

# KIC 009905648

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009905648-01	OBS	No	0.917338	132.418300	57.8	4.050	8.4	10.1	1.80	7372	1.59	18586.33
009905648-02	OBS	No	285.199817	144.911649	2161.4	9.726	8.9	7.9	1.80	7372	15.20	8.82
009905648-03	OBS	No	427.857707	266.803130	1287.3	9.491	7.5	7.2	1.80	7372	7.82	5.14

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009905648-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV
009905648-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_POS_ALT
009905648-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_CHASES—LPP_ALT—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST

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

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

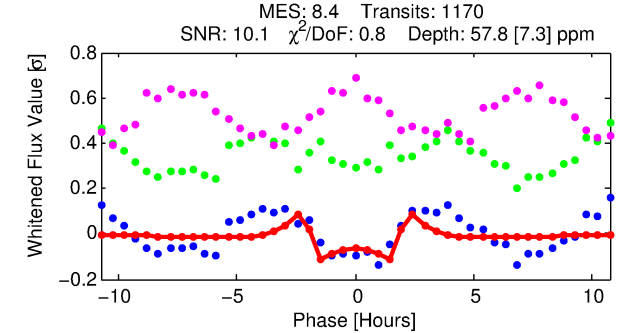
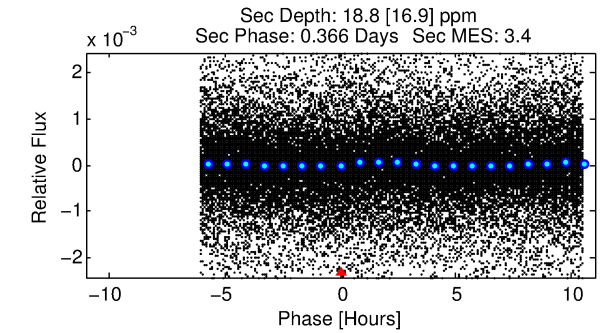
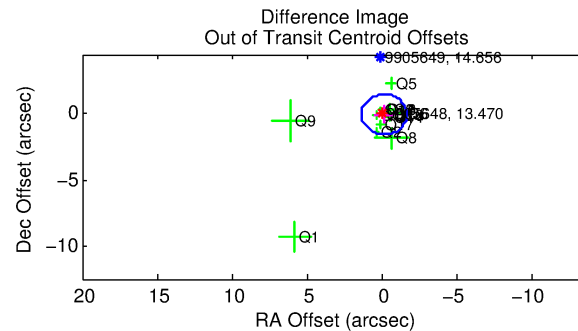
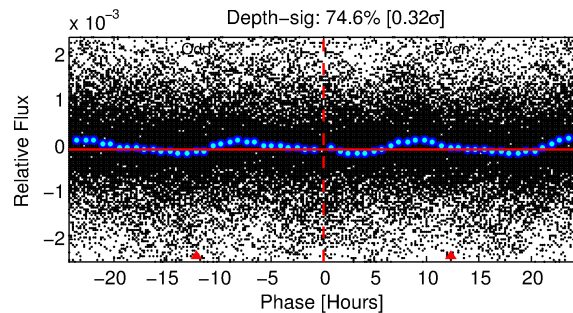
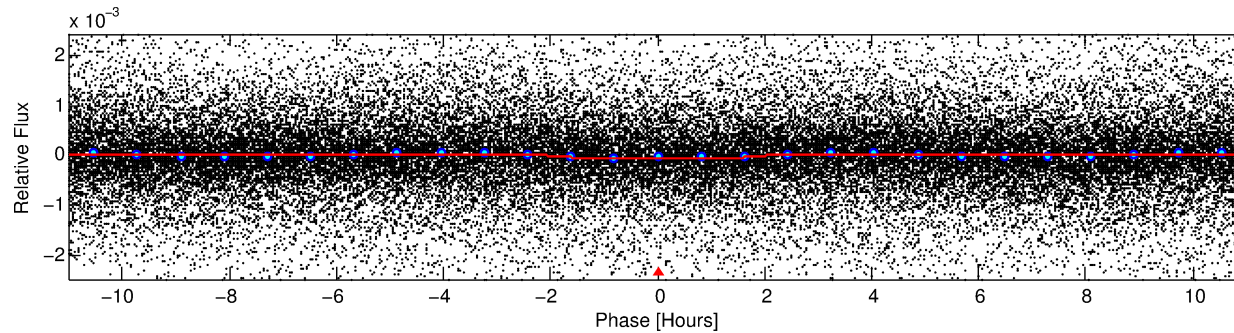
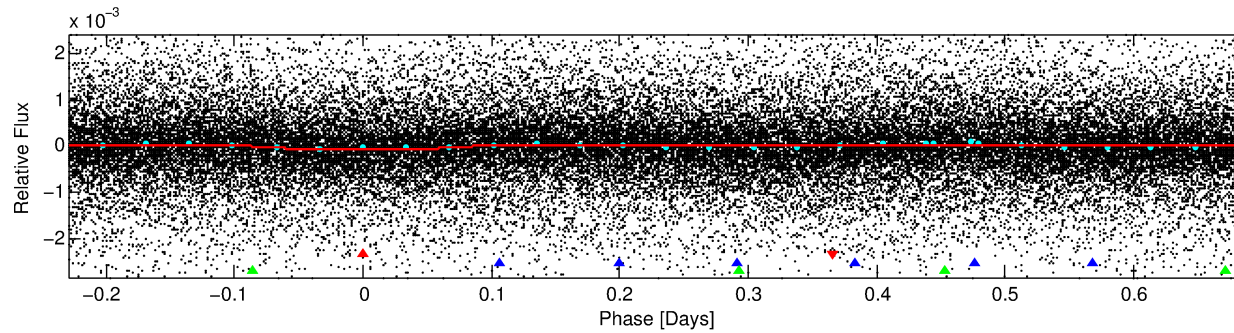
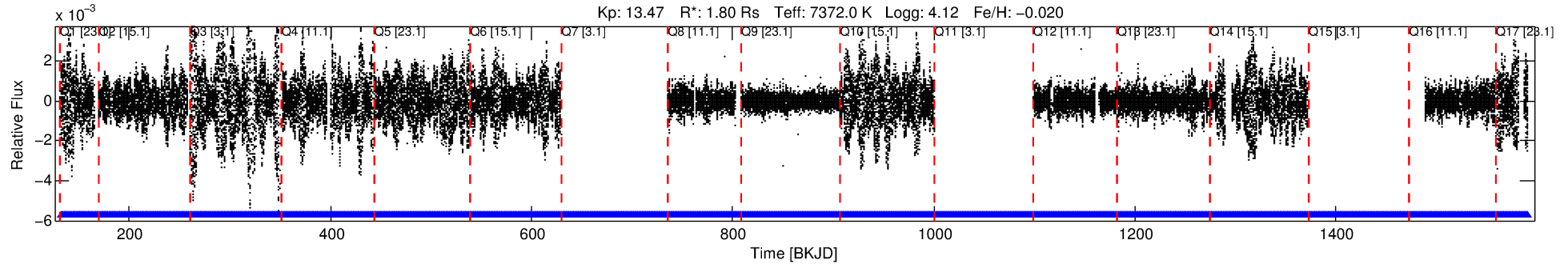
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 009905648-01

No Significant Match Found

# DV One-Page Summary

KIC: 9905648 Candidate: 1 of 3 Period: 0.917 d



## DV Fit Results:

Period = 0.91734 [0.00001] d  
Epoch = 132.4183 [0.0018] BKJD  
Rp/R\* = 0.0081 [0.0015]  
a/R\* = 1.22 [0.43]  
b = 0.90 [0.23]  
Seff = 18586.33 [7483.76]  
Teff = 2977 [300] K  
Rp = 1.59 [0.57] Re  
a = 0.0215 [0.0054] AU  
Ag = 1.90 [1.96] [0.46 $\sigma$ ]  
Teffp = 5406 [1328] K [1.78 $\sigma$ ]

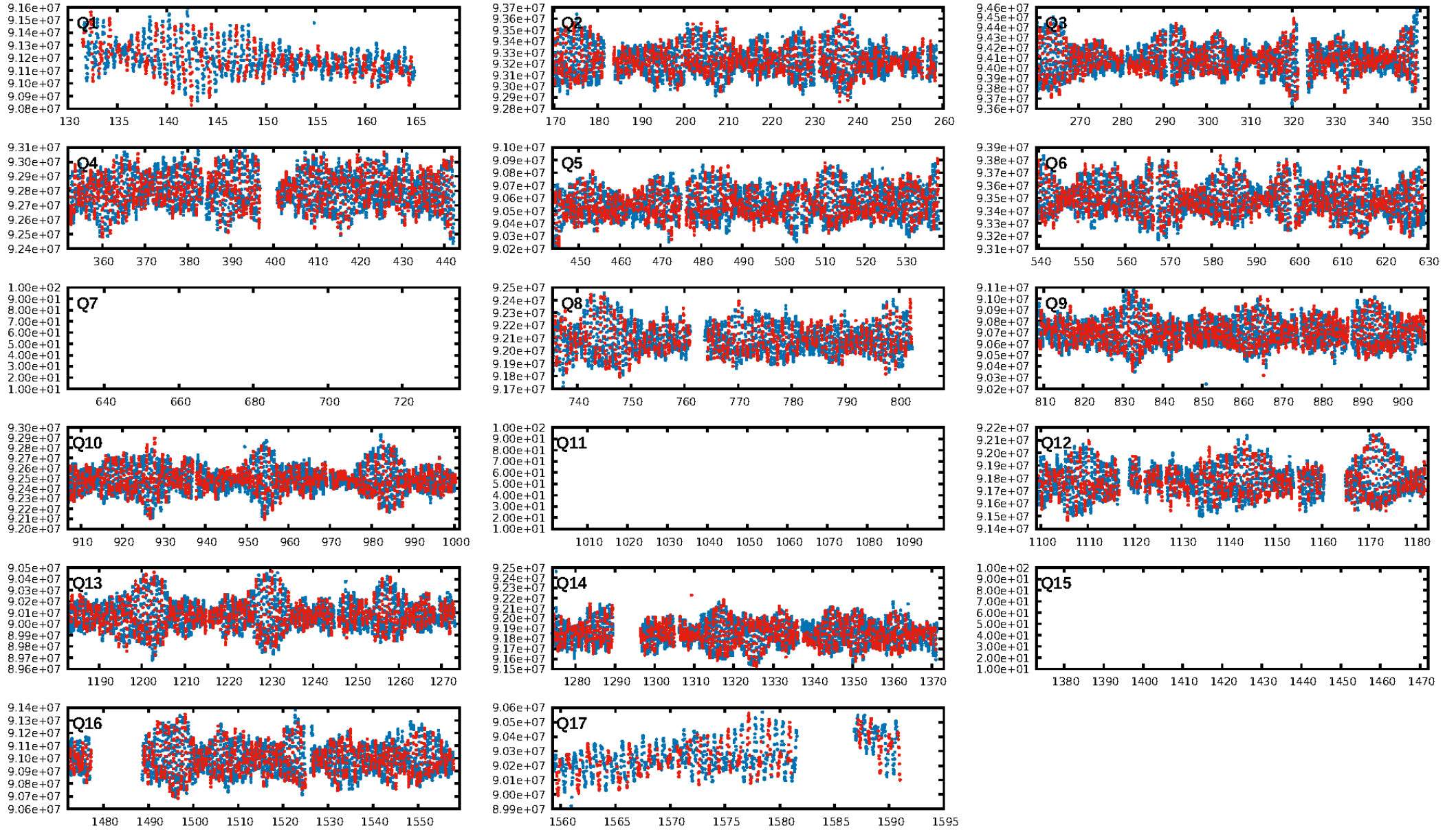
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [647.61 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
**Bootstrap-pfa: 1.29e-12**  
RollingBand-fgt: 1.00 [1104/1104]  
GhostDiagnostic-chr: 65.07  
Centroid-sig: 12.1%  
Centroid-so: 0.481 arcsec [1.19 $\sigma$ ]  
OotOffset-rm: 0.175 arcsec [0.35 $\sigma$ ]  
KicOffset-rm: 0.199 arcsec [0.38 $\sigma$ ]  
OotOffset-st: 4/1/4/5 [14]  
KicOffset-st: 4/1/4/5 [14]  
DiffImageQuality-fgm: 0.71 [10/14]  
DiffImageOverlap-fno: 1.00 [14/14]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 18:15:35 Z

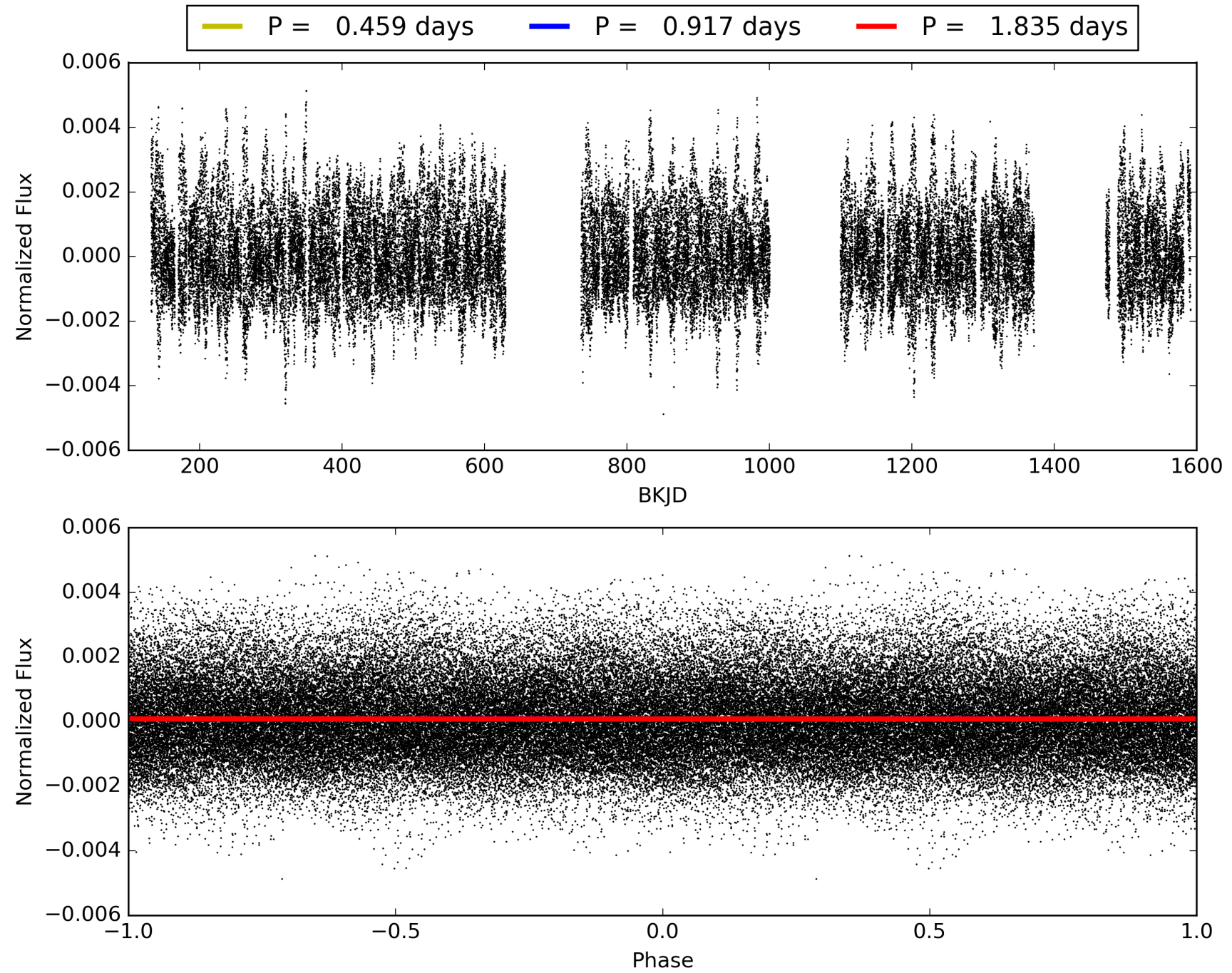
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 009905648-01, PDC Light Curves



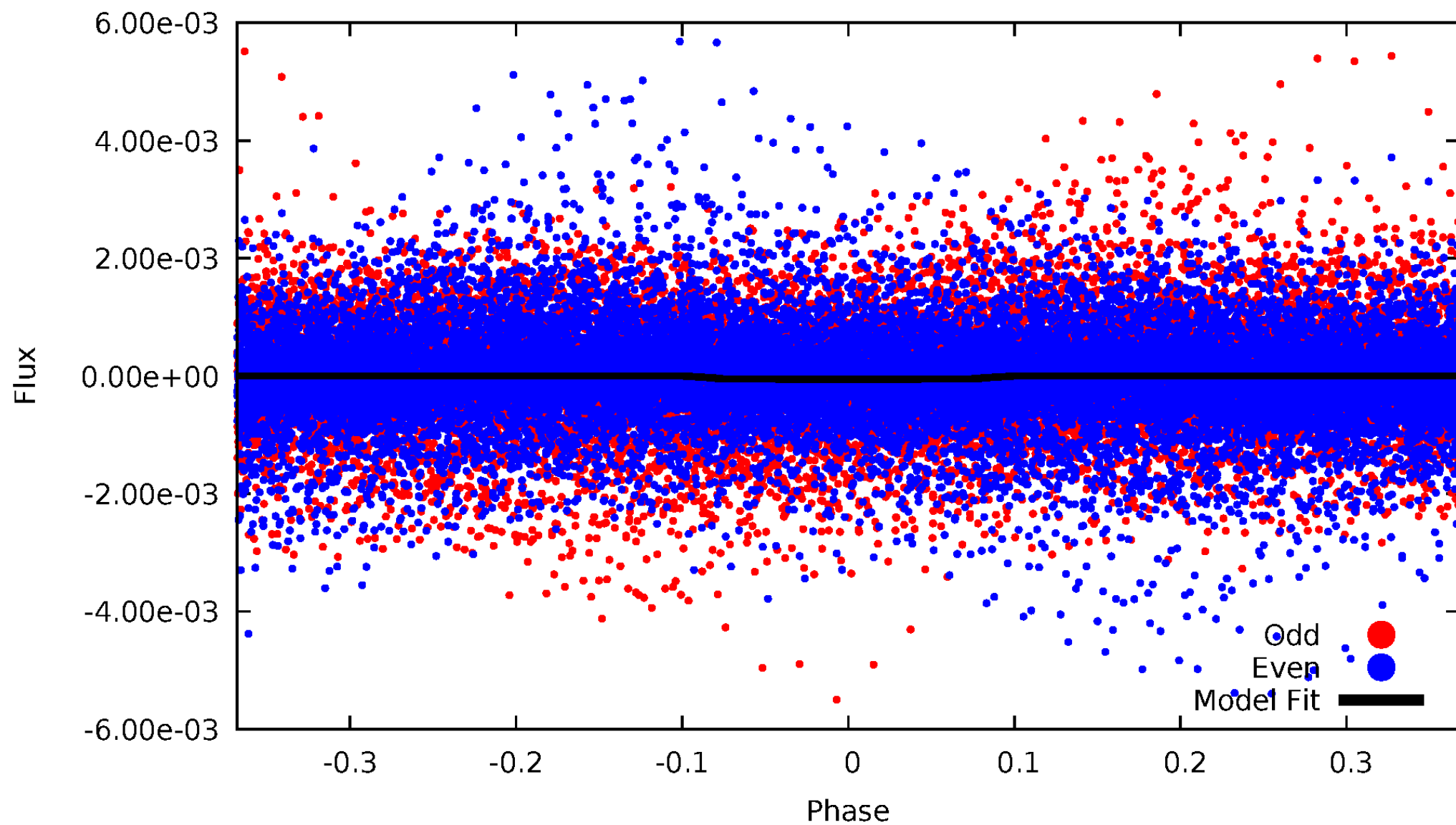


TCE 009905648-01



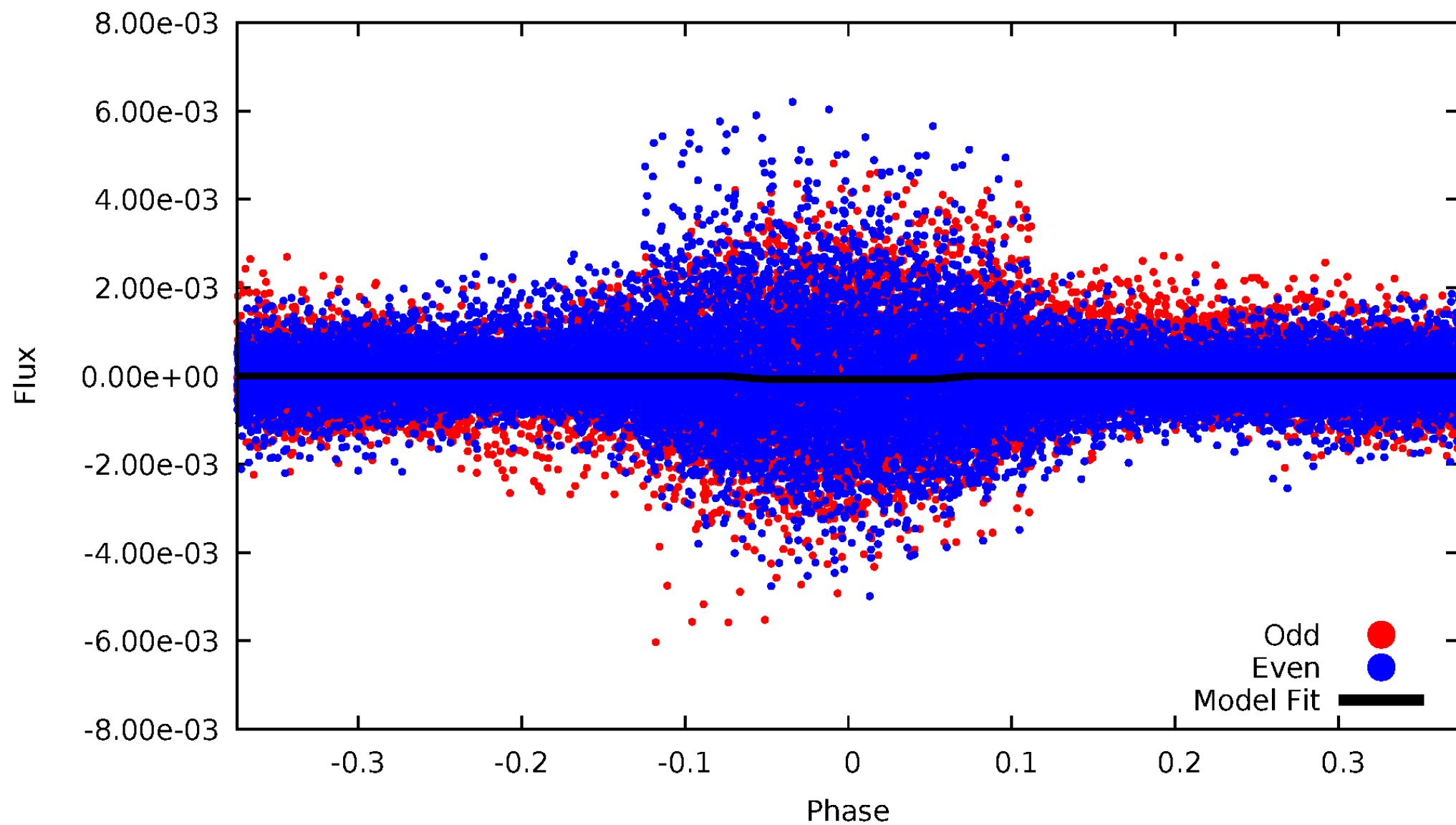
# DV Odd/Even

TCE 009905648-01



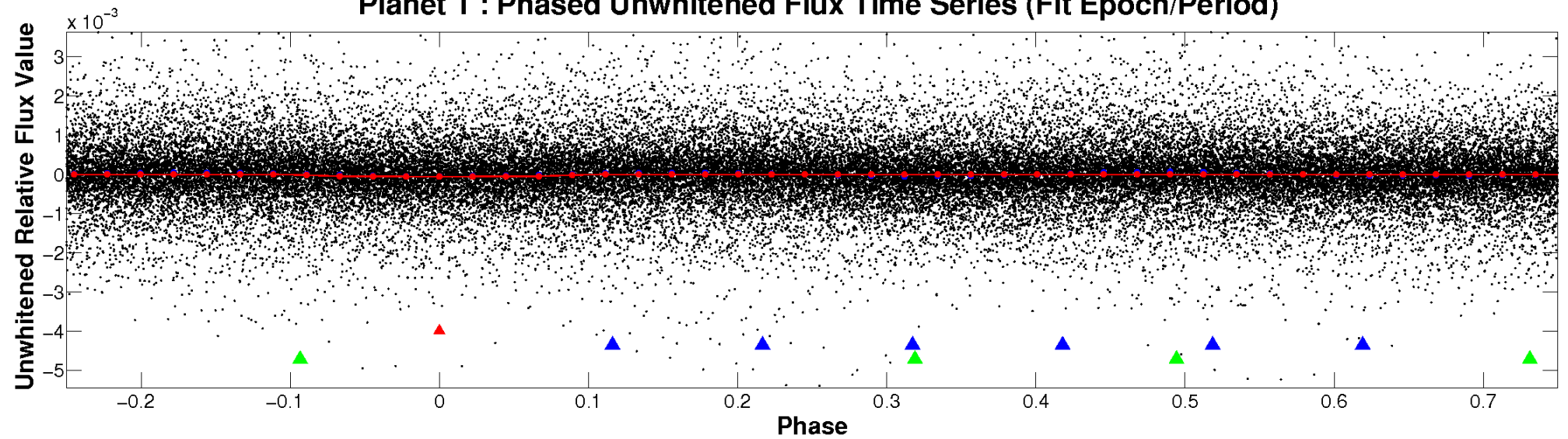
# ALT Odd/Even

TCE 009905648-01

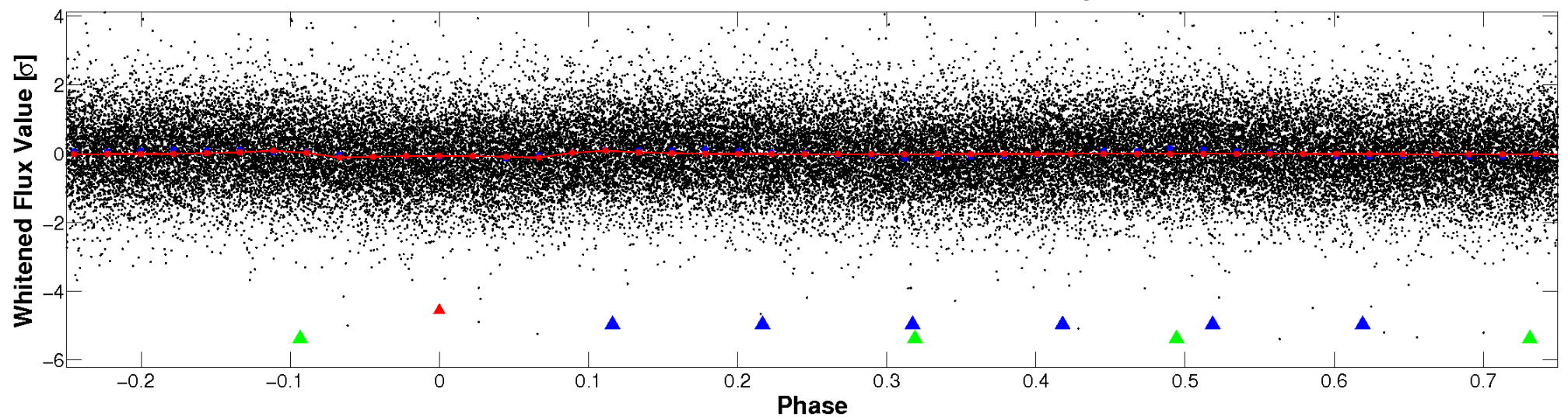


# Non-Whitened Vs. Whitened Light Curve

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



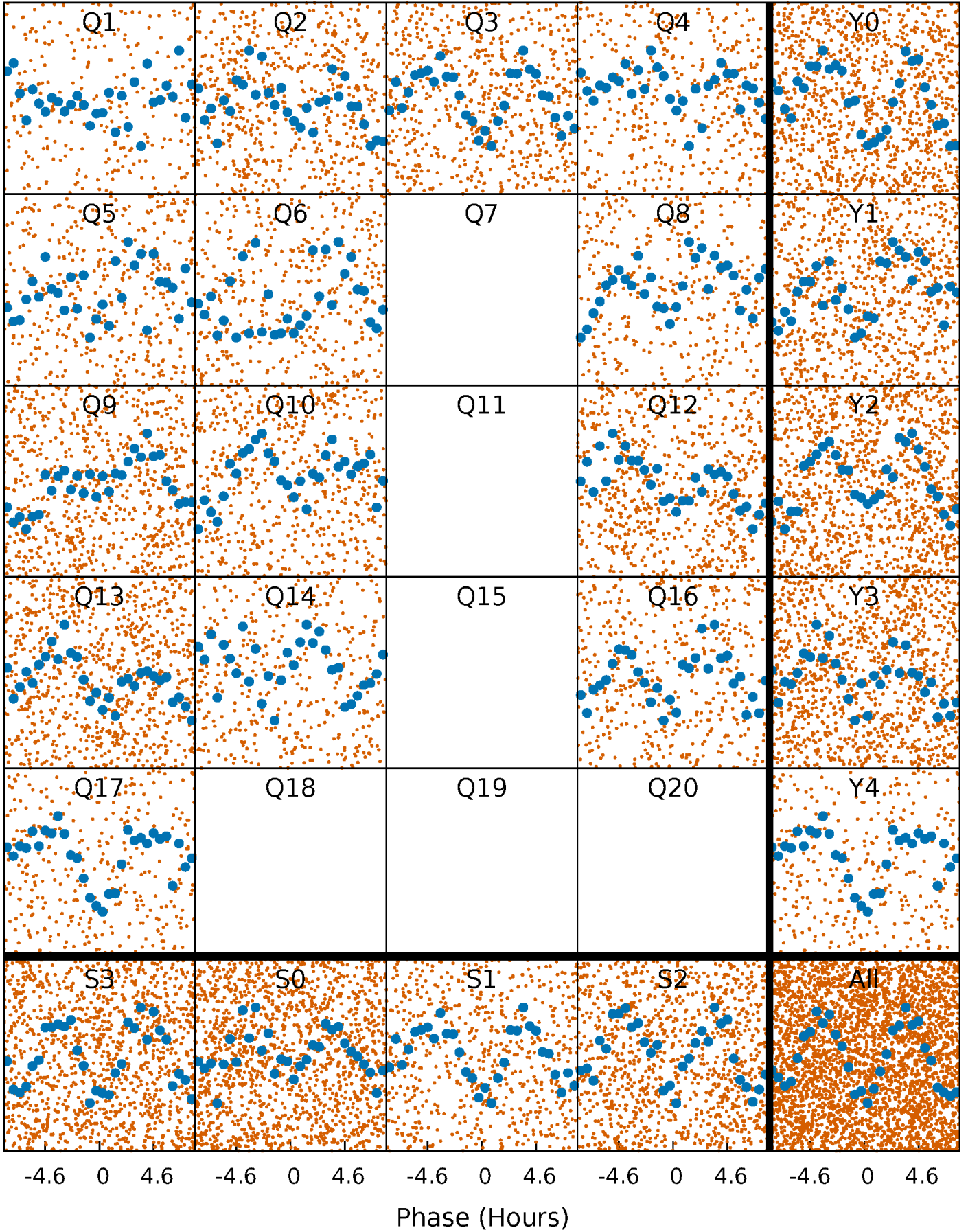
**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**





