

# KIC 005455407

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005455407-01	OBS	No	405.667204	264.234509	474.1	5.540	15.8	8.7	2.18	5519	5.19	3.34
005455407-02	OBS	No	629.942151	137.531595	477.1	14.936	12.5	8.2	2.18	5519	5.01	1.86
005455407-03	OBS	No	289.137237	190.110722	378.6	9.816	12.7	6.9	2.18	5519	4.48	5.25
005455407-04	OBS	No	529.596497	340.722578	344.9	10.441	10.9	6.1	2.18	5519	4.35	2.34
005455407-05	OBS	No	243.480546	158.300050	350.6	8.873	9.5	8.0	2.18	5519	4.13	6.60
005455407-06	OBS	No	368.806760	416.475967	509.8	14.882	8.8	8.9	2.18	5519	6.01	3.80

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005455407-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS
005455407-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005455407-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV
005455407-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV
005455407-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—INCONSISTENT_TRANS
005455407-06	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV

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

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

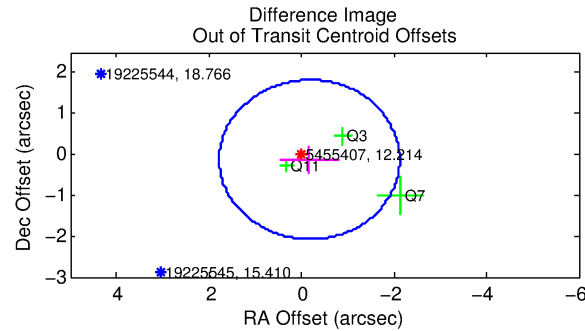
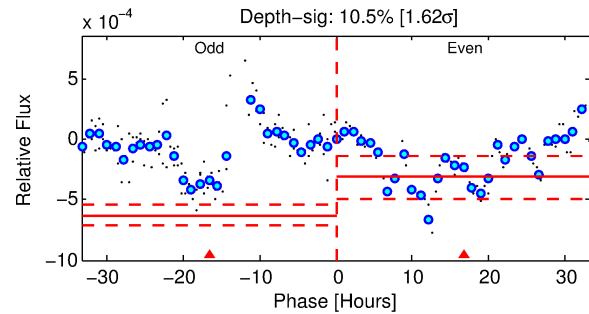
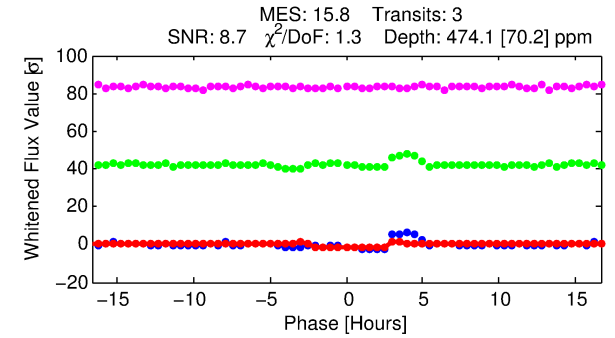
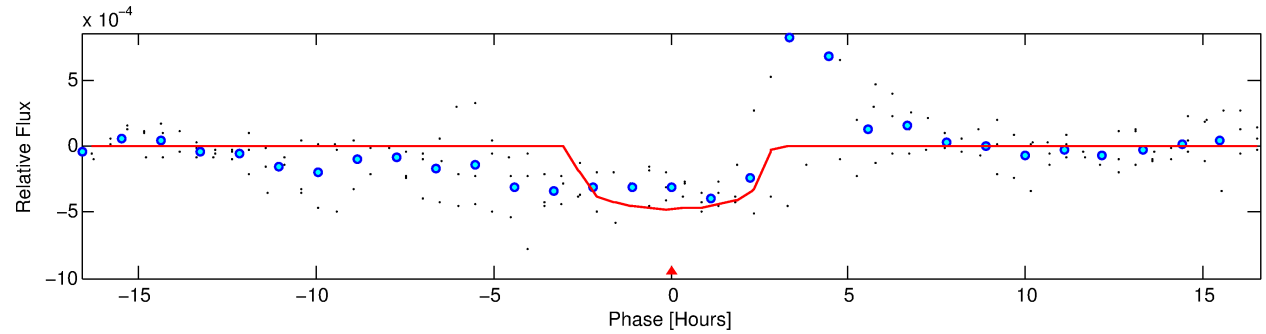
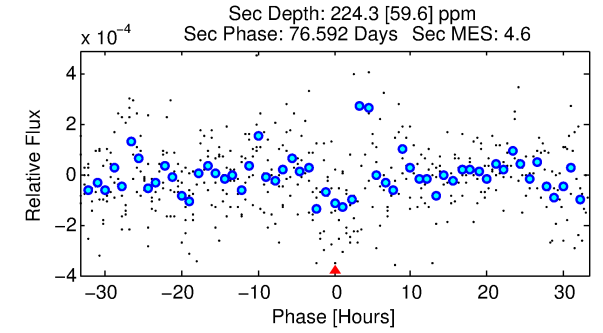
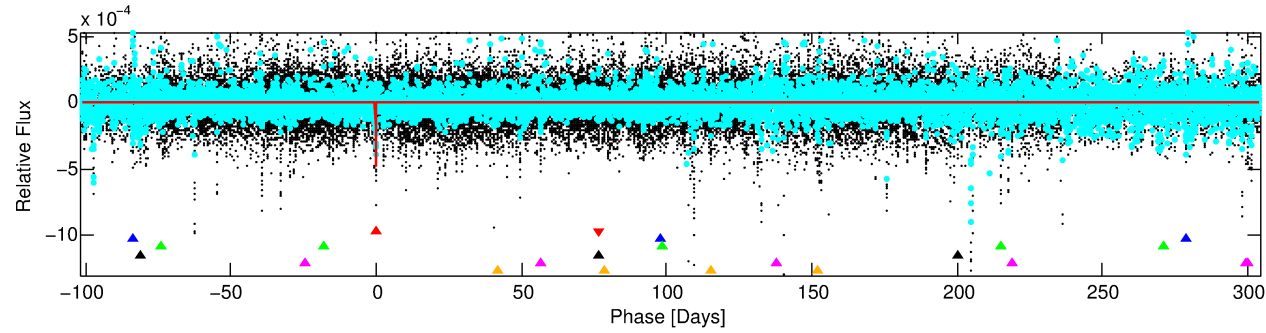
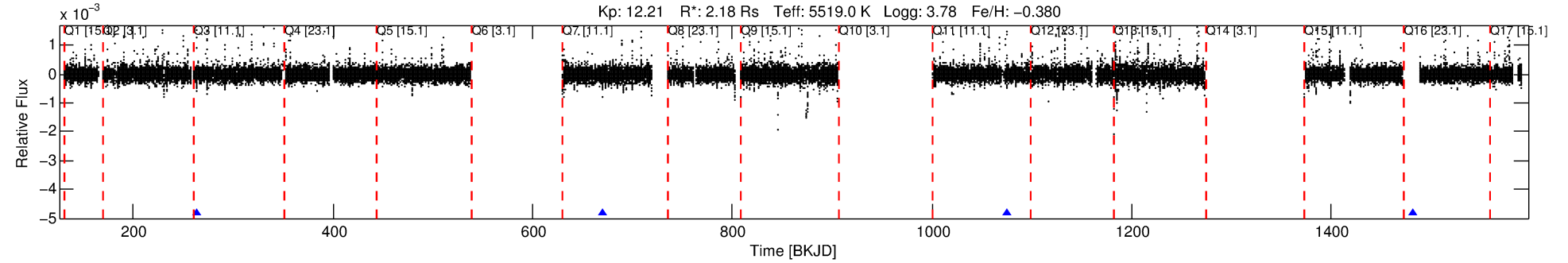
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 005455407-01

No Significant Match Found

# DV One-Page Summary

KIC: 5455407 Candidate: 1 of 6 Period: 405.667 d



## DV Fit Results:

Period = 405.66720 [0.00517] d  
Epoch = 264.2345 [0.0077] BKJD  
Rp/R\* = 0.0218 [0.0093]  
a/R\* = 381.25 [689.96]  
b = 0.76 [1.02]  
Seff = 3.34 [3.94]  
Teq = 345 [102] K  
Rp = 5.19 [3.99] Re  
a = 1.0885 [0.7541] AU  
Ag = 5433.45 [8029.58] [0.68 $\sigma$ ]  
Teffp = 4577 [1039] K [4.06 $\sigma$ ]

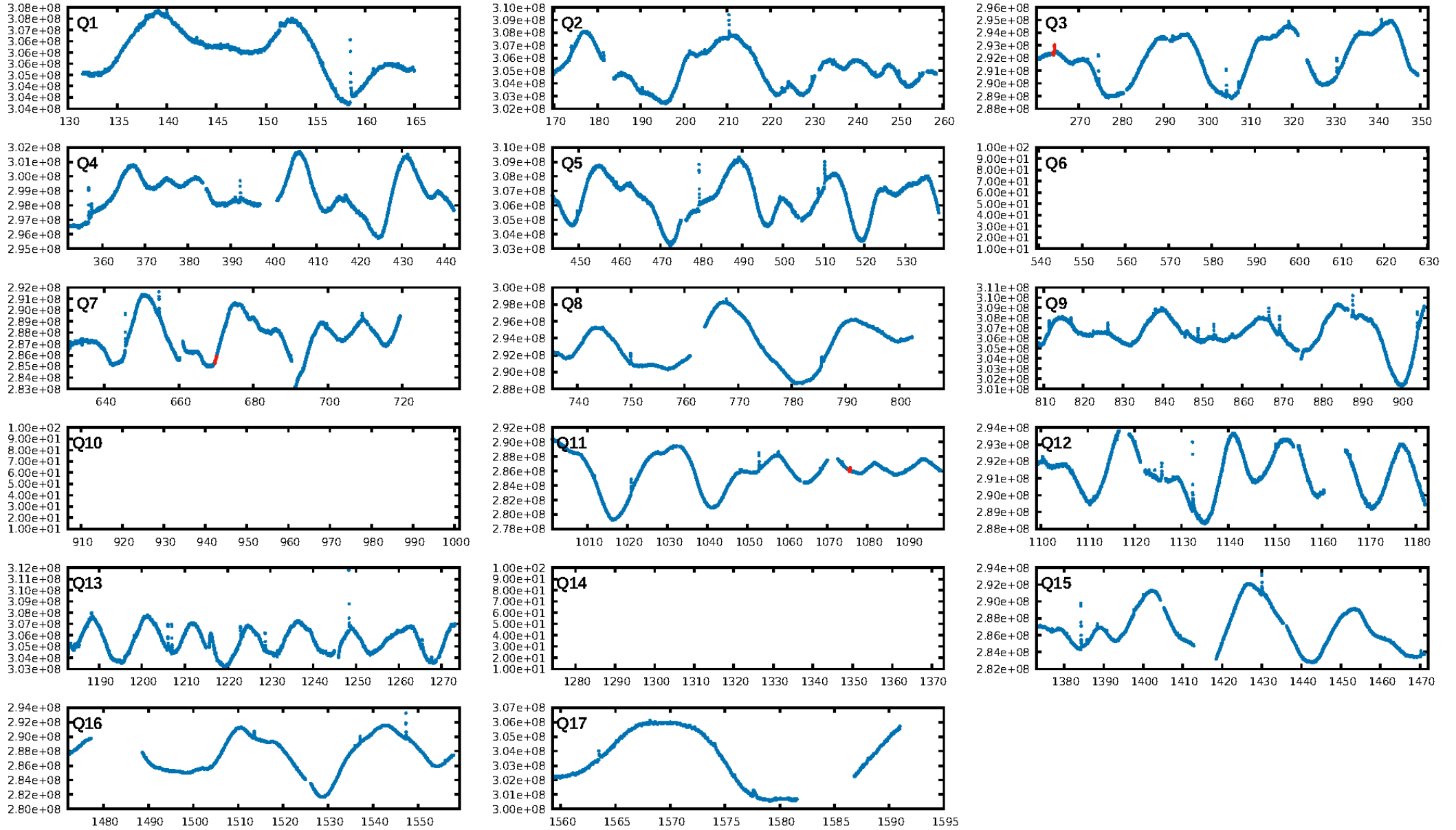
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [55.71 $\sigma$ ]  
LongPeriod-sig: 100.0% [251.64 $\sigma$ ]  
**ModelChiSquare2-sig: 0.0%**  
ModelChiSquareGof-sig: 35.4%  
Bootstrap-pfa: 4.16e-15  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 1.571  
Centroid-sig: 2.6%  
Centroid-so: 0.960 arcsec [1.73 $\sigma$ ]  
OotOffset-rm: 0.214 arcsec [0.33 $\sigma$ ]  
OotOffset-st: 0/3/0/0 [3]  
KicOffset-rm: 0.336 arcsec [0.99 $\sigma$ ]  
KicOffset-st: 0/3/0/0 [3]  
DiffImageQuality-fgm: 1.00 [3/3]  
DiffImageOverlap-fno: 1.00 [3/3]

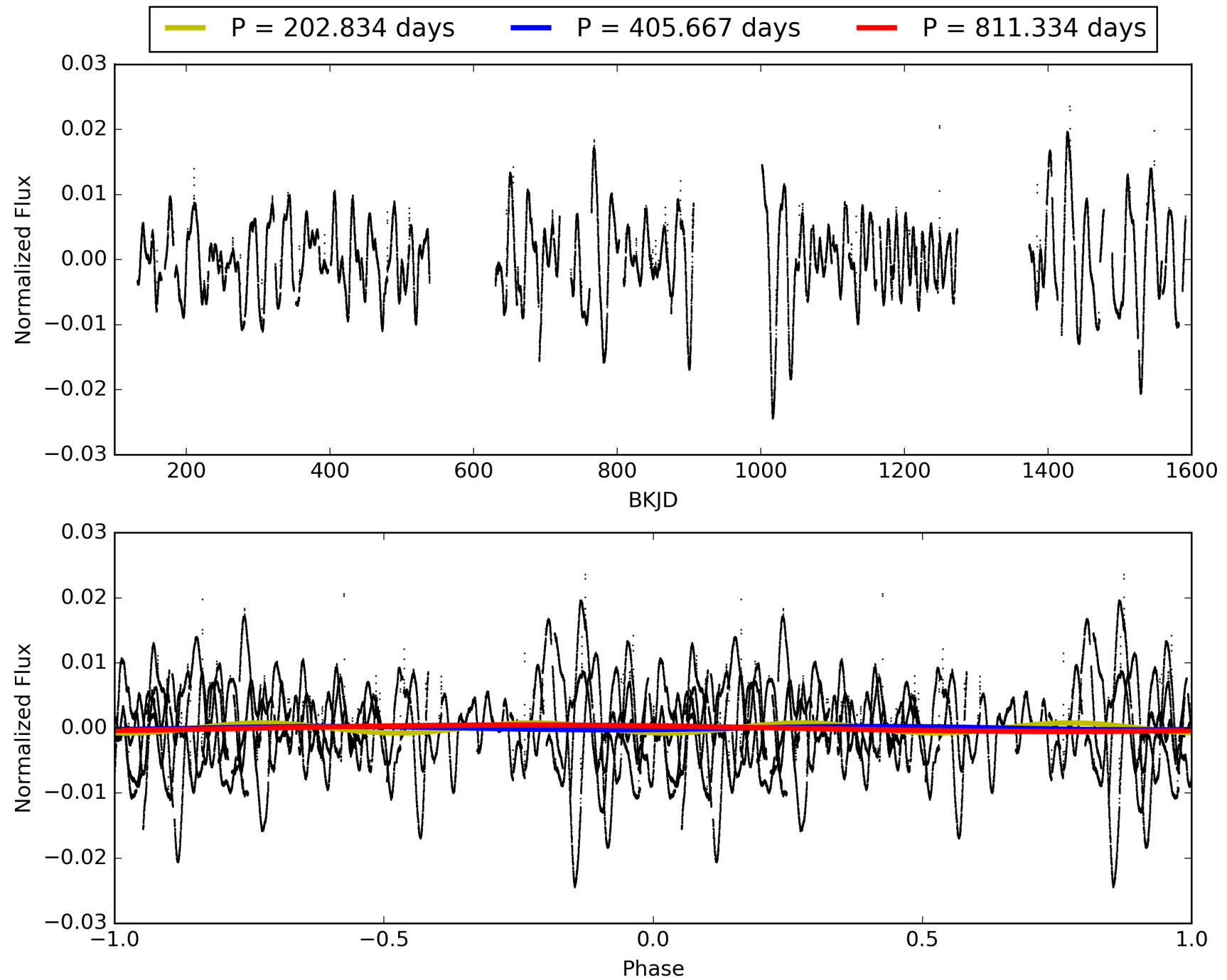
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 05:14:48 Z

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

# TCE 005455407-01, PDC Light Curves



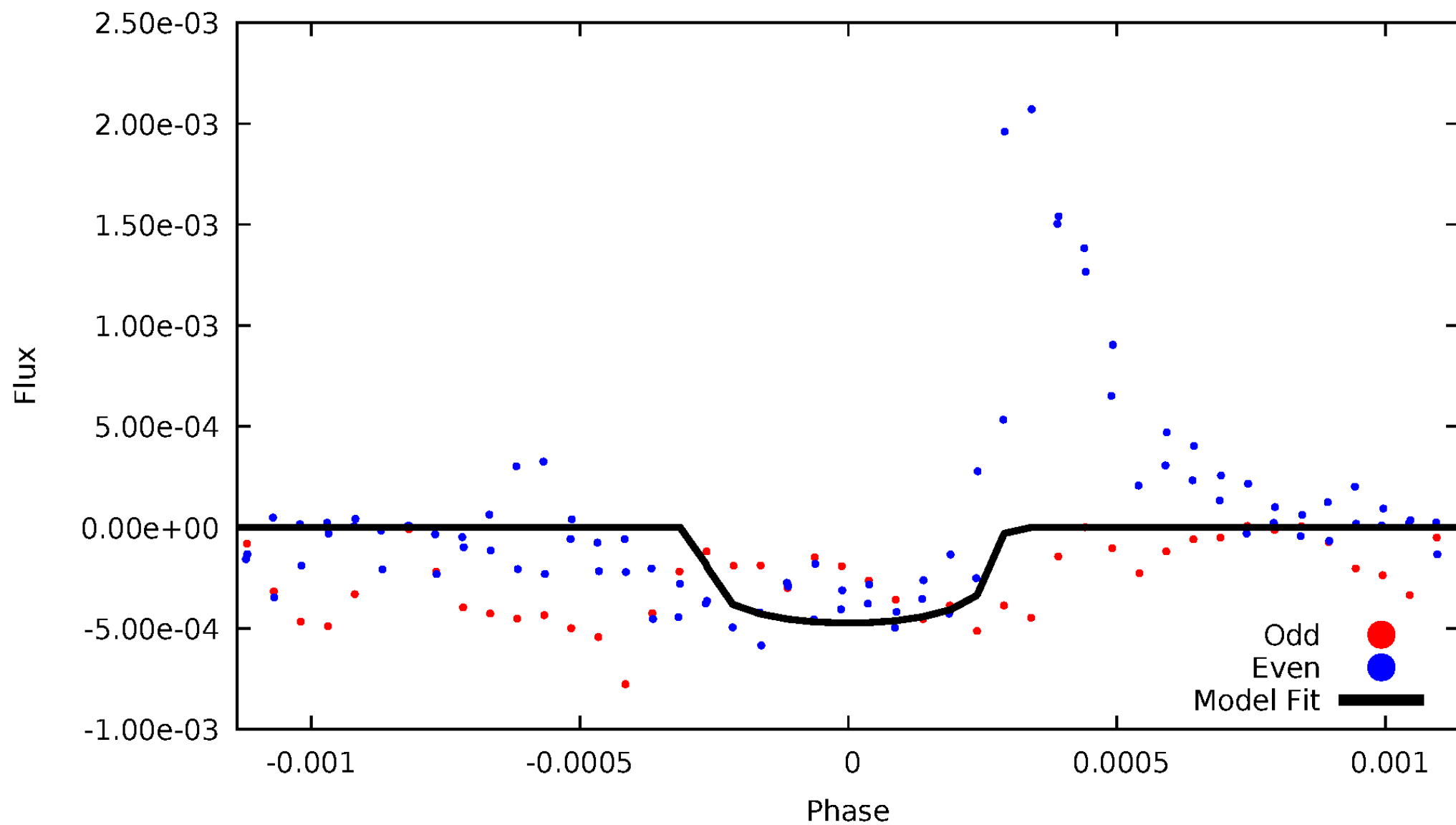
# TCE 005455407-01





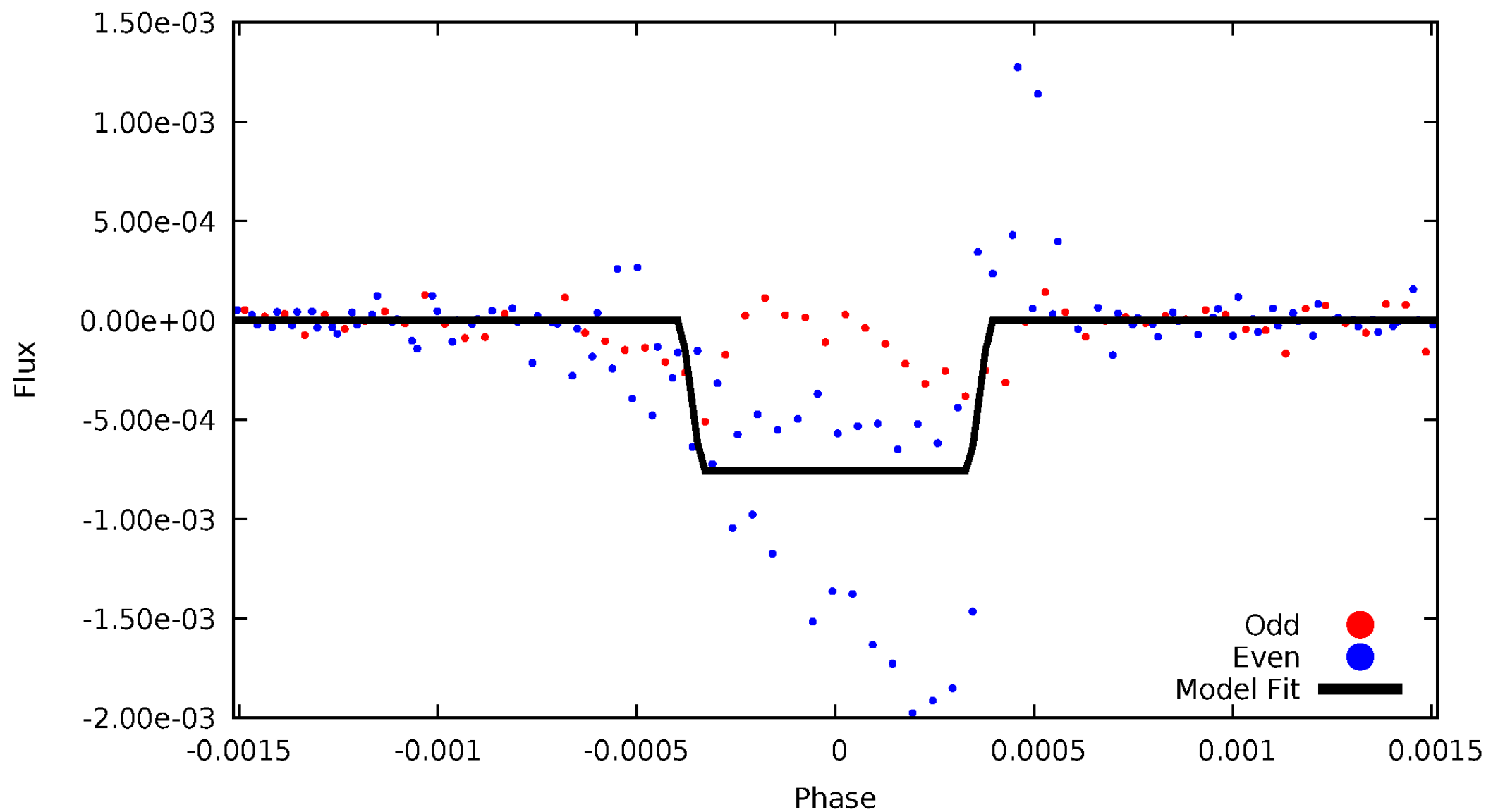
# DV Odd/Even

TCE 005455407-01



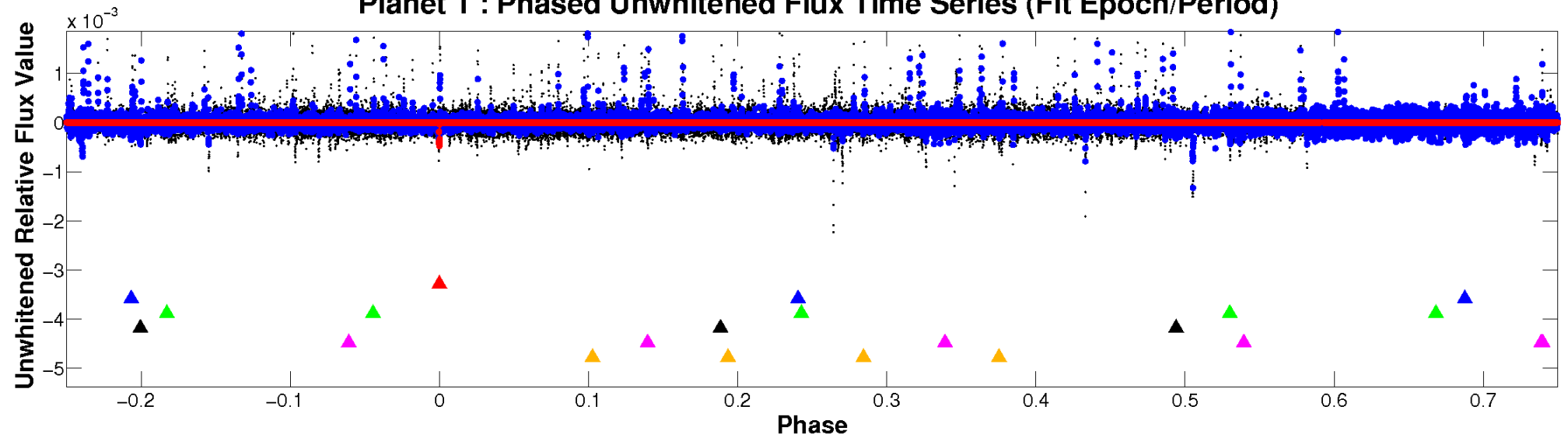
# ALT Odd/Even

TCE 005455407-01

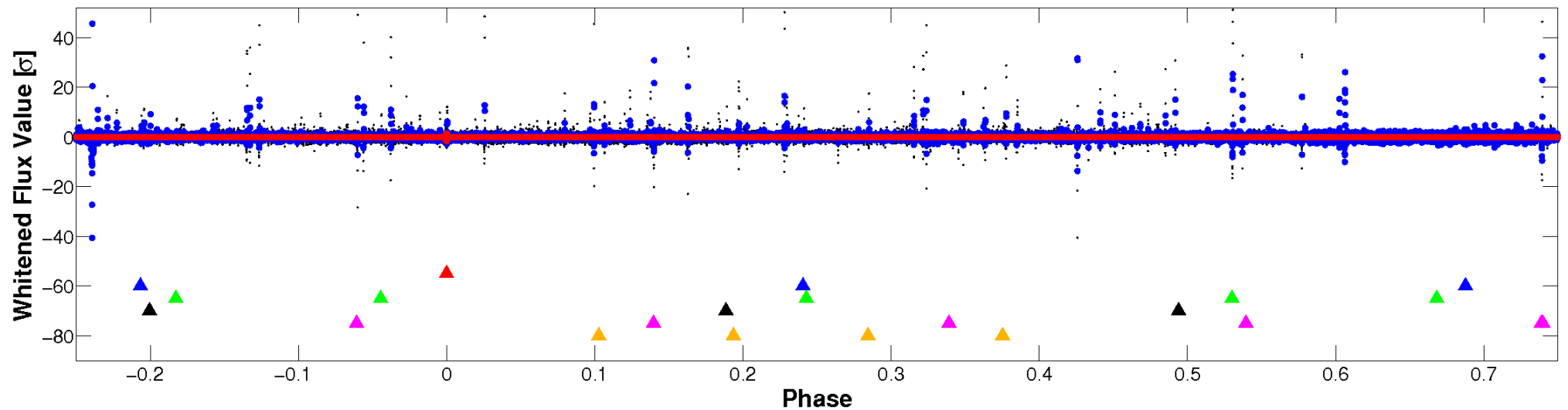


# Non-Whitened Vs. Whitened Light Curve

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

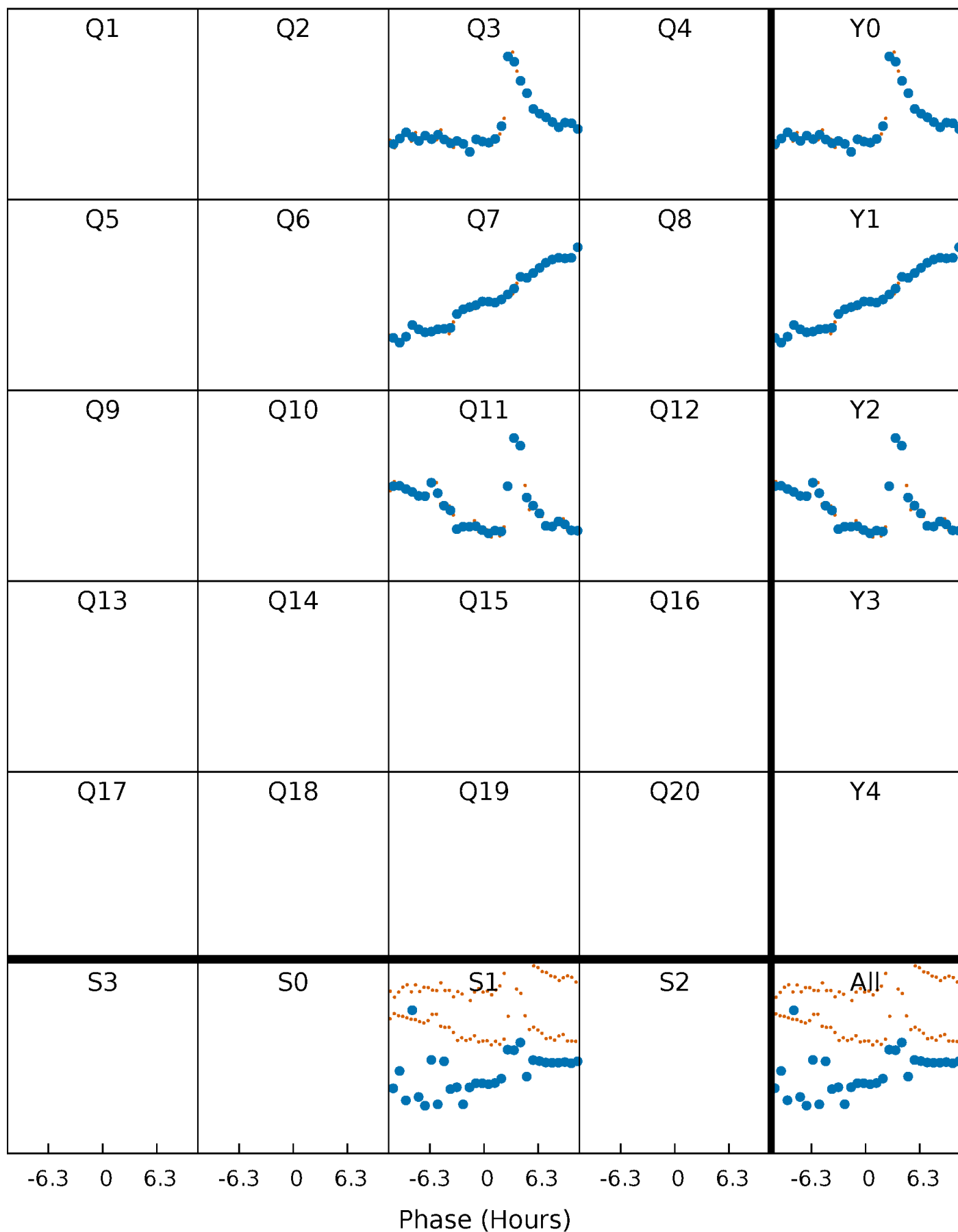


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



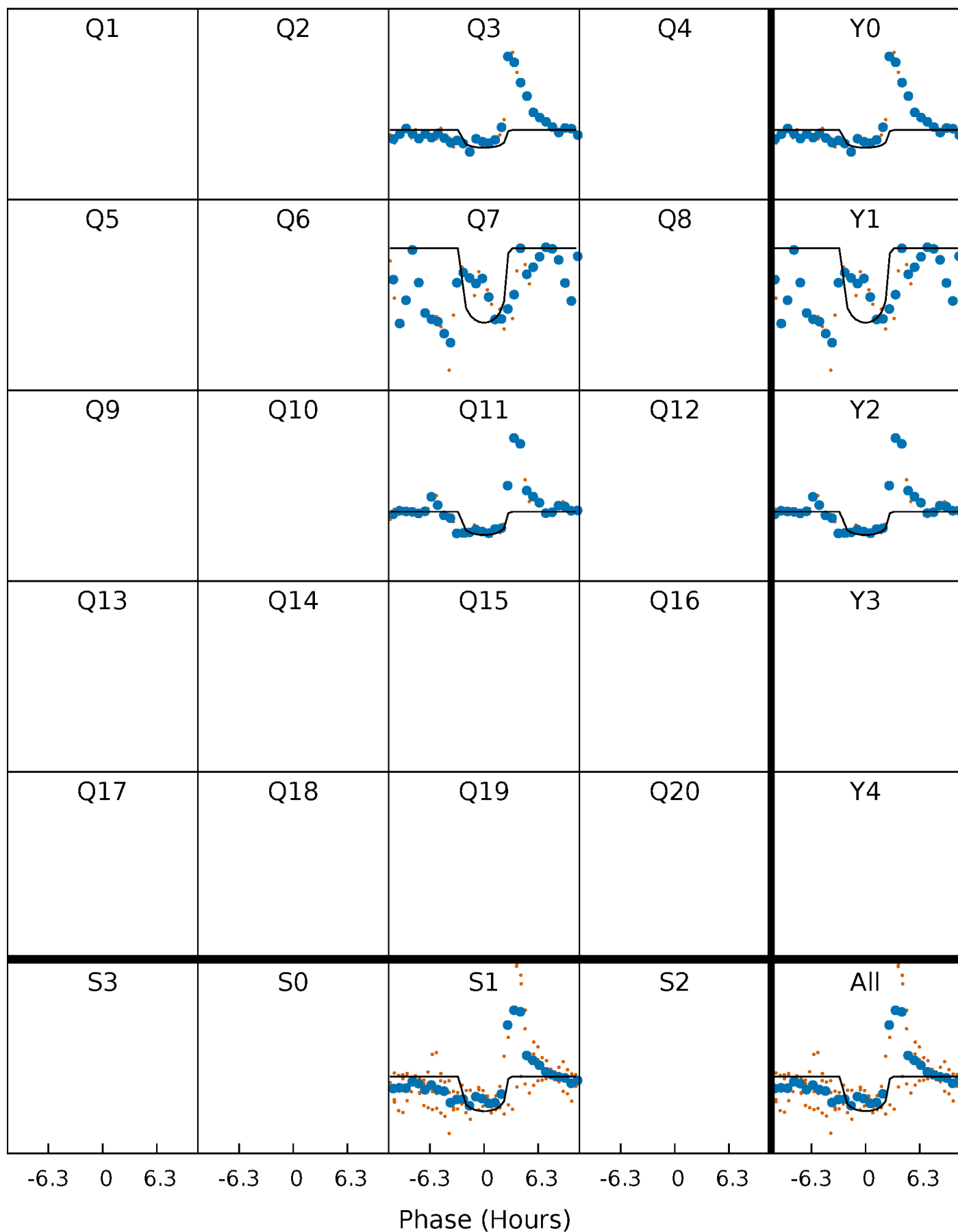
# PDC Quarter-Phased Transit Curves

TCE 005455407-01   P=405.667204 Days    $T_0=264.234510$  (BKJD)



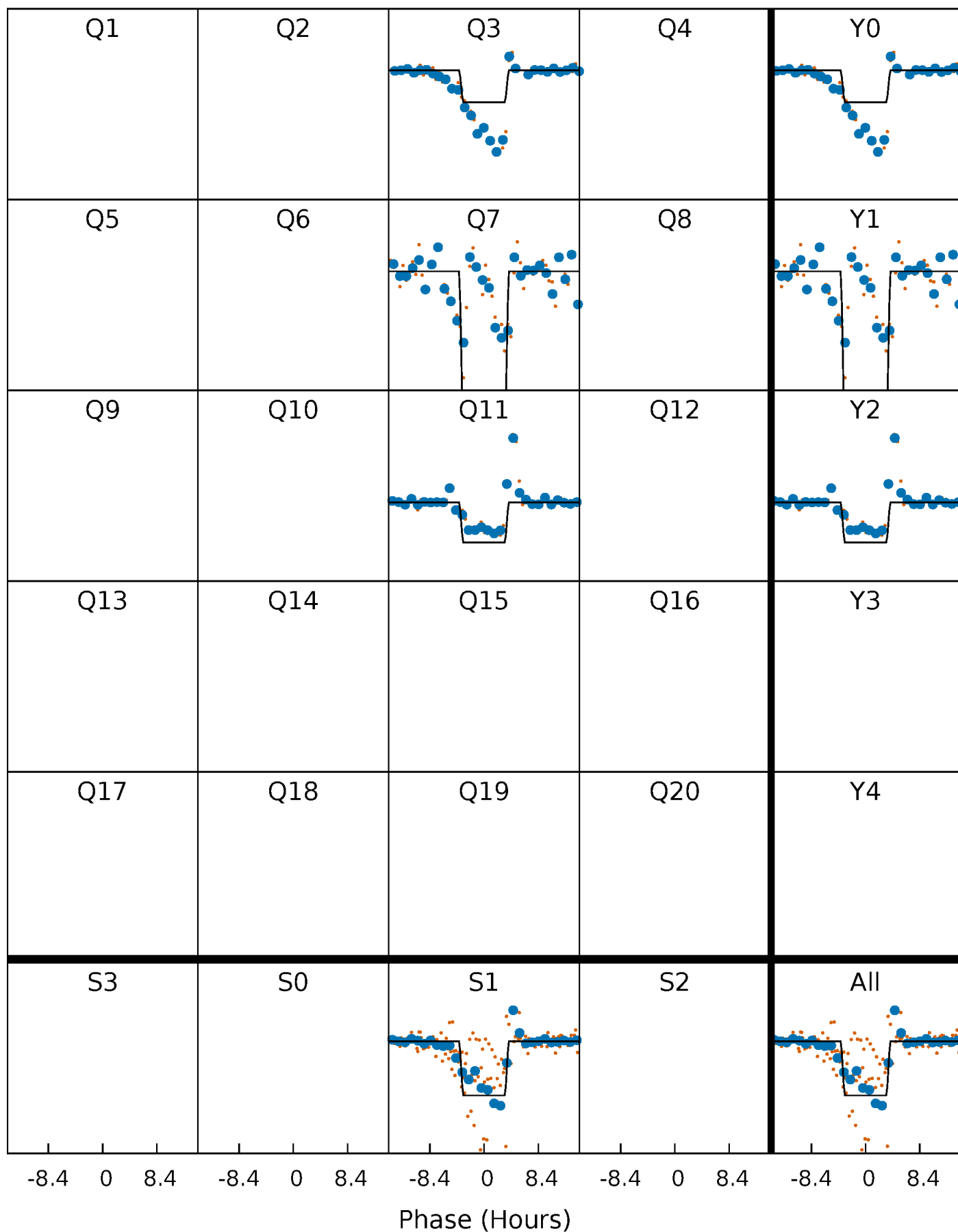
# DV Quarter-Phased Transit Curves

TCE 005455407-01     $P=405.667204$  Days     $T_0=264.234510$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

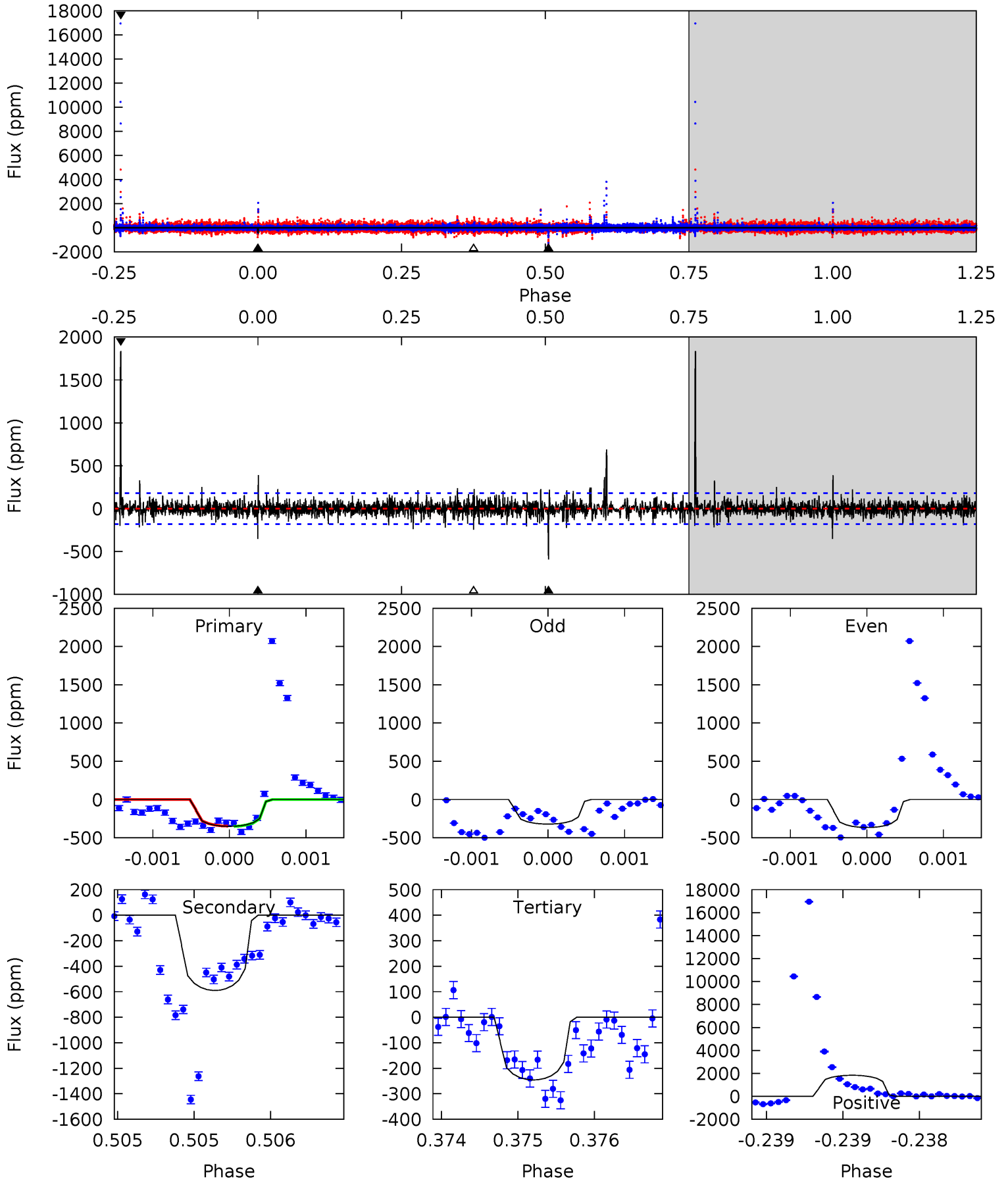
TCE 005455407-01 P=405.674278 Days  $T_0=264.191981$  (BKJD)



# DV Model-Shift Uniqueness Test

005455407-01, P = 405.667204 Days, E = 264.234510 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
10.8	18.2	7.57	56.5	5.54	3.43	2.13	3.25	-45.7	10.6	-38.4	0.52	1.07	0.76	0.07

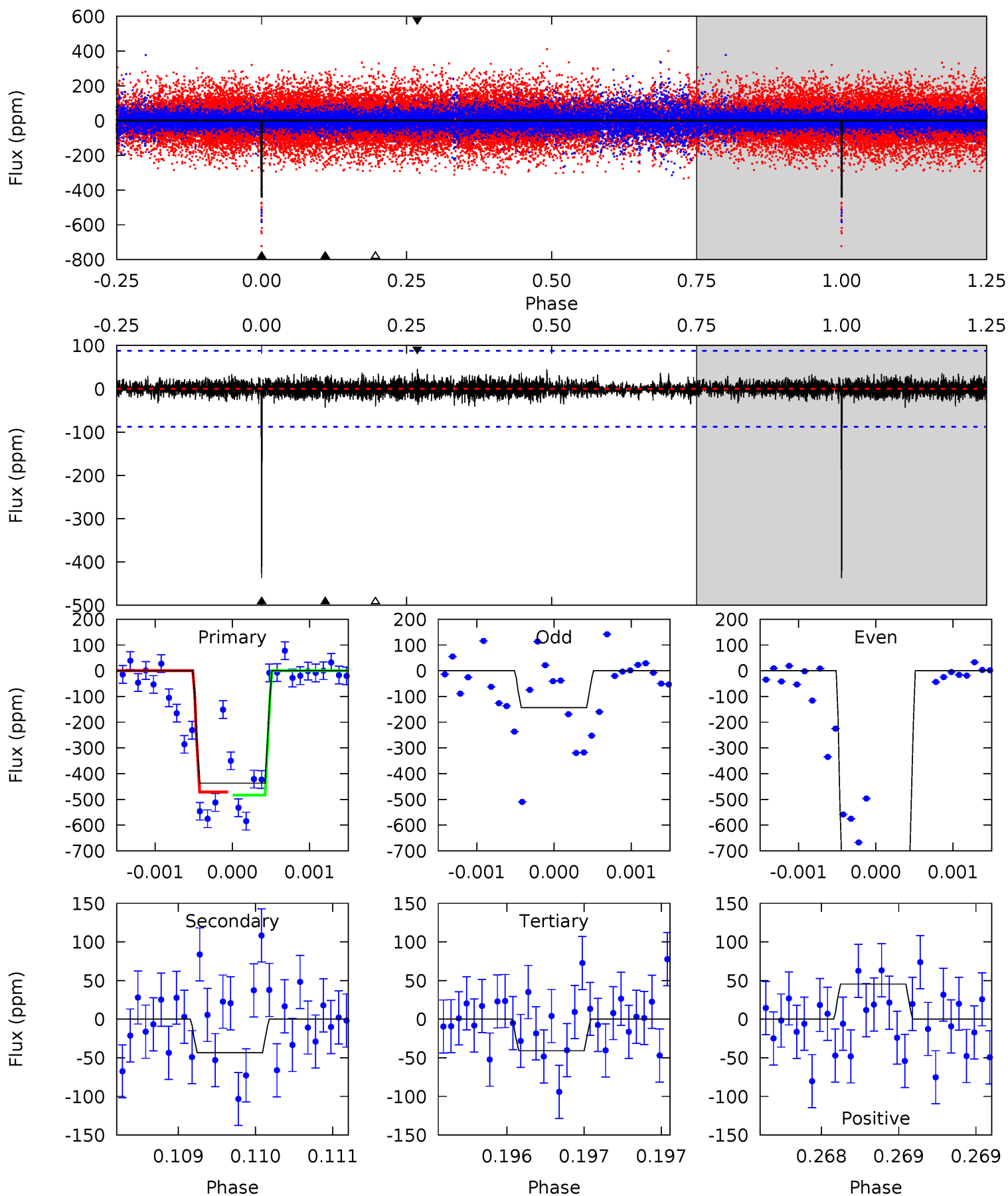




# Alt Model-Shift Uniqueness Test

005455407-01, P = 405.674278 Days, E = 264.191981 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
27.4	2.71	2.56	2.85	5.50	3.36	0.58	24.8	24.5	0.16	-0.14	30.9	1.47	0.09	0



### Stellar Parameters For KIC 005455407

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5519^{+174}_{-154}$	$3.779^{+0.712}_{-0.237}$	$-0.380^{+0.350}_{-0.250}$	$2.183^{+0.751}_{-1.394}$	$1.045^{+0.184}_{-0.225}$	$0.142^{+1.851}_{-0.088}$
	+3%/-3%	+19%/-6%	+92%/-66%	+34%/-64%	+18%/-22%	+1307%/-62%
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 005455407-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-590 \pm 32$	$4.91^{+2.67}_{-2.47}$	$476^{+56}_{-71}$	$5804^{+1816}_{-856}$	$15947^{+46023}_{-9425}$
Alt.	$-43 \pm 16$	$6.13^{+3.22}_{-2.62}$	$478^{+53}_{-80}$	$3252^{+473}_{-330}$	$729^{+1580}_{-425}$

$T_{\text{max}}$  = 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

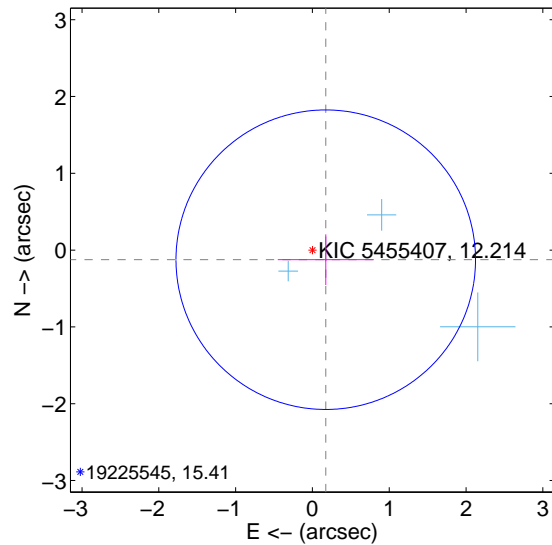
Supplemental centroid analysis for 005455407-01. Kepler magnitude: 12.21. Transit SNR 8.75

There are 3 quarters with good PRF difference image offsets

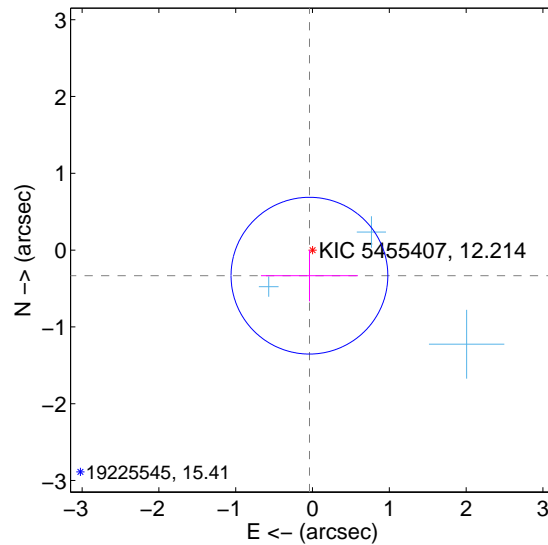
The direct PRF centroid is offset from the target star catalog position by about 0.33 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.214 \pm 0.650$	0.33	$-0.173 \pm 0.625$	$-0.125 \pm 0.330$
PRF-fit source offset from KIC position	$0.336 \pm 0.340$	0.99	$0.040 \pm 0.631$	$-0.333 \pm 0.334$
photometric centroid source offset	$0.96 \pm 0.56$	1.73	$-0.84 \pm 0.55$	$-0.47 \pm 0.57$

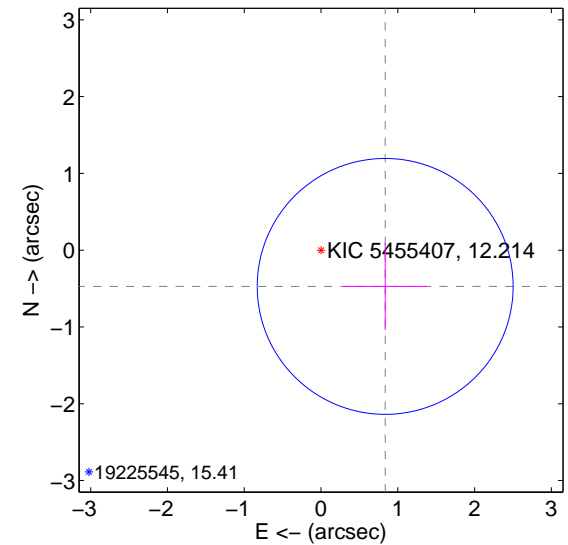
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

