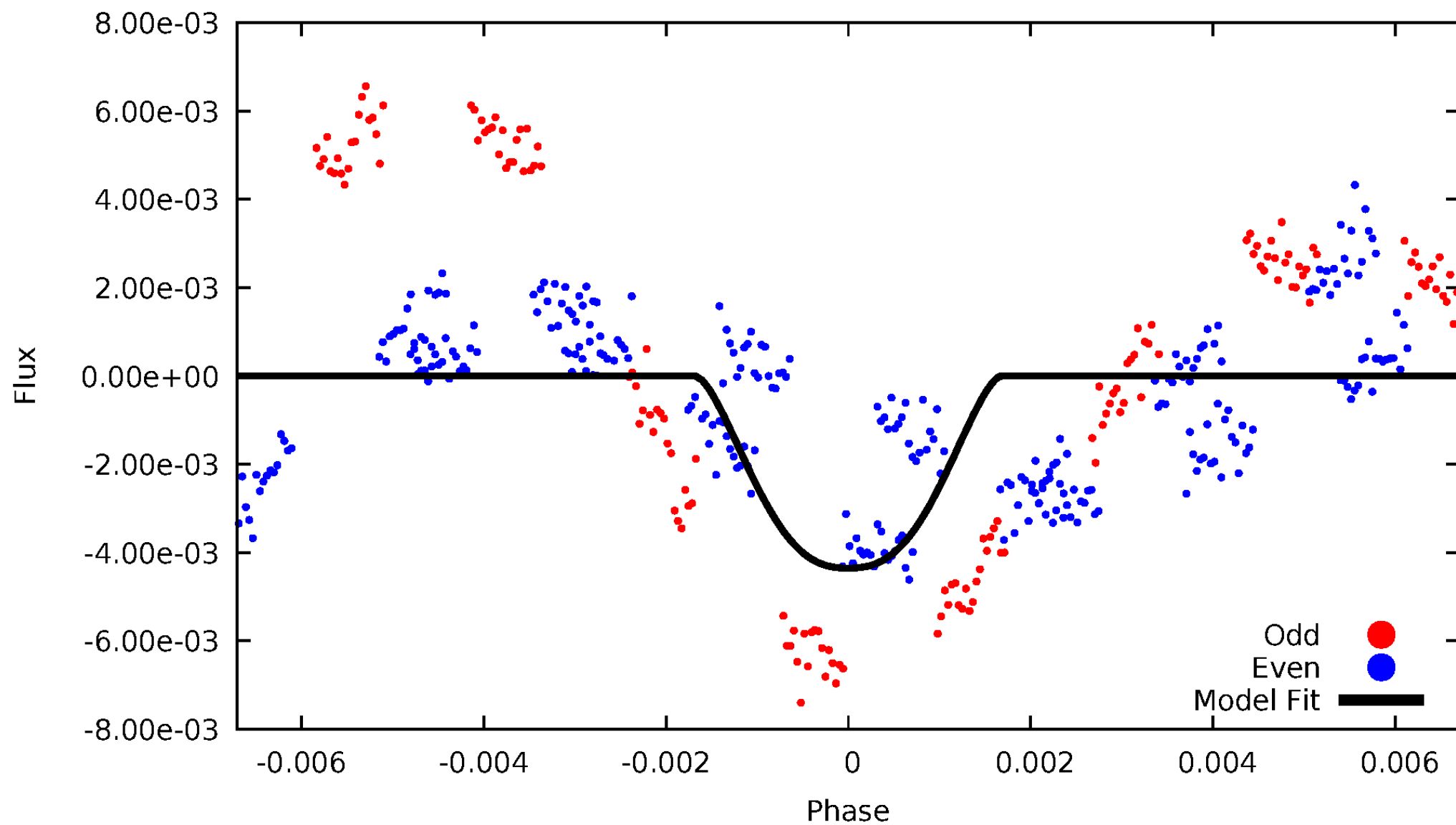


TCE 006138551-03



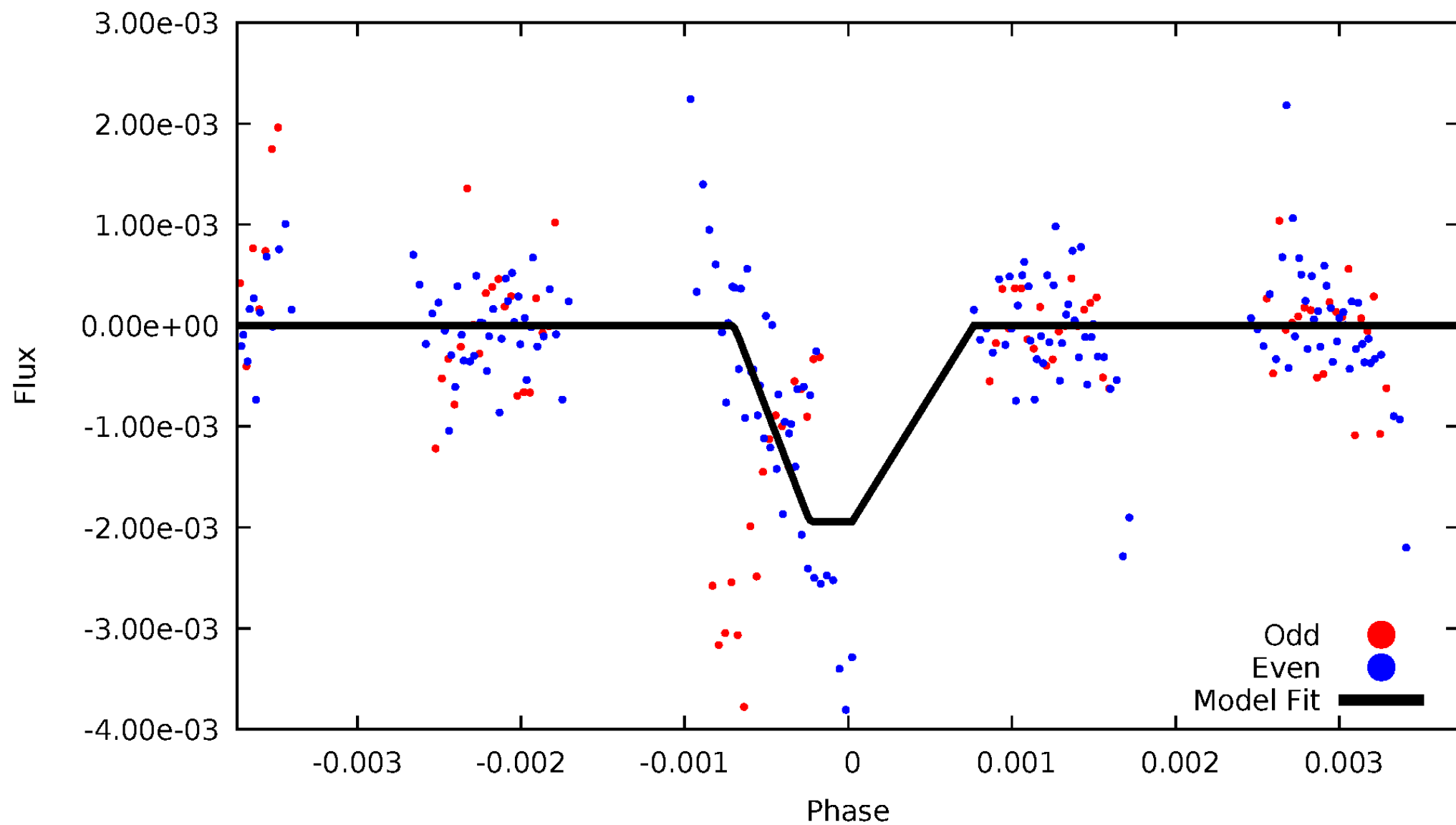
# DV Odd/Even

TCE 006138551-03



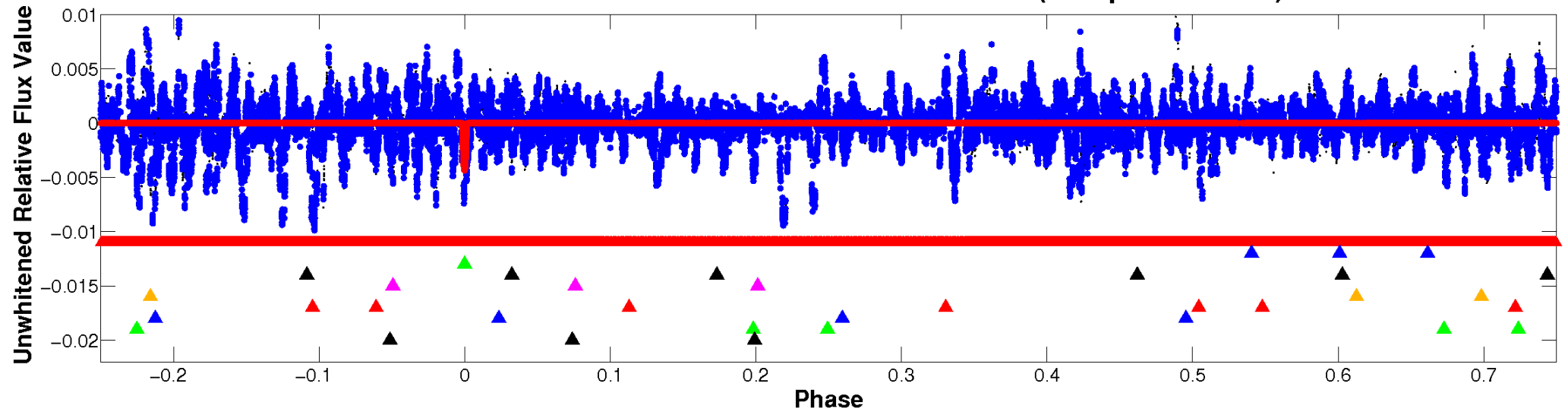
# ALT Odd/Even

TCE 006138551-03

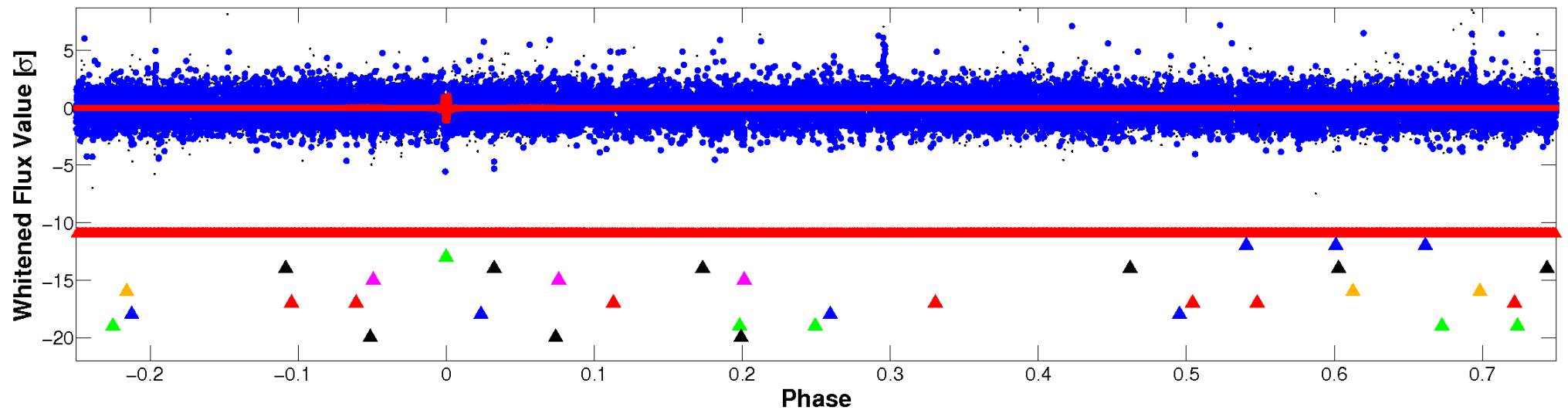


# Non-Whitened Vs. Whitened Light Curve

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

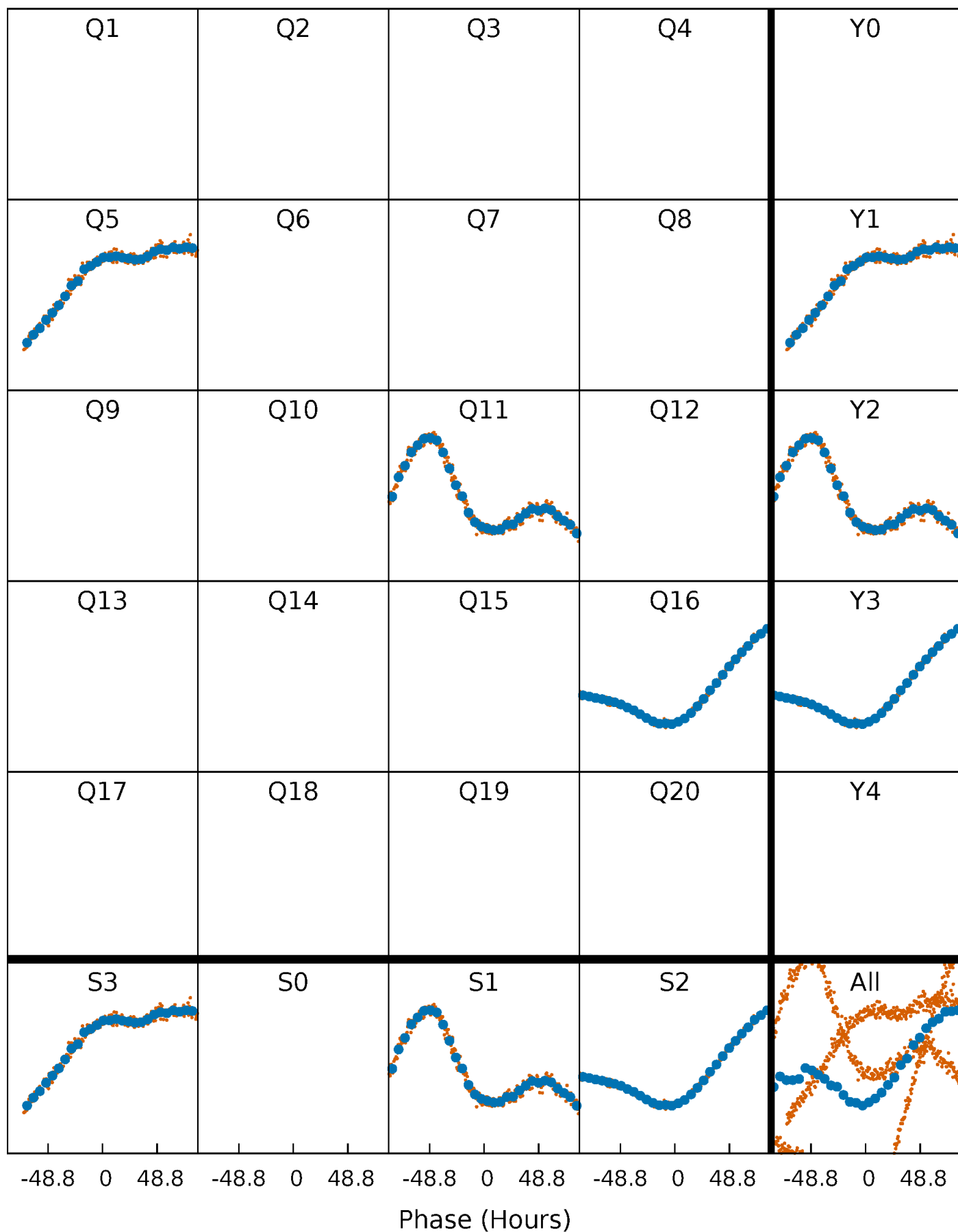


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



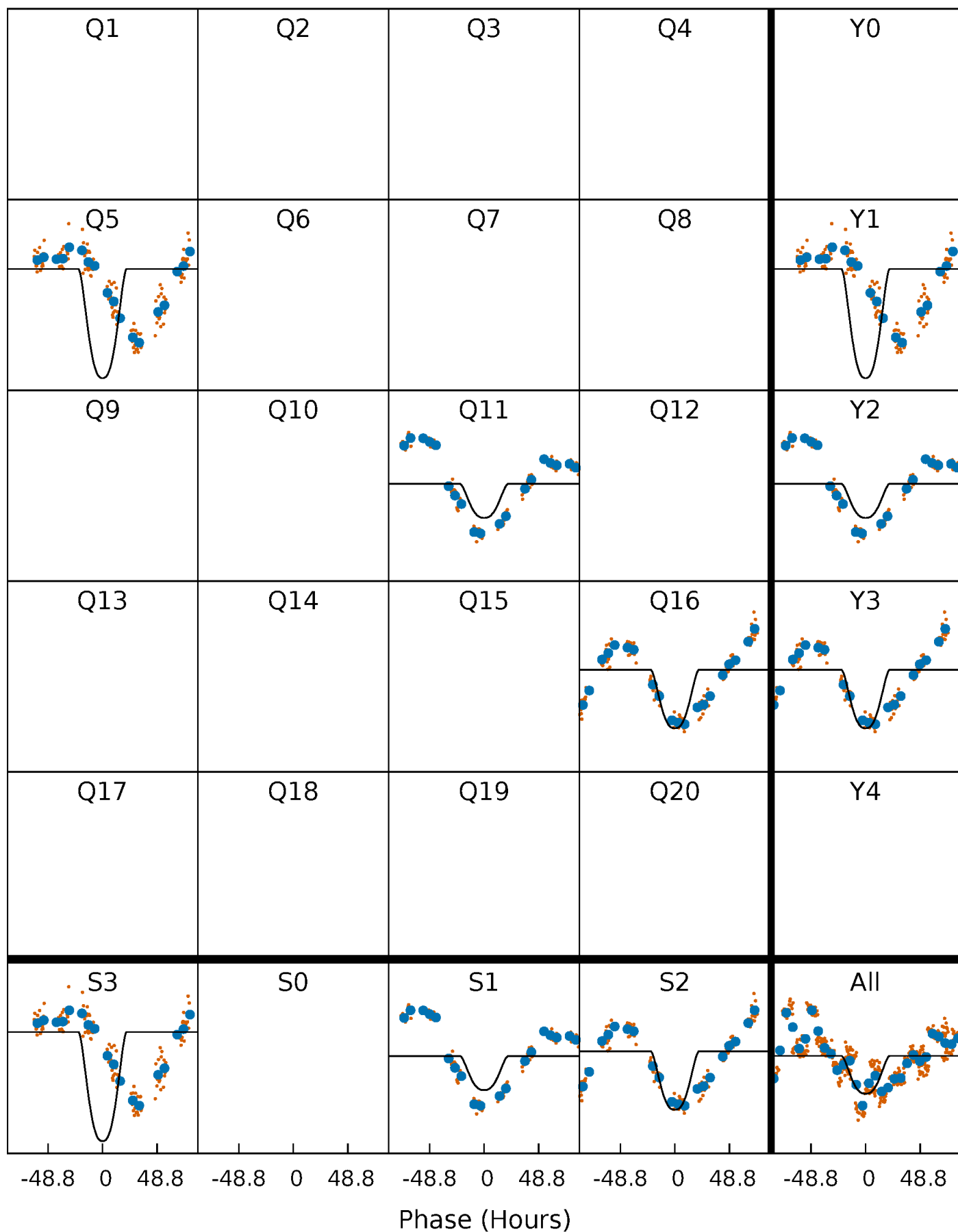
# PDC Quarter-Phased Transit Curves

TCE 006138551-03 P=530.761276 Days  $T_0=479.223857$  (BKJD)



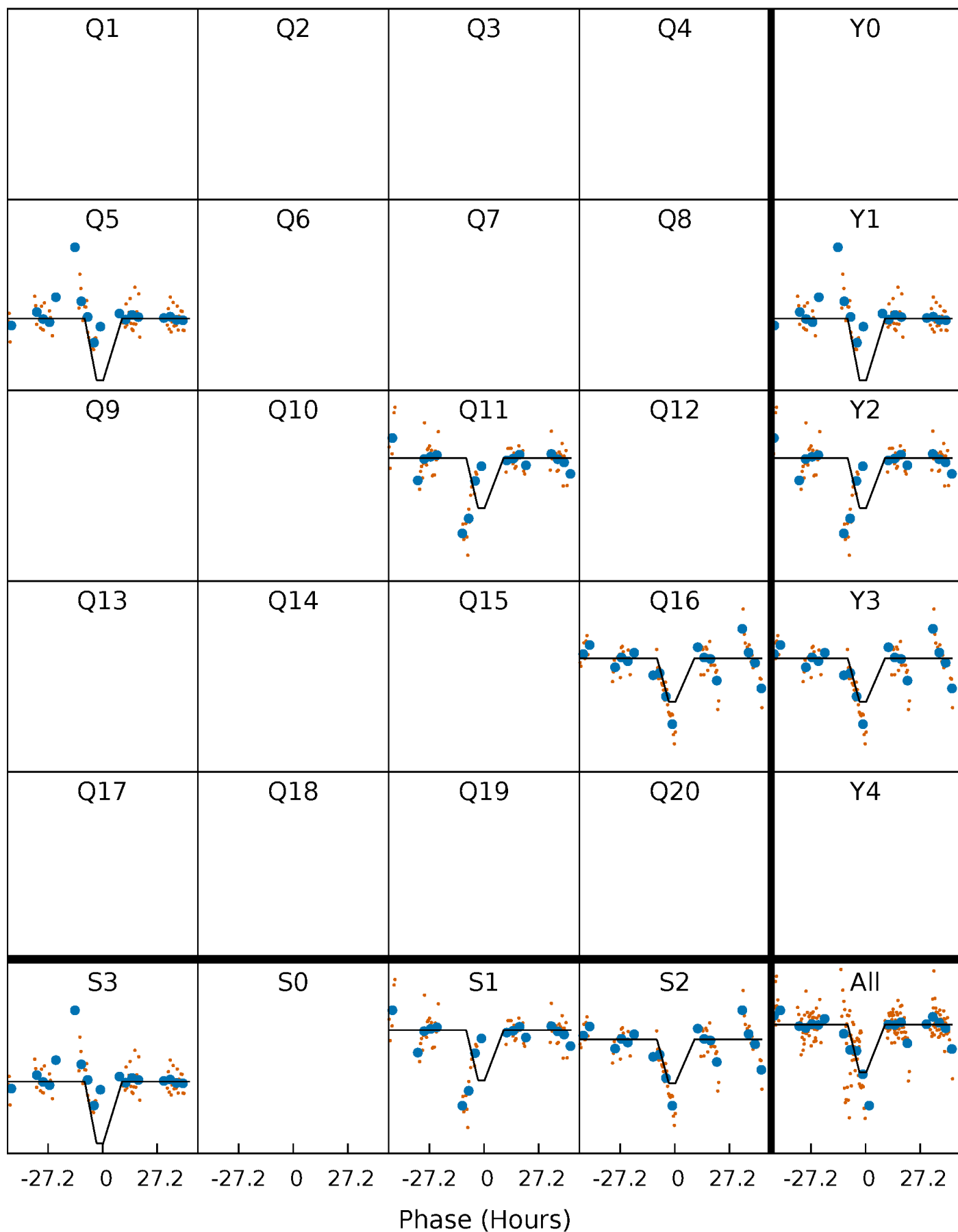
# DV Quarter-Phased Transit Curves

TCE 006138551-03     $P=530.761276$  Days     $T_0=479.223857$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 006138551-03 P=531.061413 Days  $T_0=478.985888$  (BKJD)

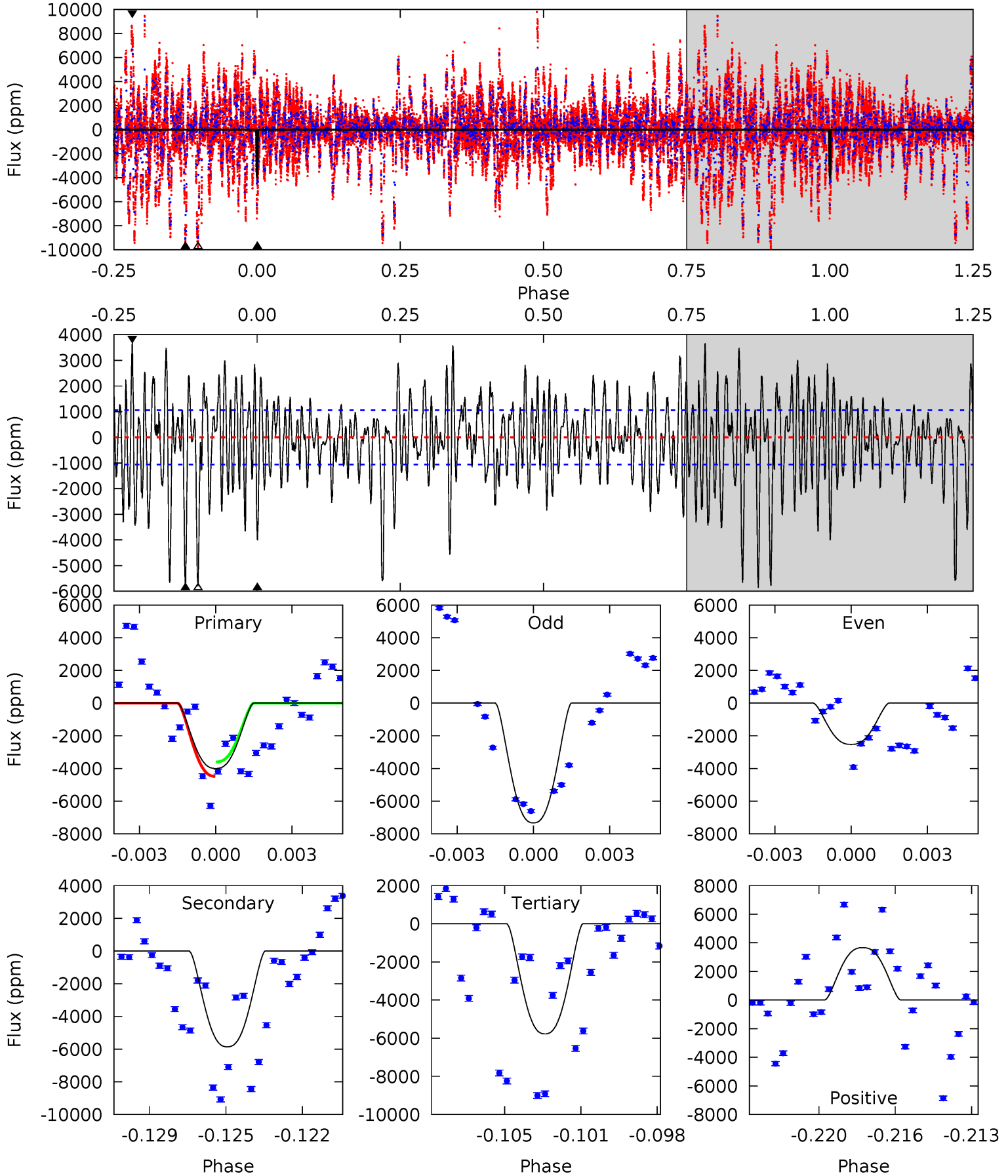




# DV Model-Shift Uniqueness Test

006138551-03, P = 530.761276 Days, E = 479.223857 Days

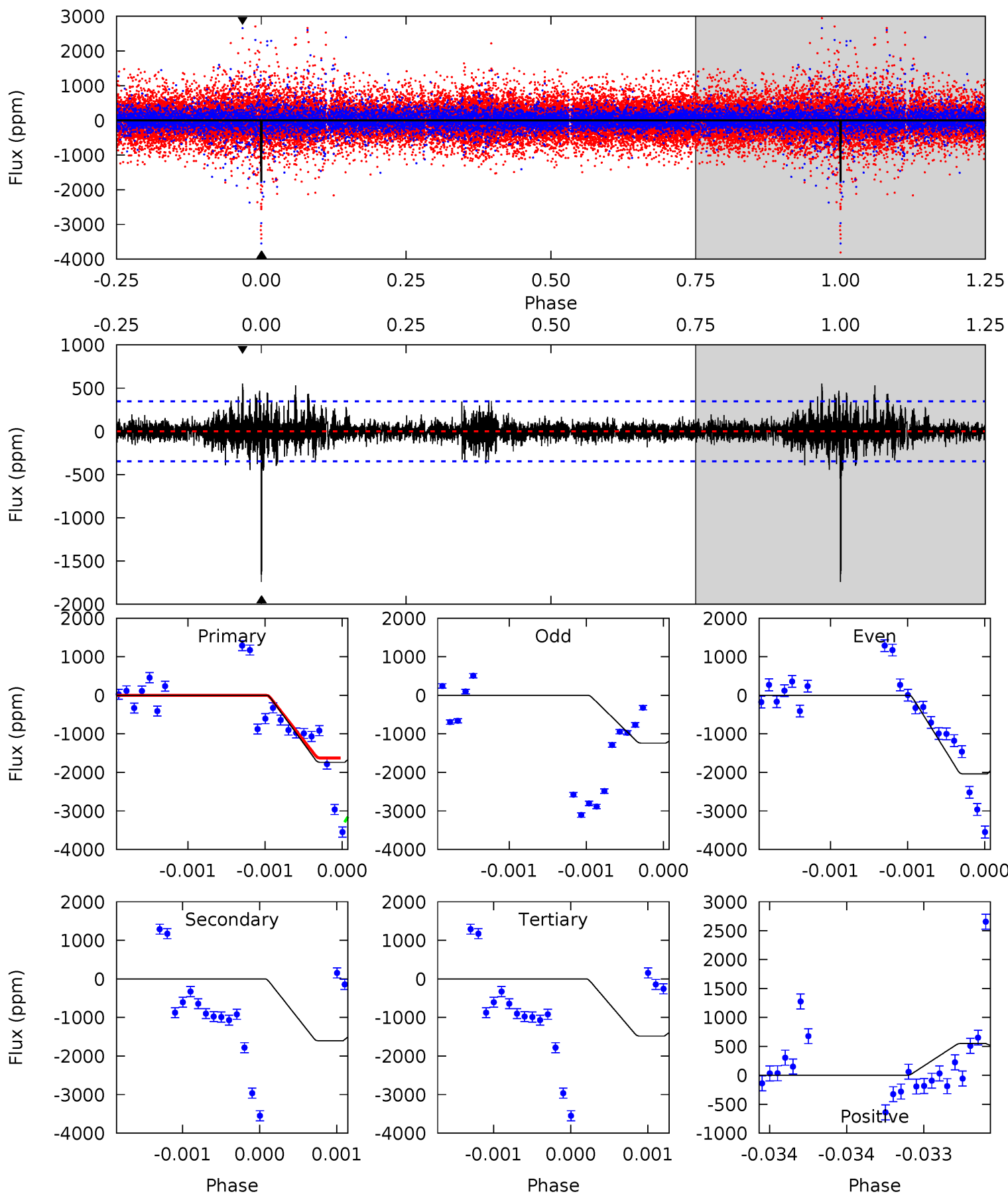
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
19.8	29.0	28.6	18.1	5.23	2.93	6.84	-8.79	1.66	0.42	10.9	11.6	0.98	0.38	2.23



# Alt Model-Shift Uniqueness Test

006138551-03, P = 531.061413 Days, E = 478.985888 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
27.6	25.5	23.6	8.74	5.51	3.38	1.33	4.06	18.9	1.91	16.7	6.06	0	0.24	19.1



### Stellar Parameters For KIC 006138551

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4987^{+151}_{-136}$	$4.579^{+0.045}_{-0.050}$	$-0.100^{+0.300}_{-0.300}$	$0.741^{+0.071}_{-0.065}$	$0.760^{+0.078}_{-0.064}$	$2.633^{+0.538}_{-0.491}$
	+3%/-3%	+1%/-1%	+300%/-300%	+10%/-9%	+10%/-8%	+20%/-19%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 006138551-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-5862 \pm 202$	$6.20^{+0.81}_{-0.76}$	$246^{+9}_{-9}$	$5005^{+329}_{-276}$	$114895^{+34693}_{-23519}$
Alt.	$-1605 \pm 63$	$3.56^{+0.71}_{-0.76}$	$246^{+9}_{-9}$	$4810^{+538}_{-339}$	$95455^{+58284}_{-28335}$

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

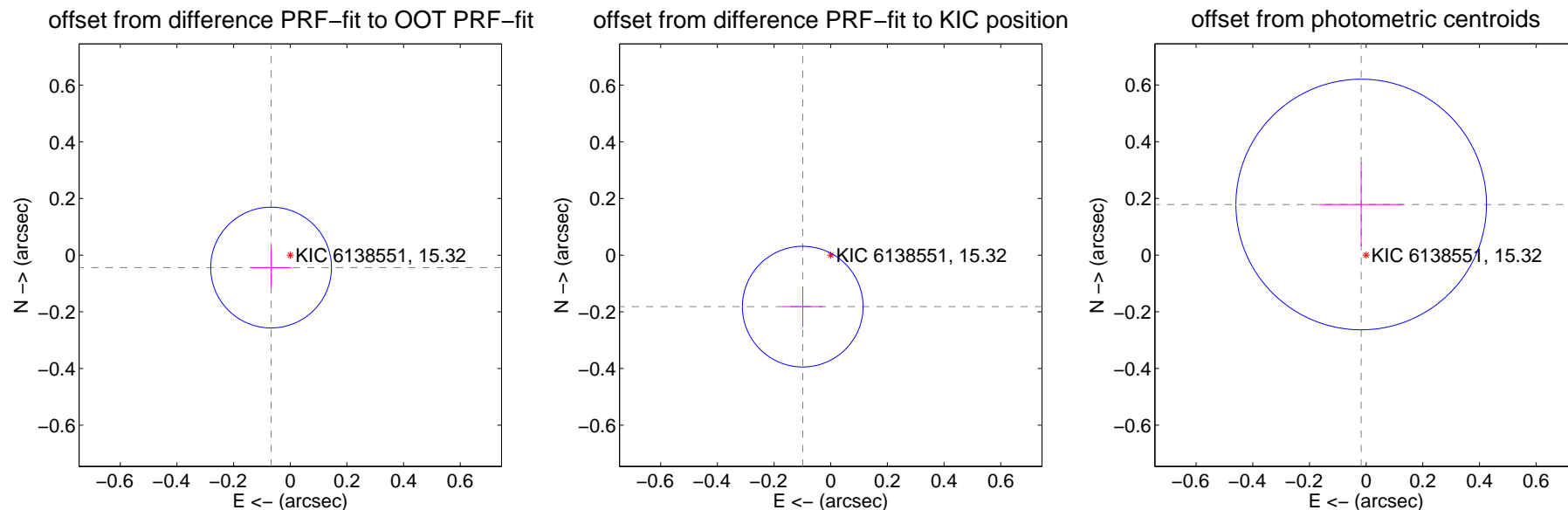
## DV Centroid Data

Supplemental centroid analysis for 006138551-03. Kepler magnitude: 15.32. Transit SNR 8.58

There are 1 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.14 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.081 \pm 0.071$	1.14	$0.068 \pm 0.071$	$-0.044 \pm 0.071$
PRF-fit source offset from KIC position	$0.207 \pm 0.071$	2.91	$0.099 \pm 0.071$	$-0.182 \pm 0.071$
photometric centroid source offset	$0.18 \pm 0.15$	1.22	$0.02 \pm 0.15$	$0.18 \pm 0.15$



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.

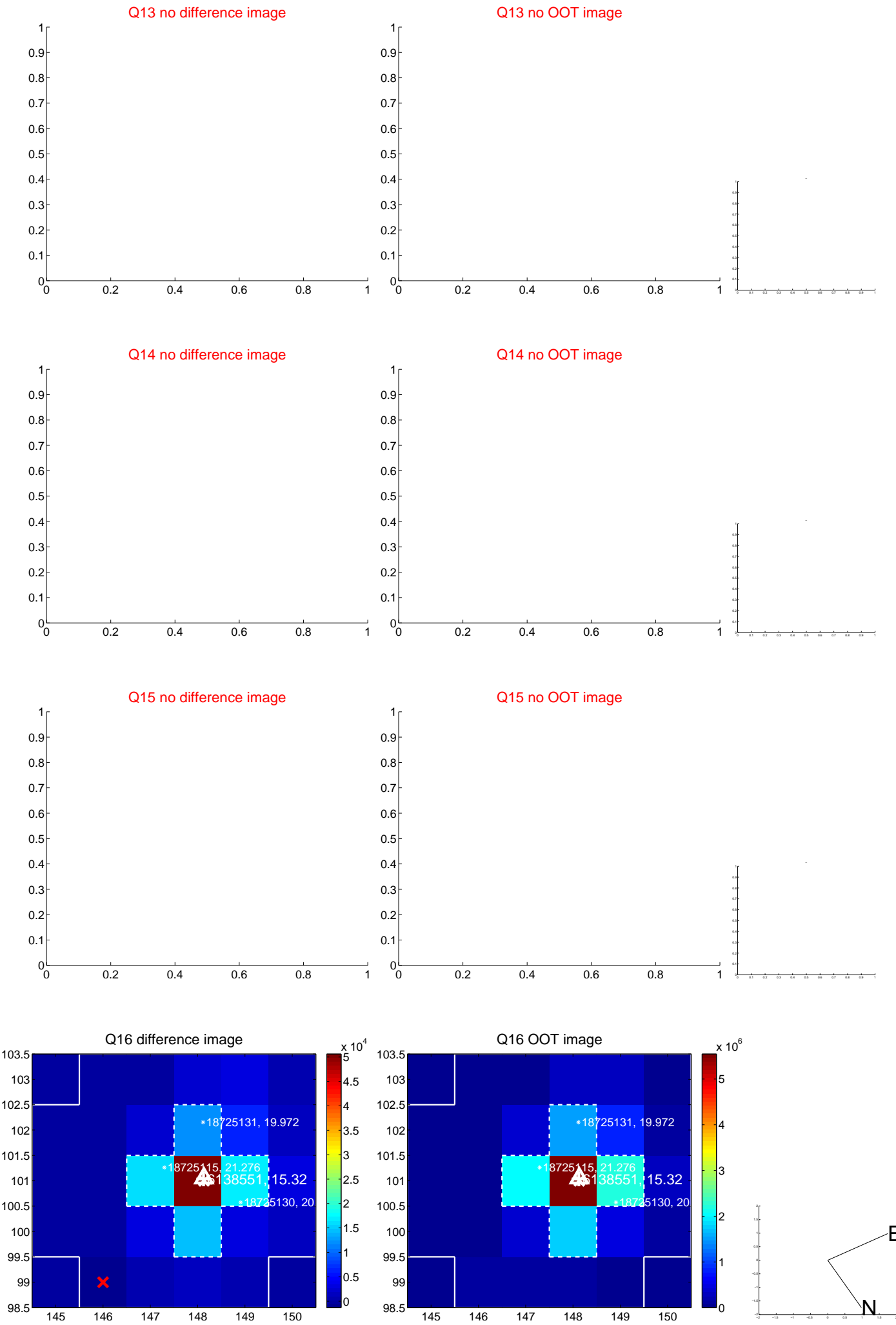


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

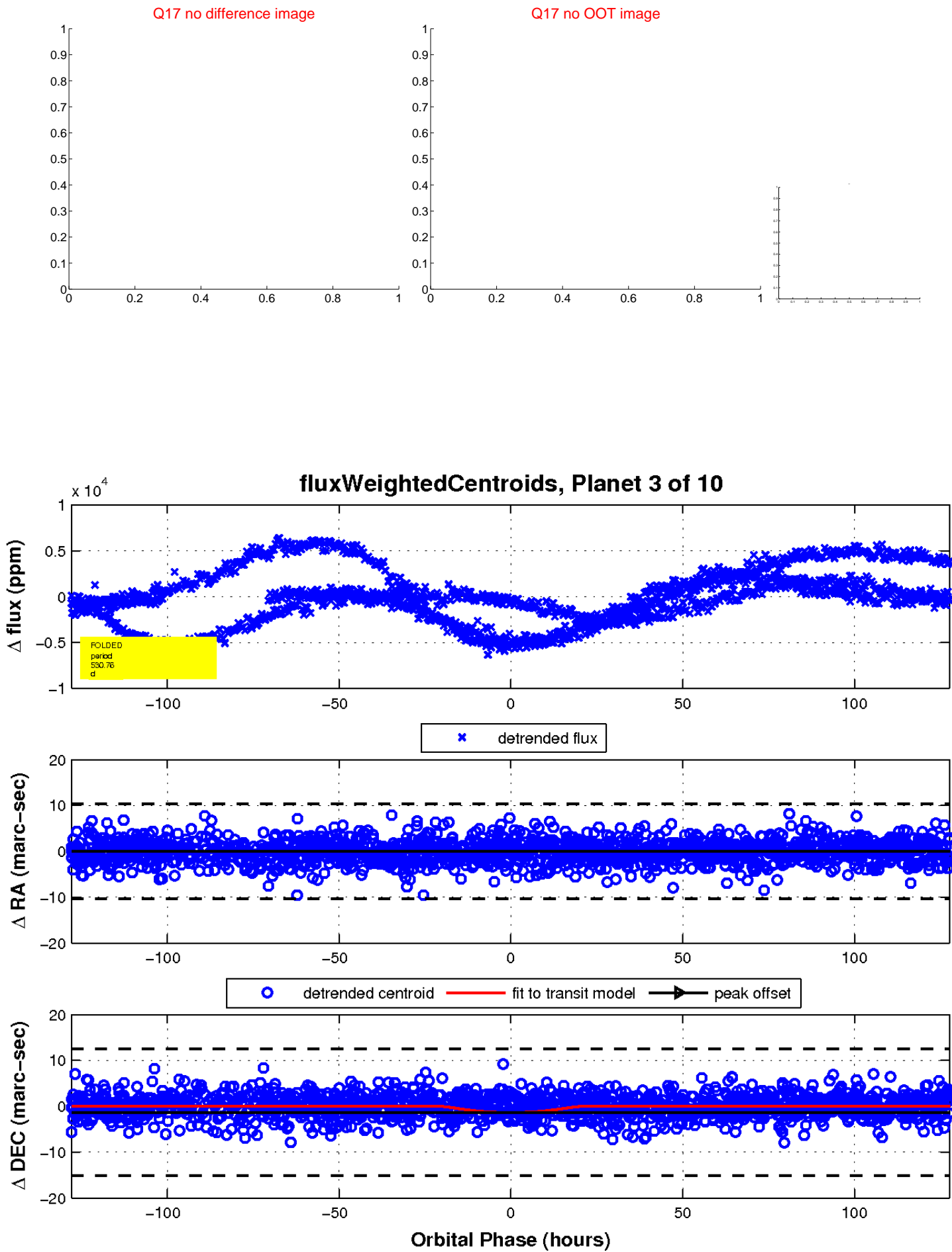




white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.

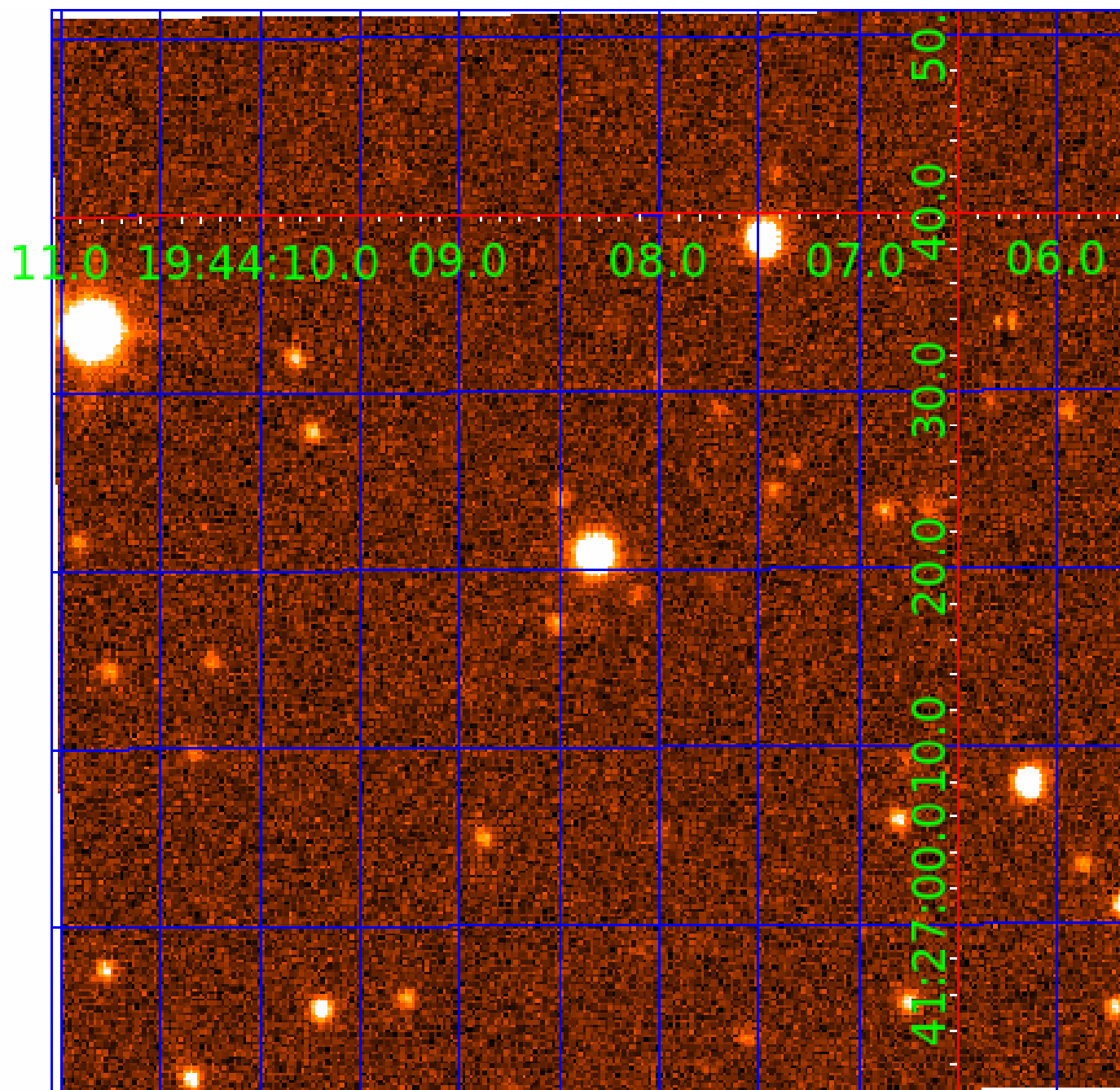


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006138551-01	OBS	No	0.903264	132.276864	60.2	3.755	7.8	9.6	0.74	4987	0.58	1092.39
006138551-02	OBS	No	562.854767	235.373574	932.2	6.266	16.6	4.6	0.74	4987	2.58	0.20
006138551-03	OBS	No	530.761276	479.223857	4353.4	42.694	16.7	8.6	0.74	4987	6.18	0.22
006138551-04	OBS	No	228.013194	343.175015	1171.4	13.680	15.1	6.7	0.74	4987	5.12	0.69
006138551-05	OBS	No	464.265857	586.087268	1073.6	6.635	13.9	7.7	0.74	4987	2.51	0.27
006138551-06	OBS	No	576.302885	273.589413	1404.5	14.591	12.2	7.4	0.74	4987	3.24	0.20
006138551-07	OBS	No	207.671057	239.280791	614.0	3.898	11.6	4.3	0.74	4987	2.13	0.78
006138551-08	OBS	No	405.523905	211.416753	1420.6	13.319	11.5	8.4	0.74	4987	3.42	0.32
006138551-09	OBS	No	278.937876	305.513027	390.8	6.513	11.0	2.9	0.74	4987	1.74	0.52
006138551-10	OBS	No	464.292287	584.958197	3505.3	46.997	9.5	5.4	0.74	4987	5.35	0.27

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006138551-01	OBS	FP	0.00	1	0	0	0	LPP_DV
006138551-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_TRACKER—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
006138551-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
006138551-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV
006138551-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
006138551-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS
006138551-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_TRACKER—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
006138551-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—INCONSISTENT_TRANS
006138551-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—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
006138551-10	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—SAME_NTL_PERIOD—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.

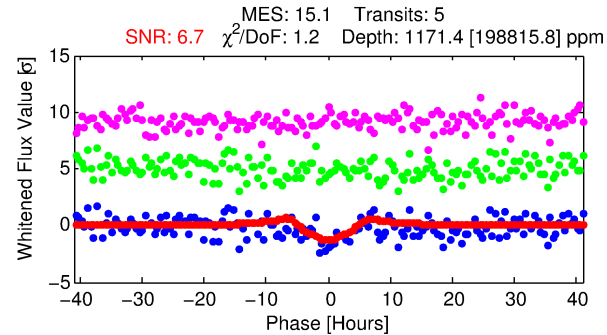
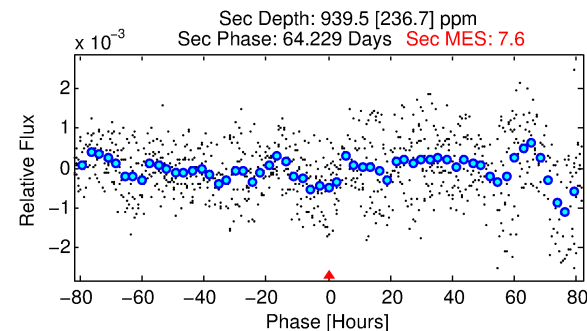
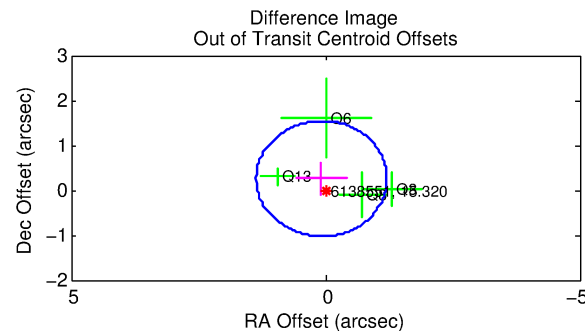
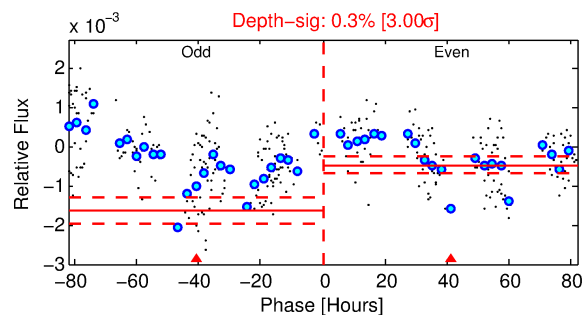
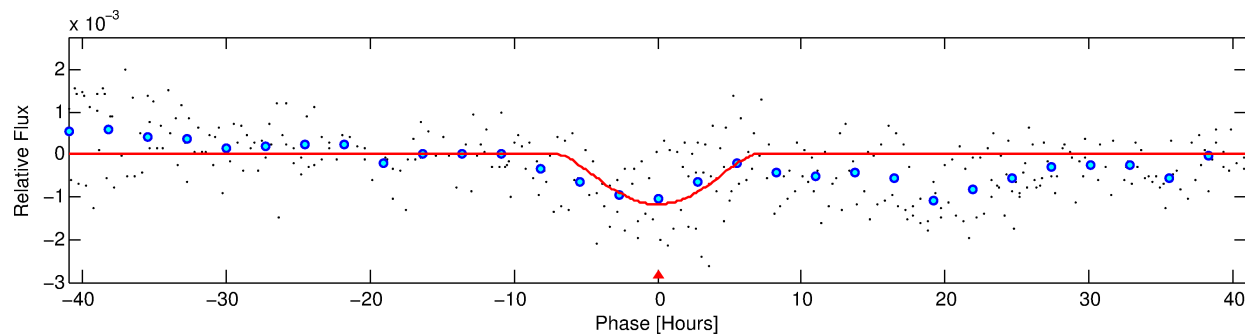
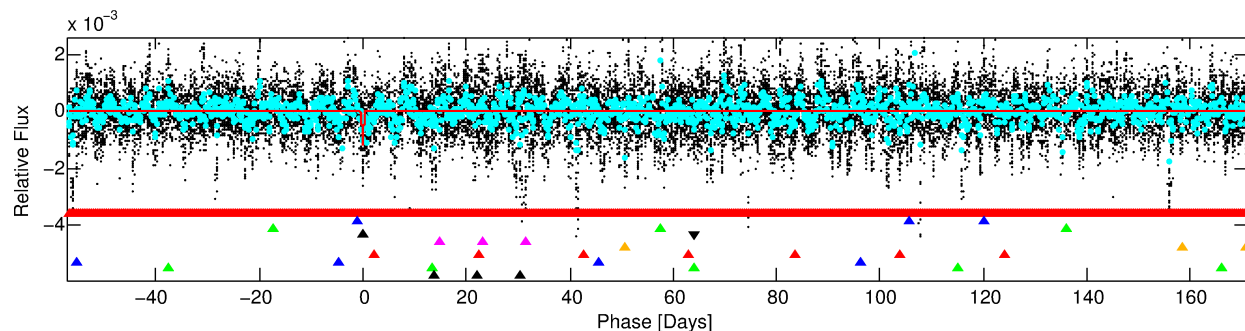
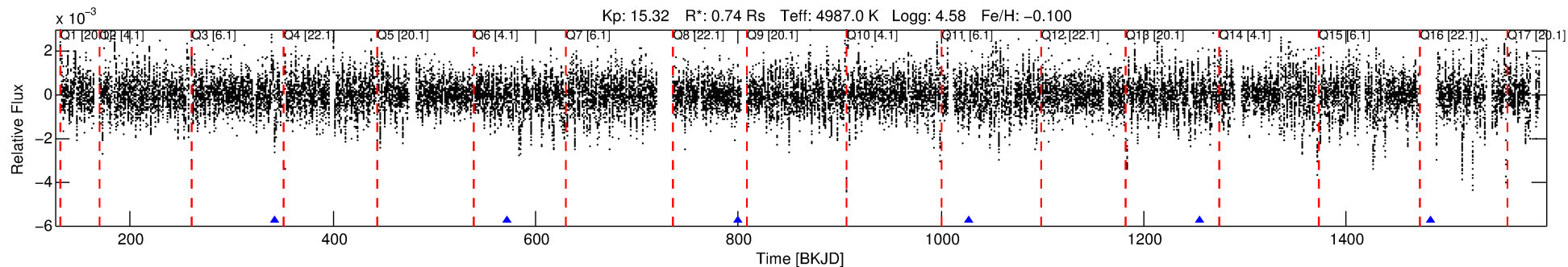
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 006138551-04

No Significant Match Found

# DV One-Page Summary

KIC: 6138551 Candidate: 4 of 10 Period: 228.013 d



## DV Fit Results:

Period = 228.01319 [0.01535] d  
Epoch = 343.1750 [0.0365] BKJD  
Rp/R\* = 0.0633 [0.2622]  
a/R\* = 46.03 [41.98]  
b = 1.00 [6.71]  
Seff = 0.68 [0.11]  
Teq = 232 [9] K  
Rp = 5.12 [21.20] Re  
a = 0.6666 [0.0497] AU  
Ag = 8761.23 [72588.70] [0.12 $\sigma$ ]  
Teffp = 3470 [7187] K [0.45 $\sigma$ ]

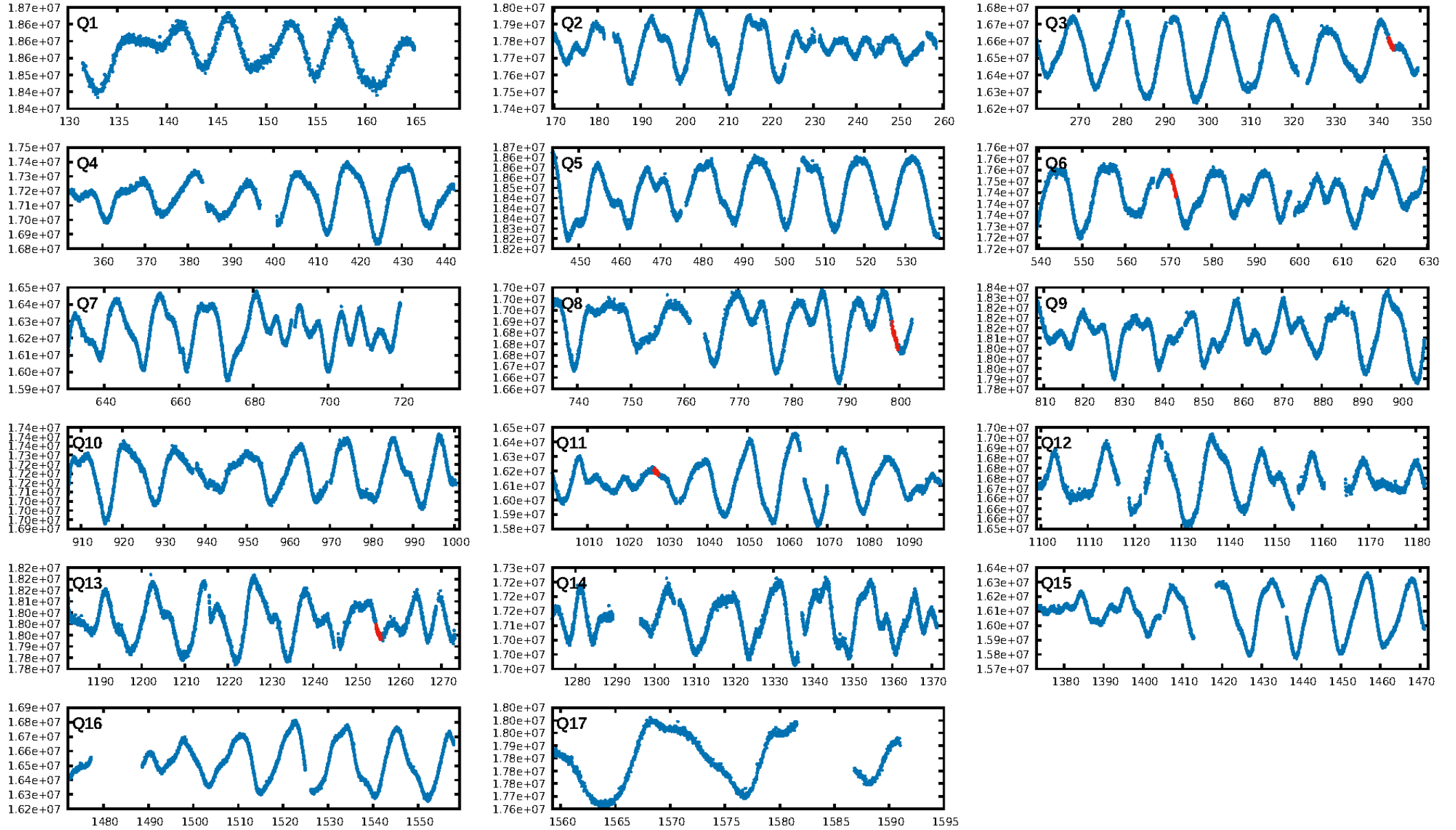
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [34.32 $\sigma$ ]  
LongPeriod-sig: 100.0% [80.67 $\sigma$ ]  
ModelChiSquare2-sig: 9.2%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [5/5]  
GhostDiagnostic-chr: 0.3471  
Centroid-sig: 9.9%  
Centroid-so: 0.753 arcsec [1.04 $\sigma$ ]  
OotOffset-rm: 0.266 arcsec [0.62 $\sigma$ ]  
KicOffset-rm: 0.113 arcsec [0.20 $\sigma$ ]  
OotOffset-st: 1/1/1/1 [4]  
KicOffset-st: 1/1/1/1 [4]  
DiffImageQuality-fgm: 0.75 [3/4]  
DiffImageOverlap-fno: 0.00 [0/4]

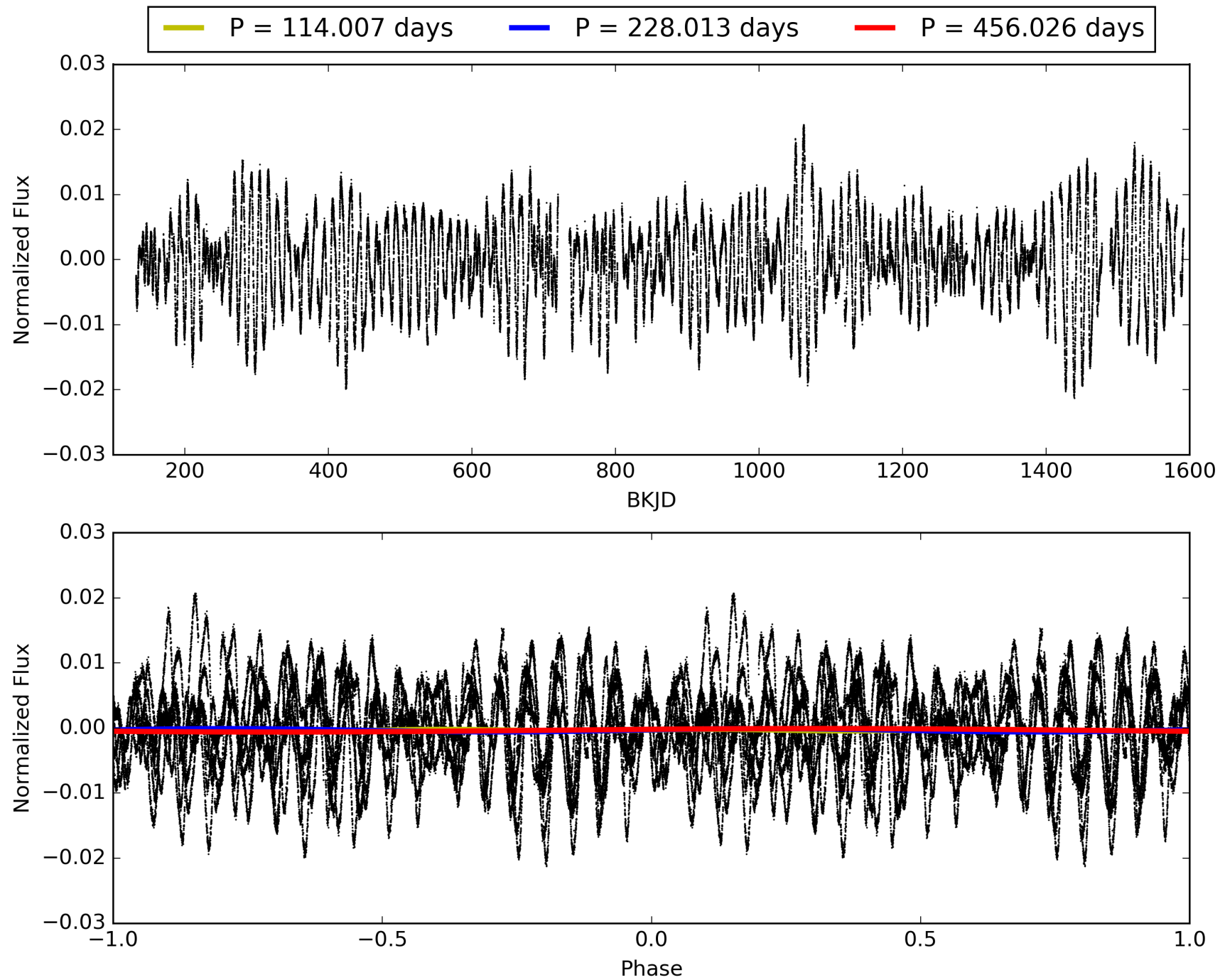
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 03-Feb-2016 04:50:44 Z

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

# TCE 006138551-04, PDC Light Curves



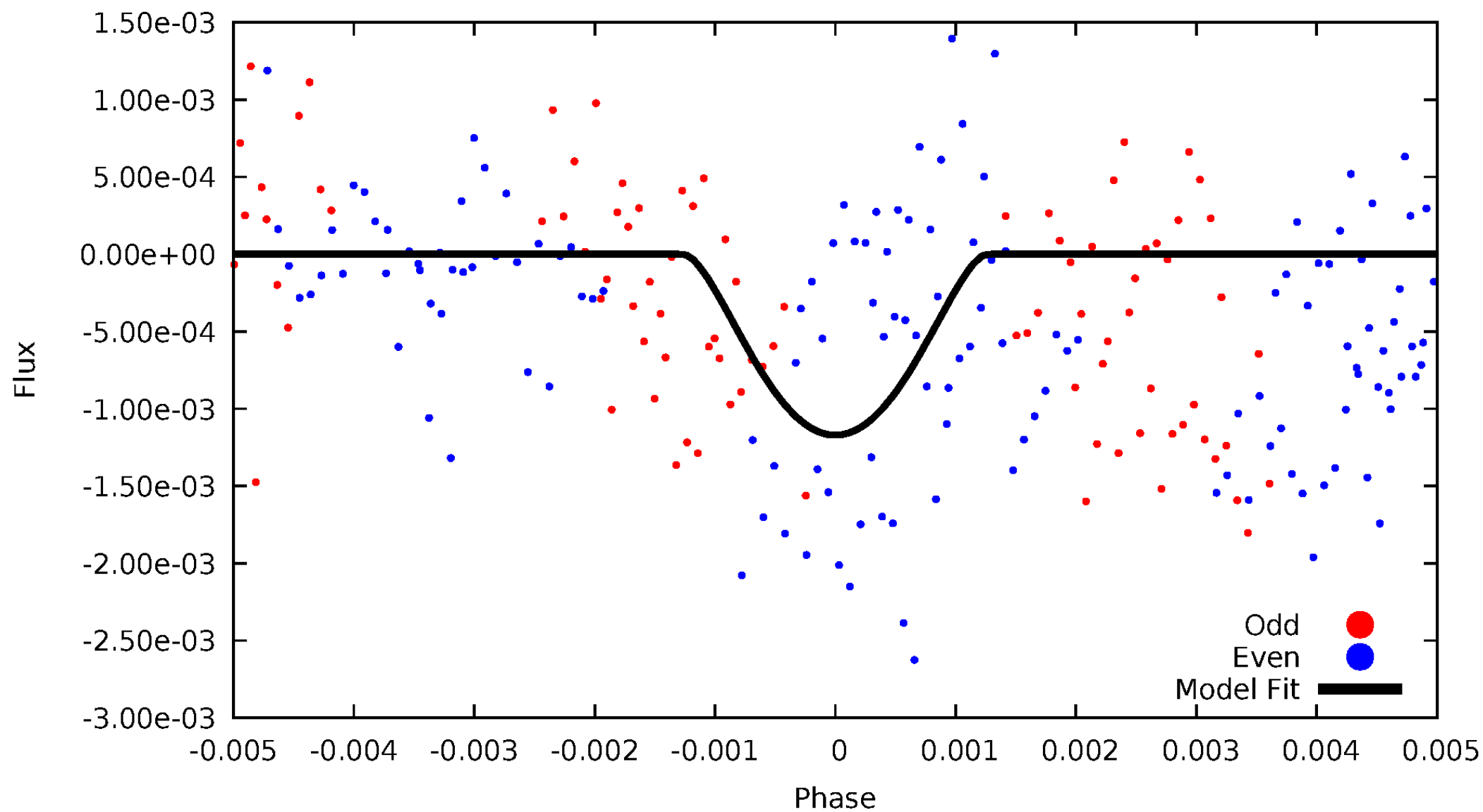
# TCE 006138551-04





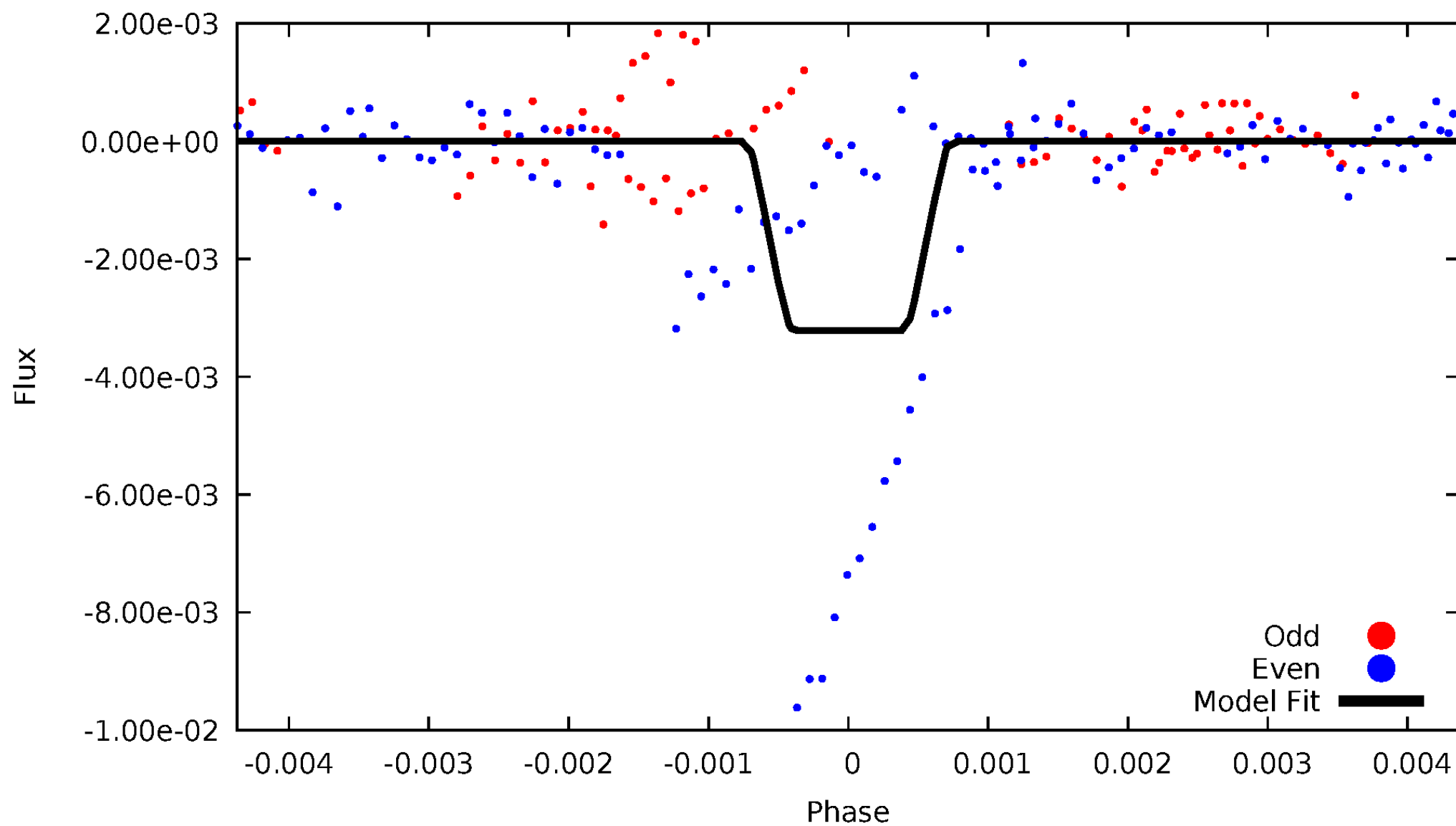
# DV Odd/Even

TCE 006138551-04



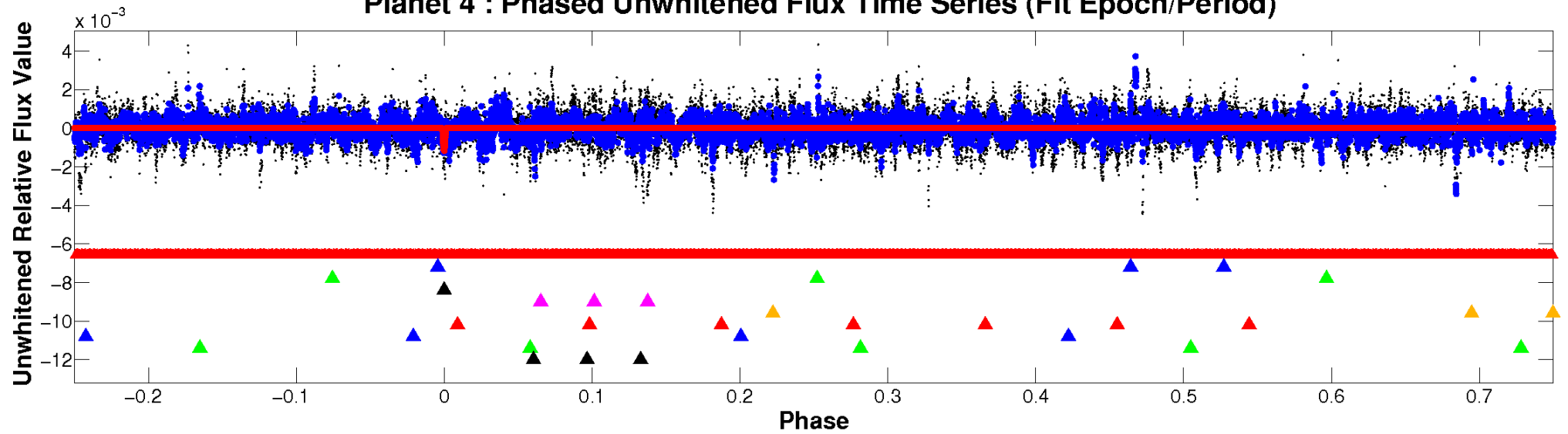
# ALT Odd/Even

TCE 006138551-04

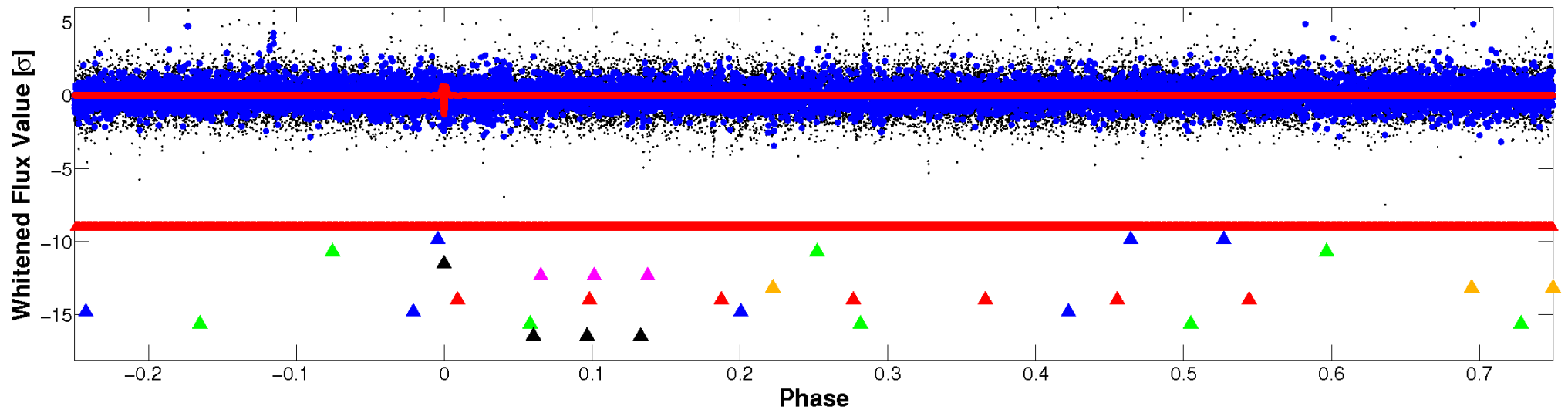


# Non-Whitened Vs. Whitened Light Curve

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

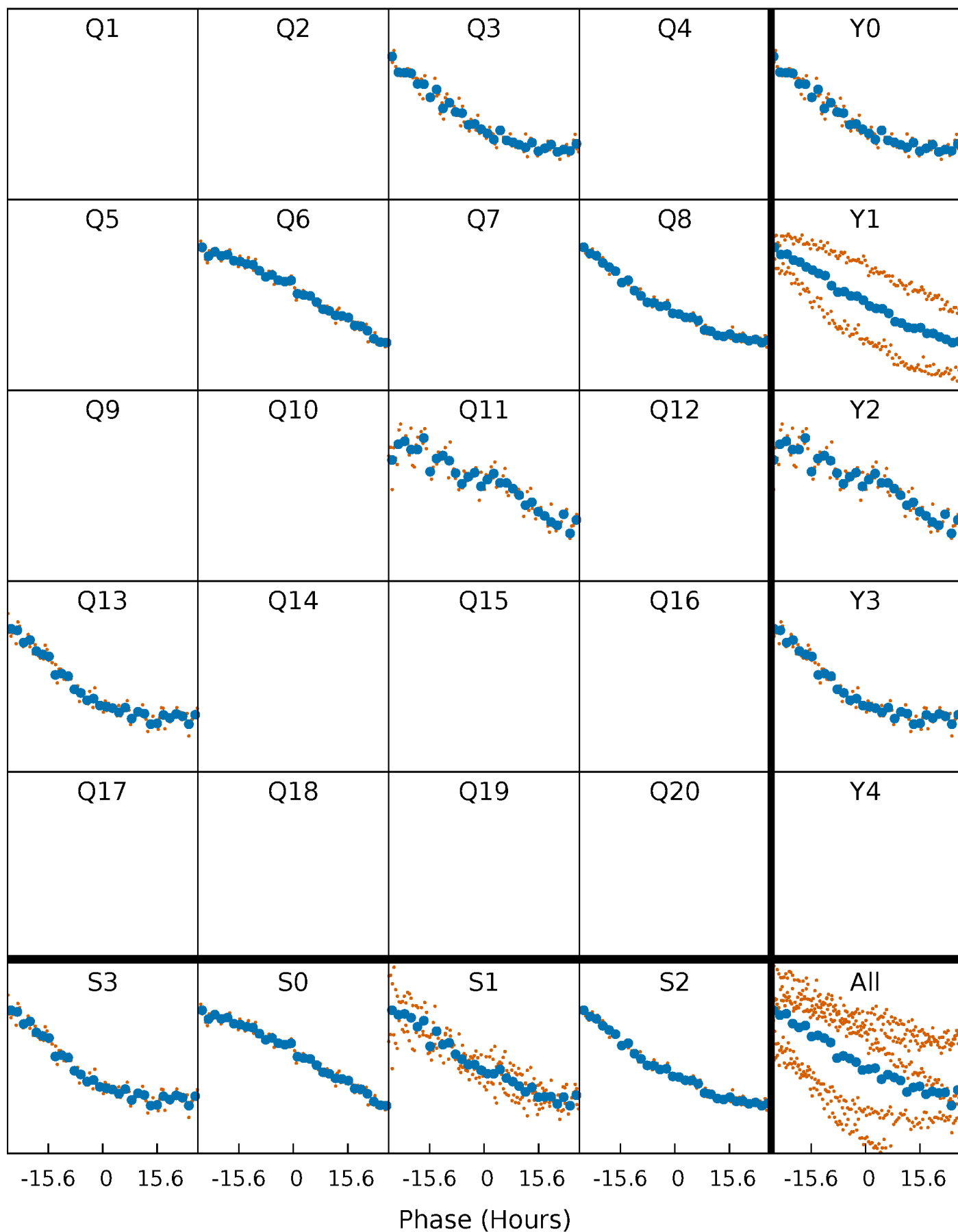


## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



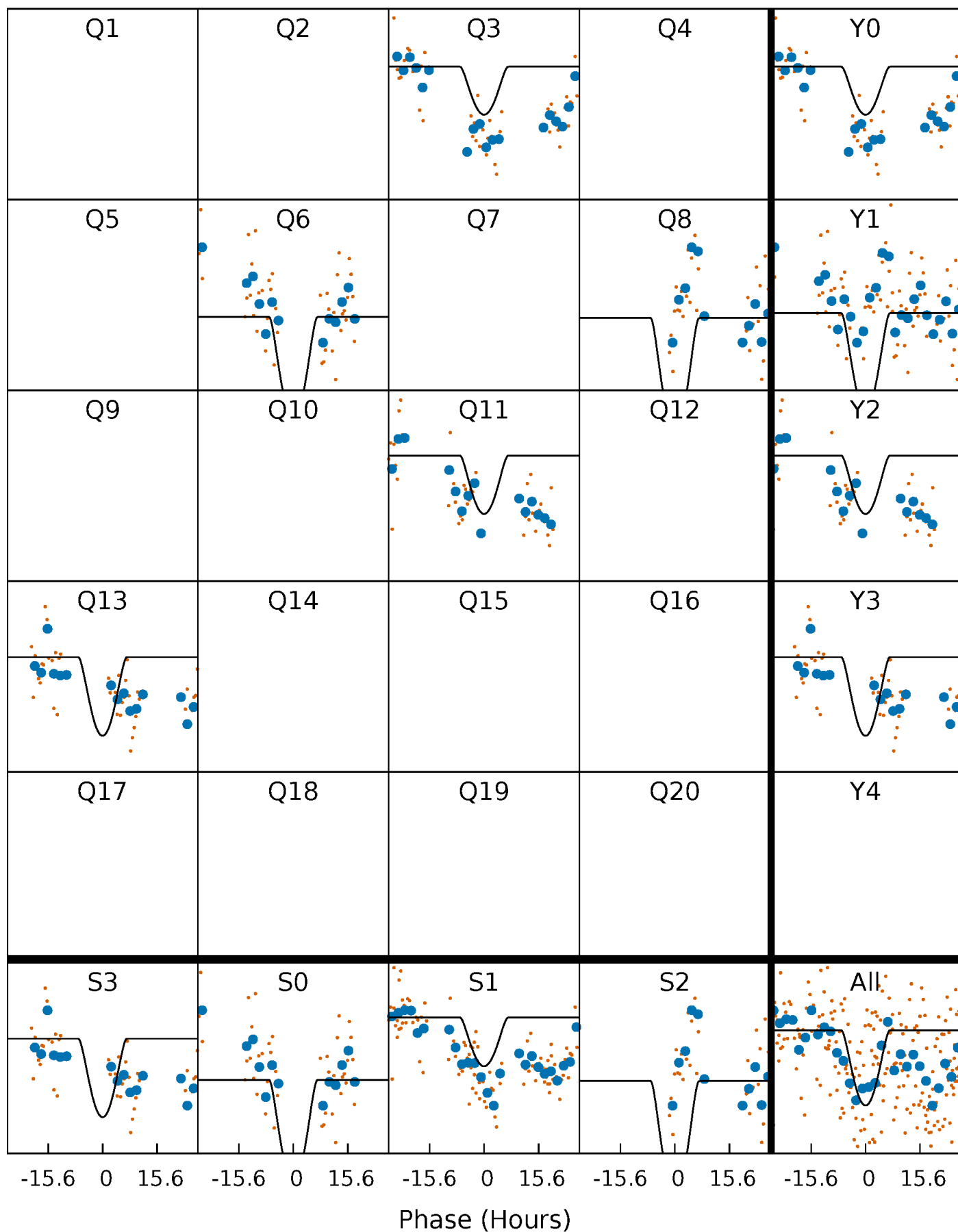
# PDC Quarter-Phased Transit Curves

TCE 006138551-04   P=228.013194 Days    $T_0=343.175015$  (BKJD)



