

# KIC 004931390

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004931390-01	OBS	No	1.902349	133.308539	6.9	6.917	8.1	7.2	1.36	6642	0.42	3062.20
004931390-02	OBS	No	195.601524	215.748792	86.5	3.896	8.5	7.1	1.36	6642	1.45	6.36
004931390-03	OBS	No	7.609264	131.960703	15.9	5.582	8.8	9.3	1.36	6642	0.65	482.28

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004931390-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—CENT_SATURATED
004931390-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL_SKYE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—CENT_SATURATED
004931390-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—SAME_NTL_PERIOD—CENT_SATURATED

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

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

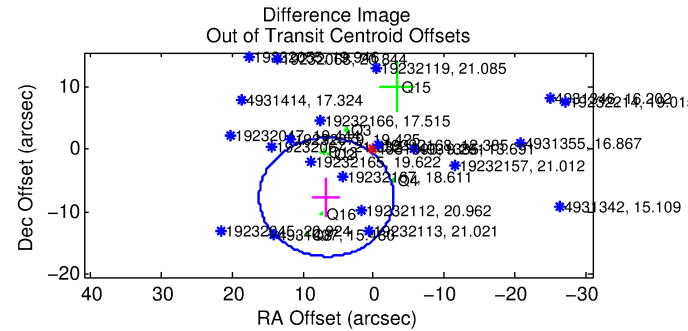
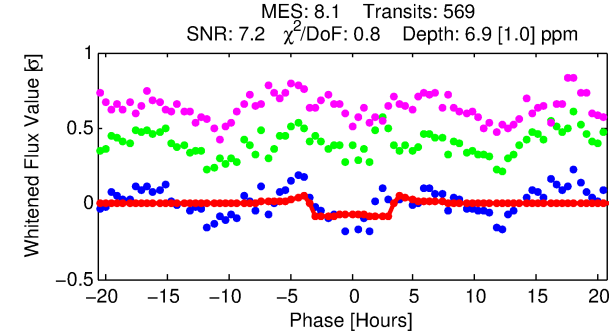
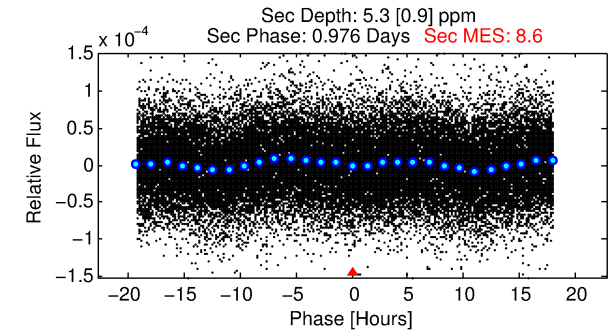
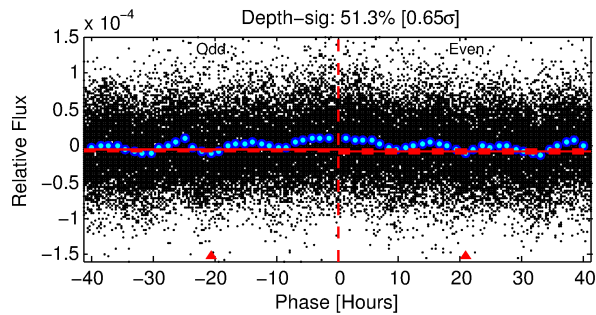
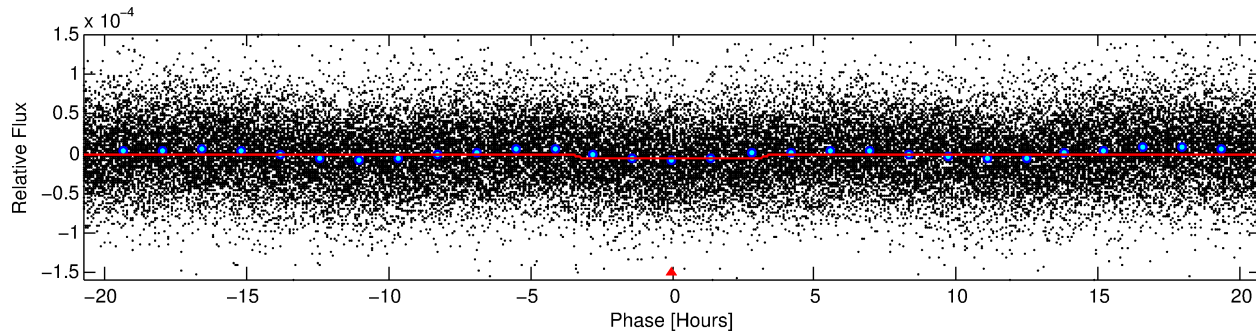
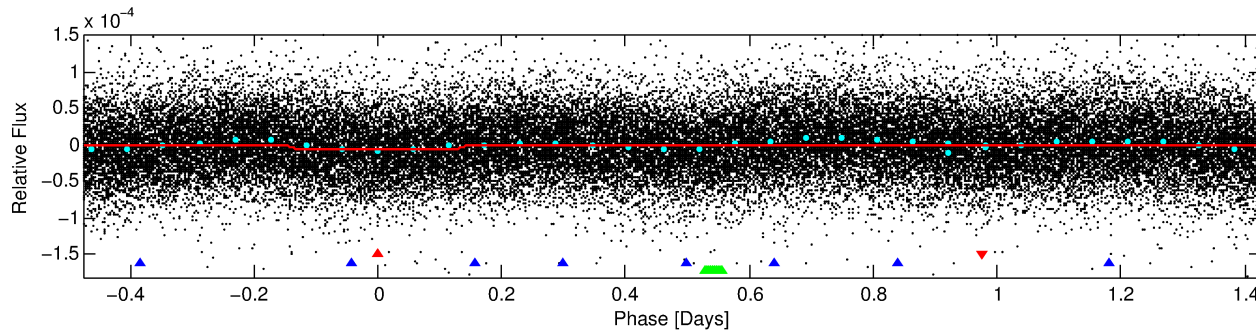
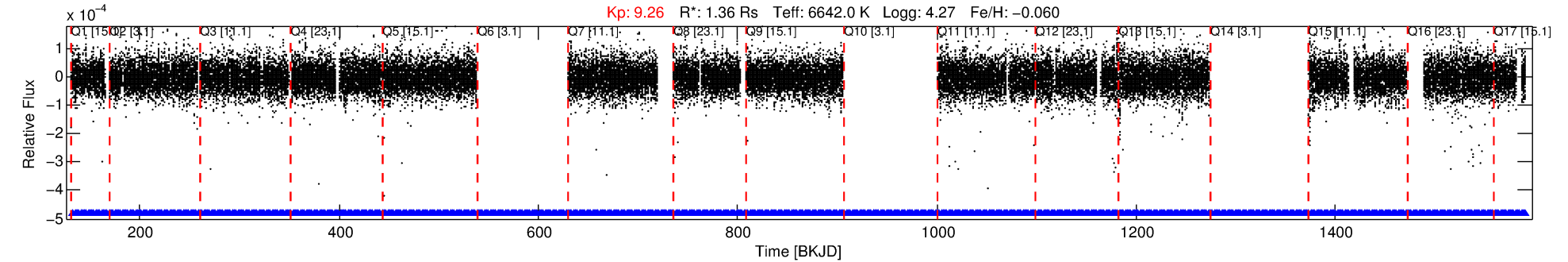
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 004931390-01

No Significant Match Found

# DV One-Page Summary

KIC: 4931390 Candidate: 1 of 3 Period: 1.902 d



## DV Fit Results:

Period = 1.90235 [0.00002] d  
Epoch = 133.3085 [0.0046] BKJD  
Rp/R\* = 0.0028 [0.0005]  
a/R\* = 1.32 [0.49]  
b = 0.90 [0.19]  
Seff = 3062.20 [184.54]  
Teq = 1897 [29] K  
Rp = 0.42 [0.07] Re  
a = 0.0325 [0.0008] AU  
Ag = 17.48 [6.56] [2.51σ]  
Teffp = 5996 [566] K [7.23σ]

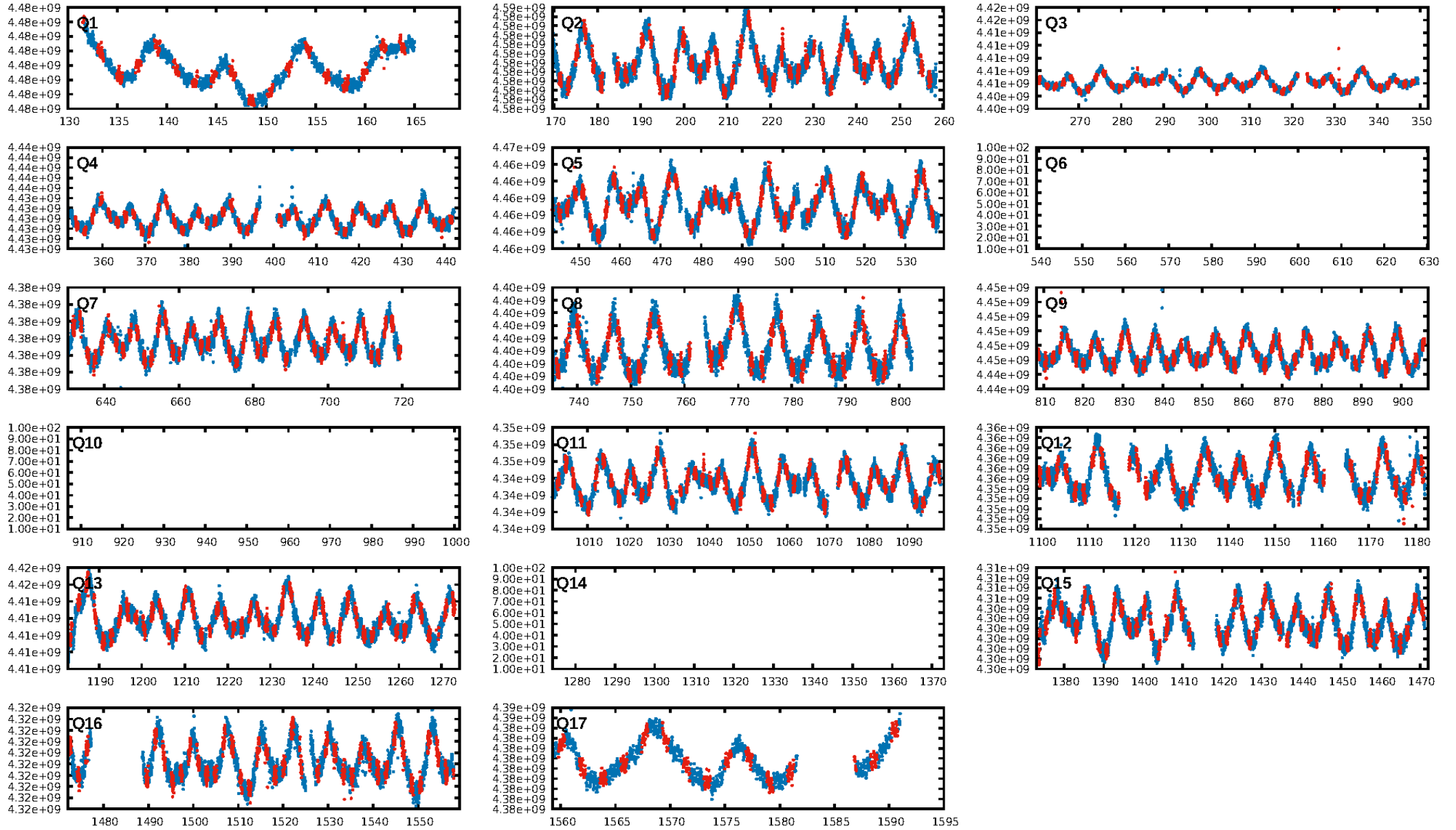
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [15.41σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 2.97e-11  
RollingBand-fig: 1.00 [536/536]  
GhostDiagnostic-chr: N/A  
Centroid-sig: 16.8%  
Centroid-so: 2.690 arcsec [1.29σ]  
OotOffset-rm: 10.200 arcsec [3.22σ]  
KicOffset-rm: 7.299 arcsec [2.37σ]  
OotOffset-st: 1/2/3/1 [7]  
KicOffset-st: 1/2/3/1 [7]  
DiffImageQuality-fgm: 0.00 [0/7]  
DiffImageOverlap-fno: 1.00 [14/14]

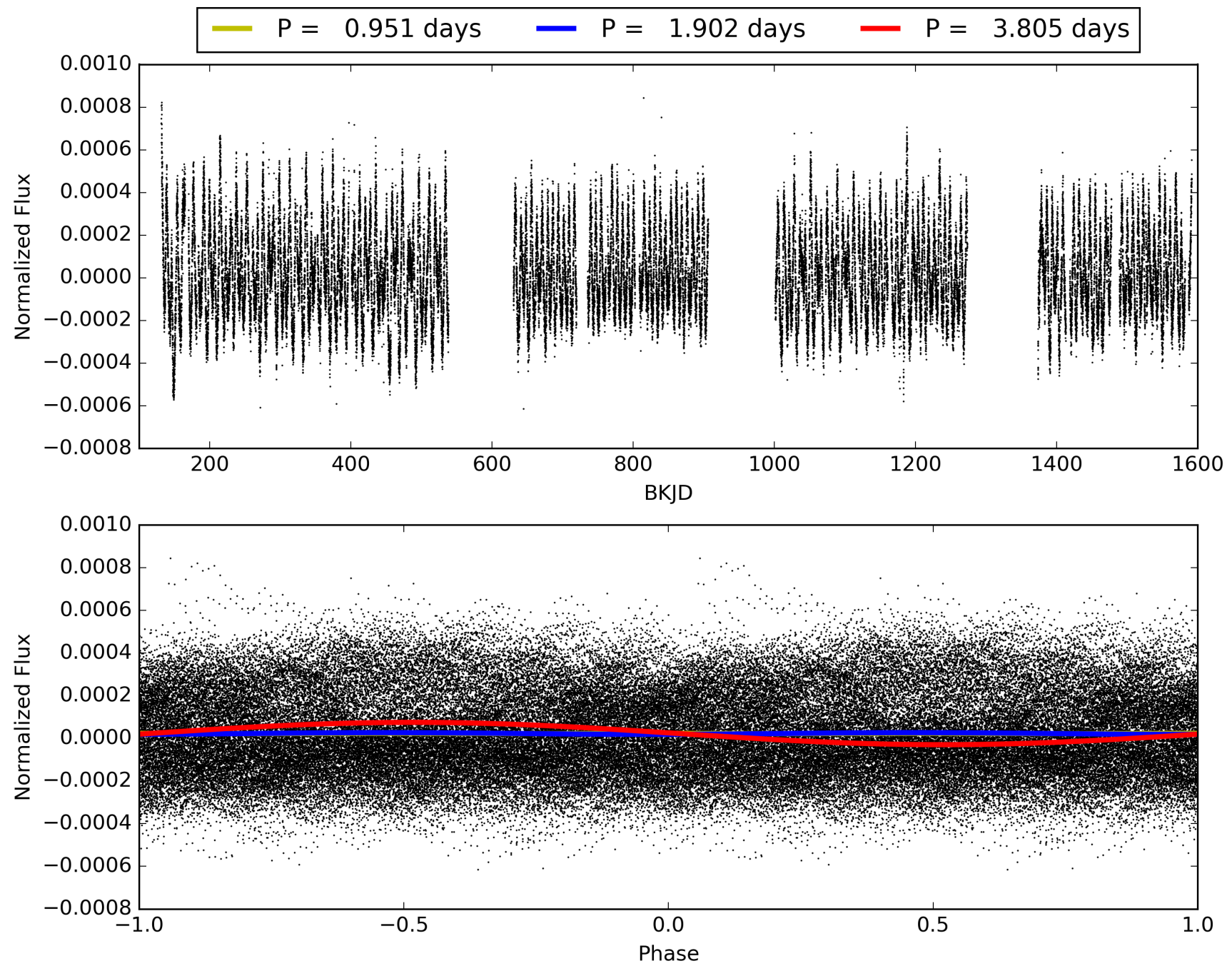
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 15:12:00 Z

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

# TCE 004931390-01, PDC Light Curves

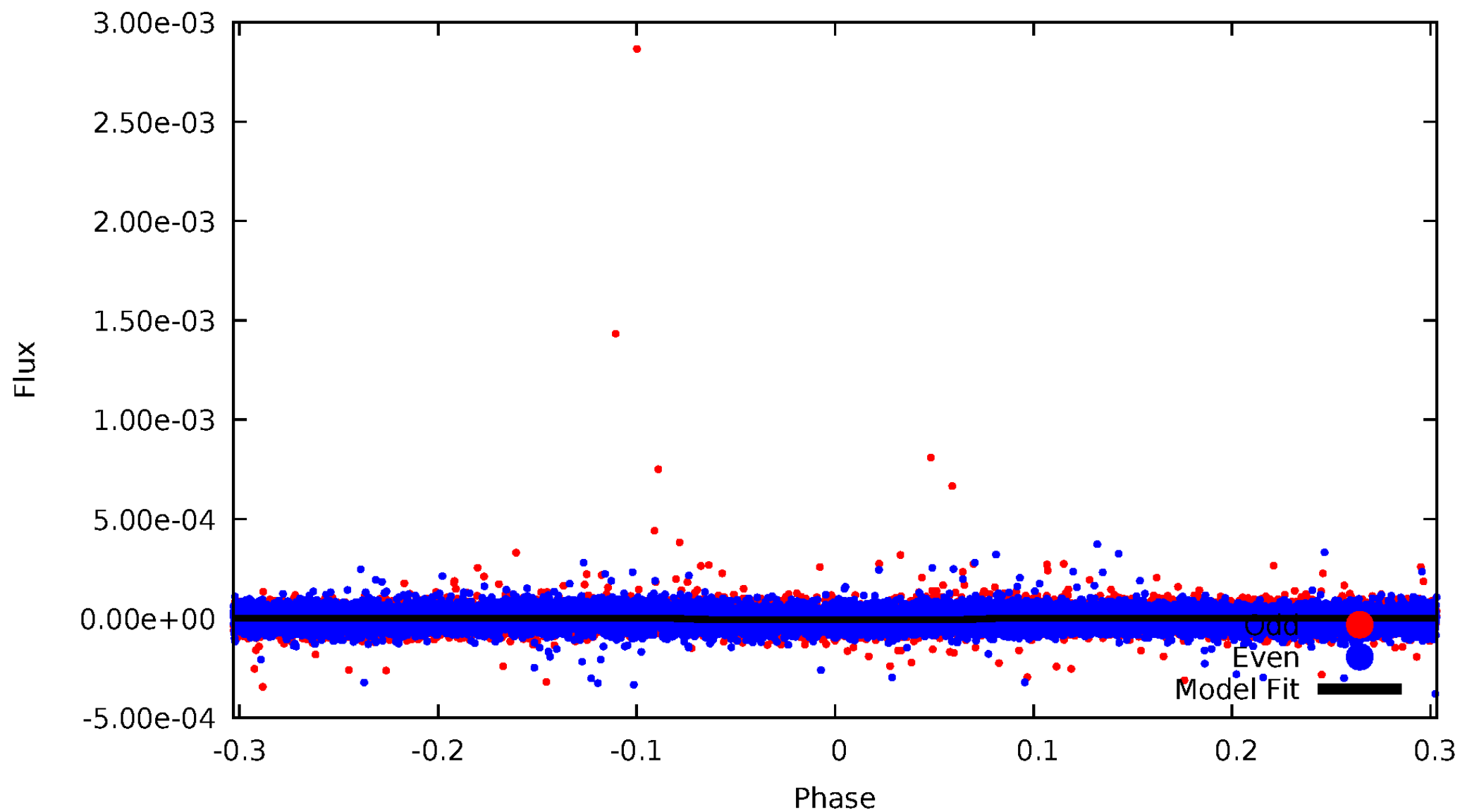


TCE 004931390-01



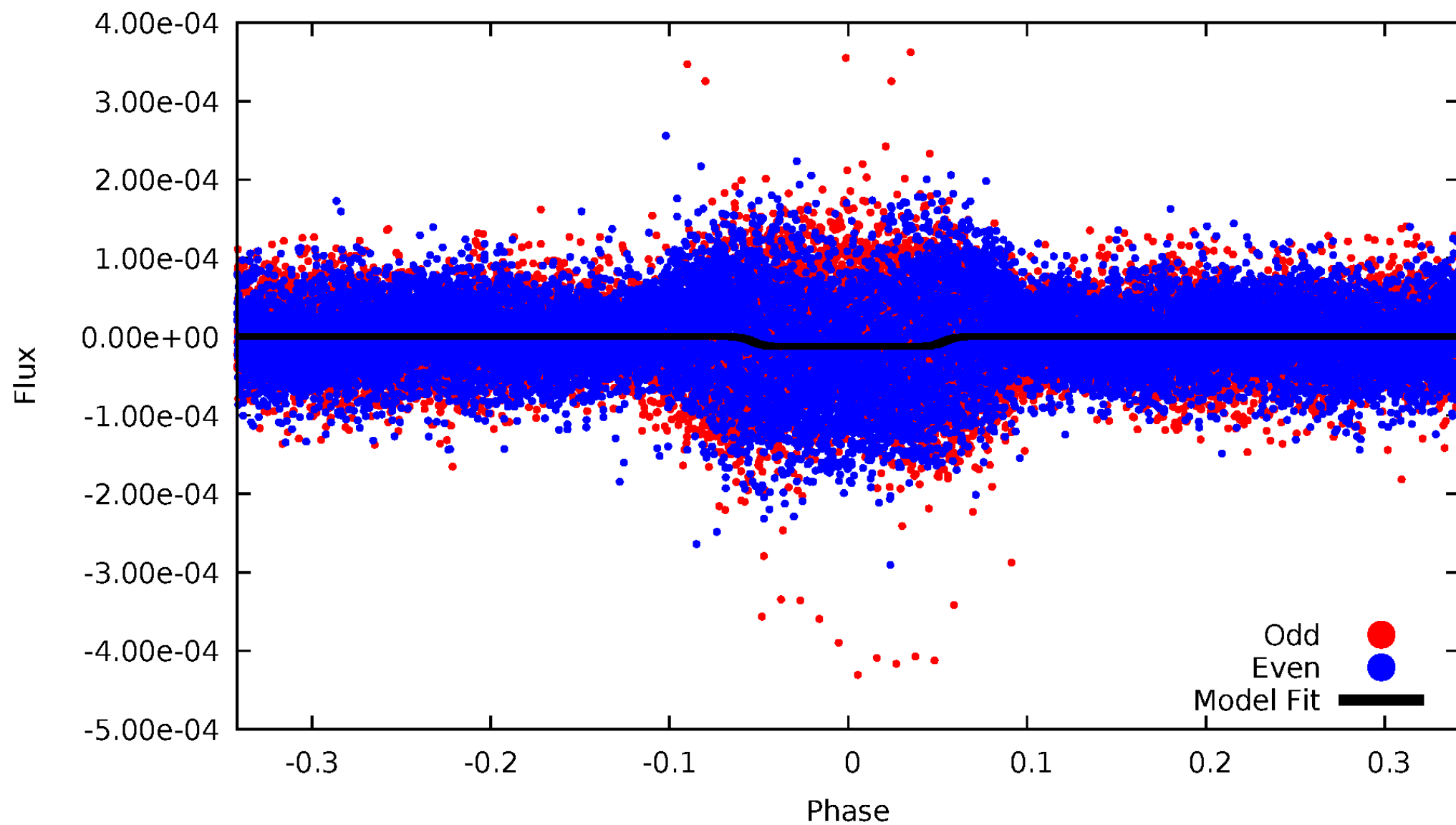
# DV Odd/Even

TCE 004931390-01



# ALT Odd/Even

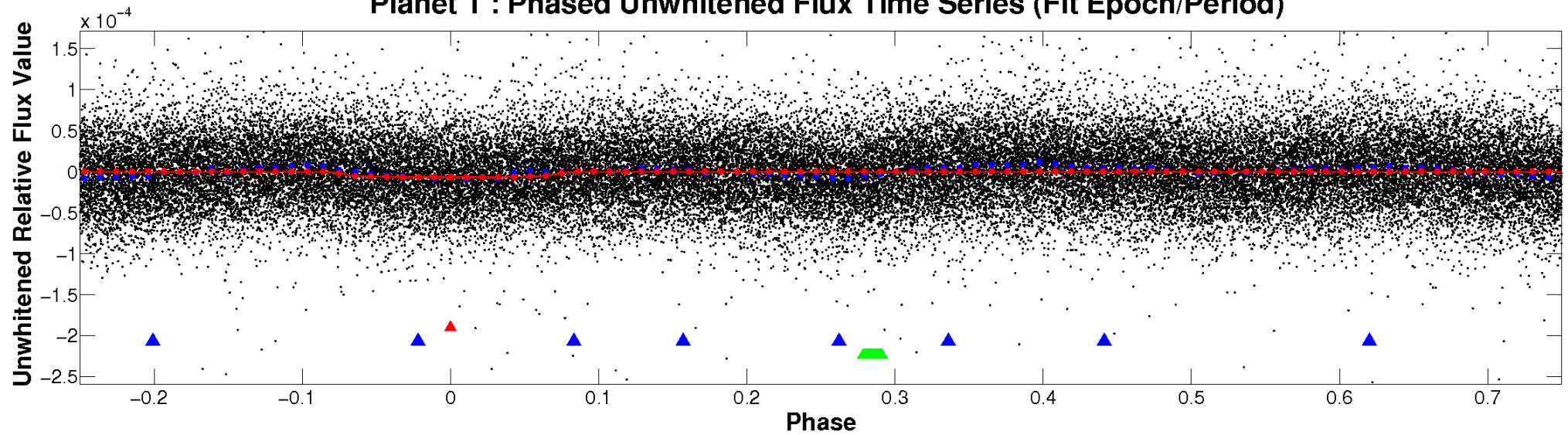
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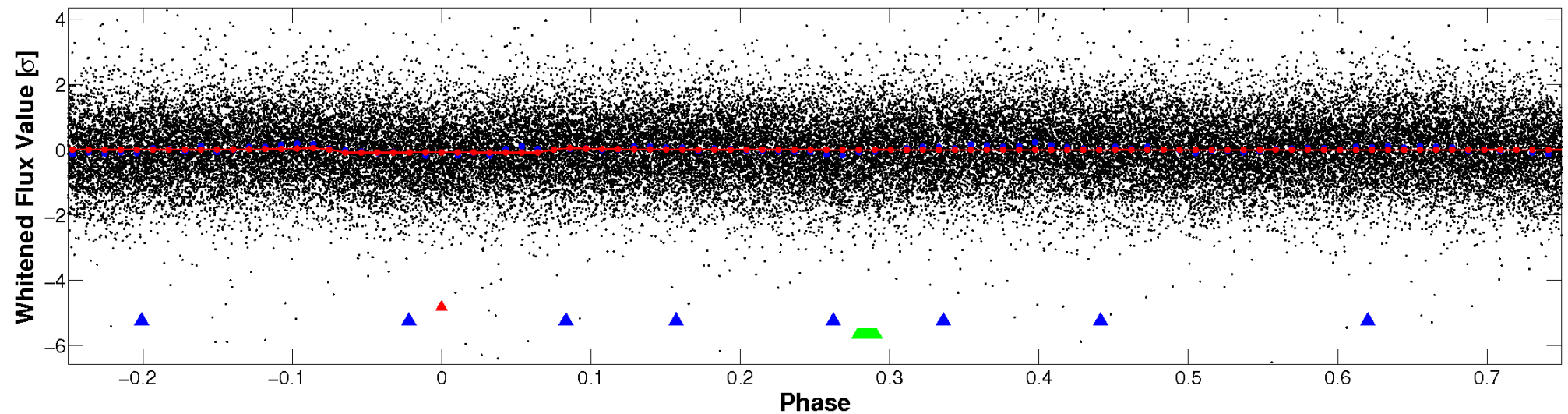