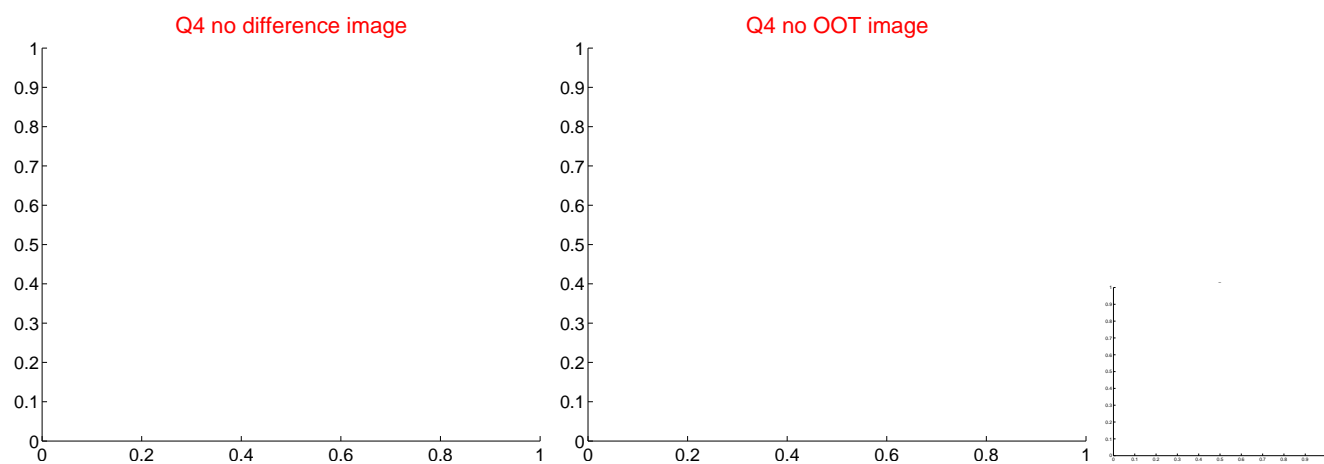
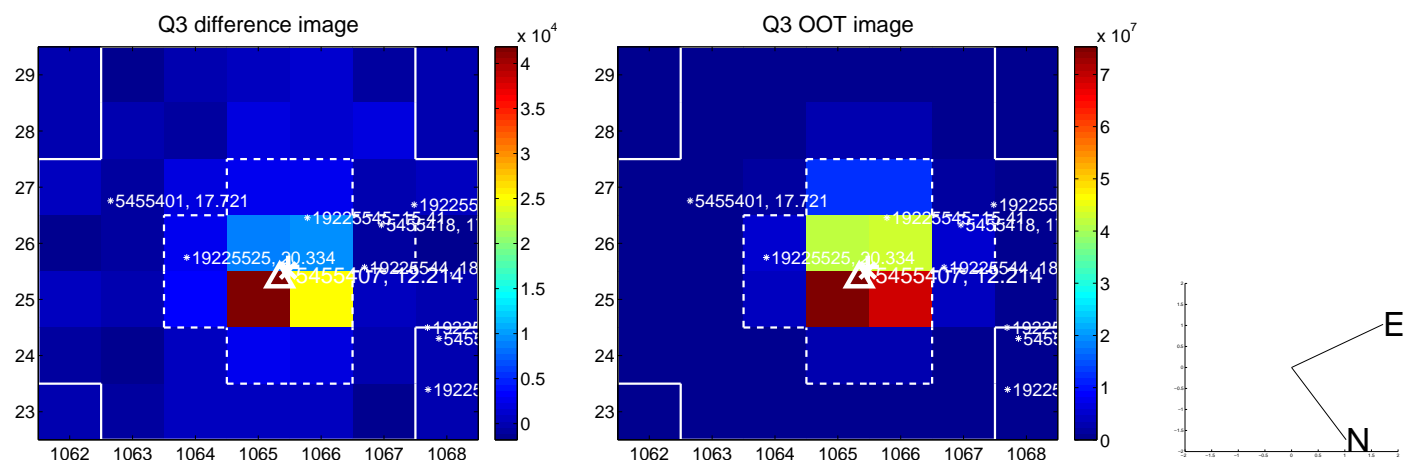
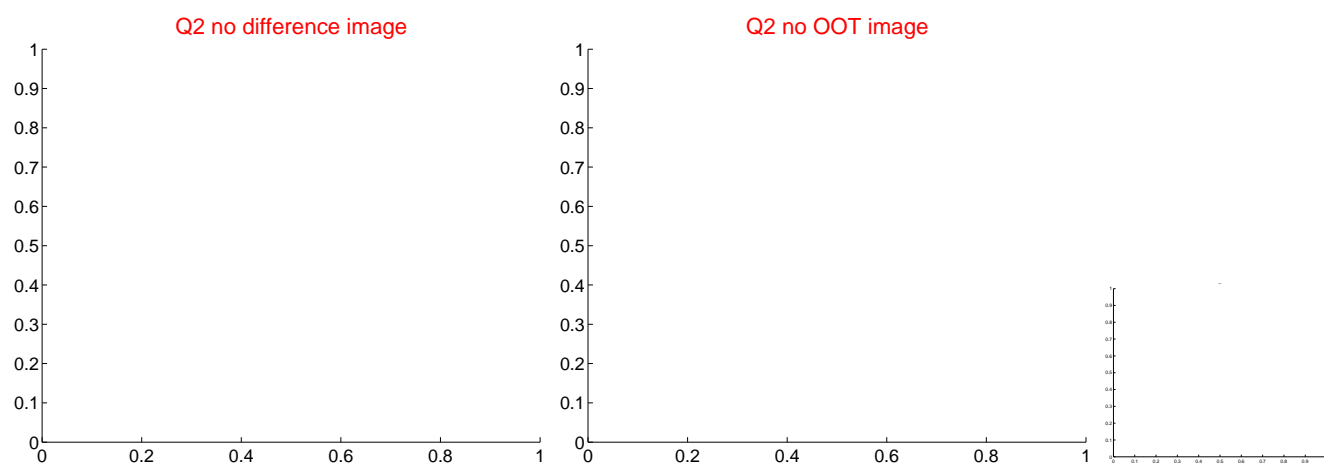
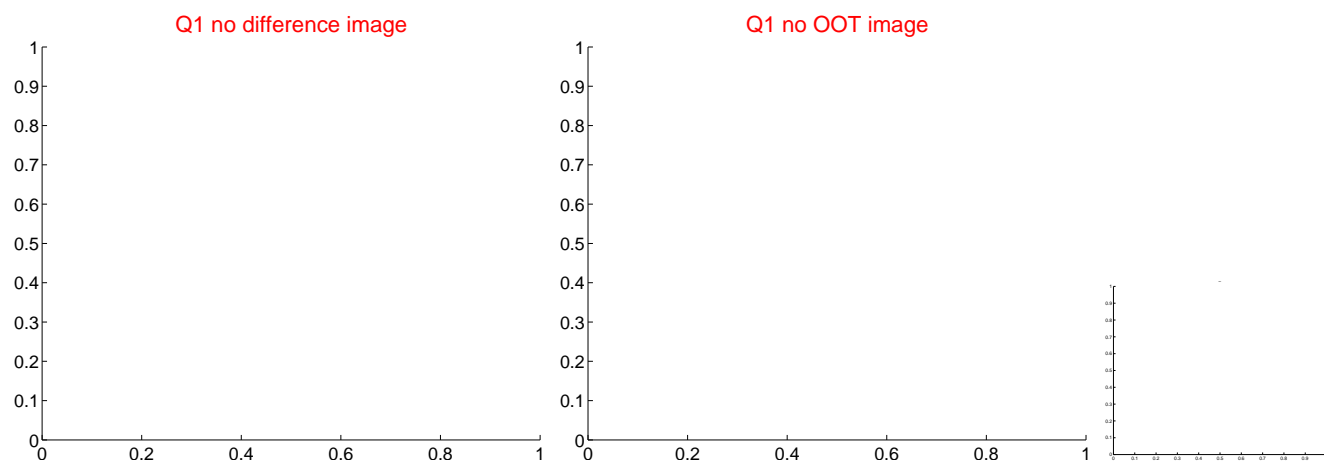


offset from photometric centroids

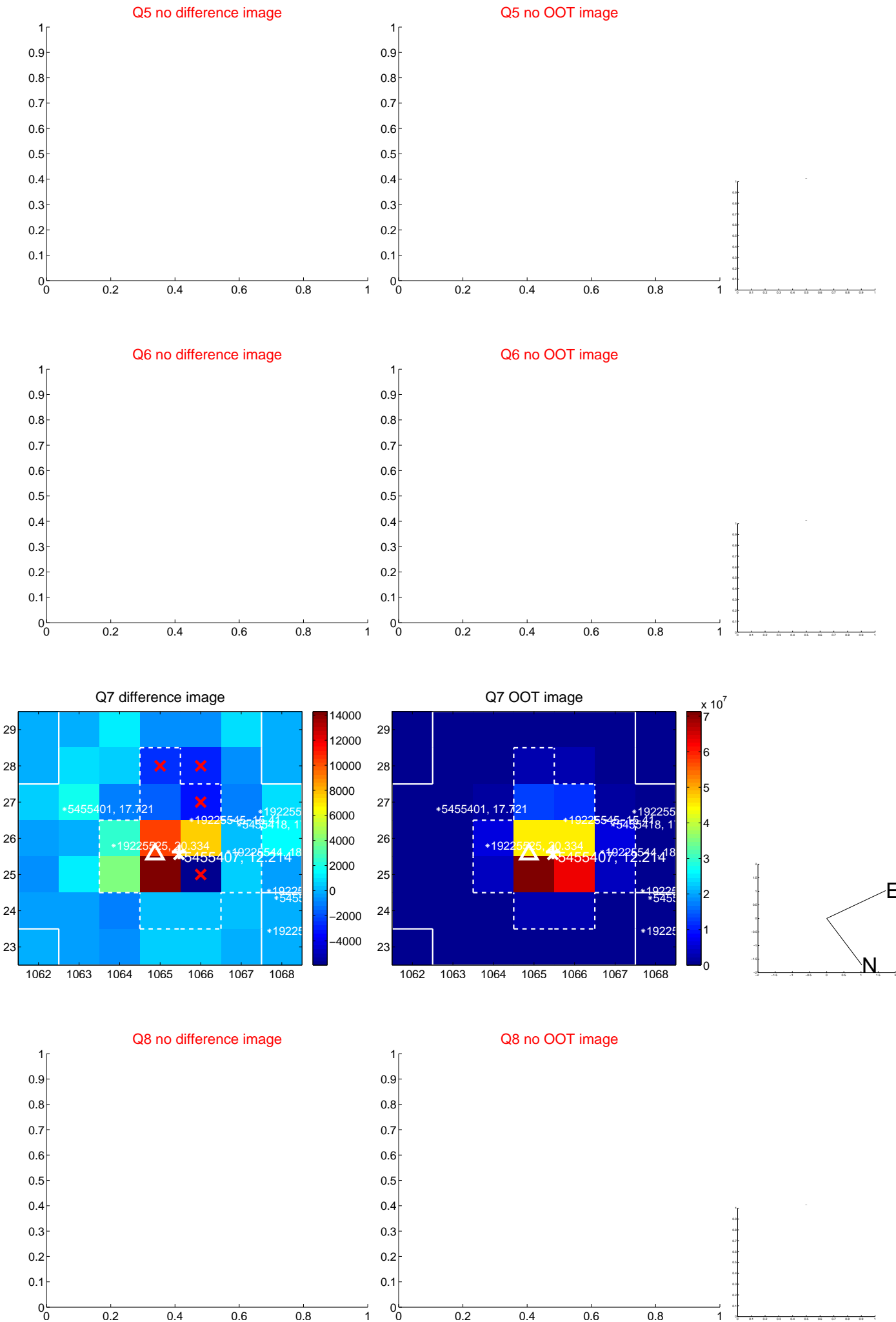


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

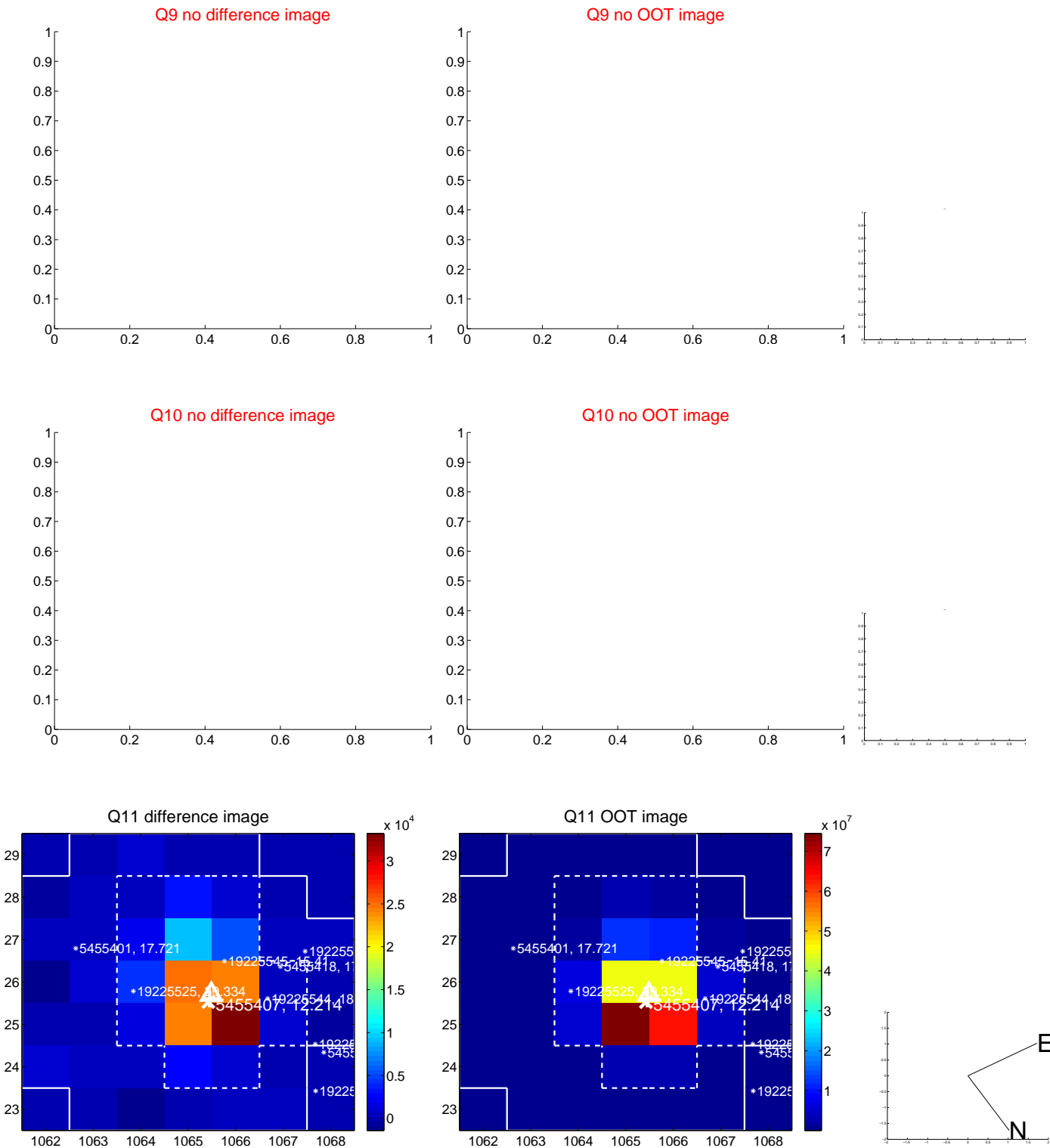
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value



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.

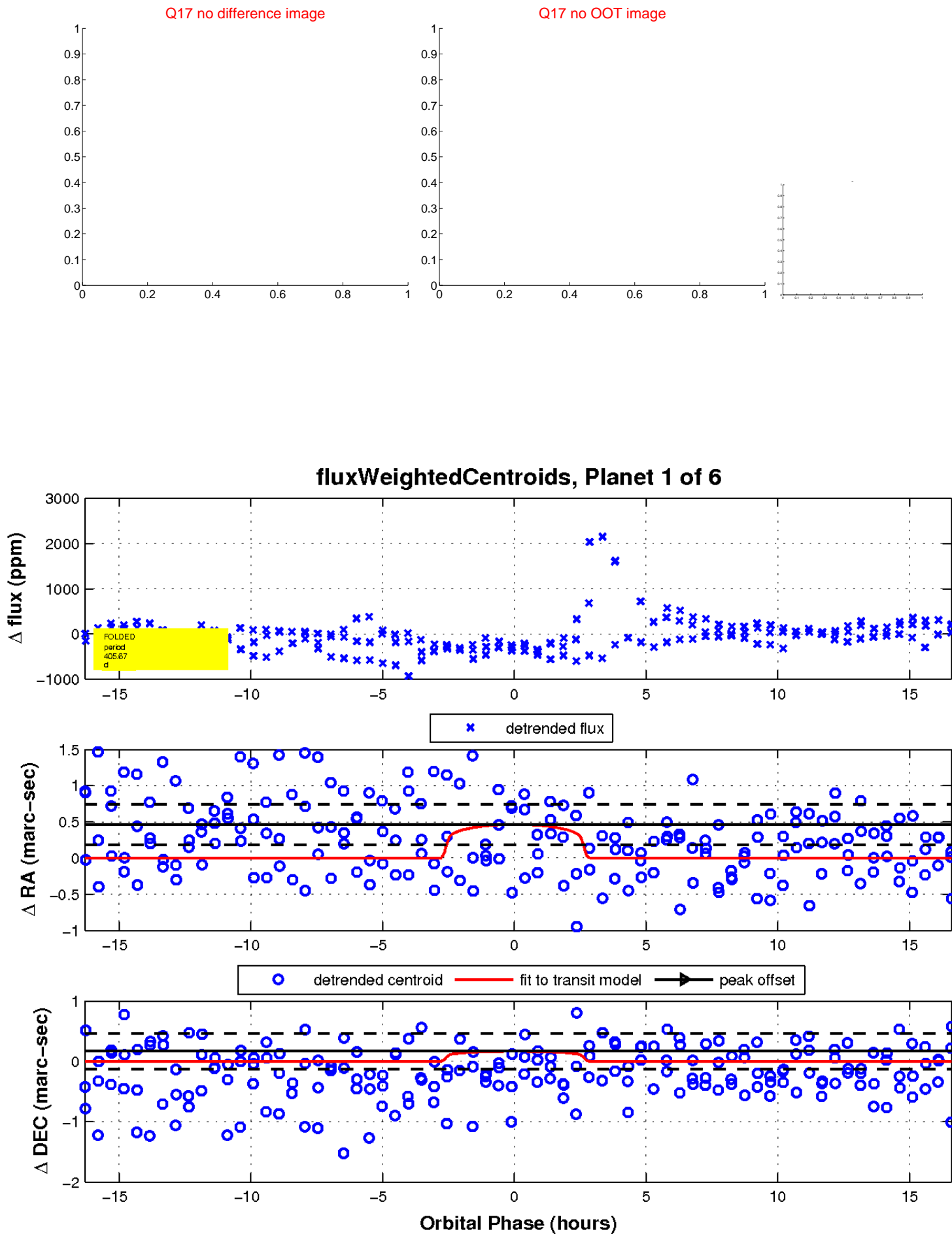


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



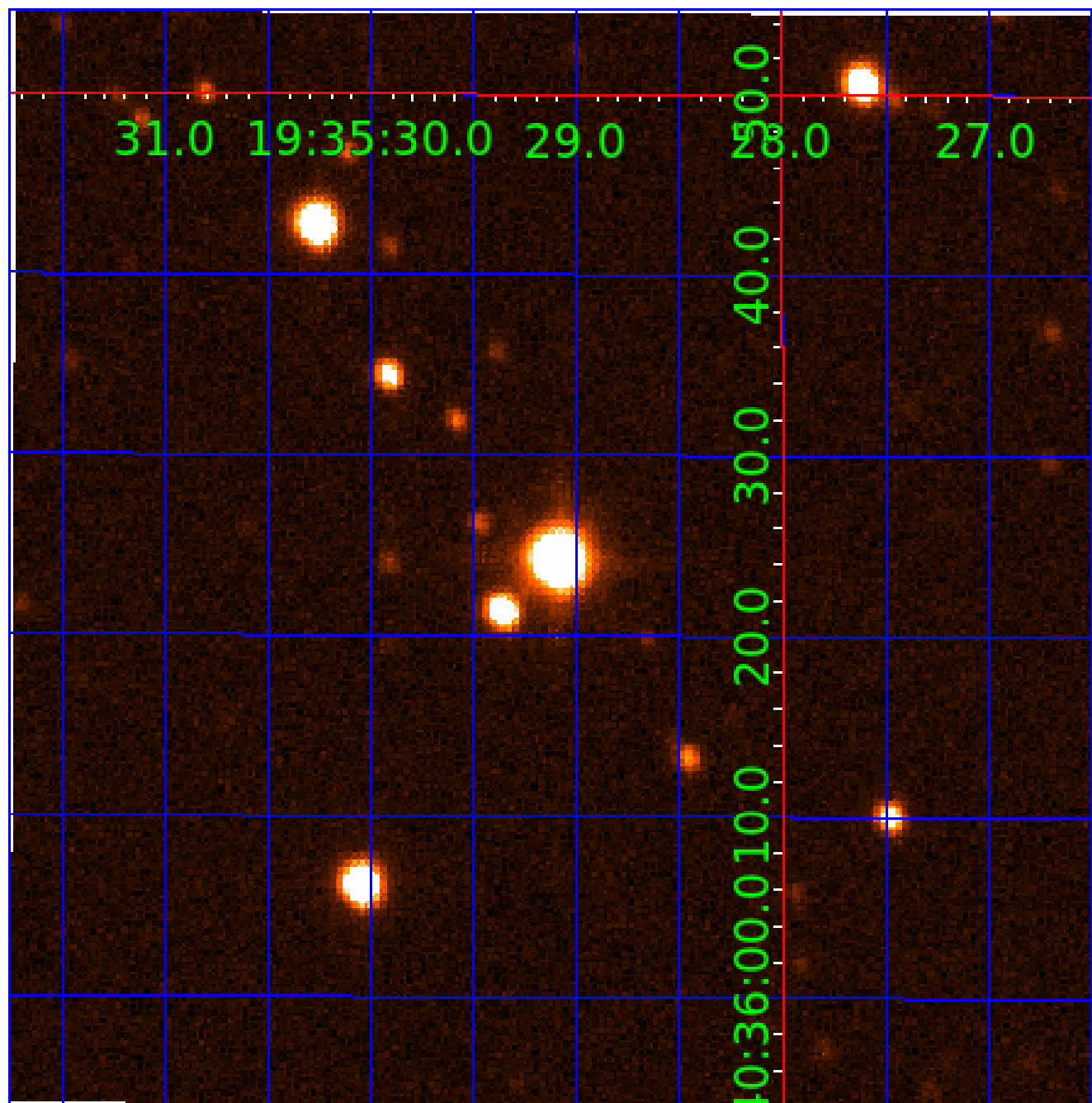


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 005455407

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005455407-01	OBS	No	405.667204	264.234509	474.1	5.540	15.8	8.7	2.18	5519	5.19	3.34
005455407-02	OBS	No	629.942151	137.531595	477.1	14.936	12.5	8.2	2.18	5519	5.01	1.86
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## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
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005455407-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005455407-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV
005455407-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV
005455407-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—INCONSISTENT_TRANS
005455407-06	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV

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

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

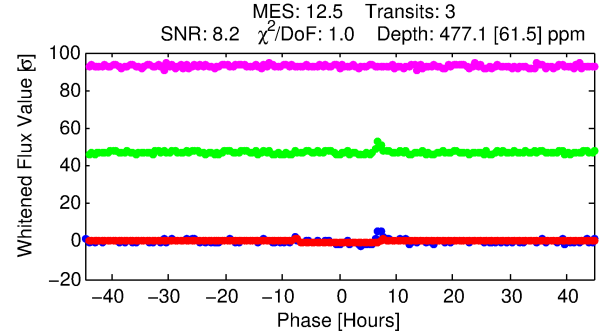
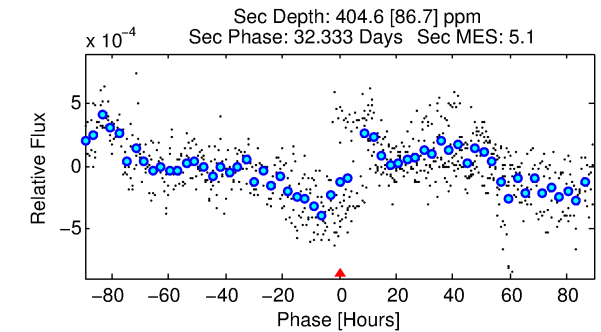
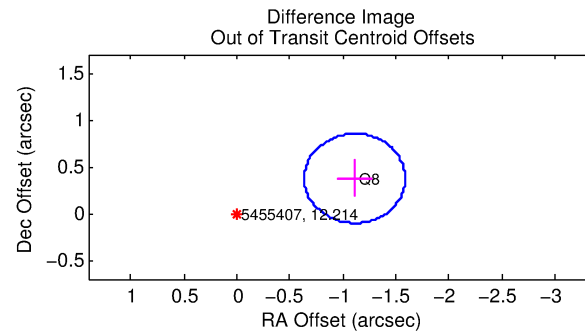
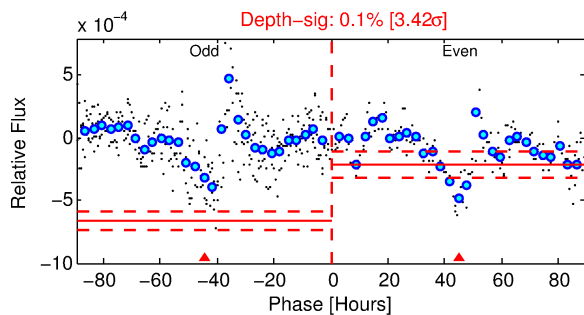
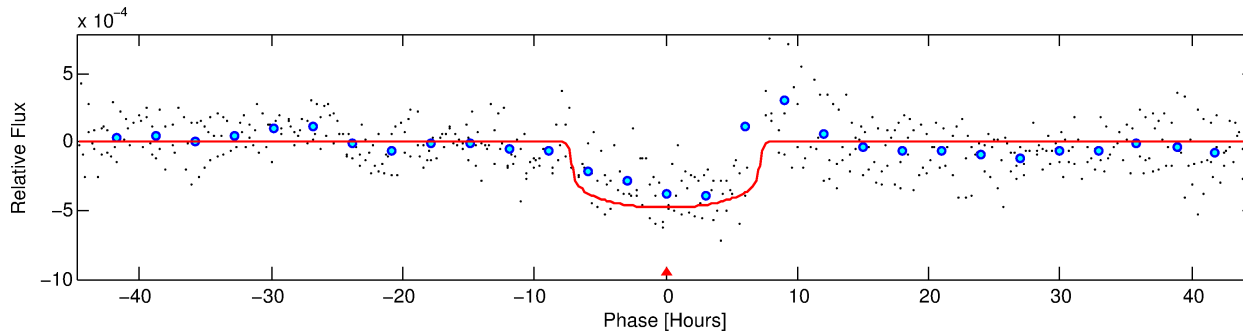
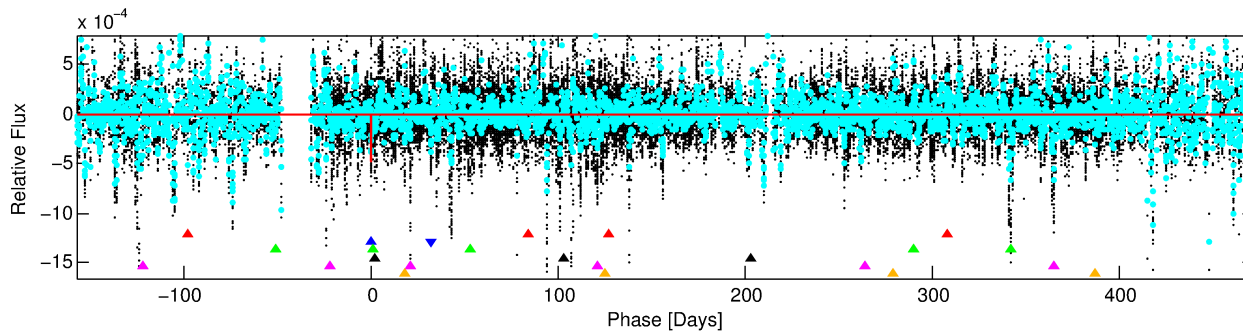
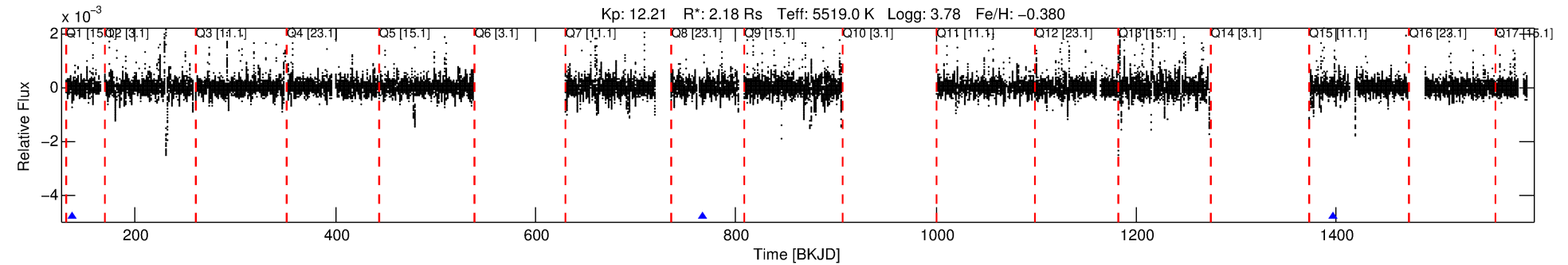
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 005455407-02

No Significant Match Found

# DV One-Page Summary

KIC: 5455407 Candidate: 2 of 6 Period: 629.942 d



## DV Fit Results:

Period = 629.94215 [0.00619] d  
Epoch = 137.5316 [0.0068] BKJD  
Rp/R\* = 0.0210 [0.0039]  
a/R\* = 255.23 [183.56]  
b = 0.64 [0.65]  
Seff = 1.86 [2.19]  
Teq = 298 [88] K  
Rp = 5.01 [3.33] Re  
a = 1.4597 [1.0112] AU  
Ag = 18897.39 [23578.10] [0.80 $\sigma$ ]  
Teffp = 5398 [599] K [8.43 $\sigma$ ]

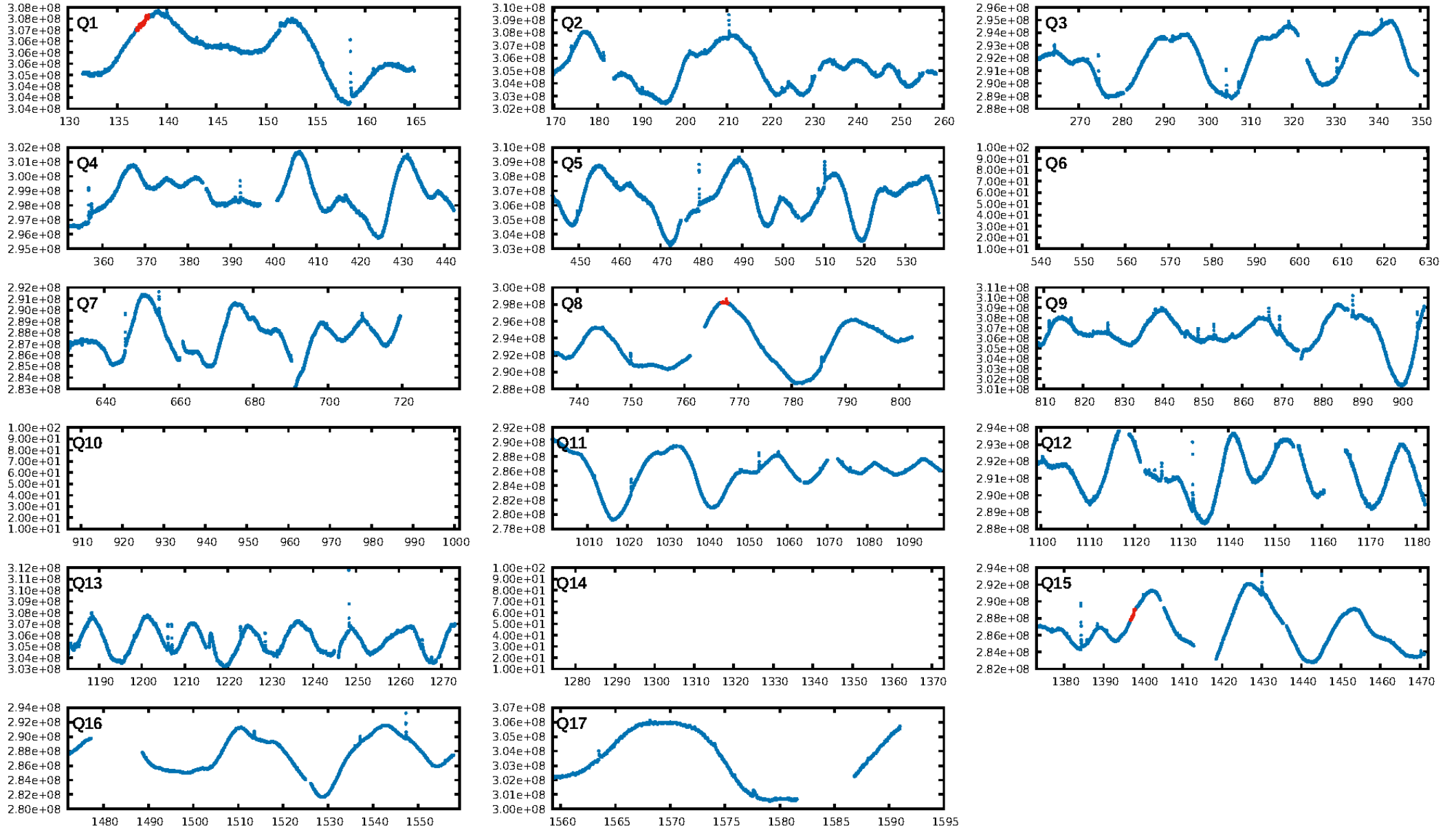
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [132.15 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 8.0%  
ModelChiSquareGof-sig: 98.8%  
**Bootstrap-pfa: 6.97e-10**  
RollingBand-fgt: 1.00 [2/2]  
**GhostDiagnostic-chr: 0.7751**  
Centroid-sig: 7.5%  
Centroid-so: 0.605 arcsec [1.50 $\sigma$ ]  
**OotOffset-rm: 1.174 arcsec [7.38 $\sigma$ ]**  
**KicOffset-rm: 1.015 arcsec [6.36 $\sigma$ ]**  
OotOffset-st: 0/0/1/0 [1]  
KicOffset-st: 0/0/1/0 [1]  
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DiffImageOverlap-fno: 0.50 [1/2]

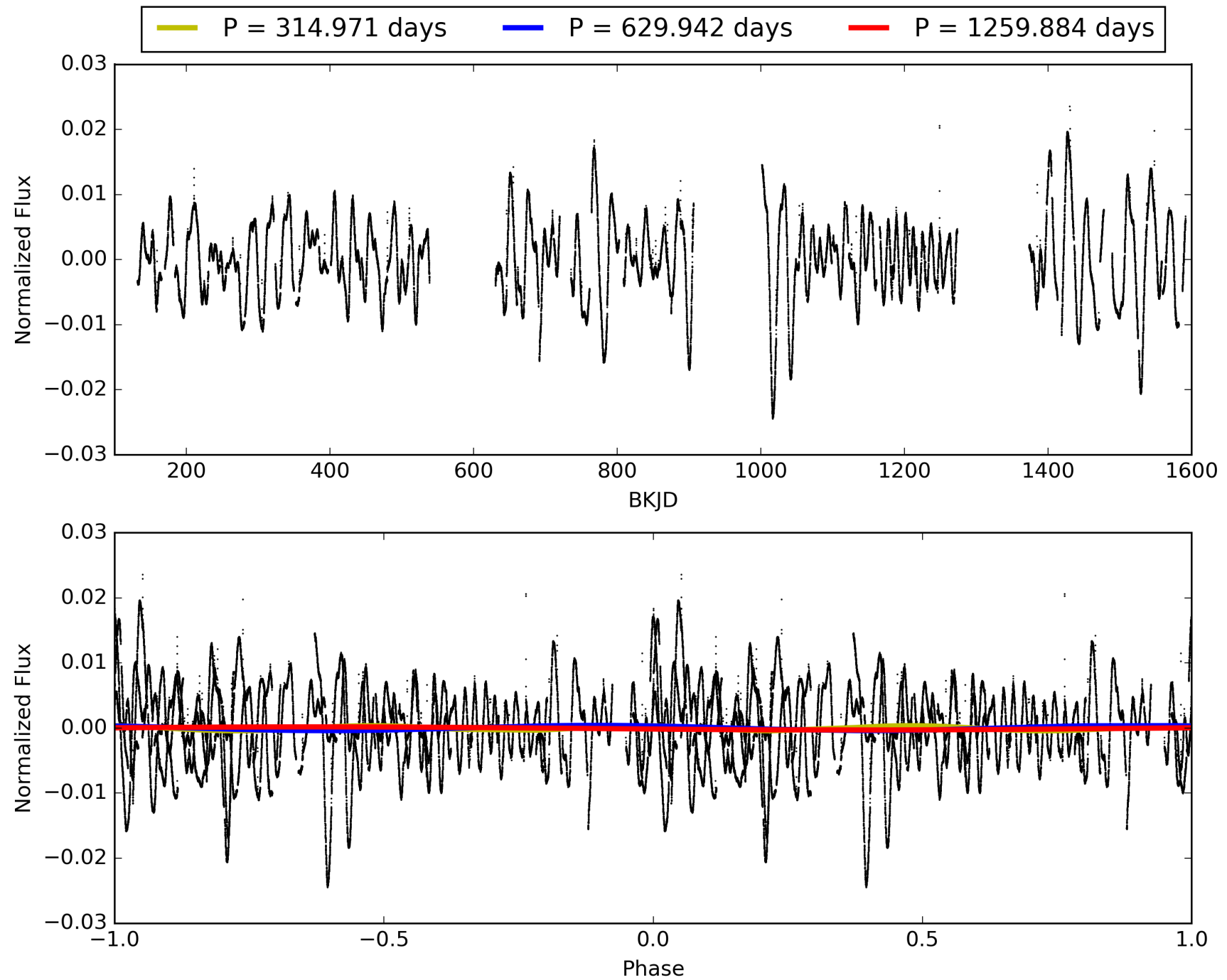
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 005455407-02, PDC Light Curves

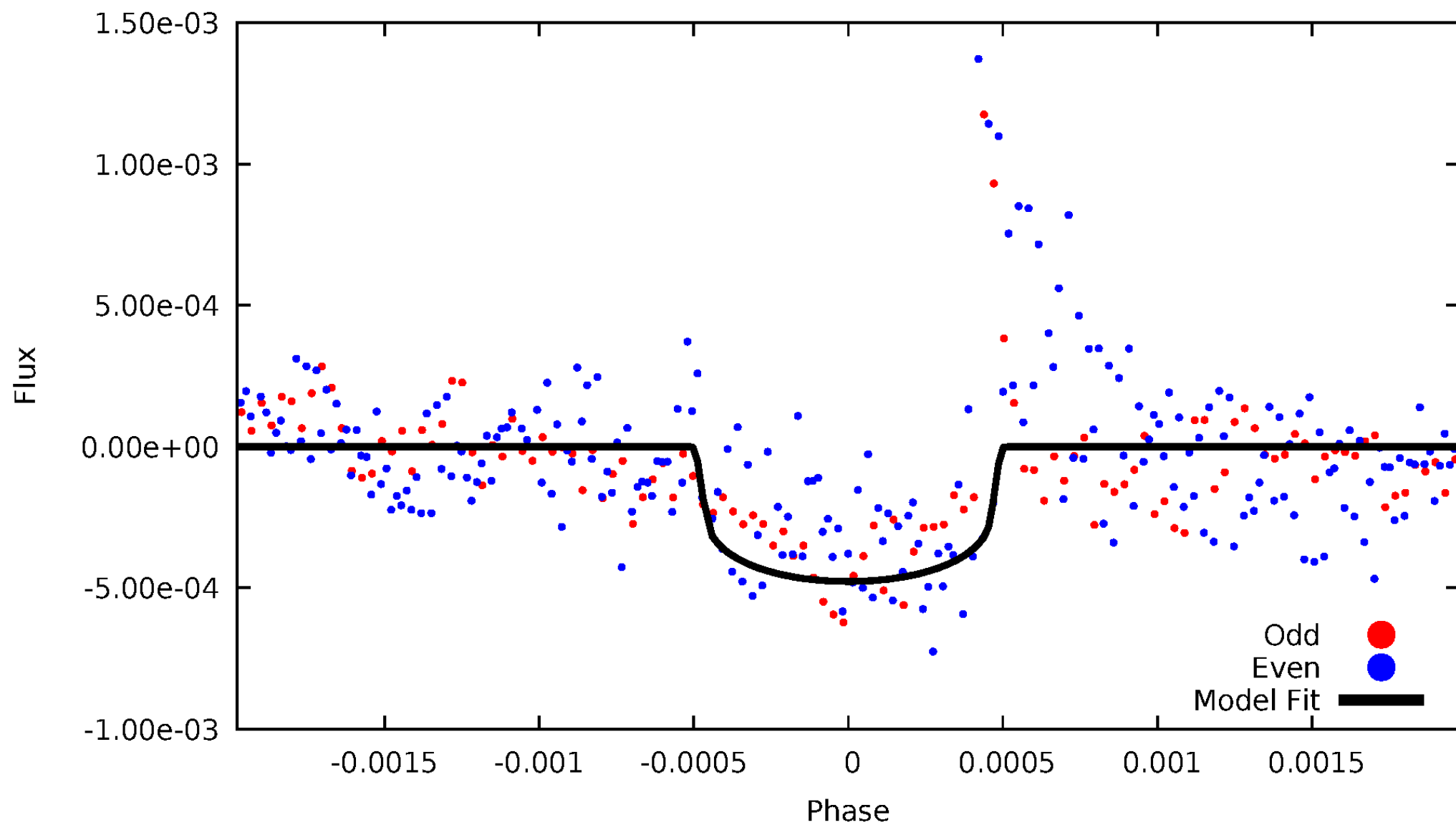


TCE 005455407-02



# DV Odd/Even

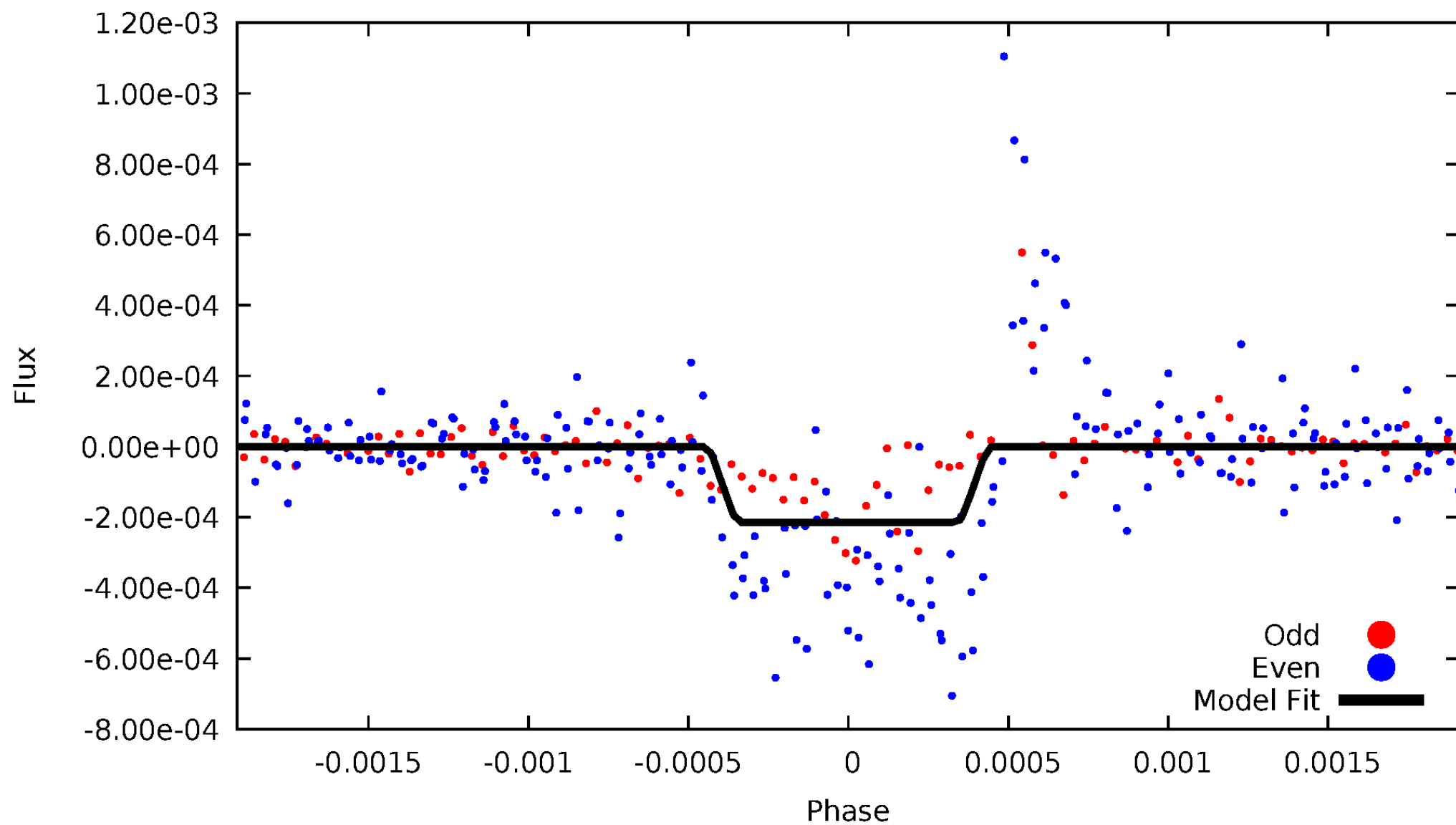
TCE 005455407-02





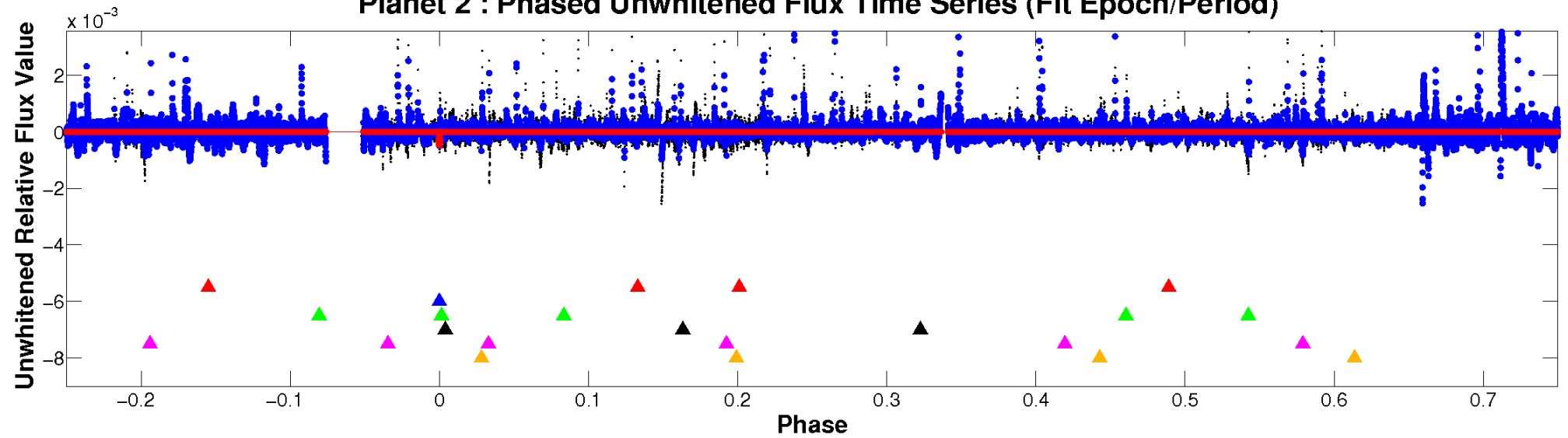
# ALT Odd/Even

TCE 005455407-02

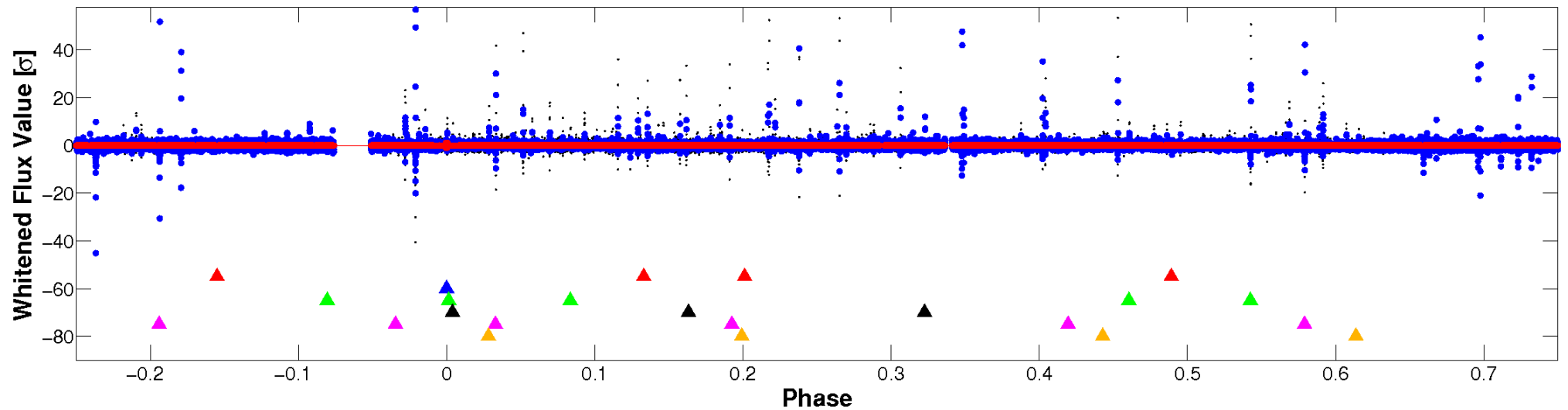


# Non-Whitened Vs. Whitened Light Curve

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

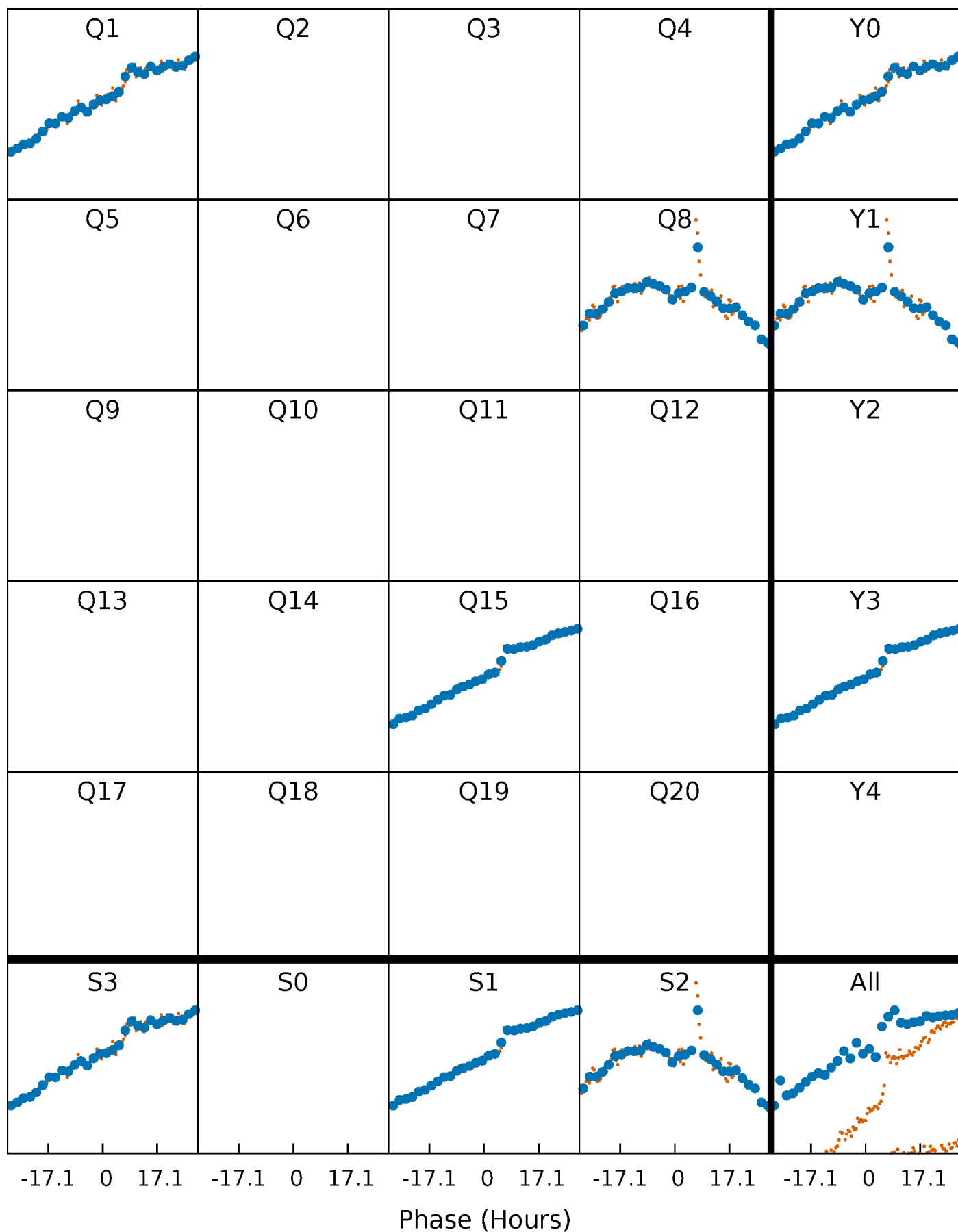


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



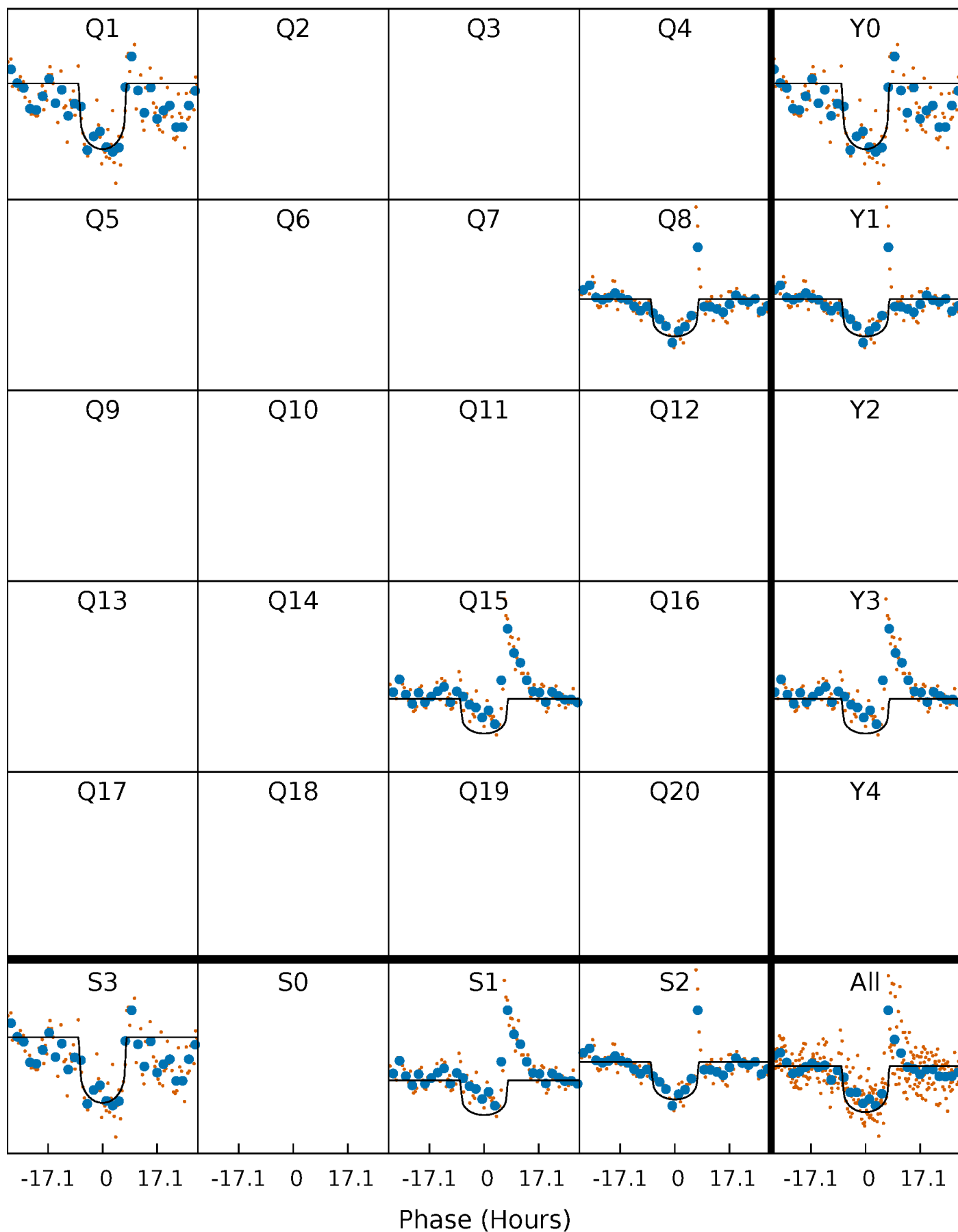
# PDC Quarter-Phased Transit Curves

TCE 005455407-02     $P=629.942151$  Days     $T_0=137.531595$  (BKJD)



