

# KIC 007047356

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
007047356-01	OBS	No	0.535216	131.934125	32.4	1.932	9.0	5.7	1.39	7011	0.93	20365.81
007047356-02	OBS	No	458.156149	187.813770	1155.3	5.225	8.3	7.5	1.39	7011	4.98	2.51

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007047356-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT
007047356-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT

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

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

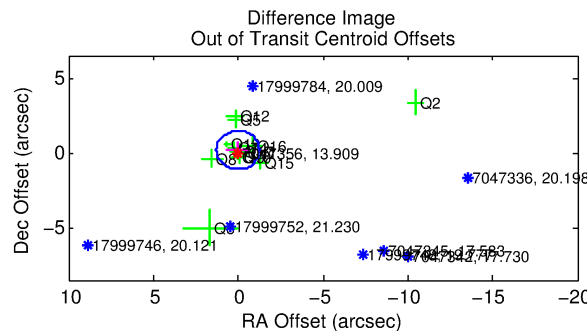
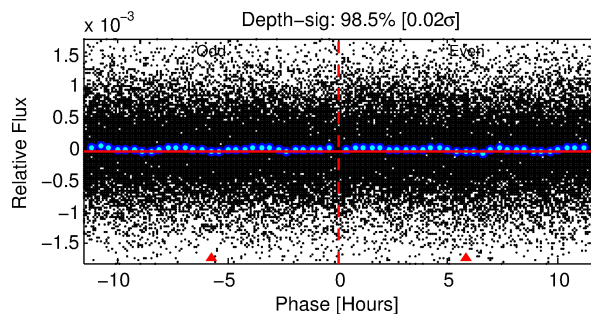
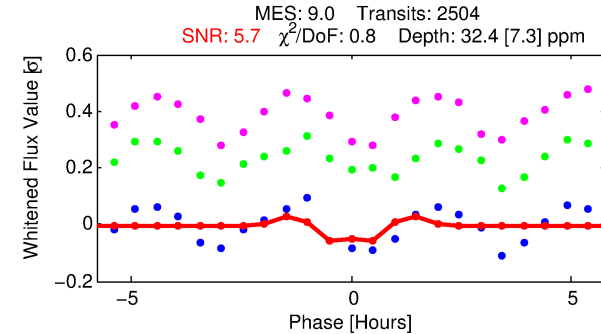
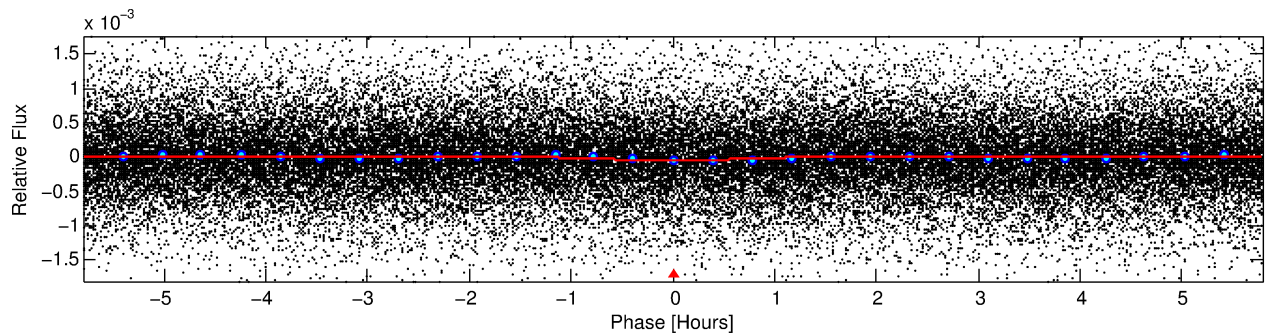
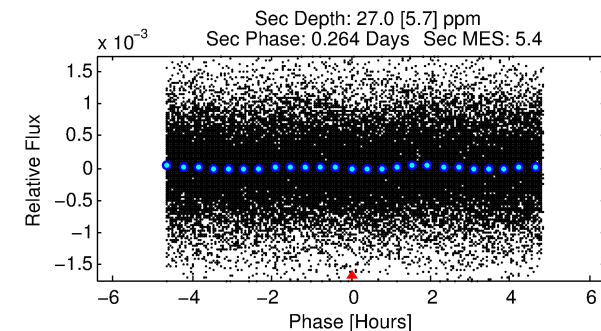
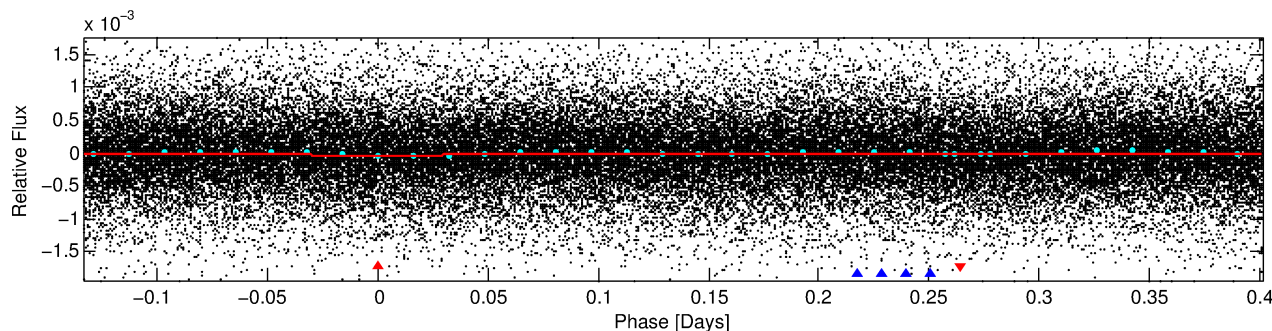
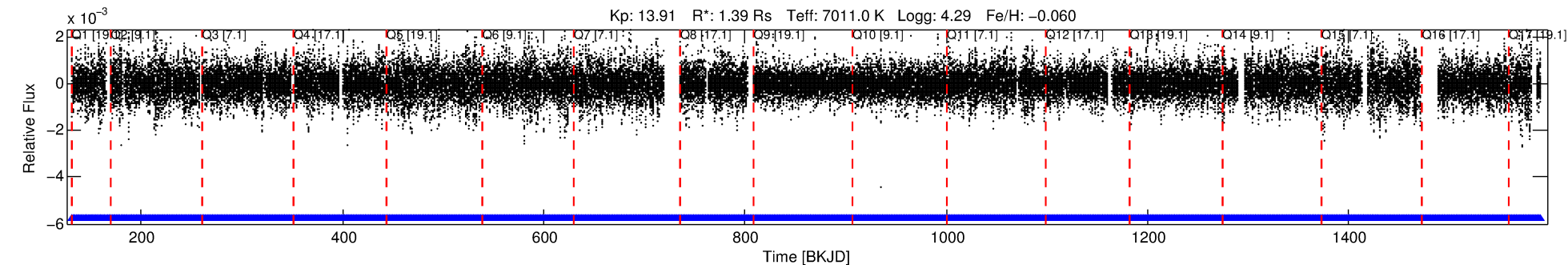
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 007047356-01

No Significant Match Found

# DV One-Page Summary

KIC: 7047356 Candidate: 1 of 2 Period: 0.535 d



## DV Fit Results:

Period = 0.53522 [0.00002] d  
Epoch = 131.9341 [0.0024] BKJD  
Rp/R\* = 0.0061 [0.0025]  
a/R\* = 1.31 [1.32]  
b = 0.91 [0.46]  
Seff = 20365.80 [9407.64]  
Teq = 3046 [352] K  
Rp = 0.93 [0.52] Re  
a = 0.0143 [0.0044] AU  
Ag = 3.53 [3.34] [0.76σ]  
Teffp = 6456 [1384] K [2.39σ]

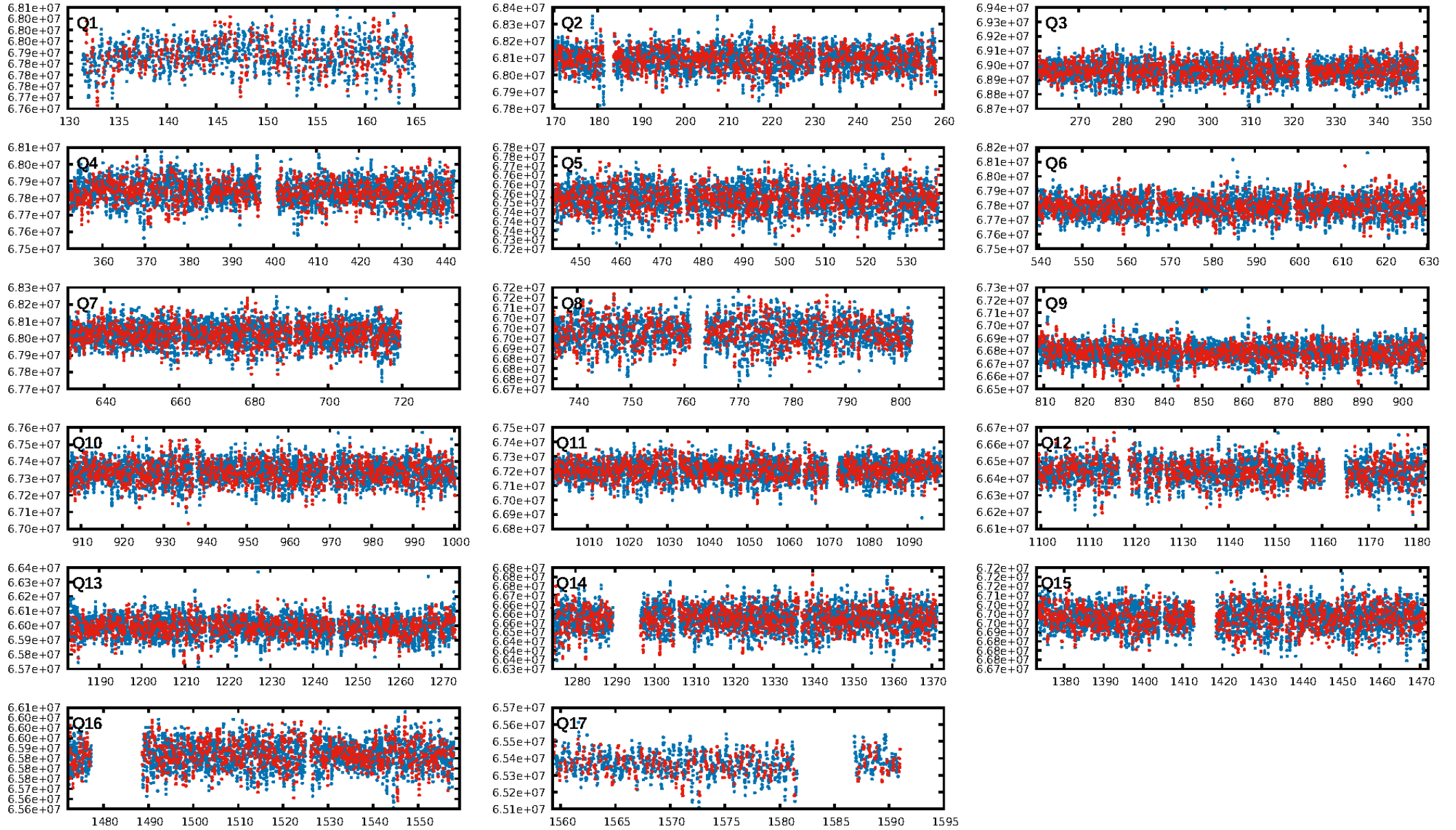
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [1971.48σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 3.24e-17  
RollingBand-fgt: 1.00 [2392/2392]  
GhostDiagnostic-chr: 1.199  
Centroid-sig: 56.8%  
Centroid-so: 0.494 arcsec [0.62σ]  
OotOffset-rm: 0.168 arcsec [0.40σ]  
KicOffset-rm: 0.117 arcsec [0.17σ]  
OotOffset-st: 3/4/4/4 [15]  
KicOffset-st: 3/4/4/4 [15]  
DiffImageQuality-fgm: 0.60 [9/15]  
DiffImageOverlap-fno: 1.00 [17/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 04:20:51 Z

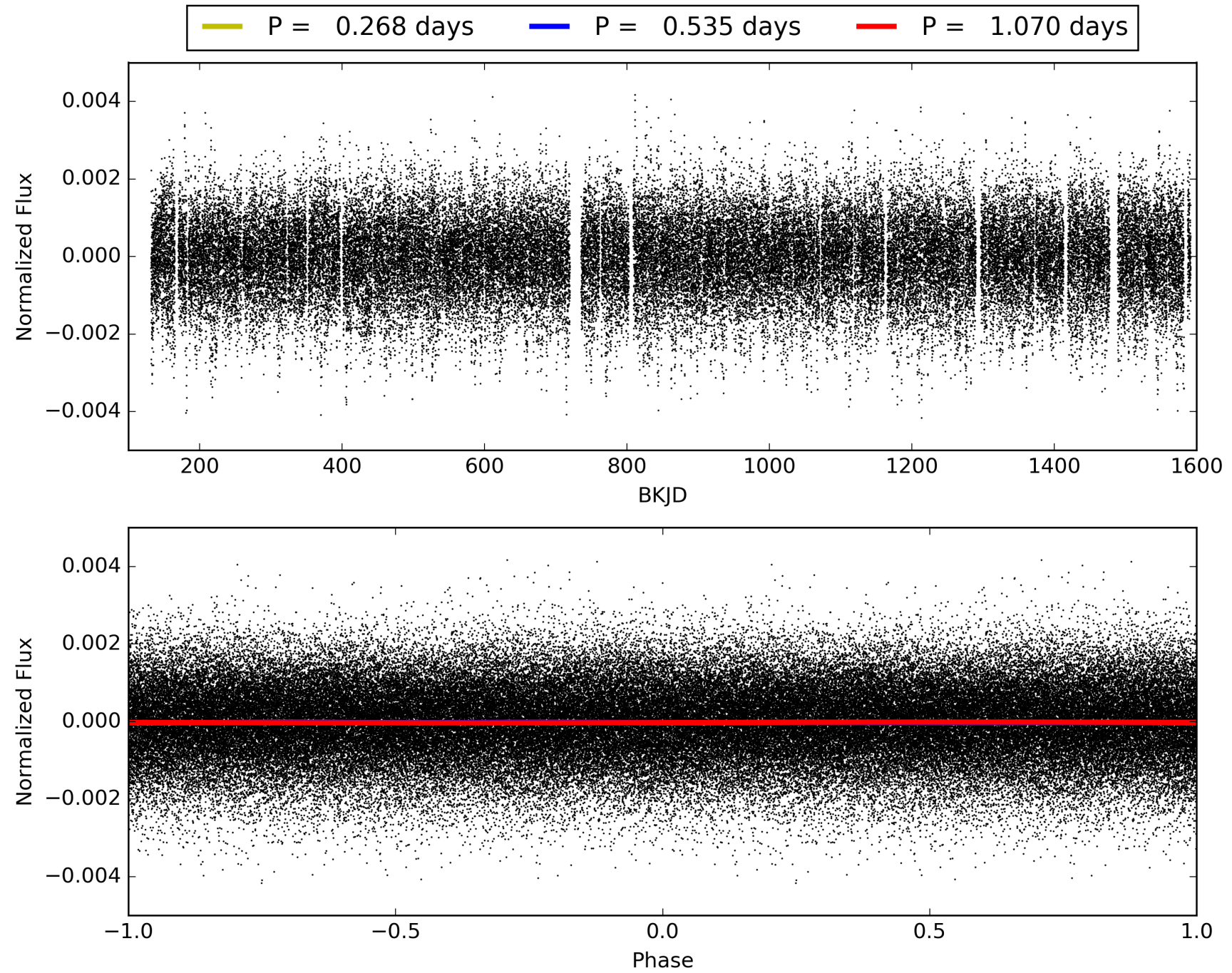
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 007047356-01, PDC Light Curves



