

# KIC 006951642

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006951642-01	OBS	No	1.384118	131.786960	52.8	7.933	8.8	3.2	4.42	7365	3.40	59215.24
006951642-02	OBS	No	106.444106	158.130695	4190.1	11.707	8.8	9.0	4.42	7365	41.22	181.06
006951642-03	OBS	No	155.387535	256.874191	1947.1	10.584	9.3	7.0	4.42	7365	21.77	109.34
006951642-04	OBS	No	113.593551	225.208195	3881.9	9.049	8.8	9.8	4.42	7365	49.71	166.03
006951642-05	OBS	No	181.191432	275.335077	2015.9	5.509	8.4	7.6	4.42	7365	21.14	89.09
006951642-06	OBS	No	53.376225	132.903938	1975.6	7.744	7.4	9.1	4.42	7365	34.74	454.50

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006951642-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
006951642-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
006951642-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
006951642-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
006951642-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV— MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
006951642-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—MOD_NONUNIQ_ALT—CENT_SATURATED

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

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

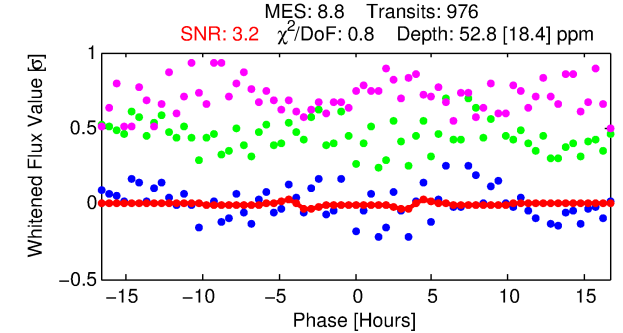
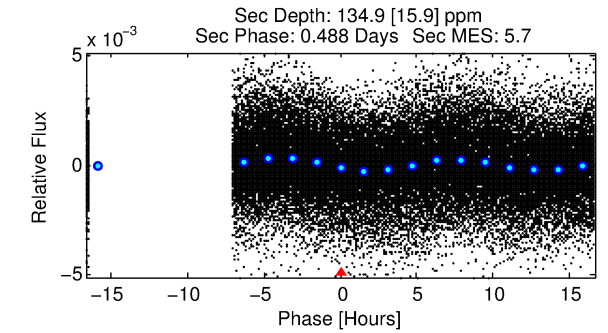
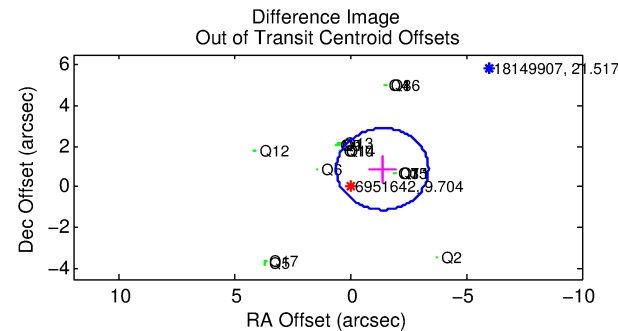
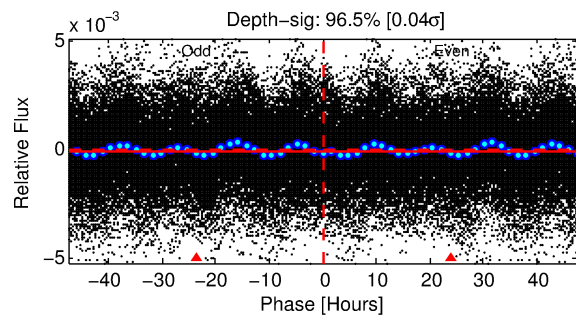
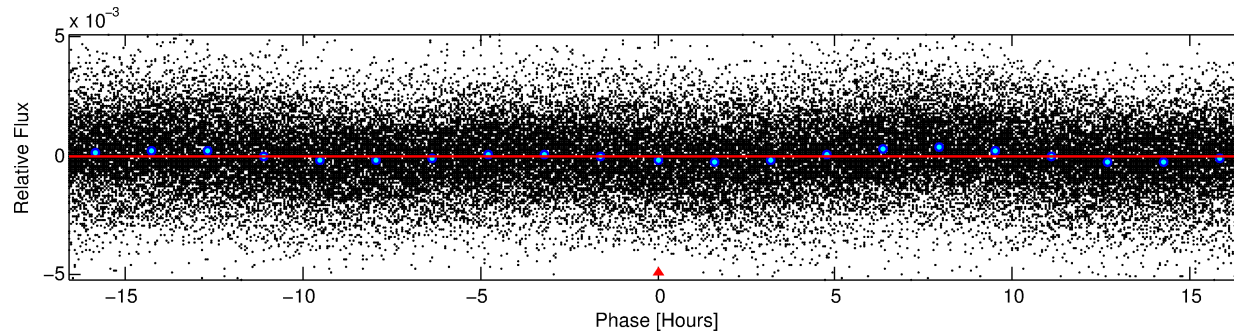
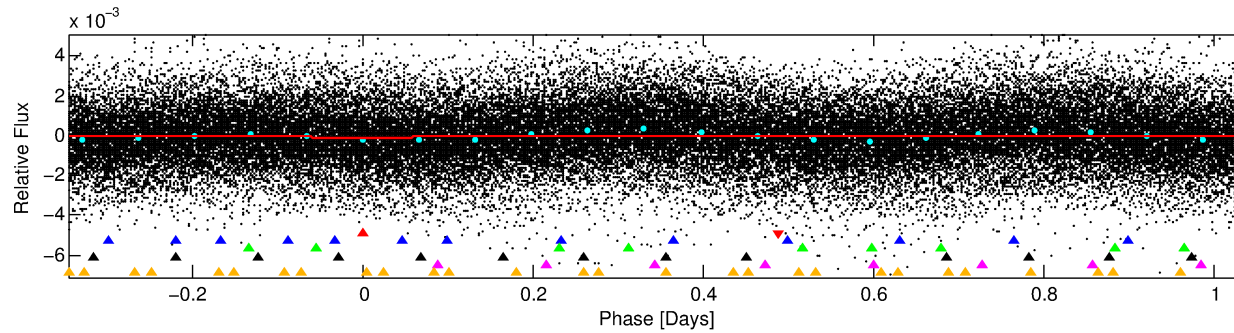
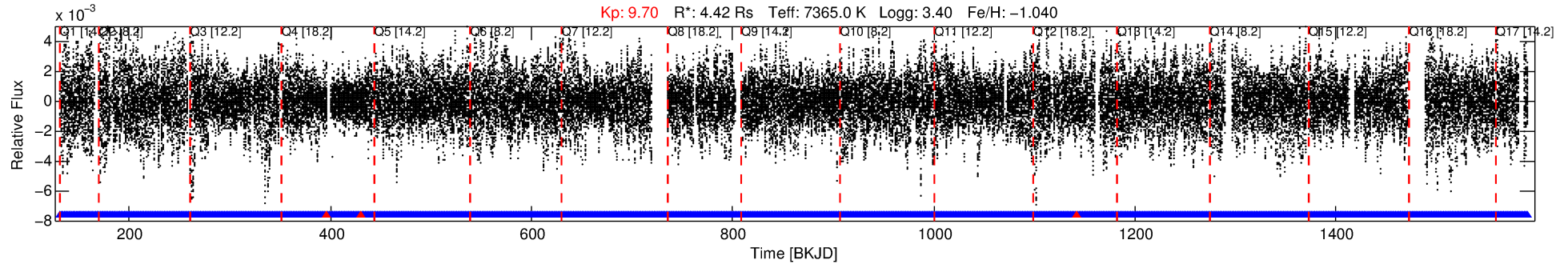
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 006951642-01

No Significant Match Found

# DV One-Page Summary

KIC: 6951642 Candidate: 1 of 6 Period: 1.384 d



## DV Fit Results:

Period = 1.38412 [0.00003] d  
Epoch = 131.7870 [0.0054] BKJD  
 $R_p/R^* = 0.0070$  [0.0045]  
 $a/R^* = 1.30$  [1.91]  
 $b = 0.65$  [3.22]  
 $\text{Seff} = 59215.24$  [86390.40]  
 $T_{\text{eq}} = 3978$  [1451] K  
 $R_p = 3.40$  [3.26]  $R_e$   
 $a = 0.0295$  [0.0246] AU  
 $\text{Ag} = 5.59$  [10.84] [0.42 $\sigma$ ]  
 $T_{\text{eff}} = 9457$  [3065] K [1.62 $\sigma$ ]

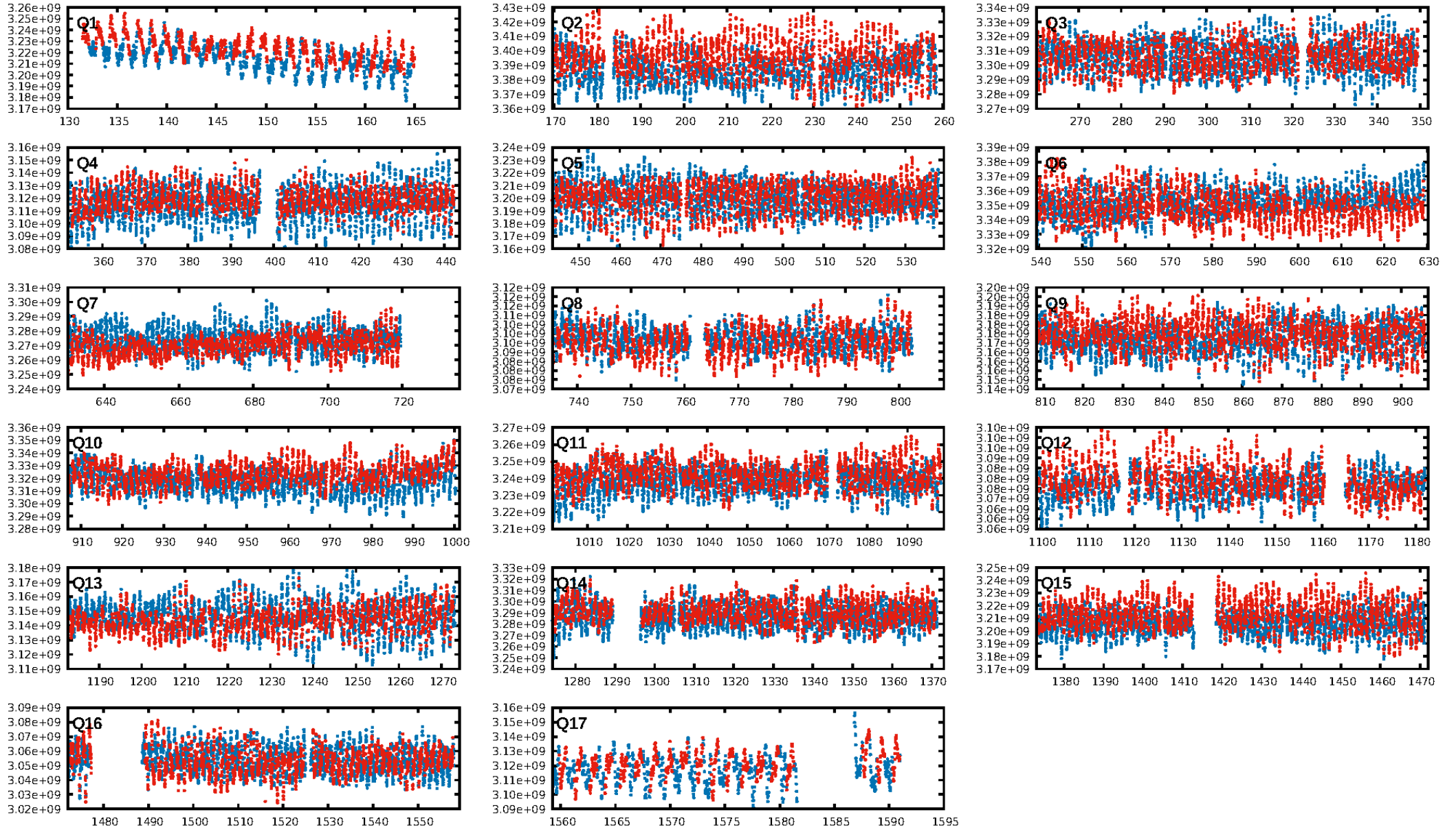
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [112.56 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 1.76e-11  
RollingBand-fgt: 1.00 [929/932]  
GhostDiagnostic-chr: N/A  
Centroid-sig: 0.0%  
Centroid-so: 0.455 arcsec [0.69 $\sigma$ ]  
OotOffset-rm: 1.632 arcsec [2.45 $\sigma$ ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-rm: 3.517 arcsec [5.10 $\sigma$ ]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 0.00 [0/17]  
DiffImageOverlap-fno: 1.00 [17/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 12:56:33 Z

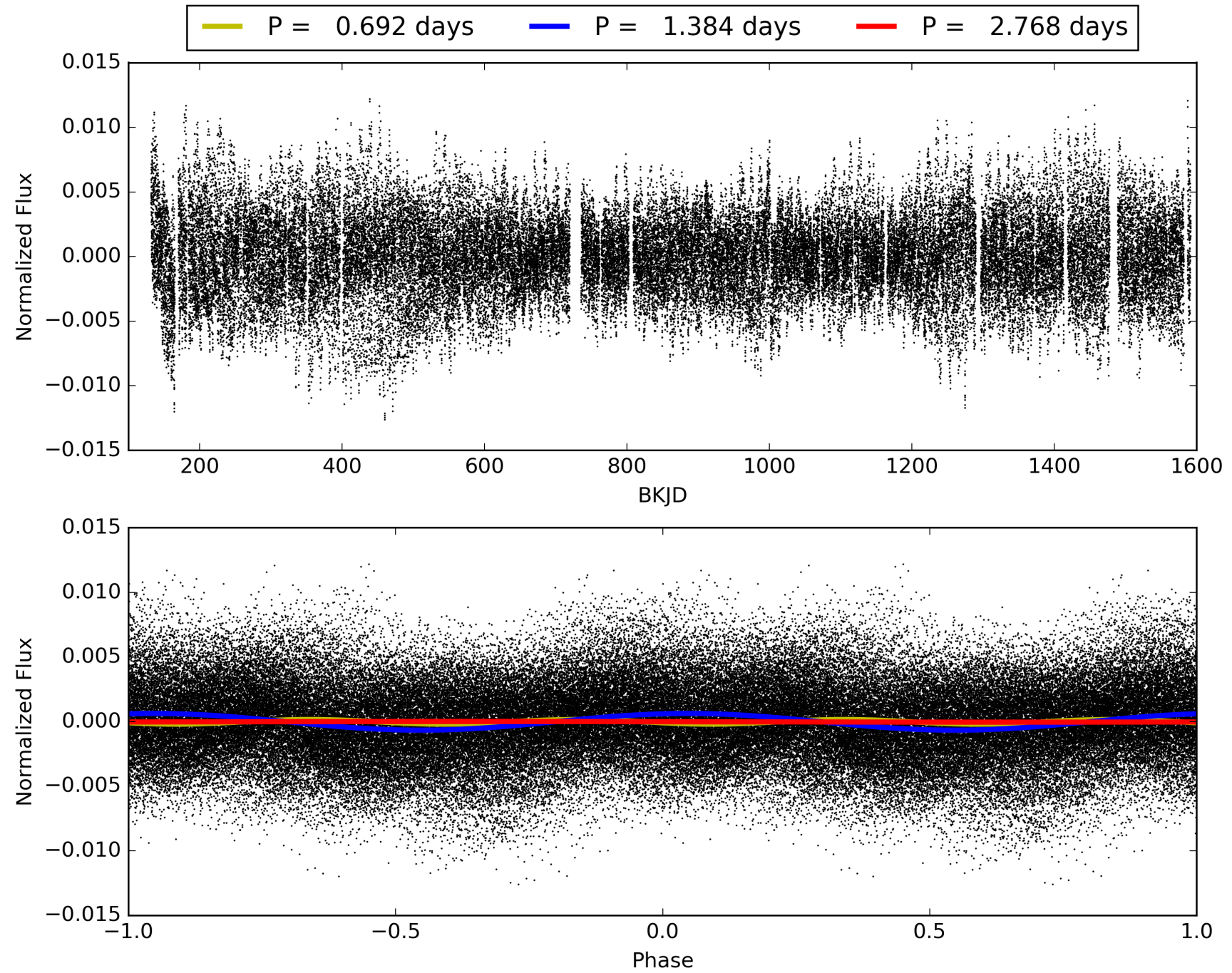
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 006951642-01, PDC Light Curves





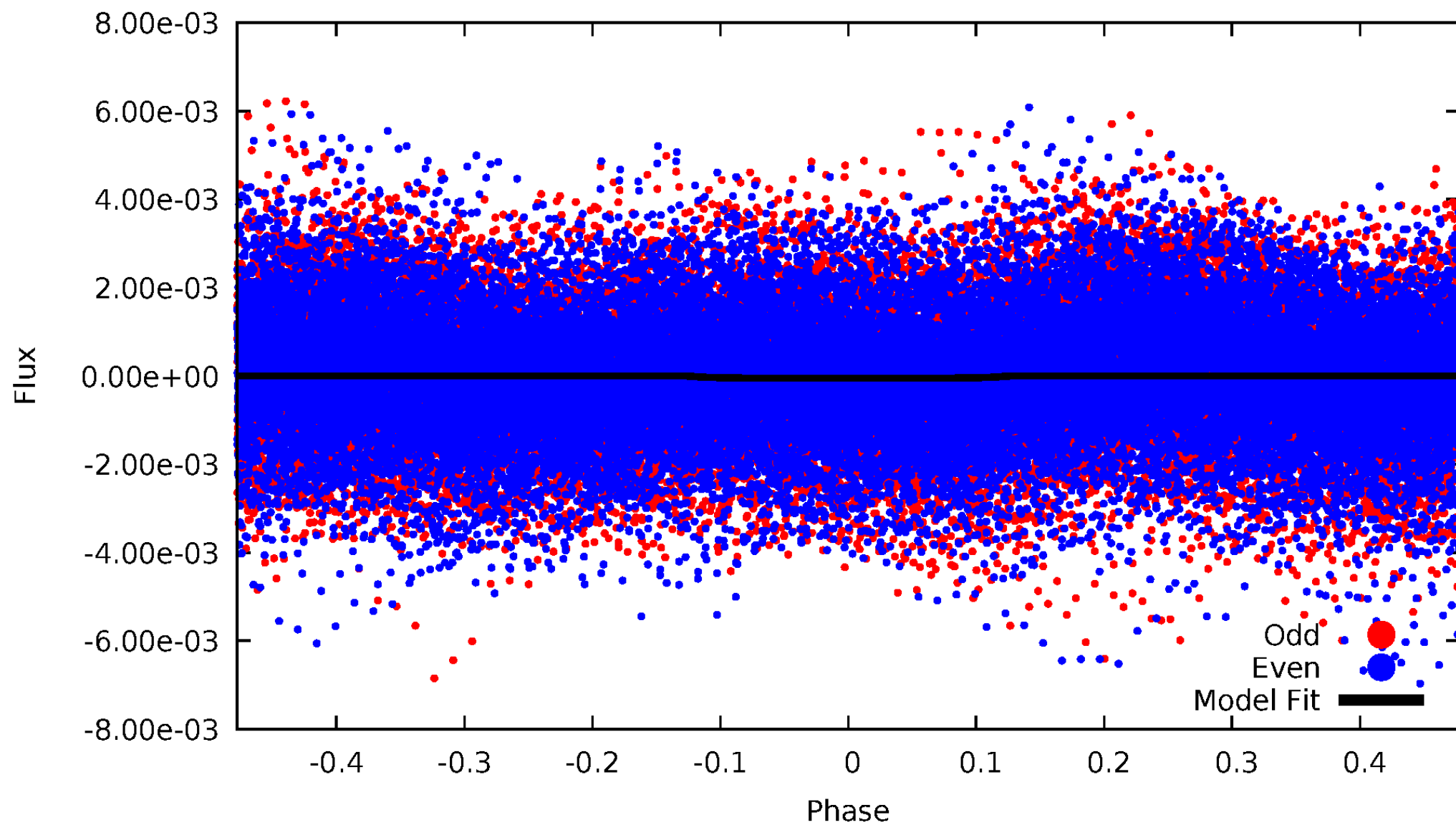
TCE 006951642-01





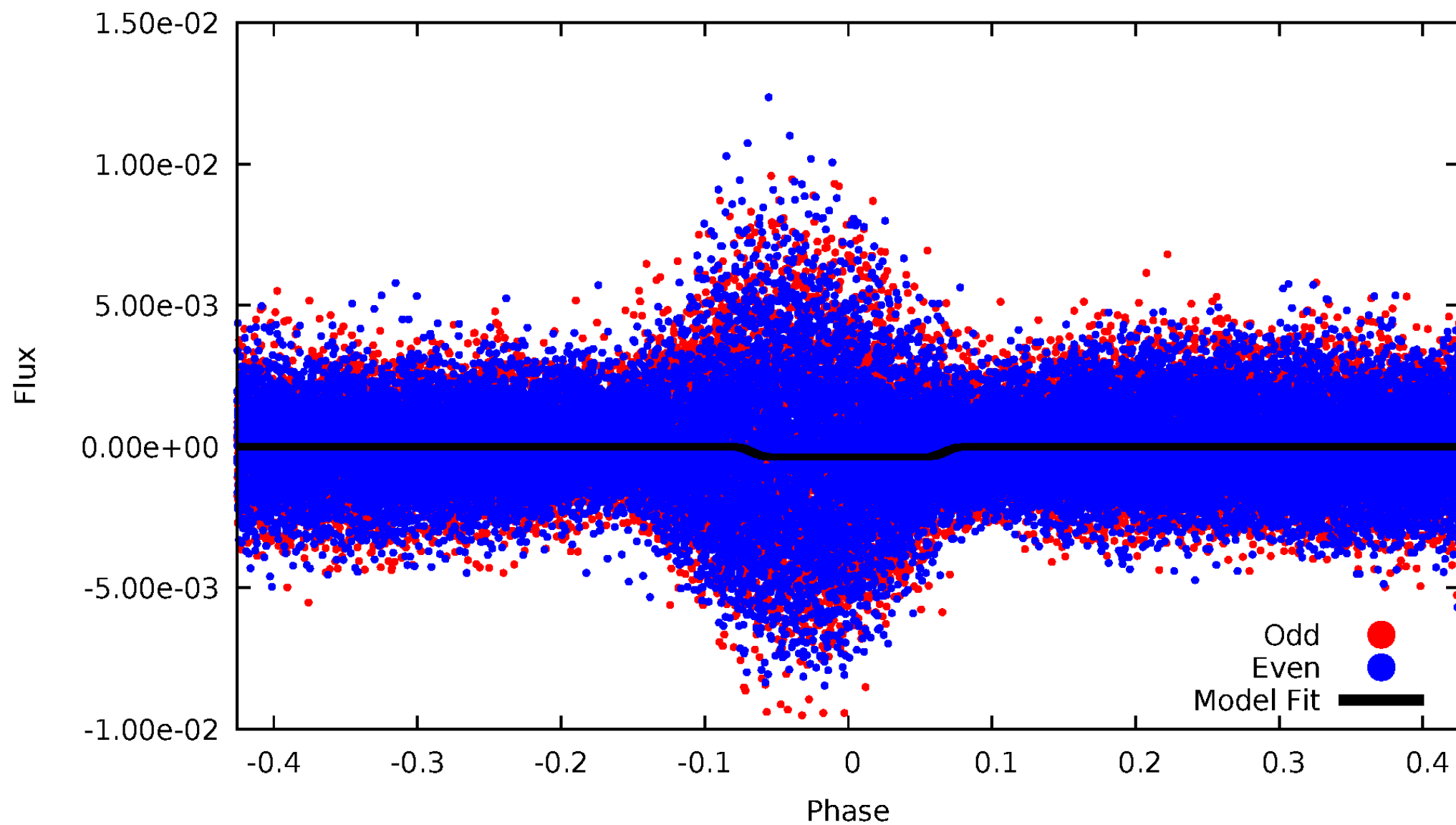
# DV Odd/Even

TCE 006951642-01



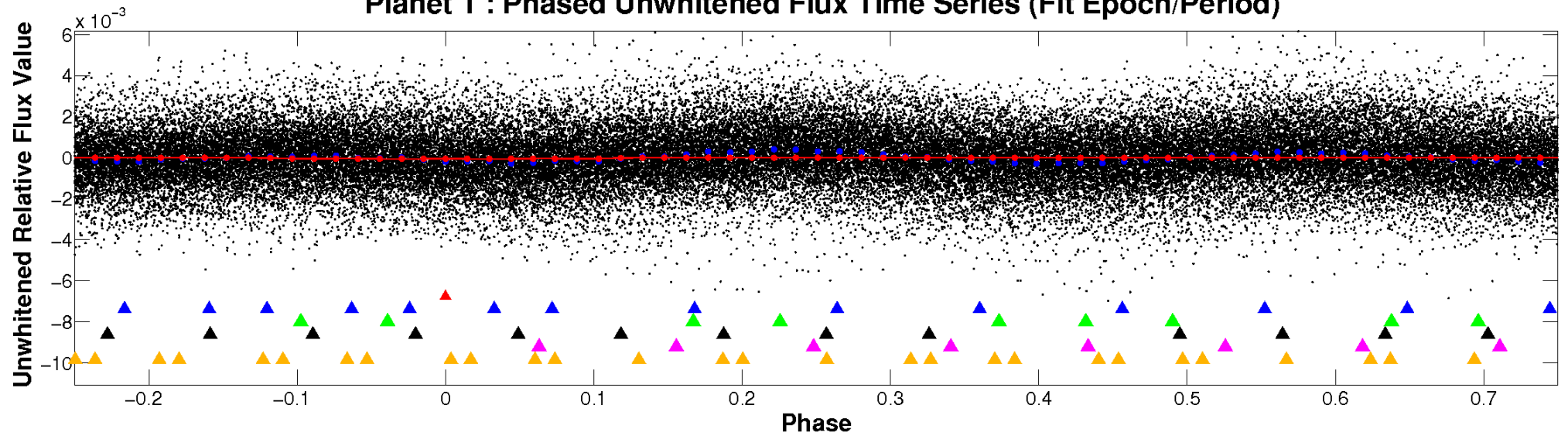
# ALT Odd/Even

TCE 006951642-01

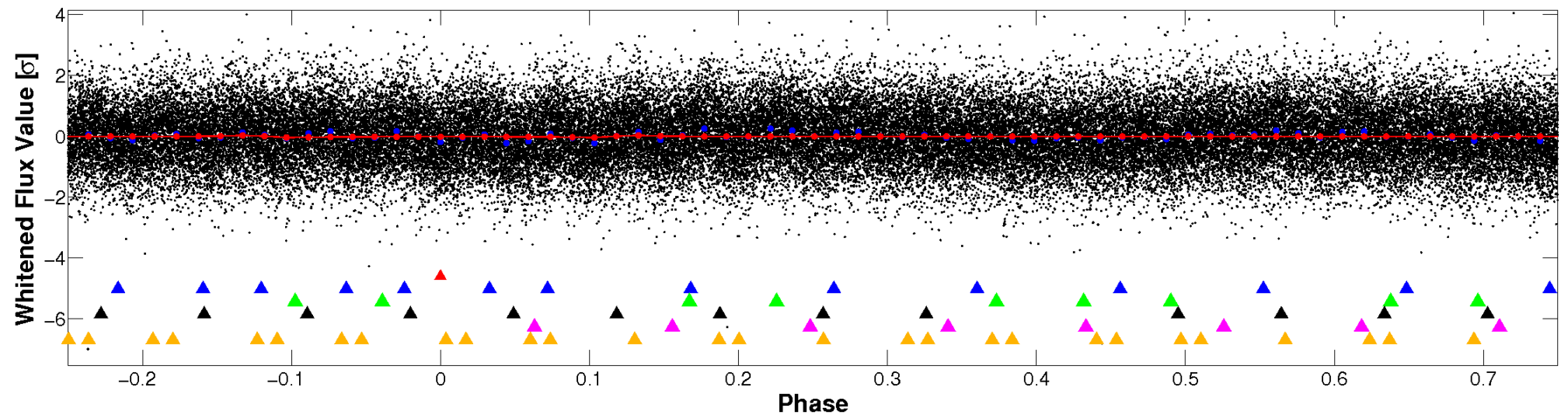


# Non-Whitened Vs. Whitened Light Curve

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



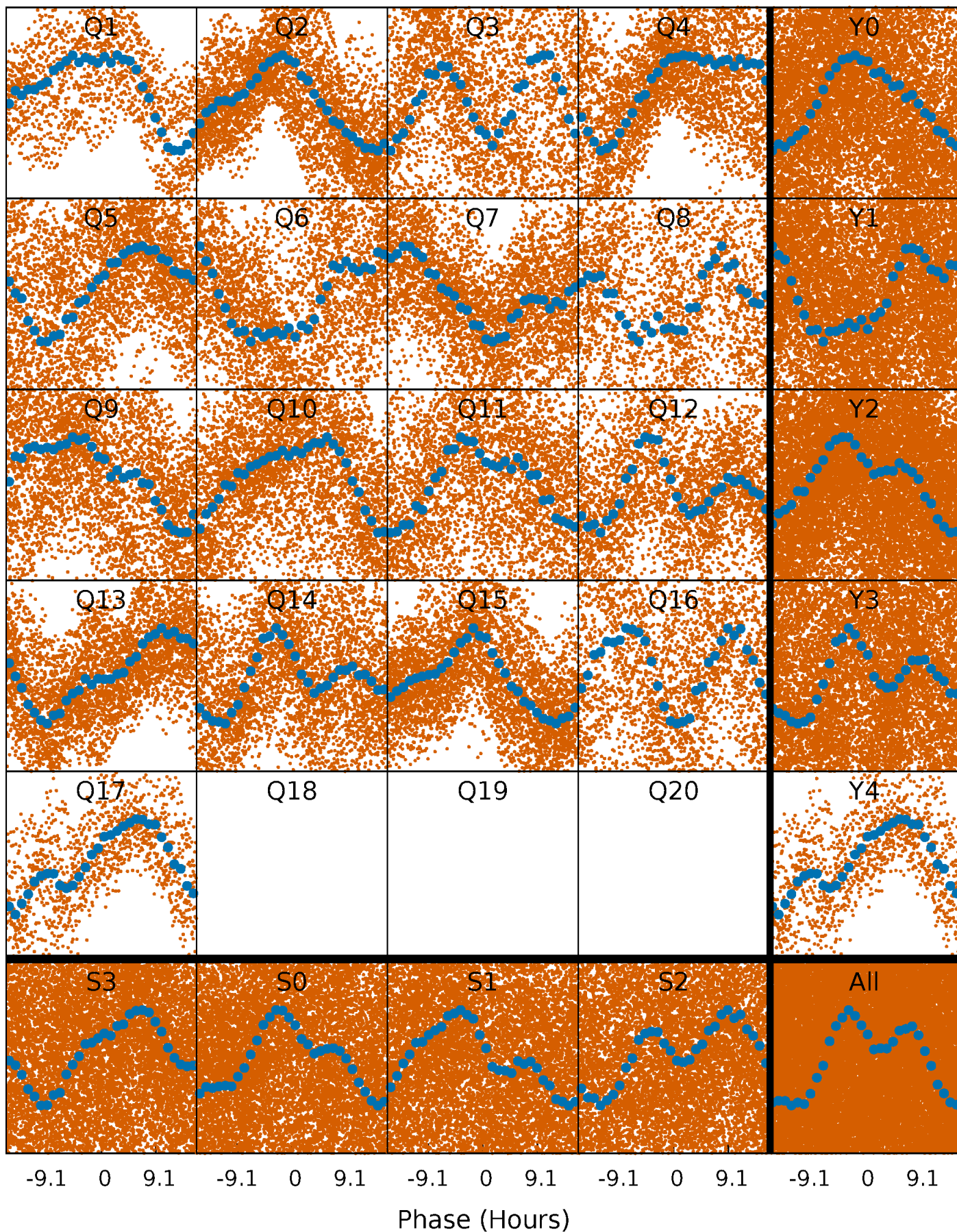
Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)





# PDC Quarter-Phased Transit Curves

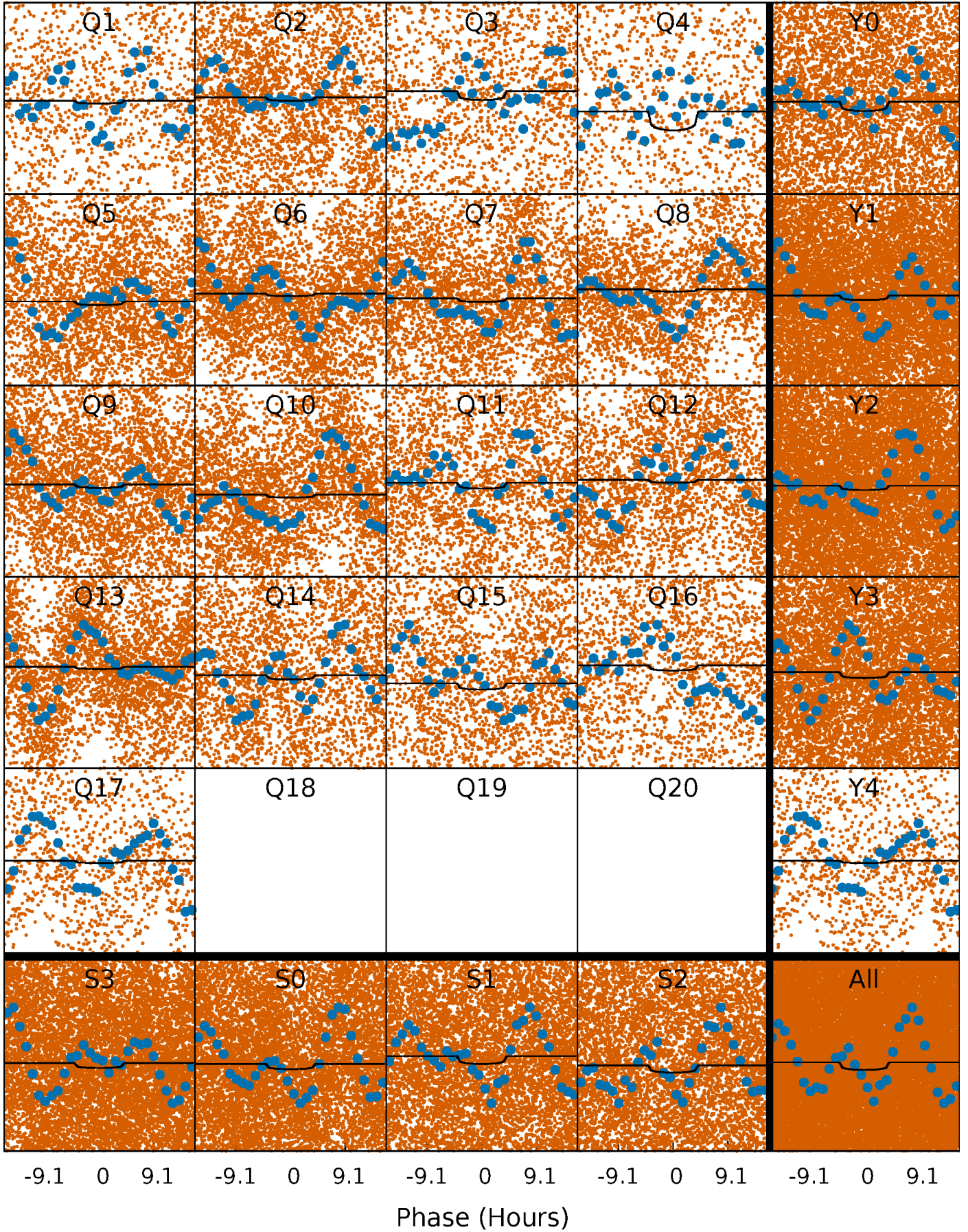
TCE 006951642-01 P= 1.384118 Days  $T_0=131.786960$  (BKJD)





# DV Quarter-Phased Transit Curves

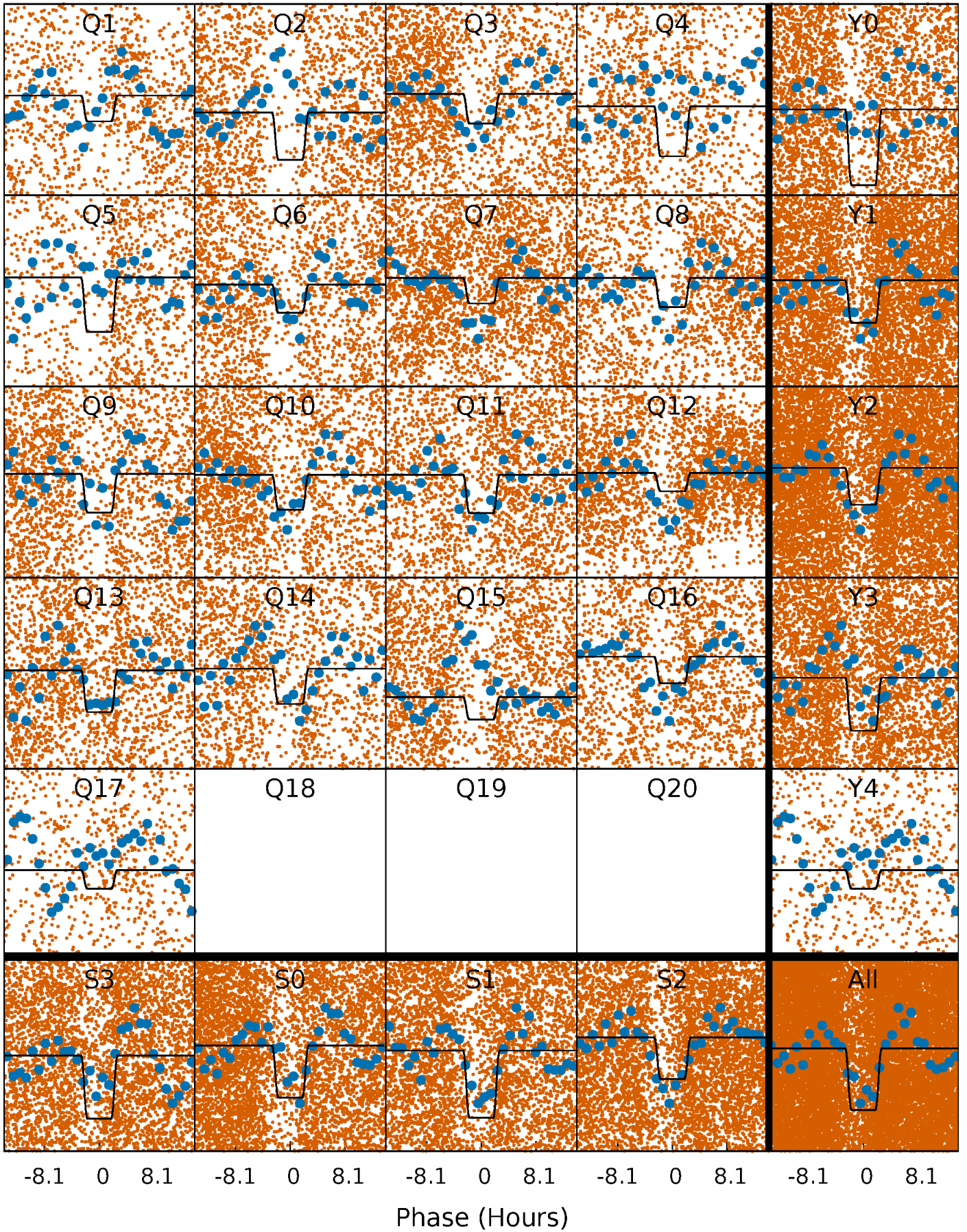
TCE 006951642-01 P= 1.384118 Days  $T_0=131.786960$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

TCE 006951642-01 P= 1.384085 Days  $T_0=131.892630$  (BKJD)

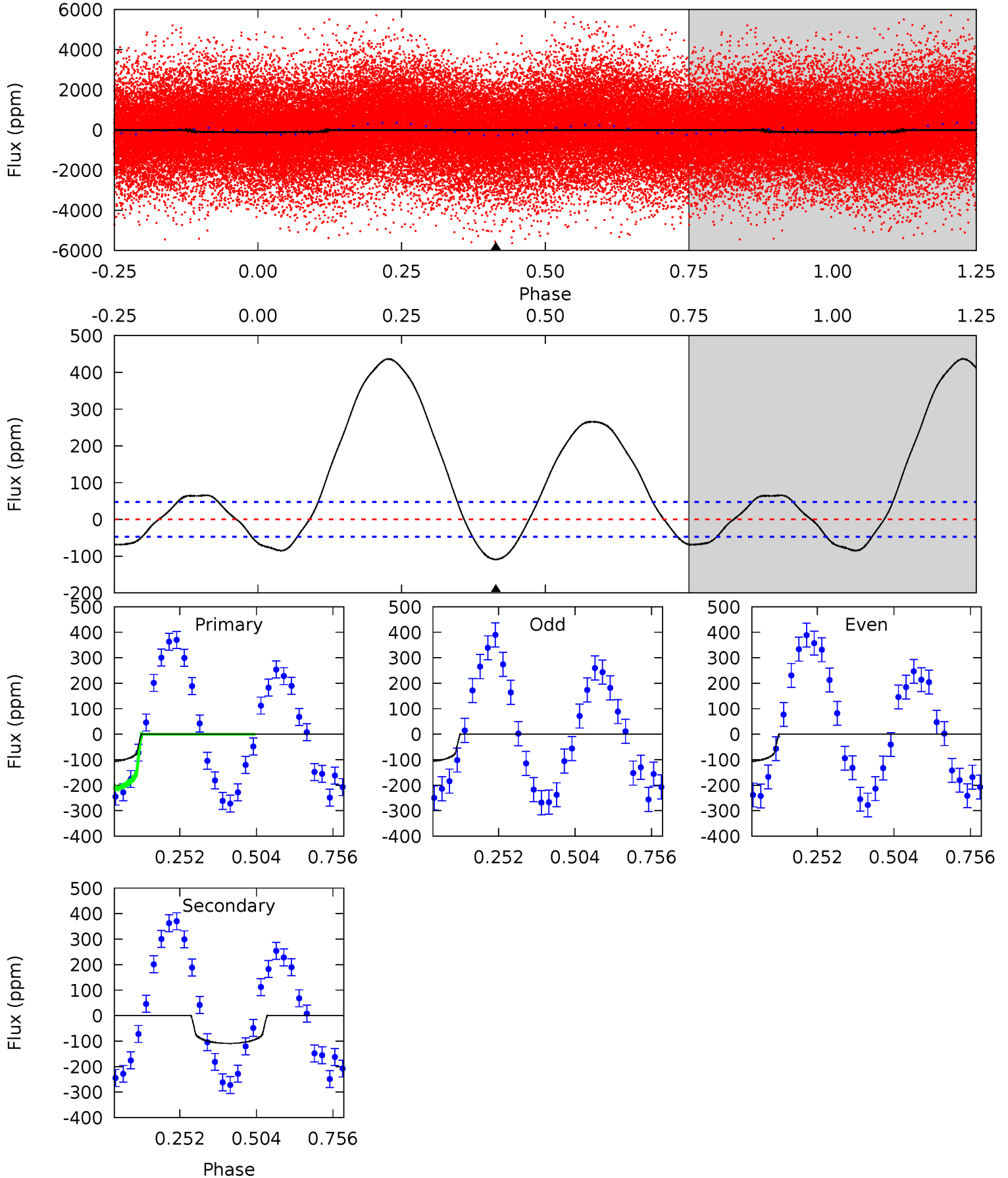




# DV Model-Shift Uniqueness Test

006951642-01, P = 1.384118 Days, E = 130.402842 Days

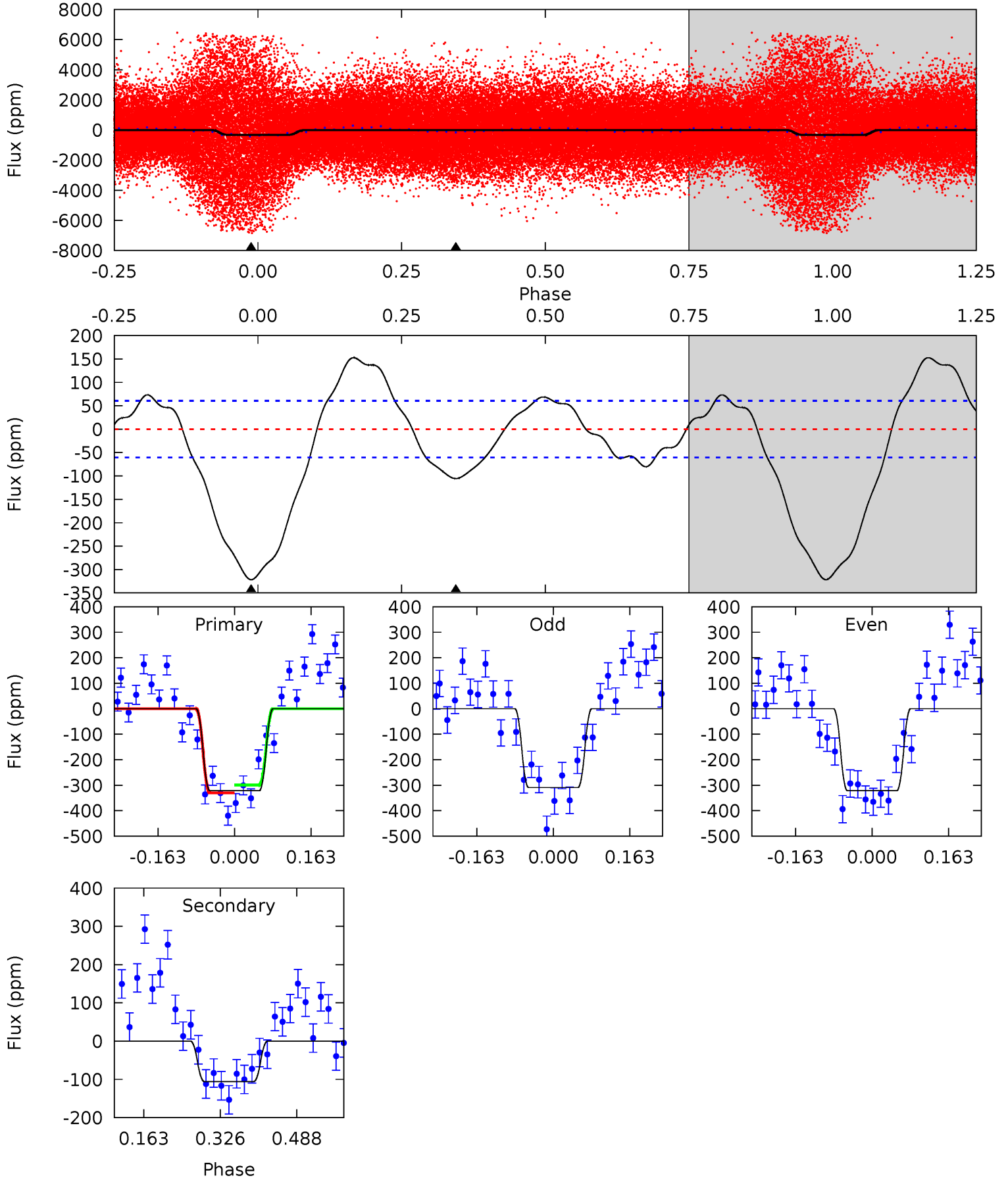
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.1	10.1	0	0	4.37	1.15	7.30	10.1	10.1	10.1	10.1	0.03	1.05	0.80	9.93



# Alt Model-Shift Uniqueness Test

006951642-01, P = 1.384085 Days, E = 130.508545 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
23.7	7.79	0	0	4.46	1.40	4.66	23.7	23.7	7.79	7.79	0.47	1.24	0.32	1.10



### Stellar Parameters For KIC 006951642

	$T_{\text{eff}} (K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (g \cdot \text{cm}^{-3})$
	$7365^{+233}_{-285}$	$3.399^{+0.893}_{-0.094}$	$-1.040^{+0.300}_{-0.300}$	$4.422^{+0.556}_{-3.149}$	$1.789^{+0.126}_{-0.753}$	$0.029^{+0.690}_{-0.009}$
	+3%/-4%	+26%/-3%	+29%/-29%	+13%/-71%	+7%/-42%	+2369%/-30%
Source	KIC0	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 006951642-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-109 \pm 11$	$2.95^{+2.15}_{-1.73}$	$5345^{+419}_{-1000}$	$8741^{+8222}_{-2267}$	$5.629^{+26.731}_{-3.642}$
Alt.	$-106 \pm 14$	$7.75^{+3.33}_{-3.05}$	$5329^{+423}_{-1004}$	$4845^{+1040}_{-1015}$	$0.809^{+1.411}_{-0.402}$

$T_{max}$  = 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

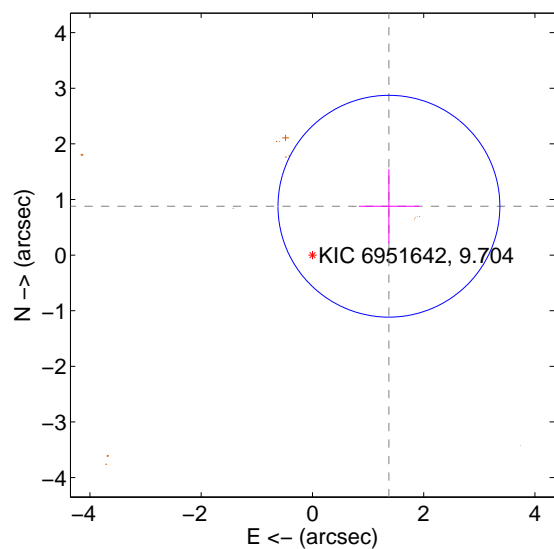
Supplemental centroid analysis for 006951642-01. **Kepler magnitude: 9.70.** Transit SNR 3.25

**There are 0 quarters with good PRF difference image offsets**

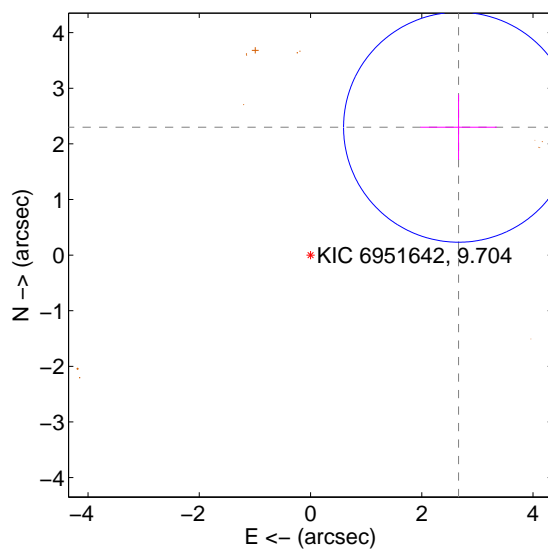
The direct PRF centroid is offset from the target star catalog position by about 1.65 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.632 \pm 0.665$	2.45	$-1.375 \pm 0.541$	$0.878 \pm 0.668$
PRF-fit source offset from KIC position	<b><math>3.517 \pm 0.689</math></b>	<b>5.10</b>	$-2.662 \pm 0.687$	$2.299 \pm 0.587$
photometric centroid source offset	$0.46 \pm 0.66$	0.69	$0.32 \pm 0.43$	$-0.32 \pm 0.82$

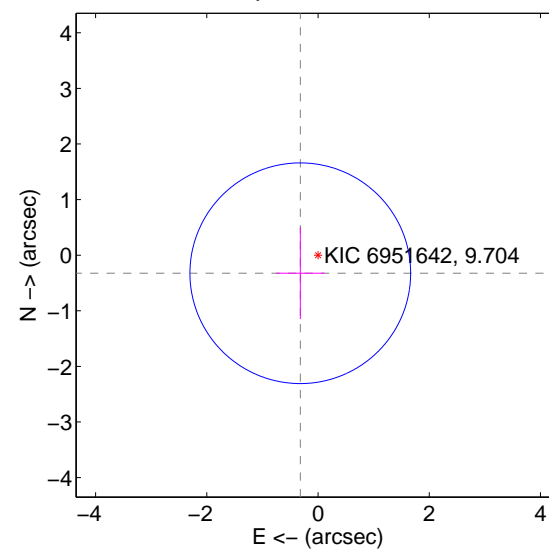
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

