

# KIC 005194220

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005194220-01	OBS	No	0.774367	132.081398	59.3	1.905	7.8	7.9	0.91	5233	0.85	2184.68
005194220-02	OBS	No	0.774371	131.693491	64.5	1.852	8.0	8.9	0.91	5233	0.89	2184.66

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005194220-01	OBS	FP	0.00	1	0	1	0	LPP_DV—CENT_RESOLVED_OFFSET—HALO_GHOST
005194220-02	OBS	FP	0.00	1	0	1	0	SAME_NTL_PERIOD—CENT_RESOLVED_OFFSET

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

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

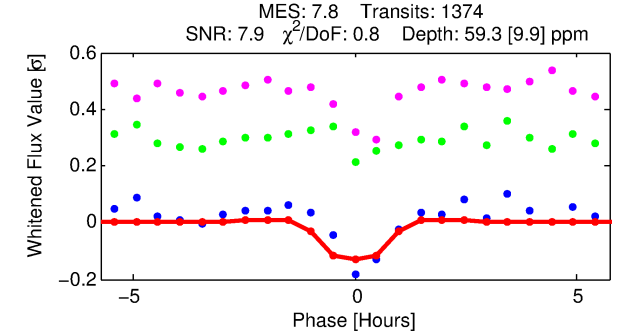
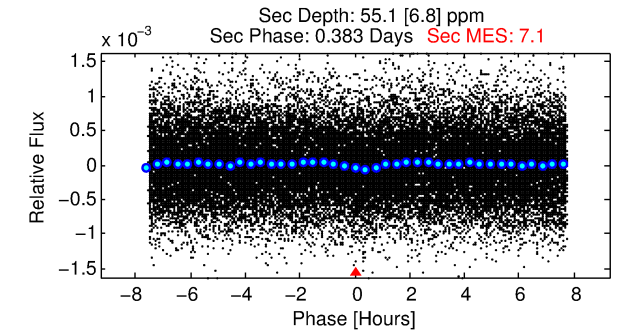
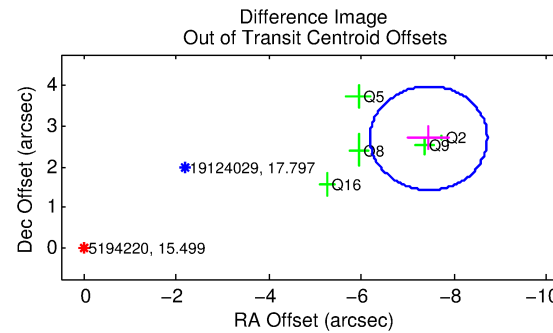
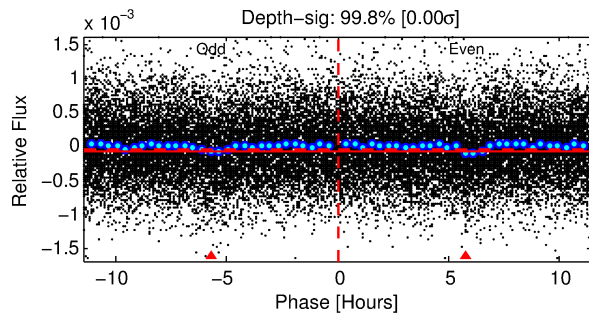
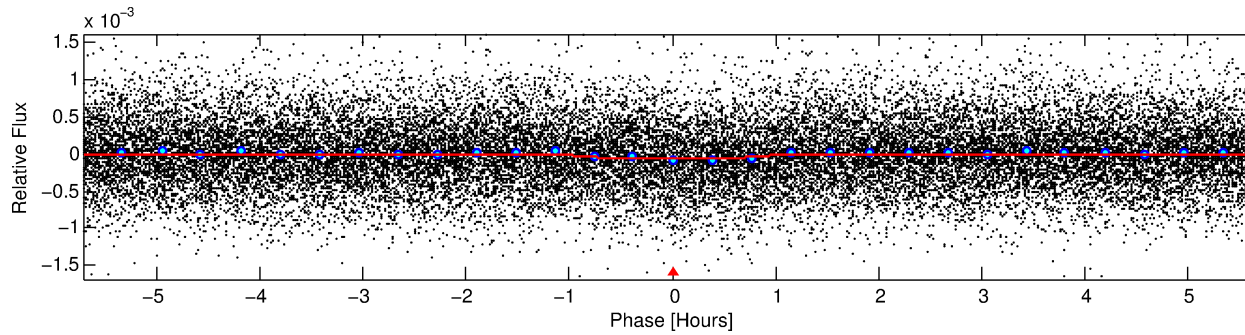
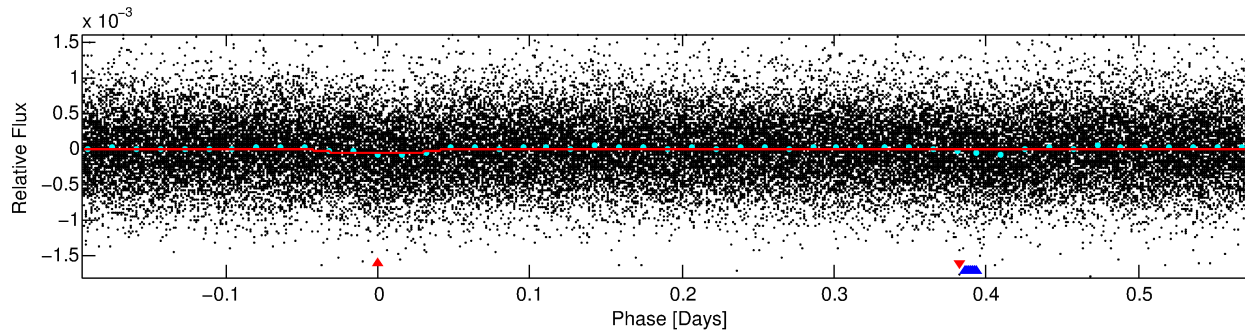
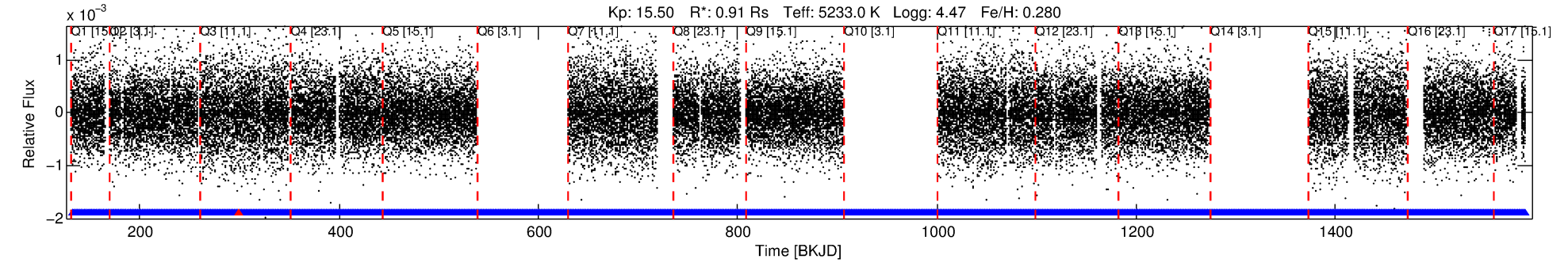
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 005194220-01

No Significant Match Found

# DV One-Page Summary

KIC: 5194220 Candidate: 1 of 2 Period: 0.774 d



## DV Fit Results:

Period = 0.77437 [0.00001] d  
Epoch = 132.0814 [0.0034] BKJD  
Rp/R\* = 0.0086 [0.0079]  
a/R\* = 1.70 [4.21]  
b = 0.90 [0.83]  
Seff = 2184.68 [556.71]  
Teq = 1743 [111] K  
Rp = 0.85 [0.79] Re  
a = 0.0159 [0.0024] AU  
Ag = 10.65 [19.79] [0.49σ]  
Teffp = 4869 [2251] K [1.39σ]

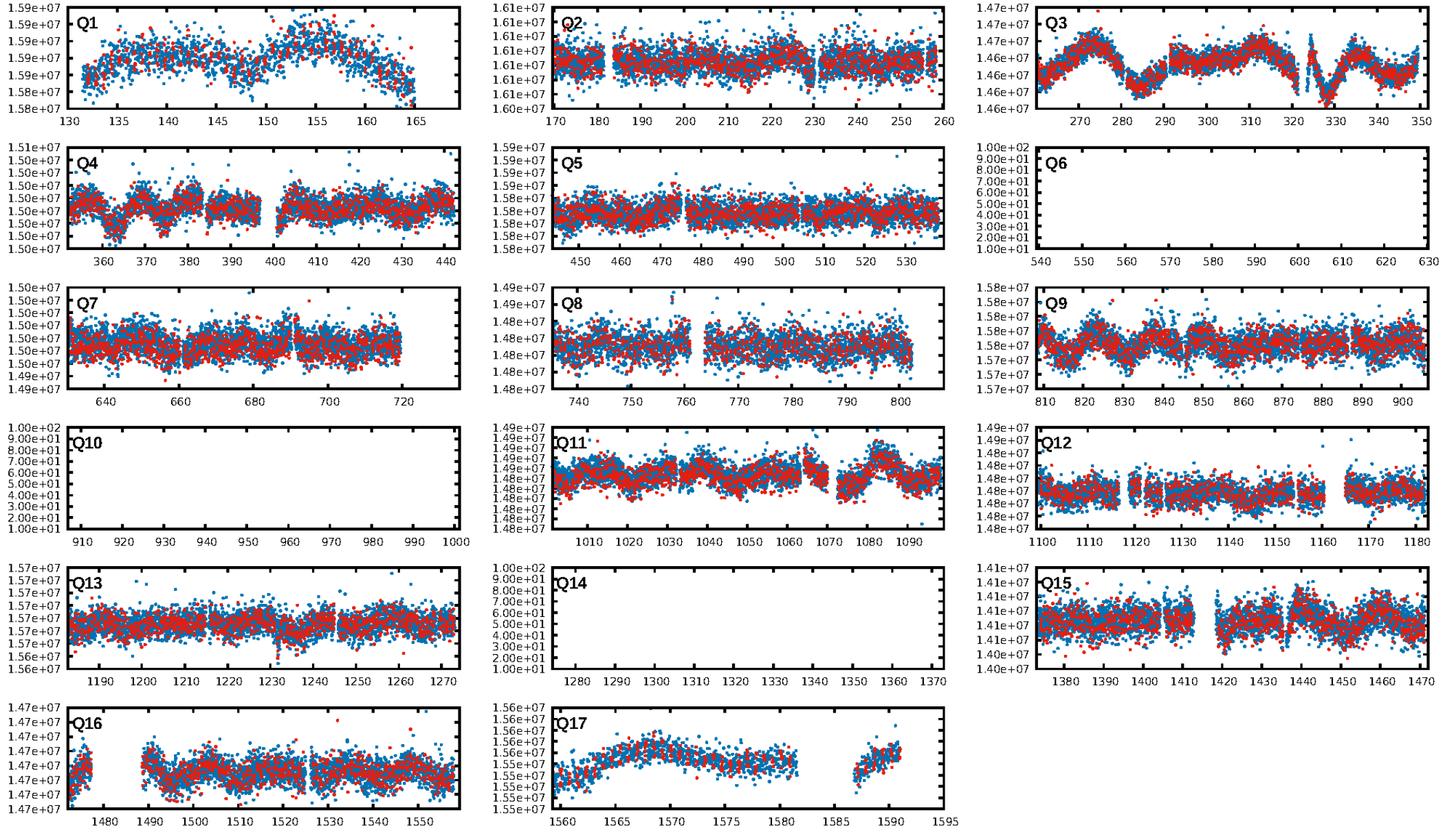
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.0% [0.00σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 2.36e-16  
RollingBand-fgt: 1.00 [1295/1296]  
GhostDiagnostic-chr: -0.002216  
Centroid-sig: 0.0%  
Centroid-so: 9.965 arcsec [5.29σ]  
OotOffset-rm: 7.926 arcsec [18.71σ]  
KicOffset-rm: 8.094 arcsec [17.02σ]  
OotOffset-st: 1/0/2/2 [5]  
KicOffset-st: 1/0/2/2 [5]  
DiffImageQuality-fgm: 1.00 [5/5]  
DiffImageOverlap-fno: 1.00 [14/14]

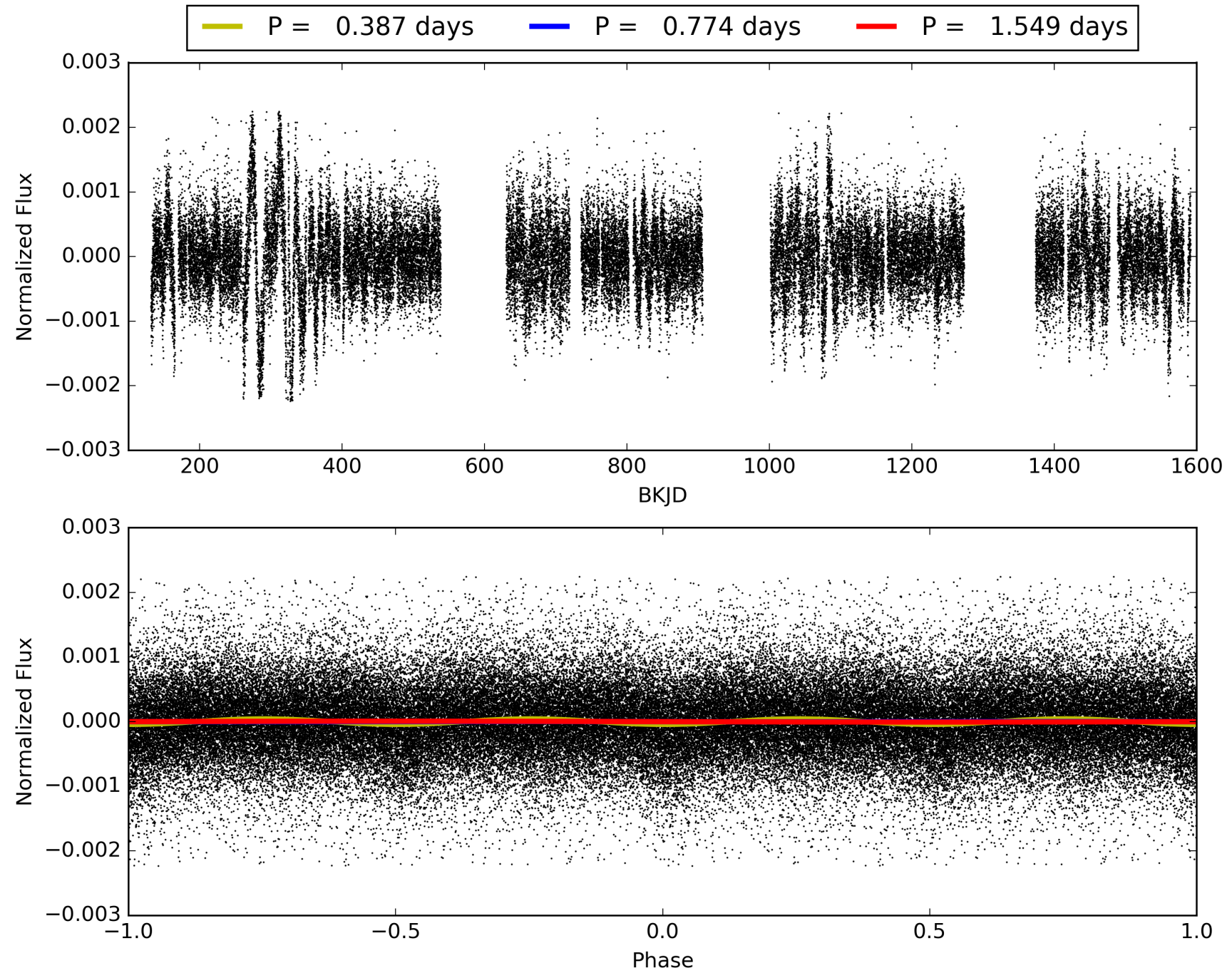
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 16:35:11 Z