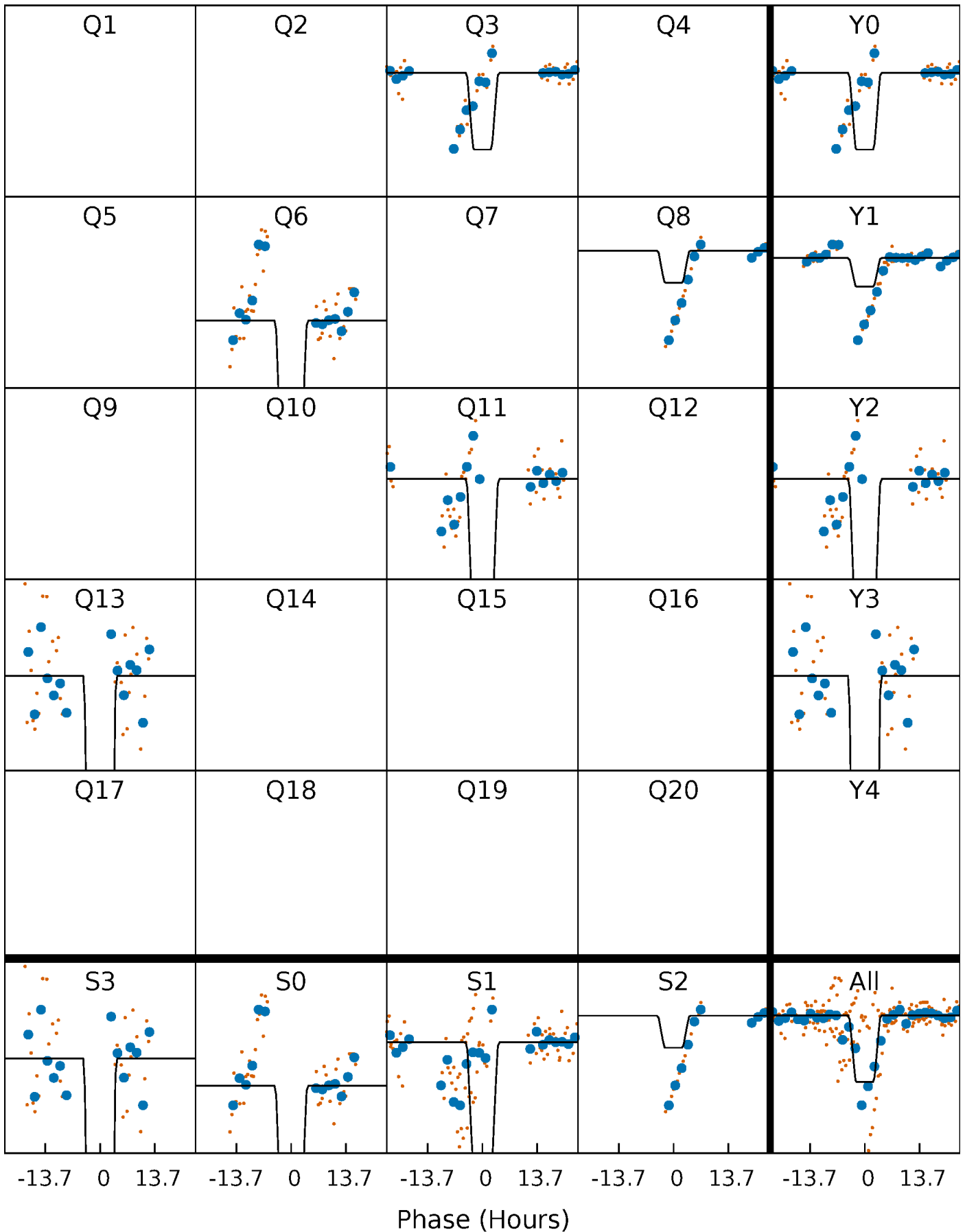
# DV Quarter-Phased Transit Curves

TCE 006138551-04   P=228.013194 Days    $T_0=343.175015$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

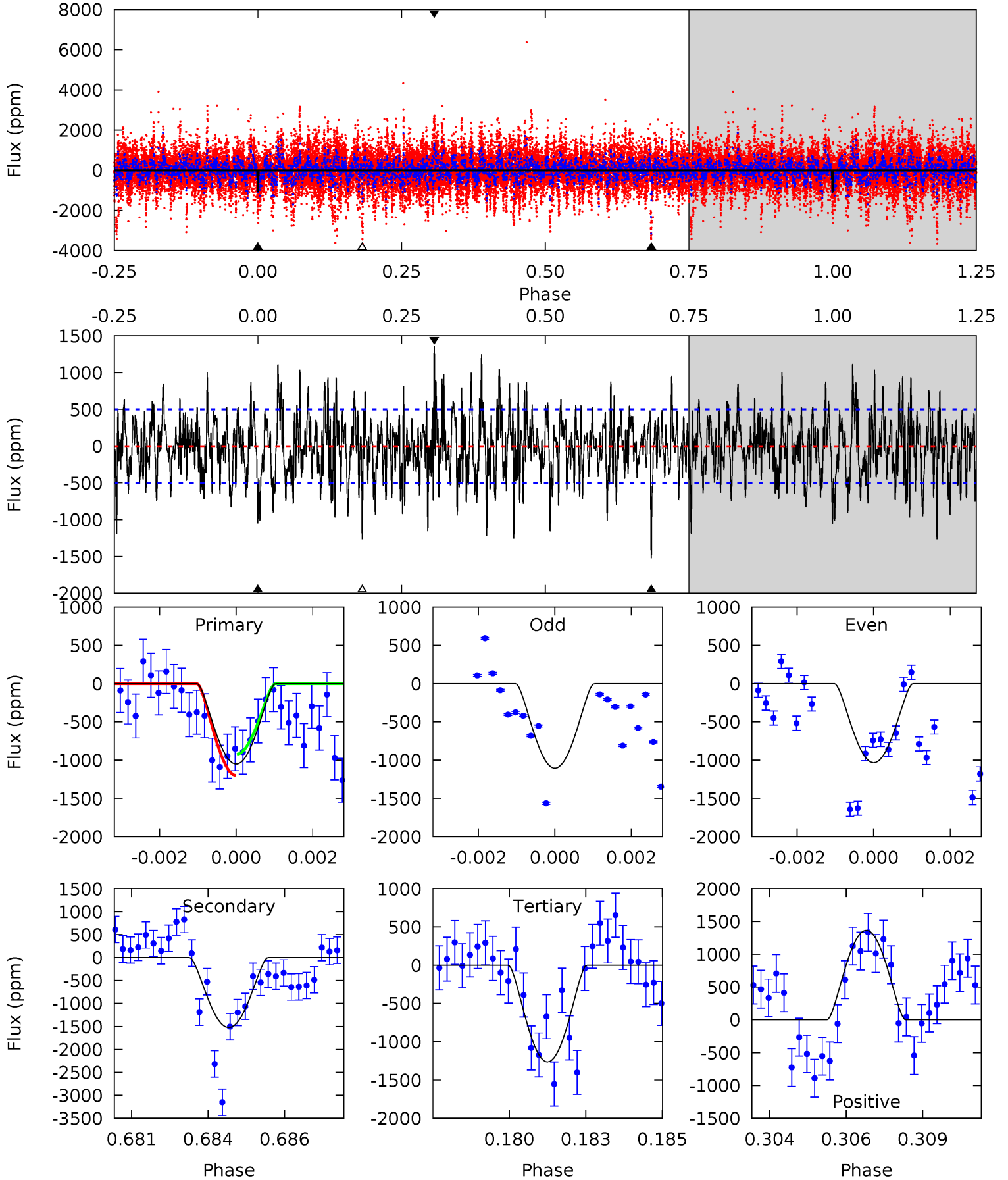
TCE 006138551-04 P=227.970418 Days  $T_0=343.278972$  (BKJD)



# DV Model-Shift Uniqueness Test

006138551-04, P = 228.013194 Days, E = 115.161821 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.1	16.1	13.4	14.4	5.29	3.03	3.98	-2.25	-3.31	2.76	1.70	0.32	1.13	0.47	1.47

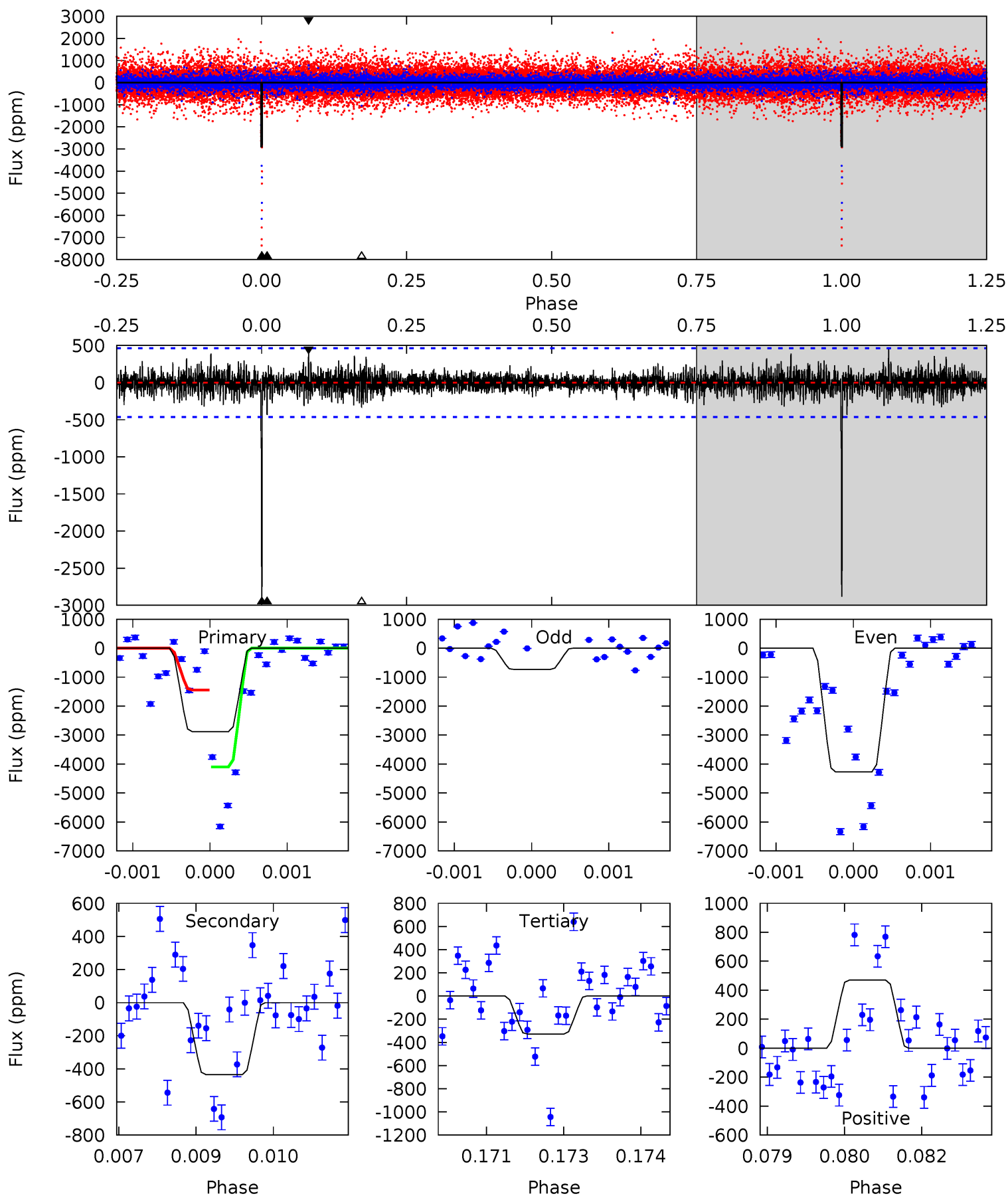




# Alt Model-Shift Uniqueness Test

006138551-04, P = 227.970418 Days, E = 115.308554 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
33.5	5.05	3.81	5.46	5.38	3.18	0.97	29.7	28.0	1.24	-0.40	17.8	-15.5	0.14	15.1



### Stellar Parameters For KIC 006138551

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4987^{+151}_{-136}$	$4.579^{+0.045}_{-0.050}$	$-0.100^{+0.300}_{-0.300}$	$0.741^{+0.071}_{-0.065}$	$0.760^{+0.078}_{-0.064}$	$2.633^{+0.538}_{-0.491}$
	+3%/-3%	+1%/-1%	+300%/-300%	+10%/-9%	+10%/-8%	+20%/-19%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 006138551-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-1524 \pm 94$	$16.65^{+16.38}_{-11.52}$	$325^{+13}_{-11}$	$2853^{+1322}_{-446}$	$1381^{+12511}_{-1042}$
Alt.	$-435 \pm 86$	$16.67^{+16.87}_{-11.47}$	$325^{+12}_{-11}$	$2446^{+896}_{-363}$	$379^{+3761}_{-284}$

$T_{\text{max}}$  = 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

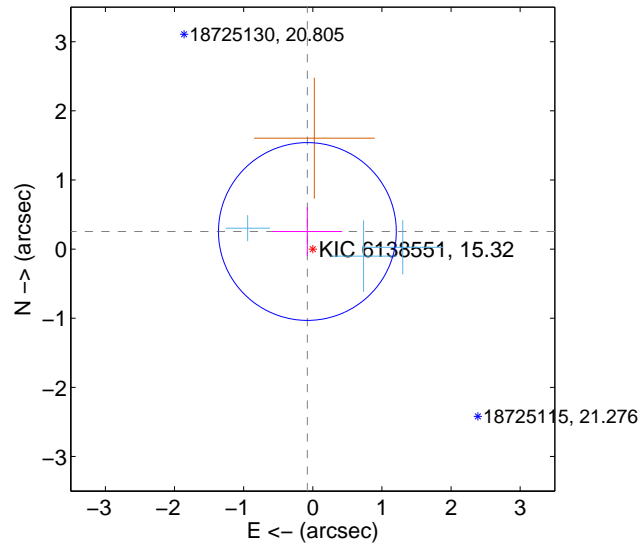
Supplemental centroid analysis for 006138551-04. Kepler magnitude: 15.32. Transit SNR 6.65

There are 3 quarters with good PRF difference image offsets

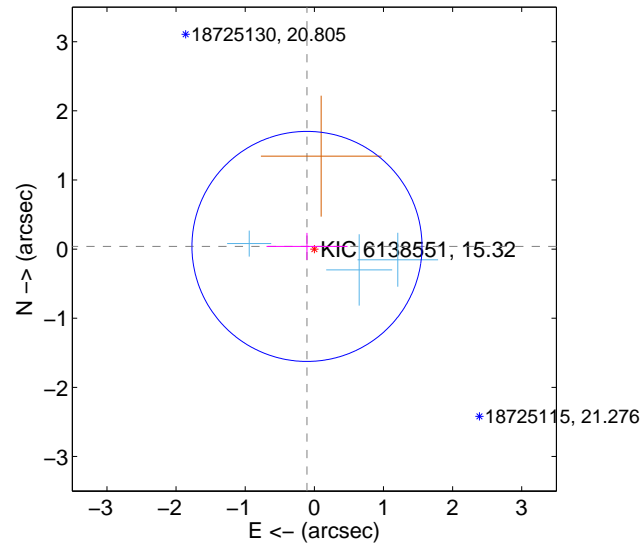
The direct PRF centroid is offset from the target star catalog position by about 0.22 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.266 \pm 0.429$	0.62	$0.078 \pm 0.503$	$0.254 \pm 0.351$
PRF-fit source offset from KIC position	$0.113 \pm 0.555$	0.20	$0.107 \pm 0.586$	$0.039 \pm 0.195$
photometric centroid source offset	$0.75 \pm 0.72$	1.04	$-0.07 \pm 0.87$	$0.75 \pm 0.72$

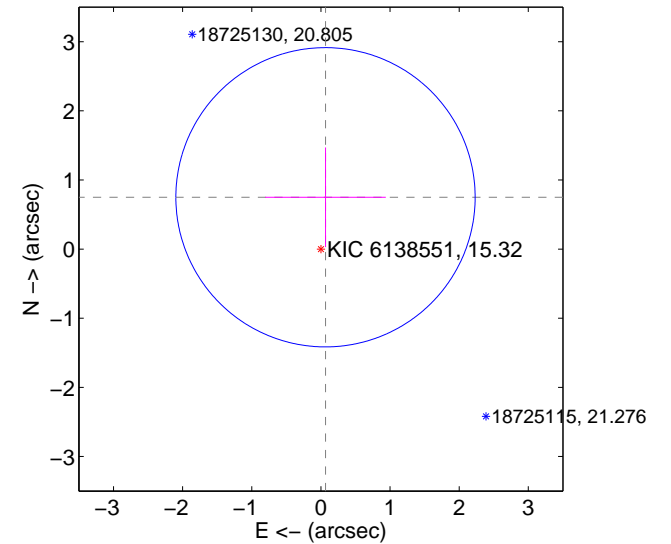
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position



offset from photometric centroids



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

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

Q1 no difference image



Q1 no OOT image



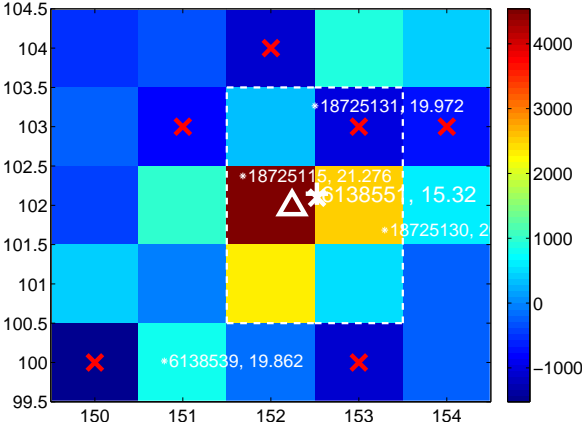
Q2 no difference image



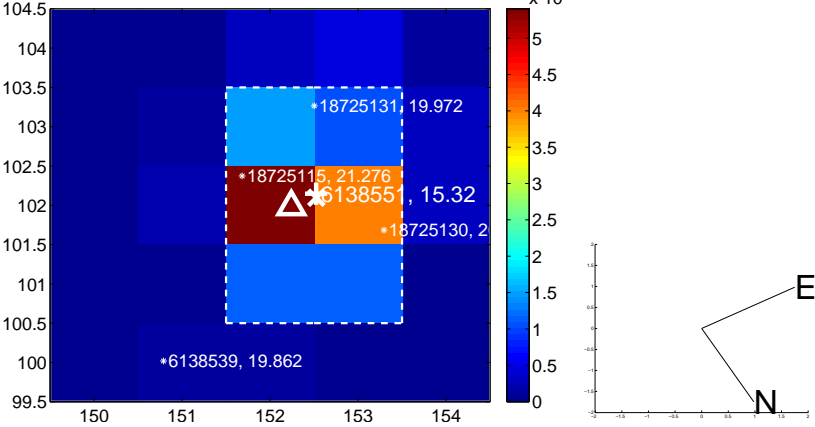
Q2 no OOT image



Q3 difference image



Q3 OOT image



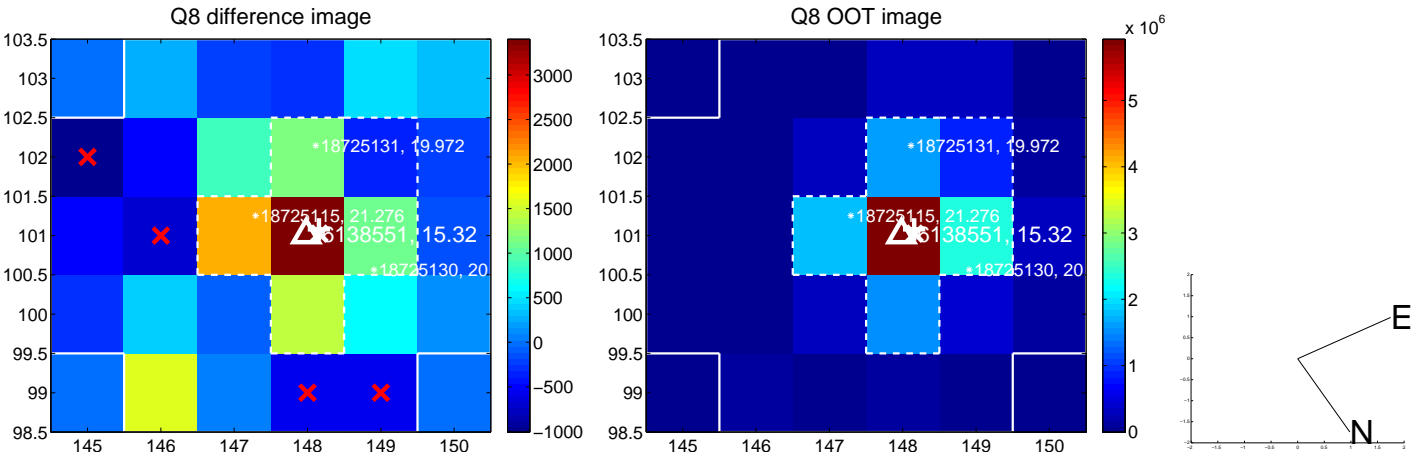
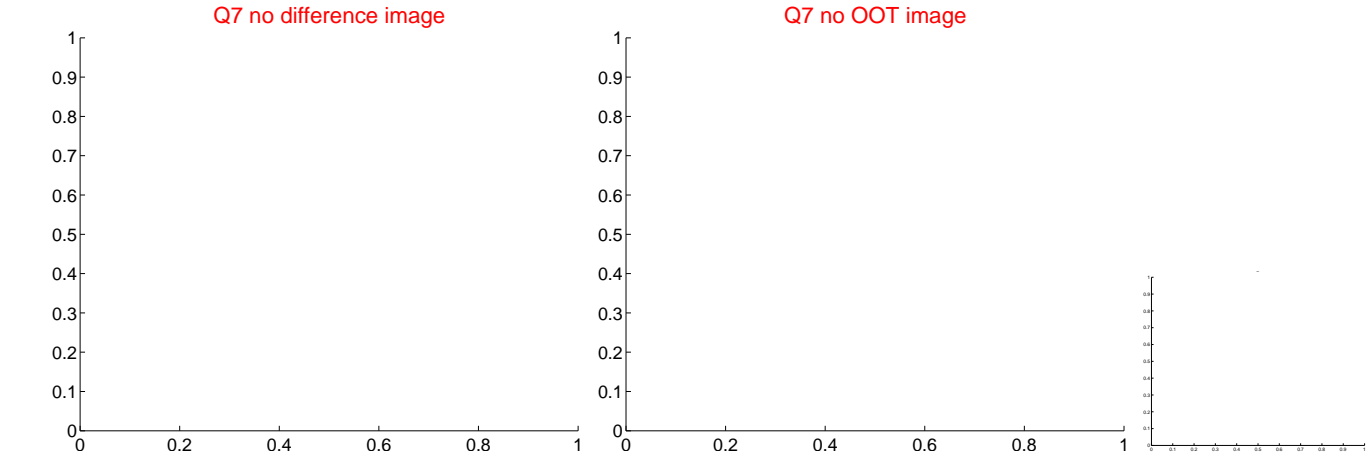
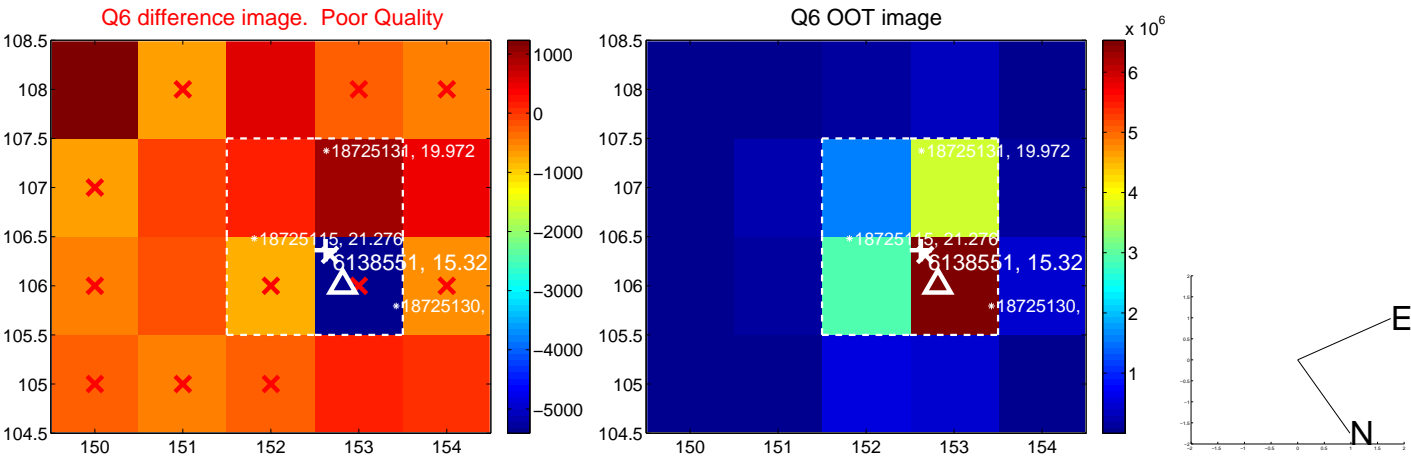
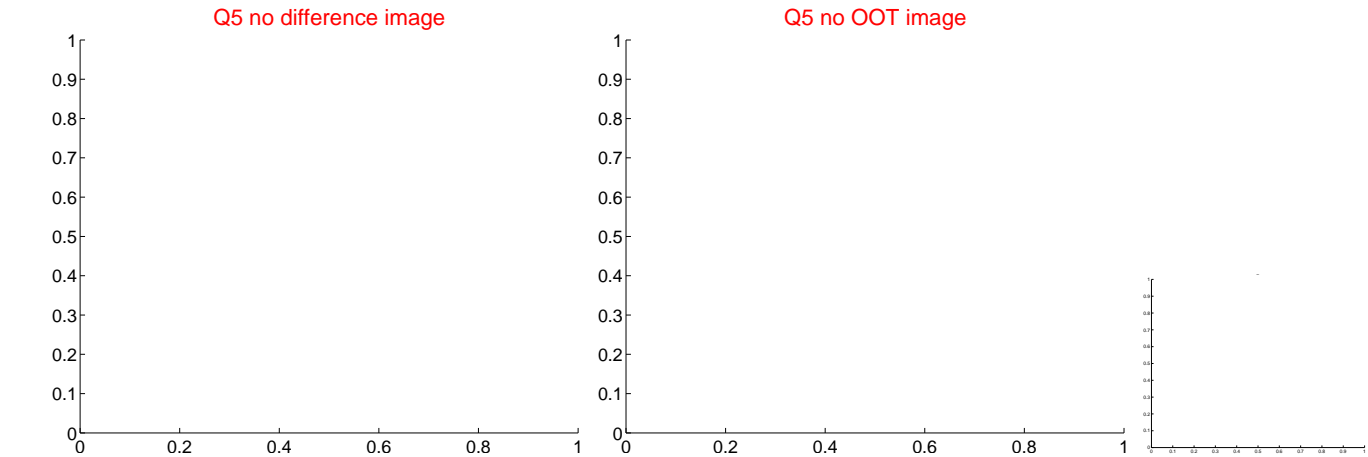
Q4 no difference image



Q4 no OOT image



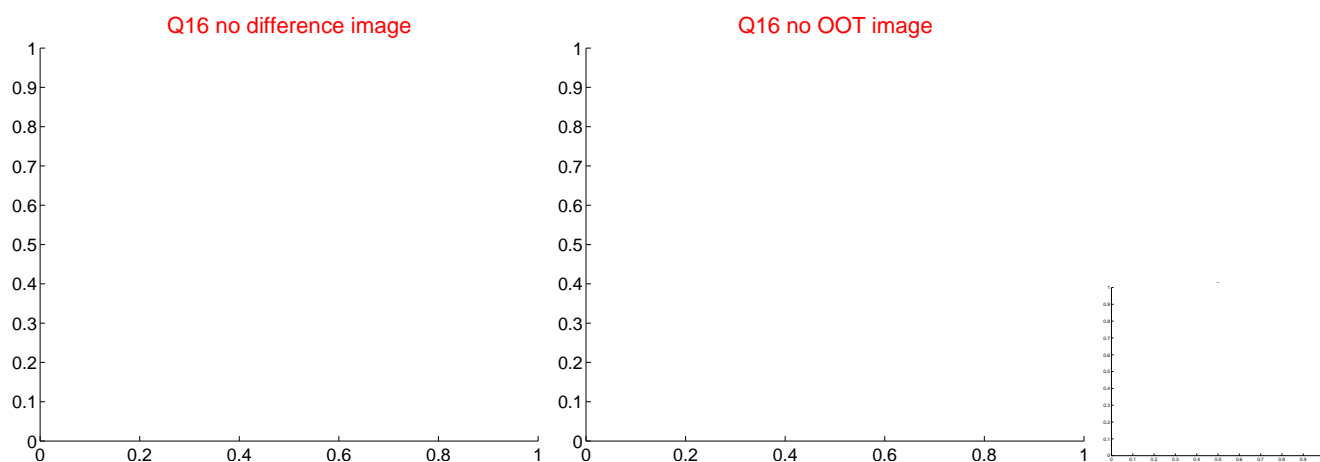
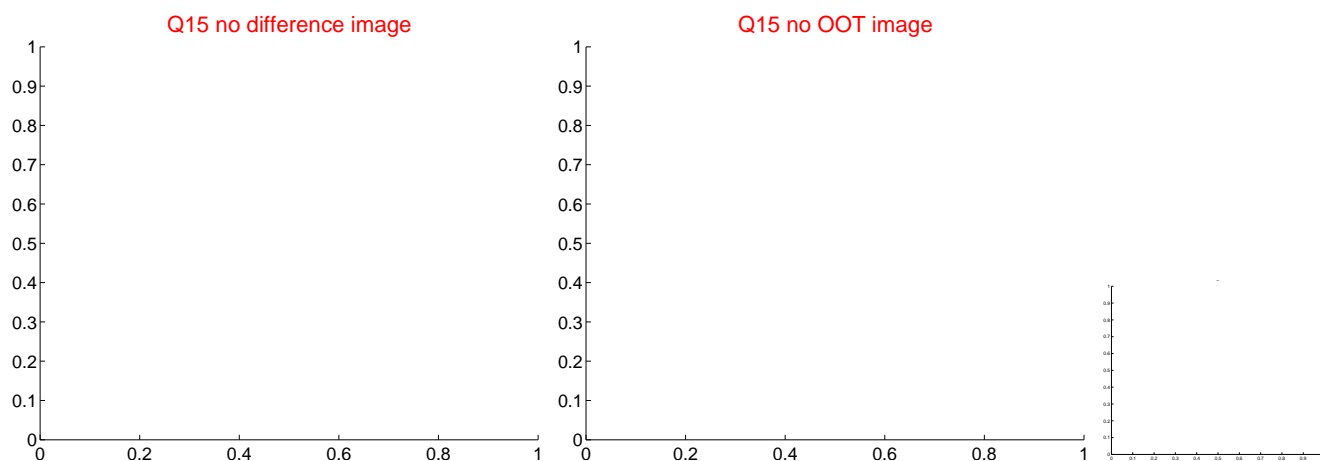
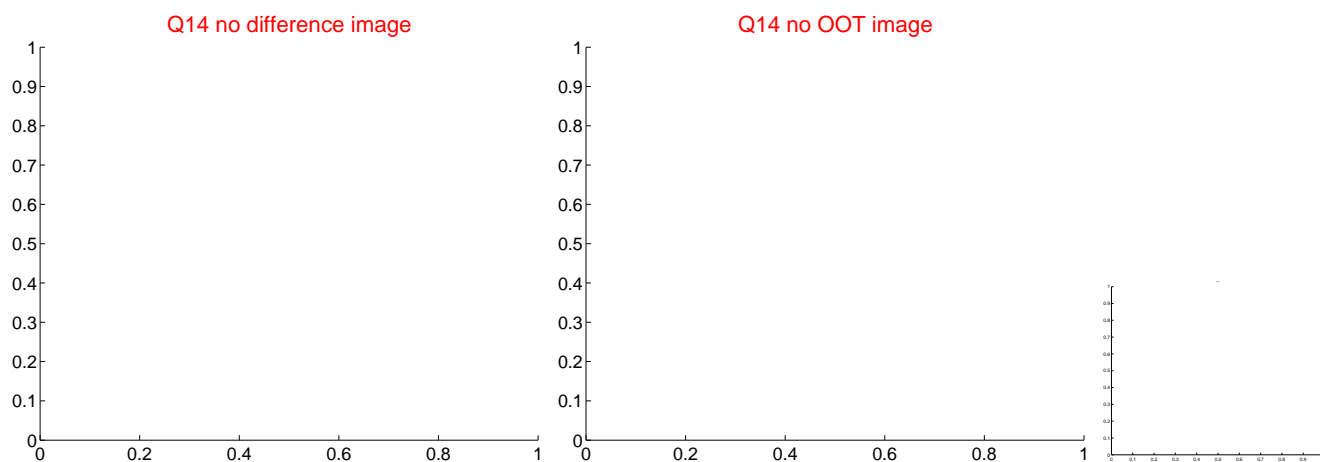
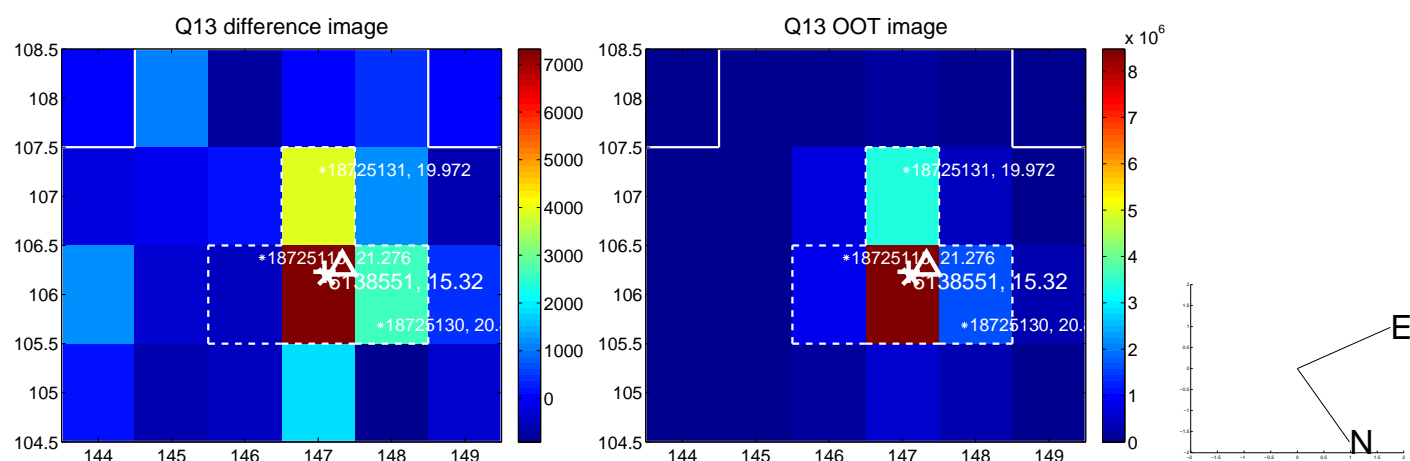
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



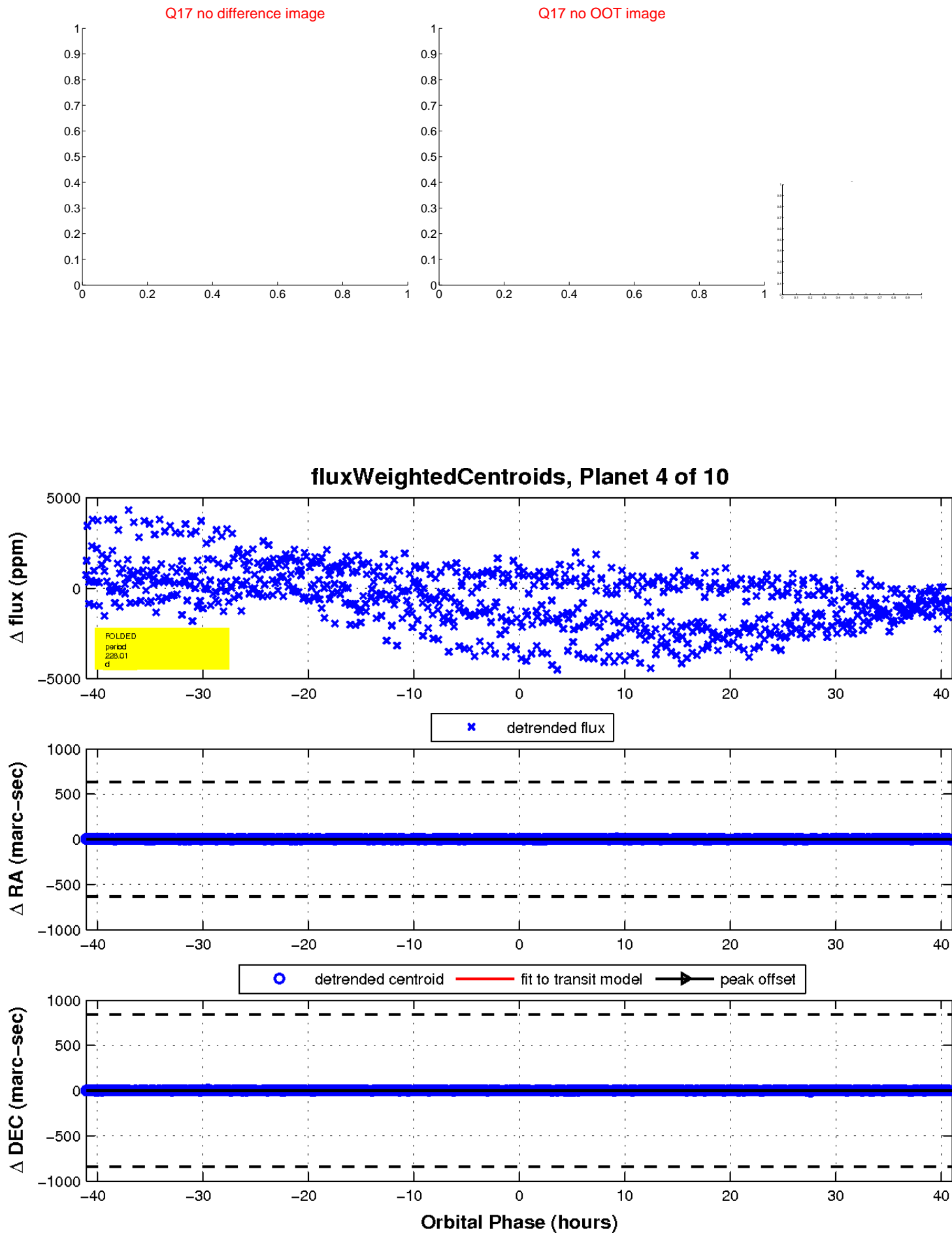
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

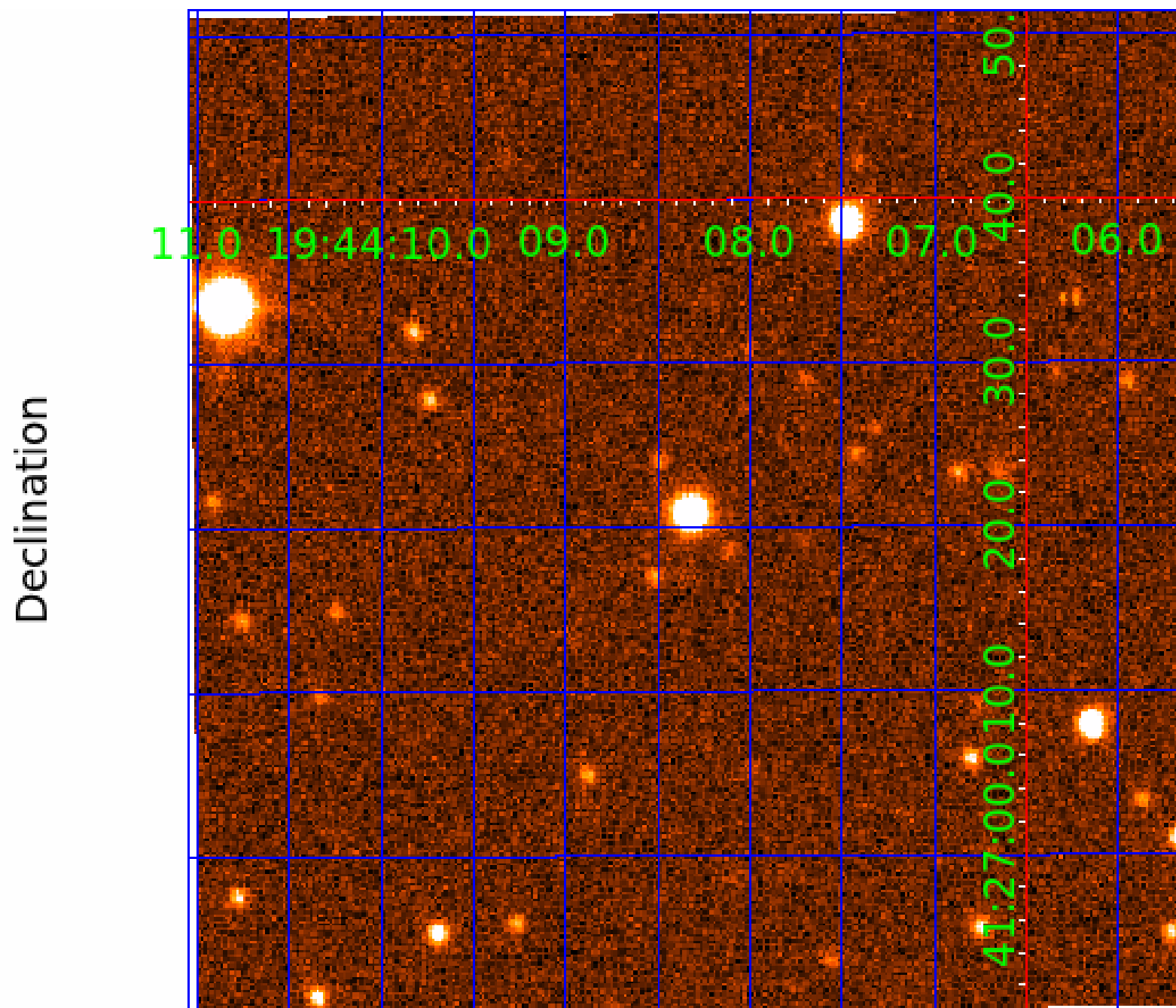


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





UKIRT Image



## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006138551-01	OBS	No	0.903264	132.276864	60.2	3.755	7.8	9.6	0.74	4987	0.58	1092.39
006138551-02	OBS	No	562.854767	235.373574	932.2	6.266	16.6	4.6	0.74	4987	2.58	0.20
006138551-03	OBS	No	530.761276	479.223857	4353.4	42.694	16.7	8.6	0.74	4987	6.18	0.22
006138551-04	OBS	No	228.013194	343.175015	1171.4	13.680	15.1	6.7	0.74	4987	5.12	0.69
006138551-05	OBS	No	464.265857	586.087268	1073.6	6.635	13.9	7.7	0.74	4987	2.51	0.27
006138551-06	OBS	No	576.302885	273.589413	1404.5	14.591	12.2	7.4	0.74	4987	3.24	0.20
006138551-07	OBS	No	207.671057	239.280791	614.0	3.898	11.6	4.3	0.74	4987	2.13	0.78
006138551-08	OBS	No	405.523905	211.416753	1420.6	13.319	11.5	8.4	0.74	4987	3.42	0.32
006138551-09	OBS	No	278.937876	305.513027	390.8	6.513	11.0	2.9	0.74	4987	1.74	0.52
006138551-10	OBS	No	464.292287	584.958197	3505.3	46.997	9.5	5.4	0.74	4987	5.35	0.27

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006138551-01	OBS	FP	0.00	1	0	0	0	LPP_DV
006138551-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_TRACKER—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
006138551-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
006138551-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV
006138551-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
006138551-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS
006138551-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_TRACKER—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
006138551-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—INCONSISTENT_TRANS
006138551-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—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
006138551-10	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—SAME_NTL_PERIOD—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.

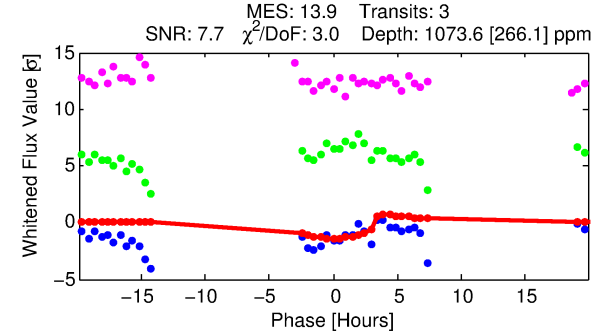
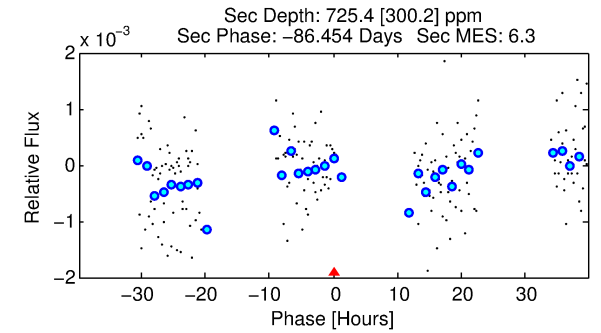
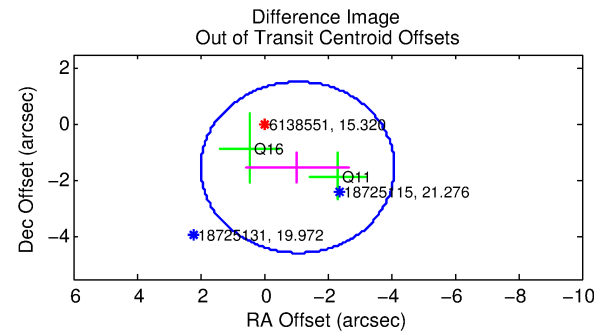
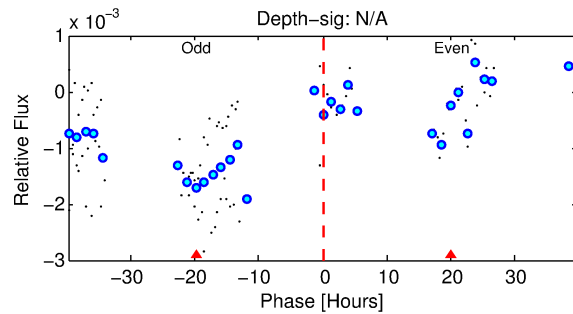
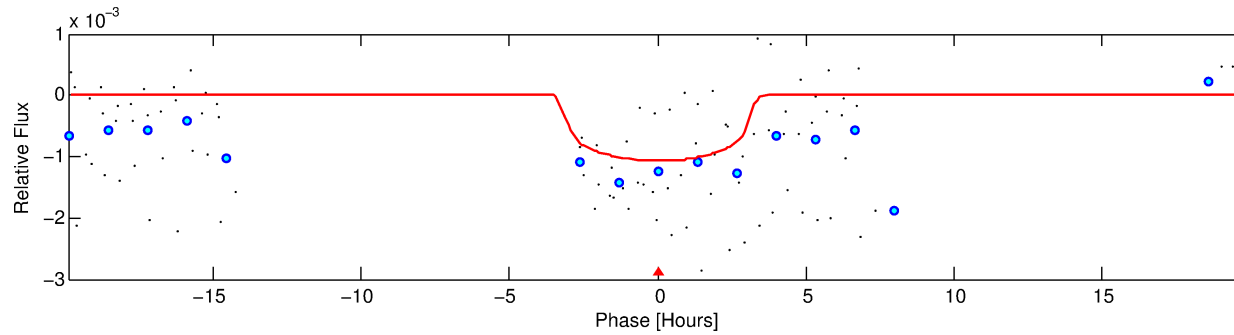
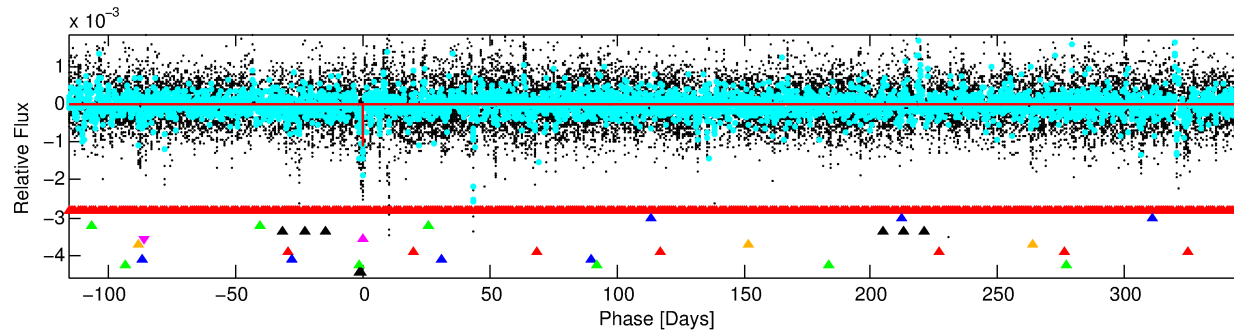
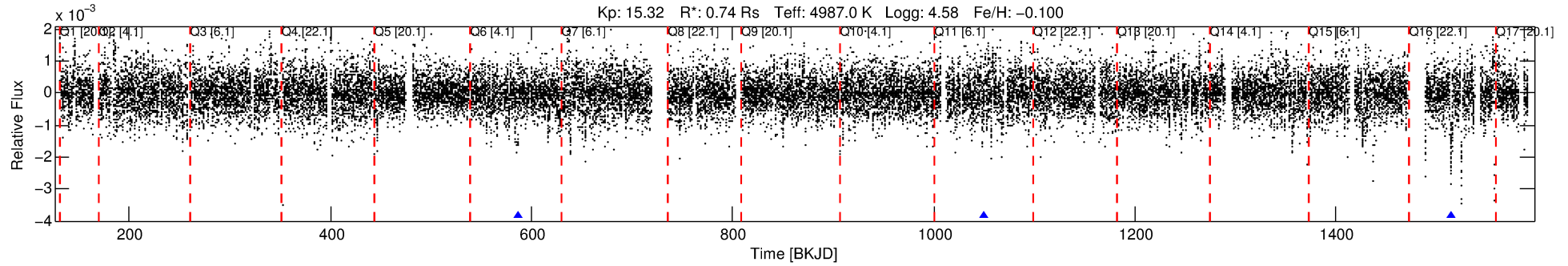
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 006138551-05

No Significant Match Found

# DV One-Page Summary

KIC: 6138551 Candidate: 5 of 10 Period: 464.266 d



## DV Fit Results:

Period = 464.26586 [0.01945] d  
Epoch = 586.0873 [0.0347] BKJD  
Rp/R\* = 0.0310 [0.0583]  
a/R\* = 446.08 [2856.08]  
b = 0.61 [6.86]  
Seff = 0.27 [0.04]  
Teq = 183 [7] K  
Rp = 2.51 [4.72] Re  
a = 1.0709 [0.0798] AU  
Ag = 72654.61 [274563.56] [0.26σ]  
Teff = 4645 [4390] K [1.02σ]

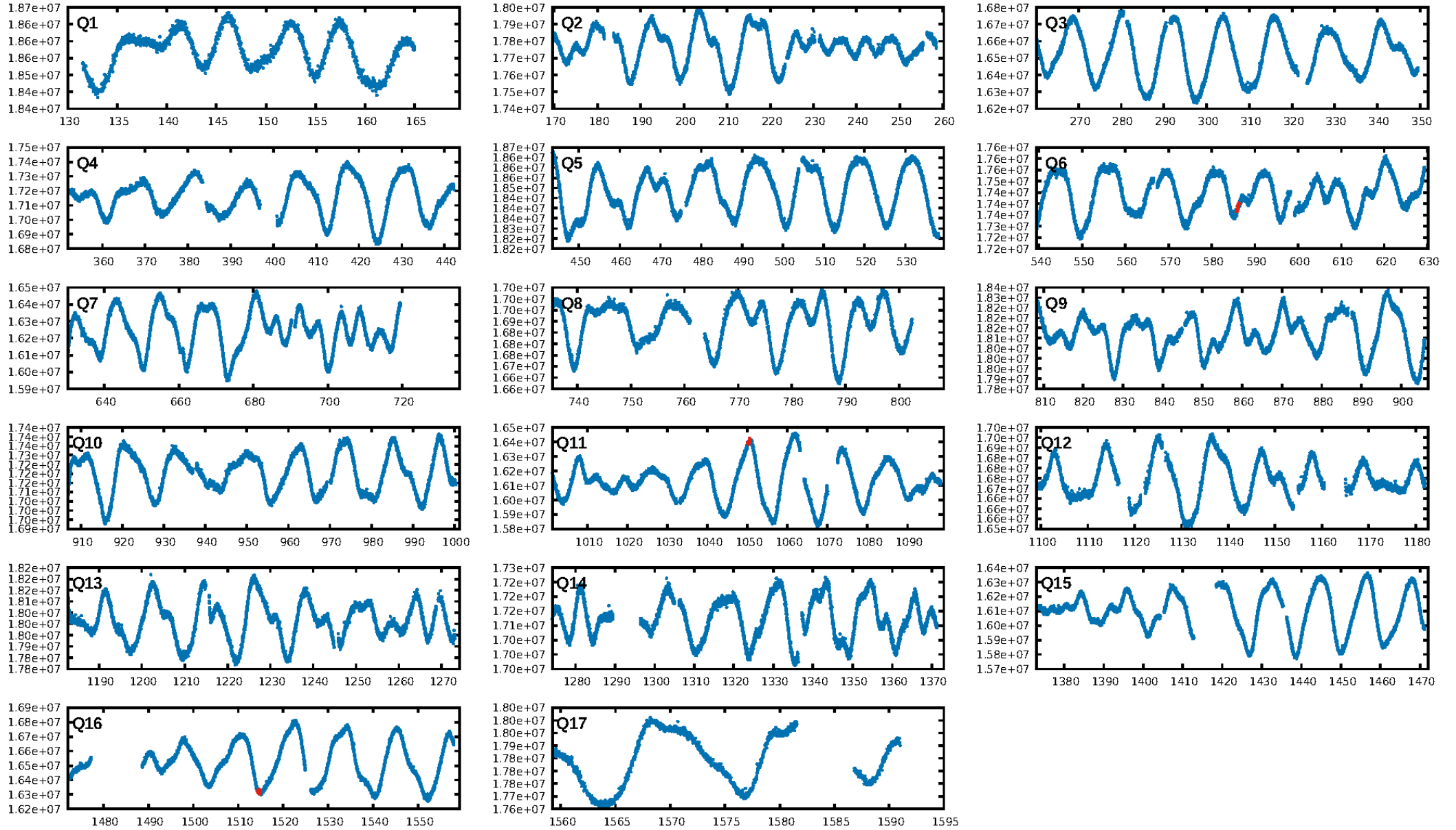
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [94.75σ]  
LongPeriod-sig: 1.1% [0.01σ]  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 9.8%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 0.2359  
Centroid-sig: 26.4%  
Centroid-so: 1.174 arcsec [0.98σ]  
OotOffset-rm: 1.858 arcsec [1.83σ]  
OotOffset-st: 0/1/1/0 [2]  
KicOffset-rm: 1.945 arcsec [1.90σ]  
KicOffset-st: 0/1/1/0 [2]  
DiffImageQuality-fgm: 0.50 [1/2]  
DiffImageOverlap-fno: 0.00 [0/3]

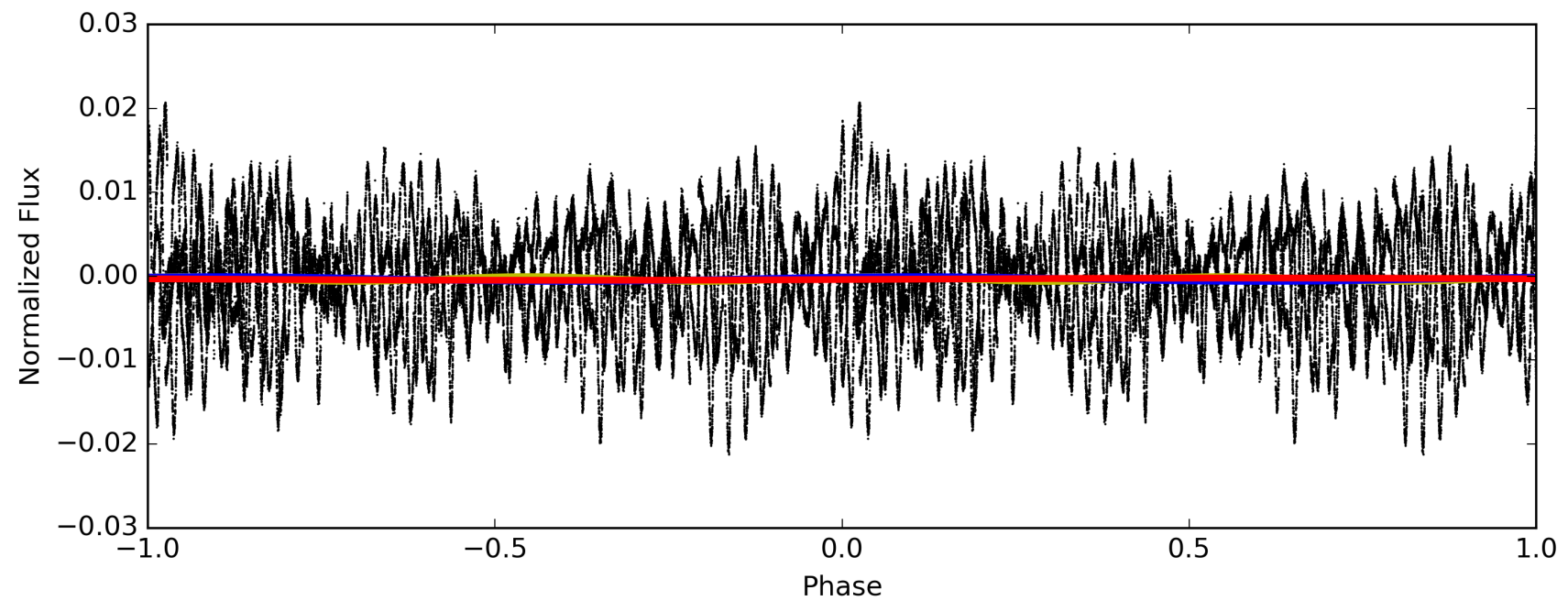
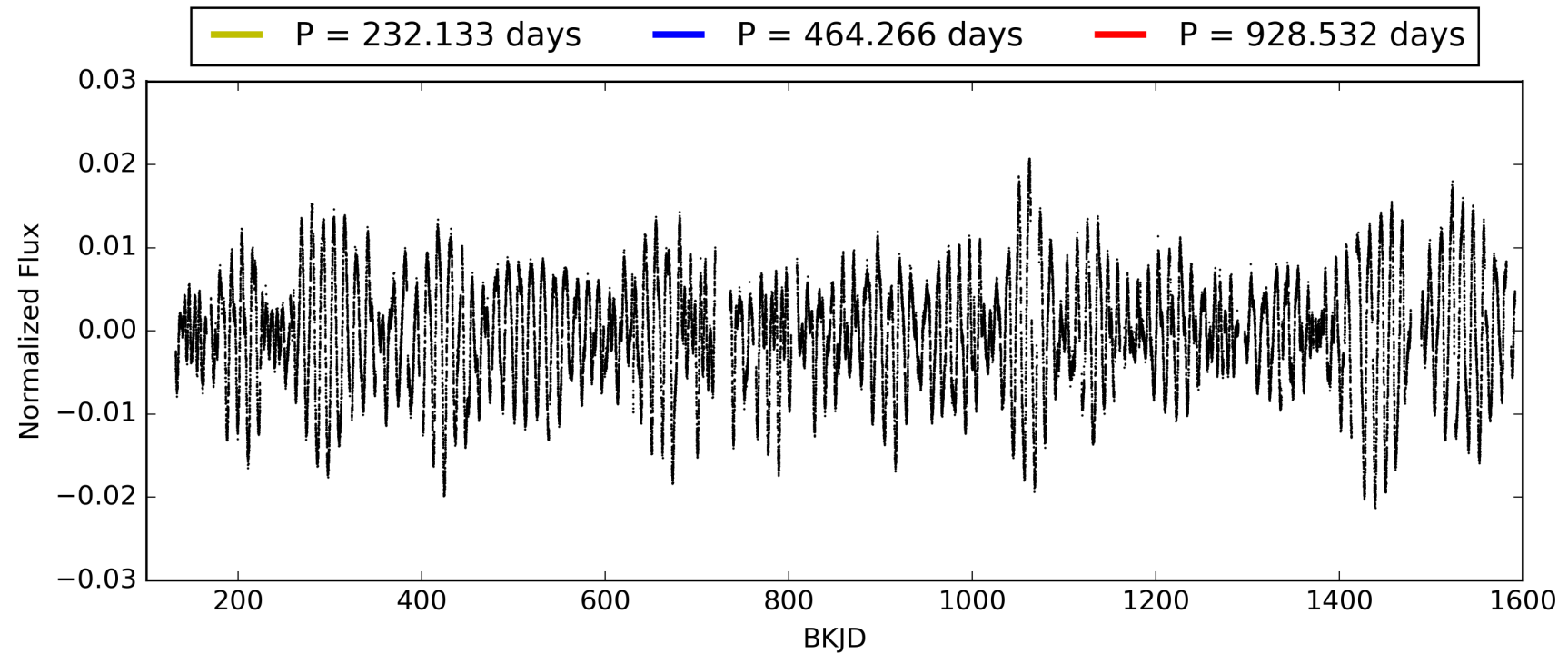
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 03-Feb-2016 04:50:53 Z

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

# TCE 006138551-05, PDC Light Curves

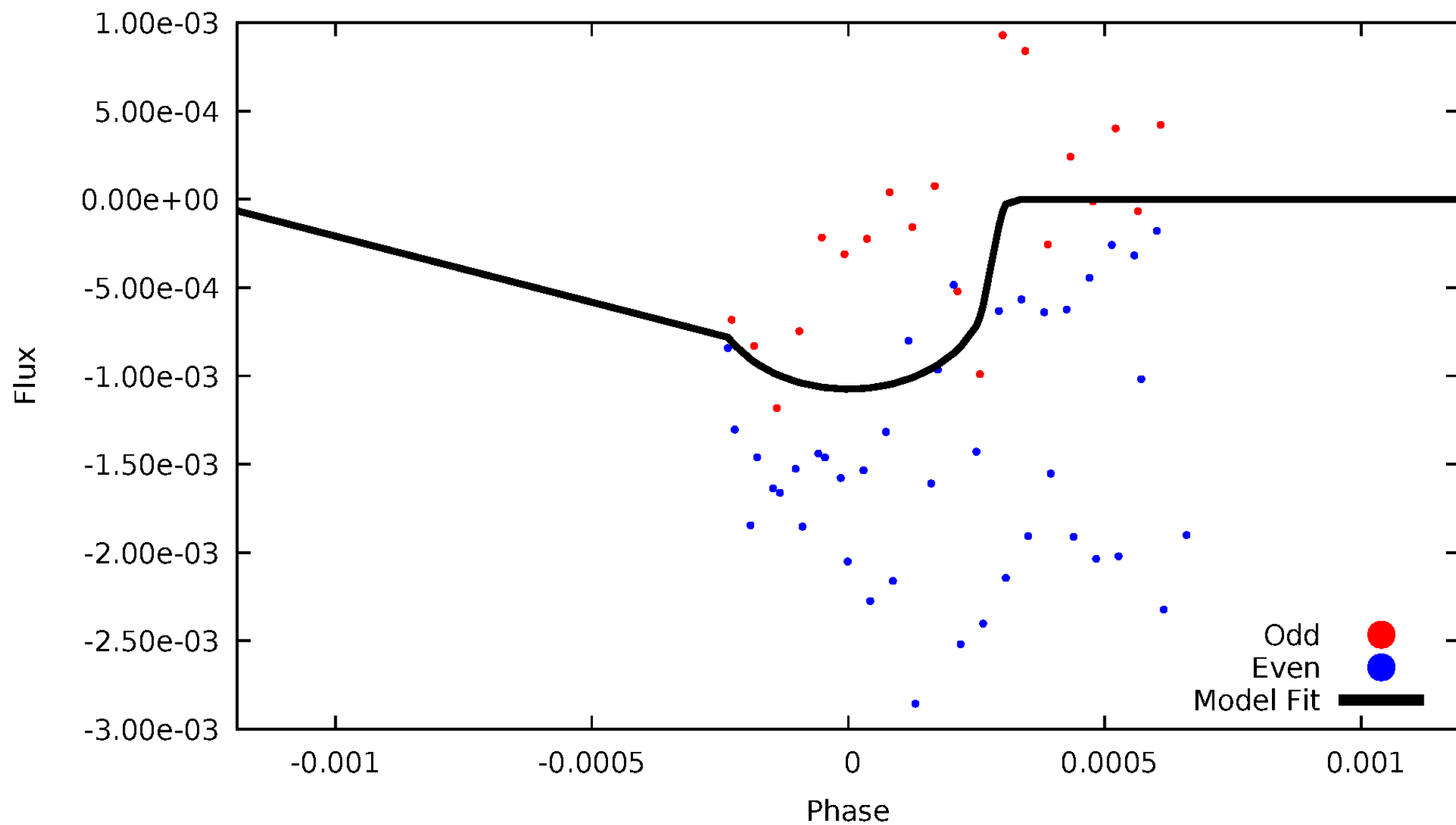


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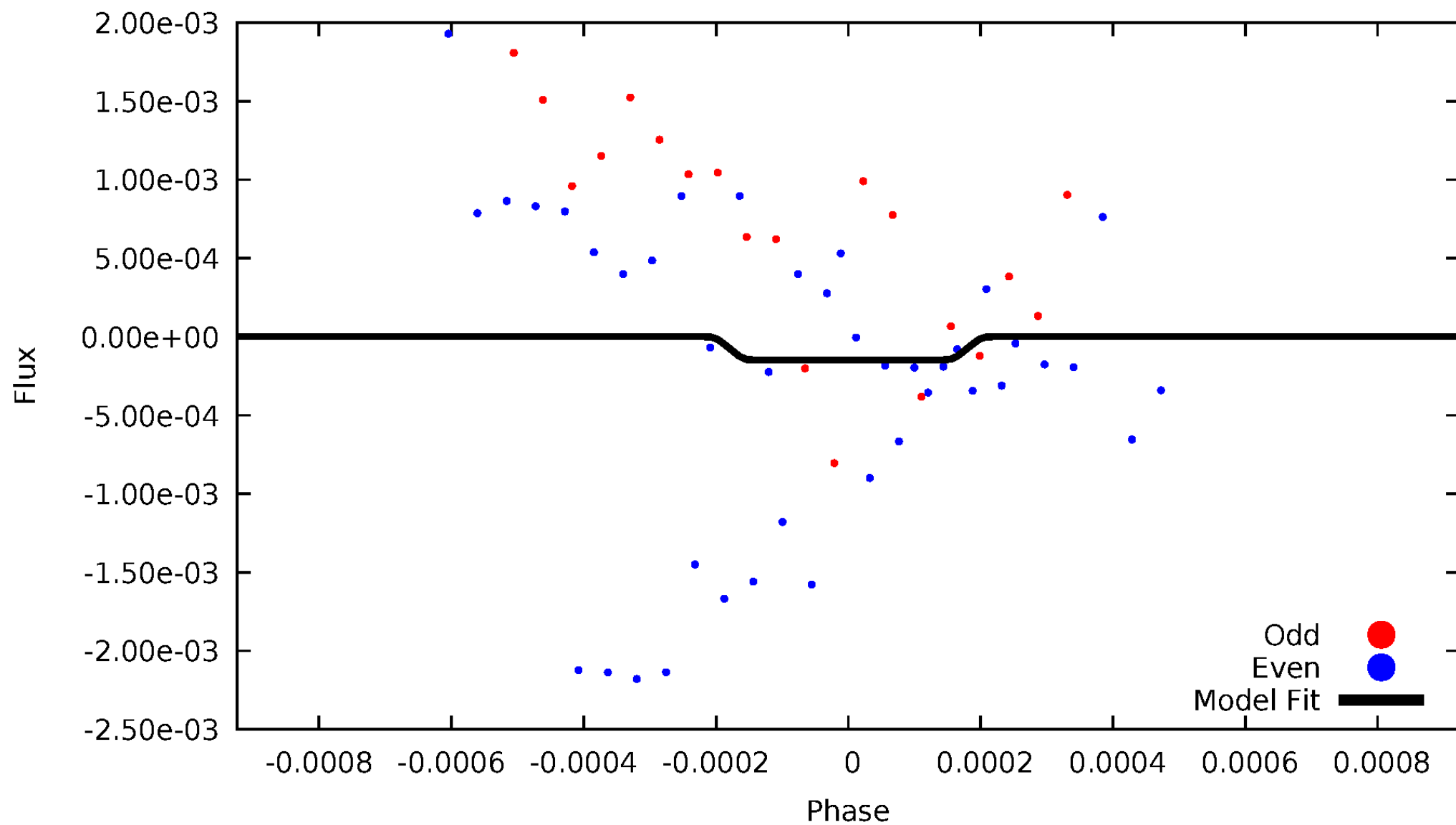
# DV Odd/Even