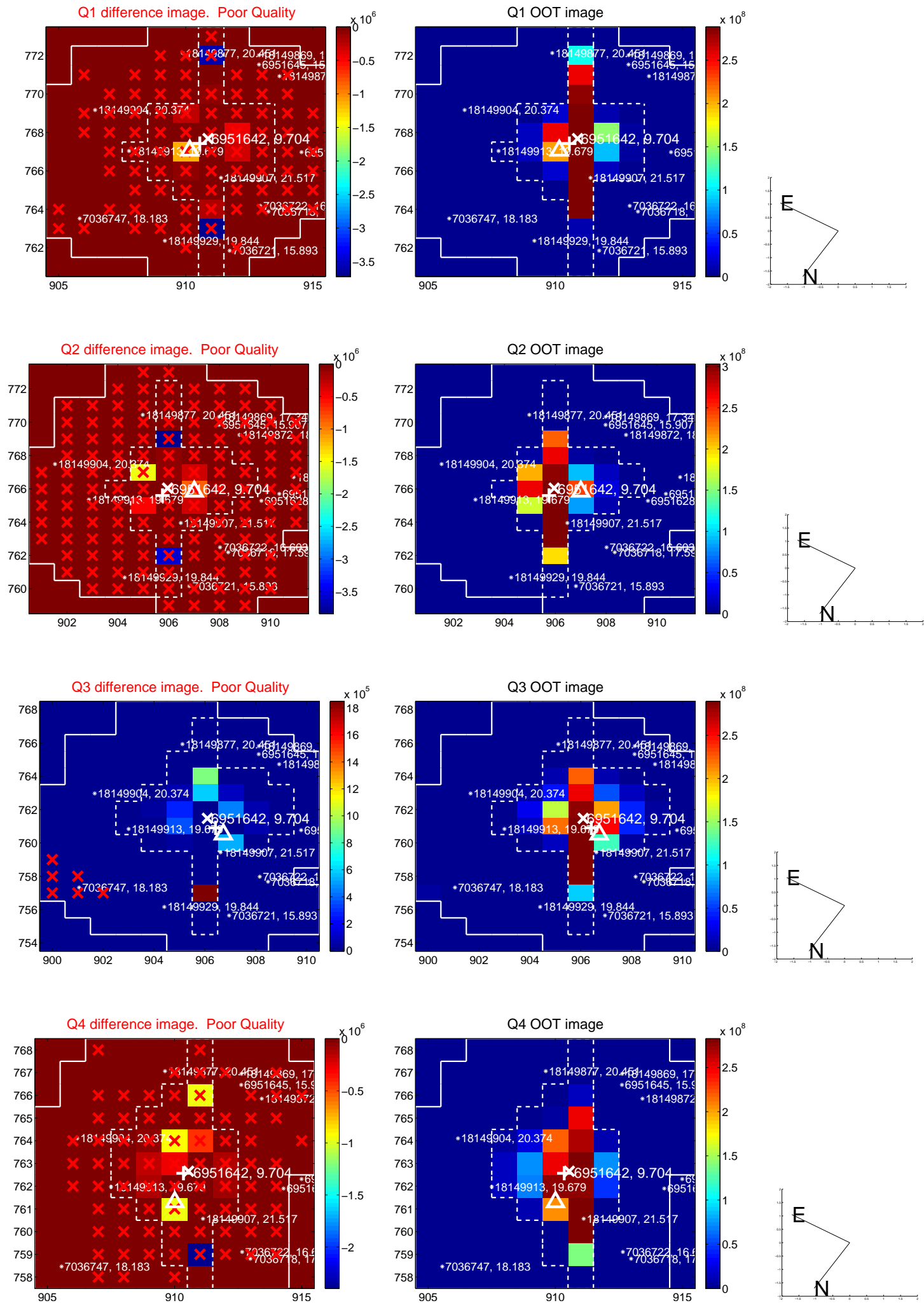


offset from photometric centroids

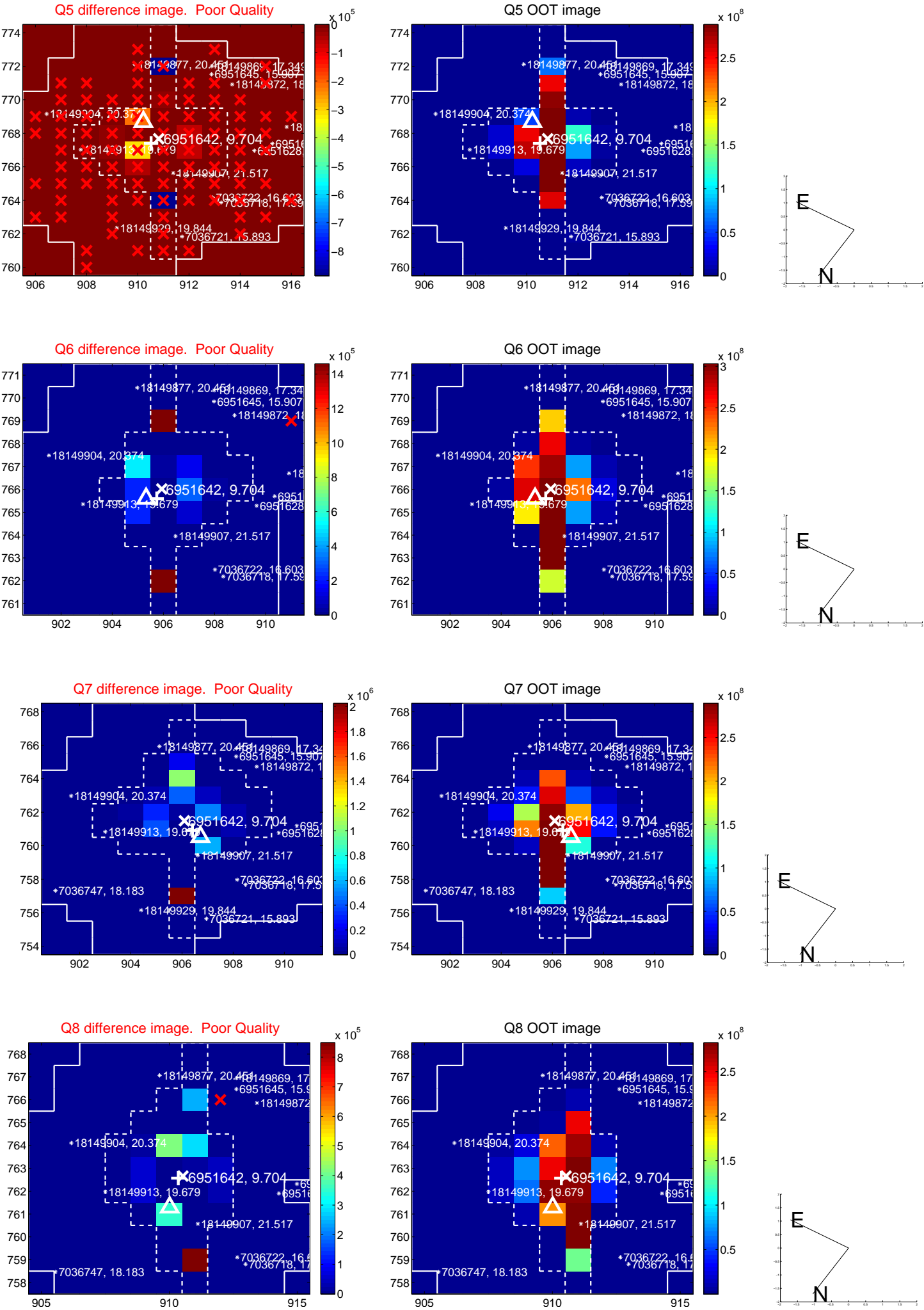


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

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

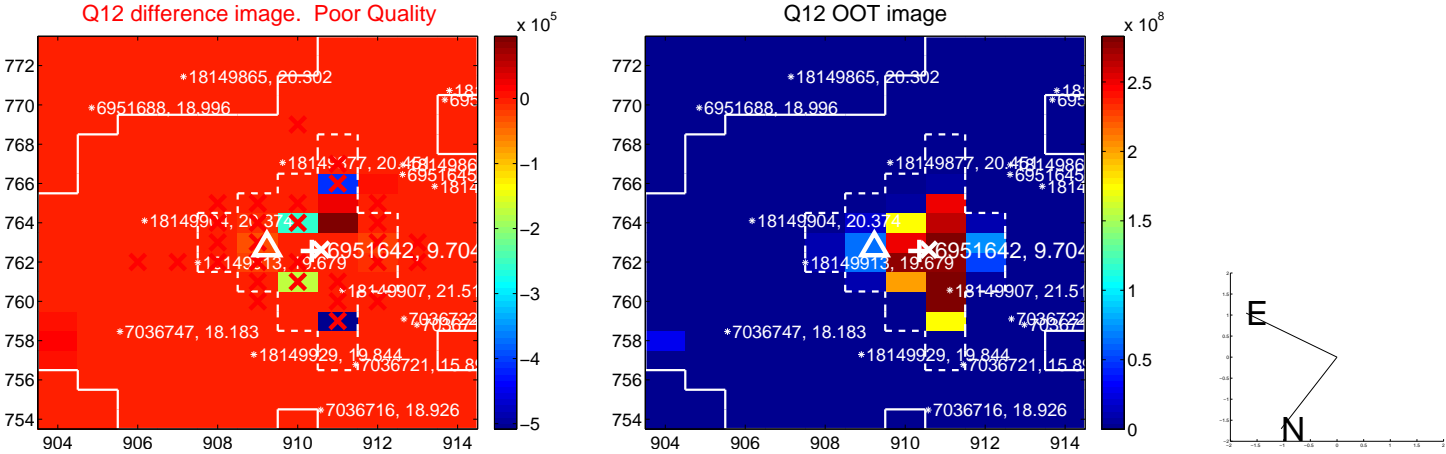
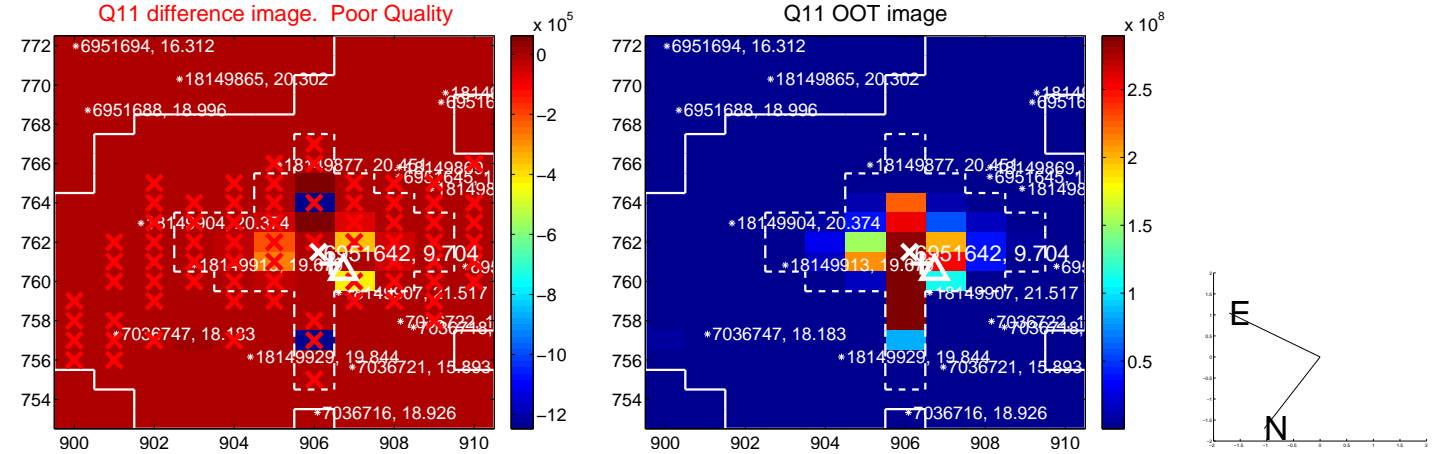
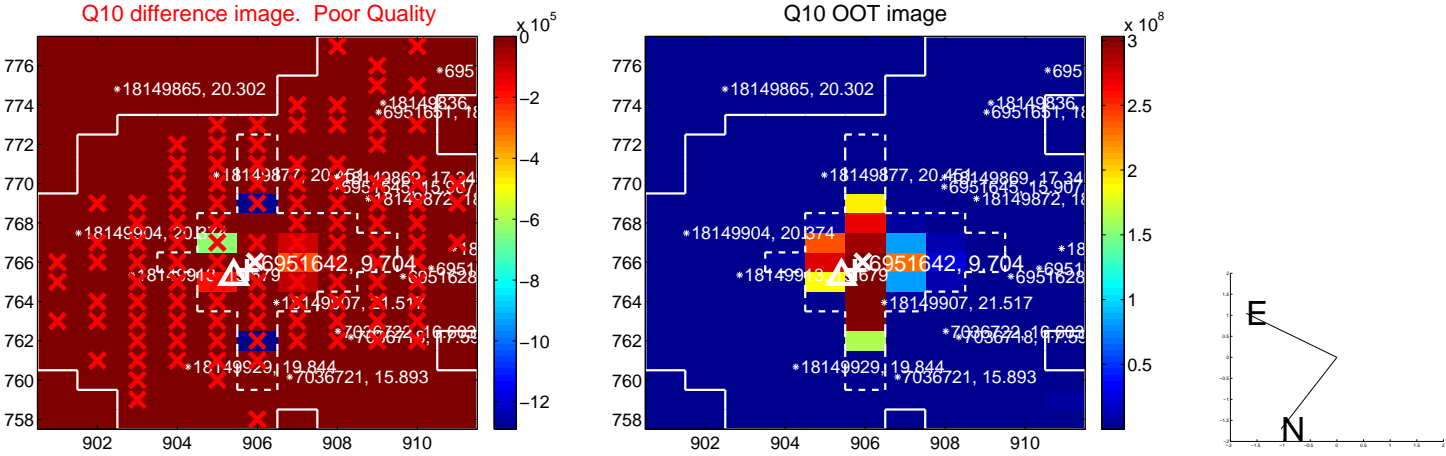
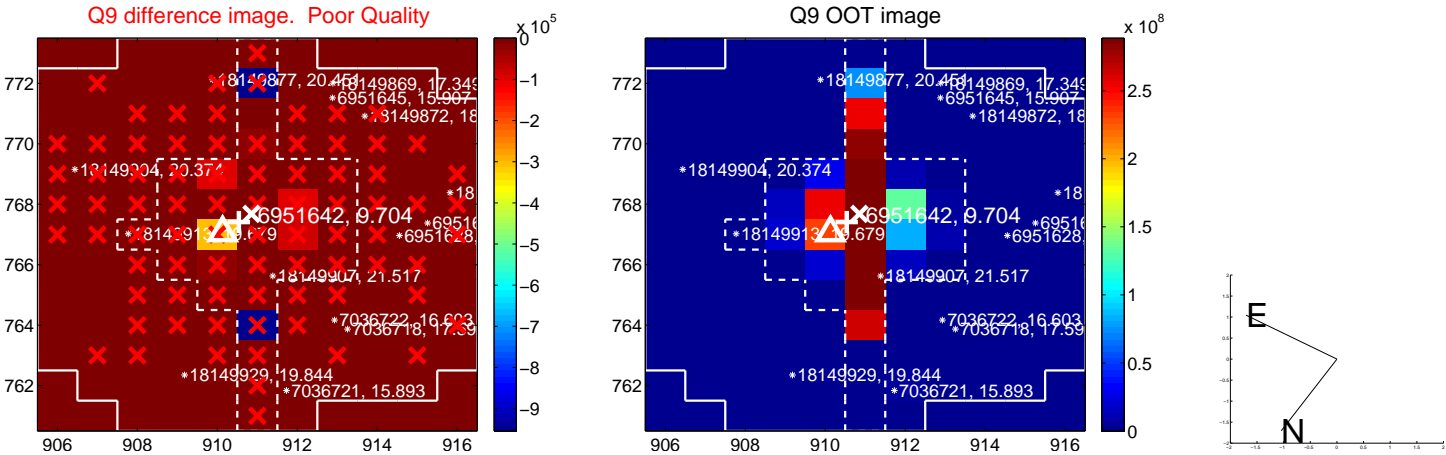


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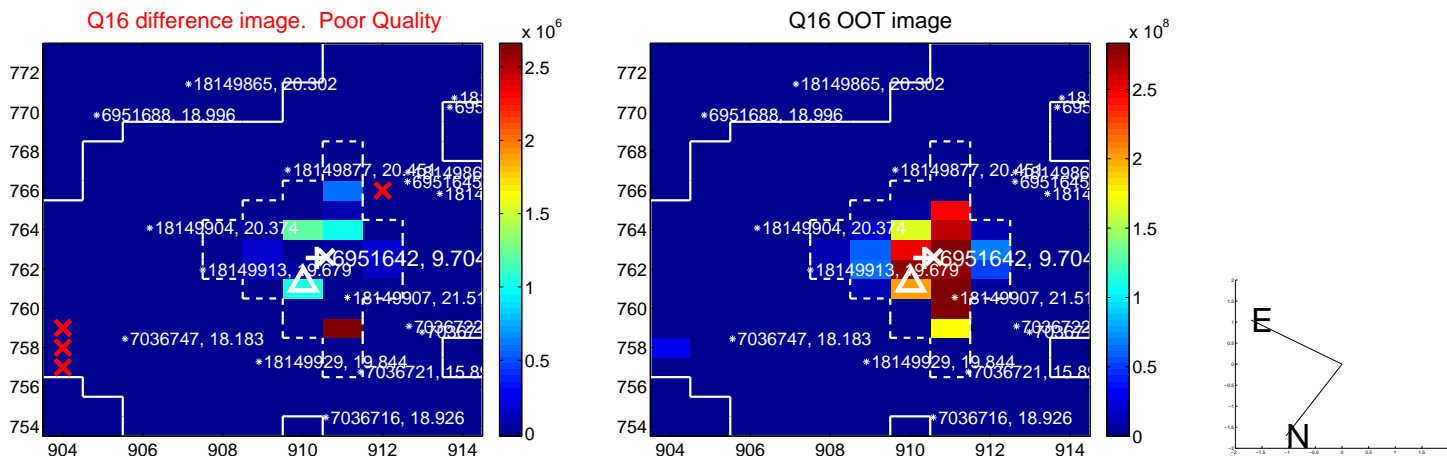
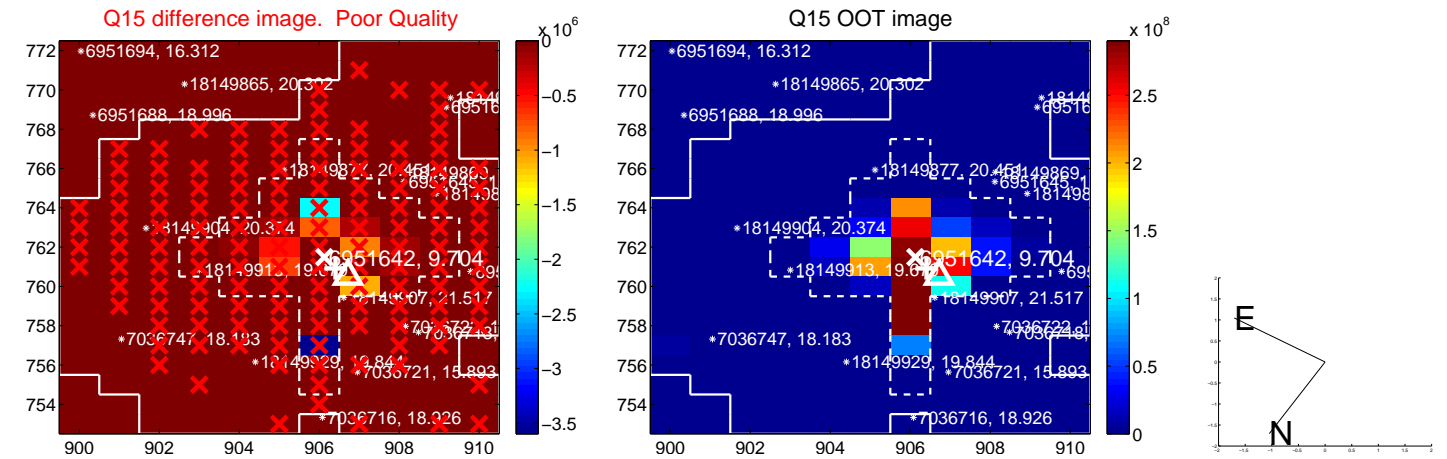
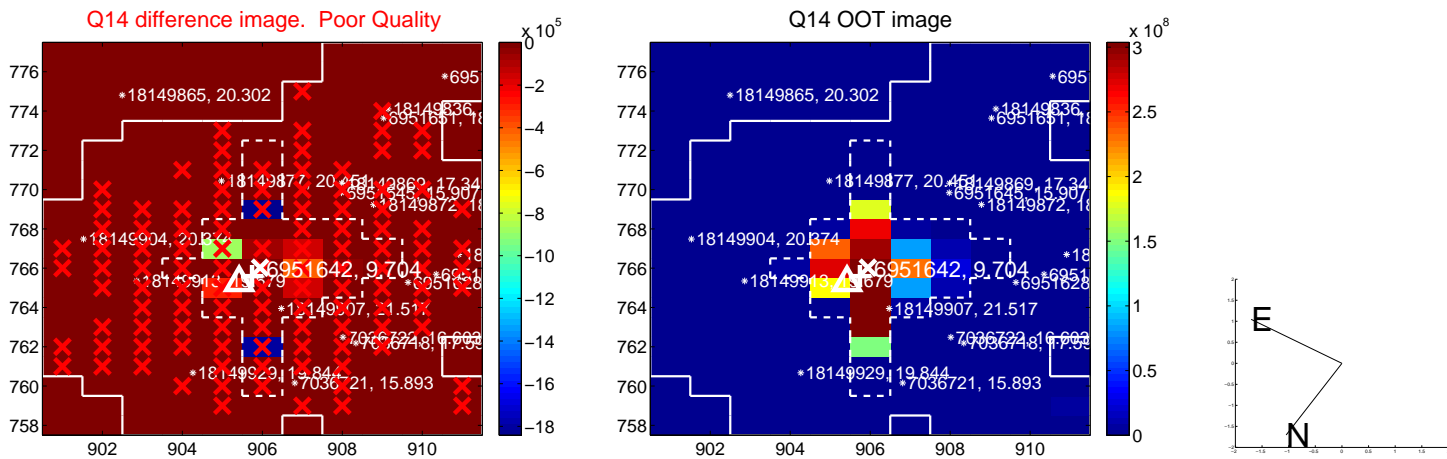
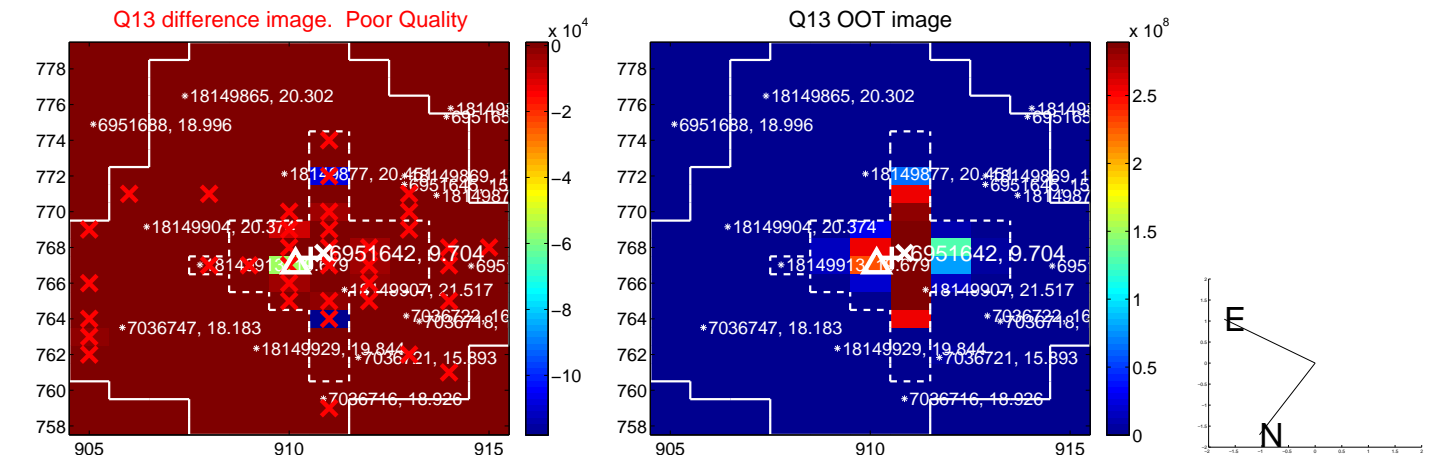




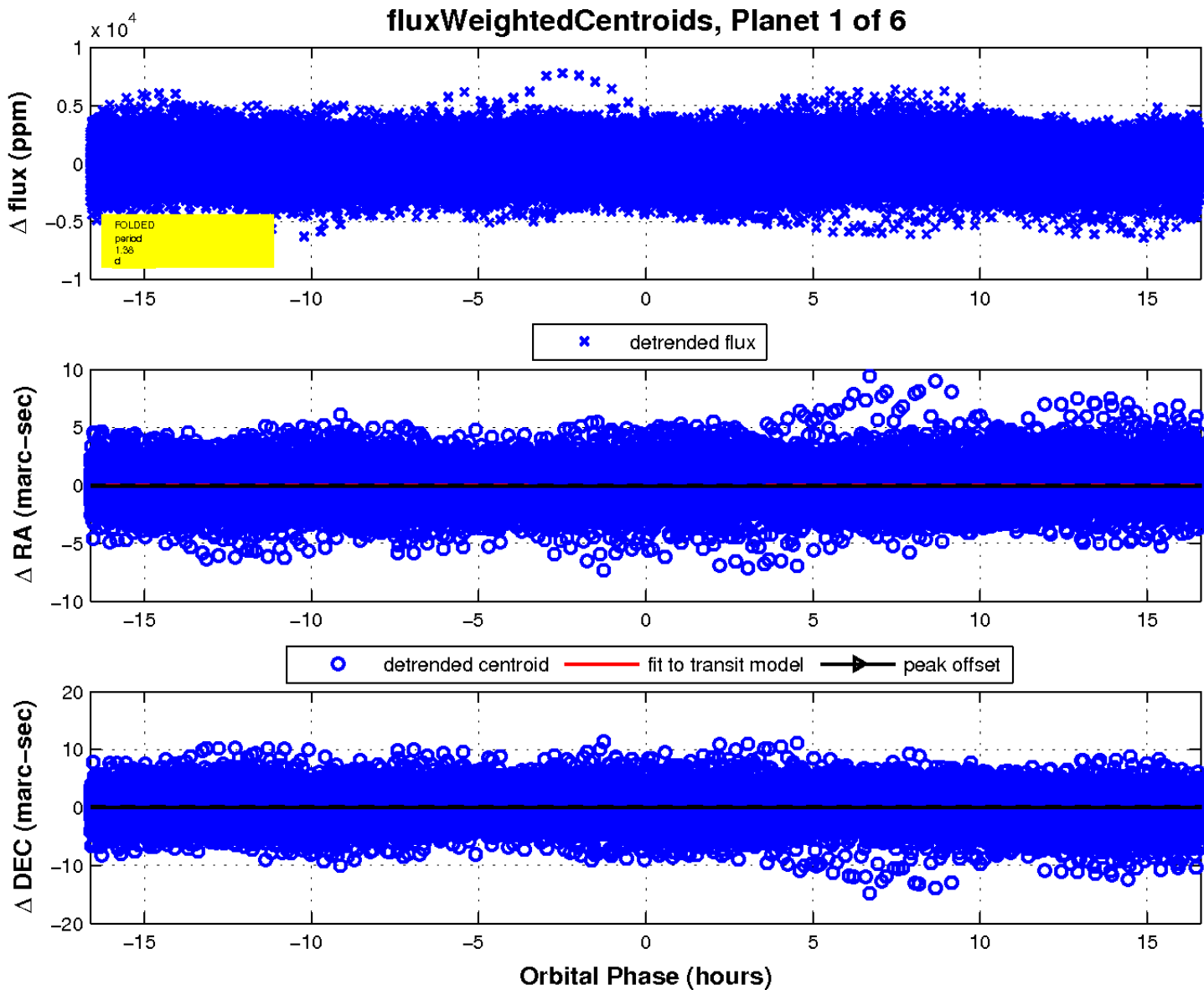
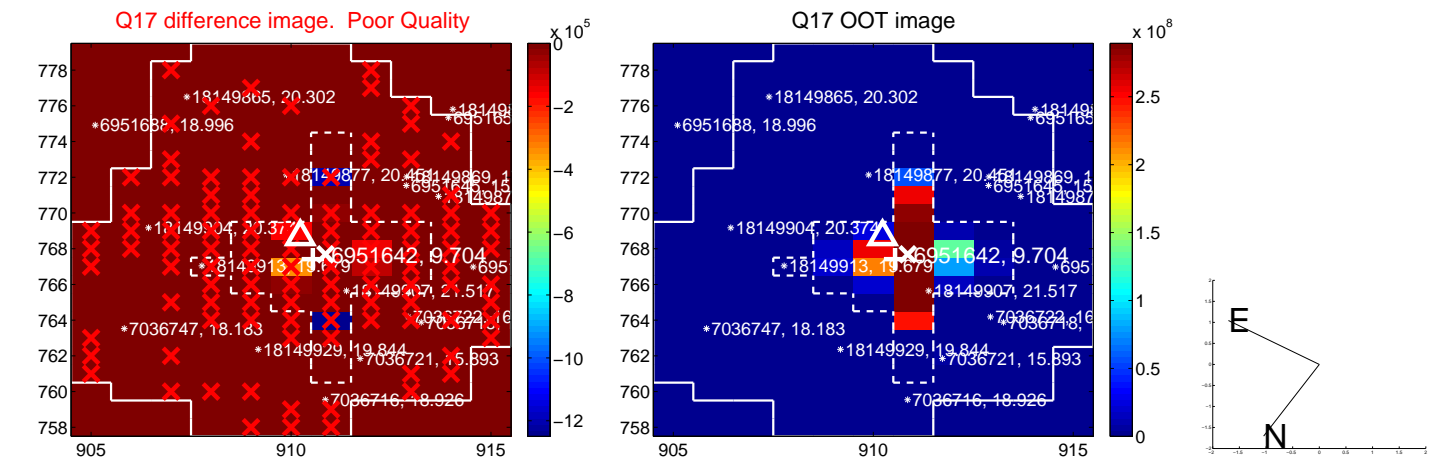
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white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



Declination

# KIC 006951642

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
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## Robovetter Results

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006951642-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
006951642-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
006951642-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
006951642-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
006951642-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—MOD_NONUNIQ_ALT—CENT_SATURATED

**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.

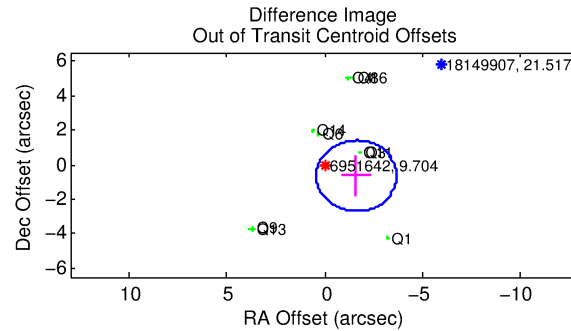
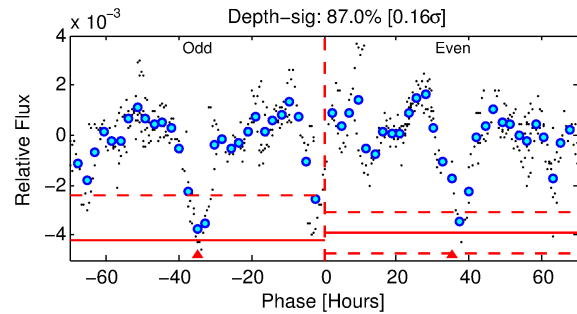
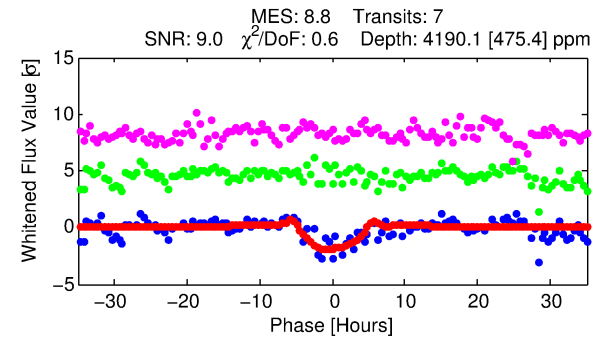
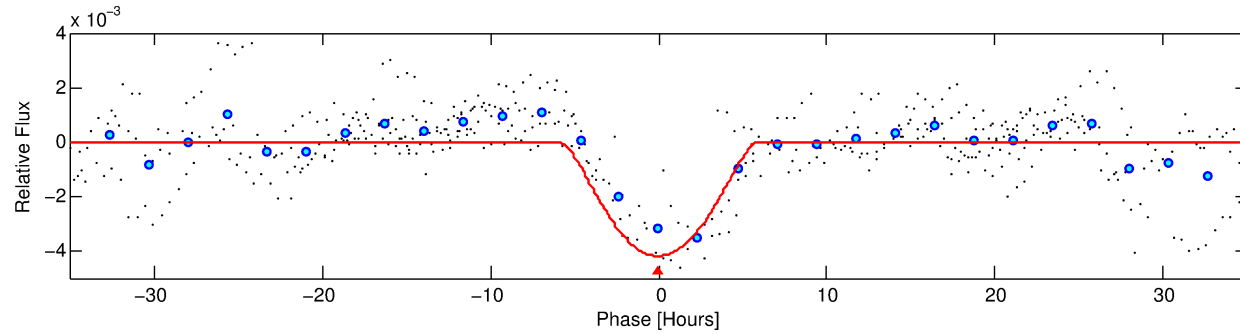
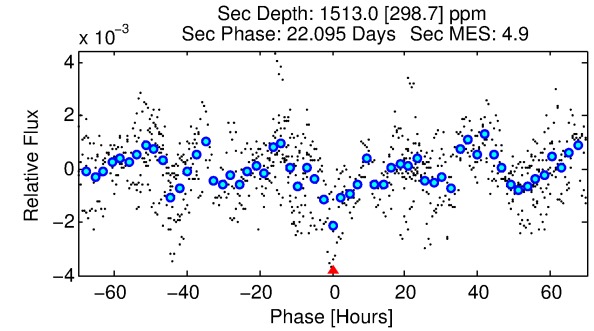
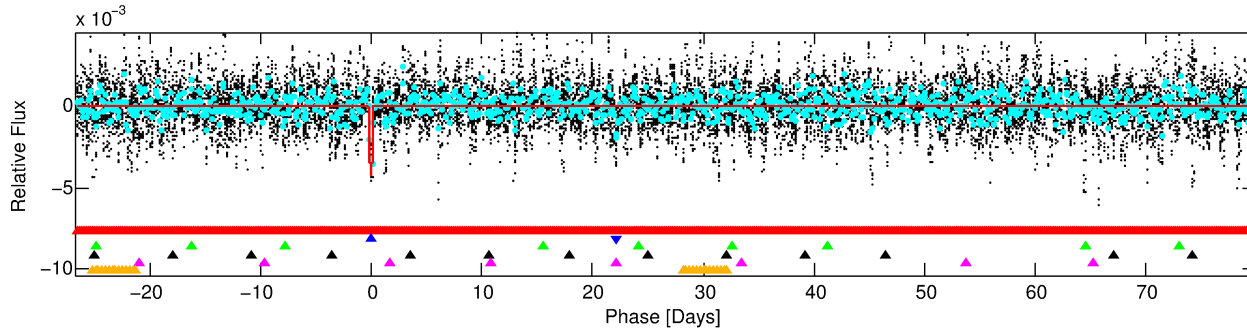
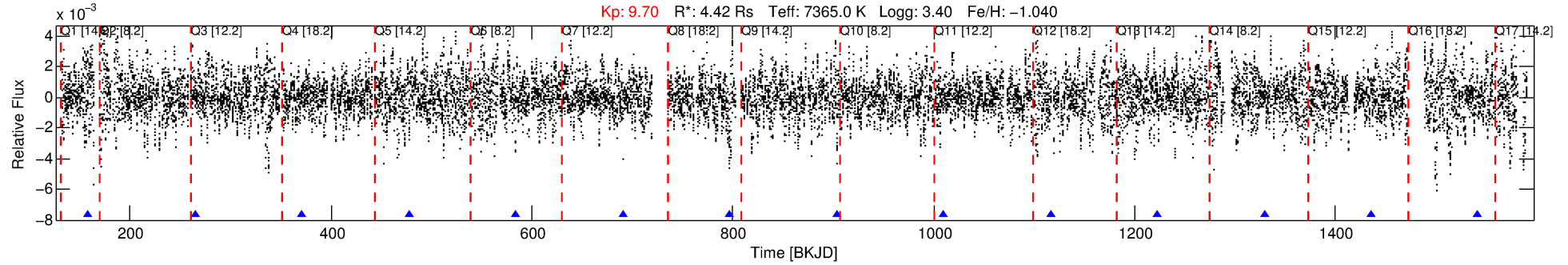
Ephemeris Match Information For 006951642-02

No Significant Match Found



# DV One-Page Summary

KIC: 6951642 Candidate: 2 of 6 Period: 106.444 d



## DV Fit Results:

Period = 106.44411 [0.00359] d  
Epoch = 158.1307 [0.0229] BKJD  
Rp/R\* = 0.0854 [0.0440]  
a/R\* = 34.50 [5.06]  
b = 0.97 [0.08]  
Seff = 181.07 [264.16]  
Teq = 935 [341] K  
Rp = 41.22 [36.24] Re  
a = 0.5336 [0.4449] AU  
Ag = 139.47 [249.73] [0.55σ]  
Teffp = 4970 [1318] K [2.96σ]

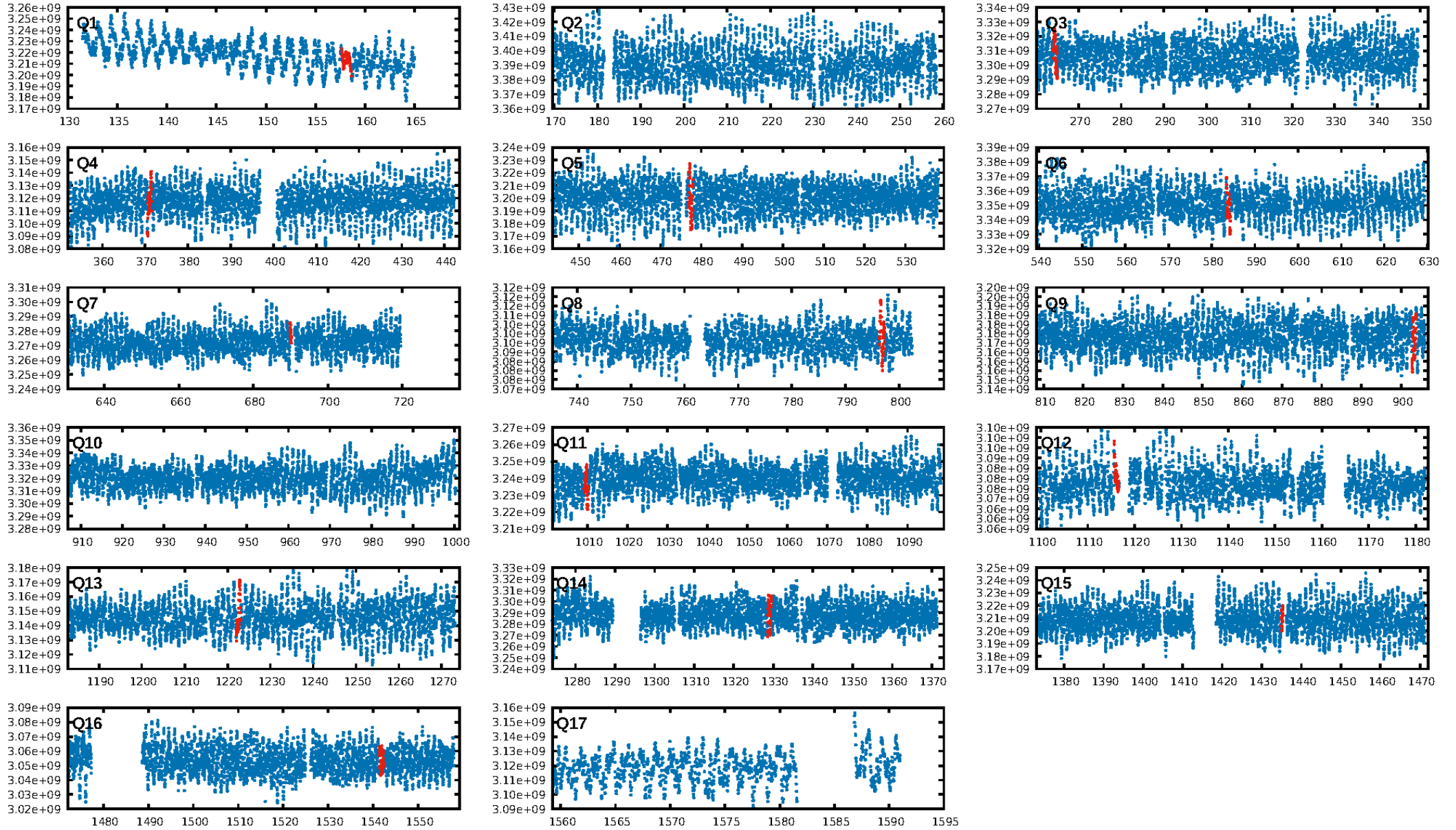
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [90.73σ]  
LongPeriod-sig: 100.0% [11.60σ]  
ModelChiSquare2-sig: 55.8%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 3.85e-09  
RollingBand-fgt: 1.00 [7/7]  
GhostDiagnostic-chr: N/A  
Centroid-sig: 9.5%  
Centroid-so: 1.101 arcsec [7.82σ]  
OotOffset-rm: 1.745 arcsec [2.55σ]  
KicOffset-rm: 2.474 arcsec [2.73σ]  
OotOffset-st: 2/2/3/3 [10]  
KicOffset-st: 2/2/3/3 [10]  
DiffImageQuality-fgm: 0.00 [0/10]  
DiffImageOverlap-fno: 0.00 [0/10]

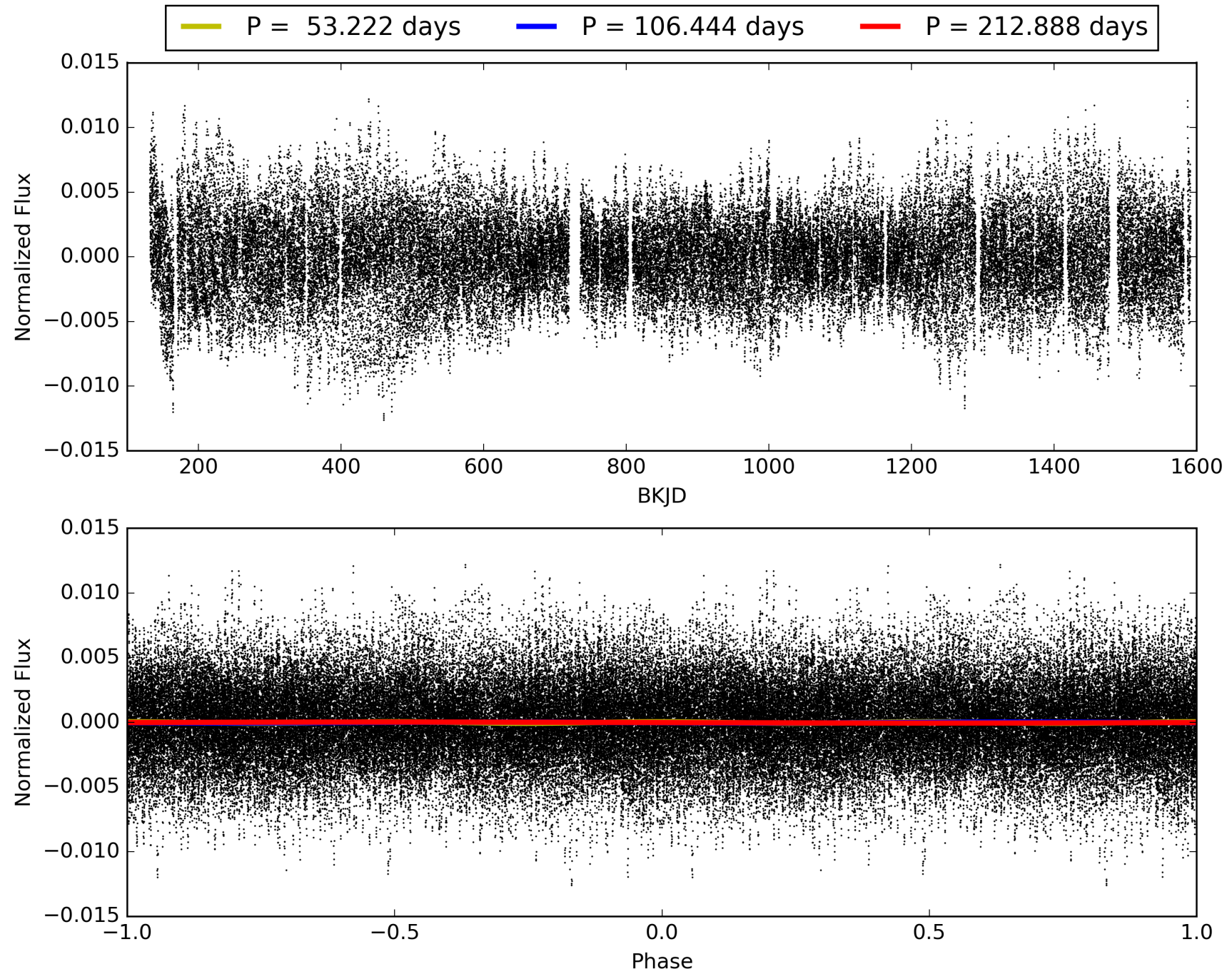
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 12:56:44 Z

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

# TCE 006951642-02, PDC Light Curves

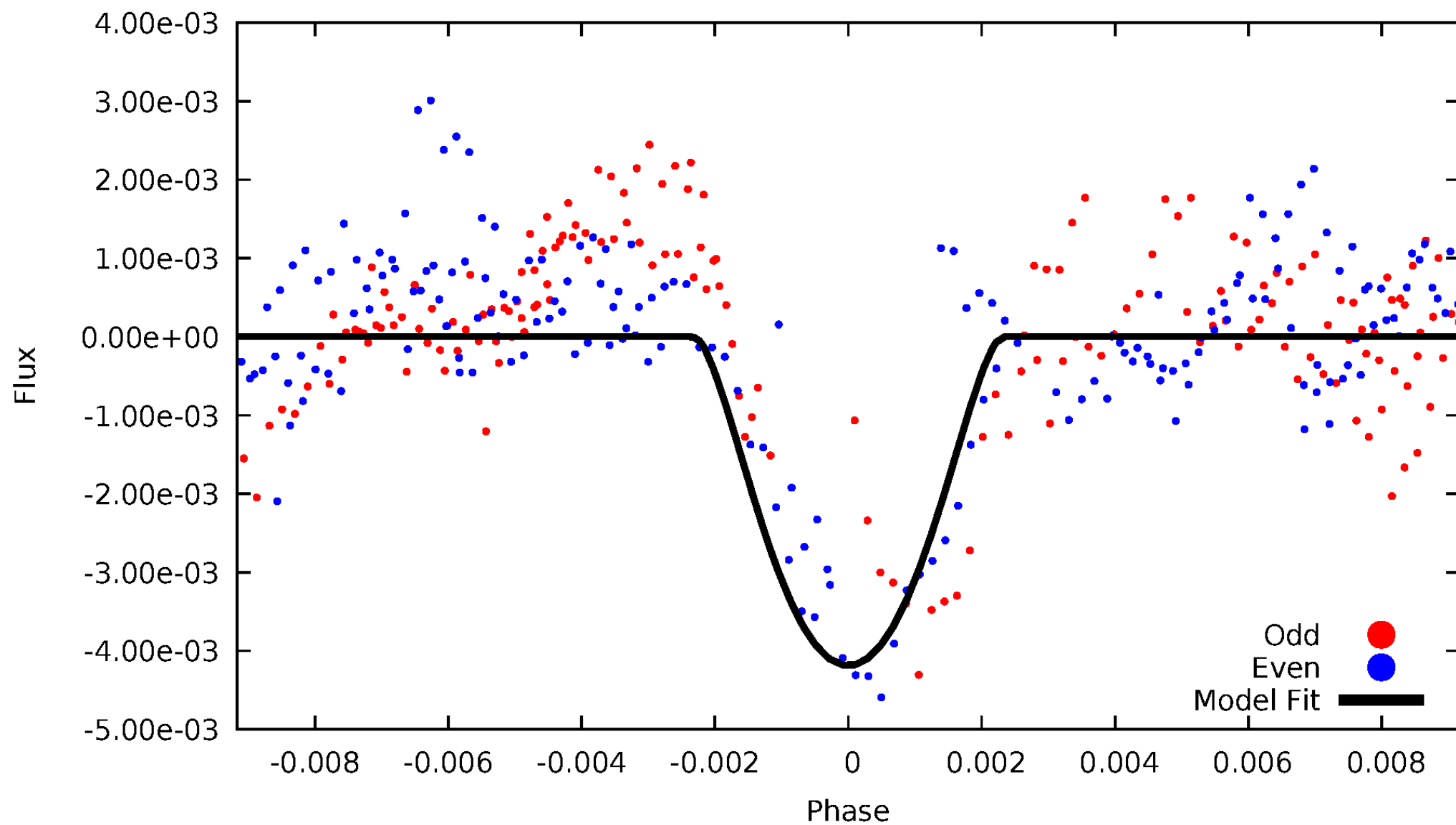


TCE 006951642-02



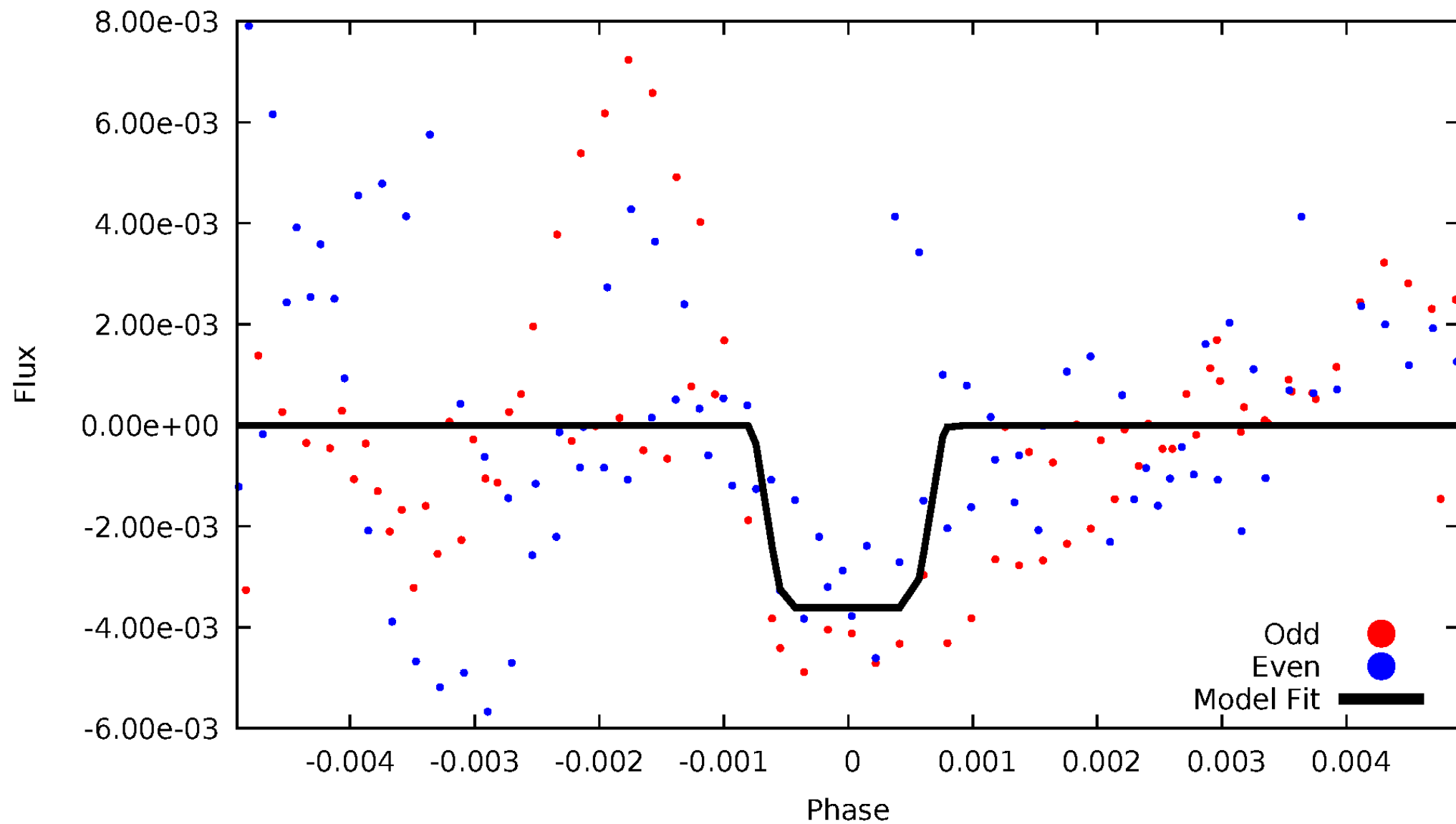
# DV Odd/Even

TCE 006951642-02



# ALT Odd/Even

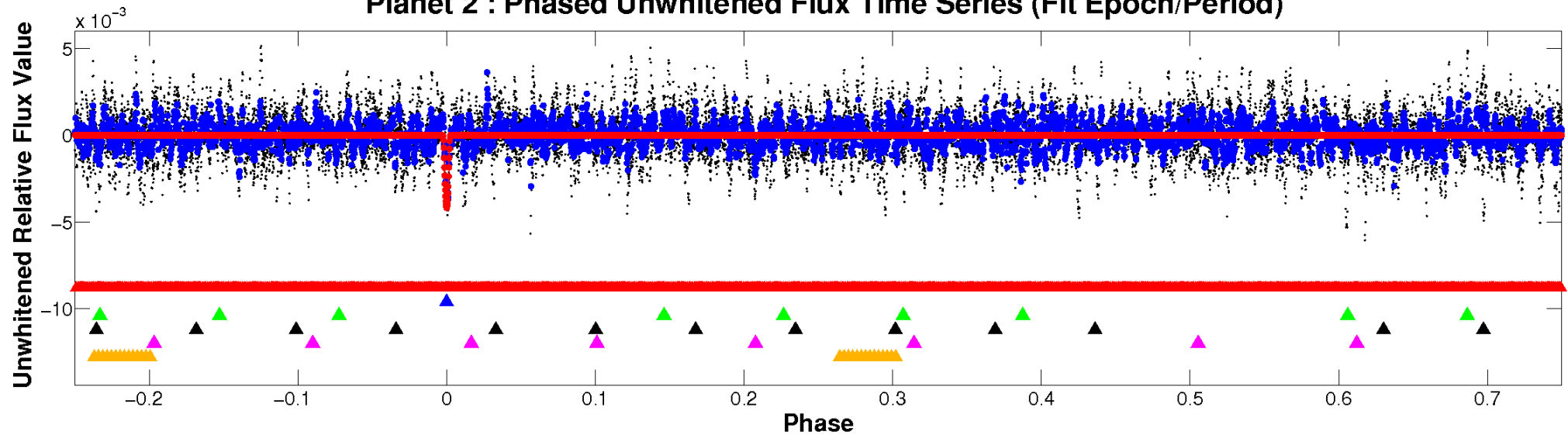
TCE 006951642-02



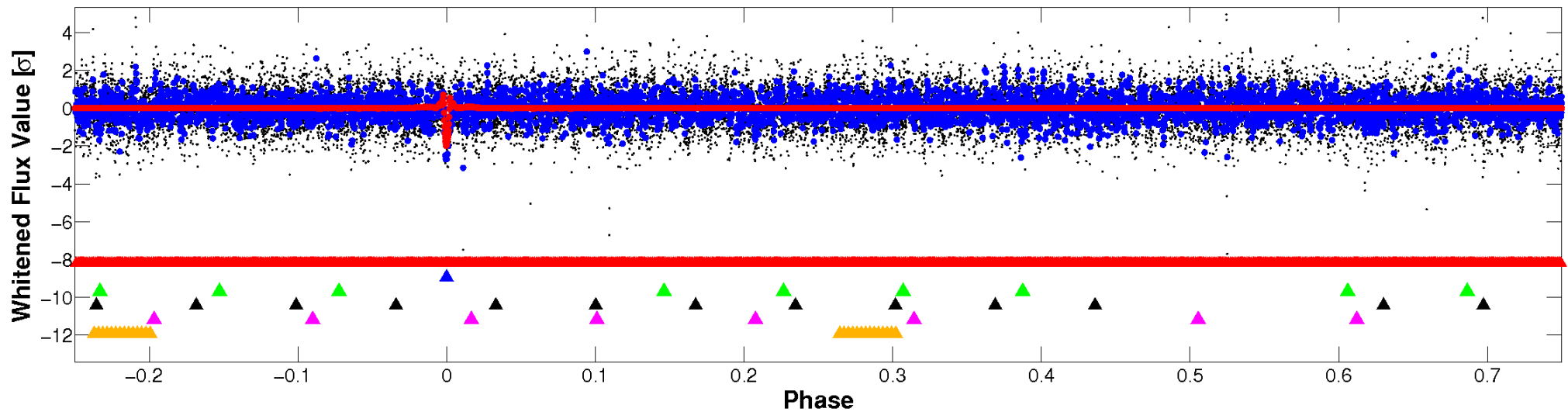


# Non-Whitened Vs. Whitened Light Curve

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

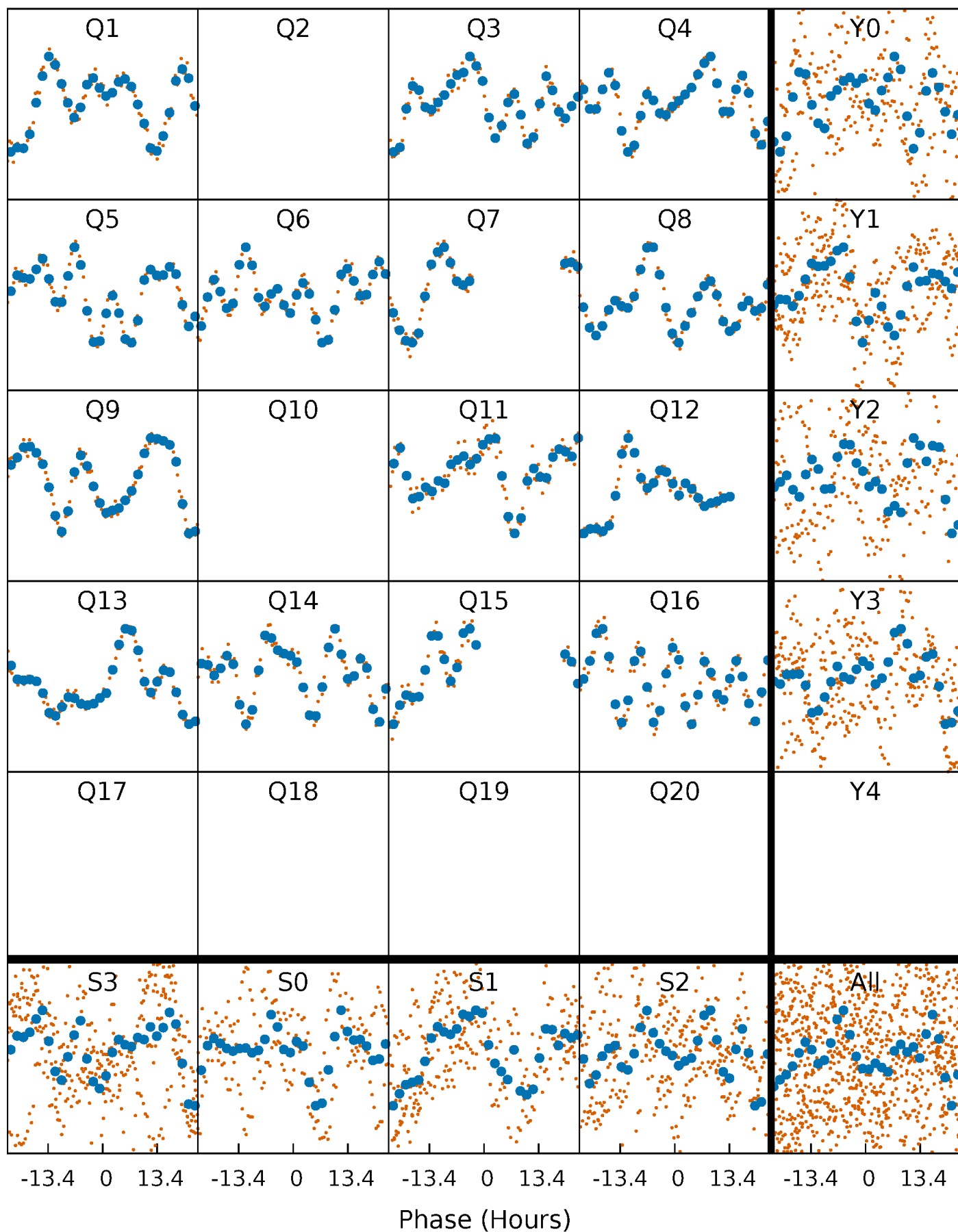


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



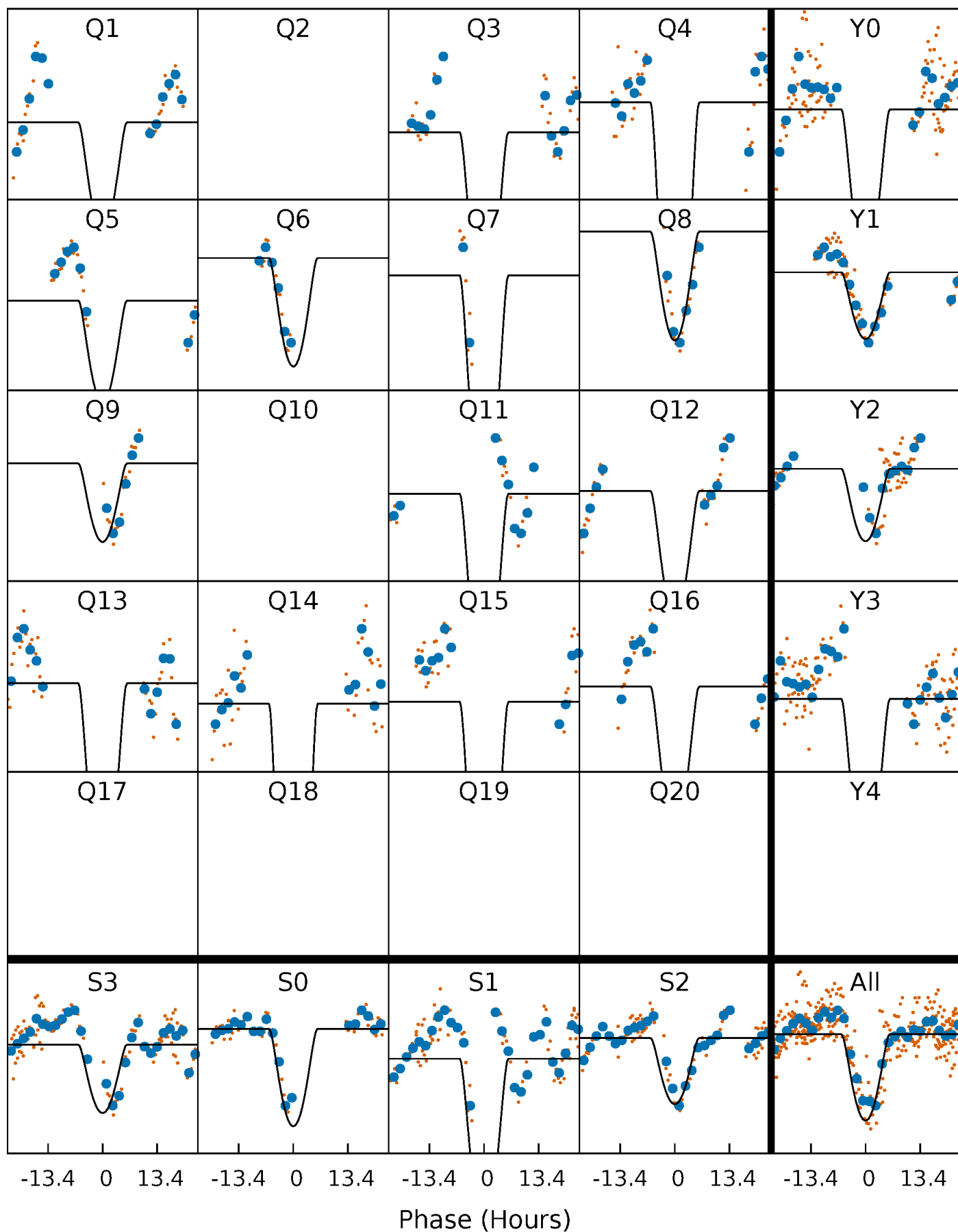
# PDC Quarter-Phased Transit Curves

TCE 006951642-02 P=106.444106 Days  $T_0=158.130695$  (BKJD)