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

# TCE 005194220-01, PDC Light Curves



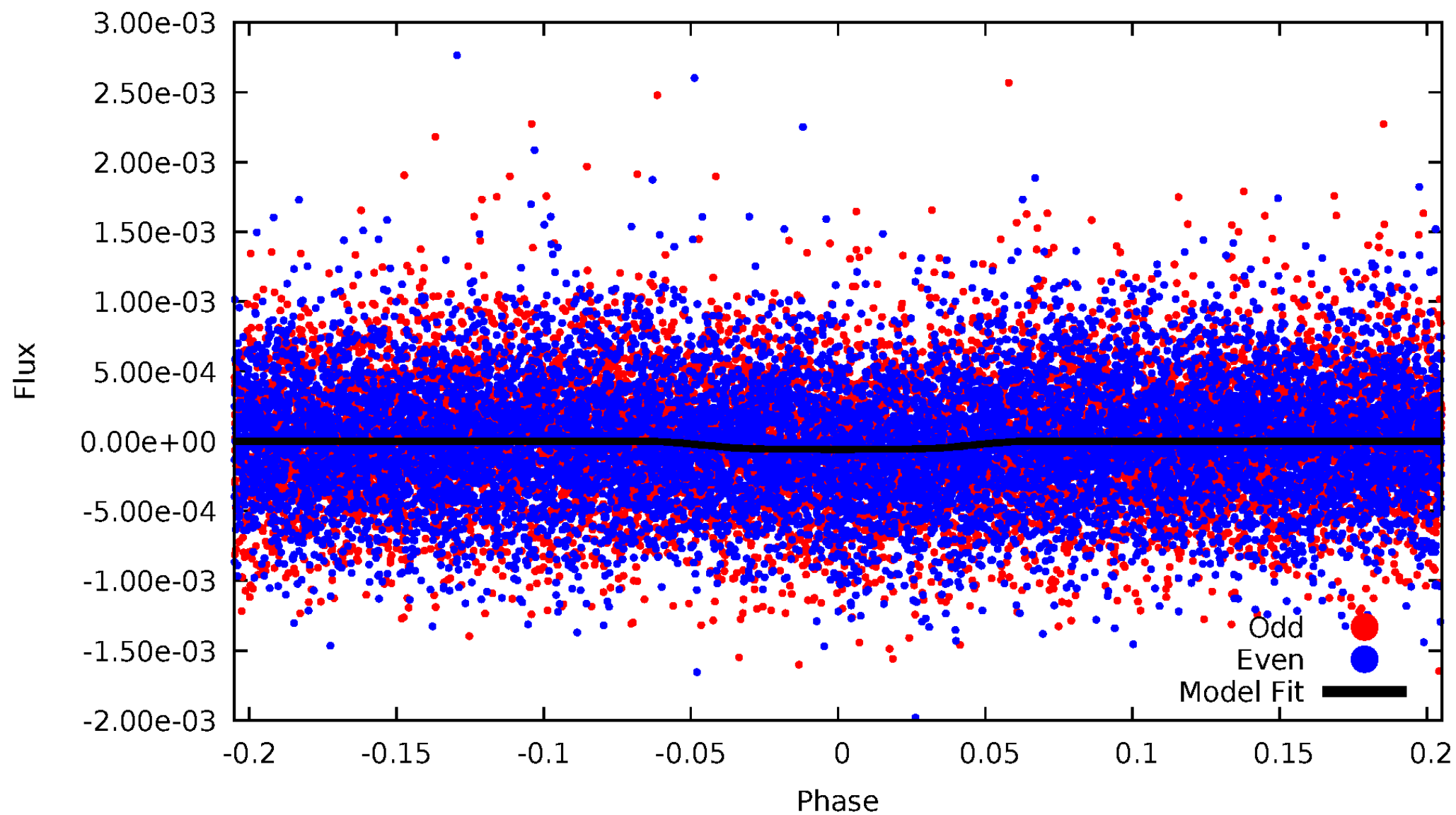
TCE 005194220-01





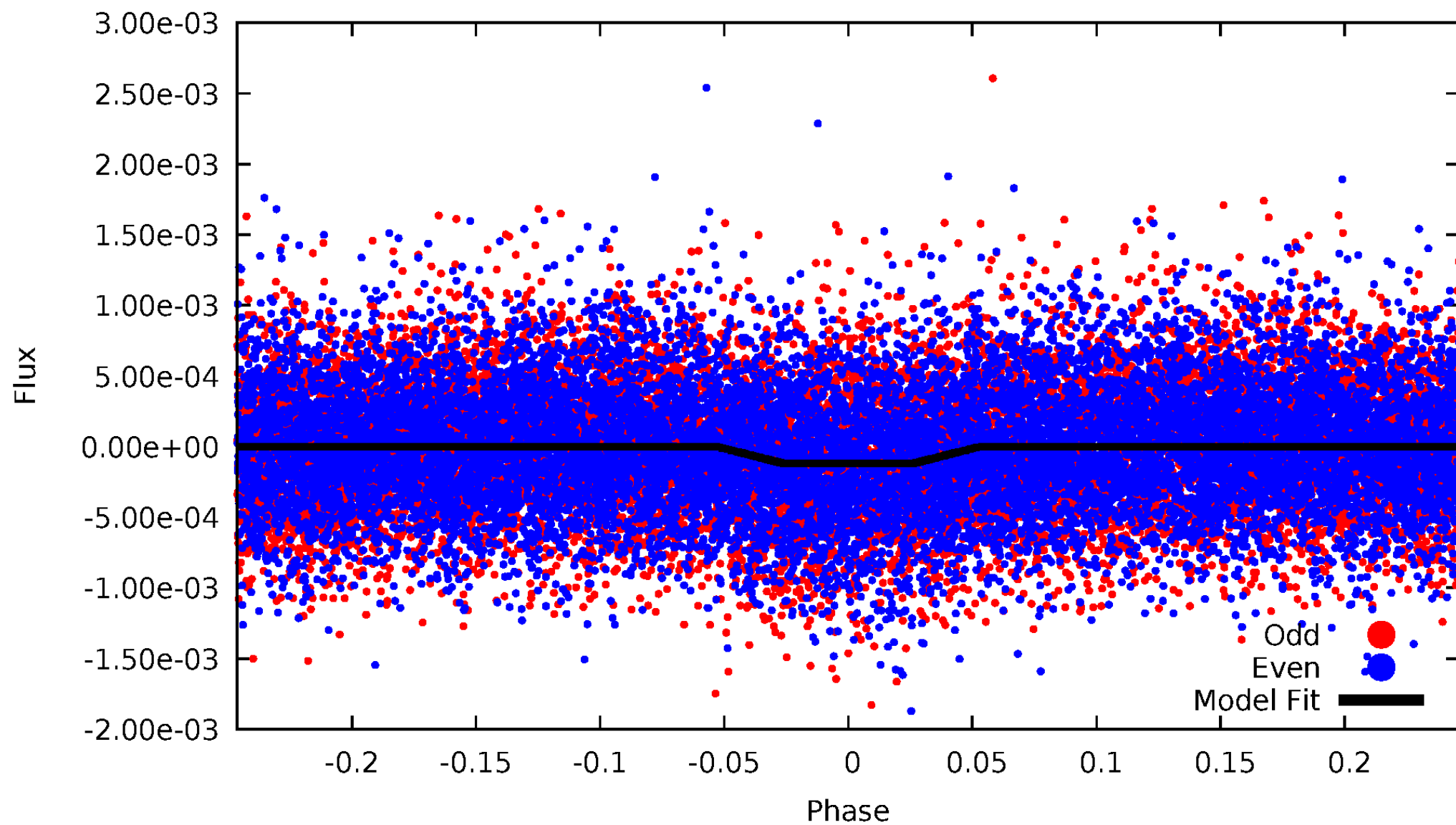
# DV Odd/Even

TCE 005194220-01

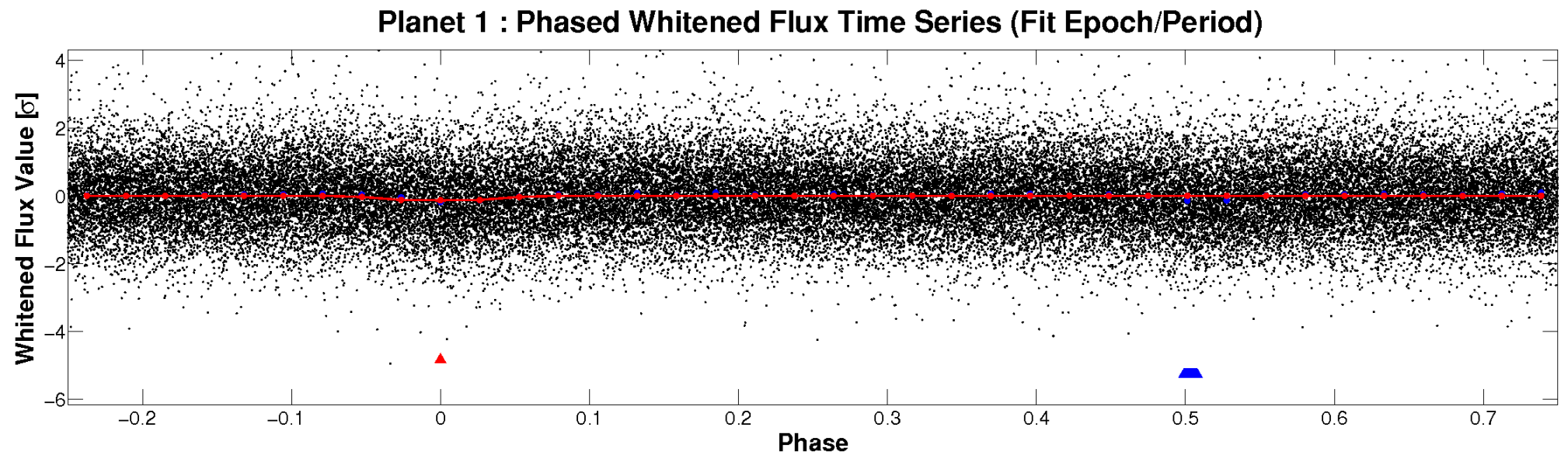
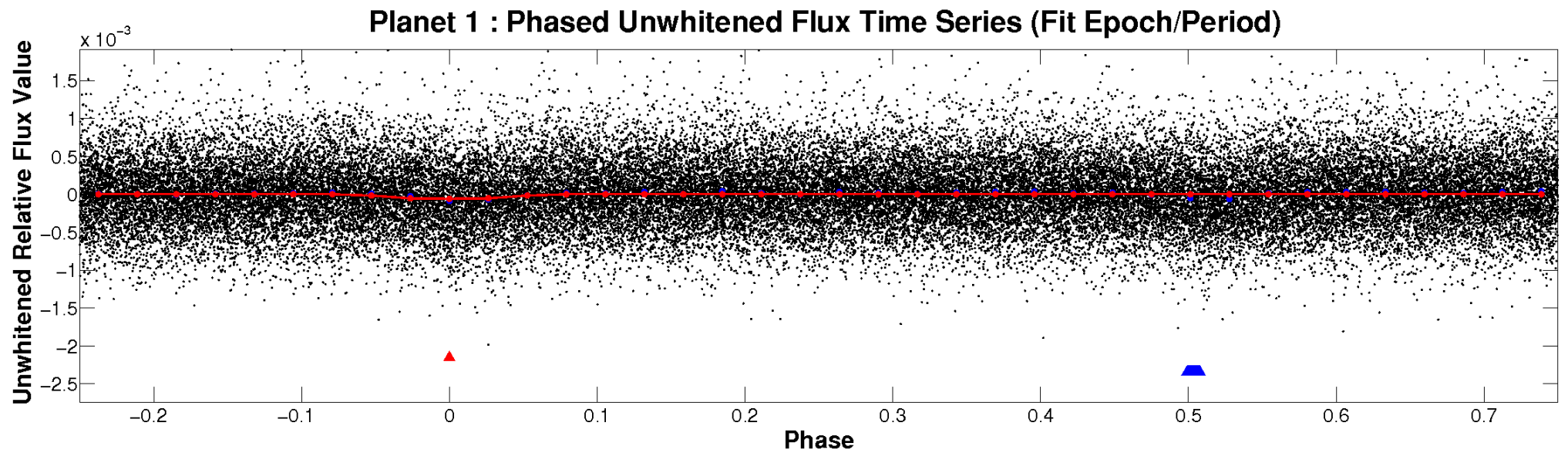


# ALT Odd/Even

TCE 005194220-01

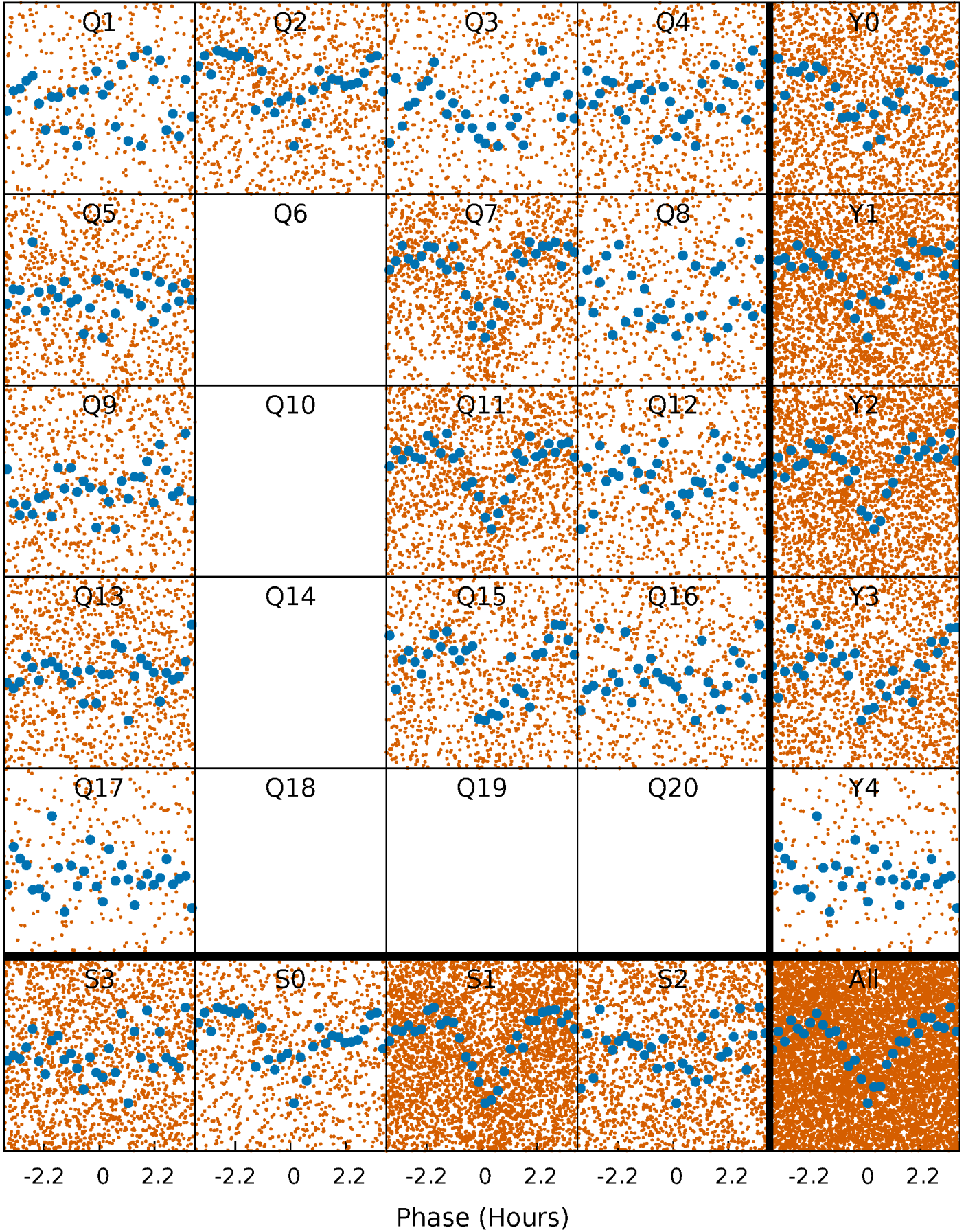


# Non-Whitened Vs. Whitened Light Curve



# PDC Quarter-Phased Transit Curves

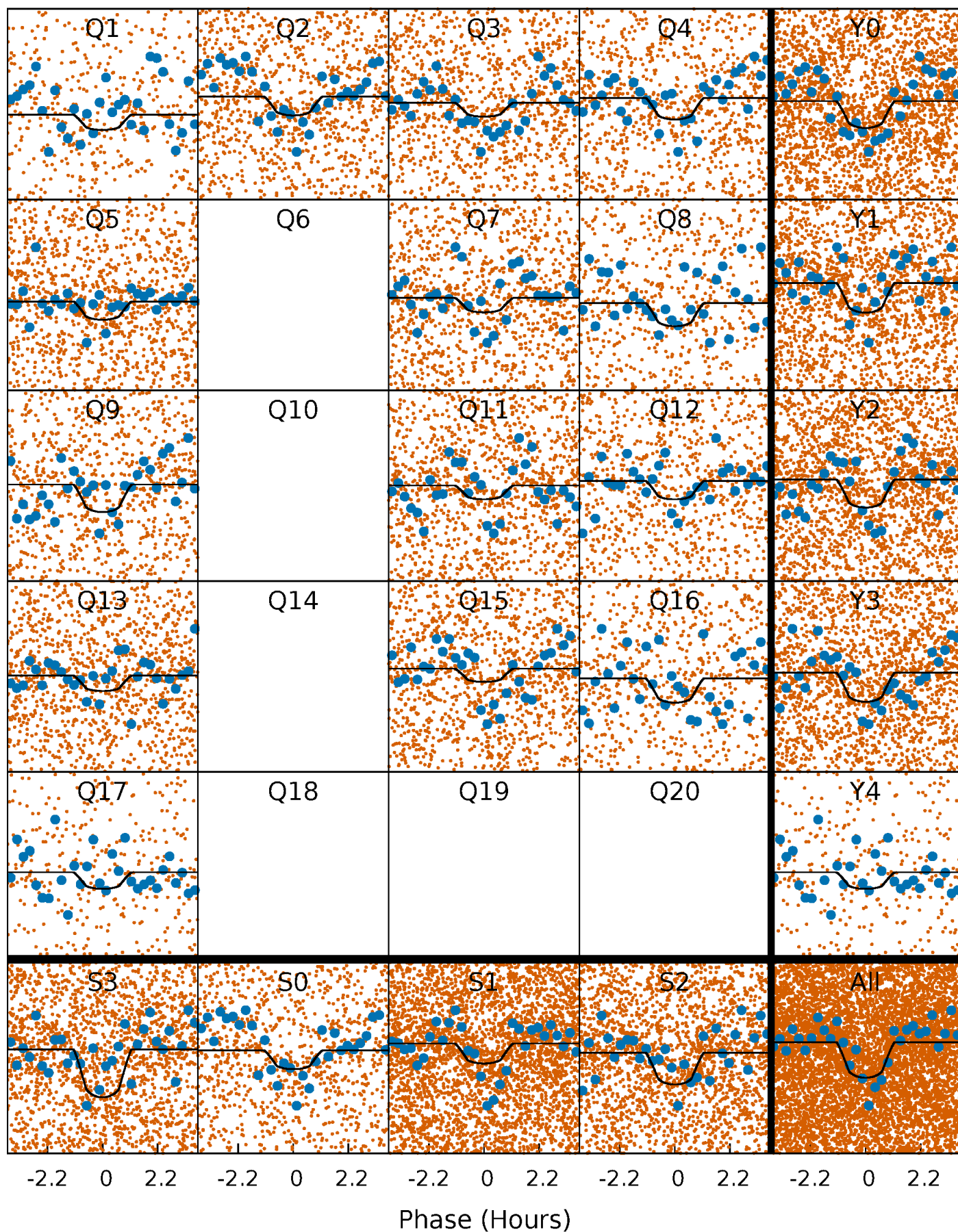
TCE 005194220-01 P= 0.774367 Days  $T_0=132.081398$  (BKJD)





