

# KIC 008957218

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008957218-01	OBS	No	440.908335	154.829795	516.2	8.318	18.7	7.9	1.61	5477	4.64	1.80
008957218-02	OBS	No	458.416275	285.917787	514.7	3.164	15.9	8.7	1.61	5477	4.52	1.71
008957218-03	OBS	No	578.350781	361.871328	461.2	5.188	14.2	7.7	1.61	5477	4.27	1.25
008957218-04	OBS	No	658.130956	191.906115	361.9	3.295	15.0	6.0	1.61	5477	3.18	1.05
008957218-05	OBS	No	543.299171	379.891554	499.2	3.676	15.7	8.8	1.61	5477	3.78	1.36
008957218-06	OBS	No	483.183255	364.740726	419.4	5.346	15.2	7.1	1.61	5477	4.07	1.59
008957218-07	OBS	No	342.600741	136.217524	373.4	3.500	13.3	-1.0	1.61	5477	3.07	2.52

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008957218-01	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_MARSHALL_ZUMA—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
008957218-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV
008957218-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
008957218-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
008957218-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV
008957218-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
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**Notes:** OBS = Observed. INJ = Injected. INV = Inverted. SCR = Scrambled.

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

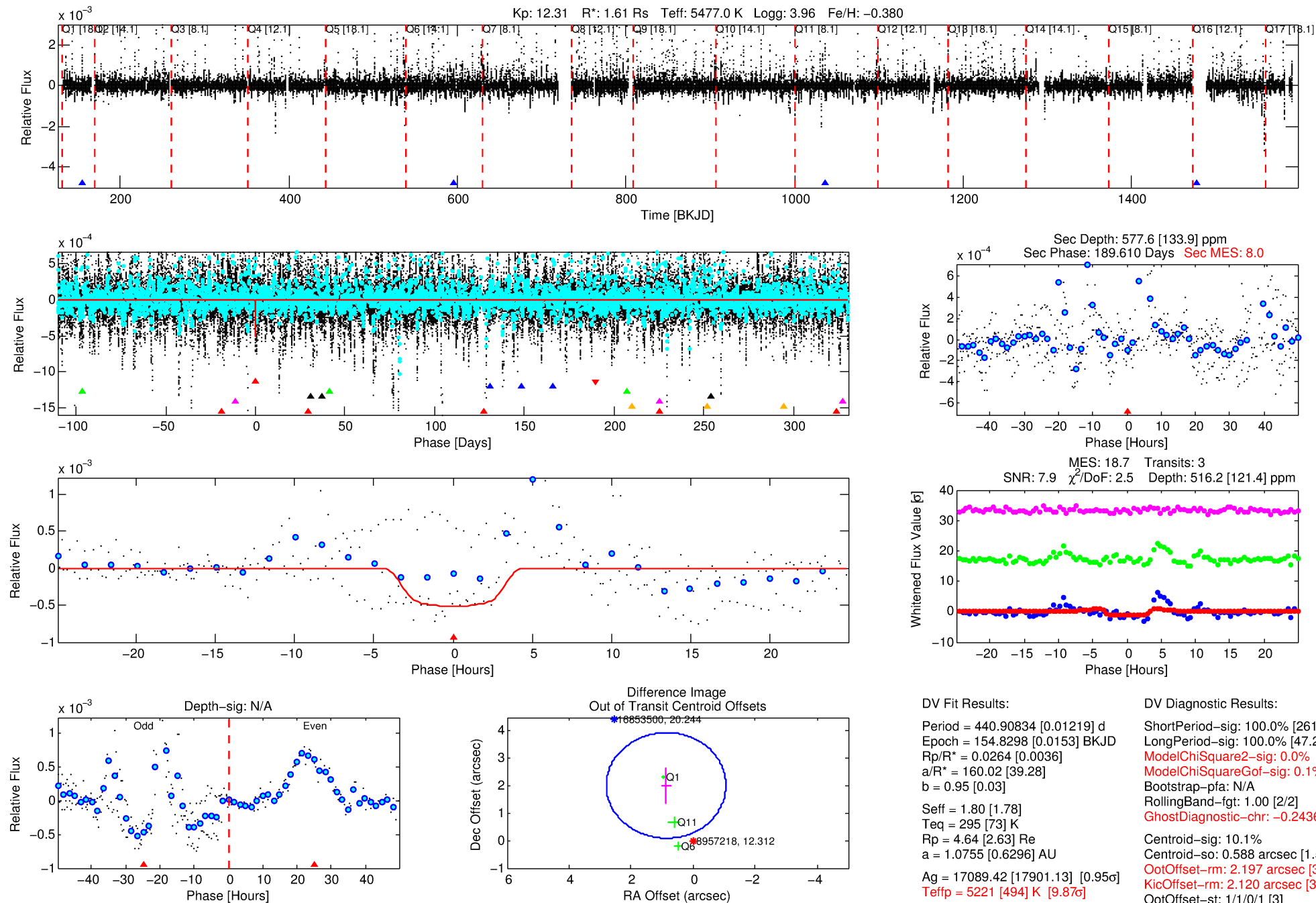
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 008957218-01

No Significant Match Found

# DV One-Page Summary

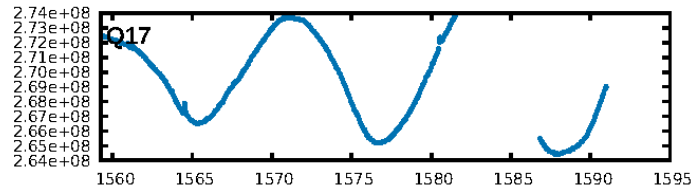
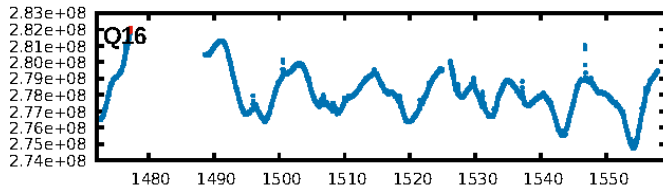
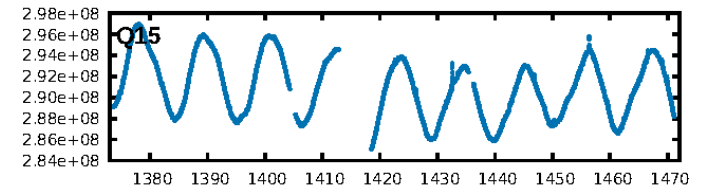
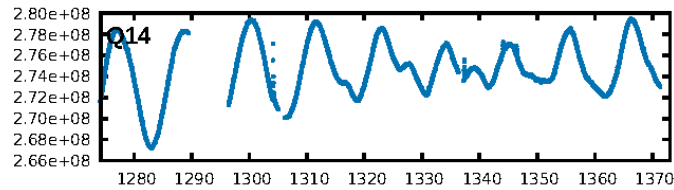
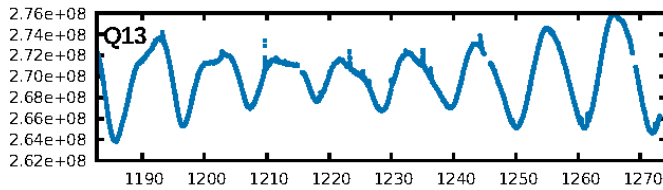
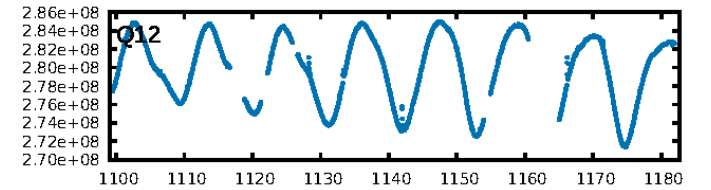
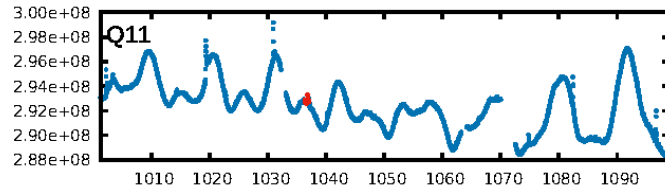
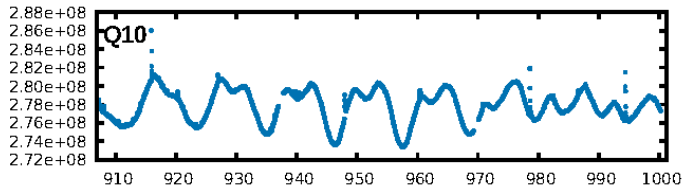
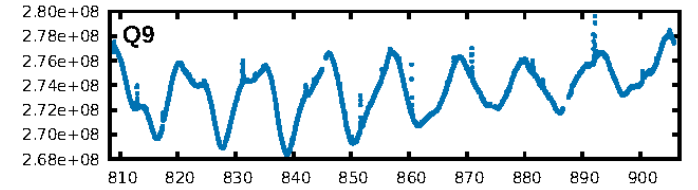
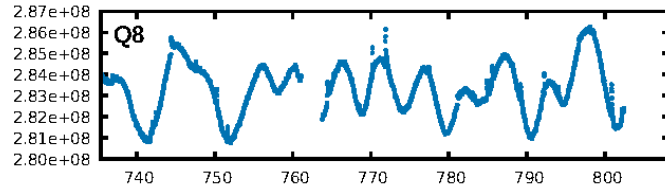
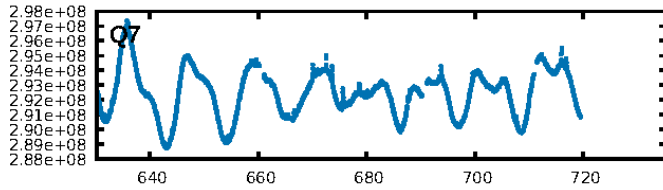
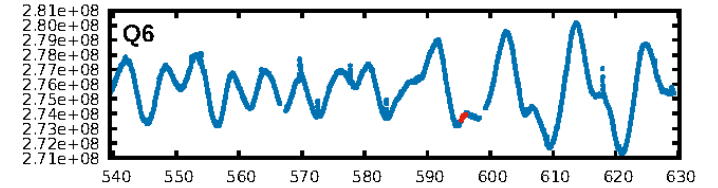
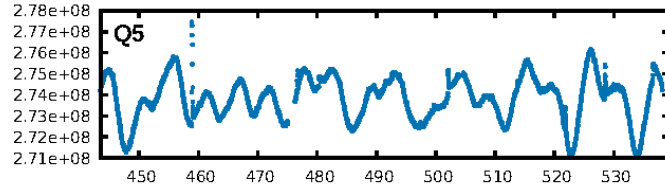
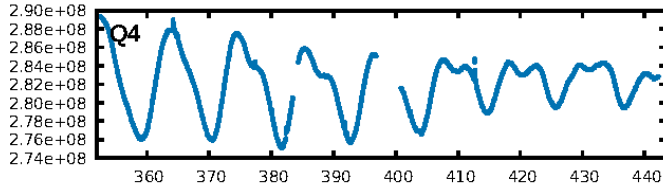
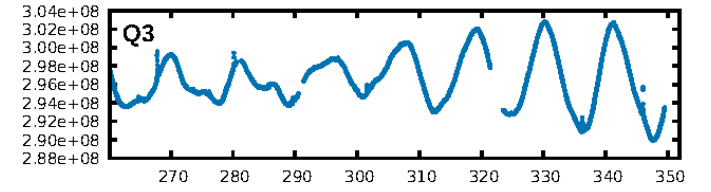
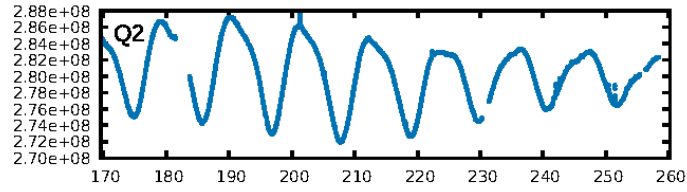
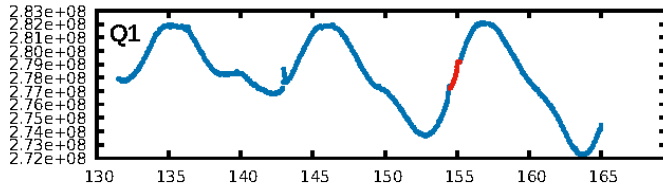
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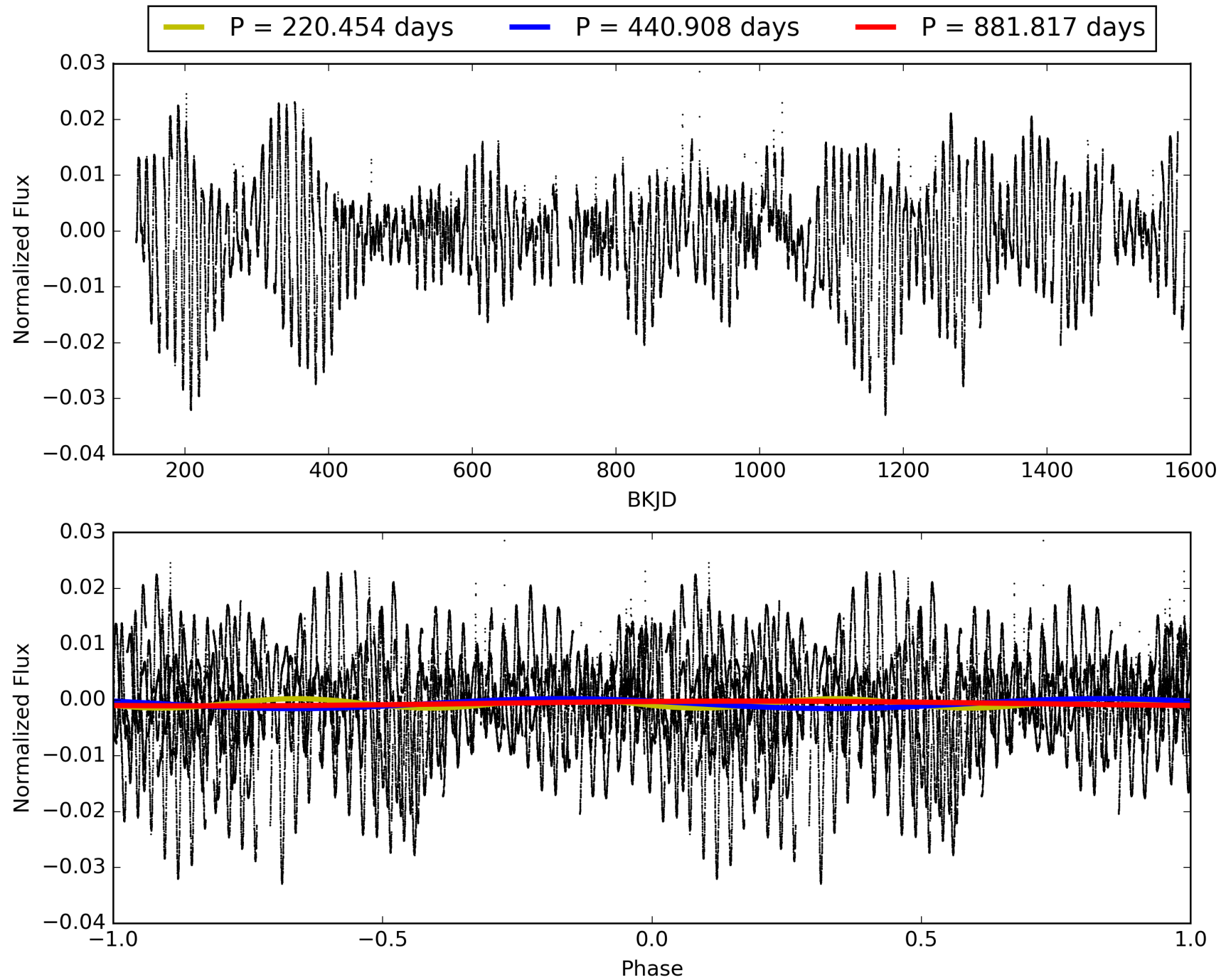
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 008957218-01, PDC Light Curves

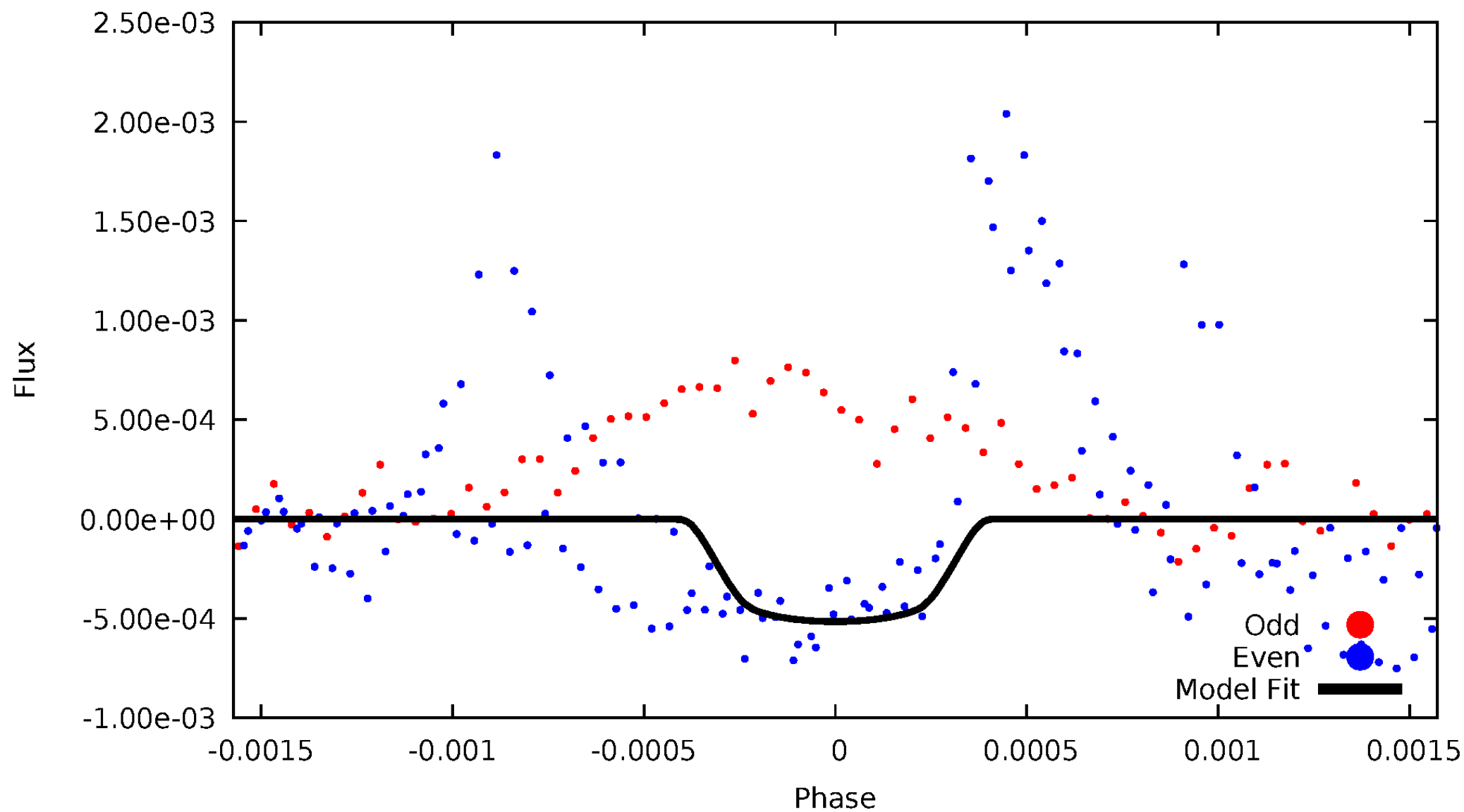


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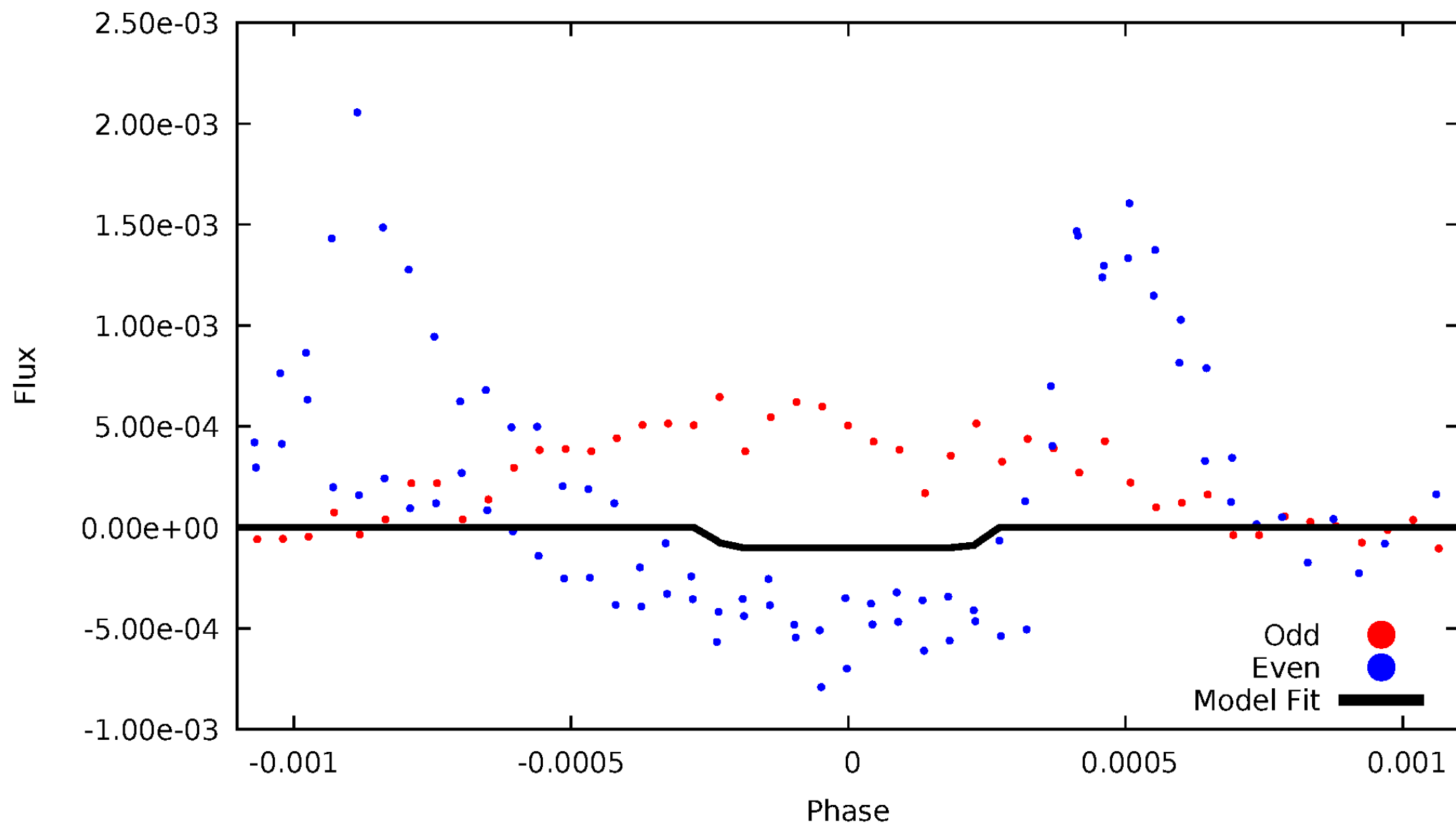
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TCE 008957218-01



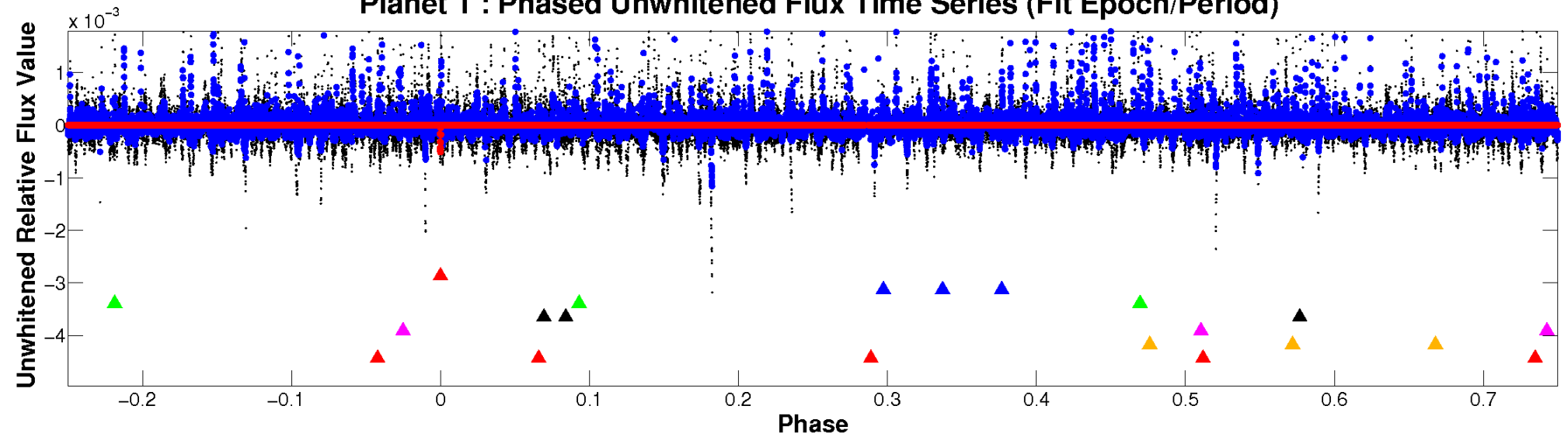
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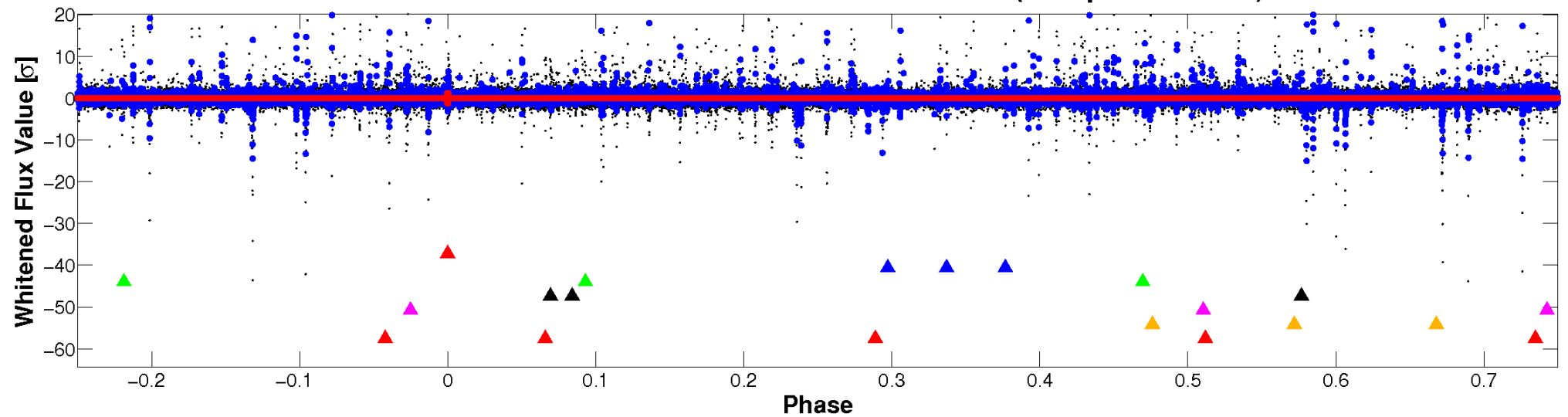


# Non-Whitened Vs. Whitened Light Curve

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

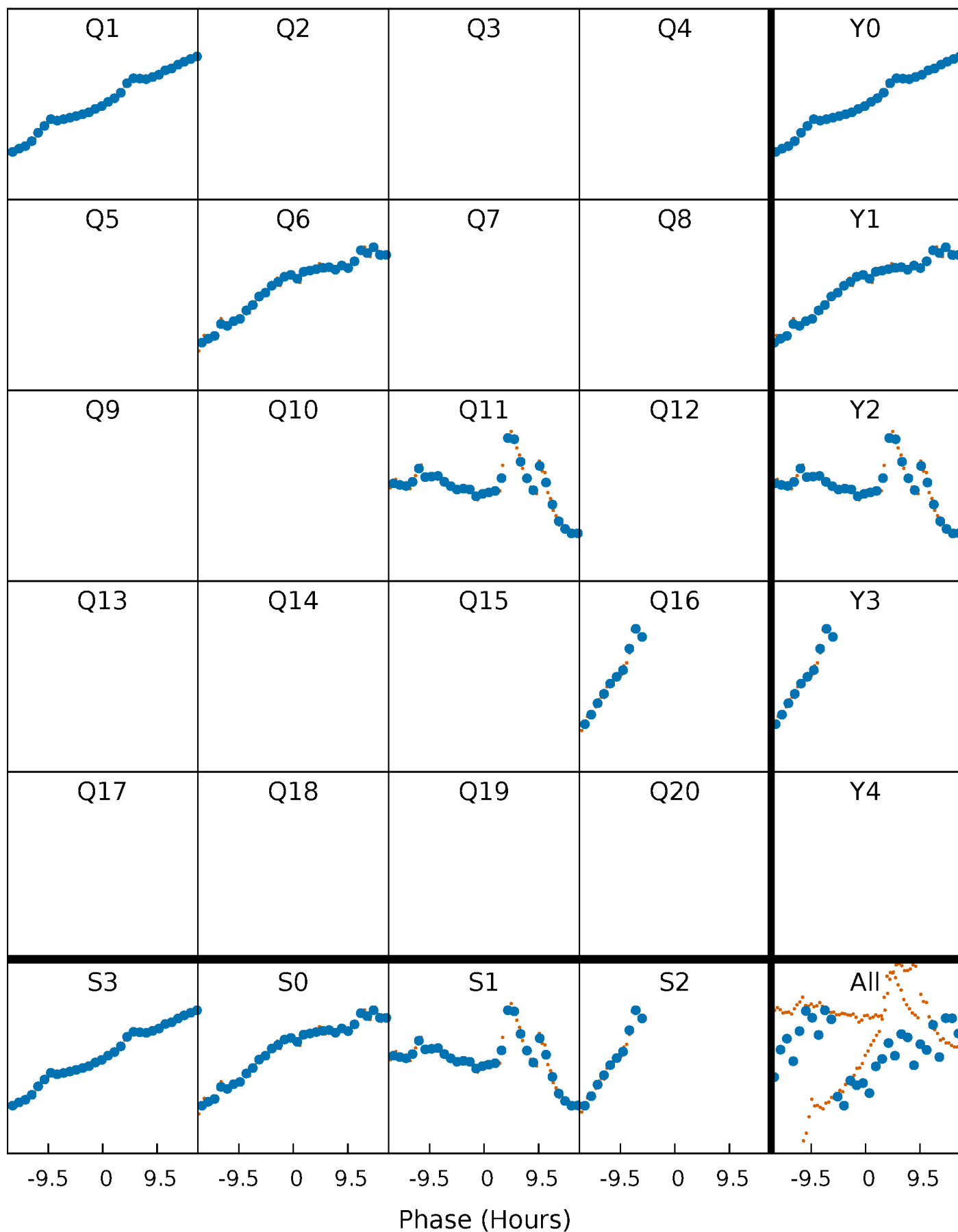


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



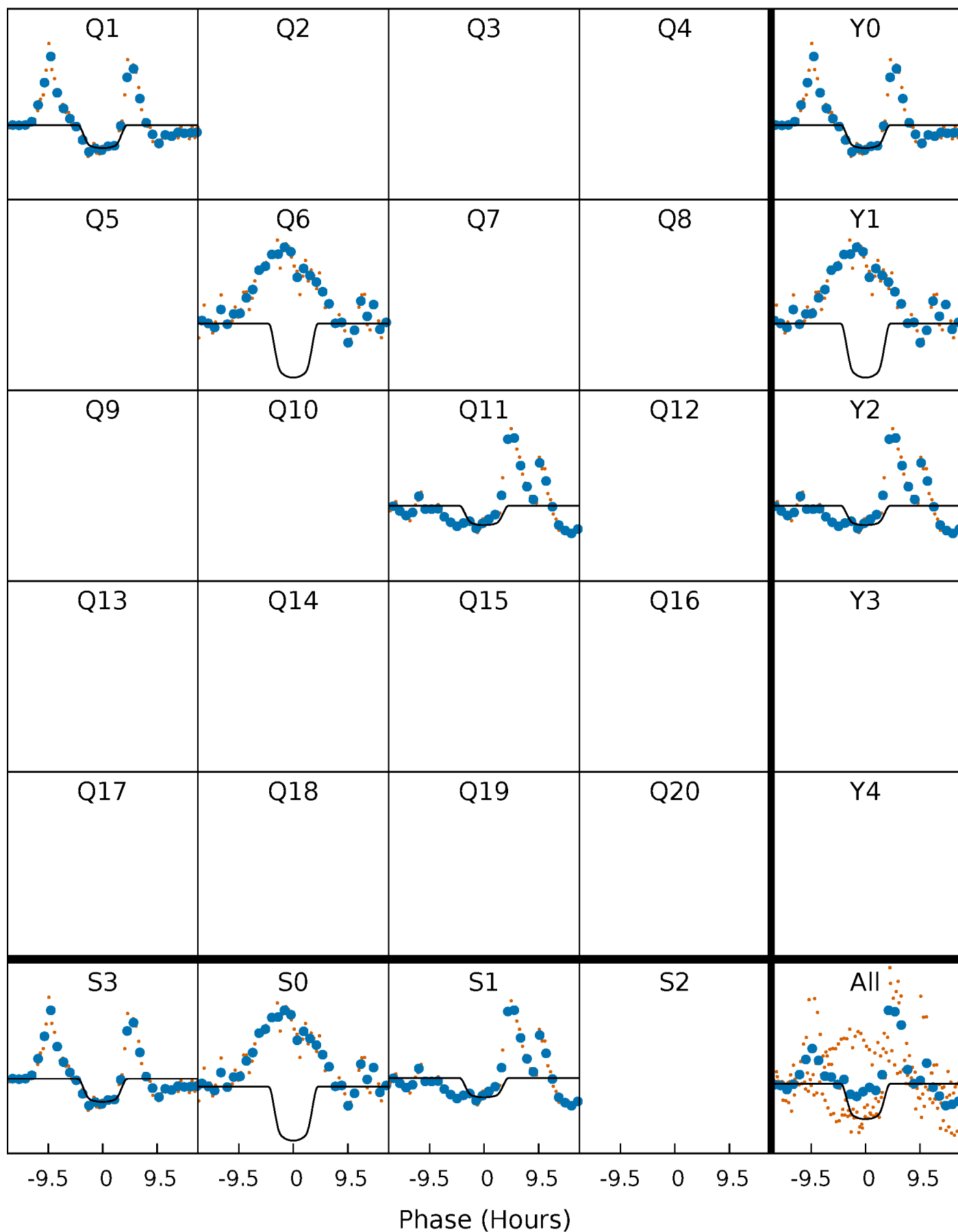
# PDC Quarter-Phased Transit Curves

TCE 008957218-01 P=440.908335 Days  $T_0=154.829795$  (BKJD)



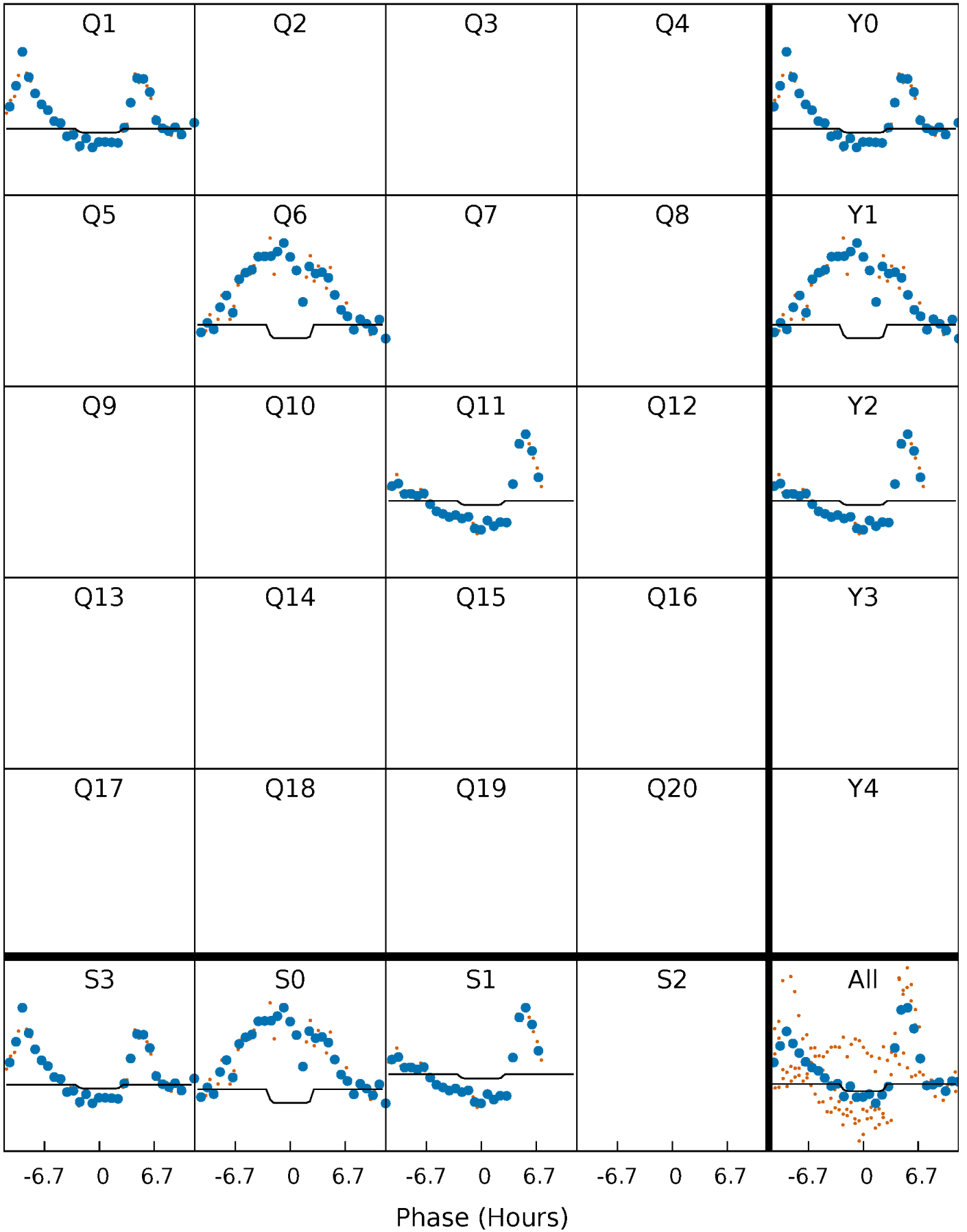
# DV Quarter-Phased Transit Curves

TCE 008957218-01 P=440.908335 Days  $T_0=154.829795$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

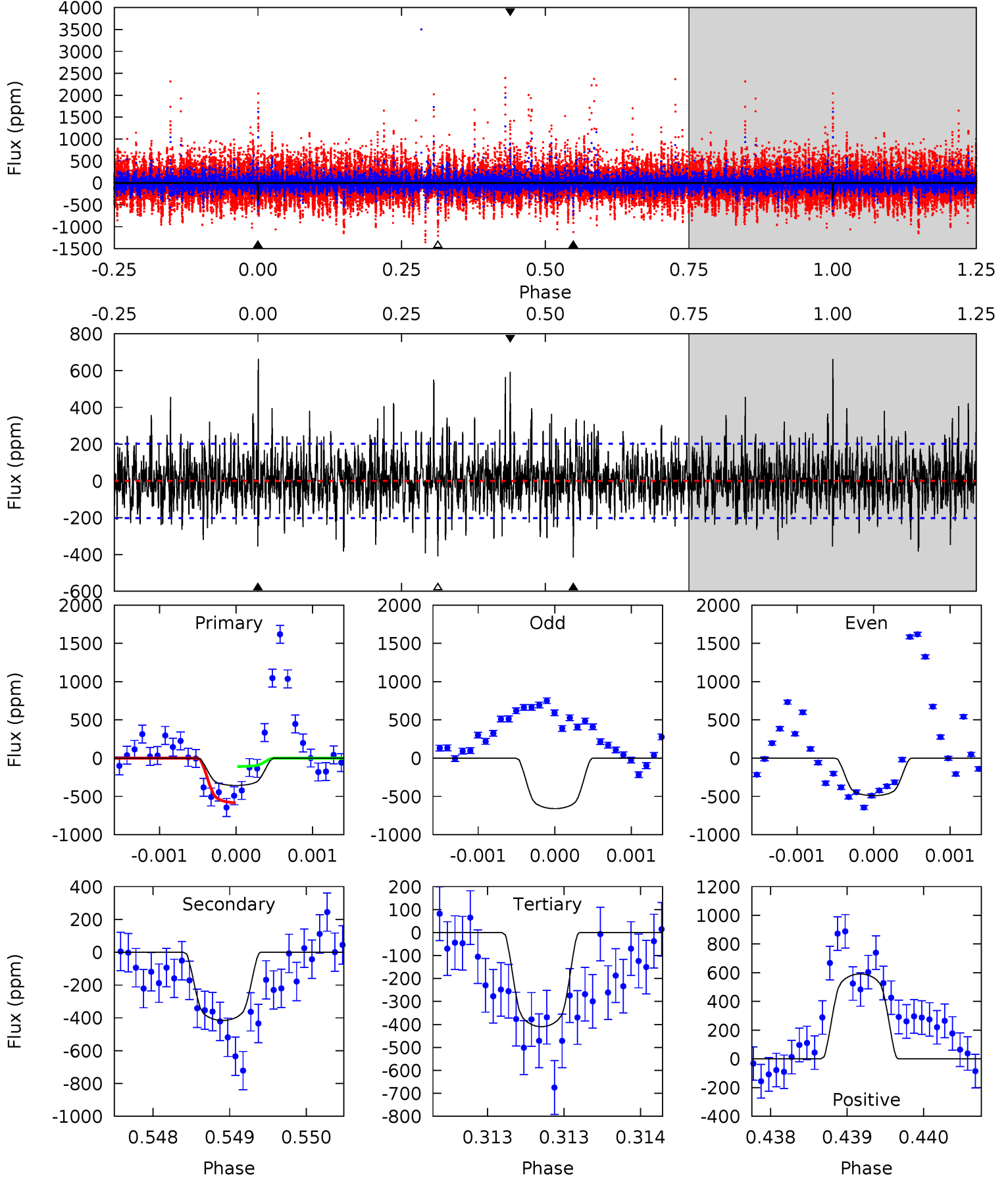
TCE 008957218-01 P=440.894924 Days  $T_0=154.830086$  (BKJD)



# DV Model-Shift Uniqueness Test

008957218-01, P = 440.908335 Days, E = 154.829795 Days

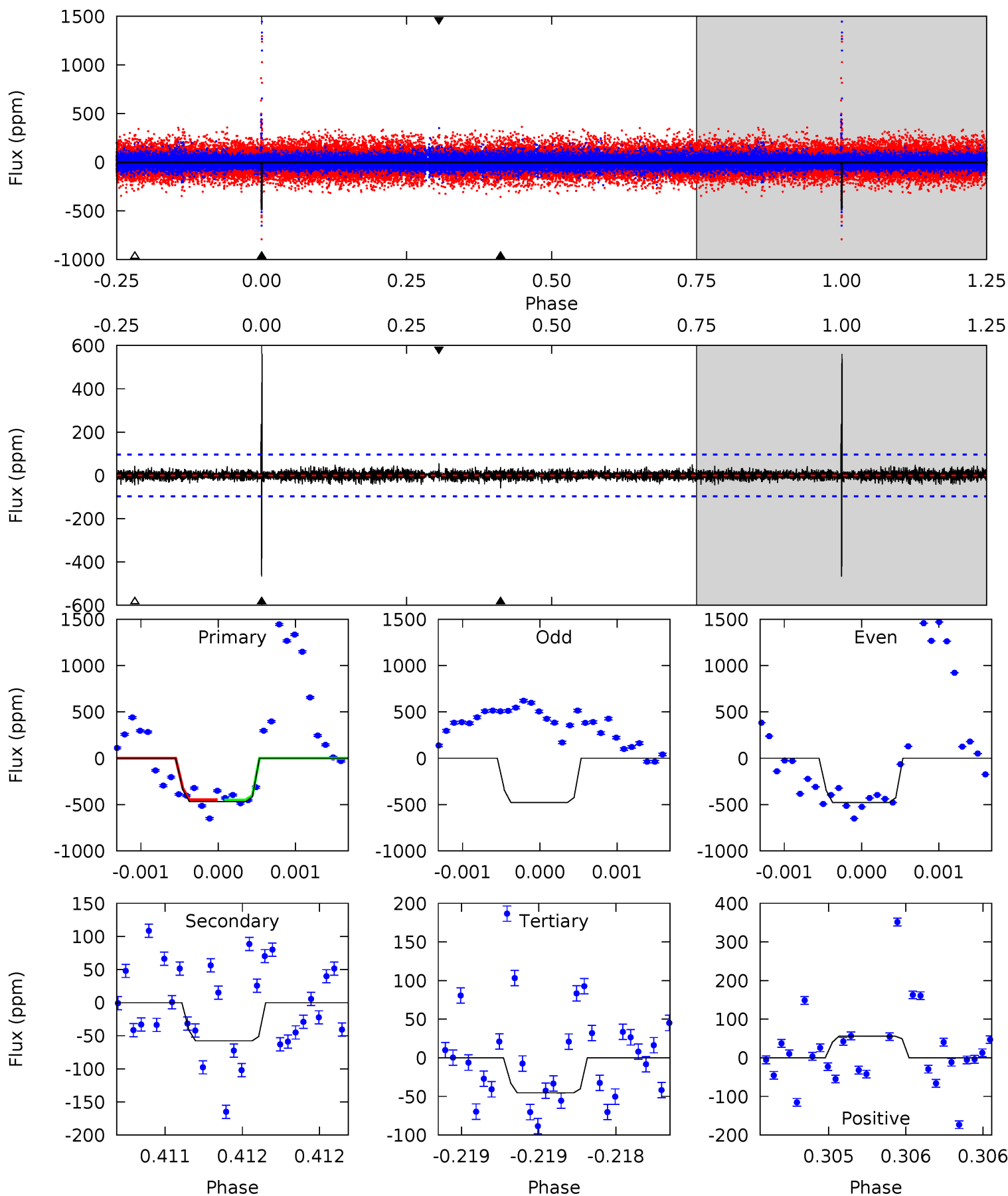
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.66	11.3	11.1	16.1	5.49	3.35	2.81	-1.45	-6.39	0.17	-4.77	1.67	0.22	0.61	6.46



# Alt Model-Shift Uniqueness Test

008957218-01, P = 440.894924 Days, E = 154.830086 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
27.0	3.34	2.62	3.22	5.57	3.48	0.73	24.4	23.8	0.73	0.12	0.00	0.40	0.55	0



### Stellar Parameters For KIC 008957218

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5477^{+164}_{-148}$	$3.957^{+0.595}_{-0.255}$	$-0.380^{+0.350}_{-0.250}$	$1.607^{+0.803}_{-0.883}$	$0.853^{+0.116}_{-0.095}$	$0.290^{+2.152}_{-0.169}$
	+3%/-3%	+15%/-6%	+92%/-66%	+50%/-55%	+14%/-11%	+743%/-58%
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 008957218-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-416 \pm 37$	$4.41^{+1.50}_{-1.34}$	$406^{+54}_{-64}$	$4907^{+348}_{-311}$	$13819^{+14040}_{-6152}$
Alt.	$-58 \pm 17$	$1.60^{+0.89}_{-0.66}$	$406^{+50}_{-60}$	$4856^{+1090}_{-632}$	$13784^{+28667}_{-8194}$

$T_{max}$  = Theoretical Maximum Planetary Temperature

$T_{obs}$  = Observed Planetary Temperature (Assuming  $A=0.3$ )

$A_{obs}$  = Observed Albedo (Assuming  $T=0$ )

If a secondary eclipse is present, the system is likely an EB if  $T_{obs} \gg T_{max}$  AND  $A_{obs} \gg 1.0$

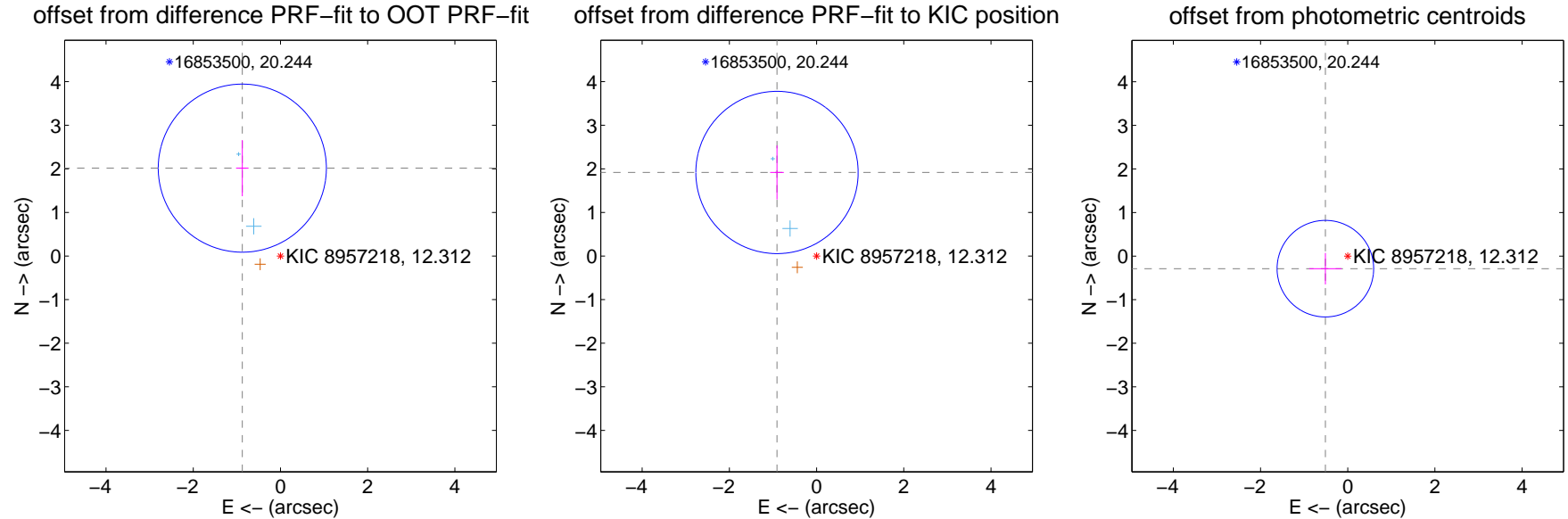
## DV Centroid Data

Supplemental centroid analysis for 008957218-01. Kepler magnitude: 12.31. Transit SNR 7.92

There are 2 quarters with good PRF difference image offsets

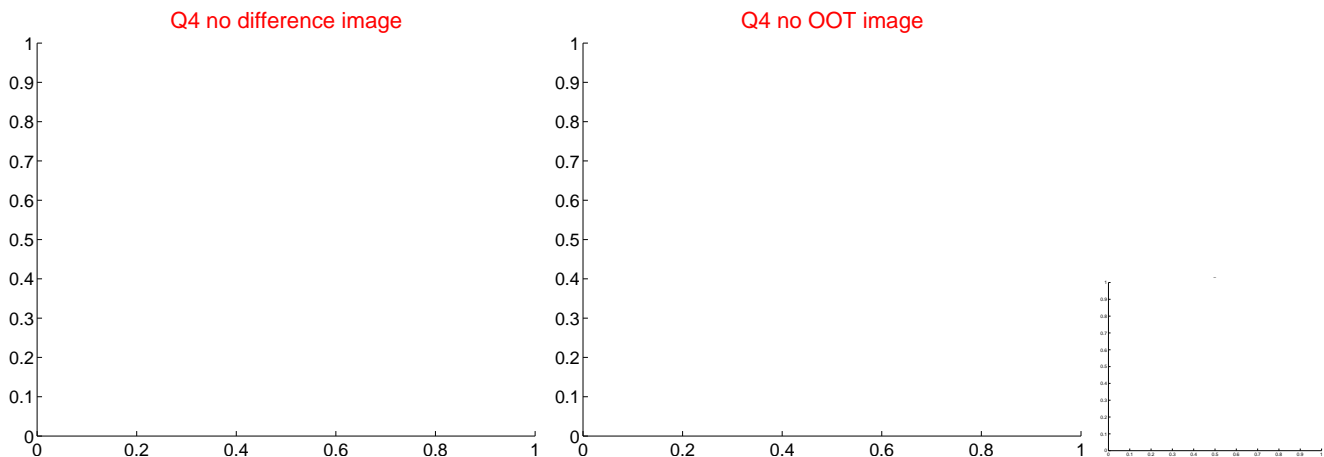
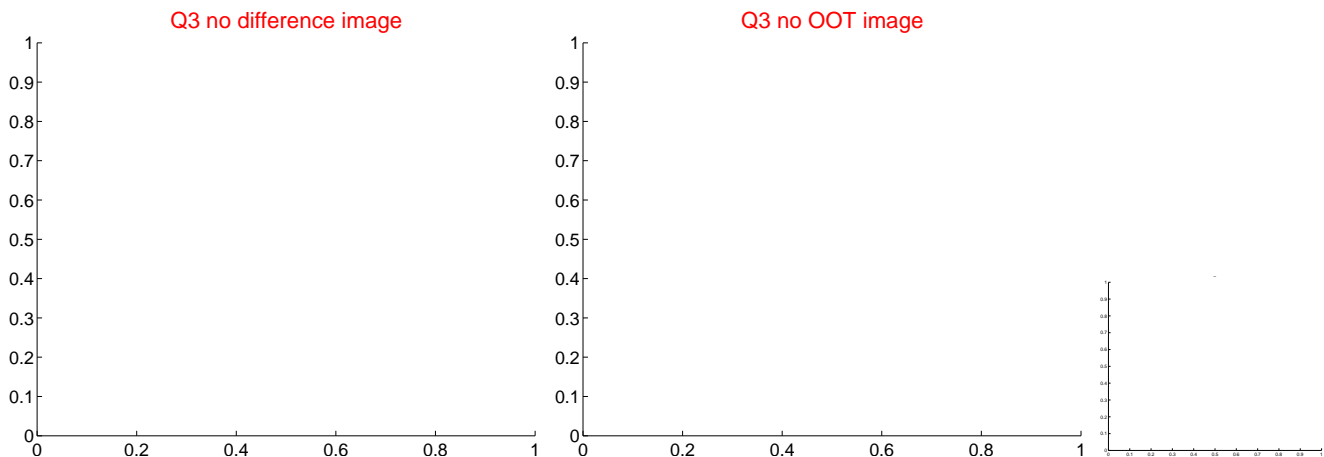
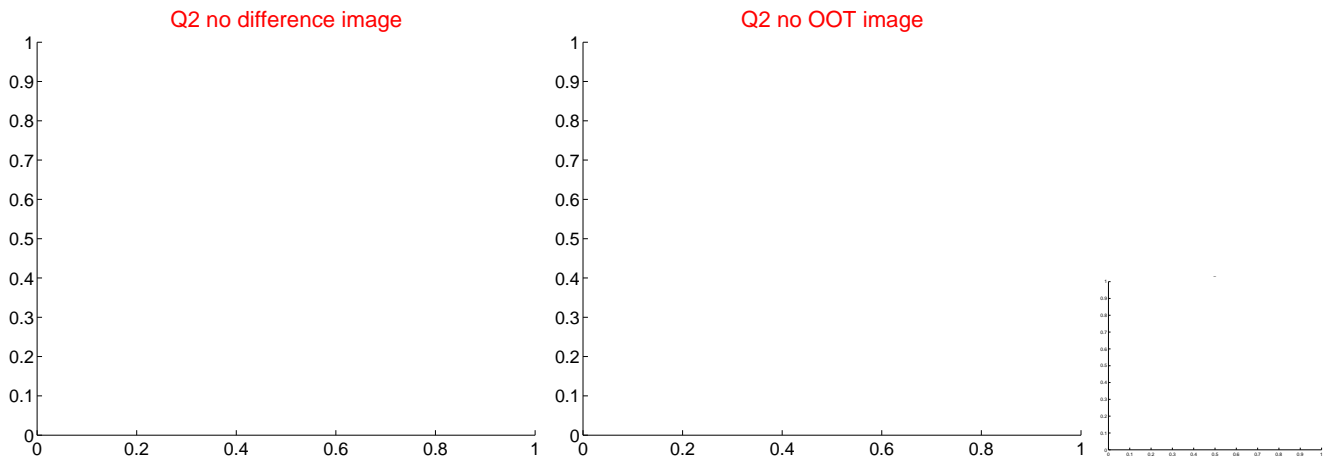
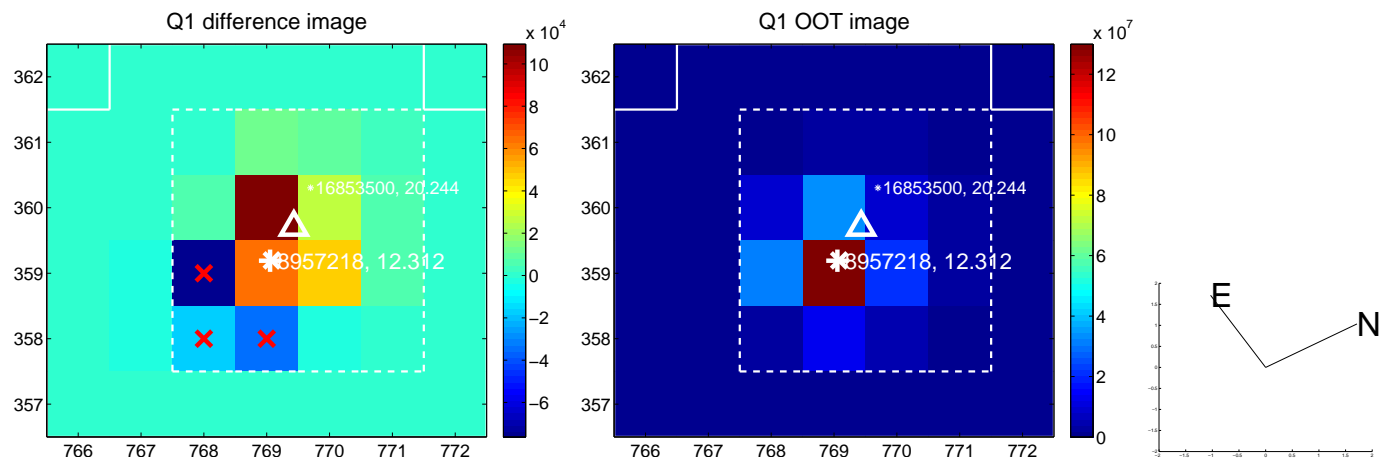
The direct PRF centroid is offset from the target star catalog position by about 0.05 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.197 \pm 0.643$	3.42	$0.875 \pm 0.144$	$2.016 \pm 0.645$
PRF-fit source offset from KIC position	$2.120 \pm 0.620$	3.42	$0.907 \pm 0.157$	$1.916 \pm 0.619$
photometric centroid source offset	$0.59 \pm 0.37$	1.59	$0.51 \pm 0.37$	$-0.29 \pm 0.36$

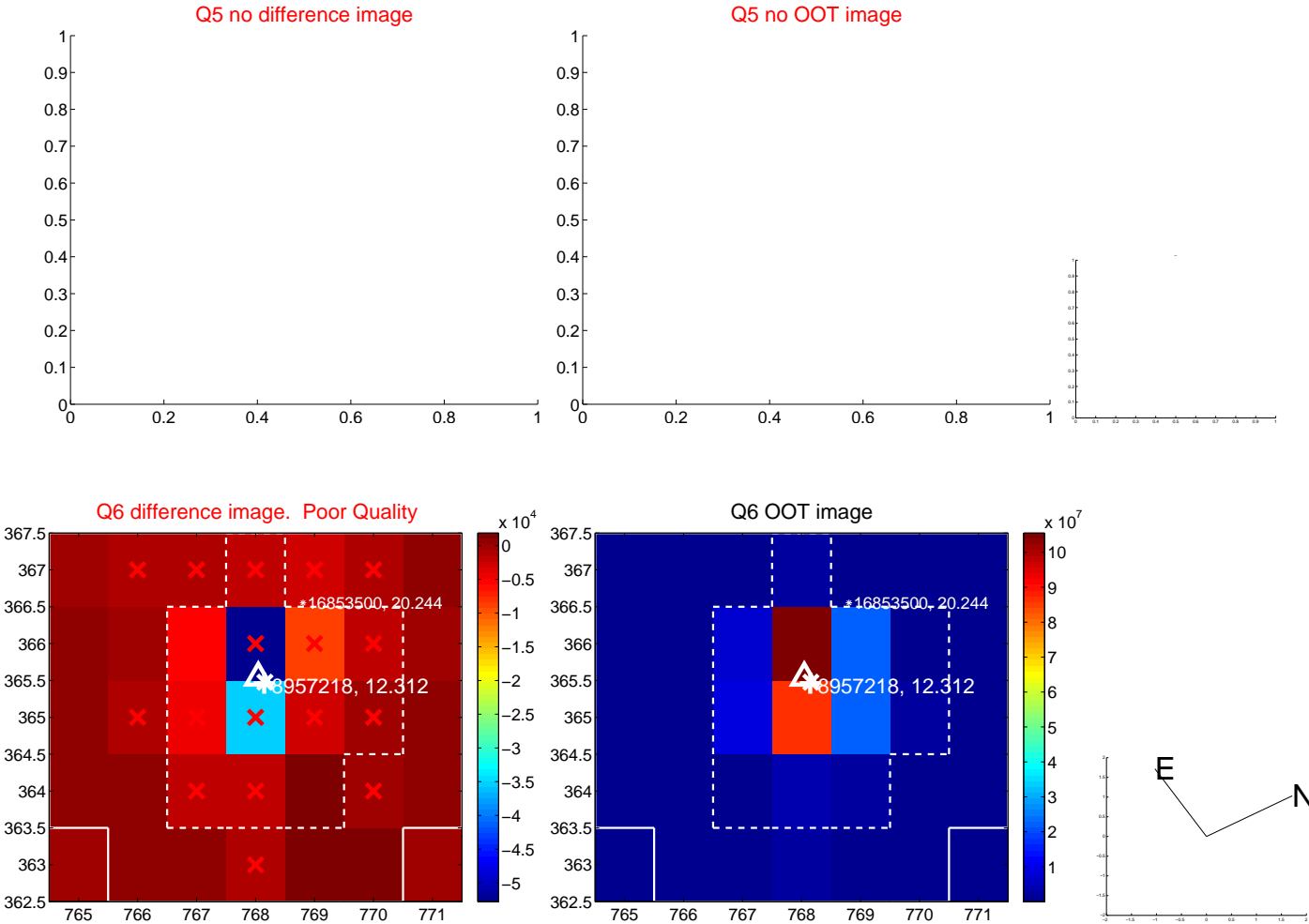


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

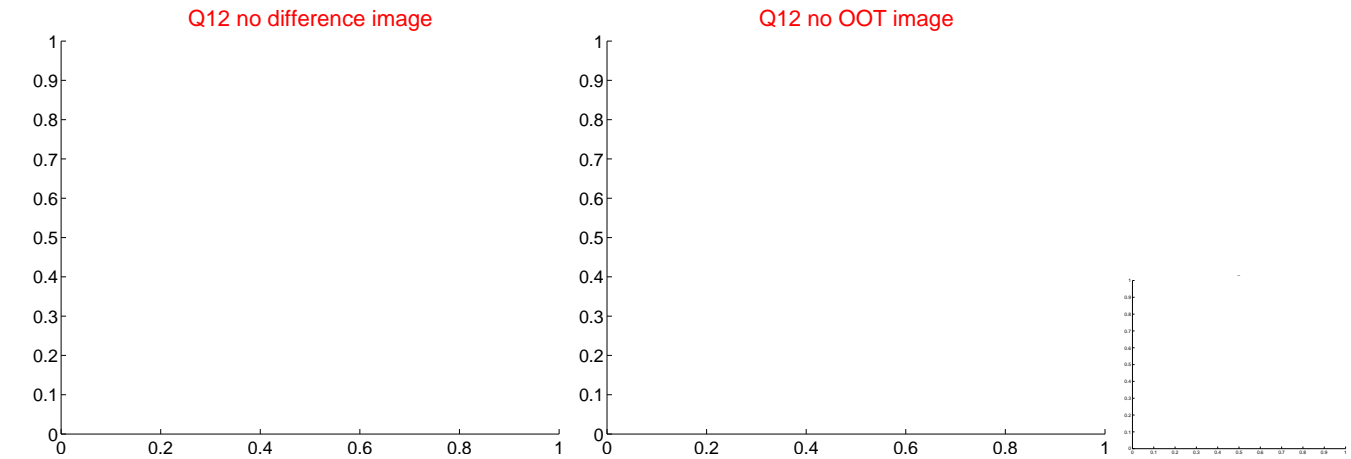
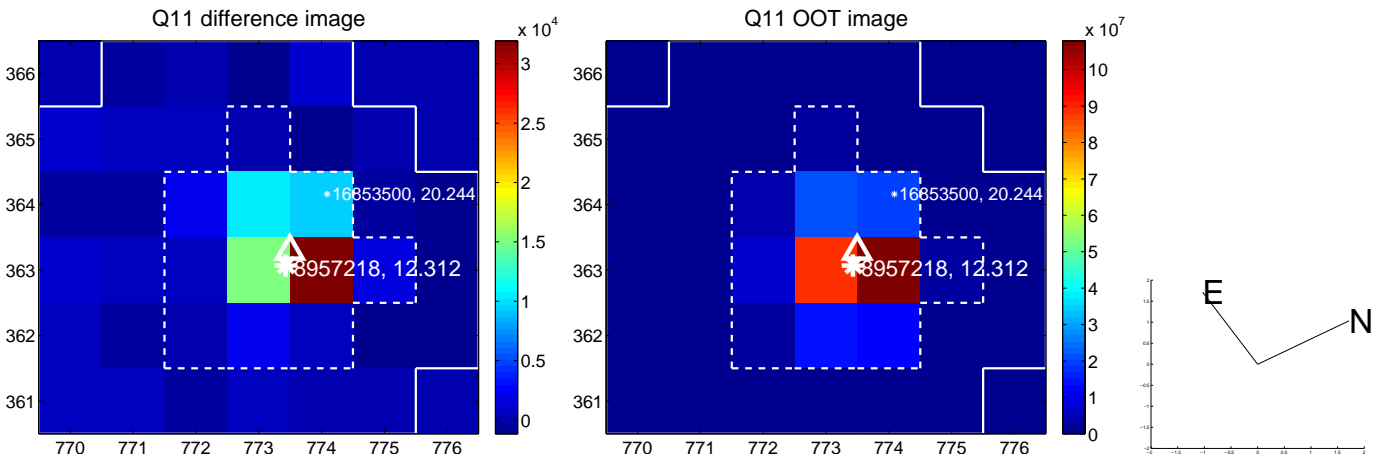
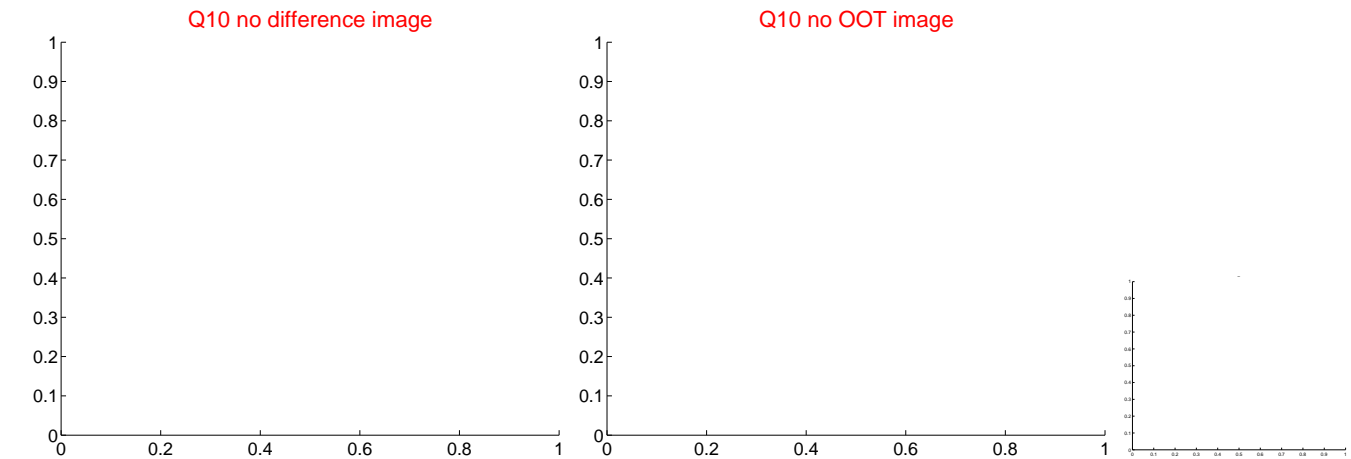
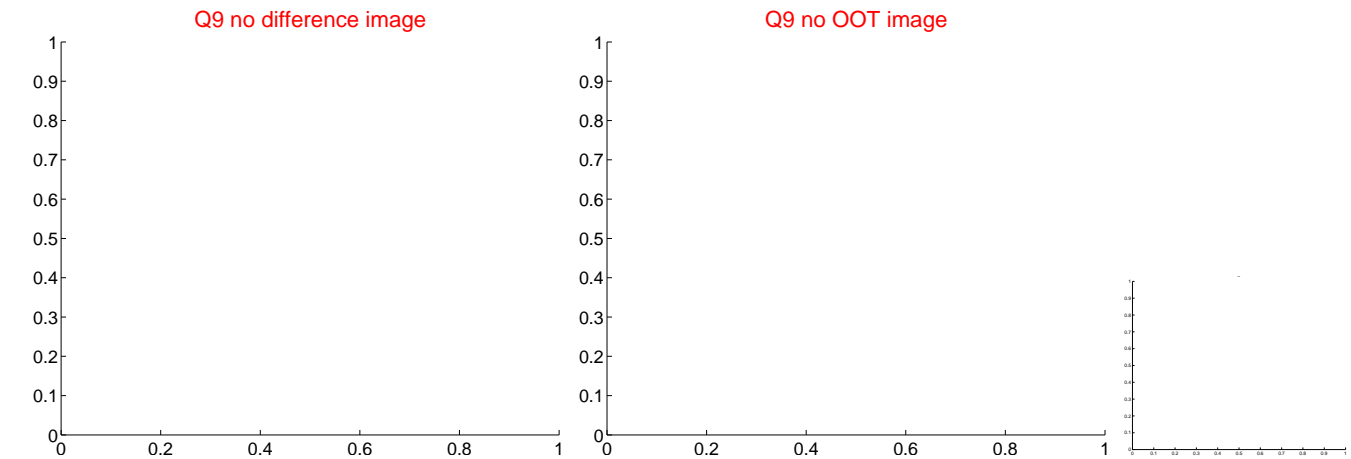
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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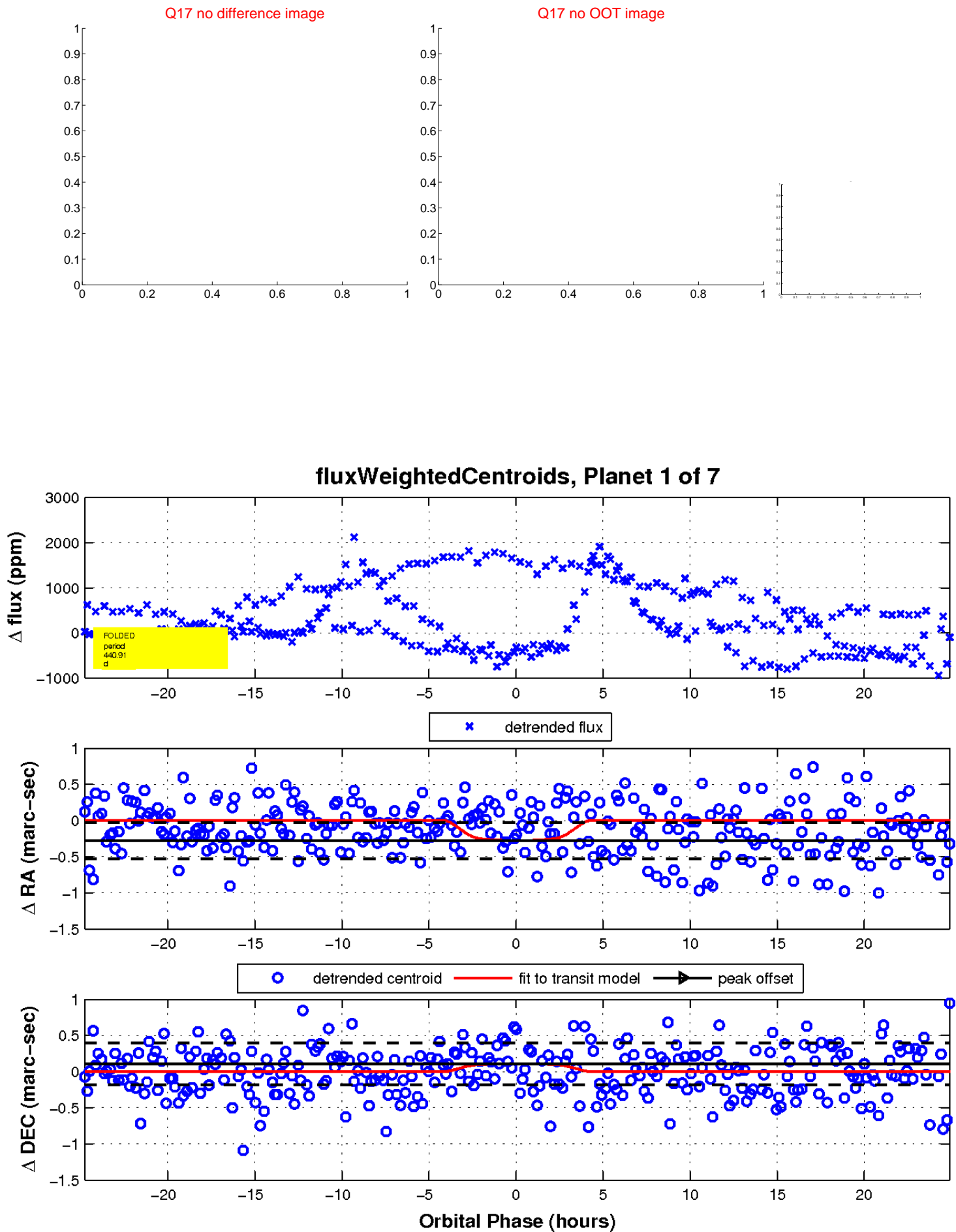
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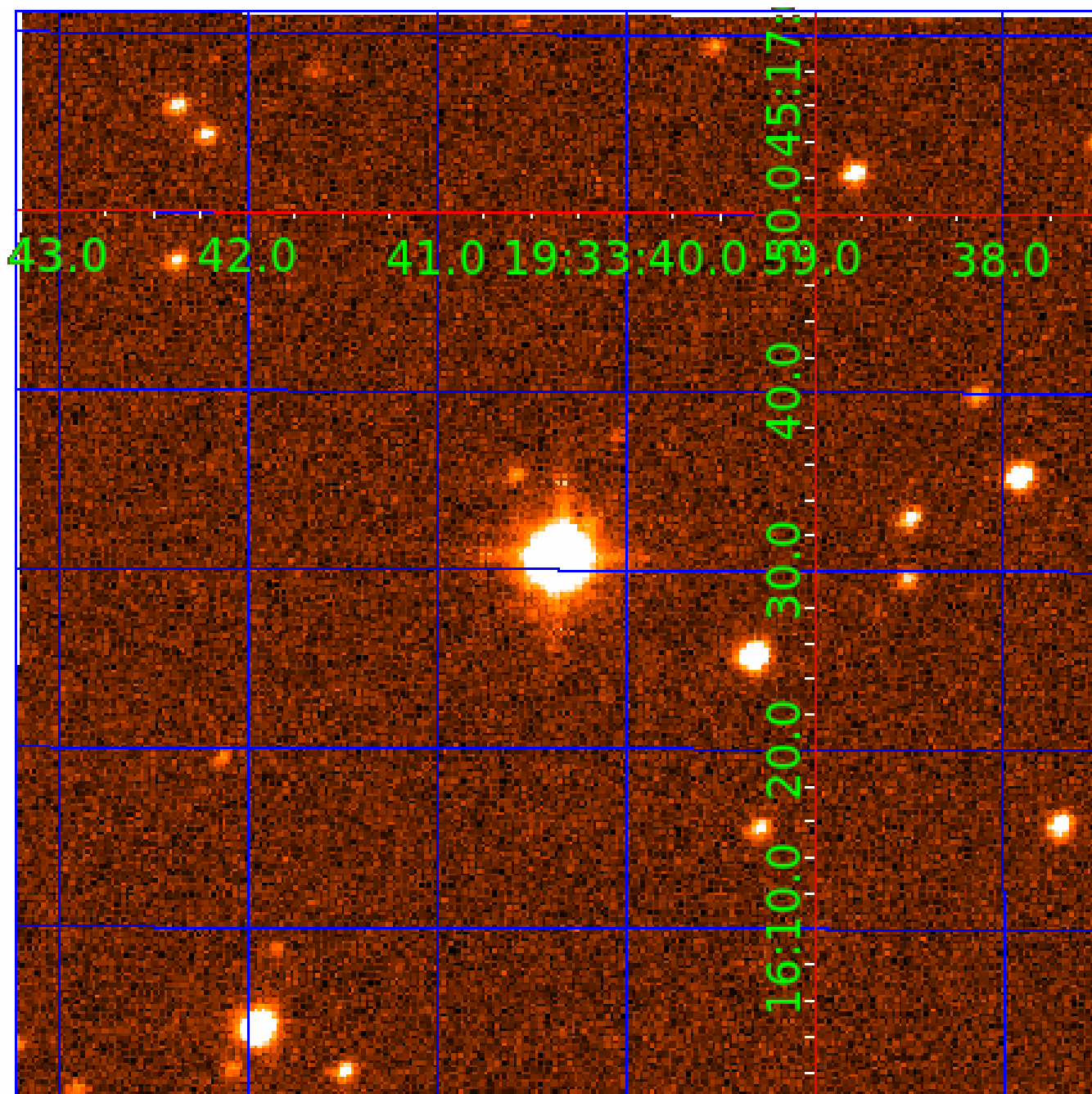