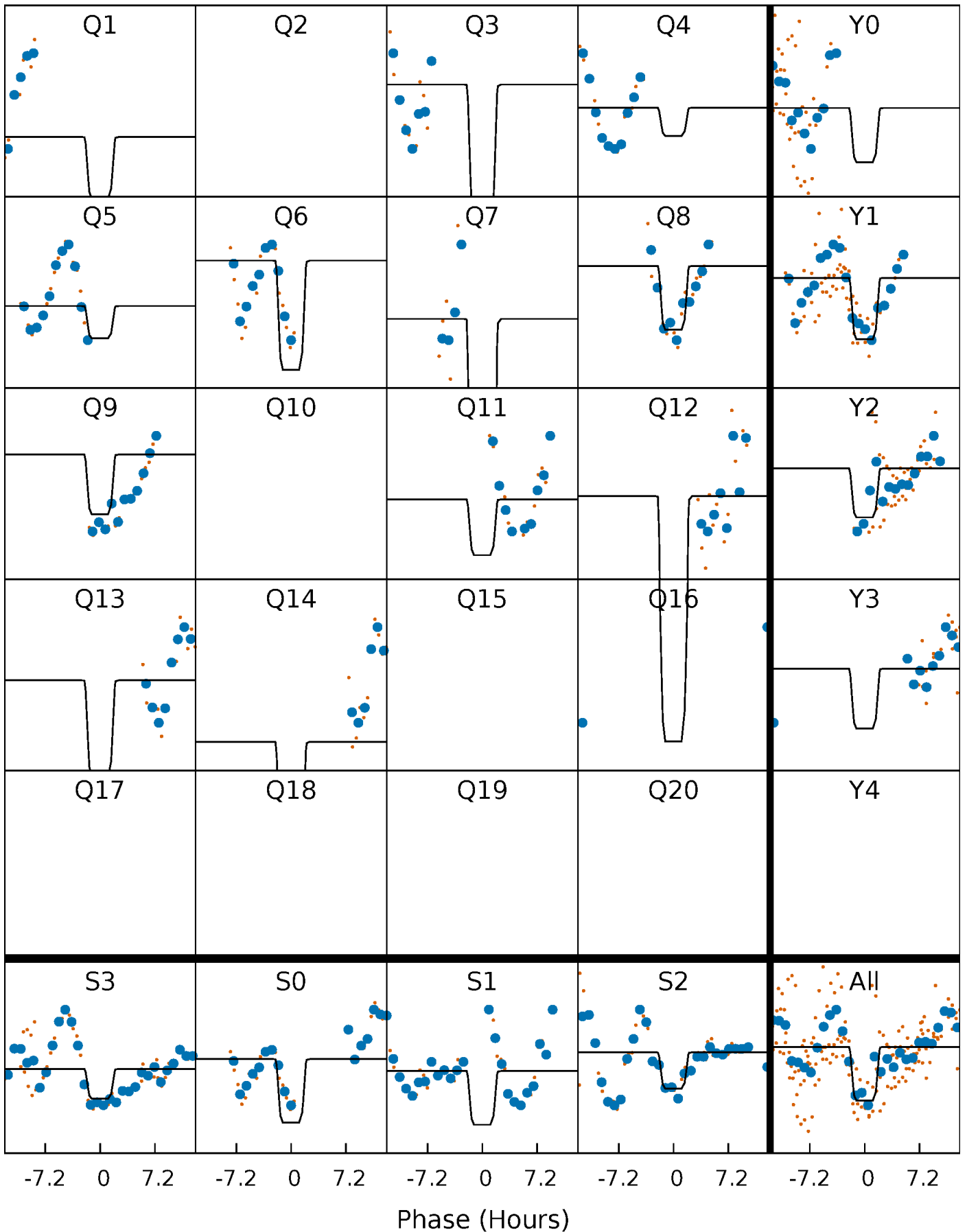
# DV Quarter-Phased Transit Curves

TCE 006951642-02     $P=106.444106$  Days     $T_0=158.130695$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 006951642-02 P=106.483430 Days  $T_0=157.923938$  (BKJD)

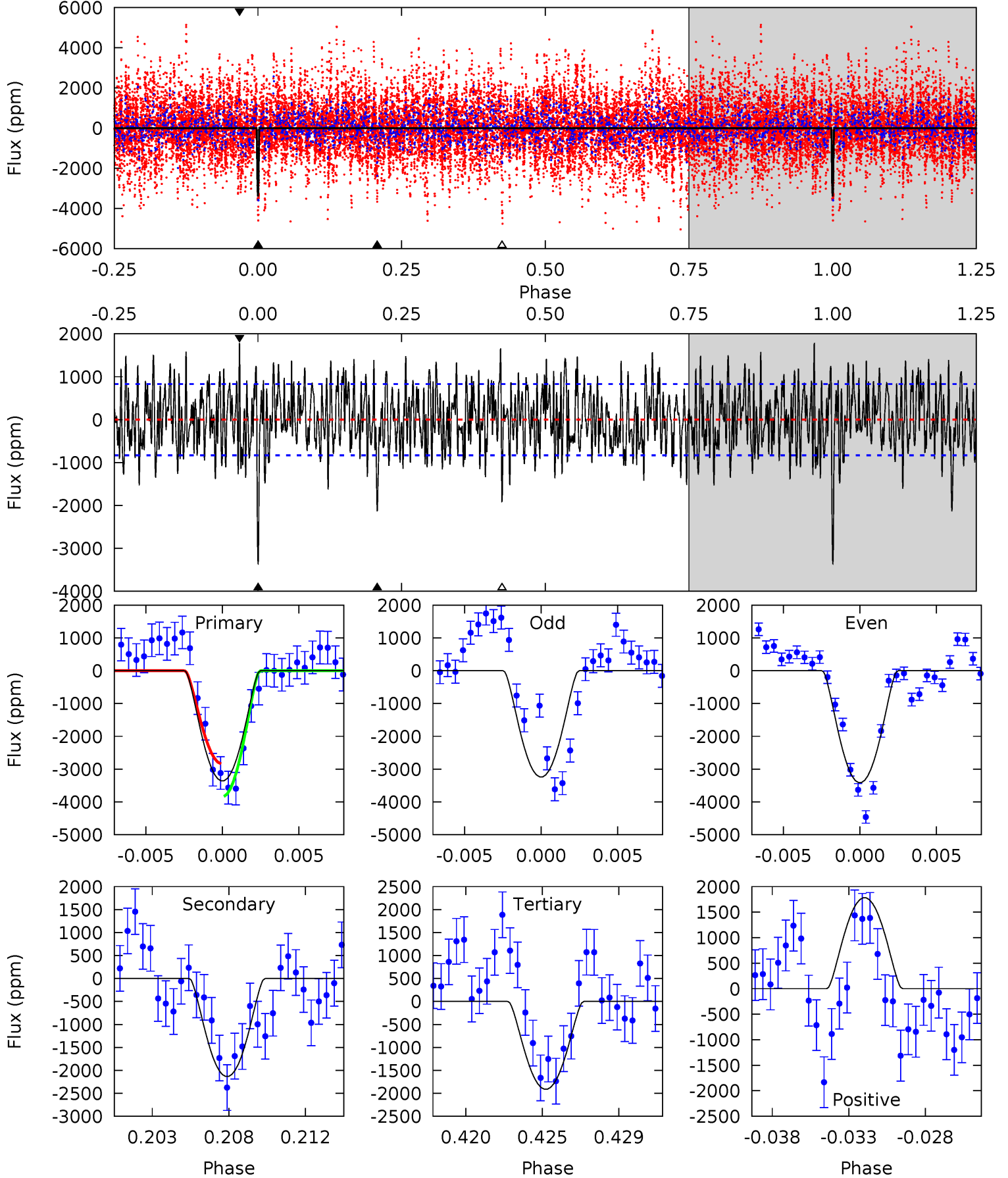




# DV Model-Shift Uniqueness Test

006951642-02,  $P = 106.444106$  Days,  $E = 51.686589$  Days

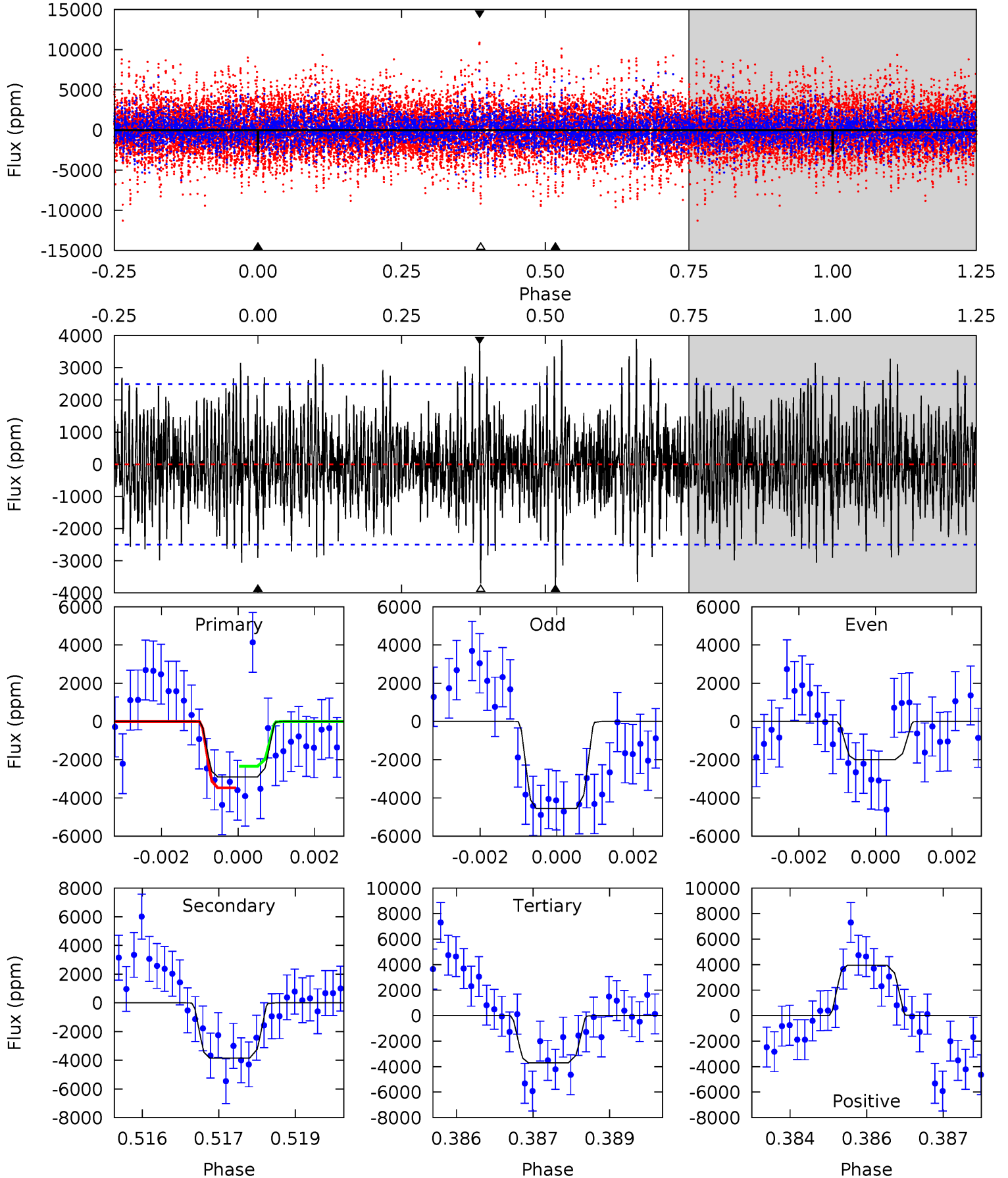
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
20.9	13.3	11.9	11.1	5.17	2.83	3.86	9.03	9.83	1.39	2.19	0.53	0.03	0.35	3.10



# Alt Model-Shift Uniqueness Test

006951642-02, P = 106.483430 Days, E = 51.440508 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.23	8.25	7.96	8.47	5.37	3.15	2.19	-1.73	-2.25	0.29	-0.23	2.59	0.67	0.51	1.21



### Stellar Parameters For KIC 006951642

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7365^{+233}_{-285}$	$3.399^{+0.893}_{-0.094}$	$-1.040^{+0.300}_{-0.300}$	$4.422^{+0.556}_{-3.149}$	$1.789^{+0.126}_{-0.753}$	$0.029^{+0.690}_{-0.009}$
	+3%/-4%	+26%/-3%	+29%/-29%	+13%/-71%	+7%/-42%	+2369%/-30%
Source	KIC0	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 006951642-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-2132 \pm 161$	$32.68^{+26.02}_{-17.25}$	$1263^{+93}_{-260}$	$5382^{+1973}_{-876}$	$293^{+971}_{-197}$
Alt.	$-3839 \pm 466$	$23.39^{+22.16}_{-14.32}$	$1246^{+115}_{-240}$	$7302^{+6350}_{-1689}$	$1101^{+5634}_{-808}$

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

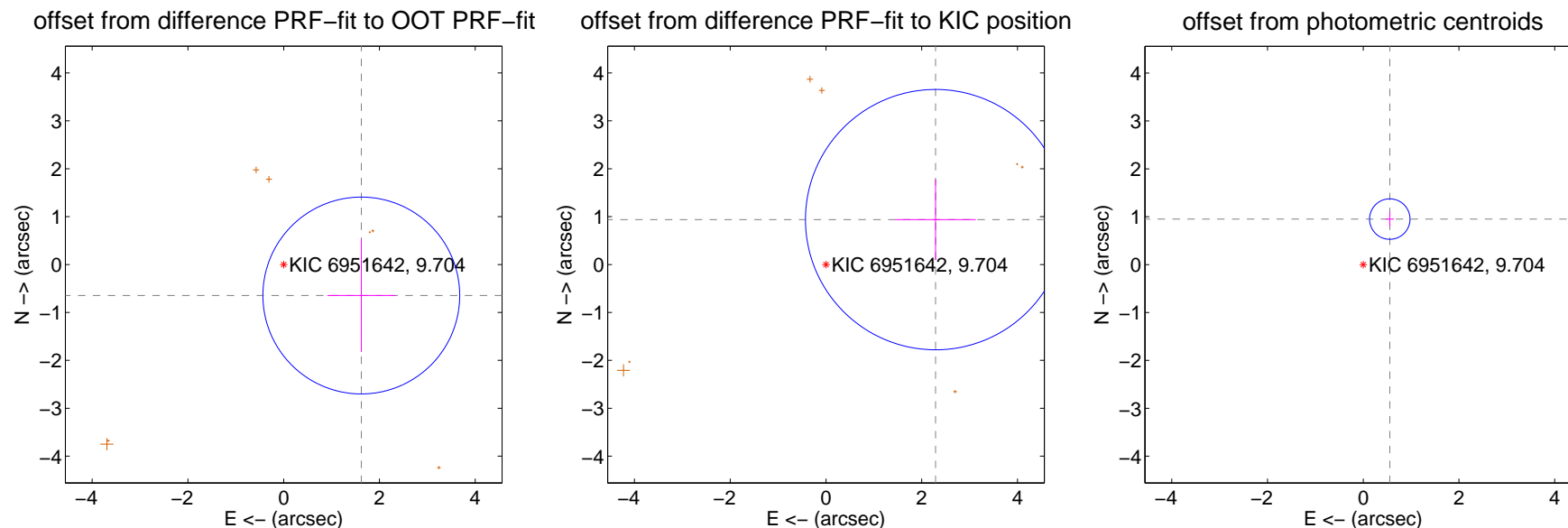
## DV Centroid Data

Supplemental centroid analysis for 006951642-02. **Kepler magnitude: 9.70.** Transit SNR 8.99

**There are 0 quarters with good PRF difference image offsets**

The direct PRF centroid is offset from the target star catalog position by about 0.95 arcsec

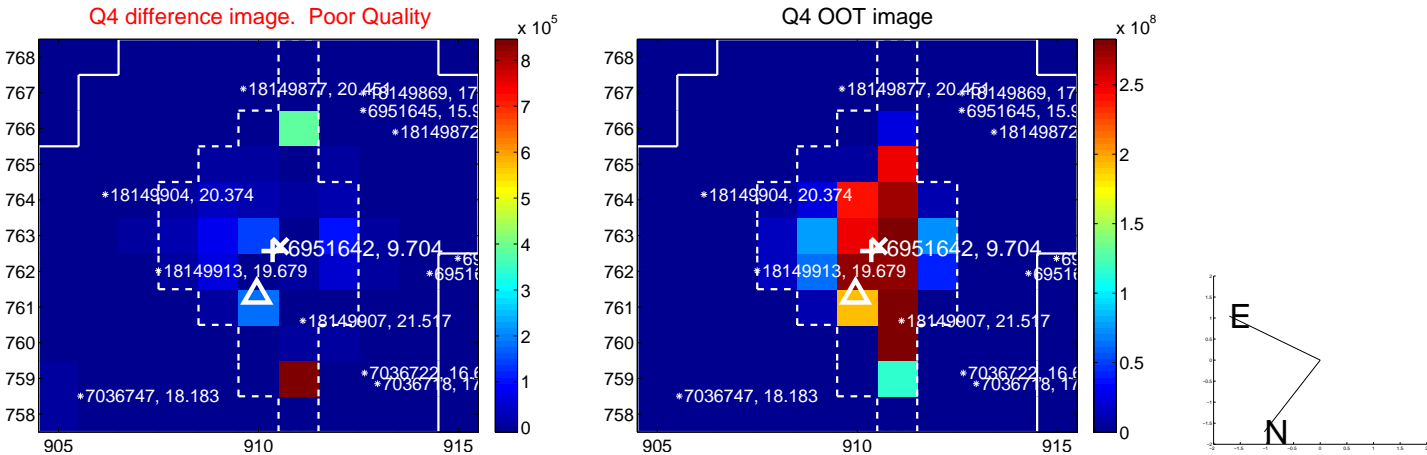
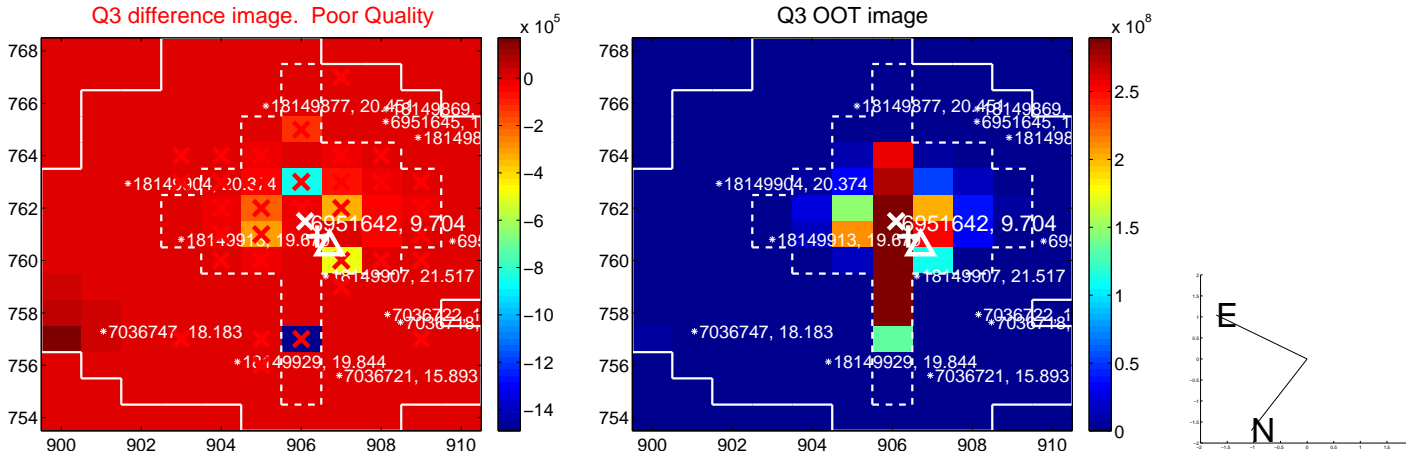
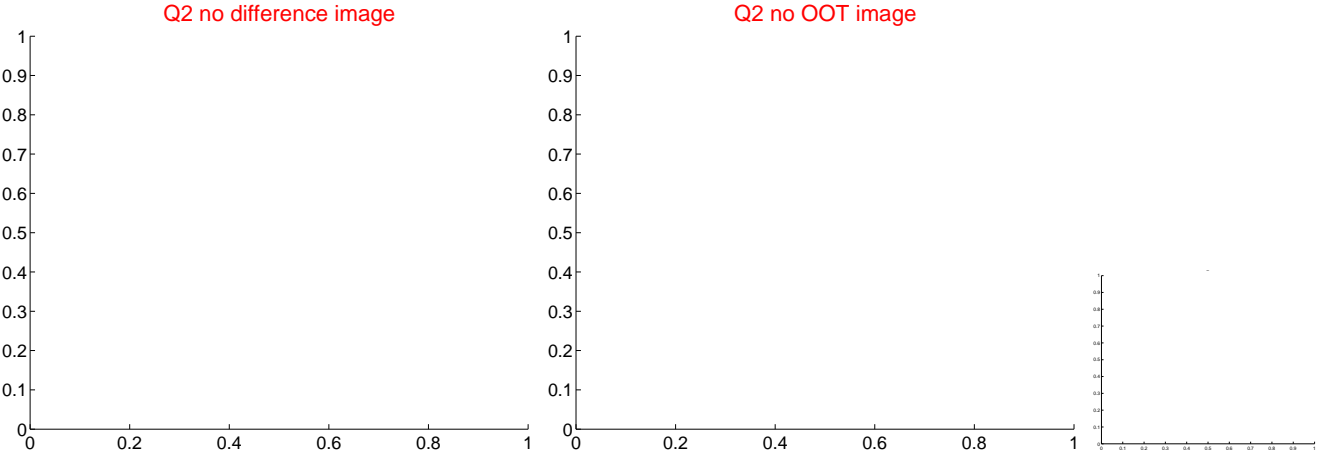
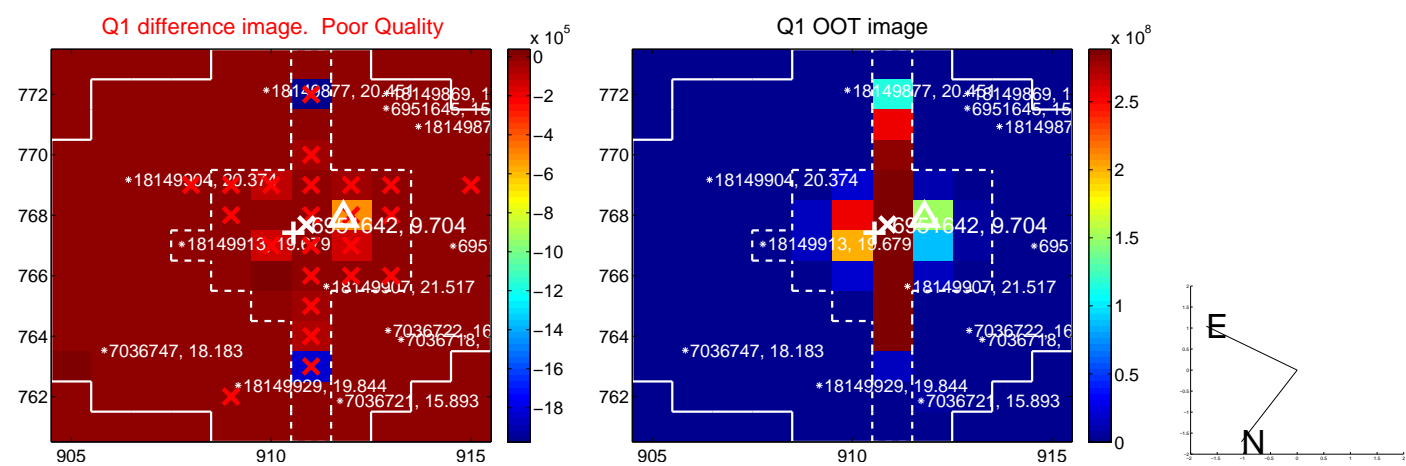
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.745 \pm 0.685$	2.55	$-1.621 \pm 0.709$	$-0.646 \pm 1.177$
PRF-fit source offset from KIC position	$2.474 \pm 0.906$	2.73	$-2.289 \pm 0.841$	$0.937 \pm 0.842$
photometric centroid source offset	$1.10 \pm 0.14$	<b>7.82</b>	$-0.55 \pm 0.08$	$0.95 \pm 0.16$



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



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



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

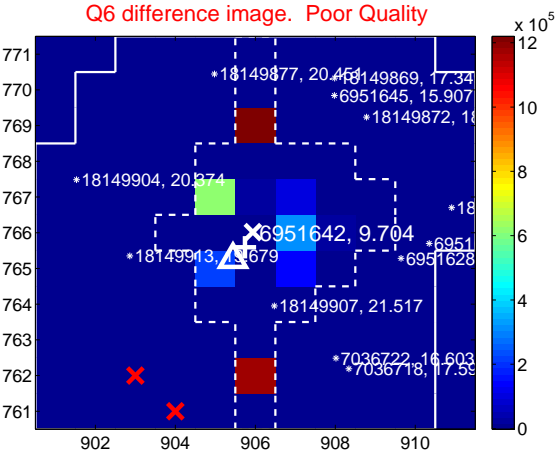
Q5 no difference image



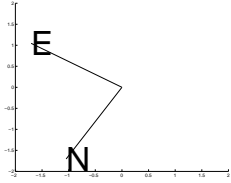
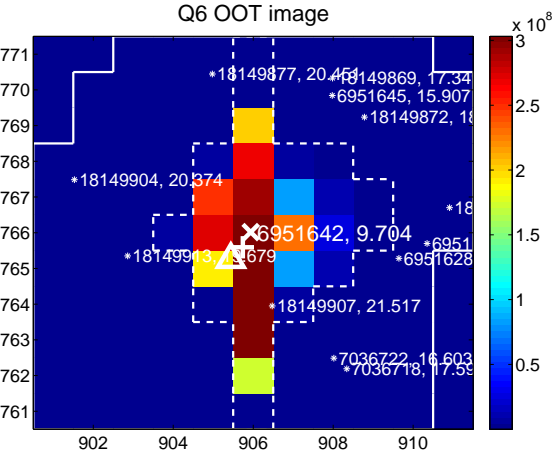
Q5 no OOT image



Q6 difference image. Poor Quality



Q6 OOT image



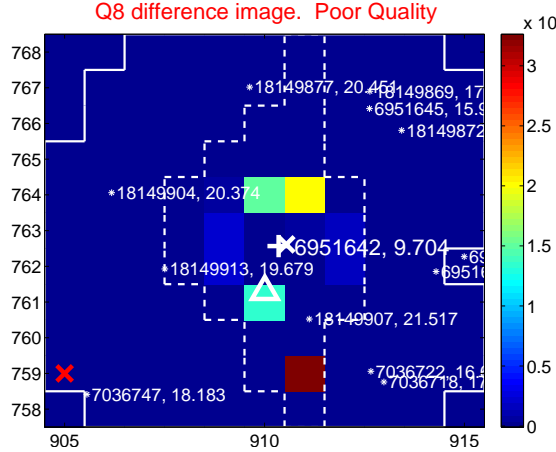
Q7 no difference image



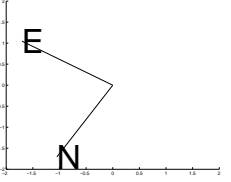
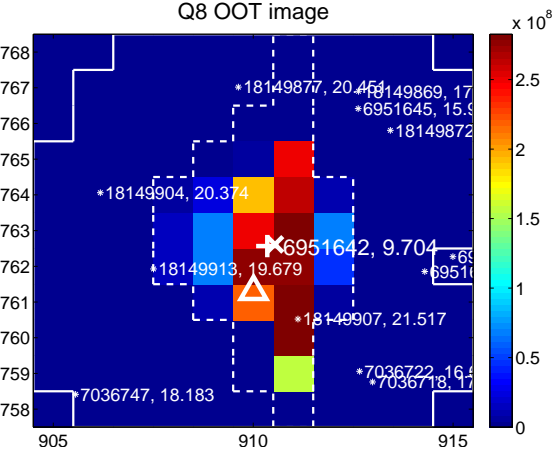
Q7 no OOT image



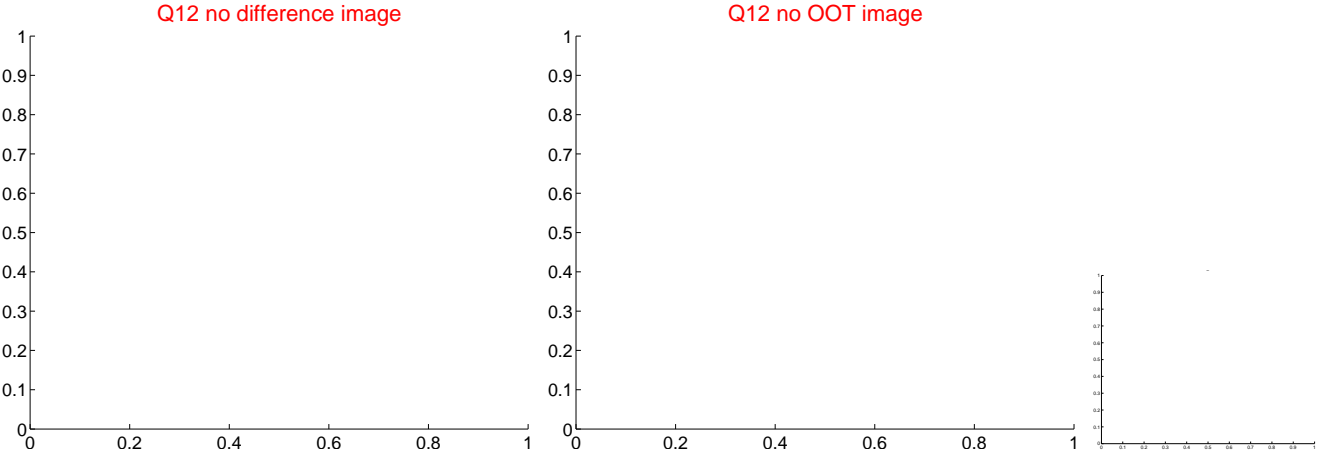
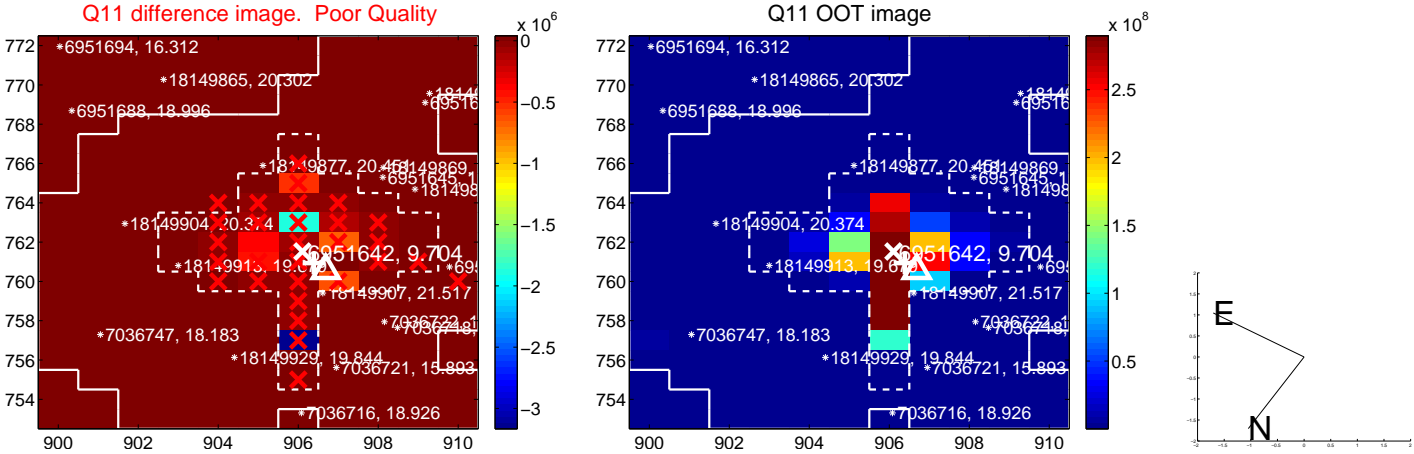
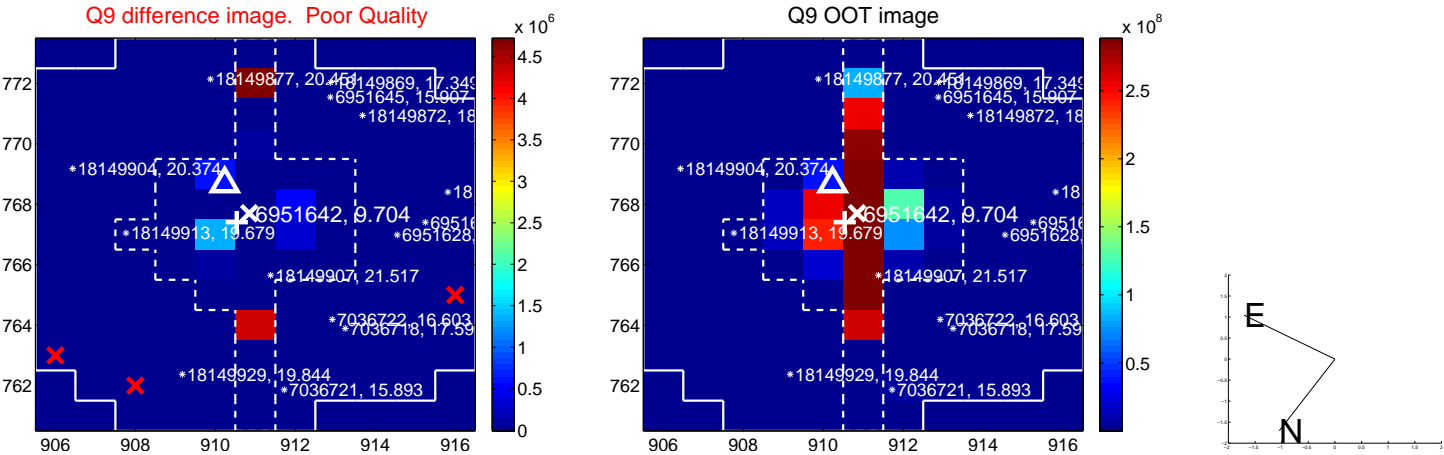
Q8 difference image. Poor Quality



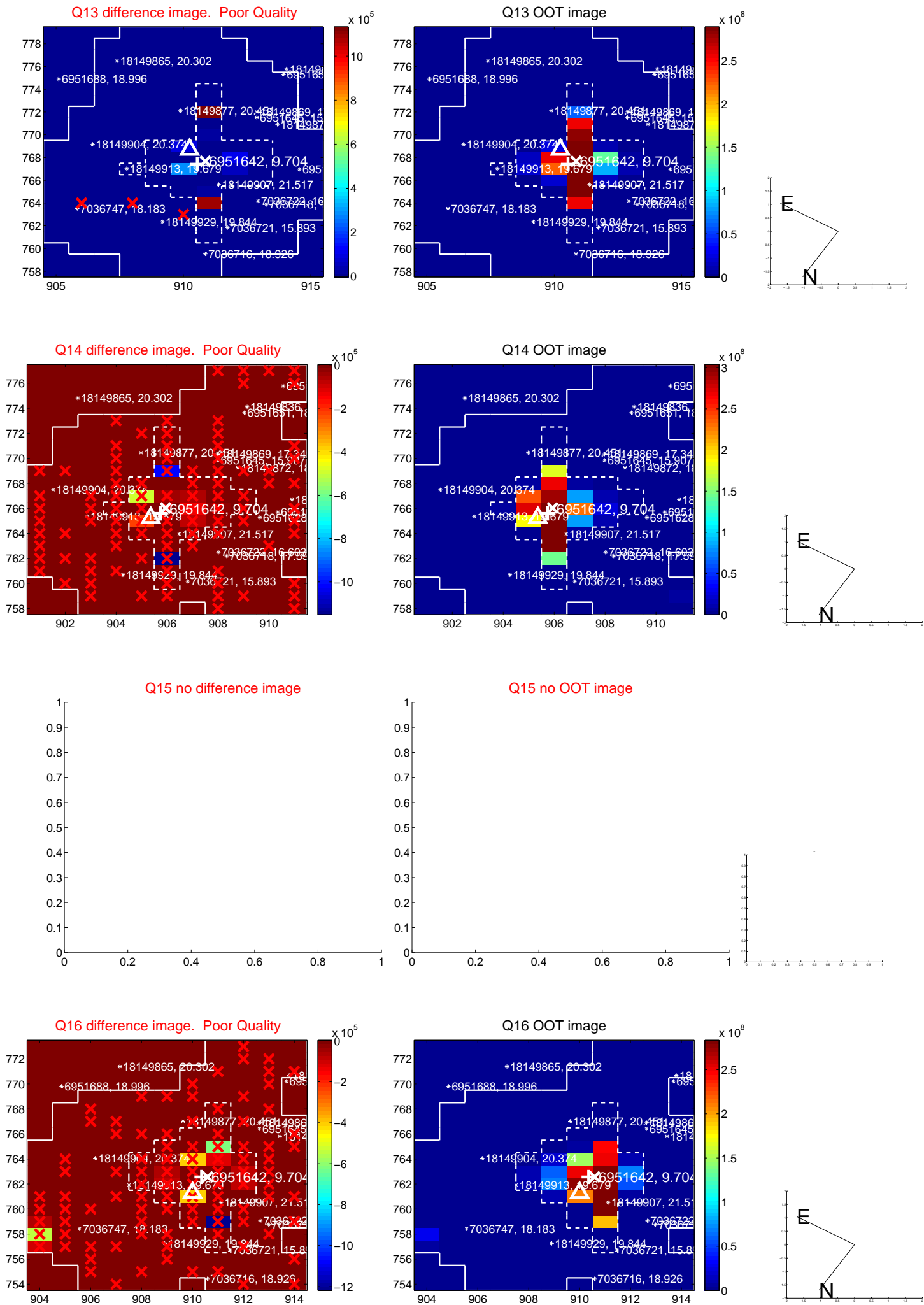
Q8 OOT image



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.

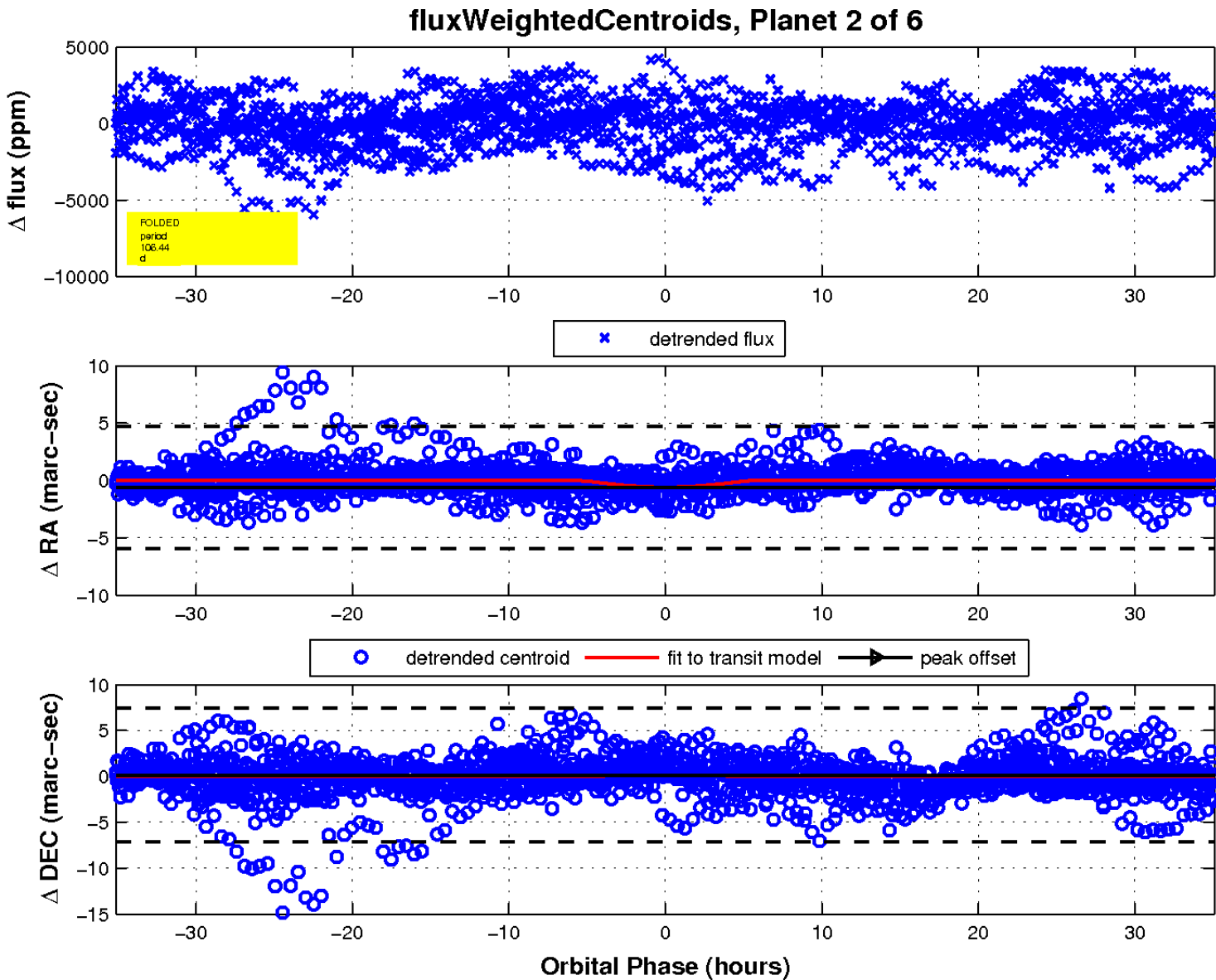




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

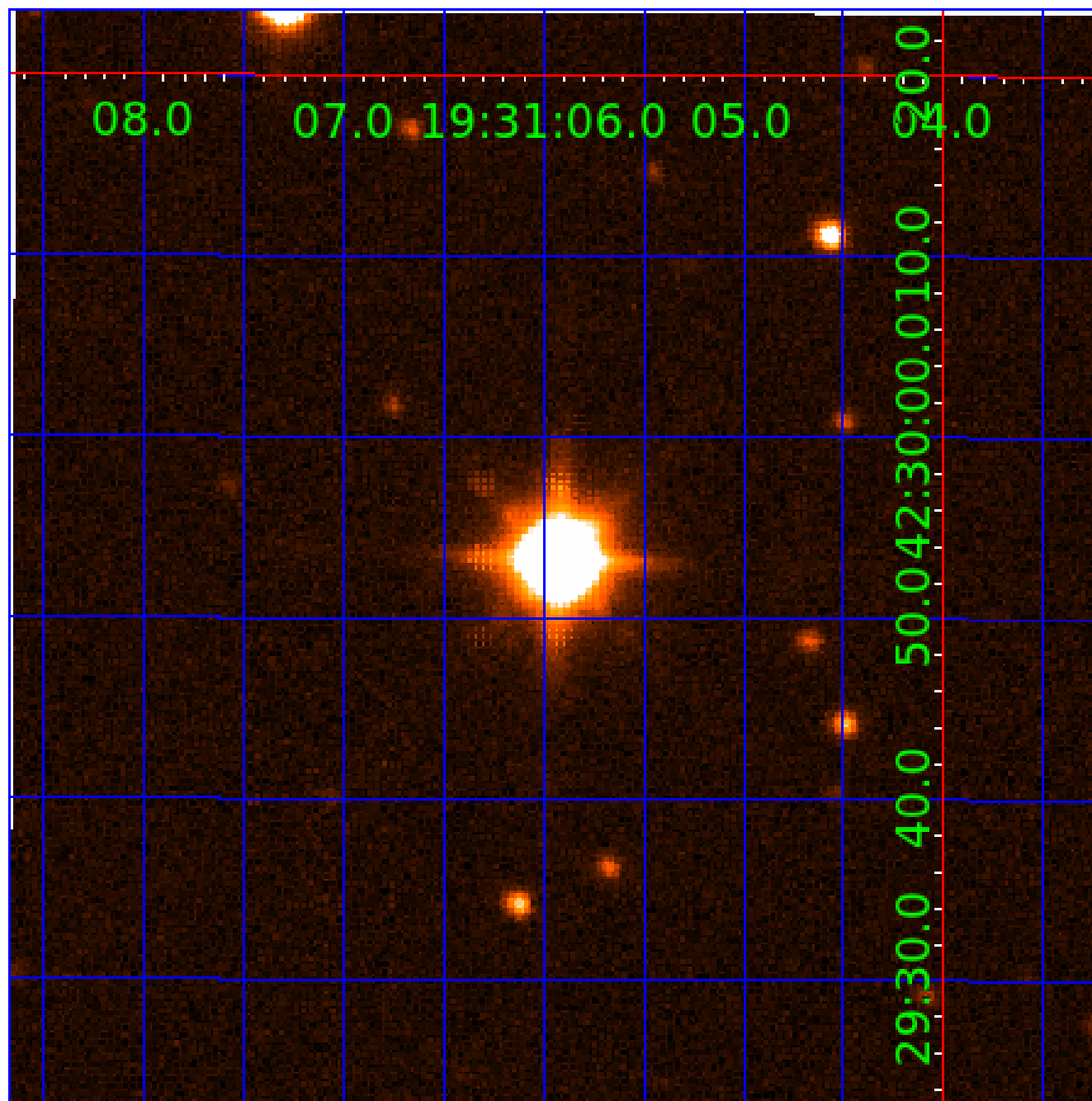
Q17 no difference image

Q17 no OOT image



UKIRT Image

Declination



# KIC 006951642

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006951642-01	OBS	No	1.384118	131.786960	52.8	7.933	8.8	3.2	4.42	7365	3.40	59215.24
006951642-02	OBS	No	106.444106	158.130695	4190.1	11.707	8.8	9.0	4.42	7365	41.22	181.06
006951642-03	OBS	No	155.387535	256.874191	1947.1	10.584	9.3	7.0	4.42	7365	21.77	109.34
006951642-04	OBS	No	113.593551	225.208195	3881.9	9.049	8.8	9.8	4.42	7365	49.71	166.03
006951642-05	OBS	No	181.191432	275.335077	2015.9	5.509	8.4	7.6	4.42	7365	21.14	89.09
006951642-06	OBS	No	53.376225	132.903938	1975.6	7.744	7.4	9.1	4.42	7365	34.74	454.50

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006951642-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
006951642-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
006951642-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
006951642-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
006951642-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV— MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
006951642-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—MOD_NONUNIQ_ALT—CENT_SATURATED

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

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

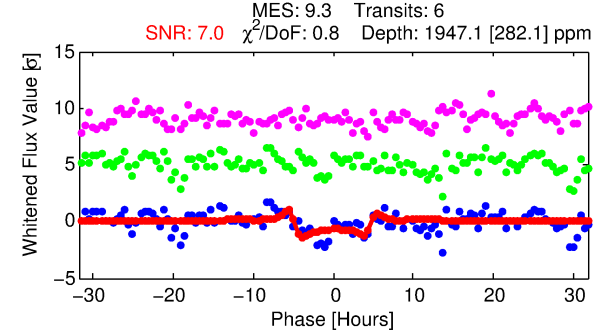
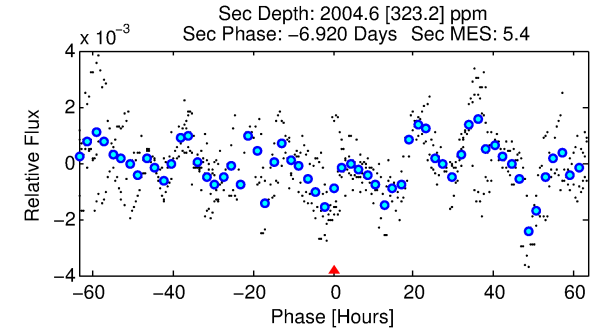
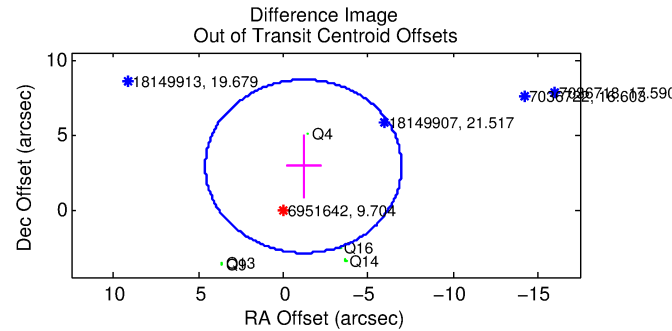
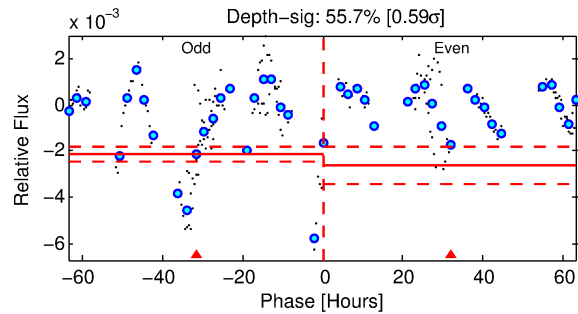
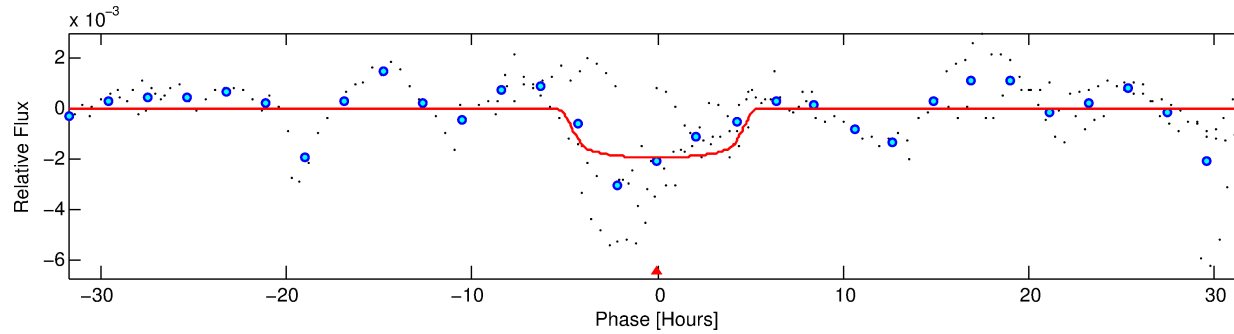
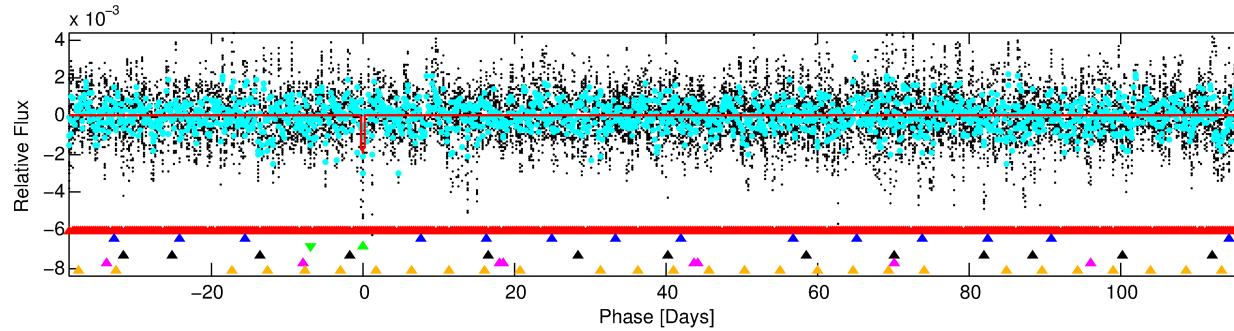
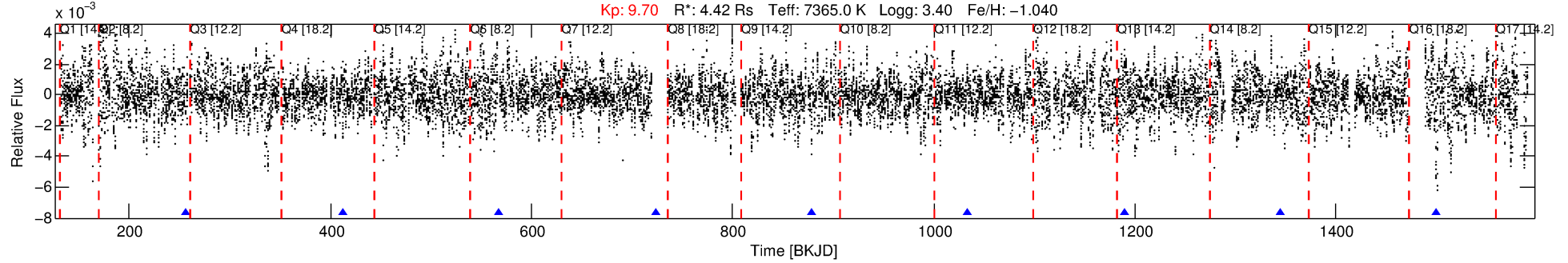
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 006951642-03

No Significant Match Found

# DV One-Page Summary

KIC: 6951642 Candidate: 3 of 6 Period: 155.388 d



## DV Fit Results:

Period = 155.38753 [0.00234] d  
Epoch = 256.8742 [0.0110] BKJD  
 $R_p/R^* = 0.0451$  [0.0040]  
 $a/R^* = 72.30$  [16.09]  
 $b = 0.82$  [0.09]  
 $\text{Seff} = 109.34$  [159.52]  
 $\text{Teq} = 825$  [301] K  
 $R_p = 21.77$  [15.62]  $R_e$   
 $a = 0.6866$  [0.5725] AU  
 $\text{Ag} = 1097.45$  [1613.91] [0.68 $\sigma$ ]  
 $\text{Teffp} = 7338$  [526] K [10.76 $\sigma$ ]

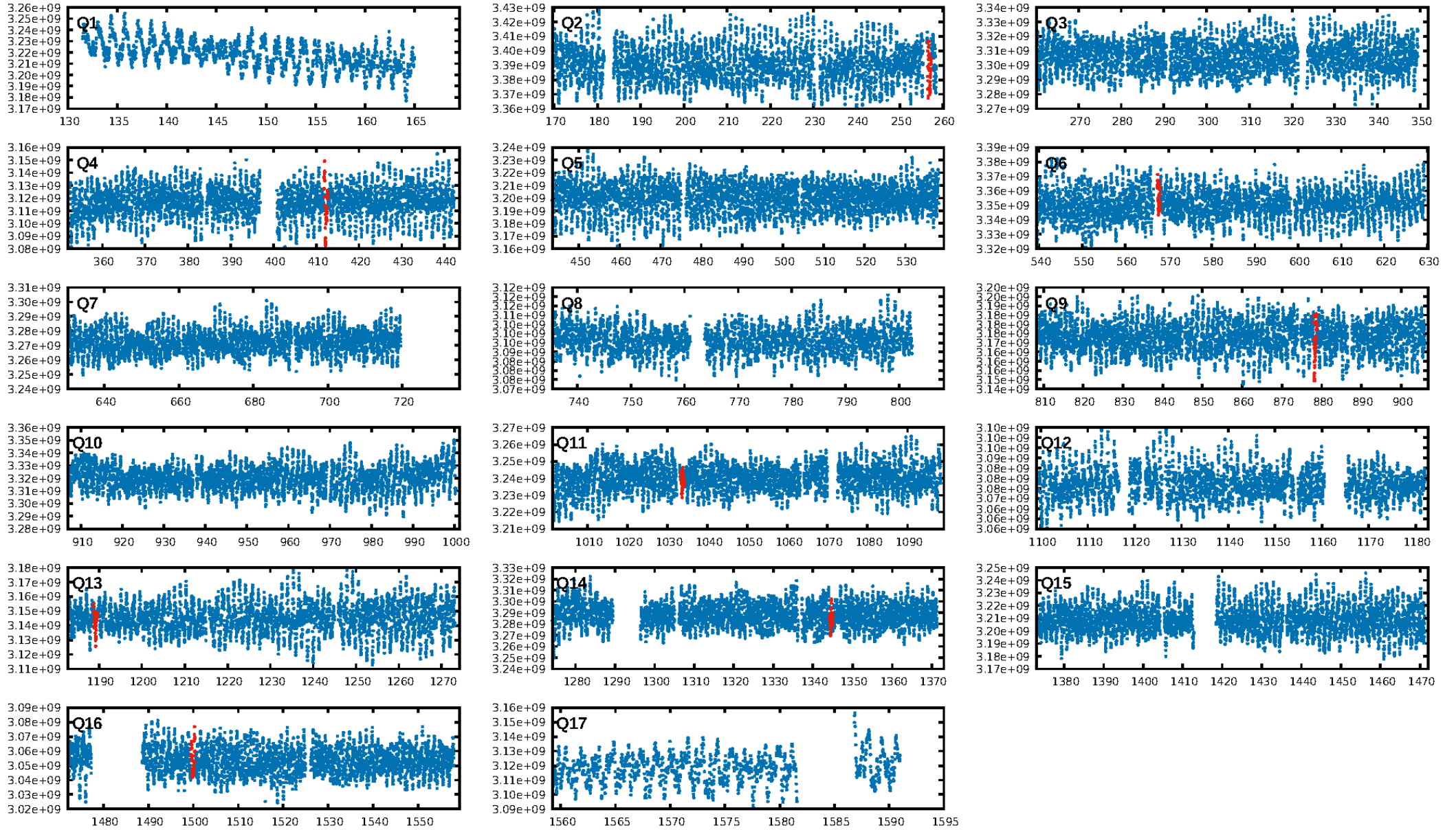
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [72.03 $\sigma$ ]  
LongPeriod-sig: 100.0% [51.90 $\sigma$ ]  
ModelChiSquare2-sig: 9.1%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 6.32e-10  
RollingBand-fgt: 1.00 [6/6]  
GhostDiagnostic-chr: N/A  
Centroid-sig: 84.6%  
Centroid-so: 1.287 arcsec [4.97 $\sigma$ ]  
OotOffset-rm: 3.127 arcsec [1.62 $\sigma$ ]  
KicOffset-rm: 1.959 arcsec [1.19 $\sigma$ ]  
OotOffset-st: 1/0/2/2 [5]  
KicOffset-st: 1/0/2/2 [5]  
DiffImageQuality-fgm: 0.00 [0/5]  
DiffImageOverlap-fno: 0.00 [0/5]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 12:56:48 Z