# PDC Quarter-Phased Transit Curves

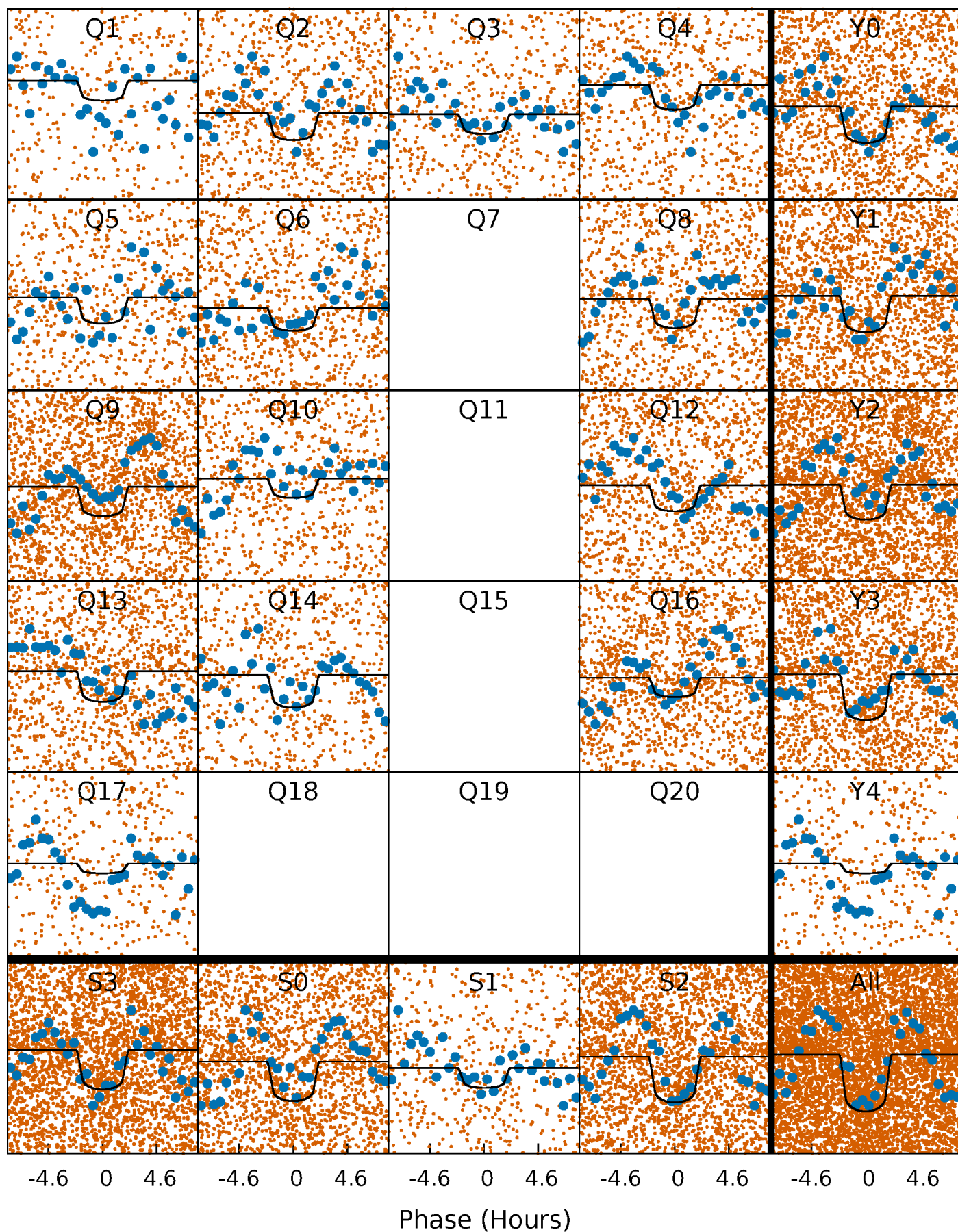
TCE 009905648-01 P= 0.917338 Days  $T_0=132.418300$  (BKJD)





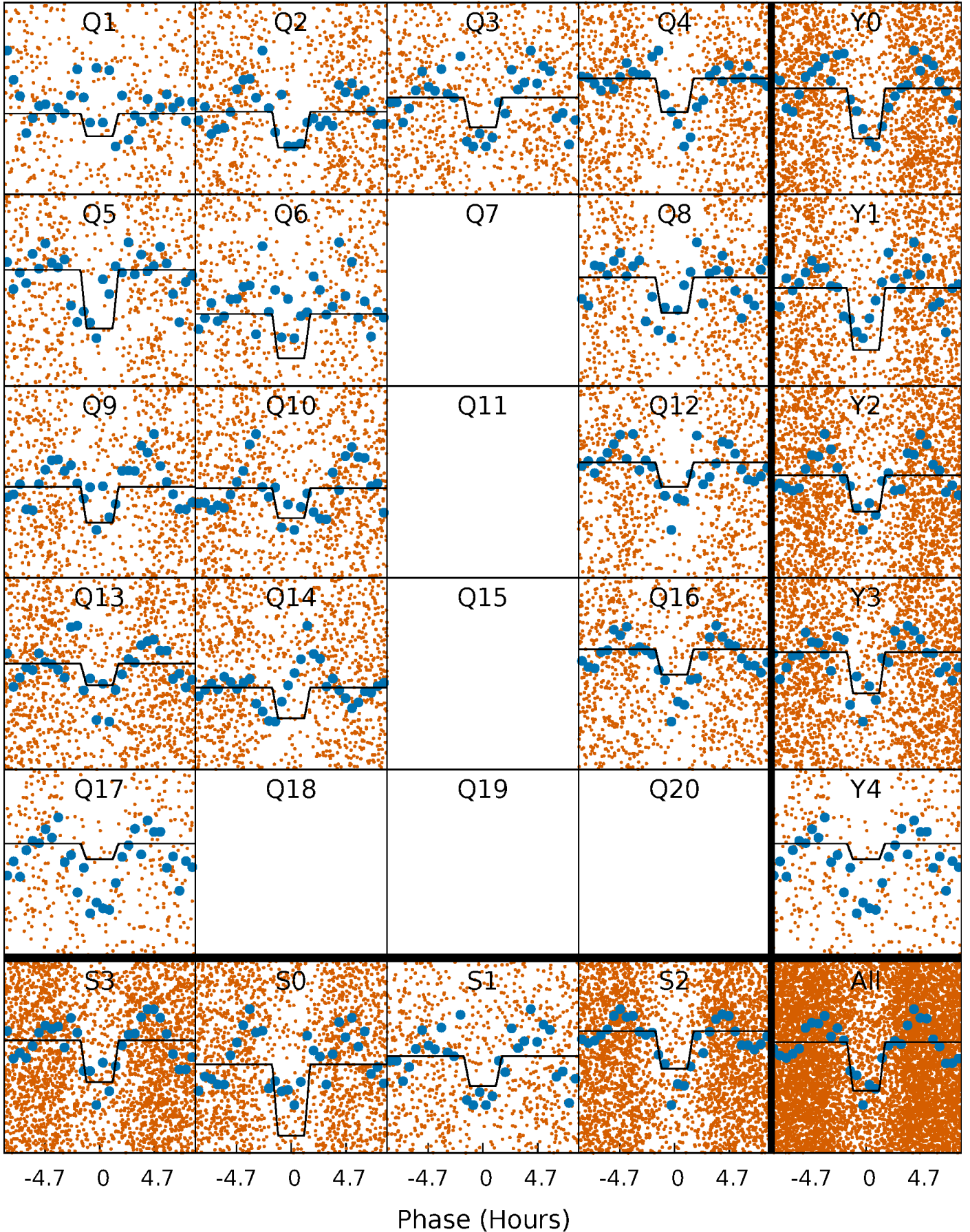
# DV Quarter-Phased Transit Curves

TCE 009905648-01 P= 0.917338 Days  $T_0=132.418300$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

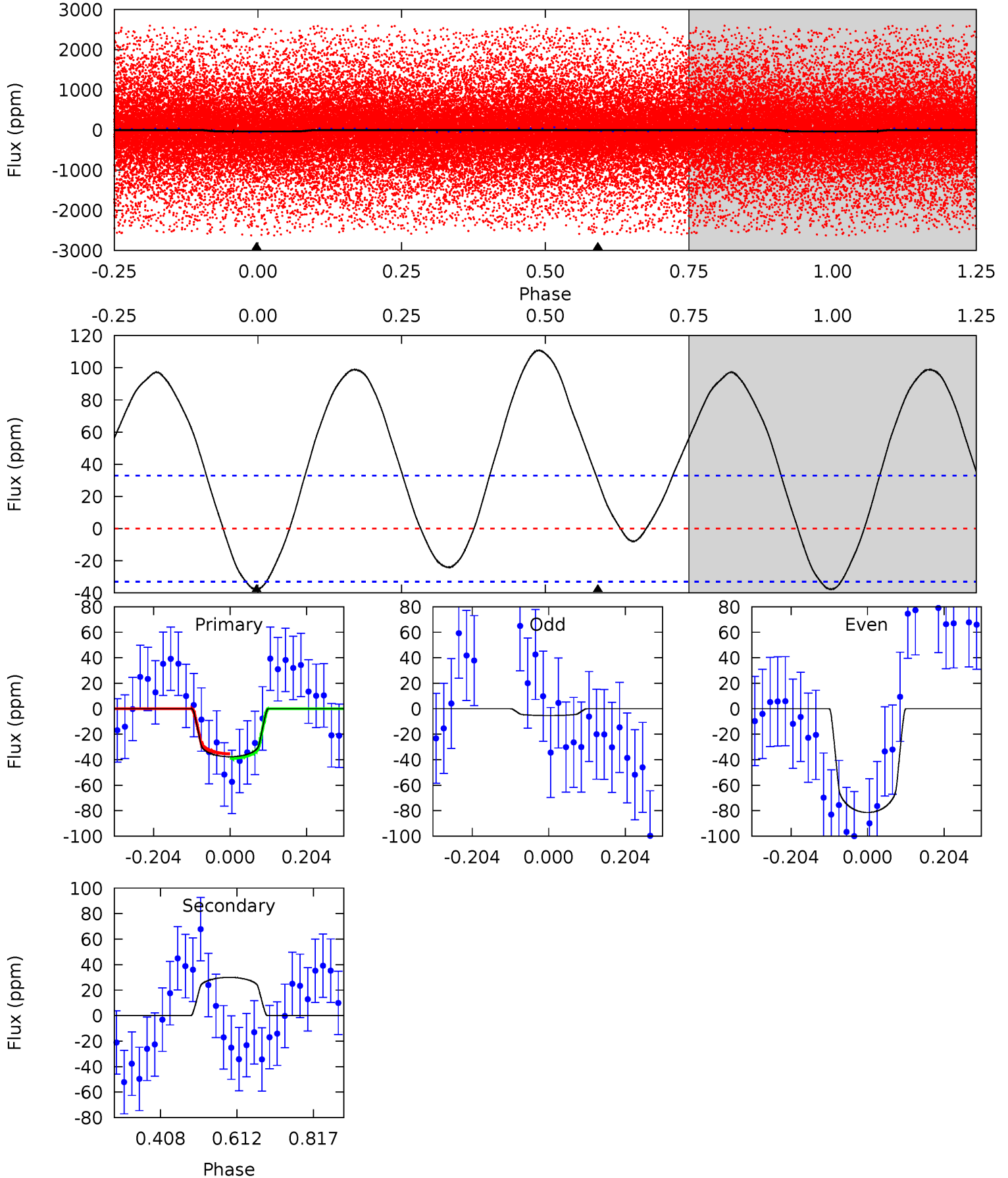
TCE 009905648-01 P= 0.917340 Days  $T_0=132.417203$  (BKJD)



# DV Model-Shift Uniqueness Test

009905648-01, P = 0.917338 Days, E = 131.500962 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
5.05	-4.02	0	0	4.41	1.27	4.53	5.05	5.05	-4.02	-4.02	5.01	1.28	0.75	0.24

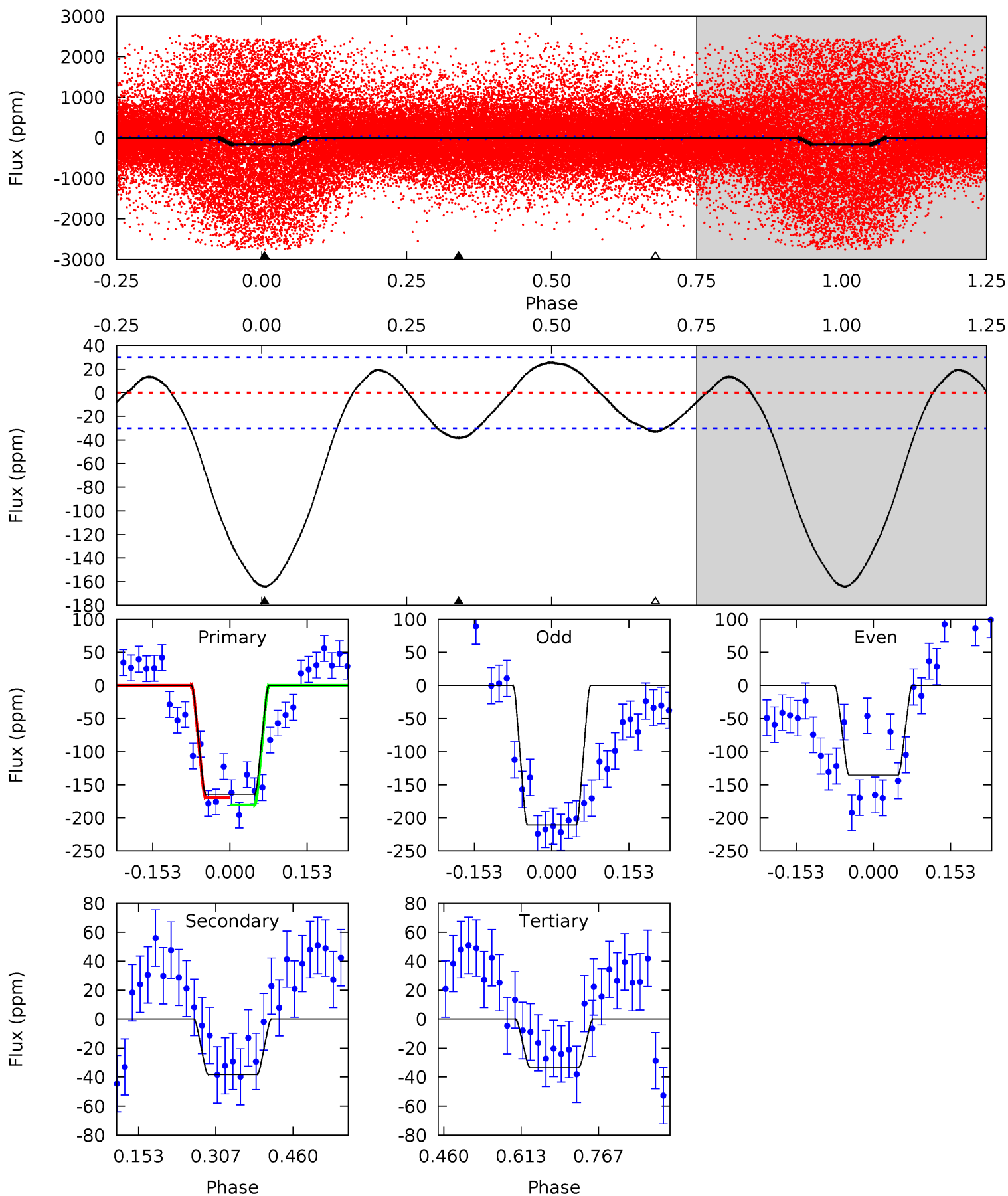




# Alt Model-Shift Uniqueness Test

009905648-01, P = 0.917340 Days, E = 131.499863 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
24.4	5.68	4.90	0	4.47	1.43	2.70	19.5	24.4	0.77	5.68	5.73	0.57	0.14	0.86





### Stellar Parameters For KIC 009905648

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7372^{+231}_{-334}$	$4.124^{+0.128}_{-0.192}$	$-0.020^{+0.200}_{-0.350}$	$1.803^{+0.557}_{-0.371}$	$1.577^{+0.210}_{-0.234}$	$0.379^{+0.277}_{-0.185}$
	+3%/-5%	+3%/-5%	+1000%/-1750%	+31%/-21%	+13%/-15%	+73%/-49%
Source	KIC0	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 009905648-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$30 \pm 7$	$1.61^{+0.39}_{-0.31}$	$4179^{+335}_{-298}$	$-6067^{+585}_{-823}$	$-2.827^{+1.155}_{-1.913}$
Alt.	$-38 \pm 7$	$1.74^{+0.41}_{-0.36}$	$4180^{+331}_{-264}$	$5936^{+760}_{-559}$	$3.175^{+2.026}_{-1.190}$

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

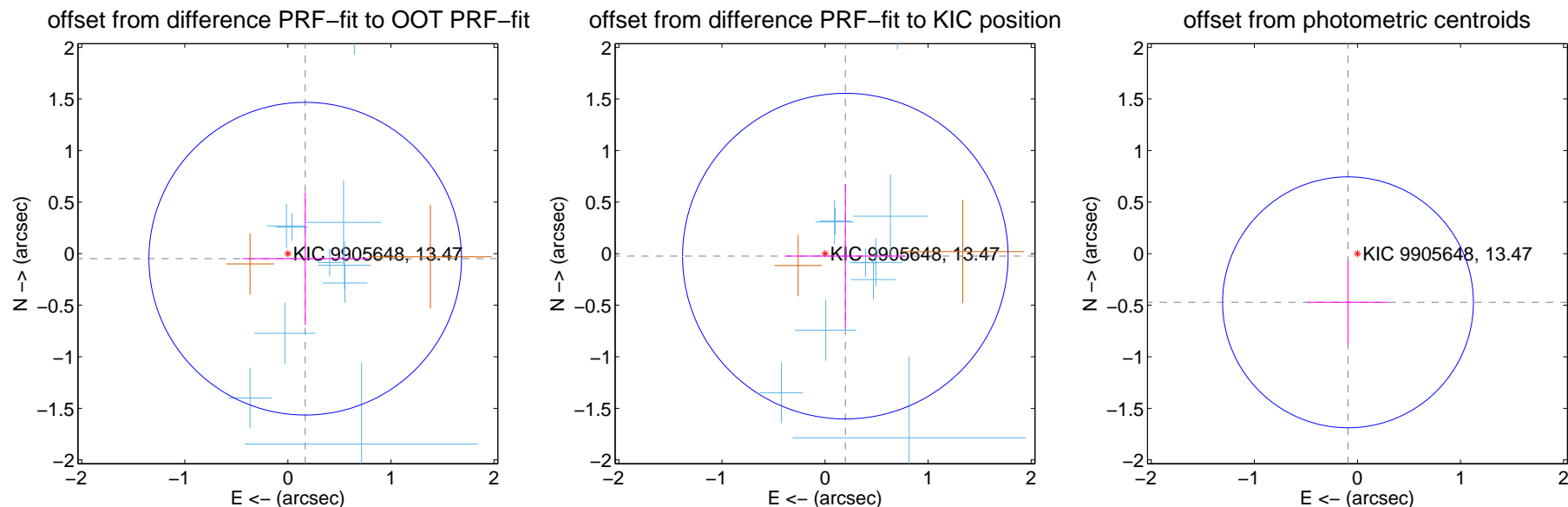
## DV Centroid Data

Supplemental centroid analysis for 009905648-01. Kepler magnitude: 13.47. Transit SNR 10.06

There are 10 quarters with good PRF difference image offsets

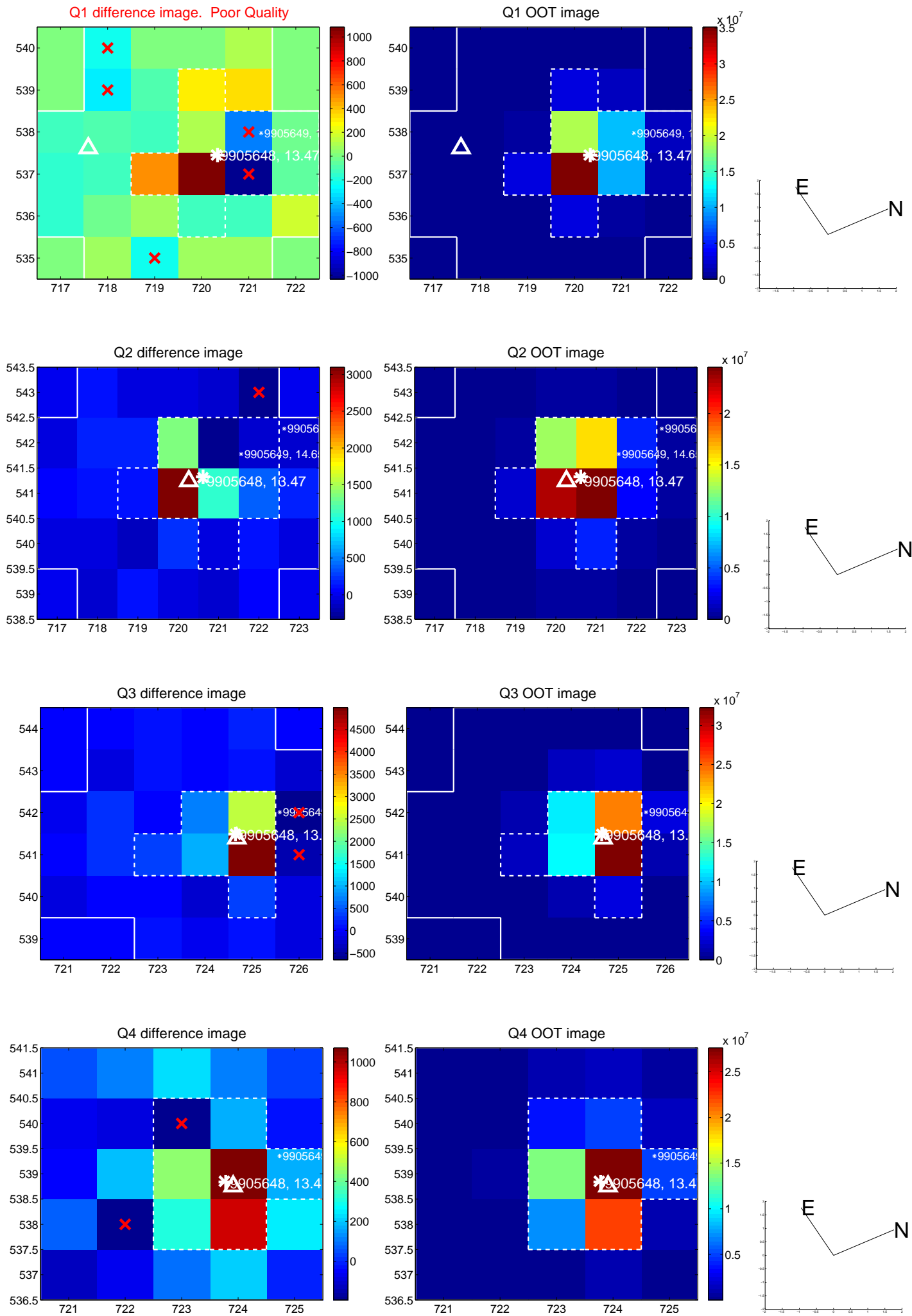
The direct PRF centroid is offset from the target star catalog position by about 0.05 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.175 \pm 0.505$	0.35	$-0.168 \pm 0.609$	$-0.049 \pm 0.644$
PRF-fit source offset from KIC position	$0.199 \pm 0.526$	0.38	$-0.197 \pm 0.579$	$-0.024 \pm 0.700$
photometric centroid source offset	$0.48 \pm 0.41$	1.19	$0.09 \pm 0.39$	$-0.47 \pm 0.41$