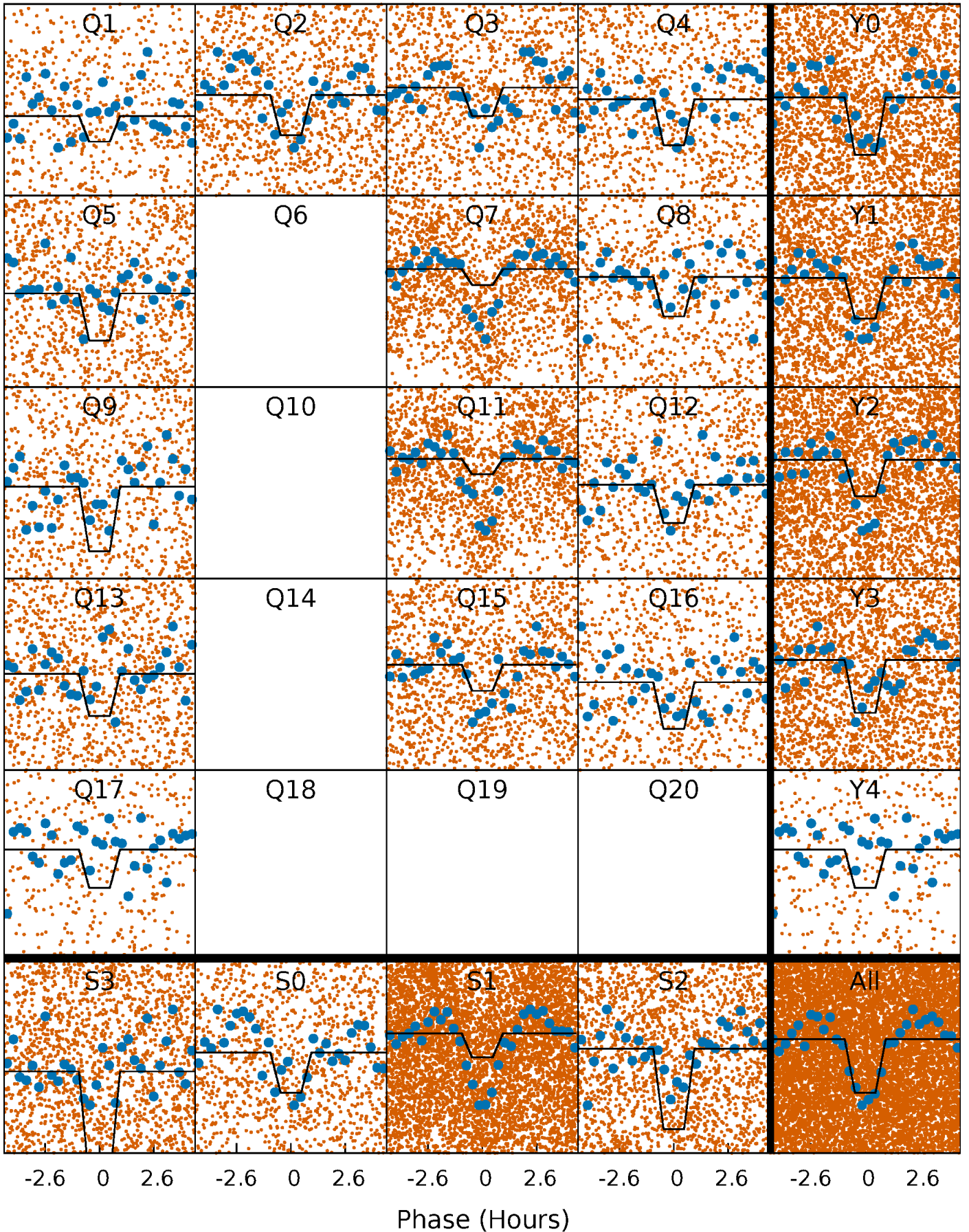
# DV Quarter-Phased Transit Curves

TCE 005194220-01 P= 0.774367 Days  $T_0=132.081398$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

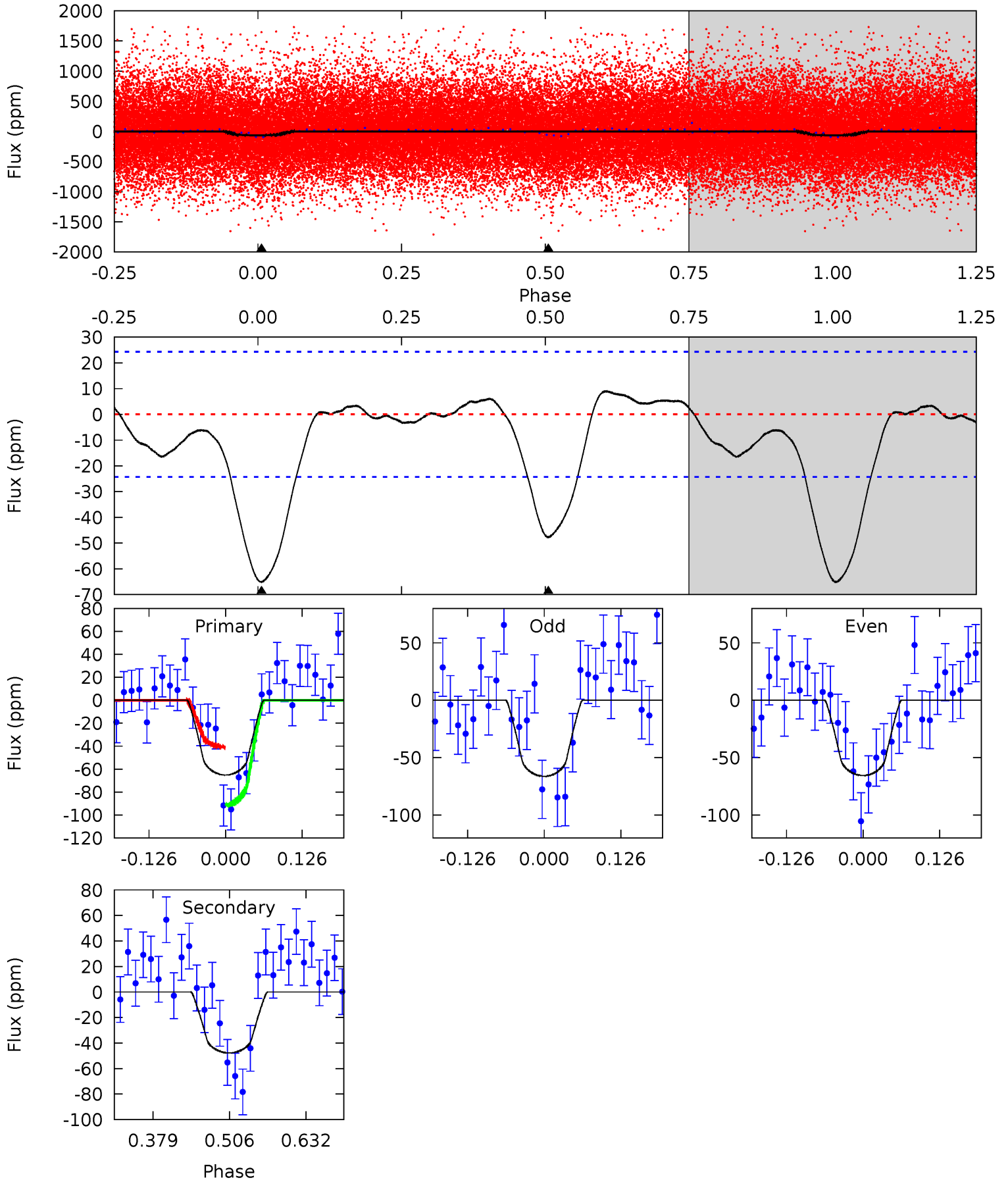
TCE 005194220-01   P= 0.774379 Days    $T_0=132.079047$  (BKJD)



# DV Model-Shift Uniqueness Test

005194220-01, P = 0.774367 Days, E = 131.307031 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
12.1	8.86	0	0	4.52	1.53	1.20	12.1	12.1	8.86	8.86	0.07	1.14	0.12	4.70

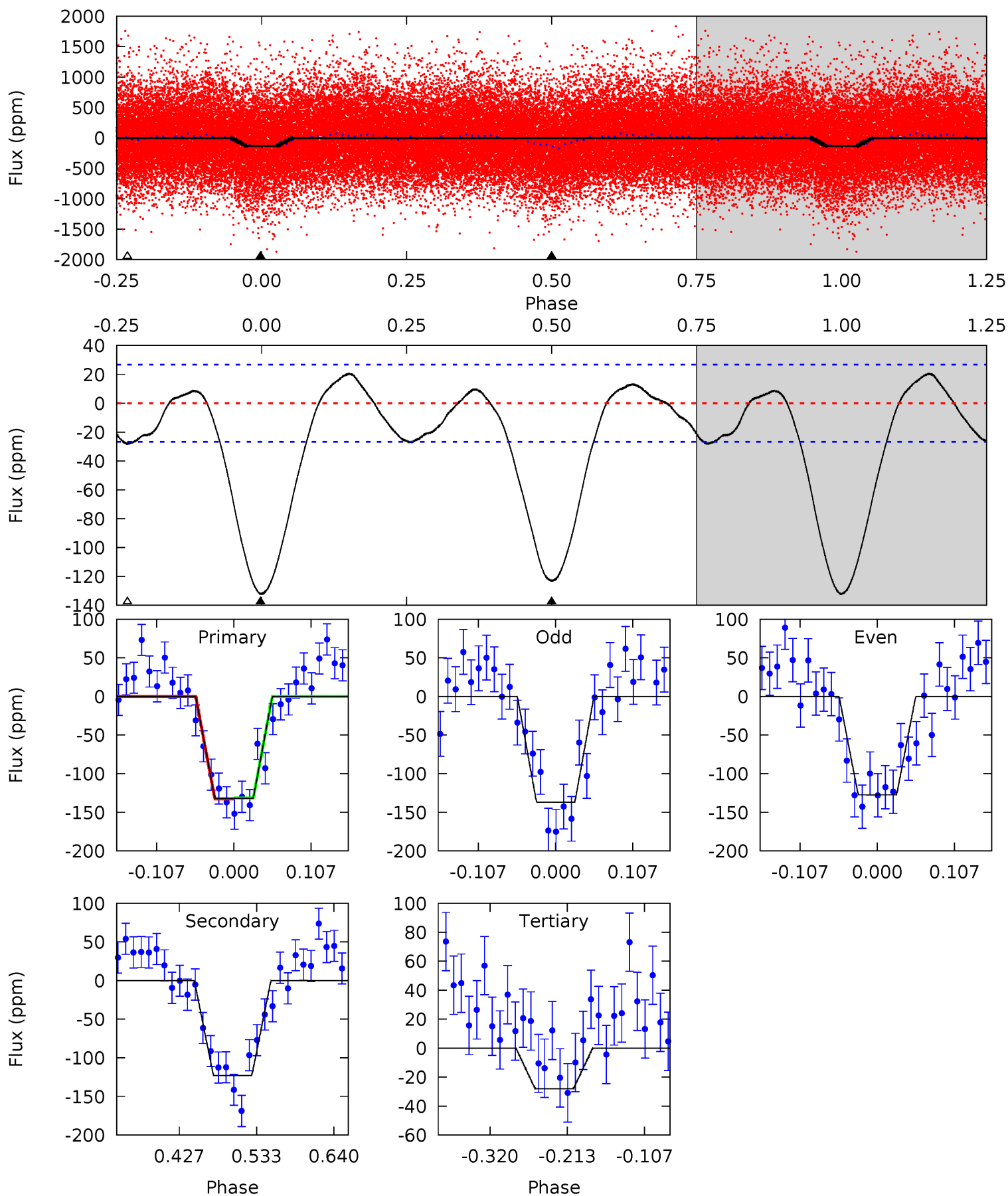




# Alt Model-Shift Uniqueness Test

005194220-01, P = 0.774379 Days, E = 131.304668 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
22.4	20.9	4.76	0	4.55	1.61	2.43	17.7	22.4	16.1	20.9	0.79	1.23	0.13	0.10





### Stellar Parameters For KIC 005194220

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M(M_{\odot})$	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5233^{+173}_{-157}$	$4.474^{+0.080}_{-0.120}$	$0.280^{+0.150}_{-0.300}$	$0.906^{+0.158}_{-0.097}$	$0.890^{+0.068}_{-0.068}$	$1.686^{+0.570}_{-0.594}$
	+3%/-3%	+2%/-3%	+54%/-107%	+17%/-11%	+8%/-8%	+34%/-35%
Source	PHO1	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 005194220-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-48 \pm 5$	$0.99^{+0.76}_{-0.63}$	$2453^{+125}_{-121}$	$4438^{+2792}_{-844}$	$6.596^{+44.872}_{-4.413}$
Alt.	$-123 \pm 6$	$1.19^{+0.83}_{-0.66}$	$2446^{+124}_{-105}$	$5035^{+2394}_{-972}$	$12^{+49}_{-8}$

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

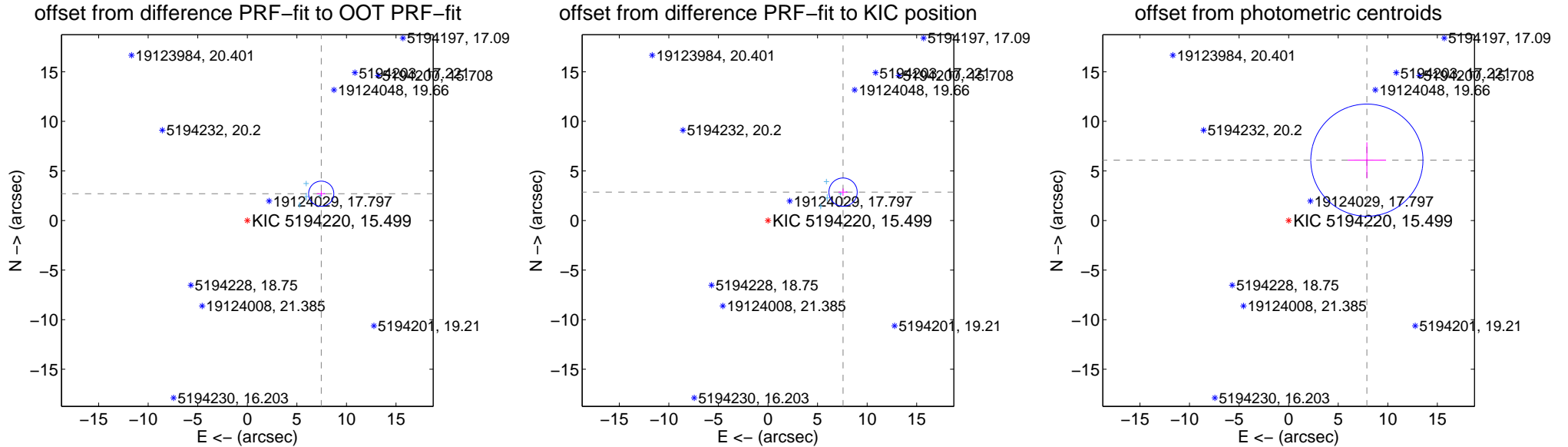
## DV Centroid Data

Supplemental centroid analysis for 005194220-01. Kepler magnitude: 15.50. Transit SNR 7.89