TCE 006138551-05



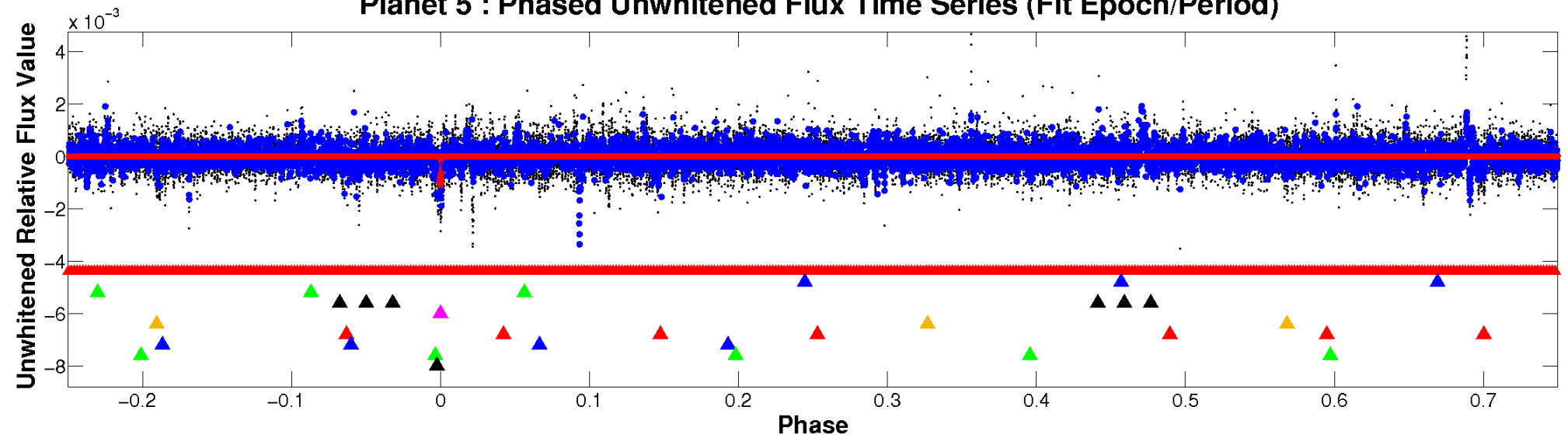
# ALT Odd/Even

TCE 006138551-05

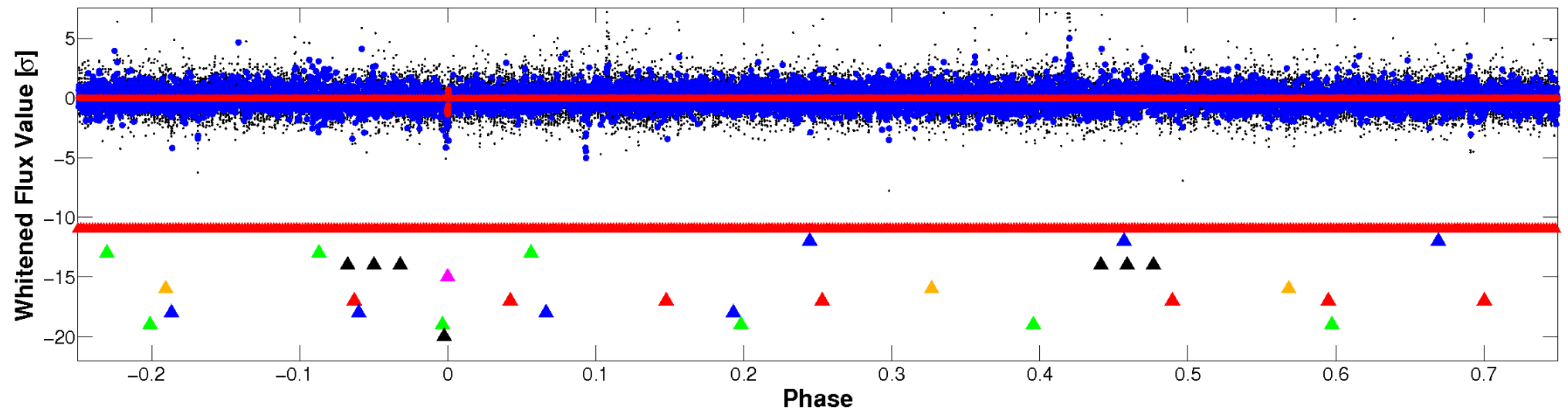


# Non-Whitened Vs. Whitened Light Curve

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



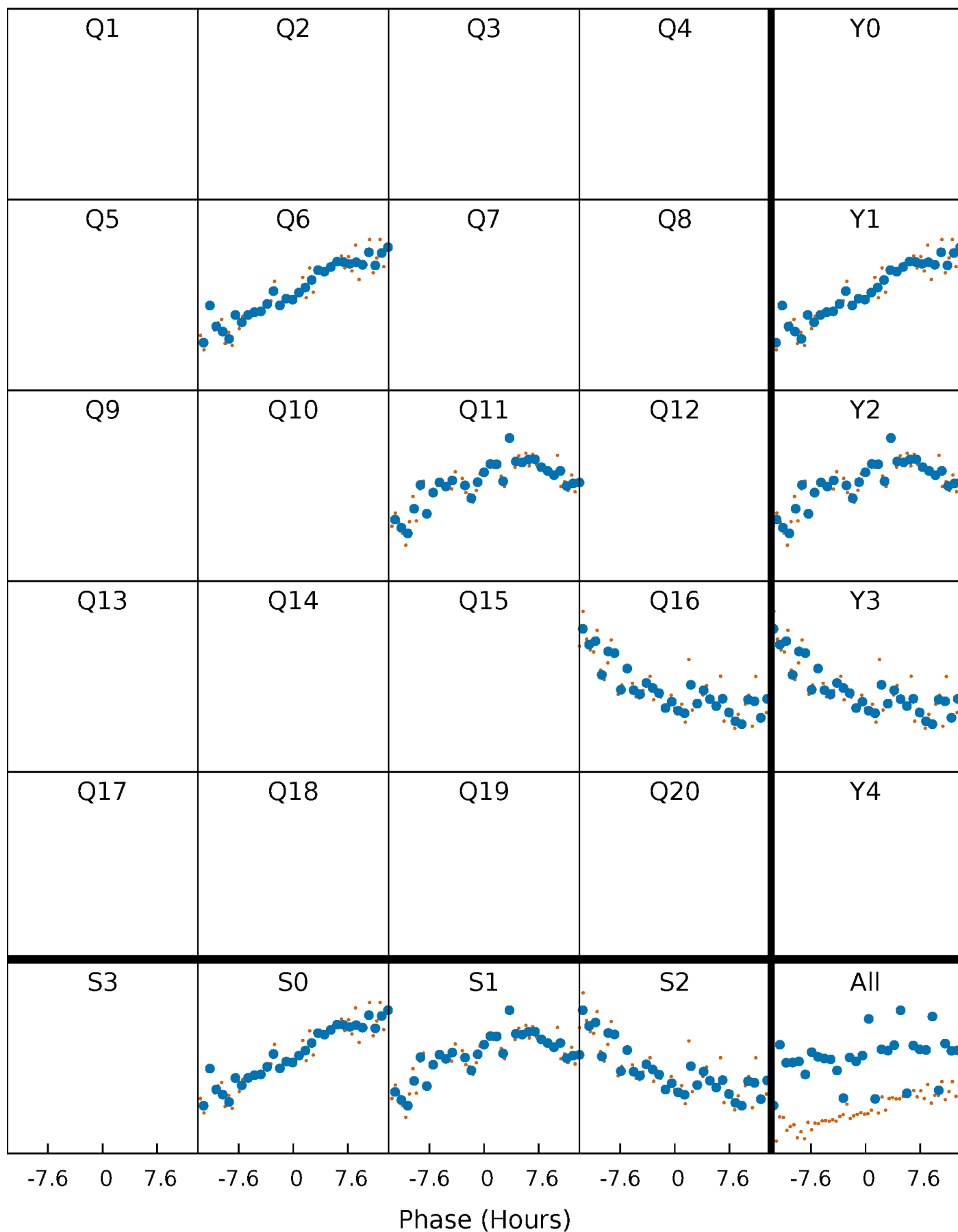
## Planet 5 : Phased Whitened Flux Time Series (Fit Epoch/Period)





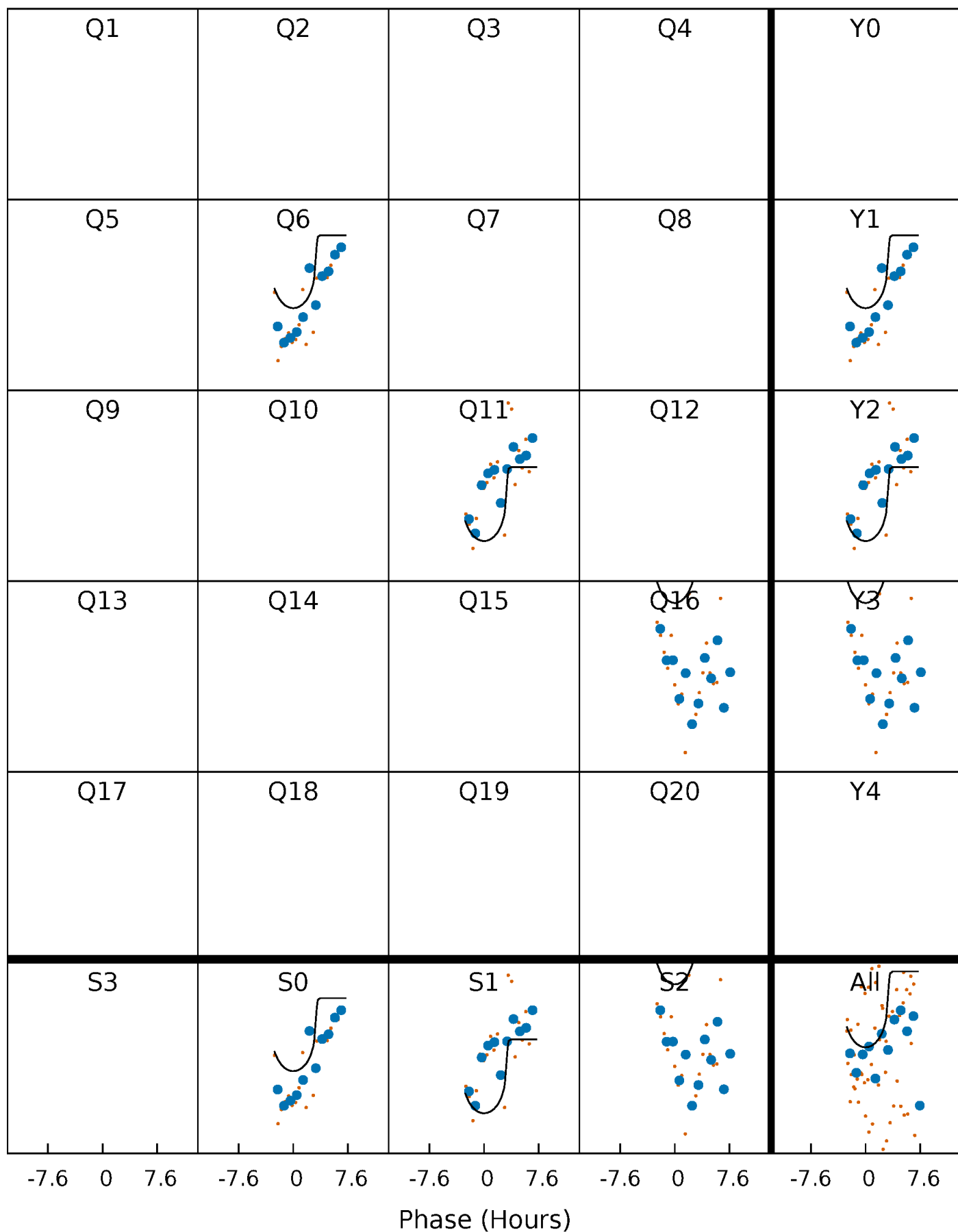
# PDC Quarter-Phased Transit Curves

TCE 006138551-05     $P=464.265857$  Days     $T_0=586.087268$  (BKJD)



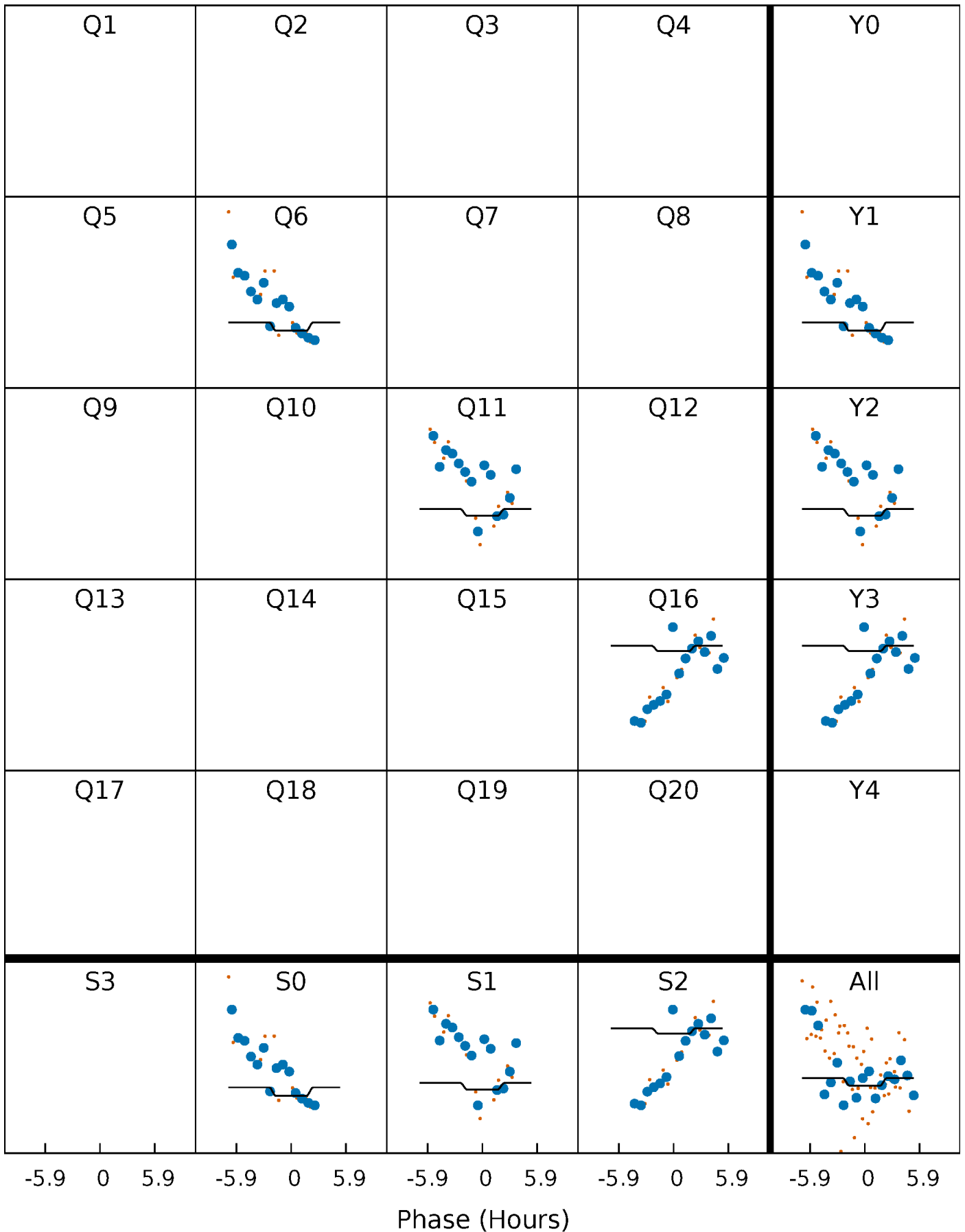
# DV Quarter-Phased Transit Curves

TCE 006138551-05 P=464.265857 Days  $T_0=586.087268$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

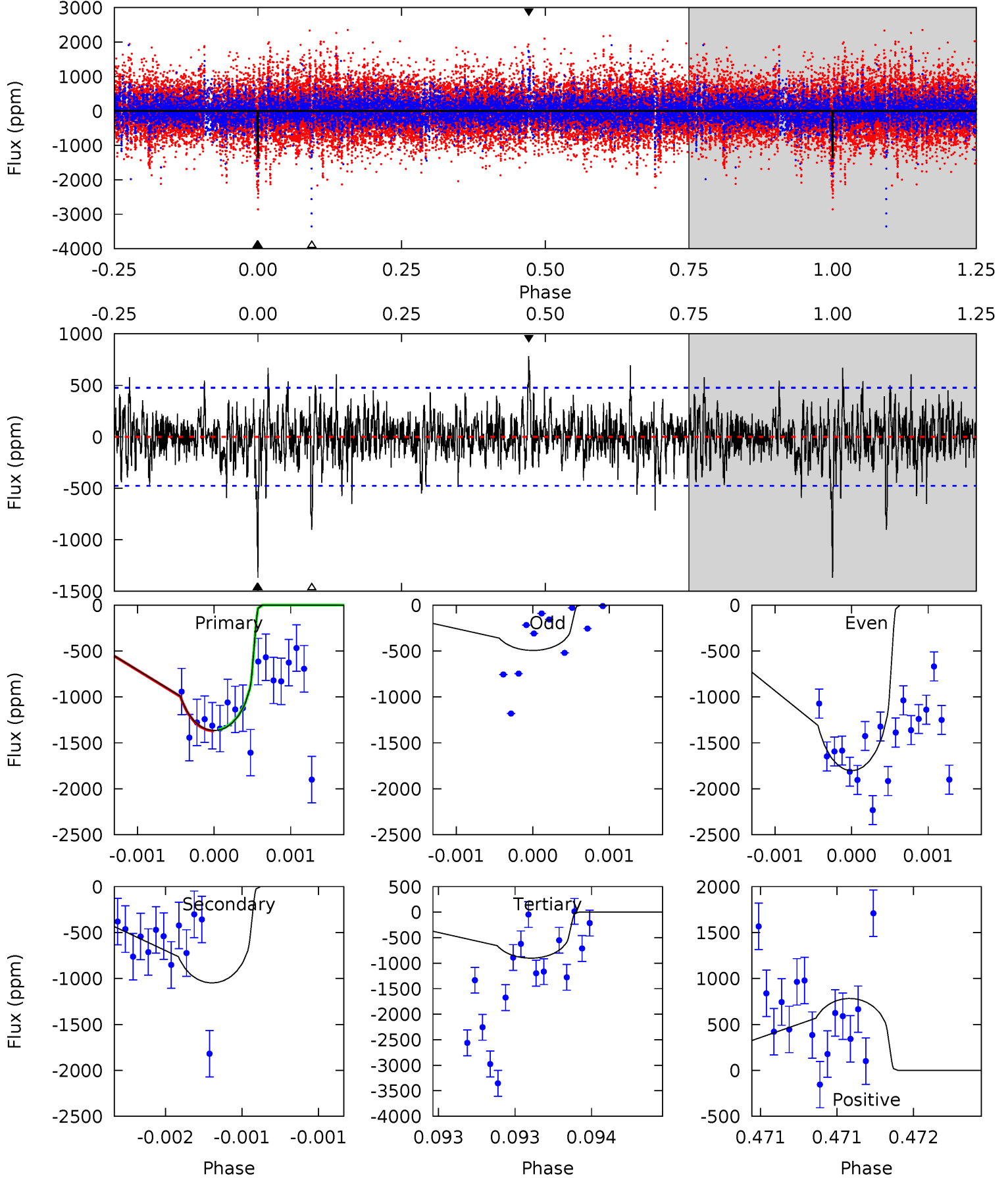
TCE 006138551-05 P=464.223238 Days  $T_0=586.258960$  (BKJD)



# DV Model-Shift Uniqueness Test

006138551-05, P = 464.265857 Days, E = 121.821411 Days

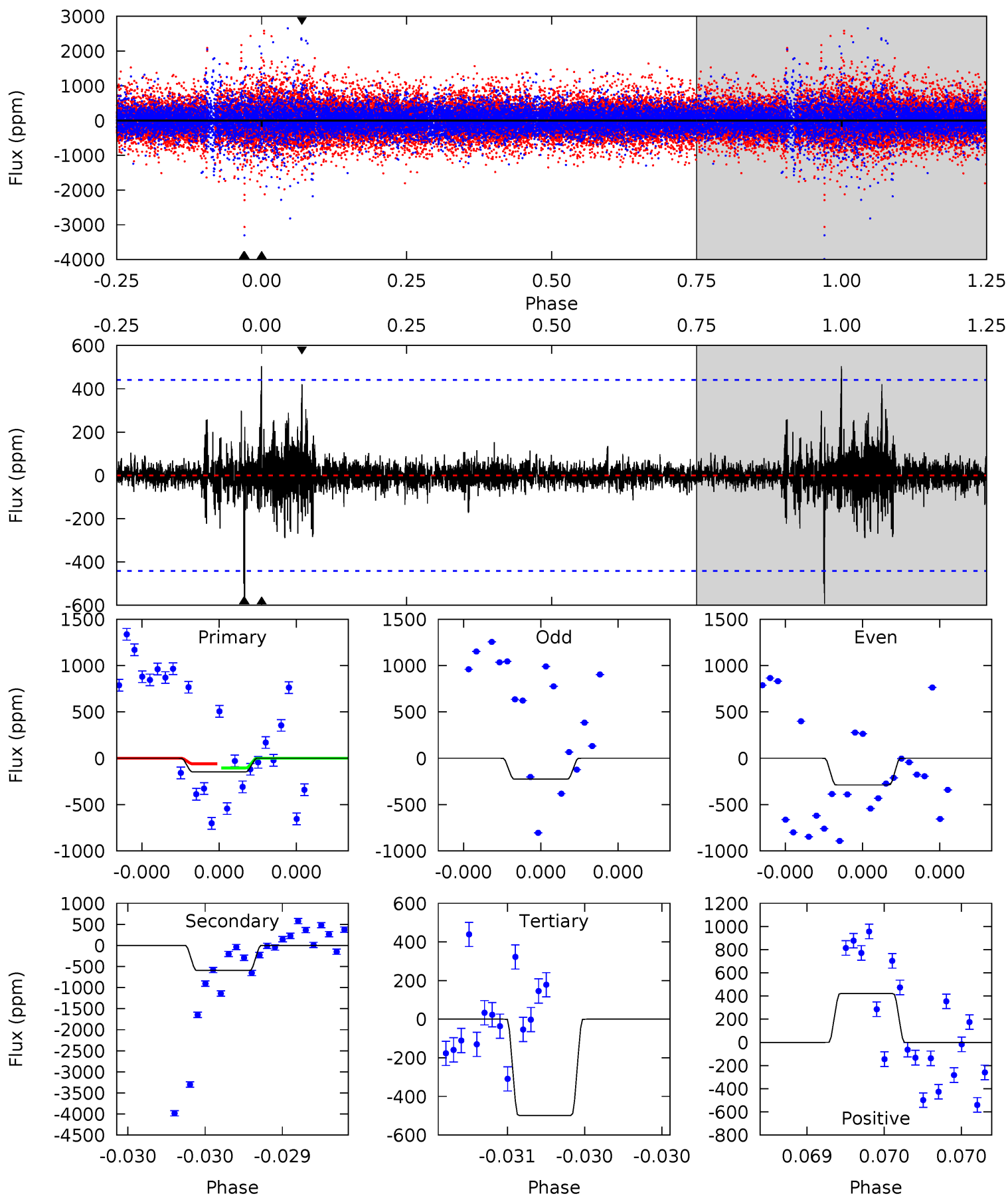
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
15.9	12.2	10.5	9.13	5.56	3.46	2.03	5.42	6.82	1.71	3.11	7.13	0.91	0.36	0.08



# Alt Model-Shift Uniqueness Test

006138551-05, P = 464.223238 Days, E = 122.035722 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
1.87	7.53	6.32	5.34	5.60	3.52	0.63	-4.46	-3.47	1.21	2.19	0.37	-2.57	0.46	0.29



### Stellar Parameters For KIC 006138551

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4987^{+151}_{-136}$	$4.579^{+0.045}_{-0.050}$	$-0.100^{+0.300}_{-0.300}$	$0.741^{+0.071}_{-0.065}$	$0.760^{+0.078}_{-0.064}$	$2.633^{+0.538}_{-0.491}$
	+3%/-3%	+1%/-1%	+300%/-300%	+10%/-9%	+10%/-8%	+20%/-19%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 006138551-05 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-1048 \pm 86$	$4.43^{+3.97}_{-2.97}$	$256^{+9}_{-9}$	$4109^{+2480}_{-802}$	$33569^{+271755}_{-24145}$
Alt.	$-593 \pm 79$	$3.56^{+3.88}_{-2.49}$	$257^{+9}_{-9}$	$3958^{+2629}_{-821}$	$29176^{+288198}_{-22470}$

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

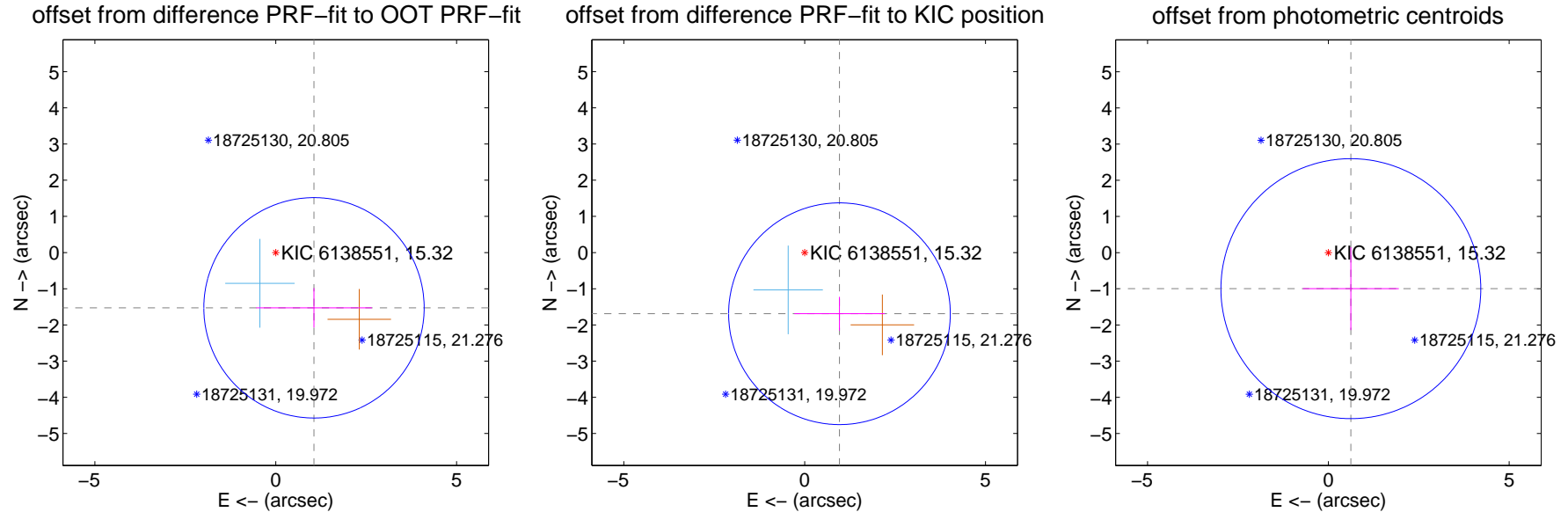
## DV Centroid Data

Supplemental centroid analysis for 006138551-05. Kepler magnitude: 15.32. Transit SNR 7.72

There are 1 quarters with good PRF difference image offsets

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

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.858 \pm 1.015$	1.83	$-1.058 \pm 1.600$	$-1.527 \pm 0.546$
PRF-fit source offset from KIC position	$1.945 \pm 1.021$	1.90	$-0.962 \pm 1.249$	$-1.690 \pm 0.467$
photometric centroid source offset	$1.17 \pm 1.20$	0.98	$-0.62 \pm 1.33$	$-1.00 \pm 1.14$



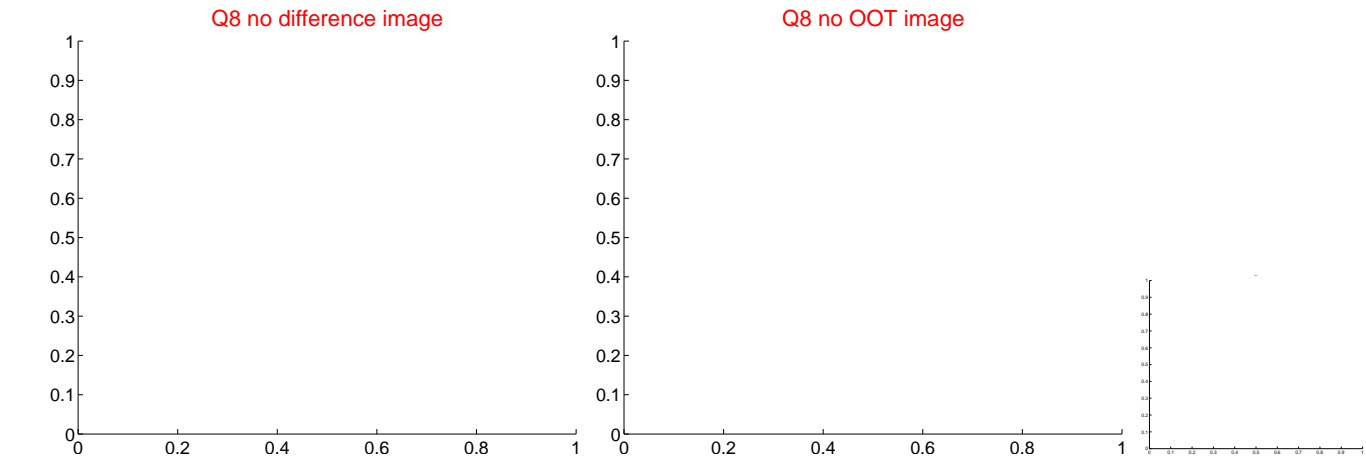
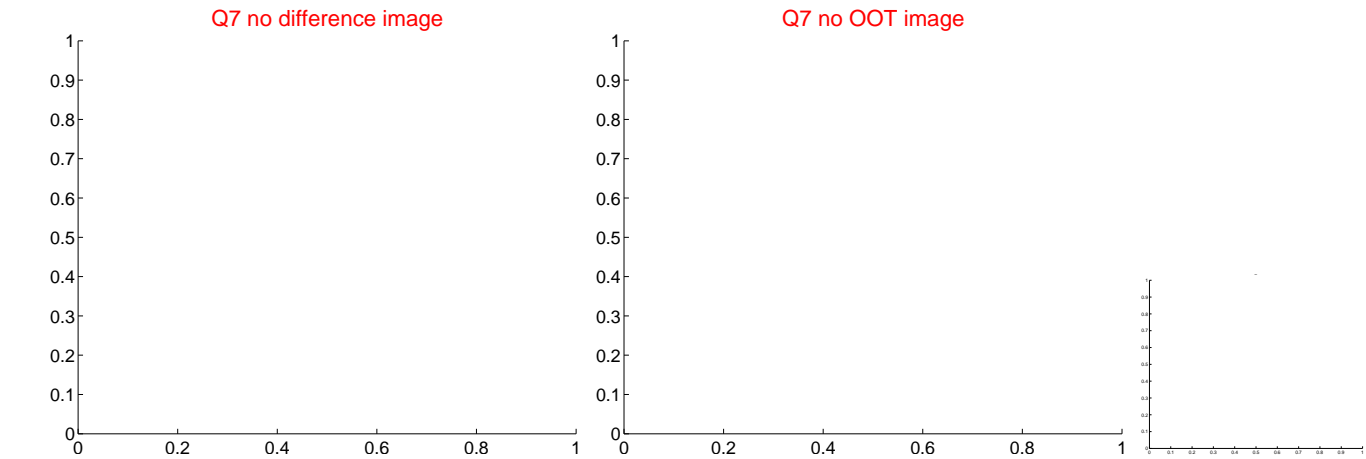
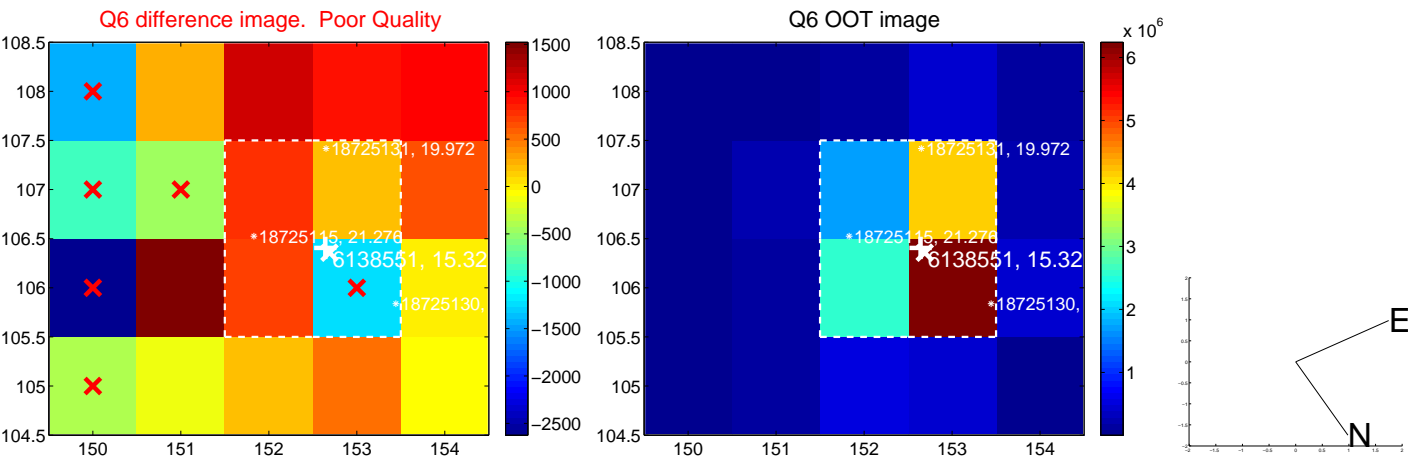
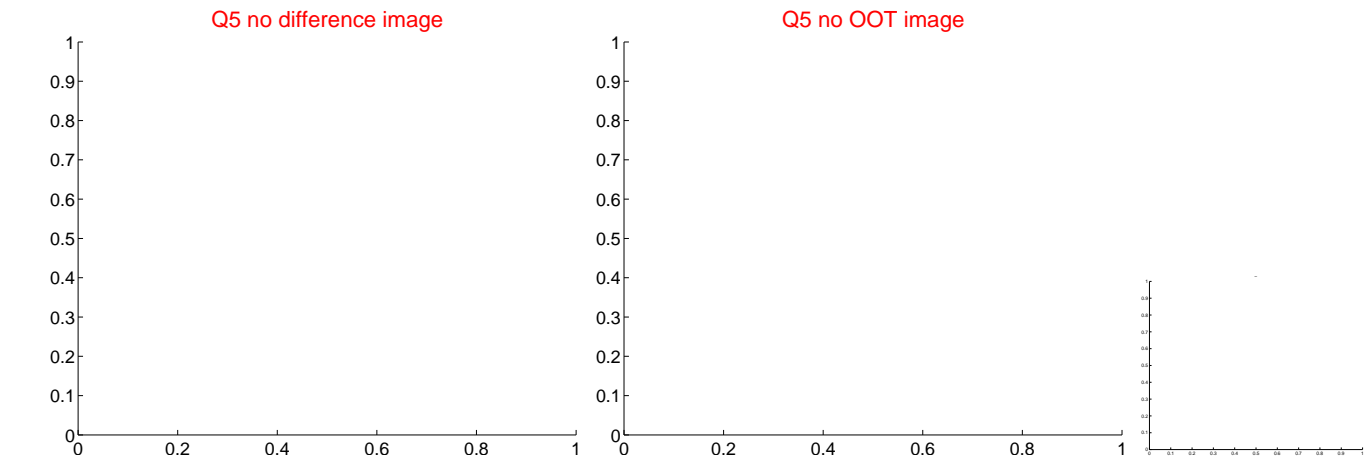
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

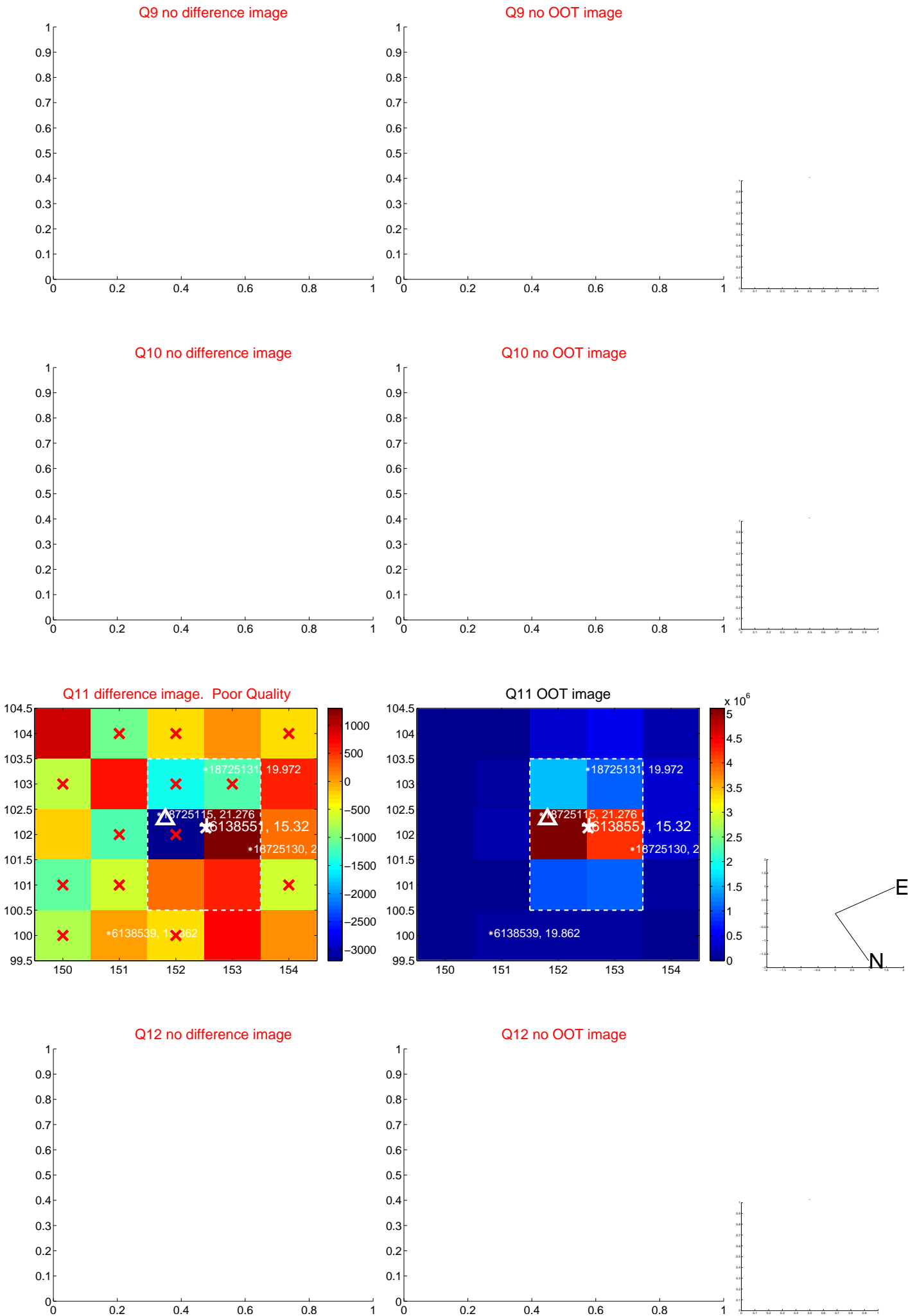




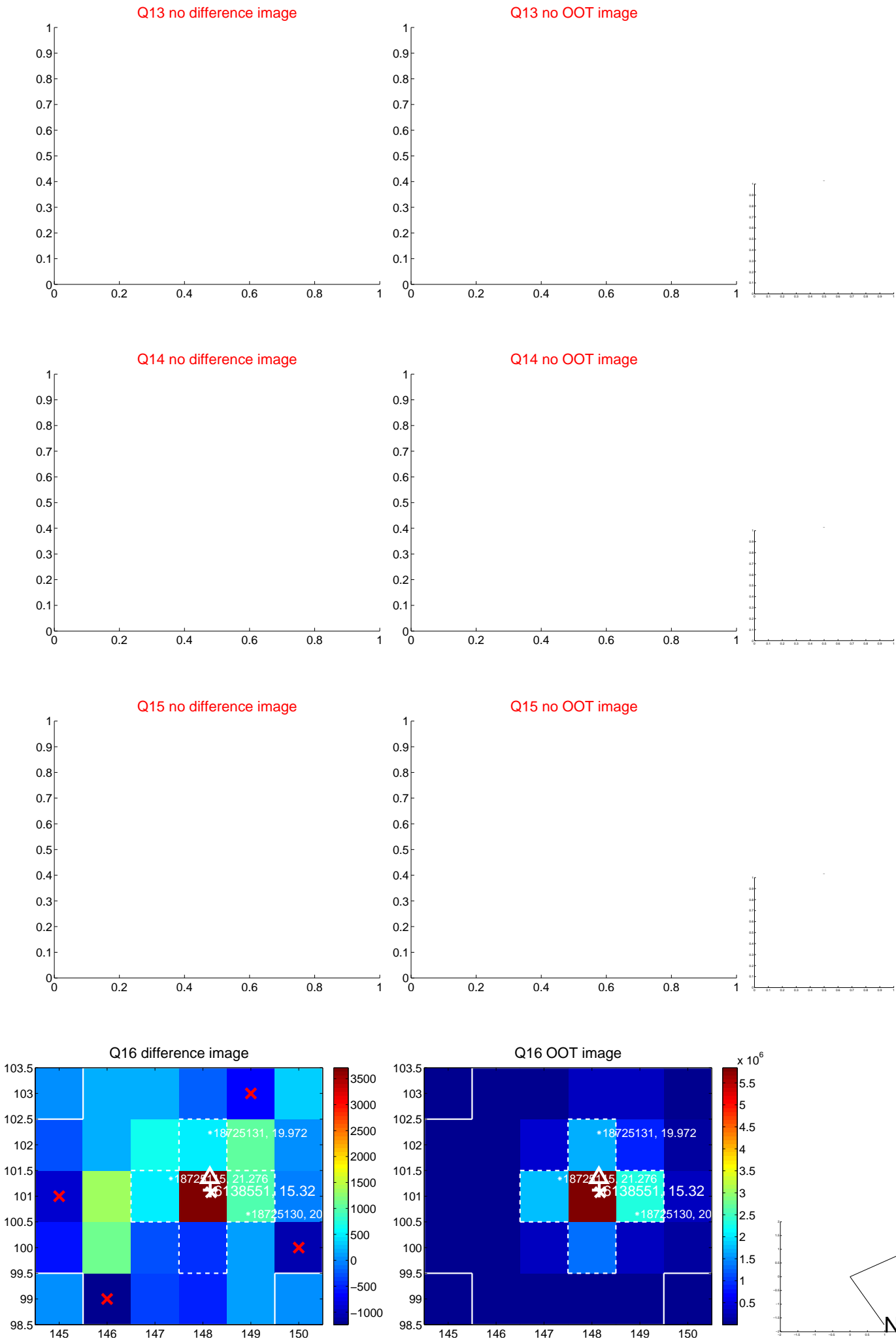
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



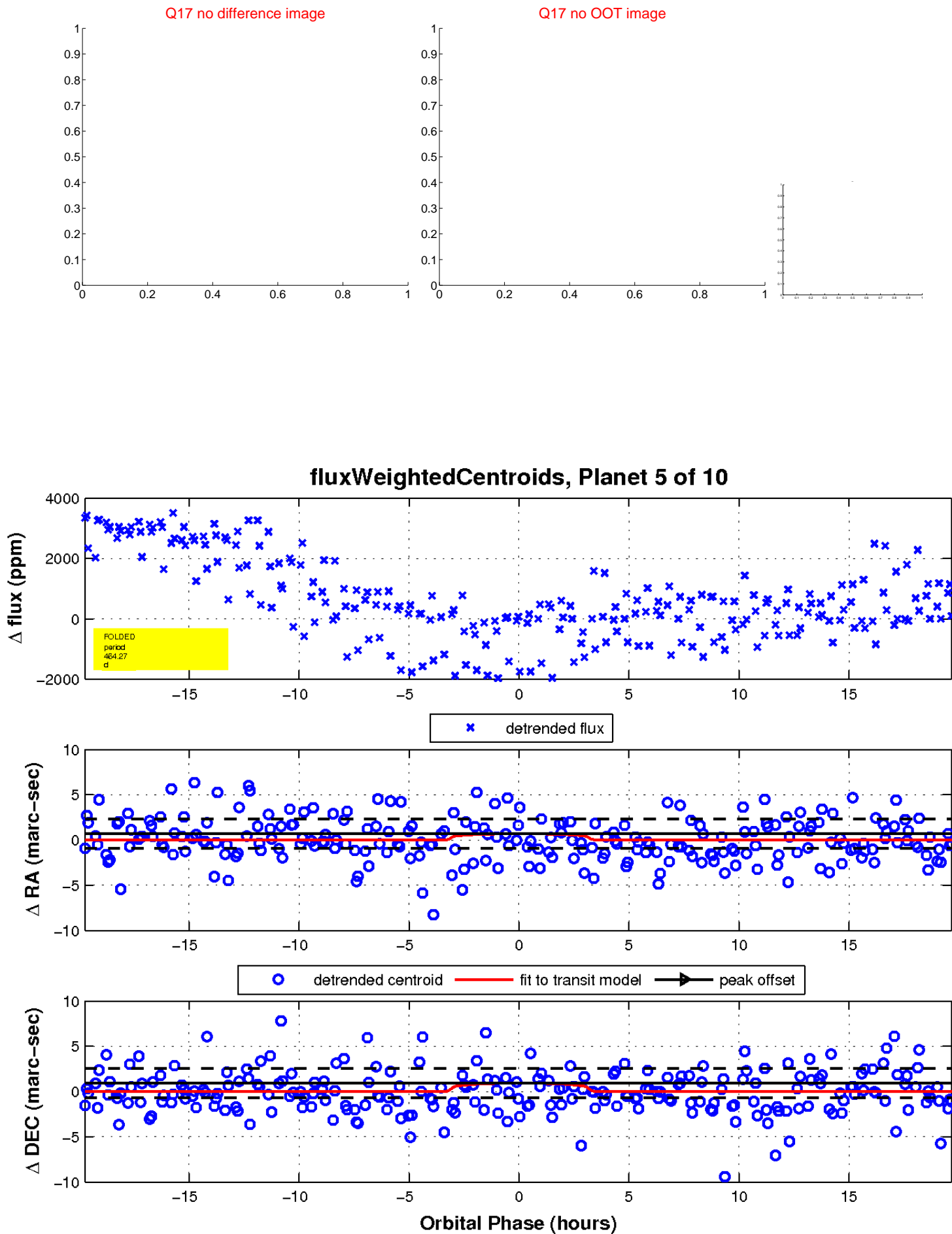
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

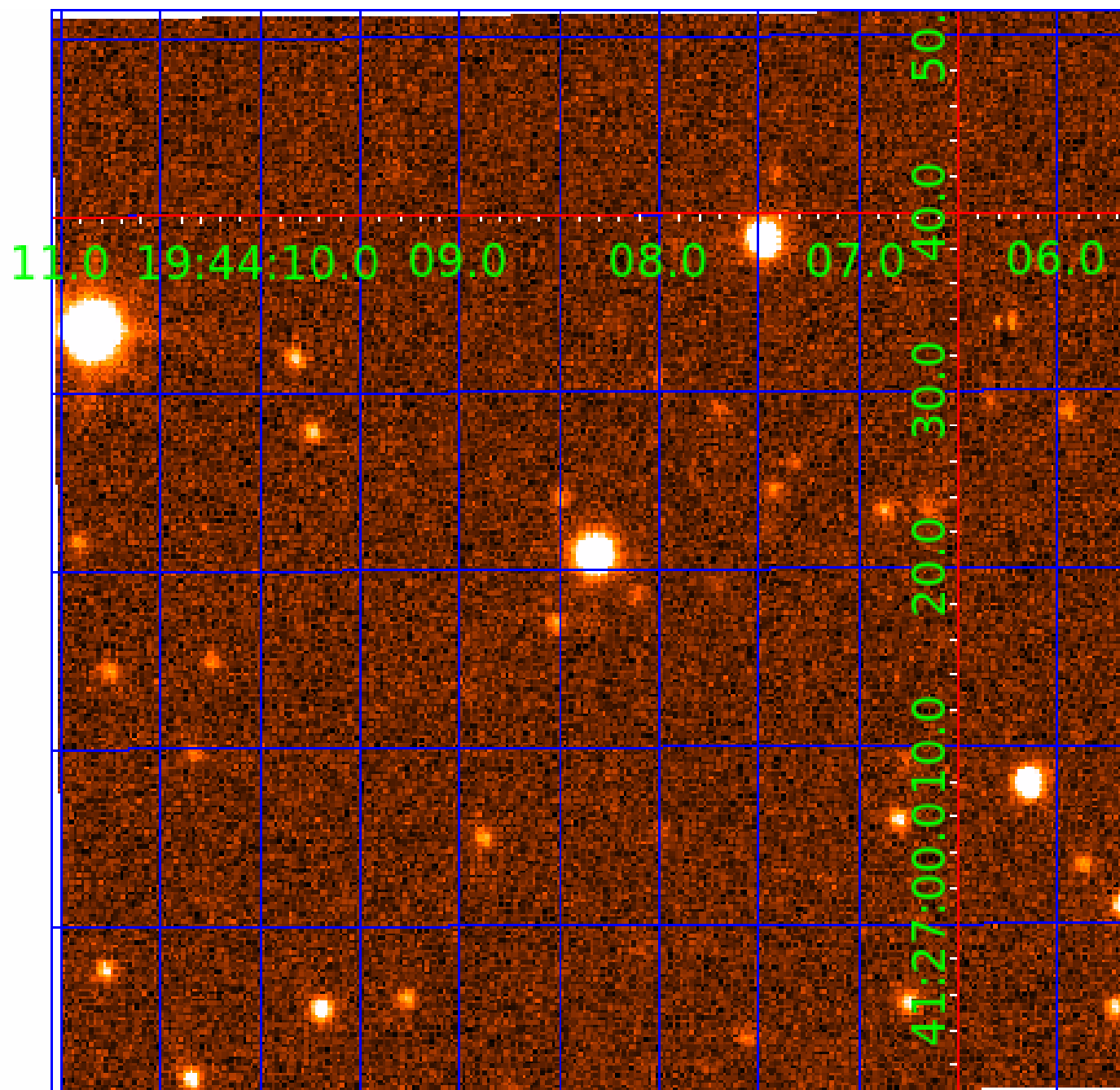


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



# UKIRT Image

Declination



## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006138551-01	OBS	No	0.903264	132.276864	60.2	3.755	7.8	9.6	0.74	4987	0.58	1092.39
006138551-02	OBS	No	562.854767	235.373574	932.2	6.266	16.6	4.6	0.74	4987	2.58	0.20
006138551-03	OBS	No	530.761276	479.223857	4353.4	42.694	16.7	8.6	0.74	4987	6.18	0.22
006138551-04	OBS	No	228.013194	343.175015	1171.4	13.680	15.1	6.7	0.74	4987	5.12	0.69
006138551-05	OBS	No	464.265857	586.087268	1073.6	6.635	13.9	7.7	0.74	4987	2.51	0.27
006138551-06	OBS	No	576.302885	273.589413	1404.5	14.591	12.2	7.4	0.74	4987	3.24	0.20
006138551-07	OBS	No	207.671057	239.280791	614.0	3.898	11.6	4.3	0.74	4987	2.13	0.78
006138551-08	OBS	No	405.523905	211.416753	1420.6	13.319	11.5	8.4	0.74	4987	3.42	0.32
006138551-09	OBS	No	278.937876	305.513027	390.8	6.513	11.0	2.9	0.74	4987	1.74	0.52
006138551-10	OBS	No	464.292287	584.958197	3505.3	46.997	9.5	5.4	0.74	4987	5.35	0.27

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006138551-01	OBS	FP	0.00	1	0	0	0	LPP_DV
006138551-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_TRACKER—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
006138551-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
006138551-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV
006138551-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
006138551-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS
006138551-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_TRACKER—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
006138551-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—INCONSISTENT_TRANS
006138551-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—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
006138551-10	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—SAME_NTL_PERIOD—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.

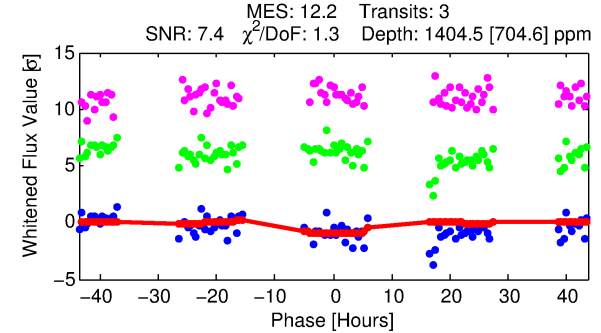
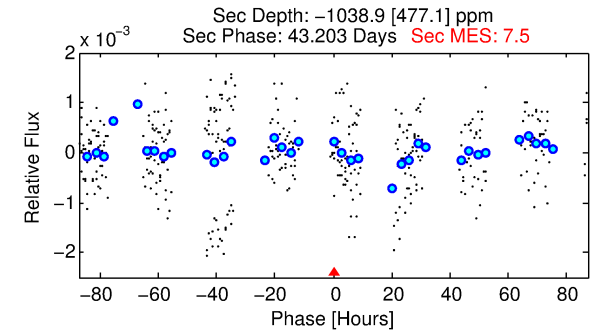
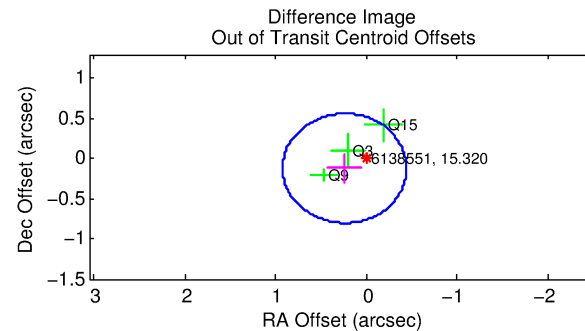
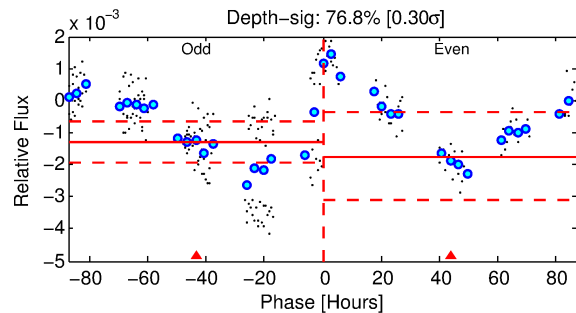
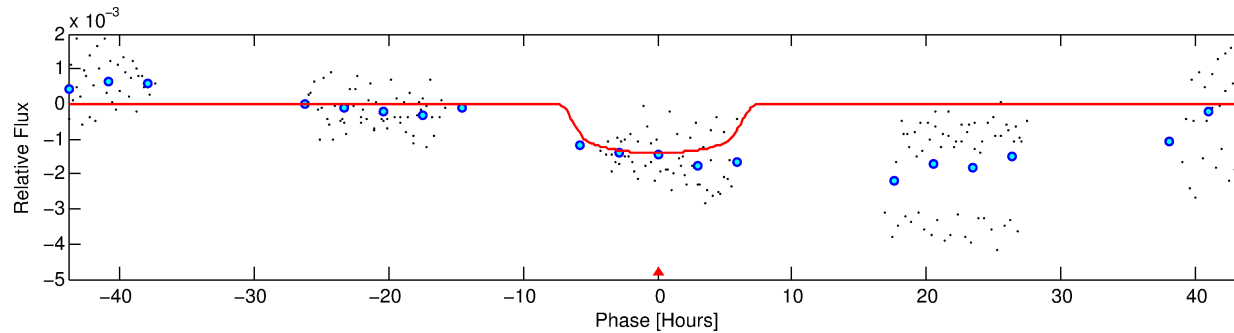
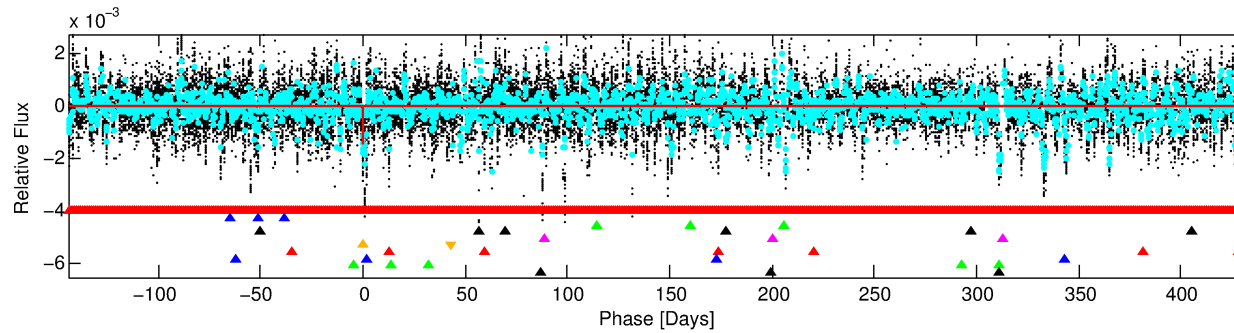
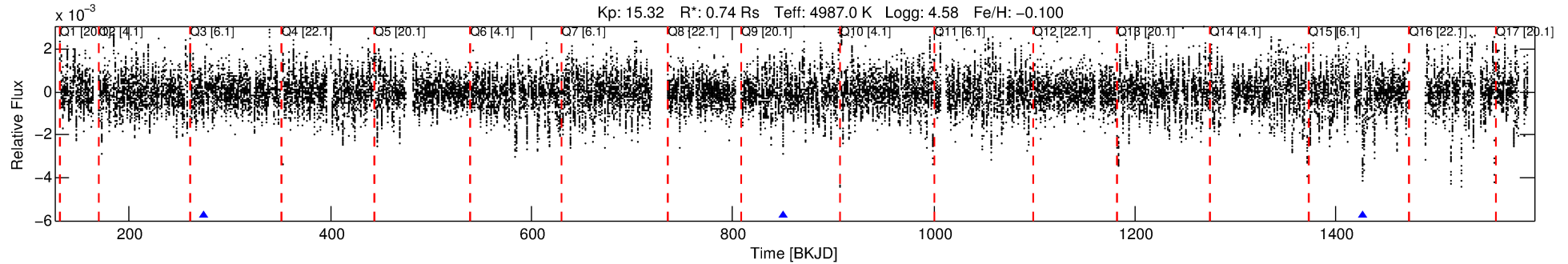
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 006138551-06

No Significant Match Found

# DV One-Page Summary

KIC: 6138551 Candidate: 6 of 10 Period: 576.303 d



## DV Fit Results:

Period = 576.30288 [0.06510] d  
Epoch = 273.5894 [0.1156] BKJD  
Rp/R\* = 0.0401 [0.0272]  
a/R\* = 177.63 [402.43]  
b = 0.86 [0.63]  
Seff = 0.20 [0.03]  
Teq = 170 [7] K  
Rp = 3.24 [2.22] Re  
a = 1.2369 [0.0922] AU  
Ag = N/A  
Teffp = N/A

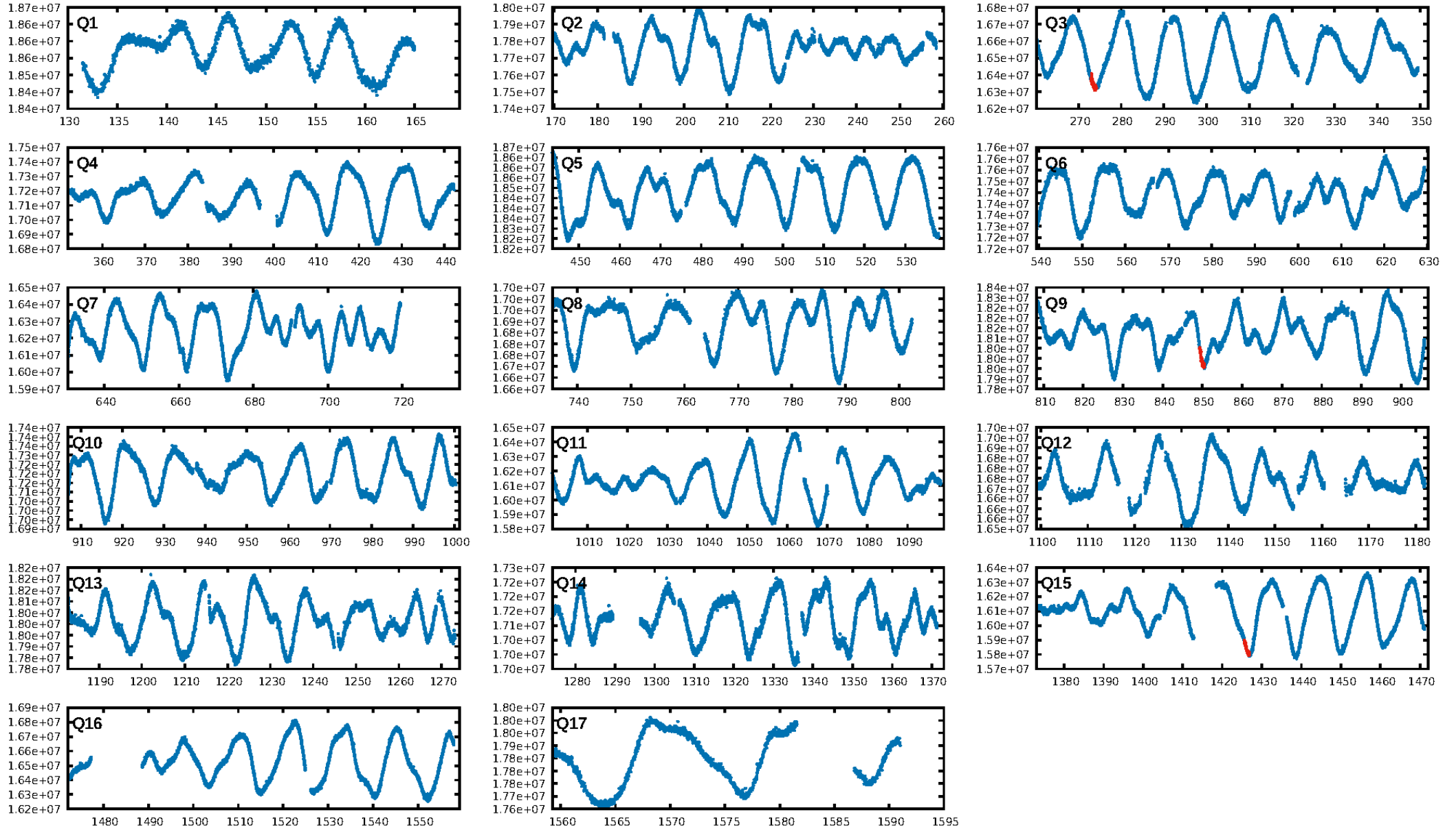
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [20.32 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 3.2%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
**GhostDiagnostic-chr: -5.172**  
Centroid-sig: 17.8%  
Centroid-so: 0.937 arcsec [1.29 $\sigma$ ]  
OotOffset-rm: 0.268 arcsec [1.18 $\sigma$ ]  
KicOffset-rm: 0.373 arcsec [1.57 $\sigma$ ]  
OotOffset-st: 0/2/0/1 [3]  
KicOffset-st: 0/2/0/1 [3]  
DiffImageQuality-fgm: 1.00 [3/3]  
DiffImageOverlap-fno: 0.00 [0/3]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 03-Feb-2016 04:50:59 Z

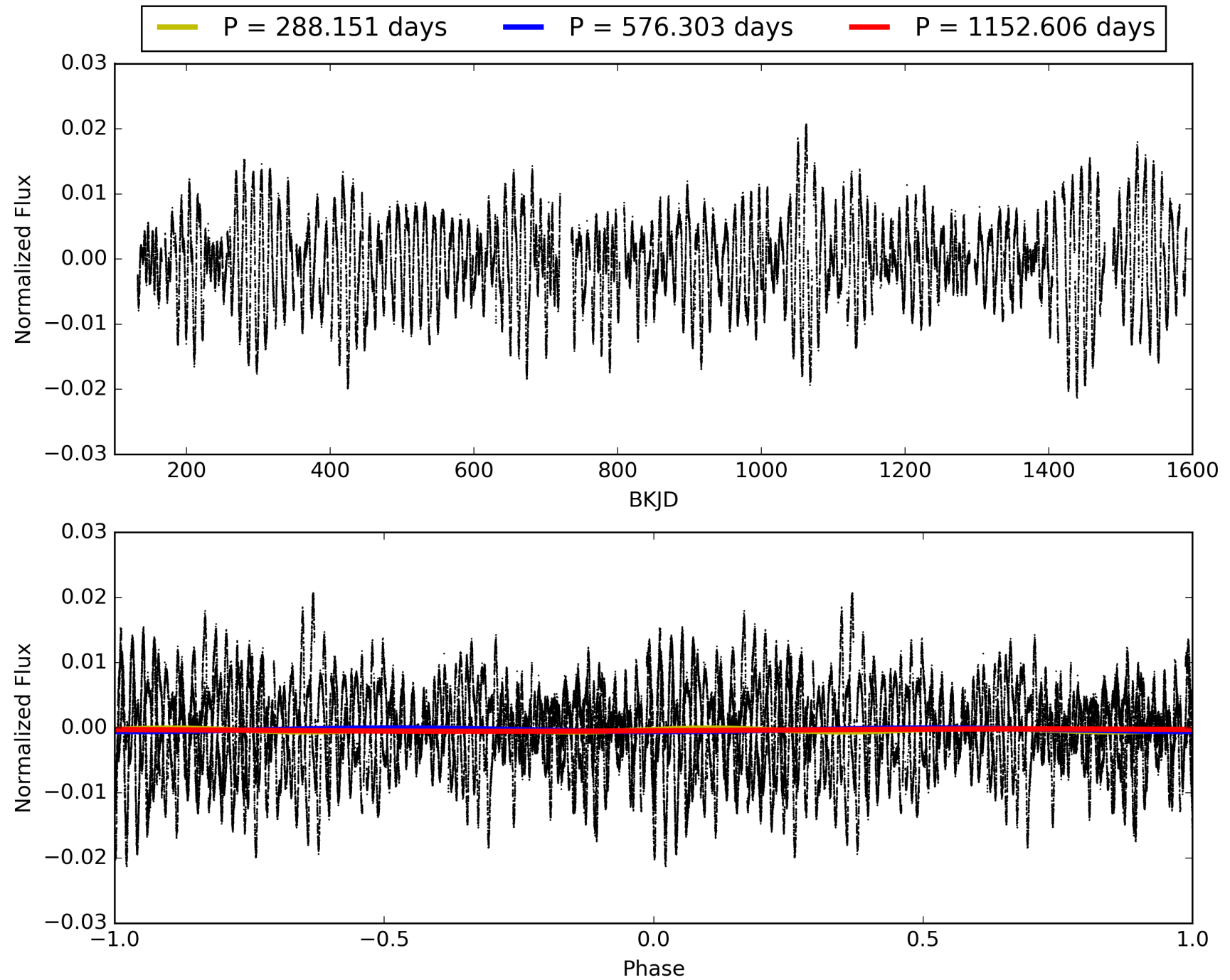
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 006138551-06, PDC Light Curves