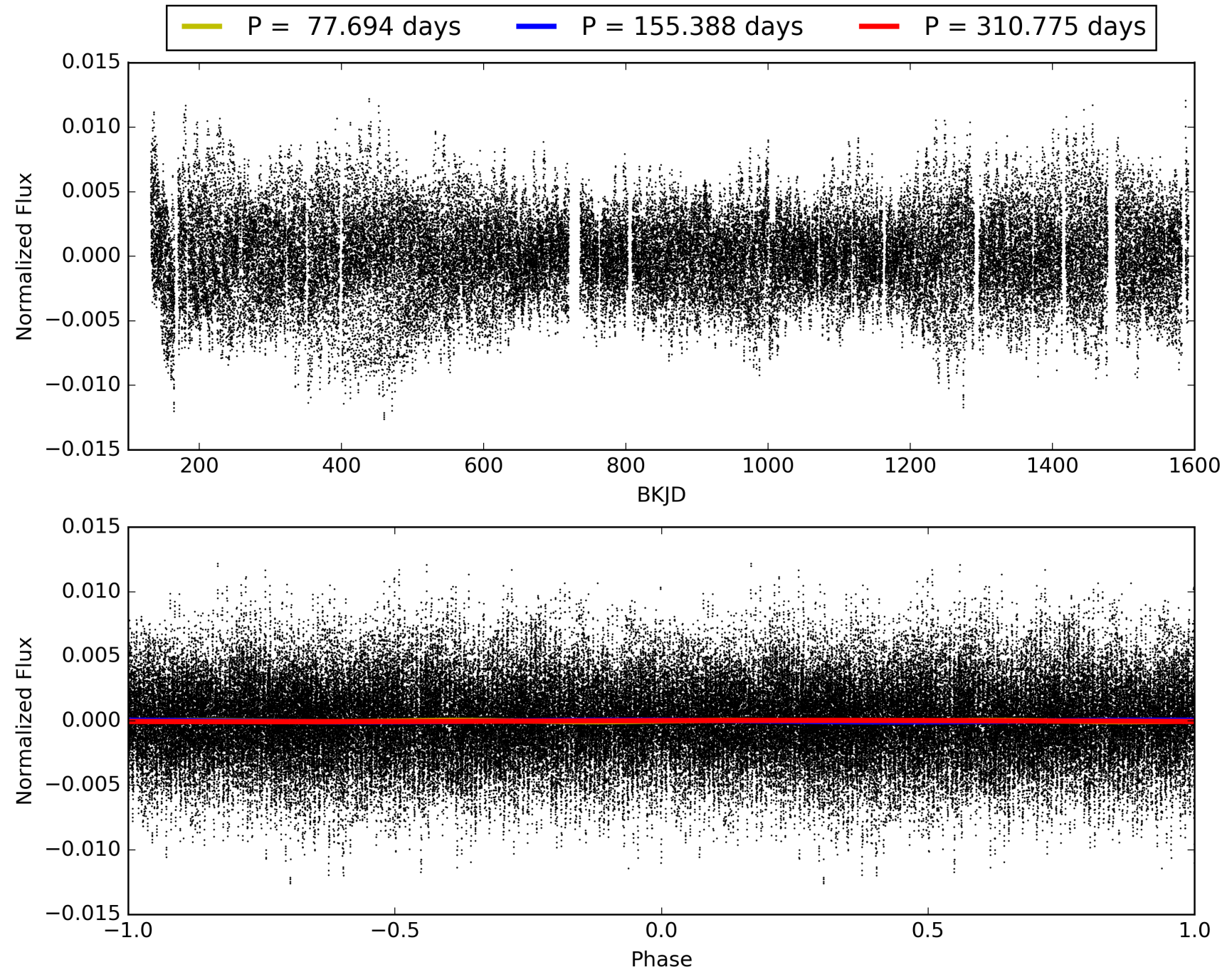
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 006951642-03, PDC Light Curves



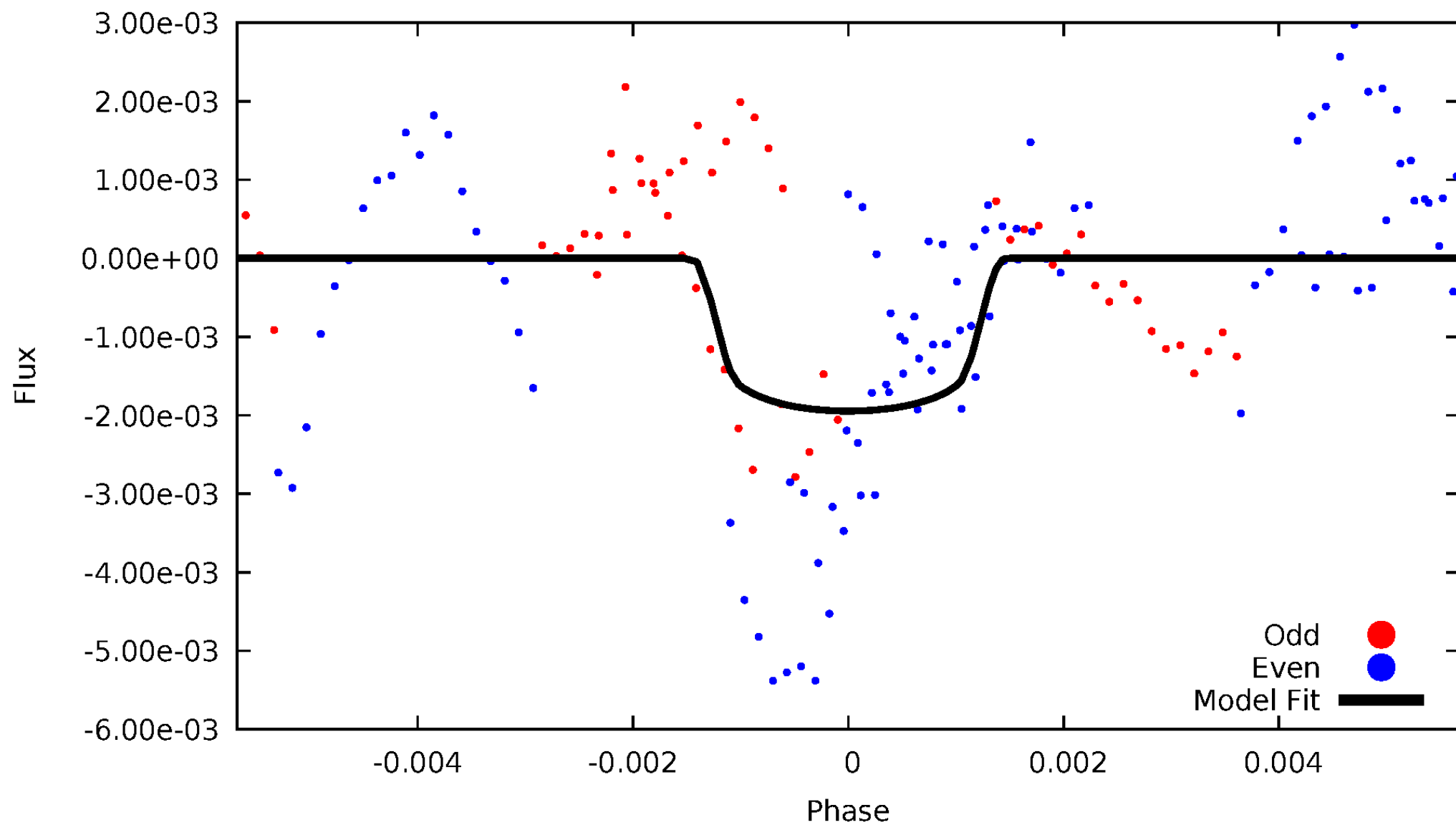


# TCE 006951642-03



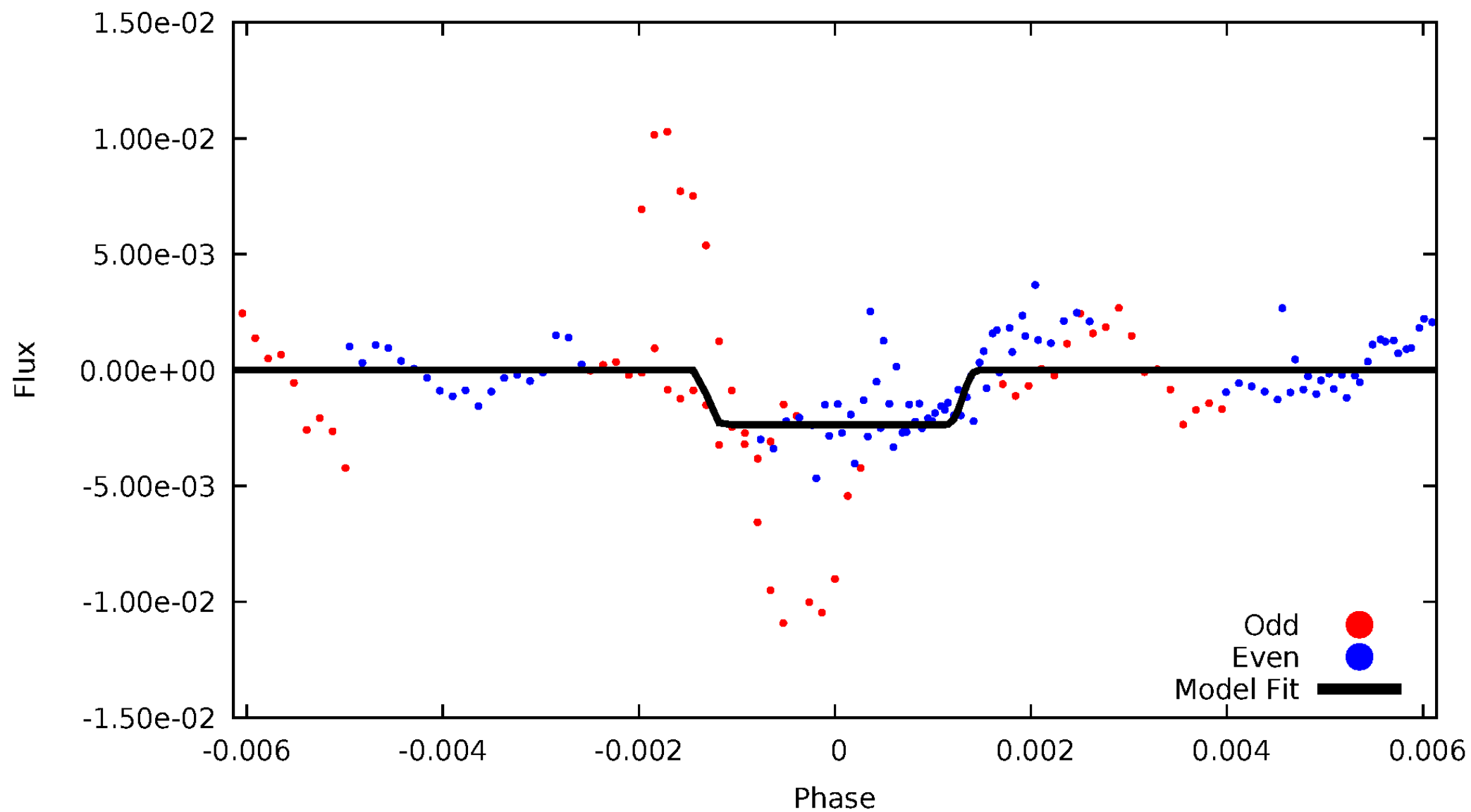
# DV Odd/Even

TCE 006951642-03

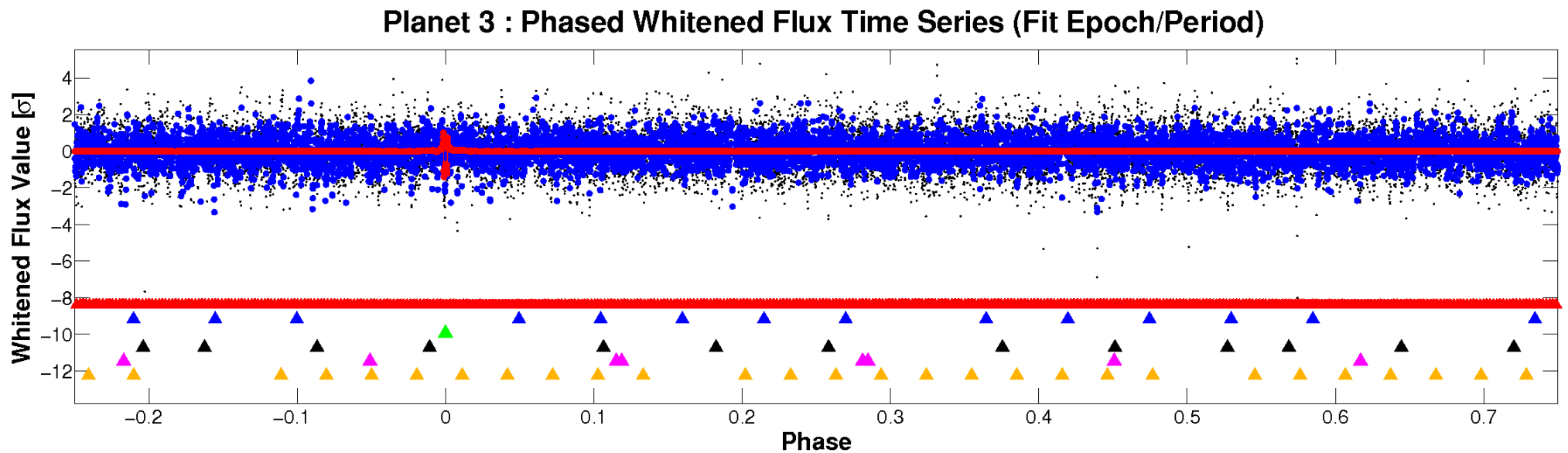
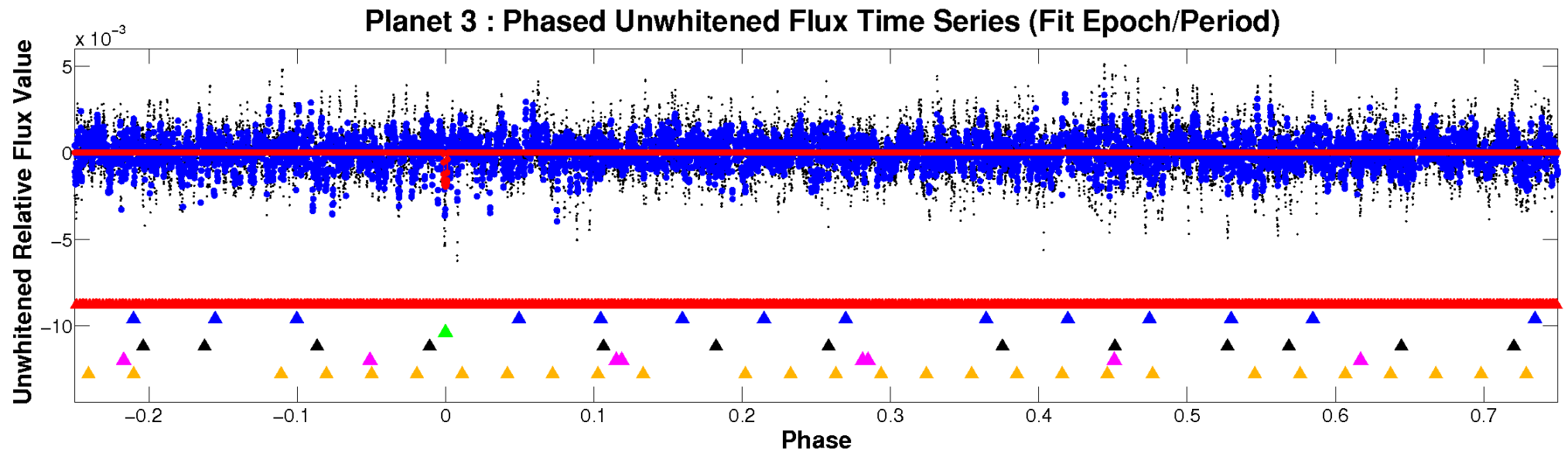


# ALT Odd/Even

TCE 006951642-03

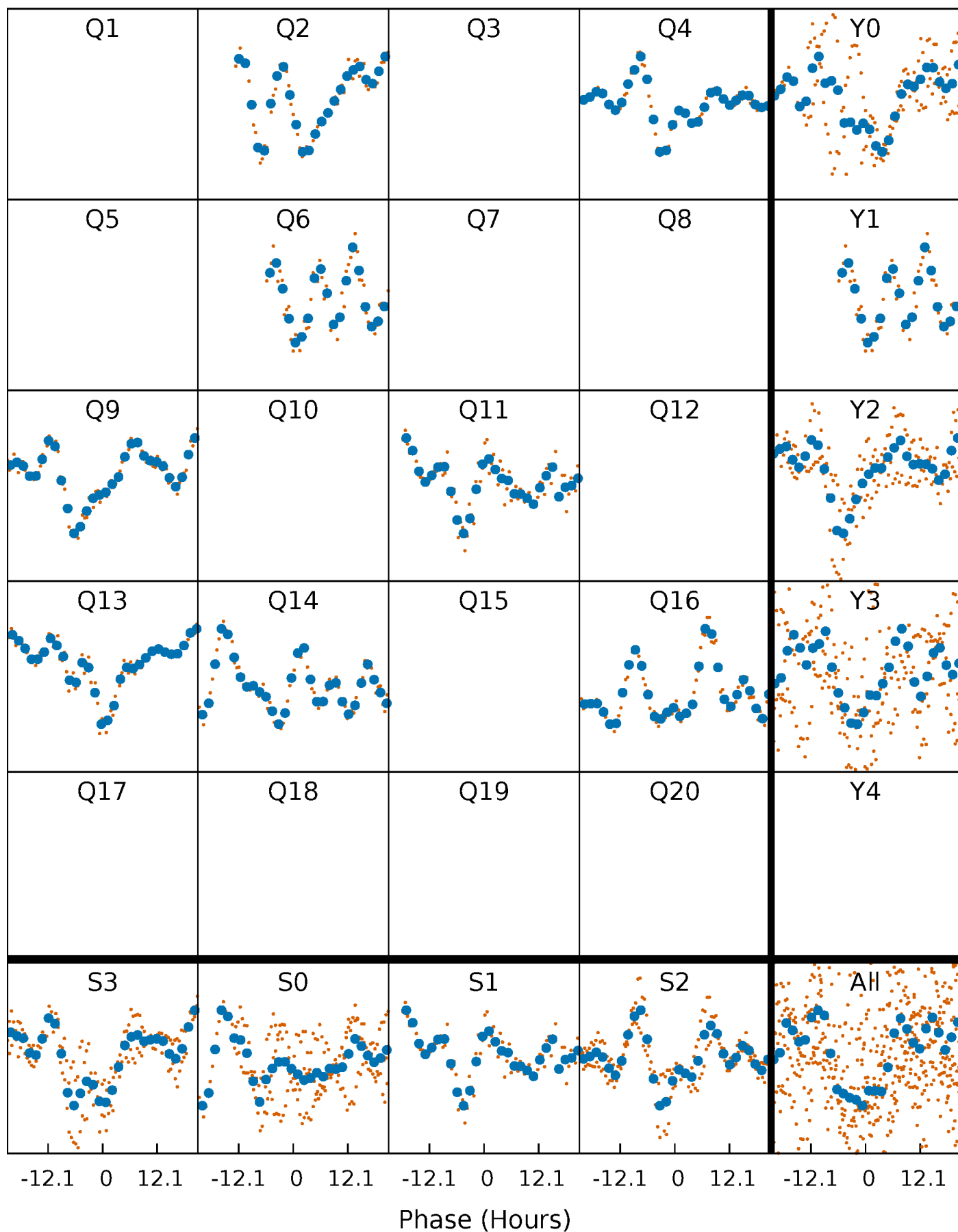


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

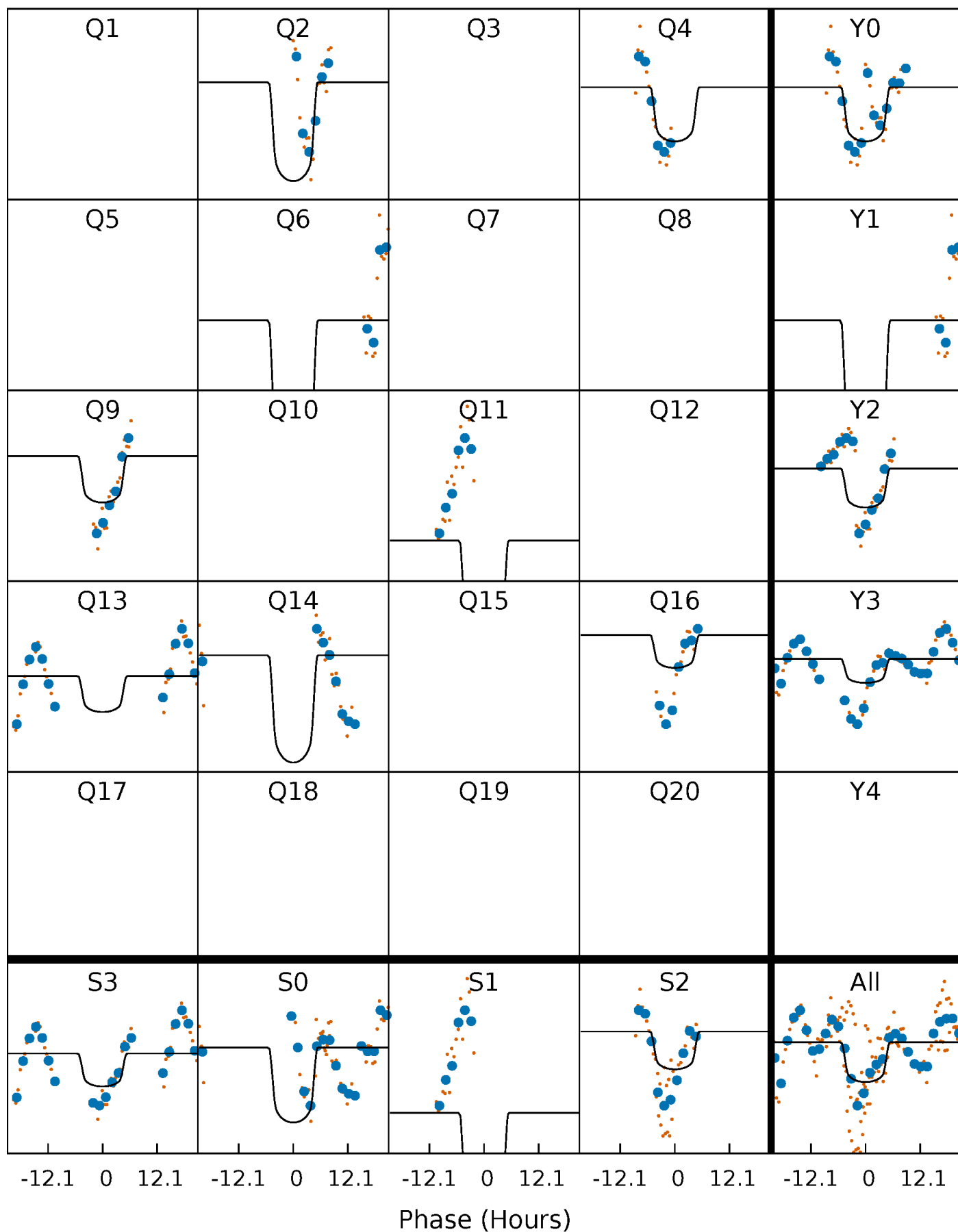
TCE 006951642-03     $P=155.387535$  Days     $T_0=256.874191$  (BKJD)





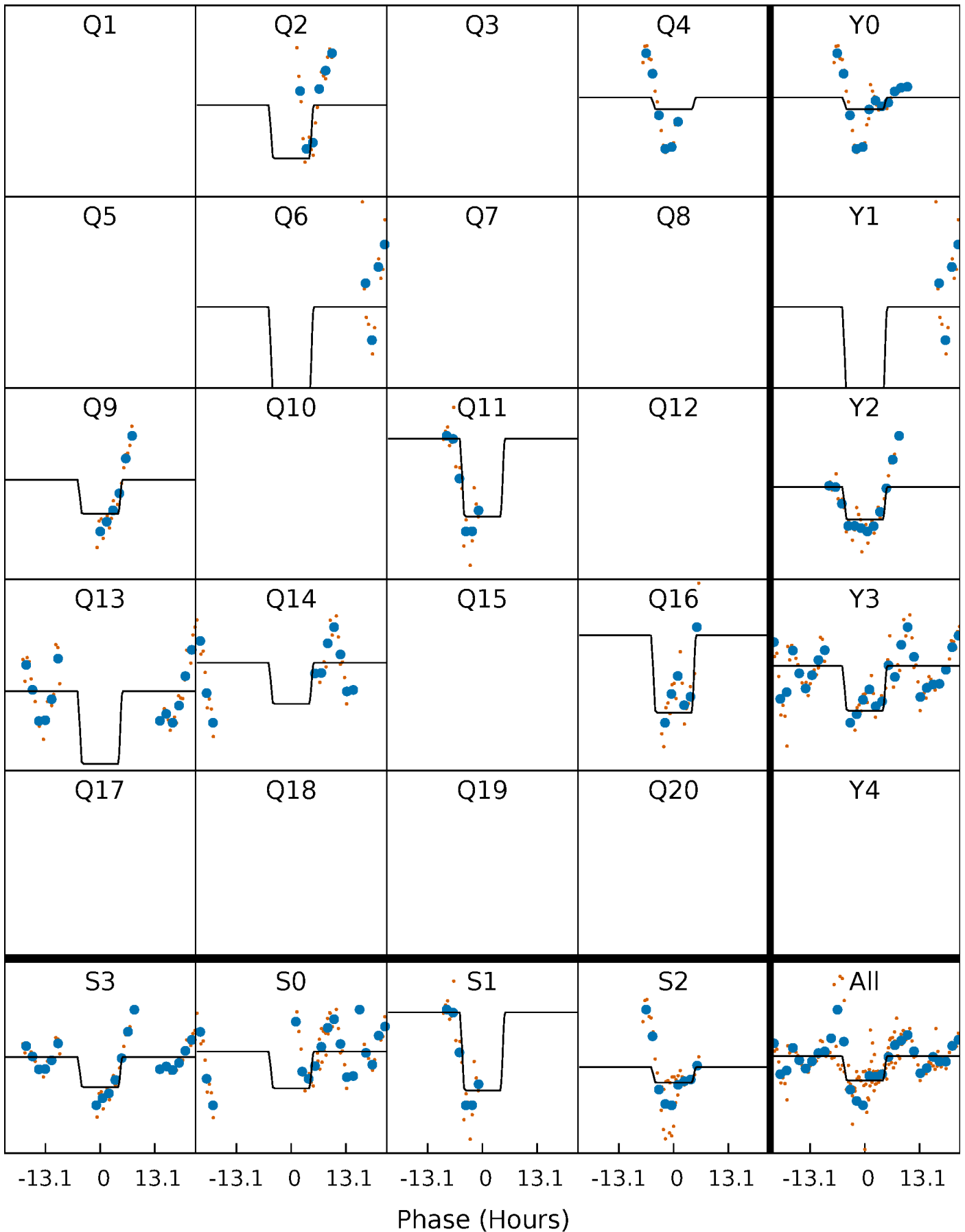
# DV Quarter-Phased Transit Curves

TCE 006951642-03   P=155.387535 Days    $T_0=256.874191$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

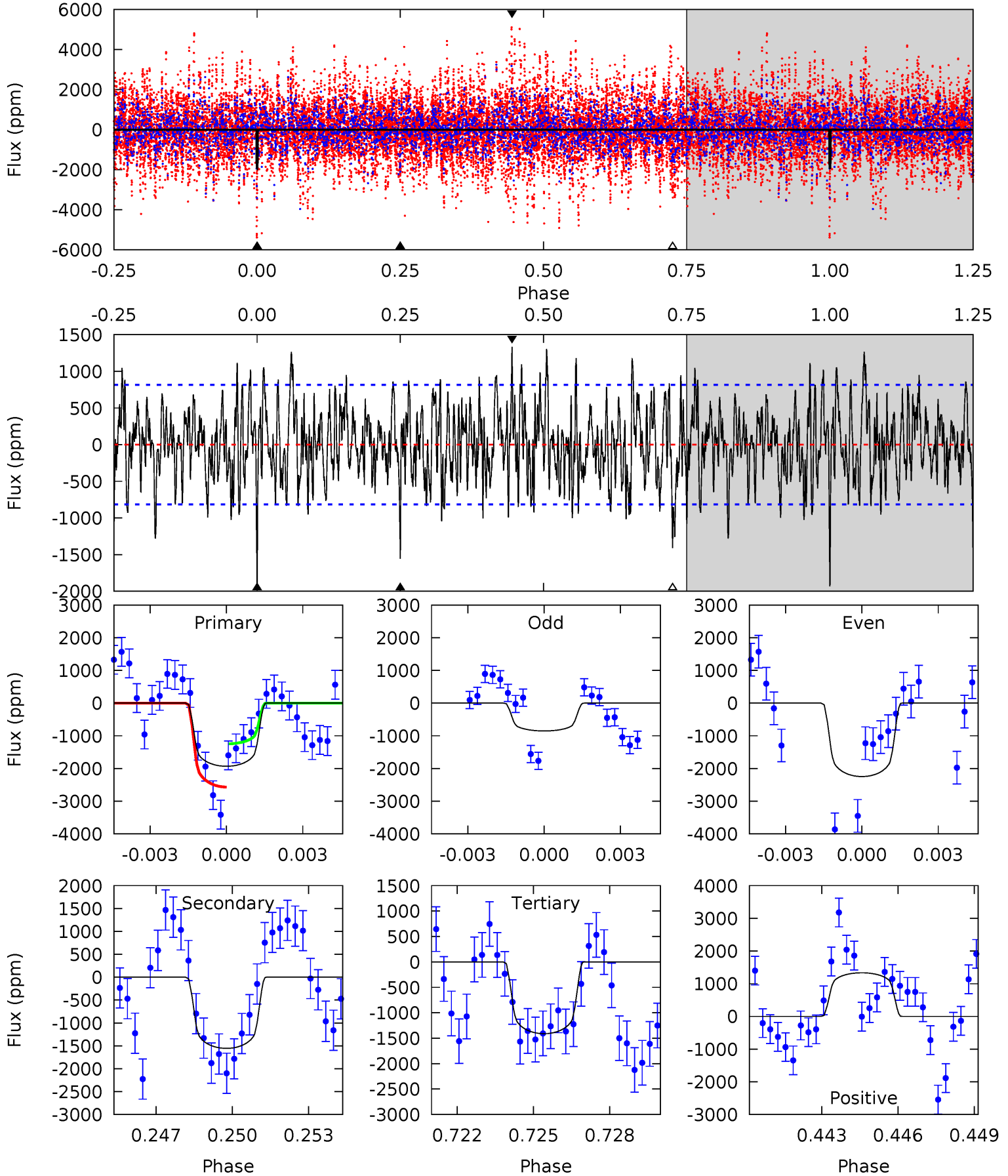
TCE 006951642-03 P=155.388088 Days  $T_0=256.817431$  (BKJD)



# DV Model-Shift Uniqueness Test

006951642-03, P = 155.387535 Days, E = 101.486656 Days

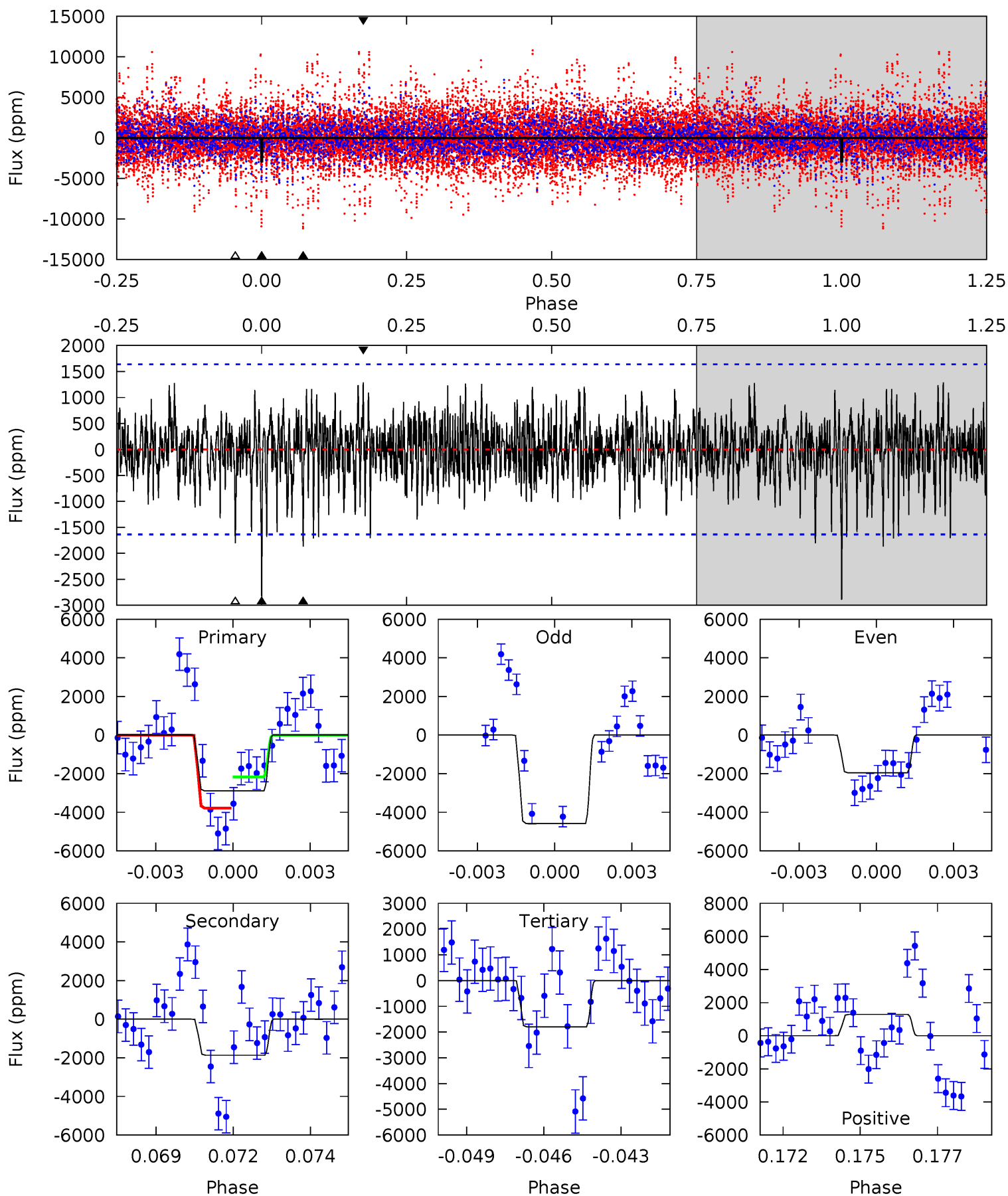
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.5	10.0	9.11	8.61	5.26	2.98	2.90	3.37	3.86	0.93	1.43	4.02	0.57	0.41	4.27



# Alt Model-Shift Uniqueness Test

006951642-03, P = 155.388088 Days, E = 101.429343 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
9.30	6.00	5.79	4.13	5.26	2.98	1.51	3.51	5.17	0.21	1.87	3.90	1.05	0.31	2.58



### Stellar Parameters For KIC 006951642

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7365^{+233}_{-285}$	$3.399^{+0.893}_{-0.094}$	$-1.040^{+0.300}_{-0.300}$	$4.422^{+0.556}_{-3.149}$	$1.789^{+0.126}_{-0.753}$	$0.029^{+0.690}_{-0.009}$
	+3%/-4%	+26%/-3%	+29%/-29%	+13%/-71%	+7%/-42%	+2369%/-30%
Source	KIC0	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 006951642-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-1555 \pm 155$	$19.77^{+4.04}_{-7.43}$	$1106^{+88}_{-205}$	$6805^{+490}_{-429}$	$1016^{+1332}_{-307}$
Alt.	$-1866 \pm 311$	$21.48^{+4.34}_{-7.96}$	$1109^{+87}_{-209}$	$6866^{+523}_{-460}$	$1032^{+1363}_{-318}$

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



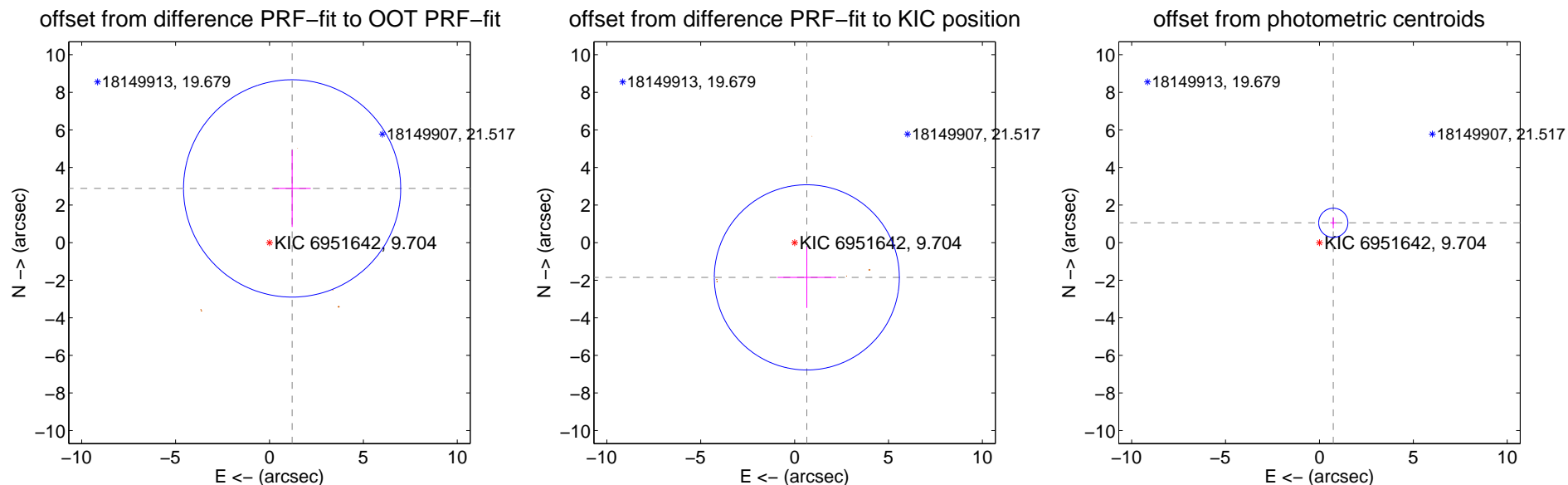
## DV Centroid Data

Supplemental centroid analysis for 006951642-03. **Kepler magnitude: 9.70.** Transit SNR 6.98

**There are 0 quarters with good PRF difference image offsets**

The direct PRF centroid is offset from the target star catalog position by about 0.96 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$3.127 \pm 1.928$	1.62	$-1.205 \pm 0.991$	$2.886 \pm 2.048$
PRF-fit source offset from KIC position	$1.959 \pm 1.643$	1.19	$-0.650 \pm 1.564$	$-1.848 \pm 1.624$
photometric centroid source offset	$1.29 \pm 0.26$	4.97	$-0.74 \pm 0.16$	$1.06 \pm 0.30$



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

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

Q1 no difference image



Q1 no OOT image



Q2 no difference image



Q2 no OOT image



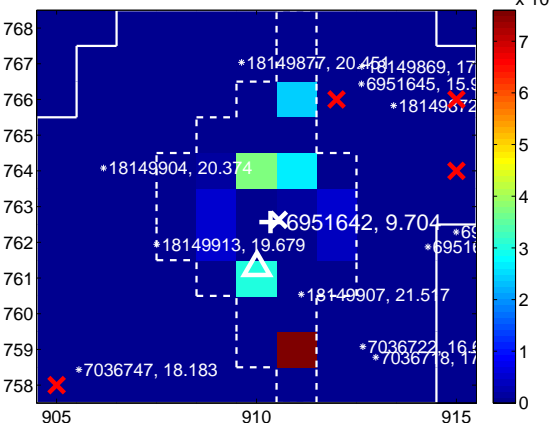
Q3 no difference image



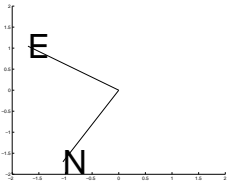
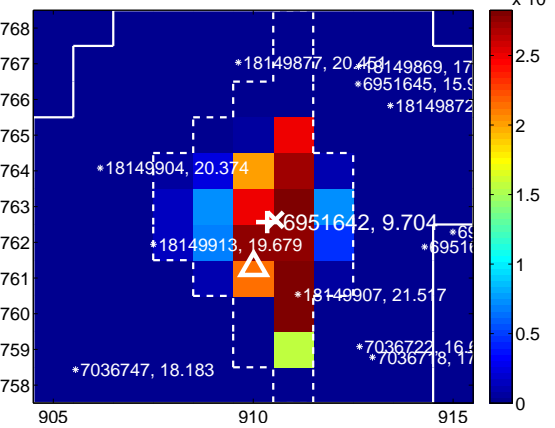
Q3 no OOT image



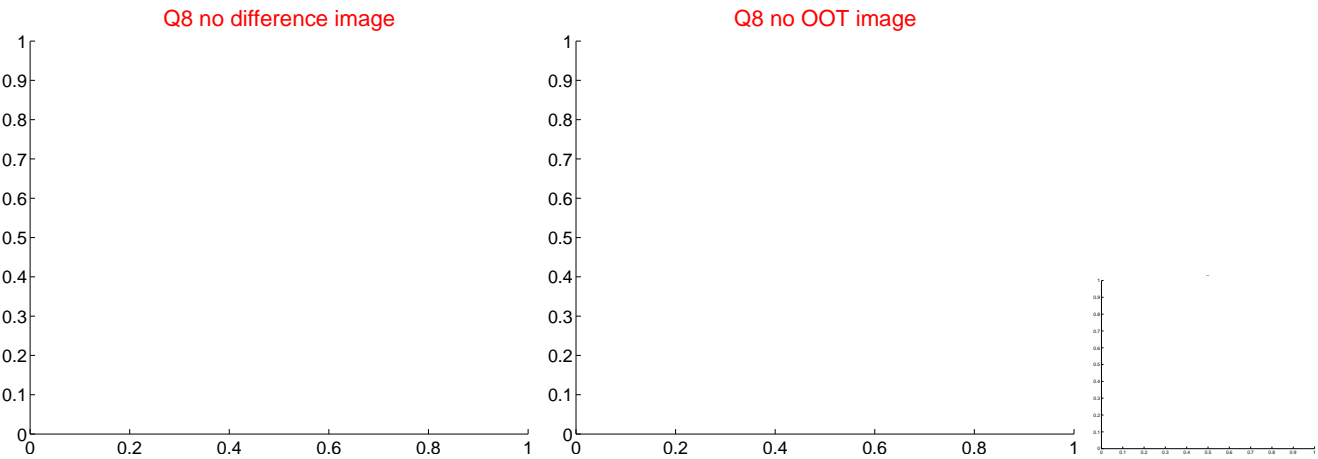
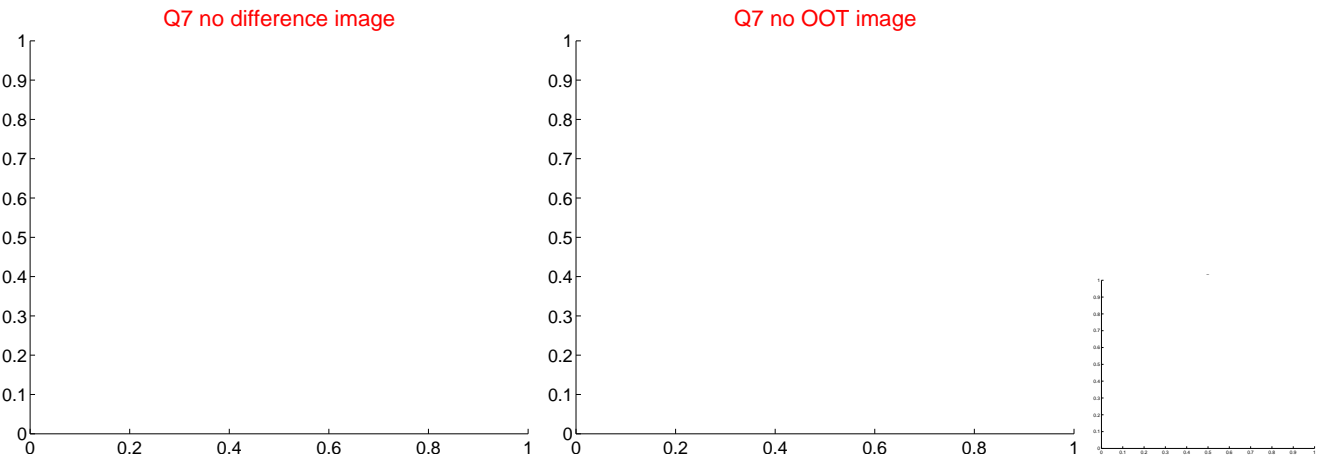
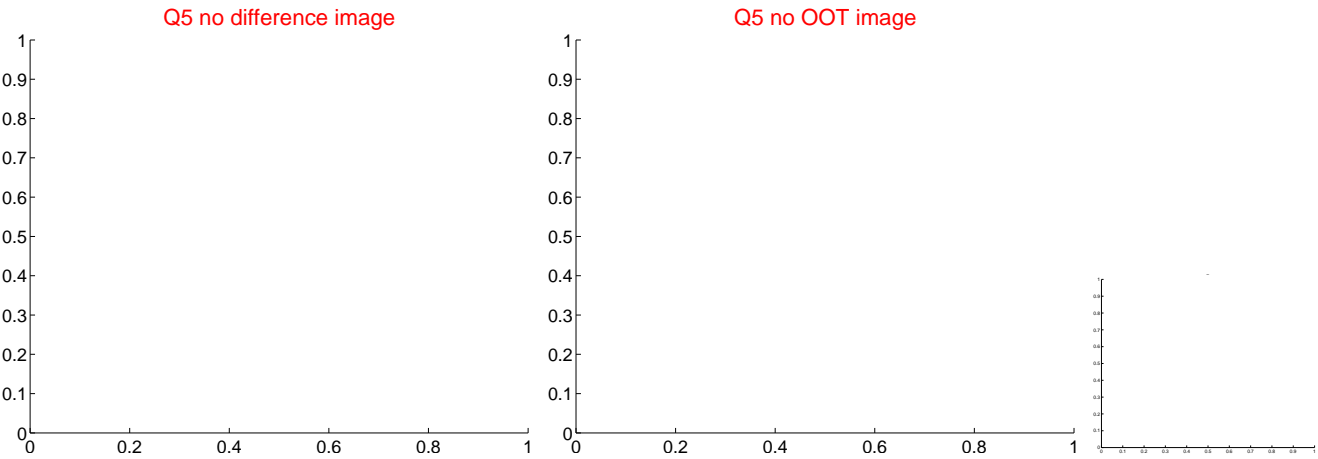
Q4 difference image. Poor Quality



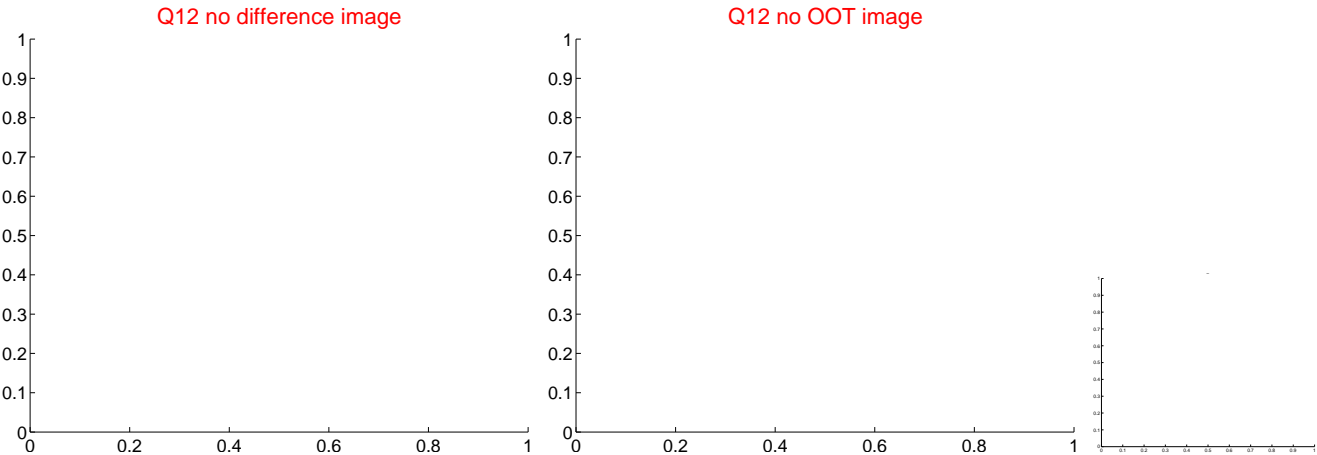
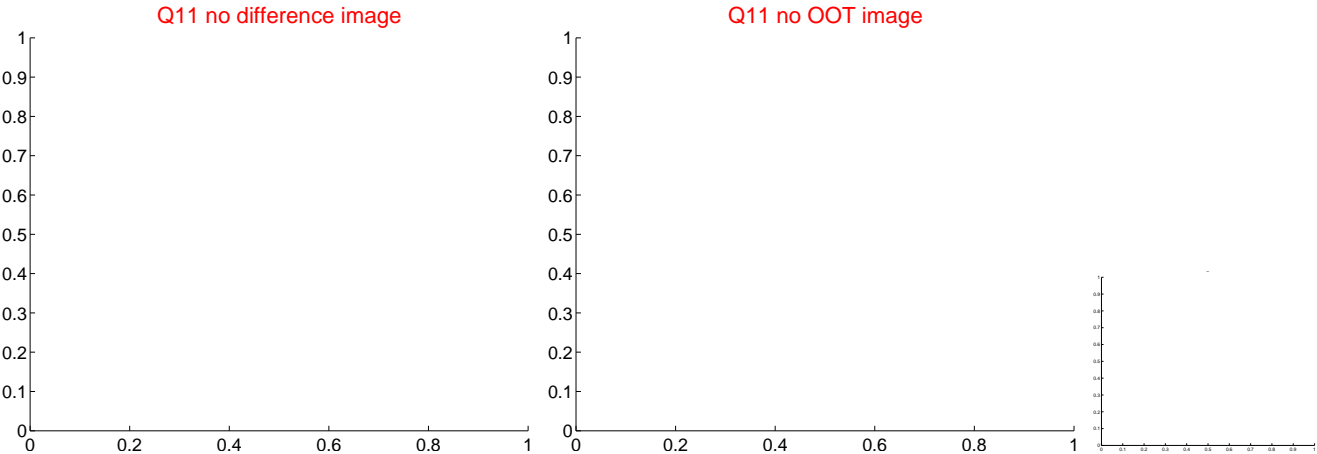
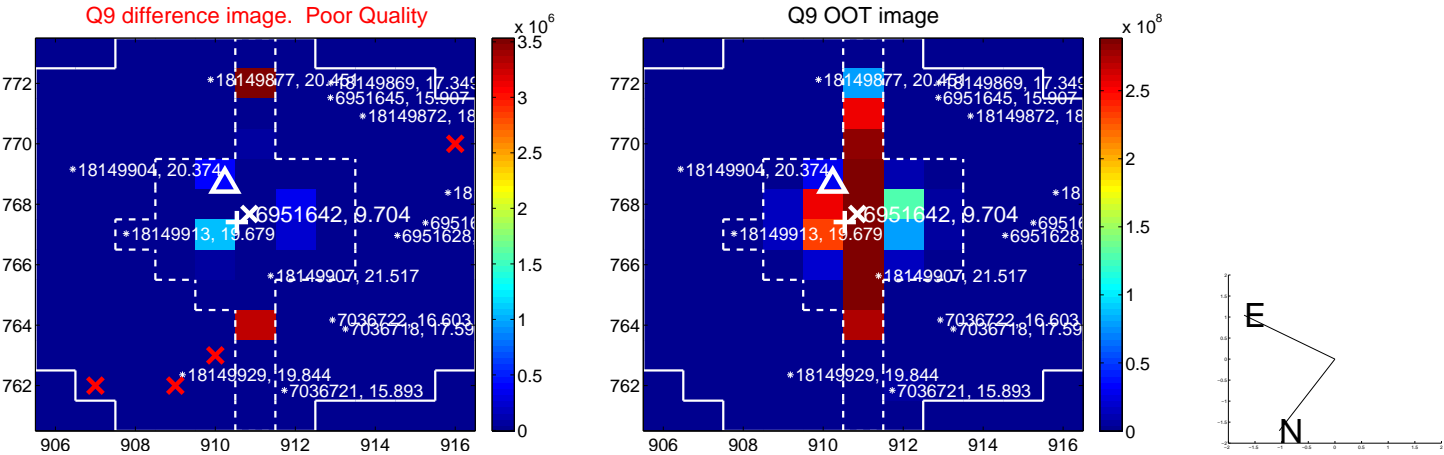
Q4 OOT image



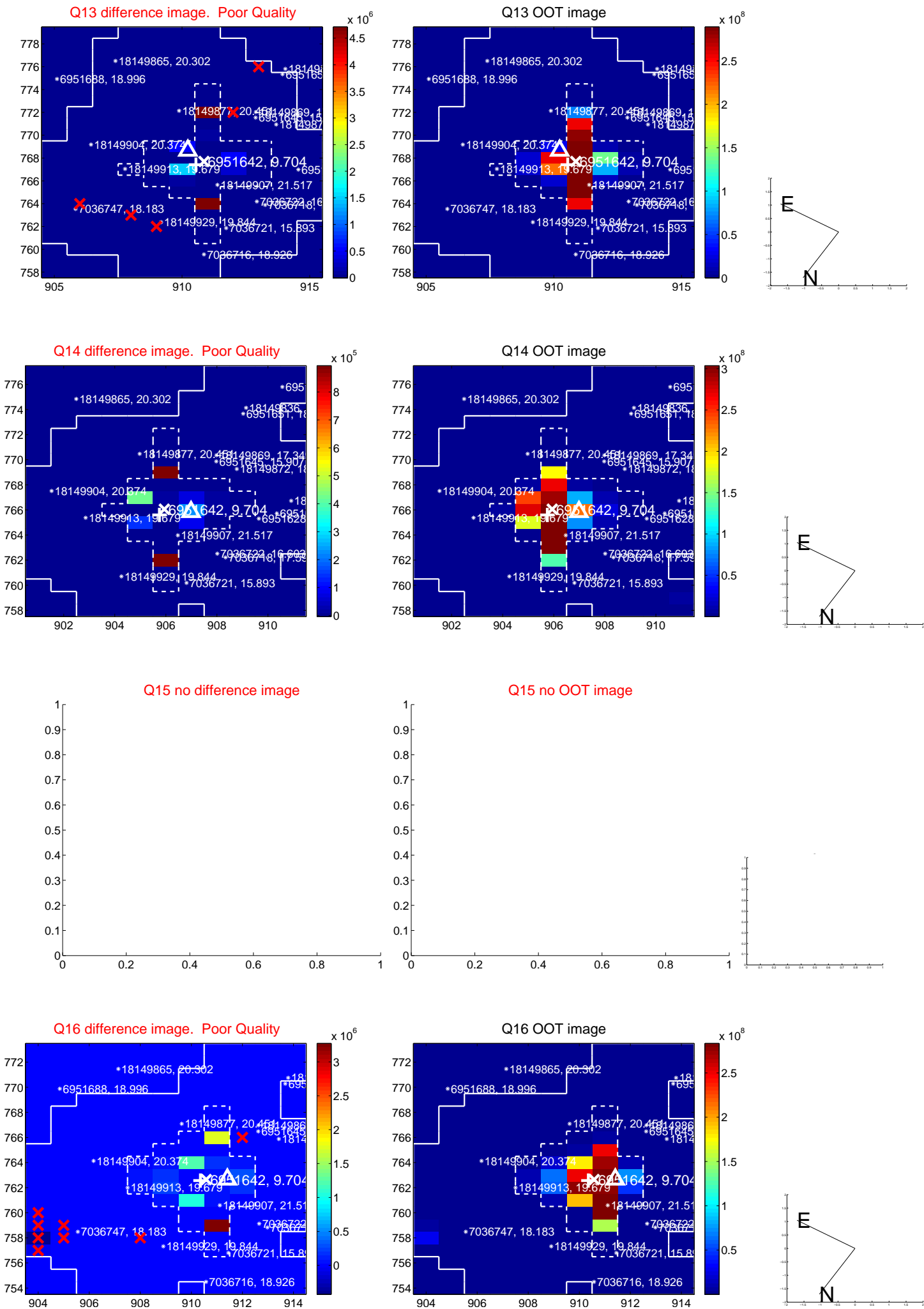
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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.