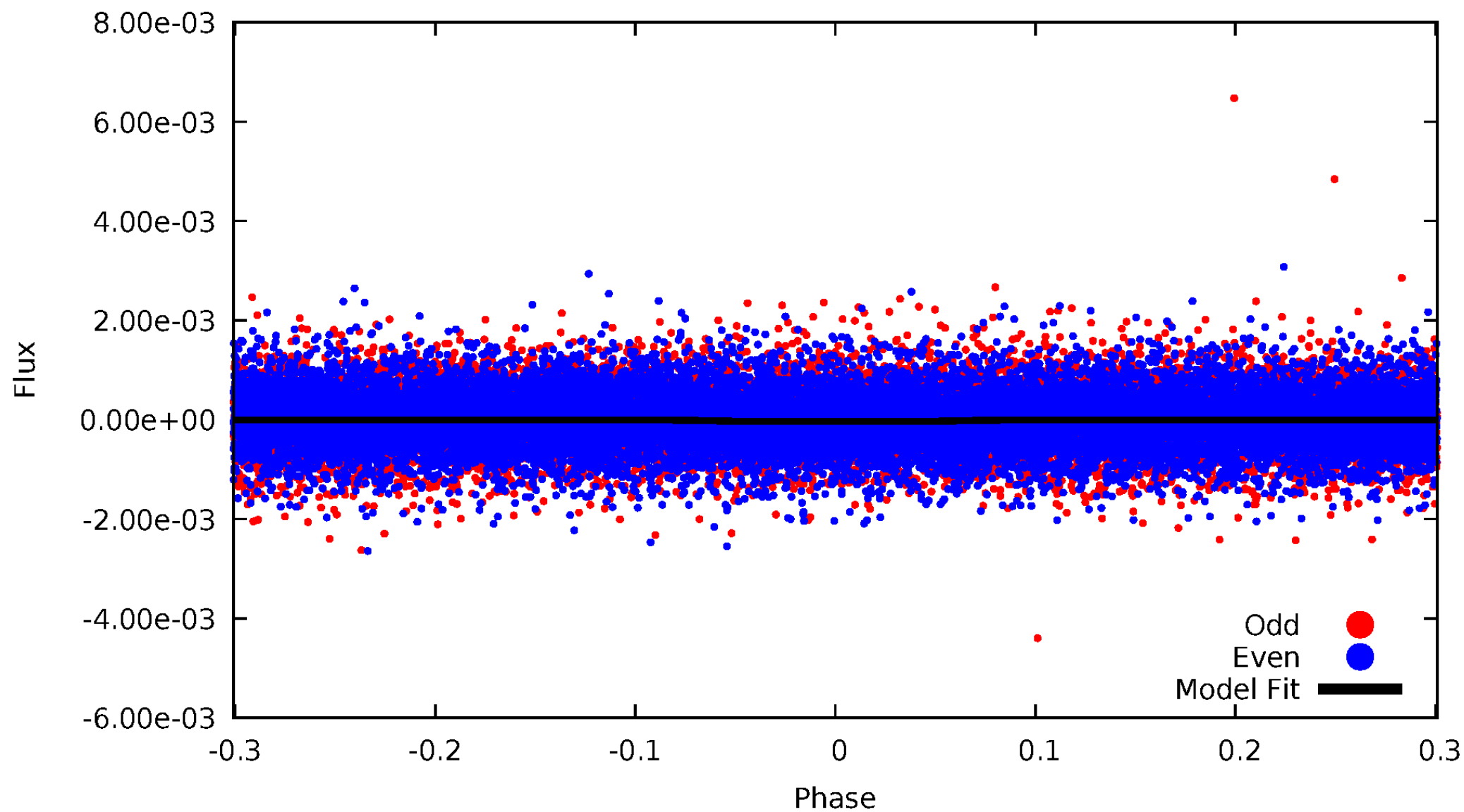


TCE 007047356-01



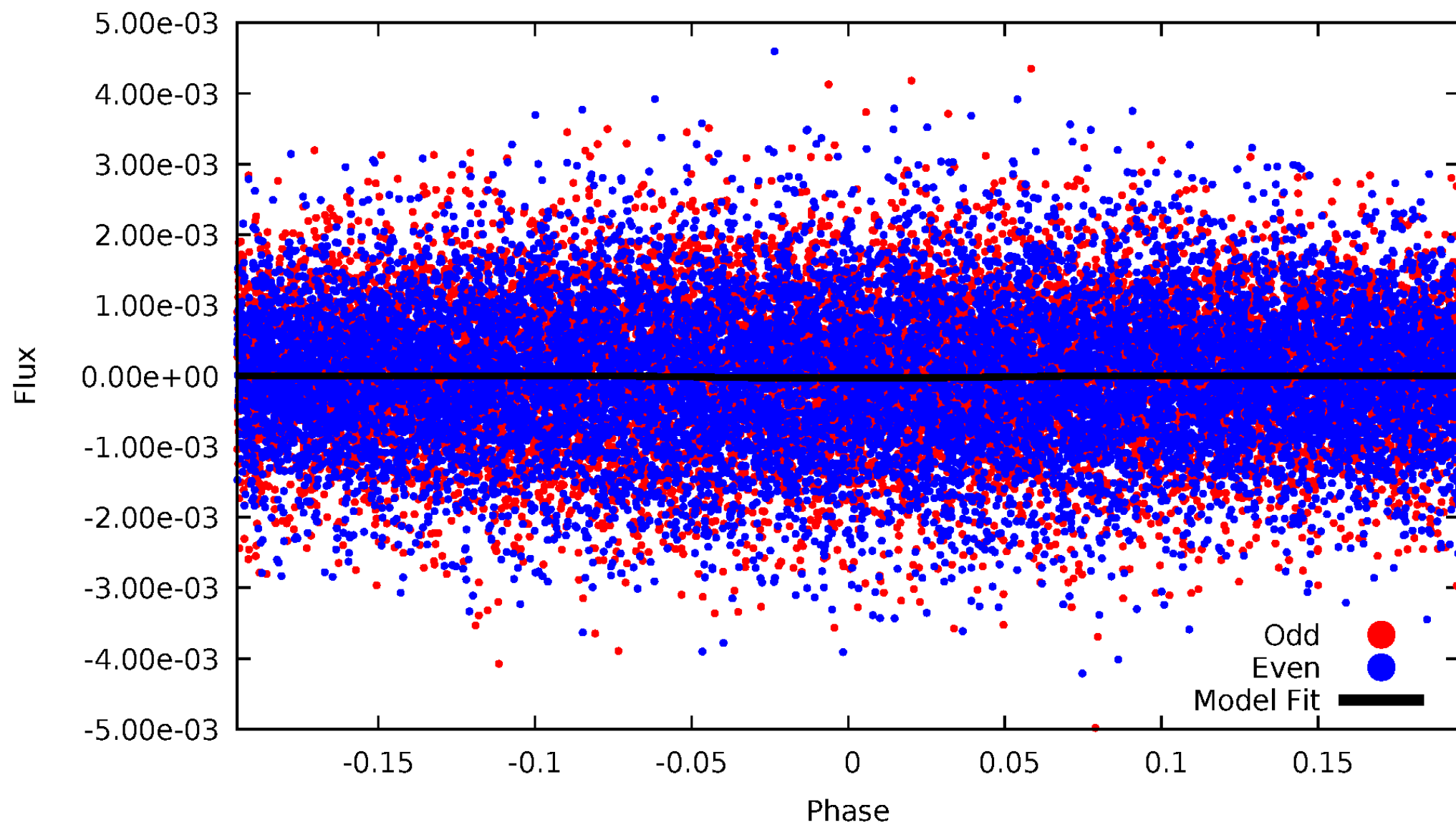
# DV Odd/Even

TCE 007047356-01



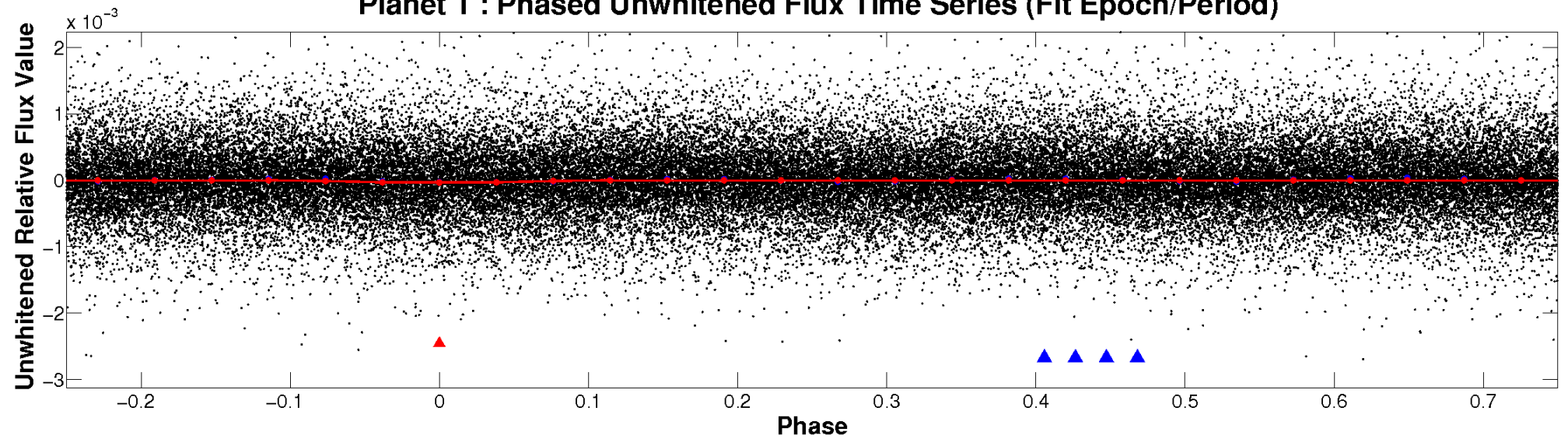
# ALT Odd/Even

TCE 007047356-01

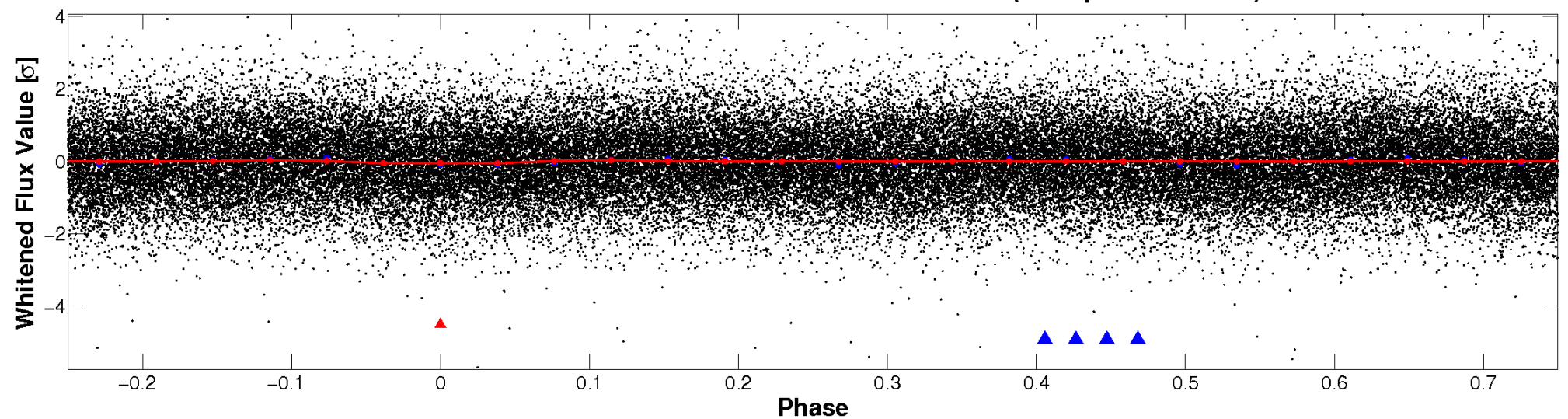


# Non-Whitened Vs. Whitened Light Curve

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



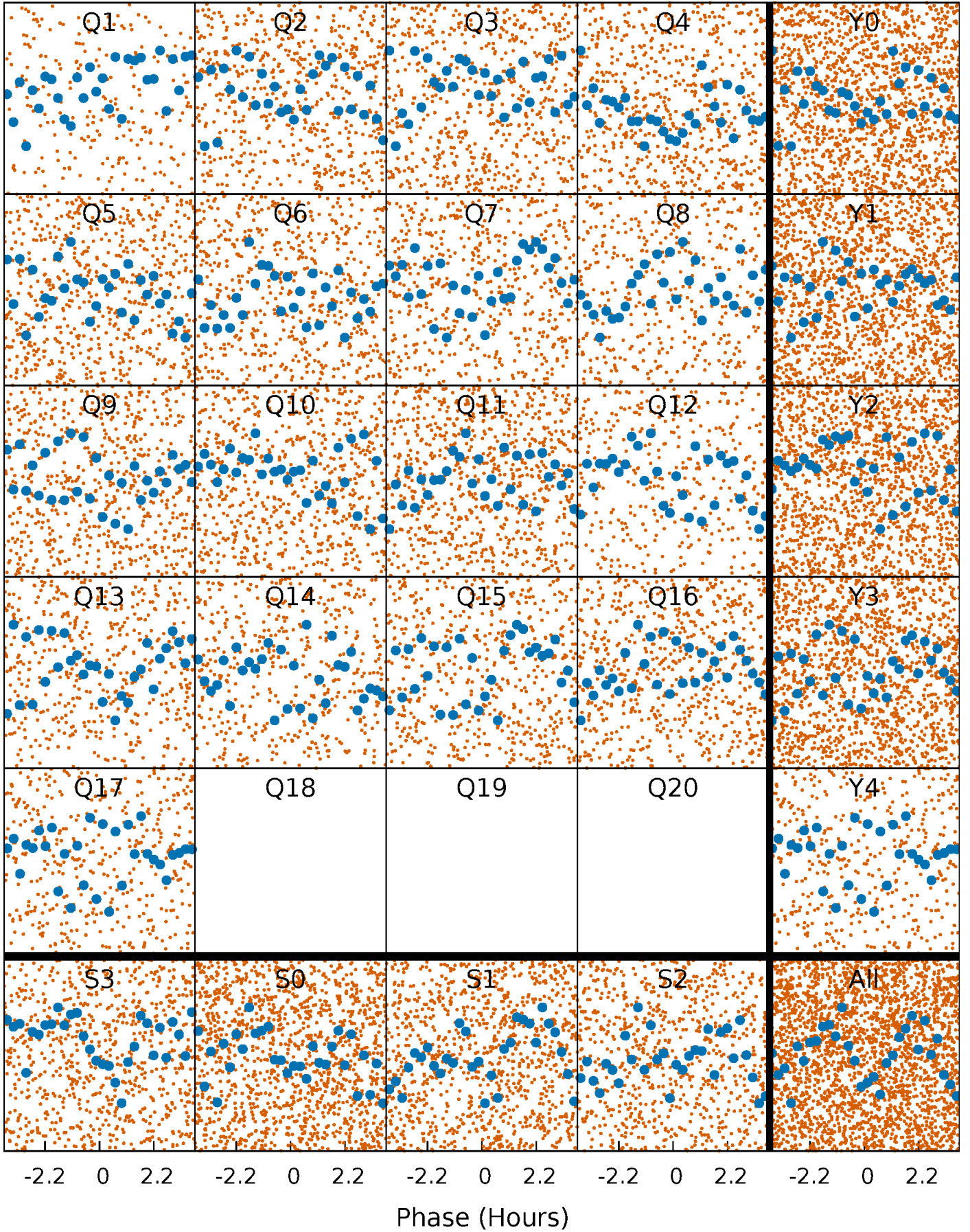
**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**





# PDC Quarter-Phased Transit Curves

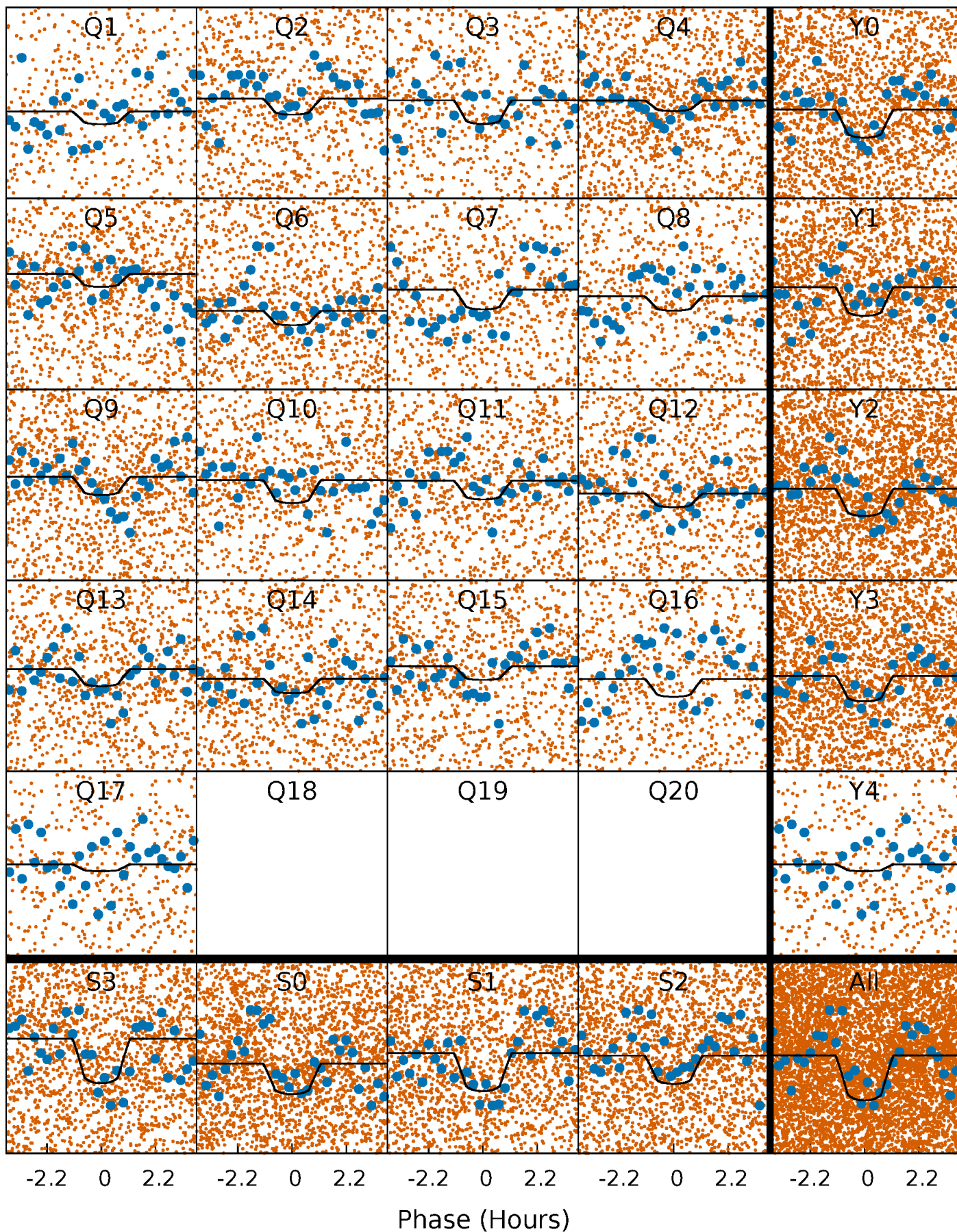
TCE 007047356-01 P= 0.535216 Days  $T_0=131.934125$  (BKJD)





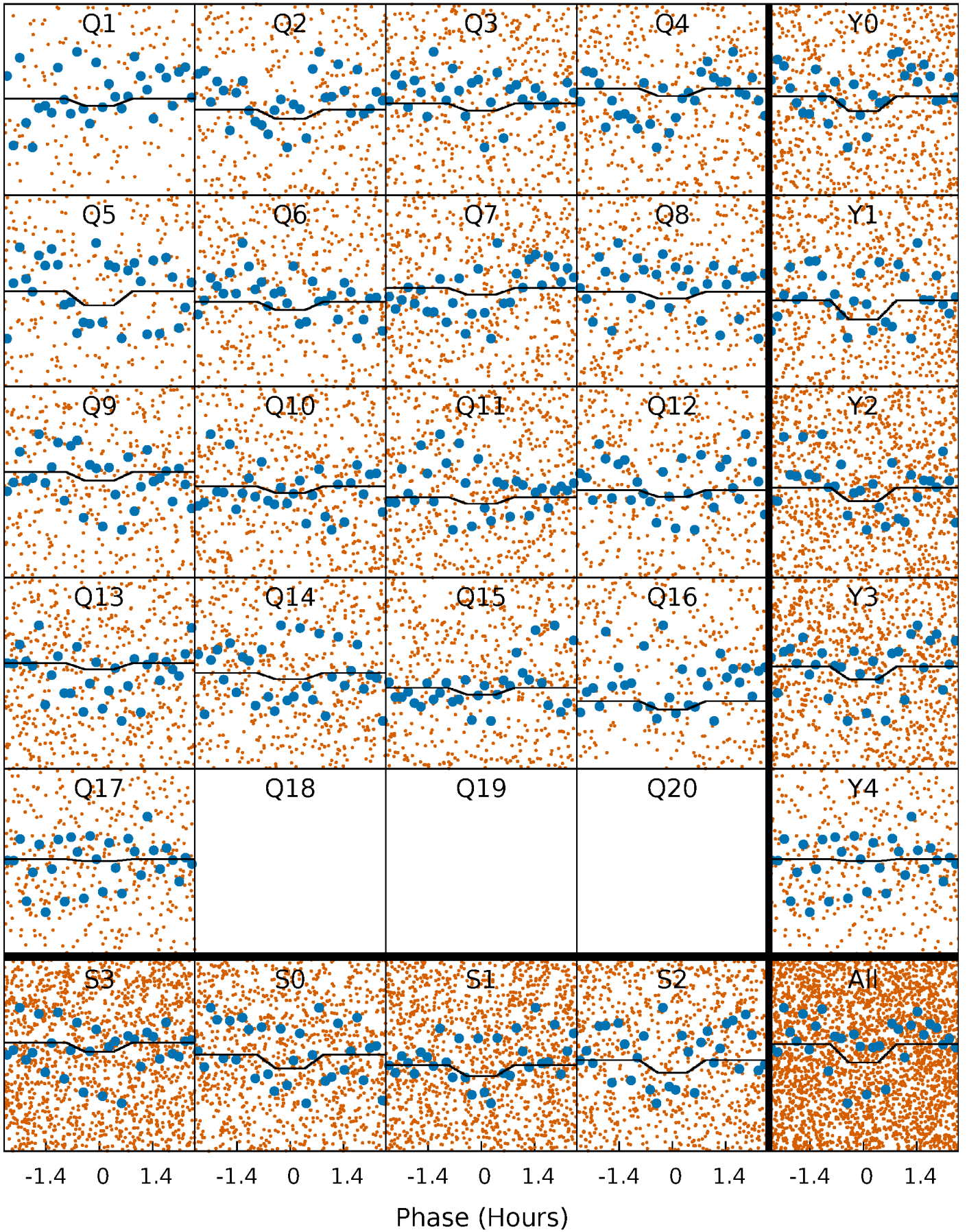
# DV Quarter-Phased Transit Curves

TCE 007047356-01 P= 0.535216 Days  $T_0=131.934125$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

