

# KIC 008609450

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008609450-01	OBS	1278.02	44.347354	161.315210	769.2	6.571	31.9	34.1	0.87	5600	2.66	13.03
008609450-02	OBS	1278.01	24.805768	145.072415	637.0	6.328	32.7	35.8	0.87	5600	2.36	28.27
008609450-03	OBS	1278.04	13.639704	141.729281	171.6	5.964	12.0	12.8	0.87	5600	1.37	62.75
008609450-04	OBS	1278.03	9.220819	138.003924	133.8	5.322	11.3	11.2	0.87	5600	1.29	105.75
008609450-05	OBS	1278.05	203.257809	208.462165	328.4	6.657	7.6	7.6	0.87	5600	1.75	1.71

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008609450-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
008609450-02	OBS	PC	1.00	0	0	0	0	NO_COMMENT
008609450-03	OBS	PC	0.99	0	0	0	0	NO_COMMENT
008609450-04	OBS	PC	0.90	0	0	0	0	NO_COMMENT
008609450-05	OBS	FP	0.17	1	0	0	0	INDIV_TRANS_MARSHALL—MOD_NONUNIQ_ALT

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

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

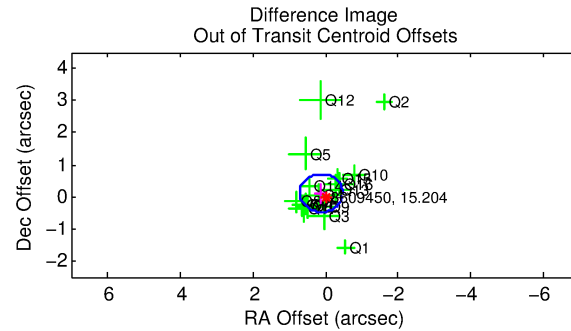
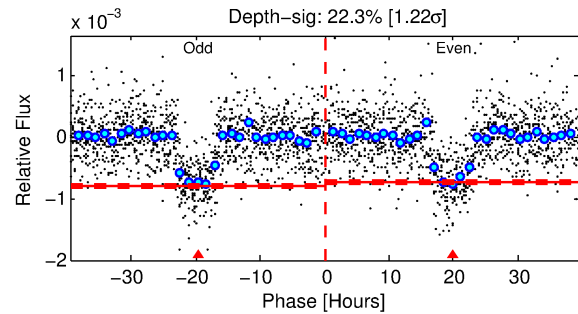
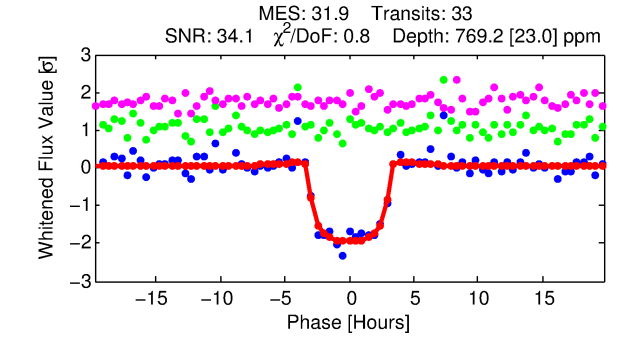
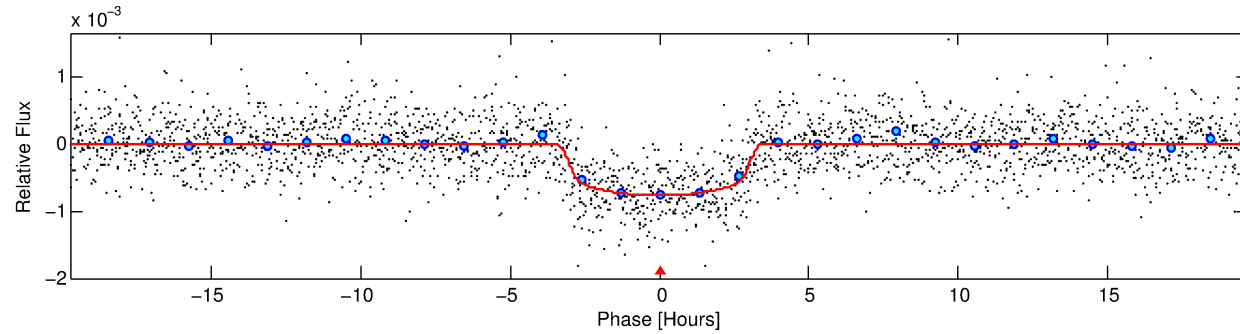
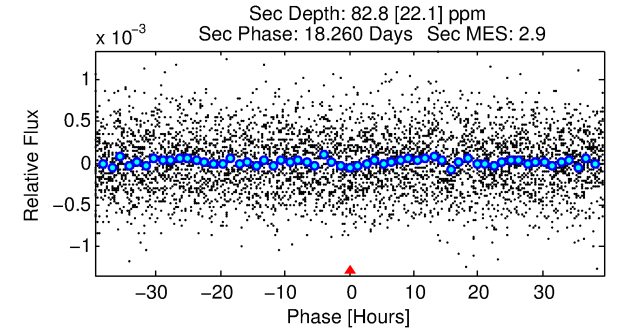
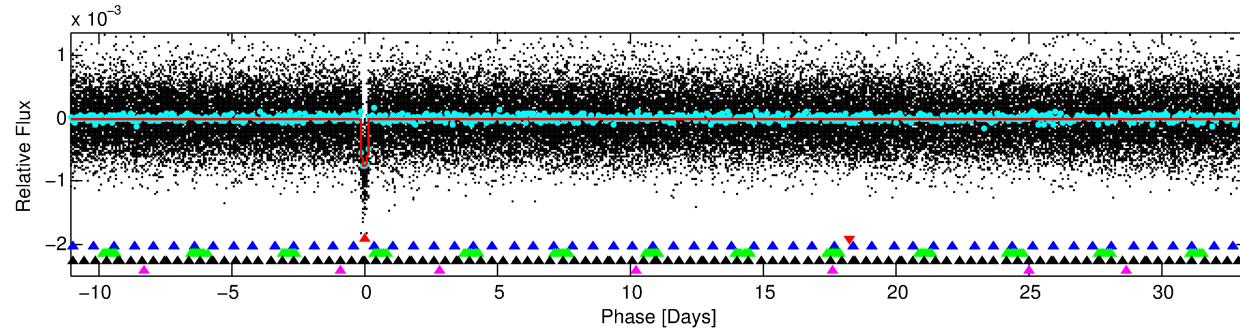
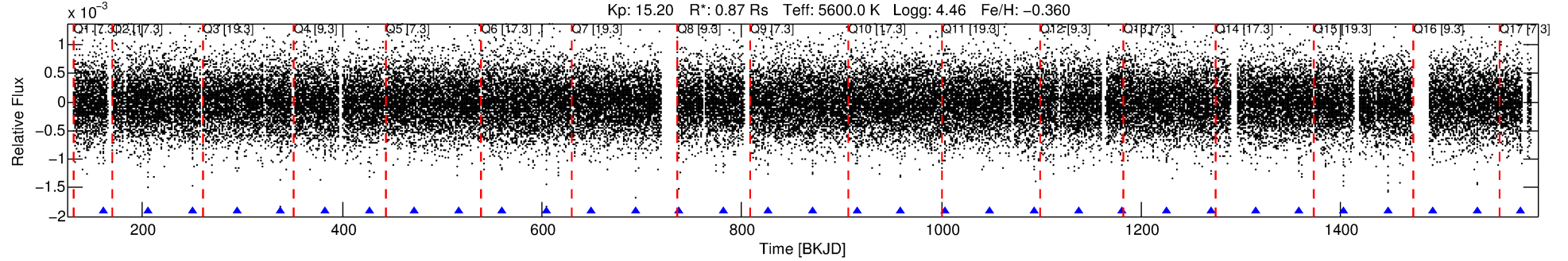
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 008609450-01

No Significant Match Found

# DV One-Page Summary

KIC: 8609450 Candidate: 1 of 5 Period: 44.347 d  
KOI: K01278.02 Name: Kepler-282e Corr: 0.987



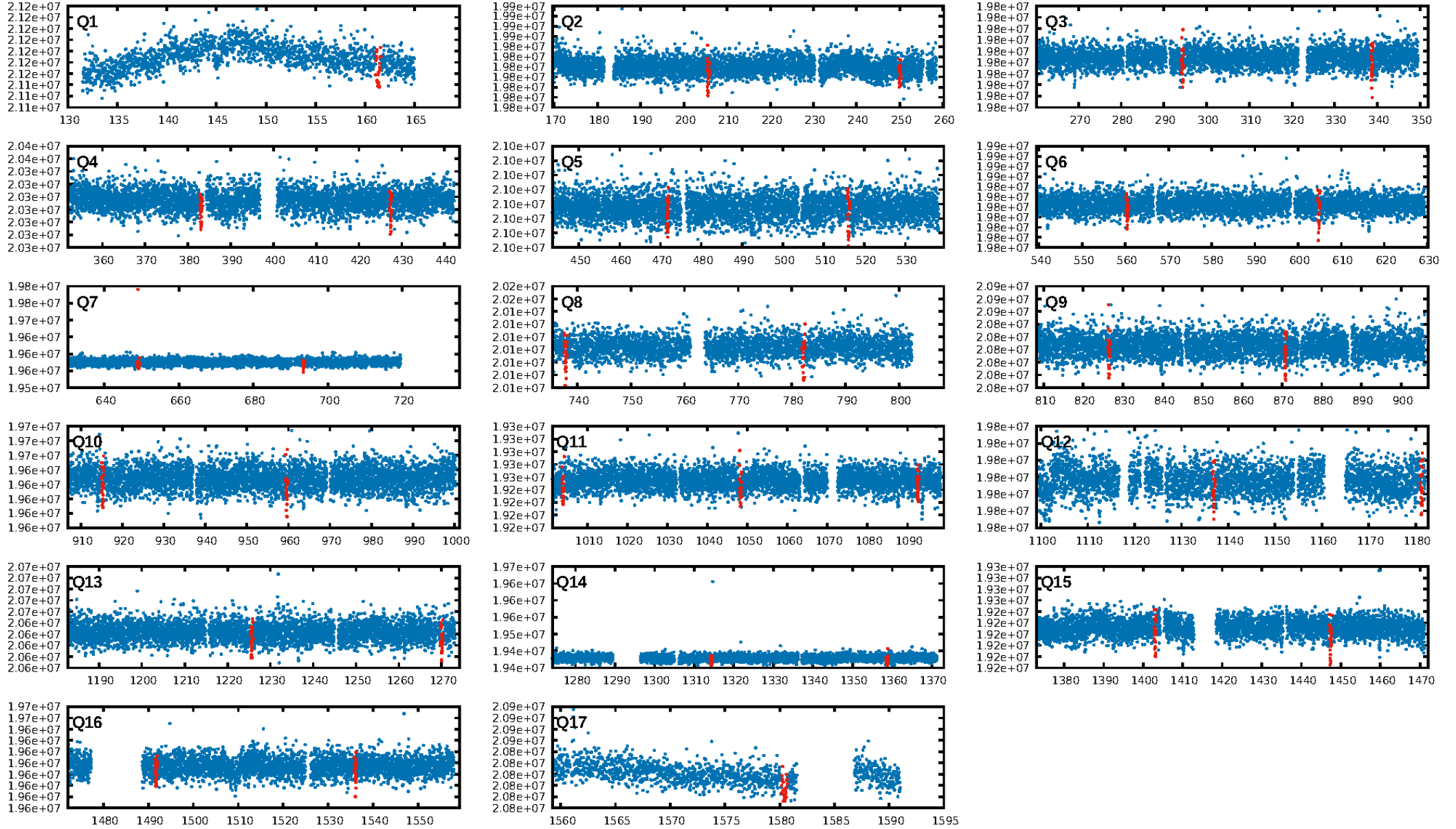
## DV Fit Results:

Period = 44.34735 [0.00019] d  
Epoch = 161.3152 [0.0037] BKJD  
Rp/R\* = 0.0280 [0.0030]  
a/R\* = 34.41 [16.21]  
b = 0.78 [0.24]  
Seff = 13.03 [2.45]  
Teff = 484 [23] K  
Rp = 2.66 [0.39] Re  
a = 0.2268 [0.0234] AU  
Ag = 330.87 [126.47] [2.61σ]  
Teffp = 3194 [281] K [9.63σ]

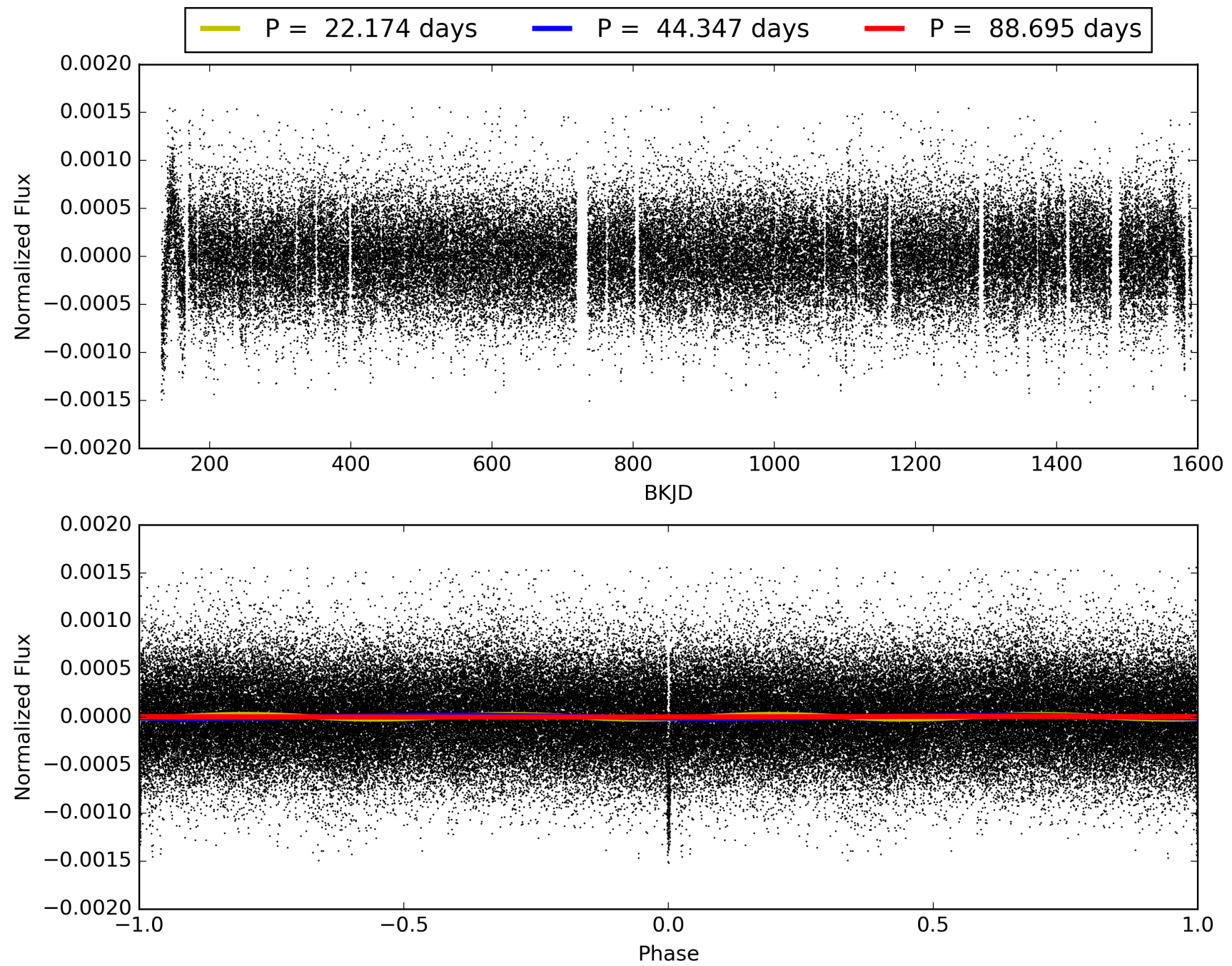
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [51.41σ]  
LongPeriod-sig: 100.0% [407.75σ]  
ModelChiSquare2-sig: 98.9%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 7.57e-211  
RollingBand-fgt: 1.00 [31/31]  
GhostDiagnostic-chr: 2.907  
Centroid-sig: 47.1%  
Centroid-so: 0.380 arcsec [1.03σ]  
OotOffset-rm: 0.169 arcsec [0.85σ]  
KicOffset-rm: 0.114 arcsec [0.57σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 1.00 [17/17]  
DiffImageOverlap-fno: 0.94 [16/17]

# TCE 008609450-01, PDC Light Curves



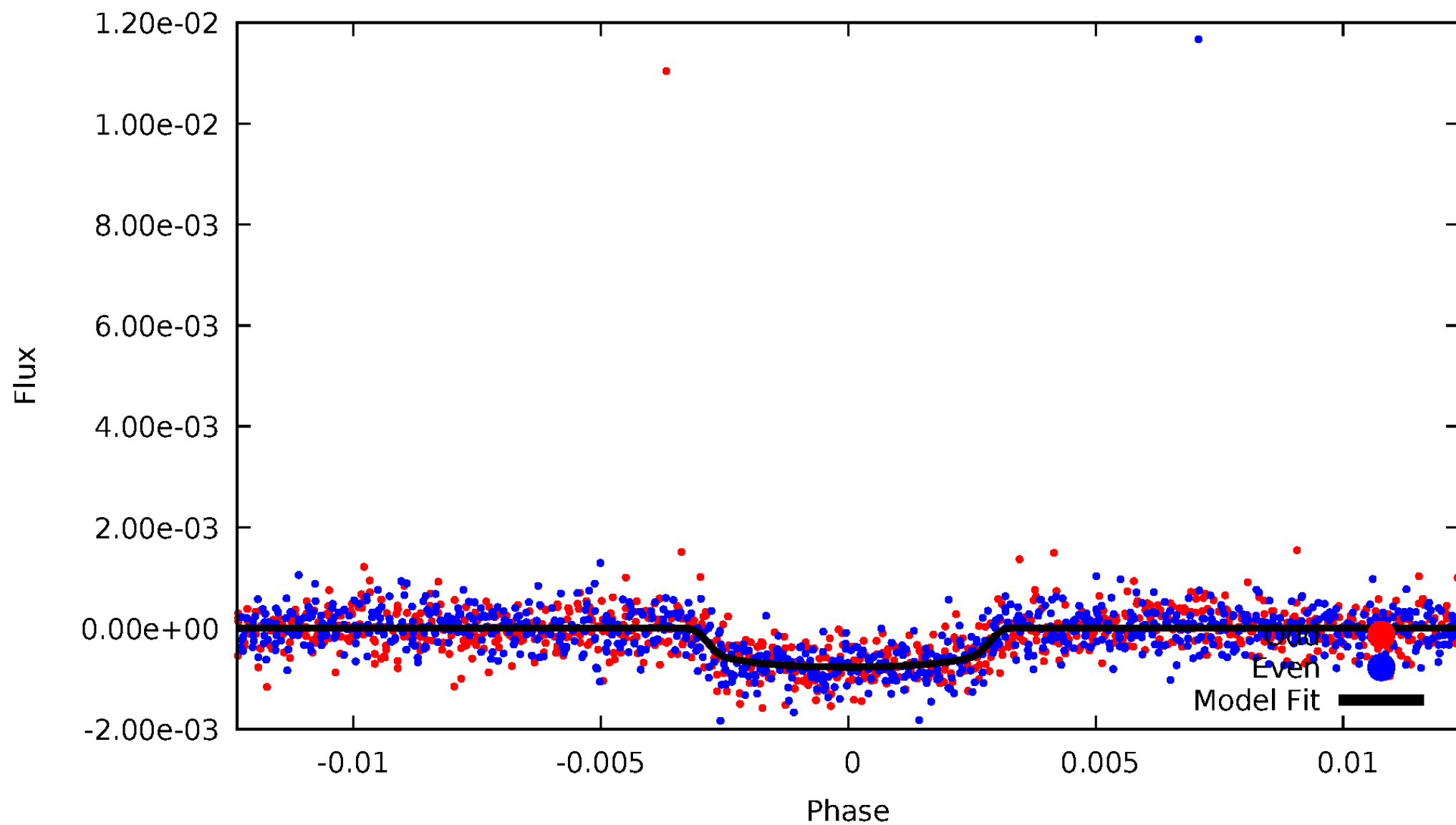
TCE 008609450-01





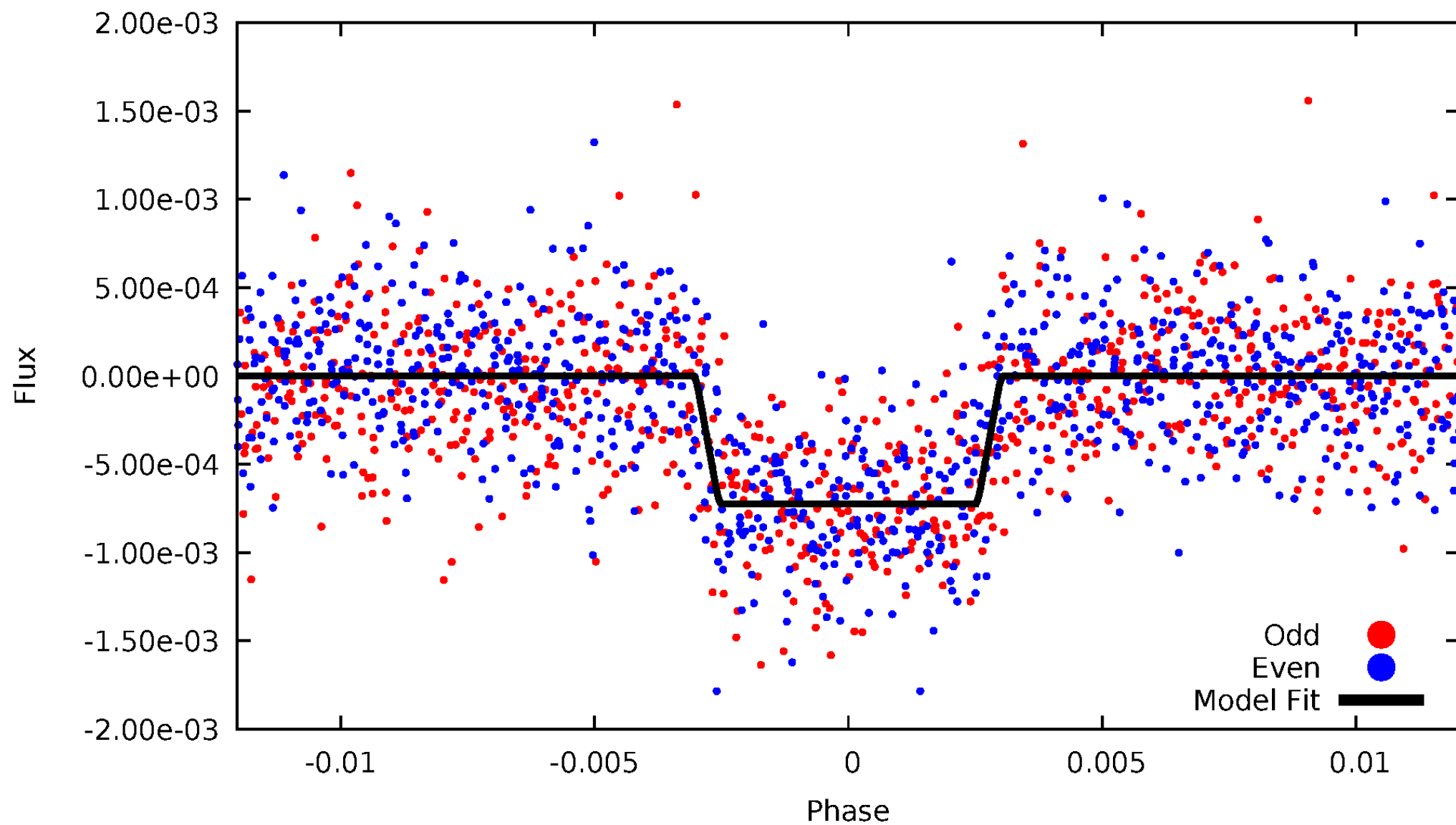
# DV Odd/Even

TCE 008609450-01



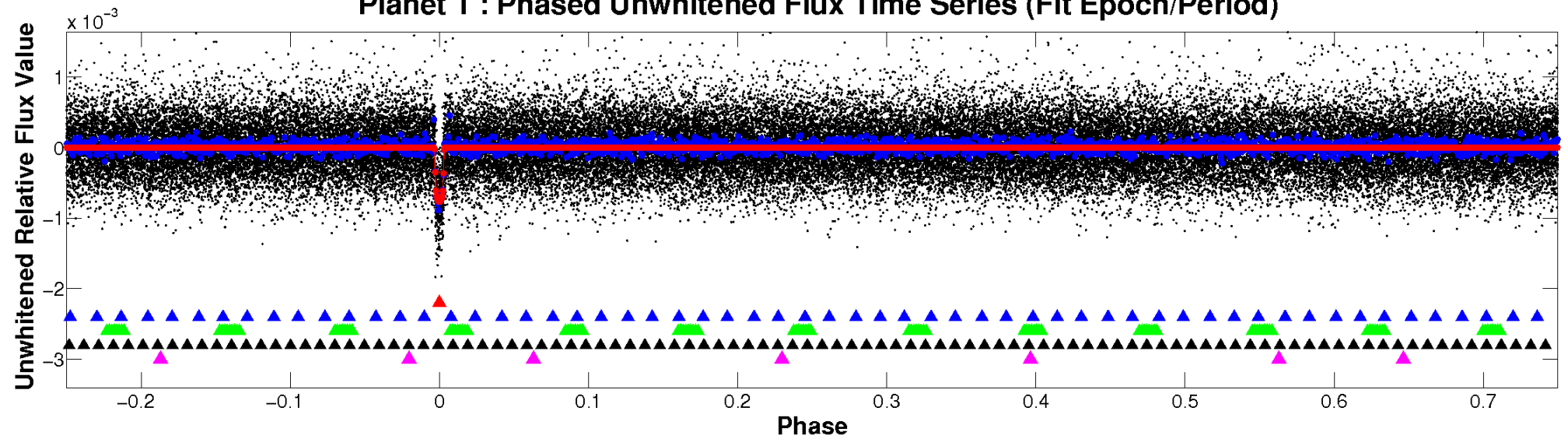
# ALT Odd/Even

TCE 008609450-01

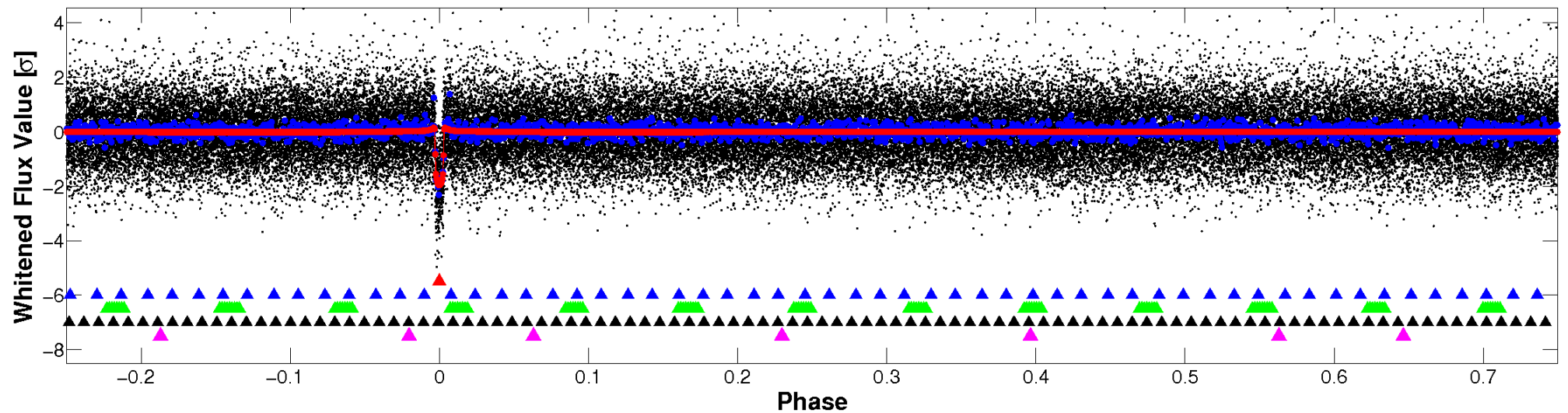


# Non-Whitened Vs. Whitened Light Curve

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

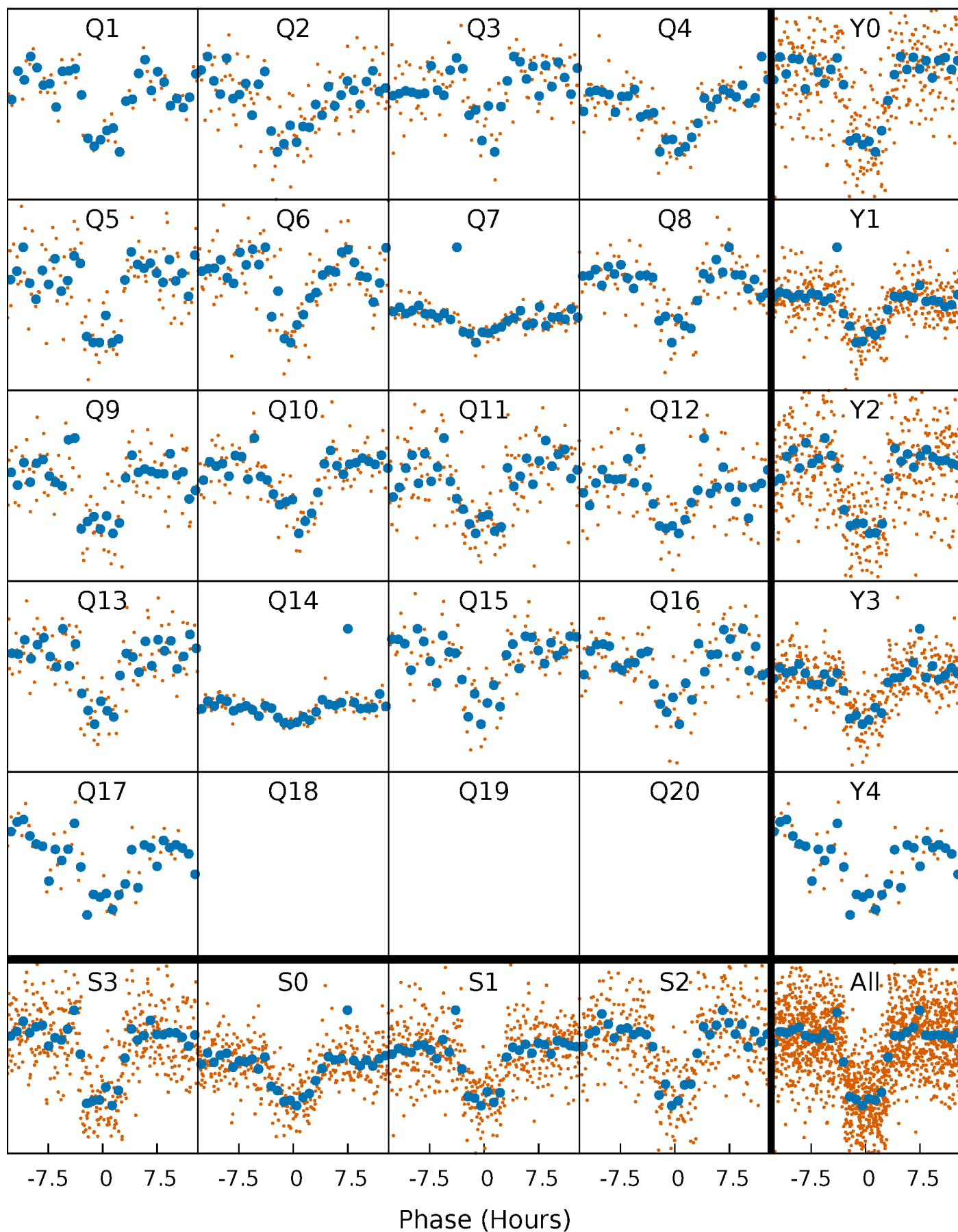


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

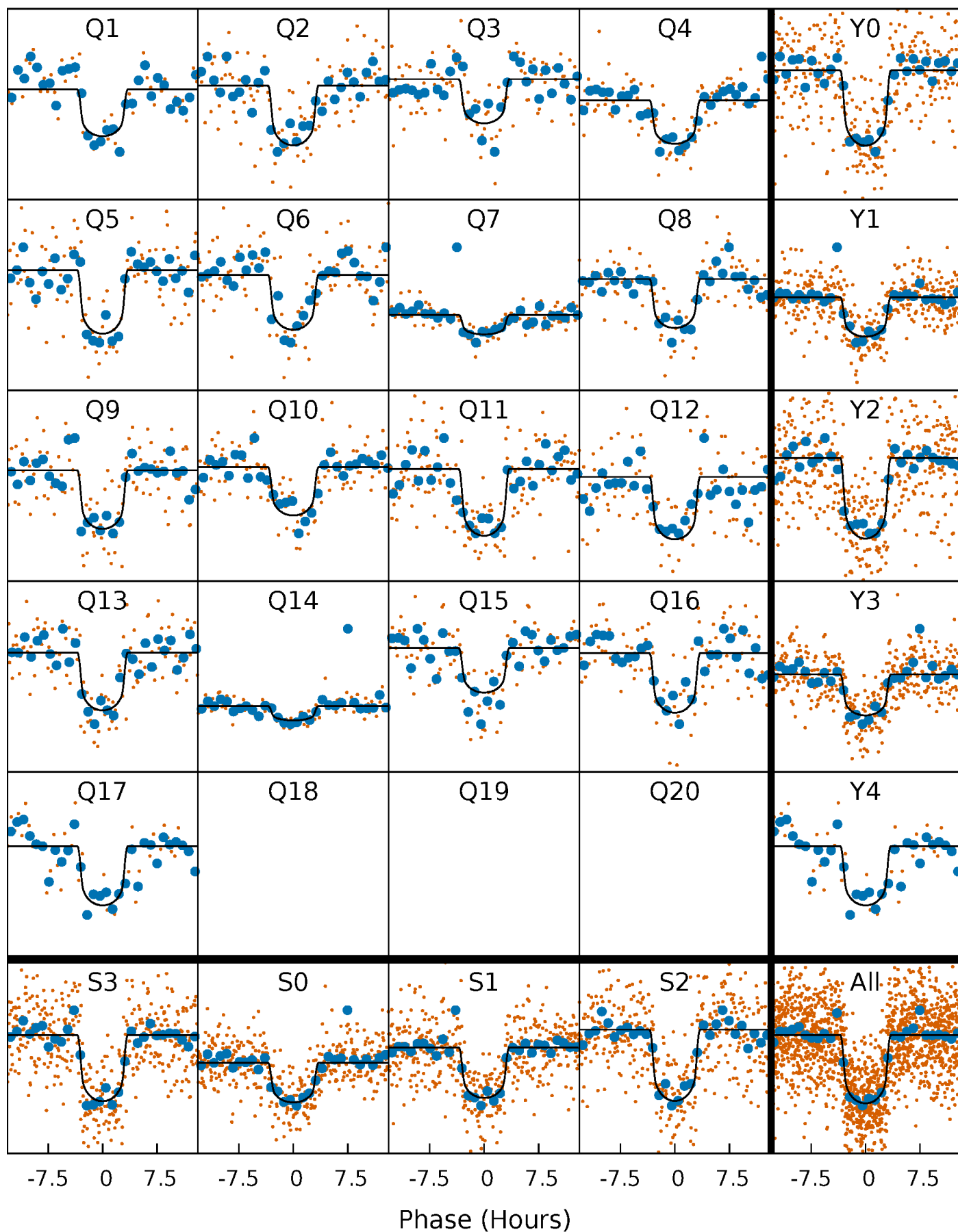
TCE 008609450-01   P= 44.347354 Days    $T_0=161.315210$  (BKJD)





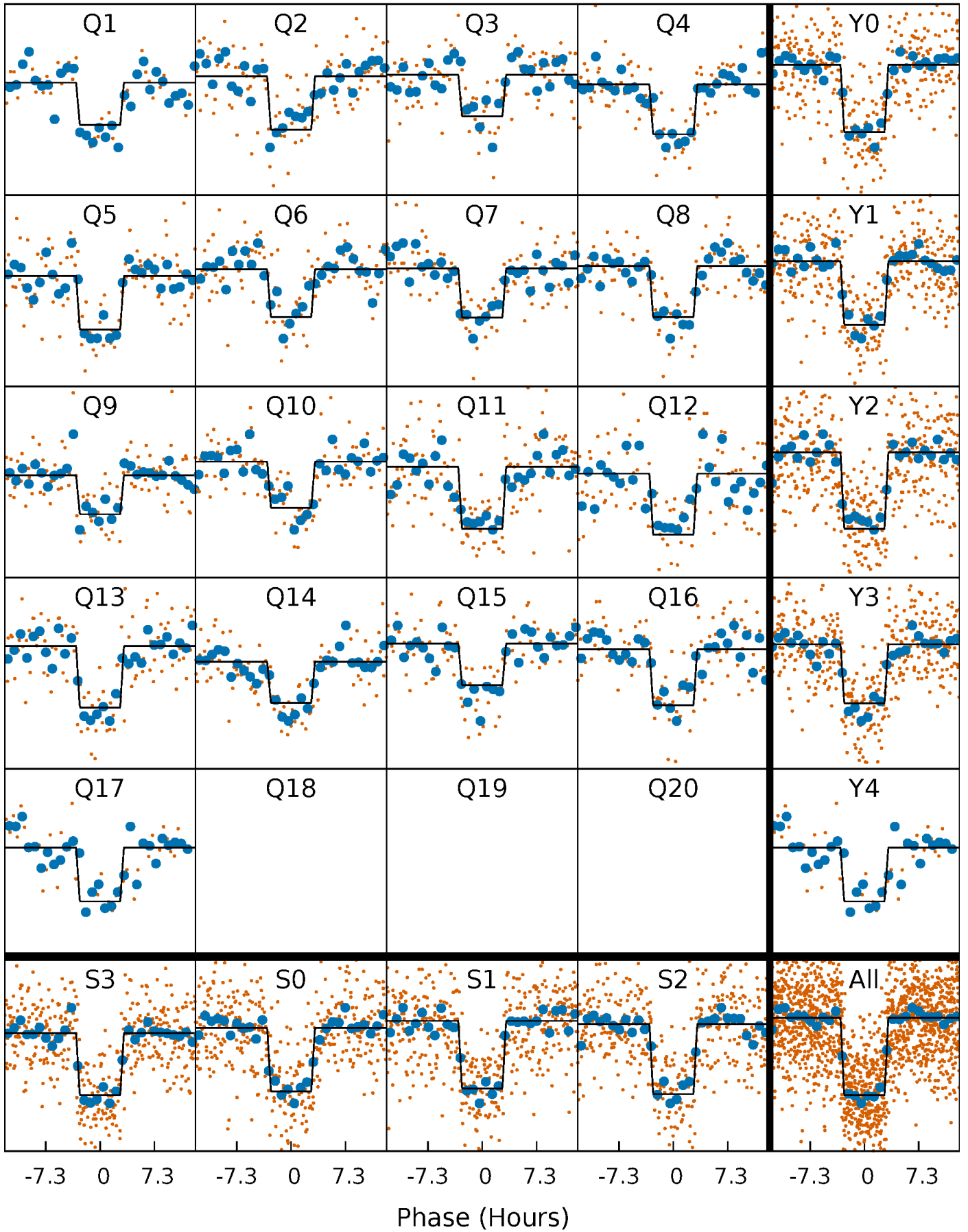
# DV Quarter-Phased Transit Curves

TCE 008609450-01   P= 44.347354 Days    $T_0=161.315210$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

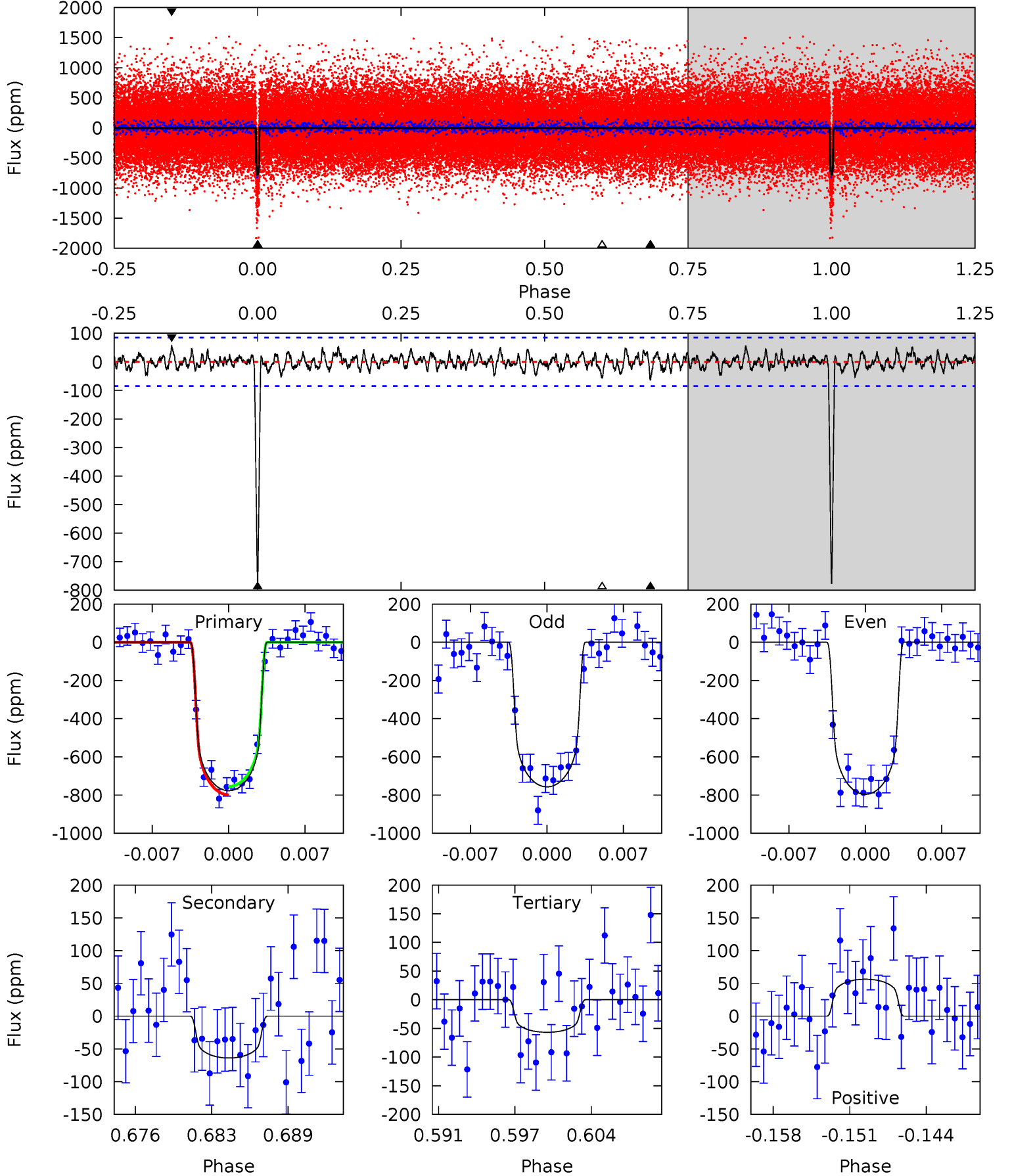
TCE 008609450-01 P= 44.347307 Days  $T_0=161.316143$  (BKJD)



# DV Model-Shift Uniqueness Test

008609450-01,  $P = 44.347354$  Days,  $E = 116.967856$  Days

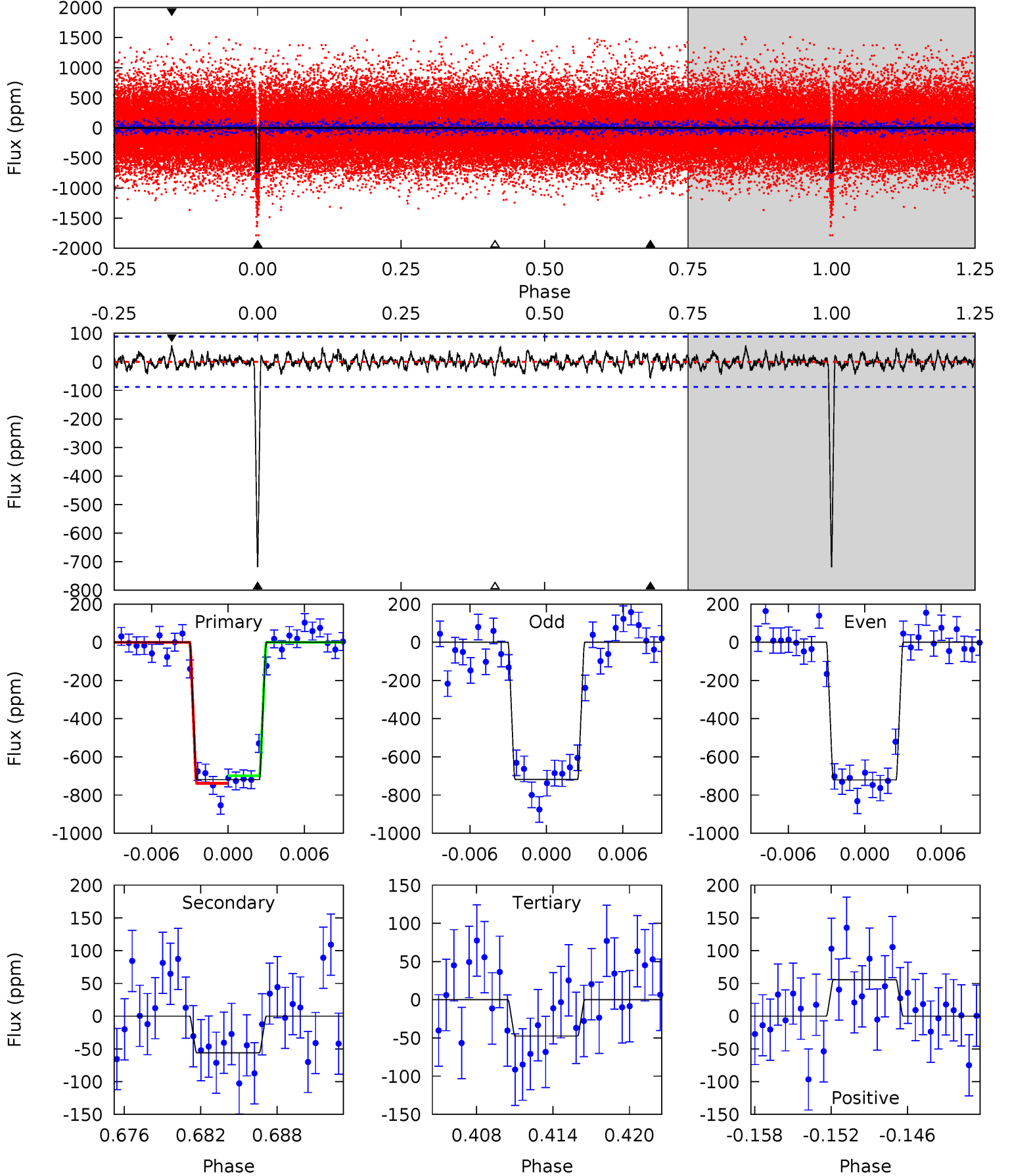
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
46.7	3.84	3.41	3.38	5.11	2.72	1.15	43.3	43.3	0.43	0.45	1.17	0.99	0.07	1.29



# Alt Model-Shift Uniqueness Test

008609450-01,  $P = 44.347307$  Days,  $E = 116.968836$  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
41.8	3.25	2.76	3.24	5.12	2.74	0.95	39.0	38.6	0.49	0.02	0.08	1.01	0.07	1.14





### Stellar Parameters For KIC 008609450

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5600^{+112}_{-100}$	$4.455^{+0.102}_{-0.077}$	$-0.360^{+0.150}_{-0.150}$	$0.872^{+0.088}_{-0.088}$	$0.793^{+0.064}_{-0.035}$	$1.683^{+0.728}_{-0.398}$
	+2%/-2%	+2%/-2%	+42%/-42%	+10%/-10%	+8%/-4%	+43%/-24%
Source	SPE58	SPE58	SPE58	DSEP		

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

### Secondary Eclipse Parameters for KIC 008609450-01 / KOI 1278.02

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-64 \pm 17$	$2.66^{+0.33}_{-0.32}$	$676^{+23}_{-23}$	$3473^{+203}_{-202}$	$254^{+111}_{-84}$
Alt.	$-56 \pm 17$	$2.56^{+0.34}_{-0.33}$	$676^{+23}_{-24}$	$3433^{+218}_{-235}$	$237^{+118}_{-90}$

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

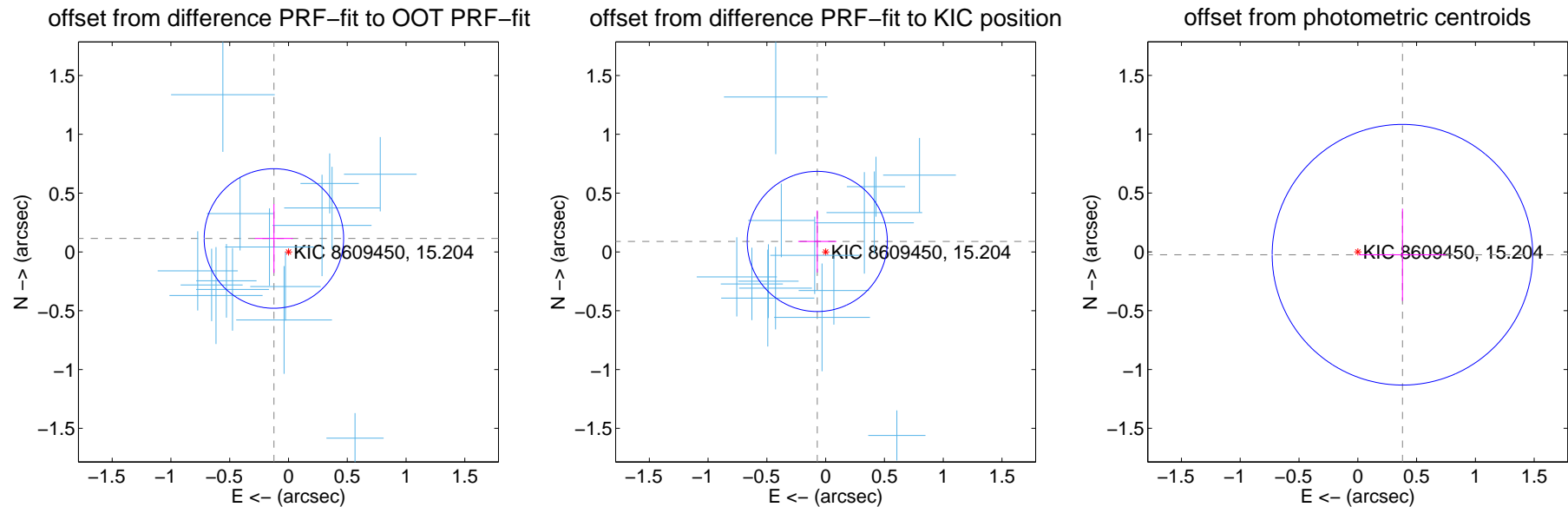
## DV Centroid Data

Supplemental centroid analysis for 008609450-01. Kepler magnitude: 15.20. Transit SNR 34.09

There are 17 quarters with good PRF difference image offsets

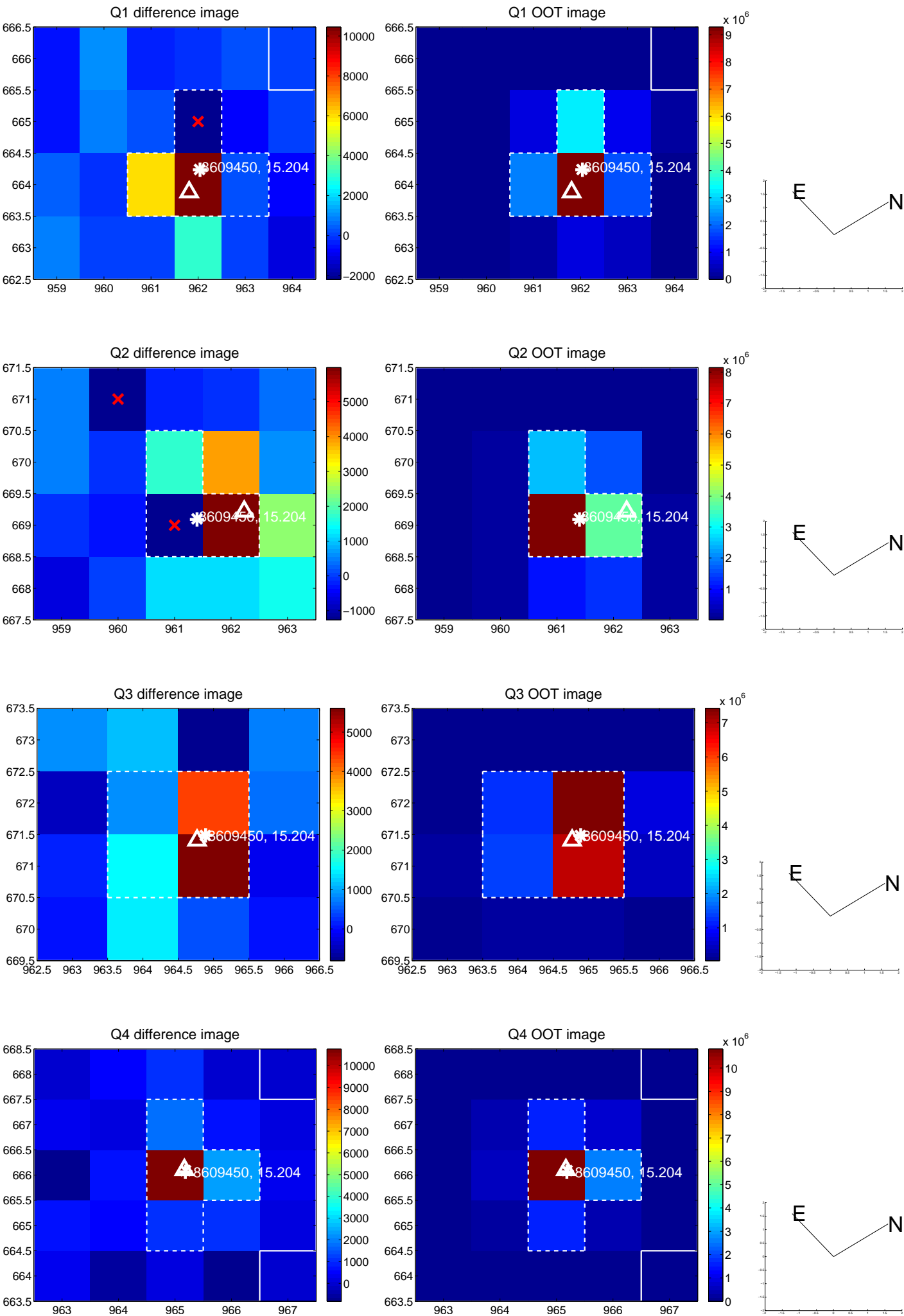
The direct PRF centroid is offset from the target star catalog position by about 0.13 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.169 \pm 0.198$	0.85	$0.124 \pm 0.162$	$0.114 \pm 0.293$
PRF-fit source offset from KIC position	$0.114 \pm 0.199$	0.57	$0.071 \pm 0.162$	$0.089 \pm 0.263$
photometric centroid source offset	$0.38 \pm 0.37$	1.03	$-0.38 \pm 0.37$	$-0.02 \pm 0.39$