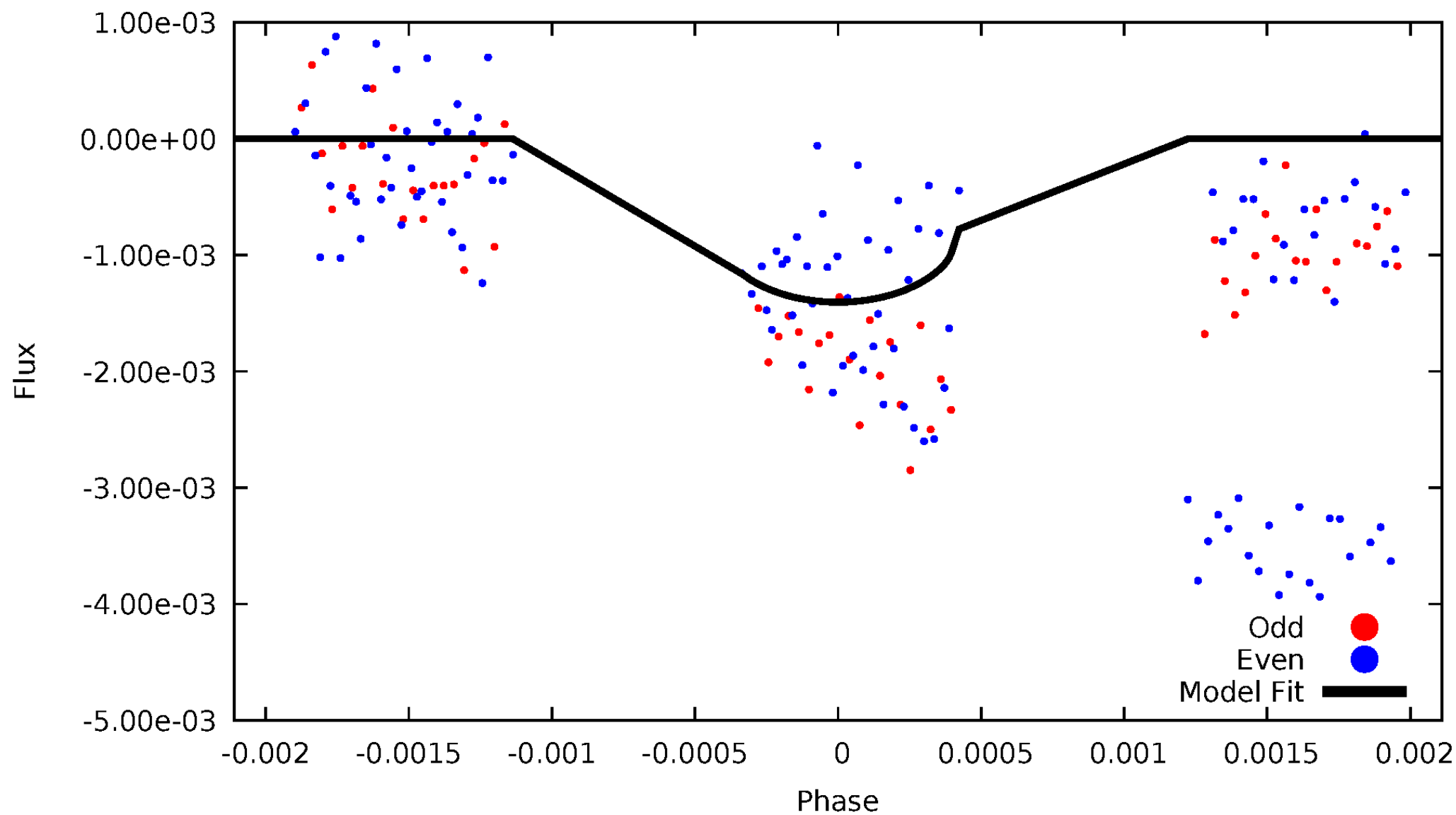


# TCE 006138551-06



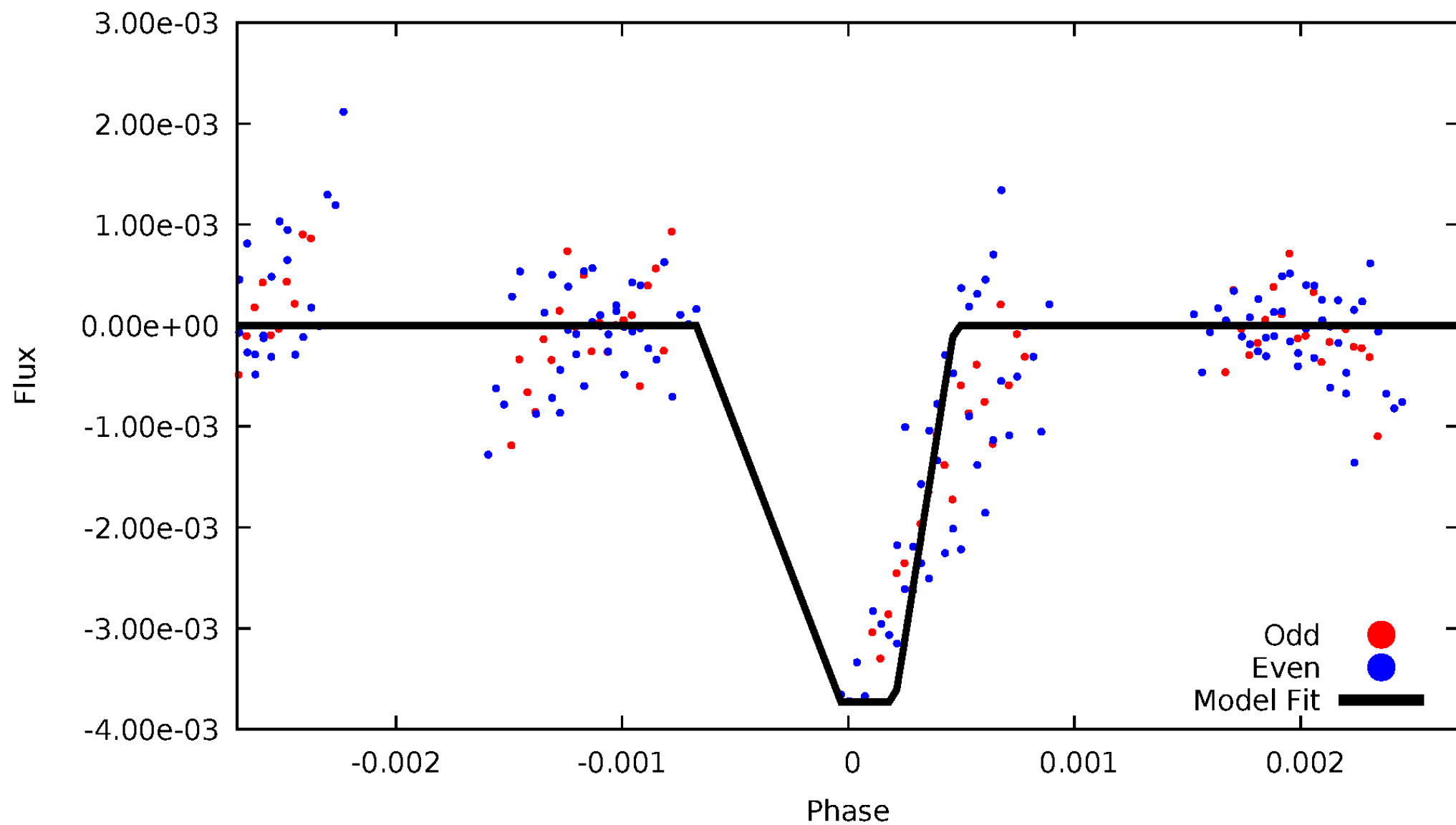
# DV Odd/Even

TCE 006138551-06



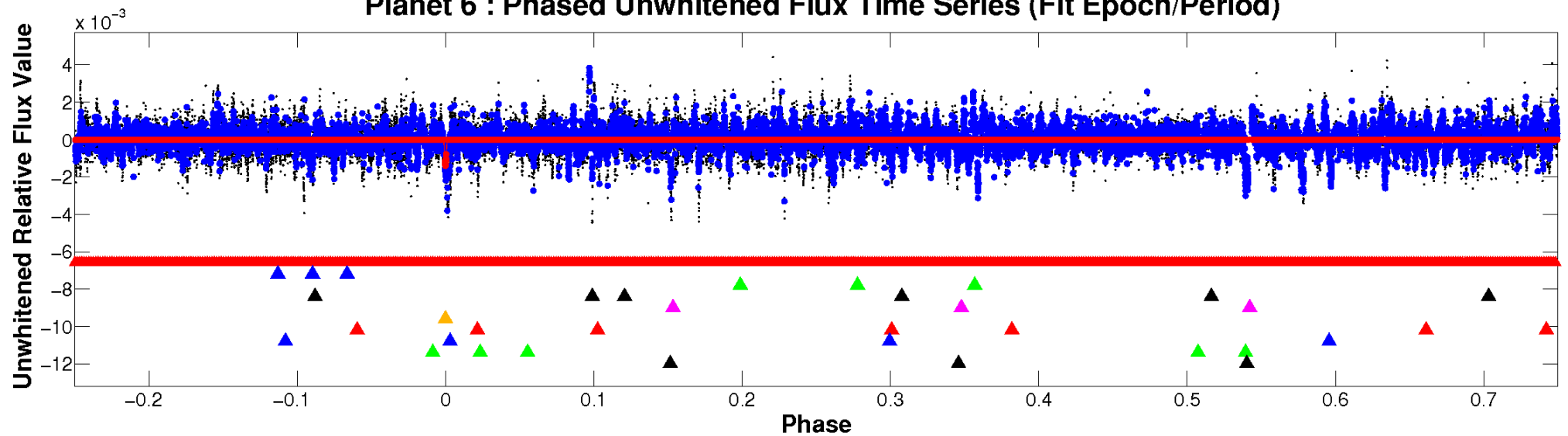
# ALT Odd/Even

TCE 006138551-06

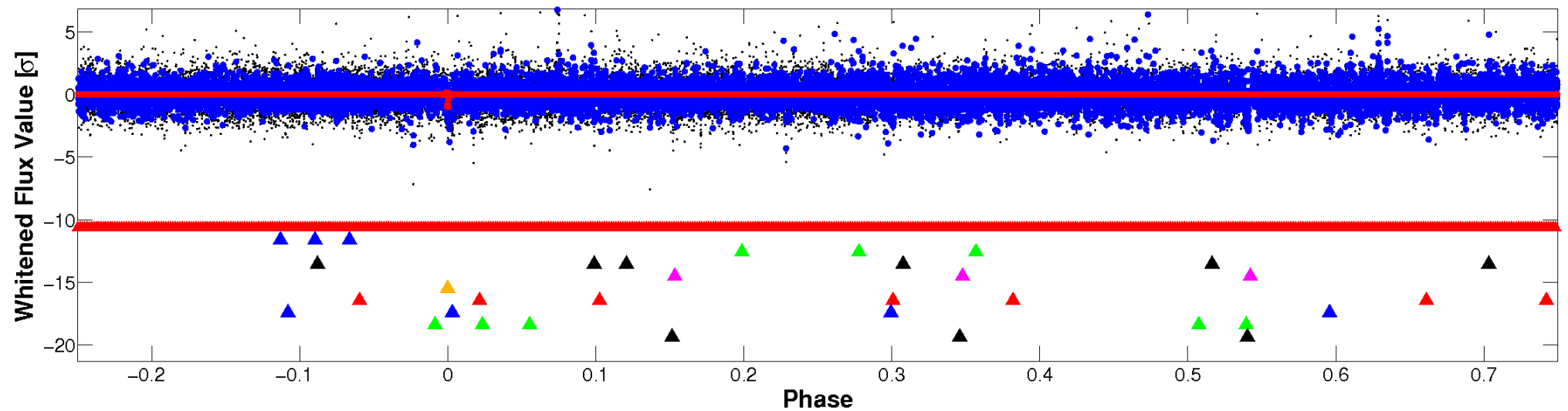


# Non-Whitened Vs. Whitened Light Curve

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

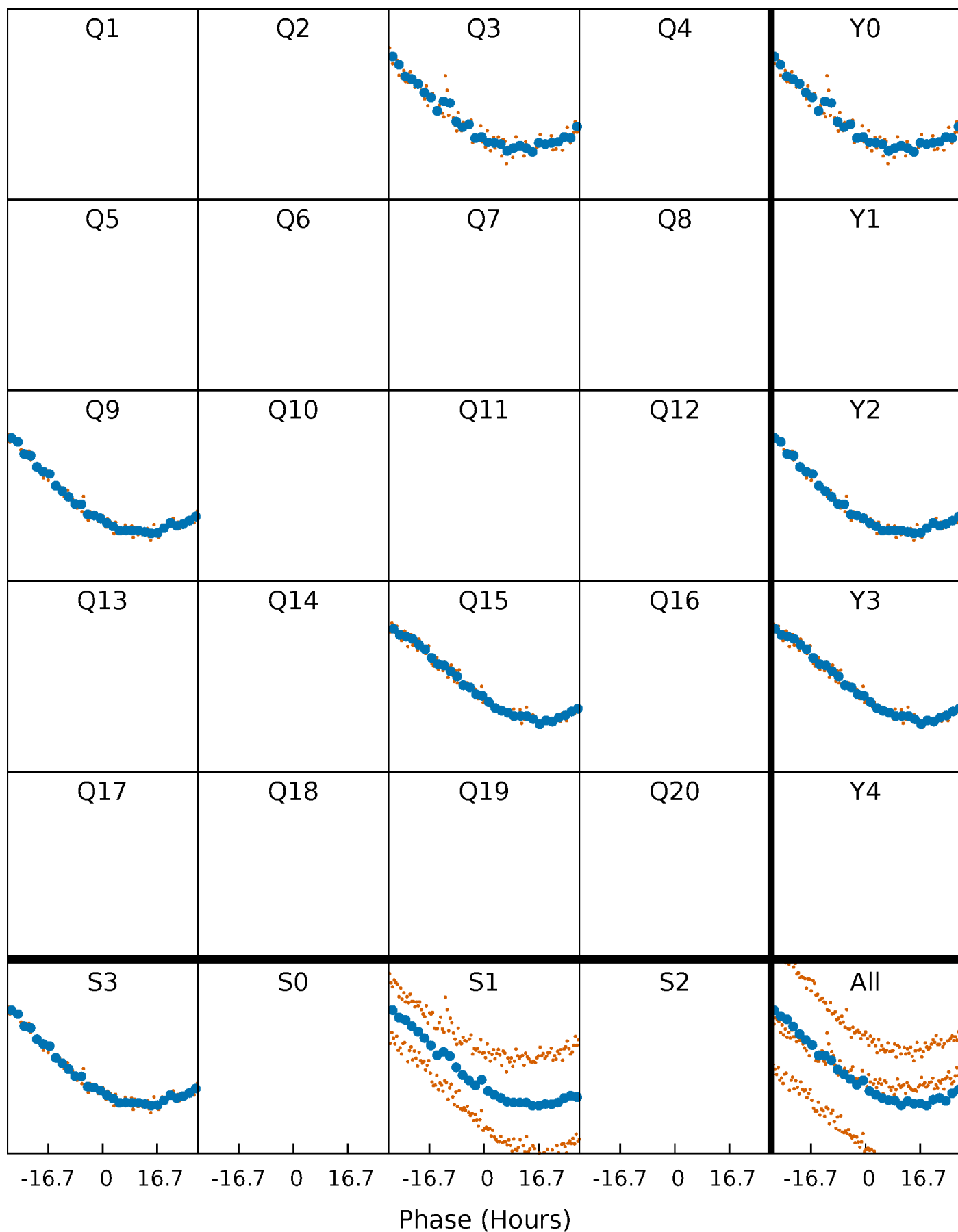


## Planet 6 : Phased Whitened Flux Time Series (Fit Epoch/Period)



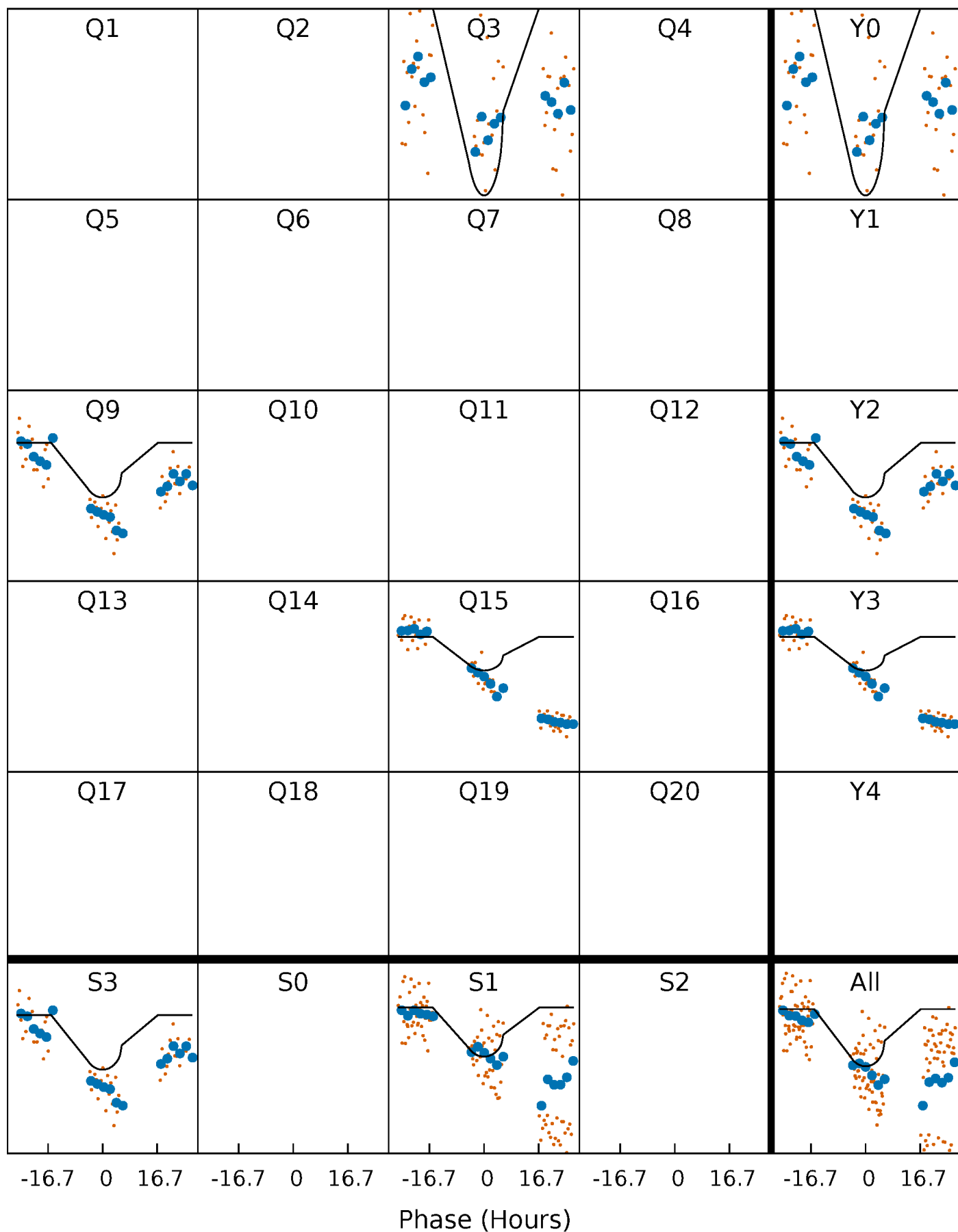
# PDC Quarter-Phased Transit Curves

TCE 006138551-06     $P=576.302885$  Days     $T_0=273.589413$  (BKJD)



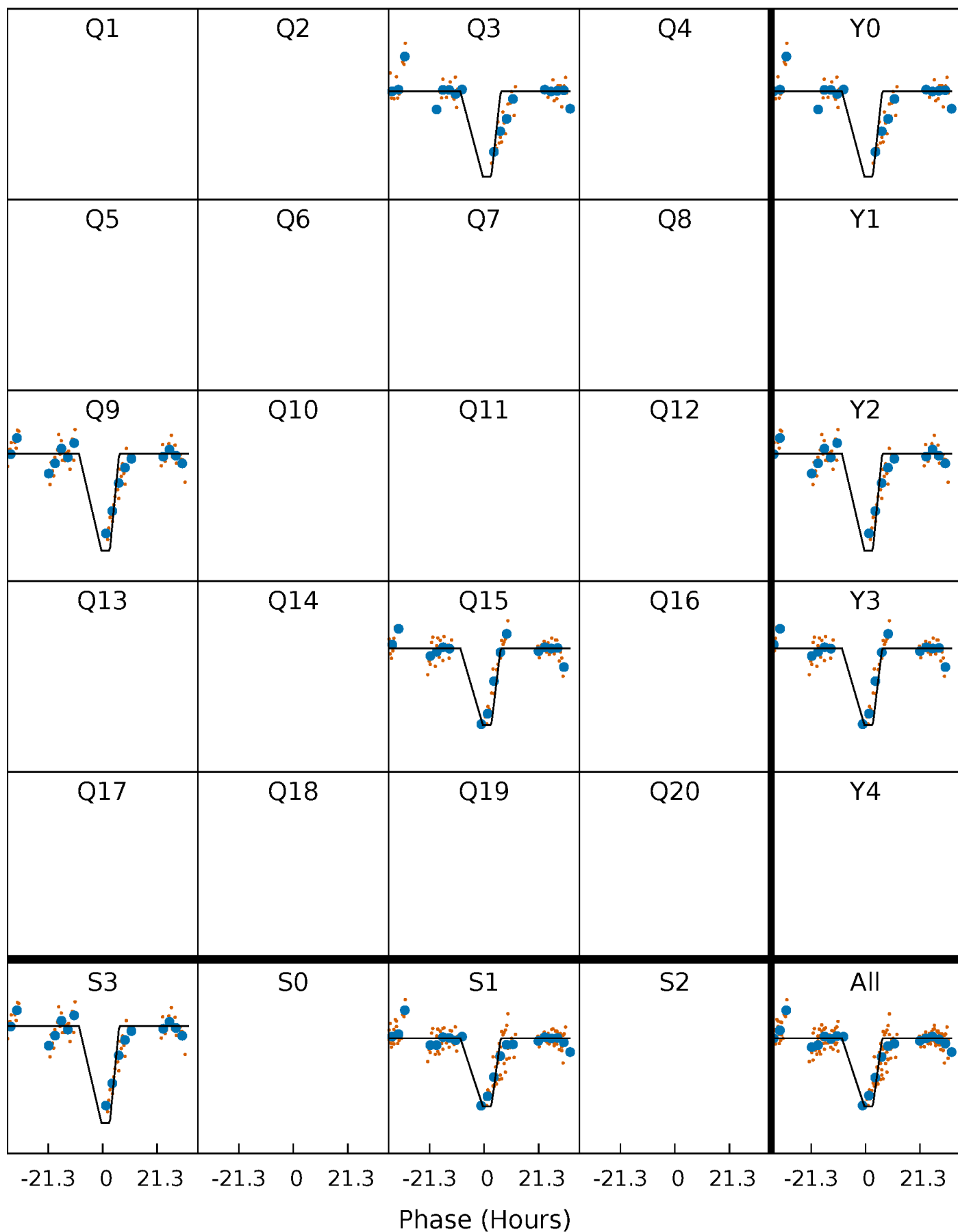
# DV Quarter-Phased Transit Curves

TCE 006138551-06 P=576.302885 Days  $T_0=273.589413$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

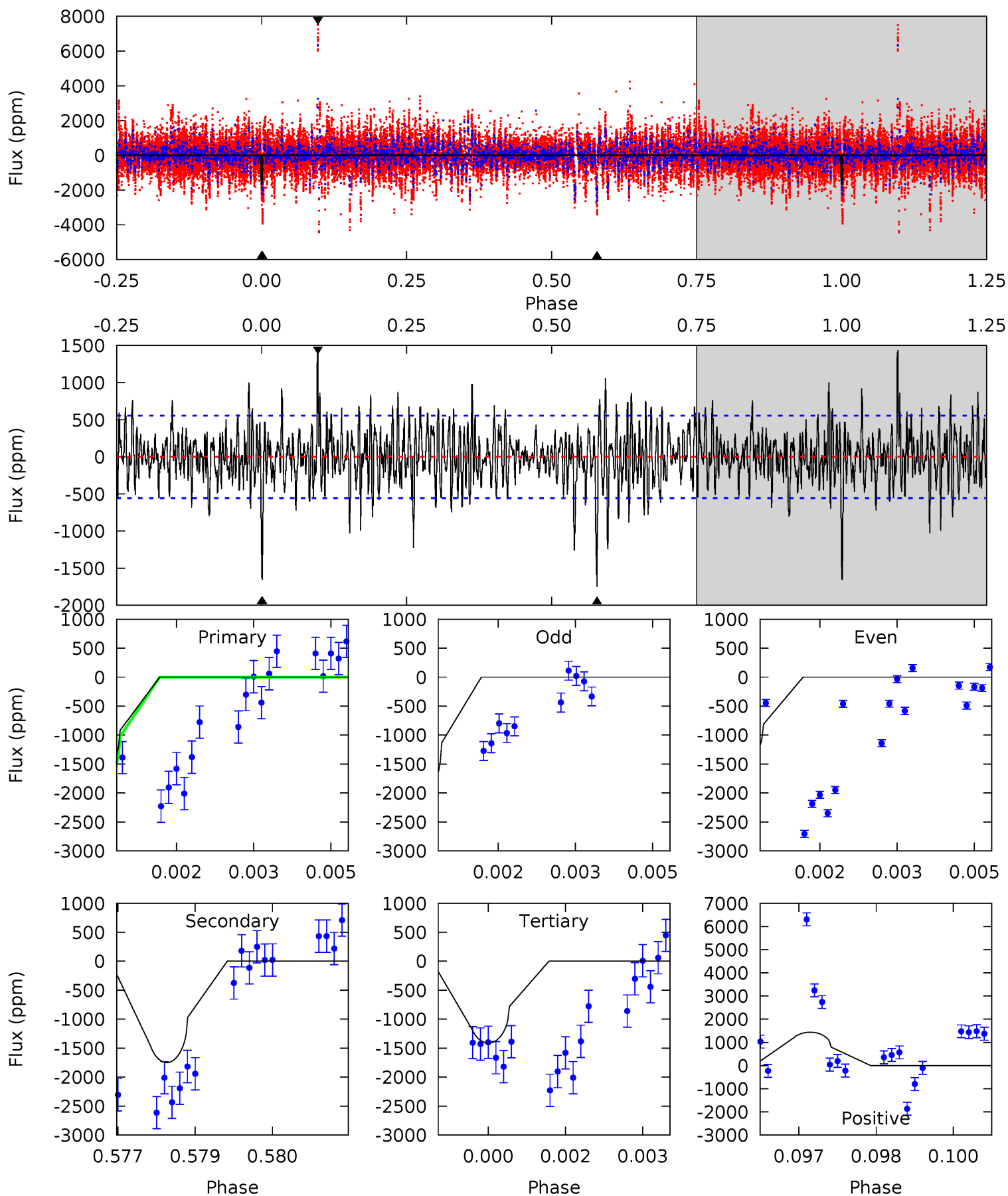
TCE 006138551-06 P=576.348993 Days  $T_0=273.321530$  (BKJD)



# DV Model-Shift Uniqueness Test

006138551-06, P = 576.302885 Days, E = 273.589413 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
16.0	16.9	13.7	13.9	5.37	3.16	3.08	2.38	2.13	3.26	3.02	2.62	0.86	0.45	2.02

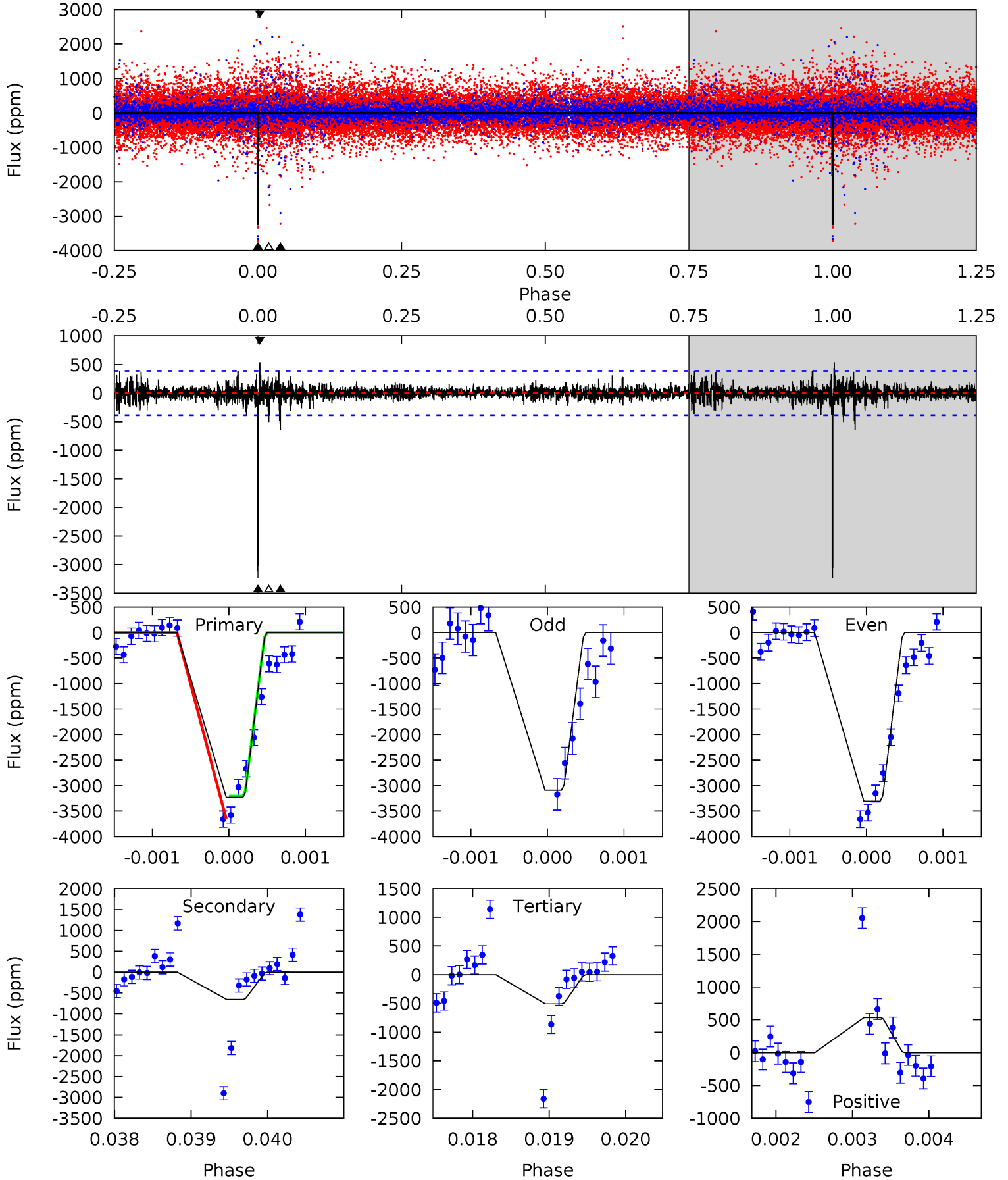




# Alt Model-Shift Uniqueness Test

006138551-06, P = 576.348993 Days, E = 273.321530 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
45.5	9.19	7.12	7.53	5.45	3.29	0.99	38.4	38.0	2.07	1.66	1.43	1.07	0.14	1.10



### Stellar Parameters For KIC 006138551

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4987^{+151}_{-136}$	$4.579^{+0.045}_{-0.050}$	$-0.100^{+0.300}_{-0.300}$	$0.741^{+0.071}_{-0.065}$	$0.760^{+0.078}_{-0.064}$	$2.633^{+0.538}_{-0.491}$
	+3%/-3%	+1%/-1%	+300%/-300%	+10%/-9%	+10%/-8%	+20%/-19%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 006138551-06 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-1749 \pm 103$	$3.56^{+2.13}_{-2.03}$	$239^{+8}_{-8}$	$4900^{+2468}_{-802}$	$113317^{+544463}_{-67254}$
Alt.	$-652 \pm 71$	$5.11^{+2.15}_{-2.19}$	$239^{+9}_{-8}$	$3589^{+785}_{-384}$	$20933^{+44145}_{-10361}$

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

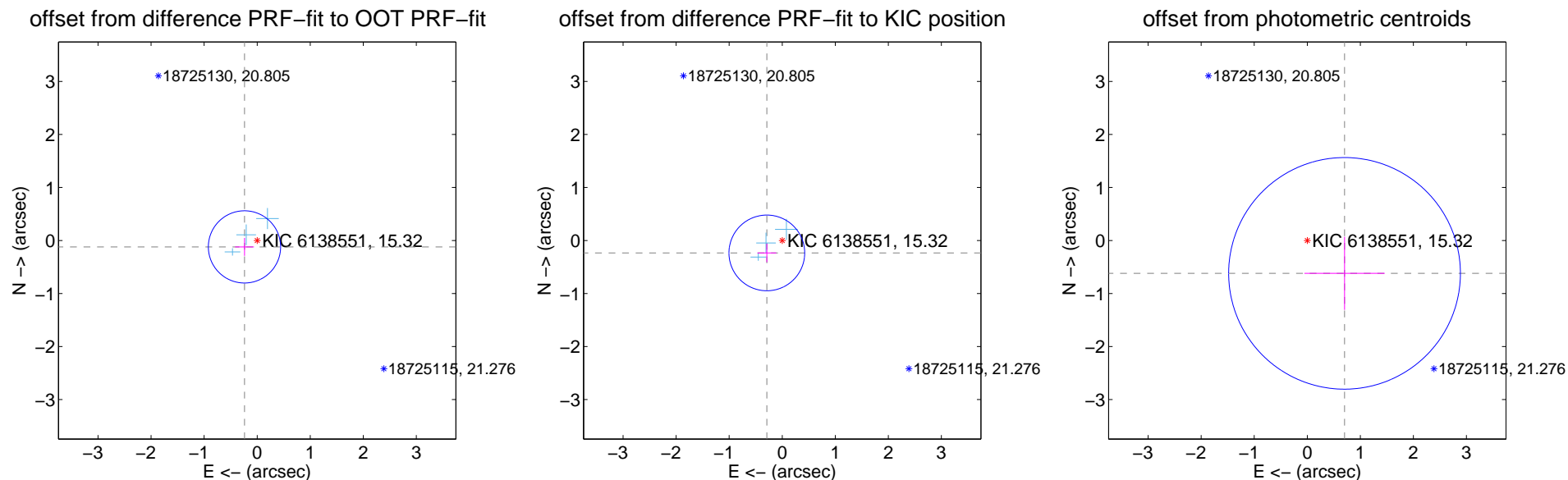
## DV Centroid Data

Supplemental centroid analysis for 006138551-06. Kepler magnitude: 15.32. Transit SNR 7.43

There are 3 quarters with good PRF difference image offsets

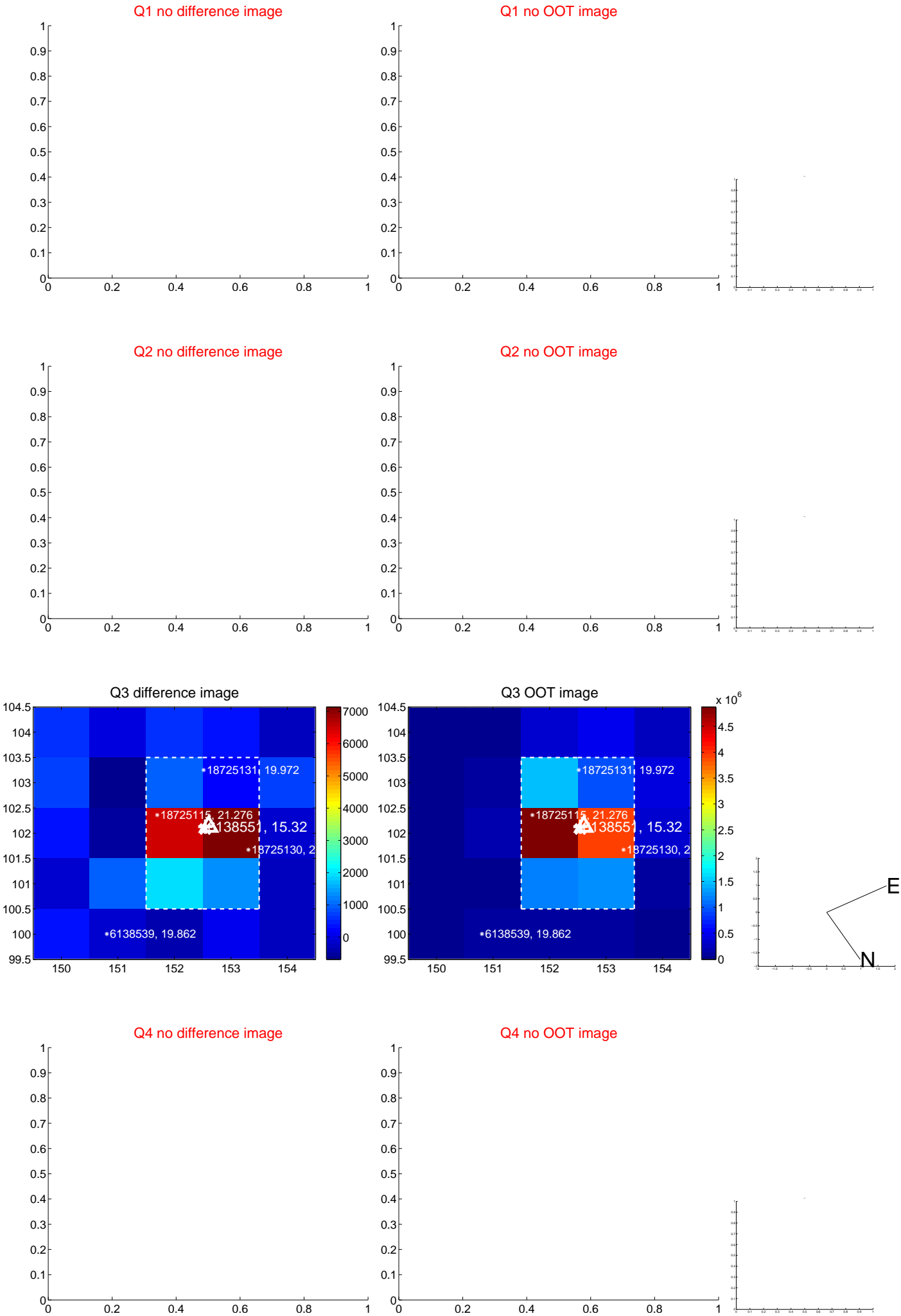
The direct PRF centroid is offset from the target star catalog position by about 0.24 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.268 \pm 0.227$	1.18	$0.239 \pm 0.178$	$-0.121 \pm 0.169$
PRF-fit source offset from KIC position	$0.373 \pm 0.238$	1.57	$0.290 \pm 0.177$	$-0.234 \pm 0.175$
photometric centroid source offset	$0.94 \pm 0.73$	1.29	$-0.70 \pm 0.76$	$-0.62 \pm 0.69$

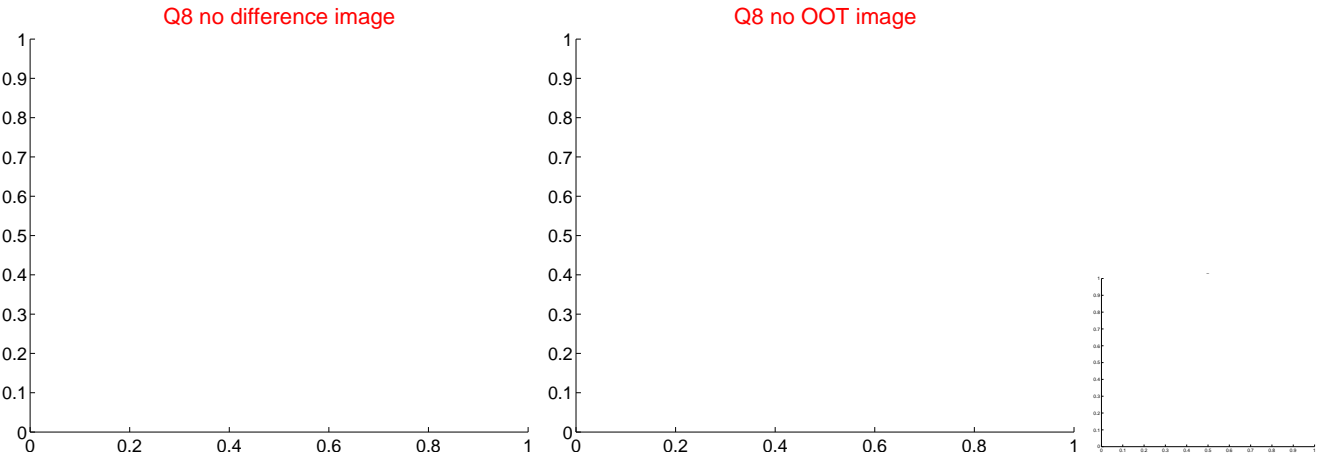
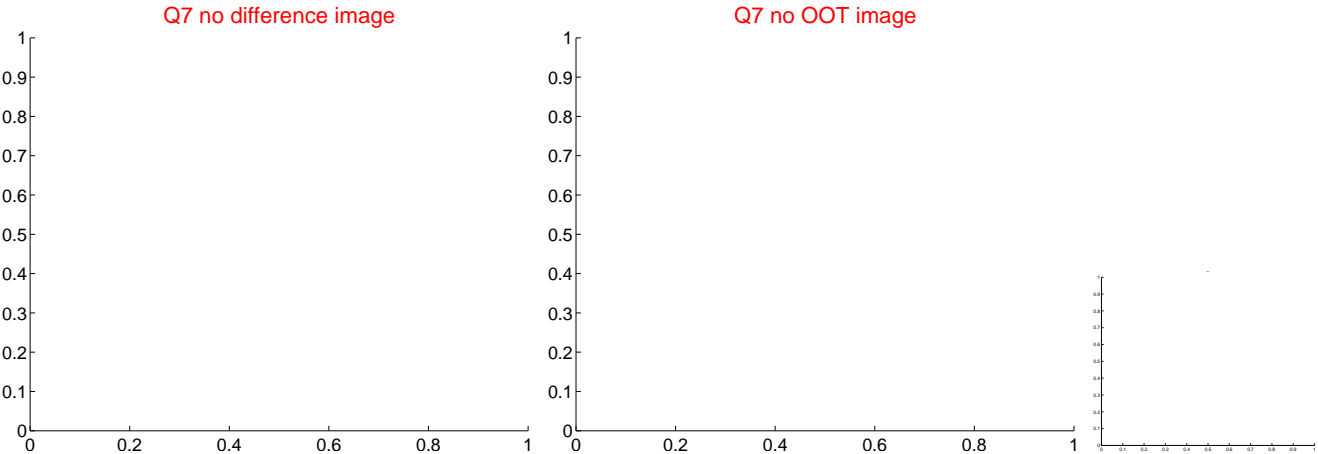
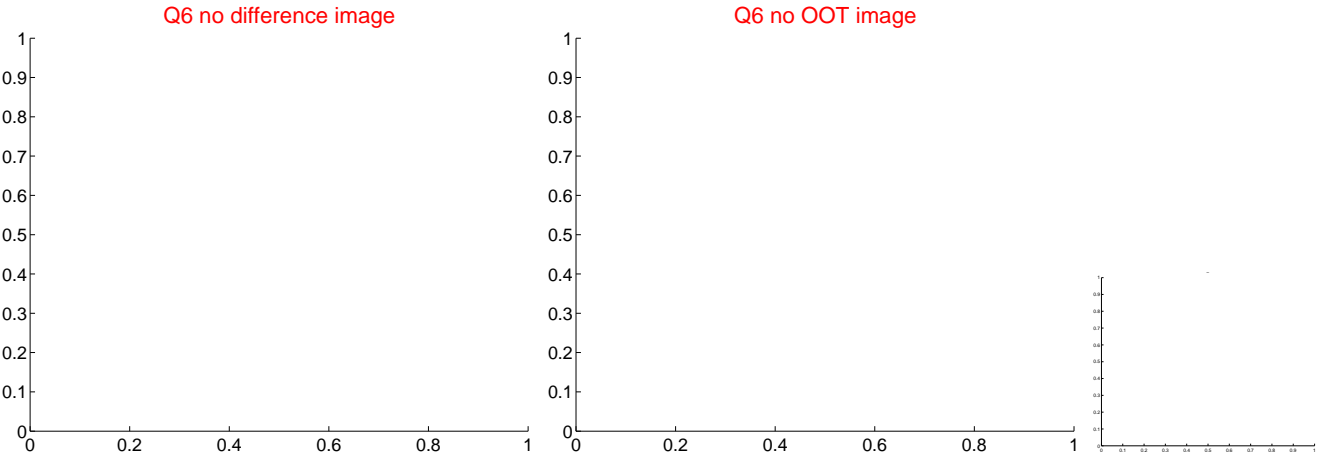
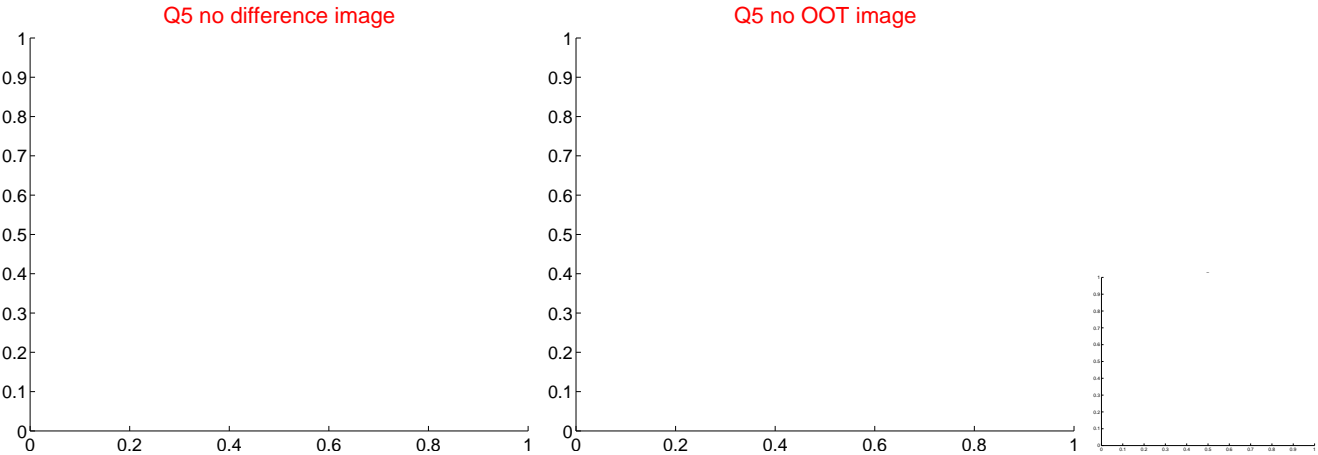


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

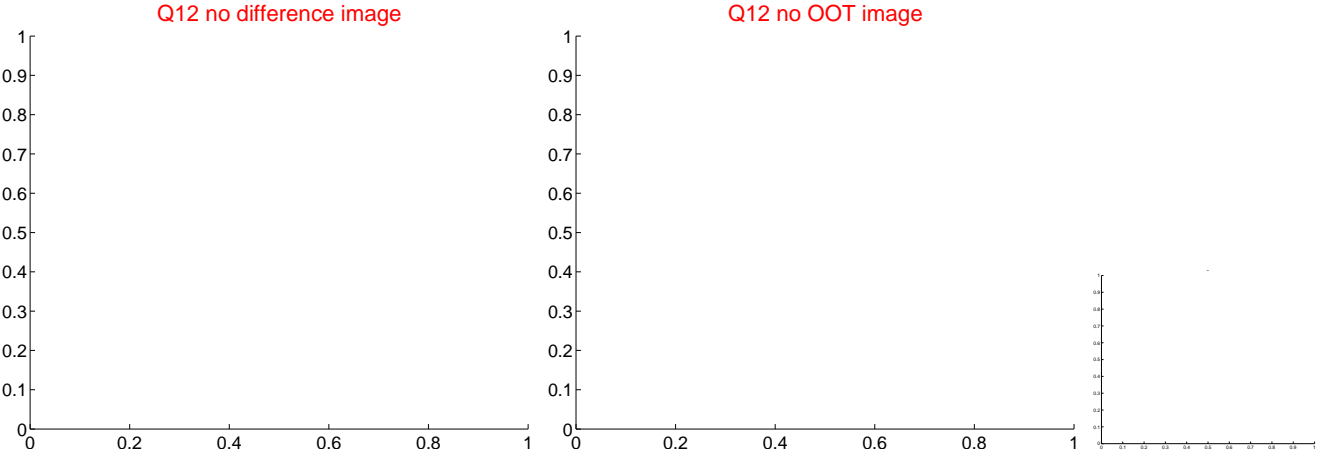
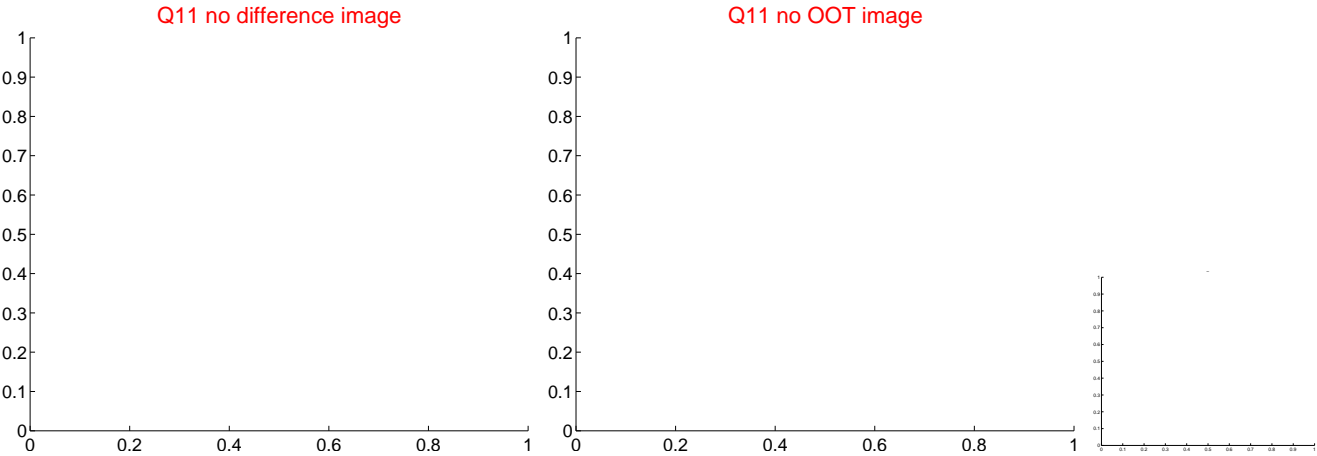
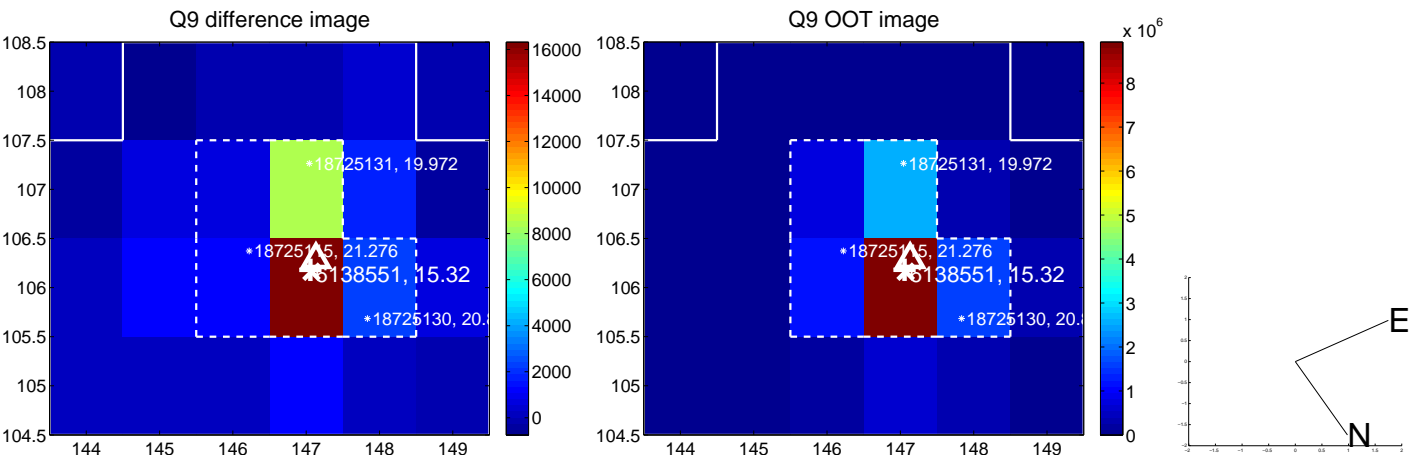
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



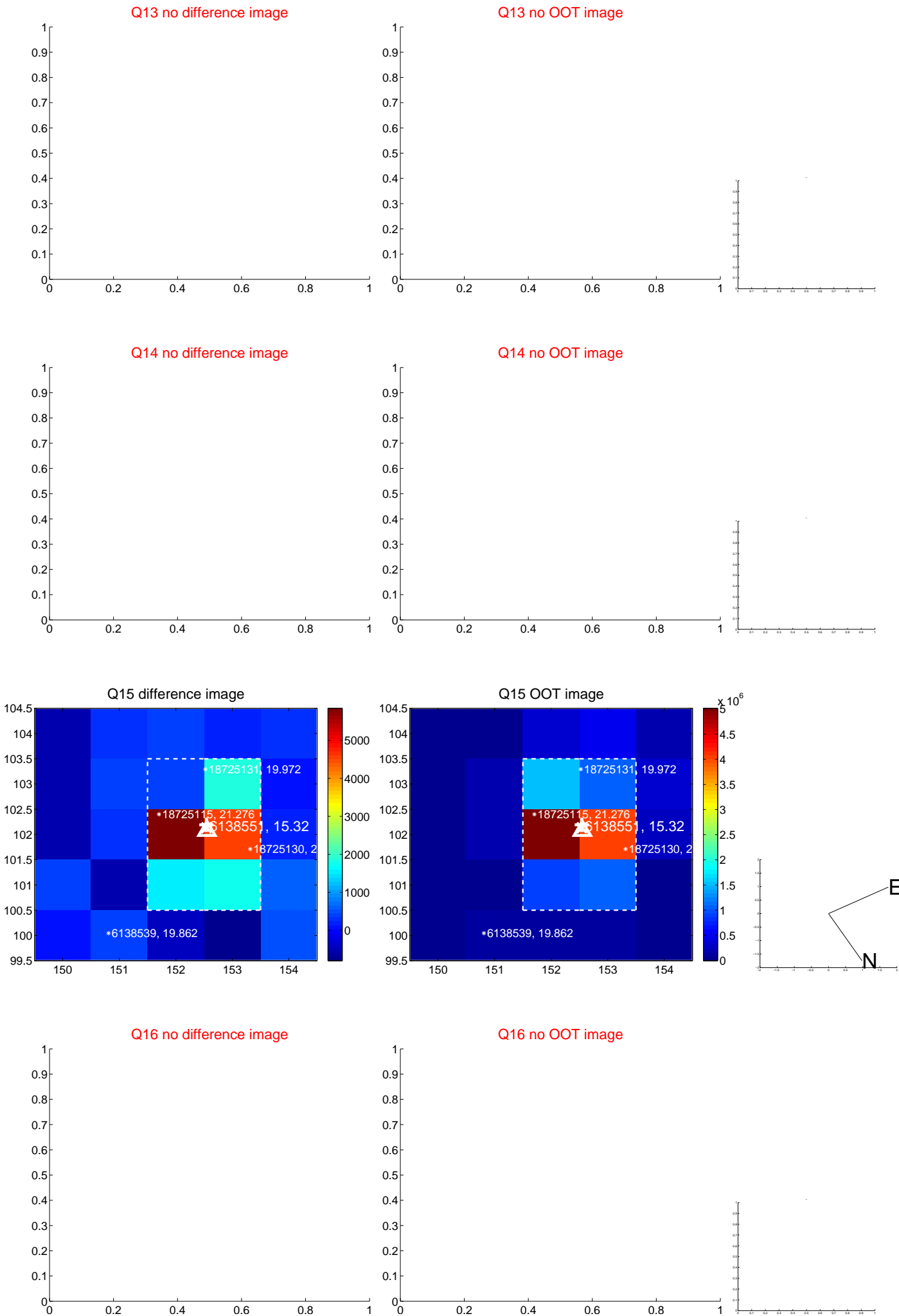
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



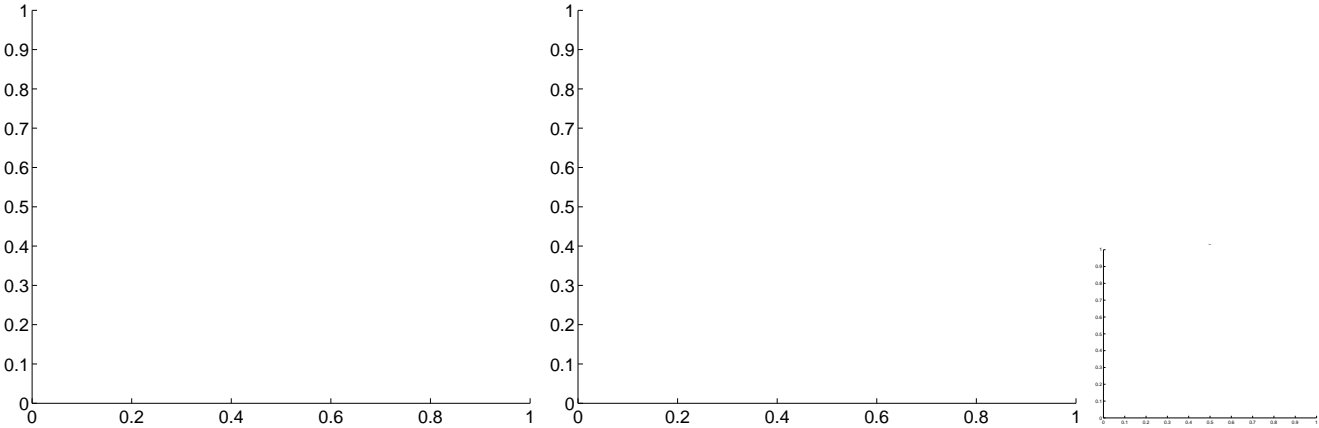
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



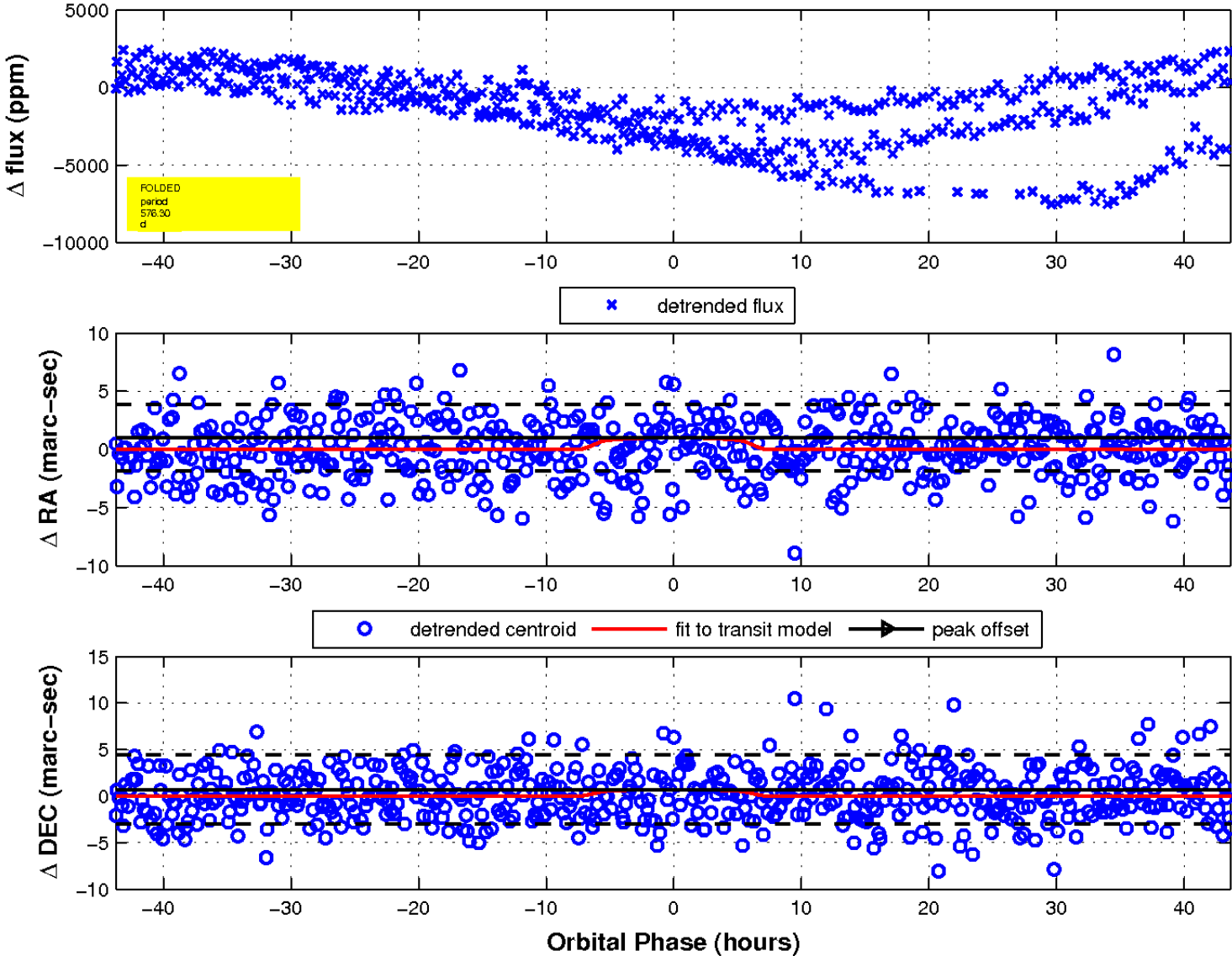
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

Q17 no difference image

Q17 no OOT image



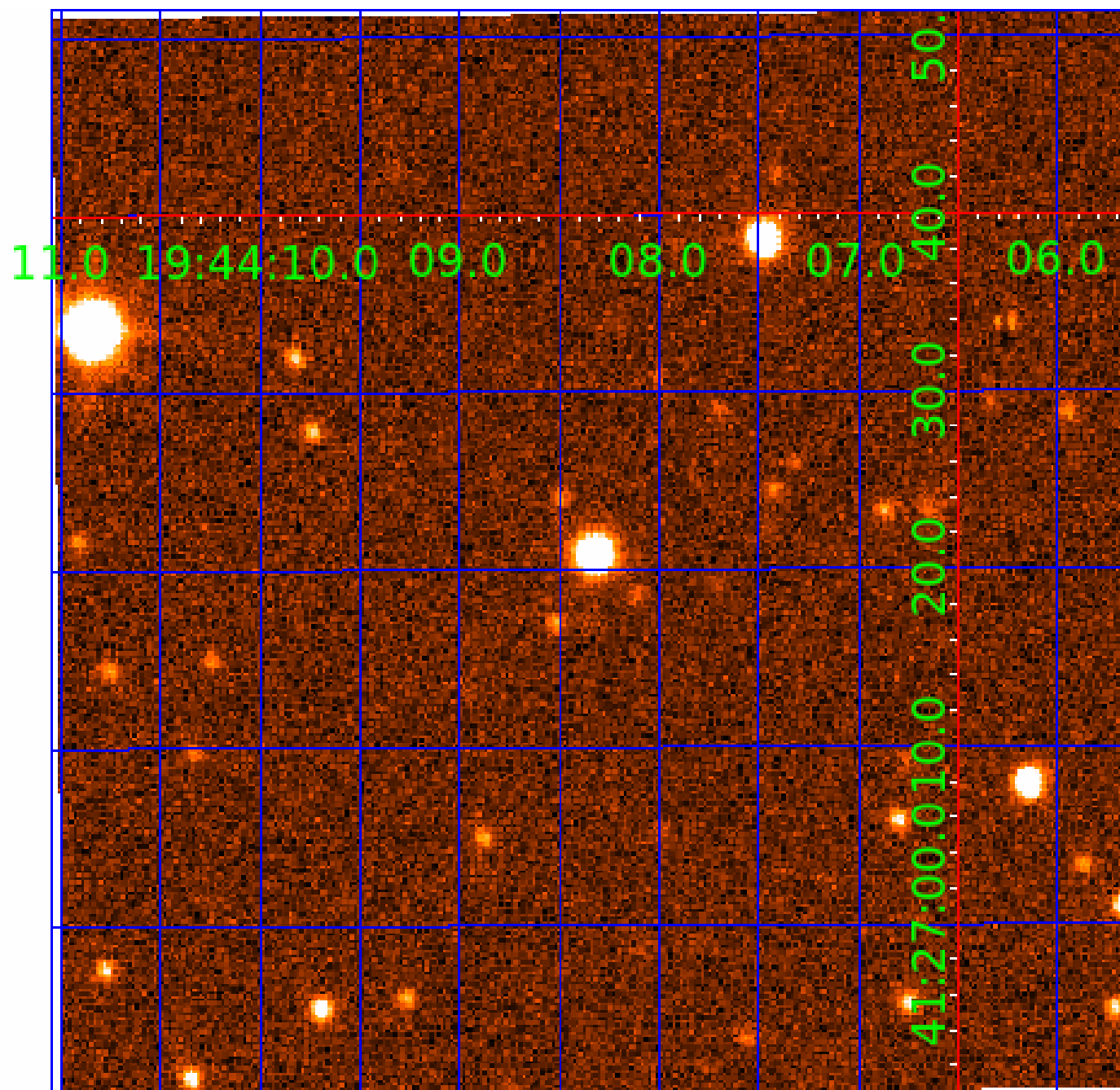
fluxWeightedCentroids, Planet 6 of 10





UKIRT Image

Declination



## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006138551-01	OBS	No	0.903264	132.276864	60.2	3.755	7.8	9.6	0.74	4987	0.58	1092.39
006138551-02	OBS	No	562.854767	235.373574	932.2	6.266	16.6	4.6	0.74	4987	2.58	0.20
006138551-03	OBS	No	530.761276	479.223857	4353.4	42.694	16.7	8.6	0.74	4987	6.18	0.22
006138551-04	OBS	No	228.013194	343.175015	1171.4	13.680	15.1	6.7	0.74	4987	5.12	0.69
006138551-05	OBS	No	464.265857	586.087268	1073.6	6.635	13.9	7.7	0.74	4987	2.51	0.27
006138551-06	OBS	No	576.302885	273.589413	1404.5	14.591	12.2	7.4	0.74	4987	3.24	0.20
006138551-07	OBS	No	207.671057	239.280791	614.0	3.898	11.6	4.3	0.74	4987	2.13	0.78
006138551-08	OBS	No	405.523905	211.416753	1420.6	13.319	11.5	8.4	0.74	4987	3.42	0.32
006138551-09	OBS	No	278.937876	305.513027	390.8	6.513	11.0	2.9	0.74	4987	1.74	0.52
006138551-10	OBS	No	464.292287	584.958197	3505.3	46.997	9.5	5.4	0.74	4987	5.35	0.27

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006138551-01	OBS	FP	0.00	1	0	0	0	LPP_DV
006138551-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_TRACKER—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
006138551-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
006138551-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV
006138551-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
006138551-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS
006138551-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_TRACKER—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
006138551-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—INCONSISTENT_TRANS
006138551-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—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
006138551-10	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—SAME_NTL_PERIOD—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.

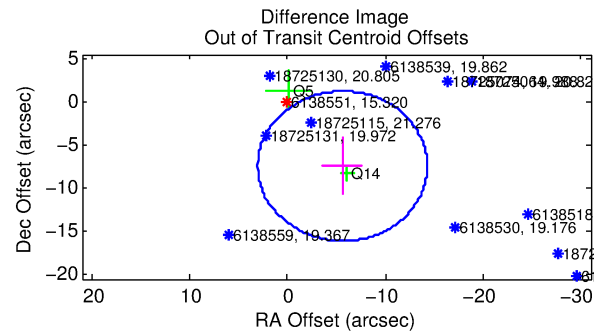
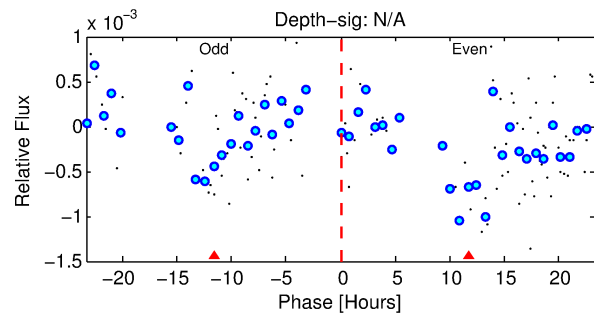
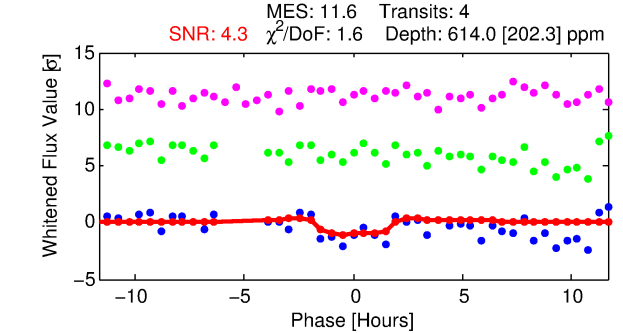
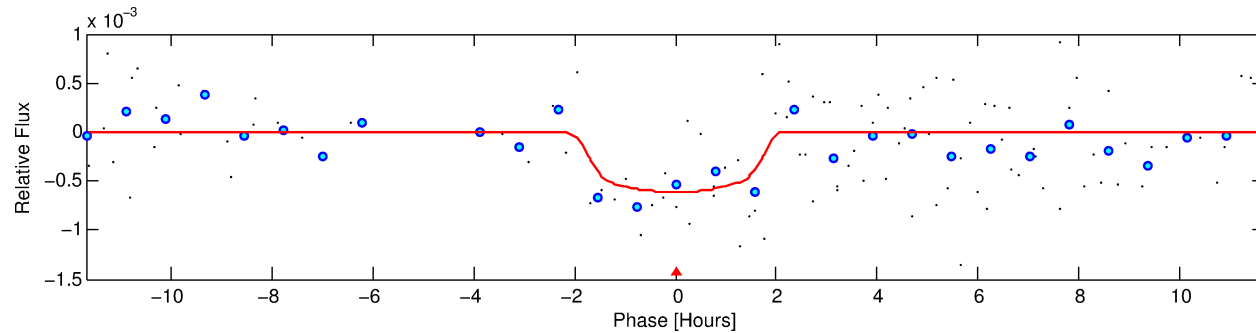
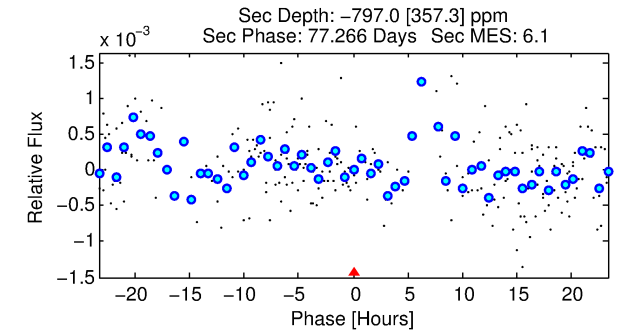
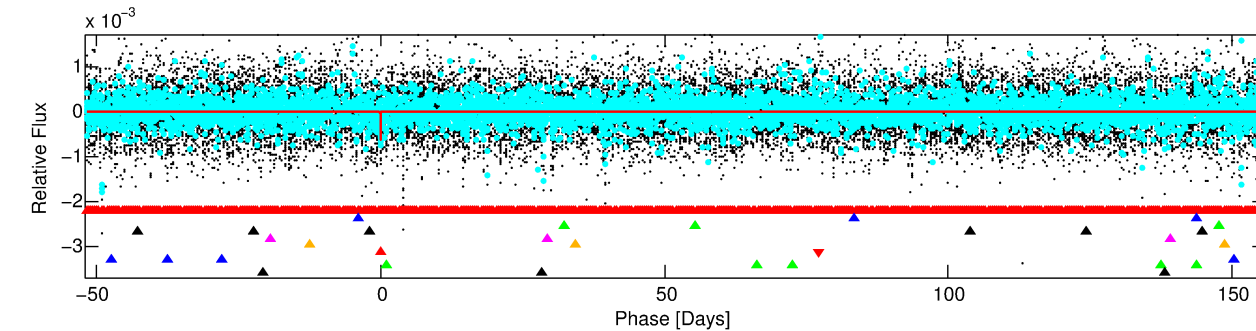
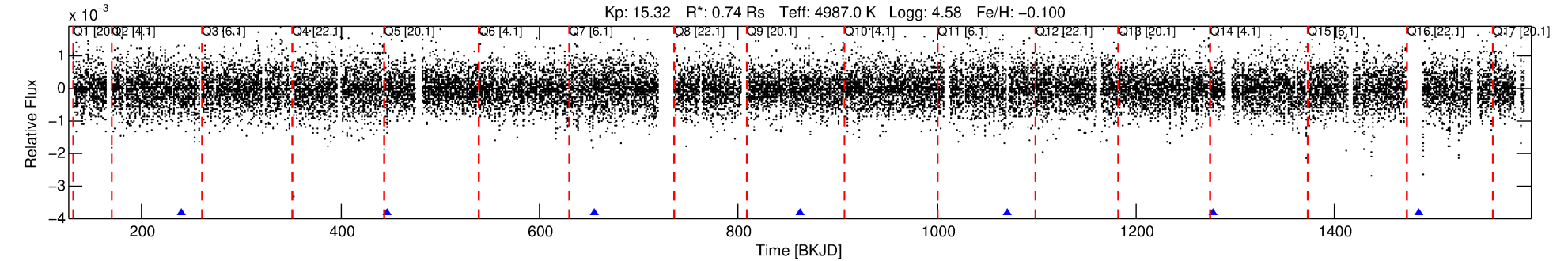
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 006138551-07

No Significant Match Found

# DV One-Page Summary

KIC: 6138551 Candidate: 7 of 10 Period: 207.671 d



## DV Fit Results:

Period = 207.67106 [0.01227] d  
Epoch = 239.2808 [0.0181] BKJD  
Rp/R\* = 0.0263 [0.0370]  
a/R\* = 233.83 [1190.84]  
b = 0.85 [1.71]  
Seff = 0.78 [0.12]  
Teq = 239 [9] K  
Rp = 2.13 [3.00] Re  
a = 0.6264 [0.0467] AU  
Ag = N/A  
Teffp = N/A

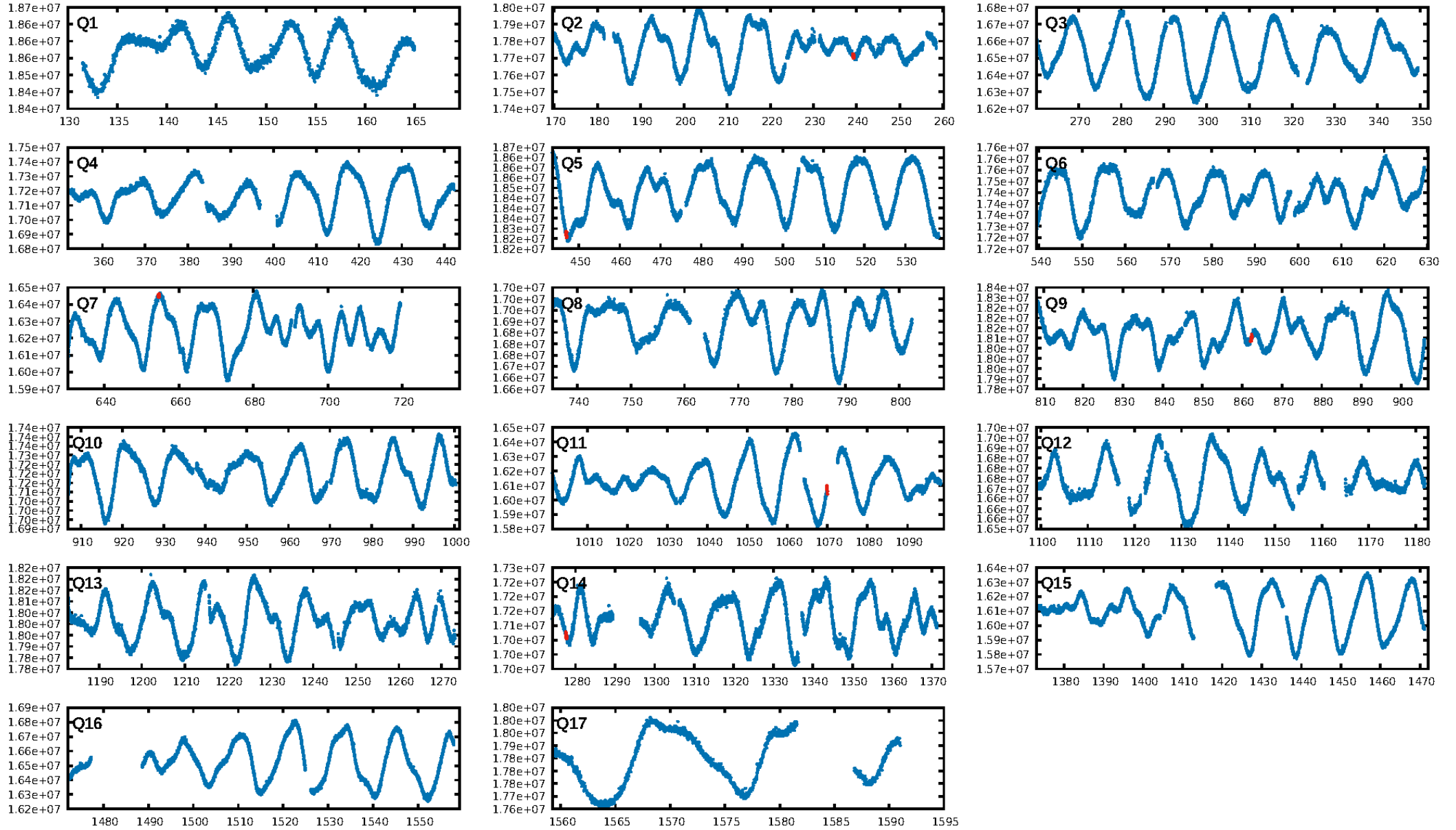
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [916.93]  
LongPeriod-sig: 100.0% [34.32]  
ModelChiSquare2-sig: 15.0%  
ModelChiSquareGof-sig: 97.6%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: -1.876  
Centroid-sig: 66.0%  
Centroid-so: 0.843 arcsec [0.44]  
OotOffset-rm: 9.315 arcsec [3.23]  
KicOffset-rm: 9.536 arcsec [2.04]  
OotOffset-st: 1/0/0/1 [2]  
KicOffset-st: 1/0/0/1 [2]  
DiffImageQuality-fgm: 0.50 [1/2]  
DiffImageOverlap-fno: 0.00 [0/5]

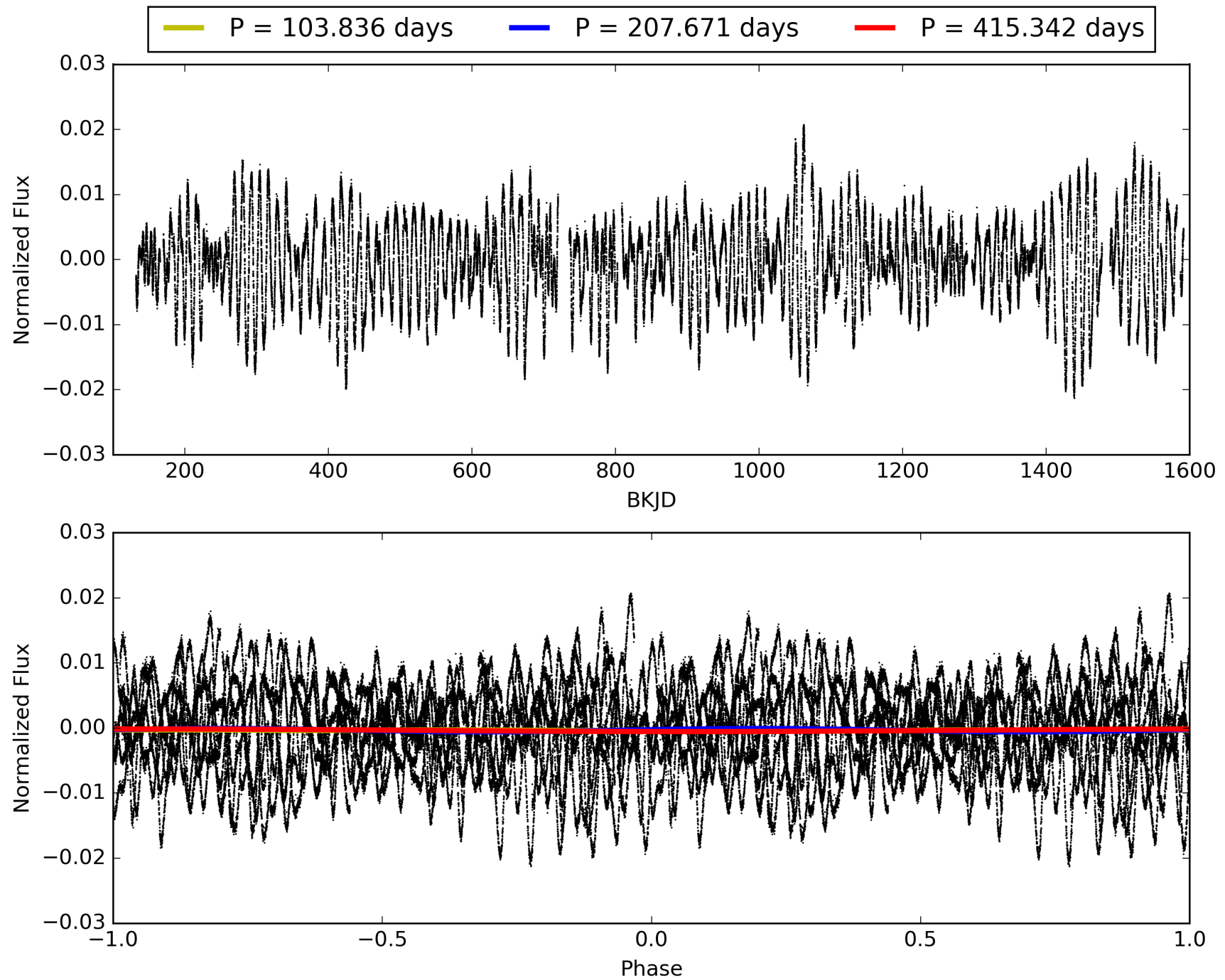
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 03-Feb-2016 04:51:06 Z