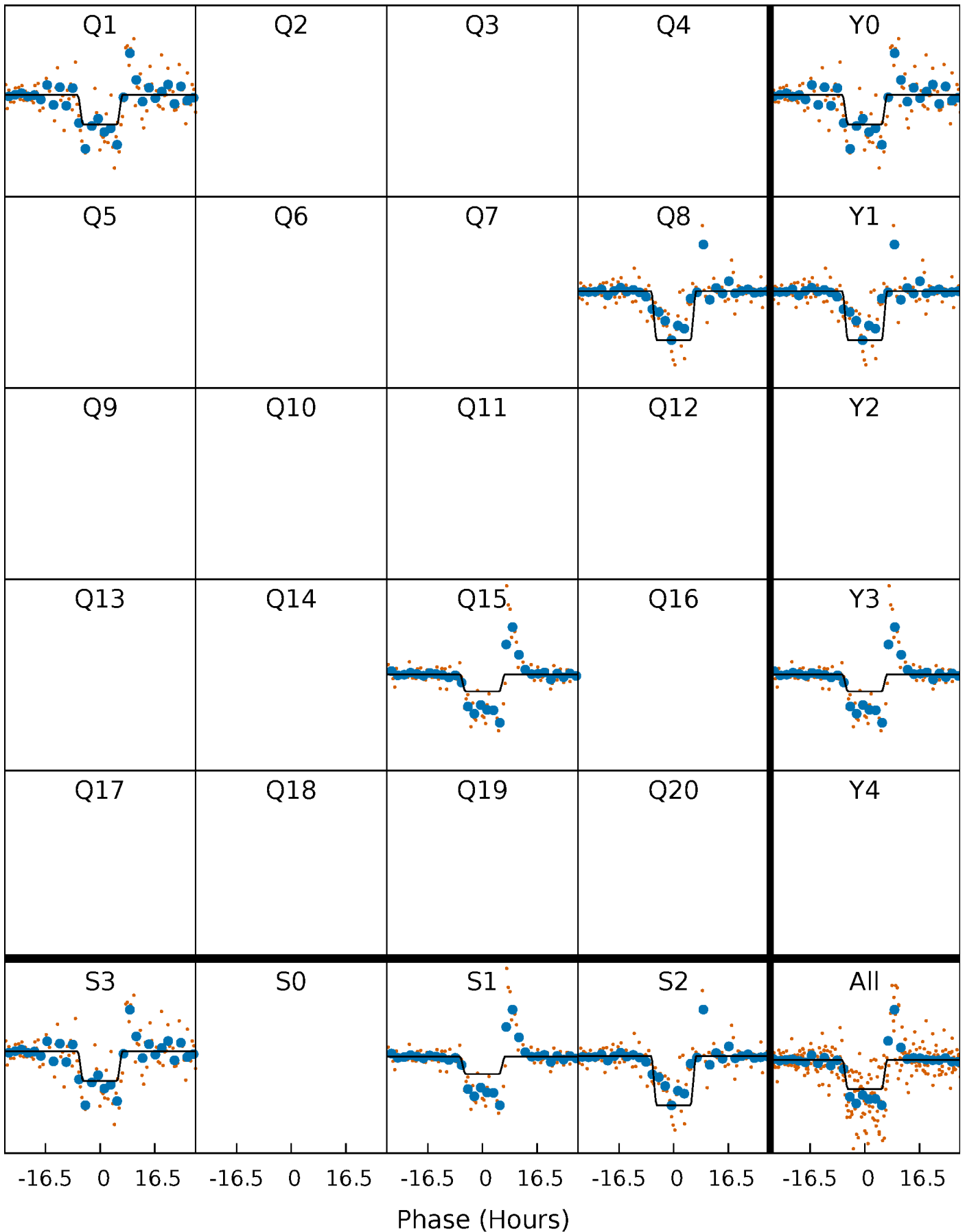
# DV Quarter-Phased Transit Curves

TCE 005455407-02     $P=629.942151$  Days     $T_0=137.531595$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

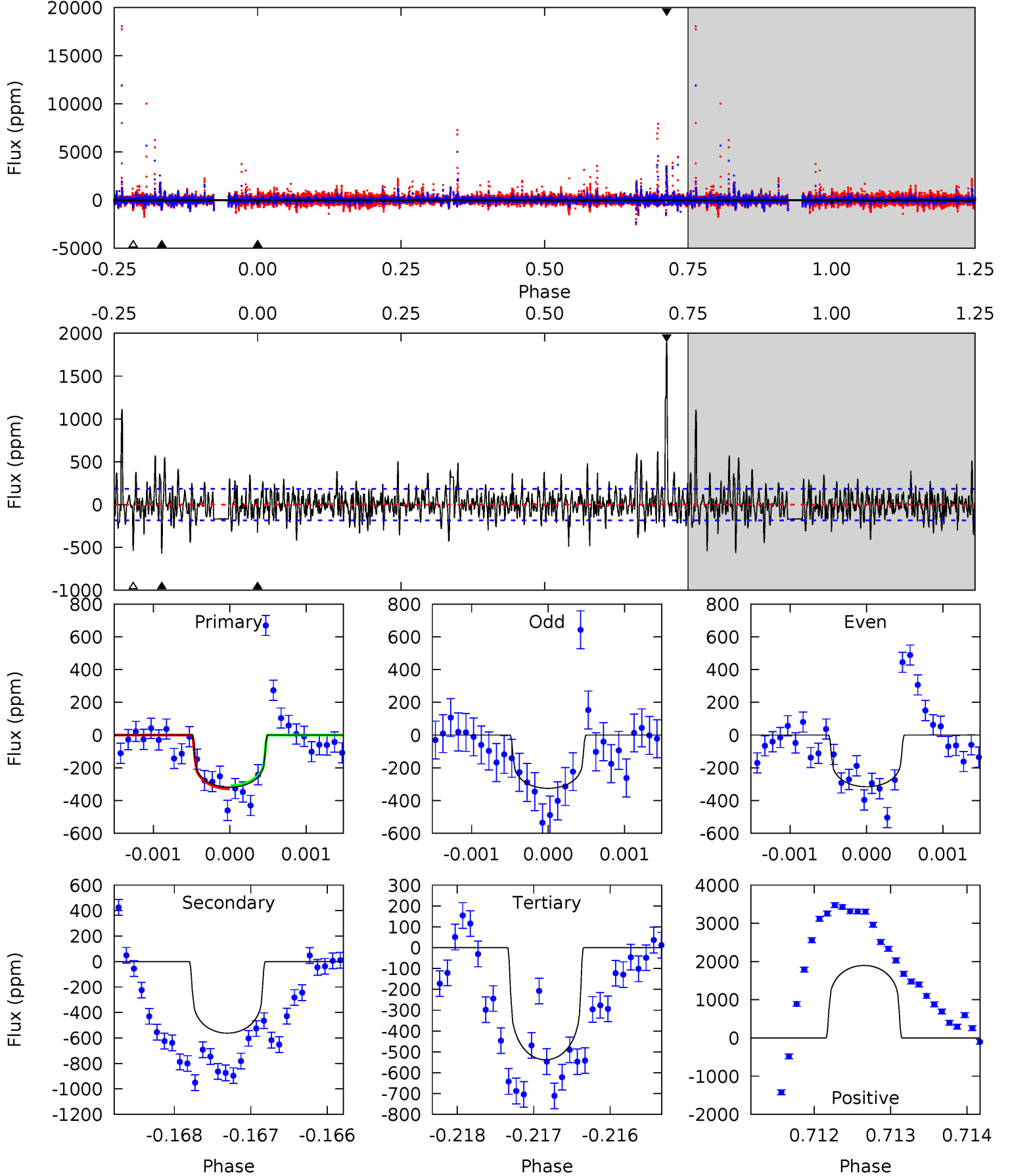
TCE 005455407-02     $P=629.925788$  Days     $T_0=137.523136$  (BKJD)



# DV Model-Shift Uniqueness Test

005455407-02, P = 629.942151 Days, E = 137.531595 Days

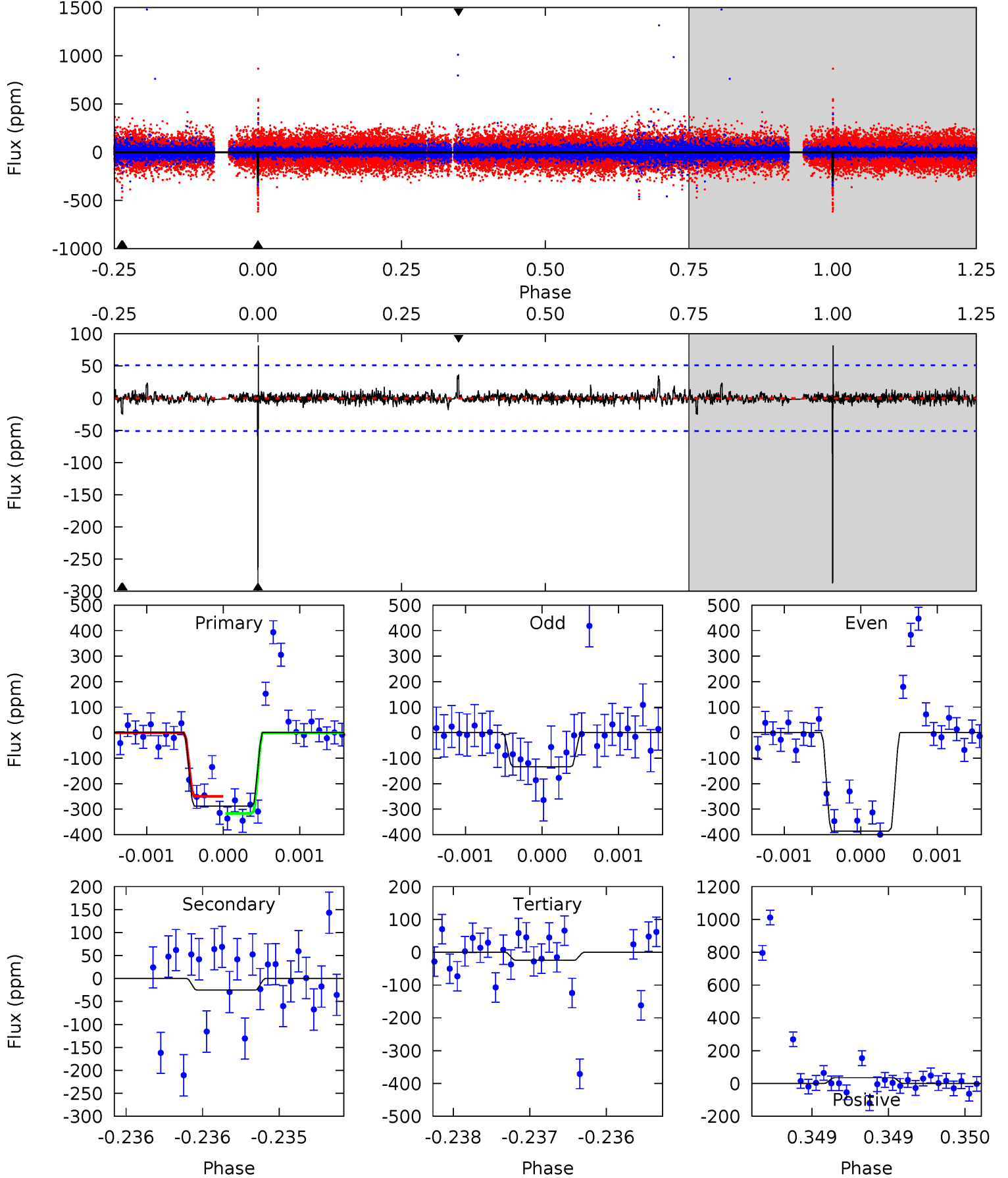
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.44	16.7	15.9	56.2	5.45	3.28	4.41	-6.50	-46.7	0.71	-39.5	0.12	0.93	0.77	0.28



# Alt Model-Shift Uniqueness Test

005455407-02, P = 629.925788 Days, E = 137.523136 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
30.9	2.72	2.65	3.80	5.47	3.33	0.49	28.2	27.1	0.07	-1.08	13.1	1.04	0.22	3.49





### Stellar Parameters For KIC 005455407

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5519^{+174}_{-154}$	$3.779^{+0.712}_{-0.237}$	$-0.380^{+0.350}_{-0.250}$	$2.183^{+0.751}_{-1.394}$	$1.045^{+0.184}_{-0.225}$	$0.142^{+1.851}_{-0.088}$
	+3%/-3%	+19%/-6%	+92%/-66%	+34%/-64%	+18%/-22%	+1307%/-62%
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 005455407-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-562 \pm 34$	$4.69^{+1.52}_{-1.53}$	$411^{+44}_{-65}$	$5858^{+648}_{-473}$	$29833^{+34961}_{-12937}$
Alt.	$-25 \pm 9$	$3.29^{+1.31}_{-1.29}$	$412^{+43}_{-70}$	$3616^{+466}_{-332}$	$2634^{+4646}_{-1517}$

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

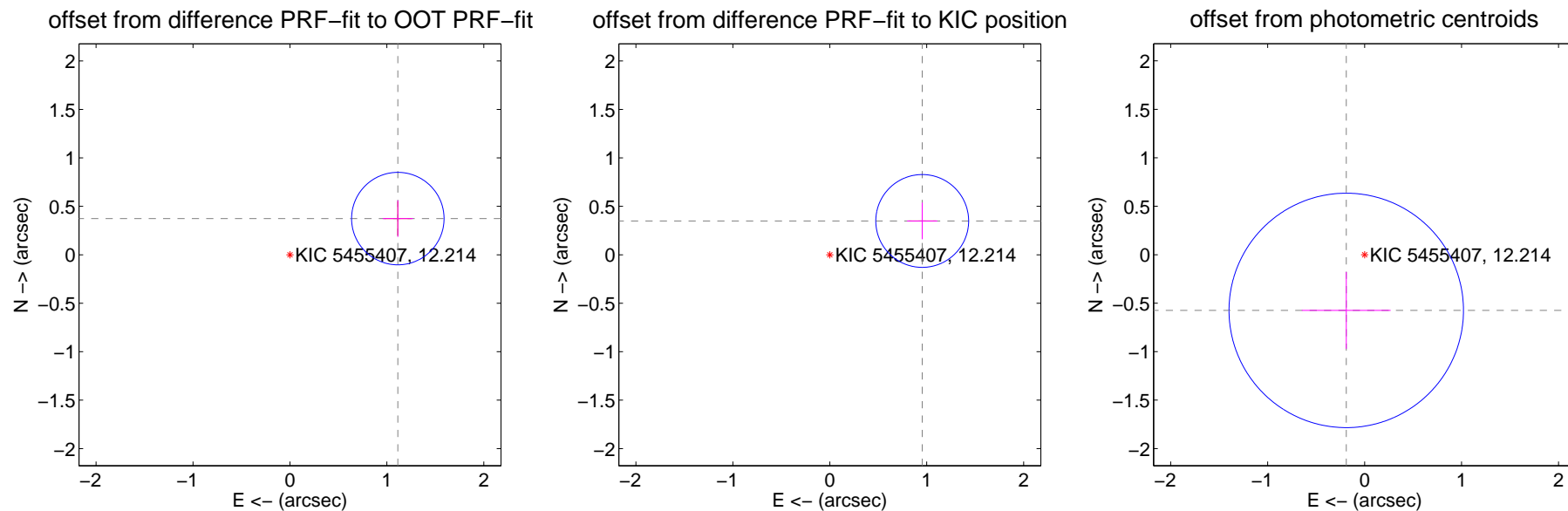
## DV Centroid Data

Supplemental centroid analysis for 005455407-02. Kepler magnitude: 12.21. Transit SNR 8.16

There are 0 quarters with good PRF difference image offsets

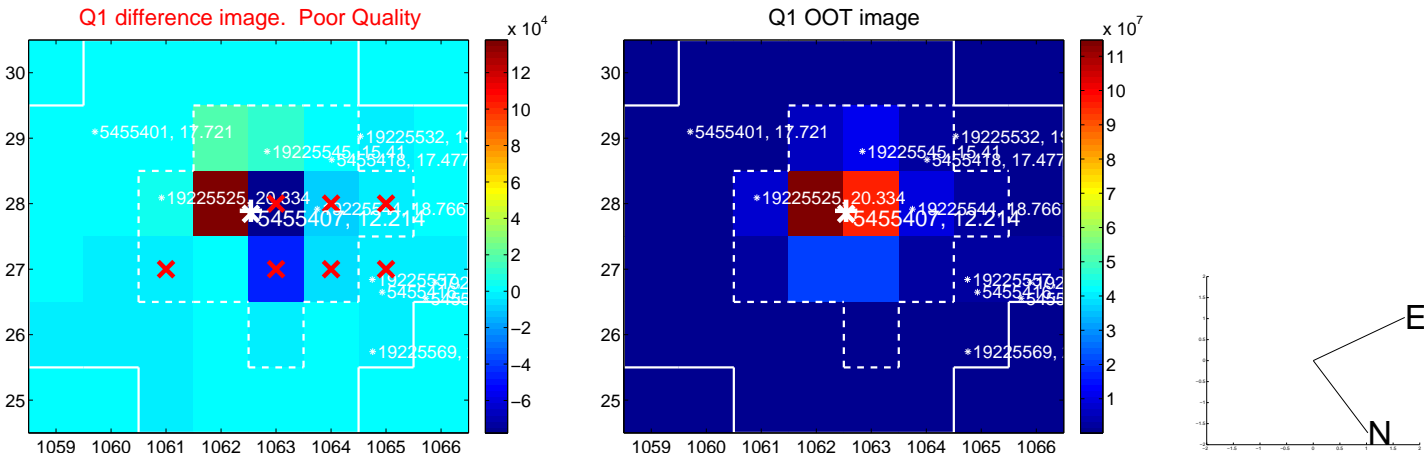
The direct PRF centroid is offset from the target star catalog position by about 0.16 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.174 \pm 0.159$	7.38	$-1.113 \pm 0.155$	$0.373 \pm 0.189$
PRF-fit source offset from KIC position	$1.015 \pm 0.160$	6.36	$-0.954 \pm 0.155$	$0.349 \pm 0.189$
photometric centroid source offset	$0.60 \pm 0.40$	1.50	$0.19 \pm 0.46$	$-0.57 \pm 0.40$

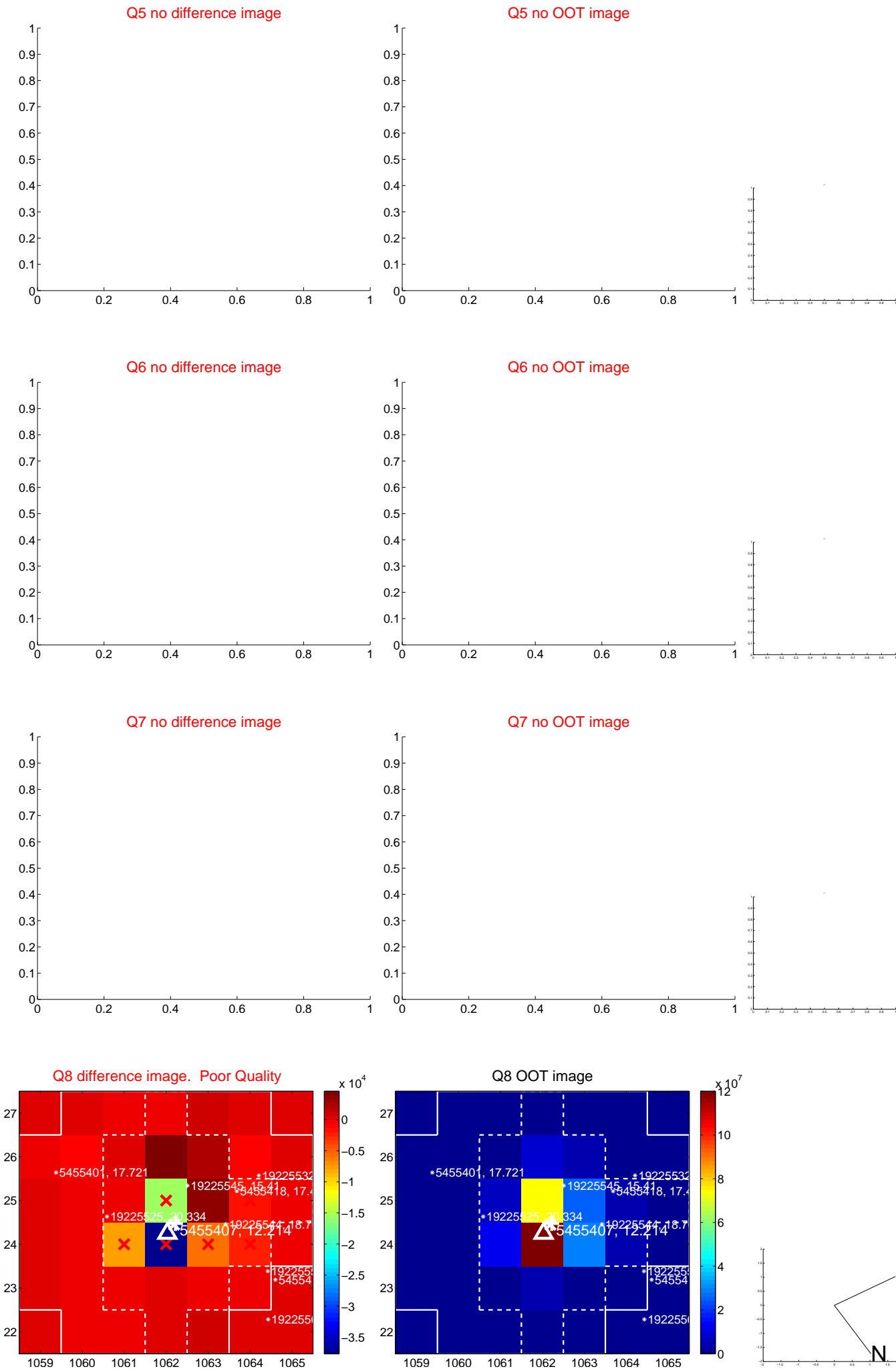


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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



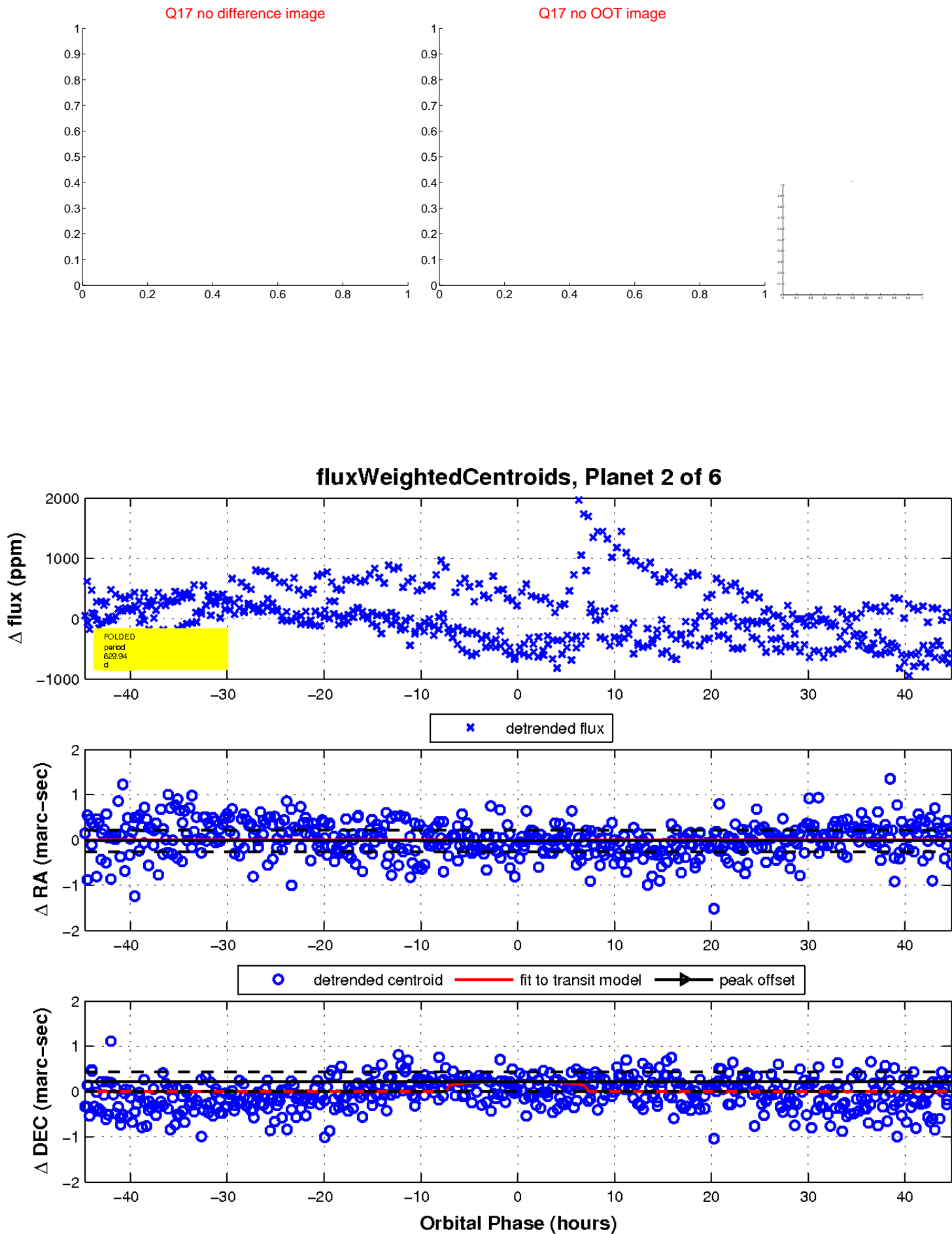
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

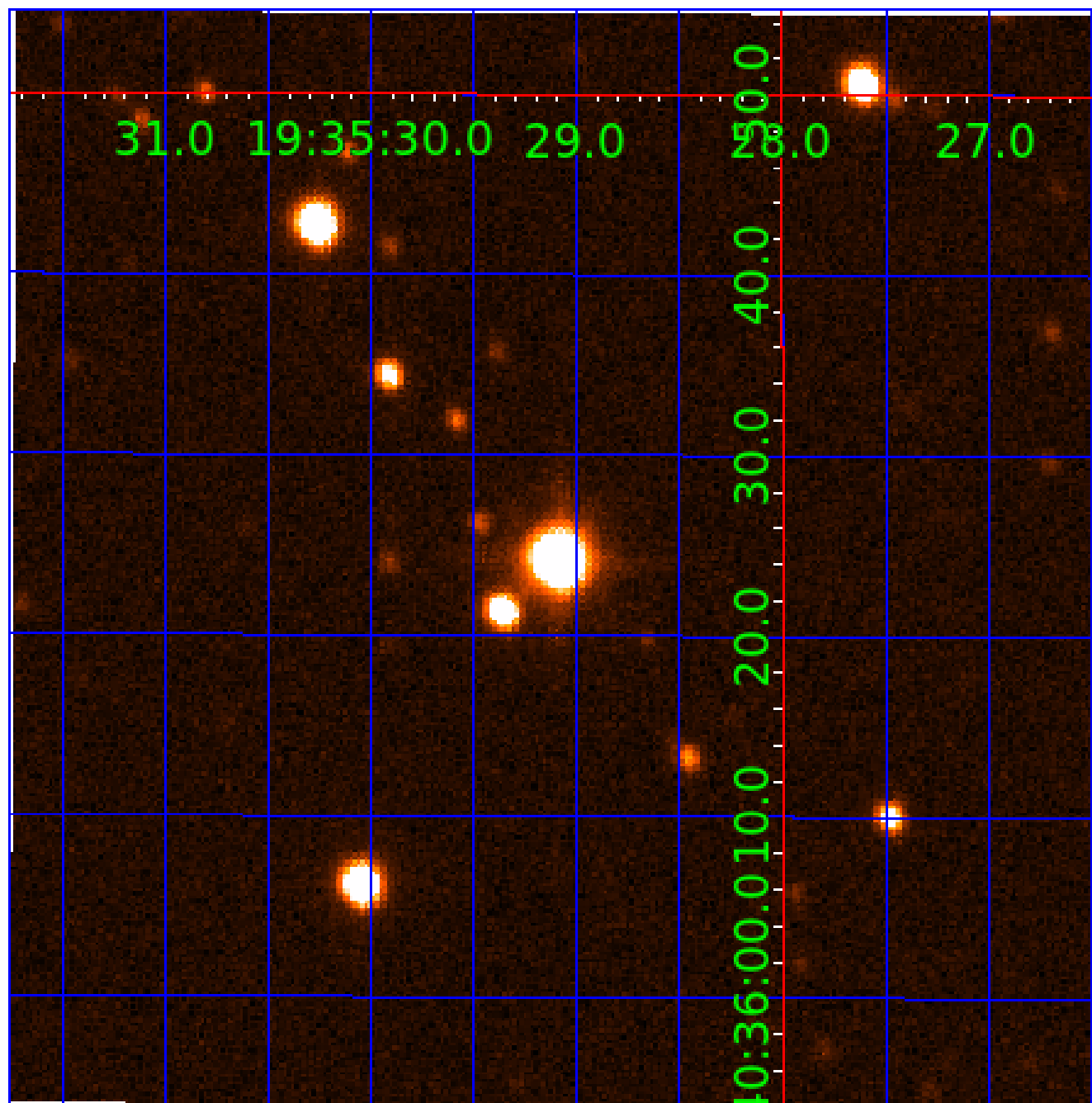


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 005455407

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005455407-01	OBS	No	405.667204	264.234509	474.1	5.540	15.8	8.7	2.18	5519	5.19	3.34
005455407-02	OBS	No	629.942151	137.531595	477.1	14.936	12.5	8.2	2.18	5519	5.01	1.86
005455407-03	OBS	No	289.137237	190.110722	378.6	9.816	12.7	6.9	2.18	5519	4.48	5.25
005455407-04	OBS	No	529.596497	340.722578	344.9	10.441	10.9	6.1	2.18	5519	4.35	2.34
005455407-05	OBS	No	243.480546	158.300050	350.6	8.873	9.5	8.0	2.18	5519	4.13	6.60
005455407-06	OBS	No	368.806760	416.475967	509.8	14.882	8.8	8.9	2.18	5519	6.01	3.80

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005455407-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS
005455407-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005455407-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV
005455407-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV
005455407-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—INCONSISTENT_TRANS
005455407-06	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV

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

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

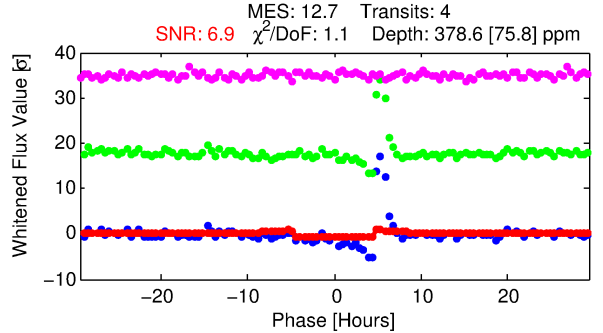
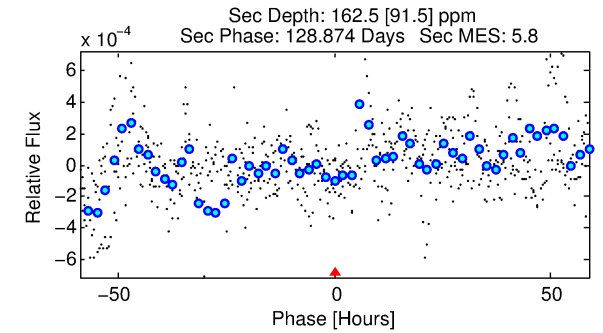
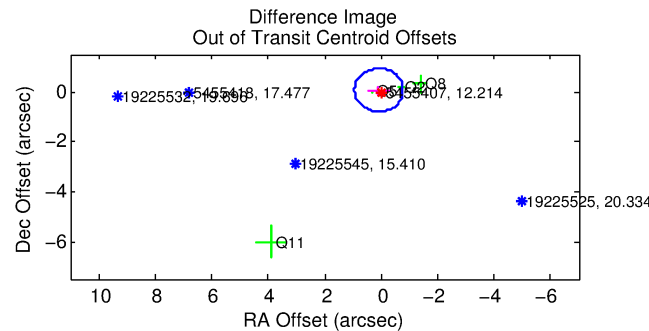
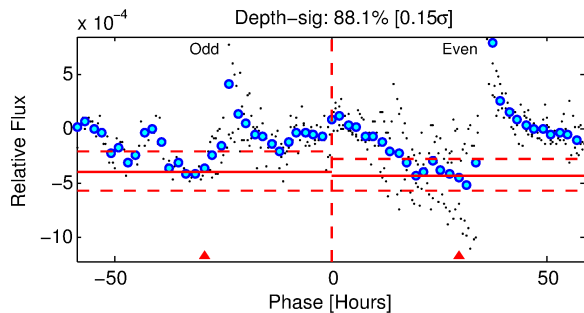
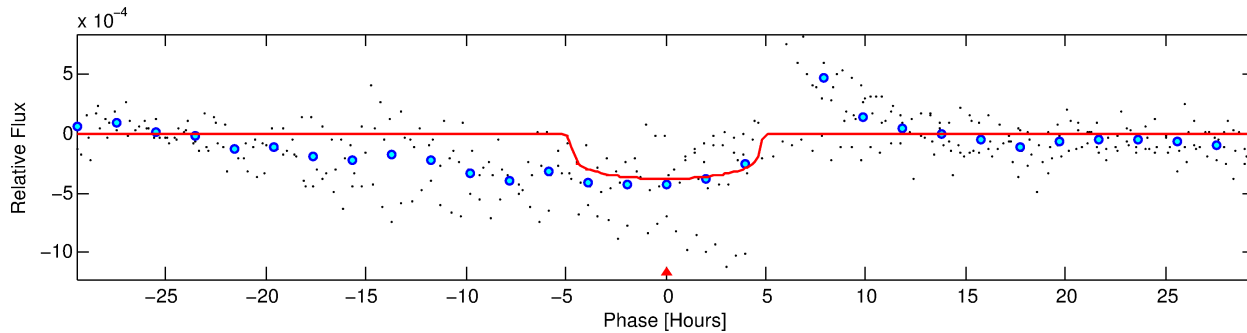
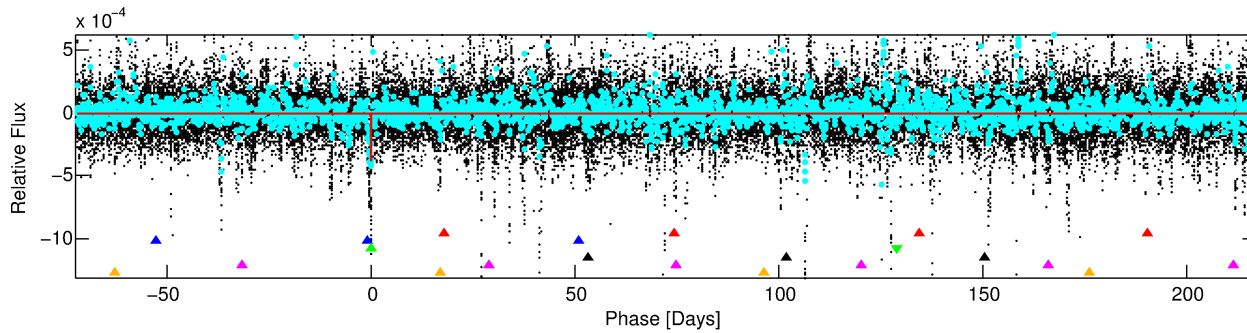
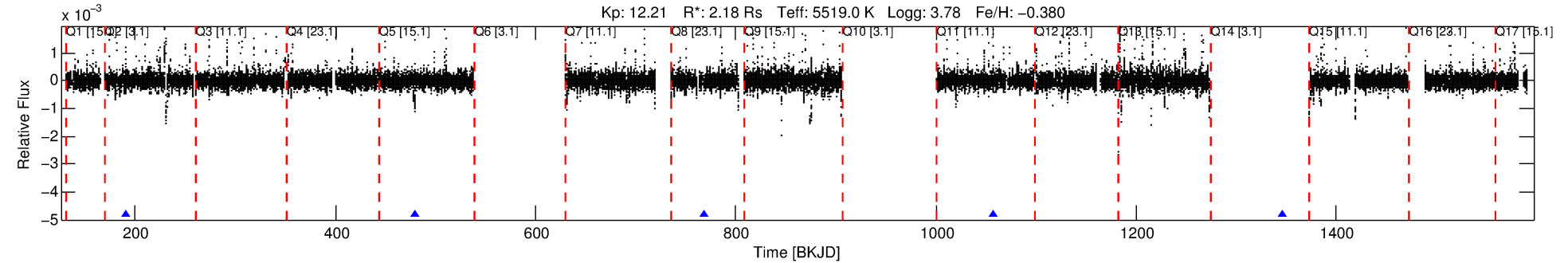
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 005455407-03

No Significant Match Found

# DV One-Page Summary

KIC: 5455407 Candidate: 3 of 6 Period: 289.137 d



## DV Fit Results:

Period = 289.13724 [0.00652] d  
Epoch = 190.1107 [0.0117] BKJD  
Rp/R\* = 0.0188 [0.0098]  
a/R\* = 174.90 [379.37]  
b = 0.66 [1.88]  
Seff = 5.25 [6.19]  
Teq = 386 [114] K  
Rp = 4.48 [3.69] Re  
a = 0.8686 [0.6017] AU  
Ag = 3360.89 [5599.89] [0.60σ]  
Teffp = 4544 [1352] K [3.06σ]

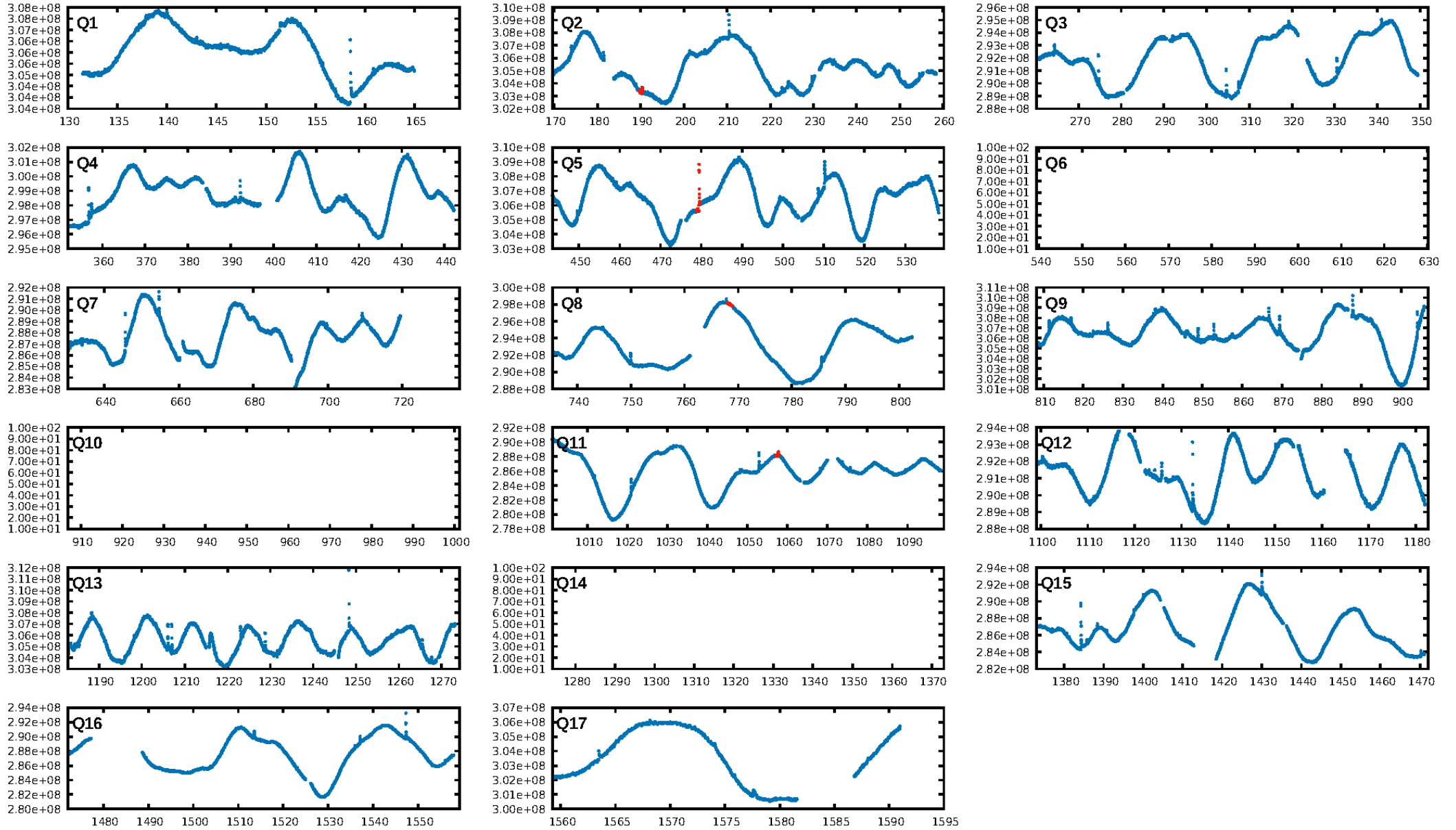
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [82.81σ]  
LongPeriod-sig: 100.0% [107.25σ]  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 99.8%  
Bootstrap-pfa: 1.08e-11  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: 3.275  
Centroid-sig: 68.4%  
Centroid-so: 0.208 arcsec [0.39σ]  
OotOffset-rm: 0.112 arcsec [0.39σ]  
OotOffset-st: 1/1/1/1 [4]  
KicOffset-rm: 0.224 arcsec [0.50σ]  
KicOffset-st: 1/1/1/1 [4]  
DiffImageQuality-fgm: 0.50 [2/4]  
DiffImageOverlap-fno: 0.75 [3/4]

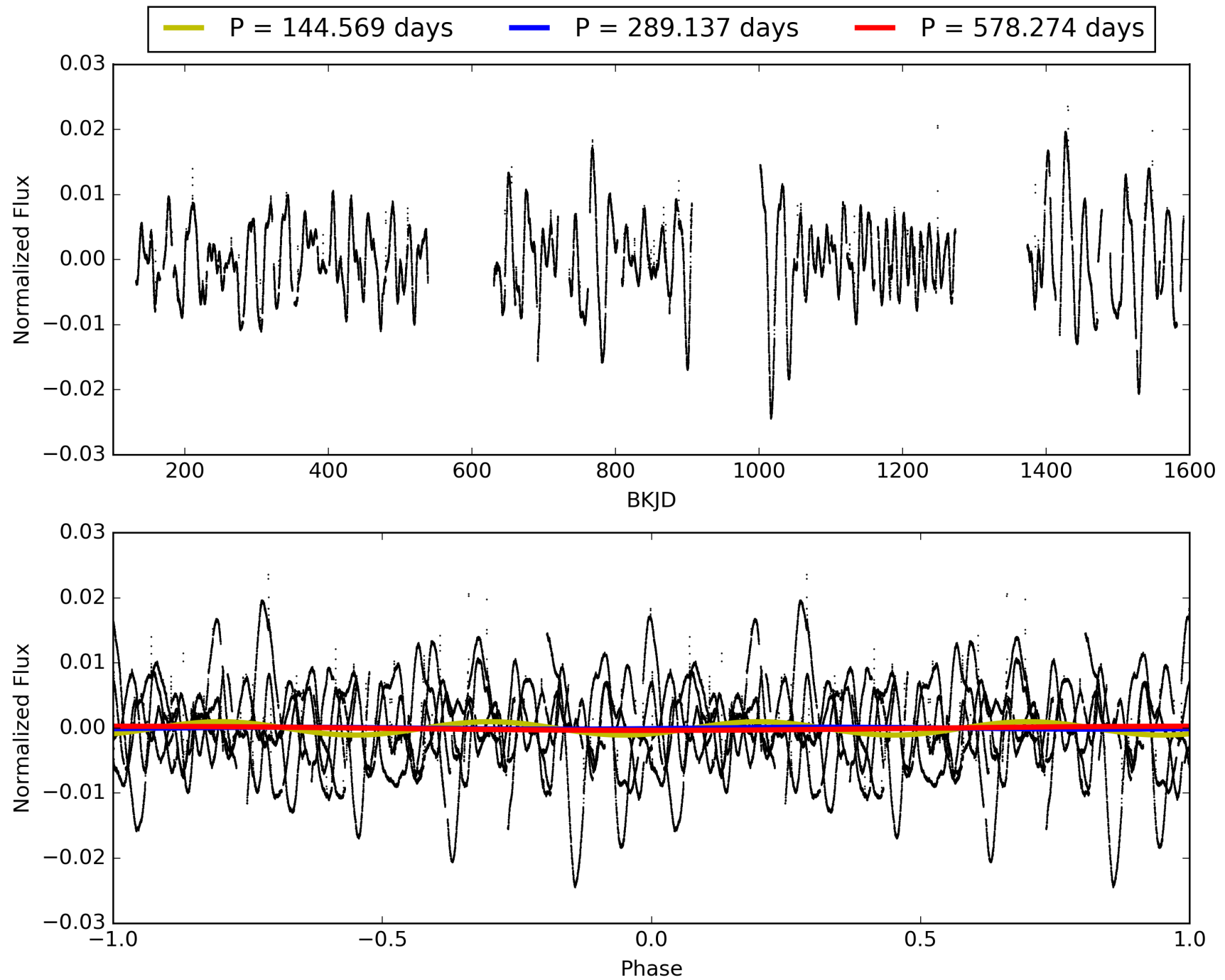
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 05:15:05 Z