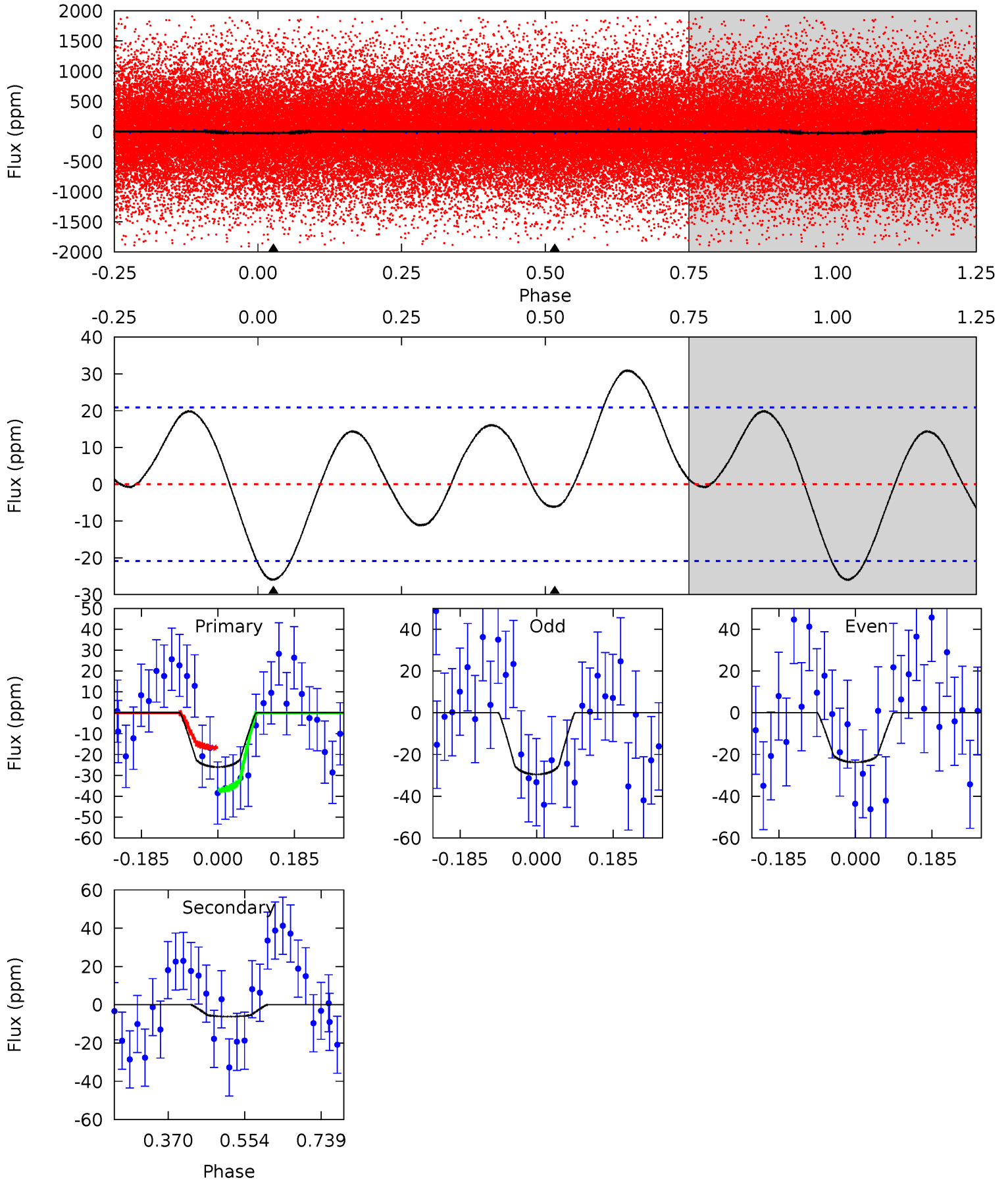
TCE 007047356-01 P= 0.535217 Days  $T_0=131.945261$  (BKJD)



# DV Model-Shift Uniqueness Test

007047356-01, P = 0.535216 Days, E = 131.398909 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.52	1.31	0	0	4.43	1.33	1.54	5.52	5.52	1.31	1.31	0.62	0.98	0.54	2.17

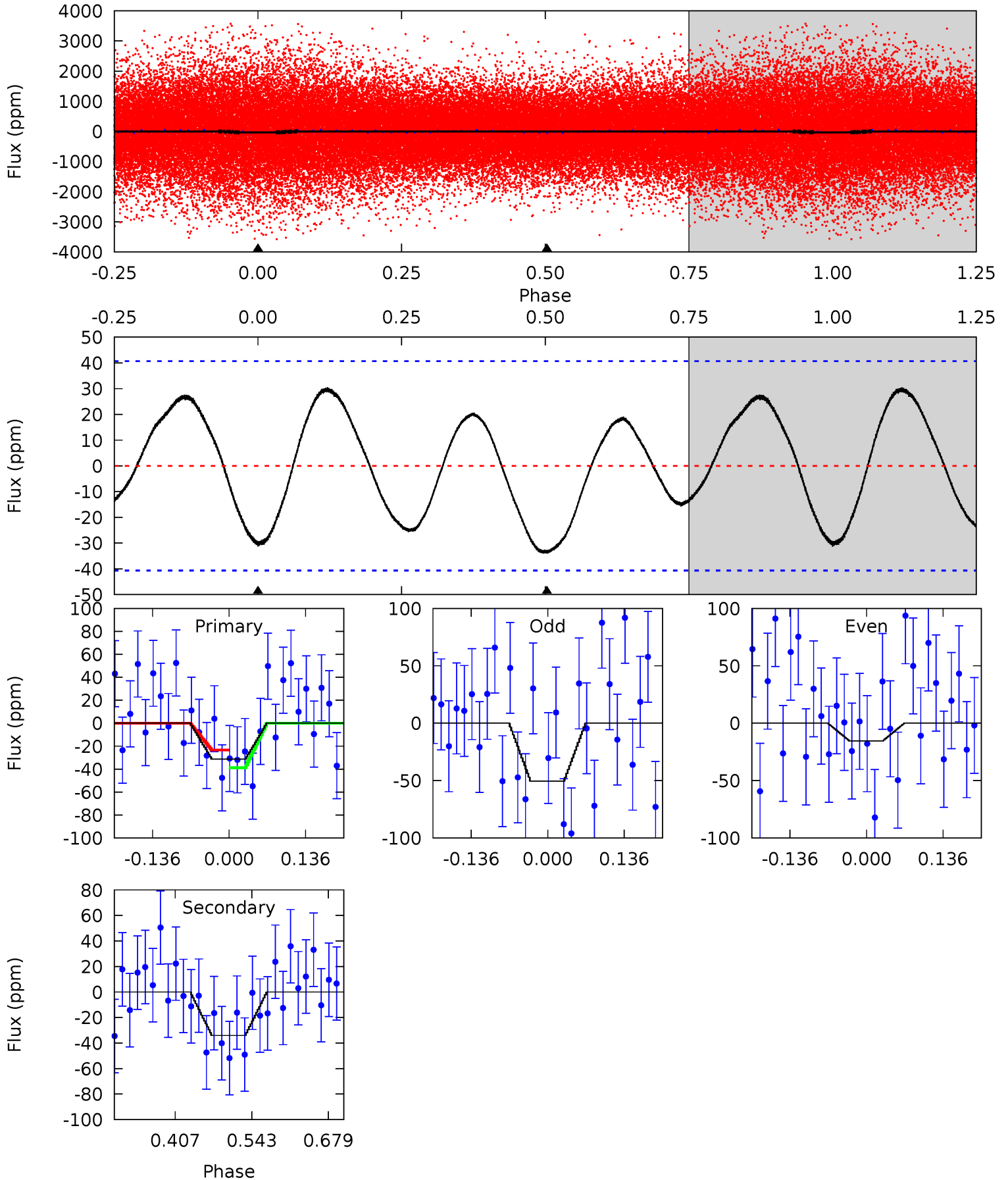




# Alt Model-Shift Uniqueness Test

007047356-01, P = 0.535217 Days, E = 131.410044 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
3.47	3.77	0	0	4.50	1.49	1.67	3.47	3.47	3.77	3.77	1.82	1.64	0.47	0.85





### Stellar Parameters For KIC 007047356

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7011^{+194}_{-291}$	$4.288^{+0.075}_{-0.225}$	$-0.060^{+0.250}_{-0.350}$	$1.388^{+0.537}_{-0.179}$	$1.369^{+0.216}_{-0.195}$	$0.721^{+0.286}_{-0.405}$
	+3%/-4%	+2%/-5%	+417%/-583%	+39%/-13%	+16%/-14%	+40%/-56%
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 007047356-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-6 \pm 5$	$0.96^{+0.47}_{-0.38}$	$4326^{+393}_{-244}$	$4105^{+1591}_{-7511}$	$0.709^{+1.679}_{-0.530}$
Alt.	$-34 \pm 9$	$0.84^{+0.46}_{-0.40}$	$4322^{+370}_{-248}$	$7270^{+3959}_{-1564}$	$5.289^{+13.458}_{-3.145}$

$T_{max}$  = 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

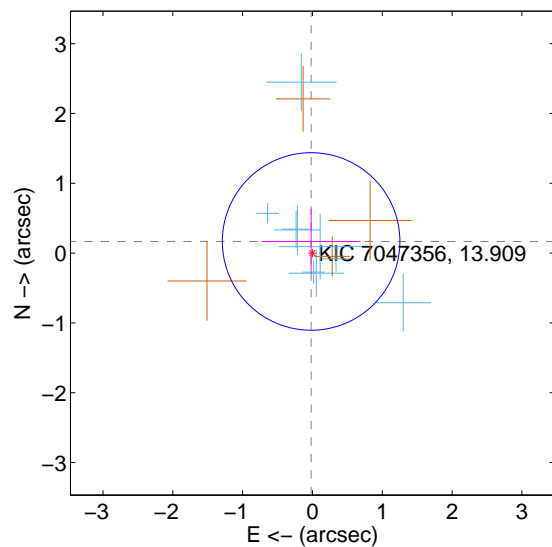
Supplemental centroid analysis for 007047356-01. Kepler magnitude: 13.91. Transit SNR 5.72

There are 9 quarters with good PRF difference image offsets

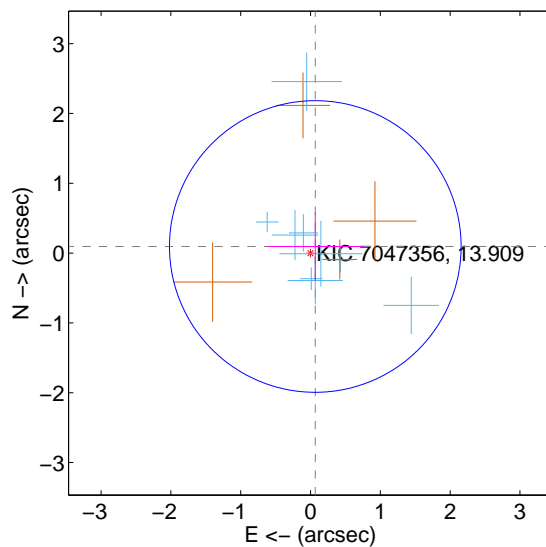
The direct PRF centroid is offset from the target star catalog position by about 0.11 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.168 \pm 0.424$	0.40	$0.019 \pm 0.706$	$0.166 \pm 0.464$
PRF-fit source offset from KIC position	$0.117 \pm 0.696$	0.17	$-0.068 \pm 0.690$	$0.095 \pm 0.490$
photometric centroid source offset	$0.49 \pm 0.80$	0.62	$0.08 \pm 0.67$	$-0.49 \pm 0.80$

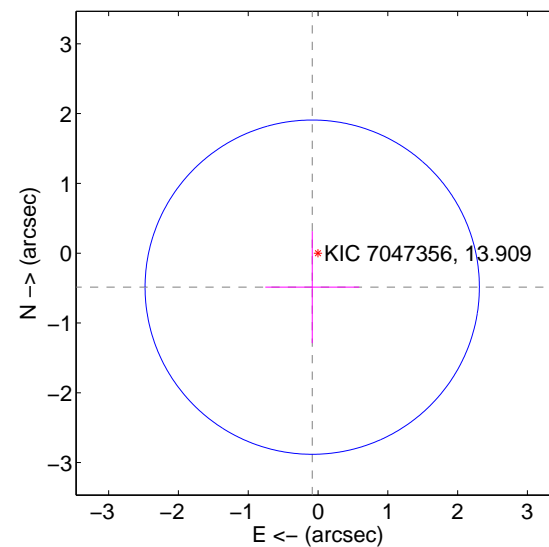
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

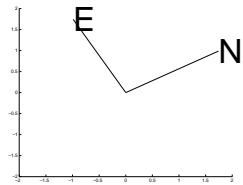
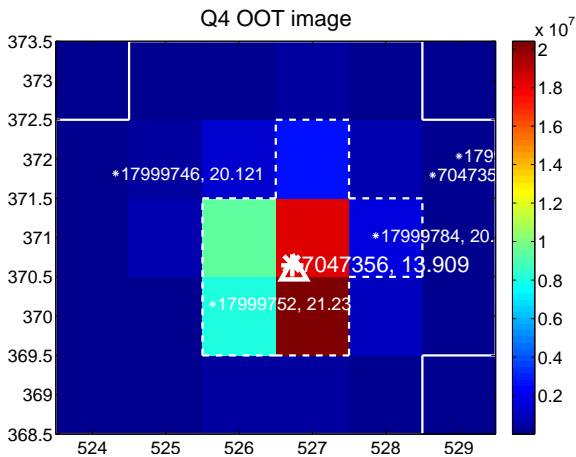
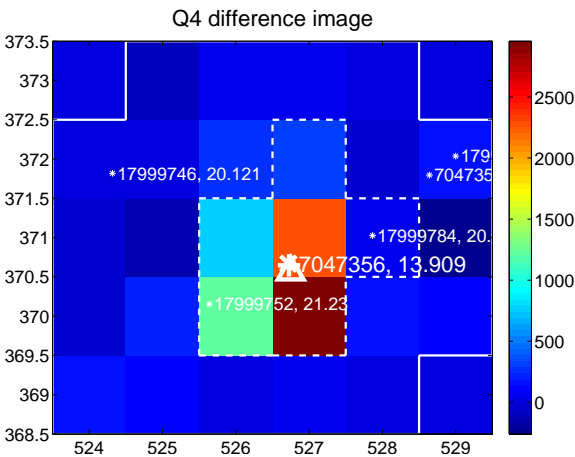
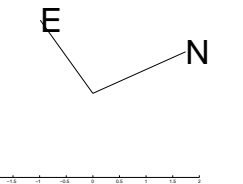
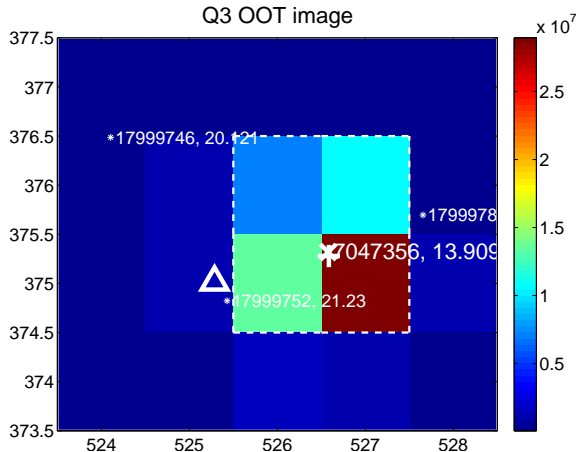
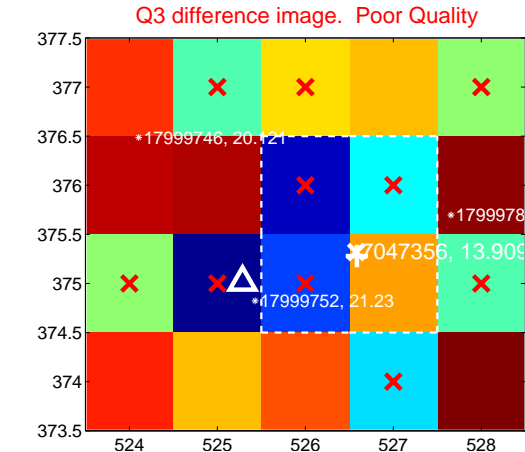
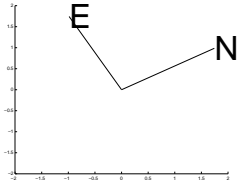
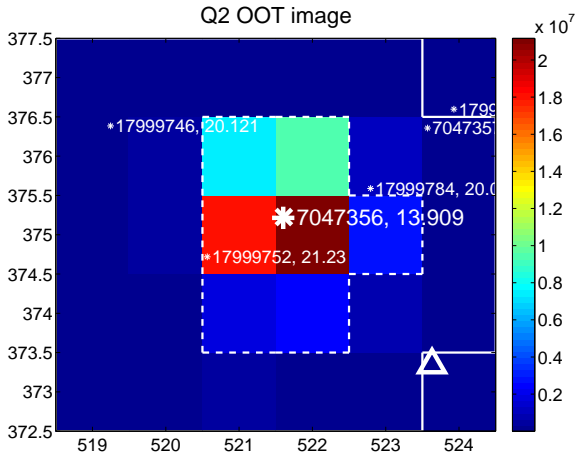
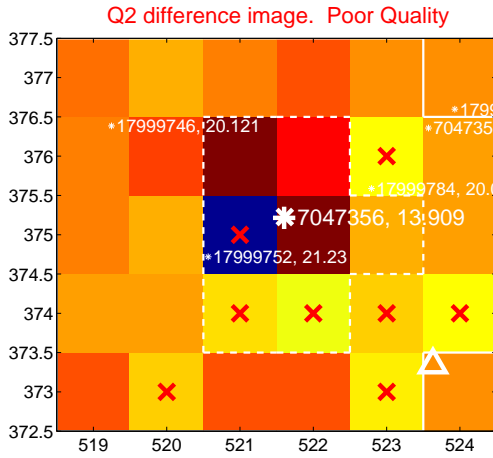
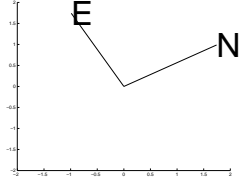
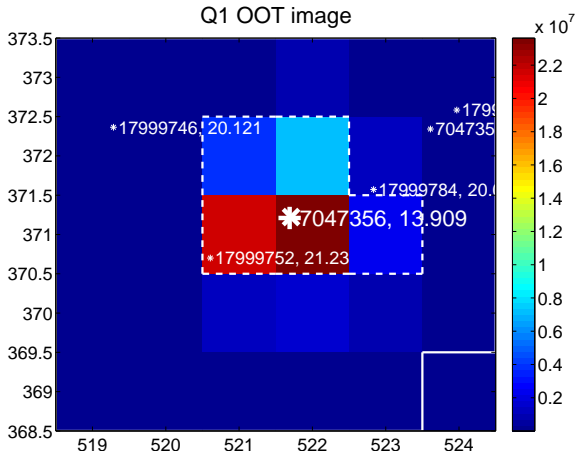
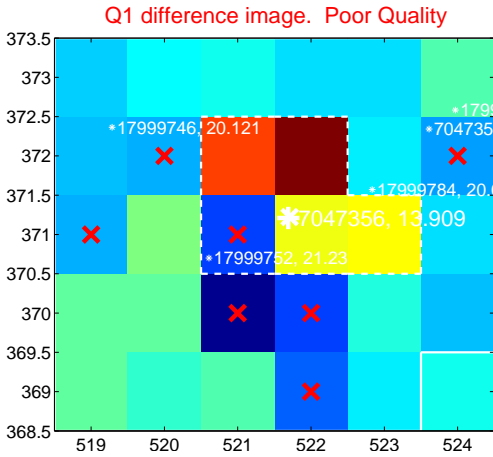