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

# TCE 006138551-07, PDC Light Curves

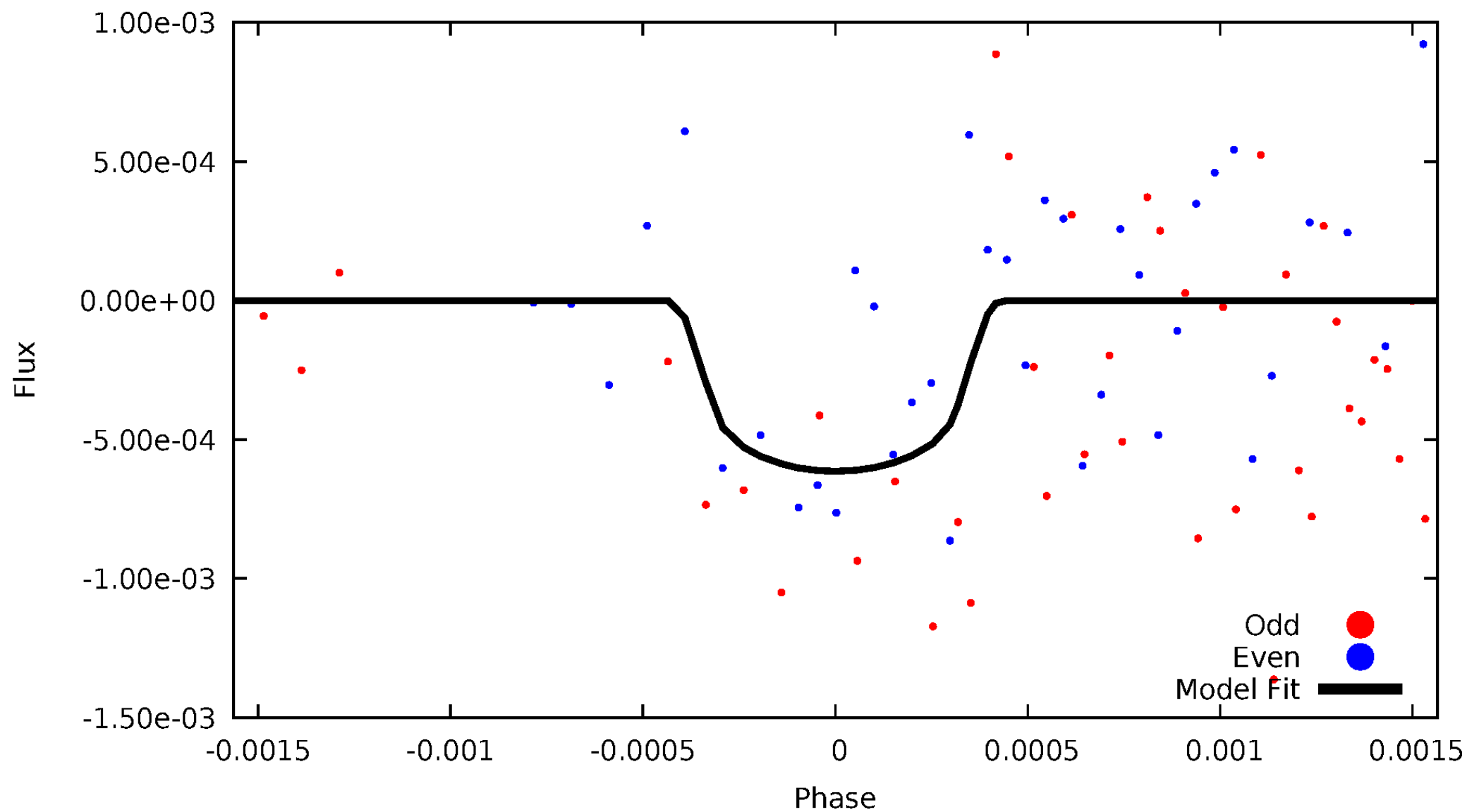


TCE 006138551-07



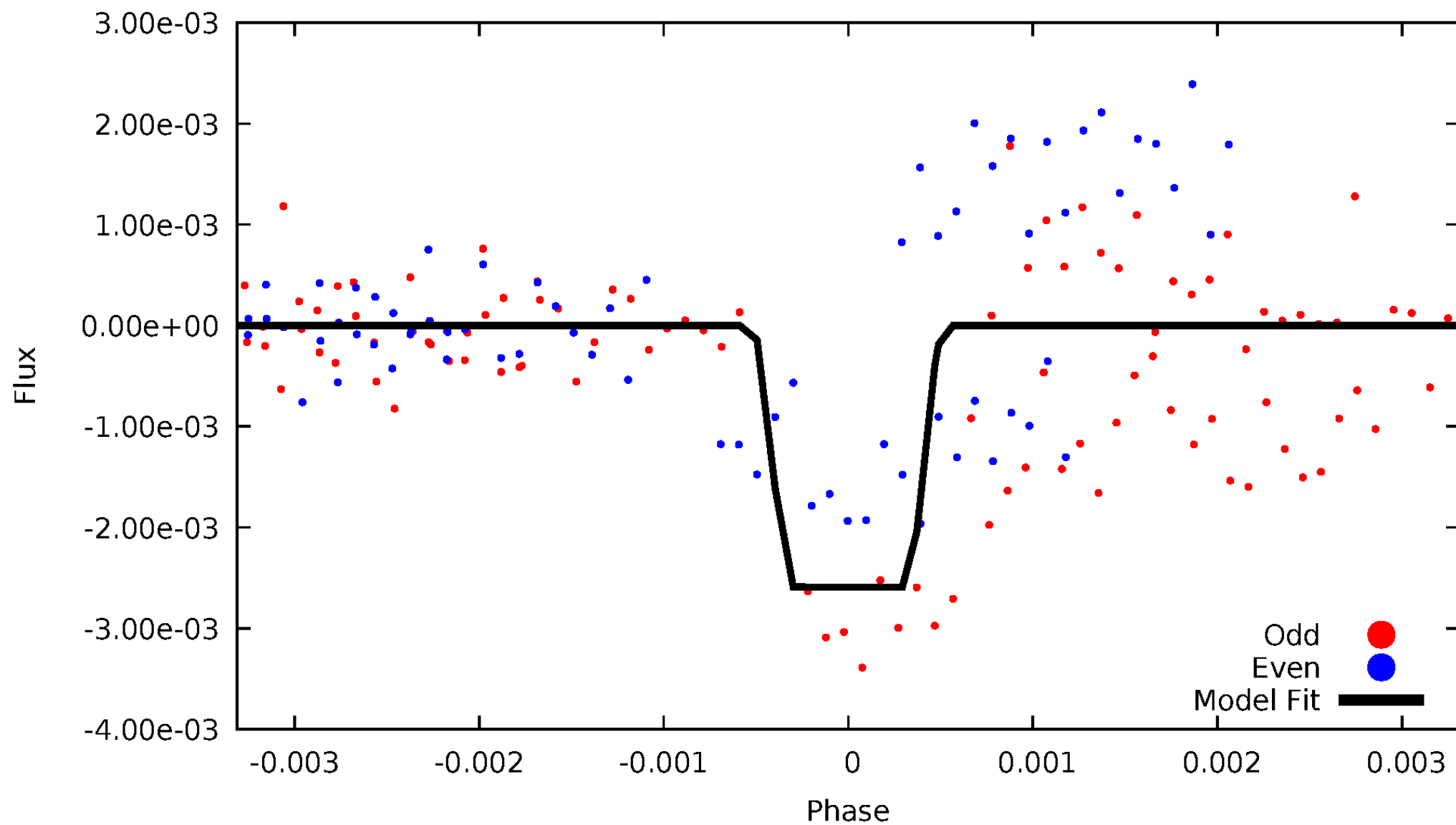
# DV Odd/Even

TCE 006138551-07



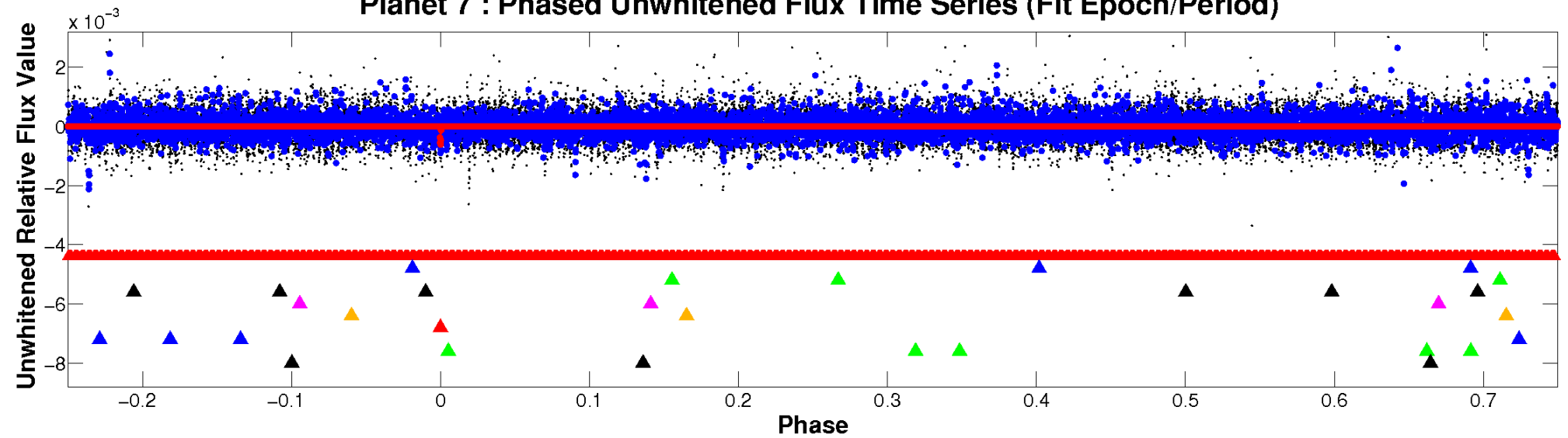
# ALT Odd/Even

TCE 006138551-07

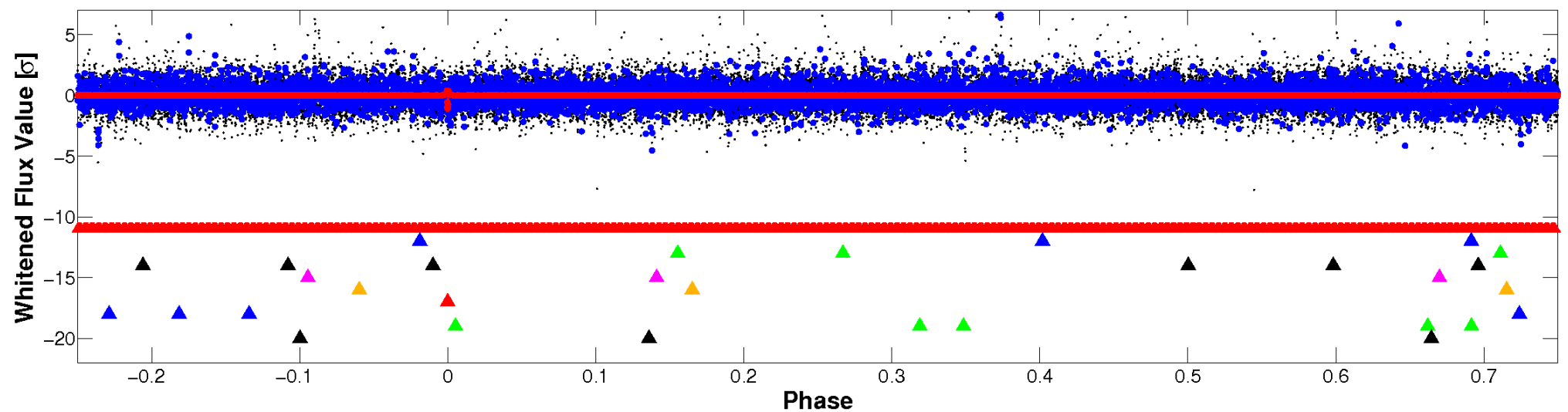


# Non-Whitened Vs. Whitened Light Curve

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



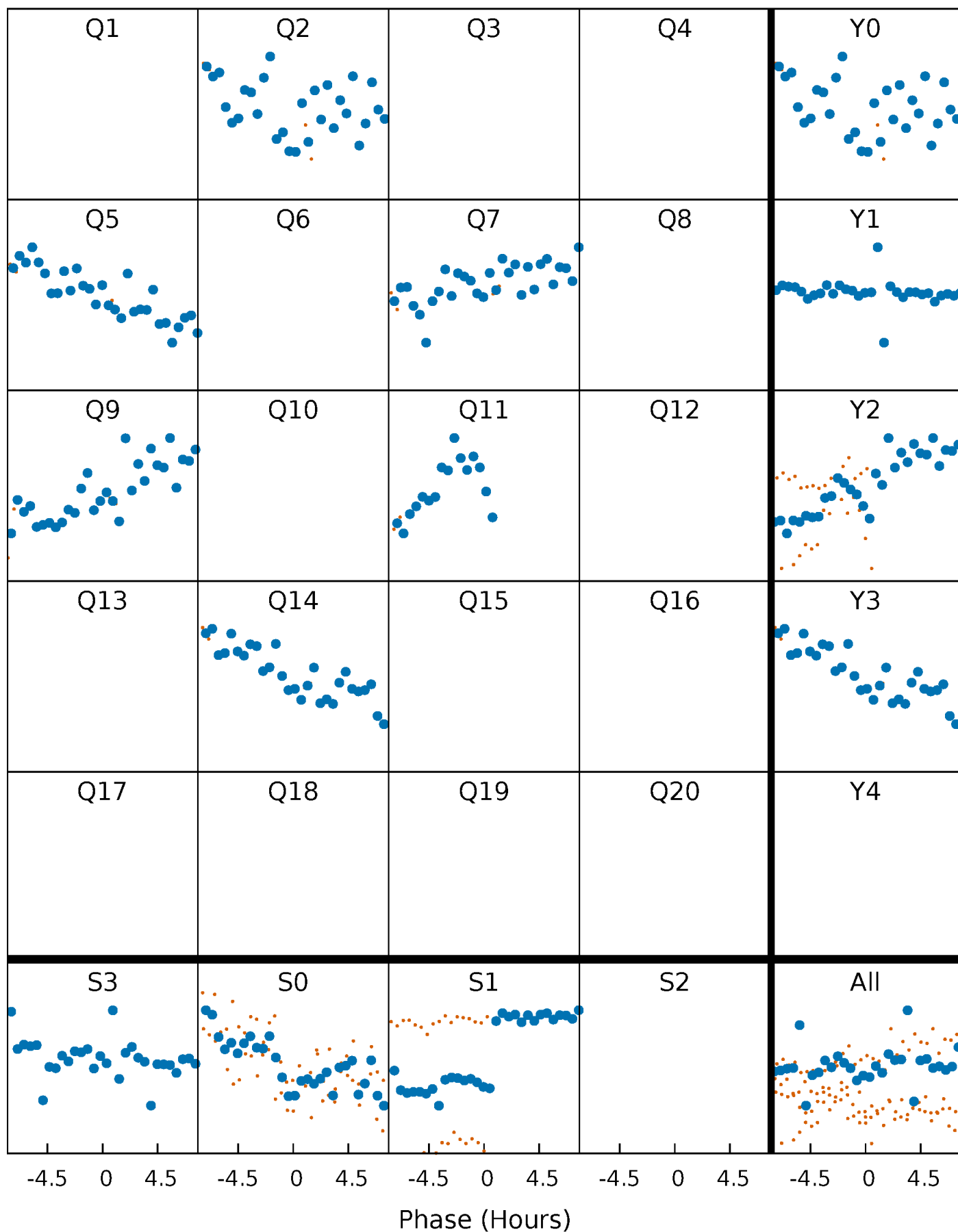
## Planet 7 : Phased Whitened Flux Time Series (Fit Epoch/Period)





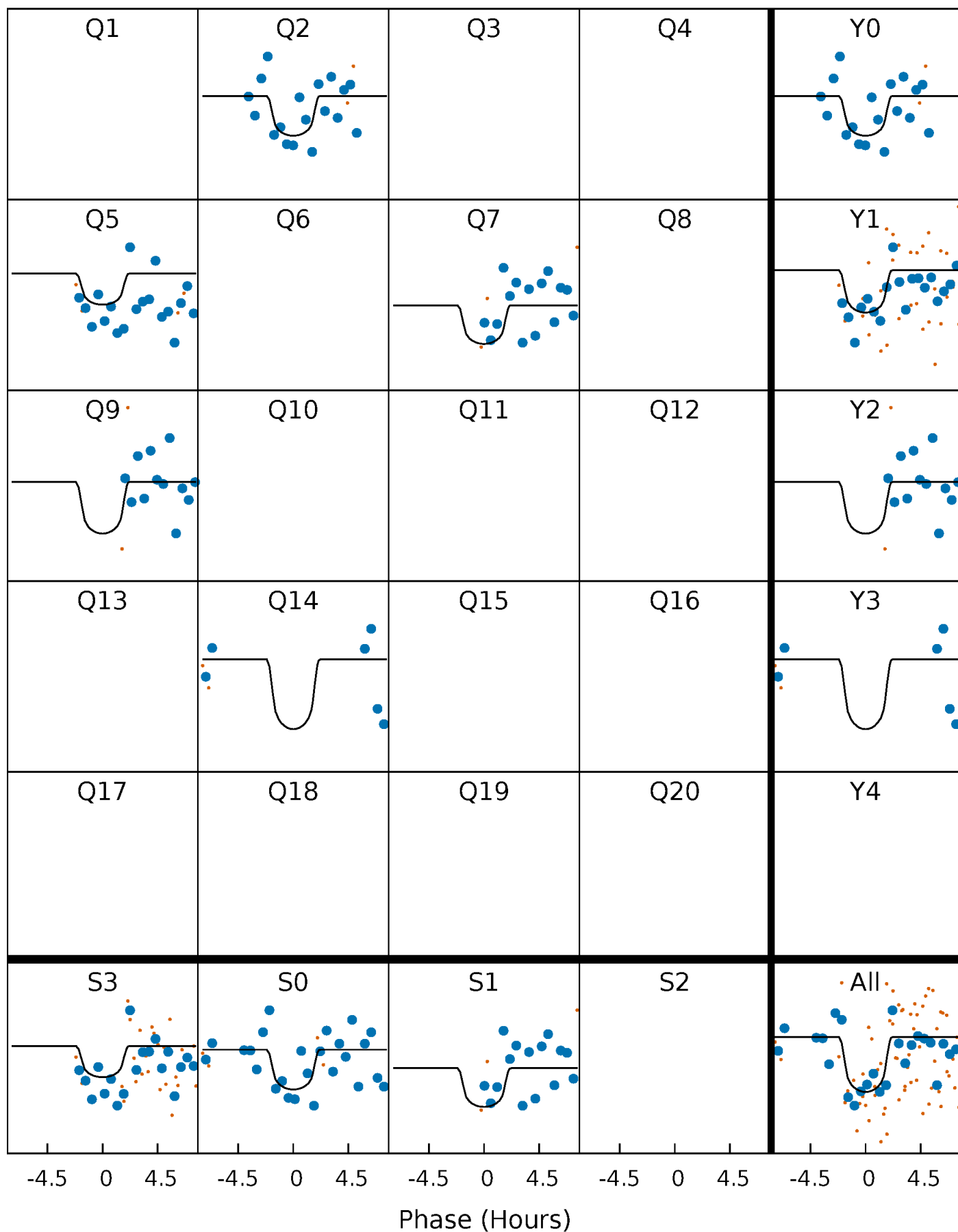
# PDC Quarter-Phased Transit Curves

TCE 006138551-07   P=207.671057 Days    $T_0=239.280791$  (BKJD)



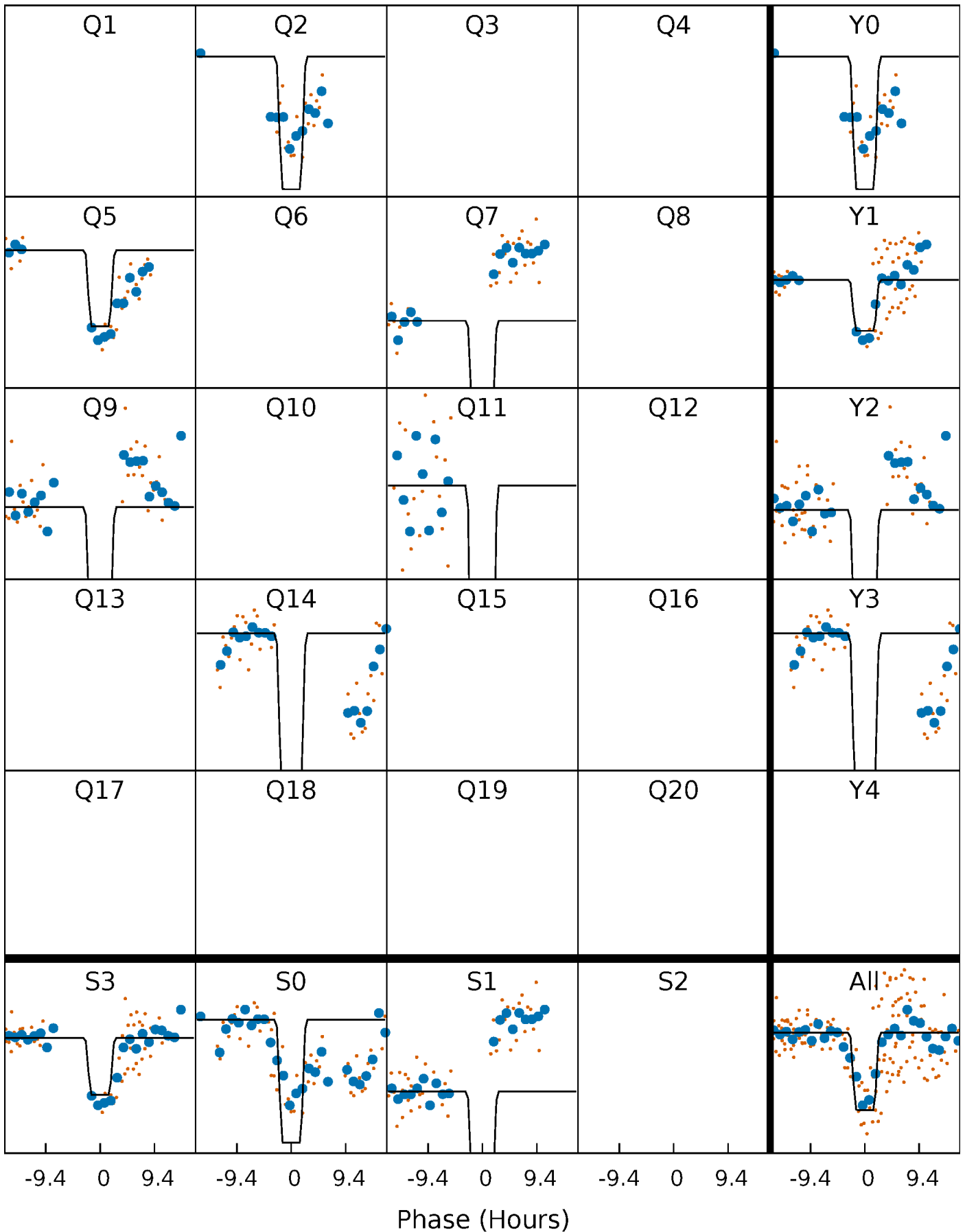
# DV Quarter-Phased Transit Curves

TCE 006138551-07 P=207.671057 Days  $T_0=239.280791$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

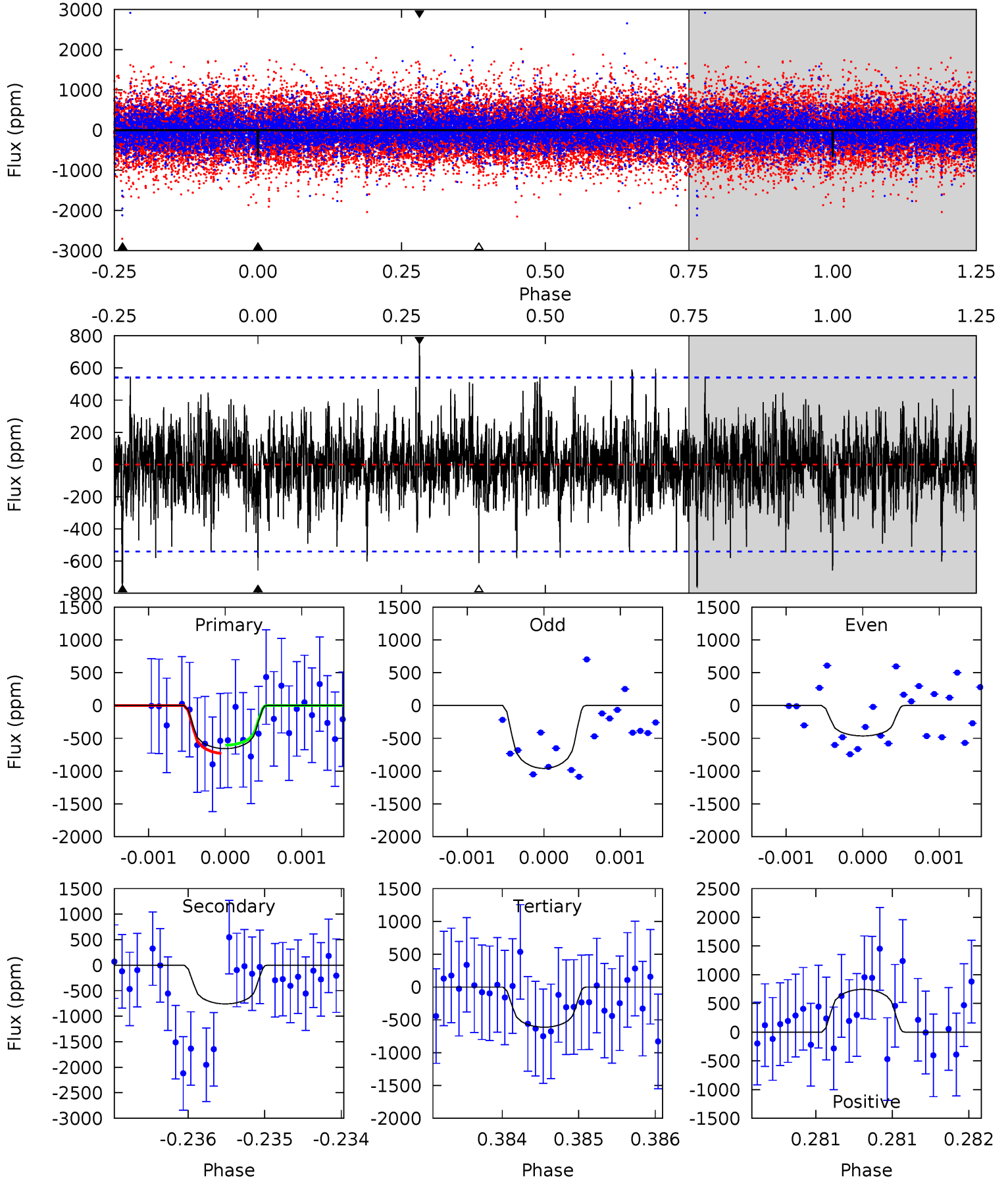
TCE 006138551-07     $P=207.645837$  Days     $T_0=239.261417$  (BKJD)



# DV Model-Shift Uniqueness Test

006138551-07, P = 207.671057 Days, E = 31.609734 Days

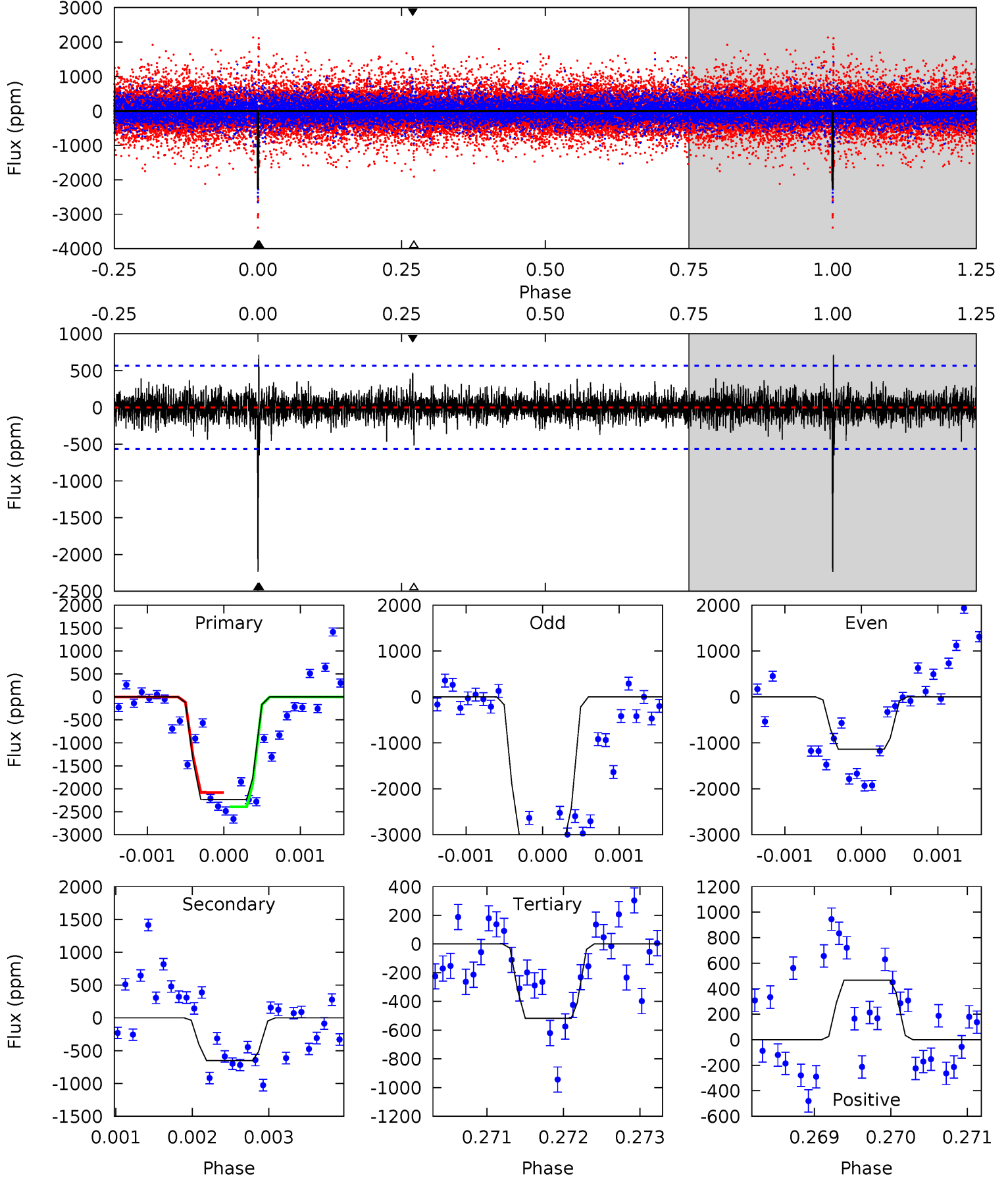
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.68	7.71	6.22	7.58	5.49	3.35	1.53	0.46	-0.90	1.49	0.13	2.48	1.01	0.50	0.62



# Alt Model-Shift Uniqueness Test

006138551-07, P = 207.645837 Days, E = 31.615580 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
21.5	6.26	4.97	4.49	5.45	3.30	1.00	16.5	17.0	1.29	1.77	9.97	0.69	0.24	1.51



### Stellar Parameters For KIC 006138551

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4987^{+151}_{-136}$	$4.579^{+0.045}_{-0.050}$	$-0.100^{+0.300}_{-0.300}$	$0.741^{+0.071}_{-0.065}$	$0.760^{+0.078}_{-0.064}$	$2.633^{+0.538}_{-0.491}$
	+3%/-3%	+1%/-1%	+300%/-300%	+10%/-9%	+10%/-8%	+20%/-19%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 006138551-07 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-759 \pm 98$	$3.17^{+2.58}_{-2.10}$	$335^{+12}_{-11}$	$4342^{+2906}_{-812}$	$16155^{+129442}_{-11179}$
Alt.	$-652 \pm 104$	$4.60^{+2.73}_{-2.50}$	$336^{+12}_{-13}$	$3703^{+1260}_{-523}$	$6615^{+25836}_{-4073}$

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

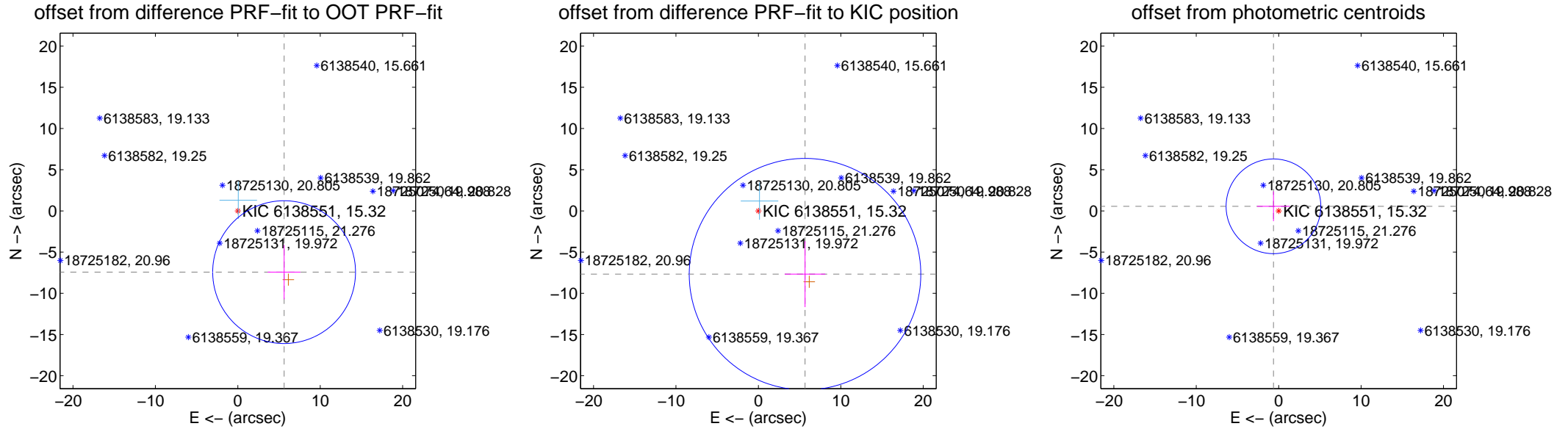
## DV Centroid Data

Supplemental centroid analysis for 006138551-07. Kepler magnitude: 15.32. Transit SNR 4.27

There are 1 quarters with good PRF difference image offsets

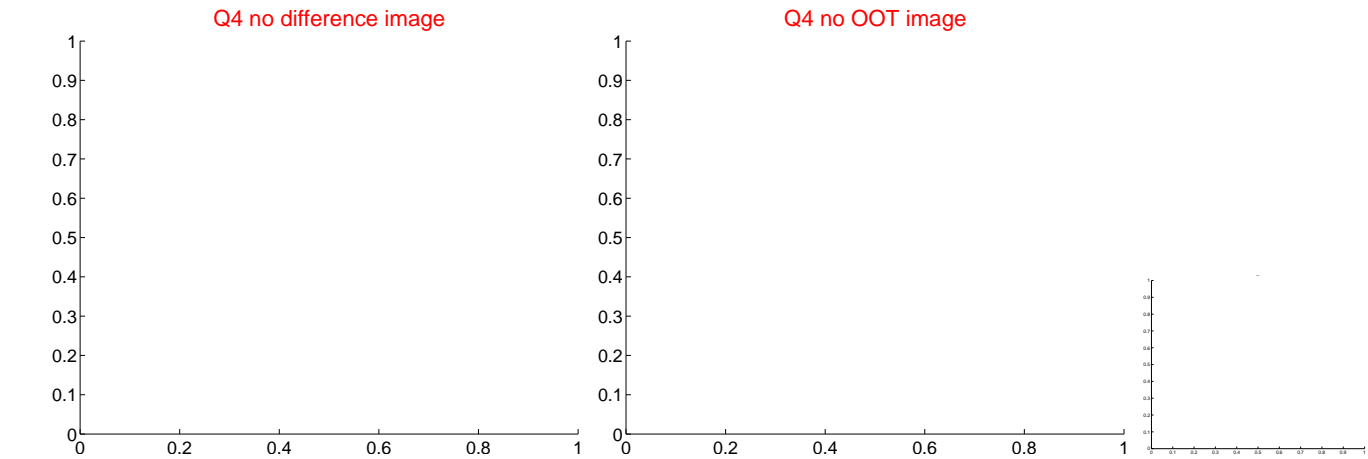
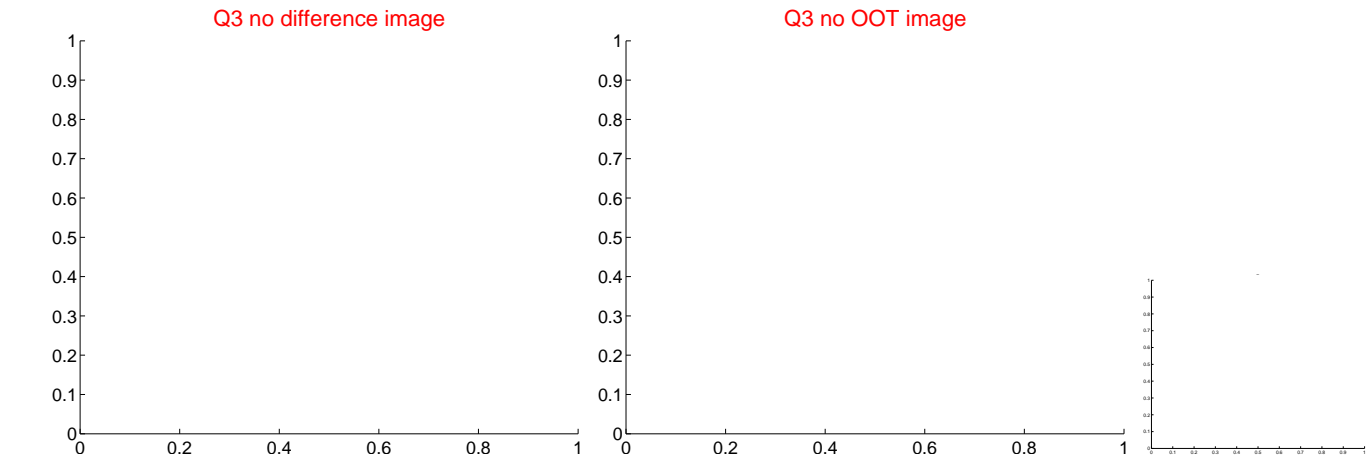
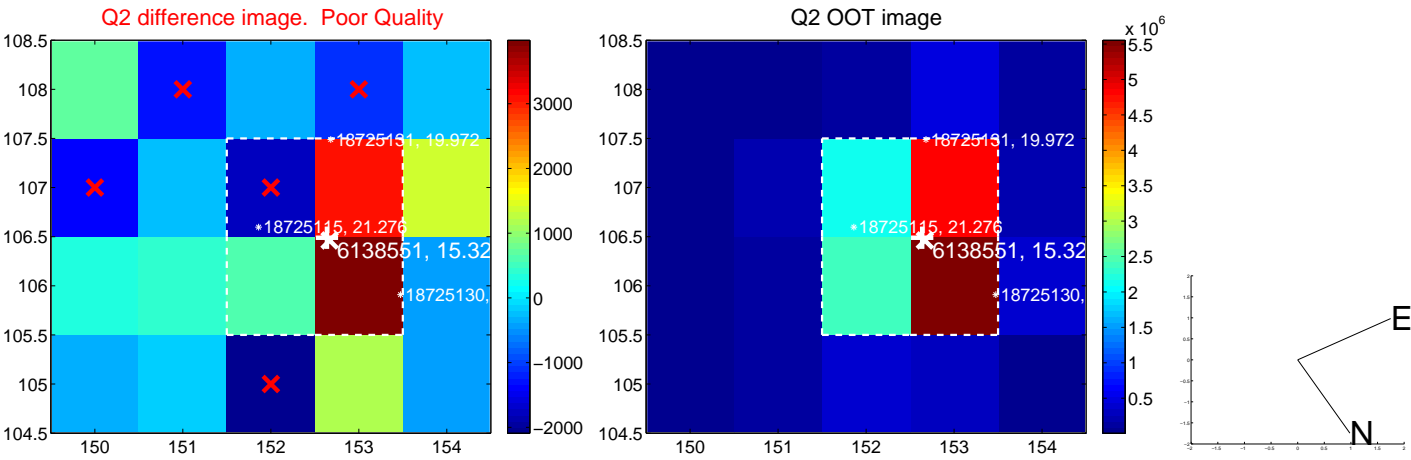
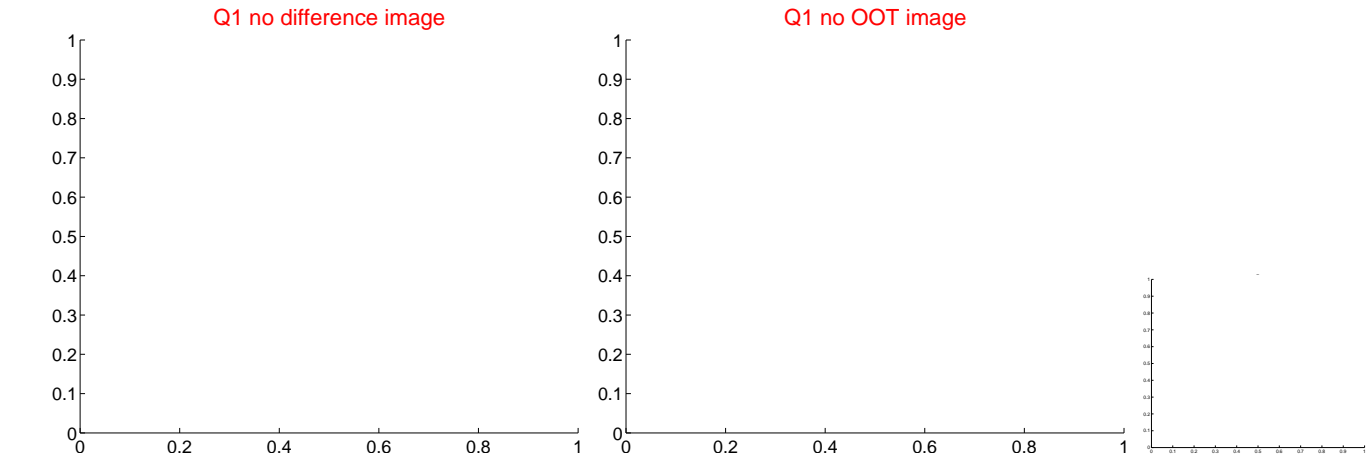
The direct PRF centroid is offset from the target star catalog position by about 0.26 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$9.315 \pm 2.888$	<b>3.23</b>	$-5.617 \pm 1.985$	$-7.431 \pm 3.295$
PRF-fit source offset from KIC position	$9.536 \pm 4.682$	2.04	$-5.658 \pm 2.464$	$-7.677 \pm 4.001$
photometric centroid source offset	$0.84 \pm 1.92$	0.44	$0.63 \pm 2.00$	$0.56 \pm 1.80$



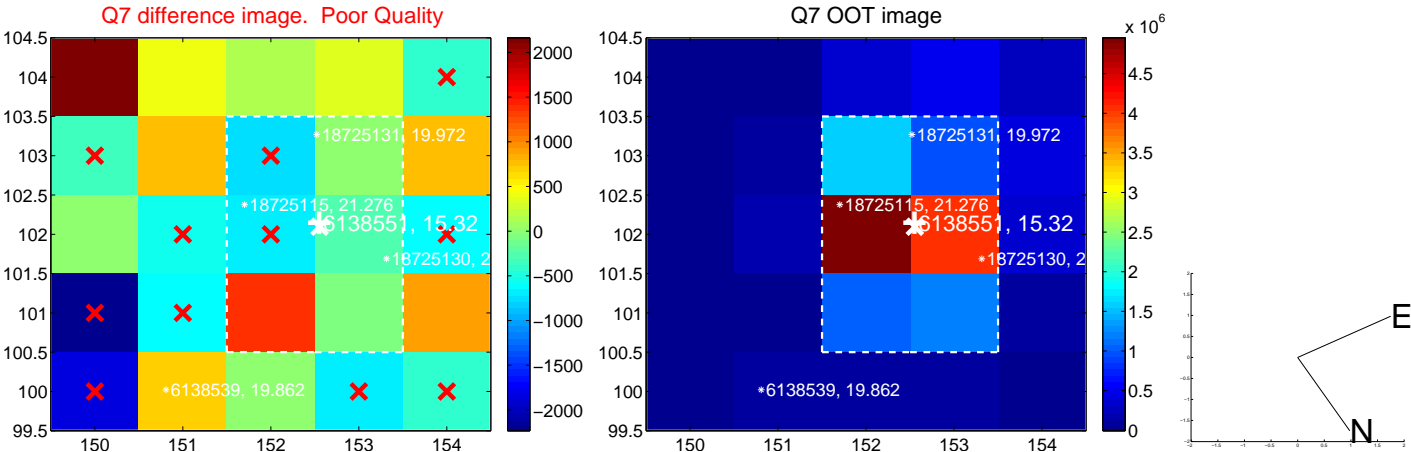
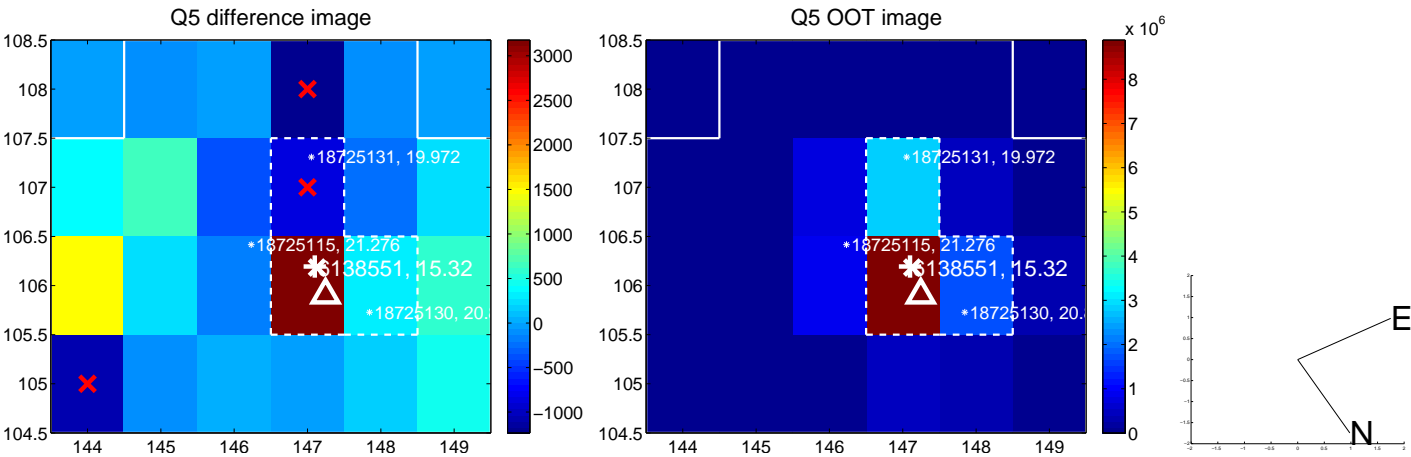
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

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

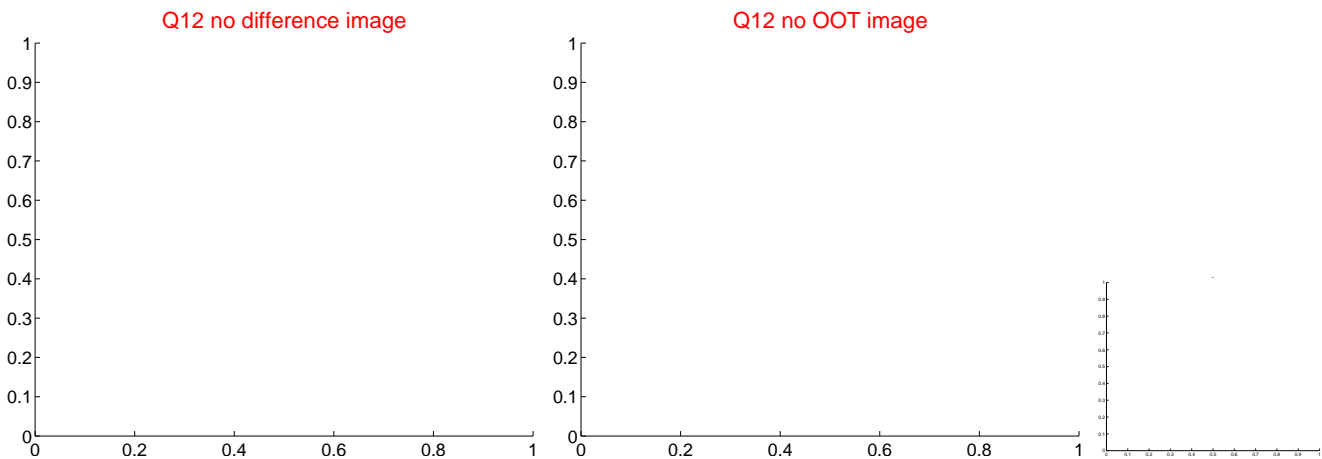
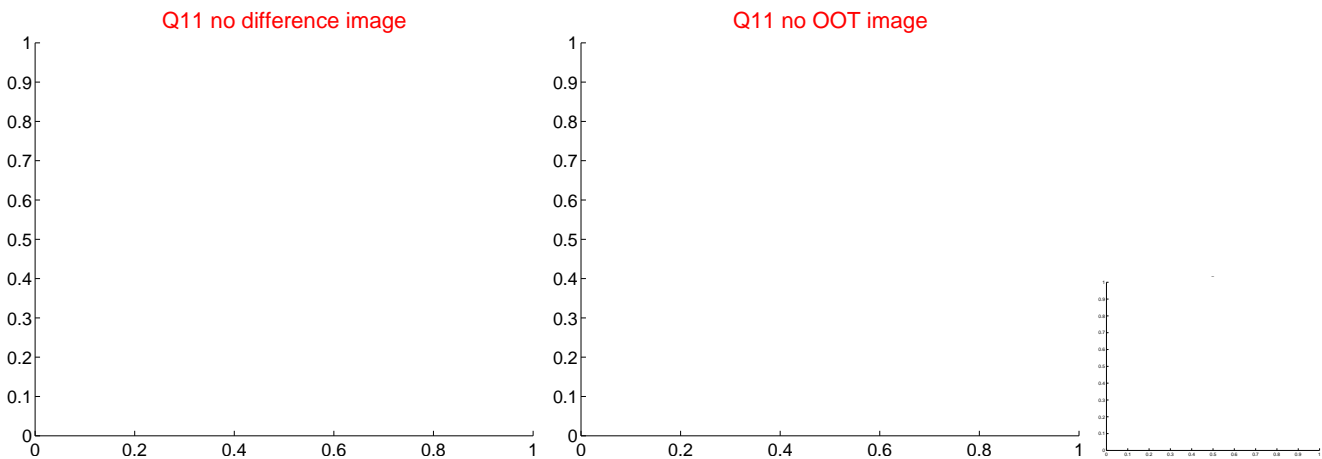
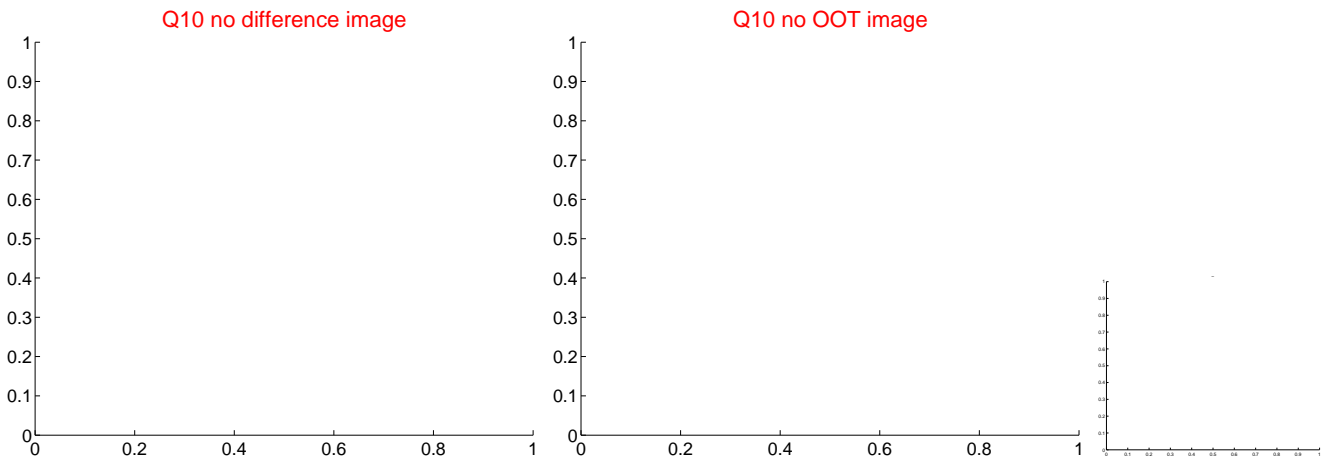
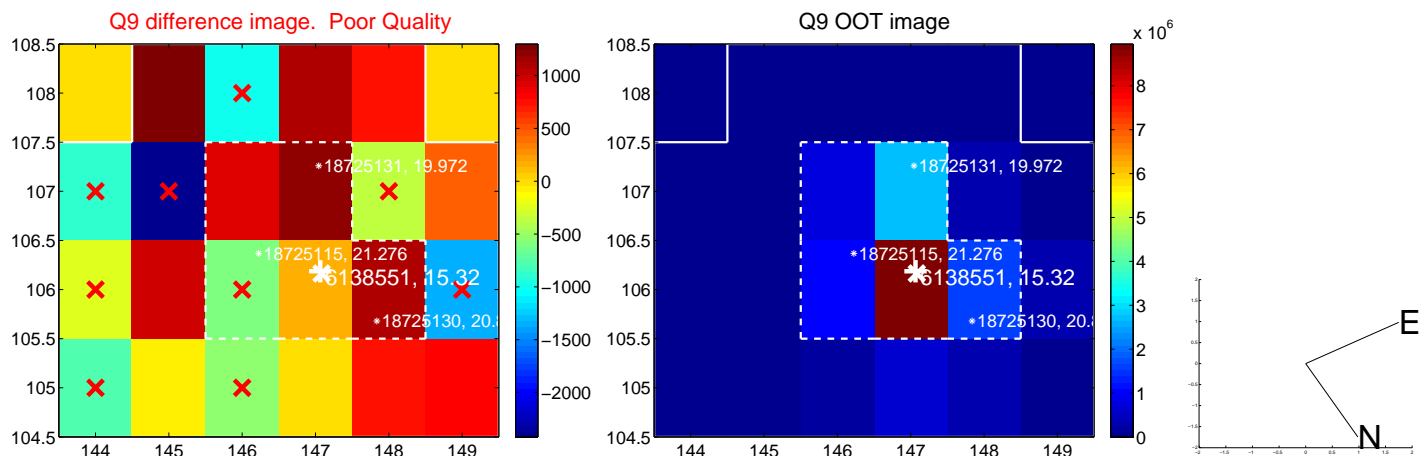




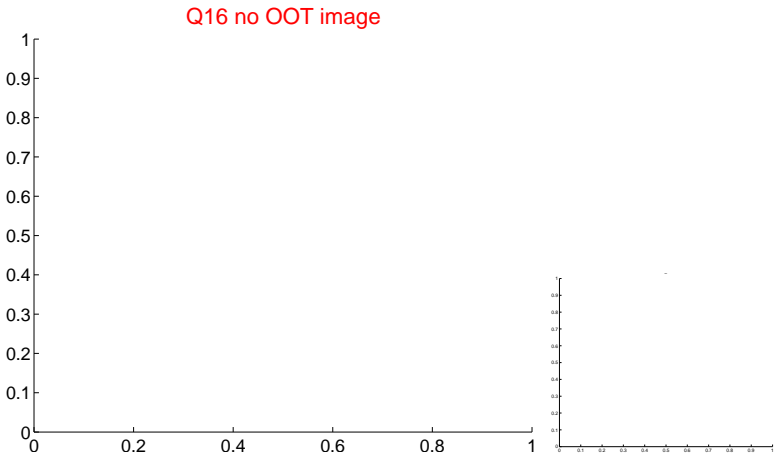
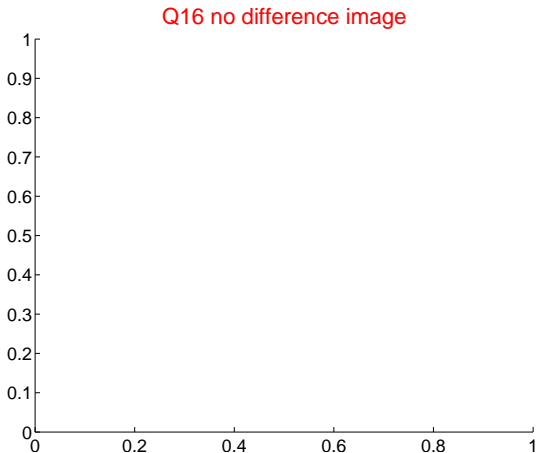
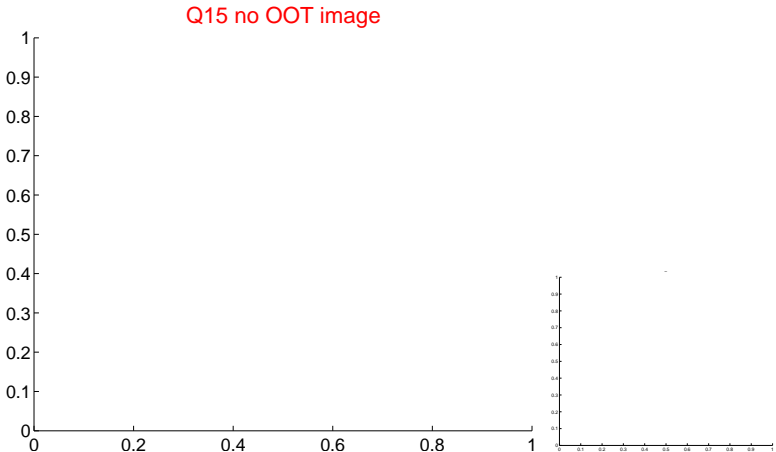
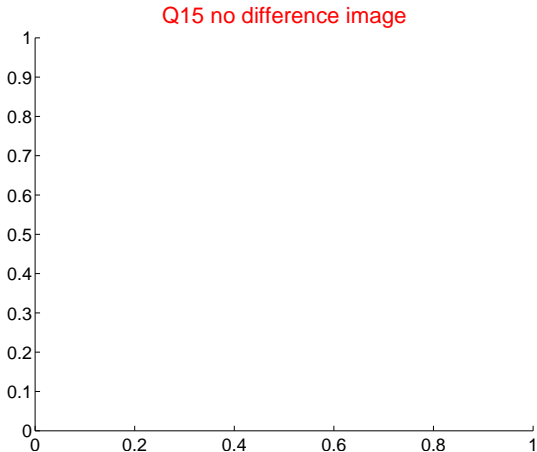
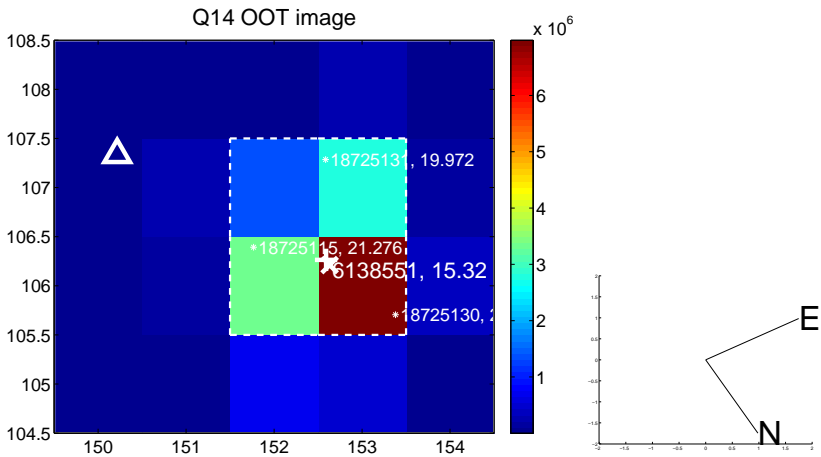
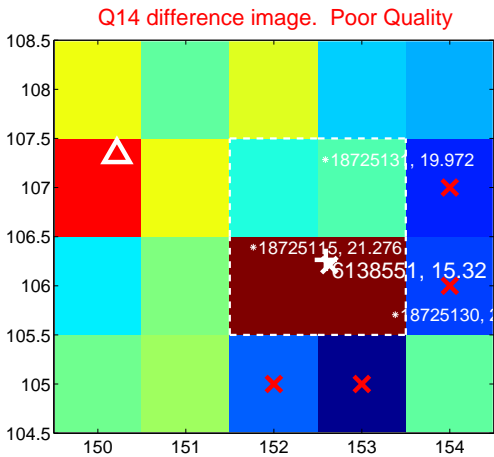
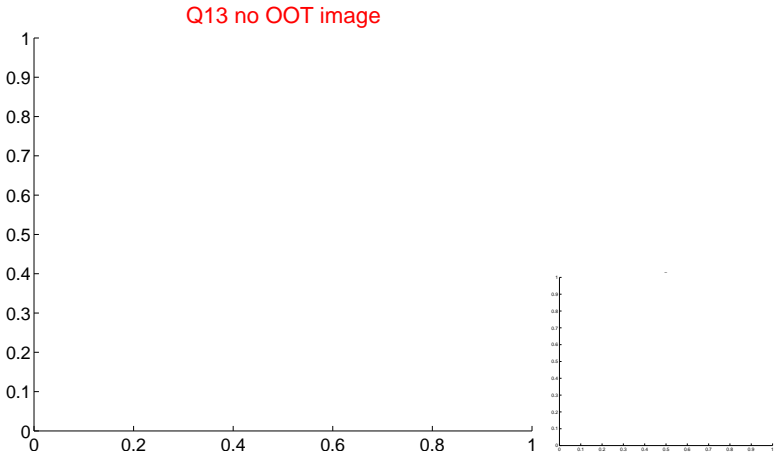
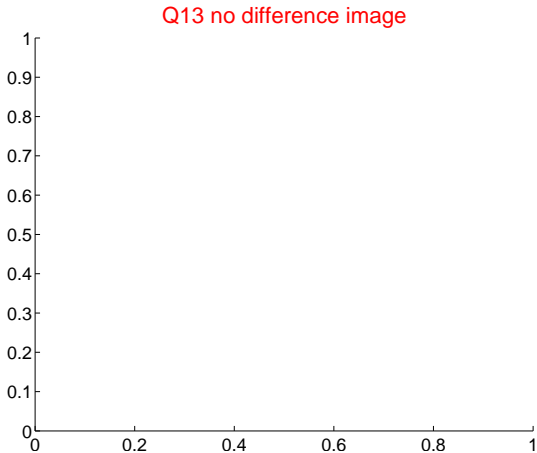
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



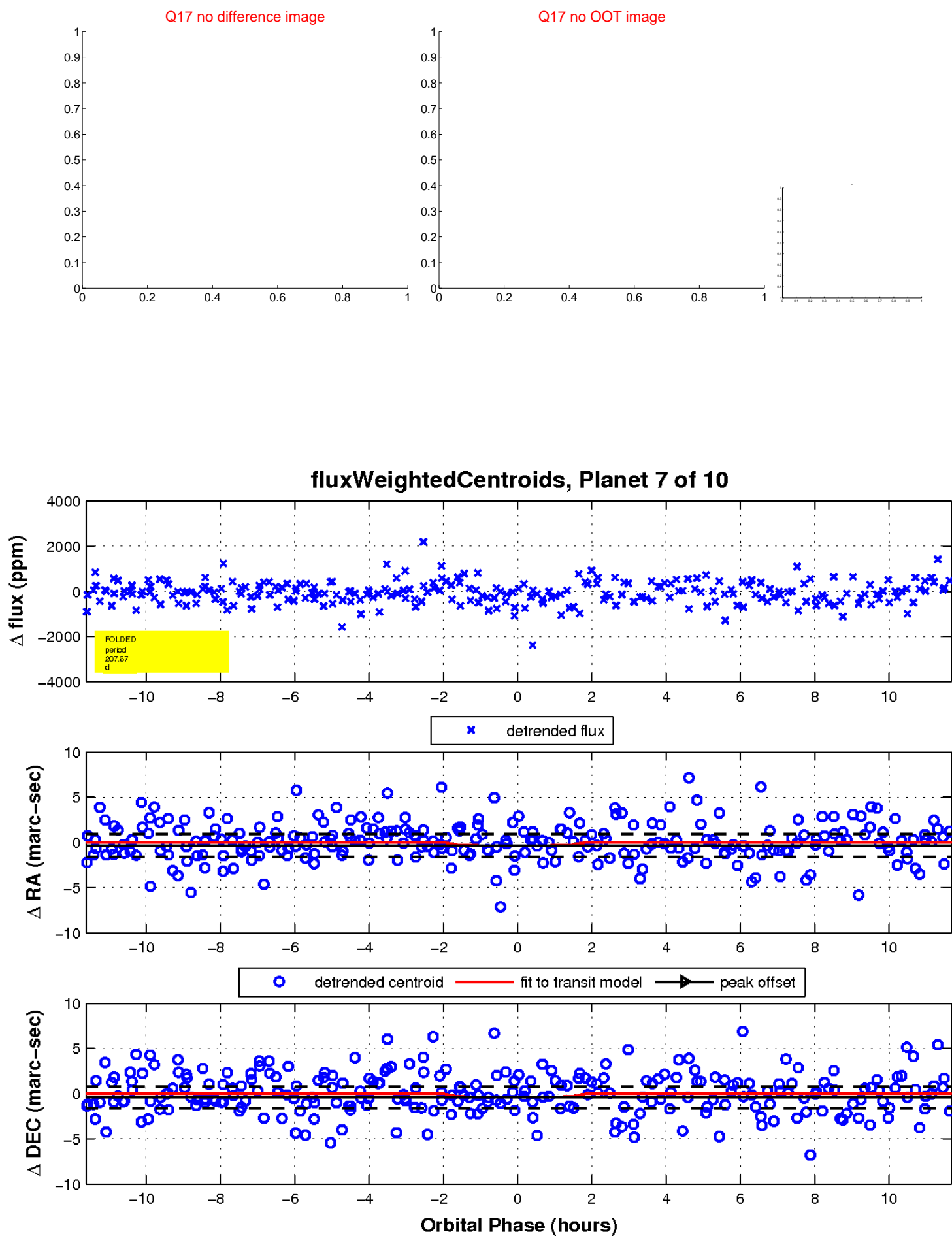
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

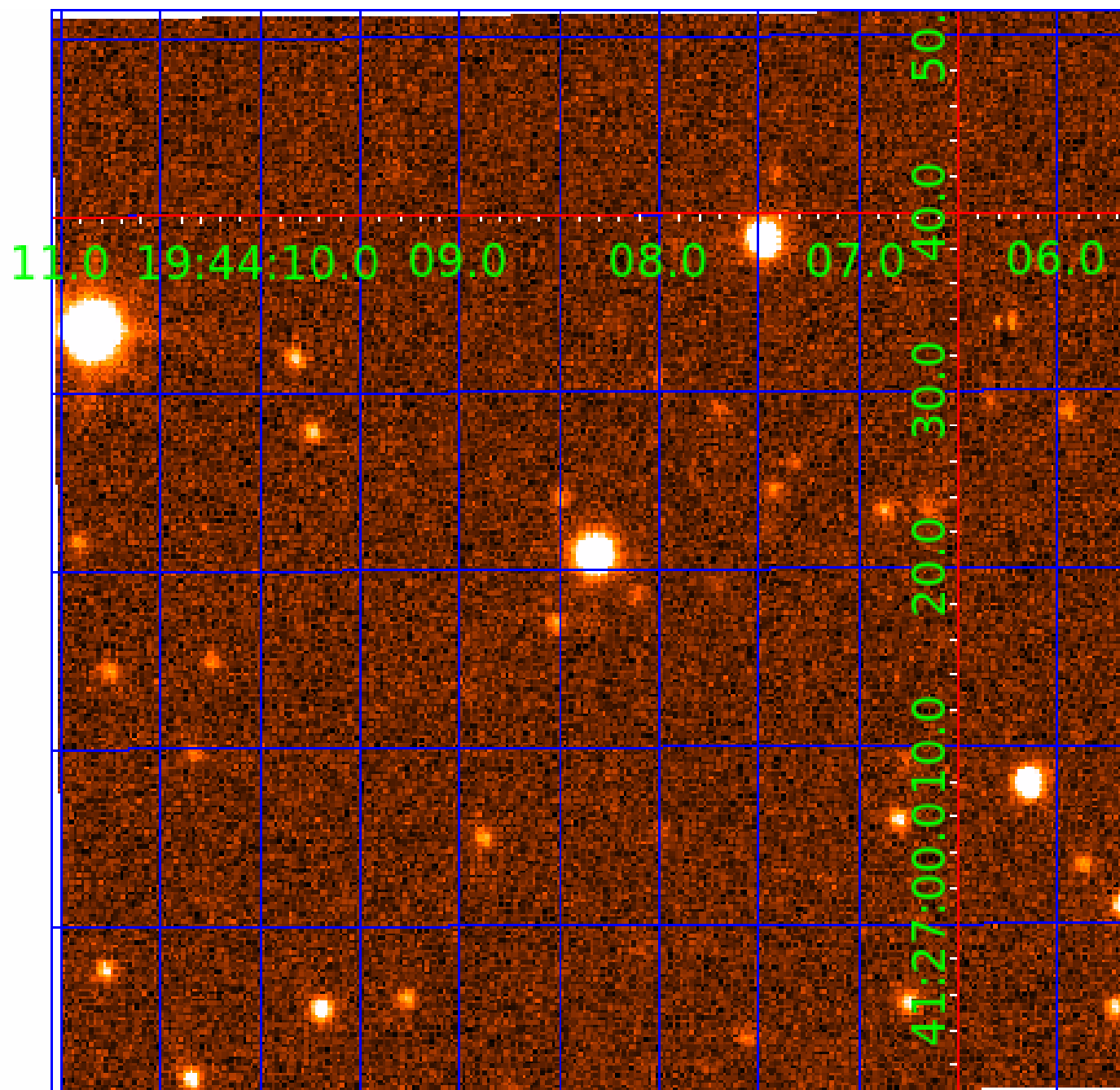


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006138551-01	OBS	No	0.903264	132.276864	60.2	3.755	7.8	9.6	0.74	4987	0.58	1092.39
006138551-02	OBS	No	562.854767	235.373574	932.2	6.266	16.6	4.6	0.74	4987	2.58	0.20
006138551-03	OBS	No	530.761276	479.223857	4353.4	42.694	16.7	8.6	0.74	4987	6.18	0.22
006138551-04	OBS	No	228.013194	343.175015	1171.4	13.680	15.1	6.7	0.74	4987	5.12	0.69
006138551-05	OBS	No	464.265857	586.087268	1073.6	6.635	13.9	7.7	0.74	4987	2.51	0.27
006138551-06	OBS	No	576.302885	273.589413	1404.5	14.591	12.2	7.4	0.74	4987	3.24	0.20
006138551-07	OBS	No	207.671057	239.280791	614.0	3.898	11.6	4.3	0.74	4987	2.13	0.78
006138551-08	OBS	No	405.523905	211.416753	1420.6	13.319	11.5	8.4	0.74	4987	3.42	0.32
006138551-09	OBS	No	278.937876	305.513027	390.8	6.513	11.0	2.9	0.74	4987	1.74	0.52
006138551-10	OBS	No	464.292287	584.958197	3505.3	46.997	9.5	5.4	0.74	4987	5.35	0.27

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006138551-01	OBS	FP	0.00	1	0	0	0	LPP_DV
006138551-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_TRACKER—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
006138551-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
006138551-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV
006138551-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
006138551-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS
006138551-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_TRACKER—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
006138551-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—INCONSISTENT_TRANS
006138551-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—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
006138551-10	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—SAME_NTL_PERIOD—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.