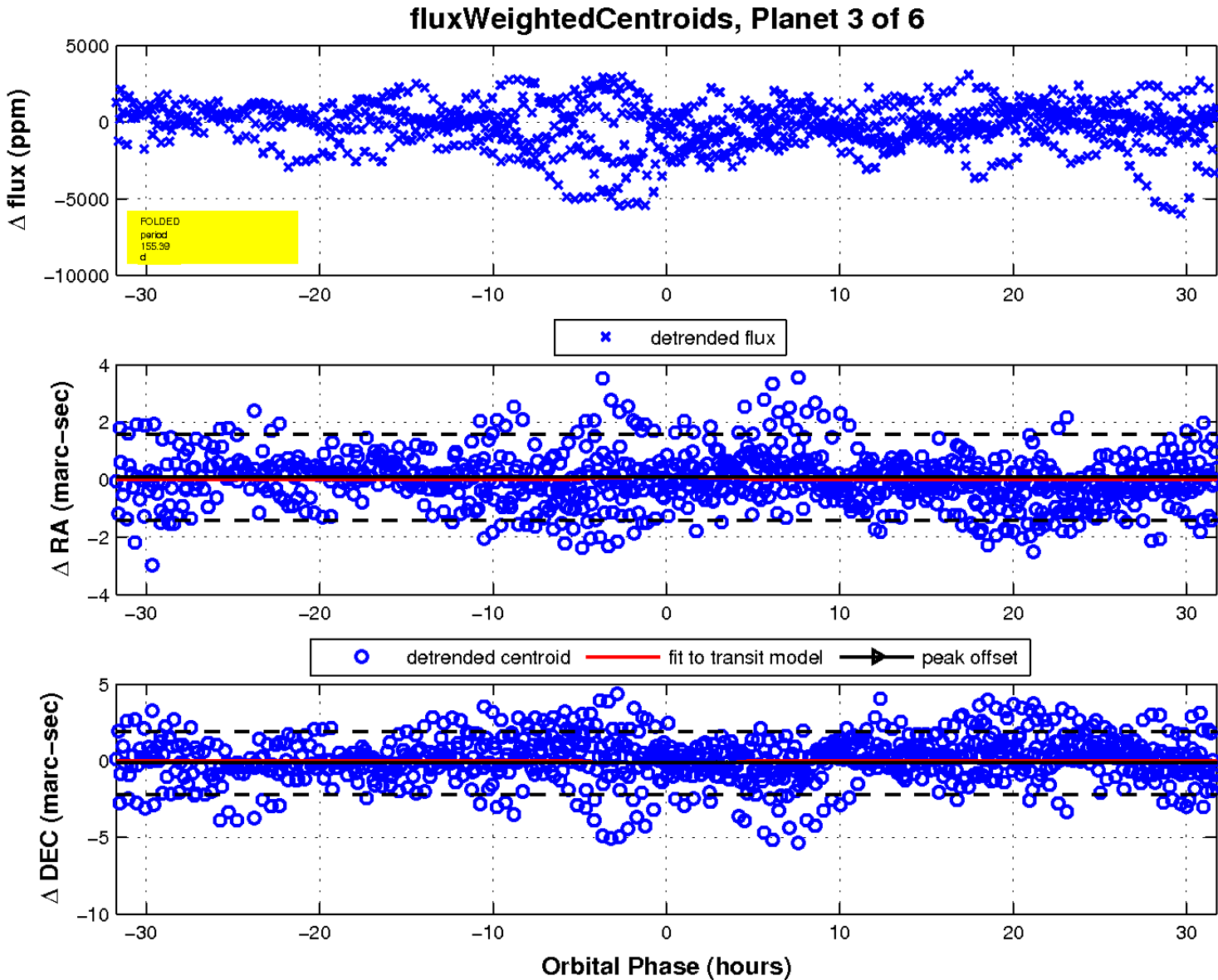




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

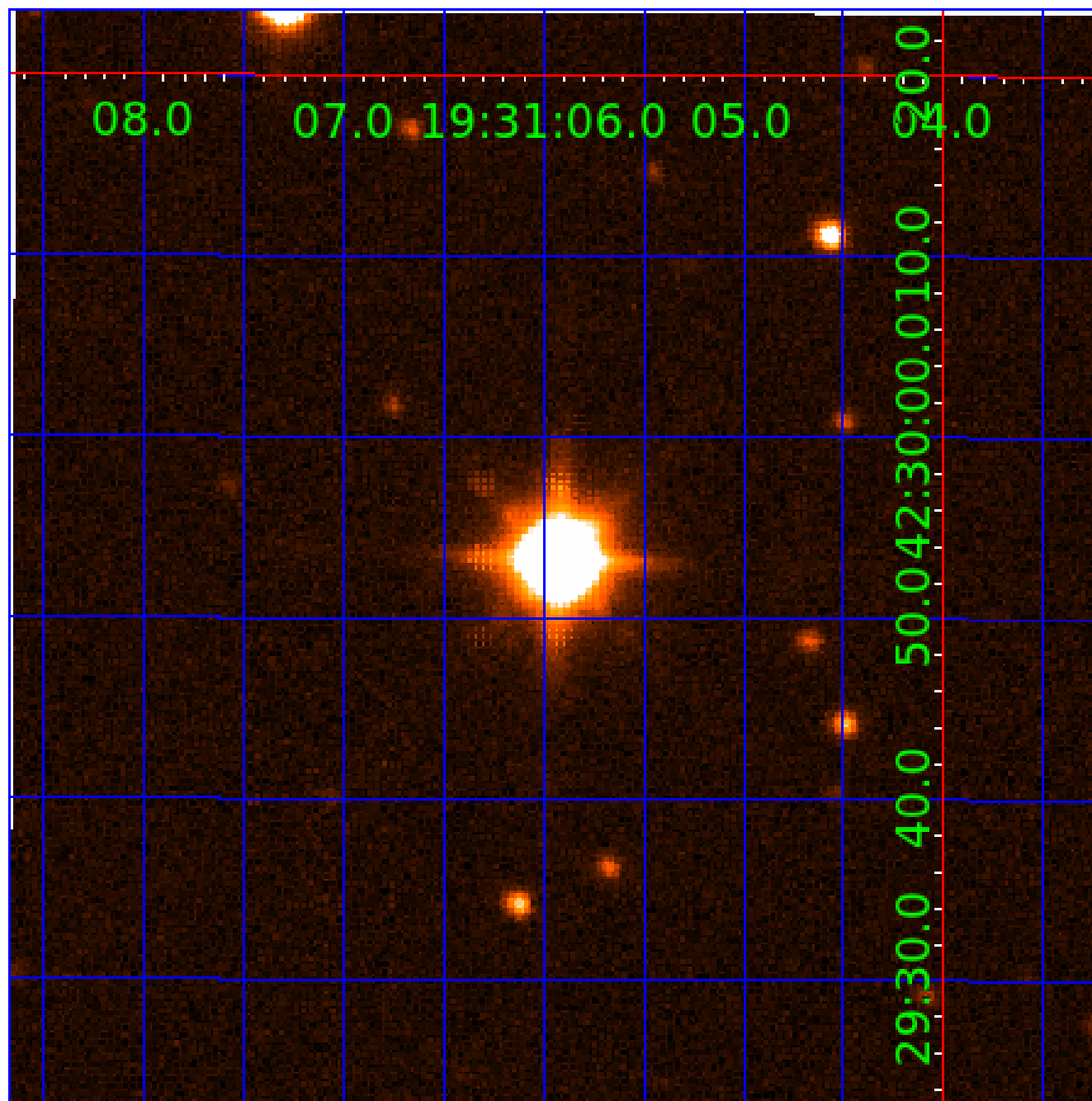
Q17 no difference image

Q17 no OOT image



UKIRT Image

Declination



# KIC 006951642

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006951642-01	OBS	No	1.384118	131.786960	52.8	7.933	8.8	3.2	4.42	7365	3.40	59215.24
006951642-02	OBS	No	106.444106	158.130695	4190.1	11.707	8.8	9.0	4.42	7365	41.22	181.06
006951642-03	OBS	No	155.387535	256.874191	1947.1	10.584	9.3	7.0	4.42	7365	21.77	109.34
006951642-04	OBS	No	113.593551	225.208195	3881.9	9.049	8.8	9.8	4.42	7365	49.71	166.03
006951642-05	OBS	No	181.191432	275.335077	2015.9	5.509	8.4	7.6	4.42	7365	21.14	89.09
006951642-06	OBS	No	53.376225	132.903938	1975.6	7.744	7.4	9.1	4.42	7365	34.74	454.50

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006951642-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
006951642-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
006951642-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
006951642-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
006951642-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
006951642-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—MOD_NONUNIQ_ALT—CENT_SATURATED

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

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

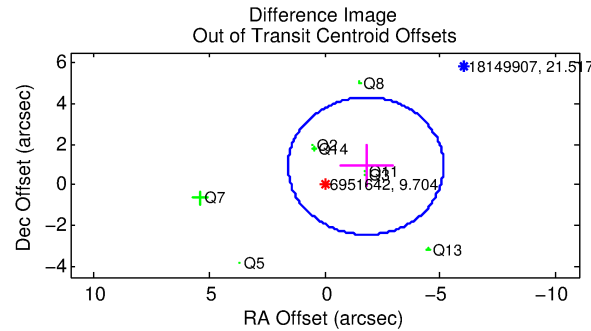
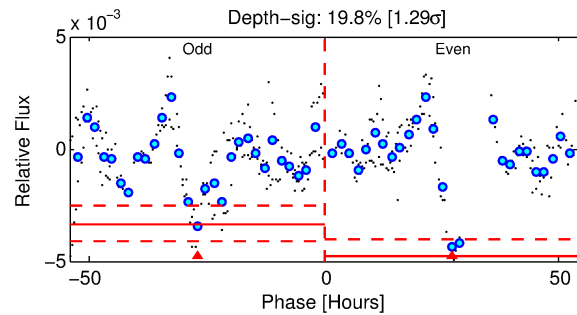
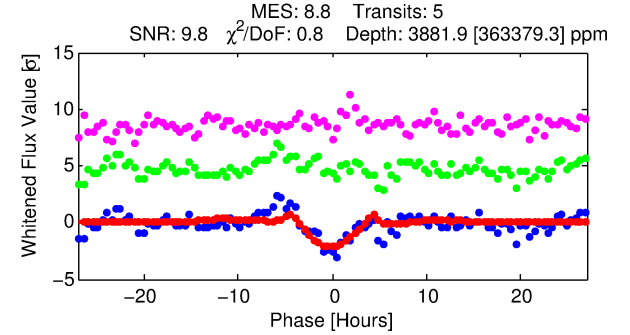
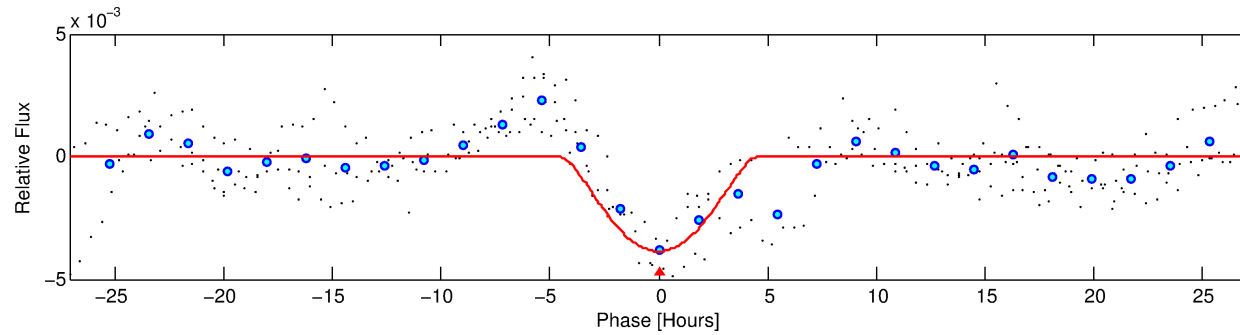
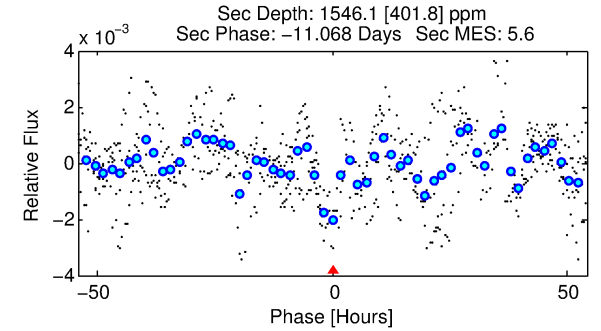
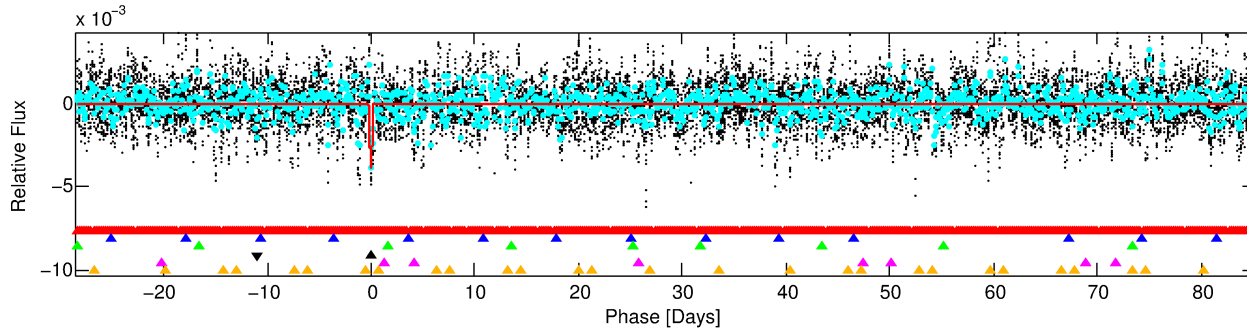
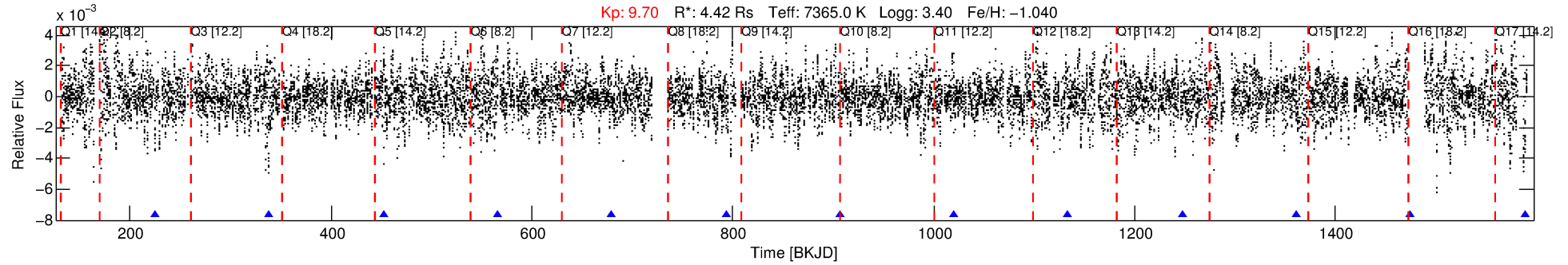
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 006951642-04

No Significant Match Found

# DV One-Page Summary

KIC: 6951642 Candidate: 4 of 6 Period: 113.594 d



## DV Fit Results:

Period = 113.59355 [0.00242] d  
Epoch = 225.2082 [0.0103] BKJD  
Rp/R\* = 0.1030 [0.1537]  
a/R\* = 44.65 [13.02]  
b = 1.00 [6.77]  
Seff = 166.03 [242.23]  
Teq = 915 [334] K  
Rp = 49.71 [82.16] Re  
a = 0.5572 [0.4646] AU  
Ag = 106.85 [355.51] [0.30σ]  
Teffp = 4550 [3410] K [1.06σ]

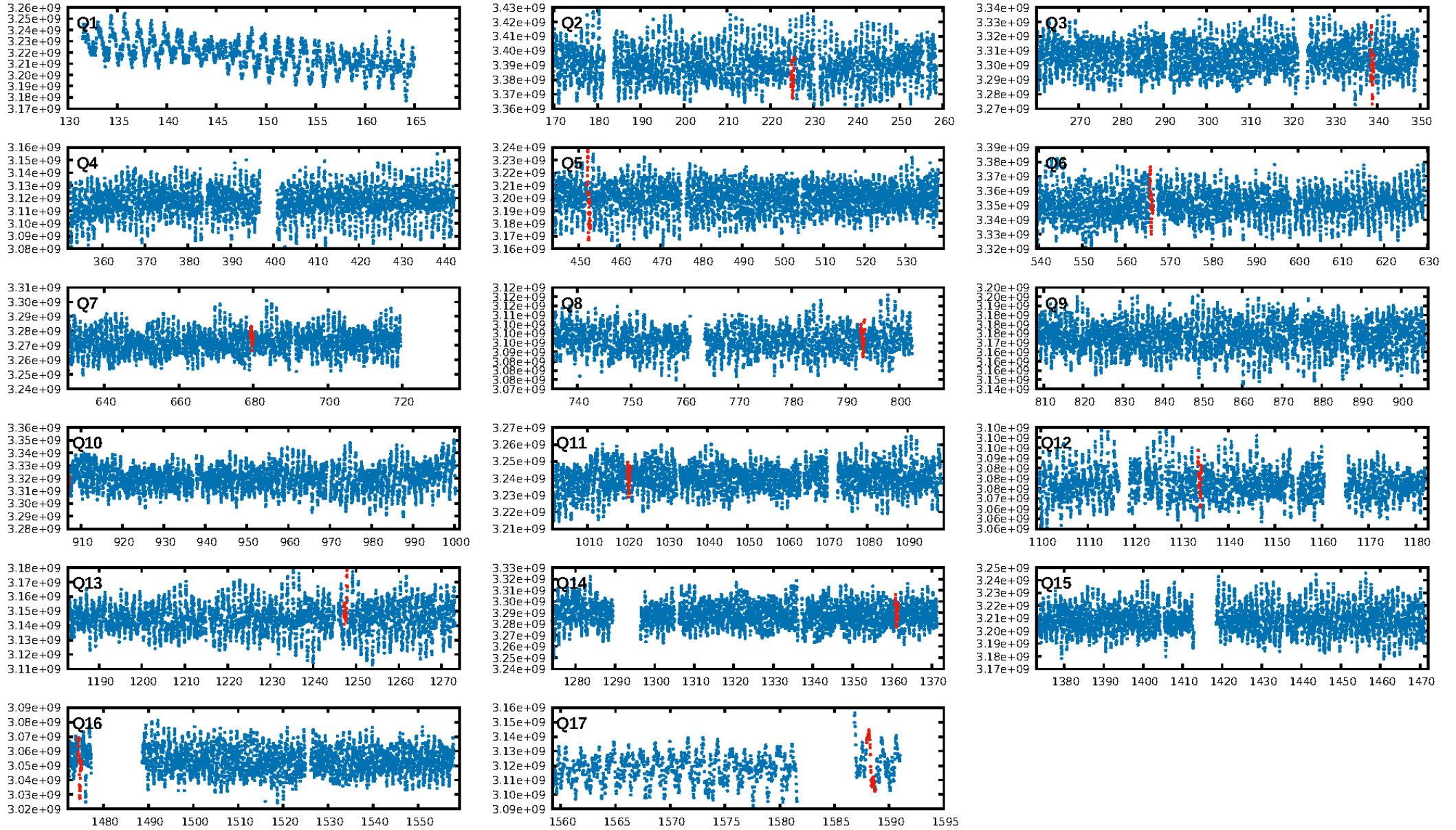
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [11.60σ]  
LongPeriod-sig: 100.0% [72.03σ]  
ModelChiSquare2-sig: 51.7%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 4.60e-09  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: N/A  
Centroid-sig: 13.3%  
Centroid-so: 1.129 arcsec [6.98σ]  
OotOffset-rm: 2.009 arcsec [1.79σ]  
KicOffset-rm: 2.394 arcsec [2.53σ]  
OotOffset-st: 2/3/1/2 [8]  
KicOffset-st: 2/3/1/2 [8]  
DiffImageQuality-fgm: 0.00 [0/8]  
DiffImageOverlap-fno: 0.00 [0/8]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 12:56:53 Z

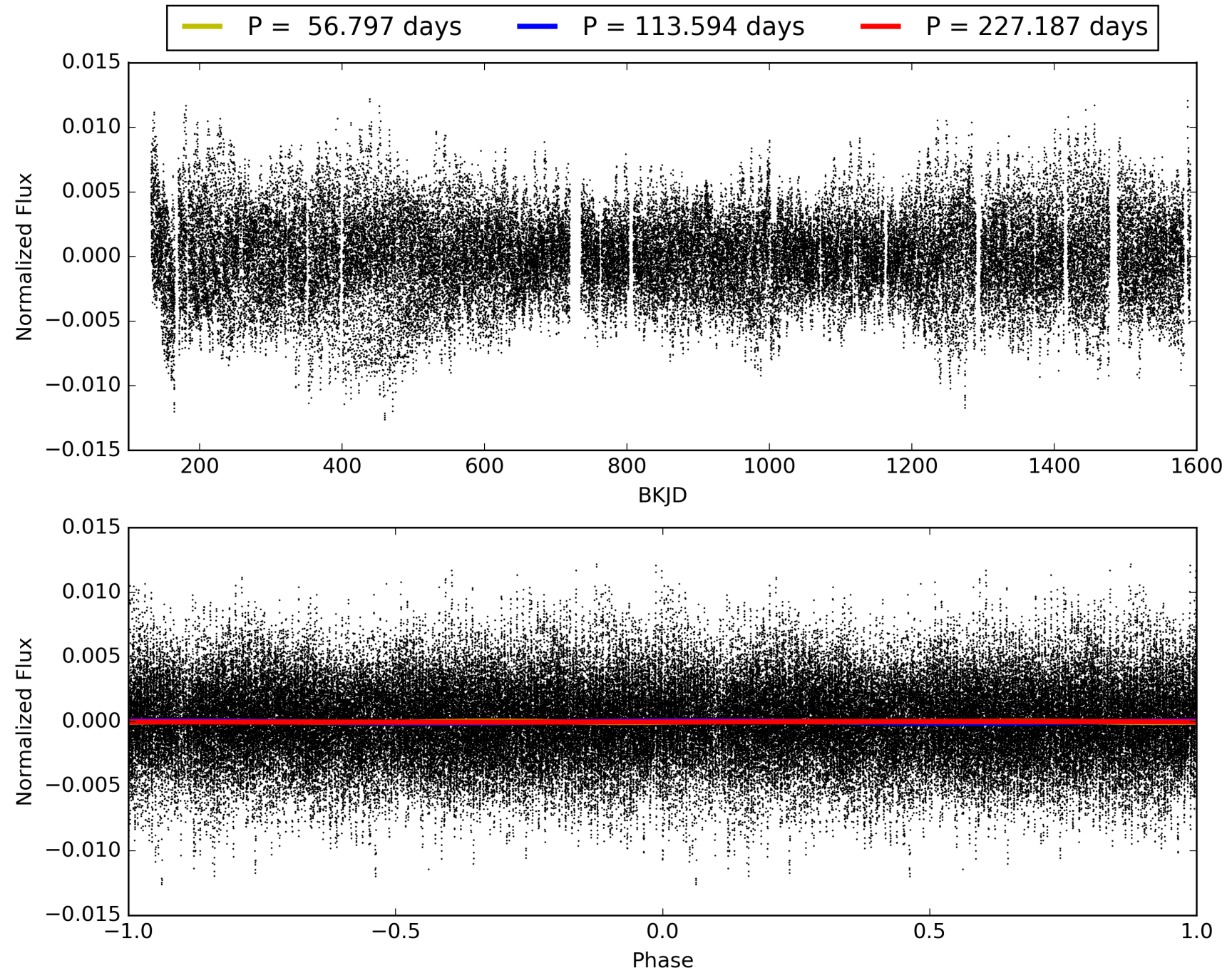
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 006951642-04, PDC Light Curves





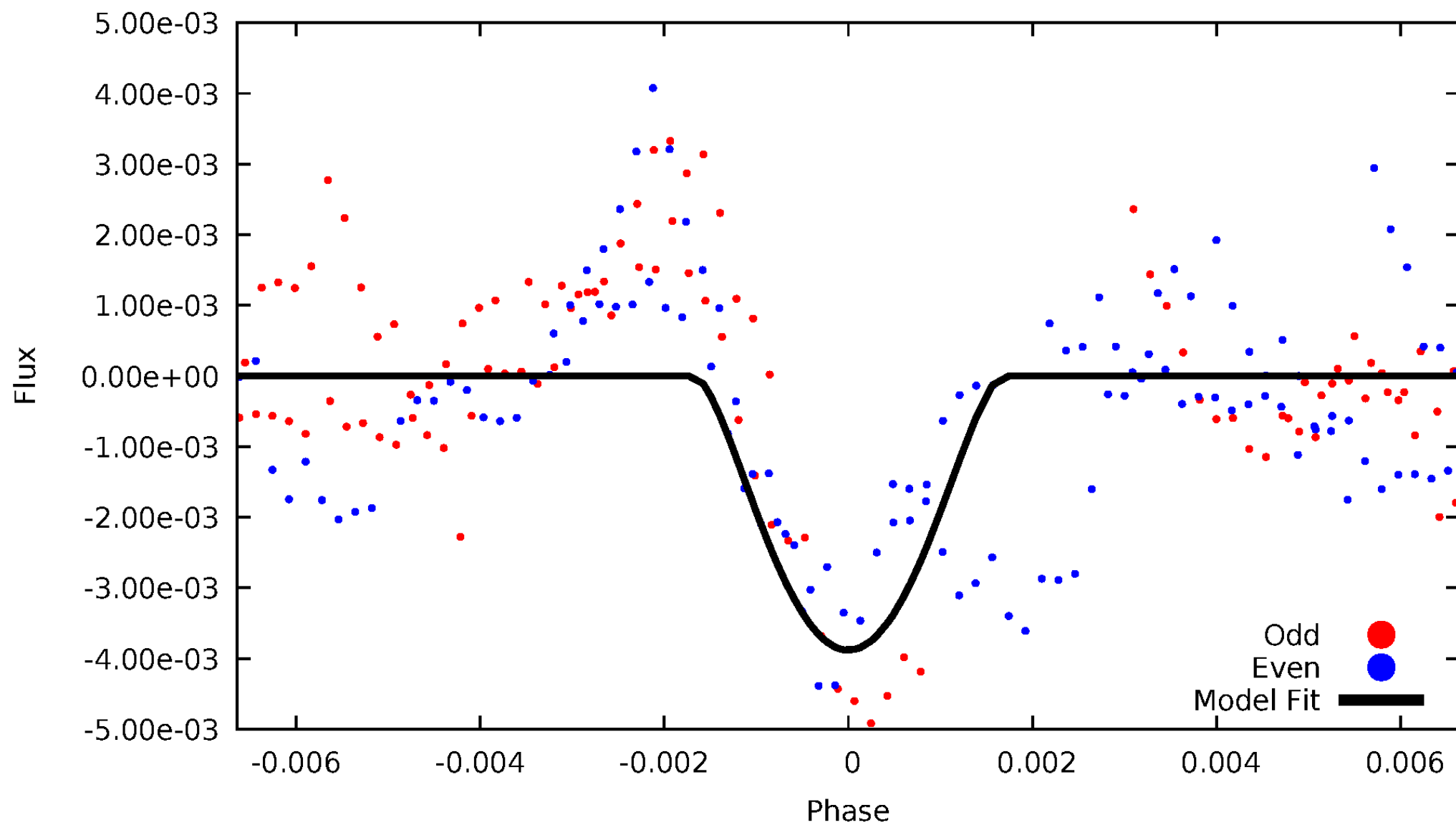
TCE 006951642-04





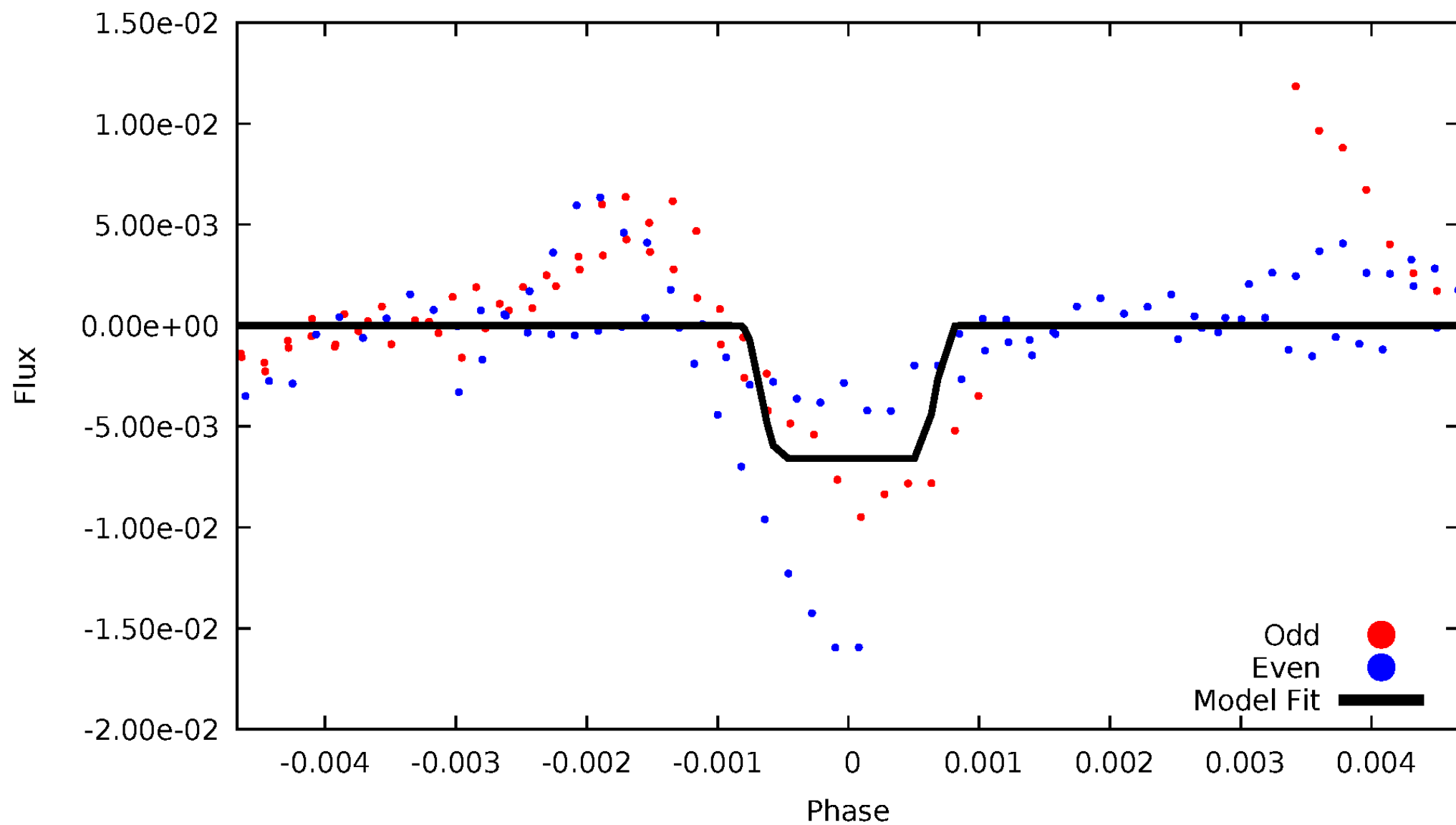
# DV Odd/Even

TCE 006951642-04



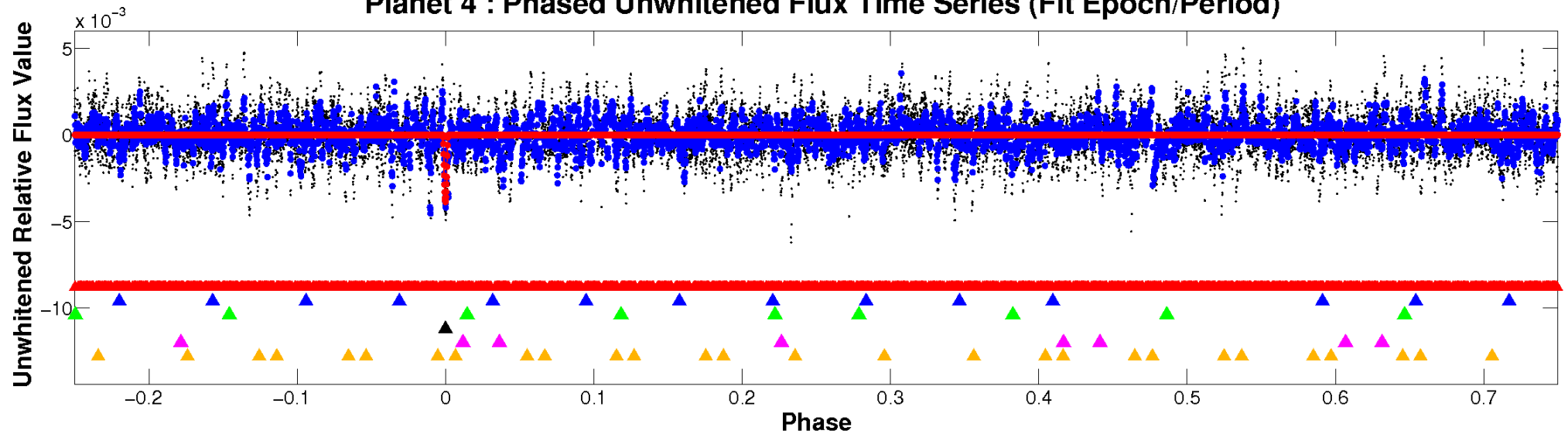
# ALT Odd/Even

TCE 006951642-04

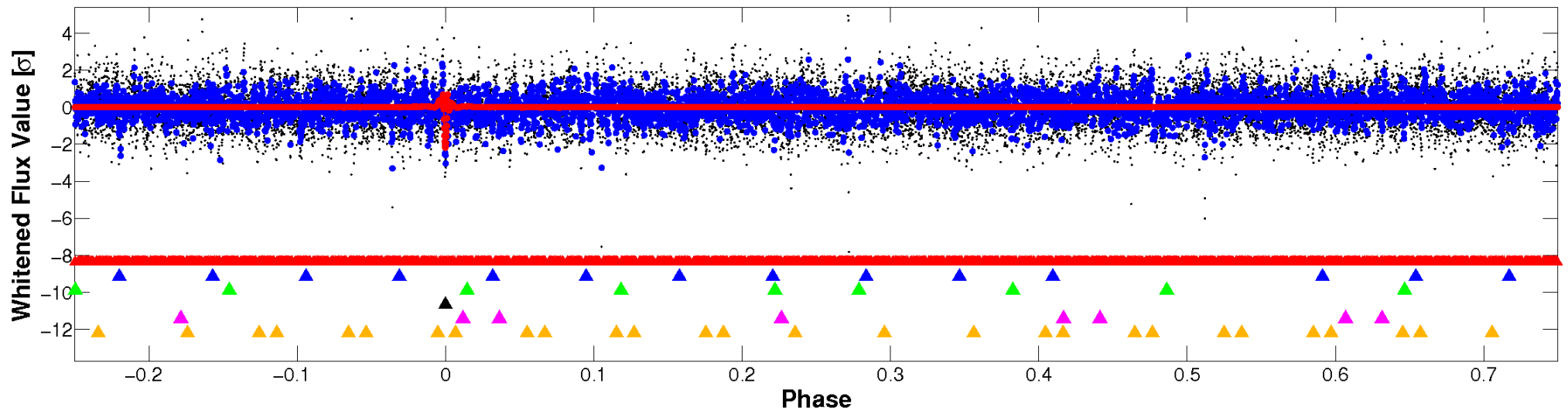


# Non-Whitened Vs. Whitened Light Curve

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

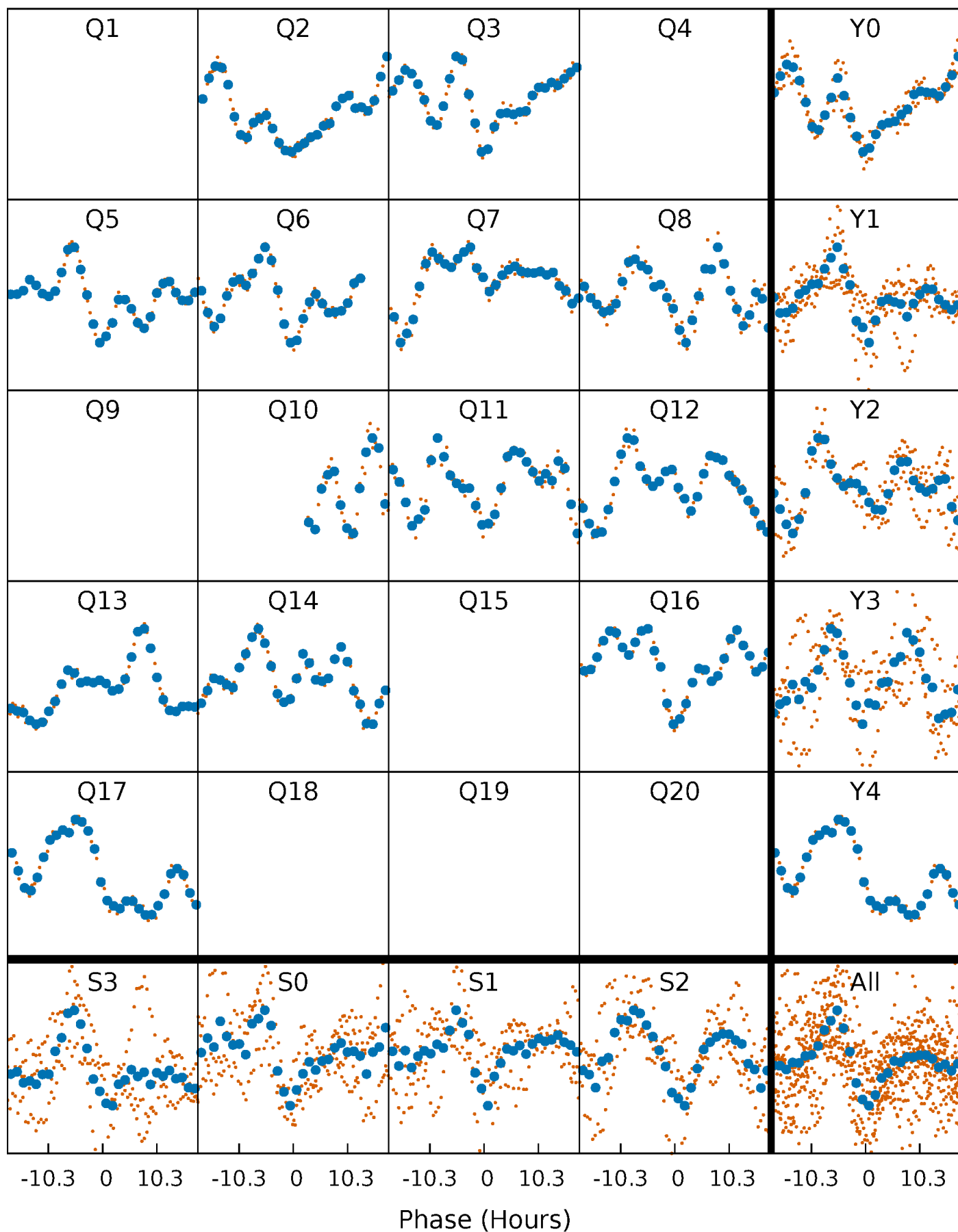


## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



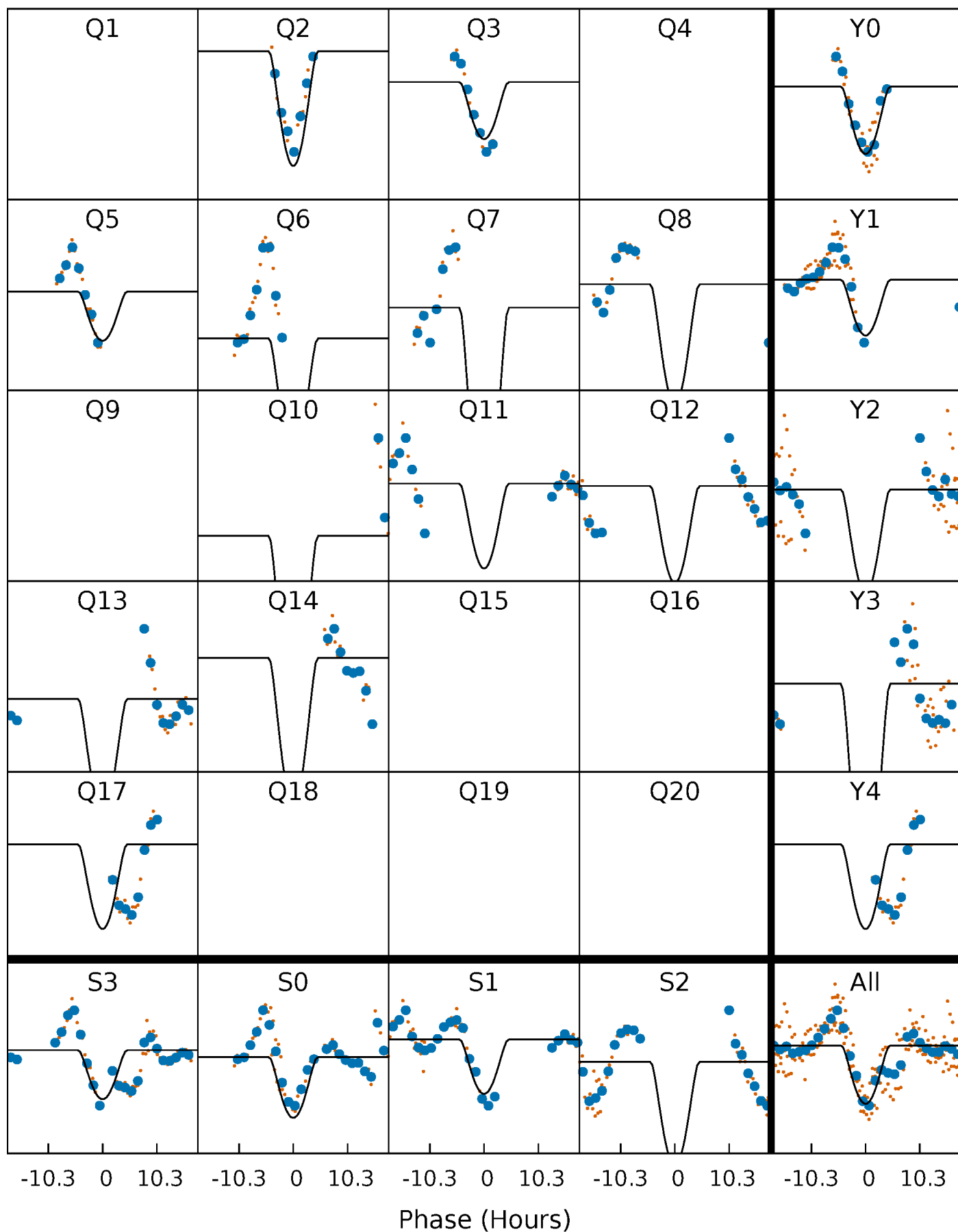
# PDC Quarter-Phased Transit Curves

TCE 006951642-04 P=113.593551 Days  $T_0=225.208195$  (BKJD)



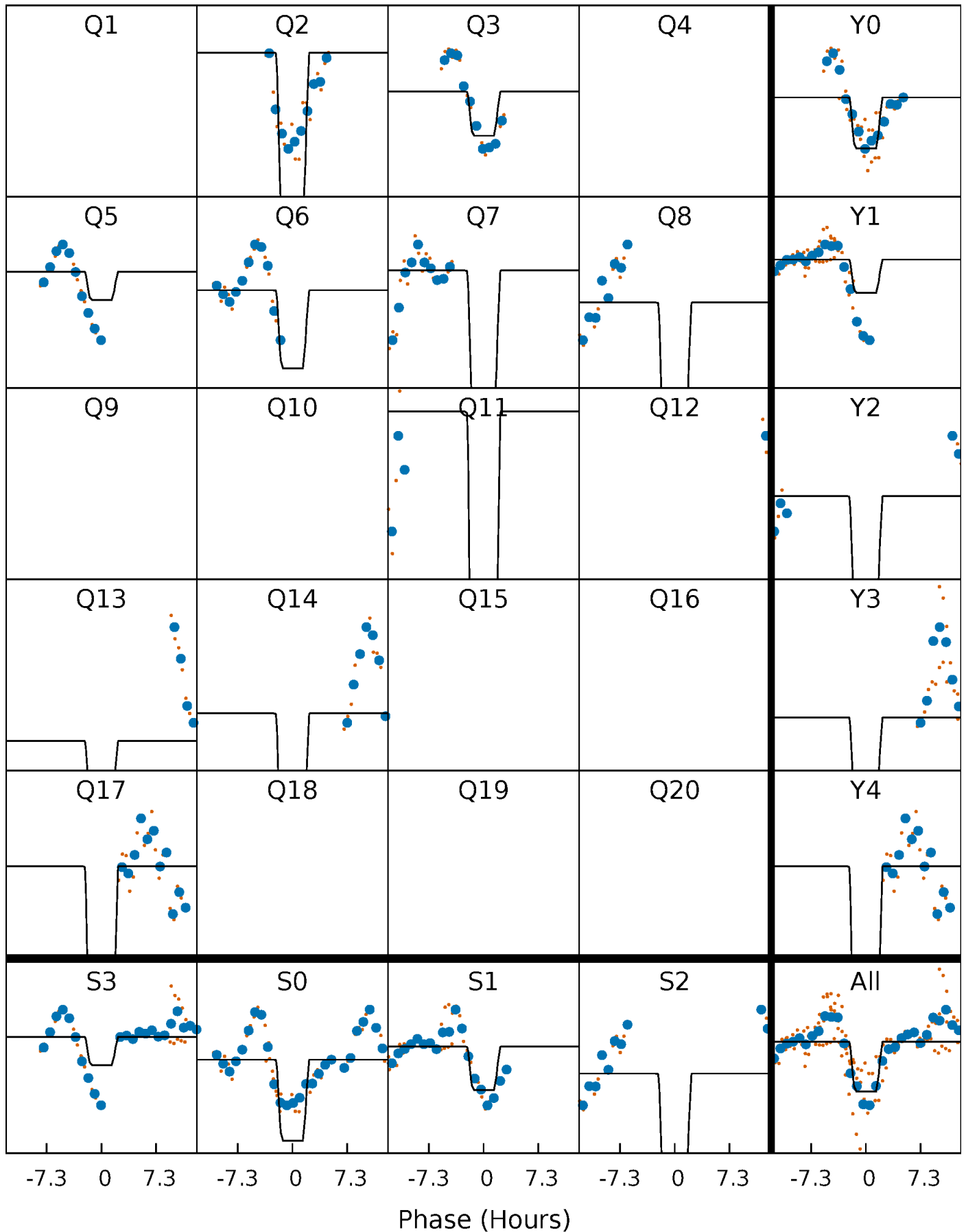
# DV Quarter-Phased Transit Curves

TCE 006951642-04 P=113.593551 Days  $T_0=225.208195$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 006951642-04 P=113.591948 Days  $T_0=225.185942$  (BKJD)

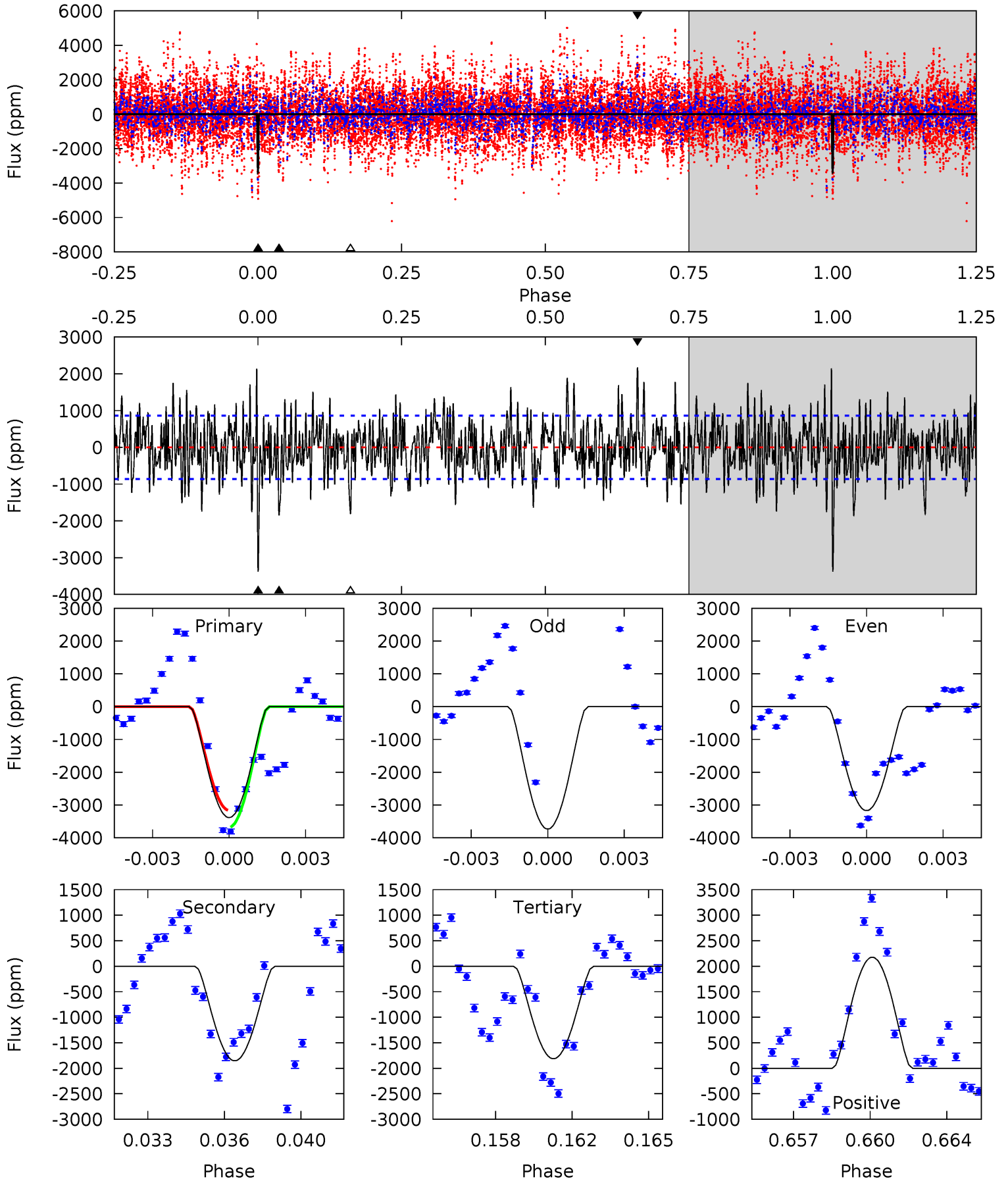




# DV Model-Shift Uniqueness Test

006951642-04, P = 113.593551 Days, E = 111.614644 Days

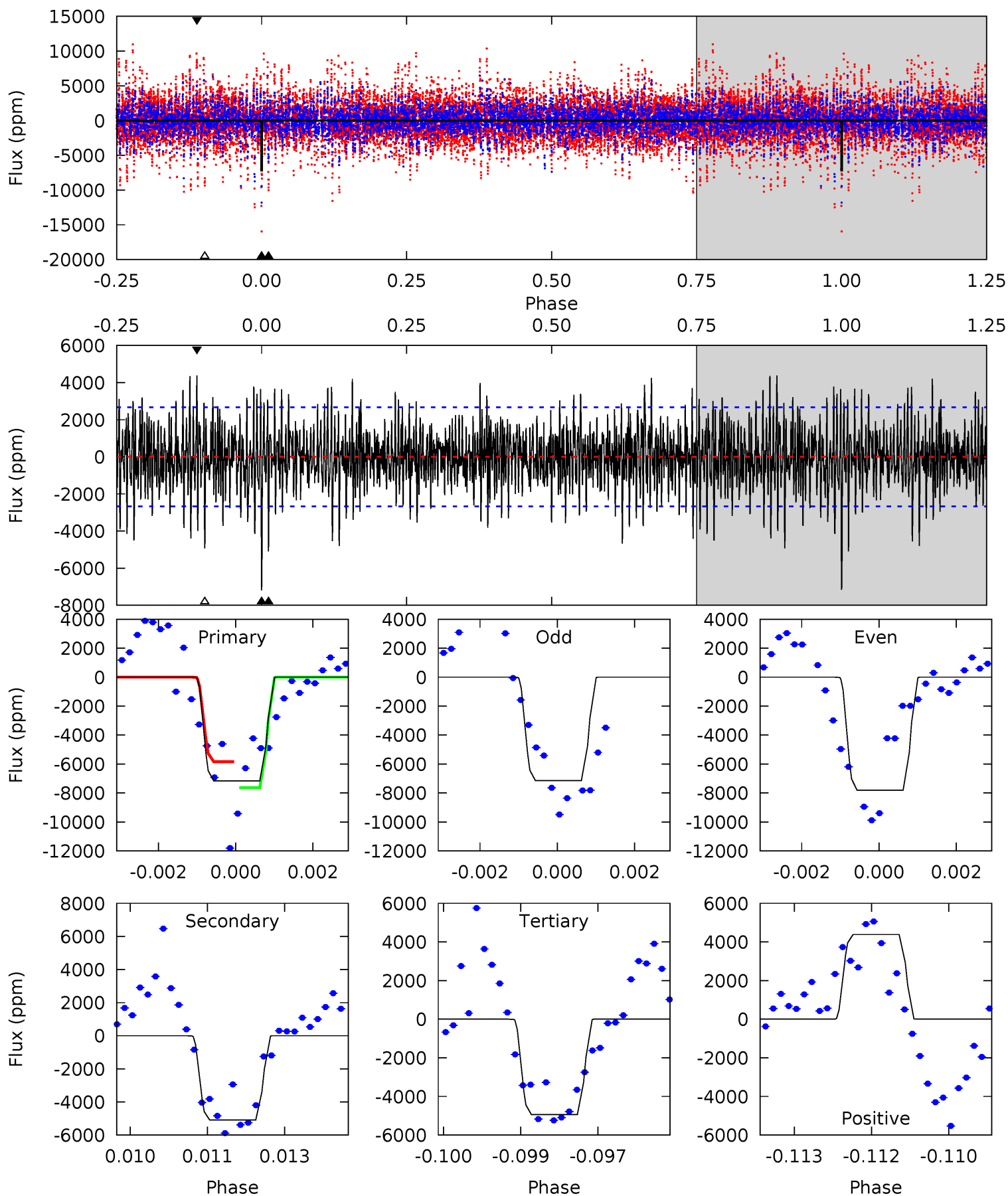
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
20.5	11.3	11.0	13.2	5.23	2.94	3.59	9.54	7.34	0.25	-1.96	1.64	0.81	0.39	1.53



# Alt Model-Shift Uniqueness Test

006951642-04, P = 113.591948 Days, E = 111.593994 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
14.4	10.2	9.90	8.80	5.37	3.15	2.67	4.48	5.58	0.32	1.42	0.68	1.20	0.38	1.74



### Stellar Parameters For KIC 006951642

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7365^{+233}_{-285}$	$3.399^{+0.893}_{-0.094}$	$-1.040^{+0.300}_{-0.300}$	$4.422^{+0.556}_{-3.149}$	$1.789^{+0.126}_{-0.753}$	$0.029^{+0.690}_{-0.009}$
	+3%/-4%	+26%/-3%	+29%/-29%	+13%/-71%	+7%/-42%	+2369%/-30%
Source	KIC0	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 006951642-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-1852 \pm 165$	$57.00^{+61.45}_{-39.72}$	$1223^{+103}_{-243}$	$4199^{+2800}_{-827}$	$92^{+820}_{-71}$
Alt.	$-5092 \pm 498$	$54.69^{+66.92}_{-37.98}$	$1231^{+97}_{-237}$	$5160^{+4546}_{-1131}$	$281^{+2365}_{-221}$

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

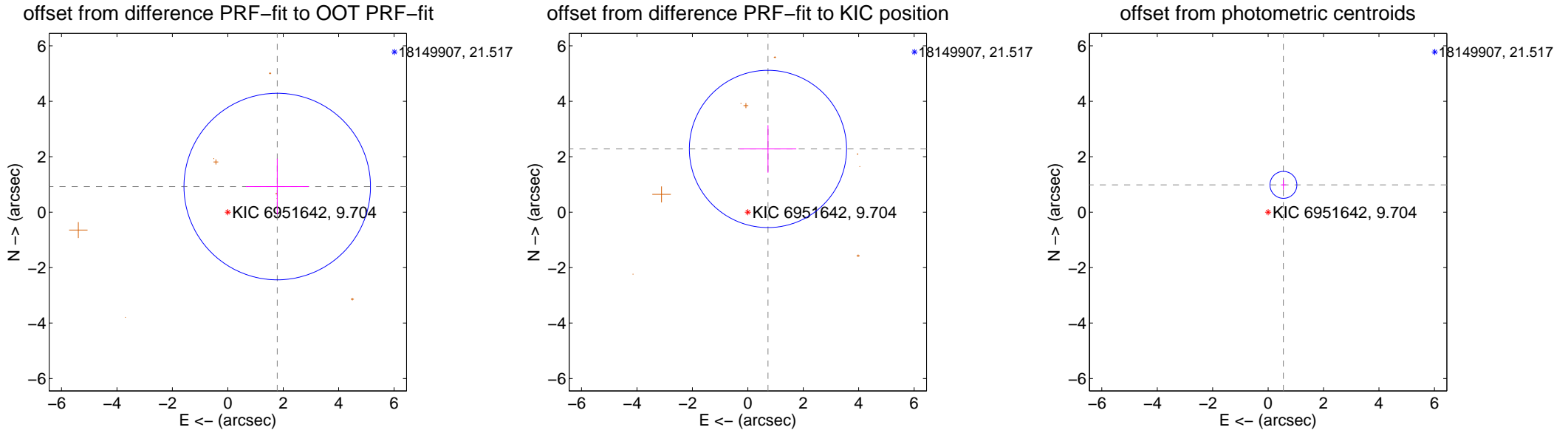
## DV Centroid Data

Supplemental centroid analysis for 006951642-04. **Kepler magnitude: 9.70.** Transit SNR 9.78

There are 0 quarters with good PRF difference image offsets

The OOT PRF centroid is offset from the target star catalog position by about 2.07 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.009 \pm 1.121$	1.79	$-1.783 \pm 1.133$	$0.924 \pm 1.005$
PRF-fit source offset from KIC position	$2.394 \pm 0.945$	2.53	$-0.726 \pm 1.019$	$2.281 \pm 0.857$
photometric centroid source offset	$1.13 \pm 0.16$	6.98	$-0.55 \pm 0.10$	$0.98 \pm 0.18$