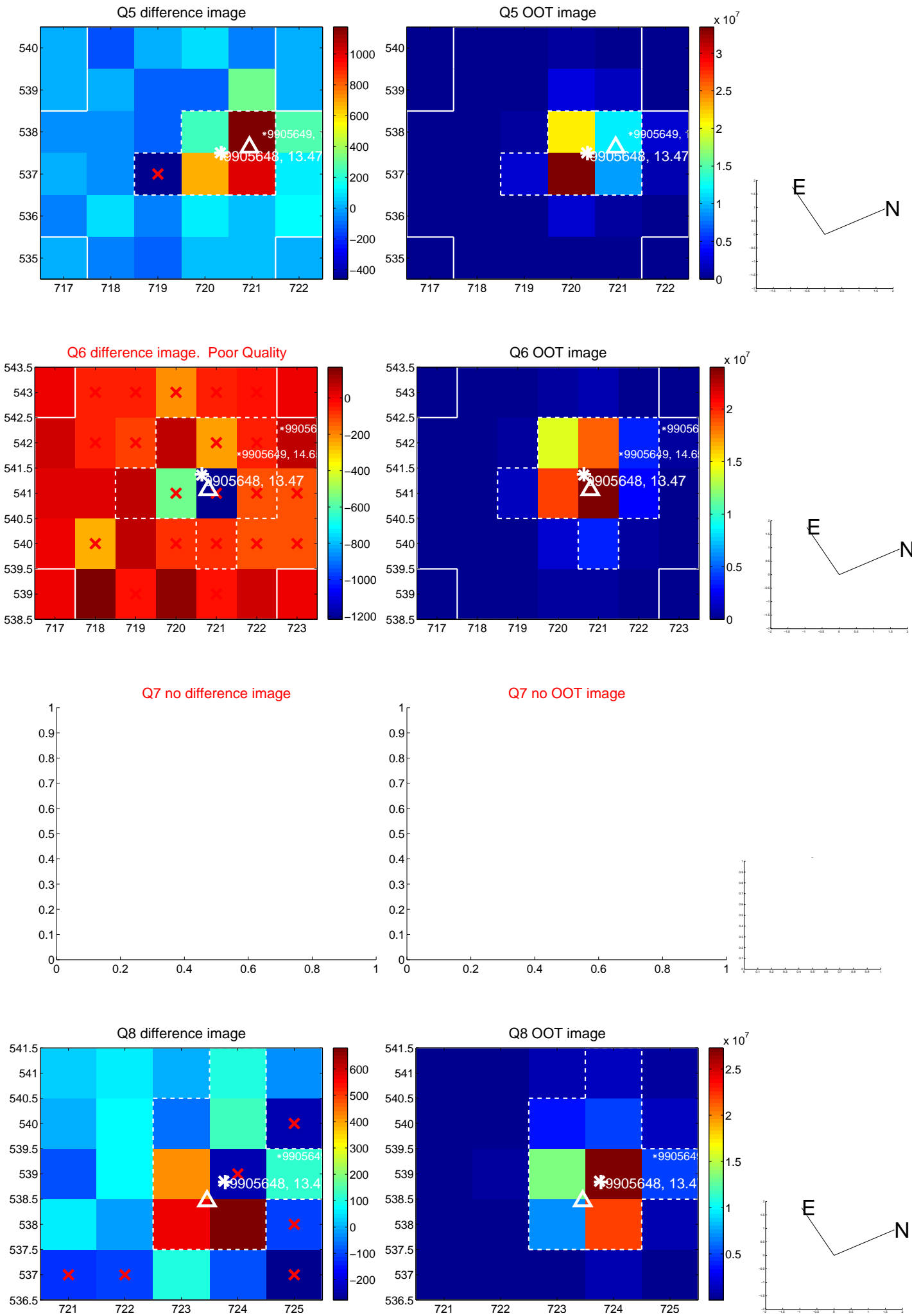


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

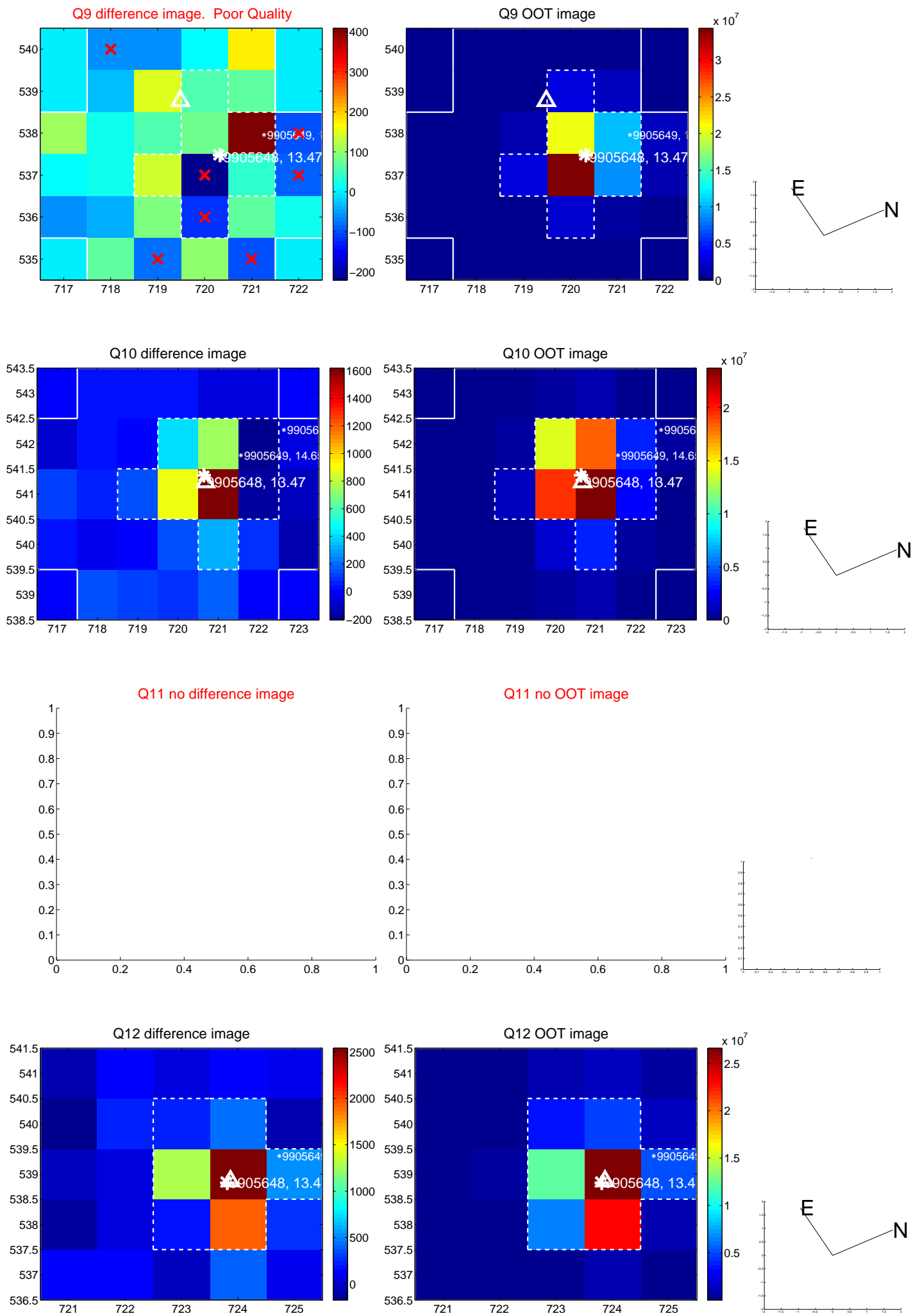


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

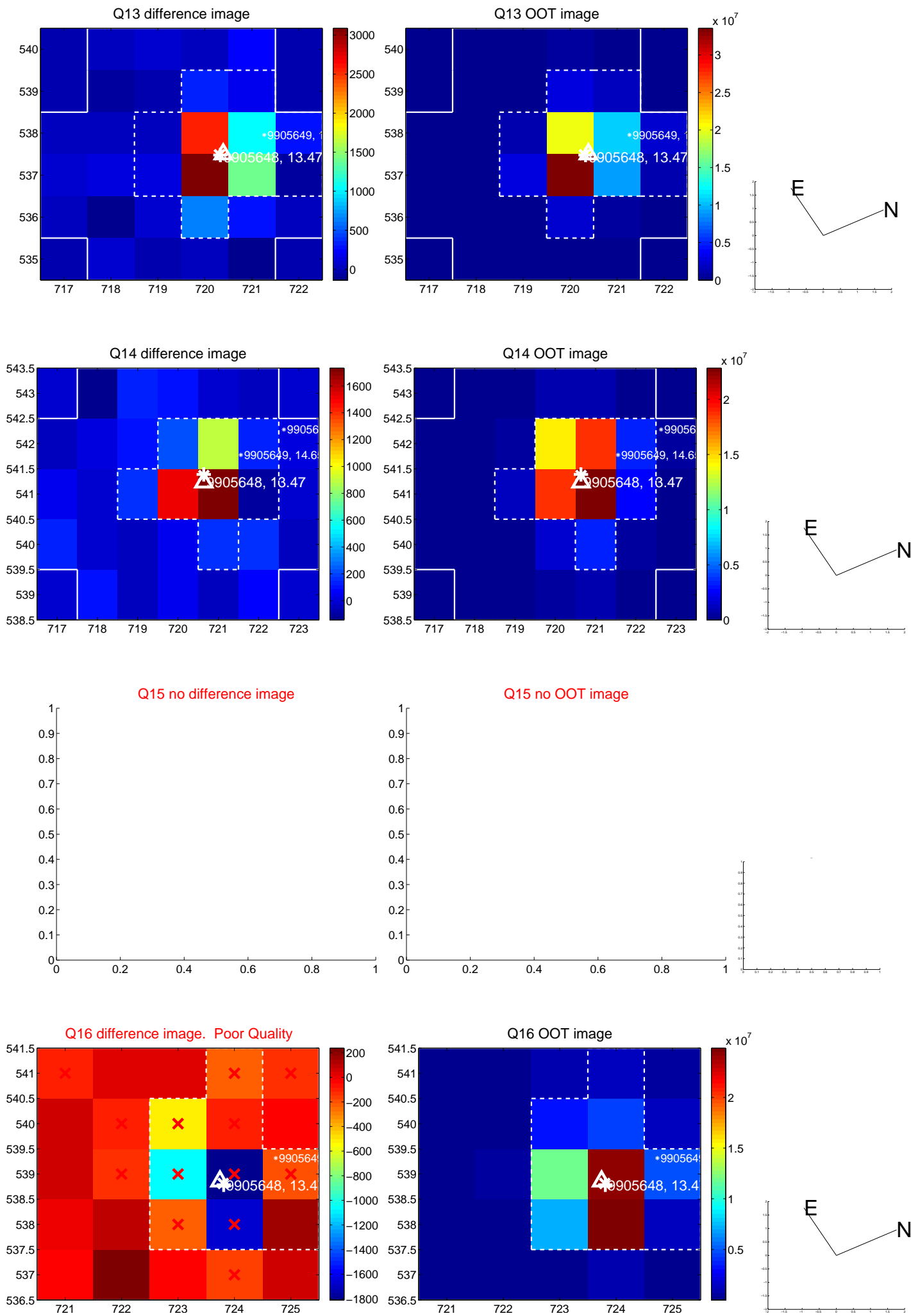




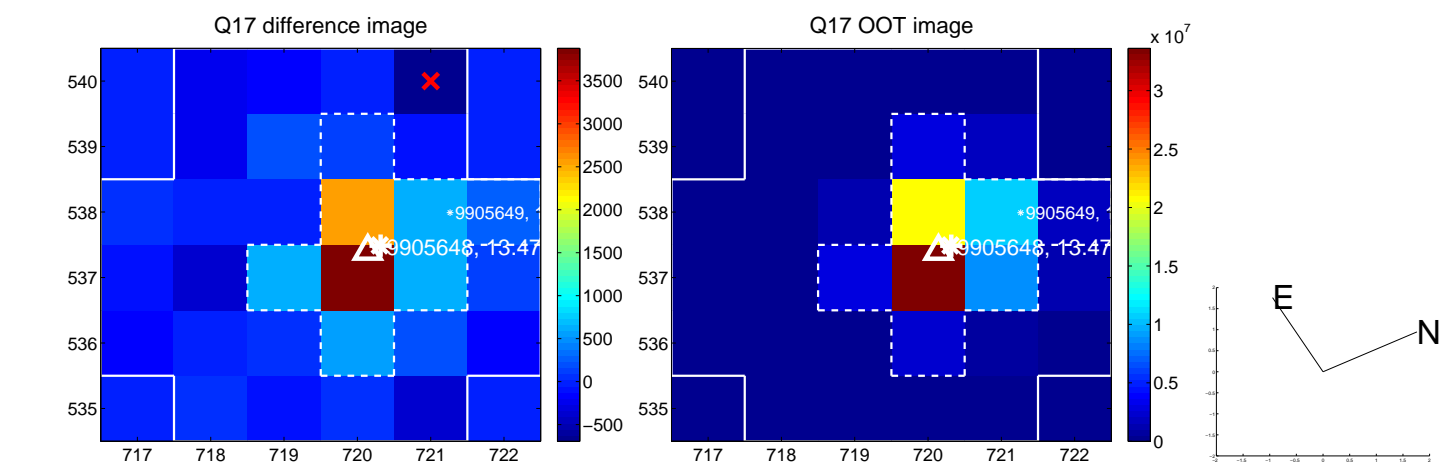
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



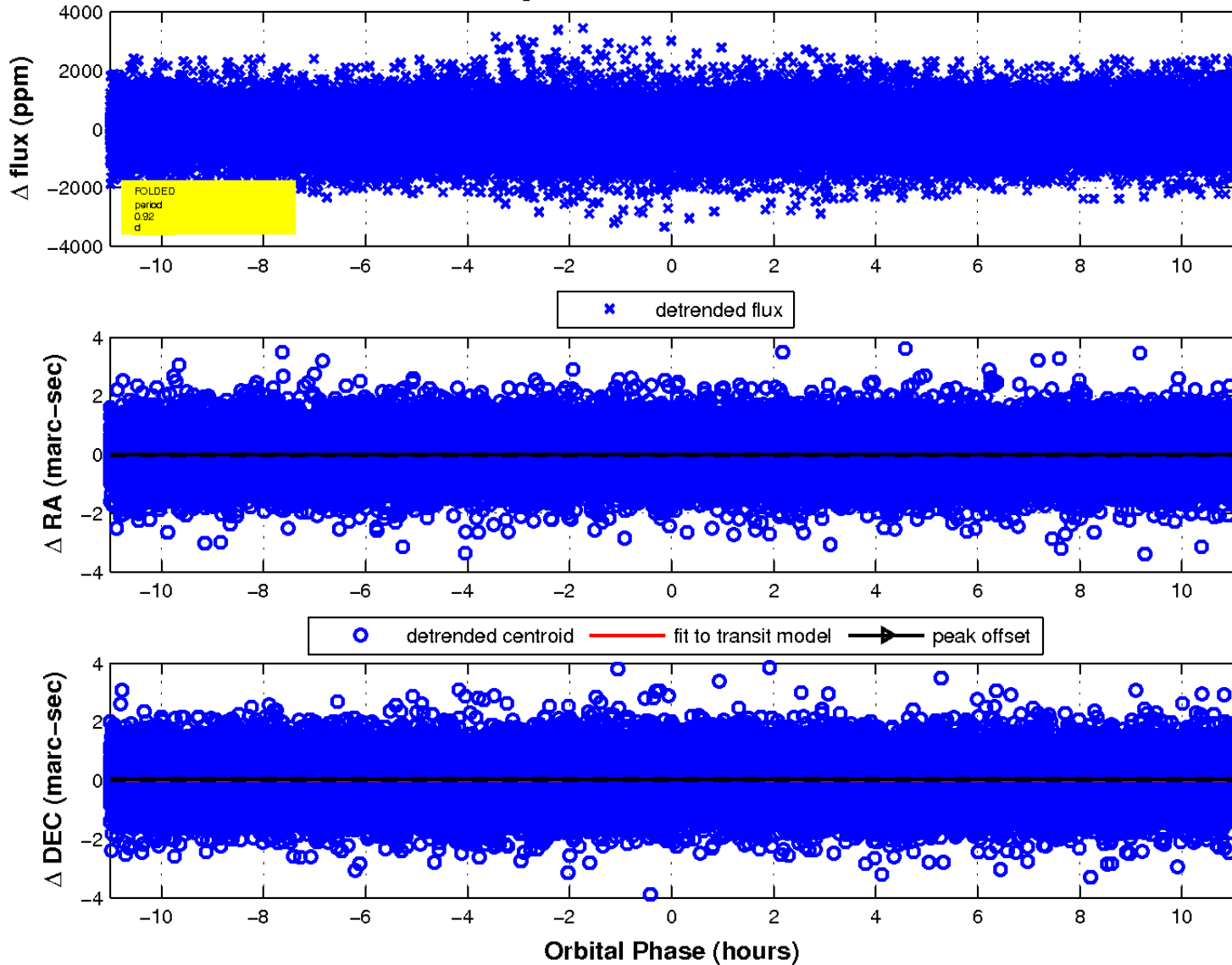
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

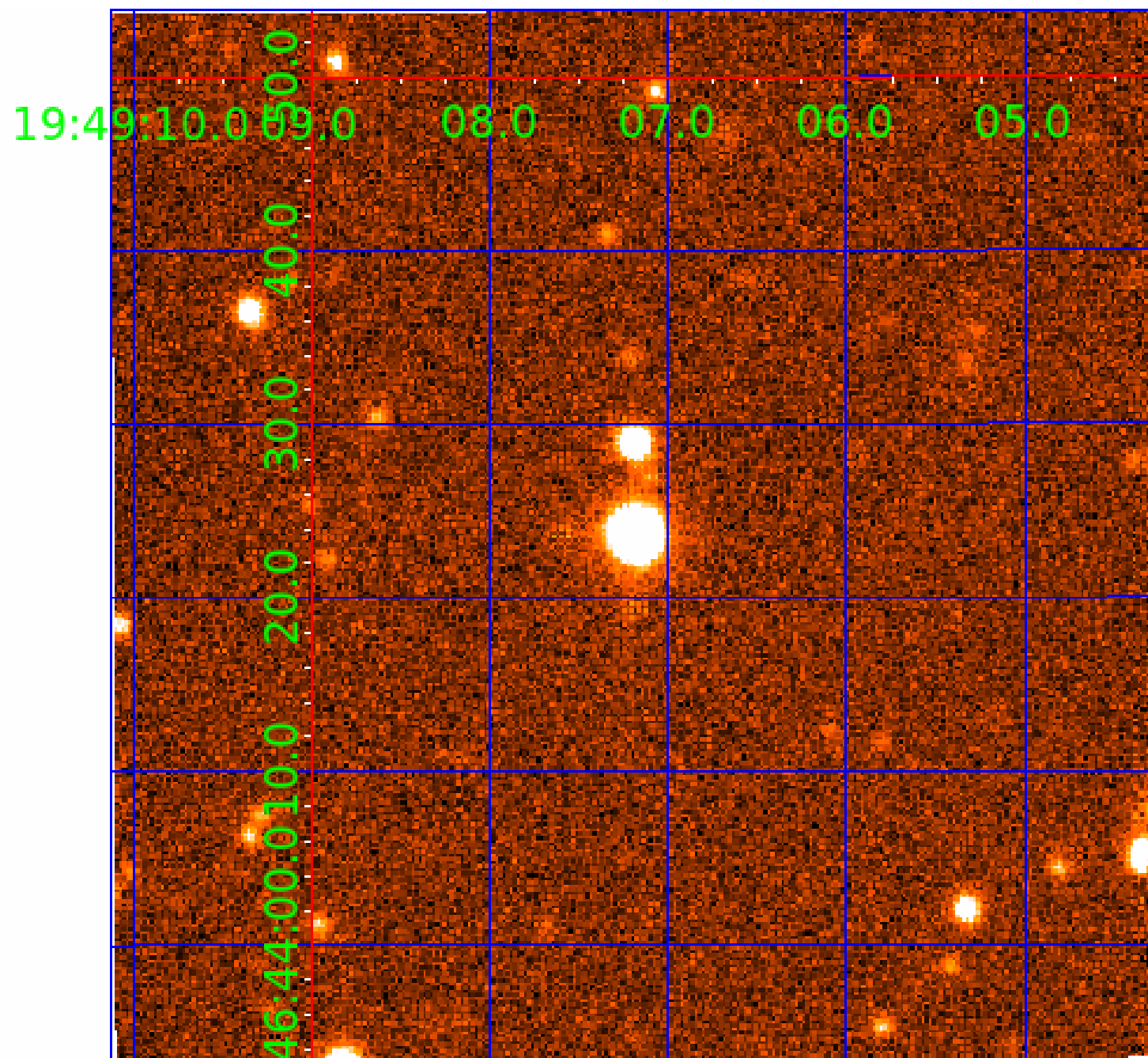


fluxWeightedCentroids, Planet 1 of 3



UKIRT Image

Declination





# KIC 009905648

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009905648-01	OBS	No	0.917338	132.418300	57.8	4.050	8.4	10.1	1.80	7372	1.59	18586.33
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009905648-03	OBS	No	427.857707	266.803130	1287.3	9.491	7.5	7.2	1.80	7372	7.82	5.14

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009905648-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV
009905648-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_POS_ALT
009905648-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_CHASES—LPP_ALT—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST

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

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

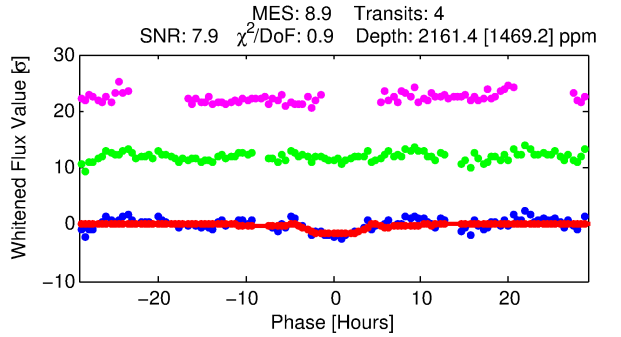
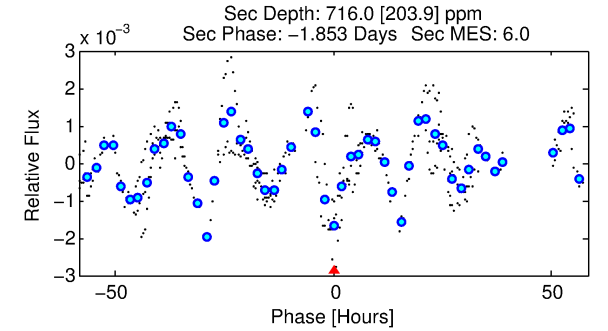
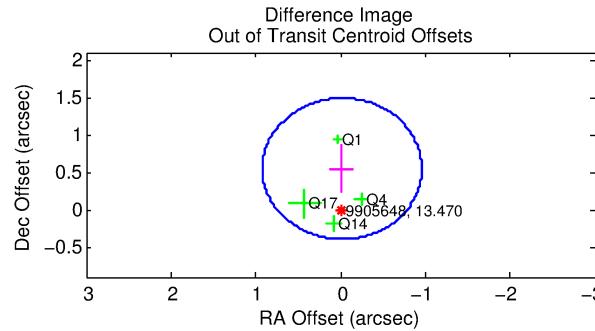
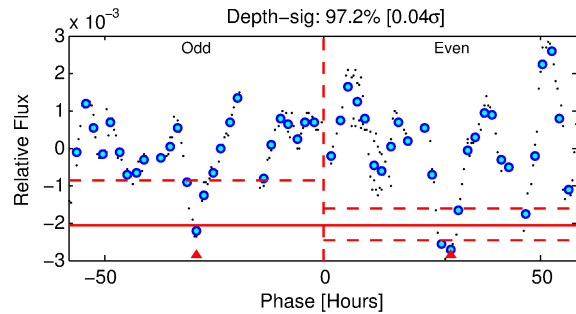
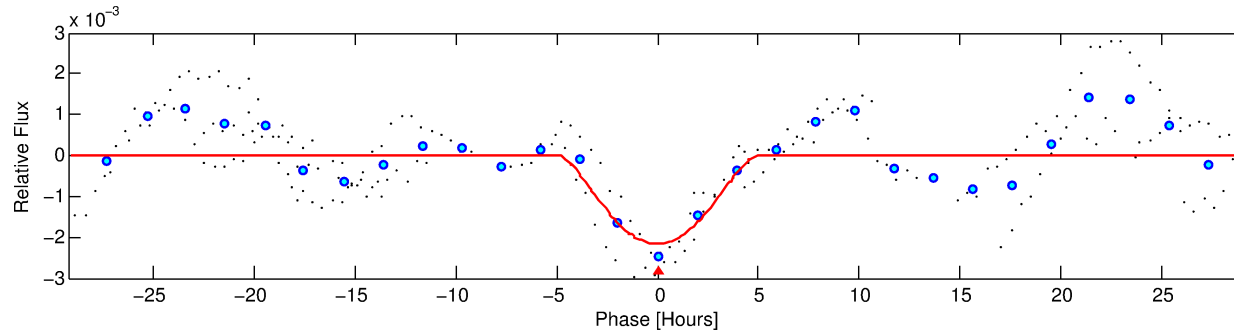
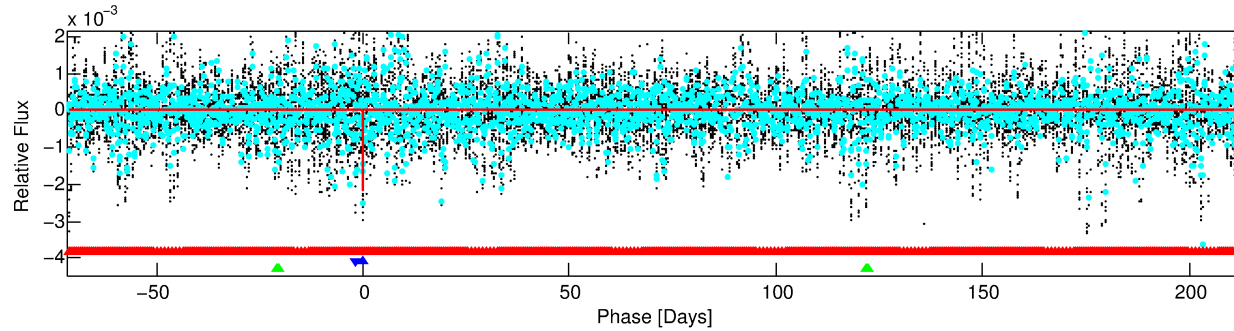
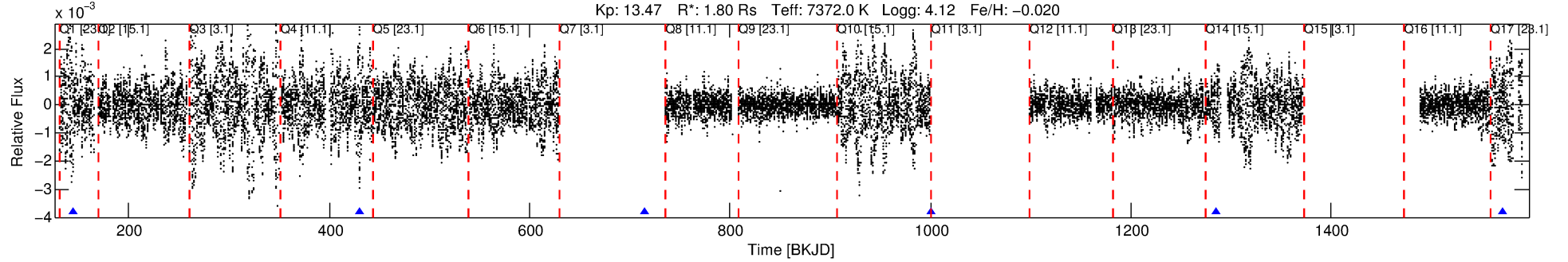
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009905648-02