# Non-Whitened Vs. Whitened Light Curve

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

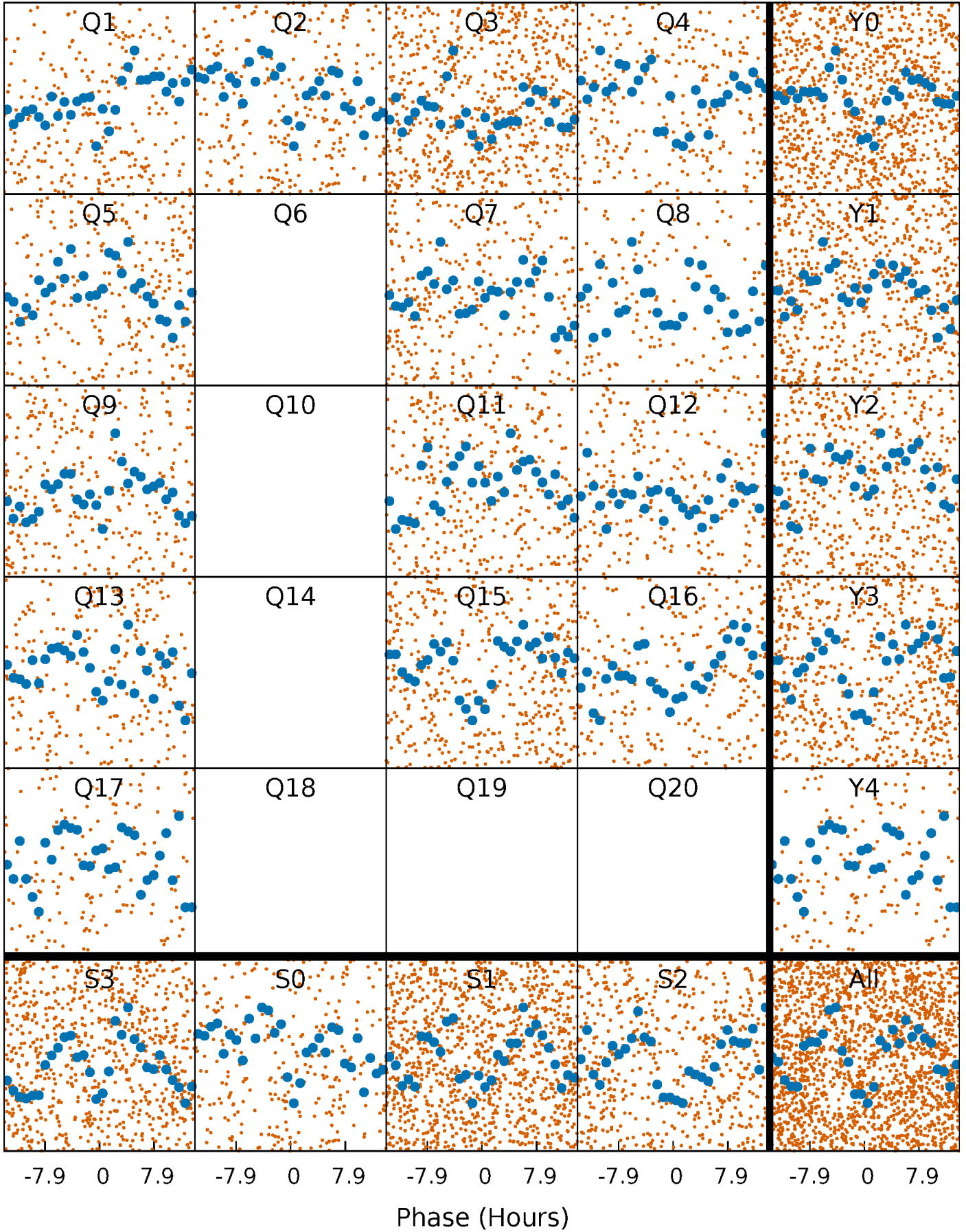


## Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

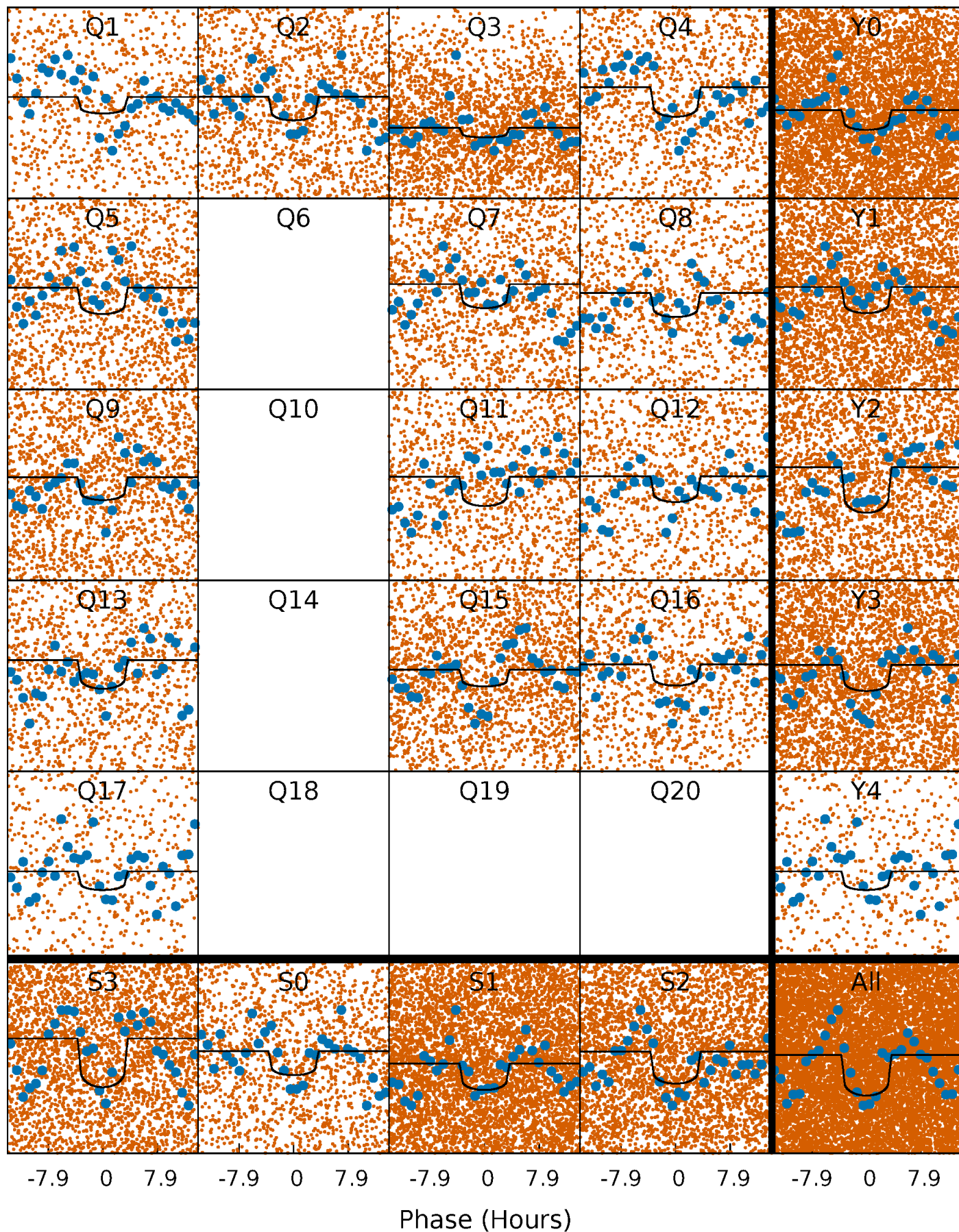
TCE 004931390-01 P= 1.902349 Days  $T_0=133.308539$  (BKJD)





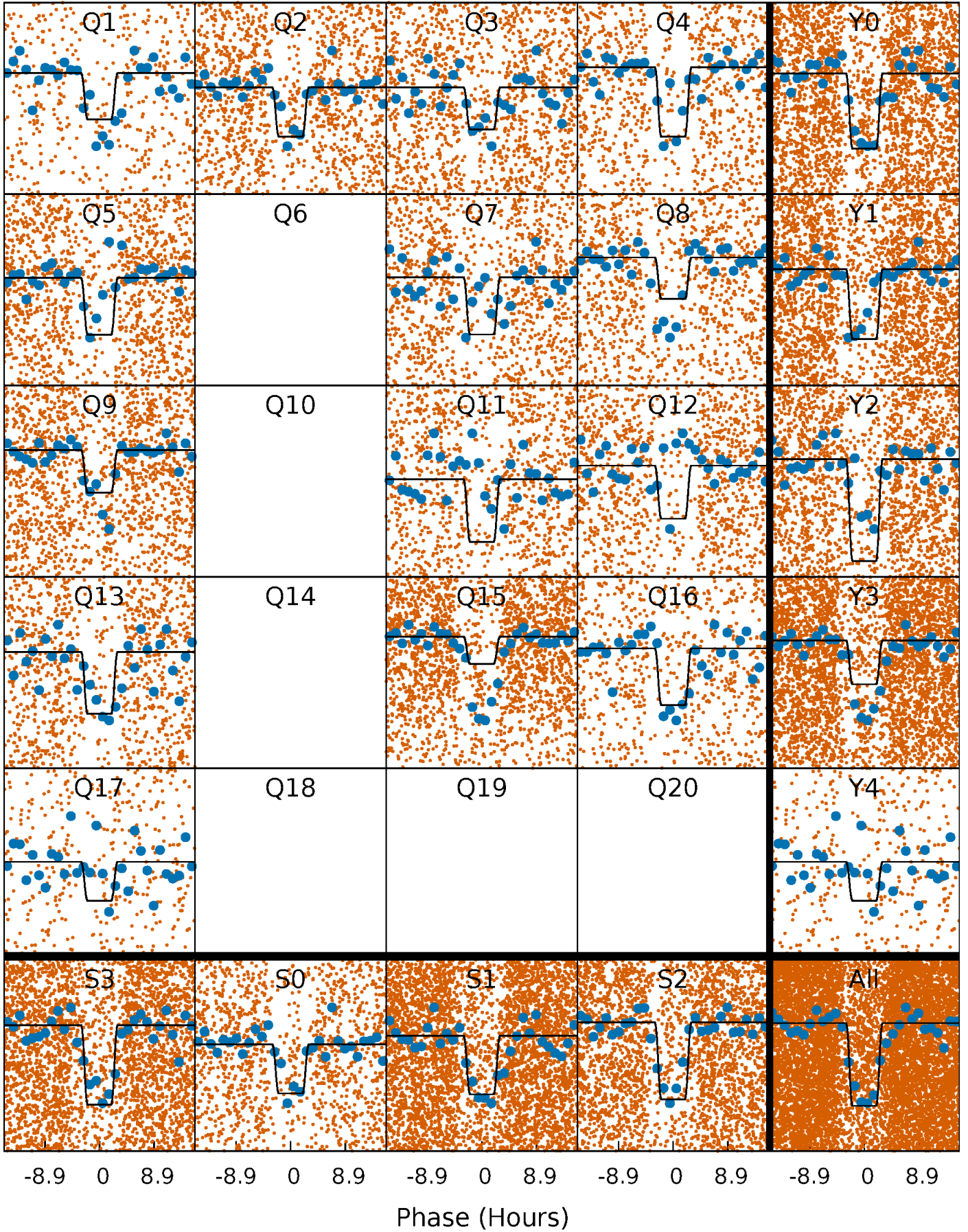
# DV Quarter-Phased Transit Curves

TCE 004931390-01 P= 1.902349 Days  $T_0=133.308539$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

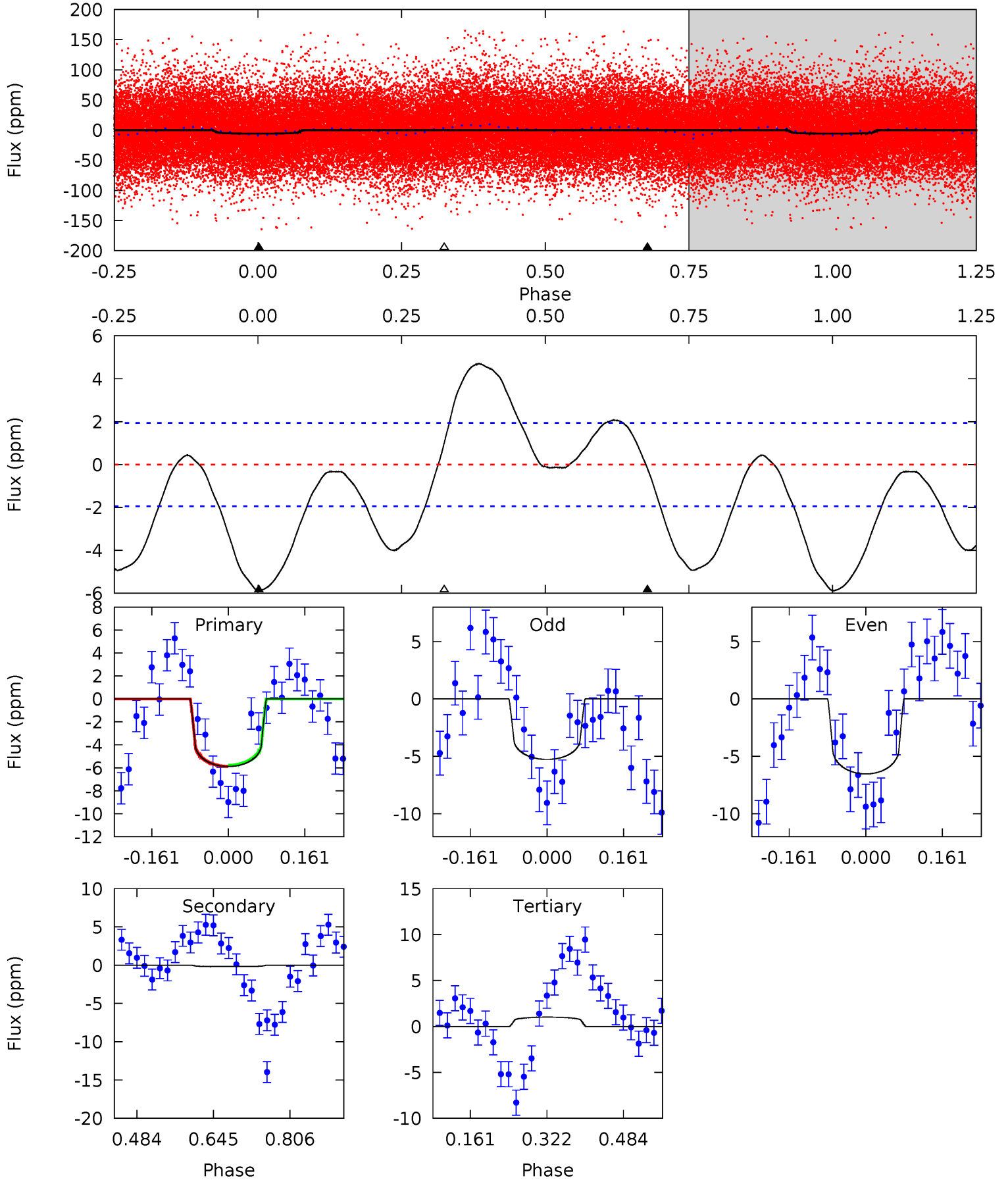
TCE 004931390-01 P= 1.902272 Days  $T_0=133.319812$  (BKJD)



# DV Model-Shift Uniqueness Test

004931390-01, P = 1.902349 Days, E = 131.406190 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.5	0.41	-2.33	0	4.46	1.40	6.78	15.9	13.5	2.74	0.41	1.46	0.87	0.44	0.12

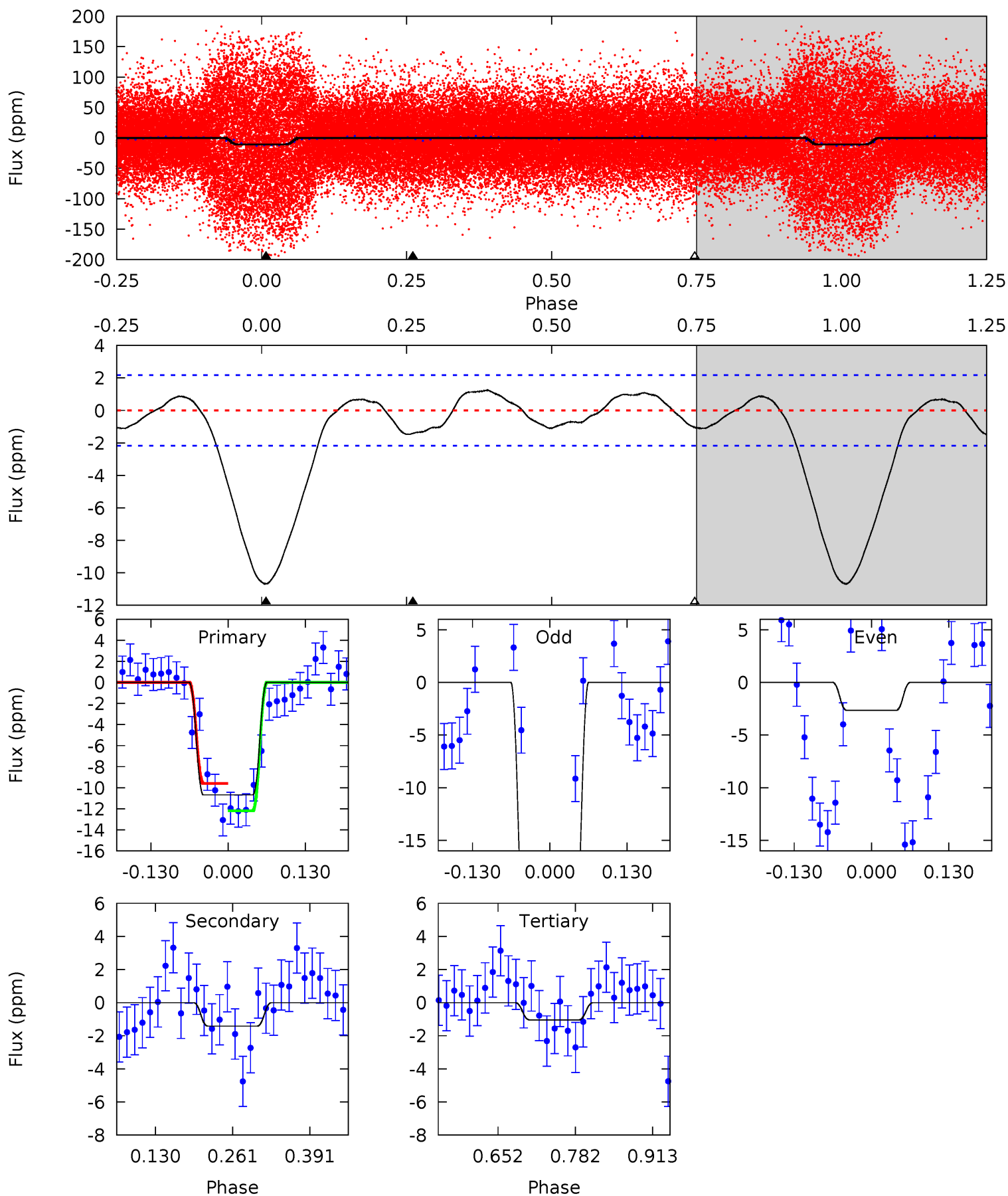




# Alt Model-Shift Uniqueness Test

004931390-01, P = 1.902272 Days, E = 131.417540 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
22.2	2.94	2.16	0	4.51	1.51	1.55	20.0	22.2	0.78	2.94	22.8	1.00	0.10	2.68



### Stellar Parameters For KIC 004931390

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6642^{+73}_{-86}$	$4.272^{+0.013}_{-0.011}$	$-0.060^{+0.150}_{-0.150}$	$1.363^{+0.032}_{-0.048}$	$1.274^{+0.050}_{-0.074}$	$0.708^{+0.046}_{-0.032}$
	+1%/-1%	+0%/-0%	+250%/-250%	+2%/-4%	+4%/-6%	+7%/-4%
Source	SPE72	AST10	SPE72	DSEP		

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

### Secondary Eclipse Parameters for KIC 004931390-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-0 \pm 0$	$0.42^{+0.08}_{-0.07}$	$2650^{+34}_{-34}$	$2994^{+858}_{-6504}$	$0.692^{+1.575}_{-1.543}$
Alt.	$-1 \pm 0$	$0.51^{+0.07}_{-0.06}$	$2648^{+34}_{-39}$	$4064^{+372}_{-354}$	$3.068^{+1.618}_{-1.161}$

$T_{\text{max}}$  = 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

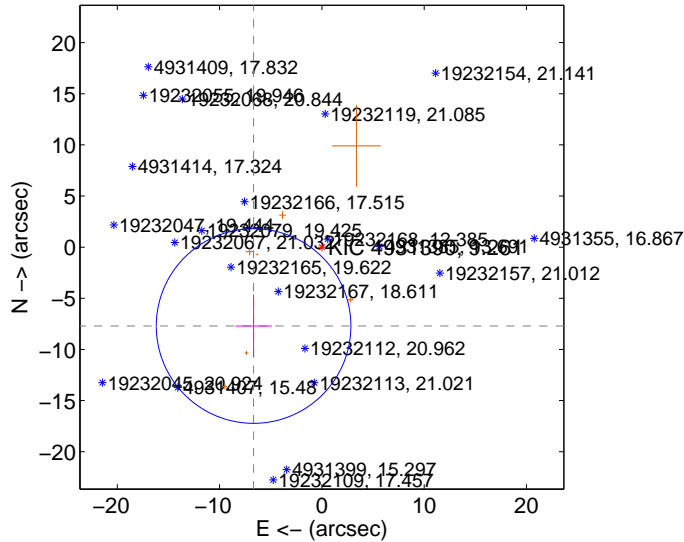
Supplemental centroid analysis for 004931390-01. **Kepler magnitude: 9.26.** Transit SNR 7.18

There are 0 quarters with good PRF difference image offsets

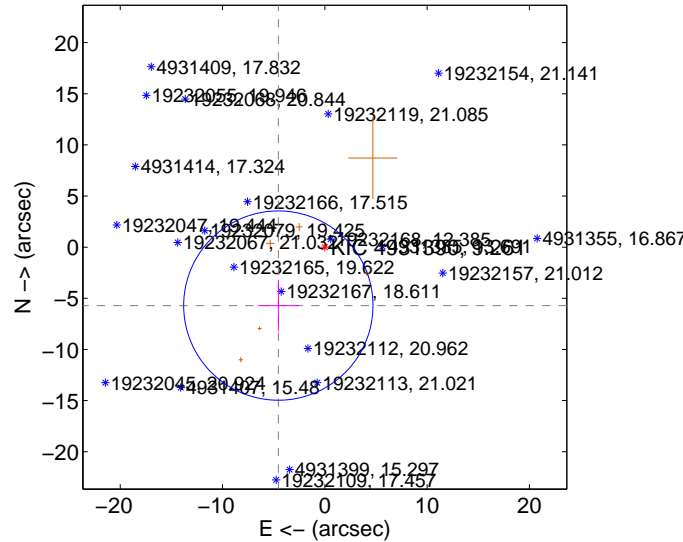
The OOT PRF centroid is offset from the target star catalog position by about 2.59 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b><math>10.200 \pm 3.171</math></b>	<b>3.22</b>	$6.677 \pm 1.792$	$-7.710 \pm 3.065$
PRF-fit source offset from KIC position	$7.299 \pm 3.084$	2.37	$4.545 \pm 2.023$	$-5.711 \pm 2.524$
photometric centroid source offset	$2.69 \pm 2.08$	1.29	$0.29 \pm 1.57$	$2.67 \pm 2.09$

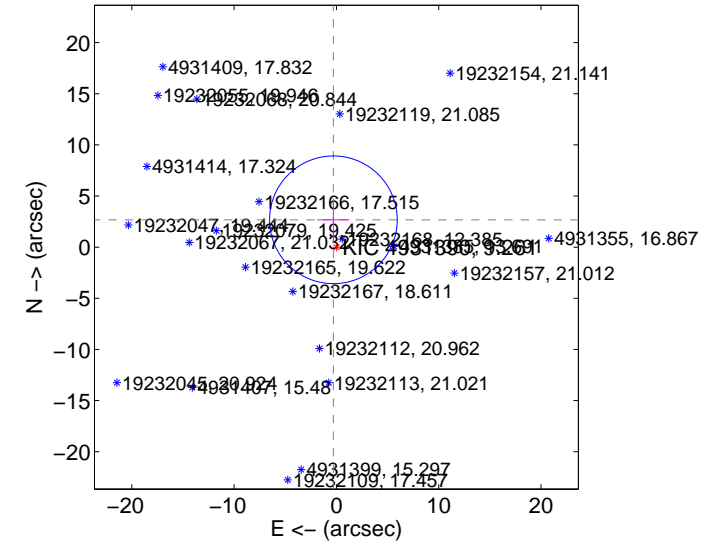
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