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UKIRT Image

Declination



# KIC 008957218

## Q1-17 DR25 TCE Parameters

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008957218-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
008957218-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
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008957218-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
008957218-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_NOFITS

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

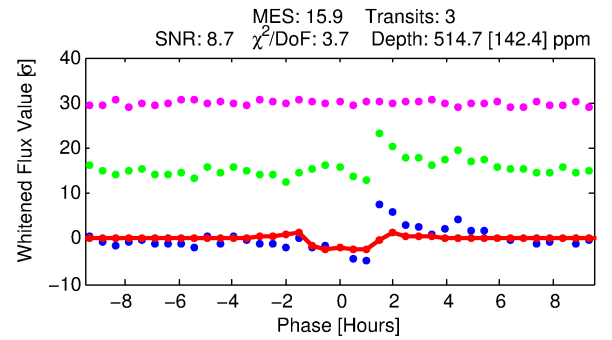
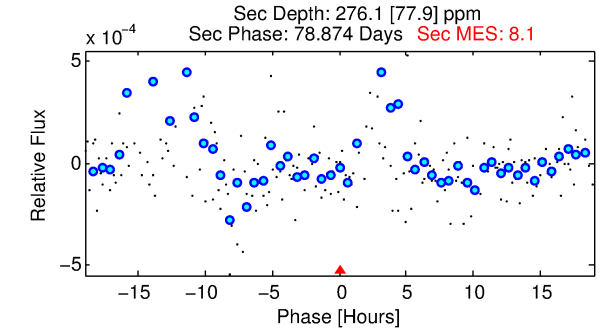
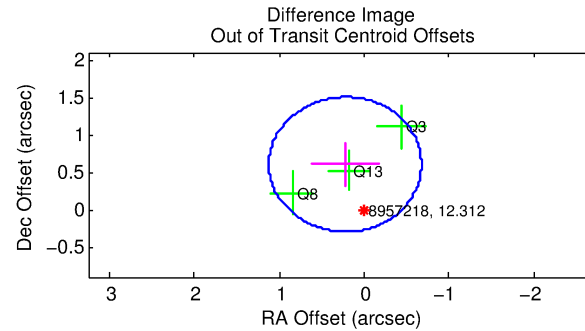
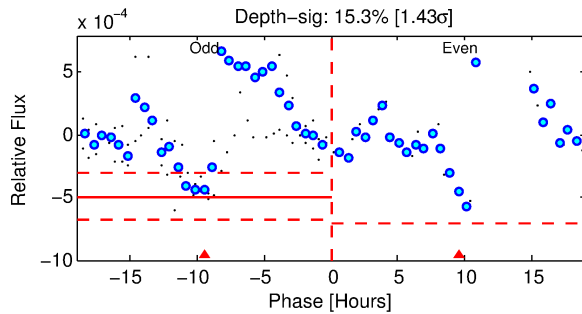
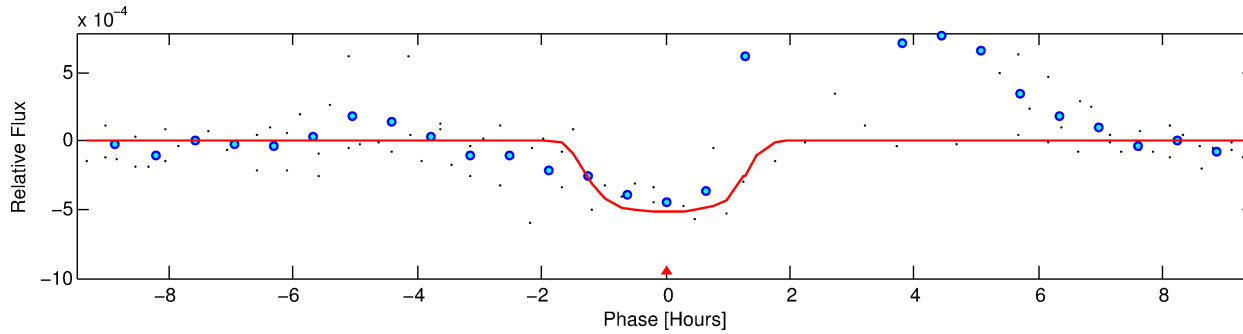
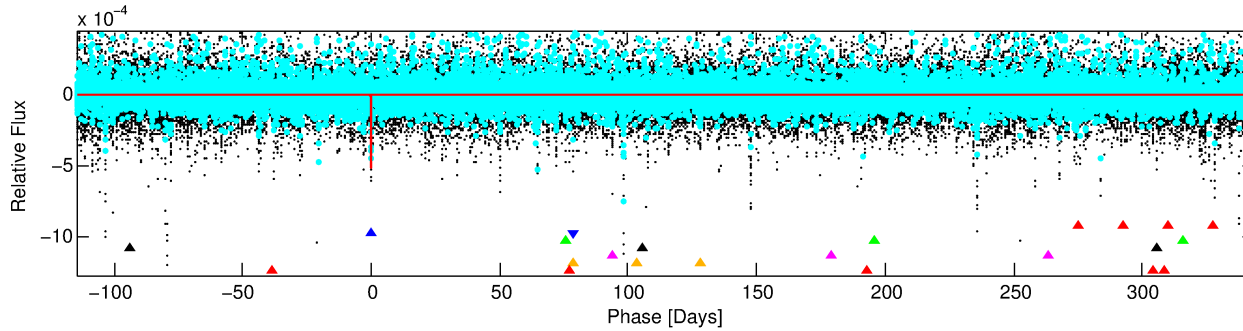
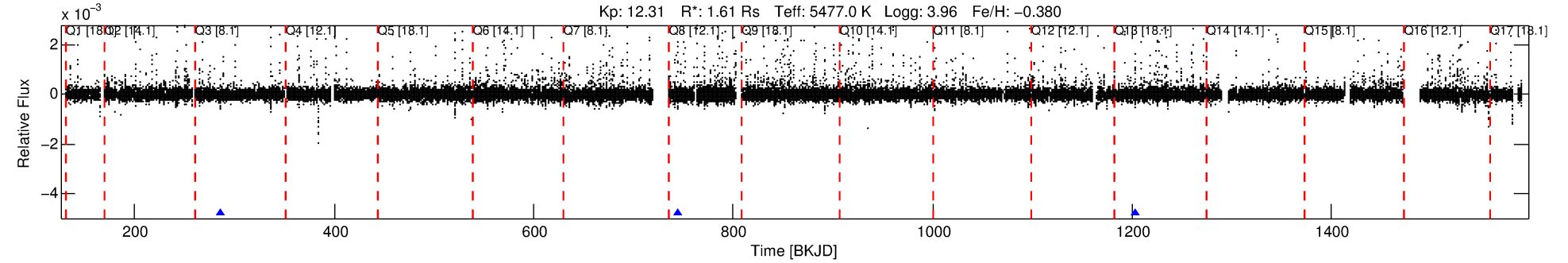
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 008957218-02

No Significant Match Found

# DV One-Page Summary

KIC: 8957218 Candidate: 2 of 7 Period: 458.416 d



## DV Fit Results:

Period = 458.41627 [0.00624] d  
Epoch = 285.9178 [0.0086] BKJD  
Rp/R\* = 0.0258 [0.0078]  
a/R\* = 474.32 [543.58]  
b = 0.93 [0.16]  
Seff = 1.71 [1.69]  
Teq = 292 [72] K  
Rp = 4.52 [2.84] Re  
a = 1.1038 [0.6462] AU  
Ag = 9059.16 [10779.15] [0.84 $\sigma$ ]  
Teffp = 4398 [747] K [5.47 $\sigma$ ]

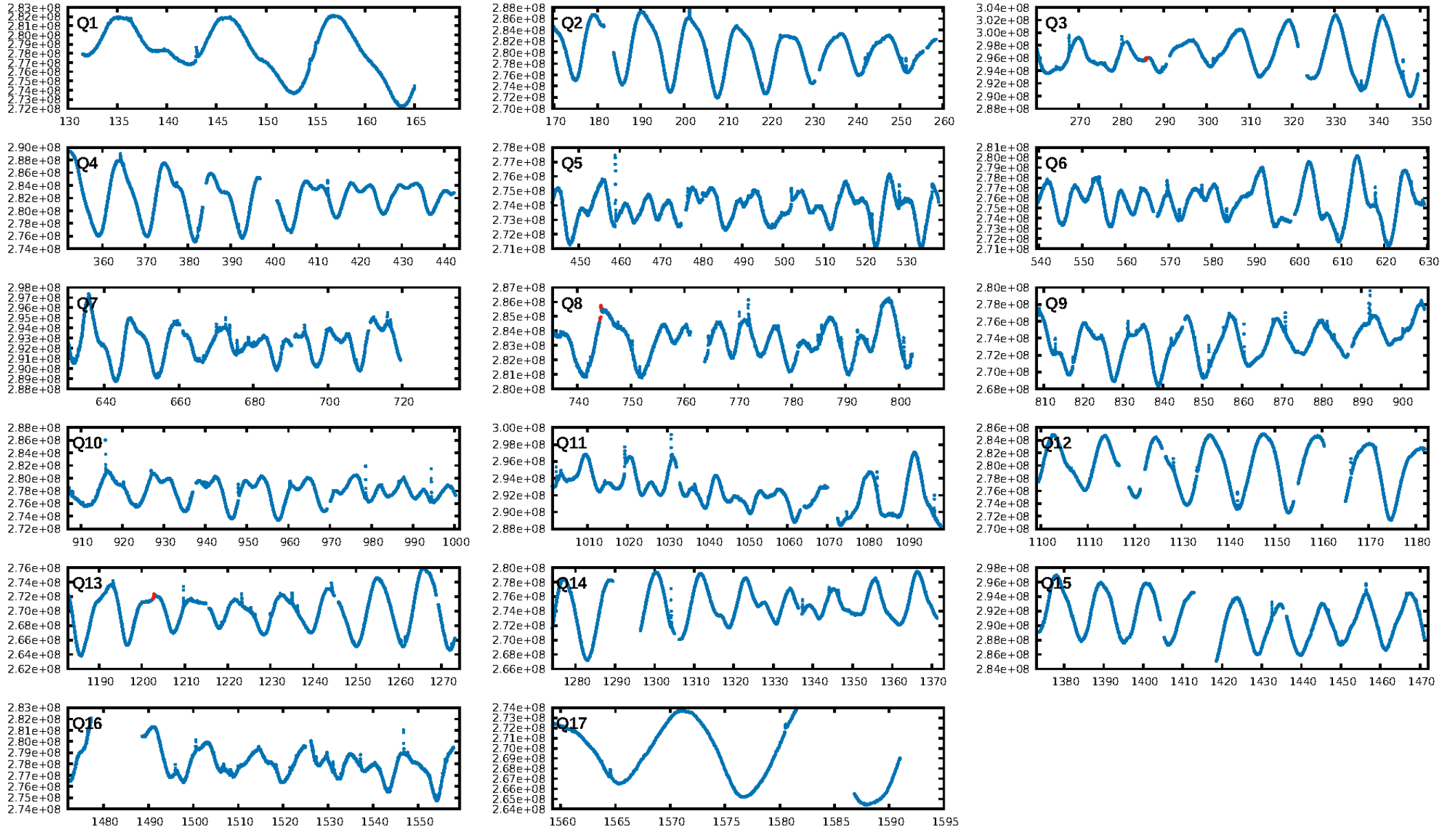
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [47.22 $\sigma$ ]  
LongPeriod-sig: 100.0% [95.68 $\sigma$ ]  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 0.7%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 15.51  
Centroid-sig: 70.7%  
Centroid-so: 0.408 arcsec [0.66 $\sigma$ ]  
OotOffset-rm: 0.641 arcsec [2.14 $\sigma$ ]  
OotOffset-st: 0/1/1/1 [3]  
KicOffset-rm: 0.580 arcsec [1.89 $\sigma$ ]  
KicOffset-st: 0/1/1/1 [3]  
DiffImageQuality-fgm: 1.00 [3/3]  
DiffImageOverlap-fno: 1.00 [3/3]

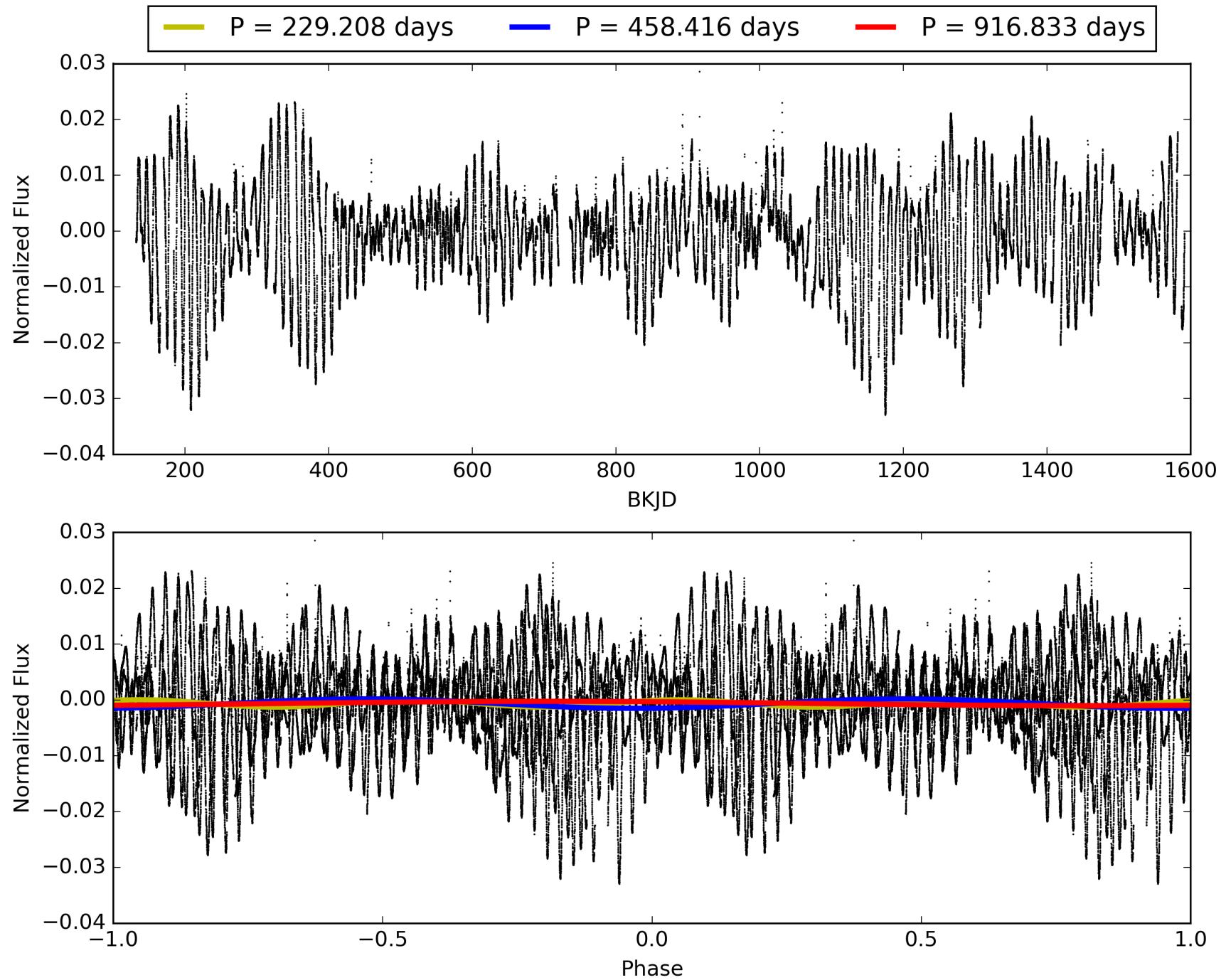
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 23:49:25 Z

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

# TCE 008957218-02, PDC Light Curves

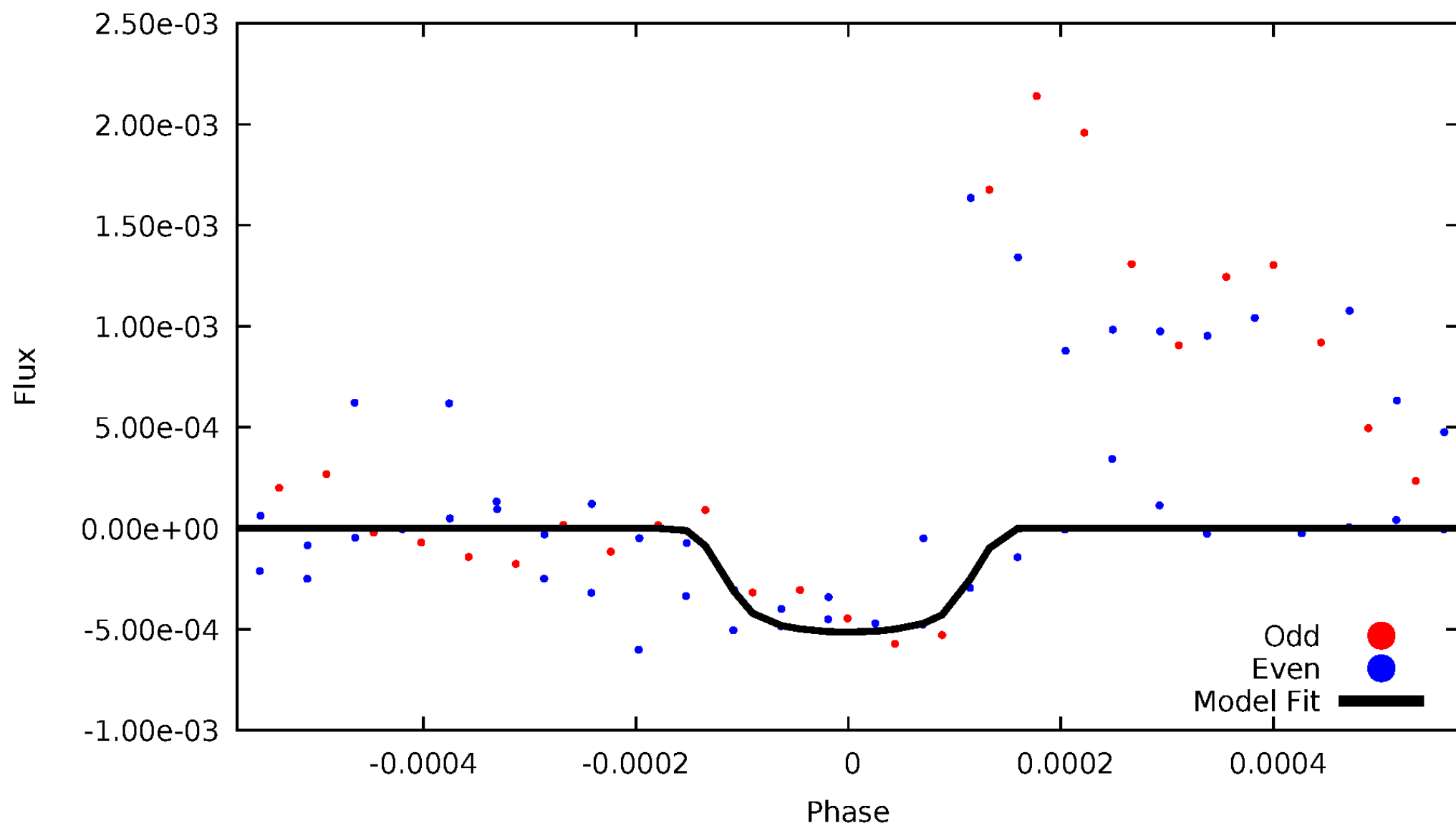


TCE 008957218-02



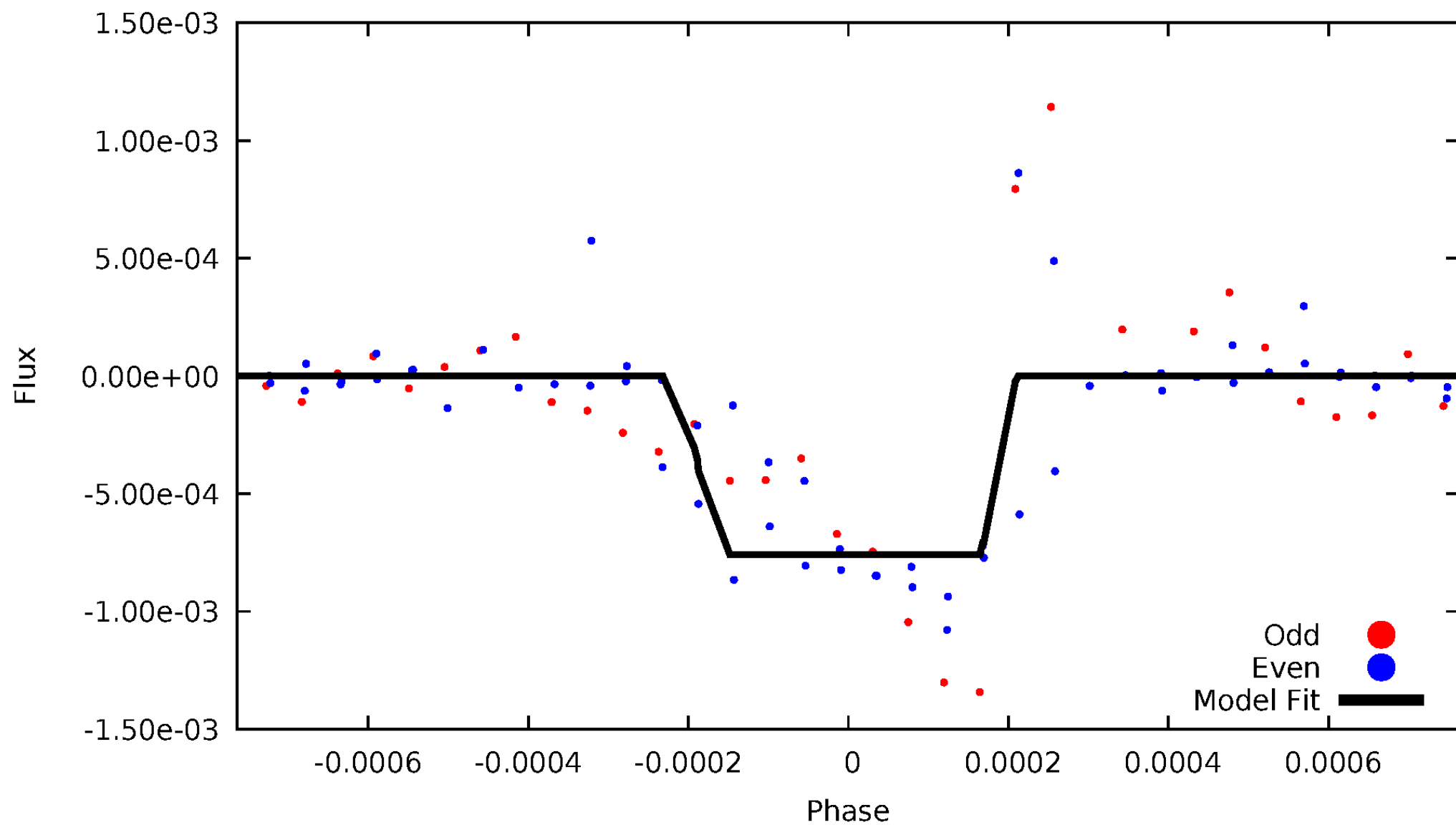
# DV Odd/Even

TCE 008957218-02



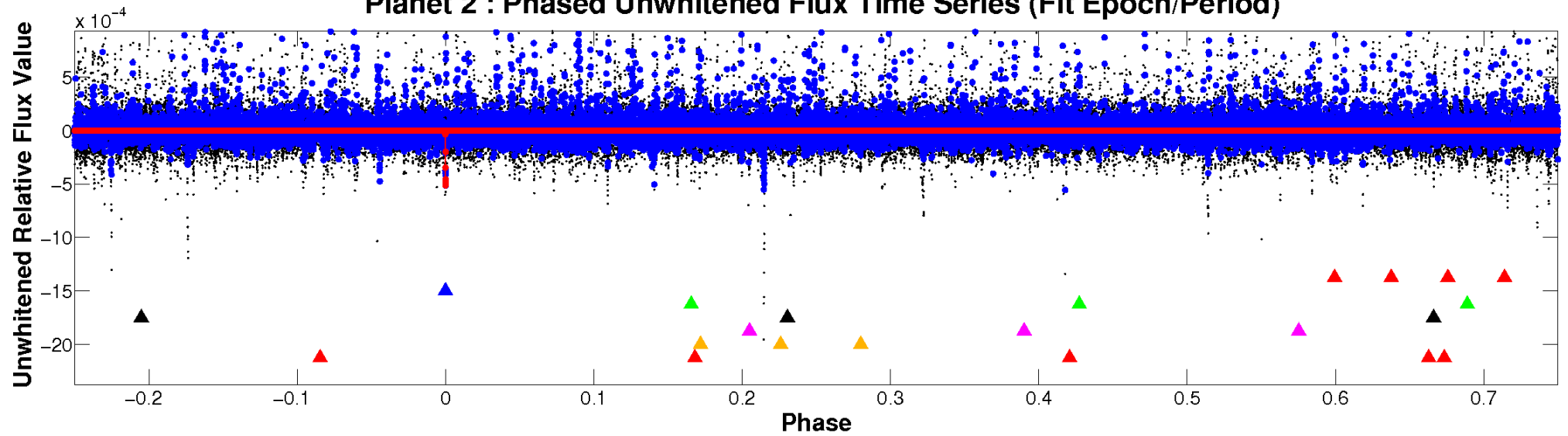
# ALT Odd/Even

TCE 008957218-02

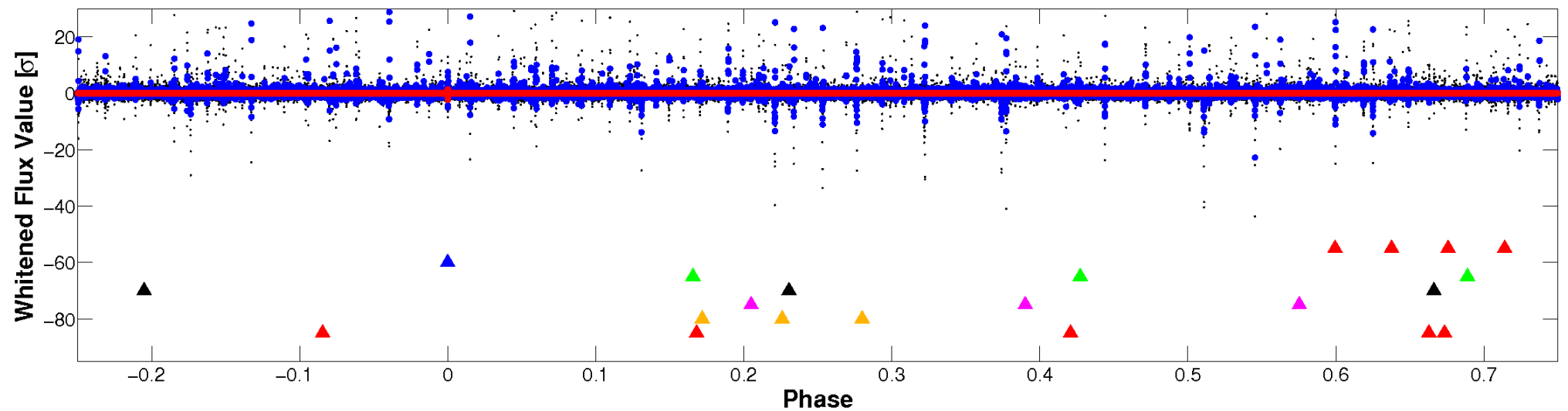


# Non-Whitened Vs. Whitened Light Curve

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

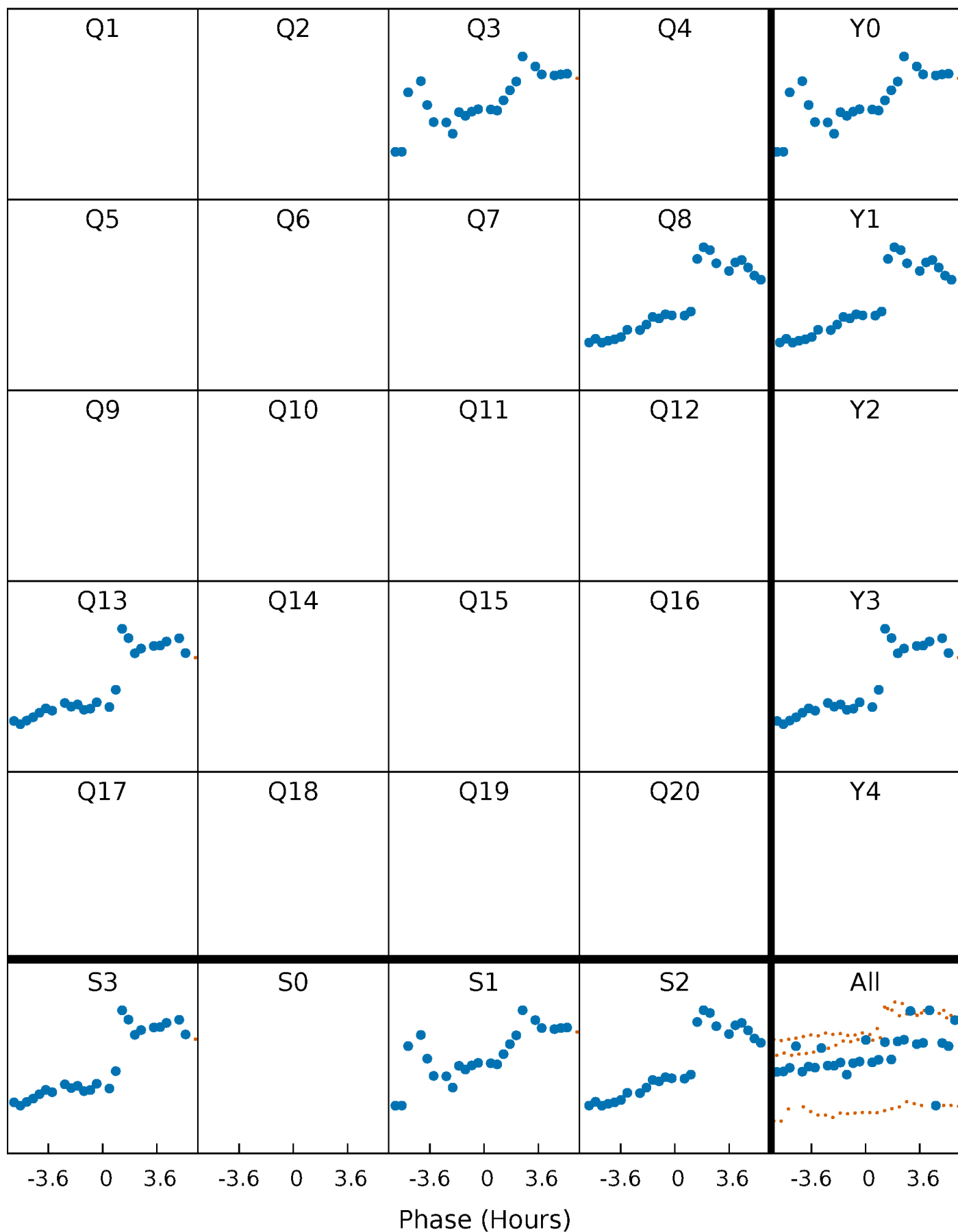


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



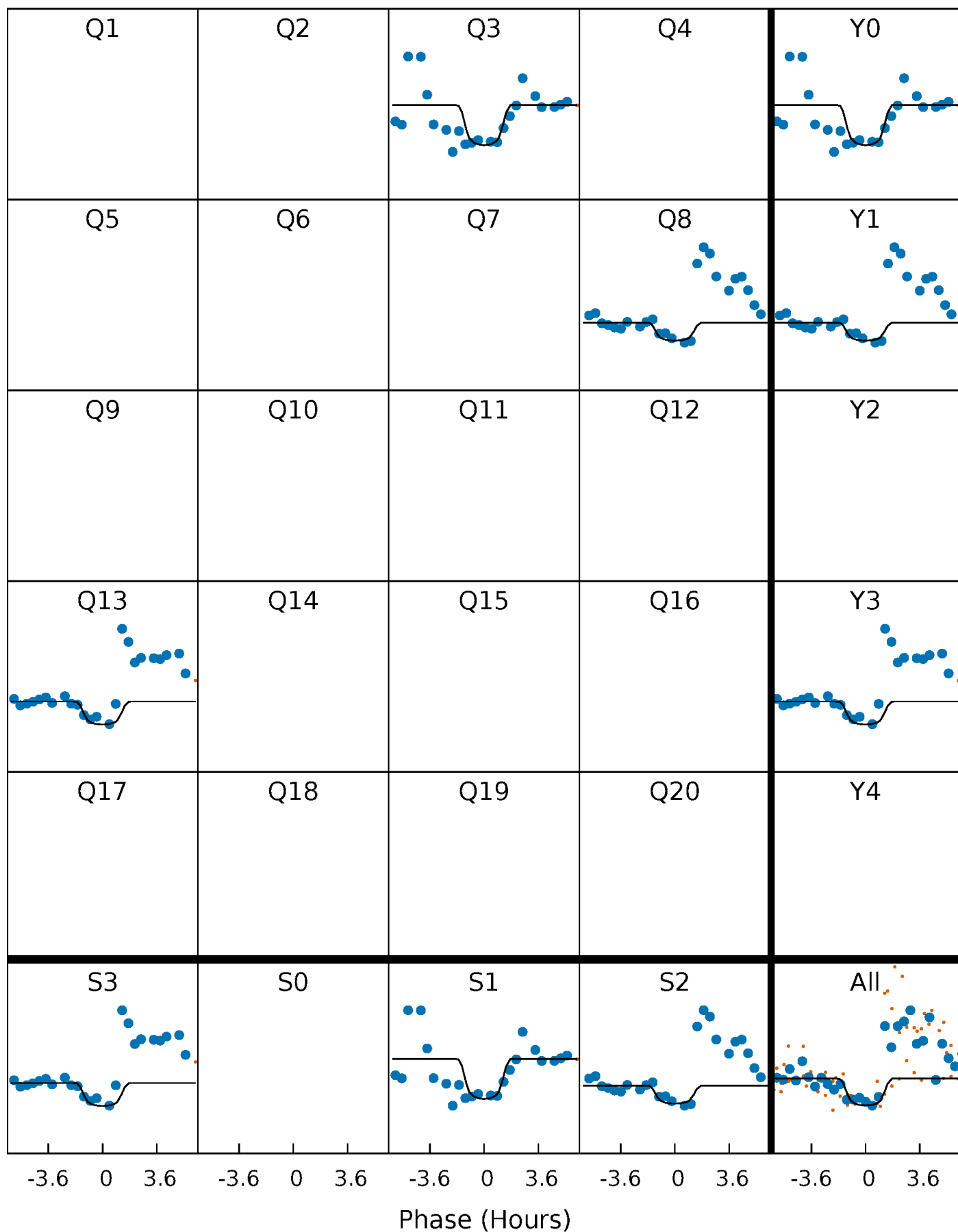
# PDC Quarter-Phased Transit Curves

TCE 008957218-02 P=458.416275 Days  $T_0=285.917787$  (BKJD)



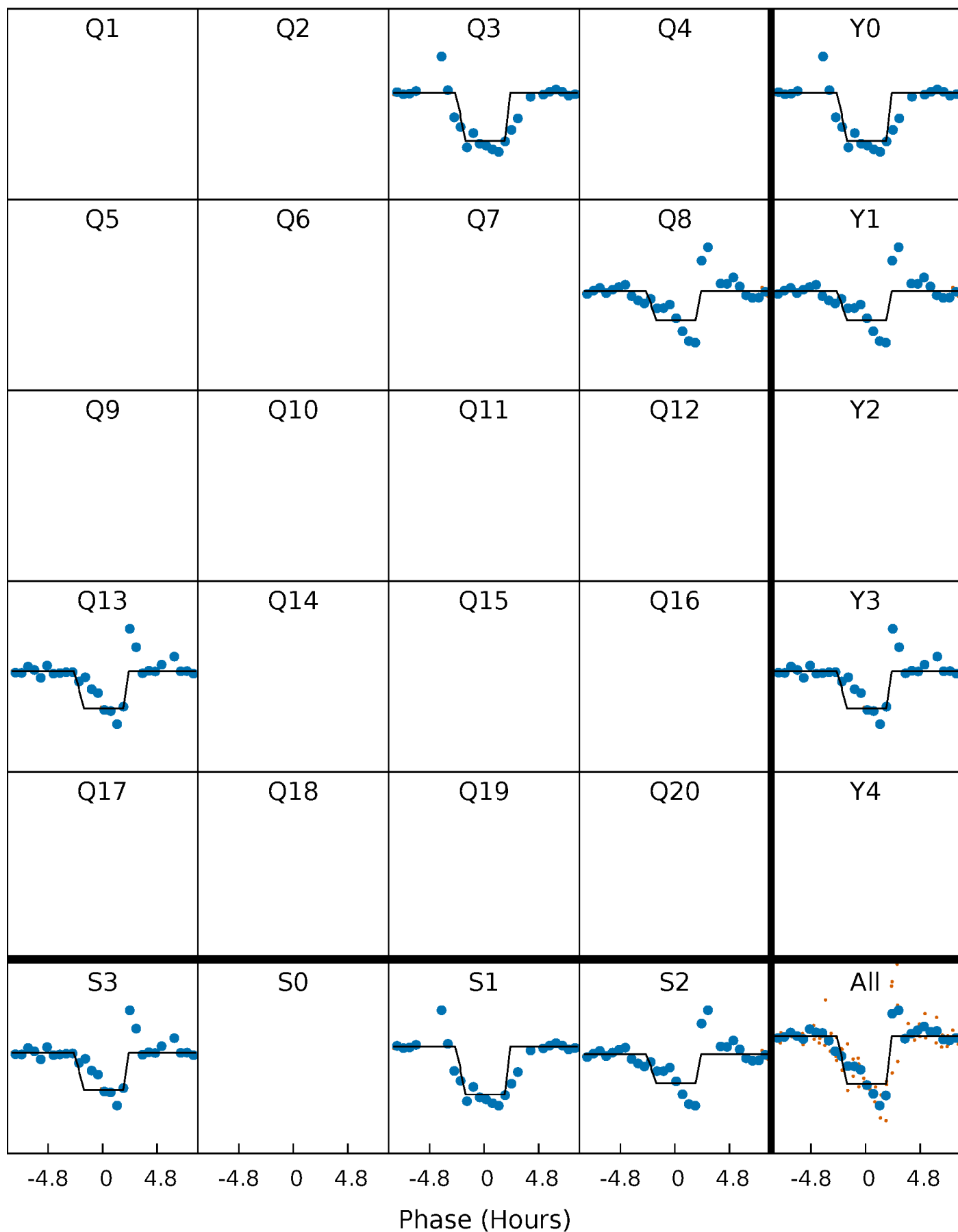
# DV Quarter-Phased Transit Curves

TCE 008957218-02     $P=458.416275$  Days     $T_0=285.917787$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

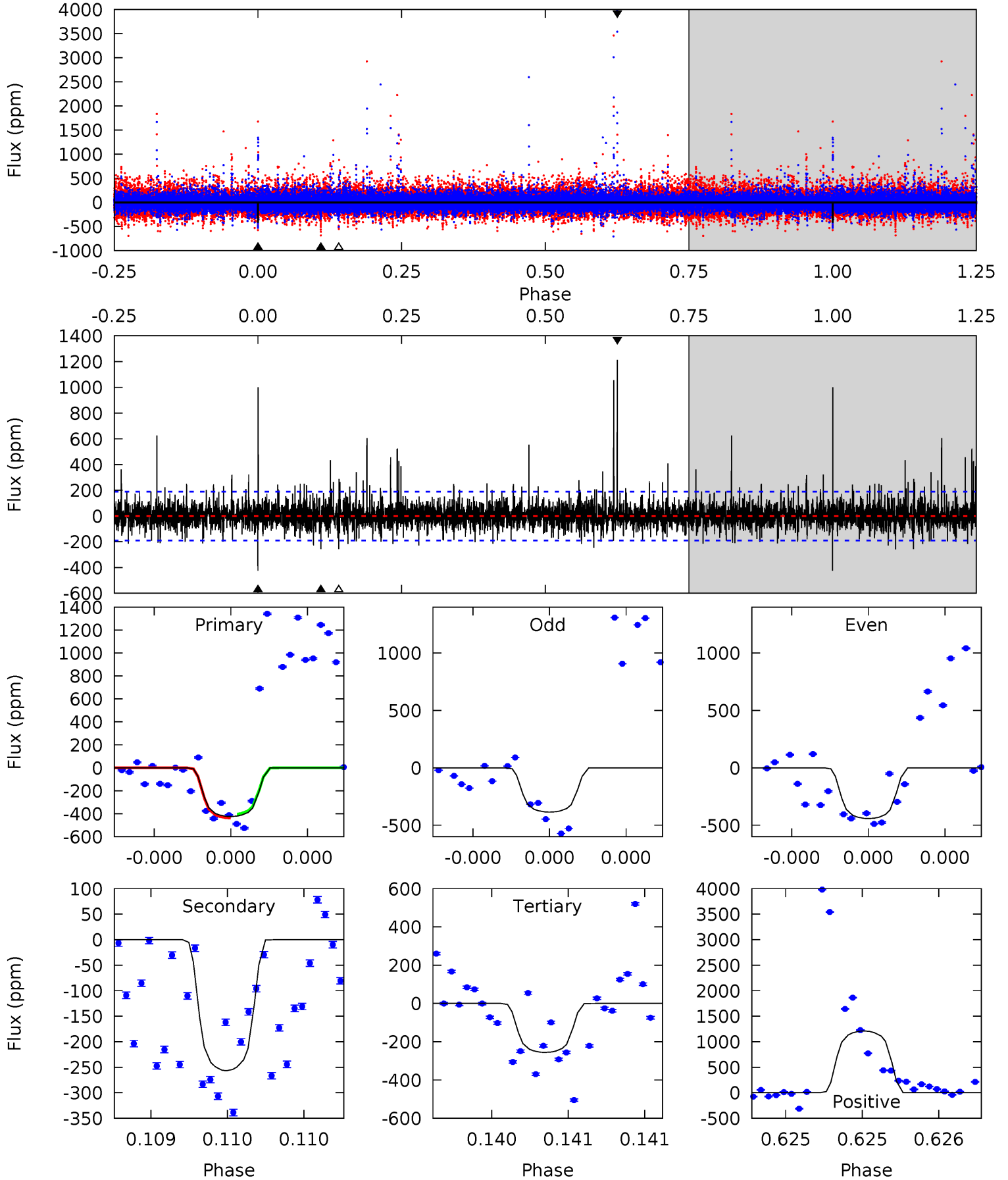
TCE 008957218-02 P=458.406485 Days  $T_0=285.892801$  (BKJD)



# DV Model-Shift Uniqueness Test

008957218-02, P = 458.416275 Days, E = 285.917787 Days

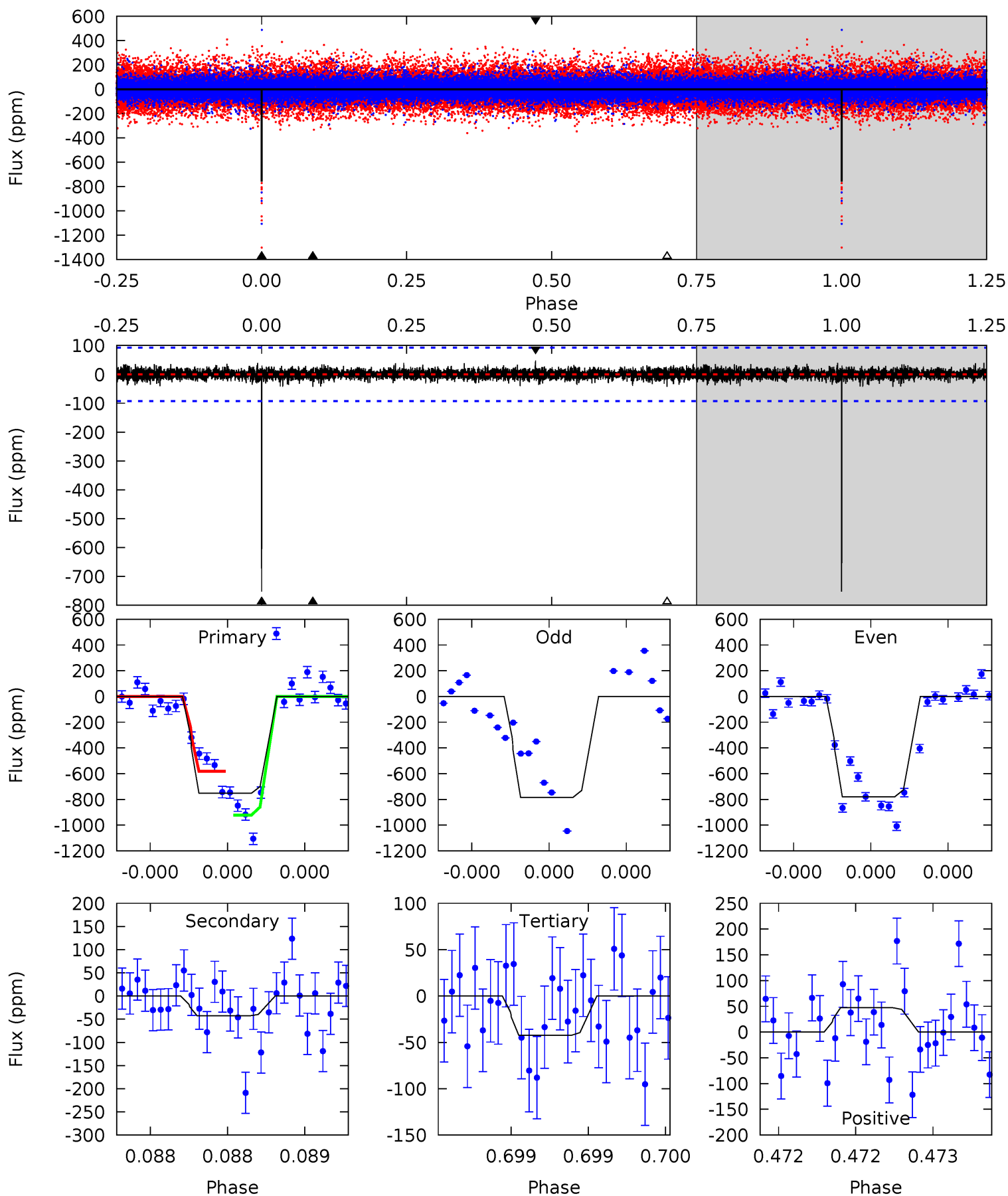
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.7	7.66	7.64	36.2	5.65	3.61	2.01	5.02	-23.5	0.02	-28.5	0.41	0.92	0.74	0.49



# Alt Model-Shift Uniqueness Test

008957218-02, P = 458.406485 Days, E = 285.892801 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
45.7	2.60	2.58	2.87	5.61	3.54	0.56	43.1	42.8	0.02	-0.27	0.13	0.96	0.06	10.4



### Stellar Parameters For KIC 008957218

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5477^{+164}_{-148}$	$3.957^{+0.595}_{-0.255}$	$-0.380^{+0.350}_{-0.250}$	$1.607^{+0.803}_{-0.883}$	$0.853^{+0.116}_{-0.095}$	$0.290^{+2.152}_{-0.169}$
	+3%/-3%	+15%/-6%	+92%/-66%	+50%/-55%	+14%/-11%	+743%/-58%
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 008957218-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-257 \pm 34$	$4.19^{+1.96}_{-1.64}$	$397^{+52}_{-61}$	$4467^{+737}_{-453}$	$9699^{+17228}_{-5203}$
Alt.	$-43 \pm 16$	$4.56^{+1.99}_{-1.68}$	$404^{+50}_{-64}$	$3215^{+409}_{-282}$	$1312^{+2375}_{-762}$

$T_{max}$  = Theoretical Maximum Planetary Temperature

$T_{obs}$  = Observed Planetary Temperature (Assuming  $A=0.3$ )

$A_{obs}$  = Observed Albedo (Assuming  $T=0$ )

If a secondary eclipse is present, the system is likely an EB if  $T_{obs} \gg T_{max}$  AND  $A_{obs} \gg 1.0$

## DV Centroid Data

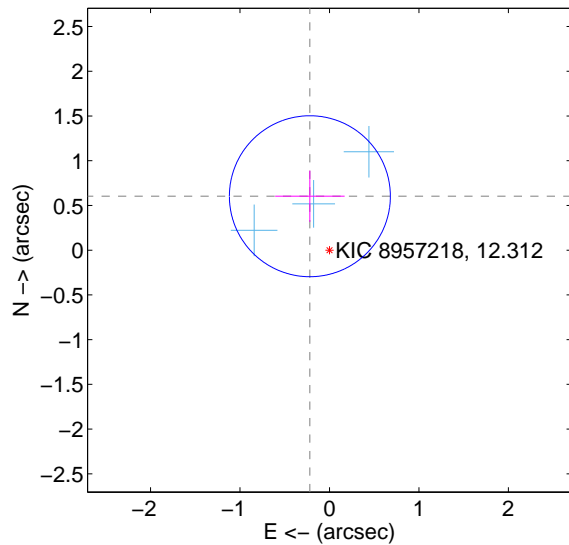
Supplemental centroid analysis for 008957218-02. Kepler magnitude: 12.31. Transit SNR 8.71

There are 3 quarters with good PRF difference image offsets

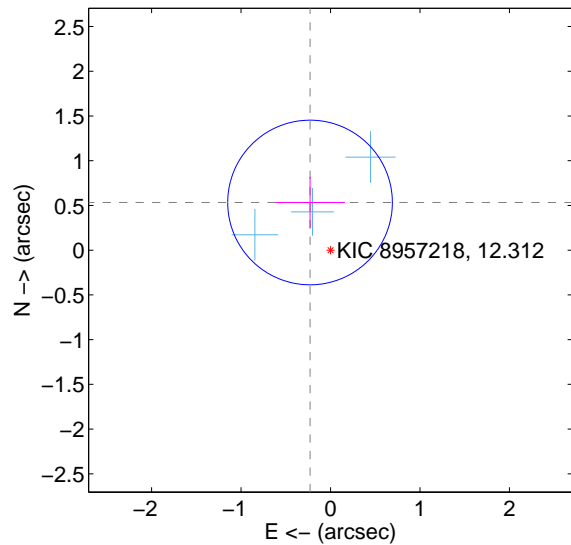
The direct PRF centroid is offset from the target star catalog position by about 0.09 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.641 \pm 0.300$	2.14	$0.219 \pm 0.388$	$0.603 \pm 0.286$
PRF-fit source offset from KIC position	$0.580 \pm 0.307$	1.89	$0.229 \pm 0.389$	$0.533 \pm 0.289$
photometric centroid source offset	$0.41 \pm 0.62$	0.66	$-0.34 \pm 0.60$	$-0.23 \pm 0.65$

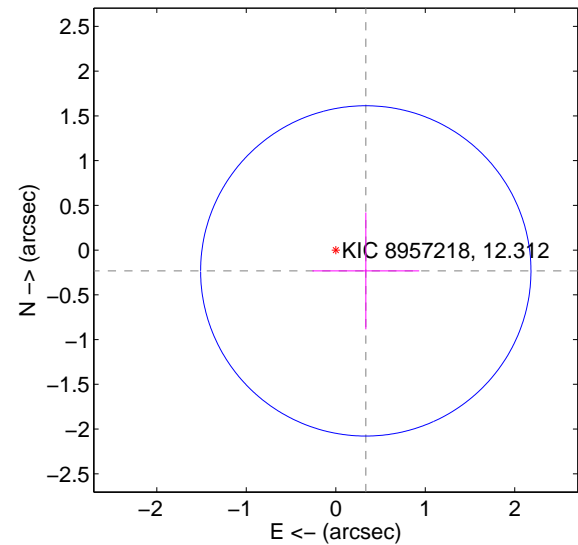
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

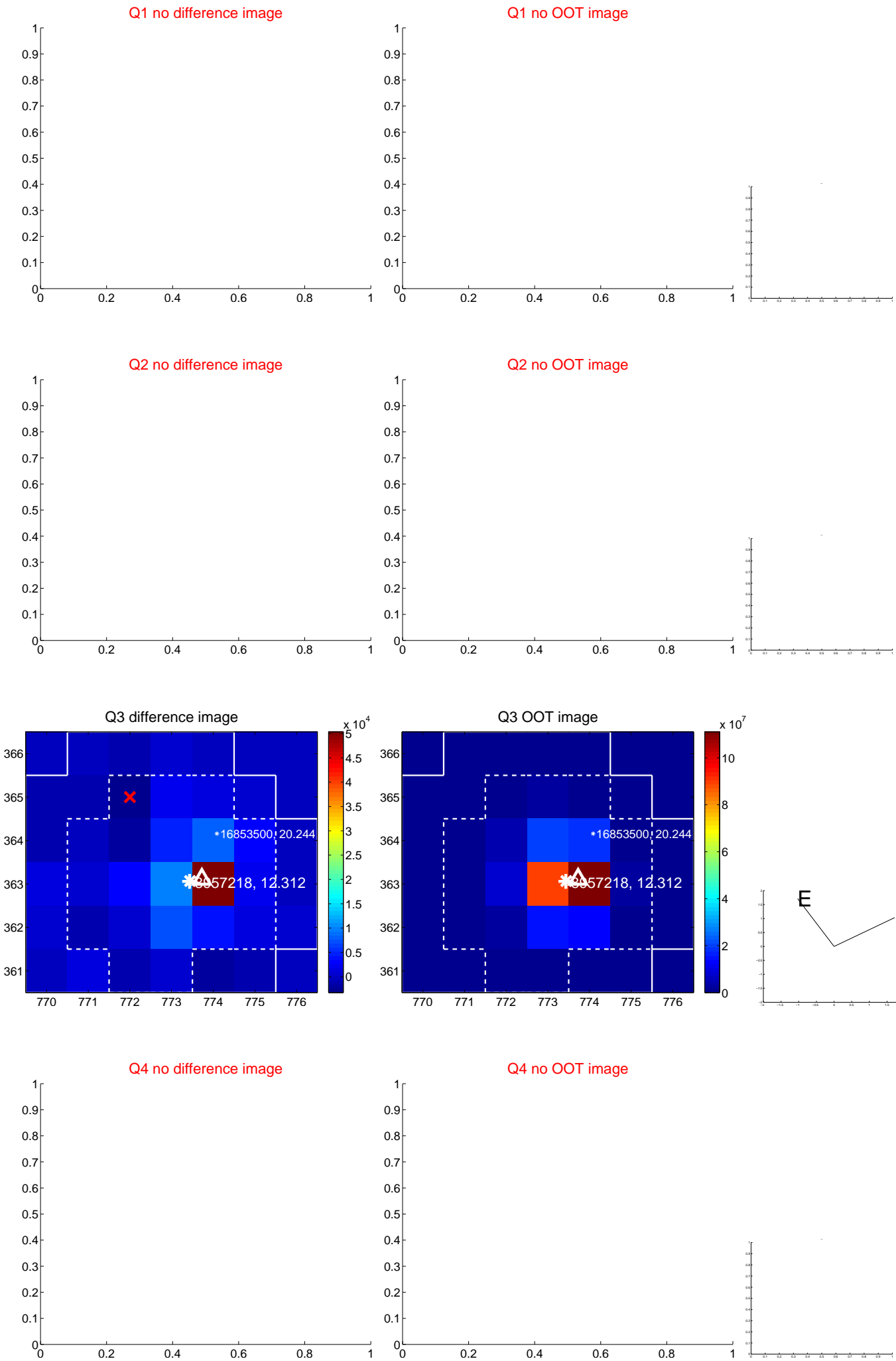


offset from photometric centroids

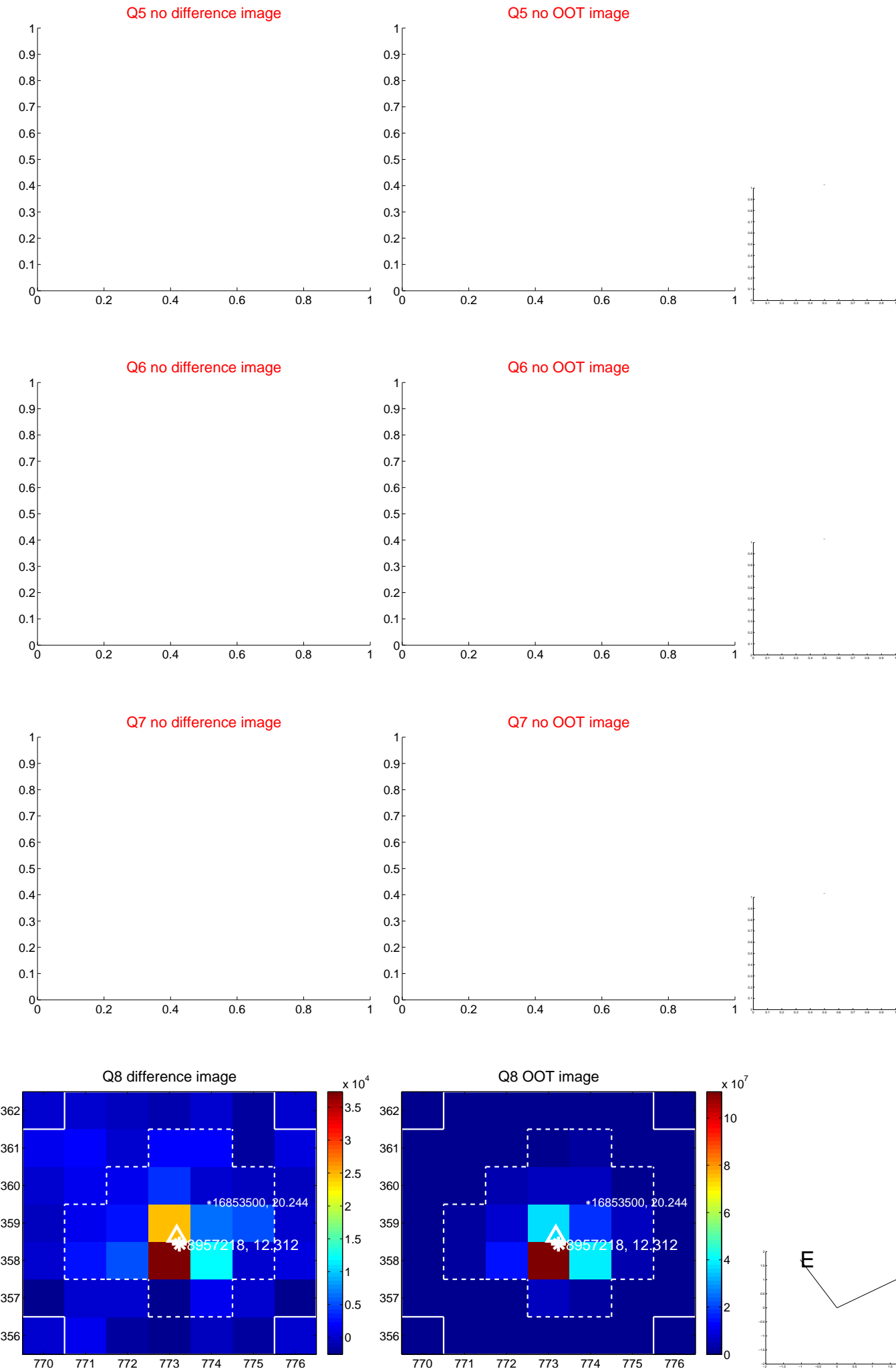


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

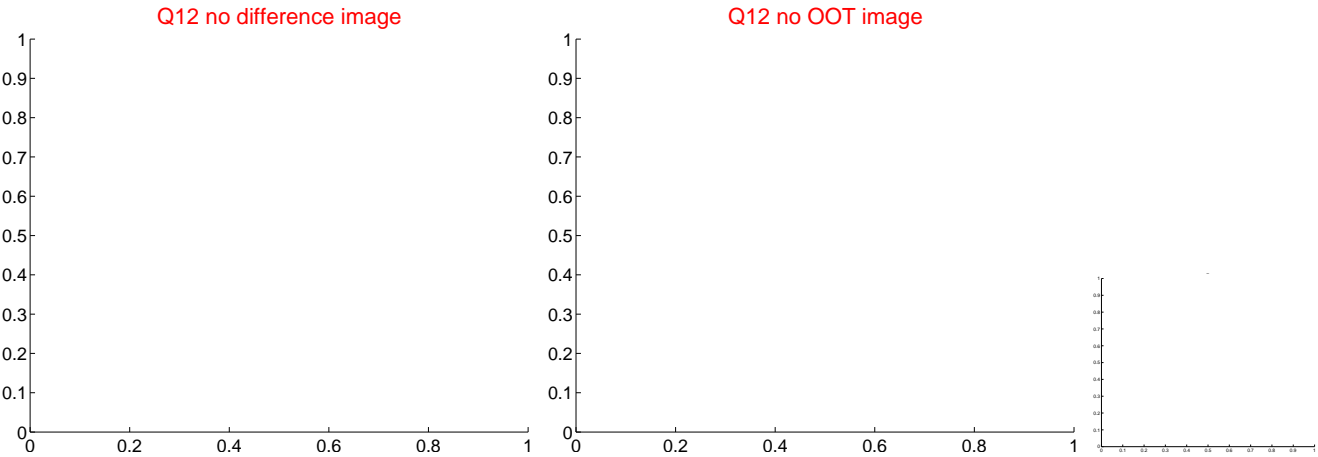
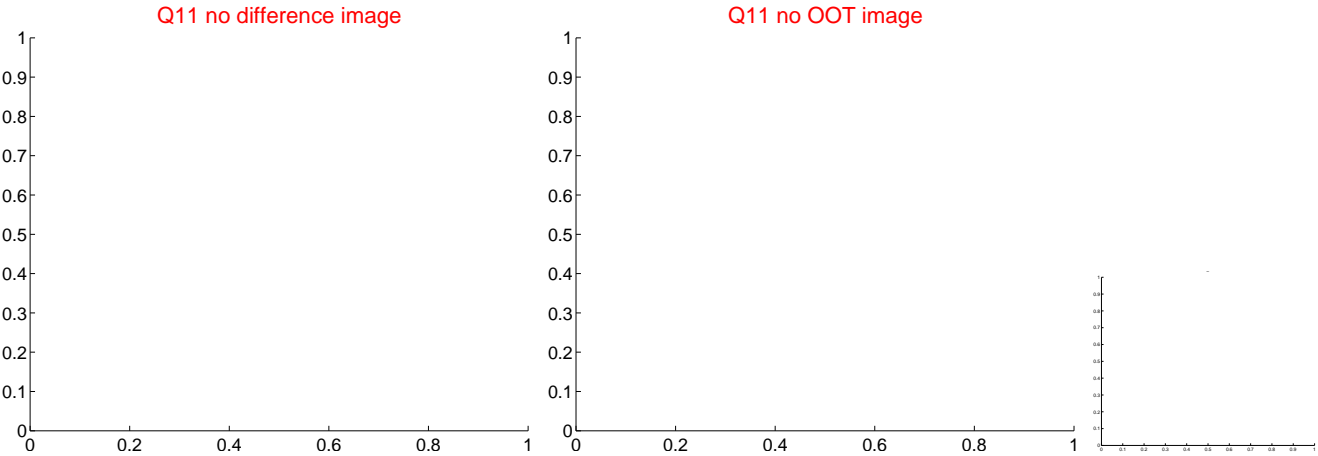
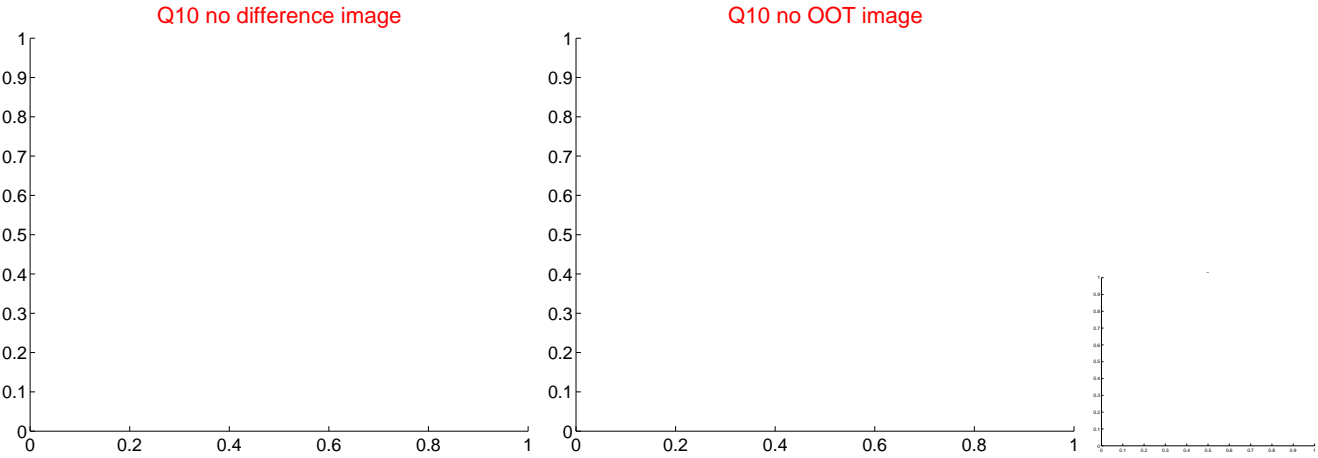
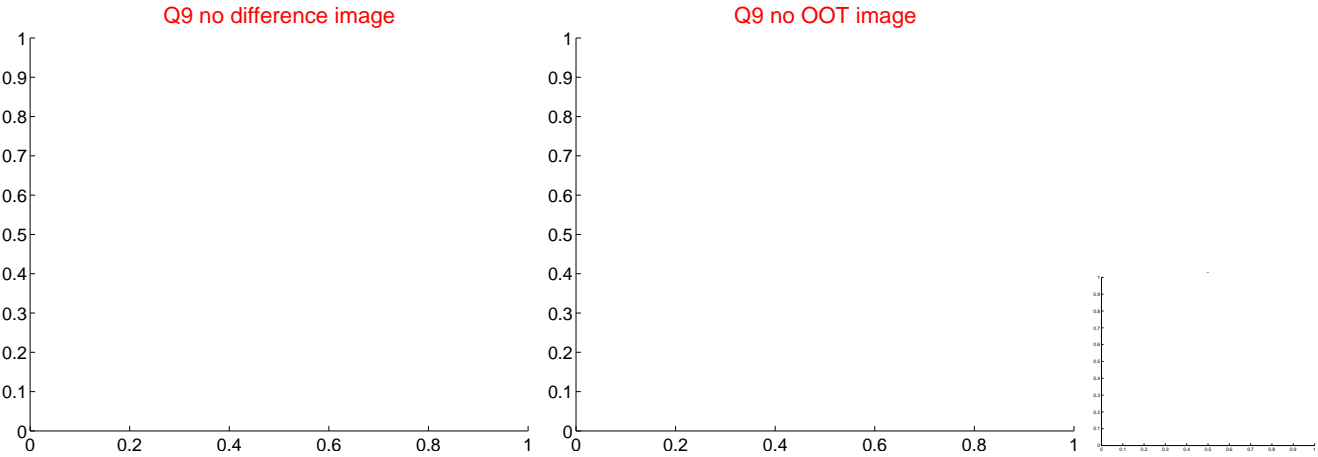
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



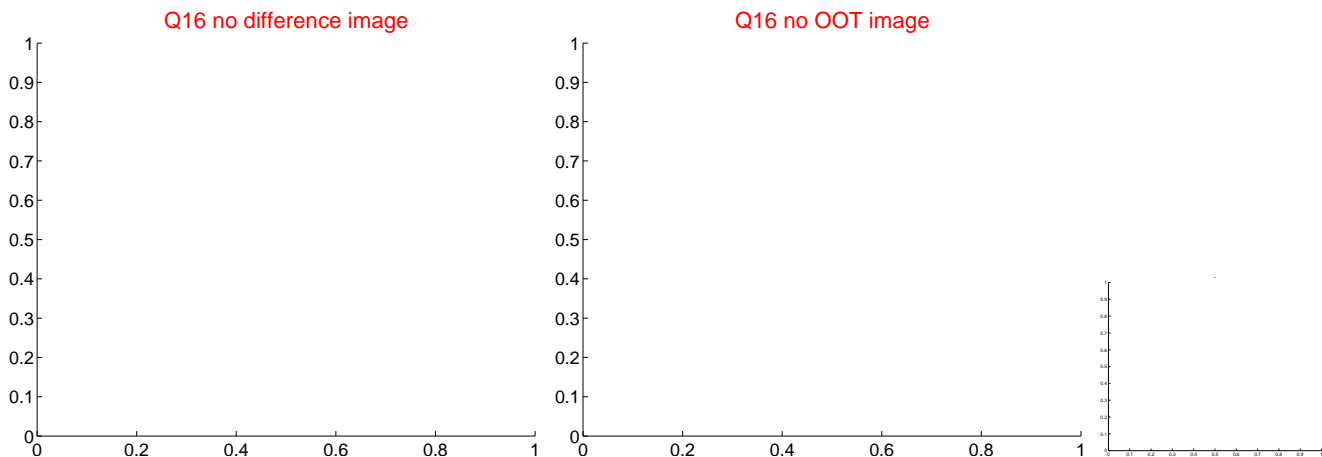
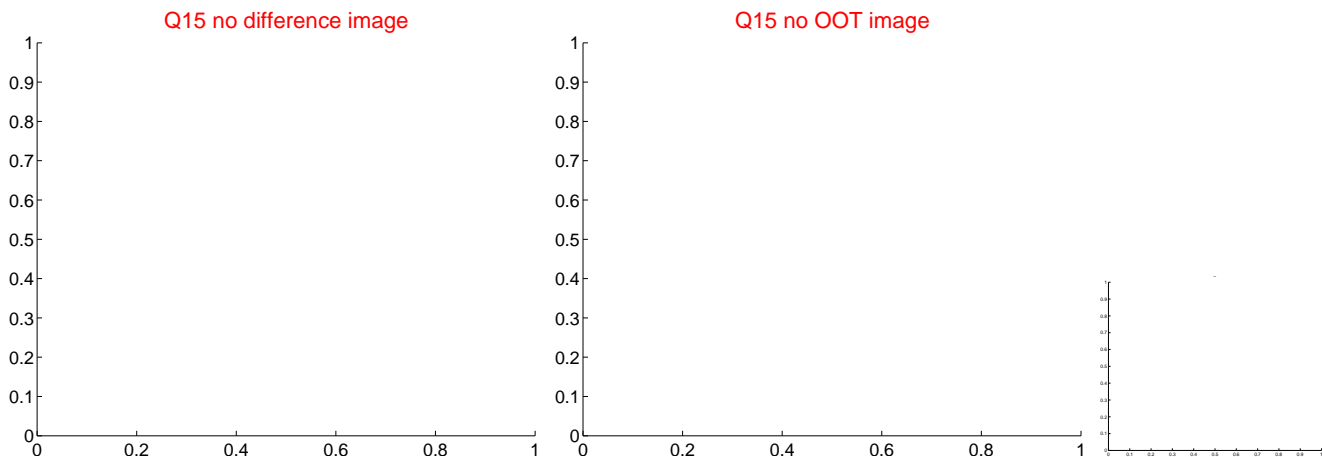
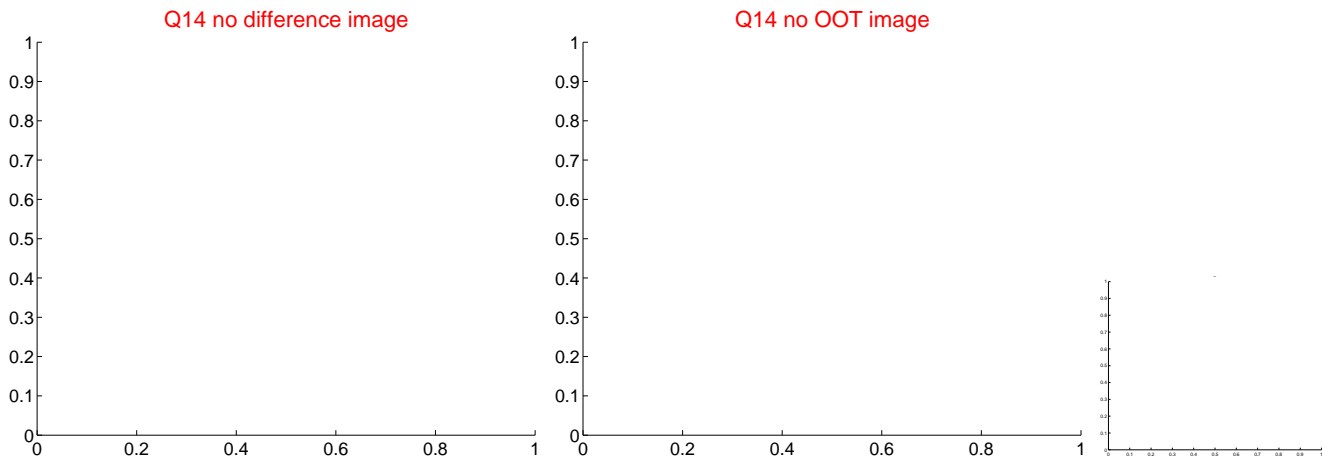
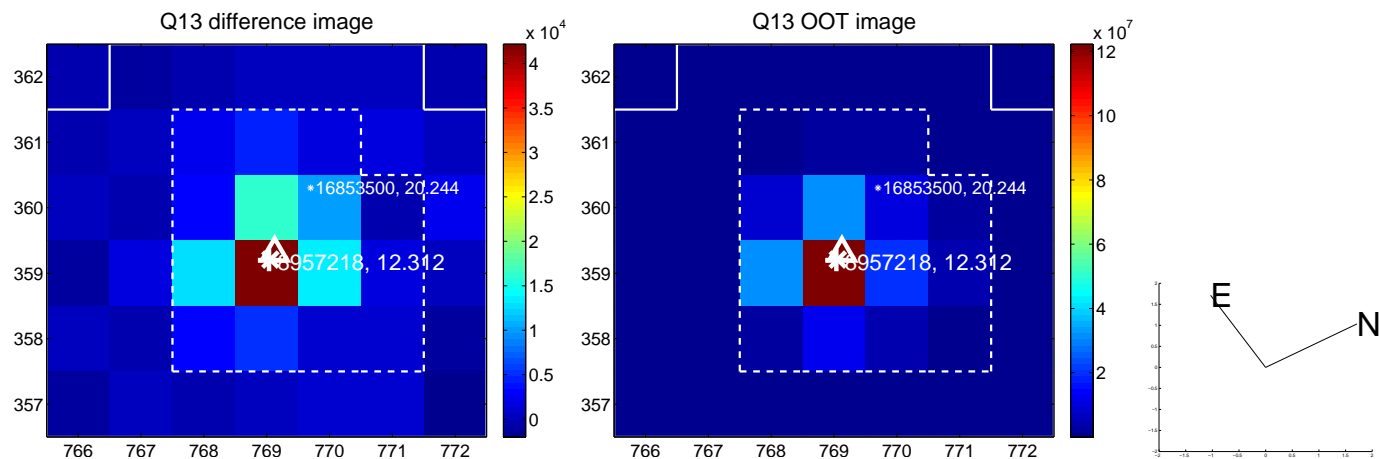
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