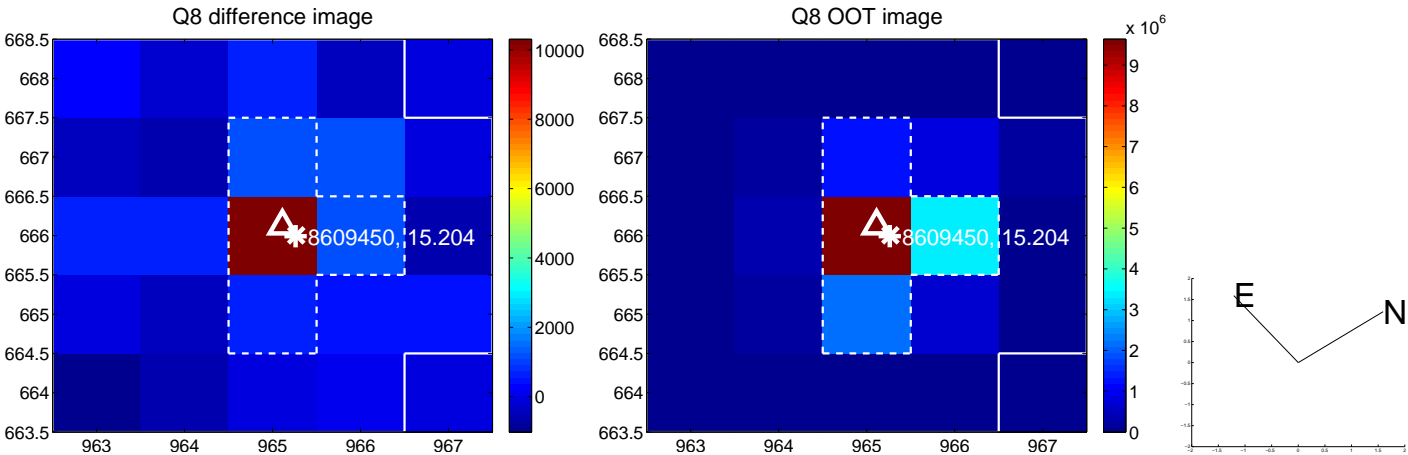
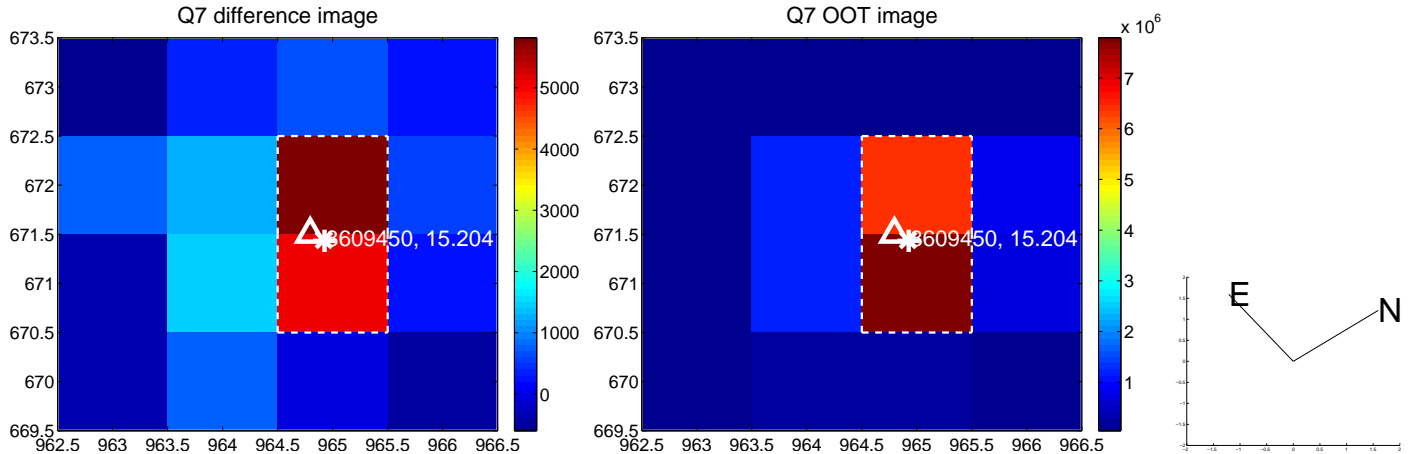
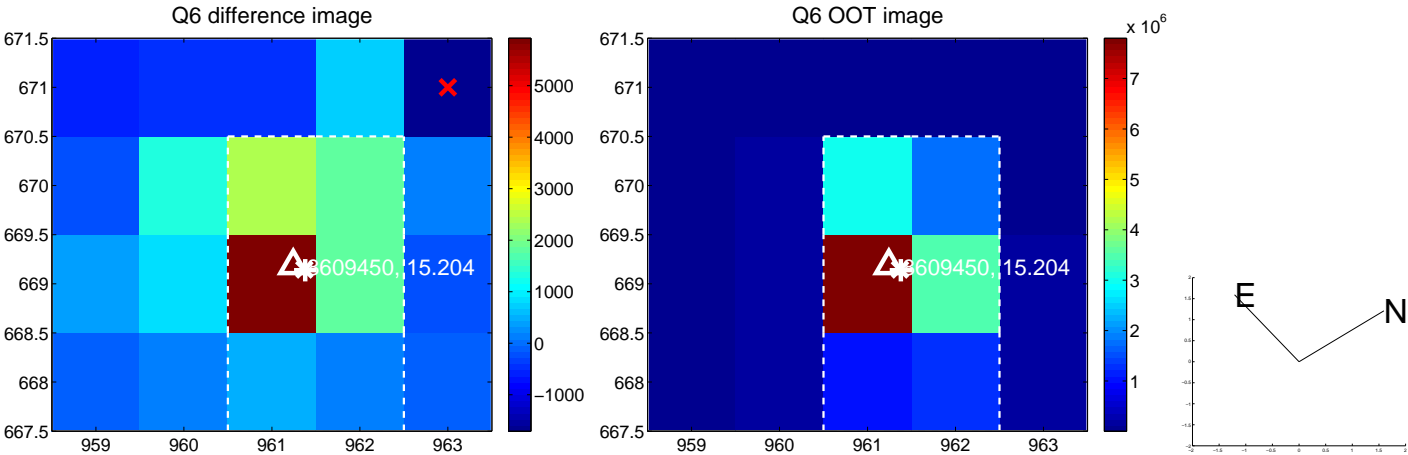
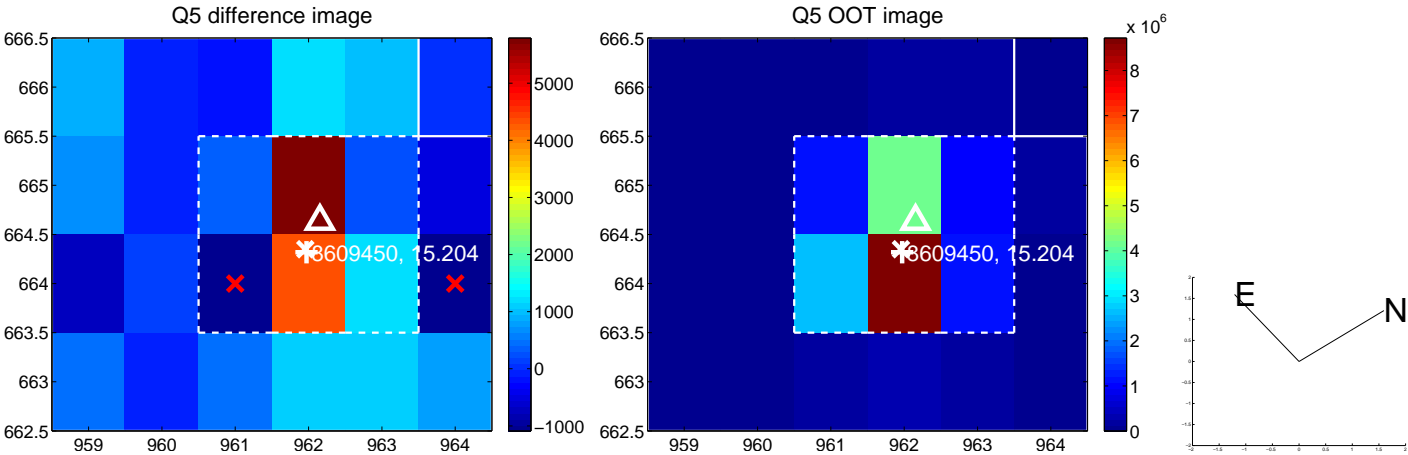


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

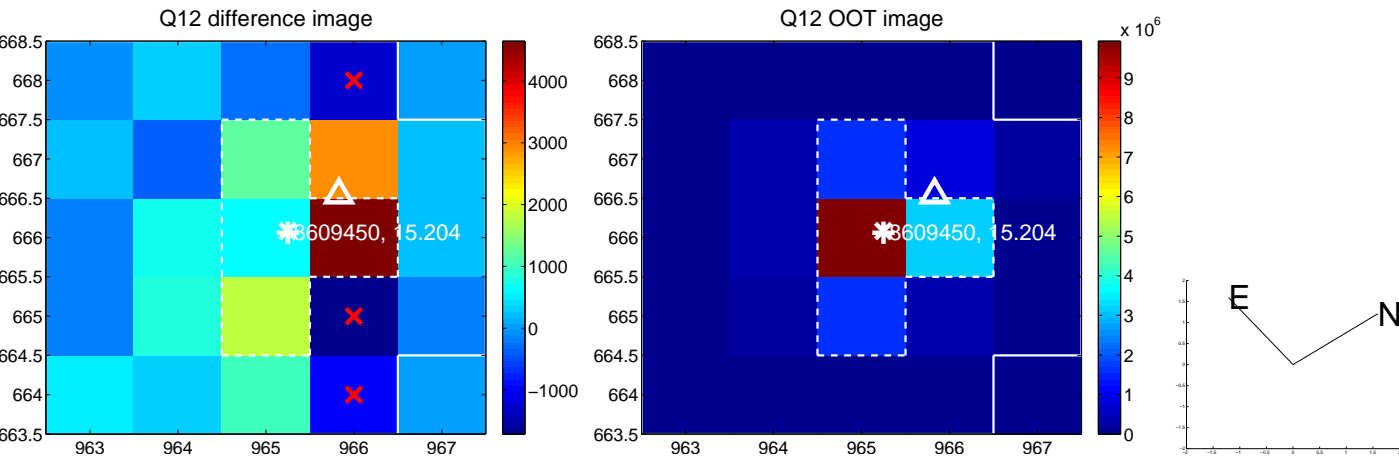
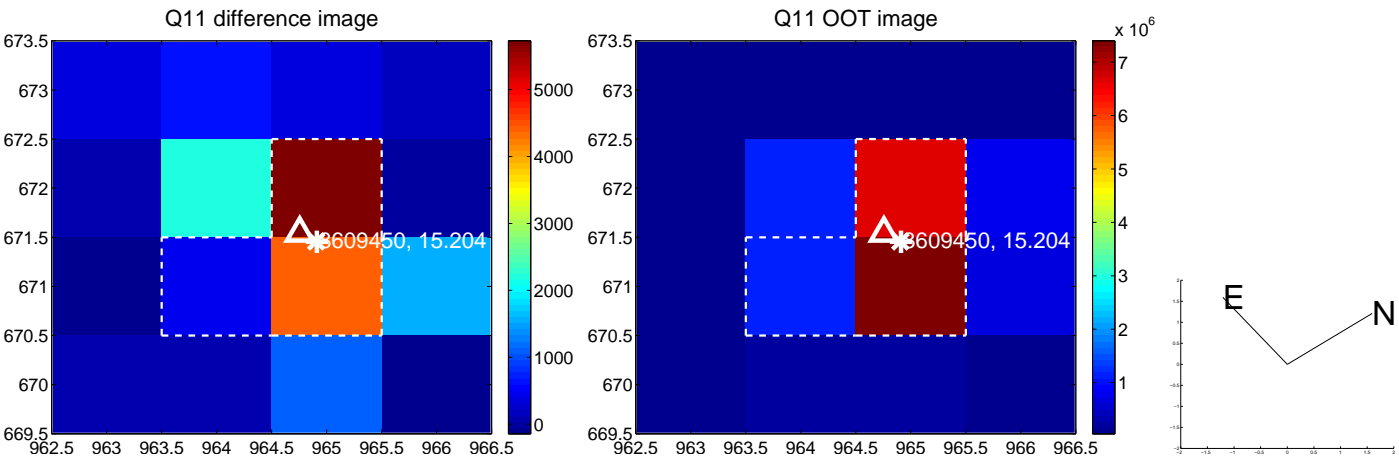
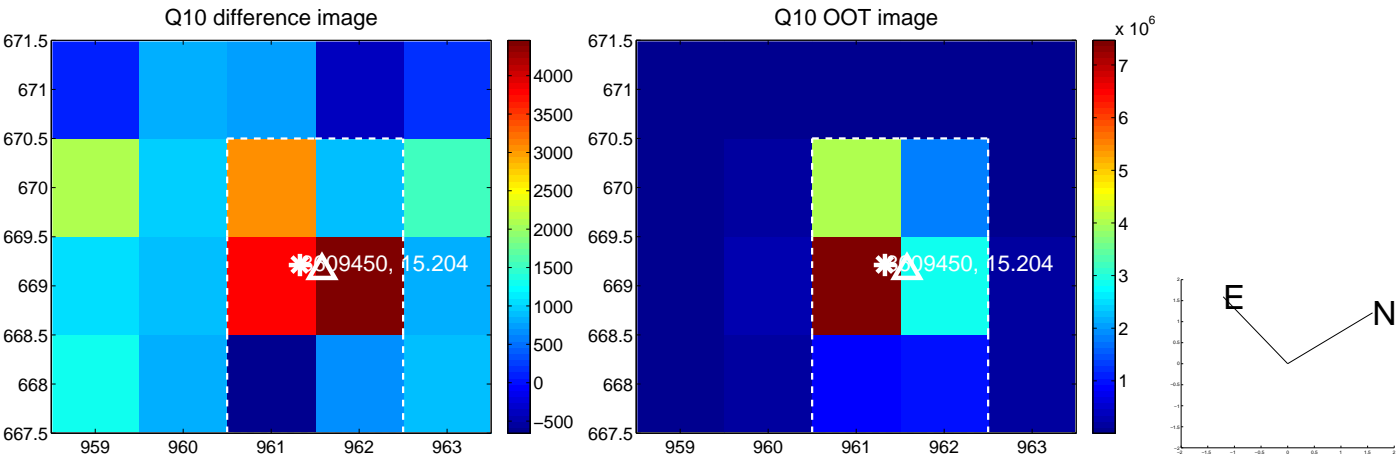
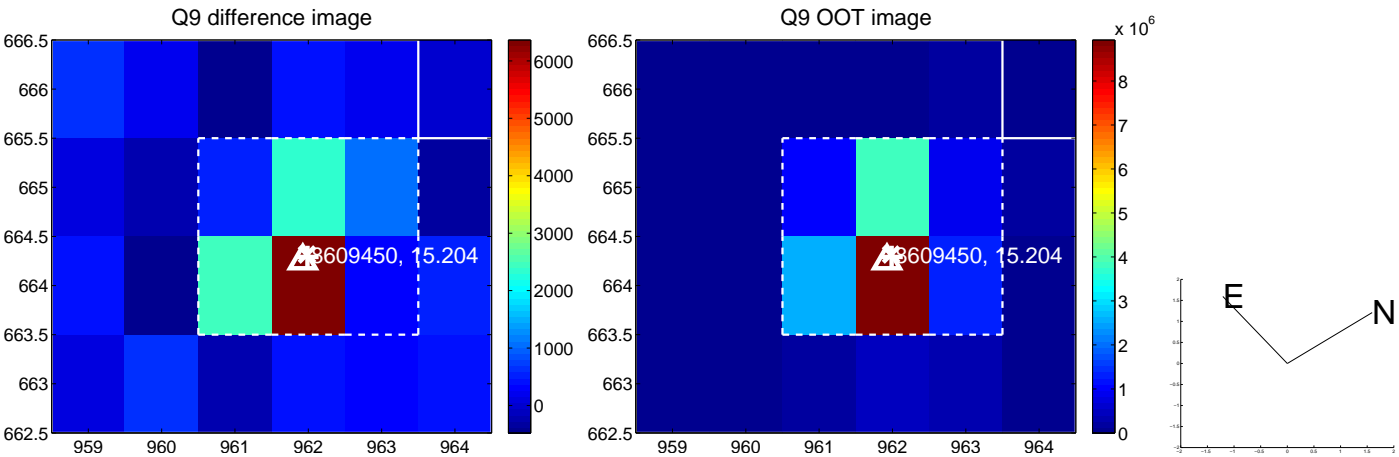


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

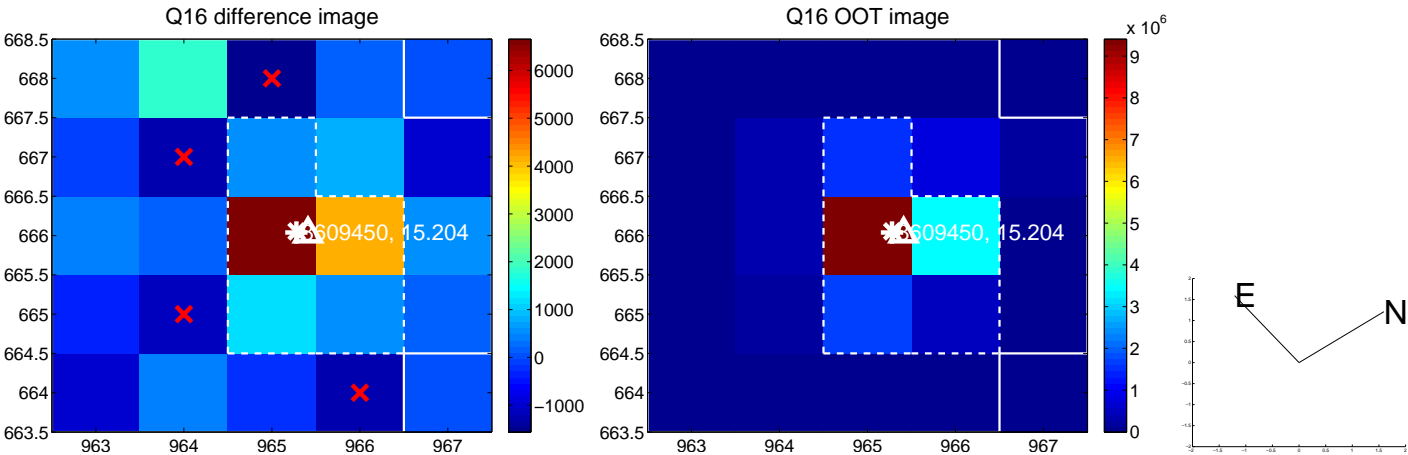
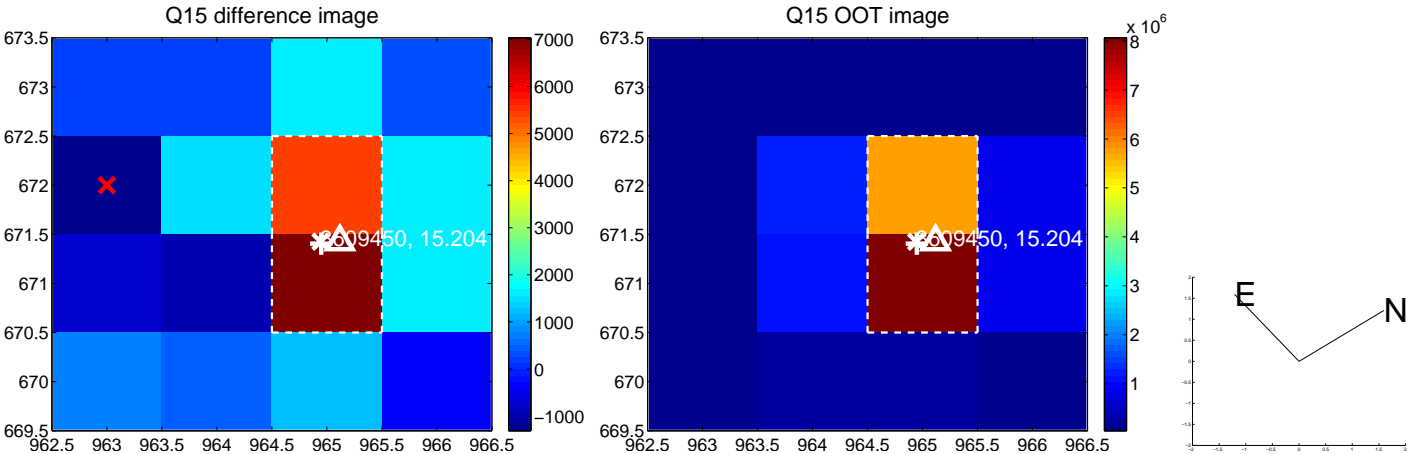
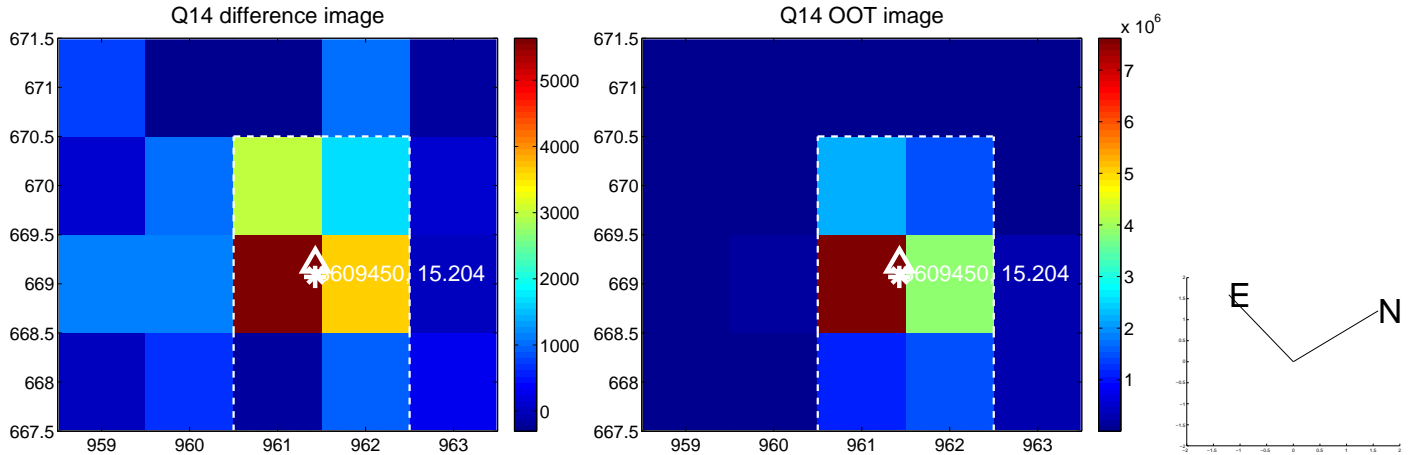
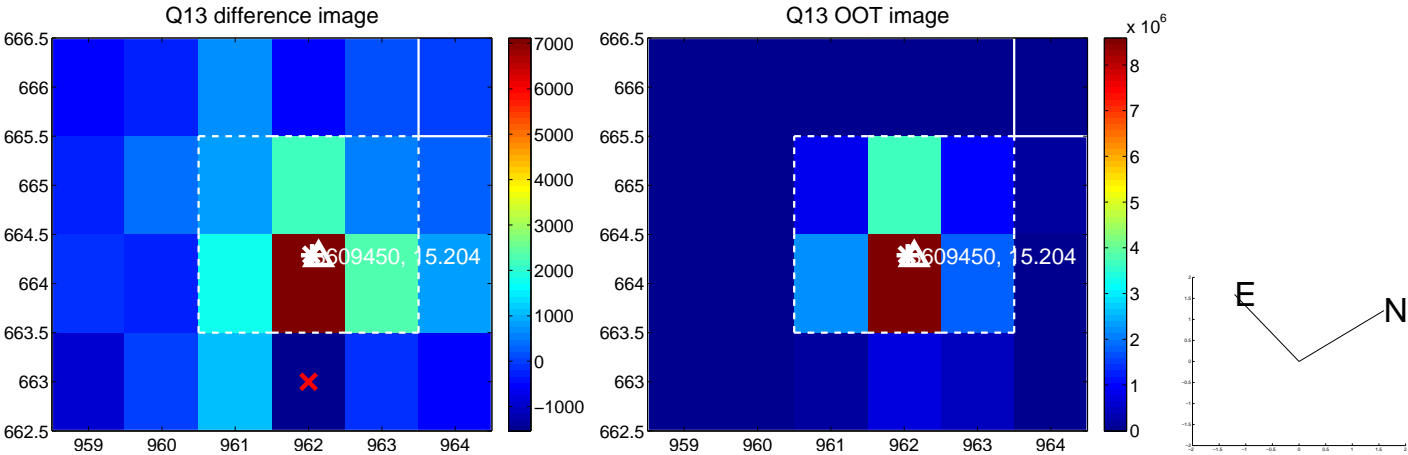




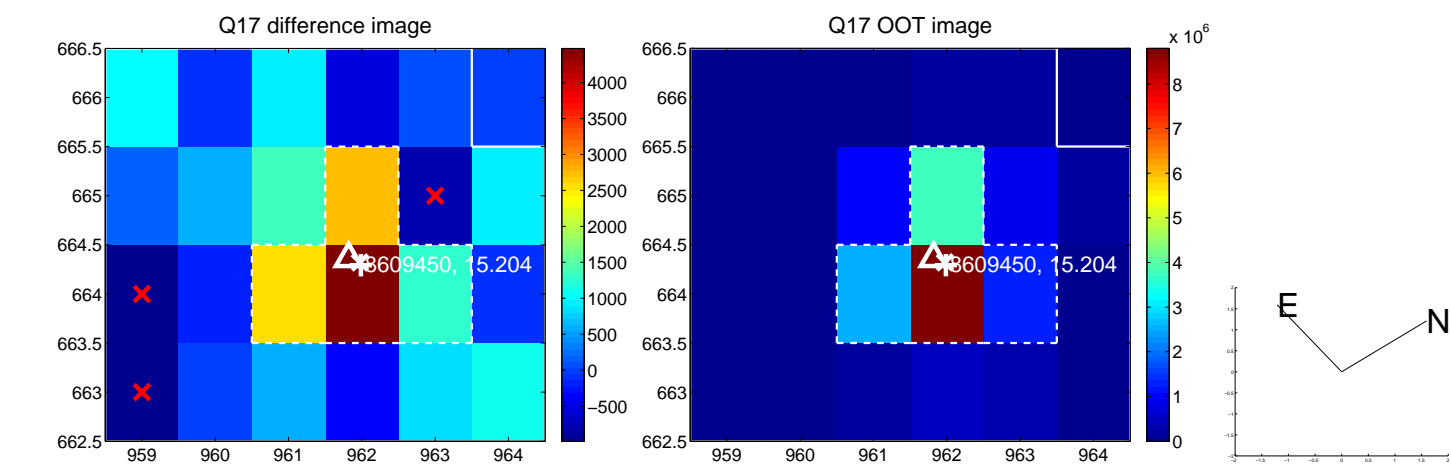
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



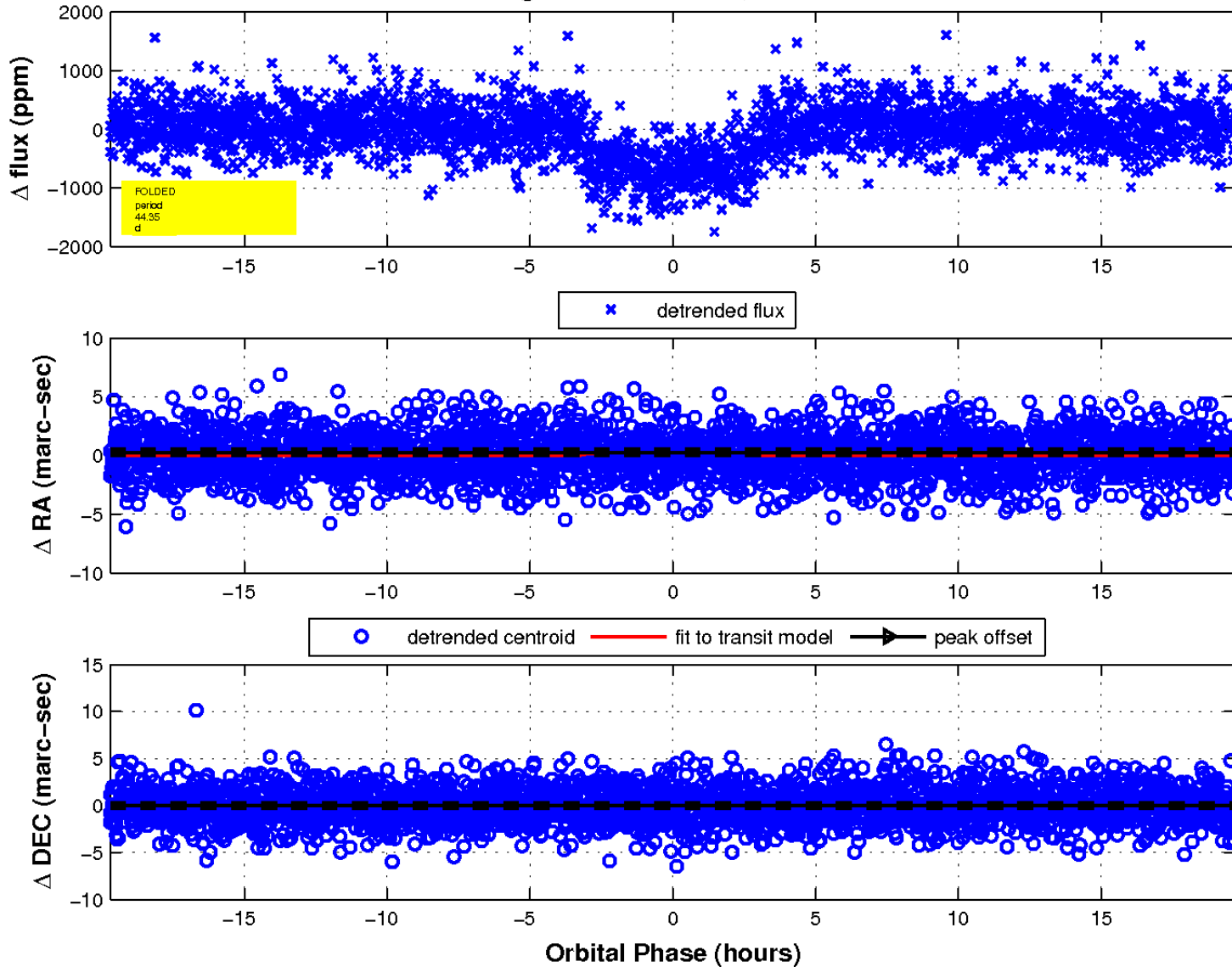
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

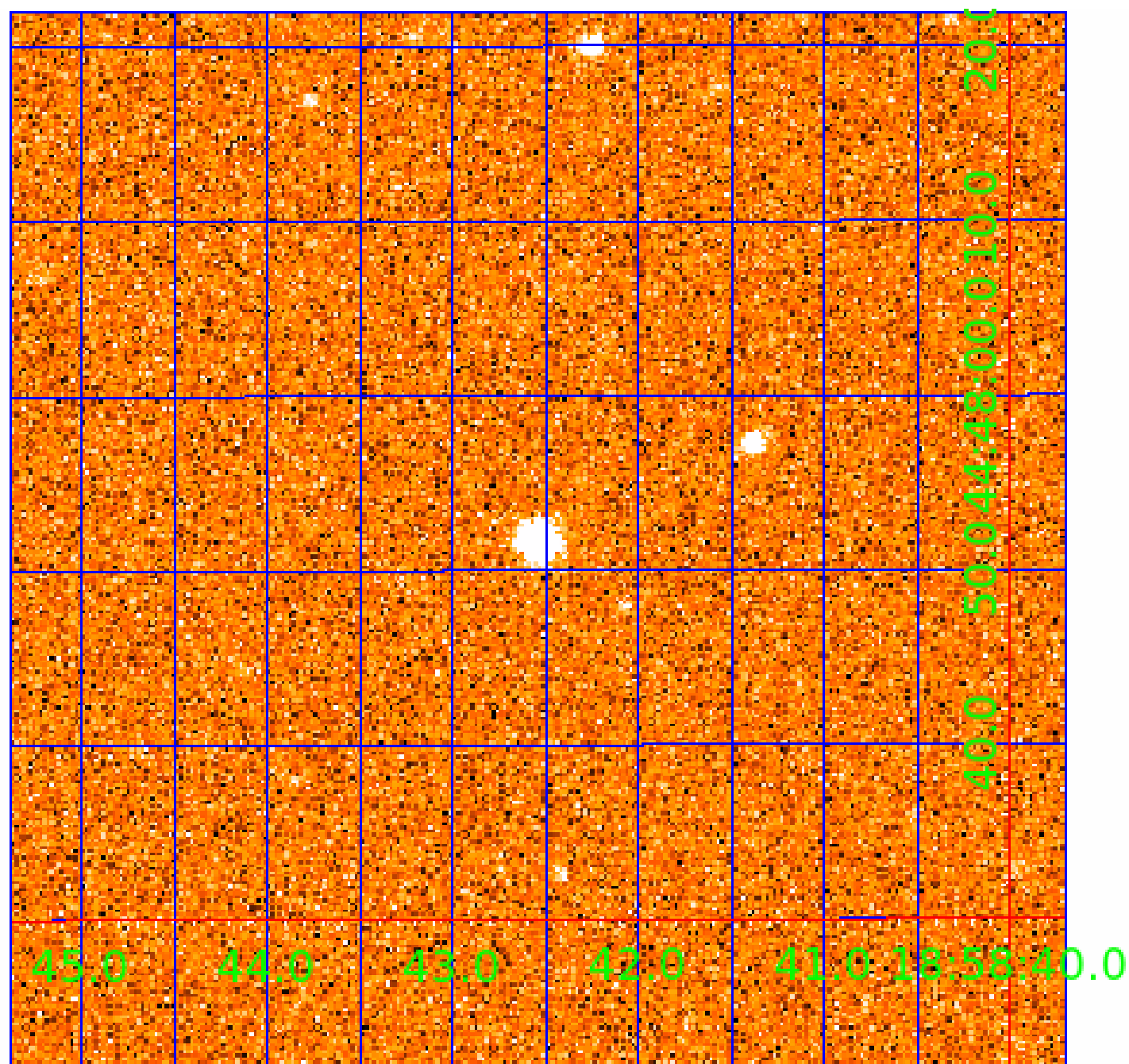


fluxWeightedCentroids, Planet 1 of 5



# UKIRT Image

Declination





# KIC 008609450

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008609450-01	OBS	1278.02	44.347354	161.315210	769.2	6.571	31.9	34.1	0.87	5600	2.66	13.03
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008609450-04	OBS	1278.03	9.220819	138.003924	133.8	5.322	11.3	11.2	0.87	5600	1.29	105.75
008609450-05	OBS	1278.05	203.257809	208.462165	328.4	6.657	7.6	7.6	0.87	5600	1.75	1.71

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008609450-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
008609450-02	OBS	PC	1.00	0	0	0	0	NO_COMMENT
008609450-03	OBS	PC	0.99	0	0	0	0	NO_COMMENT
008609450-04	OBS	PC	0.90	0	0	0	0	NO_COMMENT
008609450-05	OBS	FP	0.17	1	0	0	0	INDIV_TRANS_MARSHALL—MOD_NONUNIQ_ALT

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

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

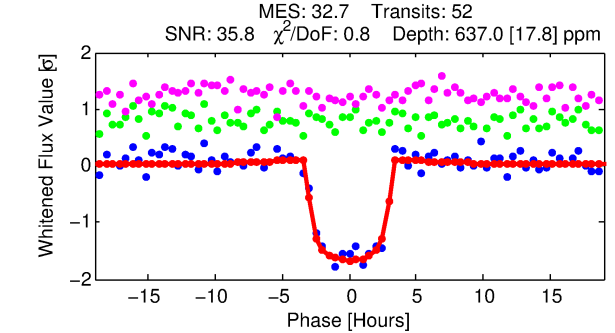
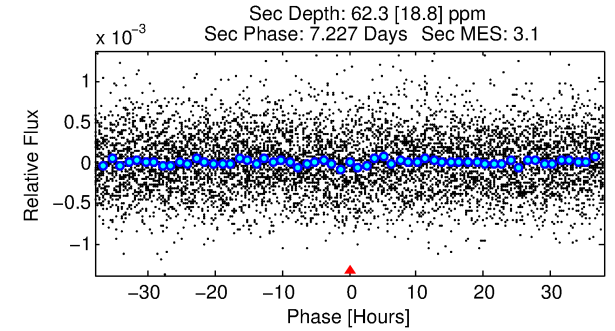
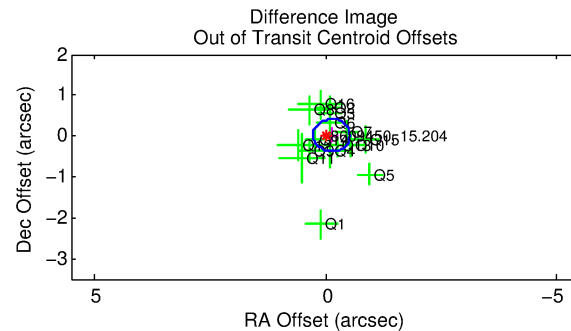
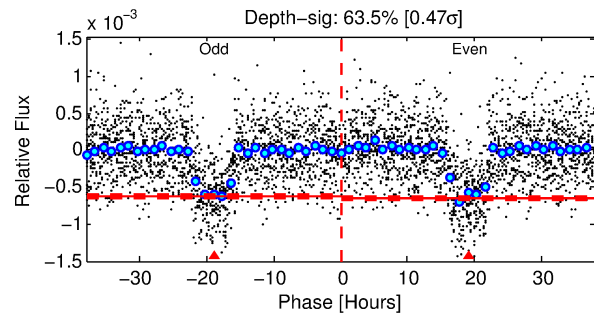
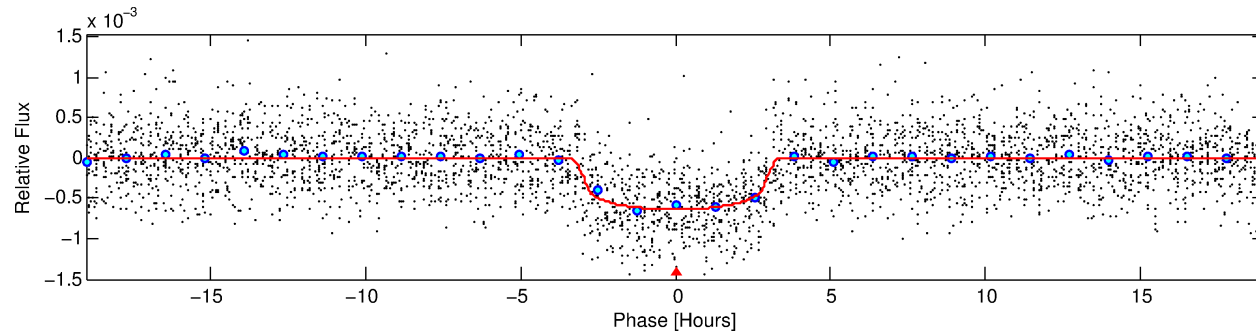
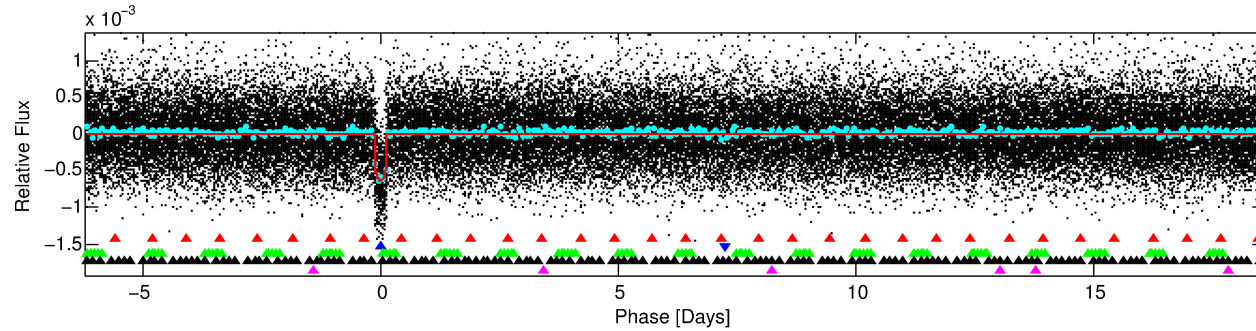
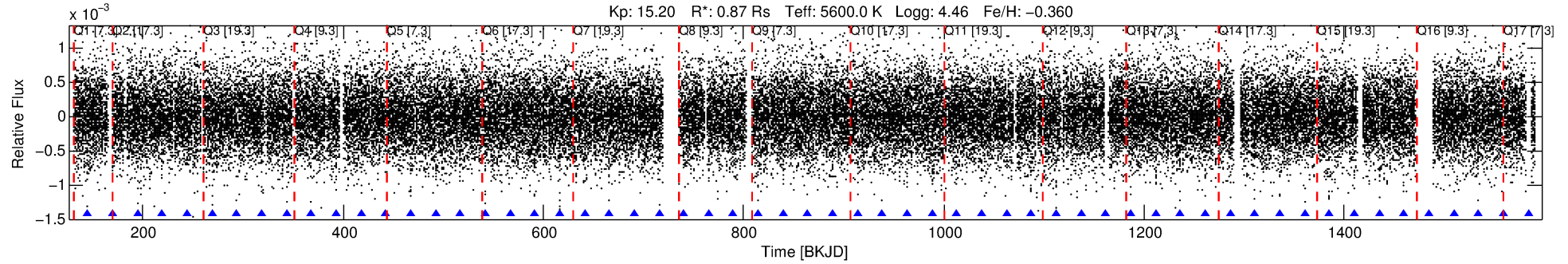
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 008609450-02

No Significant Match Found

# DV One-Page Summary

KIC: 8609450 Candidate: 2 of 5 Period: 24.806 d  
KOI: K01278.01 Name: Kepler-282d Corr: 0.986



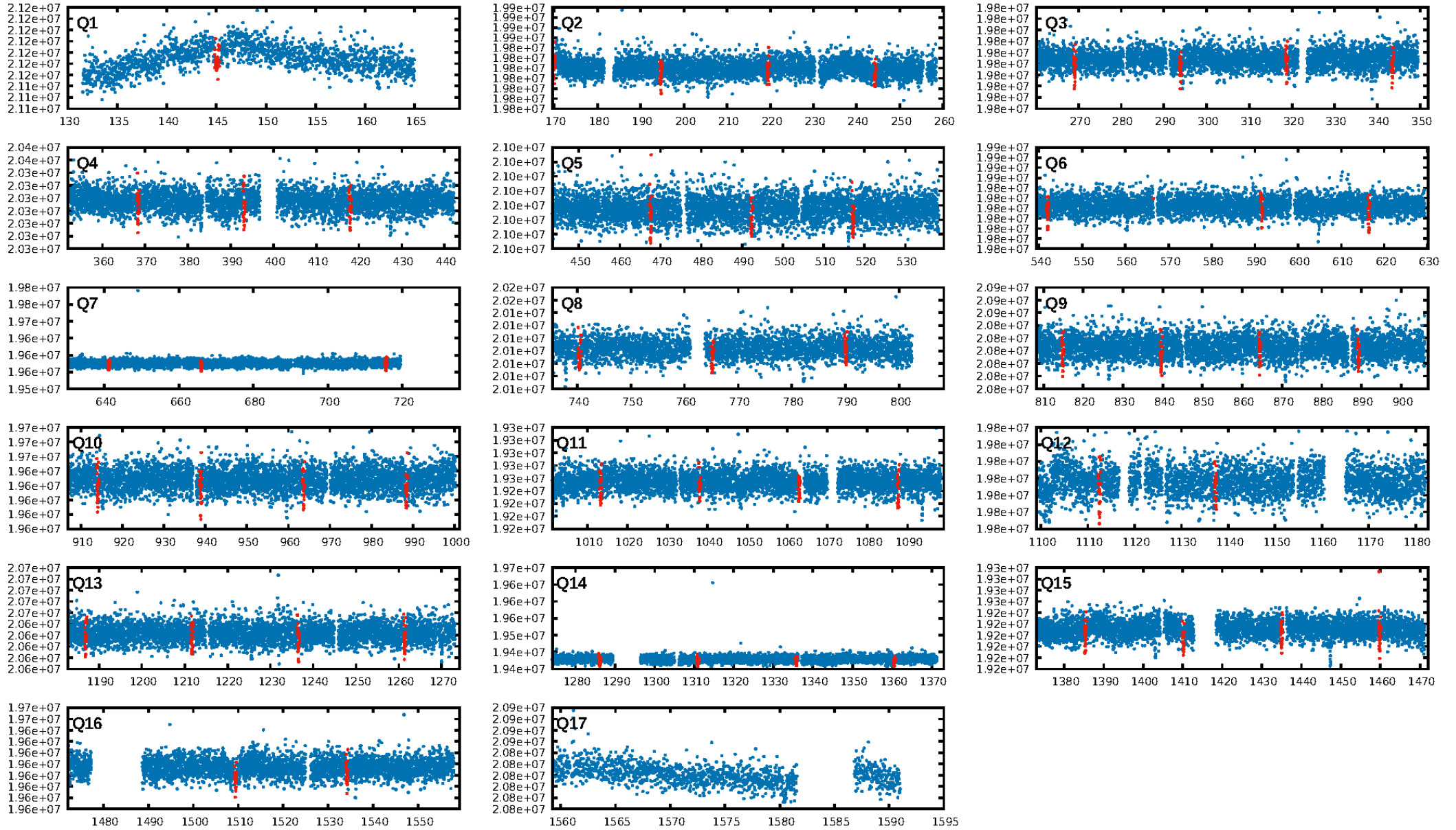
## DV Fit Results:

Period = 24.80577 [0.00011] d  
Epoch = 145.0724 [0.0037] BKJD  
Rp/R\* = 0.0248 [0.0044]  
a/R\* = 21.89 [17.16]  
b = 0.72 [0.54]  
Seff = 28.27 [5.32]  
Teff = 588 [28] K  
Rp = 2.36 [0.49] Re  
a = 0.1540 [0.0159] AU  
Ag = 145.38 [72.40] [1.99 $\sigma$ ]  
Teffp = 3156 [375] K [6.84 $\sigma$ ]

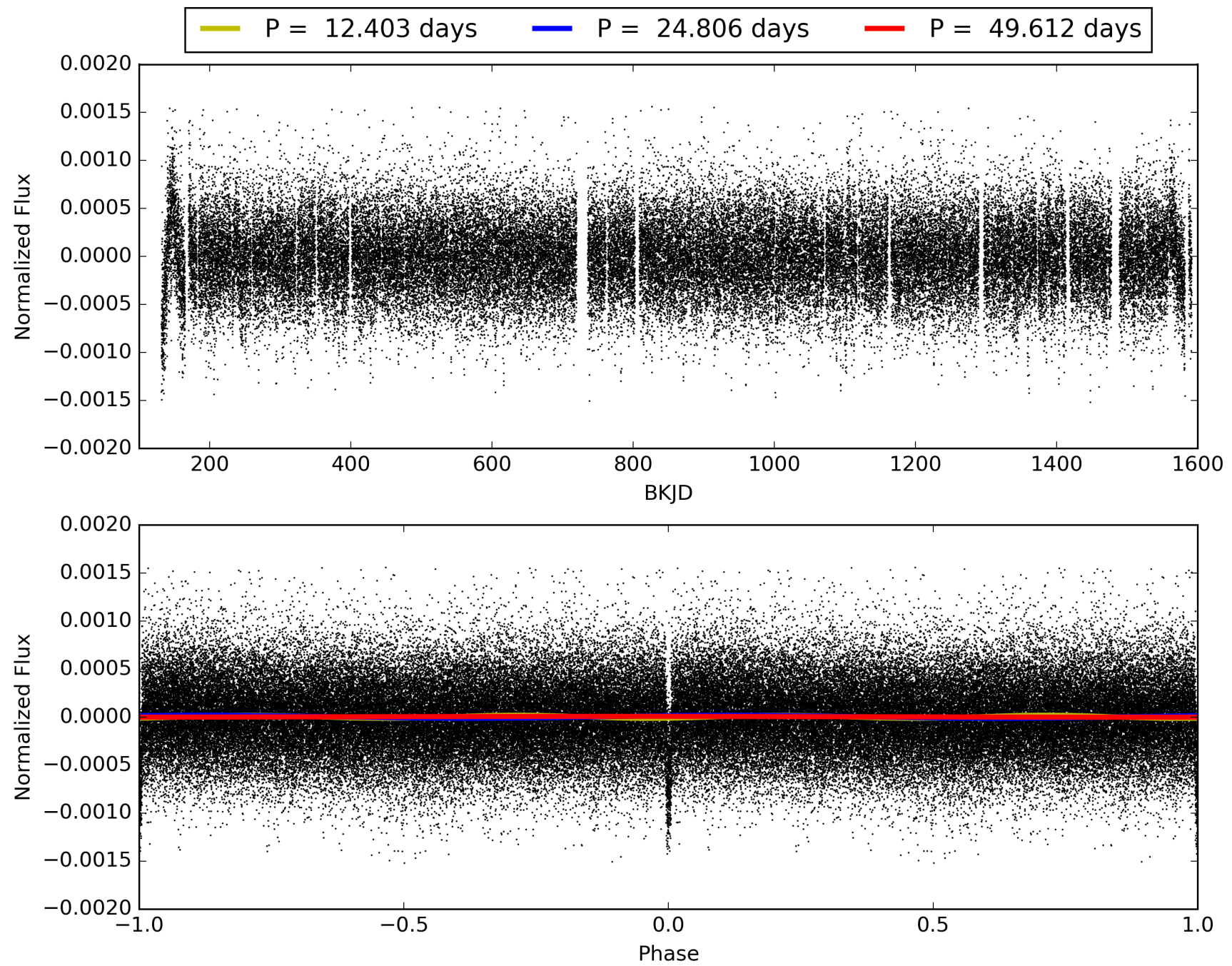
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [30.82 $\sigma$ ]  
LongPeriod-sig: 100.0% [51.41 $\sigma$ ]  
ModelChiSquare2-sig: 98.2%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 4.21e-225  
RollingBand-fgt: 1.00 [51/51]  
GhostDiagnostic-chr: 6.912  
Centroid-sig: 8.3%  
Centroid-so: 0.561 arcsec [1.51 $\sigma$ ]  
OotOffset-rm: 0.132 arcsec [1.00 $\sigma$ ]  
KicOffset-rm: 0.175 arcsec [1.32 $\sigma$ ]  
OotOffset-st: 4/4/4/4 [16]  
KicOffset-st: 4/4/4/4 [16]  
DiffImageQuality-fgm: 1.00 [16/16]  
DiffImageOverlap-fno: 1.00 [16/16]