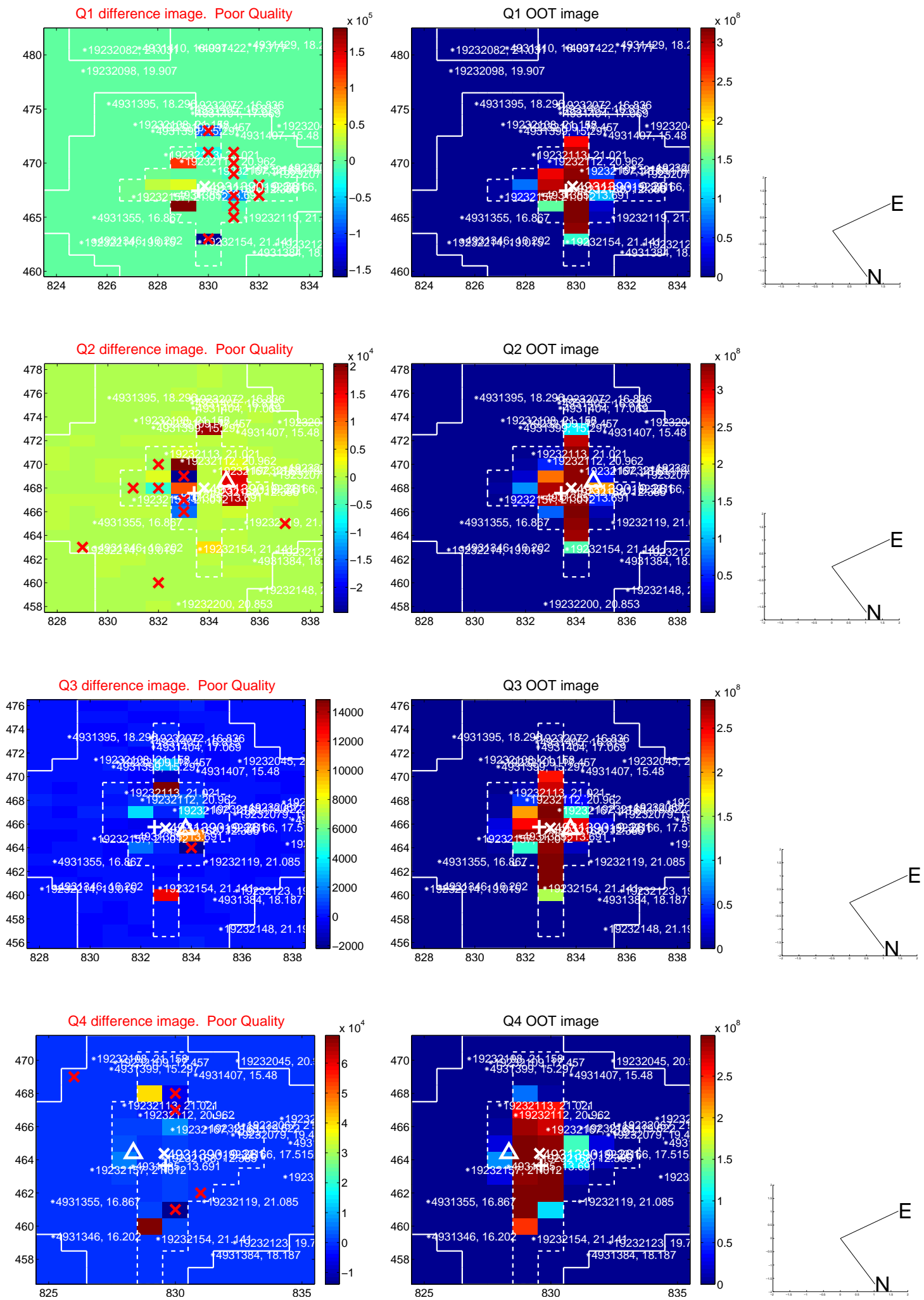


offset from photometric centroids

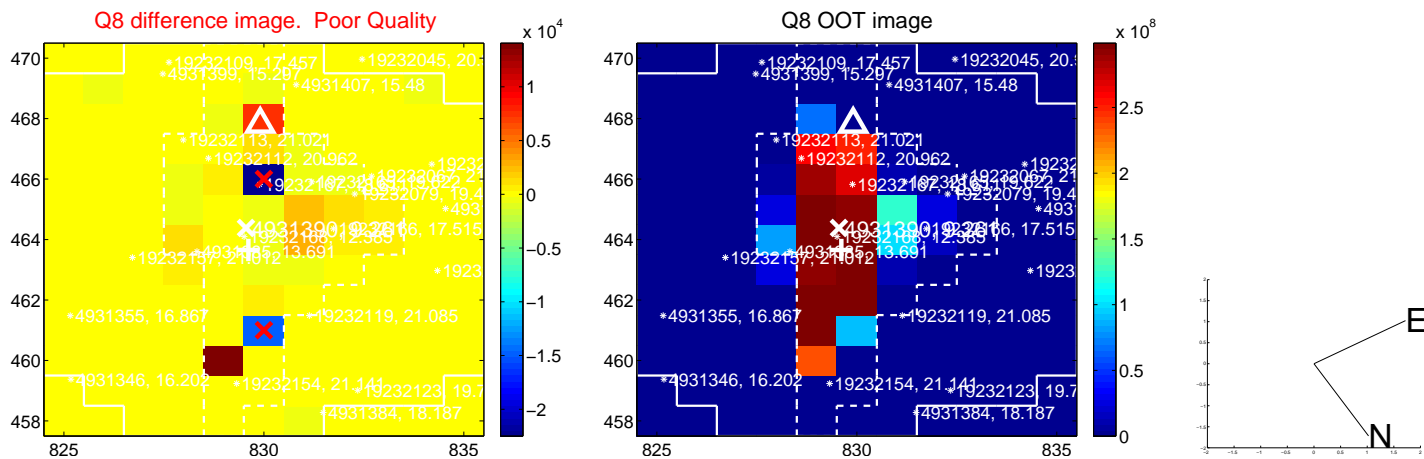
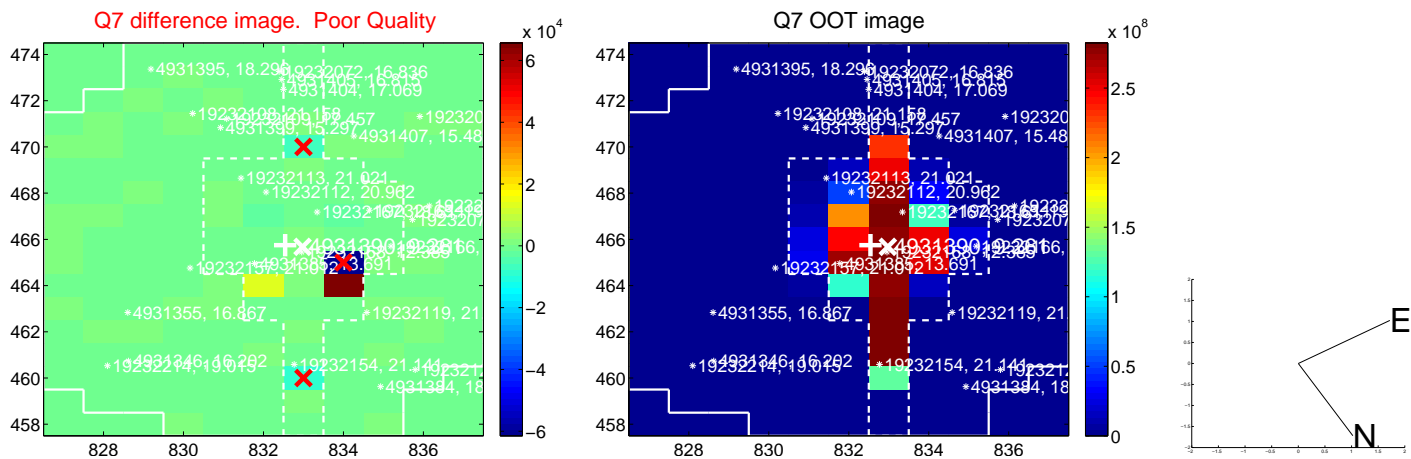
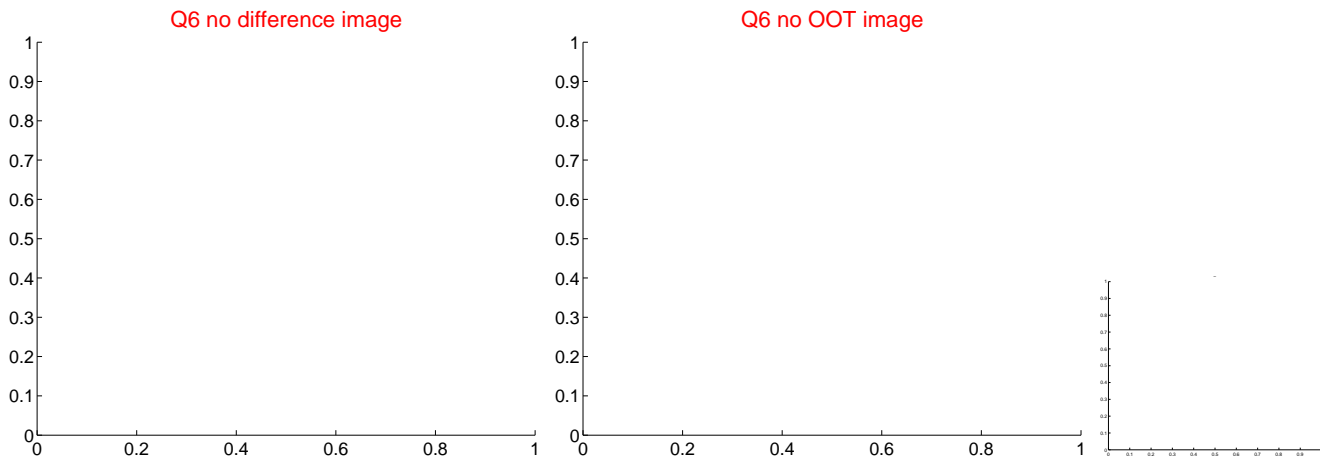
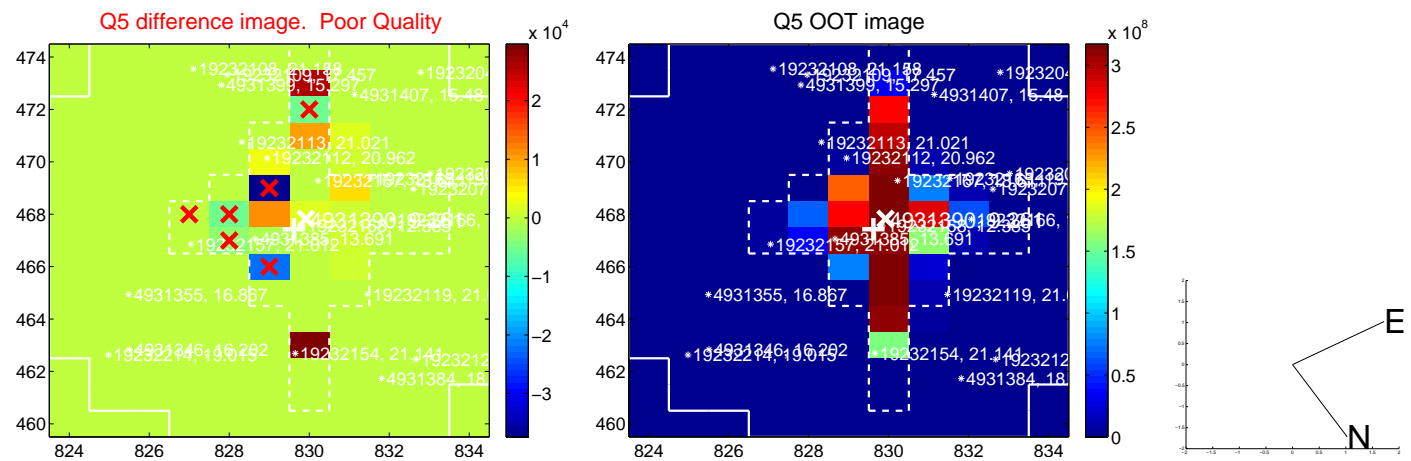


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

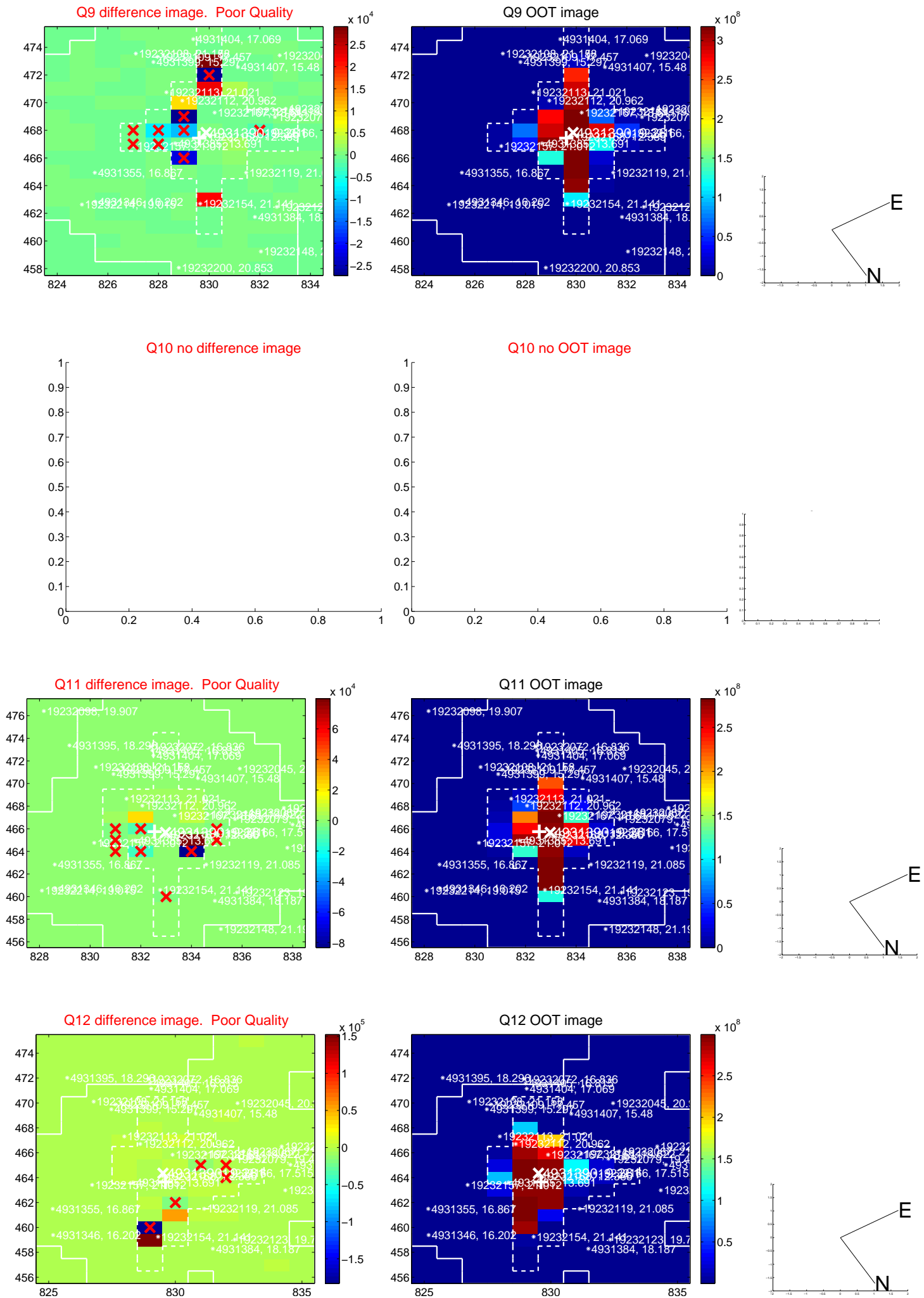
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



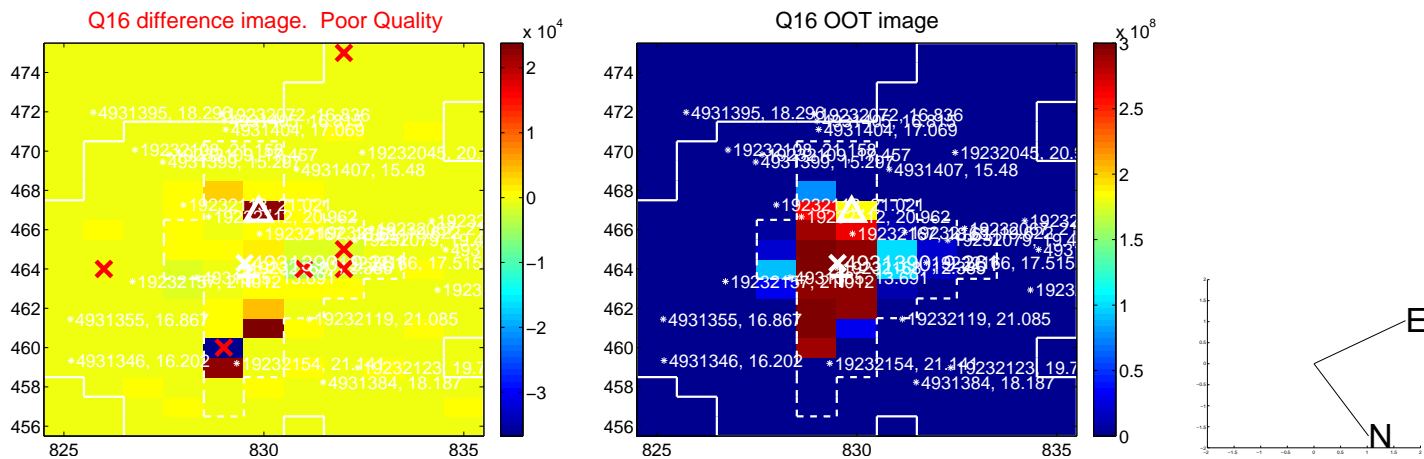
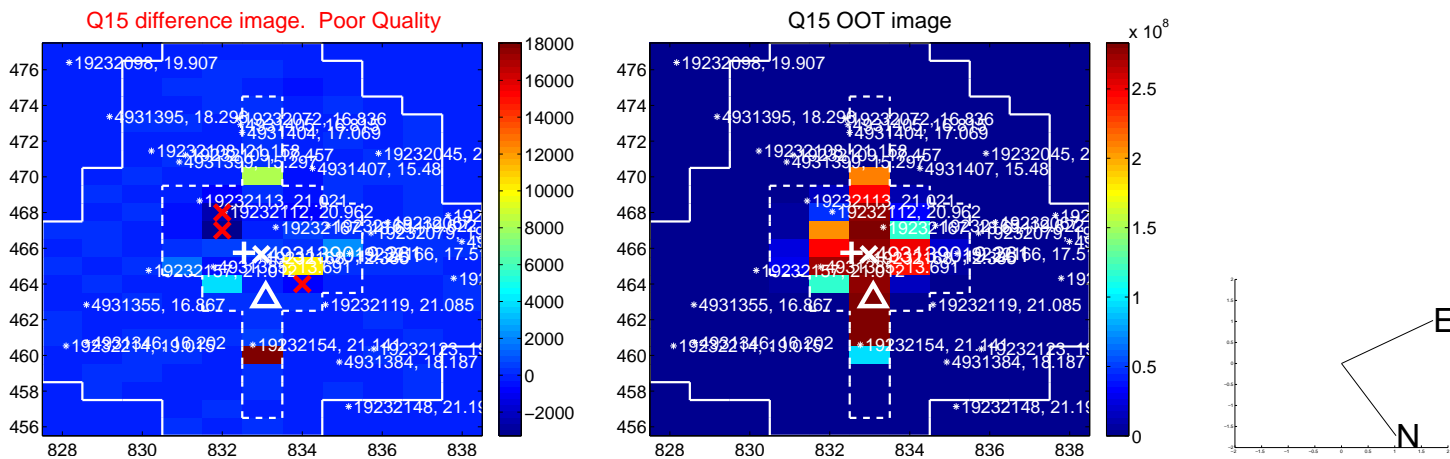
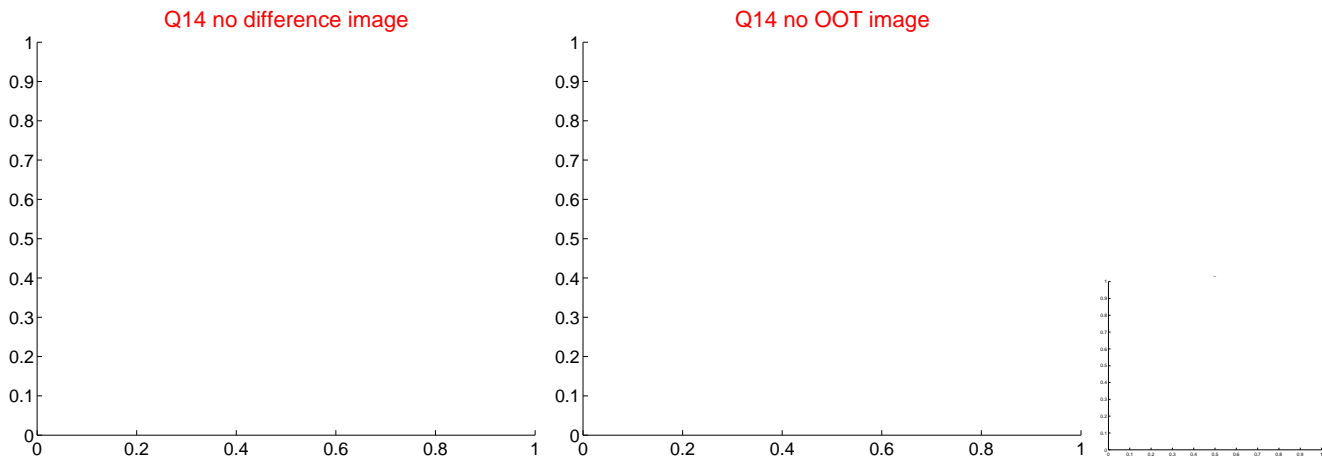
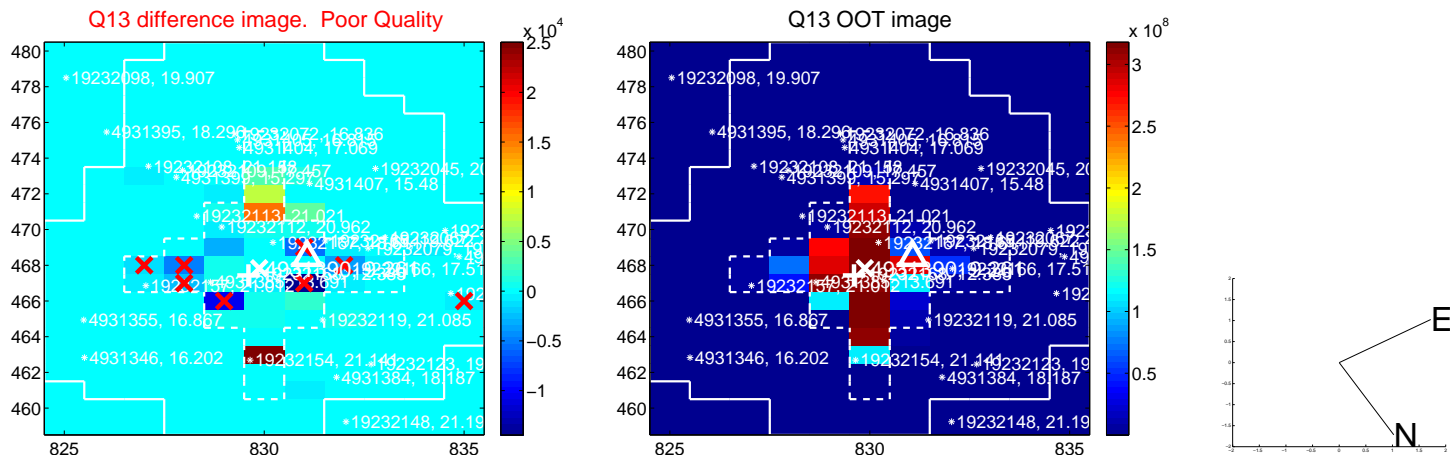
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

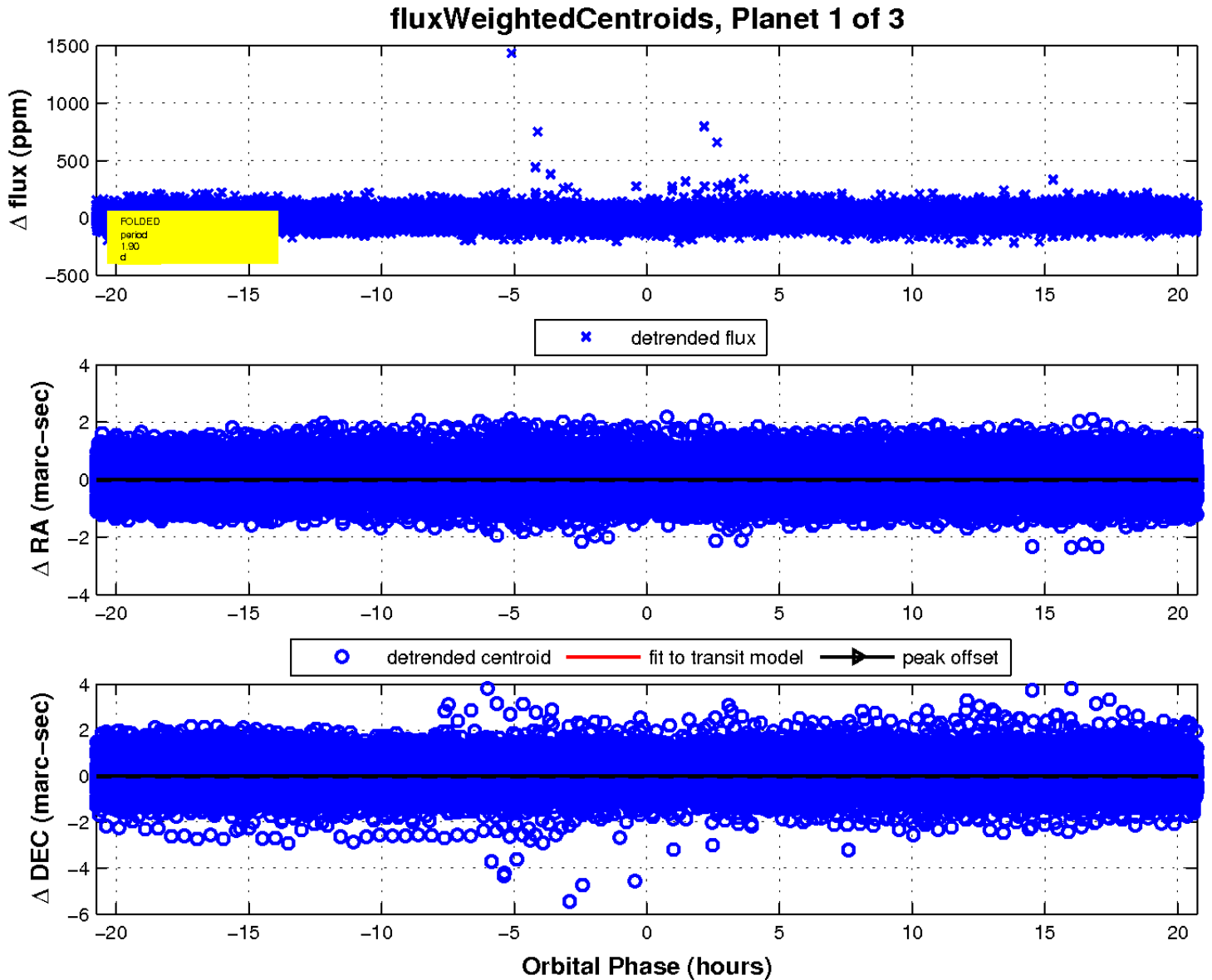
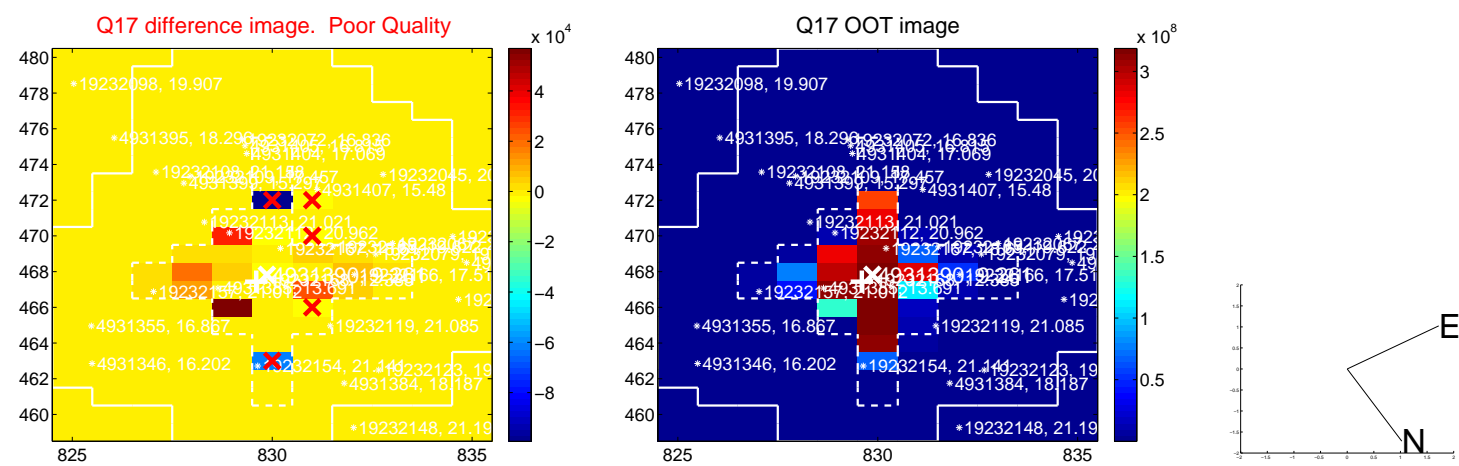