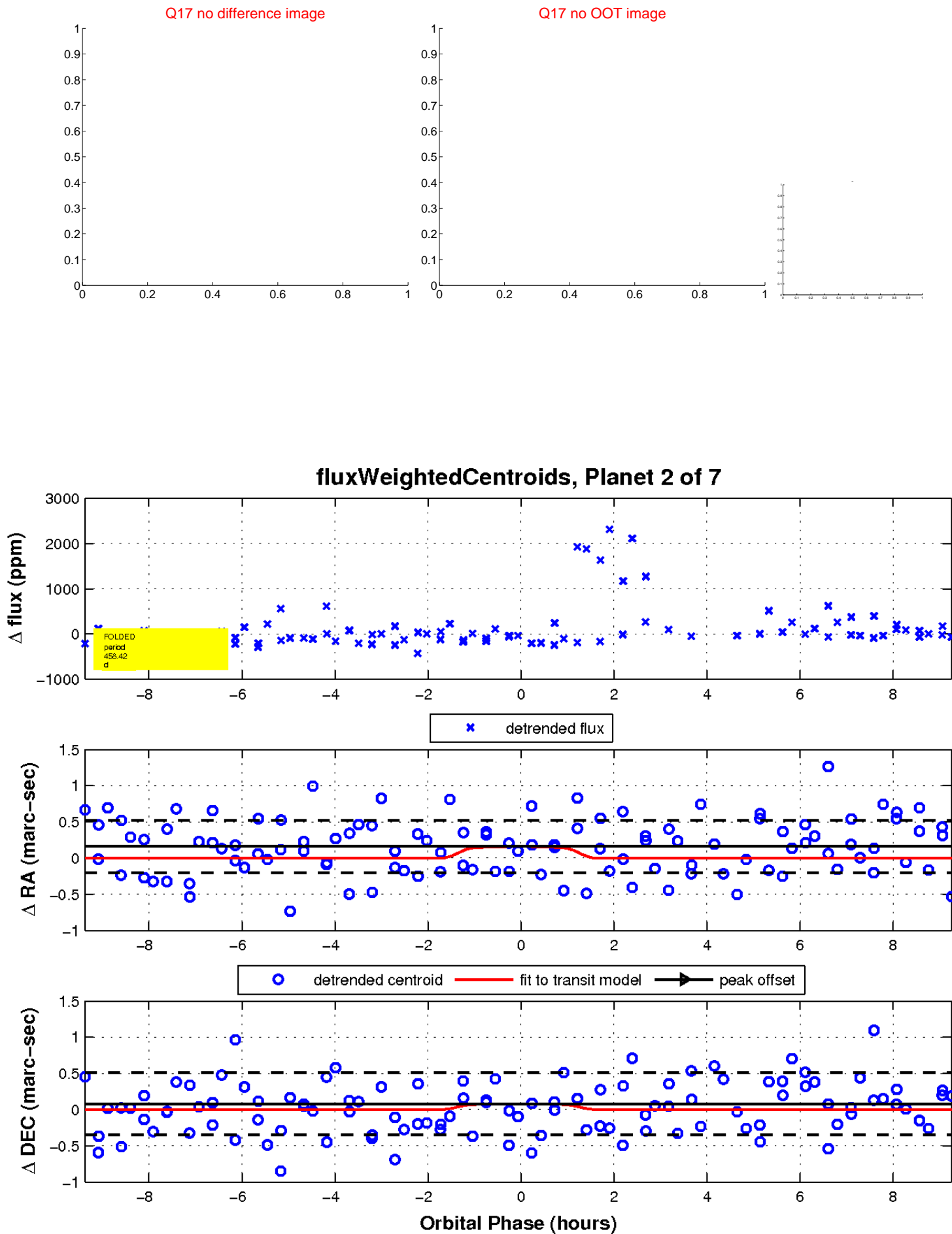
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

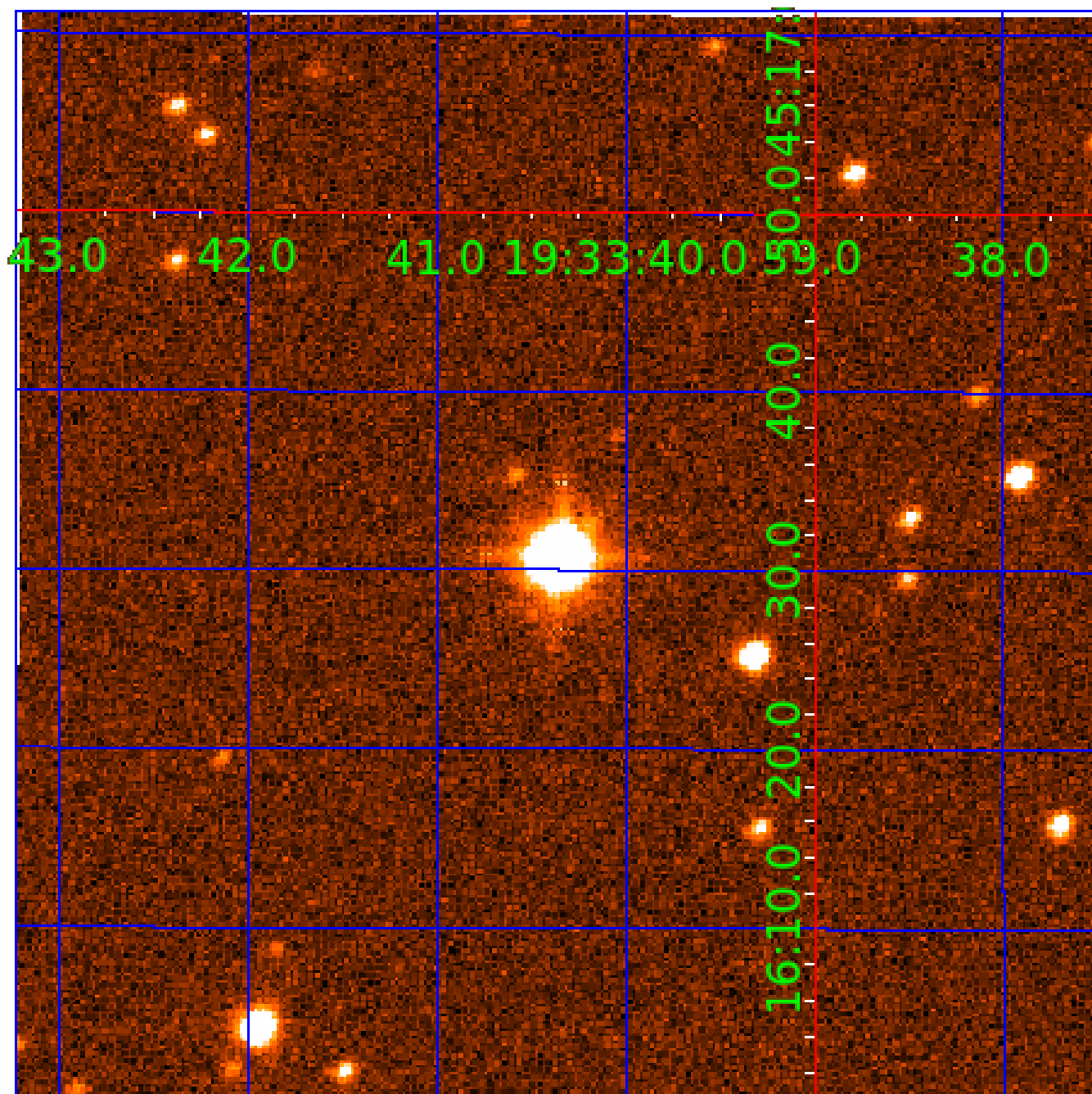


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 008957218

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008957218-01	OBS	No	440.908335	154.829795	516.2	8.318	18.7	7.9	1.61	5477	4.64	1.80
008957218-02	OBS	No	458.416275	285.917787	514.7	3.164	15.9	8.7	1.61	5477	4.52	1.71
008957218-03	OBS	No	578.350781	361.871328	461.2	5.188	14.2	7.7	1.61	5477	4.27	1.25
008957218-04	OBS	No	658.130956	191.906115	361.9	3.295	15.0	6.0	1.61	5477	3.18	1.05
008957218-05	OBS	No	543.299171	379.891554	499.2	3.676	15.7	8.8	1.61	5477	3.78	1.36
008957218-06	OBS	No	483.183255	364.740726	419.4	5.346	15.2	7.1	1.61	5477	4.07	1.59
008957218-07	OBS	No	342.600741	136.217524	373.4	3.500	13.3	-1.0	1.61	5477	3.07	2.52

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008957218-01	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_MARSHALL_ZUMA—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
008957218-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV
008957218-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
008957218-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
008957218-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV
008957218-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
008957218-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_NOFITS

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

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

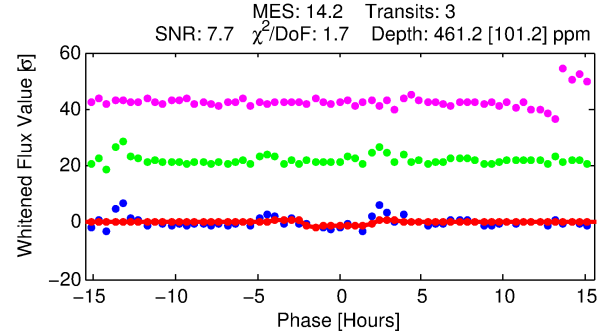
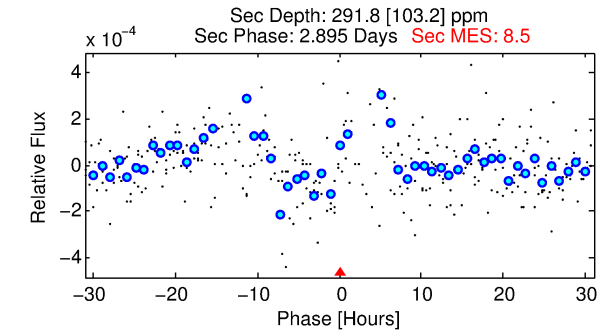
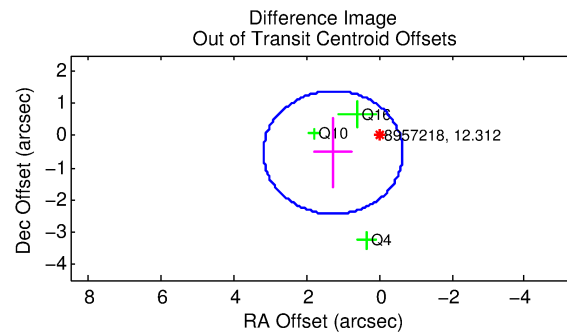
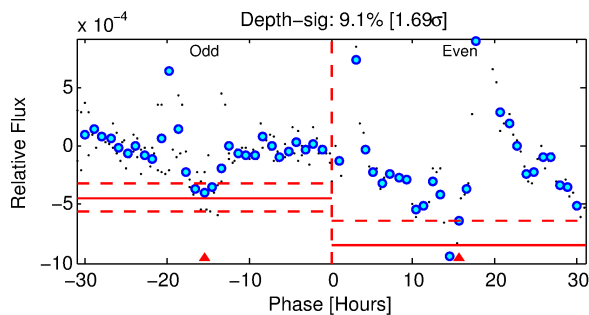
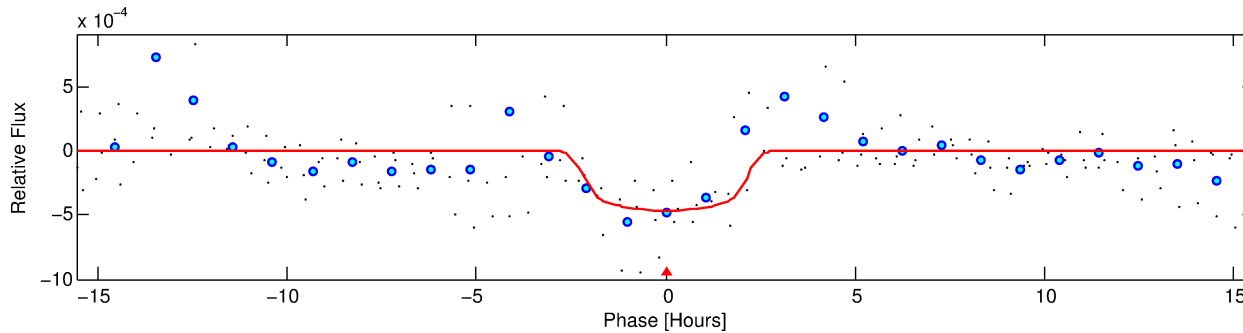
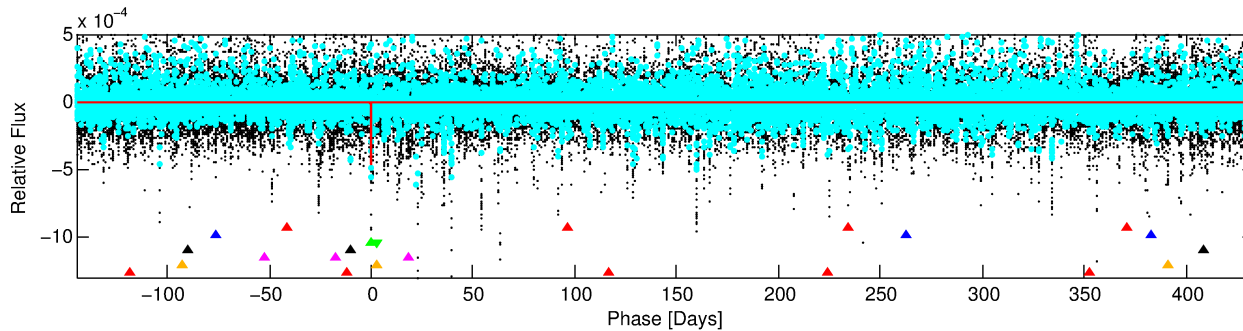
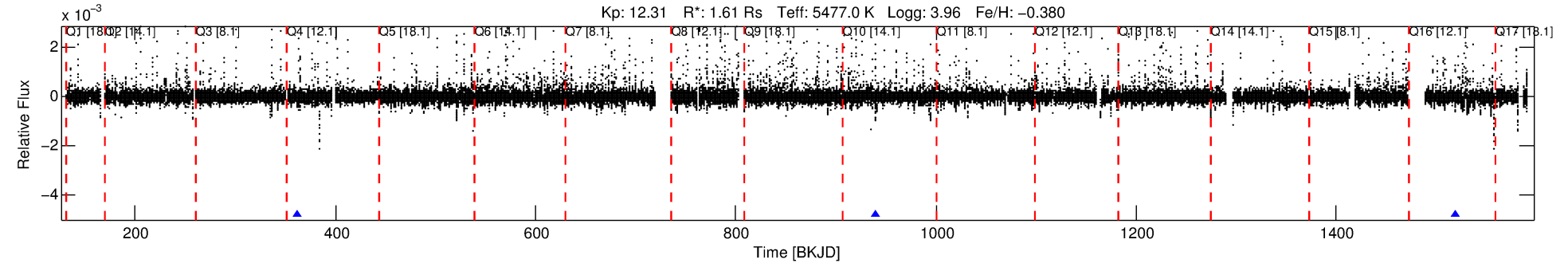
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 008957218-03

No Significant Match Found

# DV One-Page Summary

KIC: 8957218 Candidate: 3 of 7 Period: 578.351 d



## DV Fit Results:

Period = 578.35078 [0.00677] d  
Epoch = 361.8713 [0.0097] BKJD  
Rp/R\* = 0.0244 [0.0044]  
a/R\* = 363.84 [196.70]  
b = 0.93 [0.08]  
Seff = 1.25 [1.24]  
Teq = 270 [67] K  
Rp = 4.27 [2.47] Re  
a = 1.2887 [0.7545] AU  
Ag = 14617.78 [16179.97] [0.90 $\sigma$ ]  
Teffp = 4587 [597] K [7.19 $\sigma$ ]

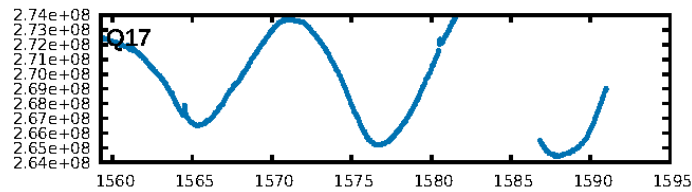
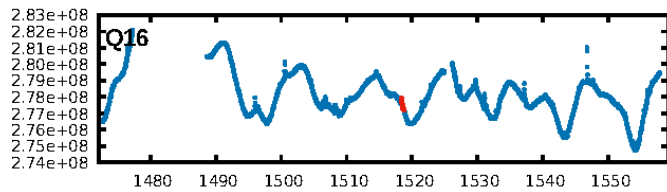
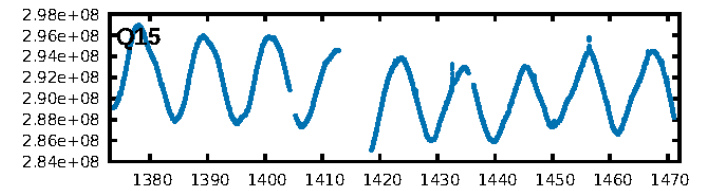
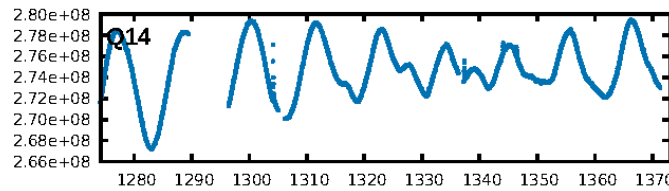
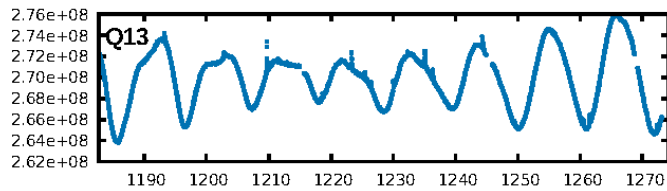
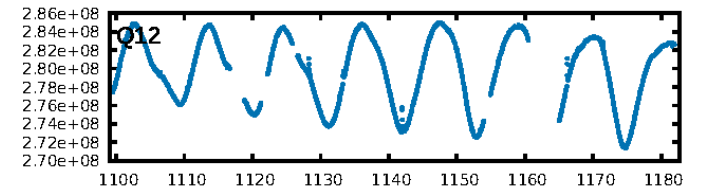
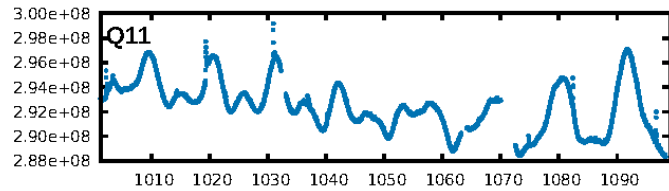
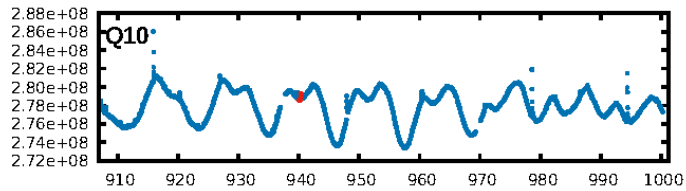
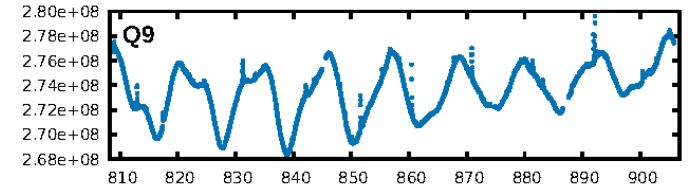
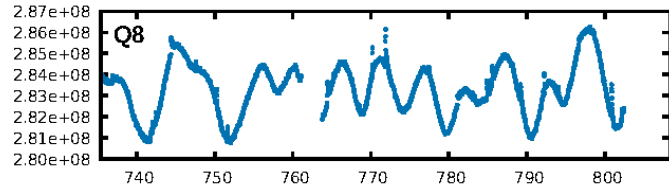
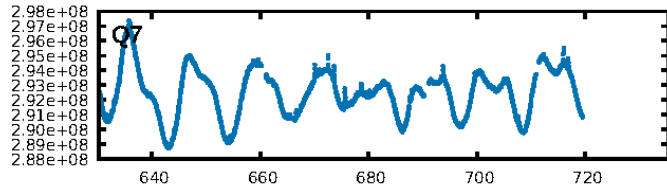
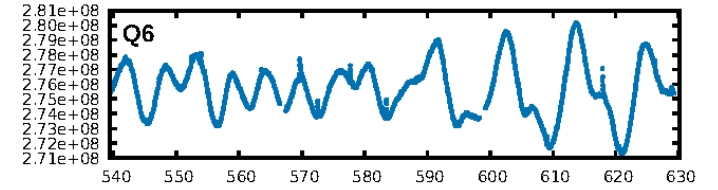
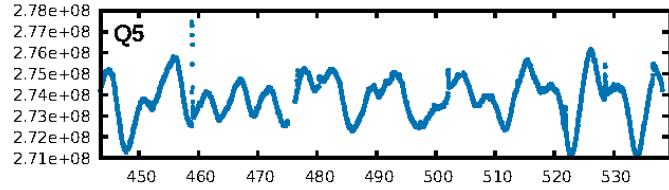
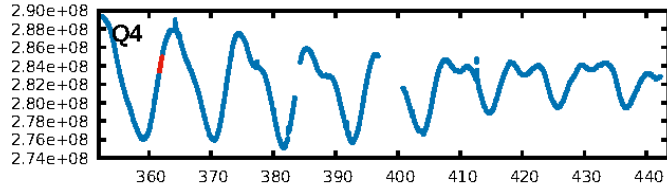
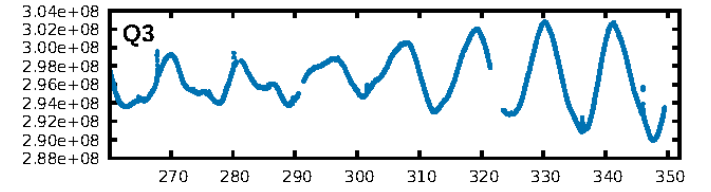
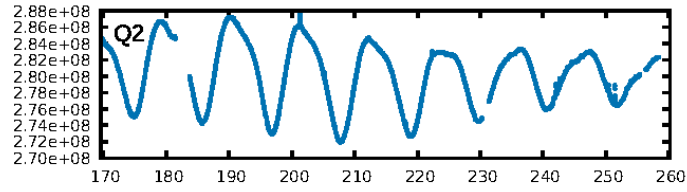
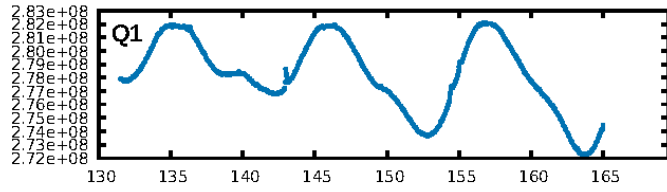
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [132.30 $\sigma$ ]  
LongPeriod-sig: 100.0% [311.54 $\sigma$ ]  
ModelChiSquare2-sig: 0.1%  
ModelChiSquareGof-sig: 15.5%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 4.453  
Centroid-sig: 20.6%  
Centroid-so: 0.575 arcsec [1.01 $\sigma$ ]  
OotOffset-rm: 1.376 arcsec [2.15 $\sigma$ ]  
OotOffset-st: 1/0/2/0 [3]  
KicOffset-rm: 1.397 arcsec [2.07 $\sigma$ ]  
KicOffset-st: 1/0/2/0 [3]  
DiffImageQuality-fgm: 0.67 [2/3]  
DiffImageOverlap-fno: 1.00 [3/3]

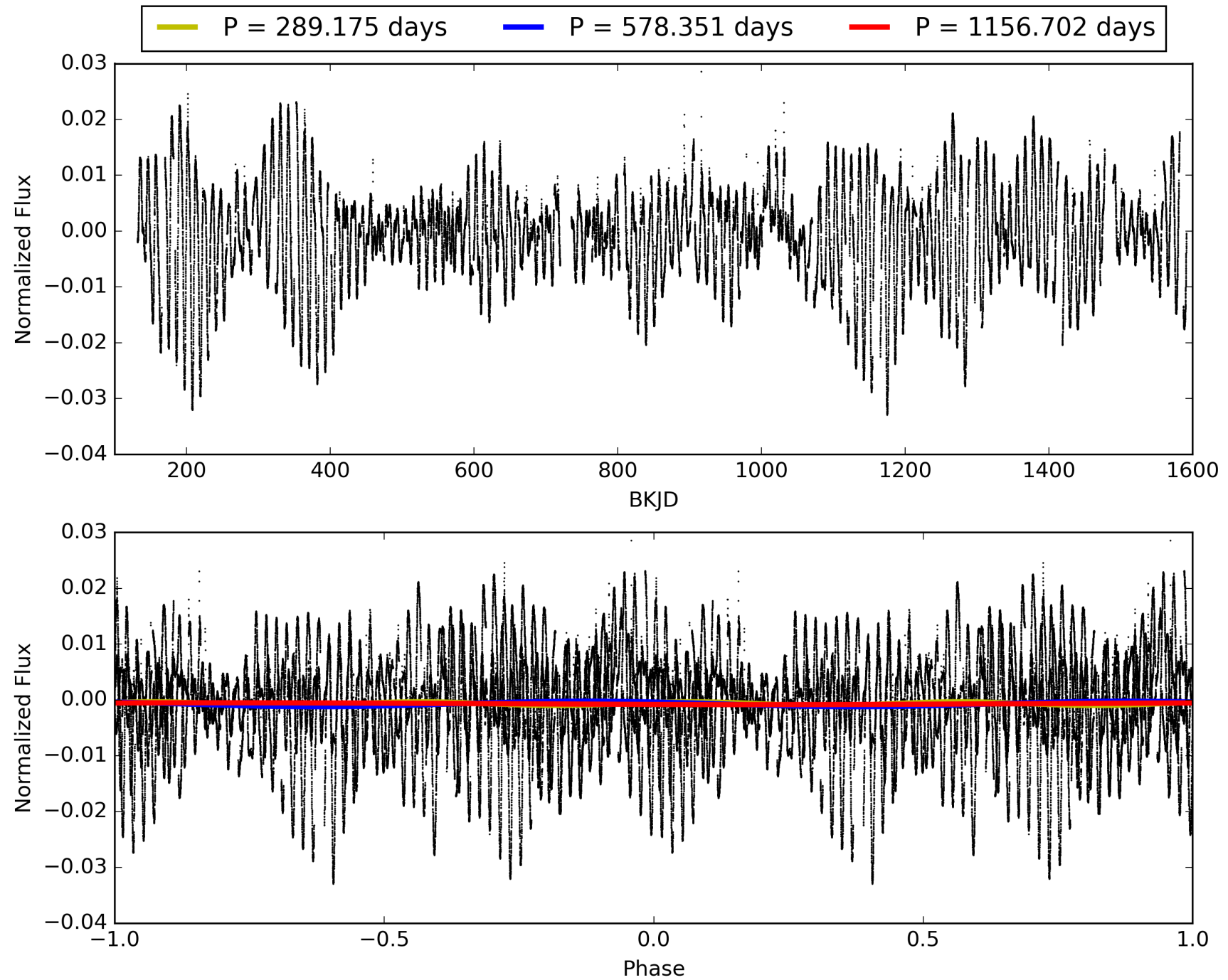
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 23:49:42 Z

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

# TCE 008957218-03, PDC Light Curves

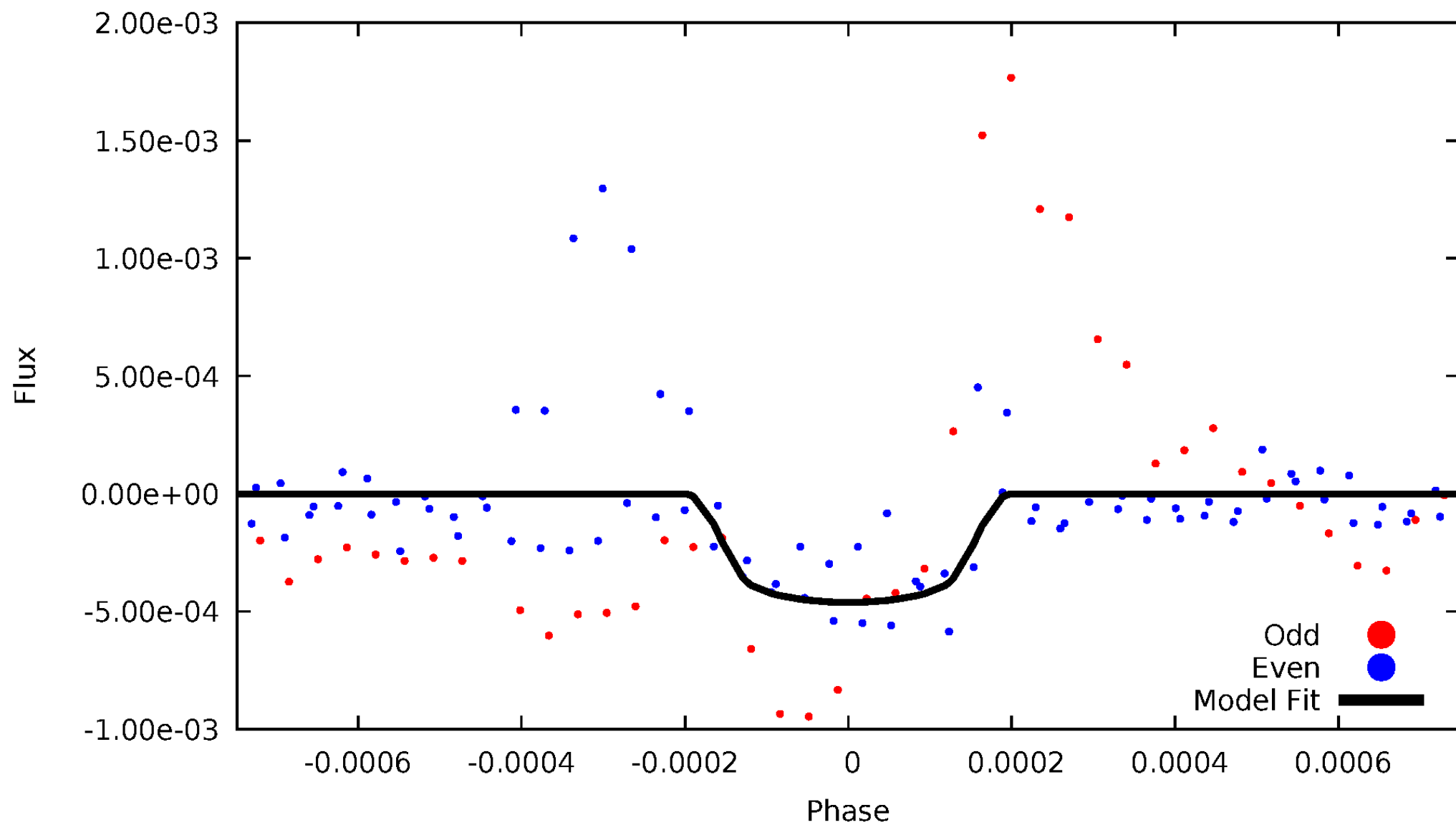


# TCE 008957218-03



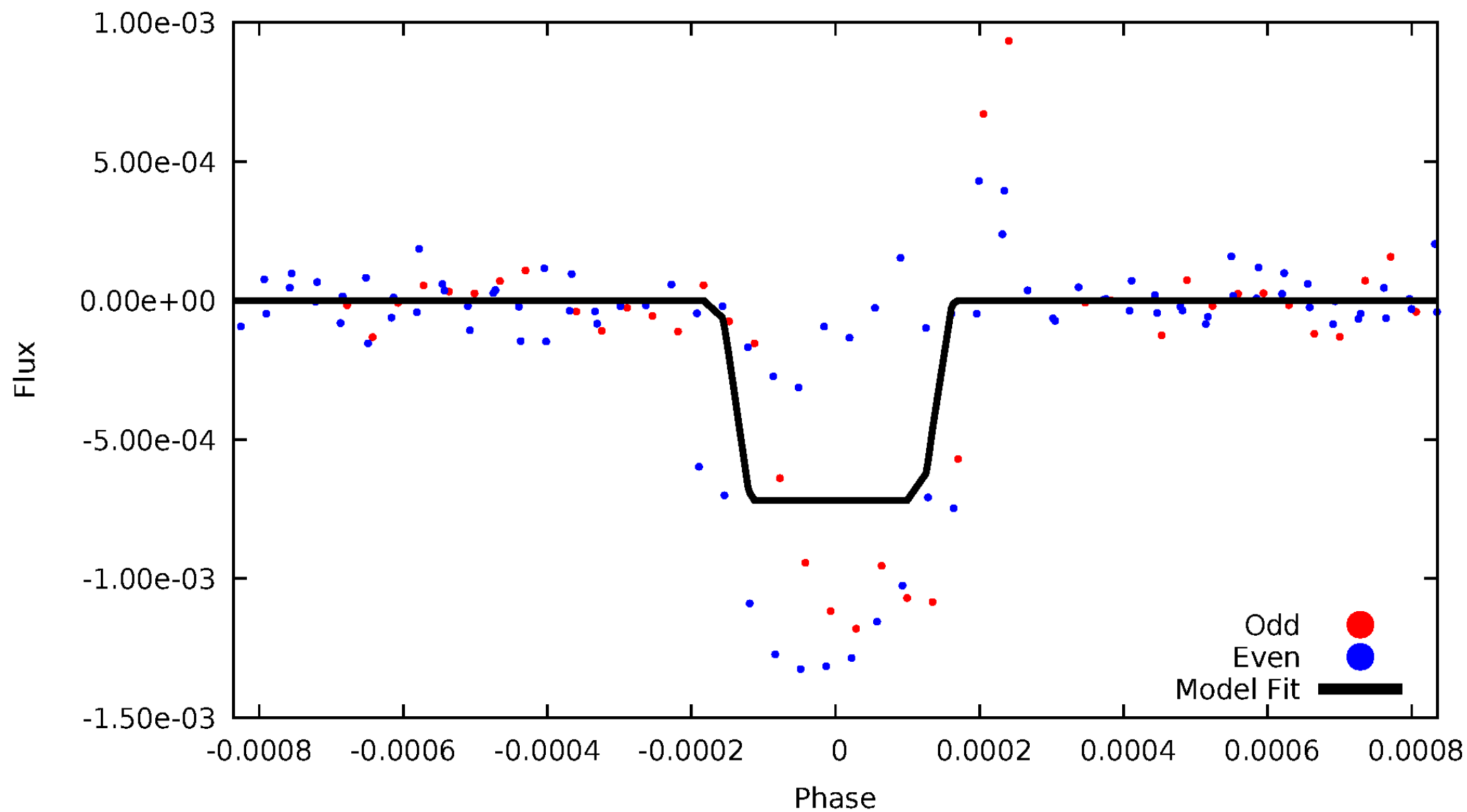
# DV Odd/Even

TCE 008957218-03



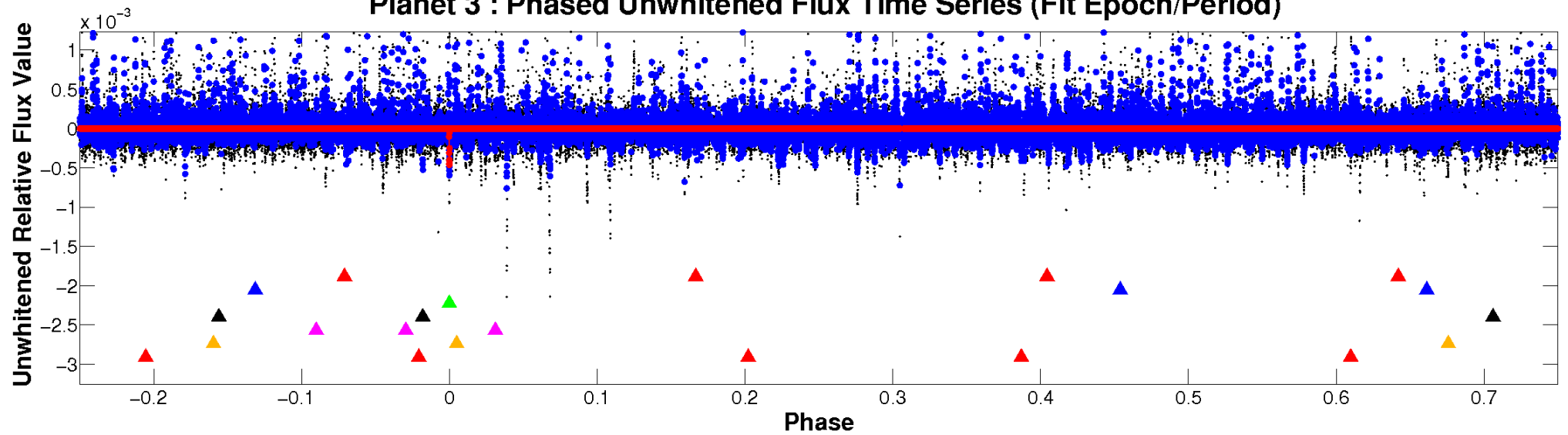
# ALT Odd/Even

TCE 008957218-03

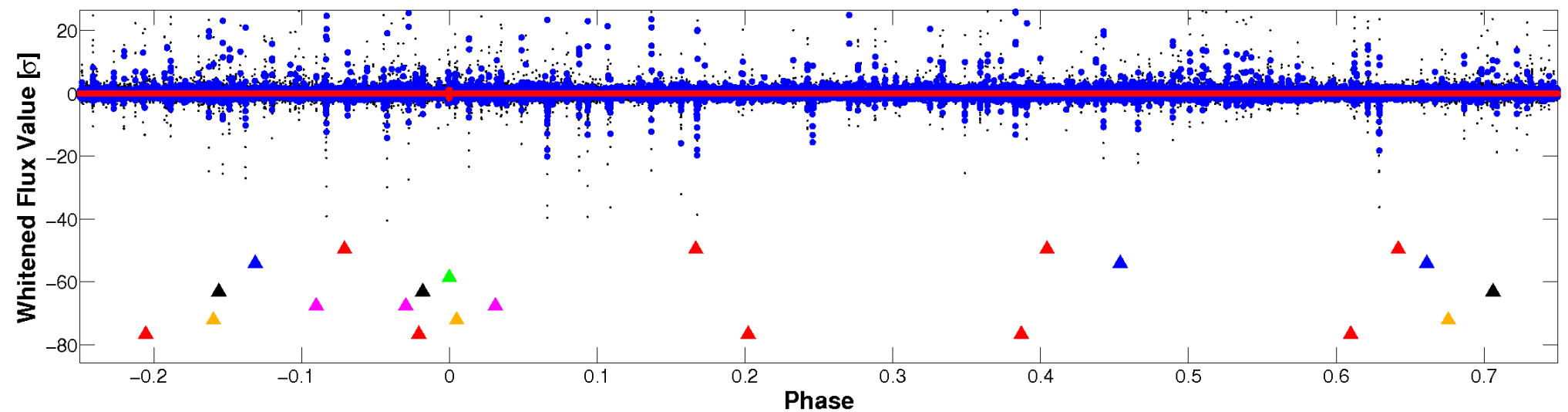


# Non-Whitened Vs. Whitened Light Curve

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

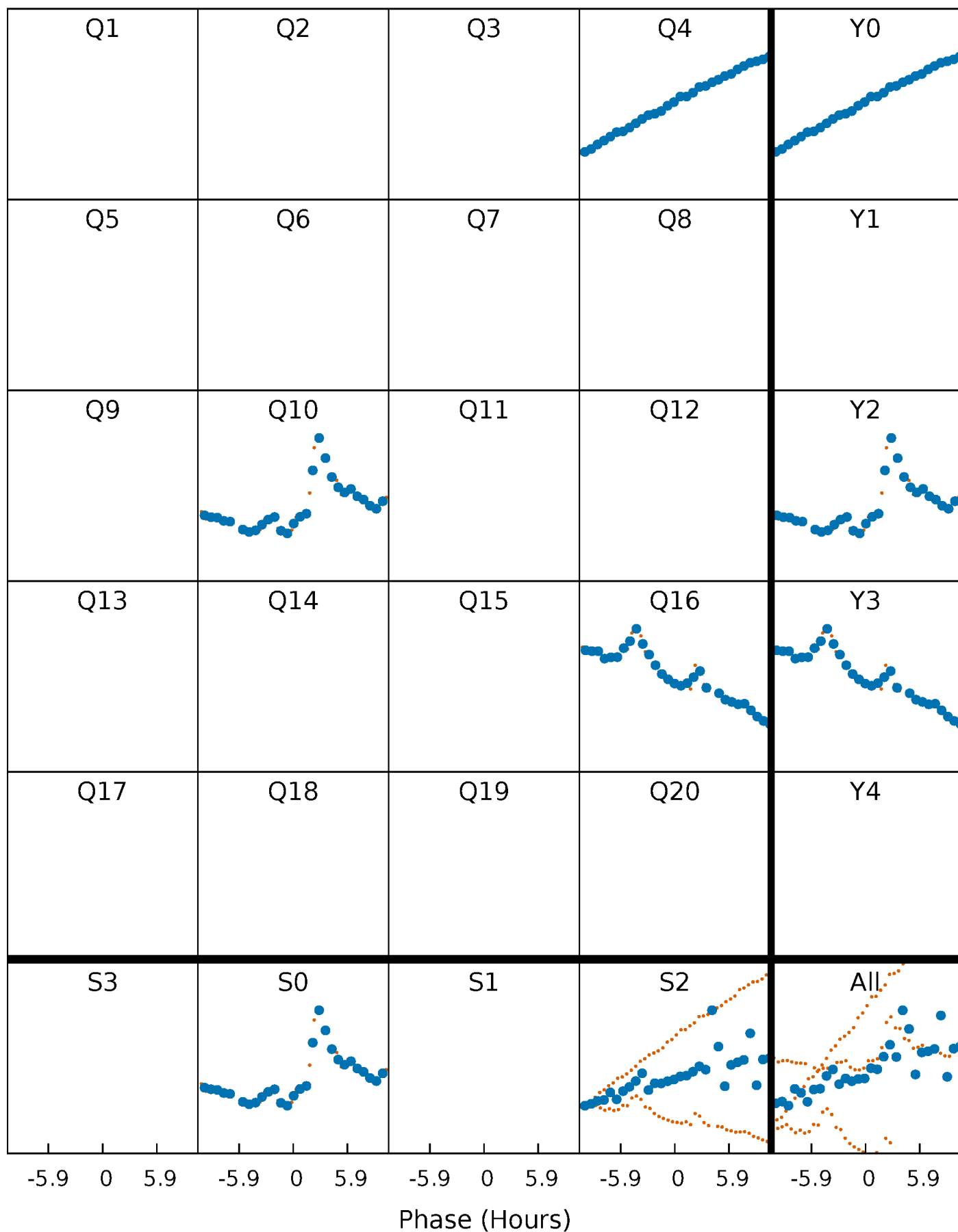


## Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



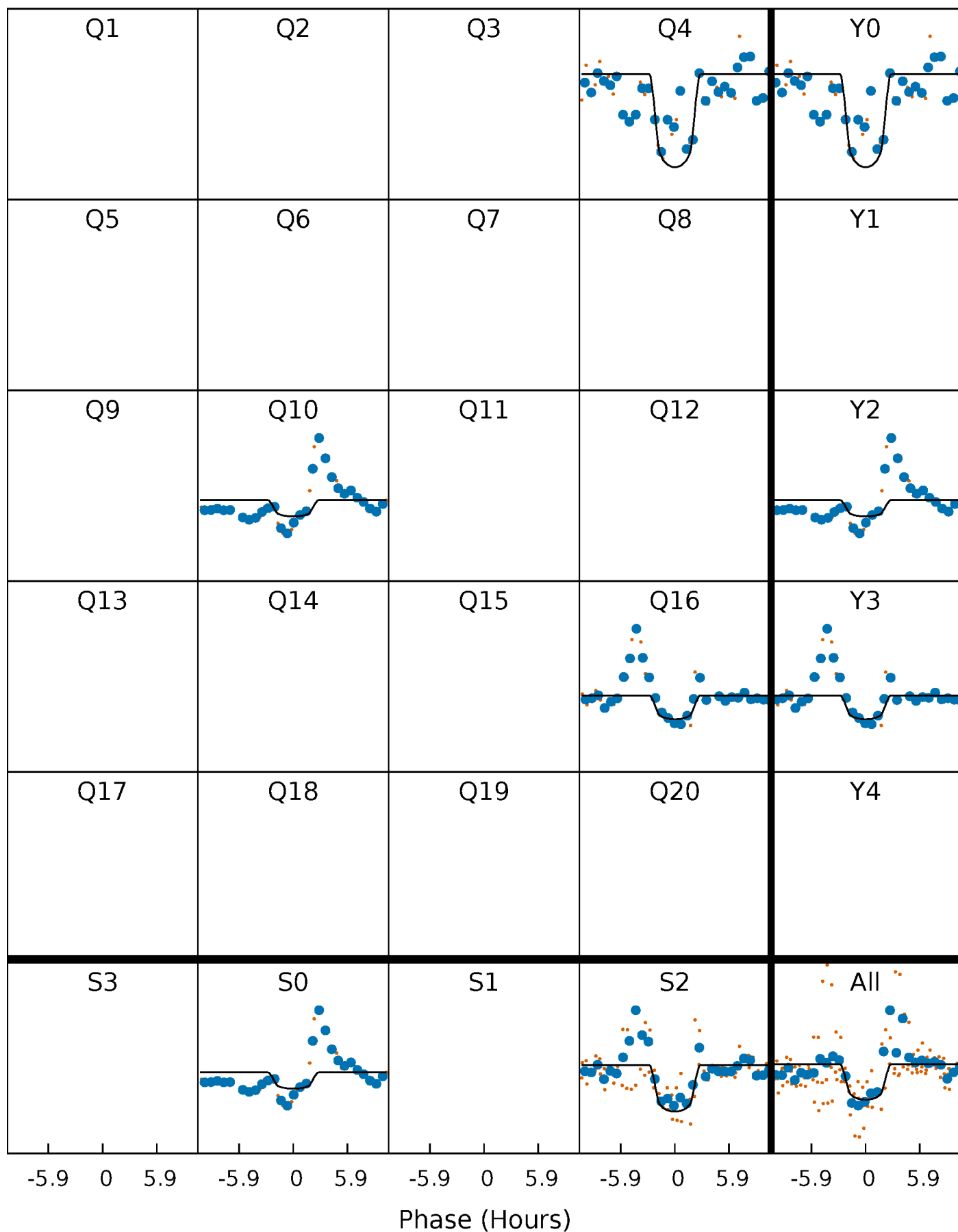
# PDC Quarter-Phased Transit Curves

TCE 008957218-03 P=578.350781 Days  $T_0=361.871328$  (BKJD)



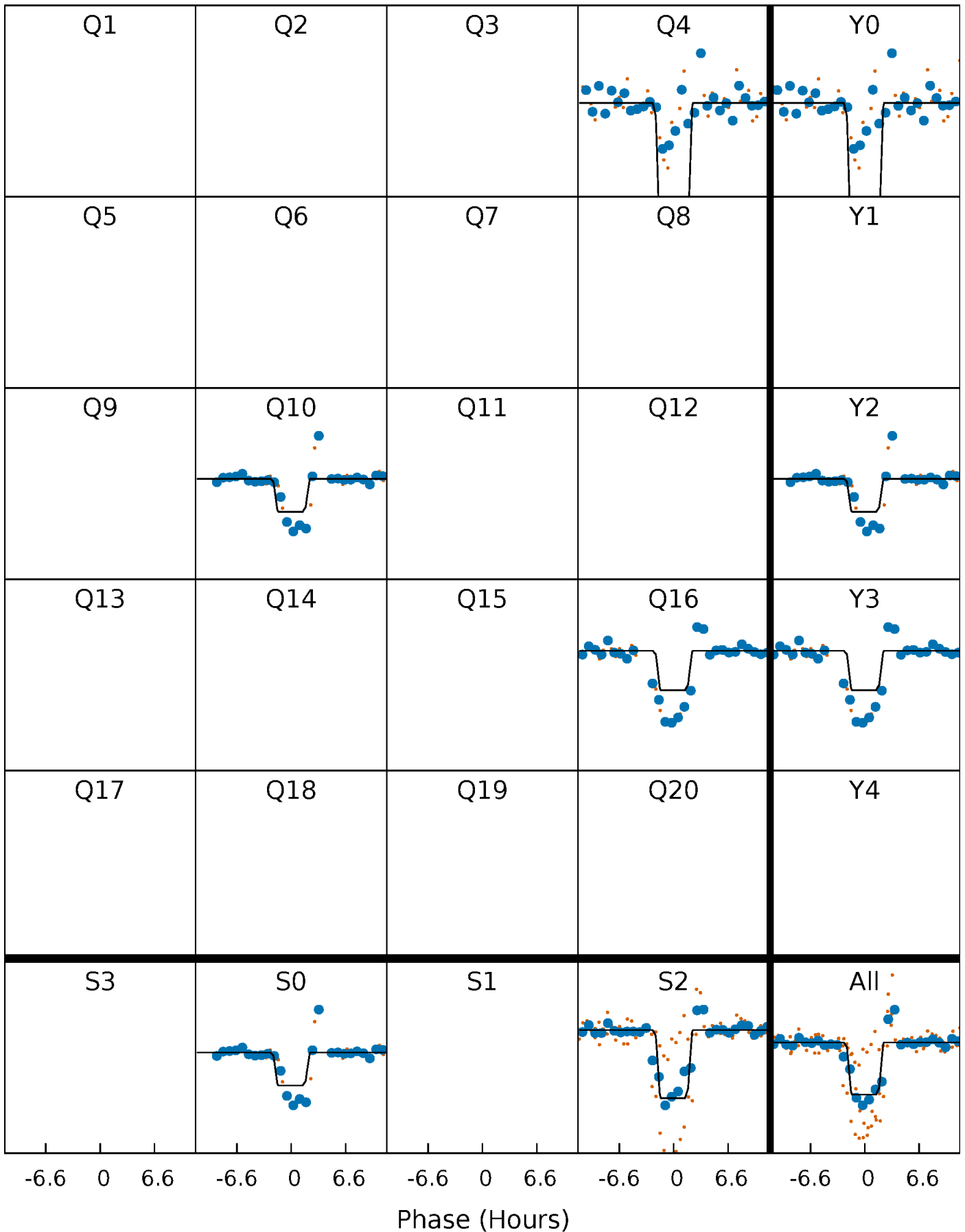
# DV Quarter-Phased Transit Curves

TCE 008957218-03 P=578.350781 Days  $T_0=361.871328$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

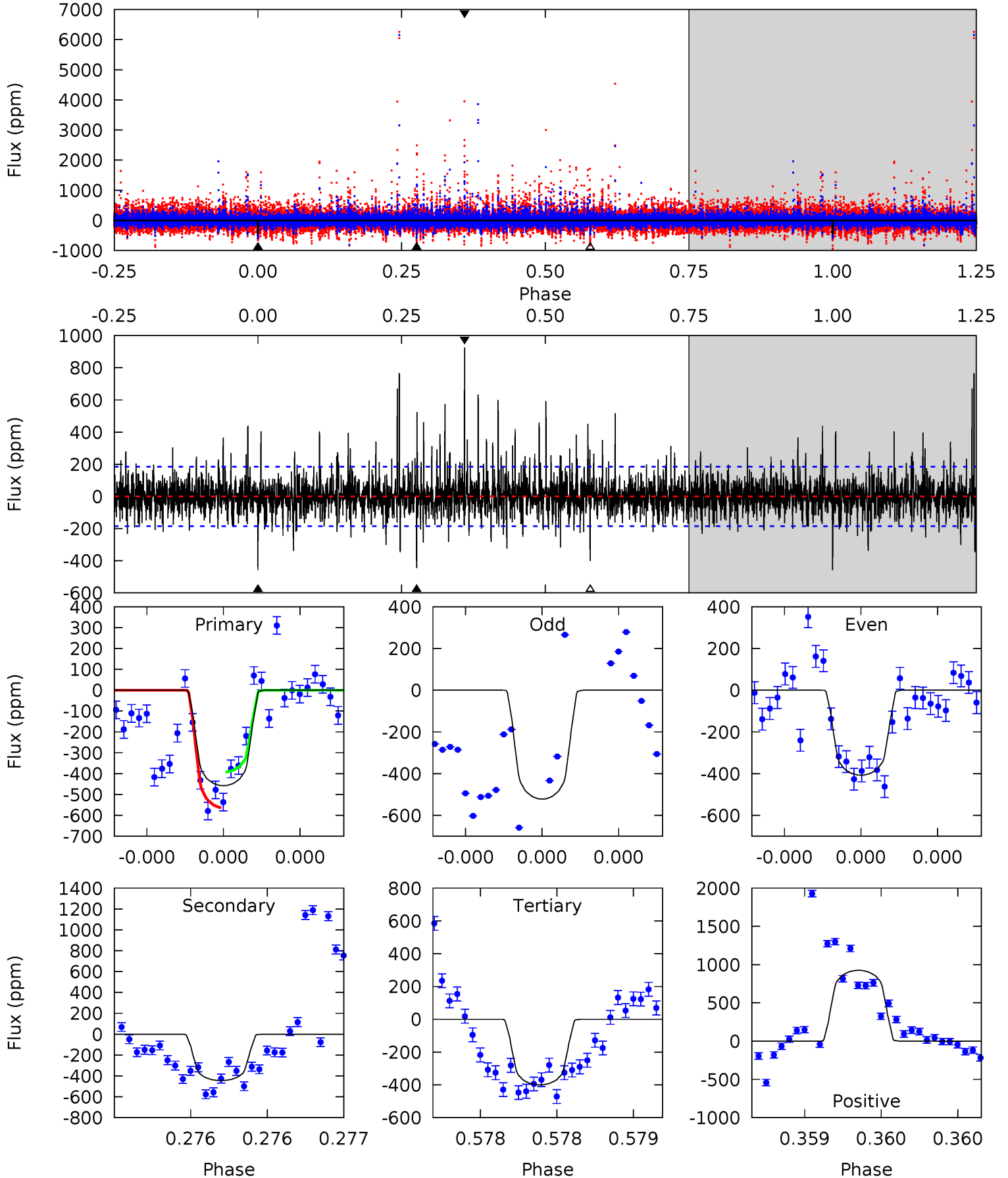
TCE 008957218-03 P=578.351482 Days  $T_0=361.846471$  (BKJD)



# DV Model-Shift Uniqueness Test

008957218-03, P = 578.350781 Days, E = 361.871328 Days

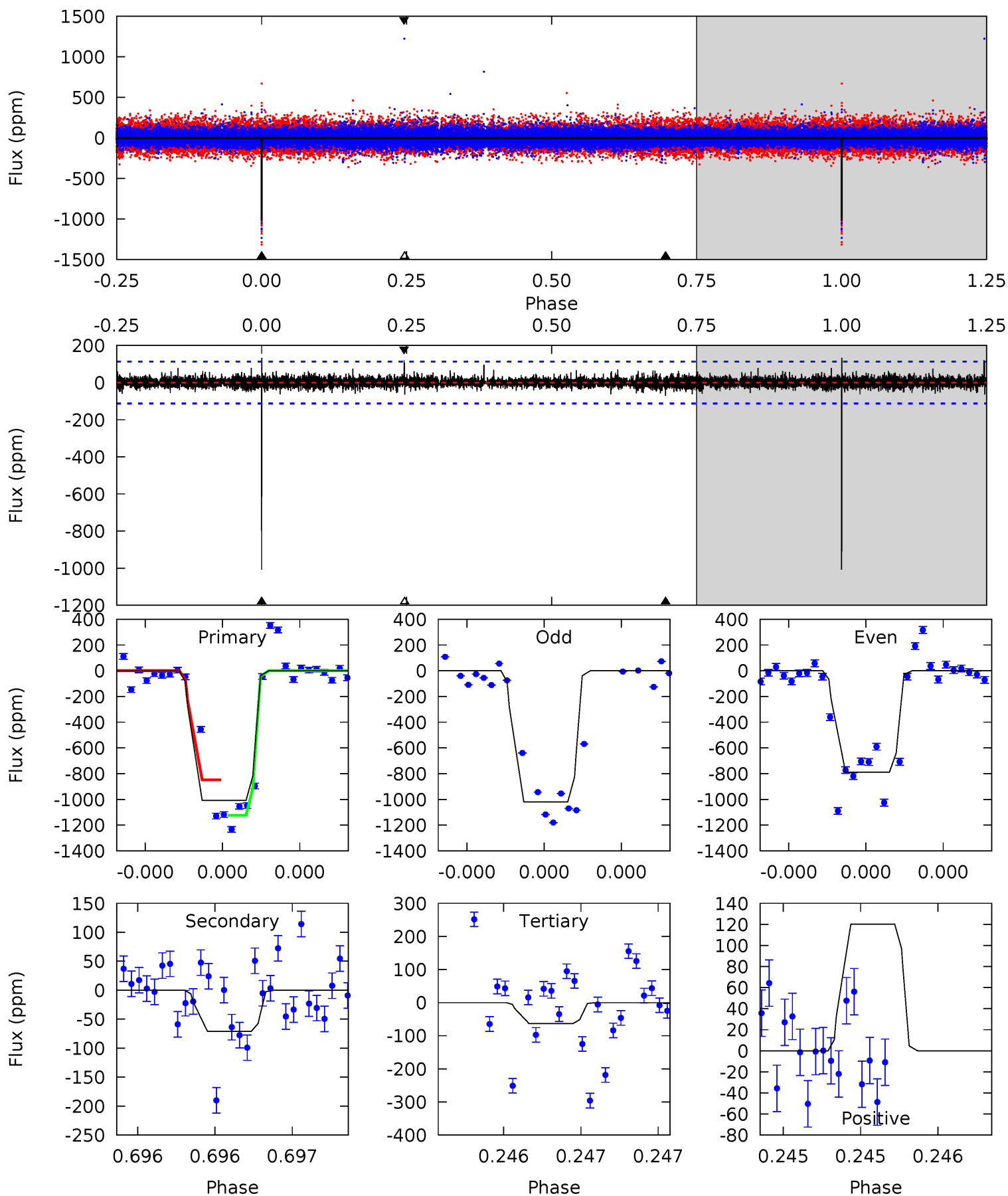
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.8	13.4	12.1	28.0	5.60	3.53	2.60	1.74	-14.1	1.34	-14.5	0.84	0.94	0.67	2.56



# Alt Model-Shift Uniqueness Test

008957218-03, P = 578.351482 Days, E = 361.846471 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
50.4	3.55	3.16	6.01	5.65	3.59	0.72	47.2	44.4	0.38	-2.46	5.70	0.82	0.12	6.80



### Stellar Parameters For KIC 008957218

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5477^{+164}_{-148}$	$3.957^{+0.595}_{-0.255}$	$-0.380^{+0.350}_{-0.250}$	$1.607^{+0.803}_{-0.883}$	$0.853^{+0.116}_{-0.095}$	$0.290^{+2.152}_{-0.169}$
	+3%/-3%	+15%/-6%	+92%/-66%	+50%/-55%	+14%/-11%	+743%/-58%
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 008957218-03 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-444 \pm 33$	$4.10^{+1.39}_{-1.35}$	$374^{+44}_{-57}$	$5131^{+565}_{-346}$	$24564^{+29031}_{-10910}$
Alt.	$-71 \pm 20$	$4.44^{+1.44}_{-1.40}$	$369^{+44}_{-58}$	$3510^{+306}_{-233}$	$3253^{+3785}_{-1626}$

$T_{max}$  = Theoretical Maximum Planetary Temperature

$T_{obs}$  = Observed Planetary Temperature (Assuming  $A=0.3$ )

$A_{obs}$  = Observed Albedo (Assuming  $T=0$ )

If a secondary eclipse is present, the system is likely an EB if  $T_{obs} \gg T_{max}$  AND  $A_{obs} \gg 1.0$

## DV Centroid Data

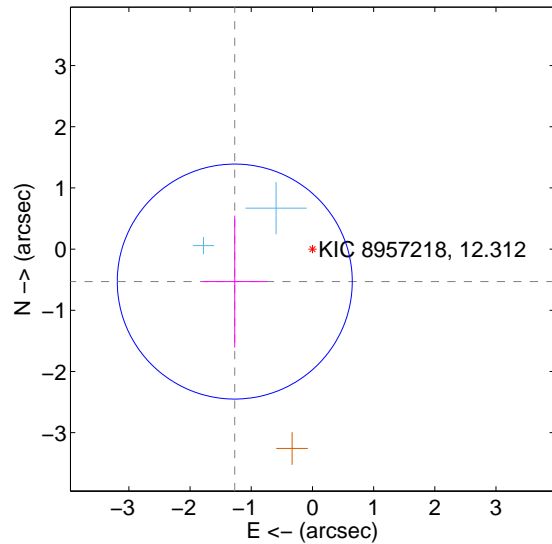
Supplemental centroid analysis for 008957218-03. Kepler magnitude: 12.31. Transit SNR 7.70

There are 2 quarters with good PRF difference image offsets

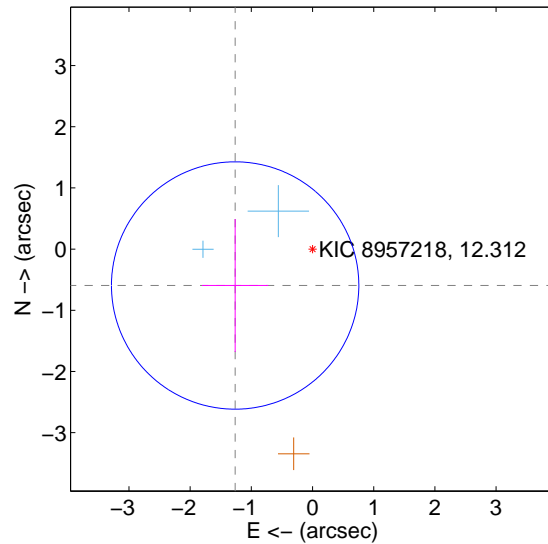
The direct PRF centroid is offset from the target star catalog position by about 0.06 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.376 \pm 0.640$	2.15	$1.269 \pm 0.527$	$-0.531 \pm 1.078$
PRF-fit source offset from KIC position	$1.397 \pm 0.674$	2.07	$1.265 \pm 0.541$	$-0.595 \pm 1.087$
photometric centroid source offset	$0.57 \pm 0.57$	1.01	$0.50 \pm 0.59$	$0.28 \pm 0.50$

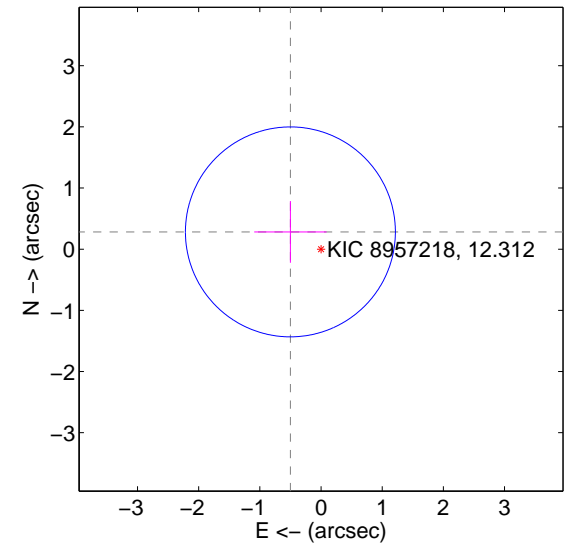
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

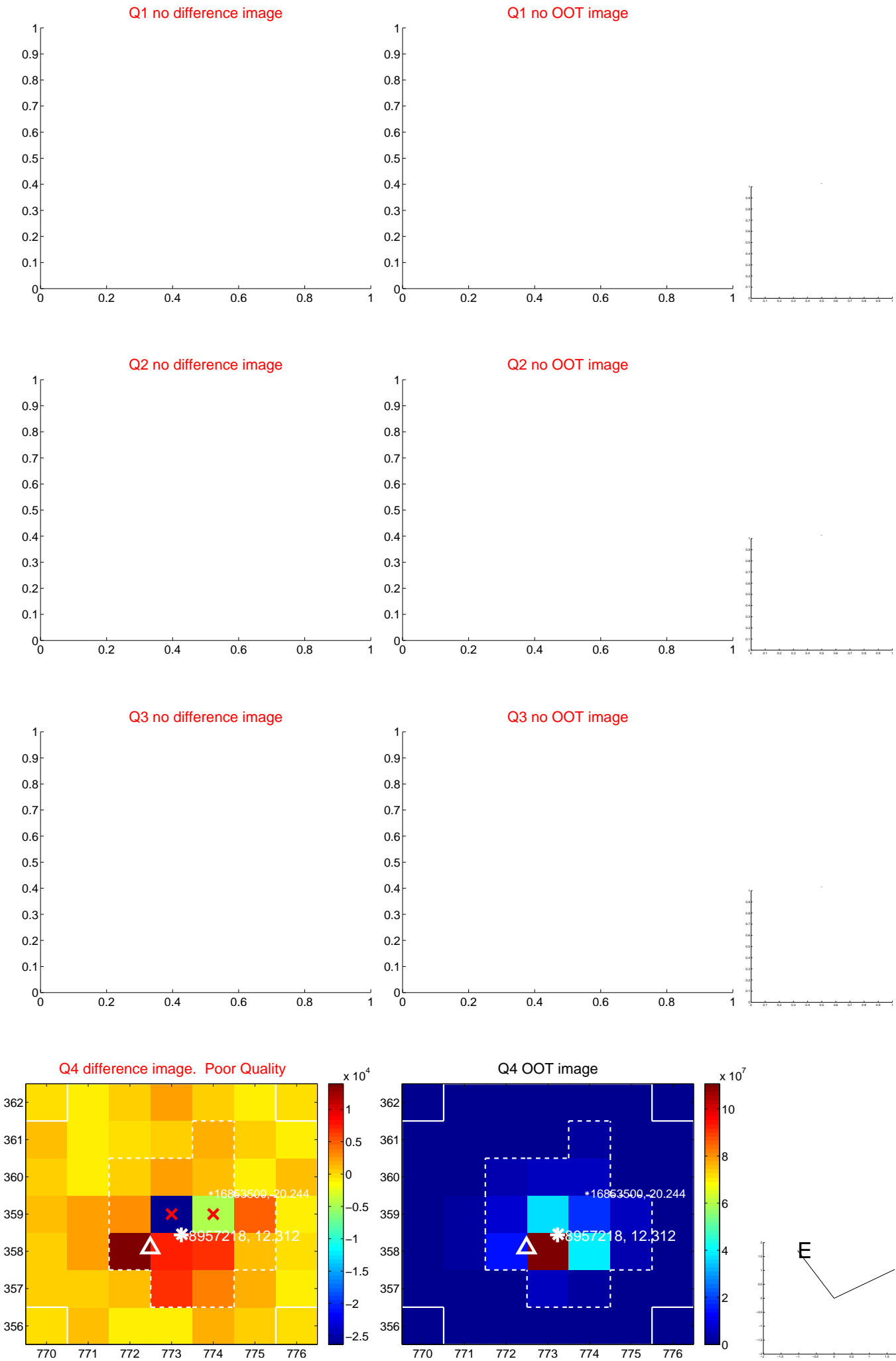


offset from photometric centroids

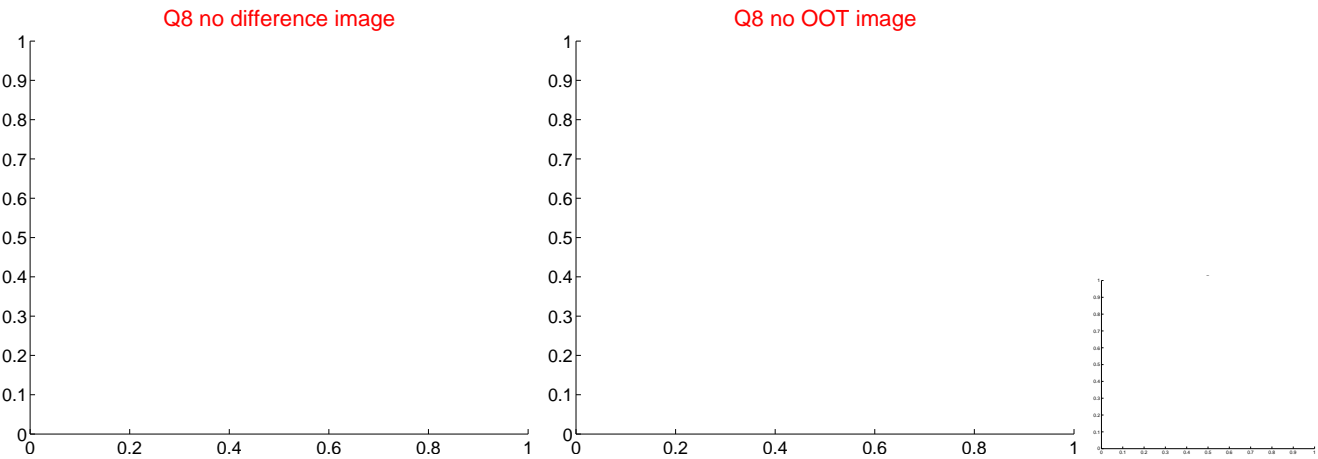
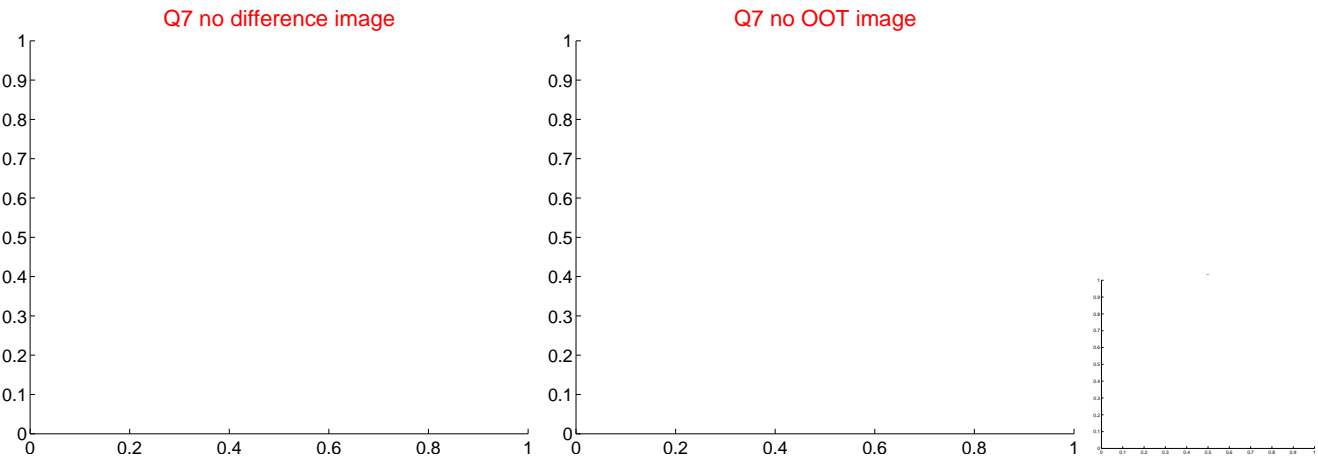
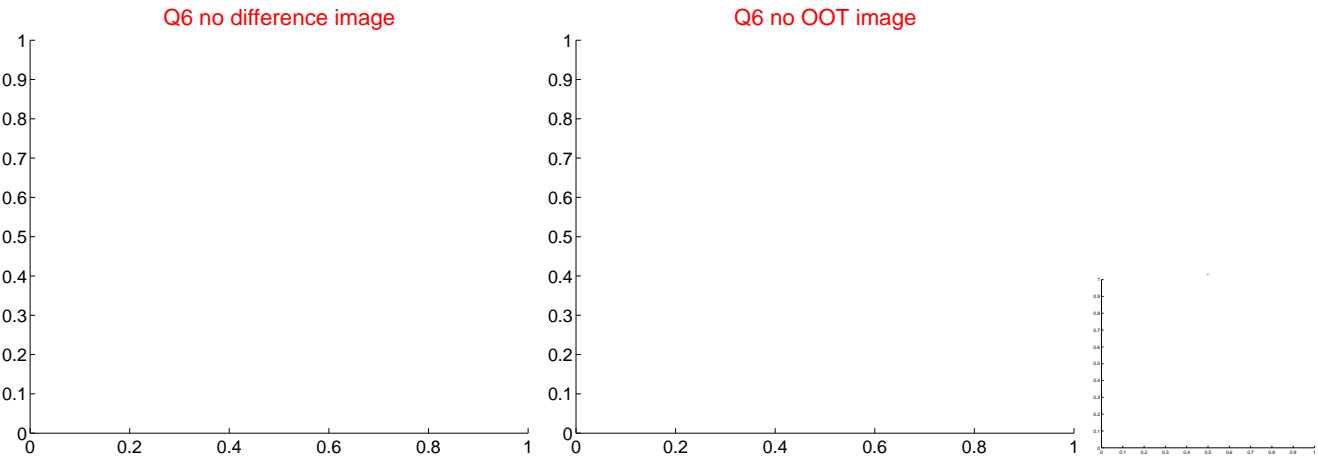
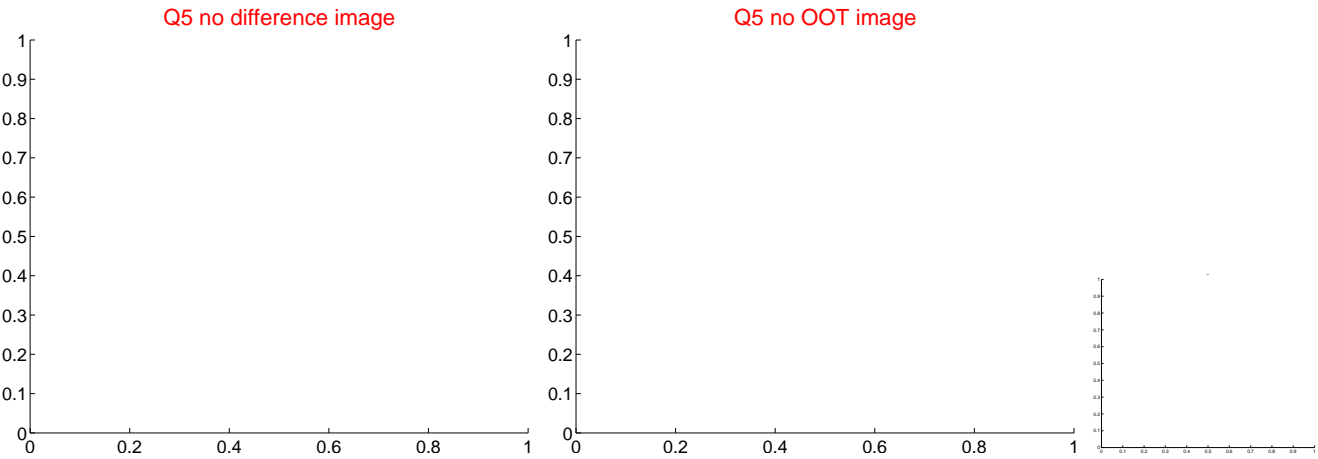