There are 5 quarters with good PRF difference image offsets

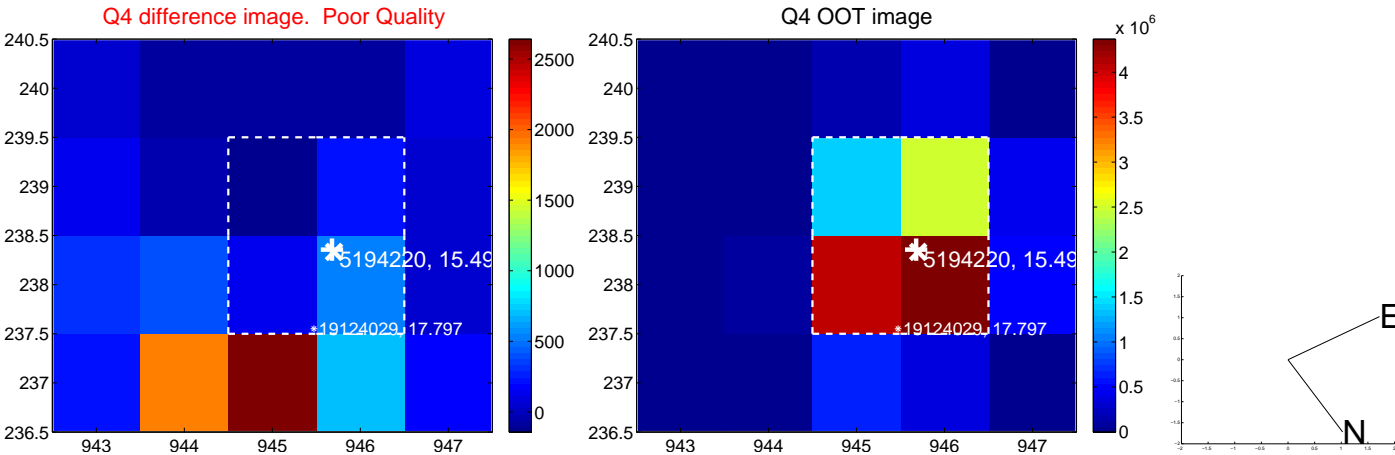
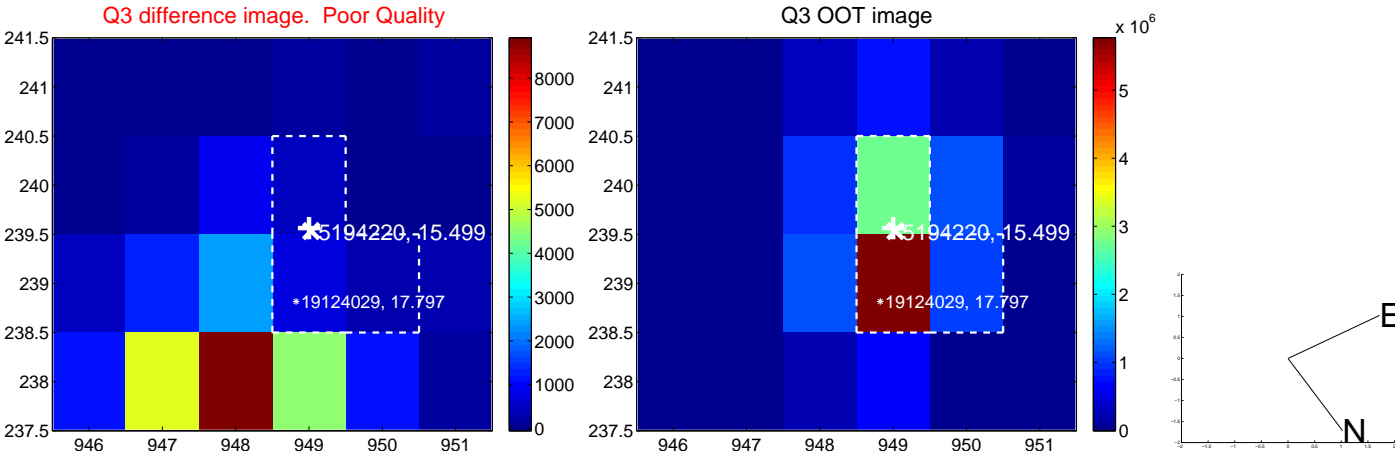
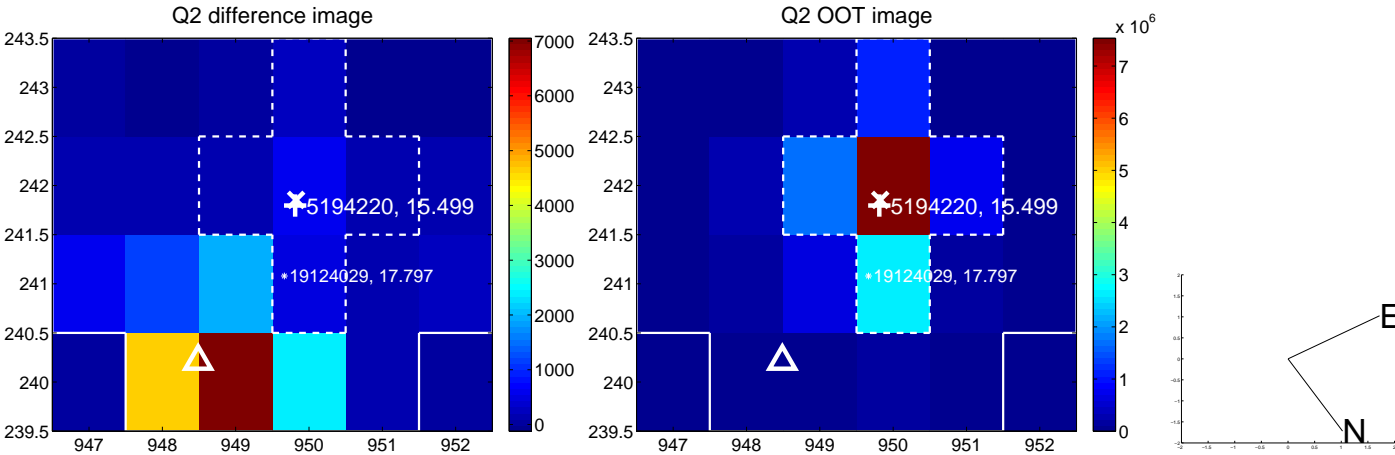
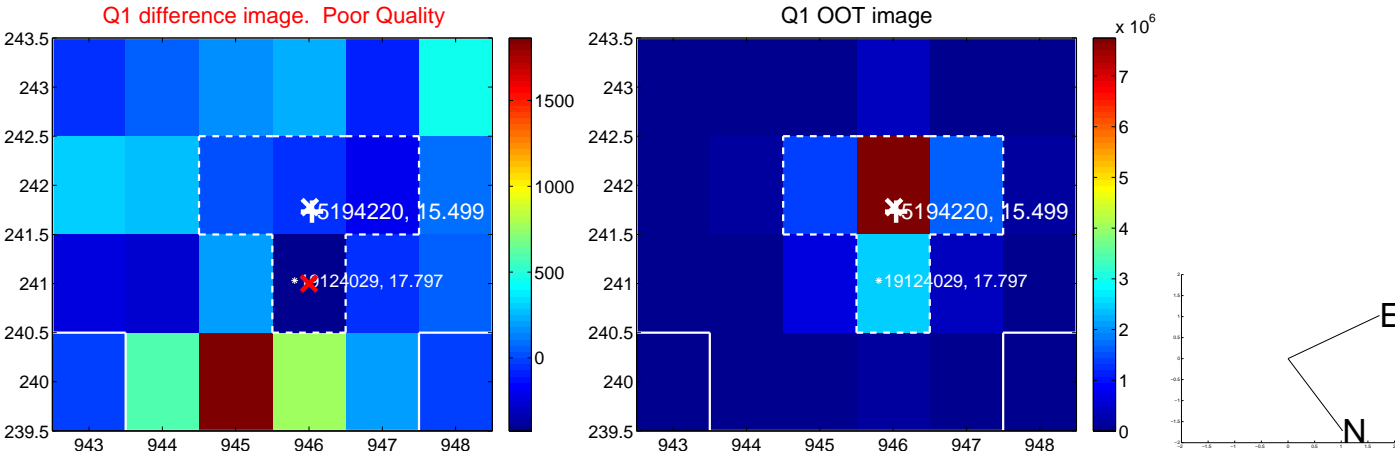
The direct PRF centroid is offset from the target star catalog position by about 0.14 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$7.926 \pm 0.424$	18.71	$-7.452 \pm 0.438$	$2.700 \pm 0.287$
PRF-fit source offset from KIC position	$8.094 \pm 0.476$	17.02	$-7.571 \pm 0.465$	$2.862 \pm 0.371$
photometric centroid source offset	$9.96 \pm 1.89$	5.29	$-7.89 \pm 1.93$	$6.09 \pm 1.80$

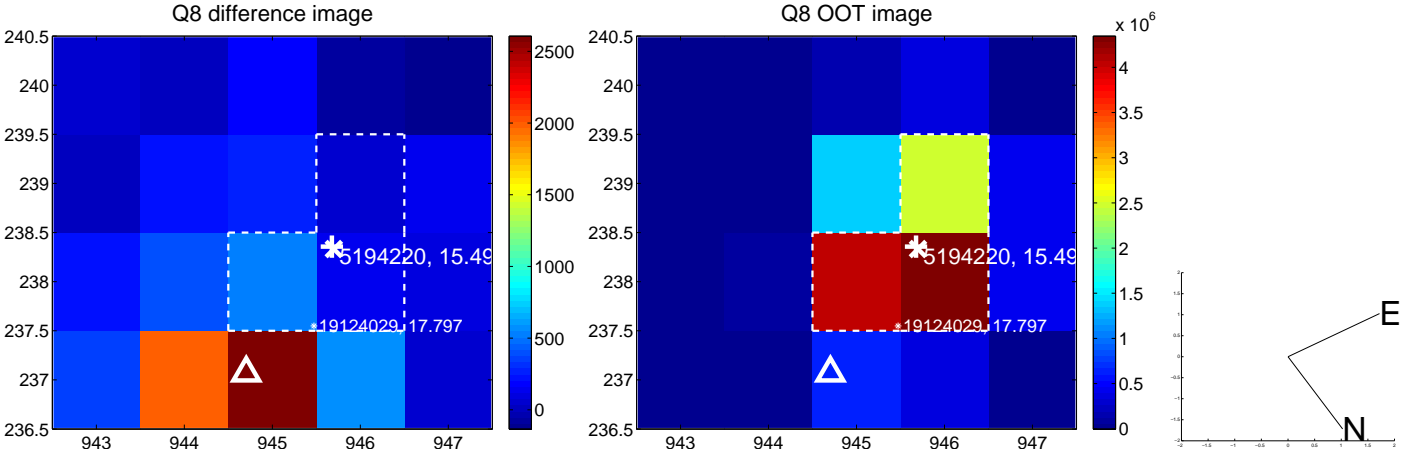
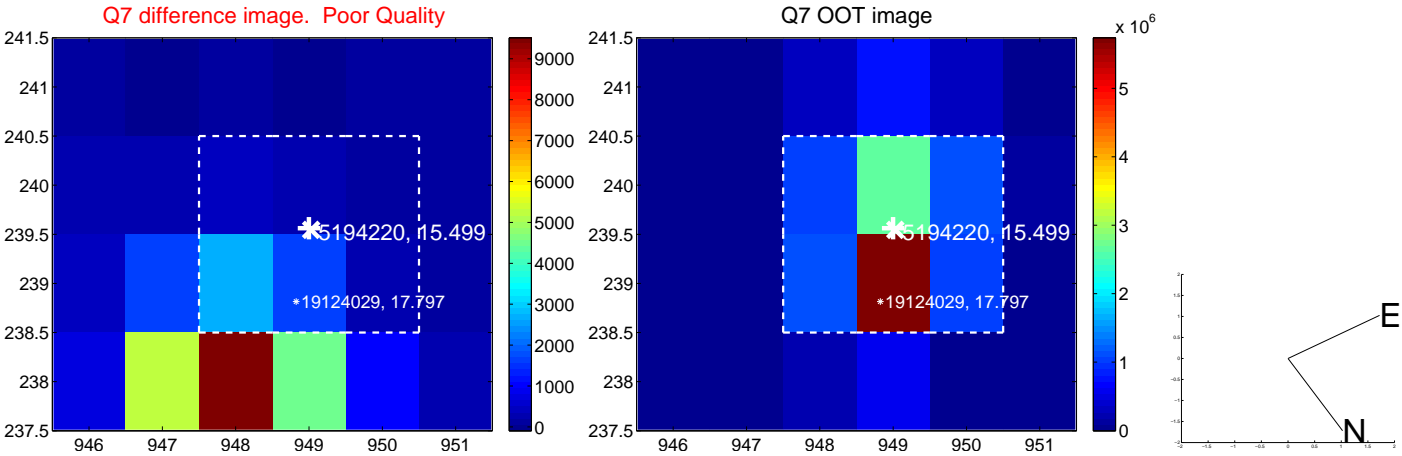
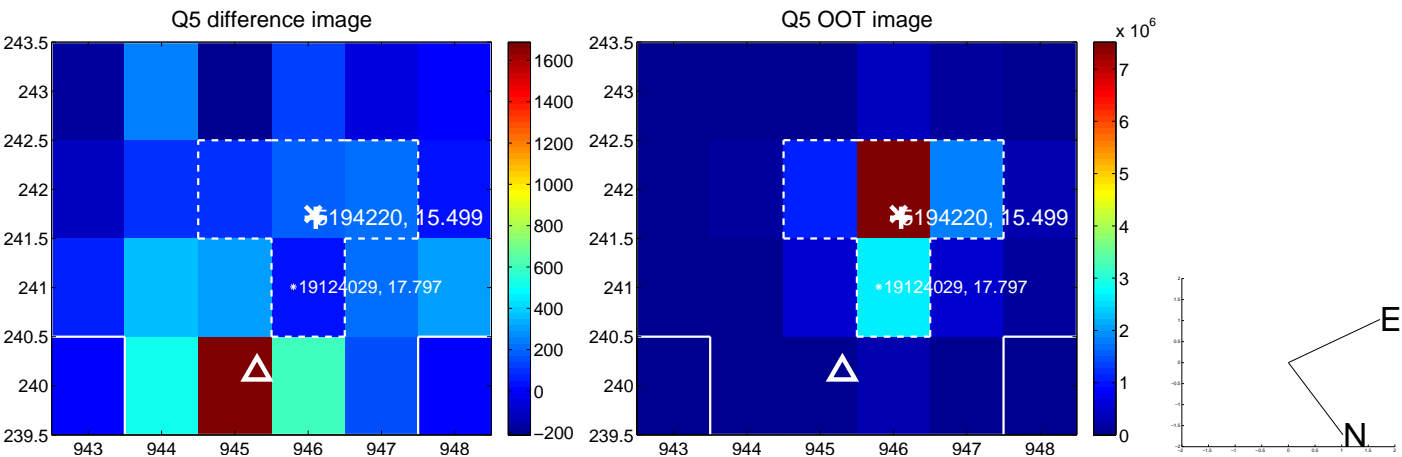