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



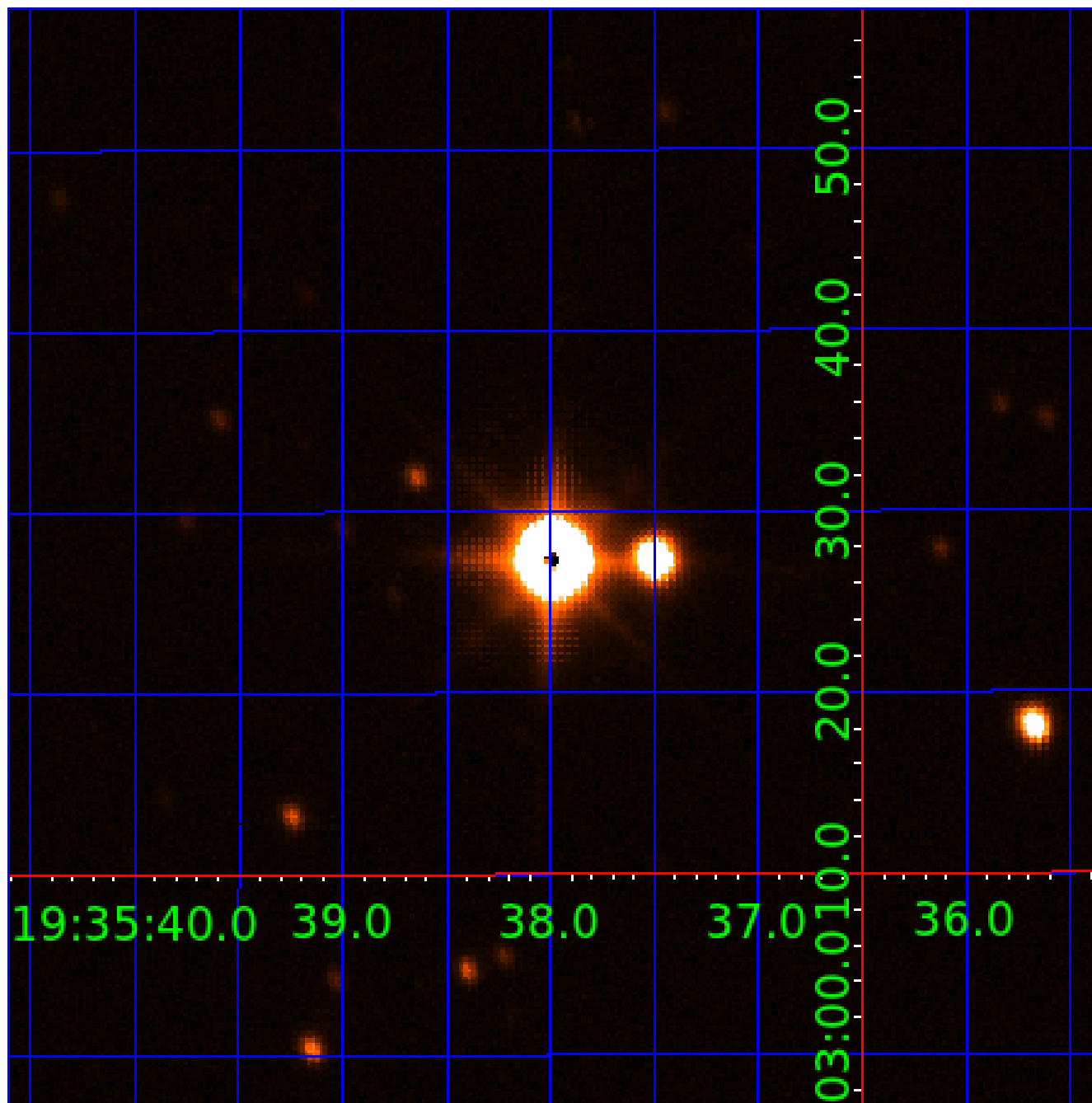


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 004931390

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004931390-01	OBS	No	1.902349	133.308539	6.9	6.917	8.1	7.2	1.36	6642	0.42	3062.20
004931390-02	OBS	No	195.601524	215.748792	86.5	3.896	8.5	7.1	1.36	6642	1.45	6.36
004931390-03	OBS	No	7.609264	131.960703	15.9	5.582	8.8	9.3	1.36	6642	0.65	482.28

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004931390-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—CENT_SATURATED
004931390-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL_SKYE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—CENT_SATURATED
004931390-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—SAME_NTL_PERIOD—CENT_SATURATED

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

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

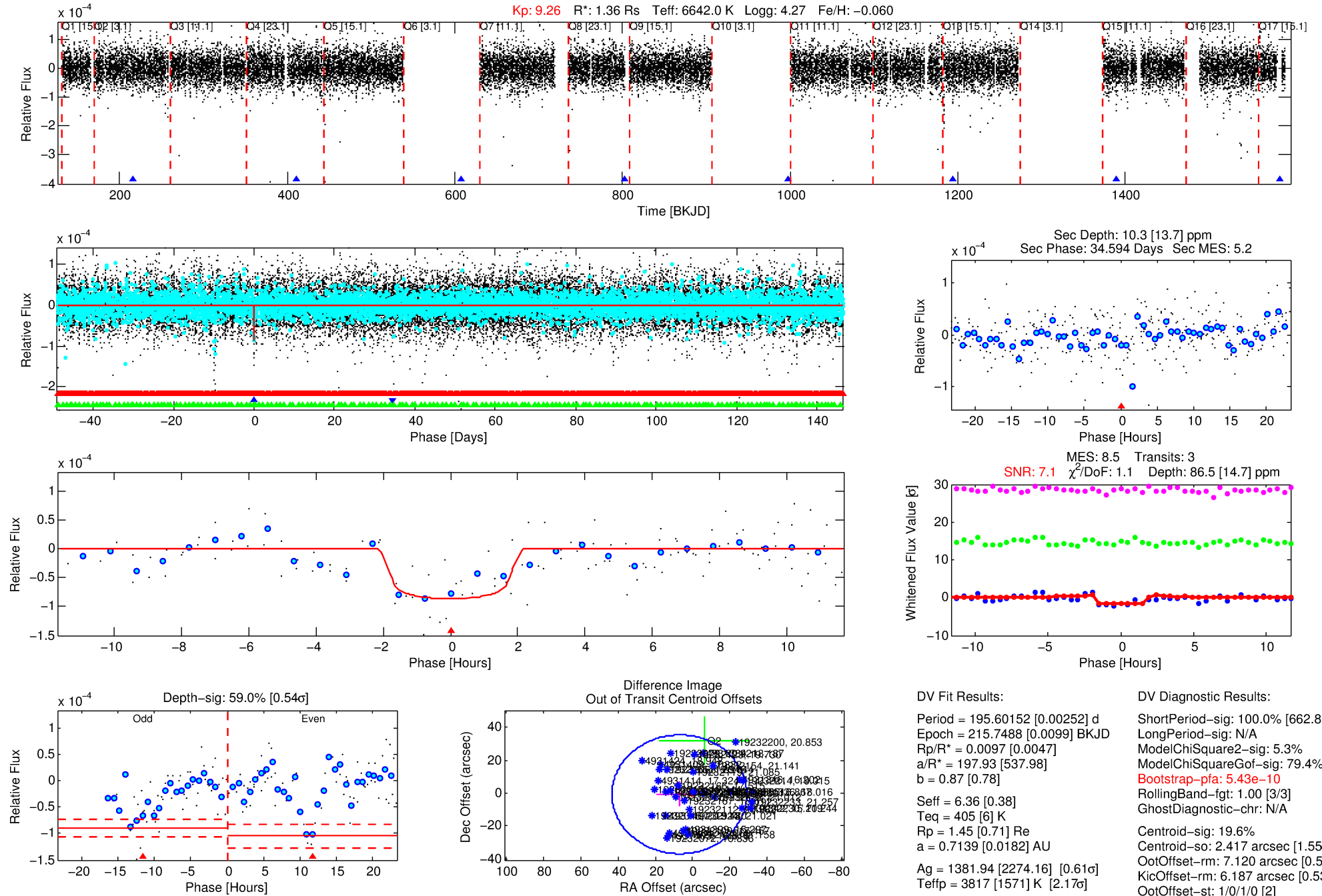
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 004931390-02

No Significant Match Found

# DV One-Page Summary

KIC: 4931390 Candidate: 2 of 3 Period: 195.602 d



## DV Fit Results:

Period = 195.60152 [0.00252] d  
Epoch = 215.7488 [0.0099] BKJD  
 $R_p/R^* = 0.0097$  [0.0047]  
 $a/R^* = 197.93$  [537.98]  
 $b = 0.87$  [0.78]  
 $\text{Seff} = 6.36$  [0.38]  
 $T_{\text{eq}} = 405$  [6] K  
 $R_p = 1.45$  [0.71]  $R_e$   
 $a = 0.7139$  [0.0182] AU  
 $\text{Ag} = 1381.94$  [2274.16] [0.61 $\sigma$ ]  
 $T_{\text{eff}} = 3817$  [1571] K [2.17 $\sigma$ ]

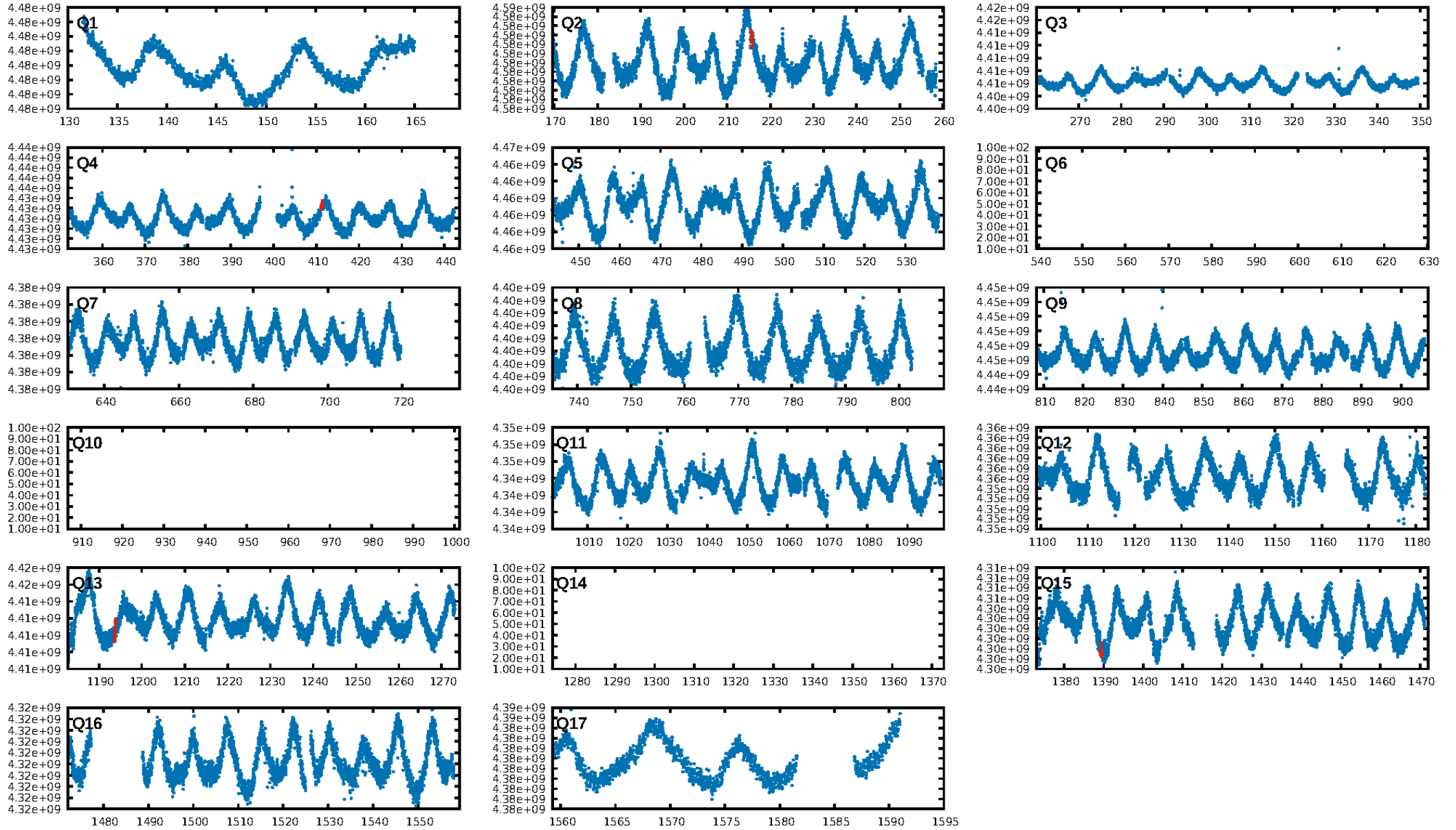
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [662.82 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 5.3%  
ModelChiSquareGof-sig: 79.4%  
**Bootstrap-pfa: 5.43e-10**  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: N/A  
Centroid-sig: 19.6%  
Centroid-so: 2.417 arcsec [1.55 $\sigma$ ]  
OotOffset-rm: 7.120 arcsec [0.59 $\sigma$ ]  
KicOffset-rm: 6.187 arcsec [0.53 $\sigma$ ]  
OotOffset-st: 1/0/1/0 [2]  
KicOffset-st: 1/0/1/0 [2]  
DiffImageQuality-fgm: 0.00 [0/2]  
DiffImageOverlap-fno: 0.00 [0/3]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 15:12:10 Z

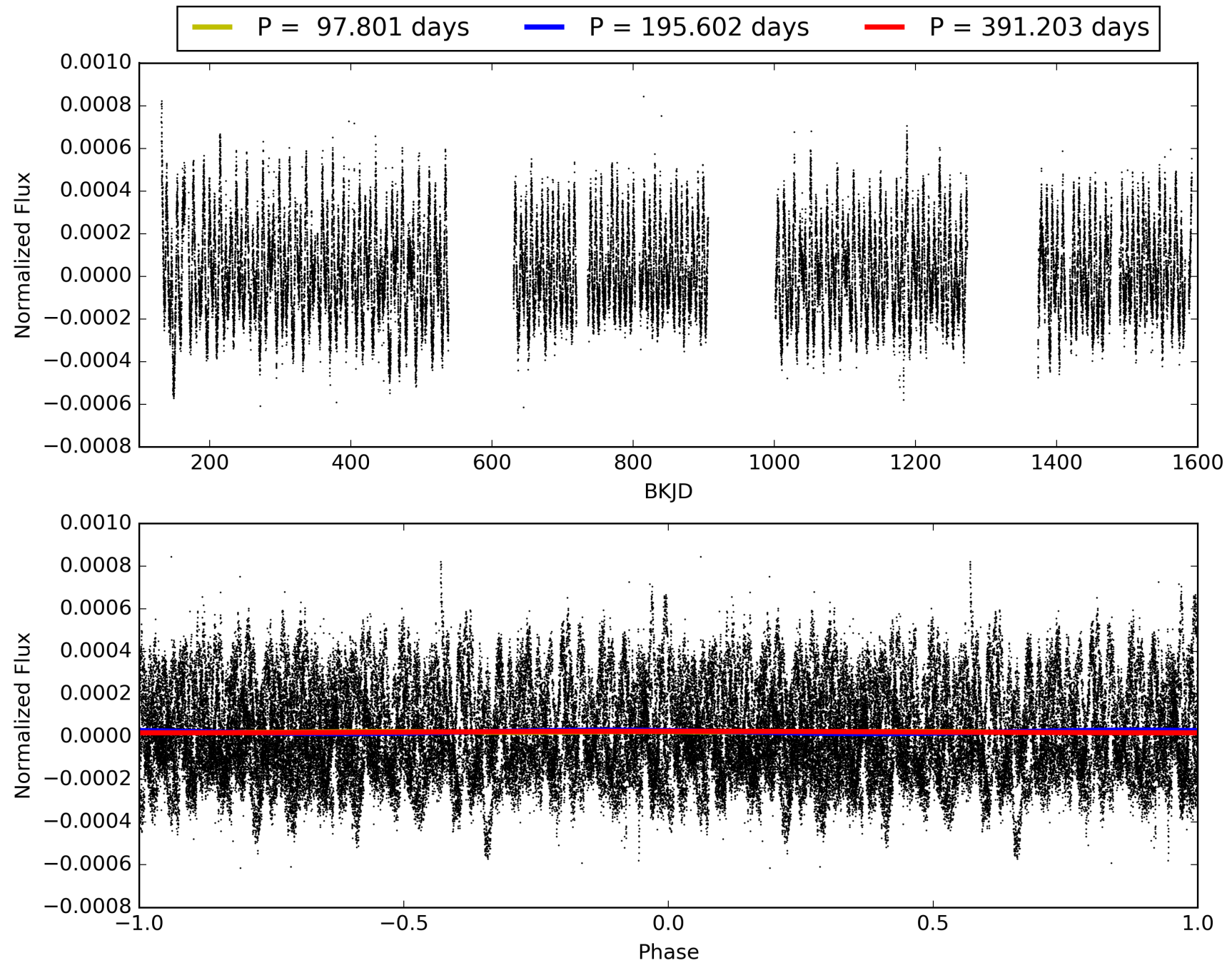
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 004931390-02, PDC Light Curves