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

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

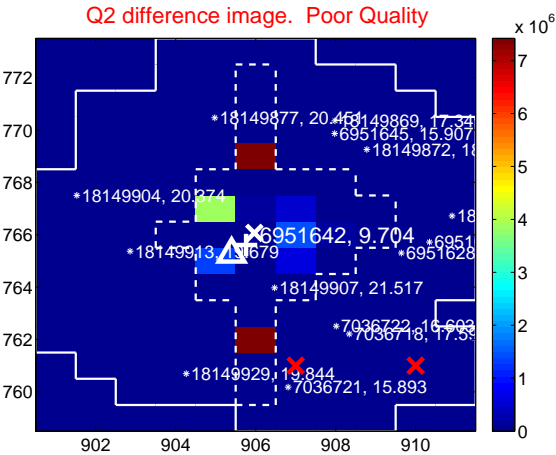
Q1 no difference image



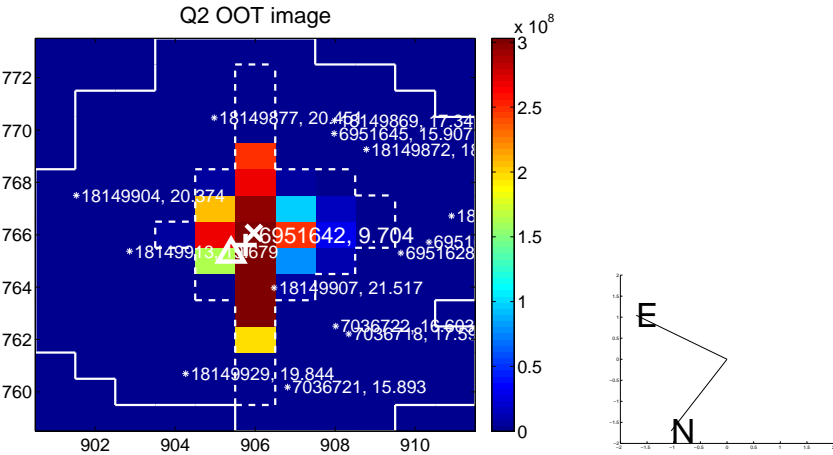
Q1 no OOT image



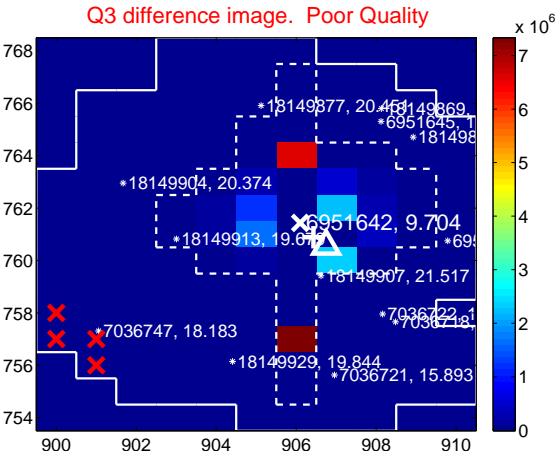
Q2 difference image. Poor Quality



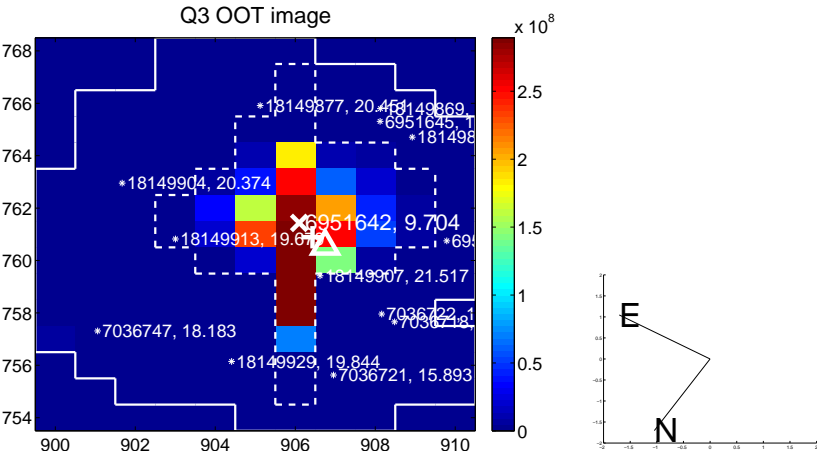
Q2 OOT image



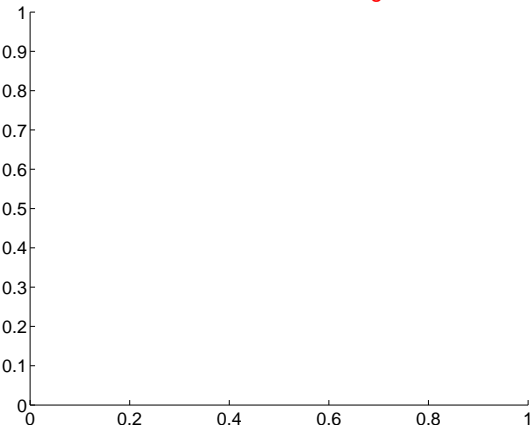
Q3 difference image. Poor Quality



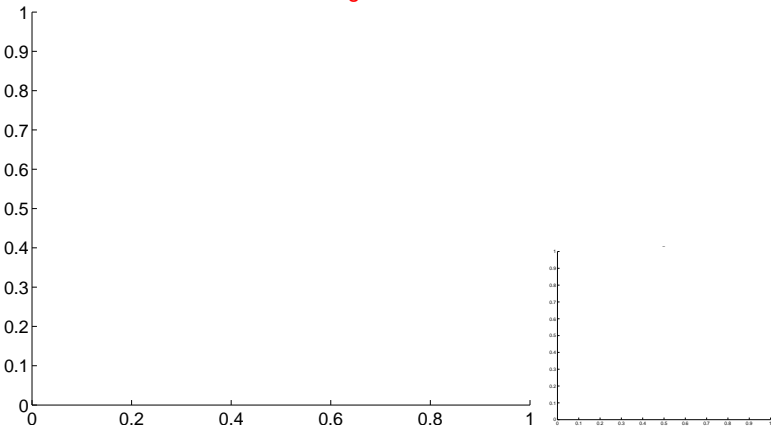
Q3 OOT image



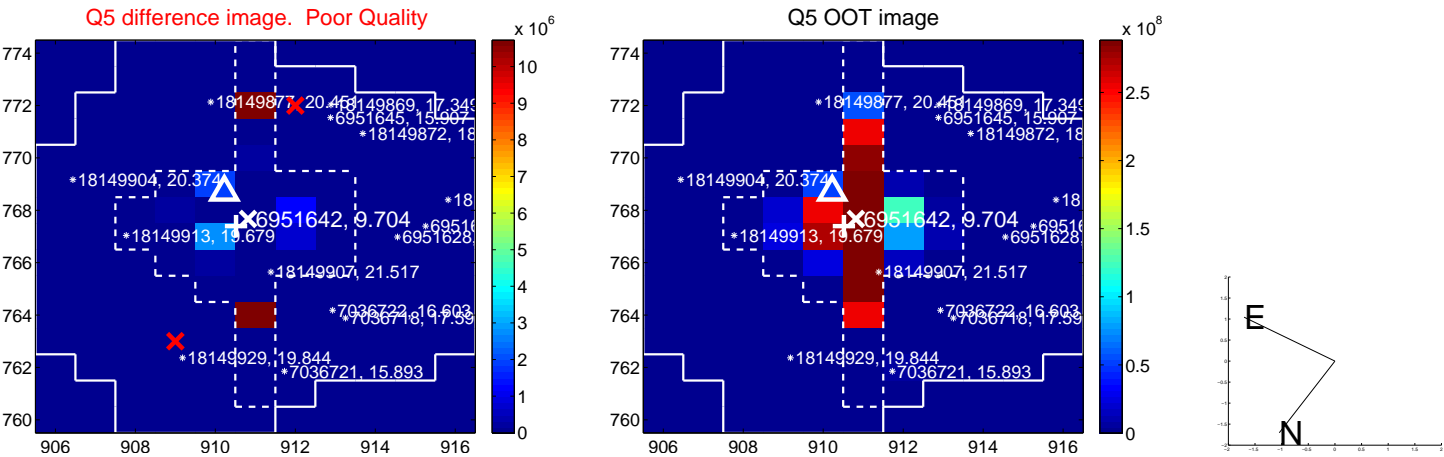
Q4 no difference image



Q4 no OOT image



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





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

Q9 no difference image



Q9 no OOT image



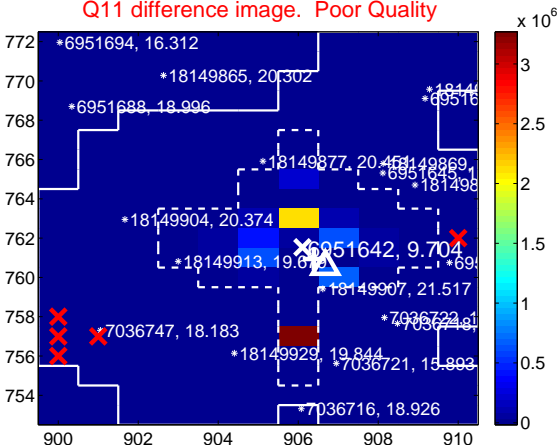
Q10 no difference image



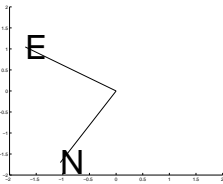
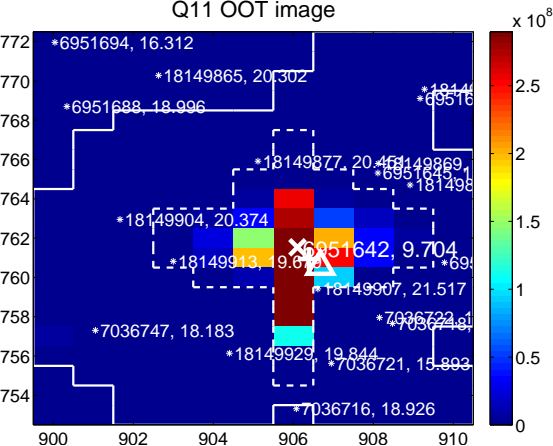
Q10 no OOT image



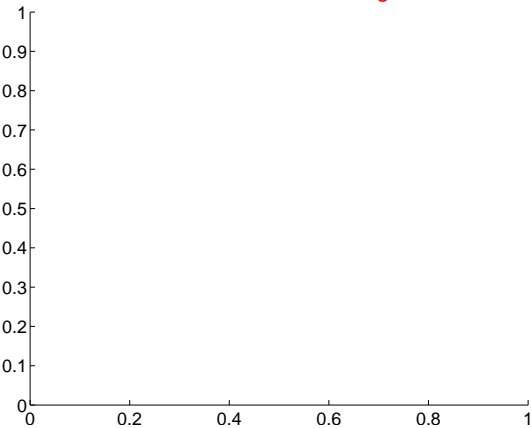
Q11 difference image. Poor Quality



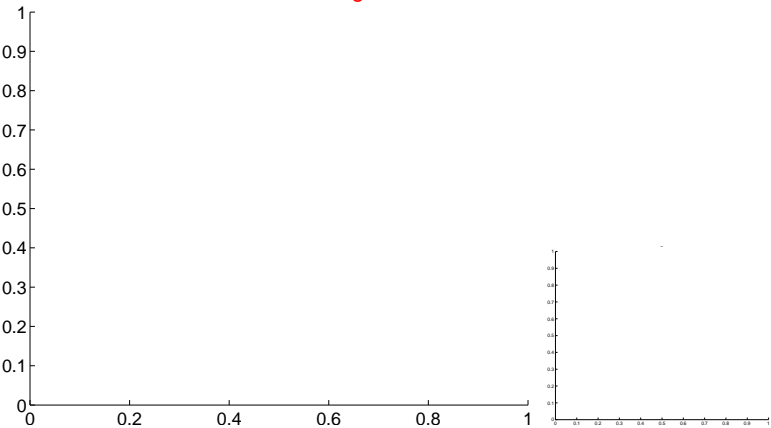
Q11 OOT image



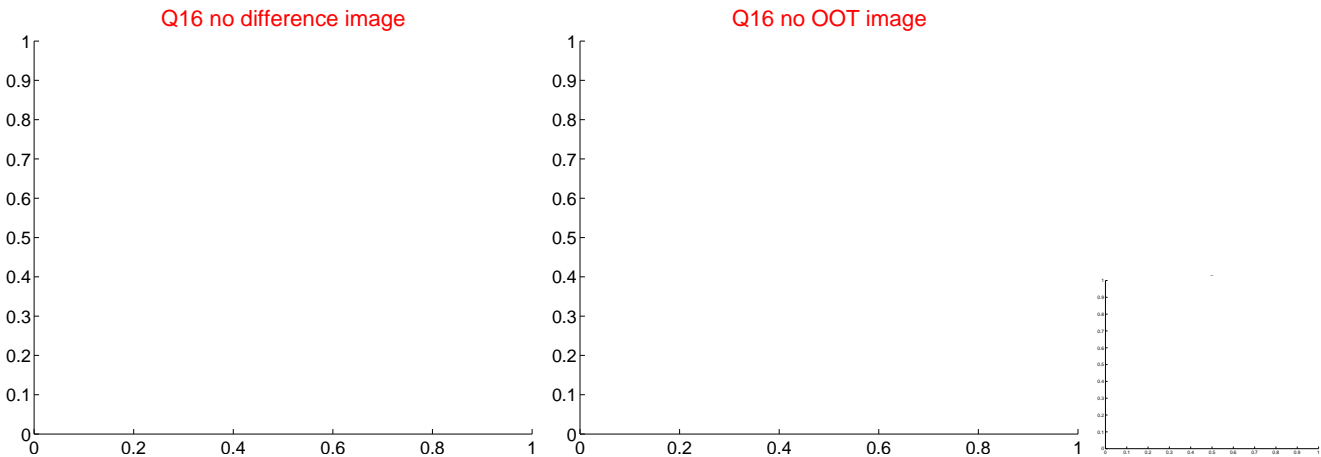
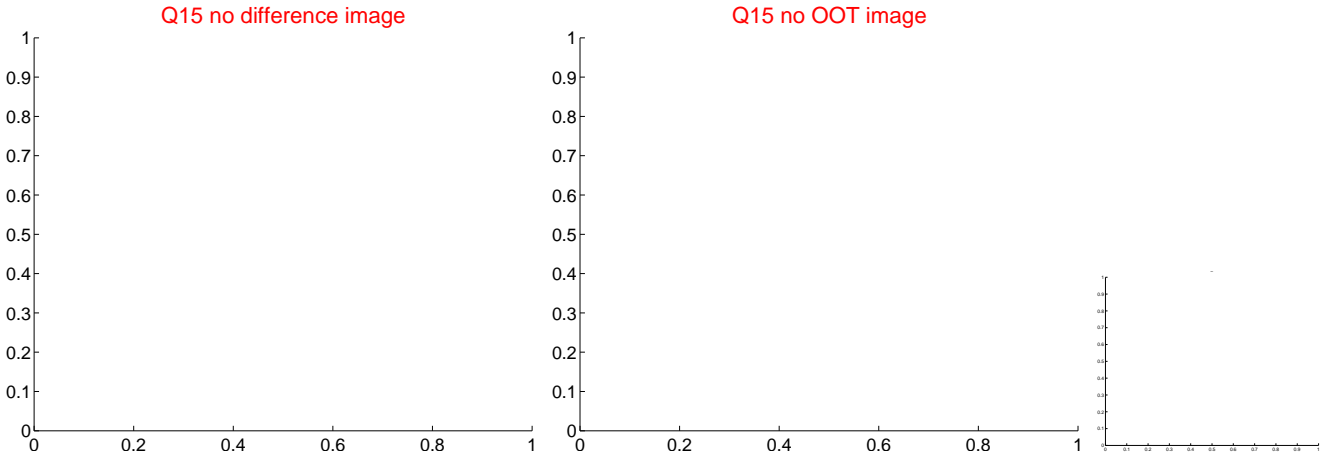
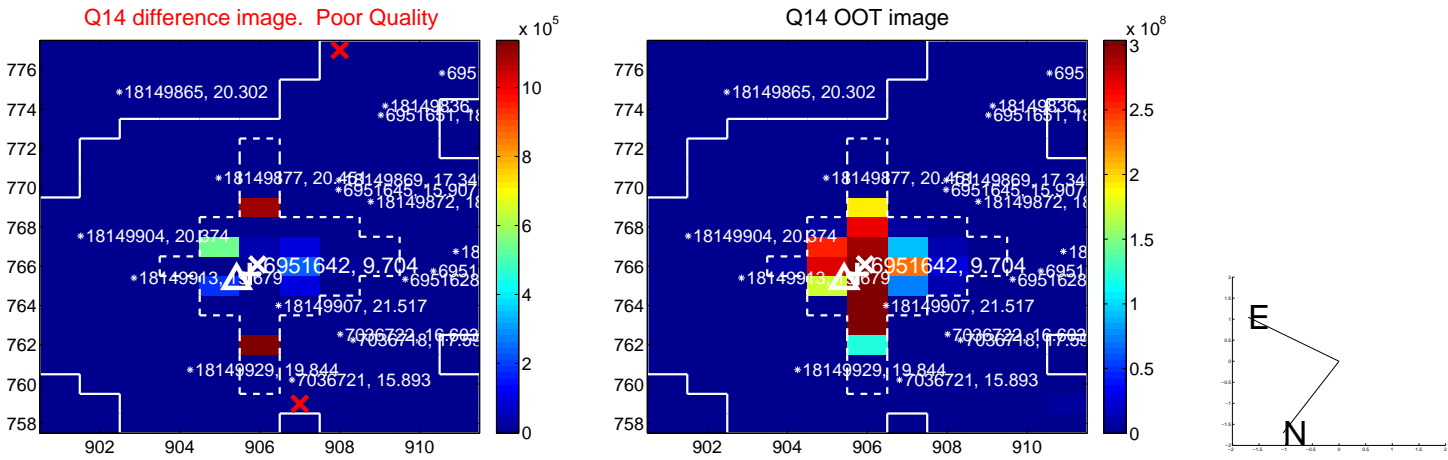
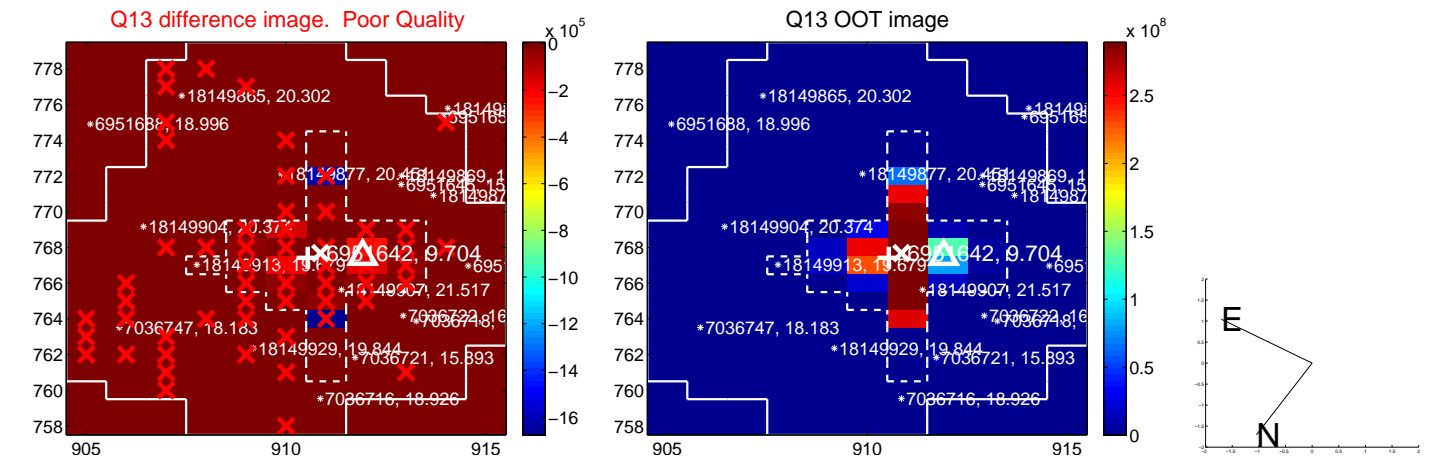
Q12 no difference image



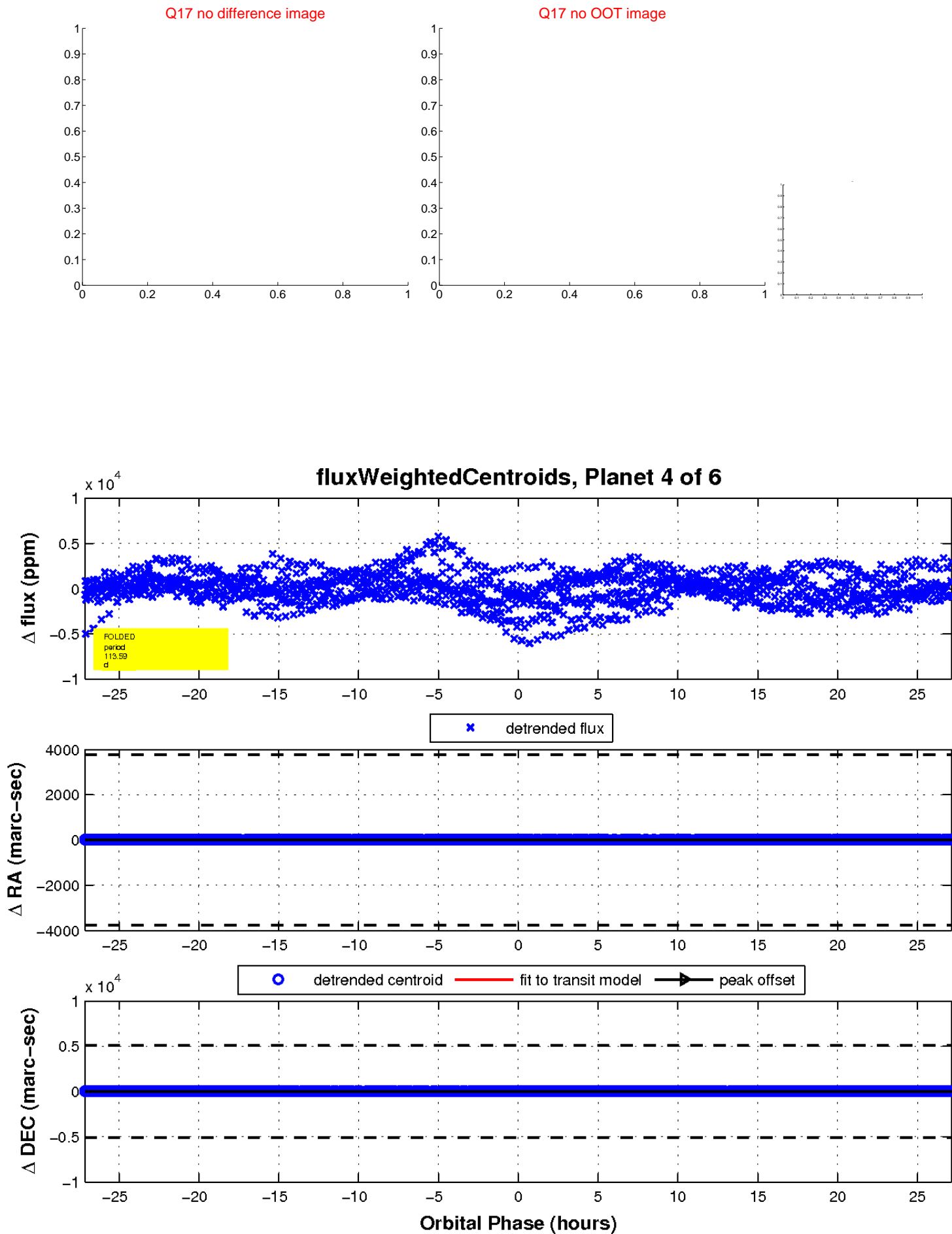
Q12 no OOT image



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

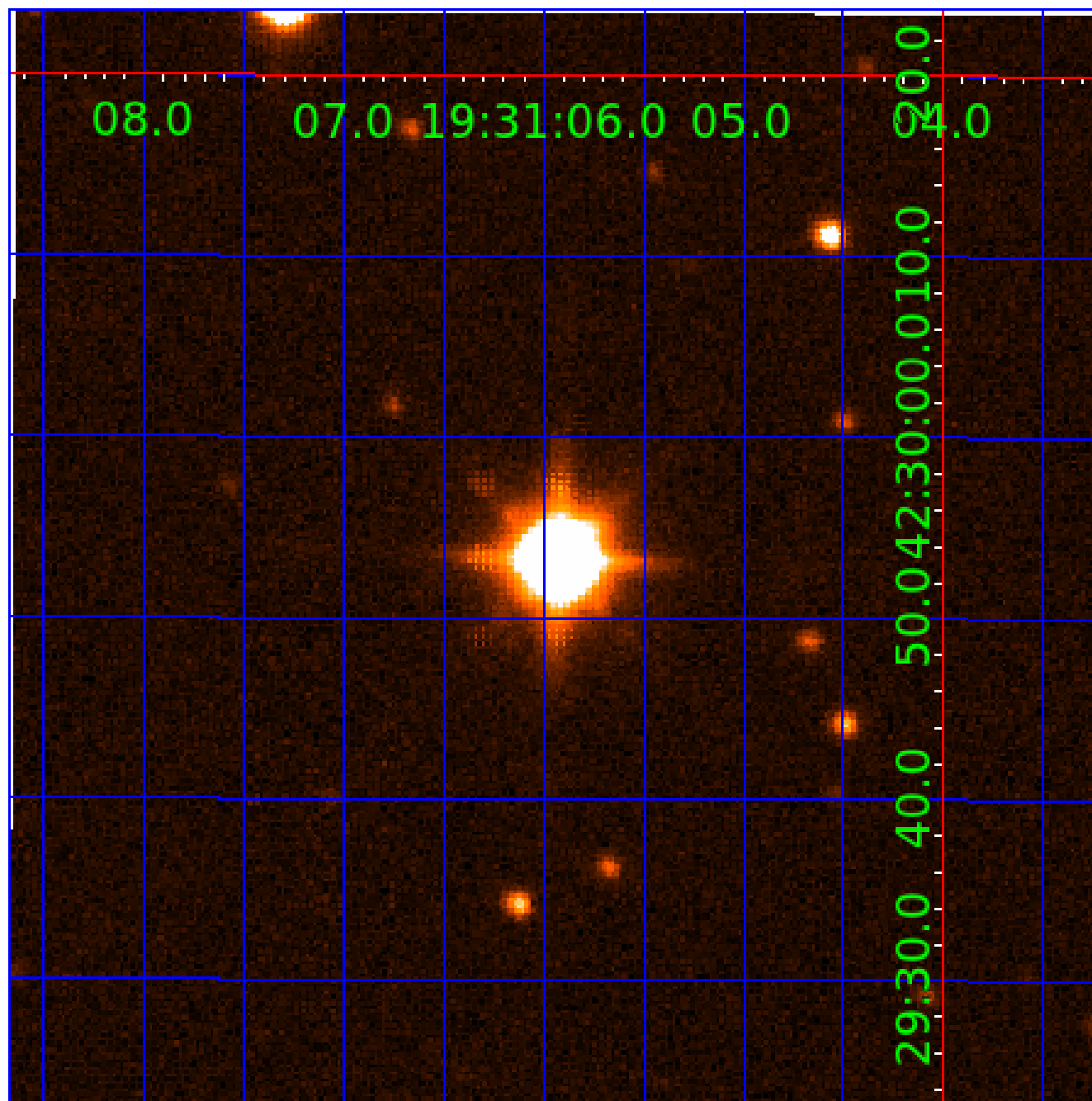


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 006951642

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006951642-01	OBS	No	1.384118	131.786960	52.8	7.933	8.8	3.2	4.42	7365	3.40	59215.24
006951642-02	OBS	No	106.444106	158.130695	4190.1	11.707	8.8	9.0	4.42	7365	41.22	181.06
006951642-03	OBS	No	155.387535	256.874191	1947.1	10.584	9.3	7.0	4.42	7365	21.77	109.34
006951642-04	OBS	No	113.593551	225.208195	3881.9	9.049	8.8	9.8	4.42	7365	49.71	166.03
006951642-05	OBS	No	181.191432	275.335077	2015.9	5.509	8.4	7.6	4.42	7365	21.14	89.09
006951642-06	OBS	No	53.376225	132.903938	1975.6	7.744	7.4	9.1	4.42	7365	34.74	454.50

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006951642-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
006951642-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
006951642-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
006951642-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
006951642-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV— MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
006951642-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—MOD_NONUNIQ_ALT—CENT_SATURATED

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

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

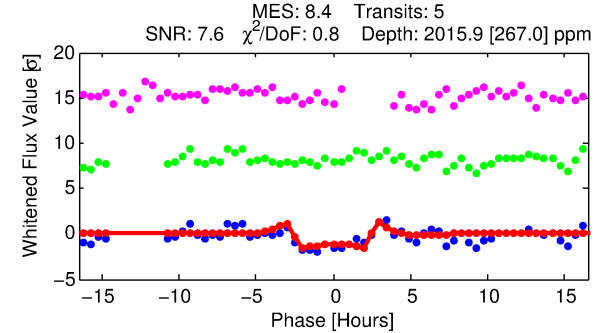
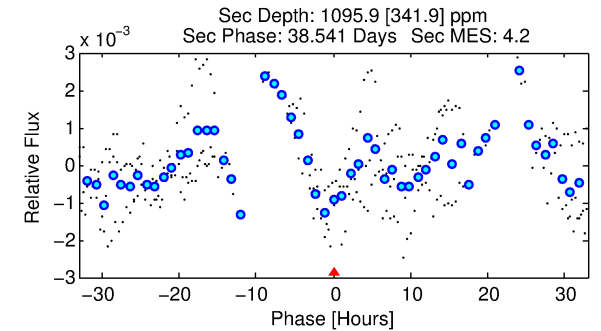
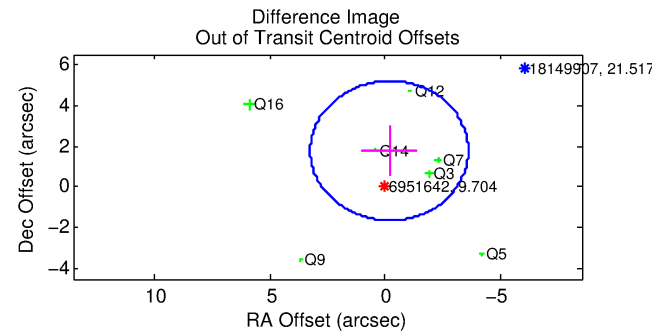
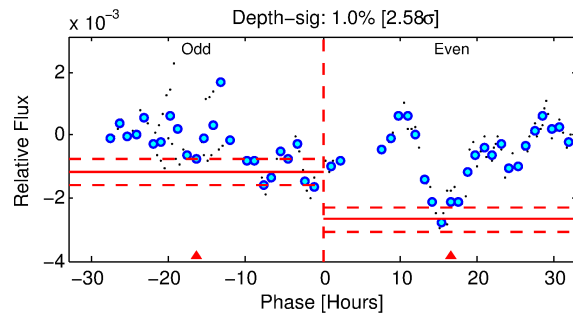
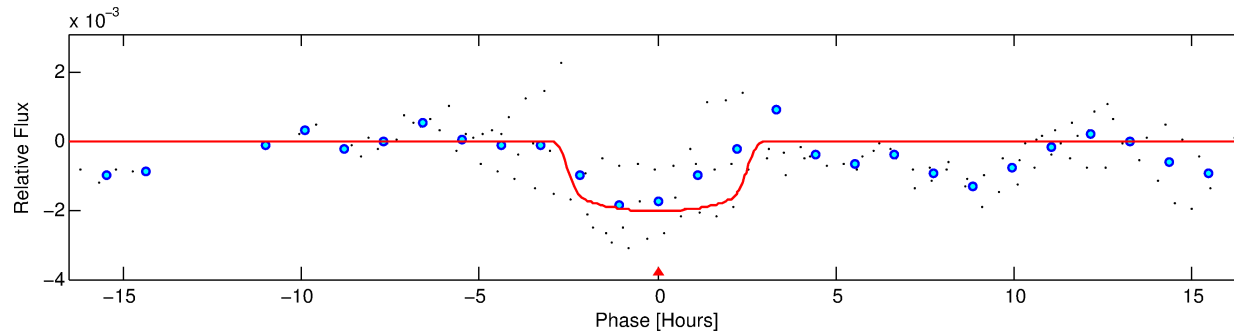
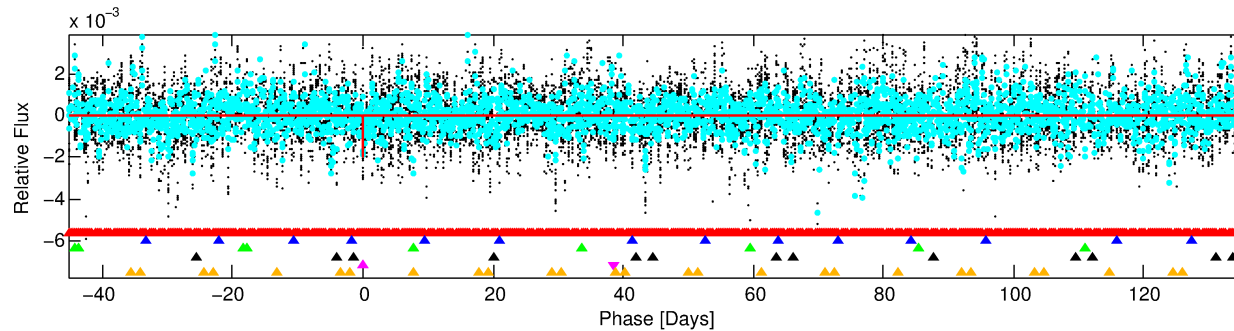
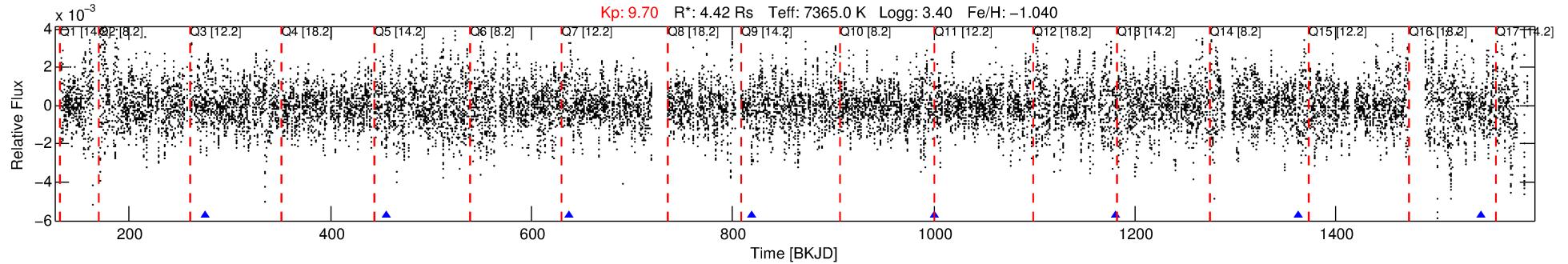
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 006951642-05

No Significant Match Found

# DV One-Page Summary

KIC: 6951642 Candidate: 5 of 6 Period: 181.191 d



## DV Fit Results:

Period = 181.19143 [0.00390] d  
Epoch = 275.3351 [0.0094] BKJD  
Rp/R\* = 0.0438 [0.0091]  
a/R\* = 200.15 [200.41]  
b = 0.67 [0.81]  
Seff = 89.09 [129.97]  
Teq = 783 [286] K  
Rp = 21.14 [15.68] Re  
a = 0.7607 [0.6342] AU  
Ag = 780.60 [1202.86] [0.65σ]  
Teffp = 6402 [868] K [6.15σ]

## DV Diagnostic Results:

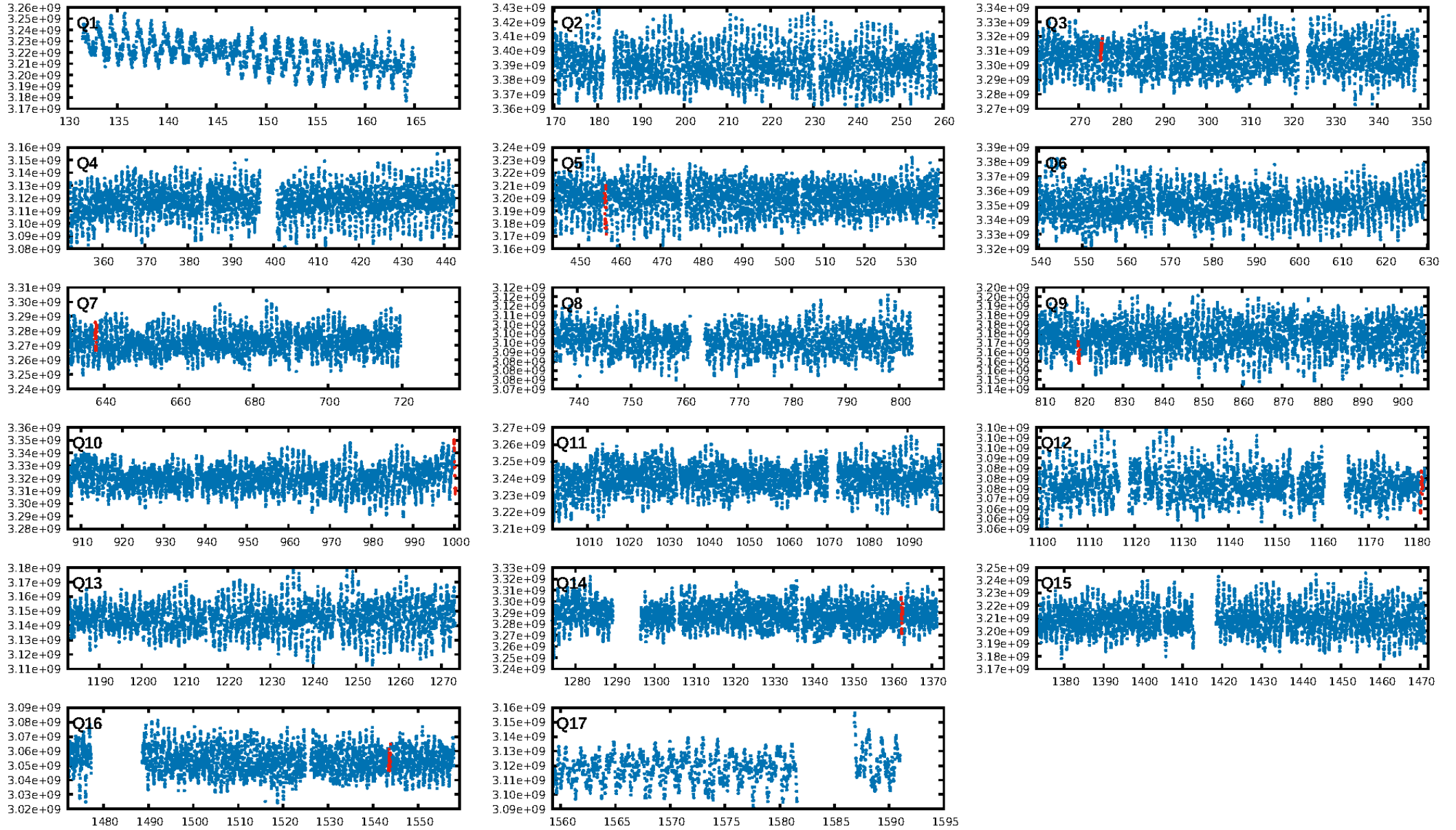
ShortPeriod-sig: 100.0% [51.90σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 21.7%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 2.38e-08  
RollingBand-fgt: 1.00 [5/5]  
GhostDiagnostic-chr: N/A  
Centroid-sig: 64.3%  
Centroid-so: 1.335 arcsec [5.33σ]  
OotOffset-rm: 1.791 arcsec [1.57σ]  
KicOffset-rm: 4.236 arcsec [4.19σ]  
OotOffset-st: 1/2/2/2 [7]  
KicOffset-st: 1/2/2/2 [7]  
DiffImageQuality-fgm: 0.00 [0/7]  
DiffImageOverlap-fno: 0.14 [1/7]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 12:56:57 Z

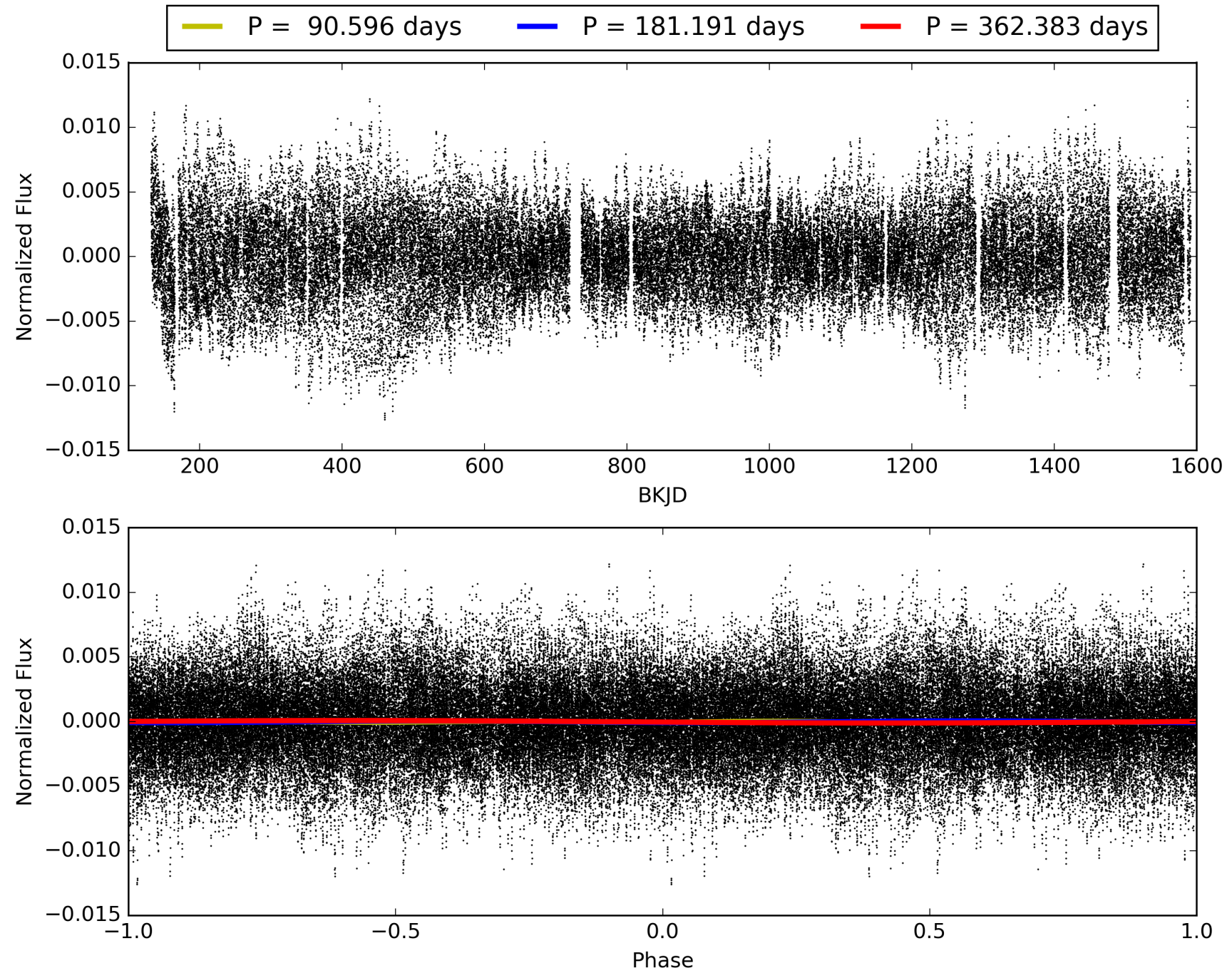
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 006951642-05, PDC Light Curves

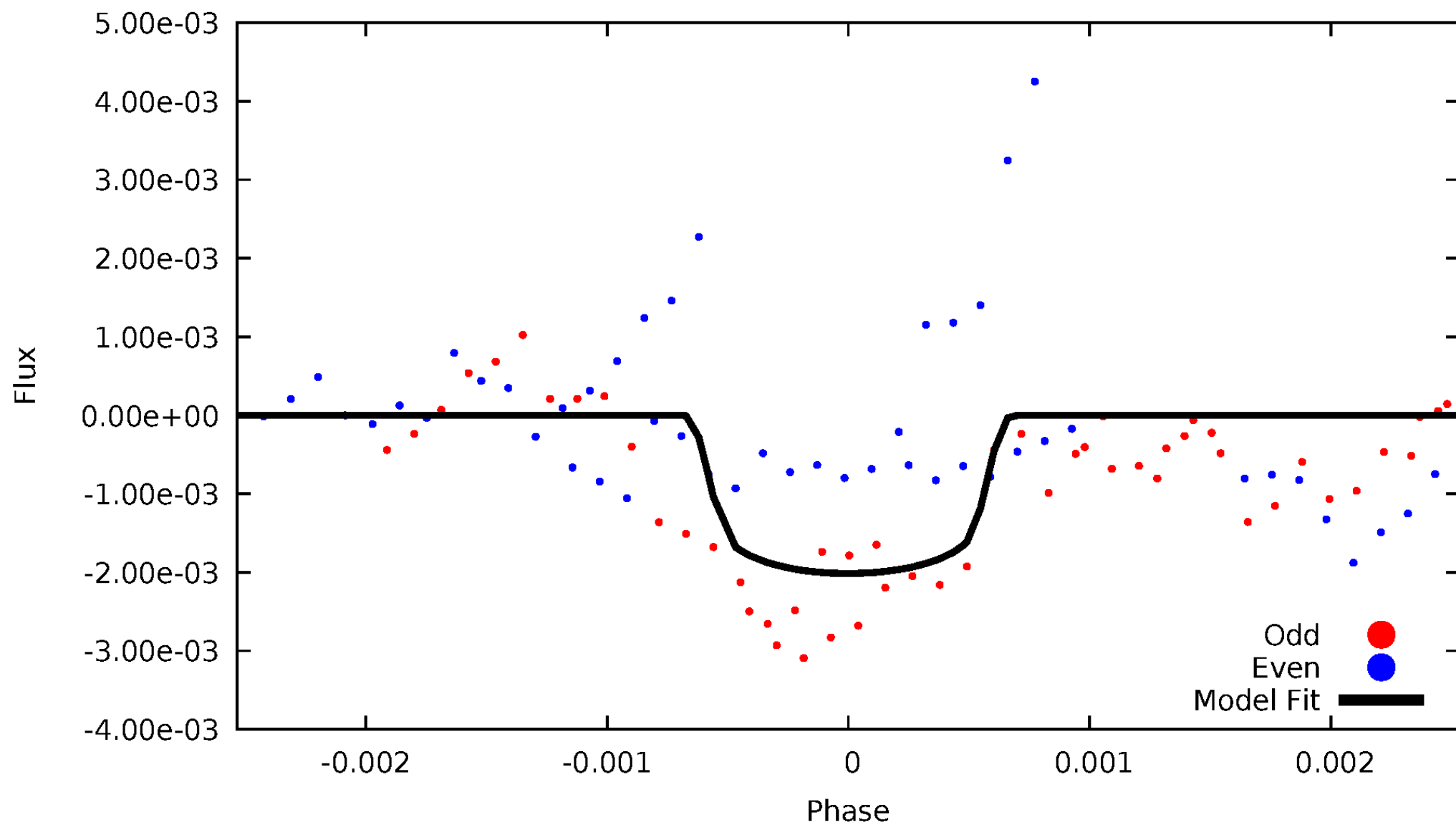


TCE 006951642-05



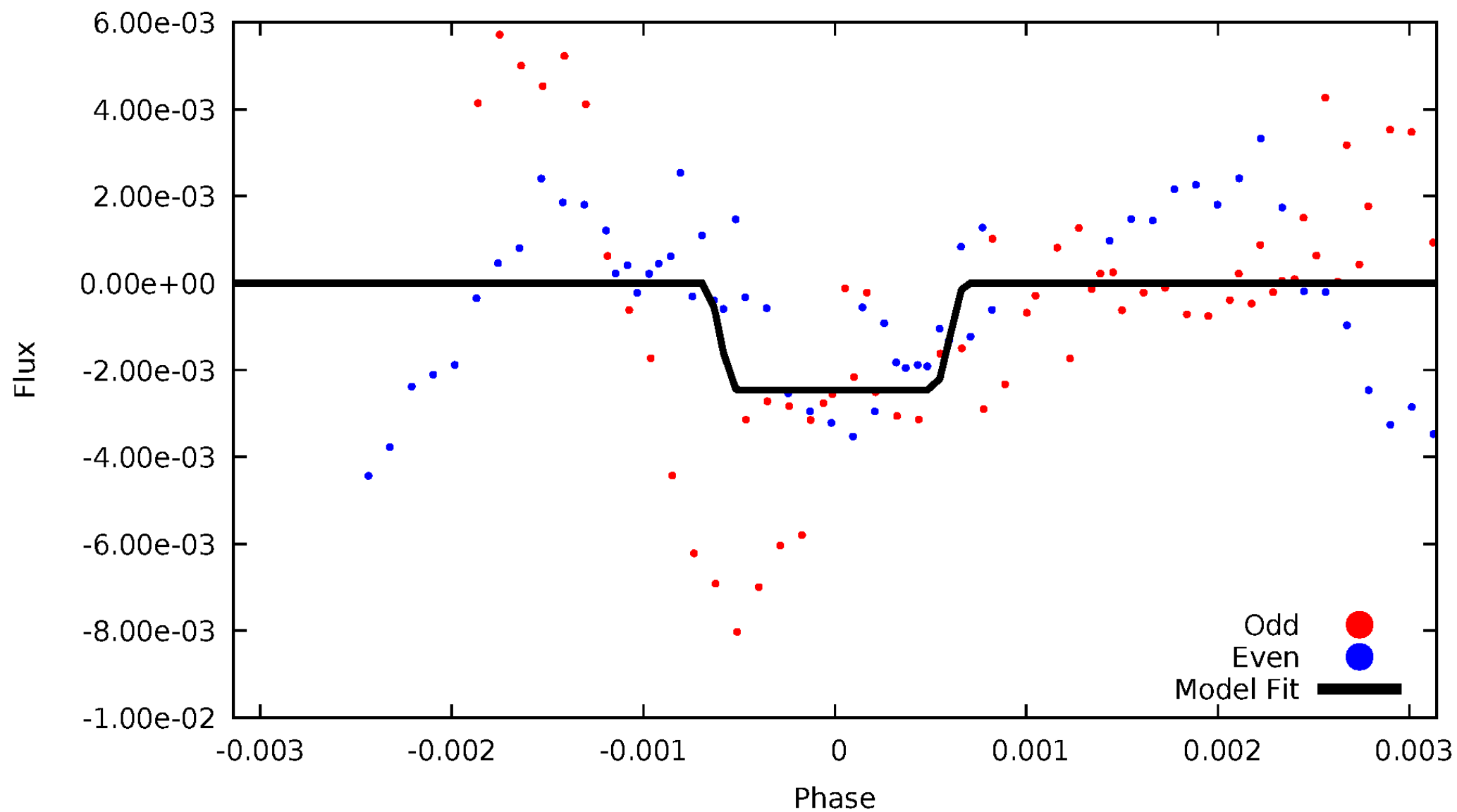
# DV Odd/Even

TCE 006951642-05



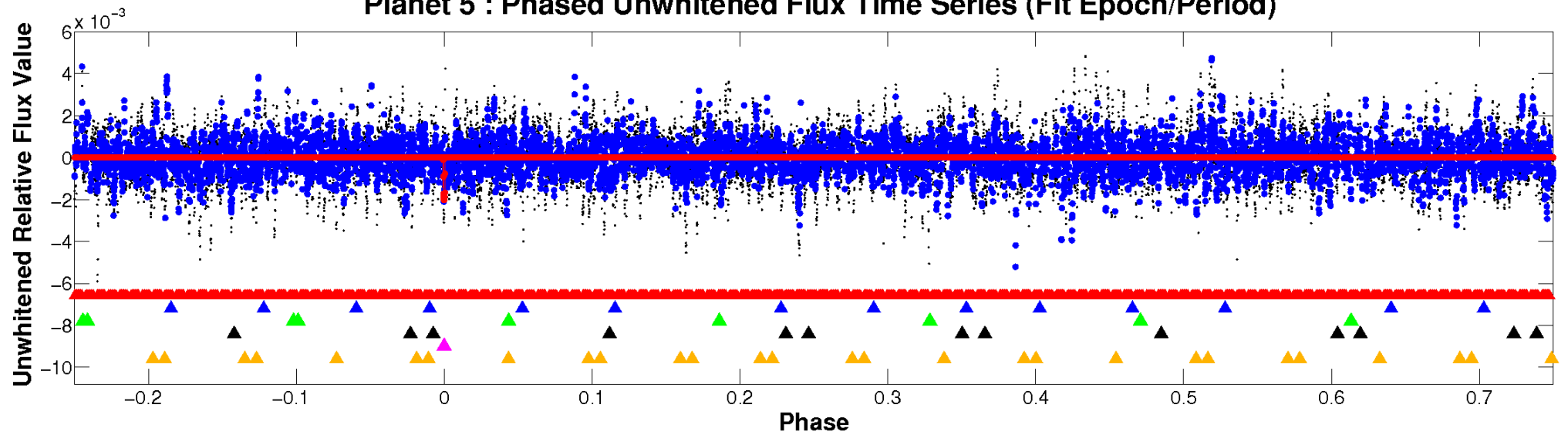
# ALT Odd/Even

TCE 006951642-05

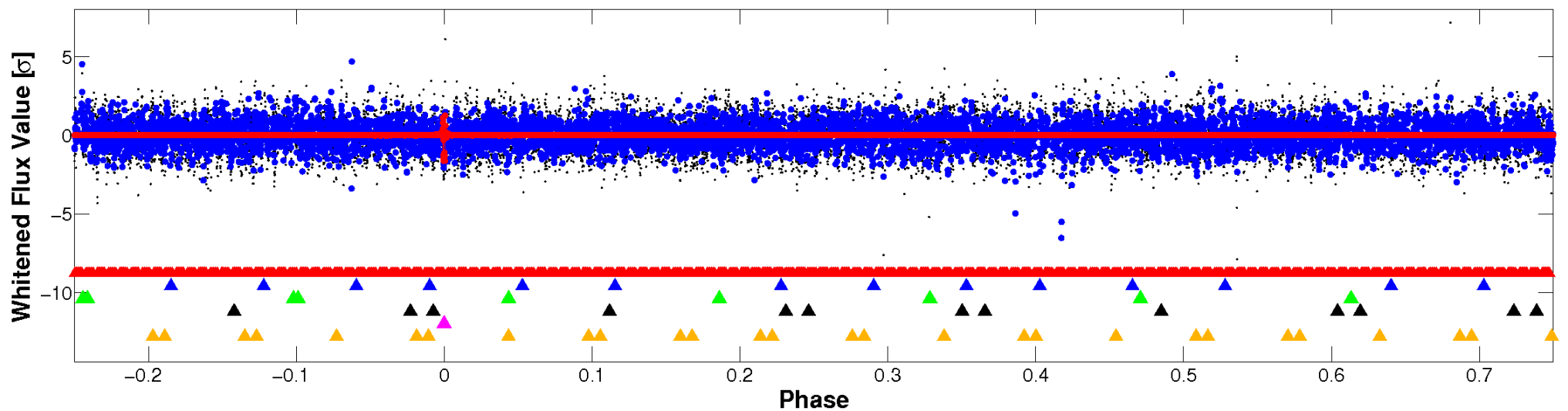


# Non-Whitened Vs. Whitened Light Curve

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

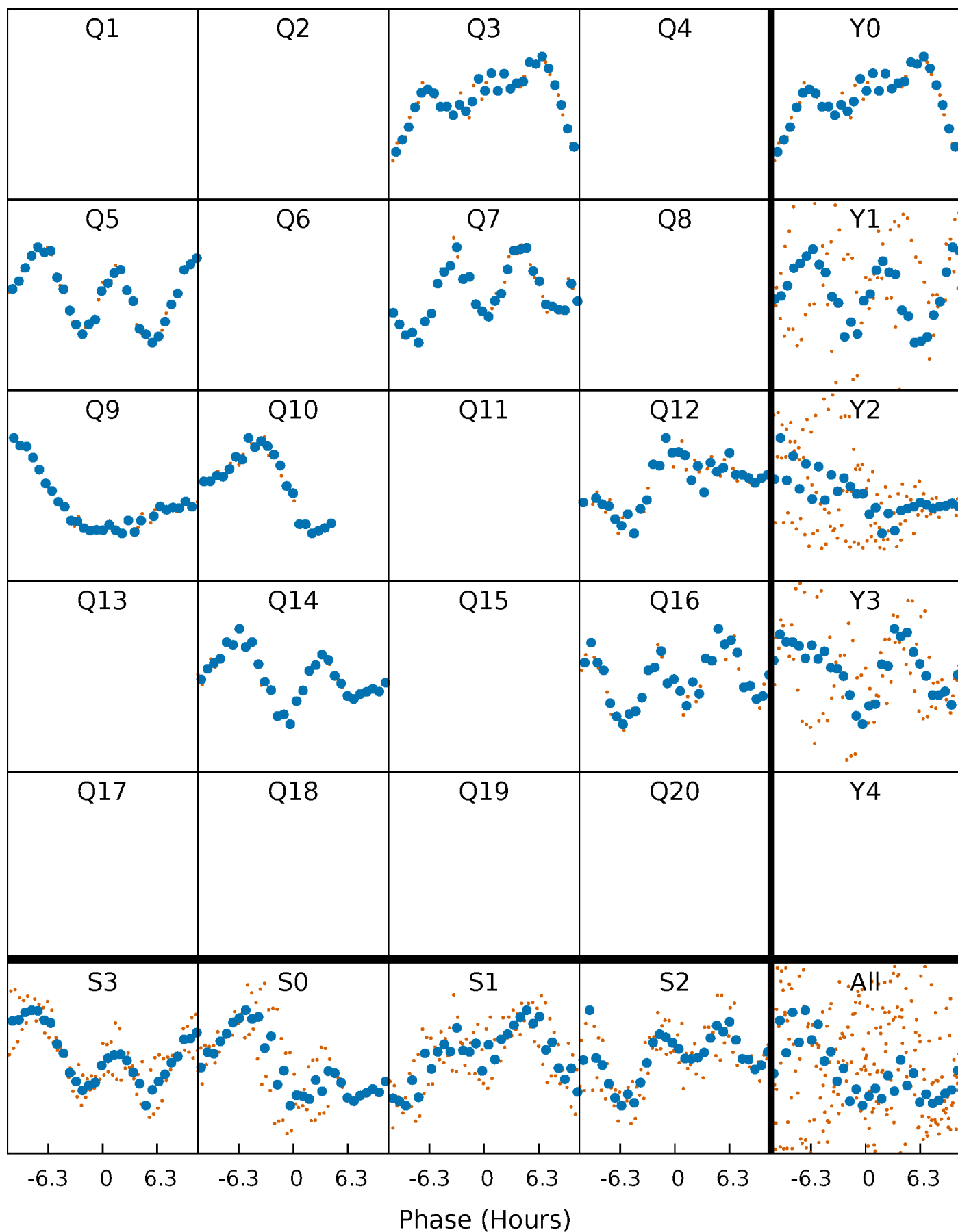


Planet 5 : Phased Whitened Flux Time Series (Fit Epoch/Period)