No Significant Match Found

# DV One-Page Summary

KIC: 9905648 Candidate: 2 of 3 Period: 285.200 d



## DV Fit Results:

Period = 285.19982 [0.00861] d  
Epoch = 144.9116 [0.0201] BKJD  
Rp/R\* = 0.0773 [0.1343]  
a/R\* = 89.76 [32.50]  
b = 1.00 [0.16]  
Seff = 8.82 [3.55]  
Teq = 439 [44] K  
Rp = 15.20 [26.85] Re  
a = 0.9873 [0.2500] AU  
Ag = 1661.43 [5827.13] [0.28 $\sigma$ ]  
Teffp = 4338 [3789] K [1.03 $\sigma$ ]

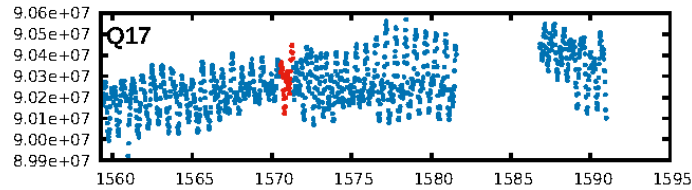
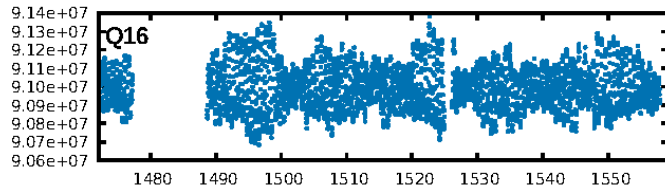
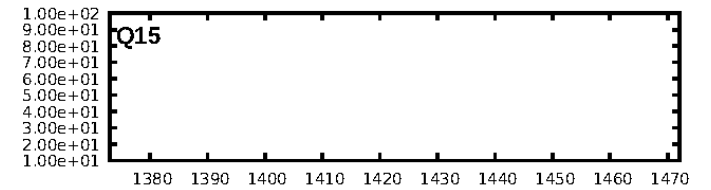
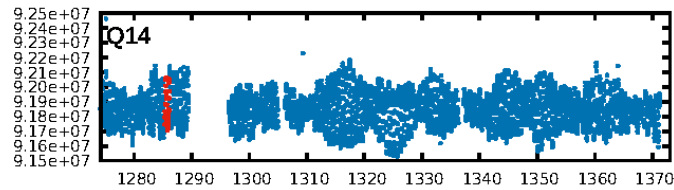
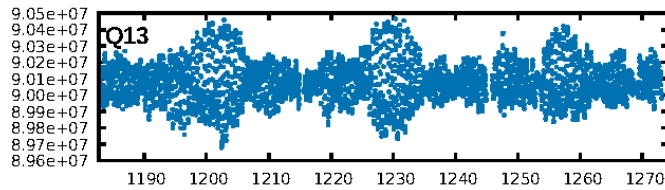
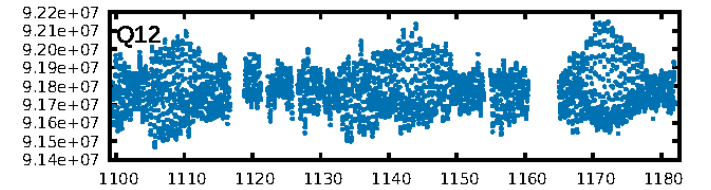
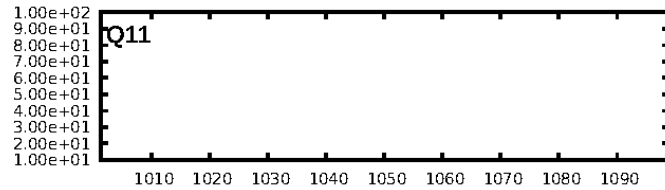
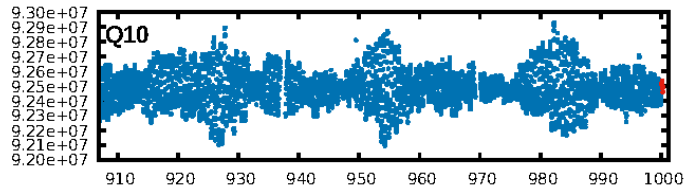
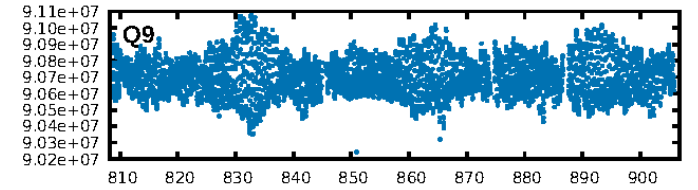
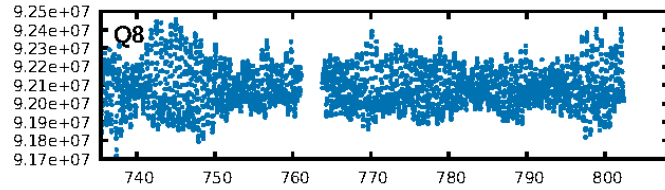
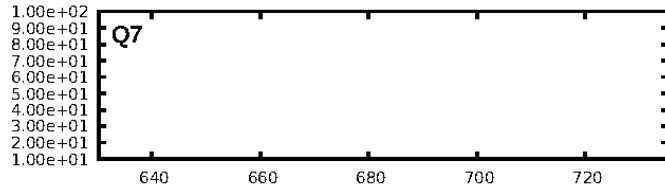
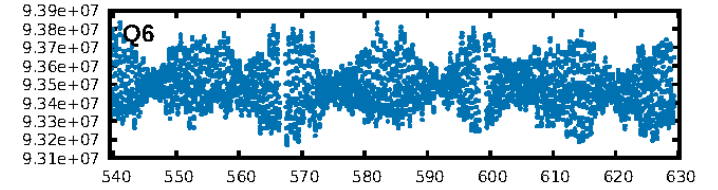
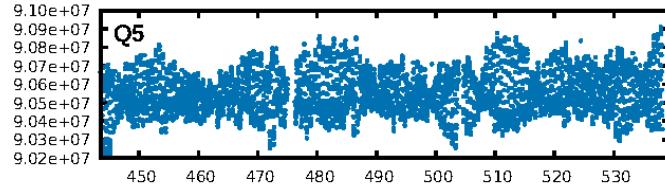
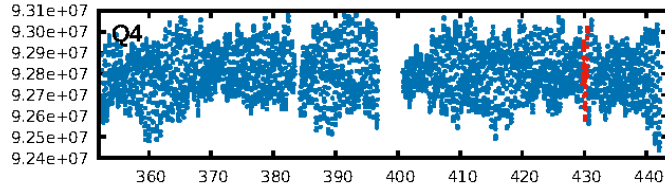
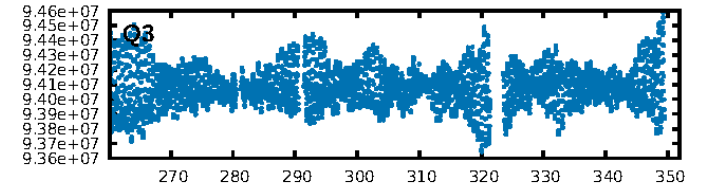
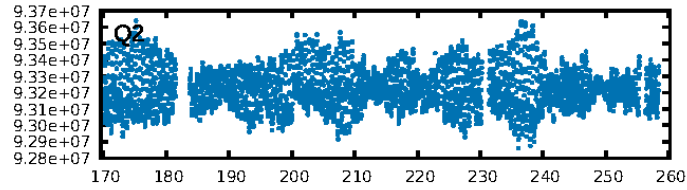
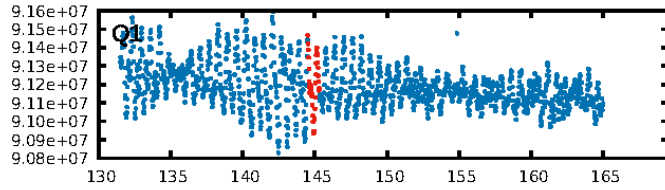
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [647.61 $\sigma$ ]  
LongPeriod-sig: 100.0% [251.95 $\sigma$ ]  
ModelChiSquare2-sig: 28.9%  
ModelChiSquareGof-sig: 100.0%  
**Bootstrap-pfa: 3.20e-12**  
RollingBand-fgt: 1.00 [2/2]  
**GhostDiagnostic-chr: 0.9485**  
Centroid-sig: 8.1%  
Centroid-so: 0.257 arcsec [1.59 $\sigma$ ]  
OotOffset-rm: 0.546 arcsec [1.74 $\sigma$ ]  
OotOffset-st: 1/0/1/2 [4]  
KicOffset-rm: 0.605 arcsec [1.87 $\sigma$ ]  
KicOffset-st: 1/0/1/2 [4]  
DiffImageQuality-fgm: 1.00 [4/4]  
DiffImageOverlap-fno: 0.00 [0/4]

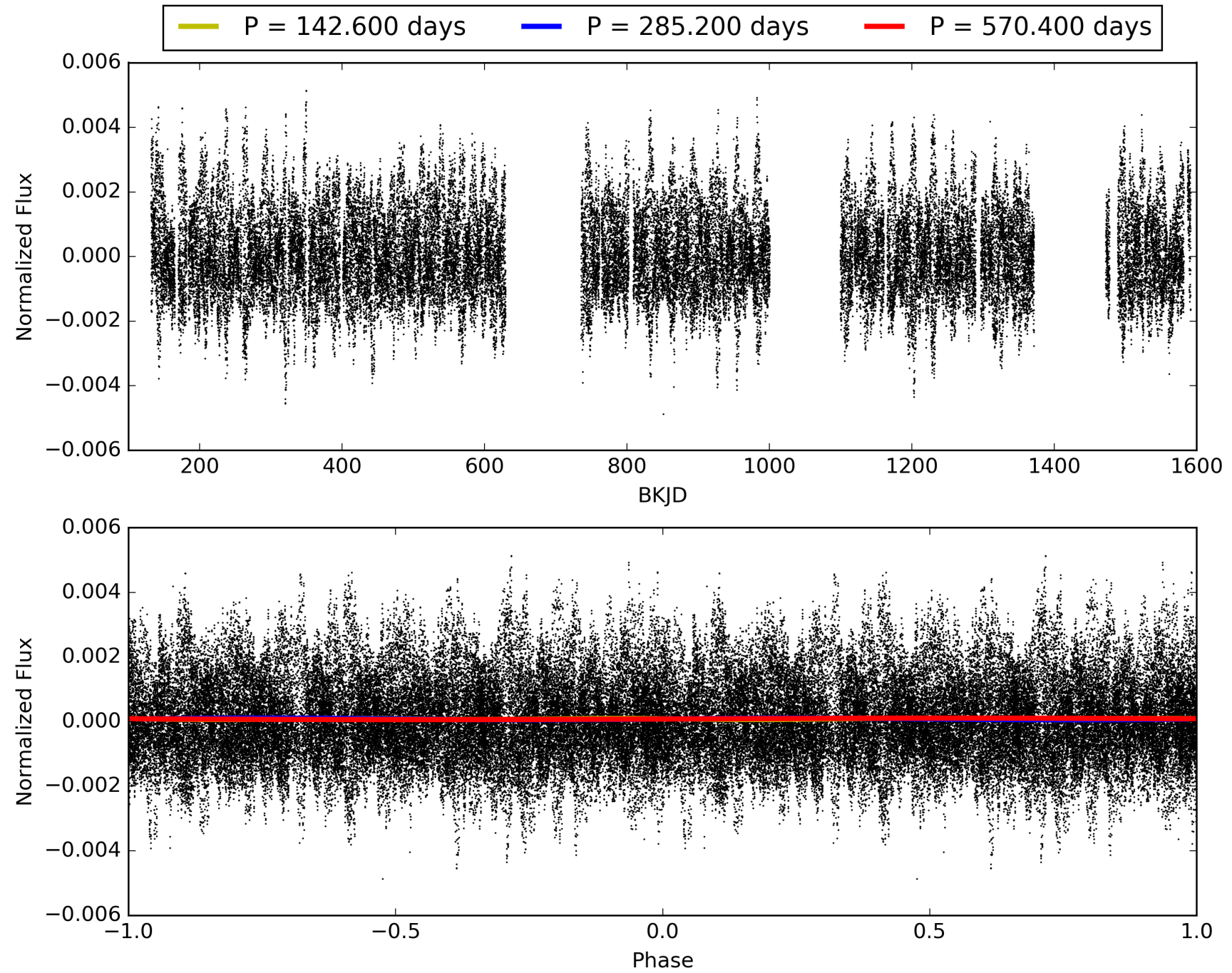
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 18:15:45 Z

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

# TCE 009905648-02, PDC Light Curves

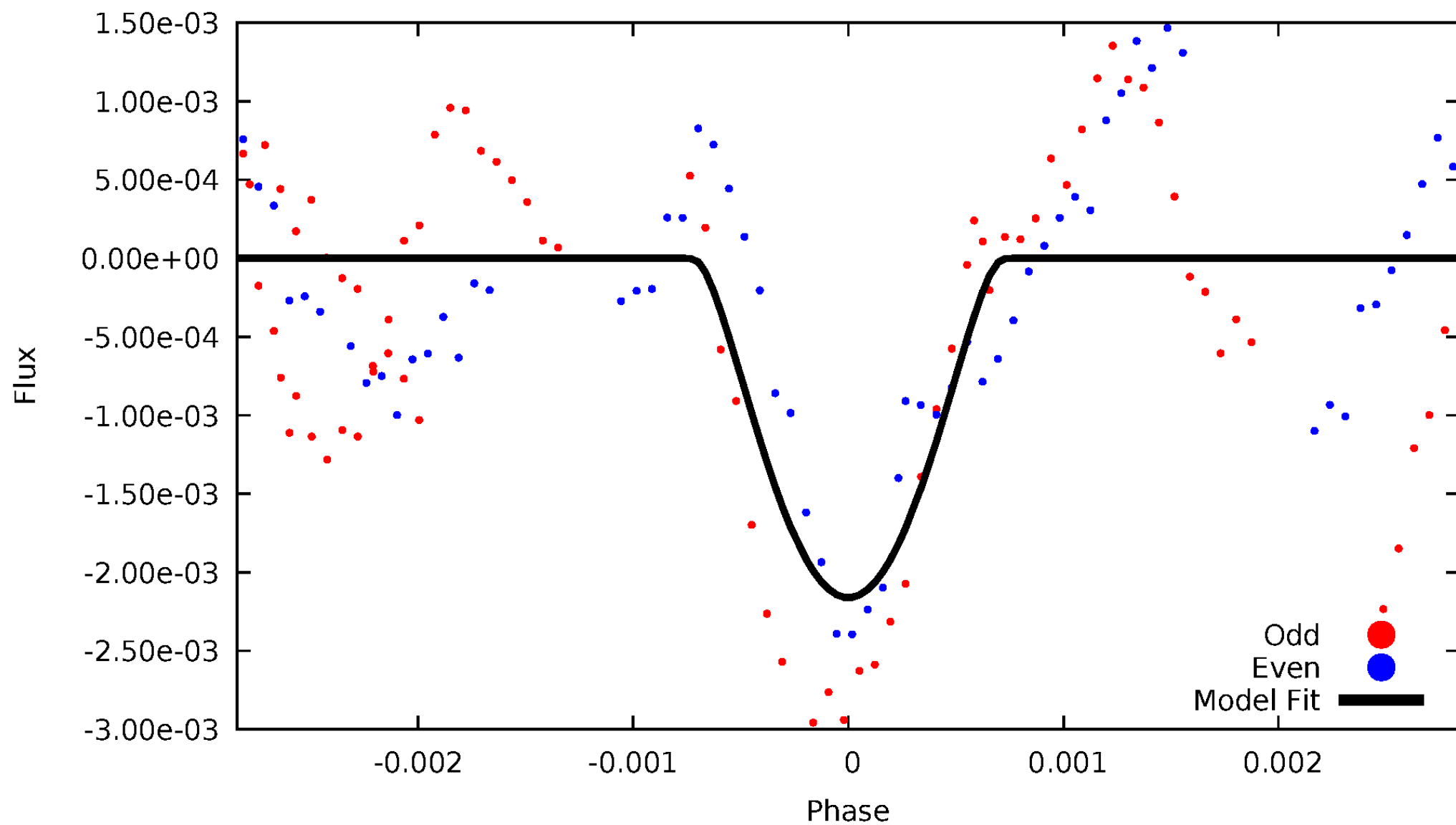


TCE 009905648-02



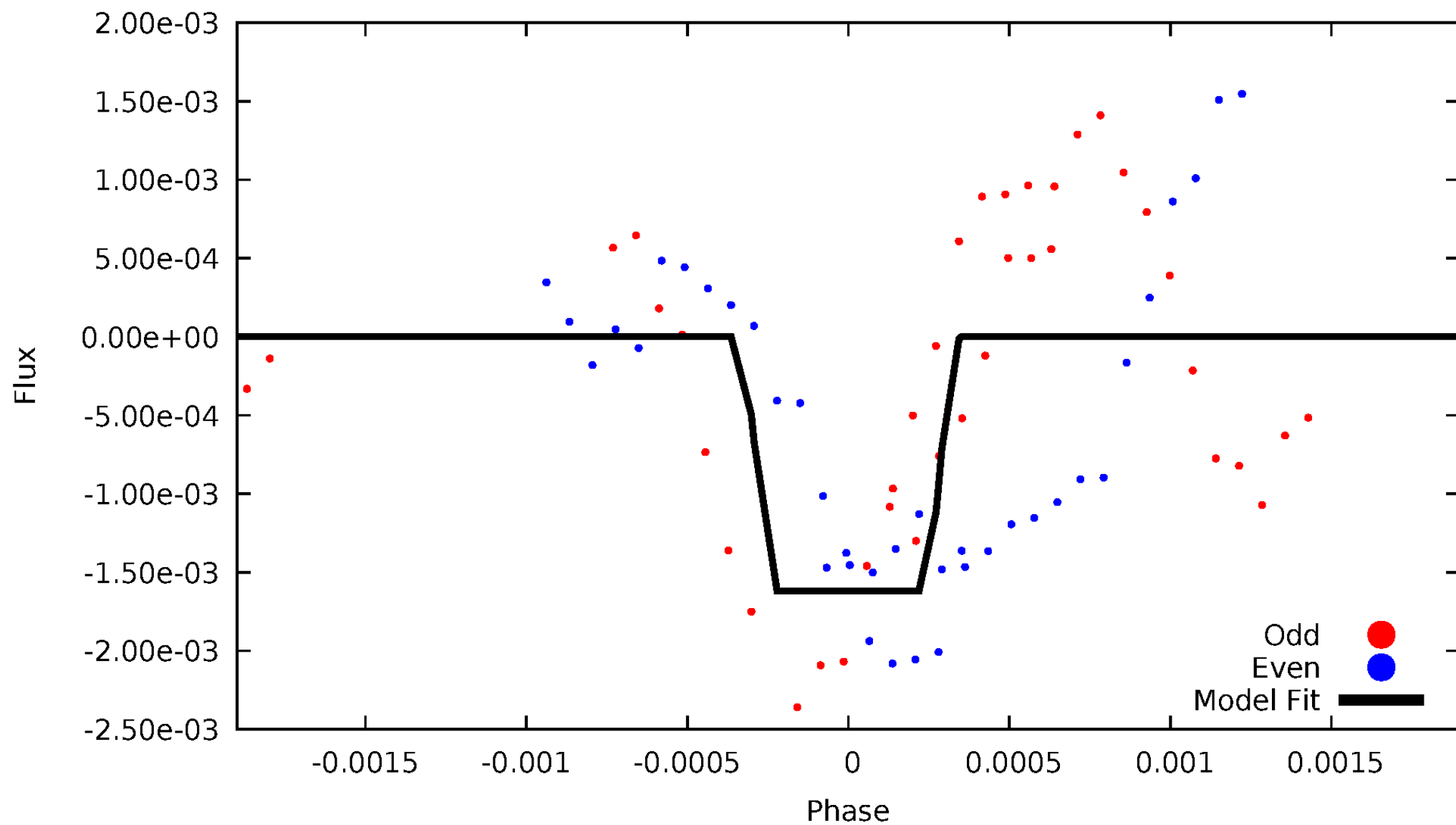
# DV Odd/Even

TCE 009905648-02



# ALT Odd/Even

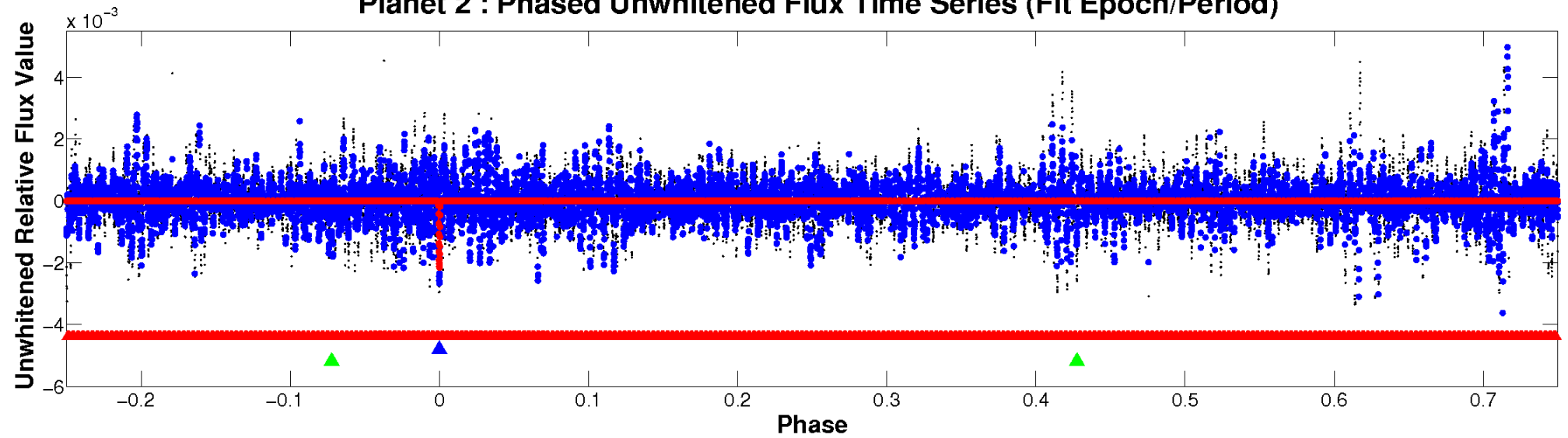
TCE 009905648-02



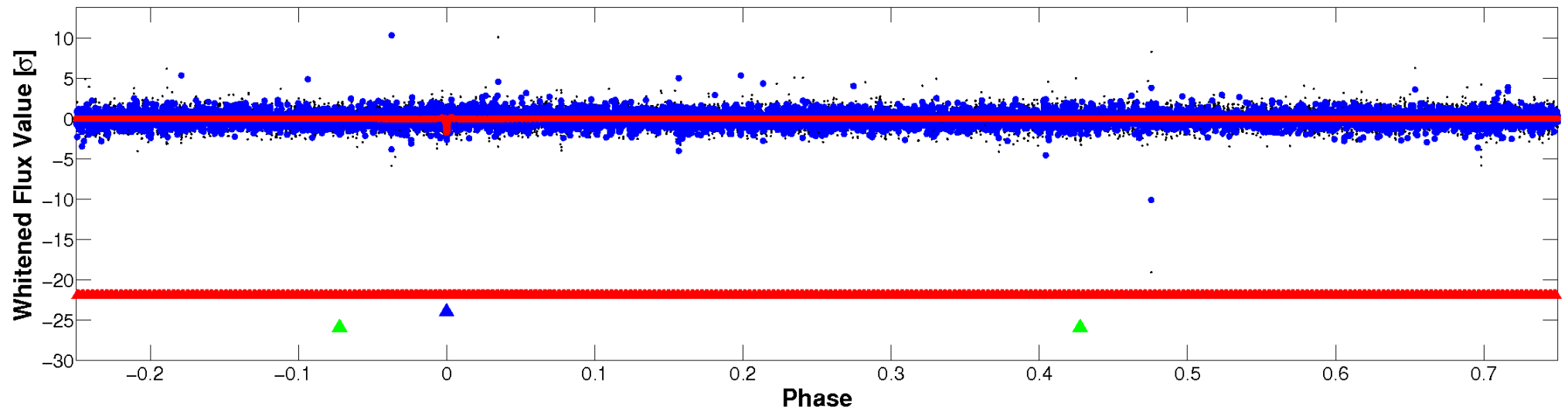


# Non-Whitened Vs. Whitened Light Curve

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

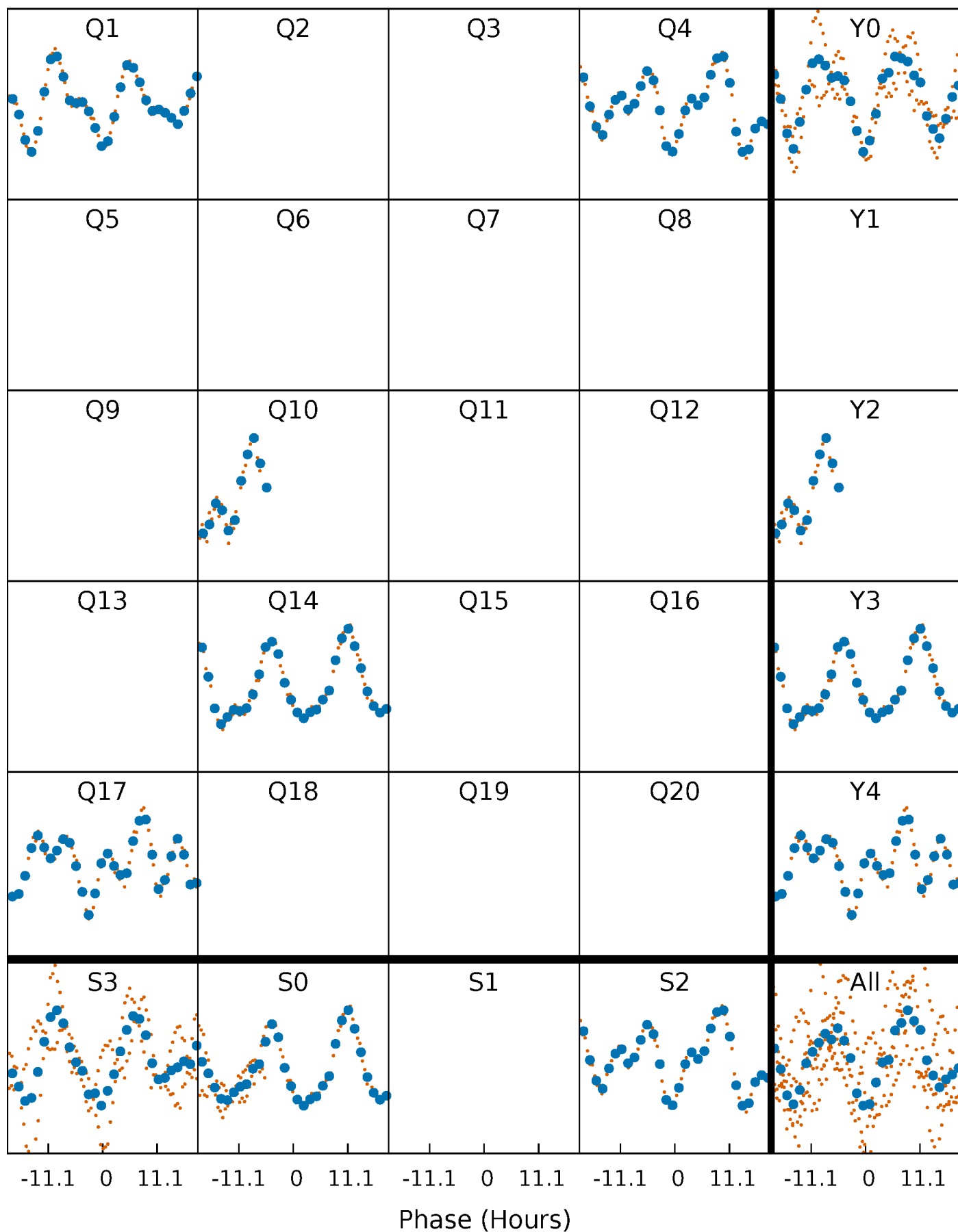


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



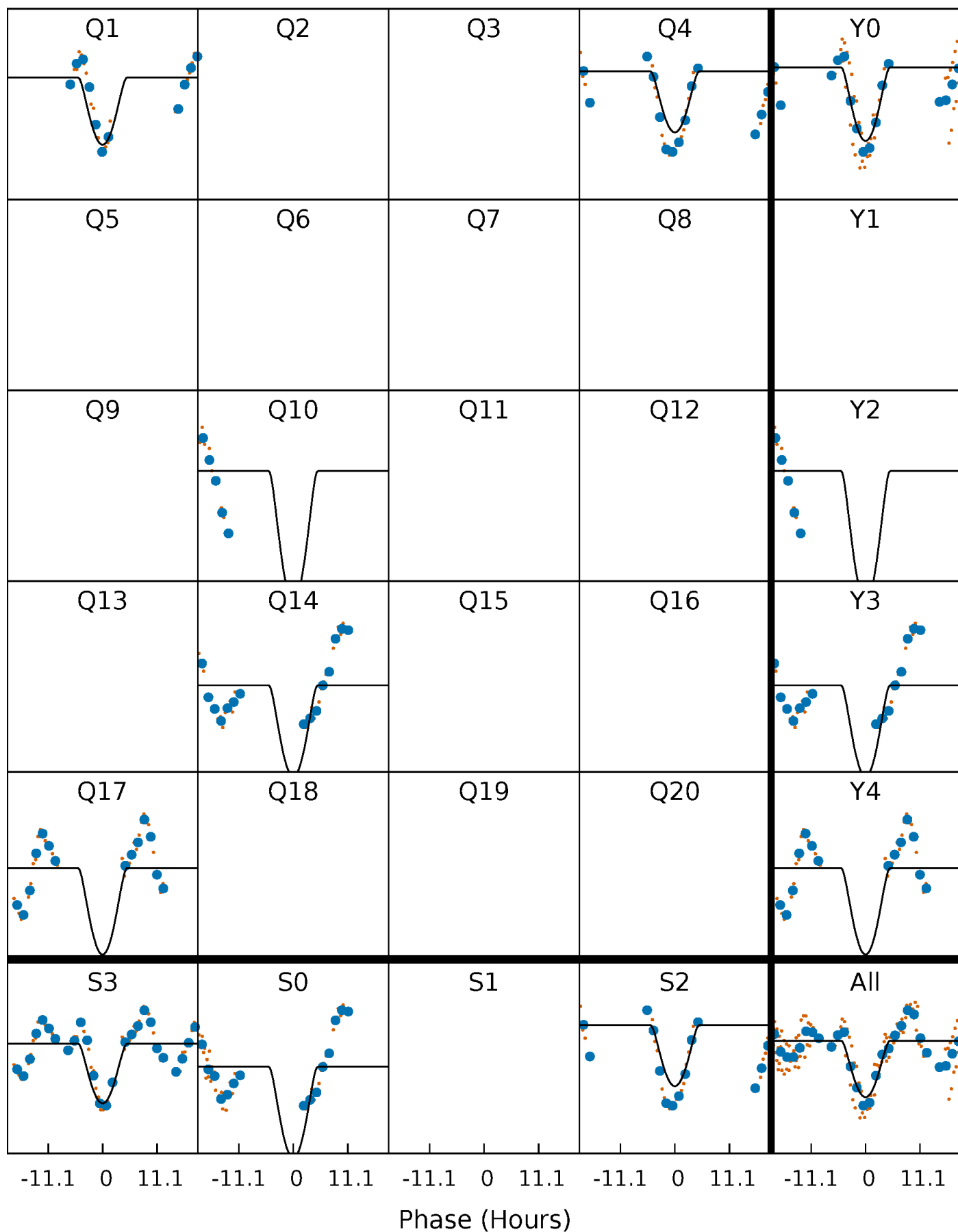
# PDC Quarter-Phased Transit Curves

TCE 009905648-02 P=285.199817 Days  $T_0=144.911649$  (BKJD)



