

# KIC 008962094

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008962094-01	OBS	0700.01	30.864324	142.072017	552.2	3.069	46.5	47.4	0.83	5677	2.33	18.26
008962094-02	OBS	0700.02	9.360603	134.530615	231.8	3.307	33.3	37.3	0.83	5677	1.50	89.60
008962094-03	OBS	0700.03	14.667242	145.420159	197.3	3.730	25.7	28.0	0.83	5677	1.26	49.23
008962094-04	OBS	0700.04	68.161354	187.030785	288.0	5.744	17.7	19.4	0.83	5677	1.51	6.35

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008962094-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
008962094-02	OBS	PC	1.00	0	0	0	0	NO_COMMENT
008962094-03	OBS	PC	1.00	0	0	0	0	NO_COMMENT
008962094-04	OBS	PC	0.98	0	0	0	0	NO_COMMENT

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

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

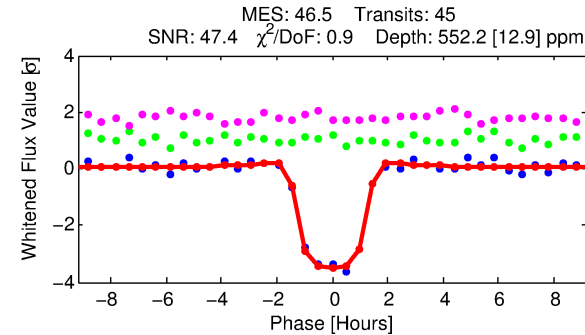
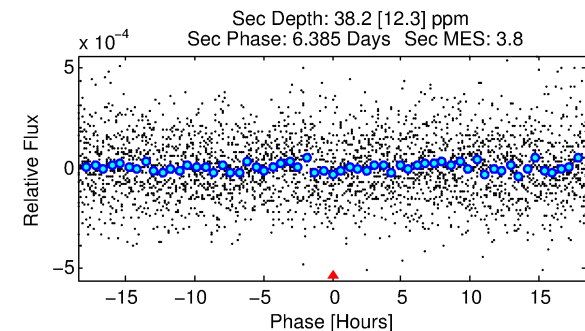
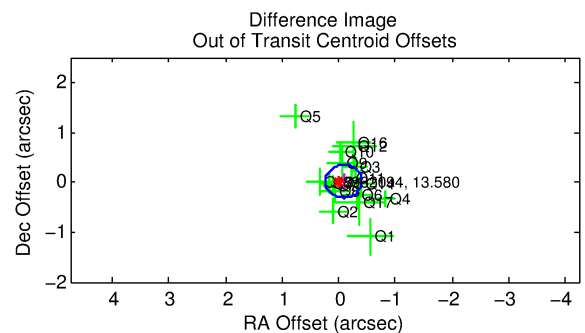
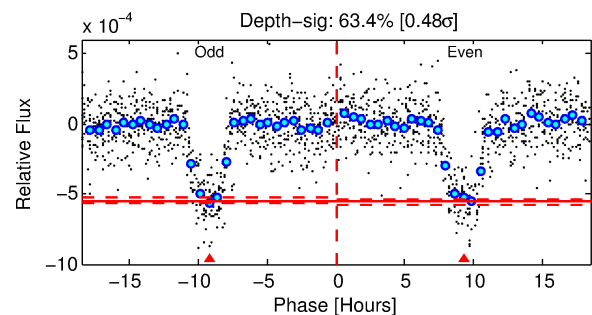
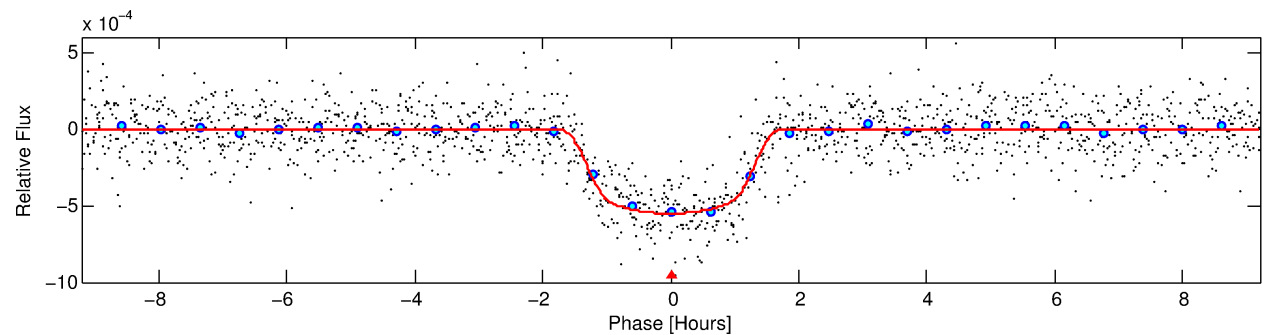
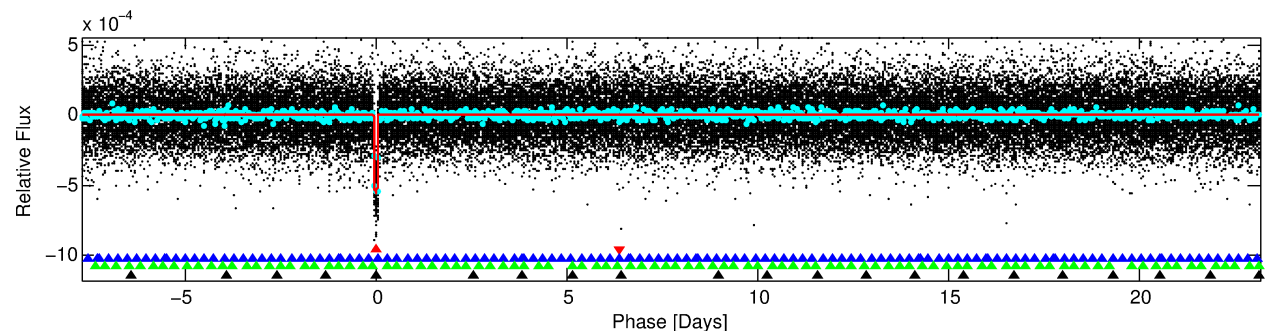
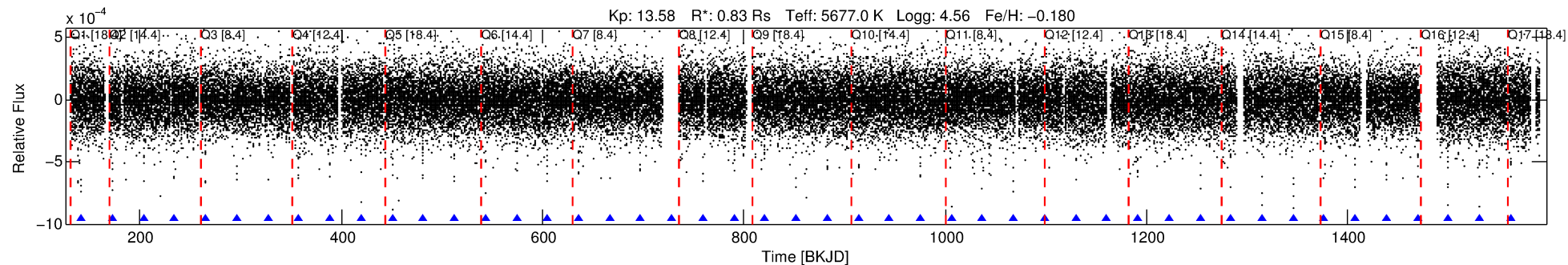
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 008962094-01

No Significant Match Found

# DV One-Page Summary

KIC: 8962094 Candidate: 1 of 4 Period: 30.864 d  
KOI: K00700.01 Name: Kepler-215d Corr: 0.954



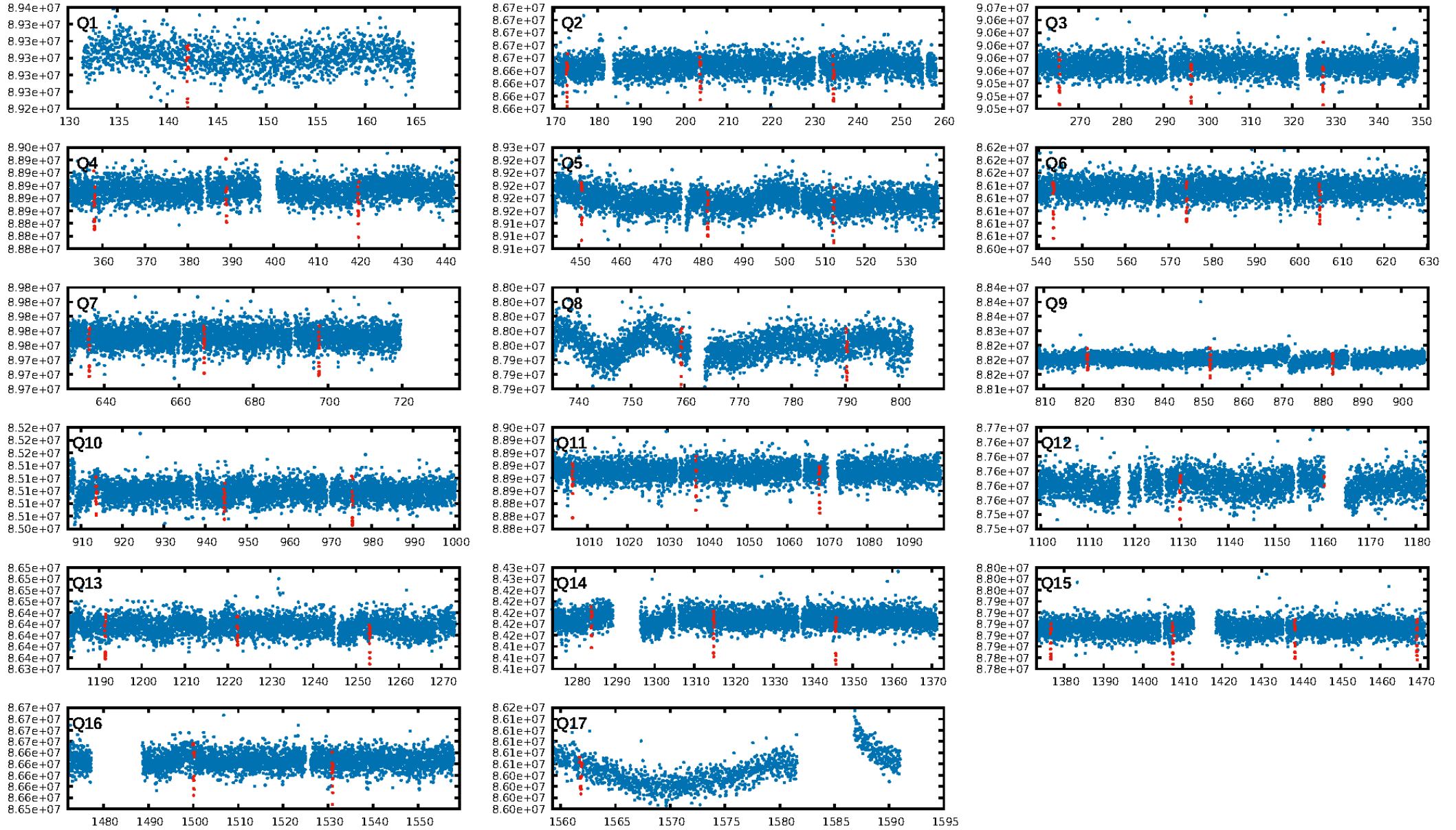
## DV Fit Results:

Period = 30.86432 [0.00006] d  
Epoch = 142.0720 [0.0015] BKJD  
Rp/R\* = 0.0257 [0.0015]  
a/R\* = 37.25 [9.91]  
b = 0.90 [0.06]  
Seff = 18.26 [3.69]  
Teq = 527 [27] K  
Rp = 2.33 [0.32] Re  
a = 0.1869 [0.0220] AU  
Ag = 135.68 [53.10] [2.54 $\sigma$ ]  
Teffp = 2781 [246] K [9.12 $\sigma$ ]

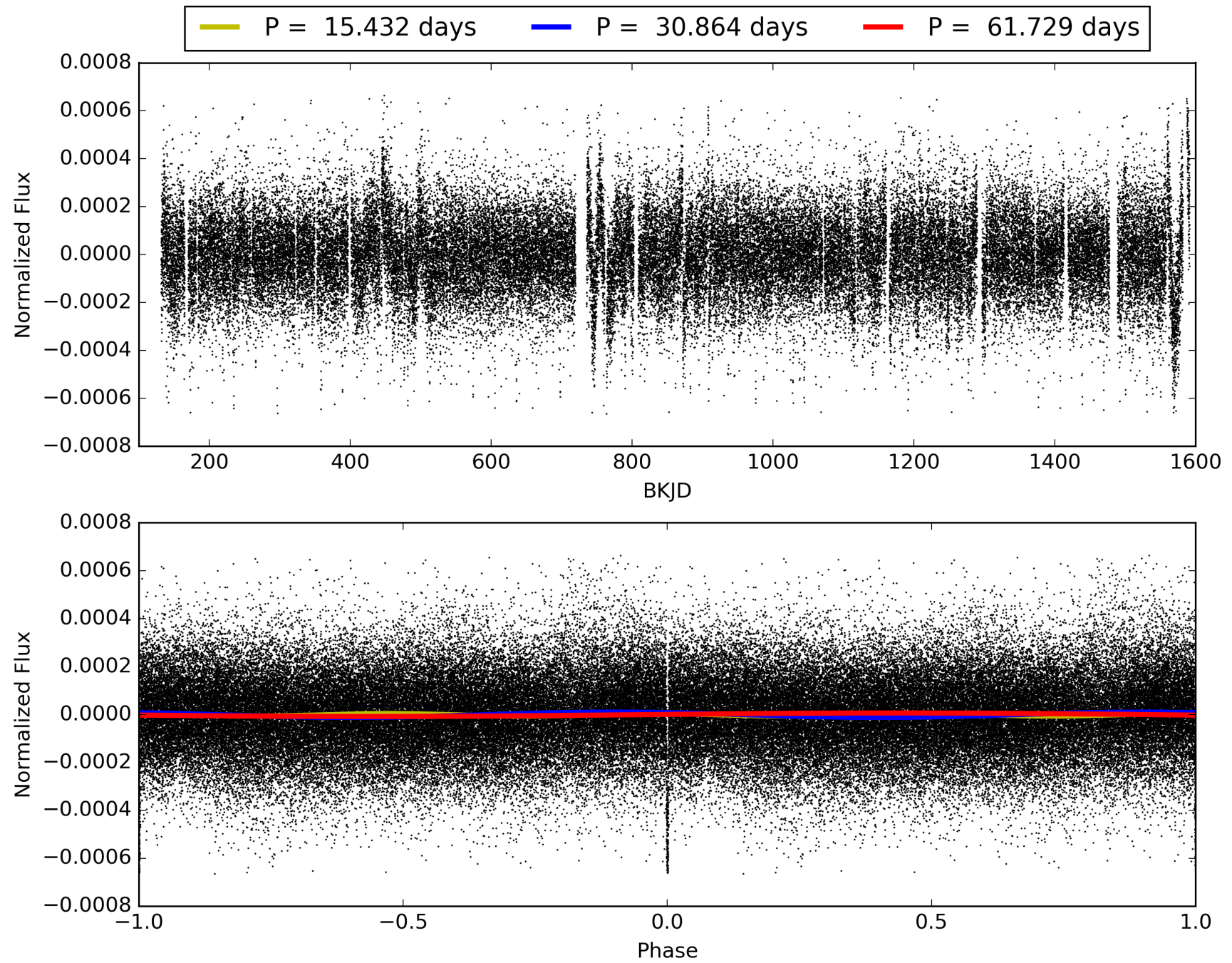
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [80.47 $\sigma$ ]  
LongPeriod-sig: 100.0% [137.44 $\sigma$ ]  
ModelChiSquare2-sig: 88.9%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 0.00e+00  
RollingBand-fgt: 1.00 [43/43]  
GhostDiagnostic-chr: 4.645  
Centroid-sig: 87.5%  
Centroid-so: 0.112 arcsec [0.45 $\sigma$ ]  
OotOffset-rm: 0.082 arcsec [0.75 $\sigma$ ]  
KicOffset-rm: 0.042 arcsec [0.40 $\sigma$ ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 1.00 [17/17]  
DiffImageOverlap-fno: 1.00 [17/17]

# TCE 008962094-01, PDC Light Curves

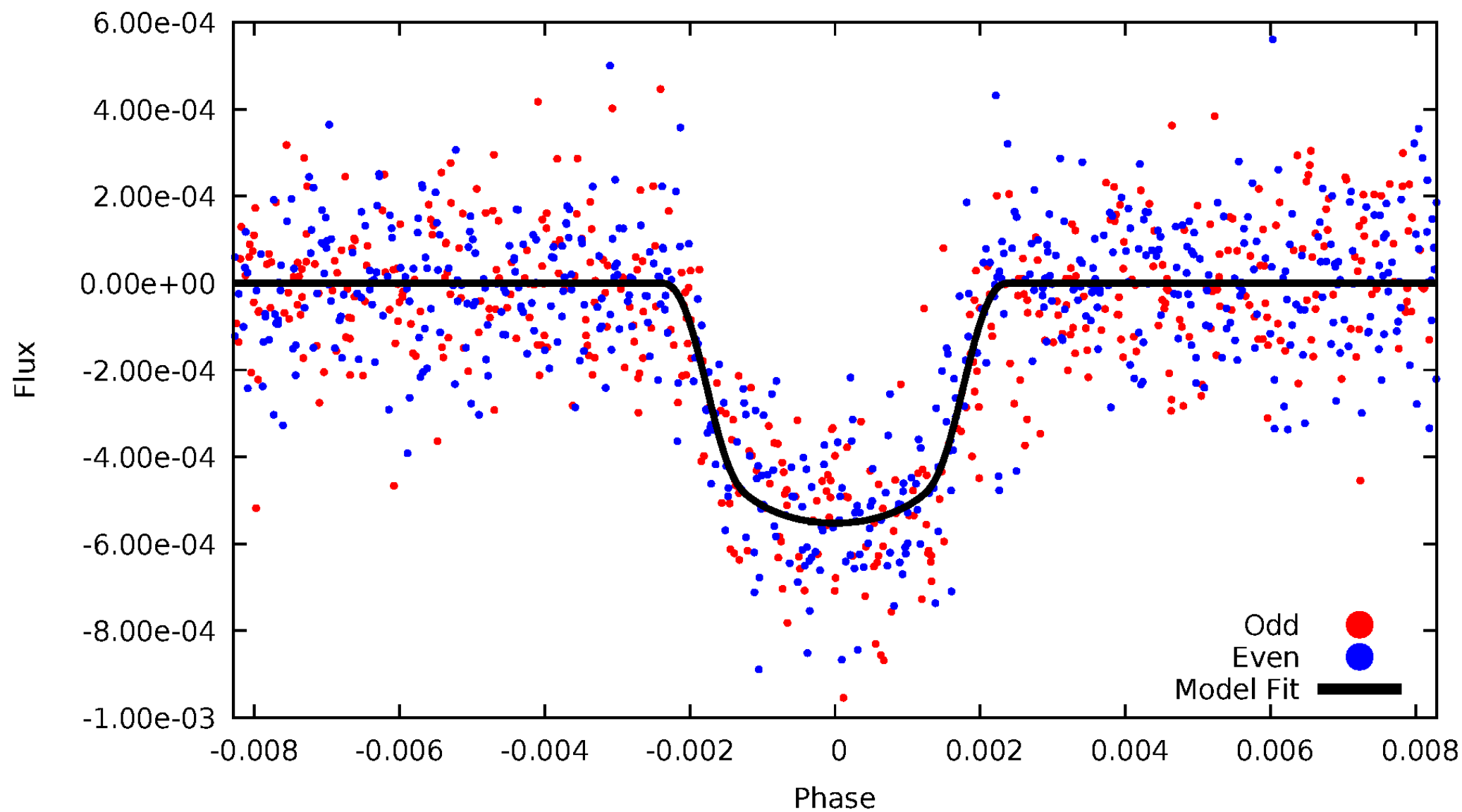


TCE 008962094-01



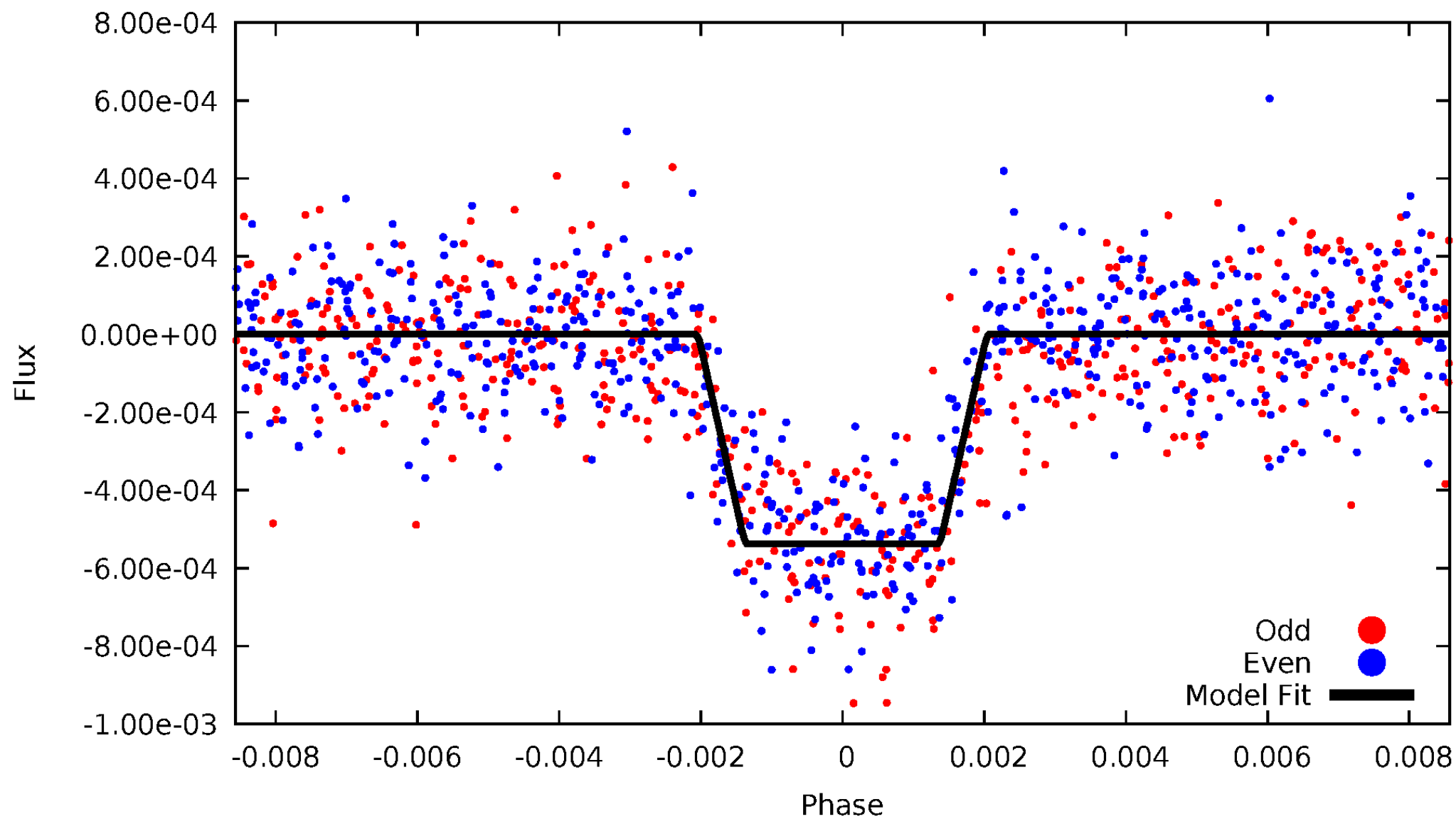
# DV Odd/Even

TCE 008962094-01



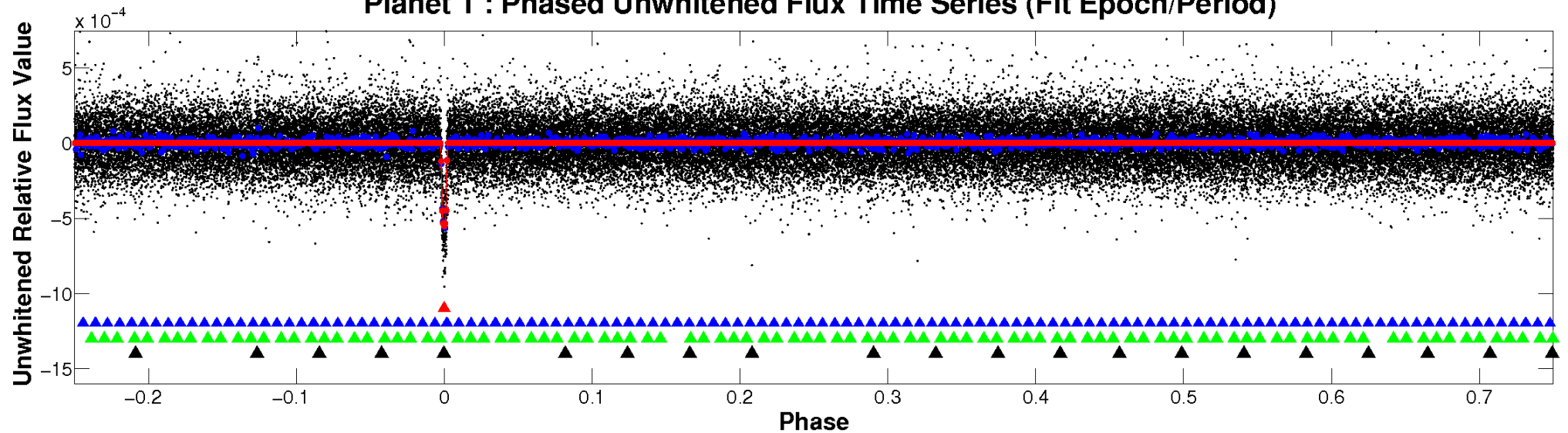
# ALT Odd/Even

TCE 008962094-01

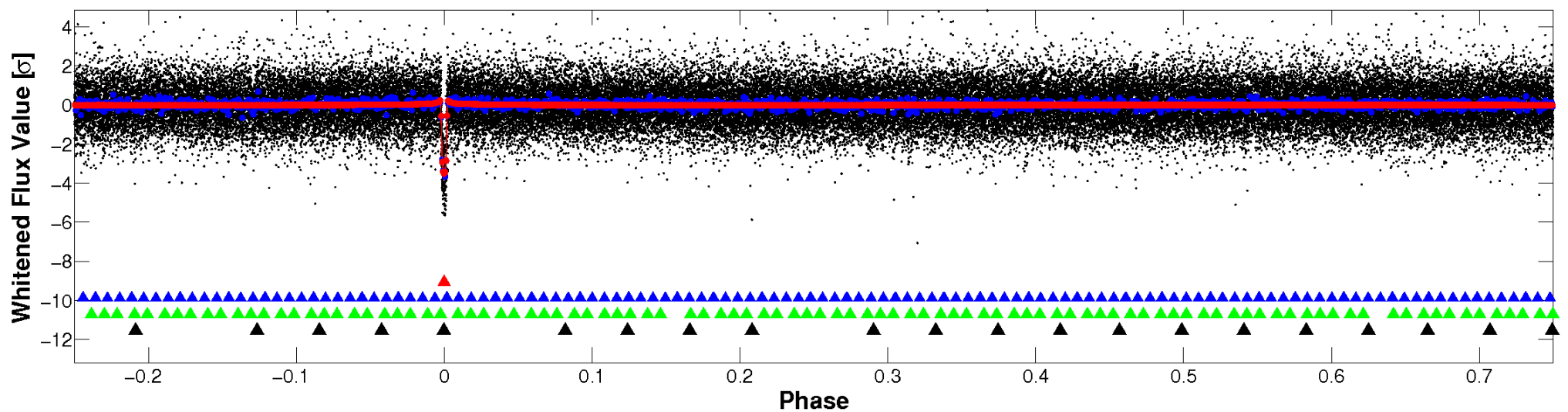


# Non-Whitened Vs. Whitened Light Curve

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

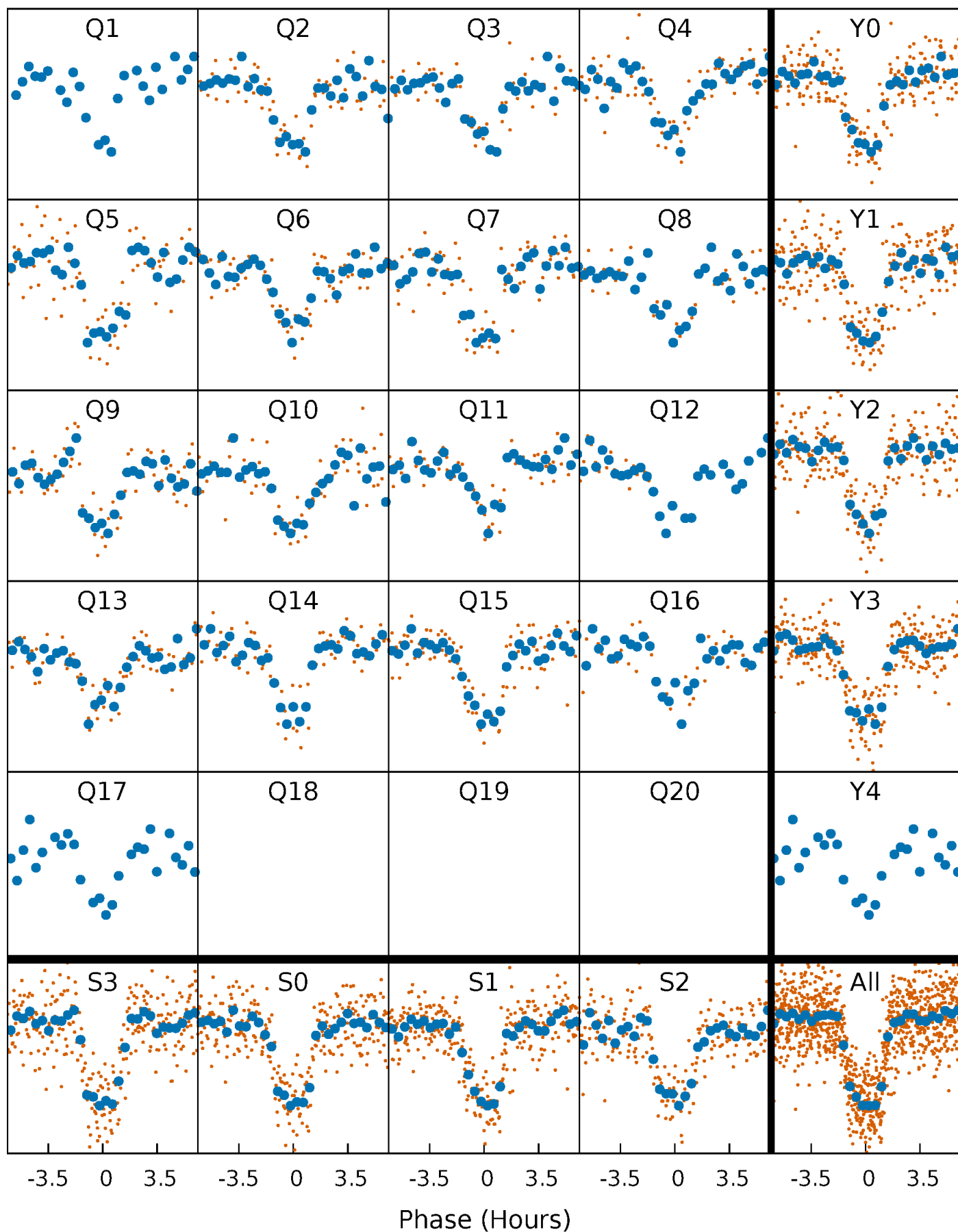


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



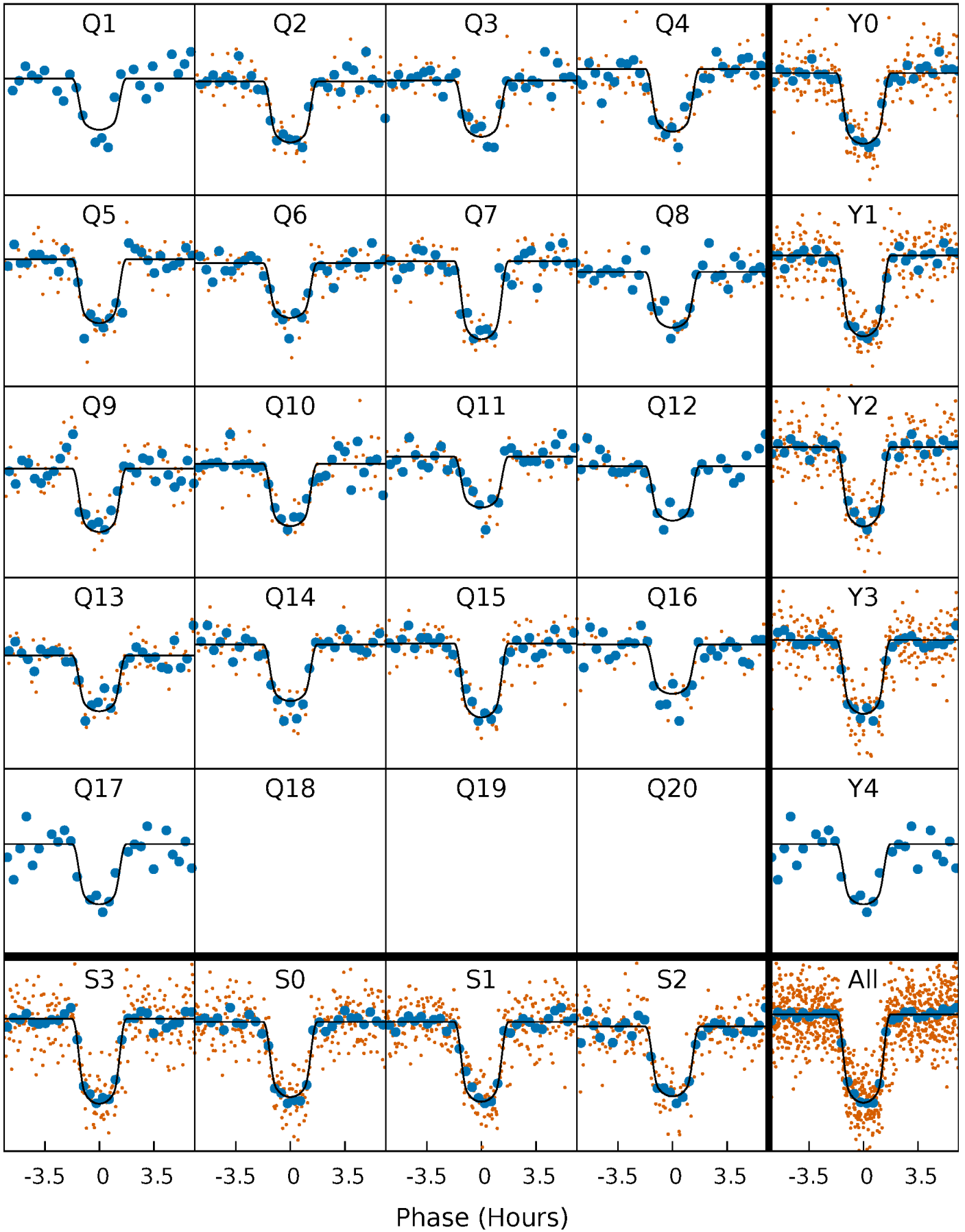
# PDC Quarter-Phased Transit Curves

TCE 008962094-01   P= 30.864324 Days    $T_0=142.072017$  (BKJD)



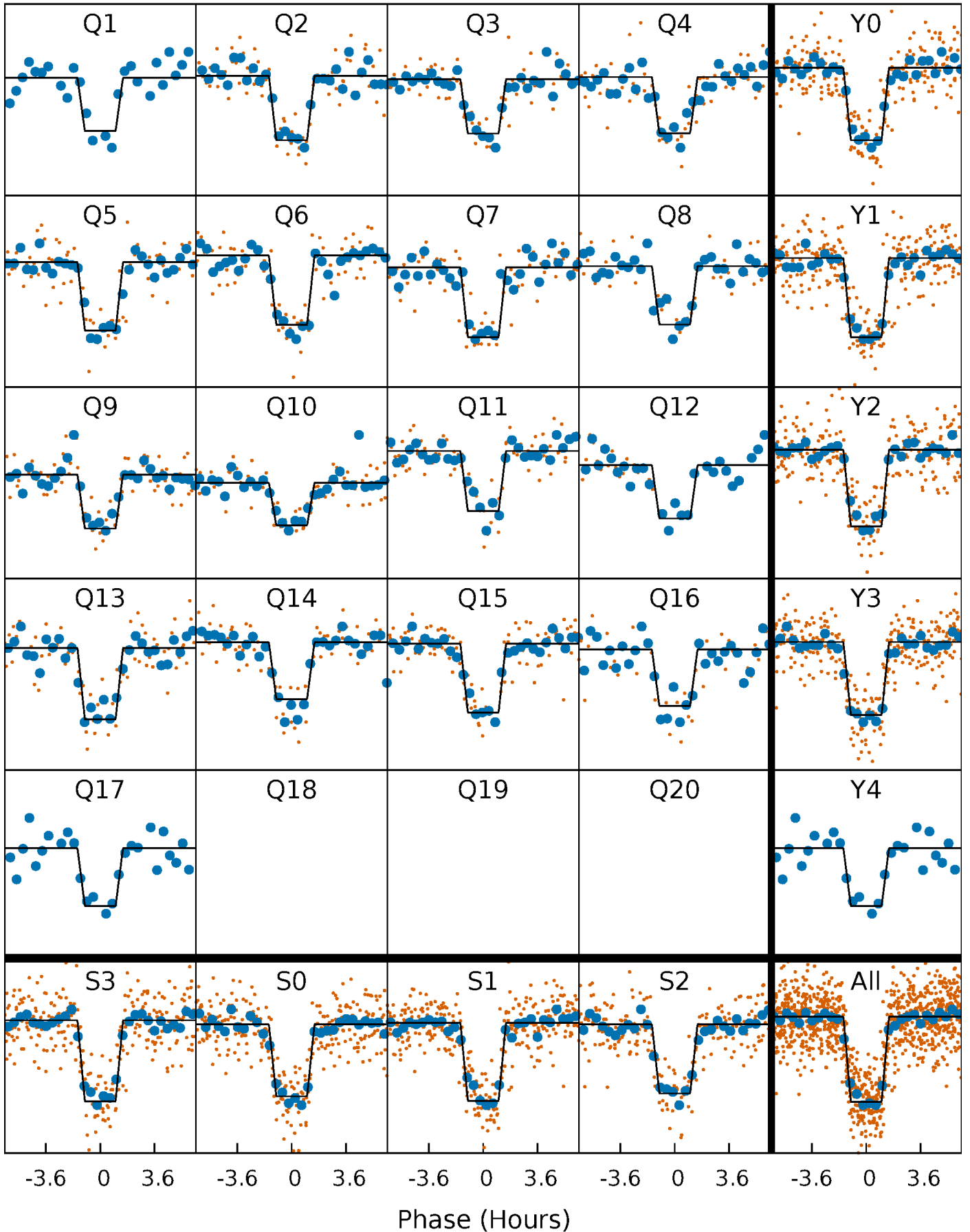
# DV Quarter-Phased Transit Curves

TCE 008962094-01   P= 30.864324 Days    $T_0=142.072017$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