offset from photometric centroids

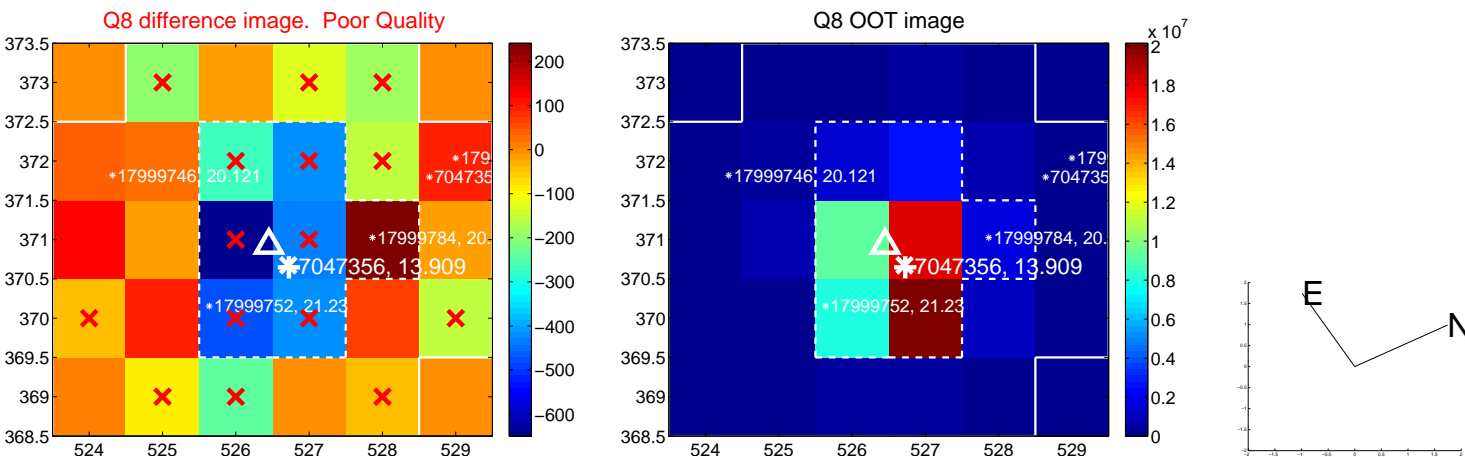
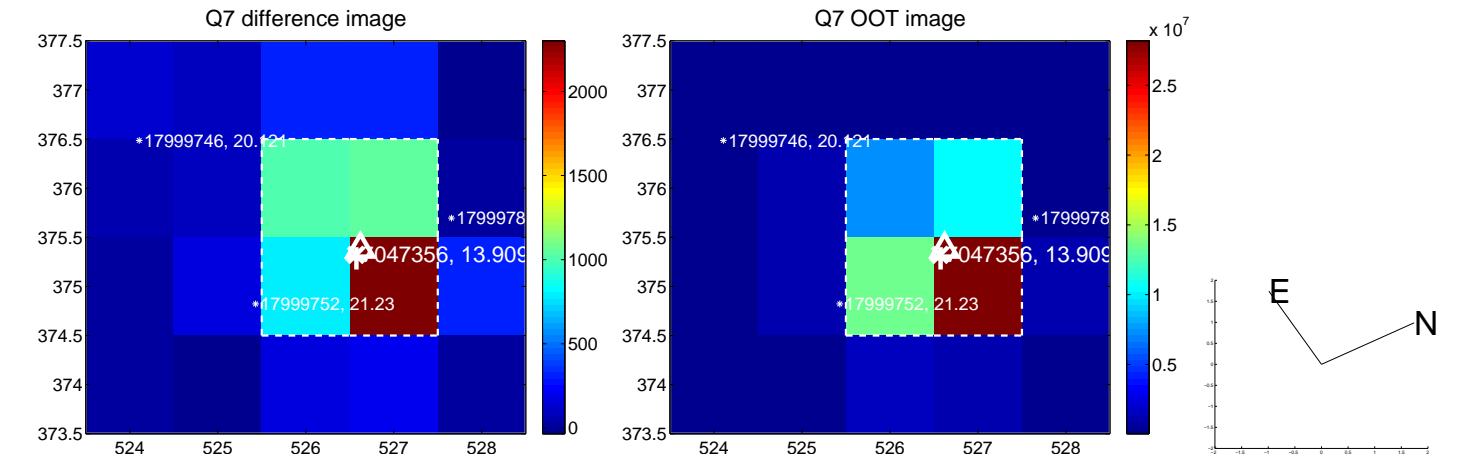
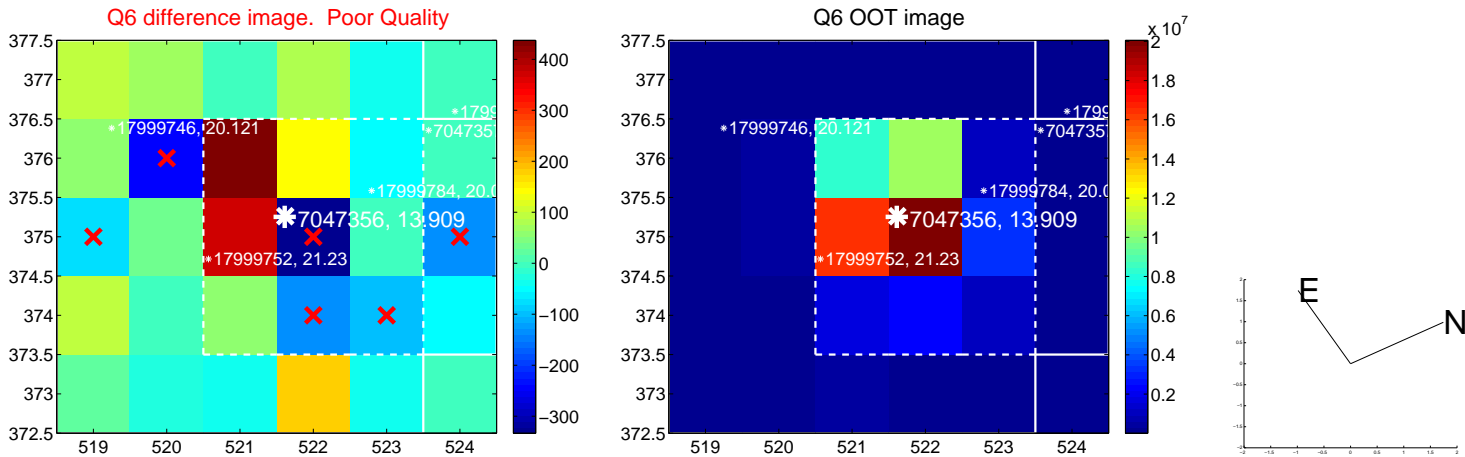
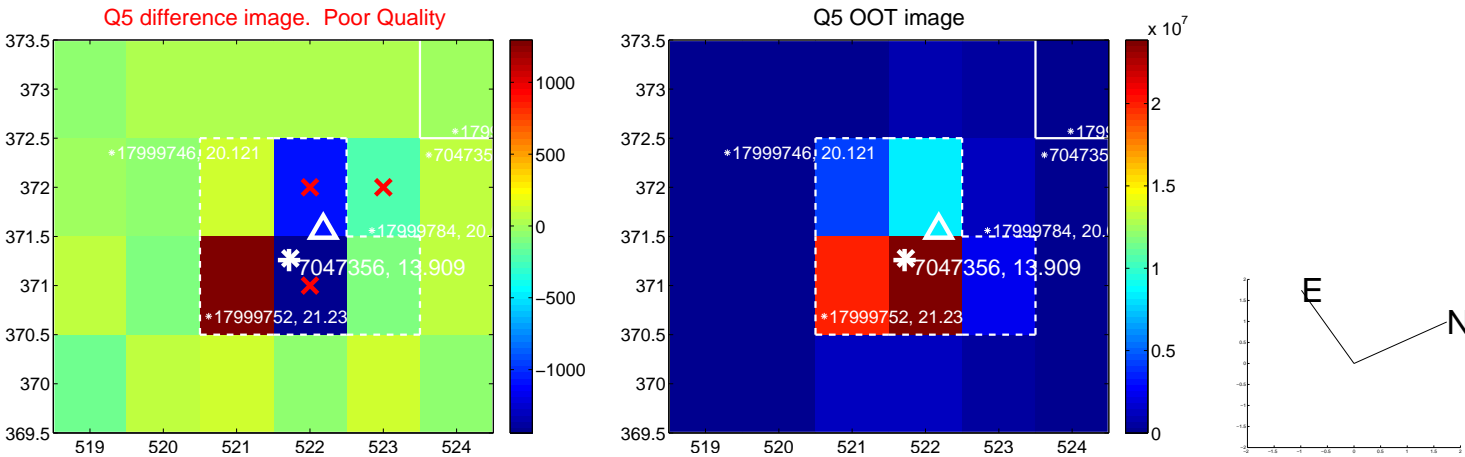


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

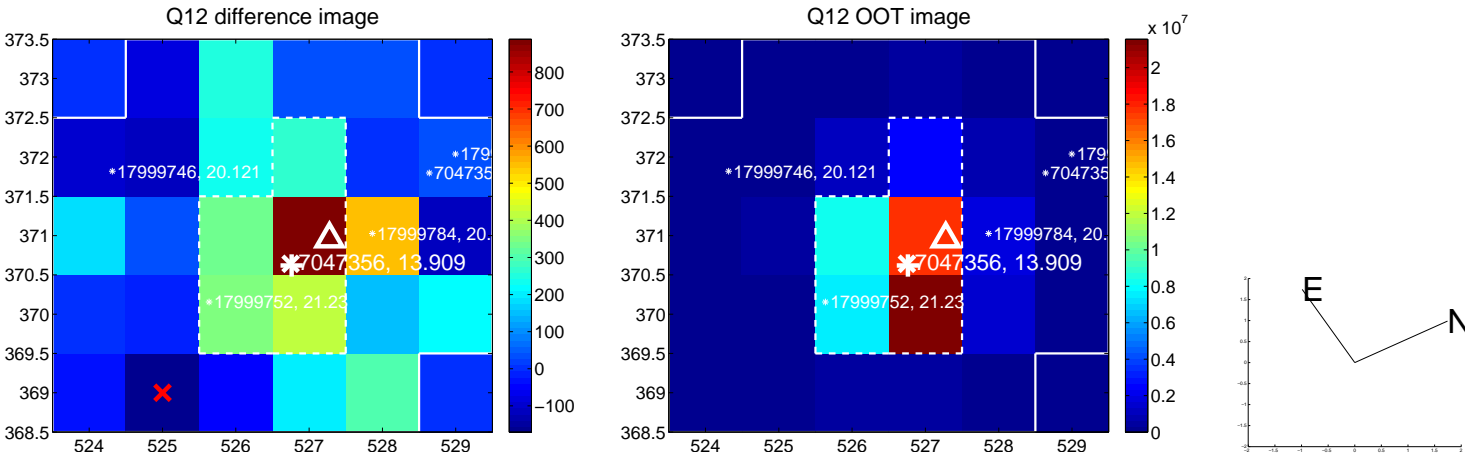
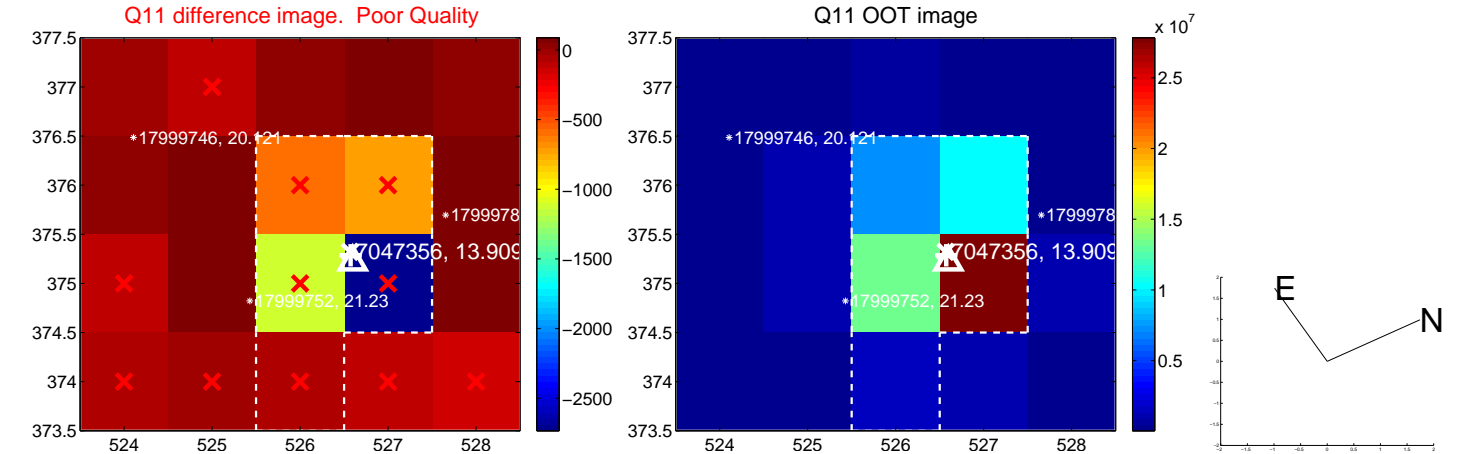
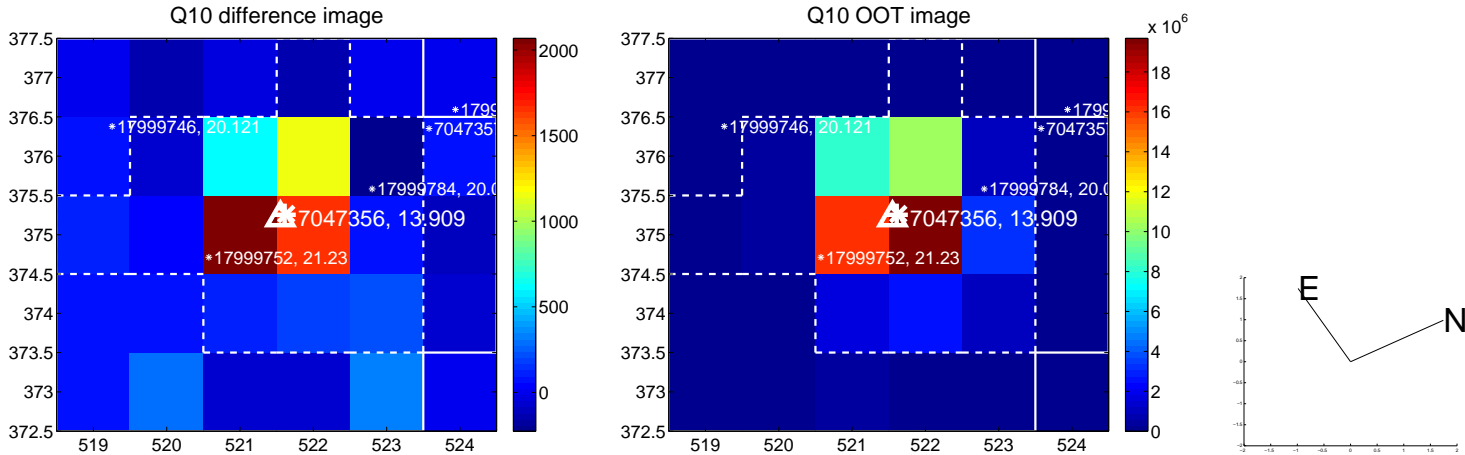
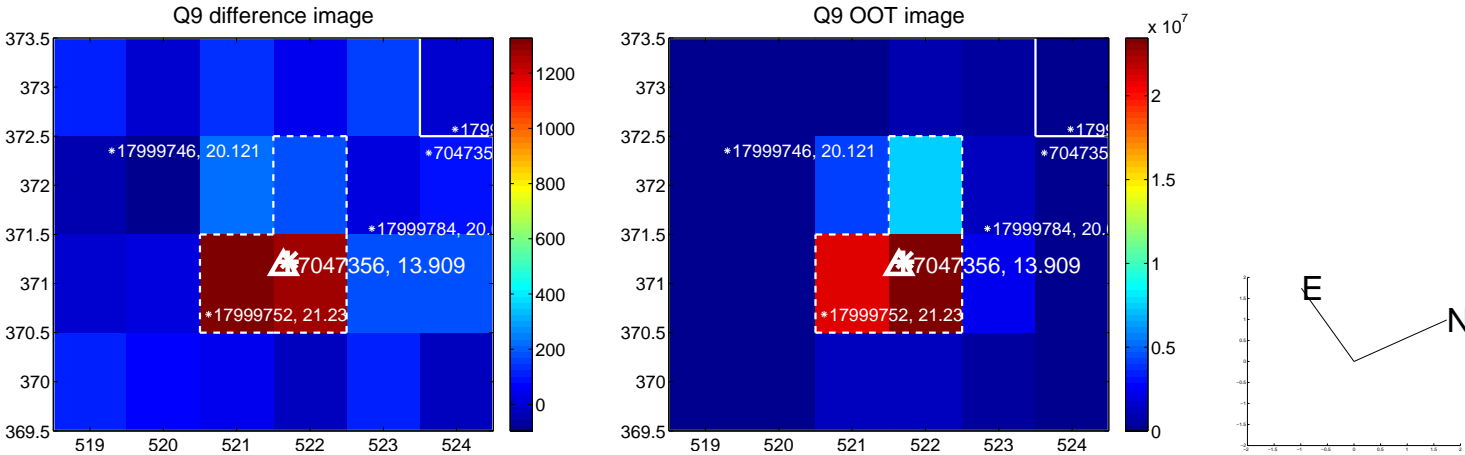