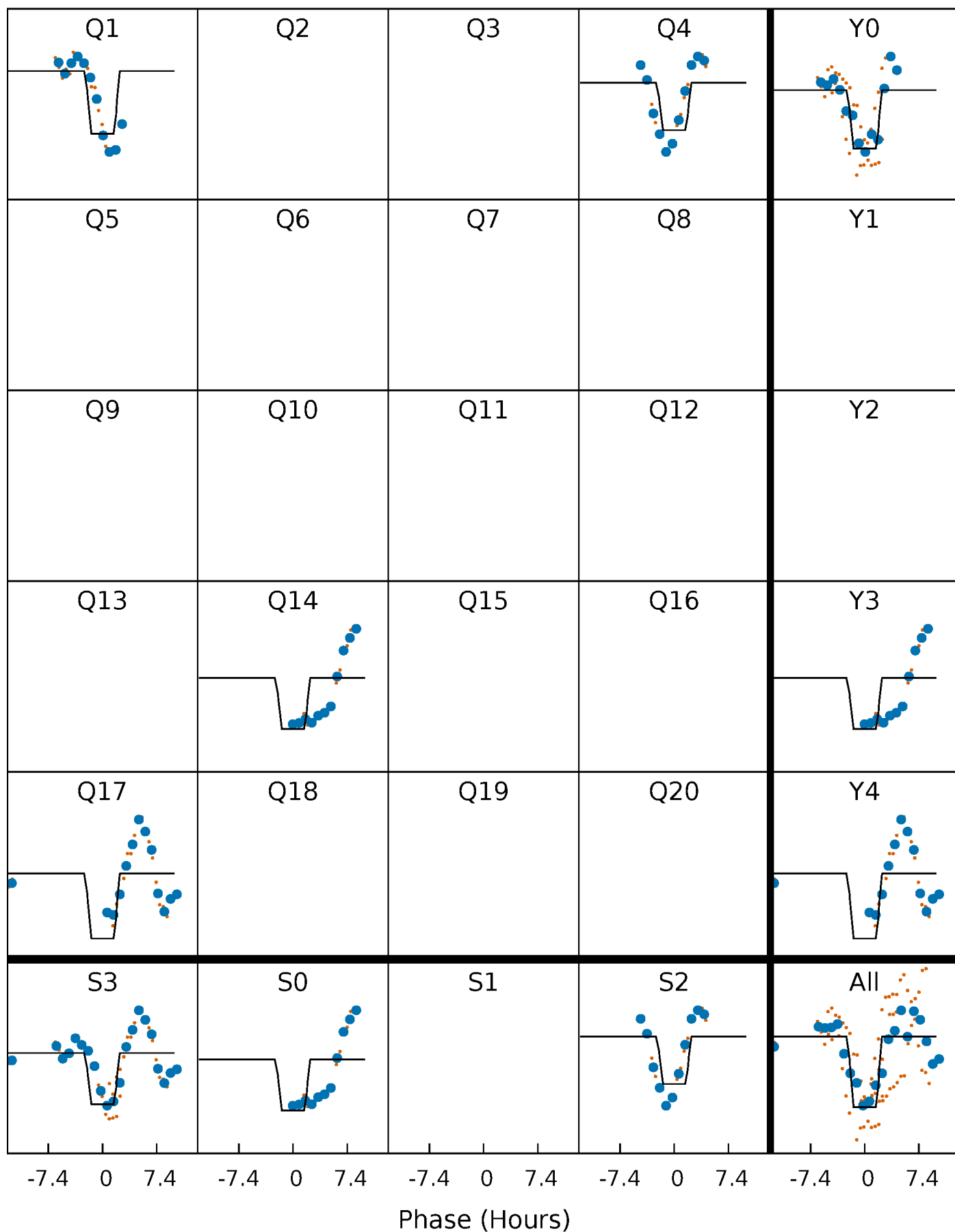
# DV Quarter-Phased Transit Curves

TCE 009905648-02 P=285.199817 Days  $T_0=144.911649$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

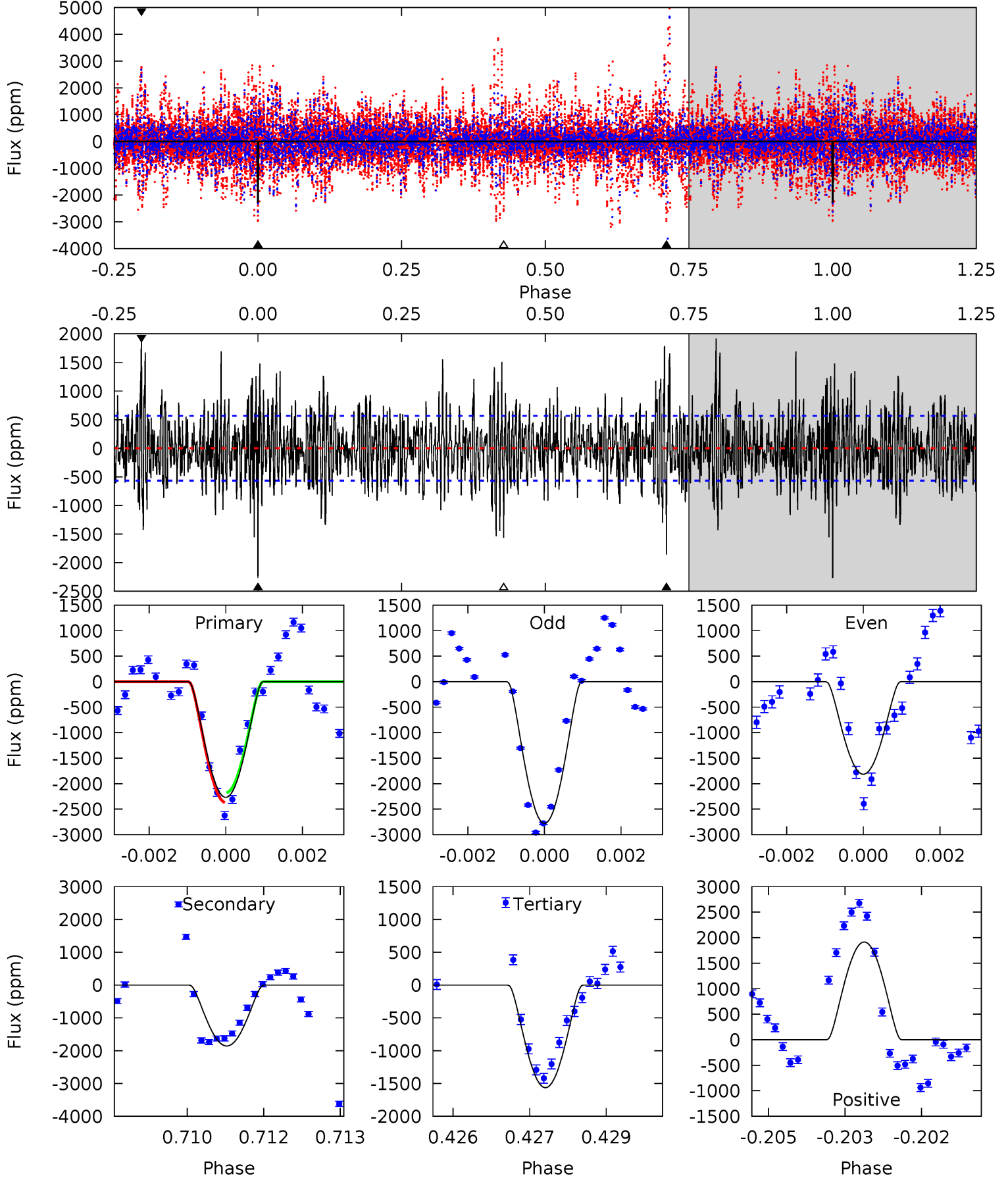
TCE 009905648-02 P=285.232064 Days  $T_0=144.877749$  (BKJD)



# DV Model-Shift Uniqueness Test

009905648-02, P = 285.199817 Days, E = 144.911649 Days

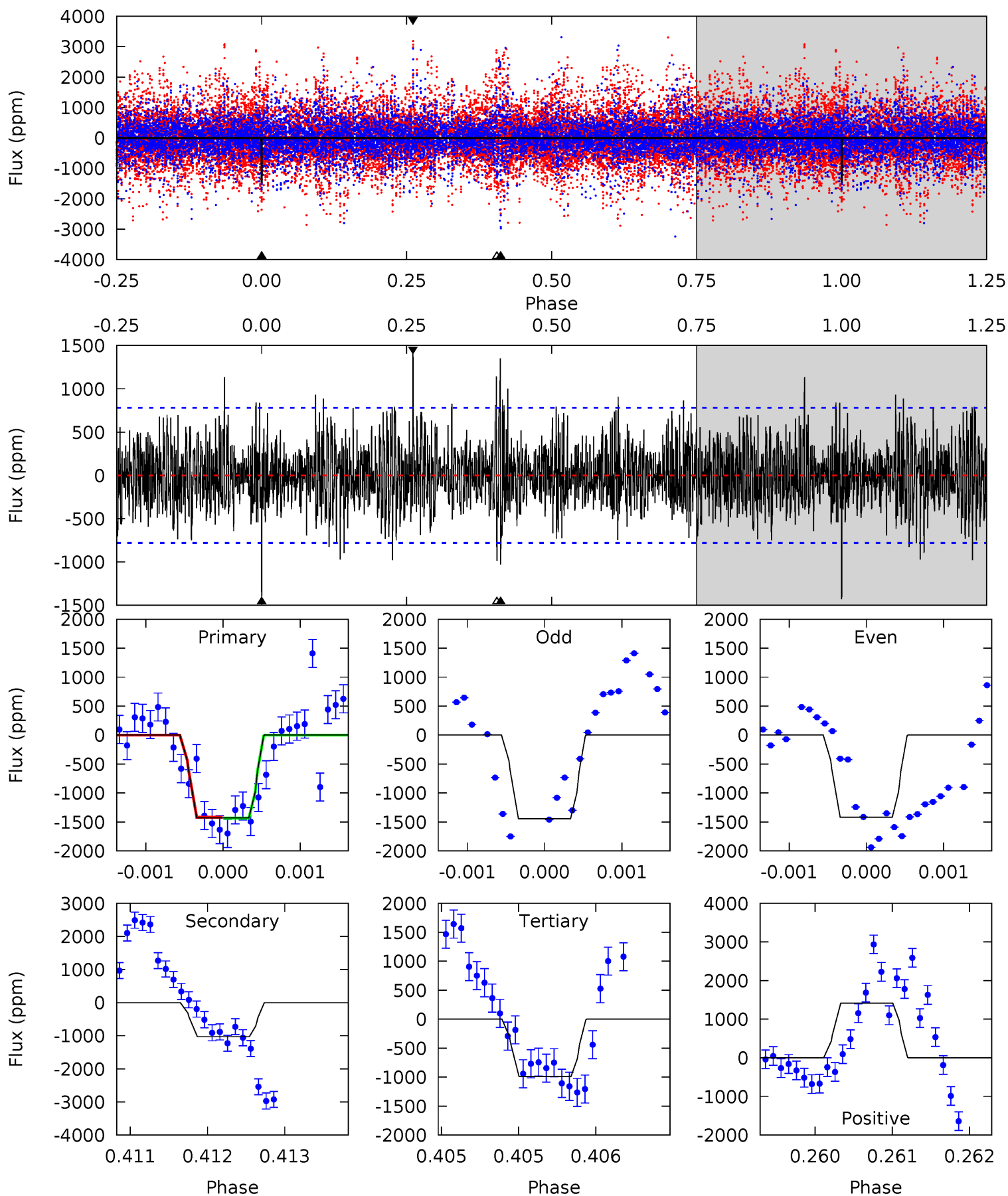
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
21.5	17.6	14.8	18.2	5.38	3.17	4.23	6.68	3.35	2.77	-0.56	4.49	0.77	0.46	0.90



# Alt Model-Shift Uniqueness Test

009905648-02, P = 285.232064 Days, E = 144.877749 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.1	7.29	7.00	10.0	5.53	3.41	2.02	3.13	0.10	0.29	-2.74	0.09	0.98	0.50	0.05





### Stellar Parameters For KIC 009905648

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$7372^{+231}_{-334}$	$4.124^{+0.128}_{-0.192}$	$-0.020^{+0.200}_{-0.350}$	$1.803^{+0.557}_{-0.371}$	$1.577^{+0.210}_{-0.234}$	$0.379^{+0.277}_{-0.185}$
	+3%/-5%	+3%/-5%	+1000%/-1750%	+31%/-21%	+13%/-15%	+73%/-49%
Source	KIC0	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 009905648-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-1855 \pm 105$	$25.75^{+21.70}_{-17.43}$	$618^{+48}_{-40}$	$4422^{+3001}_{-848}$	$1494^{+12639}_{-1058}$
Alt.	$-1028 \pm 141$	$21.79^{+22.06}_{-14.93}$	$617^{+50}_{-39}$	$4162^{+2818}_{-840}$	$1142^{+9388}_{-870}$

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

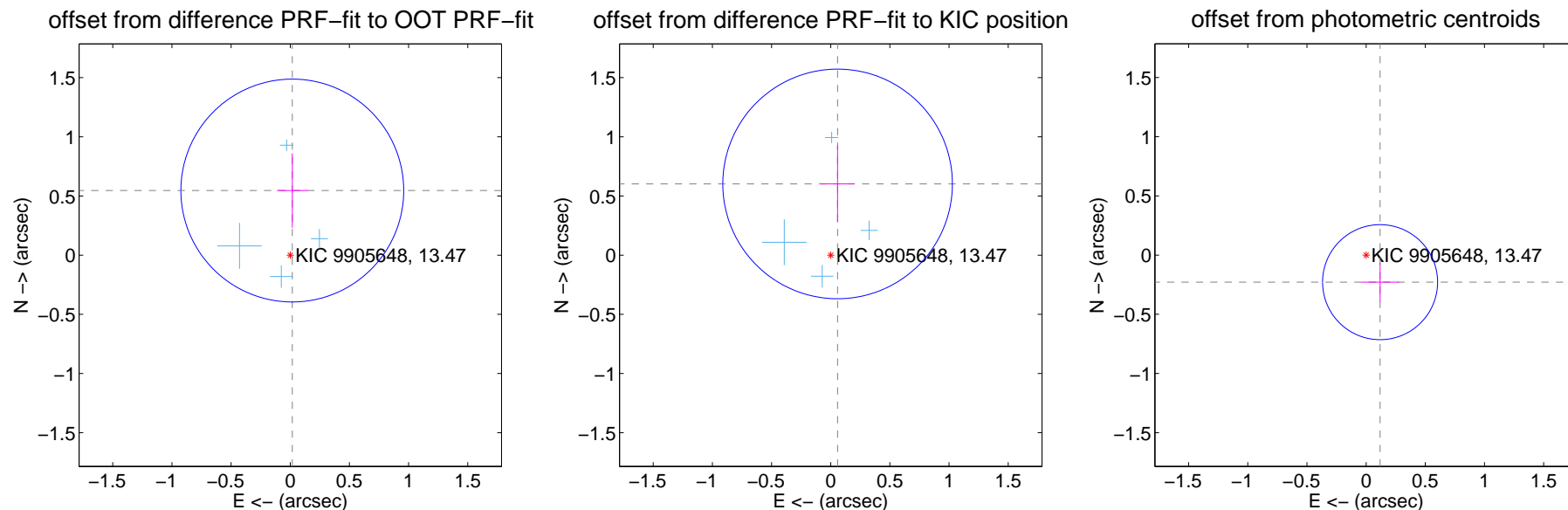
## DV Centroid Data

Supplemental centroid analysis for 009905648-02. Kepler magnitude: 13.47. Transit SNR 7.86

There are 4 quarters with good PRF difference image offsets

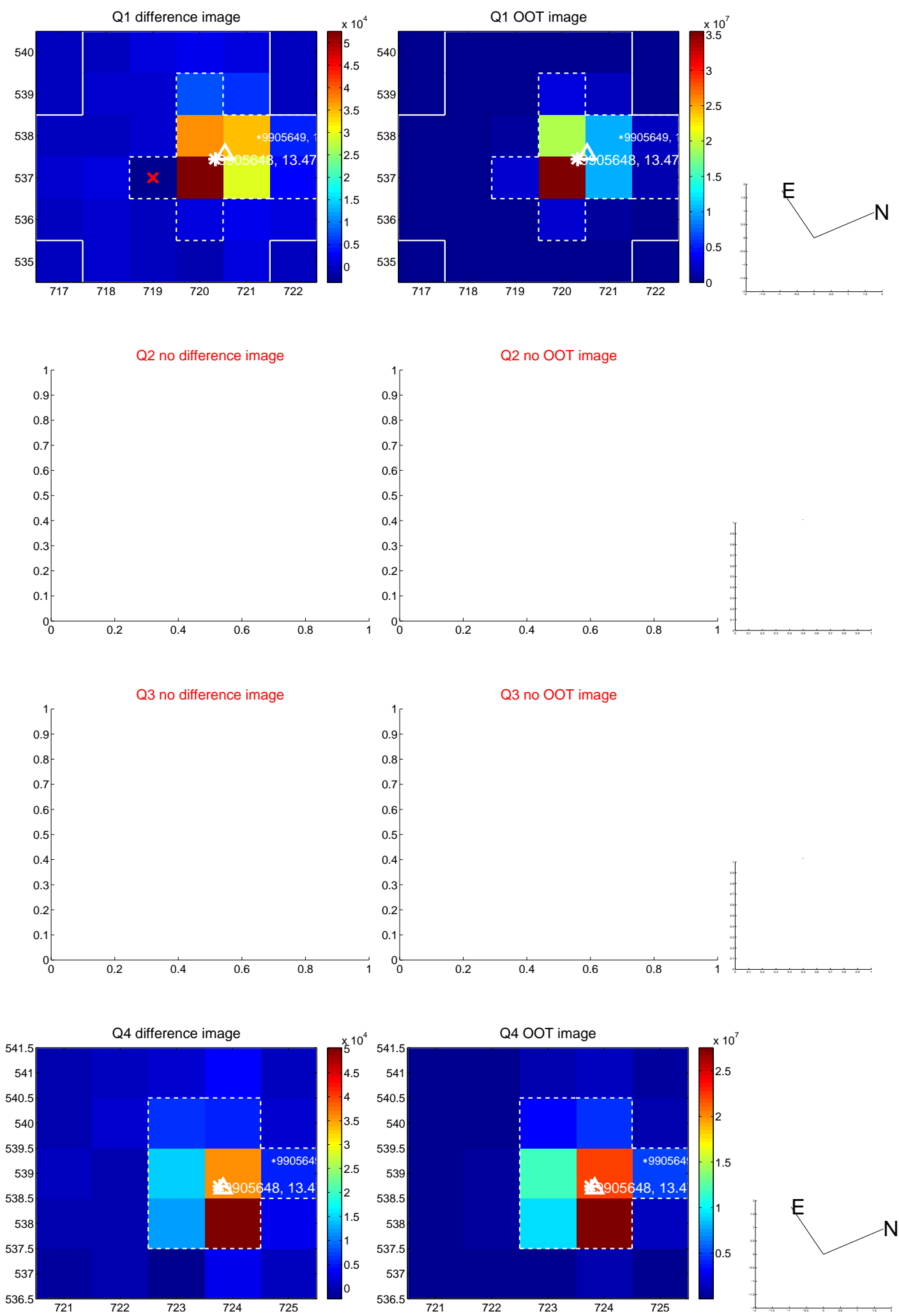
The direct PRF centroid is offset from the target star catalog position by about 0.05 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.546 \pm 0.314$	1.74	$-0.017 \pm 0.130$	$0.546 \pm 0.314$
PRF-fit source offset from KIC position	$0.605 \pm 0.323$	1.87	$-0.058 \pm 0.143$	$0.602 \pm 0.325$
photometric centroid source offset	$0.26 \pm 0.16$	1.59	$-0.12 \pm 0.16$	$-0.23 \pm 0.16$



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

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



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

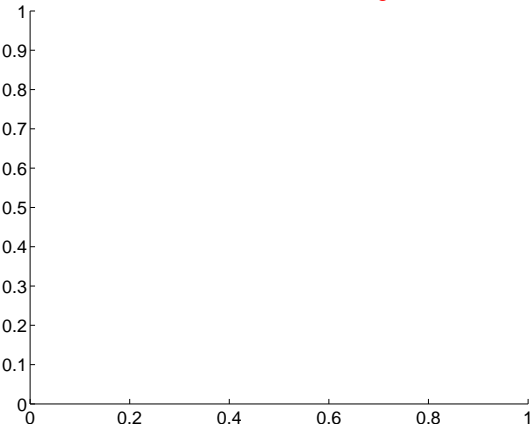


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

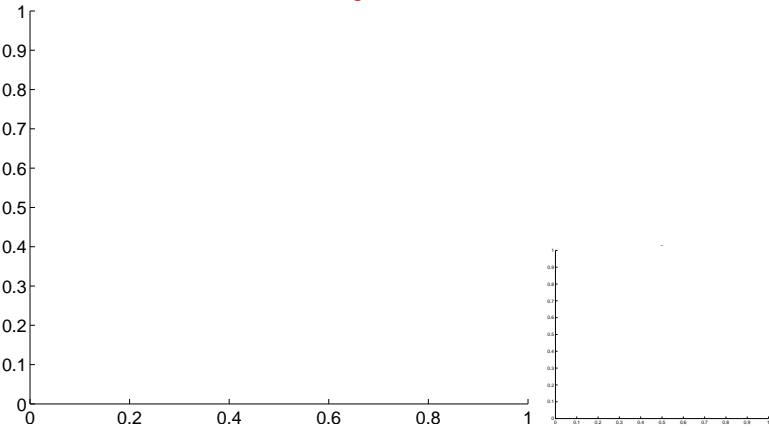


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

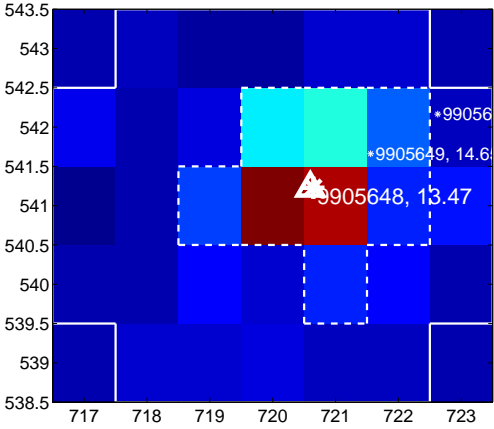
Q13 no difference image



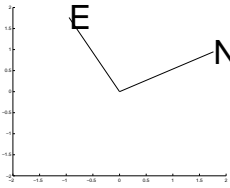
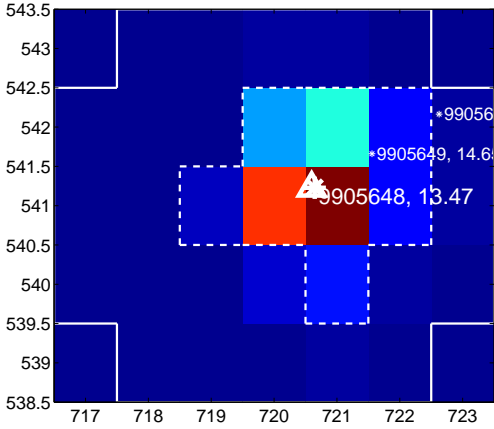
Q13 no OOT image