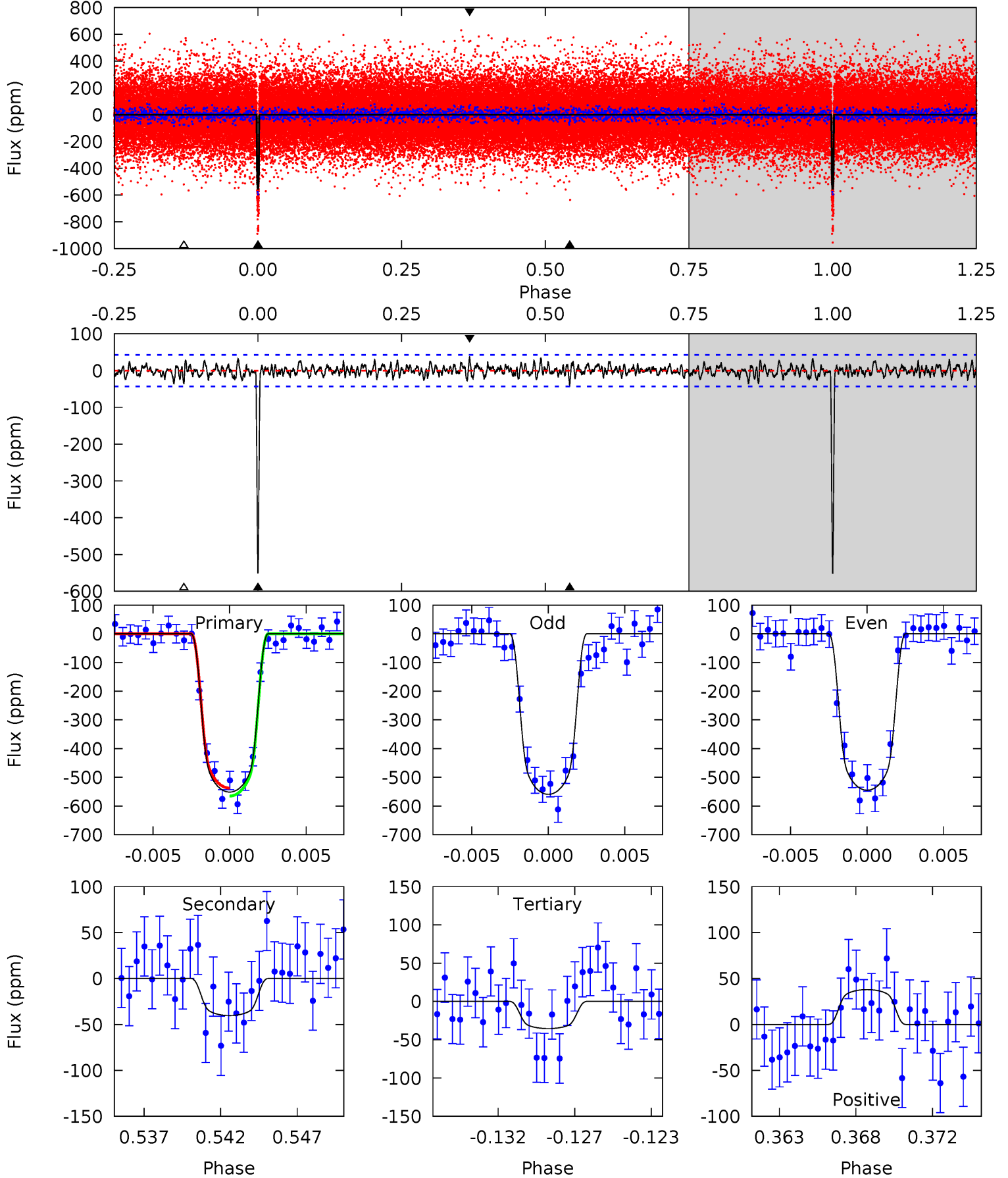
TCE 008962094-01 P= 30.864422 Days  $T_0=142.069539$  (BKJD)



# DV Model-Shift Uniqueness Test

008962094-01, P = 30.864324 Days, E = 111.207693 Days

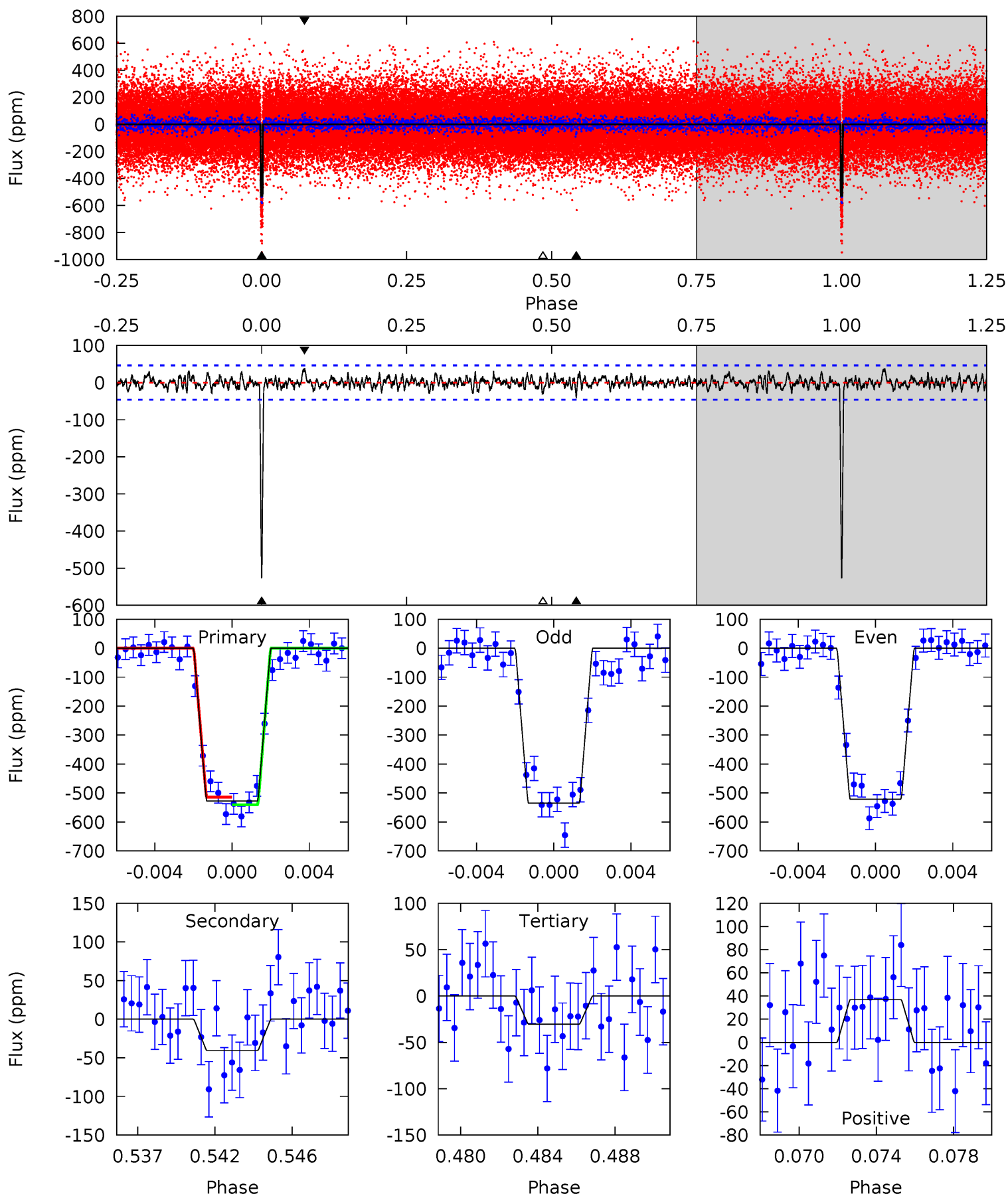
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
66.4	4.86	4.27	4.57	5.17	2.83	1.29	62.2	61.9	0.59	0.29	0.86	1.00	0.06	1.67



# Alt Model-Shift Uniqueness Test

008962094-01,  $P = 30.864422$  Days,  $E = 111.205117$  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
59.3	4.55	3.41	4.15	5.19	2.87	1.20	55.9	55.2	1.14	0.41	0.77	1.01	0.07	1.51



### Stellar Parameters For KIC 008962094

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5677^{+113}_{-113}$	$4.563^{+0.018}_{-0.108}$	$-0.180^{+0.150}_{-0.150}$	$0.828^{+0.104}_{-0.037}$	$0.920^{+0.044}_{-0.076}$	$2.281^{+0.221}_{-0.707}$
	+2%/-2%	+0%/-2%	+83%/-83%	+13%/-4%	+5%/-8%	+10%/-31%
Source	SPE59	SPE59	SPE59	DSEP		

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

### Secondary Eclipse Parameters for KIC 008962094-01 / KOI 0700.01

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-40 \pm 8$	$2.38^{+0.21}_{-0.17}$	$747^{+26}_{-20}$	$3338^{+140}_{-126}$	$132^{+40}_{-33}$
Alt.	$-40 \pm 9$	$2.15^{+0.20}_{-0.16}$	$748^{+26}_{-20}$	$3461^{+147}_{-156}$	$165^{+47}_{-44}$

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

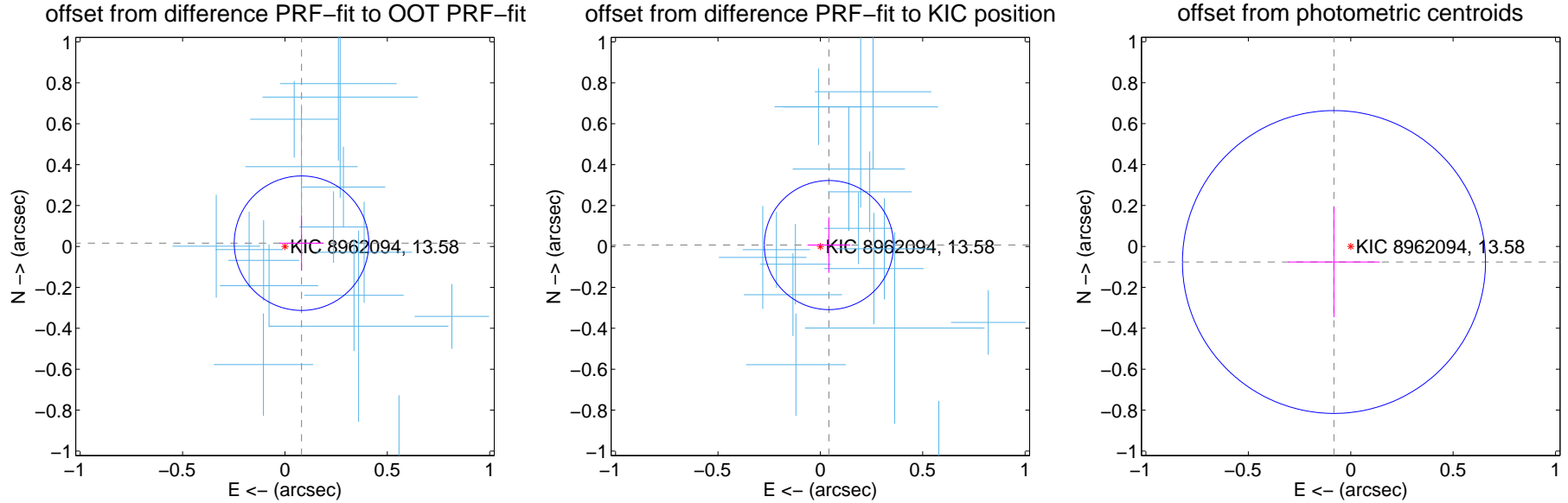
## DV Centroid Data

Supplemental centroid analysis for 008962094-01. Kepler magnitude: 13.58. Transit SNR 47.42

There are 17 quarters with good PRF difference image offsets

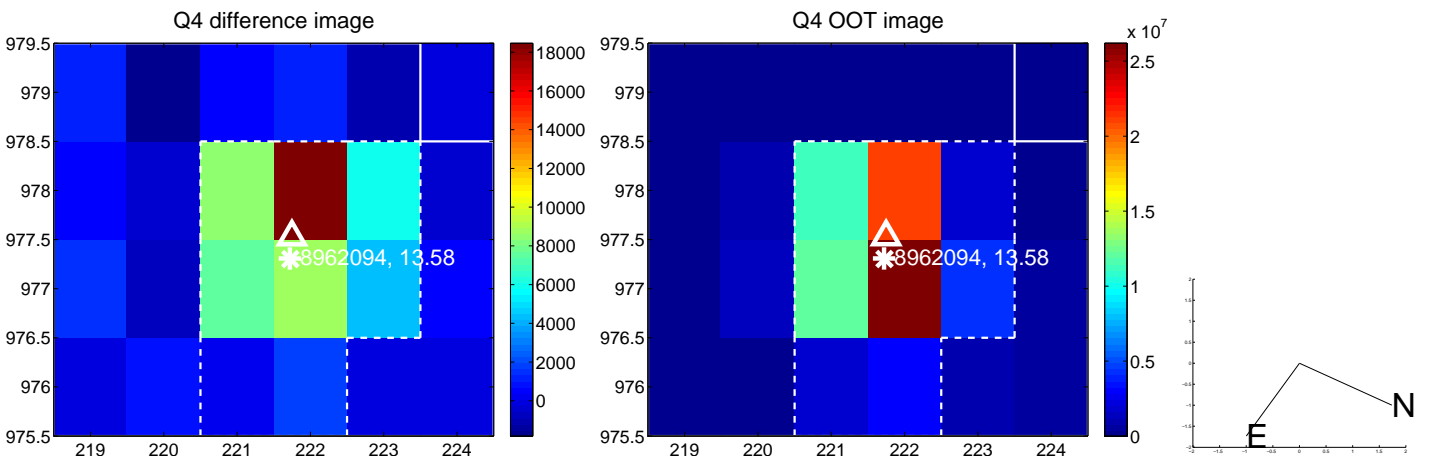
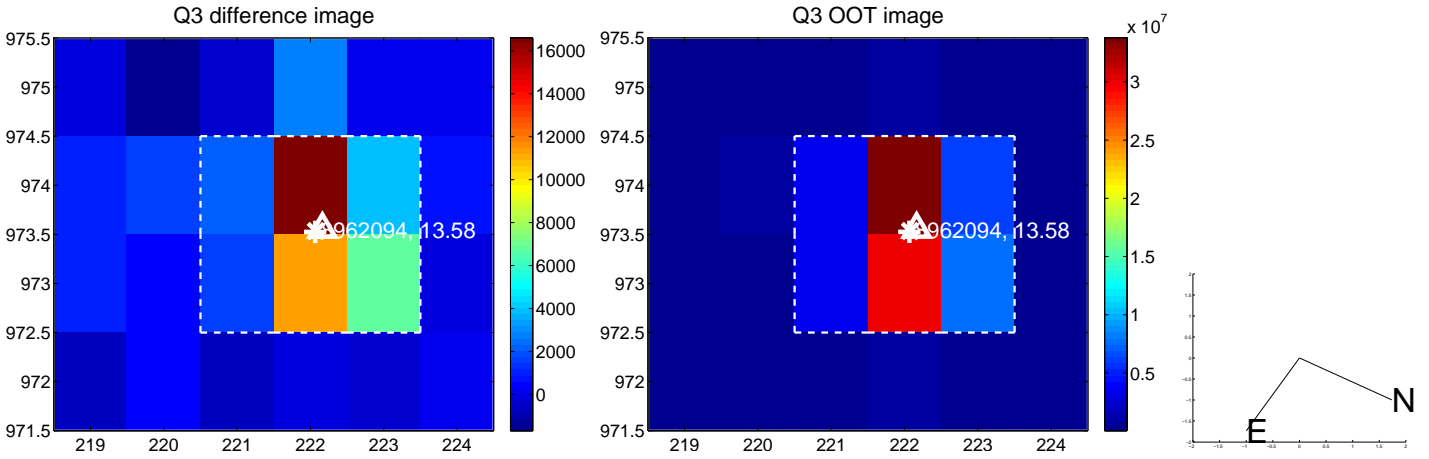
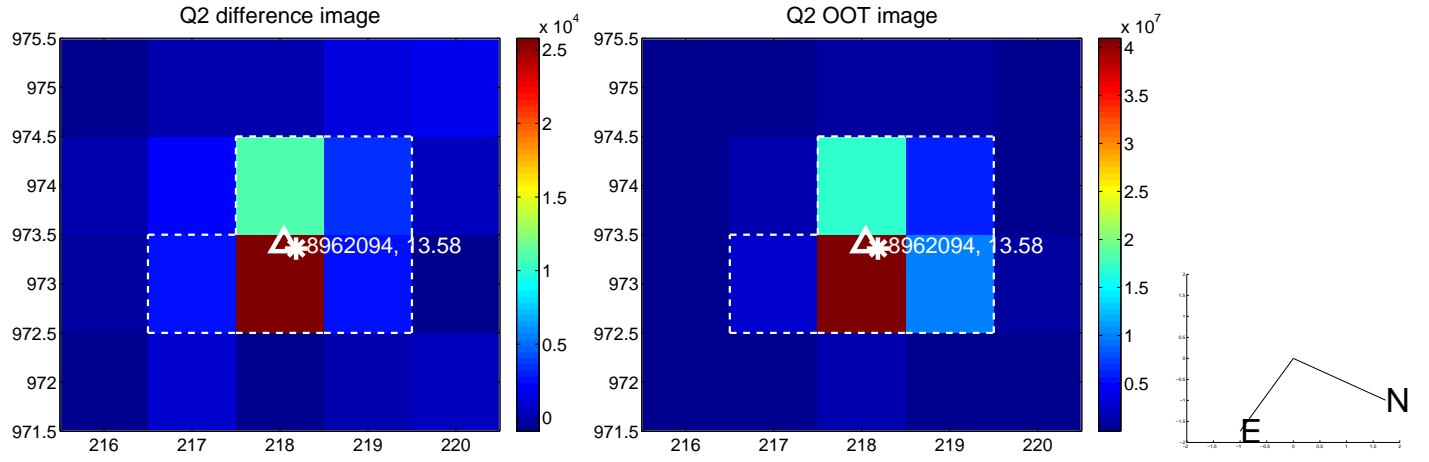
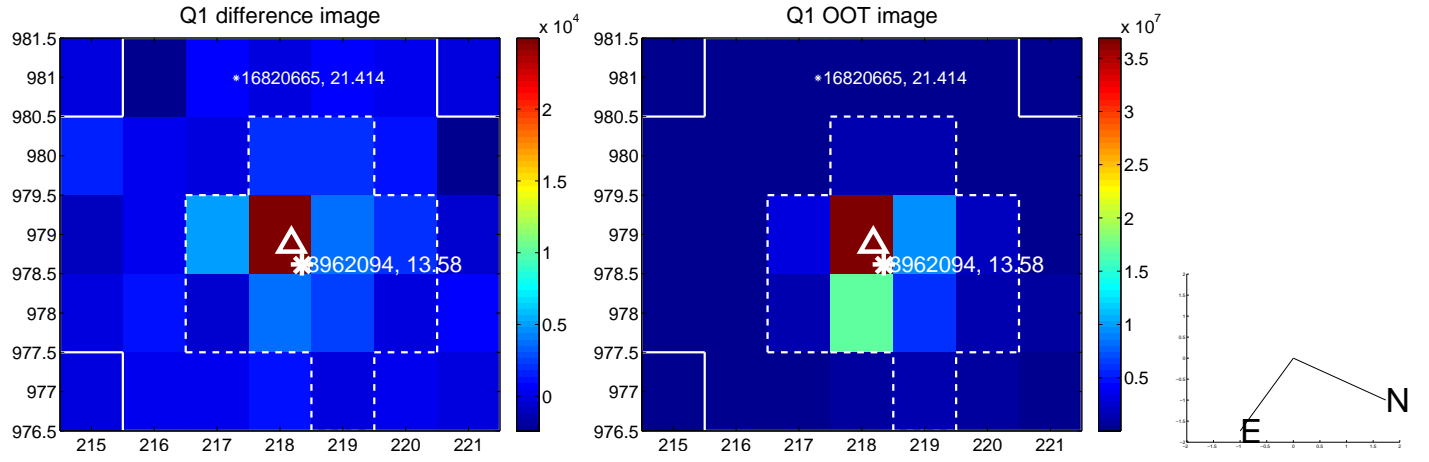
The direct PRF centroid is offset from the target star catalog position by about 0.01 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.082 \pm 0.110$	0.75	$-0.081 \pm 0.108$	$0.016 \pm 0.135$
PRF-fit source offset from KIC position	$0.042 \pm 0.105$	0.40	$-0.042 \pm 0.104$	$0.007 \pm 0.136$
photometric centroid source offset	$0.11 \pm 0.25$	0.45	$0.08 \pm 0.22$	$-0.08 \pm 0.27$

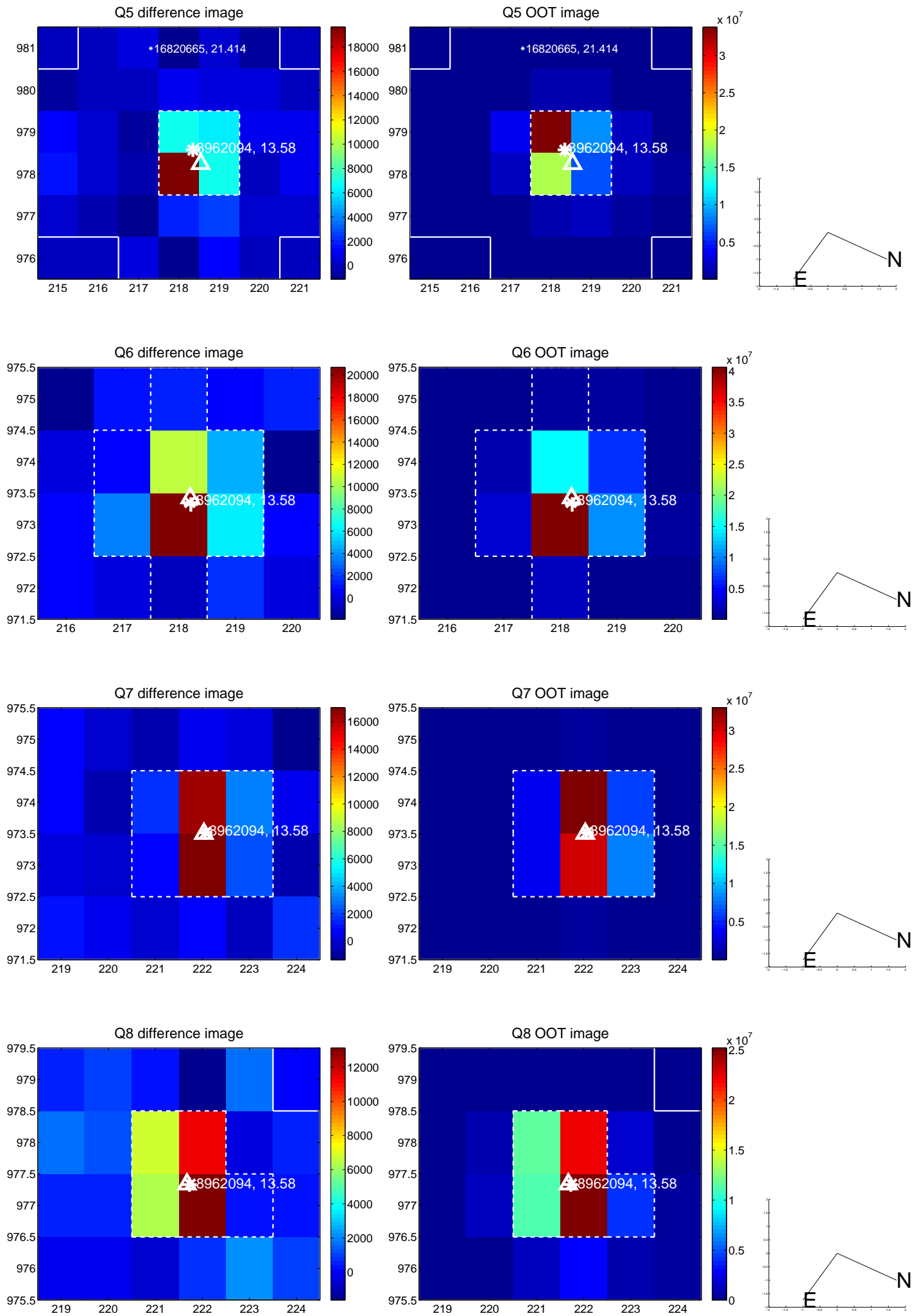


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

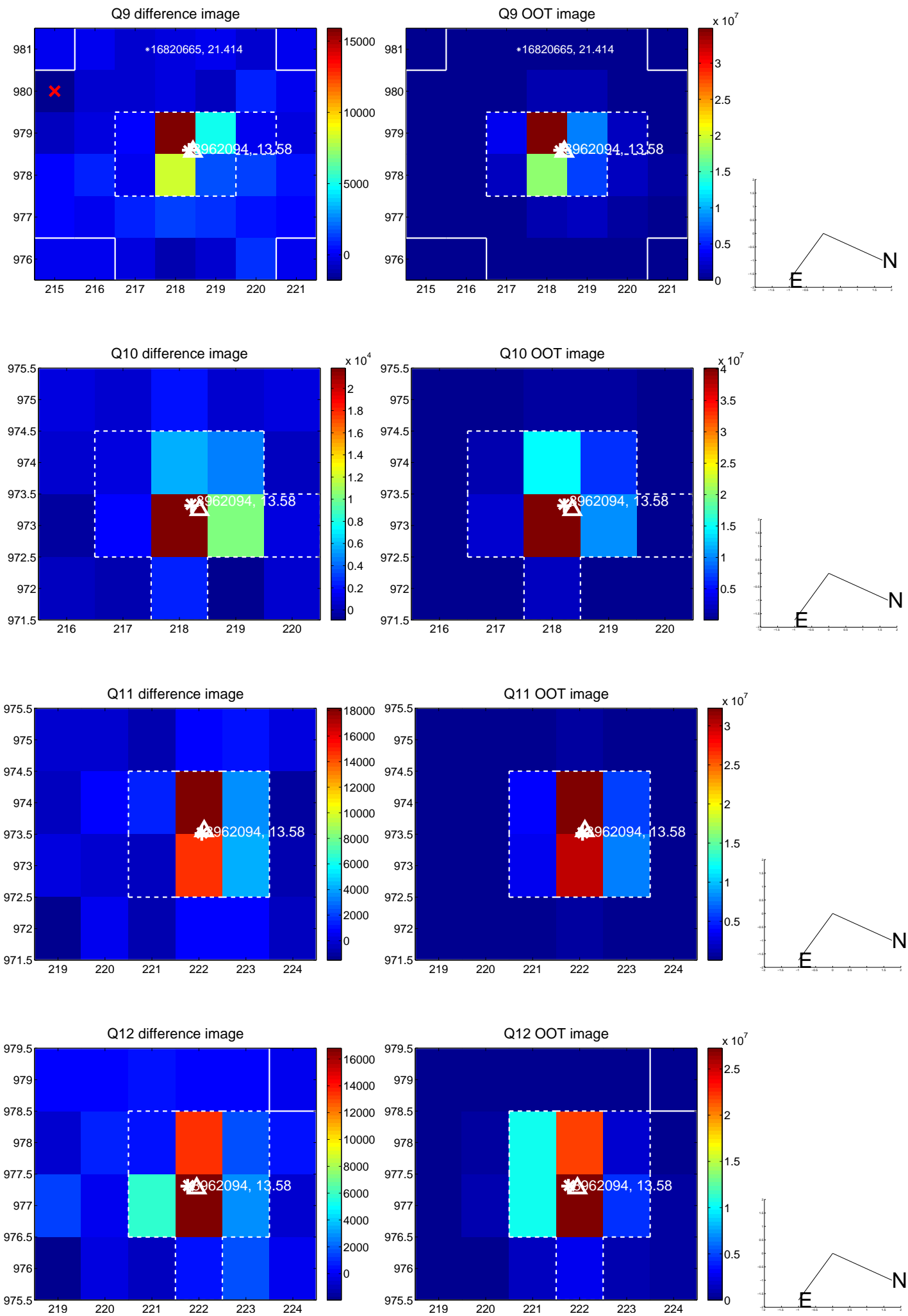
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



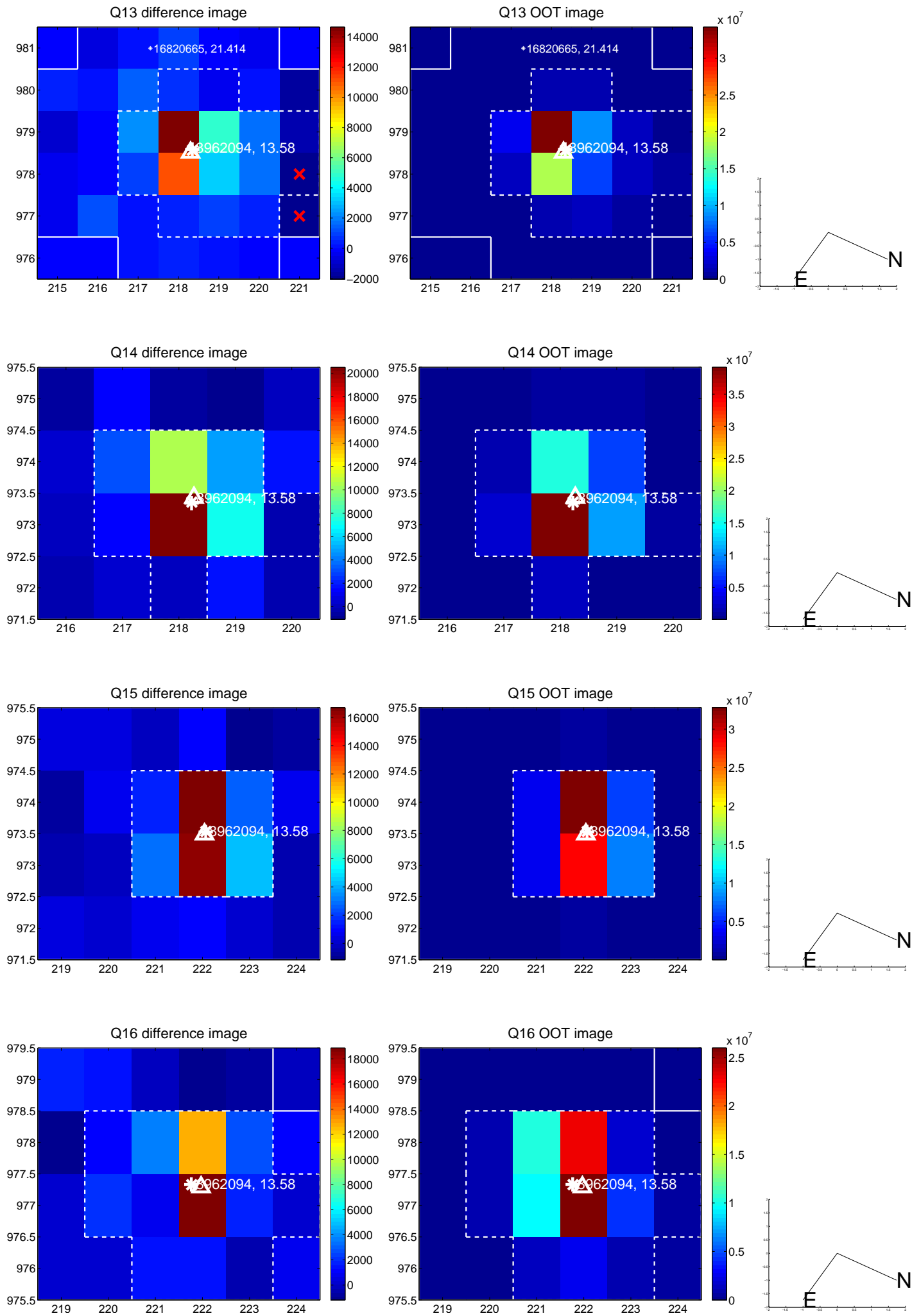
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



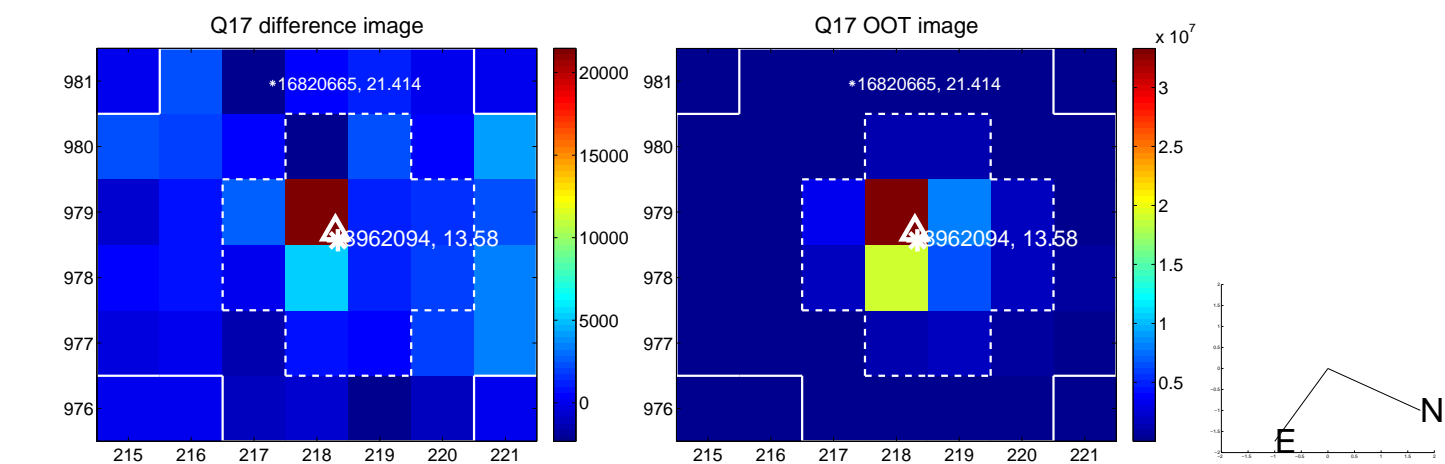
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



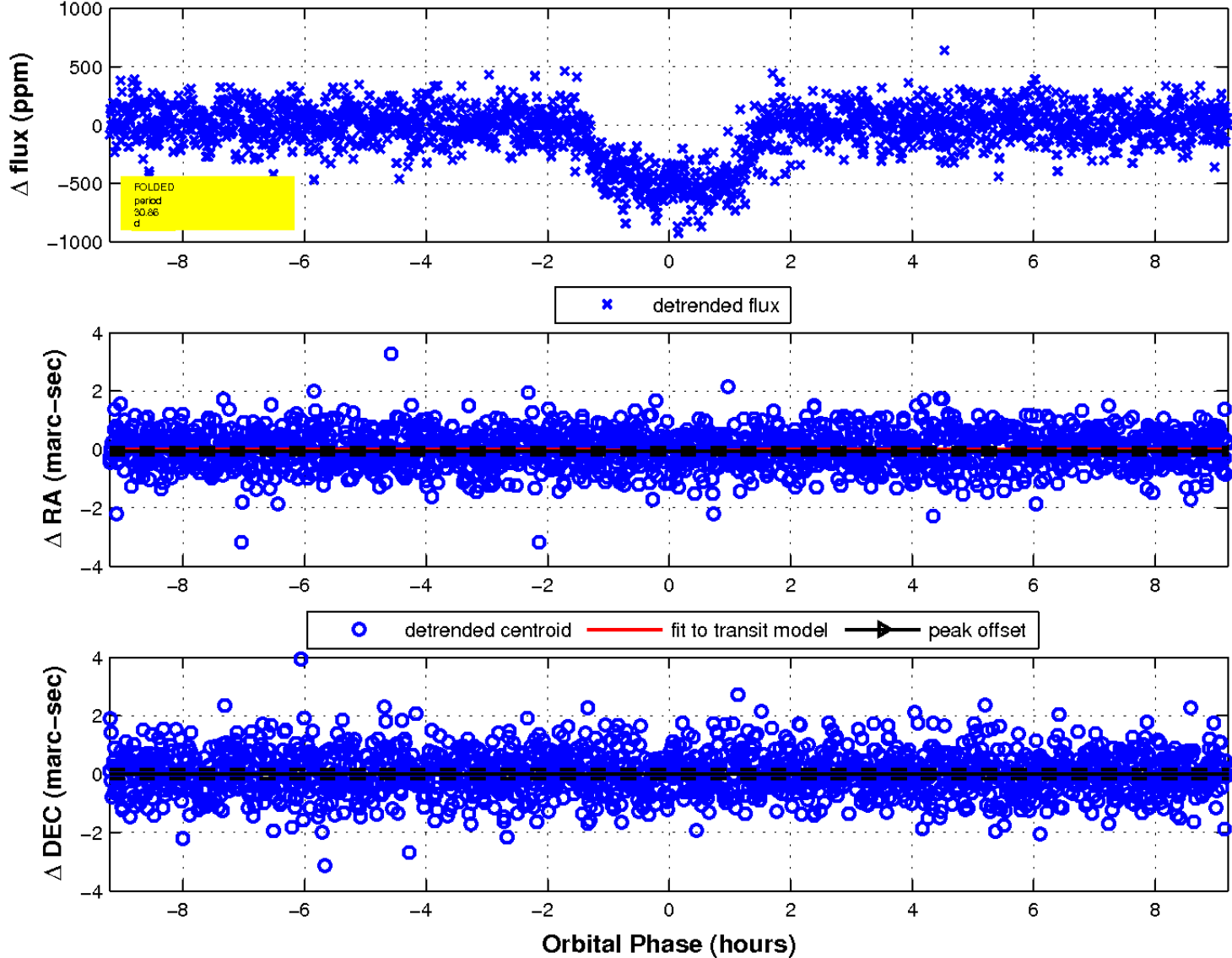
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

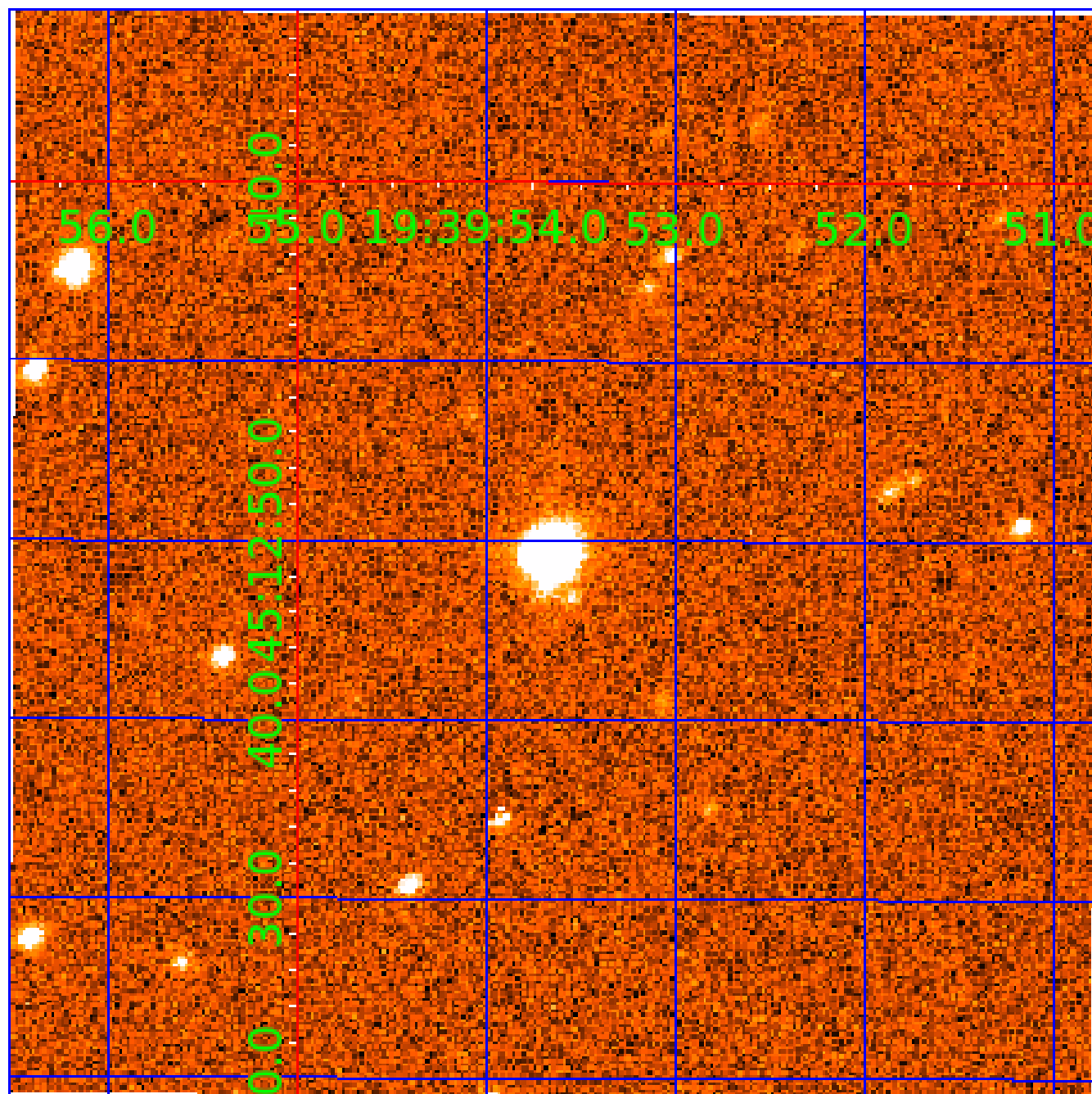


fluxWeightedCentroids, Planet 1 of 4



UKIRT Image

Declination



# KIC 008962094

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008962094-01	OBS	0700.01	30.864324	142.072017	552.2	3.069	46.5	47.4	0.83	5677	2.33	18.26
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008962094-03	OBS	0700.03	14.667242	145.420159	197.3	3.730	25.7	28.0	0.83	5677	1.26	49.23
008962094-04	OBS	0700.04	68.161354	187.030785	288.0	5.744	17.7	19.4	0.83	5677	1.51	6.35