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

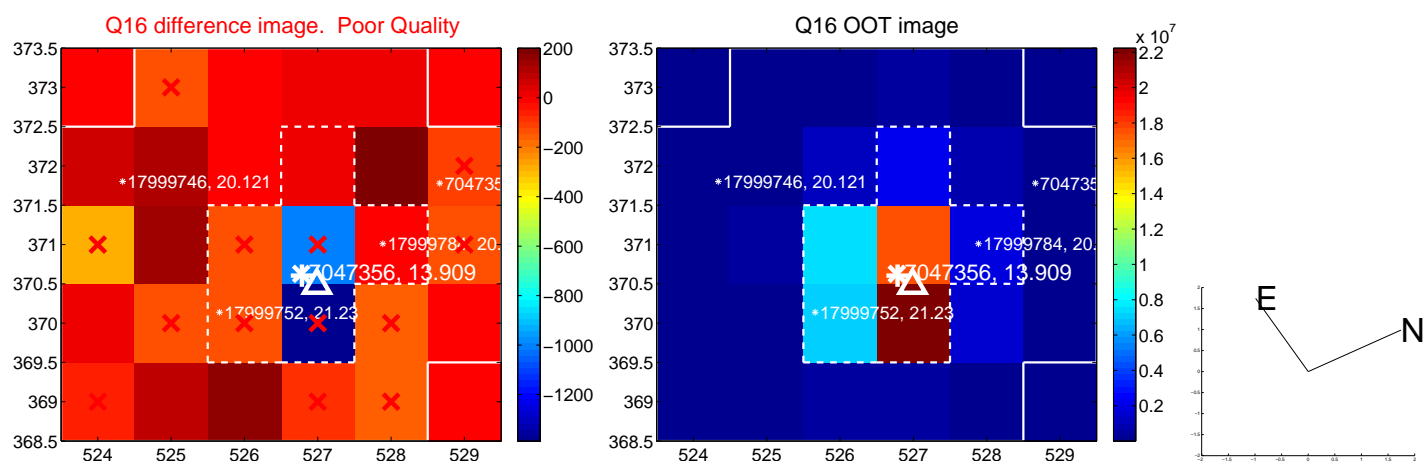
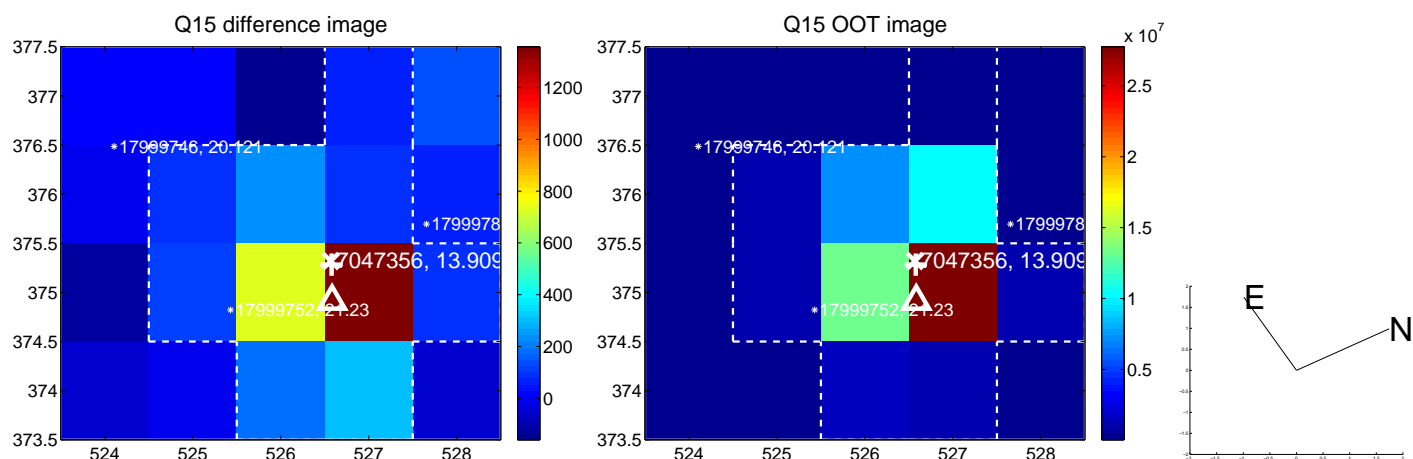
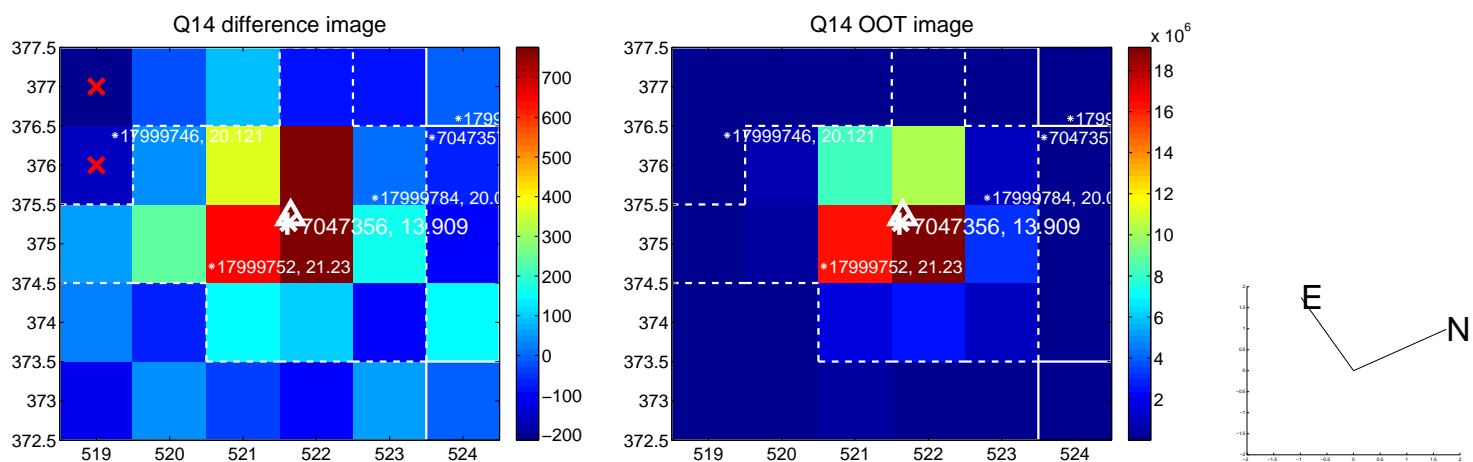
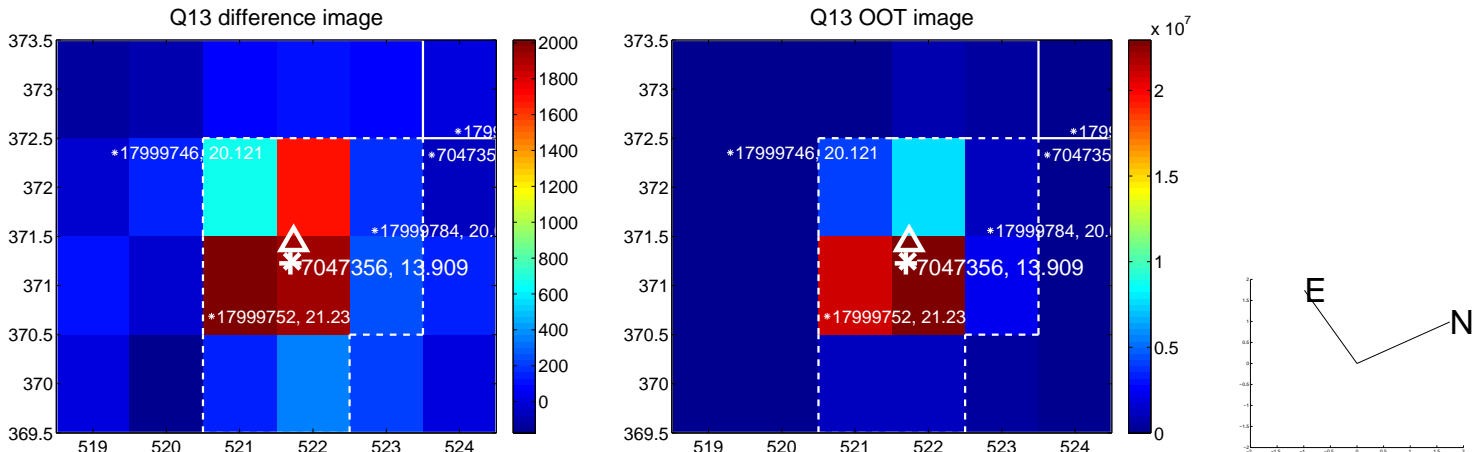




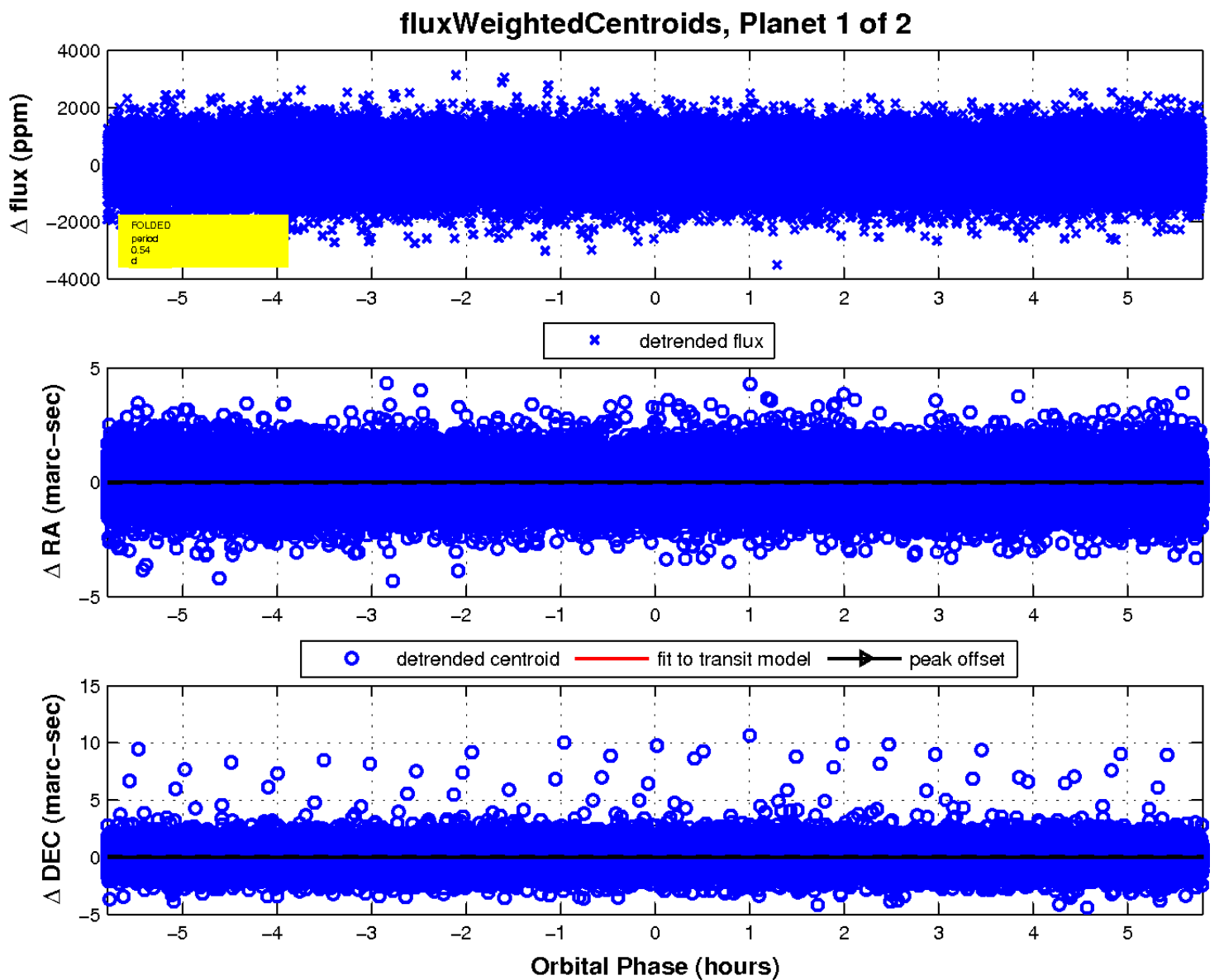
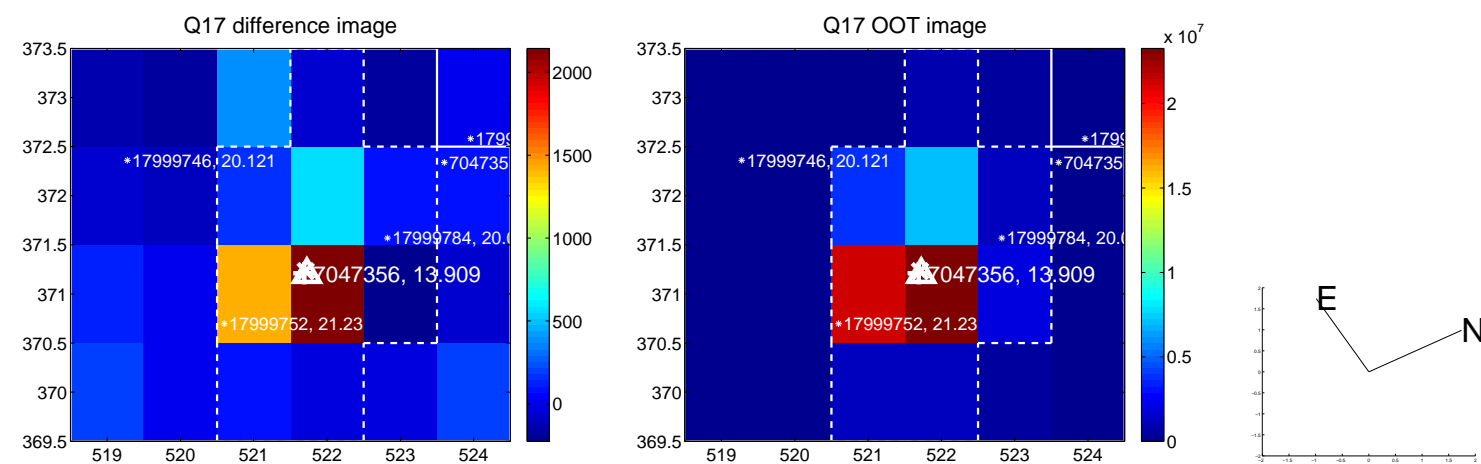
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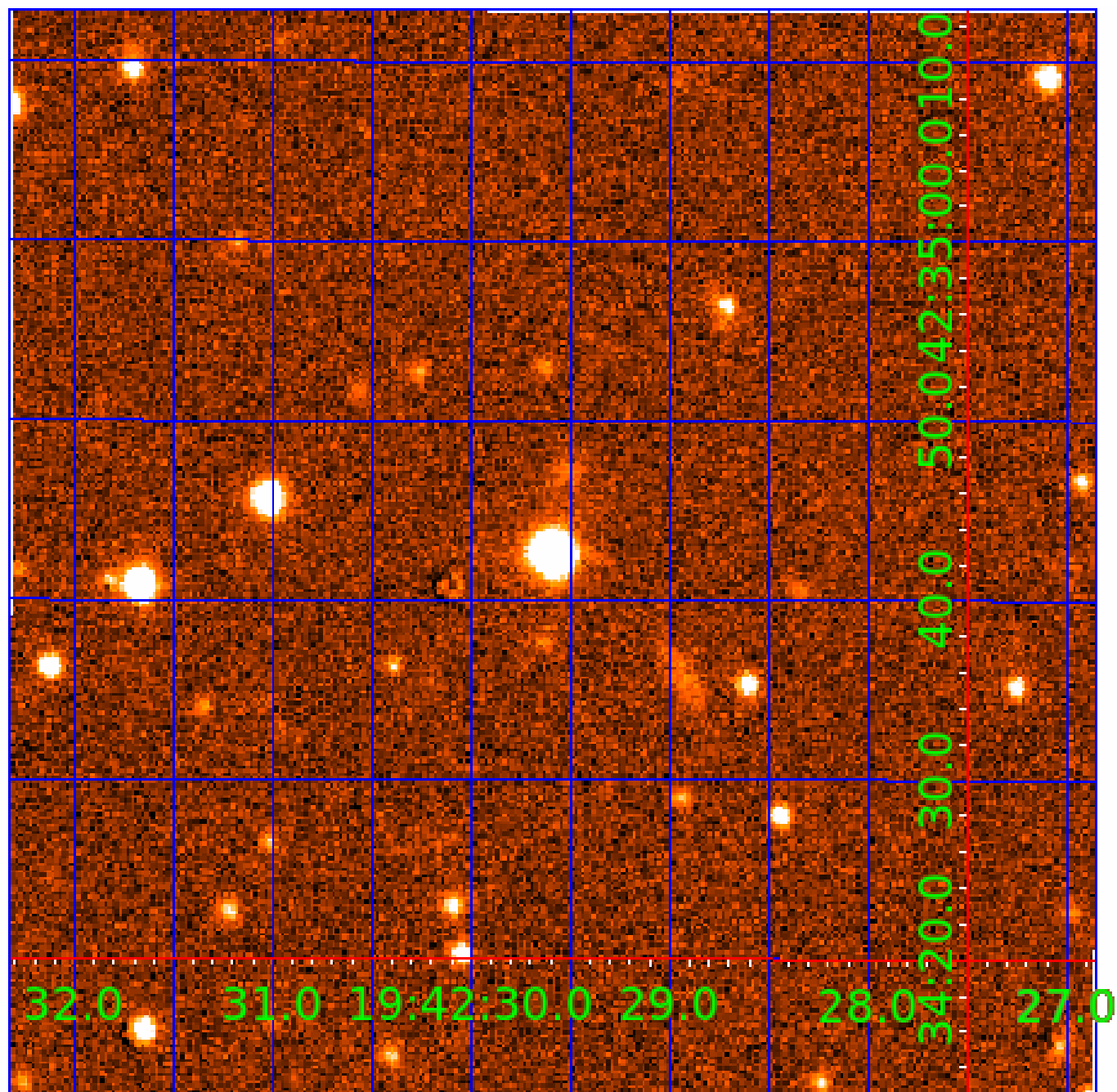


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 007047356

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
007047356-01	OBS	No	0.535216	131.934125	32.4	1.932	9.0	5.7	1.39	7011	0.93	20365.81
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## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
007047356-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT
007047356-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT

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

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

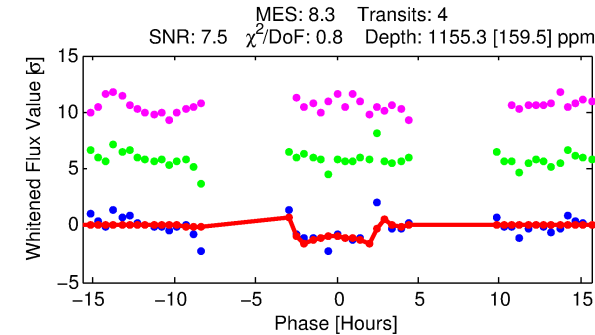
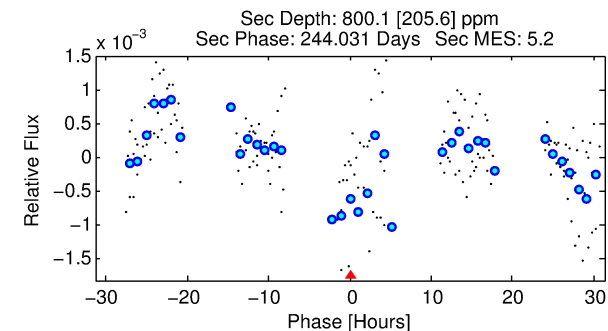
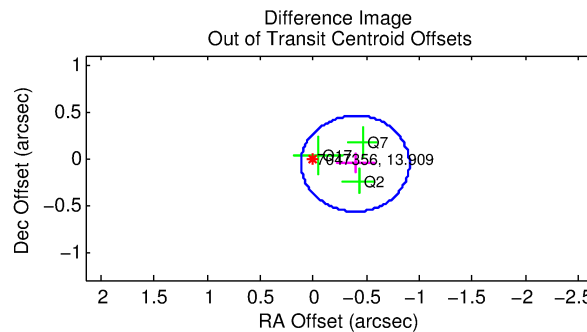
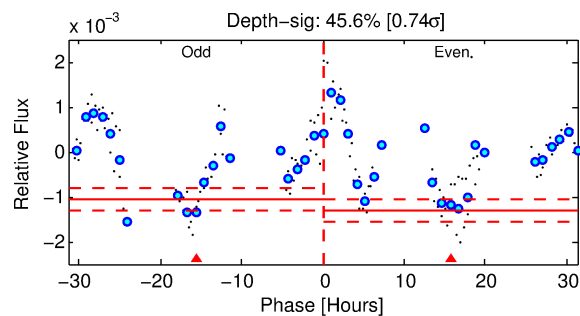
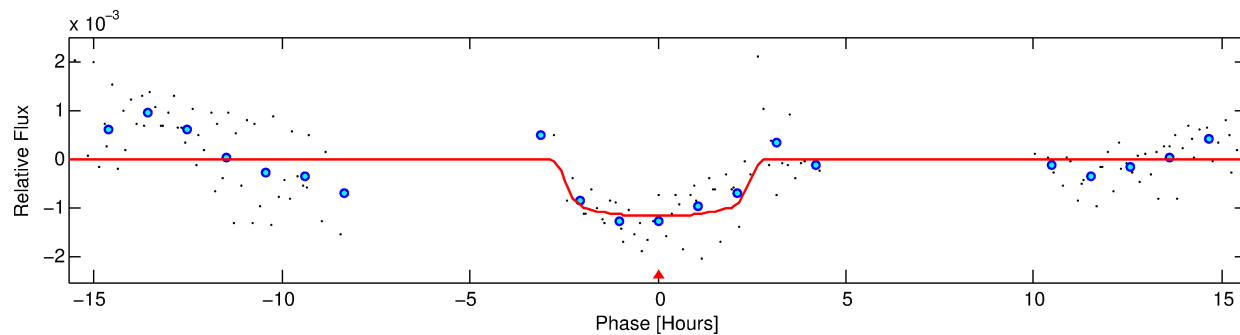
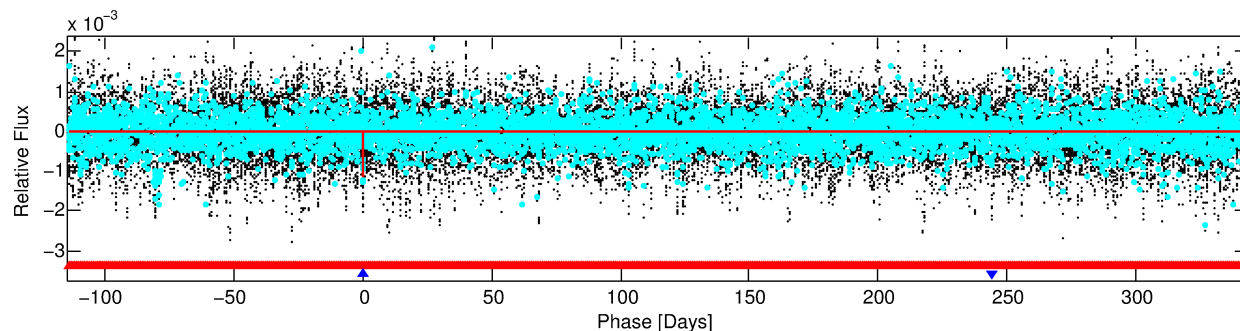
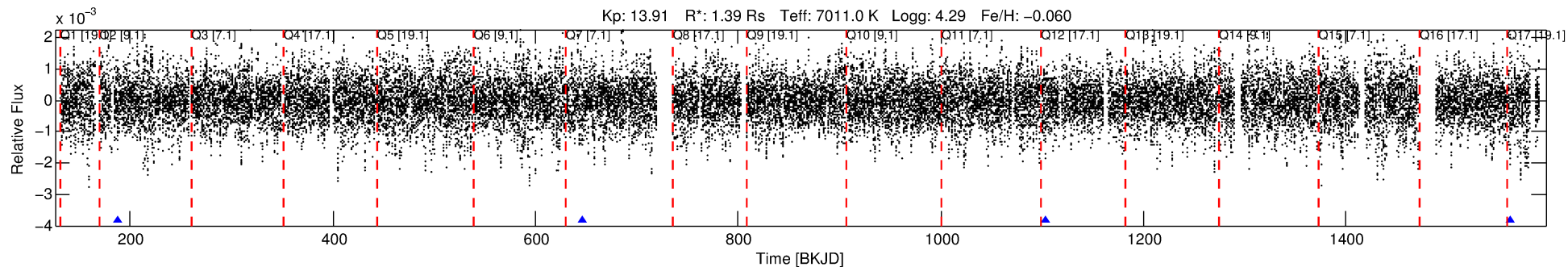
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 007047356-02