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

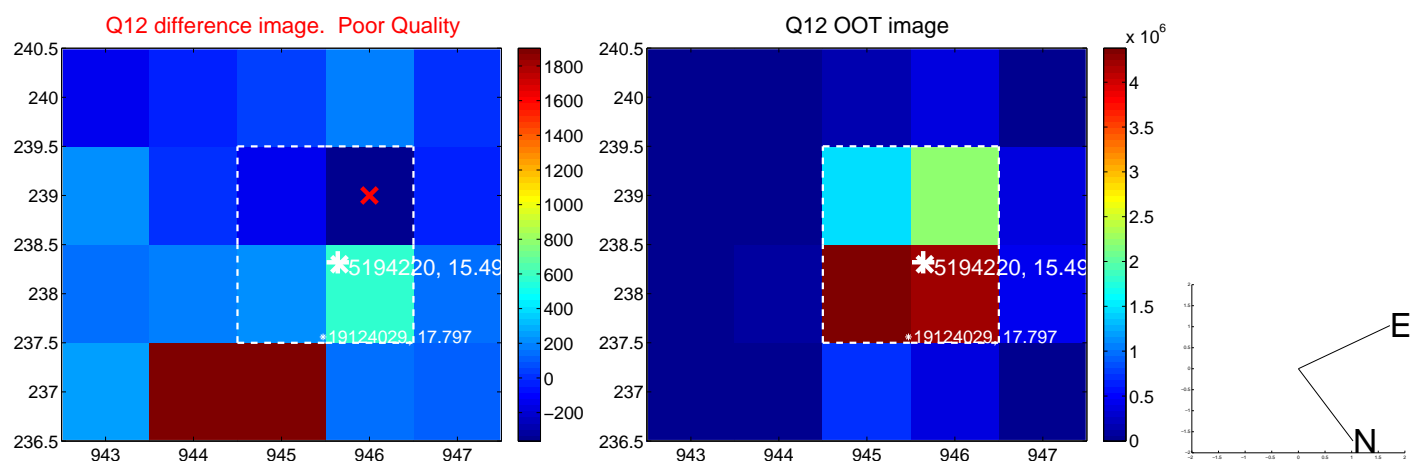
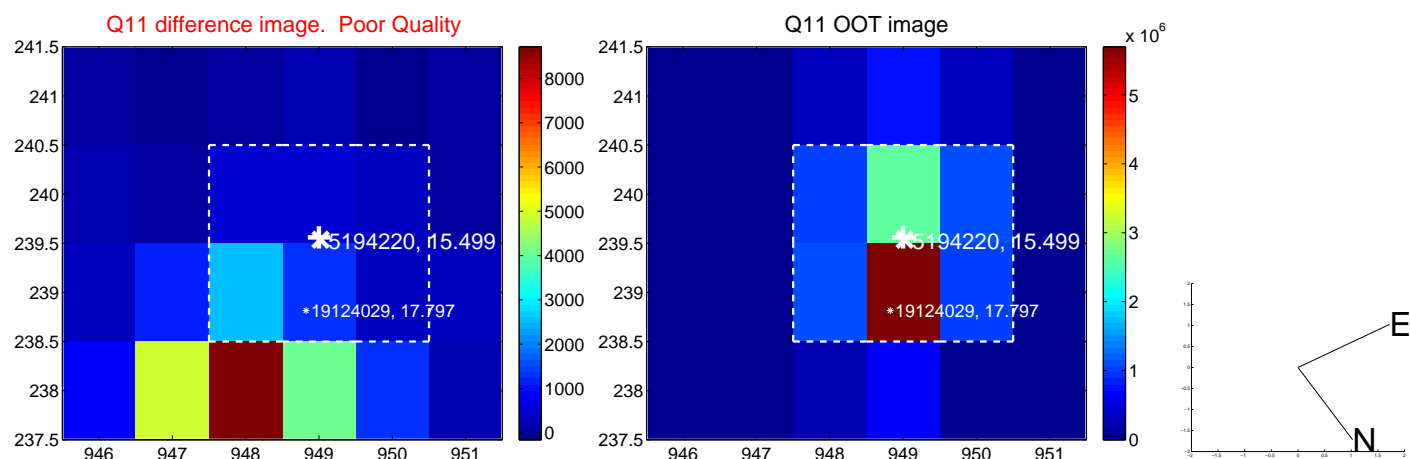
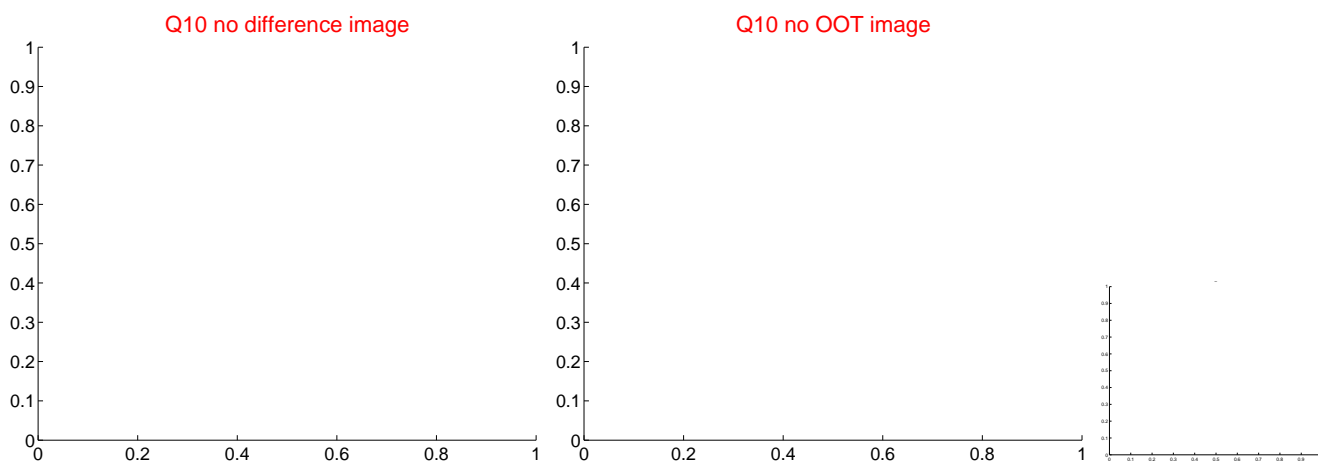
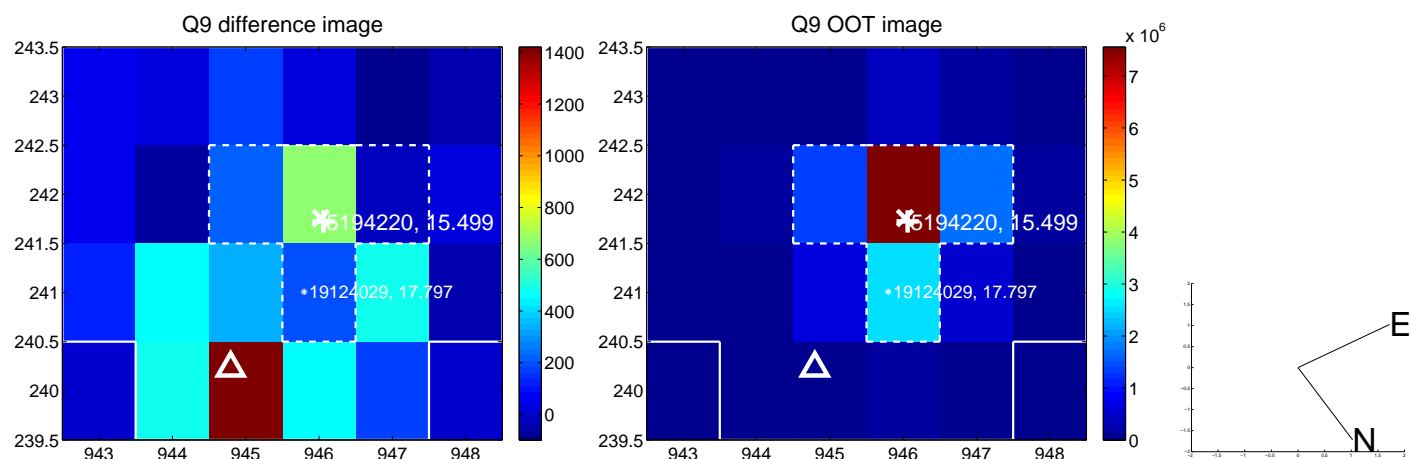


white  $\times$ : KIC target position; +: OOT centroid;  $\Delta$ : difference centroid. red  $\times$ : large negative pixel value.

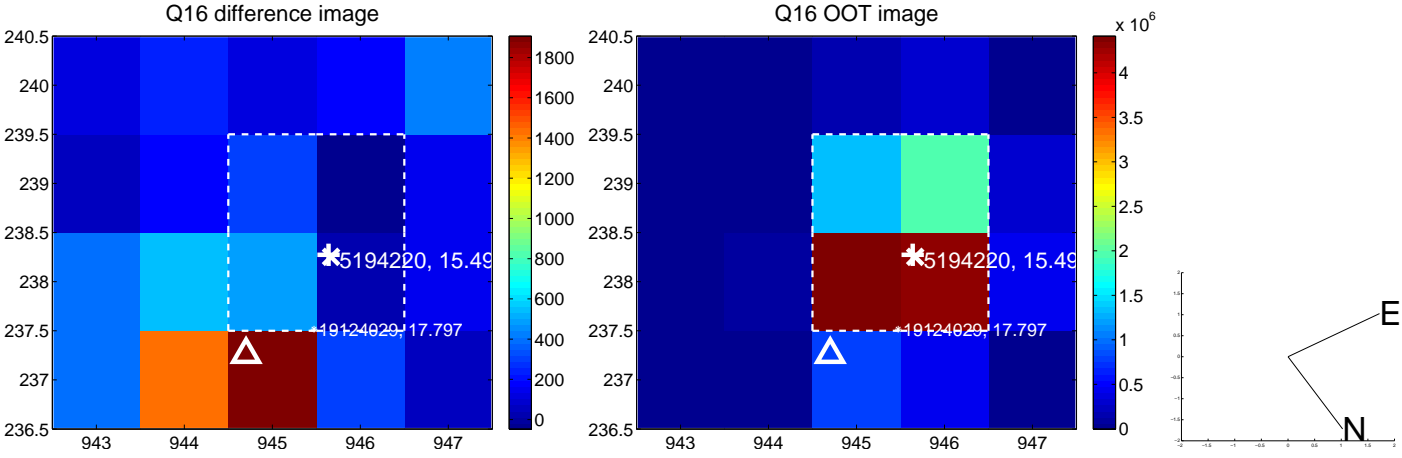
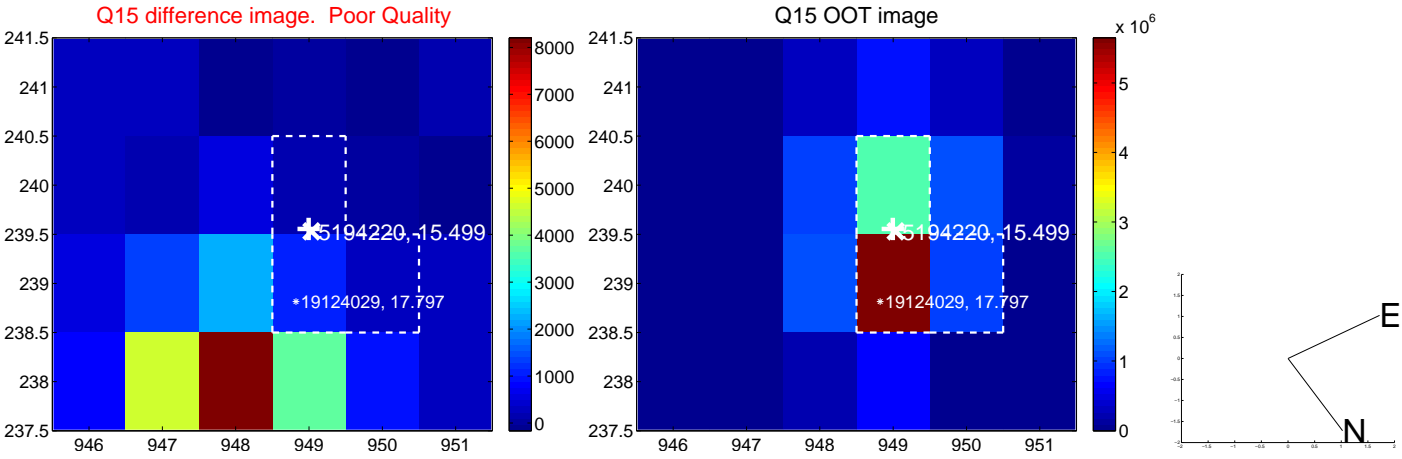
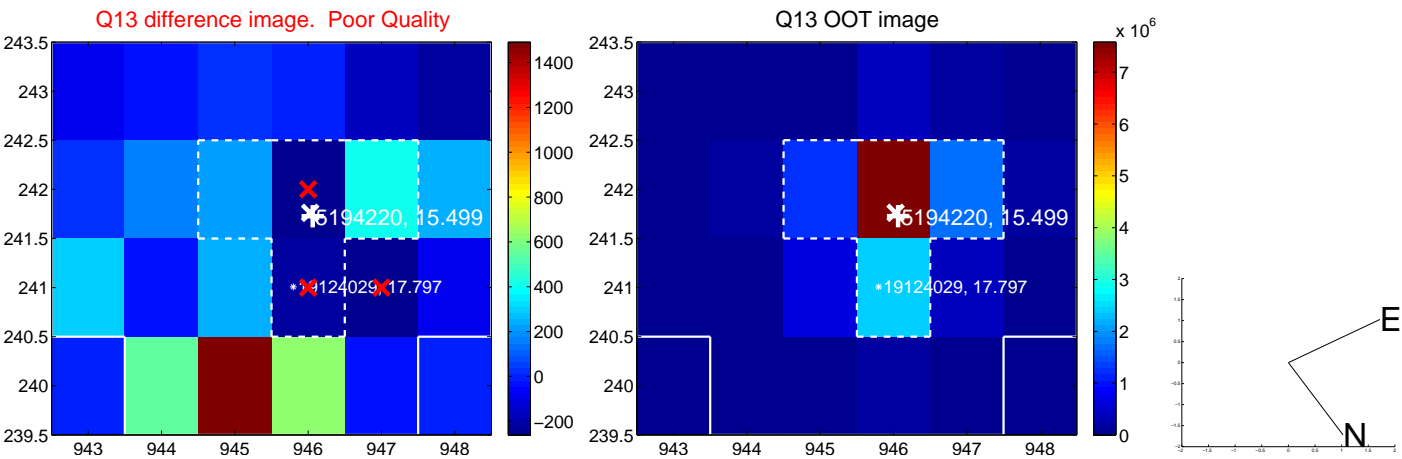




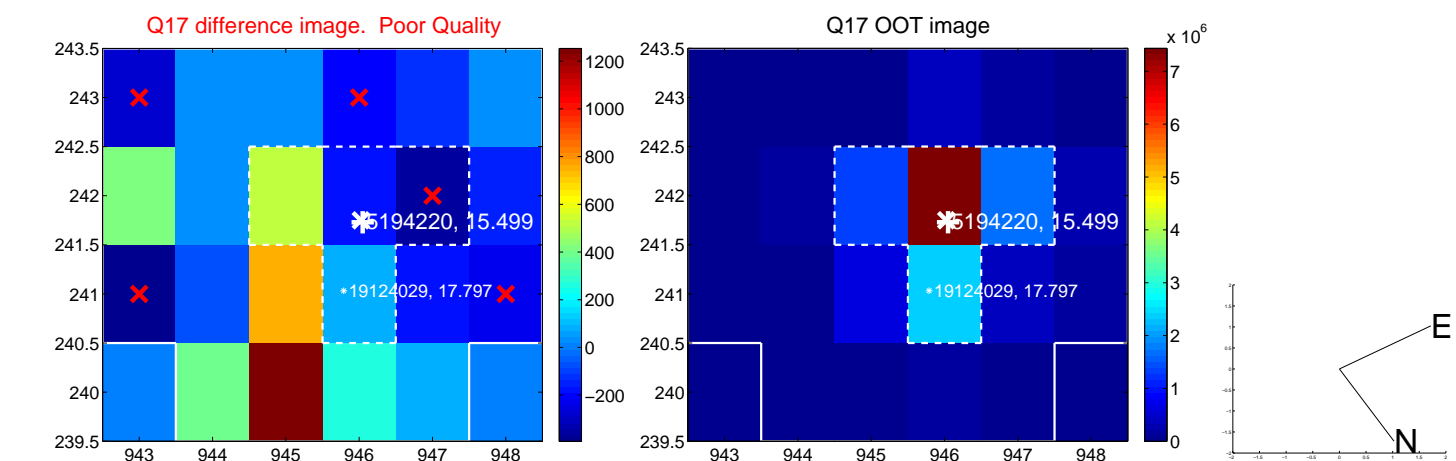
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



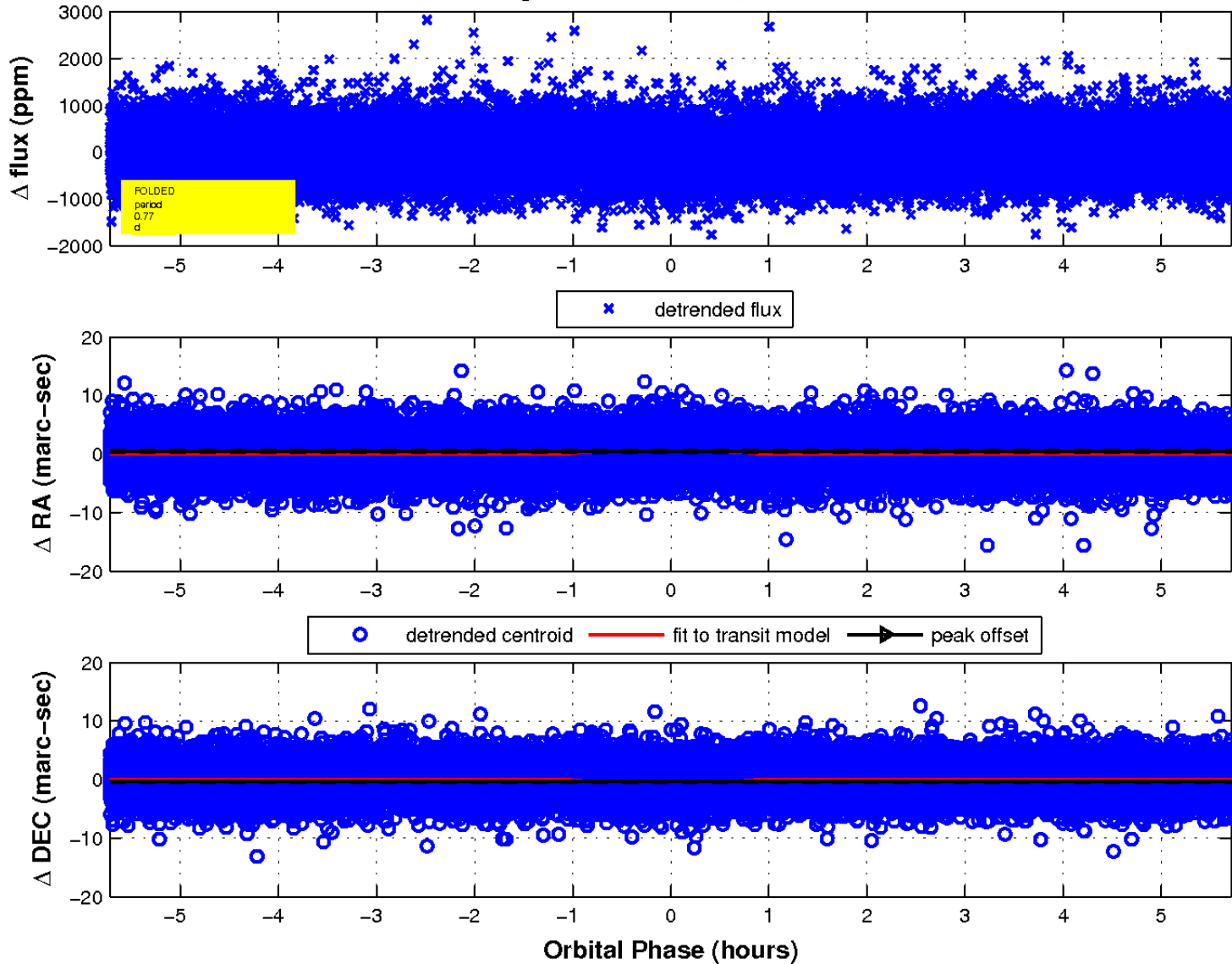
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