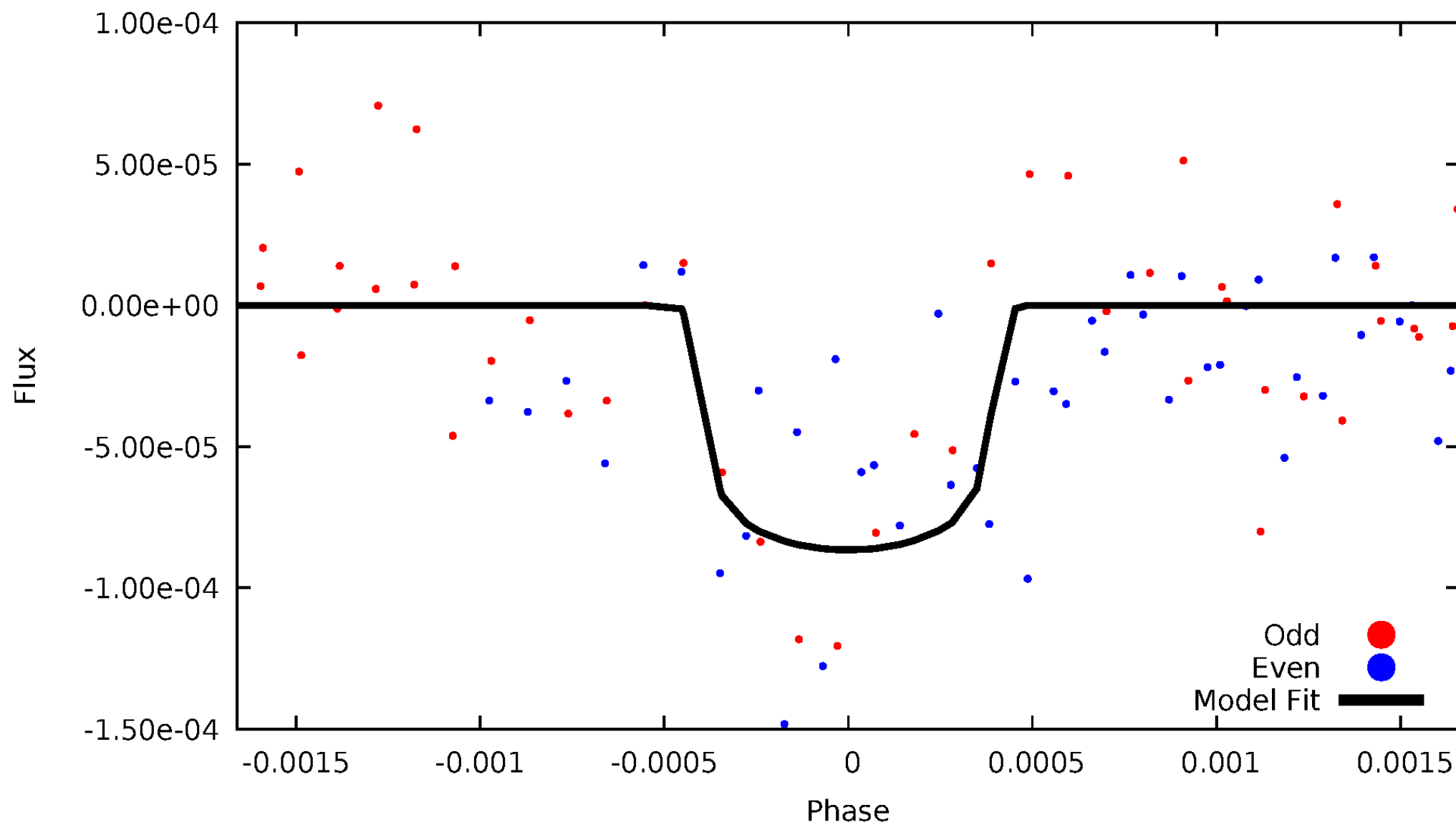


TCE 004931390-02



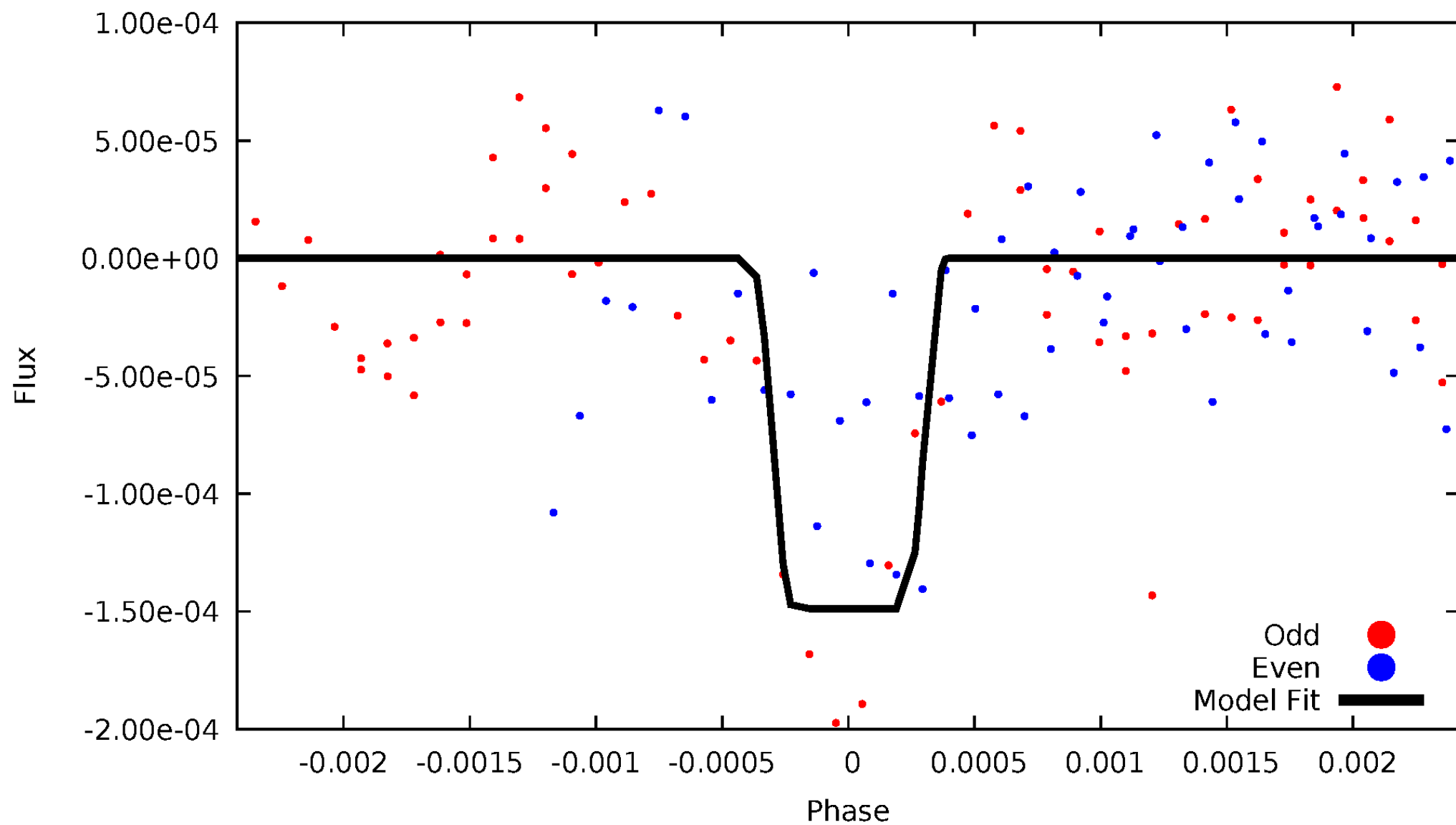
# DV Odd/Even

TCE 004931390-02



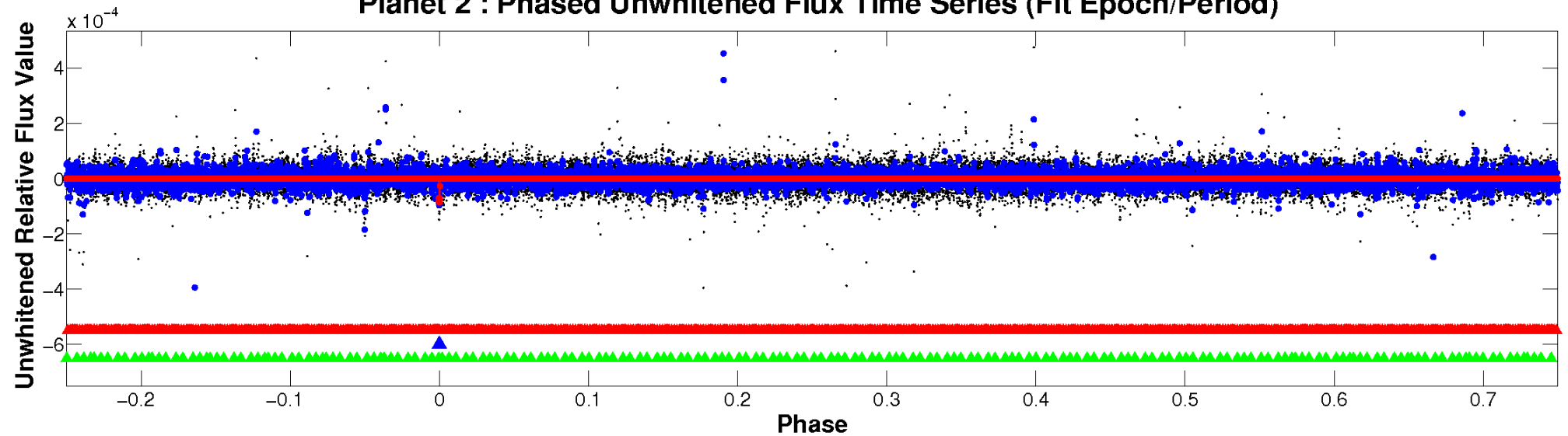
# ALT Odd/Even

TCE 004931390-02

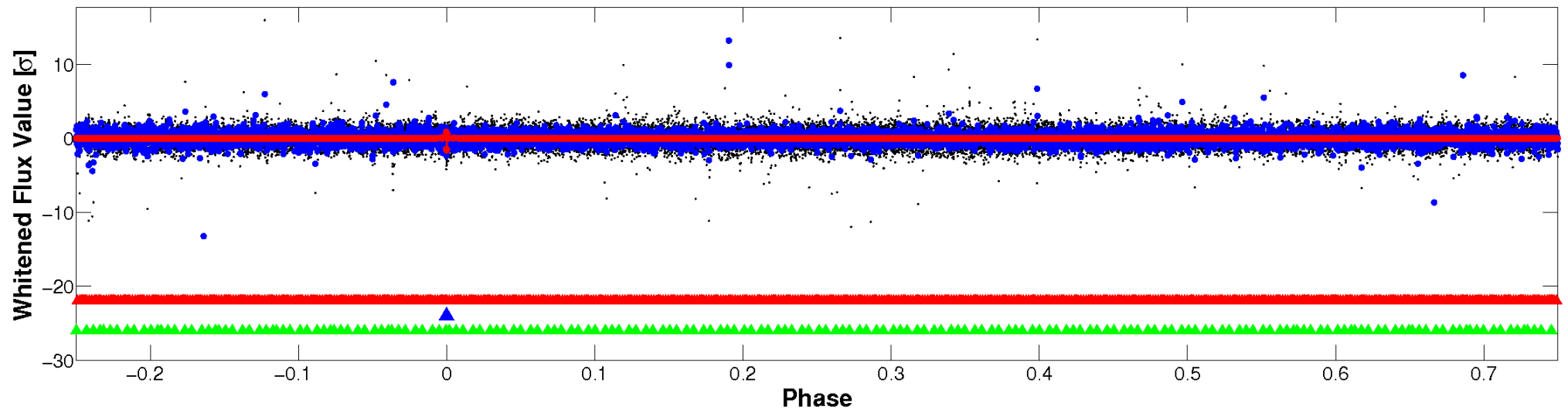


# Non-Whitened Vs. Whitened Light Curve

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

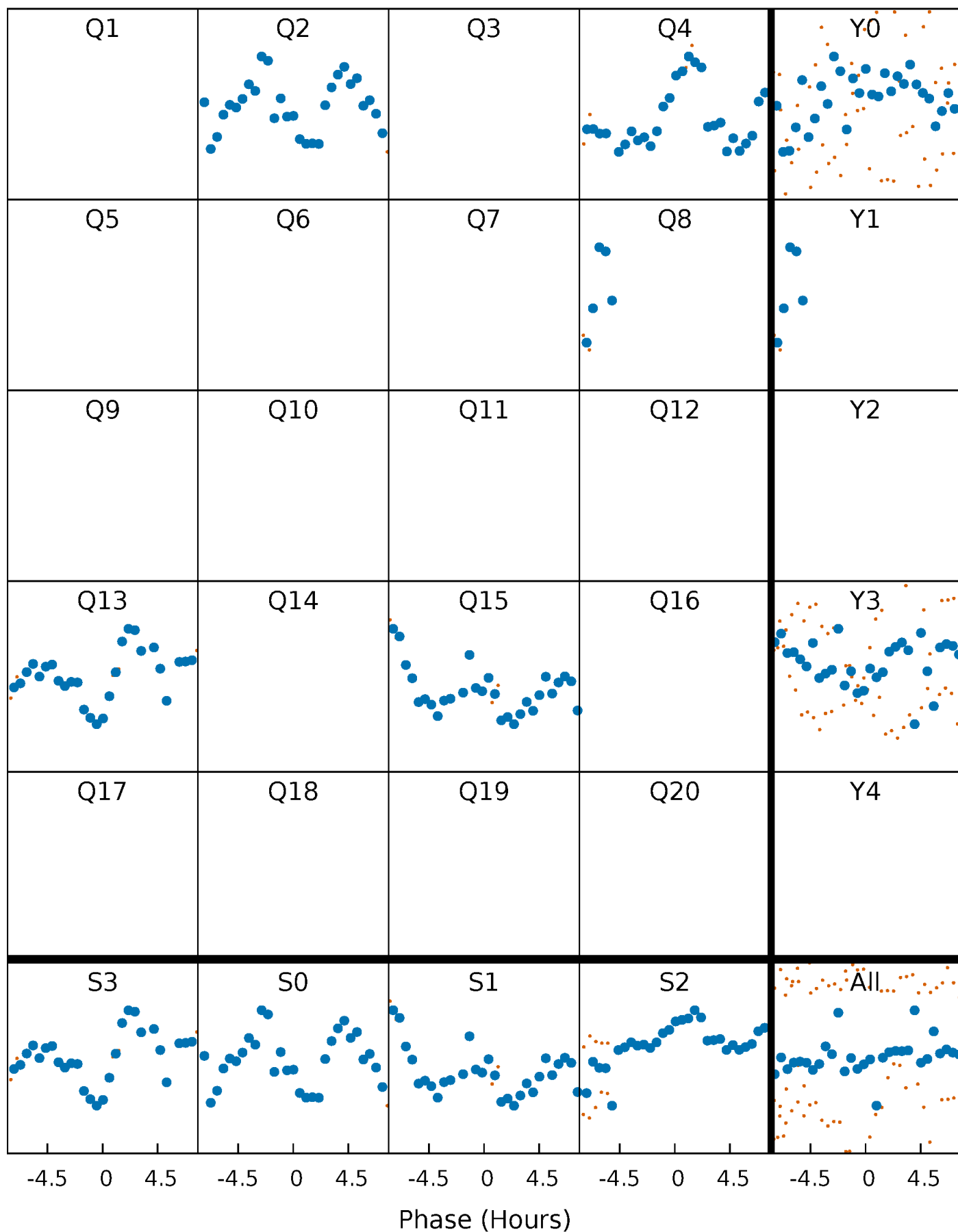


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

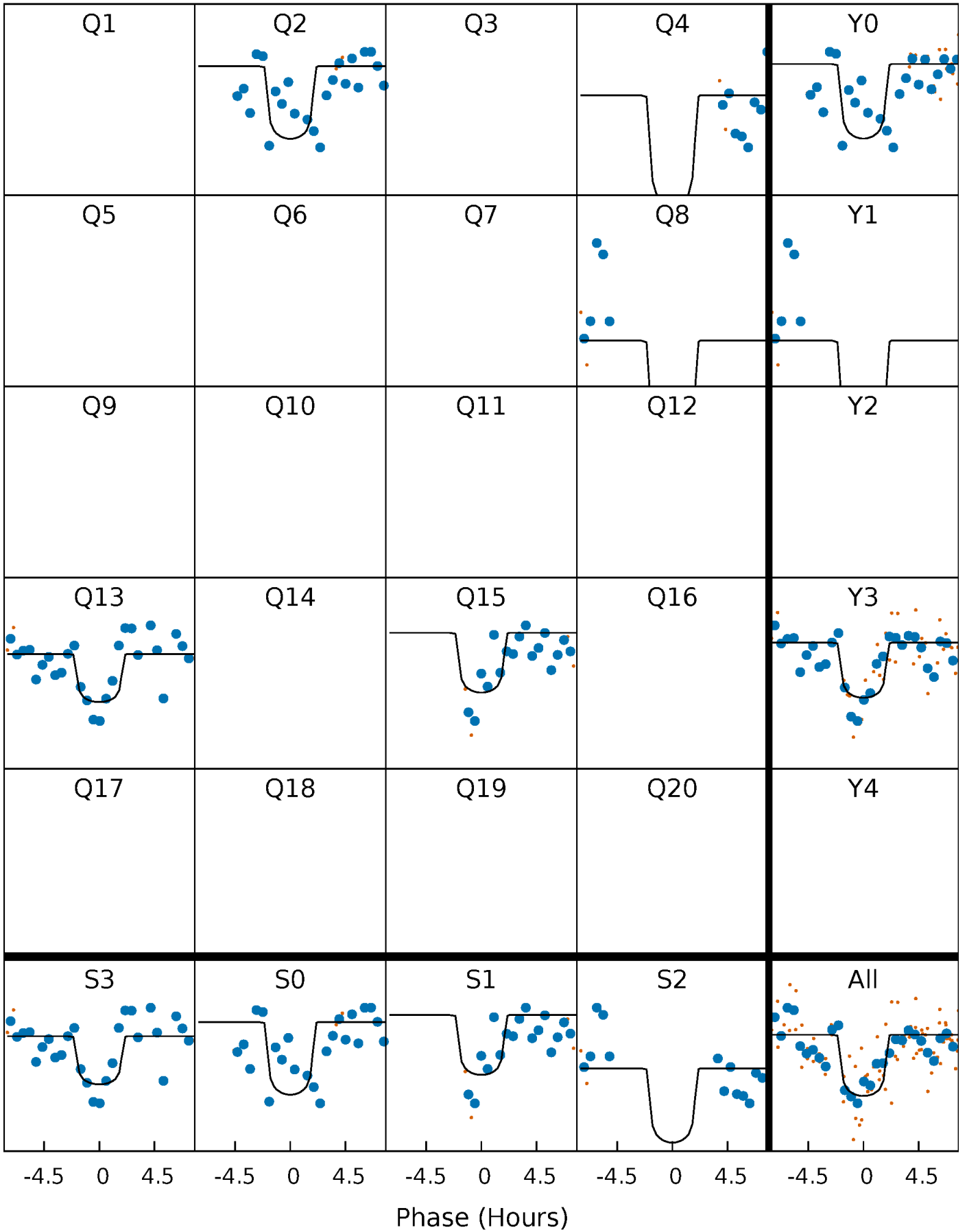
TCE 004931390-02     $P=195.601524$  Days     $T_0=215.748792$  (BKJD)





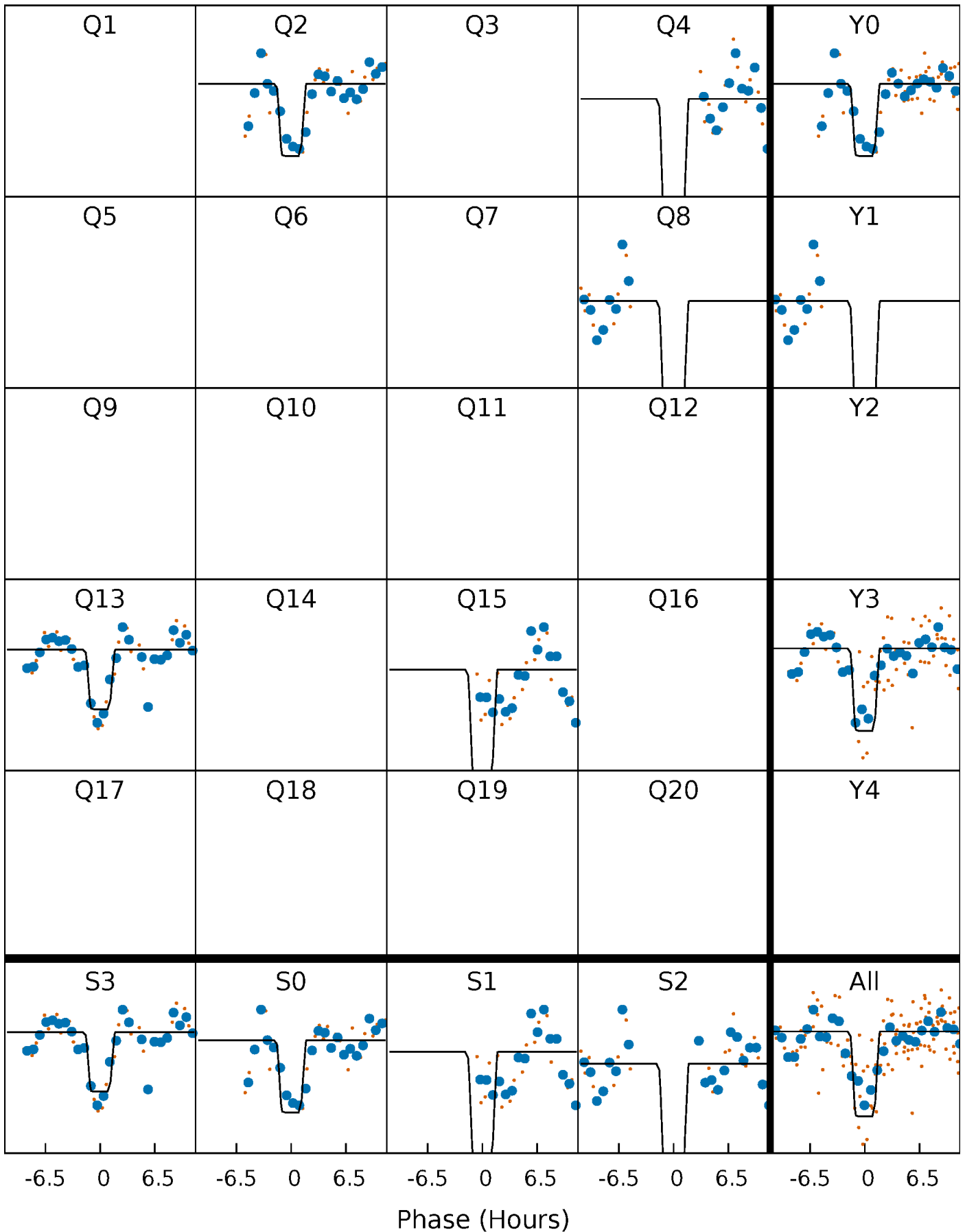
# DV Quarter-Phased Transit Curves

TCE 004931390-02     $P=195.601524$  Days     $T_0=215.748792$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

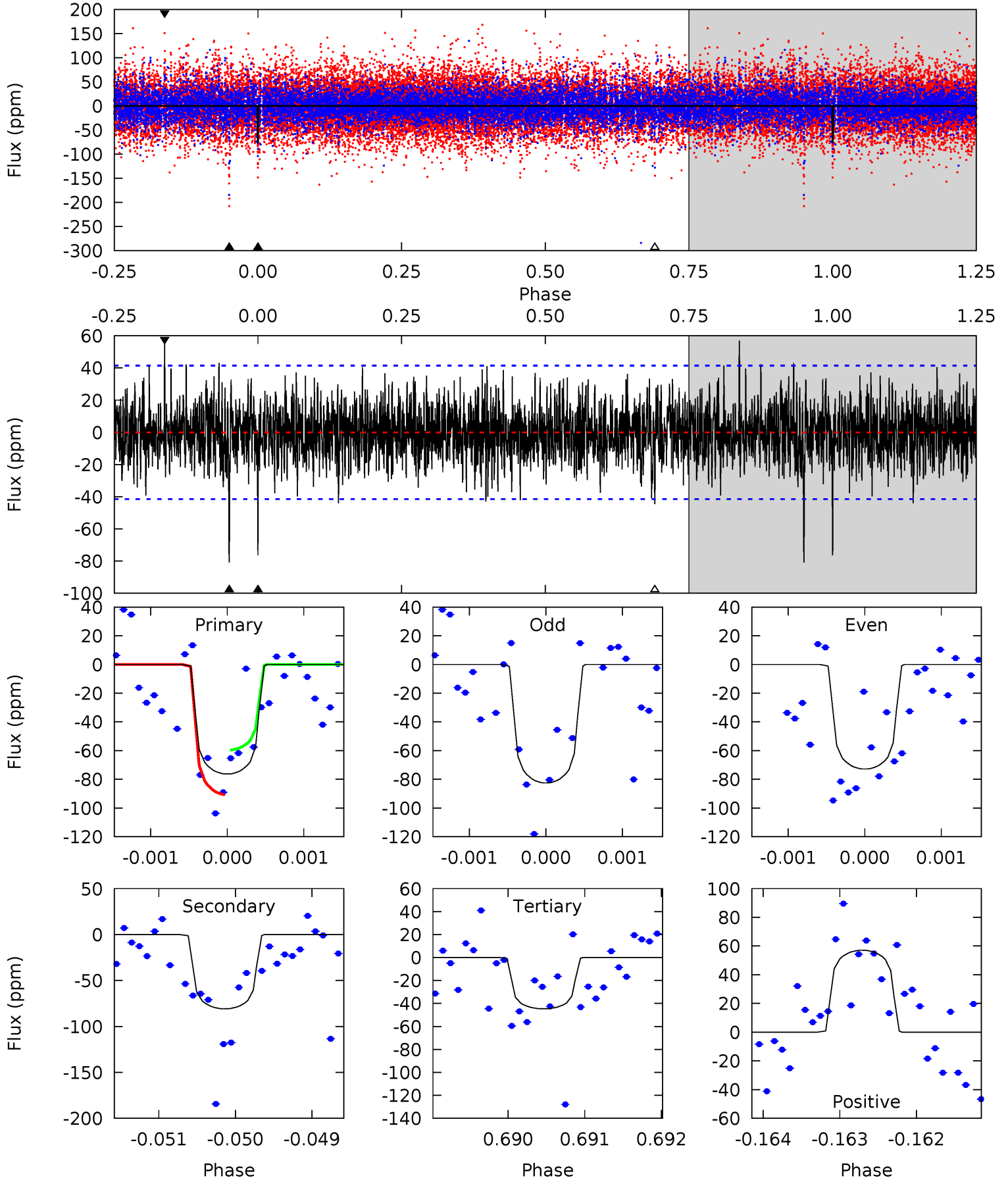
TCE 004931390-02 P=195.590646 Days  $T_0=215.786595$  (BKJD)



# DV Model-Shift Uniqueness Test

004931390-02,  $P = 195.601524$  Days,  $E = 20.147268$  Days

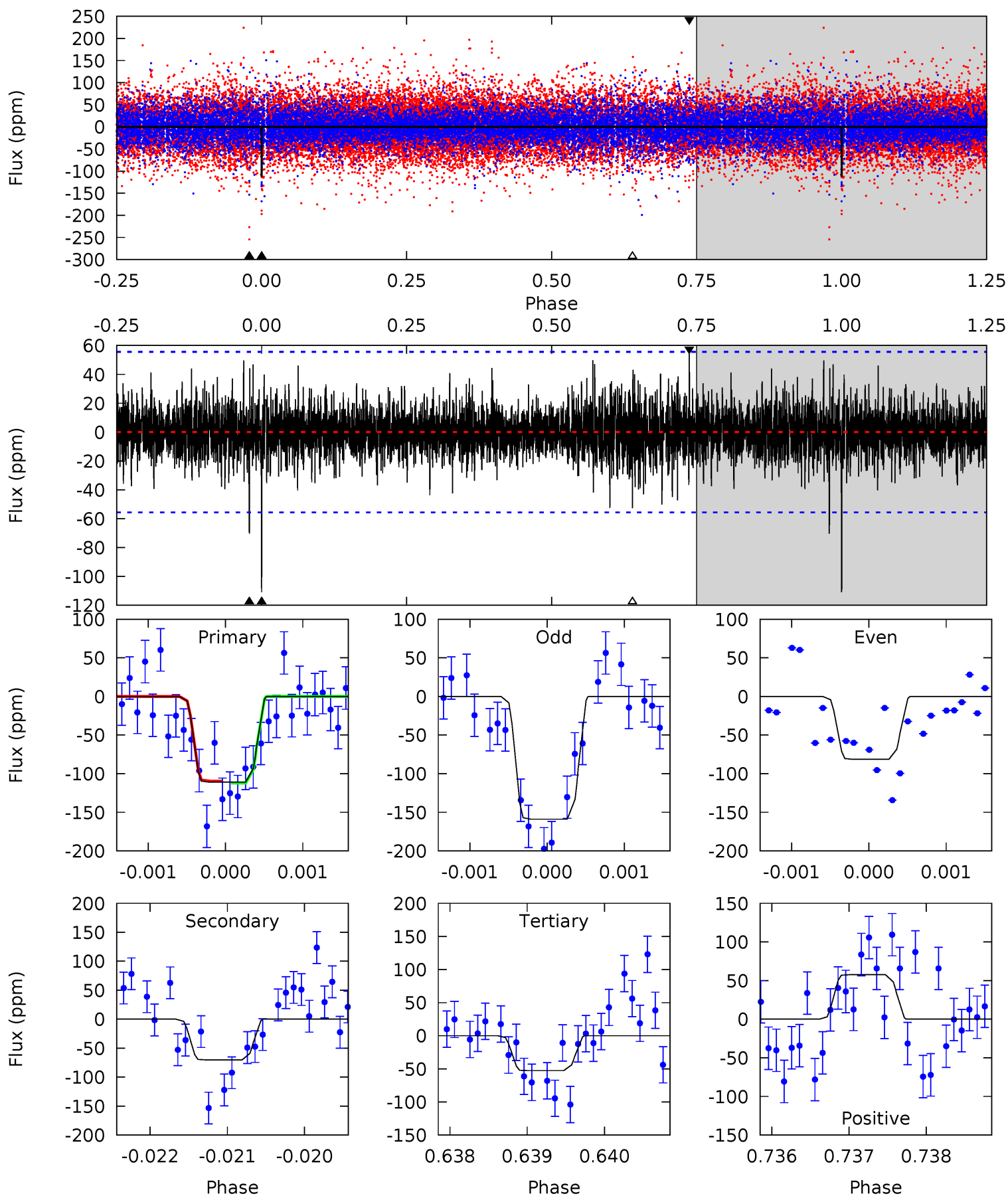
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.0	10.6	5.87	7.51	5.46	3.31	1.75	4.17	2.53	4.76	3.13	0.61	0.91	0.41	2.05



# Alt Model-Shift Uniqueness Test

004931390-02,  $P = 195.590646$  Days,  $E = 20.195949$  Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.0	6.96	5.21	5.70	5.51	3.38	1.23	5.77	5.28	1.74	1.26	3.73	0.89	0.34	0.13



### Stellar Parameters For KIC 004931390

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6642^{+73}_{-86}$	$4.272^{+0.013}_{-0.011}$	$-0.060^{+0.150}_{-0.150}$	$1.363^{+0.032}_{-0.048}$	$1.274^{+0.050}_{-0.074}$	$0.708^{+0.046}_{-0.032}$
	+1%/-1%	+0%/-0%	+250%/-250%	+2%/-4%	+4%/-6%	+7%/-4%
Source	SPE72	AST10	SPE72	DSEP		

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

### Secondary Eclipse Parameters for KIC 004931390-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-81 \pm 8$	$1.44^{+0.71}_{-0.69}$	$565^{+7}_{-8}$	$6408^{+3018}_{-1118}$	$11232^{+29263}_{-6235}$
Alt.	$-70 \pm 10$	$1.86^{+0.75}_{-0.67}$	$566^{+7}_{-8}$	$5434^{+1425}_{-756}$	$5696^{+8716}_{-2897}$

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

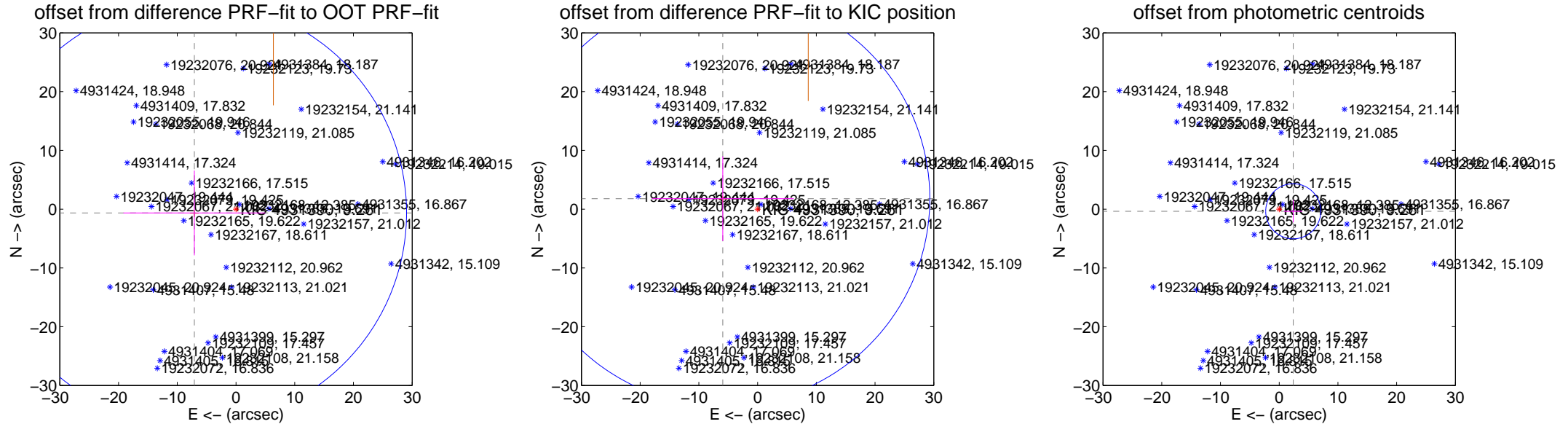
# DV Centroid Data

Supplemental centroid analysis for 004931390-02. **Kepler magnitude: 9.26.** Transit SNR 7.09

There are 0 quarters with good PRF difference image offsets

The OOT PRF centroid is offset from the target star catalog position by about 2.70 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

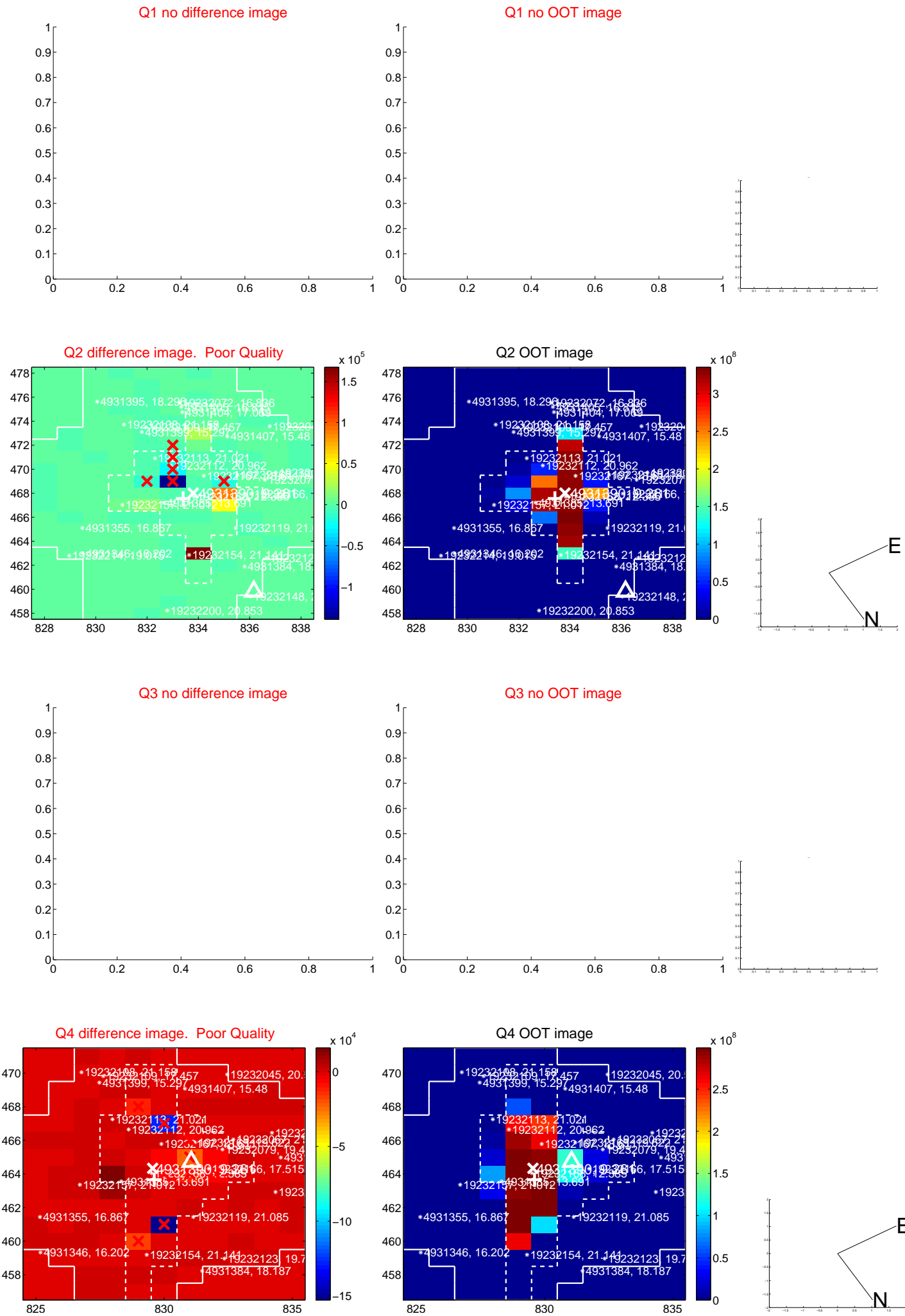
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$7.120 \pm 12.045$	0.59	$7.090 \pm 12.077$	$-0.651 \pm 7.213$
PRF-fit source offset from KIC position	$6.187 \pm 11.749$	0.53	$5.924 \pm 12.077$	$1.786 \pm 7.213$
photometric centroid source offset	$2.42 \pm 1.56$	1.55	$-2.39 \pm 1.55$	$-0.36 \pm 1.91$