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008962094-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
008962094-02	OBS	PC	1.00	0	0	0	0	NO_COMMENT
008962094-03	OBS	PC	1.00	0	0	0	0	NO_COMMENT
008962094-04	OBS	PC	0.98	0	0	0	0	NO_COMMENT

**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.

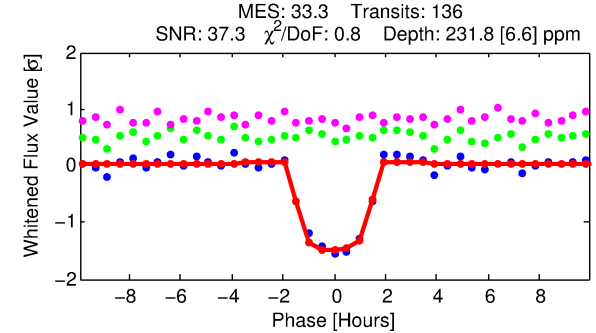
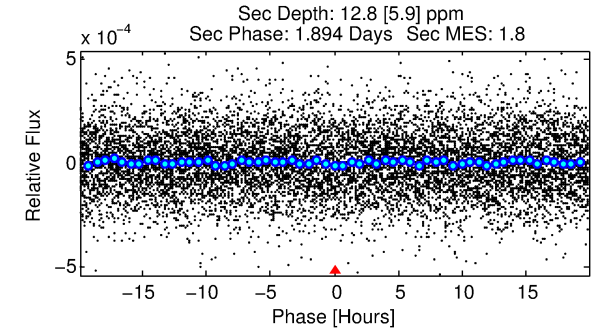
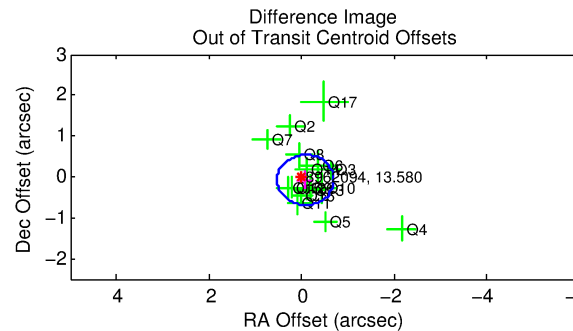
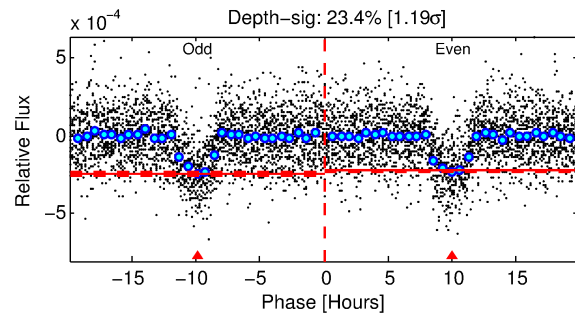
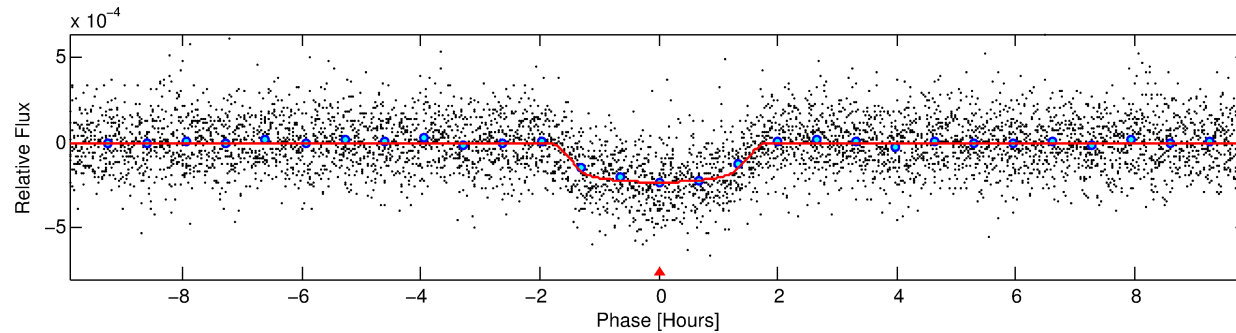
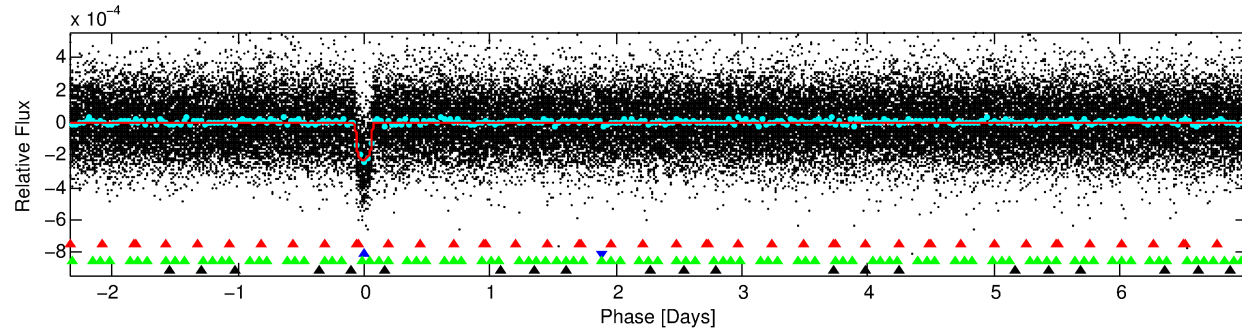
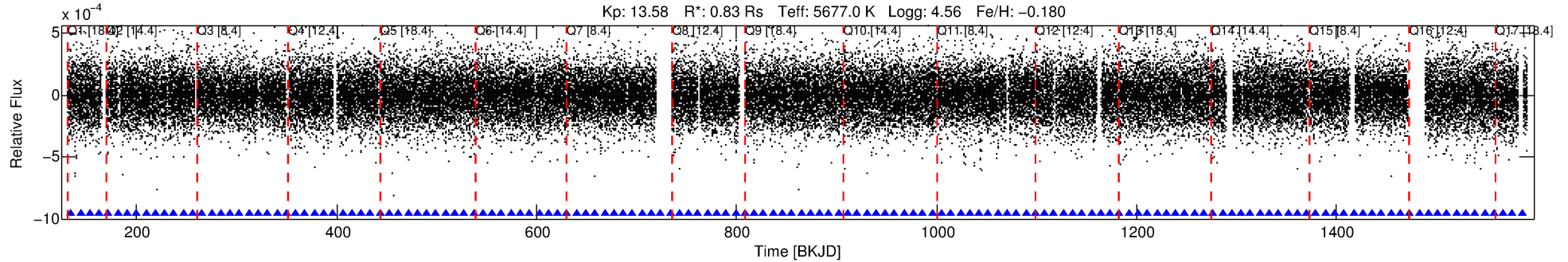
## Ephemeris Match Information For 008962094-02

No Significant Match Found

# DV One-Page Summary

KIC: 8962094 Candidate: 2 of 4 Period: 9.361 d  
KOI: K00700.02 Name: Kepler-215b Corr: 0.978

Kp: 13.58 R\*: 0.83 Rs Teff: 5677.0 K Logg: 4.56 Fe/H: -0.180



## DV Fit Results:

Period = 9.36060 [0.00002] d  
Epoch = 134.5306 [0.0019] BKJD  
Rp/R\* = 0.0166 [0.0022]  
a/R\* = 10.30 [6.30]  
b = 0.90 [0.13]  
Seff = 89.60 [18.11]  
Teq = 785 [40] K  
Rp = 1.50 [0.27] Re  
a = 0.0844 [0.0099] AU  
Ag = 22.33 [12.49] [1.71σ]  
Teffp = 2637 [352] K [5.23σ]

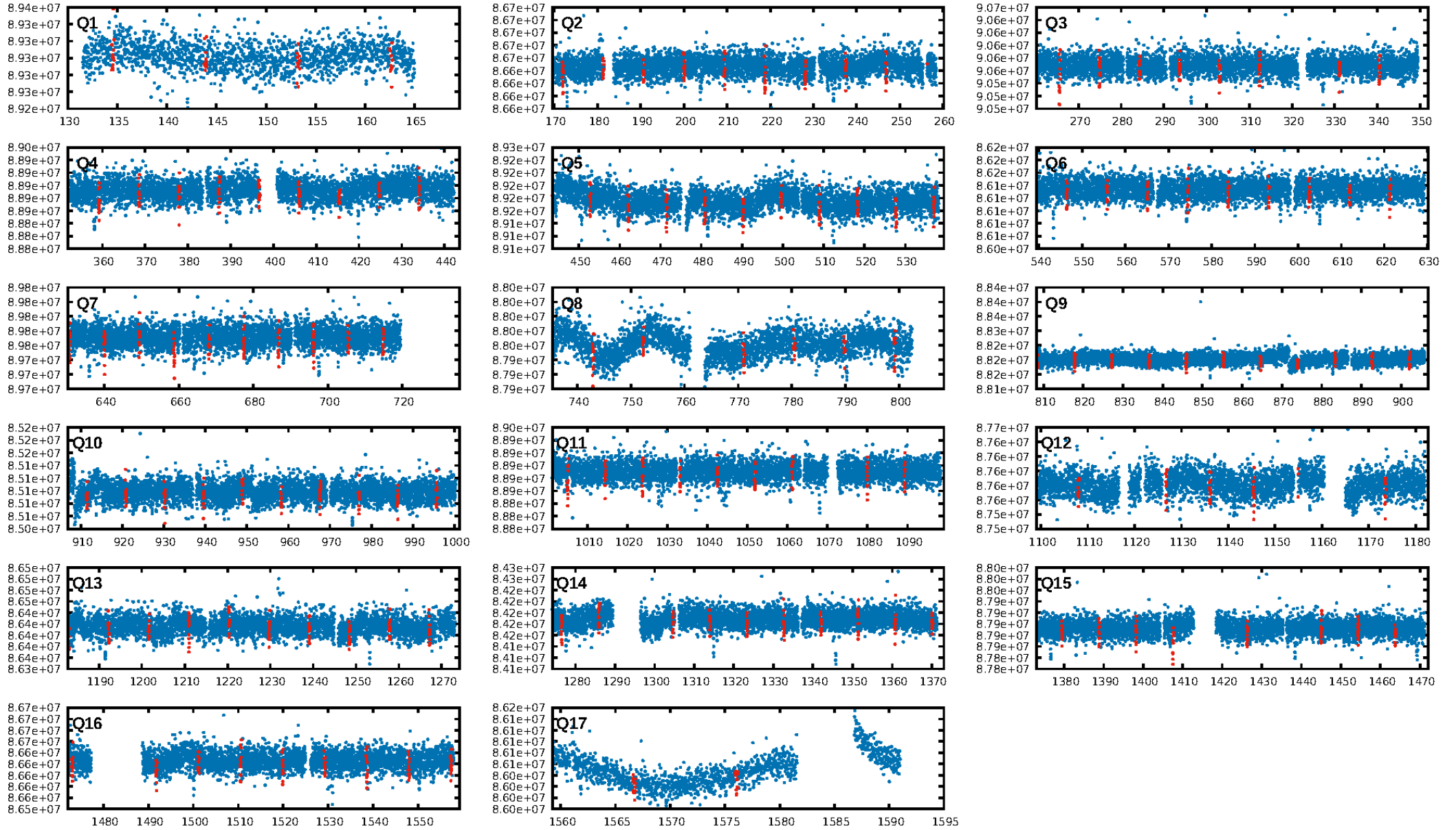
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [25.55σ]  
ModelChiSquare2-sig: 99.4%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 1.62e-229  
RollingBand-fgt: 1.00 [130/130]  
GhostDiagnostic-chr: 7.125  
Centroid-sig: 0.1%  
Centroid-so: 0.731 arcsec [2.12σ]  
OotOffset-rm: 0.114 arcsec [0.56σ]  
KicOffset-rm: 0.113 arcsec [0.49σ]  
OotOffset-st: 4/4/4/4 [16]  
KicOffset-st: 4/4/4/4 [16]  
DiffImageQuality-fgm: 1.00 [16/16]  
DiffImageOverlap-fno: 1.00 [17/17]

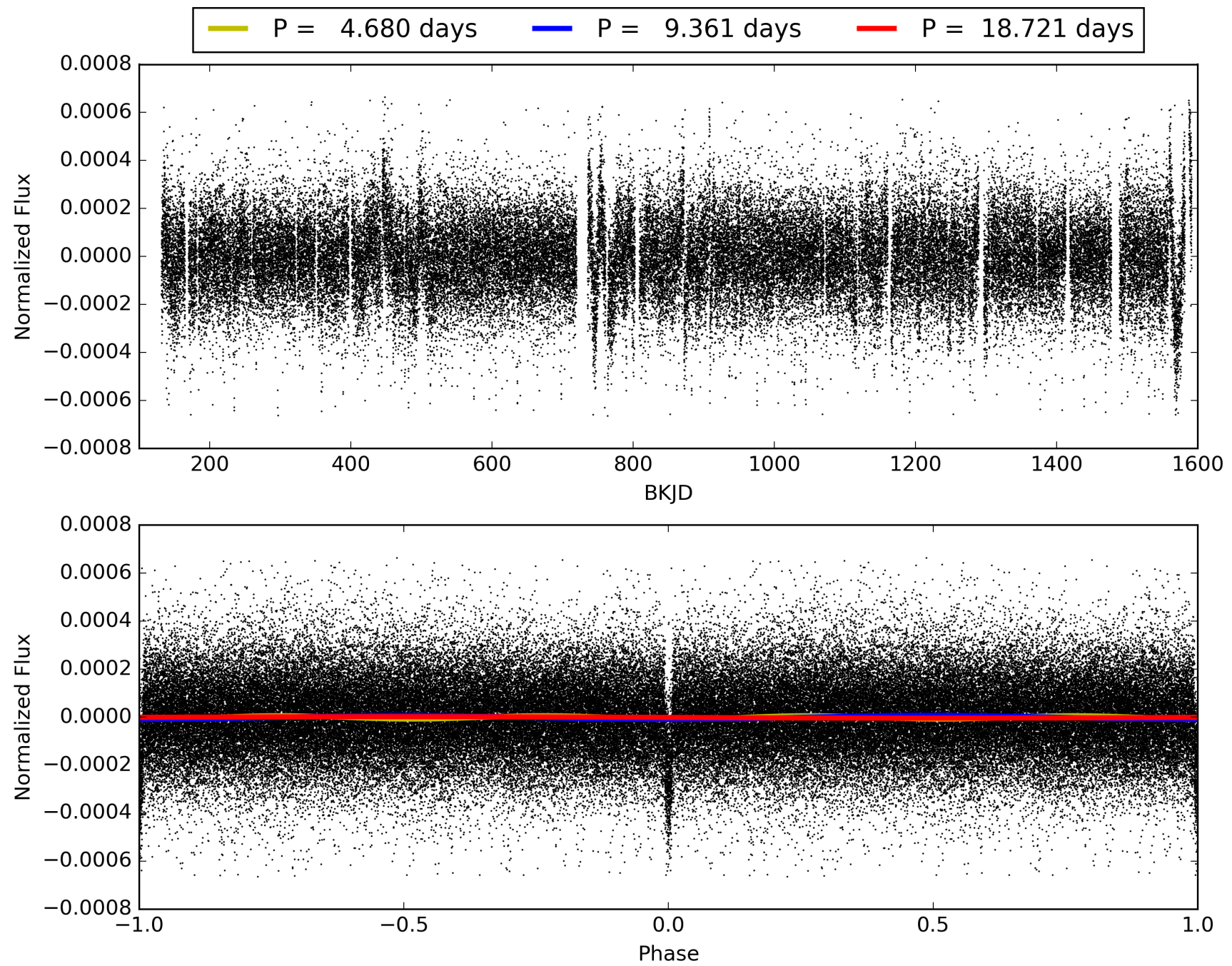
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 13:38:30 Z

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

# TCE 008962094-02, PDC Light Curves

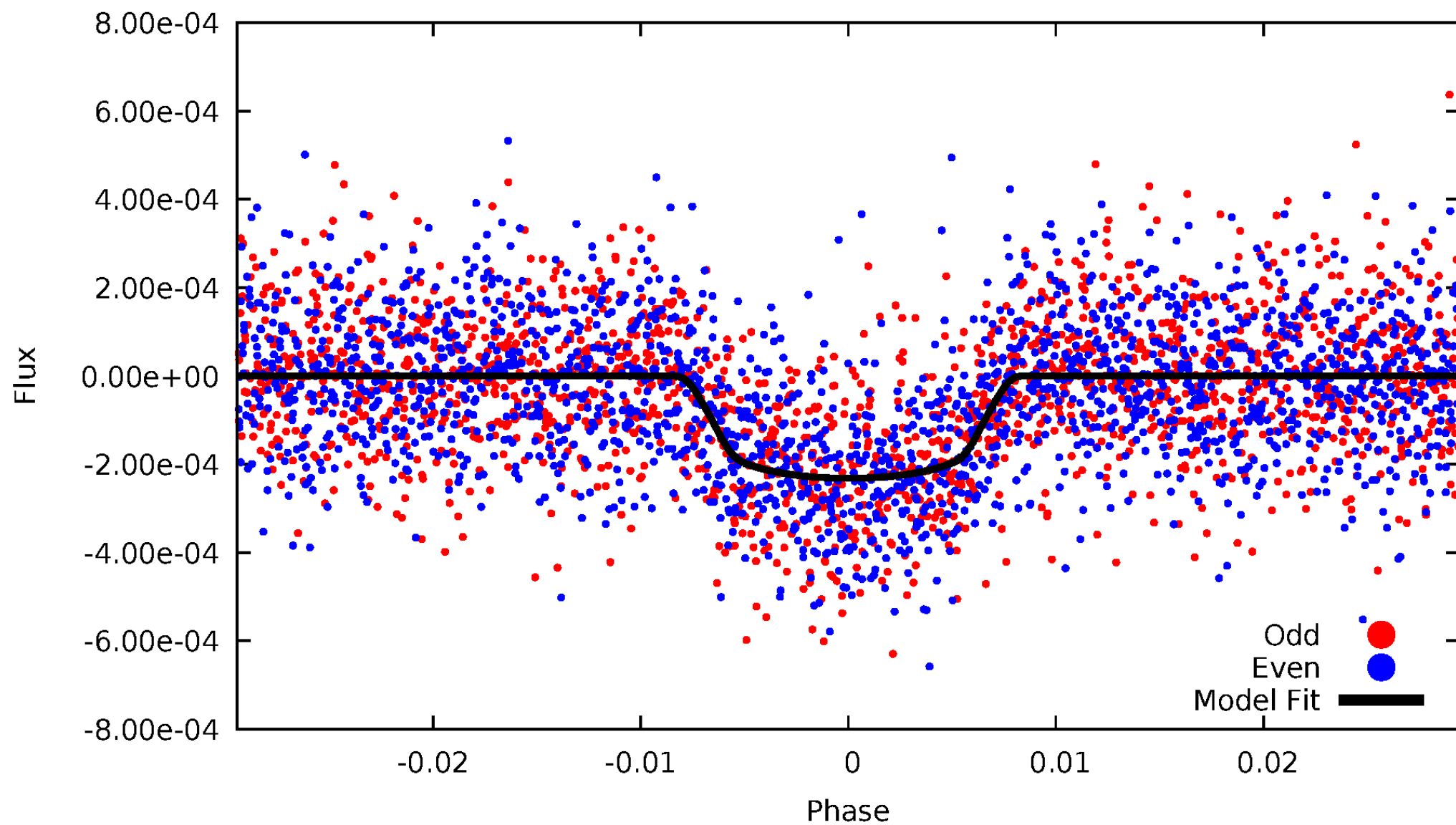


TCE 008962094-02



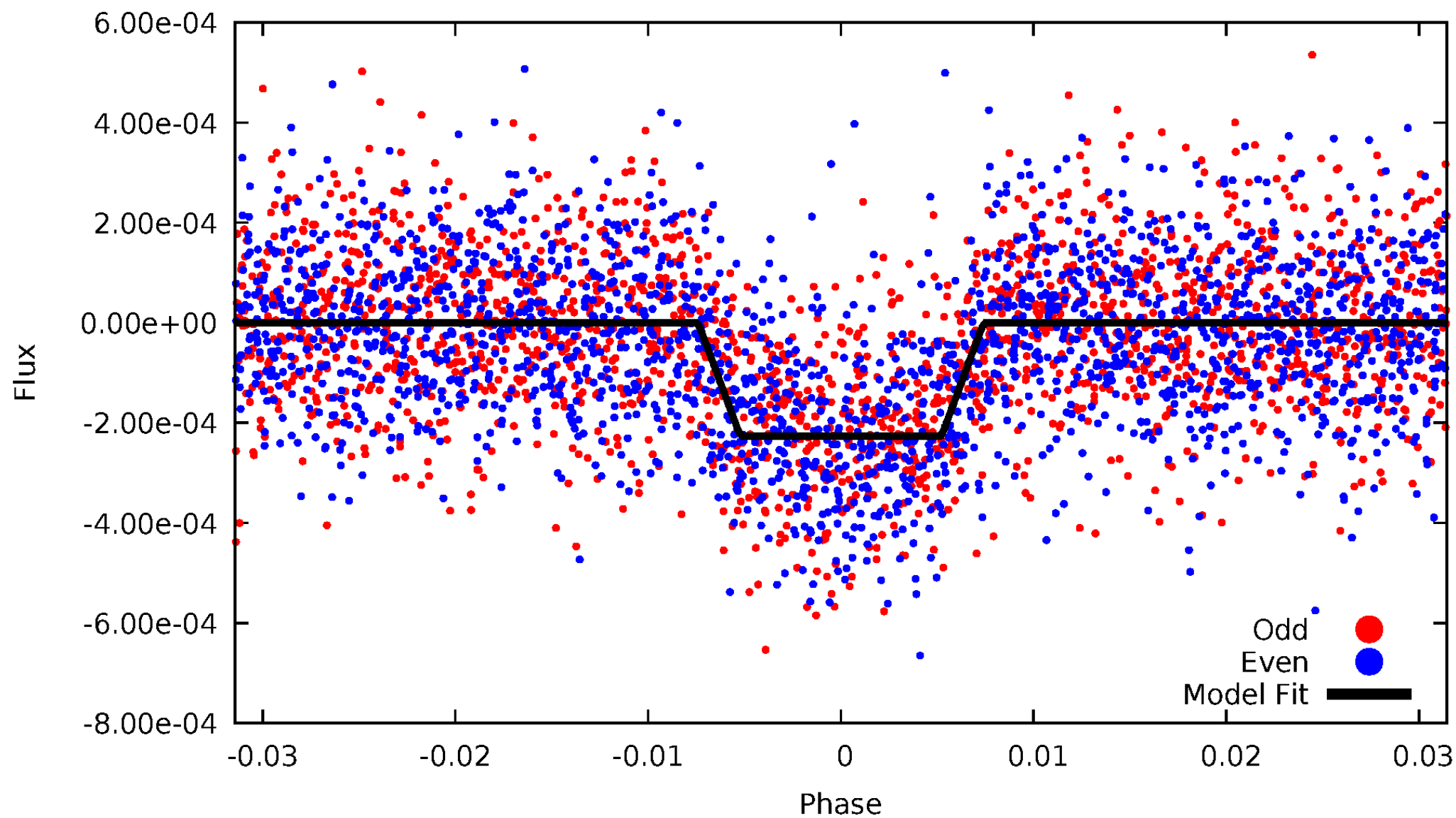
# DV Odd/Even

TCE 008962094-02



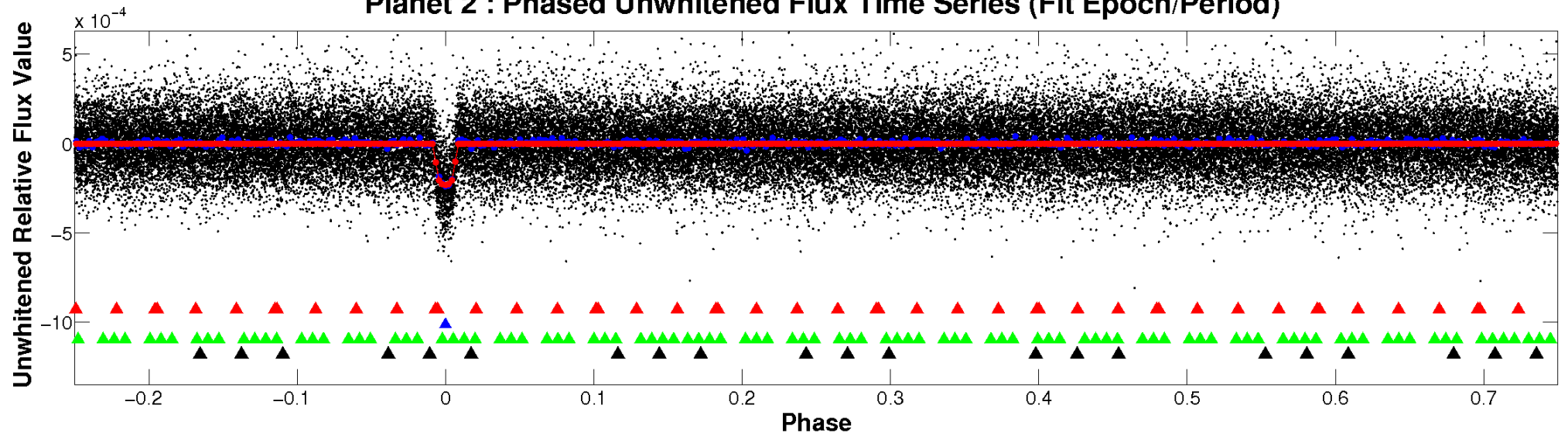
# ALT Odd/Even

TCE 008962094-02

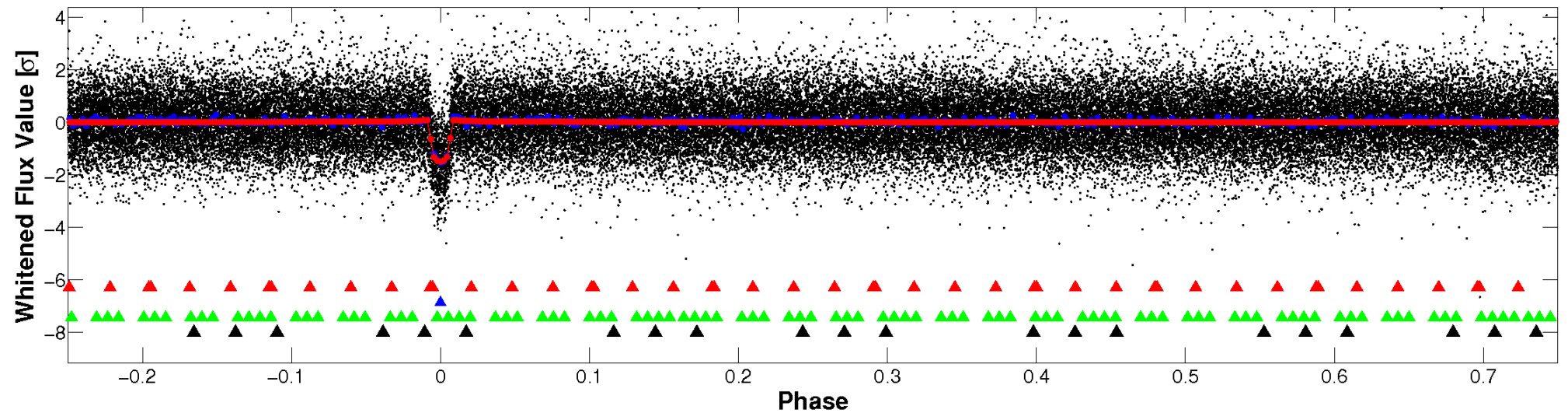


# Non-Whitened Vs. Whitened Light Curve

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

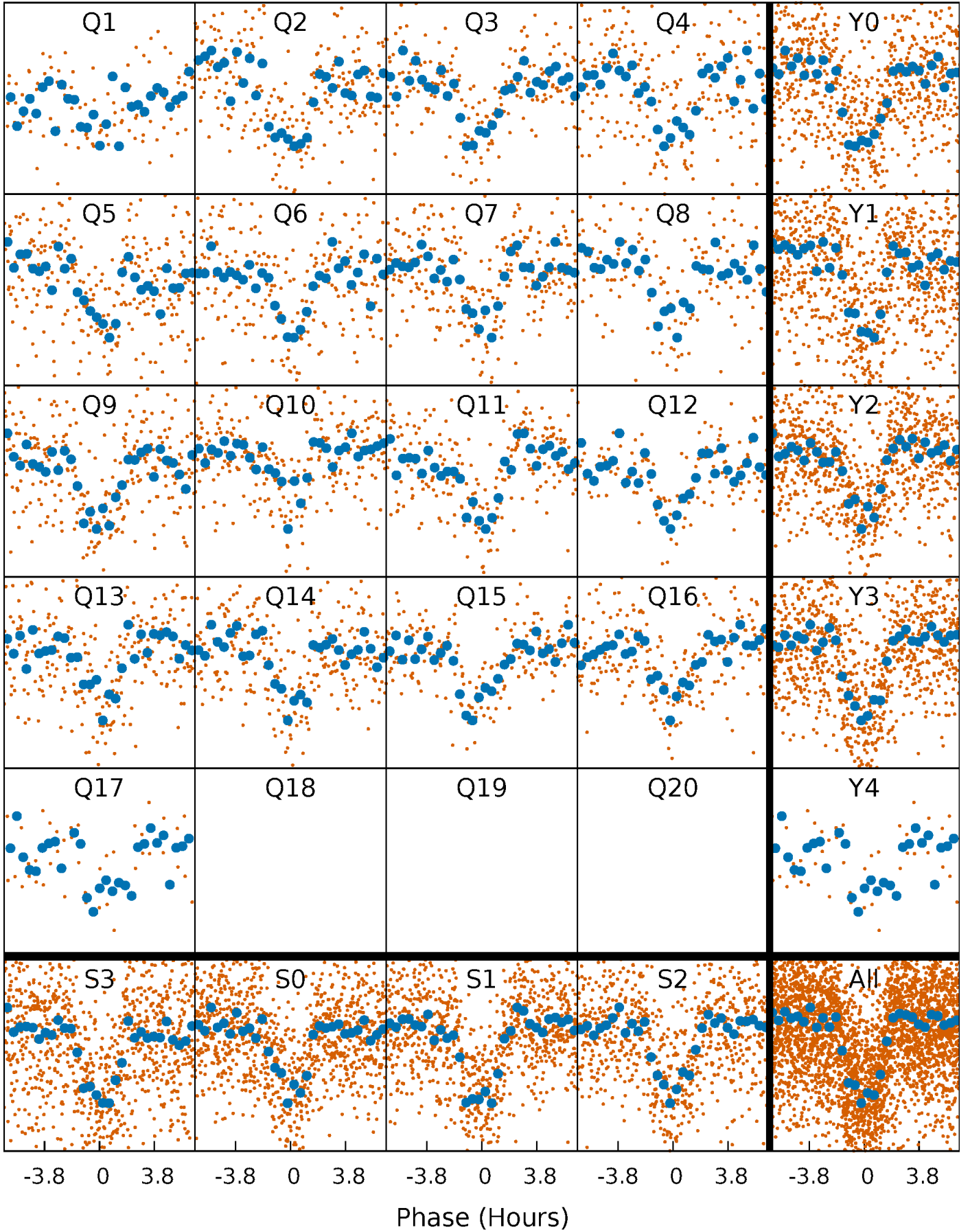


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



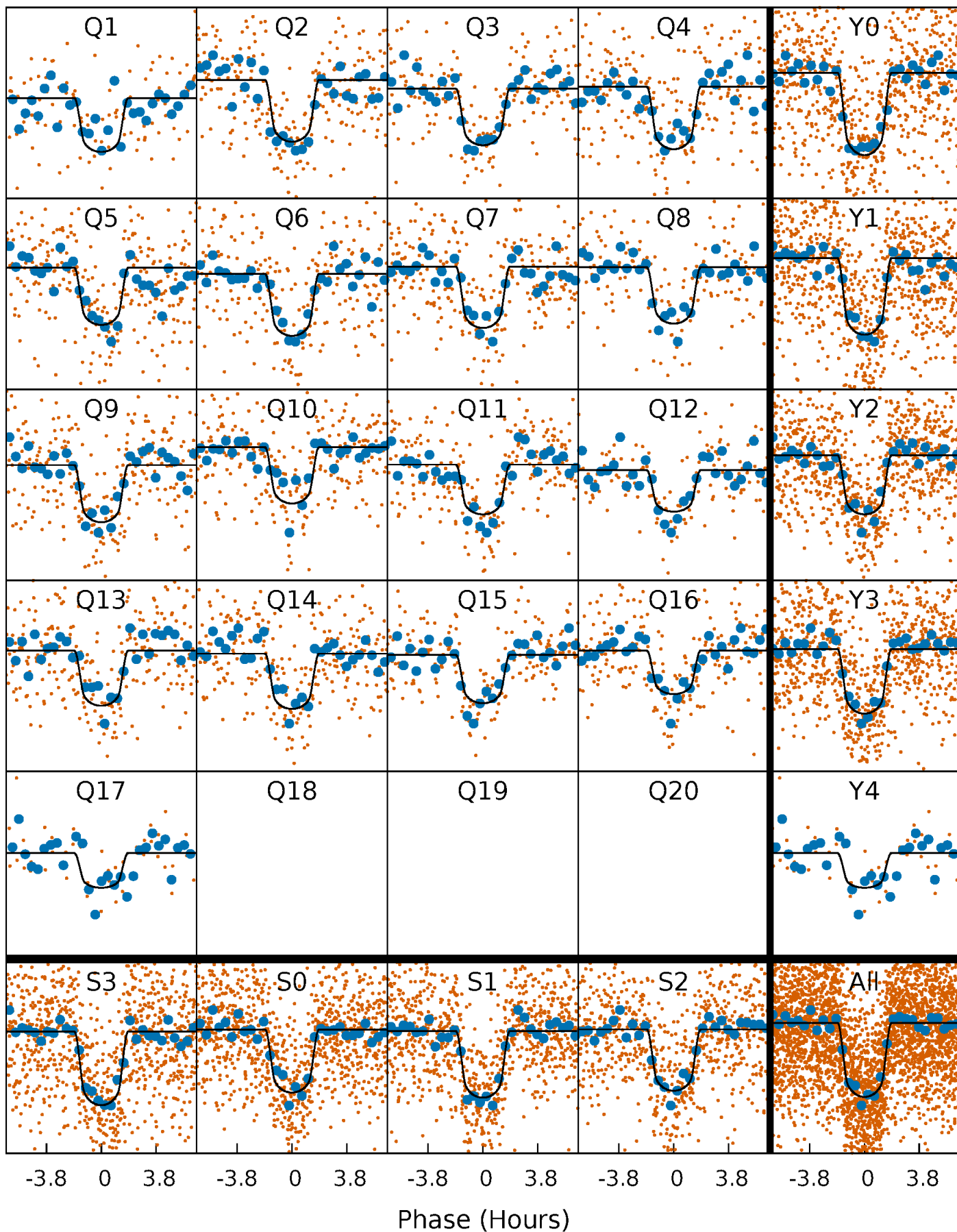
# PDC Quarter-Phased Transit Curves

TCE 008962094-02   P= 9.360603 Days    $T_0=134.530615$  (BKJD)



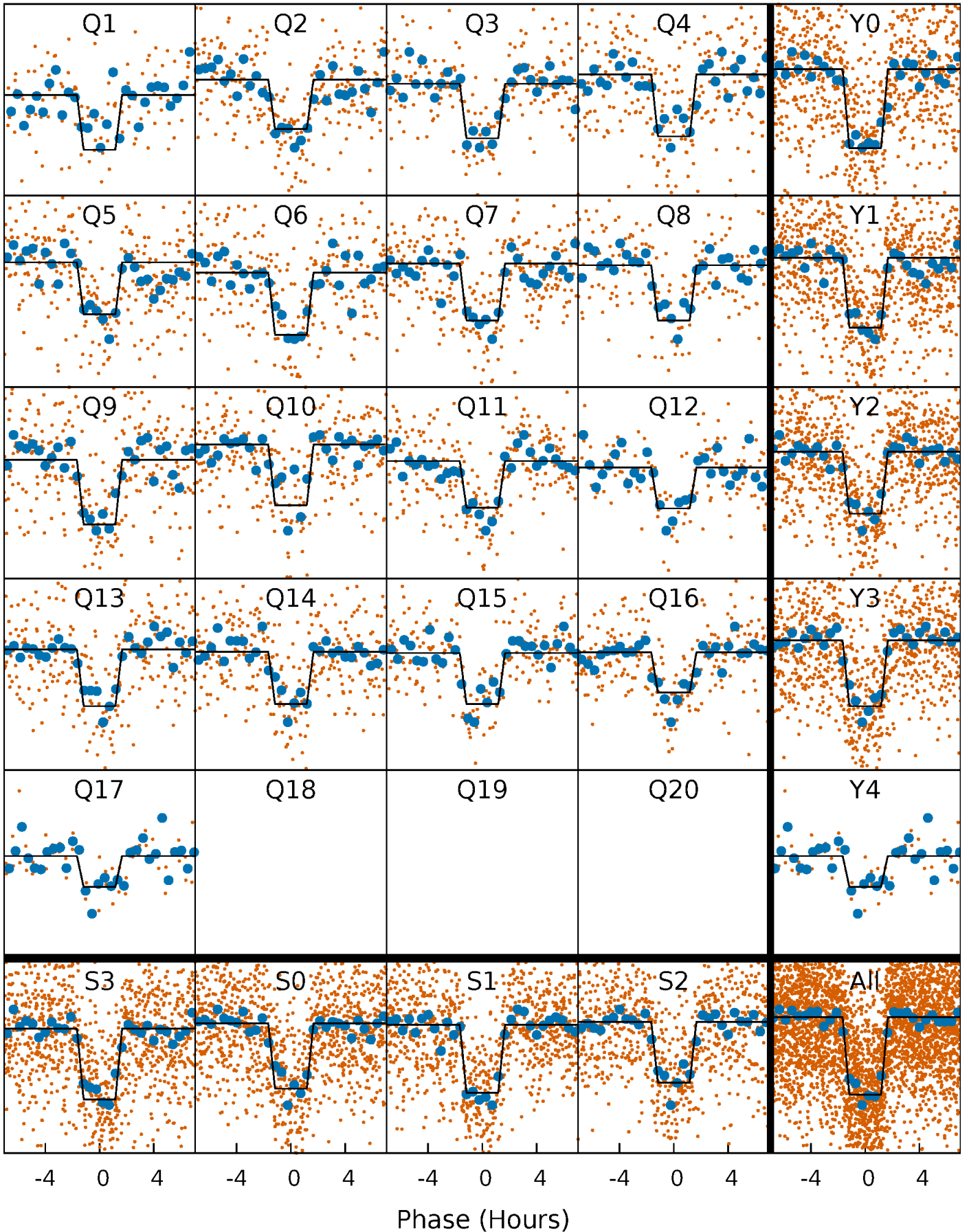
# DV Quarter-Phased Transit Curves

TCE 008962094-02   P= 9.360603 Days    $T_0=134.530615$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