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

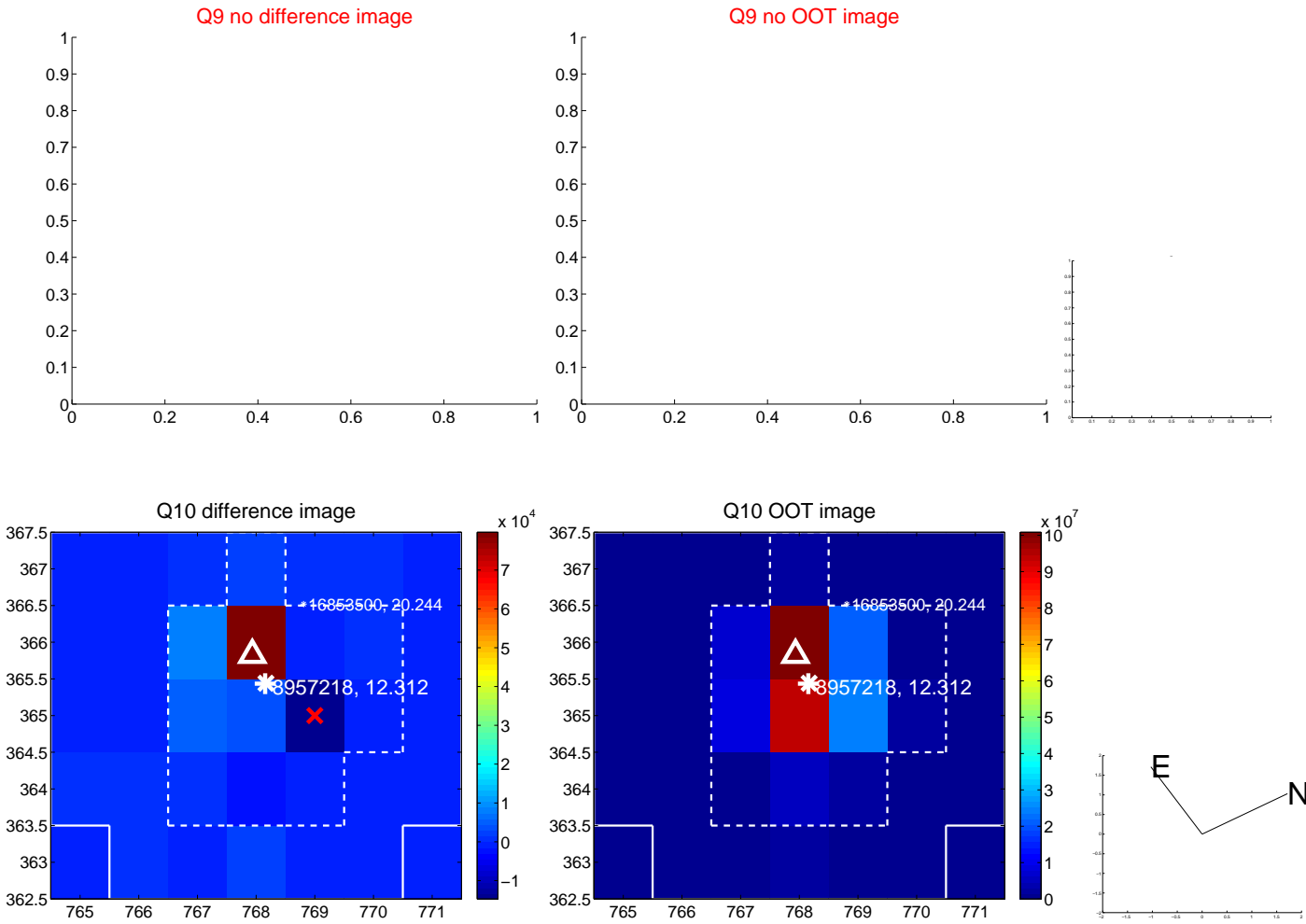
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



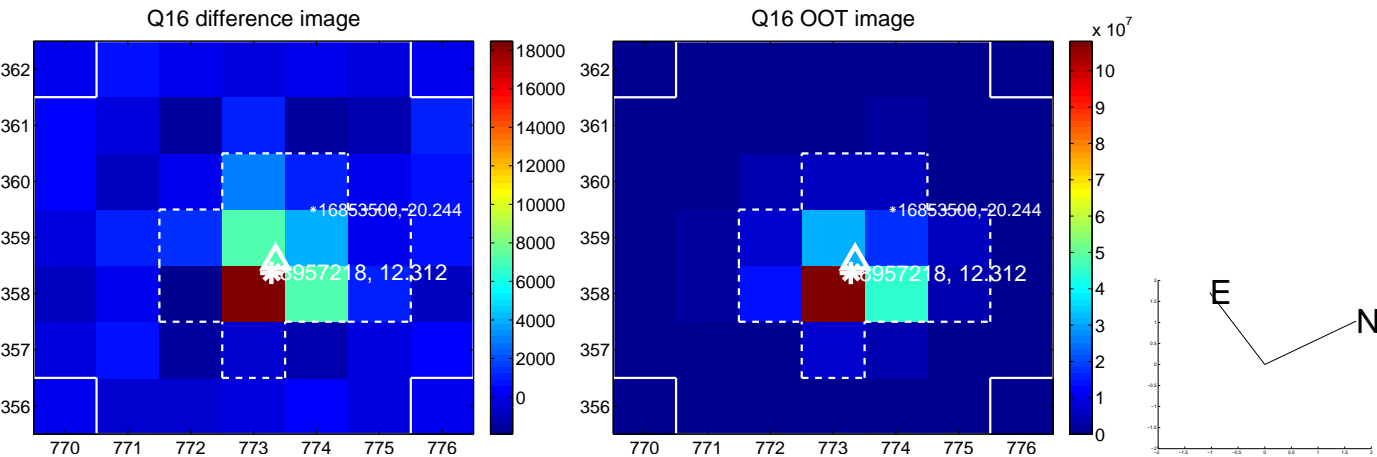
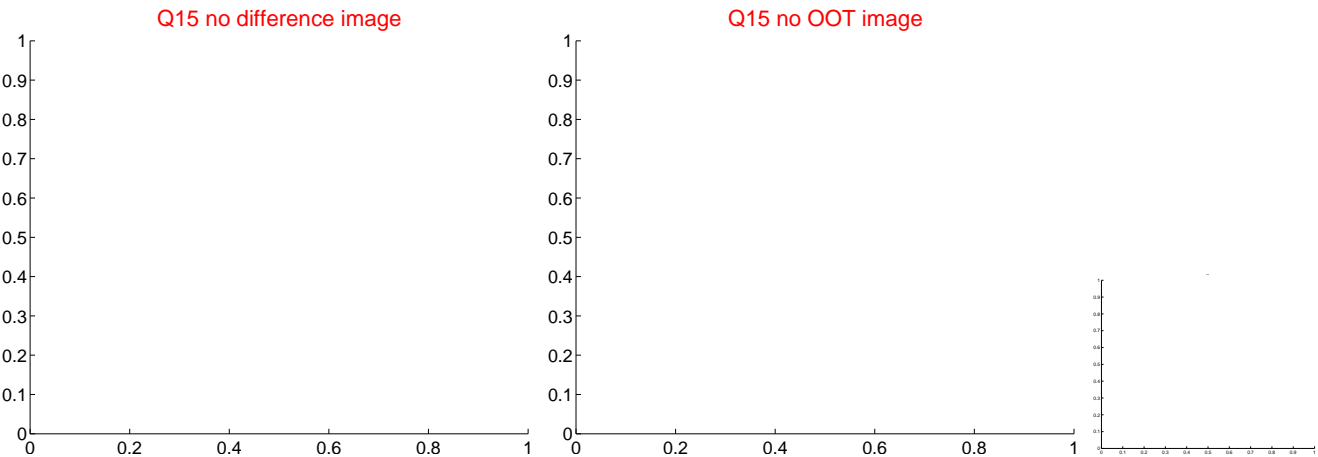
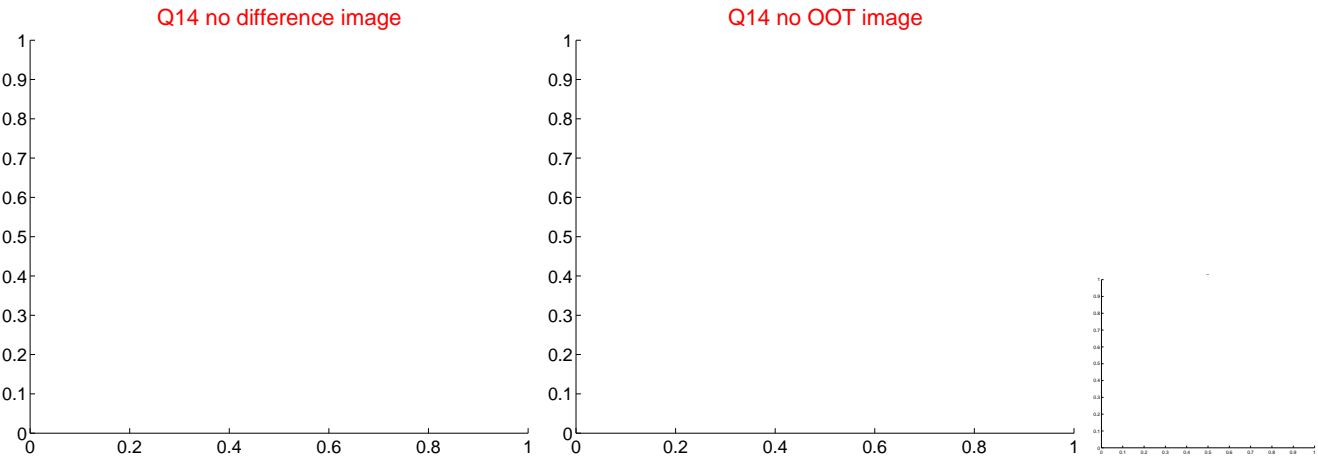
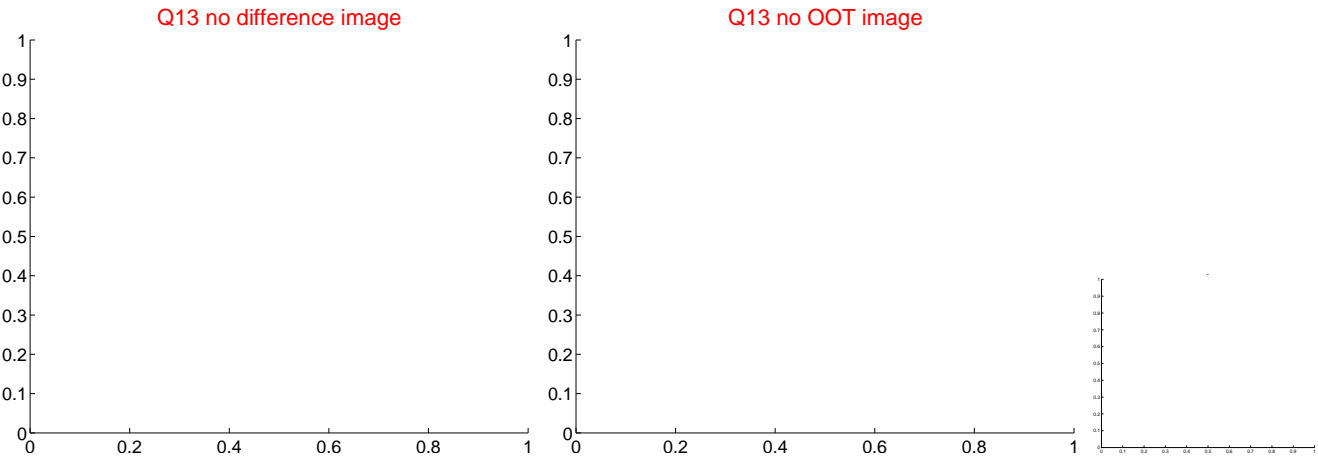
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



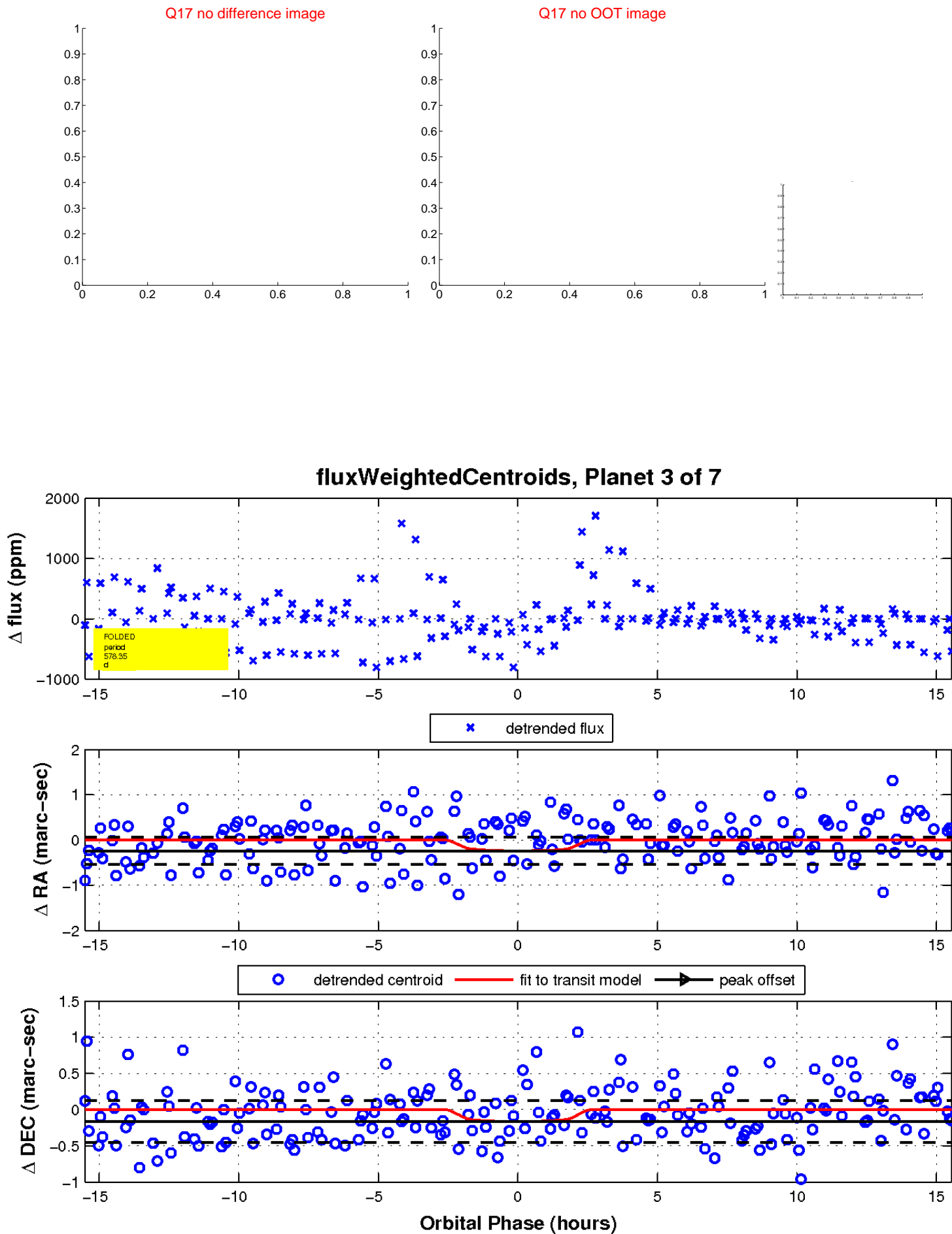
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

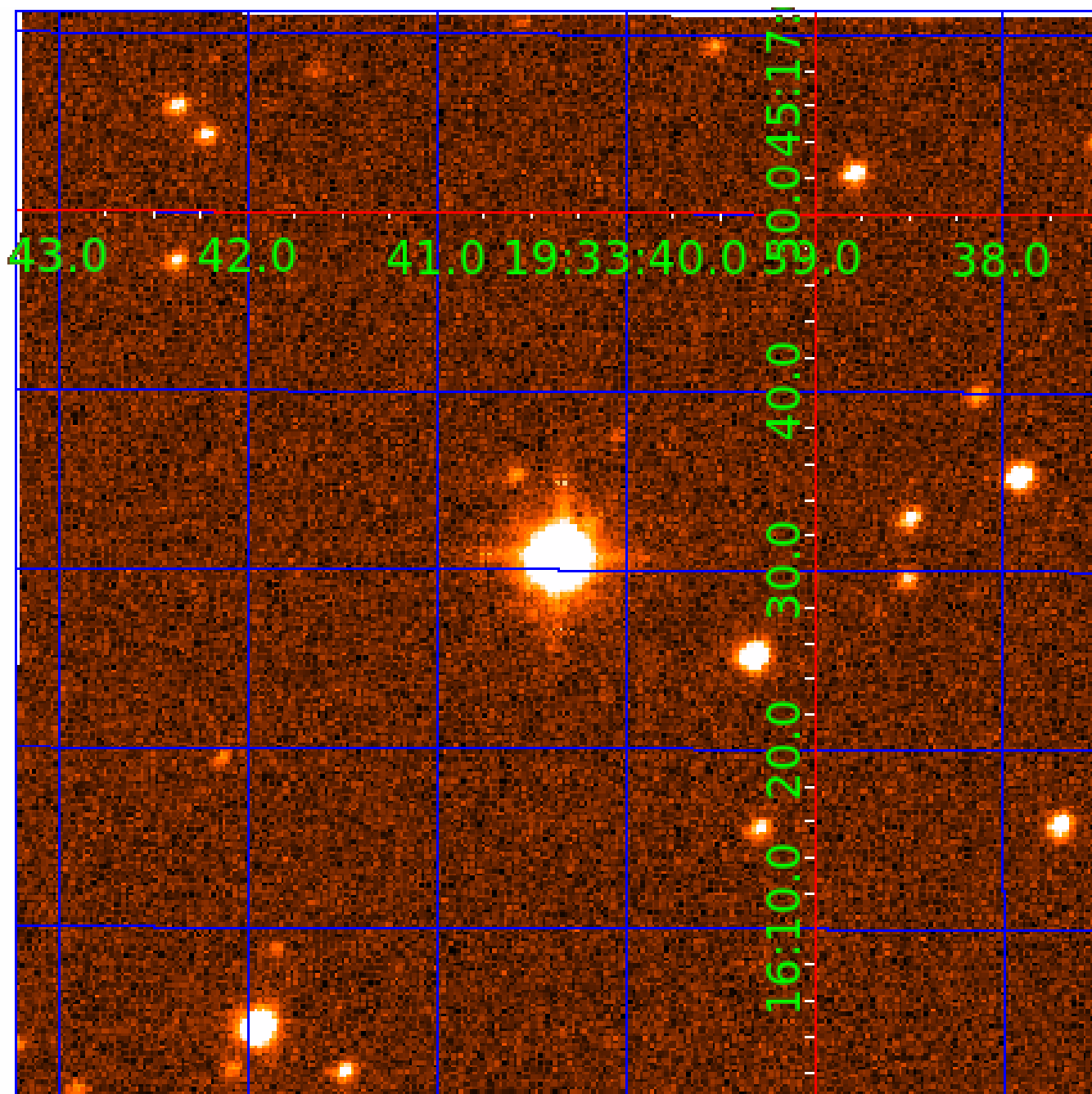


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 008957218

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008957218-01	OBS	No	440.908335	154.829795	516.2	8.318	18.7	7.9	1.61	5477	4.64	1.80
008957218-02	OBS	No	458.416275	285.917787	514.7	3.164	15.9	8.7	1.61	5477	4.52	1.71
008957218-03	OBS	No	578.350781	361.871328	461.2	5.188	14.2	7.7	1.61	5477	4.27	1.25
008957218-04	OBS	No	658.130956	191.906115	361.9	3.295	15.0	6.0	1.61	5477	3.18	1.05
008957218-05	OBS	No	543.299171	379.891554	499.2	3.676	15.7	8.8	1.61	5477	3.78	1.36
008957218-06	OBS	No	483.183255	364.740726	419.4	5.346	15.2	7.1	1.61	5477	4.07	1.59
008957218-07	OBS	No	342.600741	136.217524	373.4	3.500	13.3	-1.0	1.61	5477	3.07	2.52

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008957218-01	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_MARSHALL_ZUMA—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
008957218-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV
008957218-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
008957218-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
008957218-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV
008957218-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
008957218-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_NOFITS

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

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

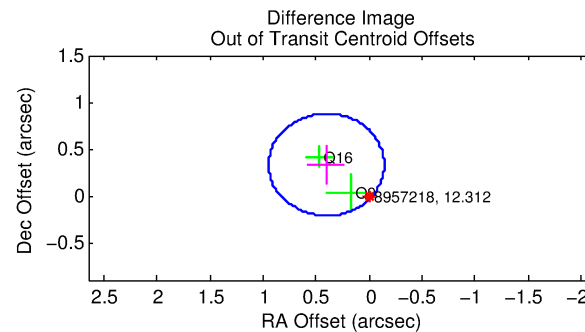
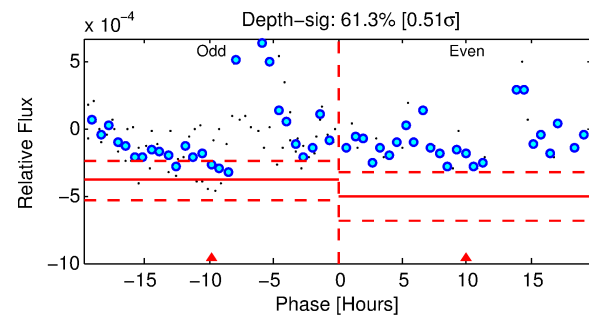
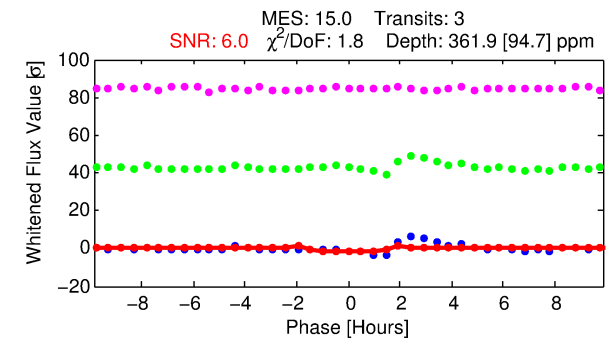
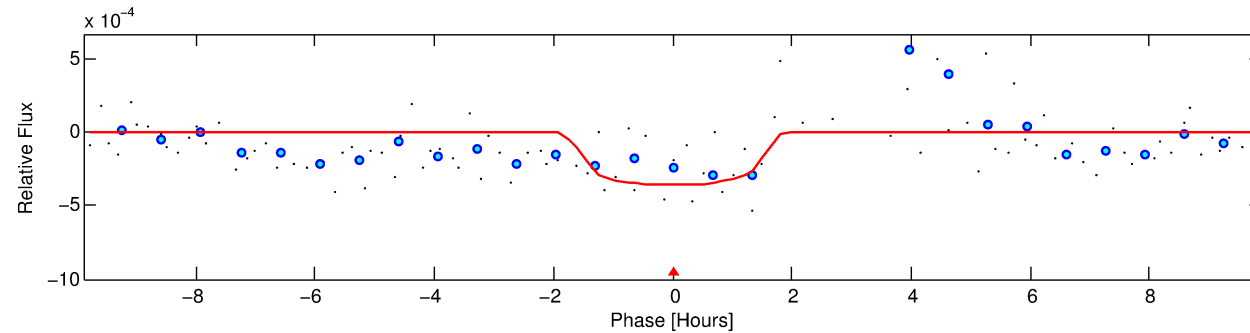
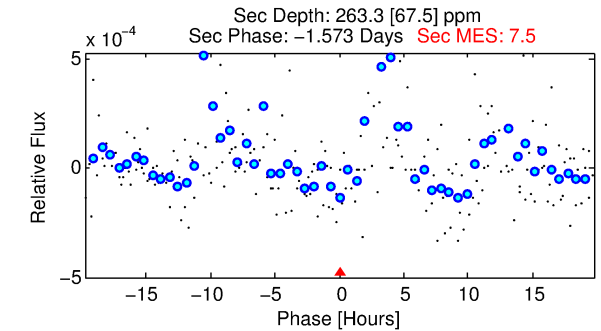
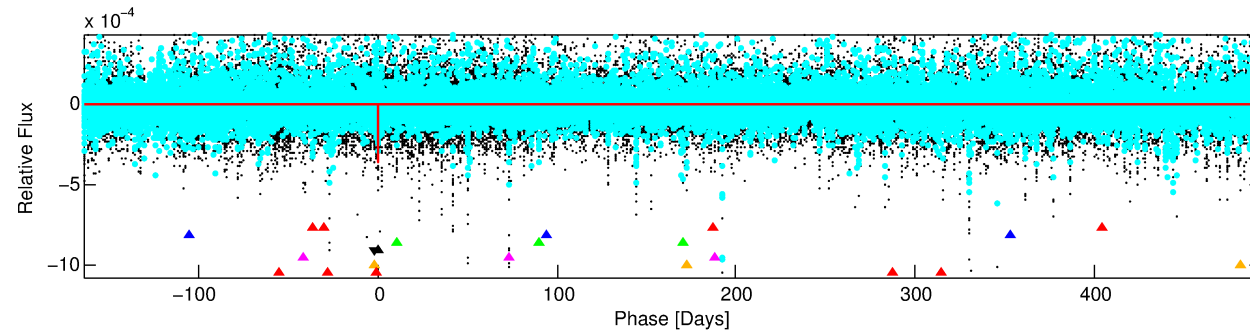
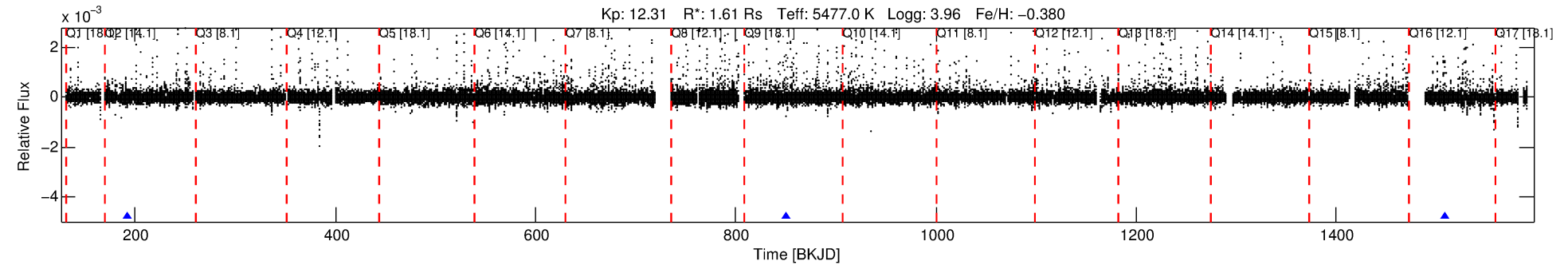
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 008957218-04

No Significant Match Found

# DV One-Page Summary

KIC: 8957218 Candidate: 4 of 7 Period: 658.131 d



## DV Fit Results:

Period = 658.13096 [0.01075] d  
Epoch = 191.9061 [0.0131] BKJD  
Rp/R\* = 0.0182 [0.0613]  
a/R\* = 1248.48 [17999.38]  
b = 0.61 [15.31]  
Seff = 1.06 [1.05]  
Teq = 258 [64] K  
Rp = 3.18 [10.89] Re  
a = 1.4047 [0.8224] AU  
Ag = 28199.41 [192477.24] [0.15 $\sigma$ ]  
Teffp = 5178 [8745] K [0.56 $\sigma$ ]

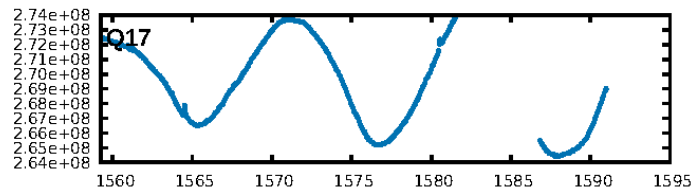
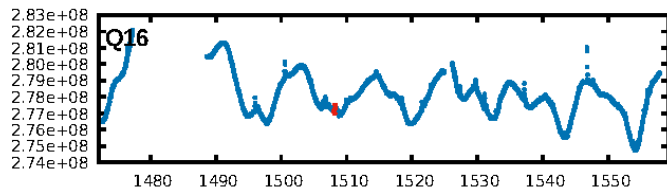
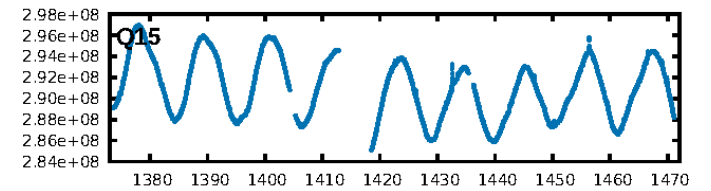
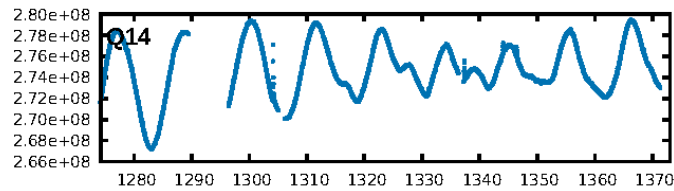
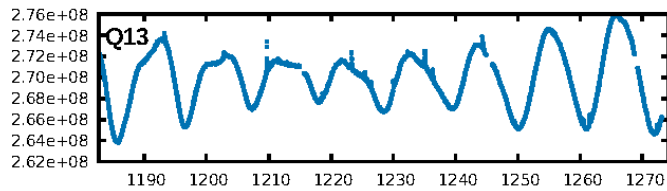
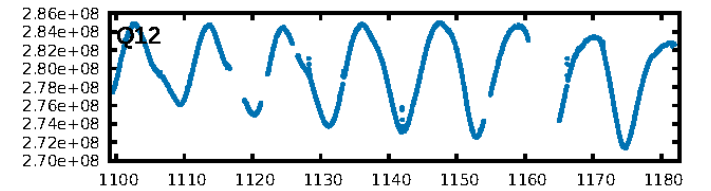
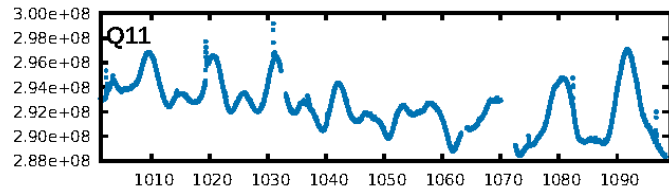
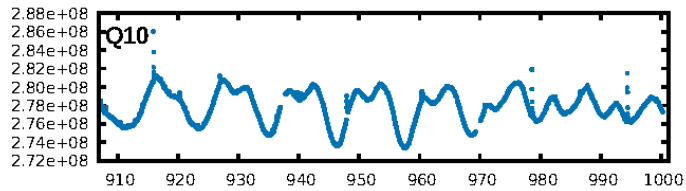
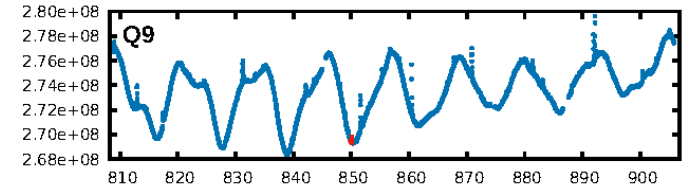
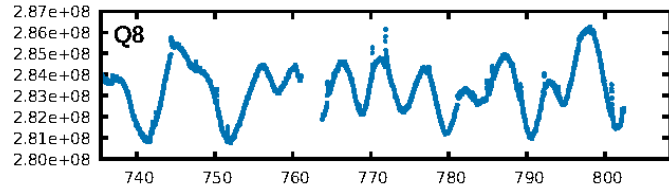
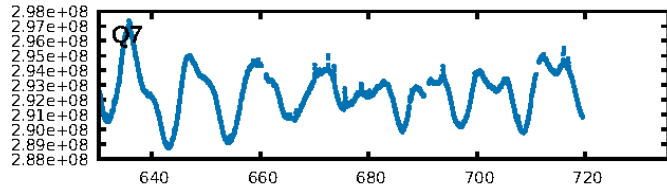
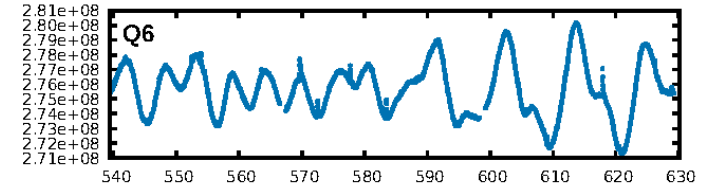
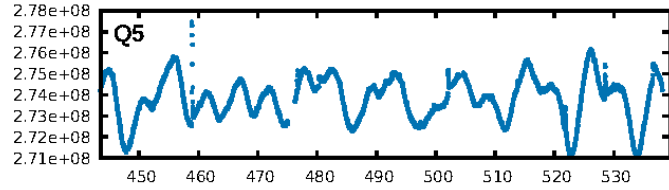
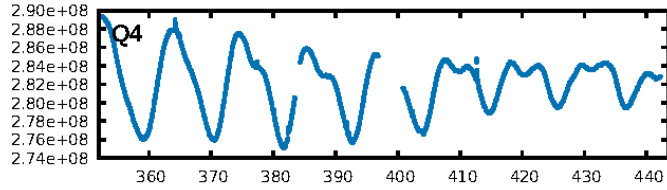
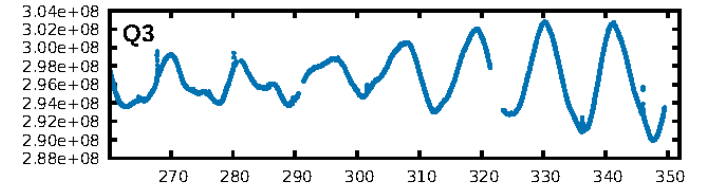
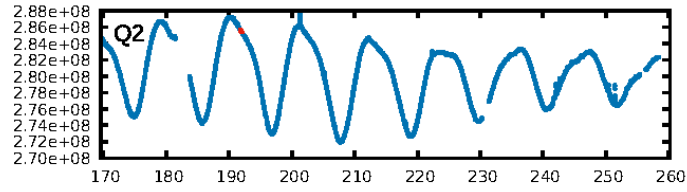
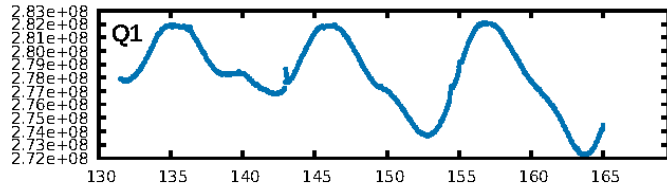
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [311.54 $\sigma$ ]  
LongPeriod-sig: N/A  
**ModelChiSquare2-sig: 0.0%**  
ModelChiSquareGof-sig: 11.1%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 1.114  
Centroid-sig: 41.7%  
Centroid-so: 0.756 arcsec [0.94 $\sigma$ ]  
OotOffset-rm: 0.522 arcsec [2.87 $\sigma$ ]  
OotOffset-st: 0/0/1/1 [2]  
KicOffset-rm: 0.482 arcsec [2.88 $\sigma$ ]  
KicOffset-st: 0/0/1/1 [2]  
DiffImageQuality-fgm: 1.00 [2/2]  
DiffImageOverlap-fno: 1.00 [3/3]

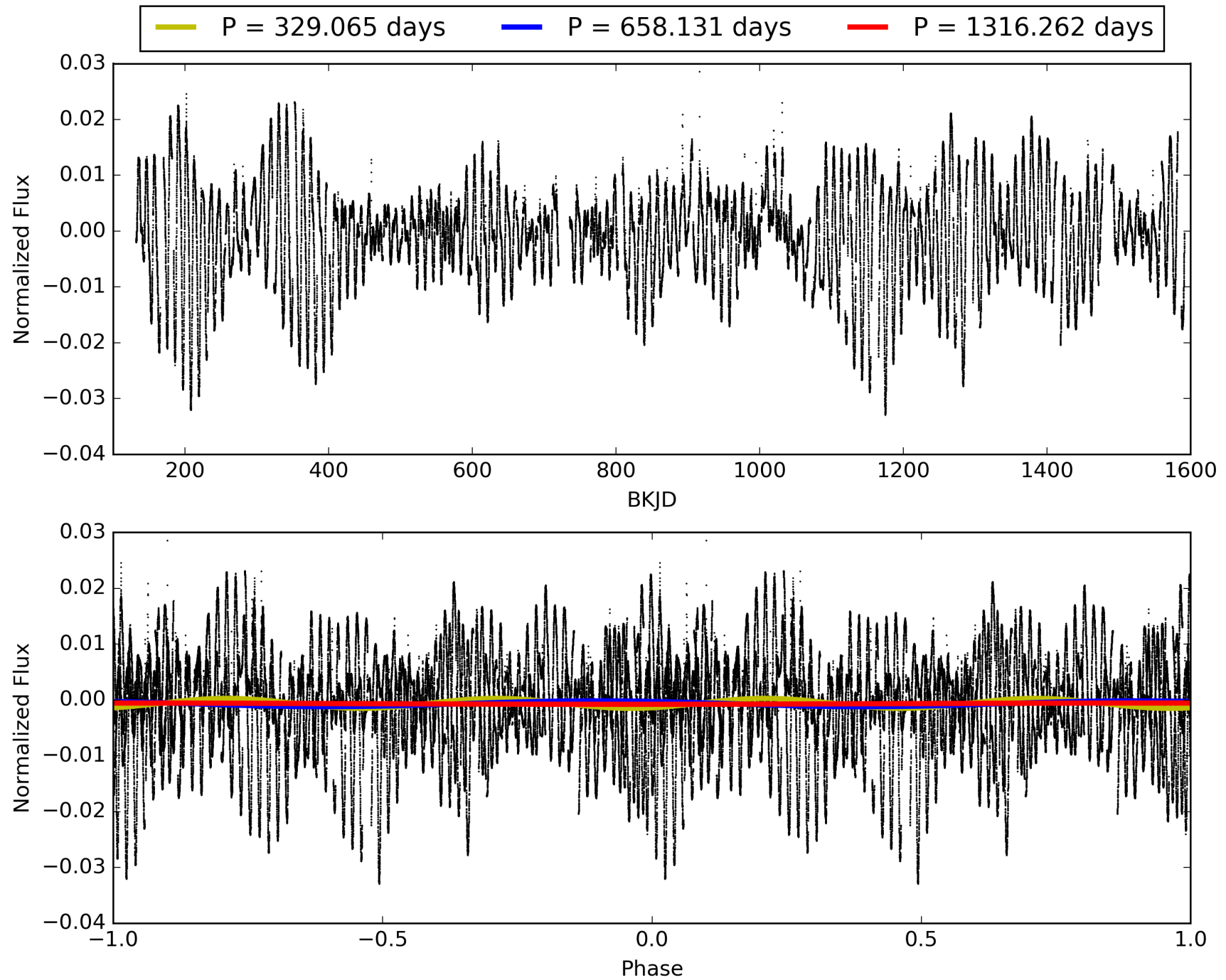
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 23:50:08 Z

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

# TCE 008957218-04, PDC Light Curves

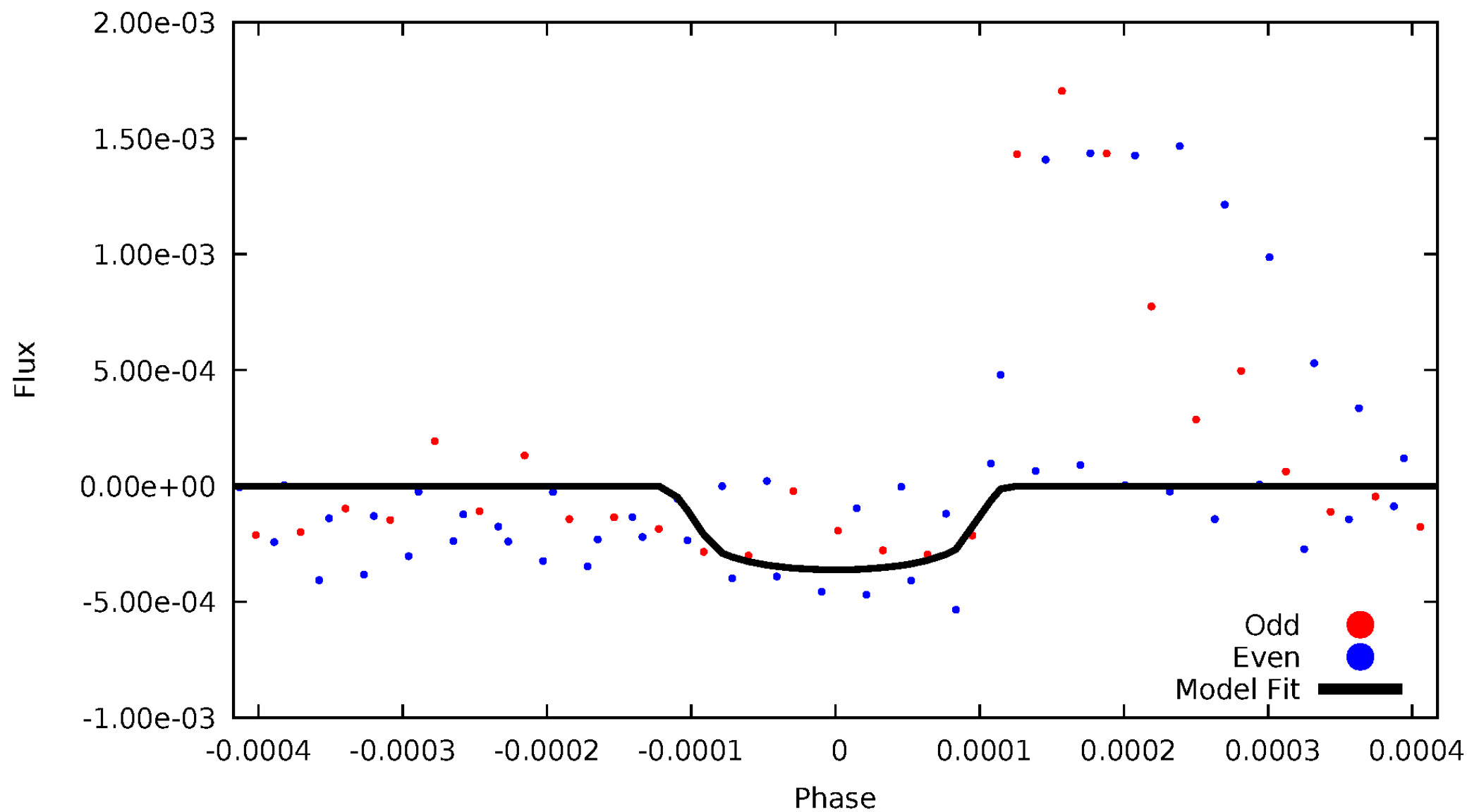


# TCE 008957218-04



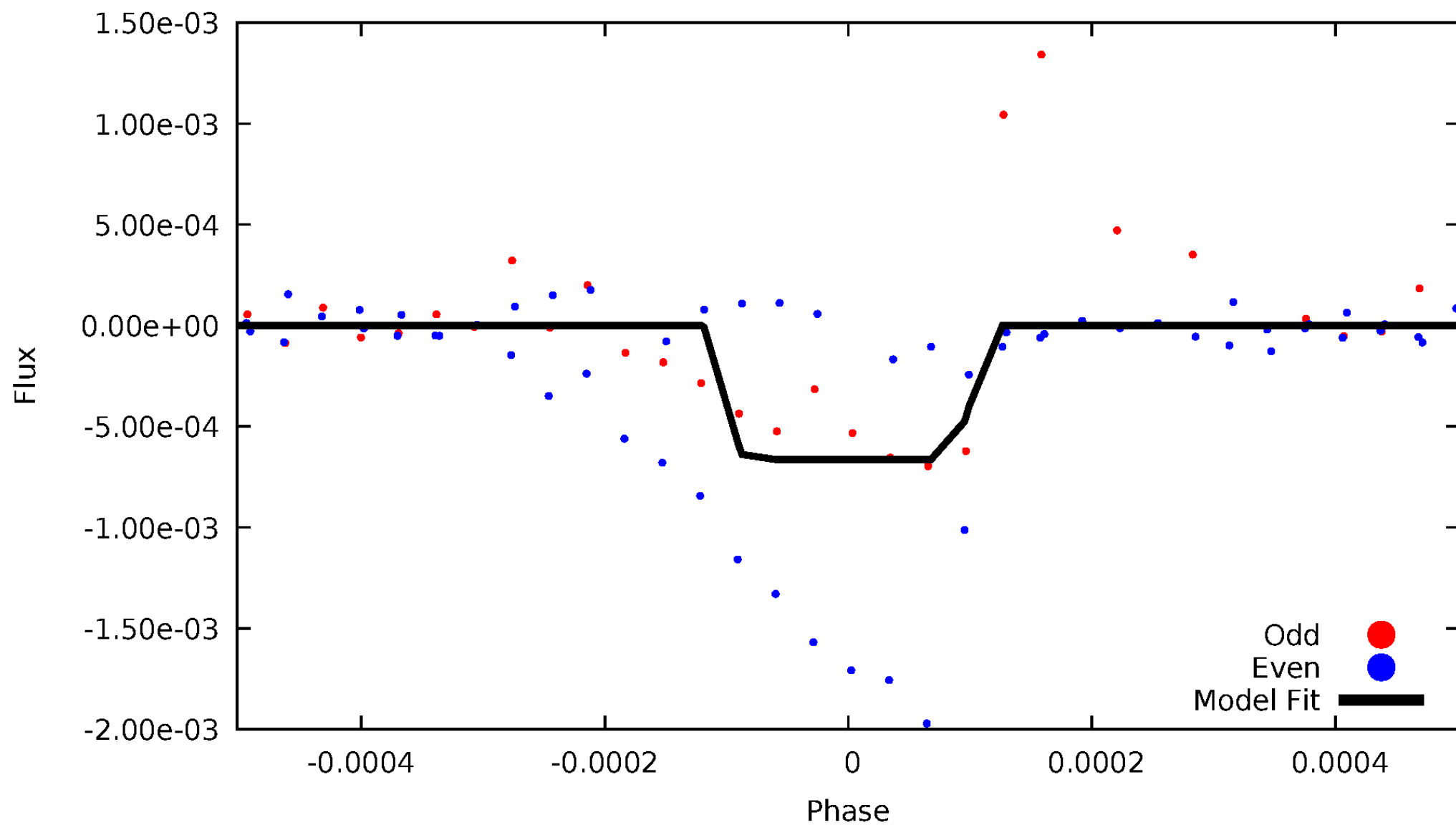
# DV Odd/Even

TCE 008957218-04



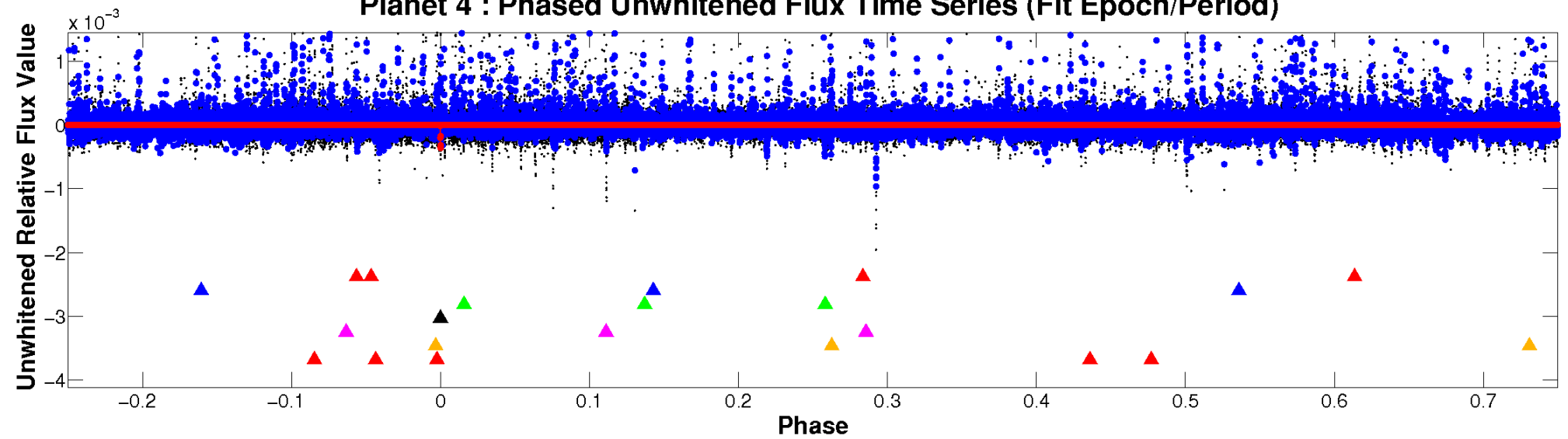
# ALT Odd/Even

TCE 008957218-04

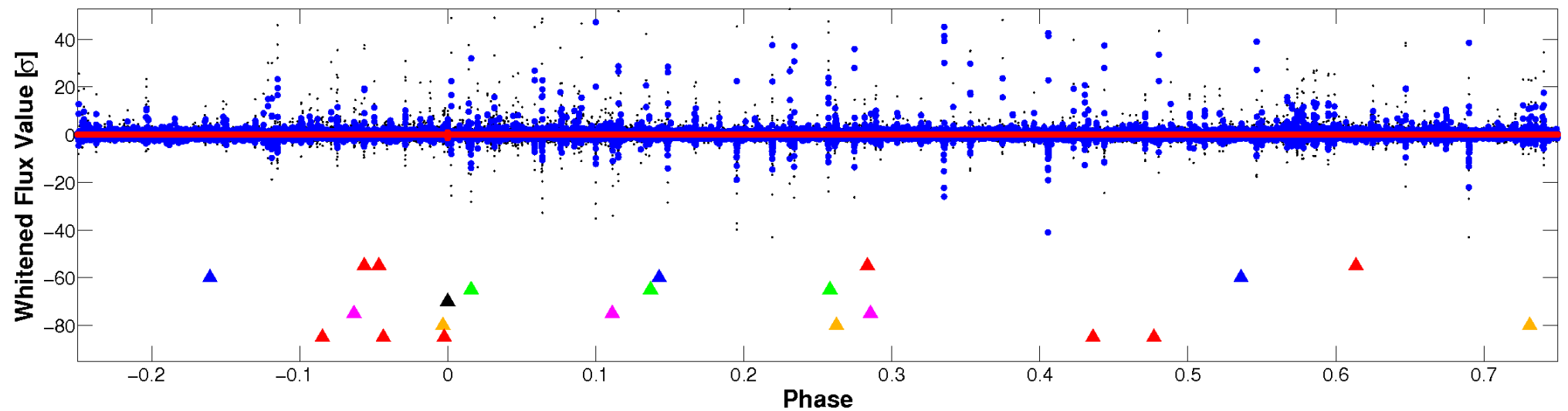


# Non-Whitened Vs. Whitened Light Curve

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

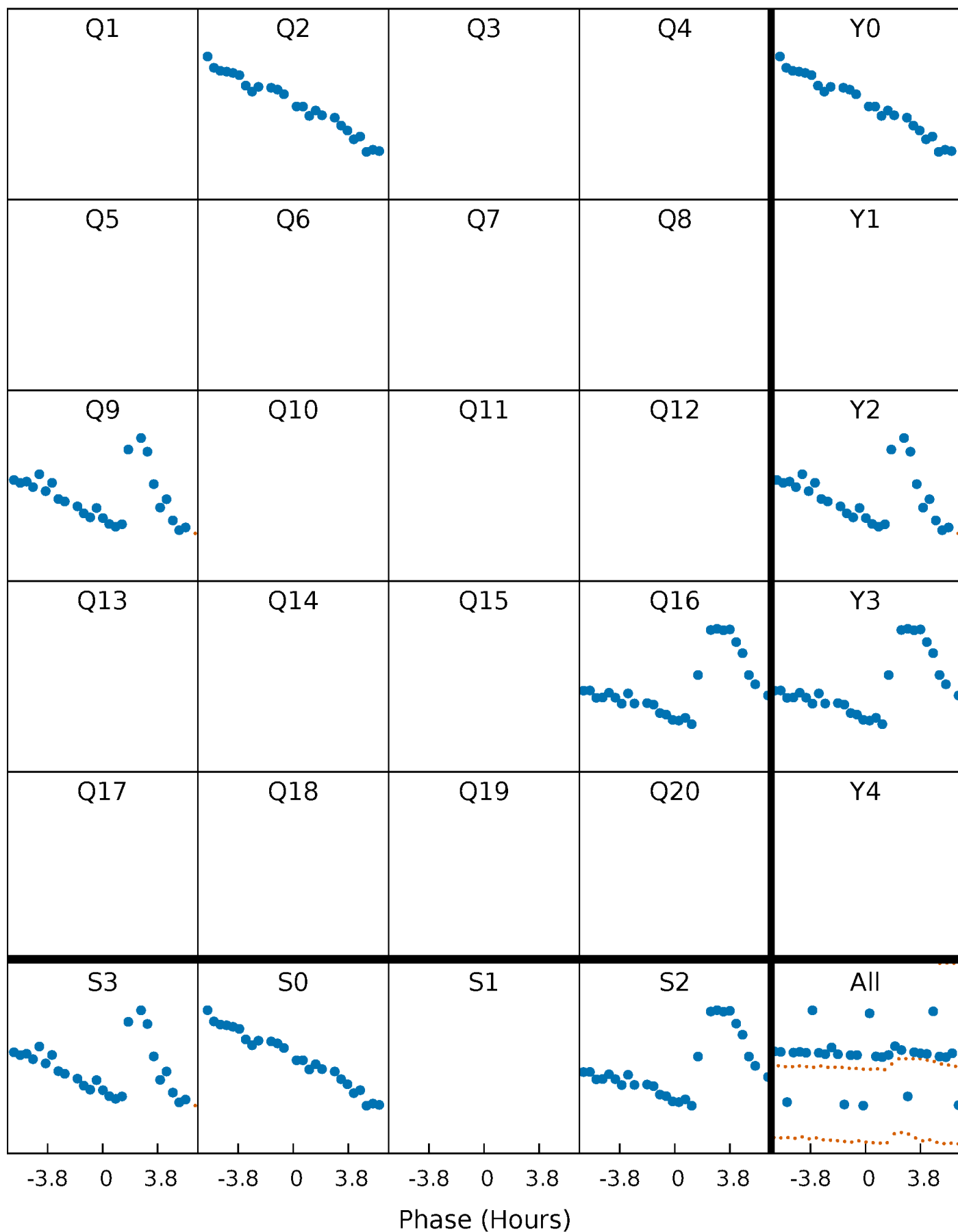


## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



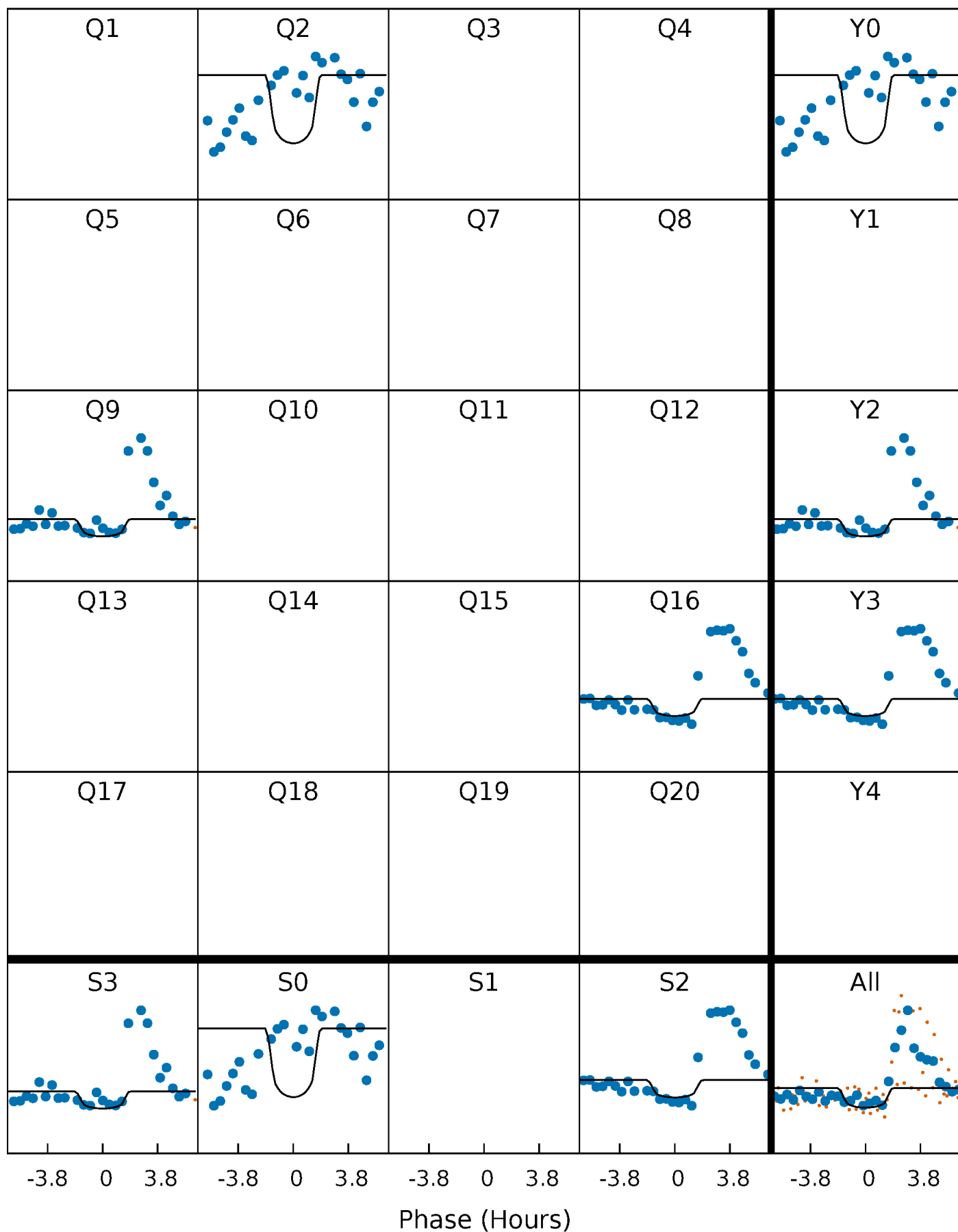
# PDC Quarter-Phased Transit Curves

TCE 008957218-04 P=658.130956 Days  $T_0=191.906115$  (BKJD)



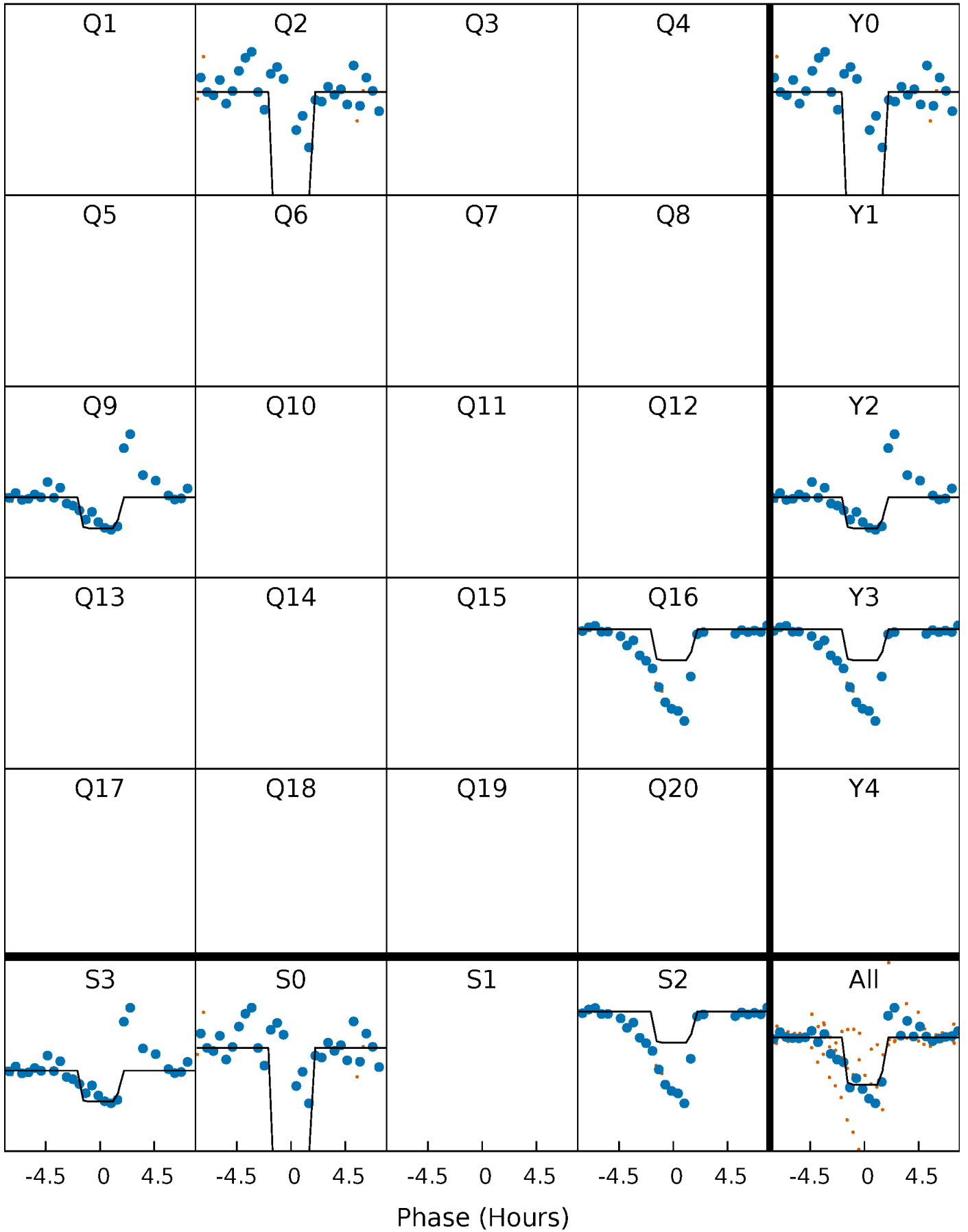
# DV Quarter-Phased Transit Curves

TCE 008957218-04     $P=658.130956$  Days     $T_0=191.906115$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

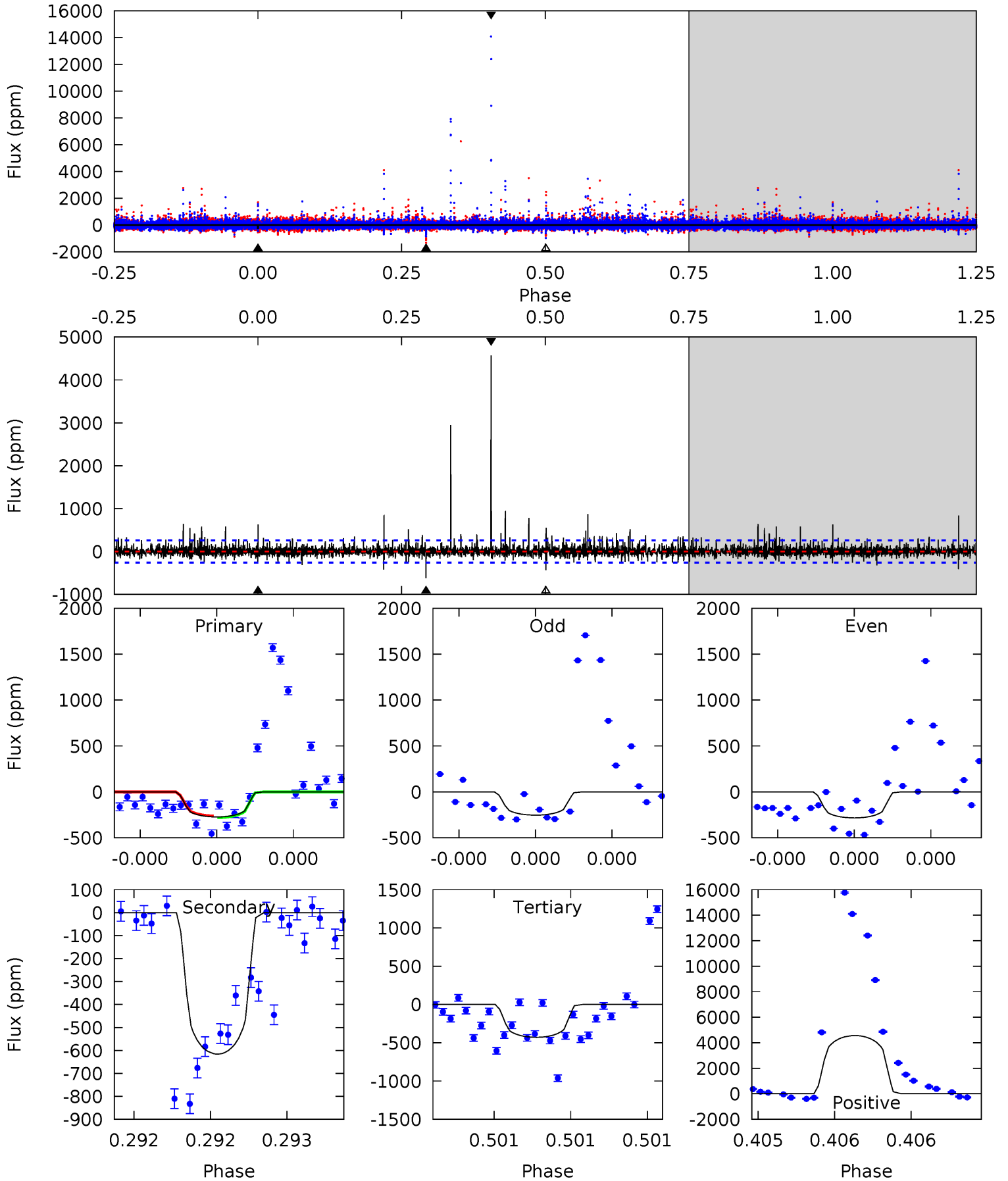
TCE 008957218-04 P=658.144534 Days  $T_0=191.891526$  (BKJD)



# DV Model-Shift Uniqueness Test

008957218-04, P = 658.130956 Days, E = 191.906115 Days

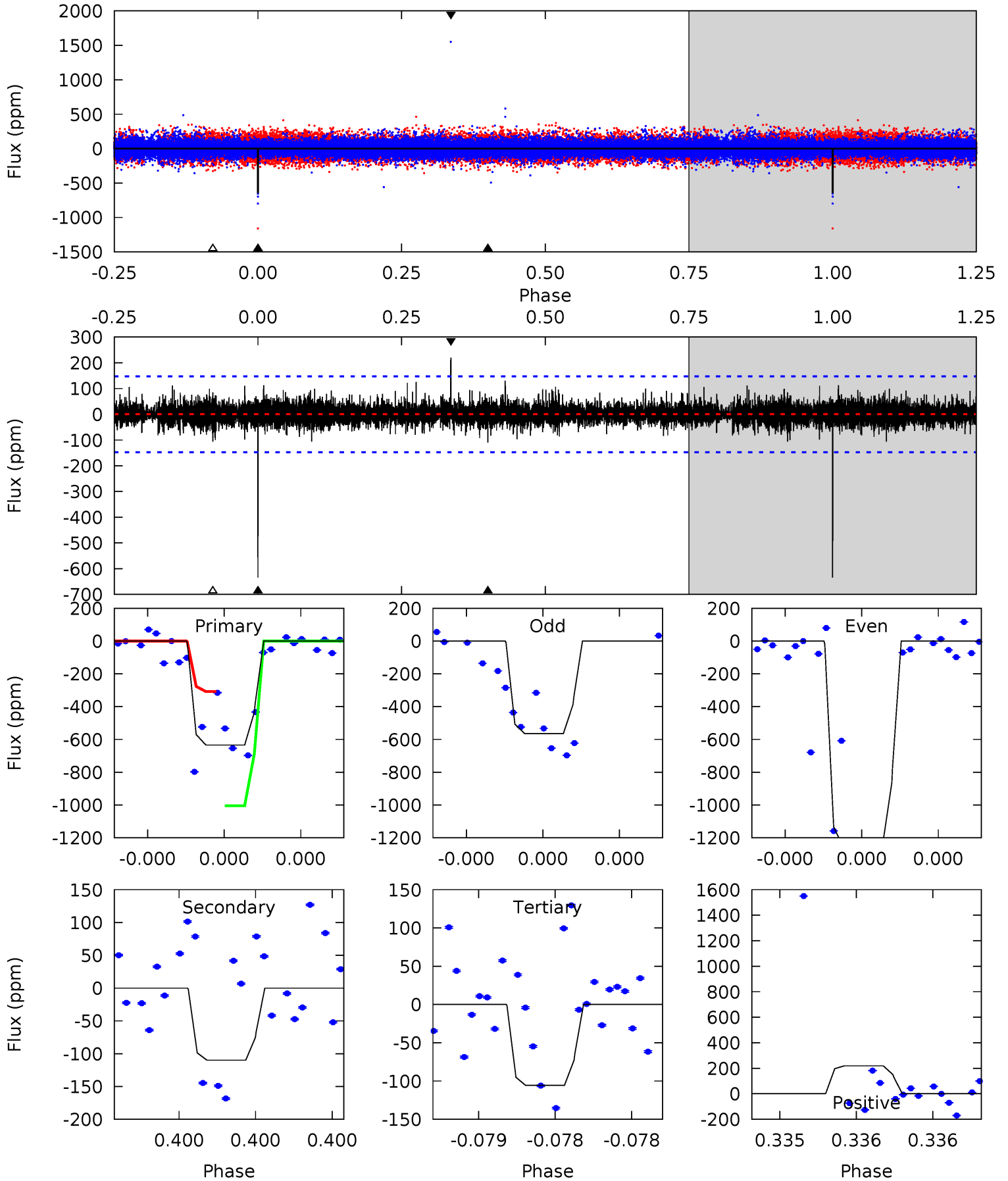
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.00	13.5	9.41	100.2	5.71	3.69	2.41	-3.41	-94.2	4.11	-86.7	0.18	1.02	0.88	0.20



# Alt Model-Shift Uniqueness Test

008957218-04, P = 658.144534 Days, E = 191.891526 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
24.5	4.25	4.09	8.48	5.70	3.67	0.82	20.4	16.1	0.16	-4.23	15.3	1.30	0.26	12.8



### Stellar Parameters For KIC 008957218

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5477^{+164}_{-148}$	$3.957^{+0.595}_{-0.255}$	$-0.380^{+0.350}_{-0.250}$	$1.607^{+0.803}_{-0.883}$	$0.853^{+0.116}_{-0.095}$	$0.290^{+2.152}_{-0.169}$
	+3%/-3%	+15%/-6%	+92%/-66%	+50%/-55%	+14%/-11%	+743%/-58%
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 008957218-04 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-616 \pm 46$	$7.84^{+8.45}_{-5.70}$	$353^{+42}_{-56}$	$4161^{+2950}_{-860}$	$11225^{+132565}_{-8611}$
Alt.	$-110 \pm 26$	$8.25^{+8.88}_{-5.60}$	$355^{+45}_{-55}$	$3097^{+1335}_{-510}$	$1776^{+14816}_{-1394}$