No Significant Match Found

# DV One-Page Summary

KIC: 7047356 Candidate: 2 of 2 Period: 458.156 d



## DV Fit Results:

Period = 458.15615 [0.00519] d  
Epoch = 187.8138 [0.0094] BKJD  
Rp/R\* = 0.0329 [0.0123]  
a/R\* = 550.01 [1140.09]  
b = 0.63 [2.01]  
Seff = 2.51 [1.16]  
Teq = 321 [37] K  
Rp = 4.98 [2.68] Re  
a = 1.2901 [0.4005] AU  
Ag = 29548.25 [26553.02] [1.11 $\sigma$ ]  
Teff = 6503 [1310] K [4.72 $\sigma$ ]

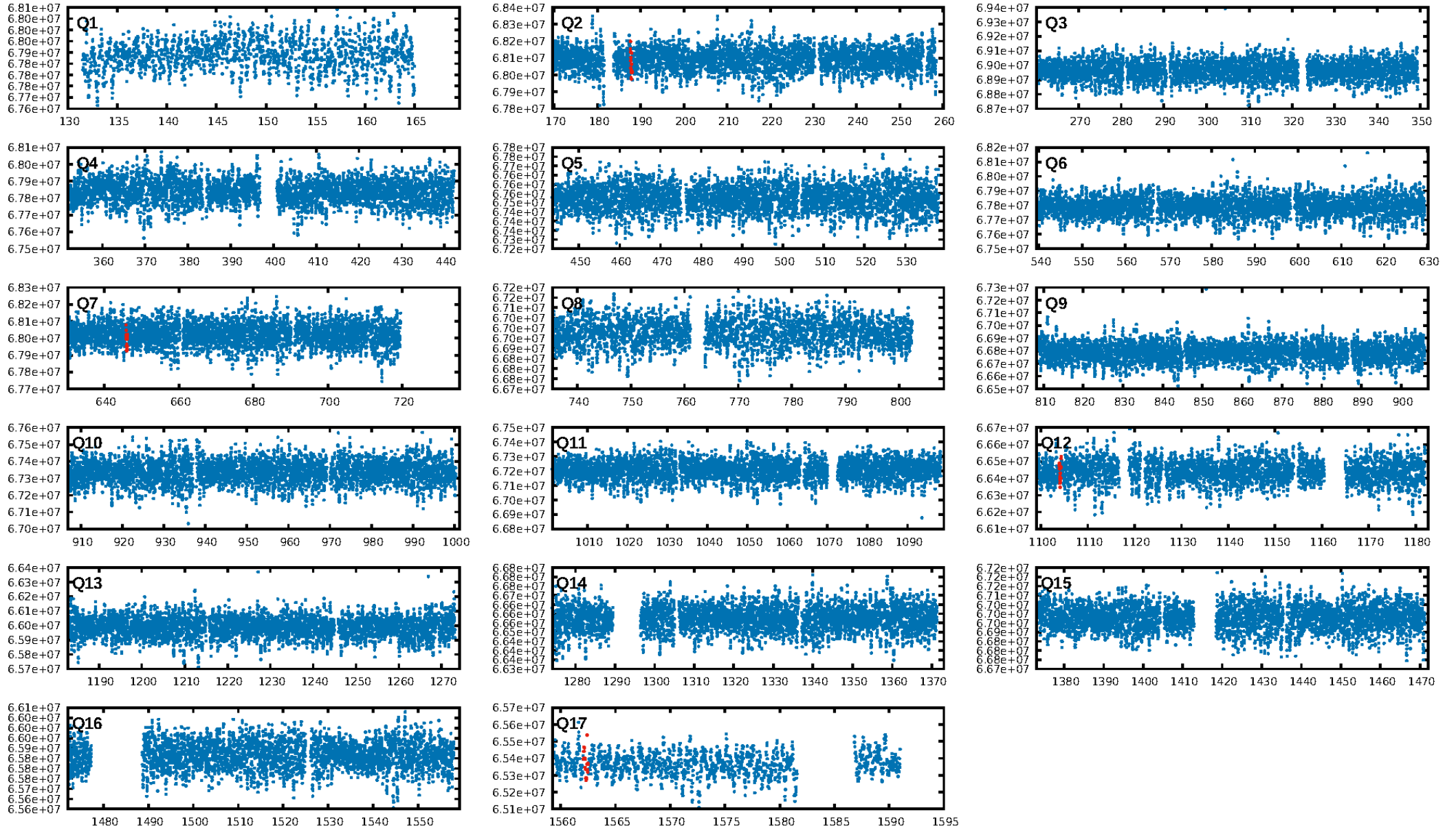
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [1971.48 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 49.7%  
ModelChiSquareGoF-sig: 100.0%  
**Bootstrap-pfa: 5.52e-10**  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 1.103  
Centroid-sig: 21.0%  
Centroid-so: 0.158 arcsec [0.51 $\sigma$ ]  
OotOffset-rm: 0.399 arcsec [2.34 $\sigma$ ]  
**KicOffset-rm: 0.466 arcsec [3.24 $\sigma$ ]**  
OotOffset-st: 1/1/0/1 [3]  
KicOffset-st: 1/1/0/1 [3]  
DiffImageQuality-fgm: 1.00 [3/3]  
DiffImageOverlap-fno: 0.00 [0/3]

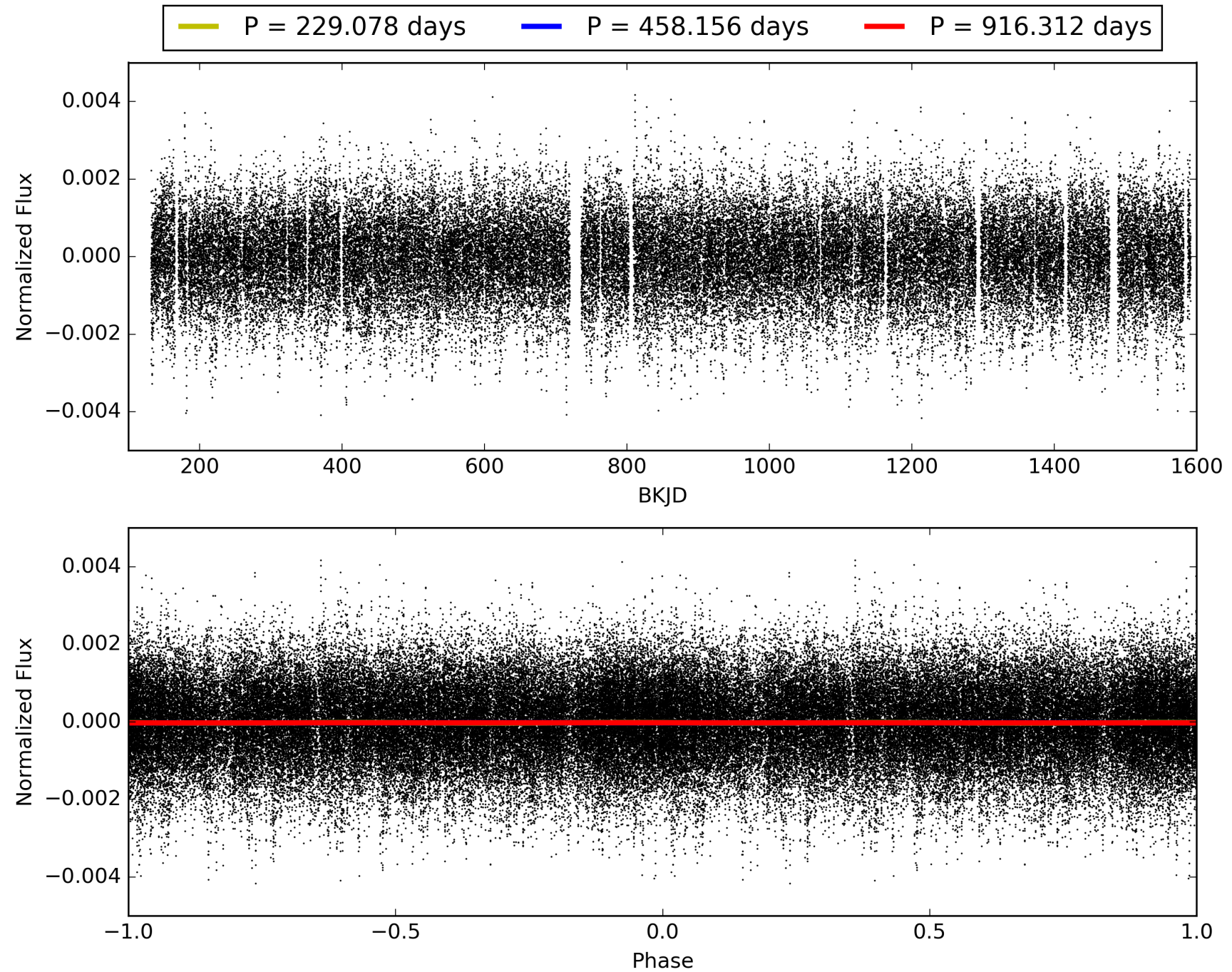
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 04:21:05 Z