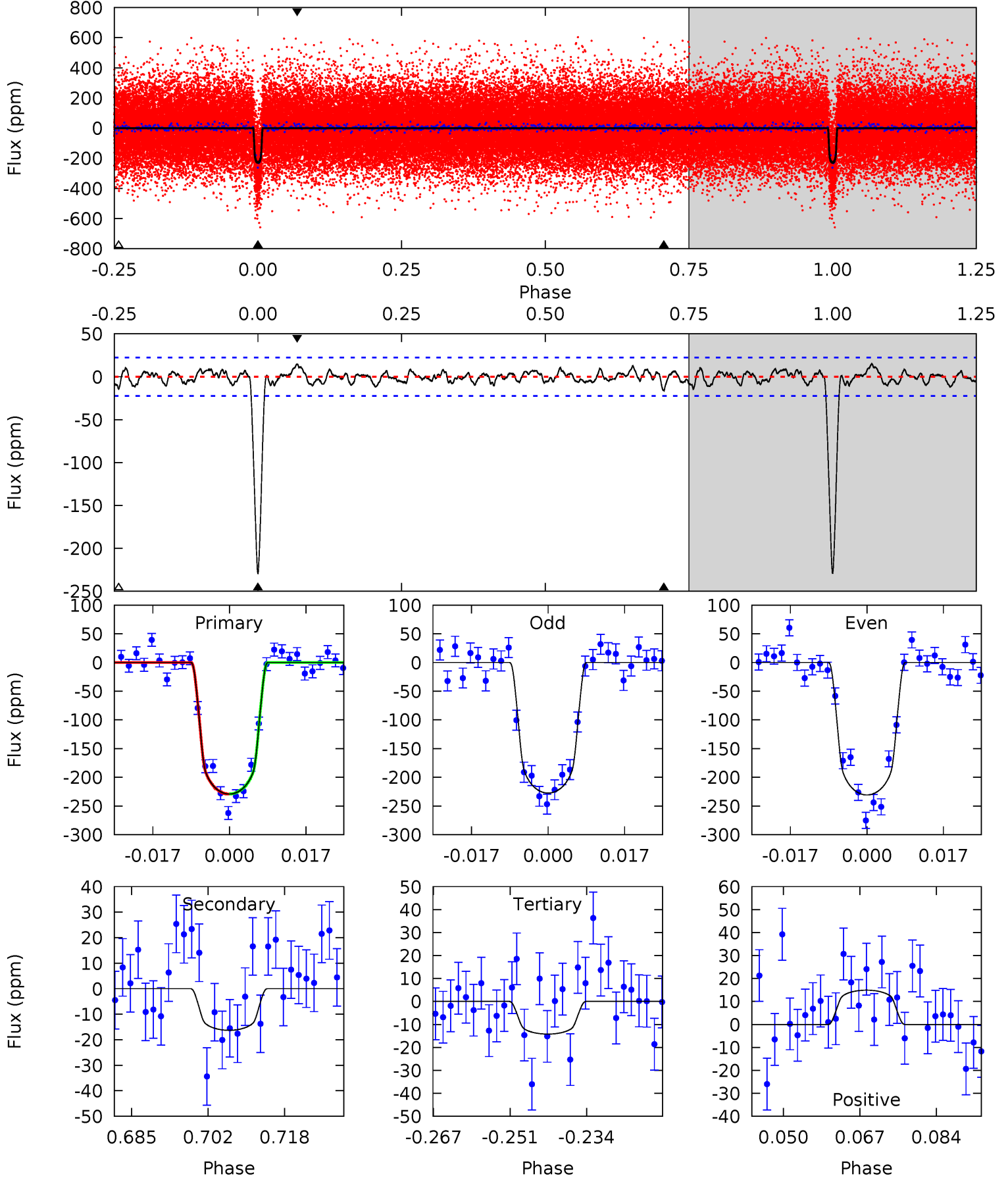
TCE 008962094-02   P= 9.360641 Days    $T_0=134.526617$  (BKJD)



# DV Model-Shift Uniqueness Test

008962094-02, P = 9.360603 Days, E = 125.170012 Days

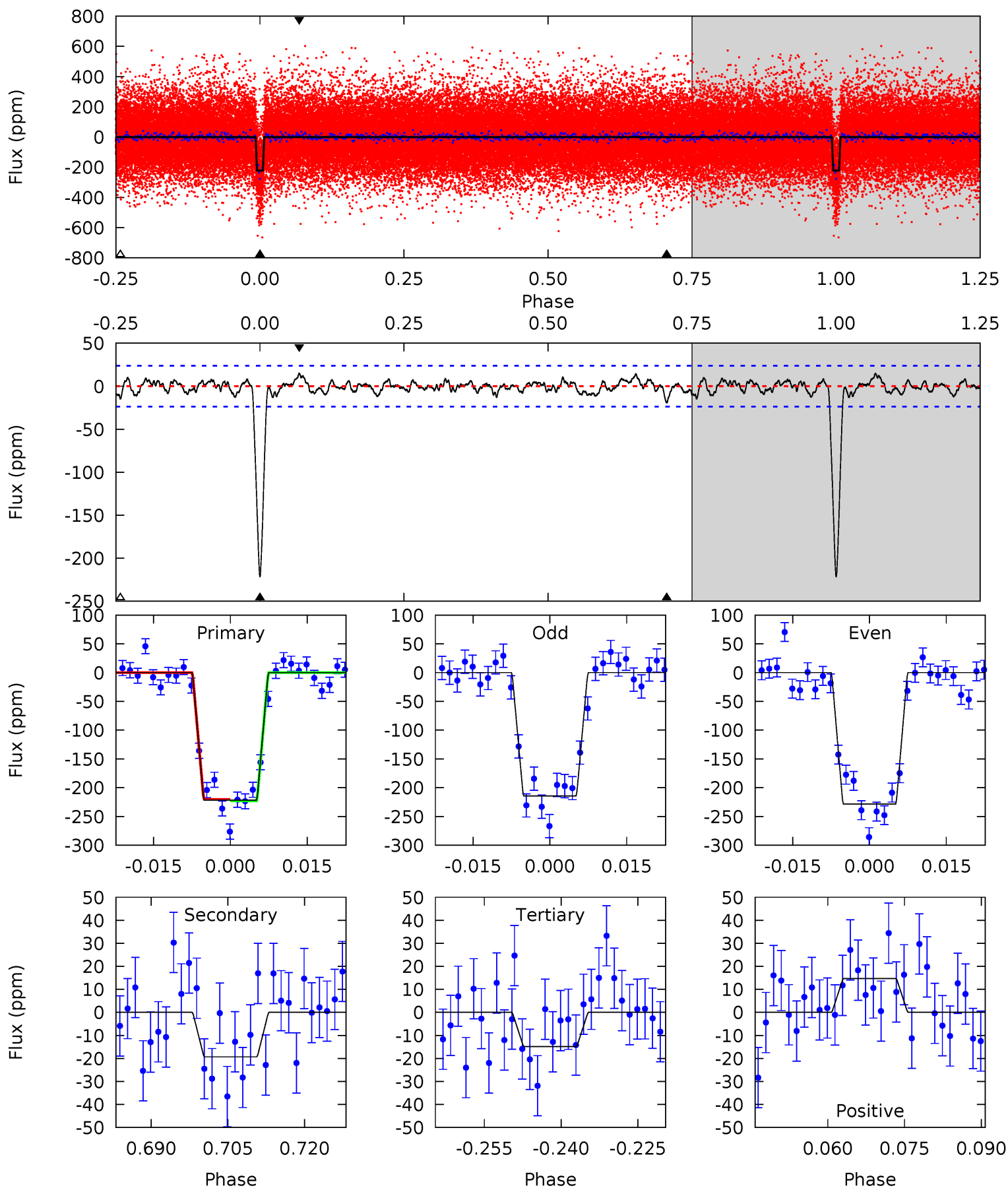
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
50.6	3.60	3.14	3.29	4.93	2.39	1.17	47.5	47.3	0.46	0.31	0.36	0.98	0.06	0.04



# Alt Model-Shift Uniqueness Test

008962094-02, P = 9.360641 Days, E = 125.165976 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
46.2	4.04	3.10	3.07	4.95	2.43	1.12	43.1	43.2	0.94	0.96	1.47	0.97	0.06	0.28



### Stellar Parameters For KIC 008962094

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5677^{+113}_{-113}$	$4.563^{+0.018}_{-0.108}$	$-0.180^{+0.150}_{-0.150}$	$0.828^{+0.104}_{-0.037}$	$0.920^{+0.044}_{-0.076}$	$2.281^{+0.221}_{-0.707}$
	+2%/-2%	+0%/-2%	+83%/-83%	+13%/-4%	+5%/-8%	+10%/-31%
Source	SPE59	SPE59	SPE59	DSEP		

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

### Secondary Eclipse Parameters for KIC 008962094-02 / KOI 0700.02

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-16 \pm 5$	$1.52^{+0.24}_{-0.19}$	$1112^{+38}_{-31}$	$3331^{+200}_{-211}$	$26^{+12}_{-9}$
Alt.	$-19 \pm 5$	$1.40^{+0.21}_{-0.22}$	$1112^{+41}_{-30}$	$3535^{+229}_{-220}$	$38^{+18}_{-13}$

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

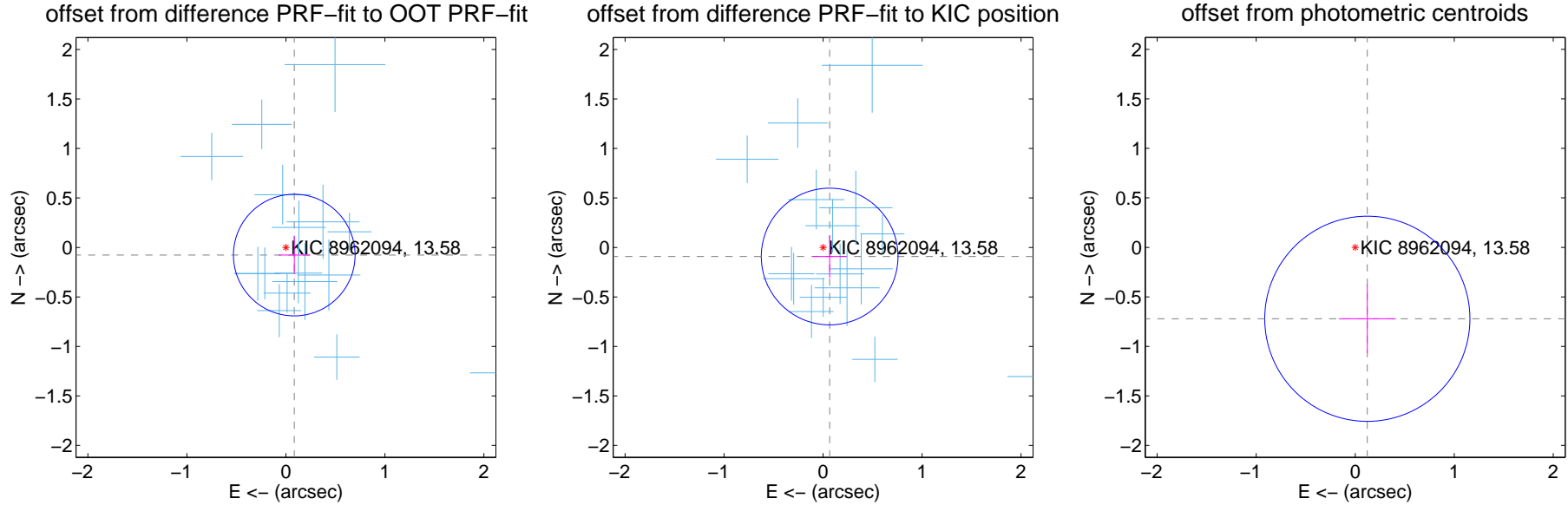
## DV Centroid Data

Supplemental centroid analysis for 008962094-02. Kepler magnitude: 13.58. Transit SNR 37.32

There are 16 quarters with good PRF difference image offsets

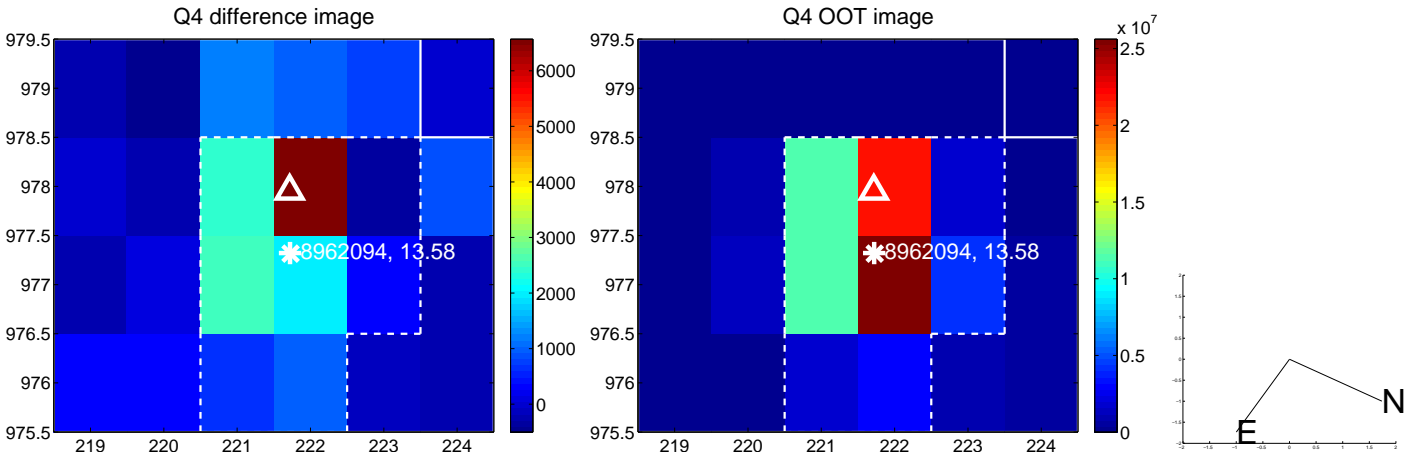
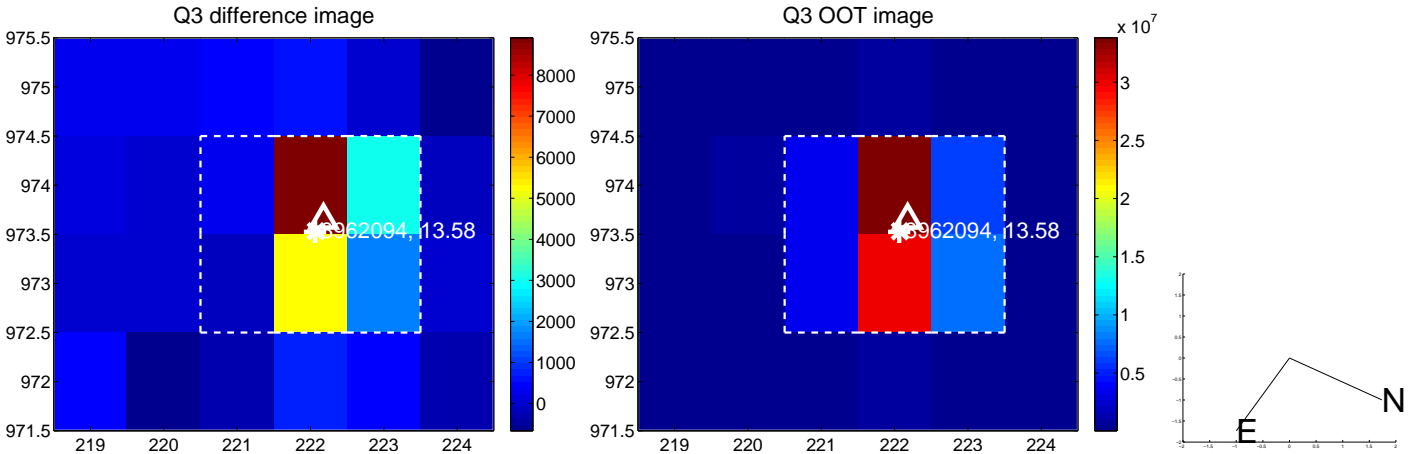
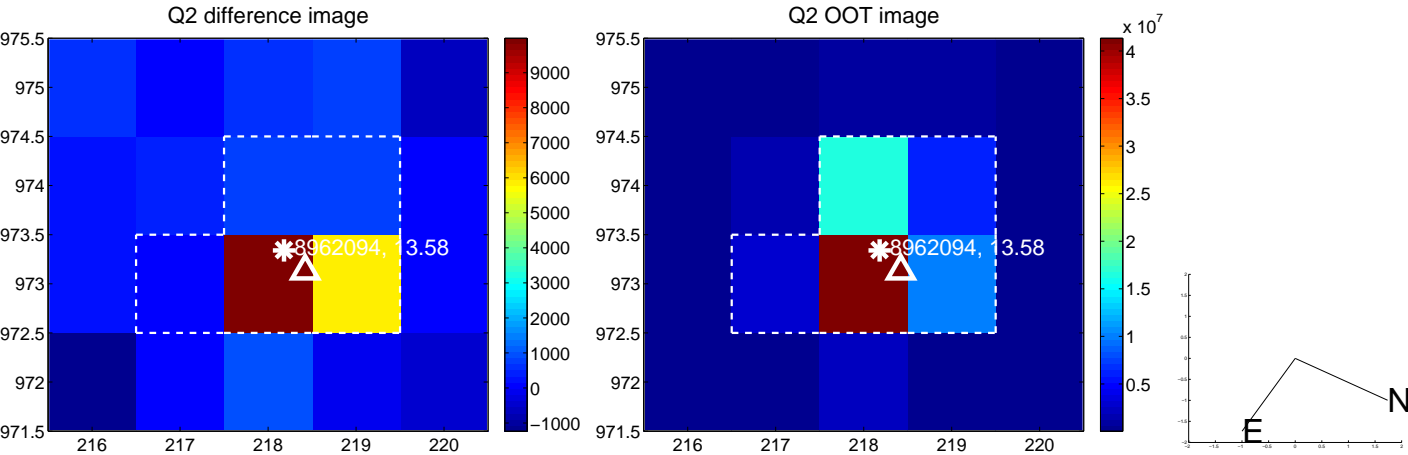
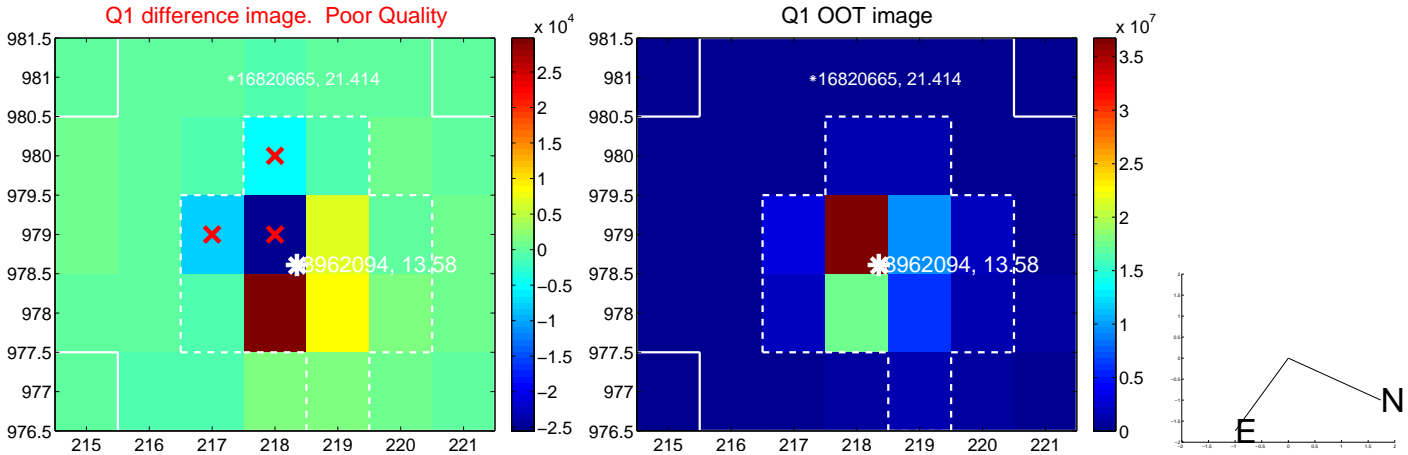
The direct PRF centroid is offset from the target star catalog position by about 0.01 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.114 \pm 0.205$	0.56	$-0.085 \pm 0.159$	$-0.077 \pm 0.193$
PRF-fit source offset from KIC position	$0.113 \pm 0.230$	0.49	$-0.067 \pm 0.169$	$-0.092 \pm 0.216$
photometric centroid source offset	$0.73 \pm 0.35$	2.12	$-0.12 \pm 0.29$	$-0.72 \pm 0.35$

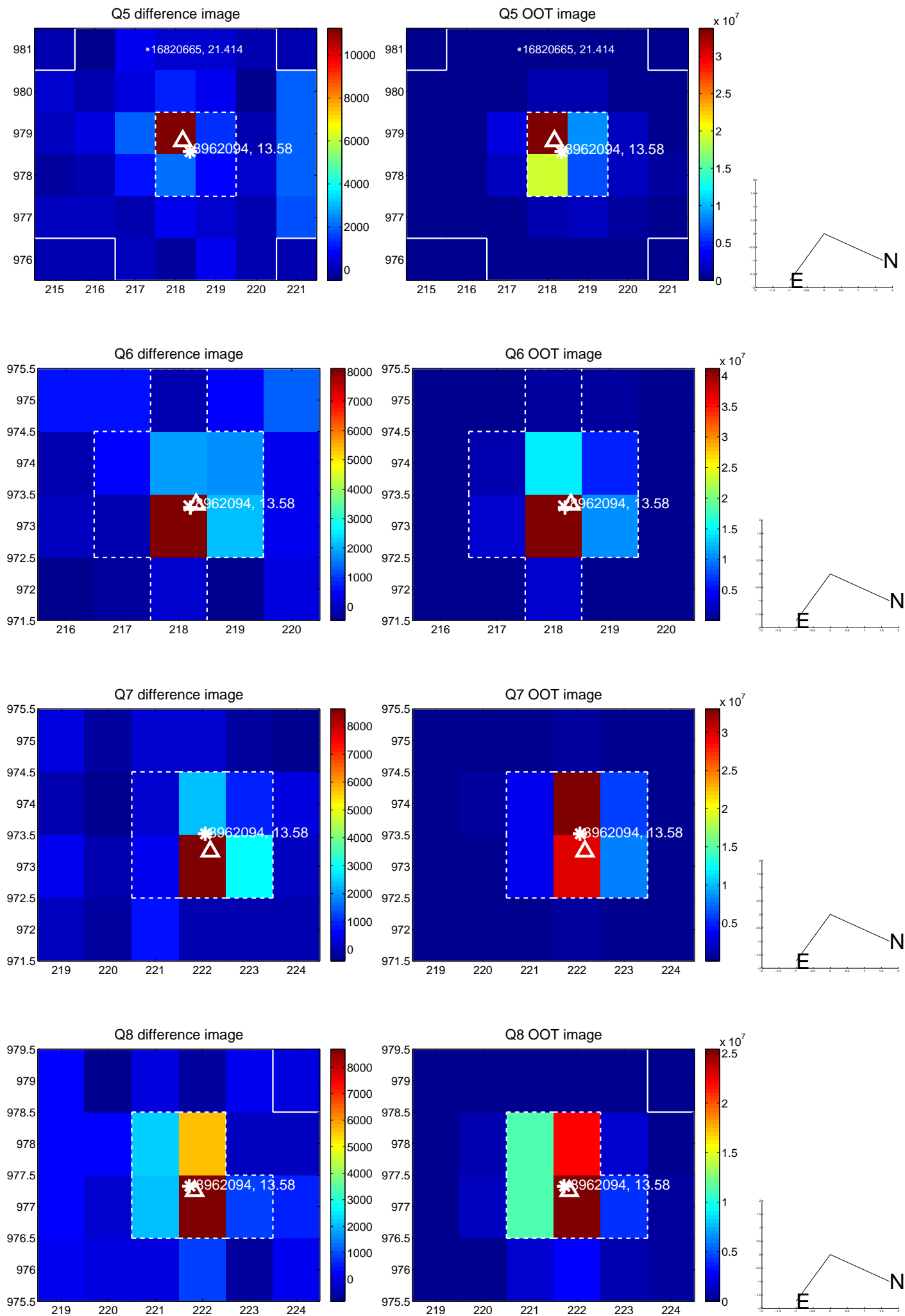


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

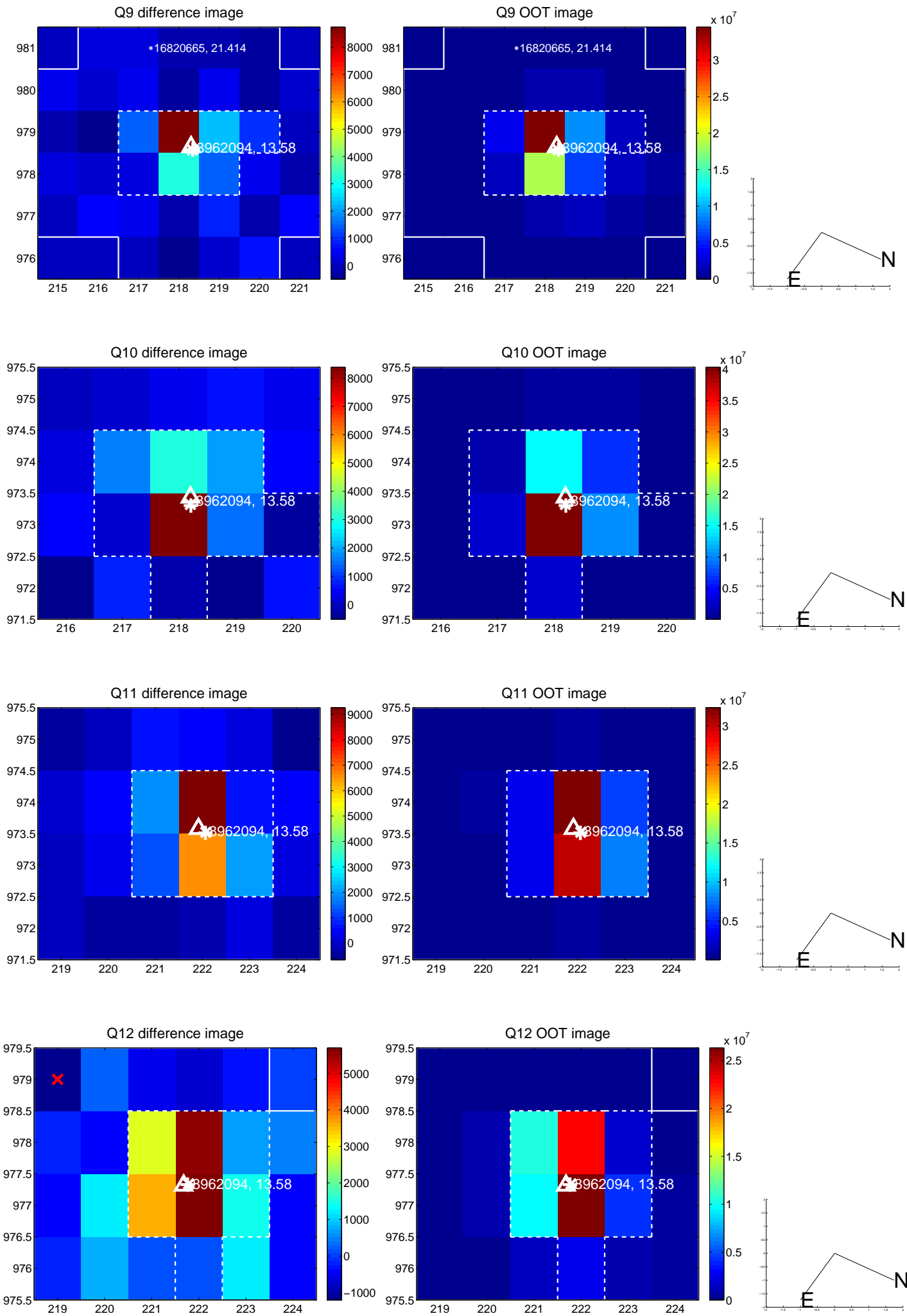
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



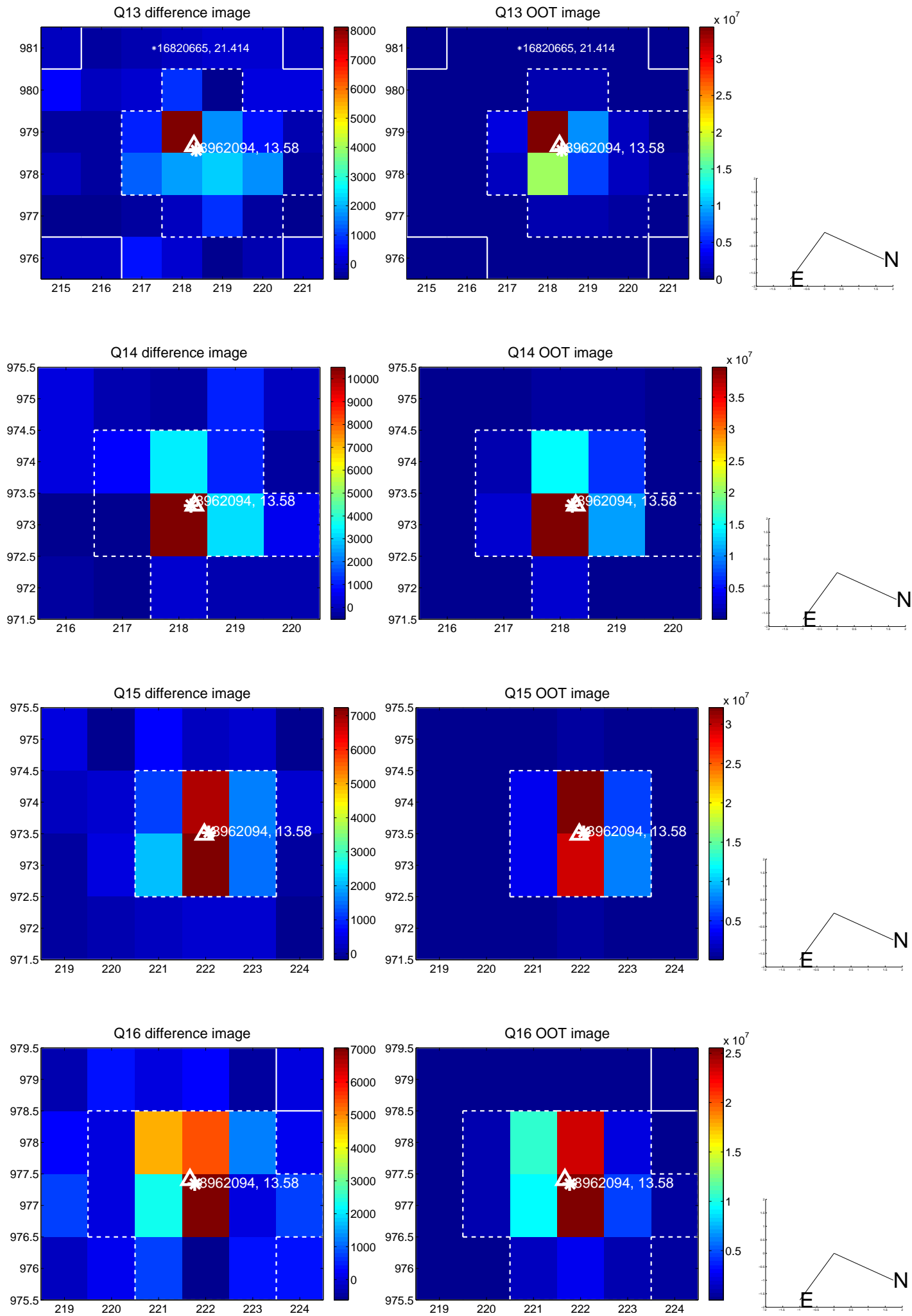
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



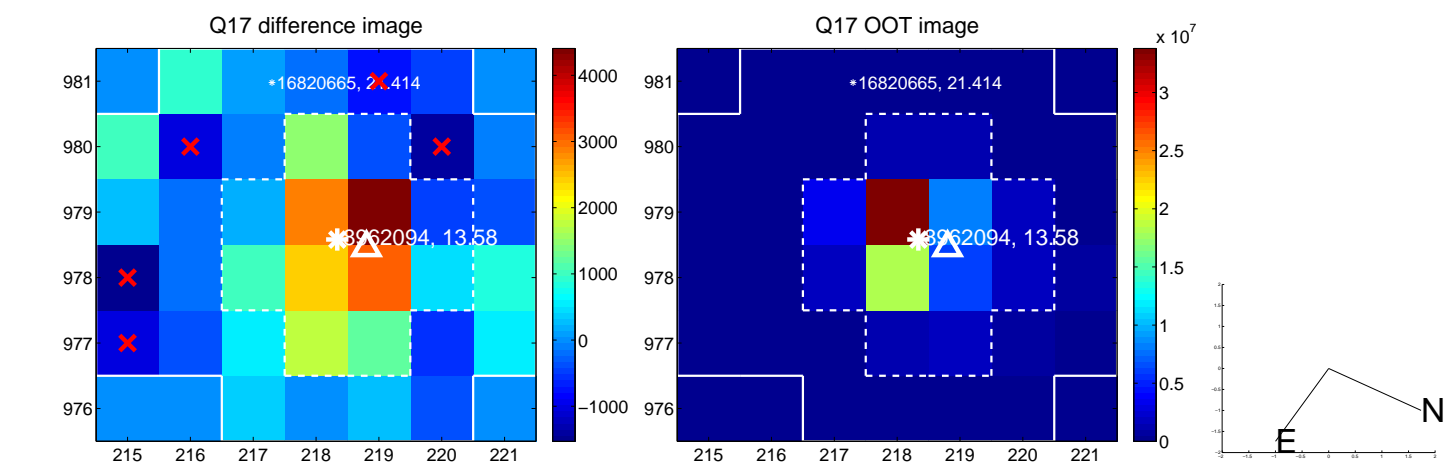
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



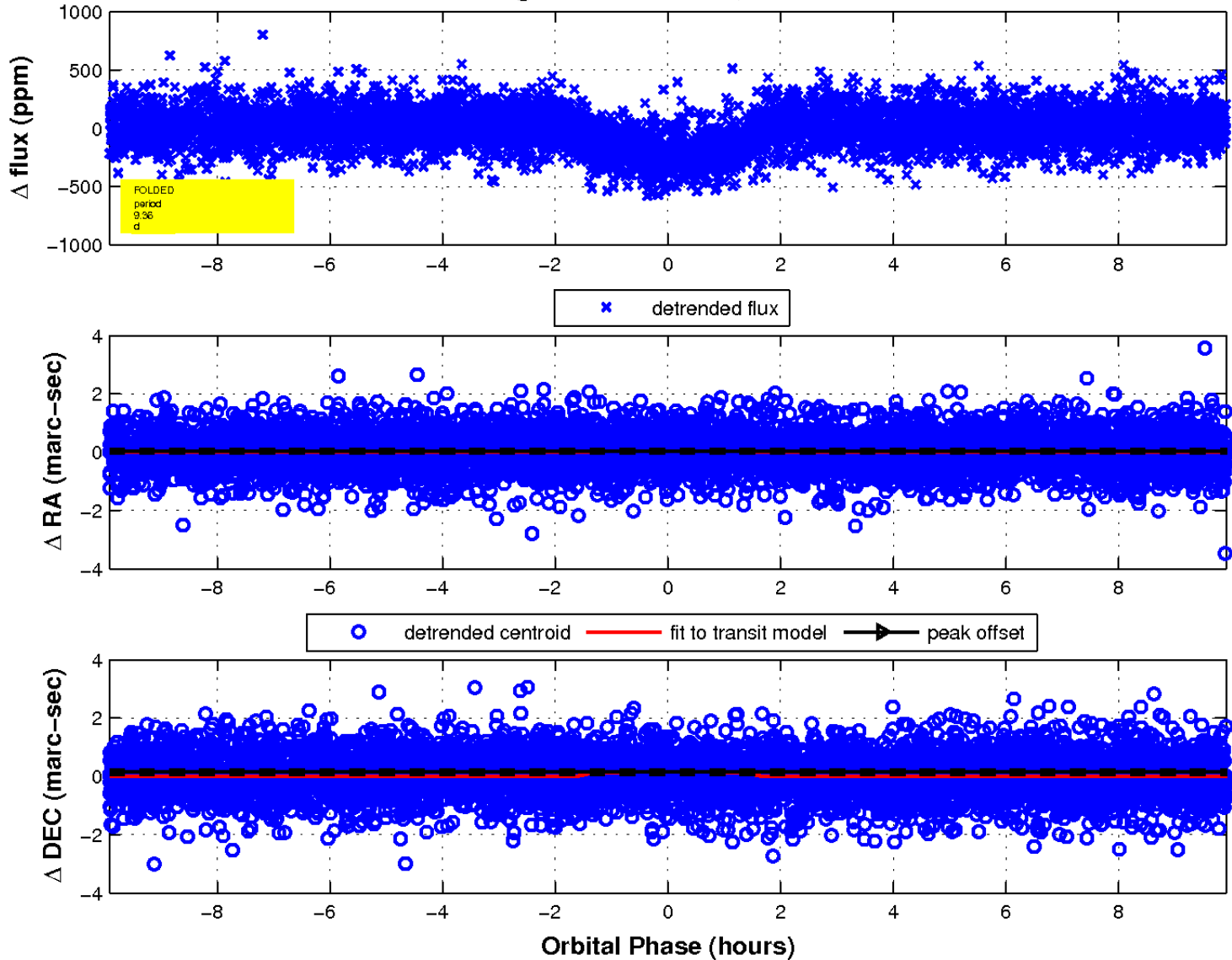
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