$T_{max}$  = Theoretical Maximum Planetary Temperature

$T_{obs}$  = Observed Planetary Temperature (Assuming  $A=0.3$ )

$A_{obs}$  = Observed Albedo (Assuming  $T=0$ )

If a secondary eclipse is present, the system is likely an EB if  $T_{obs} \gg T_{max}$  AND  $A_{obs} \gg 1.0$

## DV Centroid Data

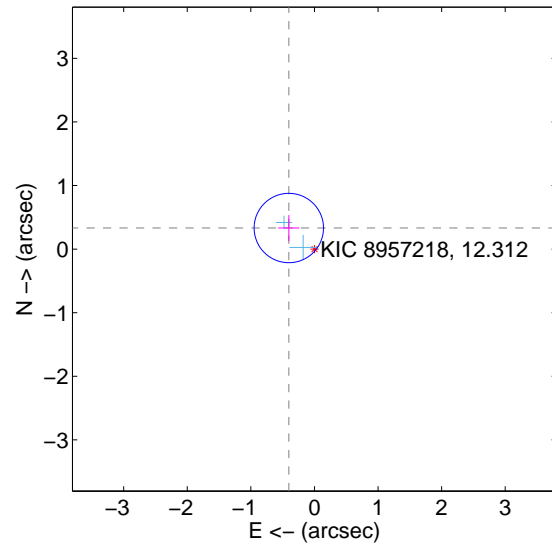
Supplemental centroid analysis for 008957218-04. Kepler magnitude: 12.31. Transit SNR 5.96

There are 2 quarters with good PRF difference image offsets

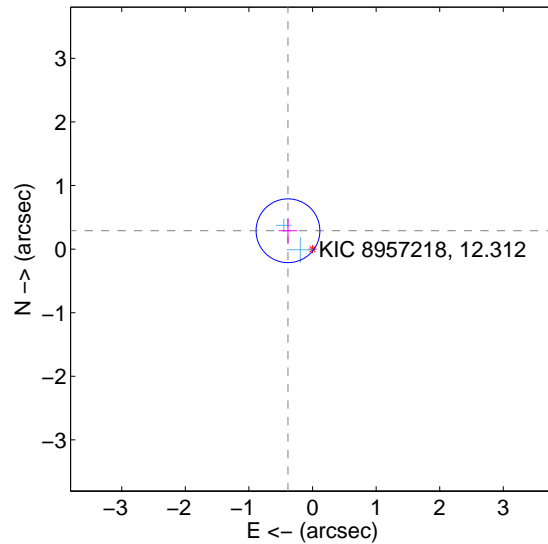
The direct PRF centroid is offset from the target star catalog position by about 0.05 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.522 \pm 0.182$	2.87	$0.403 \pm 0.166$	$0.331 \pm 0.202$
PRF-fit source offset from KIC position	$0.482 \pm 0.167$	2.88	$0.386 \pm 0.147$	$0.289 \pm 0.199$
photometric centroid source offset	$0.76 \pm 0.81$	0.94	$0.53 \pm 0.79$	$-0.54 \pm 0.82$

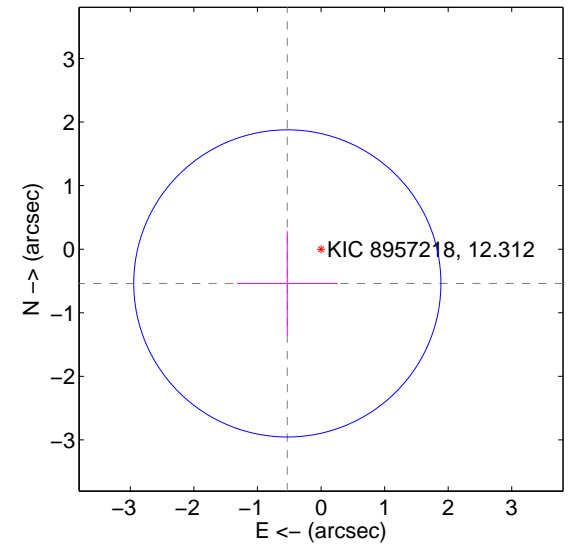
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

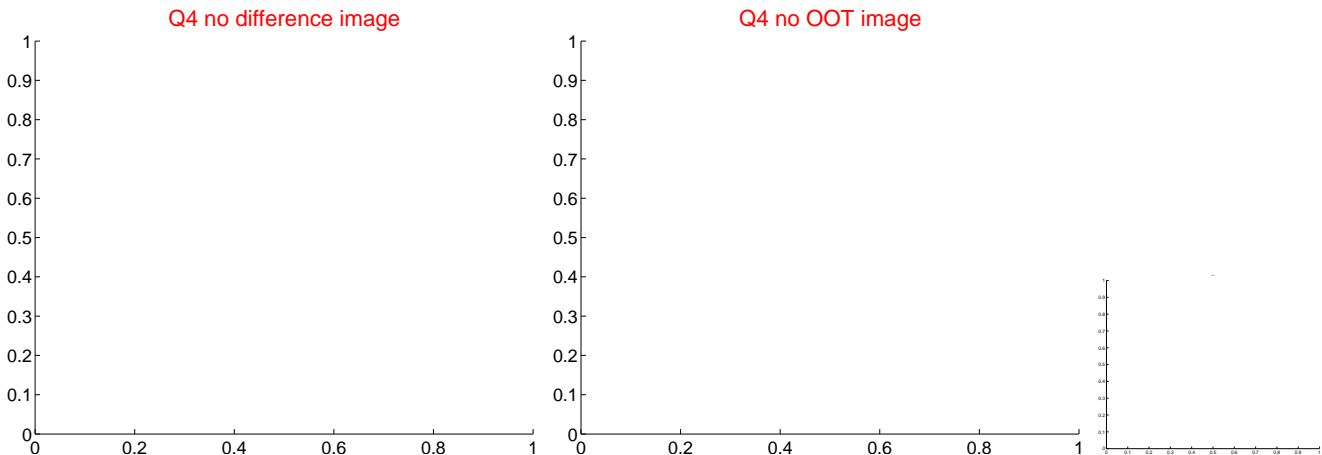
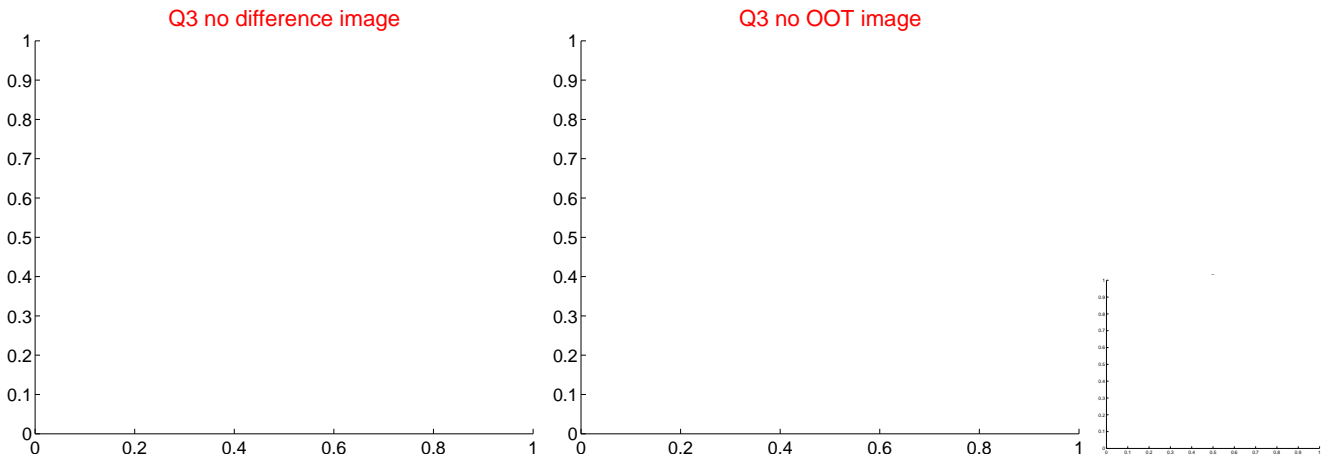
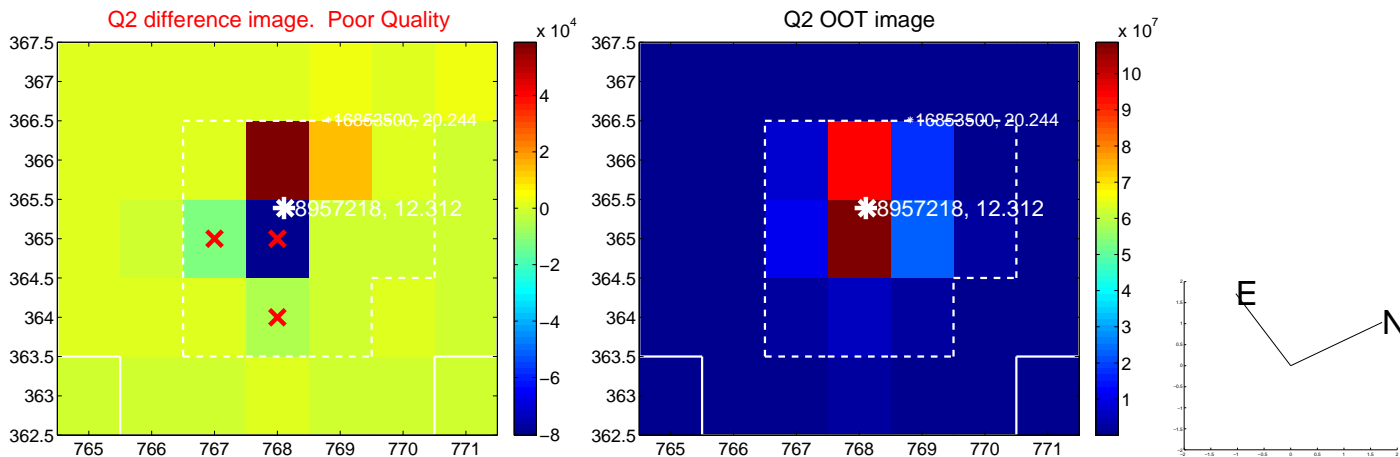
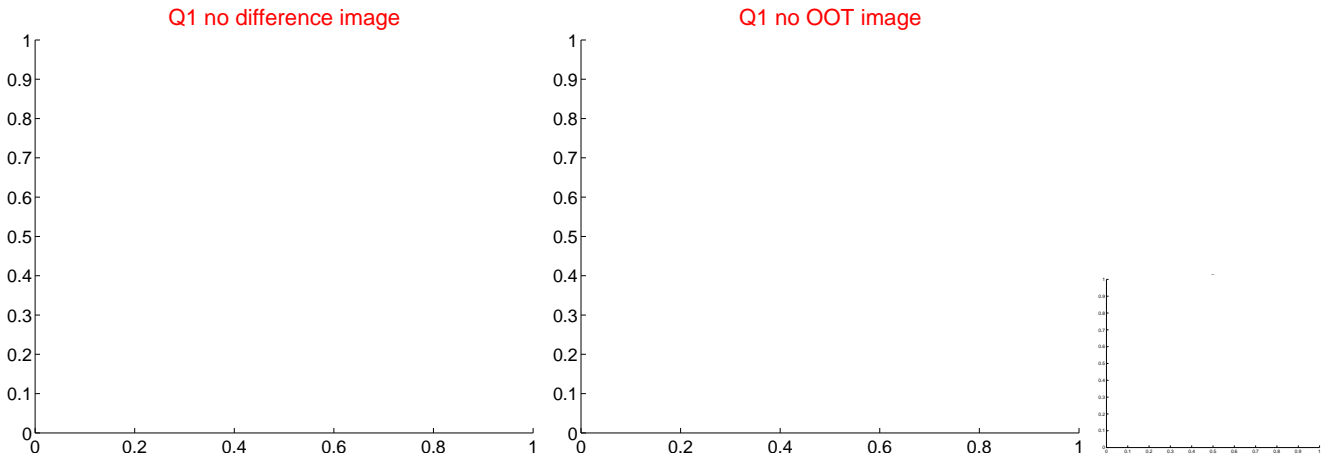


offset from photometric centroids

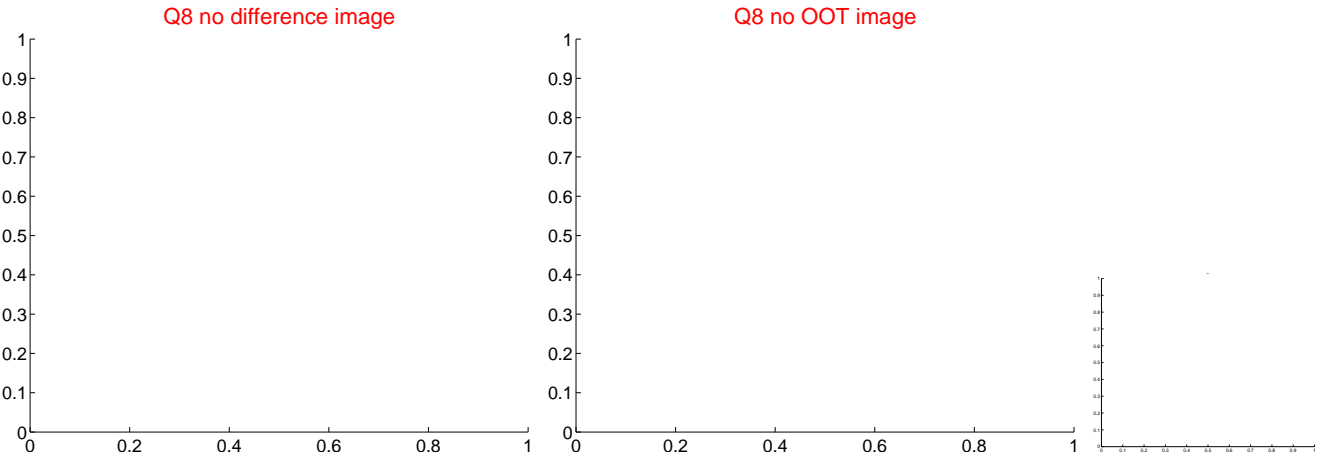
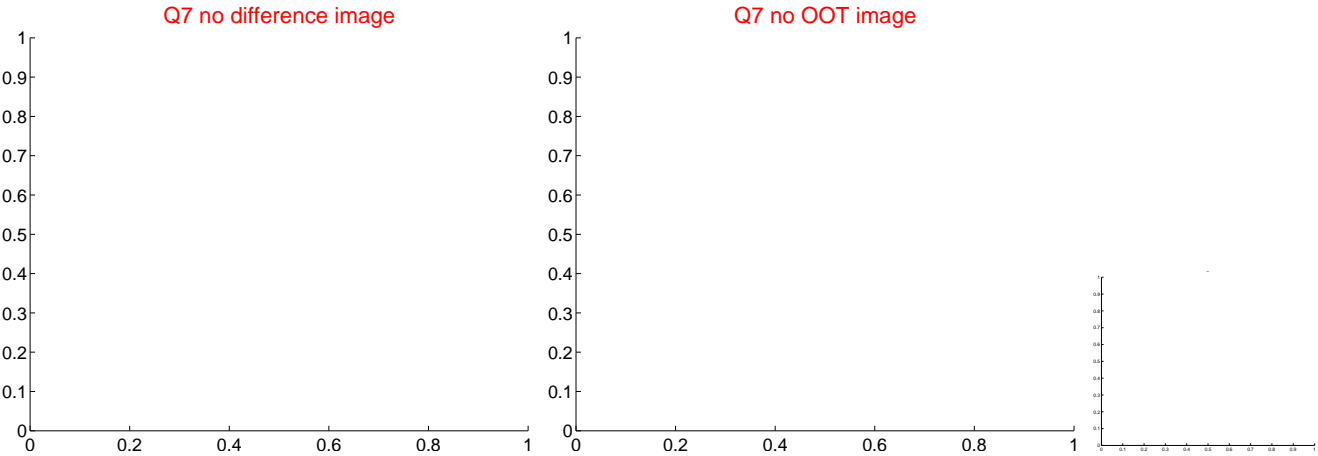
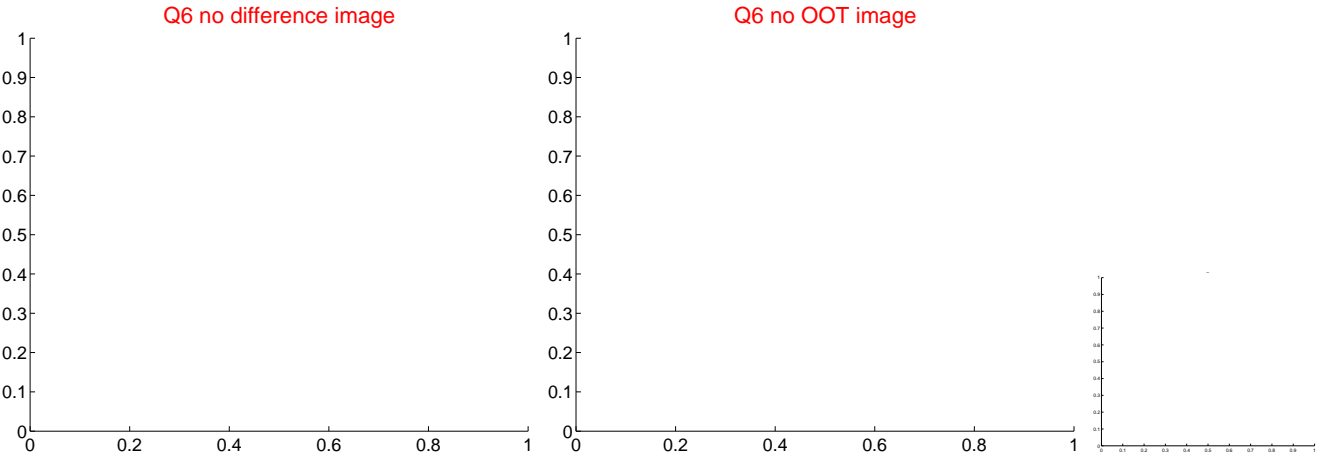
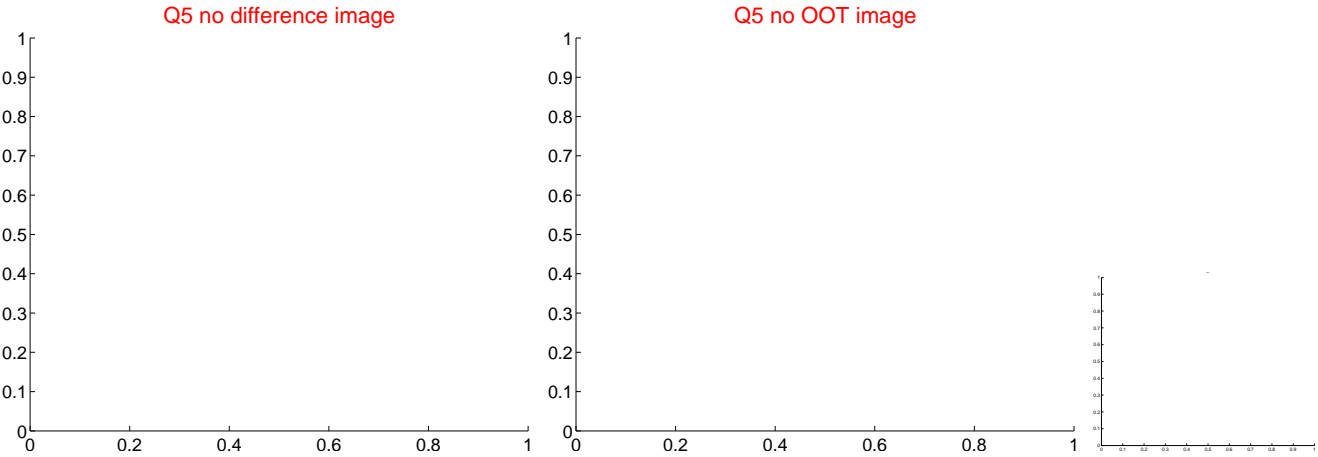


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

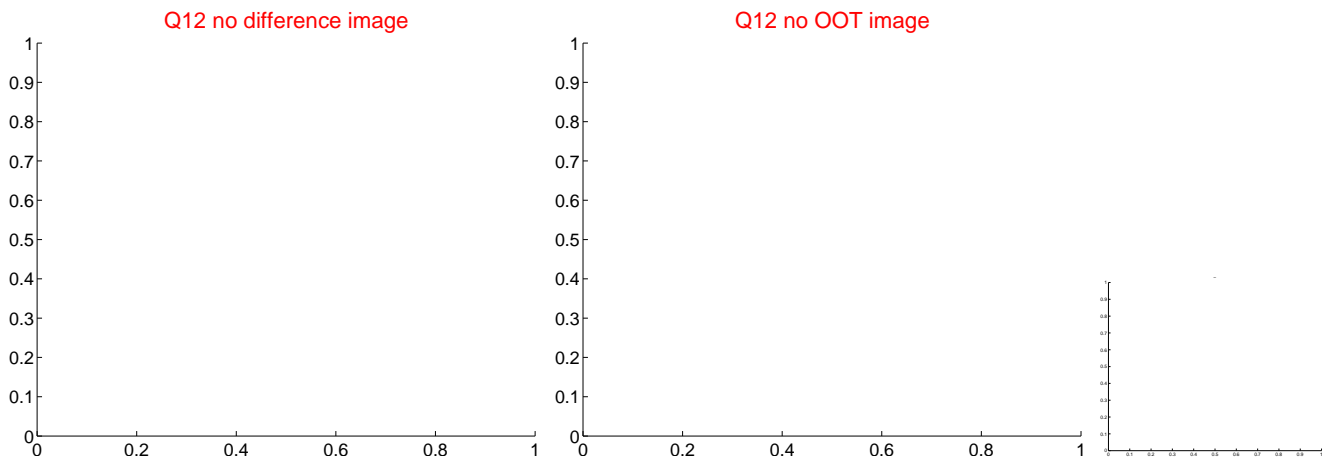
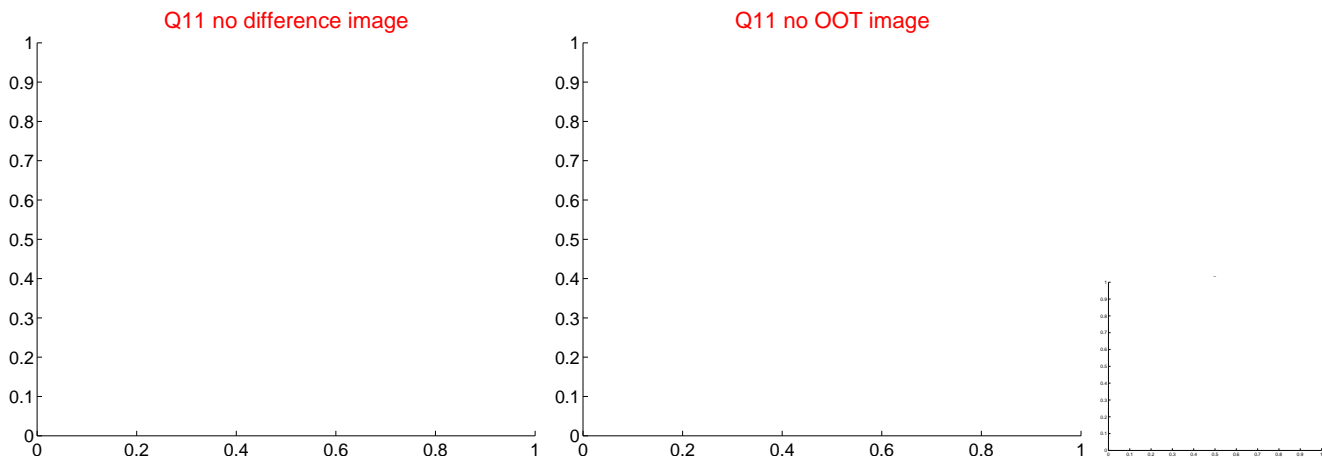
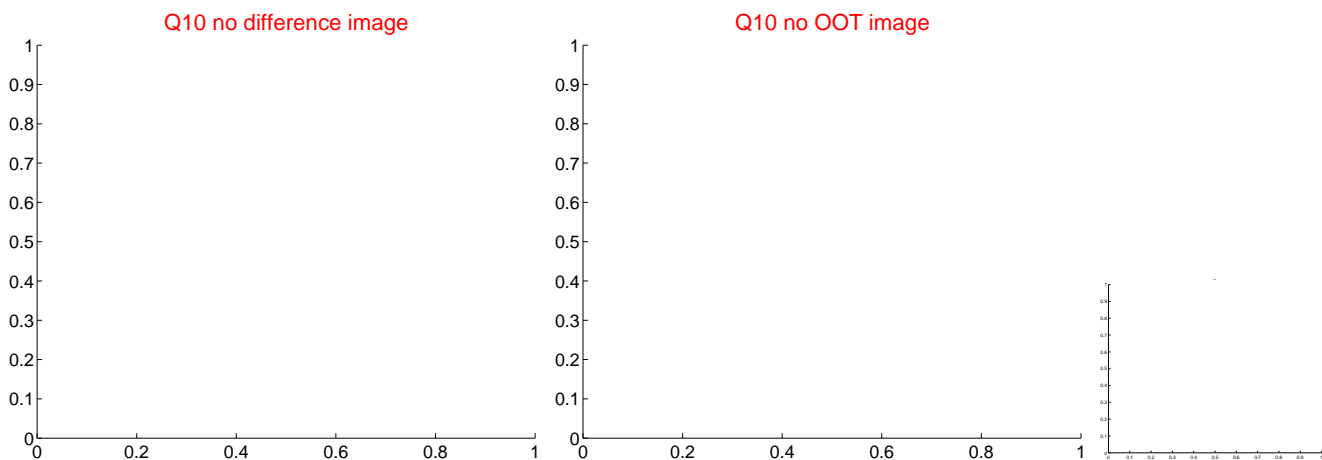
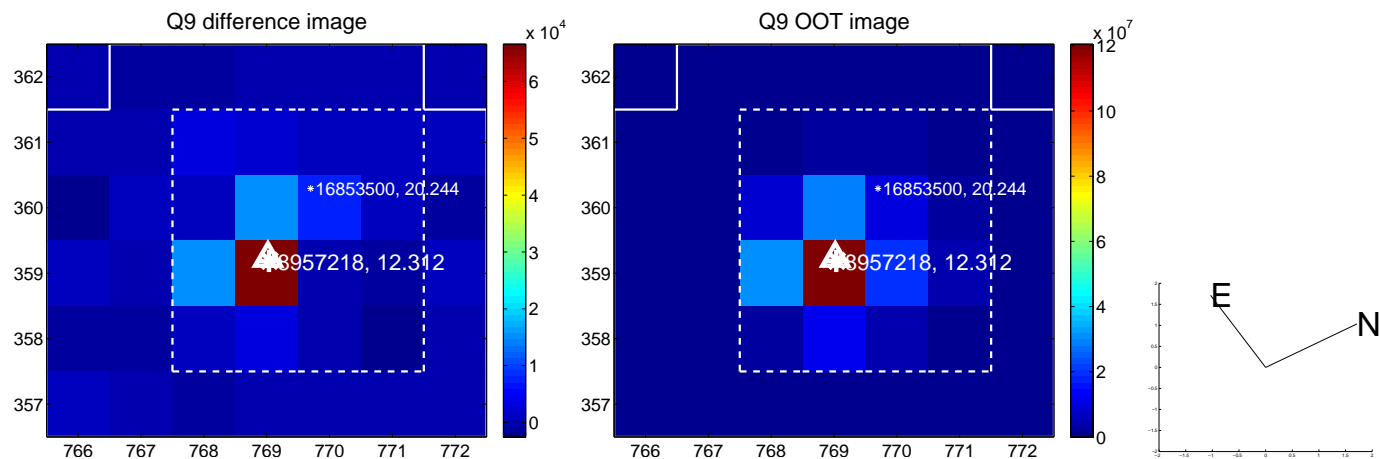
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value



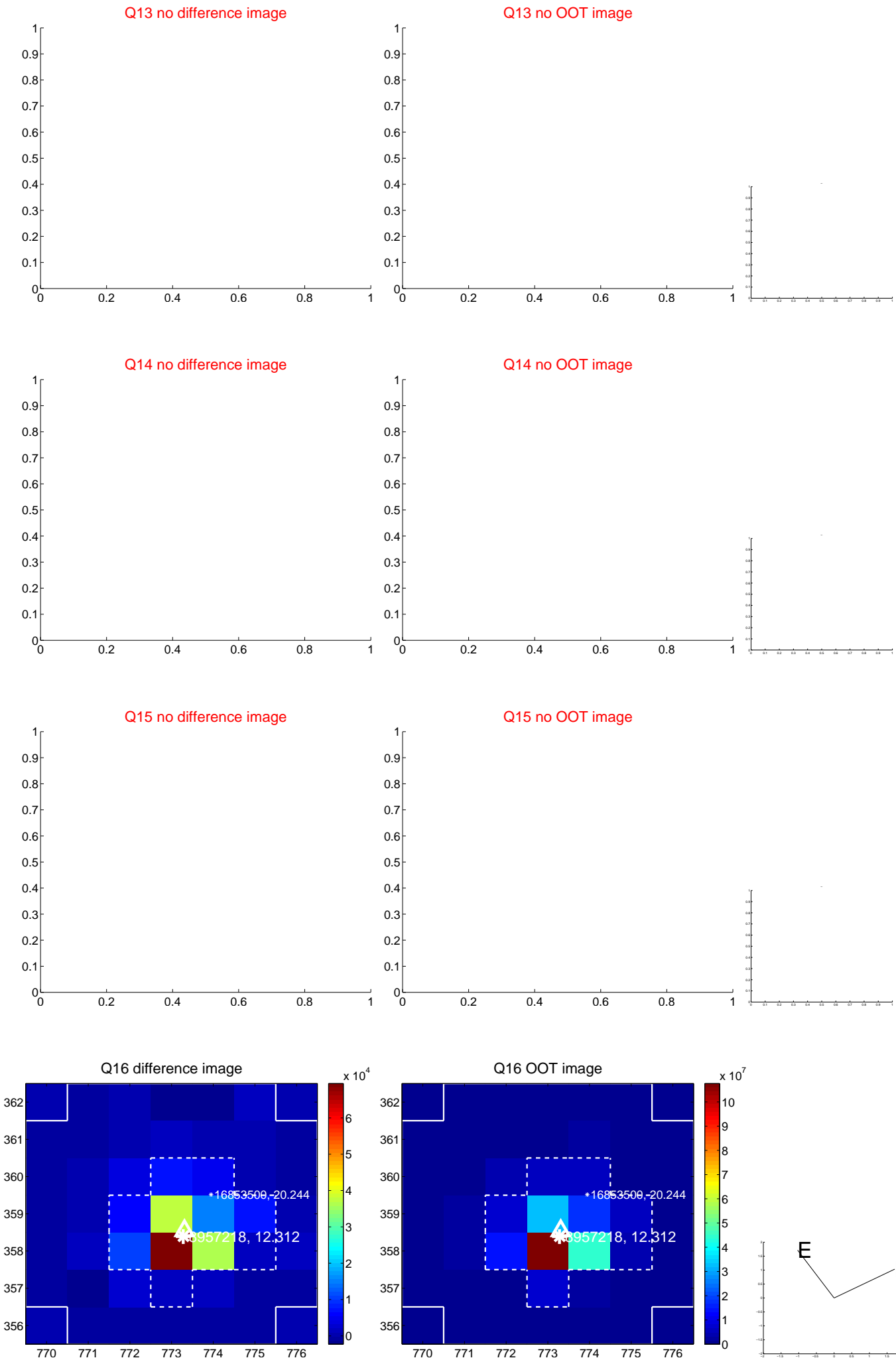
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



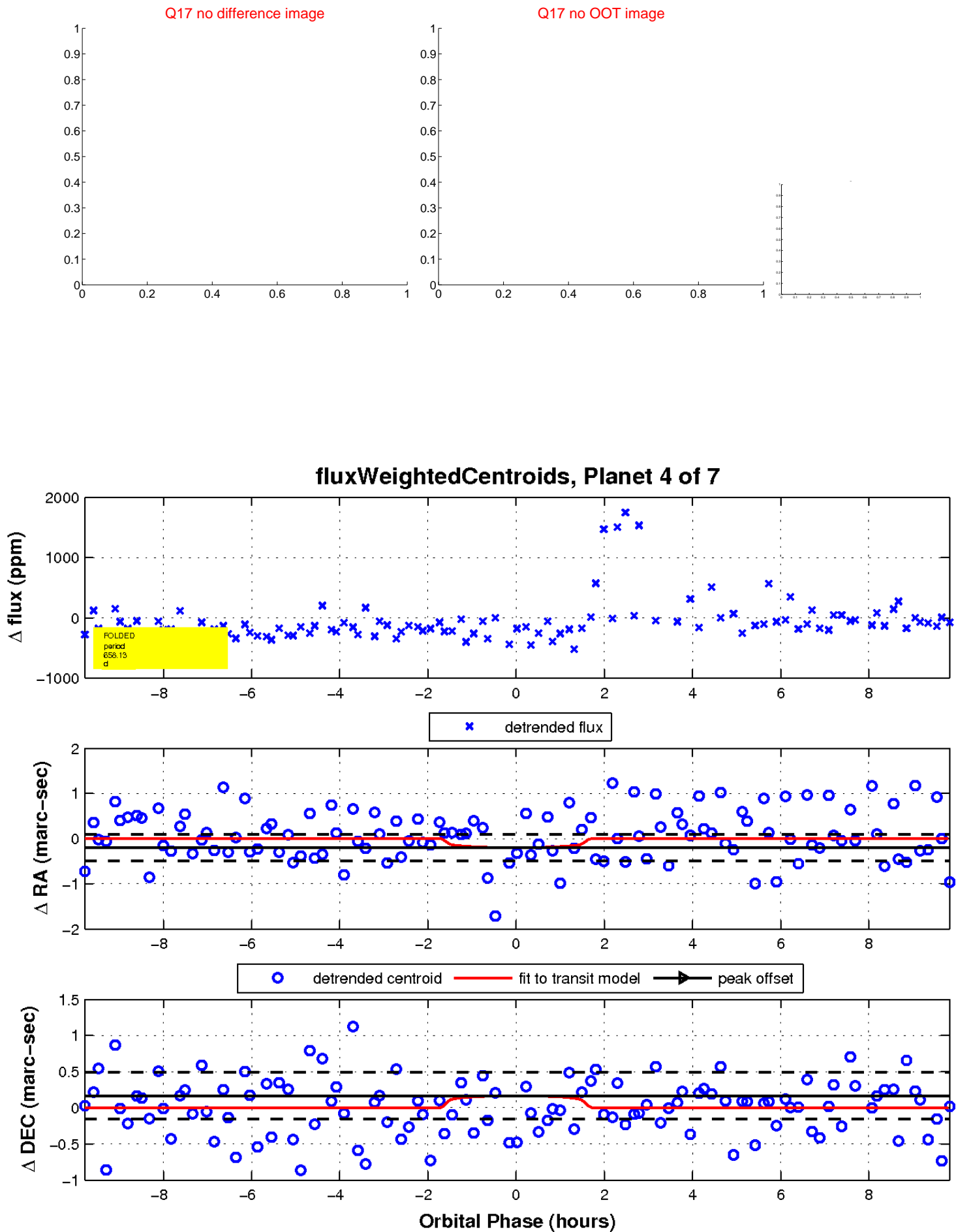
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

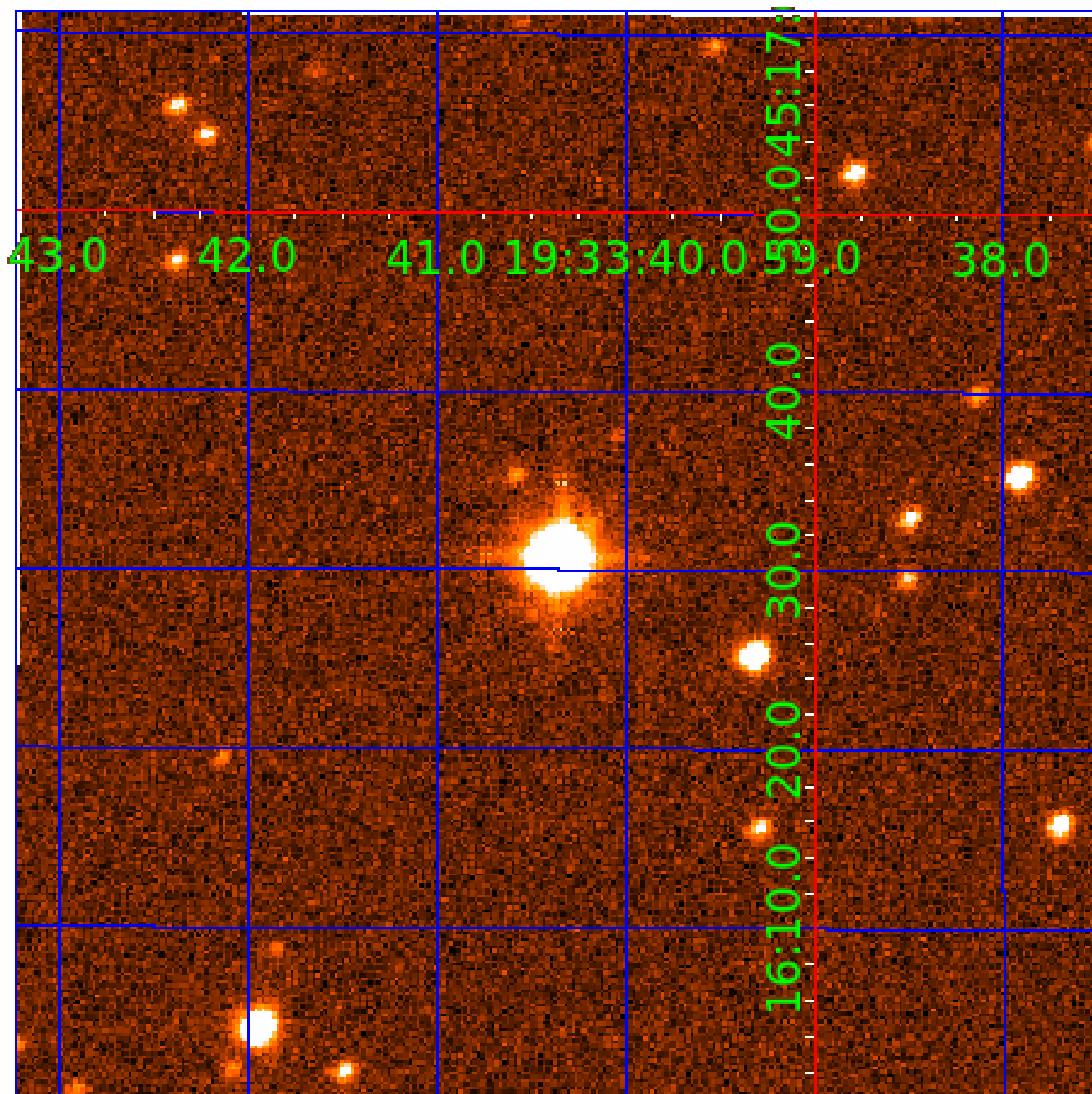


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 008957218

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008957218-01	OBS	No	440.908335	154.829795	516.2	8.318	18.7	7.9	1.61	5477	4.64	1.80
008957218-02	OBS	No	458.416275	285.917787	514.7	3.164	15.9	8.7	1.61	5477	4.52	1.71
008957218-03	OBS	No	578.350781	361.871328	461.2	5.188	14.2	7.7	1.61	5477	4.27	1.25
008957218-04	OBS	No	658.130956	191.906115	361.9	3.295	15.0	6.0	1.61	5477	3.18	1.05
008957218-05	OBS	No	543.299171	379.891554	499.2	3.676	15.7	8.8	1.61	5477	3.78	1.36
008957218-06	OBS	No	483.183255	364.740726	419.4	5.346	15.2	7.1	1.61	5477	4.07	1.59
008957218-07	OBS	No	342.600741	136.217524	373.4	3.500	13.3	-1.0	1.61	5477	3.07	2.52

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008957218-01	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_MARSHALL_ZUMA—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
008957218-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV
008957218-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
008957218-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
008957218-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV
008957218-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
008957218-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_NOFITS

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

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

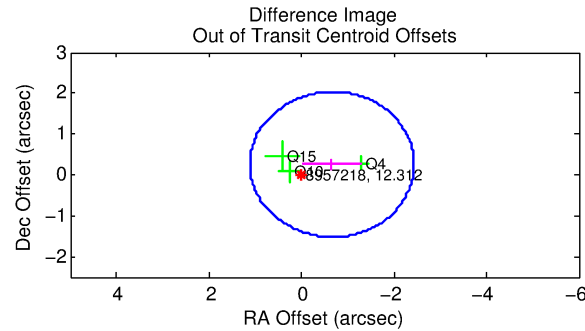
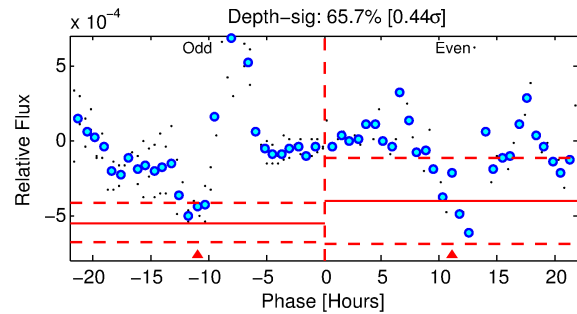
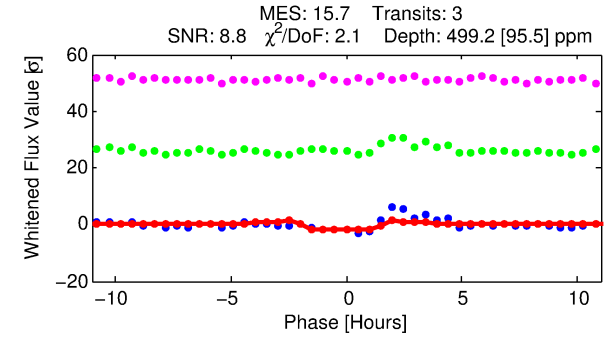
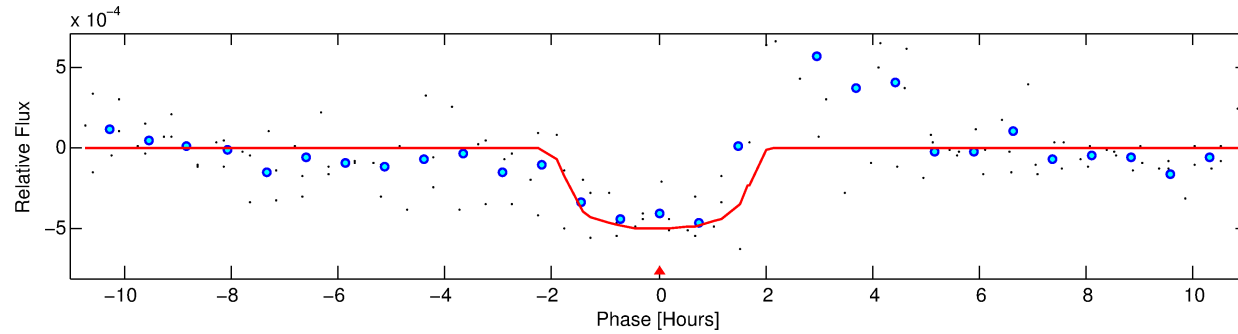
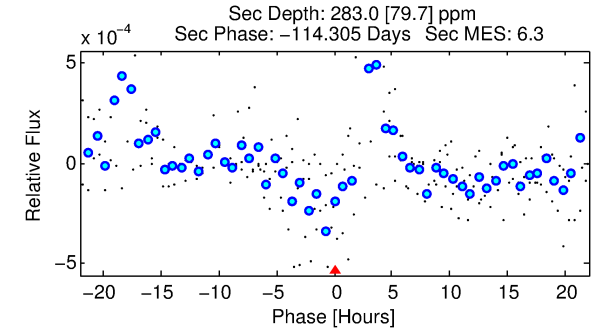
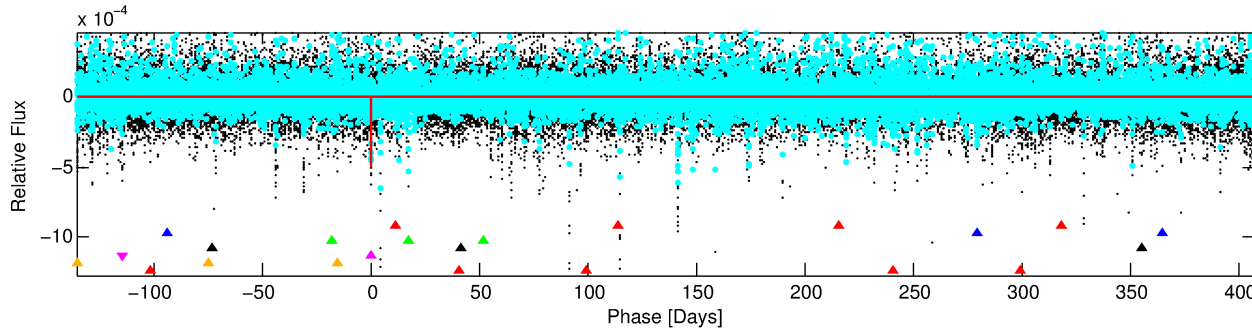
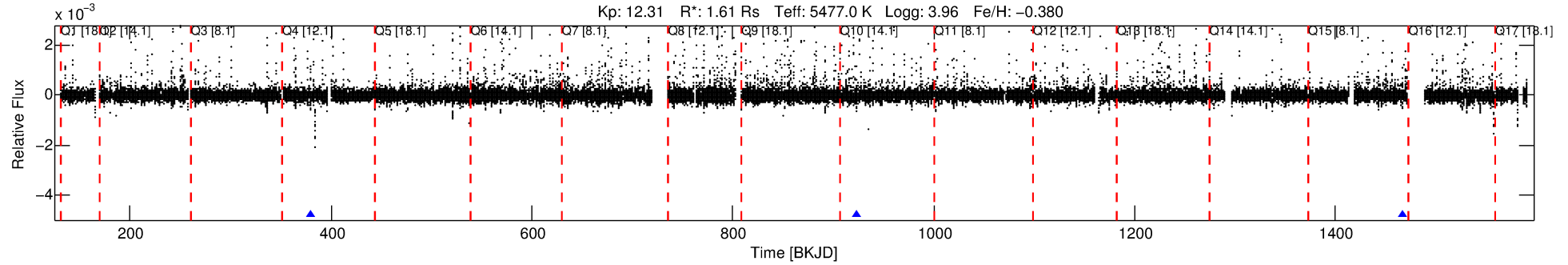
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 008957218-05

No Significant Match Found

# DV One-Page Summary

KIC: 8957218 Candidate: 5 of 7 Period: 543.299 d



## DV Fit Results:

Period = 543.29917 [0.00498] d  
Epoch = 379.8916 [0.0076] BKJD  
Rp/R\* = 0.0216 [0.0360]  
a/R\* = 885.45 [6341.31]  
b = 0.65 [6.30]  
Seff = 1.36 [1.35]  
Teq = 275 [68] K  
Rp = 3.78 [6.64] Re  
a = 1.2361 [0.7237] AU  
Ag = 16614.30 [57963.62] [0.29 $\sigma$ ]  
Teffp = 4836 [4049] K [1.13 $\sigma$ ]

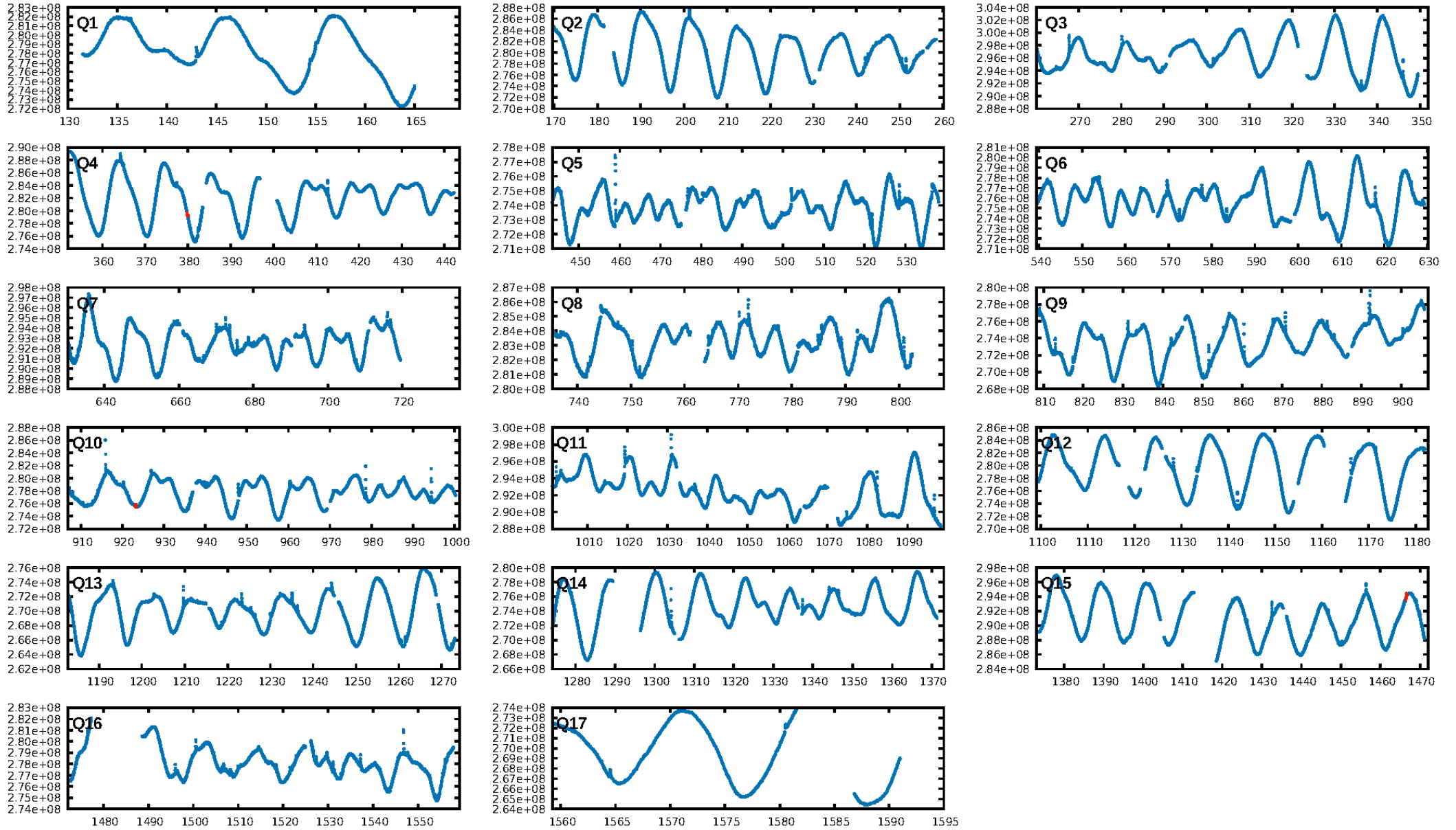
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [222.36 $\sigma$ ]  
LongPeriod-sig: 100.0% [132.30 $\sigma$ ]  
ModelChiSquare2-sig: 54.8%  
ModelChiSquareGof-sig: 29.1%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 2.279  
Centroid-sig: 58.4%  
Centroid-so: 0.338 arcsec [0.71 $\sigma$ ]  
OotOffset-rm: 0.708 arcsec [1.20 $\sigma$ ]  
OotOffset-st: 1/1/1/0 [3]  
KicOffset-rm: 0.697 arcsec [1.12 $\sigma$ ]  
KicOffset-st: 1/1/1/0 [3]  
DiffImageQuality-fgm: 1.00 [3/3]  
DiffImageOverlap-fno: 1.00 [3/3]

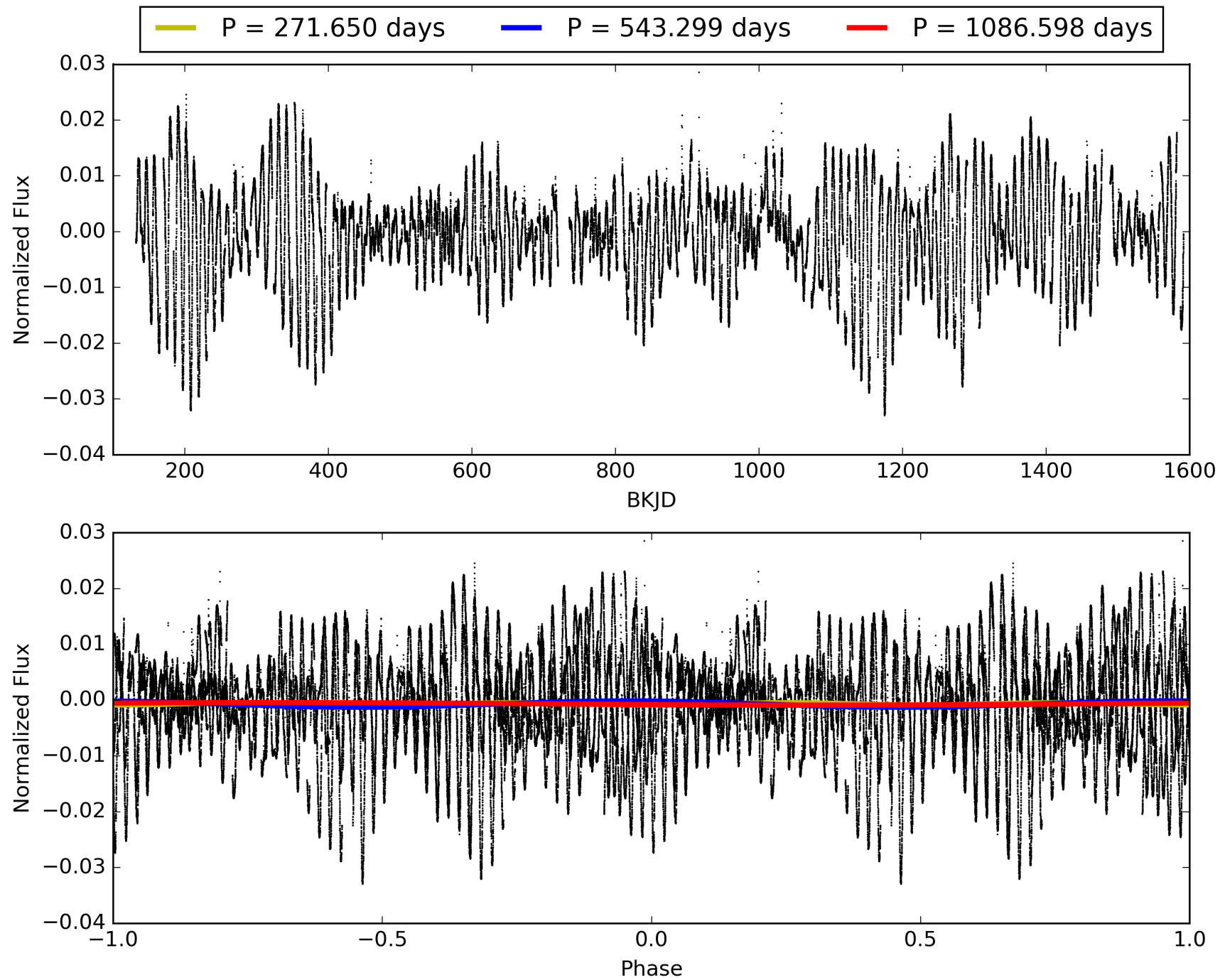
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 23:50:29 Z

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

# TCE 008957218-05, PDC Light Curves

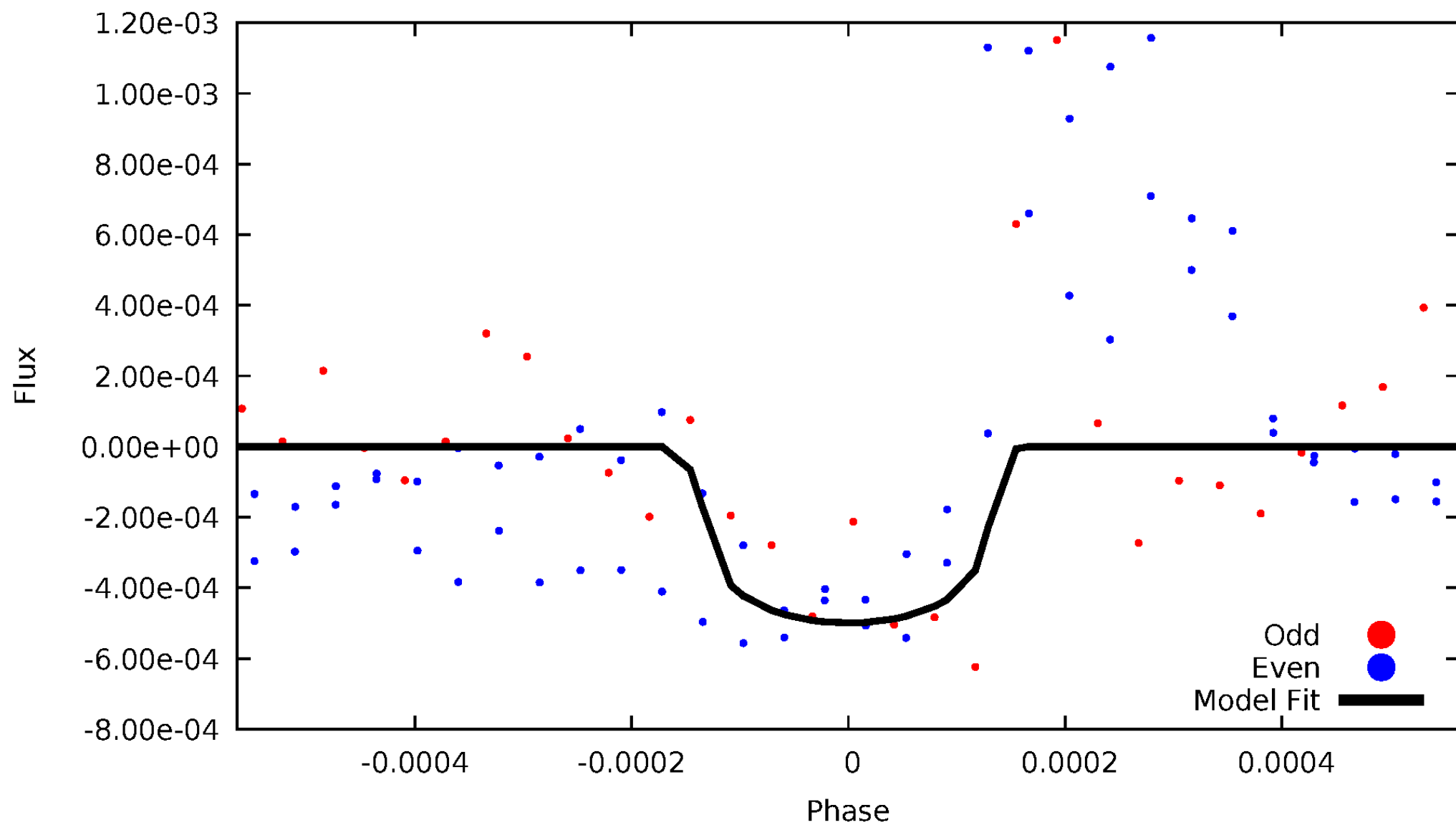


# TCE 008957218-05



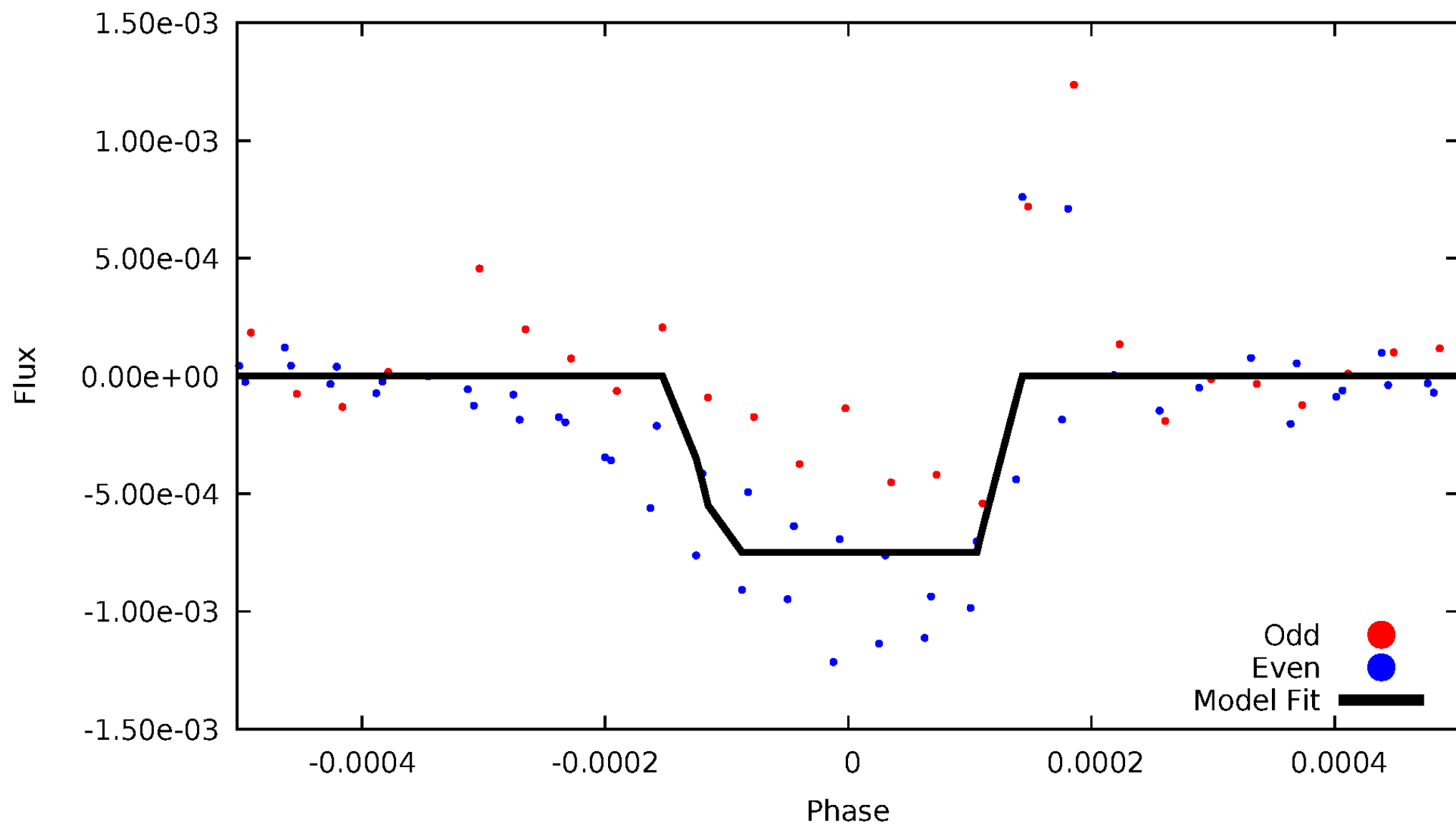
# DV Odd/Even

TCE 008957218-05



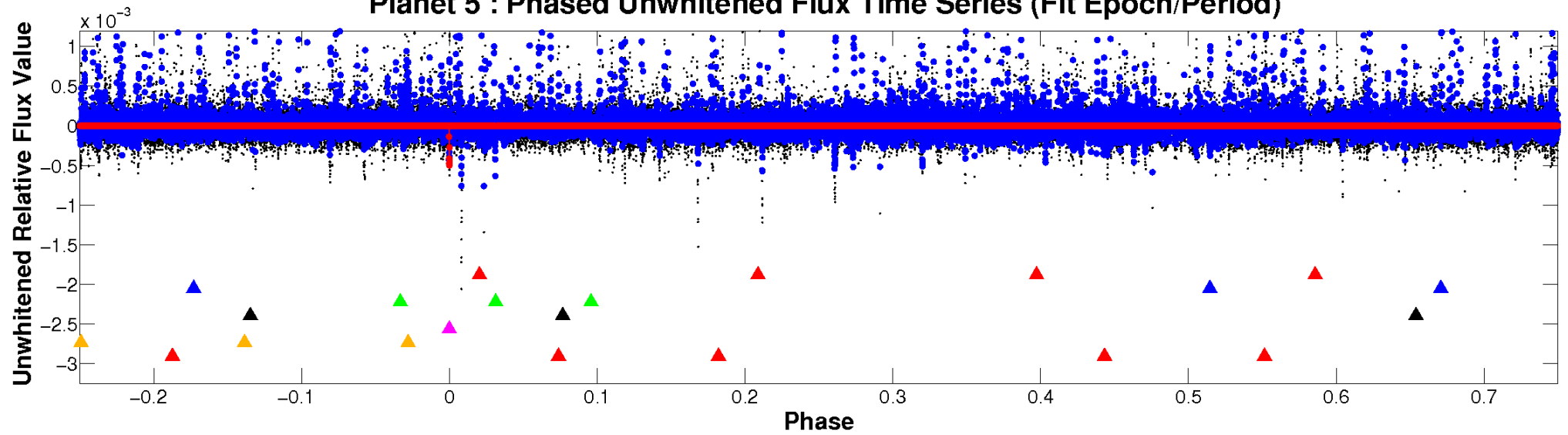
# ALT Odd/Even

TCE 008957218-05

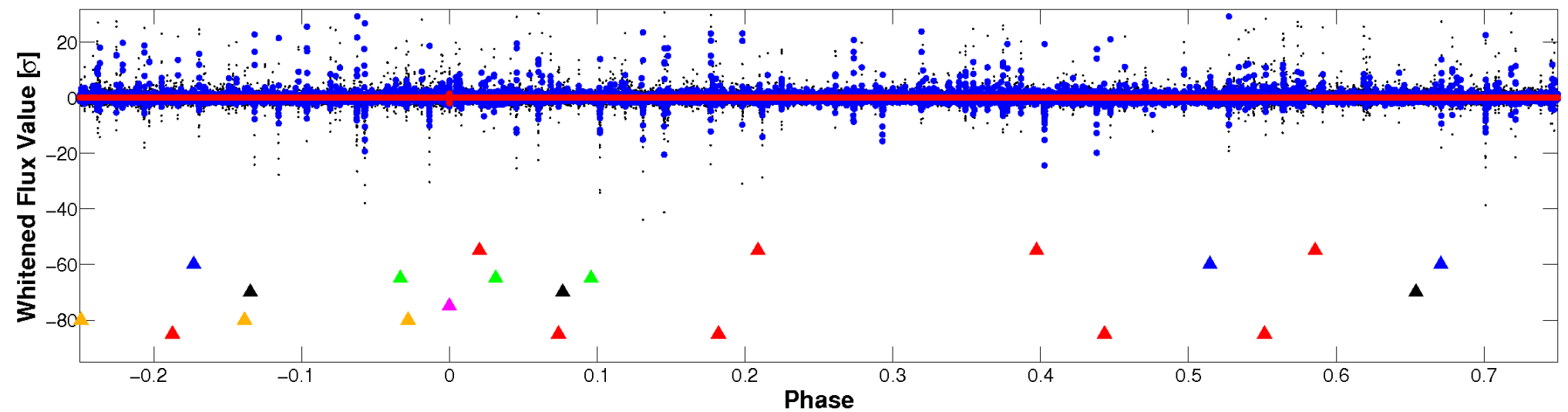


# Non-Whitened Vs. Whitened Light Curve

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

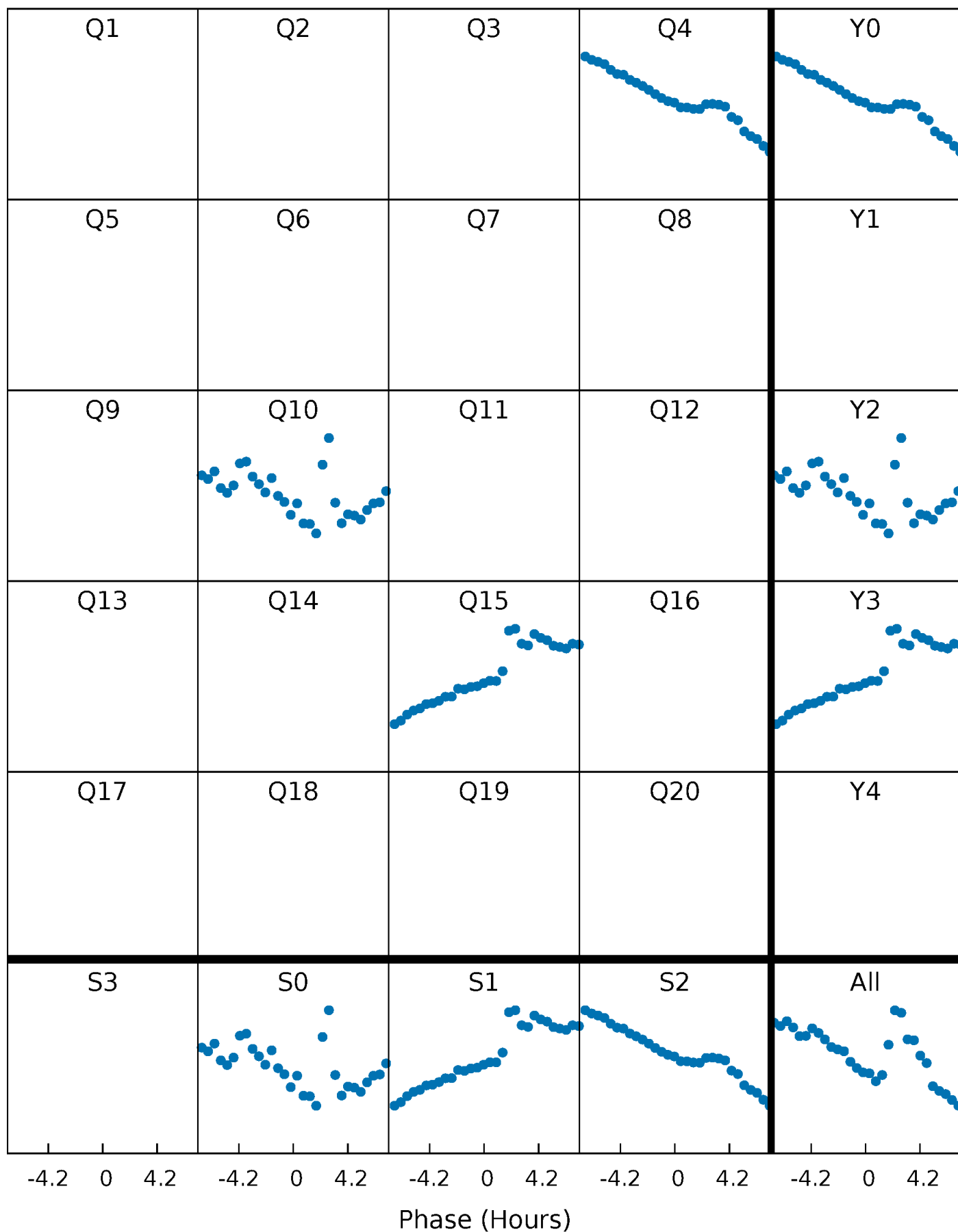


Planet 5 : Phased Whitened Flux Time Series (Fit Epoch/Period)



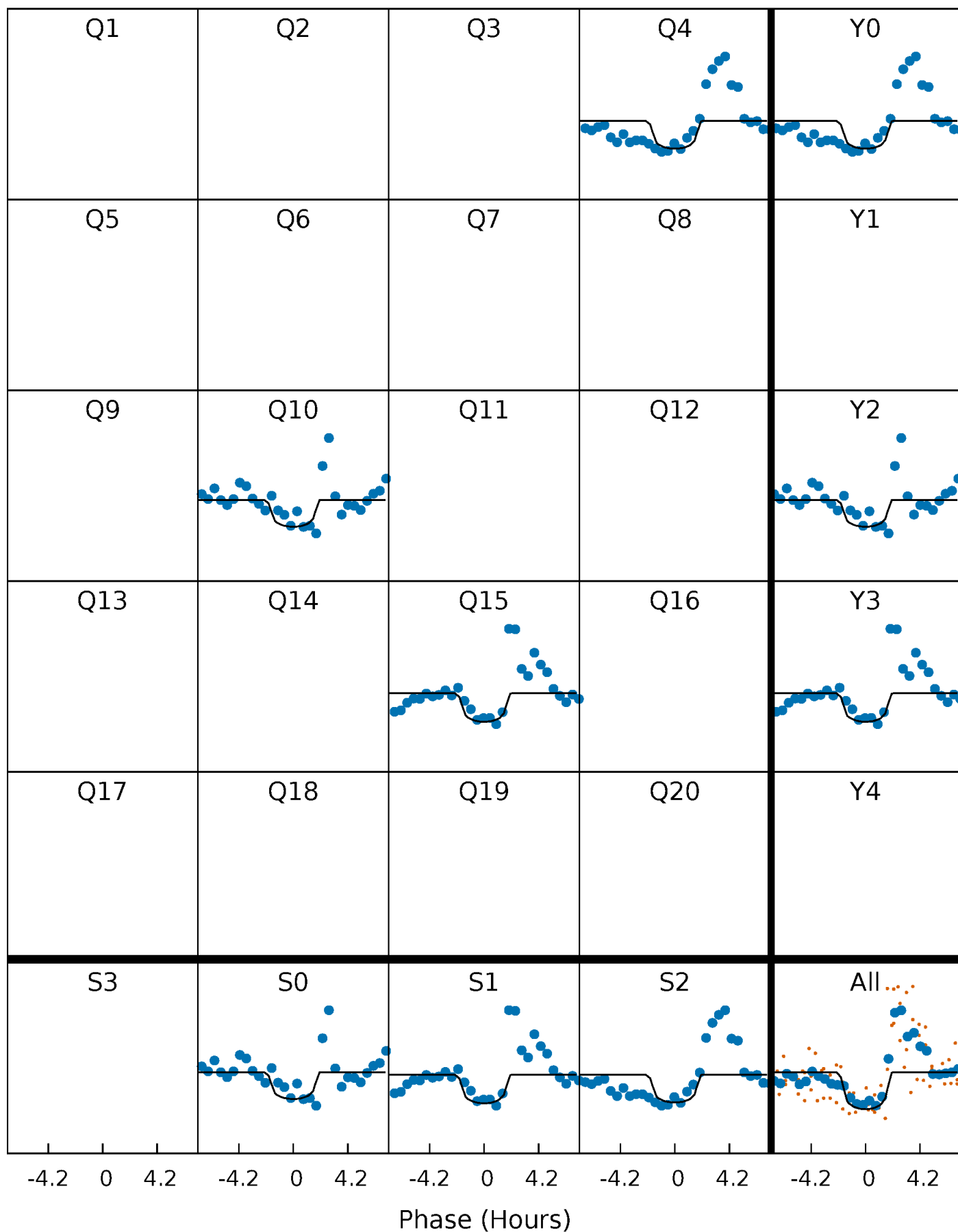
# PDC Quarter-Phased Transit Curves

TCE 008957218-05     $P=543.299171$  Days     $T_0=379.891554$  (BKJD)