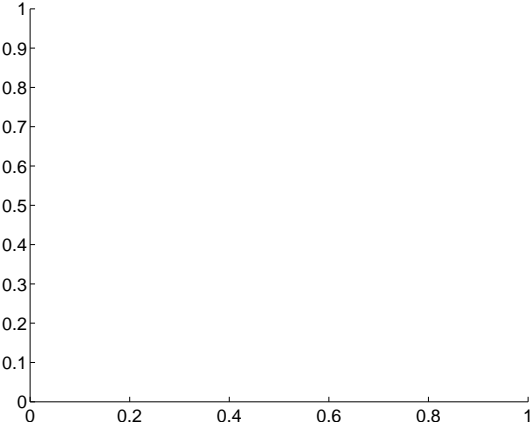
Q14 difference image



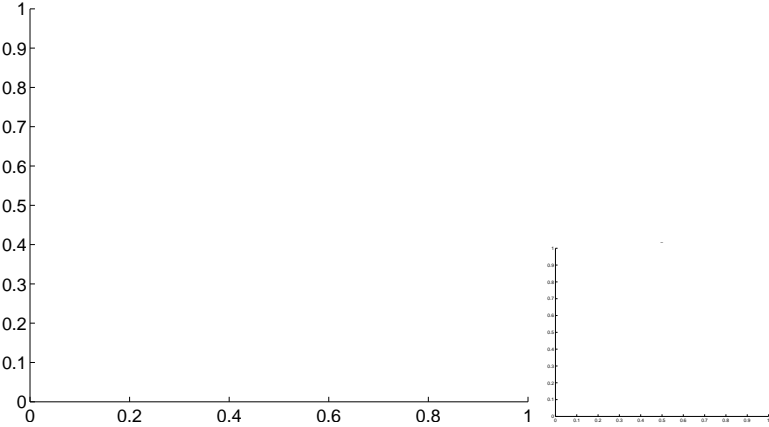
Q14 OOT image



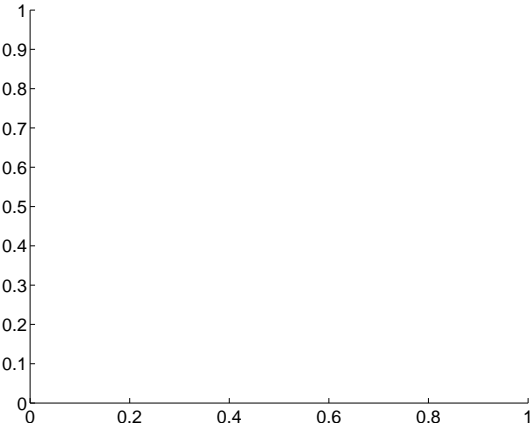
Q15 no difference image



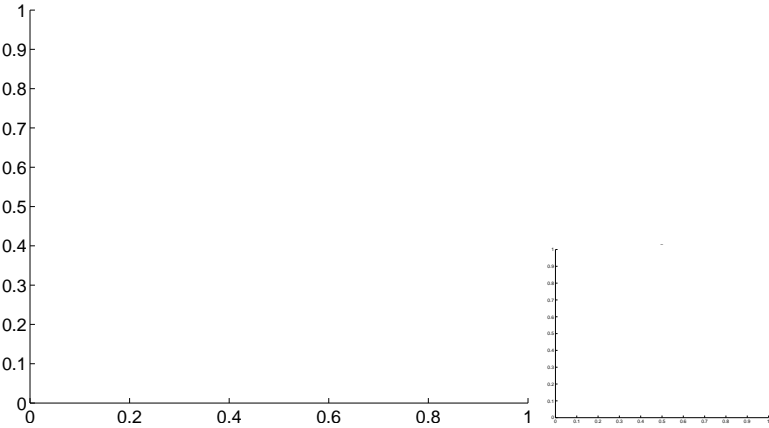
Q15 no OOT image



Q16 no difference image

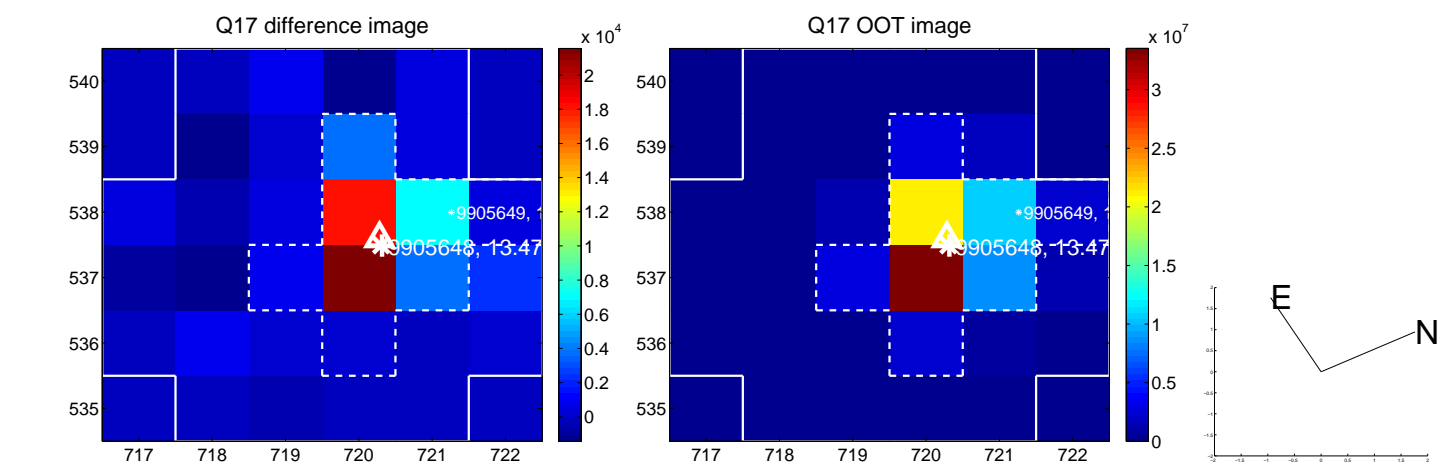


Q16 no OOT image

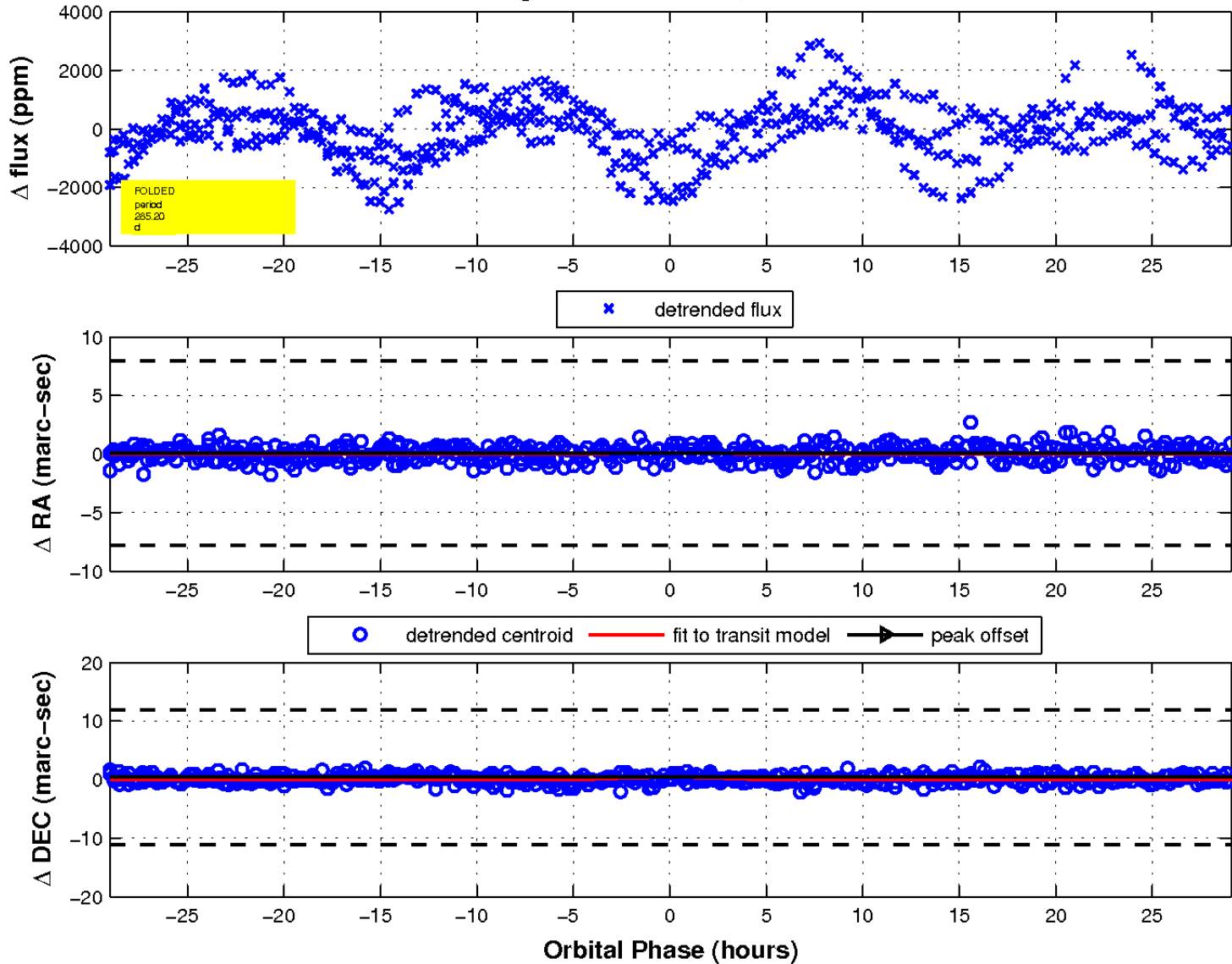




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

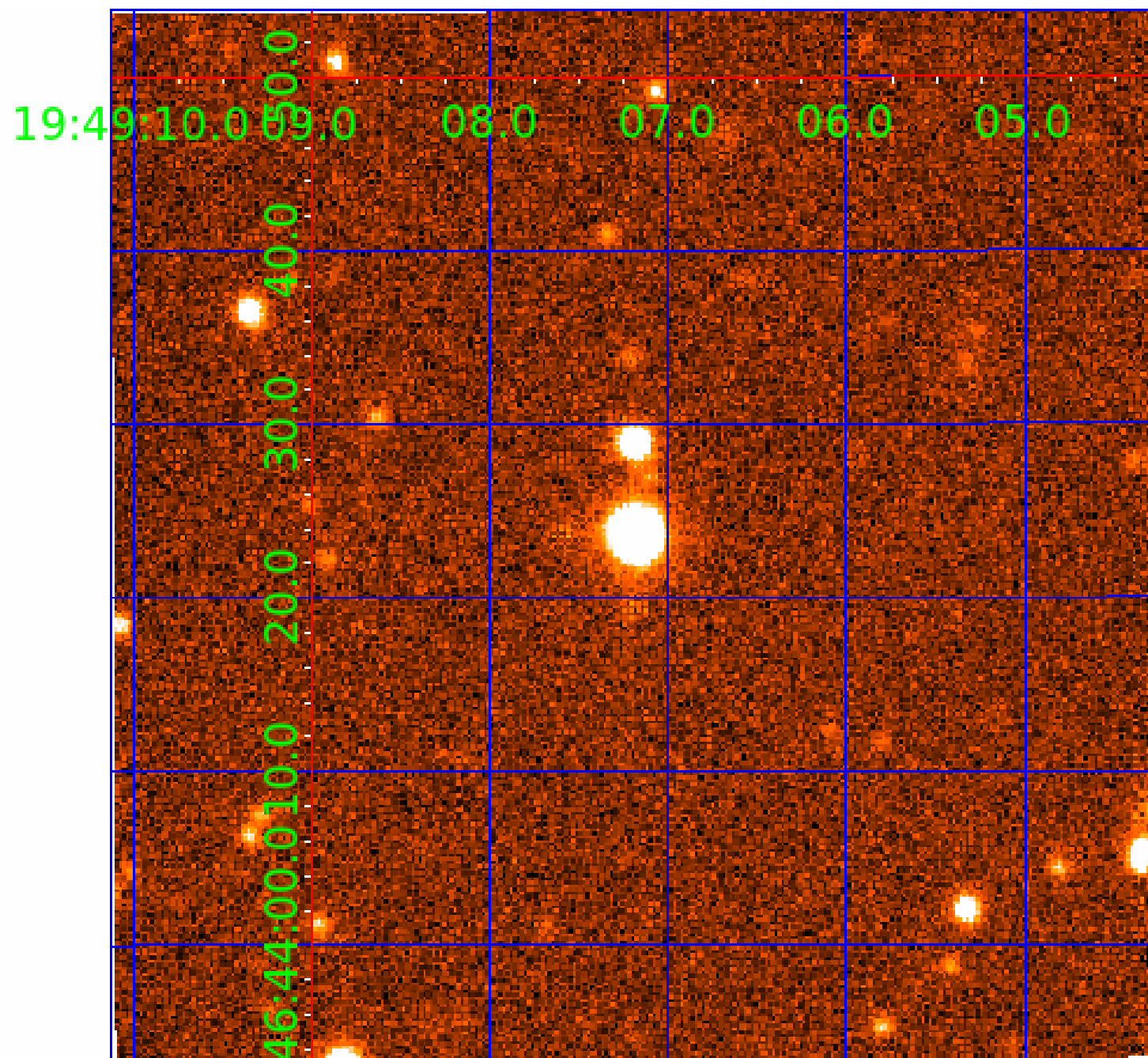


fluxWeightedCentroids, Planet 2 of 3



UKIRT Image

Declination



# KIC 009905648

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009905648-01	OBS	No	0.917338	132.418300	57.8	4.050	8.4	10.1	1.80	7372	1.59	18586.33
009905648-02	OBS	No	285.199817	144.911649	2161.4	9.726	8.9	7.9	1.80	7372	15.20	8.82
009905648-03	OBS	No	427.857707	266.803130	1287.3	9.491	7.5	7.2	1.80	7372	7.82	5.14

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009905648-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV
009905648-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_POS_ALT
009905648-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_CHASES—LPP_ALT—ALL_TRANS_CHASES—INCONSISTENT_TRANS—CENT_FEW_DIFFS—HALO_GHOST

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

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

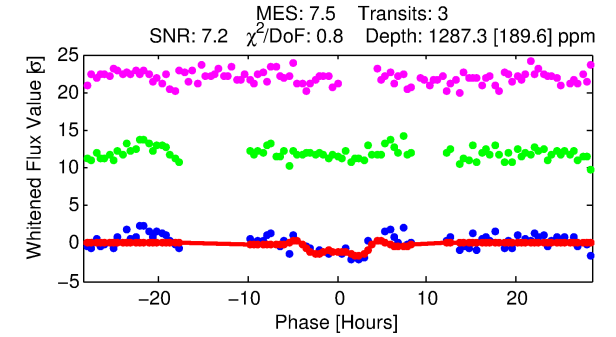
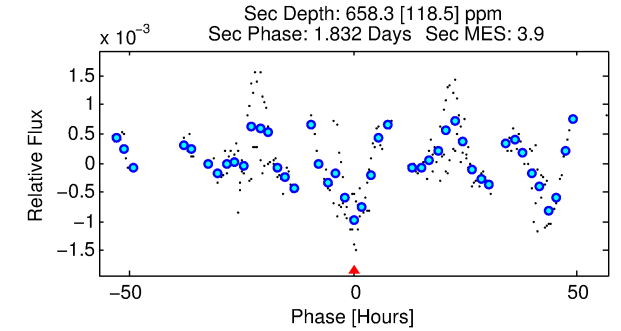
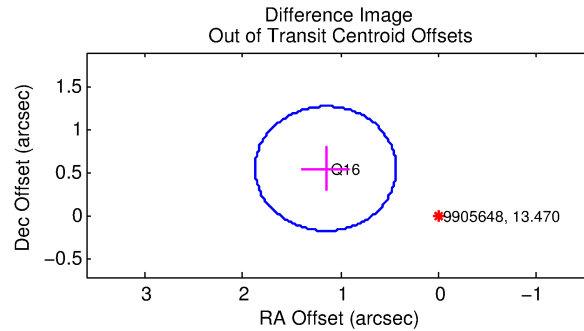
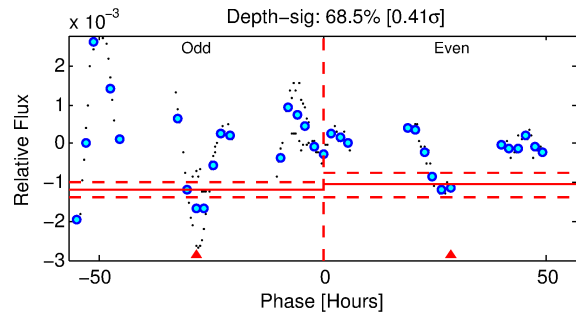
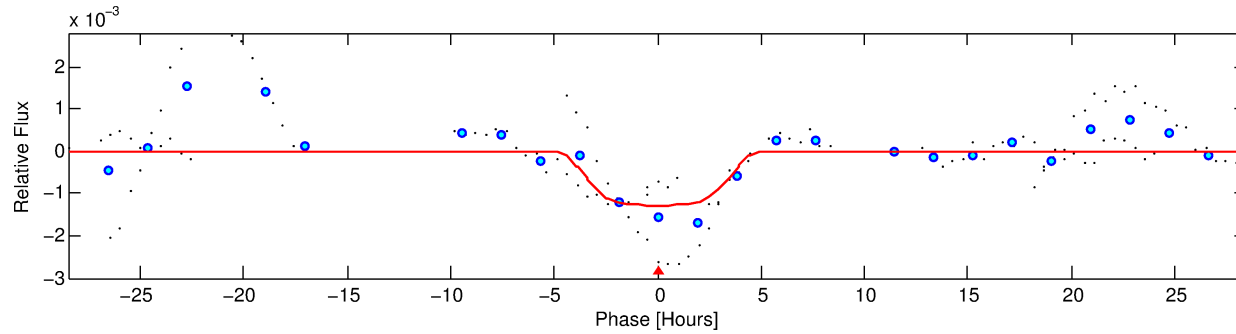
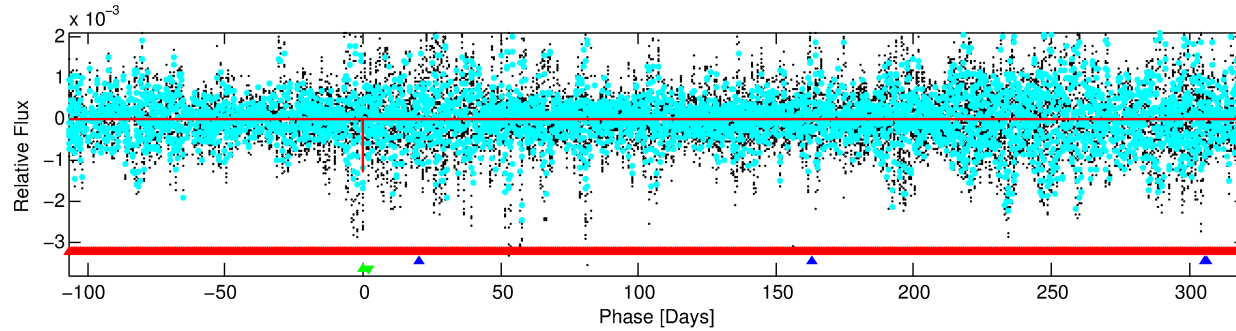
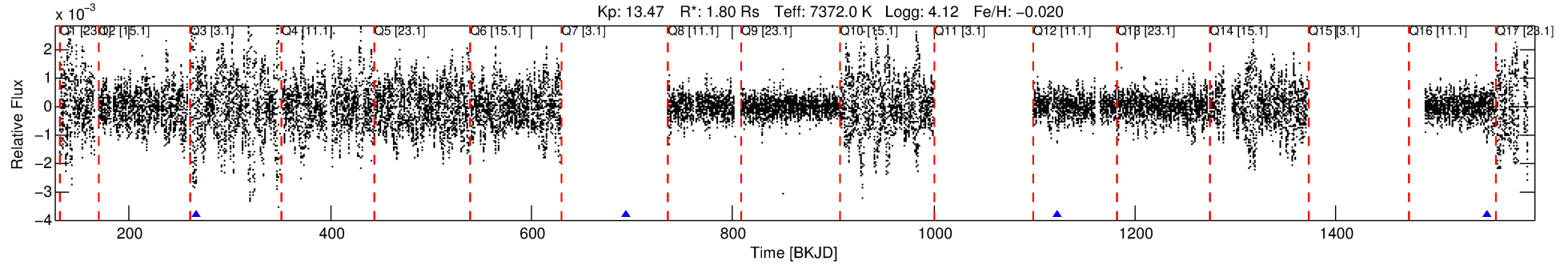
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009905648-03

No Significant Match Found

# DV One-Page Summary

KIC: 9905648 Candidate: 3 of 3 Period: 427.858 d



## DV Fit Results:

Period = 427.85771 [0.00826] d  
Epoch = 266.8031 [0.0176] BKJD  
Rp/R\* = 0.0397 [0.0032]  
a/R\* = 151.35 [16.95]  
b = 0.94 [0.01]  
Seff = 5.14 [2.07]  
Teq = 384 [39] K  
Rp = 7.82 [2.49] Re  
a = 1.2939 [0.3277] AU  
Ag = 9926.64 [4297.94] [2.31 $\sigma$ ]  
Teffp = 5925 [447] K [12.35 $\sigma$ ]

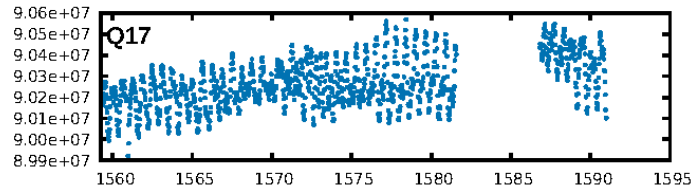
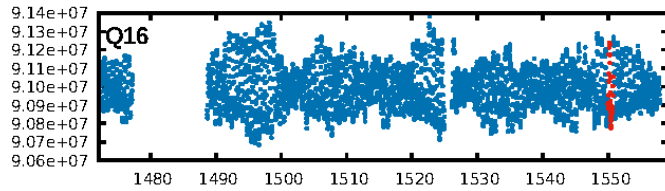
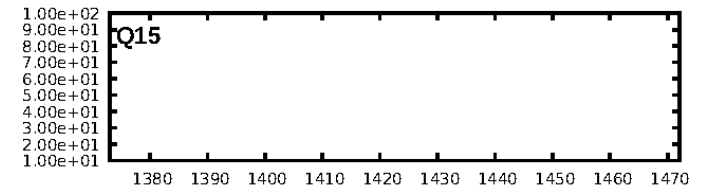
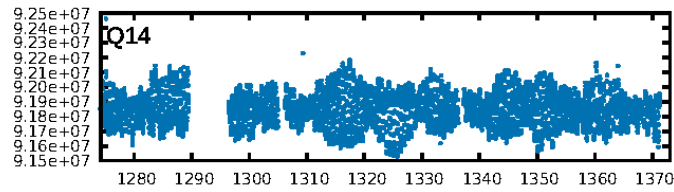
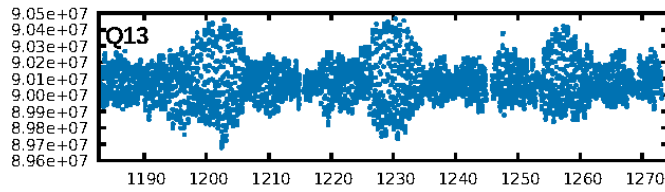
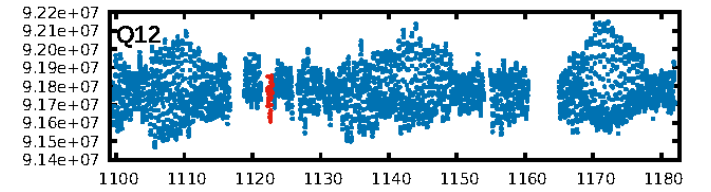
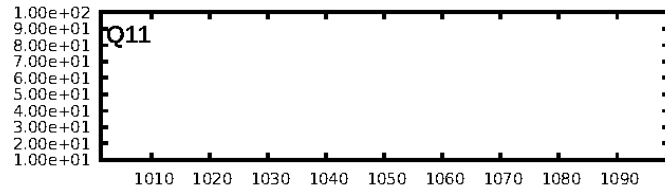
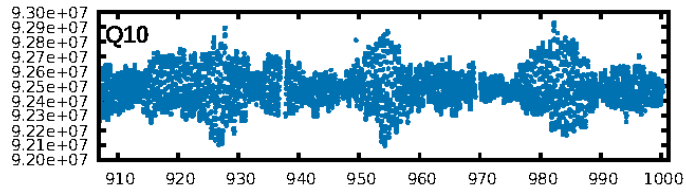
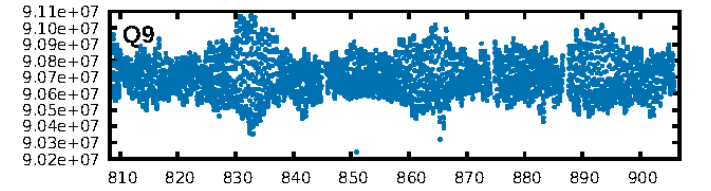
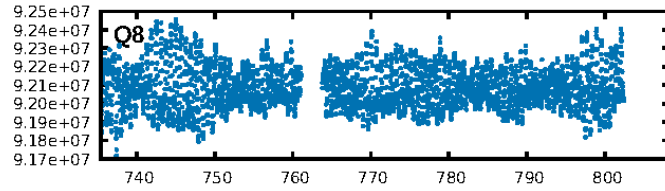
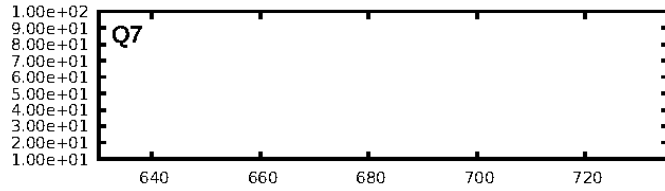
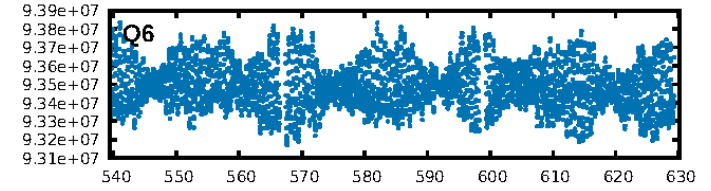
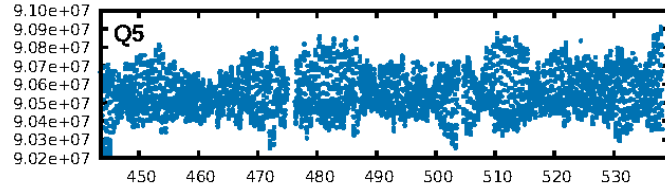
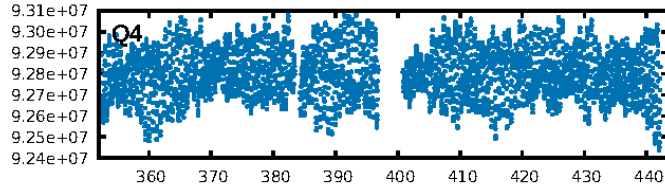
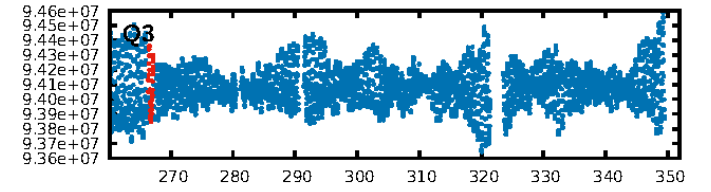
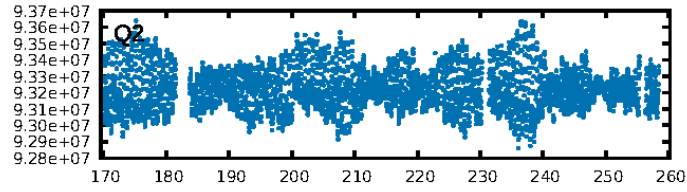
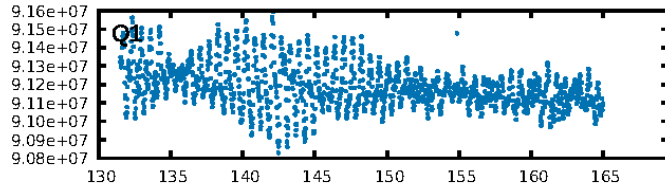
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [251.95 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 87.5%  
ModelChiSquareGof-sig: 100.0%  
**Bootstrap-pfa: 1.28e-08**  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 0.09706  
Centroid-sig: 33.4%  
Centroid-so: 0.389 arcsec [1.32 $\sigma$ ]  
**OotOffset-rm: 1.279 arcsec [5.32 $\sigma$ ]**  
**KicOffset-rm: 1.191 arcsec [4.95 $\sigma$ ]**  
OotOffset-st: 0/0/1/0 [1]  
KicOffset-st: 0/0/1/0 [1]  
DiffImageQuality-fgm: 1.00 [1/1]  
DiffImageOverlap-fno: 0.00 [0/1]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 18:15:51 Z