# TCE 008609450-02, PDC Light Curves



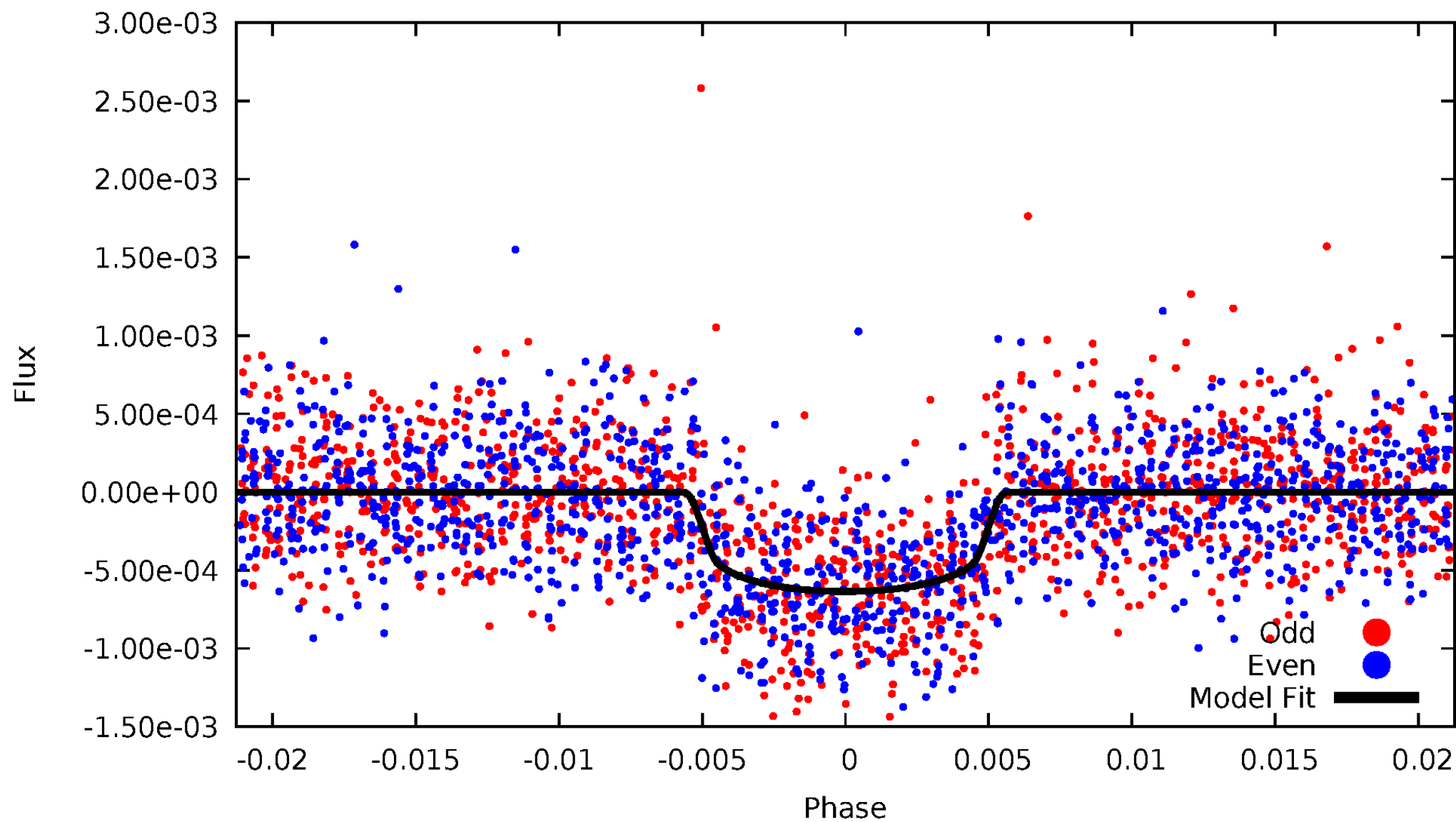
TCE 008609450-02





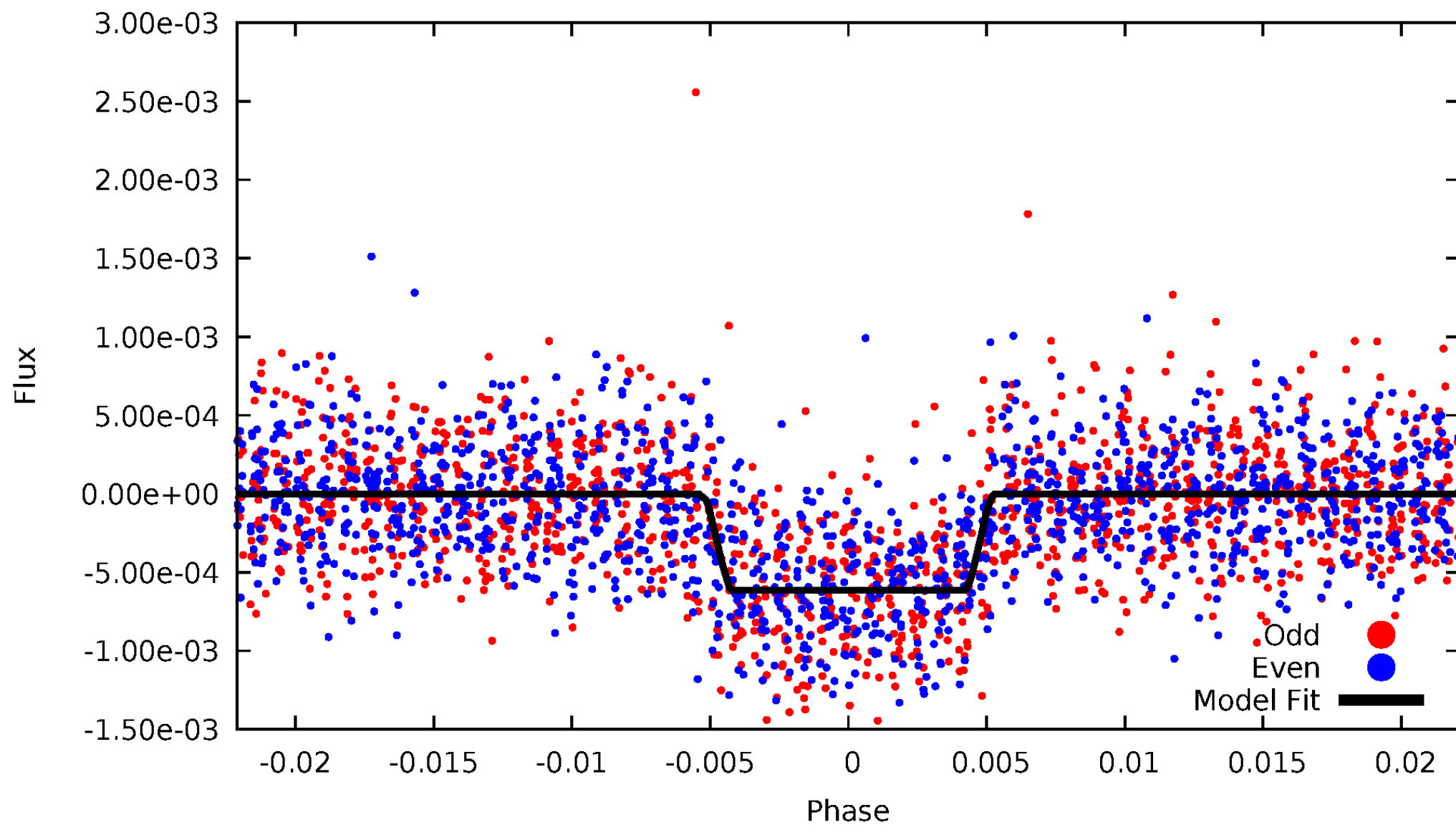
# DV Odd/Even

TCE 008609450-02



# ALT Odd/Even

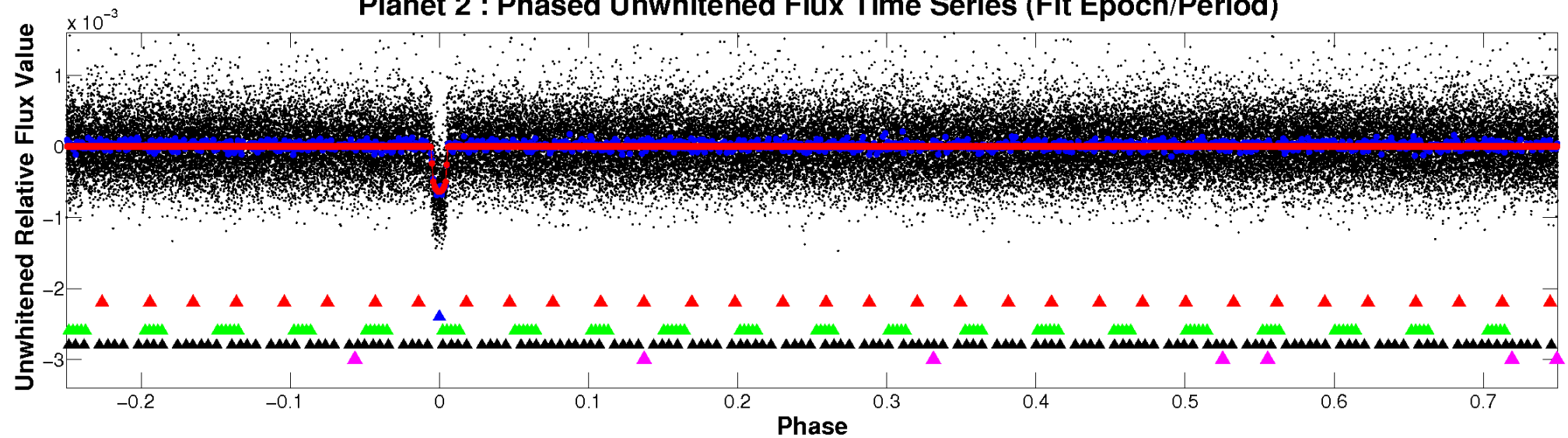
TCE 008609450-02



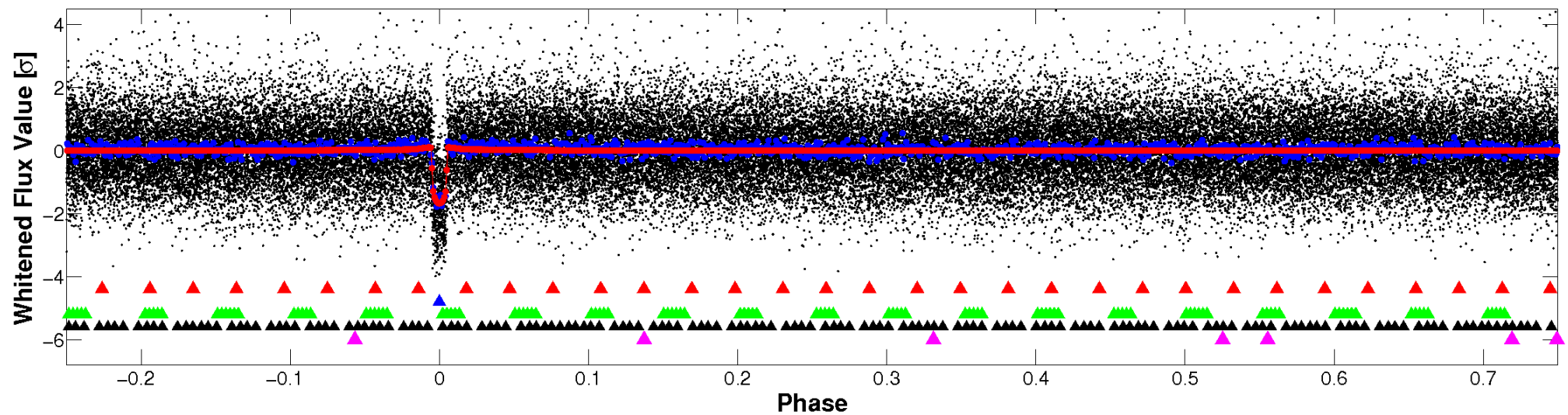


# Non-Whitened Vs. Whitened Light Curve

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

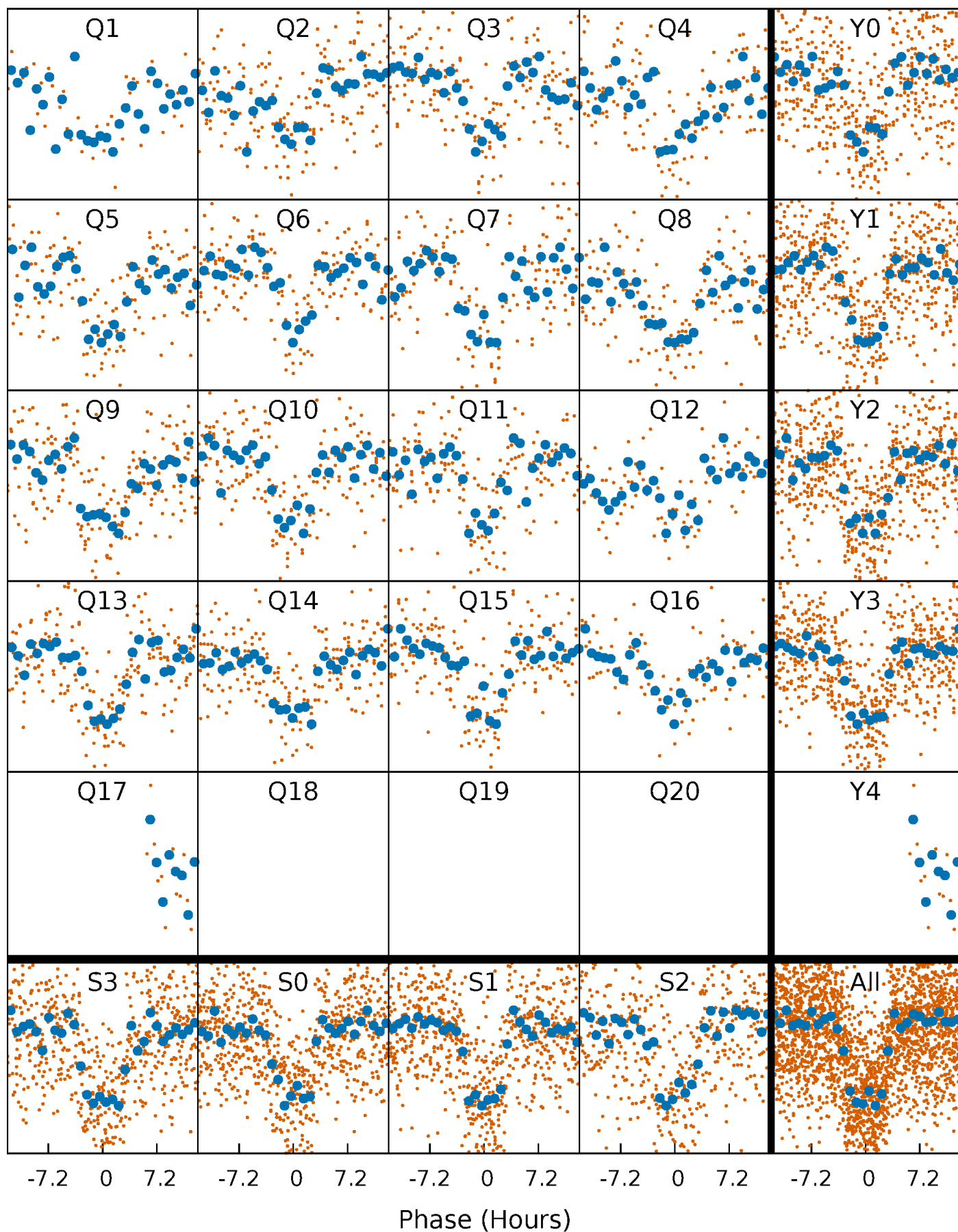


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



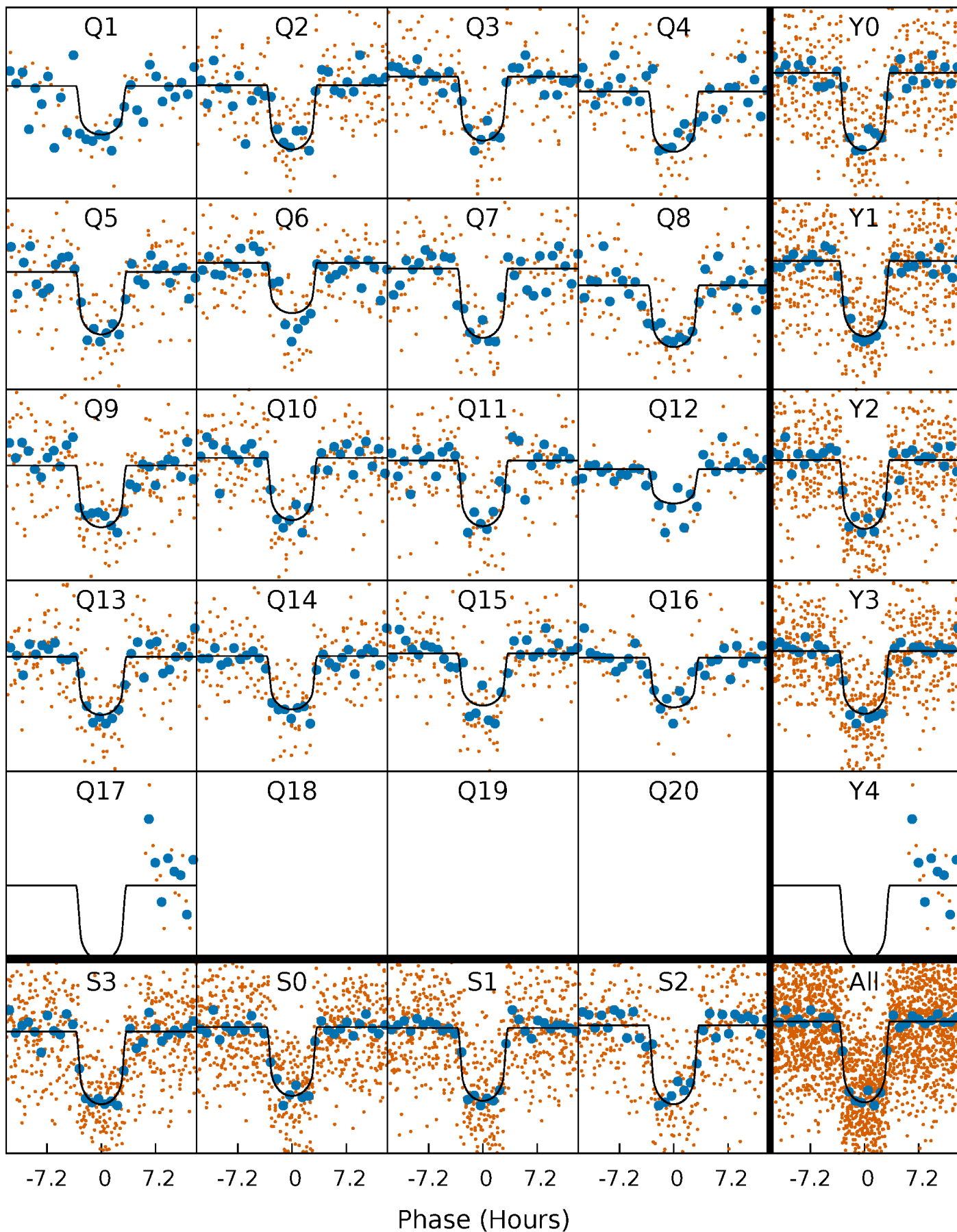
# PDC Quarter-Phased Transit Curves

TCE 008609450-02 P= 24.805768 Days  $T_0=145.072415$  (BKJD)



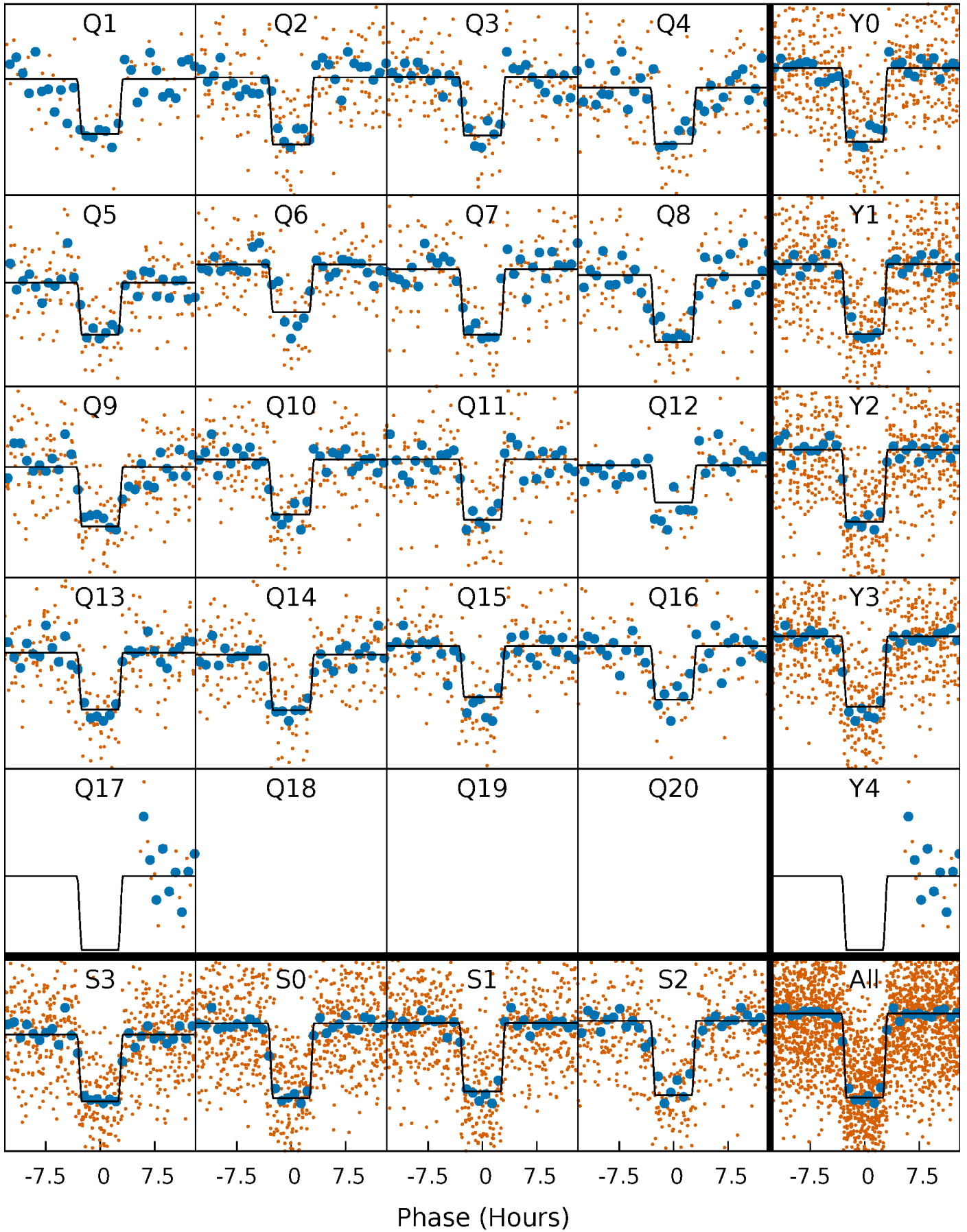
# DV Quarter-Phased Transit Curves

TCE 008609450-02 P= 24.805768 Days  $T_0=145.072415$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

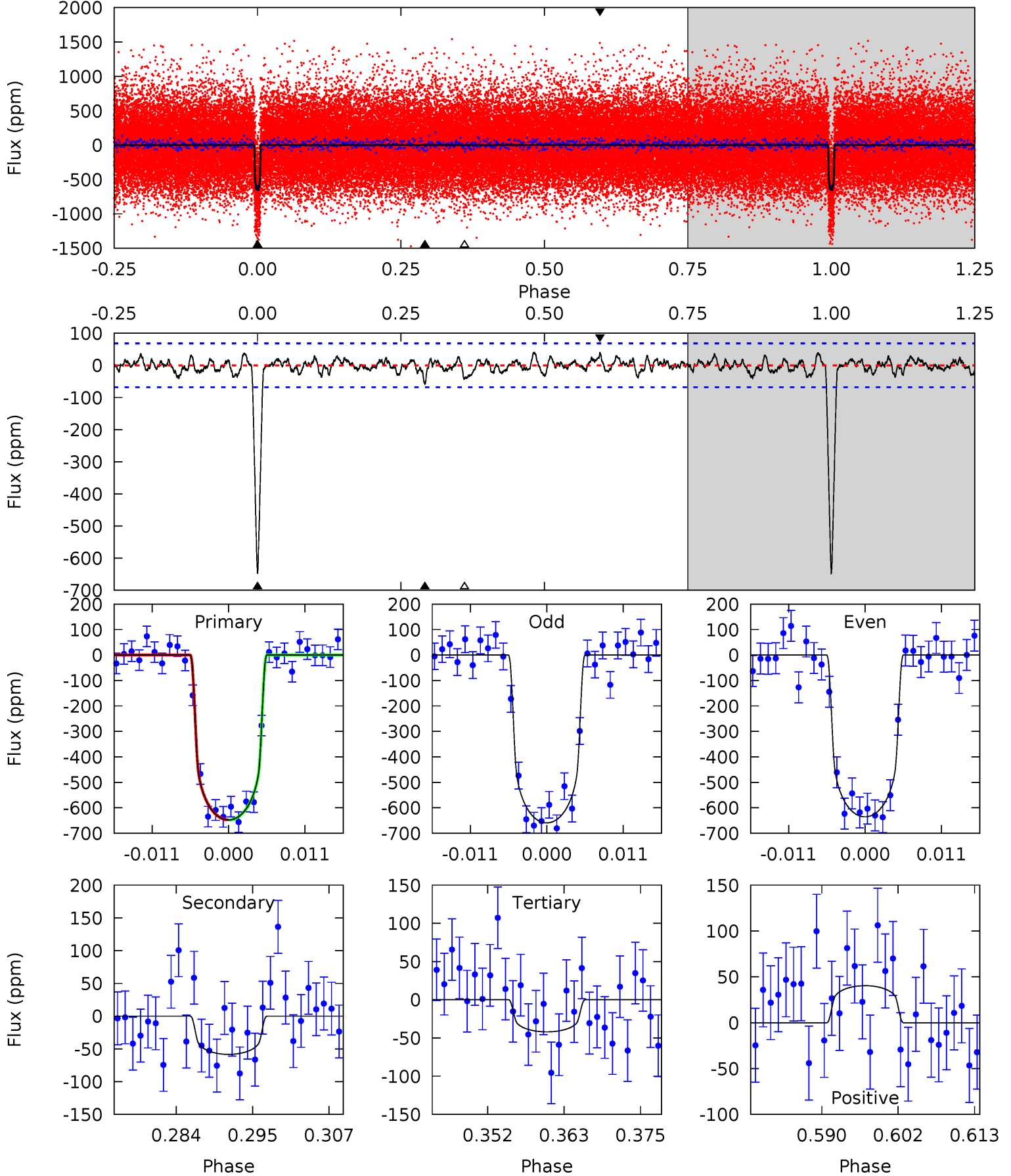
TCE 008609450-02   P= 24.806149 Days    $T_0=145.064277$  (BKJD)



# DV Model-Shift Uniqueness Test

008609450-02, P = 24.805768 Days, E = 120.266647 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
47.6	4.29	3.09	2.96	5.00	2.53	1.11	44.5	44.6	1.20	1.33	0.88	0.98	0.06	0.02

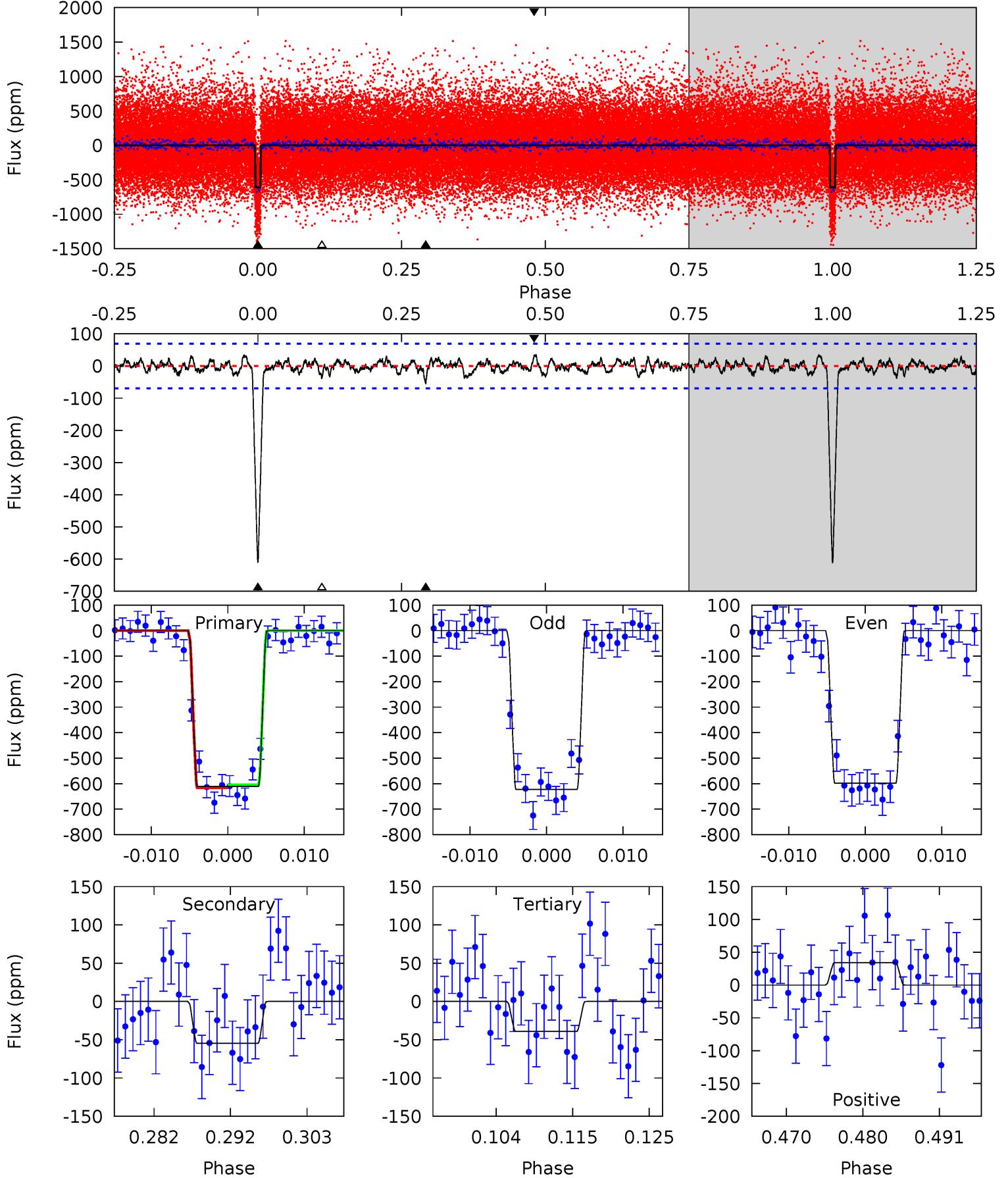




# Alt Model-Shift Uniqueness Test

008609450-02,  $P = 24.806149$  Days,  $E = 120.258128$  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
44.1	3.94	2.83	2.46	5.02	2.56	0.96	41.3	41.6	1.11	1.47	0.89	0.99	0.05	0.41



### Stellar Parameters For KIC 008609450

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5600^{+112}_{-100}$	$4.455^{+0.102}_{-0.077}$	$-0.360^{+0.150}_{-0.150}$	$0.872^{+0.088}_{-0.088}$	$0.793^{+0.064}_{-0.035}$	$1.683^{+0.728}_{-0.398}$
	+2%/-2%	+2%/-2%	+42%/-42%	+10%/-10%	+8%/-4%	+43%/-24%
Source	SPE58	SPE58	SPE58	DSEP		

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

### Secondary Eclipse Parameters for KIC 008609450-02 / KOI 1278.01

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-58 \pm 14$	$2.33^{+0.48}_{-0.43}$	$822^{+31}_{-29}$	$3579^{+289}_{-245}$	$142^{+83}_{-52}$
Alt.	$-54 \pm 14$	$2.34^{+0.50}_{-0.42}$	$821^{+29}_{-27}$	$3530^{+276}_{-241}$	$128^{+72}_{-46}$

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

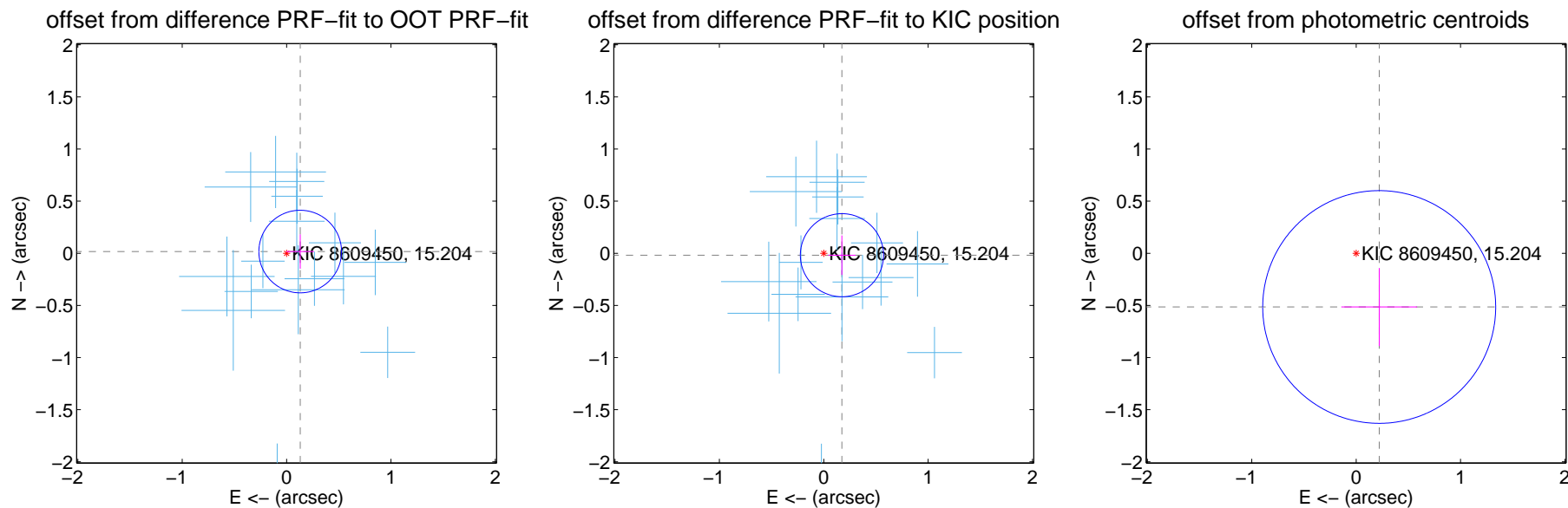
## DV Centroid Data

Supplemental centroid analysis for 008609450-02. Kepler magnitude: 15.20. Transit SNR 35.84

There are 16 quarters with good PRF difference image offsets

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

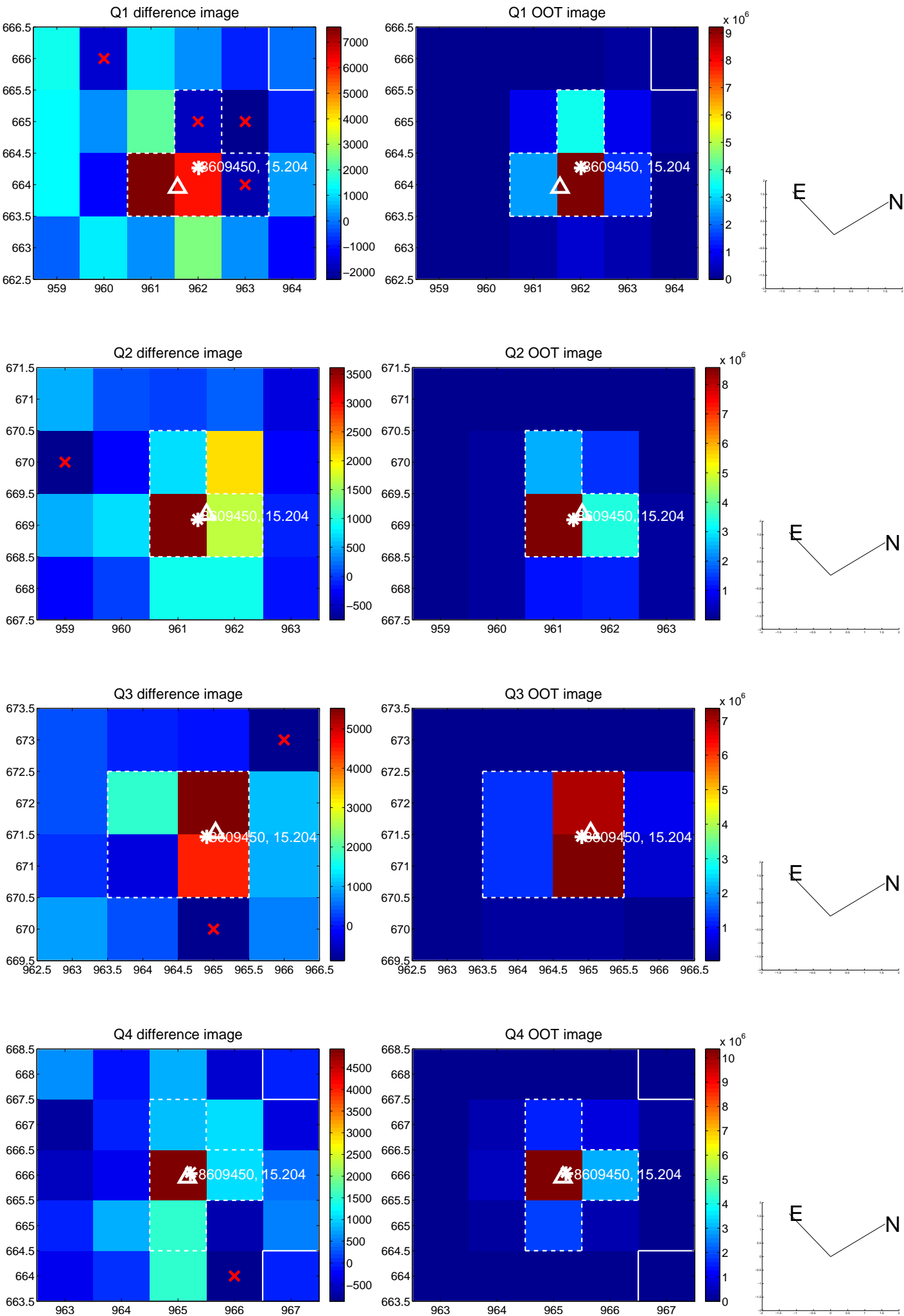
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.132 \pm 0.132$	1.00	$-0.130 \pm 0.131$	$0.017 \pm 0.164$
PRF-fit source offset from KIC position	$0.175 \pm 0.133$	1.32	$-0.174 \pm 0.130$	$-0.018 \pm 0.190$
photometric centroid source offset	$0.56 \pm 0.37$	1.51	$-0.22 \pm 0.36$	$-0.52 \pm 0.37$



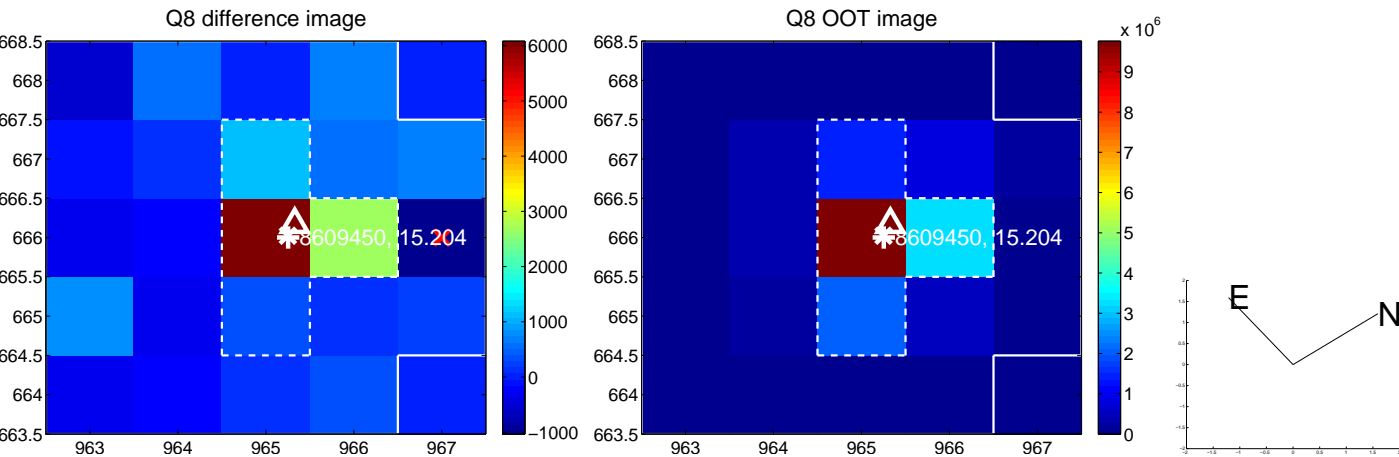
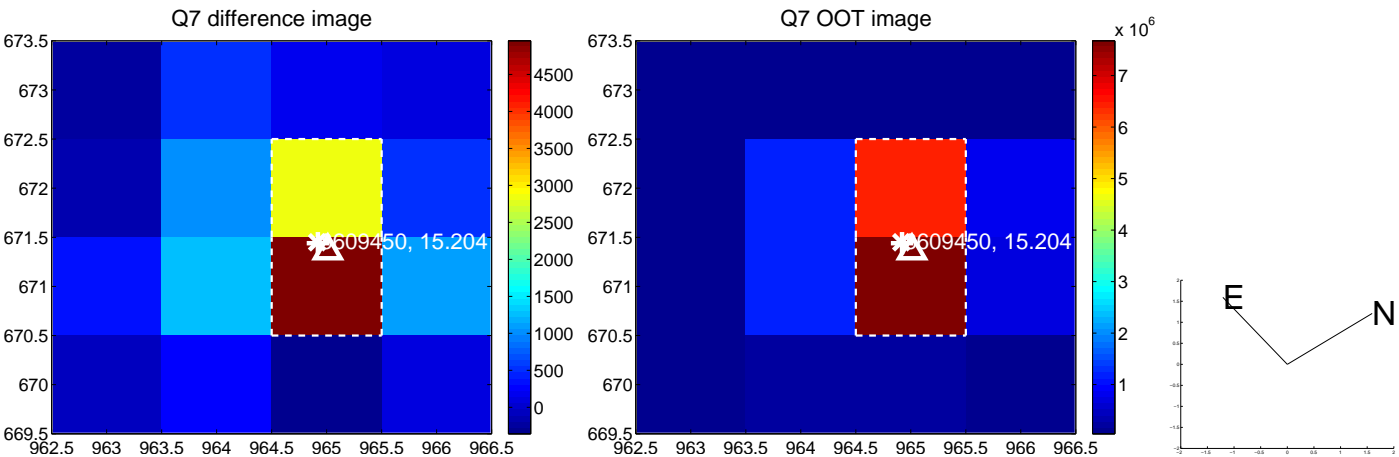
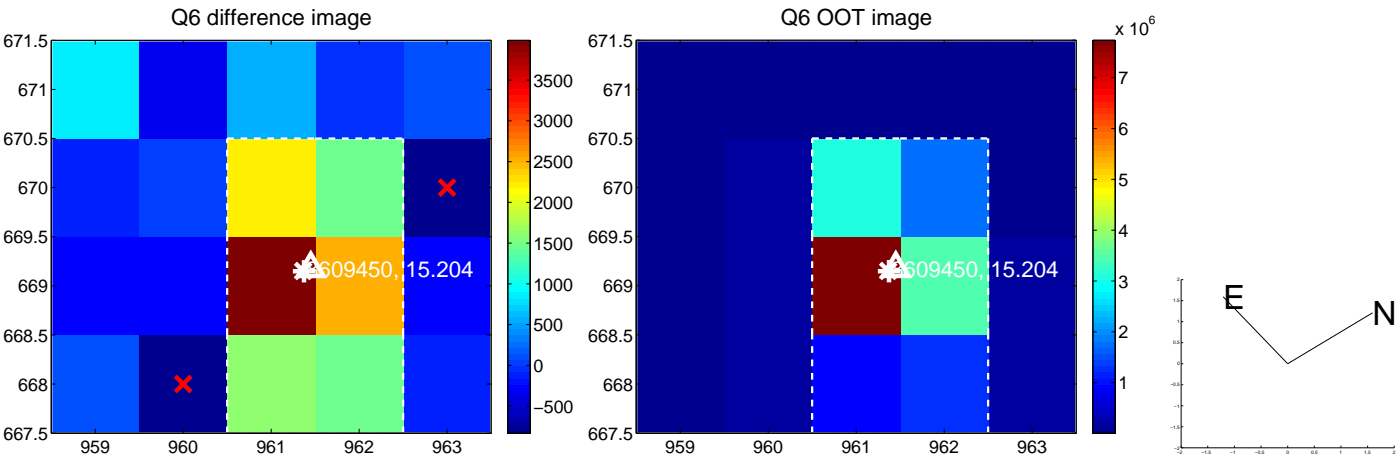
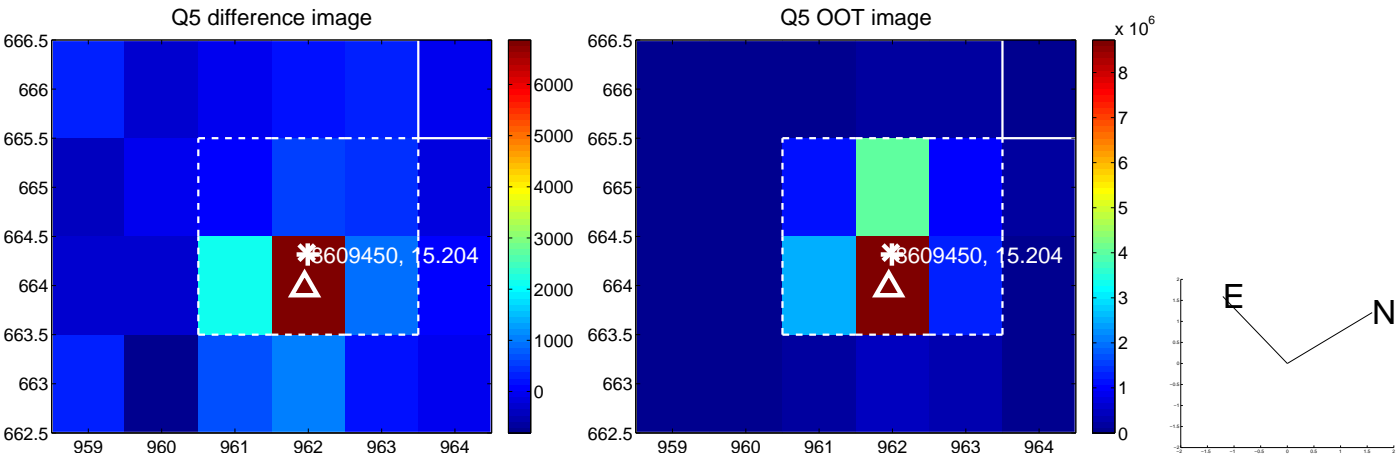
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



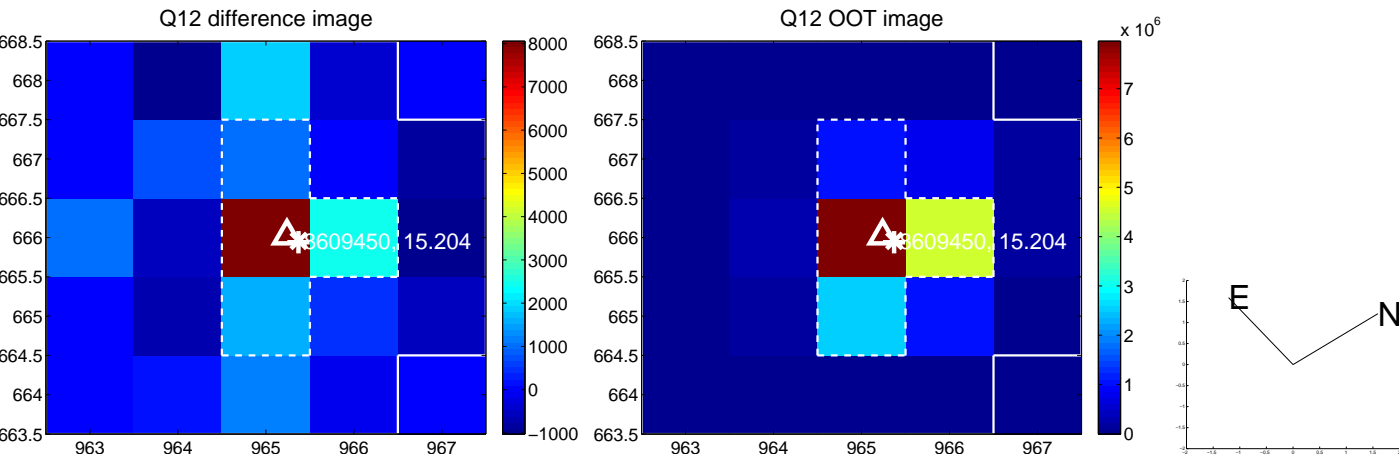
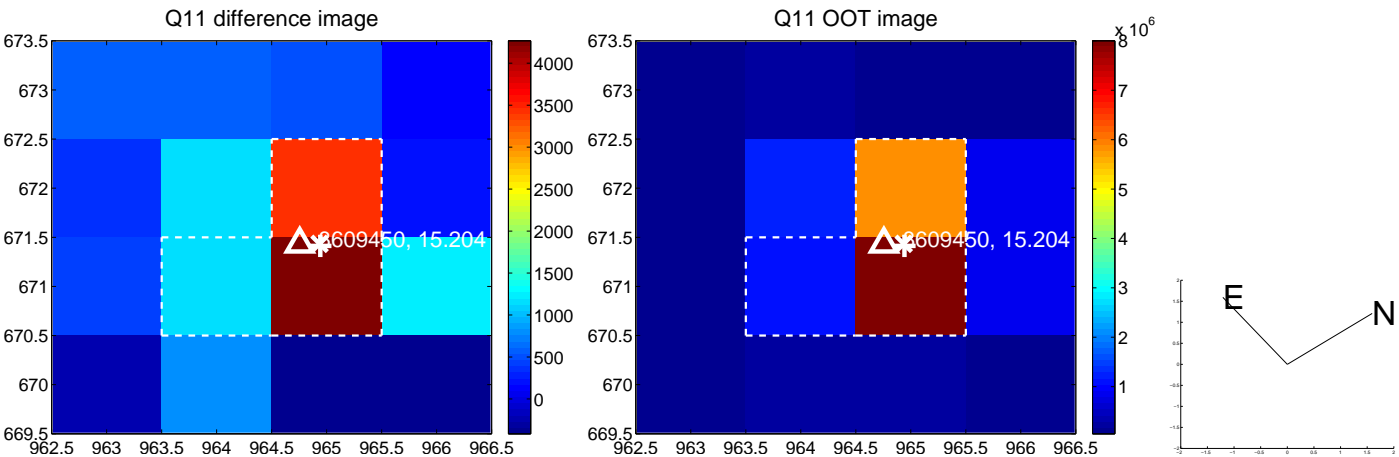
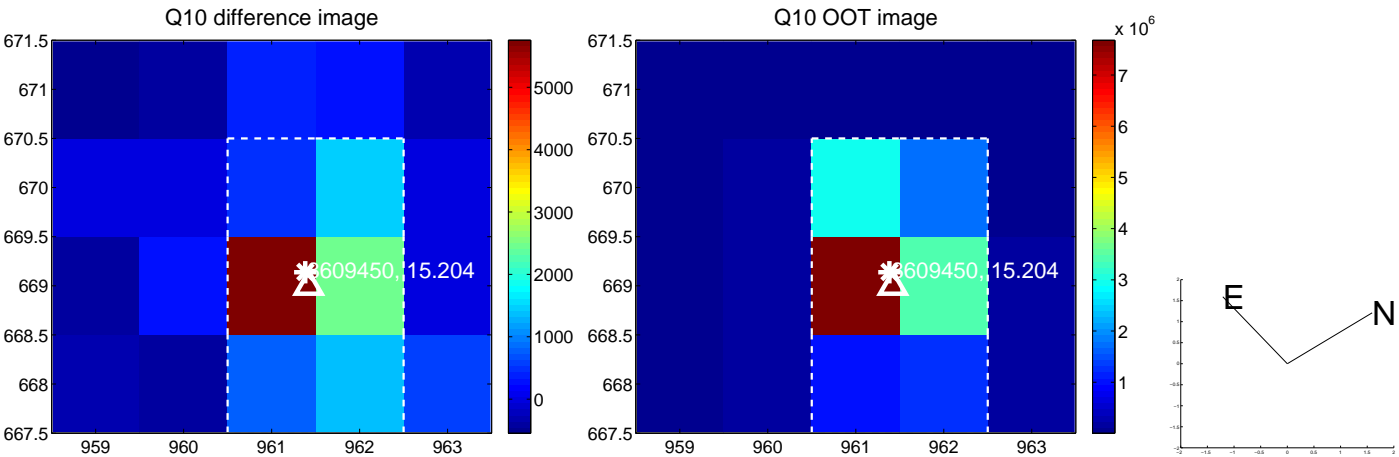
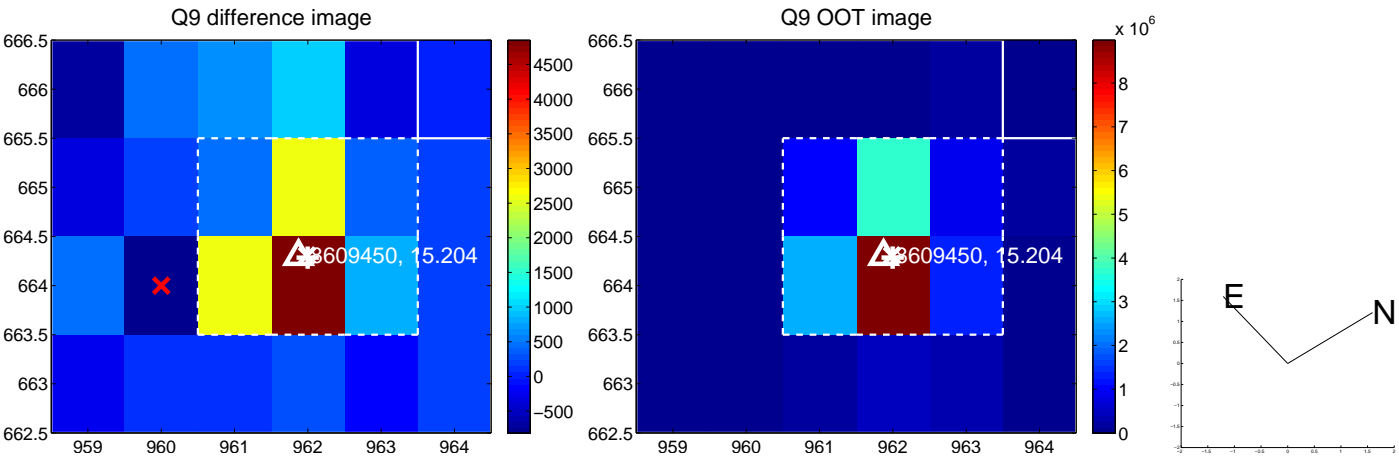
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