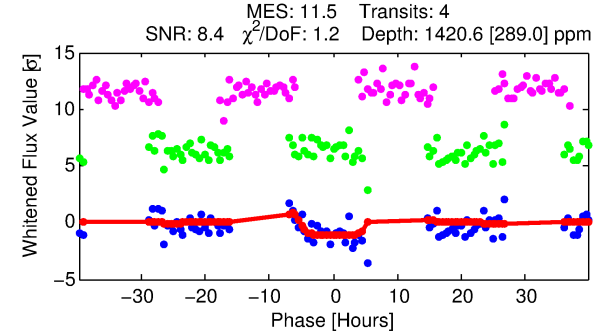
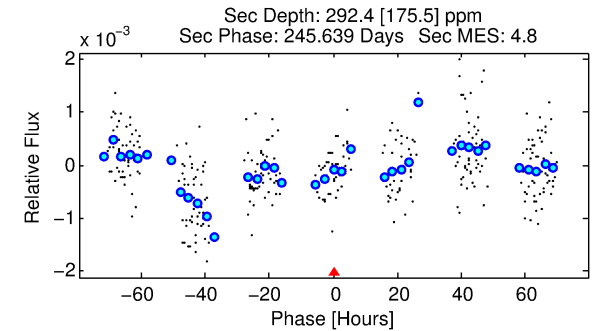
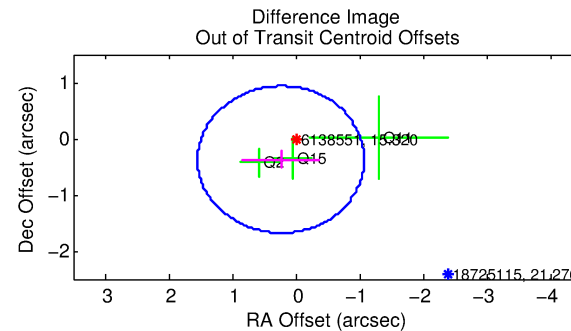
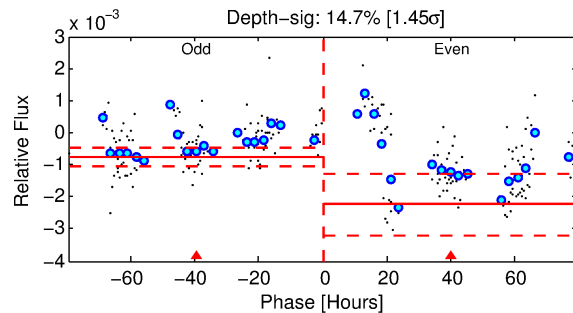
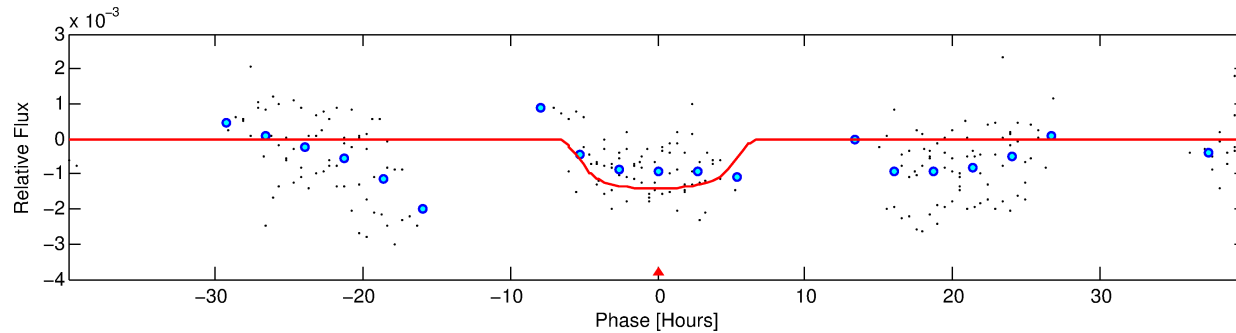
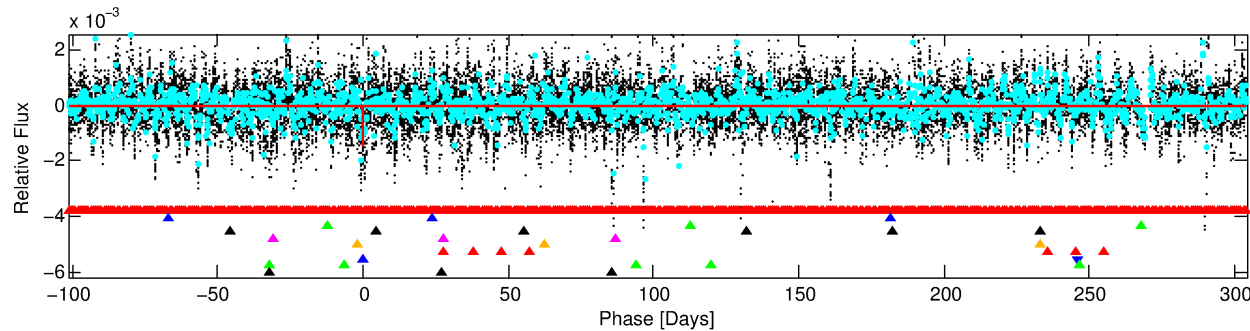
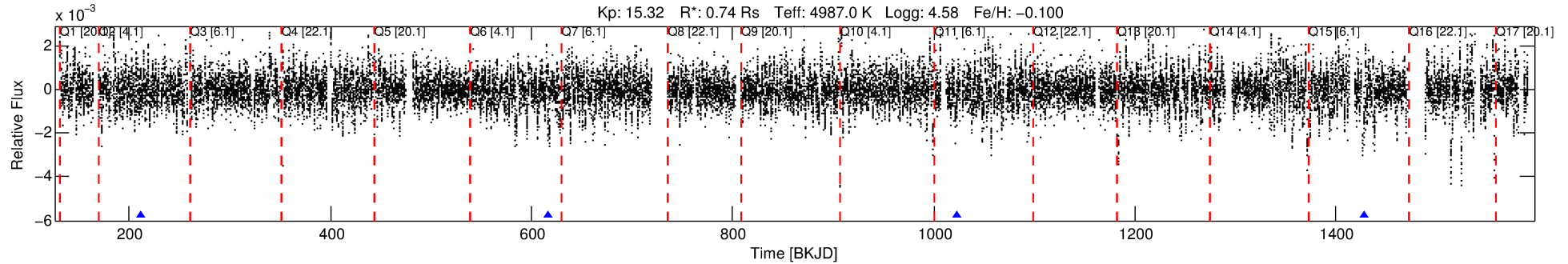
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 006138551-08

No Significant Match Found

# DV One-Page Summary

KIC: 6138551 Candidate: 8 of 10 Period: 405.524 d



## DV Fit Results:

Period = 405.52391 [0.02492] d  
Epoch = 211.4168 [0.0530] BKJD  
Rp/R\* = 0.0423 [0.0062]  
a/R\* = 120.36 [47.25]  
b = 0.90 [0.07]  
Seff = 0.32 [0.05]  
Teq = 191 [8] K  
Rp = 3.42 [0.60] Re  
a = 0.9786 [0.0729] AU  
Ag = 13146.45 [8867.62] [1.48 $\sigma$ ]  
Teffp = 3170 [537] K [5.54 $\sigma$ ]

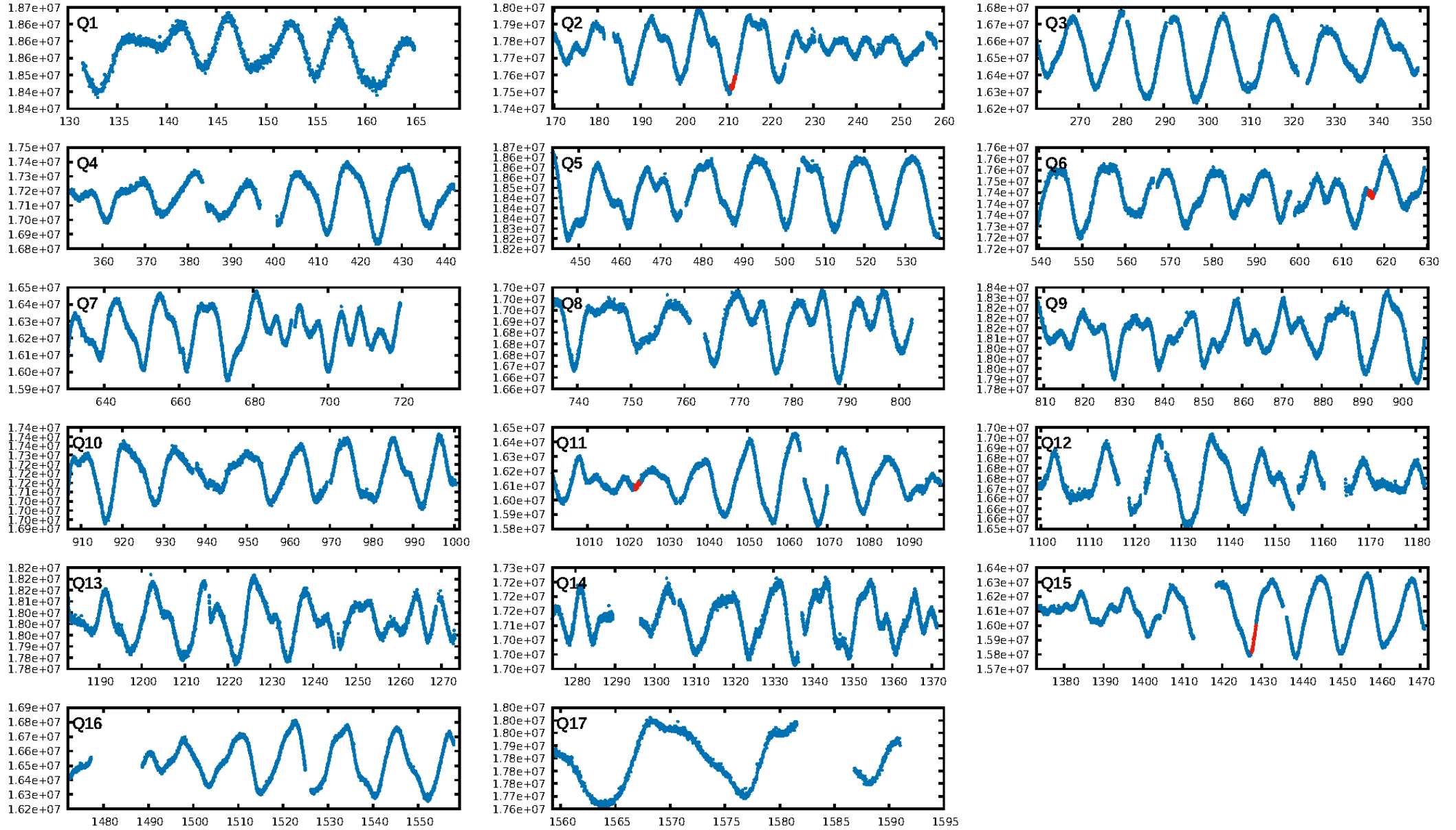
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [204.92 $\sigma$ ]  
LongPeriod-sig: 100.0% [94.75 $\sigma$ ]  
ModelChiSquare2-sig: 0.2%  
ModelChiSquareGof-sig: 99.9%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: 6.875  
Centroid-sig: 49.0%  
Centroid-so: 0.483 arcsec [0.85 $\sigma$ ]  
OotOffset-rm: 0.440 arcsec [1.01 $\sigma$ ]  
OotOffset-st: 1/2/0/0 [3]  
KicOffset-rm: 0.626 arcsec [1.54 $\sigma$ ]  
KicOffset-st: 1/2/0/0 [3]  
DiffImageQuality-fgm: 0.67 [2/3]  
DiffImageOverlap-fno: 0.00 [0/4]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 03-Feb-2016 04:51:12 Z

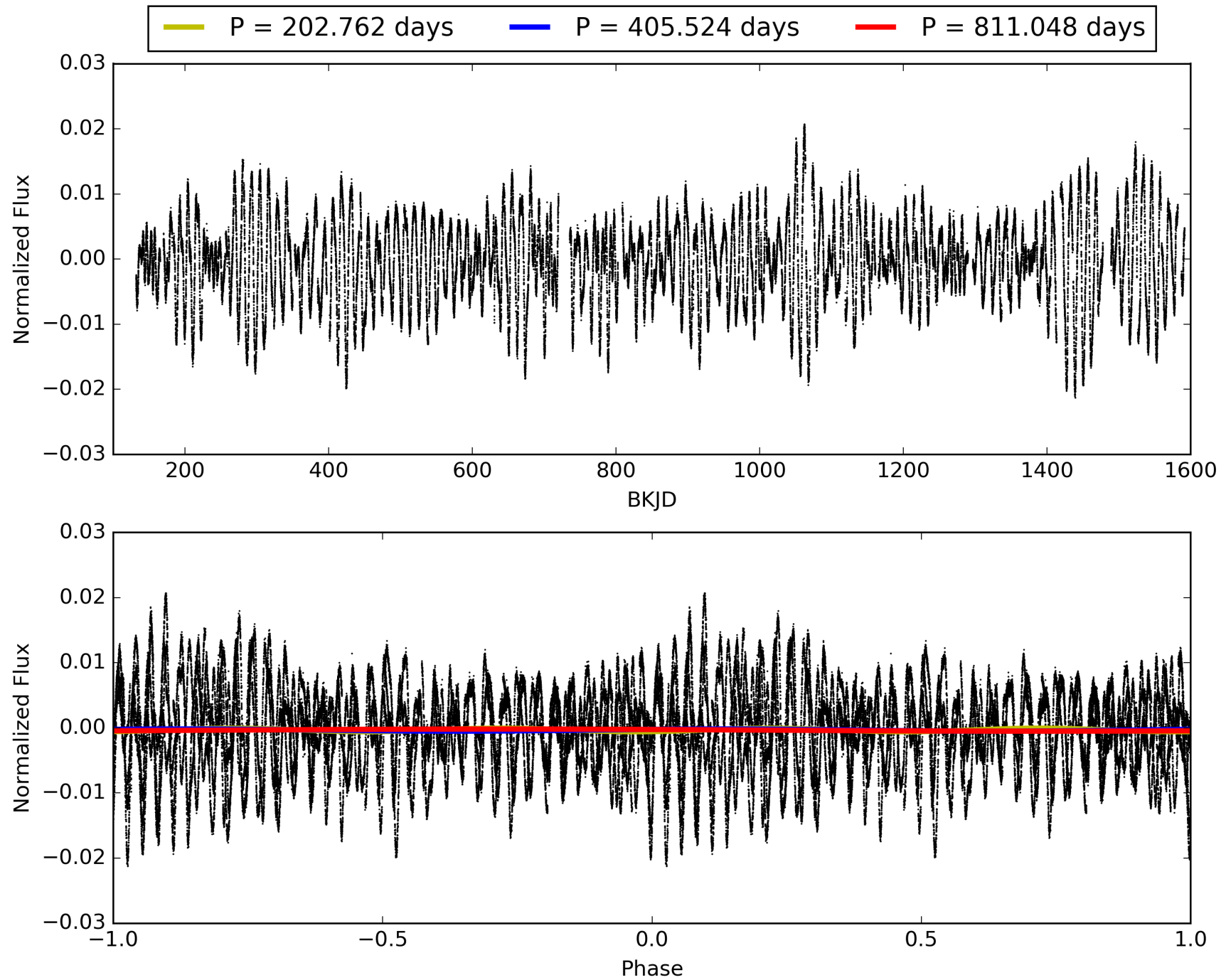
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 006138551-08, PDC Light Curves



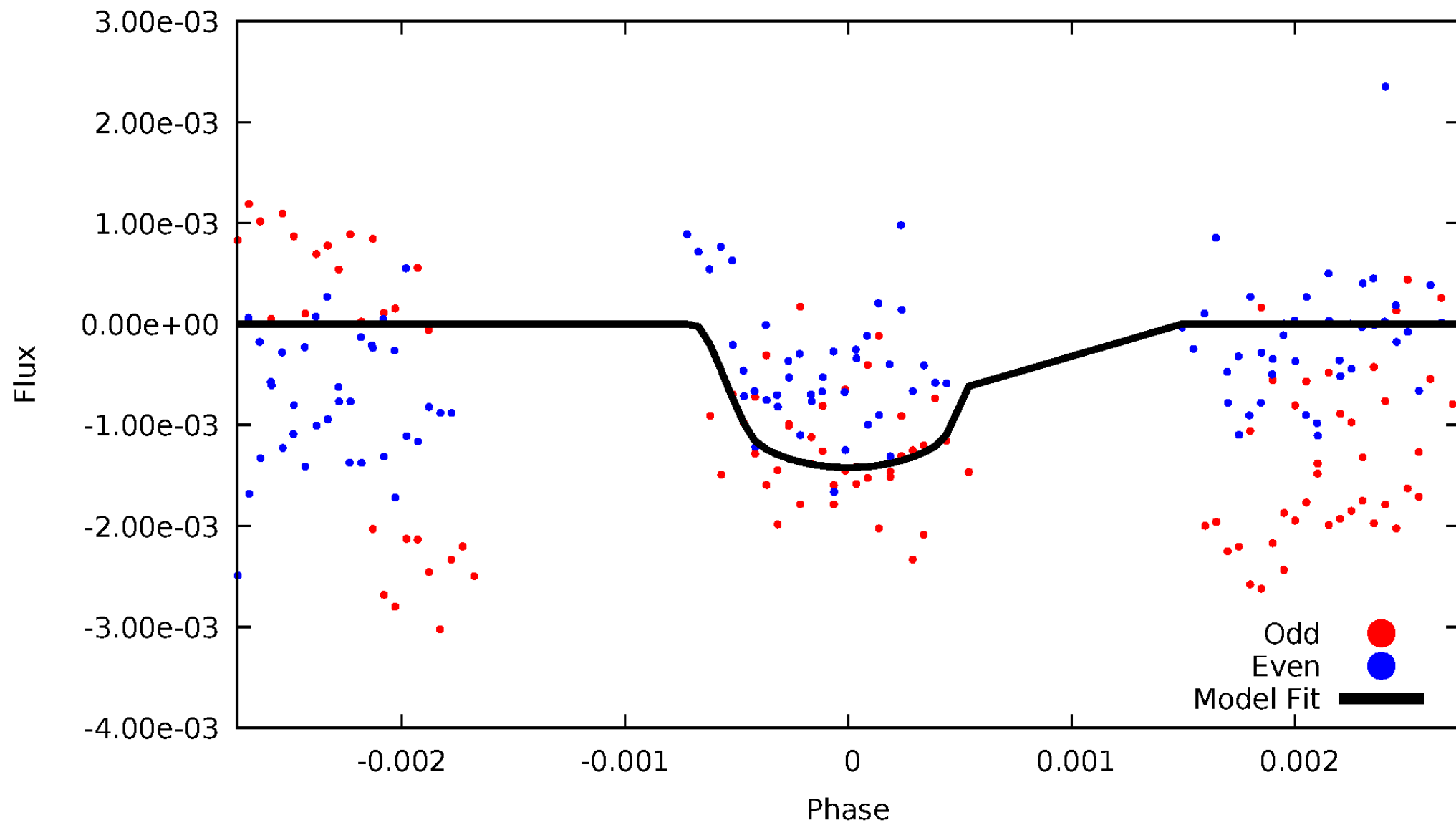


# TCE 006138551-08



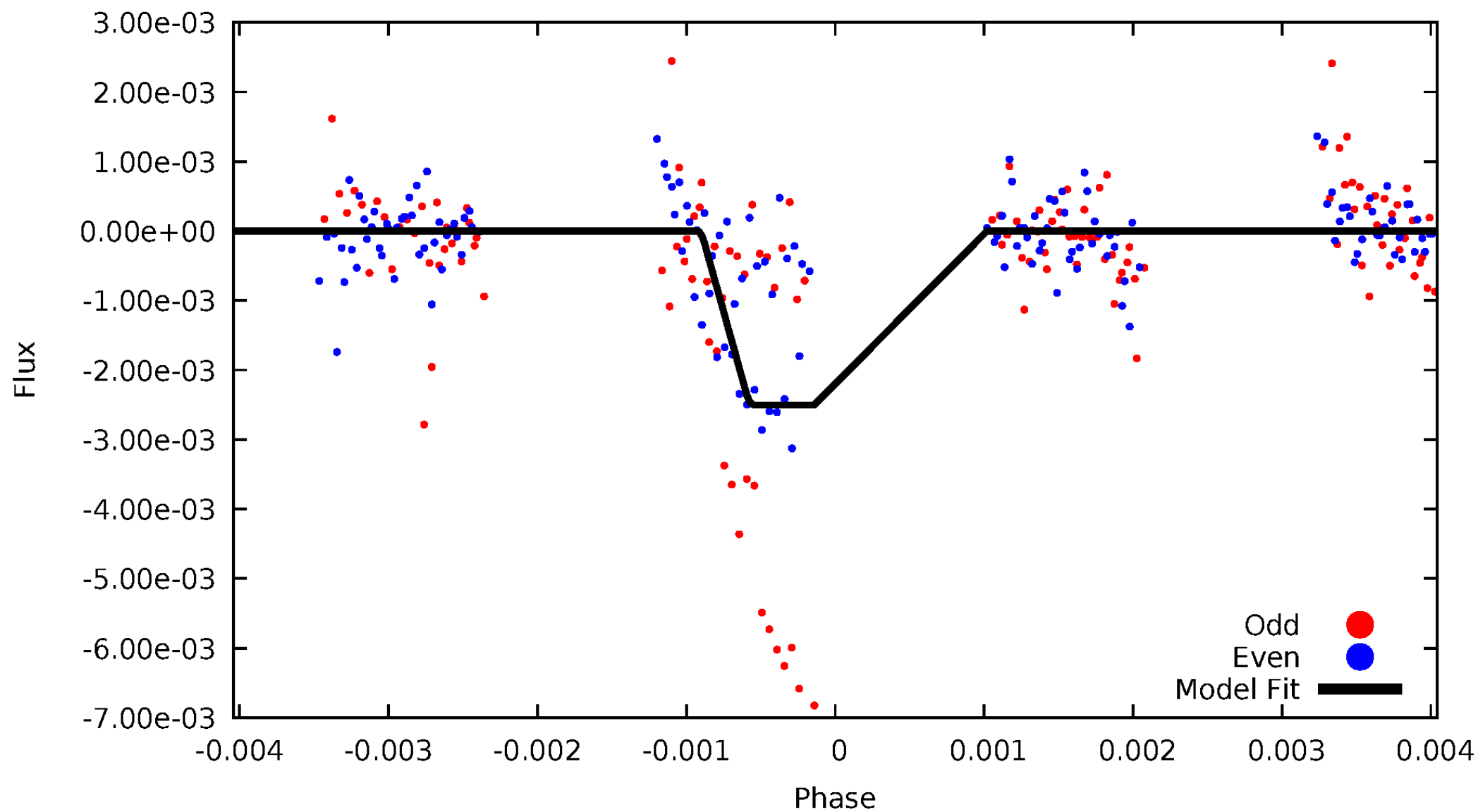
# DV Odd/Even

TCE 006138551-08



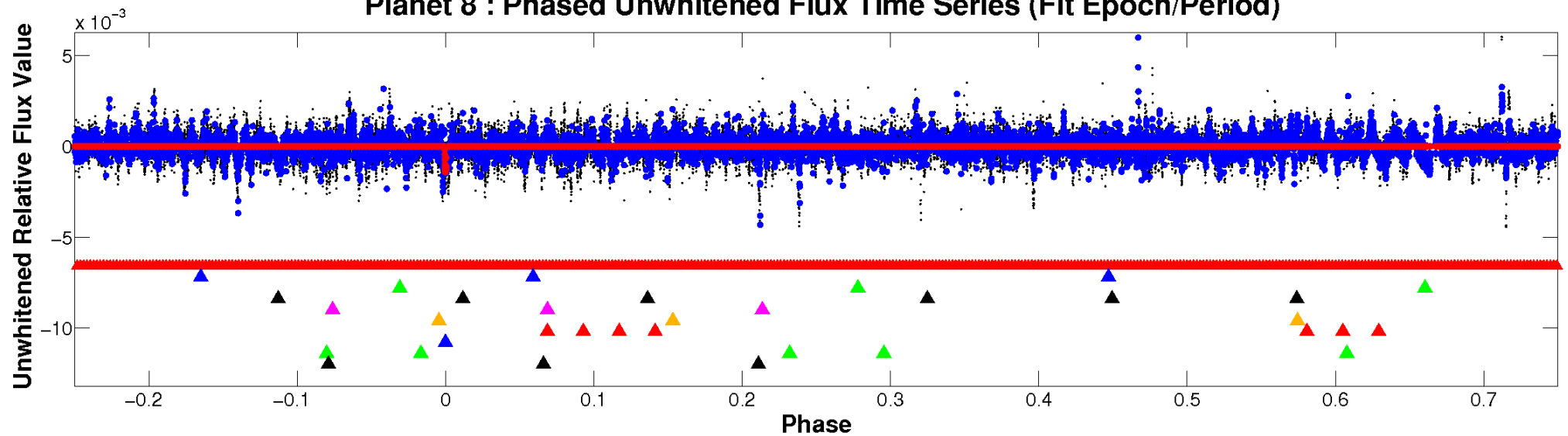
# ALT Odd/Even

TCE 006138551-08

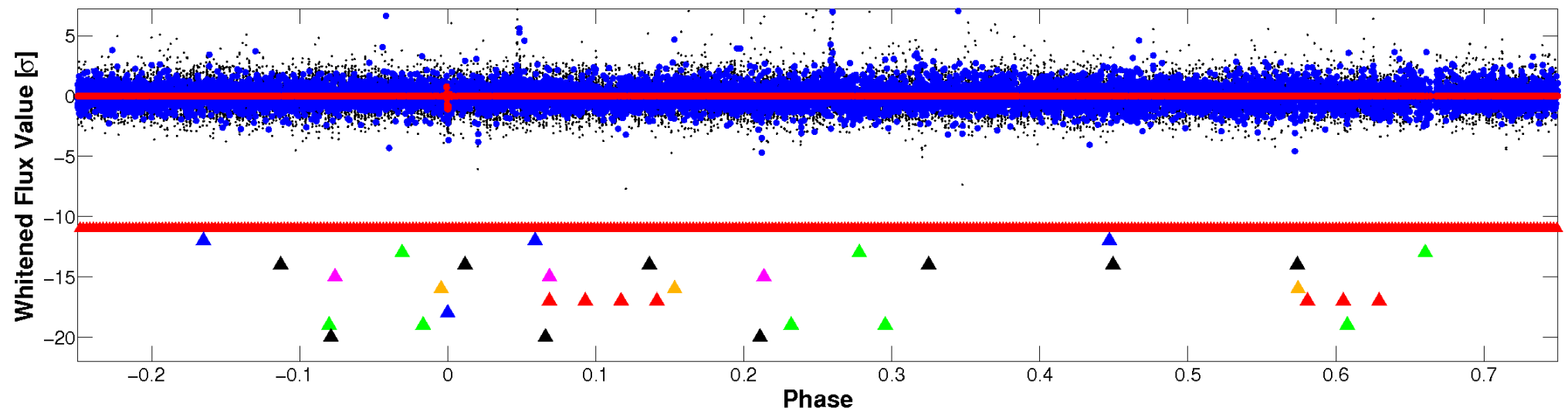


# Non-Whitened Vs. Whitened Light Curve

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

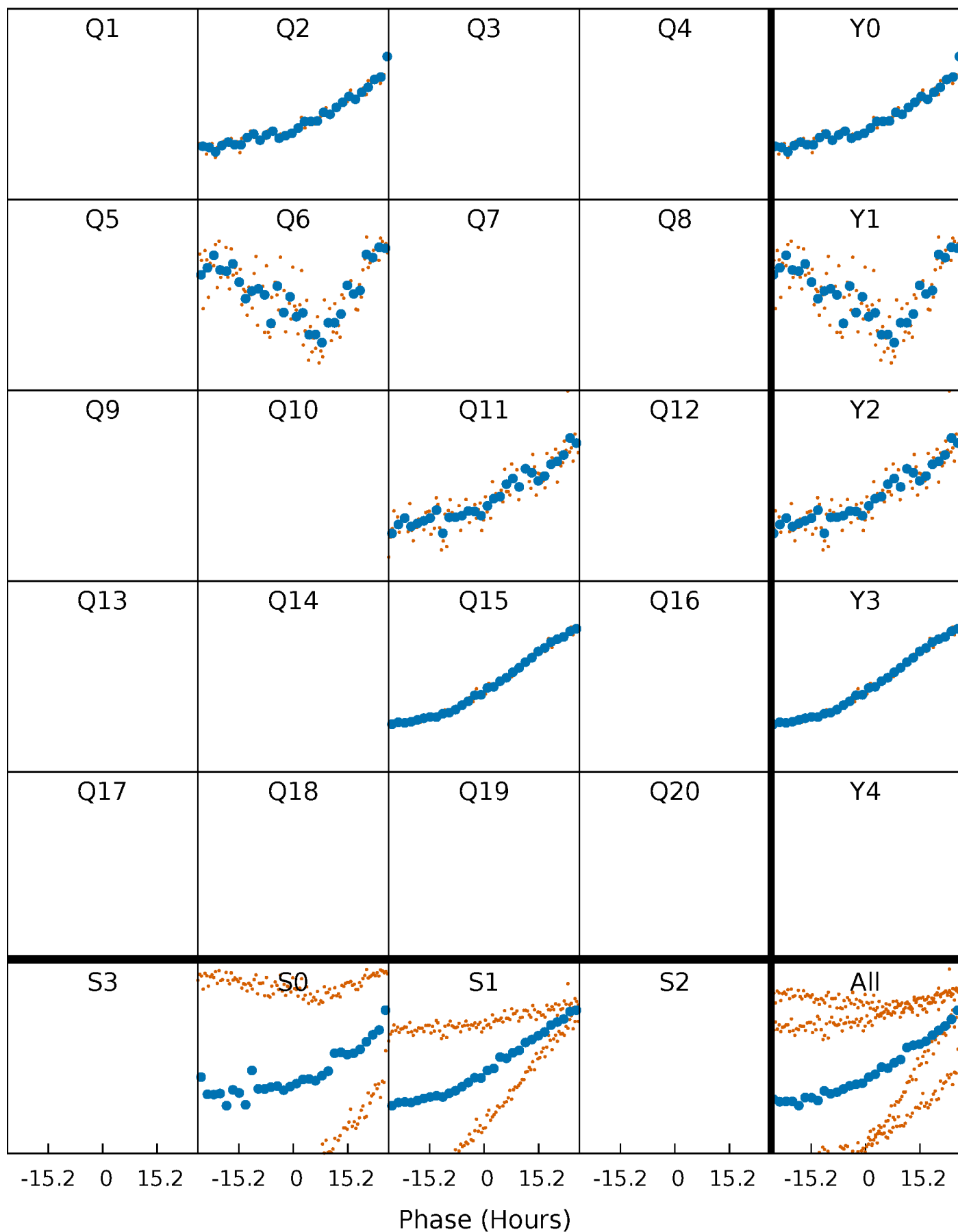


## Planet 8 : Phased Whitened Flux Time Series (Fit Epoch/Period)



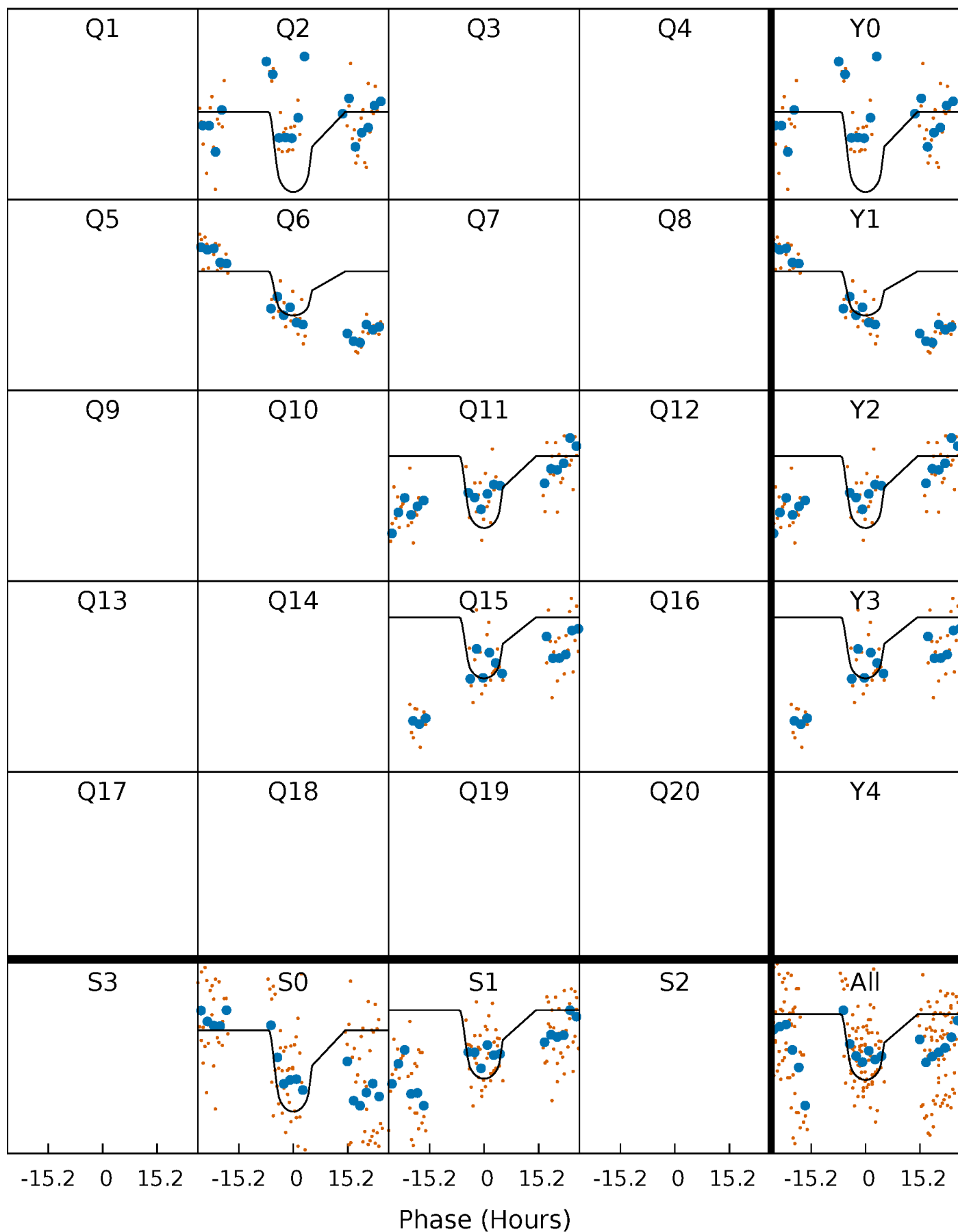
# PDC Quarter-Phased Transit Curves

TCE 006138551-08 P=405.523906 Days  $T_0=211.416753$  (BKJD)



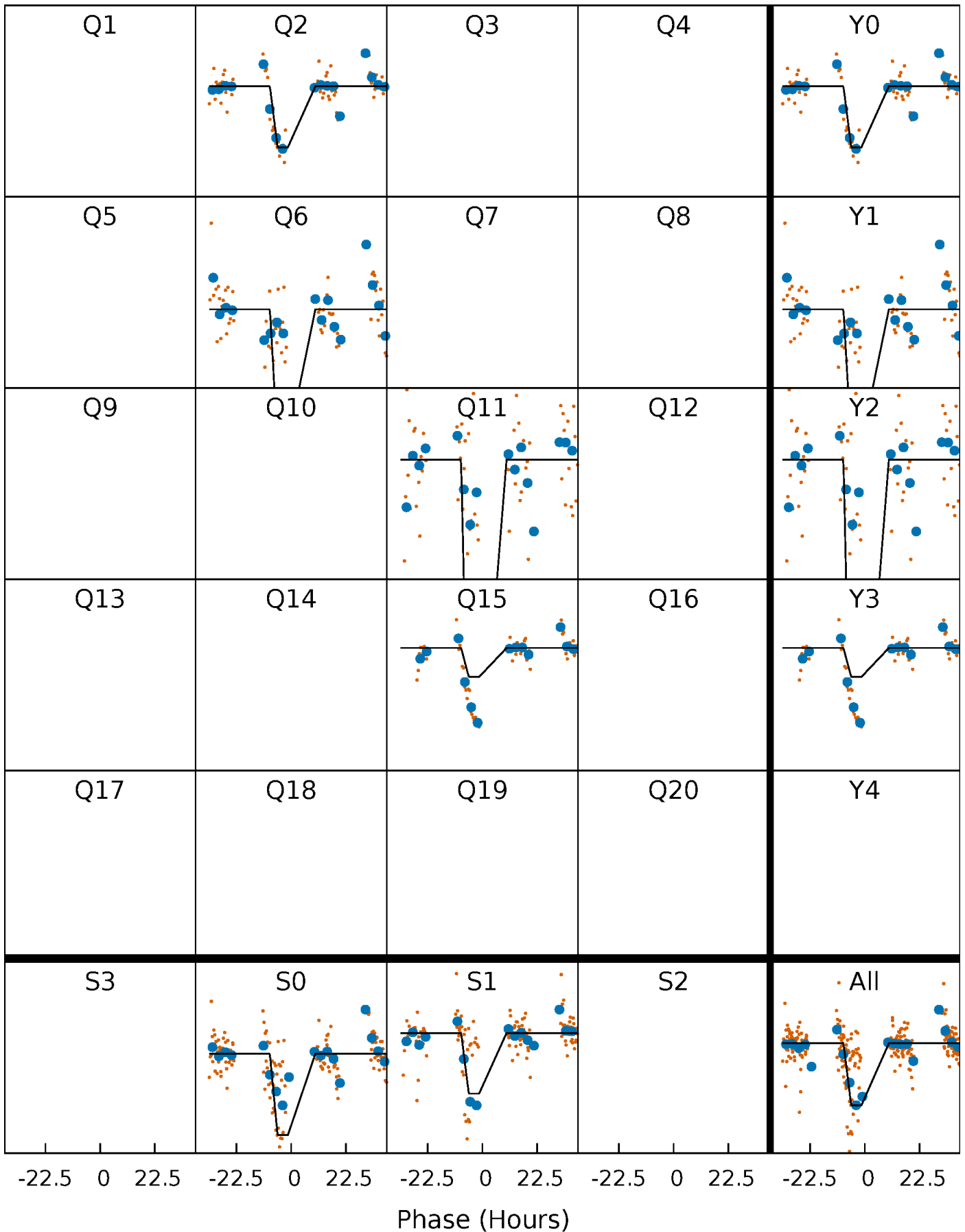
# DV Quarter-Phased Transit Curves

TCE 006138551-08     $P=405.523906$  Days     $T_0=211.416753$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

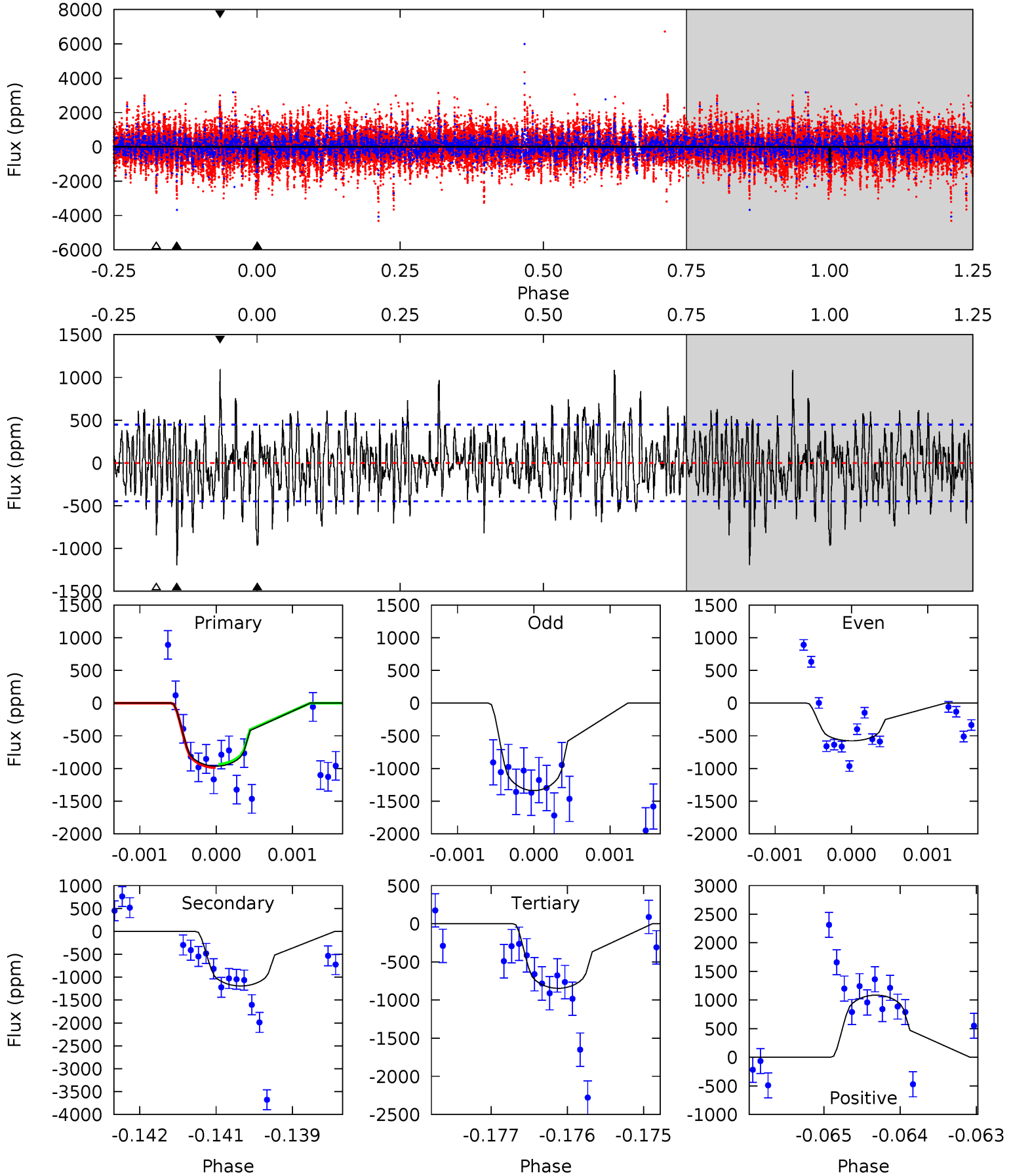
TCE 006138551-08 P=405.551676 Days  $T_0=211.609567$  (BKJD)



# DV Model-Shift Uniqueness Test

006138551-08, P = 405.523906 Days, E = 211.416753 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.7	14.4	10.2	13.1	5.42	3.24	3.53	1.44	-1.47	4.19	1.28	4.55	0.92	0.48	0.30

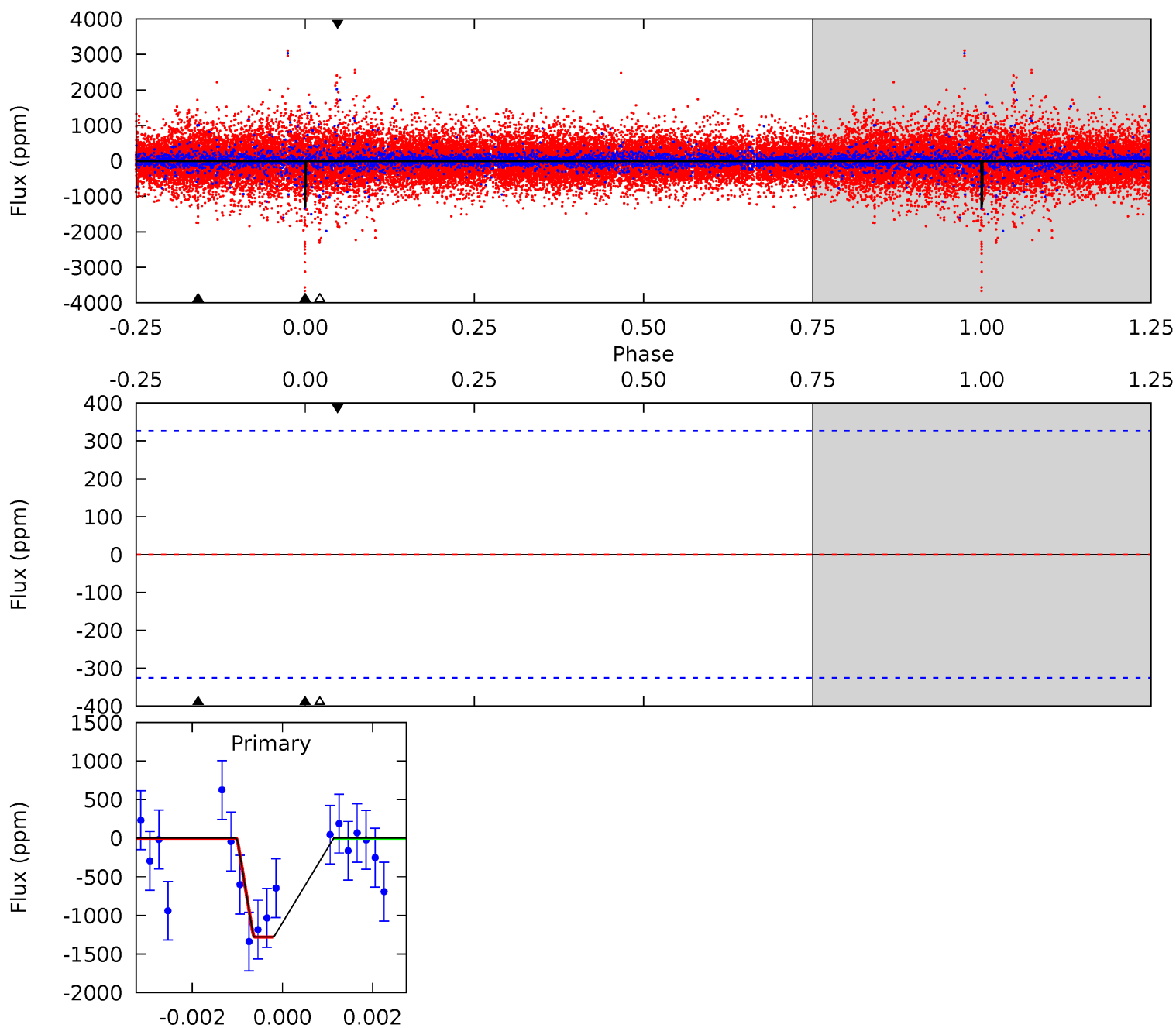




# Alt Model-Shift Uniqueness Test

006138551-08, P = 405.551676 Days, E = 211.609567 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	5.35	3.12	0	0	0	0	0	11.4	0	0	0



### Stellar Parameters For KIC 006138551

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4987^{+151}_{-136}$	$4.579^{+0.045}_{-0.050}$	$-0.100^{+0.300}_{-0.300}$	$0.741^{+0.071}_{-0.065}$	$0.760^{+0.078}_{-0.064}$	$2.633^{+0.538}_{-0.491}$
	+3%/-3%	+1%/-1%	+300%/-300%	+10%/-9%	+10%/-8%	+20%/-19%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 006138551-08 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-1192 \pm 83$	$3.43^{+0.58}_{-0.52}$	$268^{+9}_{-10}$	$4580^{+323}_{-274}$	$52768^{+21268}_{-13997}$
Alt.	$-0 \pm 61$	$4.04^{+0.58}_{-0.47}$	$268^{+10}_{-9}$	$-1758^{+4484}_{-973}$	$-36.837^{+2072.018}_{-1934.041}$

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

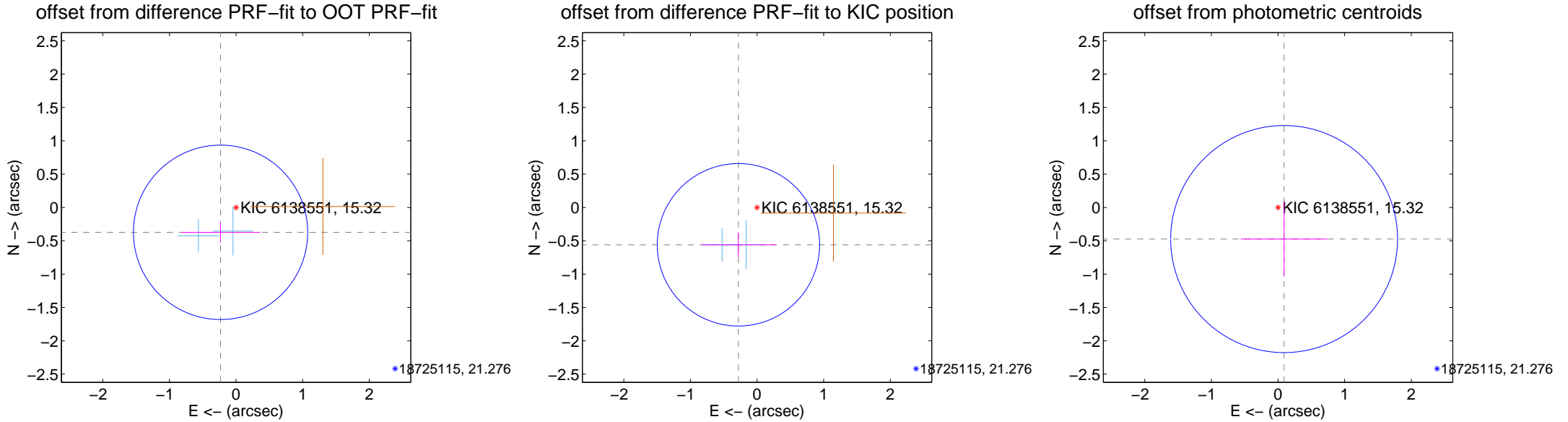
## DV Centroid Data

Supplemental centroid analysis for 006138551-08. Kepler magnitude: 15.32. Transit SNR 8.41

There are 2 quarters with good PRF difference image offsets

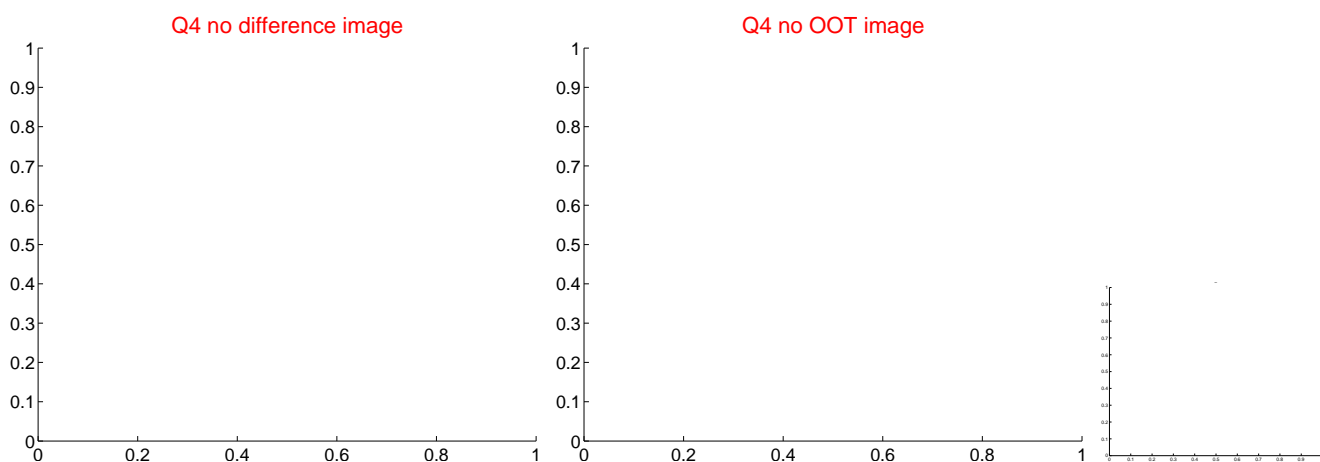
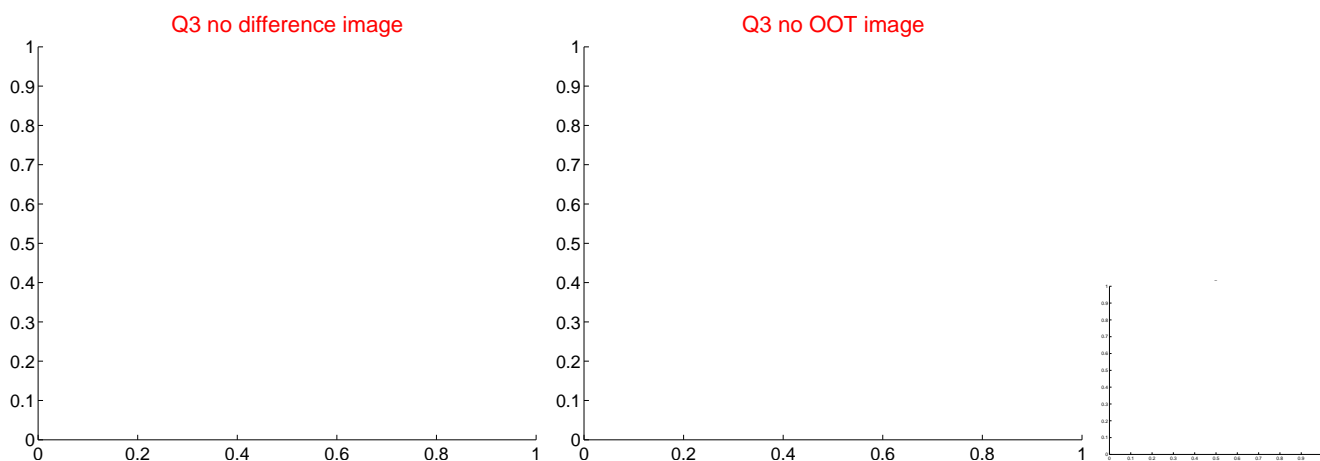
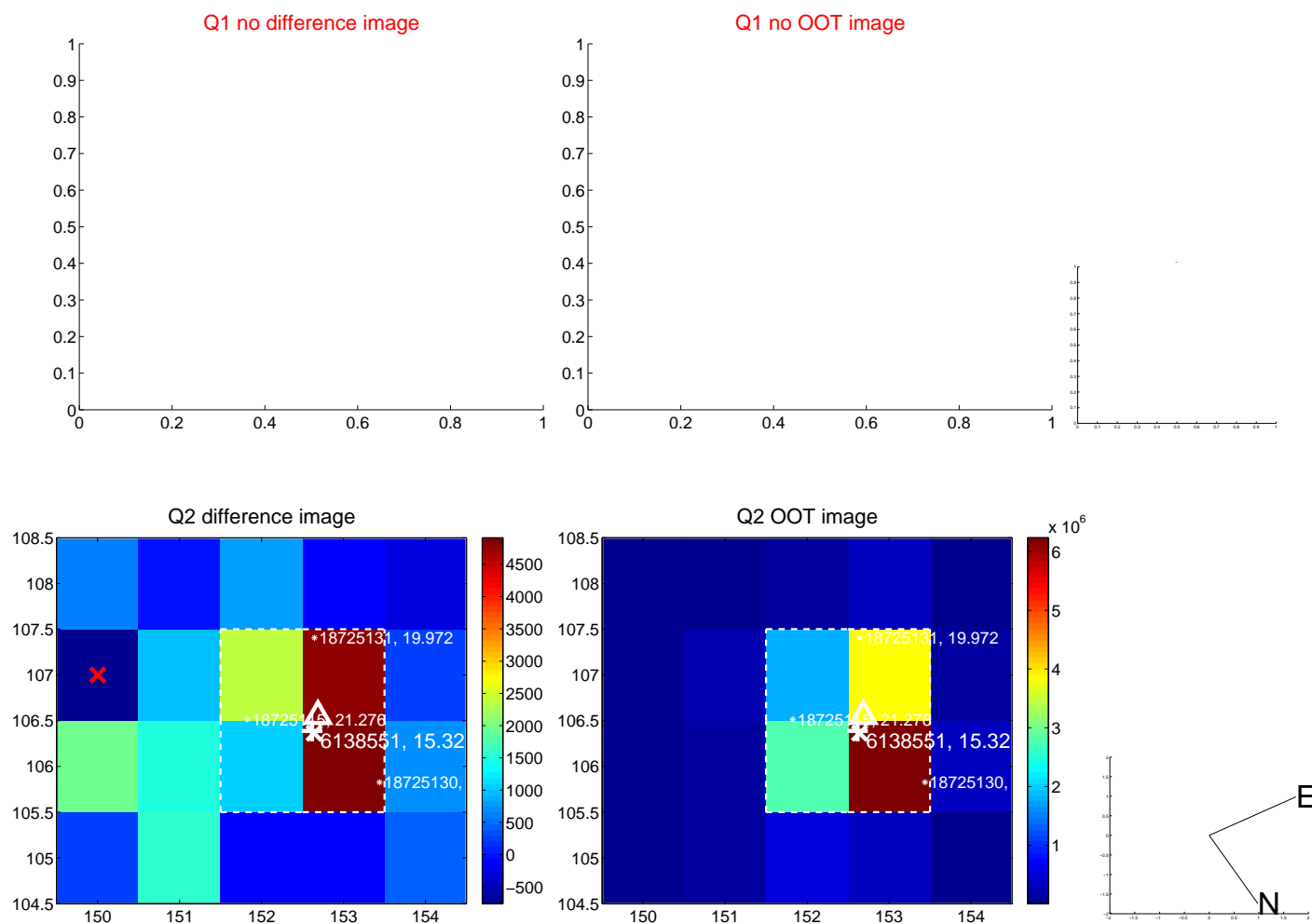
The direct PRF centroid is offset from the target star catalog position by about 0.23 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.440 \pm 0.436$	1.01	$0.233 \pm 0.592$	$-0.373 \pm 0.156$
PRF-fit source offset from KIC position	$0.626 \pm 0.406$	1.54	$0.280 \pm 0.556$	$-0.560 \pm 0.186$
photometric centroid source offset	$0.48 \pm 0.57$	0.85	$-0.09 \pm 0.65$	$-0.47 \pm 0.56$

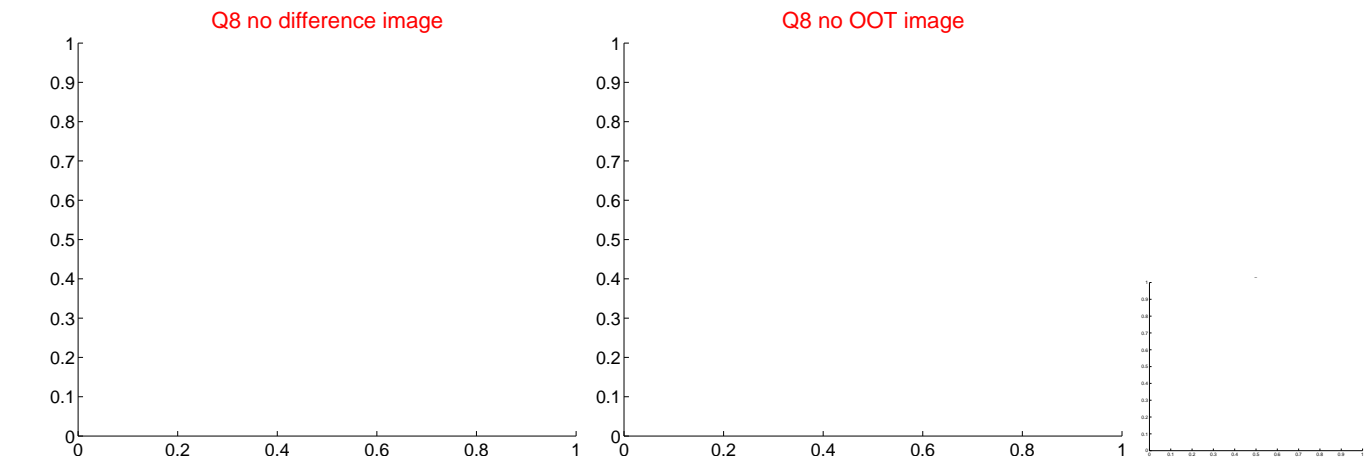
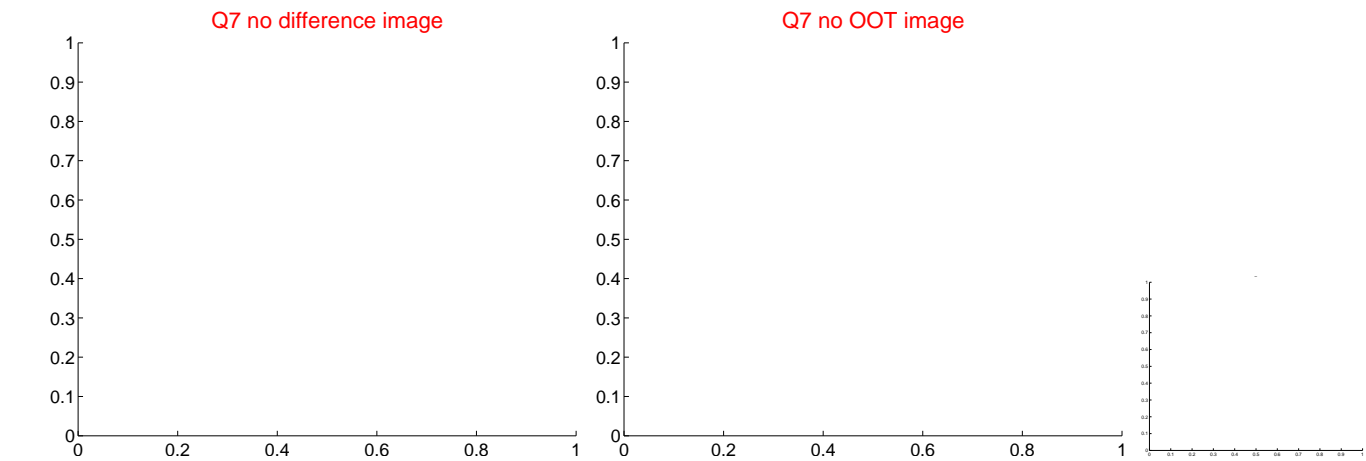
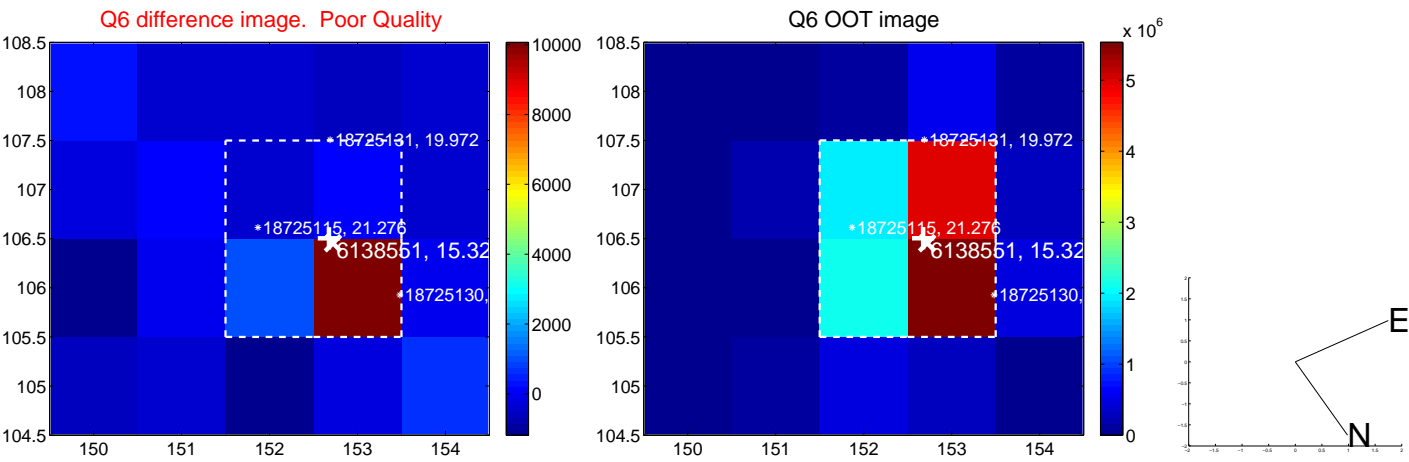
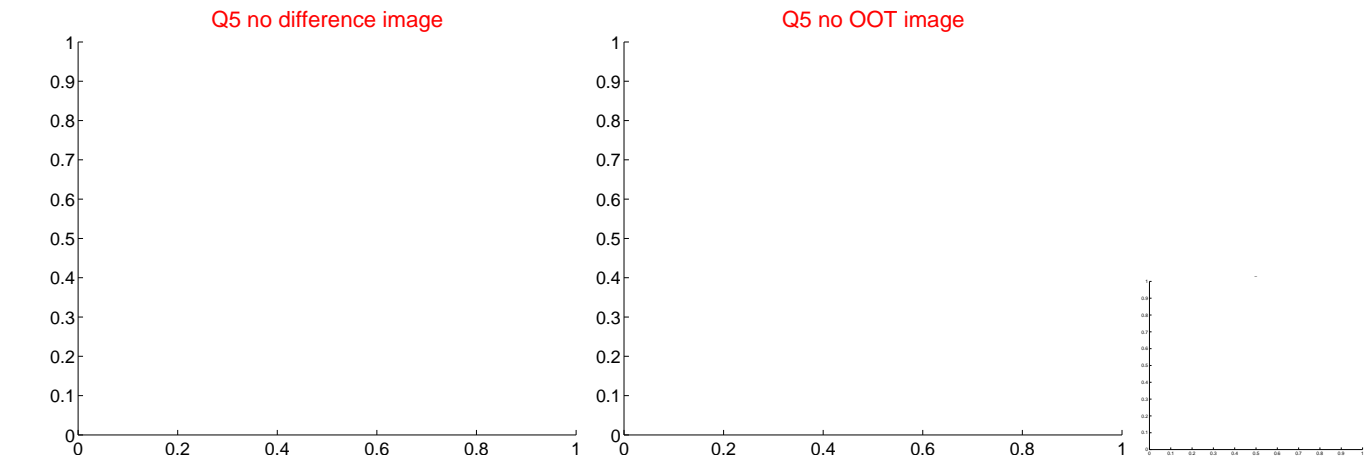


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

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



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

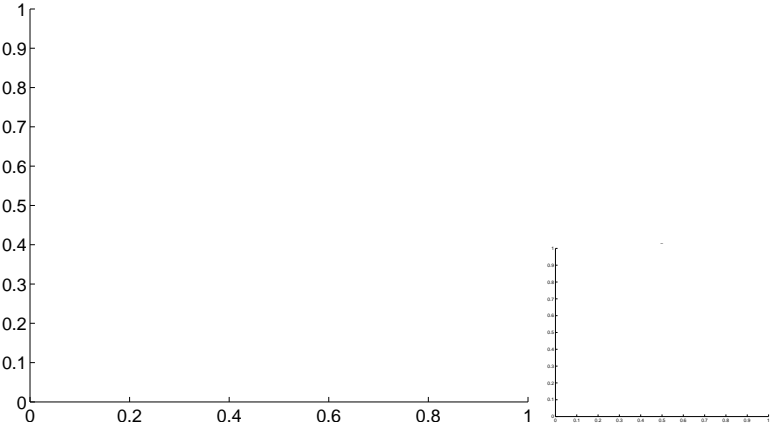


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

Q9 no difference image



Q9 no OOT image



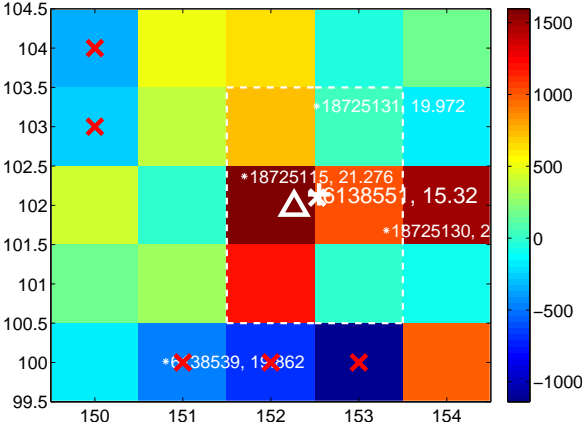
Q10 no difference image



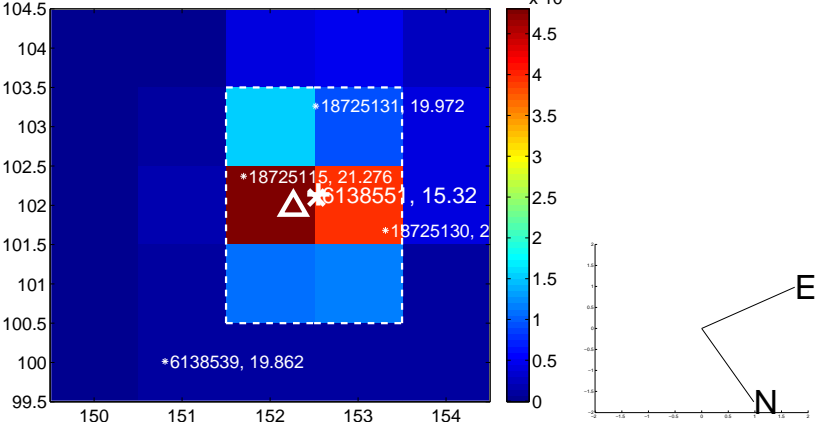
Q10 no OOT image



Q11 difference image. Poor Quality



Q11 OOT image



Q12 no difference image

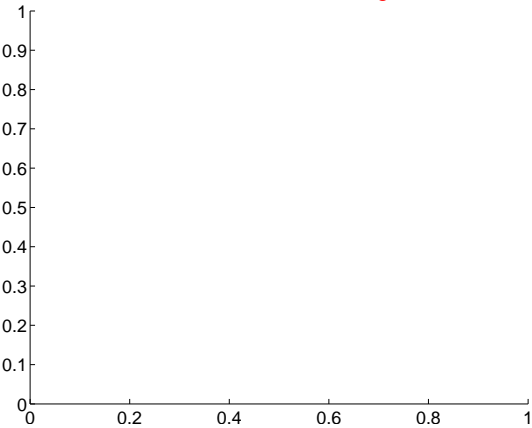


Q12 no OOT image



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

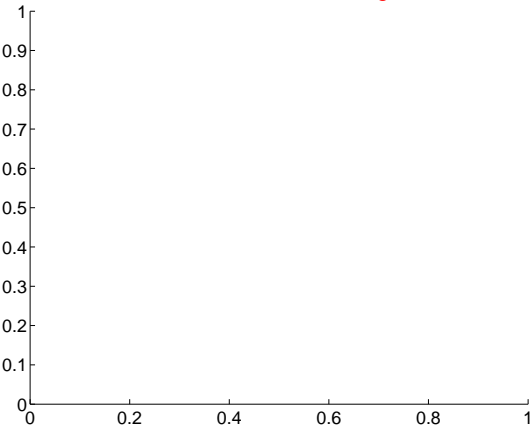
Q13 no difference image



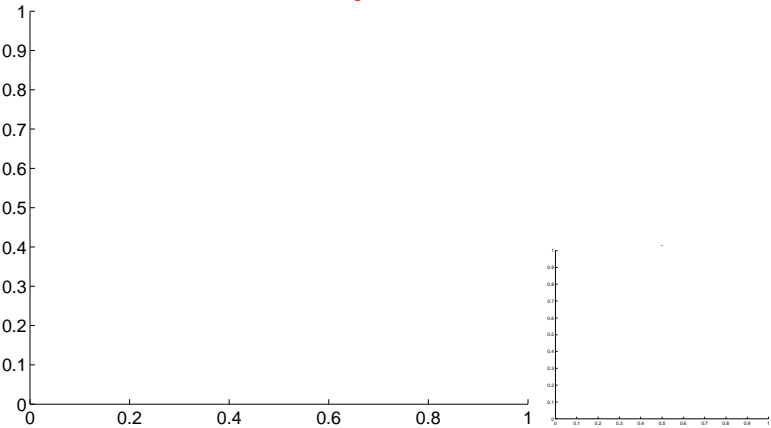
Q13 no OOT image



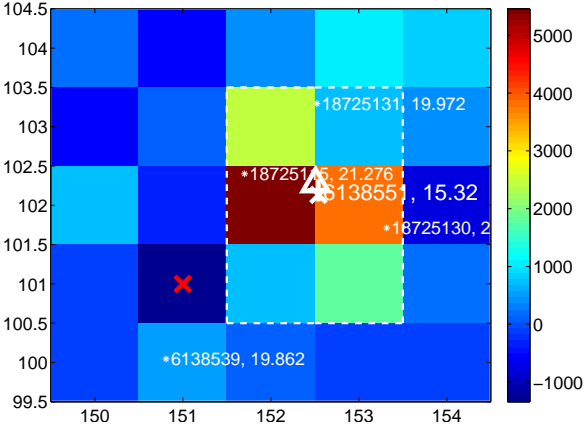
Q14 no difference image



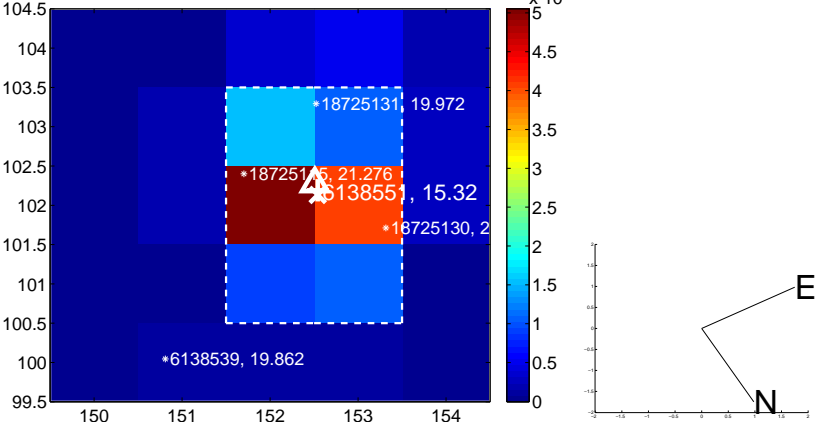
Q14 no OOT image



Q15 difference image



Q15 OOT image



Q16 no difference image



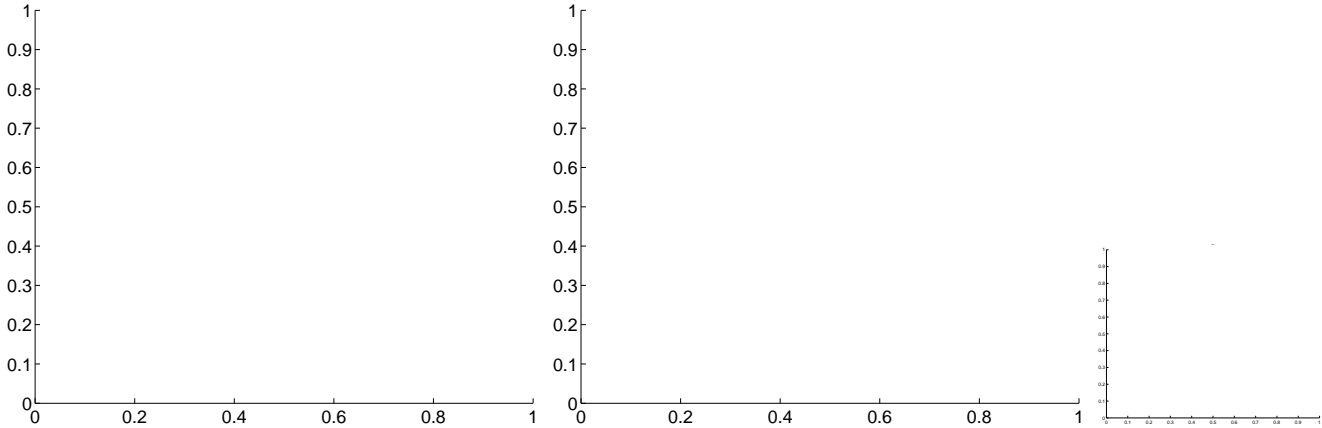
Q16 no OOT image



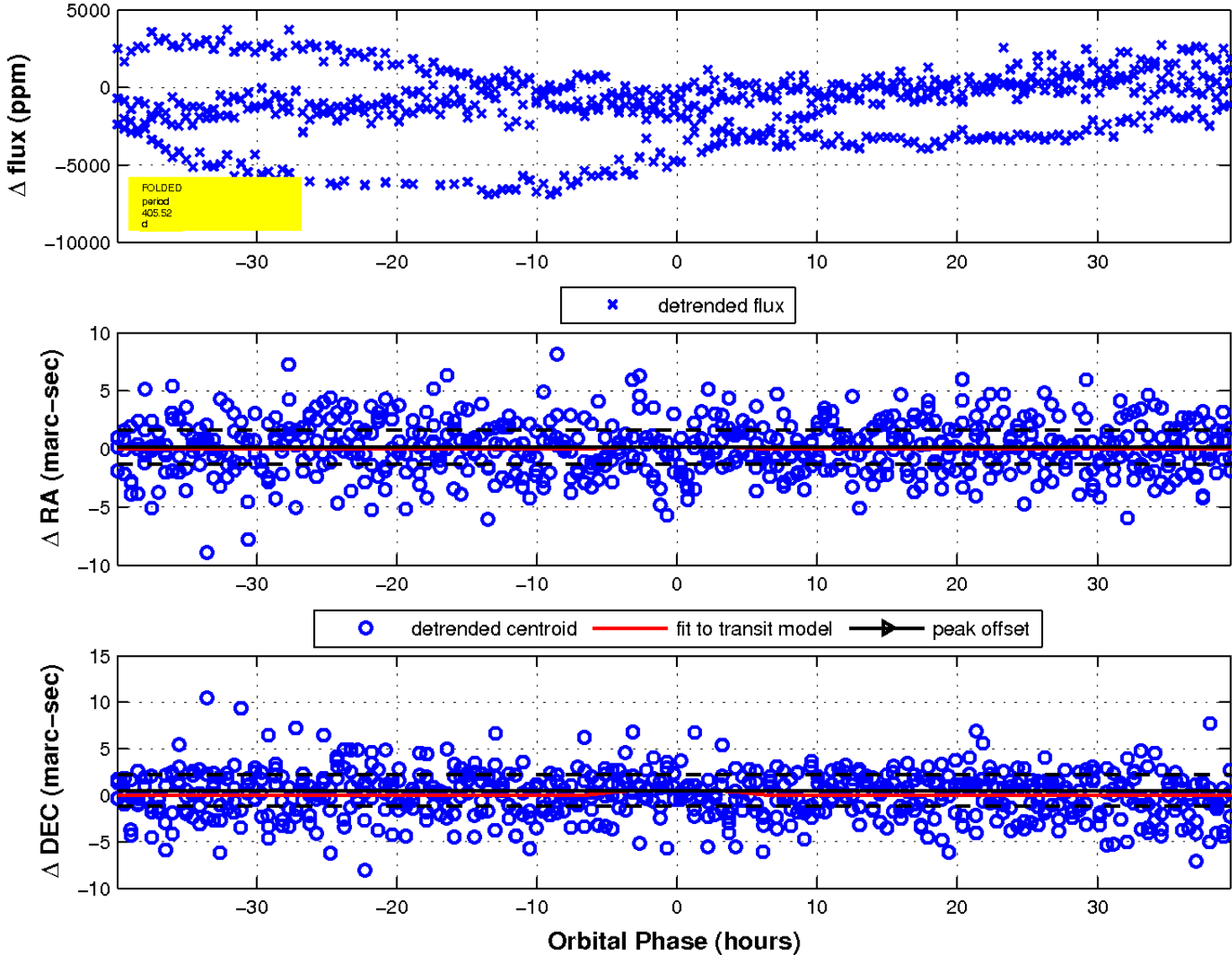
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

Q17 no difference image

Q17 no OOT image



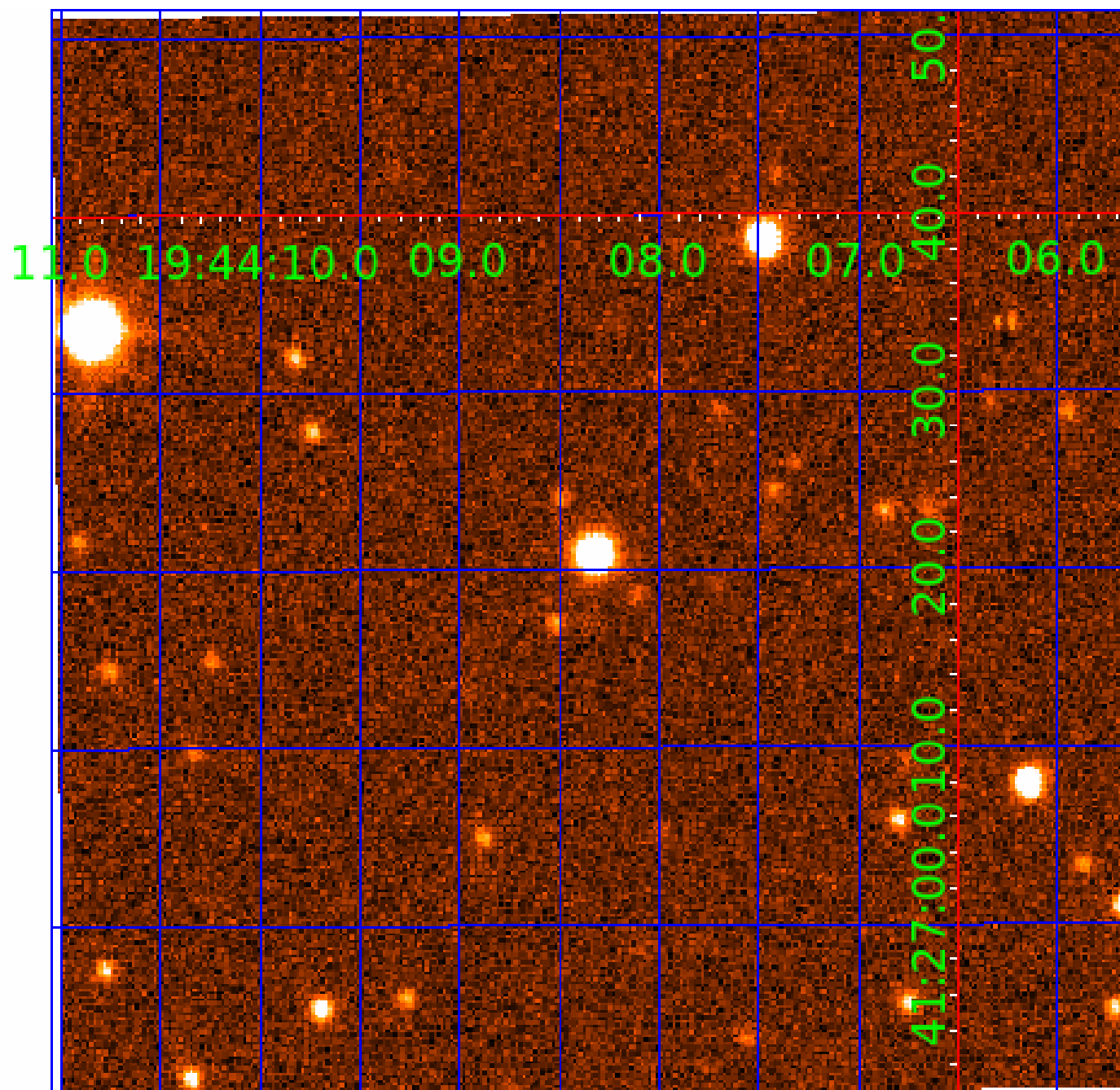
fluxWeightedCentroids, Planet 8 of 10





# UKIRT Image

Declination



## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006138551-01	OBS	No	0.903264	132.276864	60.2	3.755	7.8	9.6	0.74	4987	0.58	1092.39
006138551-02	OBS	No	562.854767	235.373574	932.2	6.266	16.6	4.6	0.74	4987	2.58	0.20
006138551-03	OBS	No	530.761276	479.223857	4353.4	42.694	16.7	8.6	0.74	4987	6.18	0.22
006138551-04	OBS	No	228.013194	343.175015	1171.4	13.680	15.1	6.7	0.74	4987	5.12	0.69
006138551-05	OBS	No	464.265857	586.087268	1073.6	6.635	13.9	7.7	0.74	4987	2.51	0.27
006138551-06	OBS	No	576.302885	273.589413	1404.5	14.591	12.2	7.4	0.74	4987	3.24	0.20
006138551-07	OBS	No	207.671057	239.280791	614.0	3.898	11.6	4.3	0.74	4987	2.13	0.78
006138551-08	OBS	No	405.523905	211.416753	1420.6	13.319	11.5	8.4	0.74	4987	3.42	0.32
006138551-09	OBS	No	278.937876	305.513027	390.8	6.513	11.0	2.9	0.74	4987	1.74	0.52
006138551-10	OBS	No	464.292287	584.958197	3505.3	46.997	9.5	5.4	0.74	4987	5.35	0.27

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006138551-01	OBS	FP	0.00	1	0	0	0	LPP_DV
006138551-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_TRACKER—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
006138551-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
006138551-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV
006138551-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
006138551-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS
006138551-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_TRACKER—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
006138551-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—INCONSISTENT_TRANS
006138551-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—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
006138551-10	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—SAME_NTL_PERIOD—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.