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

# TCE 005455407-03, PDC Light Curves

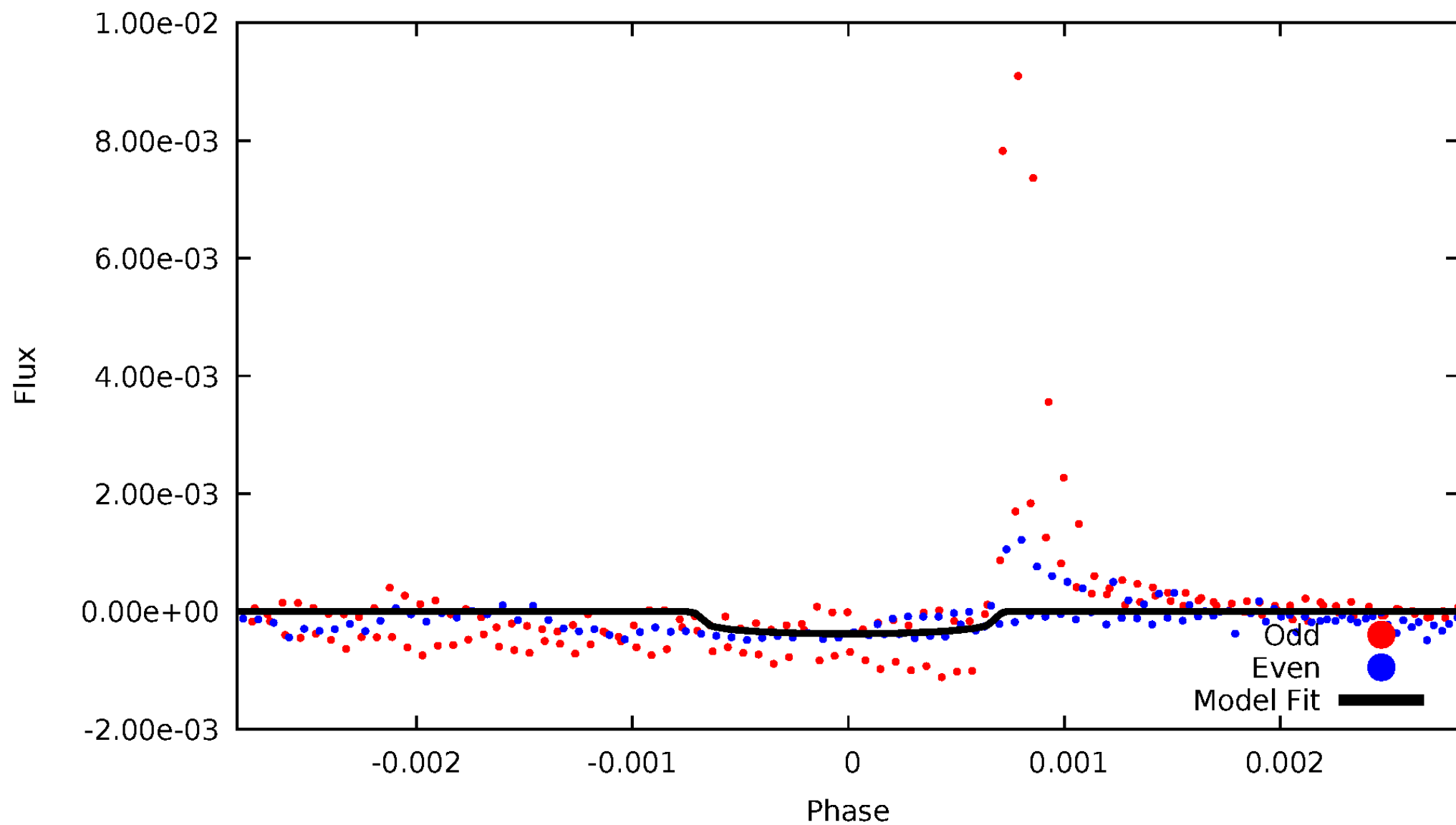


# TCE 005455407-03



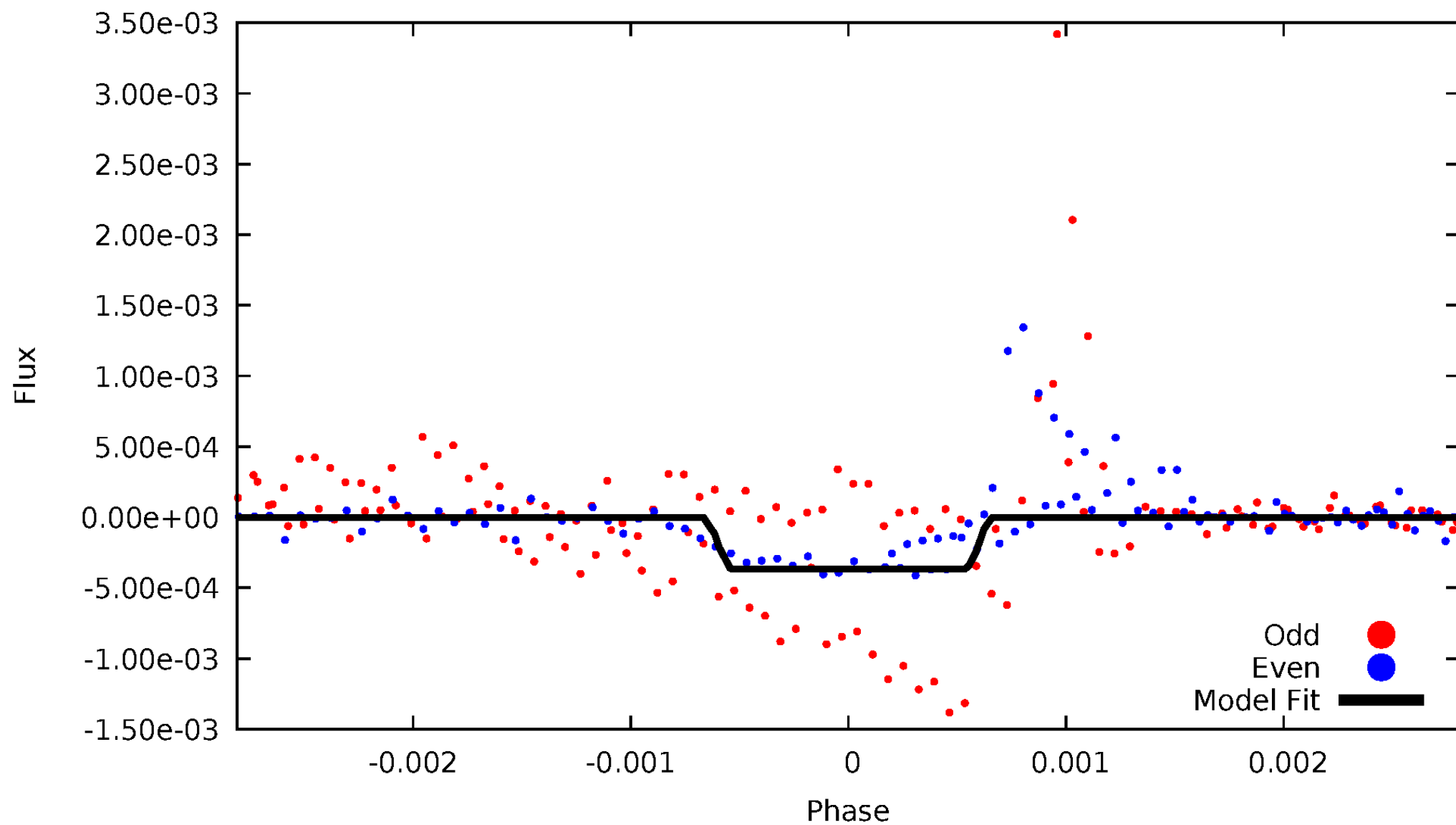
# DV Odd/Even

TCE 005455407-03



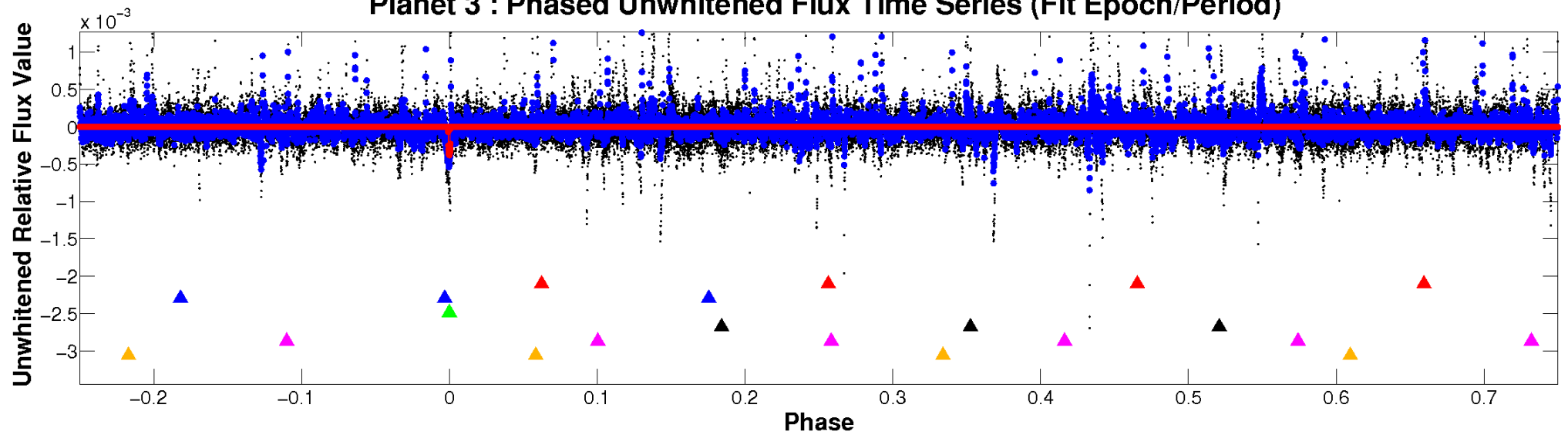
# ALT Odd/Even

TCE 005455407-03

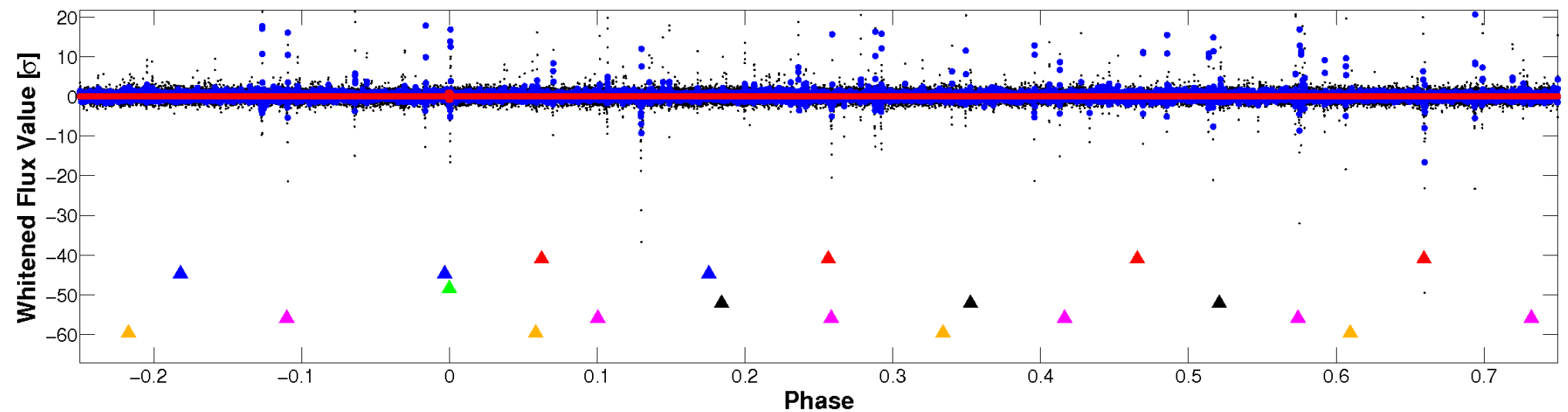


# Non-Whitened Vs. Whitened Light Curve

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

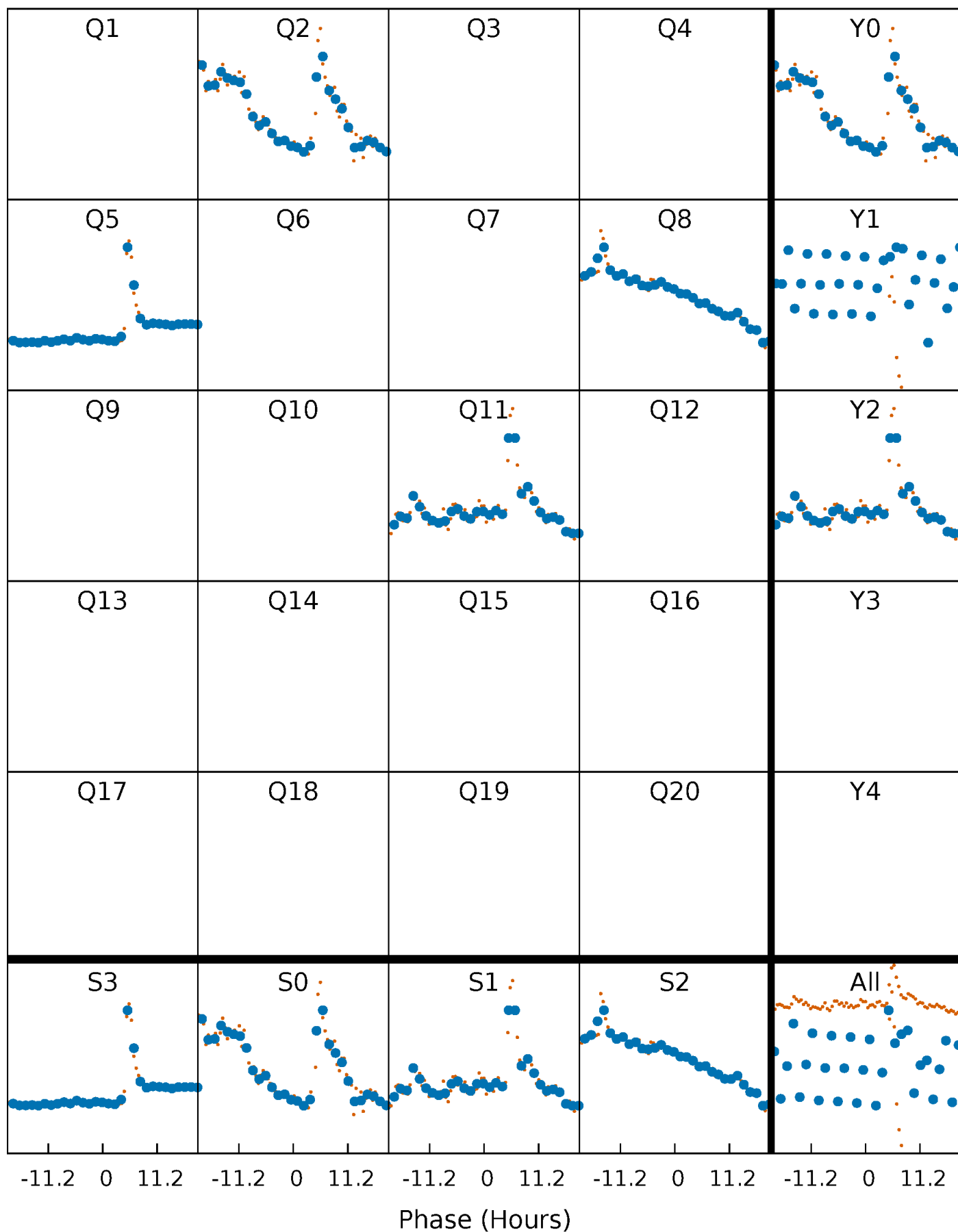


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

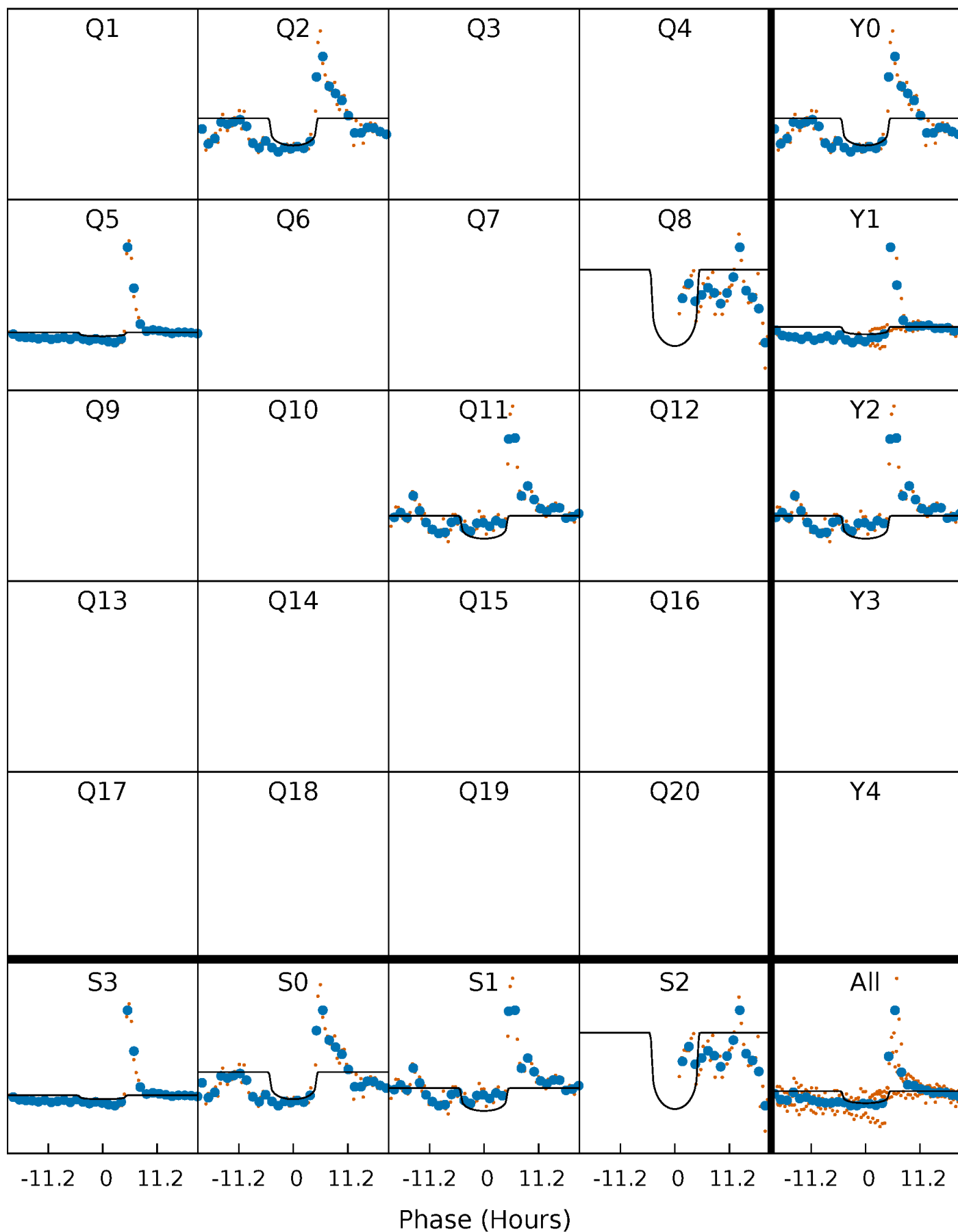
TCE 005455407-03     $P=289.137237$  Days     $T_0=190.110722$  (BKJD)





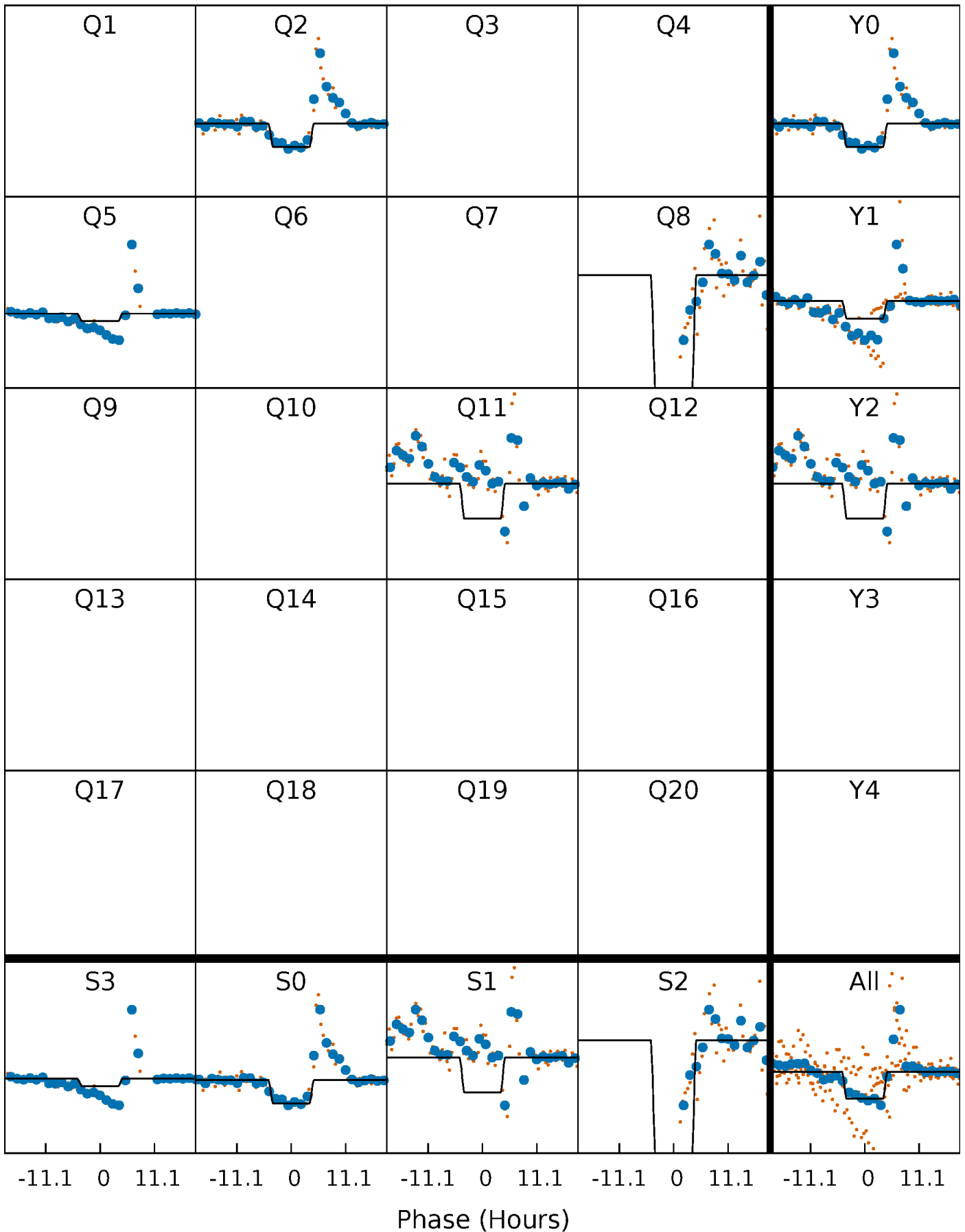
# DV Quarter-Phased Transit Curves

TCE 005455407-03     $P=289.137237$  Days     $T_0=190.110722$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

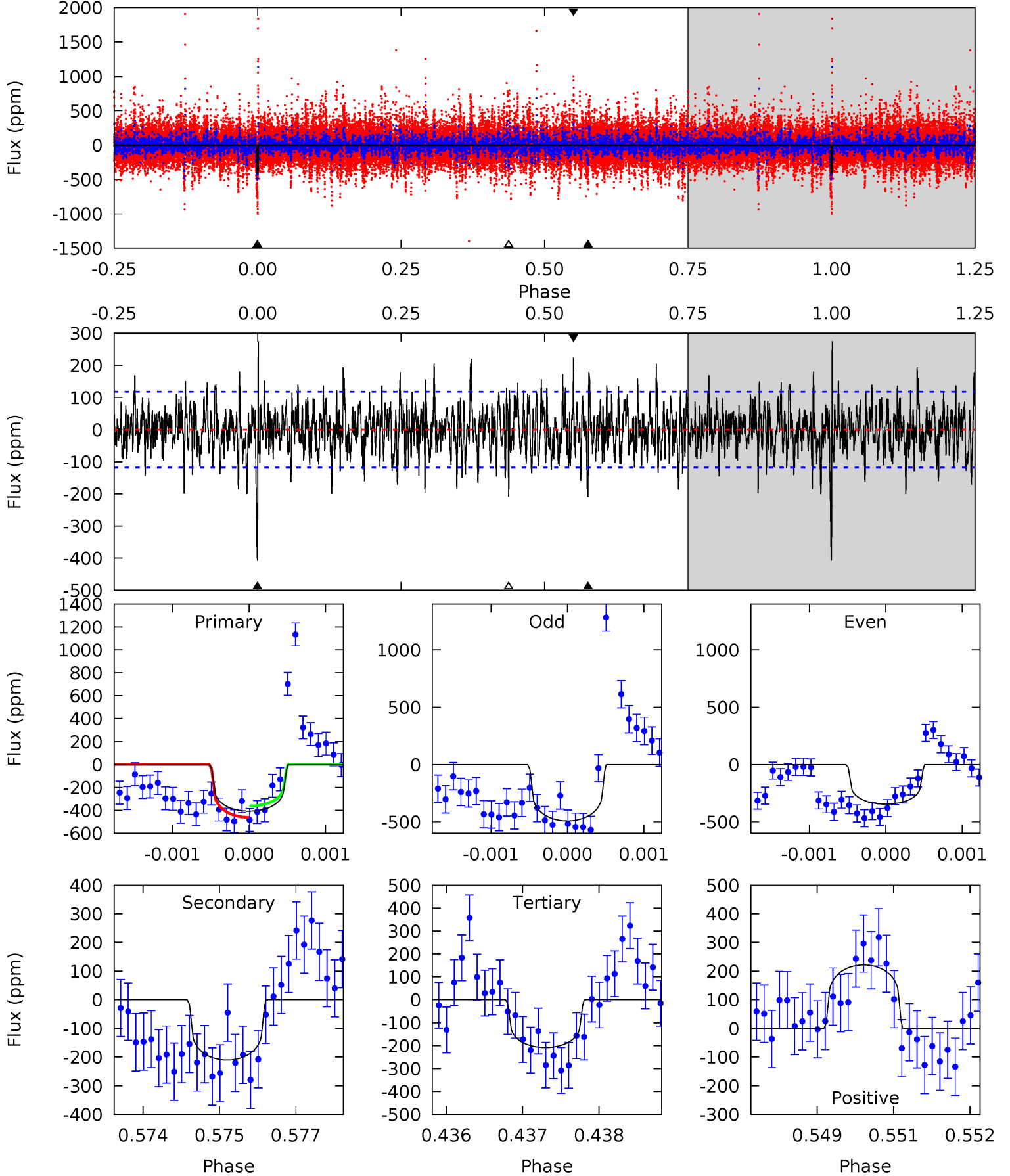
TCE 005455407-03 P=289.128063 Days  $T_0=190.110315$  (BKJD)



# DV Model-Shift Uniqueness Test

005455407-03,  $P = 289.137237$  Days,  $E = 190.110722$  Days

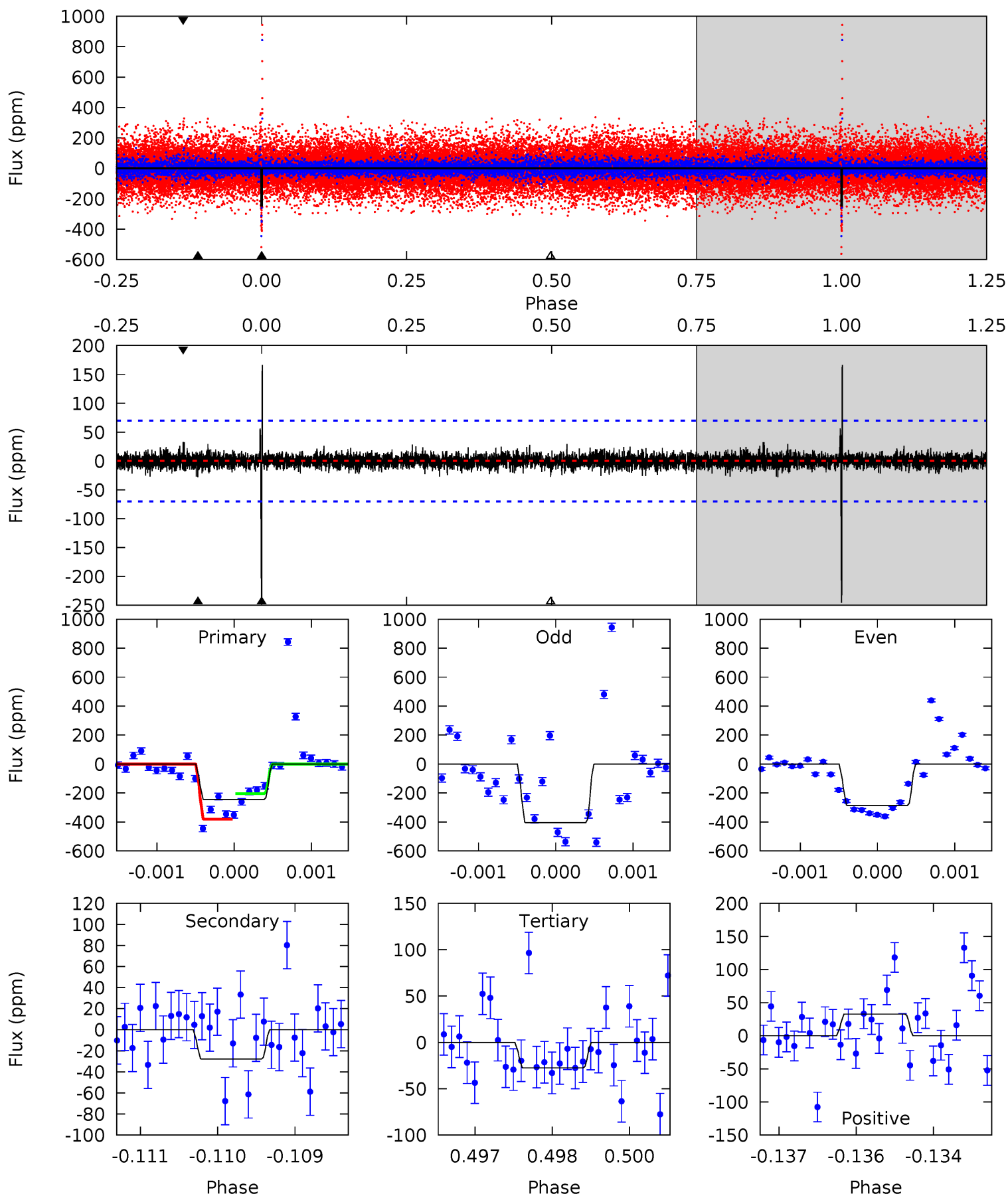
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
18.6	9.58	9.50	10.1	5.39	3.19	2.79	9.07	8.47	0.08	-0.52	2.30	1.32	0.40	2.26



# Alt Model-Shift Uniqueness Test

005455407-03, P = 289.128063 Days, E = 190.110315 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
18.9	2.14	2.13	2.52	5.40	3.21	0.55	16.8	16.4	0.02	-0.38	5.59	1.38	0.40	6.60



### Stellar Parameters For KIC 005455407

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5519^{+174}_{-154}$	$3.779^{+0.712}_{-0.237}$	$-0.380^{+0.350}_{-0.250}$	$2.183^{+0.751}_{-1.394}$	$1.045^{+0.184}_{-0.225}$	$0.142^{+1.851}_{-0.088}$
	+3%/-3%	+19%/-6%	+92%/-66%	+34%/-64%	+18%/-22%	+1307%/-62%
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 005455407-03 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-210 \pm 22$	$4.15^{+2.91}_{-2.08}$	$535^{+58}_{-87}$	$4873^{+1727}_{-731}$	$5031^{+15421}_{-3291}$
Alt.	$-28 \pm 13$	$4.08^{+2.76}_{-2.13}$	$533^{+61}_{-91}$	$3370^{+847}_{-497}$	$600^{+1994}_{-422}$

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

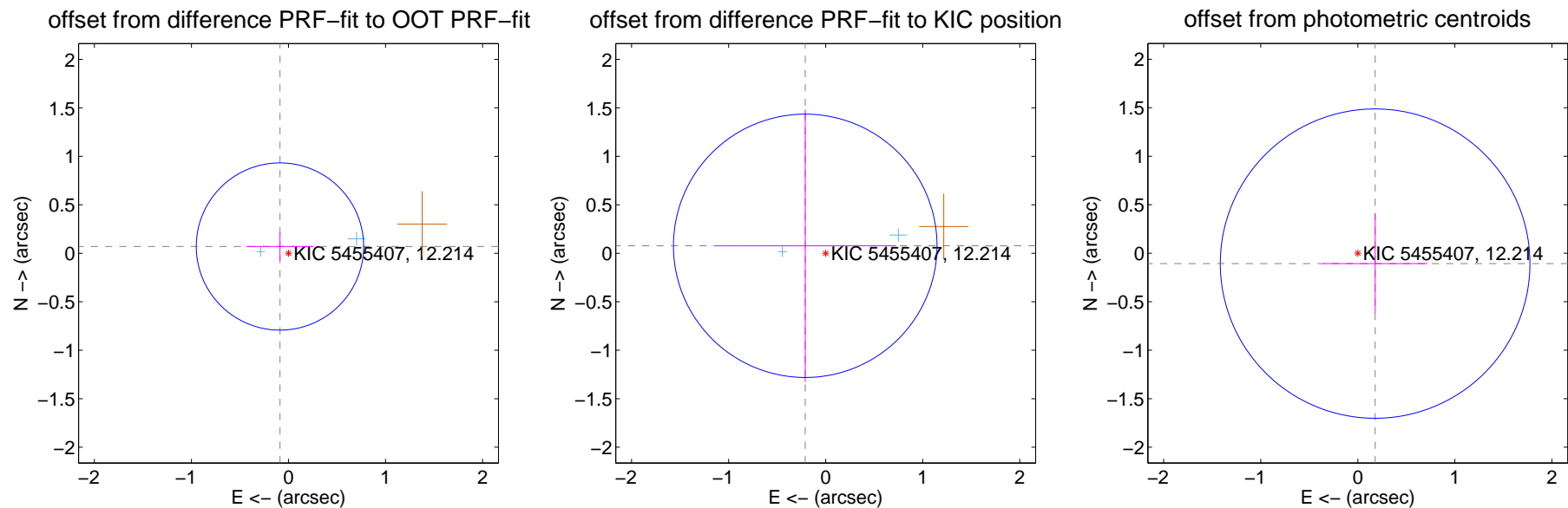
## DV Centroid Data

Supplemental centroid analysis for 005455407-03. Kepler magnitude: 12.21. Transit SNR 6.90

There are 2 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.32 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.112 \pm 0.287$	0.39	$0.088 \pm 0.348$	$0.070 \pm 0.146$
PRF-fit source offset from KIC position	$0.224 \pm 0.453$	0.50	$0.210 \pm 0.938$	$0.077 \pm 1.405$
photometric centroid source offset	$0.21 \pm 0.53$	0.39	$-0.18 \pm 0.54$	$-0.11 \pm 0.51$



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

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

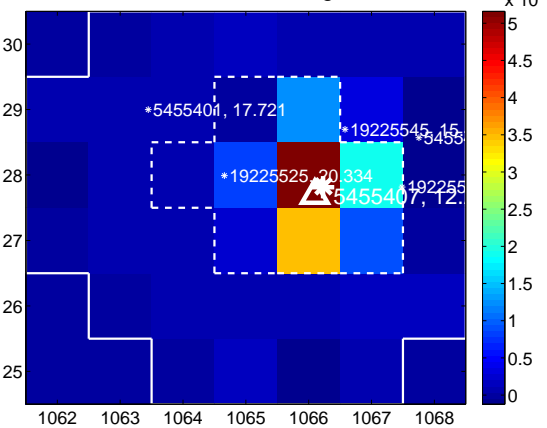
Q1 no difference image



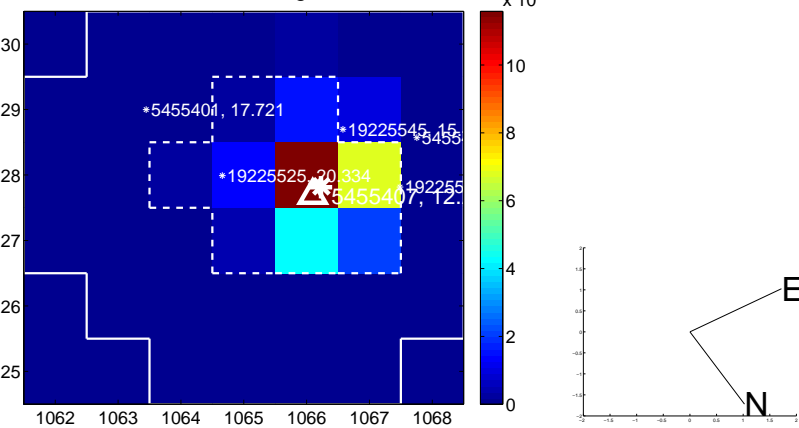
Q1 no OOT image



Q2 difference image



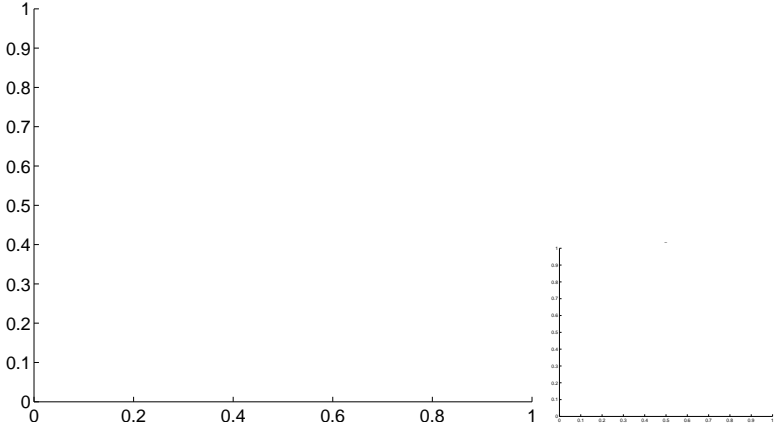
Q2 OOT image



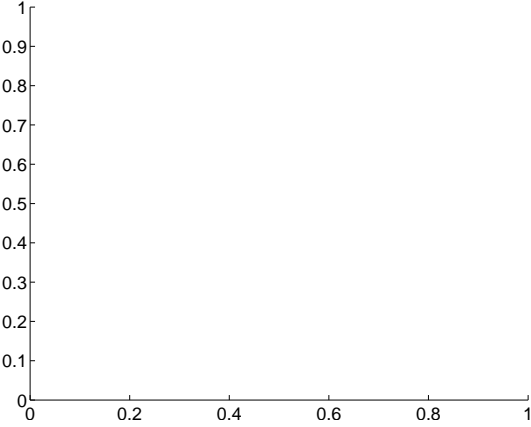
Q3 no difference image



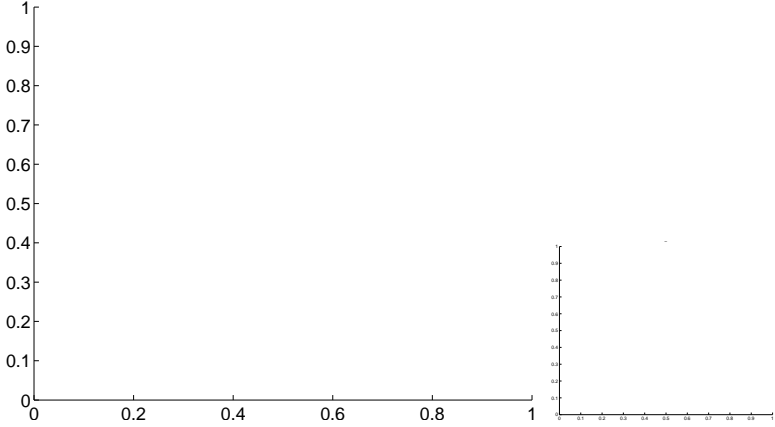
Q3 no OOT image



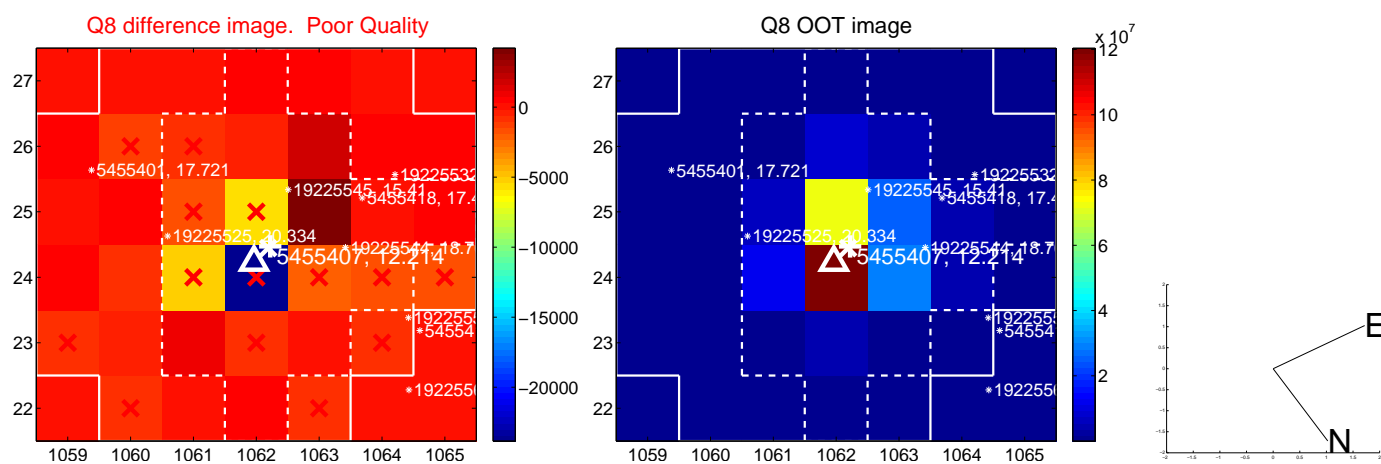
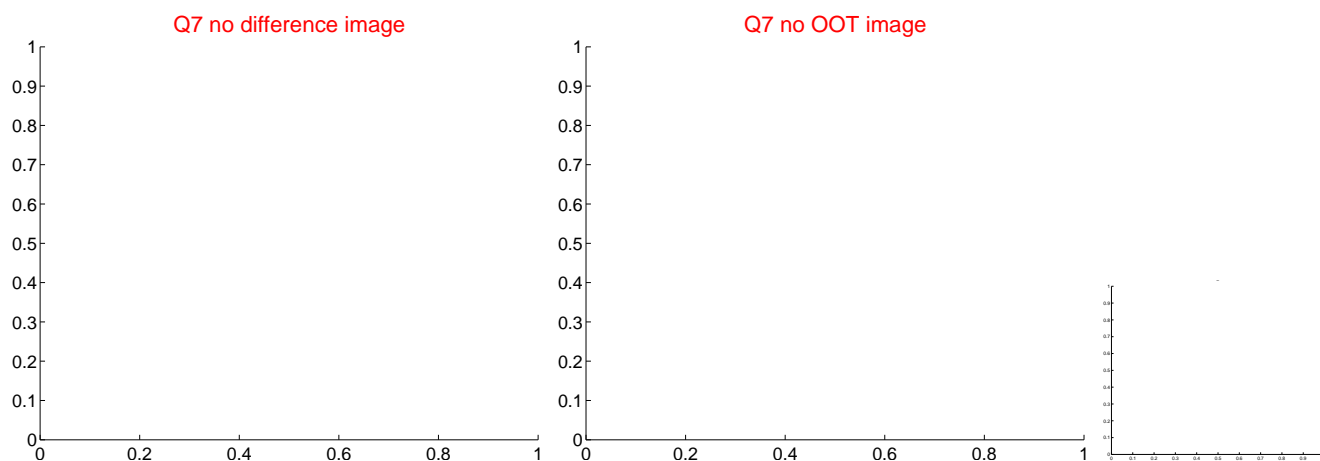
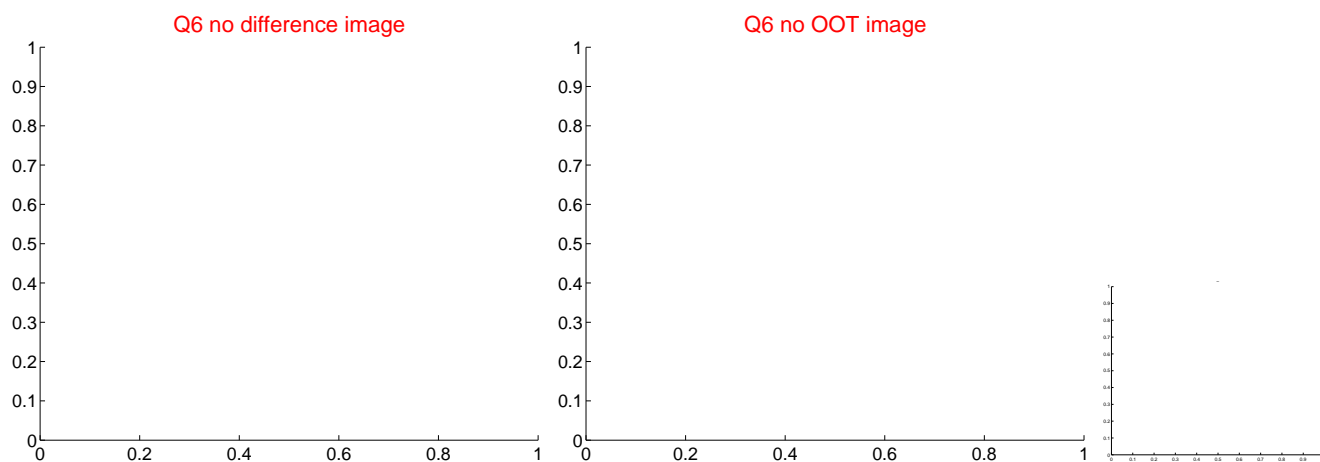
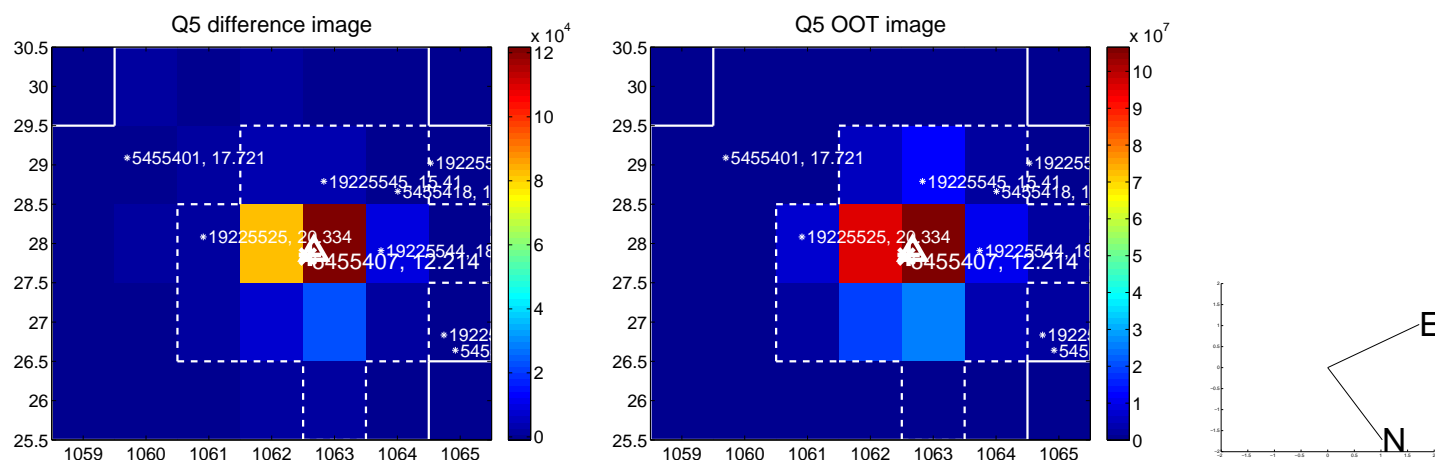
Q4 no difference image



Q4 no OOT image

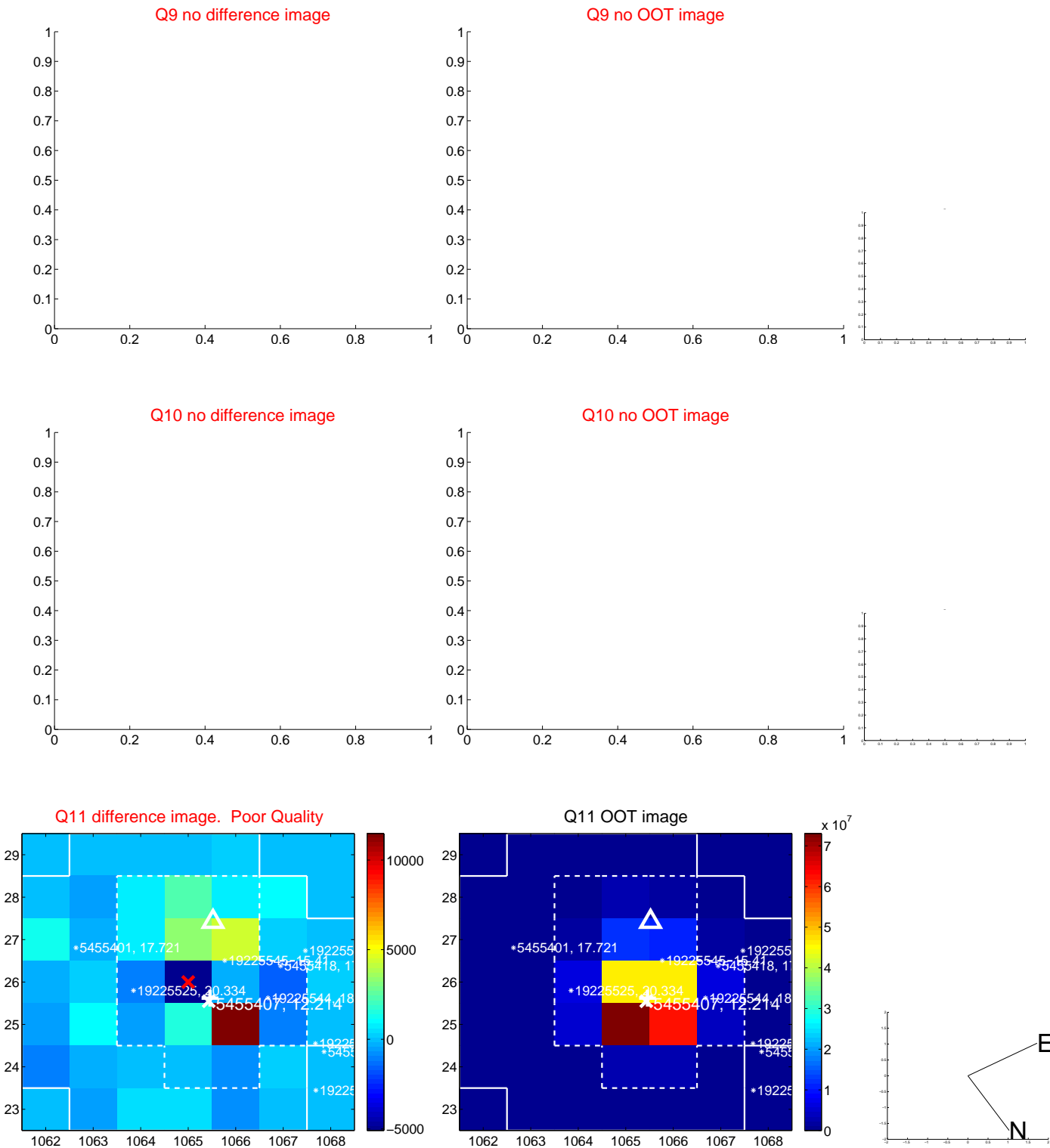


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





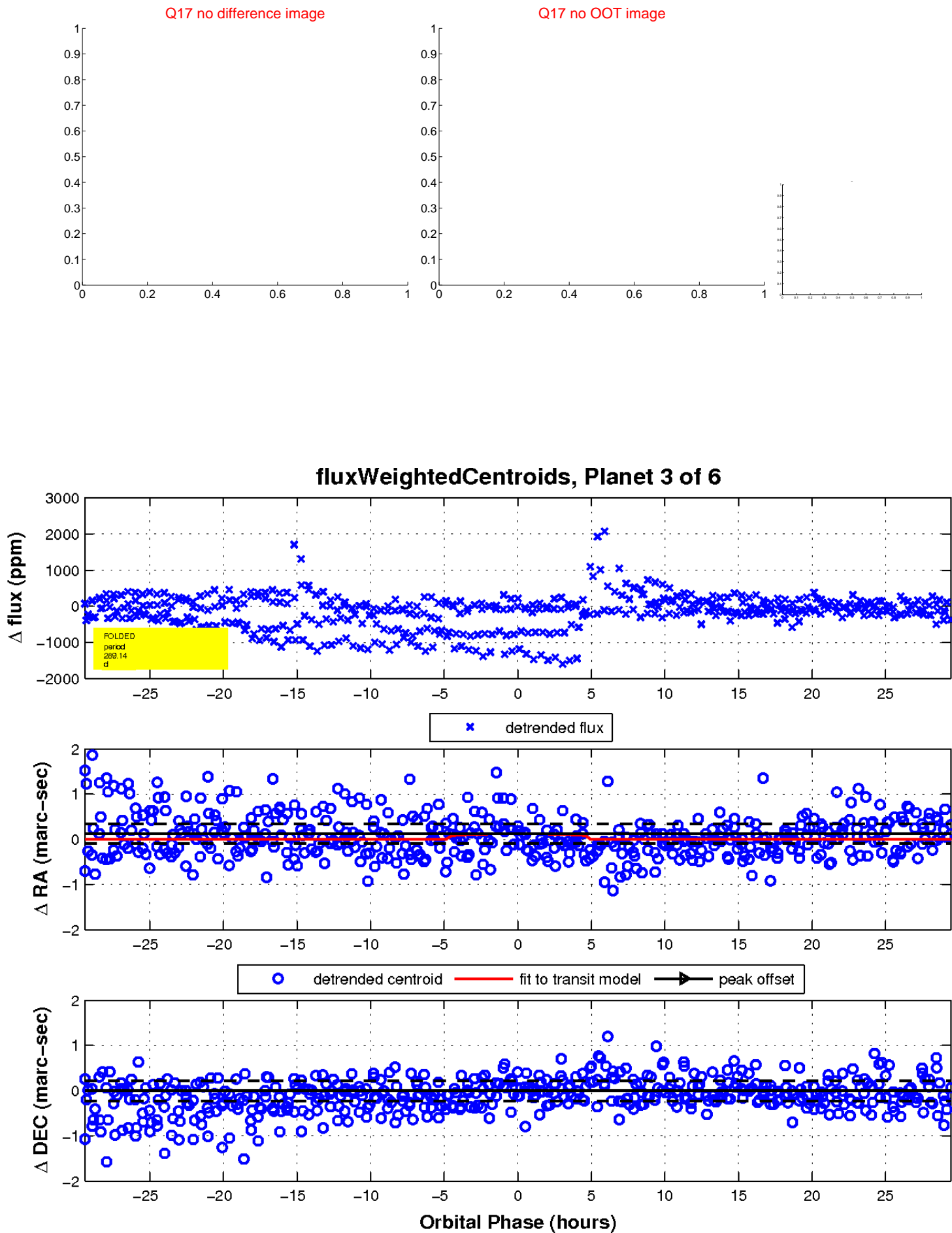
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

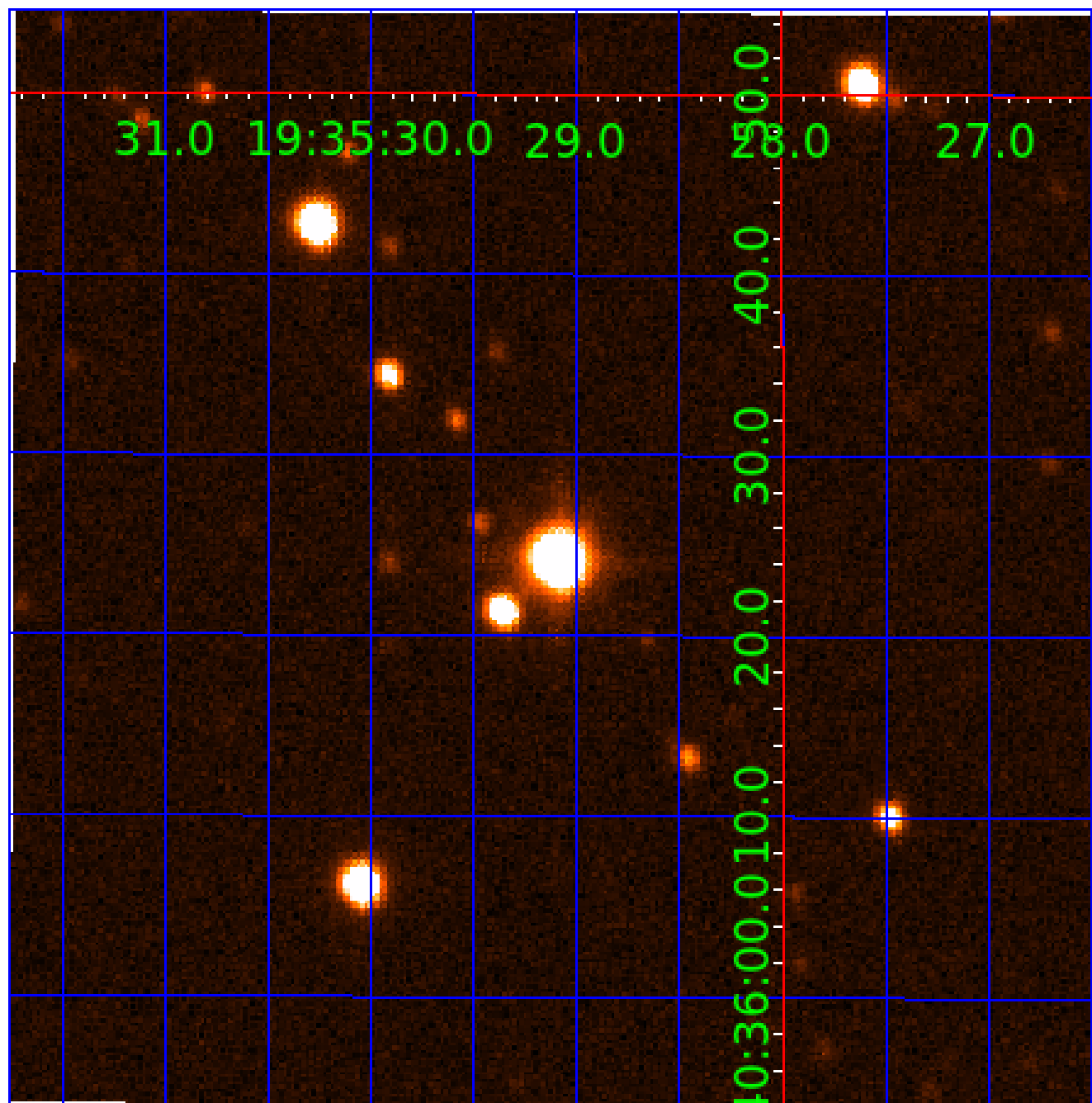


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 005455407

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005455407-01	OBS	No	405.667204	264.234509	474.1	5.540	15.8	8.7	2.18	5519	5.19	3.34
005455407-02	OBS	No	629.942151	137.531595	477.1	14.936	12.5	8.2	2.18	5519	5.01	1.86
005455407-03	OBS	No	289.137237	190.110722	378.6	9.816	12.7	6.9	2.18	5519	4.48	5.25
005455407-04	OBS	No	529.596497	340.722578	344.9	10.441	10.9	6.1	2.18	5519	4.35	2.34
005455407-05	OBS	No	243.480546	158.300050	350.6	8.873	9.5	8.0	2.18	5519	4.13	6.60
005455407-06	OBS	No	368.806760	416.475967	509.8	14.882	8.8	8.9	2.18	5519	6.01	3.80