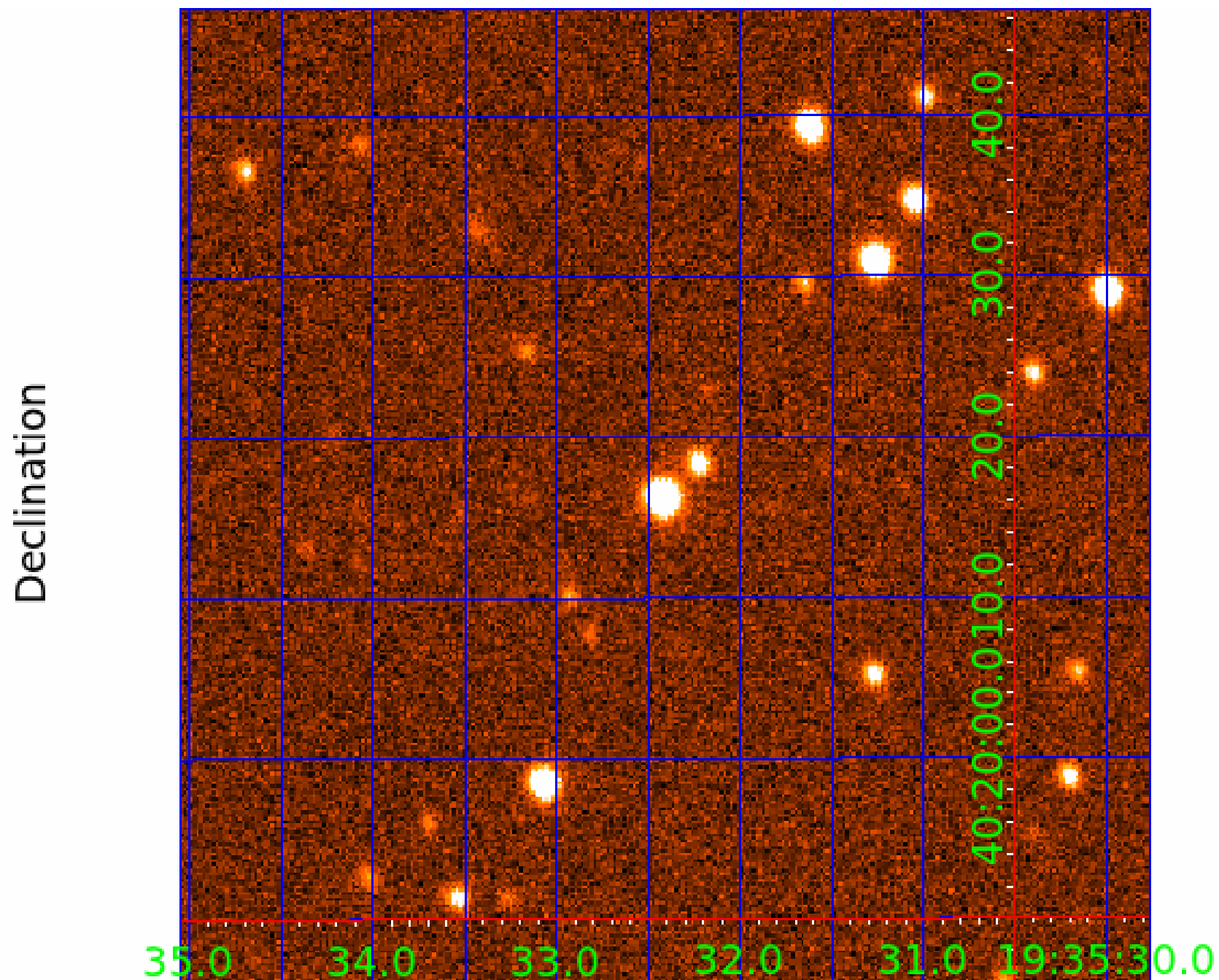
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



fluxWeightedCentroids, Planet 1 of 2



UKIRT Image





# KIC 005194220

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005194220-01	OBS	No	0.774367	132.081398	59.3	1.905	7.8	7.9	0.91	5233	0.85	2184.68
005194220-02	OBS	No	0.774371	131.693491	64.5	1.852	8.0	8.9	0.91	5233	0.89	2184.66

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005194220-01	OBS	FP	0.00	1	0	1	0	LPP_DV—CENT_RESOLVED_OFFSET—HALO_GHOST
005194220-02	OBS	FP	0.00	1	0	1	0	SAME_NTL_PERIOD—CENT_RESOLVED_OFFSET

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

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

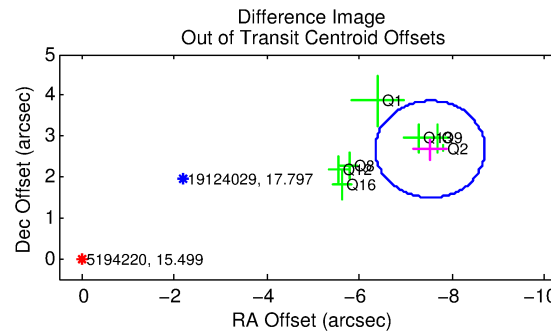
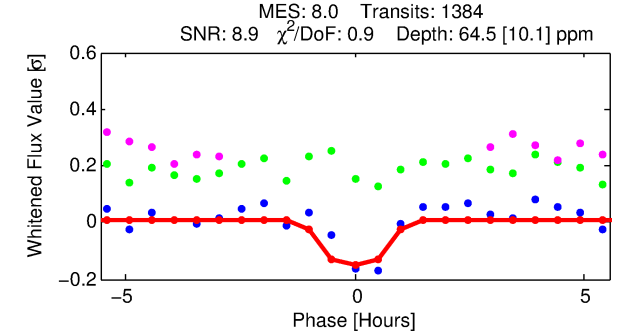
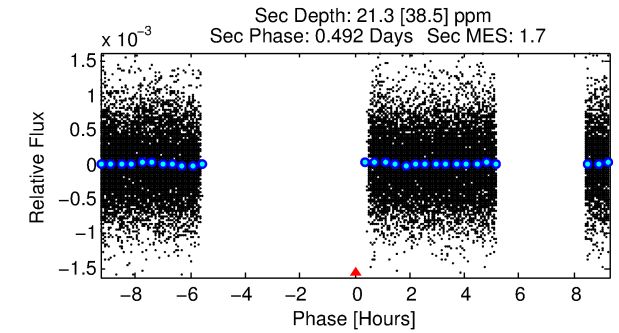
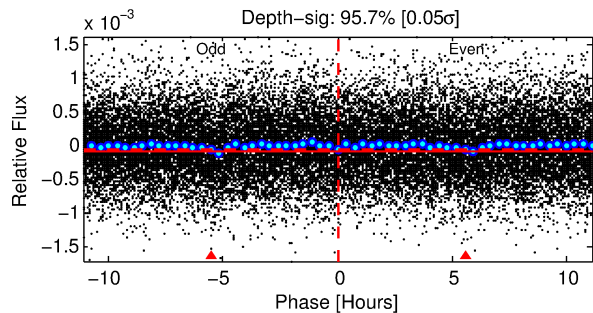
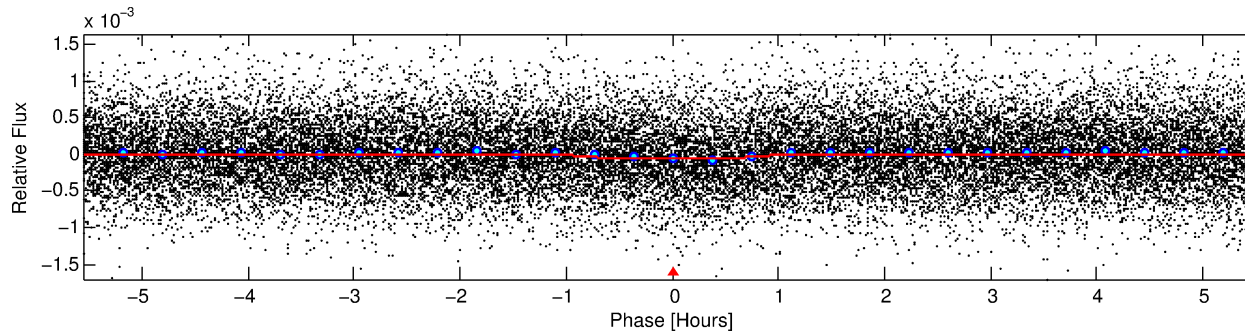
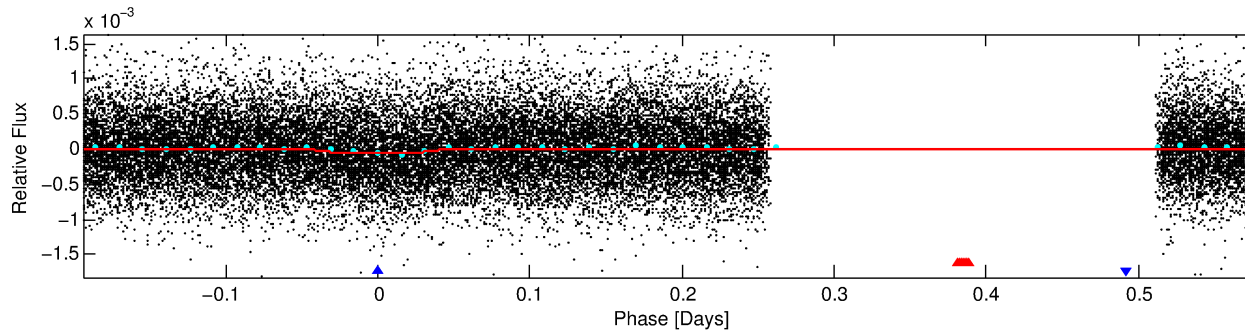
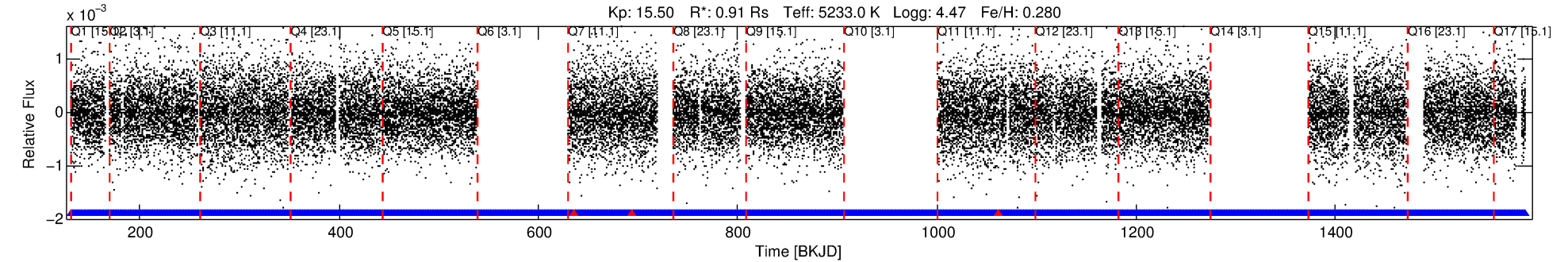
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 005194220-02

No Significant Match Found

# DV One-Page Summary

KIC: 5194220 Candidate: 2 of 2 Period: 0.774 d



## DV Fit Results:

Period = 0.77437 [0.00001] d  
Epoch = 131.6935 [0.0031] BKJD  
Rp/R\* = 0.0089 [0.0079]  
a/R\* = 1.73 [4.20]  
b = 0.90 [0.79]  
Seff = 2184.66 [556.71]  
Teq = 1743 [111] K  
Rp = 0.88 [0.79] Re  
a = 0.0159 [0.0024] AU  
Ag = 3.77 [9.57] [0.29σ]  
Teffp = 3757 [2375] K [0.85σ]

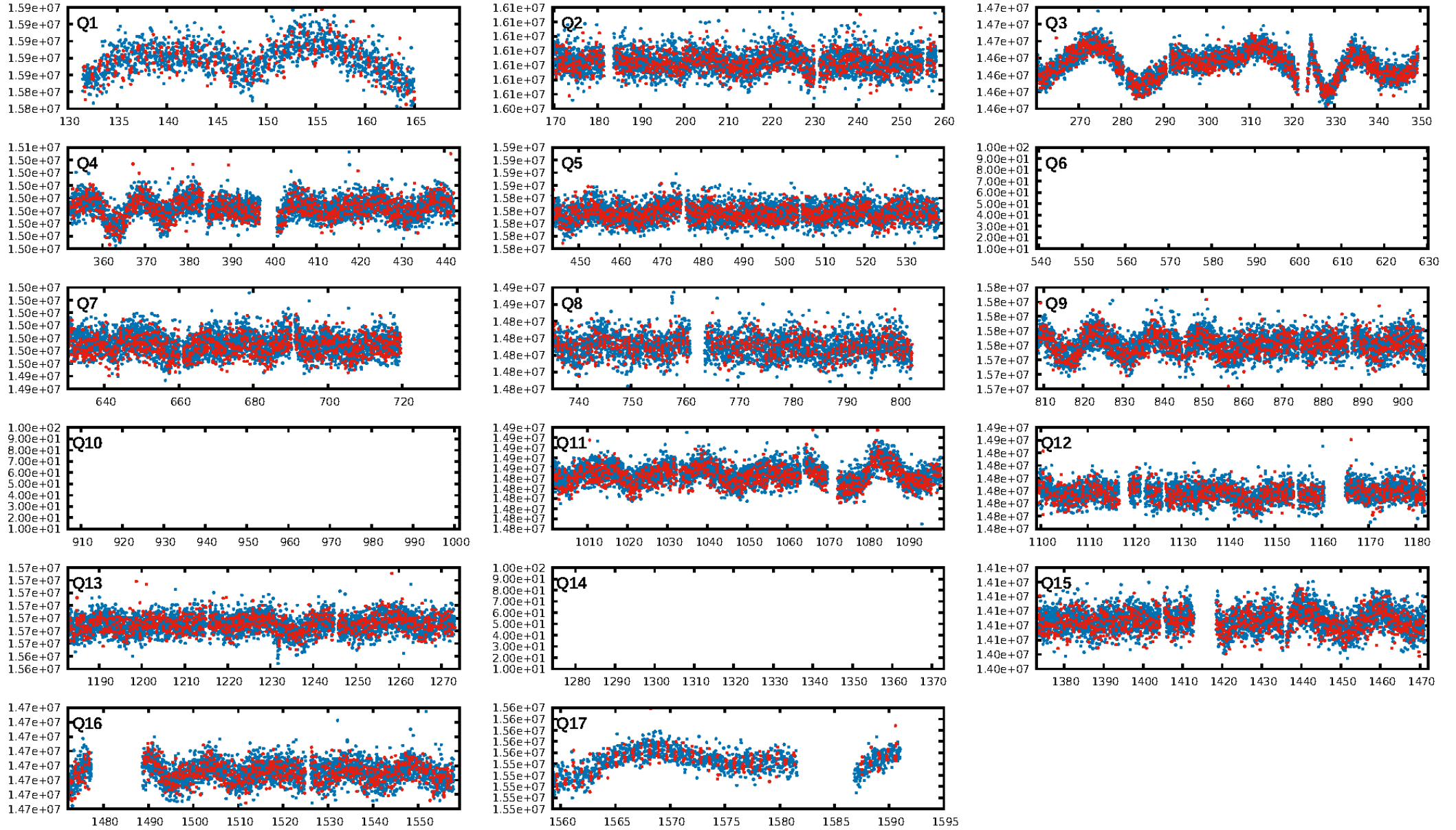
## DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 5.09e-17  
RollingBand-fgt: 1.00 [1303/1306]  
GhostDiagnostic-chr: -0.3811  
Centroid-sig: 0.0%  
Centroid-so: 11.408 arcsec [6.66σ]  
OotOffset-rm: 7.989 arcsec [20.21σ]  
KicOffset-rm: 8.164 arcsec [21.14σ]  
OotOffset-st: 1/0/3/3 [7]  
KicOffset-st: 1/0/3/3 [7]  
DiffImageQuality-fgm: 1.00 [7/7]  
DiffImageOverlap-fno: 1.00 [14/14]