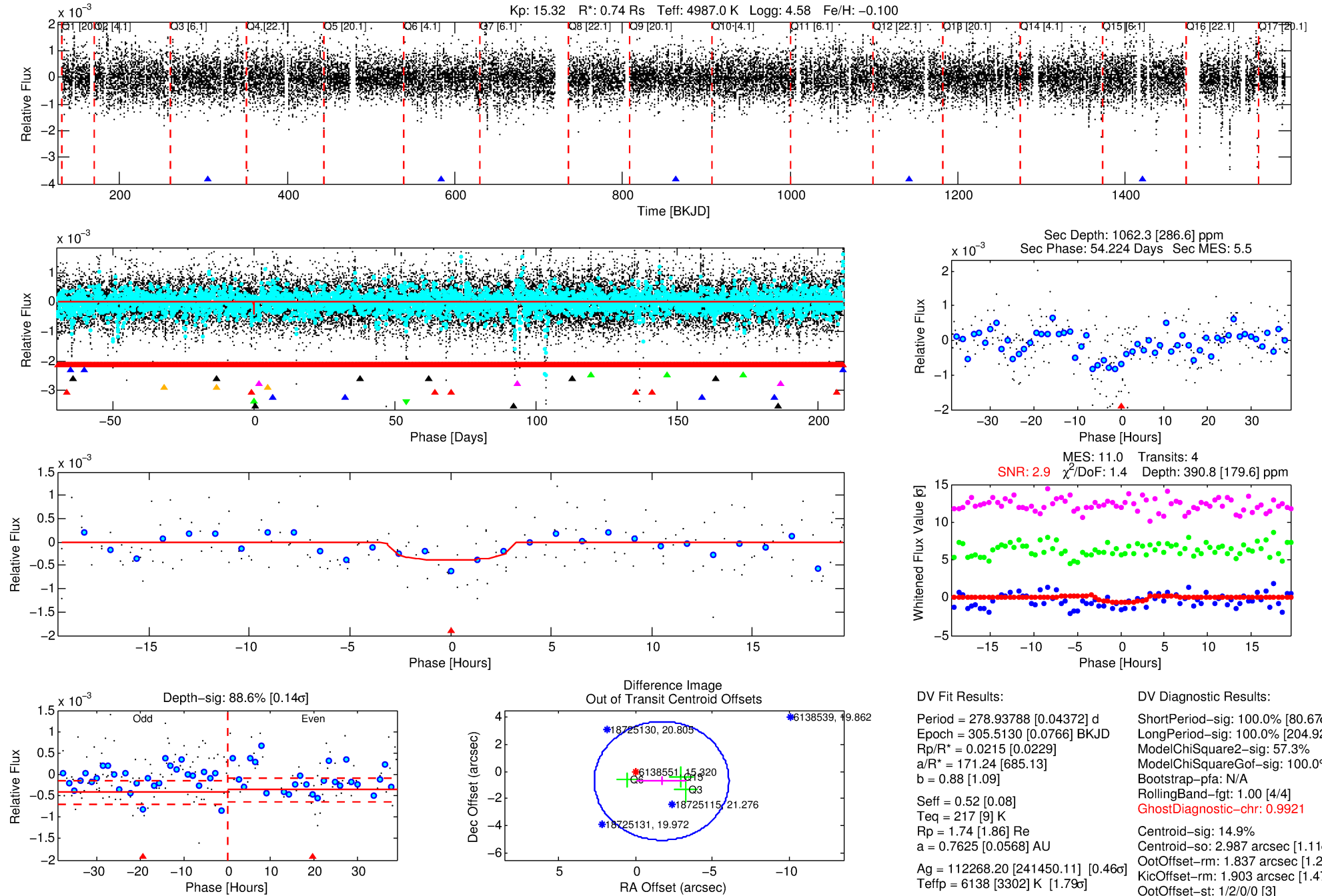
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 006138551-09

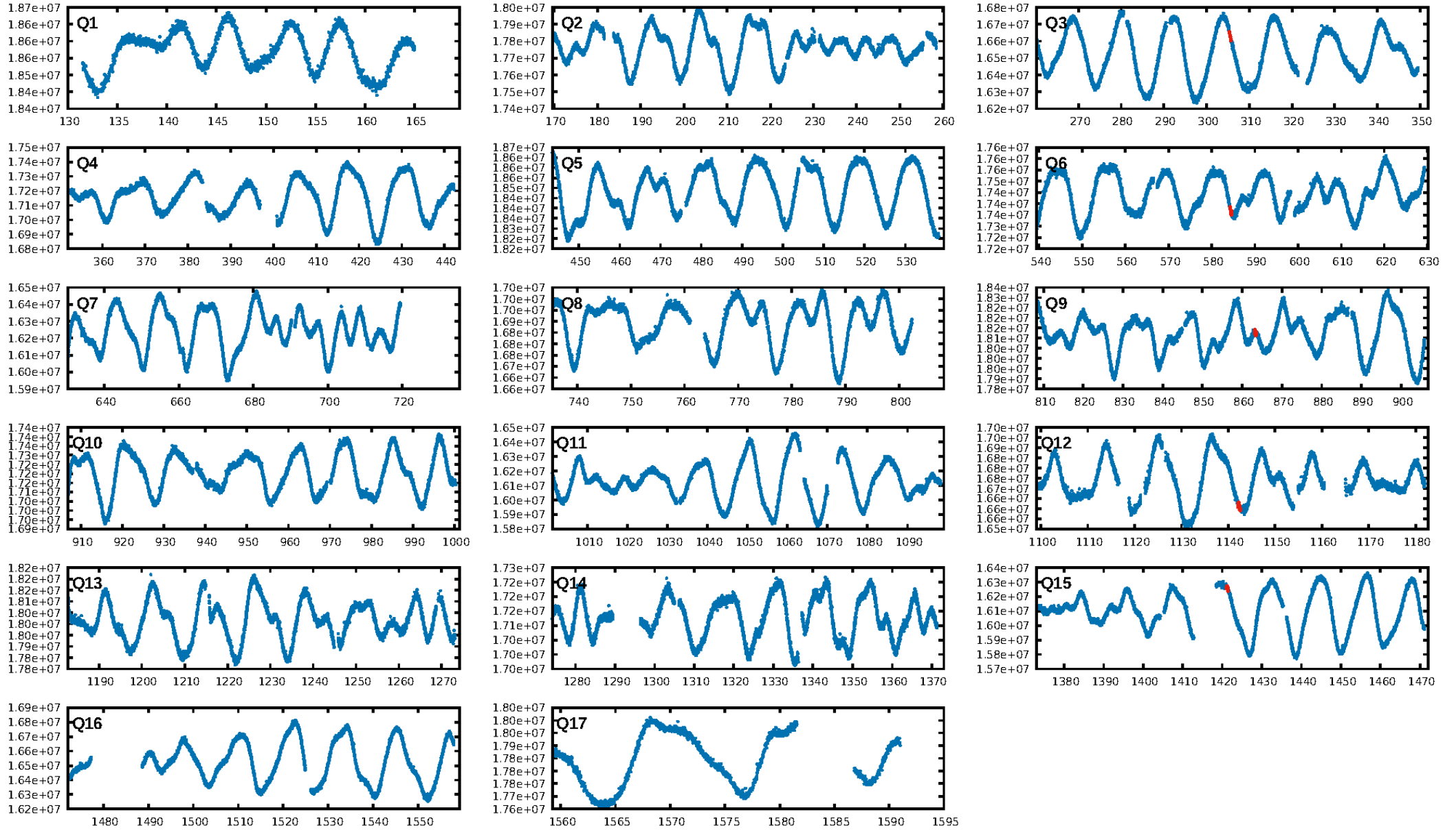
No Significant Match Found

# DV One-Page Summary

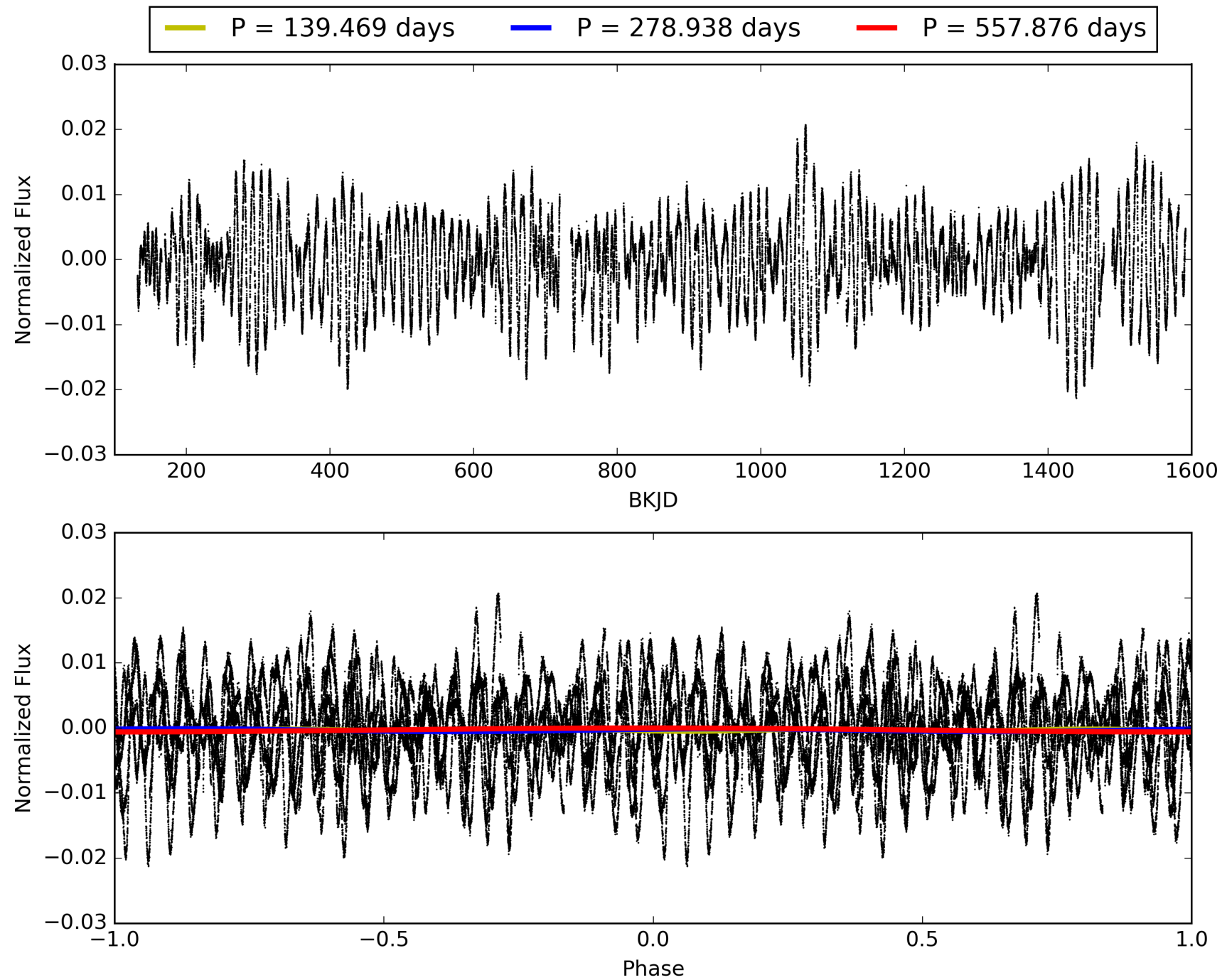
KIC: 6138551 Candidate: 9 of 10 Period: 278.938 d



# TCE 006138551-09, PDC Light Curves

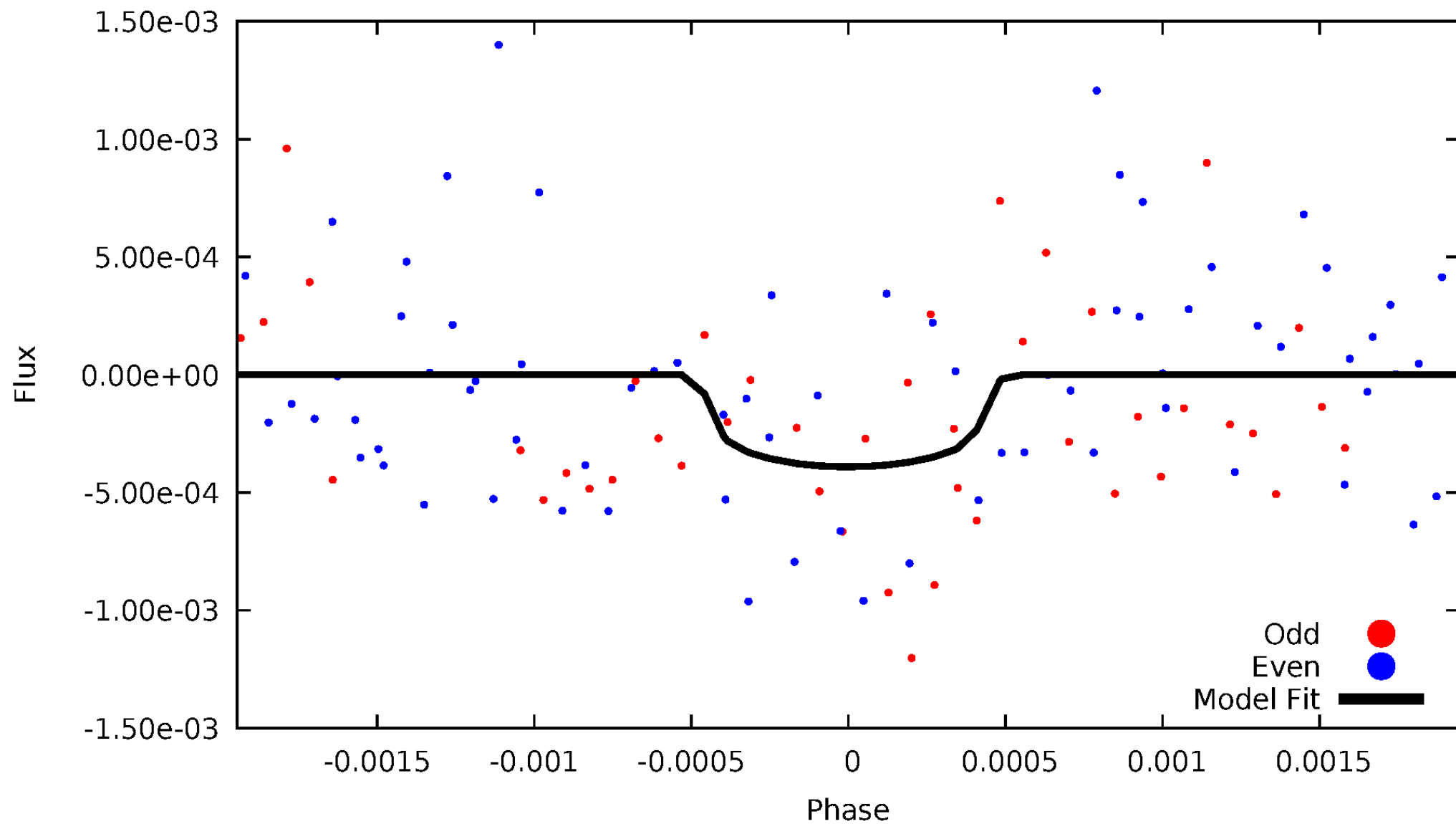


# TCE 006138551-09



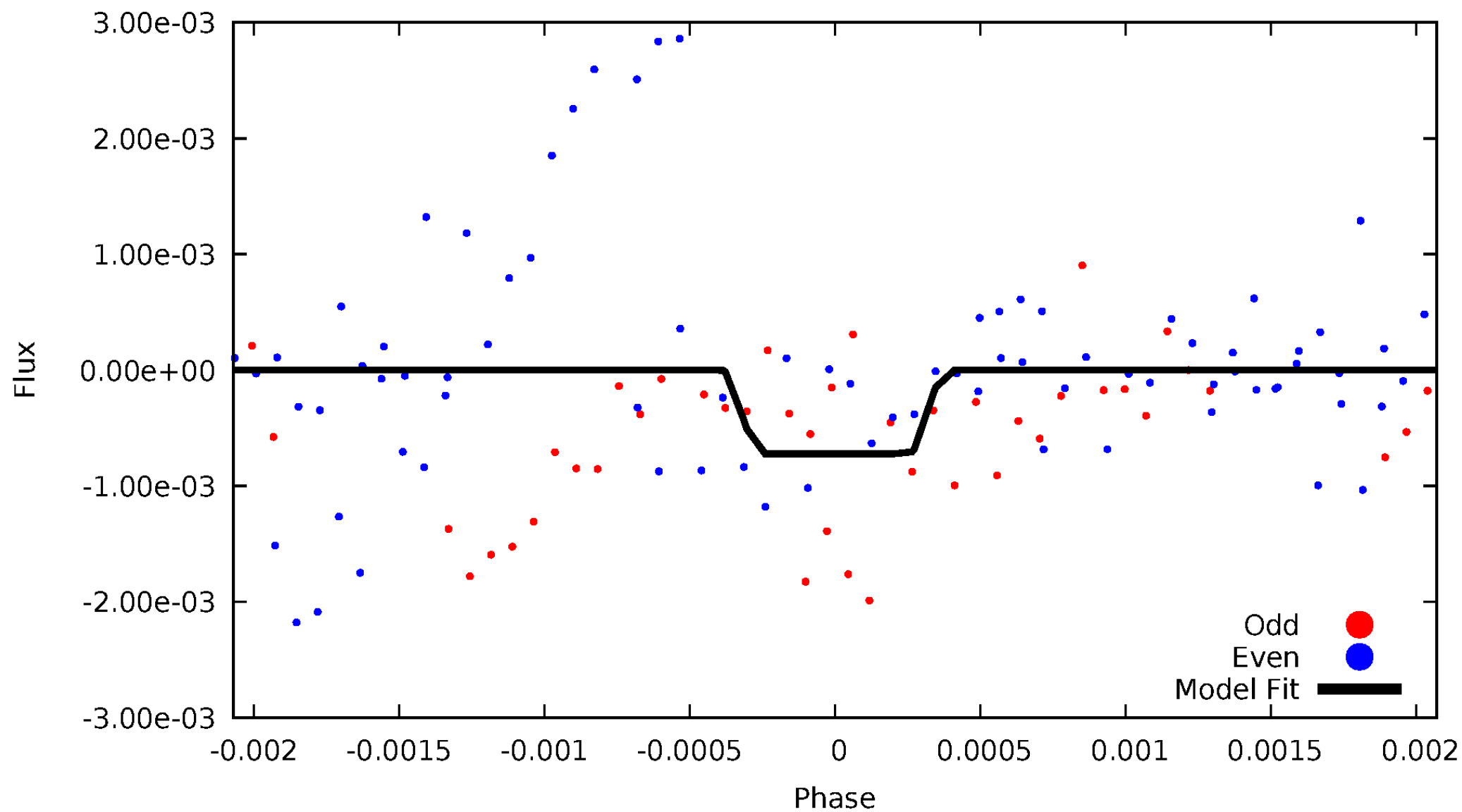
# DV Odd/Even

TCE 006138551-09



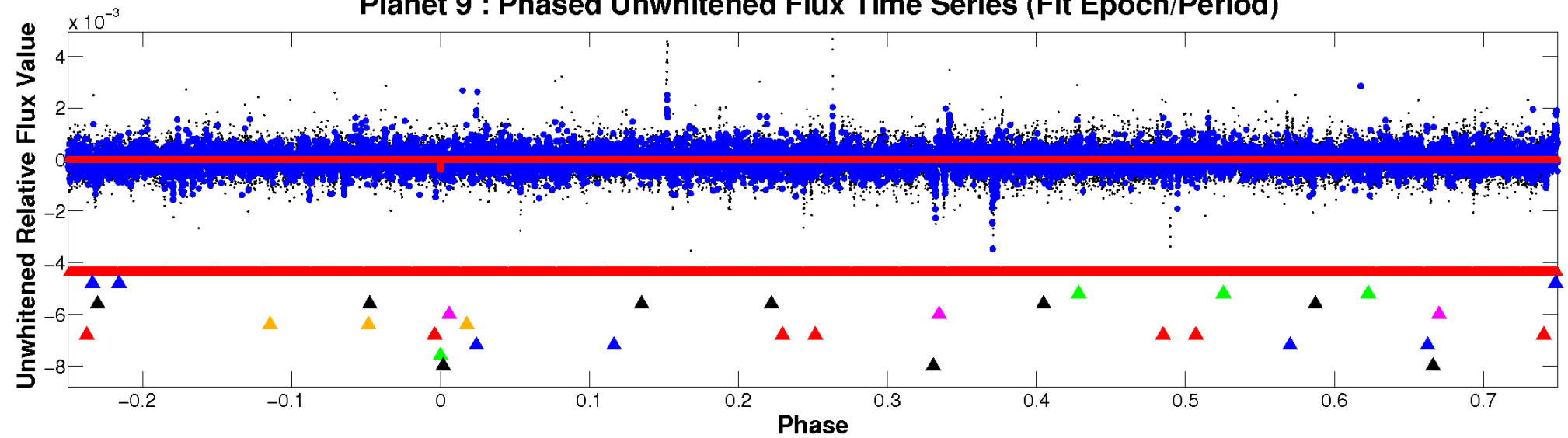
# ALT Odd/Even

TCE 006138551-09

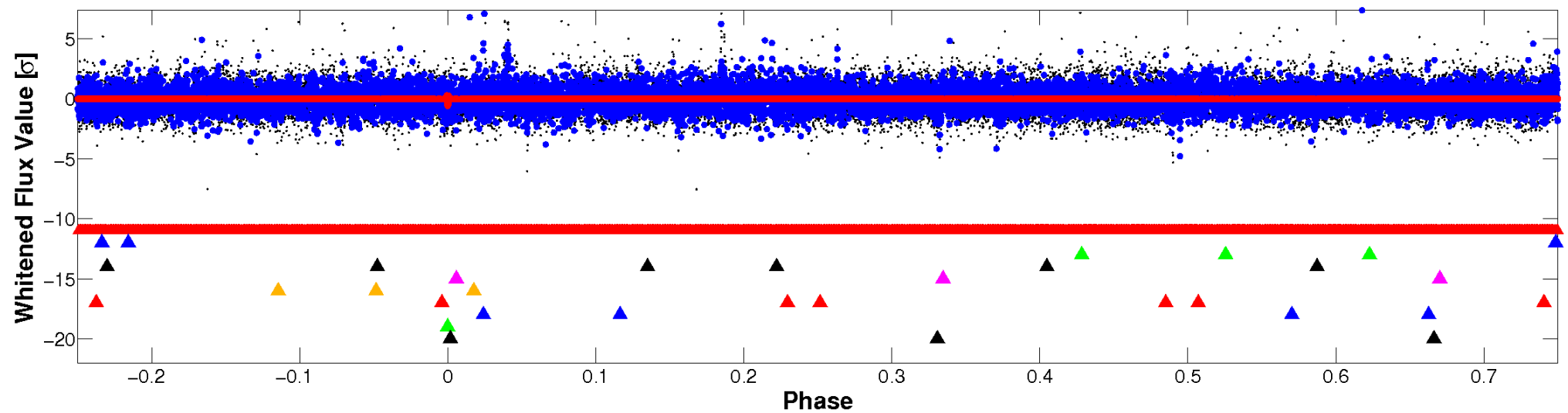


# Non-Whitened Vs. Whitened Light Curve

## Planet 9 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)



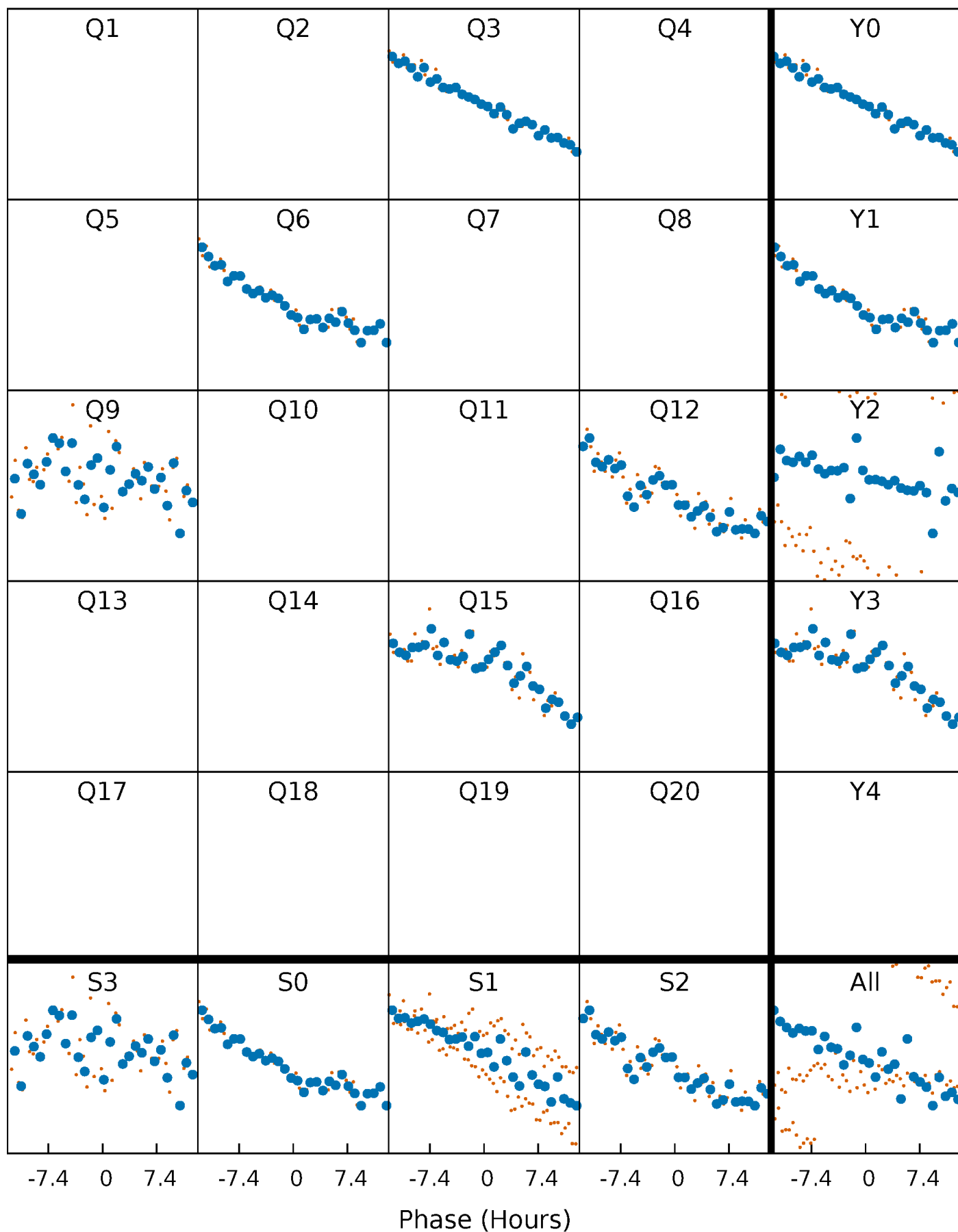
## Planet 9 : Phased Whitened Flux Time Series (Fit Epoch/Period)





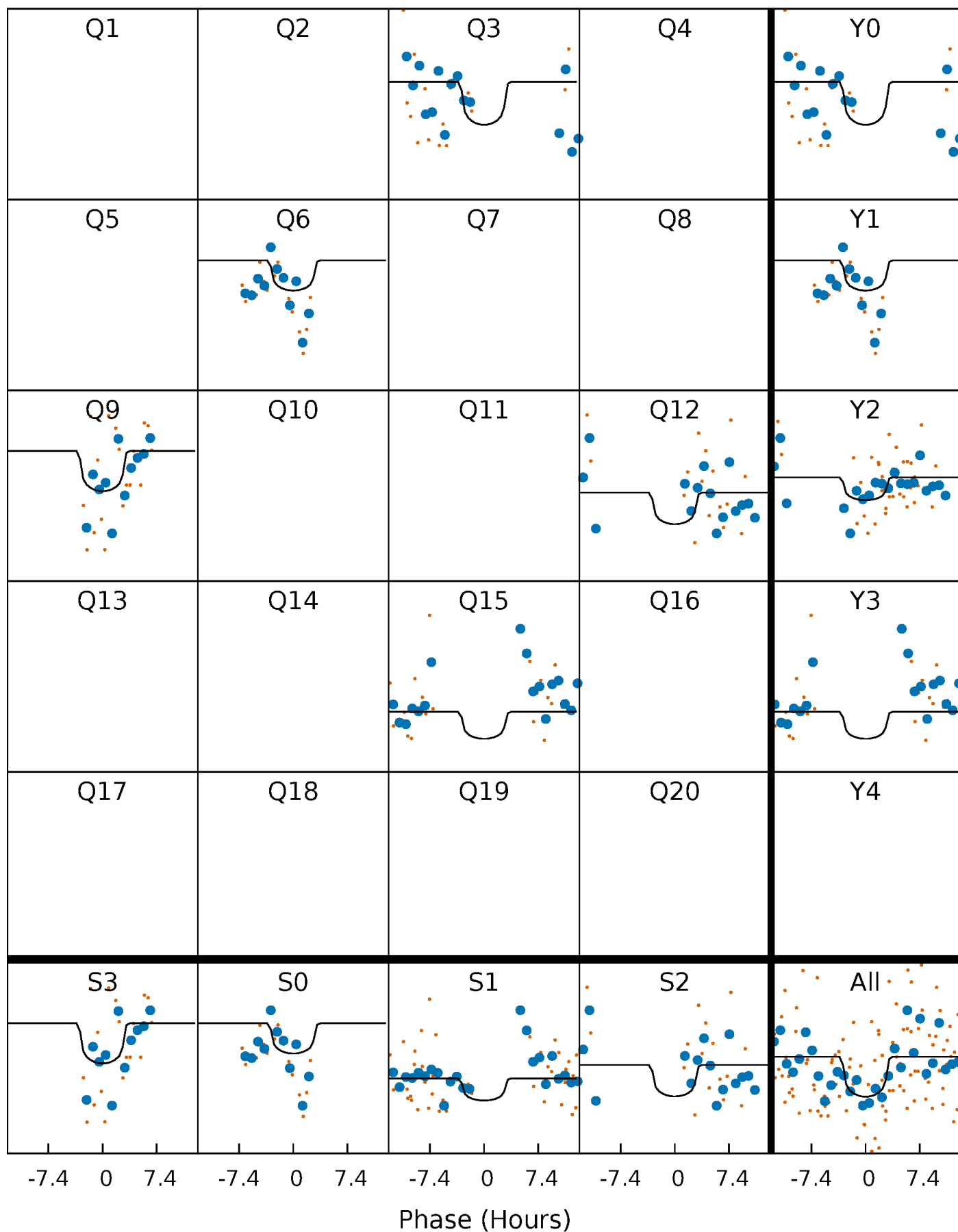
# PDC Quarter-Phased Transit Curves

TCE 006138551-09     $P=278.937876$  Days     $T_0=305.513027$  (BKJD)



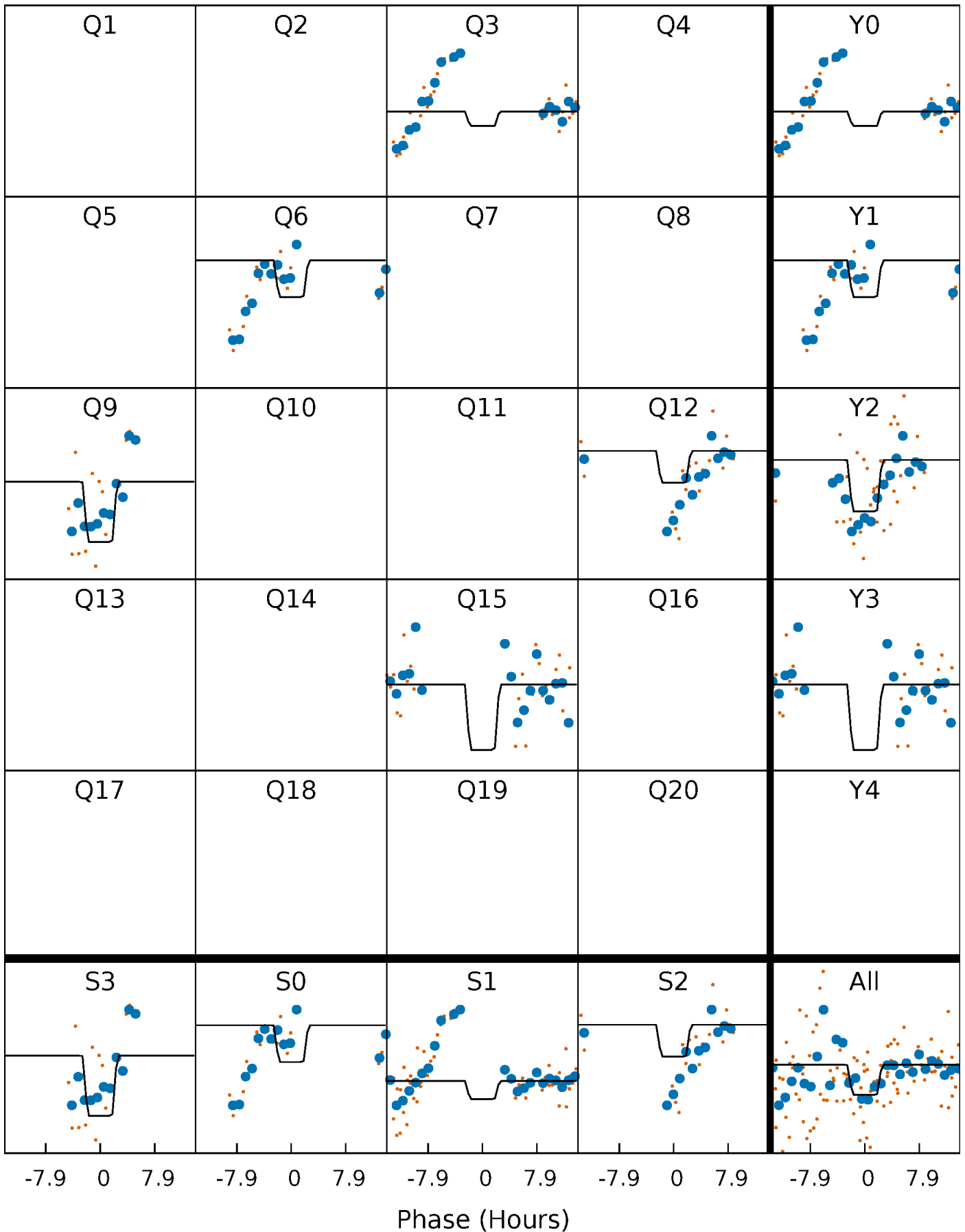
# DV Quarter-Phased Transit Curves

TCE 006138551-09     $P=278.937876$  Days     $T_0=305.513027$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

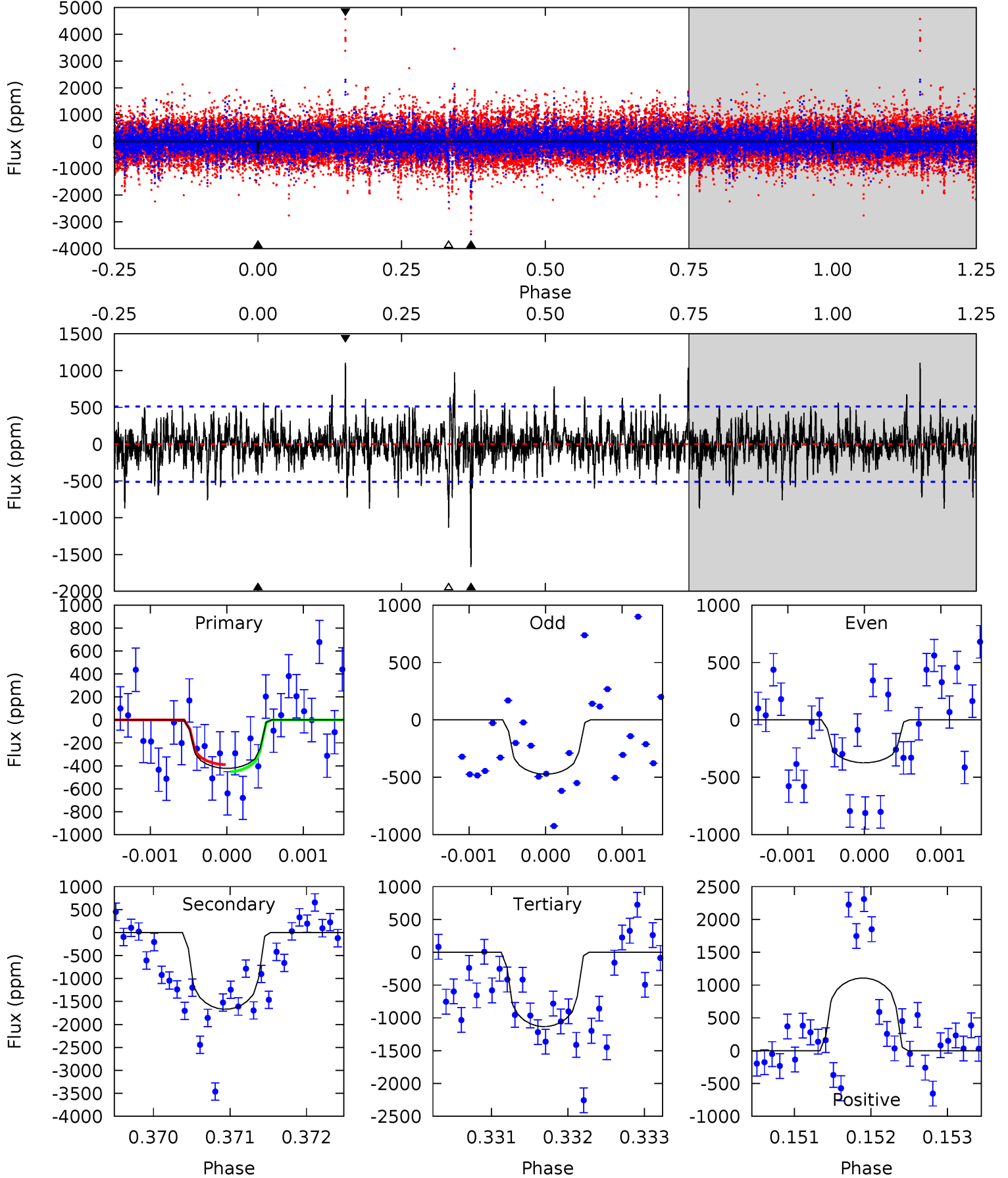
TCE 006138551-09 P=278.938528 Days  $T_0=305.592165$  (BKJD)



# DV Model-Shift Uniqueness Test

006138551-09, P = 278.937876 Days, E = 26.575151 Days

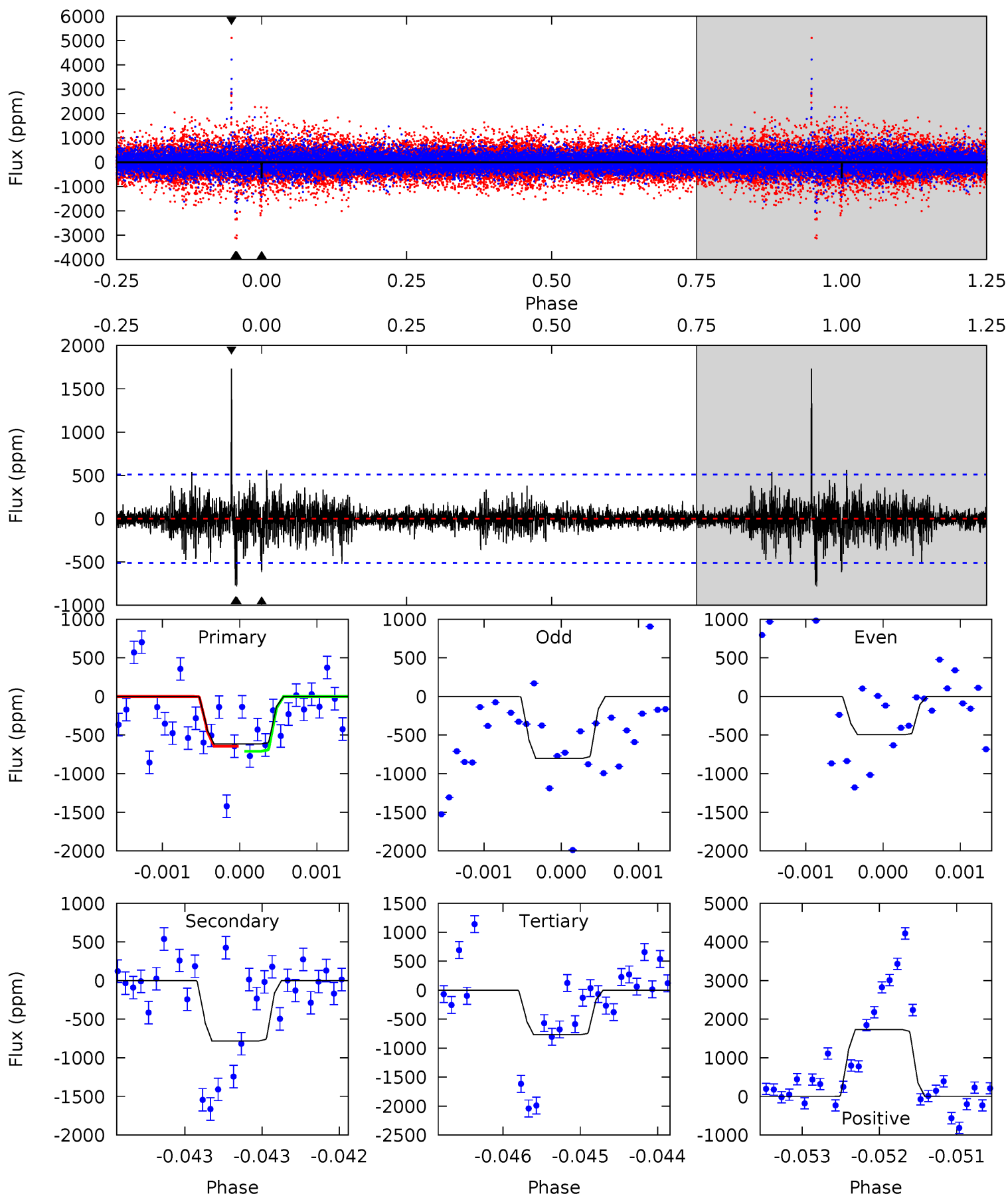
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
4.51	17.8	12.1	11.8	5.46	3.31	2.20	-7.59	-7.31	5.73	6.01	0.53	1.06	0.40	0.33



# Alt Model-Shift Uniqueness Test

006138551-09, P = 278.938528 Days, E = 26.653637 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
6.64	8.43	8.28	18.7	5.51	3.38	1.15	-1.64	-12.0	0.15	-10.2	1.70	1.37	0.69	0.37



### Stellar Parameters For KIC 006138551

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4987^{+151}_{-136}$	$4.579^{+0.045}_{-0.050}$	$-0.100^{+0.300}_{-0.300}$	$0.741^{+0.071}_{-0.065}$	$0.760^{+0.078}_{-0.064}$	$2.633^{+0.538}_{-0.491}$
	+3%/-3%	+1%/-1%	+300%/-300%	+10%/-9%	+10%/-8%	+20%/-19%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 006138551-09 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-1669 \pm 94$	$2.10^{+1.70}_{-1.27}$	$304^{+11}_{-11}$	$6134^{+4724}_{-1437}$	$119352^{+667796}_{-81997}$
Alt.	$-781 \pm 93$	$2.36^{+1.78}_{-1.47}$	$304^{+11}_{-10}$	$4877^{+3132}_{-937}$	$44206^{+279262}_{-29587}$

$T_{\text{max}}$  = 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

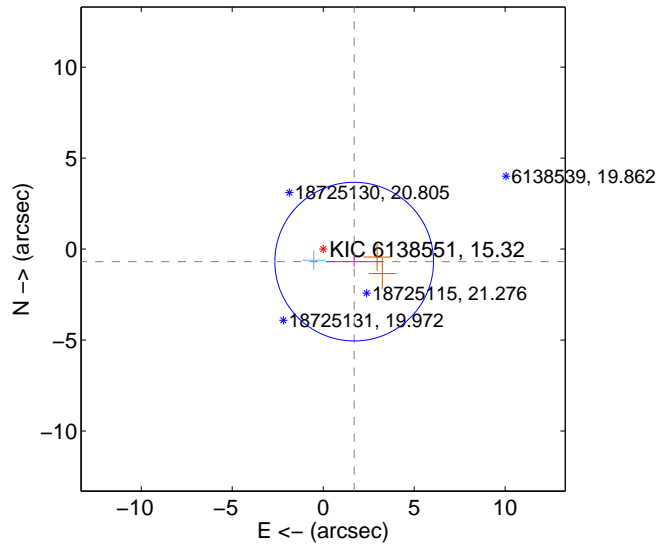
Supplemental centroid analysis for 006138551-09. Kepler magnitude: 15.32. Transit SNR 2.91

There are 1 quarters with good PRF difference image offsets

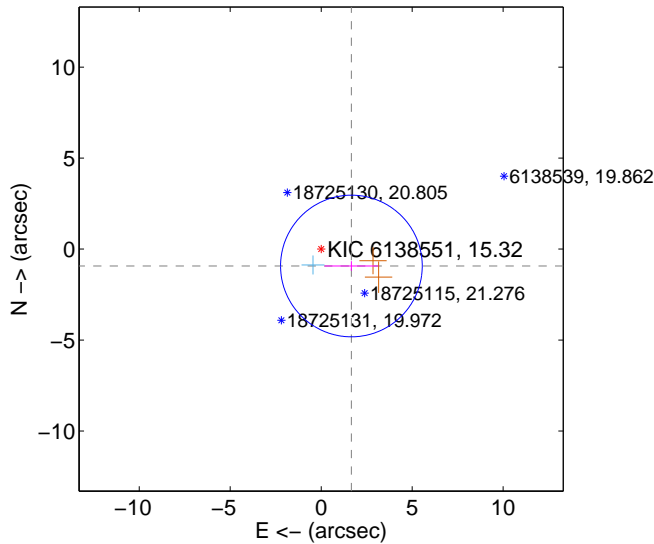
The direct PRF centroid is offset from the target star catalog position by about 0.23 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.837 \pm 1.453$	1.26	$-1.703 \pm 1.564$	$-0.689 \pm 0.282$
PRF-fit source offset from KIC position	$1.903 \pm 1.298$	1.47	$-1.661 \pm 1.480$	$-0.929 \pm 0.261$
photometric centroid source offset	$2.99 \pm 2.70$	1.11	$1.23 \pm 2.99$	$-2.72 \pm 2.64$

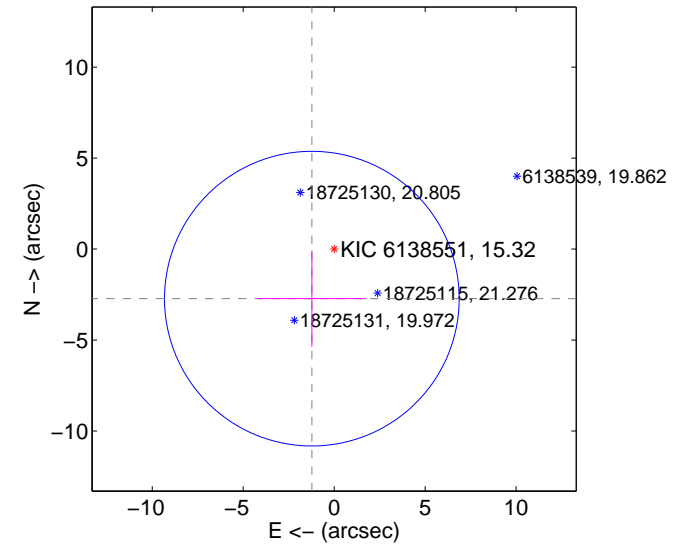
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

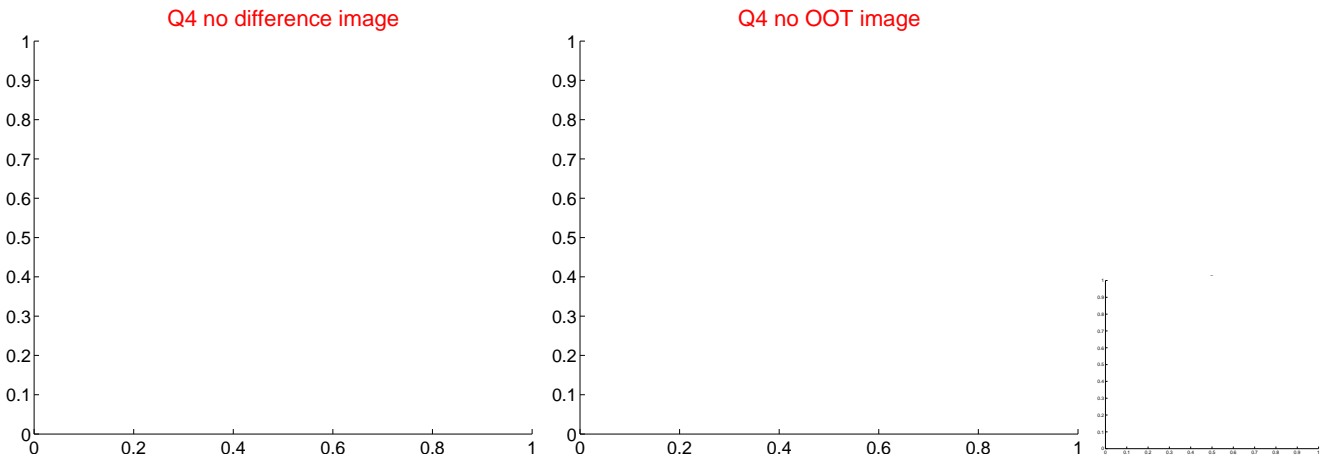
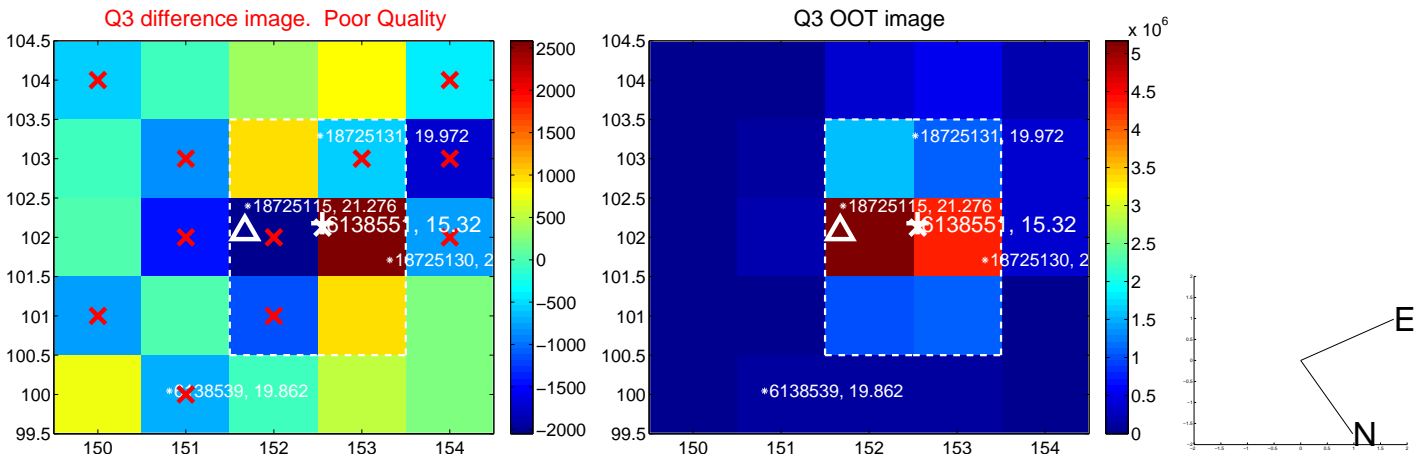
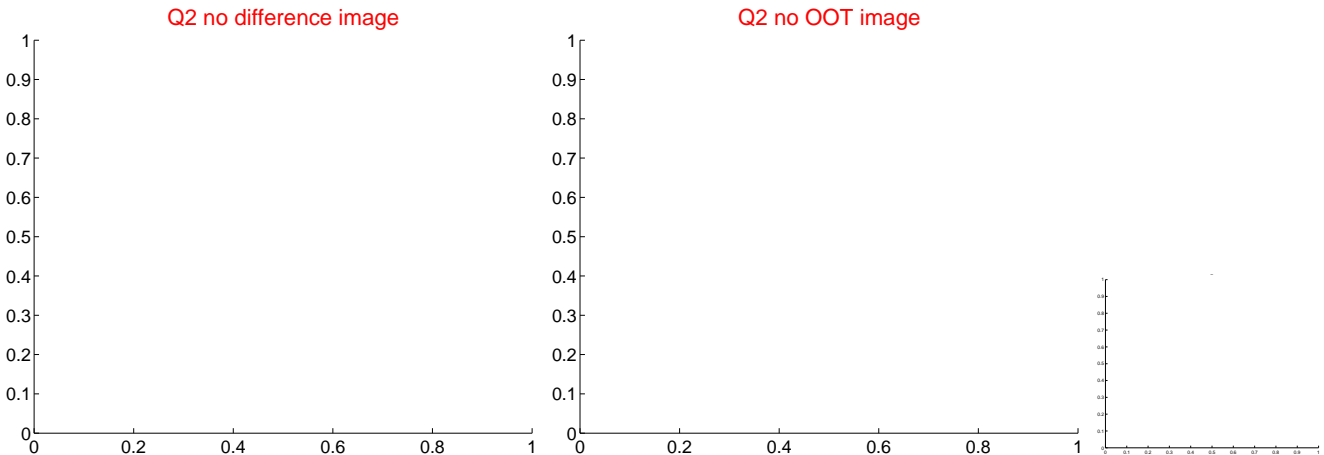
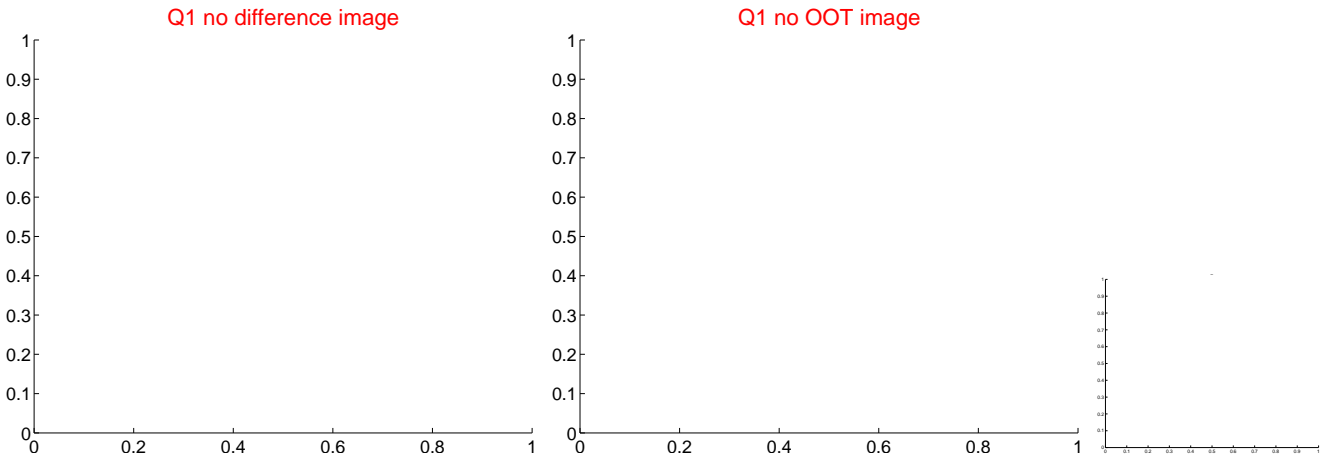


offset from photometric centroids



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

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





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

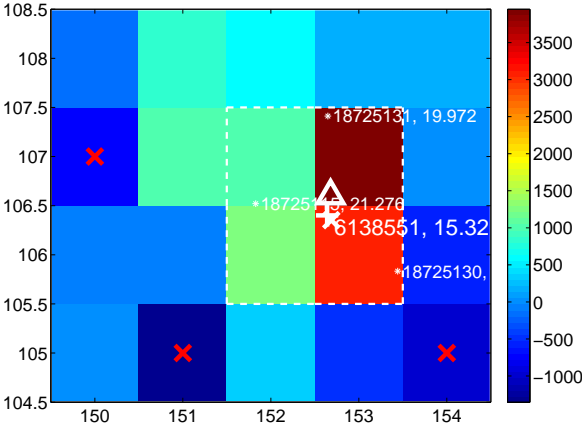
Q5 no difference image



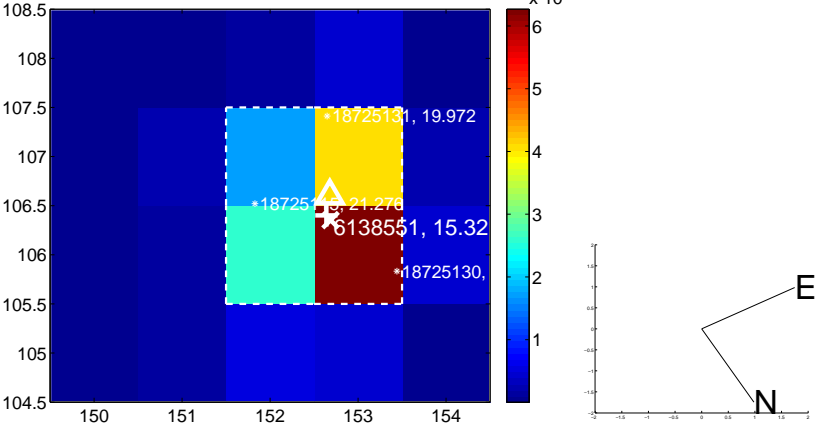
Q5 no OOT image



Q6 difference image



Q6 OOT image



Q7 no difference image



Q7 no OOT image



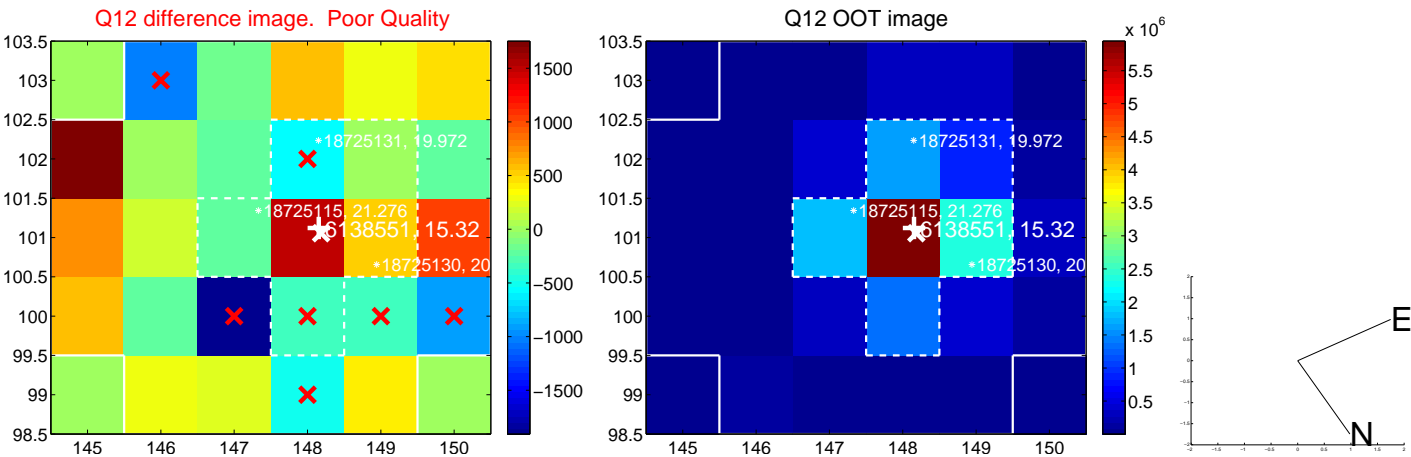
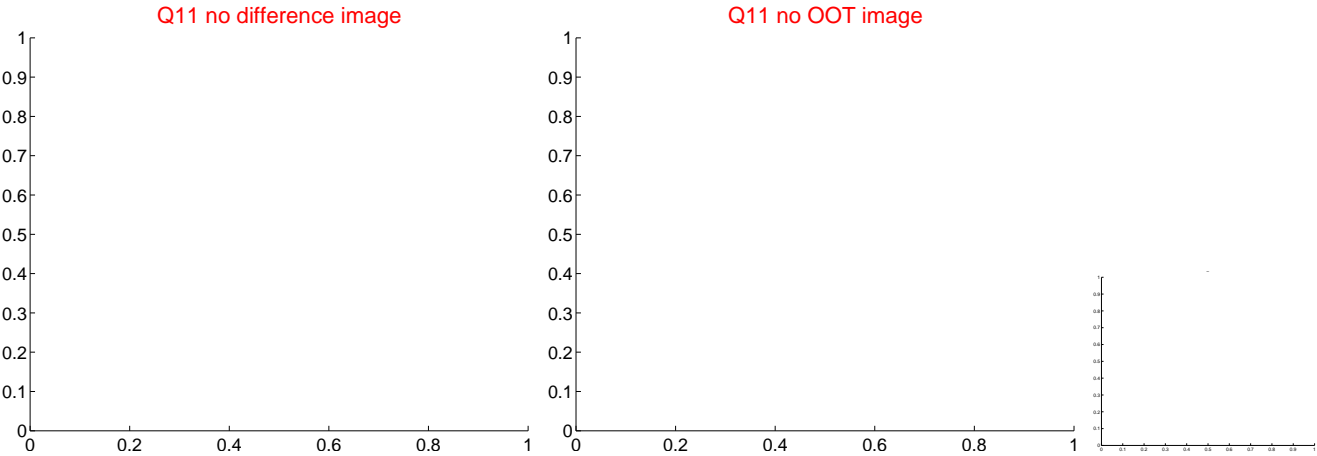
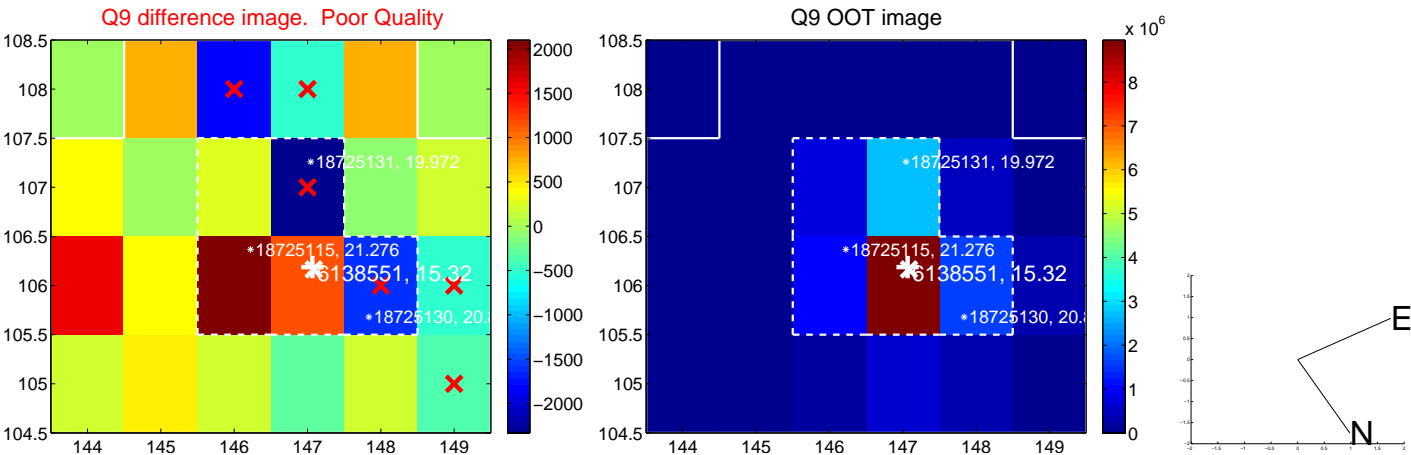
Q8 no difference image



Q8 no OOT image



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



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

Q13 no difference image



Q13 no OOT image



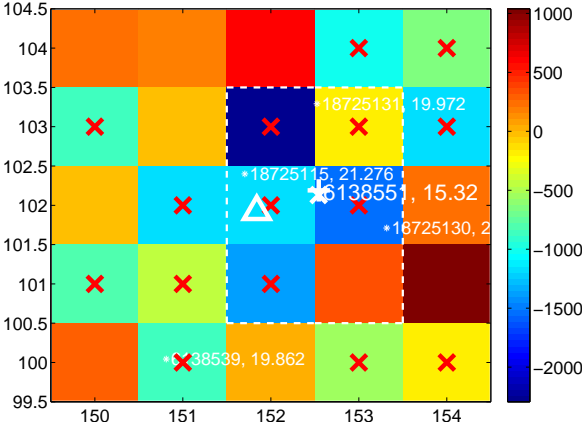
Q14 no difference image



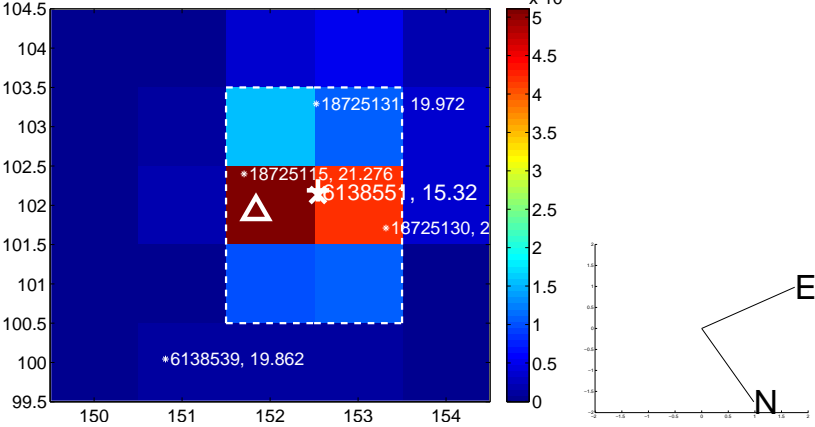
Q14 no OOT image



Q15 difference image. Poor Quality



Q15 OOT image



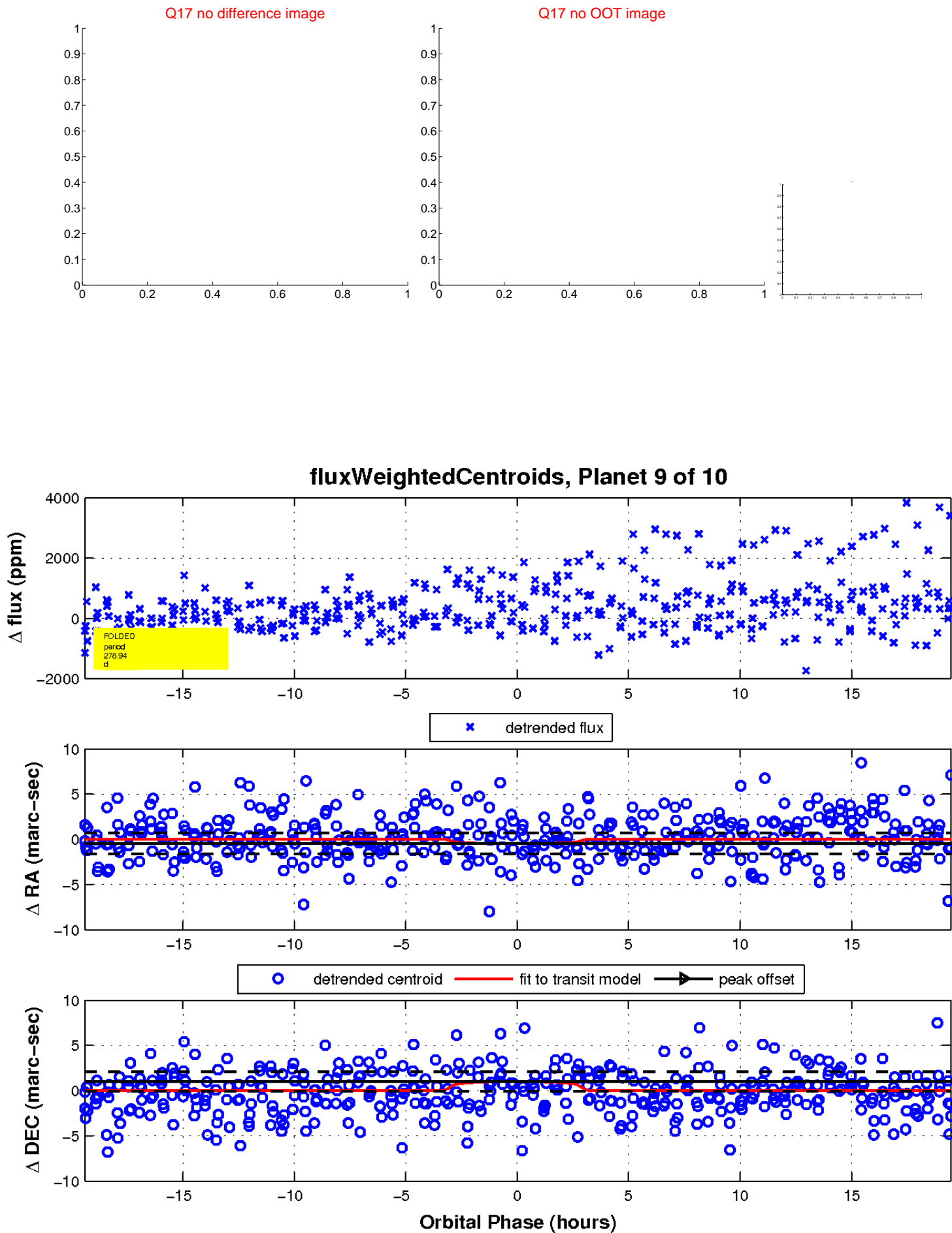
Q16 no difference image



Q16 no OOT image

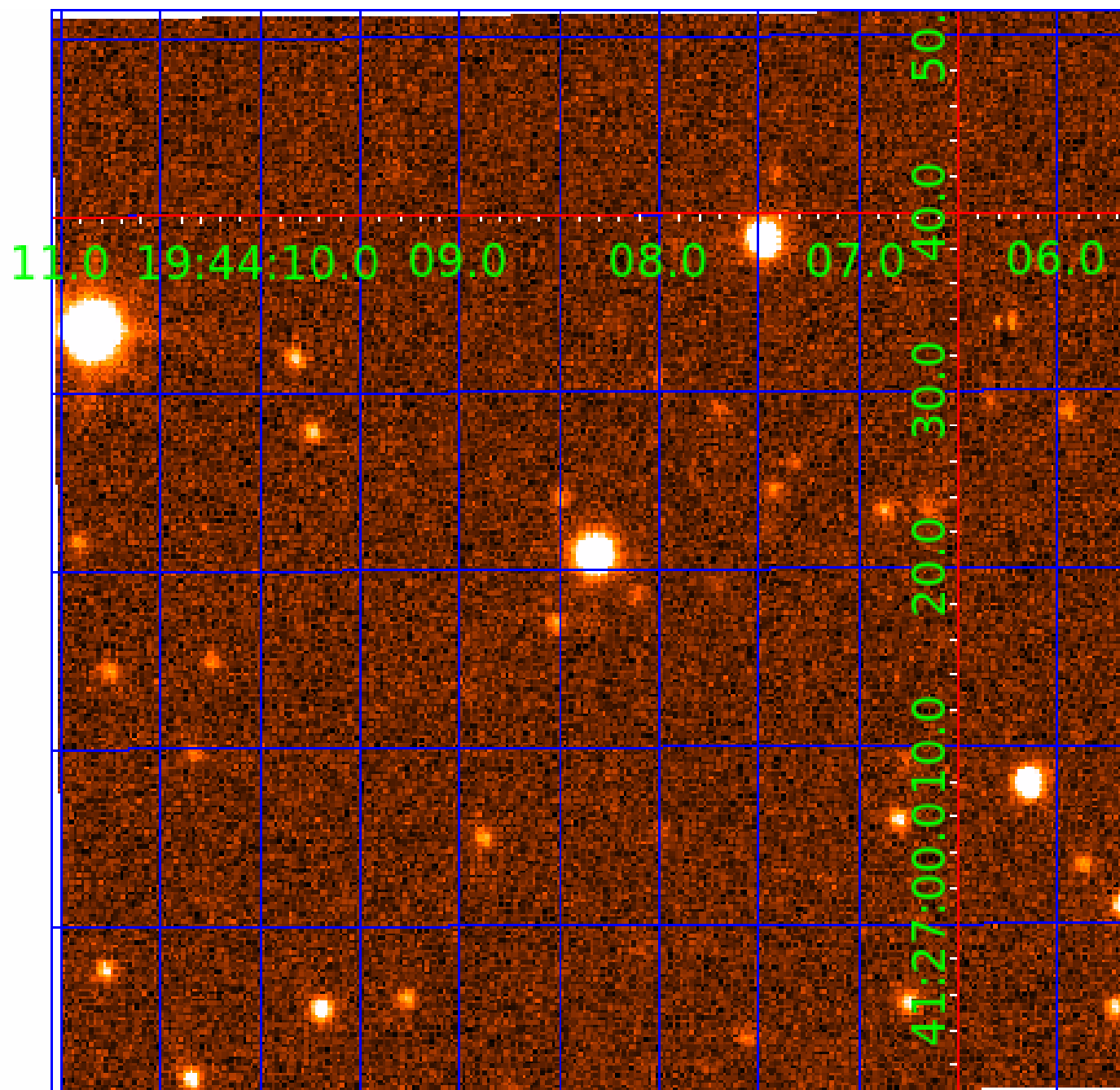


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006138551-01	OBS	No	0.903264	132.276864	60.2	3.755	7.8	9.6	0.74	4987	0.58	1092.39
006138551-02	OBS	No	562.854767	235.373574	932.2	6.266	16.6	4.6	0.74	4987	2.58	0.20
006138551-03	OBS	No	530.761276	479.223857	4353.4	42.694	16.7	8.6	0.74	4987	6.18	0.22
006138551-04	OBS	No	228.013194	343.175015	1171.4	13.680	15.1	6.7	0.74	4987	5.12	0.69
006138551-05	OBS	No	464.265857	586.087268	1073.6	6.635	13.9	7.7	0.74	4987	2.51	0.27
006138551-06	OBS	No	576.302885	273.589413	1404.5	14.591	12.2	7.4	0.74	4987	3.24	0.20
006138551-07	OBS	No	207.671057	239.280791	614.0	3.898	11.6	4.3	0.74	4987	2.13	0.78
006138551-08	OBS	No	405.523905	211.416753	1420.6	13.319	11.5	8.4	0.74	4987	3.42	0.32
006138551-09	OBS	No	278.937876	305.513027	390.8	6.513	11.0	2.9	0.74	4987	1.74	0.52
006138551-10	OBS	No	464.292287	584.958197	3505.3	46.997	9.5	5.4	0.74	4987	5.35	0.27

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006138551-01	OBS	FP	0.00	1	0	0	0	LPP_DV
006138551-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_TRACKER—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
006138551-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
006138551-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV
006138551-05	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
006138551-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS
006138551-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_TRACKER—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
006138551-08	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—INCONSISTENT_TRANS
006138551-09	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—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
006138551-10	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—SAME_NTL_PERIOD—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.