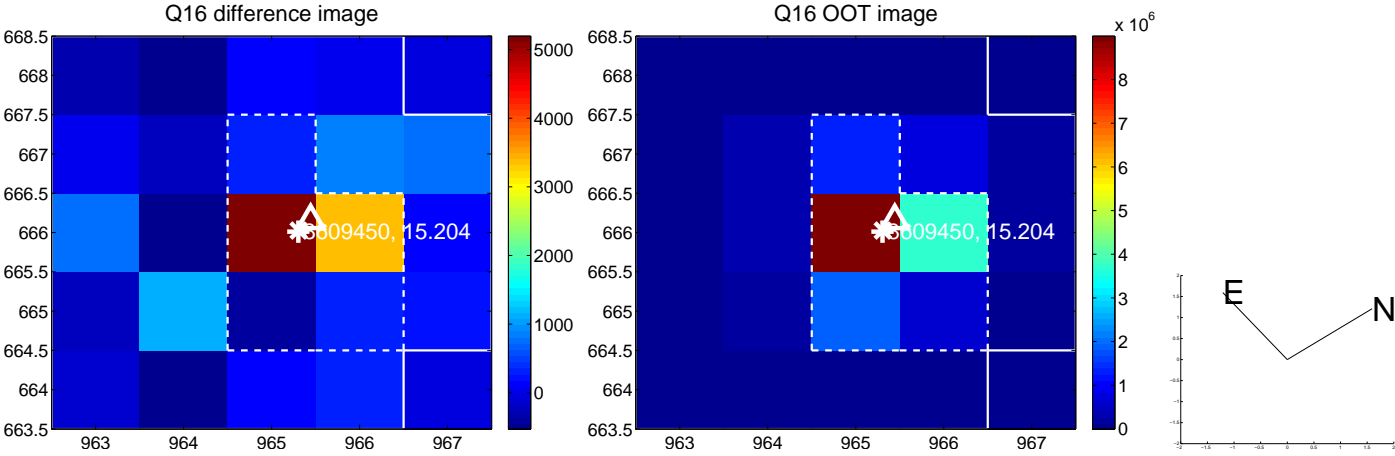
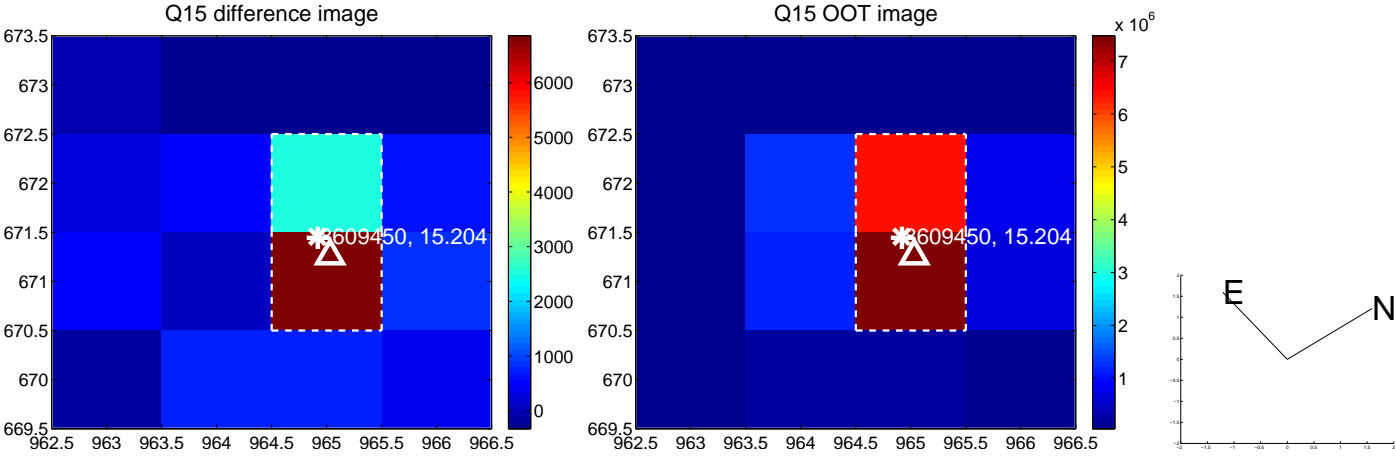
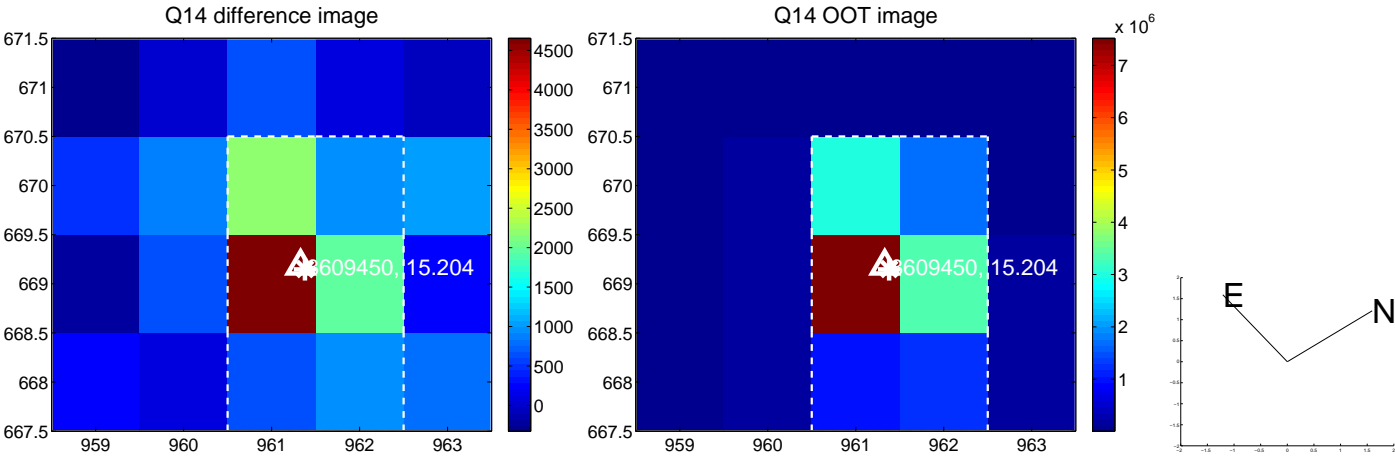
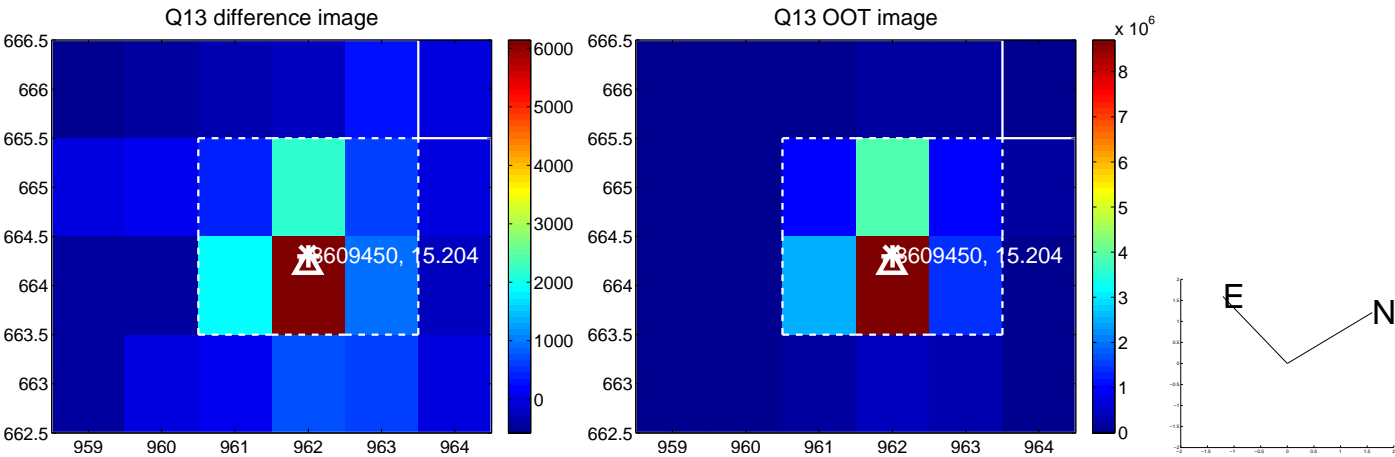
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



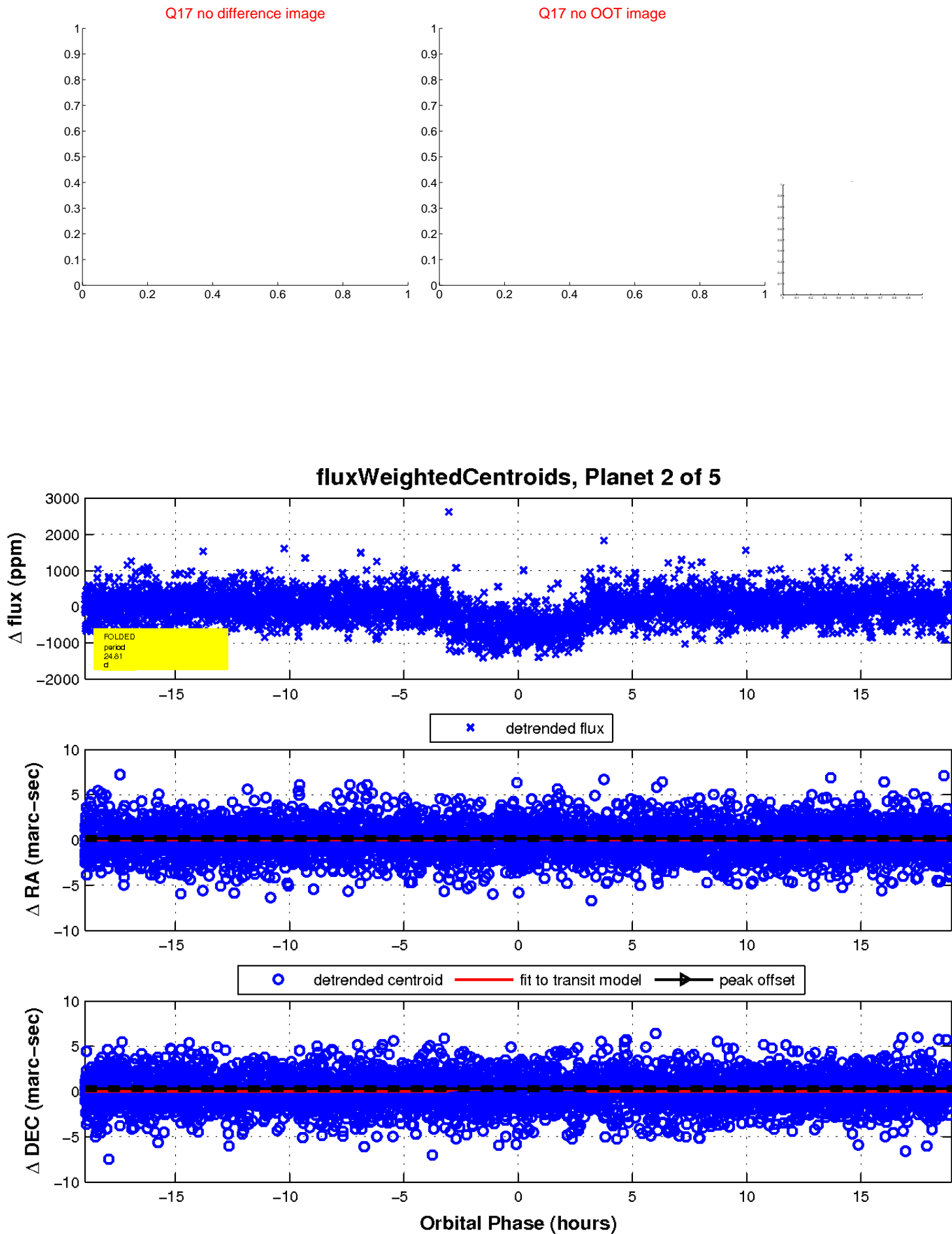
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

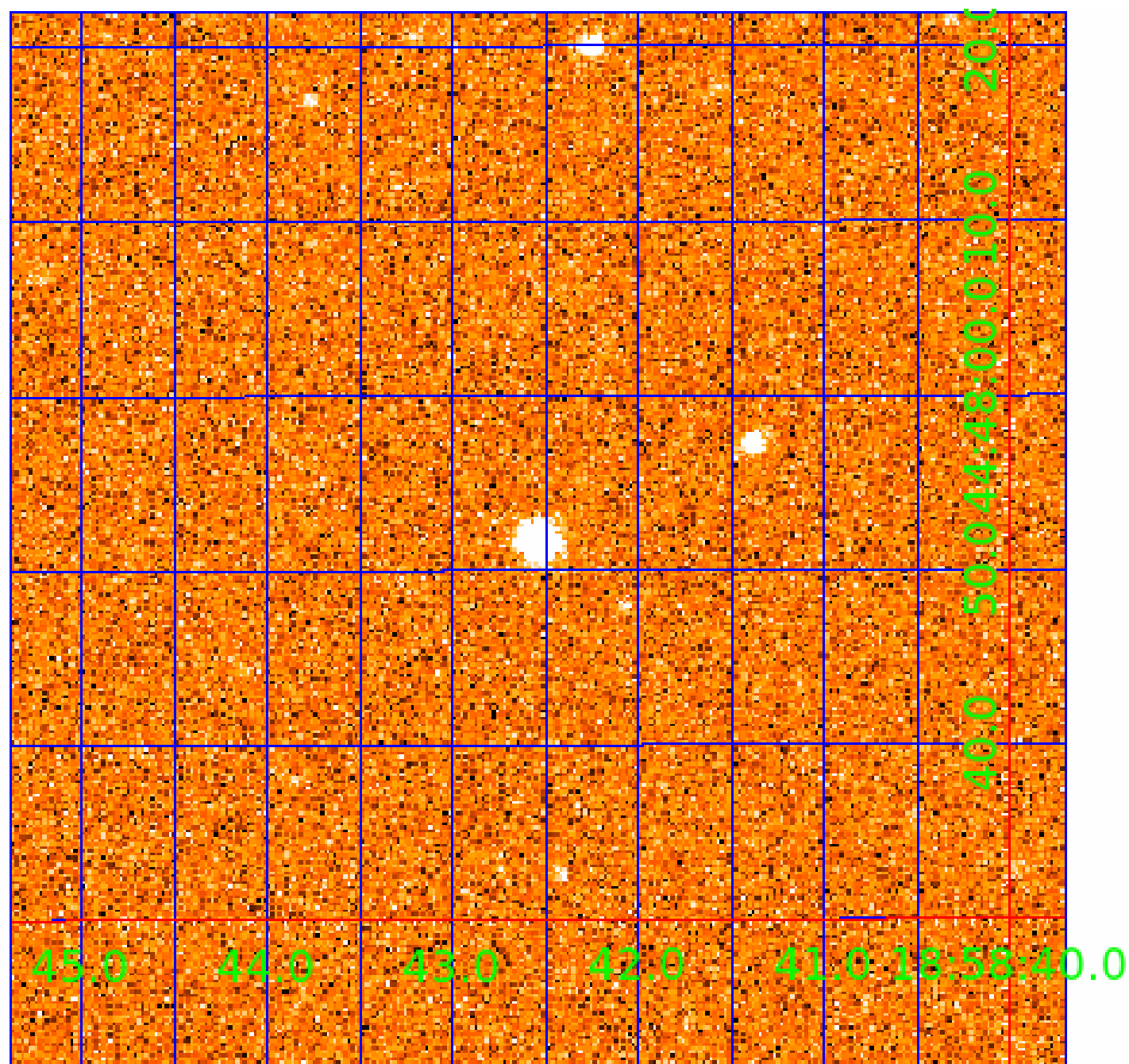


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



# UKIRT Image

Declination



# KIC 008609450

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008609450-01	OBS	1278.02	44.347354	161.315210	769.2	6.571	31.9	34.1	0.87	5600	2.66	13.03
008609450-02	OBS	1278.01	24.805768	145.072415	637.0	6.328	32.7	35.8	0.87	5600	2.36	28.27
008609450-03	OBS	1278.04	13.639704	141.729281	171.6	5.964	12.0	12.8	0.87	5600	1.37	62.75
008609450-04	OBS	1278.03	9.220819	138.003924	133.8	5.322	11.3	11.2	0.87	5600	1.29	105.75
008609450-05	OBS	1278.05	203.257809	208.462165	328.4	6.657	7.6	7.6	0.87	5600	1.75	1.71

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008609450-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
008609450-02	OBS	PC	1.00	0	0	0	0	NO_COMMENT
008609450-03	OBS	PC	0.99	0	0	0	0	NO_COMMENT
008609450-04	OBS	PC	0.90	0	0	0	0	NO_COMMENT
008609450-05	OBS	FP	0.17	1	0	0	0	INDIV_TRANS_MARSHALL—MOD_NONUNIQ_ALT

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

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

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

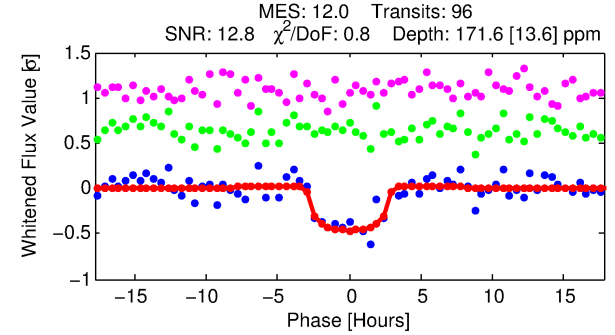
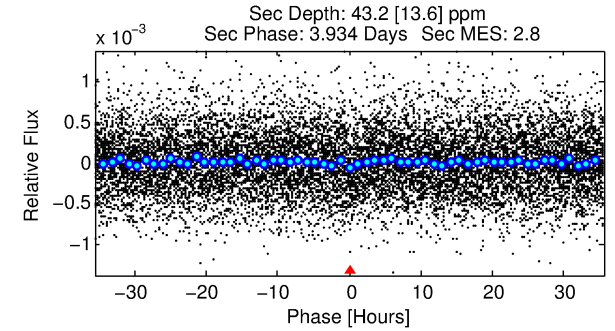
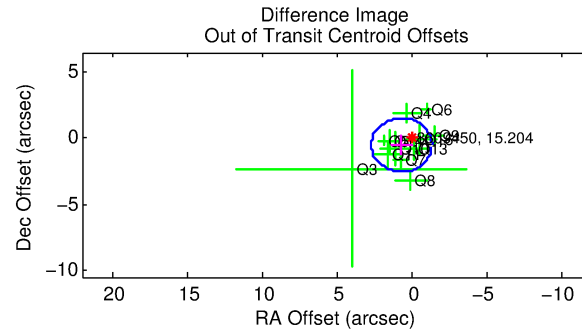
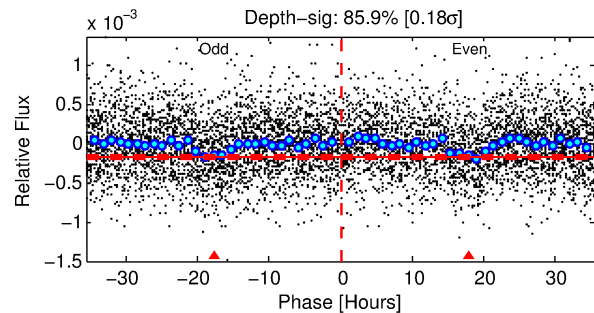
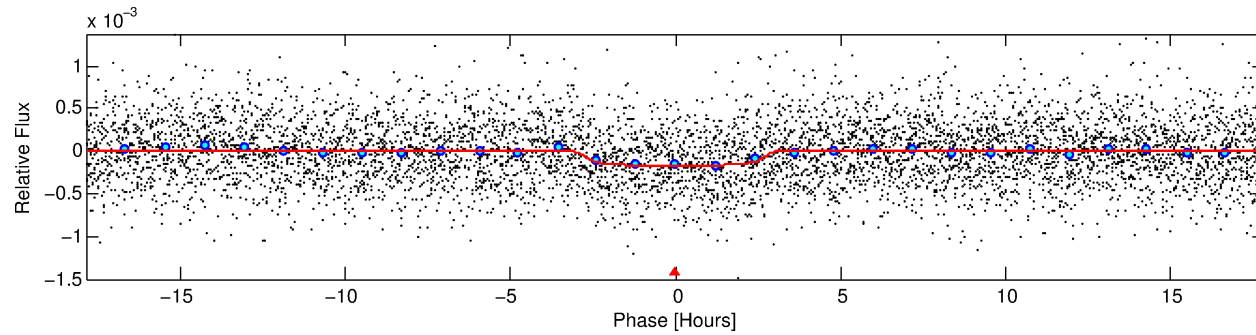
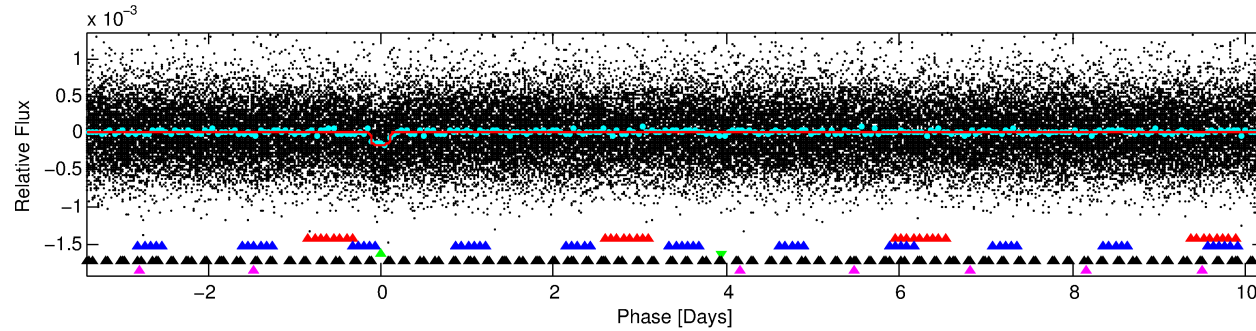
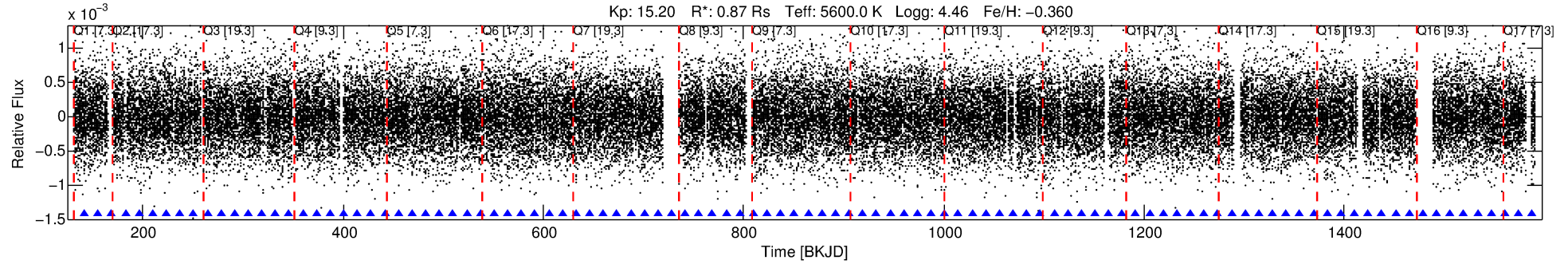
## Ephemeris Match Information For 008609450-03

No Significant Match Found



# DV One-Page Summary

KIC: 8609450 Candidate: 3 of 5 Period: 13.640 d  
KOI: K01278.04 Name: Kepler-282c Corr: 0.956



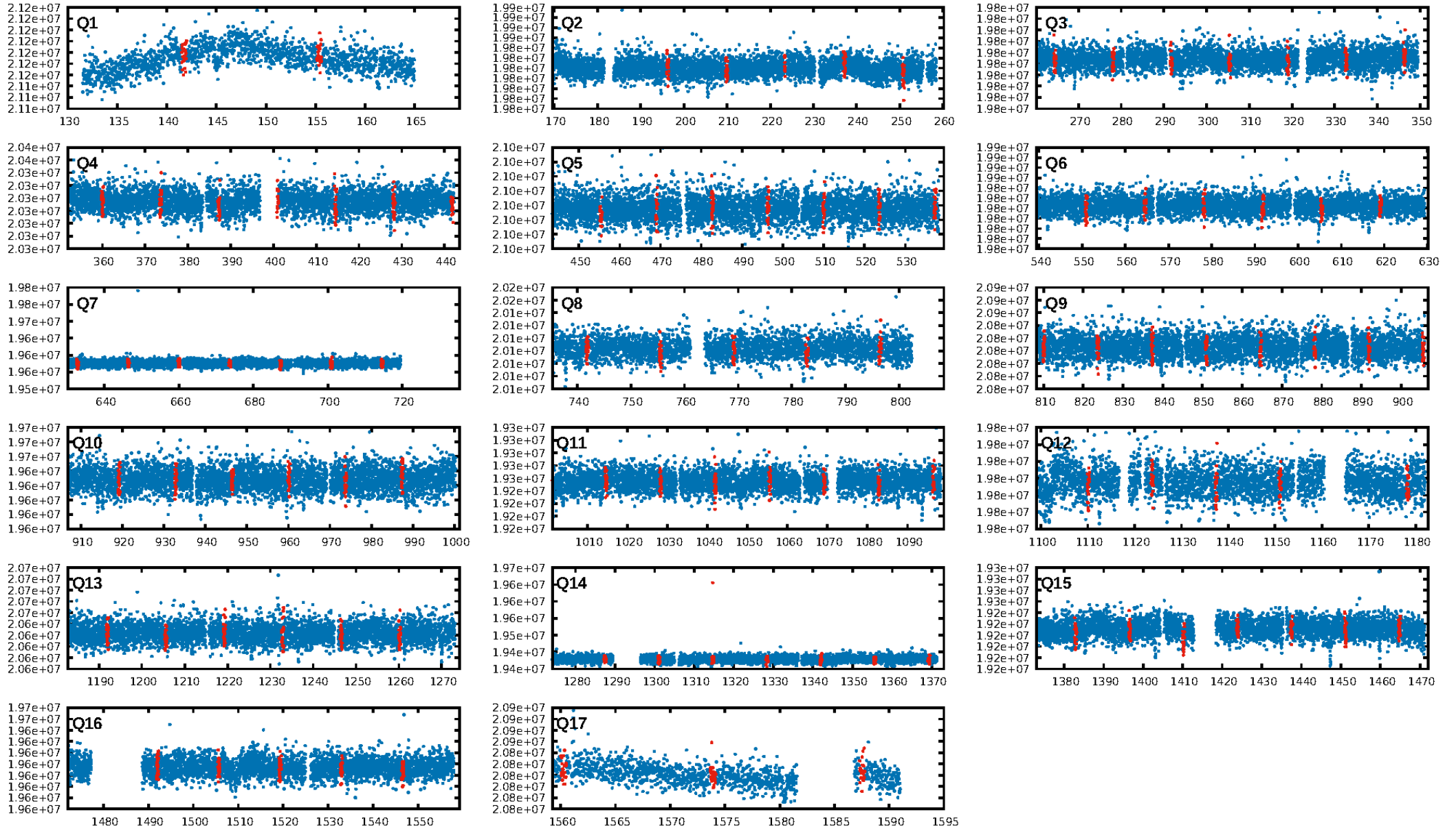
## DV Fit Results:

Period = 13.63970 [0.00015] d  
Epoch = 141.7293 [0.0091] BKJD  
Rp/R\* = 0.0144 [0.0029]  
a/R\* = 7.83 [7.42]  
b = 0.91 [0.18]  
Seff = 62.75 [11.81]  
Teff = 718 [34] K  
Rp = 1.37 [0.31] Re  
a = 0.1033 [0.0107] AU  
Ag = 134.57 [72.86] [1.83 $\sigma$ ]  
Teffp = 3779 [491] K [6.22 $\sigma$ ]

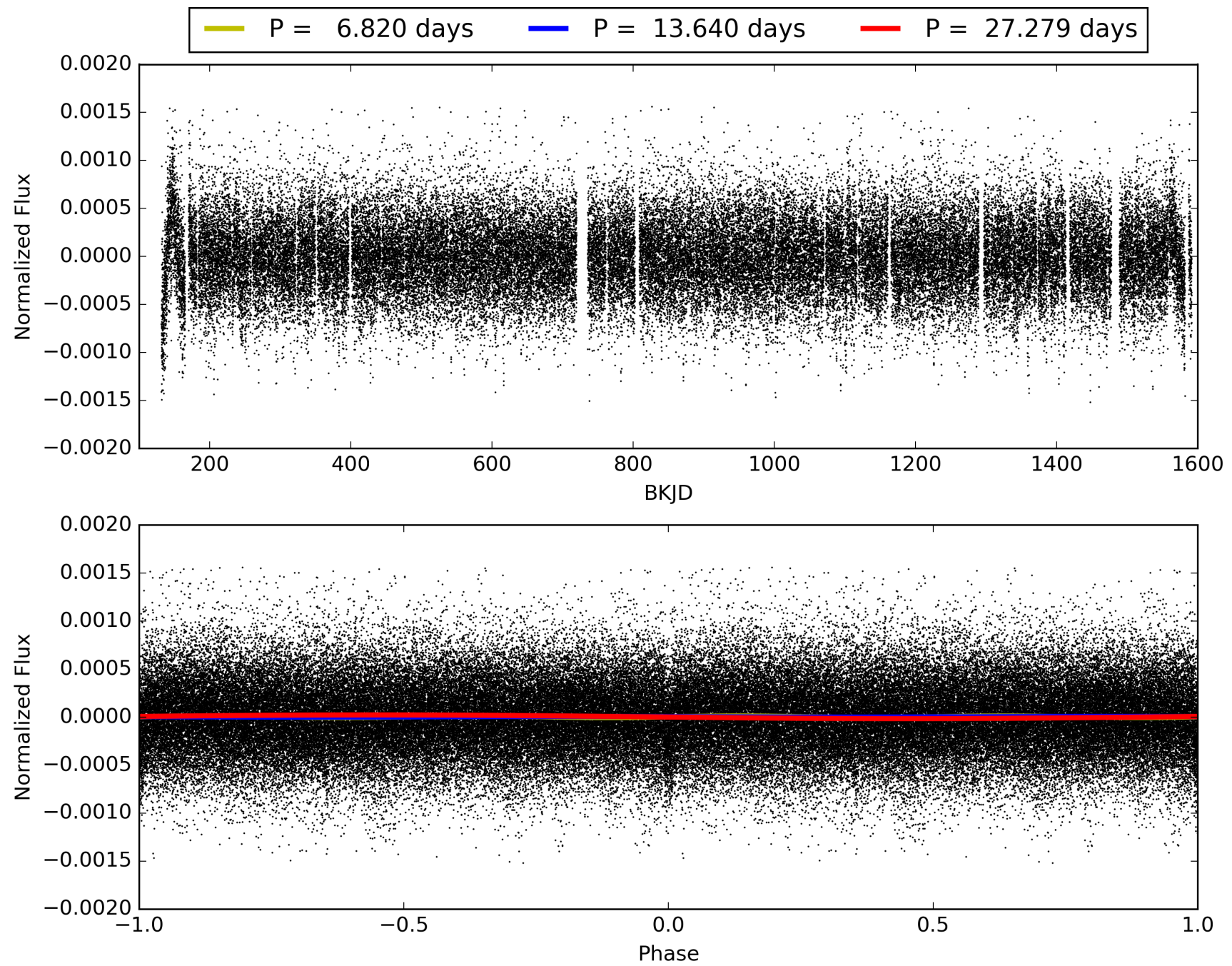
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [13.27 $\sigma$ ]  
LongPeriod-sig: 100.0% [30.82 $\sigma$ ]  
ModelChiSquare2-sig: 96.8%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 1.39e-32  
RollingBand-fgt: 1.00 [91/91]  
GhostDiagnostic-chr: 2.411  
Centroid-sig: 88.3%  
Centroid-so: 0.216 arcsec [0.21 $\sigma$ ]  
OotOffset-rm: 0.823 arcsec [1.22 $\sigma$ ]  
KicOffset-rm: 0.736 arcsec [1.09 $\sigma$ ]  
OotOffset-st: 3/3/3 [12]  
KicOffset-st: 3/3/3 [12]  
DiffImageQuality-fgm: 0.50 [6/12]  
DiffImageOverlap-fno: 1.00 [17/17]

# TCE 008609450-03, PDC Light Curves

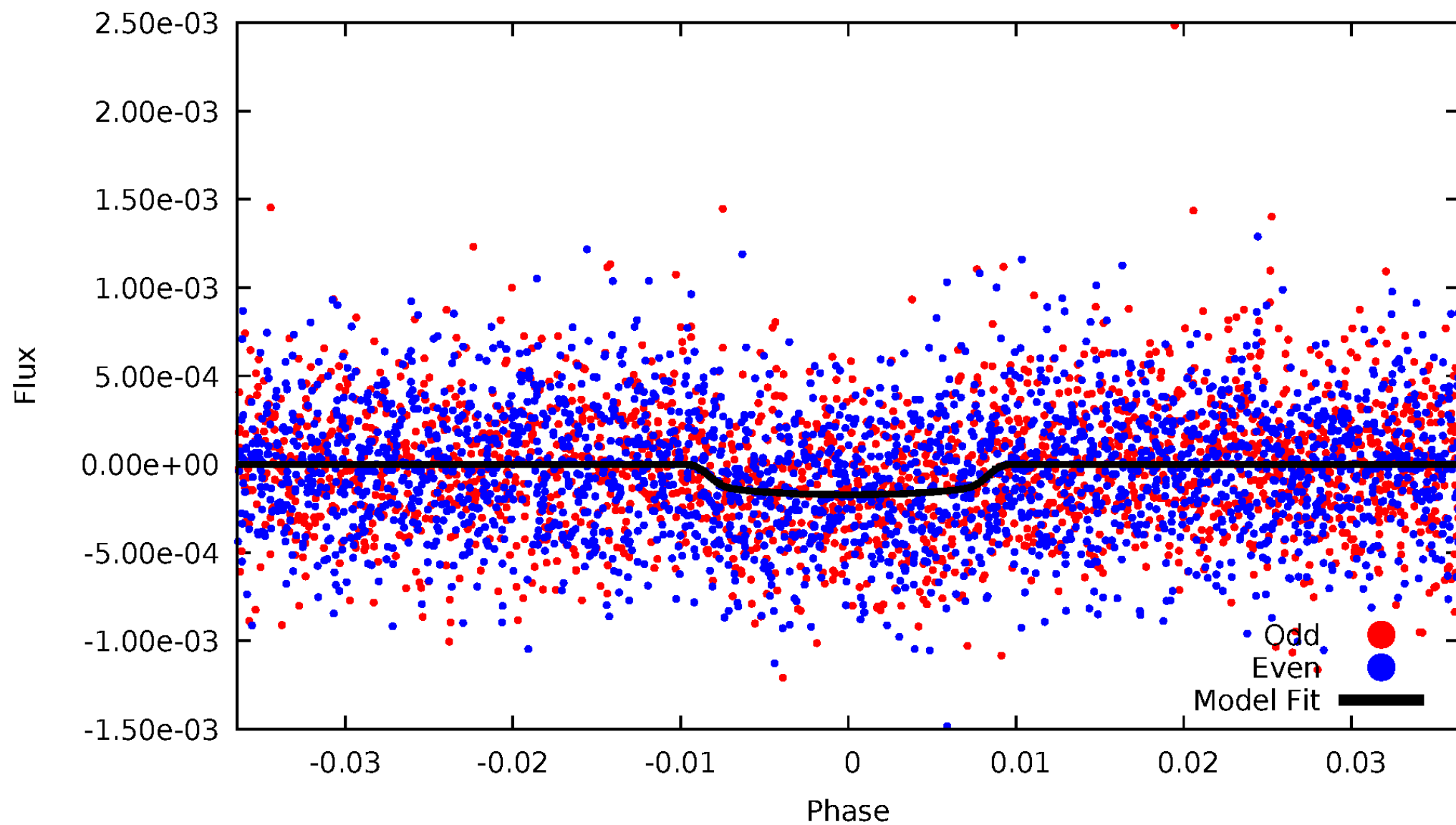


TCE 008609450-03



# DV Odd/Even

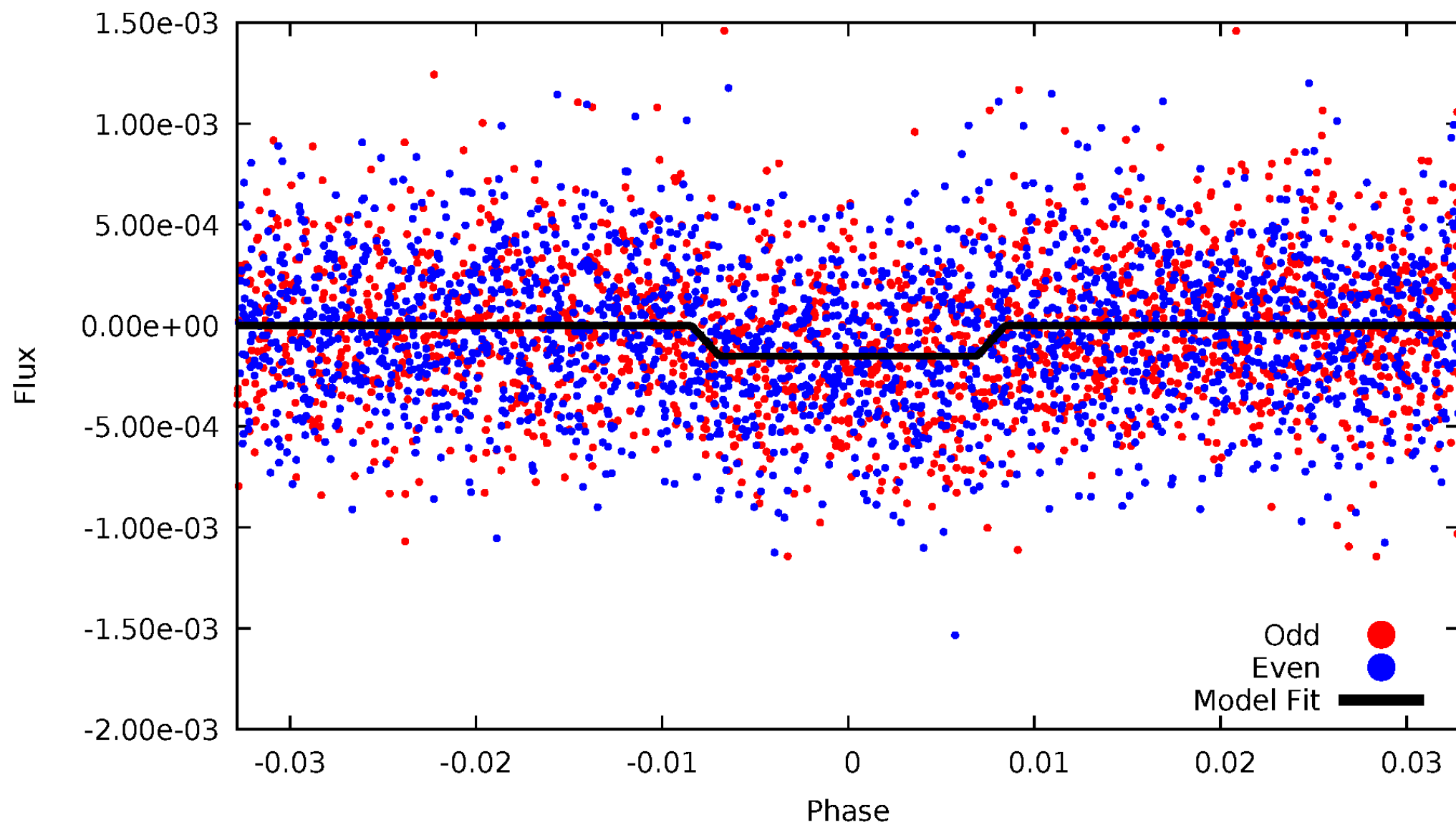
TCE 008609450-03





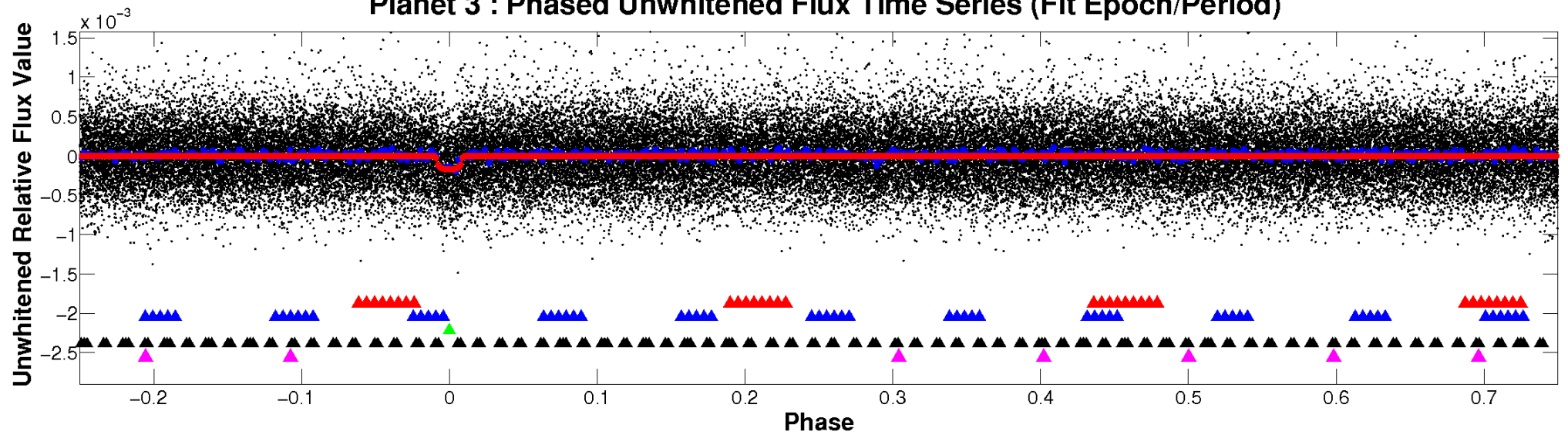
# ALT Odd/Even

TCE 008609450-03

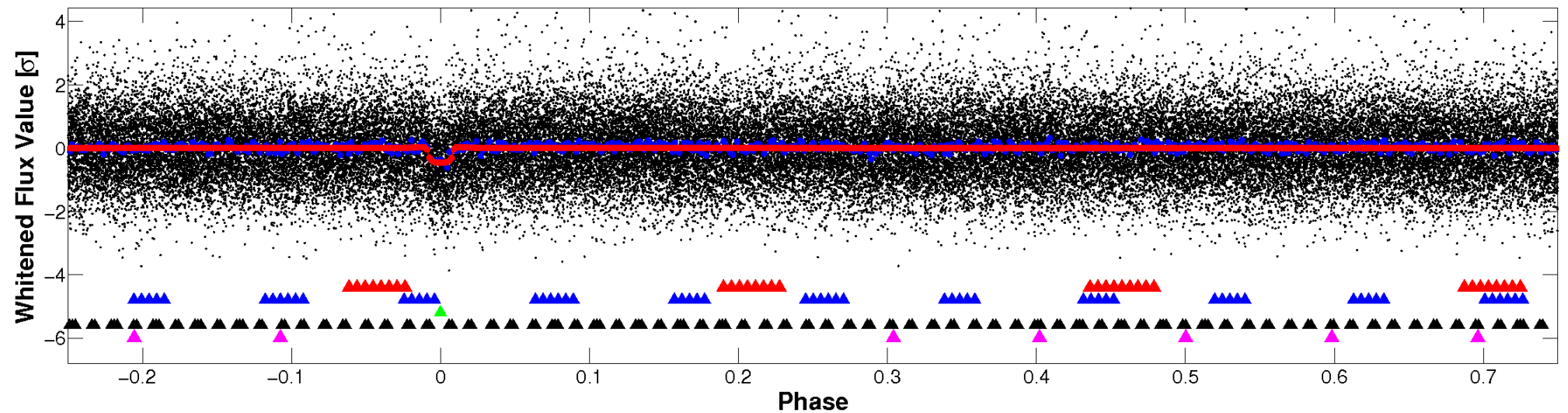


# Non-Whitened Vs. Whitened Light Curve

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

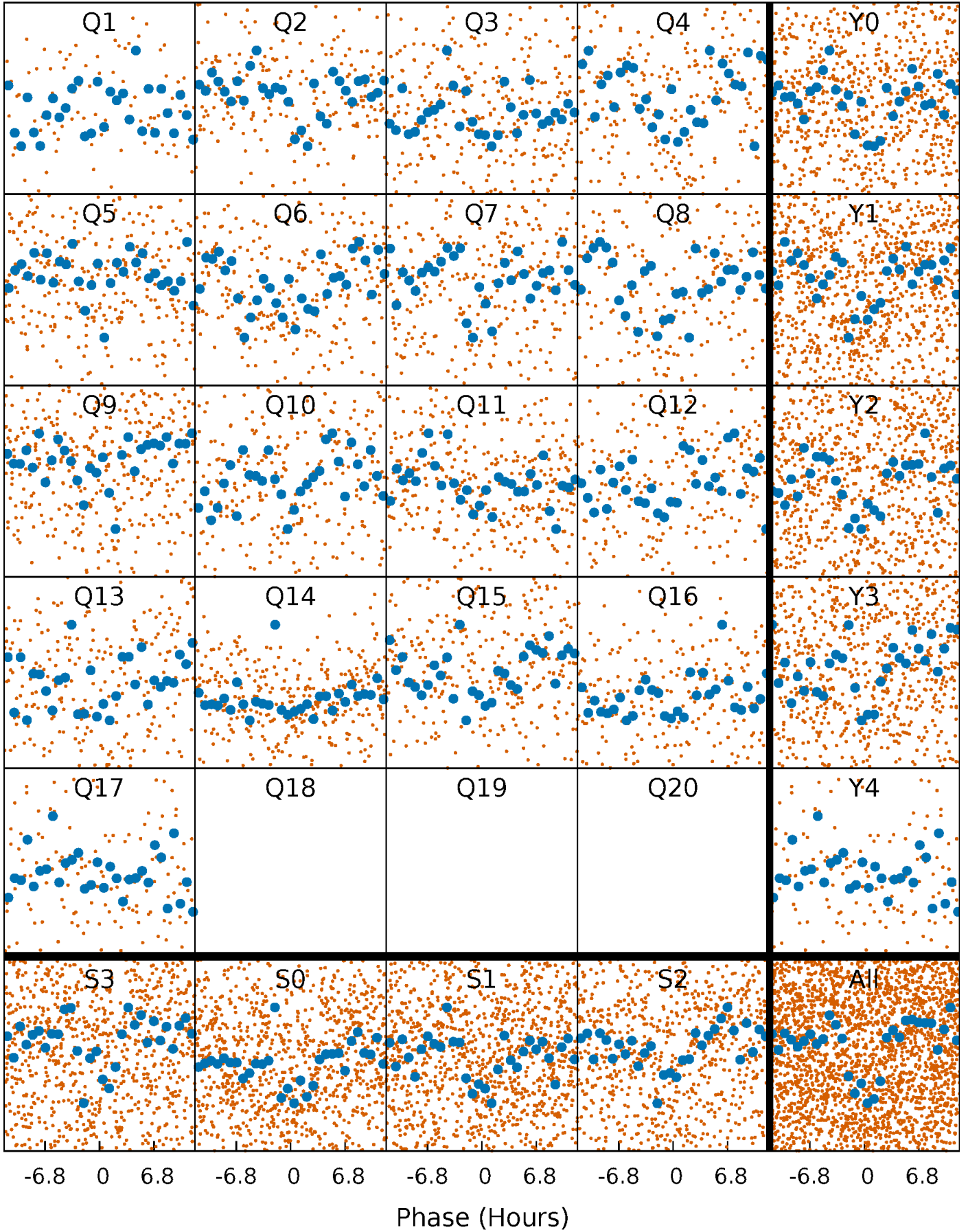


## Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

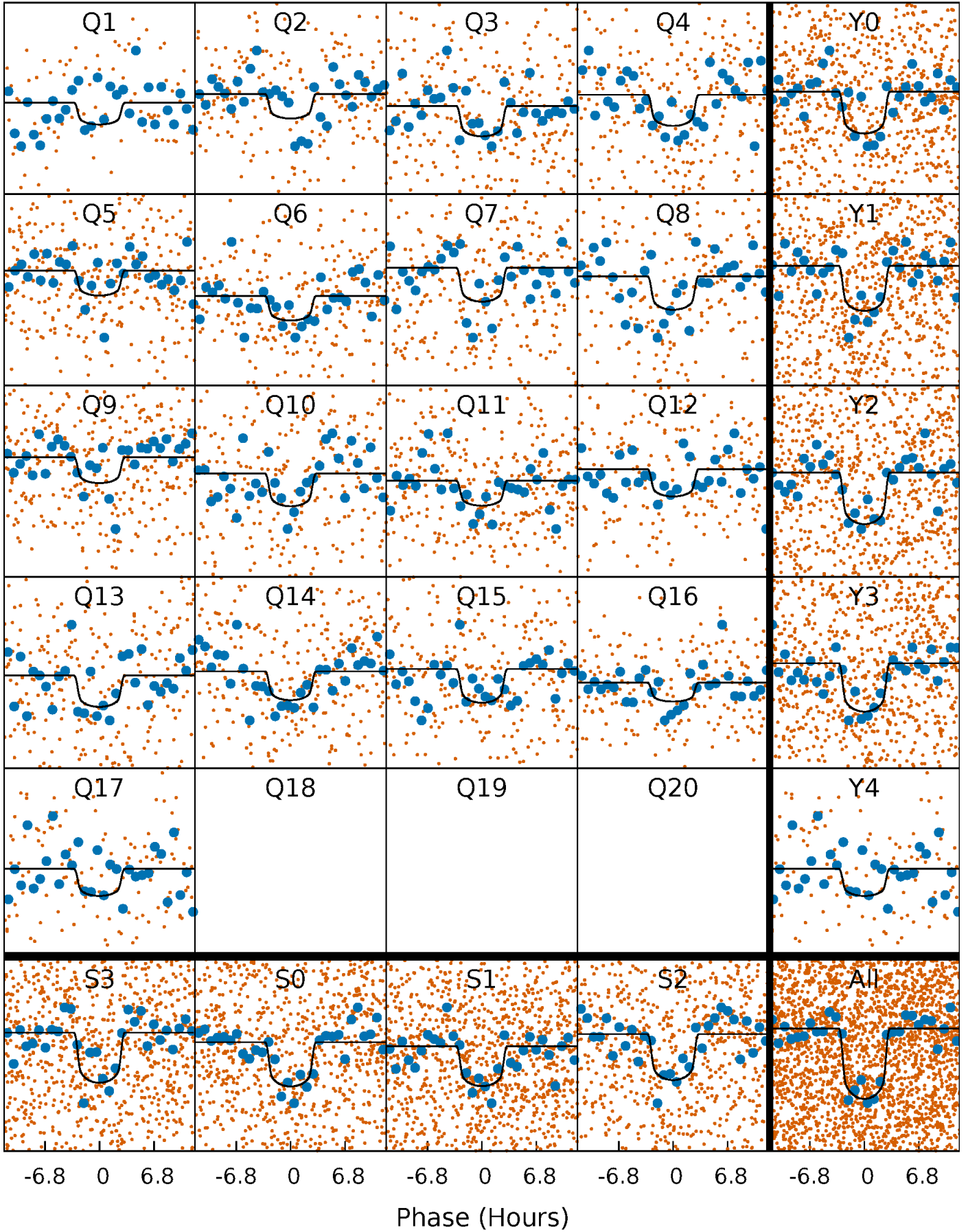
TCE 008609450-03   P= 13.639704 Days    $T_0=141.729281$  (BKJD)





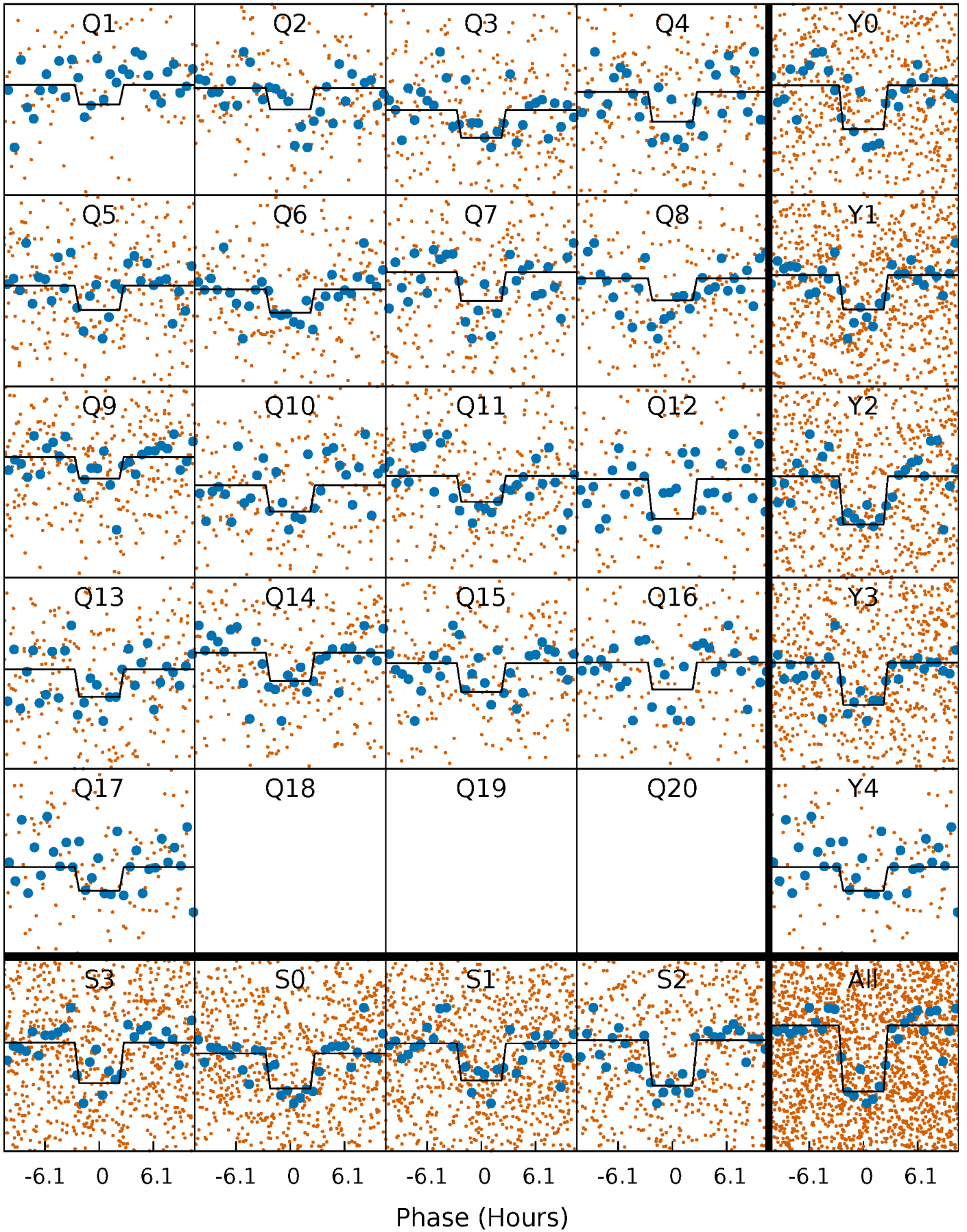
# DV Quarter-Phased Transit Curves

TCE 008609450-03   P= 13.639704 Days    $T_0=141.729281$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

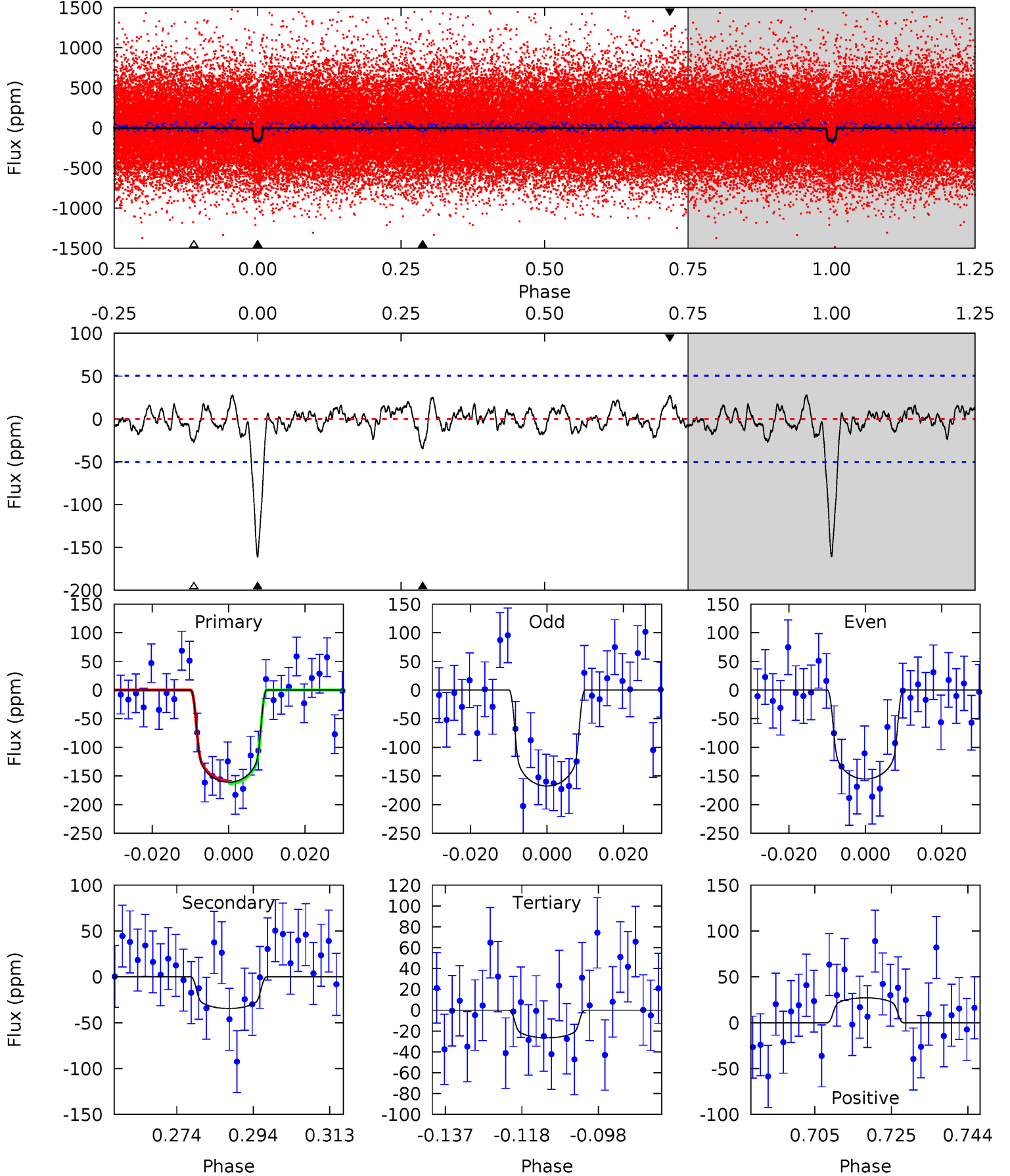
TCE 008609450-03 P= 13.639566 Days  $T_0=141.732590$  (BKJD)