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005455407-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS
005455407-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005455407-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV
005455407-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV
005455407-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—INCONSISTENT_TRANS
005455407-06	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV

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

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

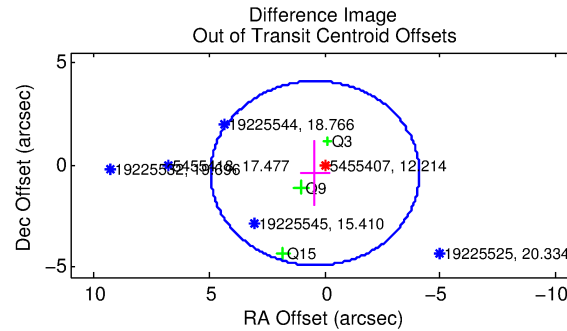
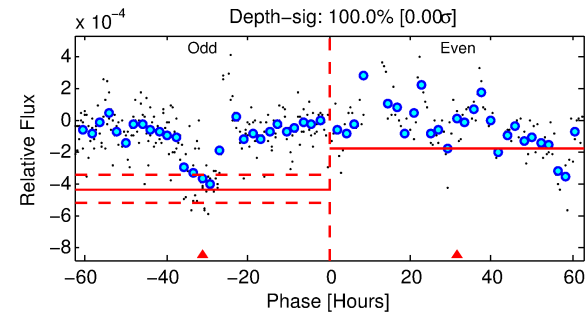
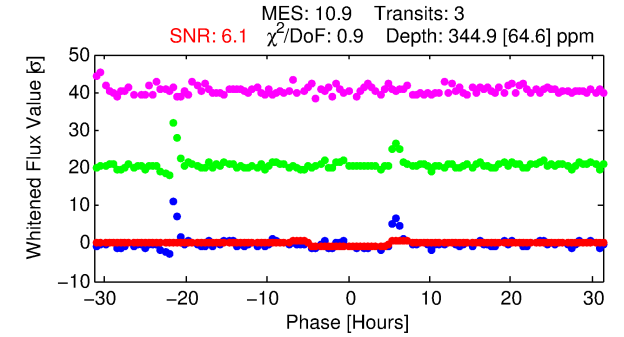
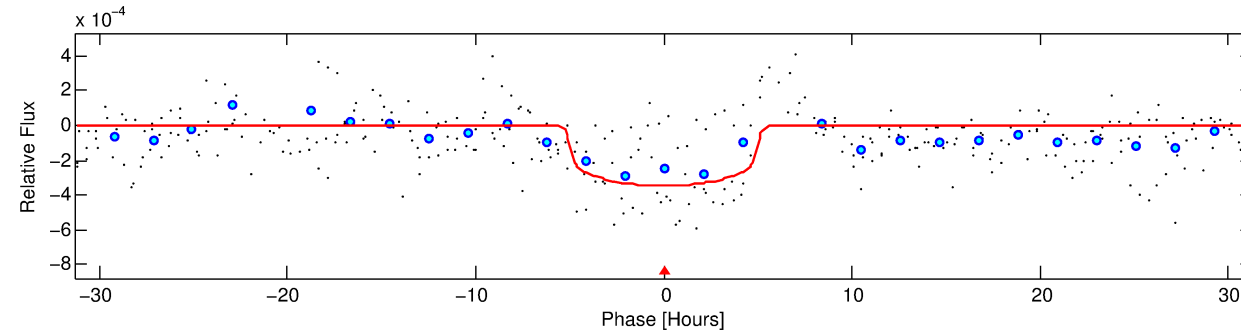
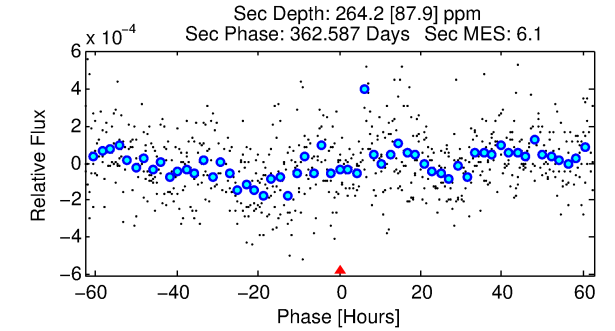
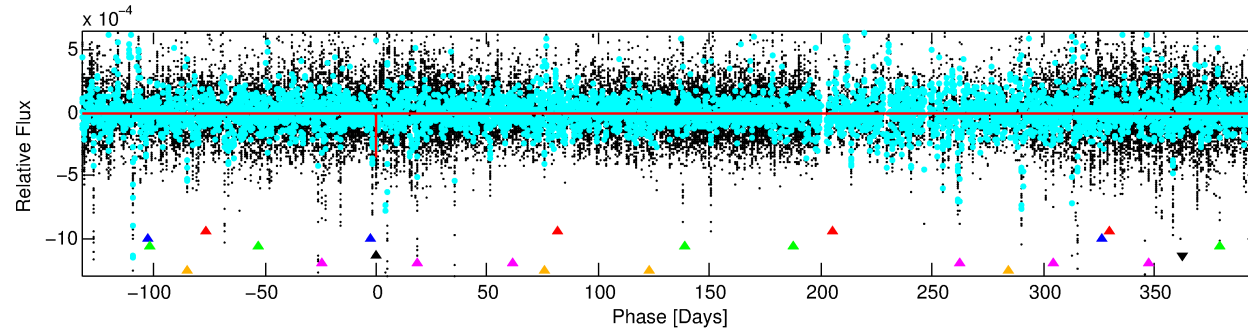
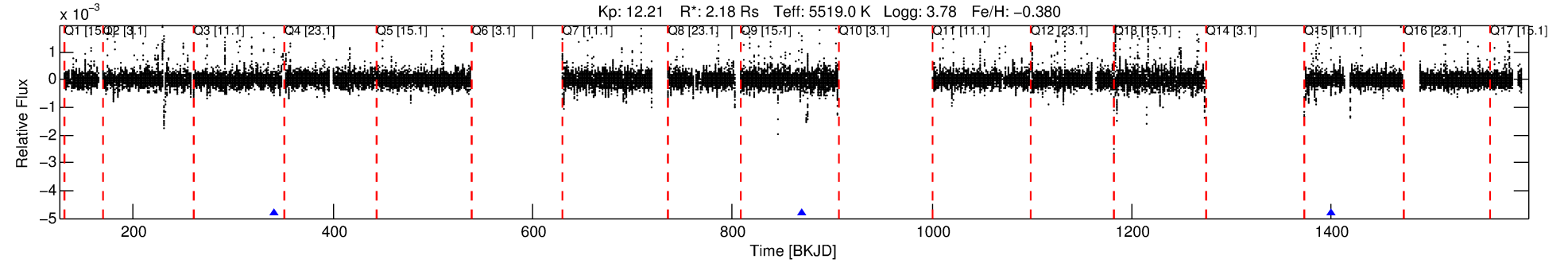
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 005455407-04

No Significant Match Found

# DV One-Page Summary

KIC: 5455407 Candidate: 4 of 6 Period: 529.596 d



## DV Fit Results:

Period = 529.59650 [0.00790] d  
Epoch = 340.7226 [0.0105] BKJD  
Rp/R\* = 0.0183 [0.0062]  
a/R\* = 279.98 [386.97]  
b = 0.72 [0.95]  
Seff = 2.34 [2.76]  
Teq = 315 [93] K  
Rp = 4.35 [3.15] Re  
a = 1.3003 [0.9007] AU  
Ag = 12973.20 [18125.09] [0.72 $\sigma$ ]  
Teffp = 5206 [1001] K [4.86 $\sigma$ ]

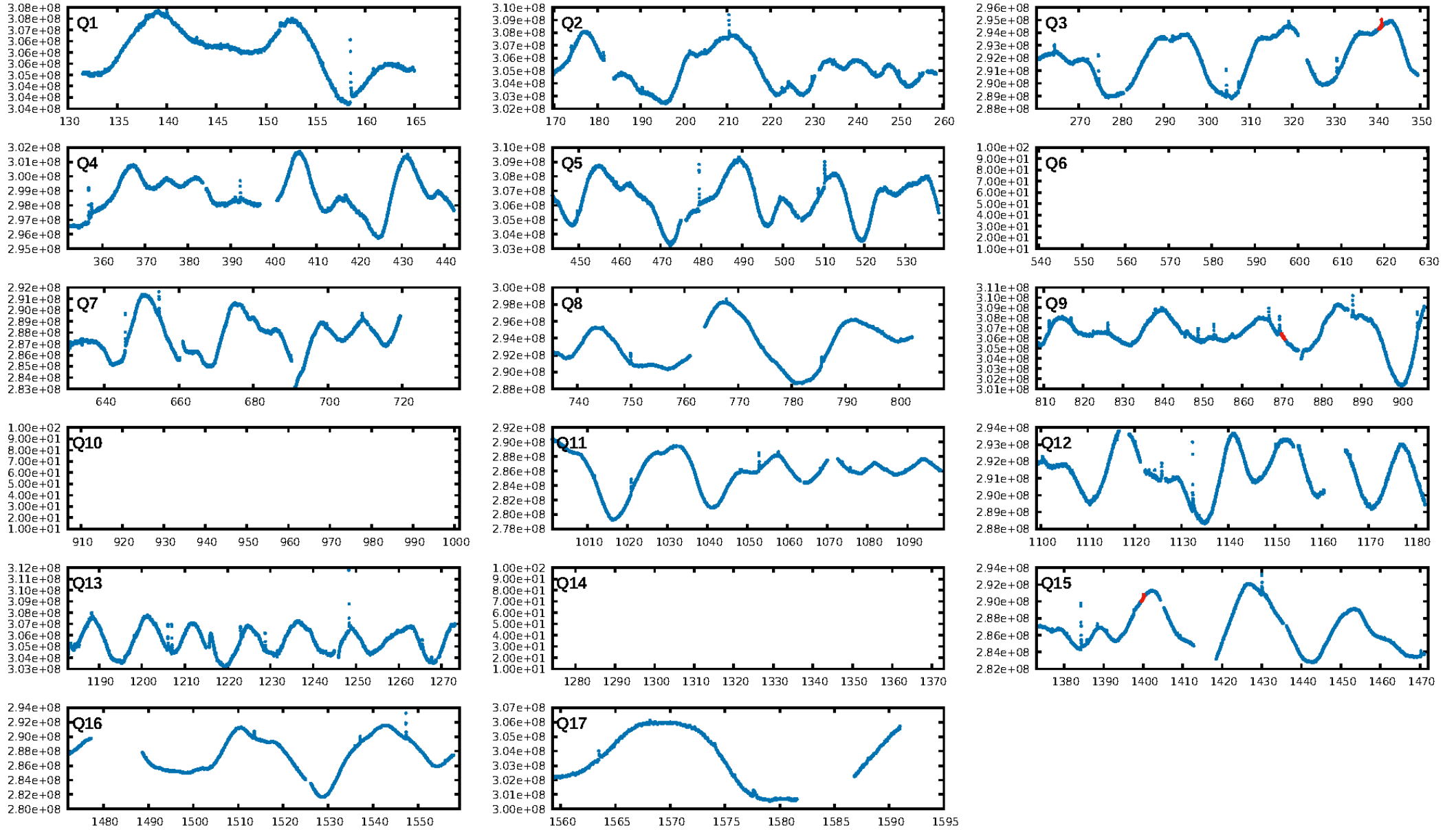
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [251.64 $\sigma$ ]  
LongPeriod-sig: 100.0% [132.15 $\sigma$ ]  
ModelChiSquare2-sig: 2.7%  
ModelChiSquareGof-sig: 98.5%  
**Bootstrap-pfa: 2.10e-08**  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 2.638  
Centroid-sig: 0.6%  
Centroid-so: 1.259 arcsec [1.81 $\sigma$ ]  
OotOffset-rm: 0.590 arcsec [0.39 $\sigma$ ]  
OotOffset-st: 0/2/0/1 [3]  
KicOffset-rm: 0.909 arcsec [0.69 $\sigma$ ]  
KicOffset-st: 0/2/0/1 [3]  
DiffImageQuality-fgm: 0.67 [2/3]  
DiffImageOverlap-fno: 1.00 [3/3]

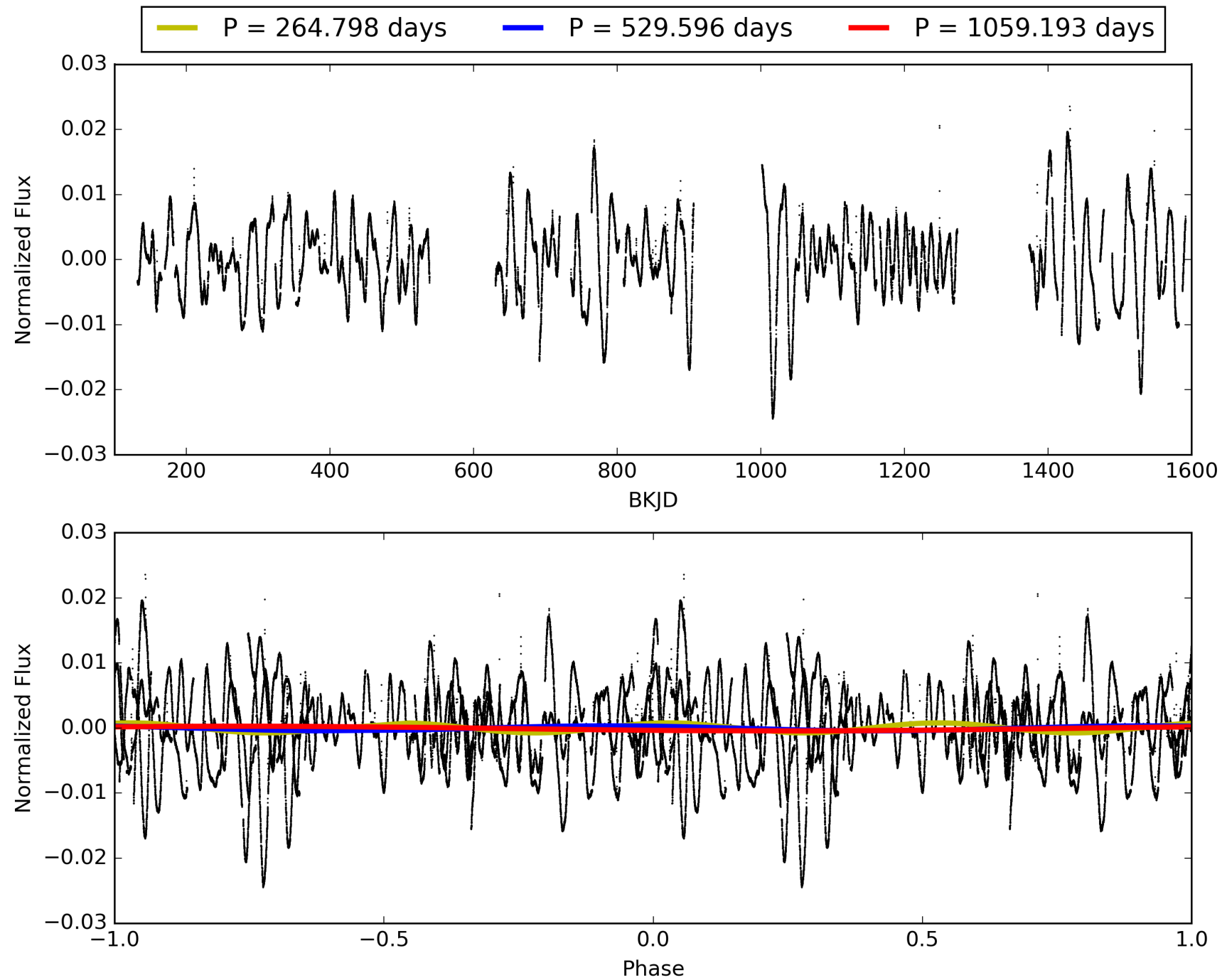
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 05:15:14 Z

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

# TCE 005455407-04, PDC Light Curves



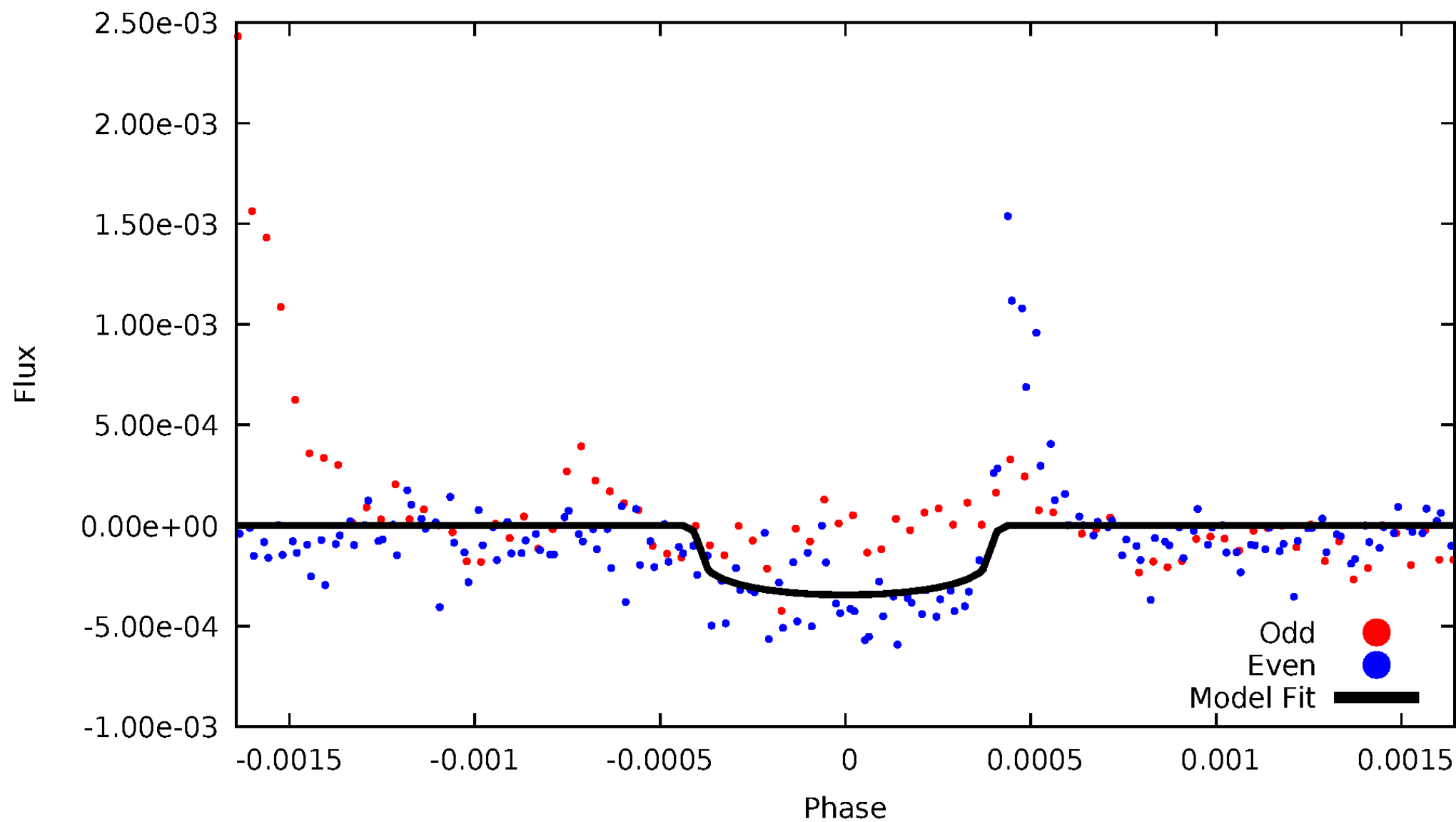
# TCE 005455407-04





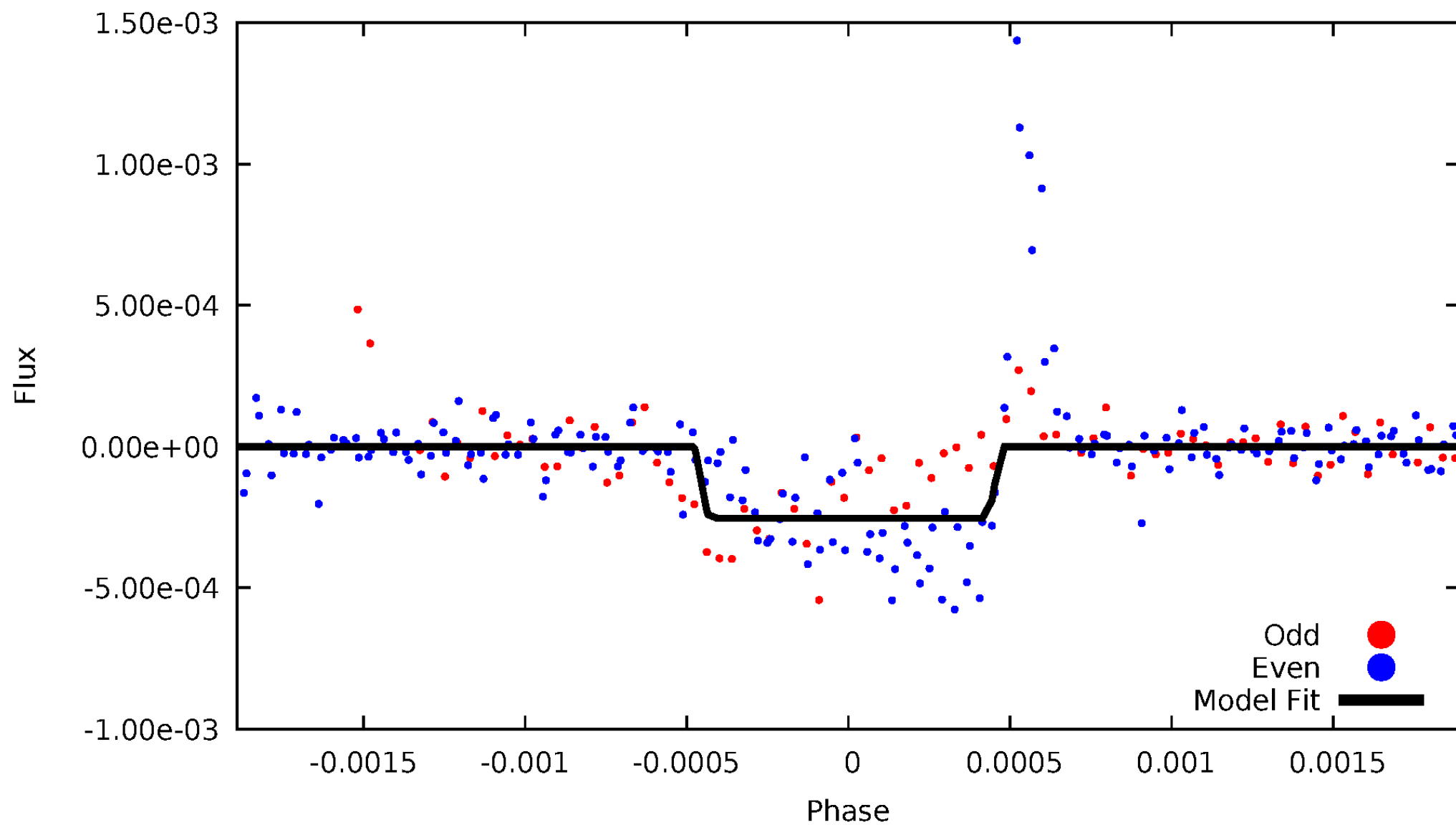
# DV Odd/Even

TCE 005455407-04



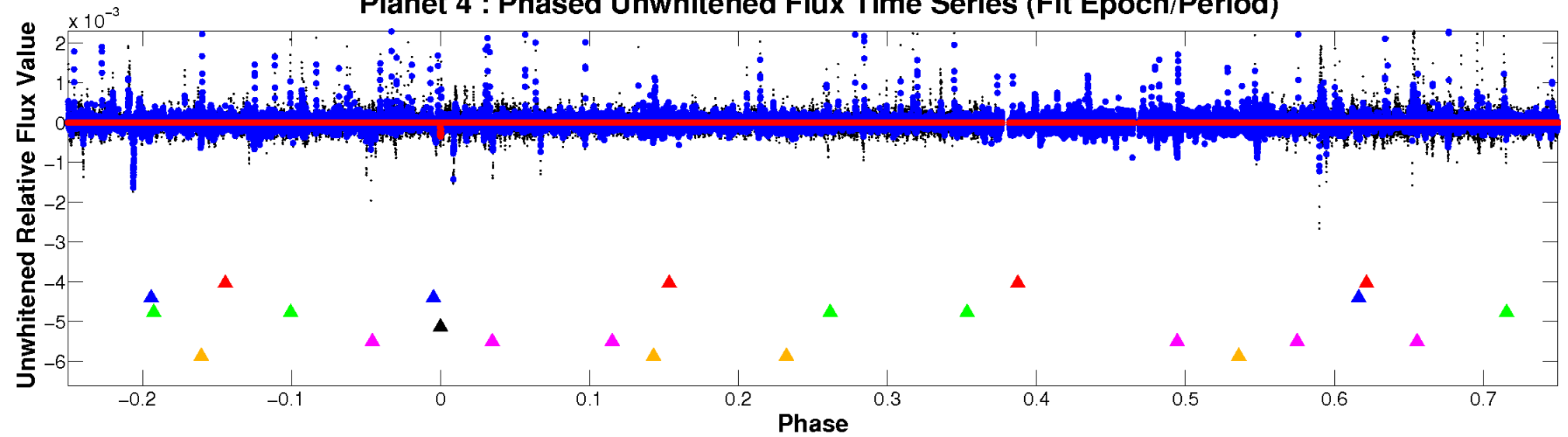
# ALT Odd/Even

TCE 005455407-04

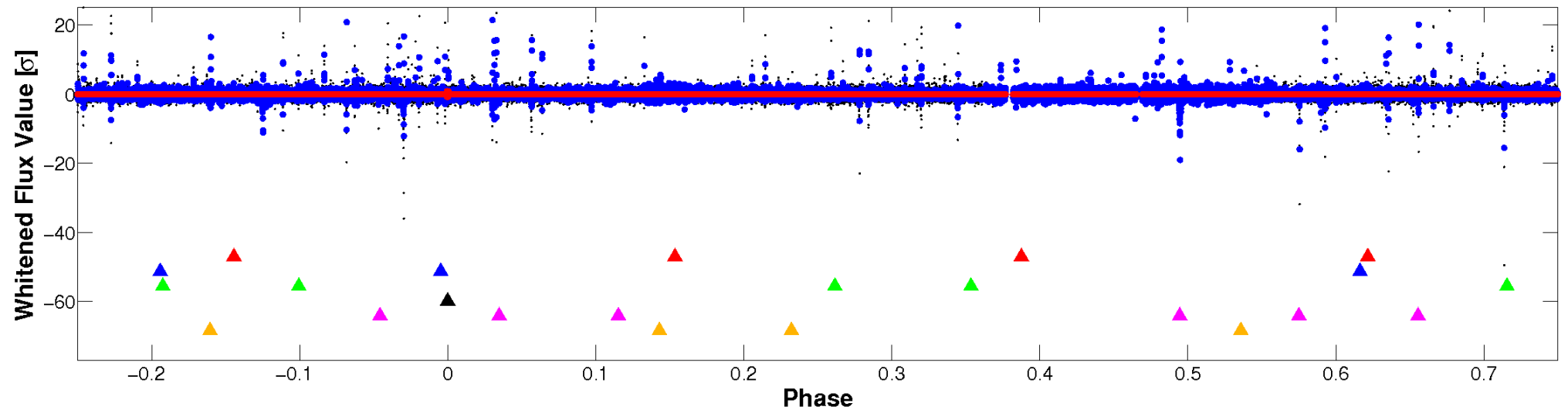


# Non-Whitened Vs. Whitened Light Curve

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

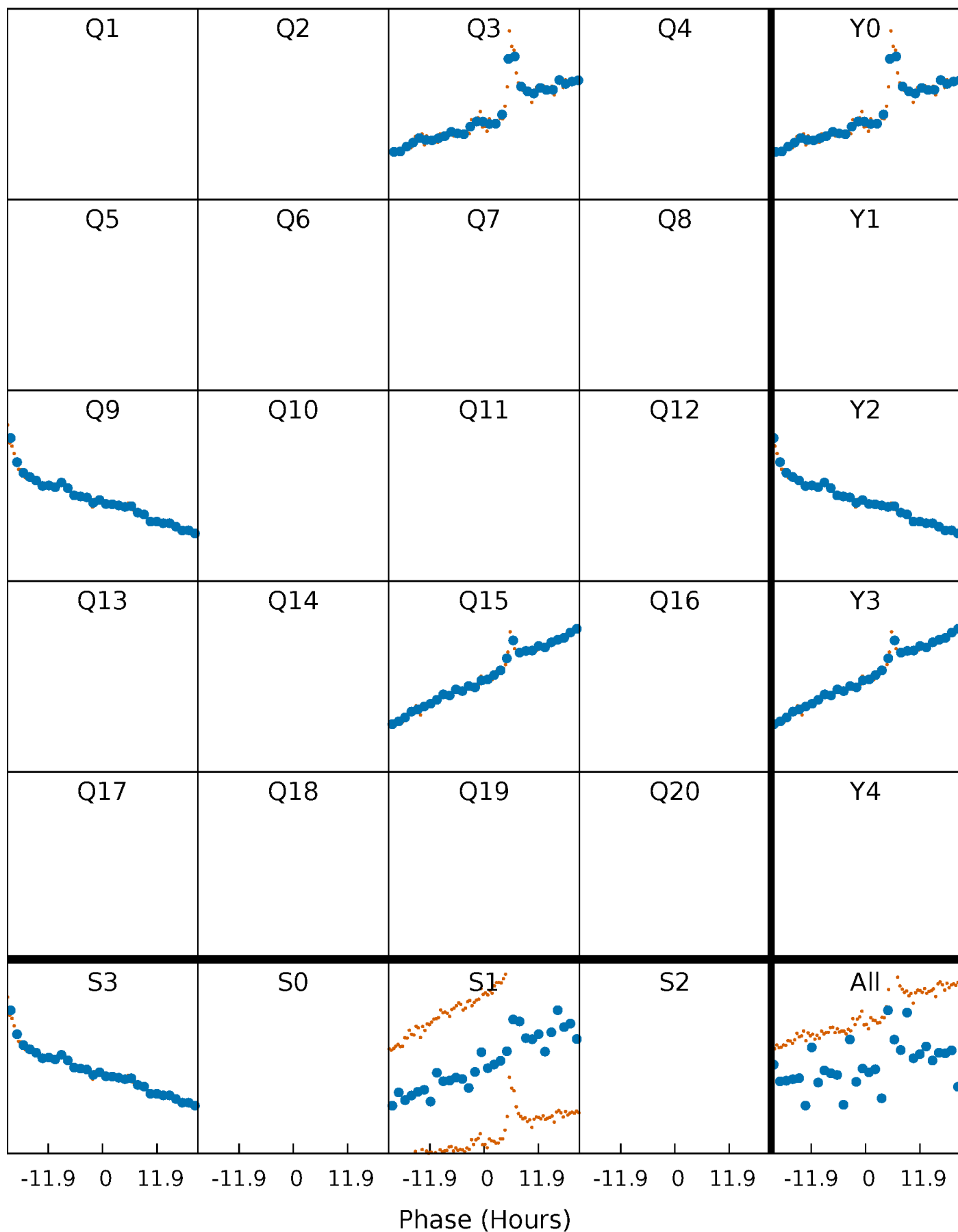


## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



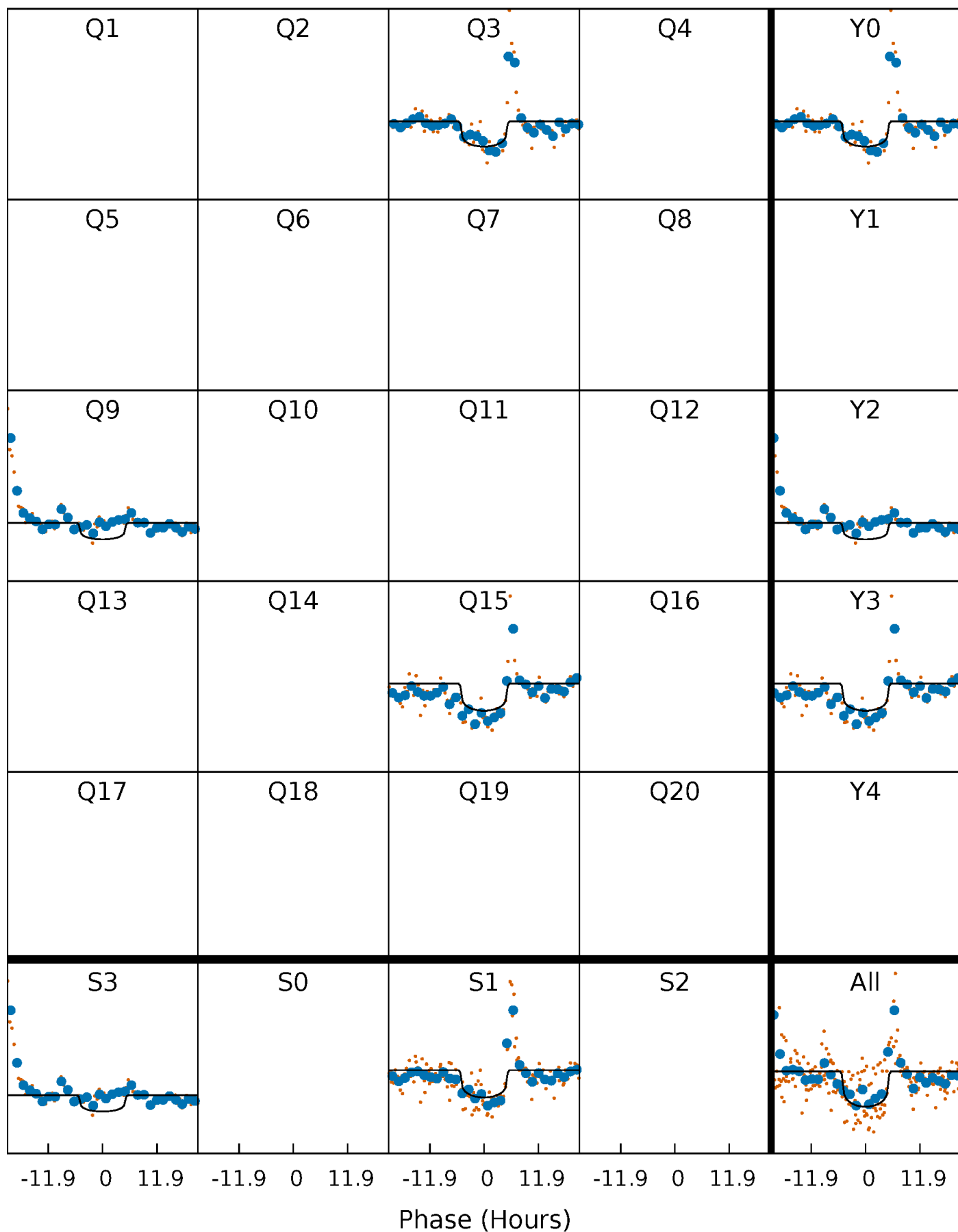
# PDC Quarter-Phased Transit Curves

TCE 005455407-04     $P=529.596497$  Days     $T_0=340.722578$  (BKJD)



# DV Quarter-Phased Transit Curves

TCE 005455407-04     $P=529.596497$  Days     $T_0=340.722578$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

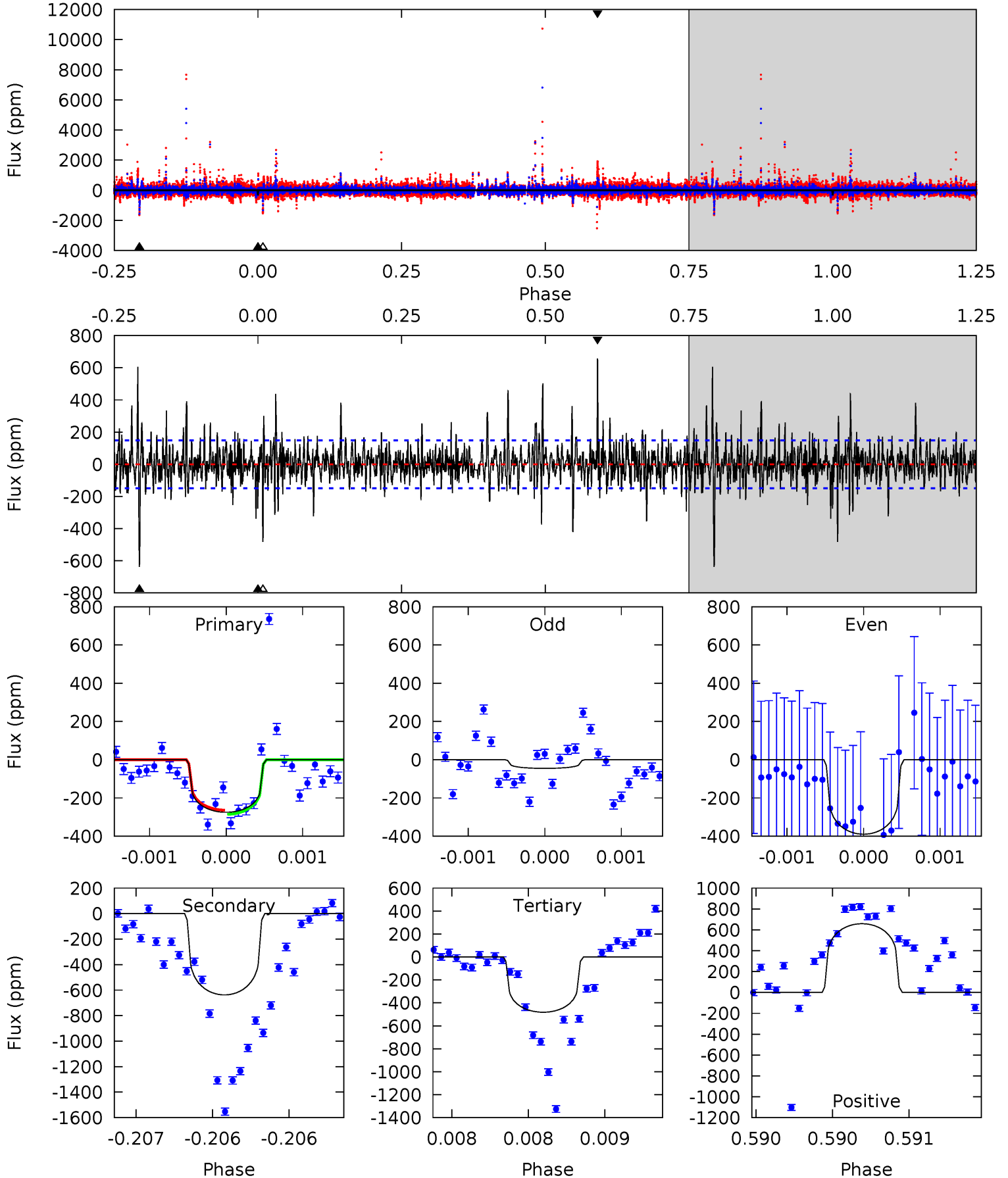
TCE 005455407-04     $P=529.597008$  Days     $T_0=340.678464$  (BKJD)



# DV Model-Shift Uniqueness Test

005455407-04, P = 529.596497 Days, E = 340.722578 Days

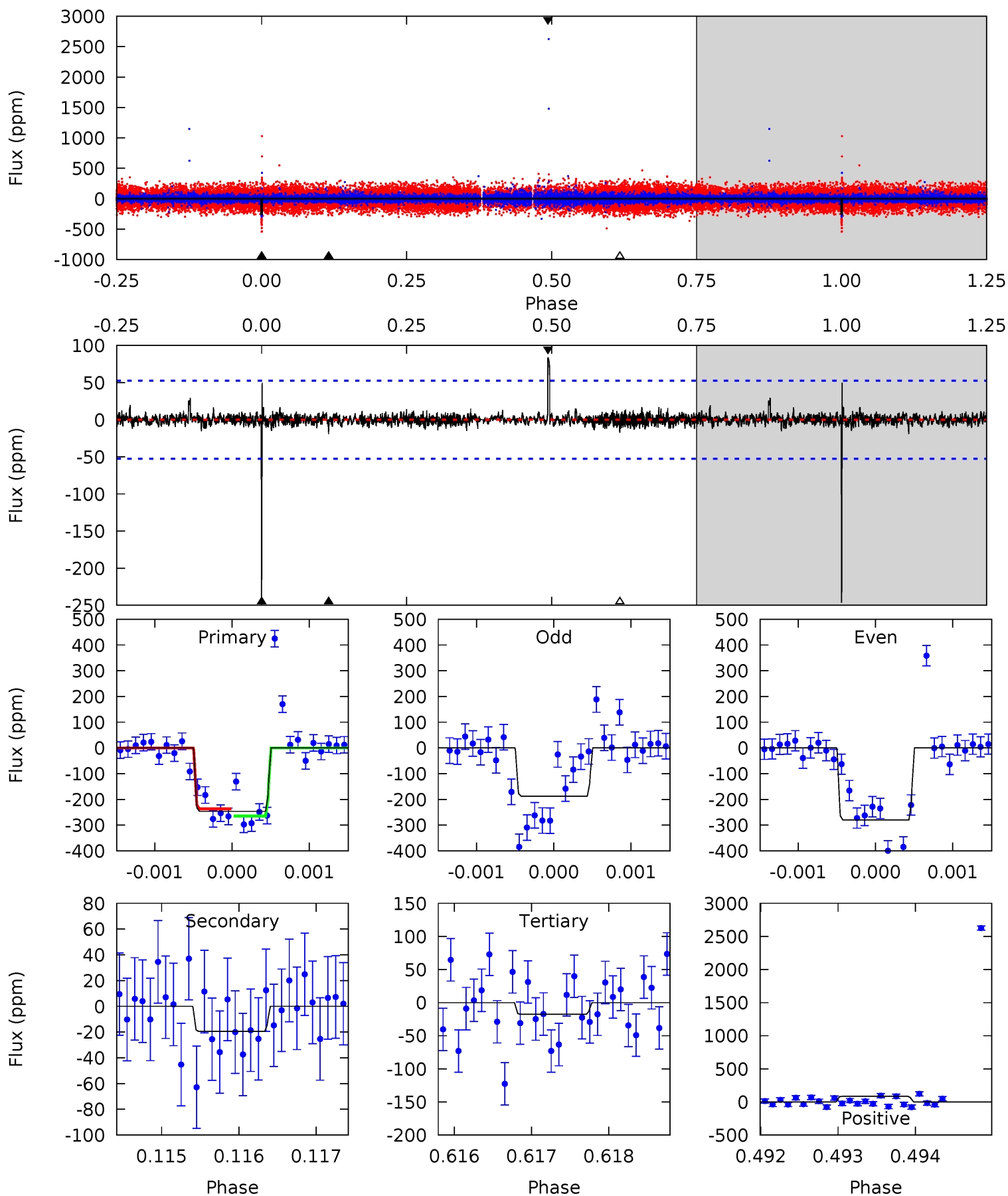
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.1	23.5	17.7	24.2	5.48	3.34	3.35	-7.61	-14.1	5.73	-0.78	4.43	0.87	0.51	0.40



# Alt Model-Shift Uniqueness Test

005455407-04, P = 529.597008 Days, E = 340.678464 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
25.6	2.02	1.82	8.74	5.46	3.30	0.53	23.8	16.9	0.20	-6.72	4.44	0.95	0.25	1.45





### Stellar Parameters For KIC 005455407

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5519^{+174}_{-154}$	$3.779^{+0.712}_{-0.237}$	$-0.380^{+0.350}_{-0.250}$	$2.183^{+0.751}_{-1.394}$	$1.045^{+0.184}_{-0.225}$	$0.142^{+1.851}_{-0.088}$
	+3%/-3%	+19%/-6%	+92%/-66%	+34%/-64%	+18%/-22%	+1307%/-62%
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 005455407-04 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-637 \pm 27$	$3.87^{+2.02}_{-1.63}$	$433^{+47}_{-73}$	$6455^{+1721}_{-868}$	$38052^{+83492}_{-20802}$
Alt.	$-19 \pm 10$	$3.46^{+1.87}_{-1.58}$	$439^{+43}_{-75}$	$3390^{+693}_{-477}$	$1430^{+3708}_{-1014}$

$T_{max}$  = 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

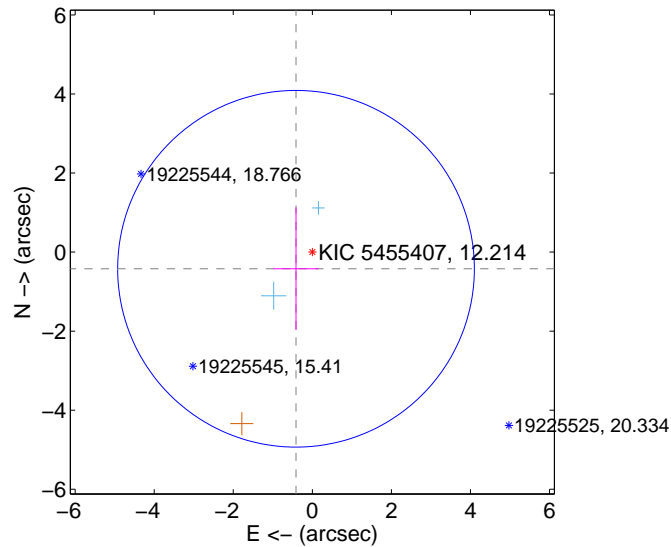
Supplemental centroid analysis for 005455407-04. Kepler magnitude: 12.21. Transit SNR 6.11

There are 2 quarters with good PRF difference image offsets

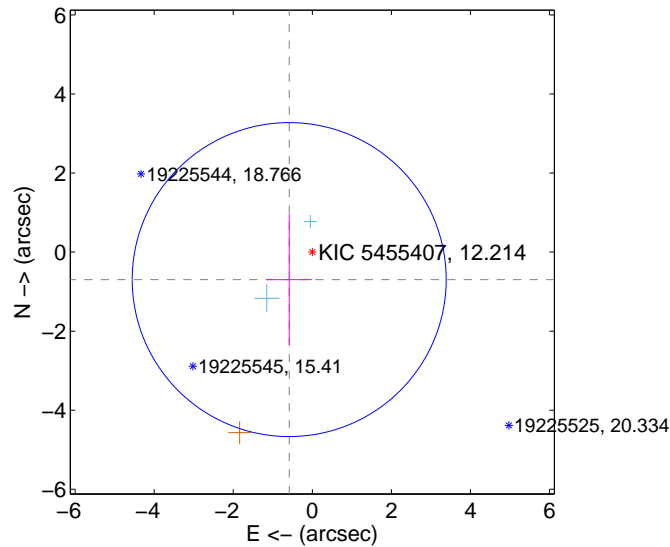
The direct PRF centroid is offset from the target star catalog position by about 0.24 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.590 \pm 1.504$	0.39	$0.413 \pm 0.575$	$-0.422 \pm 1.548$
PRF-fit source offset from KIC position	$0.909 \pm 1.324$	0.69	$0.585 \pm 0.579$	$-0.695 \pm 1.660$
photometric centroid source offset	$1.26 \pm 0.70$	1.81	$-1.16 \pm 0.71$	$0.49 \pm 0.62$

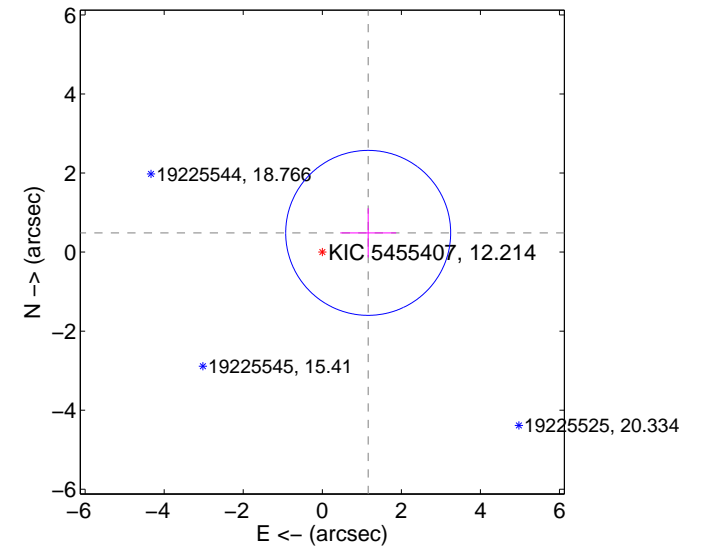
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

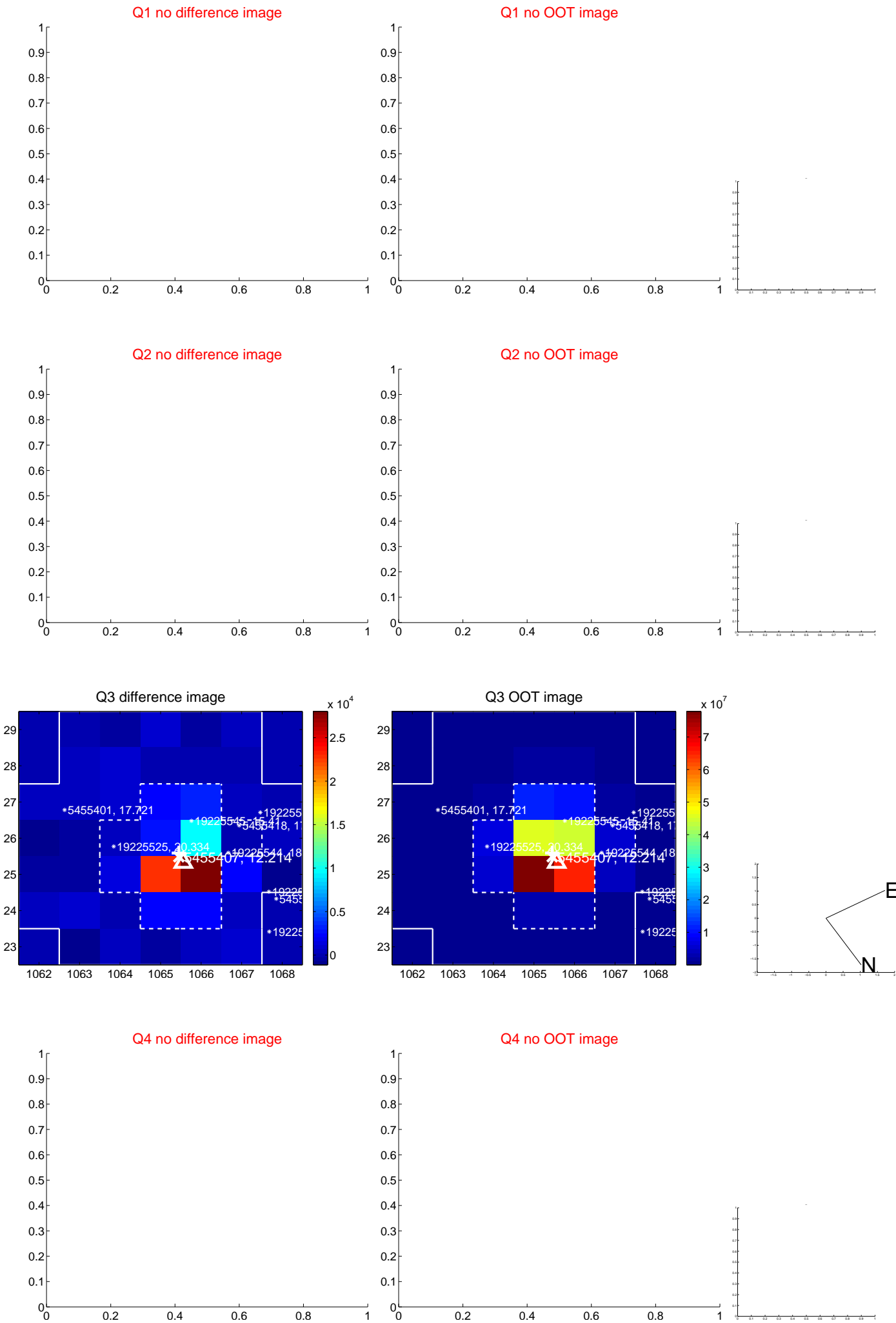


offset from photometric centroids



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.