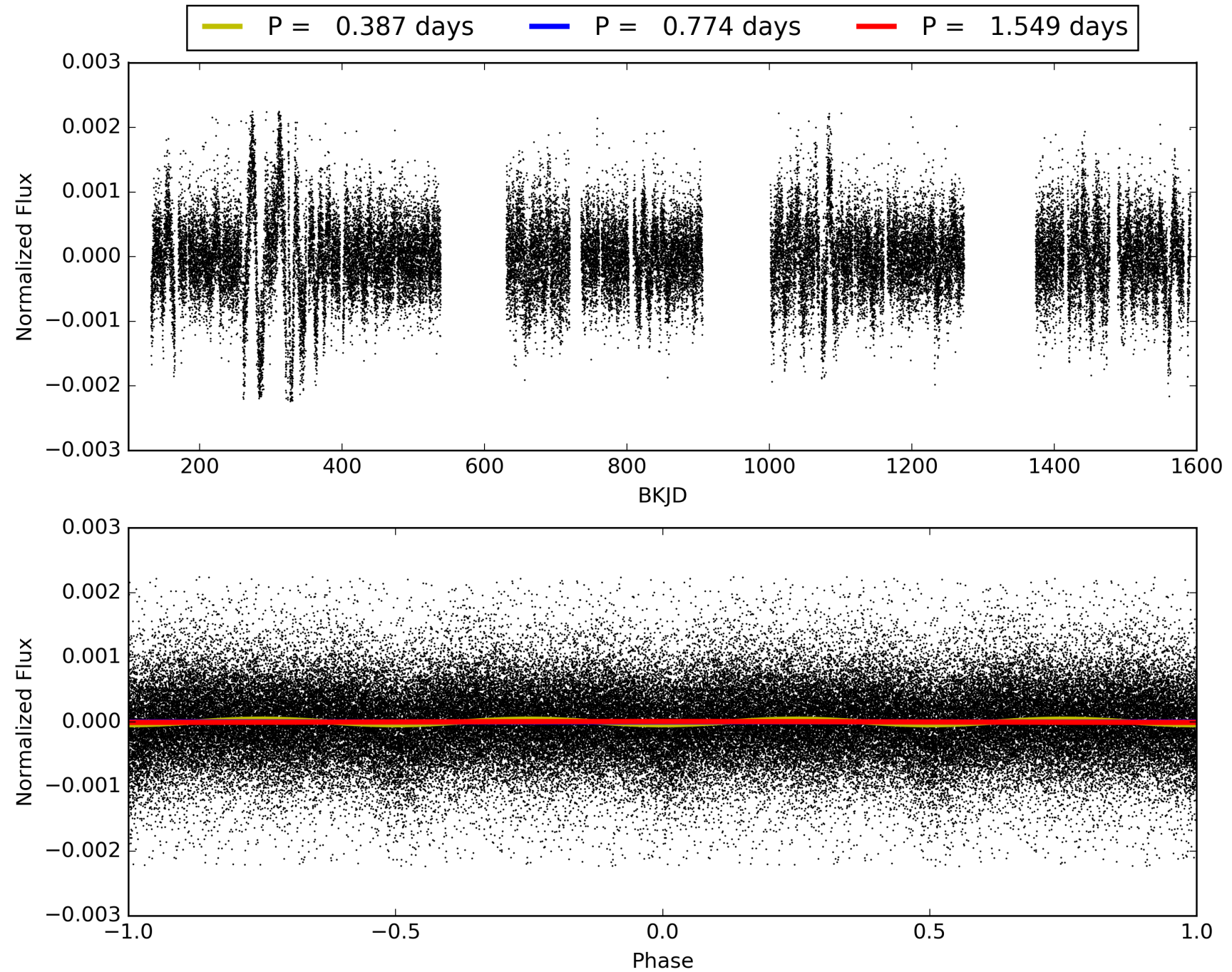
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 16:35:21 Z