# DV Model-Shift Uniqueness Test

008609450-03, P = 13.639704 Days, E = 128.089577 Days

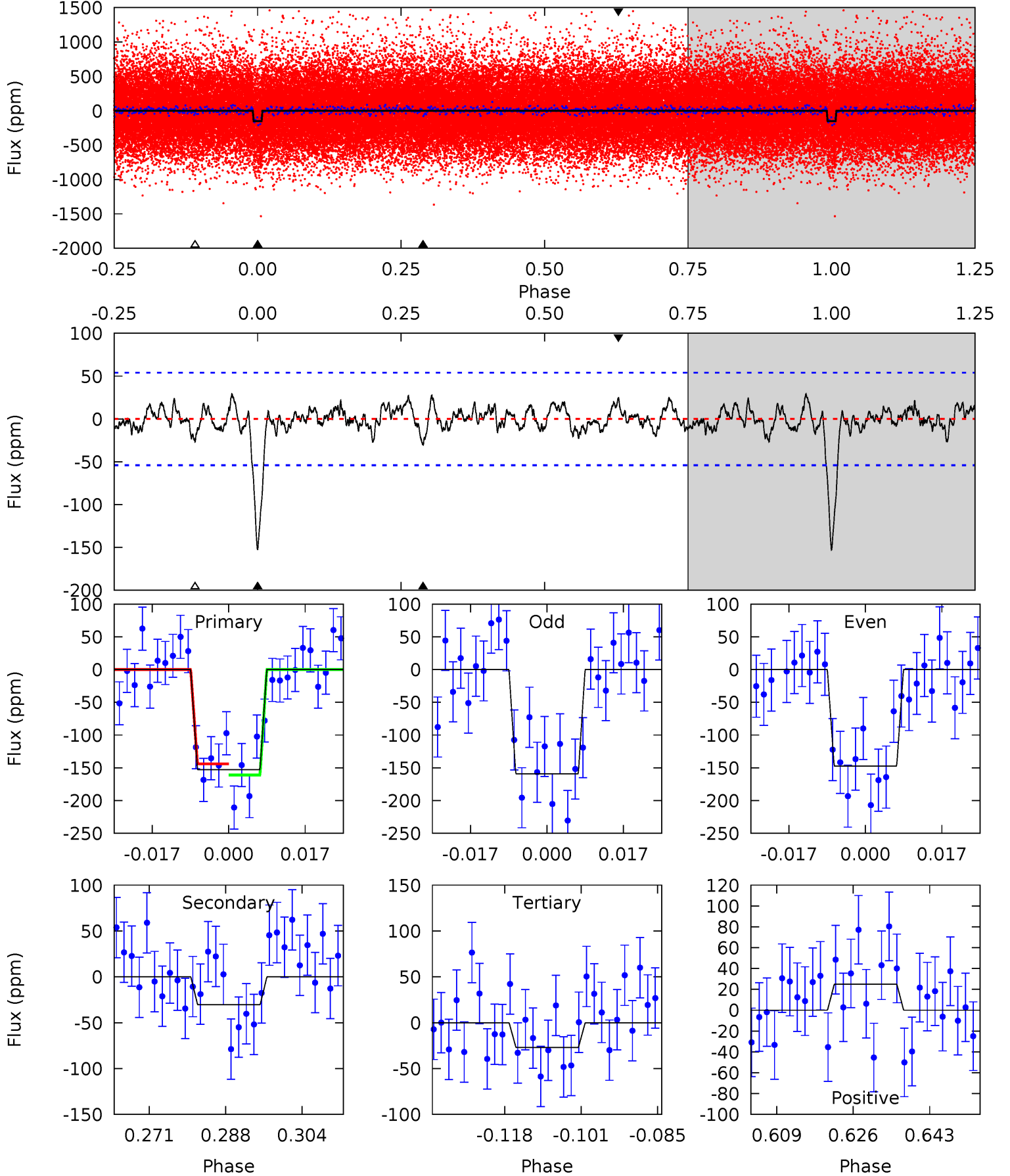
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
15.6	3.36	2.58	2.63	4.90	2.33	0.97	13.1	13.0	0.78	0.72	0.58	1.04	0.15	0.24



# Alt Model-Shift Uniqueness Test

008609450-03, P = 13.639566 Days, E = 128.093024 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
13.9	2.76	2.45	2.27	4.92	2.39	0.94	11.5	11.6	0.31	0.49	0.54	1.11	0.16	0.77



### Stellar Parameters For KIC 008609450

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5600^{+112}_{-100}$	$4.455^{+0.102}_{-0.077}$	$-0.360^{+0.150}_{-0.150}$	$0.872^{+0.088}_{-0.088}$	$0.793^{+0.064}_{-0.035}$	$1.683^{+0.728}_{-0.398}$
	+2%/-2%	+2%/-2%	+42%/-42%	+10%/-10%	+8%/-4%	+43%/-24%
Source	SPE58	SPE58	SPE58	DSEP		

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

### Secondary Eclipse Parameters for KIC 008609450-03 / KOI 1278.04

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-35 \pm 10$	$1.36^{+0.30}_{-0.29}$	$1001^{+34}_{-35}$	$3921^{+401}_{-331}$	$109^{+80}_{-45}$
Alt.	$-30 \pm 11$	$1.16^{+0.31}_{-0.27}$	$1000^{+36}_{-34}$	$4010^{+489}_{-416}$	$128^{+109}_{-62}$

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

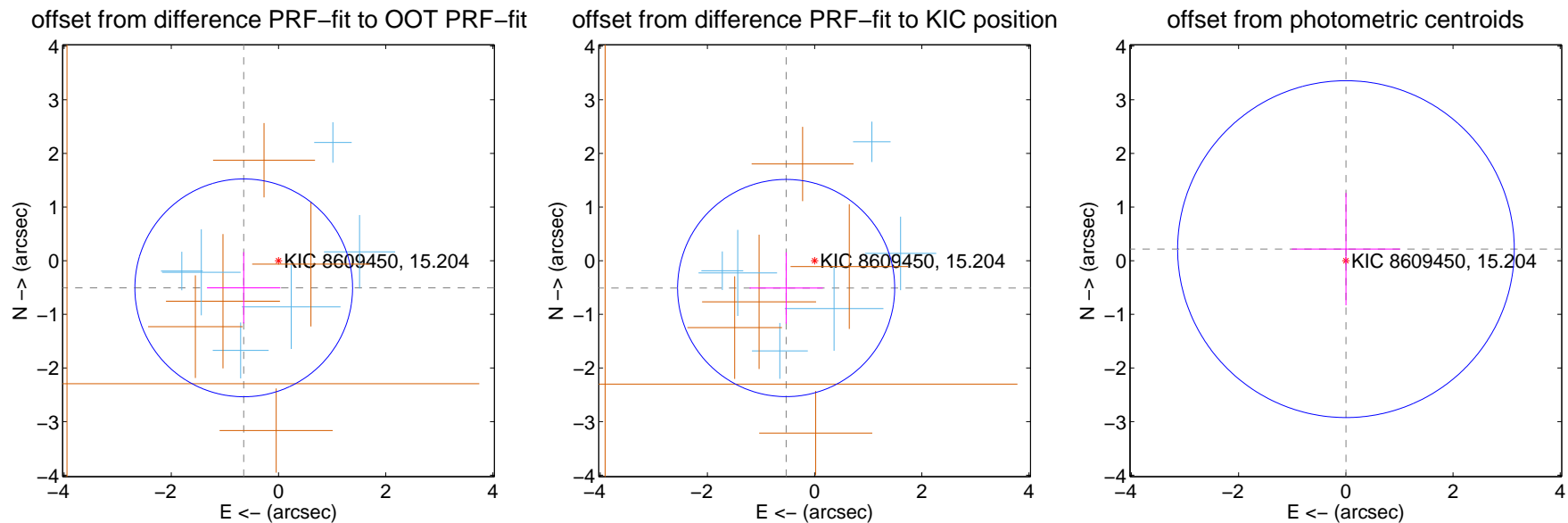
## DV Centroid Data

Supplemental centroid analysis for 008609450-03. Kepler magnitude: 15.20. Transit SNR 12.77

There are 6 quarters with good PRF difference image offsets

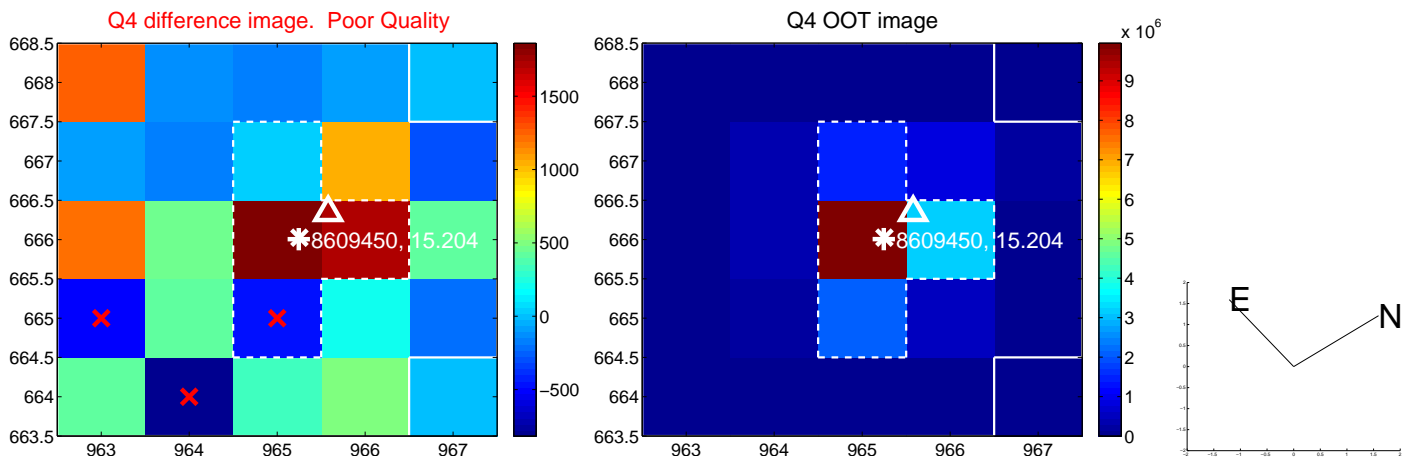
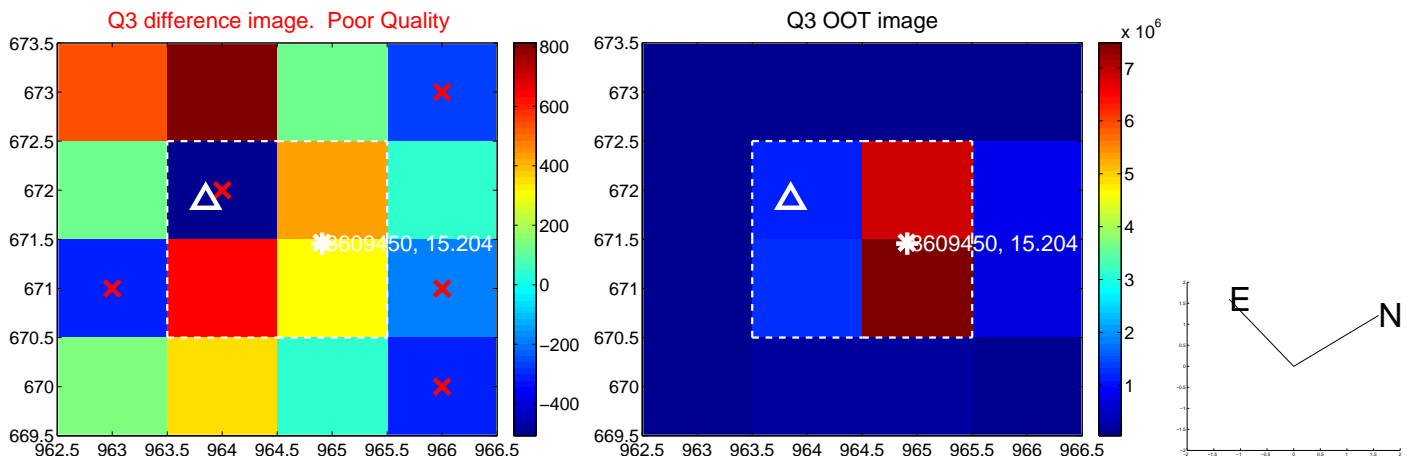
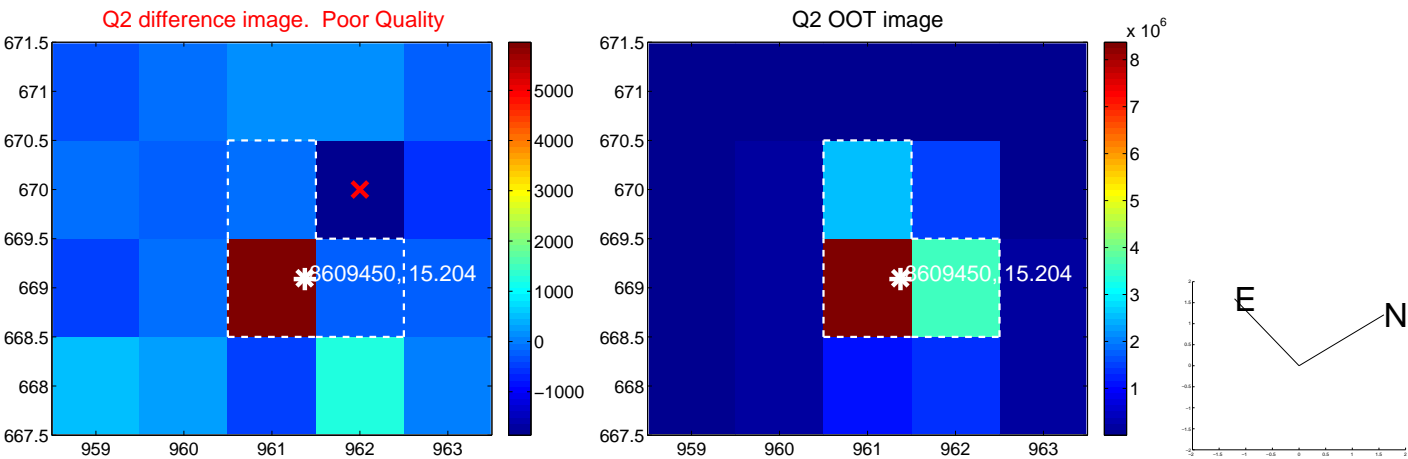
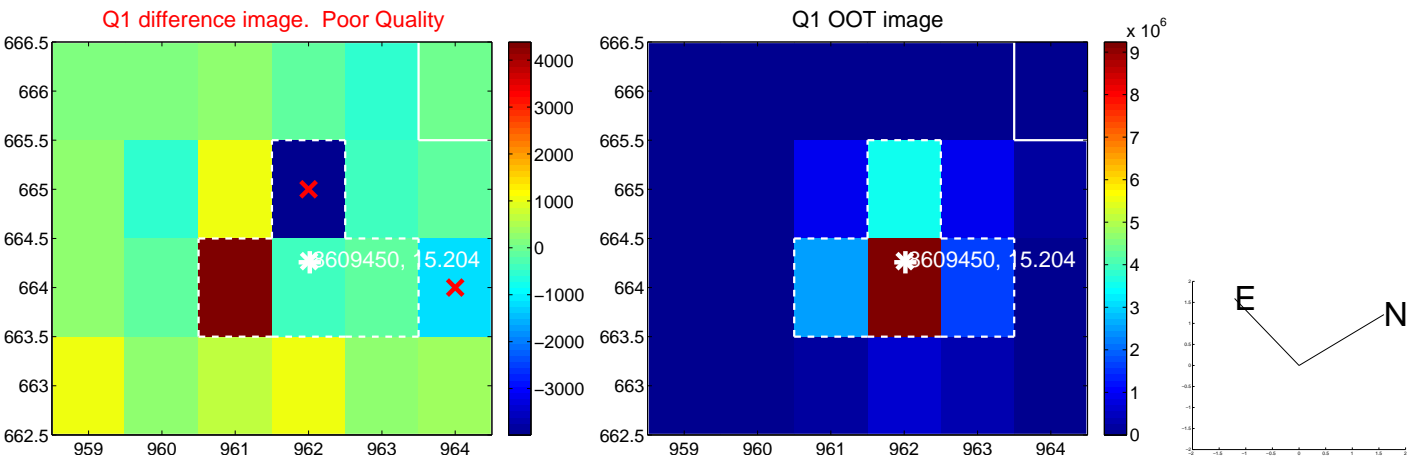
The direct PRF centroid is offset from the target star catalog position by about 0.06 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.823 \pm 0.677$	1.22	$0.649 \pm 0.684$	$-0.506 \pm 0.665$
PRF-fit source offset from KIC position	$0.736 \pm 0.675$	1.09	$0.531 \pm 0.684$	$-0.510 \pm 0.665$
photometric centroid source offset	$0.22 \pm 1.05$	0.21	$-0.00 \pm 1.01$	$0.22 \pm 1.05$



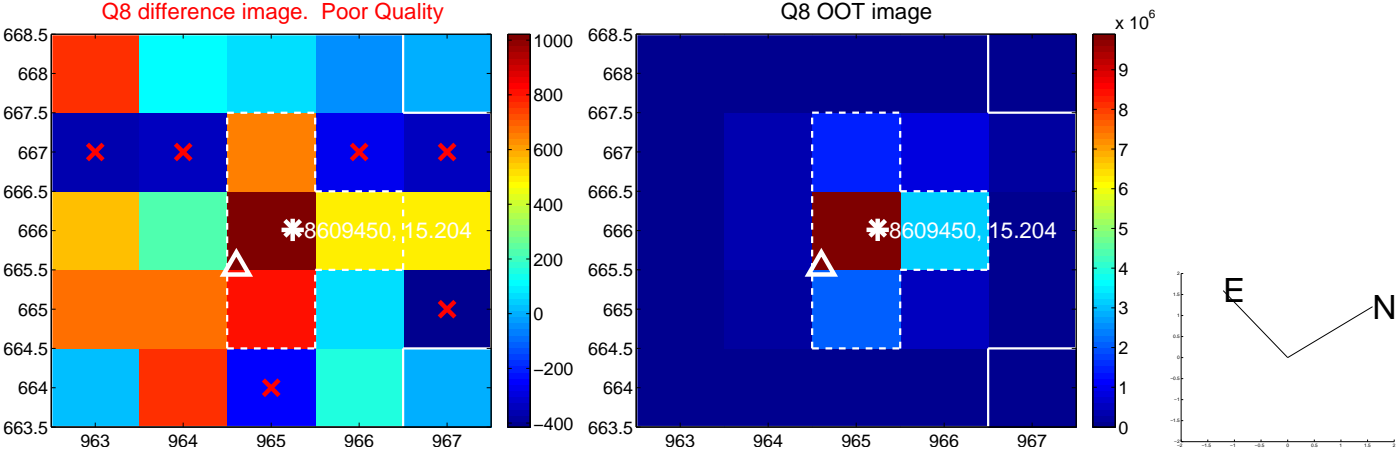
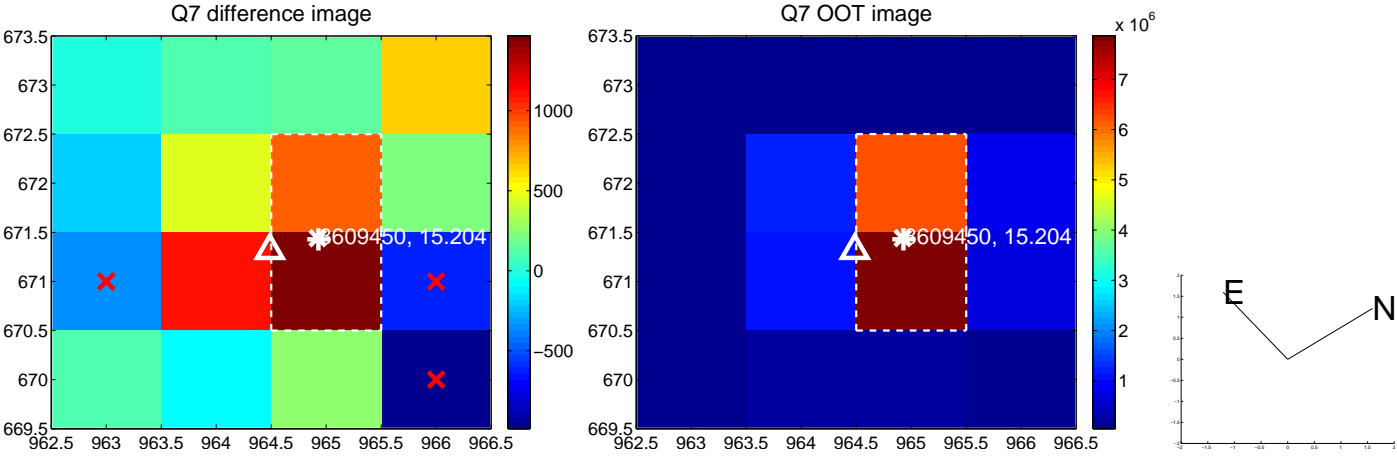
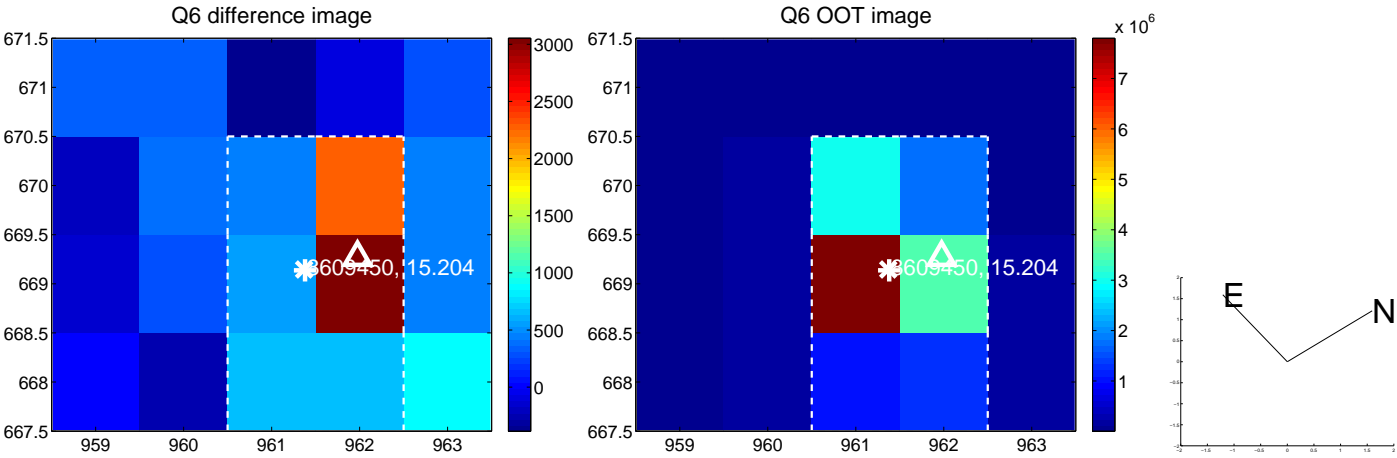
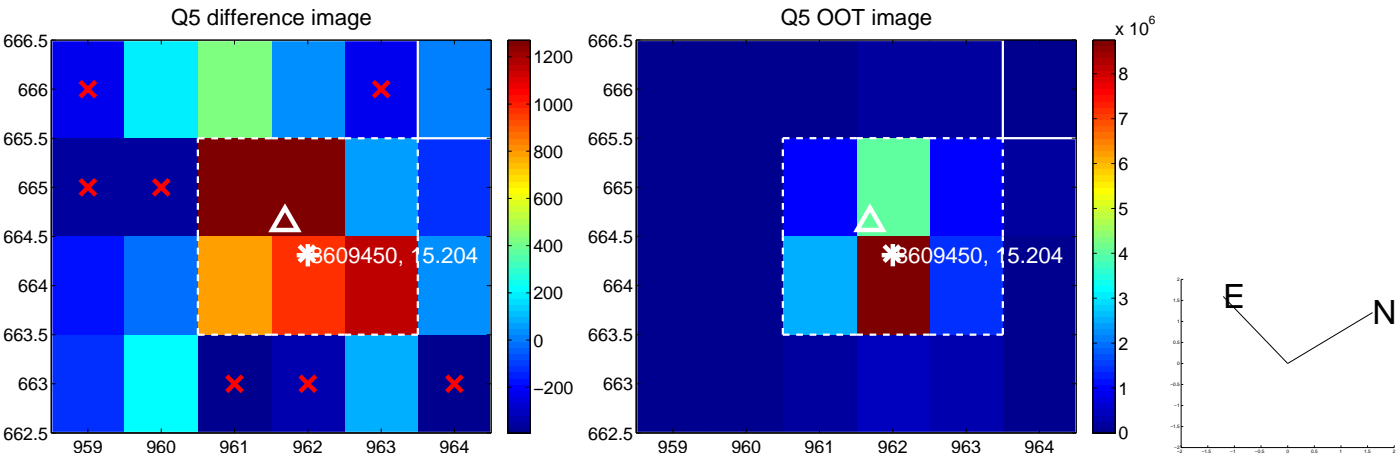
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

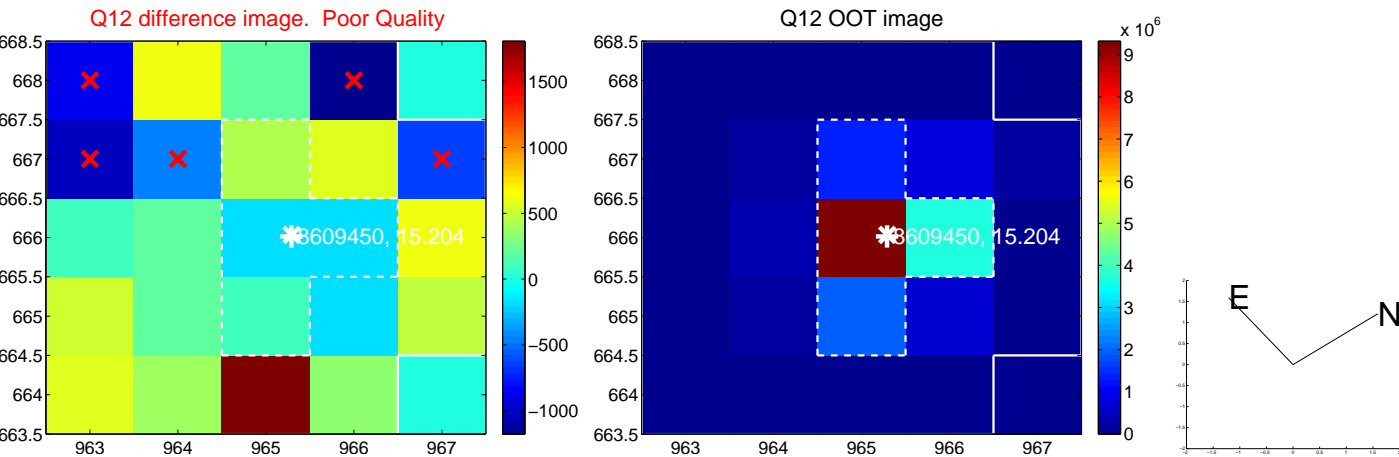
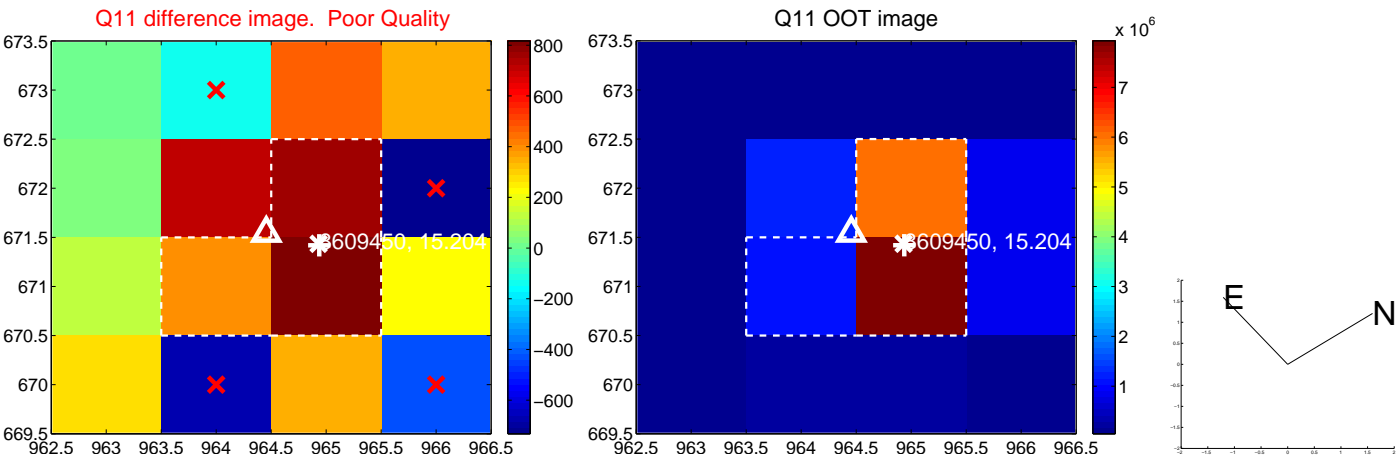
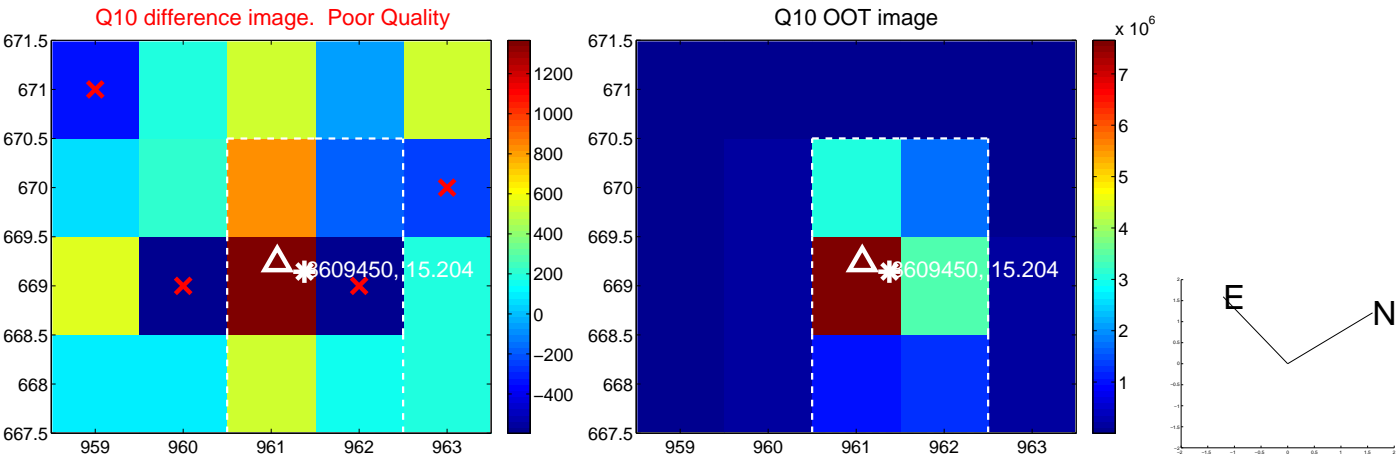
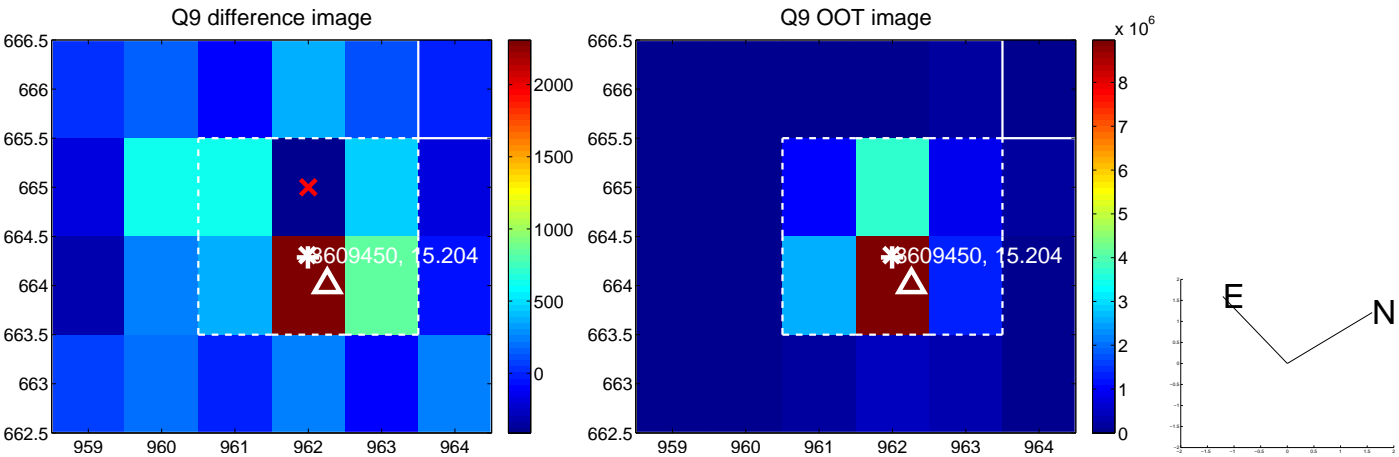




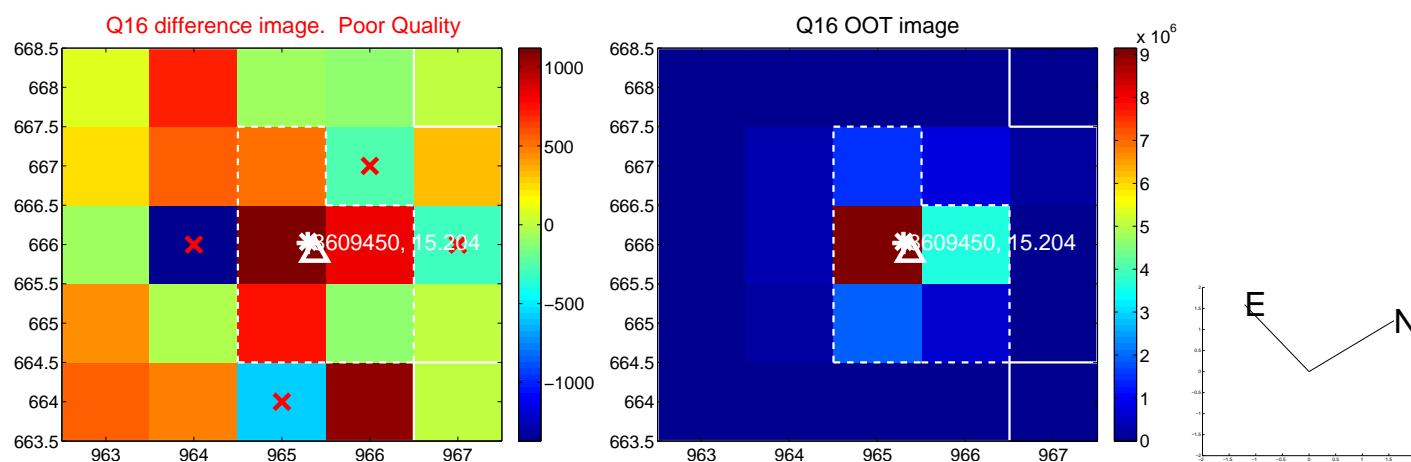
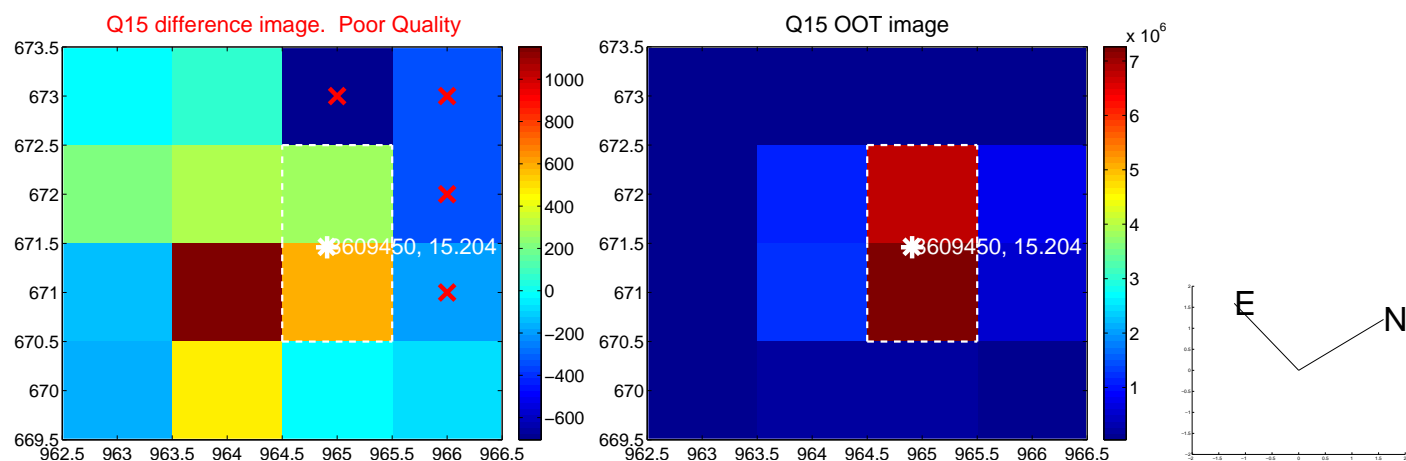
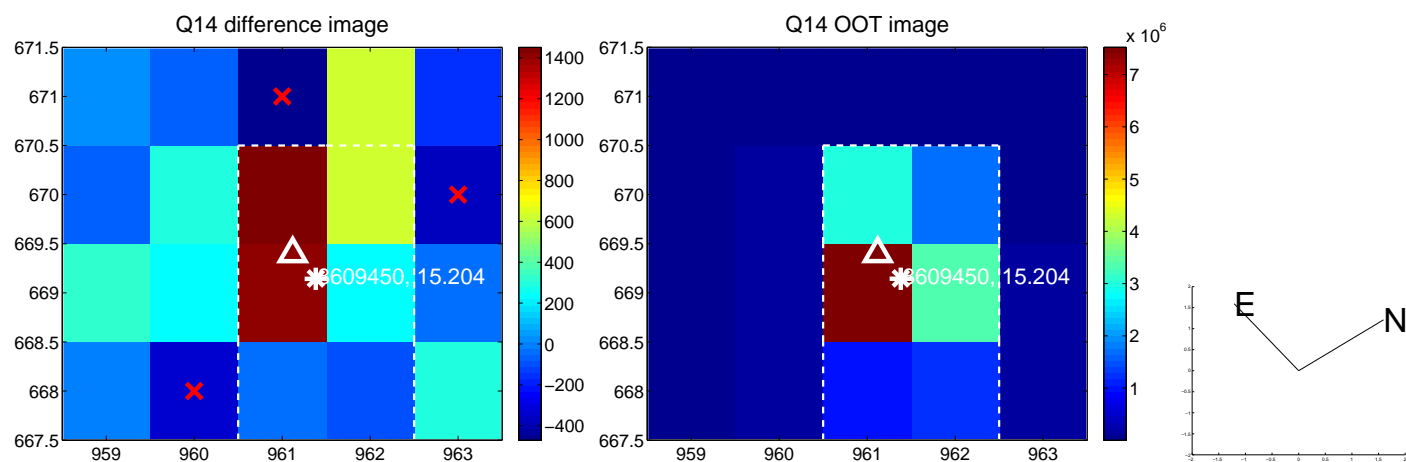
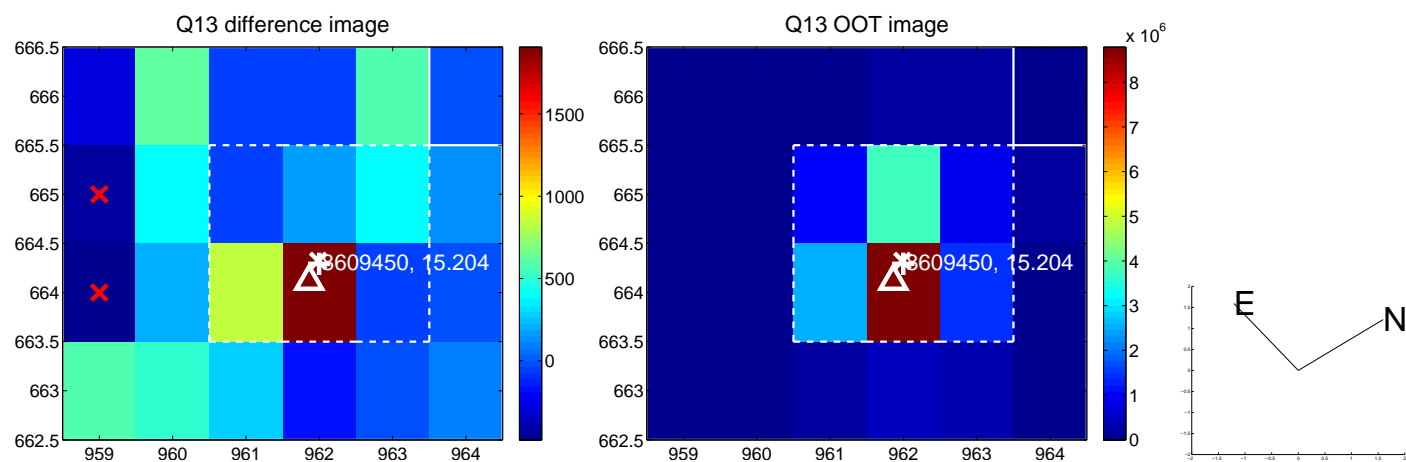
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



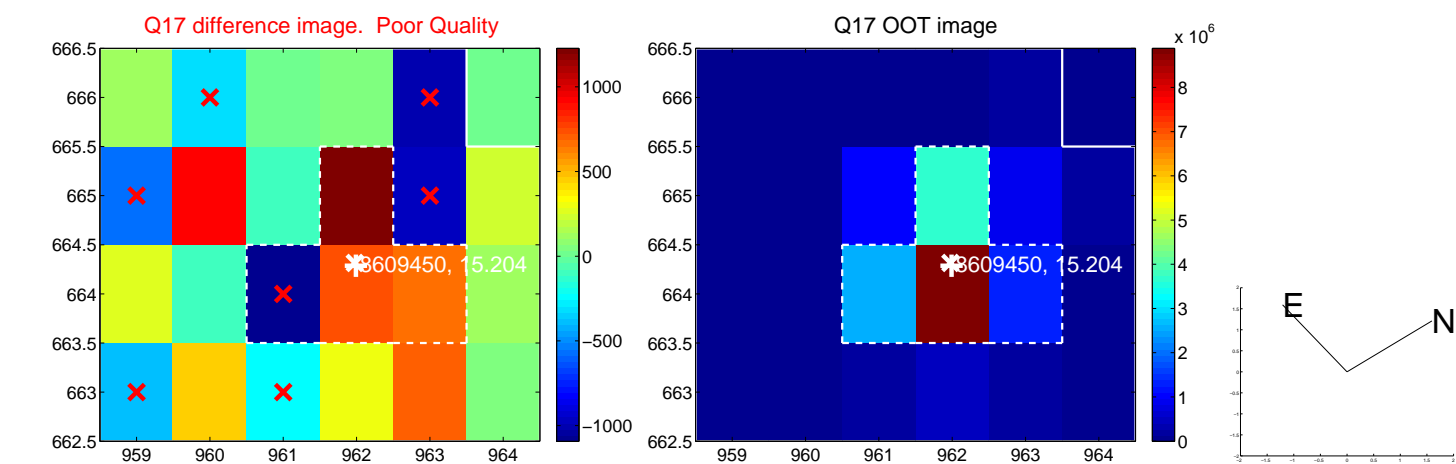
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



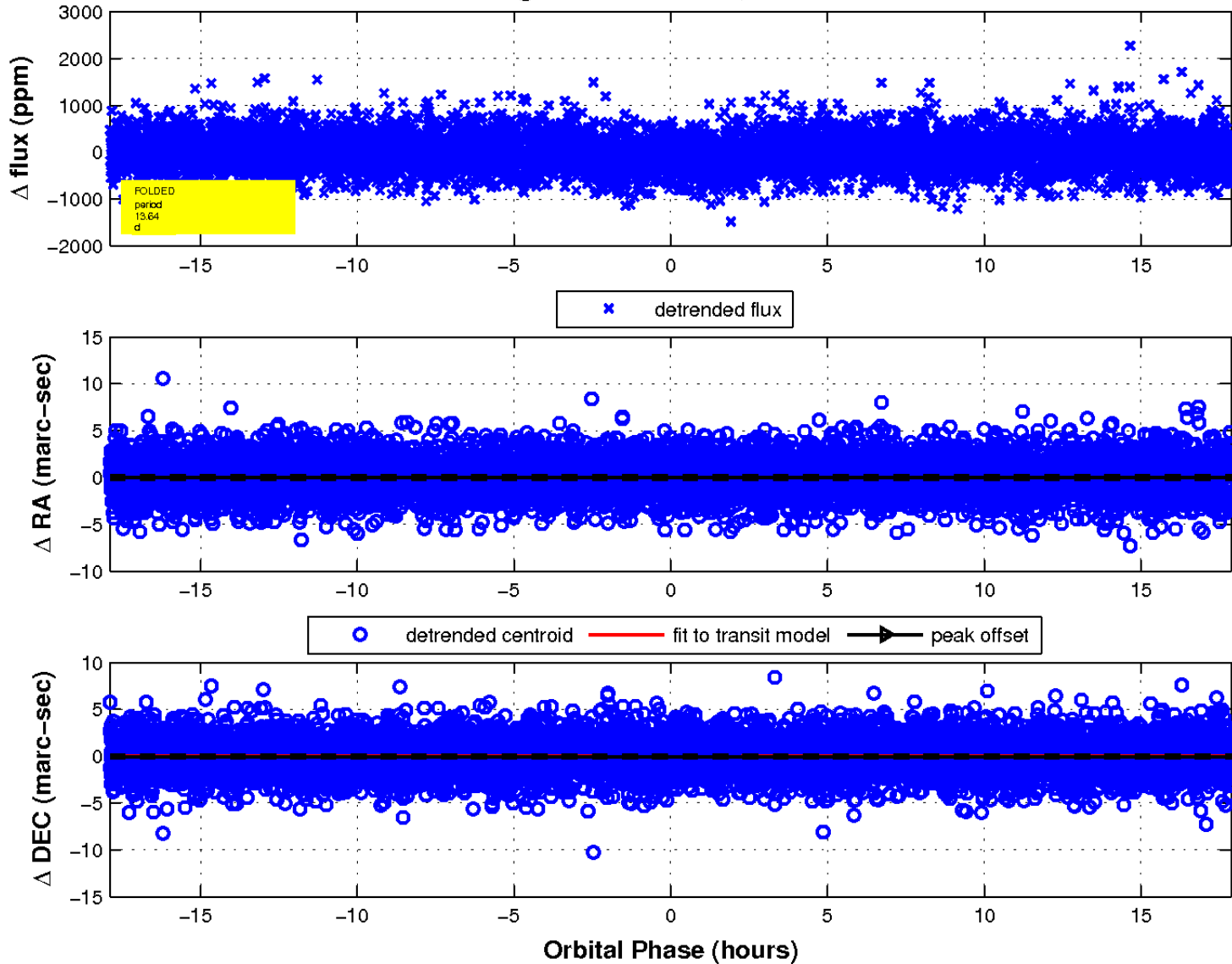
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

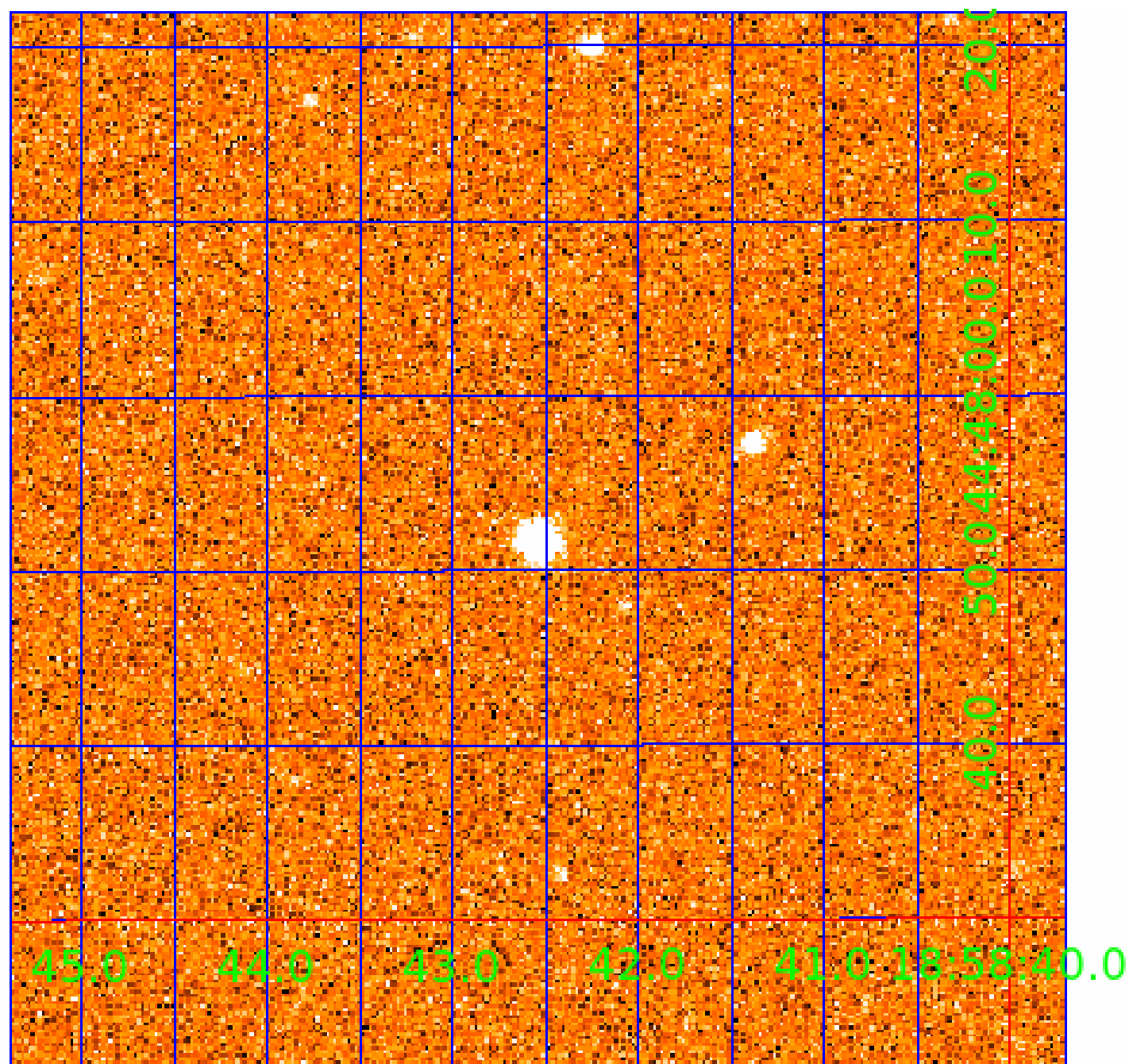


fluxWeightedCentroids, Planet 3 of 5



# UKIRT Image

Declination



# KIC 008609450

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008609450-01	OBS	1278.02	44.347354	161.315210	769.2	6.571	31.9	34.1	0.87	5600	2.66	13.03
008609450-02	OBS	1278.01	24.805768	145.072415	637.0	6.328	32.7	35.8	0.87	5600	2.36	28.27
008609450-03	OBS	1278.04	13.639704	141.729281	171.6	5.964	12.0	12.8	0.87	5600	1.37	62.75
008609450-04	OBS	1278.03	9.220819	138.003924	133.8	5.322	11.3	11.2	0.87	5600	1.29	105.75
008609450-05	OBS	1278.05	203.257809	208.462165	328.4	6.657	7.6	7.6	0.87	5600	1.75	1.71

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008609450-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
008609450-02	OBS	PC	1.00	0	0	0	0	NO_COMMENT
008609450-03	OBS	PC	0.99	0	0	0	0	NO_COMMENT
008609450-04	OBS	PC	0.90	0	0	0	0	NO_COMMENT
008609450-05	OBS	FP	0.17	1	0	0	0	INDIV_TRANS_MARSHALL—MOD_NONUNIQ_ALT