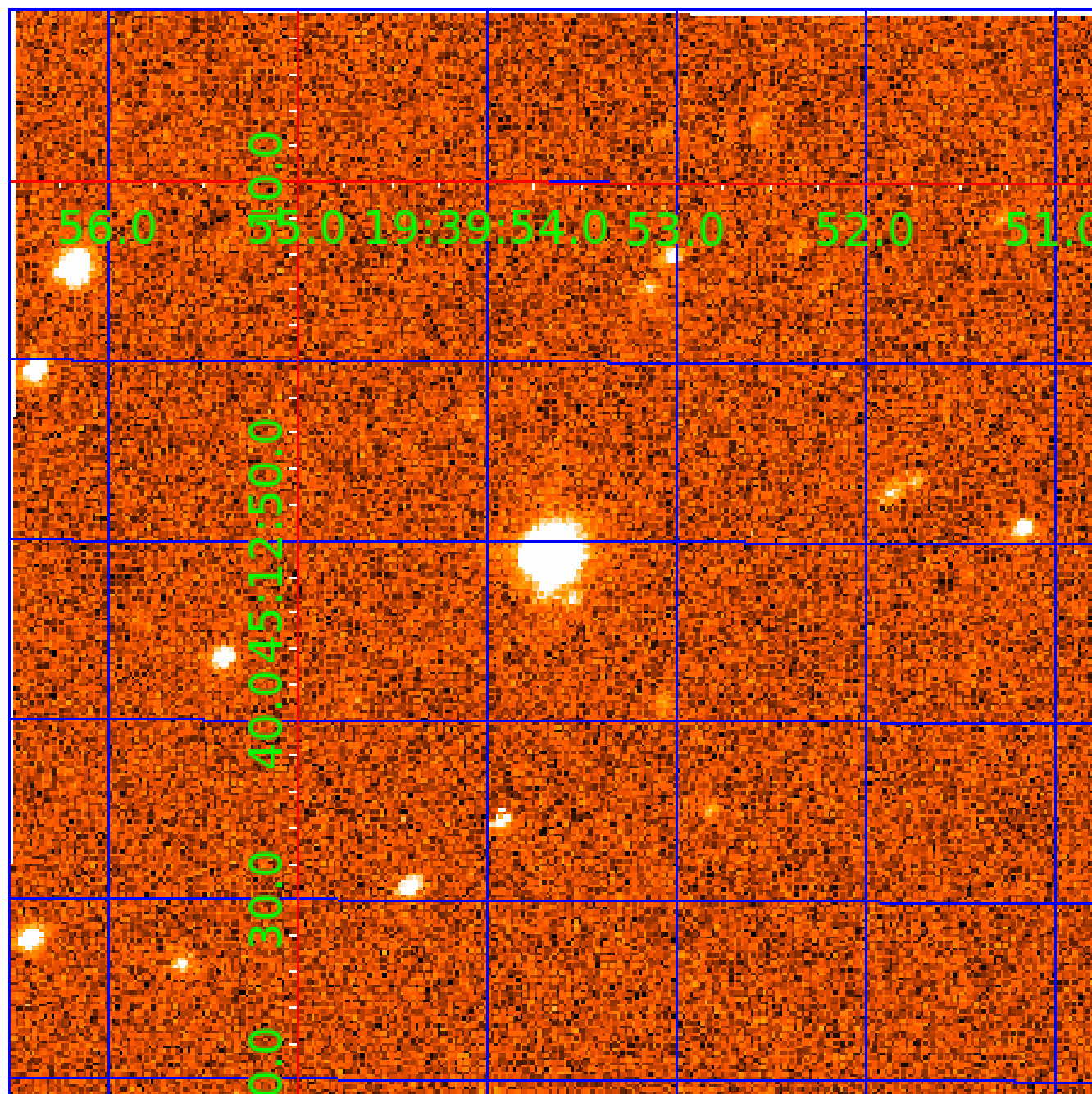


fluxWeightedCentroids, Planet 2 of 4



UKIRT Image

Declination



# KIC 008962094

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008962094-01	OBS	0700.01	30.864324	142.072017	552.2	3.069	46.5	47.4	0.83	5677	2.33	18.26
008962094-02	OBS	0700.02	9.360603	134.530615	231.8	3.307	33.3	37.3	0.83	5677	1.50	89.60
008962094-03	OBS	0700.03	14.667242	145.420159	197.3	3.730	25.7	28.0	0.83	5677	1.26	49.23
008962094-04	OBS	0700.04	68.161354	187.030785	288.0	5.744	17.7	19.4	0.83	5677	1.51	6.35

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008962094-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
008962094-02	OBS	PC	1.00	0	0	0	0	NO_COMMENT
008962094-03	OBS	PC	1.00	0	0	0	0	NO_COMMENT
008962094-04	OBS	PC	0.98	0	0	0	0	NO_COMMENT

**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.

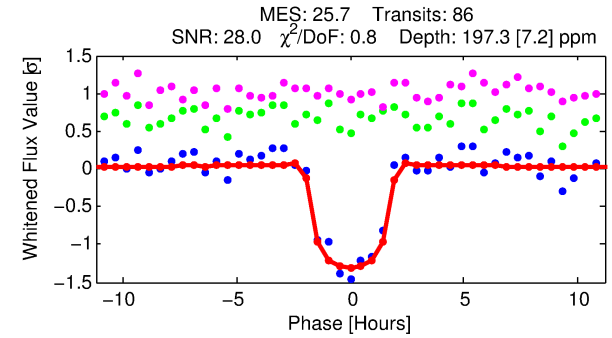
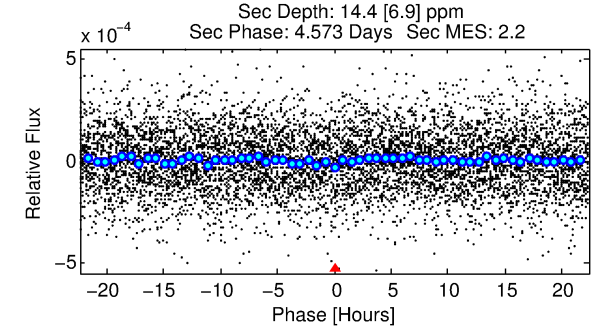
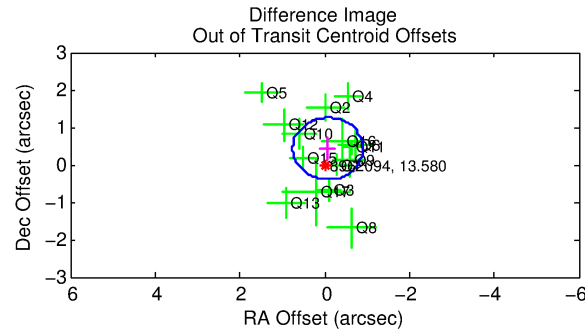
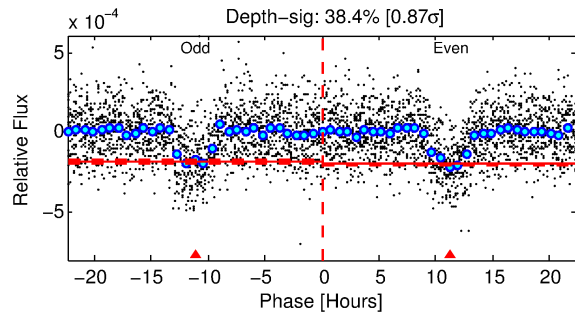
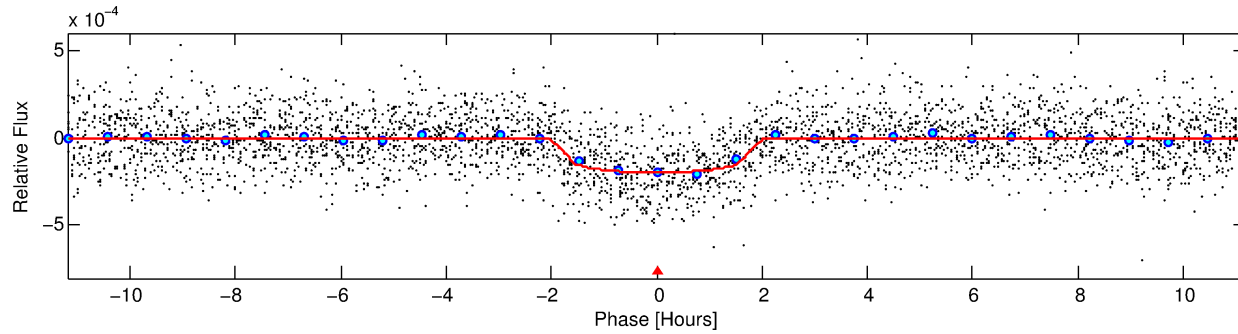
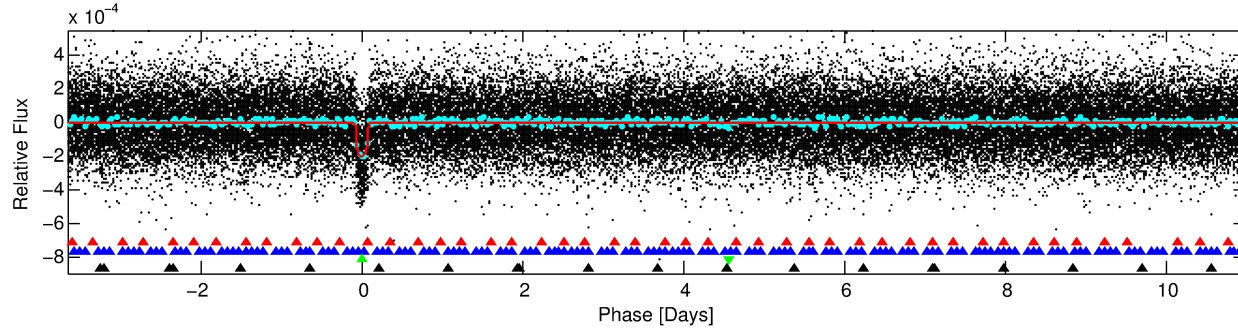
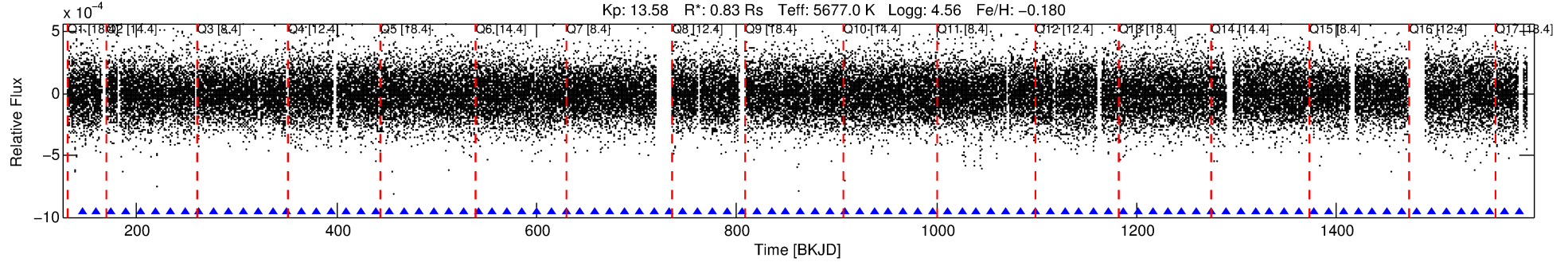
## Ephemeris Match Information For 008962094-03

No Significant Match Found

# DV One-Page Summary

KIC: 8962094 Candidate: 3 of 4 Period: 14.667 d  
KOI: K00700.03 Name: Kepler-215c Corr: 0.991

Kp: 13.58 R\*: 0.83 Rs Teff: 5677.0 K Logg: 4.56 Fe/H: -0.180



## DV Fit Results:

Period = 14.66724 [0.00005] d  
Epoch = 145.4202 [0.0029] BKJD  
Rp/R\* = 0.0140 [0.0048]  
a/R\* = 20.62 [31.32]  
b = 0.75 [0.91]  
Seff = 49.23 [9.95]  
Teq = 675 [34] K  
Rp = 1.26 [0.46] Re  
a = 0.1138 [0.0134] AU  
Ag = 64.29 [55.17] [1.15σ]  
Teffp = 2957 [622] K [3.66σ]

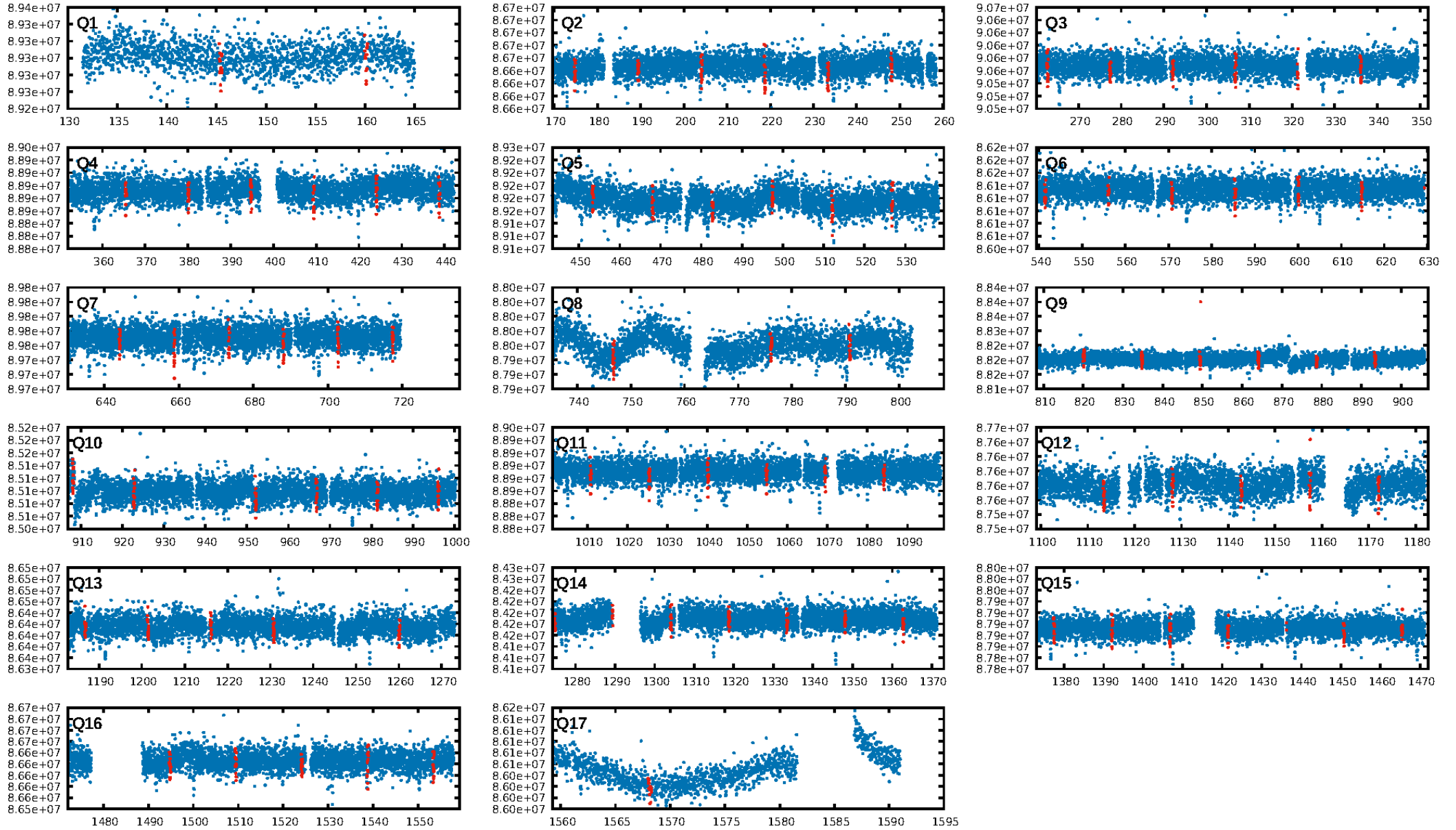
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [25.55σ]  
LongPeriod-sig: 100.0% [80.47σ]  
ModelChiSquare2-sig: 94.2%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 9.84e-137  
RollingBand-fgt: 1.00 [83/83]  
GhostDiagnostic-chr: -25.54  
Centroid-sig: 85.3%  
Centroid-so: 0.148 arcsec [0.38σ]  
OotOffset-rm: 0.435 arcsec [1.57σ]  
KicOffset-rm: 0.416 arcsec [1.45σ]  
OotOffset-st: 3/4/4/4 [15]  
KicOffset-st: 3/4/4/4 [15]  
DiffImageQuality-fgm: 1.00 [15/15]  
DiffImageOverlap-fno: 1.00 [17/17]

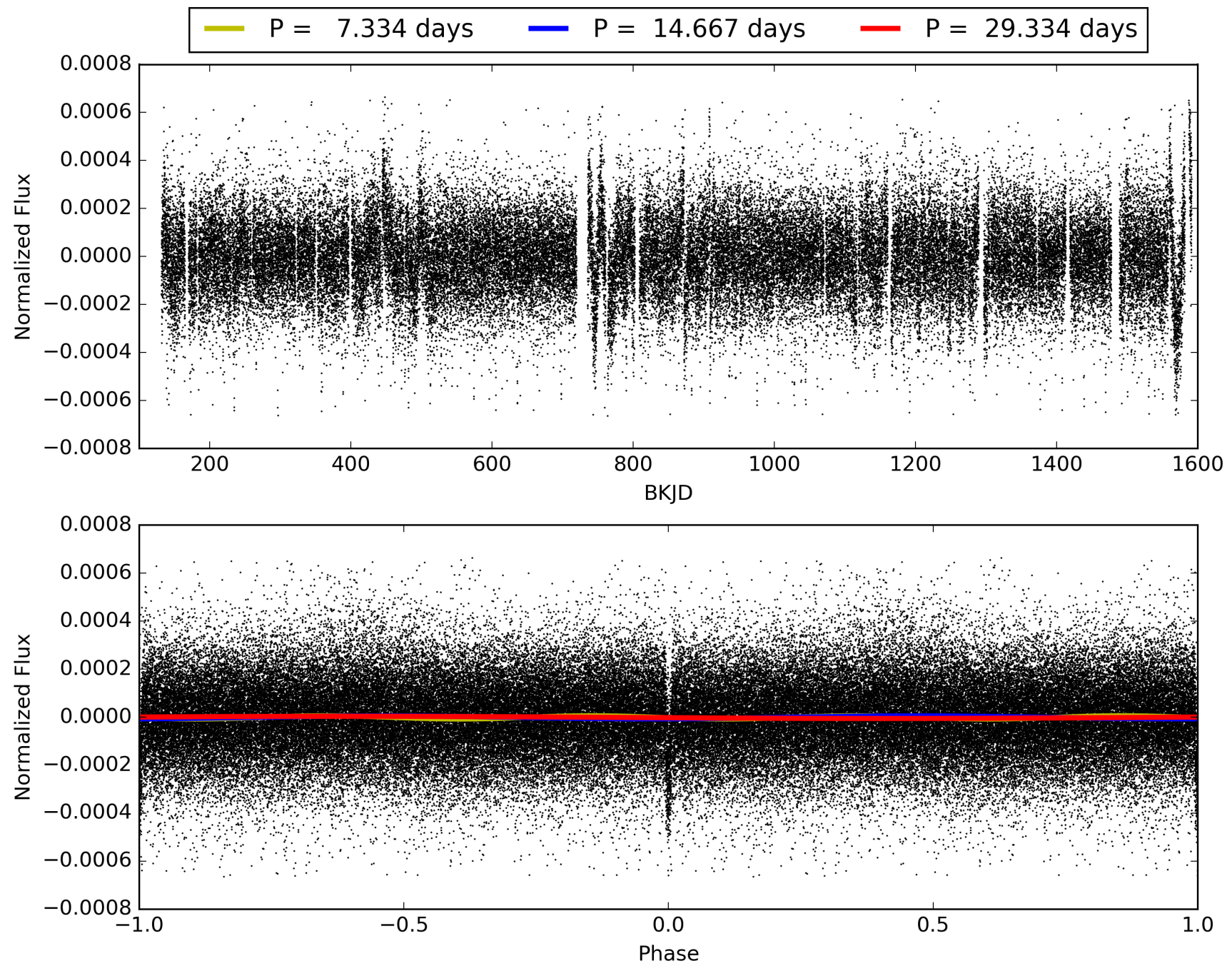
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 13:38:37 Z

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

# TCE 008962094-03, PDC Light Curves

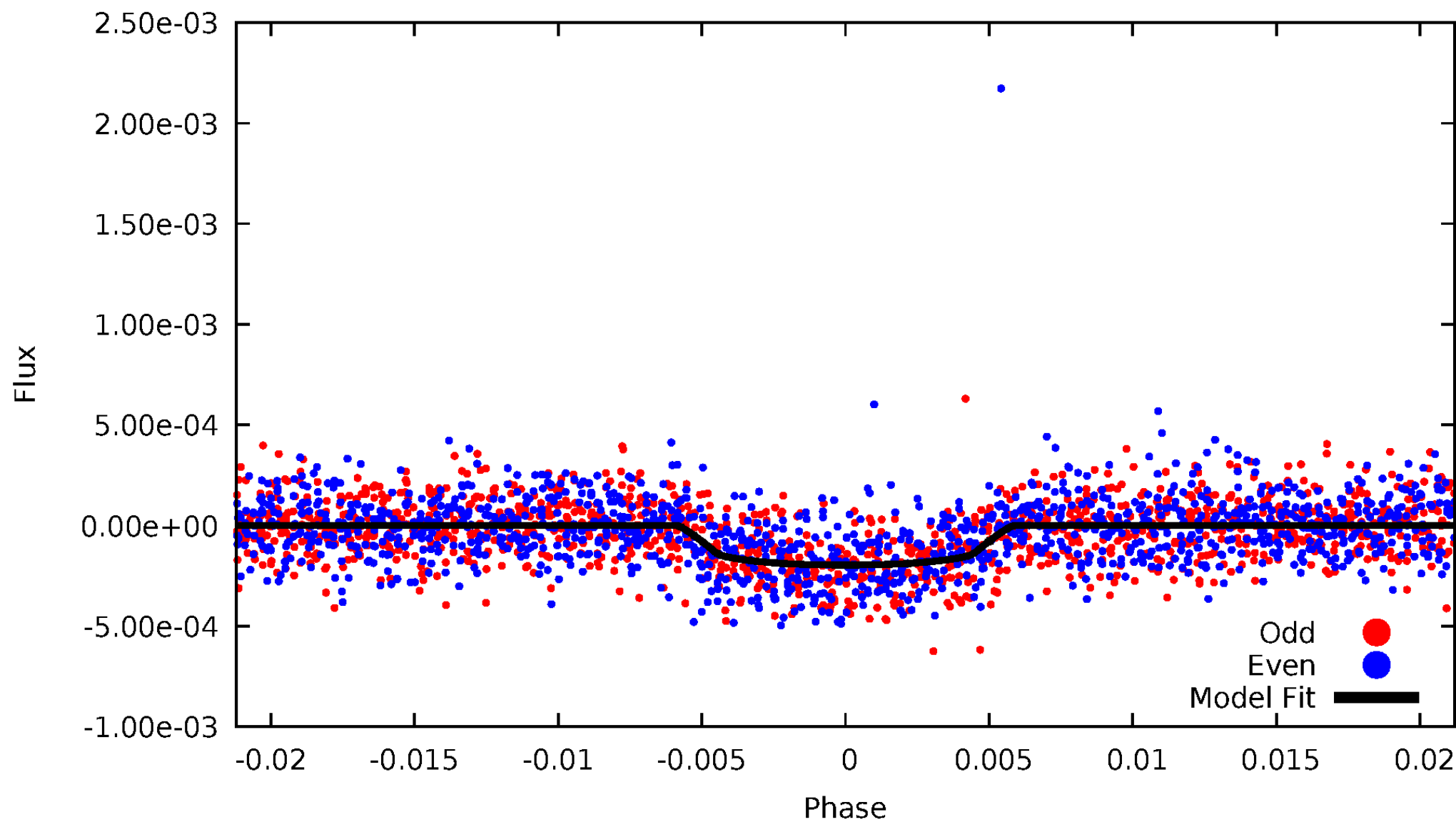


TCE 008962094-03



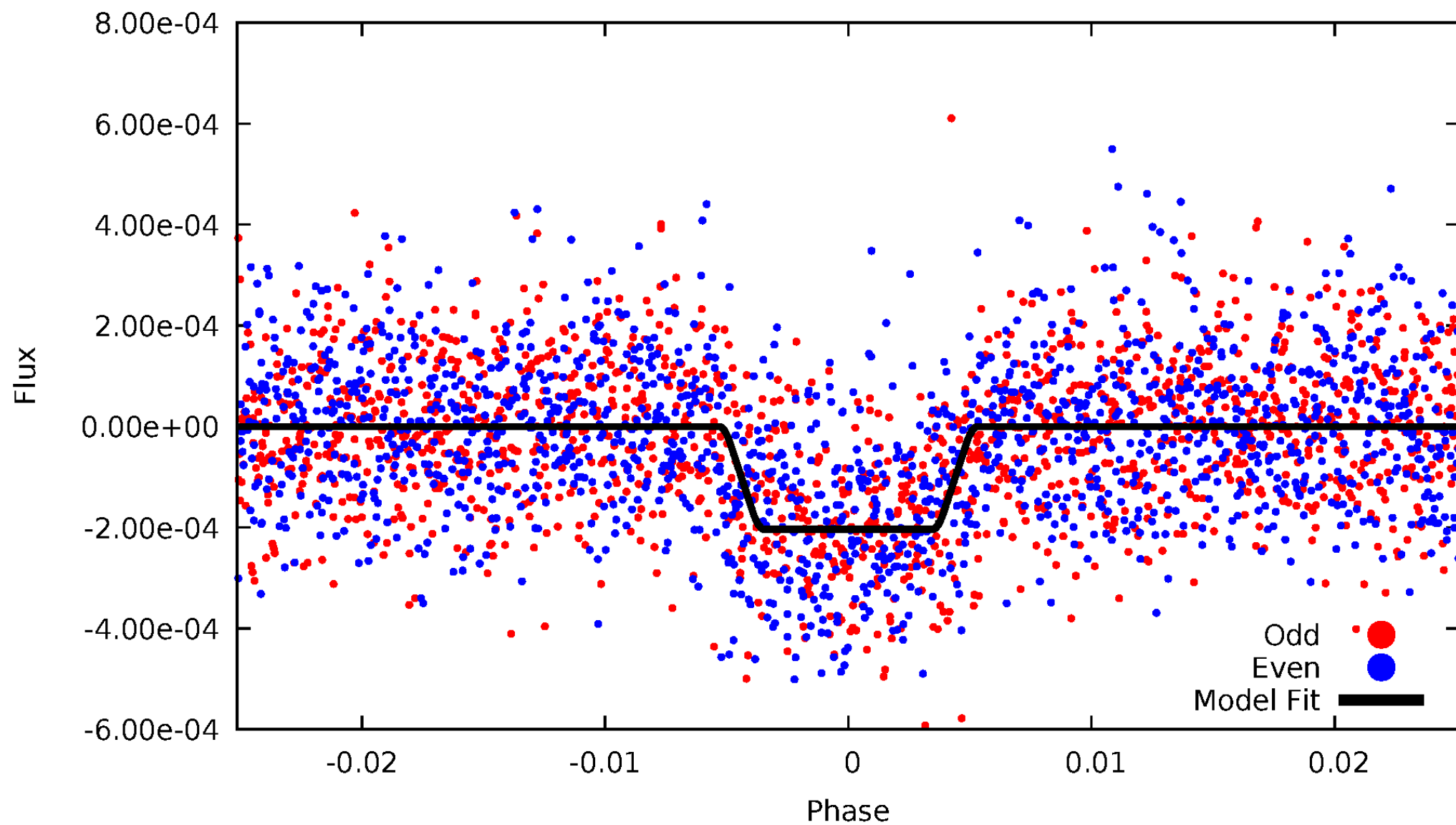
# DV Odd/Even

TCE 008962094-03



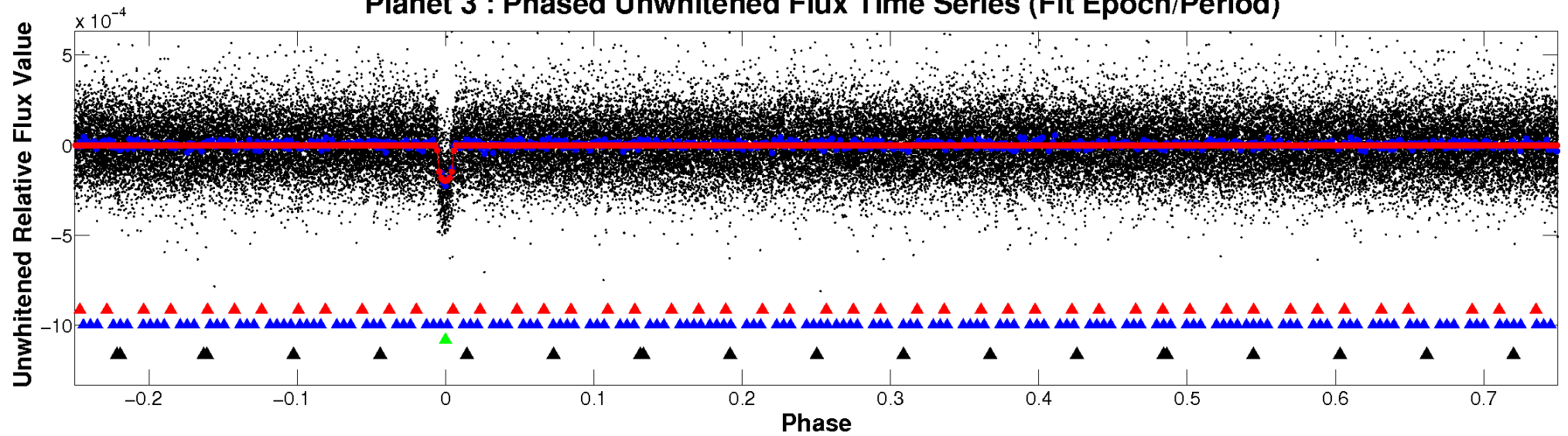
# ALT Odd/Even

TCE 008962094-03

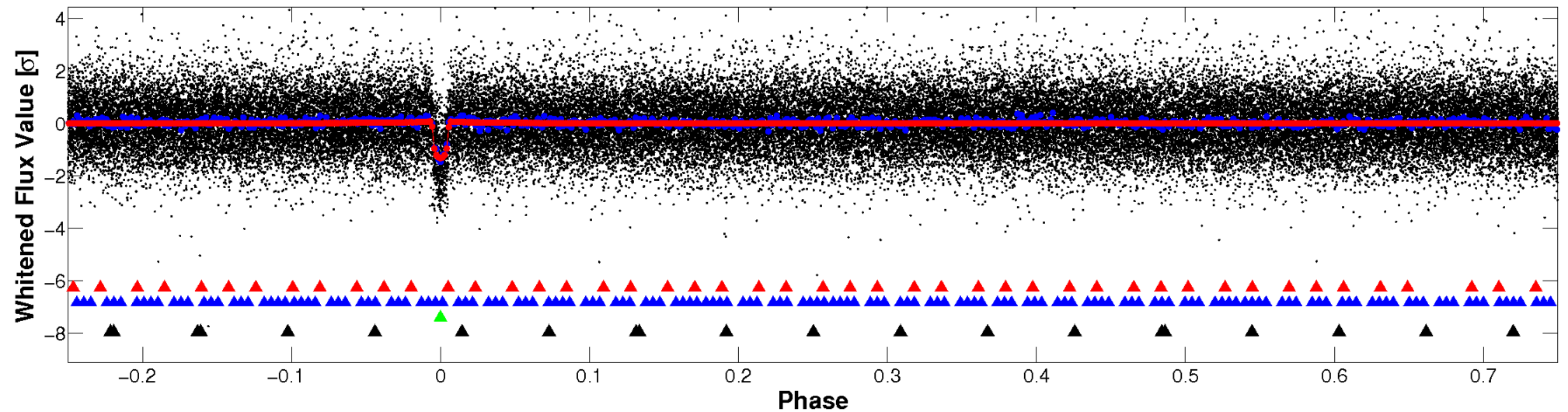


# Non-Whitened Vs. Whitened Light Curve

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

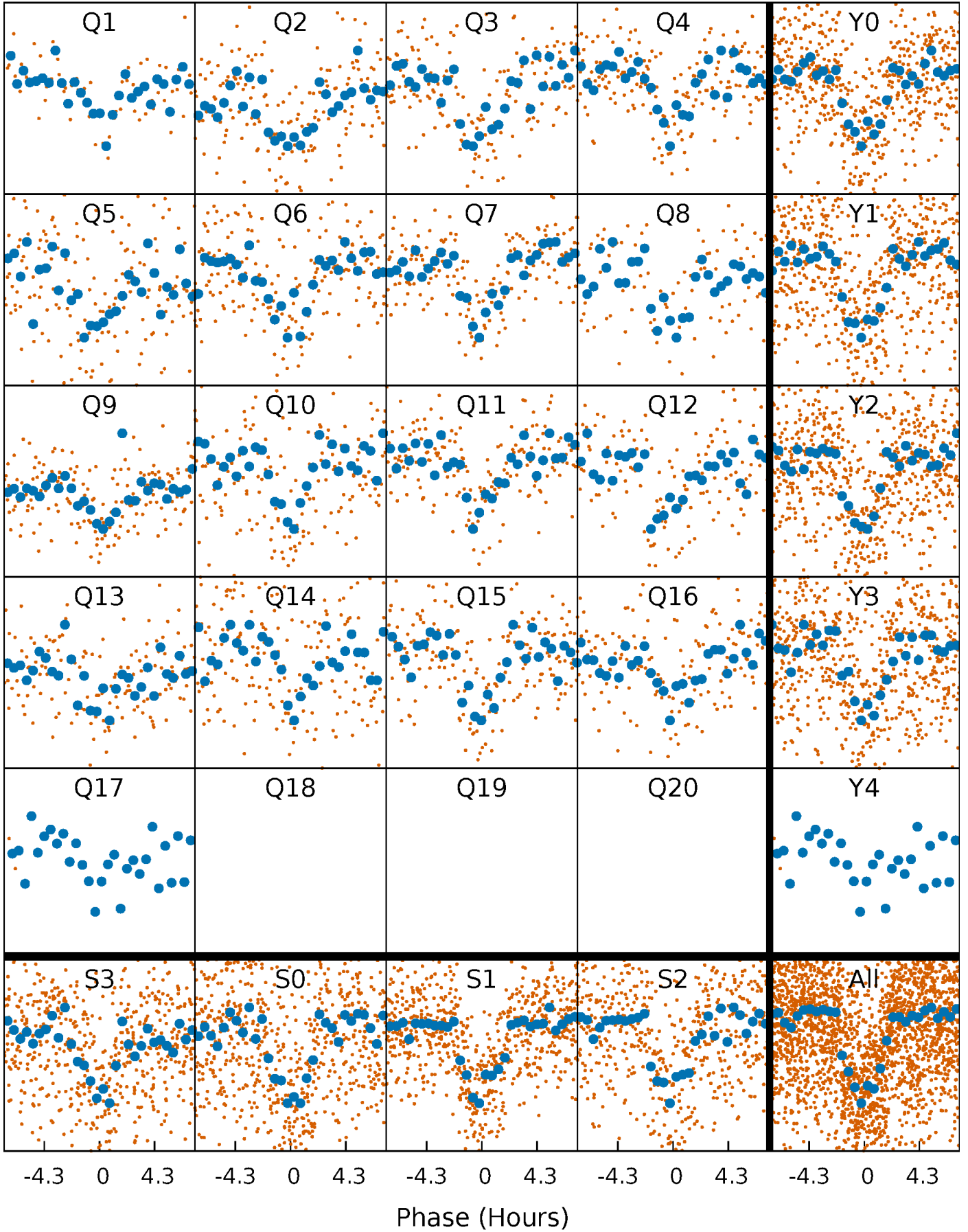


## Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



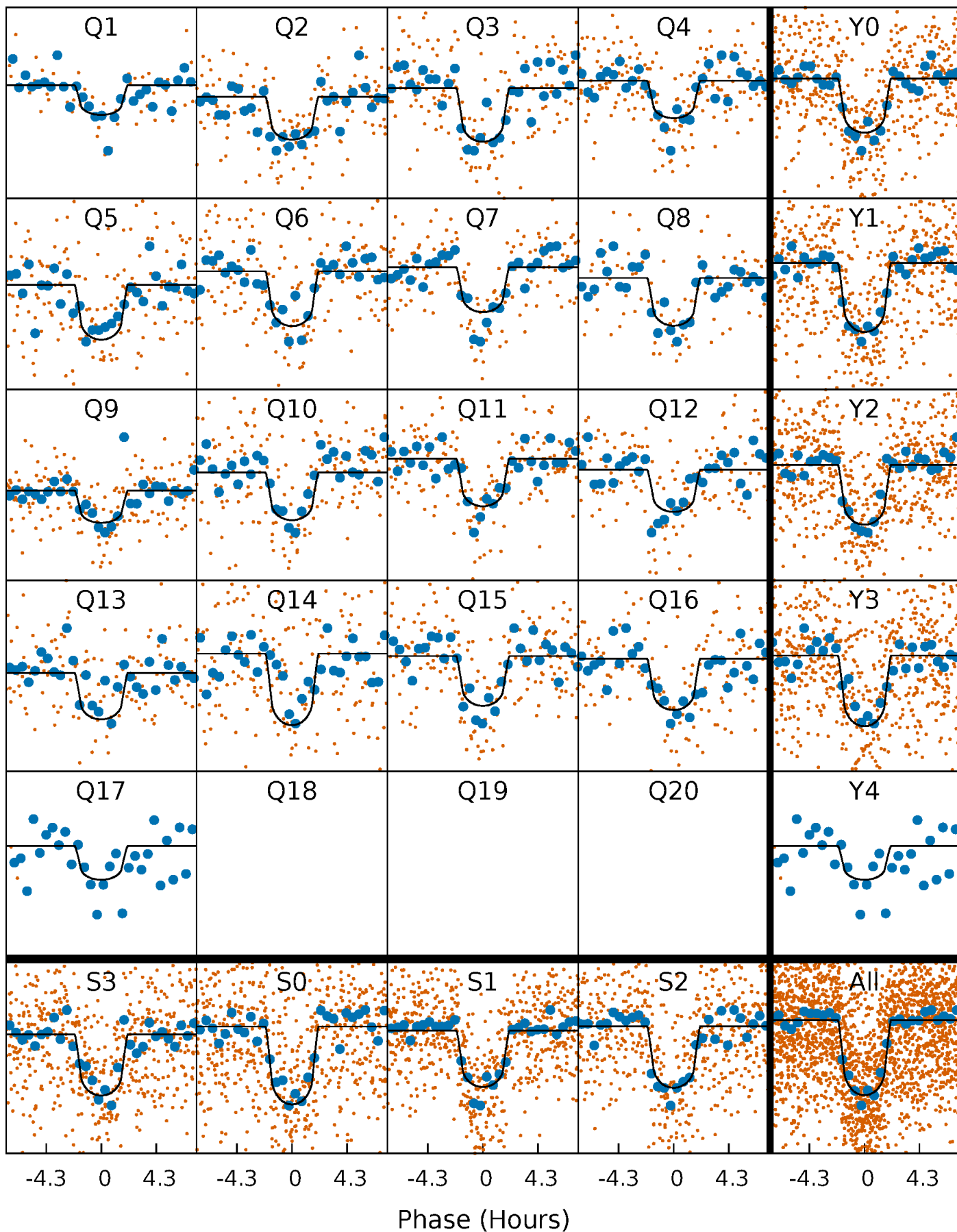
# PDC Quarter-Phased Transit Curves

TCE 008962094-03   P= 14.667242 Days    $T_0=145.420159$  (BKJD)