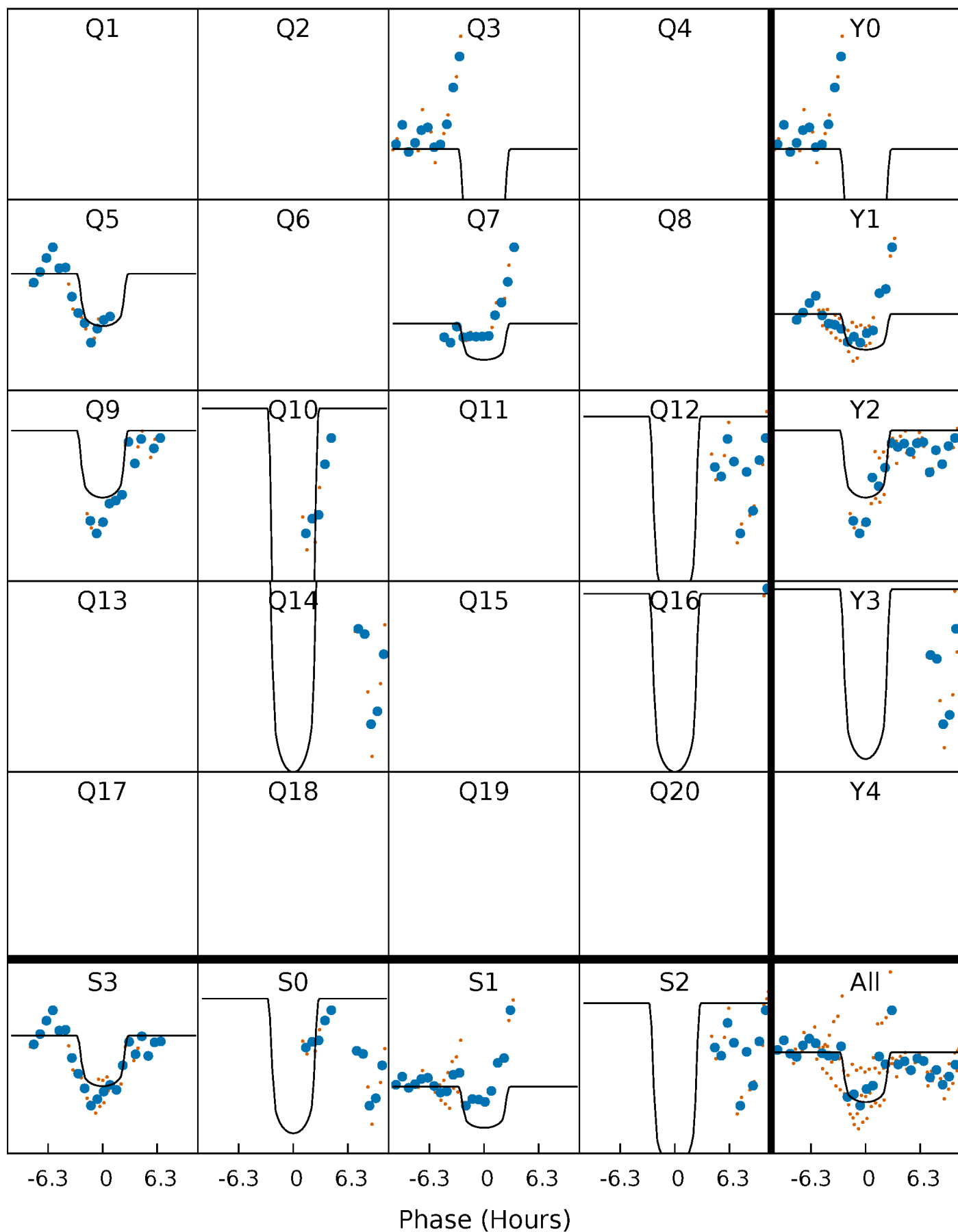
# PDC Quarter-Phased Transit Curves

TCE 006951642-05     $P=181.191432$  Days     $T_0=275.335077$  (BKJD)



# DV Quarter-Phased Transit Curves

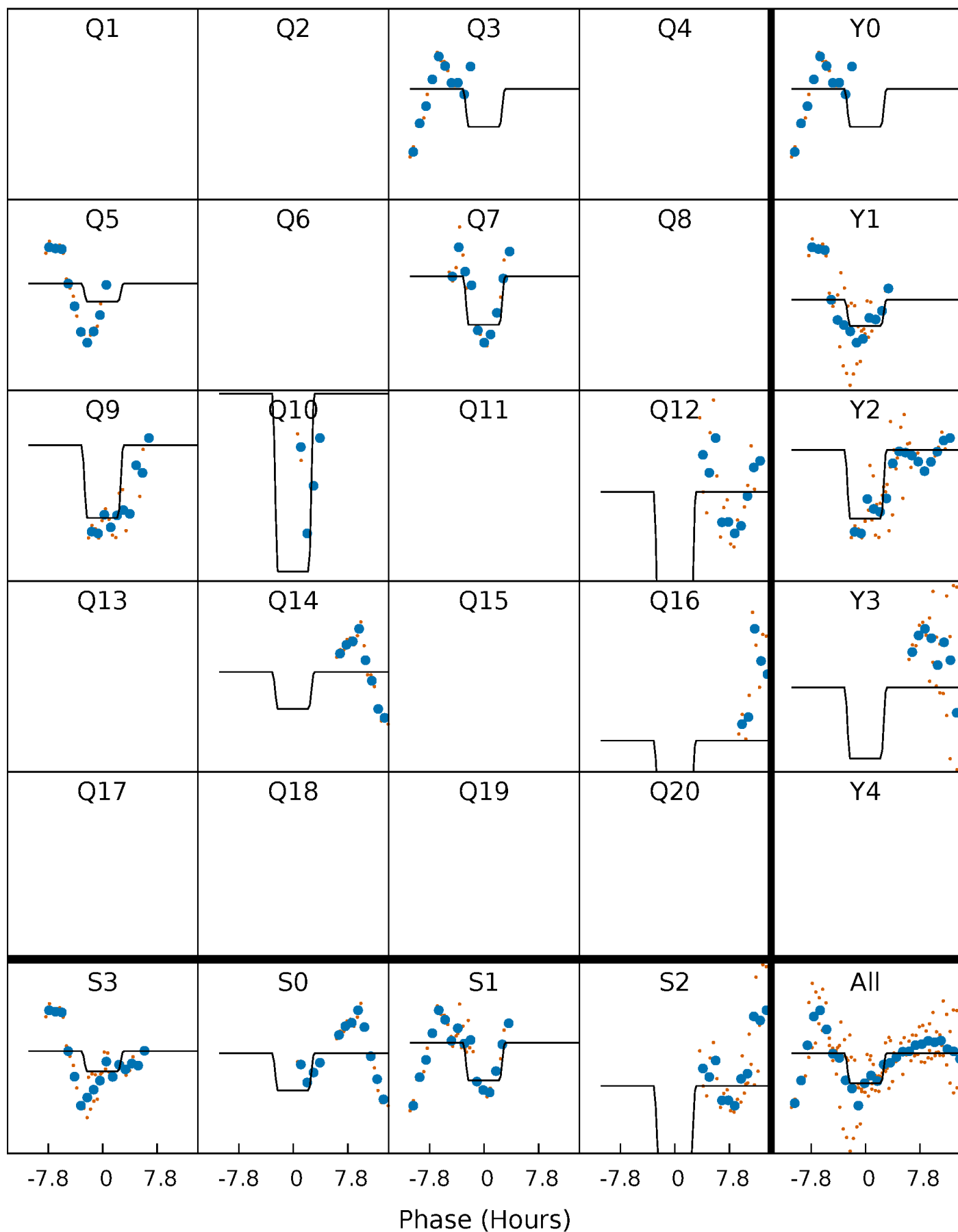
TCE 006951642-05     $P=181.191432$  Days     $T_0=275.335077$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

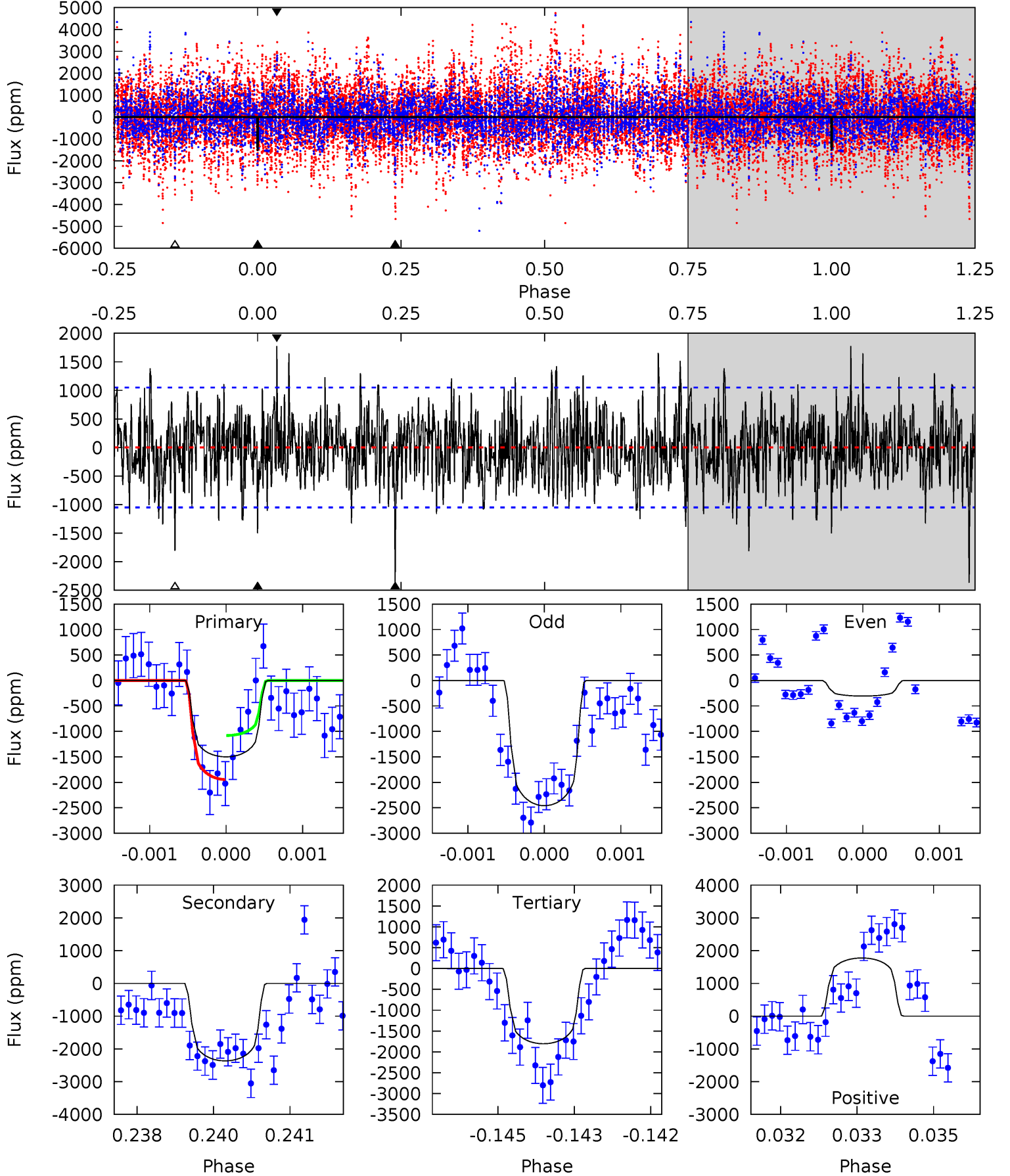
TCE 006951642-05 P=181.200824 Days  $T_0=275.316728$  (BKJD)



# DV Model-Shift Uniqueness Test

006951642-05, P = 181.191432 Days, E = 94.143645 Days

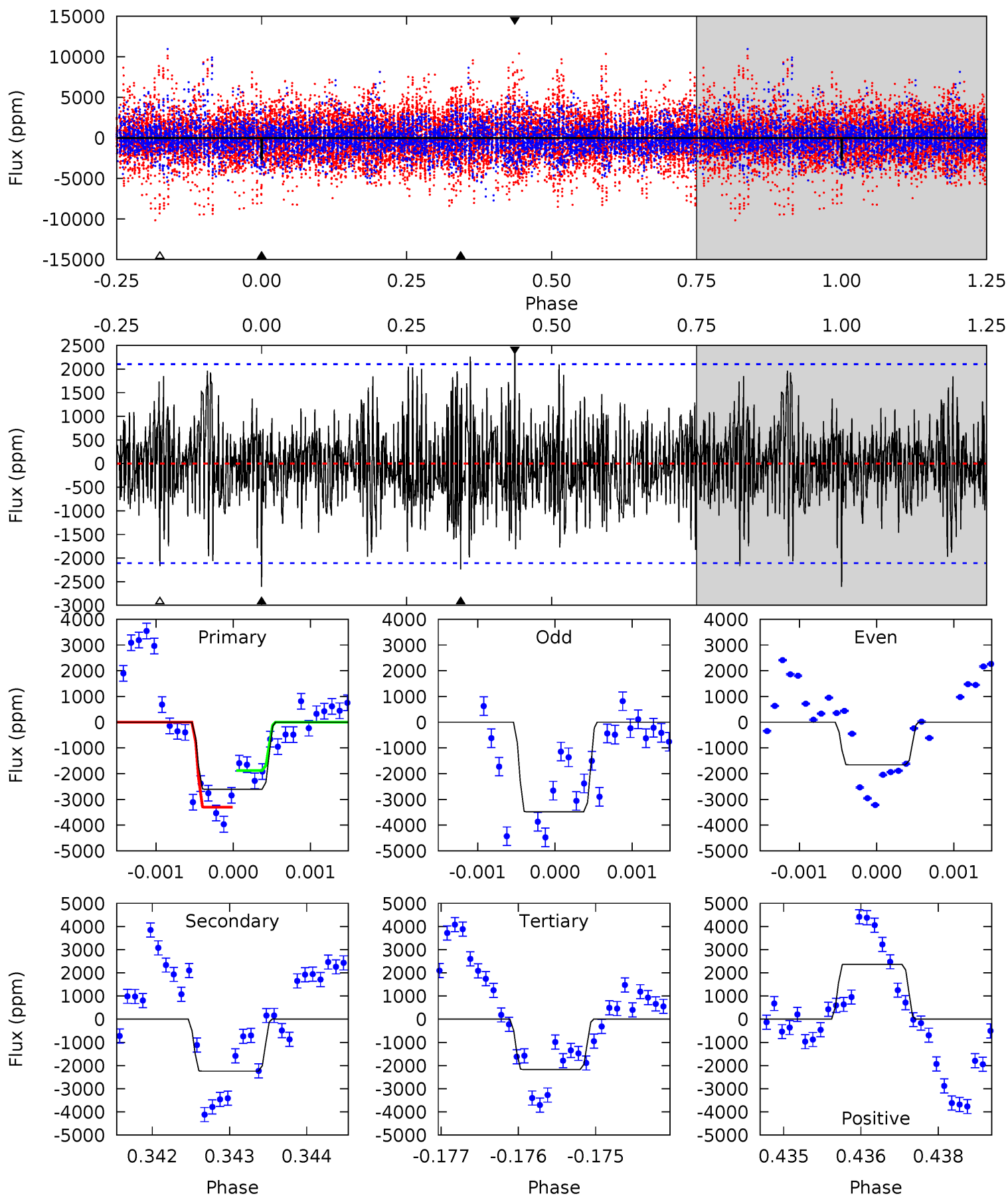
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.72	12.2	9.30	9.14	5.41	3.22	2.36	-1.57	-1.42	2.89	3.04	5.51	0.96	0.43	2.23



# Alt Model-Shift Uniqueness Test

006951642-05, P = 181.200824 Days, E = 94.115904 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.69	5.75	5.57	6.08	5.41	3.22	1.70	1.12	0.61	0.18	-0.33	2.35	0.91	0.48	1.84



### Stellar Parameters For KIC 006951642

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7365^{+233}_{-285}$	$3.399^{+0.893}_{-0.094}$	$-1.040^{+0.300}_{-0.300}$	$4.422^{+0.556}_{-3.149}$	$1.789^{+0.126}_{-0.753}$	$0.029^{+0.690}_{-0.009}$
	$+3\%/-4\%$	$+26\%/-3\%$	$+29\%/-29\%$	$+13\%/-71\%$	$+7\%/-42\%$	$+2369\%/-30\%$
Source	KIC0	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 006951642-05 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-2366 \pm 194$	$17.75^{+6.78}_{-6.64}$	$1048^{+88}_{-197}$	$7841^{+1445}_{-911}$	$2283^{+3363}_{-1030}$
Alt.	$-2241 \pm 390$	$20.89^{+6.81}_{-7.90}$	$1060^{+80}_{-189}$	$7204^{+1094}_{-836}$	$1581^{+2199}_{-680}$

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

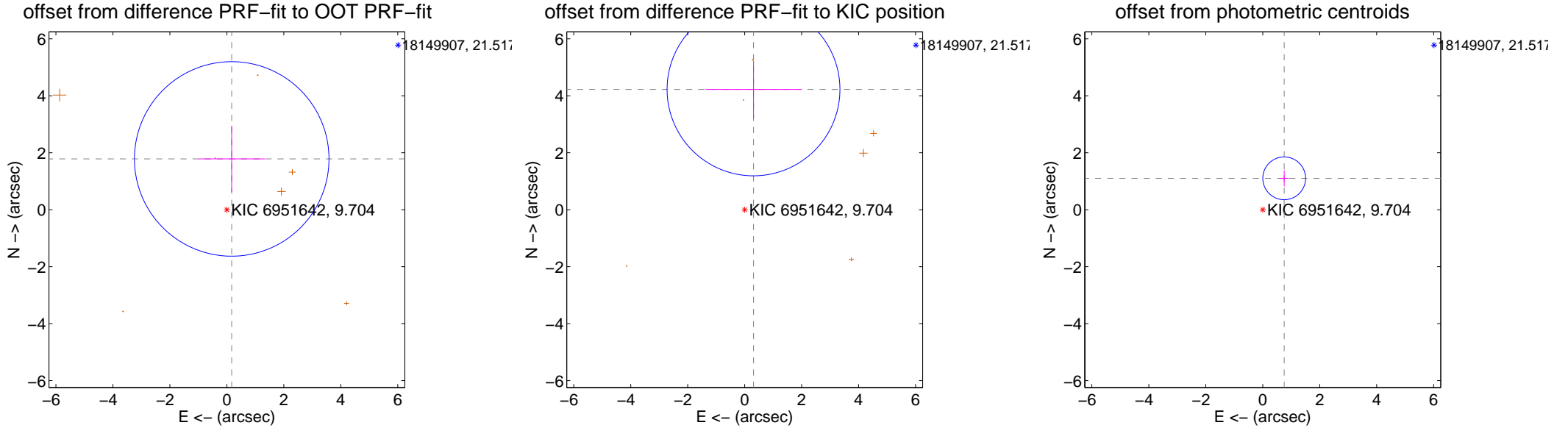
## DV Centroid Data

Supplemental centroid analysis for 006951642-05. **Kepler magnitude: 9.70.** Transit SNR 7.55

**There are 0 quarters with good PRF difference image offsets**

The direct PRF centroid is offset from the target star catalog position by about 0.95 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.791 \pm 1.138$	1.57	$-0.171 \pm 1.170$	$1.783 \pm 1.164$
PRF-fit source offset from KIC position	$4.236 \pm 1.011$	4.19	$-0.310 \pm 1.684$	$4.224 \pm 1.004$
photometric centroid source offset	$1.33 \pm 0.25$	5.33	$-0.75 \pm 0.16$	$1.10 \pm 0.28$



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

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

Q1 no difference image



Q1 no OOT image



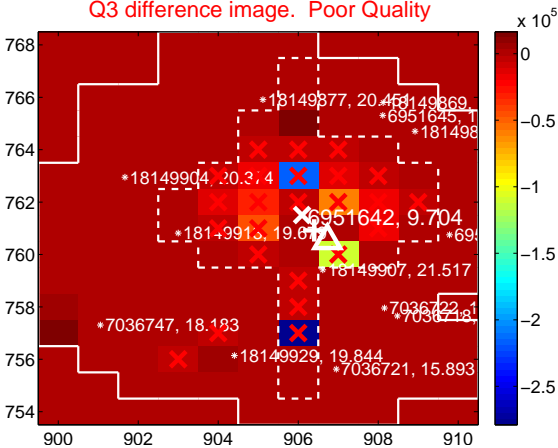
Q2 no difference image



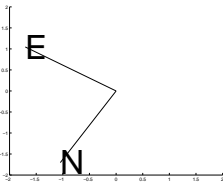
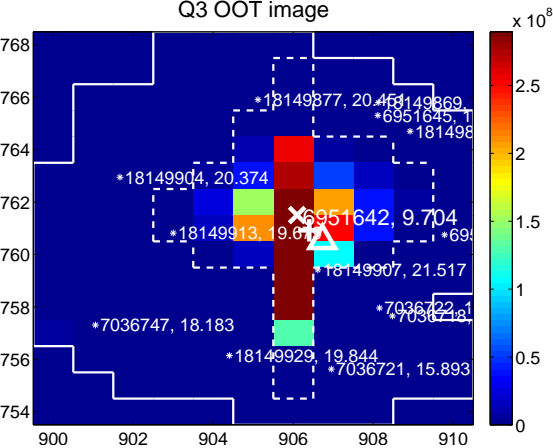
Q2 no OOT image



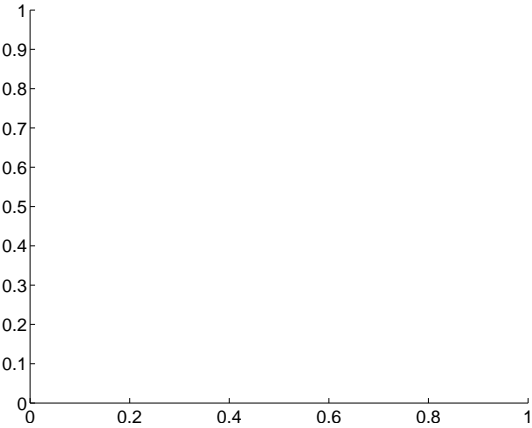
Q3 difference image. Poor Quality



Q3 OOT image



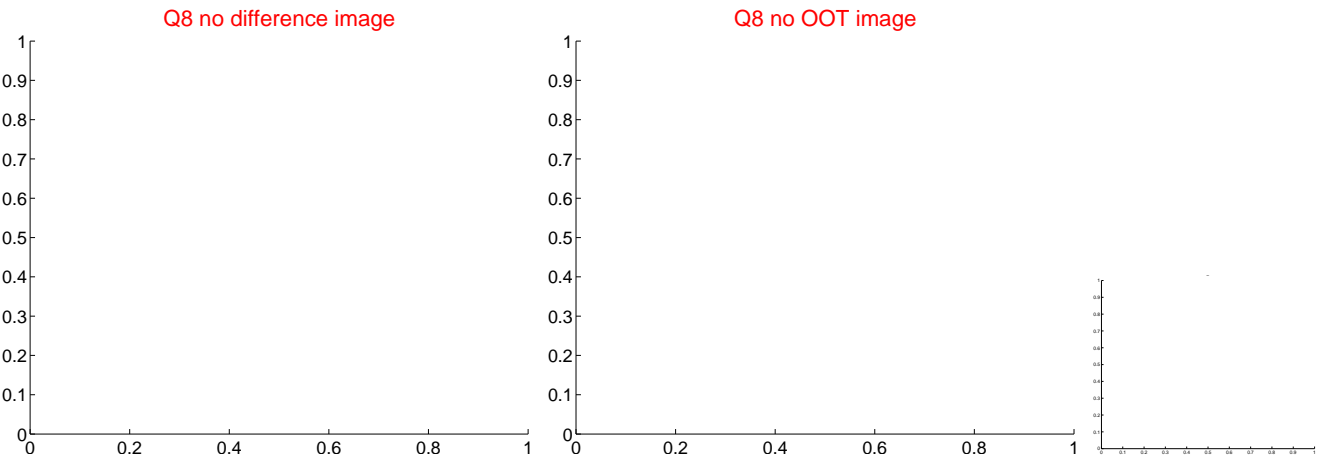
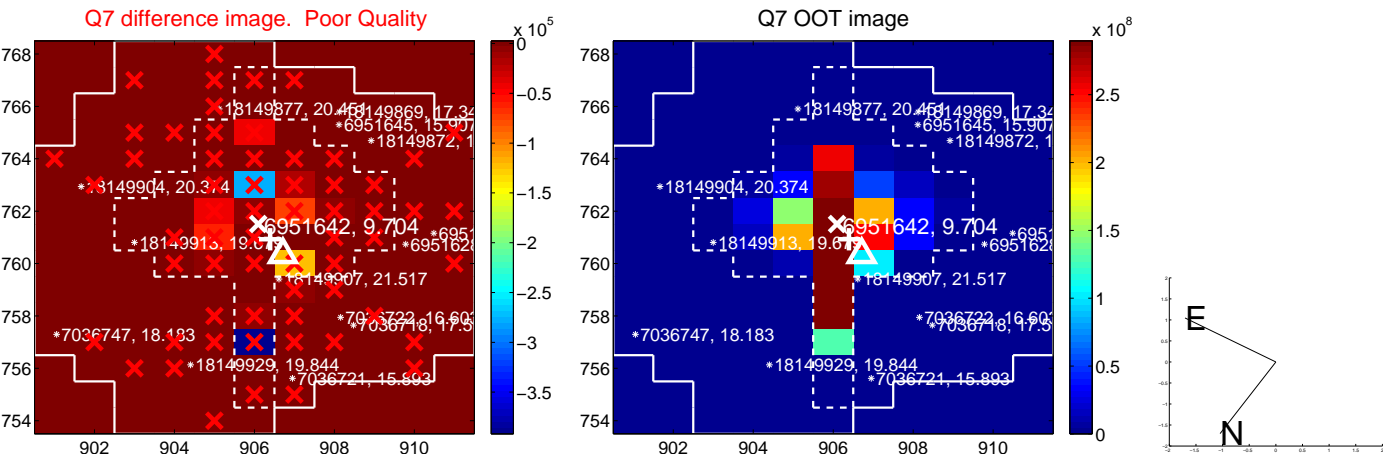
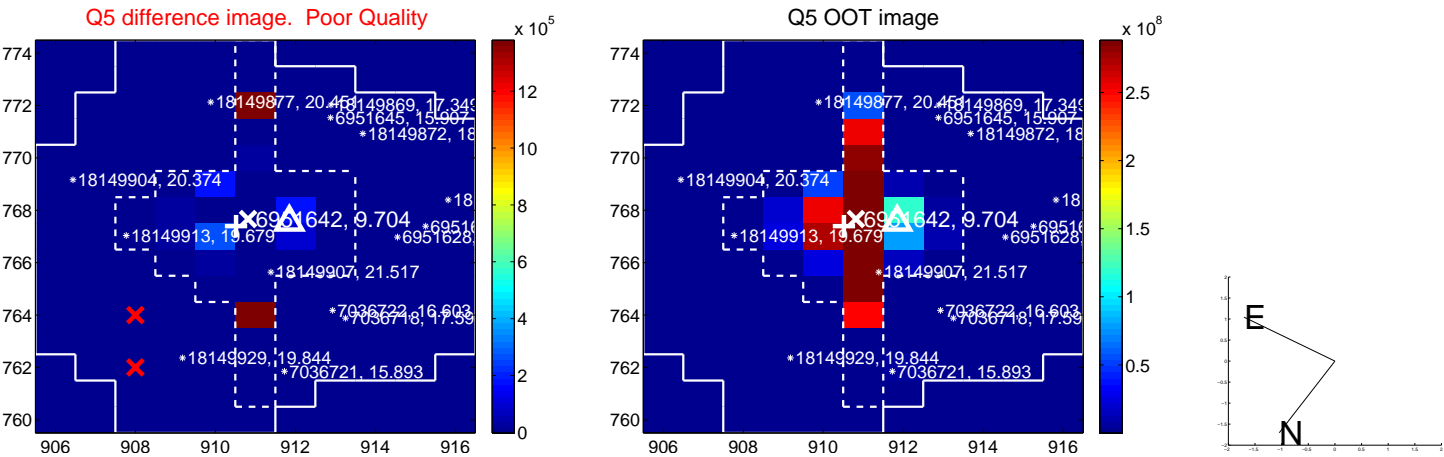
Q4 no difference image



Q4 no OOT image

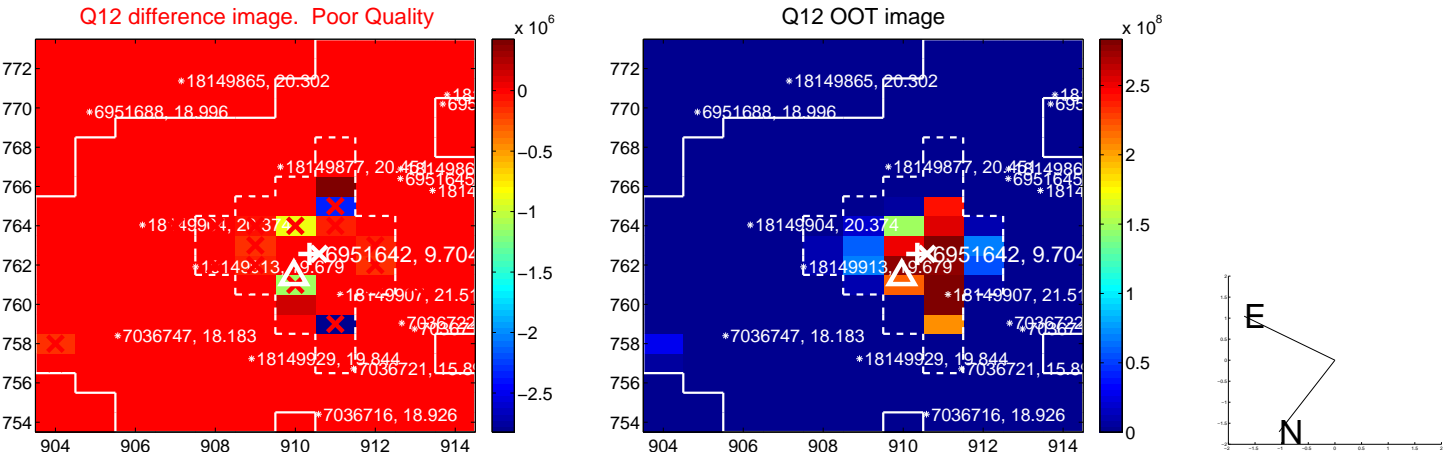
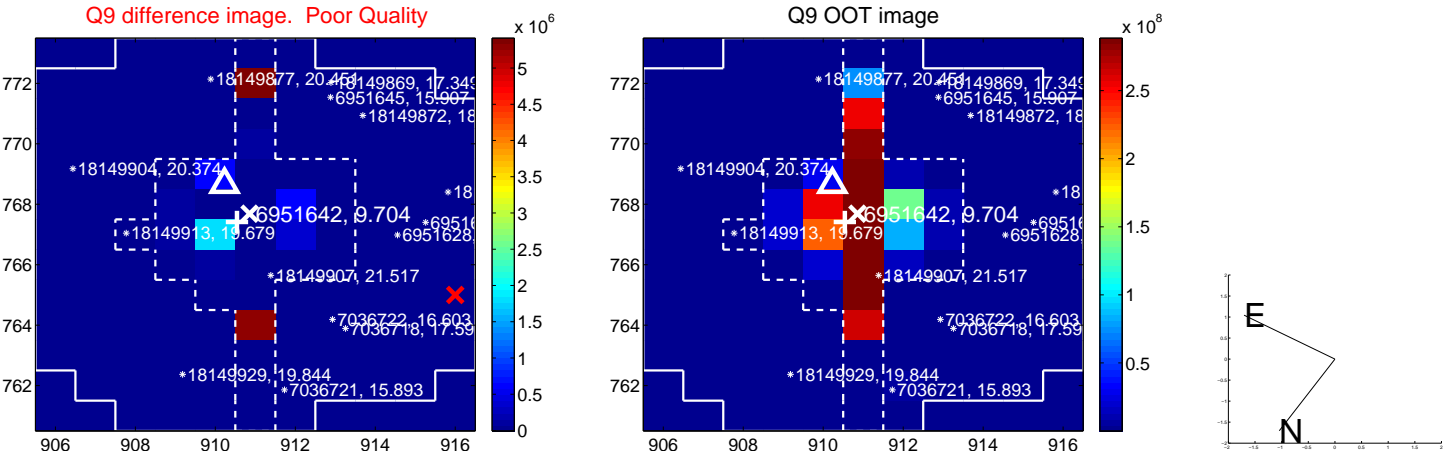


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





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



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

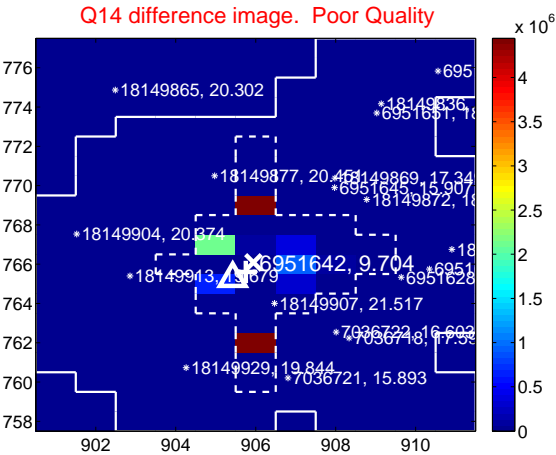
Q13 no difference image



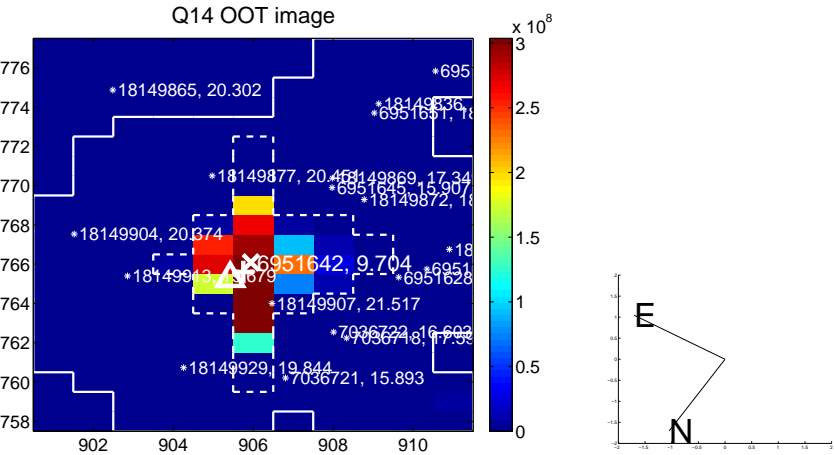
Q13 no OOT image



Q14 difference image. Poor Quality



Q14 OOT image



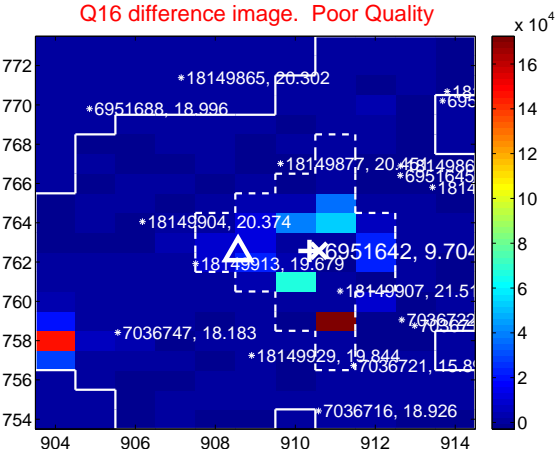
Q15 no difference image



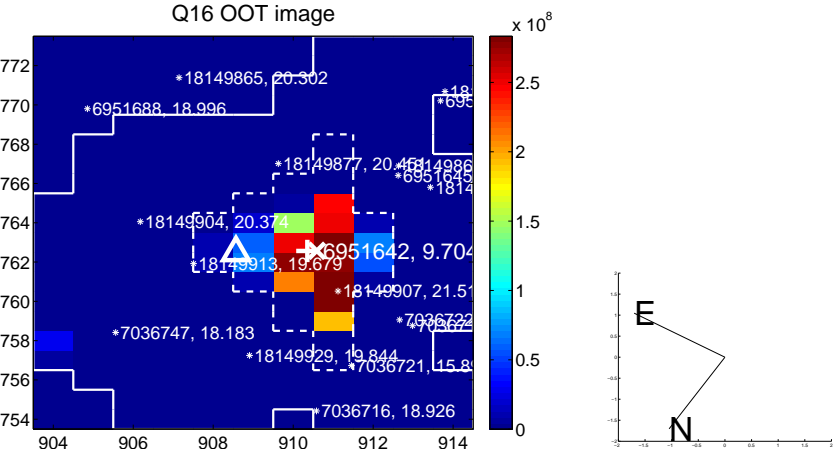
Q15 no OOT image



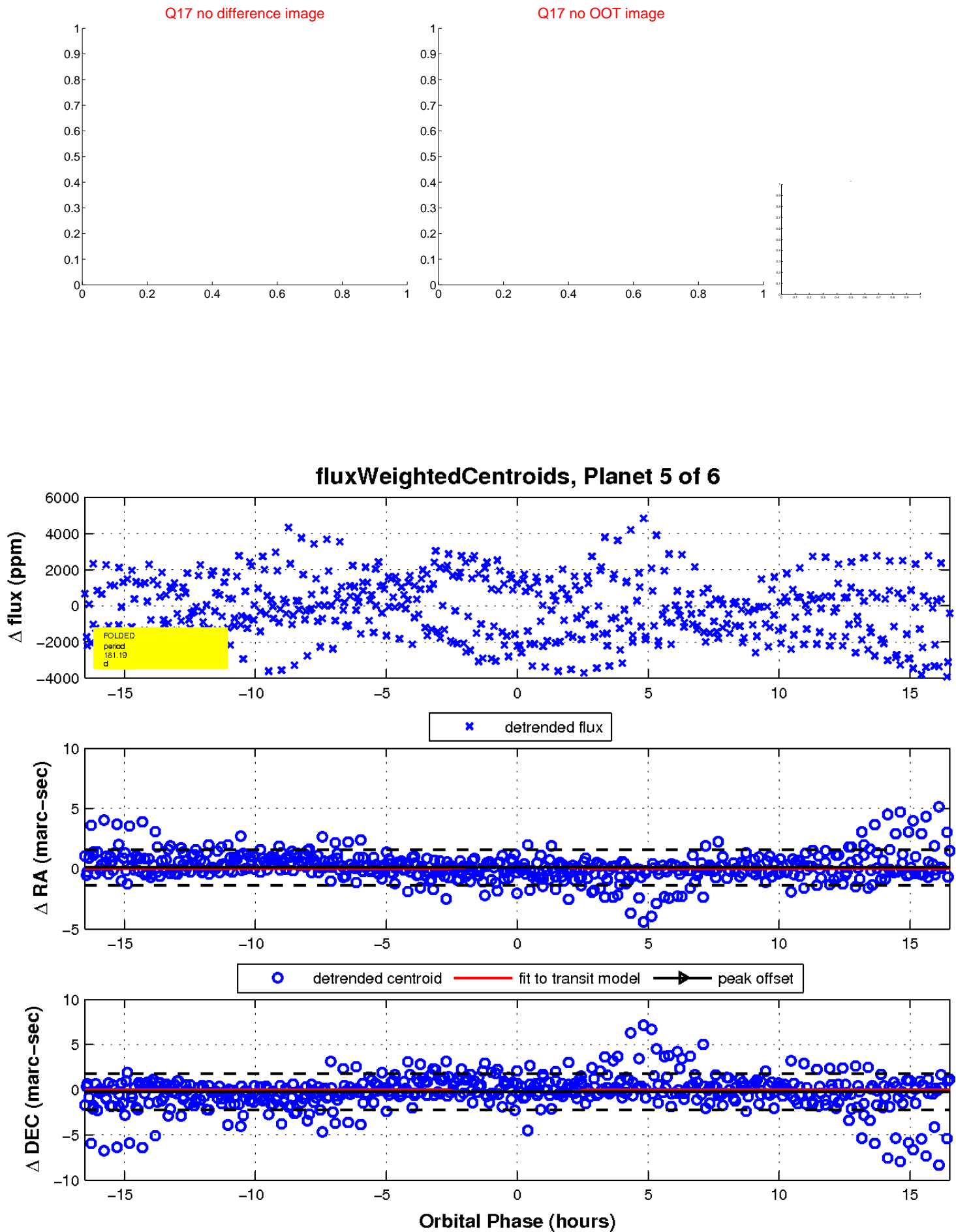
Q16 difference image. Poor Quality



Q16 OOT image

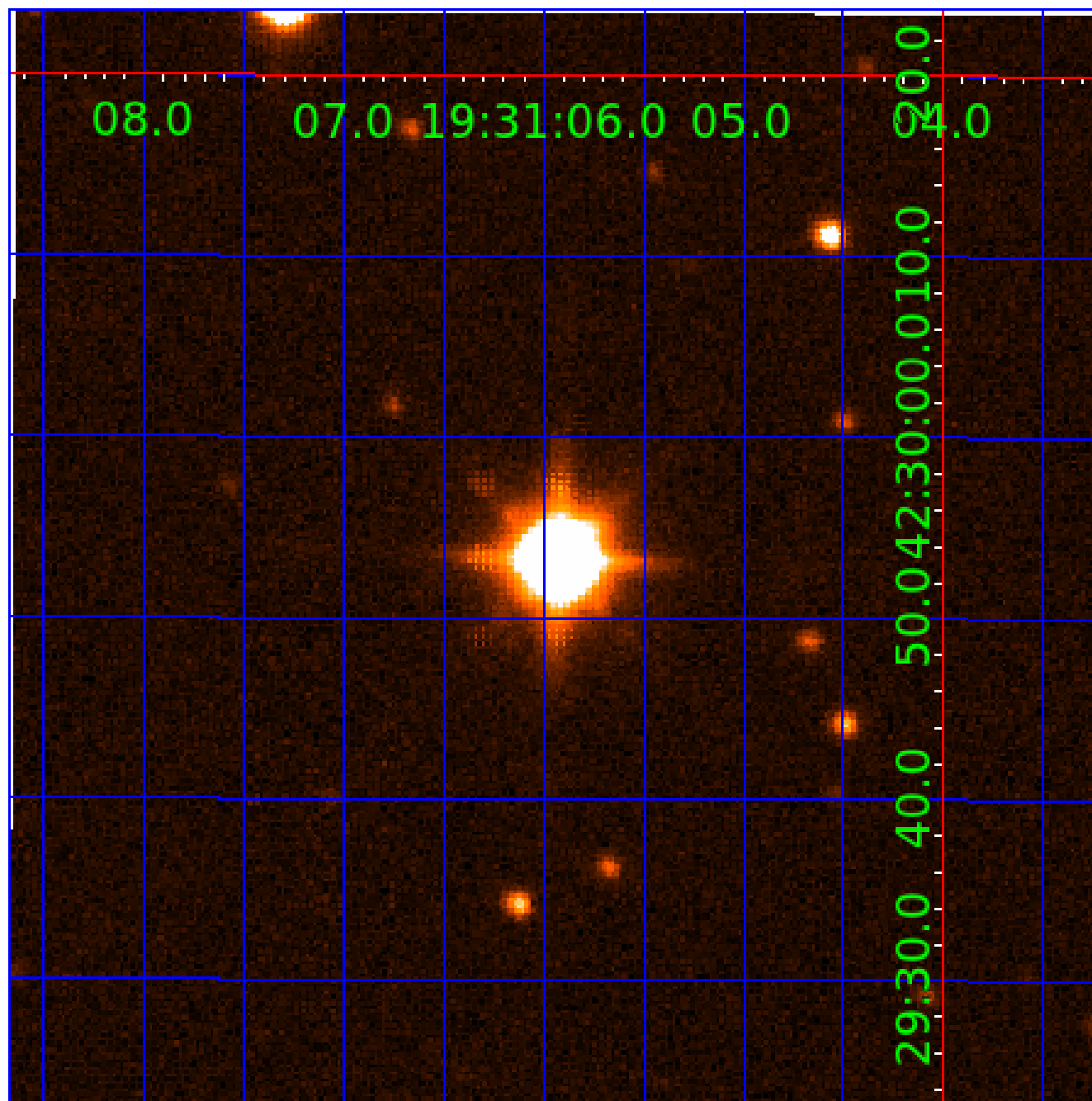


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 006951642

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
006951642-01	OBS	No	1.384118	131.786960	52.8	7.933	8.8	3.2	4.42	7365	3.40	59215.24
006951642-02	OBS	No	106.444106	158.130695	4190.1	11.707	8.8	9.0	4.42	7365	41.22	181.06
006951642-03	OBS	No	155.387535	256.874191	1947.1	10.584	9.3	7.0	4.42	7365	21.77	109.34
006951642-04	OBS	No	113.593551	225.208195	3881.9	9.049	8.8	9.8	4.42	7365	49.71	166.03
006951642-05	OBS	No	181.191432	275.335077	2015.9	5.509	8.4	7.6	4.42	7365	21.14	89.09
006951642-06	OBS	No	53.376225	132.903938	1975.6	7.744	7.4	9.1	4.42	7365	34.74	454.50

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
006951642-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
006951642-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
006951642-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
006951642-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
006951642-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV— MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
006951642-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE—TRANS_GAPPED—MOD_NONUNIQ_ALT—CENT_SATURATED

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

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

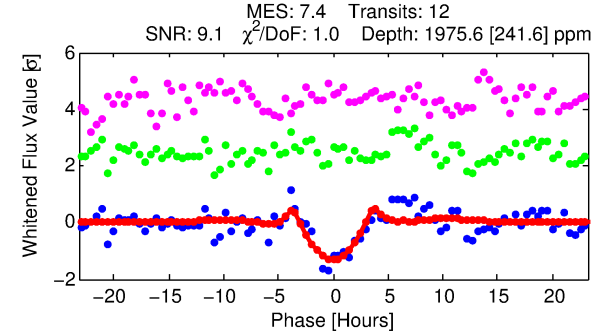
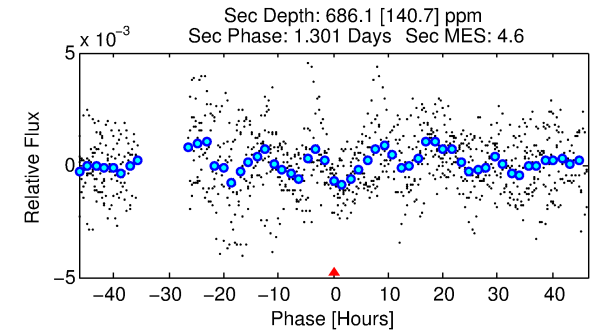
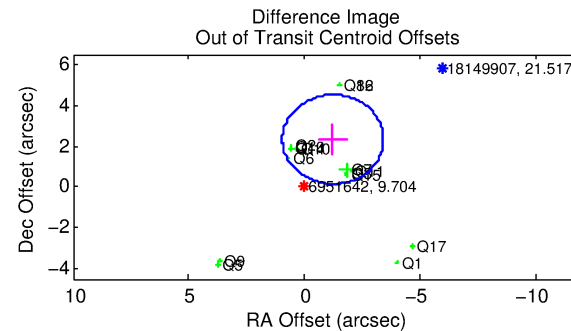
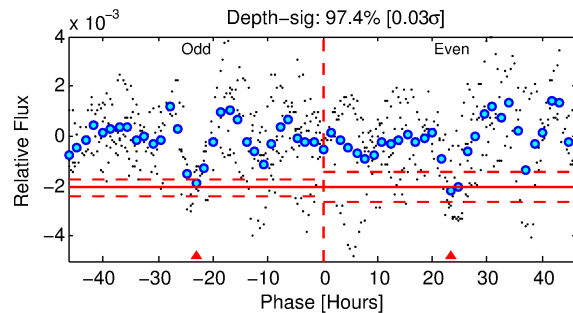
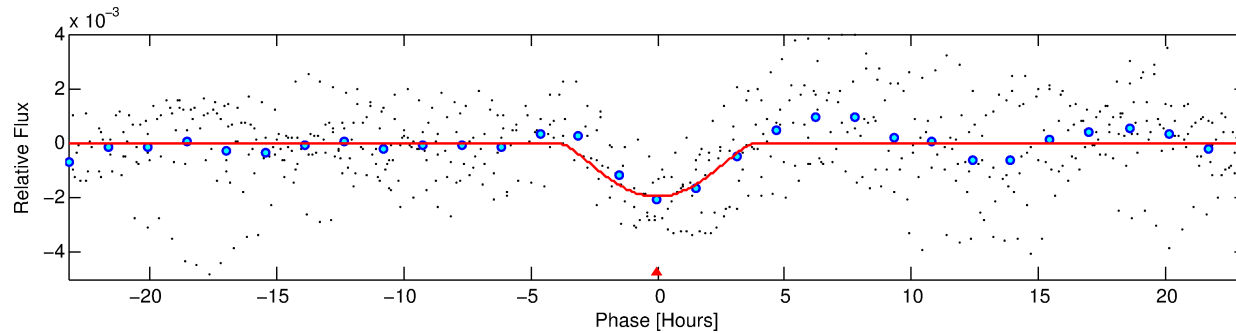
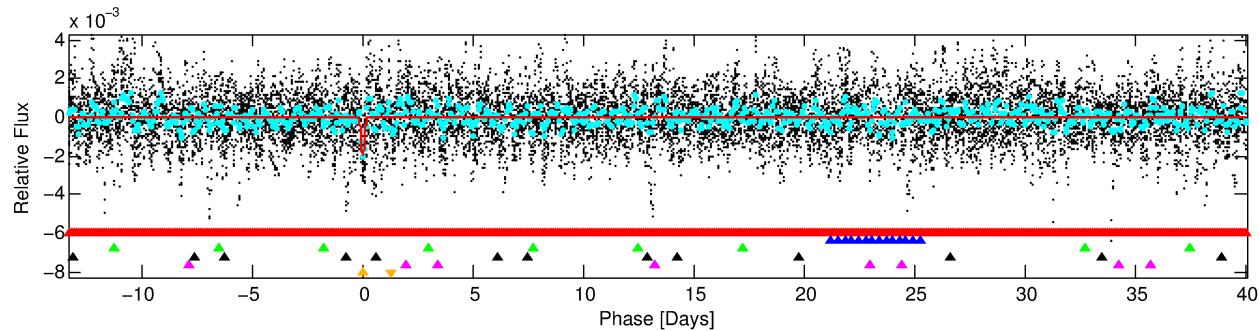
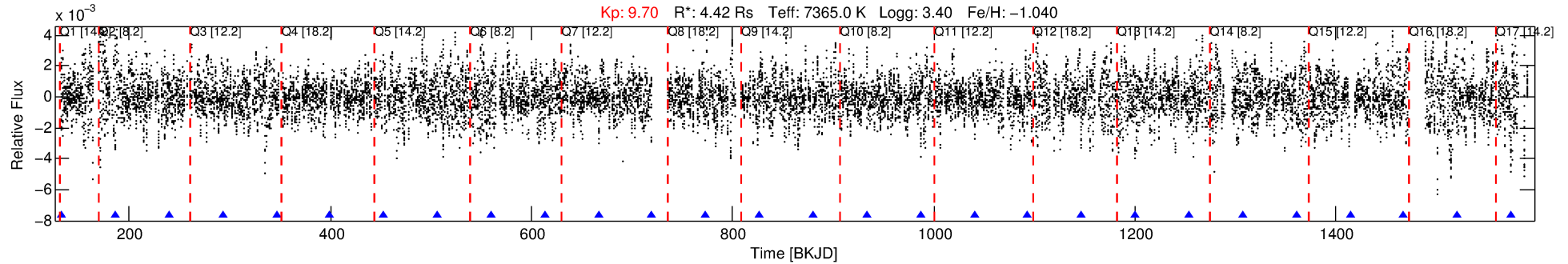
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 006951642-06

No Significant Match Found

# DV One-Page Summary

KIC: 6951642 Candidate: 6 of 6 Period: 53.376 d



## DV Fit Results:

Period = 53.37622 [0.00113] d  
Epoch = 132.9039 [0.0163] BKJD  
 $R_p/R^* = 0.0720$  [0.1143]  
 $a/R^* = 20.94$  [7.92]  
 $b = 1.00$  [0.17]  
 $\text{Seff} = 454.50$  [663.08]  
 $\text{Teq} = 1177$  [429] K  
 $R_p = 34.74$  [60.46] Re  
 $a = 0.3368$  [0.2808] AU  
 $\text{Ag} = 35.47$  [124.05] [0.28 $\sigma$ ]  
 $\text{Teffp} = 4442$  [3539] K [0.92 $\sigma$ ]

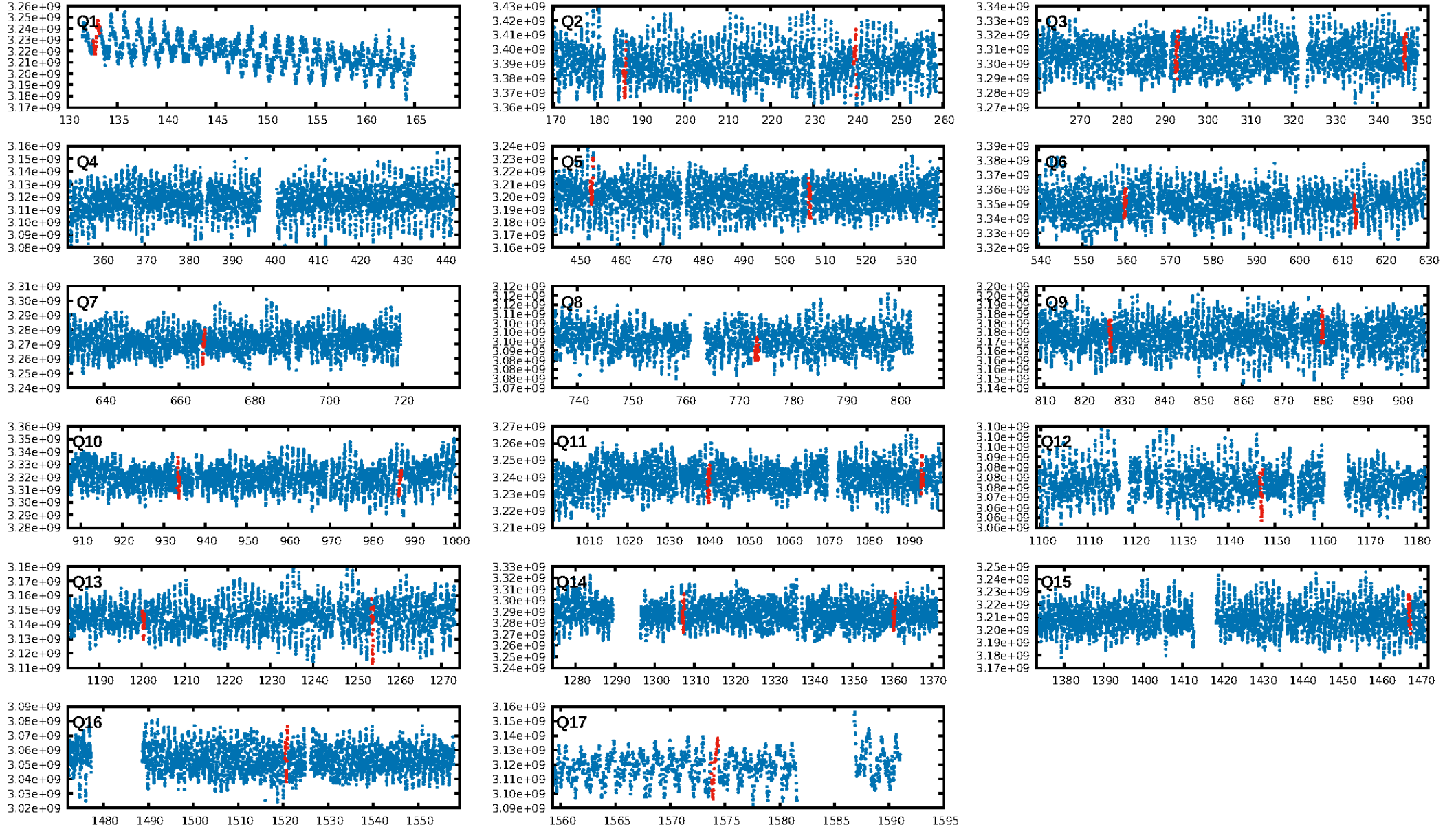
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [112.56 $\sigma$ ]  
LongPeriod-sig: 100.0% [90.73 $\sigma$ ]  
ModelChiSquare2-sig: 30.0%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 3.19e-08  
RollingBand-fgt: 1.00 [12/12]  
GhostDiagnostic-chr: N/A  
Centroid-sig: 64.2%  
Centroid-so: 1.143 arcsec [6.32 $\sigma$ ]  
OotOffset-rm: 2.641 arcsec [3.63 $\sigma$ ]  
KicOffset-rm: 4.092 arcsec [5.57 $\sigma$ ]  
OotOffset-st: 4/4/3/5 [16]  
KicOffset-st: 4/4/3/5 [16]  
DiffImageQuality-fgm: 0.00 [0/16]  
DiffImageOverlap-fno: 0.00 [0/16]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 12:57:01 Z