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

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

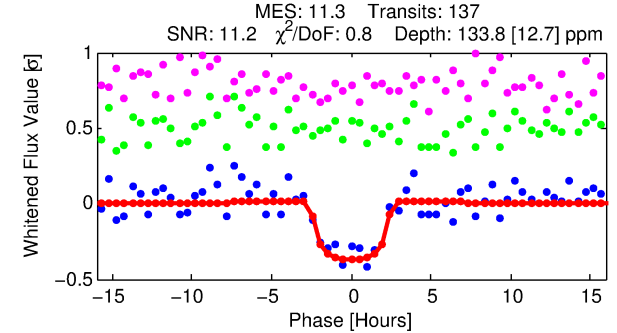
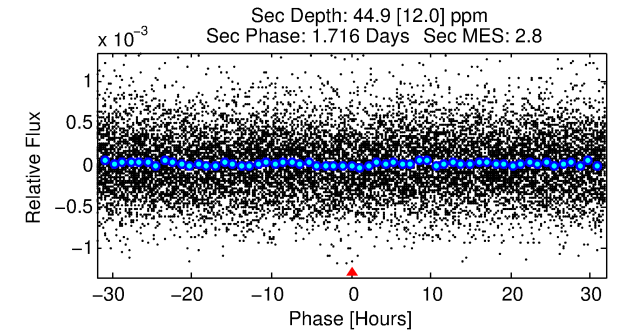
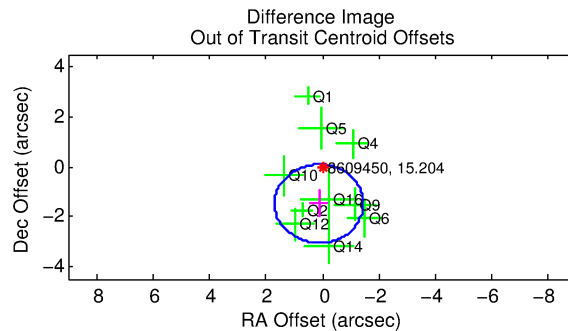
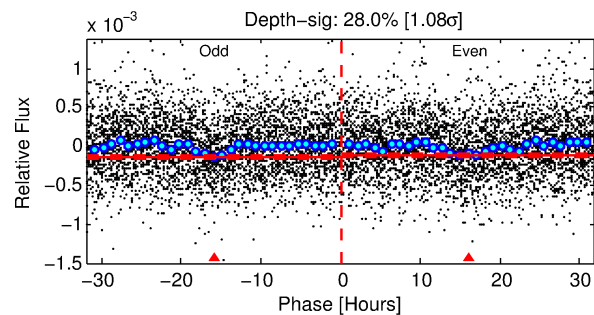
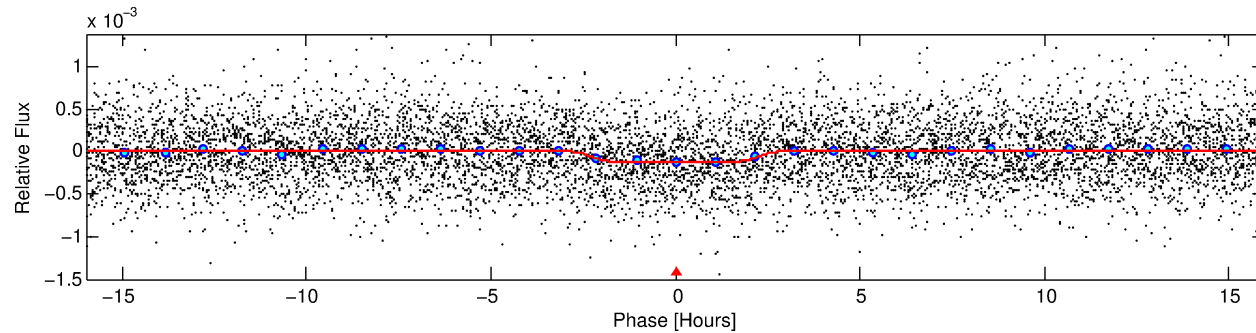
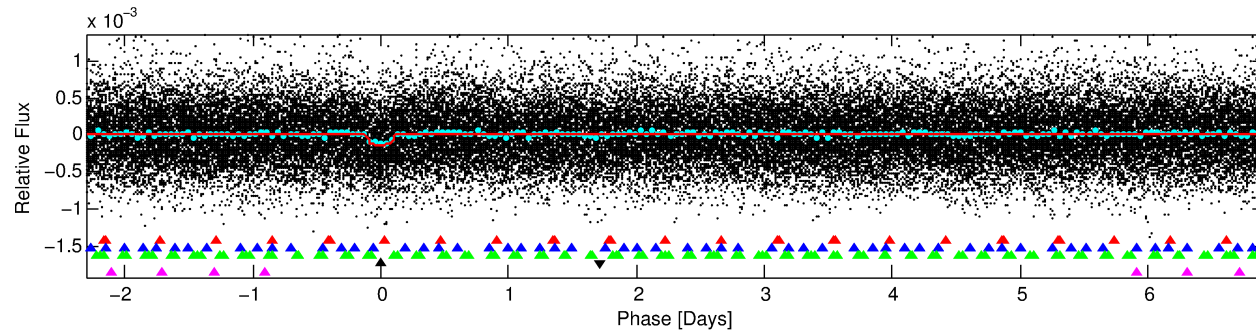
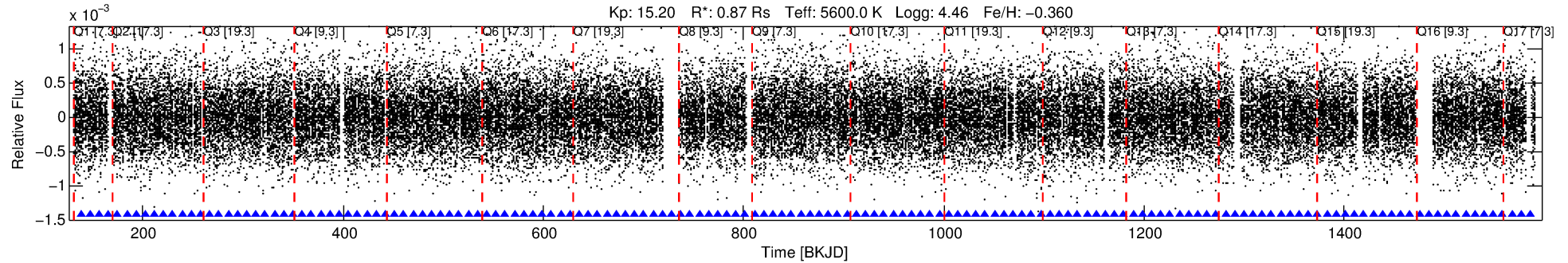
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 008609450-04

No Significant Match Found

# DV One-Page Summary

KIC: 8609450 Candidate: 4 of 5 Period: 9.221 d  
KOI: K01278.03 Name: Kepler-282b Corr: 0.926



## DV Fit Results:

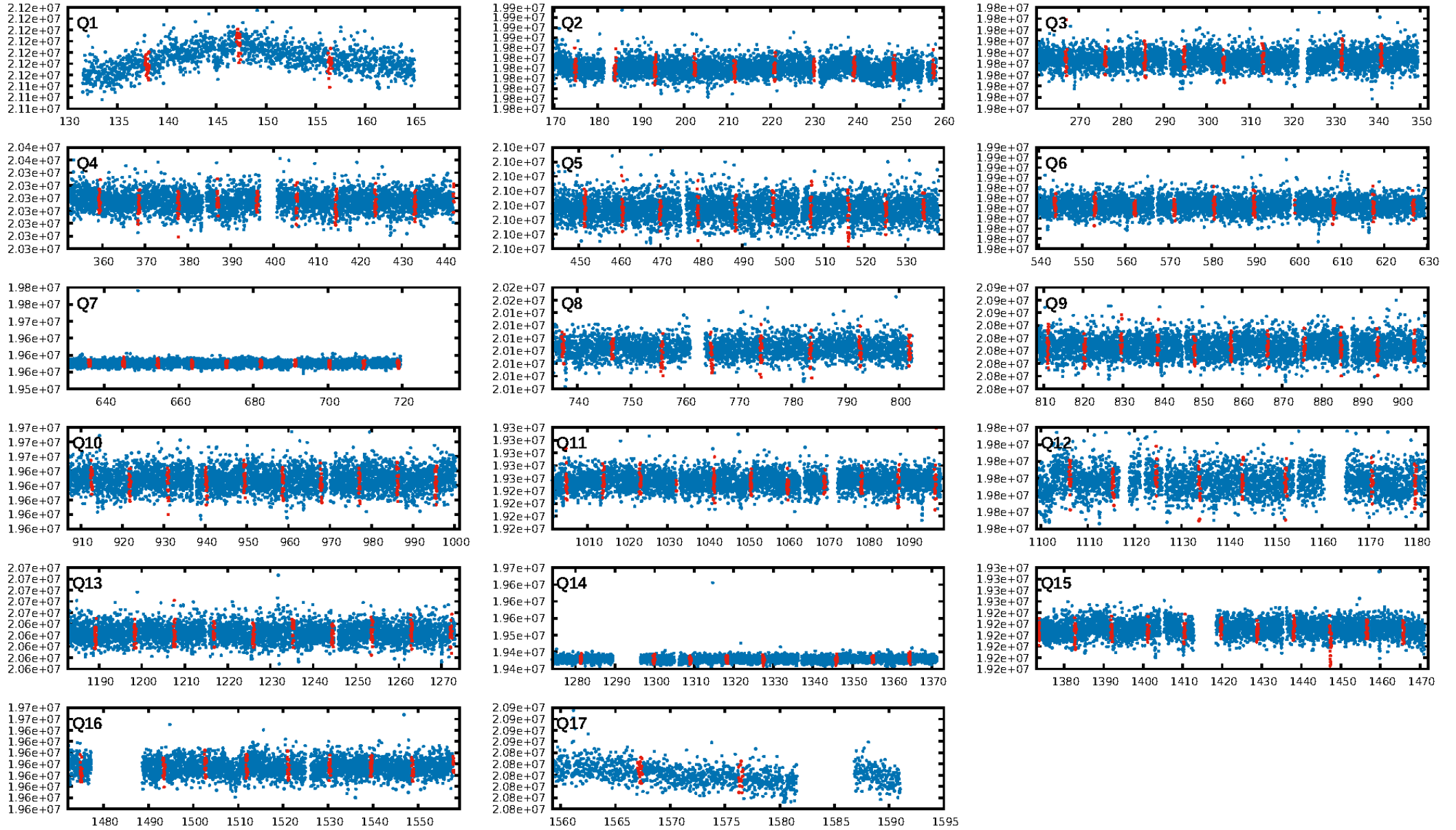
Period = 9.22082 [0.00011] d  
Epoch = 138.0039 [0.0098] BKJD  
Rp/R\* = 0.0135 [0.0018]  
a/R\* = 4.67 [2.75]  
b = 0.95 [0.06]  
Seff = 105.75 [19.91]  
Teq = 818 [38] K  
Rp = 1.29 [0.21] Re  
a = 0.0796 [0.0082] AU  
Ag = 94.43 [38.97] [2.40 $\sigma$ ]  
Teffp = 3941 [379] K [8.21 $\sigma$ ]

## DV Diagnostic Results:

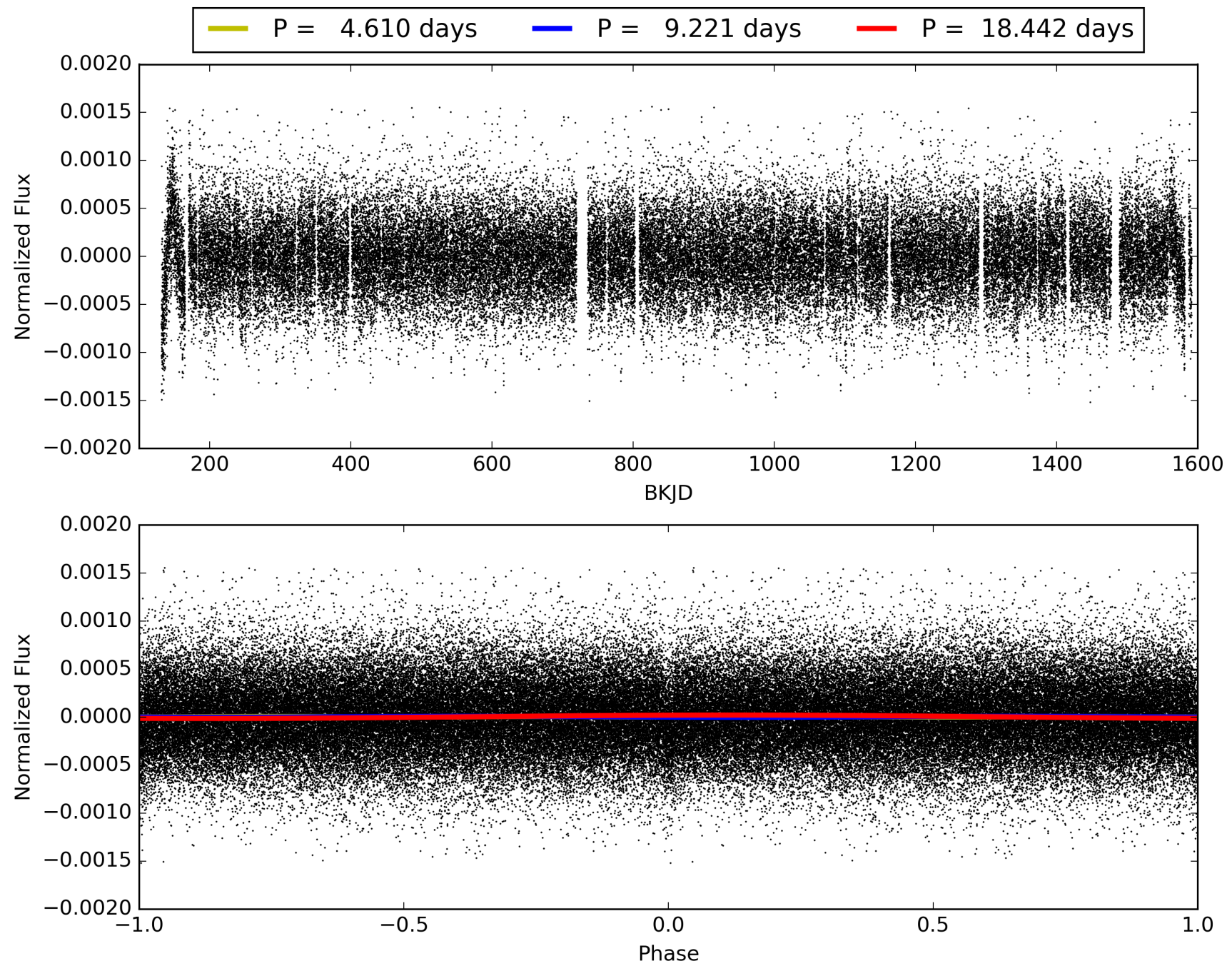
ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [13.27 $\sigma$ ]  
ModelChiSquare2-sig: 100.0%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 1.73e-29  
RollingBand-fgt: 1.00 [132/132]  
GhostDiagnostic-chr: 4.609  
Centroid-sig: 2.0%  
Centroid-so: 2.076 arcsec [1.76 $\sigma$ ]  
OotOffset-rm: 1.489 arcsec [2.84 $\sigma$ ]  
KicOffset-rm: 1.494 arcsec [2.69 $\sigma$ ]  
OotOffset-st: 4/0/3/3 [10]  
KicOffset-st: 4/0/3/3 [10]  
DiffImageQuality-fgm: 0.70 [7/10]  
DiffImageOverlap-fno: 1.00 [17/17]



# TCE 008609450-04, PDC Light Curves

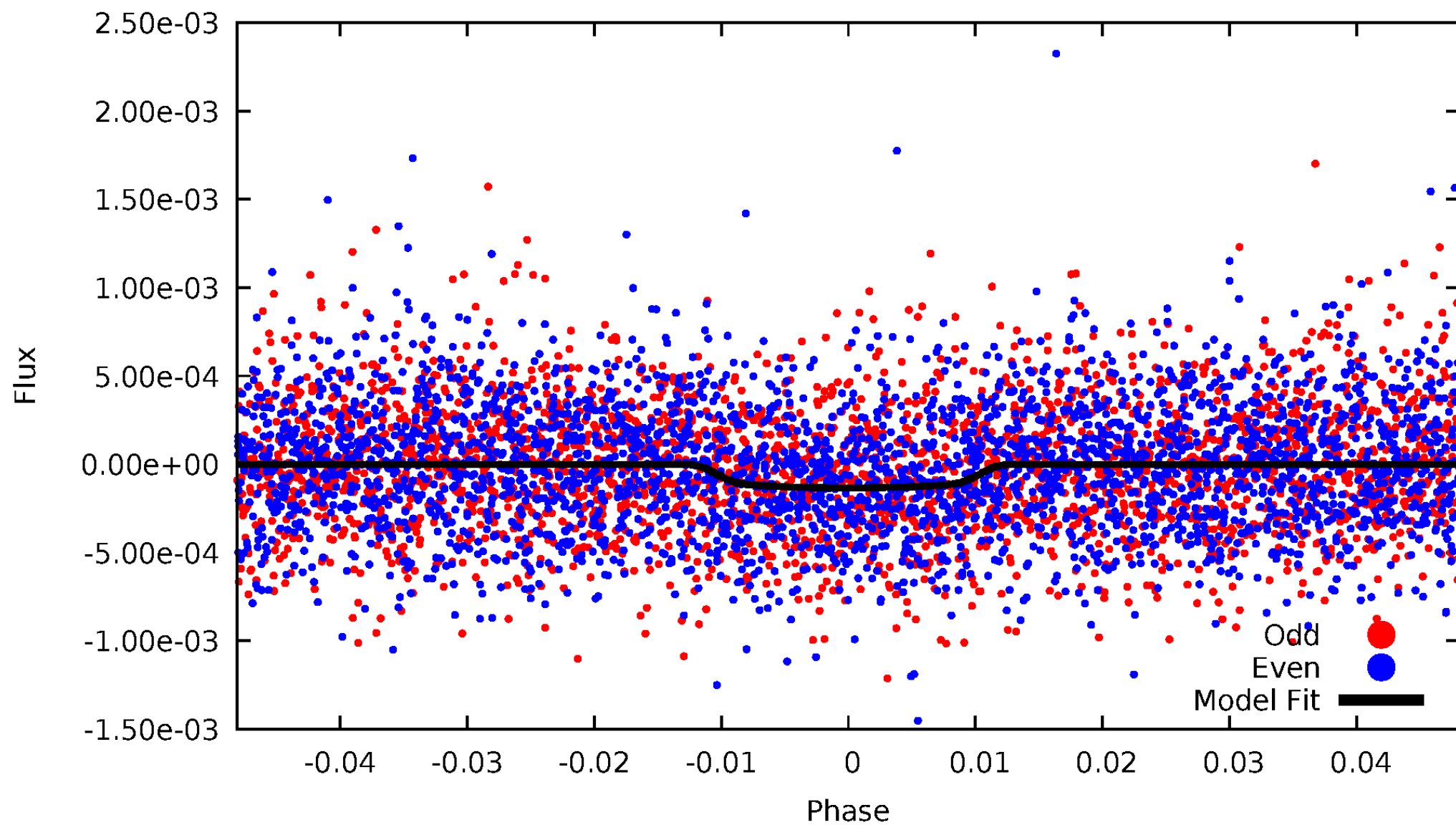


TCE 008609450-04



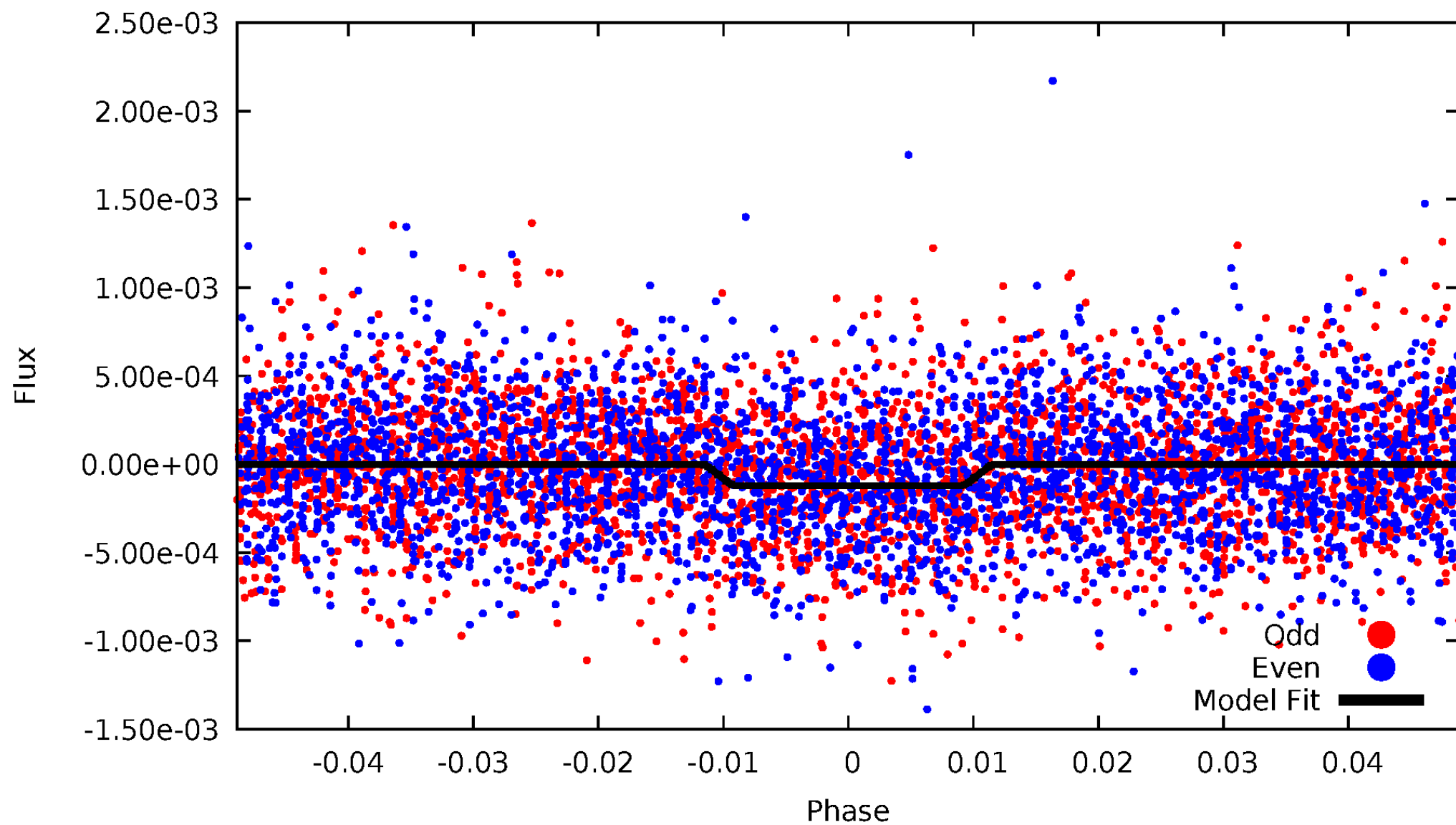
# DV Odd/Even

TCE 008609450-04



# ALT Odd/Even

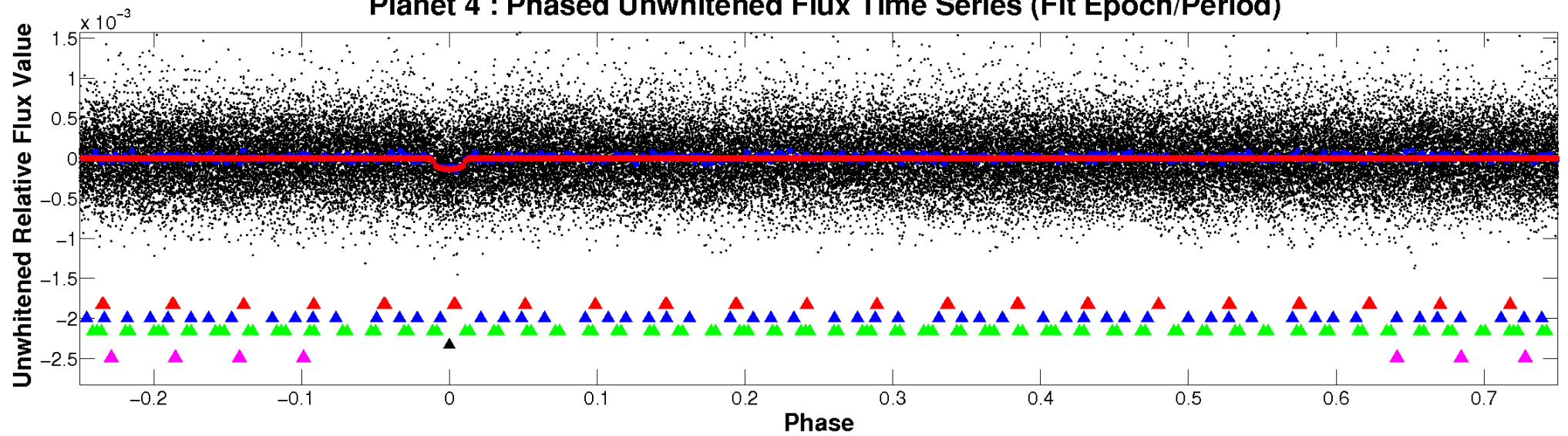
TCE 008609450-04



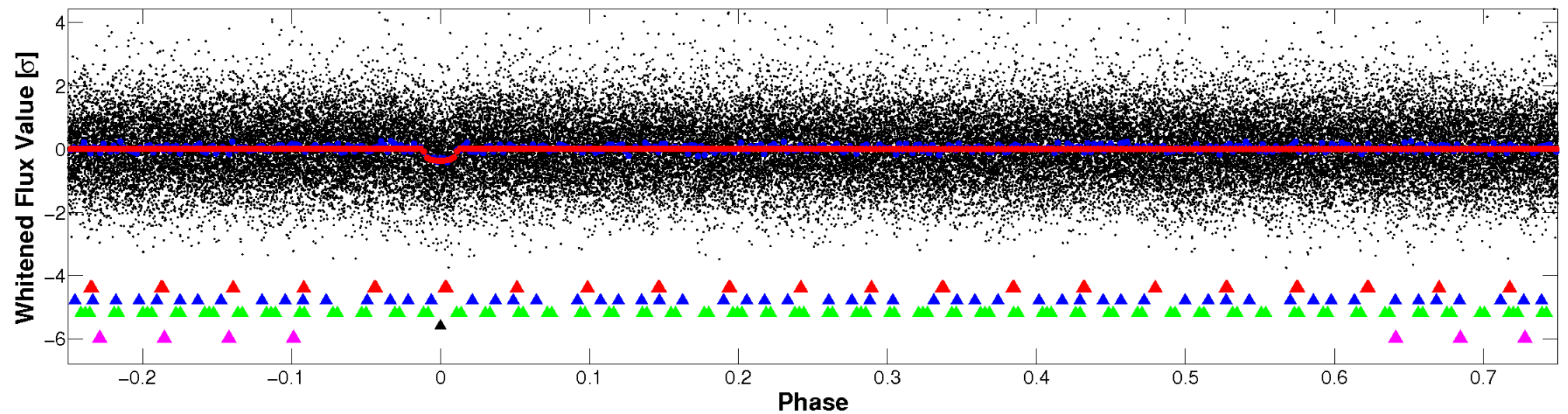


# Non-Whitened Vs. Whitened Light Curve

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

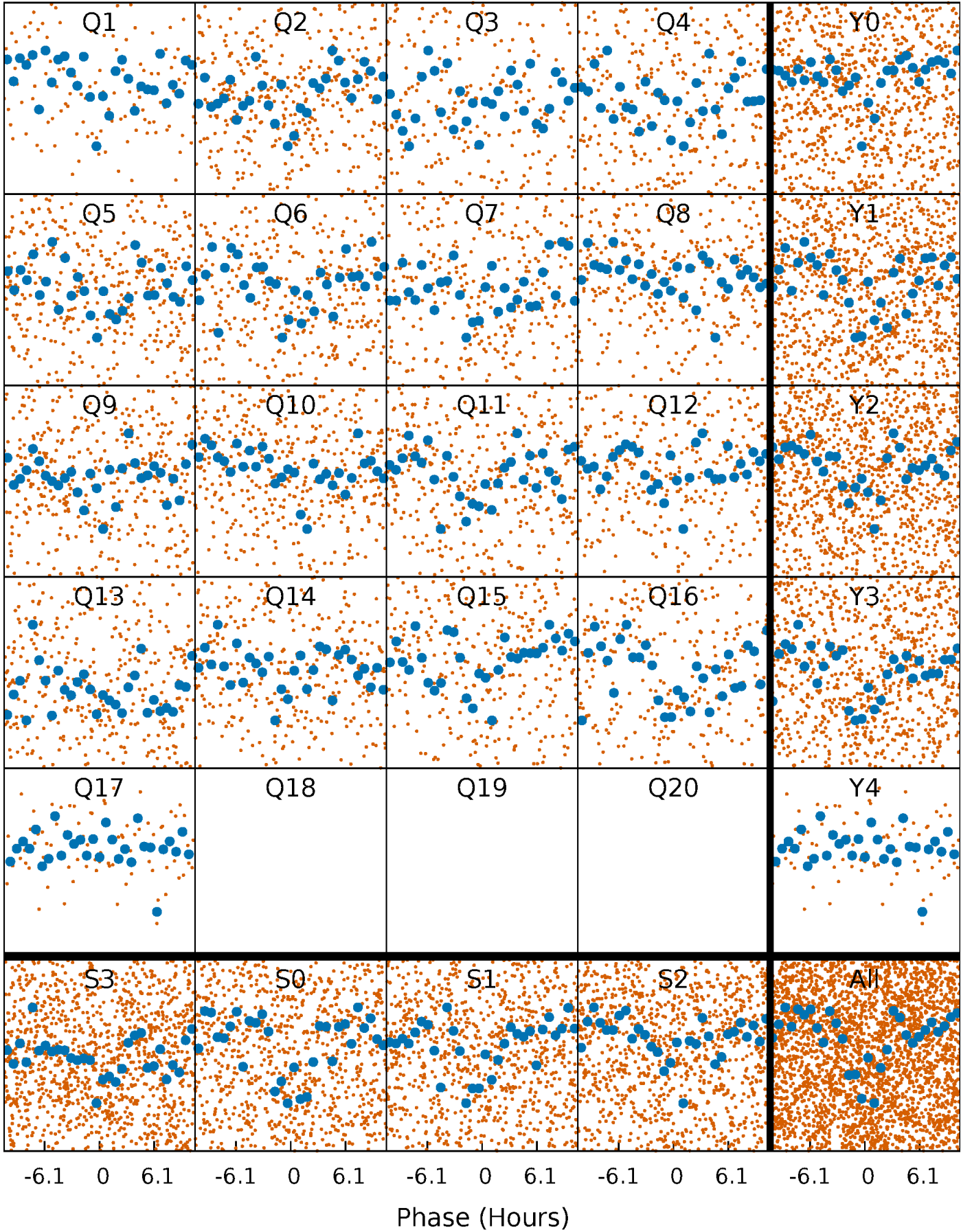


## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

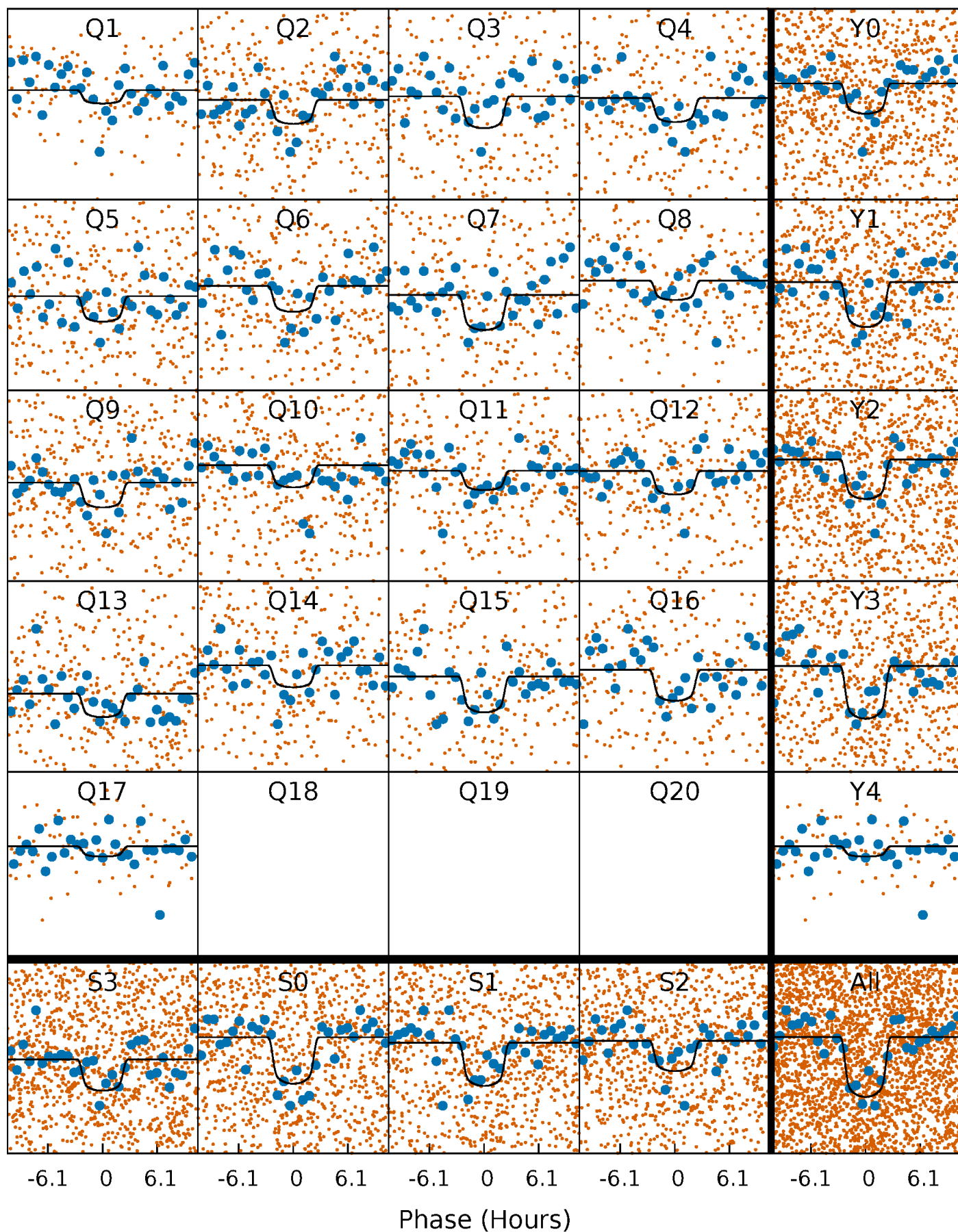
TCE 008609450-04   P= 9.220819 Days    $T_0=138.003924$  (BKJD)





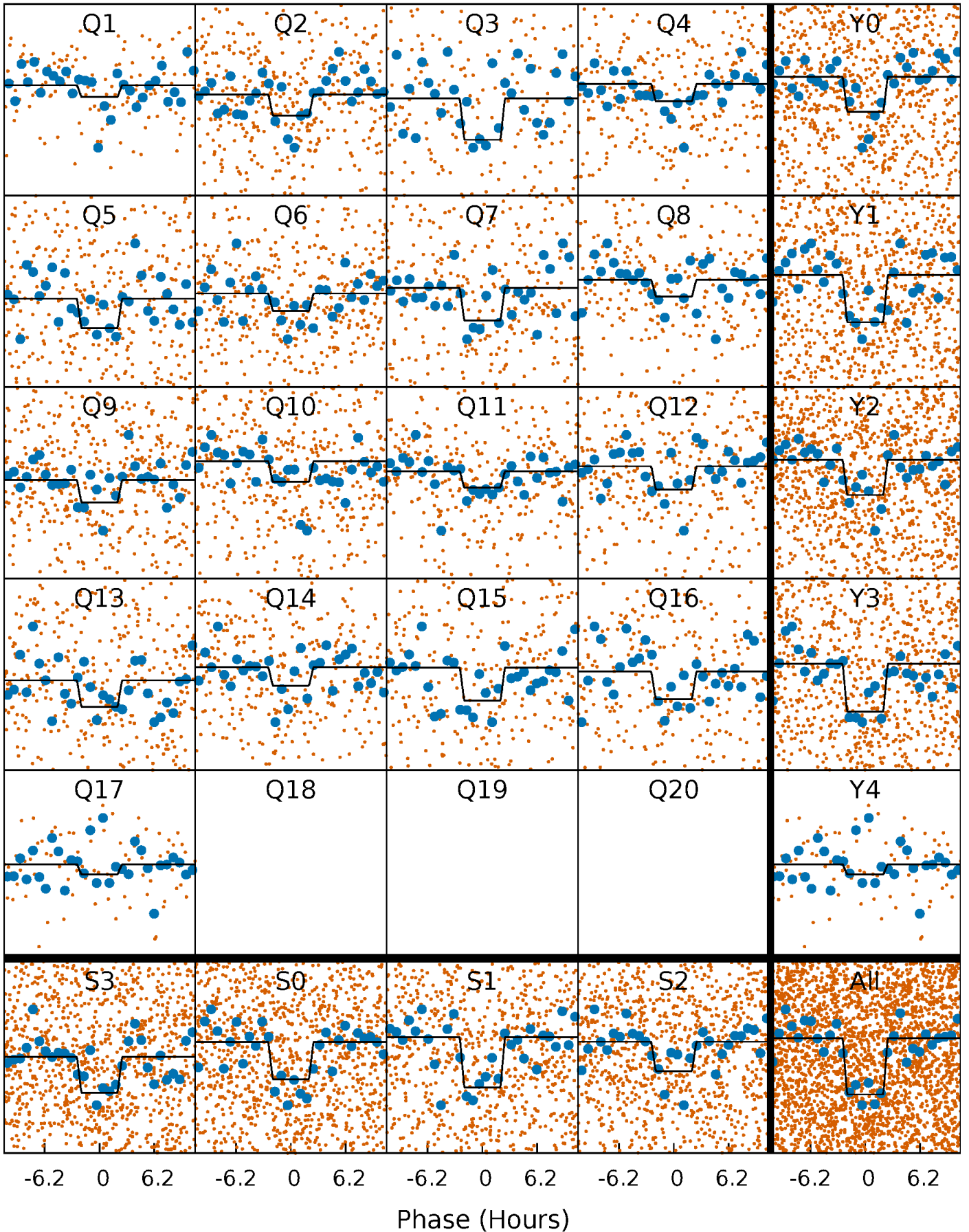
# DV Quarter-Phased Transit Curves

TCE 008609450-04 P= 9.220819 Days  $T_0=138.003924$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

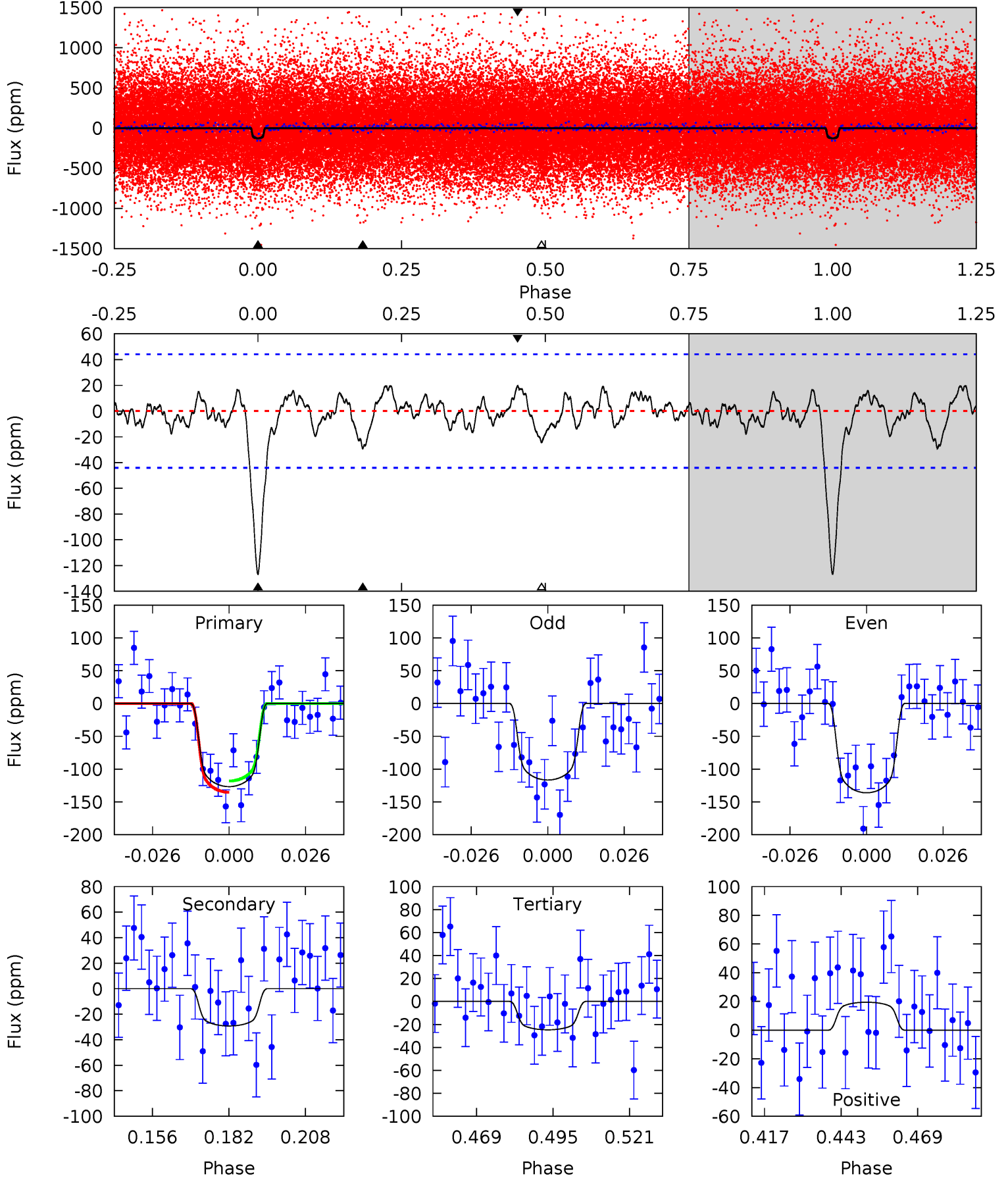
TCE 008609450-04     $P = 9.220920$  Days     $T_0 = 137.993494$  (BKJD)



# DV Model-Shift Uniqueness Test

008609450-04, P = 9.220819 Days, E = 128.783105 Days

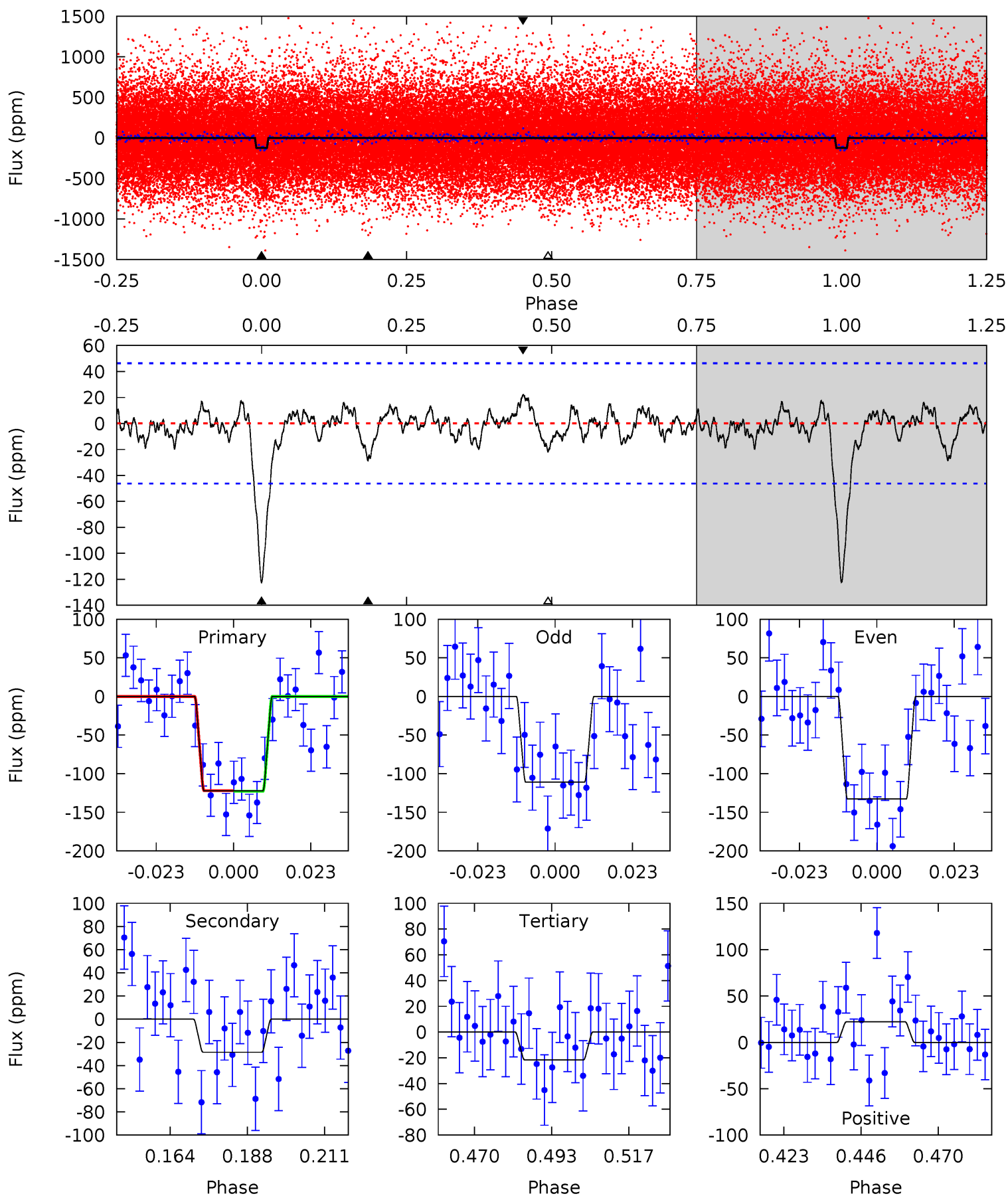
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.9	3.21	2.71	2.14	4.84	2.23	0.99	11.2	11.8	0.50	1.07	1.07	0.97	0.13	0.95



# Alt Model-Shift Uniqueness Test

008609450-04, P = 9.220920 Days, E = 128.772574 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
12.8	3.00	2.28	2.32	4.86	2.27	0.87	10.6	10.5	0.72	0.67	1.14	0.84	0.15	0.05



### Stellar Parameters For KIC 008609450

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5600^{+112}_{-100}$	$4.455^{+0.102}_{-0.077}$	$-0.360^{+0.150}_{-0.150}$	$0.872^{+0.088}_{-0.088}$	$0.793^{+0.064}_{-0.035}$	$1.683^{+0.728}_{-0.398}$
	+2%/-2%	+2%/-2%	+42%/-42%	+10%/-10%	+8%/-4%	+43%/-24%
Source	SPE58	SPE58	SPE58	DSEP		

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

### Secondary Eclipse Parameters for KIC 008609450-04 / KOI 1278.03

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-29 \pm 9$	$1.27^{+0.19}_{-0.19}$	$1142^{+37}_{-42}$	$3908^{+304}_{-315}$	$65^{+34}_{-26}$
Alt.	$-29 \pm 10$	$1.05^{+0.19}_{-0.19}$	$1140^{+40}_{-39}$	$4137^{+403}_{-361}$	$88^{+63}_{-37}$

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

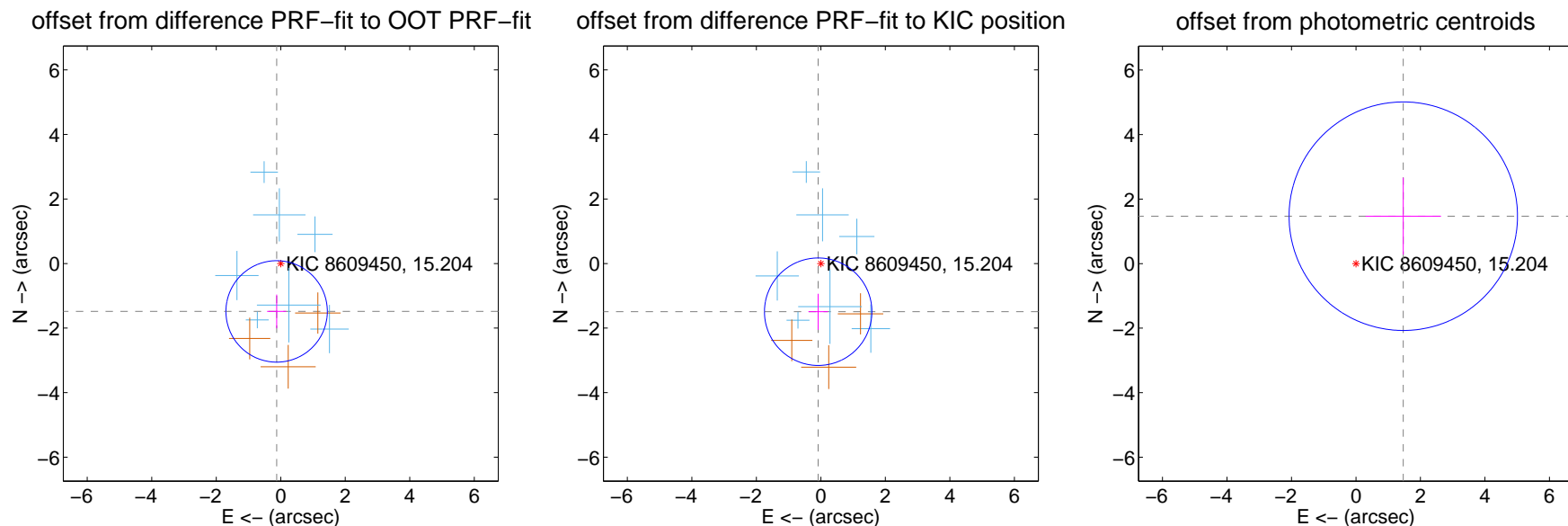
## DV Centroid Data

Supplemental centroid analysis for 008609450-04. Kepler magnitude: 15.20. Transit SNR 11.17

There are 7 quarters with good PRF difference image offsets

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

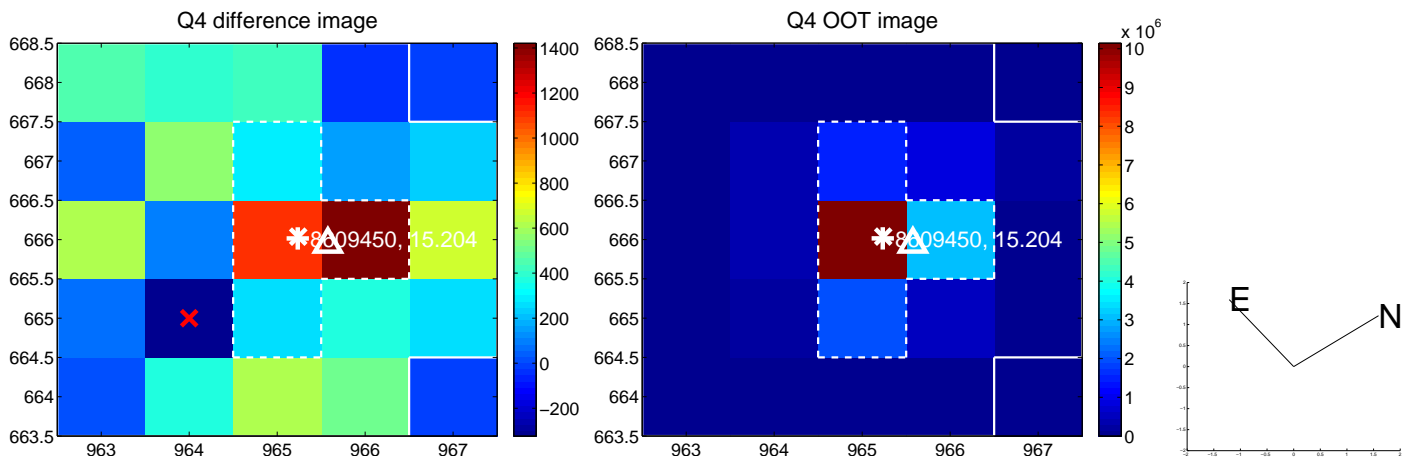
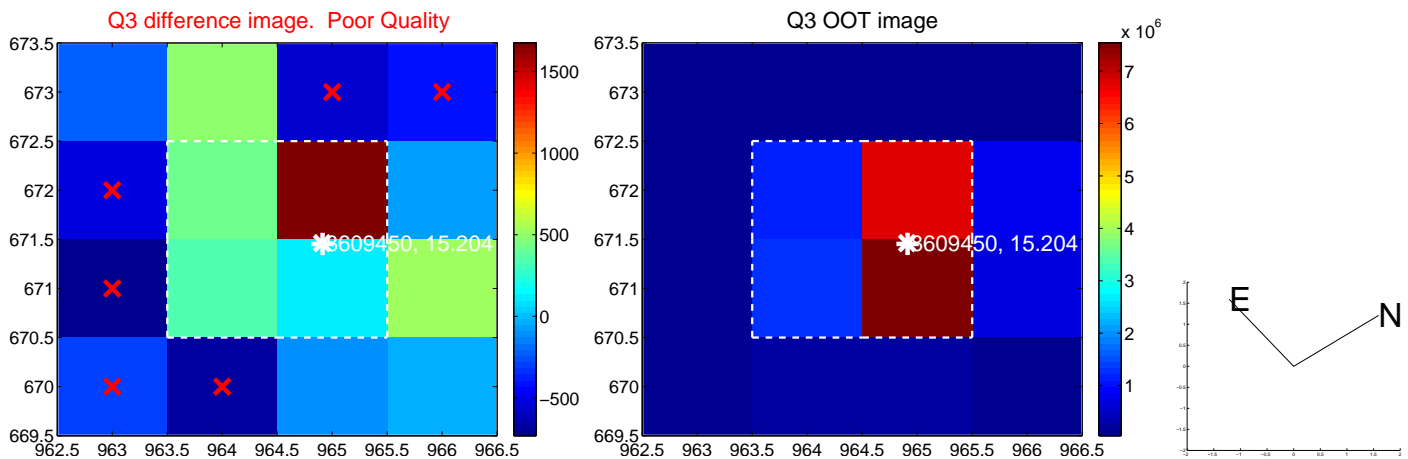
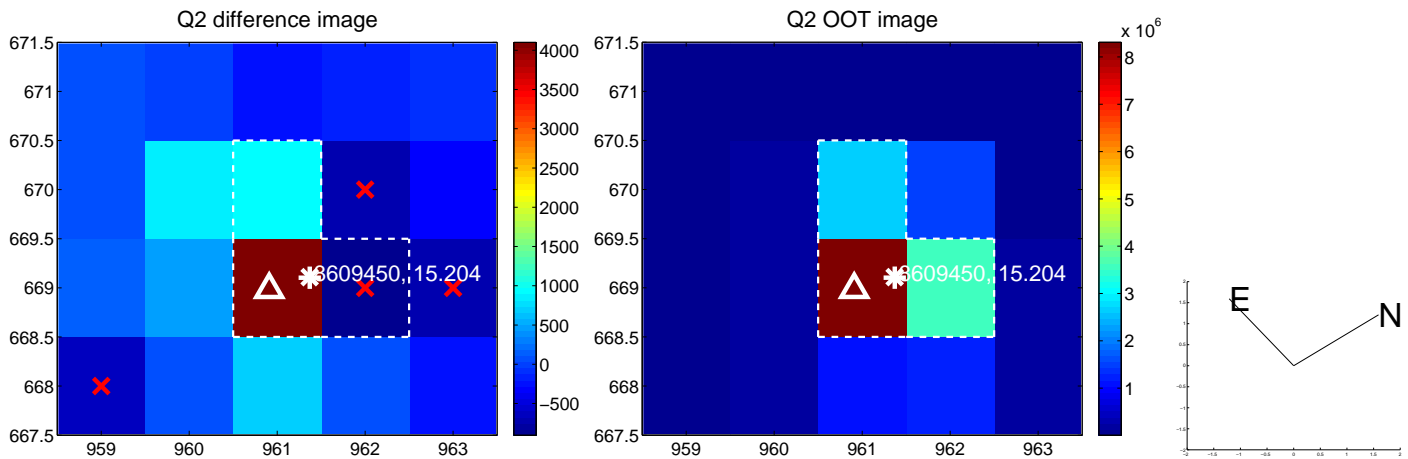
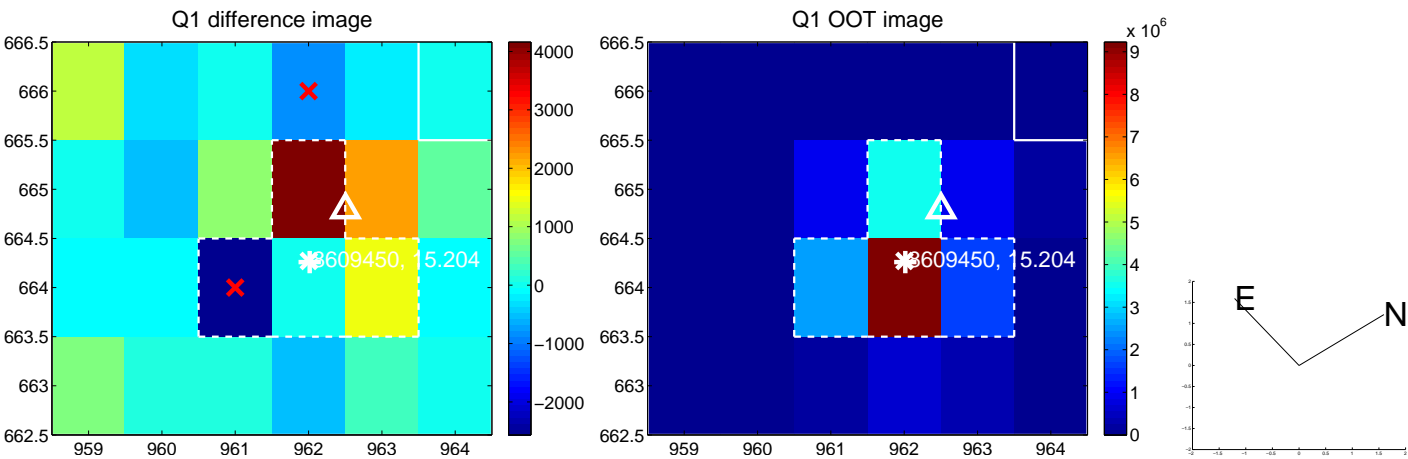
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.489 \pm 0.524$	2.84	$0.128 \pm 0.294$	$-1.483 \pm 0.521$
PRF-fit source offset from KIC position	$1.494 \pm 0.555$	2.69	$0.083 \pm 0.302$	$-1.492 \pm 0.557$
photometric centroid source offset	$2.08 \pm 1.18$	1.76	$-1.47 \pm 1.17$	$1.47 \pm 1.19$