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

# TCE 007047356-02, PDC Light Curves



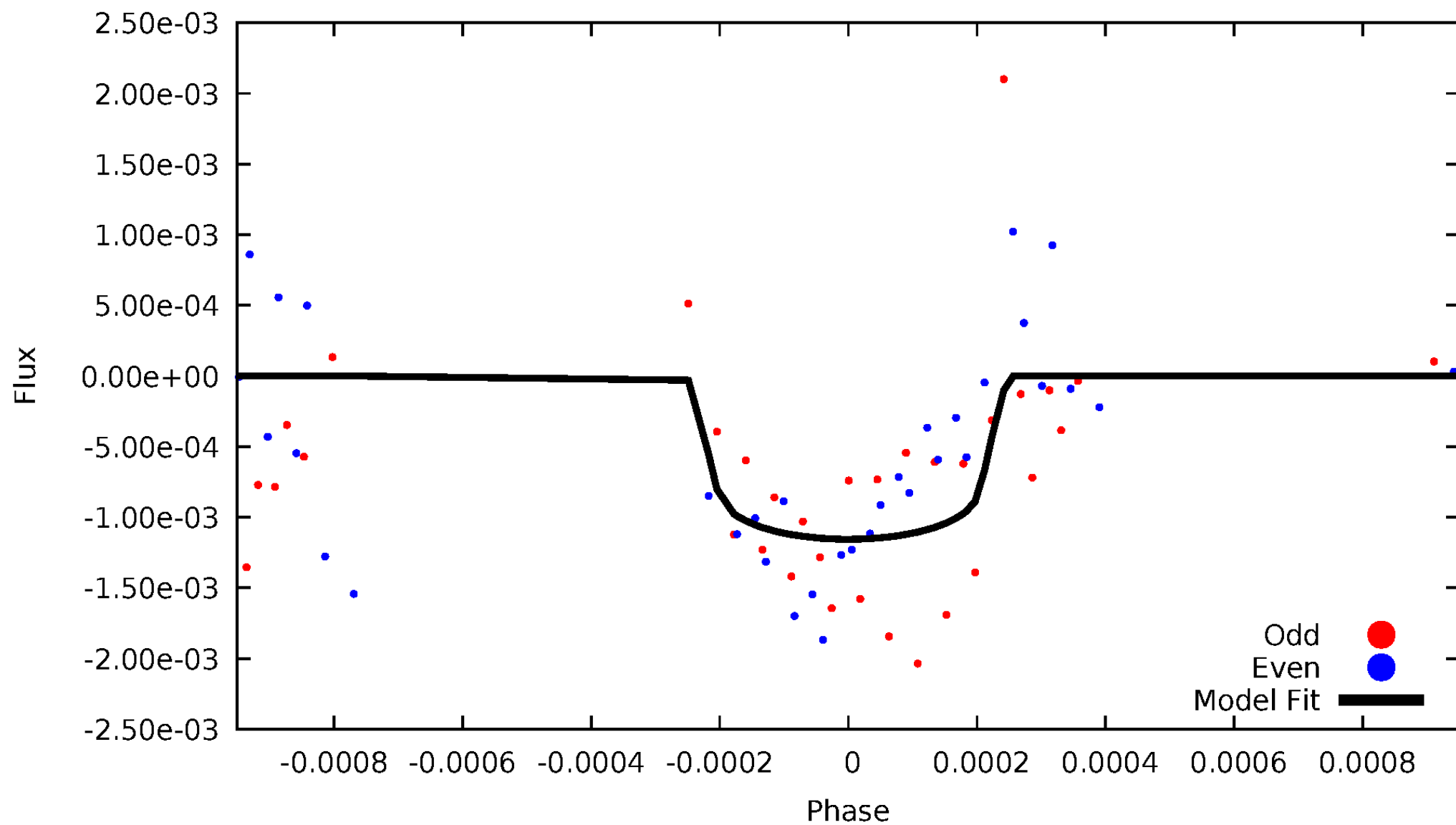
TCE 007047356-02





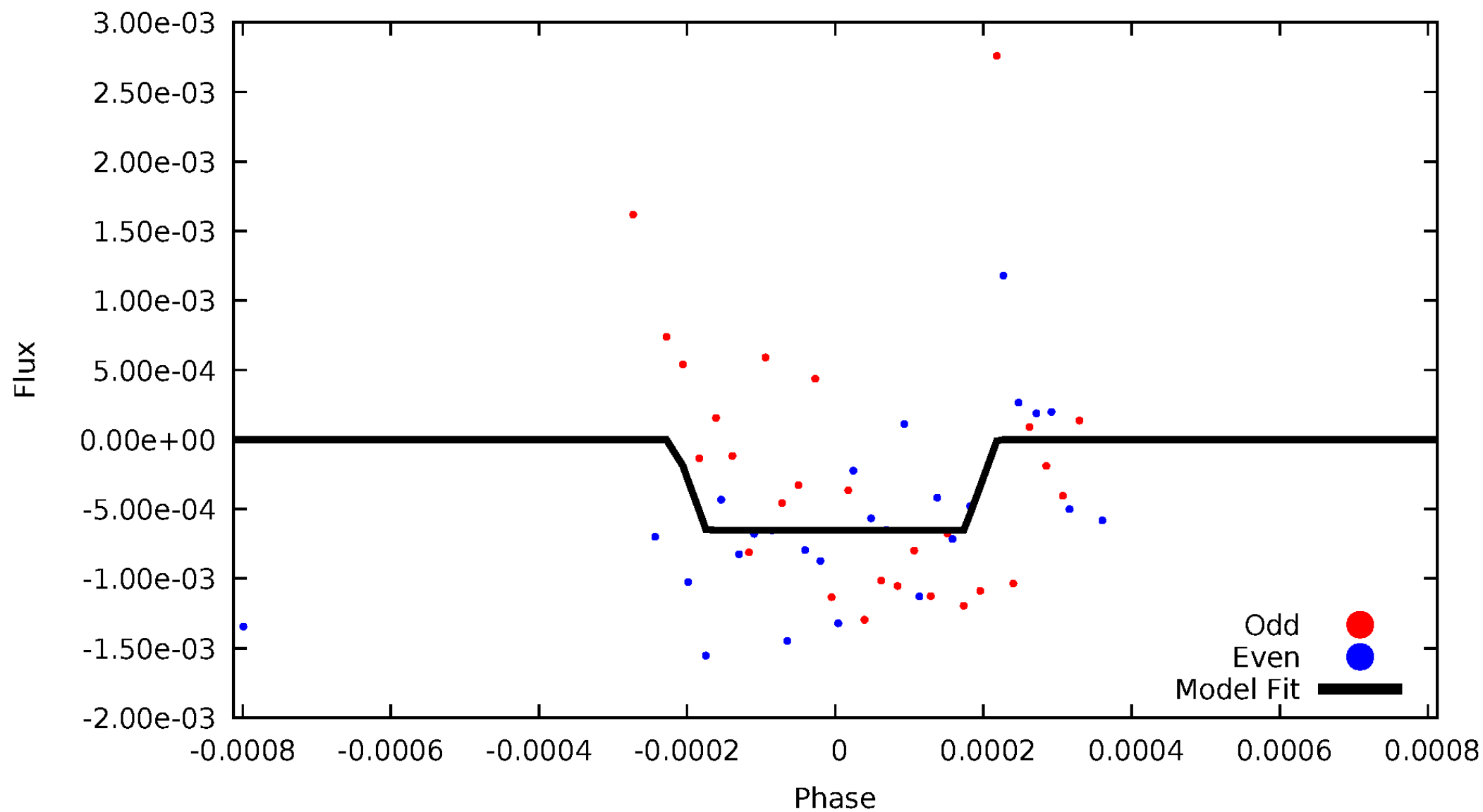
# DV Odd/Even

TCE 007047356-02



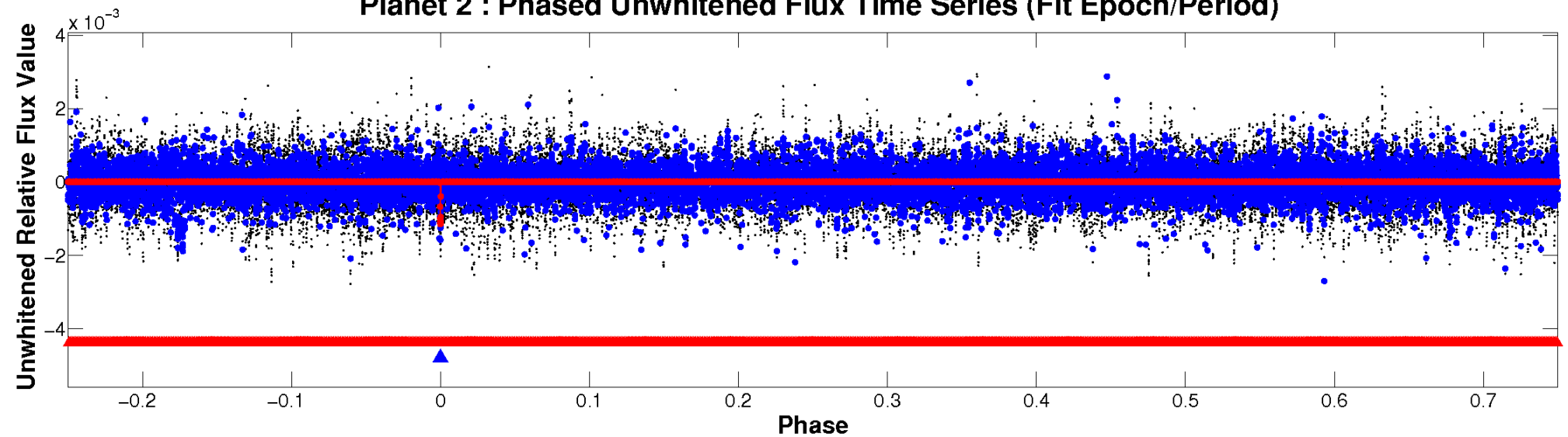
# ALT Odd/Even

TCE 007047356-02

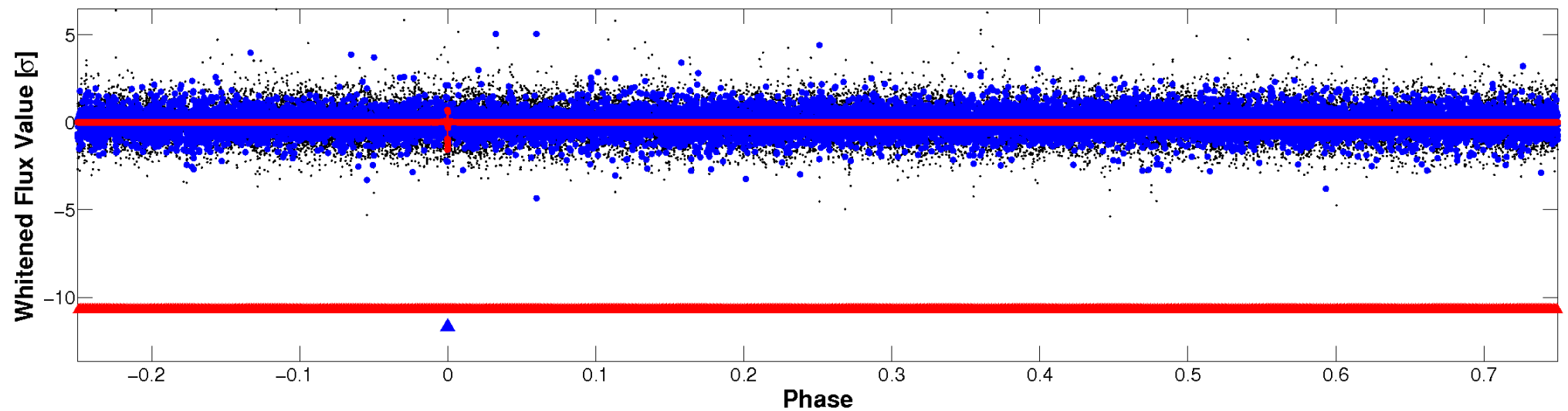


# Non-Whitened Vs. Whitened Light Curve

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

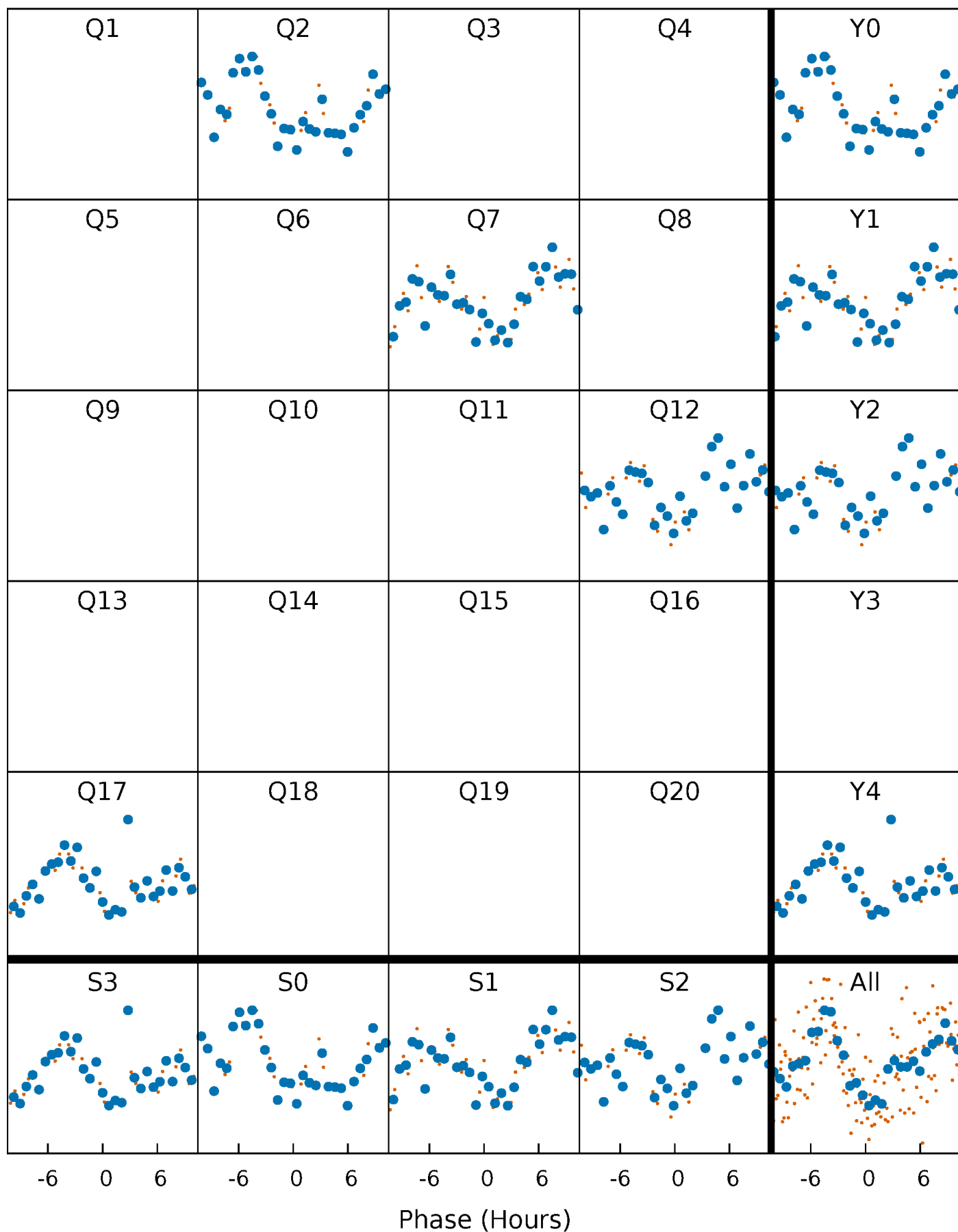


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



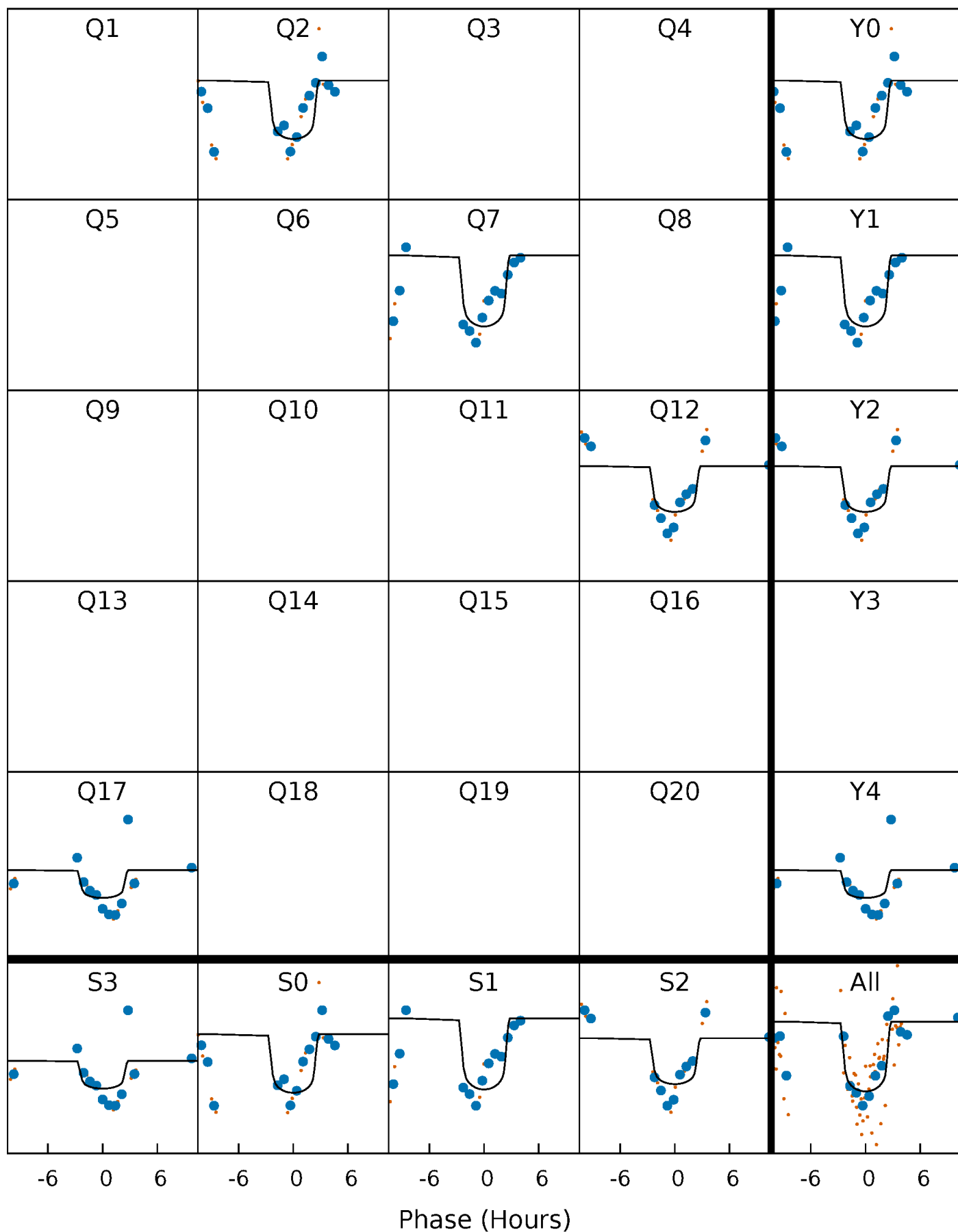
# PDC Quarter-Phased Transit Curves

TCE 007047356-02 P=458.156149 Days  $T_0=187.813770$  (BKJD)



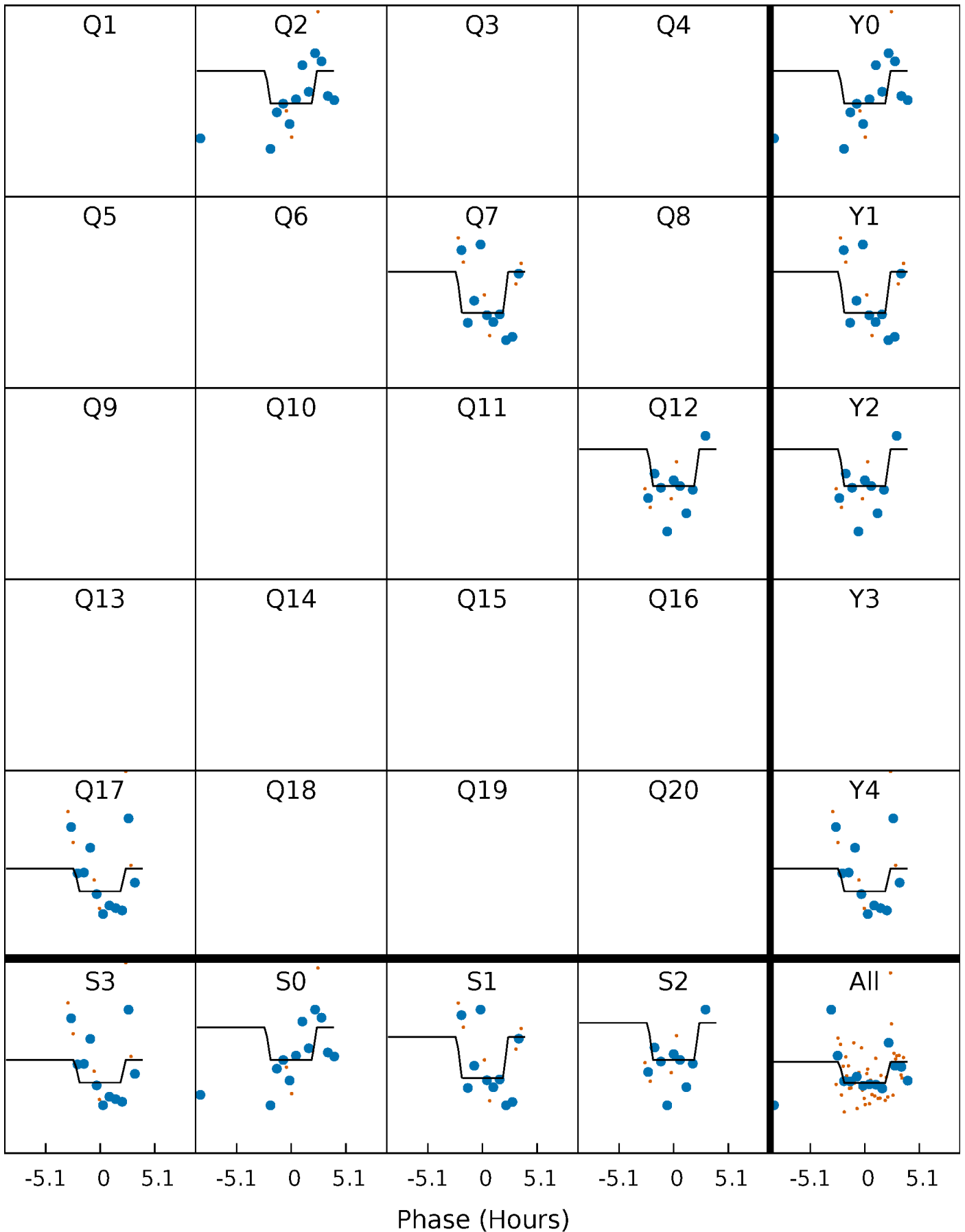
# DV Quarter-Phased Transit Curves

TCE 007047356-02 P=458.156149 Days  $T_0=187.813770$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 007047356-02 P=458.155230 Days  $T_0=187.827406$  (BKJD)

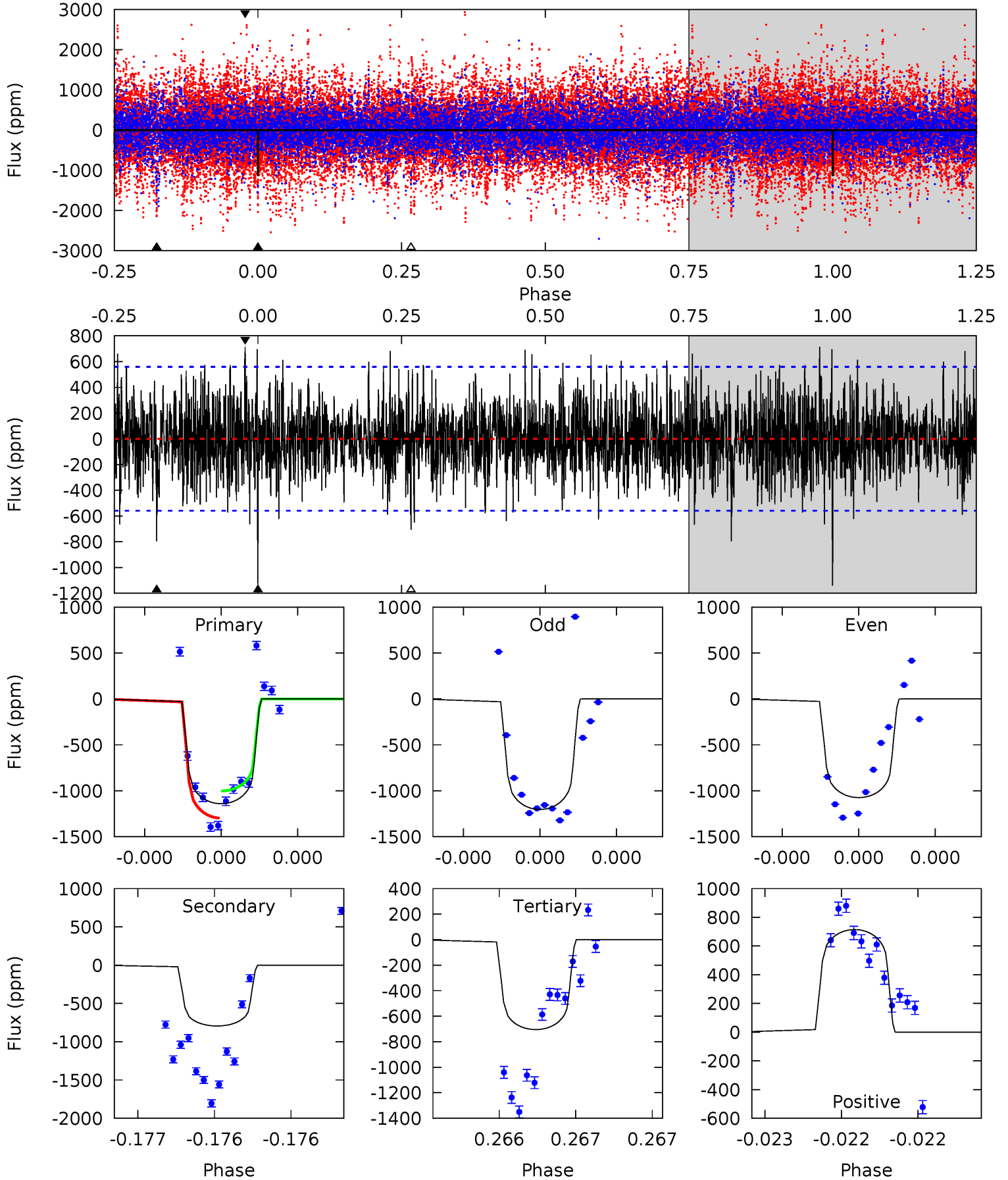




# DV Model-Shift Uniqueness Test

007047356-02, P = 458.156149 Days, E = 187.813770 Days

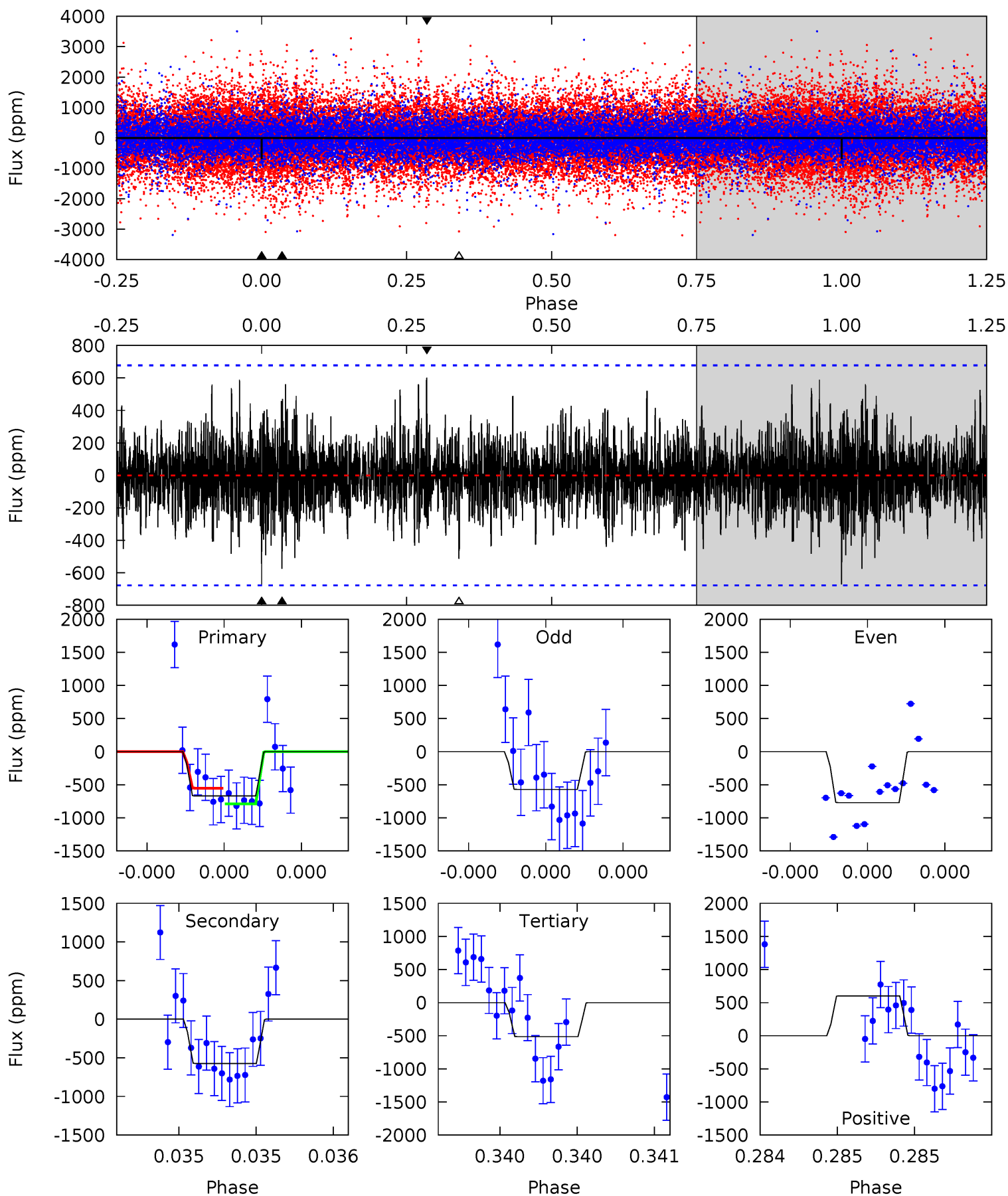
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.4	7.93	7.03	7.13	5.58	3.49	2.07	4.35	4.25	0.90	0.80	0.65	1.03	0.39	1.46