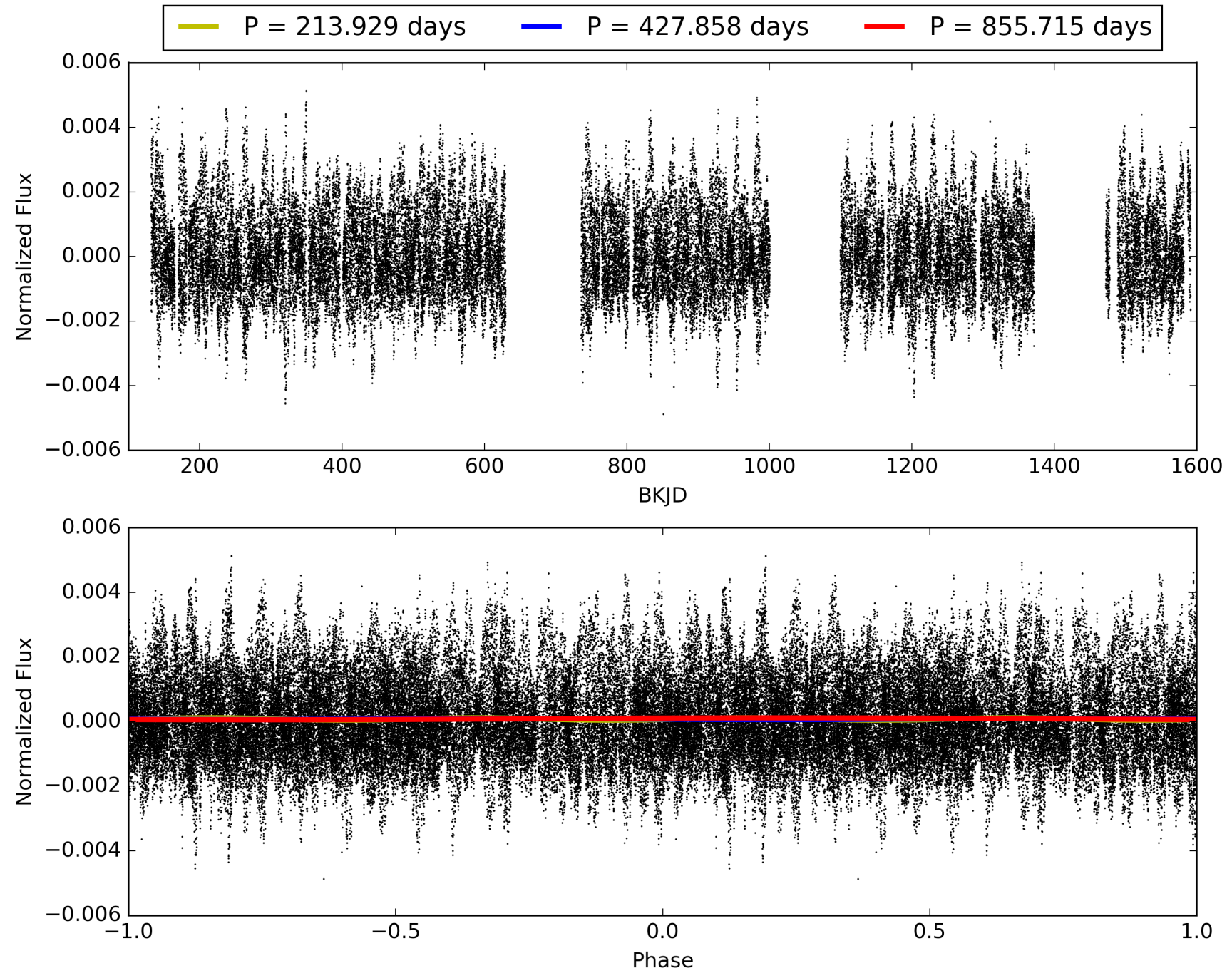
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 009905648-03, PDC Light Curves



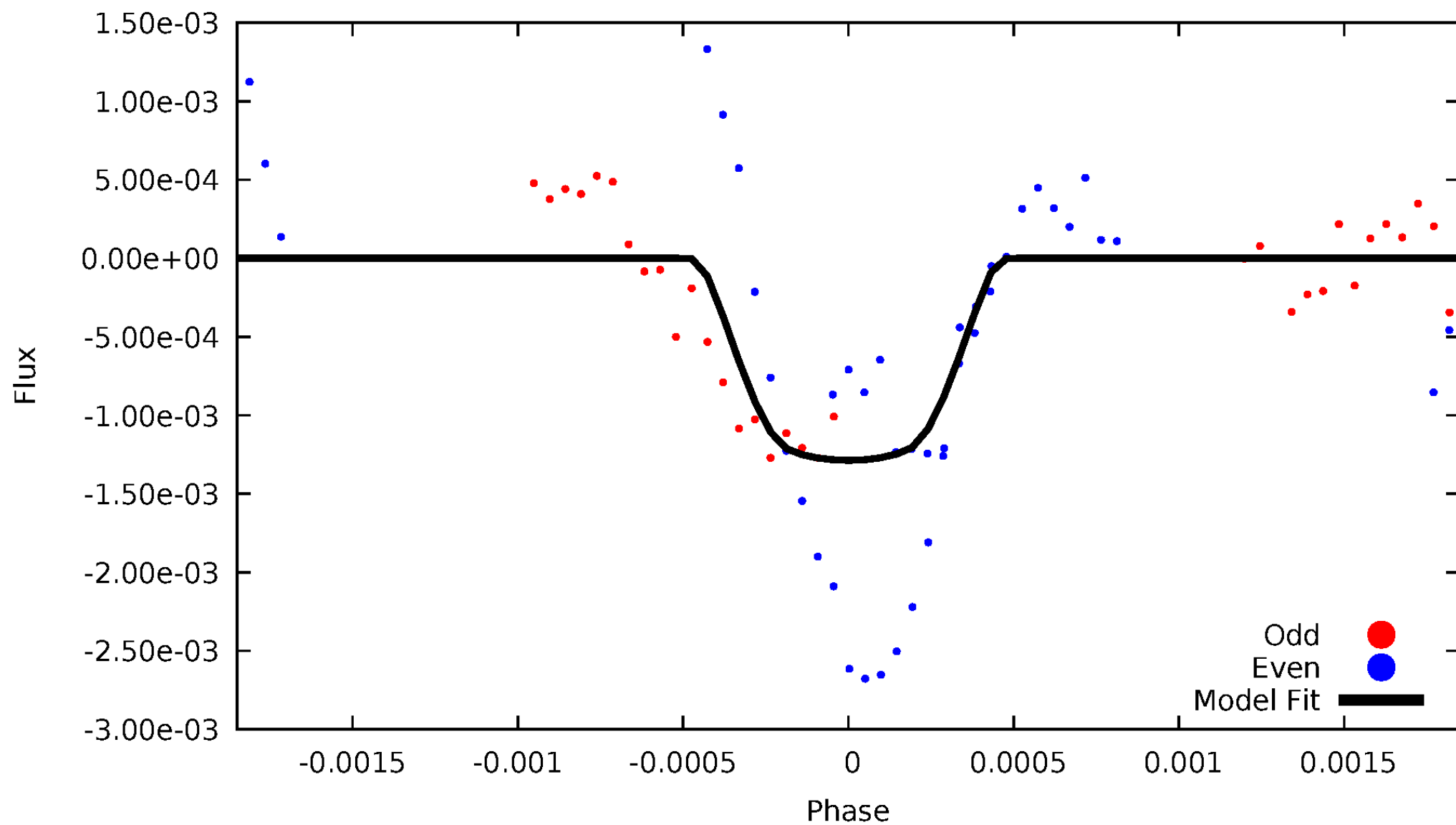


TCE 009905648-03



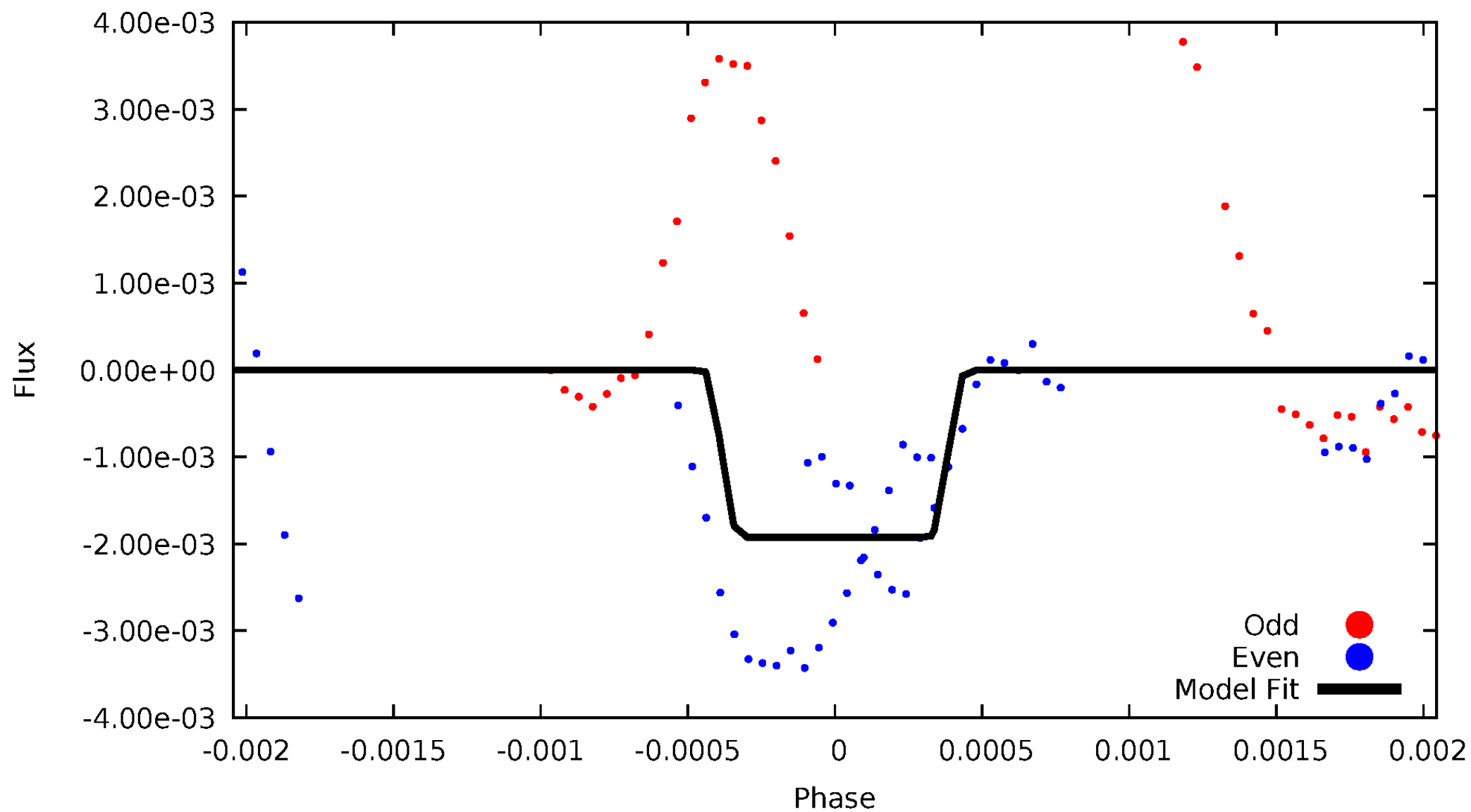
# DV Odd/Even

TCE 009905648-03



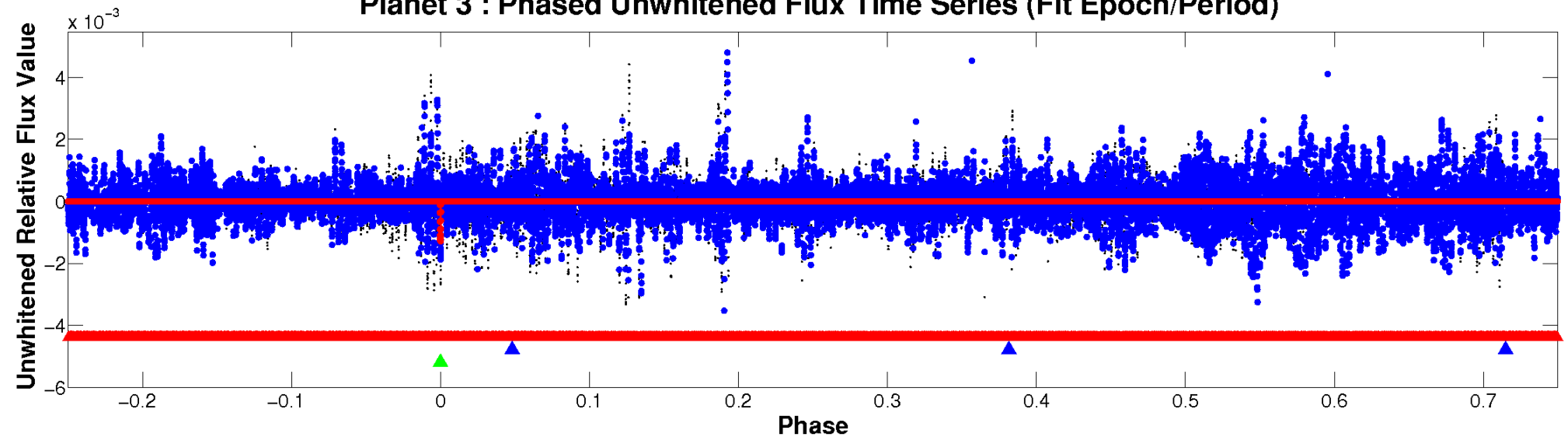
# ALT Odd/Even

TCE 009905648-03

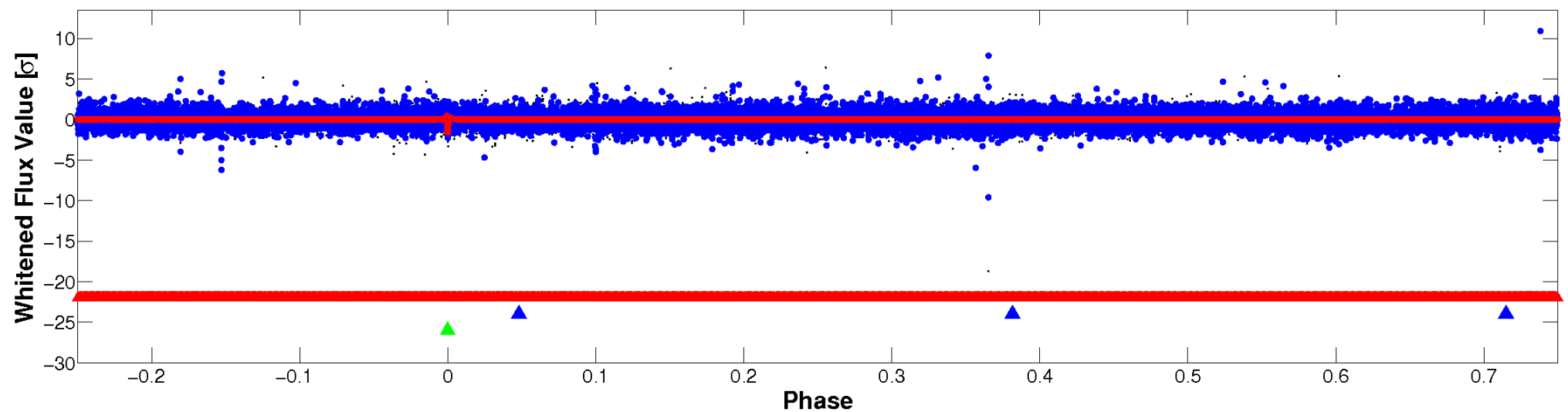


# Non-Whitened Vs. Whitened Light Curve

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

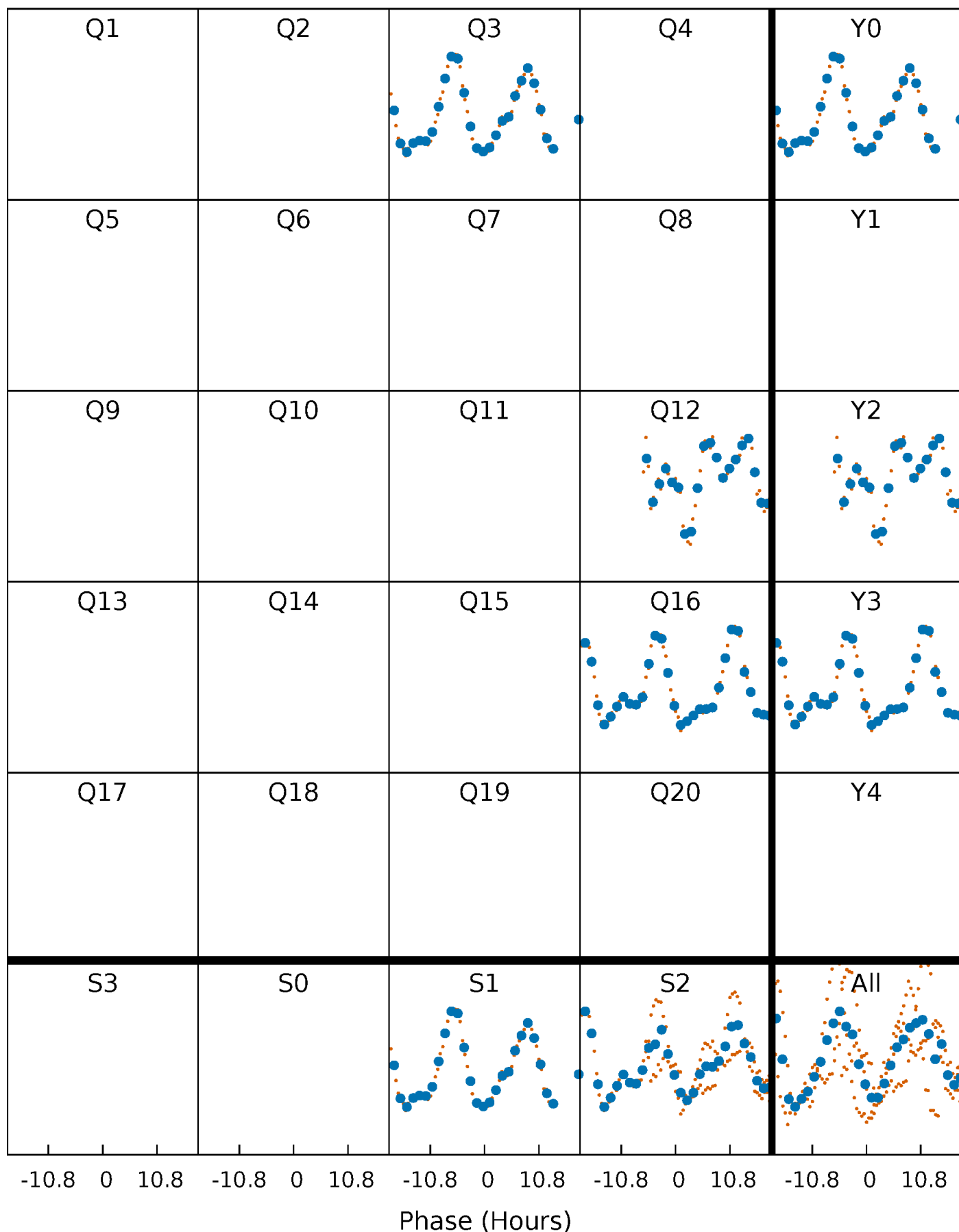


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



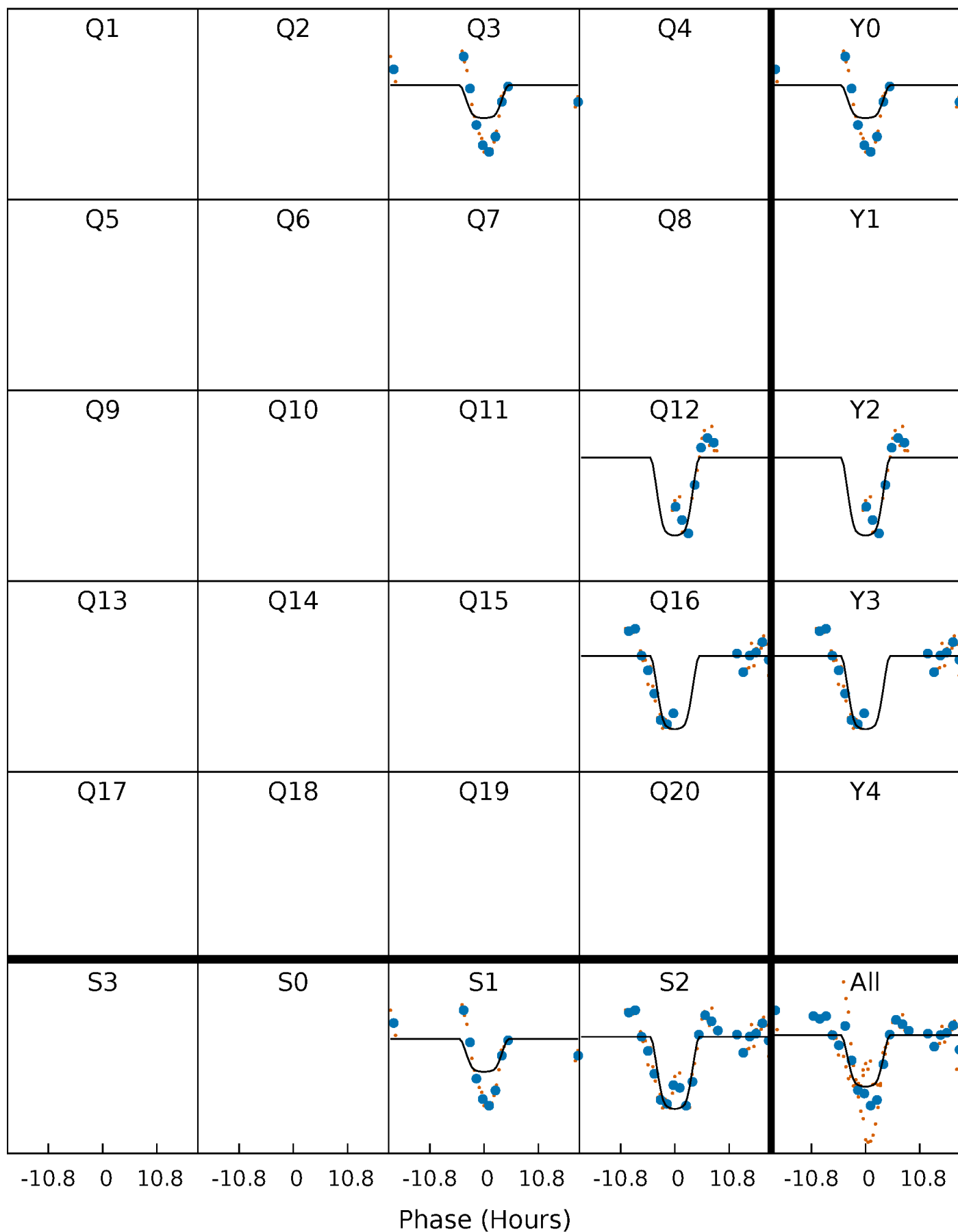
# PDC Quarter-Phased Transit Curves

TCE 009905648-03 P=427.857707 Days  $T_0=266.803130$  (BKJD)



# DV Quarter-Phased Transit Curves

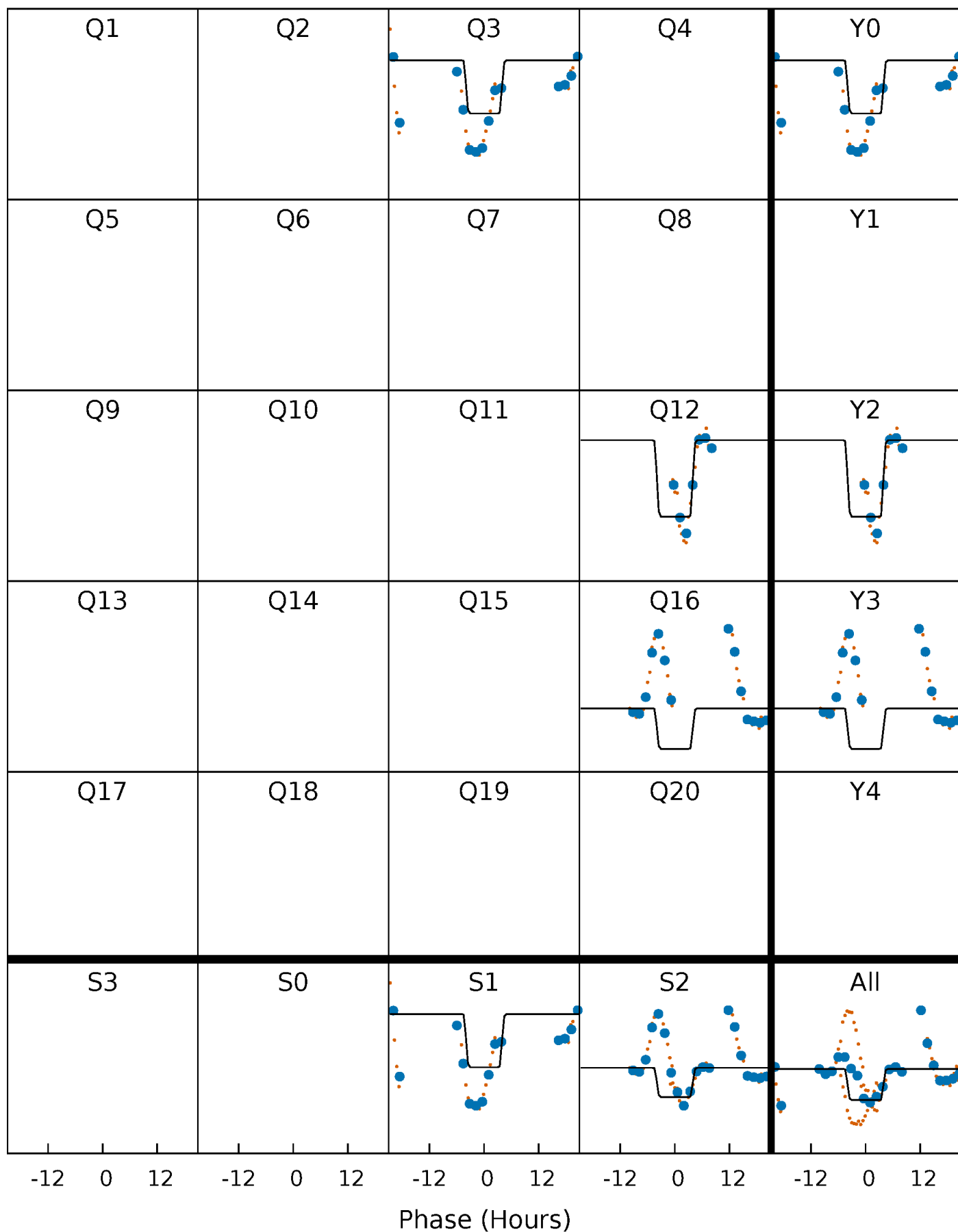
TCE 009905648-03 P=427.857707 Days  $T_0=266.803130$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