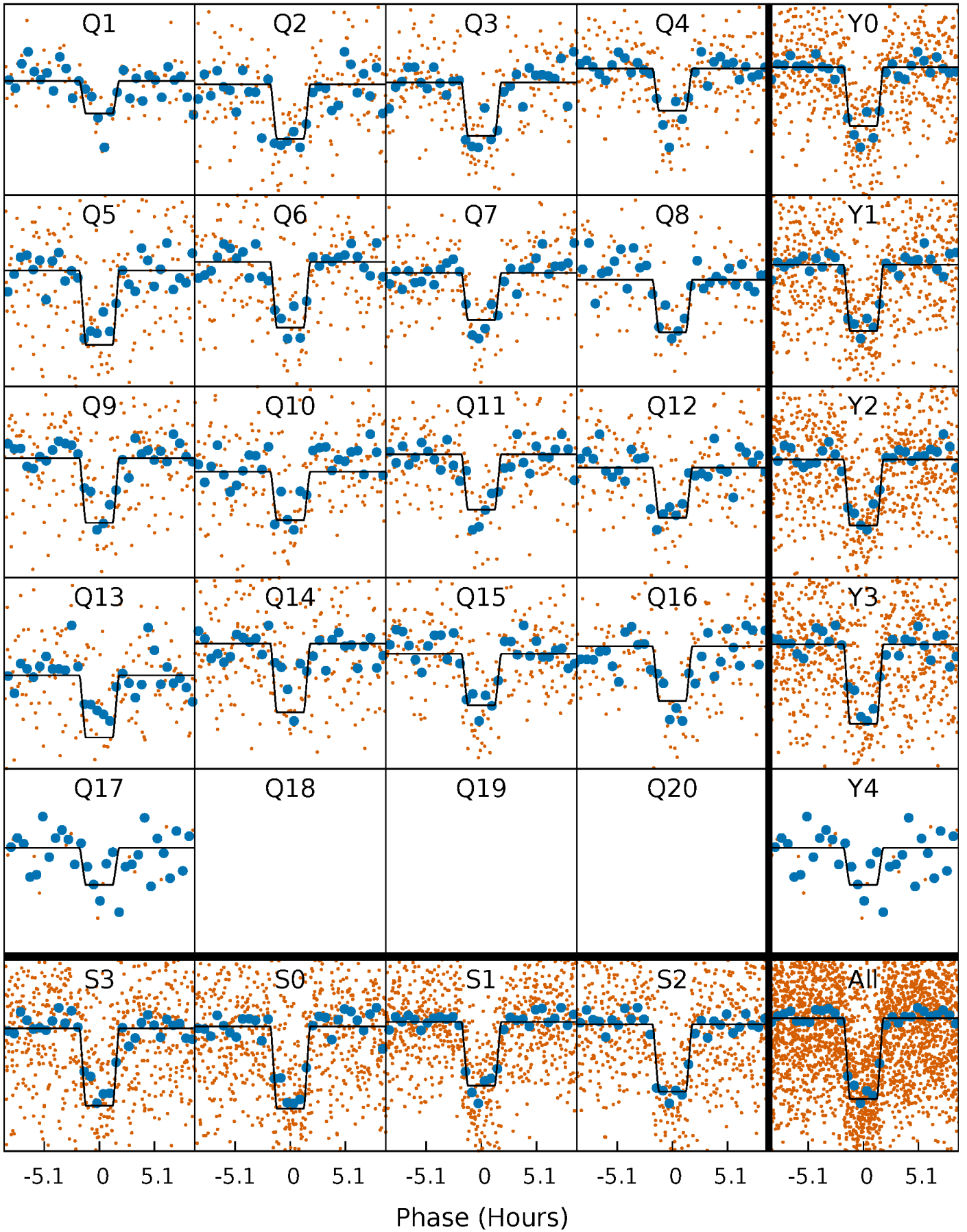
# DV Quarter-Phased Transit Curves

TCE 008962094-03   P= 14.667242 Days    $T_0=145.420159$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

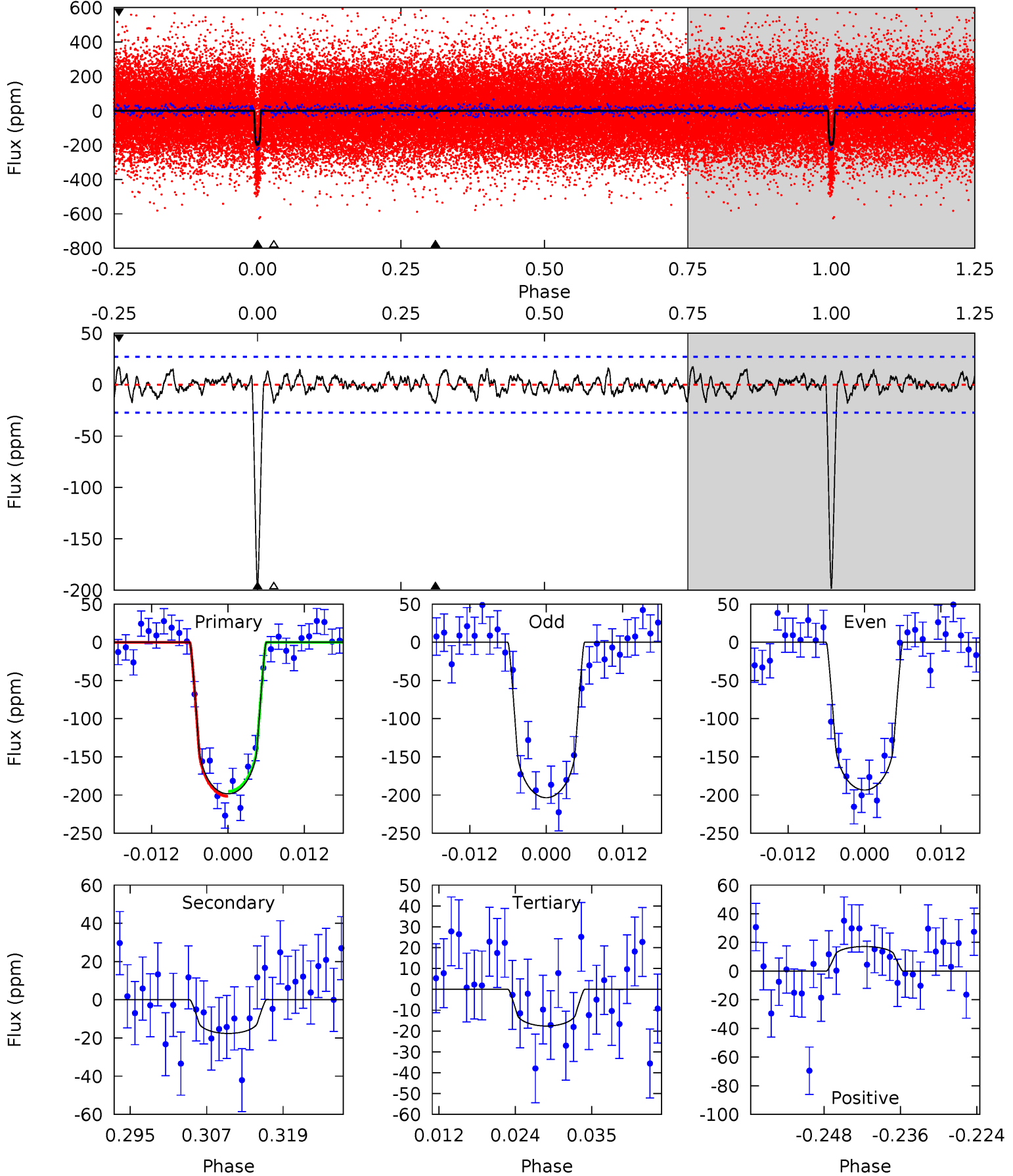
TCE 008962094-03 P= 14.667215 Days  $T_0=145.421226$  (BKJD)



# DV Model-Shift Uniqueness Test

008962094-03, P = 14.667242 Days, E = 130.752917 Days

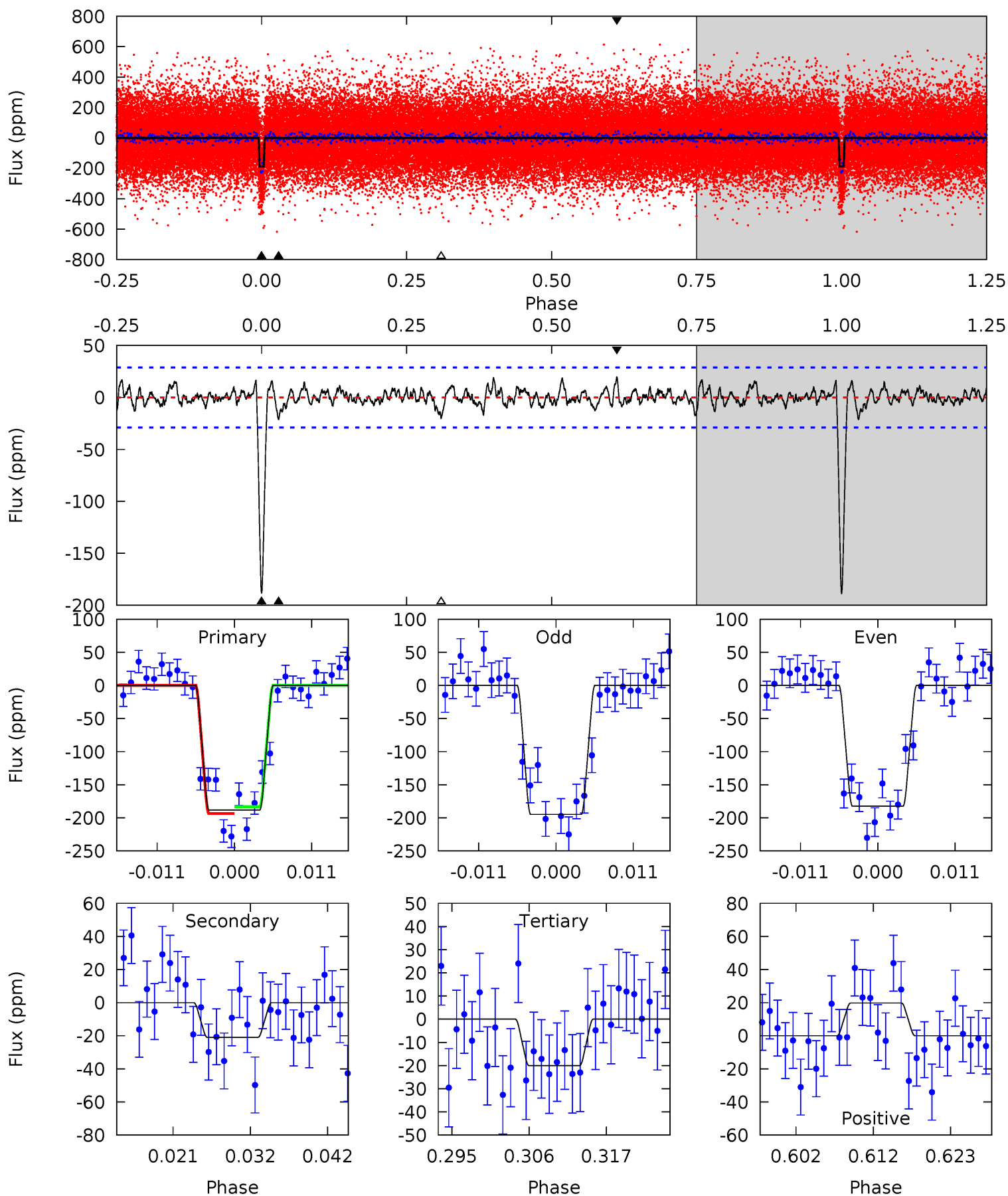
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
36.5	3.24	3.24	3.15	4.99	2.52	1.12	33.2	33.3	0.01	0.09	0.92	0.97	0.08	0.58



# Alt Model-Shift Uniqueness Test

008962094-03, P = 14.667215 Days, E = 130.754011 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
32.7	3.63	3.47	3.44	5.02	2.56	1.07	29.2	29.3	0.16	0.20	1.09	0.98	0.10	0.88



### Stellar Parameters For KIC 008962094

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5677^{+113}_{-113}$	$4.563^{+0.018}_{-0.108}$	$-0.180^{+0.150}_{-0.150}$	$0.828^{+0.104}_{-0.037}$	$0.920^{+0.044}_{-0.076}$	$2.281^{+0.221}_{-0.707}$
	+2%/-2%	+0%/-2%	+83%/-83%	+13%/-4%	+5%/-8%	+10%/-31%
Source	SPE59	SPE59	SPE59	DSEP		

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

### Secondary Eclipse Parameters for KIC 008962094-03 / KOI 0700.03

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-18 \pm 5$	$1.29^{+0.47}_{-0.44}$	$957^{+35}_{-25}$	$3531^{+608}_{-348}$	$68^{+104}_{-32}$
Alt.	$-21 \pm 6$	$1.33^{+0.49}_{-0.45}$	$957^{+34}_{-26}$	$3629^{+587}_{-391}$	$81^{+111}_{-42}$

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

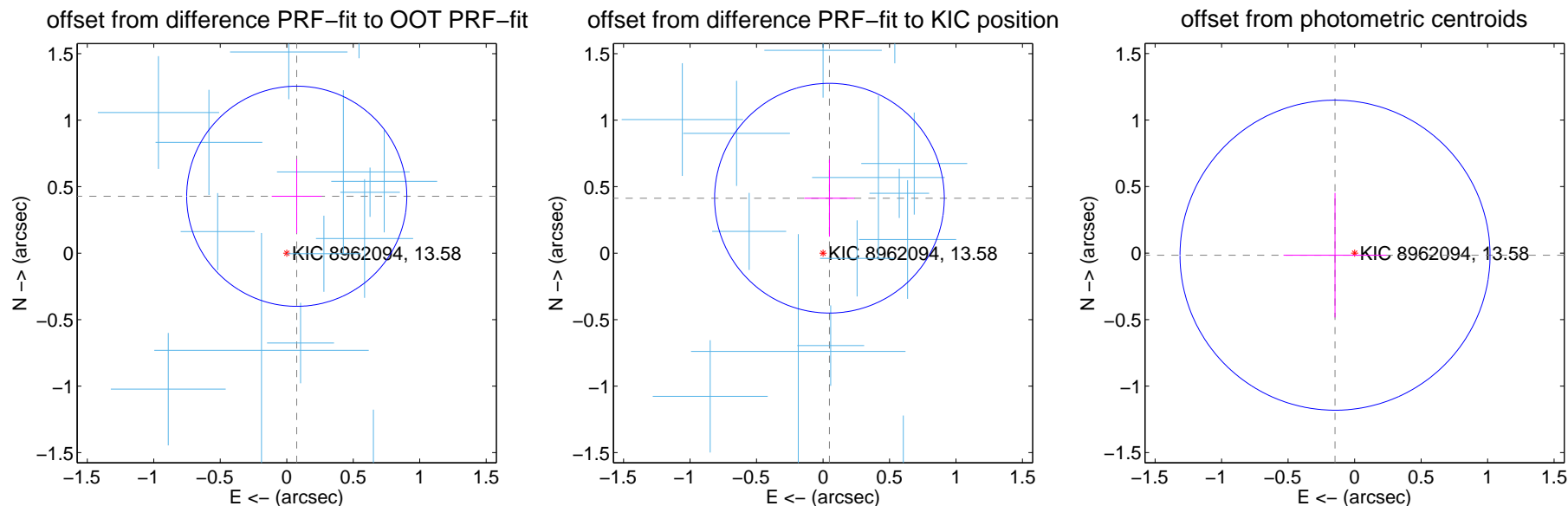
## DV Centroid Data

Supplemental centroid analysis for 008962094-03. Kepler magnitude: 13.58. Transit SNR 28.00

There are 15 quarters with good PRF difference image offsets

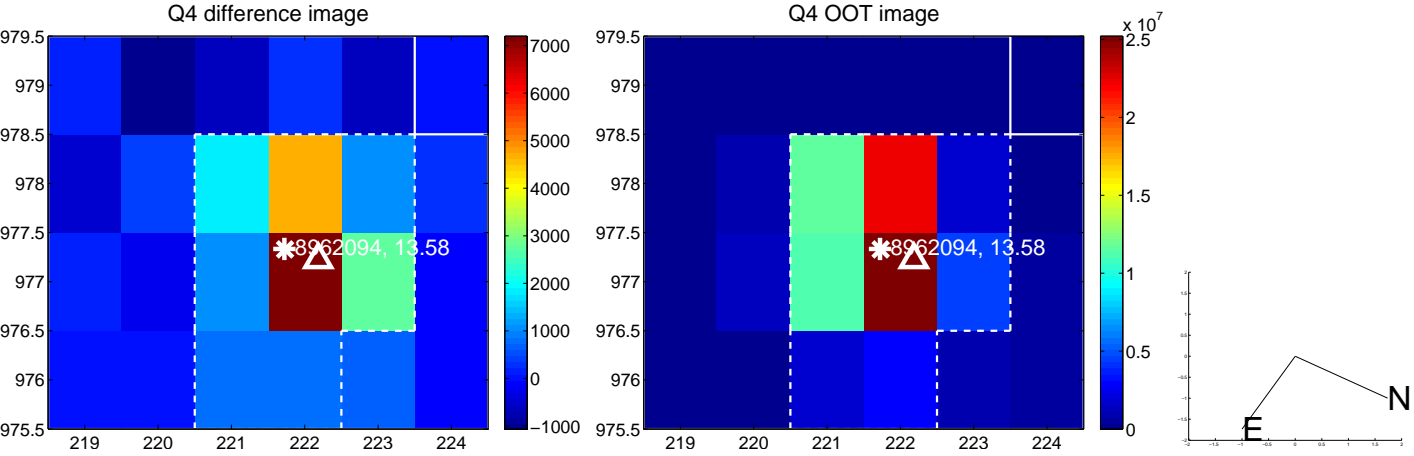
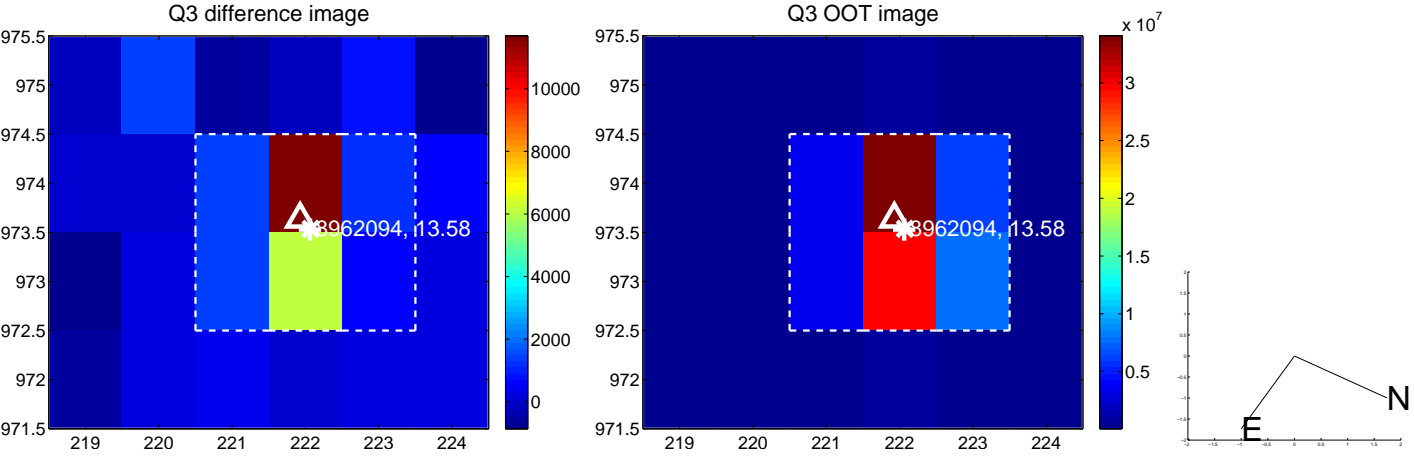
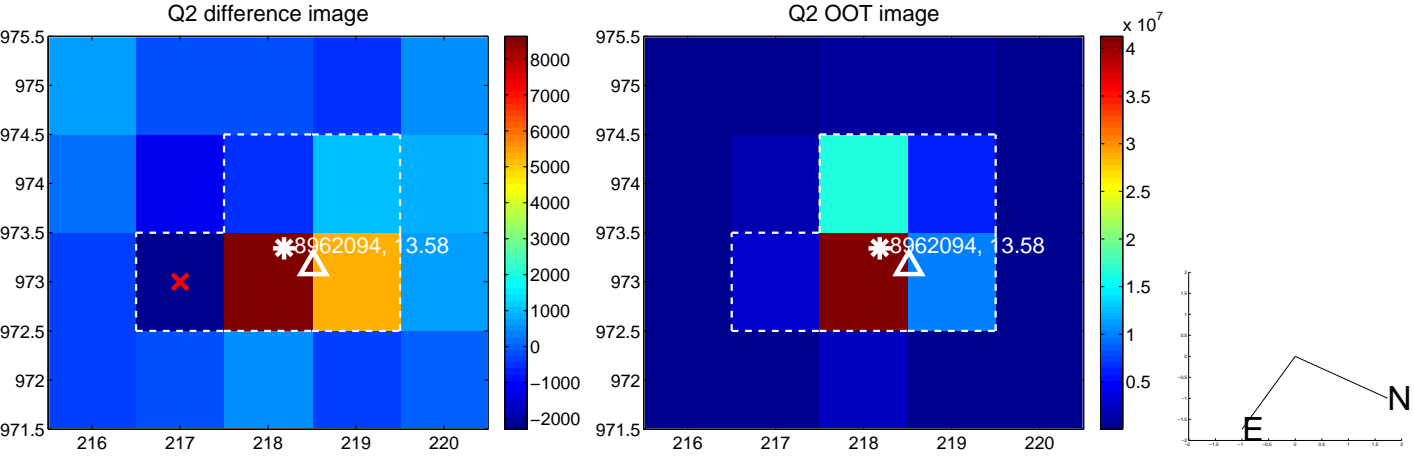
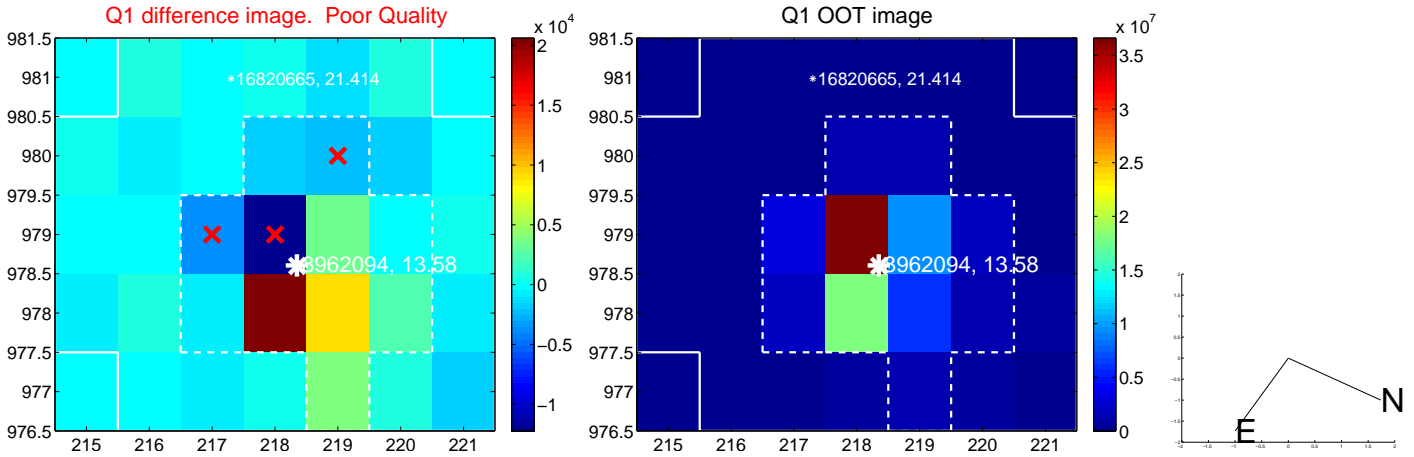
The direct PRF centroid is offset from the target star catalog position by about 0.01 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.435 \pm 0.276$	1.57	$-0.075 \pm 0.188$	$0.428 \pm 0.278$
PRF-fit source offset from KIC position	$0.416 \pm 0.288$	1.45	$-0.048 \pm 0.189$	$0.413 \pm 0.289$
photometric centroid source offset	$0.15 \pm 0.39$	0.38	$0.15 \pm 0.39$	$-0.02 \pm 0.47$

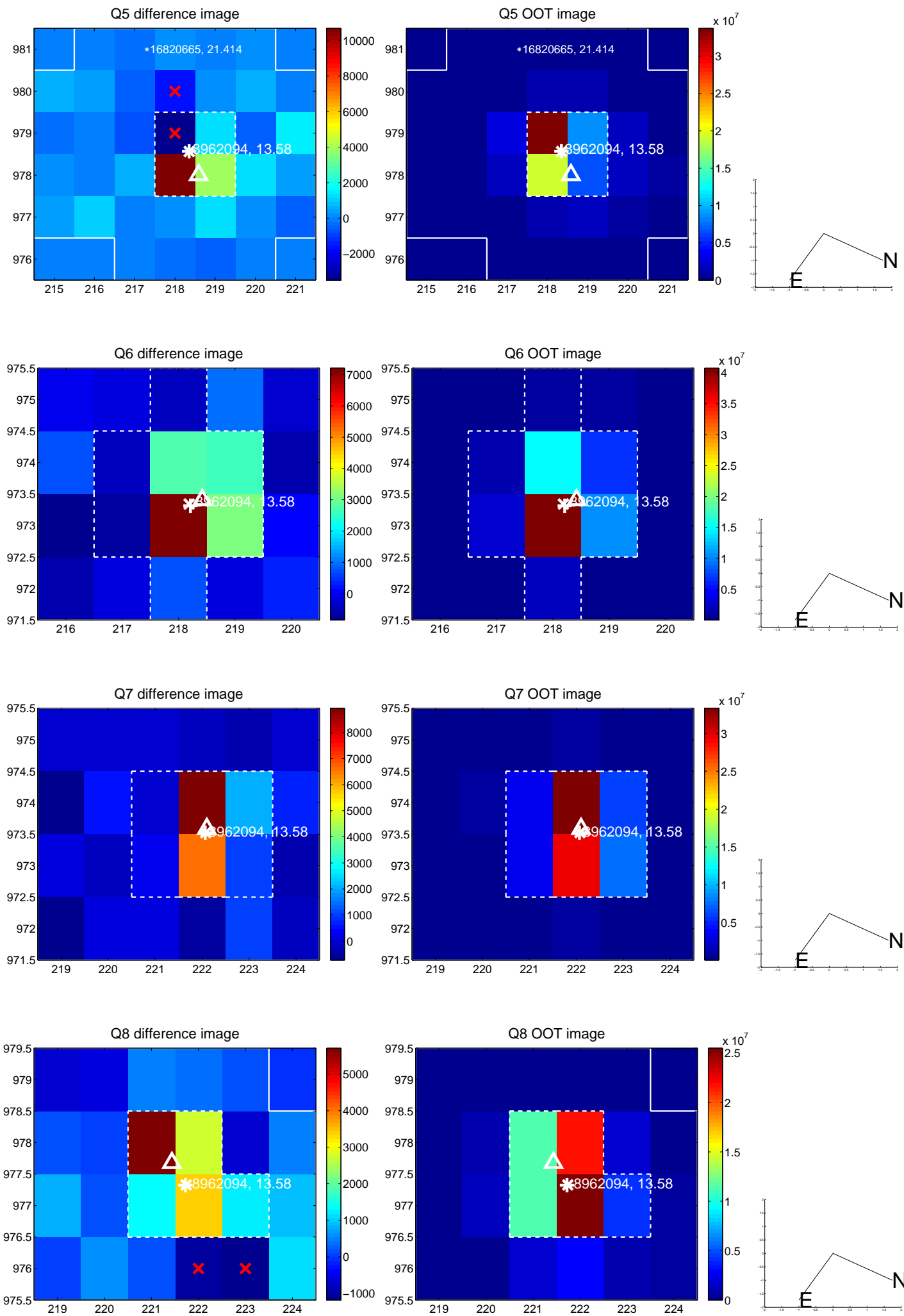


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

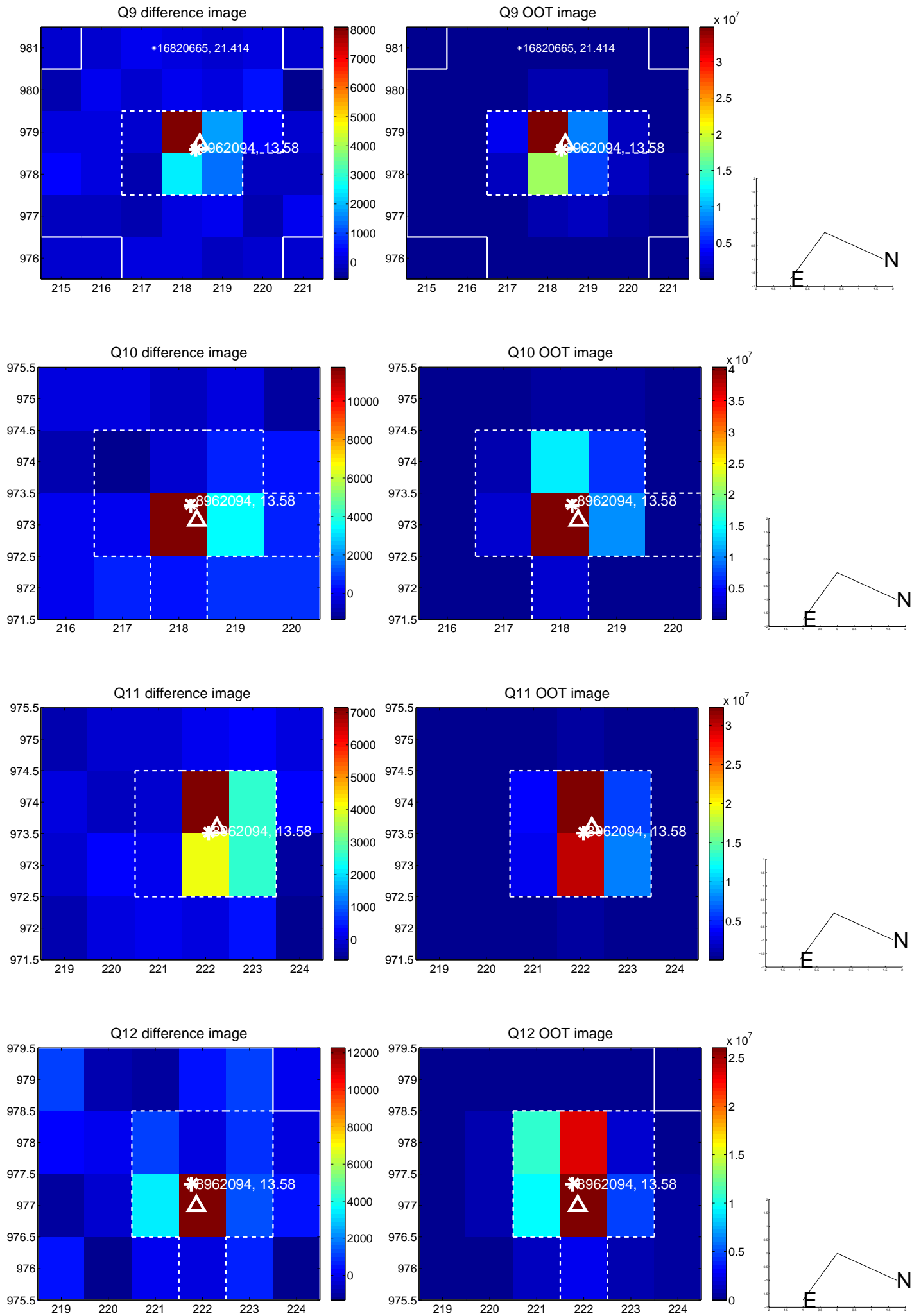
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



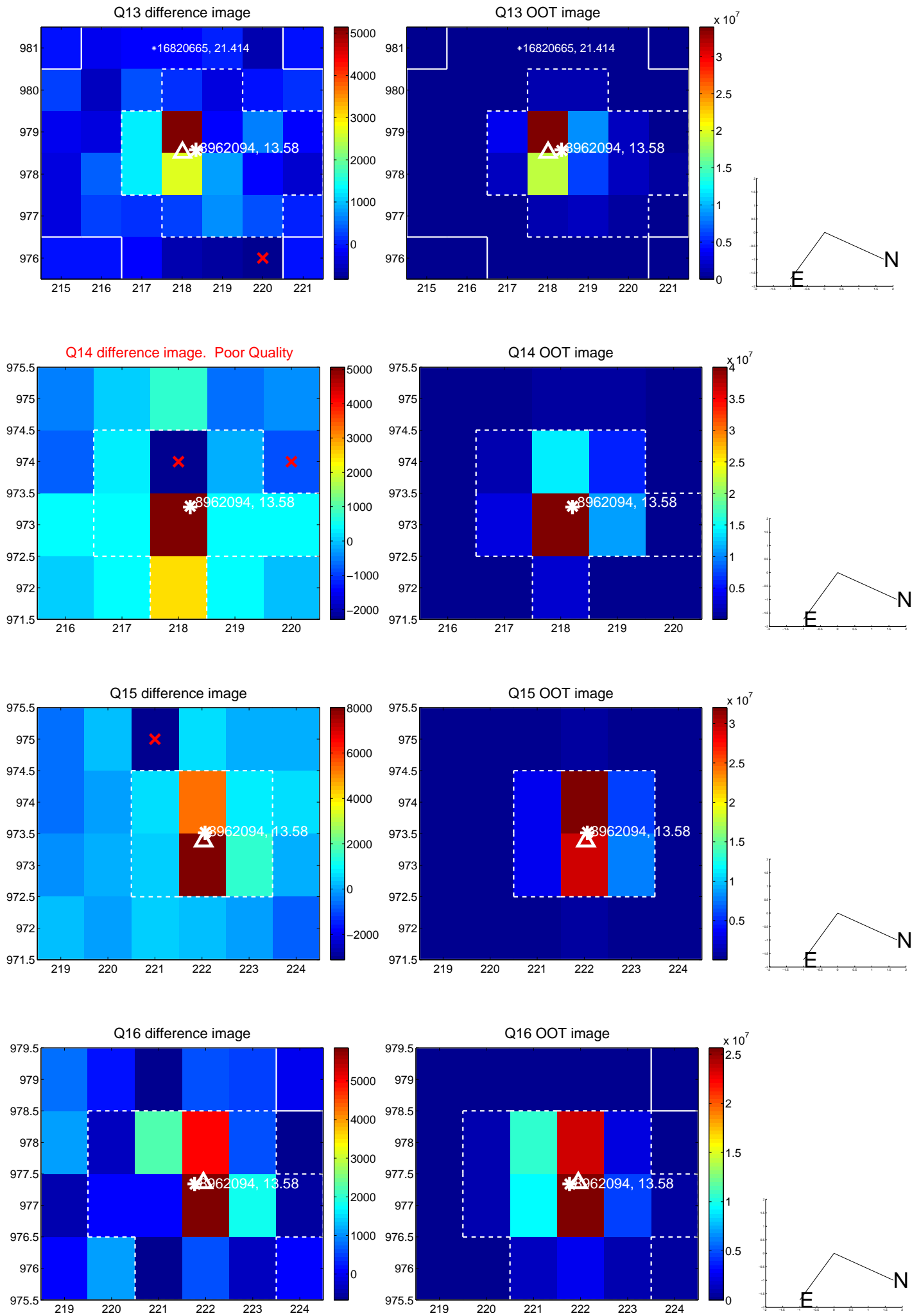
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



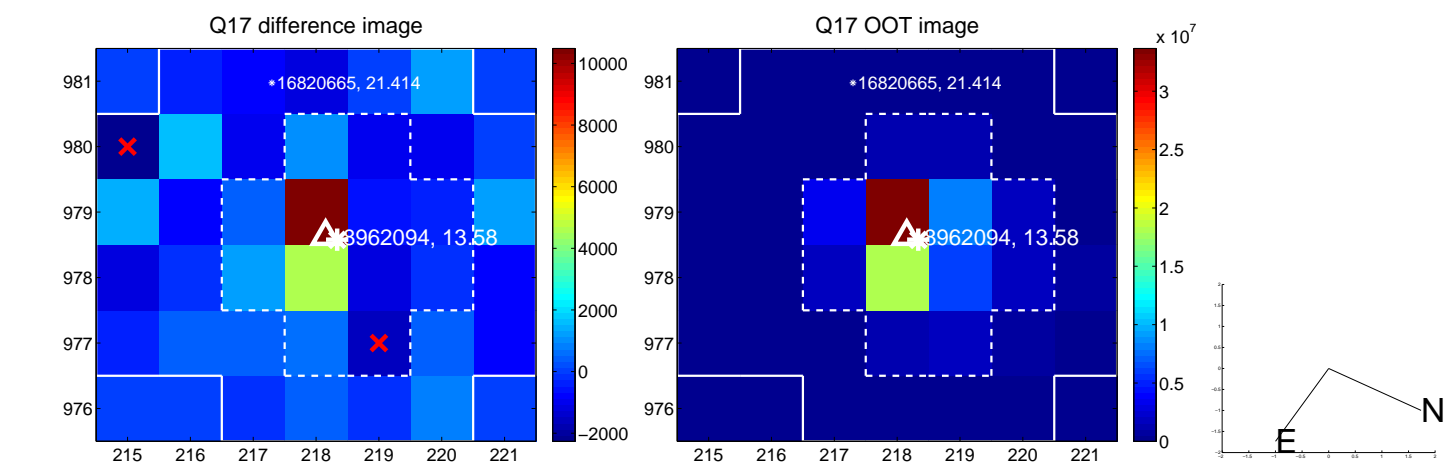
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



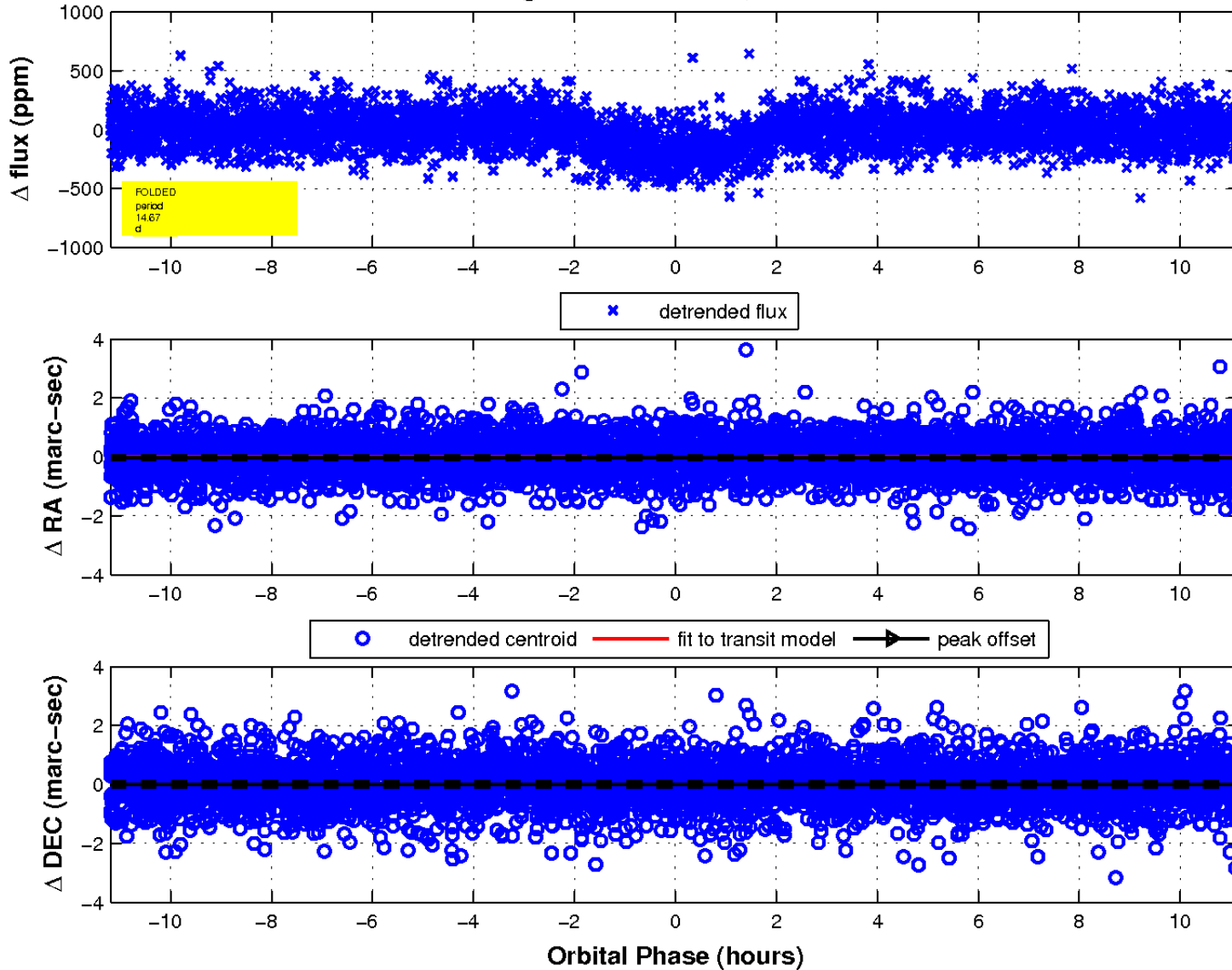
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