# Alt Model-Shift Uniqueness Test

007047356-02, P = 458.155230 Days, E = 187.827406 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.54	4.75	4.25	4.98	5.60	3.52	1.22	1.29	0.57	0.50	-0.23	0.83	0.95	0.47	0.98



### Stellar Parameters For KIC 007047356

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7011^{+194}_{-291}$	$4.288^{+0.075}_{-0.225}$	$-0.060^{+0.250}_{-0.350}$	$1.388^{+0.537}_{-0.179}$	$1.369^{+0.216}_{-0.195}$	$0.721^{+0.286}_{-0.405}$
	+3%/-4%	+2%/-5%	+417%/-583%	+39%/-13%	+16%/-14%	+40%/-56%
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 007047356-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-794 \pm 100$	$5.22^{+2.28}_{-2.11}$	$456^{+36}_{-26}$	$6410^{+2189}_{-998}$	$25943^{+47684}_{-13172}$
Alt.	$-574 \pm 121$	$4.05^{+2.07}_{-1.78}$	$456^{+36}_{-26}$	$6648^{+2742}_{-1171}$	$30785^{+66638}_{-17777}$

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

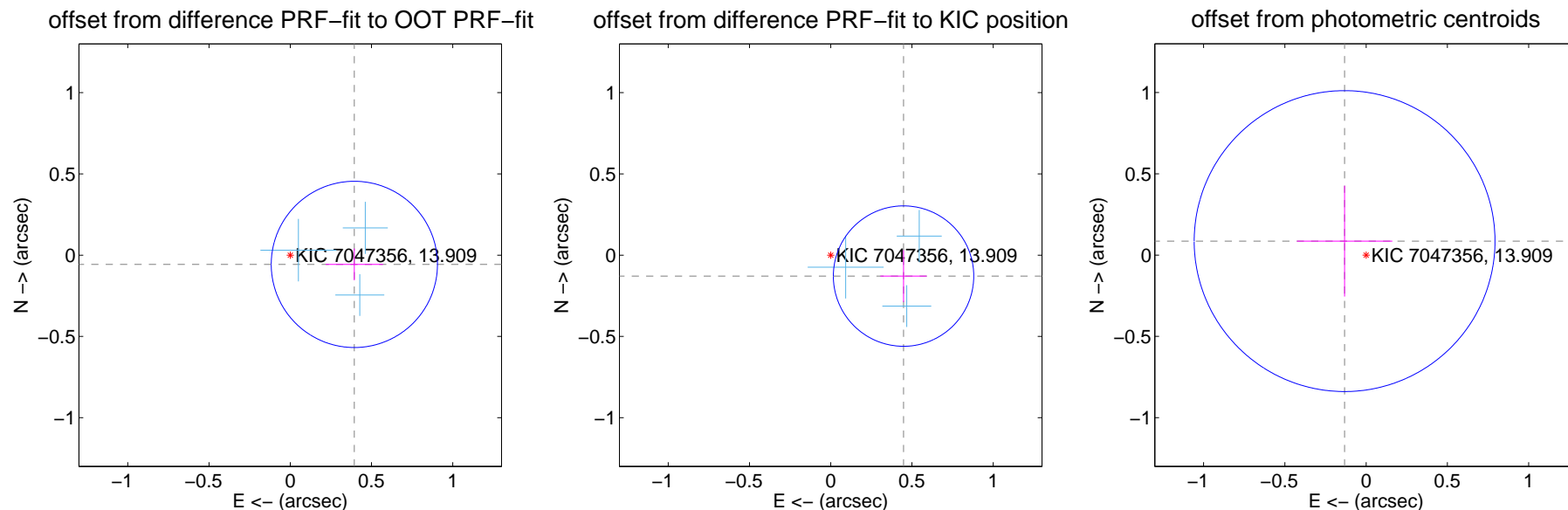
## DV Centroid Data

Supplemental centroid analysis for 007047356-02. Kepler magnitude: 13.91. Transit SNR 7.47

There are 3 quarters with good PRF difference image offsets

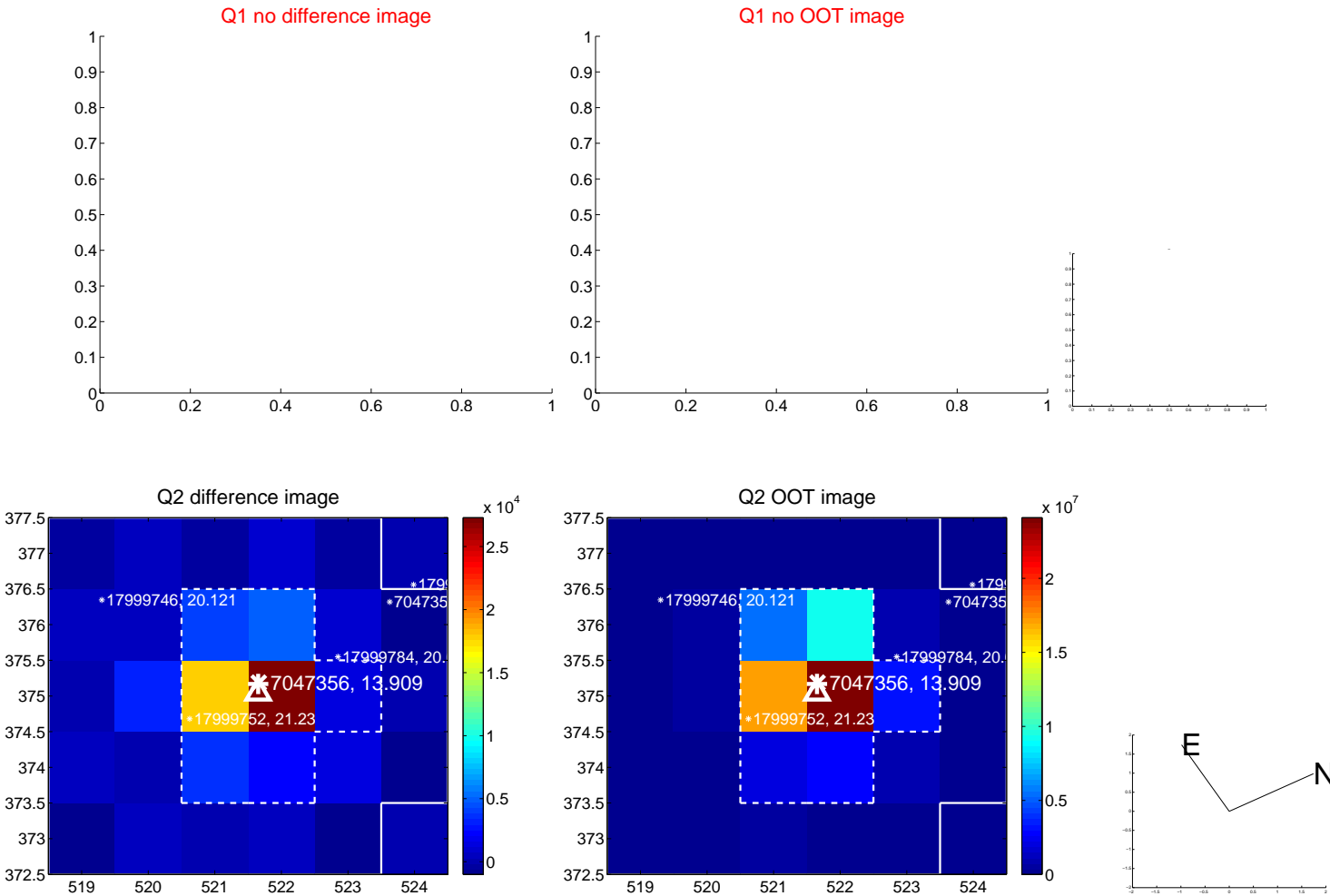
The direct PRF centroid is offset from the target star catalog position by about 0.11 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.399 \pm 0.171$	2.34	$-0.394 \pm 0.176$	$-0.057 \pm 0.098$
PRF-fit source offset from KIC position	$0.466 \pm 0.144$	3.24	$-0.448 \pm 0.143$	$-0.129 \pm 0.159$
photometric centroid source offset	$0.16 \pm 0.31$	0.51	$0.13 \pm 0.29$	$0.09 \pm 0.34$

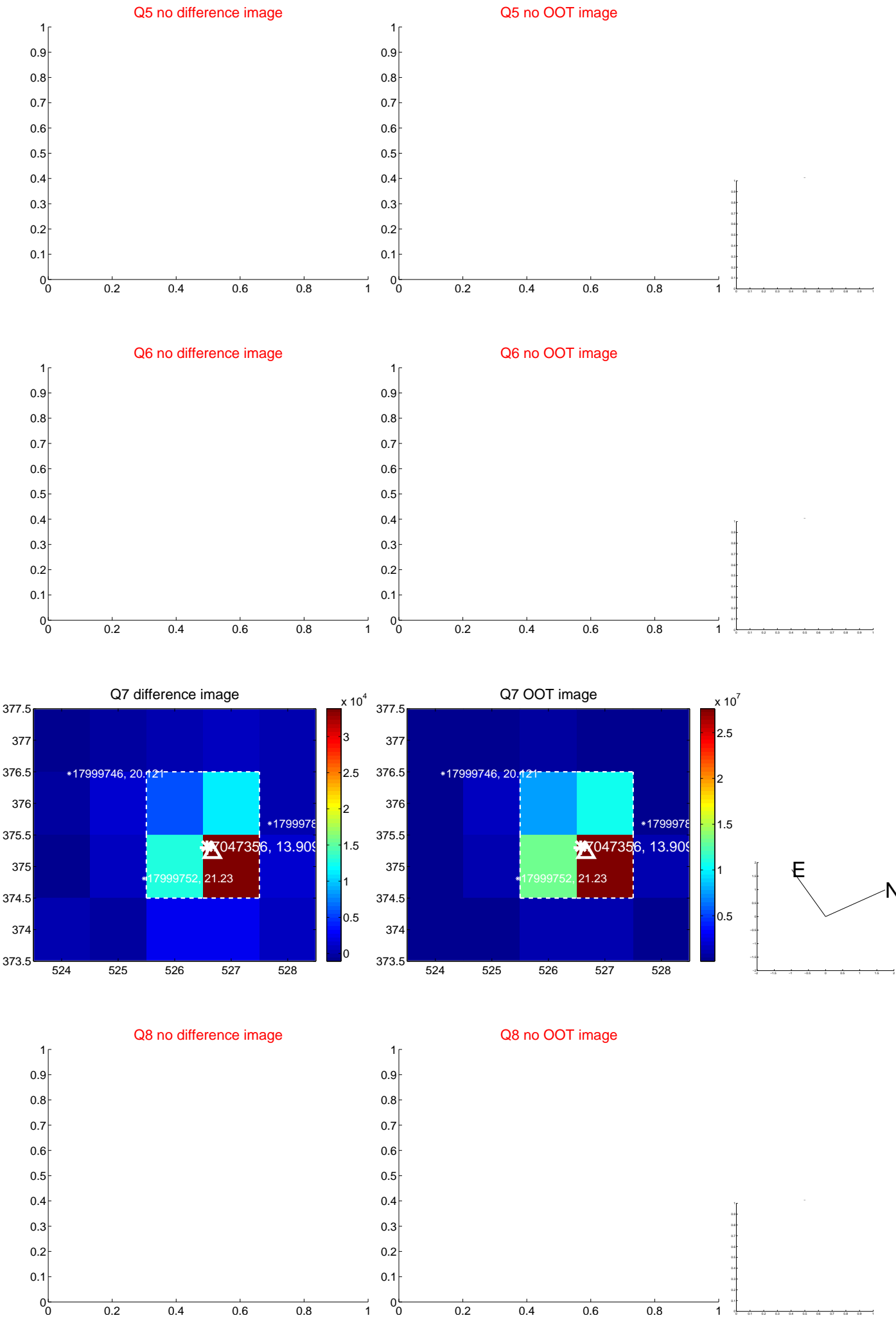


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three- $\sigma$ . 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 ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.





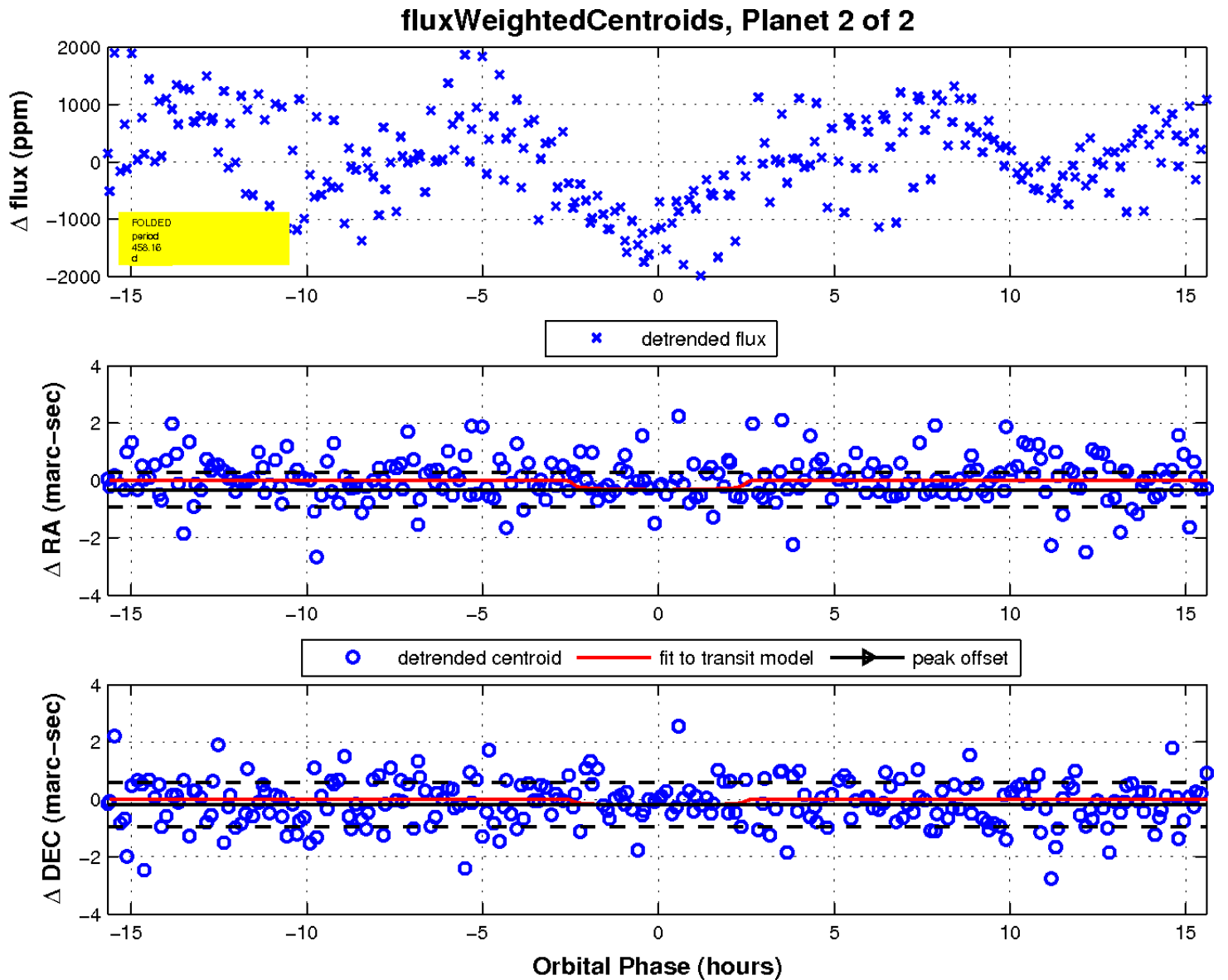
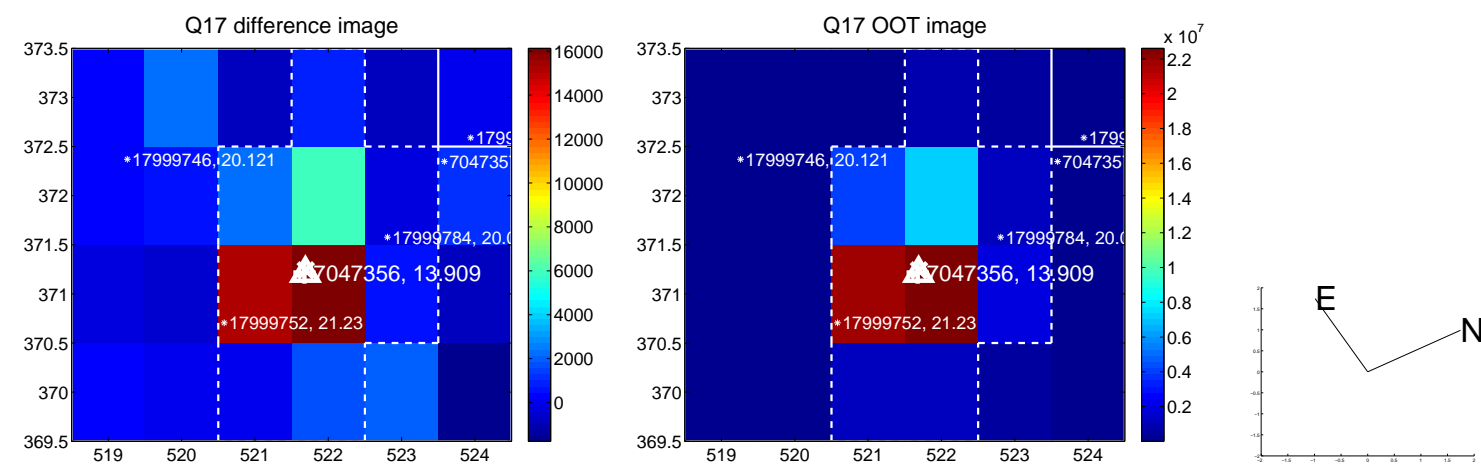
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