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



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



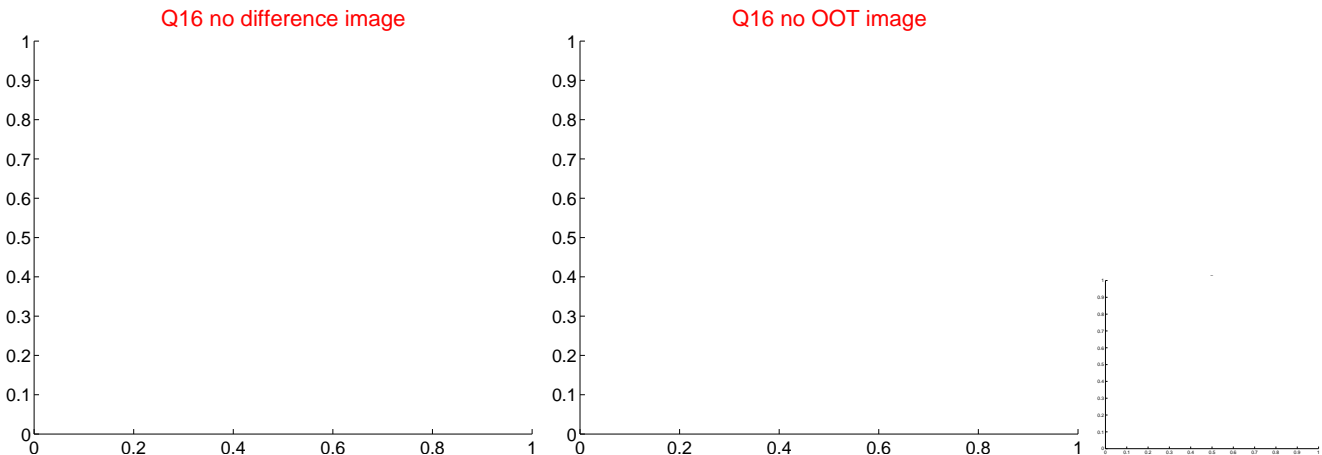
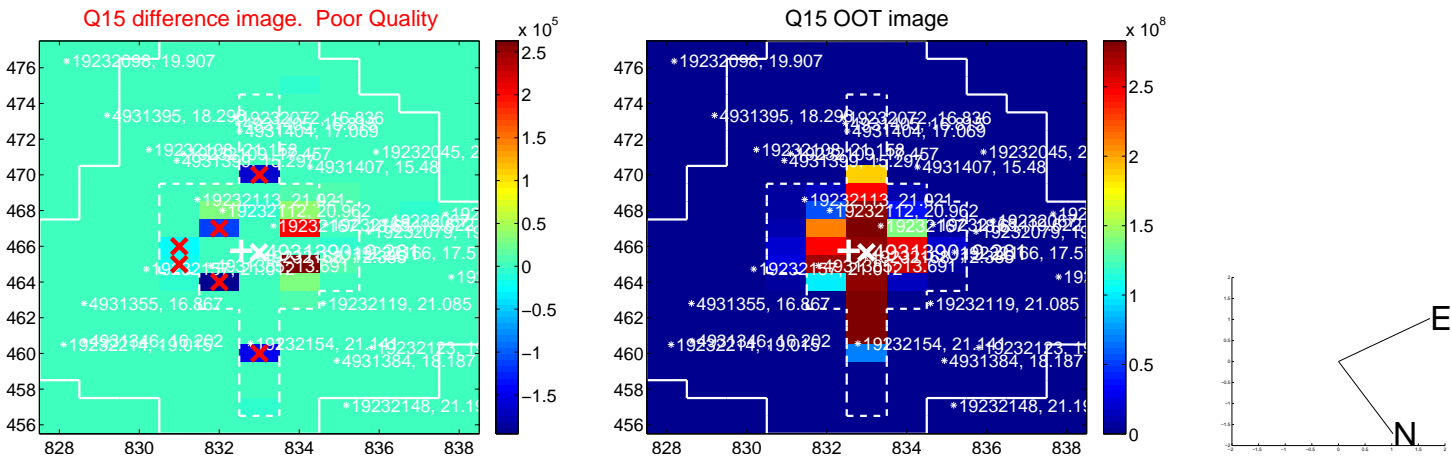
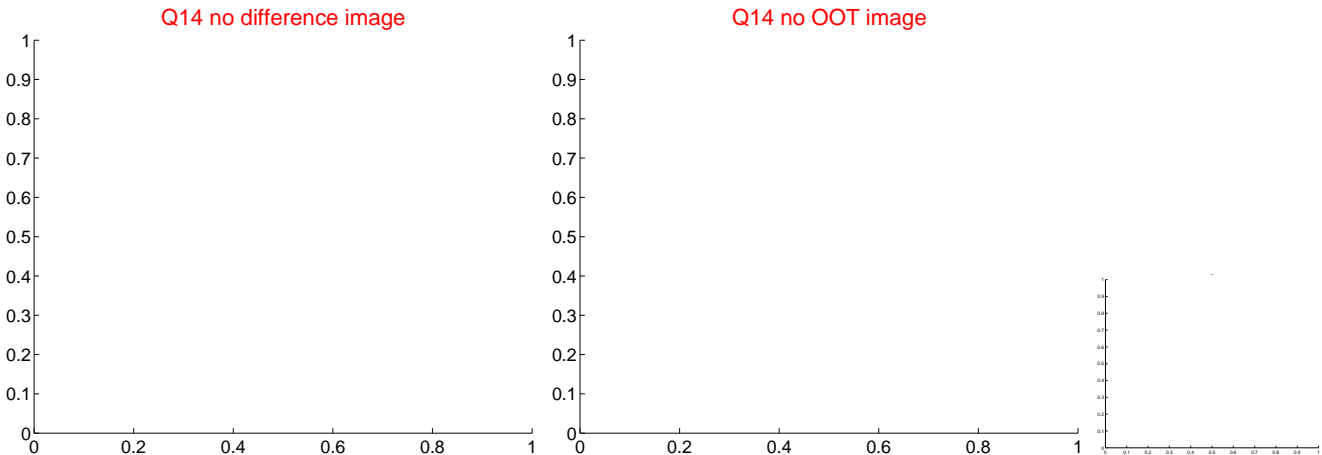
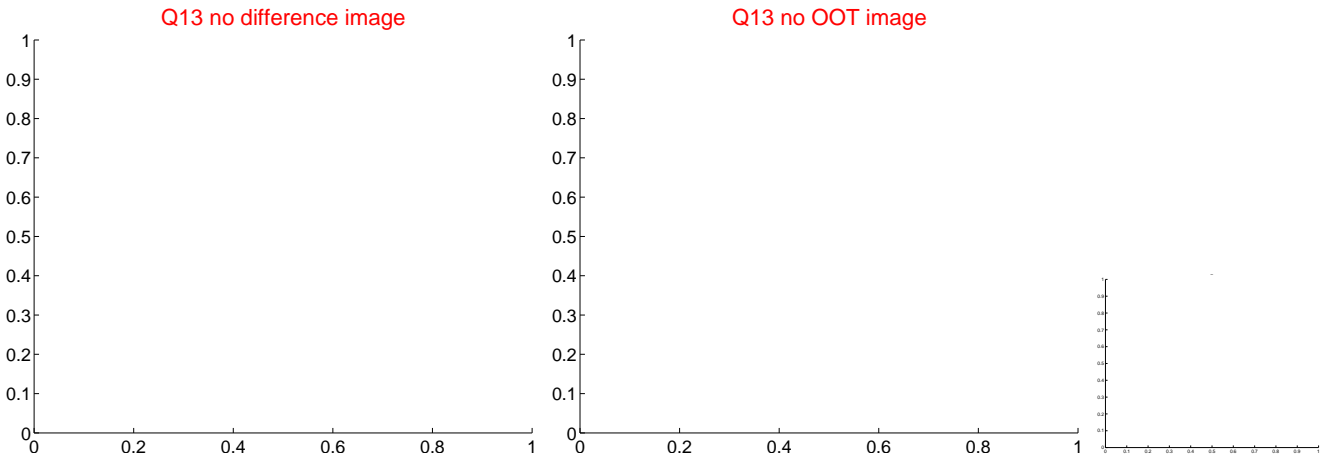
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



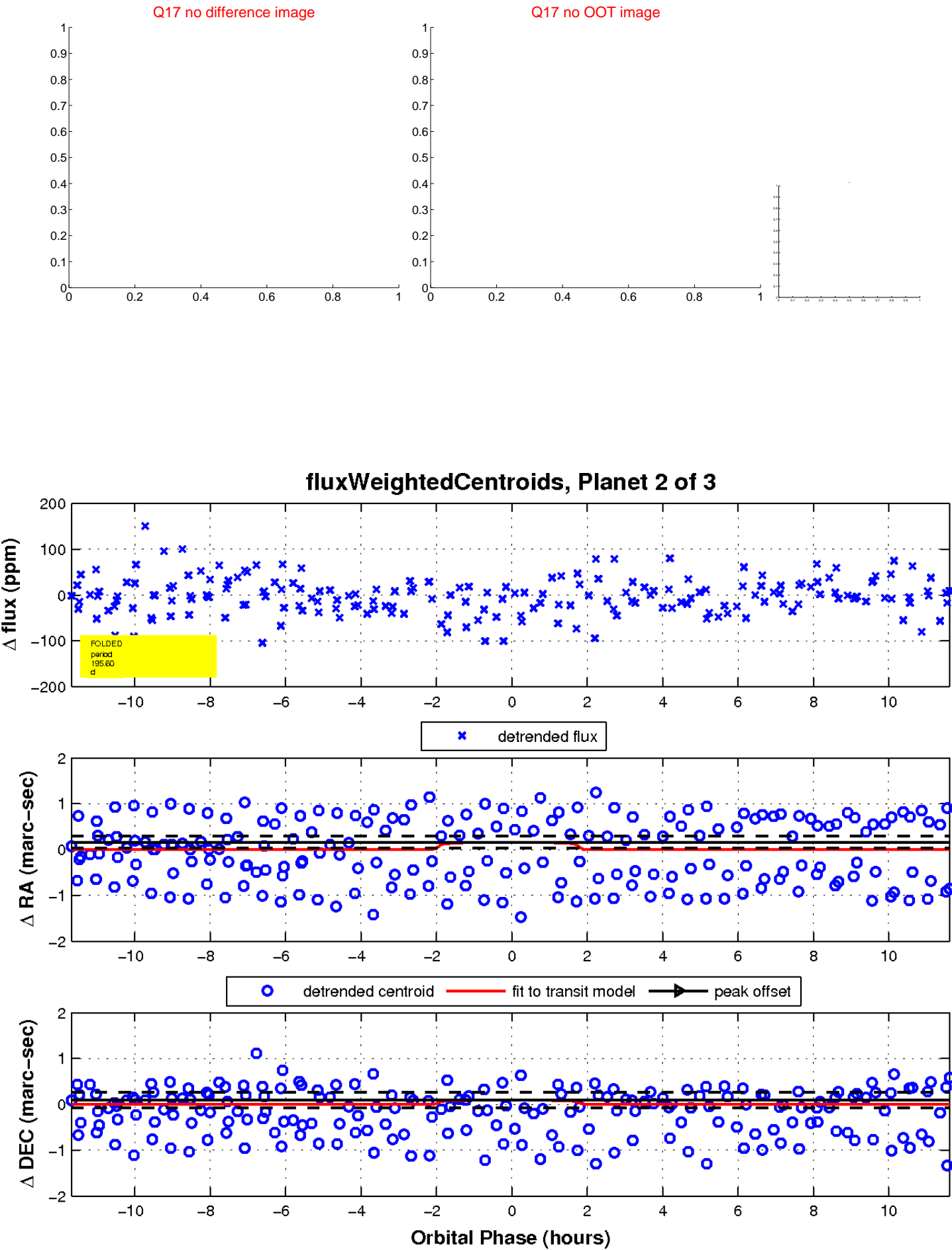
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



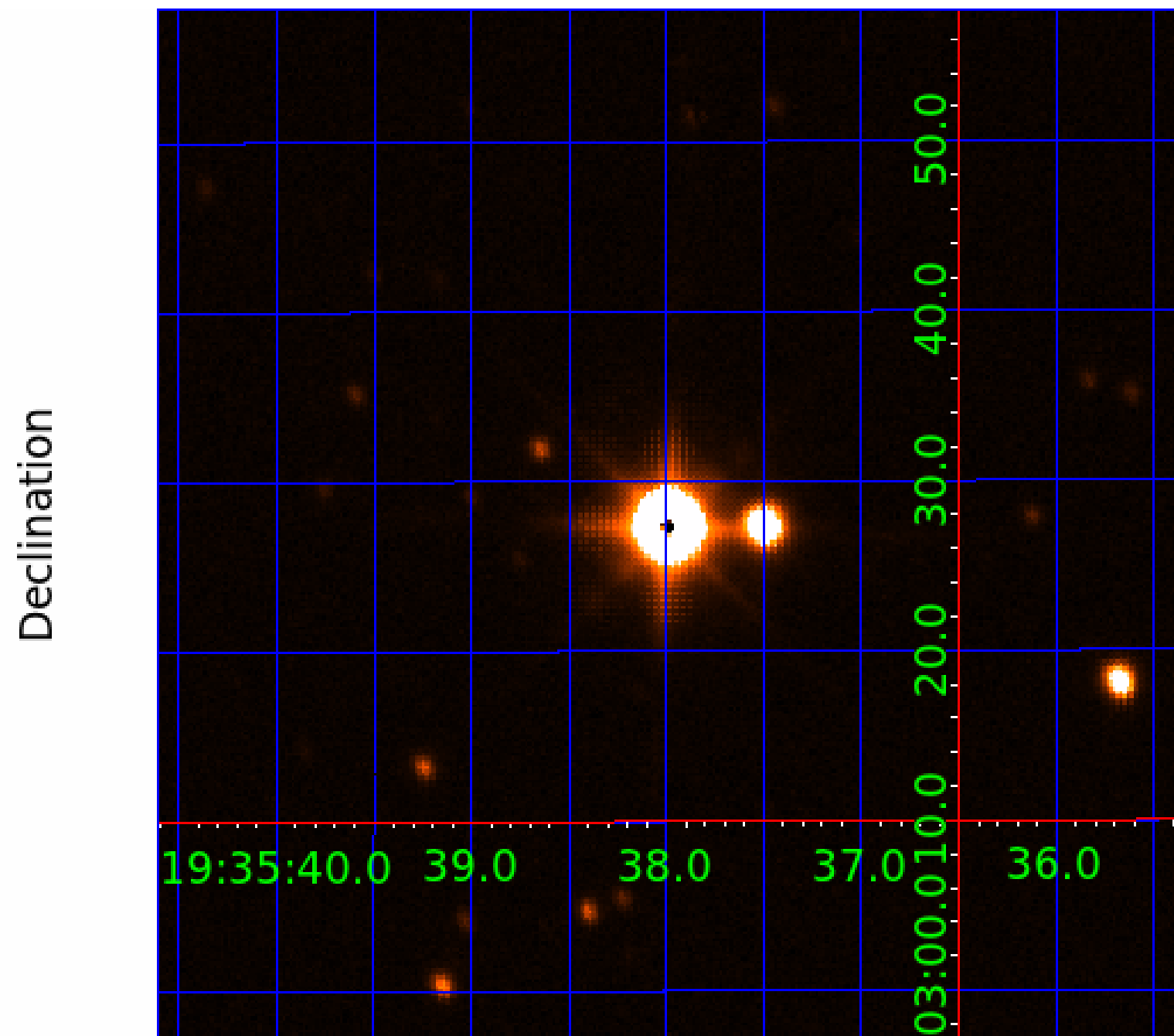
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image





# KIC 004931390

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
004931390-01	OBS	No	1.902349	133.308539	6.9	6.917	8.1	7.2	1.36	6642	0.42	3062.20
004931390-02	OBS	No	195.601524	215.748792	86.5	3.896	8.5	7.1	1.36	6642	1.45	6.36
004931390-03	OBS	No	7.609264	131.960703	15.9	5.582	8.8	9.3	1.36	6642	0.65	482.28

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004931390-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—CENT_SATURATED
004931390-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL_SKYE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—CENT_SATURATED
004931390-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—SAME_NTL_PERIOD—CENT_SATURATED

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

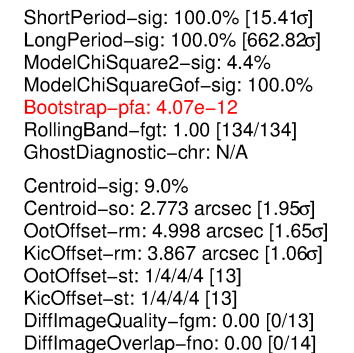
N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

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.

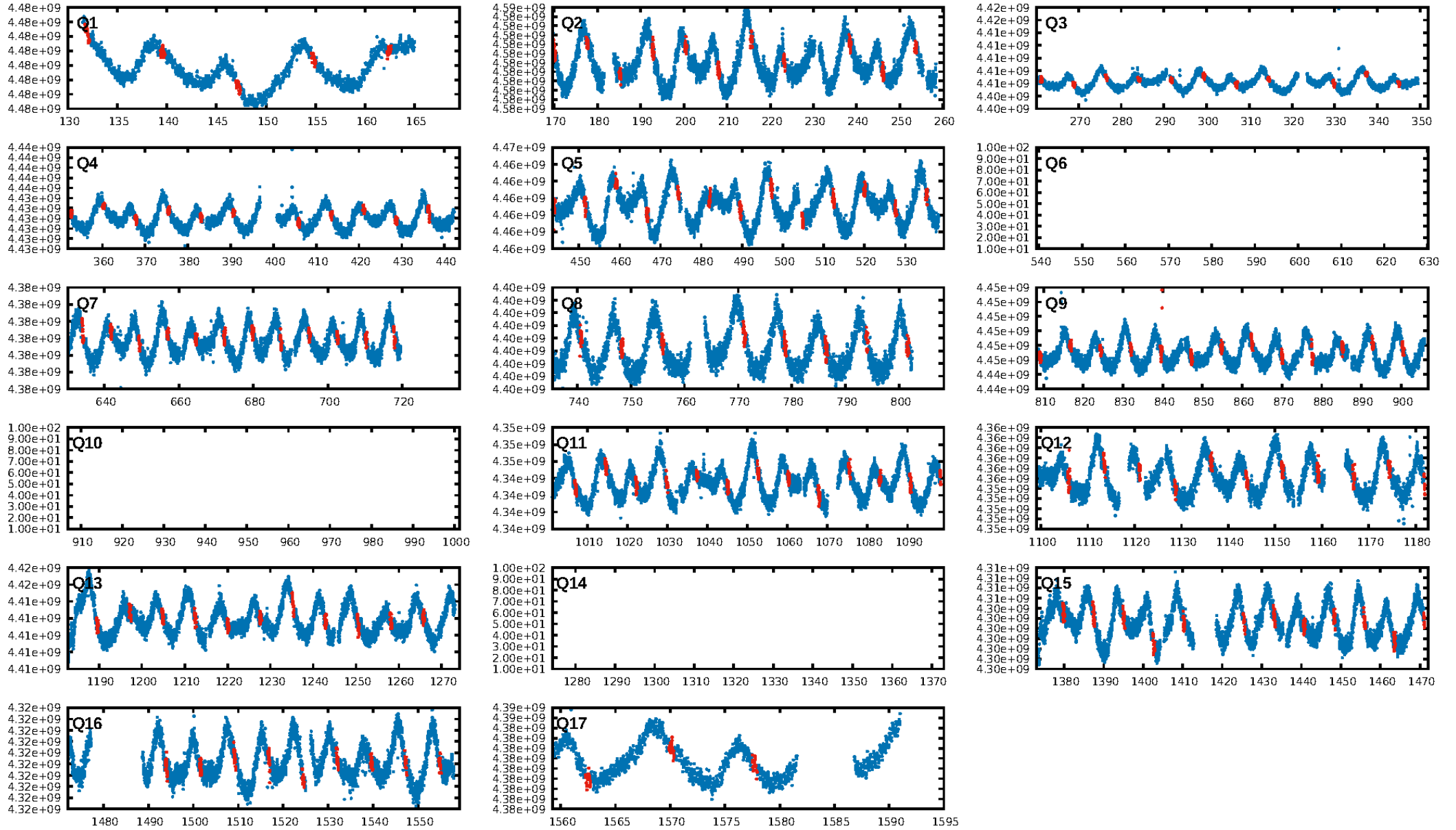
Ephemeris Match Information For 004931390-03

No Significant Match Found

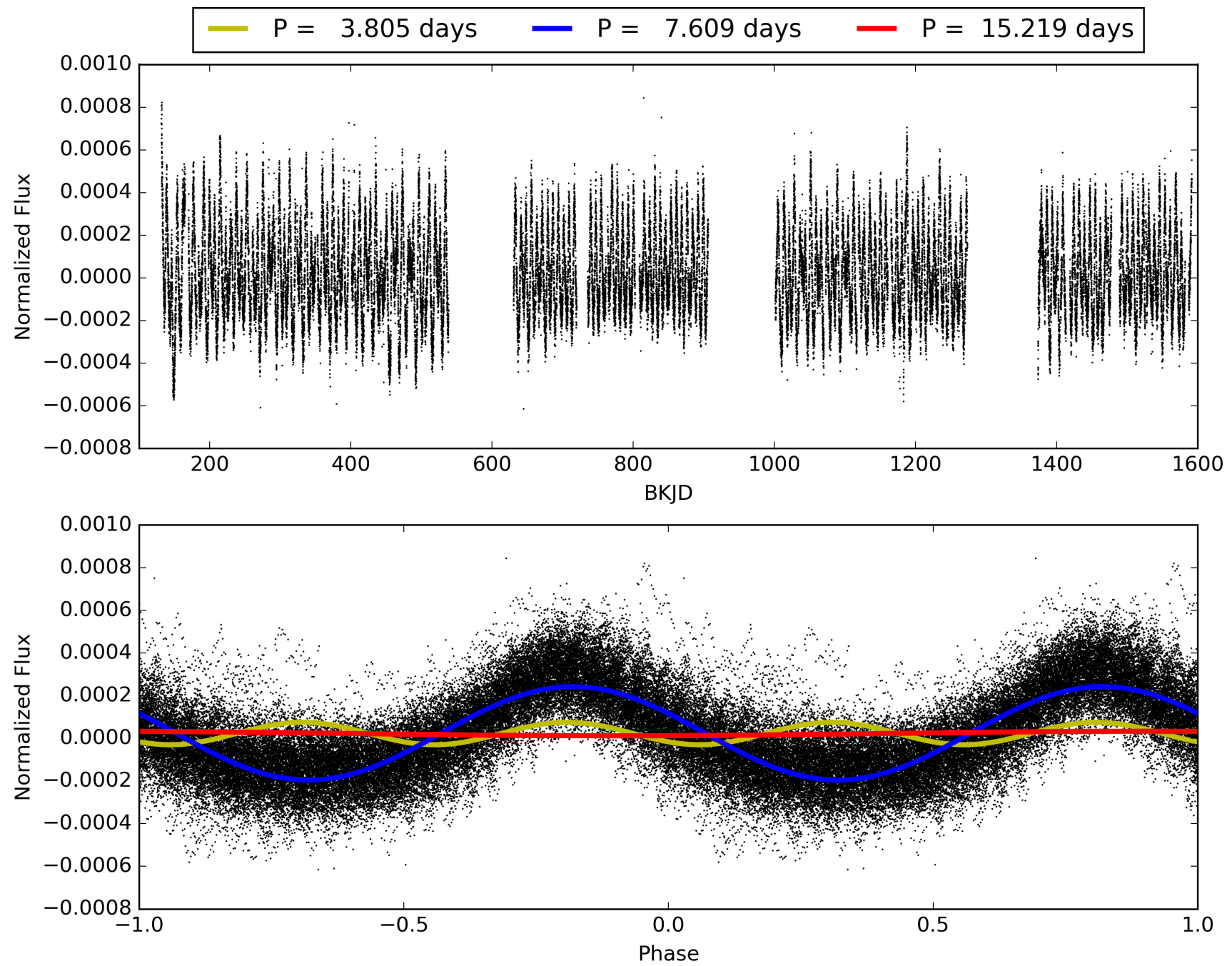
## KIC: 4931390    Candidate: 3 of 3    Period: 7.609 d