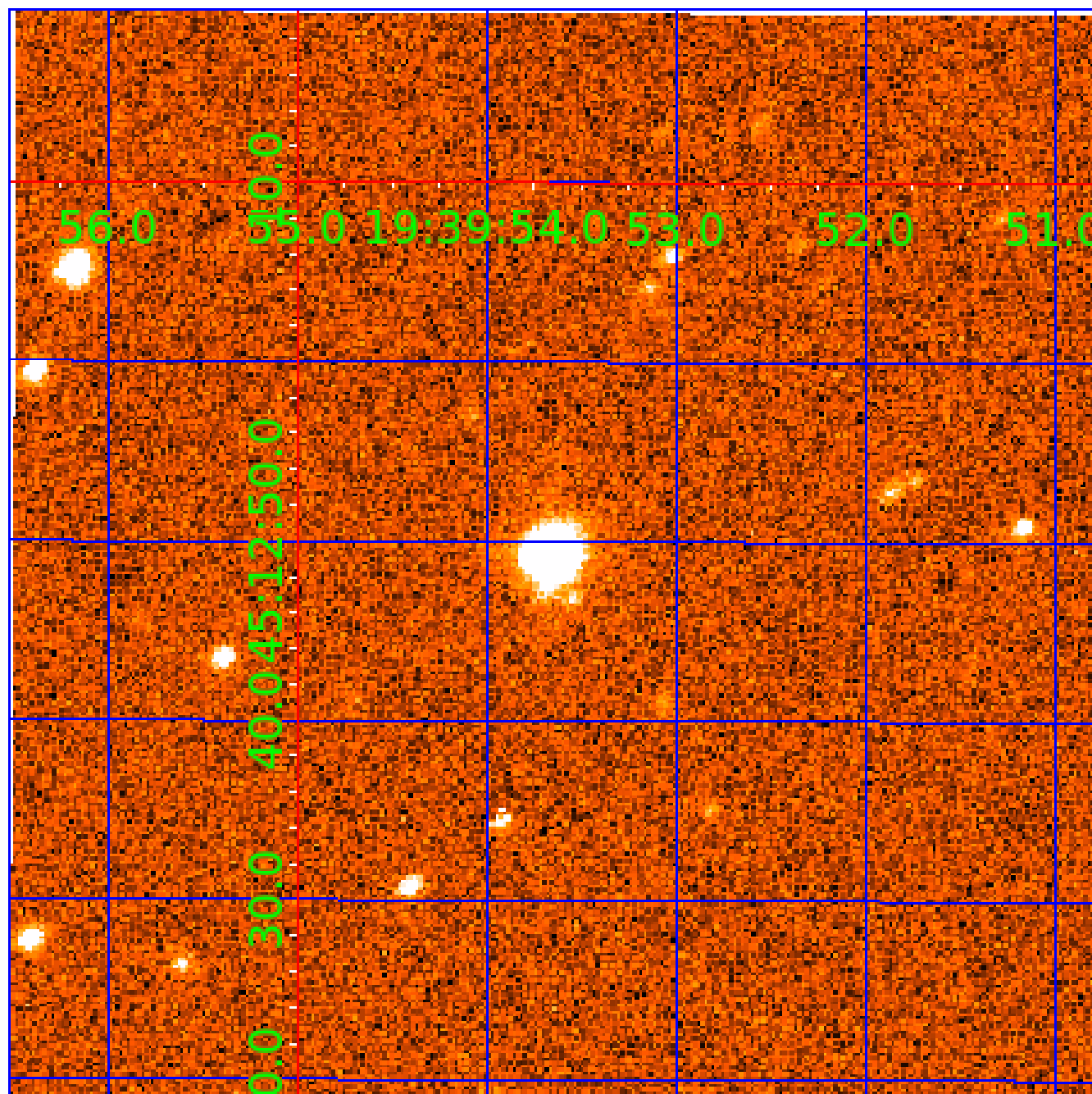


fluxWeightedCentroids, Planet 3 of 4



UKIRT Image

Declination



# KIC 008962094

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008962094-01	OBS	0700.01	30.864324	142.072017	552.2	3.069	46.5	47.4	0.83	5677	2.33	18.26
008962094-02	OBS	0700.02	9.360603	134.530615	231.8	3.307	33.3	37.3	0.83	5677	1.50	89.60
008962094-03	OBS	0700.03	14.667242	145.420159	197.3	3.730	25.7	28.0	0.83	5677	1.26	49.23
008962094-04	OBS	0700.04	68.161354	187.030785	288.0	5.744	17.7	19.4	0.83	5677	1.51	6.35

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008962094-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
008962094-02	OBS	PC	1.00	0	0	0	0	NO_COMMENT
008962094-03	OBS	PC	1.00	0	0	0	0	NO_COMMENT
008962094-04	OBS	PC	0.98	0	0	0	0	NO_COMMENT

**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.

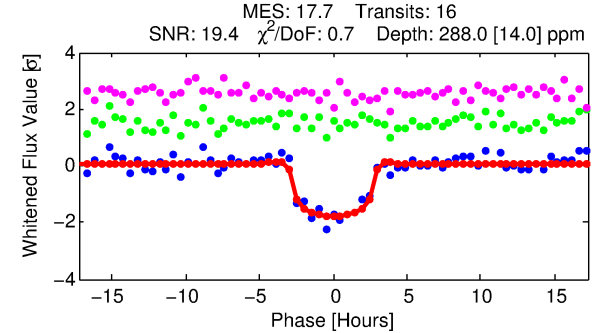
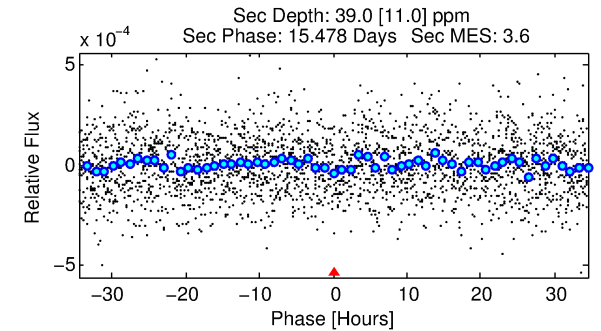
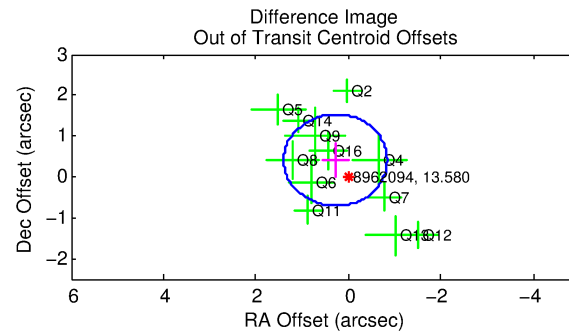
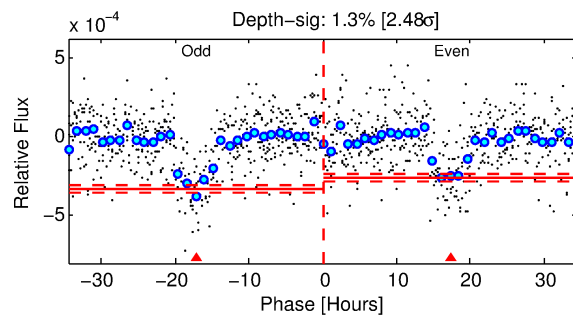
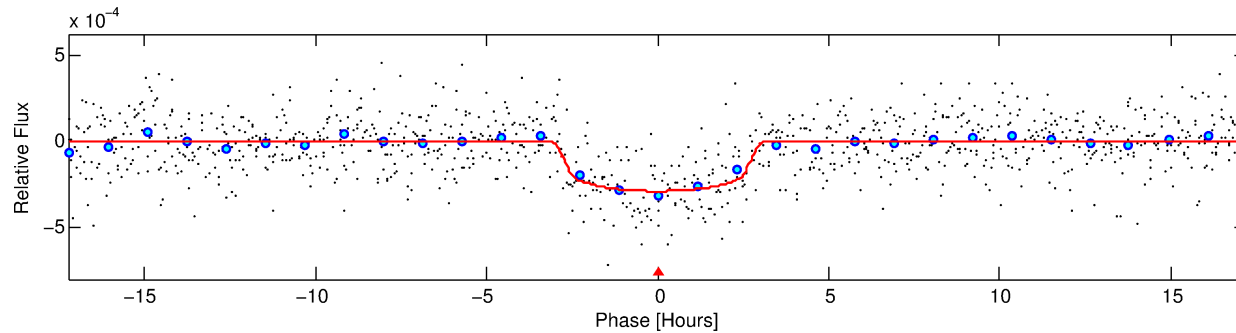
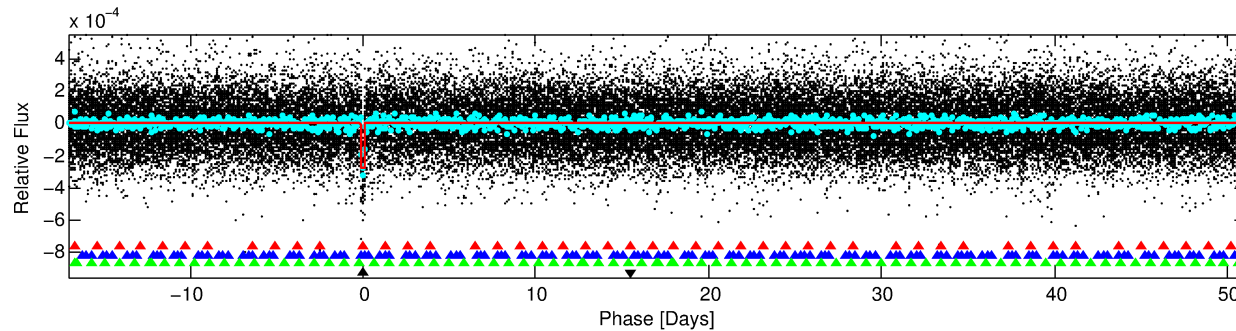
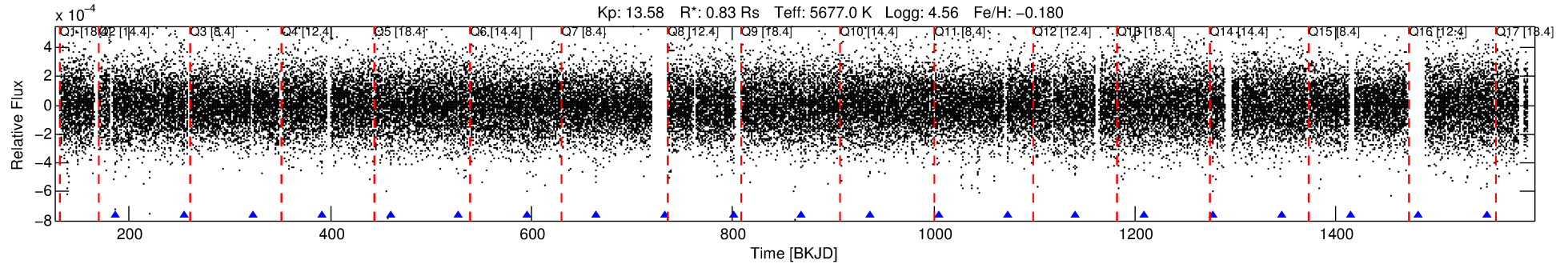
Ephemeris Match Information For 008962094-04

No Significant Match Found

# DV One-Page Summary

KIC: 8962094 Candidate: 4 of 4 Period: 68.161 d  
KOI: K00700.04 Name: Kepler-215e Corr: 0.996

Kp: 13.58 R\*: 0.83 Rs Teff: 5677.0 K Logg: 4.56 Fe/H: -0.180



## DV Fit Results:

Period = 68.16135 [0.00050] d  
Epoch = 187.0308 [0.0054] BKJD  
Rp/R\* = 0.0167 [0.0080]  
a/R\* = 65.71 [139.41]  
b = 0.71 [1.48]  
Seff = 6.35 [1.28]  
Teq = 405 [20] K  
Rp = 1.51 [0.75] Re  
a = 0.3170 [0.0374] AU  
Ag = 950.83 [969.79] [0.98σ]  
Teffp = 3475 [874] K [3.51σ]

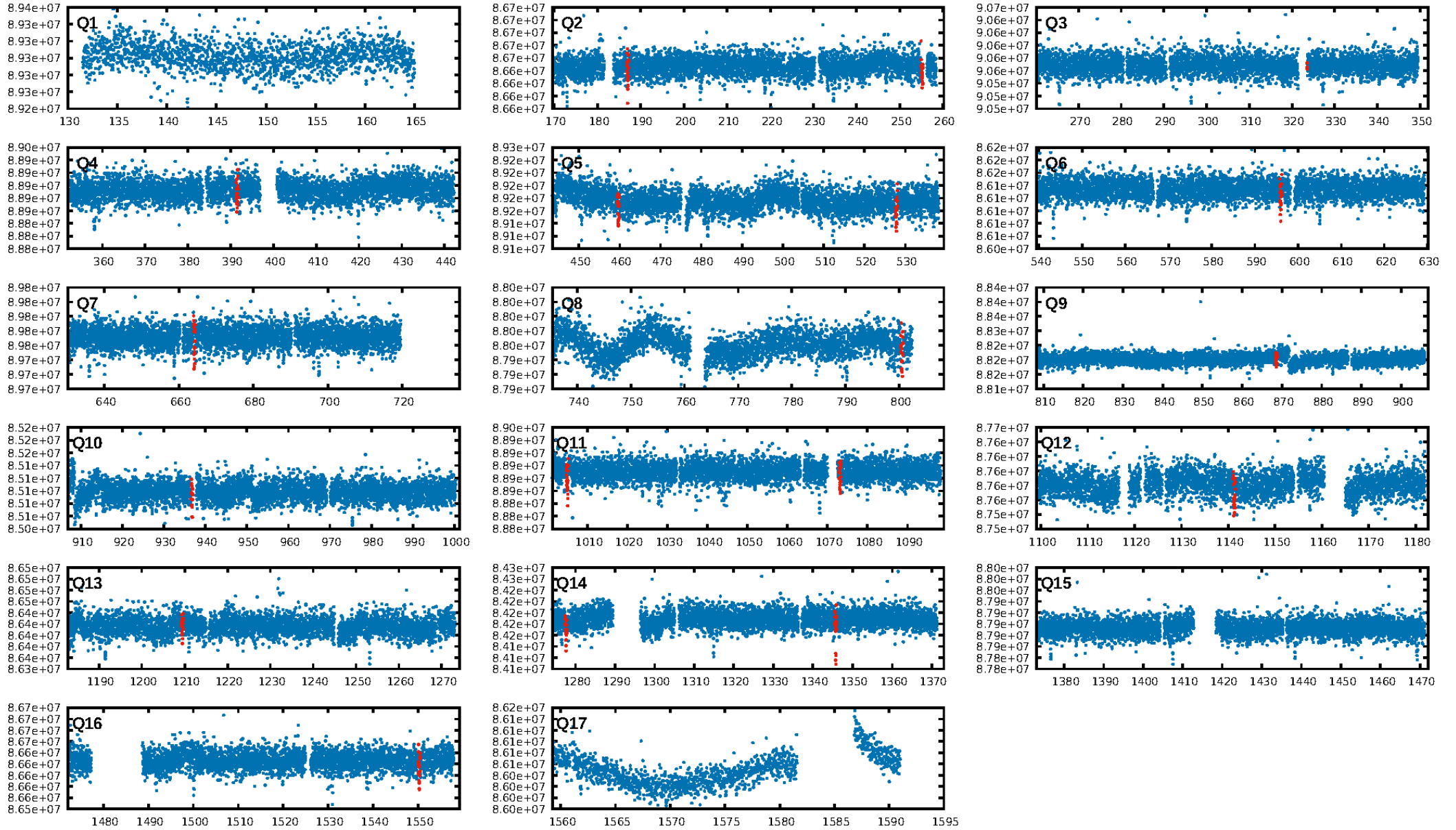
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [137.44σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 77.3%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 2.01e-64  
RollingBand-fgt: 1.00 [16/16]  
GhostDiagnostic-chr: 5.667  
Centroid-sig: 31.1%  
Centroid-so: 0.637 arcsec [1.29σ]  
OotOffset-rm: 0.497 arcsec [1.33σ]  
KicOffset-rm: 0.505 arcsec [1.29σ]  
OotOffset-st: 3/2/4/3 [12]  
KicOffset-st: 3/2/4/3 [12]  
DiffImageQuality-fgm: 1.00 [12/12]  
DiffImageOverlap-fno: 0.92 [11/12]

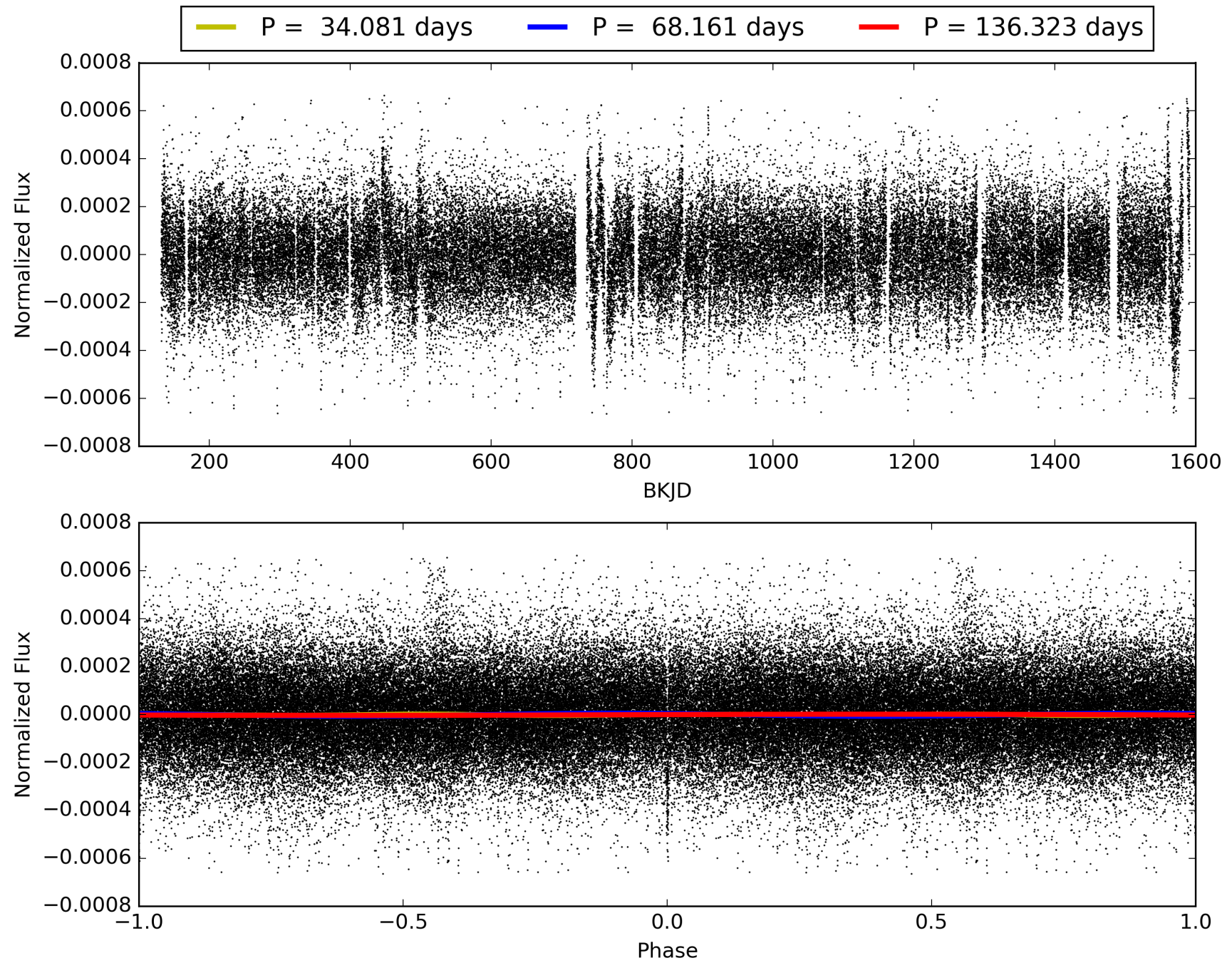
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 13:38:44 Z

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

# TCE 008962094-04, PDC Light Curves

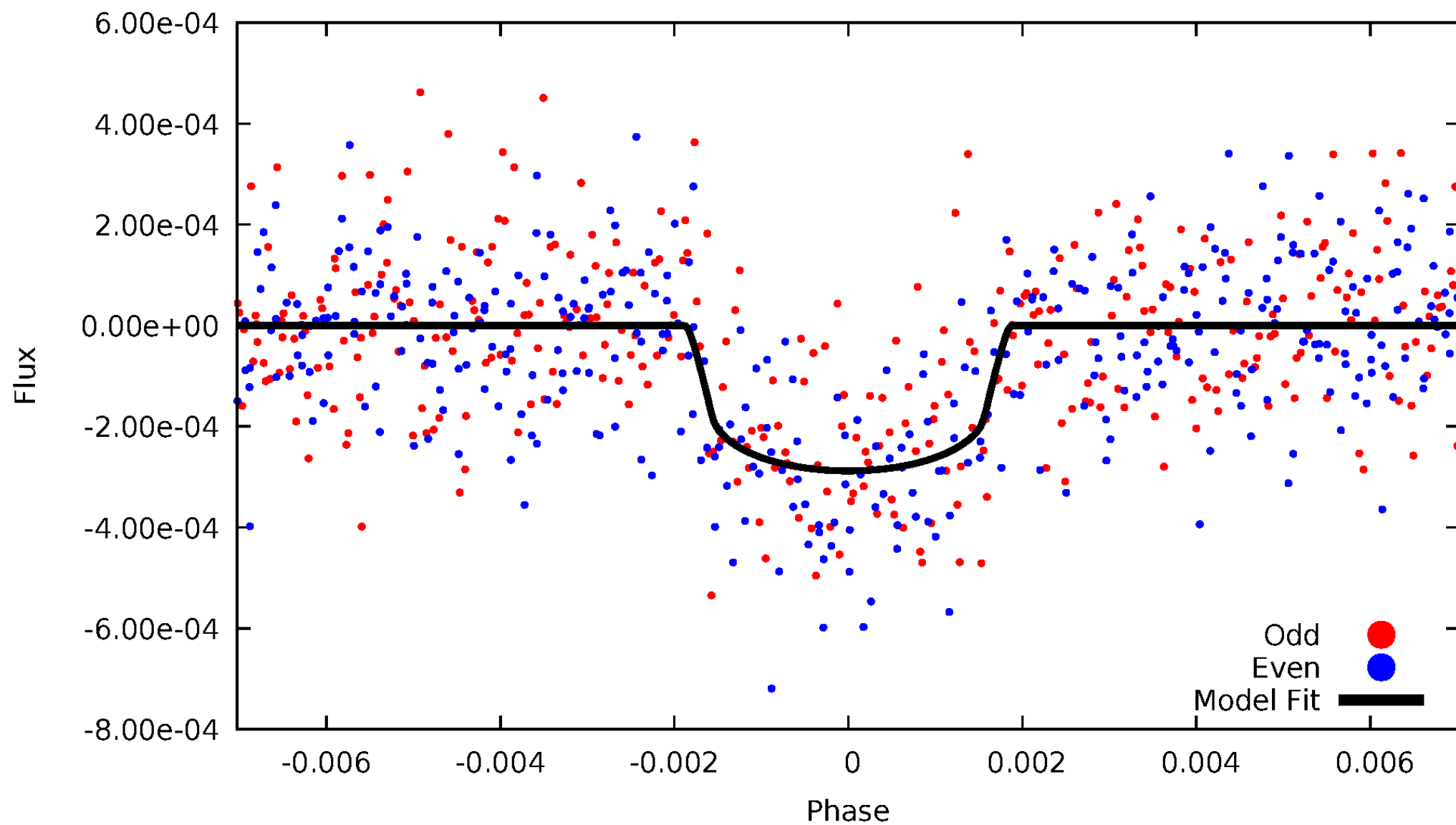


TCE 008962094-04



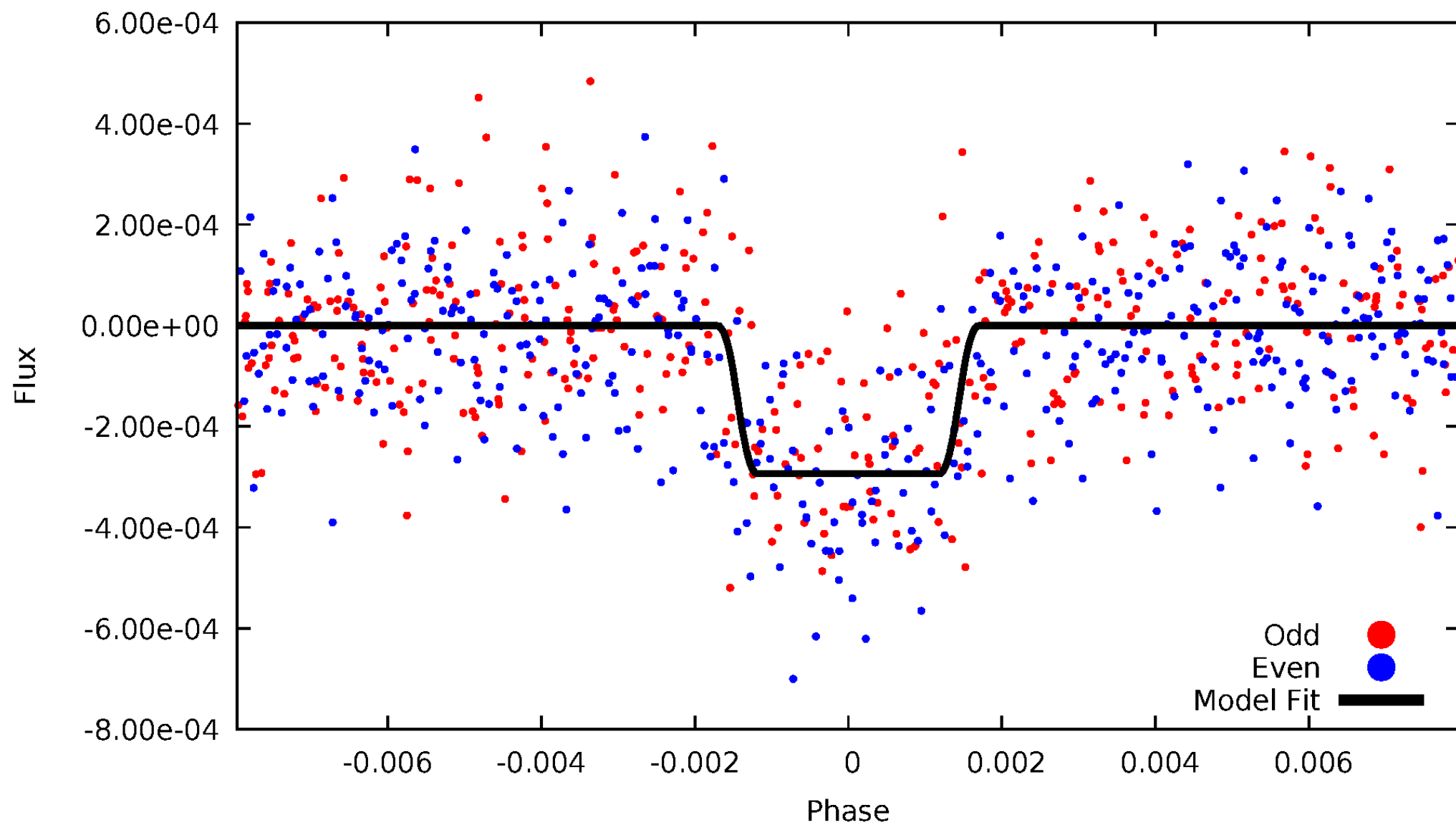
# DV Odd/Even

TCE 008962094-04



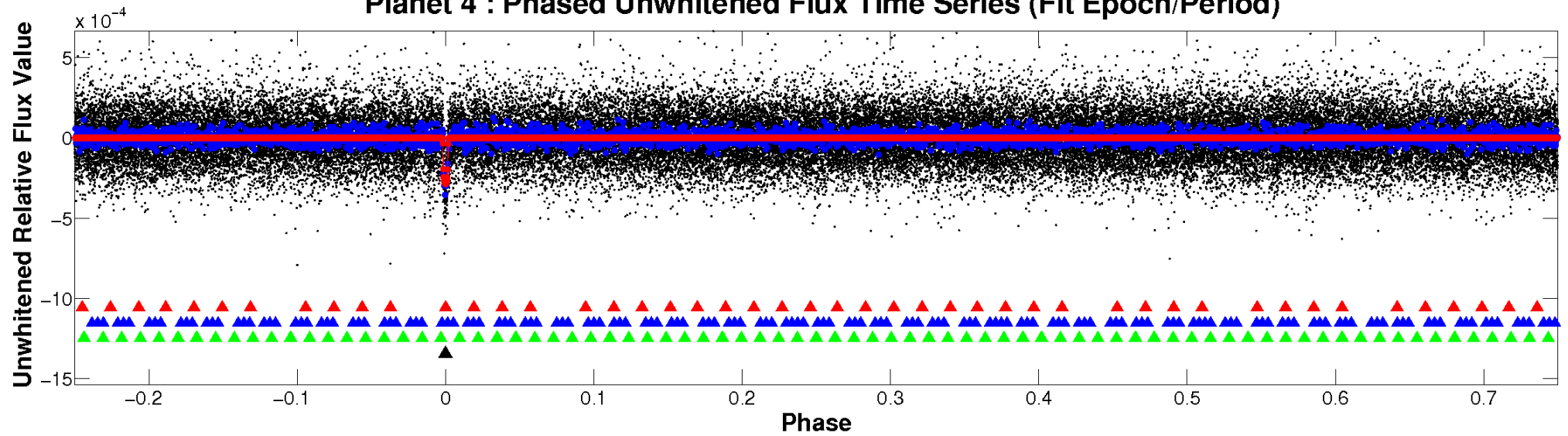
# ALT Odd/Even

TCE 008962094-04

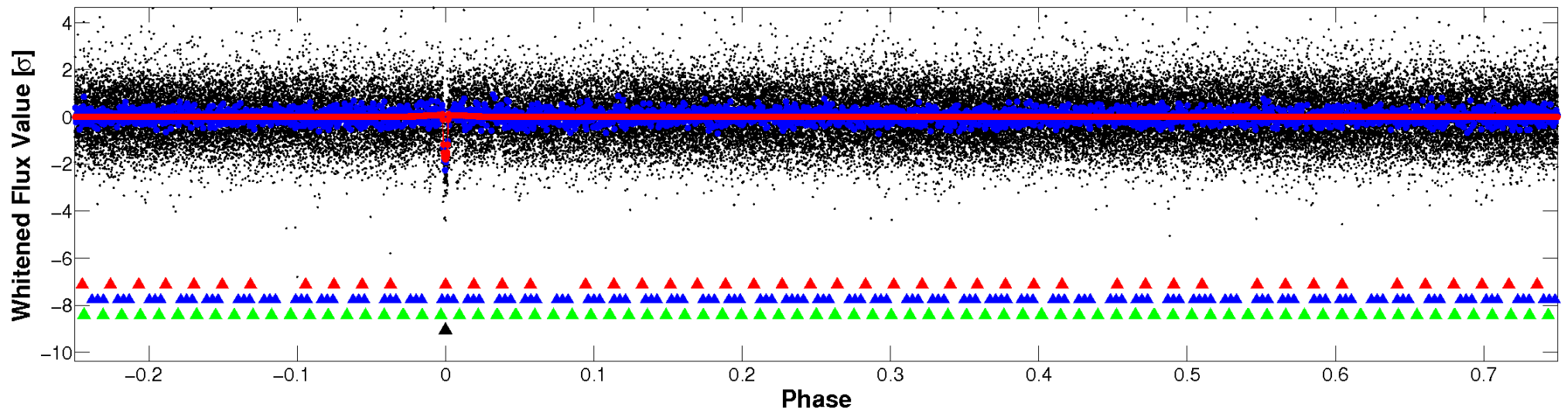


# Non-Whitened Vs. Whitened Light Curve

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

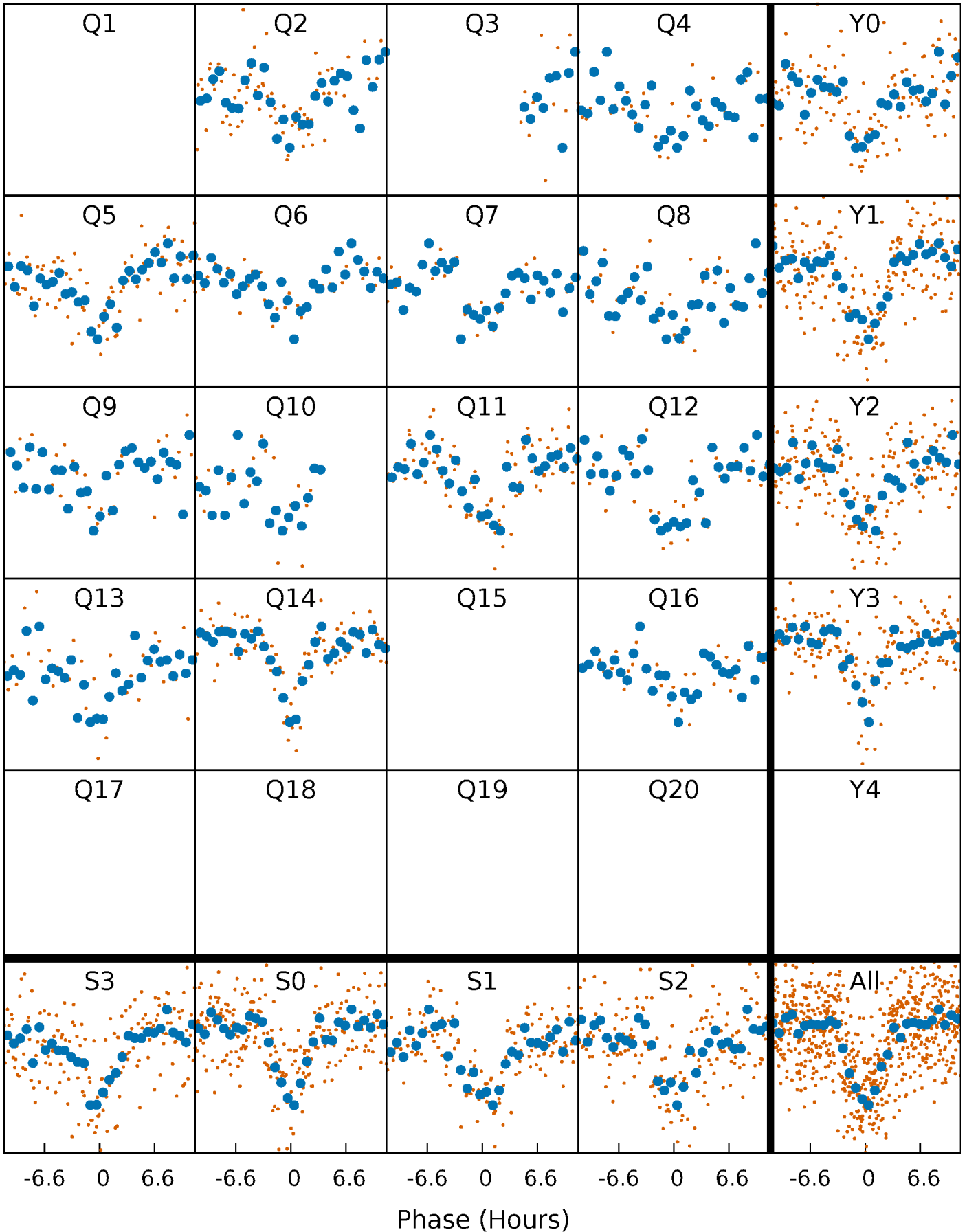


## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



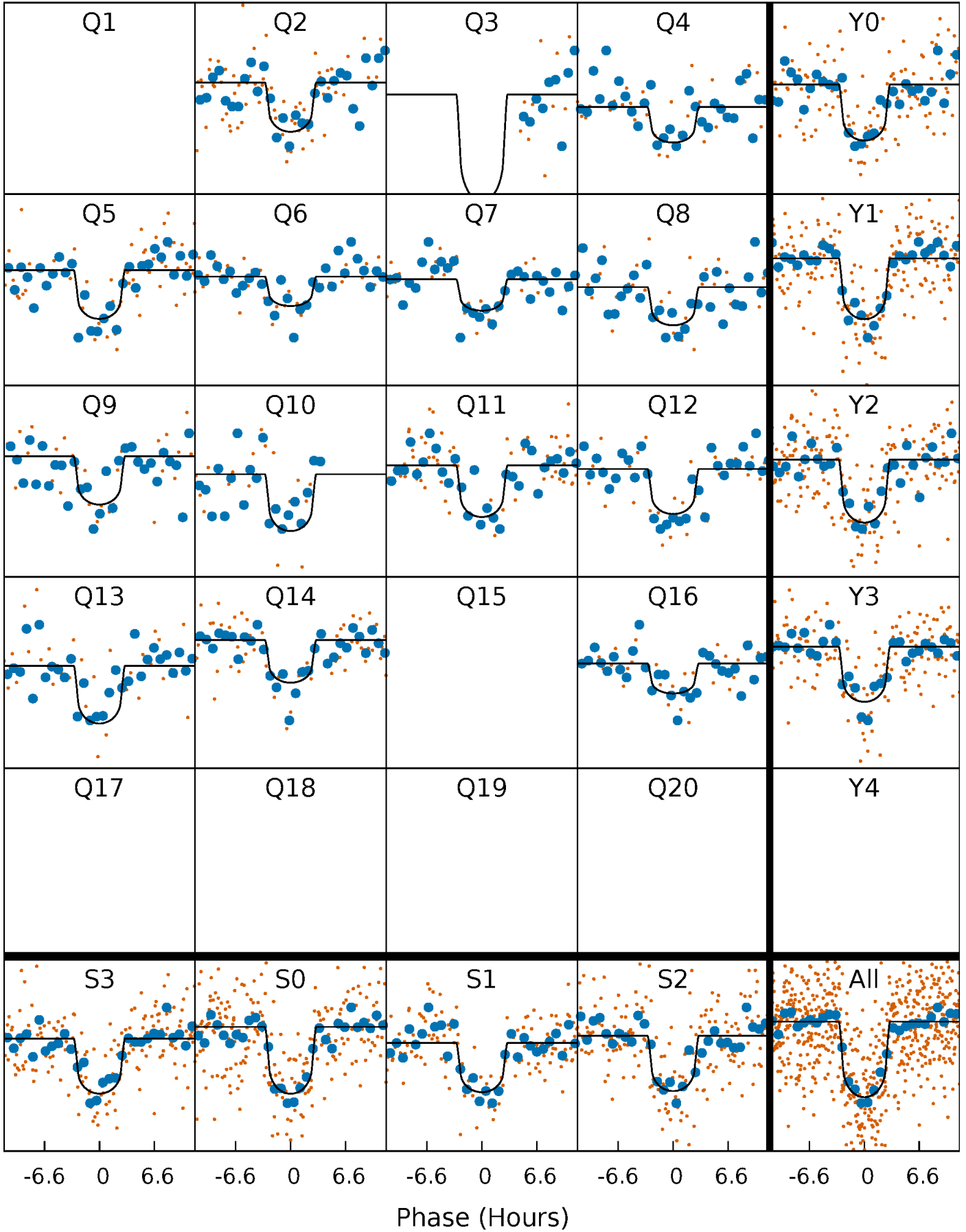
# PDC Quarter-Phased Transit Curves

TCE 008962094-04   P= 68.161354 Days    $T_0=187.030785$  (BKJD)