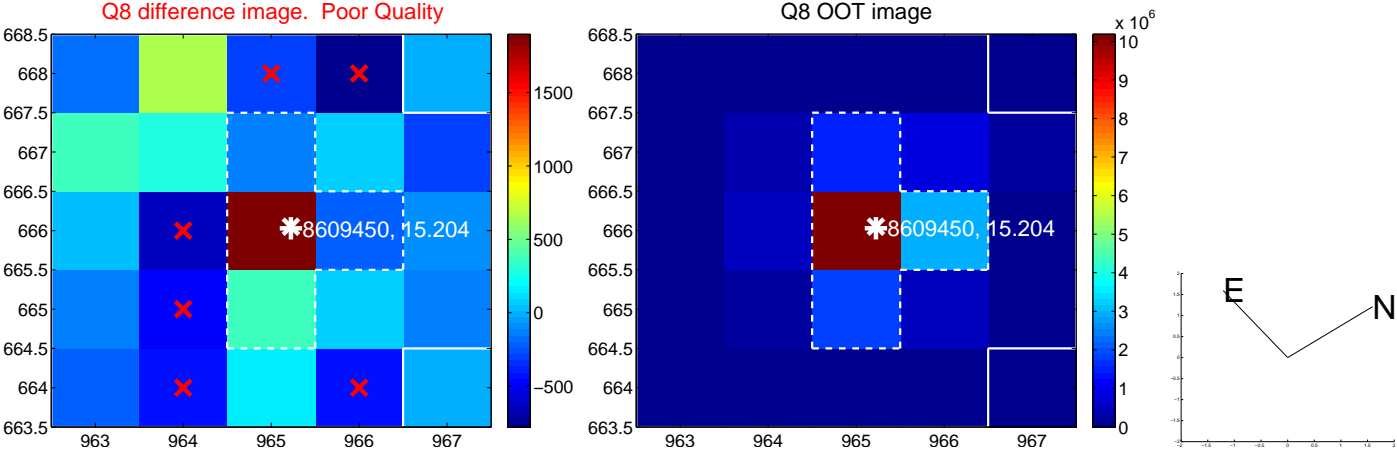
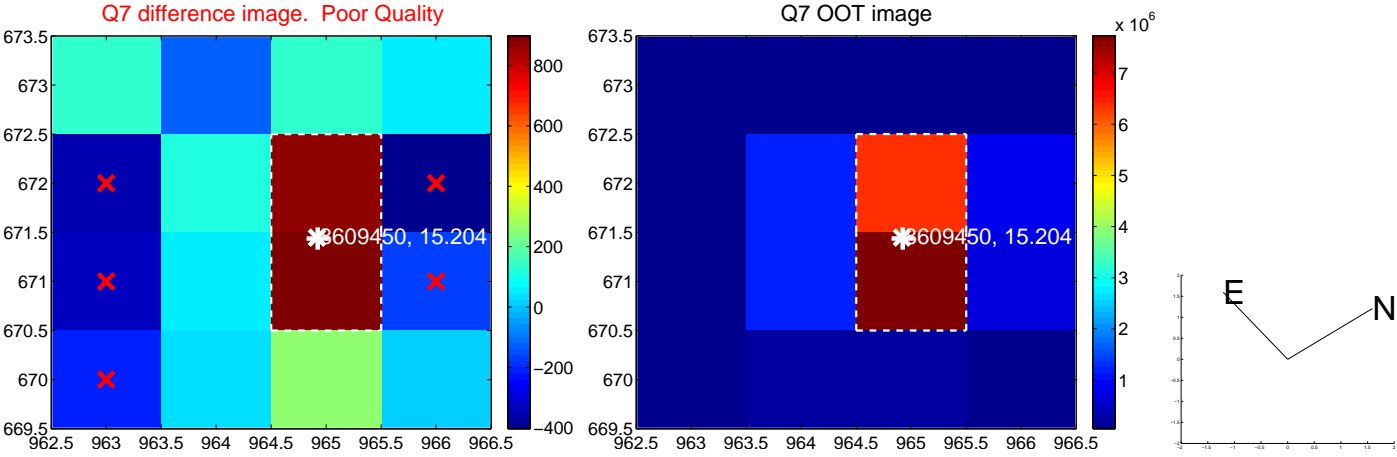
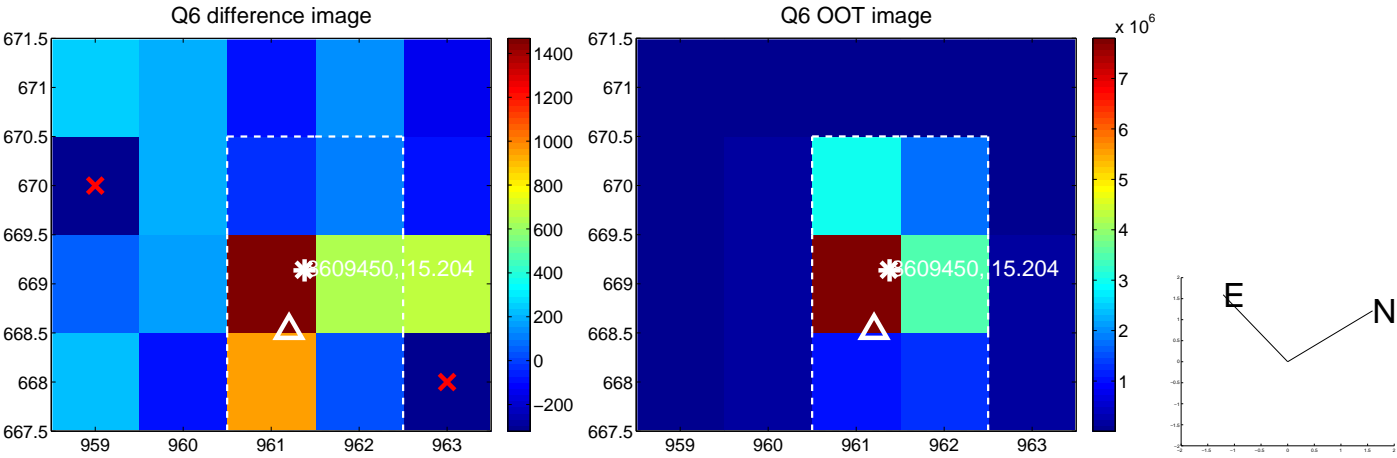
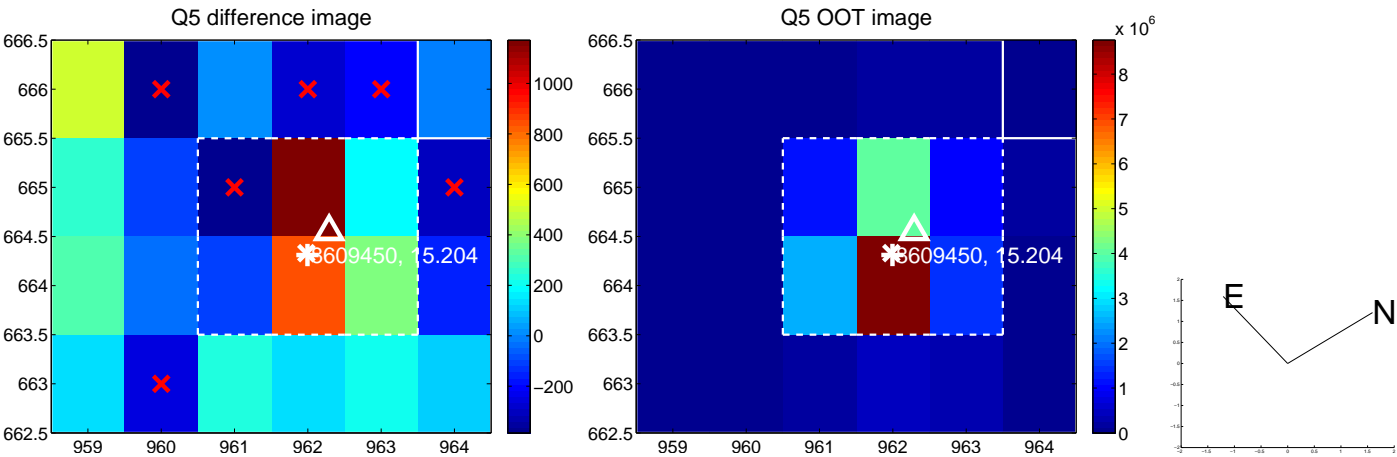
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



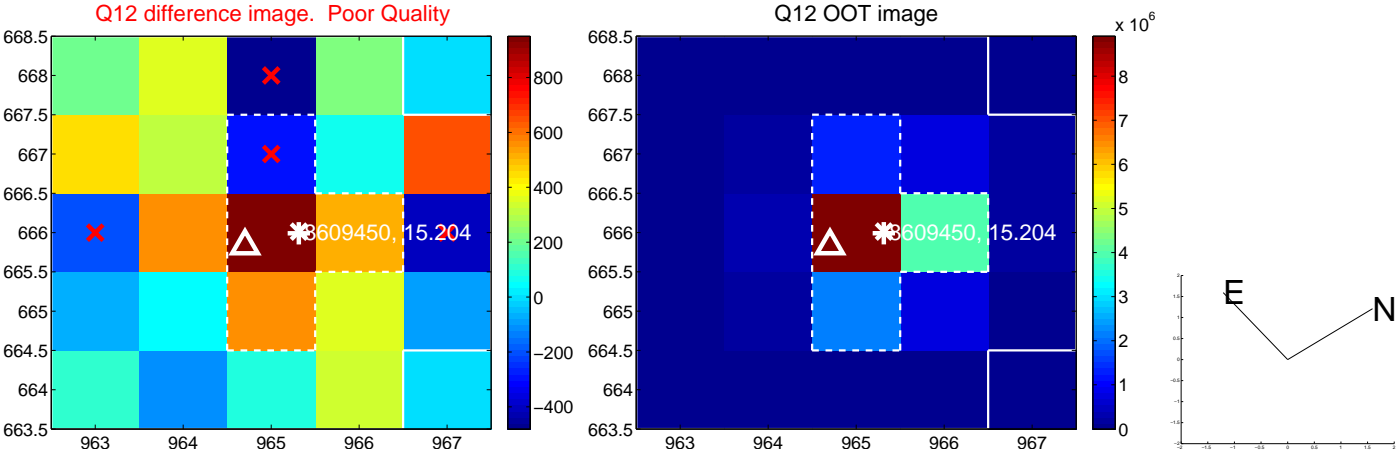
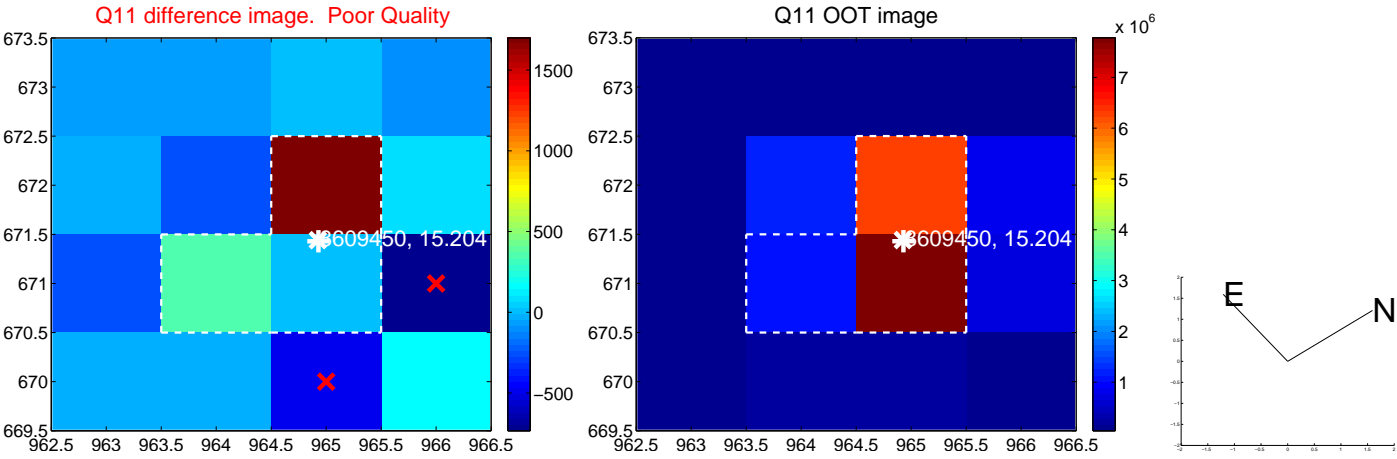
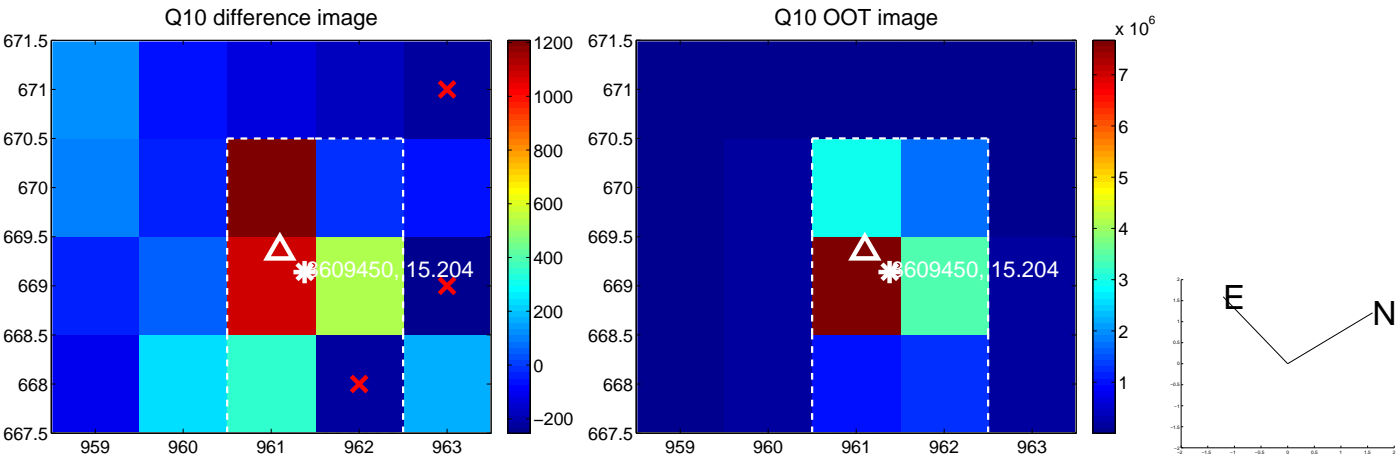
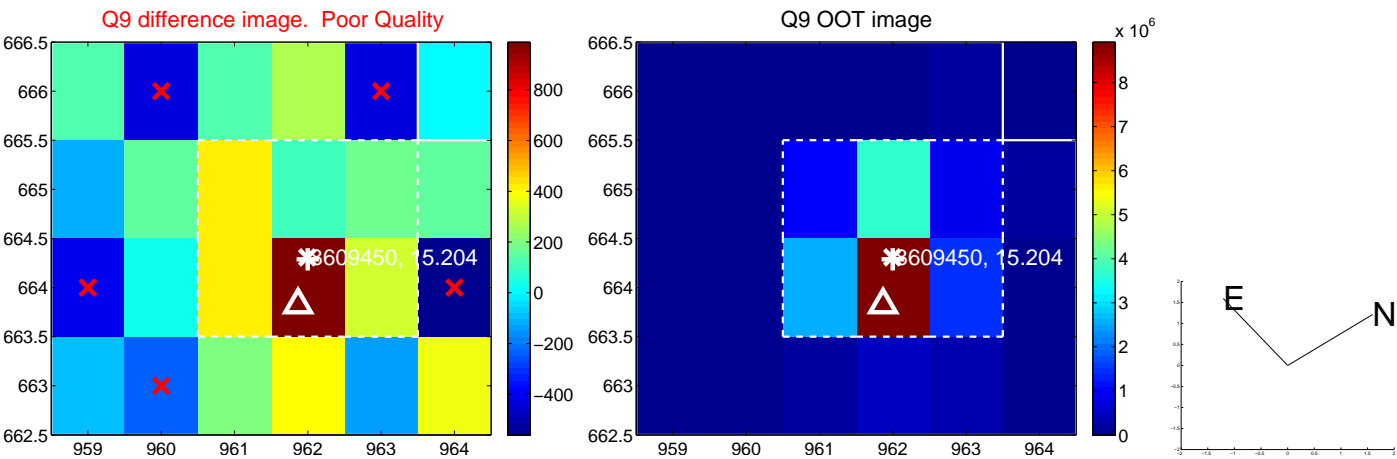
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



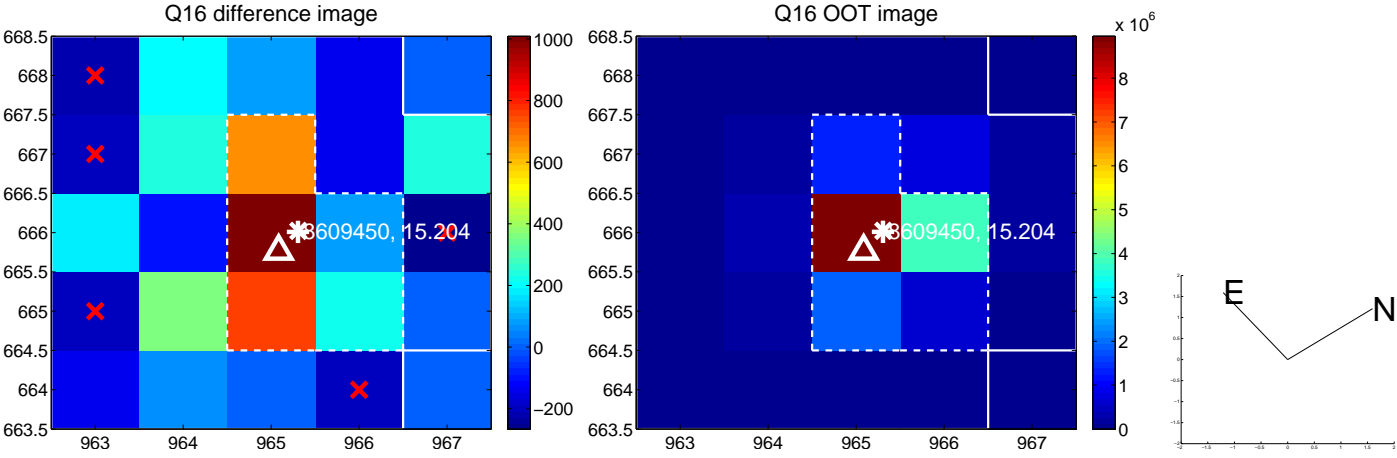
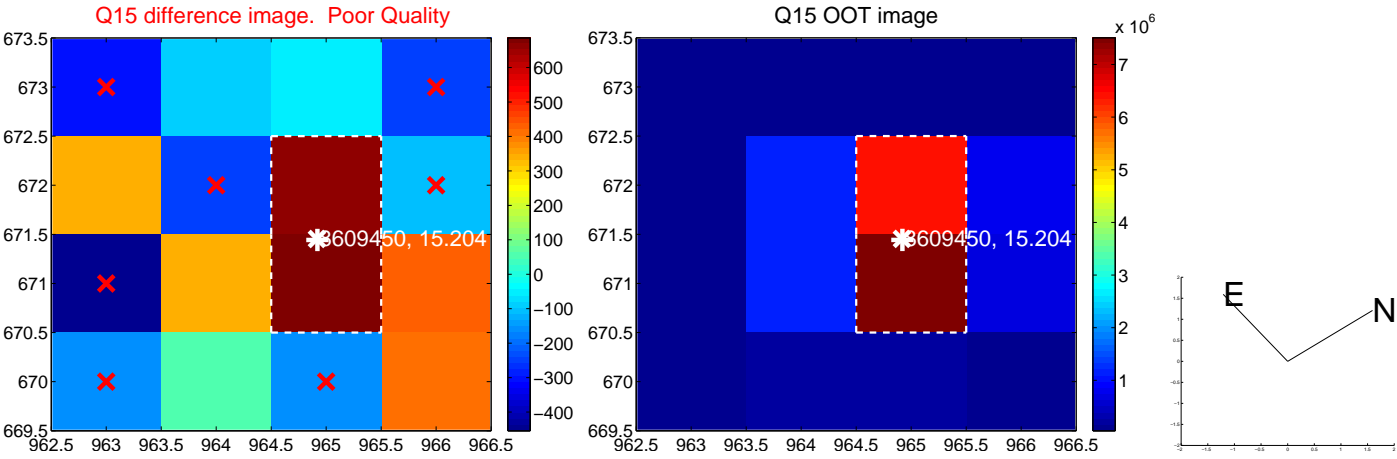
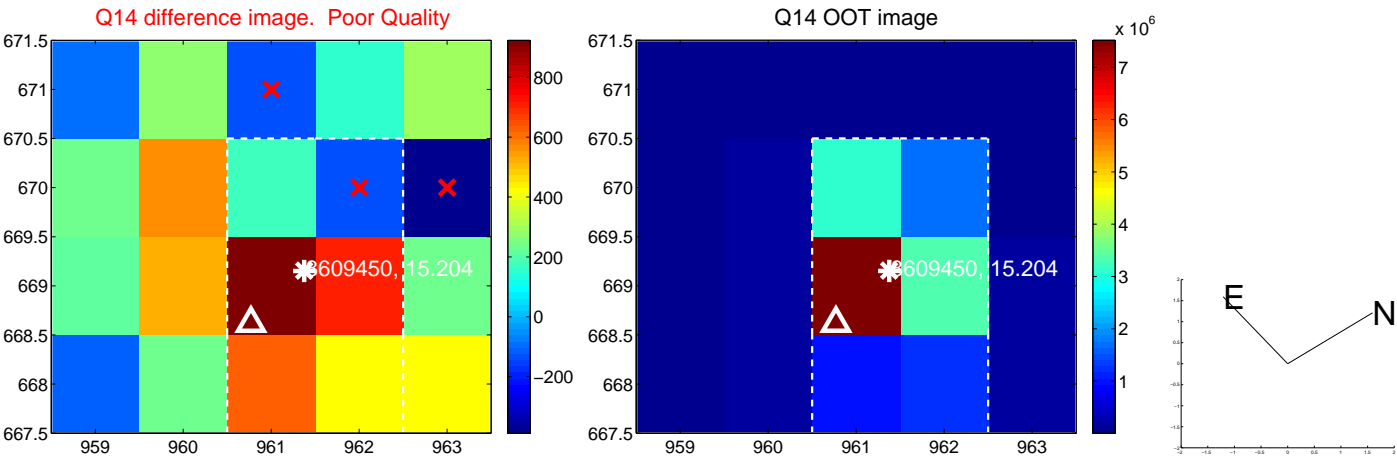
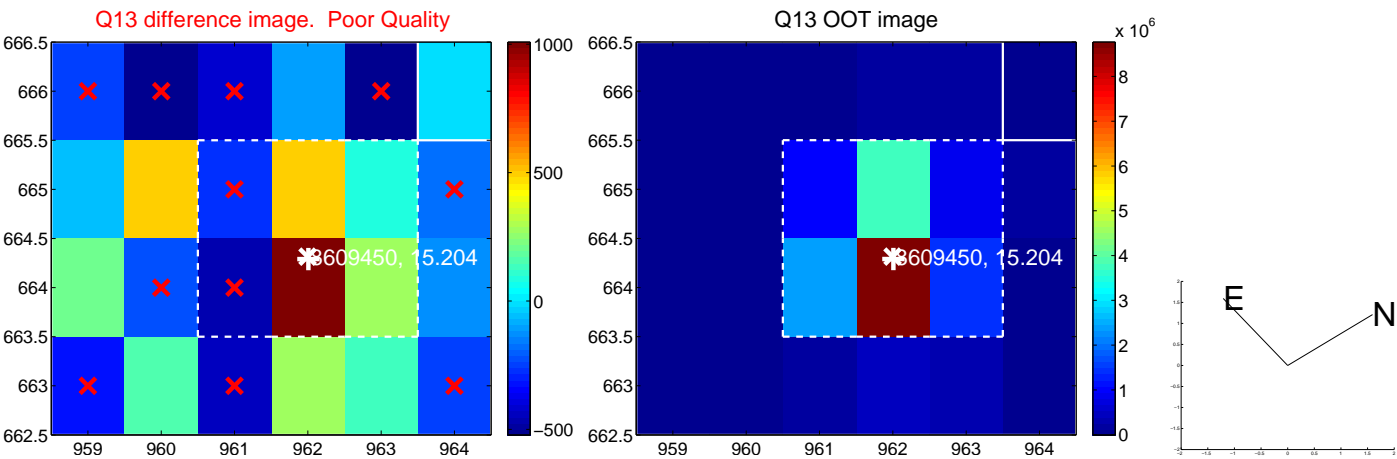
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



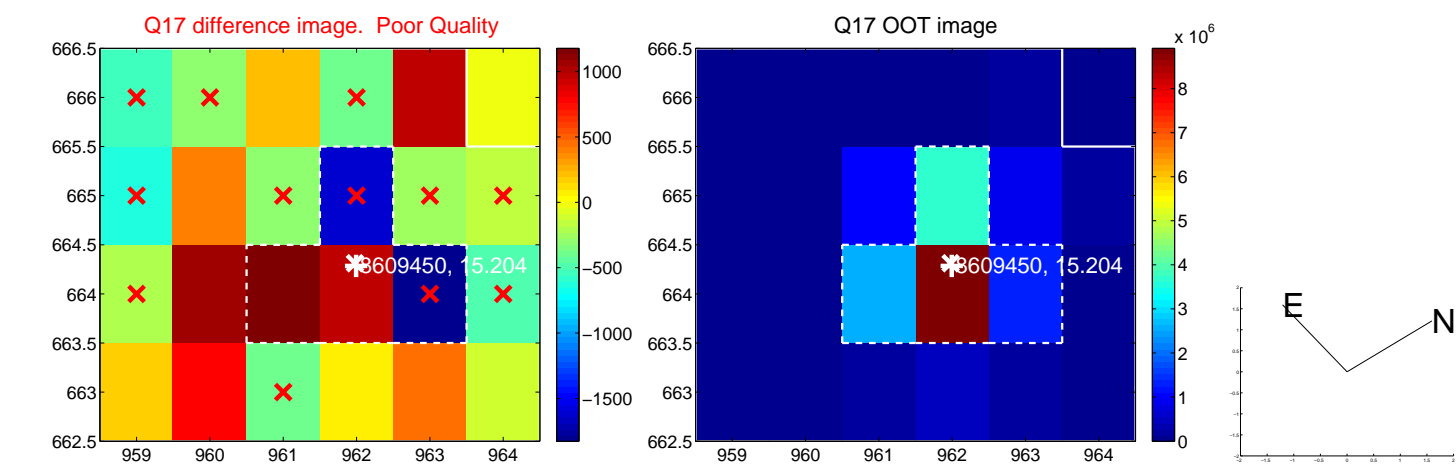
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



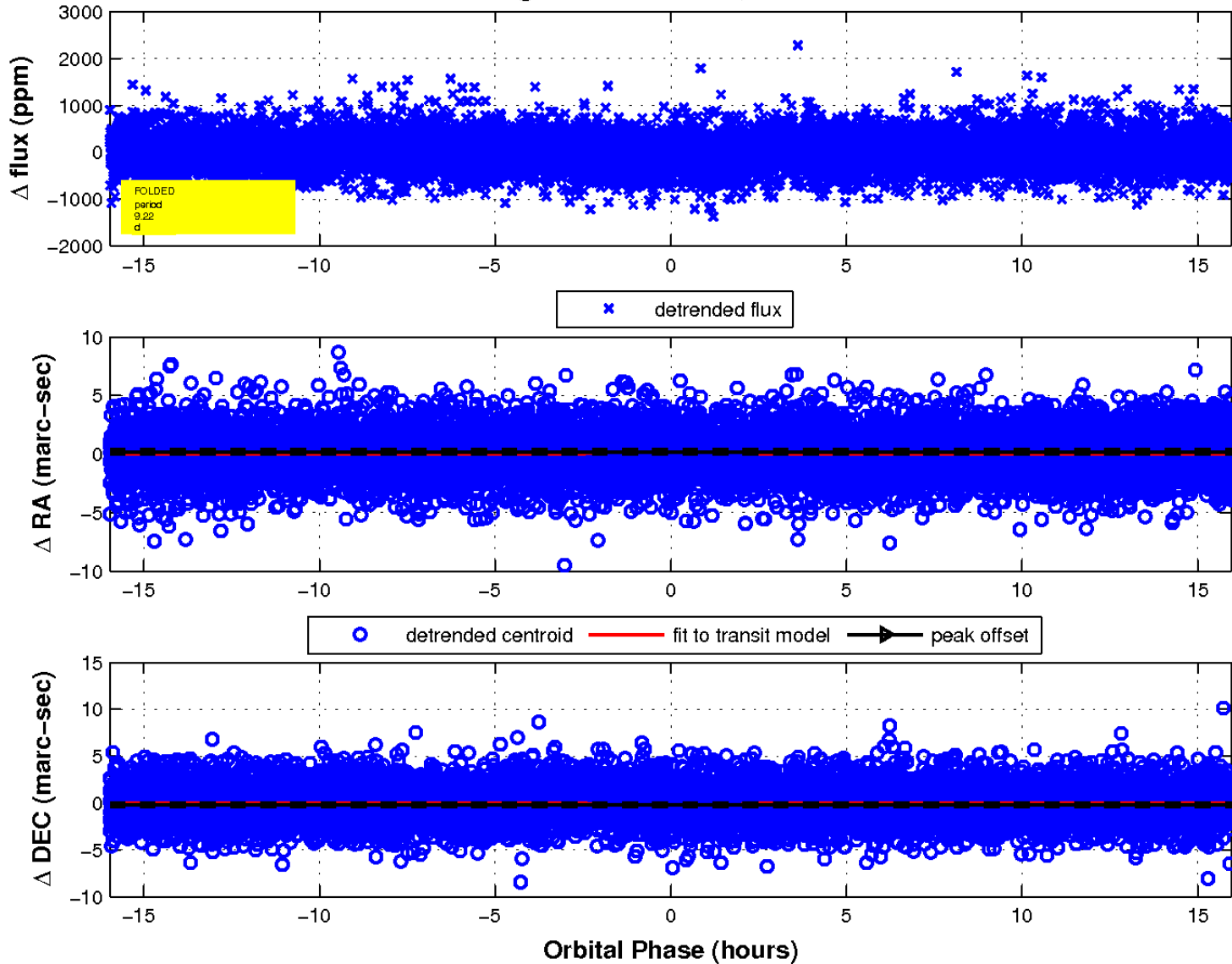
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

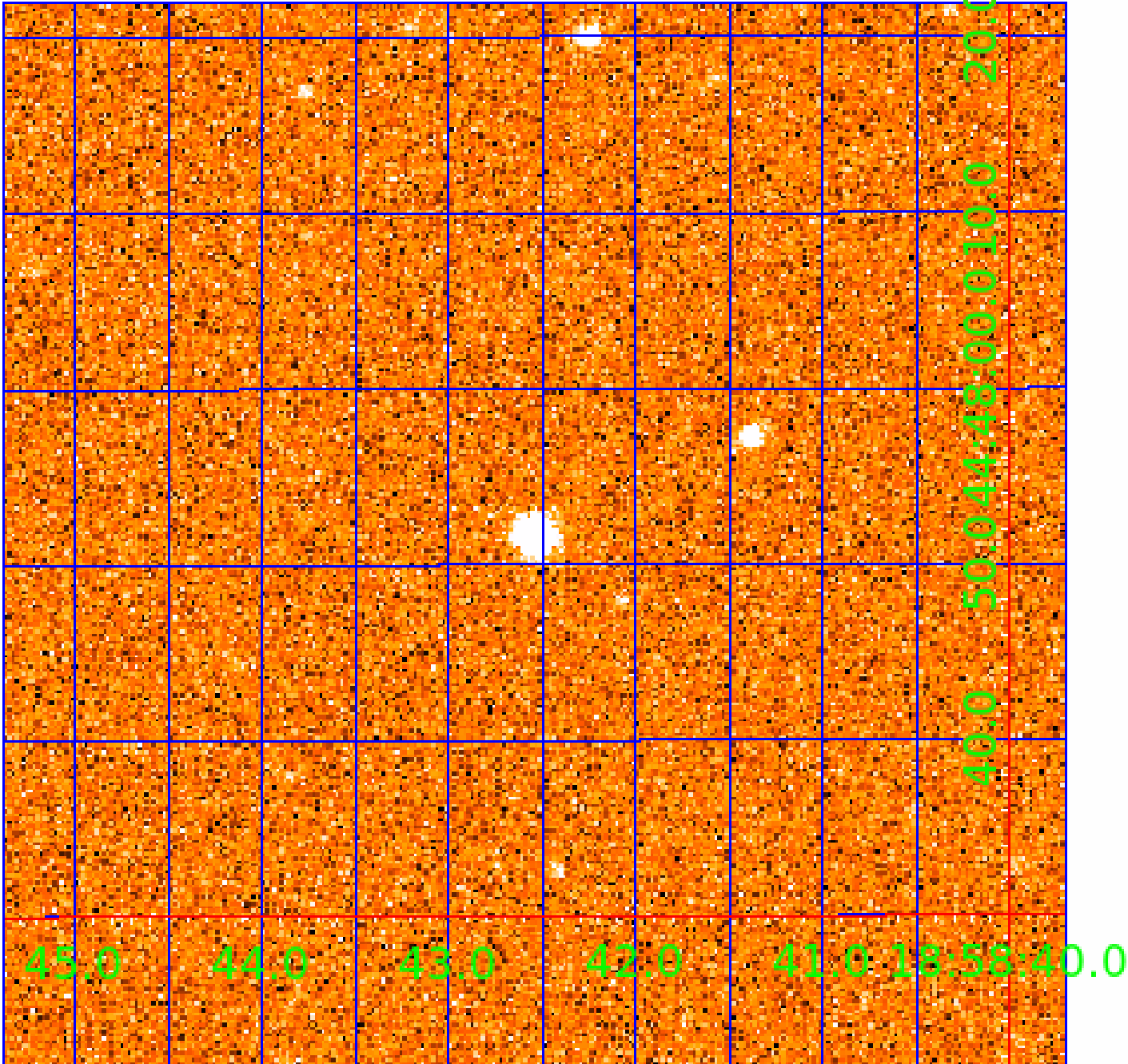


fluxWeightedCentroids, Planet 4 of 5



UKIRT Image

Declination



# KIC 008609450

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008609450-01	OBS	1278.02	44.347354	161.315210	769.2	6.571	31.9	34.1	0.87	5600	2.66	13.03
008609450-02	OBS	1278.01	24.805768	145.072415	637.0	6.328	32.7	35.8	0.87	5600	2.36	28.27
008609450-03	OBS	1278.04	13.639704	141.729281	171.6	5.964	12.0	12.8	0.87	5600	1.37	62.75
008609450-04	OBS	1278.03	9.220819	138.003924	133.8	5.322	11.3	11.2	0.87	5600	1.29	105.75
008609450-05	OBS	1278.05	203.257809	208.462165	328.4	6.657	7.6	7.6	0.87	5600	1.75	1.71

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008609450-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
008609450-02	OBS	PC	1.00	0	0	0	0	NO_COMMENT
008609450-03	OBS	PC	0.99	0	0	0	0	NO_COMMENT
008609450-04	OBS	PC	0.90	0	0	0	0	NO_COMMENT
008609450-05	OBS	FP	0.17	1	0	0	0	INDIV_TRANS_MARSHALL—MOD_NONUNIQ_ALT

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

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

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

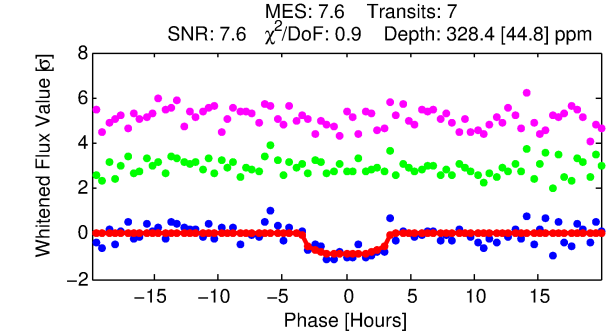
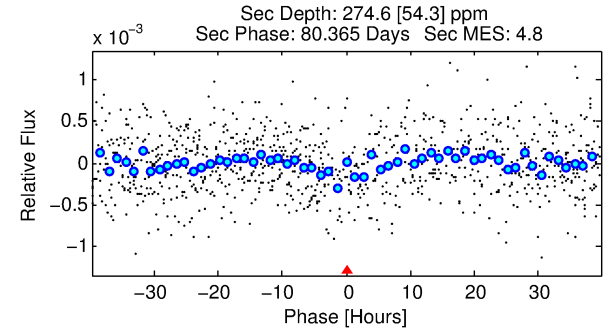
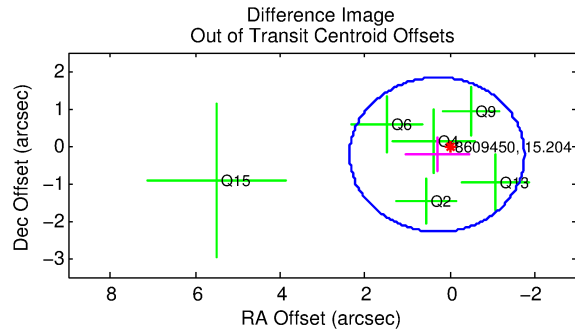
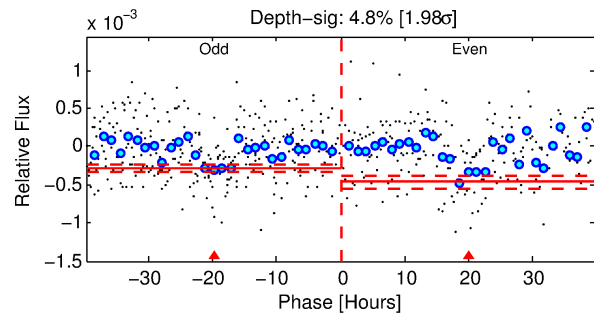
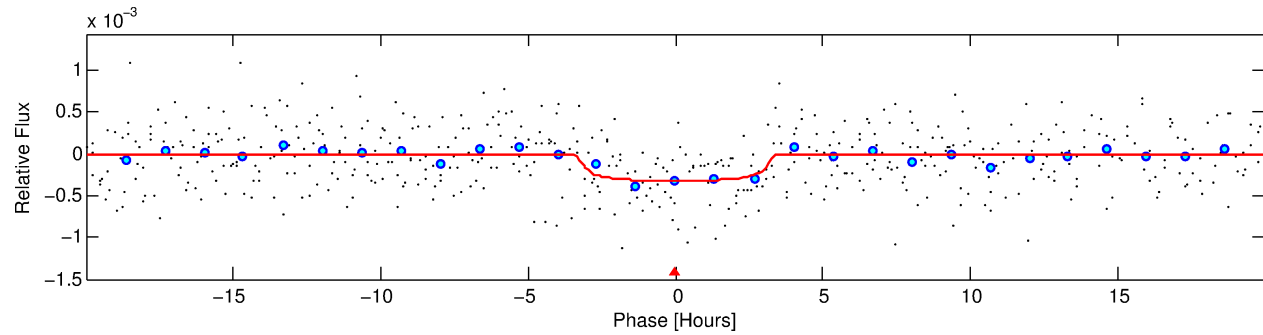
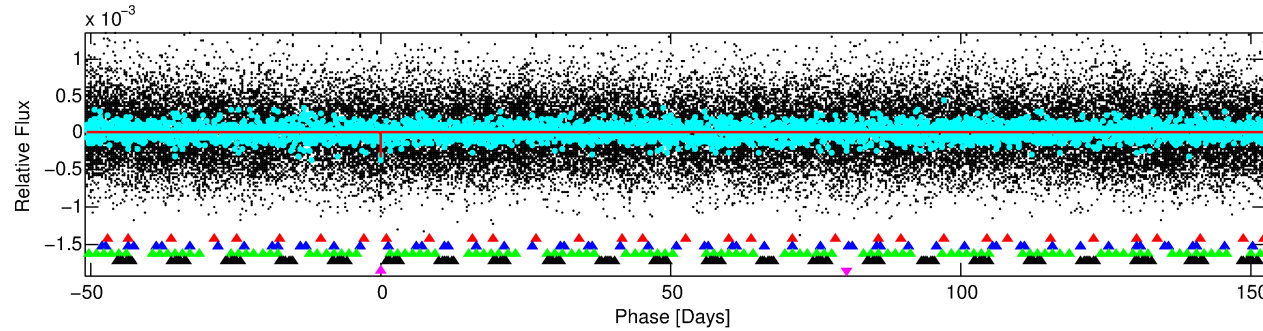
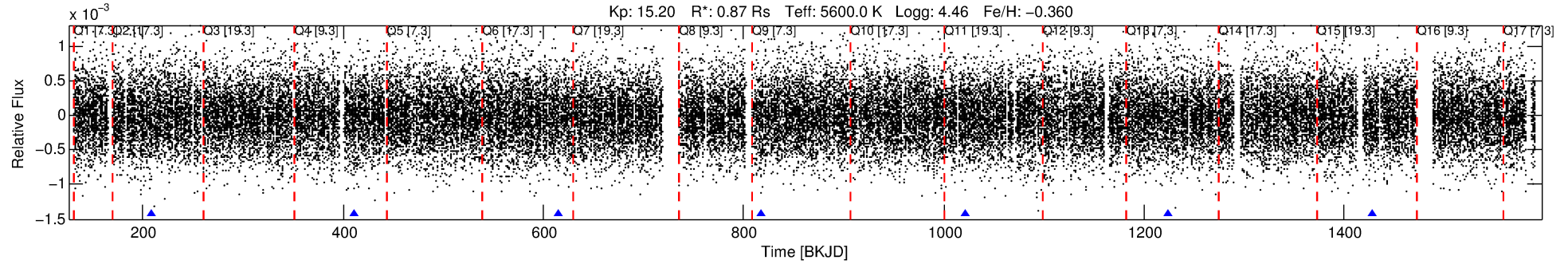
## Ephemeris Match Information For 008609450-05

No Significant Match Found



# DV One-Page Summary

KIC: 8609450 Candidate: 5 of 5 Period: 203.258 d  
KOI: K01278 Name: Kepler-282 Corr: No Ephemeris Match



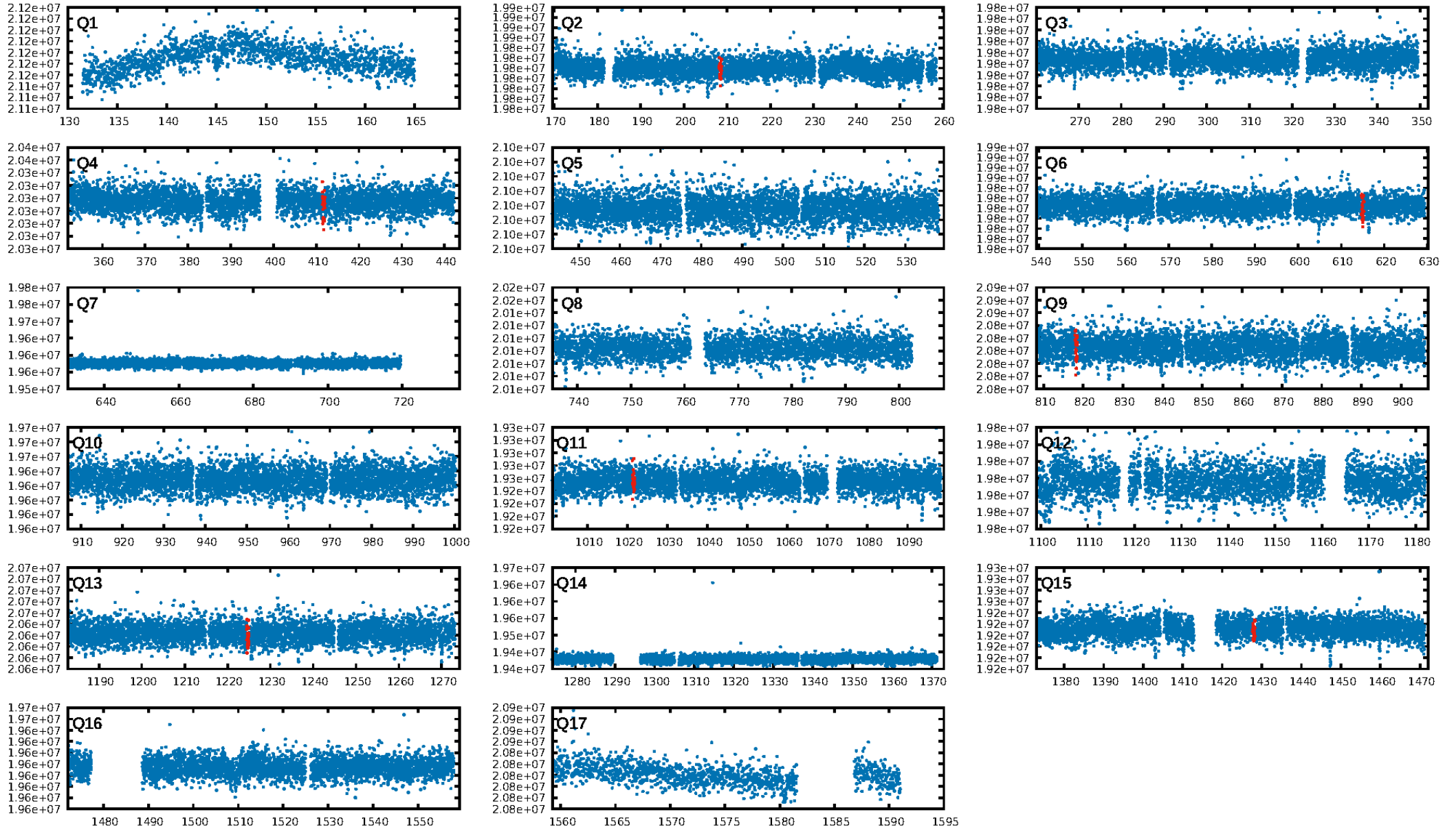
## DV Fit Results:

Period = 203.25781 [0.00418] d  
Epoch = 208.4622 [0.0161] BKJD  
Rp/R\* = 0.0183 [0.0167]  
a/R\* = 149.79 [612.02]  
b = 0.79 [1.97]  
Seff = 1.71 [0.32]  
Teq = 292 [14] K  
Rp = 1.75 [1.60] Re  
a = 0.6258 [0.0646] AU  
Ag = 19418.45 [35714.26] [0.54σ]  
Teffp = 5323 [2439] K [2.06σ]

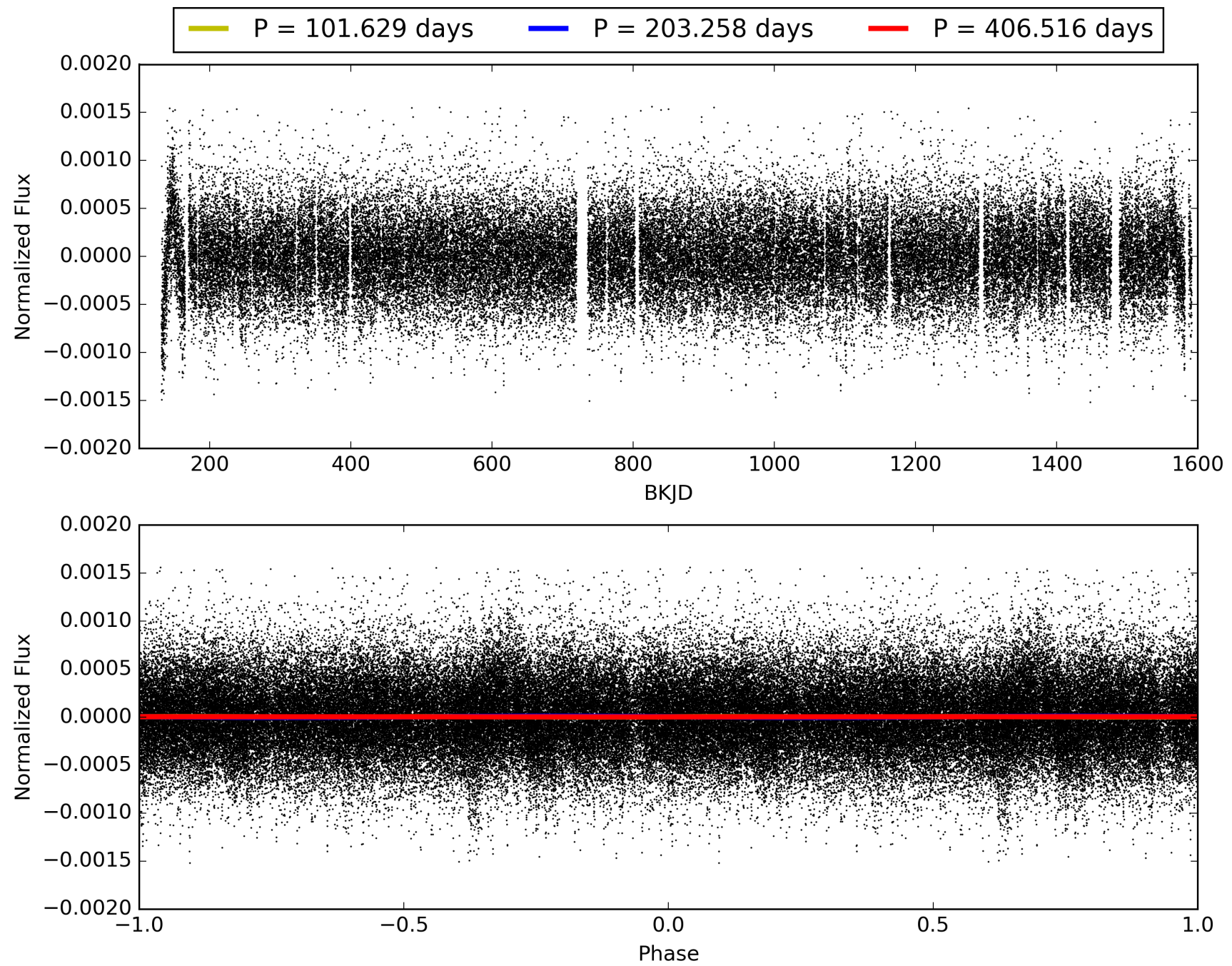
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [407.75σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 51.7%  
ModelChiSquareGof-sig: 99.7%  
**Bootstrap-pfa: 1.52e-12**  
RollingBand-fgt: 1.00 [7/7]  
GhostDiagnostic-chr: -1.492  
Centroid-sig: 18.4%  
Centroid-so: 2.465 arcsec [1.35σ]  
OotOffset-rm: 0.375 arcsec [0.55σ]  
OotOffset-st: 2/1/1/2 [6]  
KicOffset-rm: 0.350 arcsec [0.53σ]  
KicOffset-st: 2/1/1/2 [6]  
DiffImageQuality-fgm: 0.83 [5/6]  
DiffImageOverlap-fno: 1.00 [6/6]