# TCE 004931390-03, PDC Light Curves

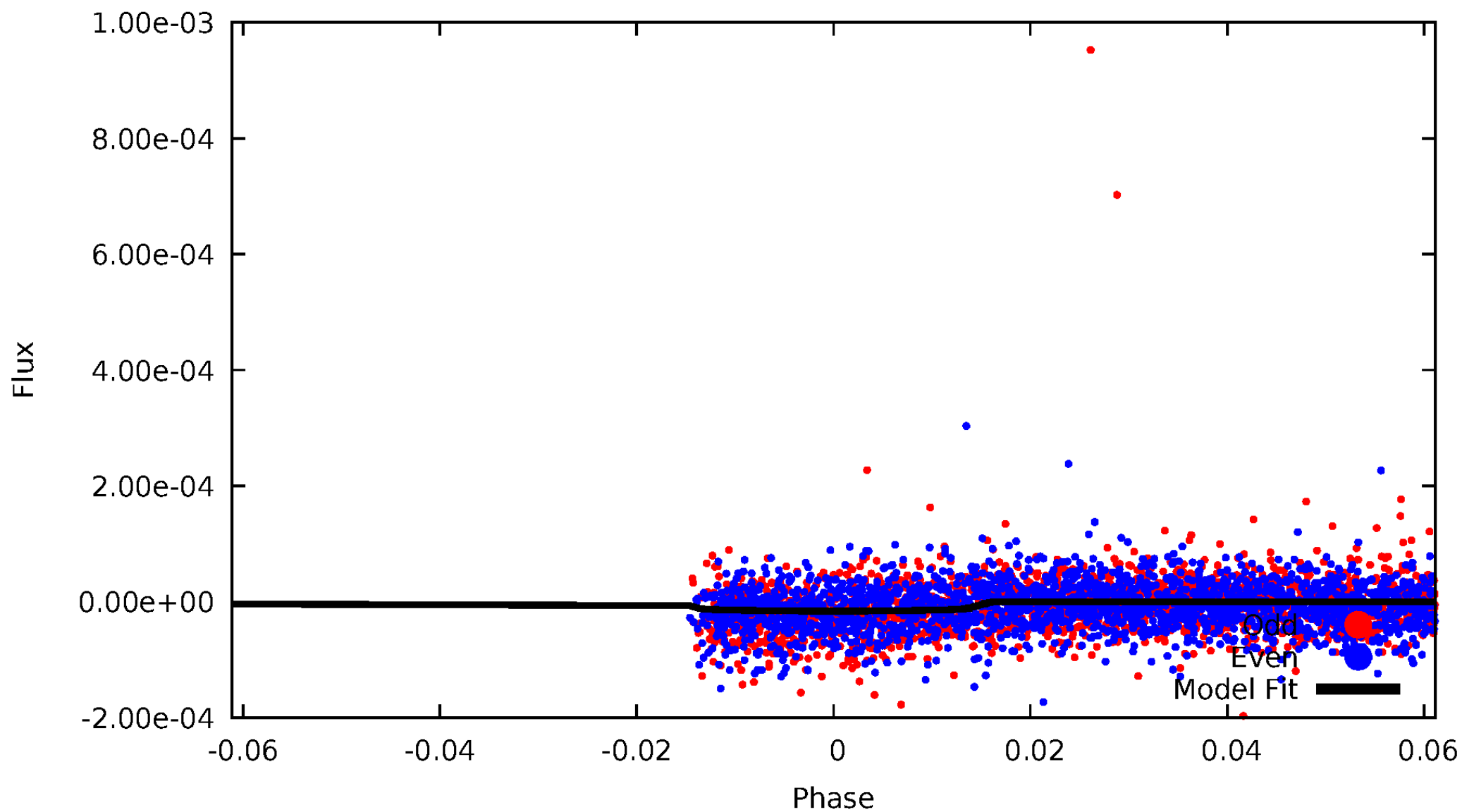


TCE 004931390-03



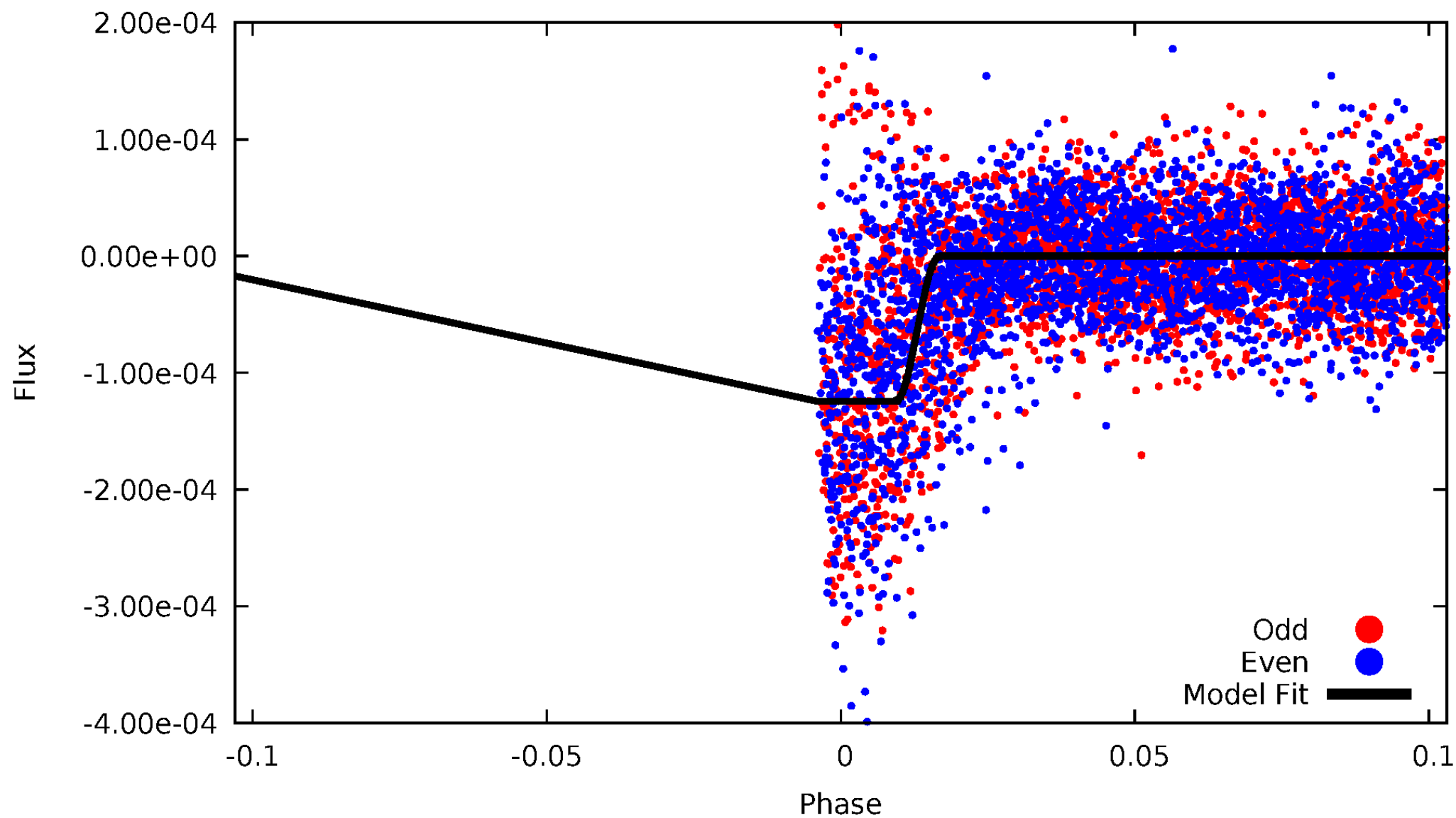
# DV Odd/Even

TCE 004931390-03



ALT Odd/Even

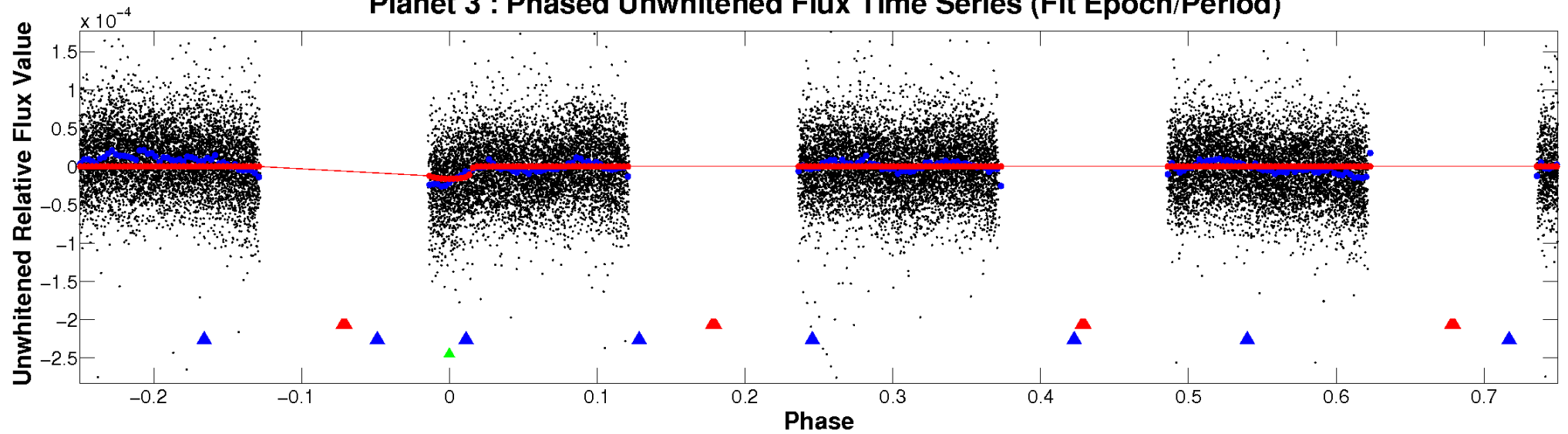
TCE 004931390-03



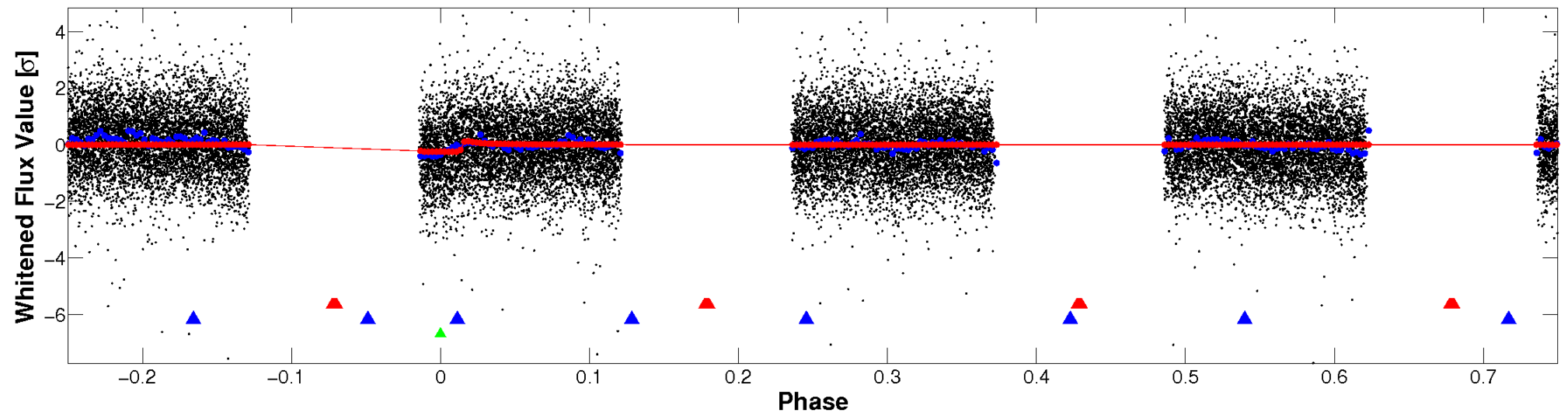


# Non-Whitened Vs. Whitened Light Curve

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

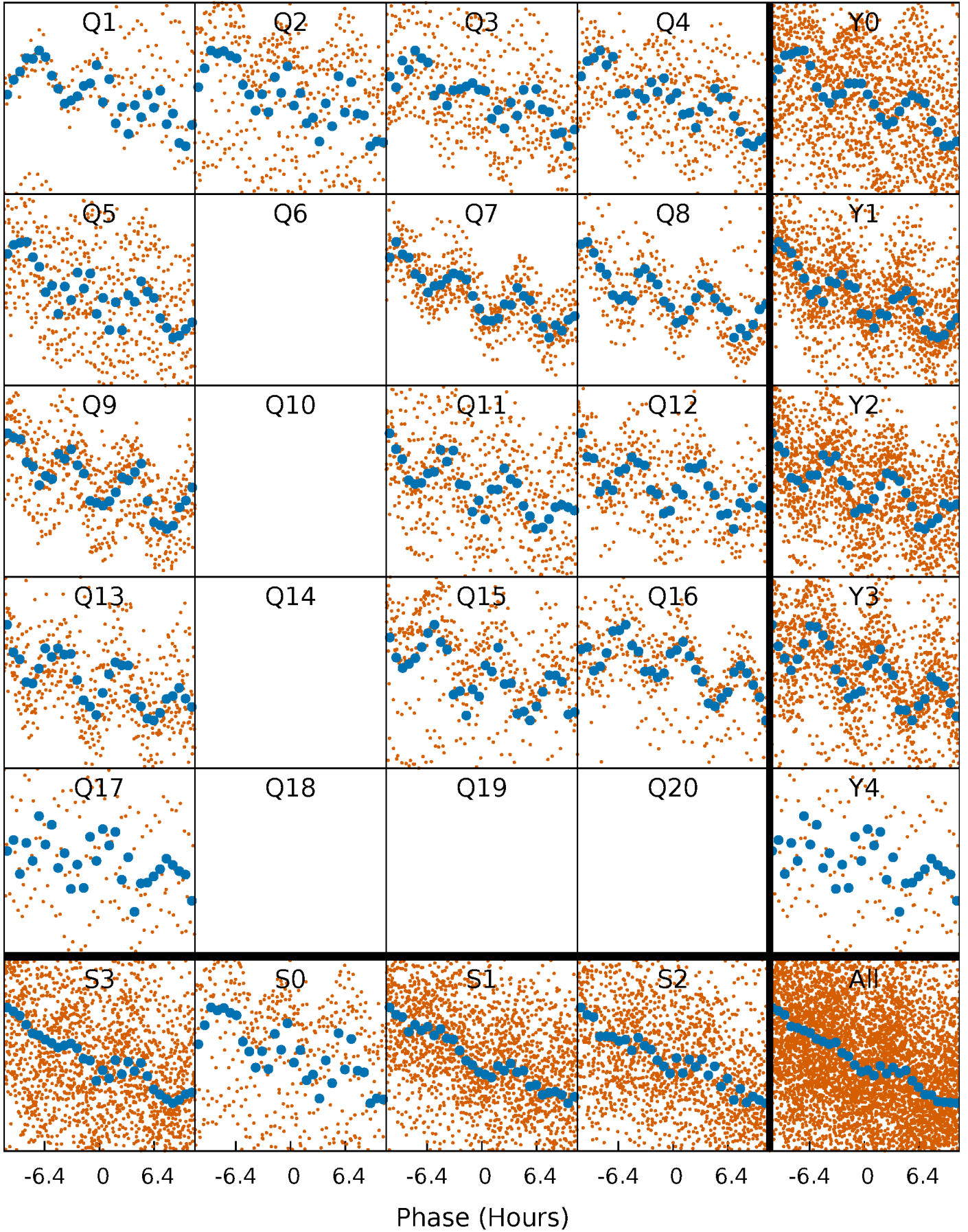


## Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



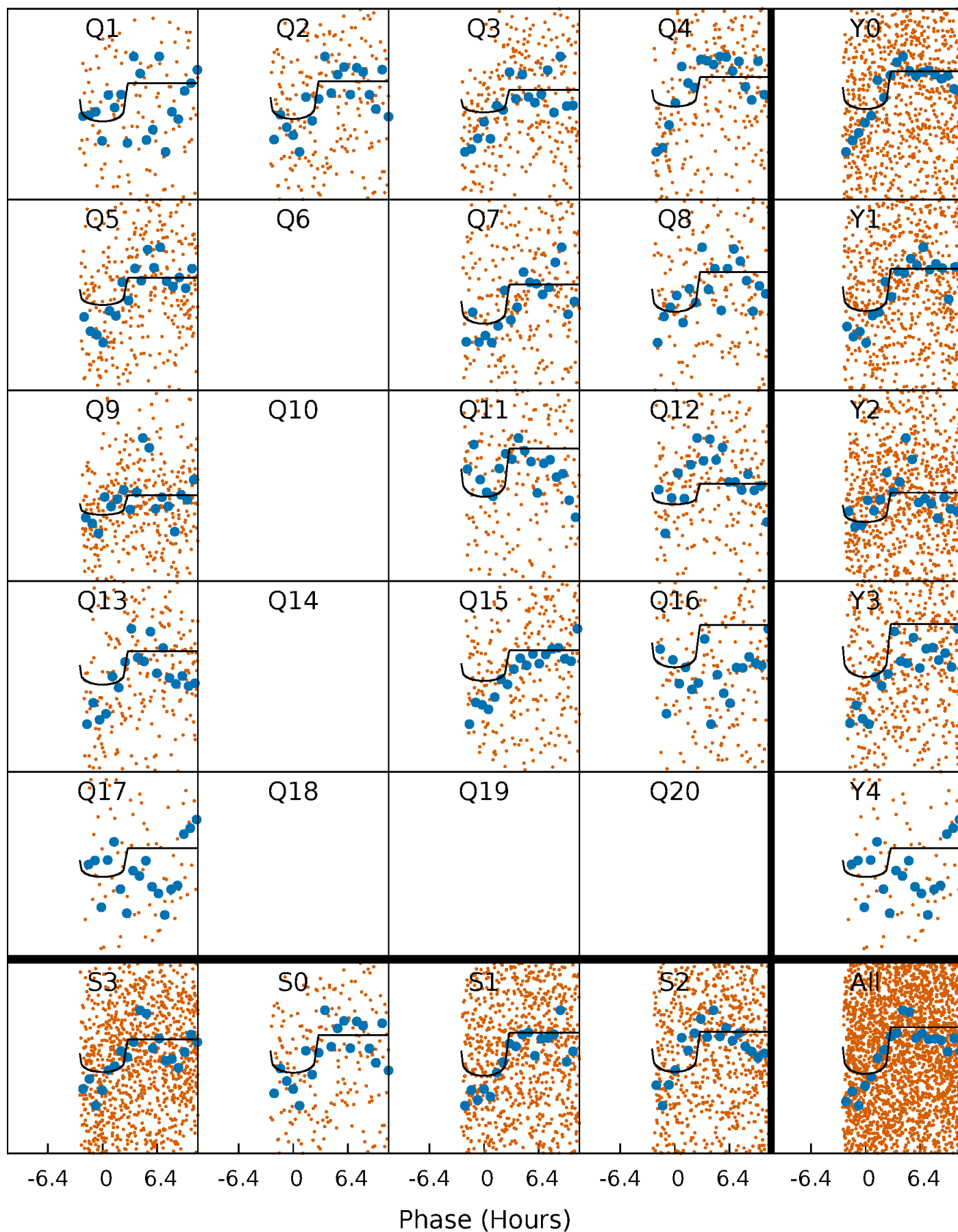
# PDC Quarter-Phased Transit Curves

TCE 004931390-03   P= 7.609264 Days    $T_0=131.960703$  (BKJD)



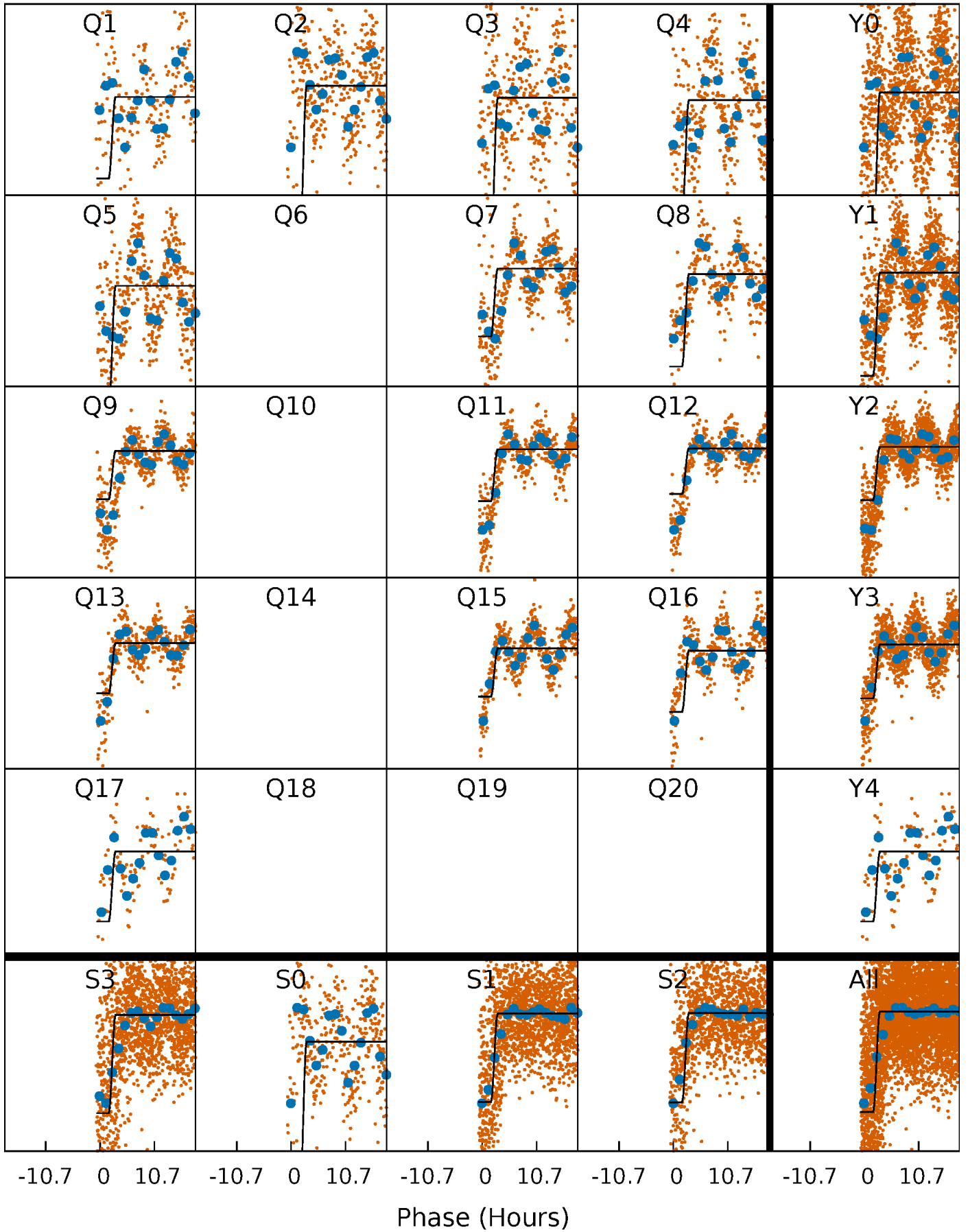
# DV Quarter-Phased Transit Curves

TCE 004931390-03   P= 7.609264 Days    $T_0=131.960703$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

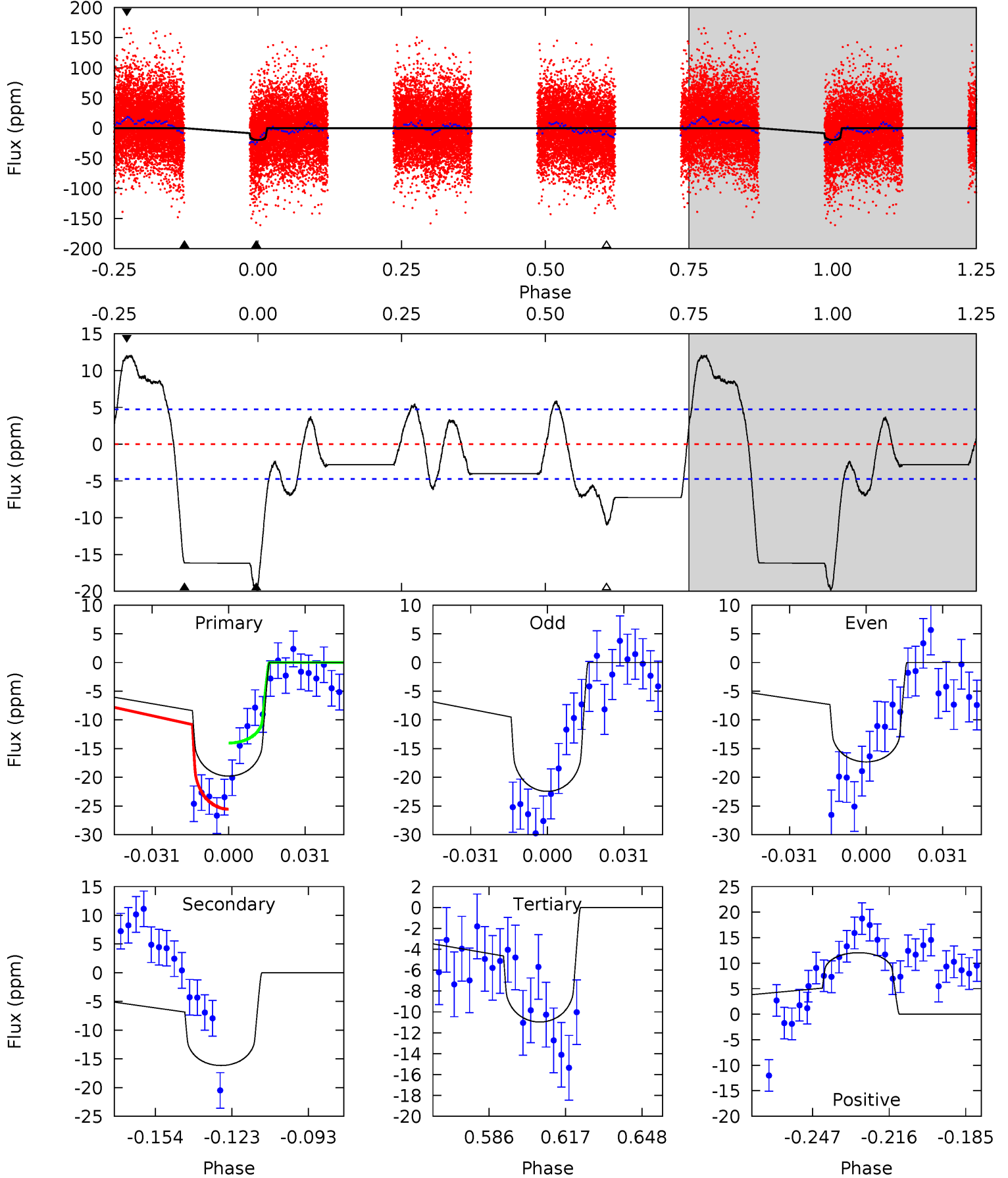
TCE 004931390-03     $P = 7.609331$  Days     $T_0 = 131.879265$  (BKJD)



# DV Model-Shift Uniqueness Test

004931390-03, P = 7.609264 Days, E = 124.351439 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
20.1	16.4	11.1	12.2	4.81	2.16	5.92	8.95	7.85	5.26	4.16	2.60	1.18	0.38	5.76

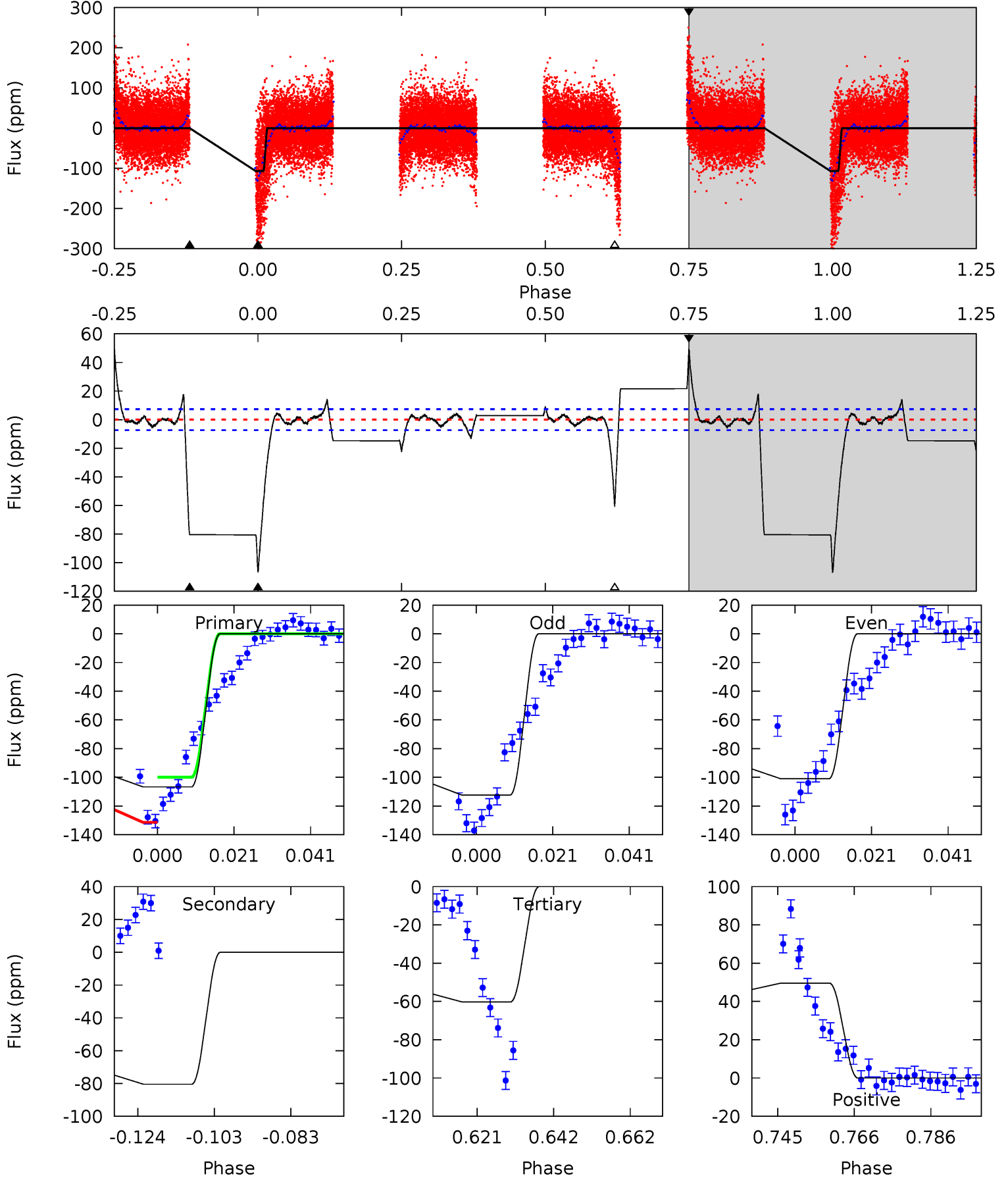




# Alt Model-Shift Uniqueness Test

004931390-03, P = 7.609331 Days, E = 124.269934 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
71.2	53.7	40.2	33.1	4.88	2.31	6.35	31.0	38.1	13.5	20.6	3.77	0.94	0.32	7.37