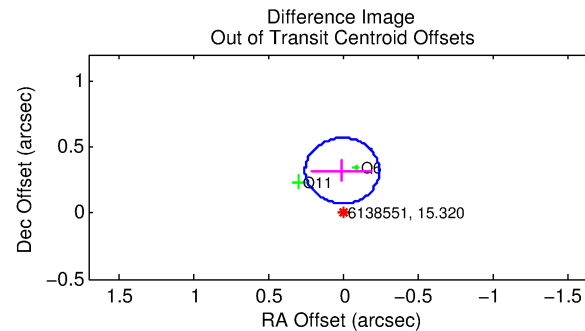
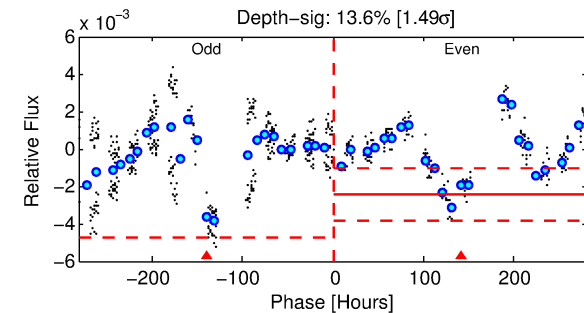
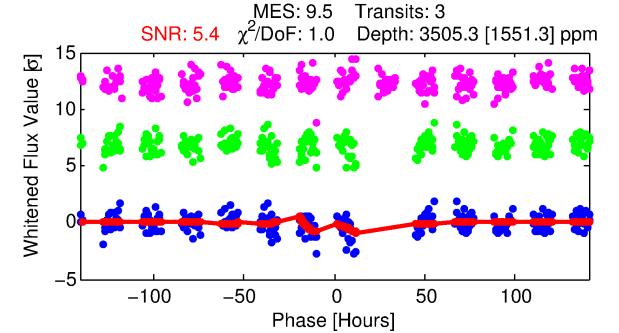
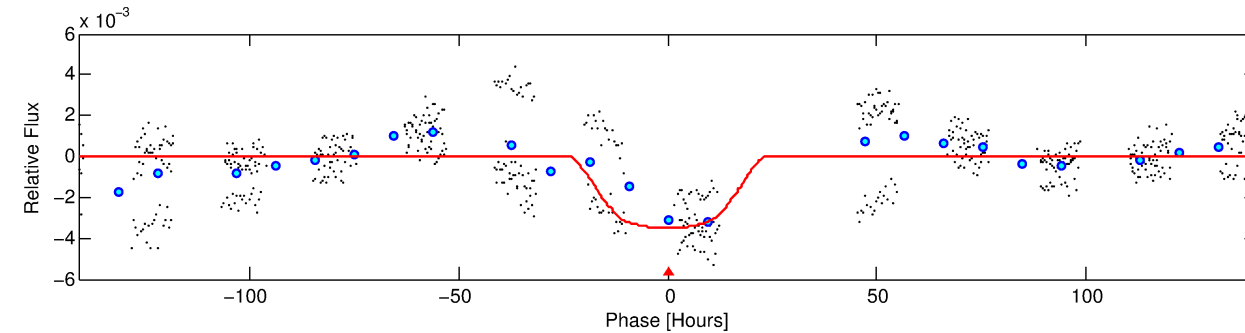
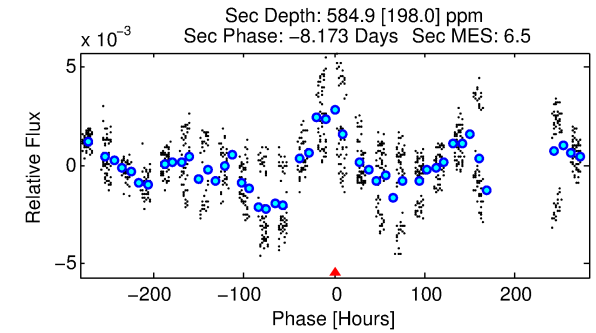
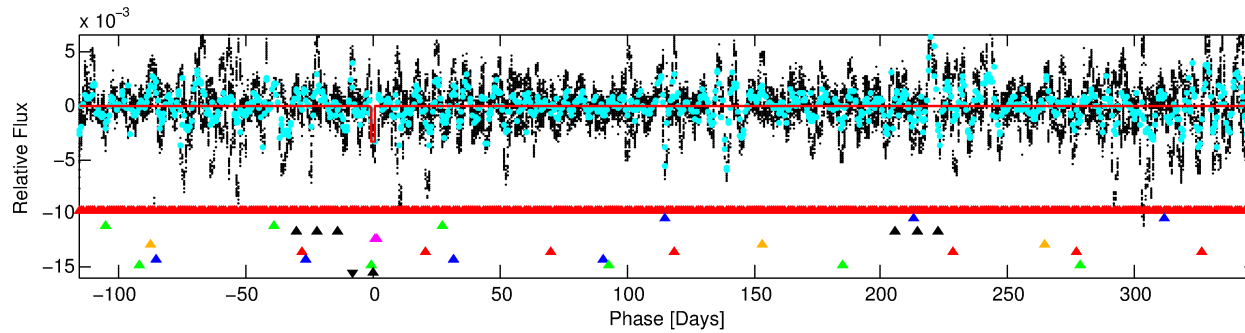
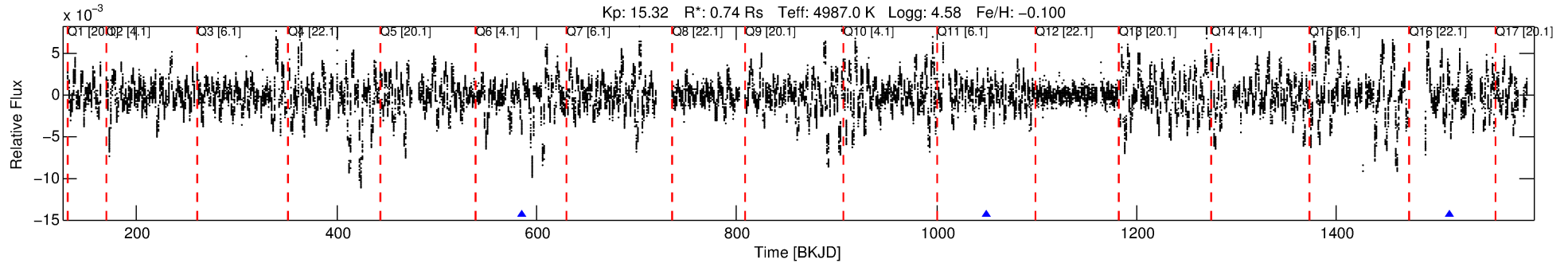
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 006138551-10

No Significant Match Found

# DV One-Page Summary

KIC: 6138551 Candidate: 10 of 10 Period: 464.292 d



## DV Fit Results:

Period = 464.29229 [0.06687] d  
Epoch = 584.9582 [0.1063] BKJD  
Rp/R\* = 0.0661 [0.0151]  
a/R\* = 43.40 [6.94]  
b = 0.90 [0.02]  
Seff = 0.27 [0.04]  
Teq = 183 [7] K  
Rp = 5.35 [1.32] Re  
a = 1.0710 [0.0798] AU  
Ag = 12908.70 [7449.02] [1.73 $\sigma$ ]  
Teffp = 3016 [438] K [6.46 $\sigma$ ]

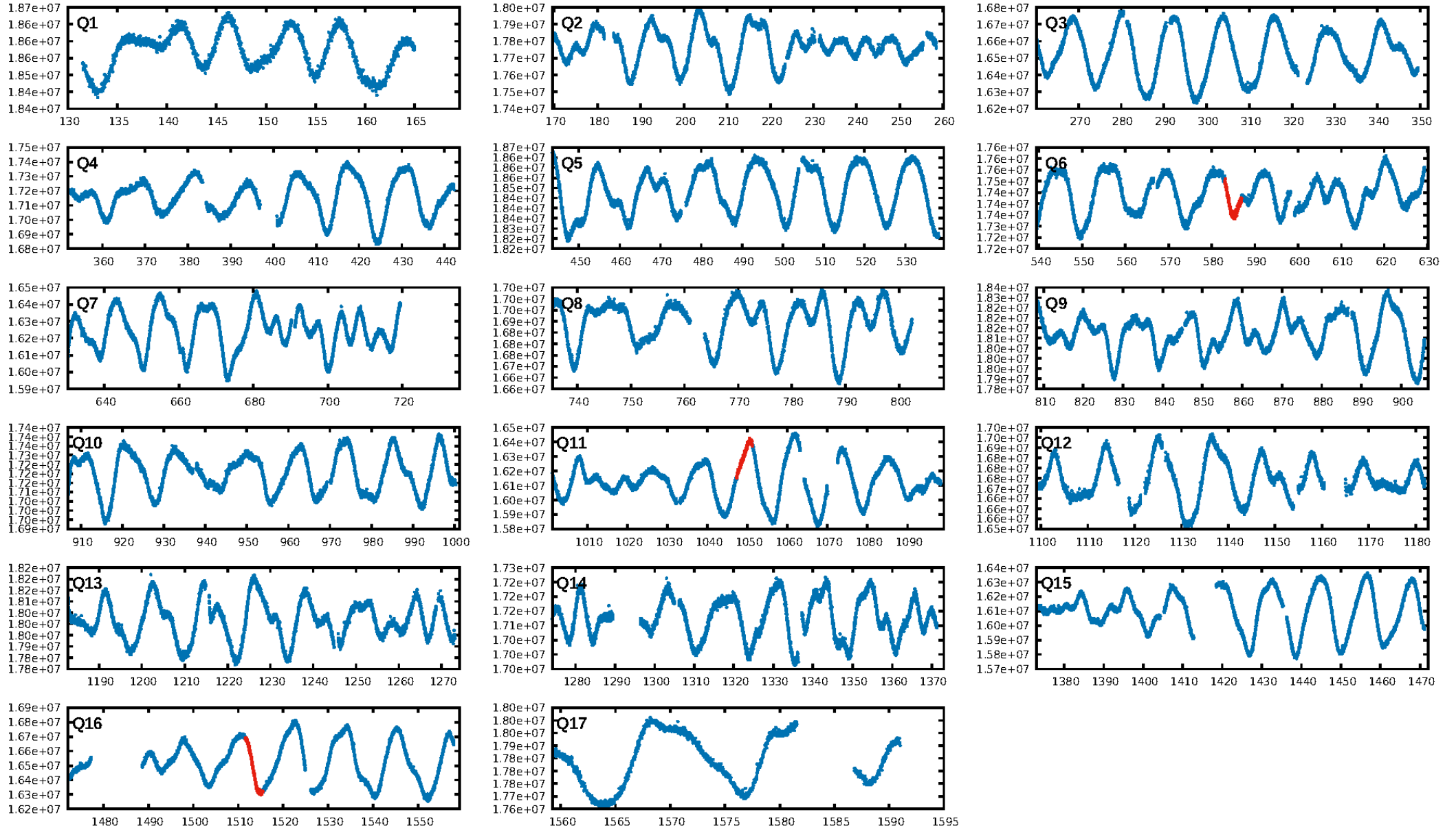
## DV Diagnostic Results:

ShortPeriod-sig: 1.1% [0.01 $\sigma$ ]  
LongPeriod-sig: 100.0% [25.12 $\sigma$ ]  
ModelChiSquare2-sig: 22.8%  
ModelChiSquareGoF-sig: 100.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 0.8187  
Centroid-sig: 11.4%  
Centroid-so: 0.298 arcsec [1.63 $\sigma$ ]  
OotOffset-rm: 0.319 arcsec [3.87 $\sigma$ ]  
KicOffset-rm: 0.084 arcsec [1.02 $\sigma$ ]  
OotOffset-st: 1/1/0/0 [2]  
KicOffset-st: 1/1/0/0 [2]  
DiffImageQuality-fgm: 0.50 [1/2]  
DiffImageOverlap-fno: 0.00 [0/2]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 03-Feb-2016 04:51:24 Z

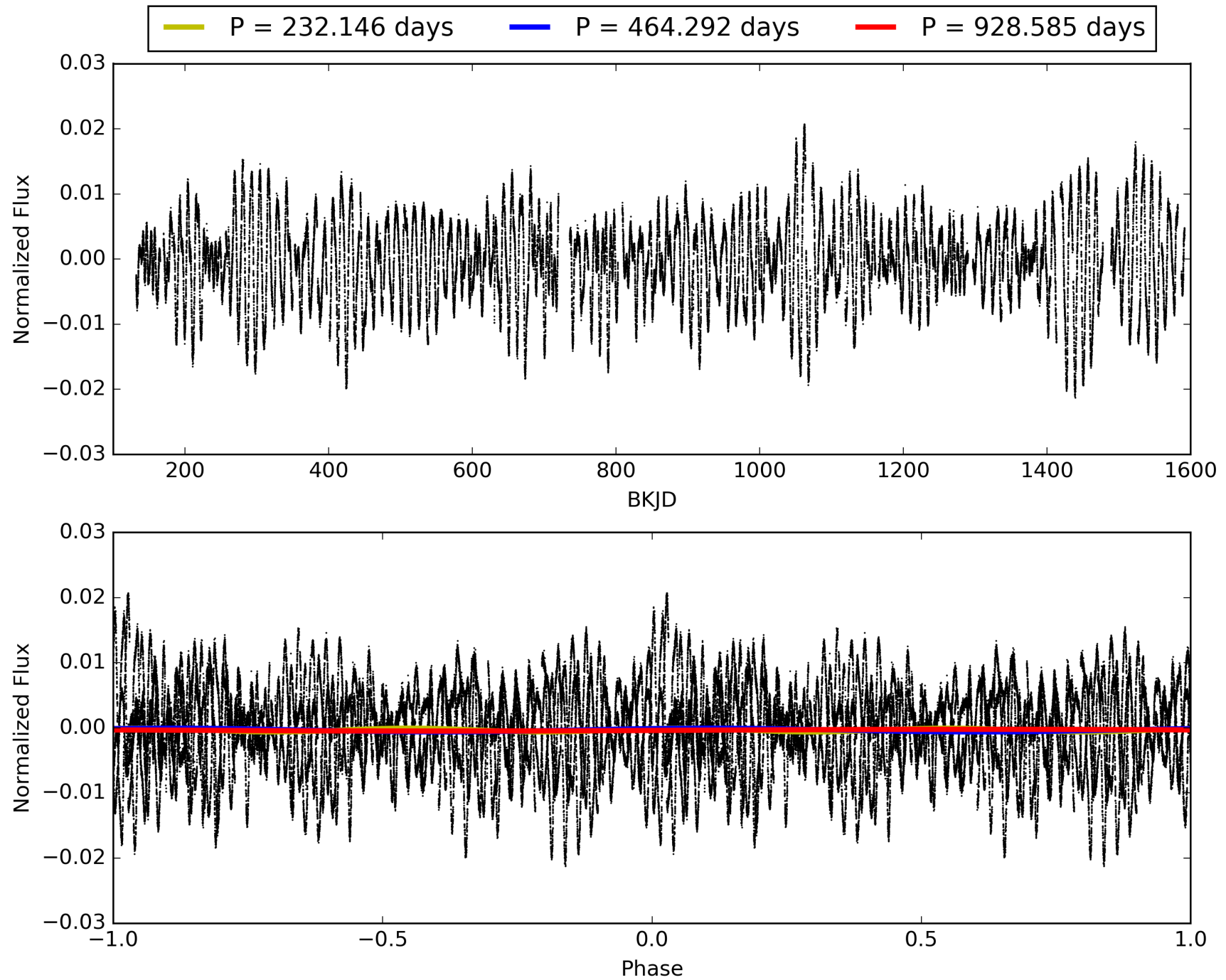
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 006138551-10, PDC Light Curves



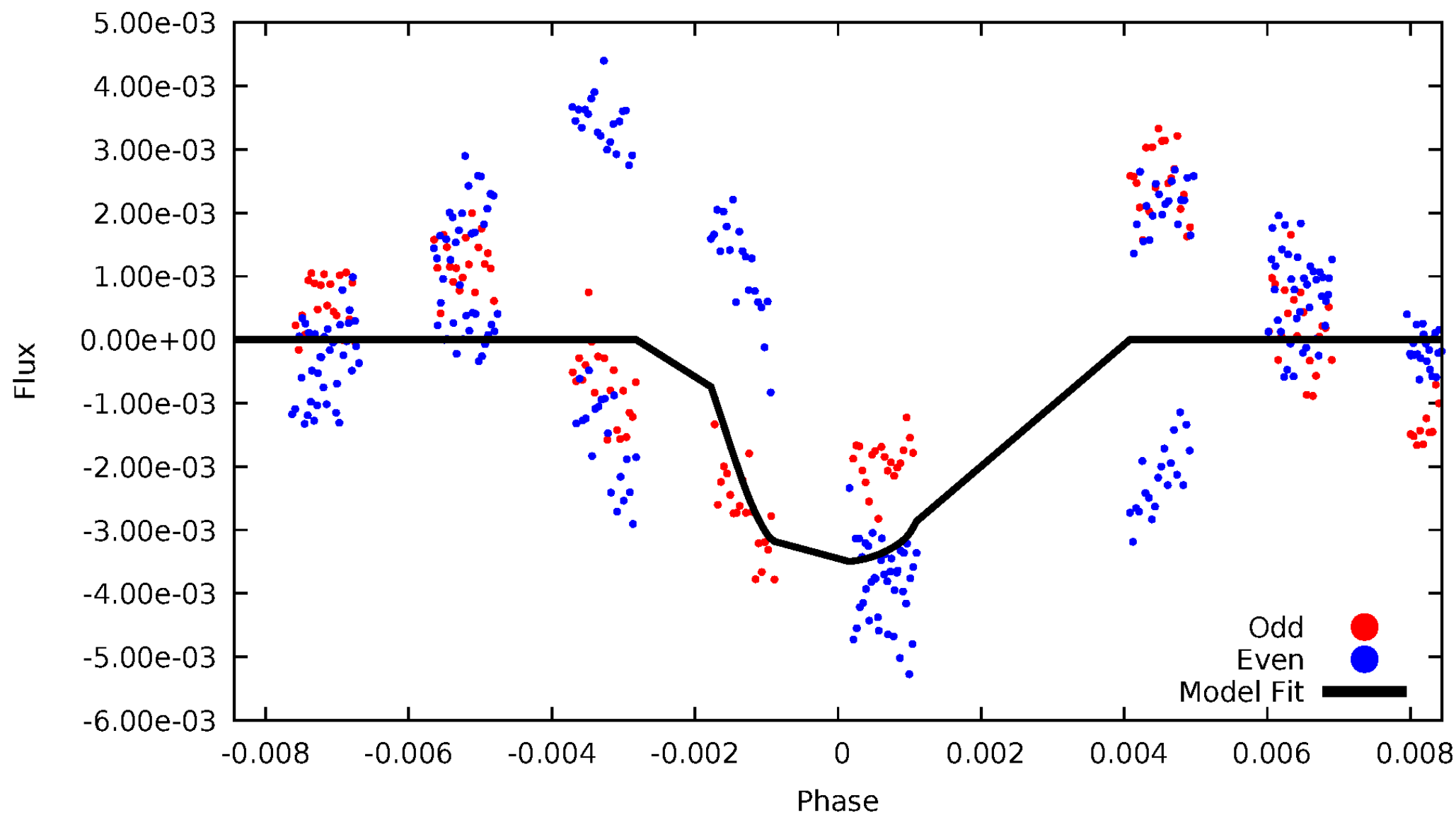


# TCE 006138551-10



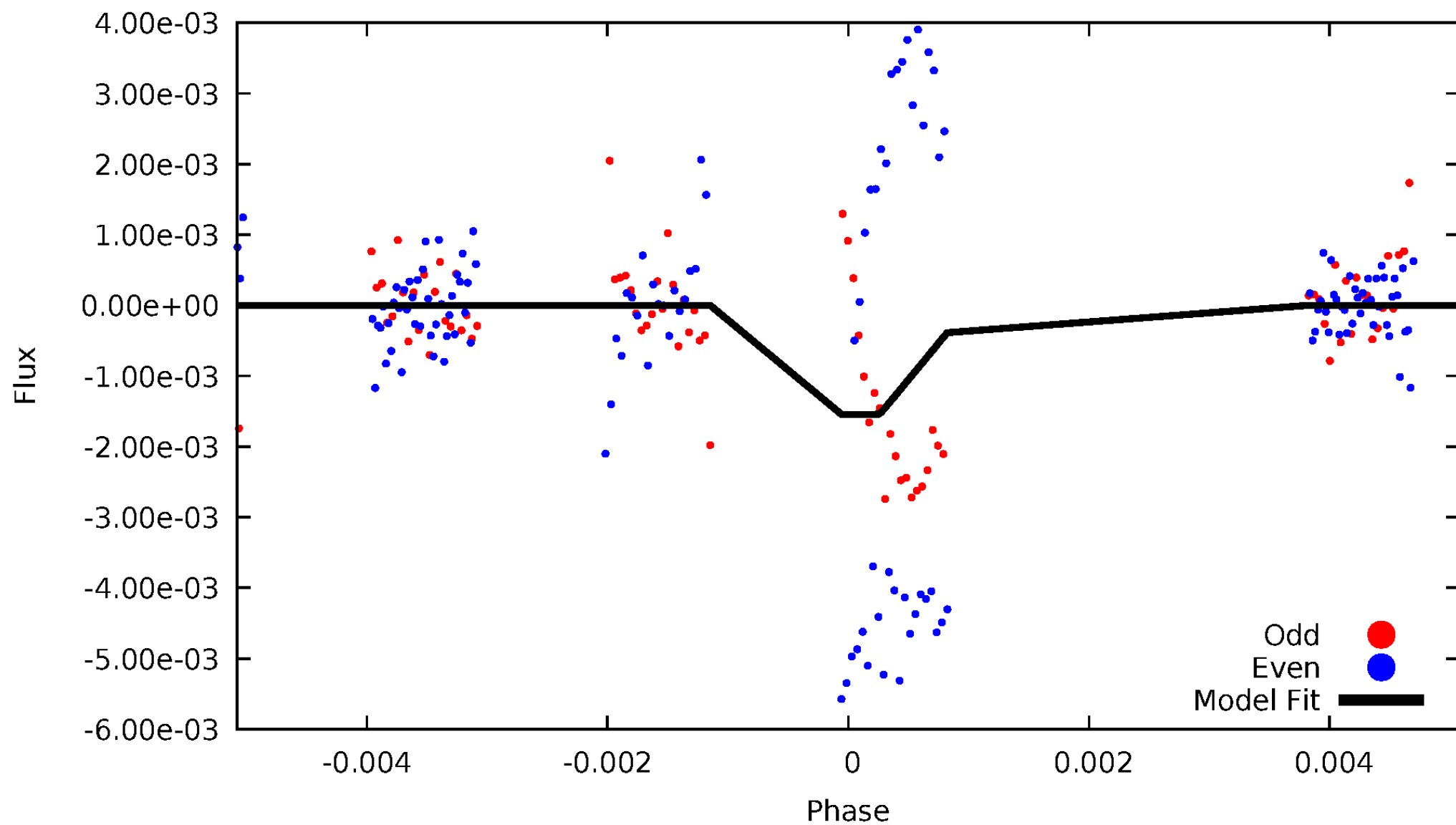
# DV Odd/Even

TCE 006138551-10



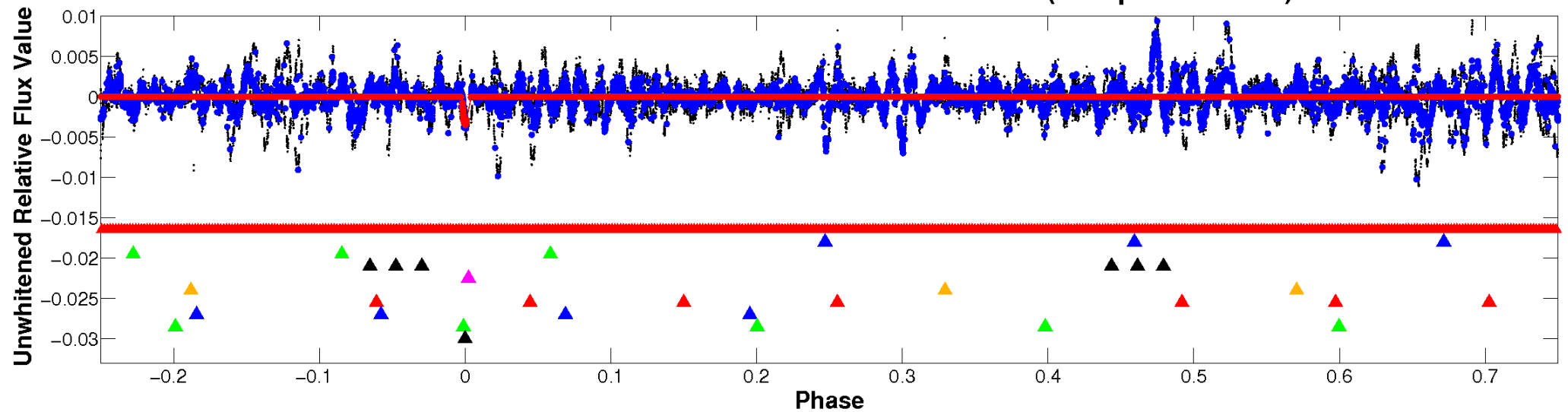
# ALT Odd/Even

TCE 006138551-10

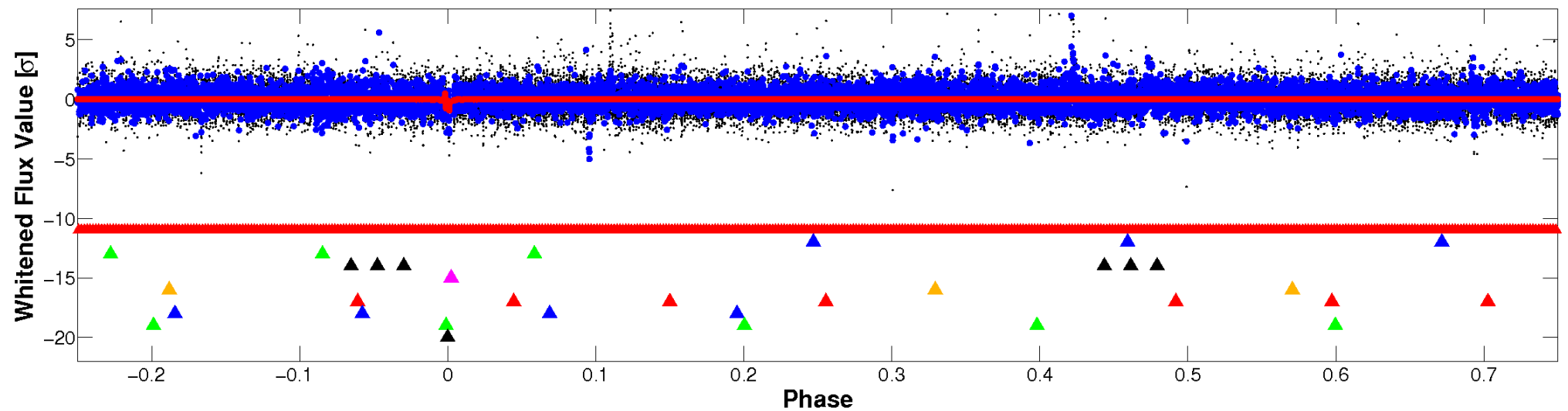


# Non-Whitened Vs. Whitened Light Curve

Planet 10 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

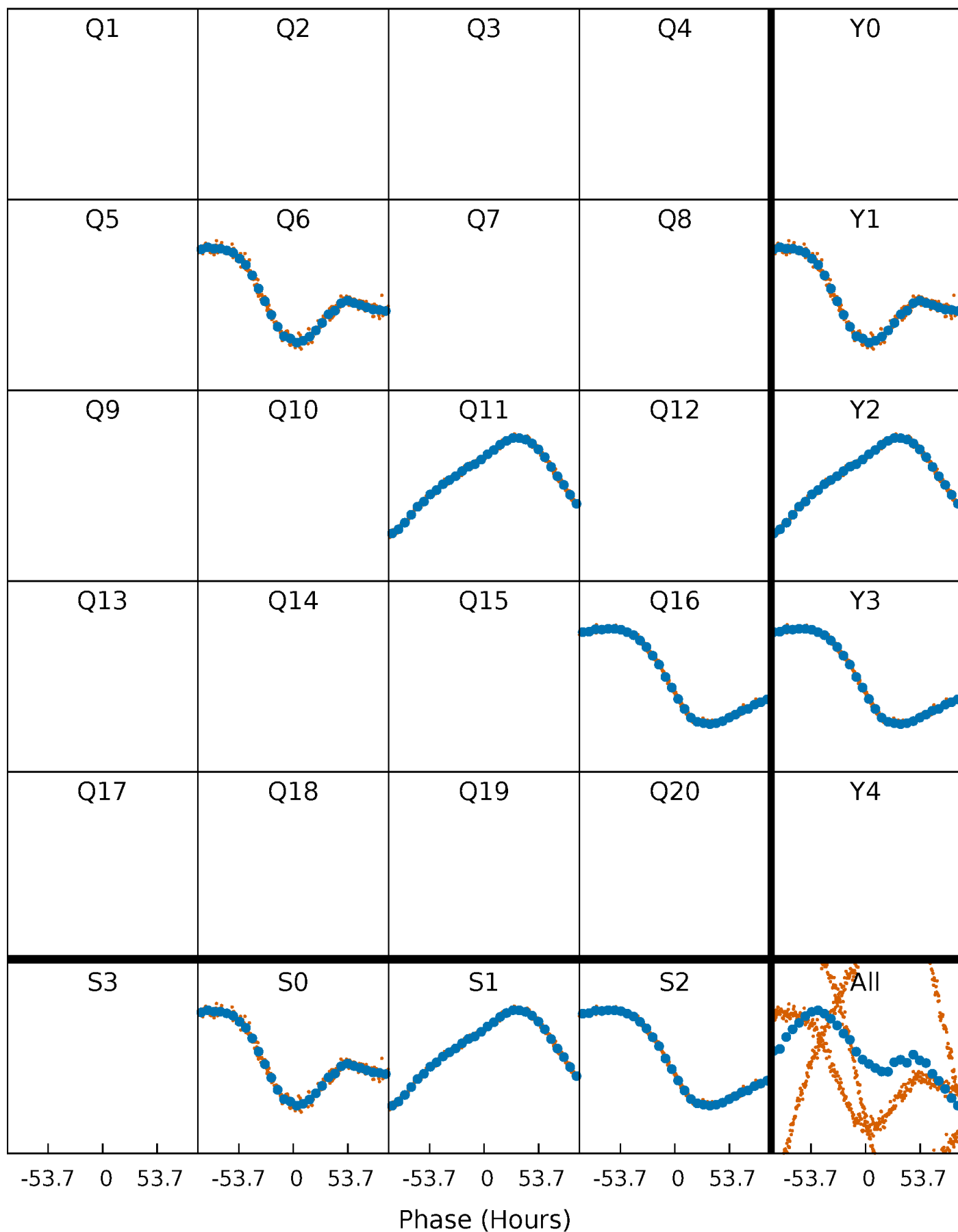


Planet 10 : Phased Whitened Flux Time Series (Fit Epoch/Period)



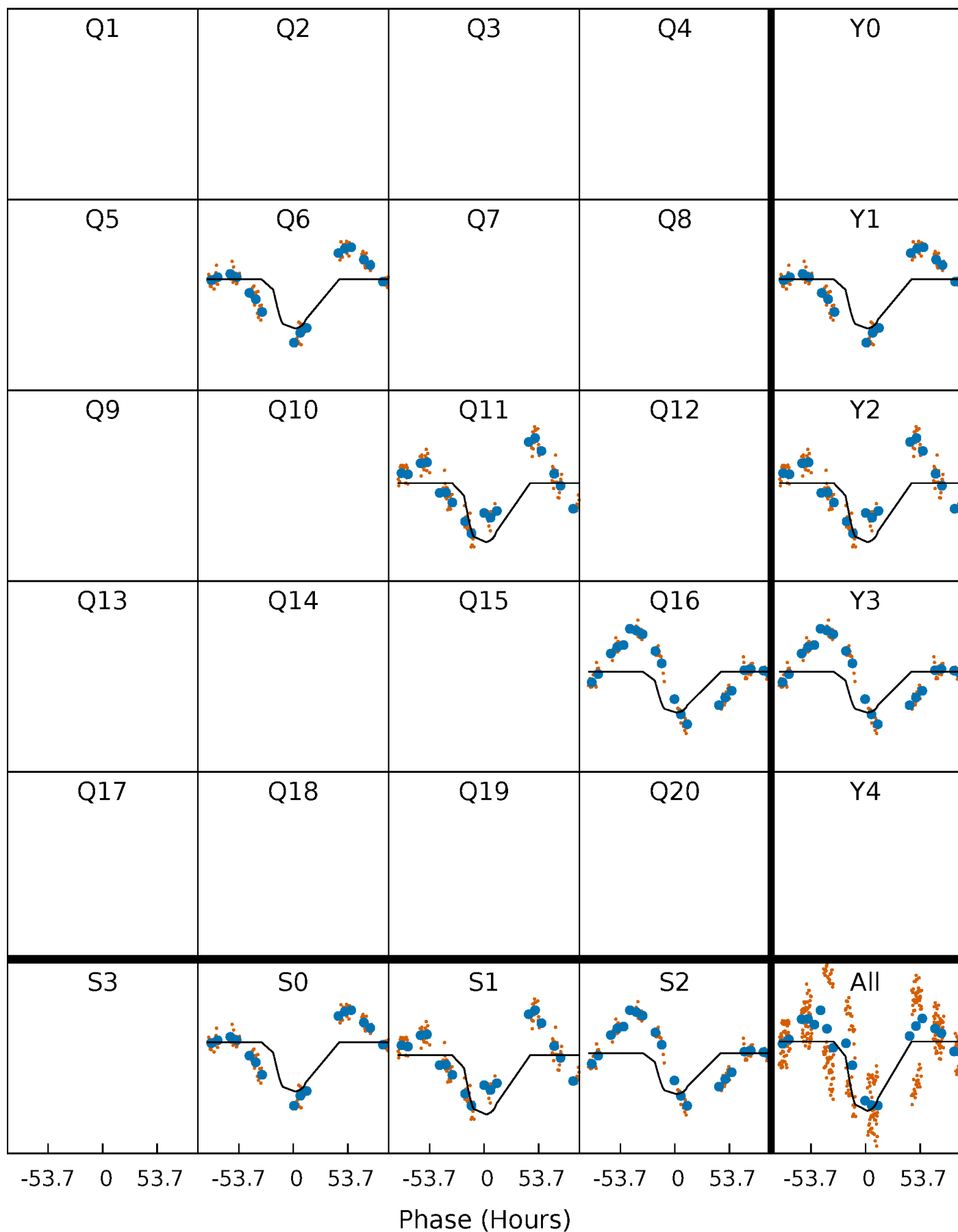
# PDC Quarter-Phased Transit Curves

TCE 006138551-10 P=464.292287 Days  $T_0=584.958197$  (BKJD)



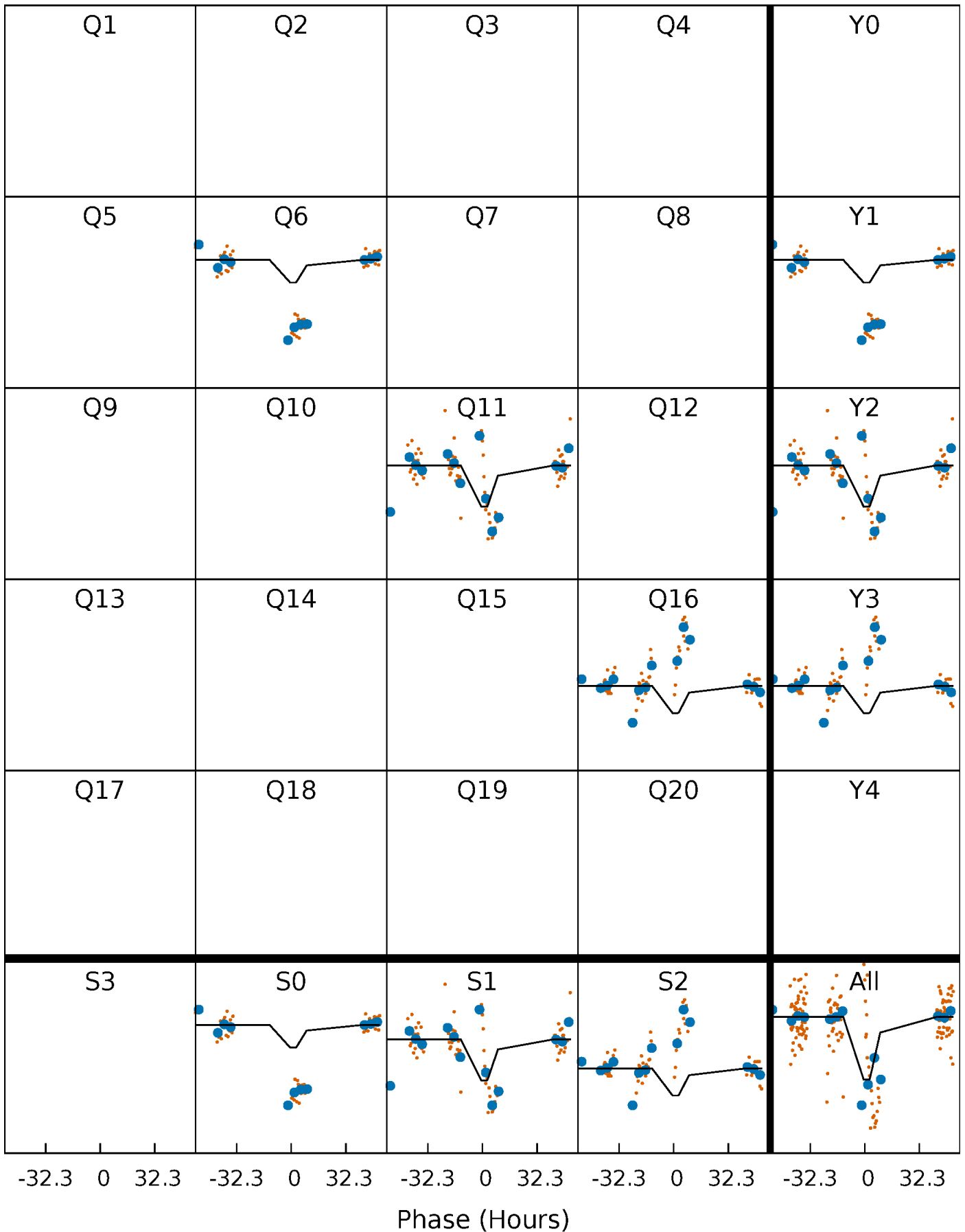
# DV Quarter-Phased Transit Curves

TCE 006138551-10 P=464.292287 Days  $T_0=584.958197$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

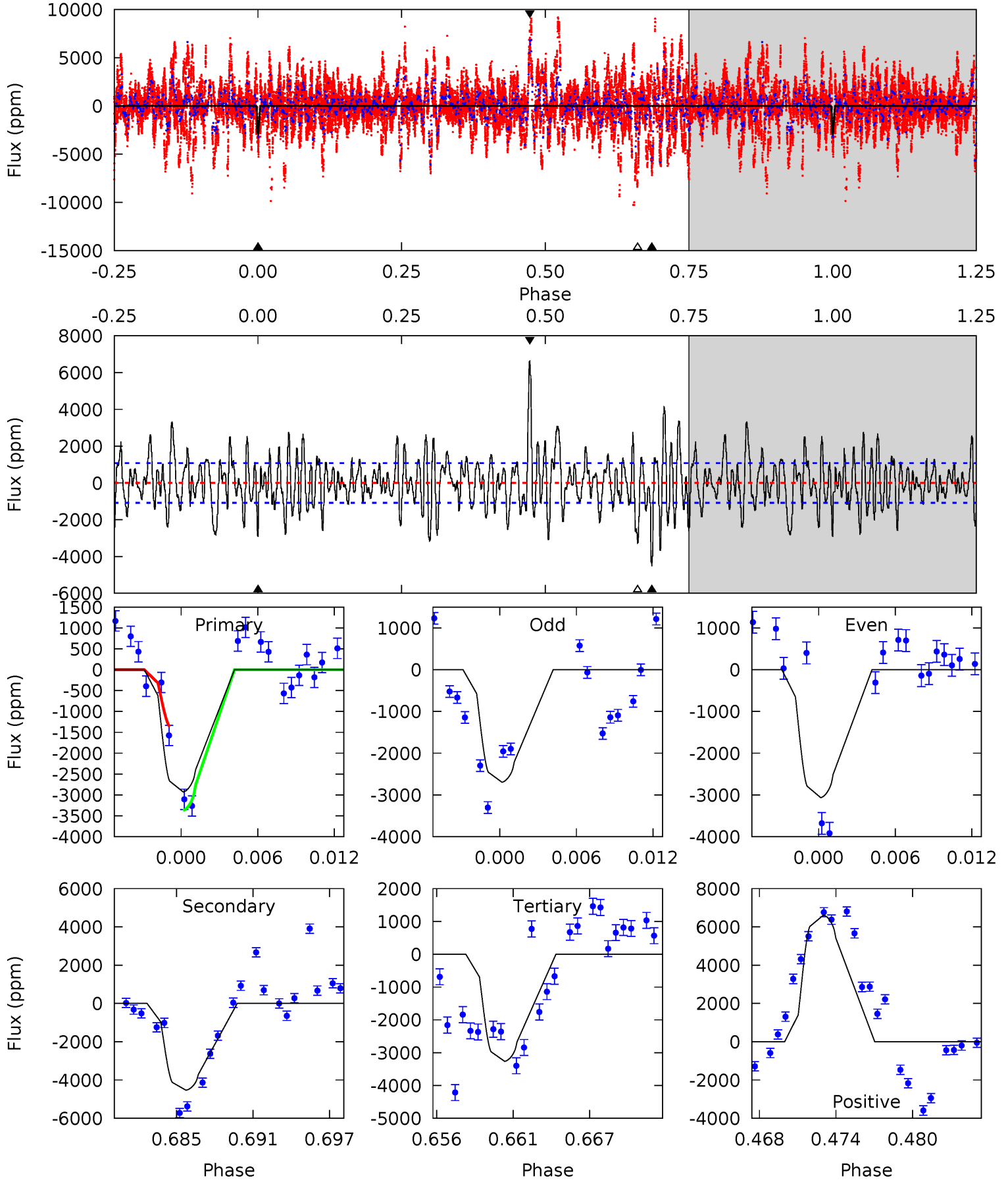
TCE 006138551-10 P=464.284539 Days  $T_0=585.085732$  (BKJD)



# DV Model-Shift Uniqueness Test

006138551-10, P = 464.292287 Days, E = 120.665910 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.9	21.5	15.5	31.4	5.13	2.76	5.93	-1.59	-17.5	6.02	-9.88	0.84	1.12	0.59	4.53

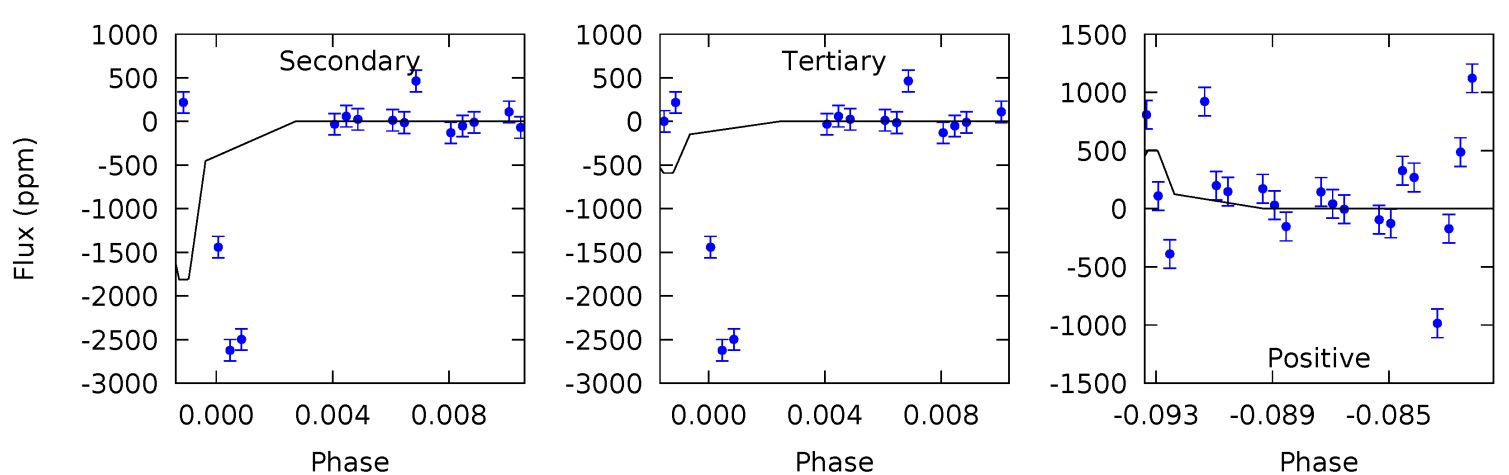
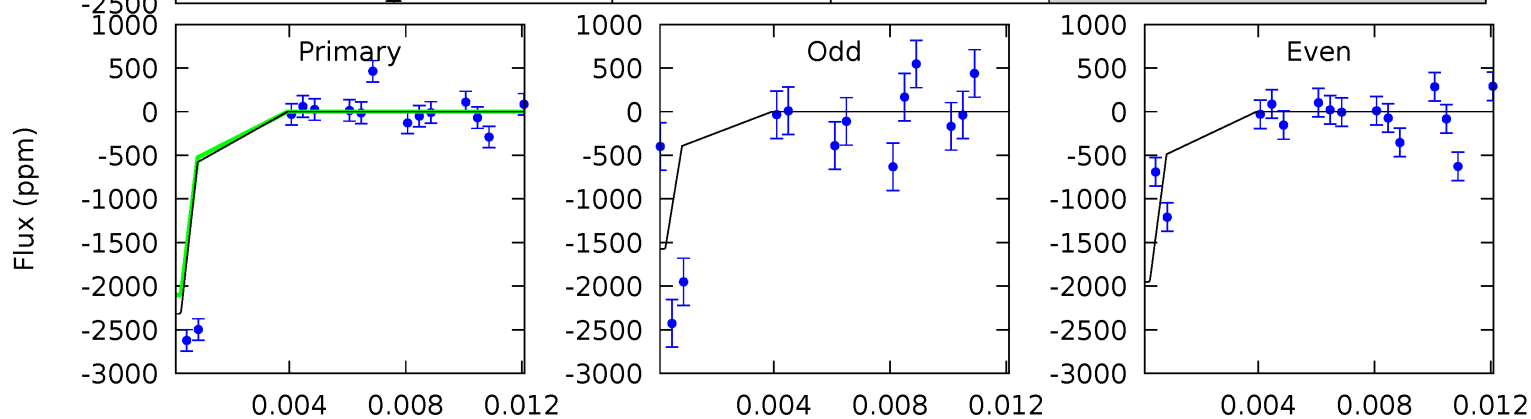
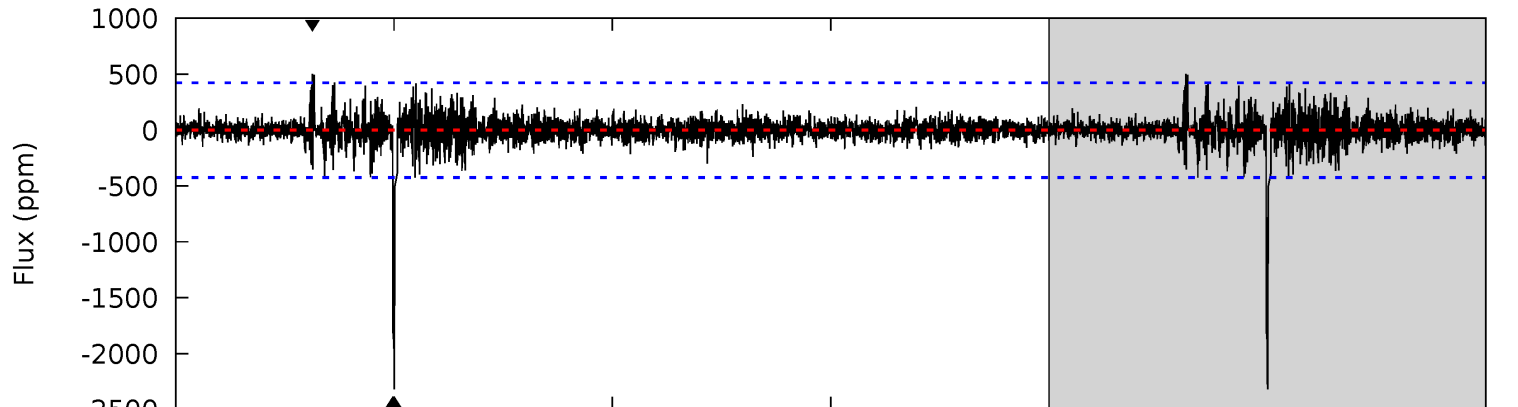
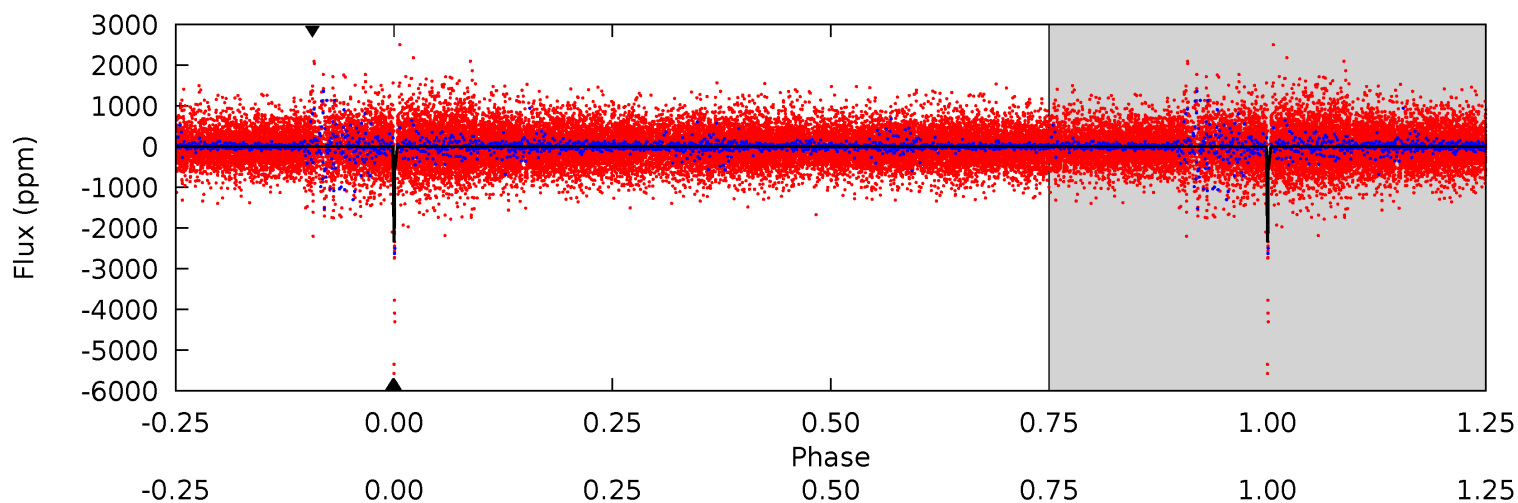




# Alt Model-Shift Uniqueness Test

006138551-10, P = 464.284539 Days, E = 120.801193 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
28.5	22.3	7.26	6.16	5.20	2.89	0.94	21.2	22.3	15.0	16.1	3.27	0.94	0.18	0.58



### Stellar Parameters For KIC 006138551

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$4987^{+151}_{-136}$	$4.579^{+0.045}_{-0.050}$	$-0.100^{+0.300}_{-0.300}$	$0.741^{+0.071}_{-0.065}$	$0.760^{+0.078}_{-0.064}$	$2.633^{+0.538}_{-0.491}$
	+3%/-3%	+1%/-1%	+300%/-300%	+10%/-9%	+10%/-8%	+20%/-19%
Source	PHO1	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 006138551-10 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-4534 \pm 211$	$5.35^{+1.37}_{-1.19}$	$256^{+9}_{-8}$	$5043^{+638}_{-444}$	$100909^{+68422}_{-35755}$
Alt.	$-1812 \pm 81$	$3.16^{+1.26}_{-1.25}$	$257^{+9}_{-10}$	$5155^{+1392}_{-641}$	$113948^{+191346}_{-55790}$

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

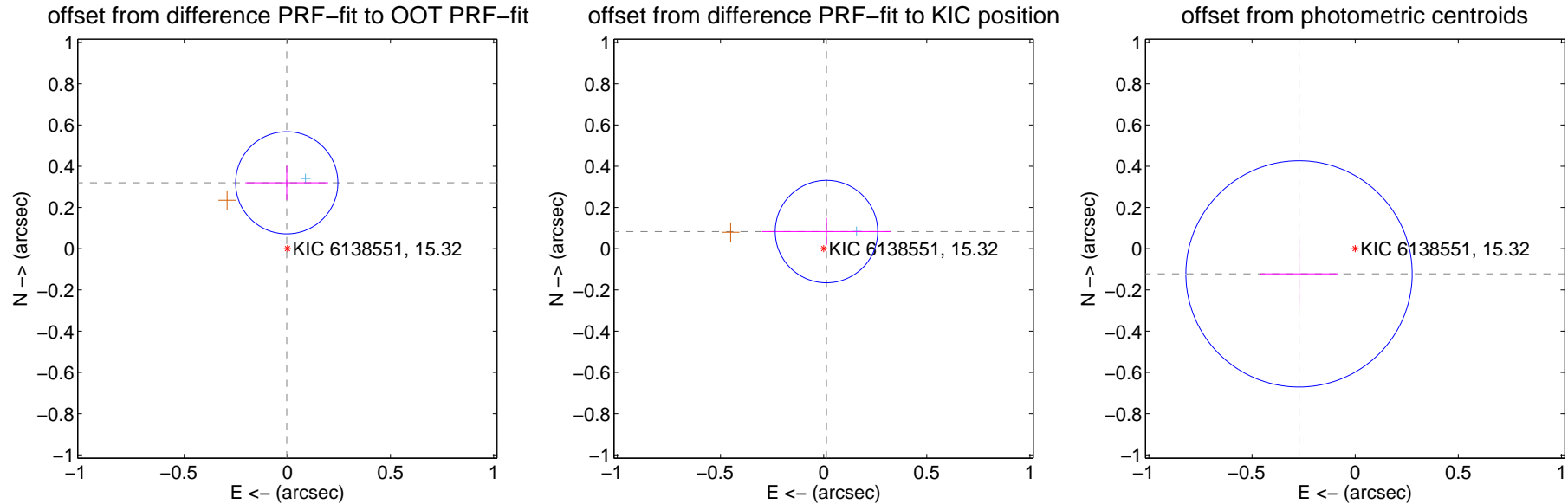
## DV Centroid Data

Supplemental centroid analysis for 006138551-10. Kepler magnitude: 15.32. Transit SNR 5.41

There are 1 quarters with good PRF difference image offsets

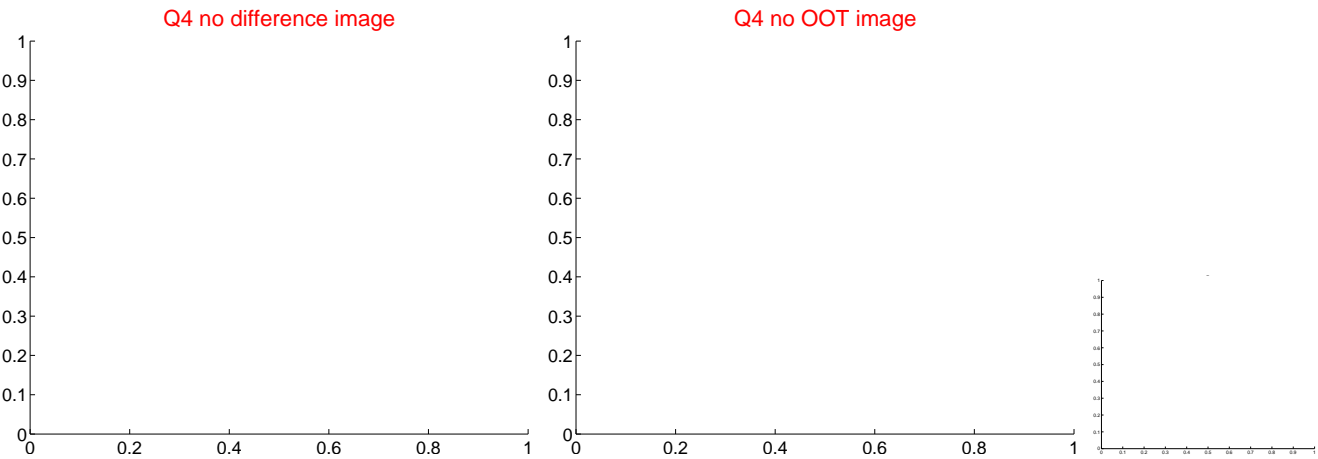
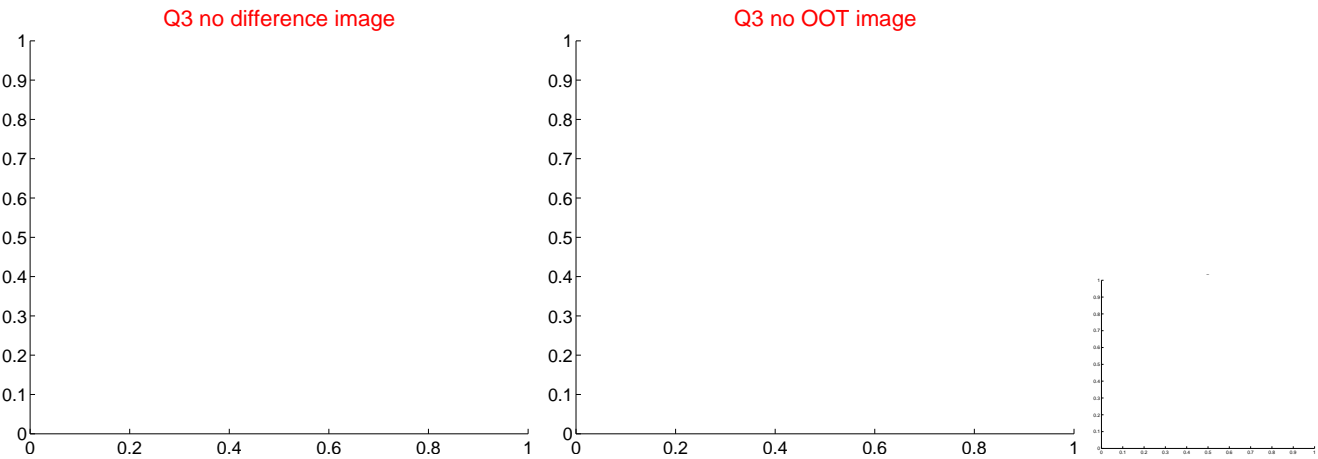
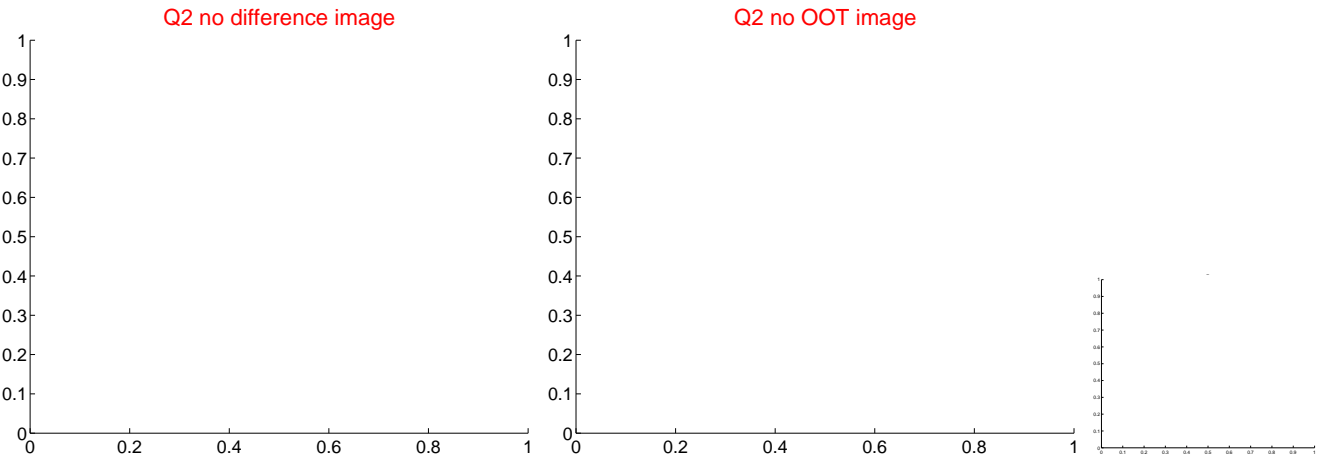
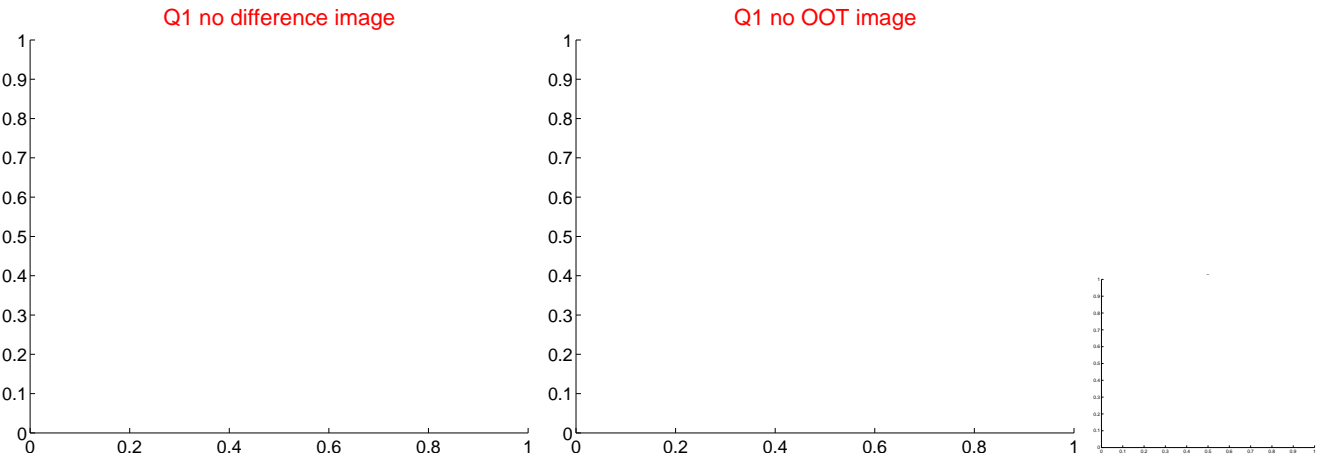
The direct PRF centroid is offset from the target star catalog position by about 0.22 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.319 \pm 0.083$	3.87	$0.003 \pm 0.201$	$0.319 \pm 0.083$
PRF-fit source offset from KIC position	$0.084 \pm 0.083$	1.02	$-0.014 \pm 0.311$	$0.083 \pm 0.067$
photometric centroid source offset	$0.30 \pm 0.18$	1.63	$0.27 \pm 0.19$	$-0.12 \pm 0.16$

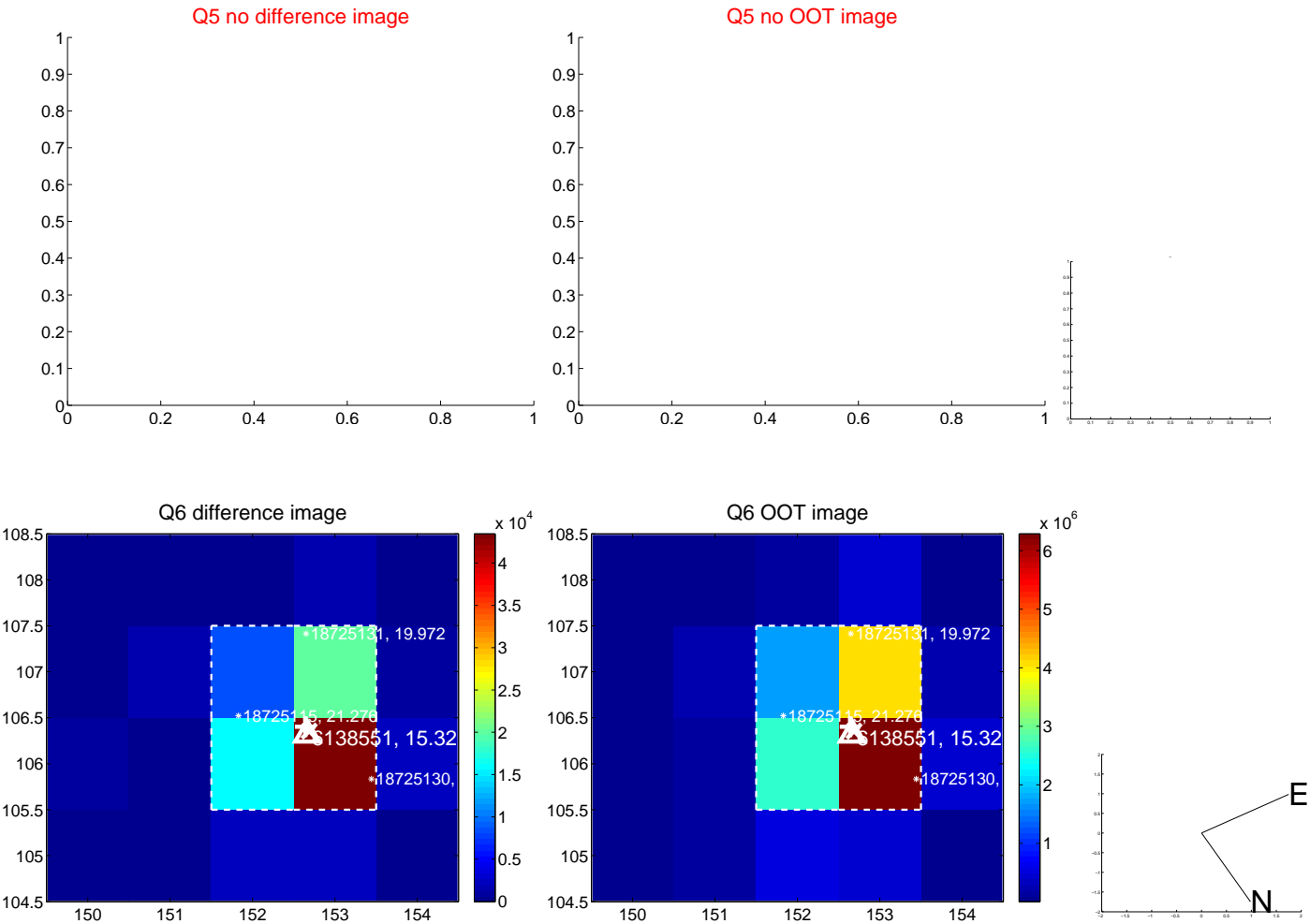


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

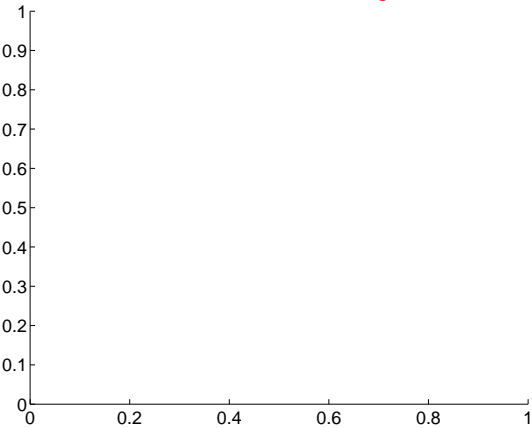
Q9 no difference image



Q9 no OOT image



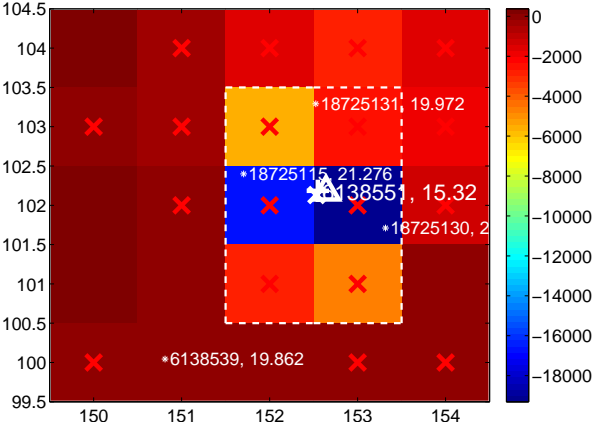
Q10 no difference image



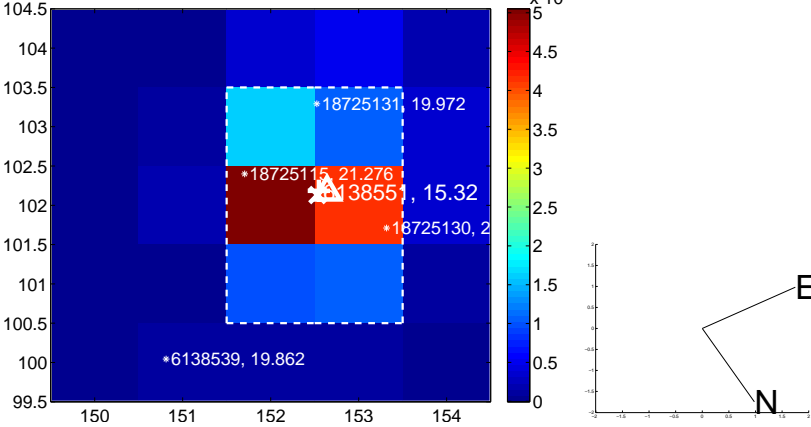
Q10 no OOT image



Q11 difference image. Poor Quality



Q11 OOT image



Q12 no difference image



Q12 no OOT image

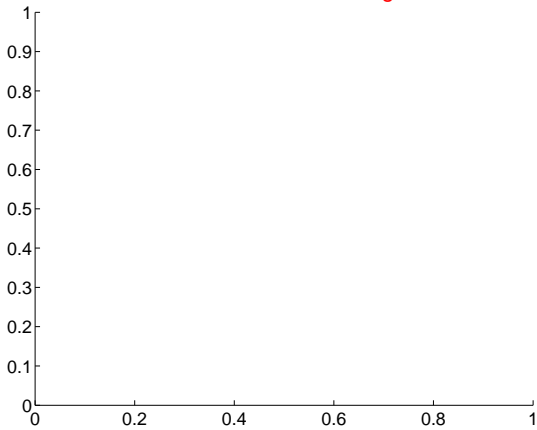


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

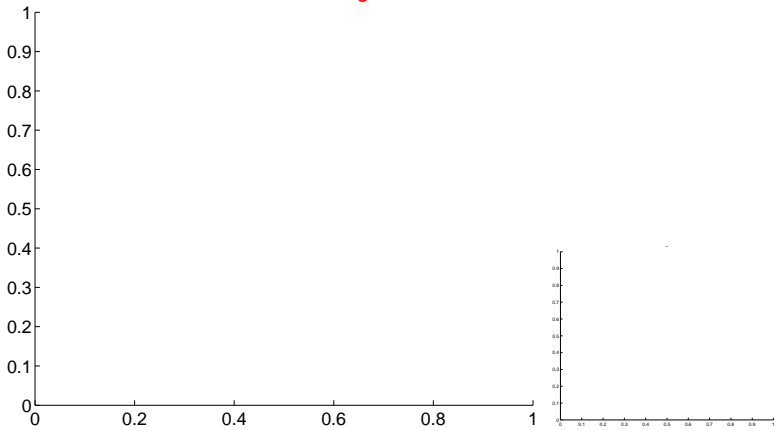


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

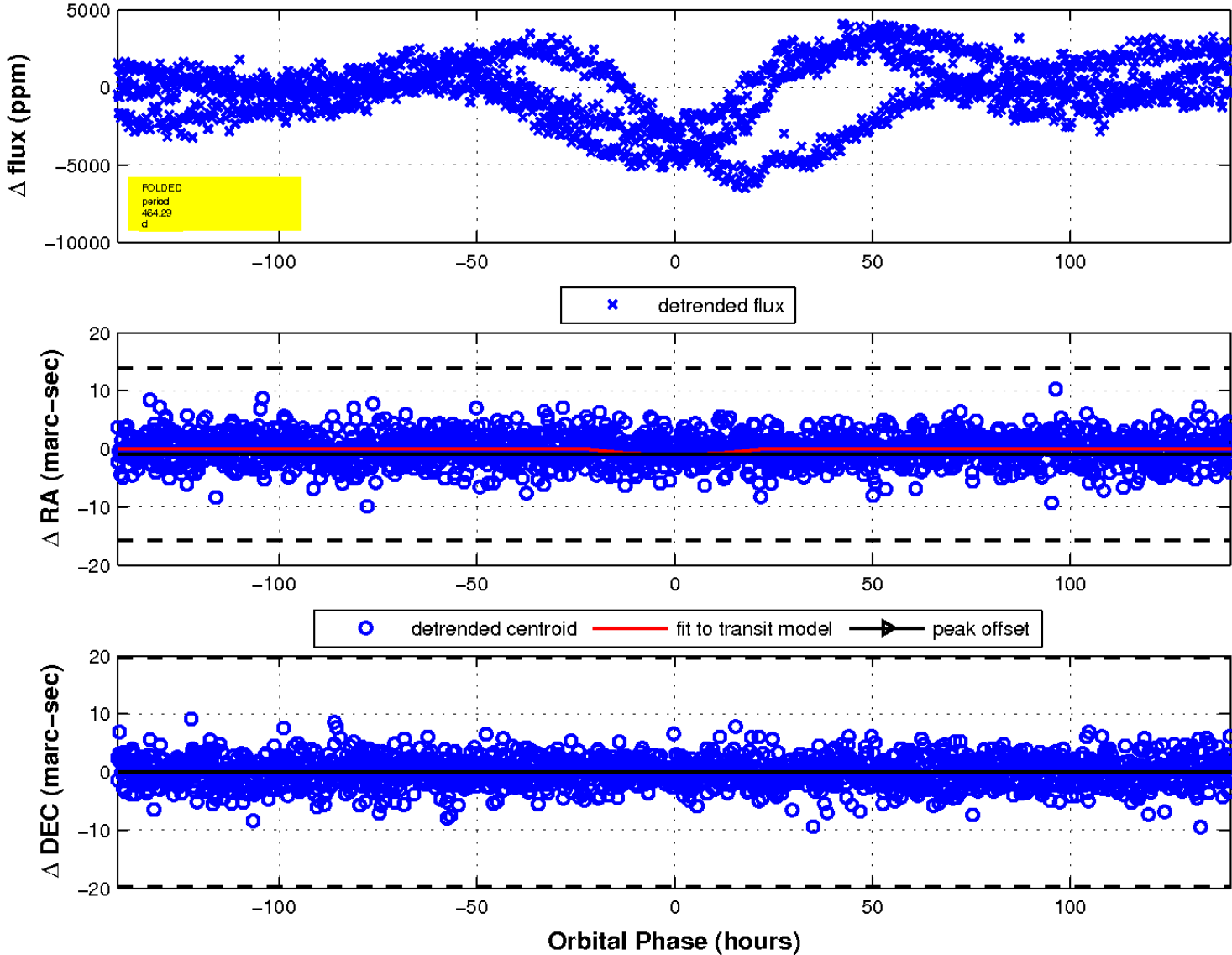
Q17 no difference image



Q17 no OOT image



fluxWeightedCentroids, Planet 10 of 10





UKIRT Image

Declination