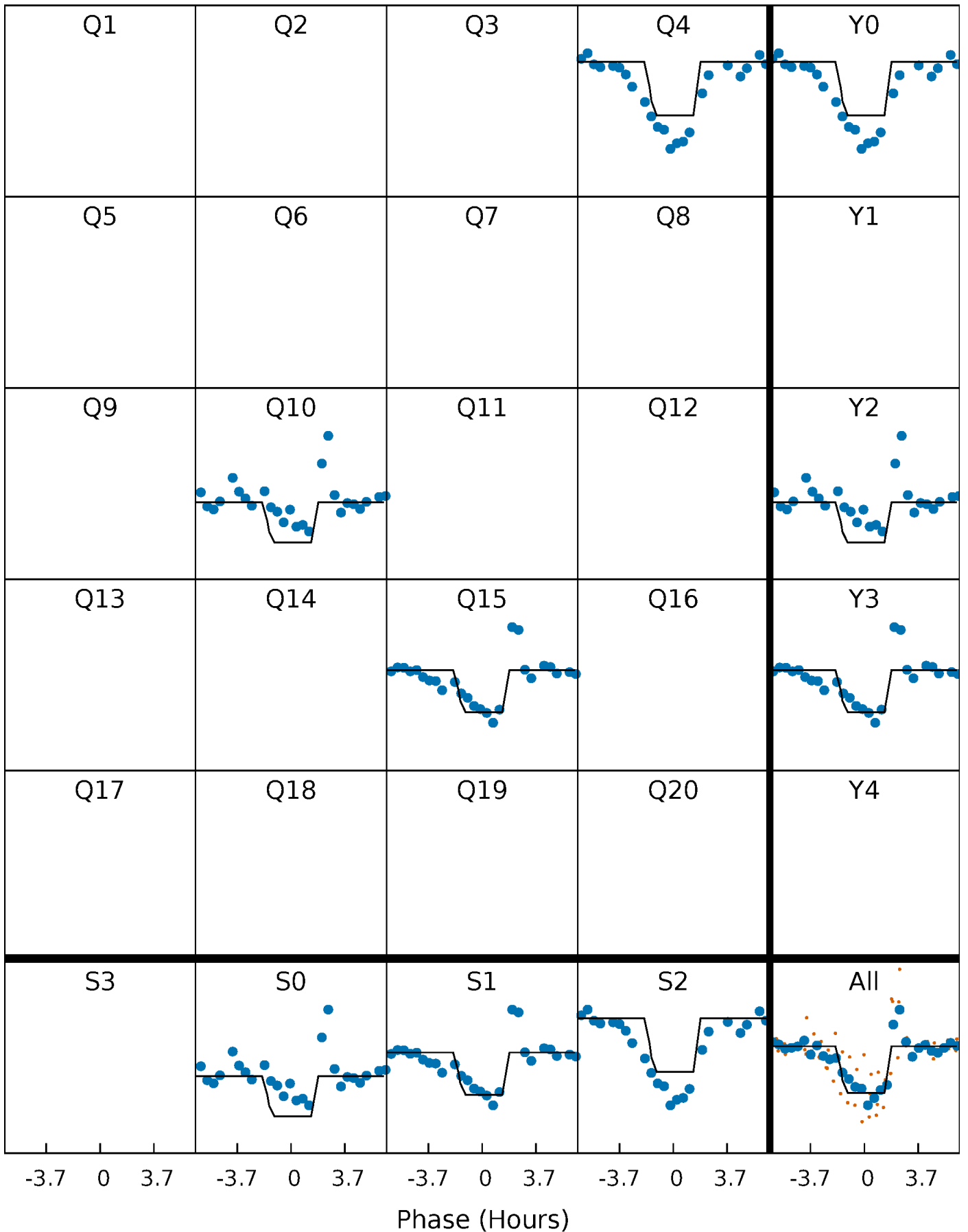
# DV Quarter-Phased Transit Curves

TCE 008957218-05     $P=543.299171$  Days     $T_0=379.891554$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

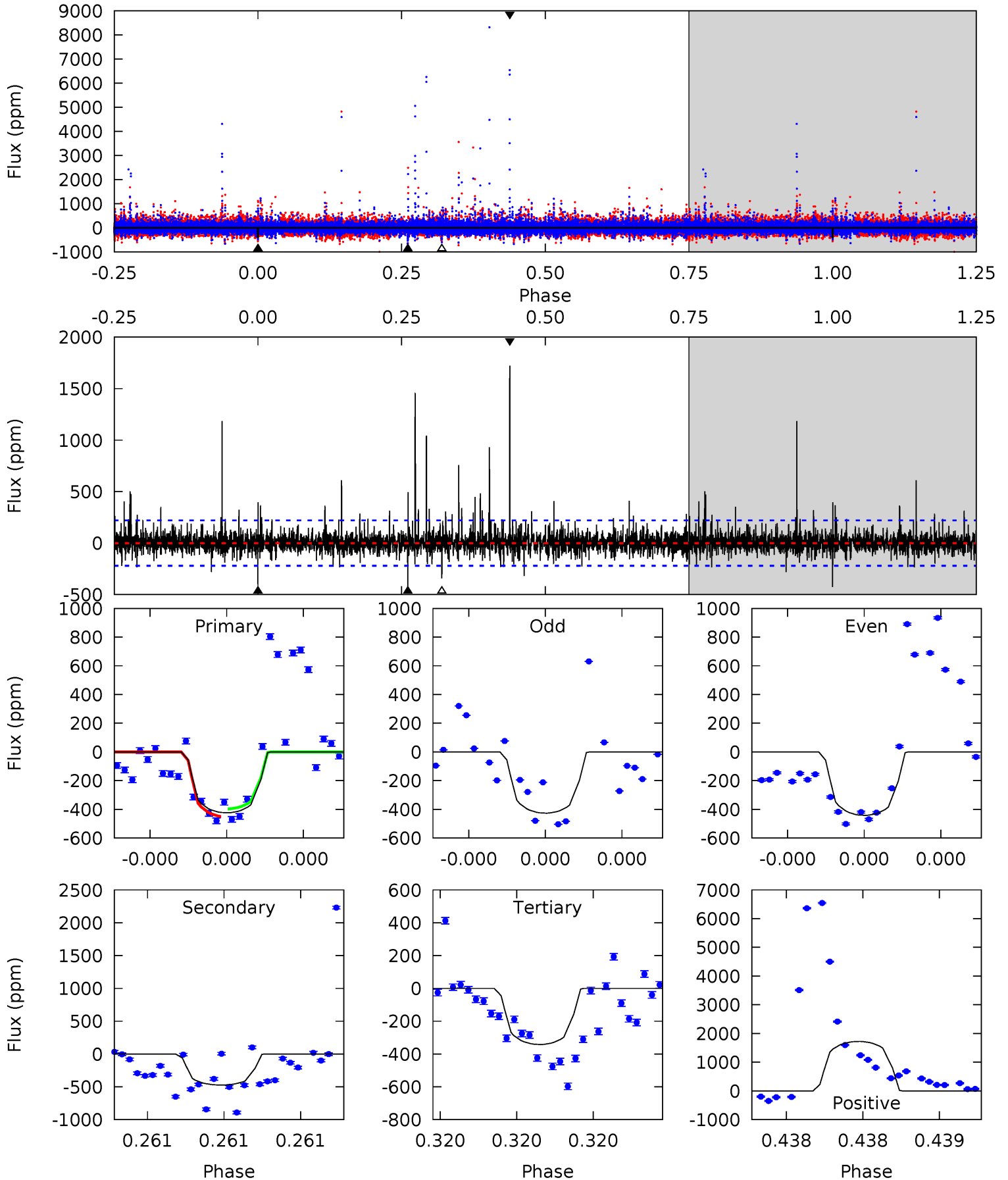
TCE 008957218-05 P=543.287493 Days  $T_0=379.906998$  (BKJD)



# DV Model-Shift Uniqueness Test

008957218-05, P = 543.299171 Days, E = 379.891554 Days

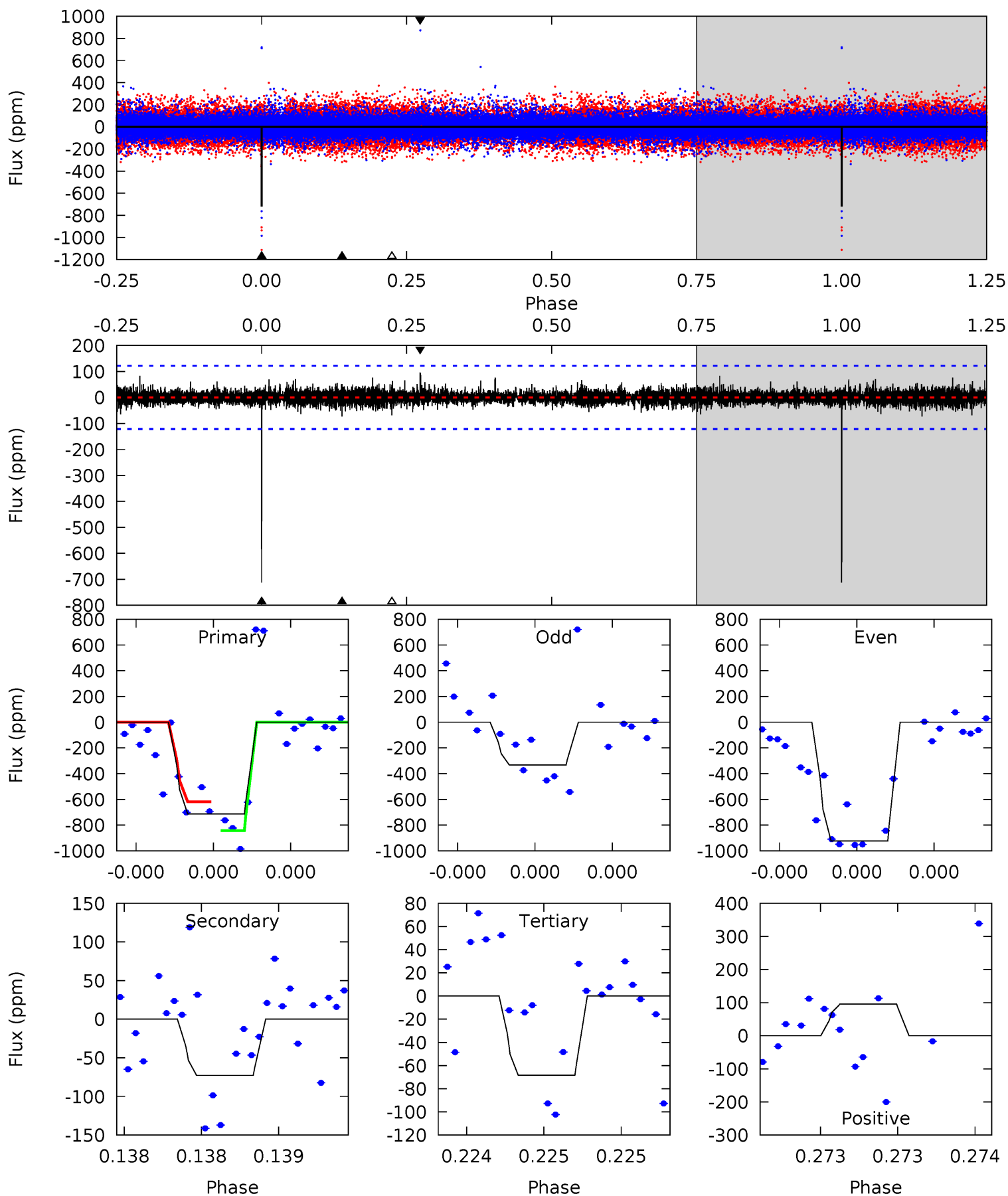
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.9	12.2	8.82	44.4	5.67	3.62	2.04	2.12	-33.5	3.38	-32.2	0.10	0.94	0.78	0.68



# Alt Model-Shift Uniqueness Test

008957218-05, P = 543.287493 Days, E = 379.906998 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
33.2	3.39	3.19	4.46	5.68	3.65	0.66	30.0	28.7	0.20	-1.07	14.1	1.00	0.12	0



### Stellar Parameters For KIC 008957218

	$T_{\text{eff}} (K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5477^{+164}_{-148}$	$3.957^{+0.595}_{-0.255}$	$-0.380^{+0.350}_{-0.250}$	$1.607^{+0.803}_{-0.883}$	$0.853^{+0.116}_{-0.095}$	$0.290^{+2.152}_{-0.169}$
	+3%/-3%	+15%/-6%	+92%/-66%	+50%/-55%	+14%/-11%	+743%/-58%
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 008957218-05 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-473 \pm 39$	$5.38^{+5.98}_{-3.79}$	$379^{+51}_{-57}$	$4612^{+3625}_{-1028}$	$13800^{+135228}_{-10624}$
Alt.	$-73 \pm 21$	$6.36^{+5.74}_{-4.23}$	$379^{+46}_{-56}$	$3172^{+1292}_{-506}$	$1523^{+11708}_{-1127}$

$T_{max}$  = Theoretical Maximum Planetary Temperature

$T_{obs}$  = Observed Planetary Temperature (Assuming  $A=0.3$ )

$A_{obs}$  = Observed Albedo (Assuming  $T=0$ )

If a secondary eclipse is present, the system is likely an EB if  $T_{obs} \gg T_{max}$  AND  $A_{obs} \gg 1.0$

## DV Centroid Data

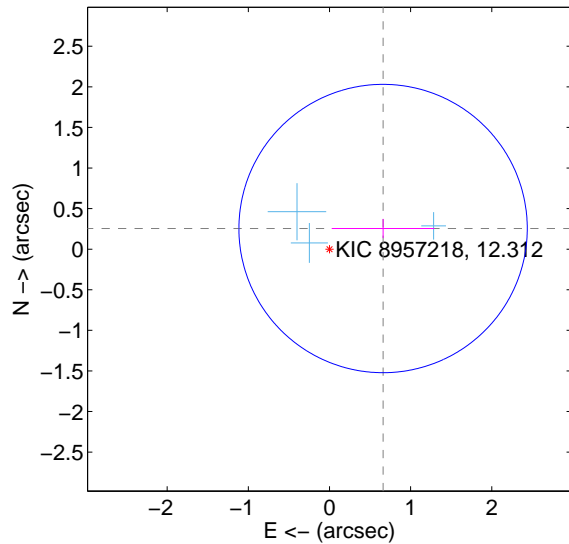
Supplemental centroid analysis for 008957218-05. Kepler magnitude: 12.31. Transit SNR 8.79

There are 3 quarters with good PRF difference image offsets

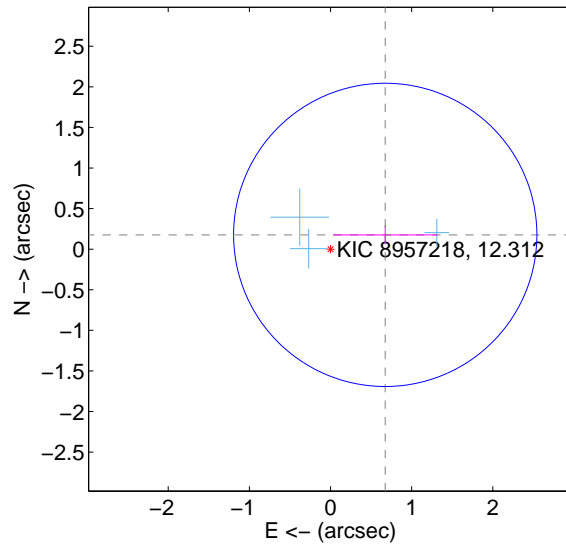
The direct PRF centroid is offset from the target star catalog position by about 0.07 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.708 \pm 0.592$	1.20	$-0.660 \pm 0.633$	$0.254 \pm 0.119$
PRF-fit source offset from KIC position	$0.697 \pm 0.623$	1.12	$-0.674 \pm 0.643$	$0.176 \pm 0.117$
photometric centroid source offset	$0.34 \pm 0.47$	0.71	$0.25 \pm 0.49$	$-0.23 \pm 0.46$

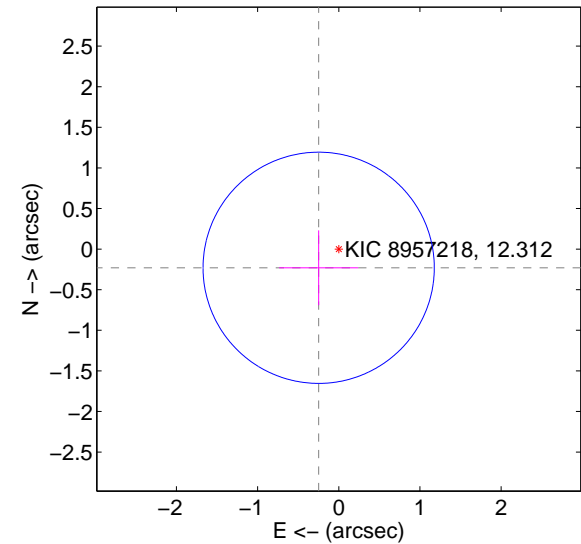
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

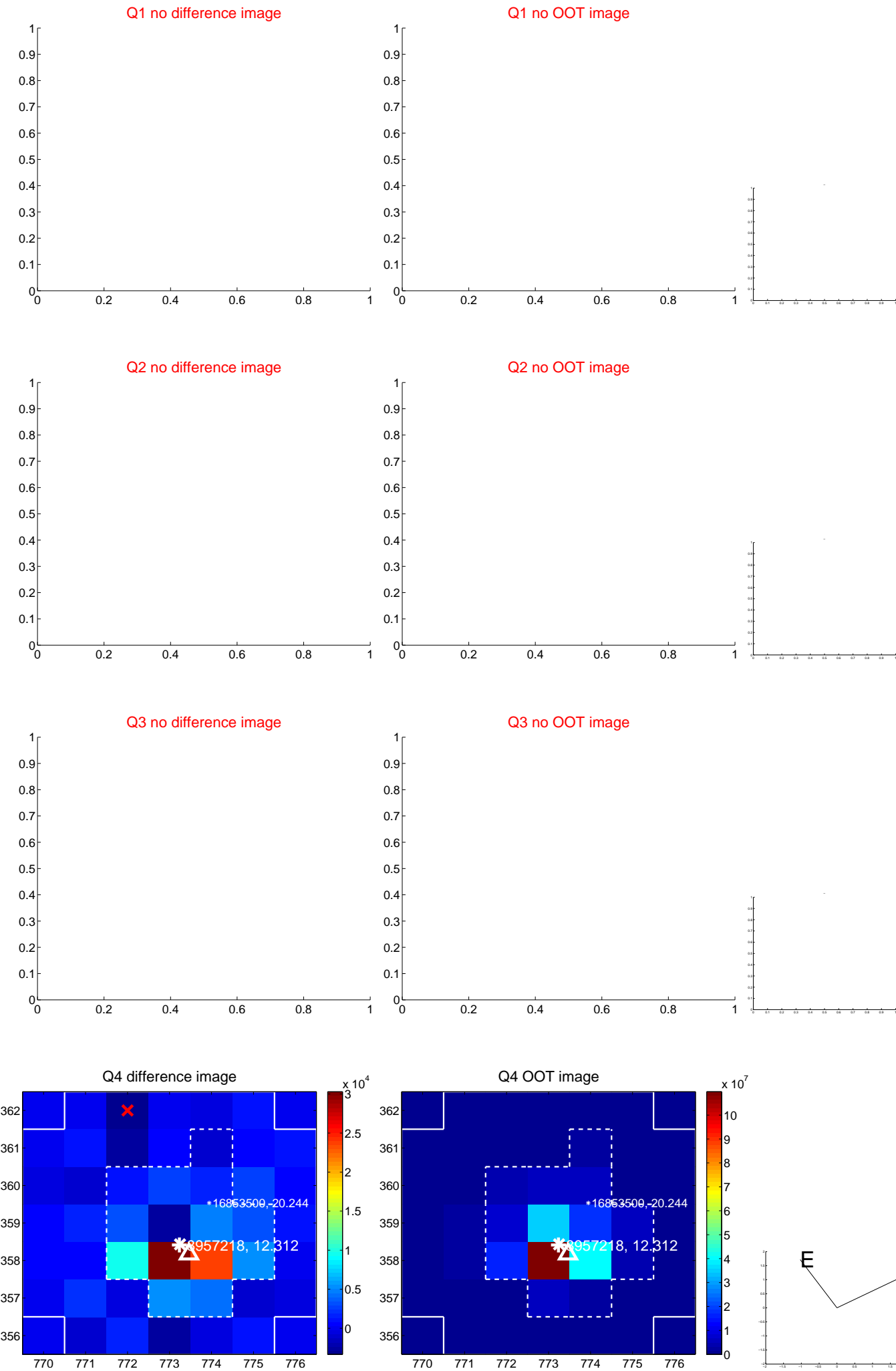


offset from photometric centroids

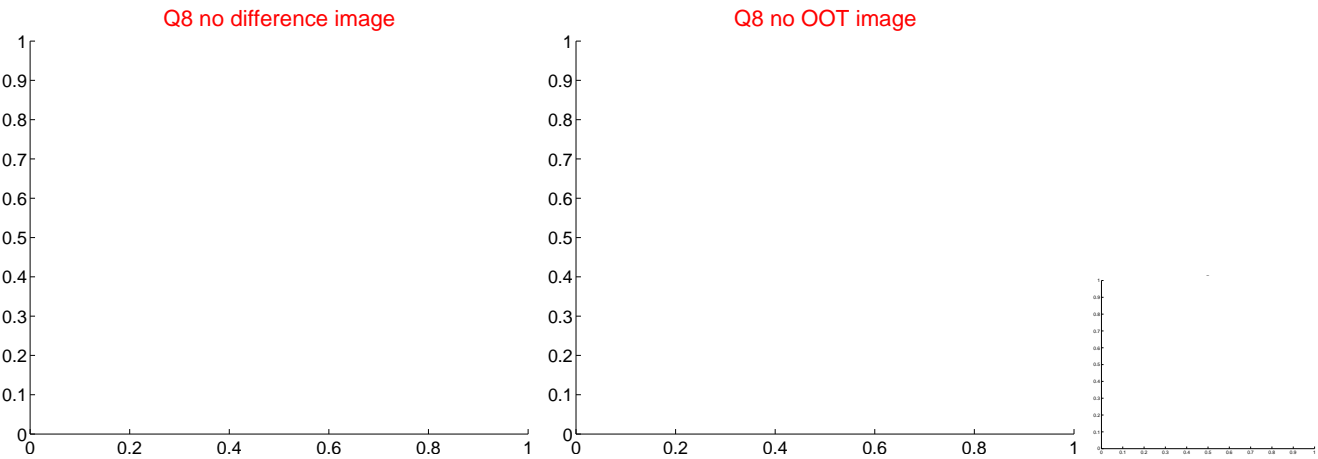
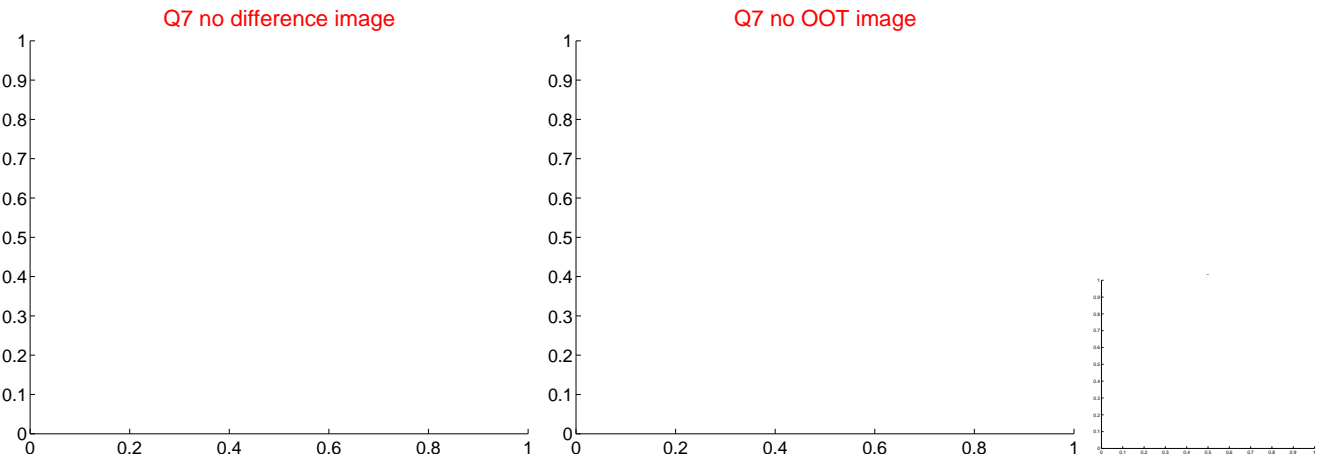
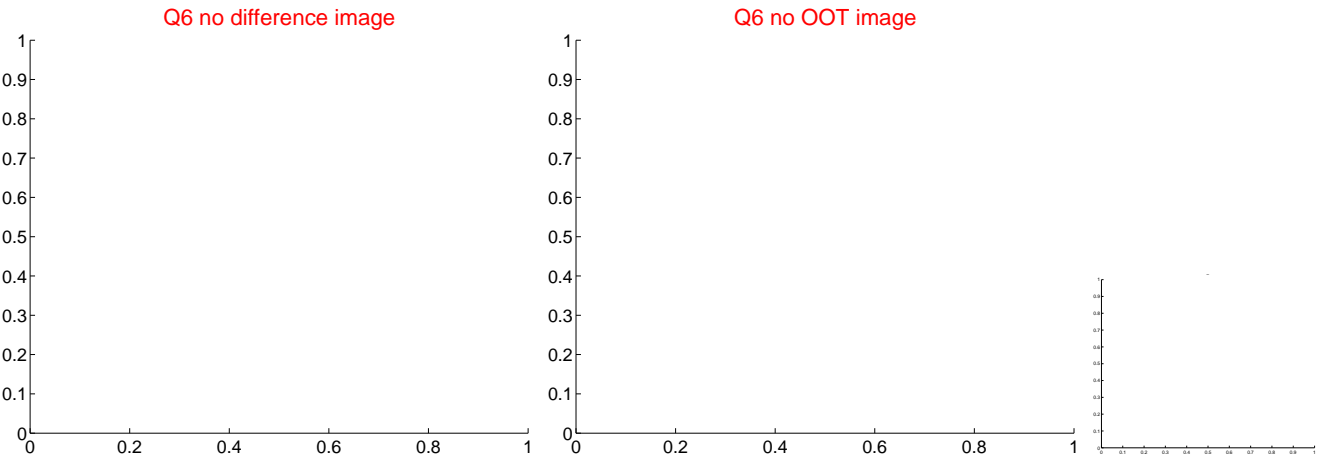
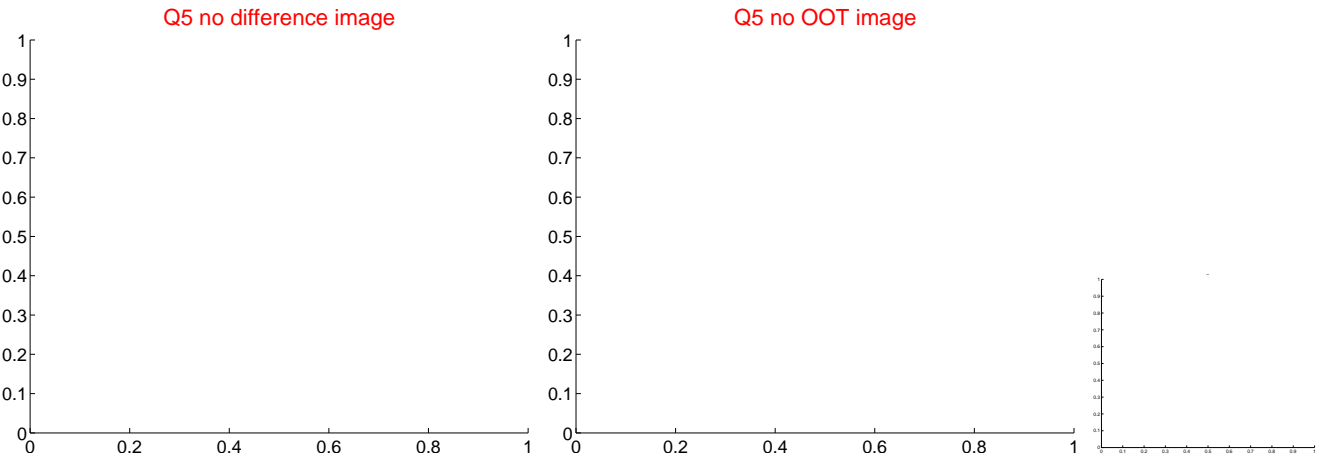


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

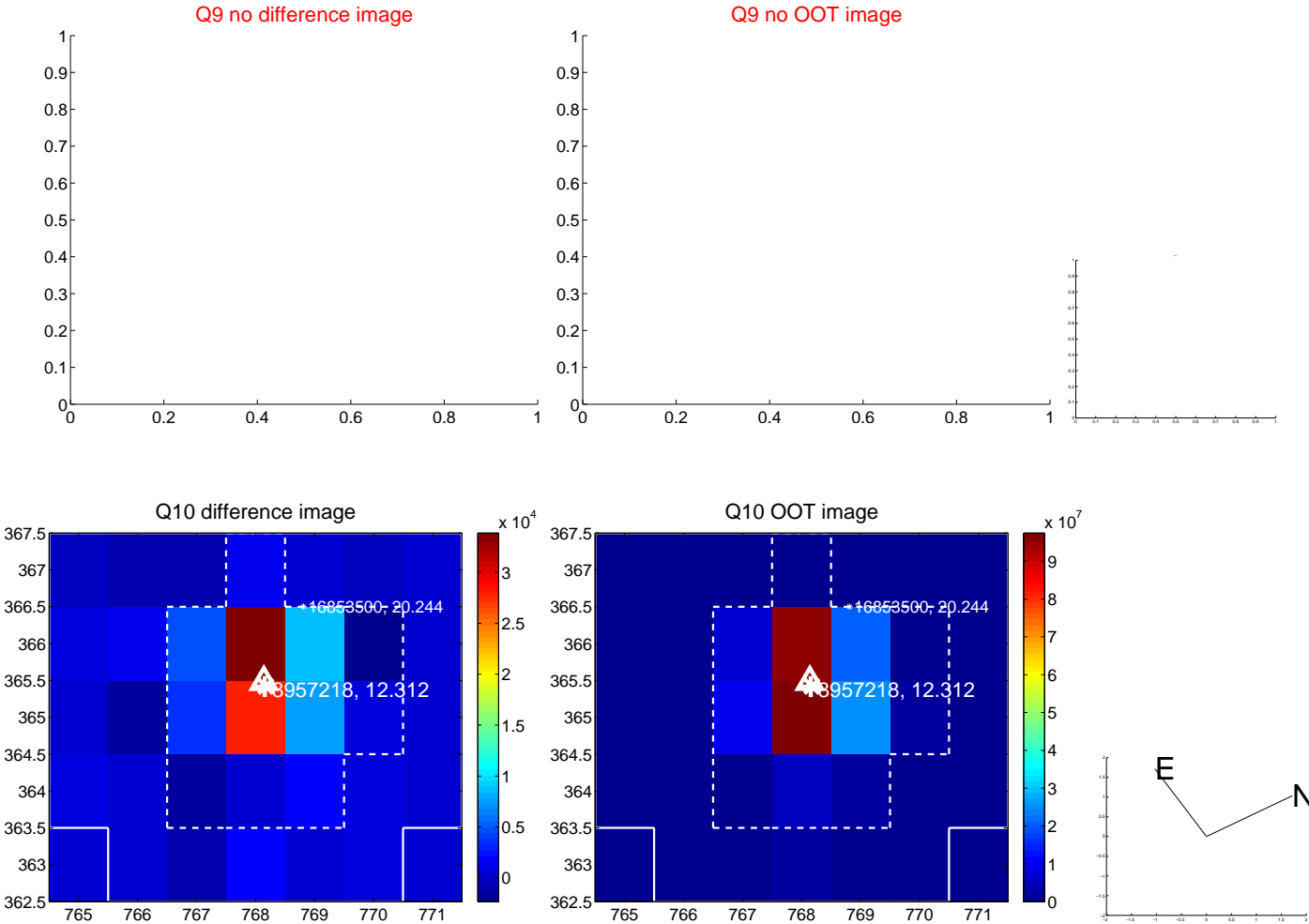
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



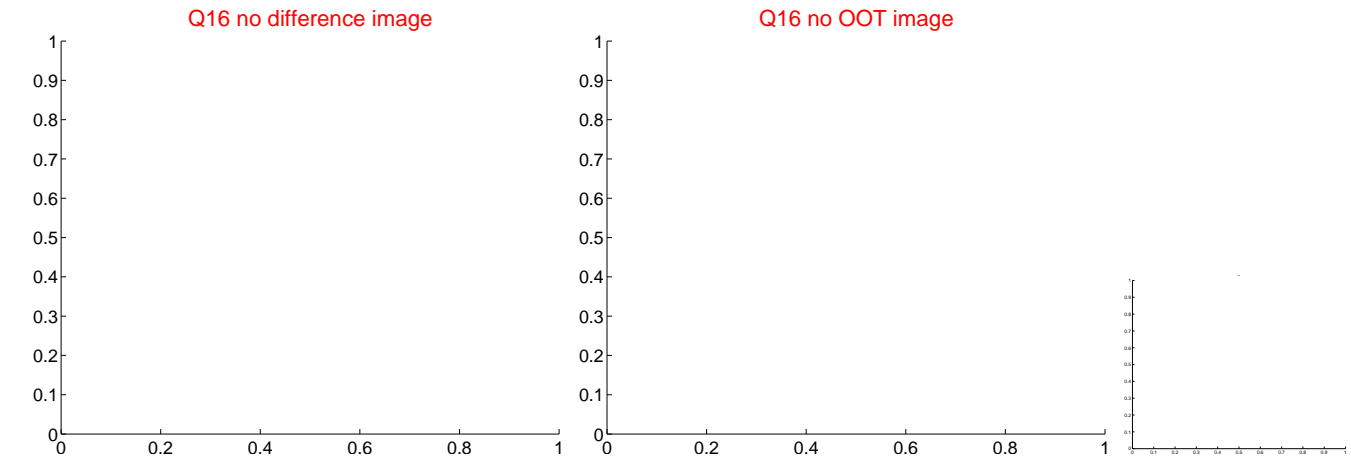
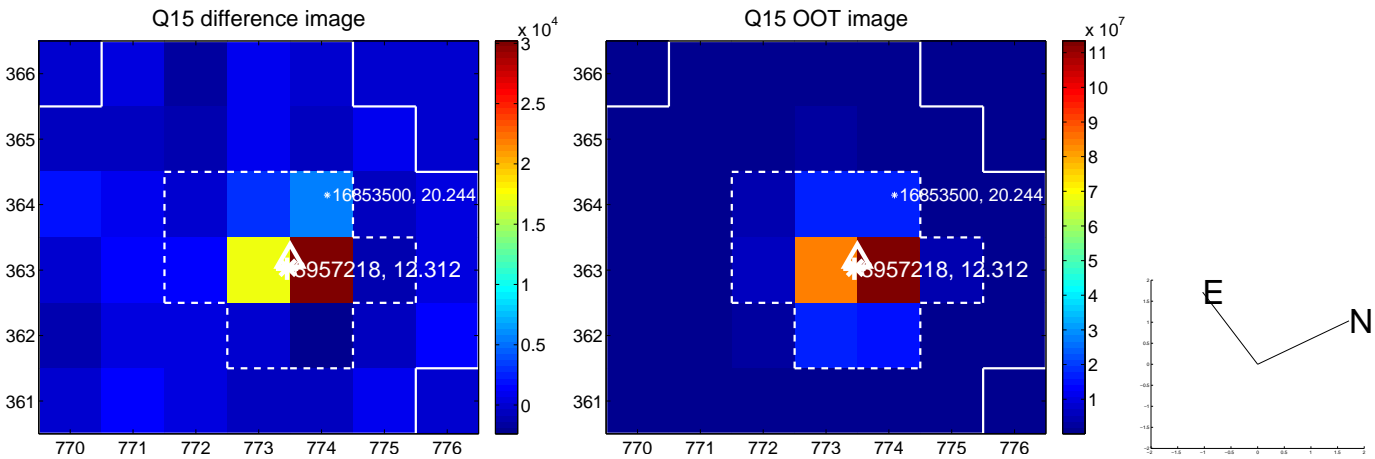
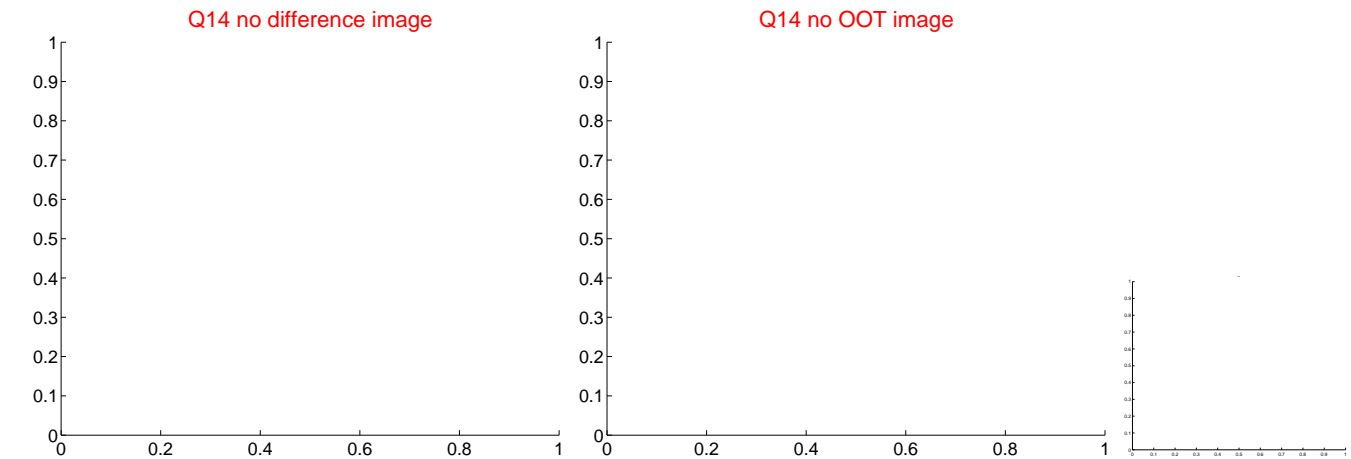
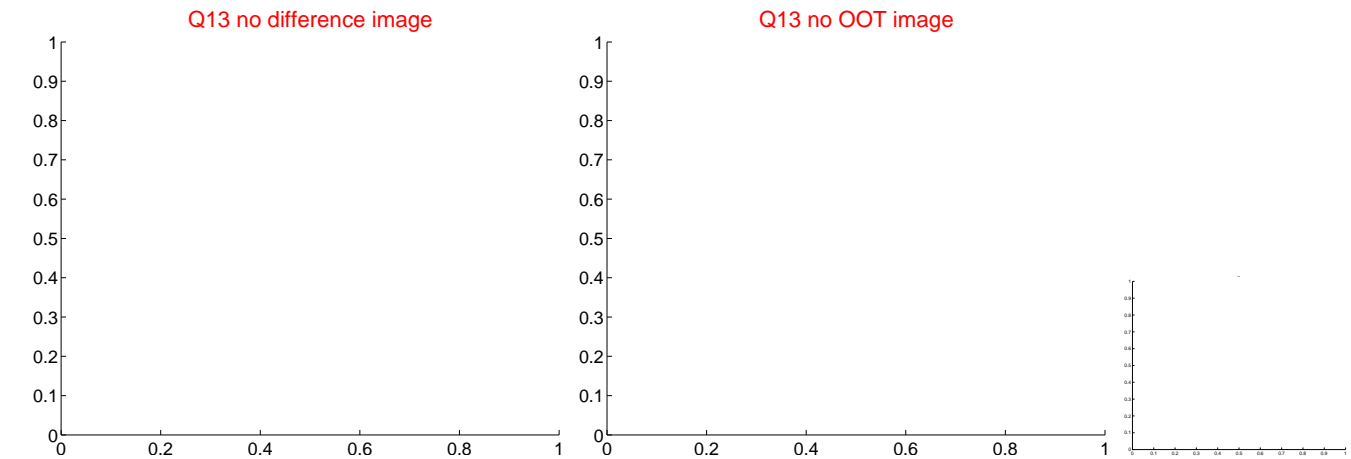
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



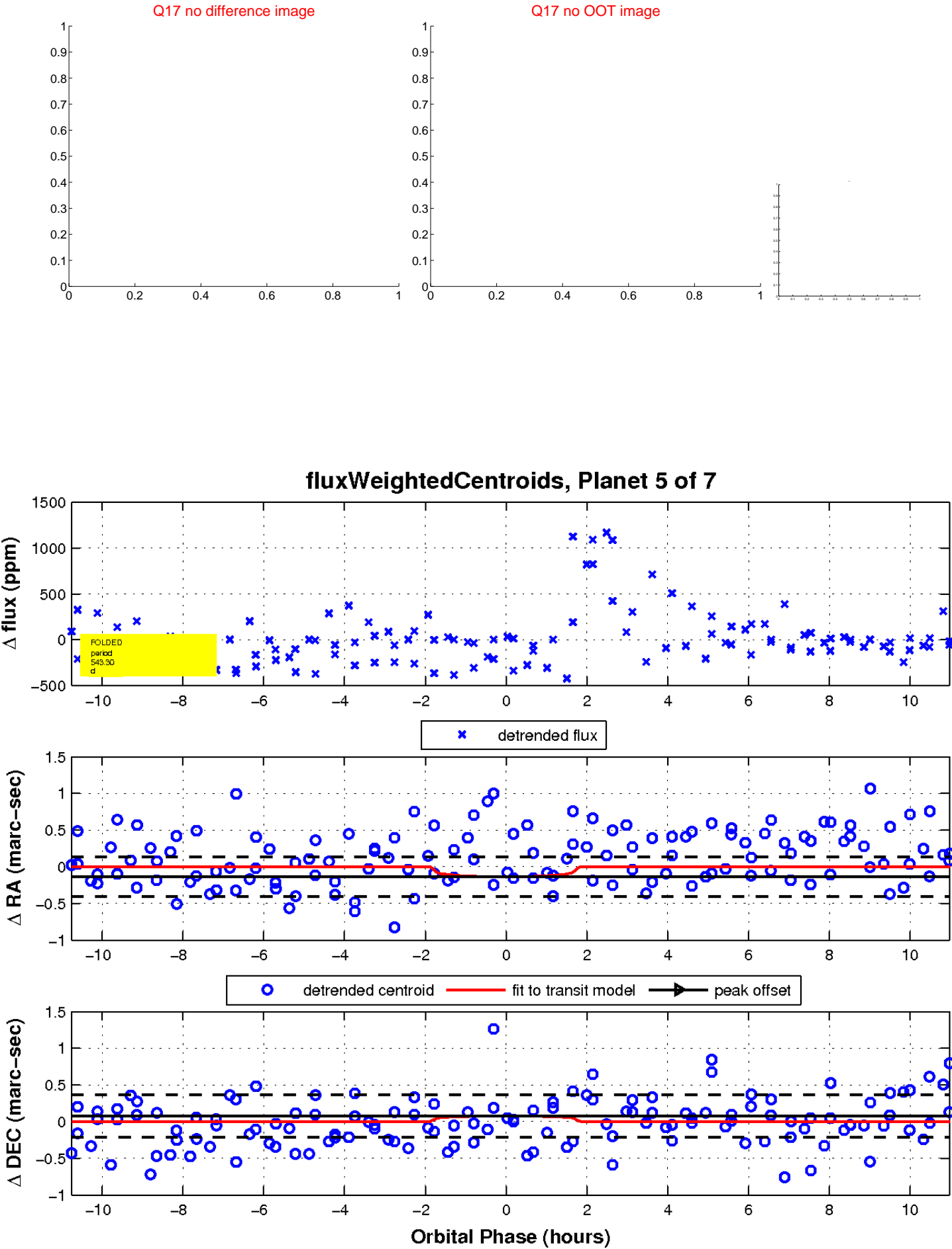
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

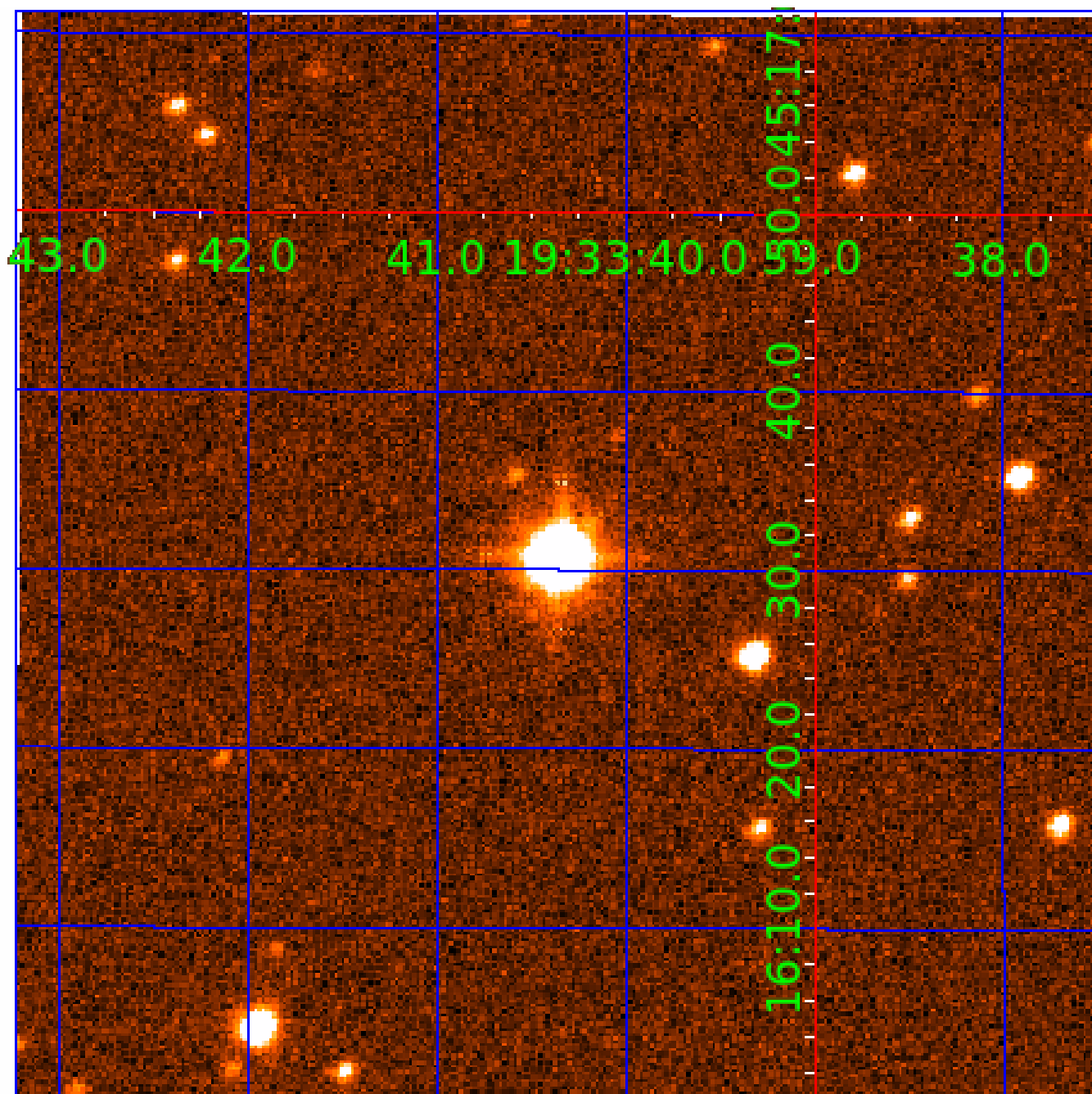


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 008957218

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008957218-01	OBS	No	440.908335	154.829795	516.2	8.318	18.7	7.9	1.61	5477	4.64	1.80
008957218-02	OBS	No	458.416275	285.917787	514.7	3.164	15.9	8.7	1.61	5477	4.52	1.71
008957218-03	OBS	No	578.350781	361.871328	461.2	5.188	14.2	7.7	1.61	5477	4.27	1.25
008957218-04	OBS	No	658.130956	191.906115	361.9	3.295	15.0	6.0	1.61	5477	3.18	1.05
008957218-05	OBS	No	543.299171	379.891554	499.2	3.676	15.7	8.8	1.61	5477	3.78	1.36
008957218-06	OBS	No	483.183255	364.740726	419.4	5.346	15.2	7.1	1.61	5477	4.07	1.59
008957218-07	OBS	No	342.600741	136.217524	373.4	3.500	13.3	-1.0	1.61	5477	3.07	2.52

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008957218-01	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_MARSHALL_ZUMA—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
008957218-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV
008957218-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
008957218-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
008957218-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV
008957218-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
008957218-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_NOFITS

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

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

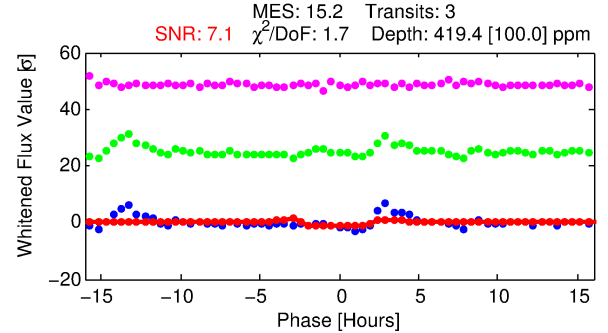
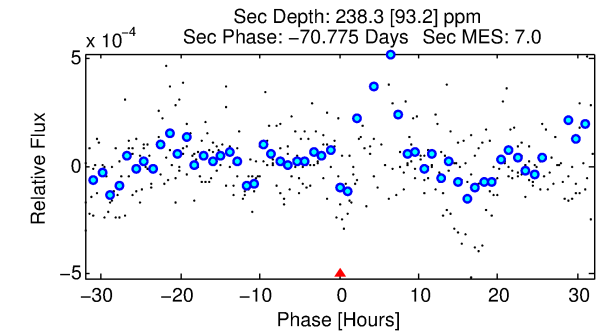
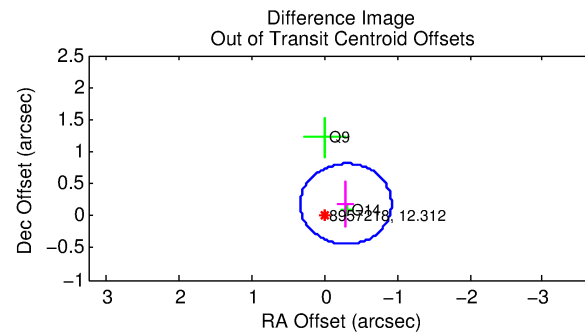
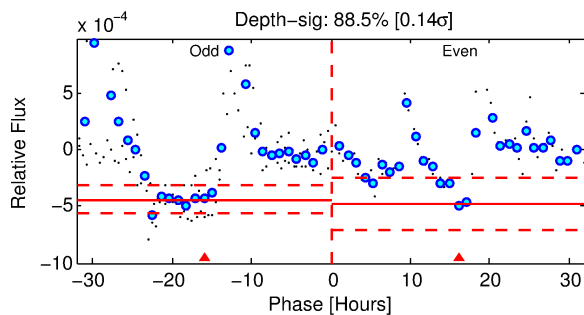
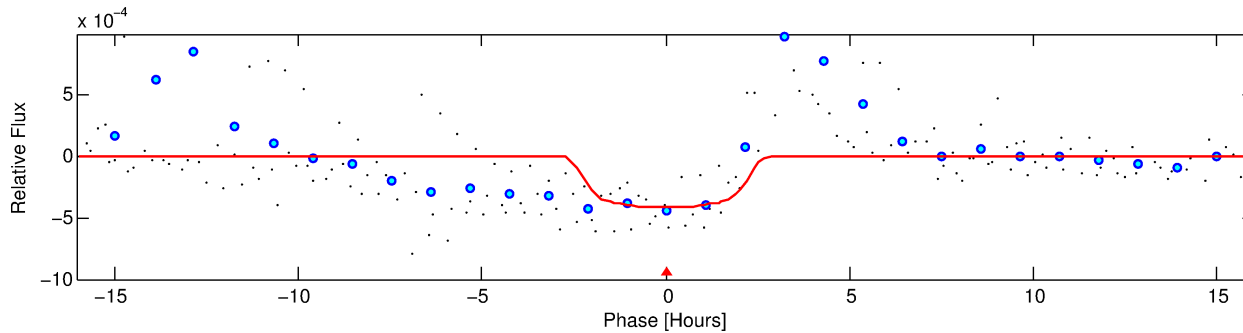
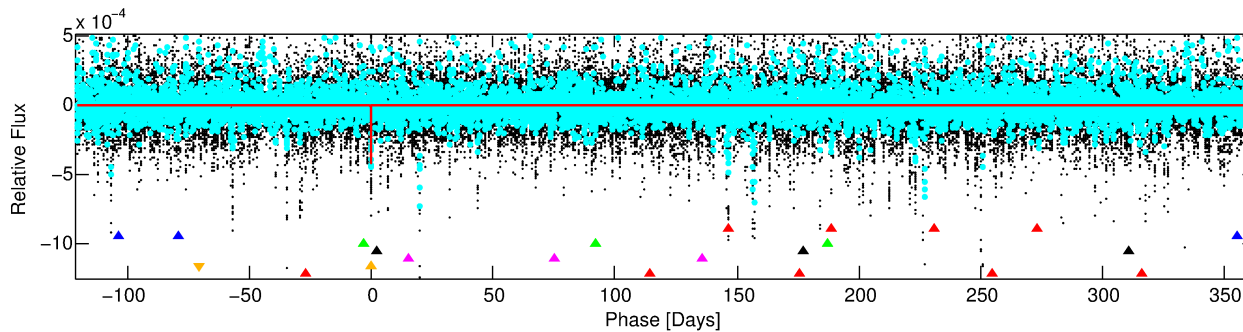
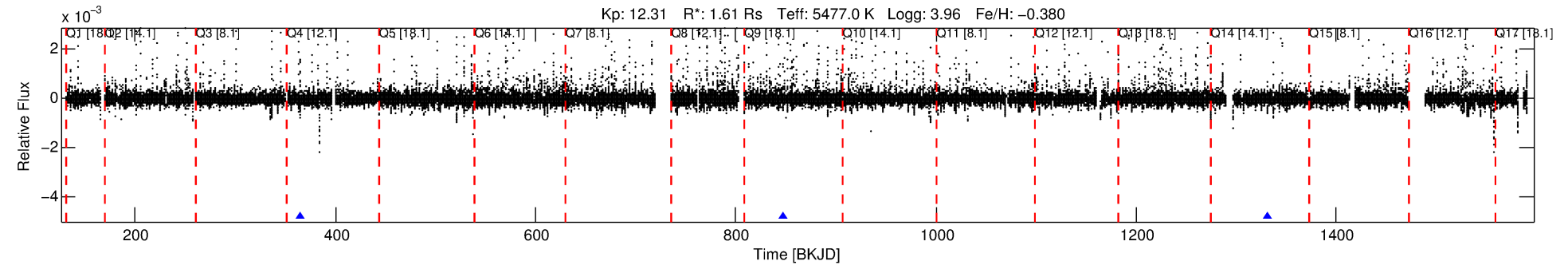
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 008957218-06

No Significant Match Found

# DV One-Page Summary

KIC: 8957218 Candidate: 6 of 7 Period: 483.183 d



## DV Fit Results:

Period = 483.18326 [0.00860] d  
Epoch = 364.7407 [0.0118] BKJD  
Rp/R\* = 0.0232 [0.0041]  
a/R\* = 292.41 [144.10]  
b = 0.93 [0.07]  
Seff = 1.59 [1.58]  
Teq = 286 [71] K  
Rp = 4.07 [2.35] Re  
a = 1.1432 [0.6693] AU  
Ag = 10329.42 [11520.14] [0.90 $\sigma$ ]  
Teffp = 4465 [601] K [6.91 $\sigma$ ]

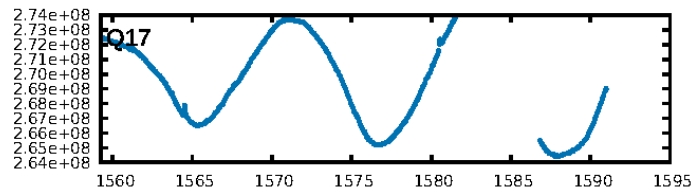
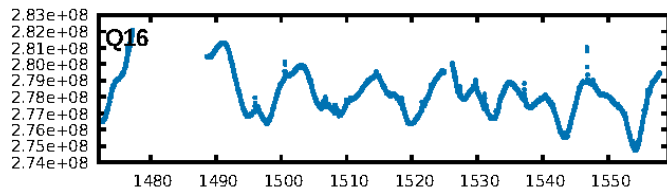
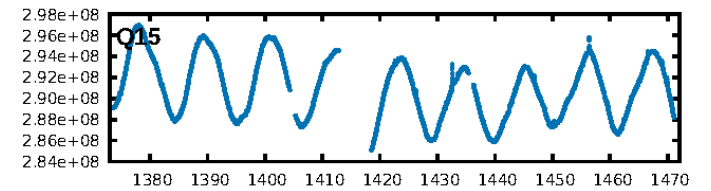
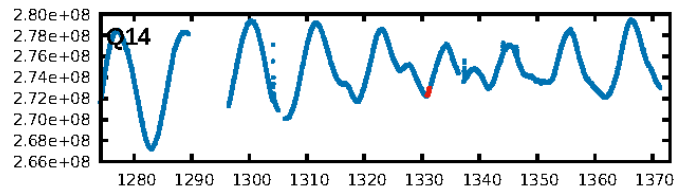
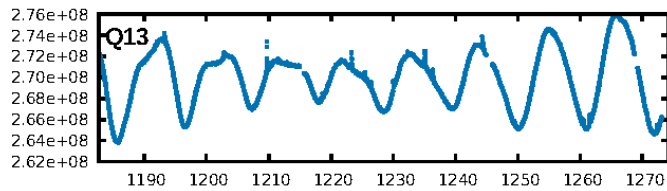
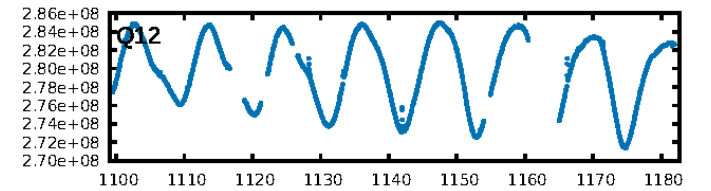
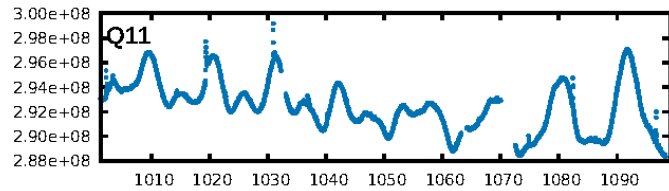
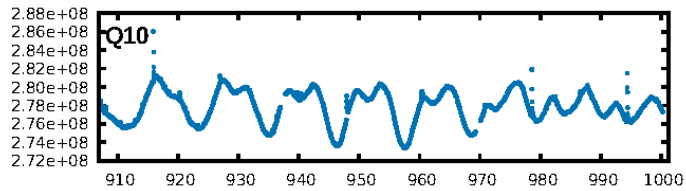
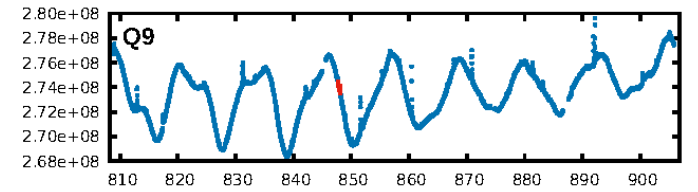
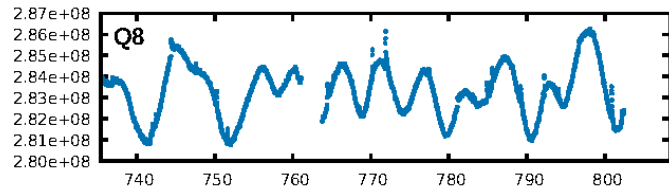
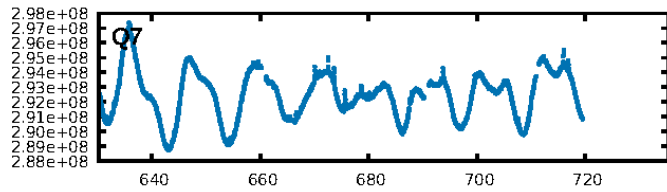
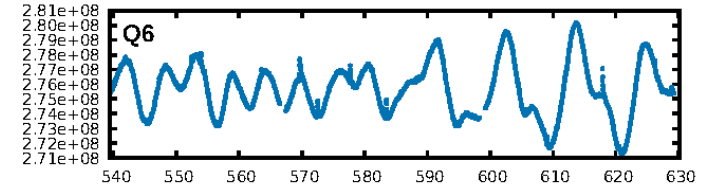
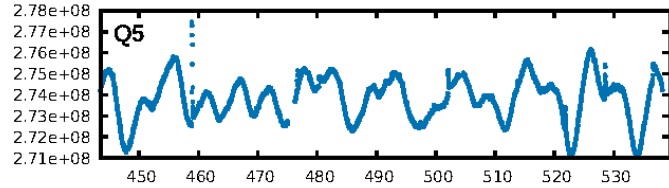
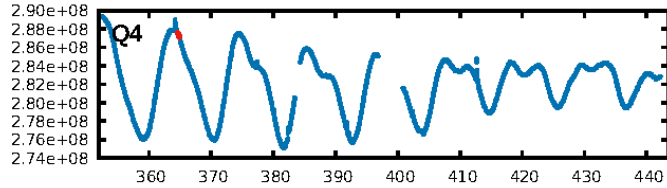
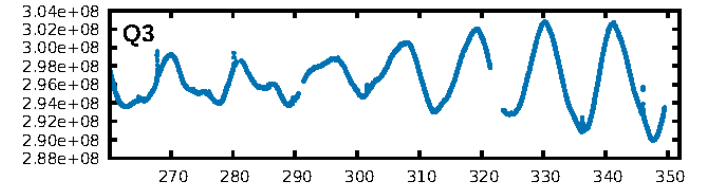
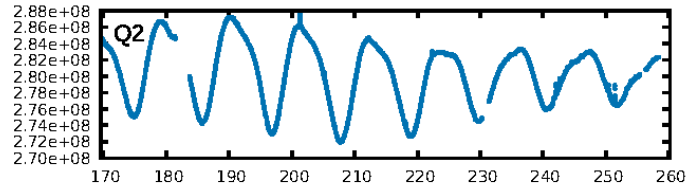
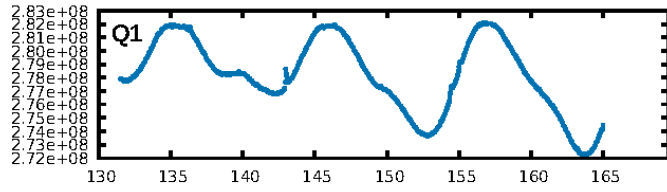
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [95.68 $\sigma$ ]  
LongPeriod-sig: 100.0% [222.36 $\sigma$ ]  
ModelChiSquare2-sig: 74.1%  
ModelChiSquareGof-sig: 45.0%  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 1.033  
Centroid-sig: 55.0%  
Centroid-so: 0.395 arcsec [0.66 $\sigma$ ]  
OotOffset-rm: 0.348 arcsec [1.66 $\sigma$ ]  
OotOffset-st: 1/0/0/1 [2]  
KicOffset-rm: 0.337 arcsec [1.87 $\sigma$ ]  
KicOffset-st: 1/0/0/1 [2]  
DiffImageQuality-fgm: 1.00 [2/2]  
DiffImageOverlap-fno: 1.00 [3/3]

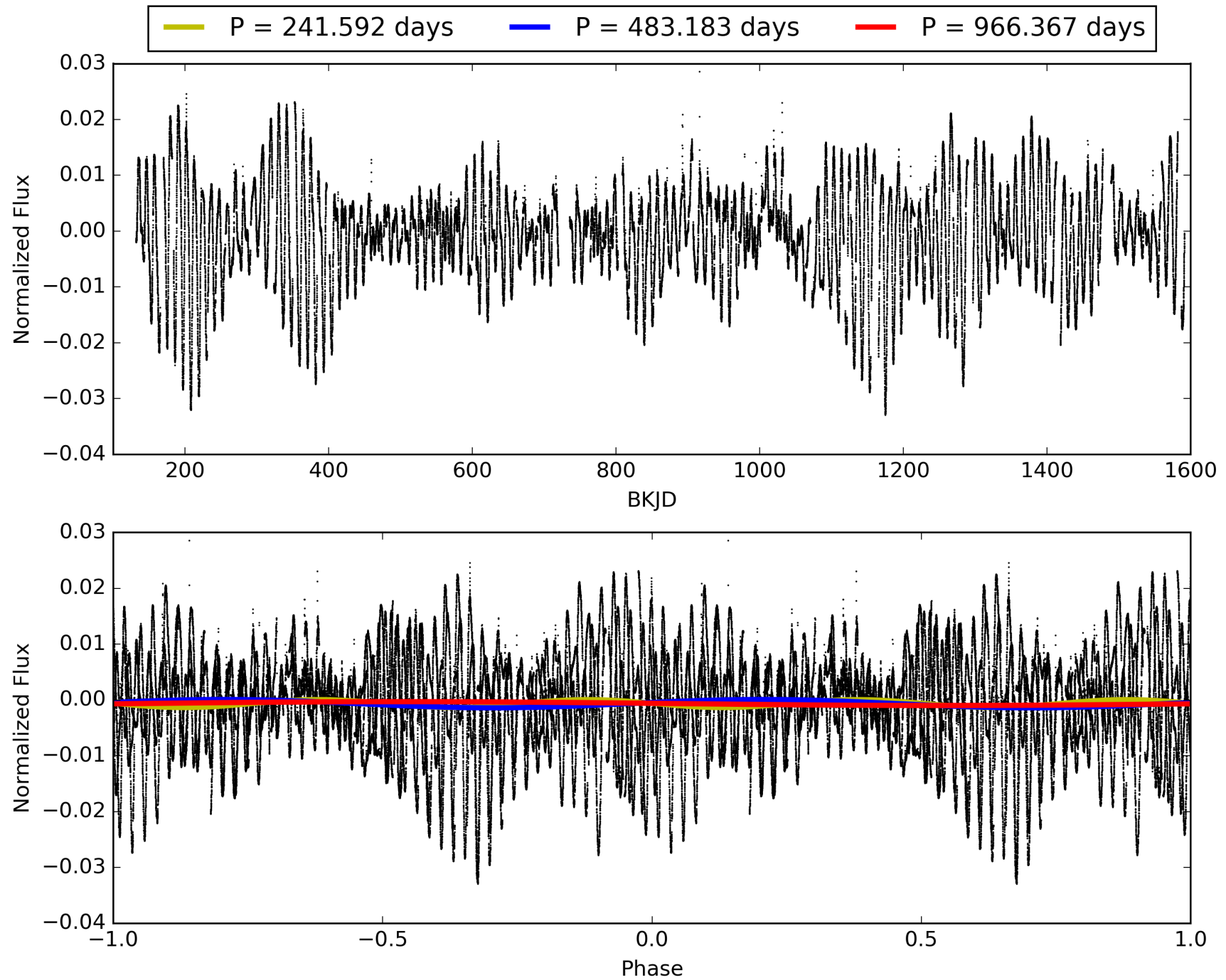
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 23:50:44 Z