### Stellar Parameters For KIC 004931390

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6642^{+73}_{-86}$	$4.272^{+0.013}_{-0.011}$	$-0.060^{+0.150}_{-0.150}$	$1.363^{+0.032}_{-0.048}$	$1.274^{+0.050}_{-0.074}$	$0.708^{+0.046}_{-0.032}$
	+1%/-1%	+0%/-0%	+250%/-250%	+2%/-4%	+4%/-6%	+7%/-4%
Source	SPE72	AST10	SPE72	DSEP		

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

### Secondary Eclipse Parameters for KIC 004931390-03 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-16 \pm 1$	$0.65^{+0.15}_{-0.15}$	$1669^{+20}_{-22}$	$6353^{+1005}_{-620}$	$143^{+102}_{-48}$
Alt.	$-80 \pm 1$	$1.66^{+0.15}_{-0.15}$	$1670^{+22}_{-23}$	$5936^{+292}_{-252}$	$108^{+22}_{-17}$

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

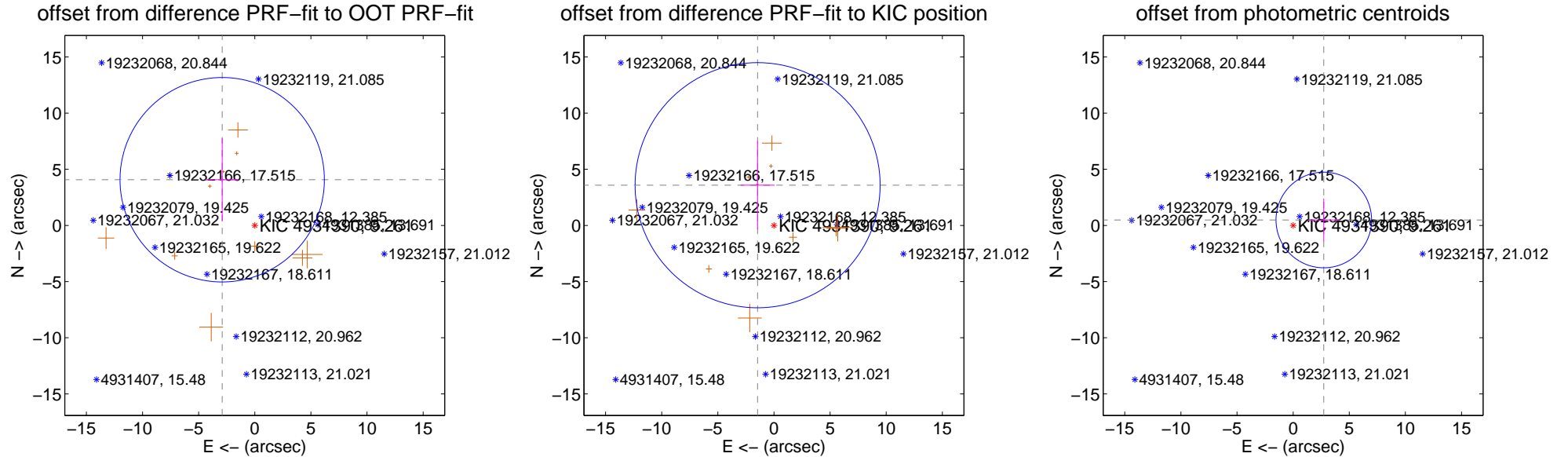
## DV Centroid Data

Supplemental centroid analysis for 004931390-03. **Kepler magnitude: 9.26.** Transit SNR 9.29

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

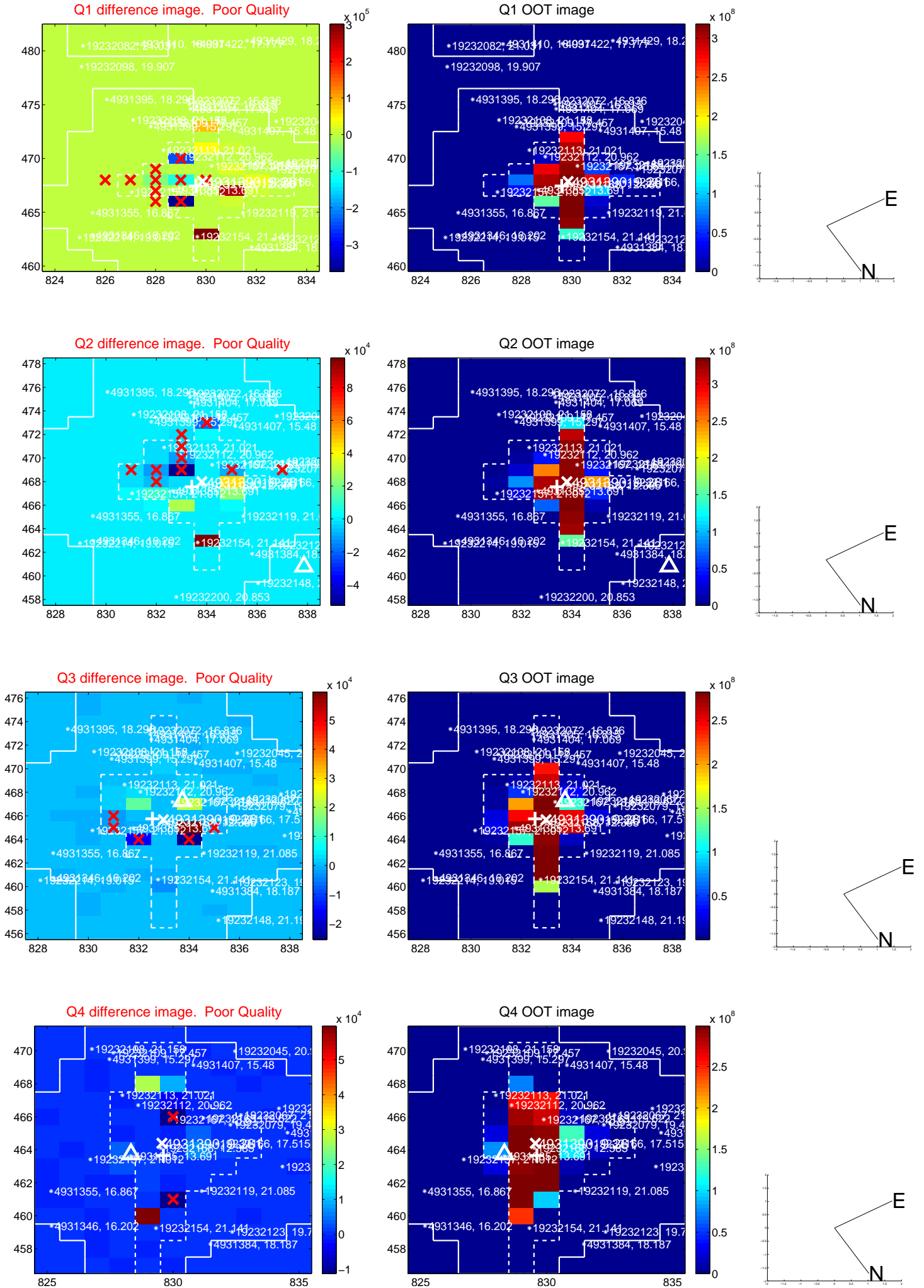
The direct PRF centroid is offset from the target star catalog position by about 1.87 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$4.998 \pm 3.034$	1.65	$2.903 \pm 1.478$	$4.069 \pm 3.686$
PRF-fit source offset from KIC position	$3.867 \pm 3.638$	1.06	$1.457 \pm 1.518$	$3.582 \pm 3.932$
photometric centroid source offset	$2.77 \pm 1.42$	1.95	$-2.73 \pm 1.40$	$0.49 \pm 1.90$

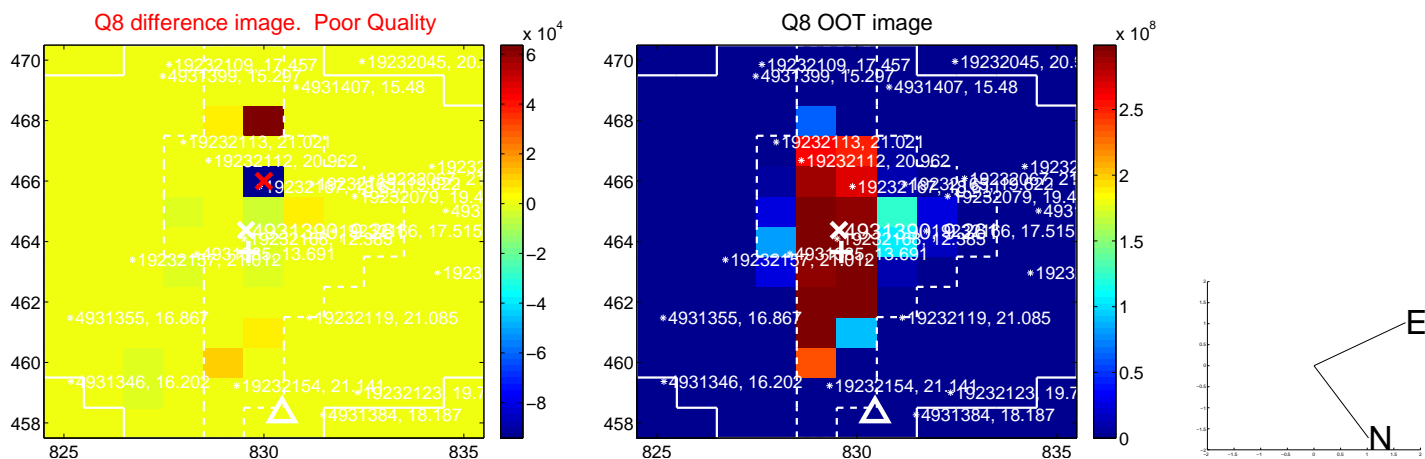
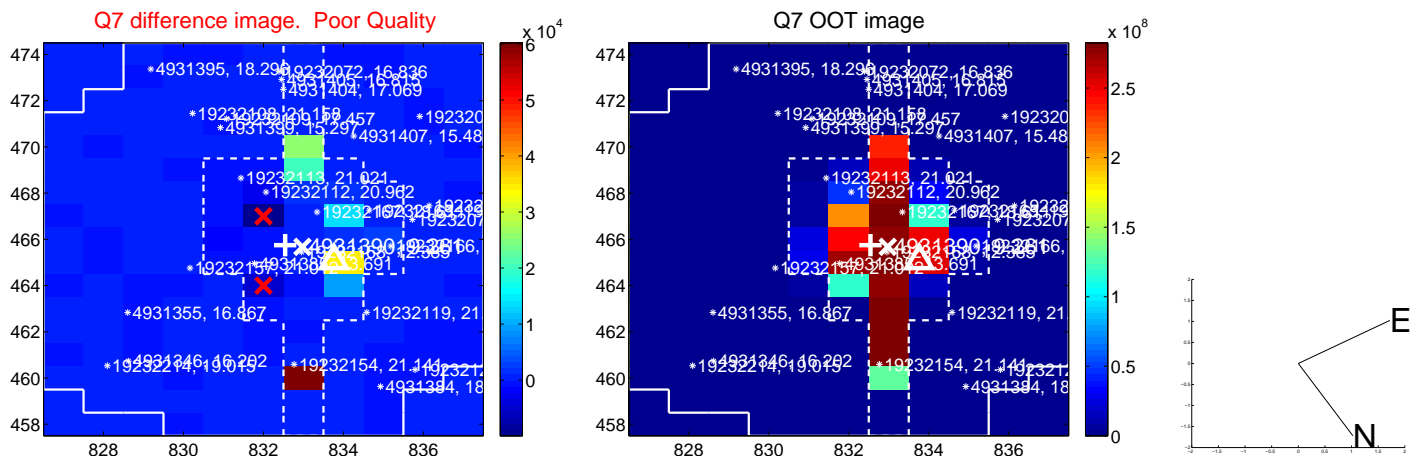
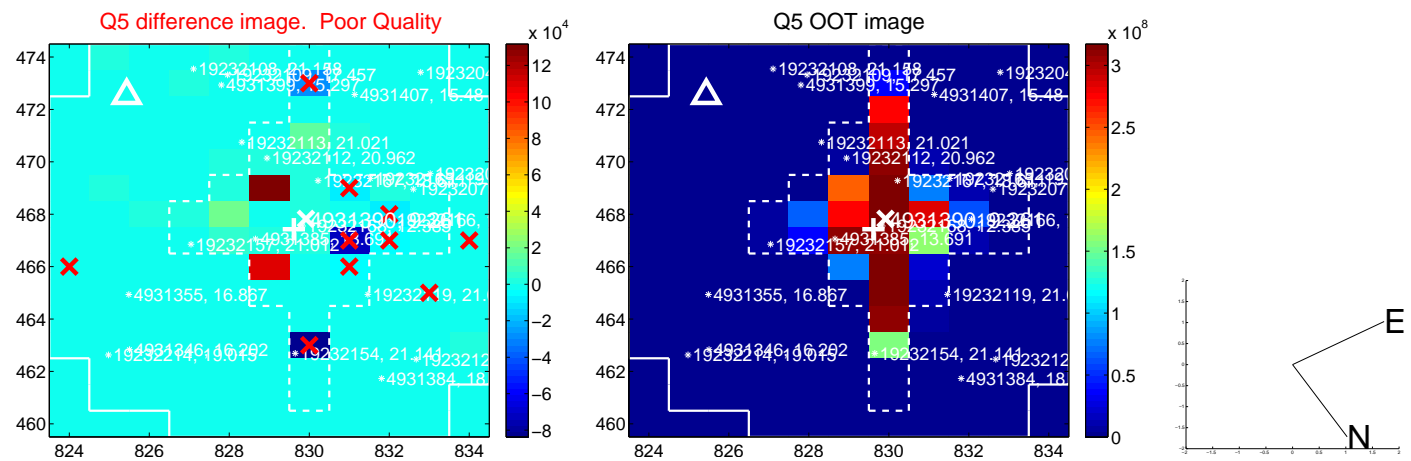


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

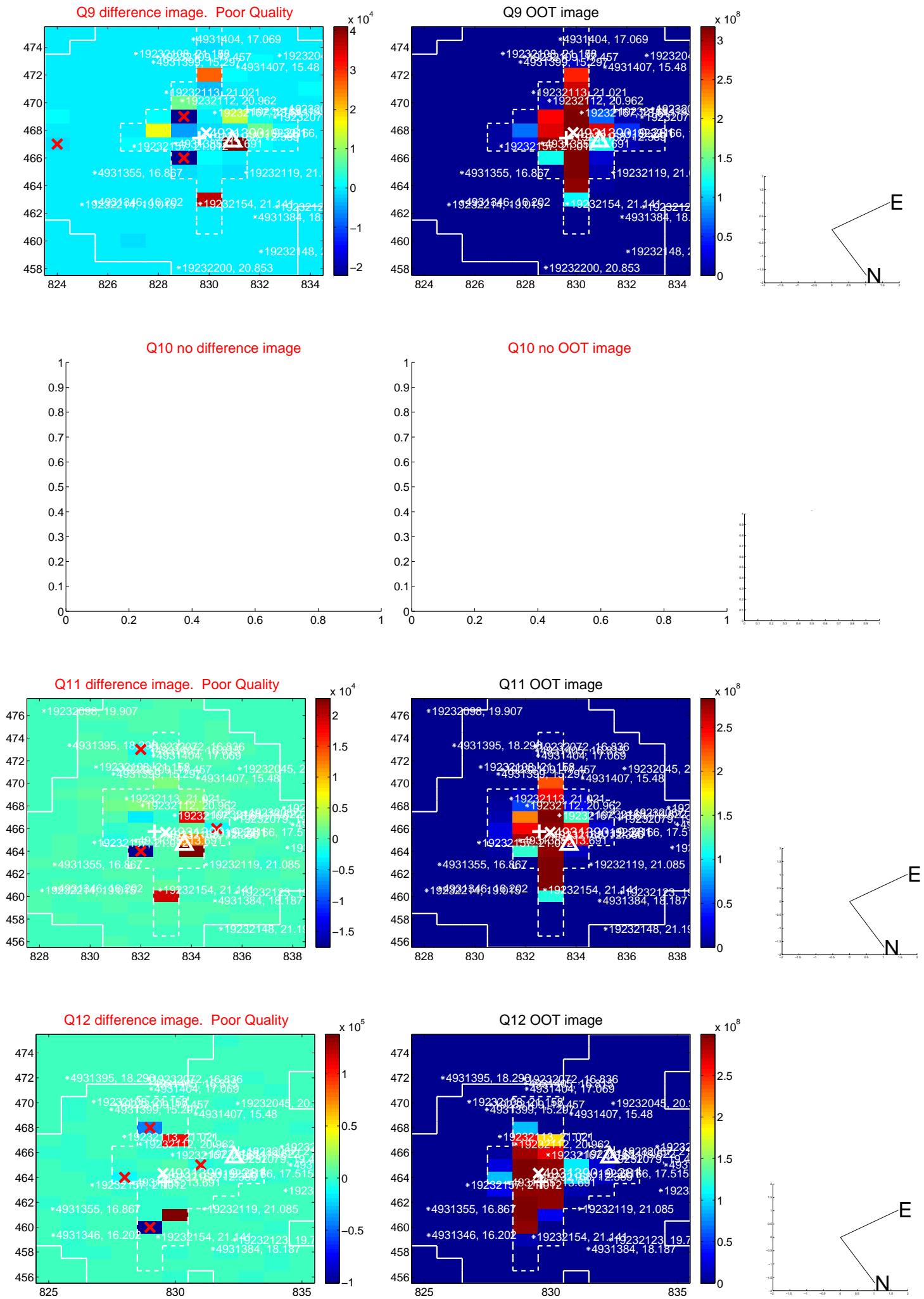
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



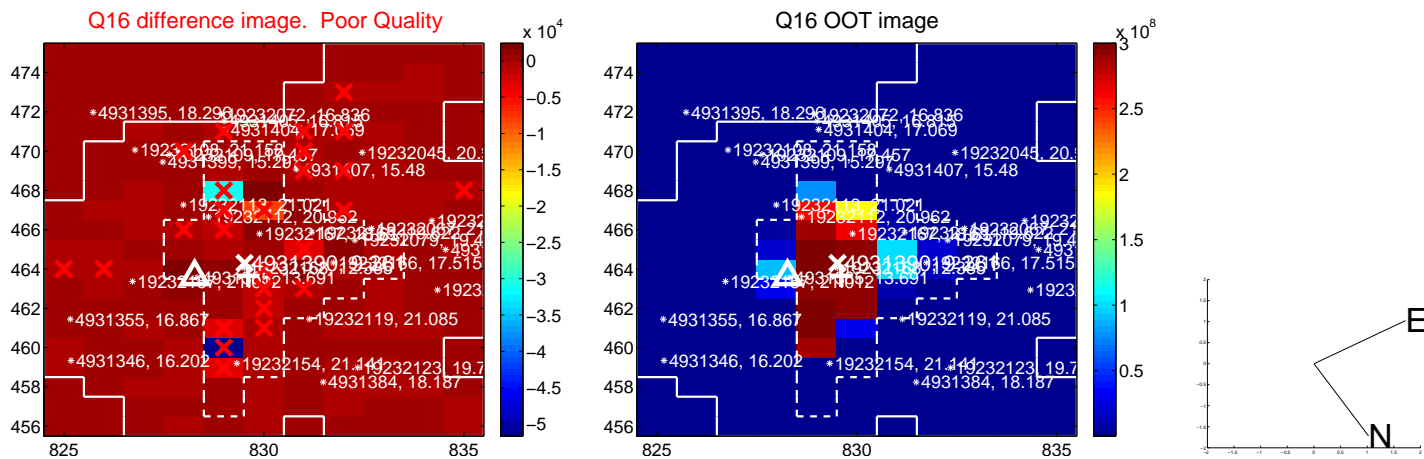
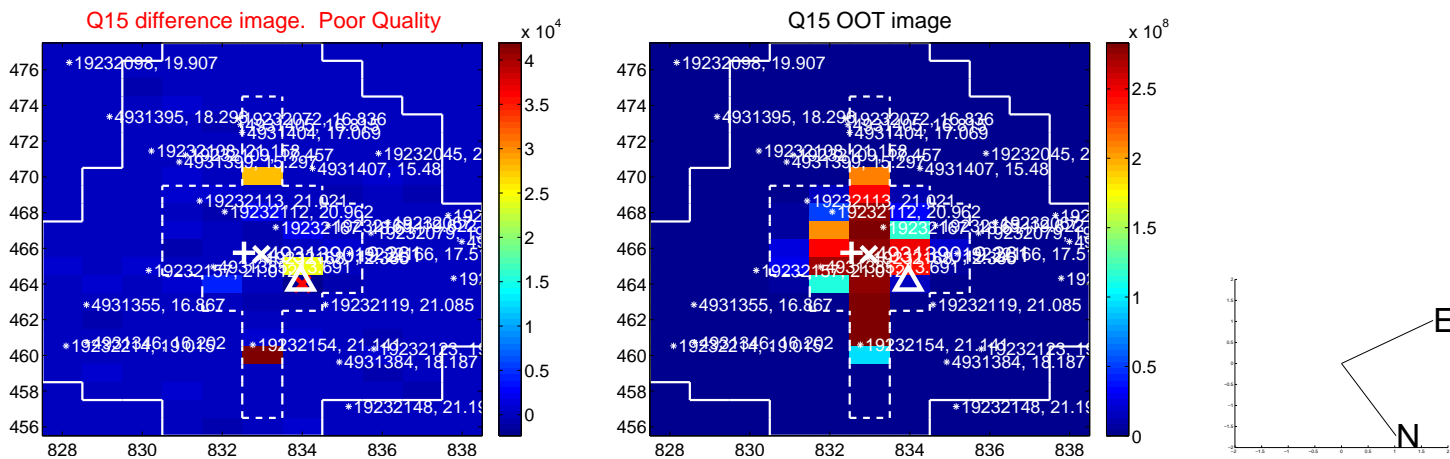
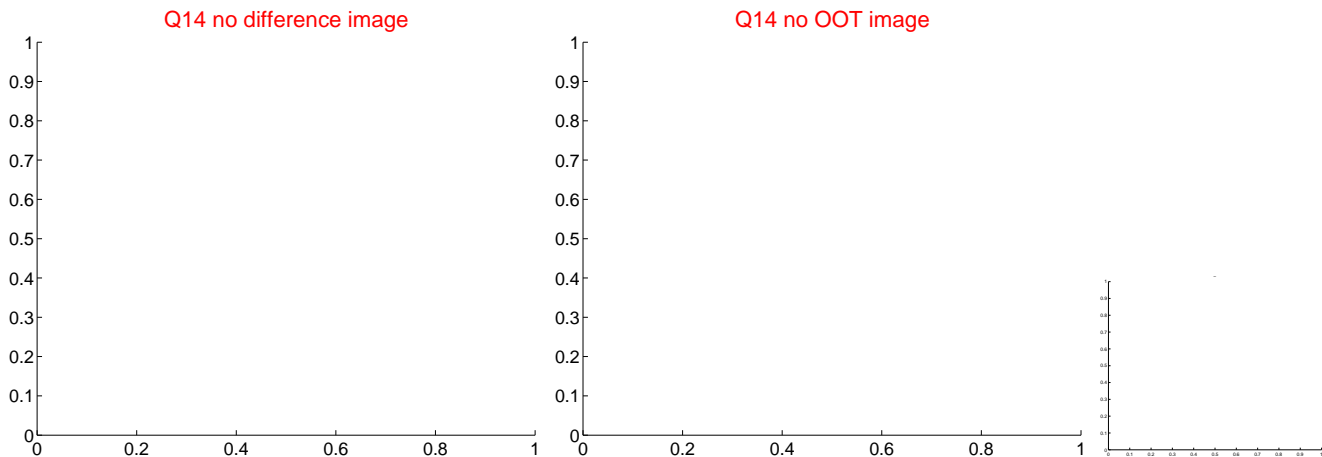
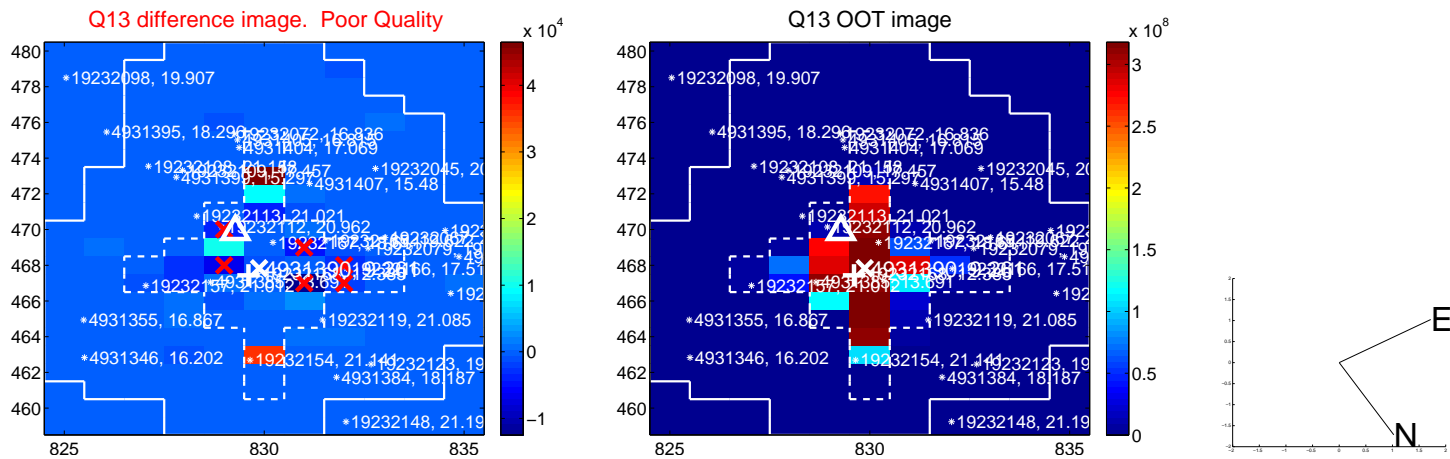
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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.







UKIRT Image