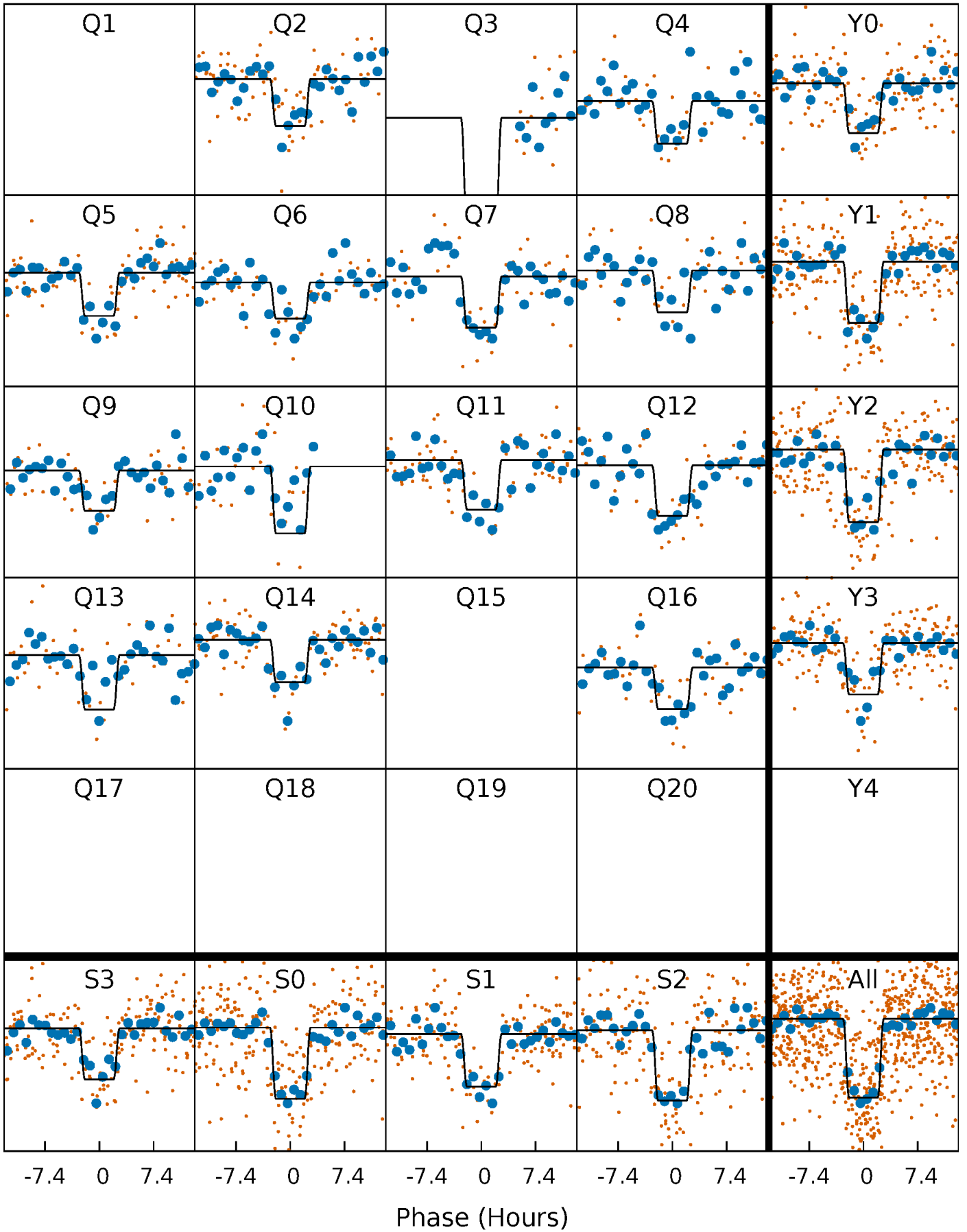
# DV Quarter-Phased Transit Curves

TCE 008962094-04 P= 68.161354 Days  $T_0=187.030785$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

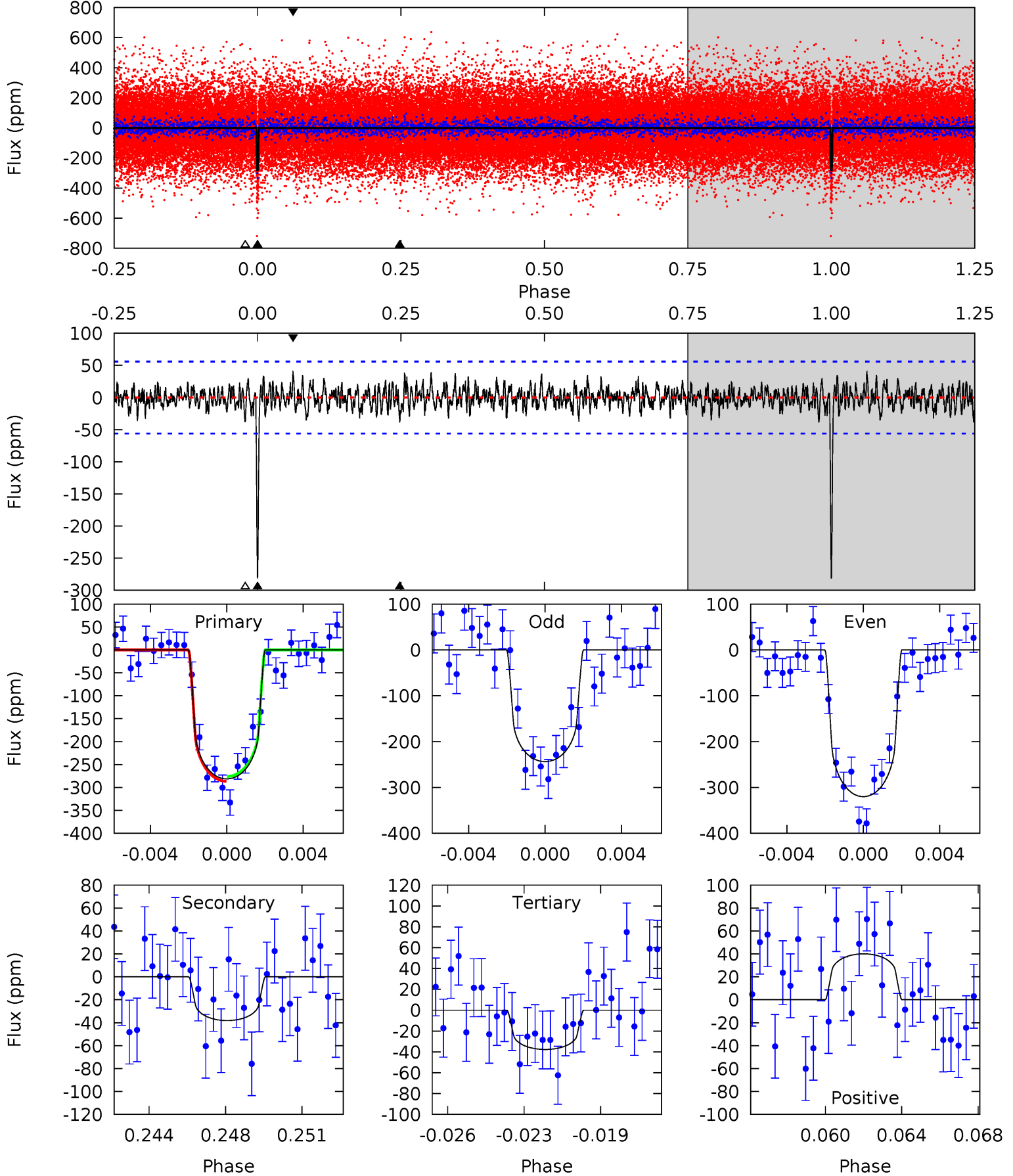
TCE 008962094-04 P= 68.162629 Days  $T_0=187.019622$  (BKJD)



# DV Model-Shift Uniqueness Test

008962094-04, P = 68.161354 Days, E = 118.869431 Days

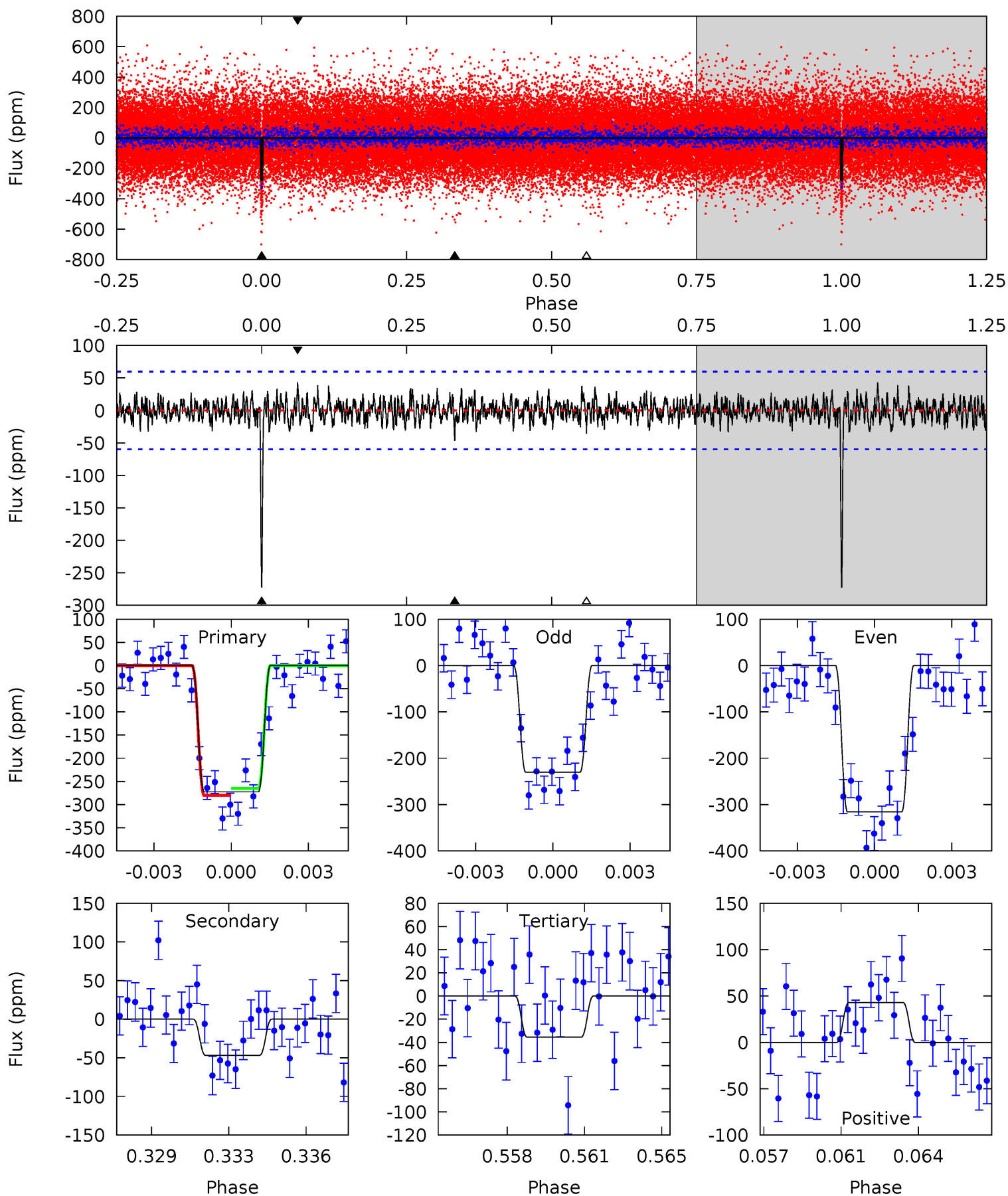
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
26.1	3.54	3.50	3.72	5.21	2.90	1.19	22.6	22.4	0.04	-0.18	3.56	0.94	0.12	0.49



# Alt Model-Shift Uniqueness Test

008962094-04, P = 68.162629 Days, E = 118.856993 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
23.8	4.09	3.10	3.76	5.23	2.93	1.09	20.7	20.1	0.99	0.33	3.75	0.93	0.14	0.65



### Stellar Parameters For KIC 008962094

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5677^{+113}_{-113}$	$4.563^{+0.018}_{-0.108}$	$-0.180^{+0.150}_{-0.150}$	$0.828^{+0.104}_{-0.037}$	$0.920^{+0.044}_{-0.076}$	$2.281^{+0.221}_{-0.707}$
	+2%/-2%	+0%/-2%	+83%/-83%	+13%/-4%	+5%/-8%	+10%/-31%
Source	SPE59	SPE59	SPE59	DSEP		

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

### Secondary Eclipse Parameters for KIC 008962094-04 / KOI 0700.04

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-38 \pm 11$	$1.57^{+0.67}_{-0.69}$	$573^{+22}_{-15}$	$3819^{+928}_{-471}$	$867^{+1930}_{-478}$
Alt.	$-47 \pm 11$	$1.61^{+0.73}_{-0.72}$	$574^{+21}_{-15}$	$3915^{+995}_{-507}$	$989^{+2268}_{-559}$

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

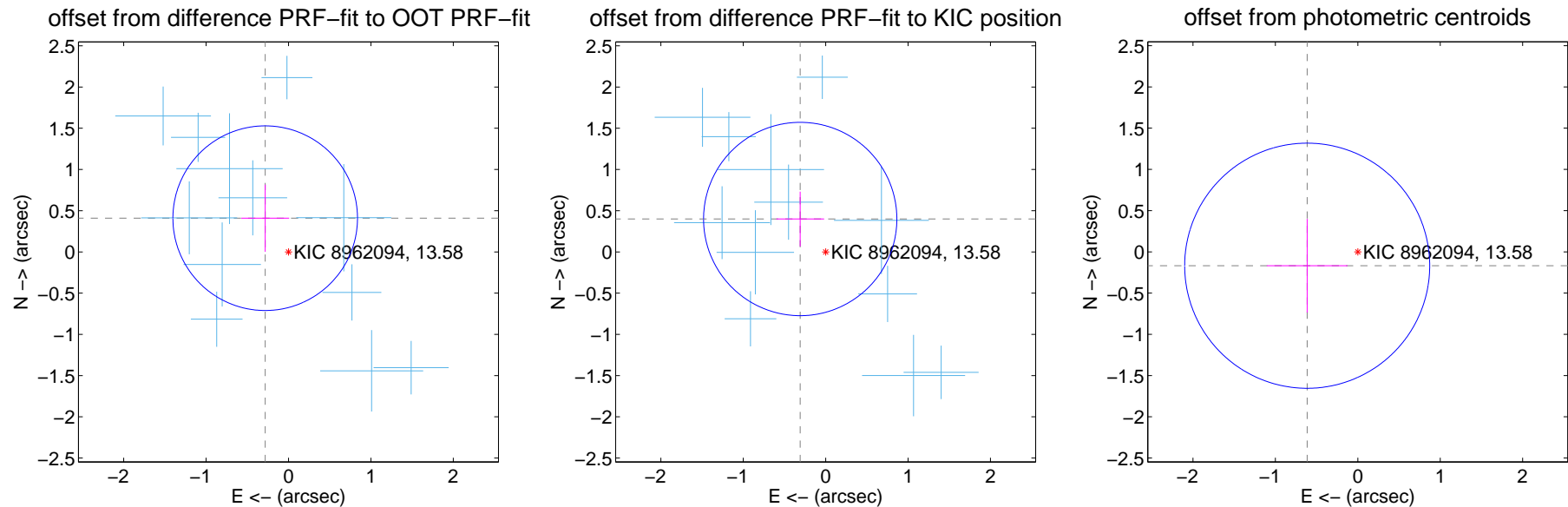
## DV Centroid Data

Supplemental centroid analysis for 008962094-04. Kepler magnitude: 13.58. Transit SNR 19.45

There are 12 quarters with good PRF difference image offsets

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

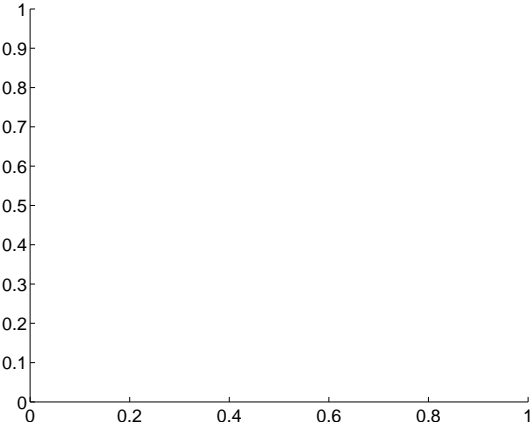
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.497 \pm 0.373$	1.33	$0.283 \pm 0.290$	$0.409 \pm 0.407$
PRF-fit source offset from KIC position	$0.505 \pm 0.391$	1.29	$0.309 \pm 0.290$	$0.399 \pm 0.332$
photometric centroid source offset	$0.64 \pm 0.50$	1.29	$0.61 \pm 0.49$	$-0.17 \pm 0.57$



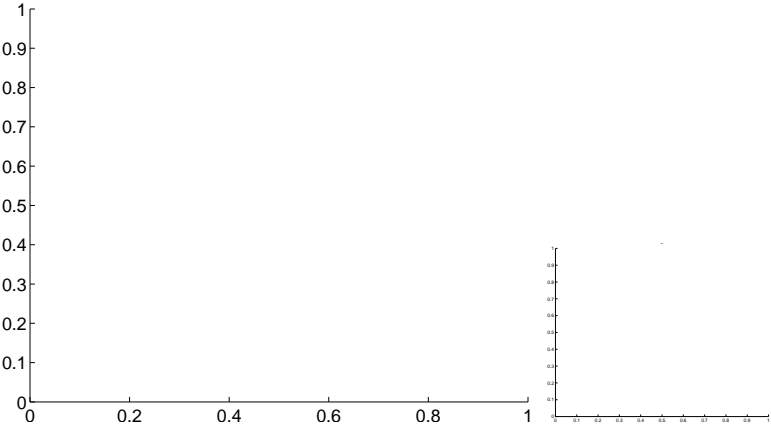
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

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

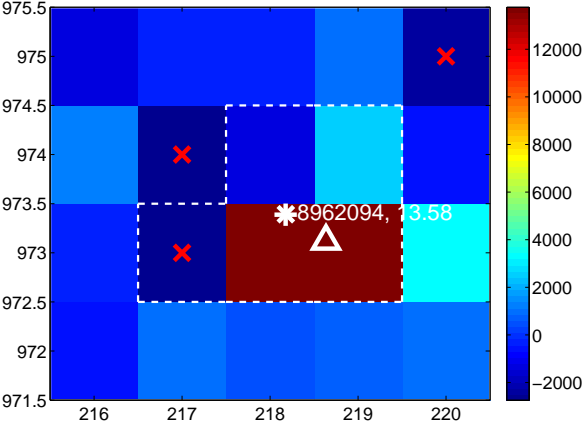
Q1 no difference image



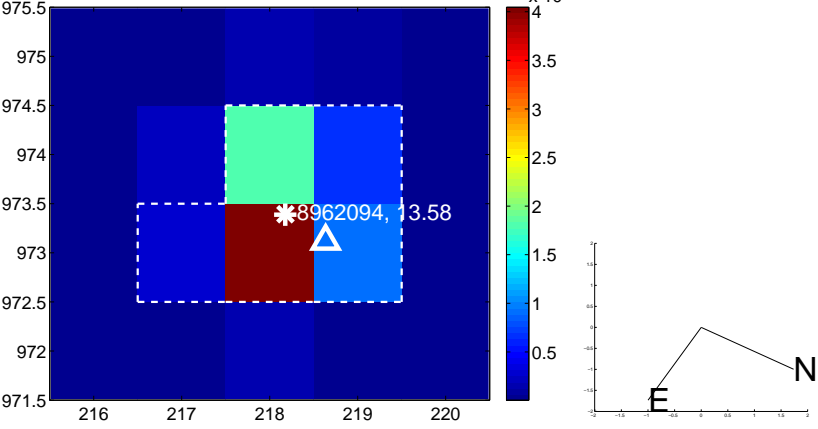
Q1 no OOT image



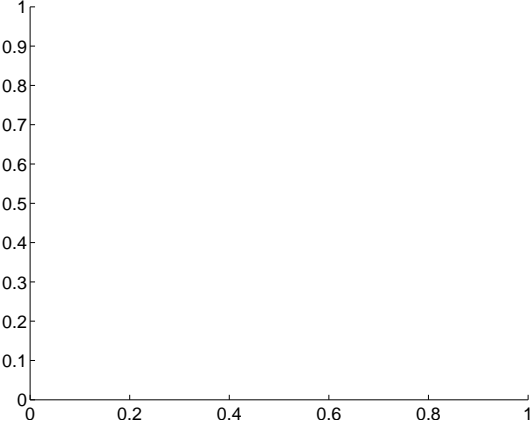
Q2 difference image



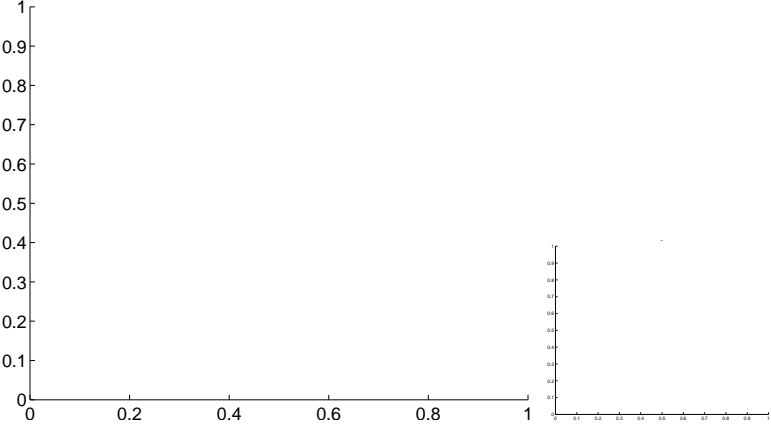
Q2 OOT image



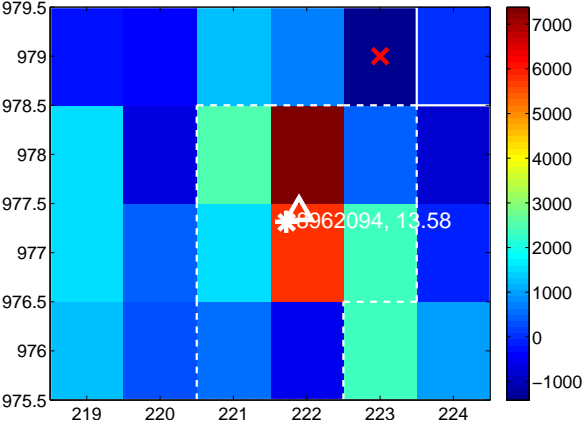
Q3 no difference image



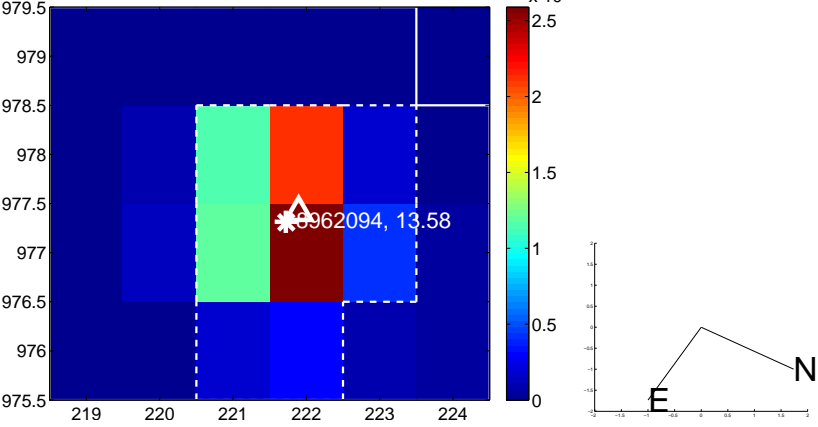
Q3 no OOT image



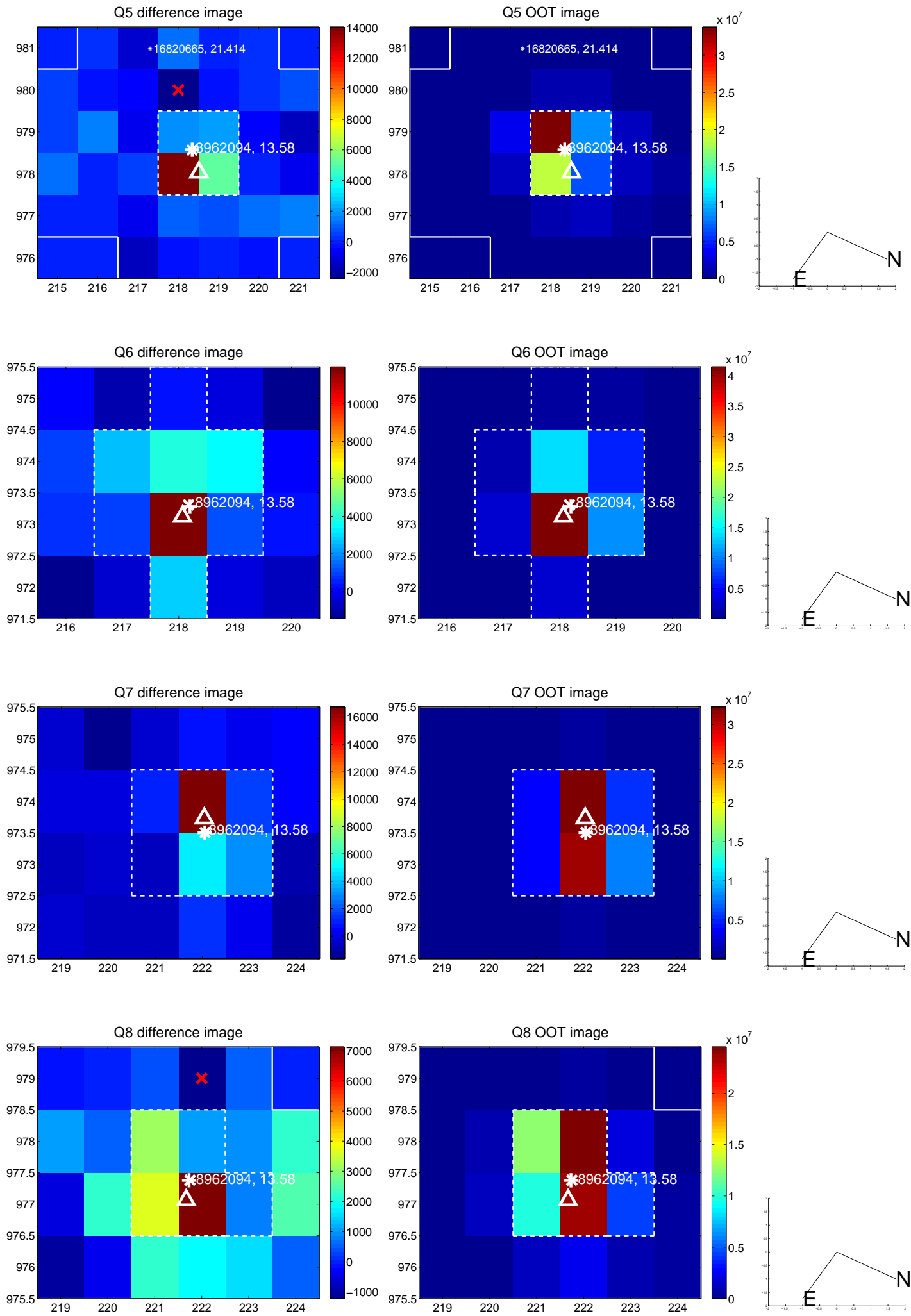
Q4 difference image



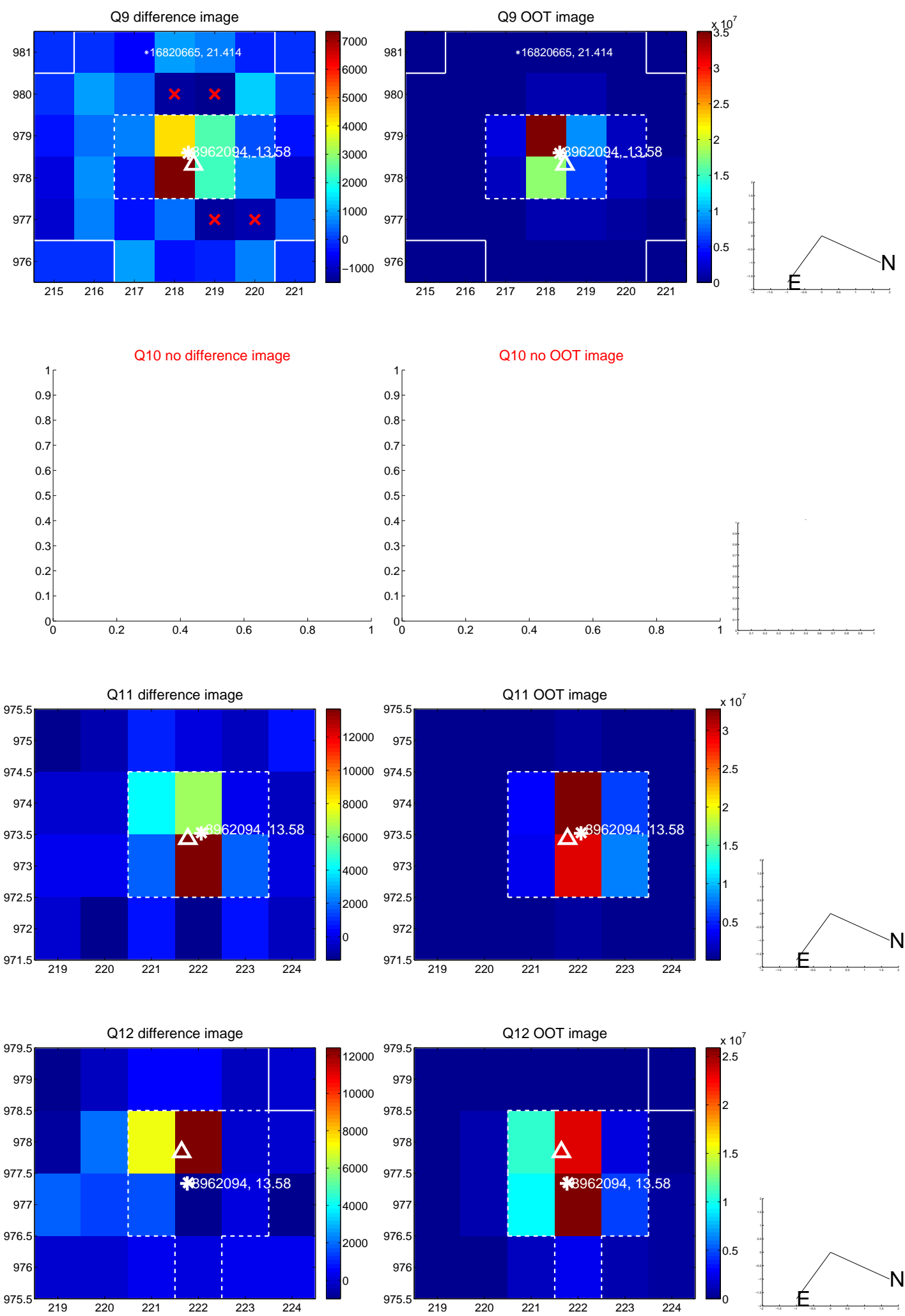
Q4 OOT image



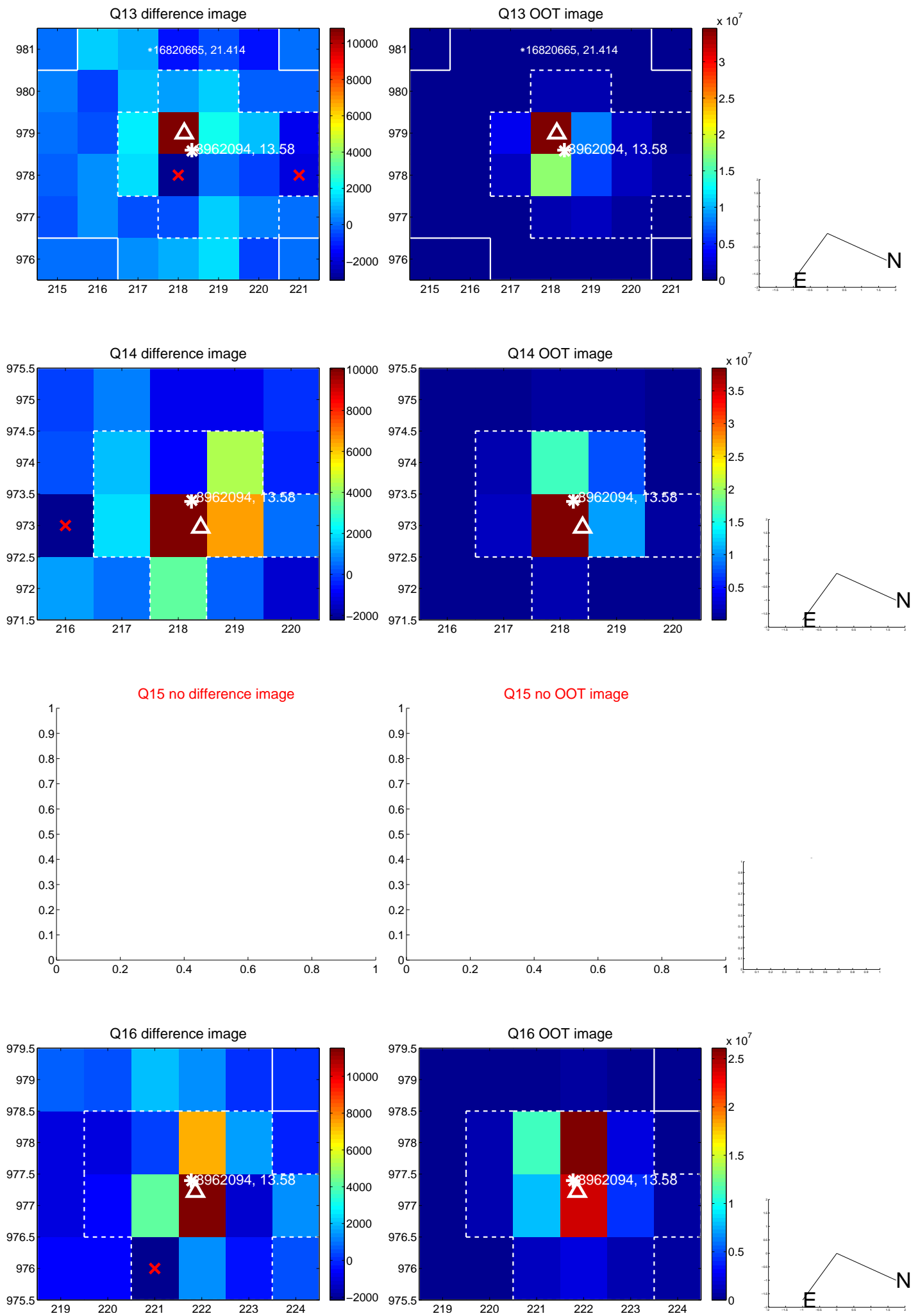
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



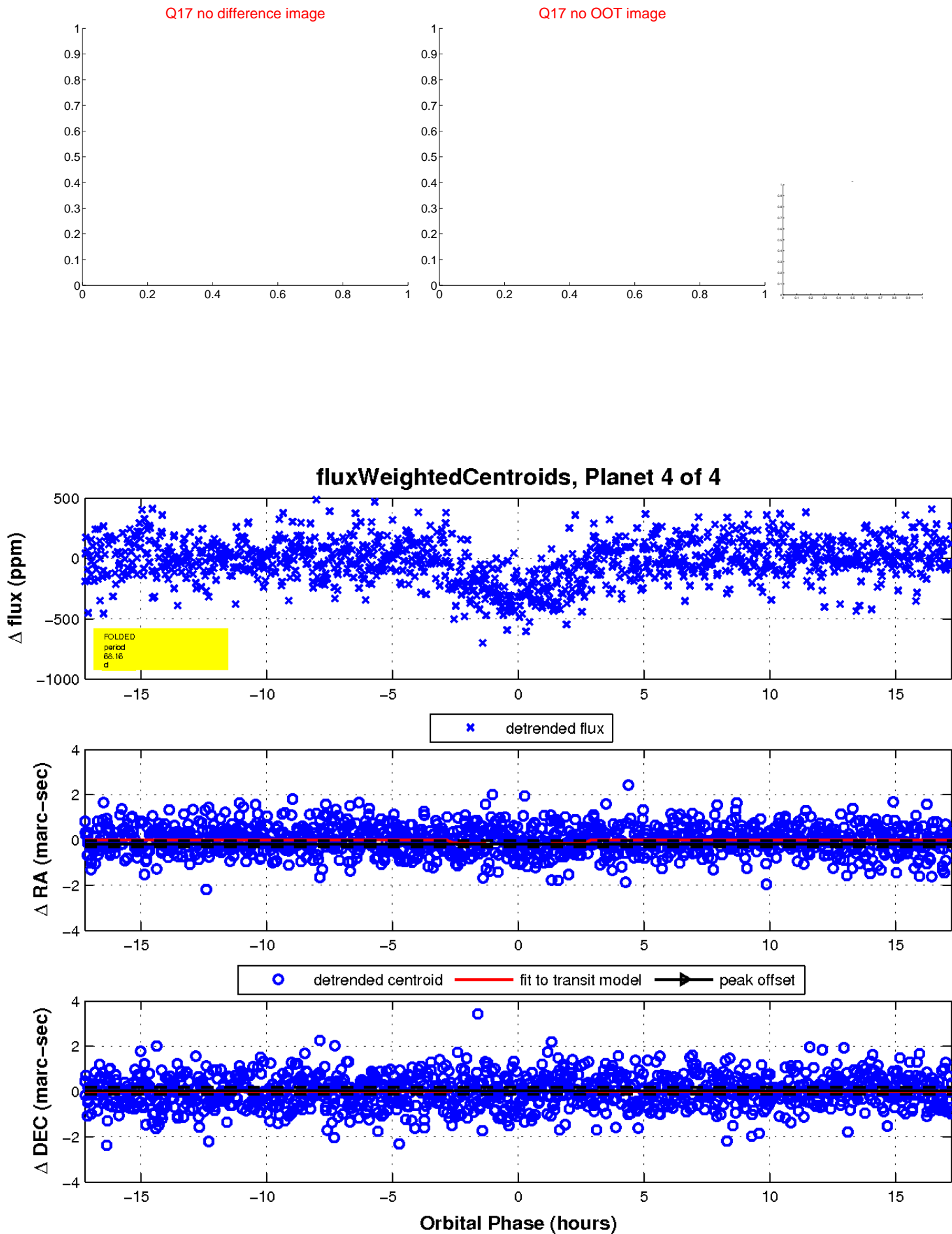
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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.



UKIRT Image

Declination