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

# TCE 008957218-06, PDC Light Curves

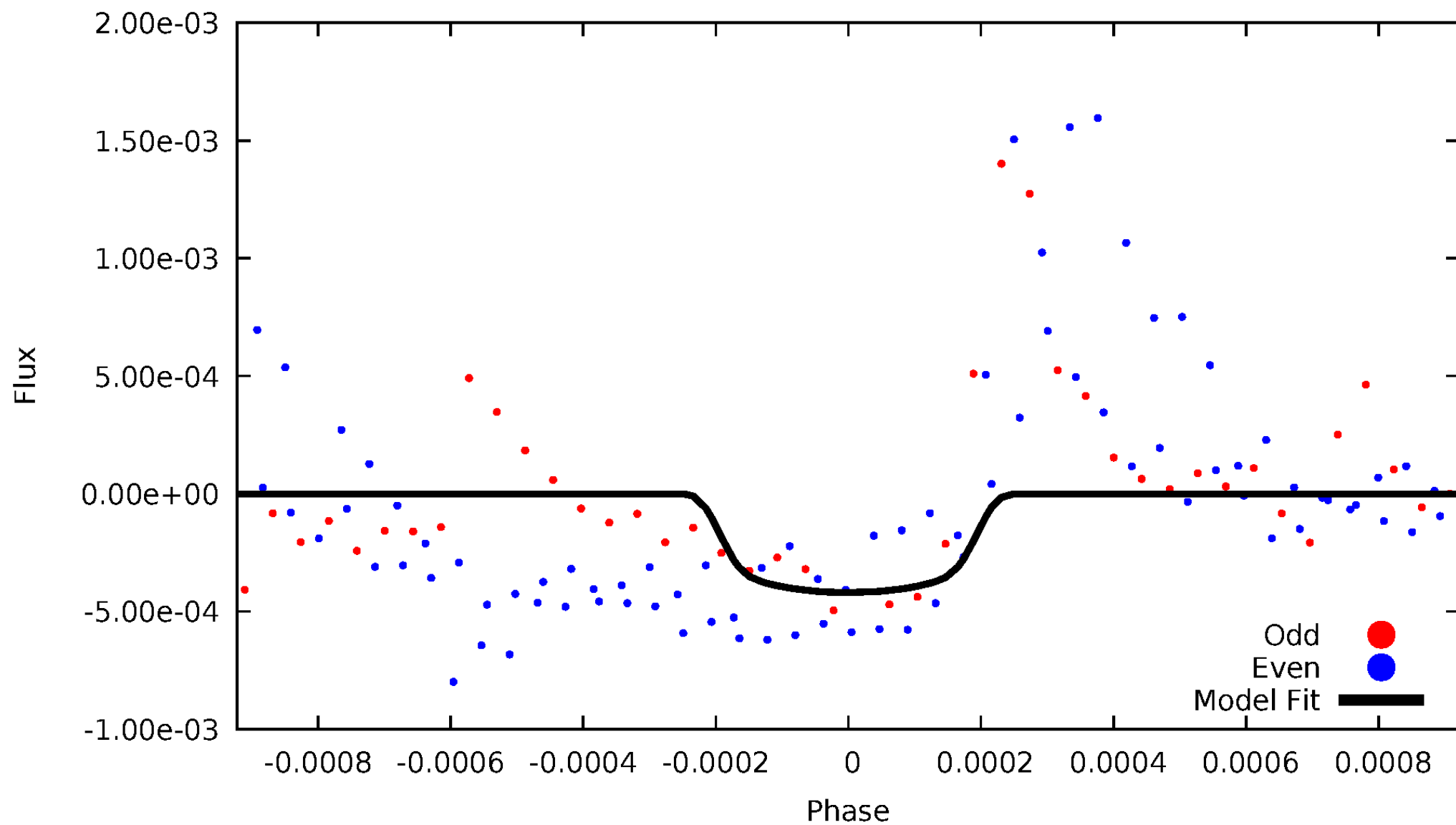


# TCE 008957218-06



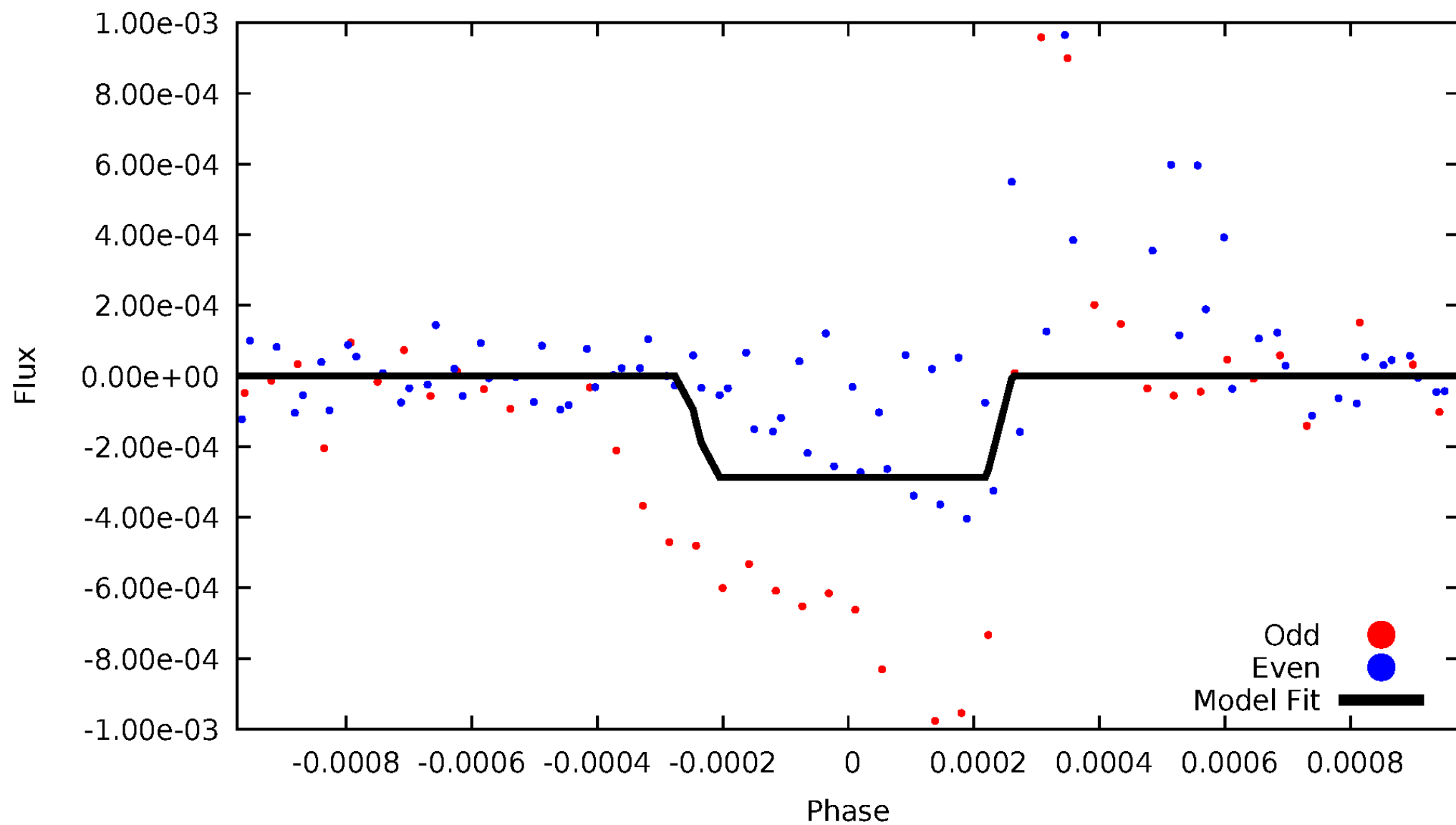
# DV Odd/Even

TCE 008957218-06



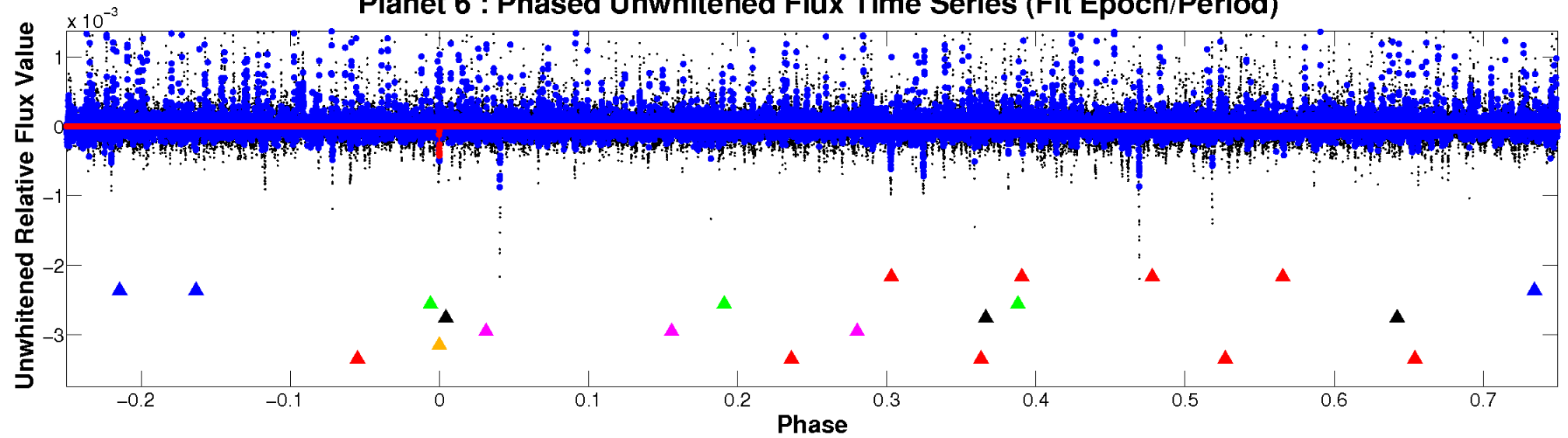
# ALT Odd/Even

TCE 008957218-06

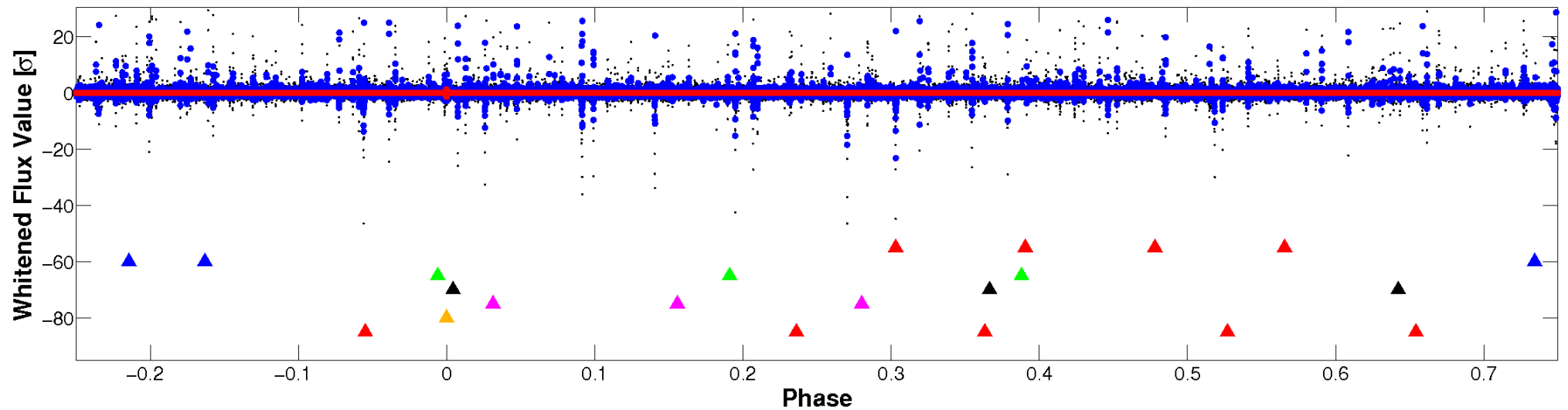


# Non-Whitened Vs. Whitened Light Curve

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

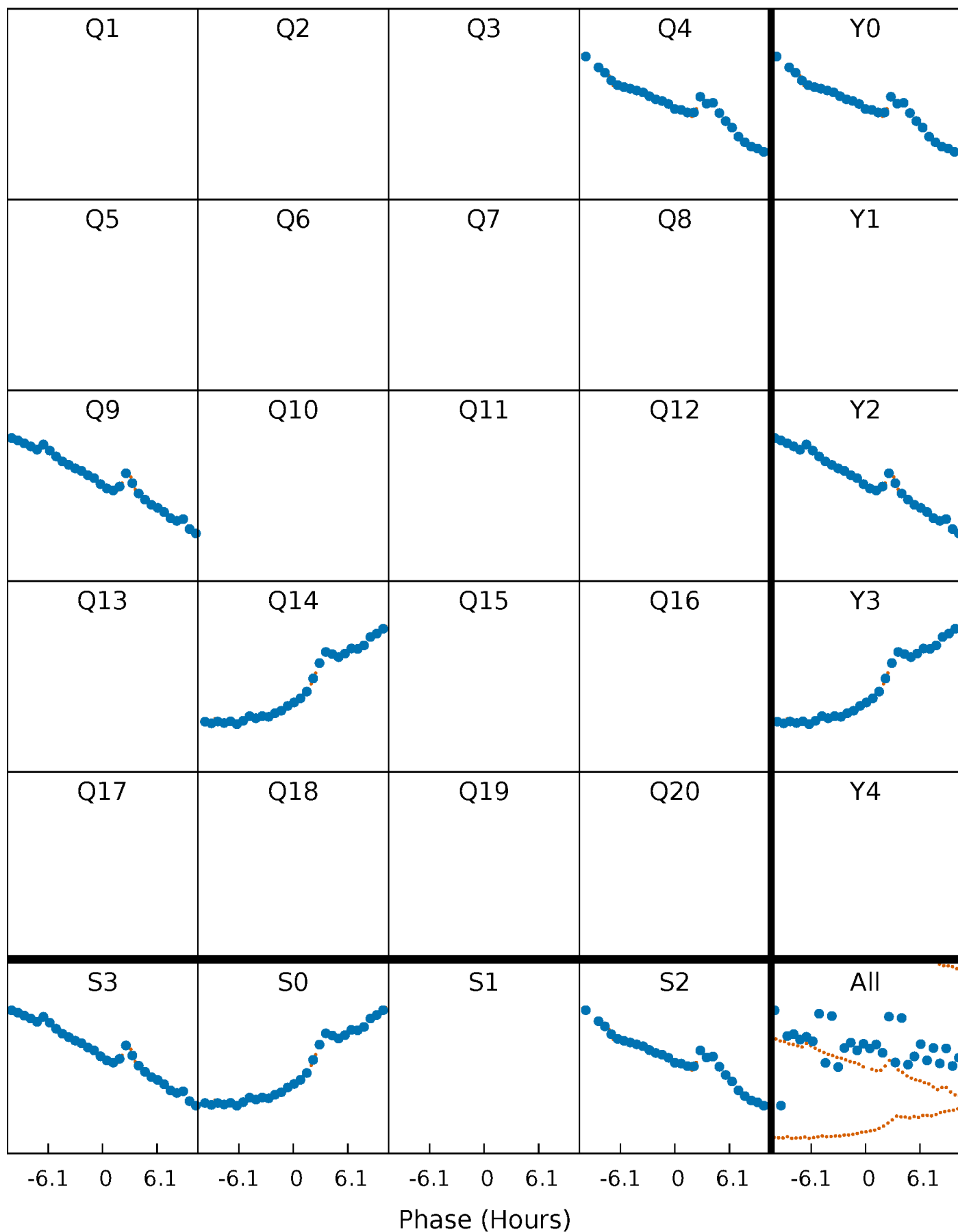


## Planet 6 : Phased Whitened Flux Time Series (Fit Epoch/Period)



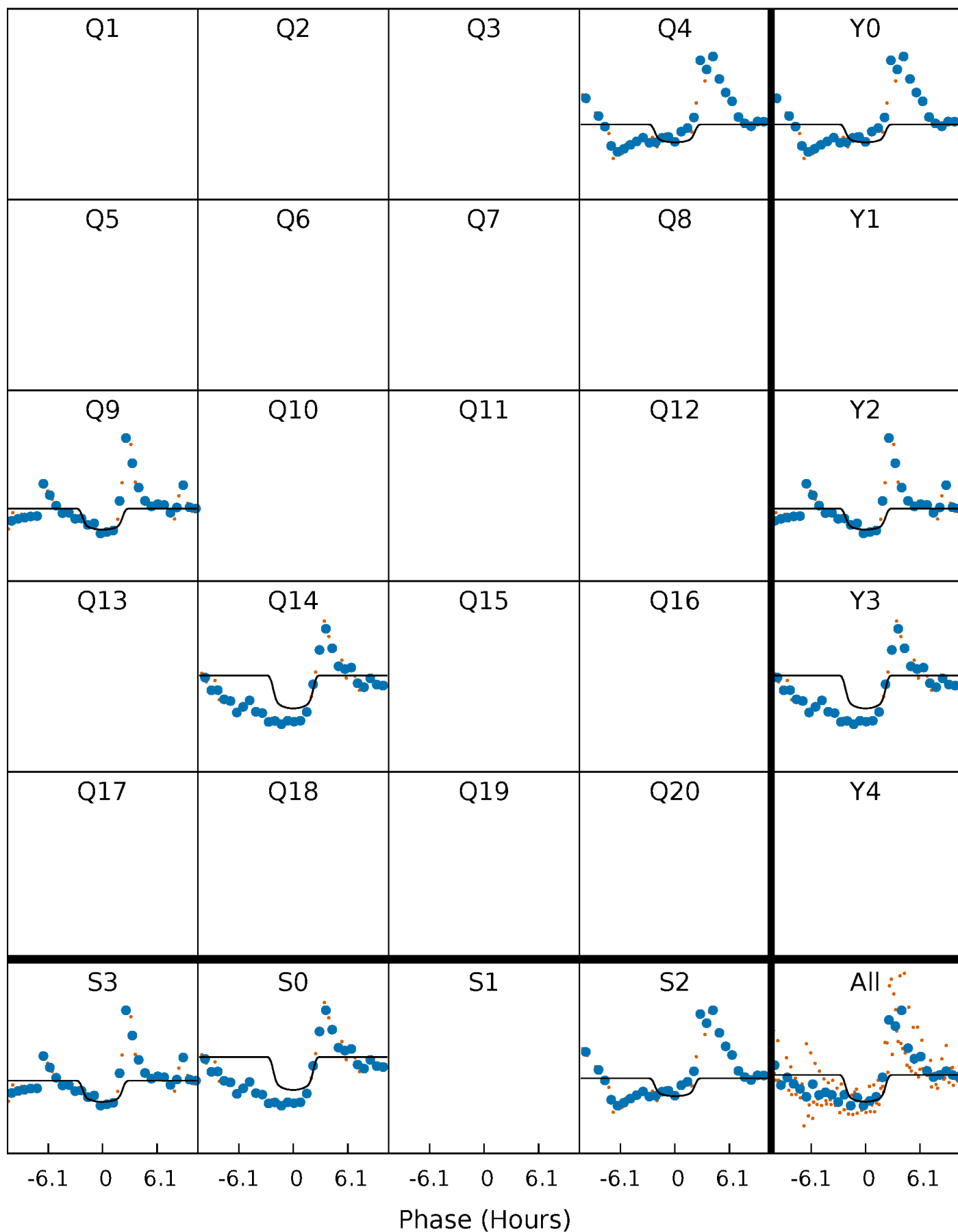
# PDC Quarter-Phased Transit Curves

TCE 008957218-06 P=483.183255 Days  $T_0=364.740726$  (BKJD)



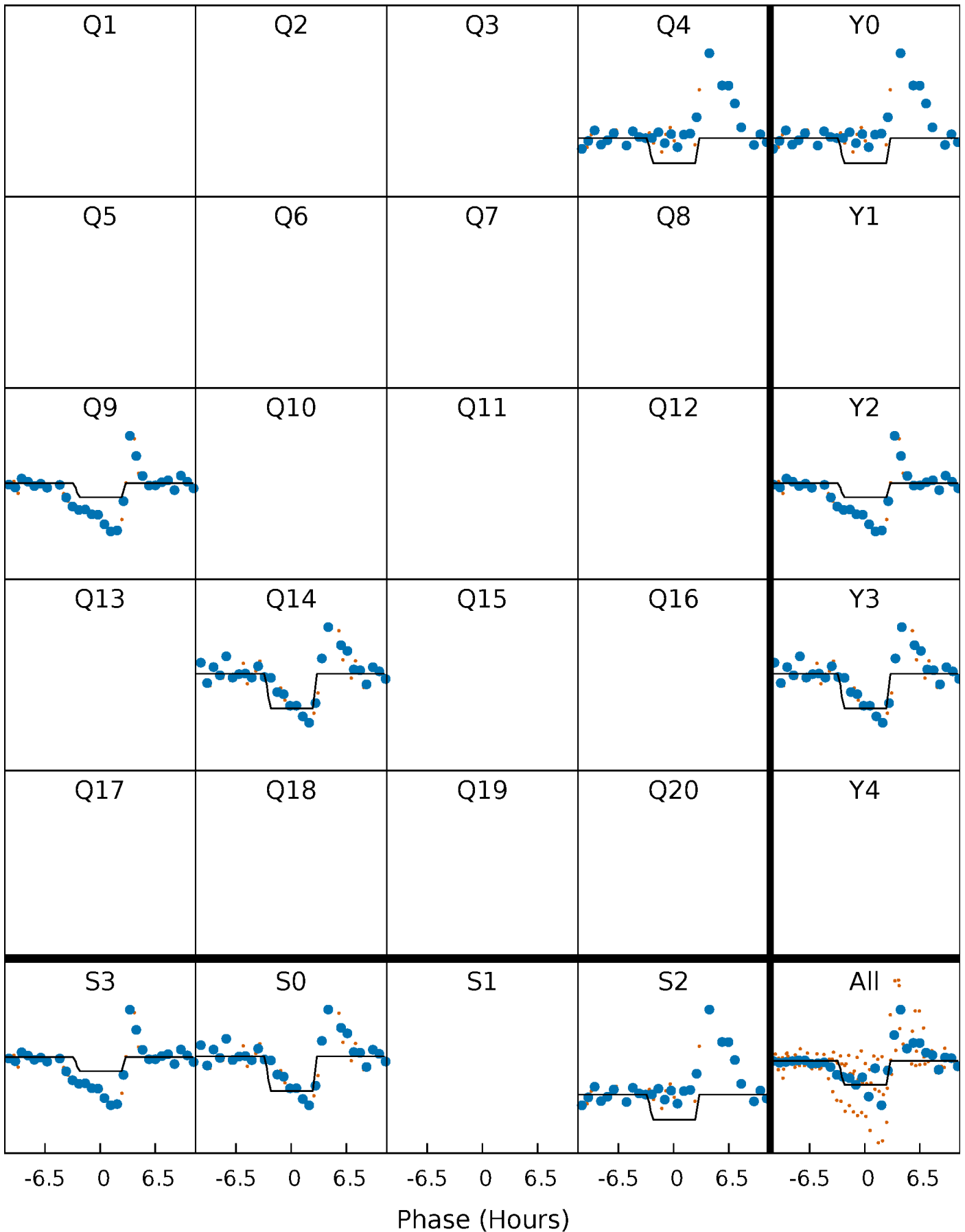
# DV Quarter-Phased Transit Curves

TCE 008957218-06     $P=483.183255$  Days     $T_0=364.740726$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

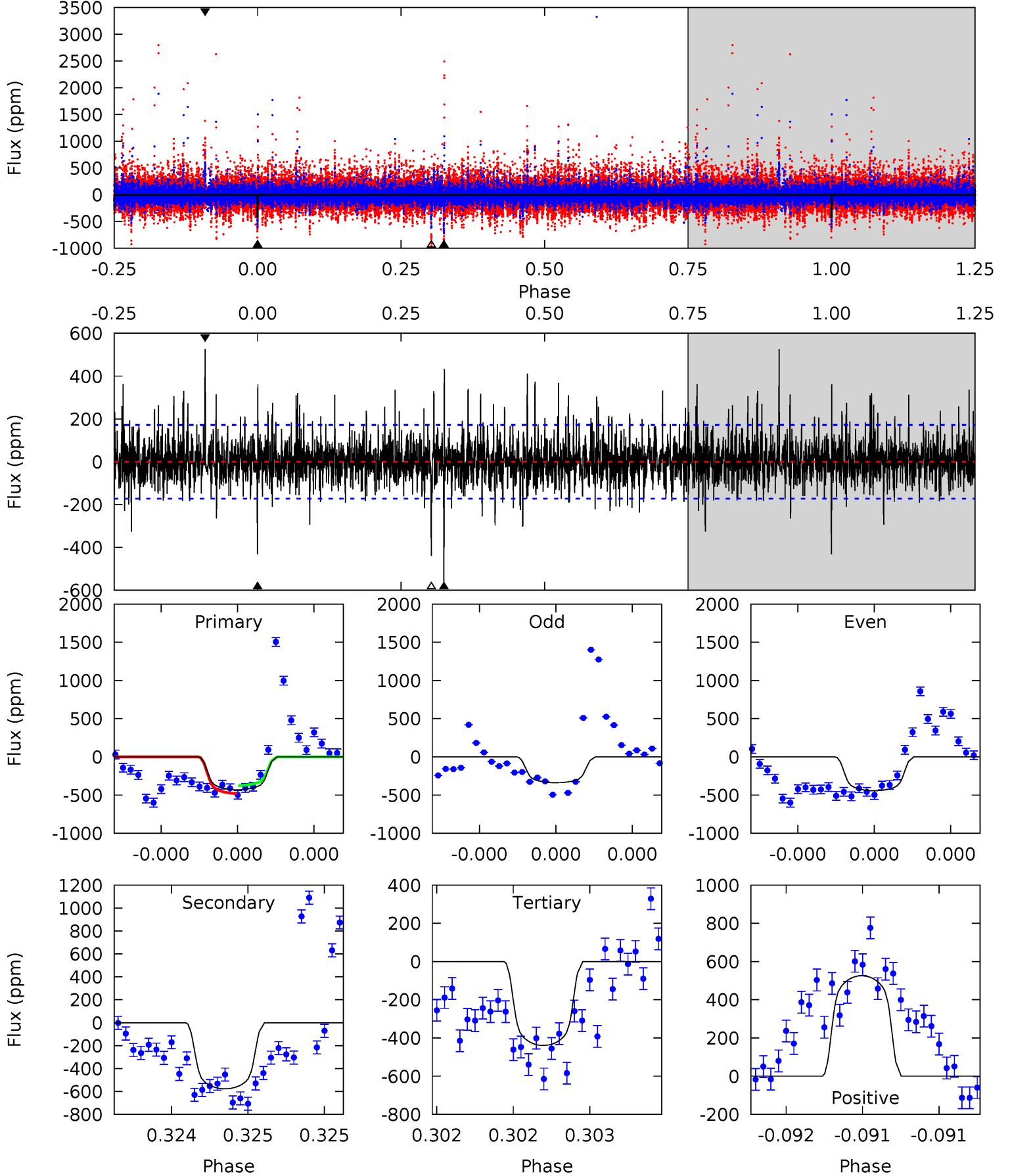
TCE 008957218-06 P=483.171960 Days  $T_0=364.715283$  (BKJD)



# DV Model-Shift Uniqueness Test

008957218-06, P = 483.183255 Days, E = 364.740726 Days

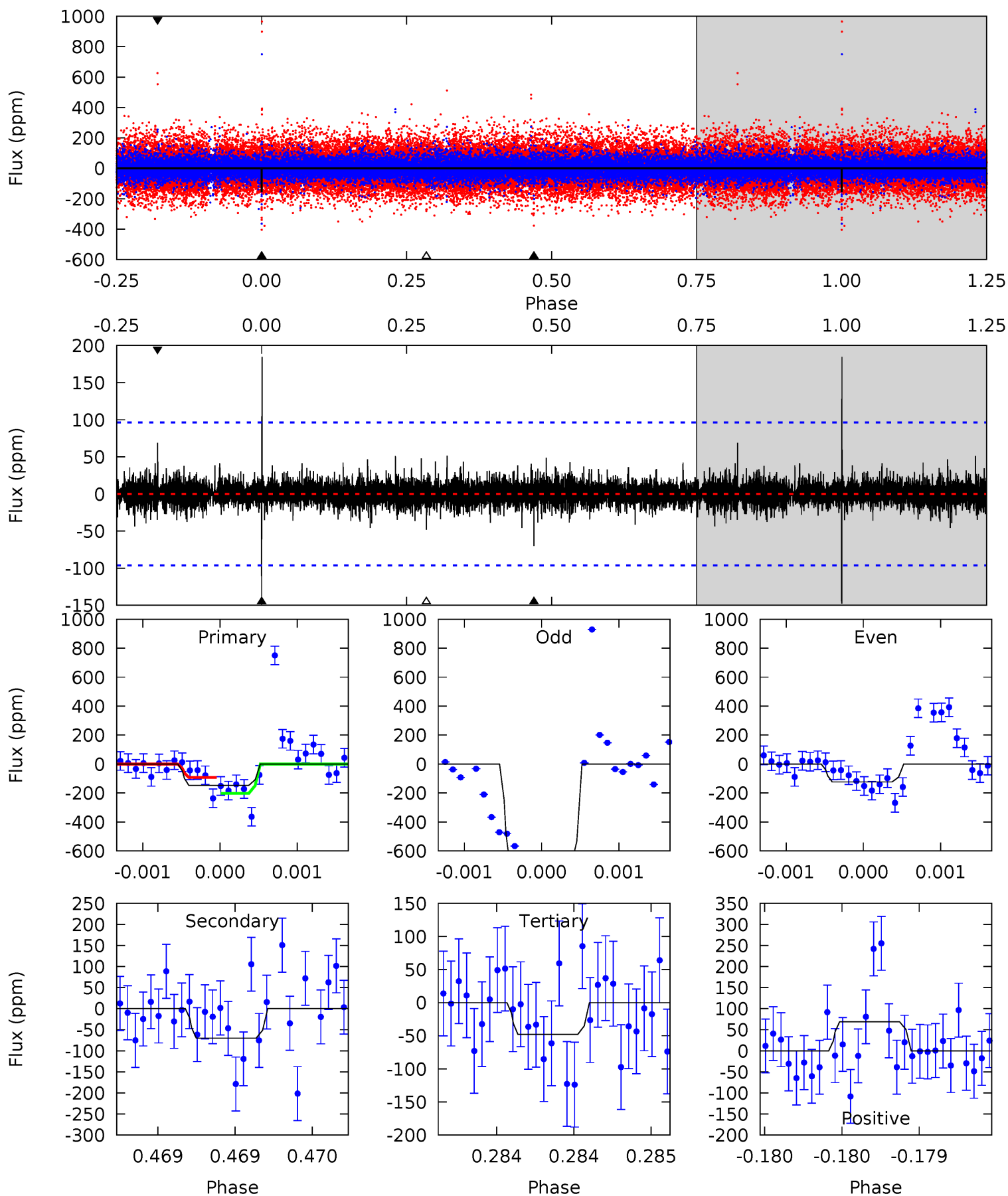
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.9	18.7	14.2	17.0	5.58	3.49	2.42	-0.29	-3.09	4.45	1.65	0.73	1.21	0.48	1.71



# Alt Model-Shift Uniqueness Test

008957218-06, P = 483.171960 Days, E = 364.715283 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
8.55	4.04	2.77	3.99	5.57	3.48	0.57	5.77	4.56	1.27	0.06	16.9	1.33	0.56	3.21



### Stellar Parameters For KIC 008957218

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5477^{+164}_{-148}$	$3.957^{+0.595}_{-0.255}$	$-0.380^{+0.350}_{-0.250}$	$1.607^{+0.803}_{-0.883}$	$0.853^{+0.116}_{-0.095}$	$0.290^{+2.152}_{-0.169}$
	+3%/-3%	+15%/-6%	+92%/-66%	+50%/-55%	+14%/-11%	+743%/-58%
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 008957218-06 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-577 \pm 31$	$3.82^{+1.37}_{-1.16}$	$392^{+50}_{-60}$	$5583^{+579}_{-436}$	$28513^{+31652}_{-13035}$
Alt.	$-70 \pm 17$	$2.79^{+1.16}_{-0.94}$	$395^{+49}_{-64}$	$4125^{+514}_{-375}$	$6519^{+9658}_{-3524}$

$T_{\text{max}}$  = 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

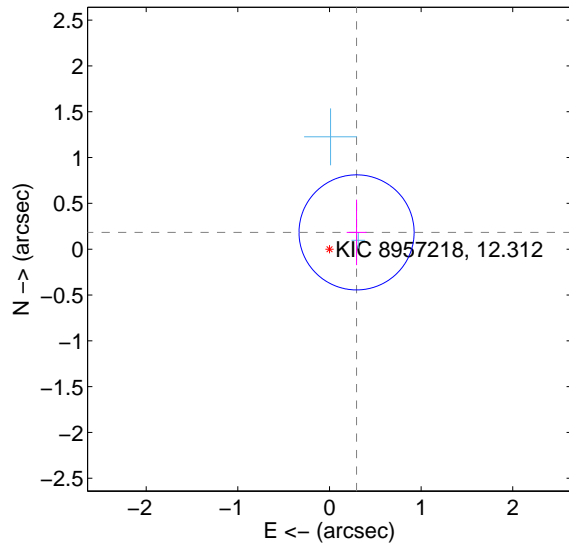
Supplemental centroid analysis for 008957218-06. Kepler magnitude: 12.31. Transit SNR 7.06

There are 2 quarters with good PRF difference image offsets

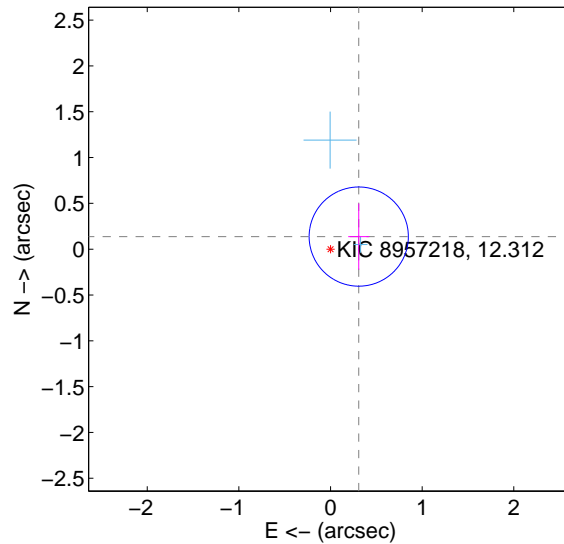
The direct PRF centroid is offset from the target star catalog position by about 0.05 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.348 \pm 0.209$	1.66	$-0.296 \pm 0.108$	$0.183 \pm 0.357$
PRF-fit source offset from KIC position	$0.337 \pm 0.180$	1.87	$-0.308 \pm 0.115$	$0.137 \pm 0.360$
photometric centroid source offset	$0.40 \pm 0.60$	0.66	$-0.29 \pm 0.58$	$0.27 \pm 0.62$

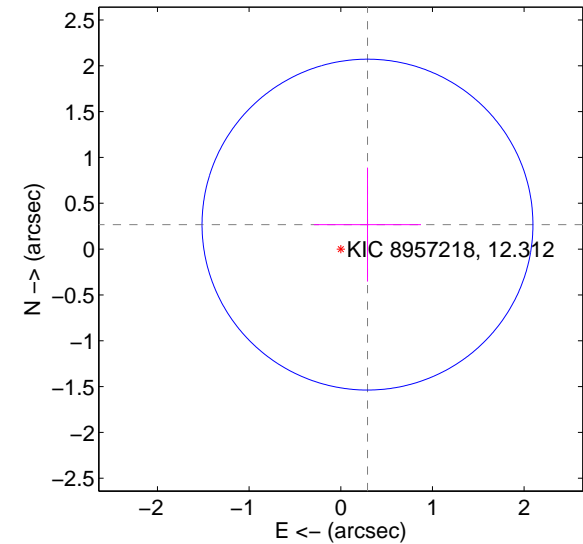
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

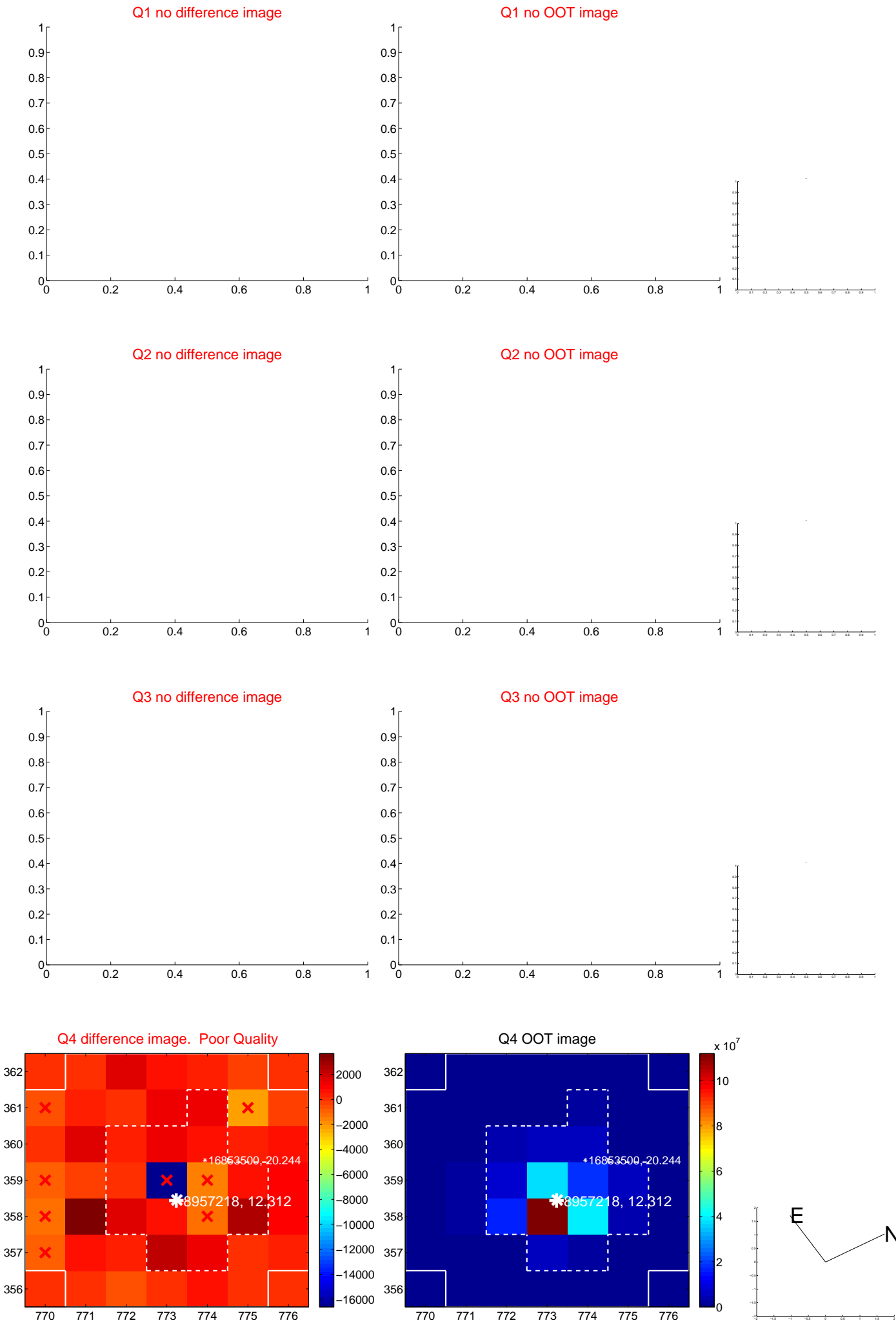


offset from photometric centroids

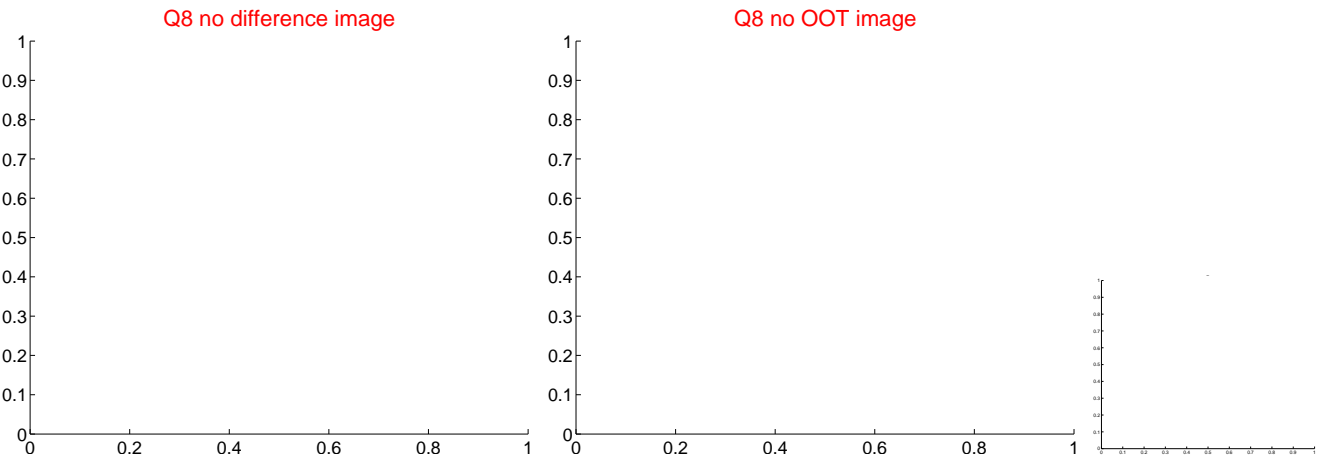
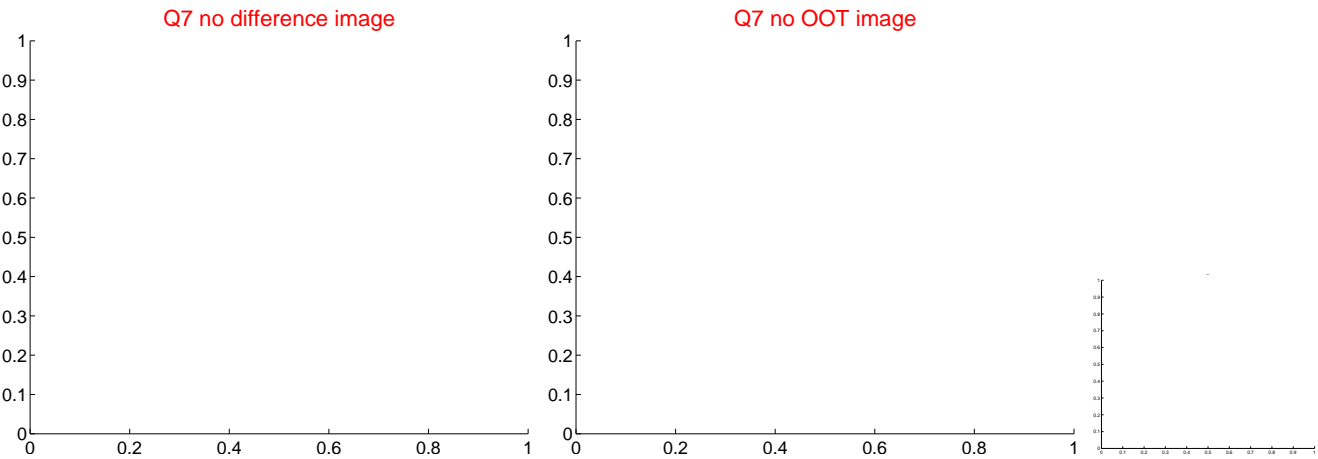
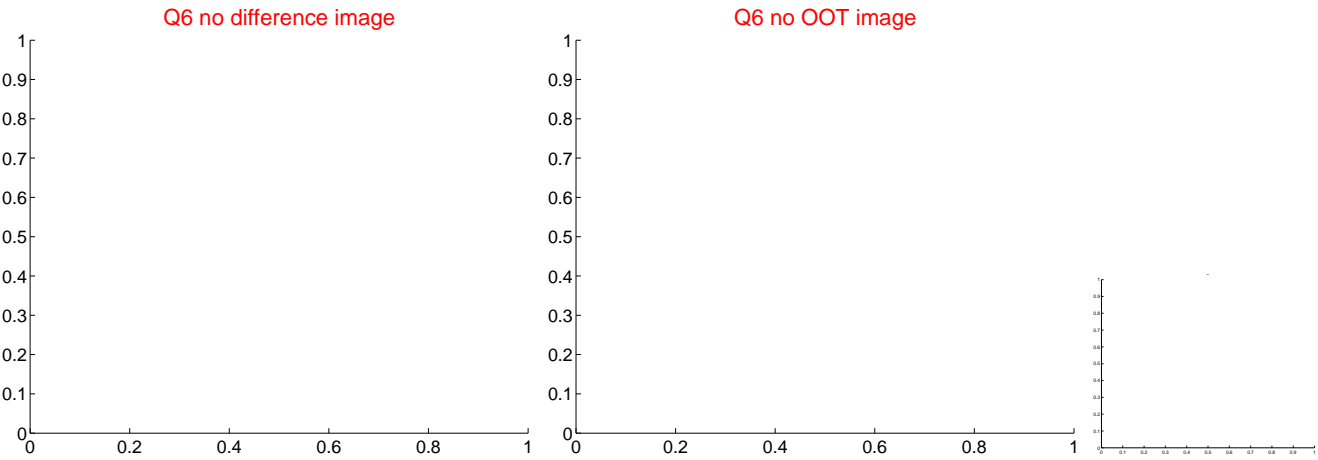
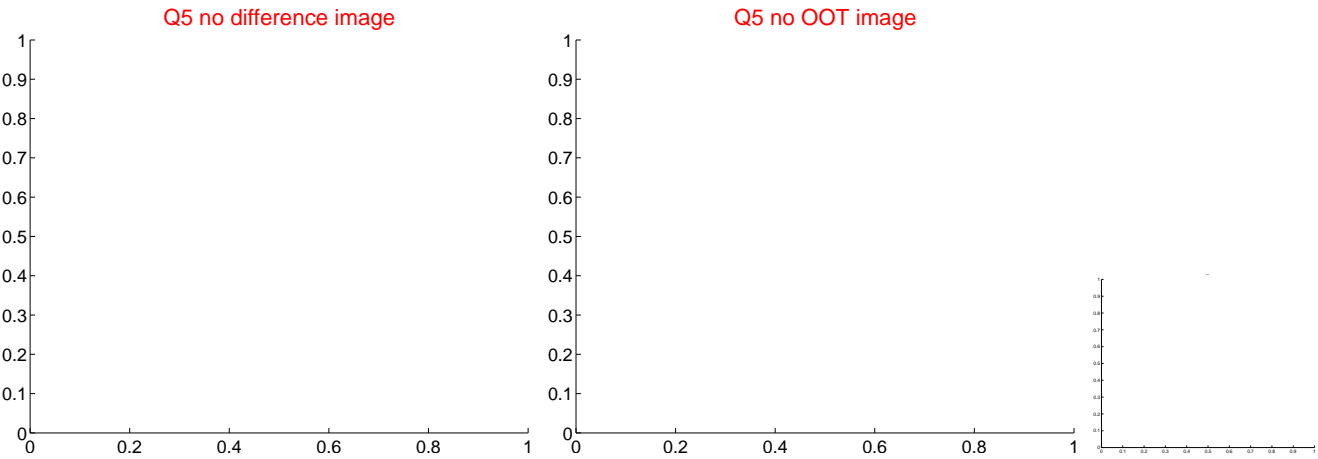


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

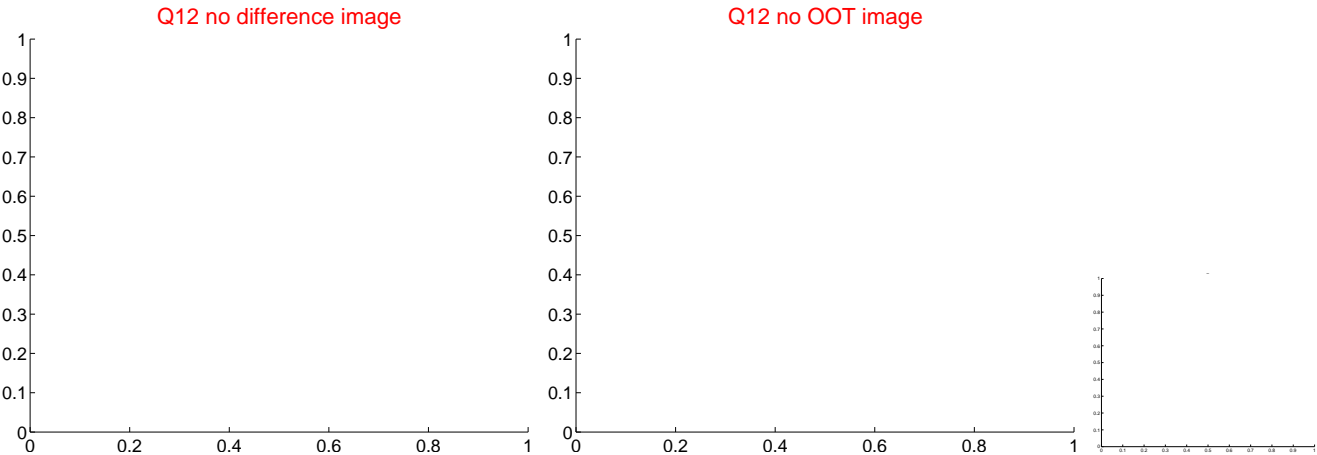
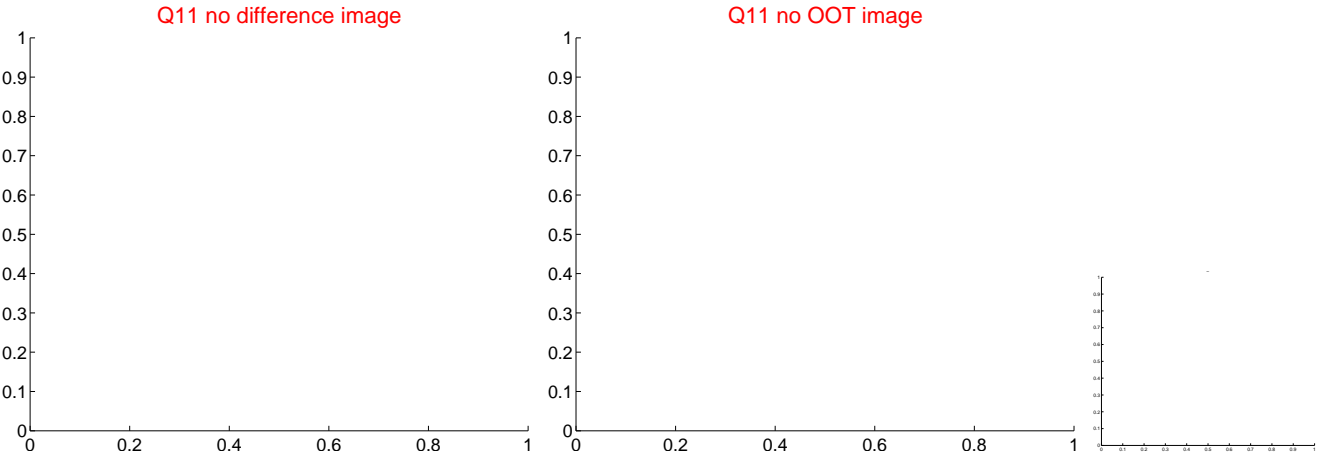
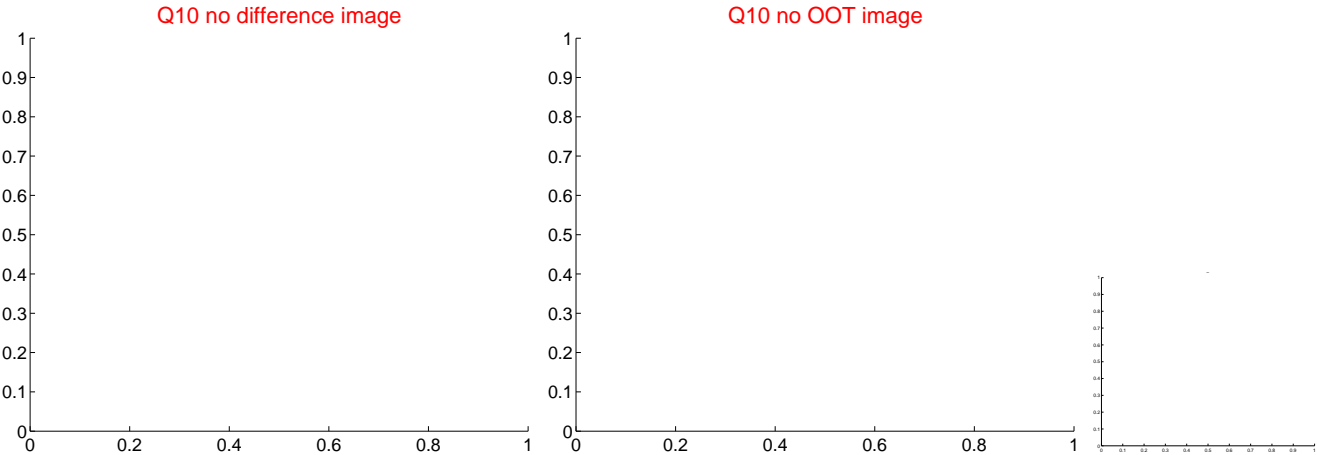
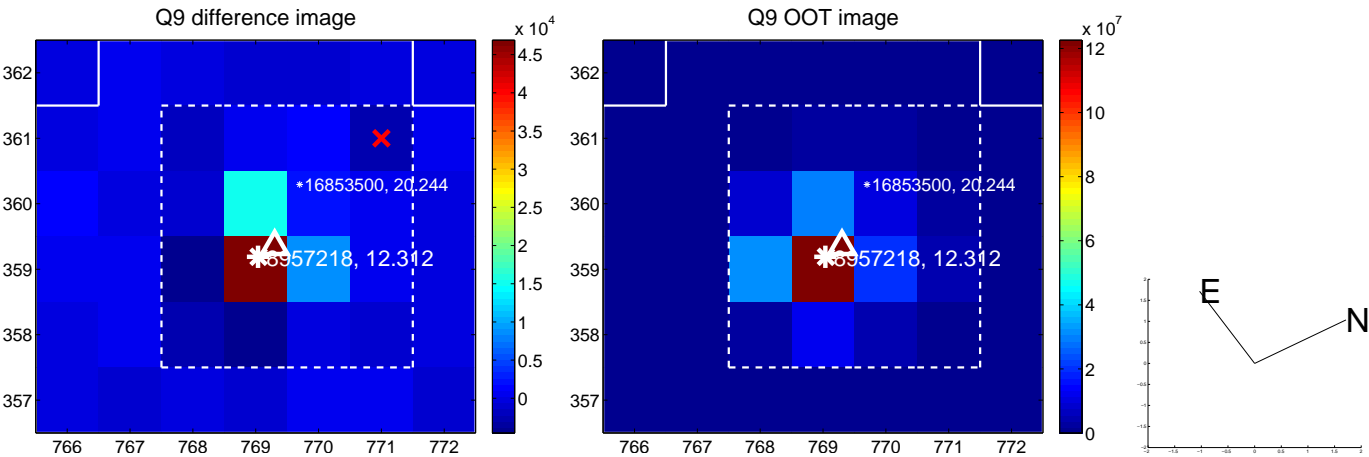
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



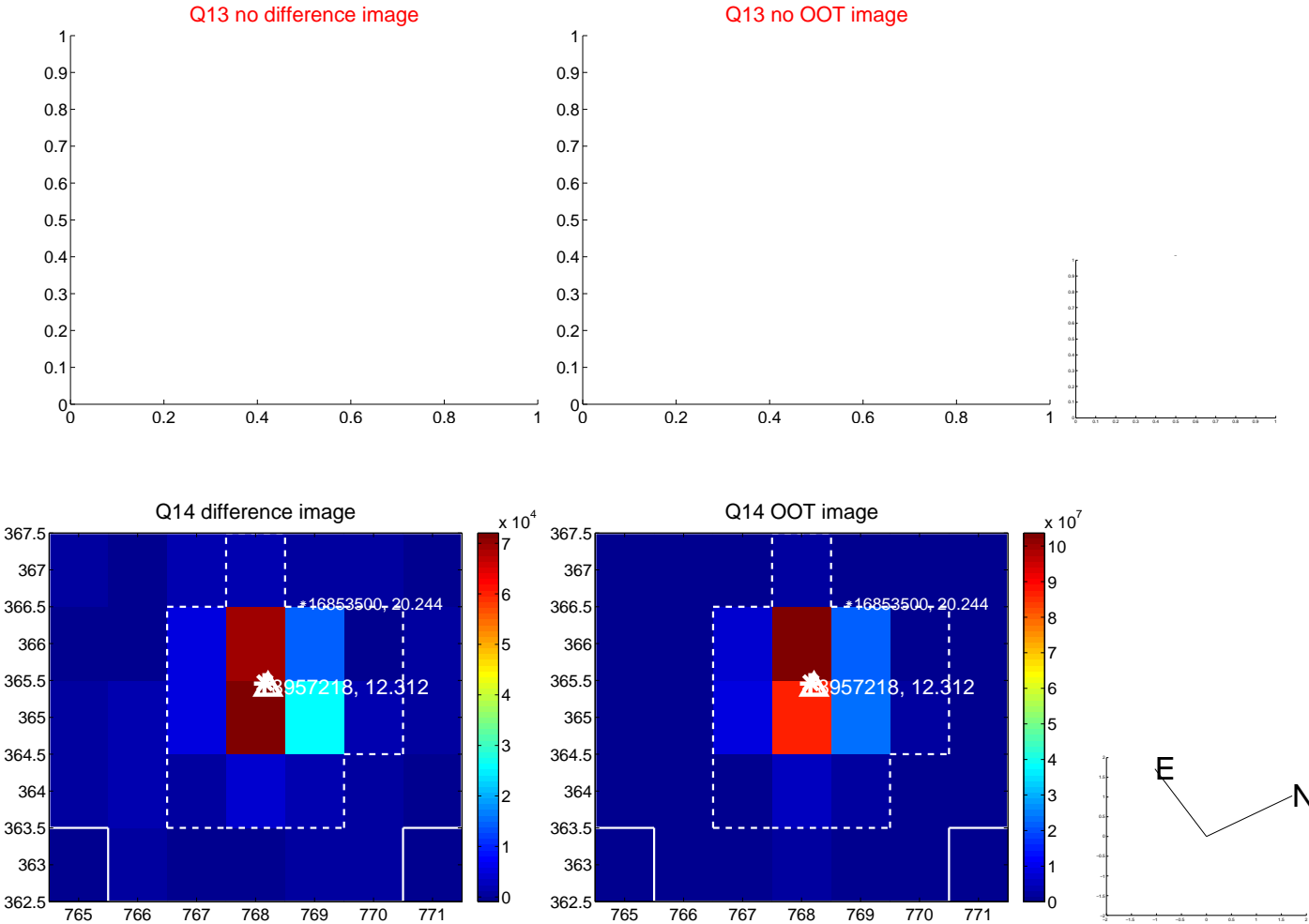
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



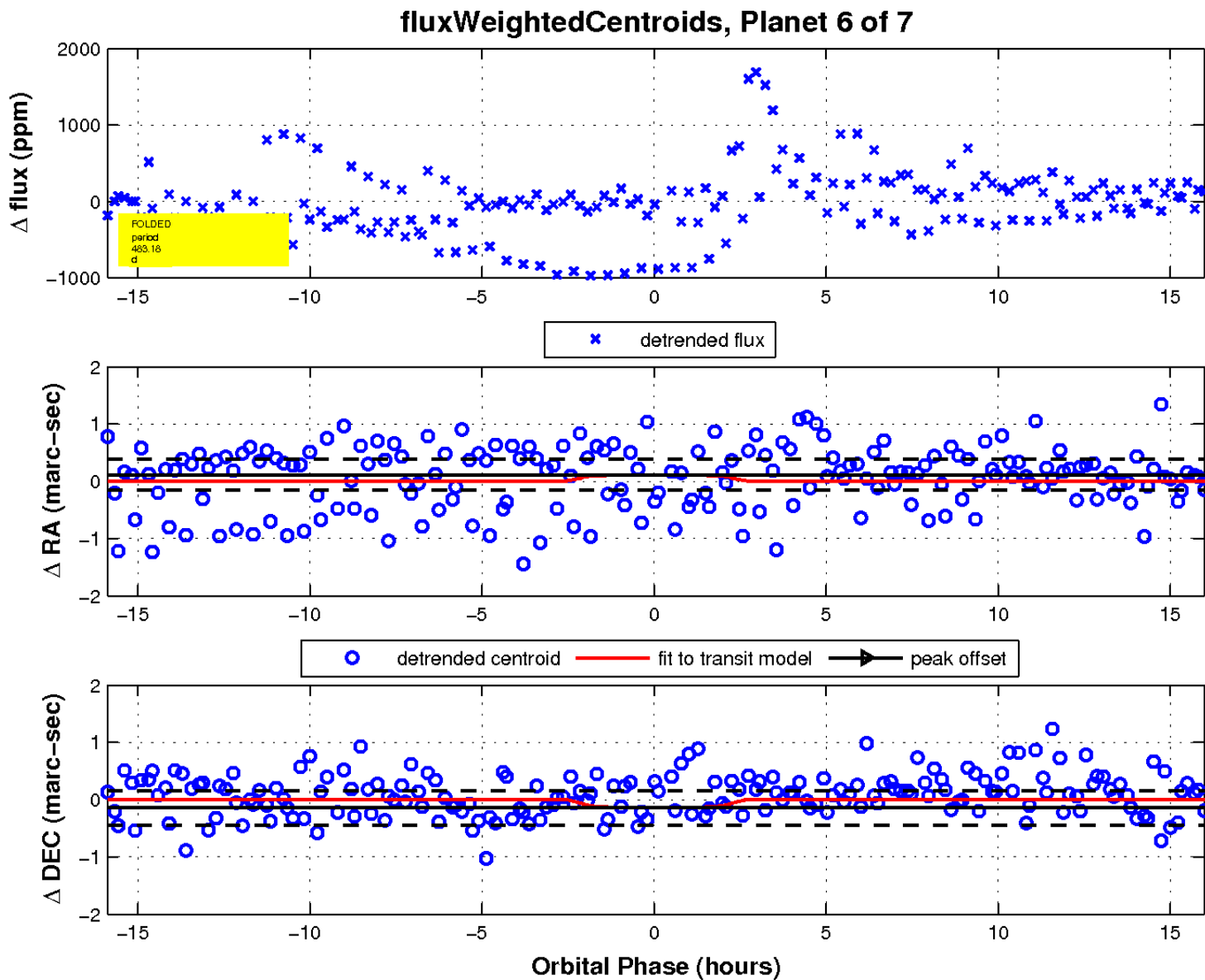
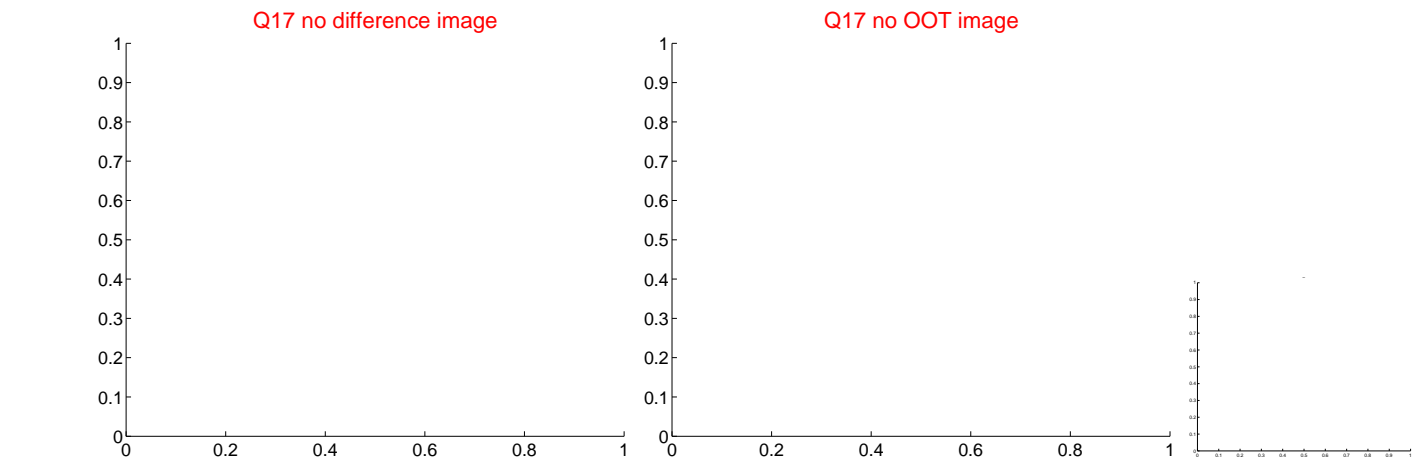
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

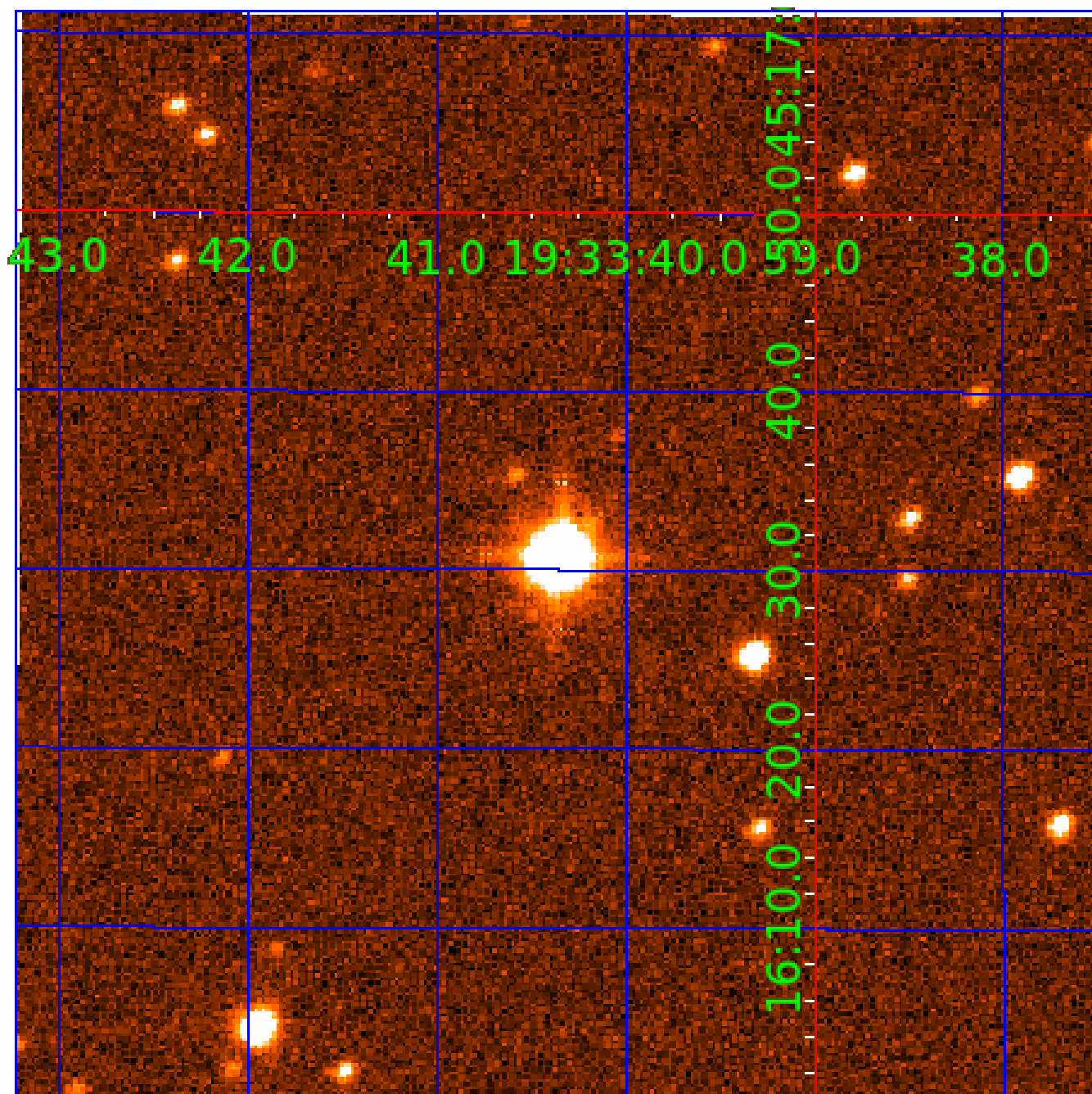


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



## KIC 008957218

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008957218-01	OBS	No	440.908335	154.829795	516.2	8.318	18.7	7.9	1.61	5477	4.64	1.80
008957218-02	OBS	No	458.416275	285.917787	514.7	3.164	15.9	8.7	1.61	5477	4.52	1.71
008957218-03	OBS	No	578.350781	361.871328	461.2	5.188	14.2	7.7	1.61	5477	4.27	1.25
008957218-04	OBS	No	658.130956	191.906115	361.9	3.295	15.0	6.0	1.61	5477	3.18	1.05
008957218-05	OBS	No	543.299171	379.891554	499.2	3.676	15.7	8.8	1.61	5477	3.78	1.36
008957218-06	OBS	No	483.183255	364.740726	419.4	5.346	15.2	7.1	1.61	5477	4.07	1.59
008957218-07	OBS	No	342.600741	136.217524	373.4	3.500	13.3	-1.0	1.61	5477	3.07	2.52

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008957218-01	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_MARSHALL_ZUMA—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST
008957218-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV
008957218-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
008957218-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
008957218-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV
008957218-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
008957218-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_NOFITS

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

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

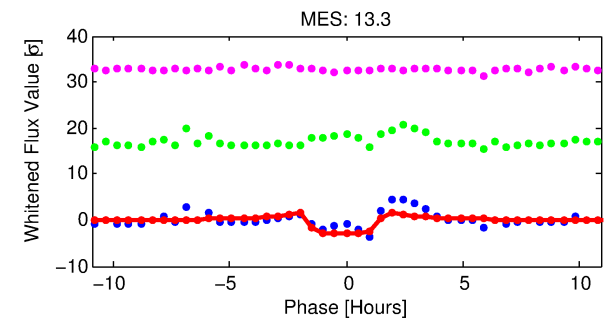
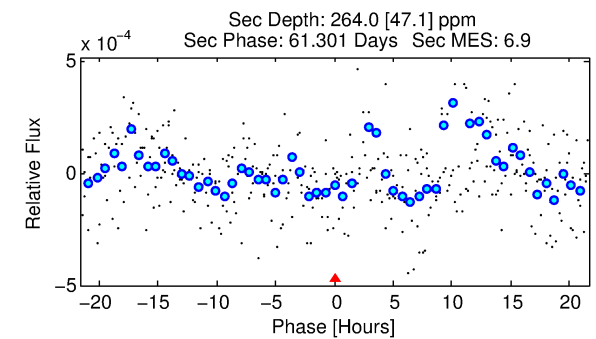
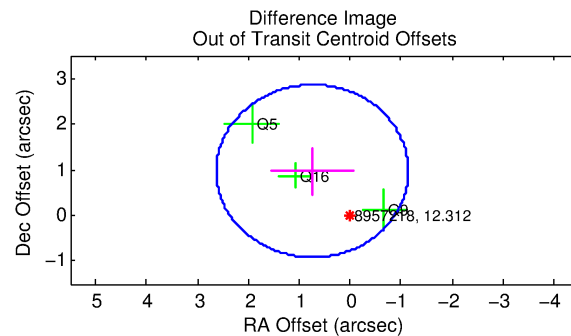
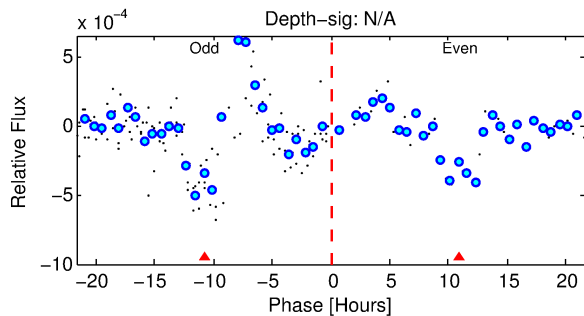
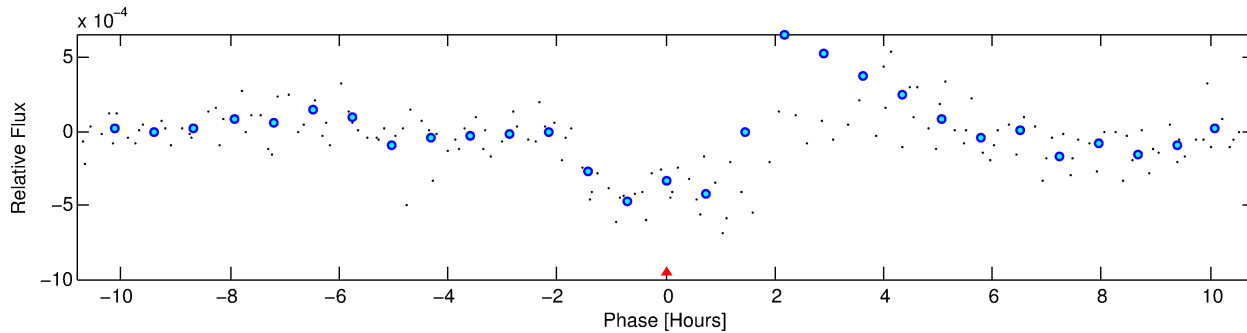
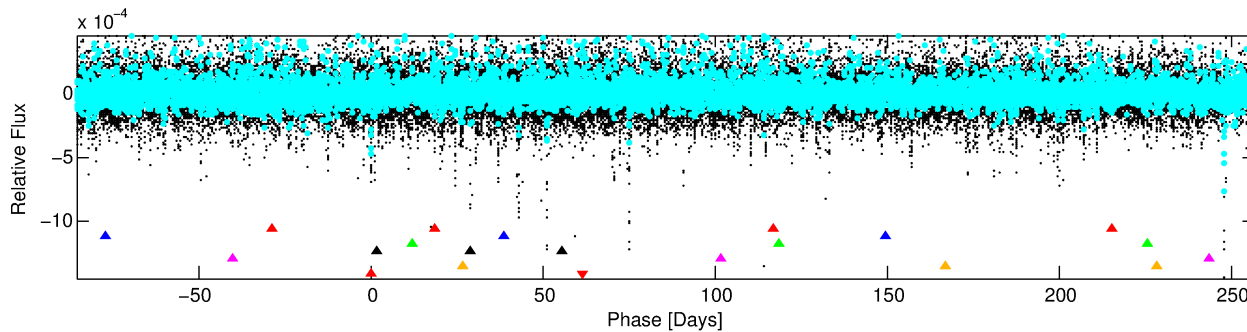
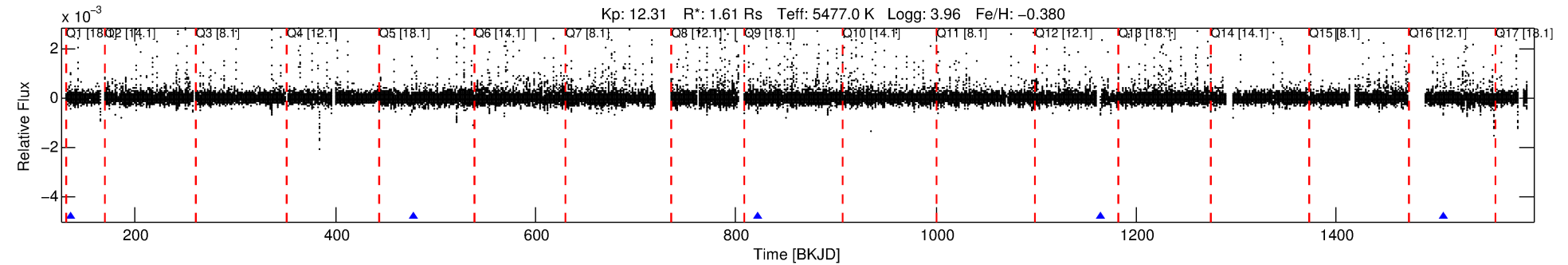
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 008957218-07

No Significant Match Found

# DV One-Page Summary

KIC: 8957218 Candidate: 7 of 7 Period: 342.601 d



## TPS TCE Results:

Period = 342.60074 d  
Epoch = 136.2175 BKJD

DV fit results are unavailable

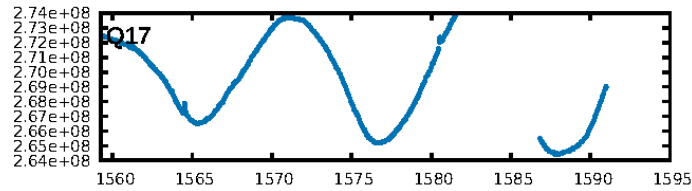
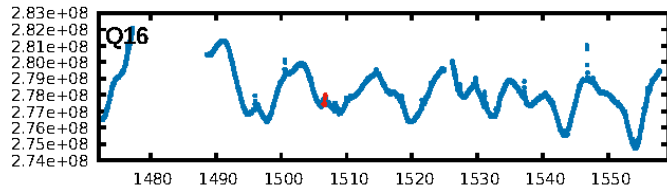
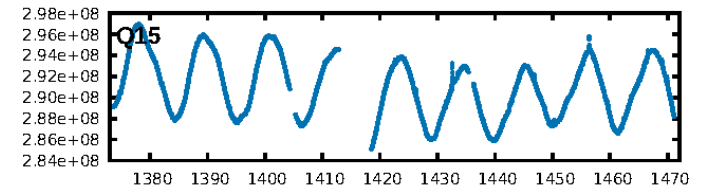
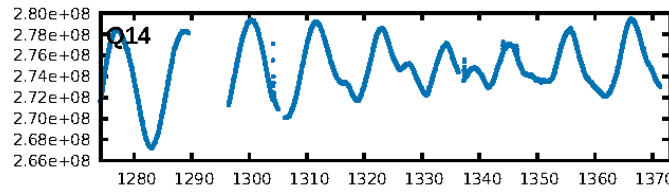
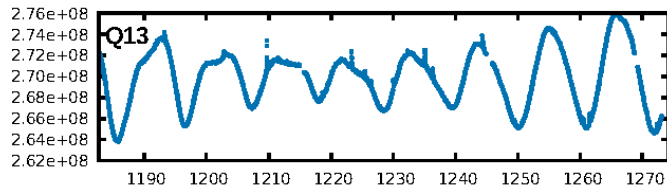
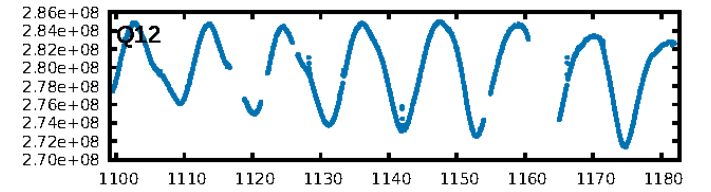
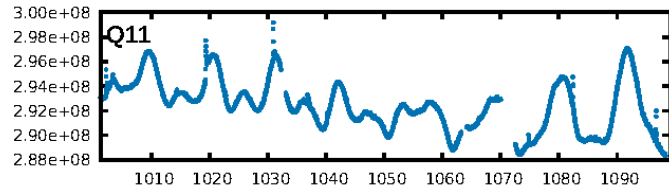
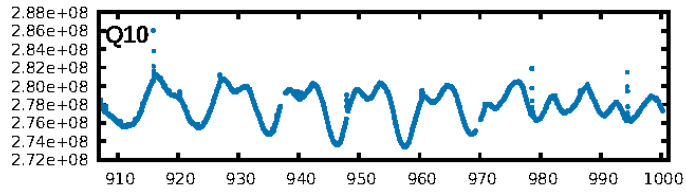
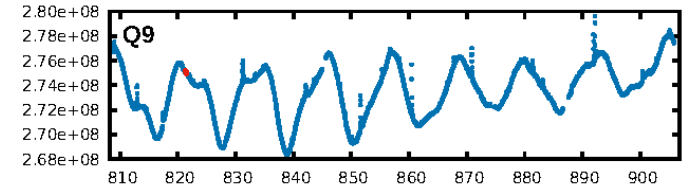
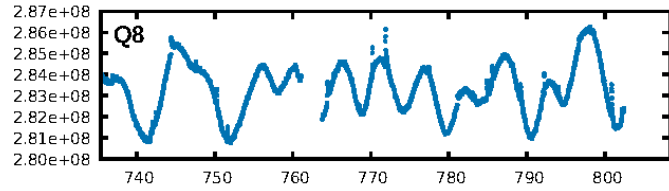
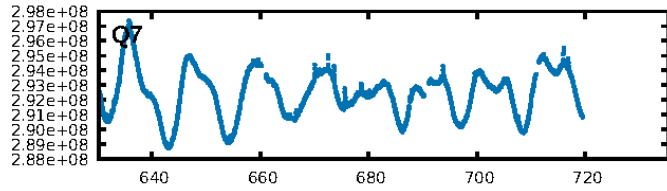
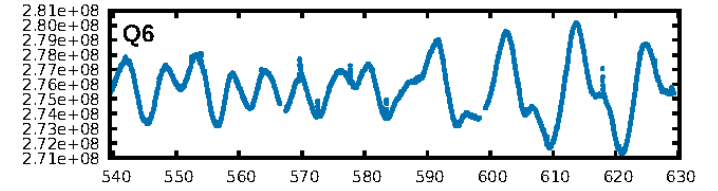
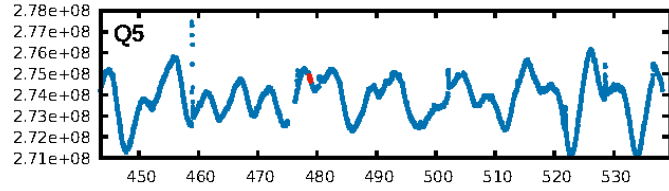
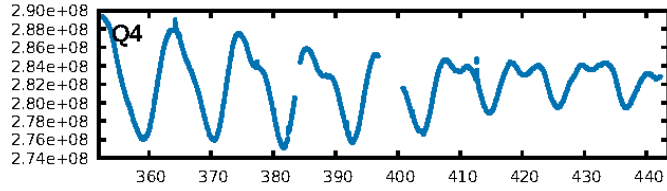
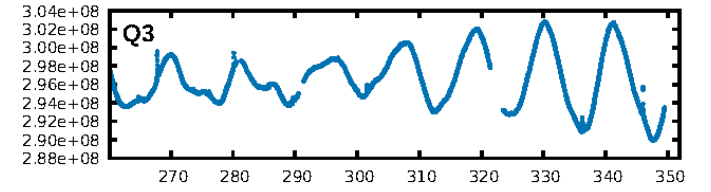
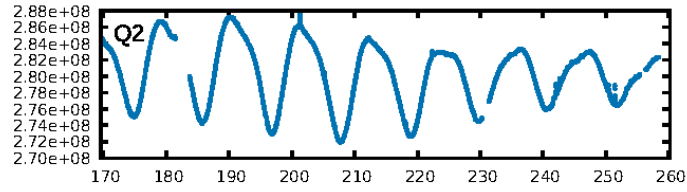
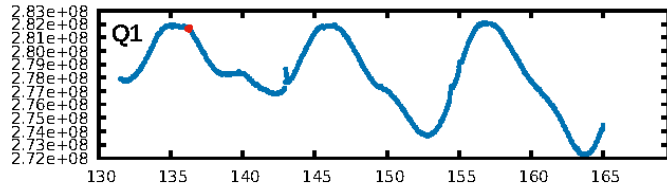
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [261.45σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: -0.4598  
Centroid-sig: 70.6%  
Centroid-so: 0.229 arcsec [0.64σ]  
OotOffset-rm: 1.223 arcsec [1.94σ]  
KicOffset-rm: 1.179 arcsec [1.52σ]  
OotOffset-st: 0/0/1/2 [3]  
KicOffset-st: 0/0/1/2 [3]  
DiffImageQuality-fgm: 1.00 [3/3]  
DiffImageOverlap-fno: 1.00 [4/4]