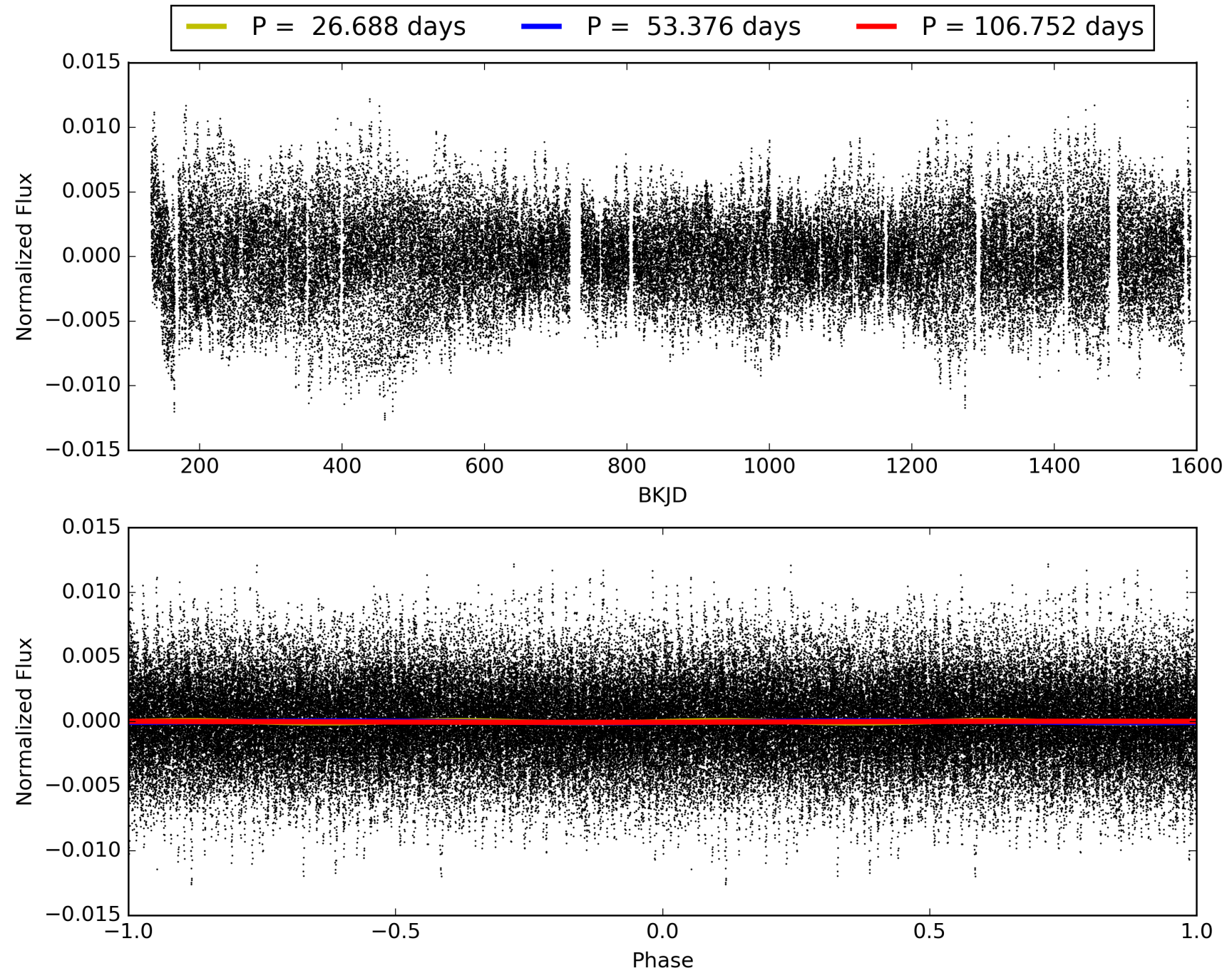
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 006951642-06, PDC Light Curves



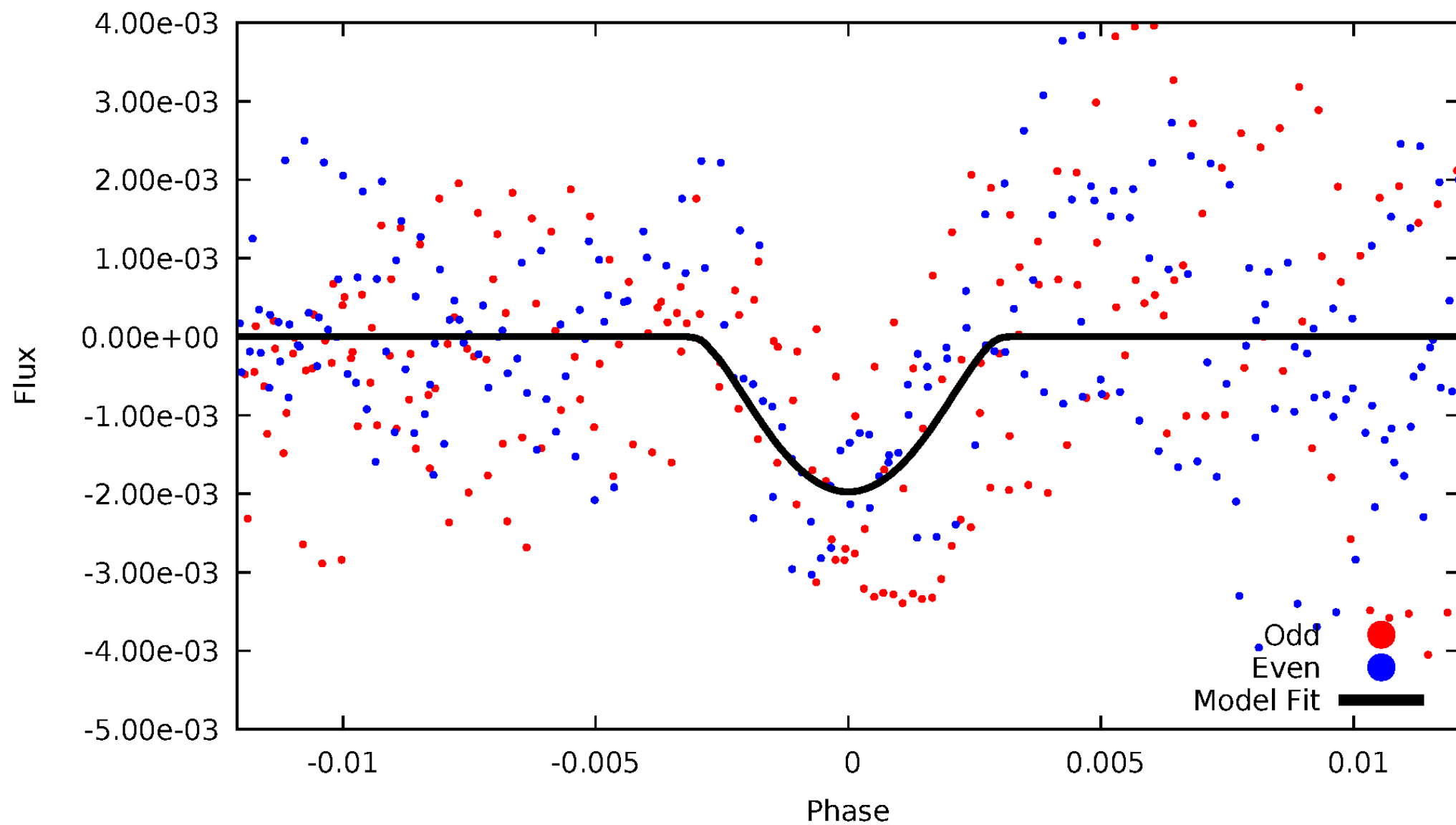


TCE 006951642-06



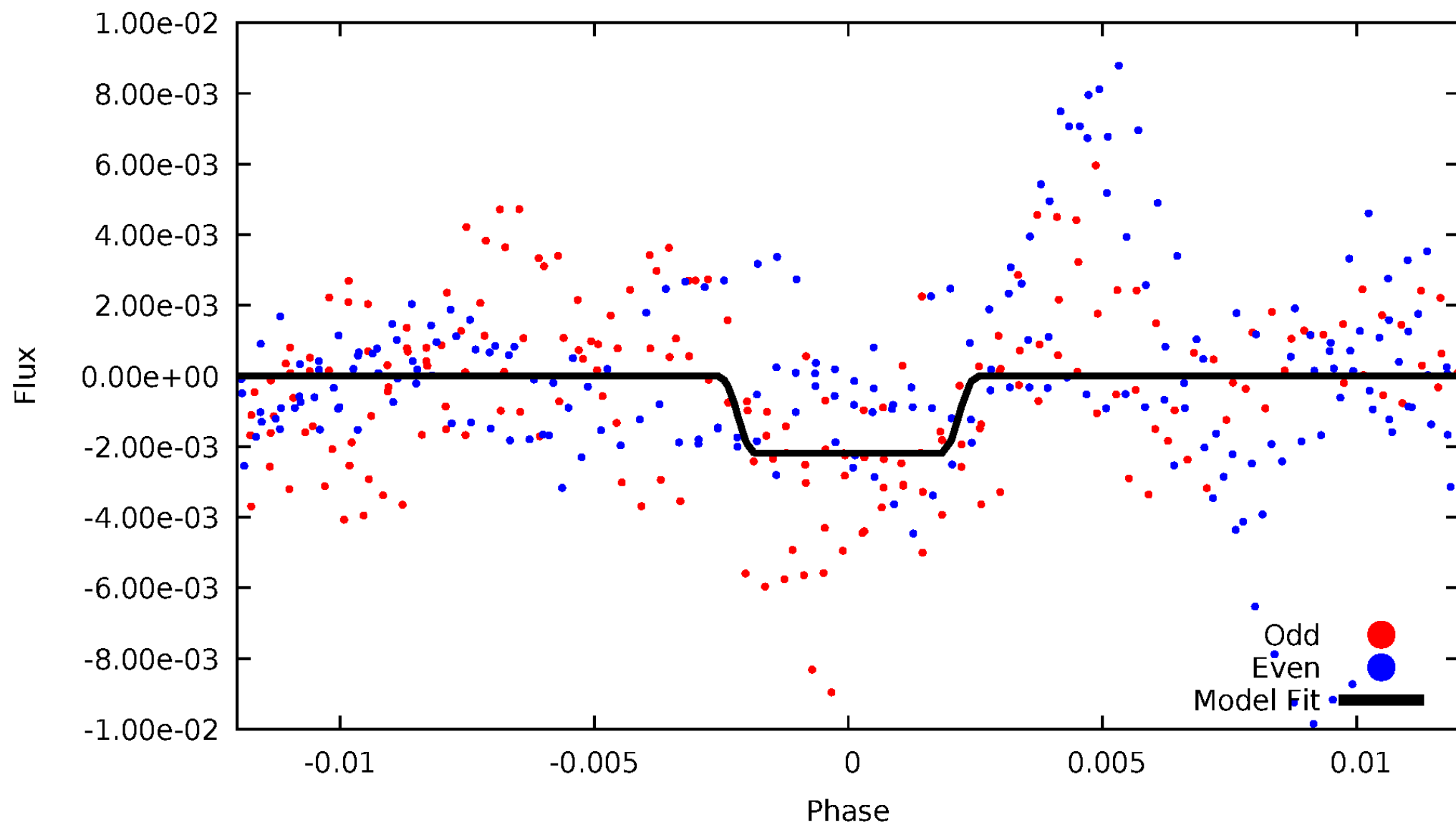
# DV Odd/Even

TCE 006951642-06



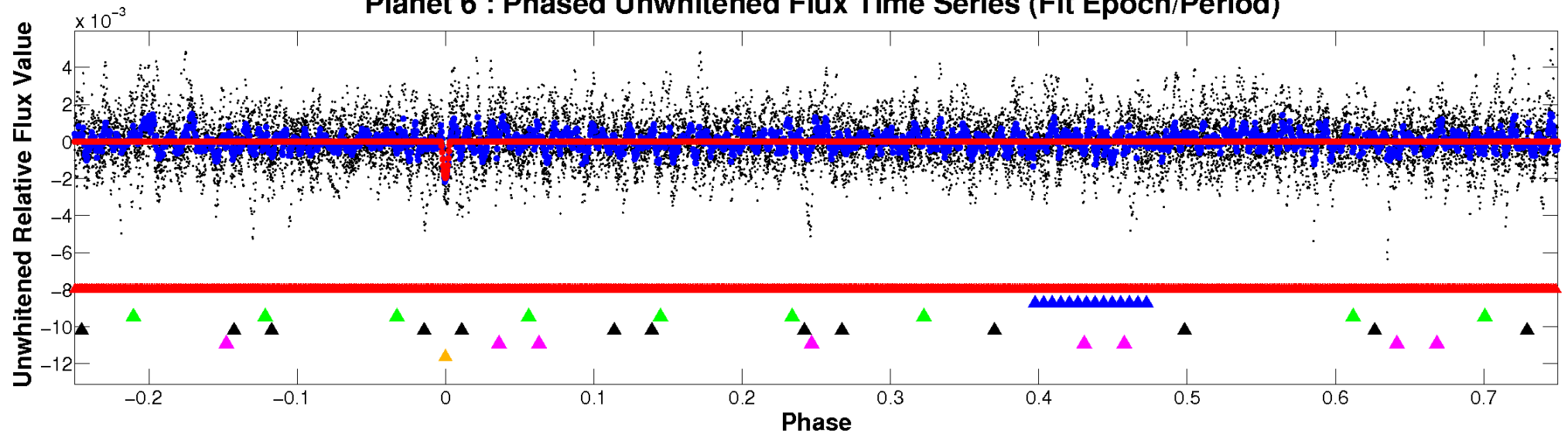
# ALT Odd/Even

TCE 006951642-06

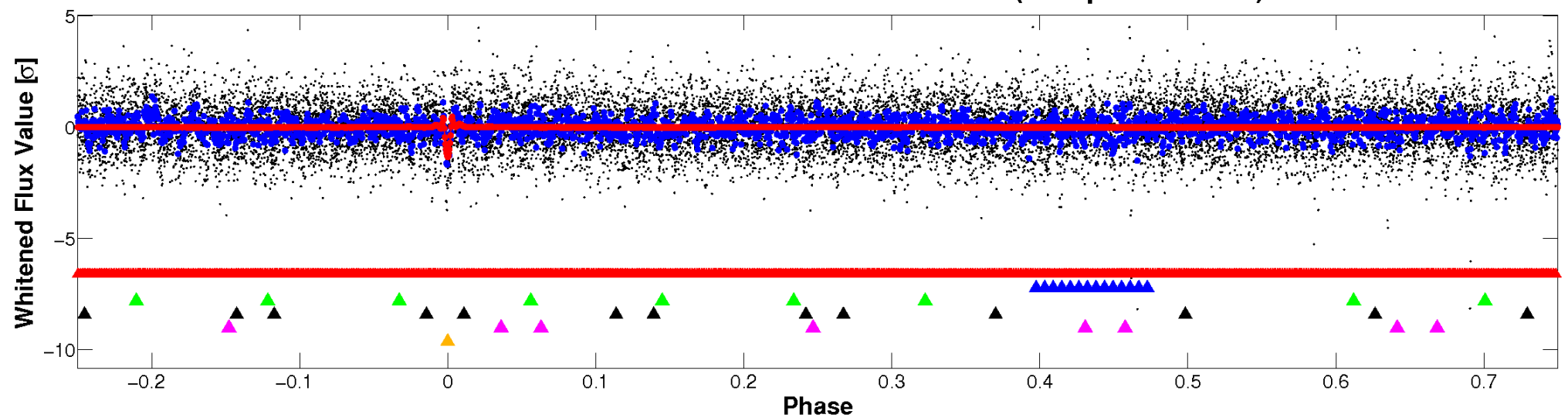


# Non-Whitened Vs. Whitened Light Curve

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

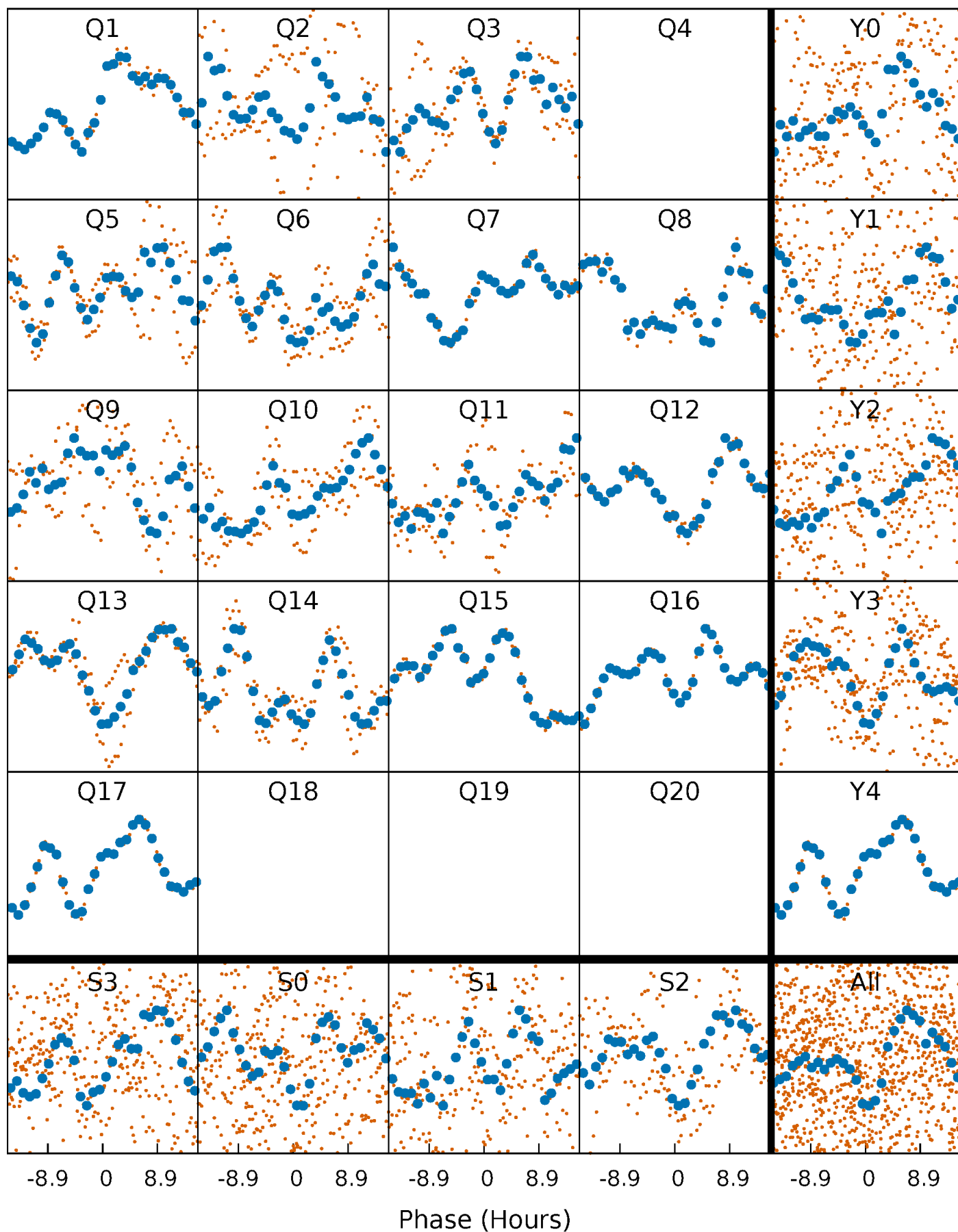


## Planet 6 : Phased Whitened Flux Time Series (Fit Epoch/Period)



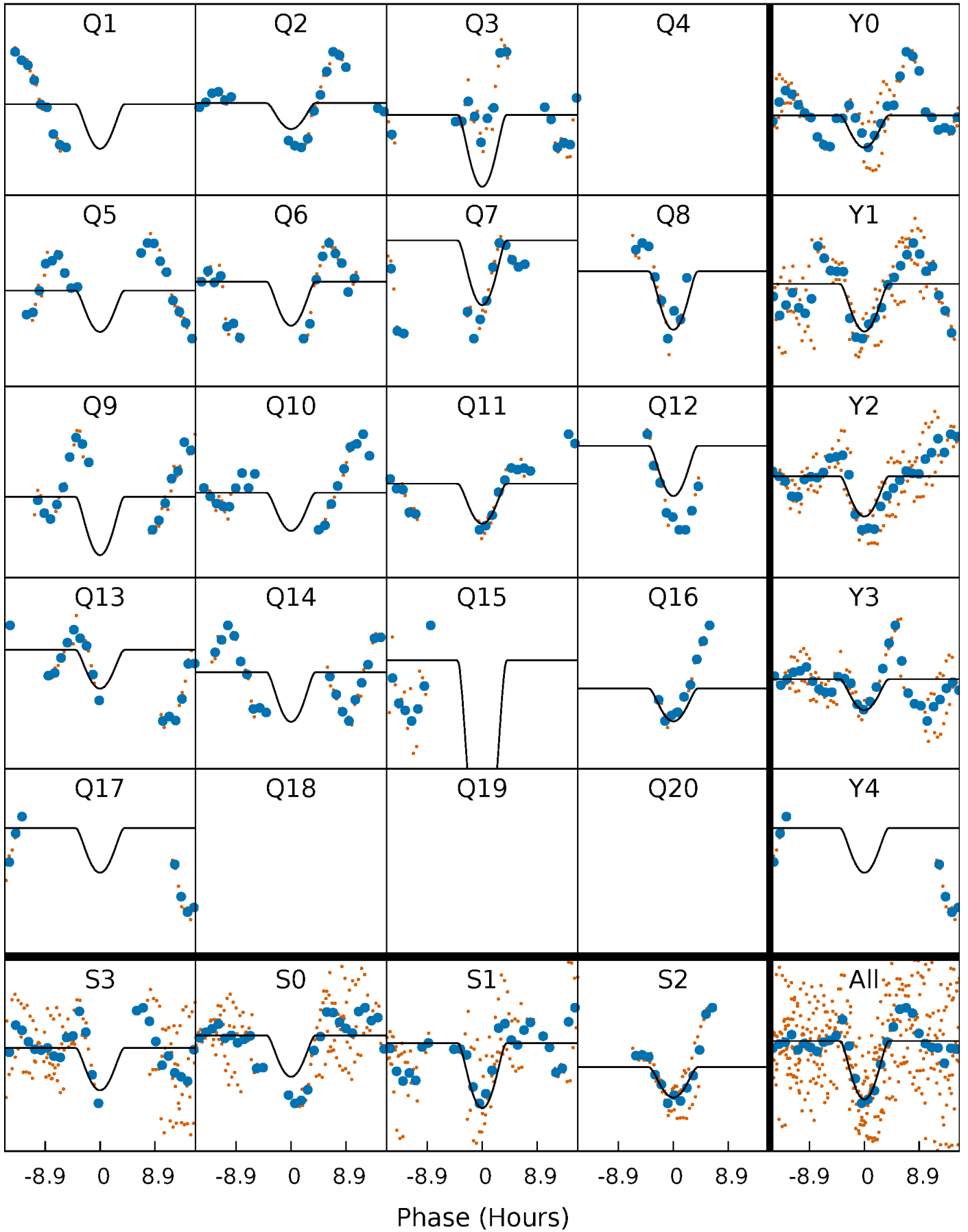
# PDC Quarter-Phased Transit Curves

TCE 006951642-06 P= 53.376225 Days  $T_0=132.903938$  (BKJD)



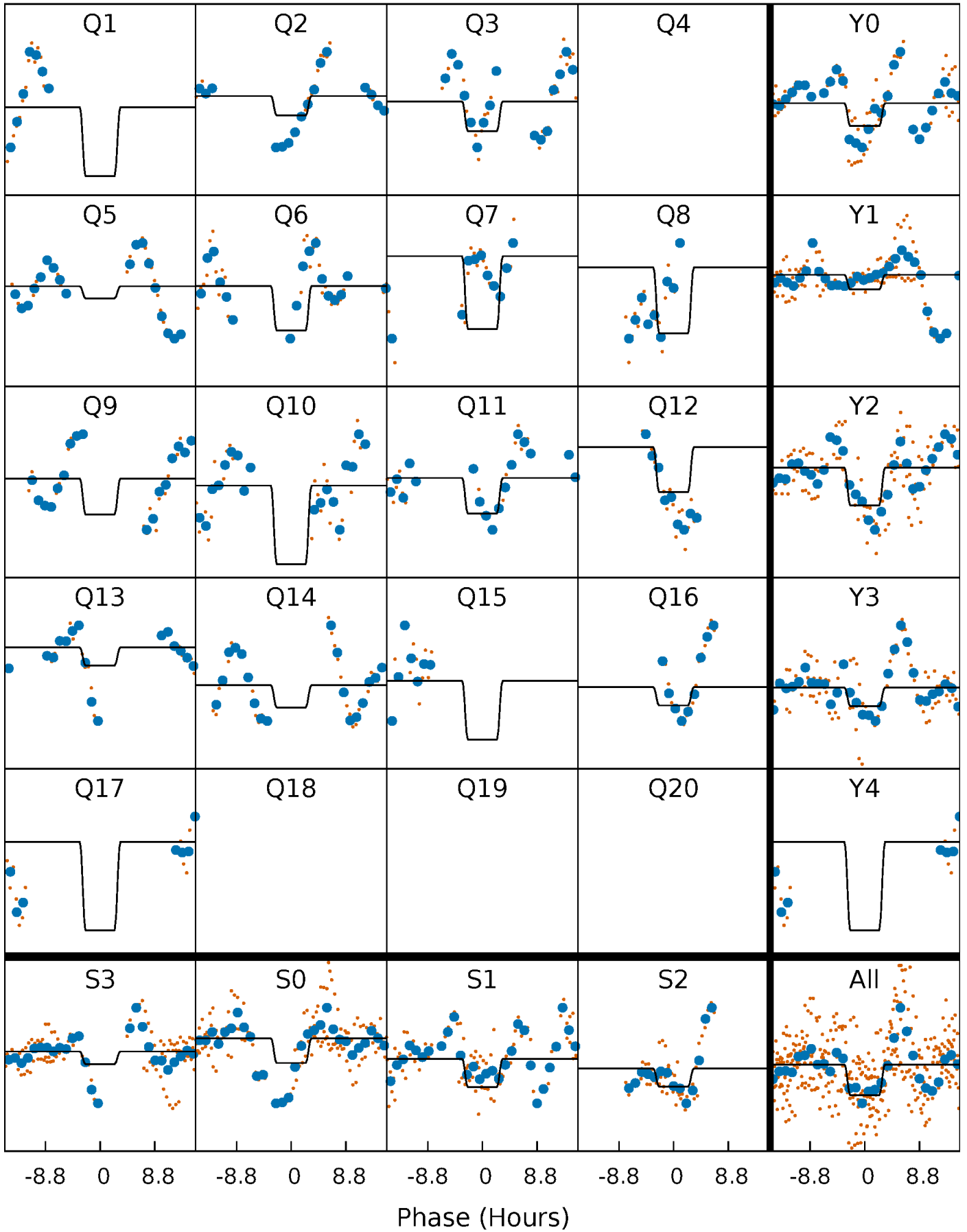
# DV Quarter-Phased Transit Curves

TCE 006951642-06 P= 53.376225 Days  $T_0=132.903938$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 006951642-06 P= 53.371034 Days  $T_0=133.013062$  (BKJD)

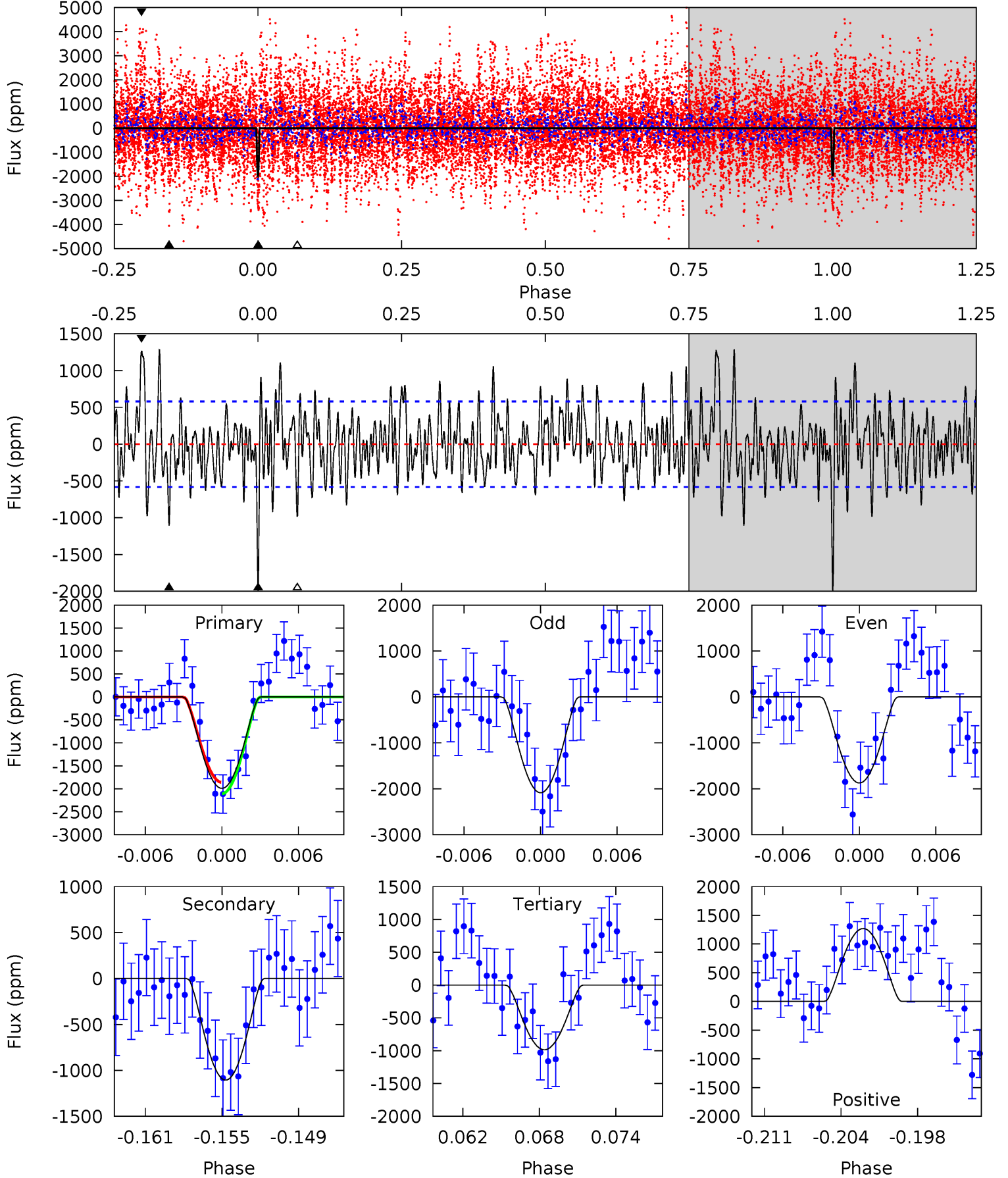




# DV Model-Shift Uniqueness Test

006951642-06, P = 53.376225 Days, E = 79.527713 Days

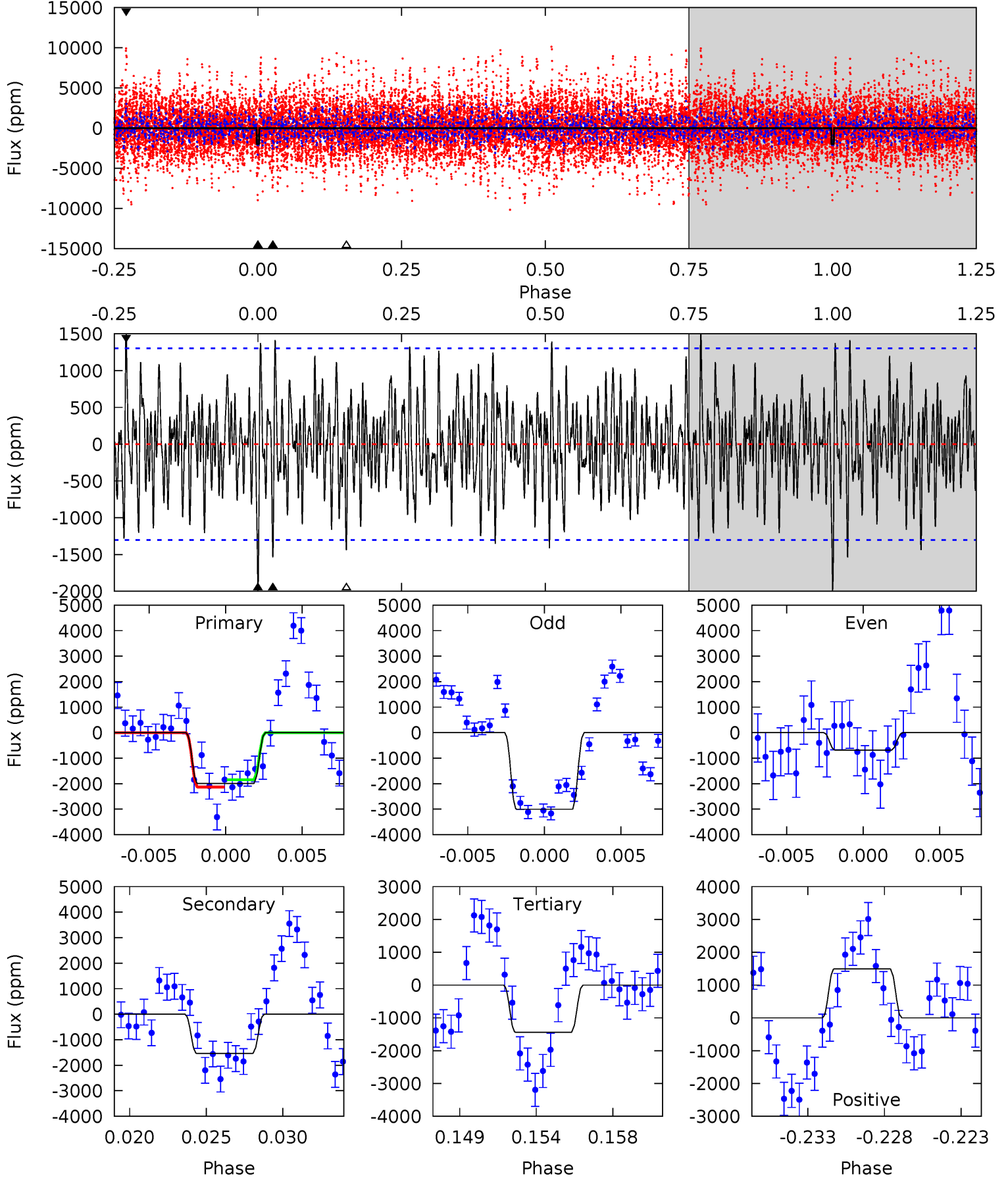
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
17.5	9.73	8.68	11.2	5.12	2.74	3.29	8.84	6.35	1.05	-1.44	0.94	0.91	0.39	1.10



# Alt Model-Shift Uniqueness Test

006951642-06, P = 53.371034 Days, E = 79.642028 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
7.90	6.09	5.70	5.92	5.16	2.81	1.98	2.20	1.98	0.39	0.17	4.59	1.68	0.43	0.57



### Stellar Parameters For KIC 006951642

	$T_{\text{eff}} (K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (g \cdot \text{cm}^{-3})$
	$7365^{+233}_{-285}$	$3.399^{+0.893}_{-0.094}$	$-1.040^{+0.300}_{-0.300}$	$4.422^{+0.556}_{-3.149}$	$1.789^{+0.126}_{-0.753}$	$0.029^{+0.690}_{-0.009}$
	+3%/-4%	+26%/-3%	+29%/-29%	+13%/-71%	+7%/-42%	+2369%/-30%
Source	KIC0	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 006951642-06 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-1106 \pm 114$	$44.78^{+45.36}_{-30.99}$	$1580^{+126}_{-318}$	$4163^{+2457}_{-769}$	$34^{+317}_{-26}$
Alt.	$-1538 \pm 253$	$34.99^{+45.00}_{-23.89}$	$1582^{+128}_{-307}$	$4794^{+3845}_{-1117}$	$74^{+628}_{-60}$

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

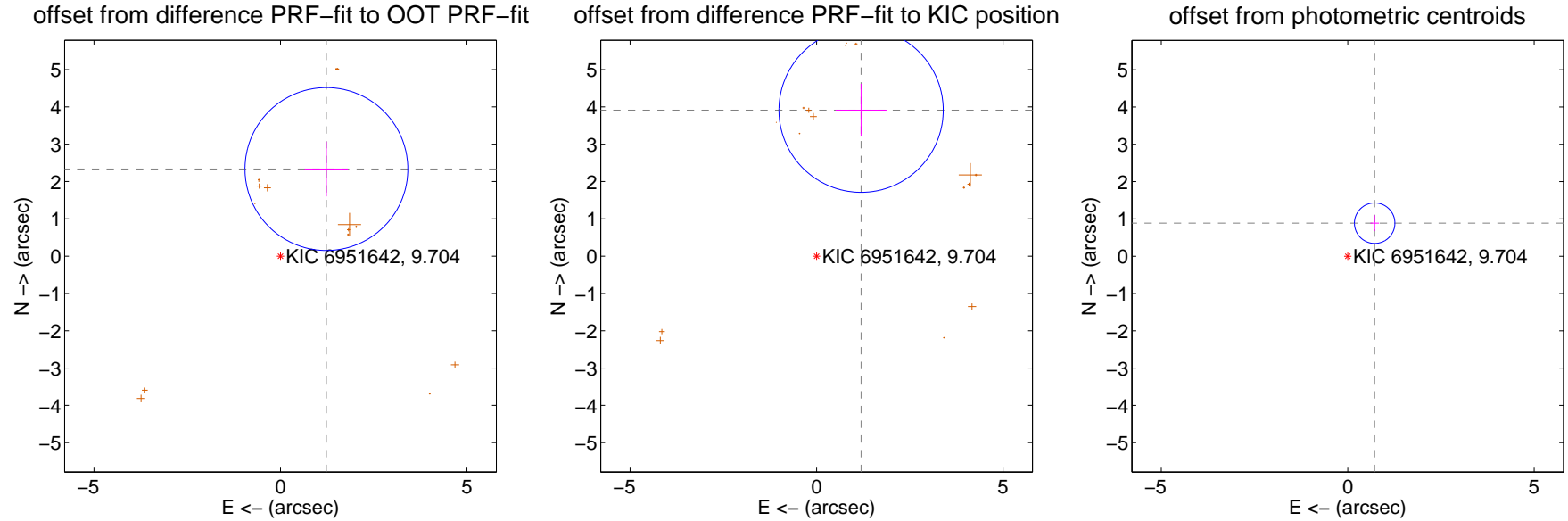
## DV Centroid Data

Supplemental centroid analysis for 006951642-06. **Kepler magnitude: 9.70.** Transit SNR 9.12

**There are 0 quarters with good PRF difference image offsets**

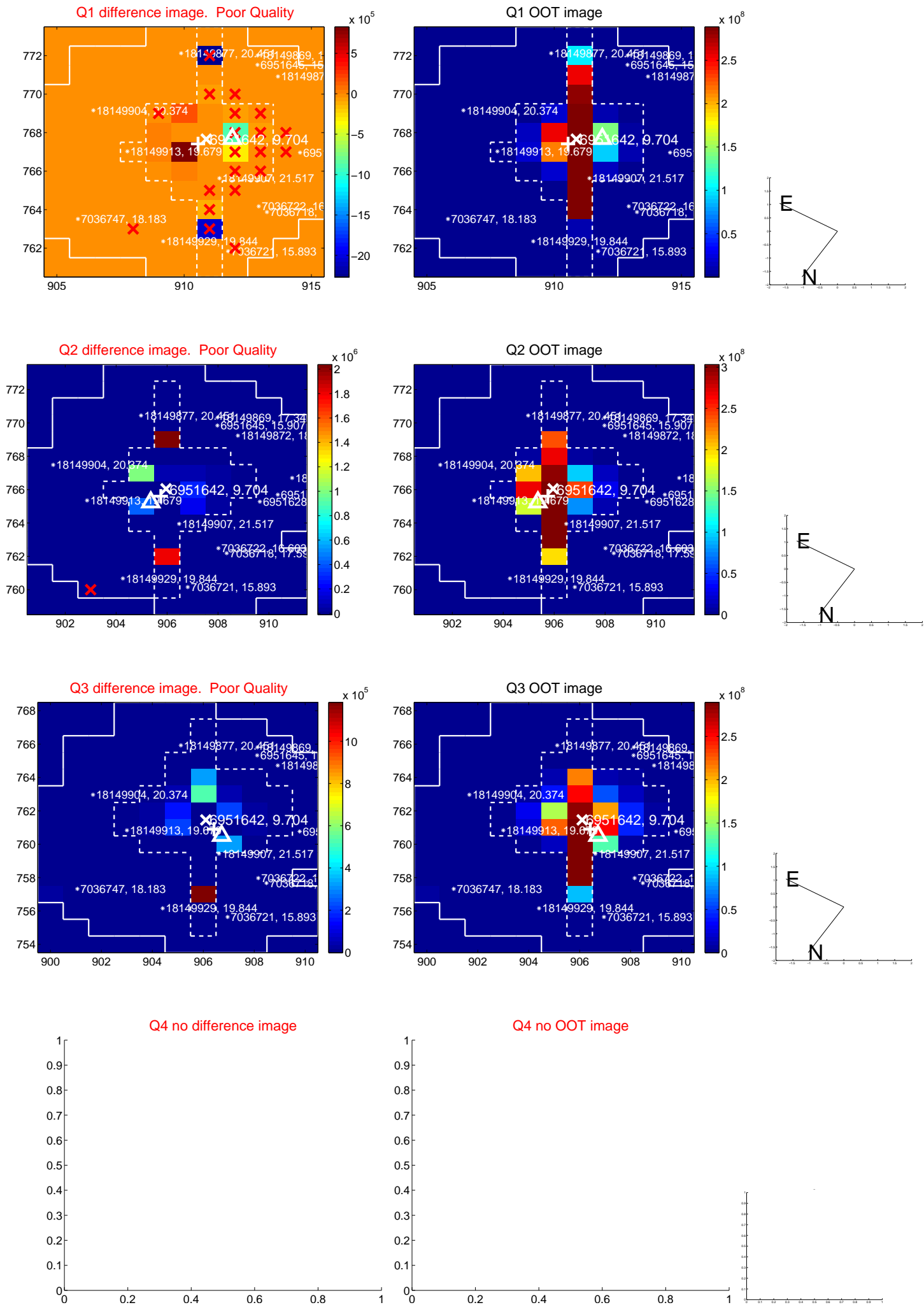
The direct PRF centroid is offset from the target star catalog position by about 1.64 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b><math>2.641 \pm 0.728</math></b>	<b>3.63</b>	$-1.232 \pm 0.581$	$2.335 \pm 0.735$
PRF-fit source offset from KIC position	<b><math>4.092 \pm 0.734</math></b>	<b>5.57</b>	$-1.194 \pm 0.681$	$3.914 \pm 0.706$
photometric centroid source offset	<b><math>1.14 \pm 0.18</math></b>	<b>6.32</b>	$-0.72 \pm 0.12$	$0.89 \pm 0.21$

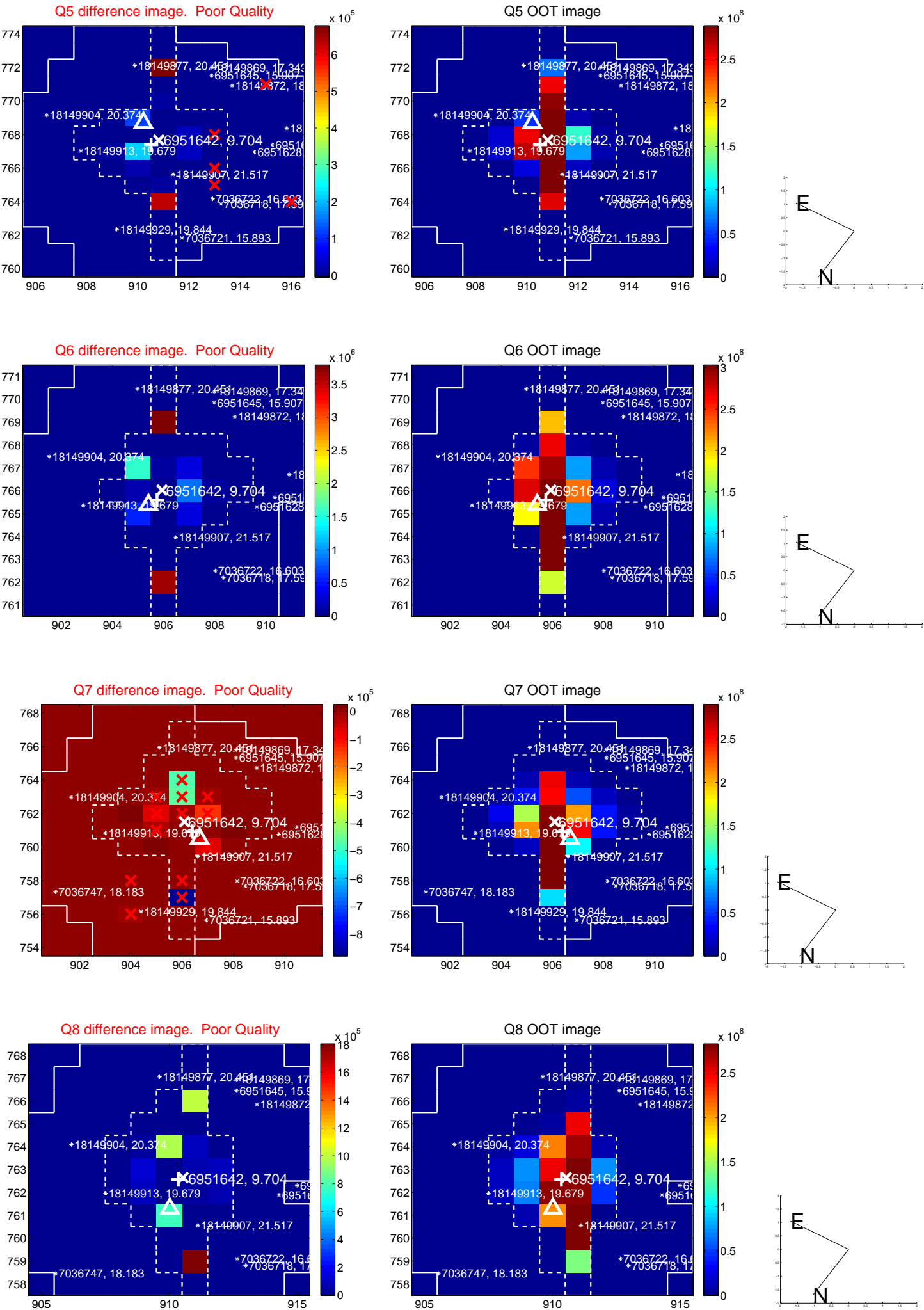


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

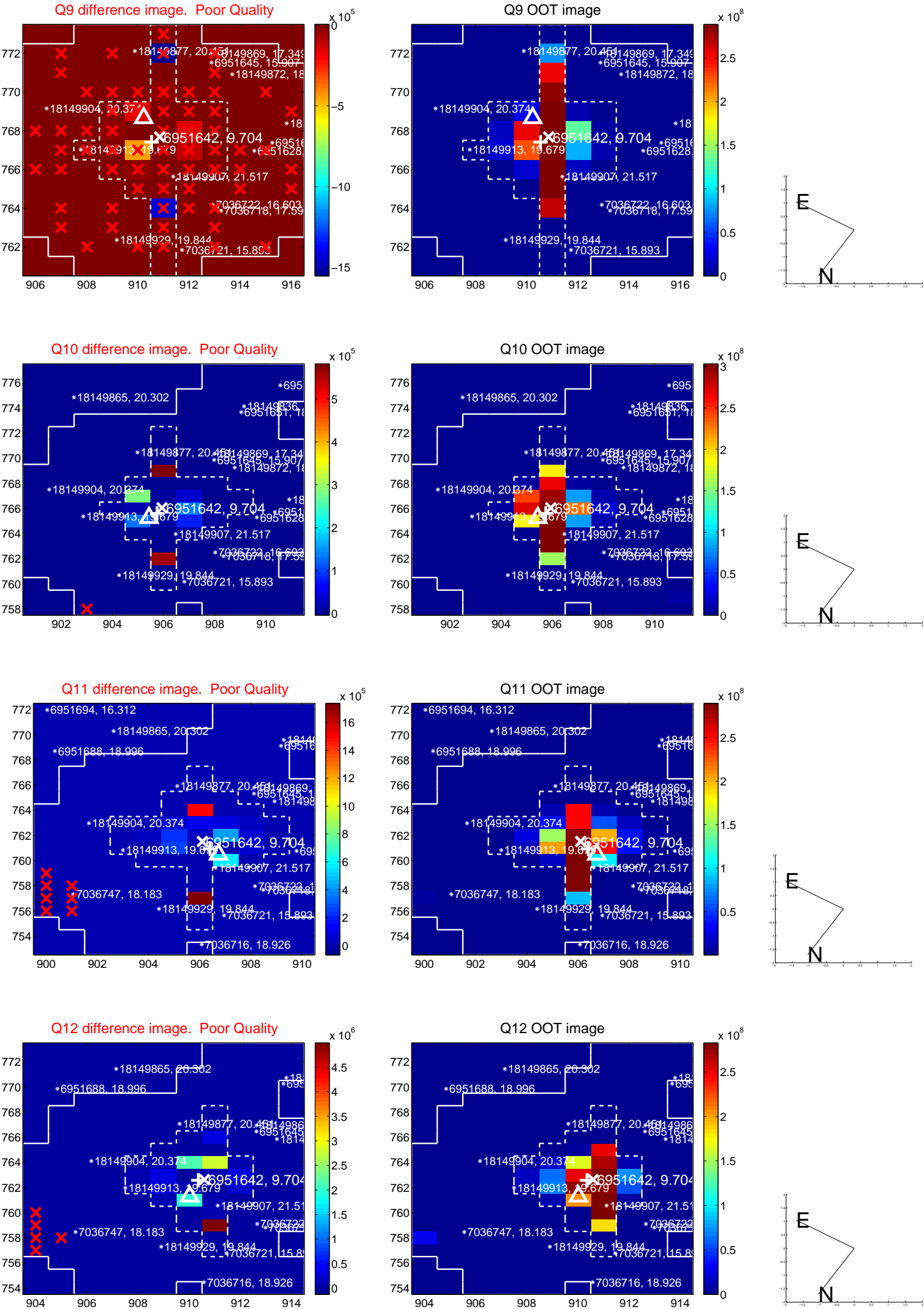
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

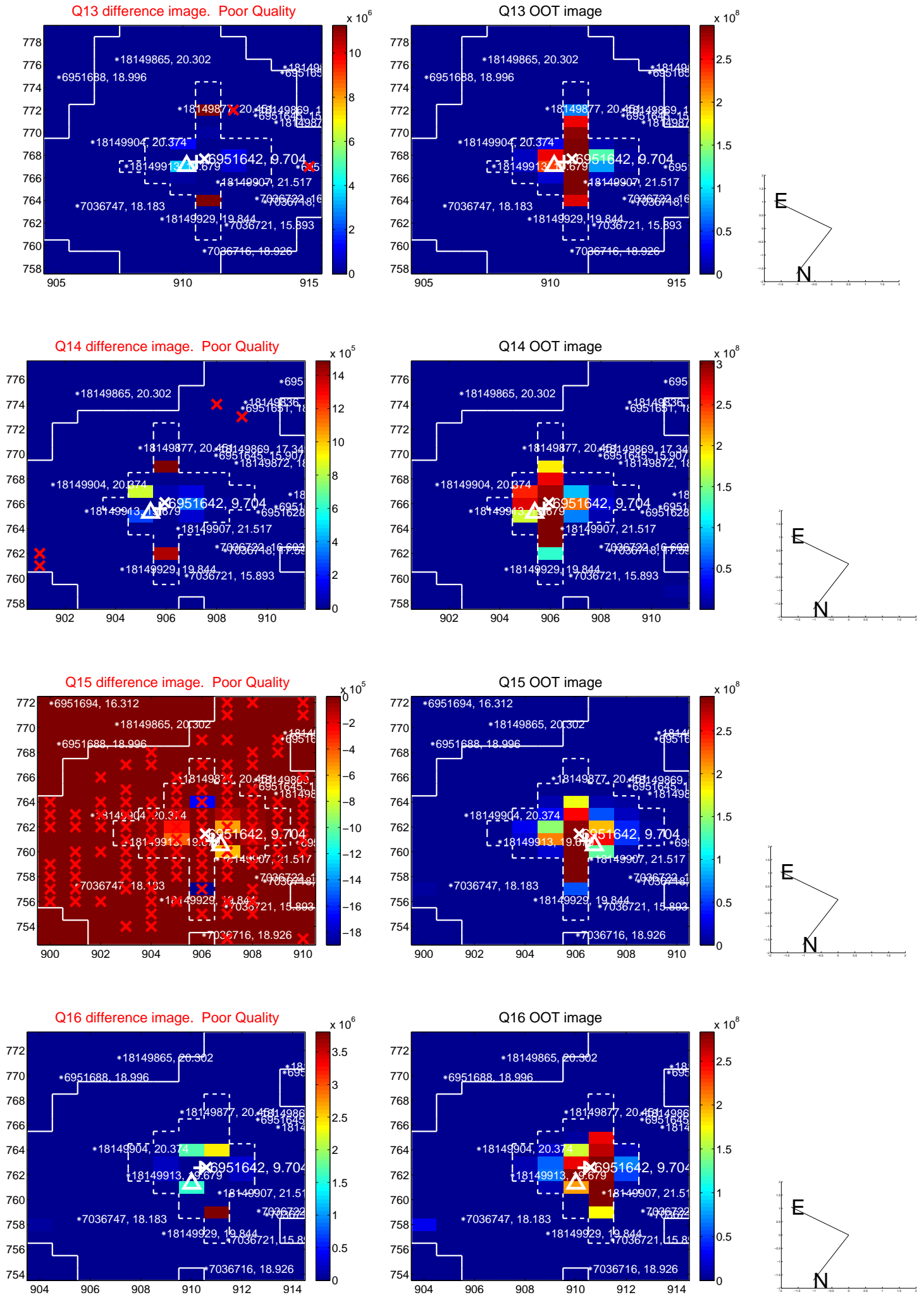


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

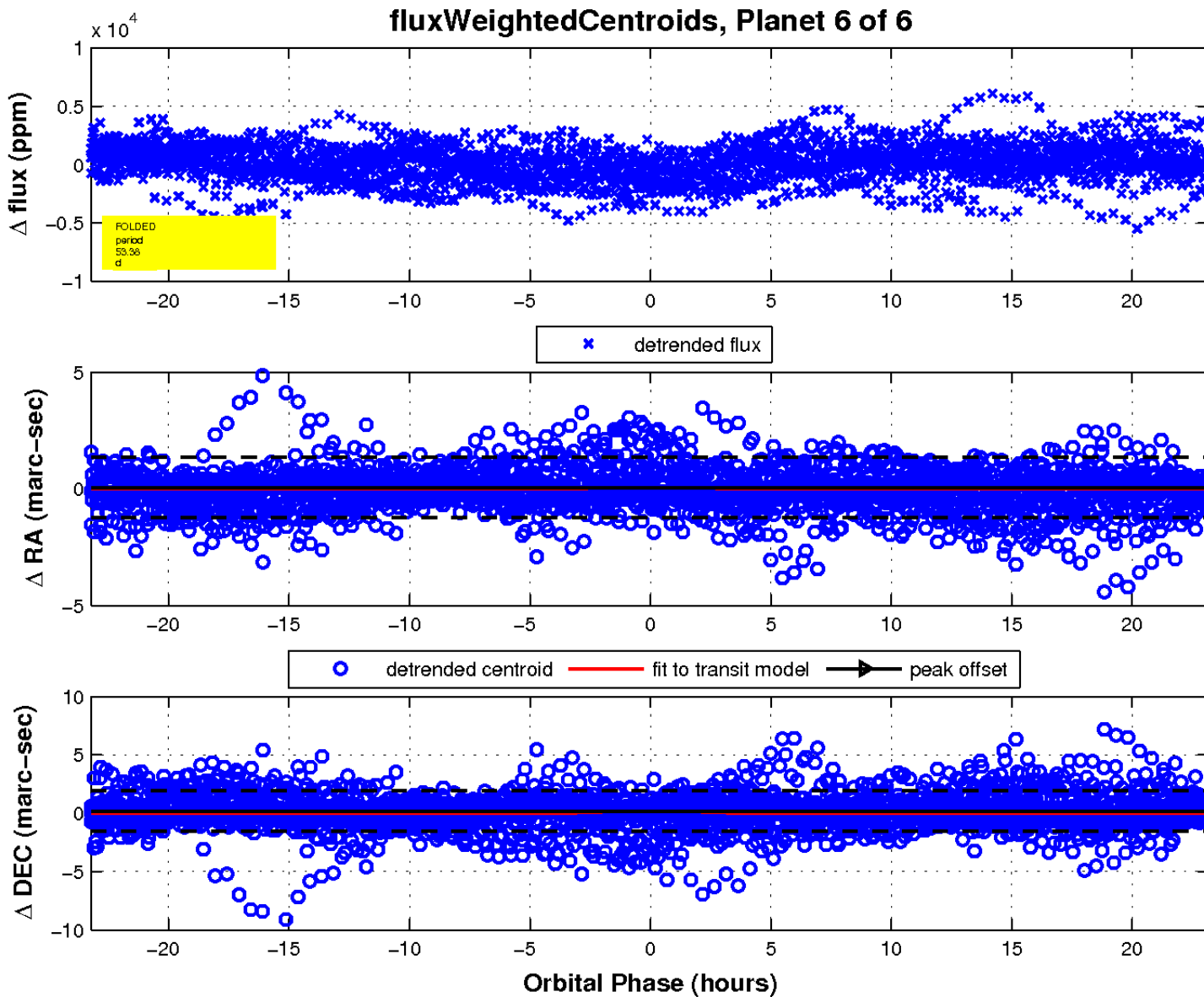
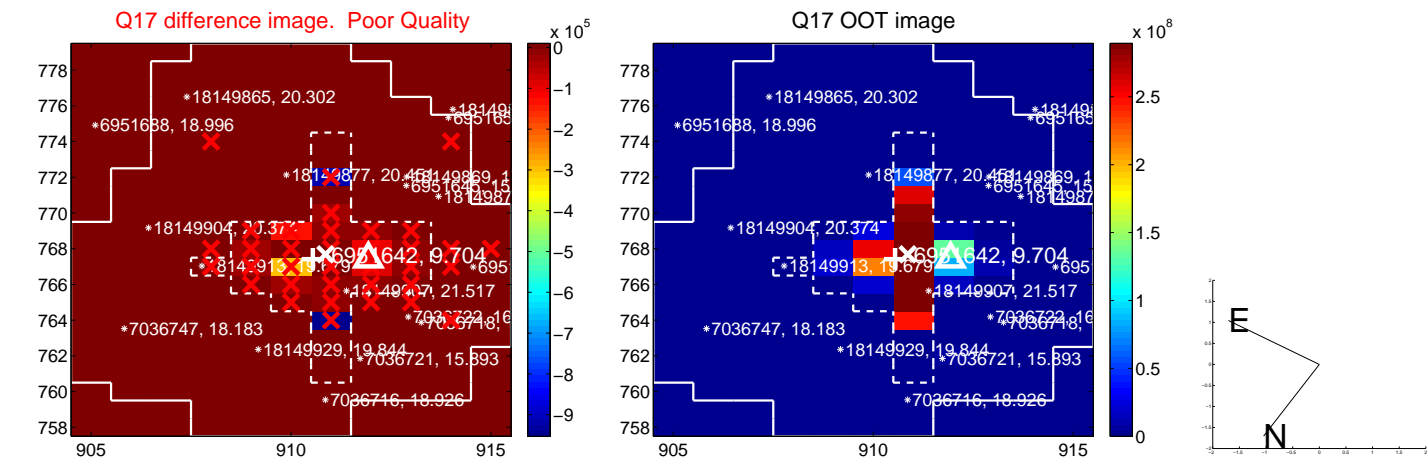




white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image

Declination