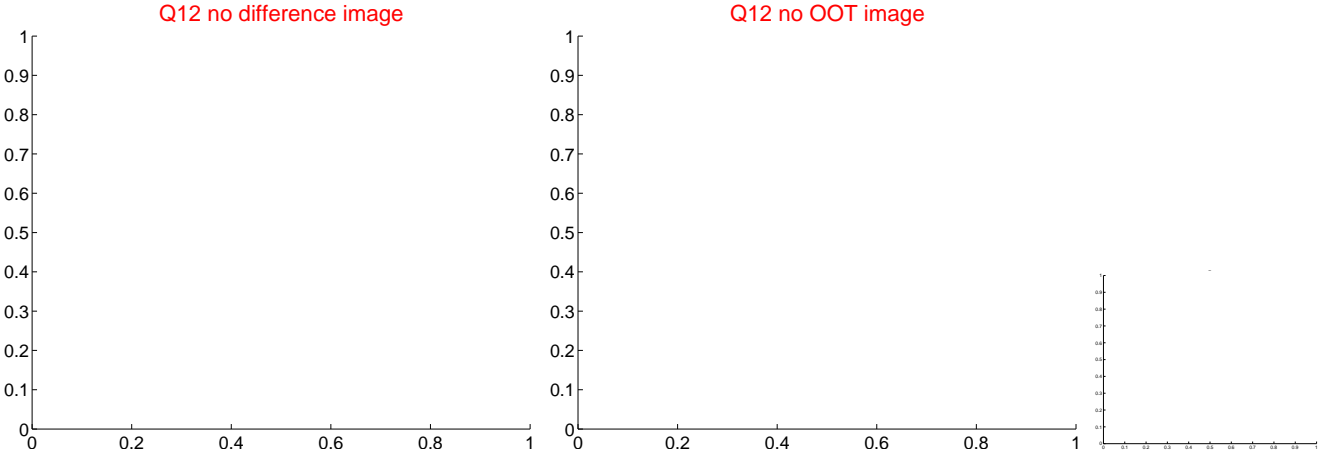
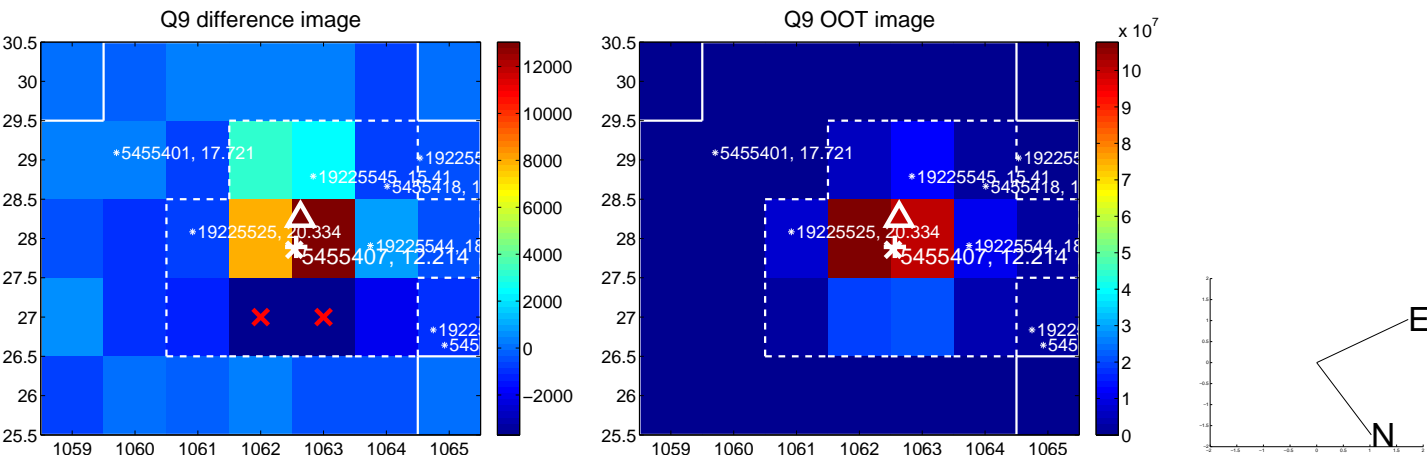
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



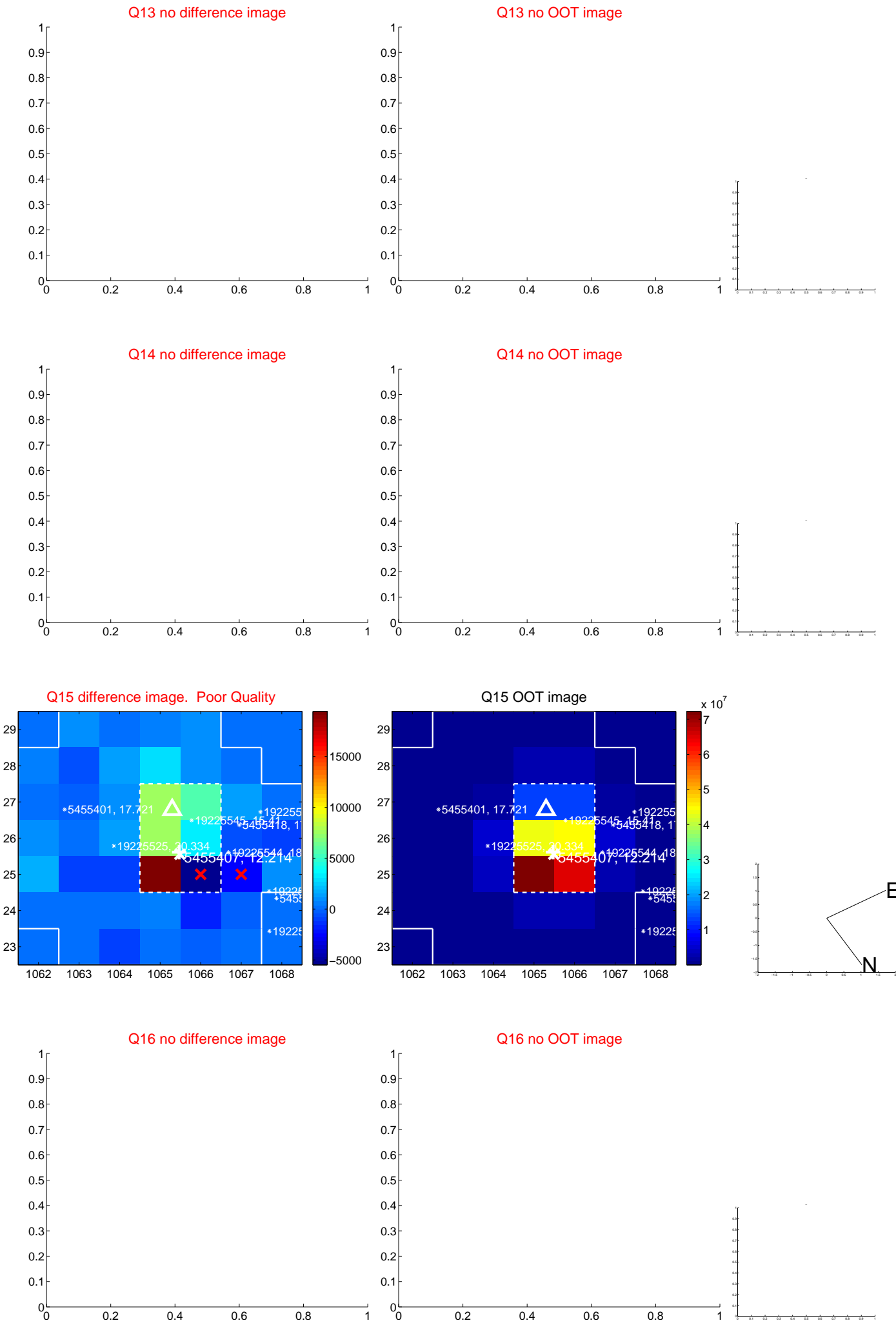
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



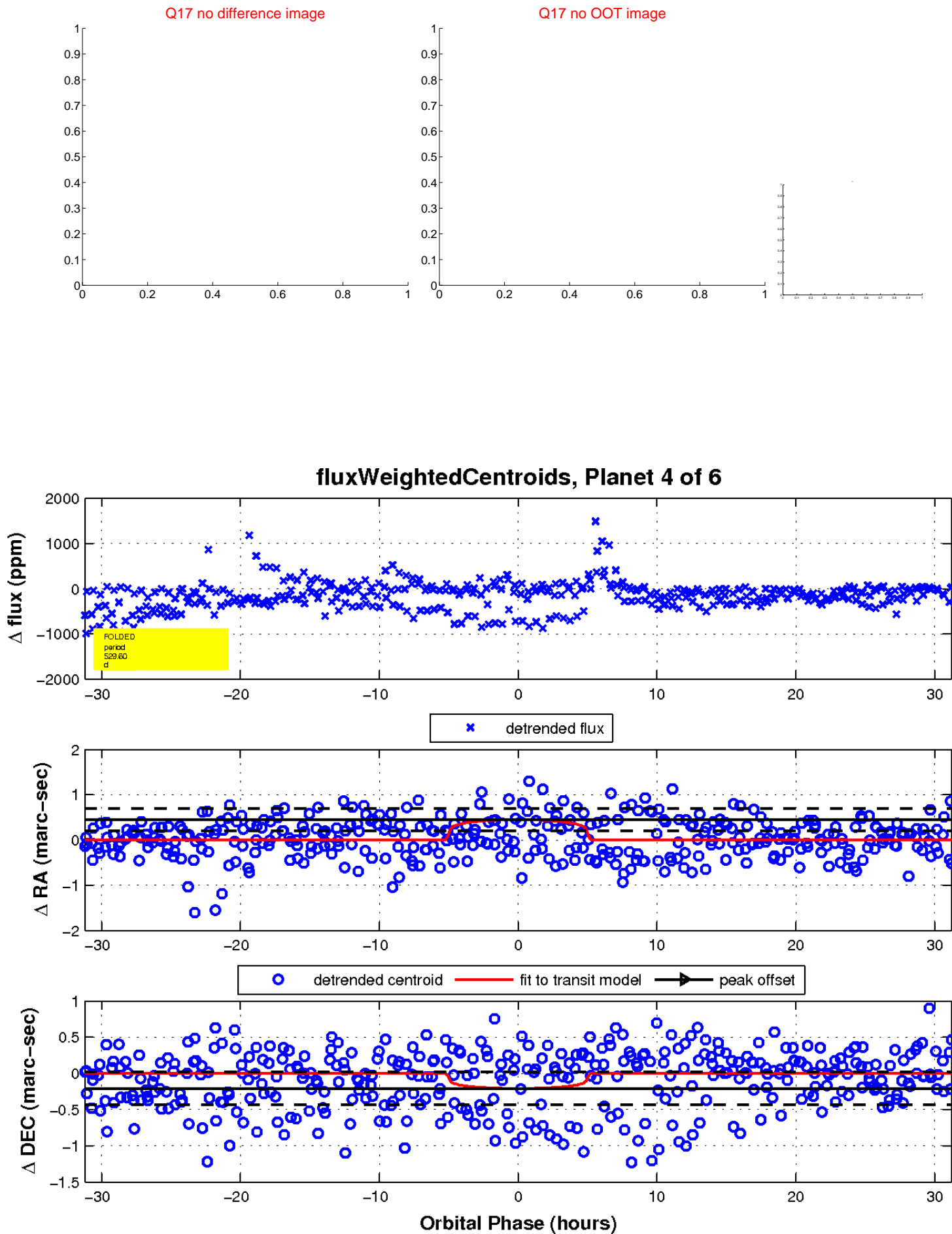
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



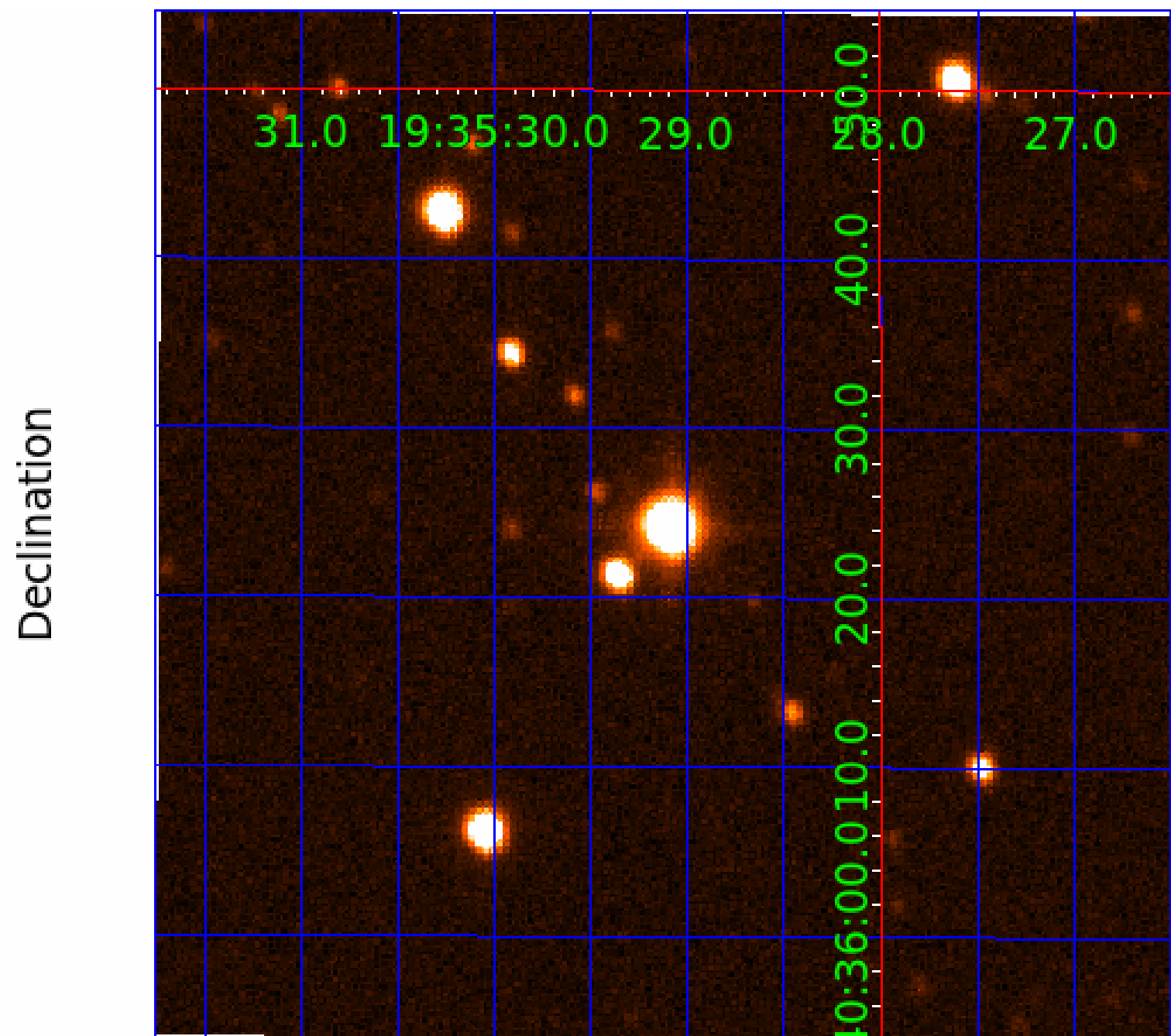
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image





# KIC 005455407

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005455407-01	OBS	No	405.667204	264.234509	474.1	5.540	15.8	8.7	2.18	5519	5.19	3.34
005455407-02	OBS	No	629.942151	137.531595	477.1	14.936	12.5	8.2	2.18	5519	5.01	1.86
005455407-03	OBS	No	289.137237	190.110722	378.6	9.816	12.7	6.9	2.18	5519	4.48	5.25
005455407-04	OBS	No	529.596497	340.722578	344.9	10.441	10.9	6.1	2.18	5519	4.35	2.34
005455407-05	OBS	No	243.480546	158.300050	350.6	8.873	9.5	8.0	2.18	5519	4.13	6.60
005455407-06	OBS	No	368.806760	416.475967	509.8	14.882	8.8	8.9	2.18	5519	6.01	3.80

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005455407-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS
005455407-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005455407-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV
005455407-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV
005455407-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—INCONSISTENT_TRANS
005455407-06	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV

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

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

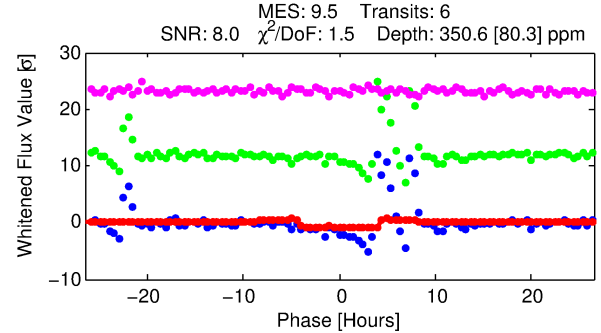
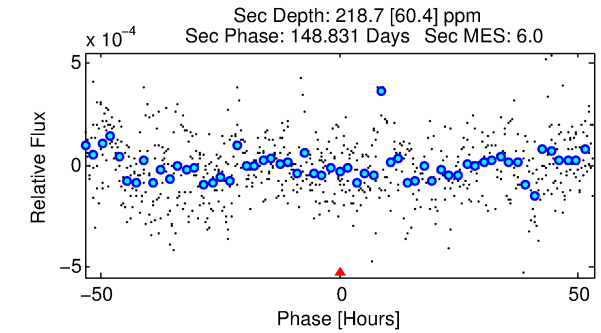
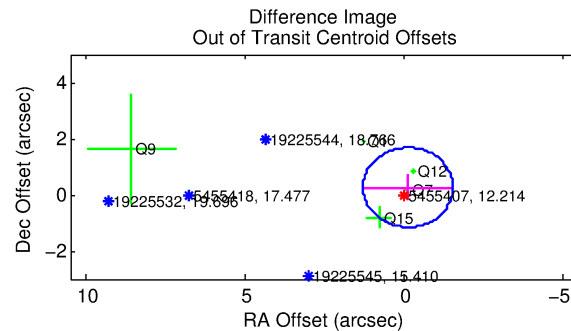
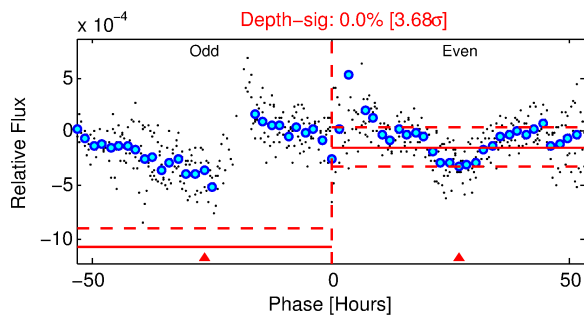
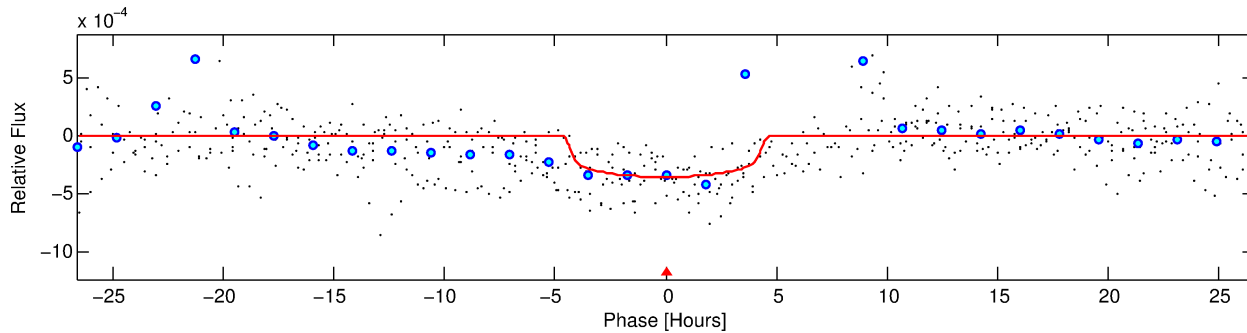
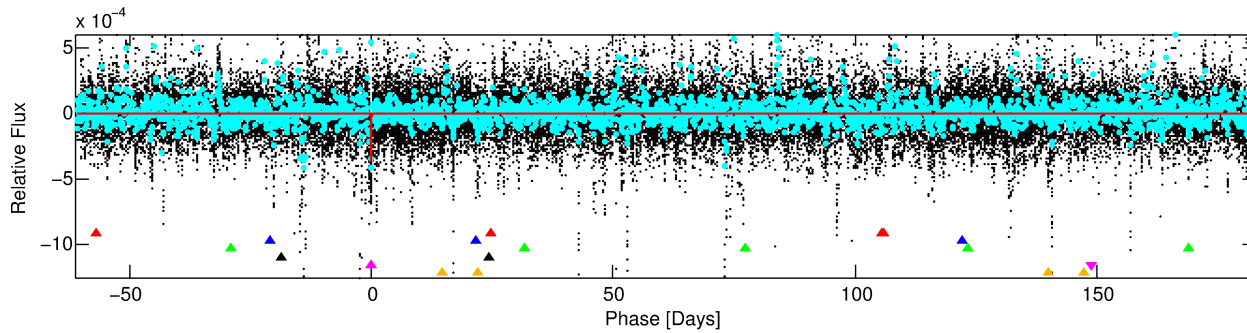
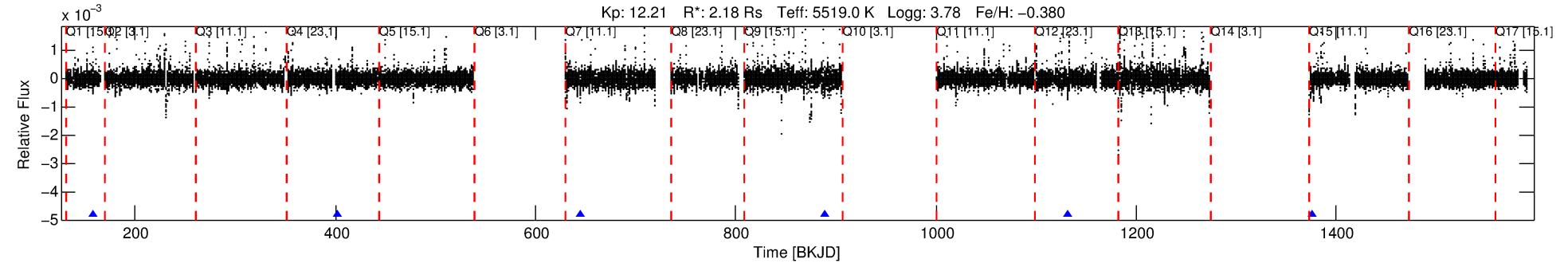
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 005455407-05

No Significant Match Found

# DV One-Page Summary

KIC: 5455407 Candidate: 5 of 6 Period: 243.481 d



## DV Fit Results:

Period = 243.48055 [0.00422] d  
Epoch = 158.3000 [0.0135] BKJD  
Rp/R\* = 0.0174 [0.0235]  
a/R\* = 193.54 [1140.59]  
b = 0.43 [11.34]  
Seff = 6.60 [7.79]  
Teq = 409 [121] K  
Rp = 4.13 [6.20] Re  
a = 0.7745 [0.5365] AU  
Ag = 4223.03 [12534.99] [0.34σ]  
Teffp = 5095 [3477] K [1.35σ]

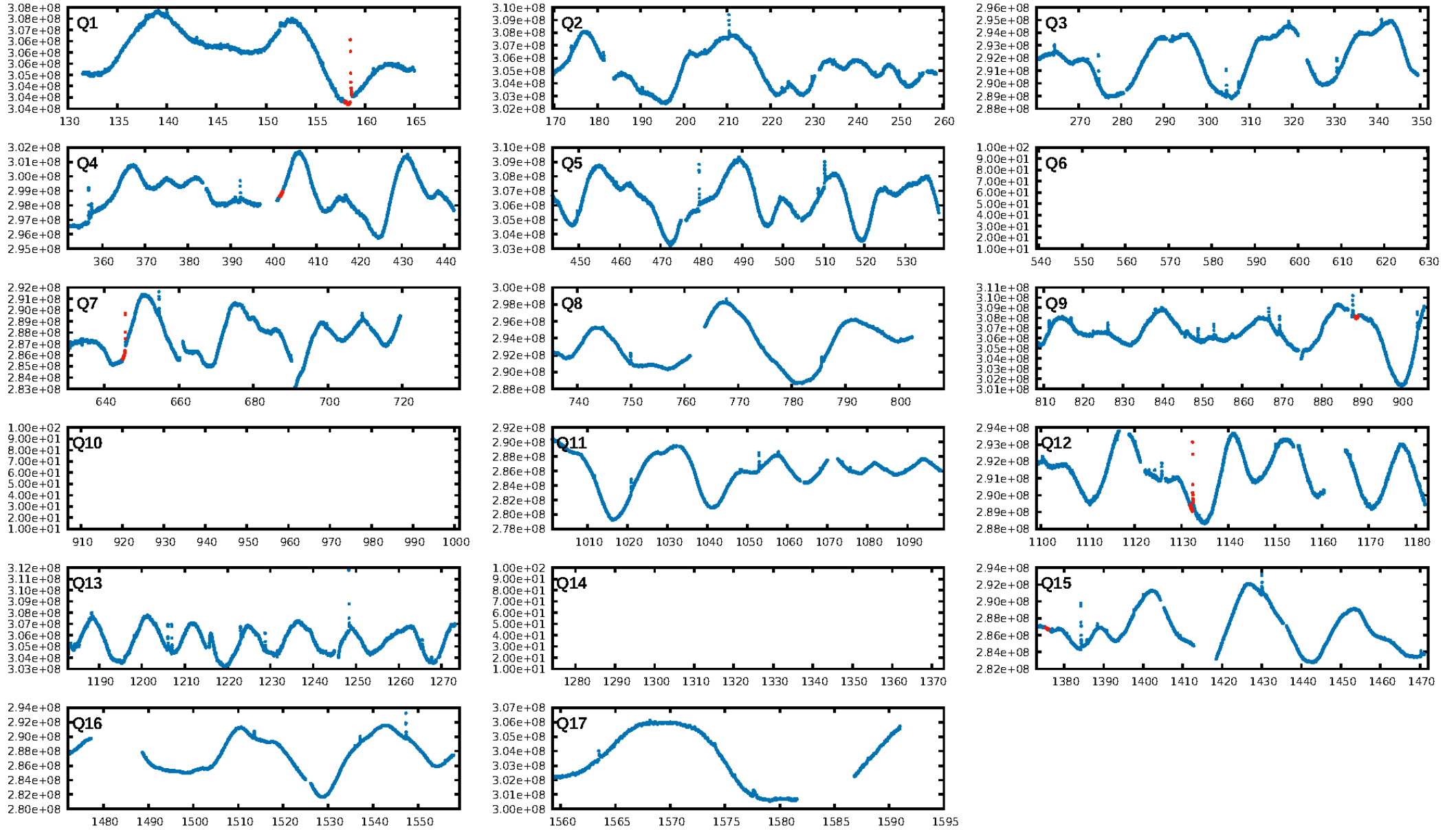
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [82.81σ]  
ModelChiSquare2-sig: 0.0%  
ModelChiSquareGof-sig: 17.1%  
Bootstrap-pfa: 1.73e-08  
RollingBand-fgt: 1.00 [5/5]  
GhostDiagnostic-chr: -0.2944  
Centroid-sig: 3.8%  
Centroid-so: 0.700 arcsec [1.66σ]  
OotOffset-rm: 0.284 arcsec [0.60σ]  
OotOffset-st: 0/2/1/2 [5]  
KicOffset-rm: 0.036 arcsec [0.04σ]  
KicOffset-st: 0/2/1/2 [5]  
DiffImageQuality-fgm: 0.80 [4/5]  
DiffImageOverlap-fno: 1.00 [5/5]

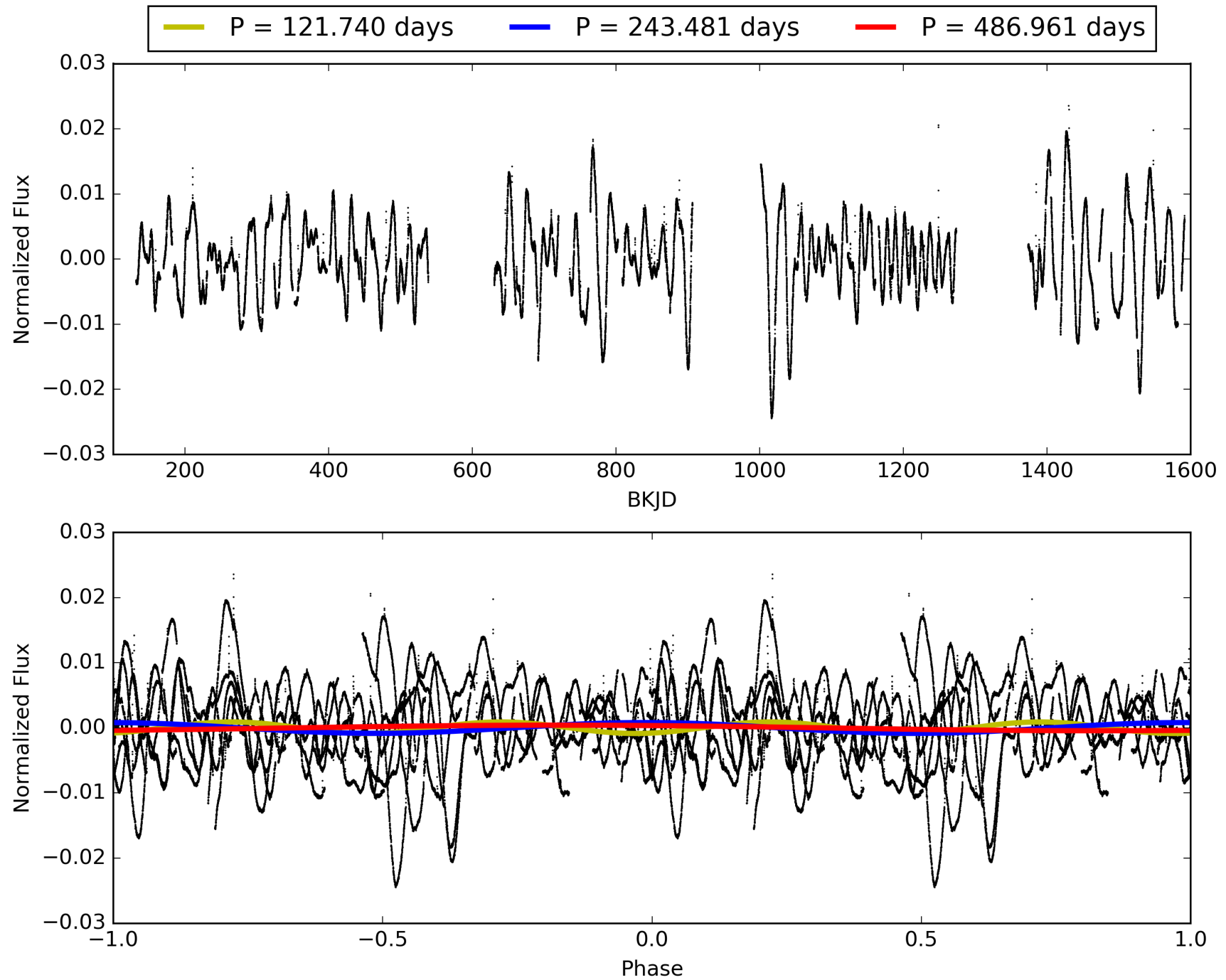
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 05:15:22 Z

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

# TCE 005455407-05, PDC Light Curves

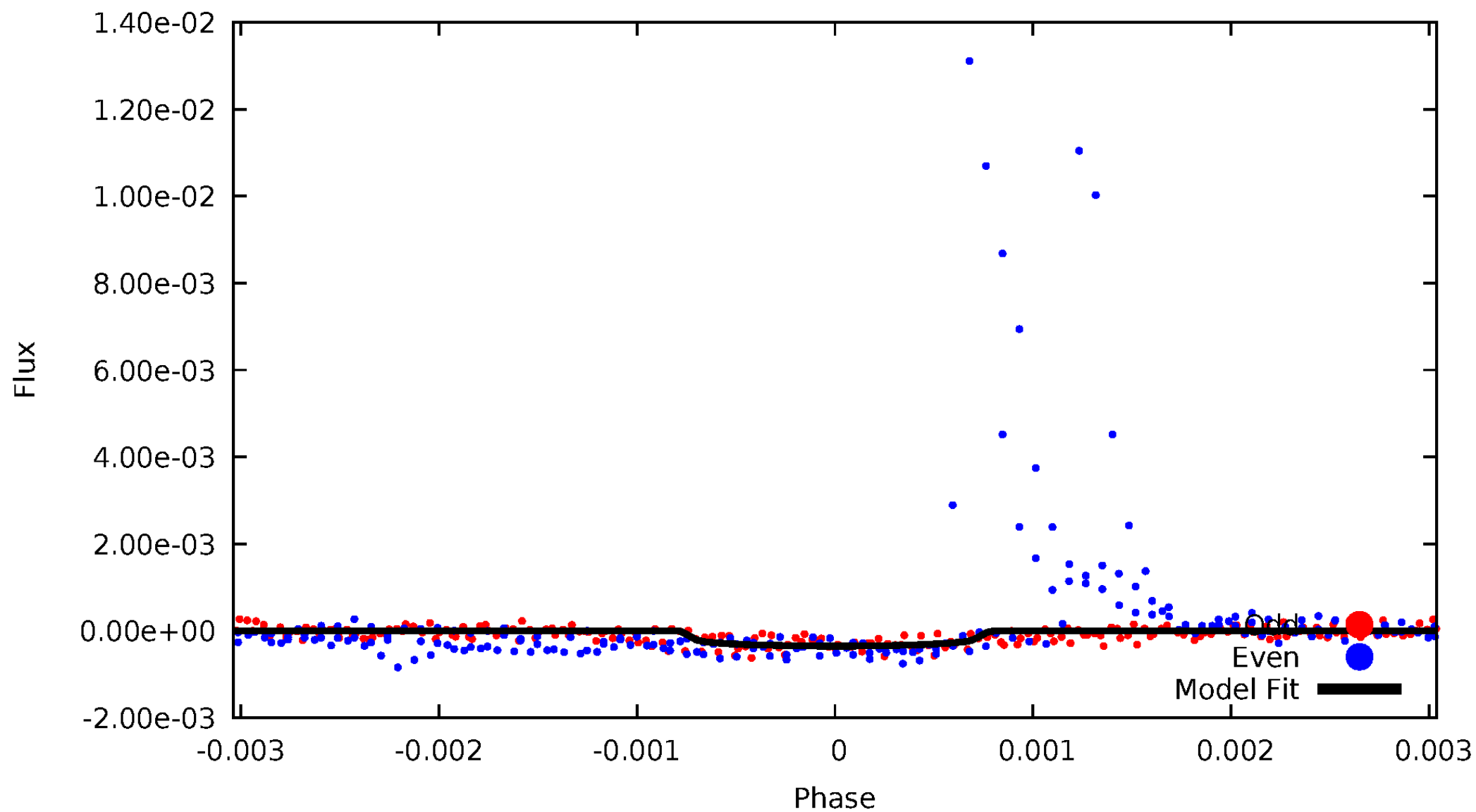


TCE 005455407-05



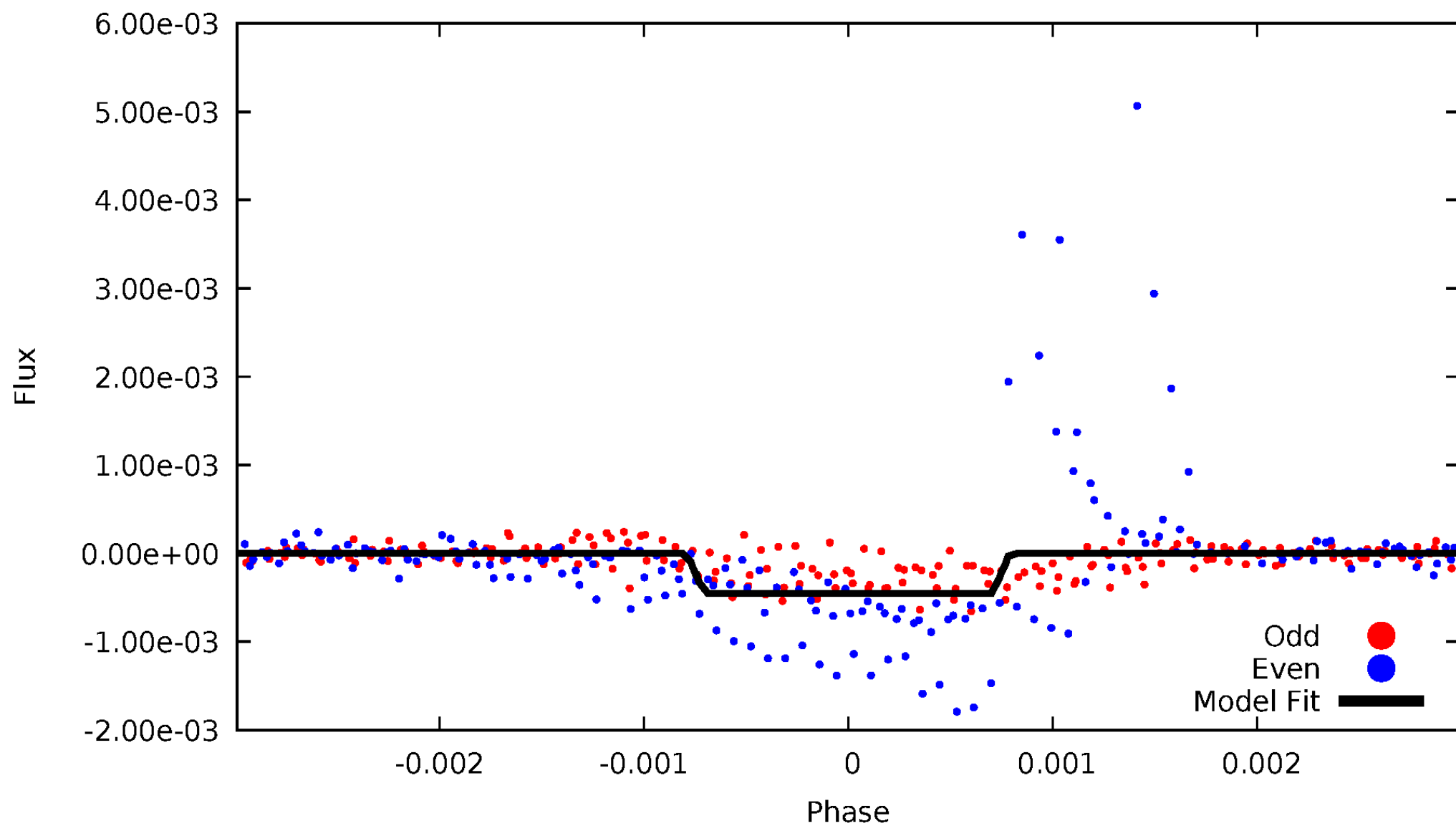
# DV Odd/Even

TCE 005455407-05

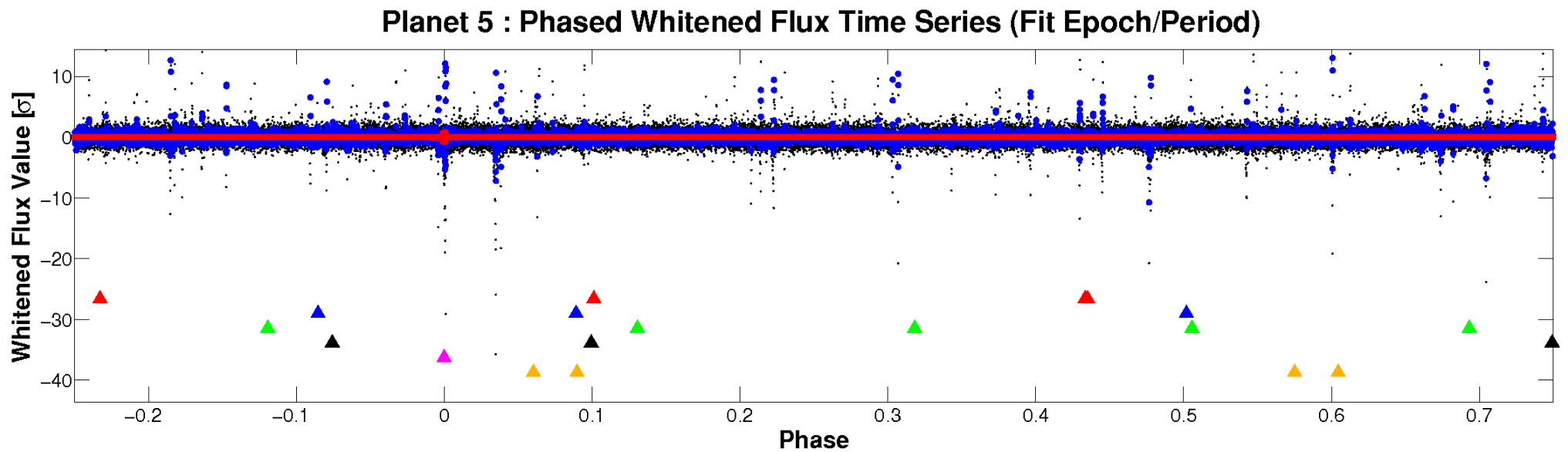
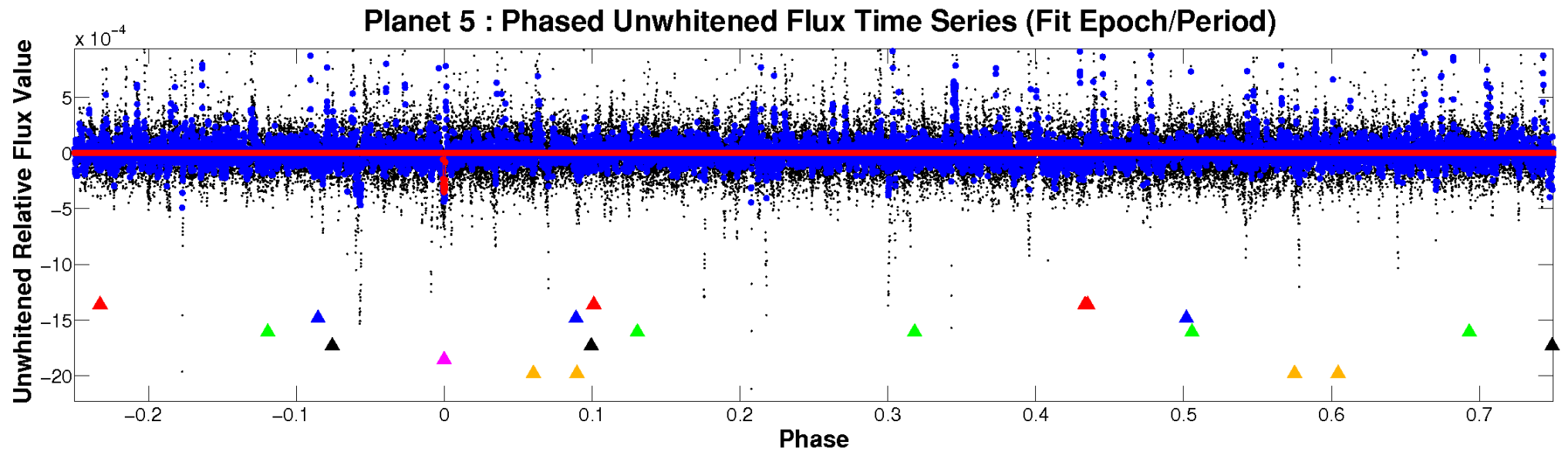


# ALT Odd/Even

TCE 005455407-05

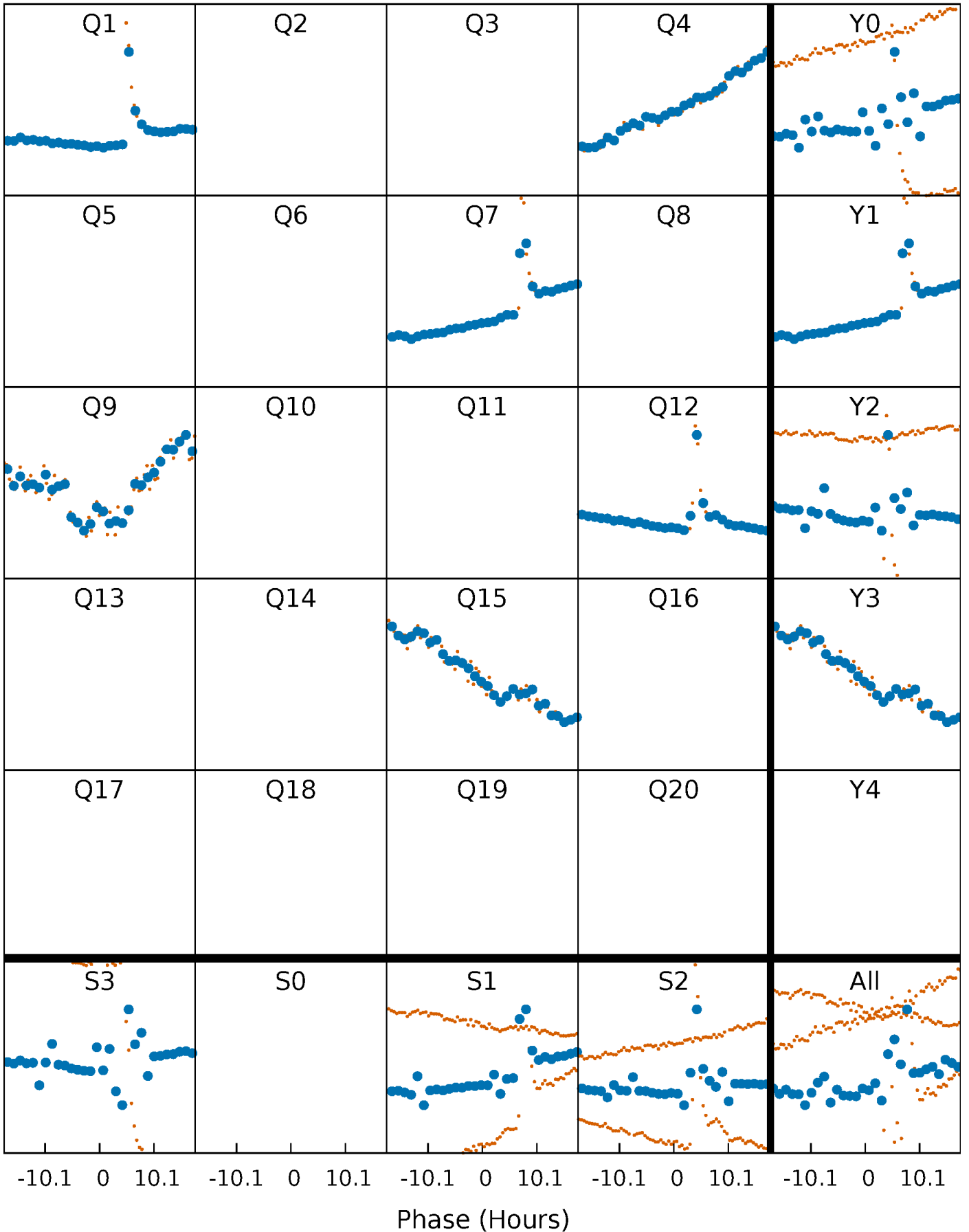


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

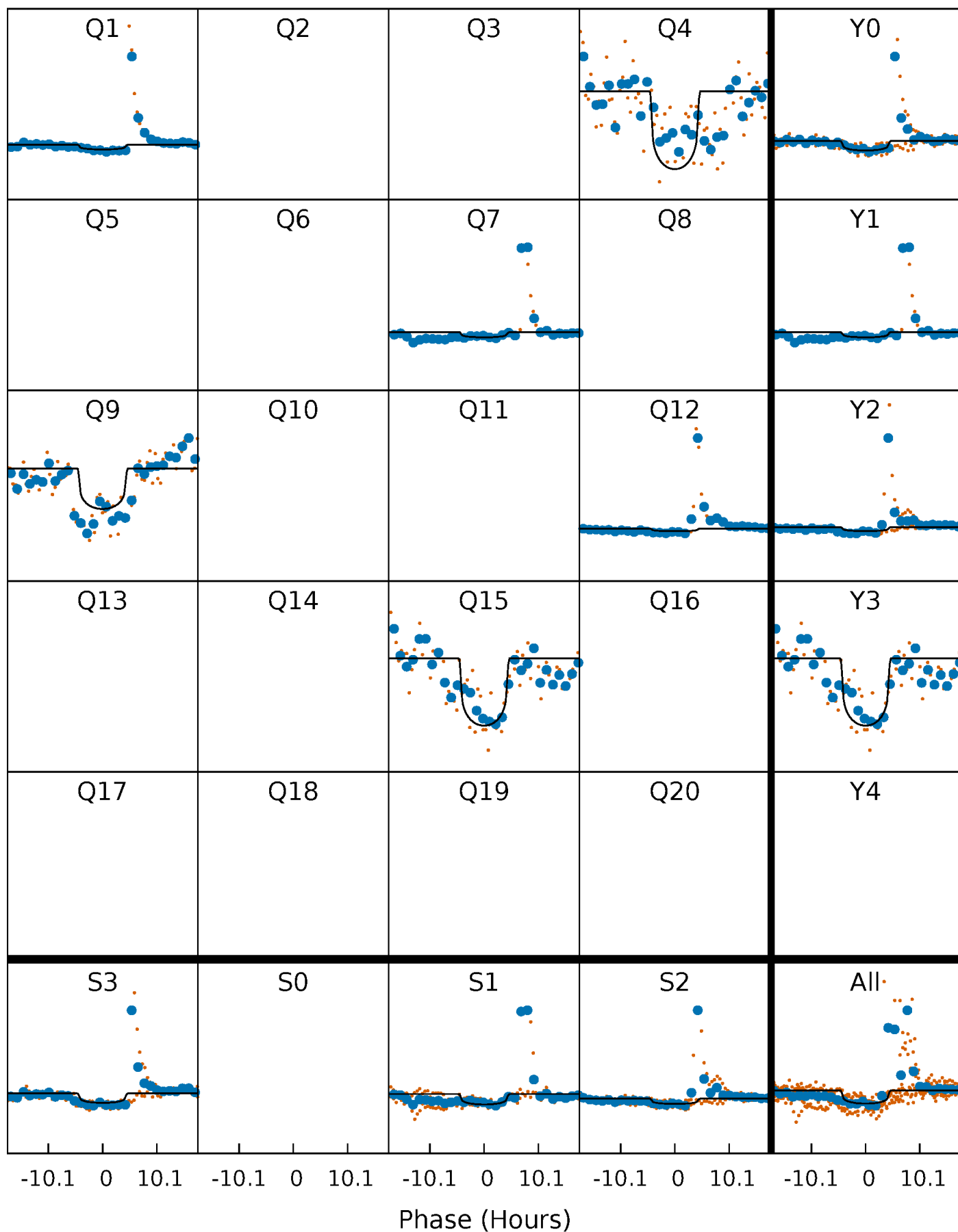
TCE 005455407-05     $P=243.480546$  Days     $T_0=158.300050$  (BKJD)