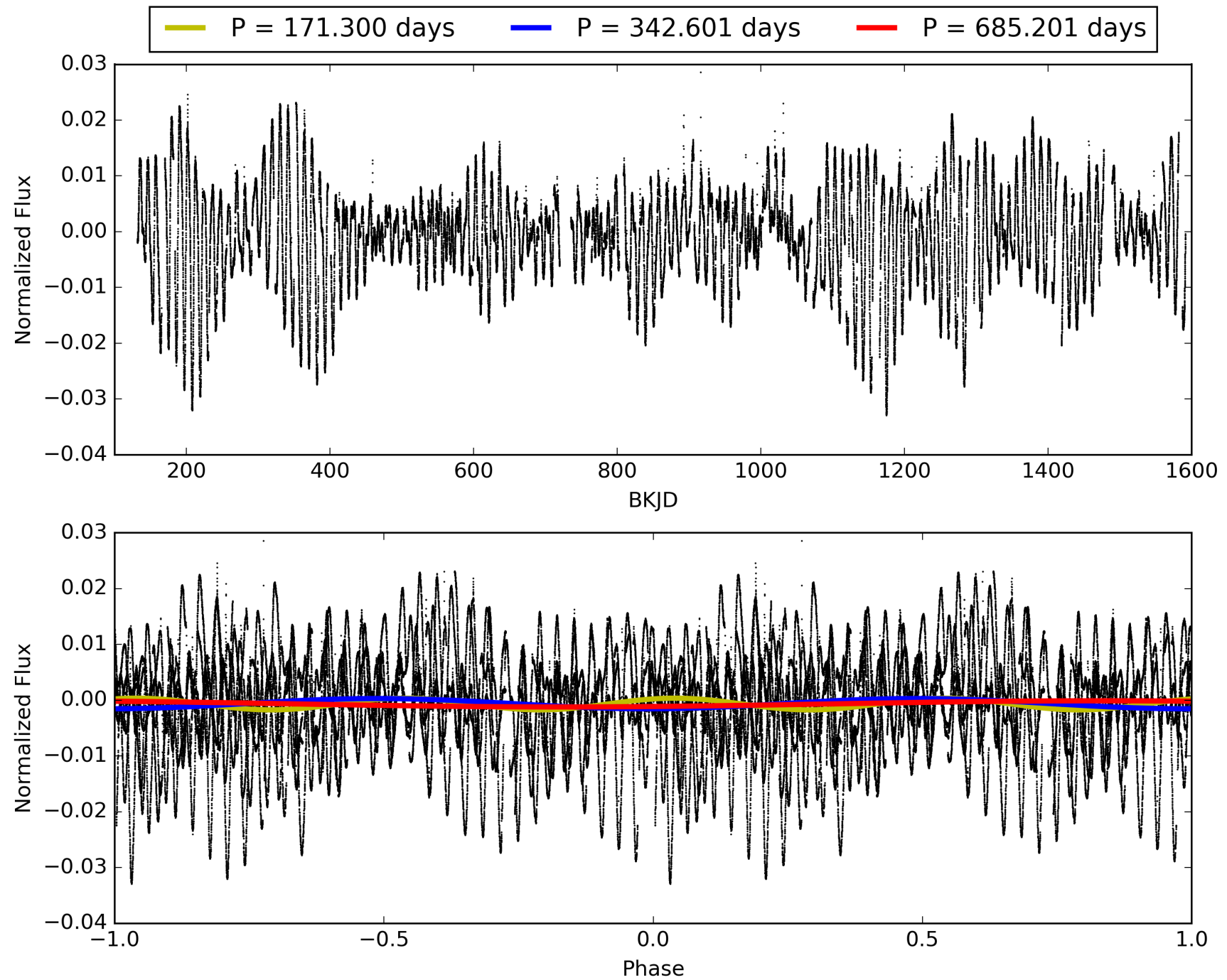
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 23:50:59 Z

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

# TCE 008957218-07, PDC Light Curves

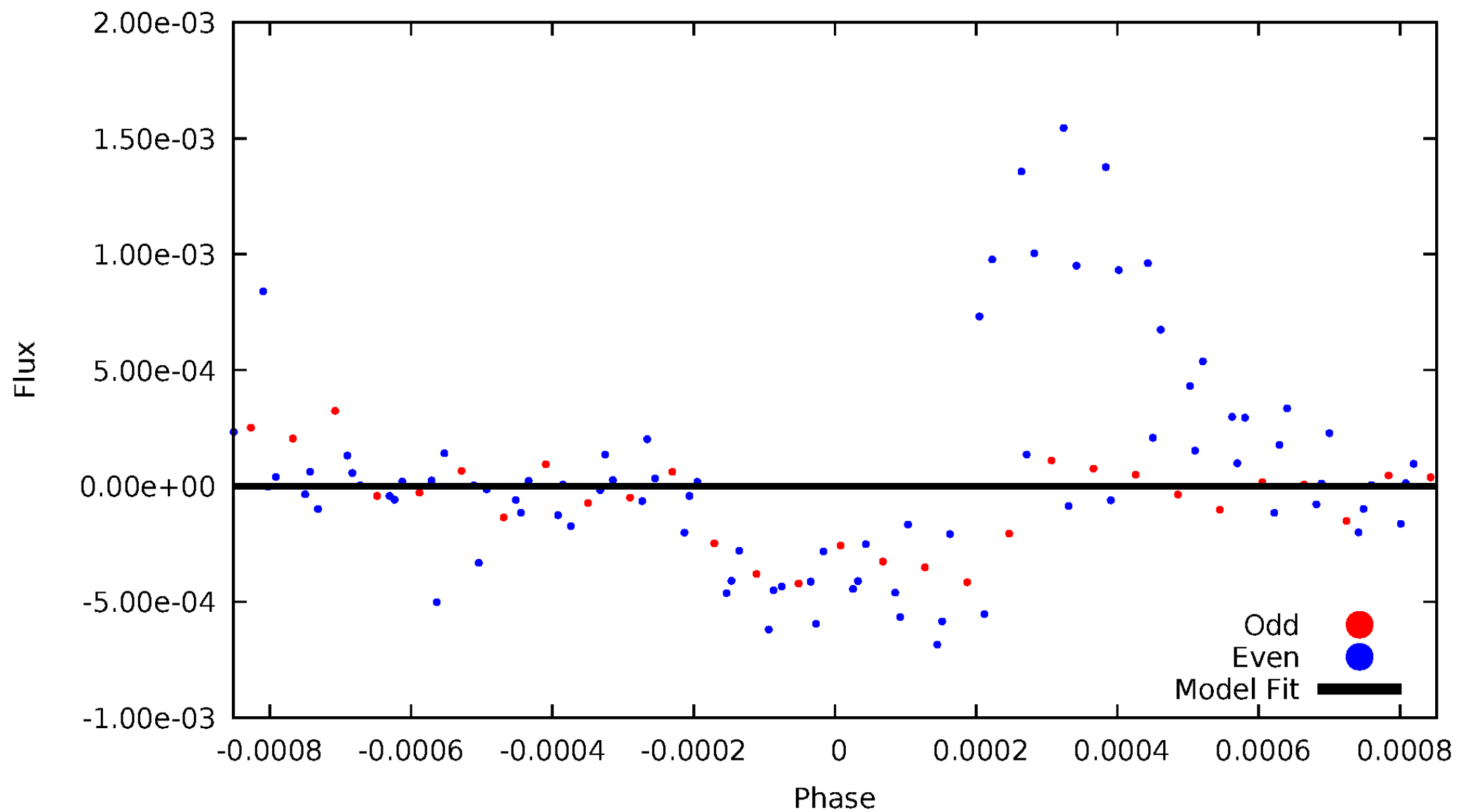


TCE 008957218-07



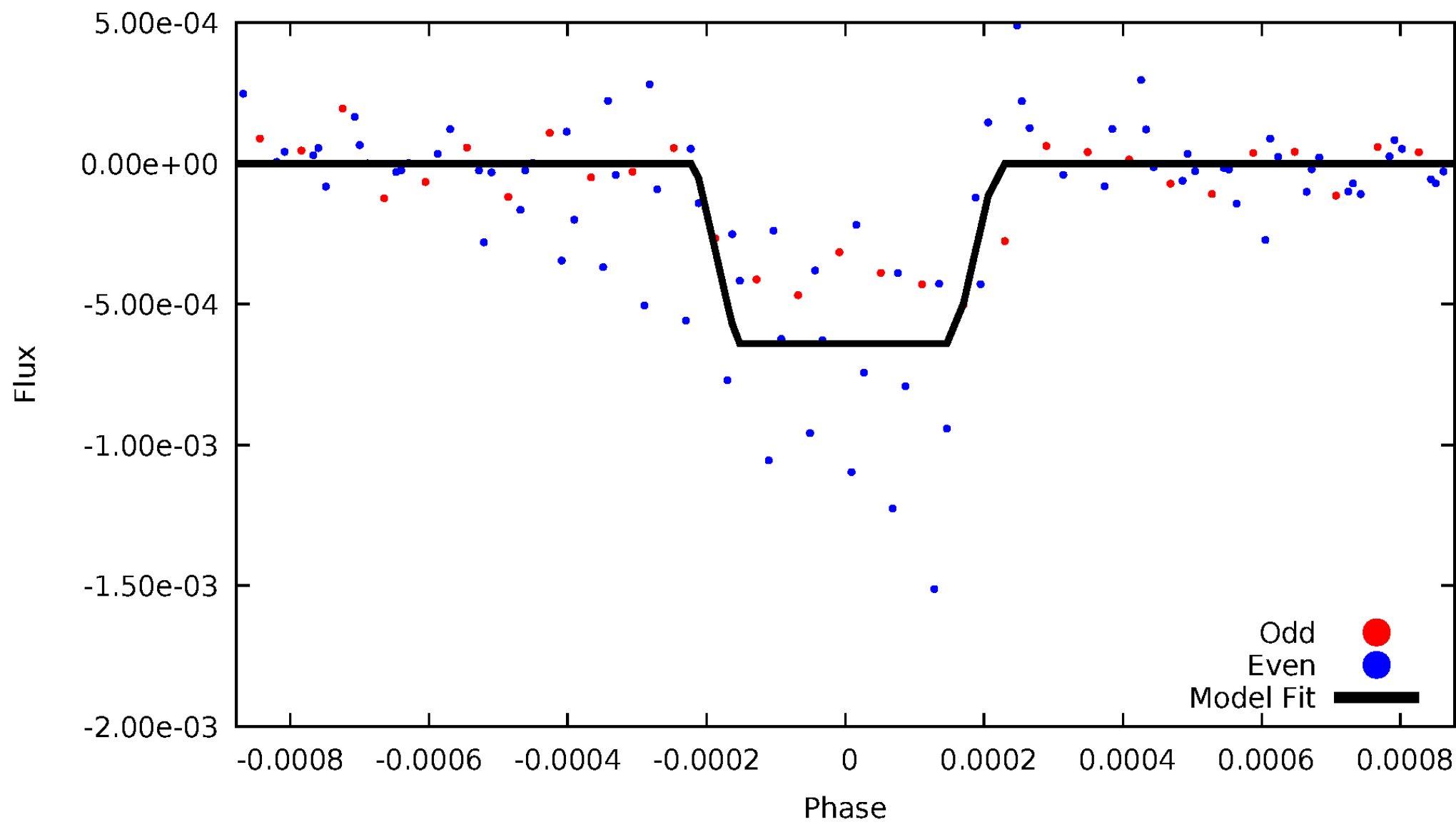
# DV Odd/Even

TCE 008957218-07

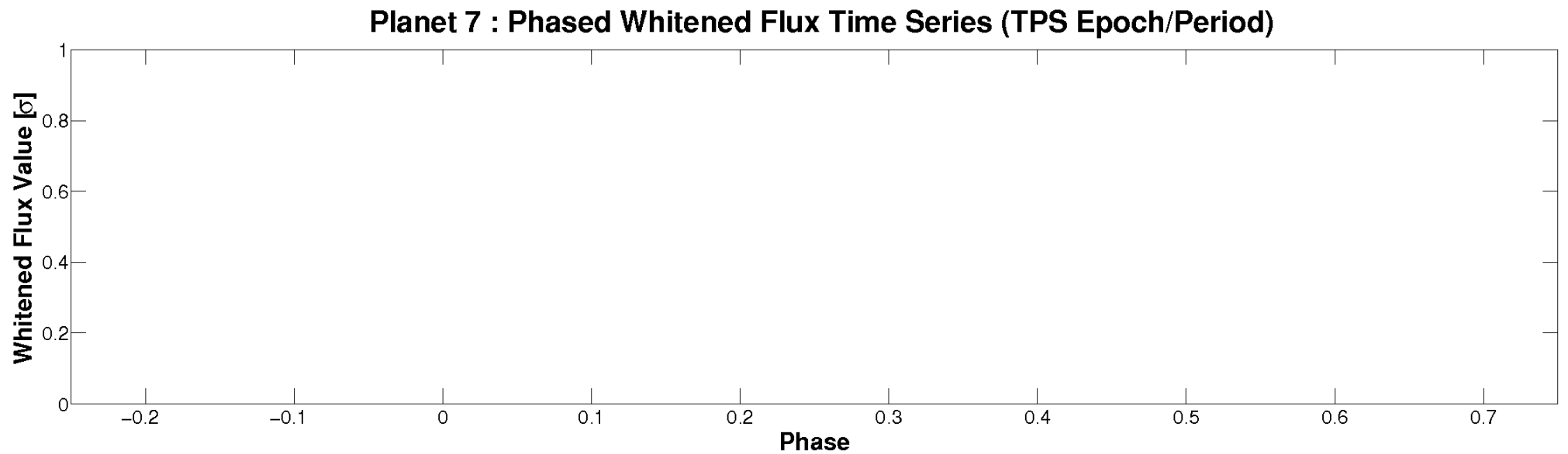
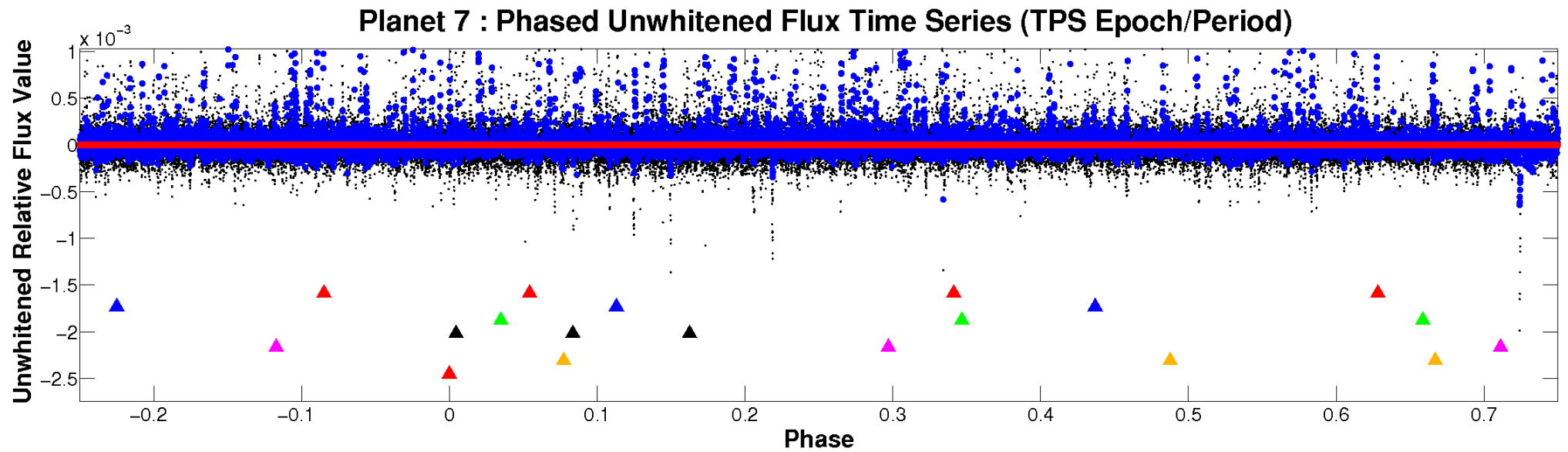


# ALT Odd/Even

TCE 008957218-07



# Non-Whitened Vs. Whitened Light Curve



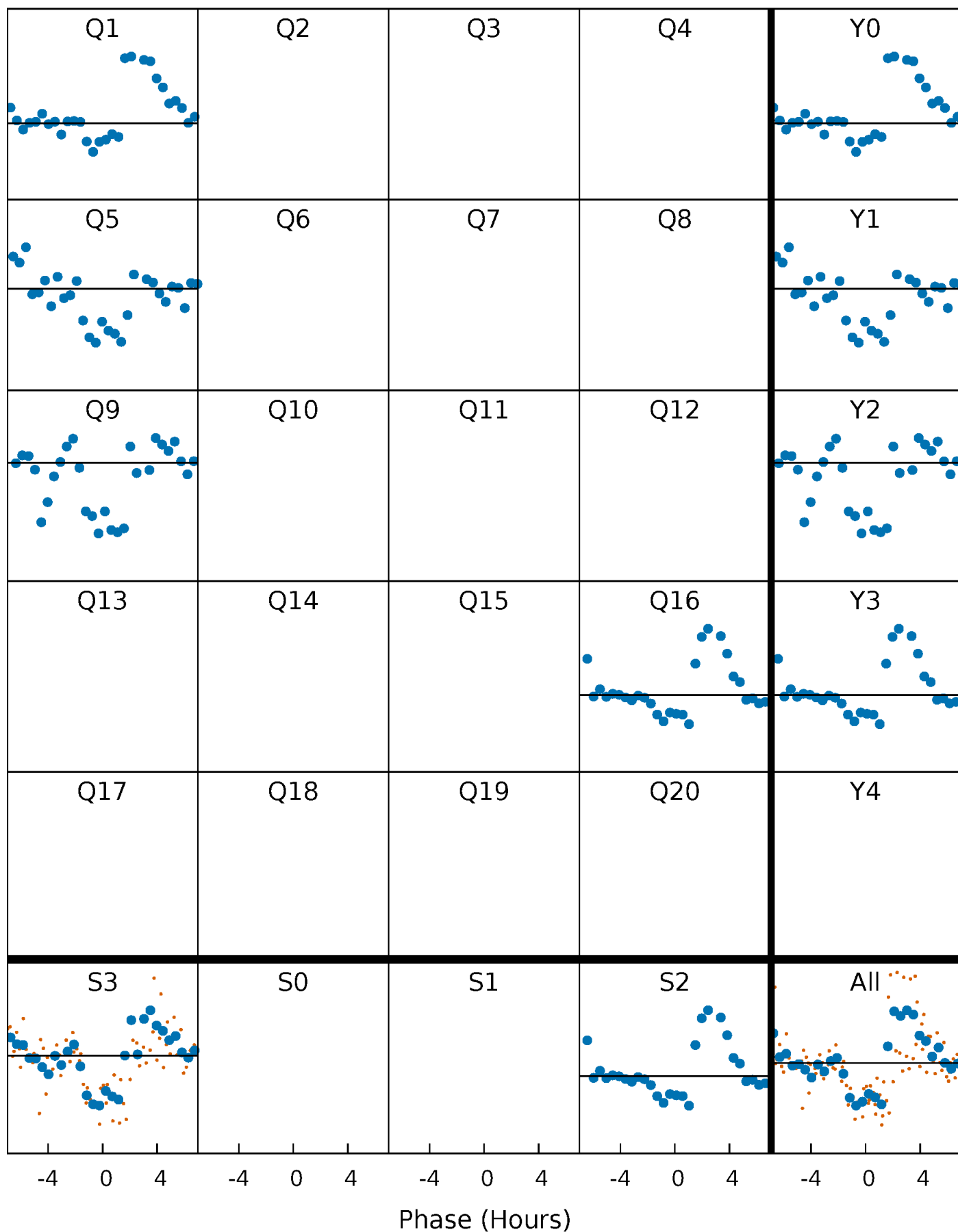
# PDC Quarter-Phased Transit Curves

TCE 008957218-07     $P=342.600742$  Days     $T_0=136.217524$  (BKJD)



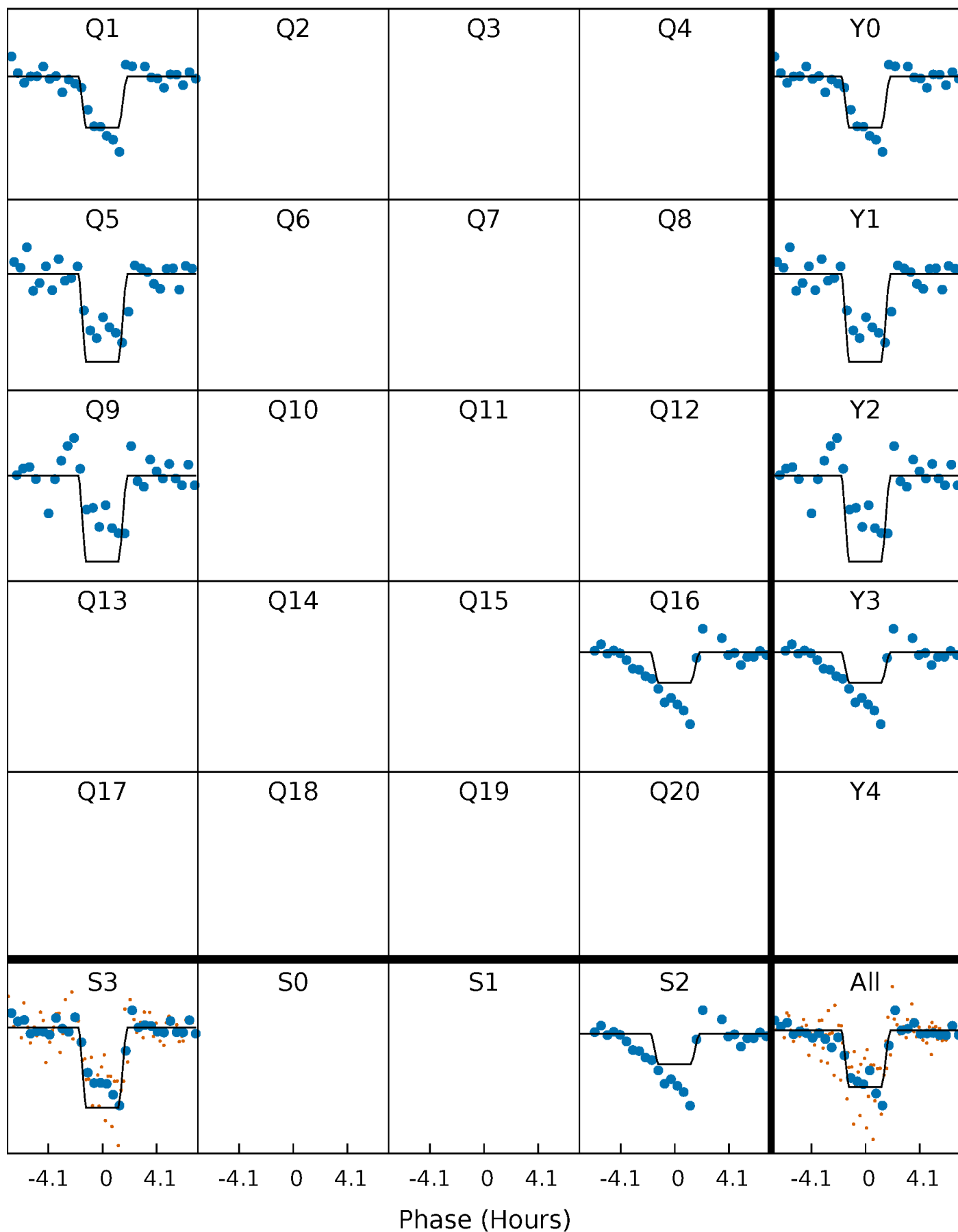
# DV Quarter-Phased Transit Curves

TCE 008957218-07     $P=342.600742$  Days     $T_0=136.217524$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

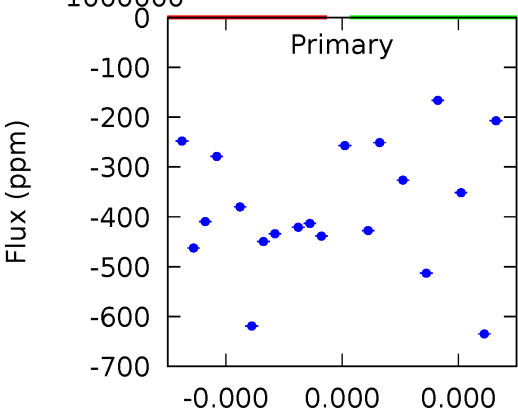
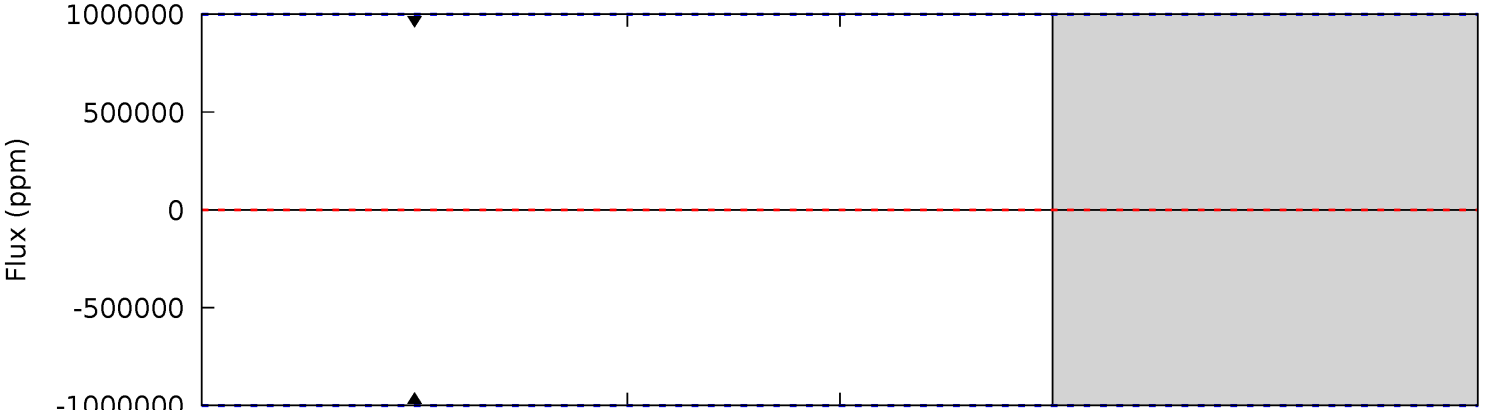
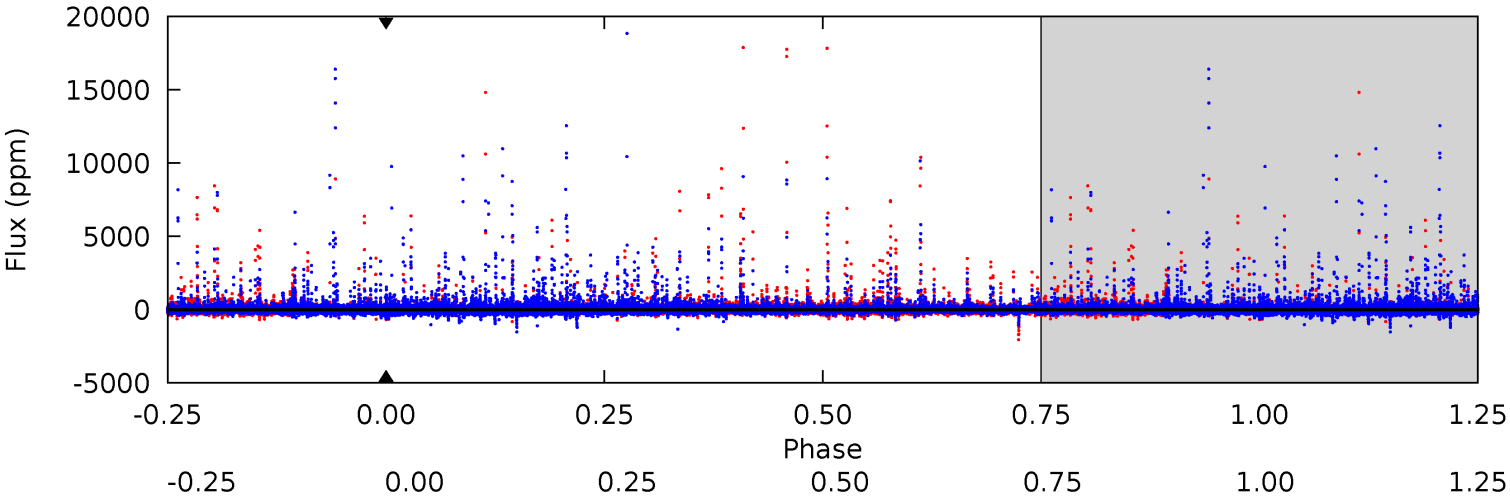
TCE 008957218-07 P=342.600742 Days  $T_0=136.223291$  (BKJD)



# DV Model-Shift Uniqueness Test

008957218-07, P = 342.600742 Days, E = 136.217524 Days

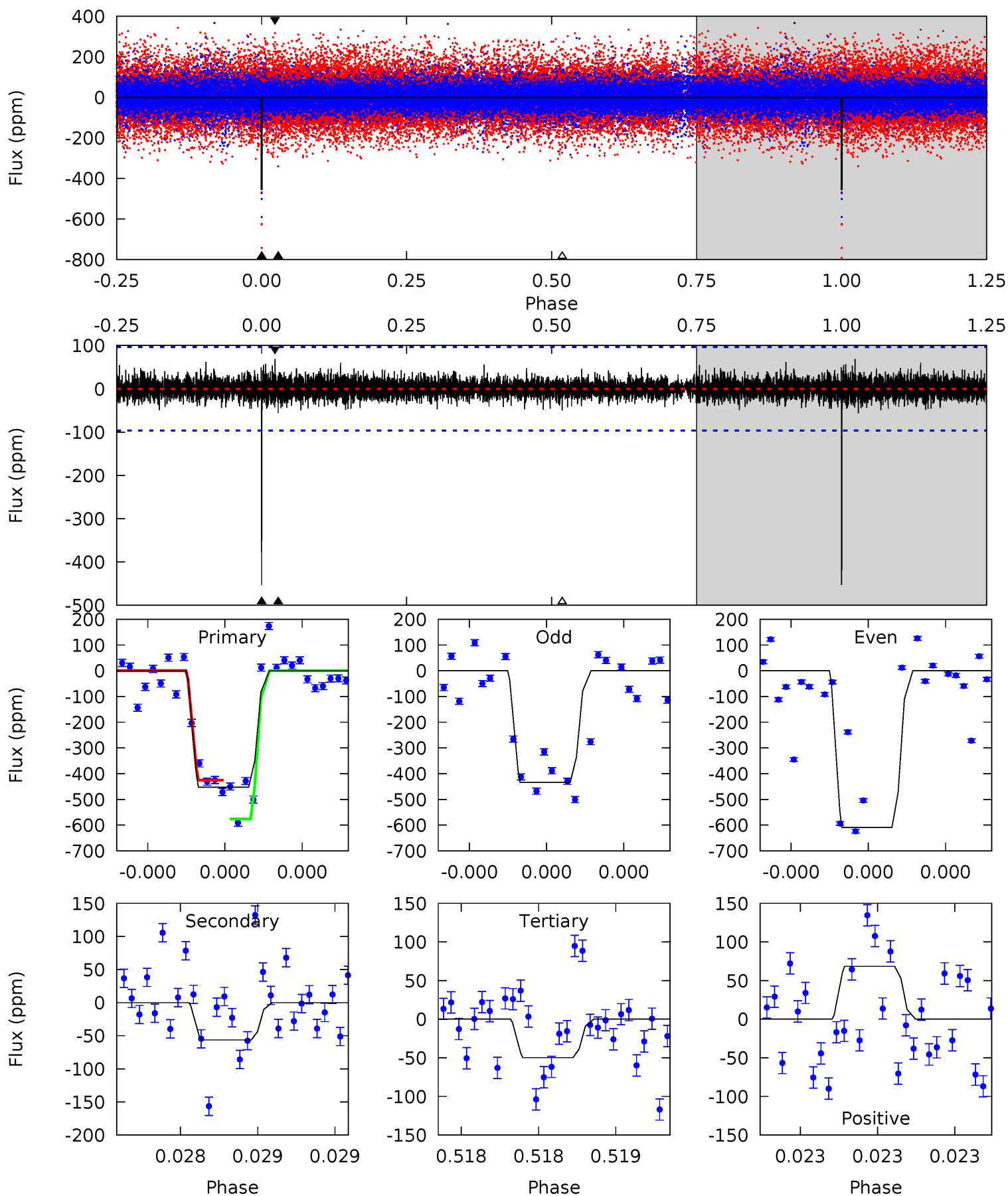
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



# Alt Model-Shift Uniqueness Test

008957218-07, P = 342.600742 Days, E = 136.223291 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
26.3	3.28	2.89	3.97	5.59	3.51	0.76	23.4	22.3	0.39	-0.69	4.67	1.15	0.13	4.38



### Stellar Parameters For KIC 008957218

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5477^{+164}_{-148}$	$3.957^{+0.595}_{-0.255}$	$-0.380^{+0.350}_{-0.250}$	$1.607^{+0.803}_{-0.883}$	$0.853^{+0.116}_{-0.095}$	$0.290^{+2.152}_{-0.169}$
	+3%/-3%	+15%/-6%	+92%/-66%	+50%/-55%	+14%/-11%	+743%/-58%
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 008957218-07 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$0 \pm 1000000$	$12.46^{+14.98}_{-8.85}$	$441^{+59}_{-66}$	$3528^{+16621}_{-20178}$	$1963^{+613274}_{-551163}$
Alt.	$-56 \pm 17$	$12.32^{+14.57}_{-8.58}$	$441^{+57}_{-64}$	$2529^{+1007}_{-389}$	$171^{+1557}_{-138}$

$T_{max}$  = Theoretical Maximum Planetary Temperature

$T_{obs}$  = Observed Planetary Temperature (Assuming  $A=0.3$ )

$A_{obs}$  = Observed Albedo (Assuming  $T=0$ )

If a secondary eclipse is present, the system is likely an EB if  $T_{obs} \gg T_{max}$  AND  $A_{obs} \gg 1.0$

## DV Centroid Data

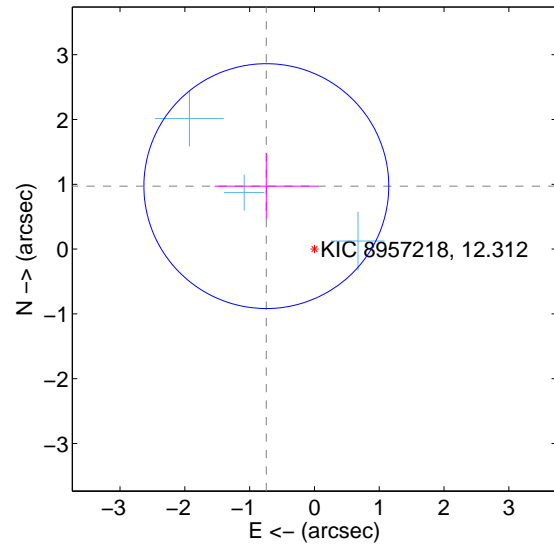
Supplemental centroid analysis for 008957218-07. Kepler magnitude: 12.31. Transit SNR -1.00

There are 3 quarters with good PRF difference image offsets

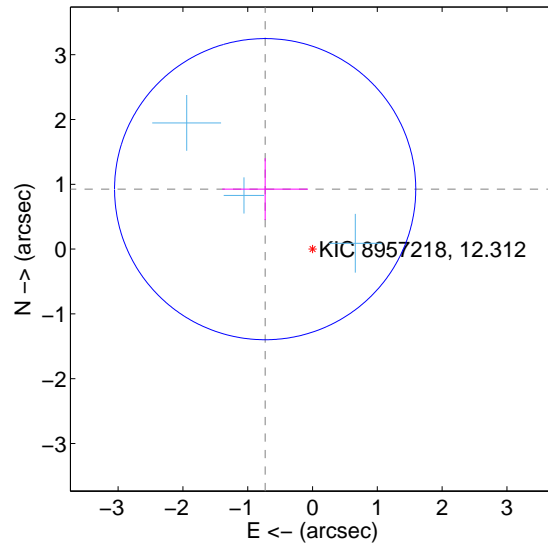
The direct PRF centroid is offset from the target star catalog position by about 0.05 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.223 \pm 0.630$	1.94	$0.743 \pm 0.798$	$0.972 \pm 0.506$
PRF-fit source offset from KIC position	$1.179 \pm 0.775$	1.52	$0.731 \pm 0.662$	$0.925 \pm 0.477$
photometric centroid source offset	$0.23 \pm 0.36$	0.64	$0.12 \pm 0.34$	$-0.19 \pm 0.36$

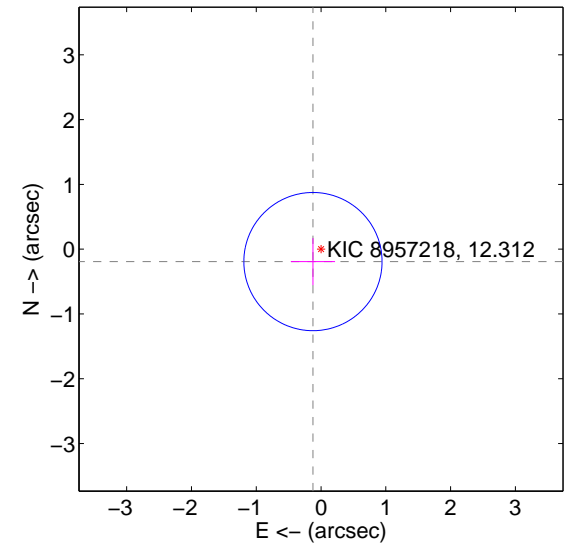
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

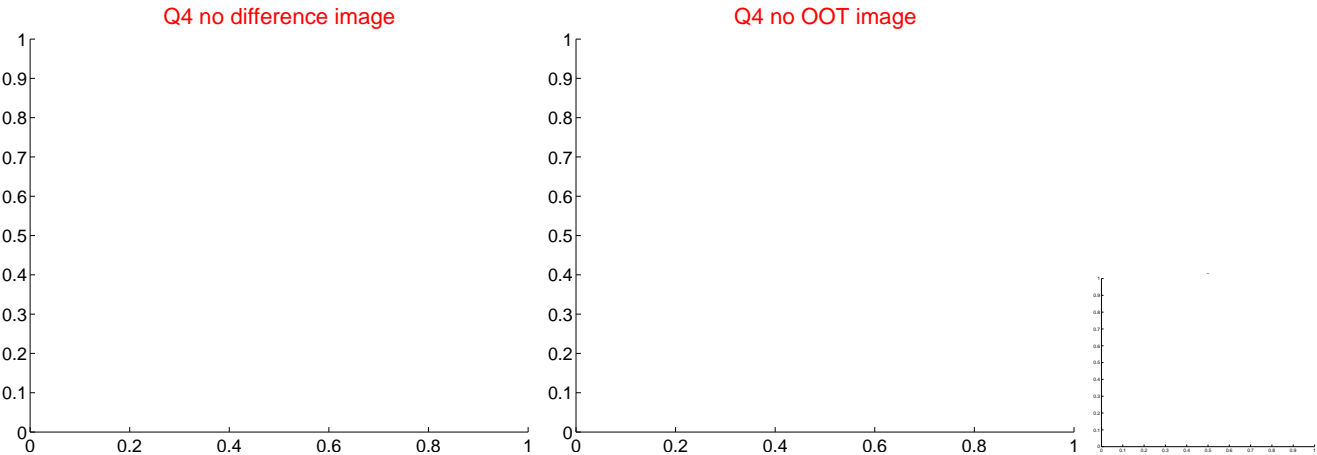
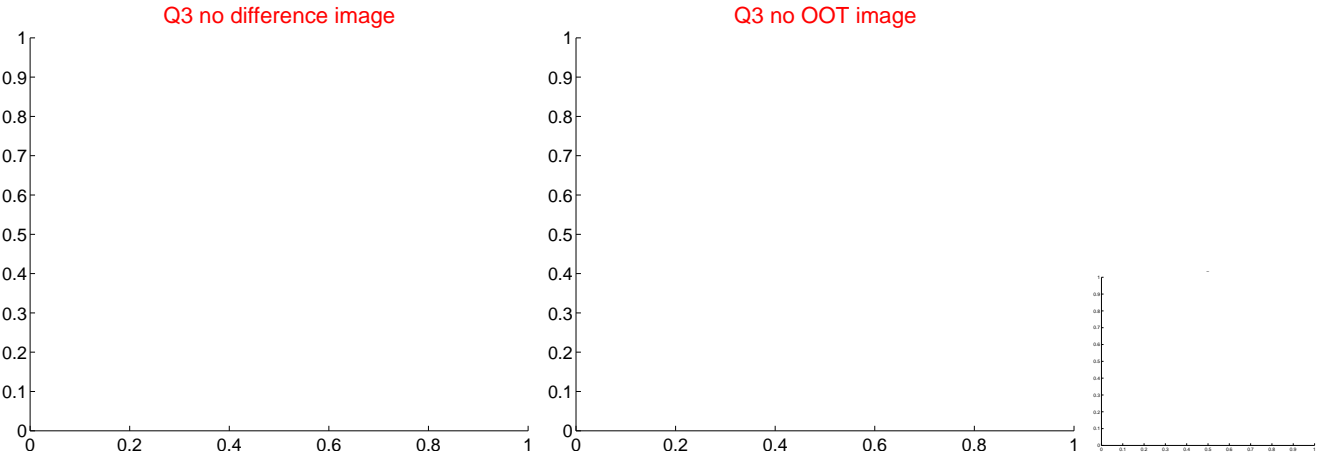
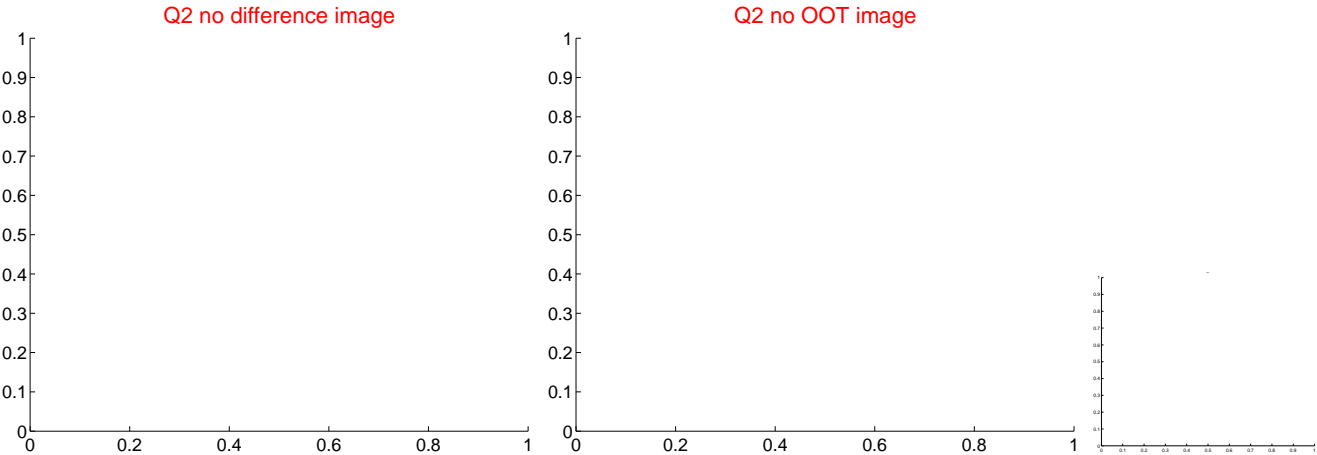
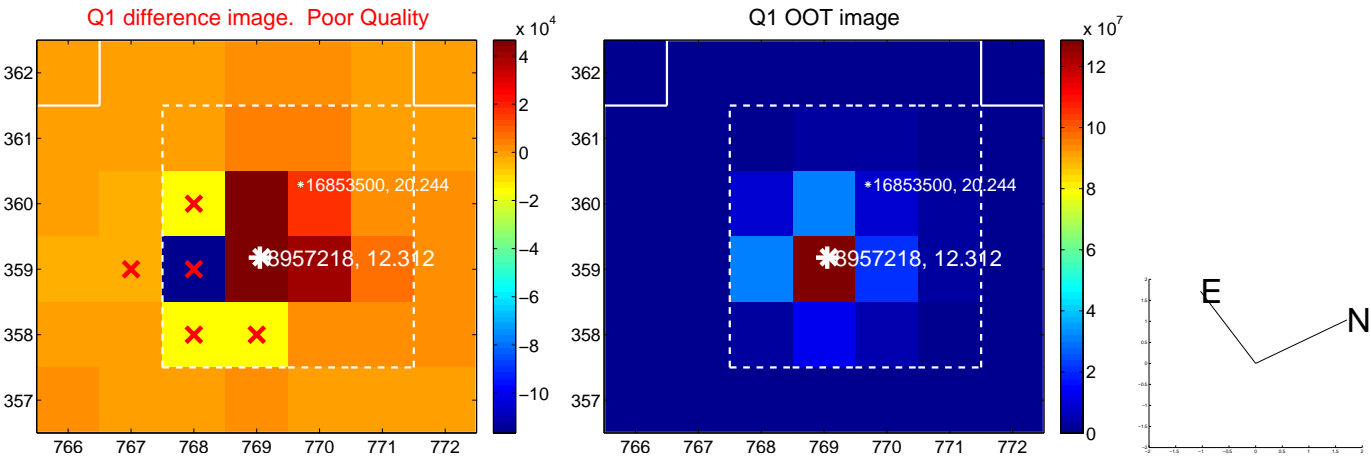


offset from photometric centroids

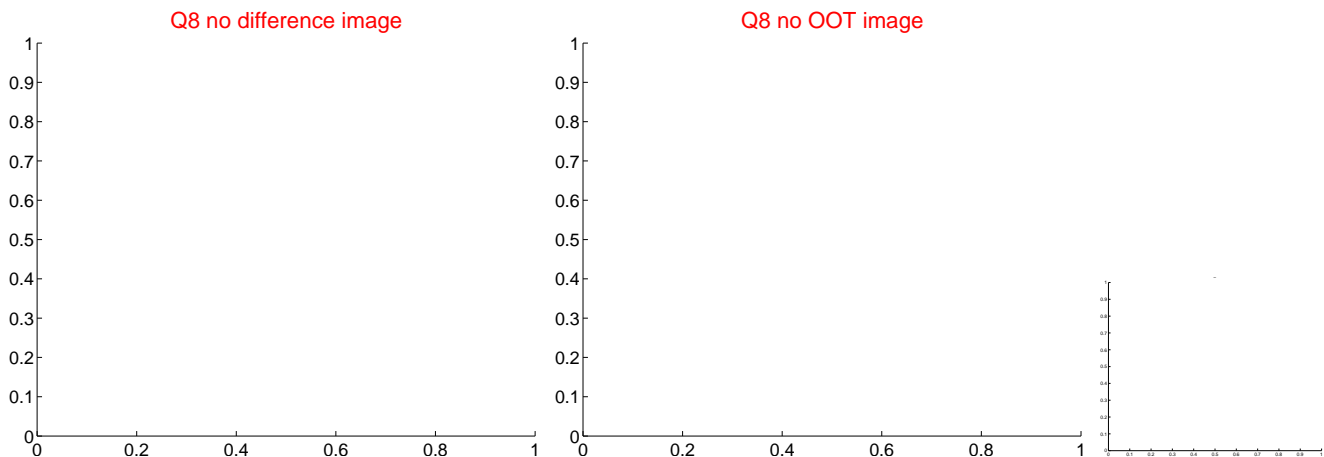
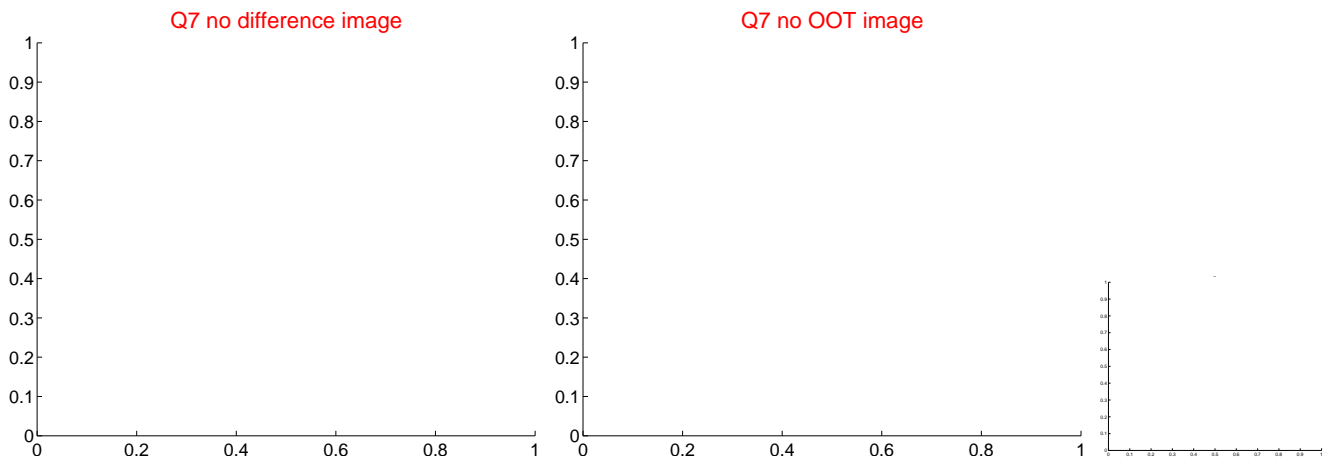
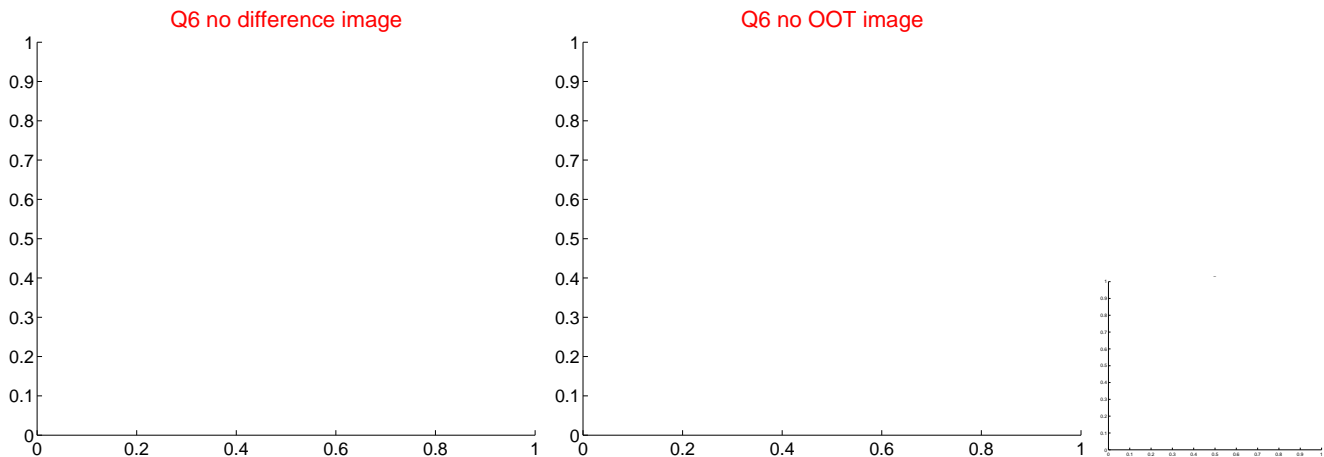
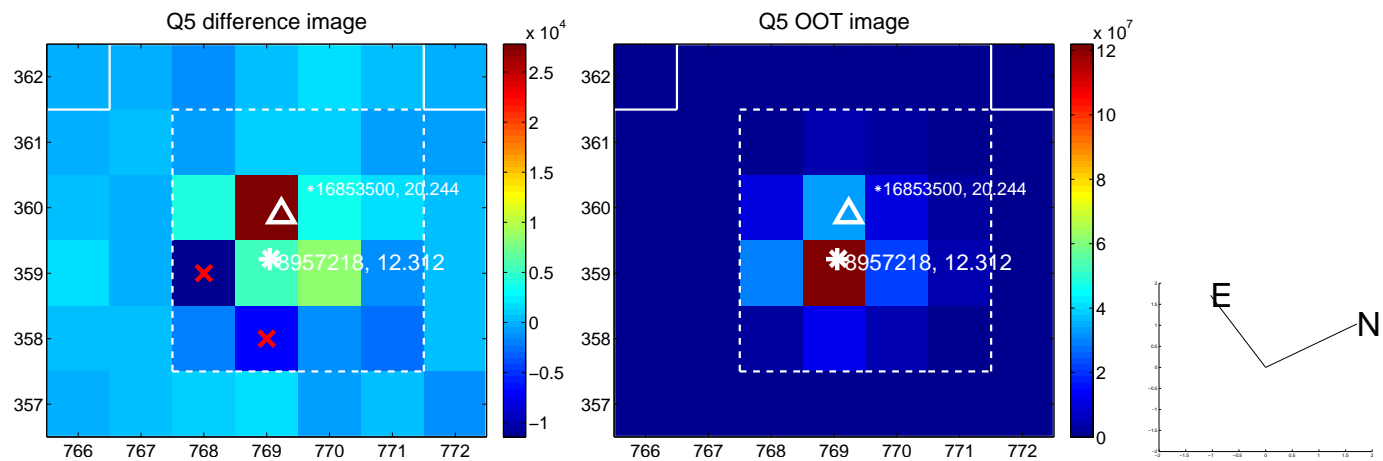


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

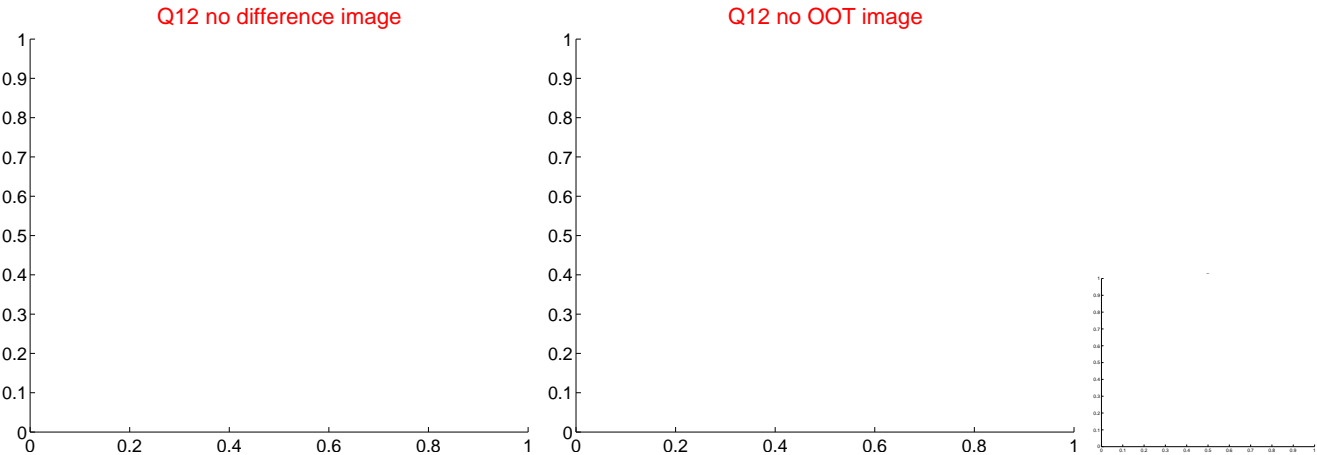
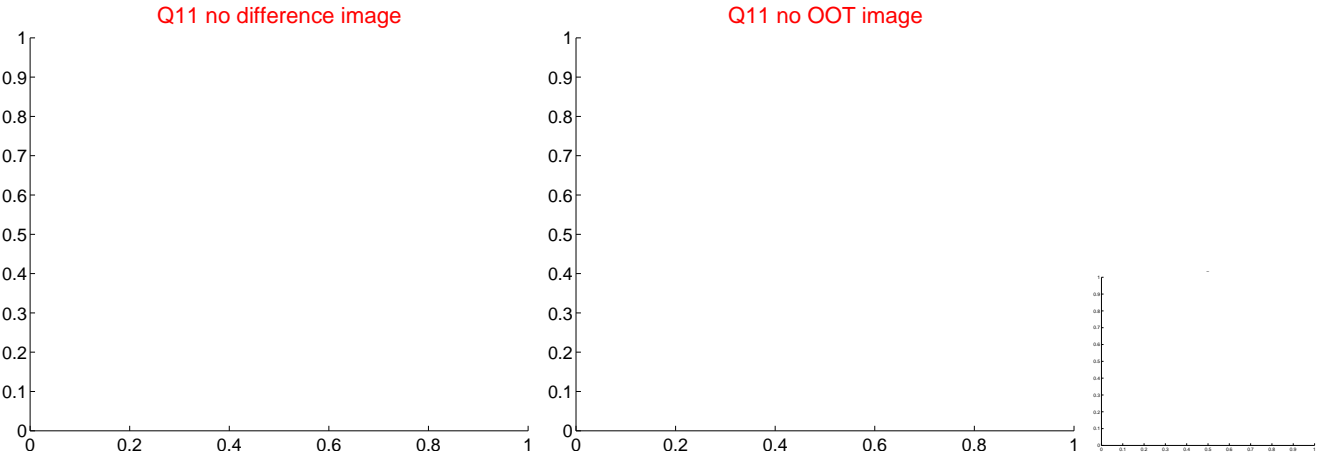
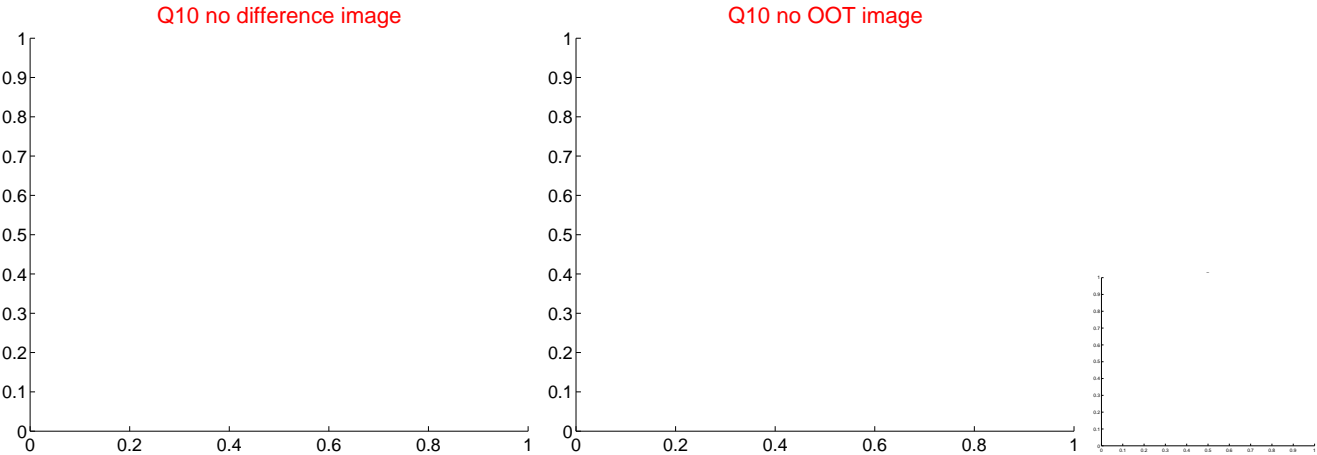
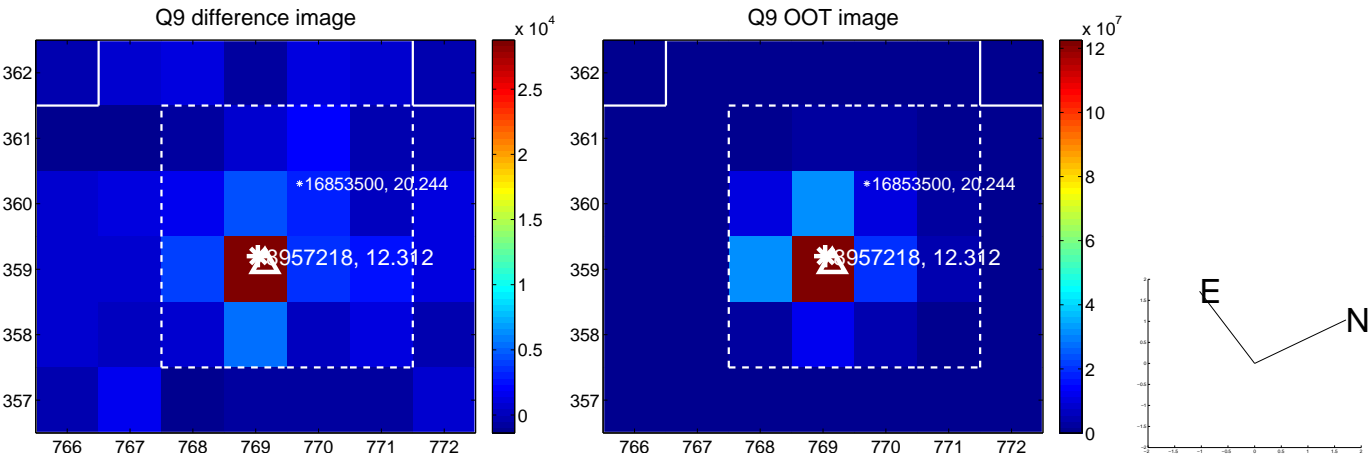
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



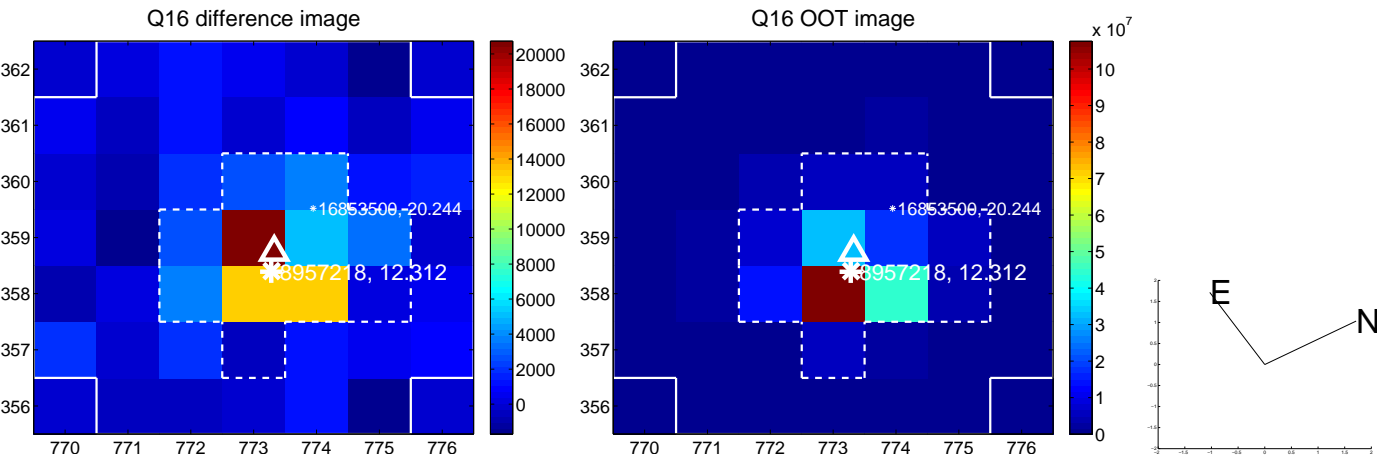
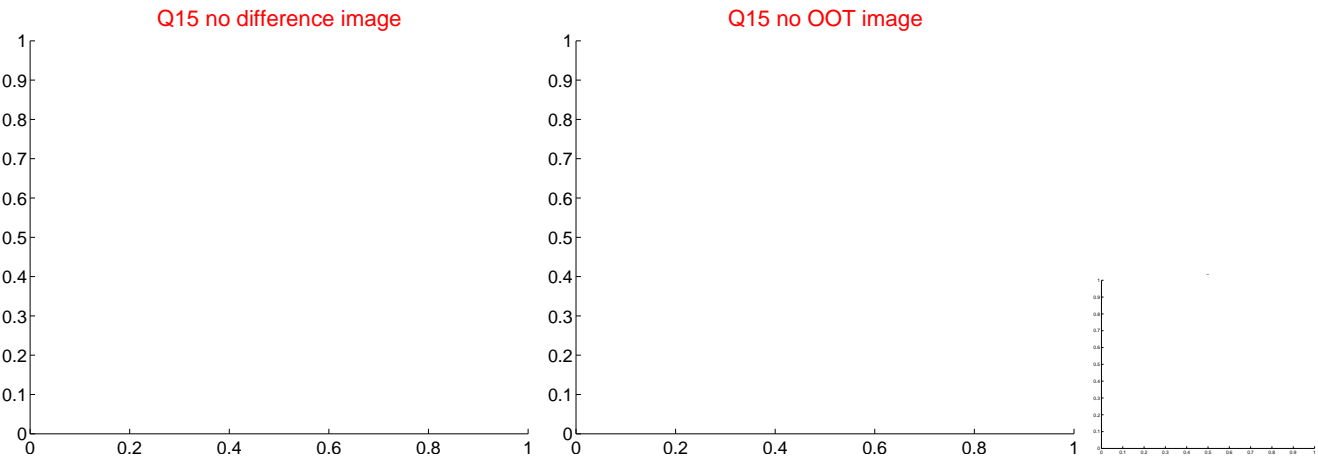
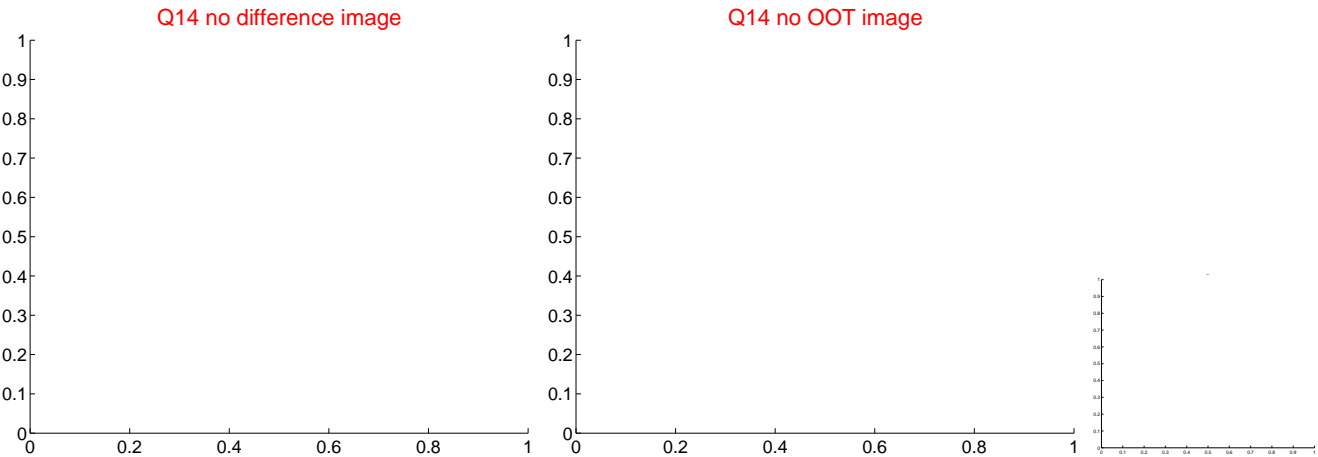
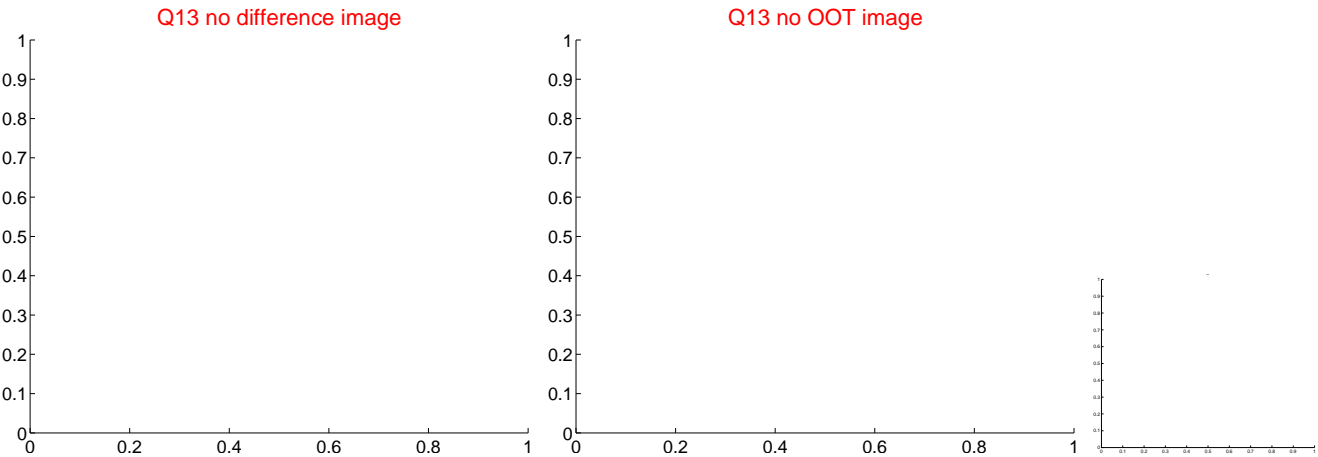
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



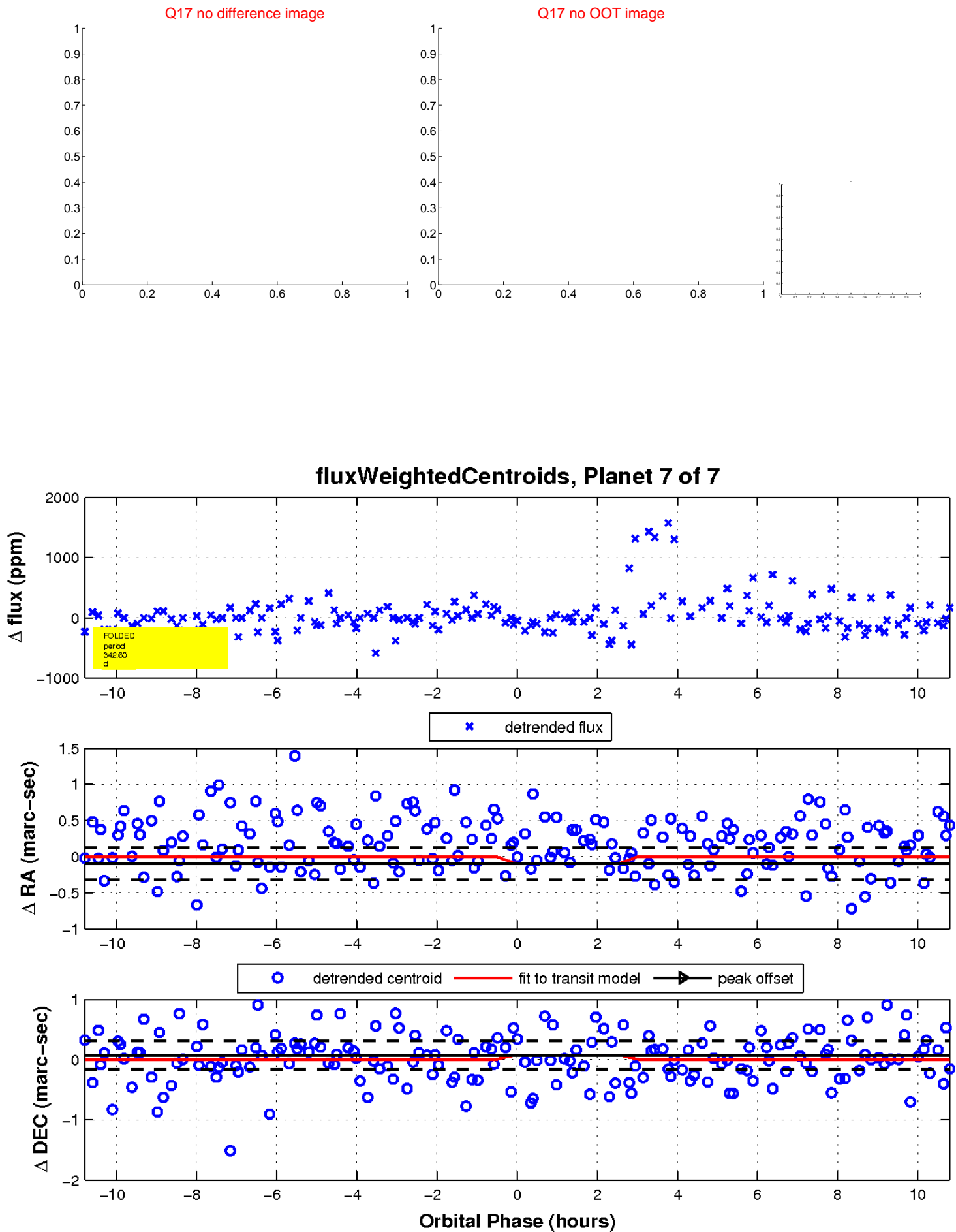
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



white ×: 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