# TCE 008609450-05, PDC Light Curves

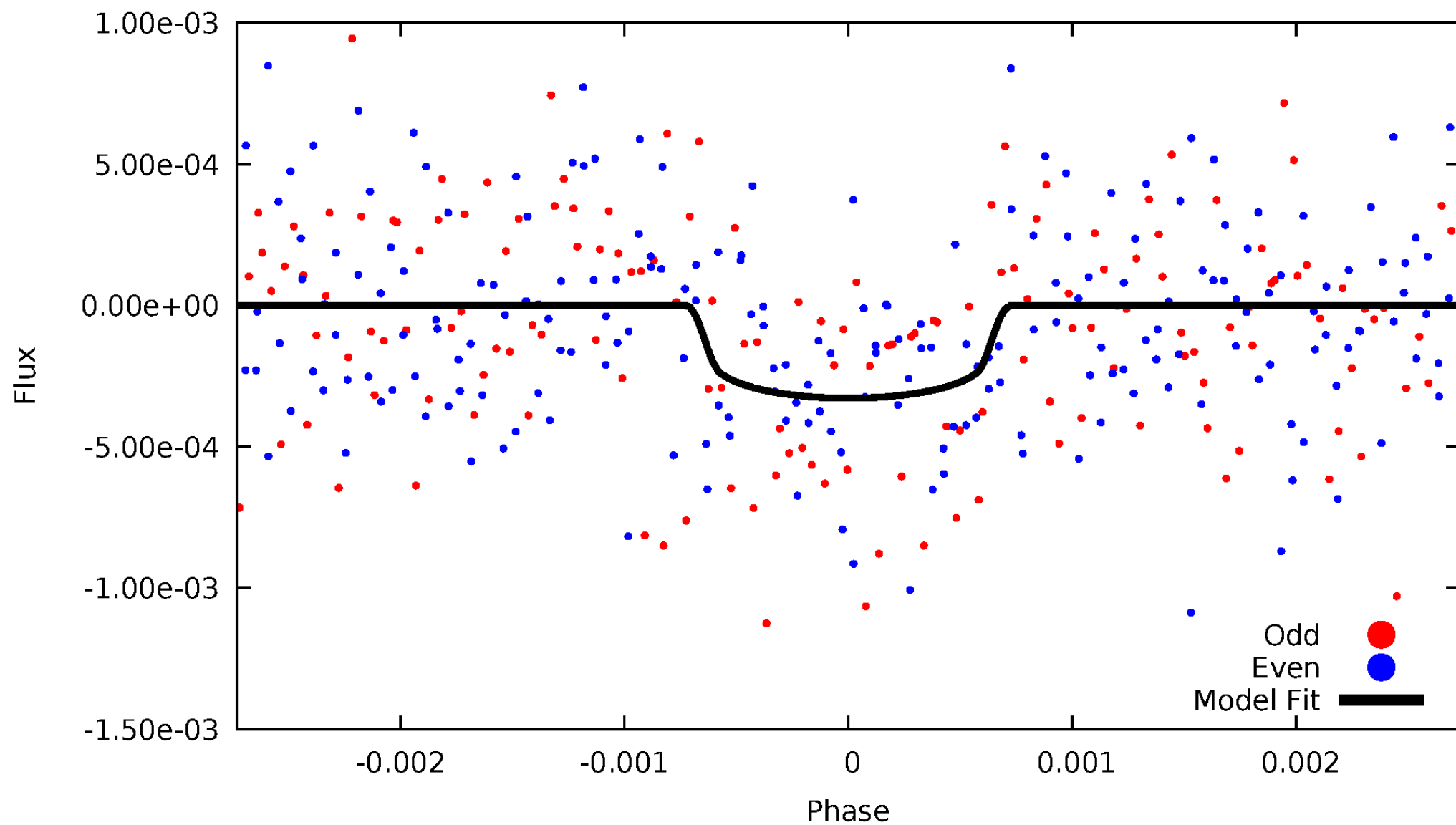


TCE 008609450-05



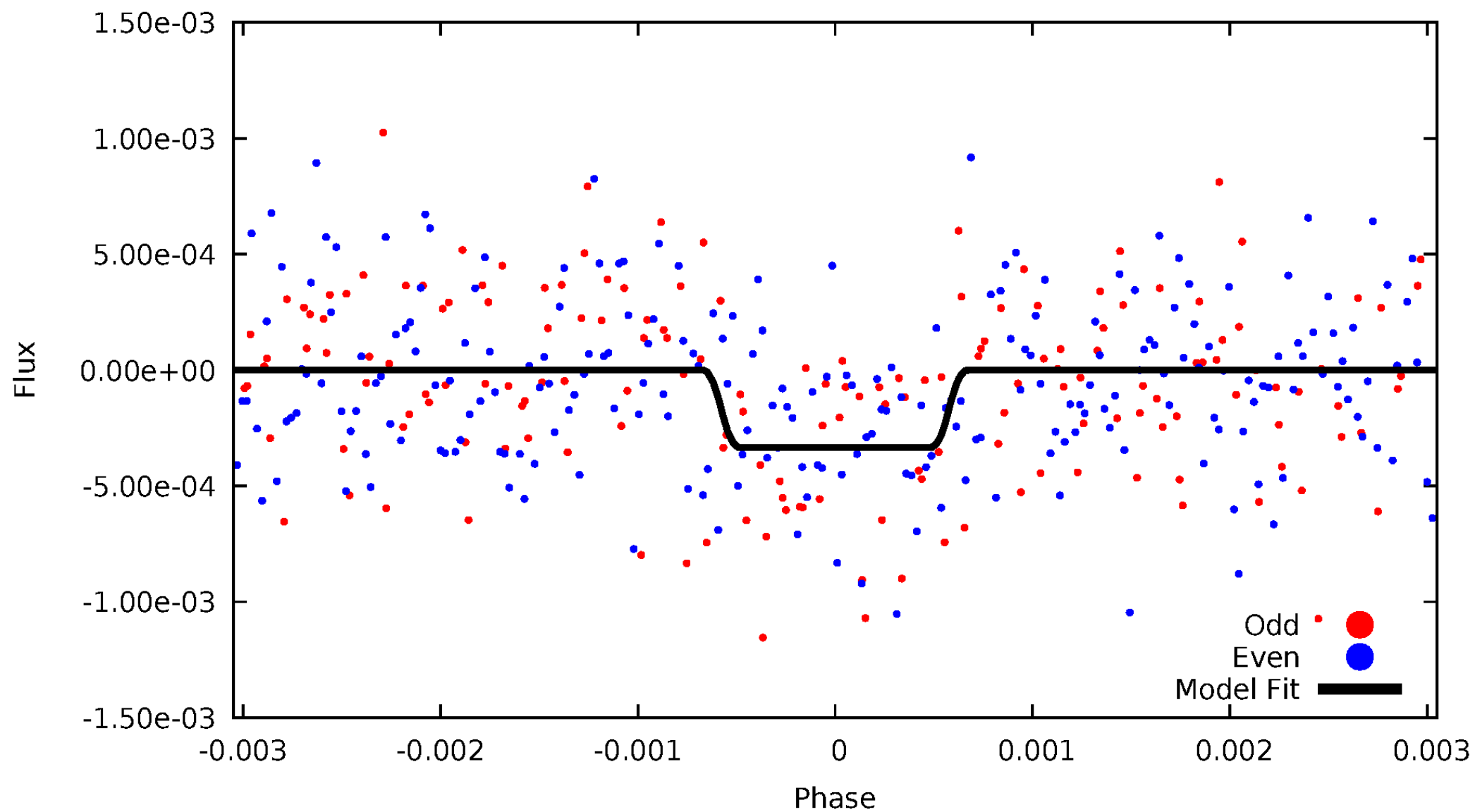
# DV Odd/Even

TCE 008609450-05



# ALT Odd/Even

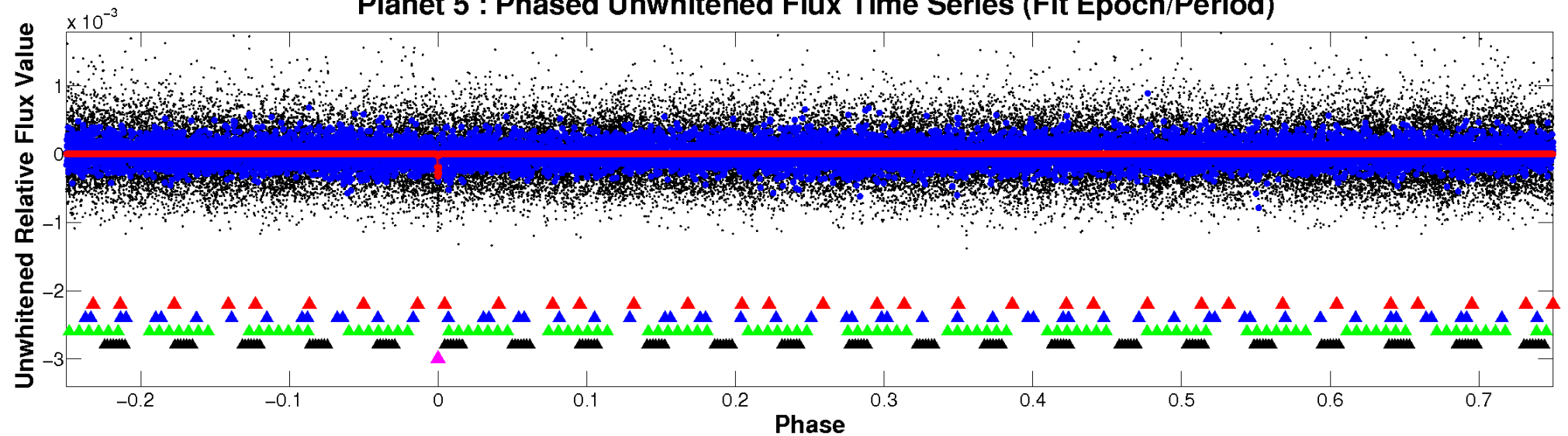
TCE 008609450-05



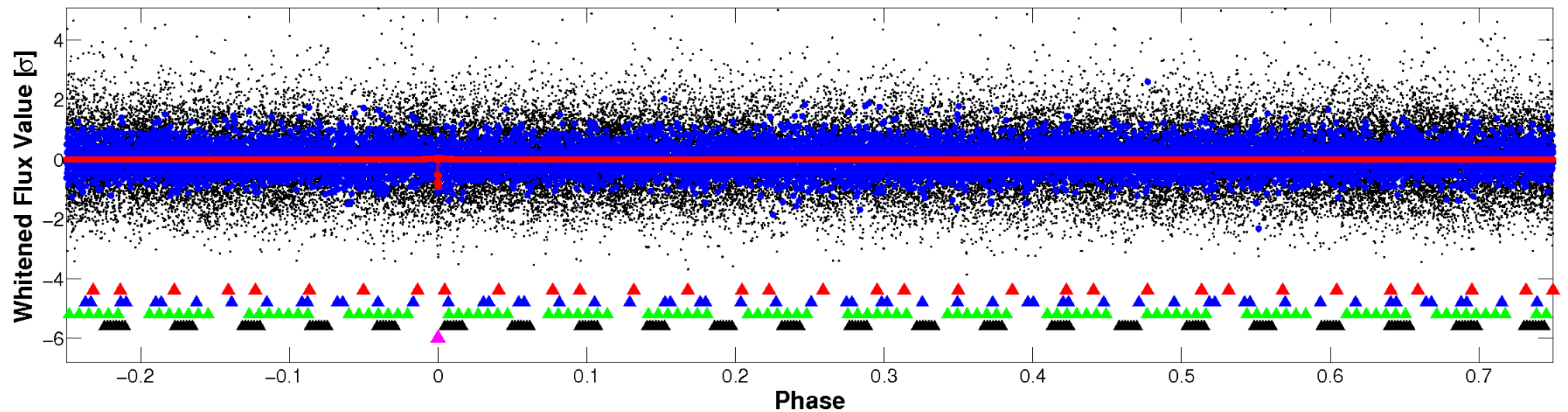


# Non-Whitened Vs. Whitened Light Curve

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

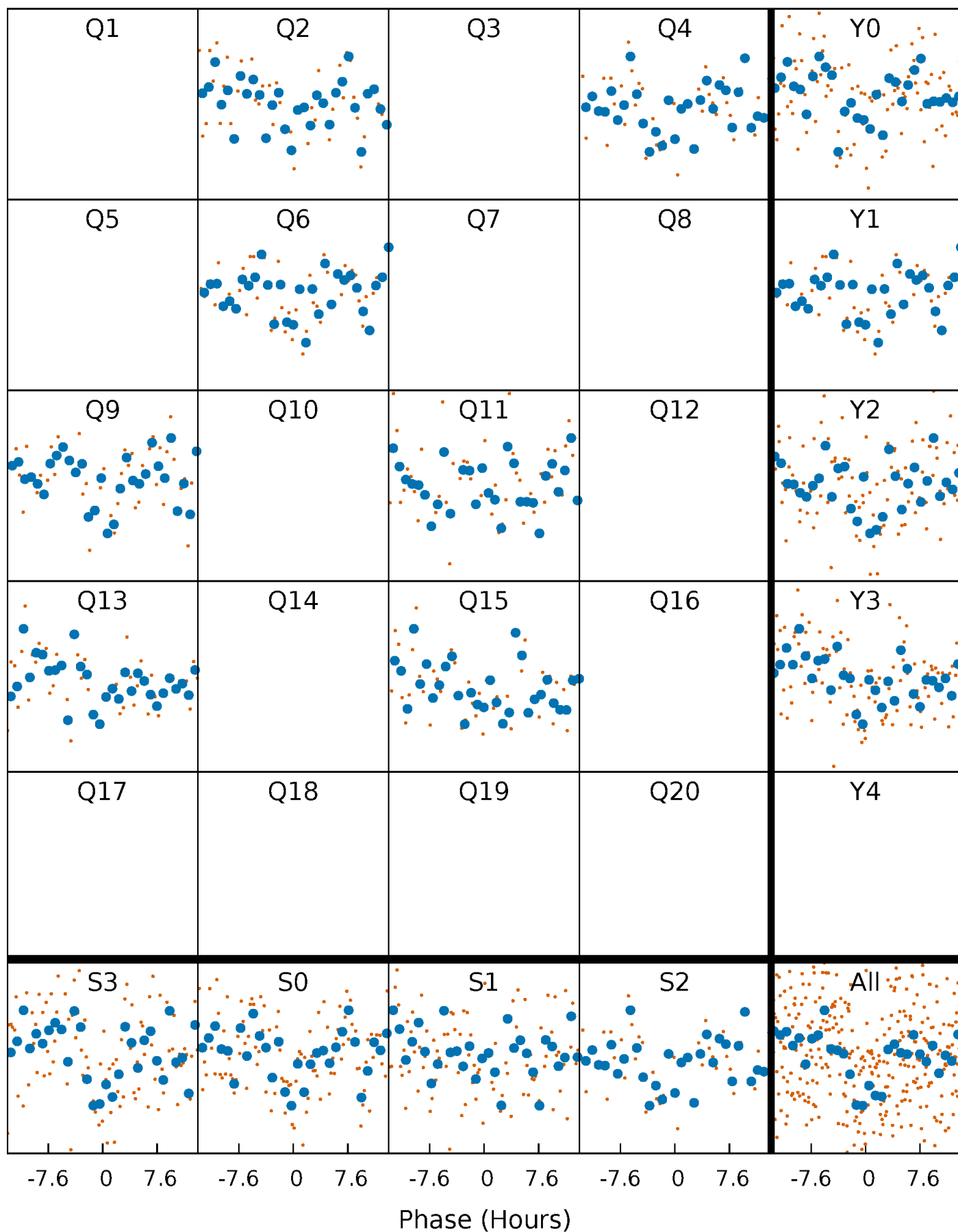


## Planet 5 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

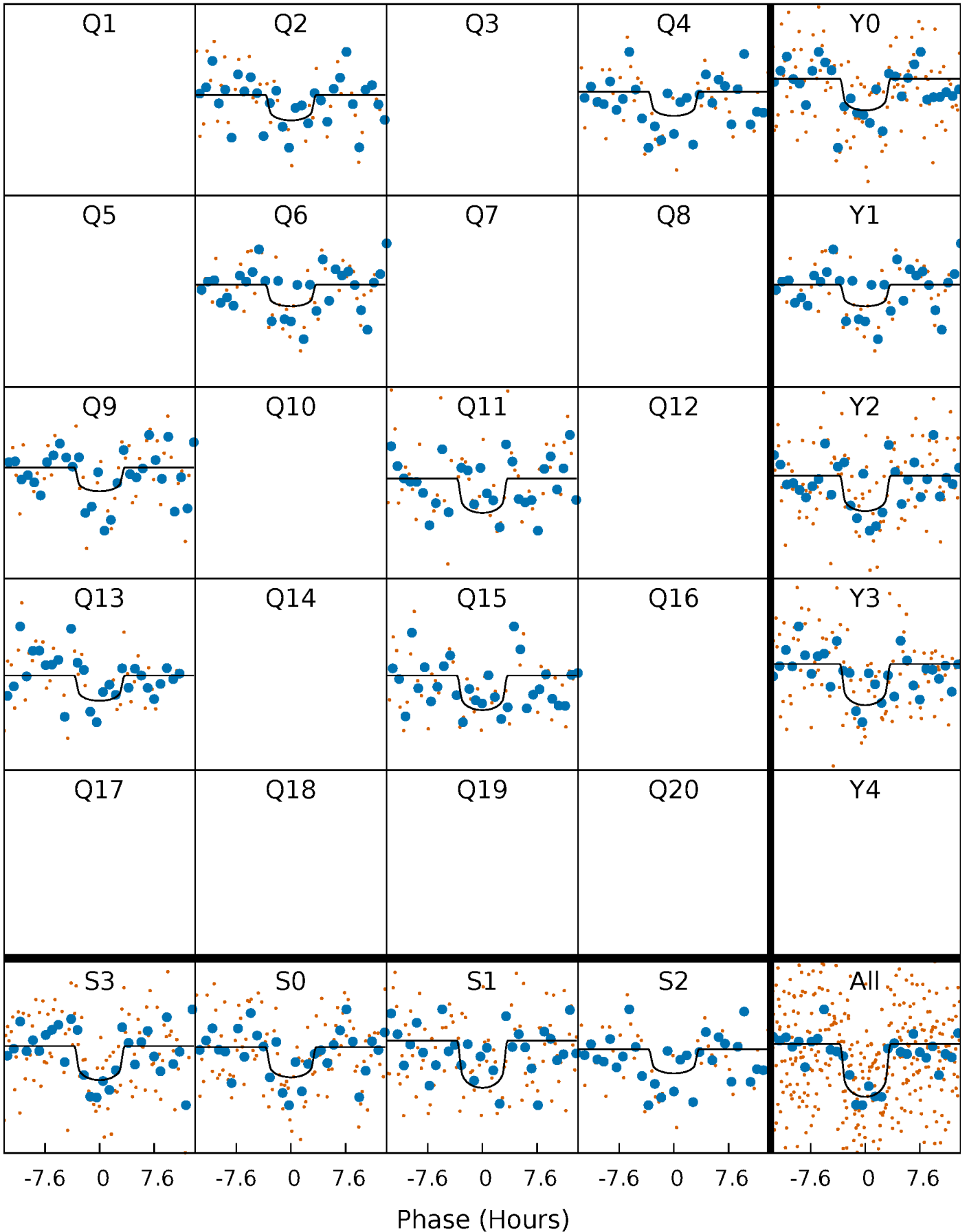
TCE 008609450-05     $P=203.257809$  Days     $T_0=208.462165$  (BKJD)





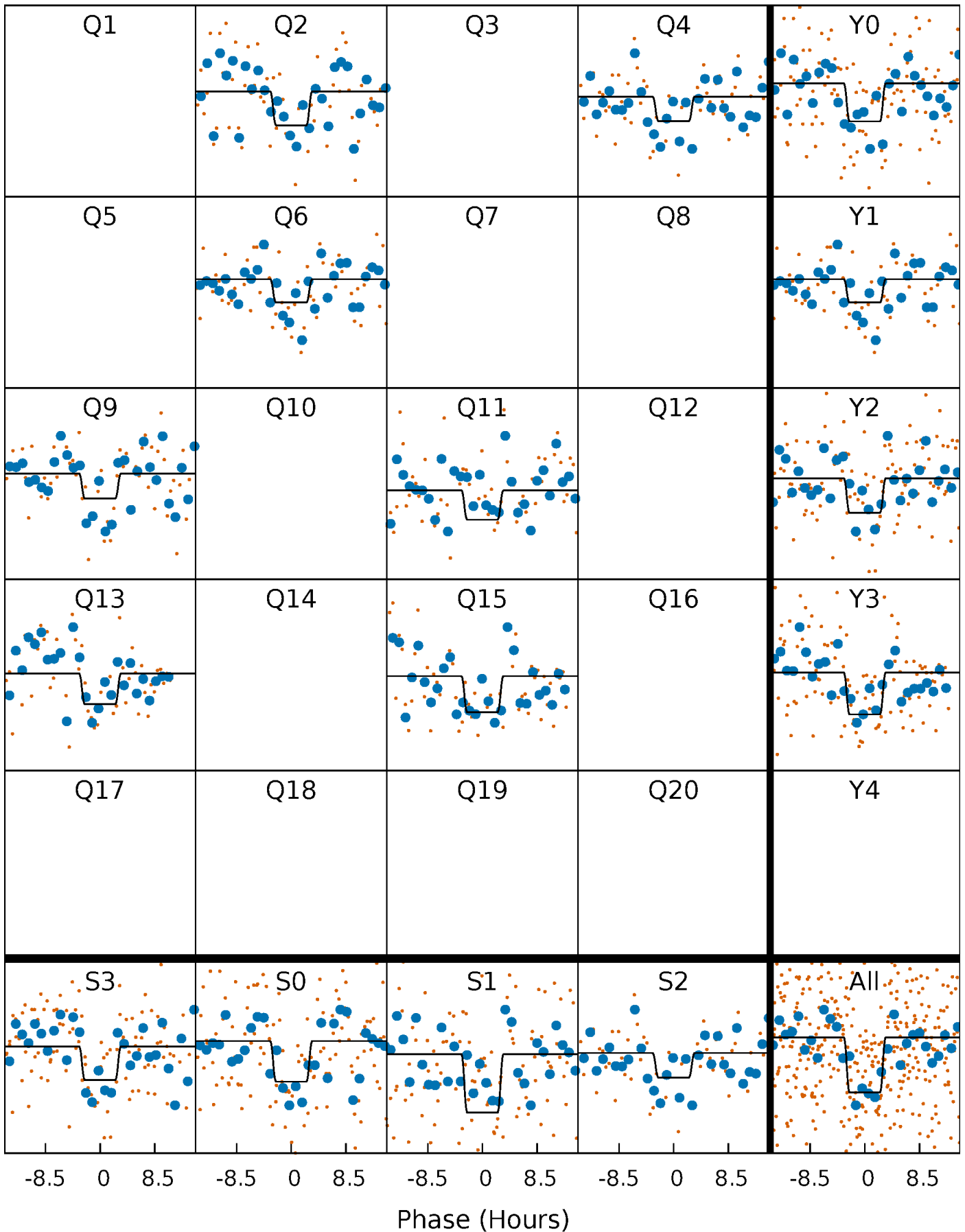
# DV Quarter-Phased Transit Curves

TCE 008609450-05     $P=203.257809$  Days     $T_0=208.462165$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

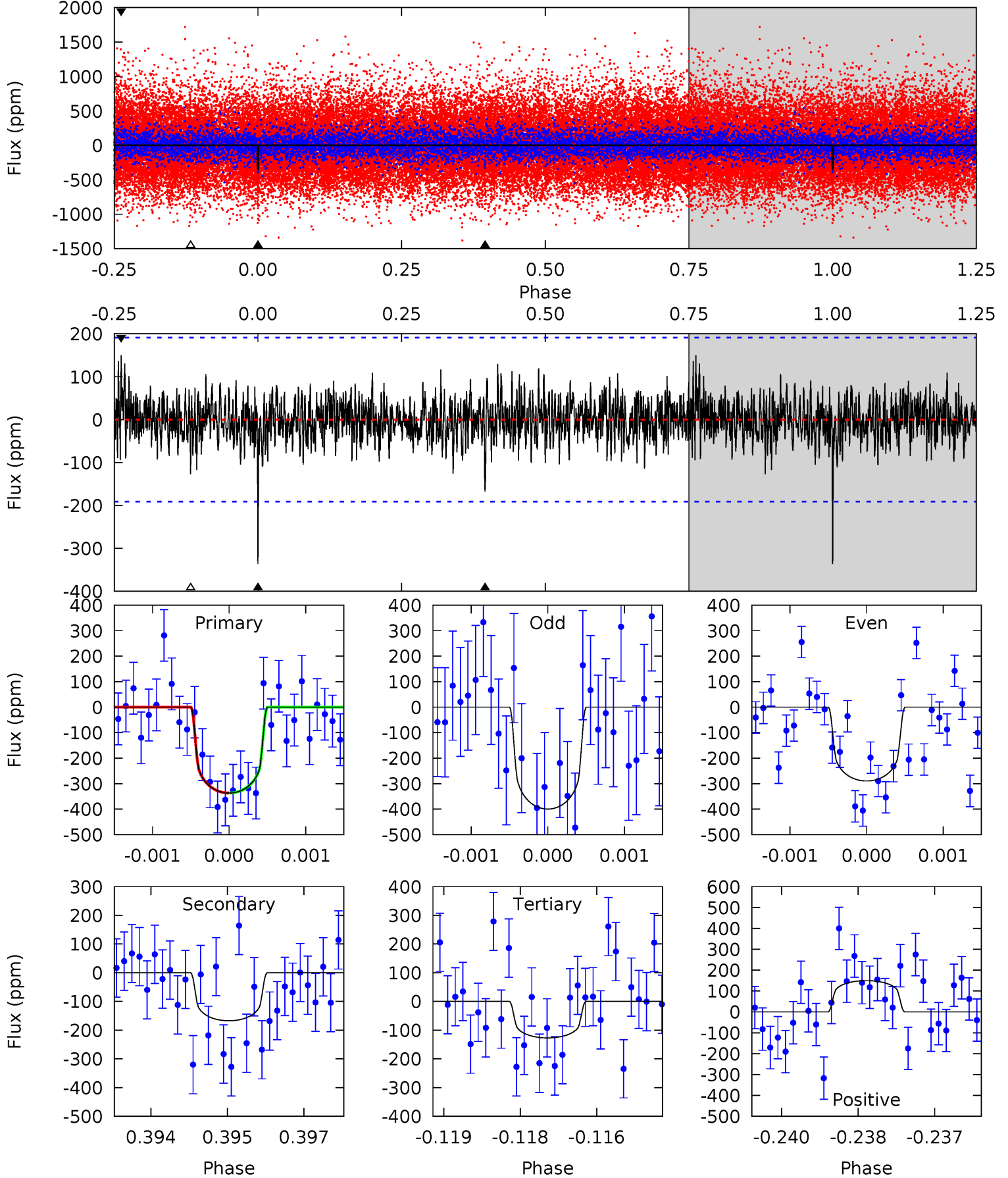
TCE 008609450-05     $P=203.265322$  Days     $T_0=208.439668$  (BKJD)



# DV Model-Shift Uniqueness Test

008609450-05, P = 203.257809 Days, E = 5.204356 Days

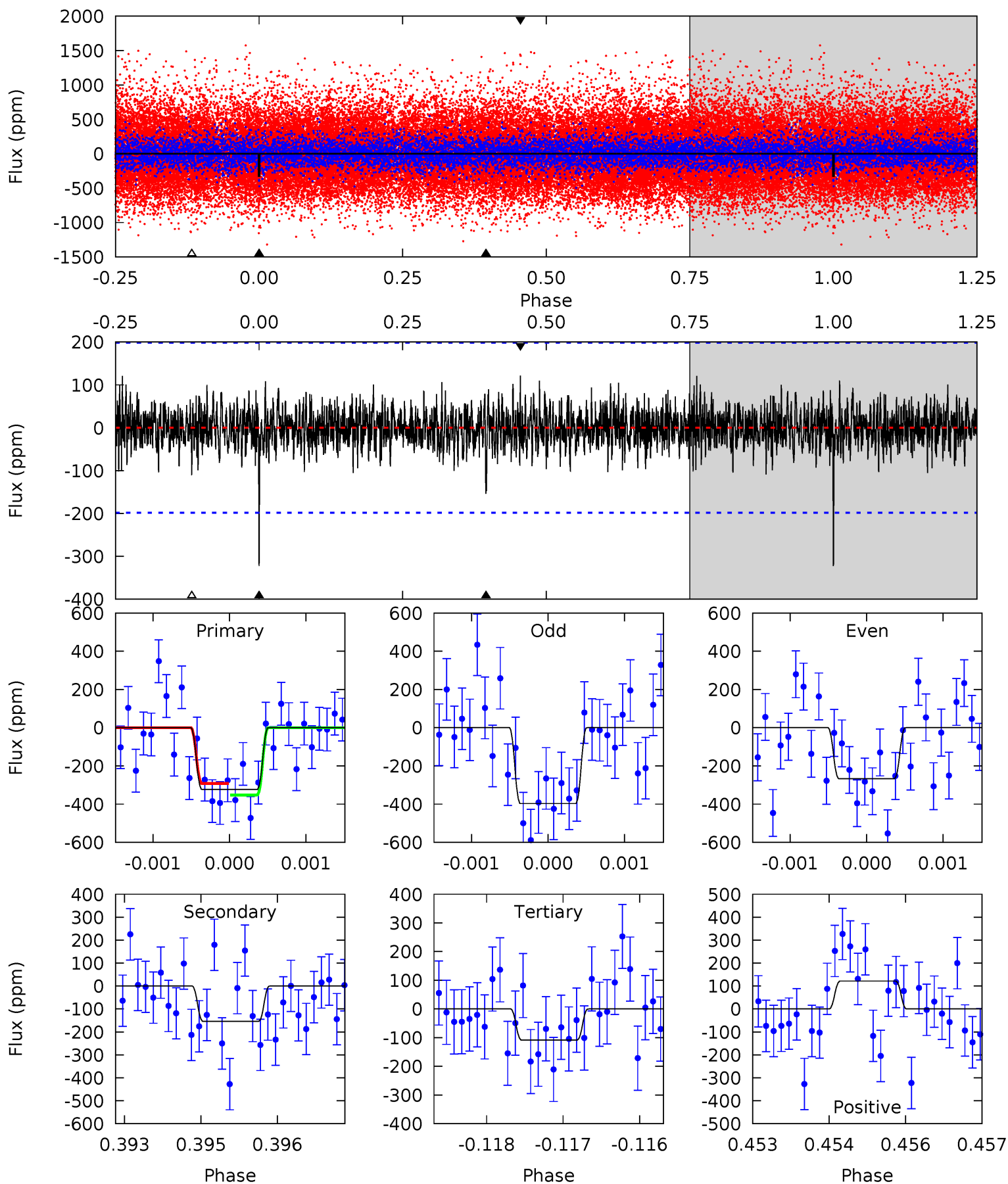
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.48	4.71	3.58	4.22	5.38	3.18	1.09	5.91	5.26	1.14	0.49	1.54	1.00	0.31	0.00



# Alt Model-Shift Uniqueness Test

008609450-05, P = 203.265322 Days, E = 5.174346 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
8.78	4.20	2.96	3.31	5.40	3.21	0.94	5.83	5.47	1.24	0.89	1.76	1.06	0.27	0.82



### Stellar Parameters For KIC 008609450

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5600^{+112}_{-100}$	$4.455^{+0.102}_{-0.077}$	$-0.360^{+0.150}_{-0.150}$	$0.872^{+0.088}_{-0.088}$	$0.793^{+0.064}_{-0.035}$	$1.683^{+0.728}_{-0.398}$
	+2%/-2%	+2%/-2%	+42%/-42%	+10%/-10%	+8%/-4%	+43%/-24%
Source	SPE58	SPE58	SPE58	DSEP		

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

### Secondary Eclipse Parameters for KIC 008609450-05 / KOI 1278.05

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-167 \pm 36$	$2.20^{+1.36}_{-1.31}$	$407^{+14}_{-14}$	$4461^{+2209}_{-786}$	$8021^{+38433}_{-5360}$
Alt.	$-154 \pm 37$	$2.02^{+1.55}_{-1.16}$	$407^{+14}_{-15}$	$4436^{+2241}_{-829}$	$8002^{+39679}_{-5544}$

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

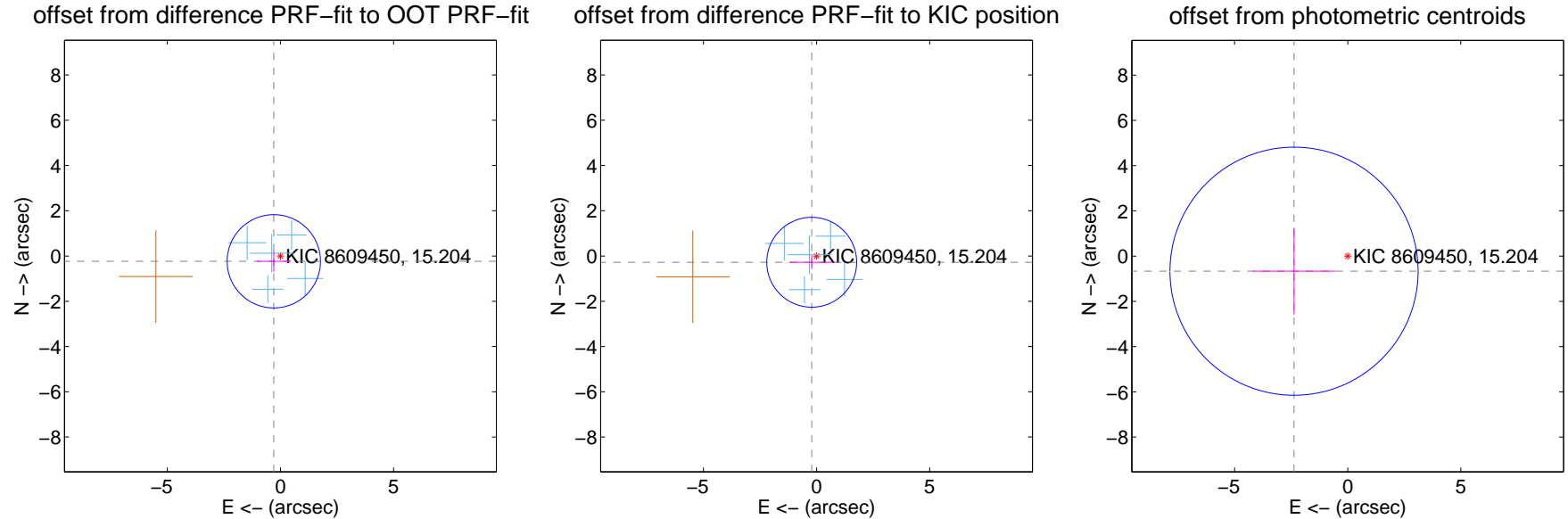
## DV Centroid Data

Supplemental centroid analysis for 008609450-05. Kepler magnitude: 15.20. Transit SNR 7.56

There are 5 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.04 arcsec

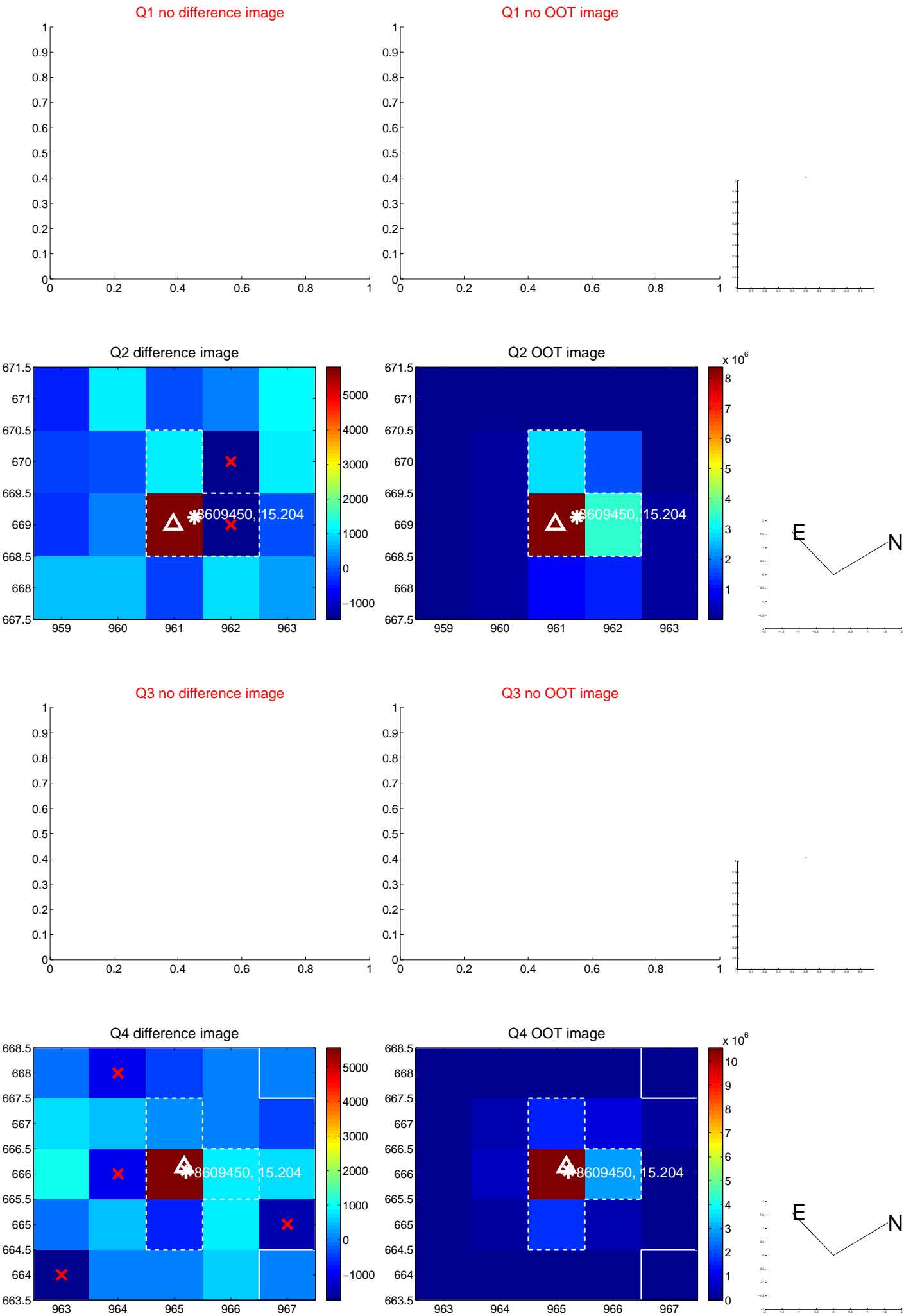
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.375 \pm 0.687$	0.55	$0.294 \pm 0.756$	$-0.234 \pm 0.459$
PRF-fit source offset from KIC position	$0.350 \pm 0.662$	0.53	$0.215 \pm 0.994$	$-0.276 \pm 0.305$
photometric centroid source offset	$2.46 \pm 1.83$	1.35	$2.37 \pm 1.82$	$-0.67 \pm 1.92$



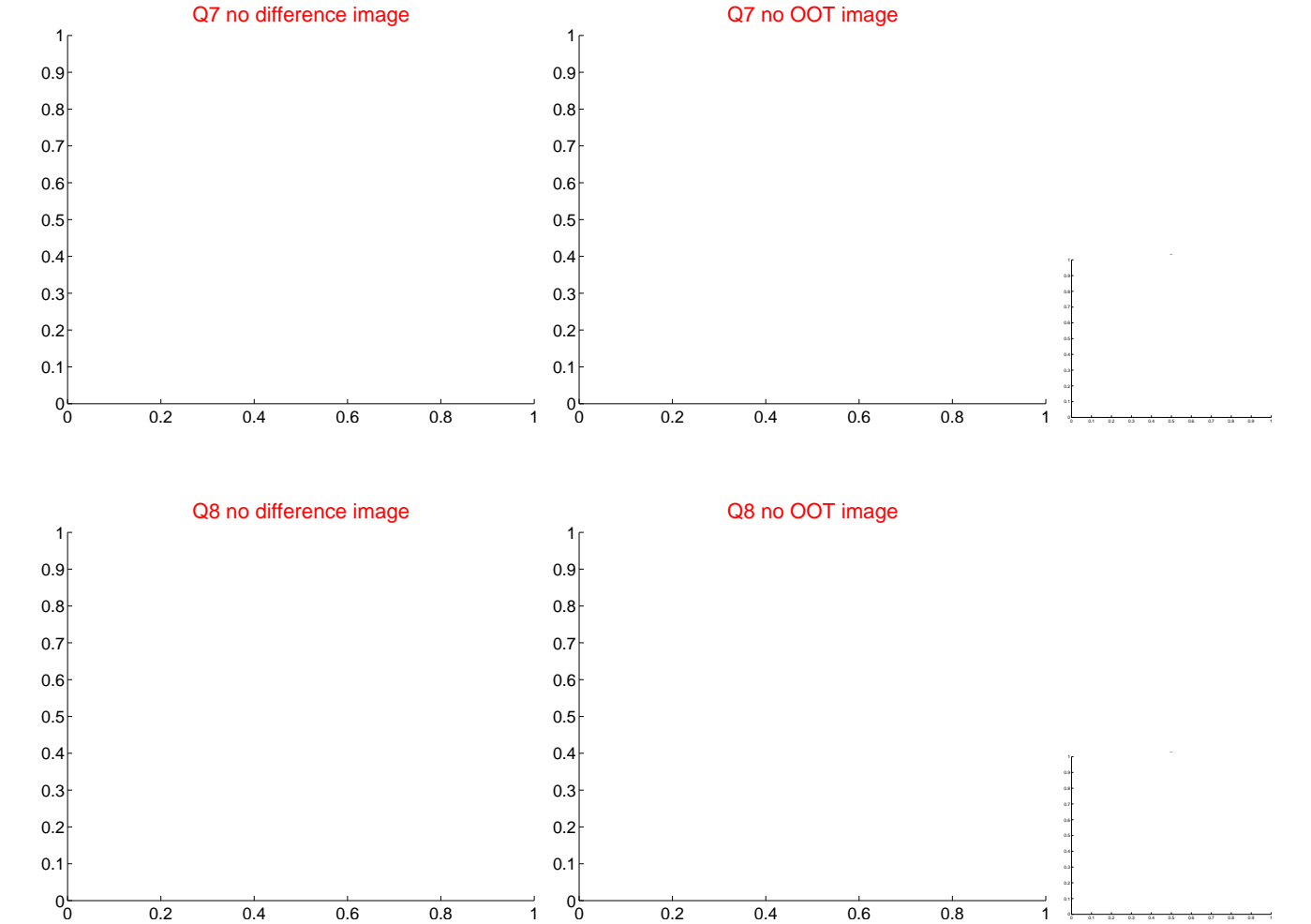
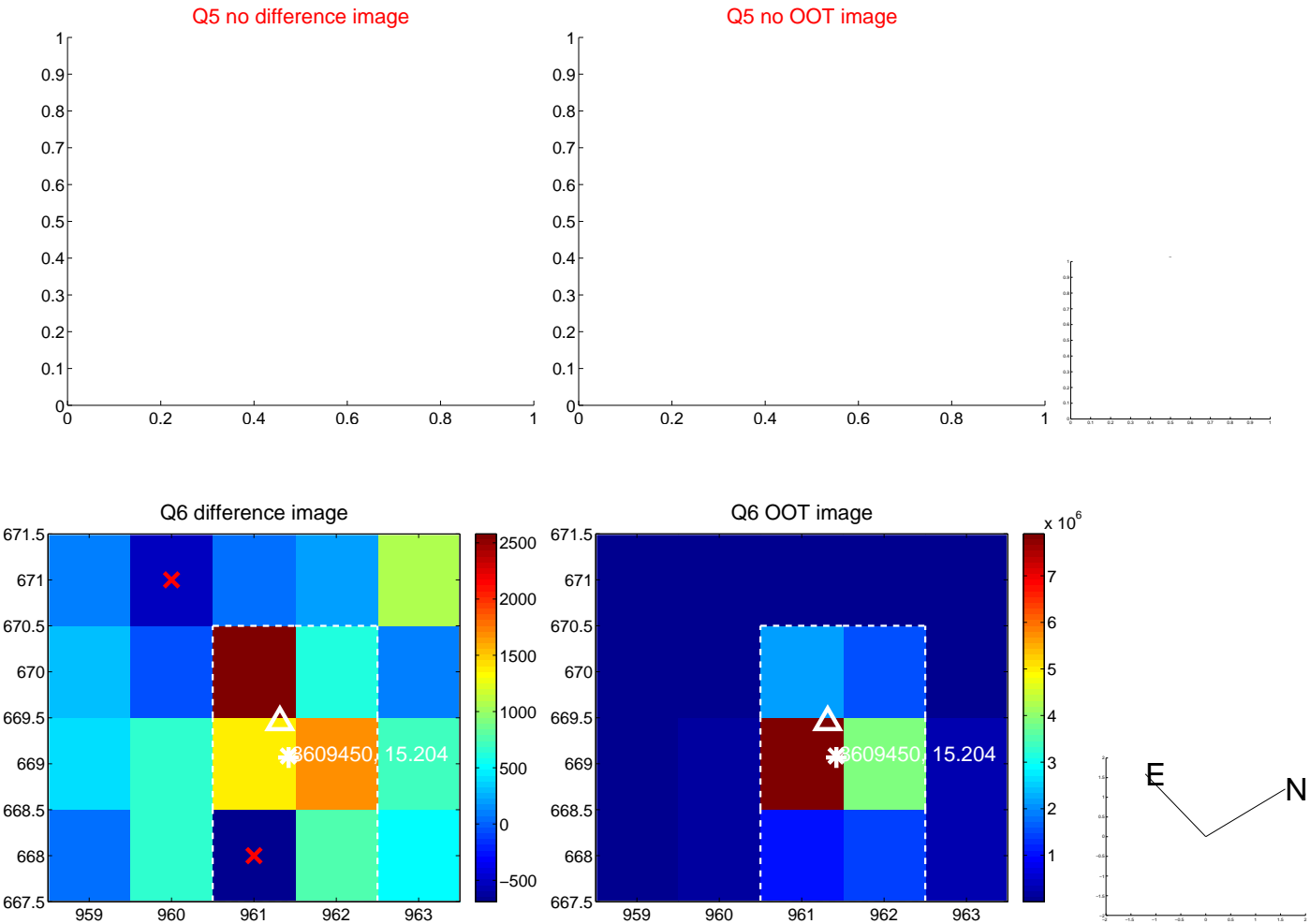
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



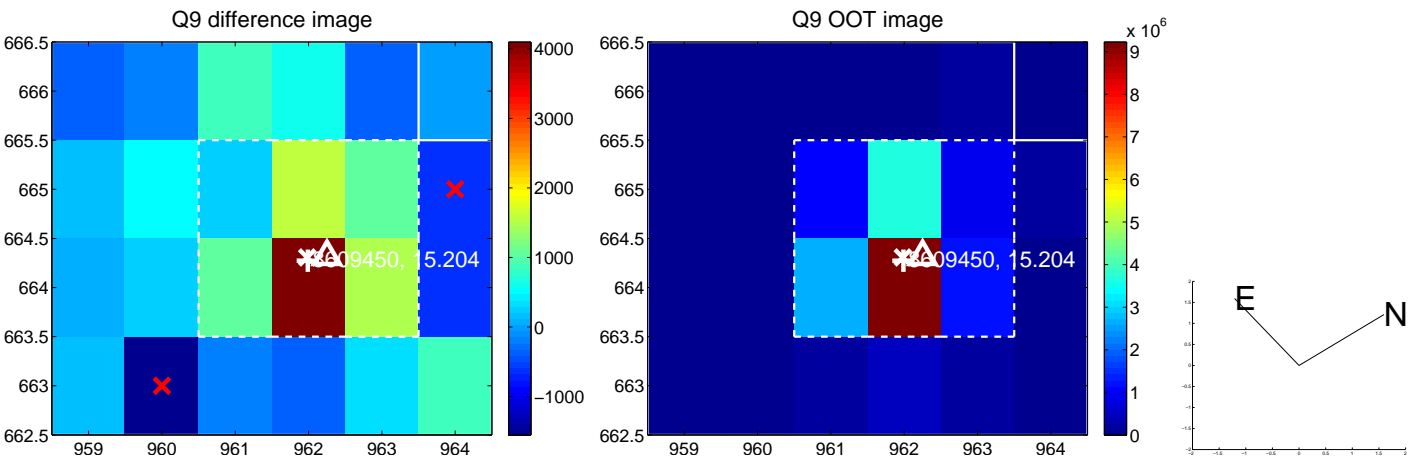
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



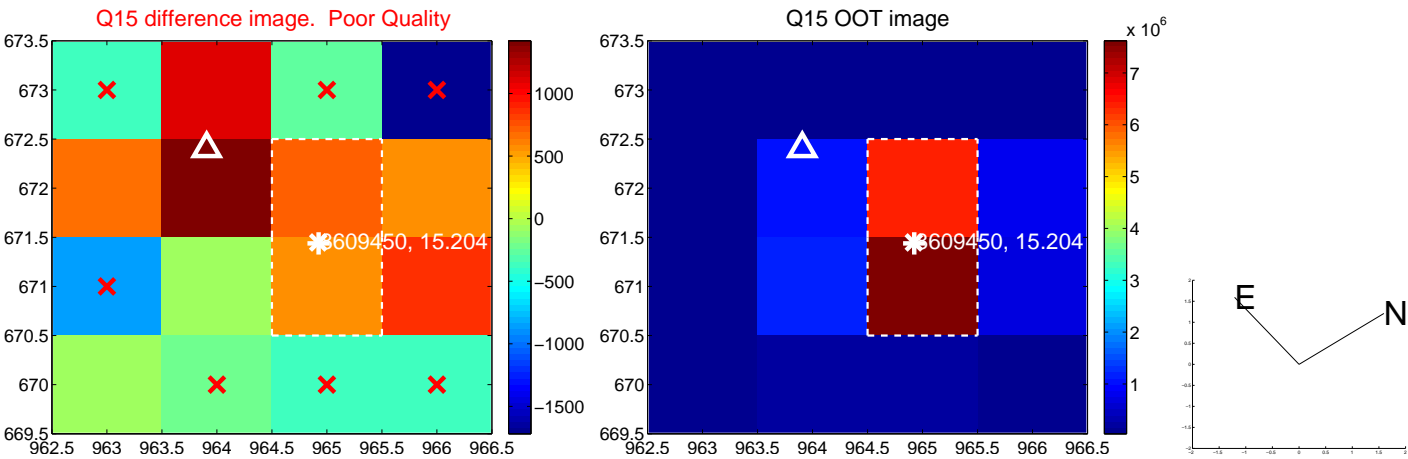
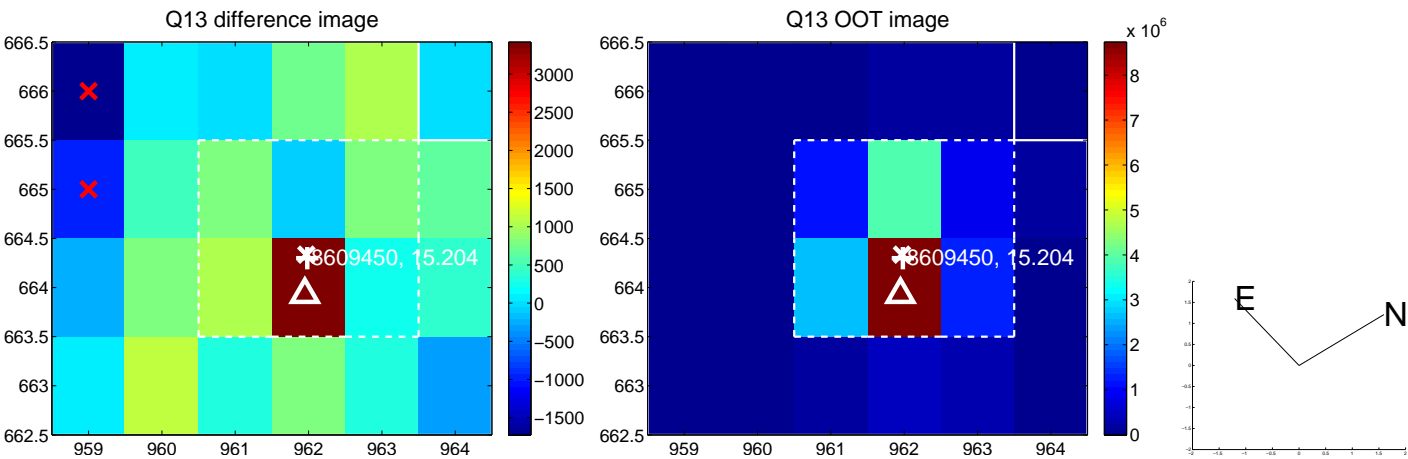
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



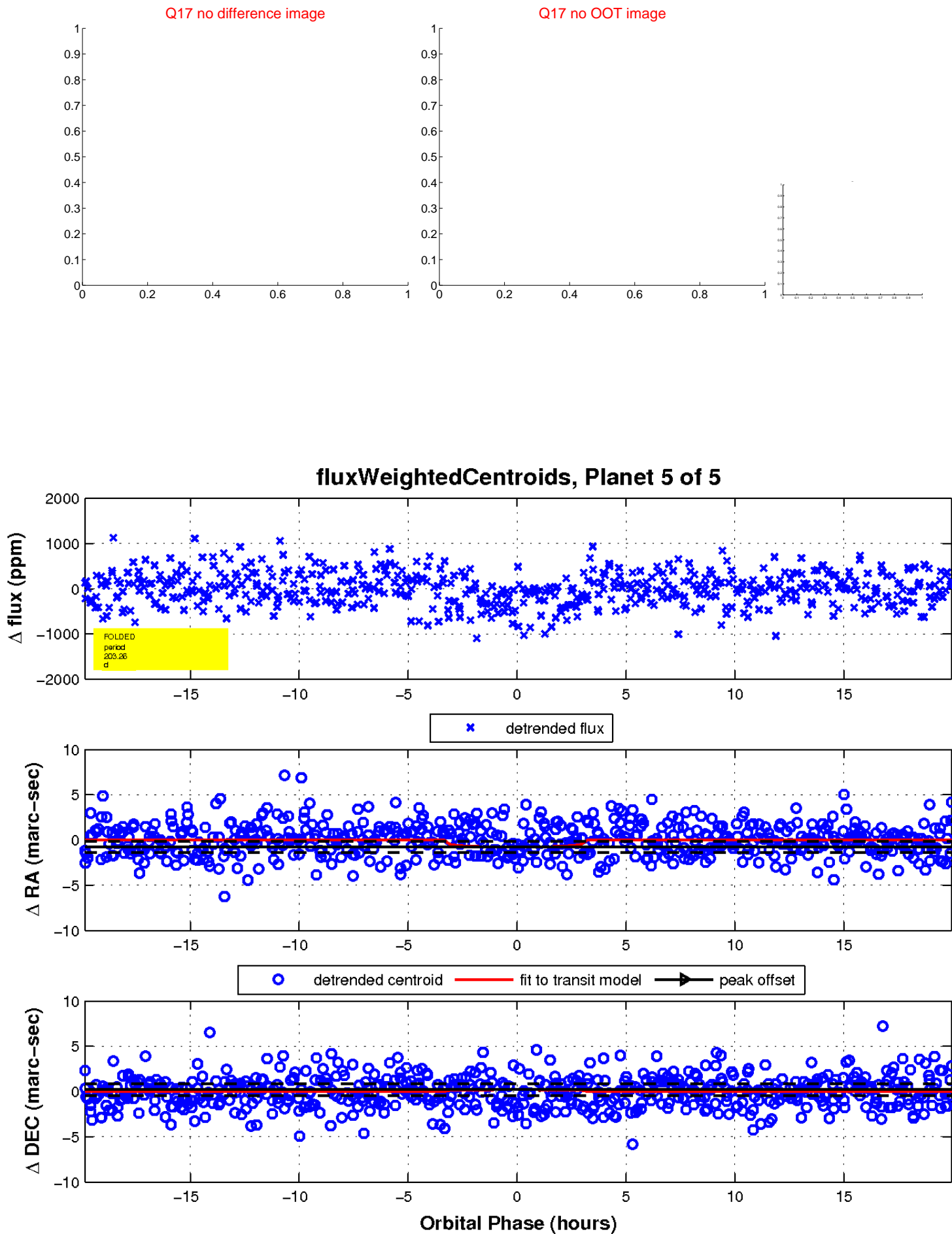
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.



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



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



# UKIRT Image

Declination