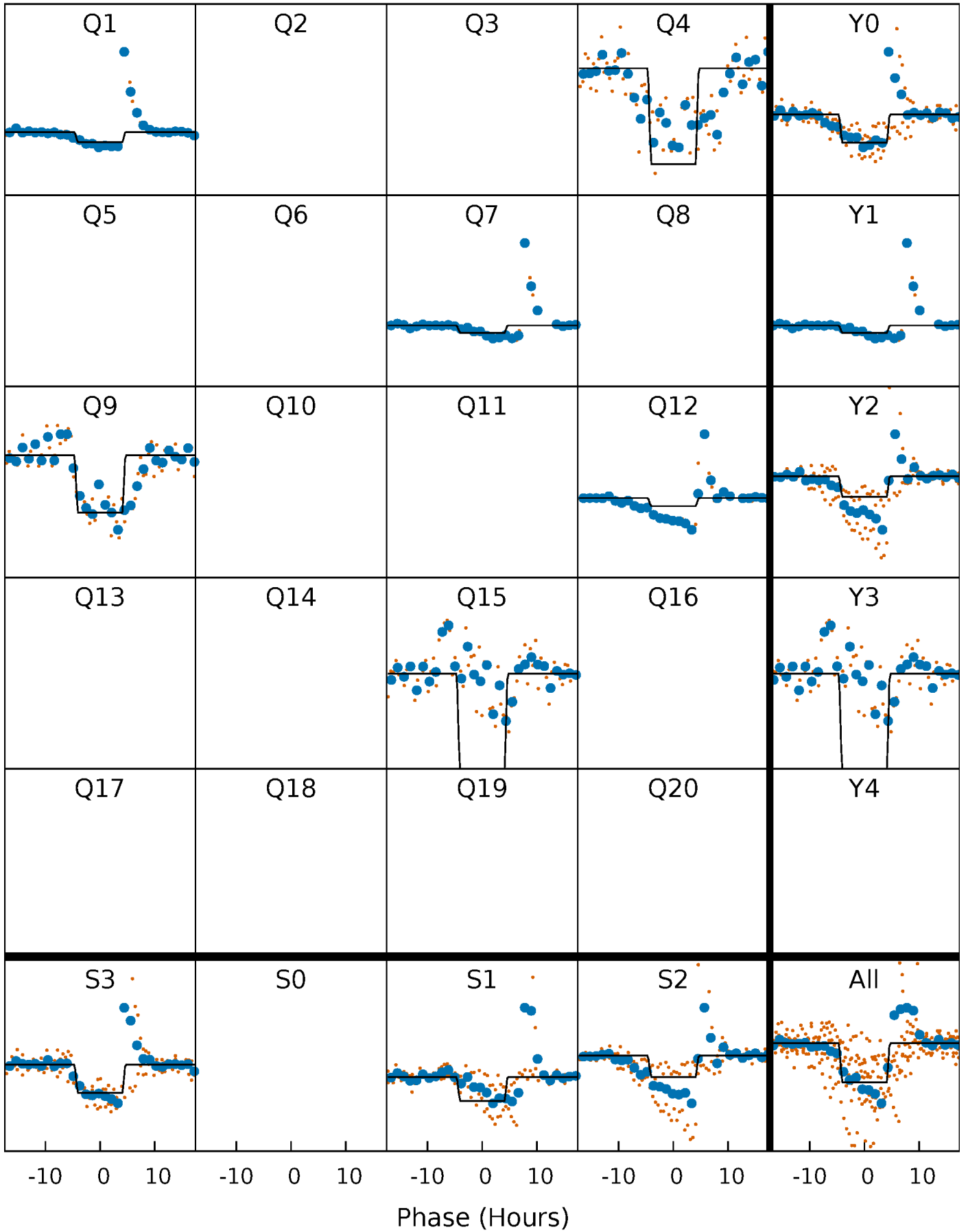
# DV Quarter-Phased Transit Curves

TCE 005455407-05     $P=243.480546$  Days     $T_0=158.300050$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

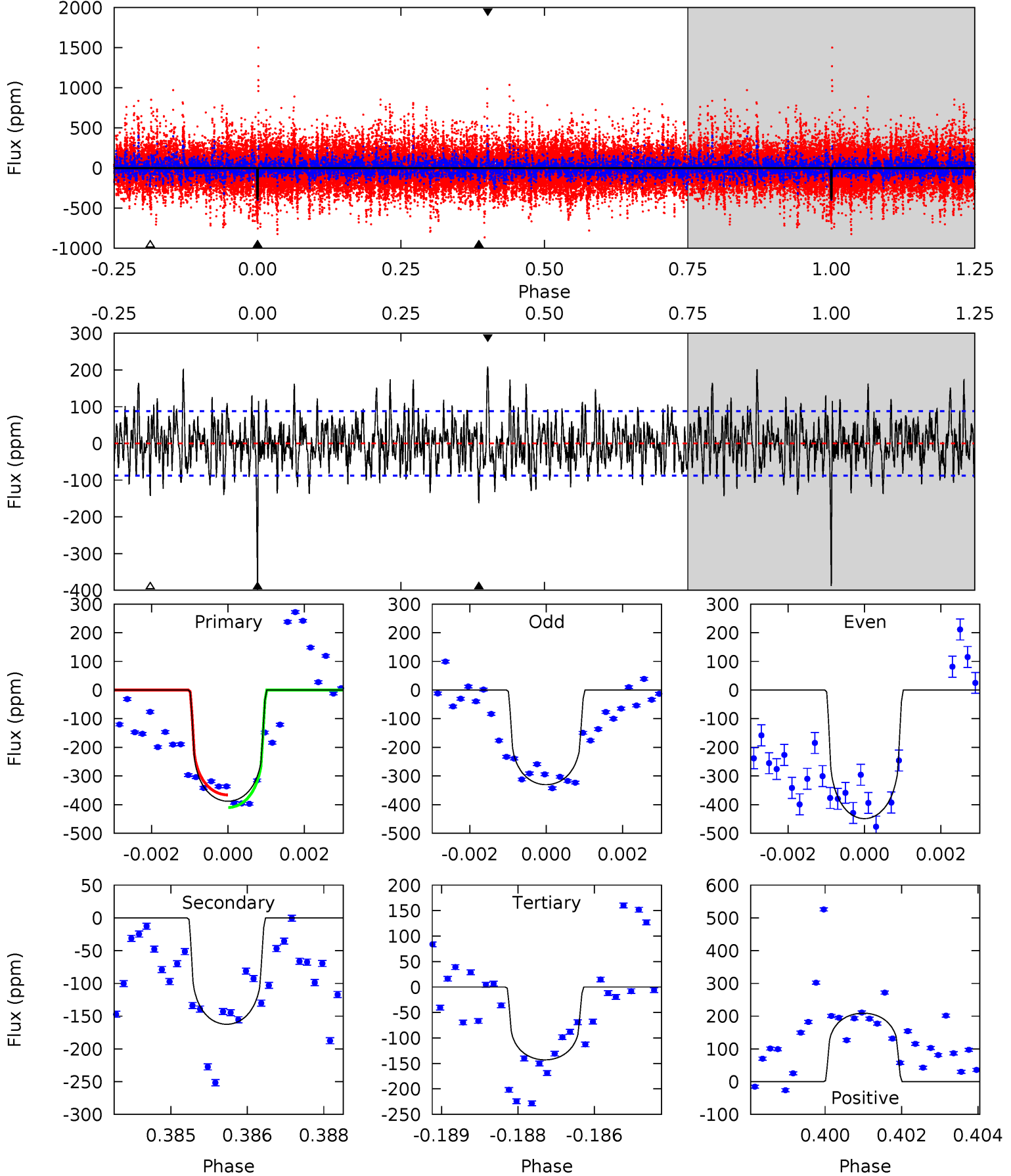
TCE 005455407-05     $P=243.459056$  Days     $T_0=158.340386$  (BKJD)



# DV Model-Shift Uniqueness Test

005455407-05, P = 243.480546 Days, E = 158.300050 Days

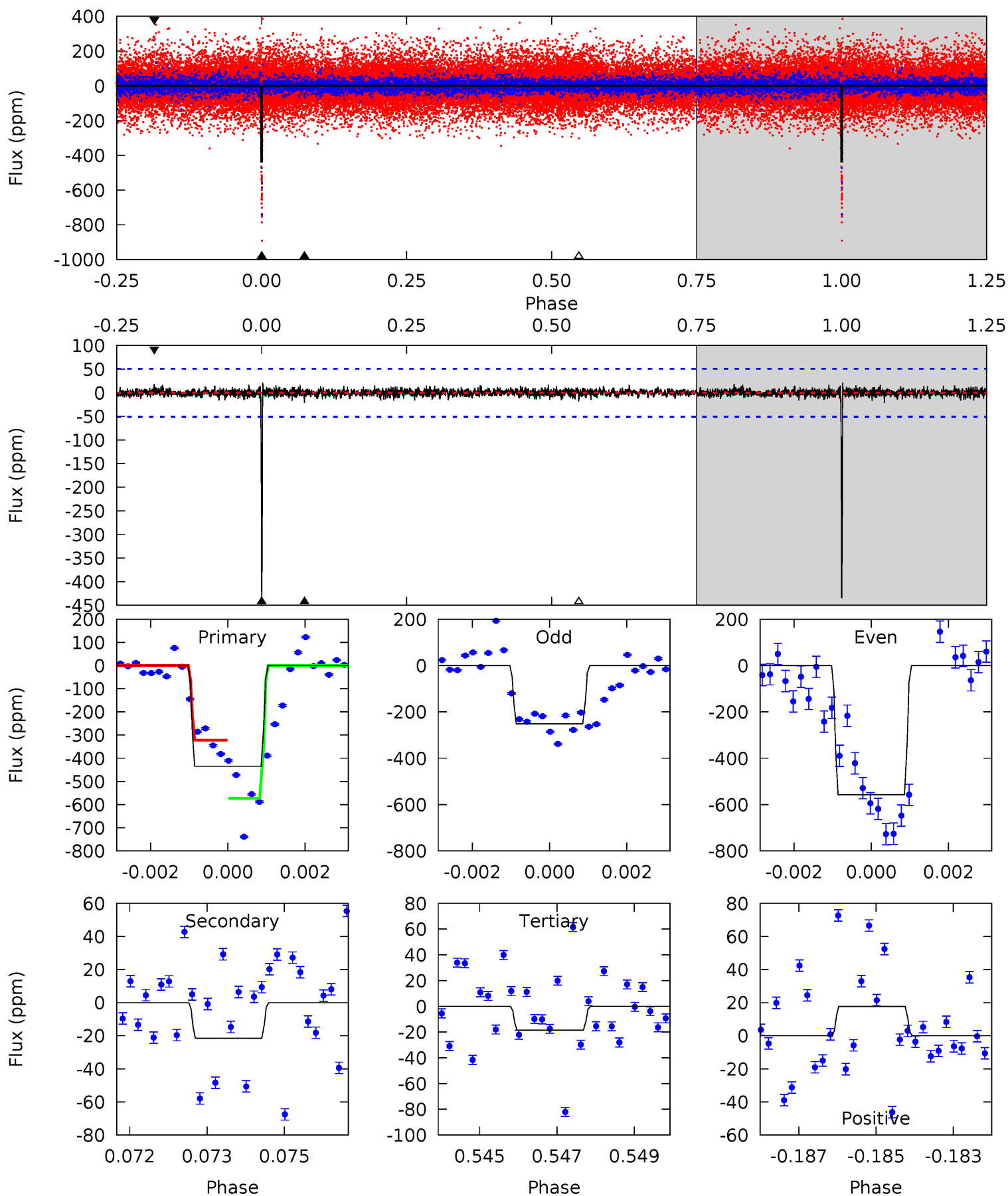
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
23.8	9.94	8.75	12.8	5.37	3.16	3.17	15.0	11.0	1.19	-2.85	3.24	0.75	0.35	1.35



# Alt Model-Shift Uniqueness Test

005455407-05, P = 243.459056 Days, E = 158.340386 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
45.9	2.28	1.95	1.87	5.37	3.16	0.47	44.0	44.1	0.32	0.41	17.2	1.12	0.05	13.2



### Stellar Parameters For KIC 005455407

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5519^{+174}_{-154}$	$3.779^{+0.712}_{-0.237}$	$-0.380^{+0.350}_{-0.250}$	$2.183^{+0.751}_{-1.394}$	$1.045^{+0.184}_{-0.225}$	$0.142^{+1.851}_{-0.088}$
	+3%/-3%	+19%/-6%	+92%/-66%	+34%/-64%	+18%/-22%	+1307%/-62%
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 005455407-05 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-162 \pm 16$	$5.11^{+5.39}_{-3.46}$	$560^{+65}_{-96}$	$4256^{+2528}_{-846}$	$2098^{+17420}_{-1604}$
Alt.	$-22 \pm 9$	$5.62^{+5.69}_{-3.73}$	$567^{+63}_{-98}$	$2957^{+1163}_{-475}$	$207^{+1484}_{-162}$

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

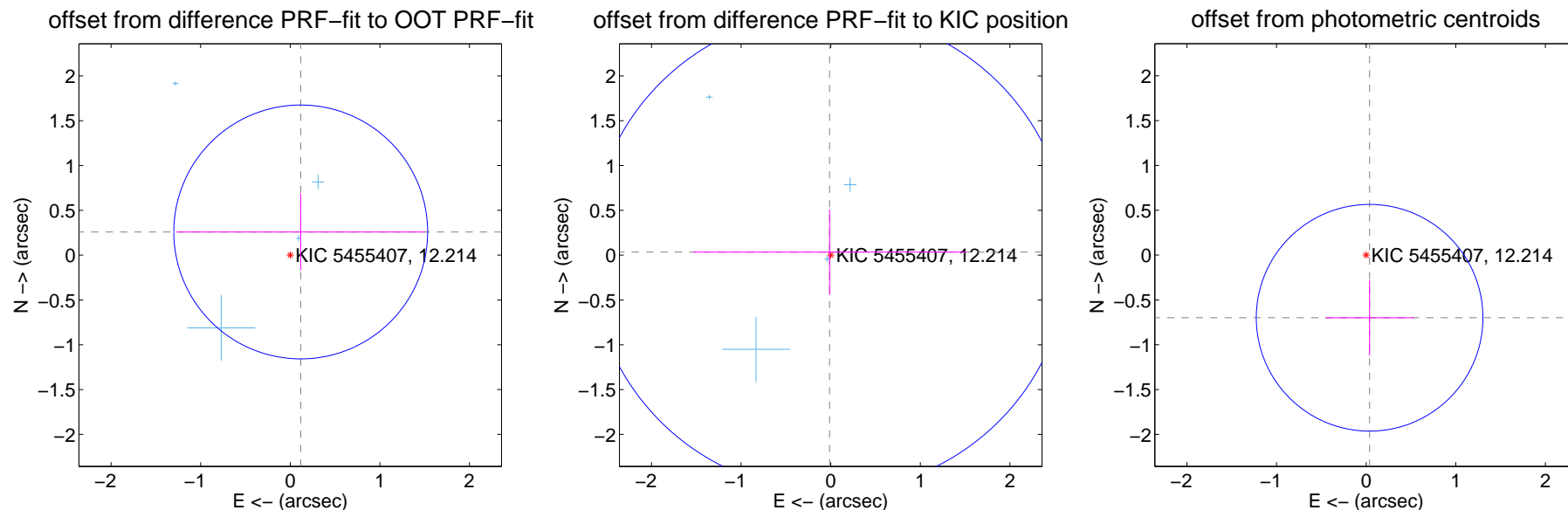
## DV Centroid Data

Supplemental centroid analysis for 005455407-05. Kepler magnitude: 12.21. Transit SNR 8.03

There are 4 quarters with good PRF difference image offsets

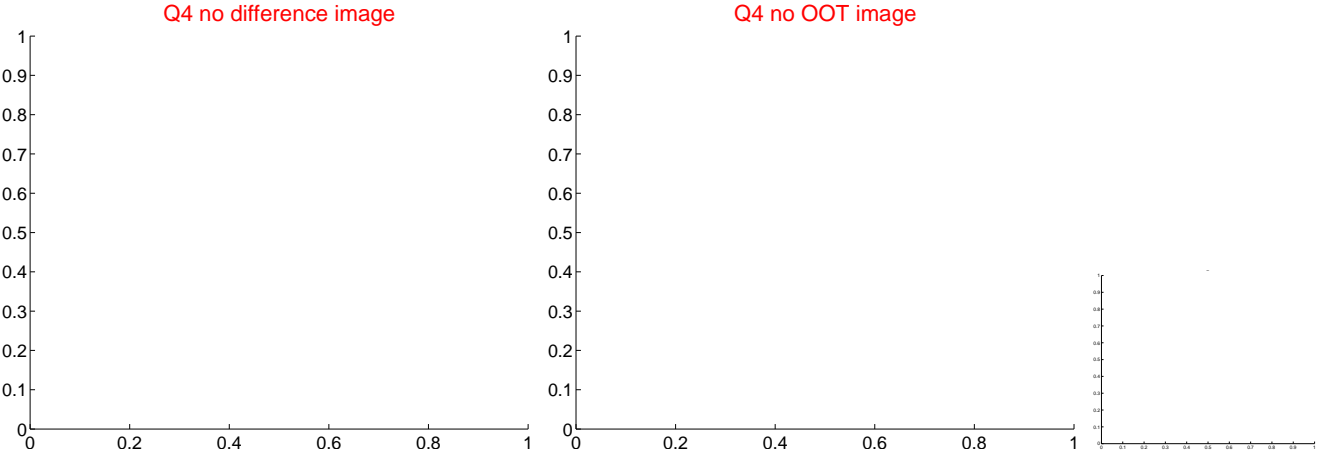
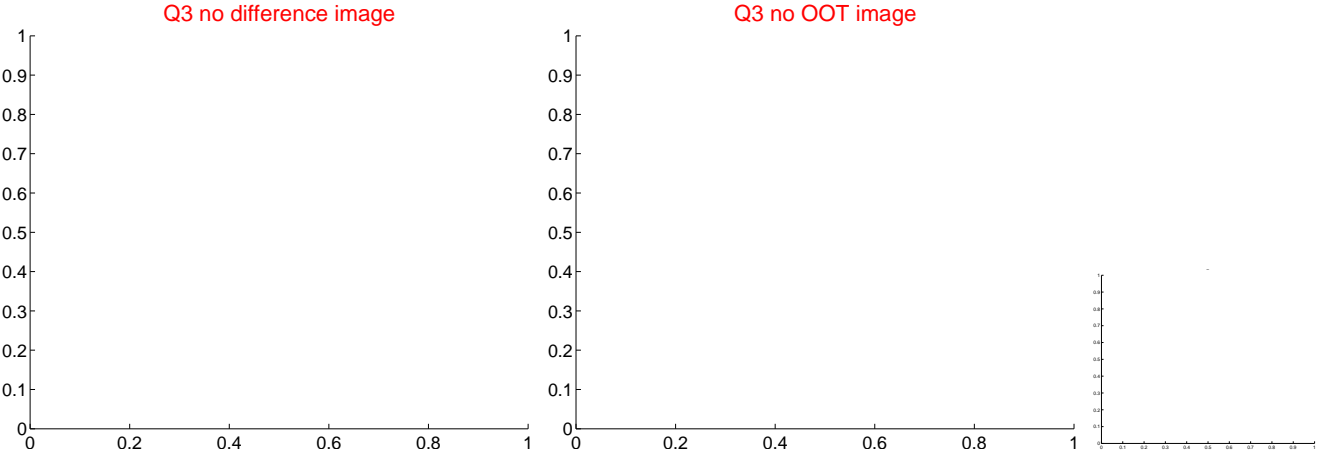
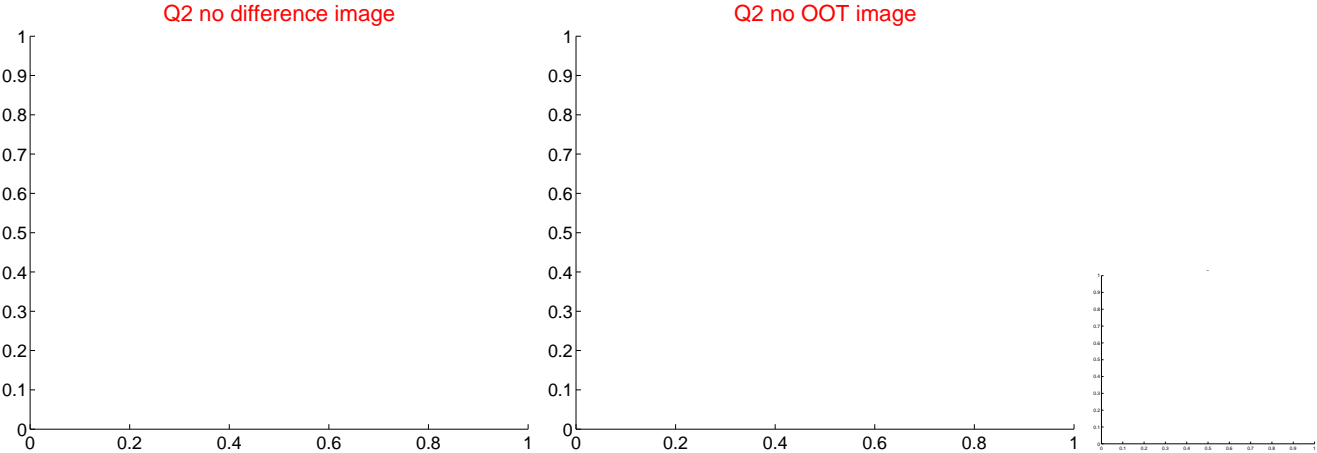
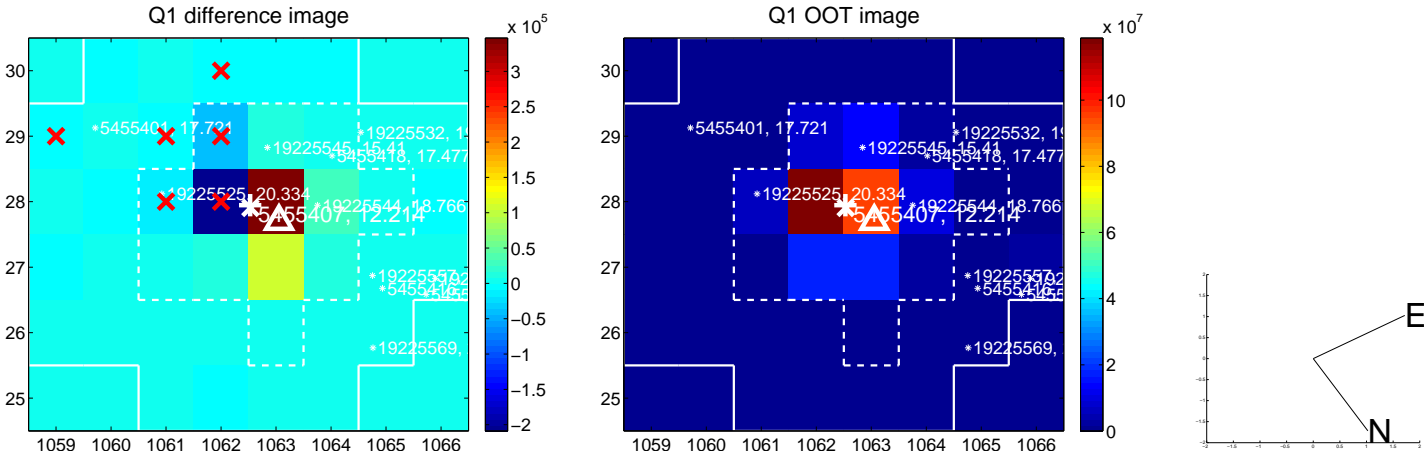
The direct PRF centroid is offset from the target star catalog position by about 0.25 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.284 \pm 0.472$	0.60	$-0.117 \pm 1.388$	$0.259 \pm 0.427$
PRF-fit source offset from KIC position	$0.036 \pm 0.890$	0.04	$0.012 \pm 1.525$	$0.034 \pm 0.477$
photometric centroid source offset	$0.70 \pm 0.42$	1.66	$-0.04 \pm 0.49$	$-0.70 \pm 0.42$

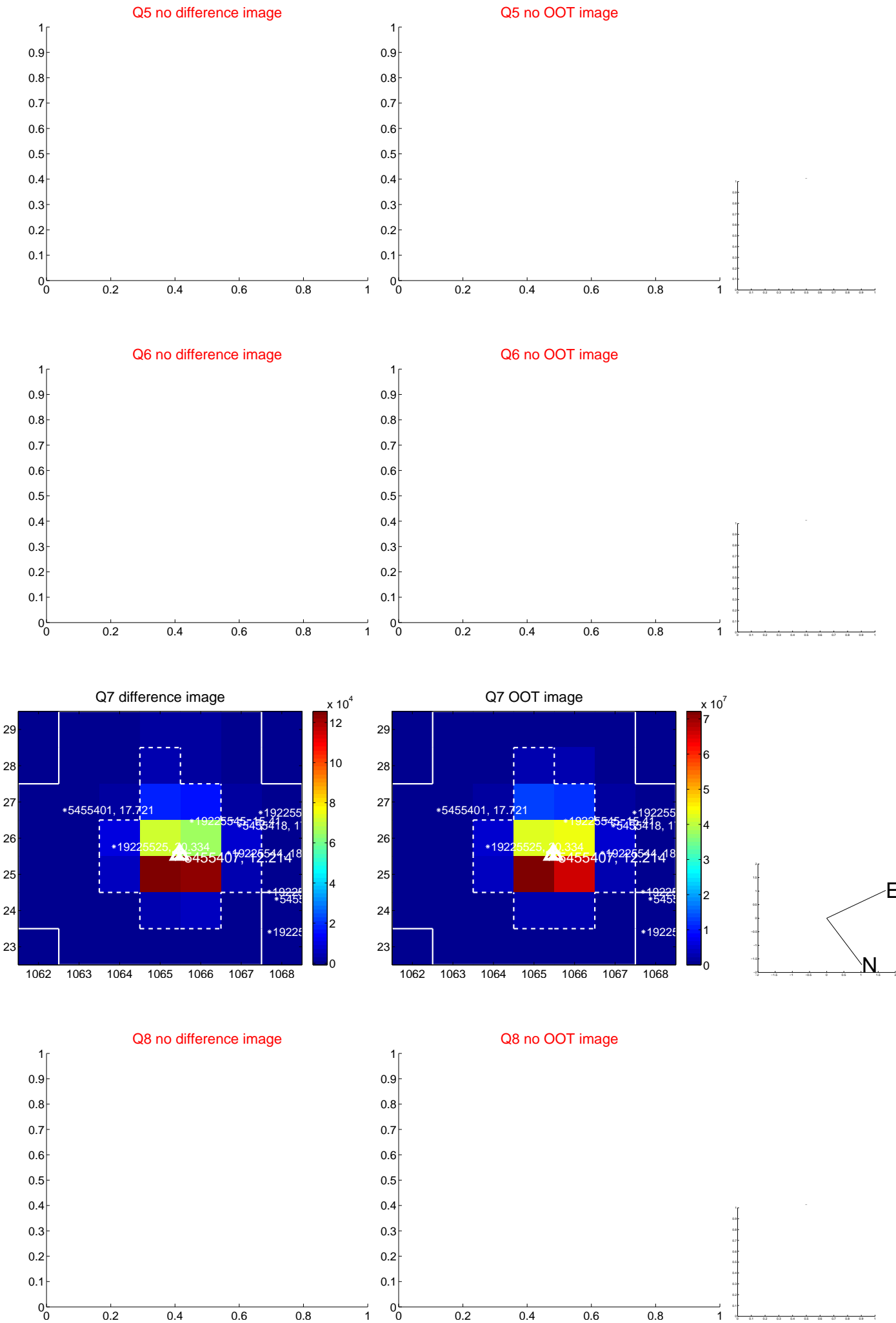


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

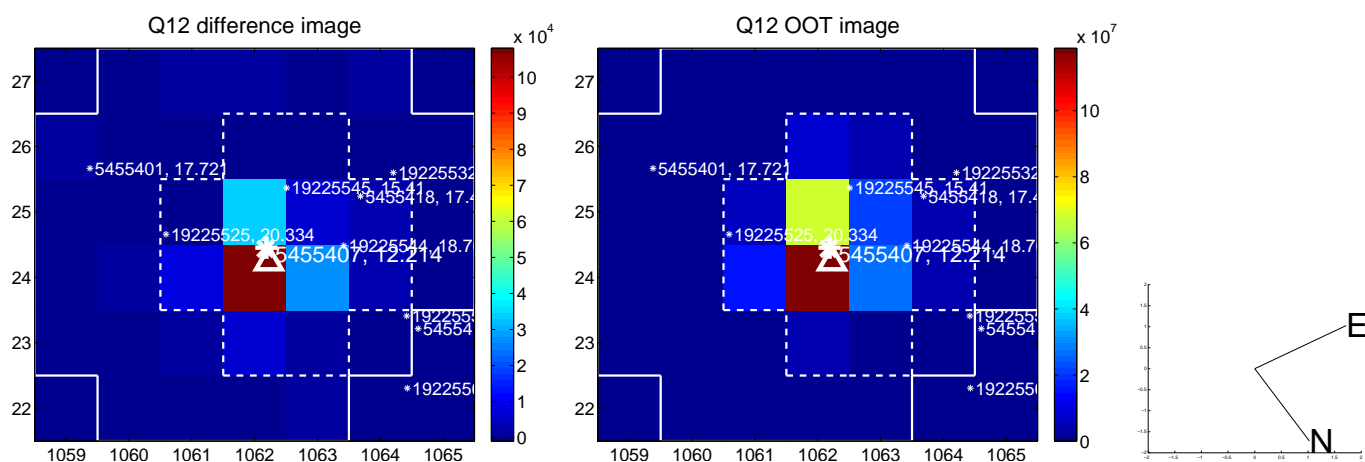
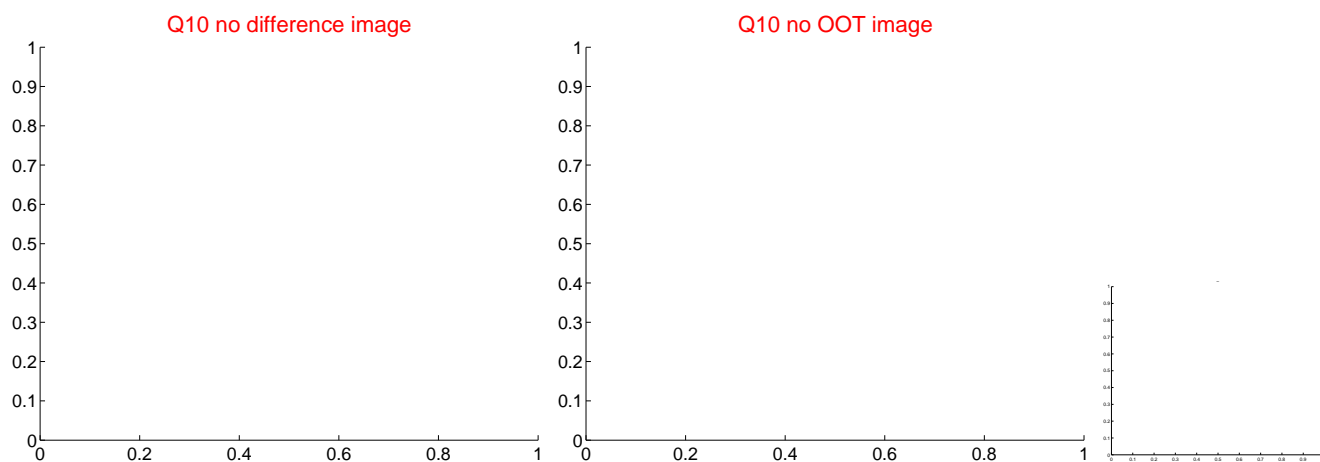
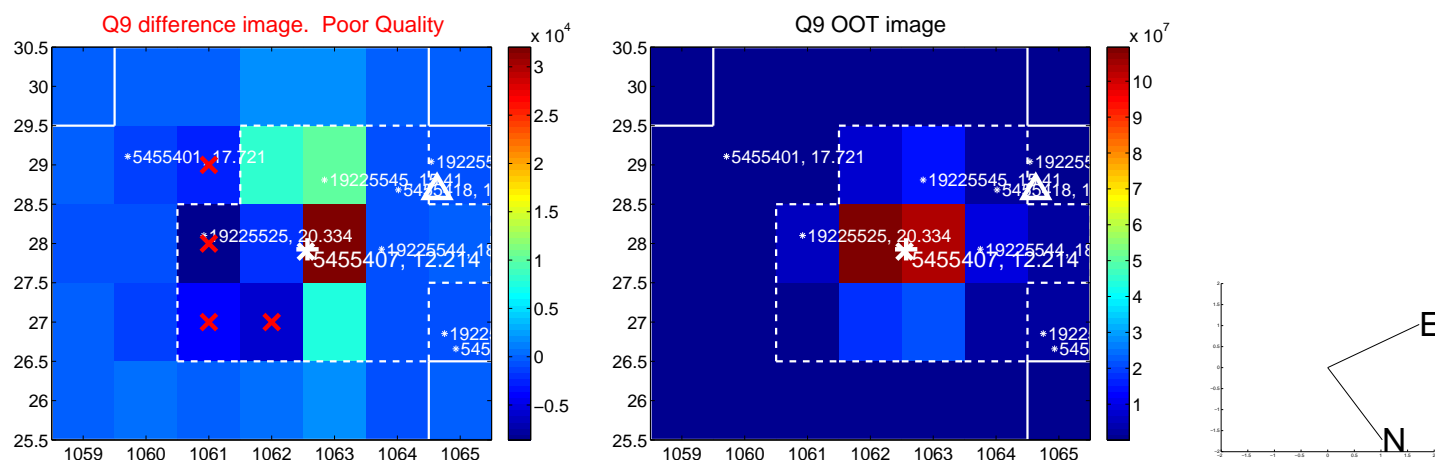


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

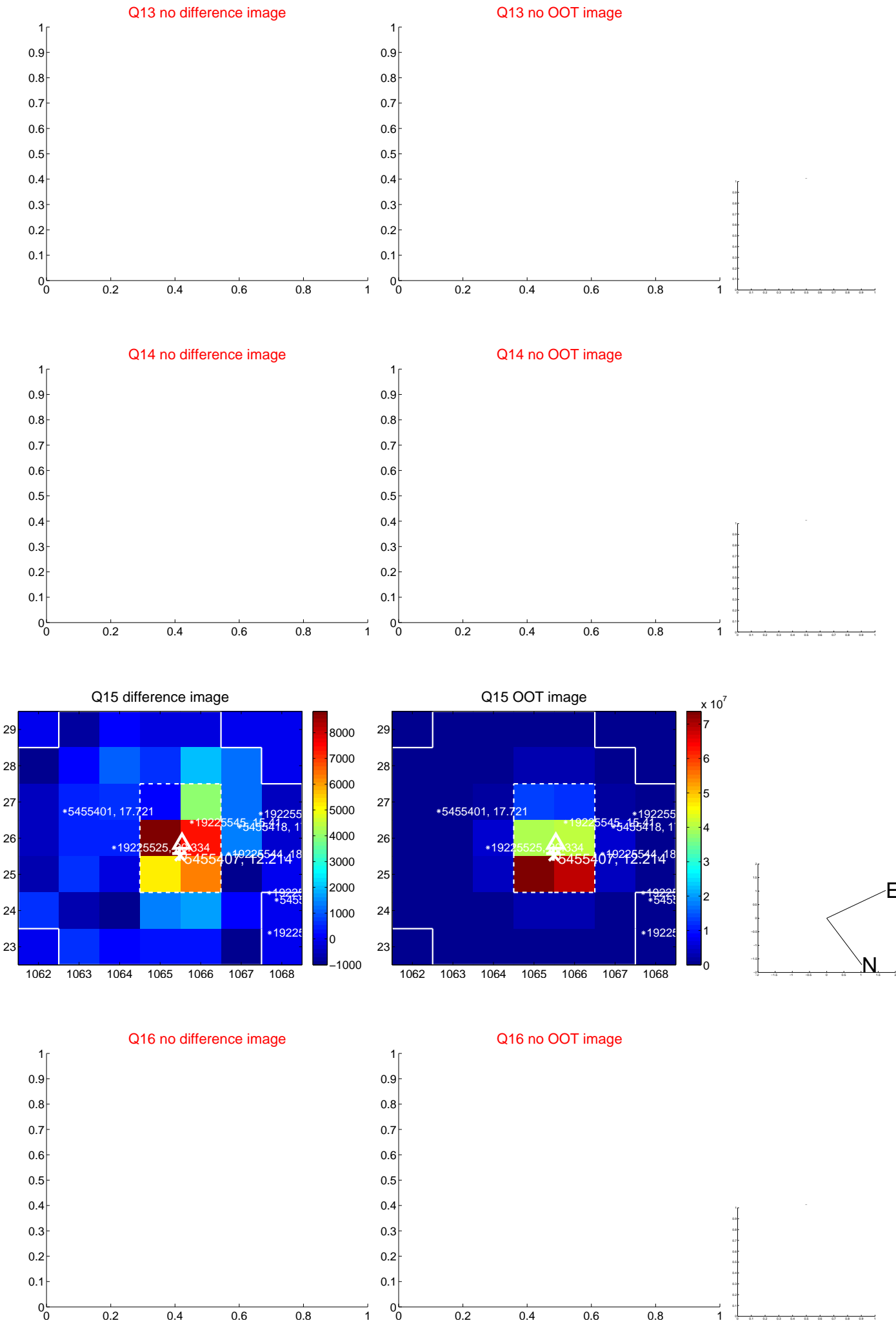




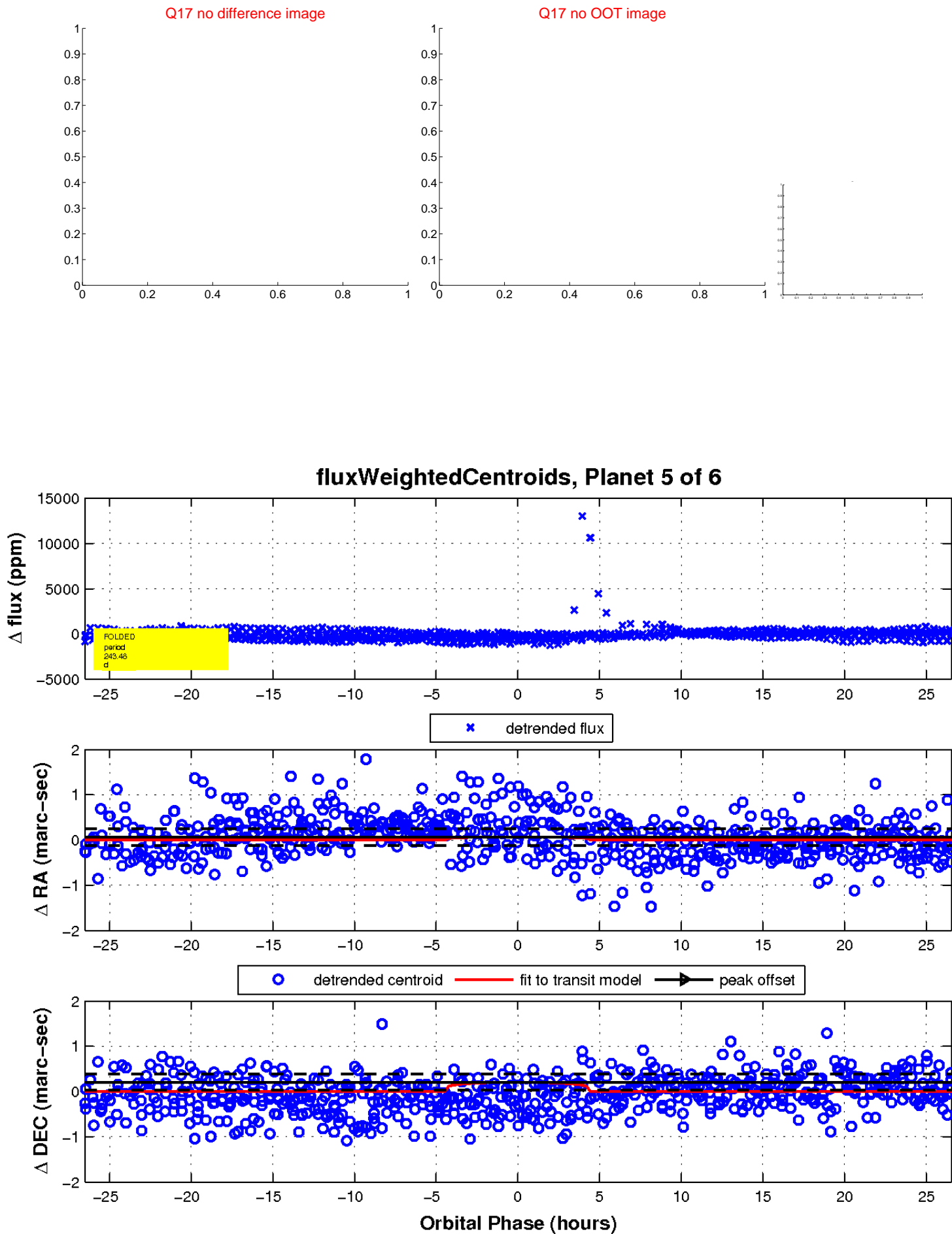
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

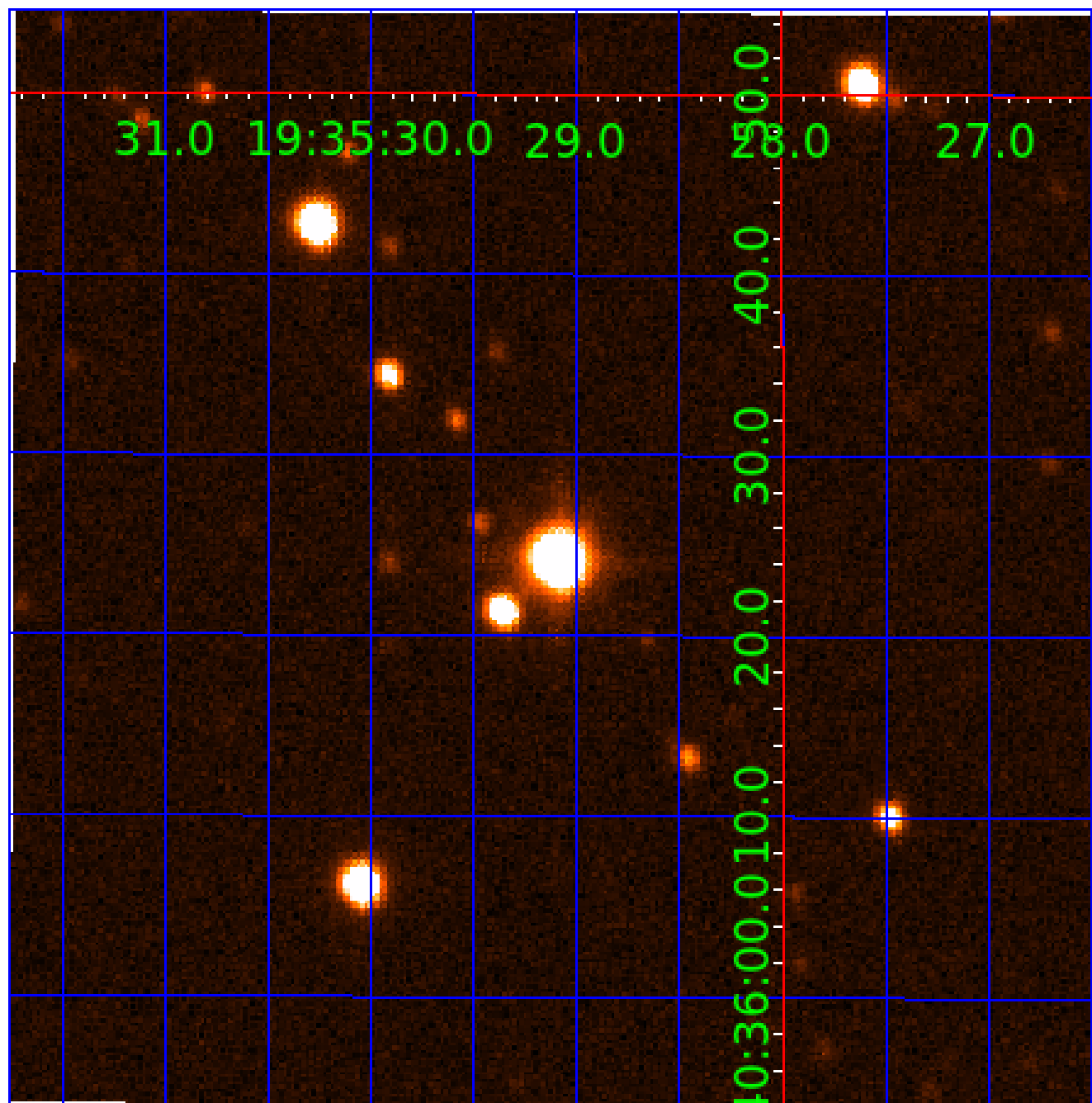


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 005455407

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005455407-01	OBS	No	405.667204	264.234509	474.1	5.540	15.8	8.7	2.18	5519	5.19	3.34
005455407-02	OBS	No	629.942151	137.531595	477.1	14.936	12.5	8.2	2.18	5519	5.01	1.86
005455407-03	OBS	No	289.137237	190.110722	378.6	9.816	12.7	6.9	2.18	5519	4.48	5.25
005455407-04	OBS	No	529.596497	340.722578	344.9	10.441	10.9	6.1	2.18	5519	4.35	2.34
005455407-05	OBS	No	243.480546	158.300050	350.6	8.873	9.5	8.0	2.18	5519	4.13	6.60
005455407-06	OBS	No	368.806760	416.475967	509.8	14.882	8.8	8.9	2.18	5519	6.01	3.80

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005455407-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—INCONSISTENT_TRANS
005455407-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
005455407-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV
005455407-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV
005455407-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—INCONSISTENT_TRANS
005455407-06	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV

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

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

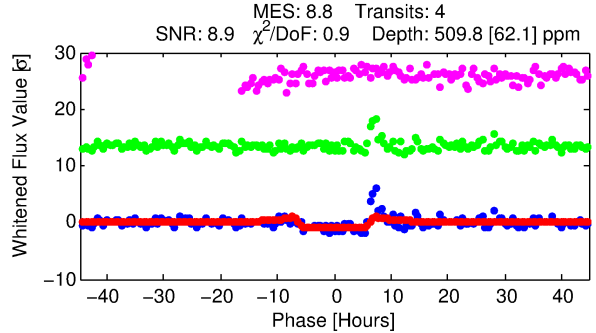
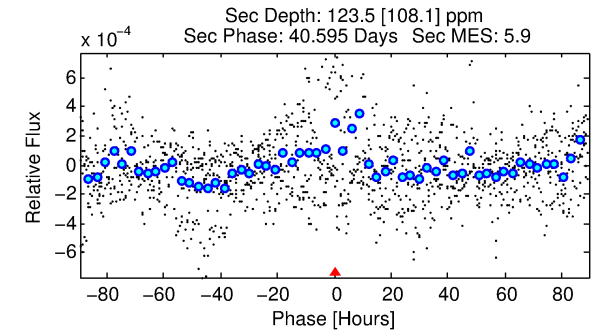
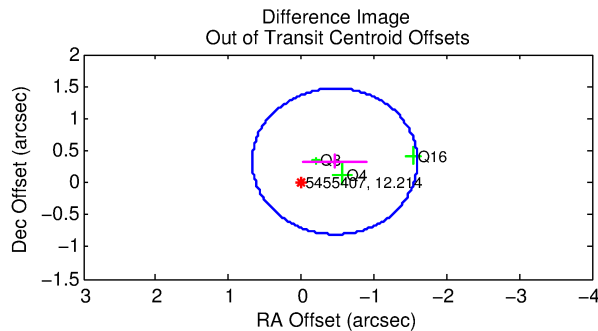
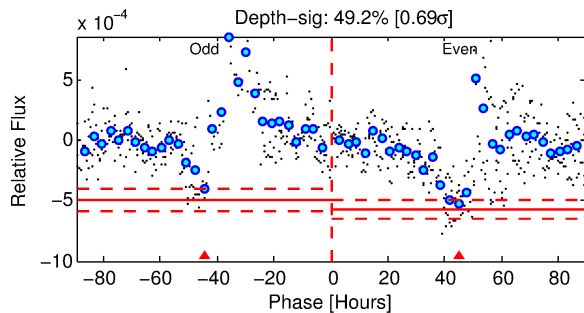
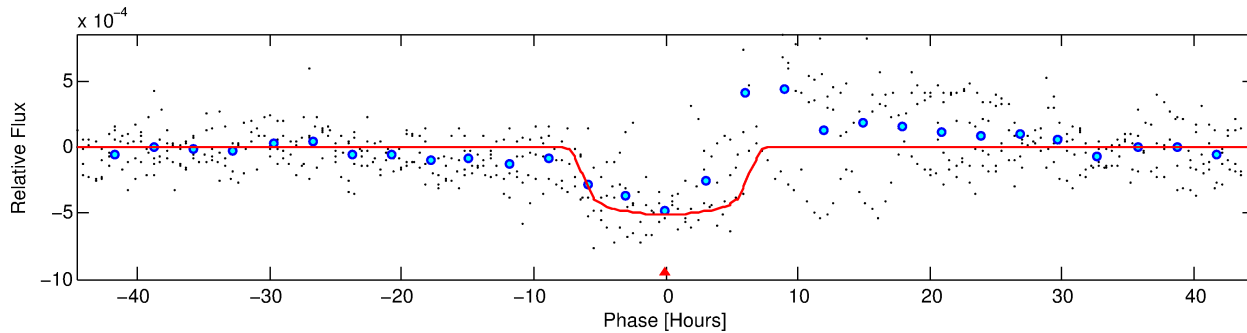
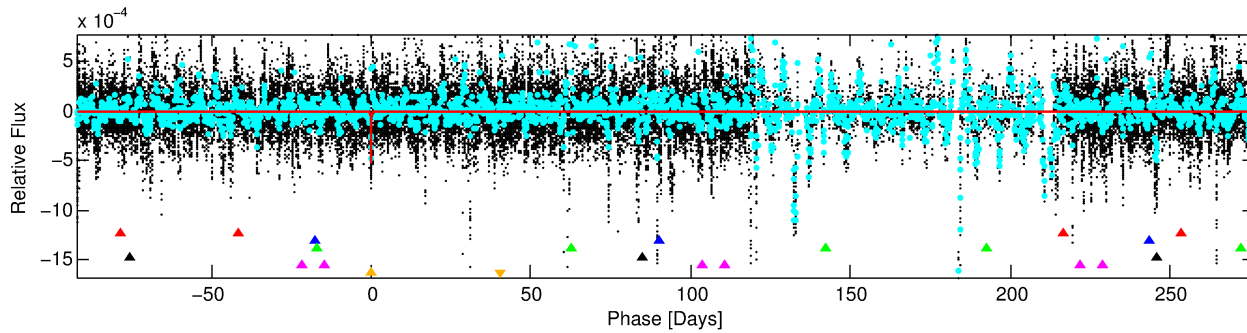
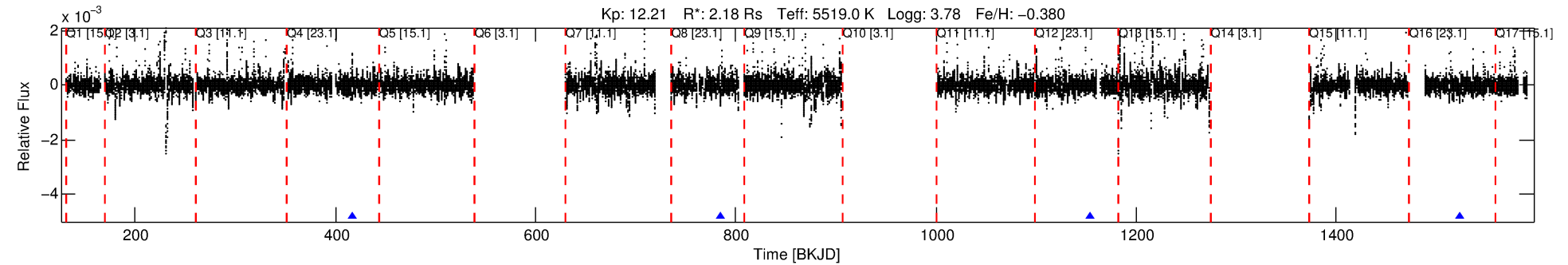
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 005455407-06

No Significant Match Found

# DV One-Page Summary

KIC: 5455407 Candidate: 6 of 6 Period: 368.807 d



## DV Fit Results:

Period = 368.80676 [0.00709] d  
Epoch = 416.4760 [0.0132] BKJD  
Rp/R\* = 0.0252 [0.0019]  
a/R\* = 84.83 [13.50]  
b = 0.92 [0.03]  
Seff = 3.80 [4.48]  
Teq = 356 [105] K  
Rp = 6.01 [3.86] Re  
a = 1.0216 [0.7077] AU  
Ag = 1964.46 [2889.10] [0.68σ]  
Teffp = 3664 [821] K [4.00σ]