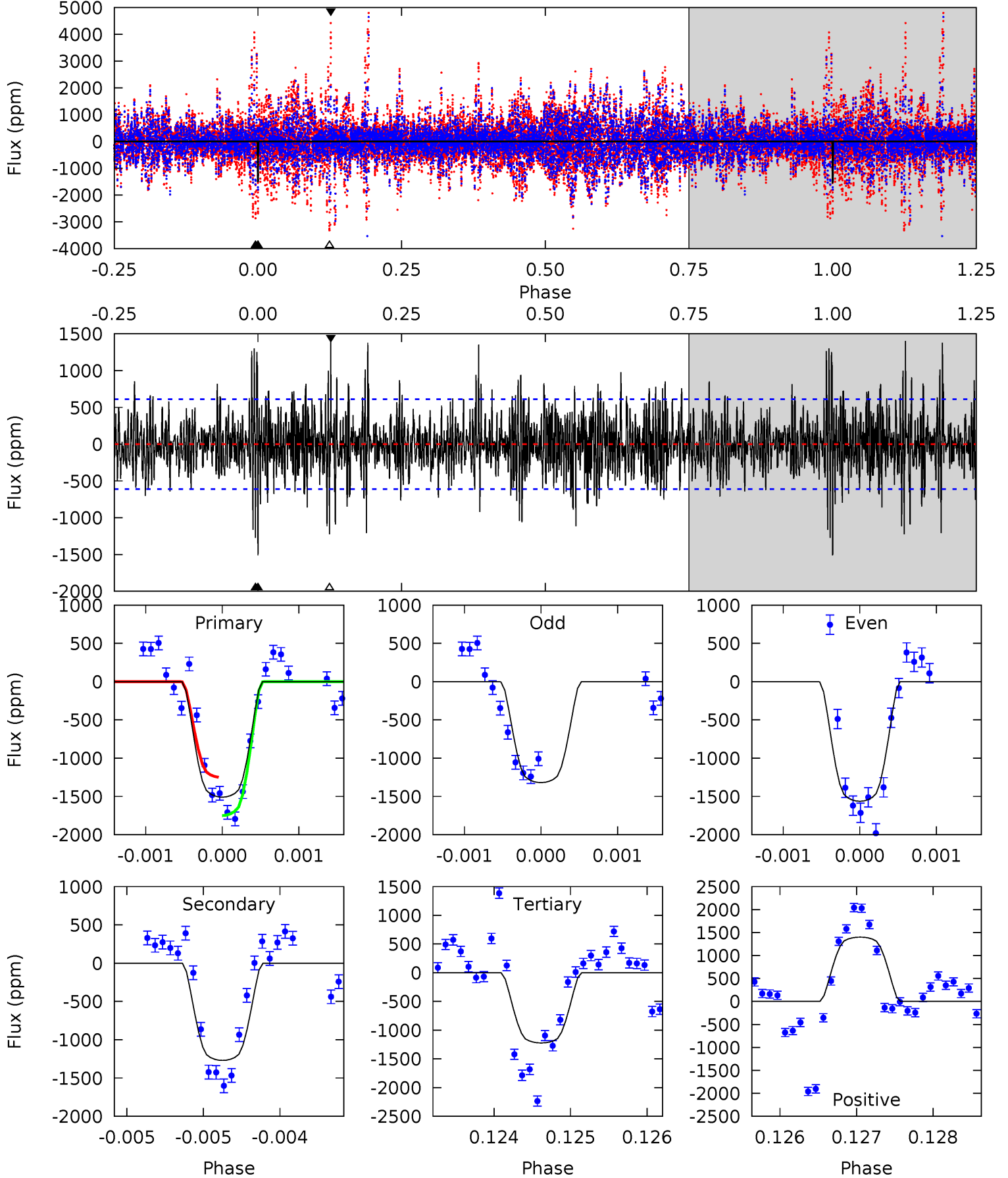
TCE 009905648-03 P=427.844691 Days  $T_0=266.848448$  (BKJD)



# DV Model-Shift Uniqueness Test

009905648-03, P = 427.857707 Days, E = 266.803130 Days

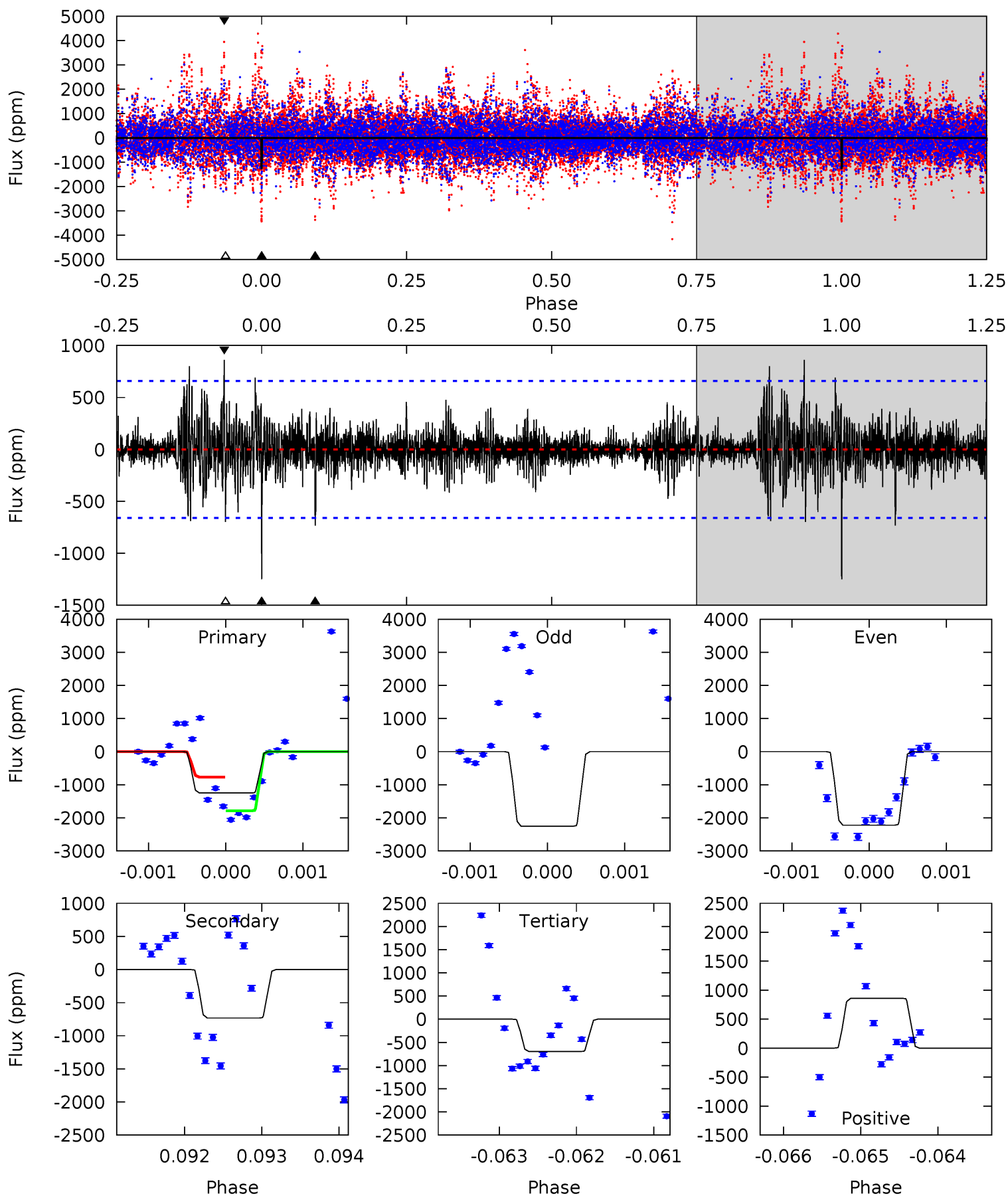
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.5	11.4	10.9	12.5	5.47	3.32	2.90	2.57	0.97	0.42	-1.17	1.05	1.07	0.48	2.23



# Alt Model-Shift Uniqueness Test

009905648-03, P = 427.844691 Days, E = 266.848448 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.4	6.08	5.78	7.15	5.48	3.33	1.16	4.61	3.24	0.30	-1.06	0.11	0.38	0.41	4.21



### Stellar Parameters For KIC 009905648

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$7372^{+231}_{-334}$	$4.124^{+0.128}_{-0.192}$	$-0.020^{+0.200}_{-0.350}$	$1.803^{+0.557}_{-0.371}$	$1.577^{+0.210}_{-0.234}$	$0.379^{+0.277}_{-0.185}$
	+3%/-5%	+3%/-5%	+1000%/-1750%	+31%/-21%	+13%/-15%	+73%/-49%
Source	KIC0	KIC0	KIC0	DSEP		

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

### Secondary Eclipse Parameters for KIC 009905648-03 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-1270 \pm 112$	$7.94^{+1.27}_{-1.16}$	$540^{+43}_{-37}$	$6933^{+436}_{-420}$	$18621^{+6333}_{-5103}$
Alt.	$-732 \pm 120$	$8.73^{+1.58}_{-1.22}$	$537^{+44}_{-35}$	$5704^{+336}_{-330}$	$8727^{+3357}_{-2636}$

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

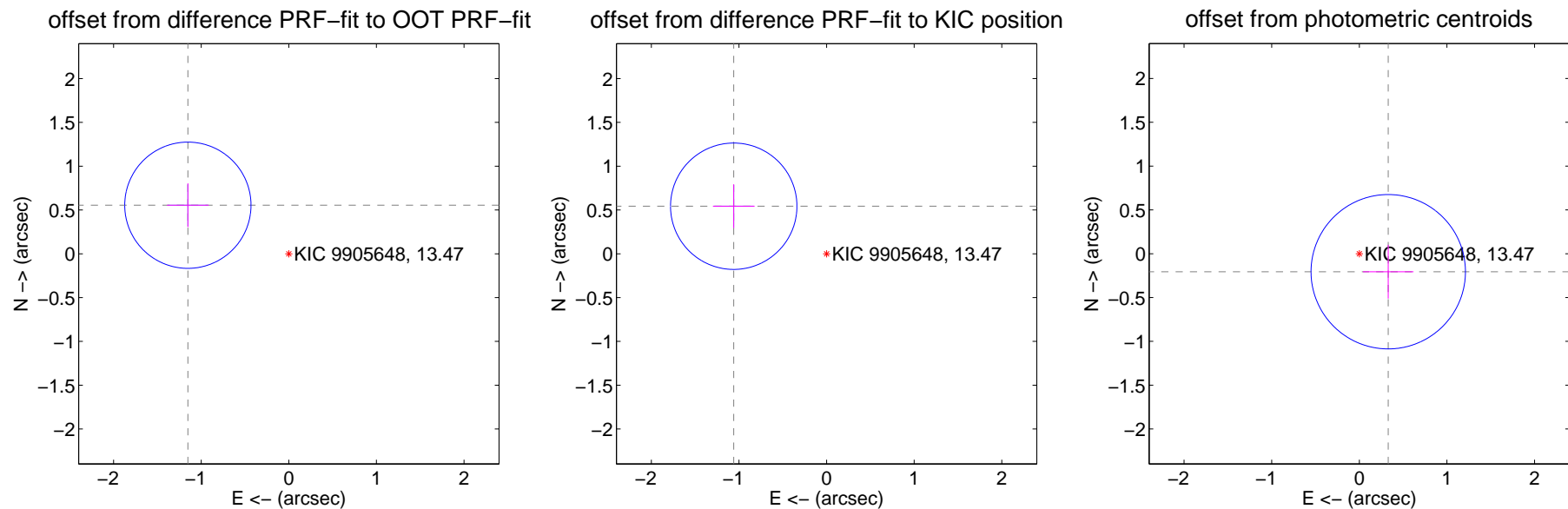
## DV Centroid Data

Supplemental centroid analysis for 009905648-03. Kepler magnitude: 13.47. Transit SNR 7.24

There are 1 quarters with good PRF difference image offsets

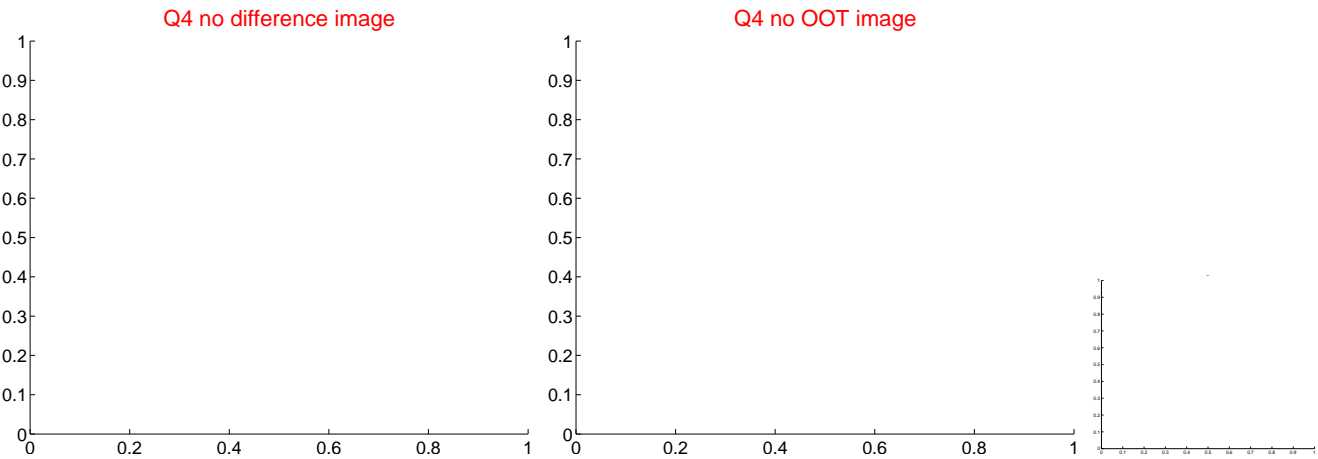
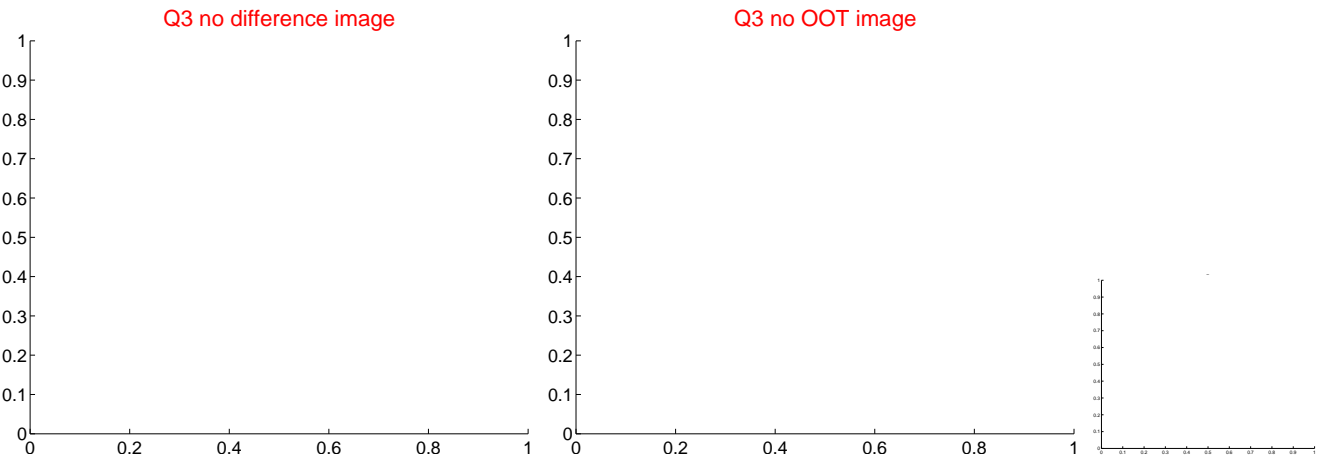
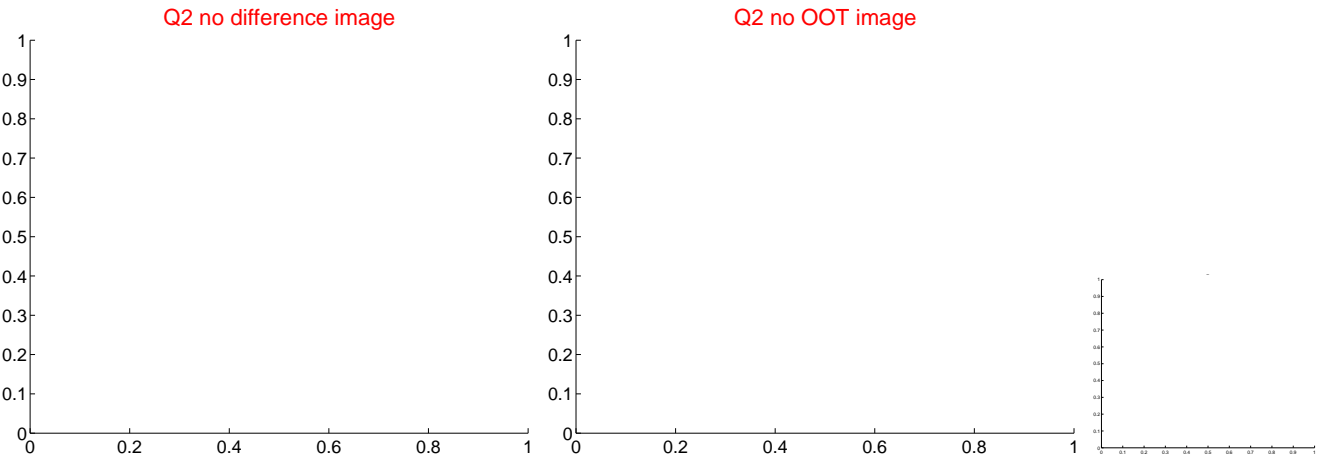
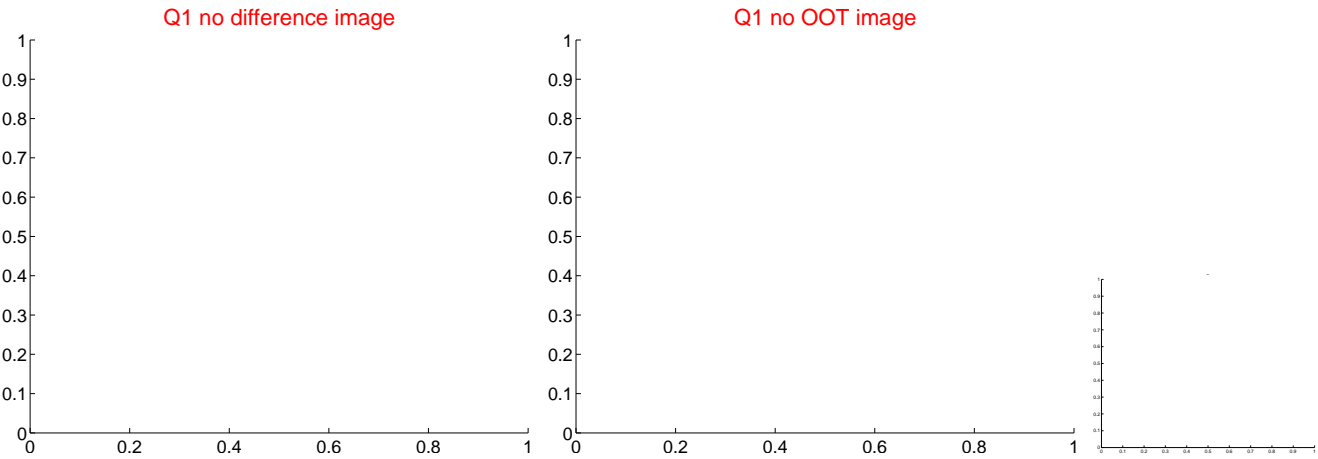
The direct PRF centroid is offset from the target star catalog position by about 0.09 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.279 \pm 0.240$	5.32	$1.152 \pm 0.238$	$0.554 \pm 0.250$
PRF-fit source offset from KIC position	$1.191 \pm 0.240$	4.95	$1.060 \pm 0.238$	$0.543 \pm 0.250$
photometric centroid source offset	$0.39 \pm 0.29$	1.32	$-0.33 \pm 0.29$	$-0.21 \pm 0.31$



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.





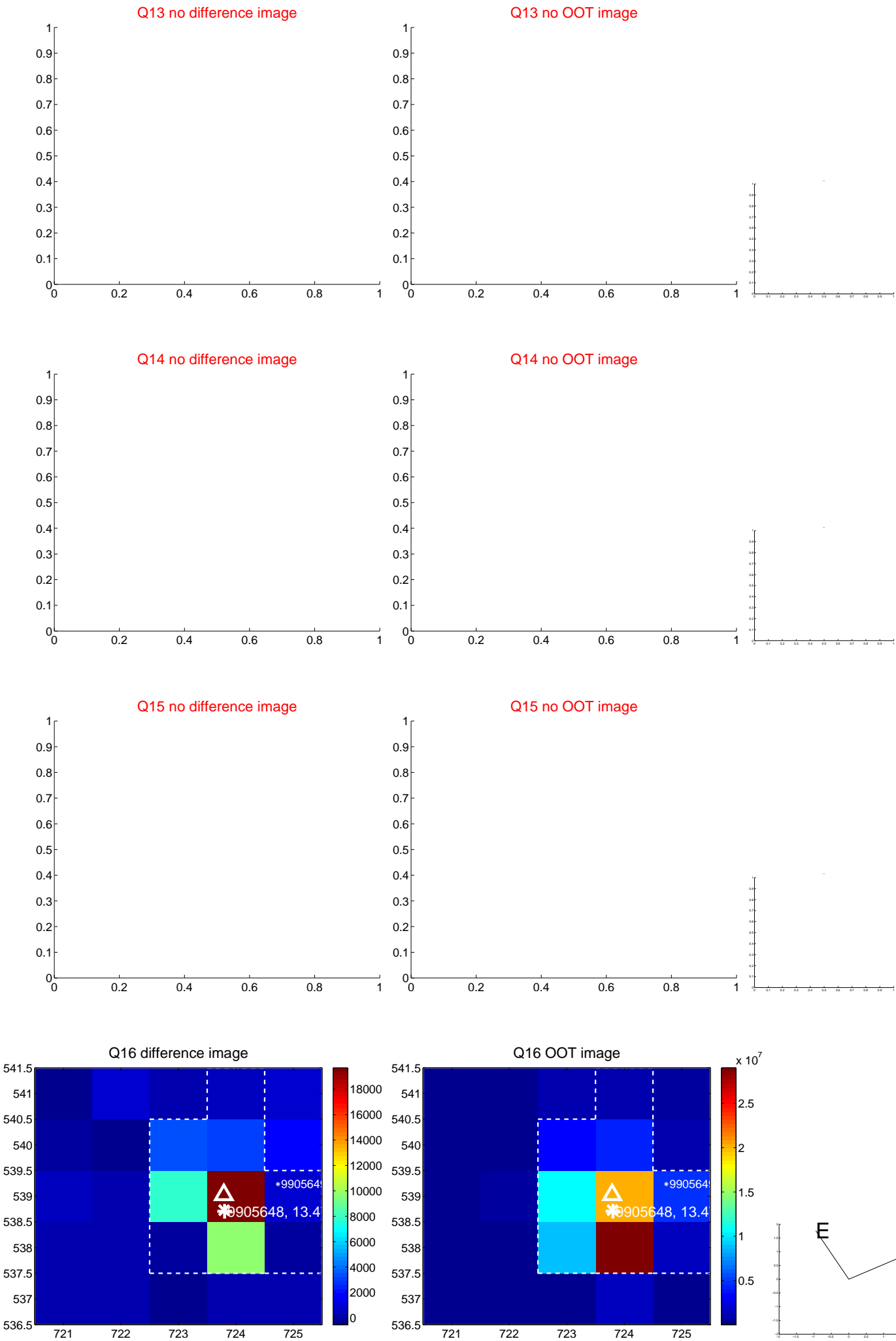
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



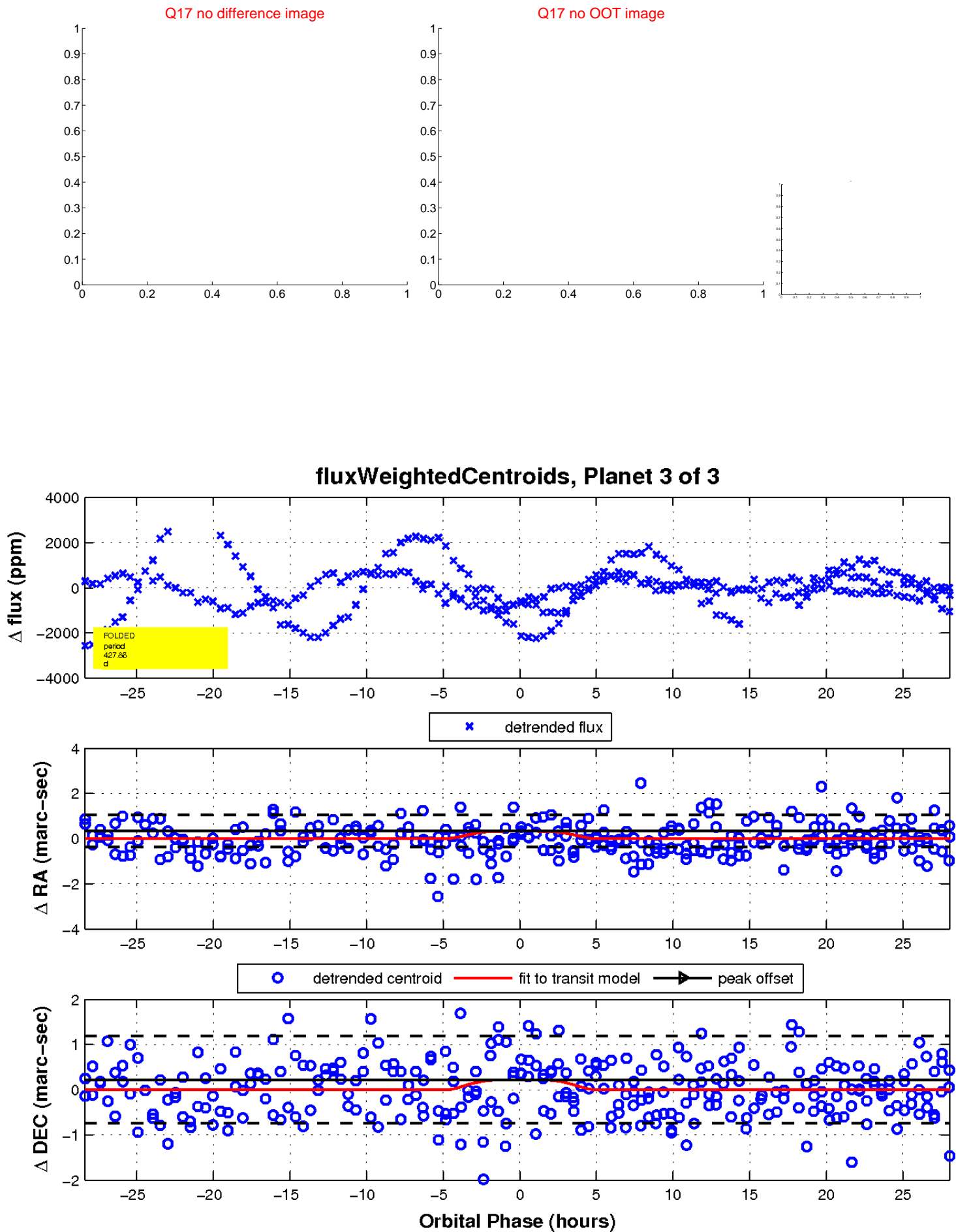
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



white ×: 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.



UKIRT Image

Declination