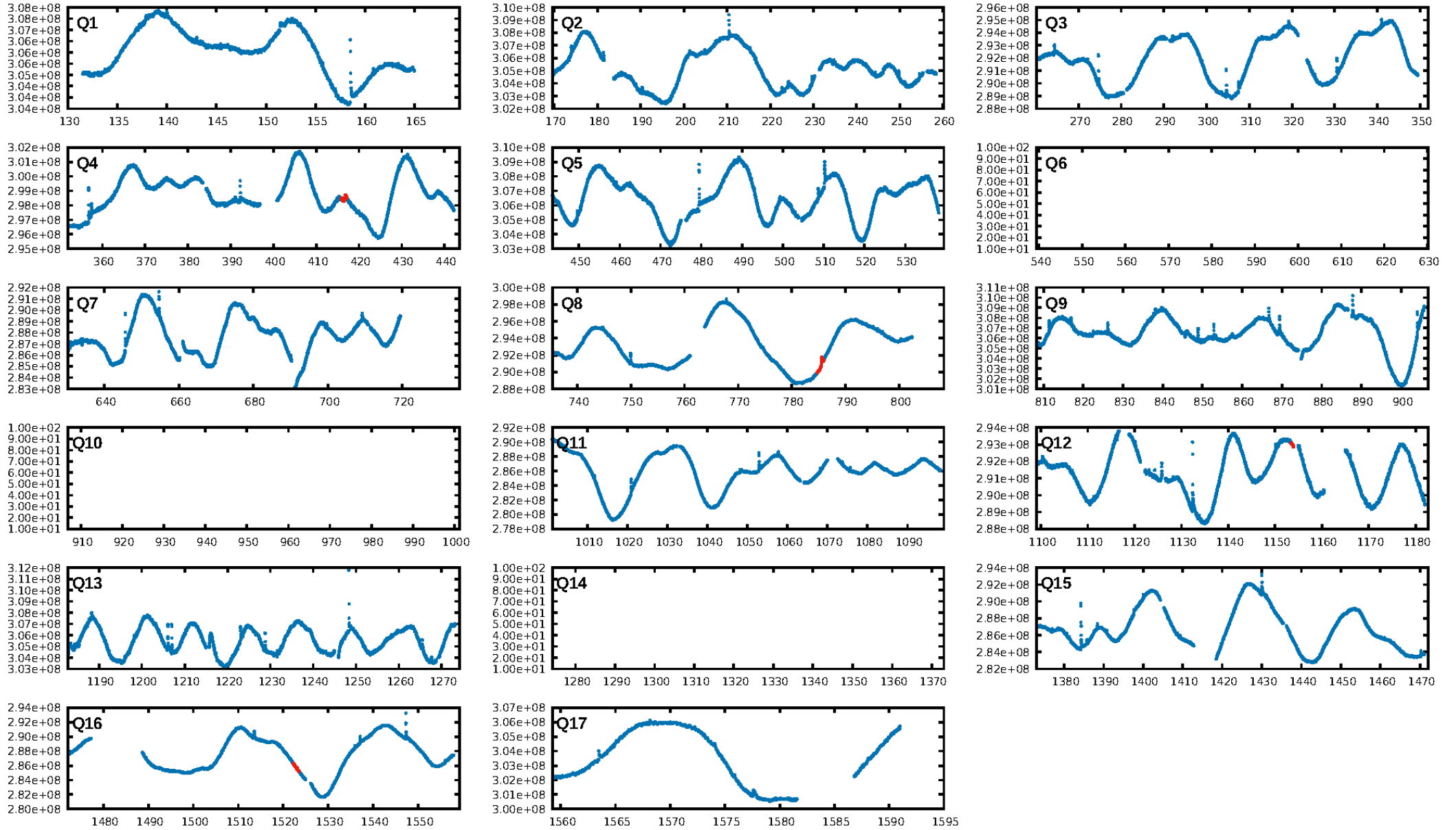
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [107.25σ]  
LongPeriod-sig: 100.0% [55.71σ]  
ModelChiSquare2-sig: 1.6%  
ModelChiSquareGof-sig: 100.0%  
**Bootstrap-pfa: 4.23e-07**  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: -0.5255  
Centroid-sig: 80.2%  
Centroid-so: 0.173 arcsec [0.41σ]  
OotOffset-rm: 0.569 arcsec [1.50σ]  
KicOffset-rm: 0.405 arcsec [1.39σ]  
OotOffset-st: 0/0/3/0 [3]  
KicOffset-st: 0/0/3/0 [3]  
DiffImageQuality-fgm: 1.00 [3/3]  
DiffImageOverlap-fno: 1.00 [3/3]

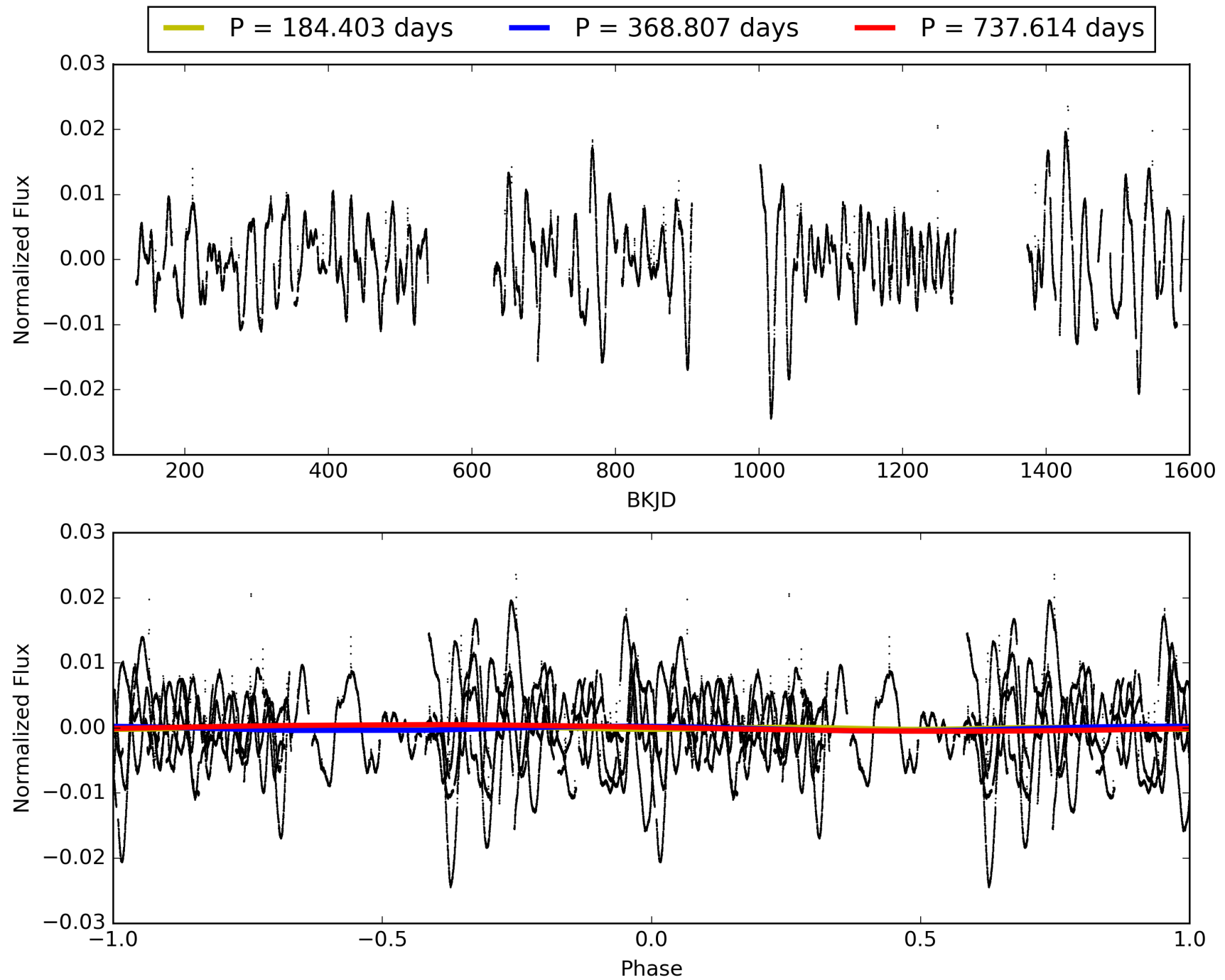
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 05:15:29 Z

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

# TCE 005455407-06, PDC Light Curves



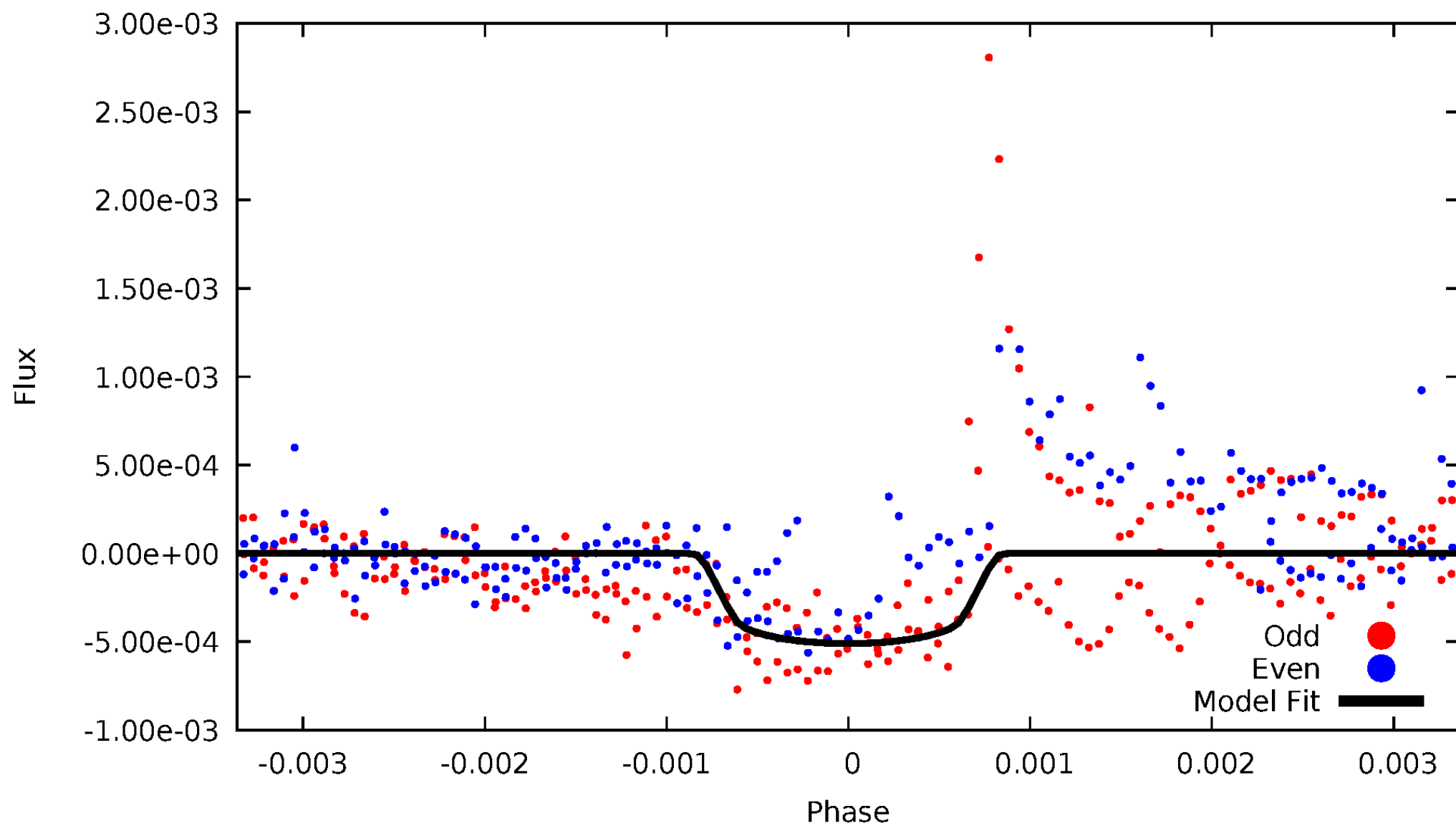
TCE 005455407-06





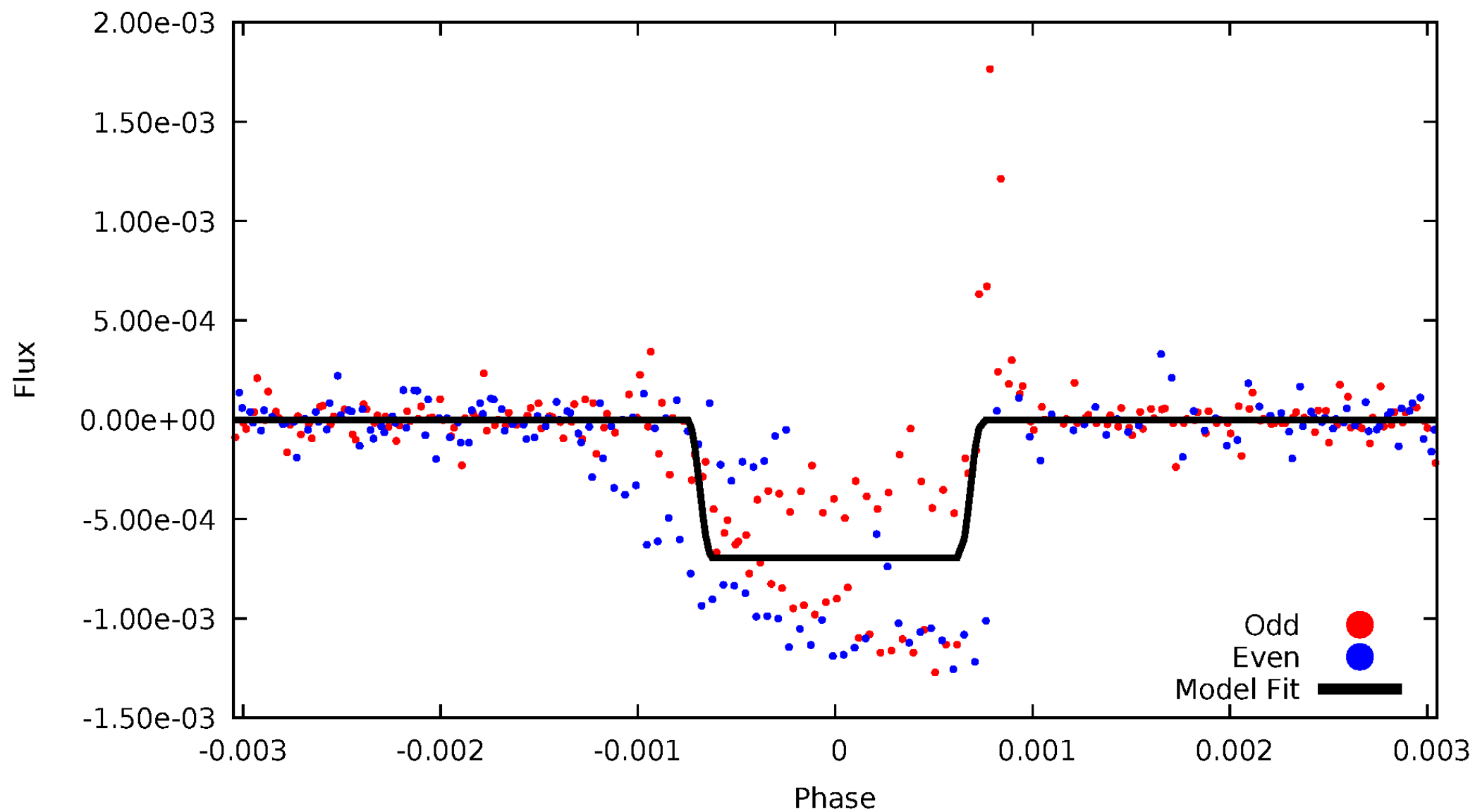
# DV Odd/Even

TCE 005455407-06



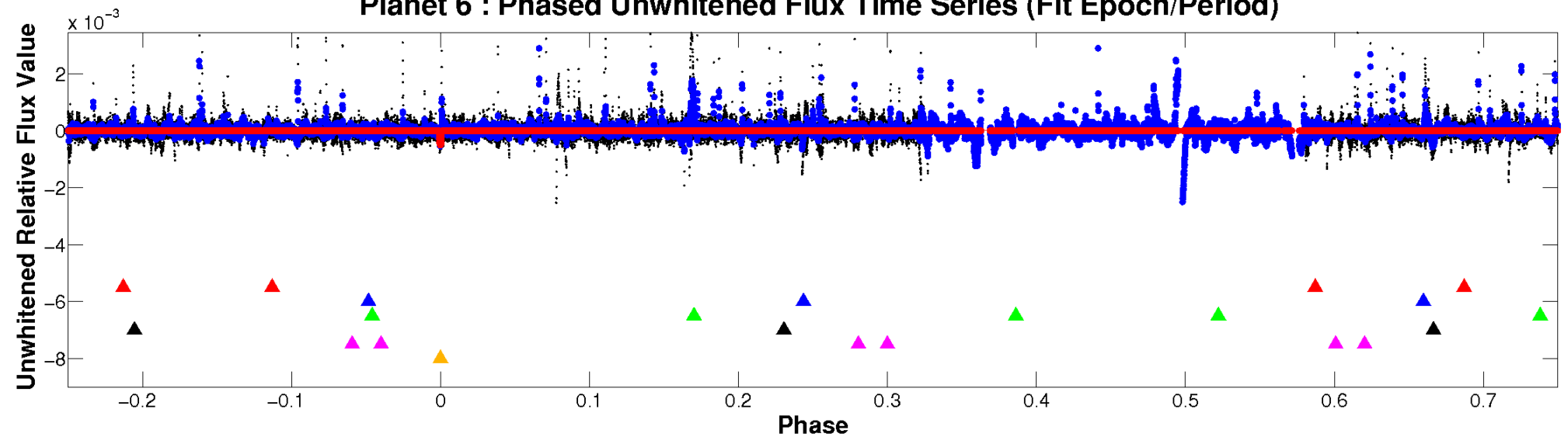
# ALT Odd/Even

TCE 005455407-06

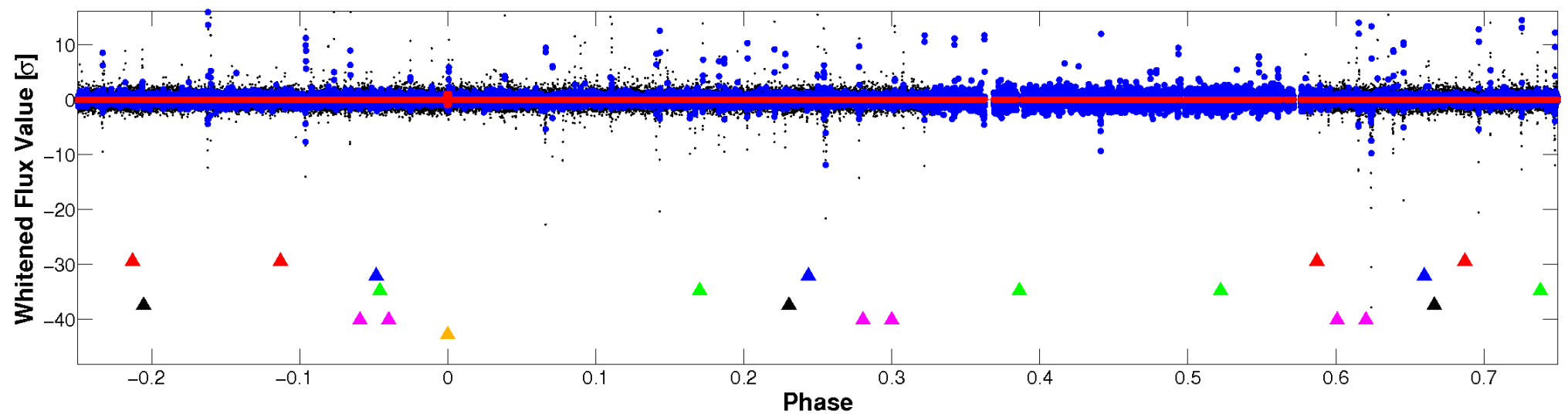


# Non-Whitened Vs. Whitened Light Curve

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

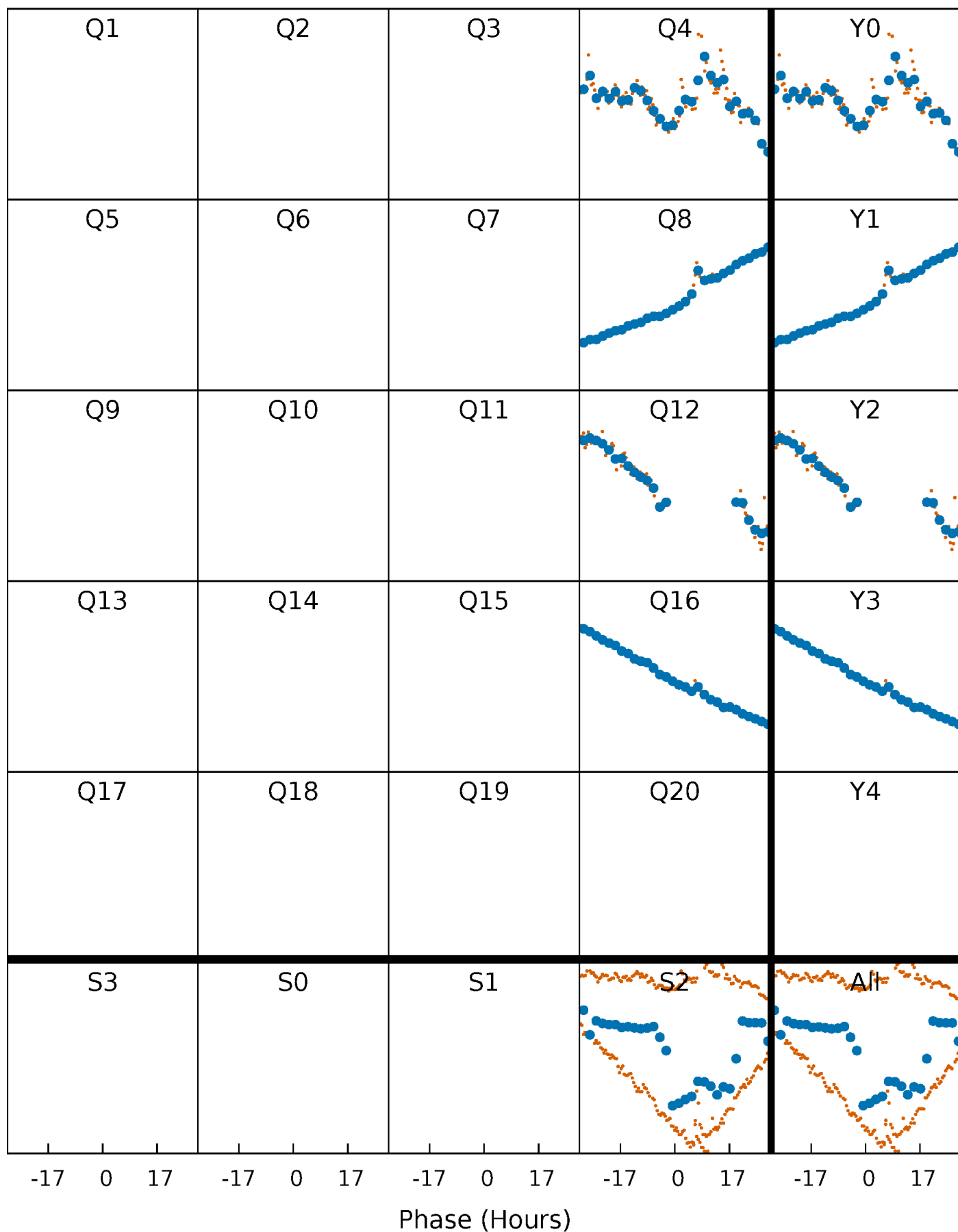


## Planet 6 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

TCE 005455407-06 P=368.806760 Days  $T_0=416.475967$  (BKJD)



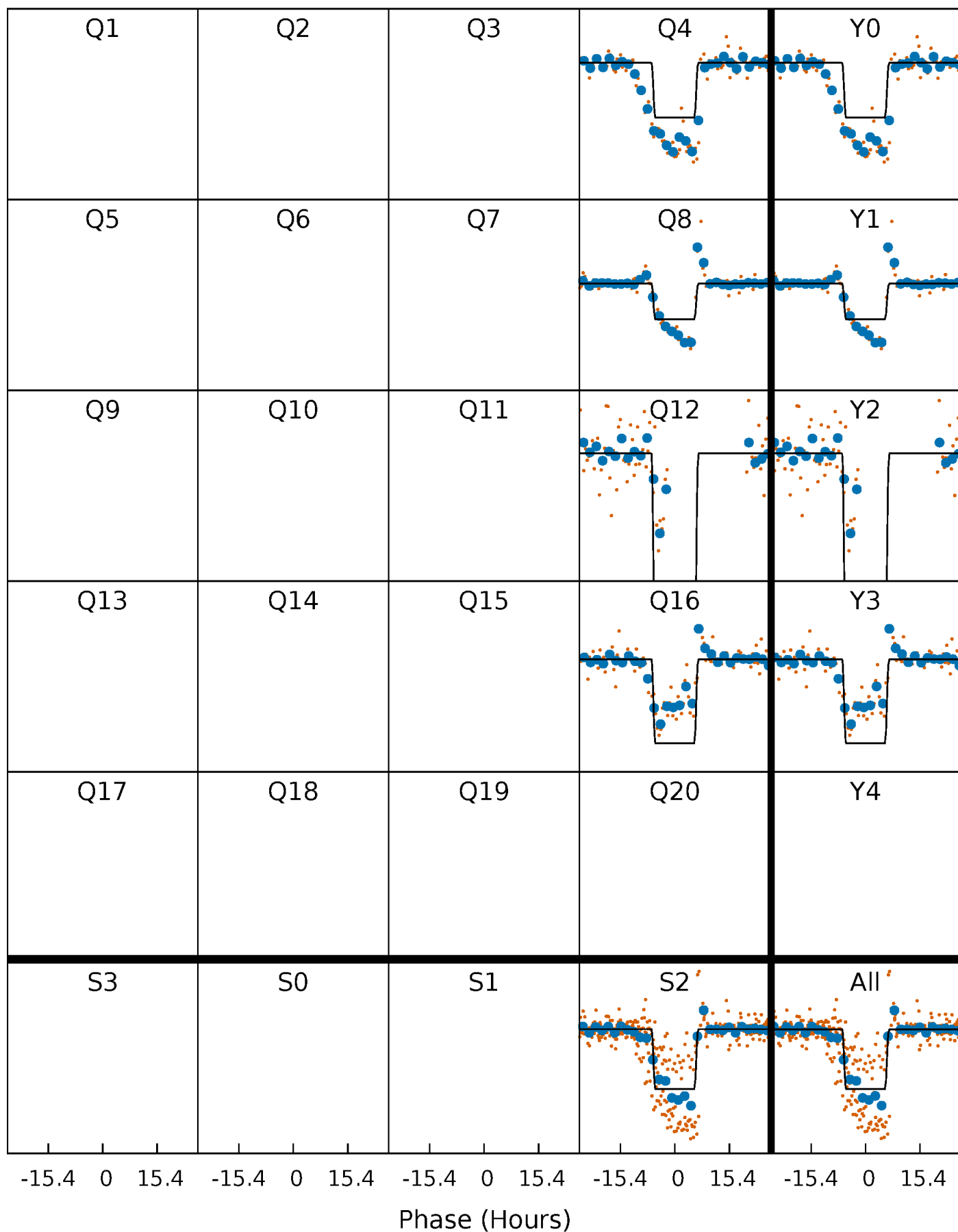
# DV Quarter-Phased Transit Curves

TCE 005455407-06     $P=368.806760$  Days     $T_0=416.475967$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

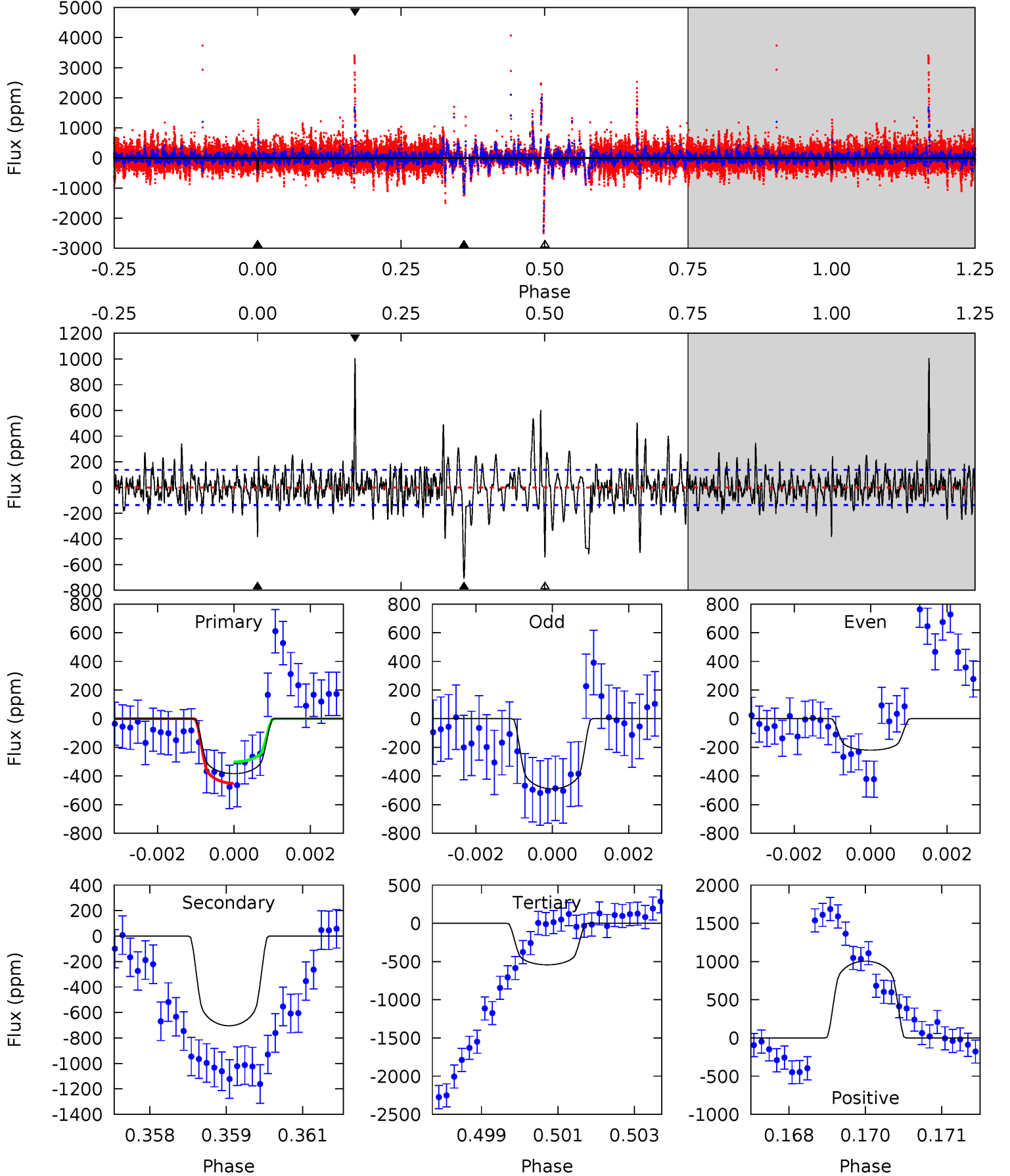
TCE 005455407-06     $P=368.798513$  Days     $T_0=416.480443$  (BKJD)



# DV Model-Shift Uniqueness Test

005455407-06,  $P = 368.806760$  Days,  $E = 47.669207$  Days

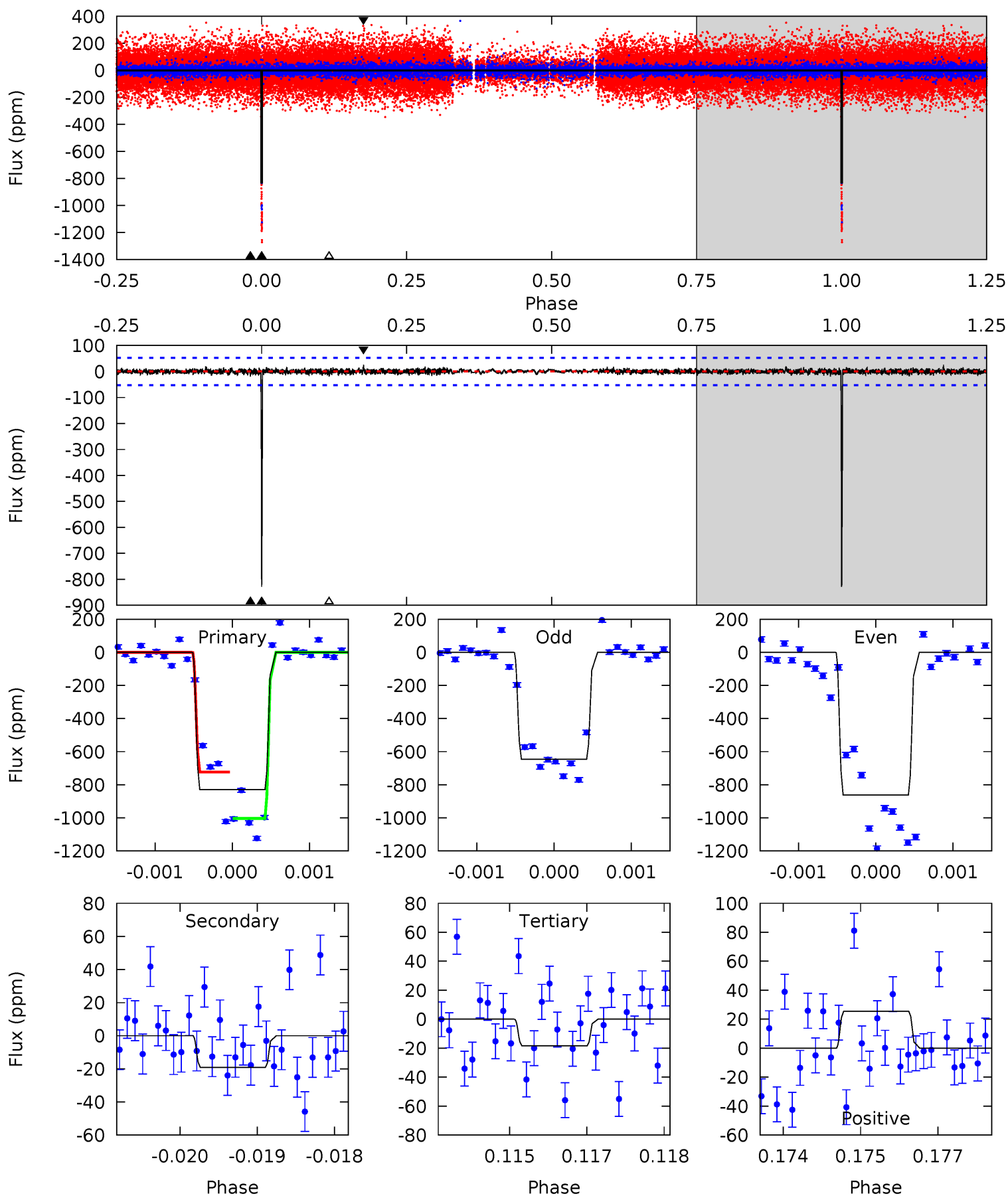
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
15.0	27.5	21.2	39.3	5.36	3.14	4.34	-6.22	-24.3	6.29	-11.8	4.62	0.87	0.59	2.92



# Alt Model-Shift Uniqueness Test

005455407-06, P = 368.798513 Days, E = 47.681930 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
84.9	1.95	1.88	2.60	5.38	3.18	0.48	83.0	82.3	0.07	-0.65	12.0	0.96	0.03	0





### Stellar Parameters For KIC 005455407

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5519^{+174}_{-154}$	$3.779^{+0.712}_{-0.237}$	$-0.380^{+0.350}_{-0.250}$	$2.183^{+0.751}_{-1.394}$	$1.045^{+0.184}_{-0.225}$	$0.142^{+1.851}_{-0.088}$
	+3%/-3%	+19%/-6%	+92%/-66%	+34%/-64%	+18%/-22%	+1307%/-62%
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 005455407-06 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-704 \pm 26$	$5.98^{+1.33}_{-1.95}$	$492^{+51}_{-79}$	$5637^{+290}_{-244}$	$11385^{+12449}_{-3568}$
Alt.	$-19 \pm 10$	$6.11^{+1.50}_{-2.04}$	$492^{+54}_{-84}$	$2922^{+205}_{-286}$	$285^{+400}_{-162}$

$T_{\text{max}}$  = 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

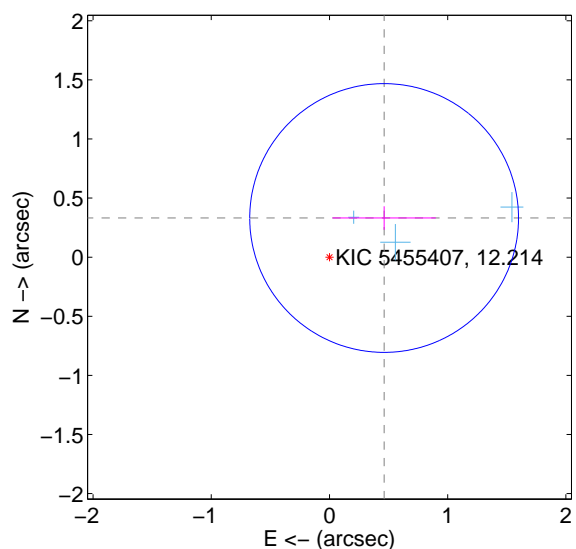
Supplemental centroid analysis for 005455407-06. Kepler magnitude: 12.21. Transit SNR 8.93

There are 3 quarters with good PRF difference image offsets

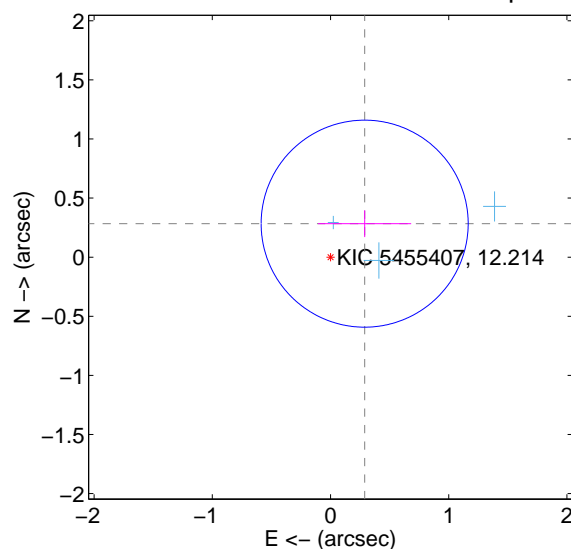
The direct PRF centroid is offset from the target star catalog position by about 0.16 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.569 \pm 0.379$	1.50	$-0.462 \pm 0.437$	$0.331 \pm 0.099$
PRF-fit source offset from KIC position	$0.405 \pm 0.292$	1.39	$-0.289 \pm 0.394$	$0.283 \pm 0.113$
photometric centroid source offset	$0.17 \pm 0.42$	0.41	$-0.10 \pm 0.51$	$-0.14 \pm 0.38$

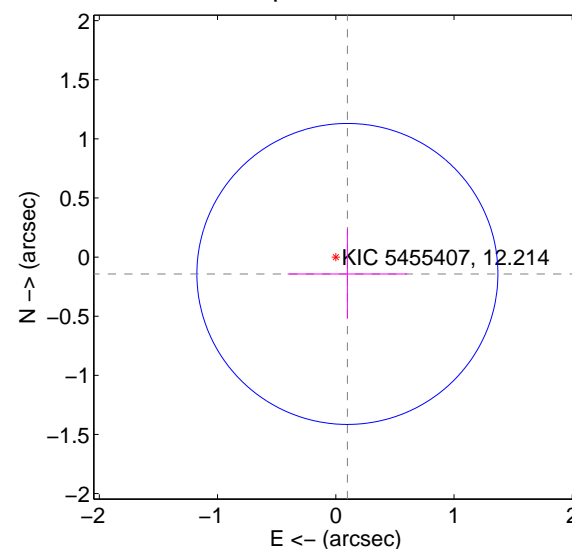
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

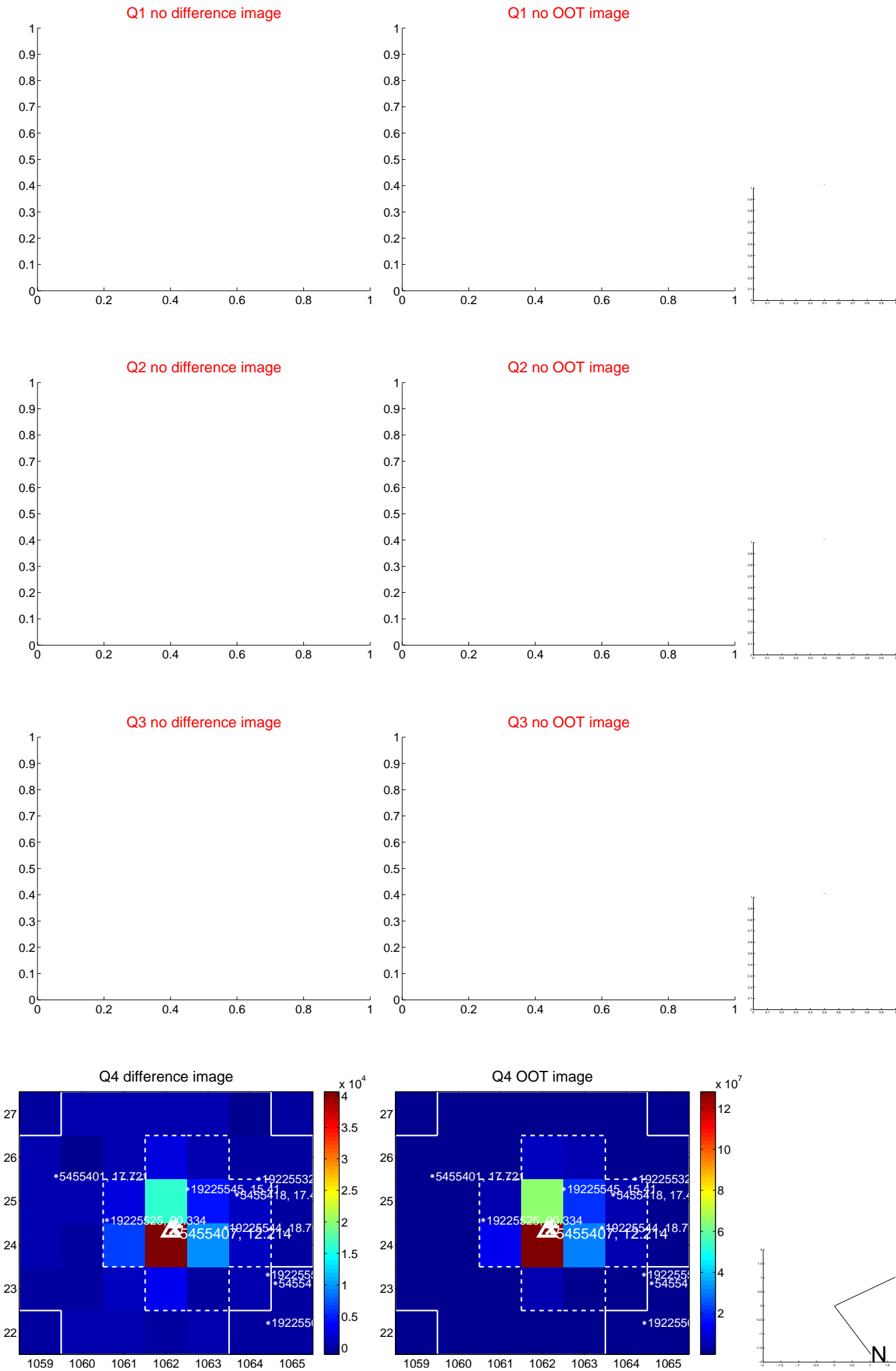


offset from photometric centroids

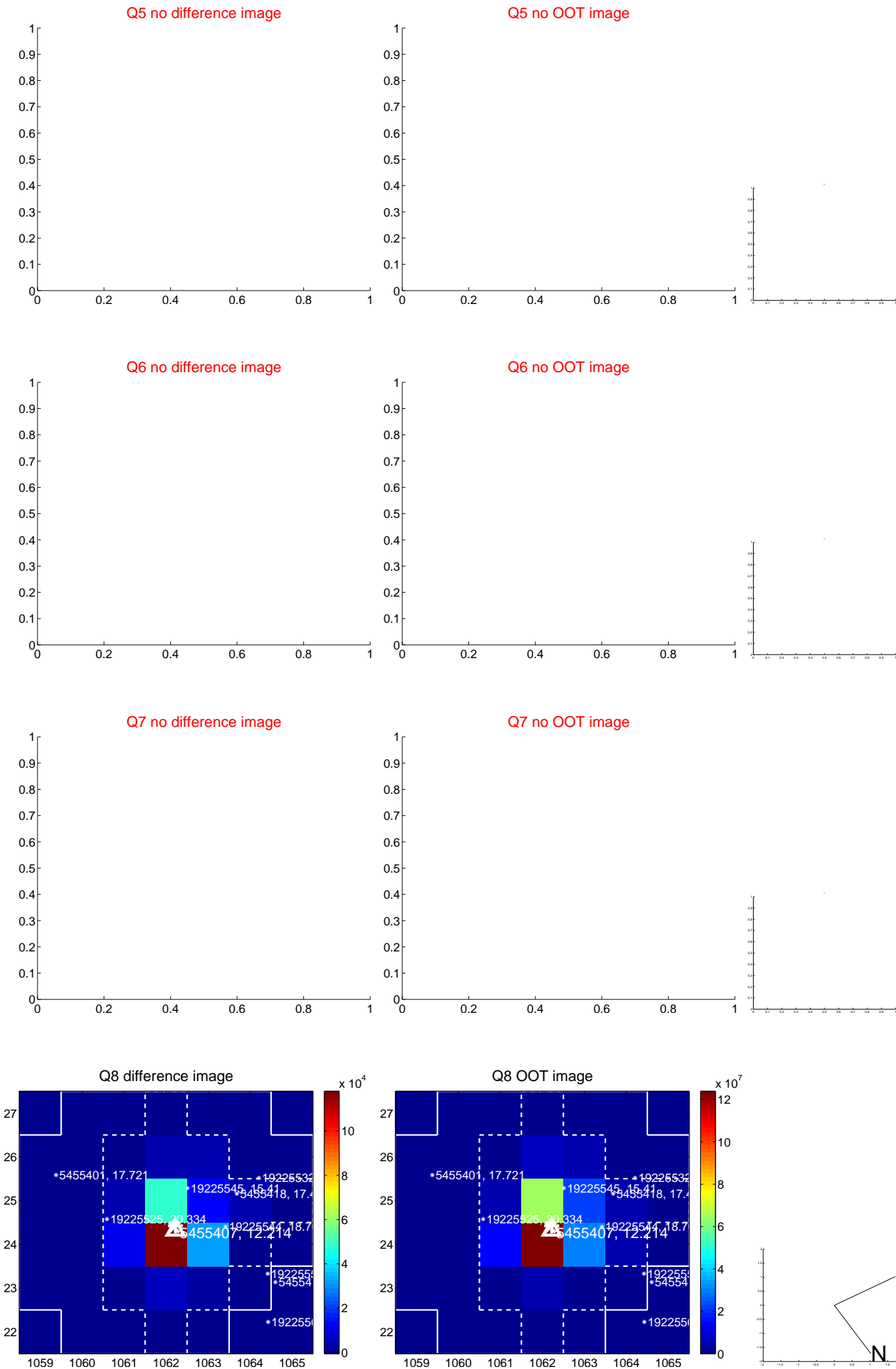


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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



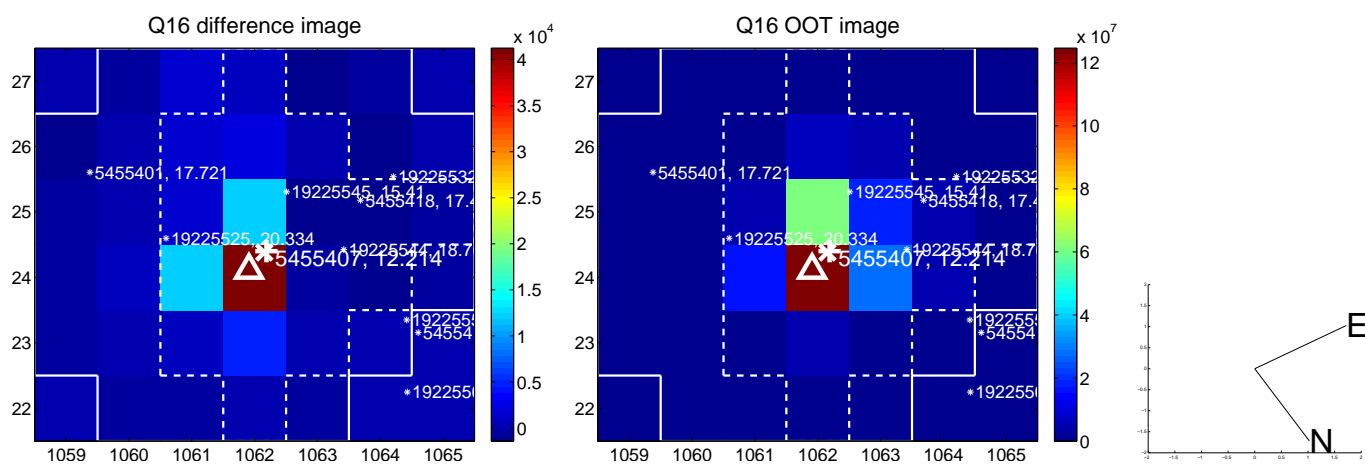
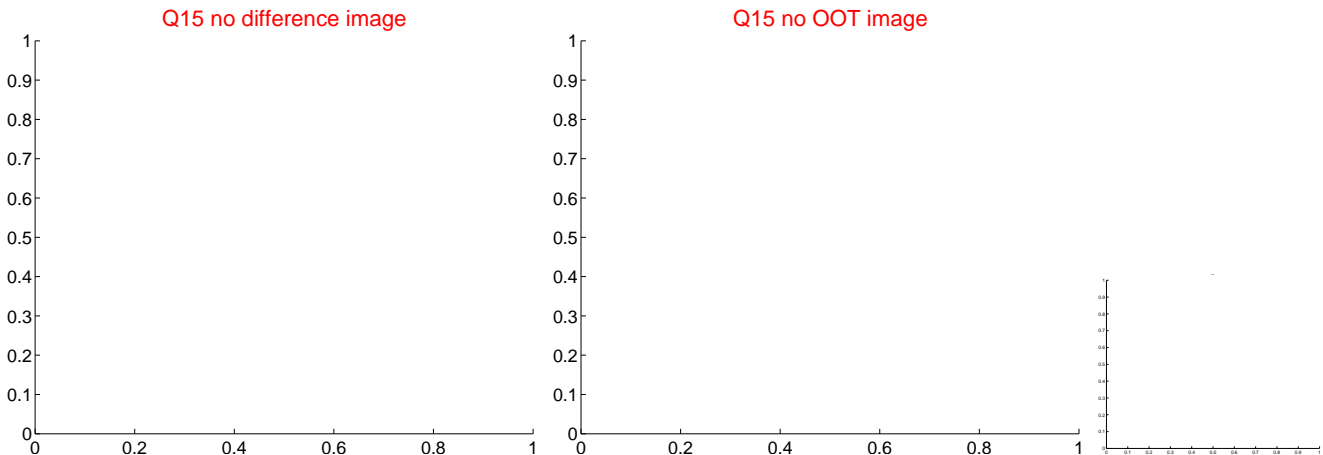
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



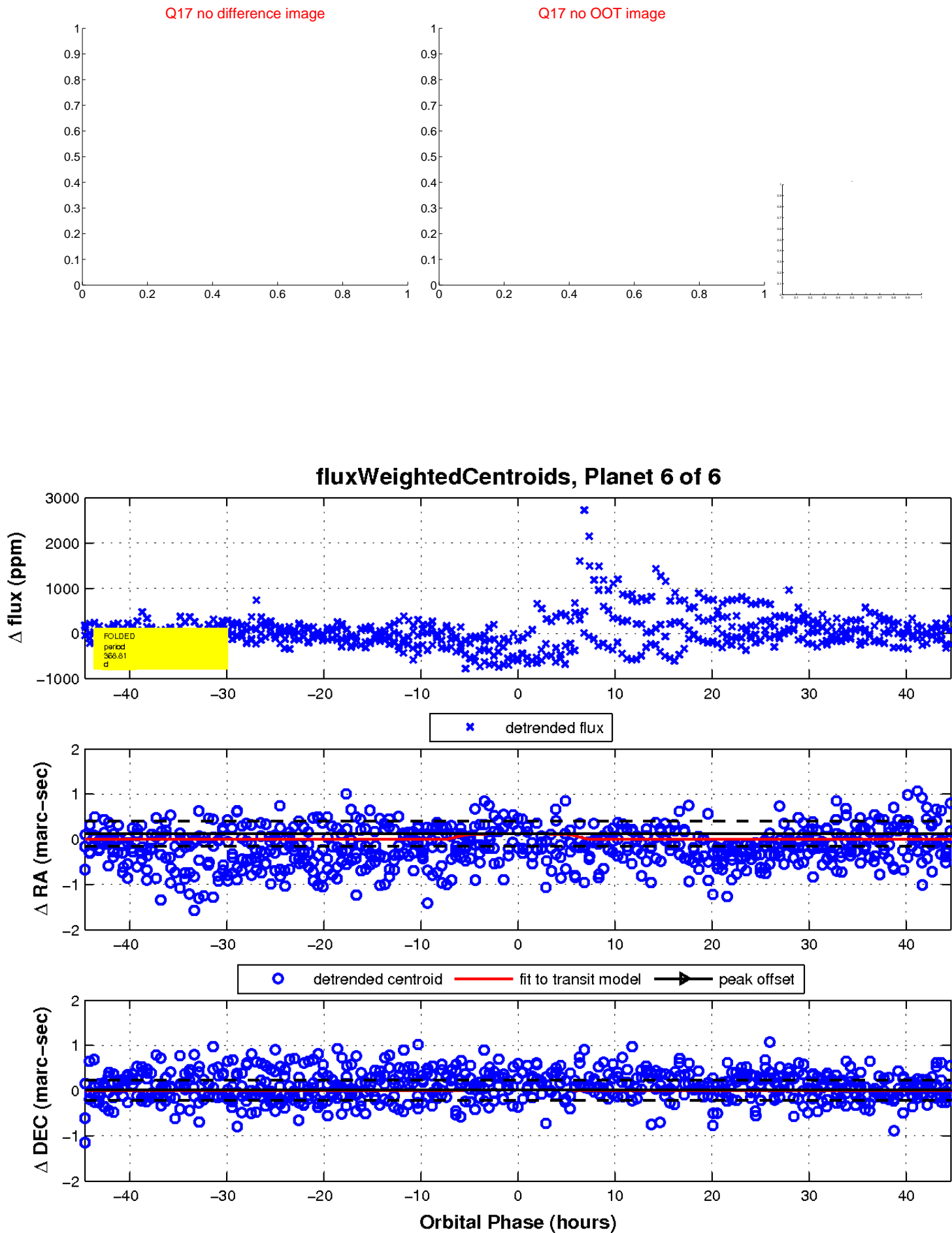
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