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

# TCE 005194220-02, PDC Light Curves



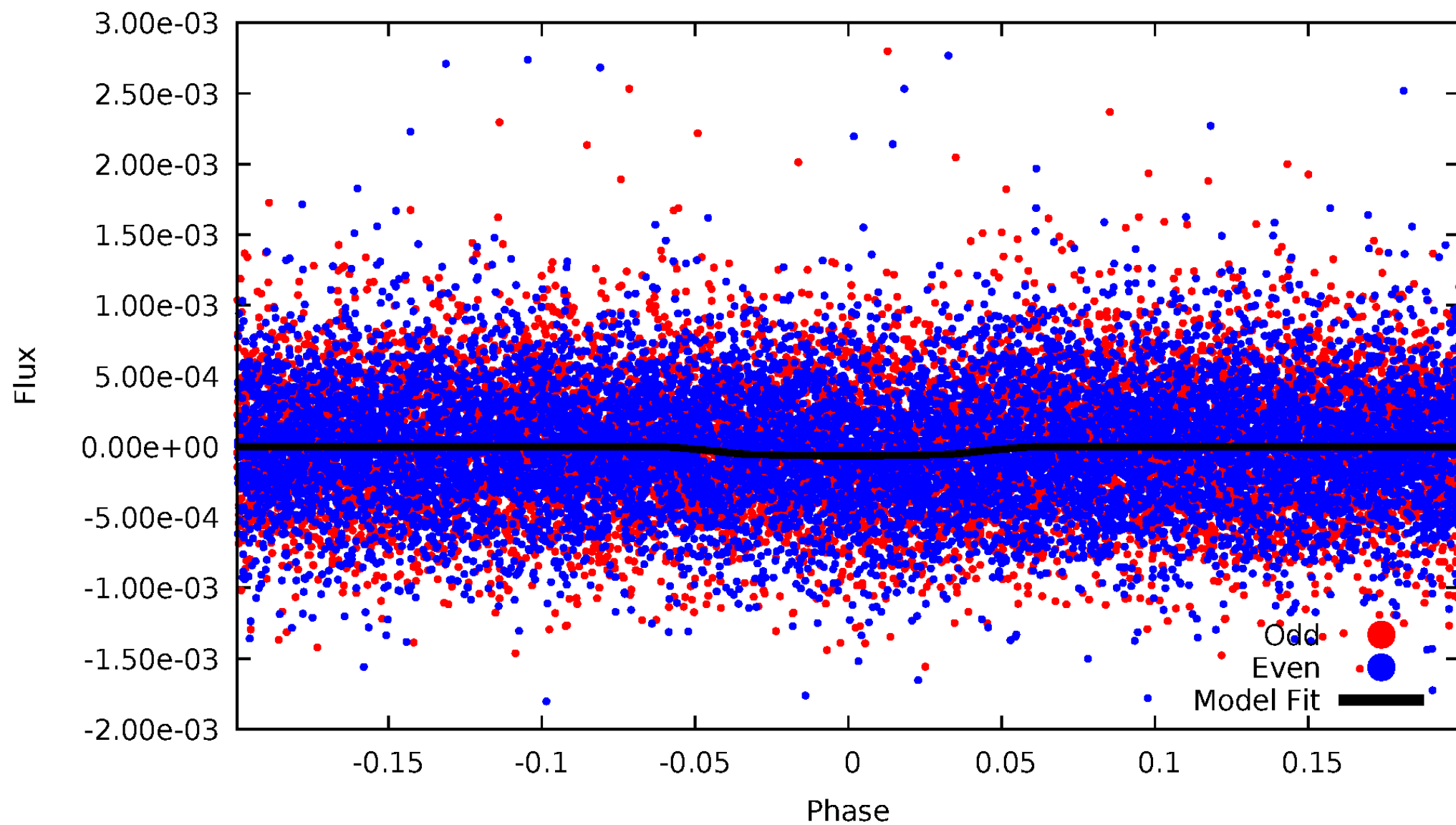
# TCE 005194220-02





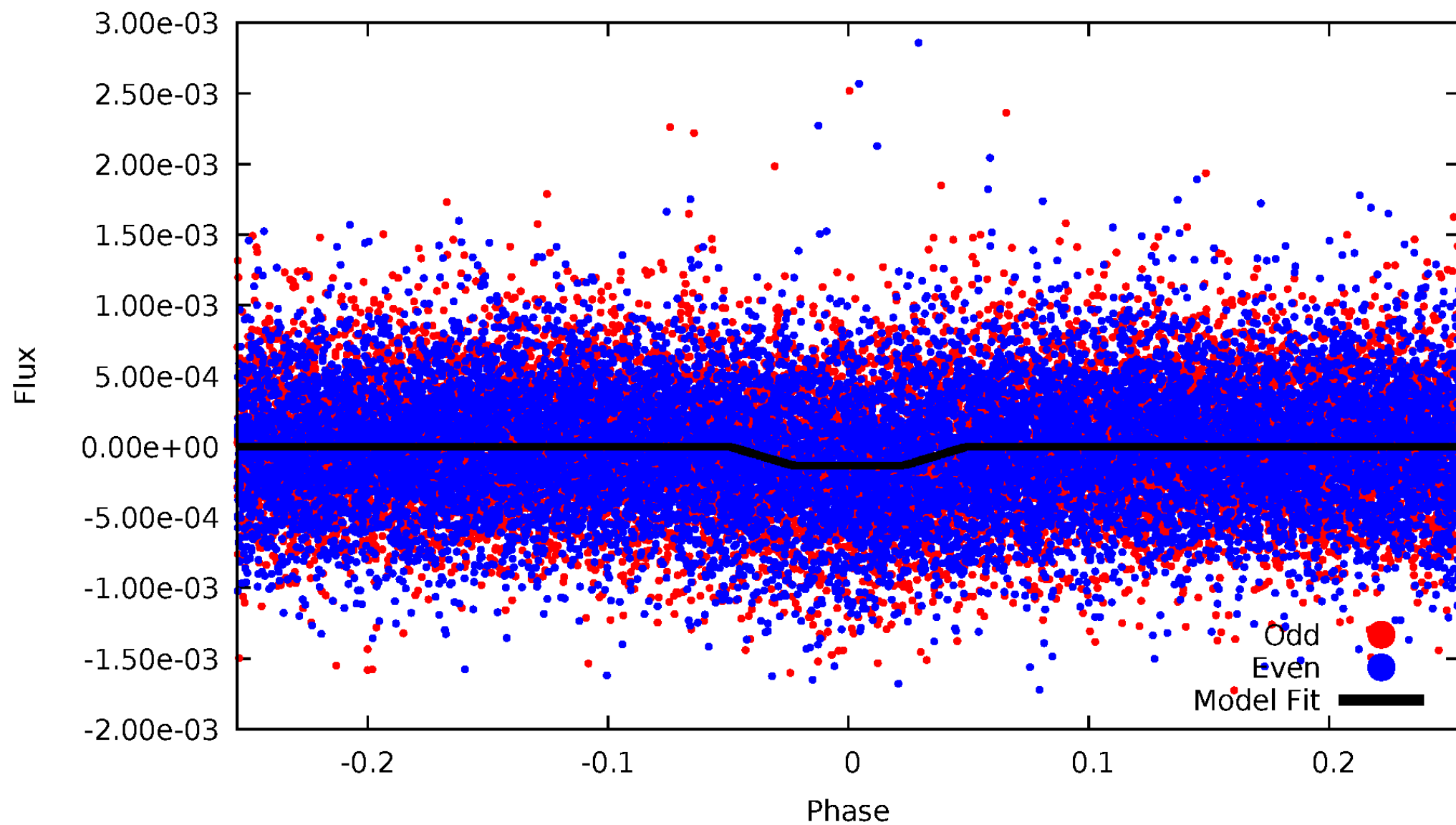
# DV Odd/Even

TCE 005194220-02



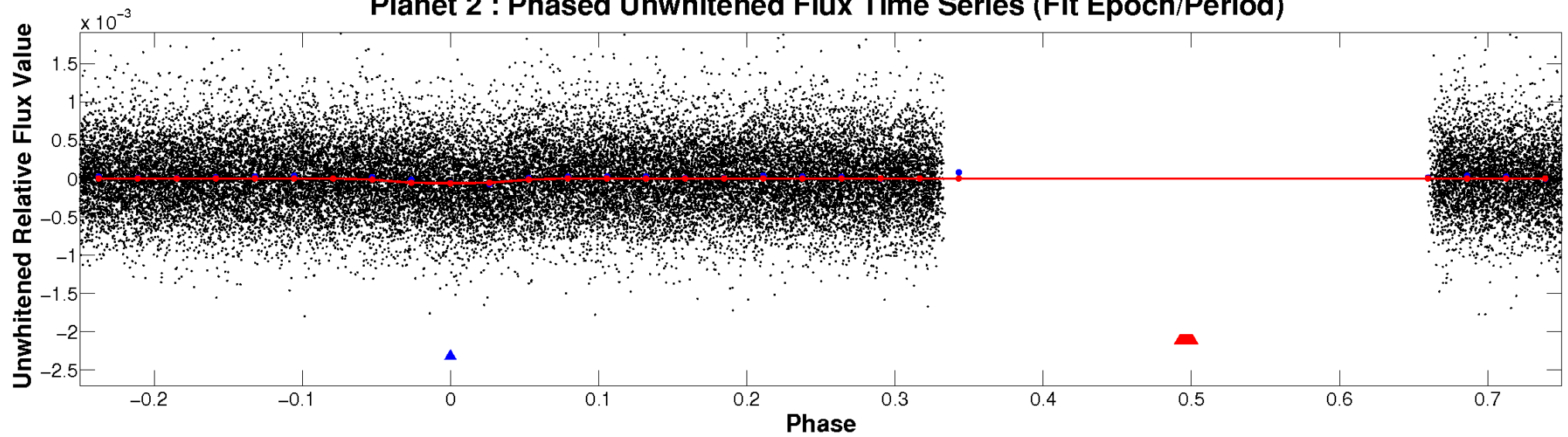
# ALT Odd/Even

TCE 005194220-02

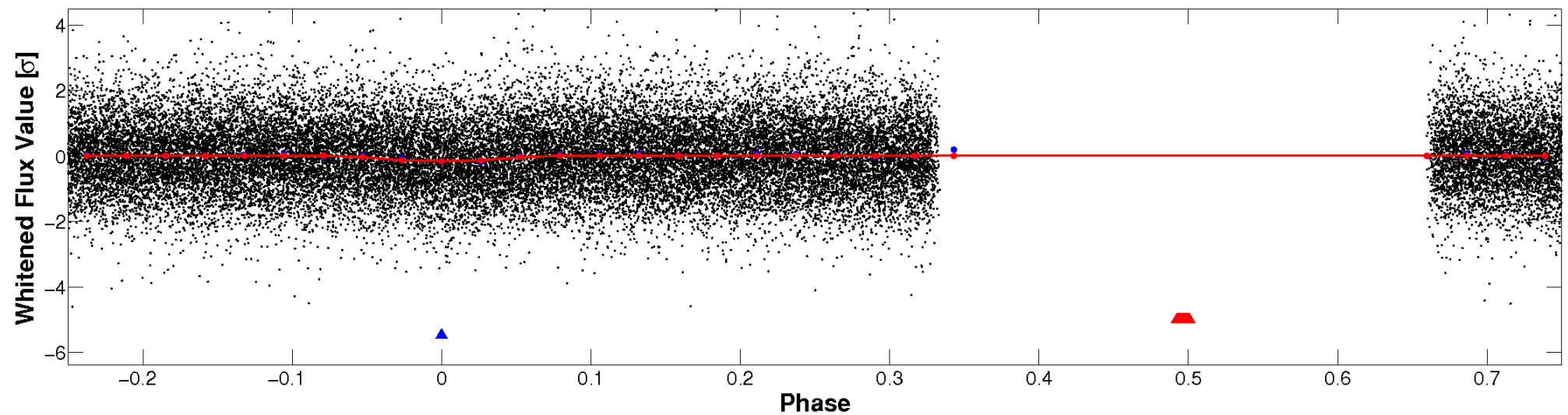


# Non-Whitened Vs. Whitened Light Curve

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

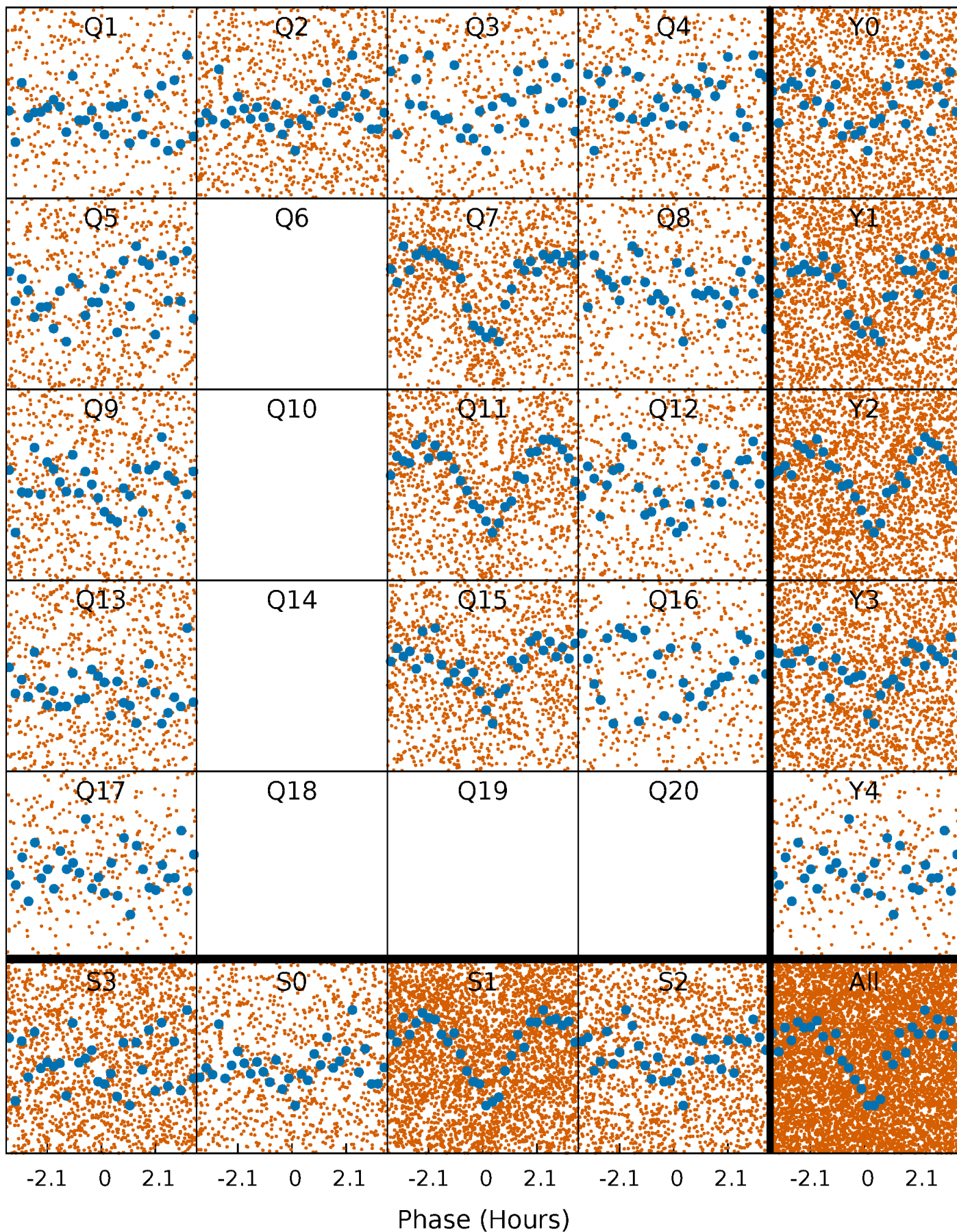


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

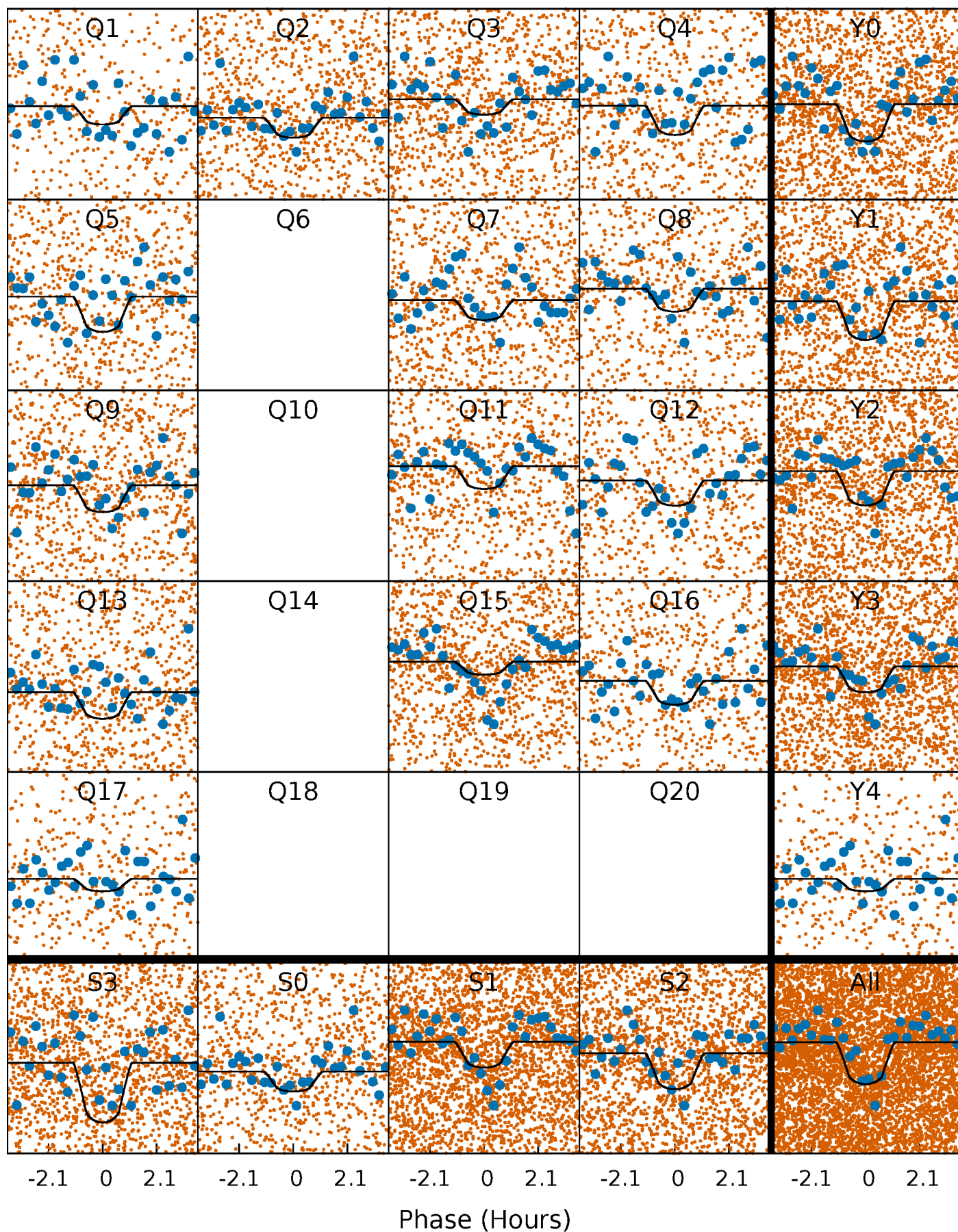
TCE 005194220-02   P= 0.774371 Days    $T_0=131.693490$  (BKJD)





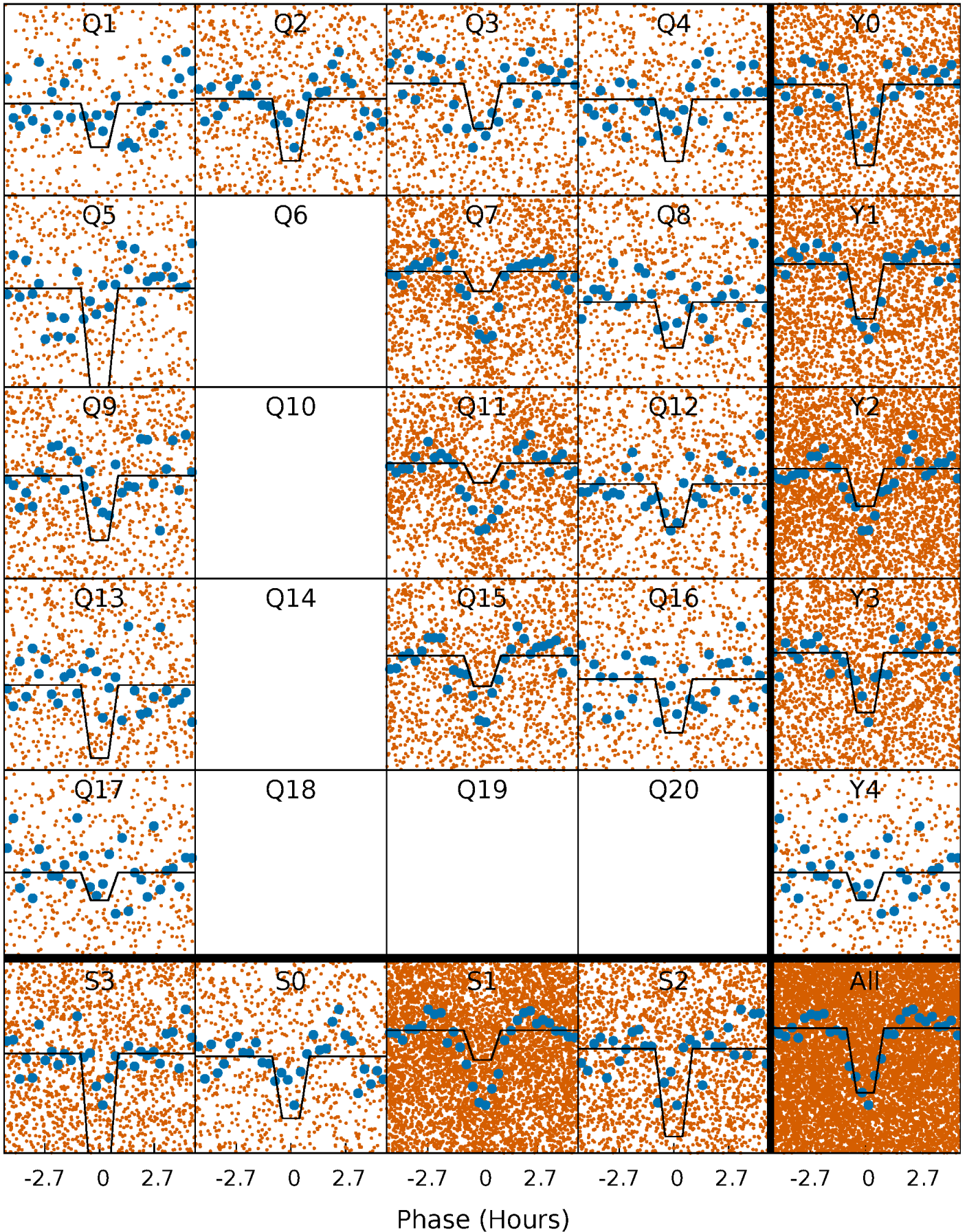
# DV Quarter-Phased Transit Curves

TCE 005194220-02   P= 0.774371 Days    $T_0=131.693490$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 005194220-02   P= 0.774379 Days    $T_0=131.692677$  (BKJD)

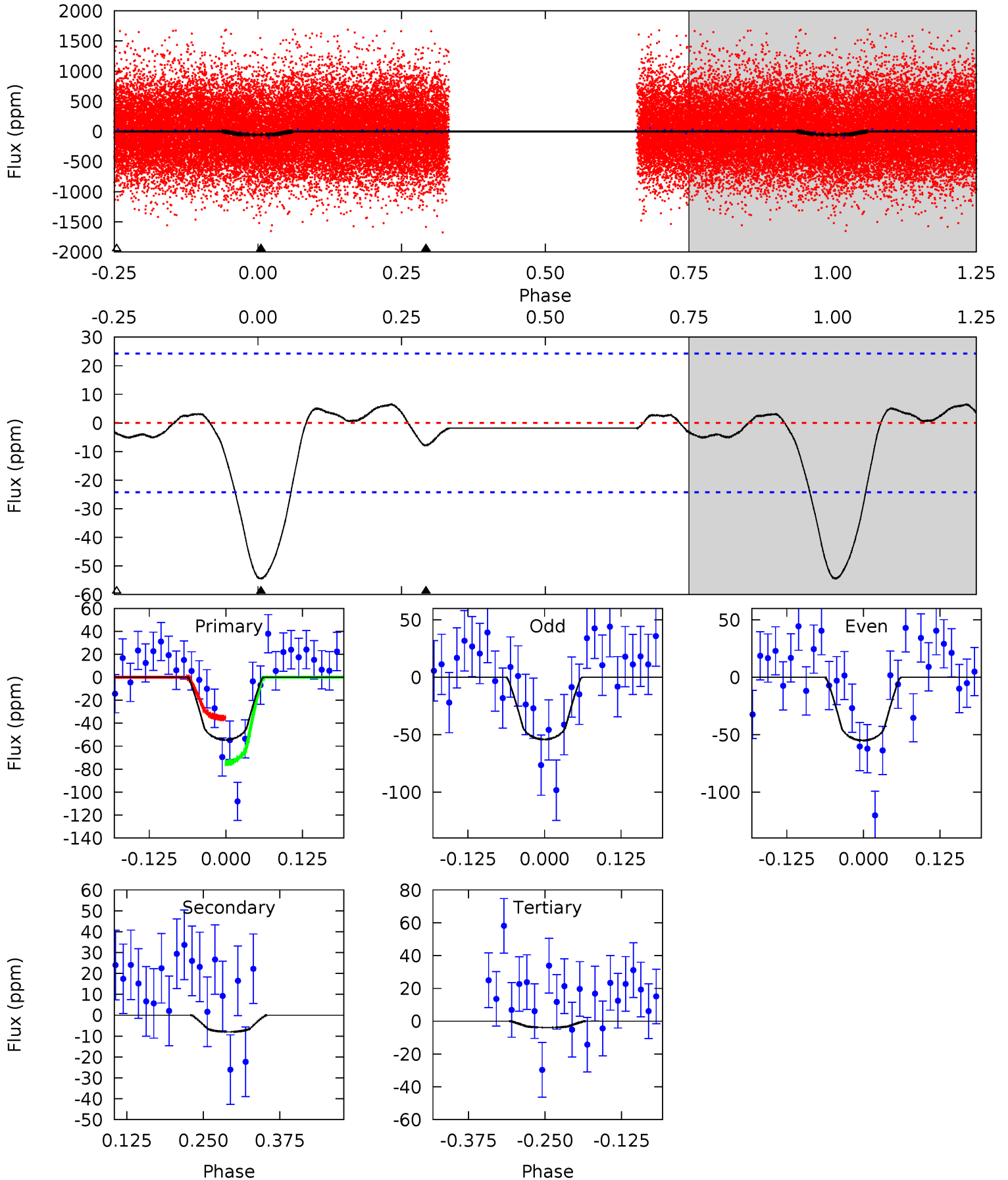




# DV Model-Shift Uniqueness Test

005194220-02, P = 0.774371 Days, E = 130.919119 Days

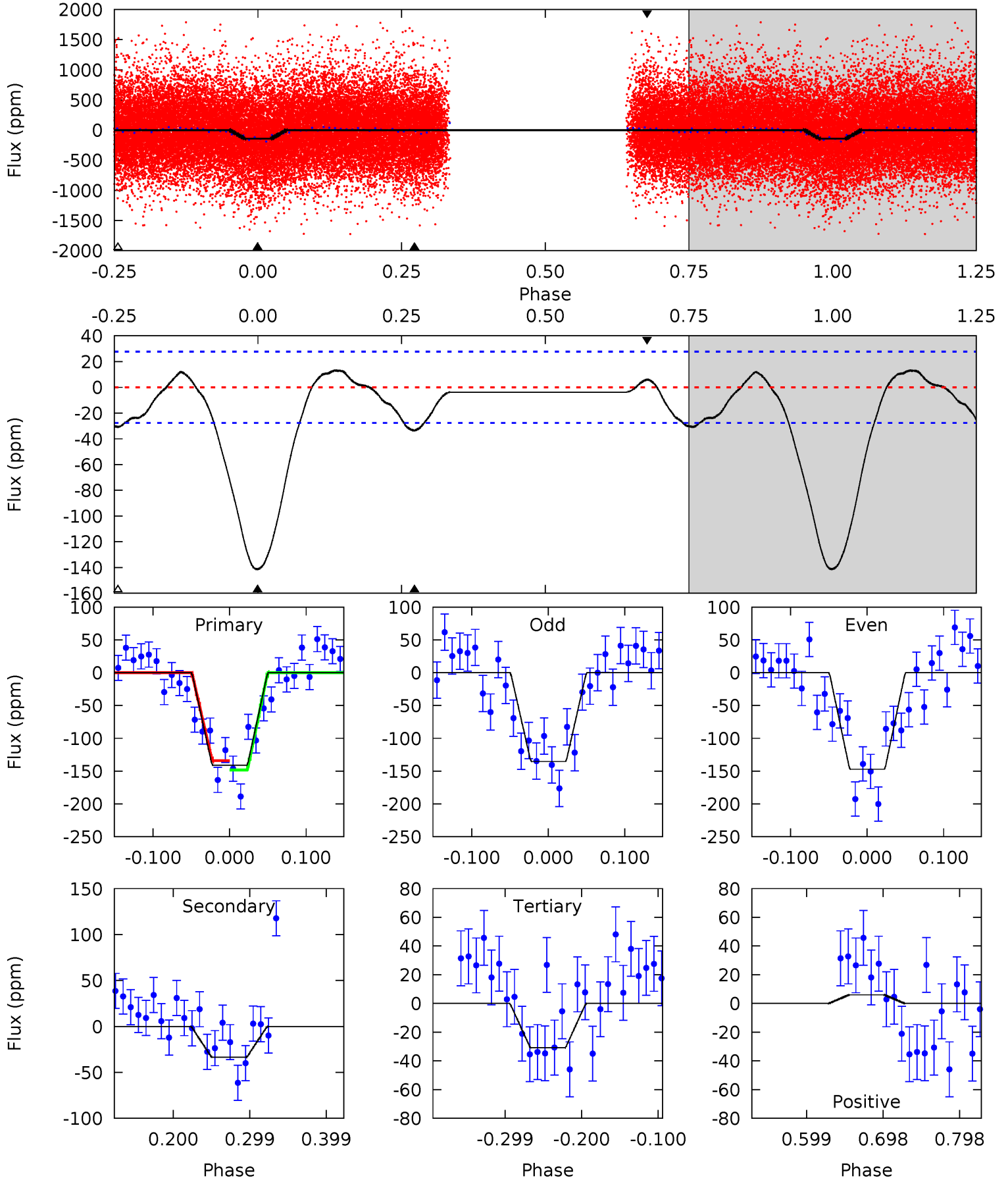
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.2	1.49	0.72	0	4.52	1.53	0.56	9.43	10.2	0.77	1.49	0.09	0.87	0.11	3.62



# Alt Model-Shift Uniqueness Test

005194220-02, P = 0.774379 Days, E = 130.918298 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
23.3	5.53	5.08	0.99	4.57	1.65	2.41	18.2	22.3	0.45	4.54	0.97	1.14	0.08	1.16



### Stellar Parameters For KIC 005194220

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5233^{+173}_{-157}$	$4.474^{+0.080}_{-0.120}$	$0.280^{+0.150}_{-0.300}$	$0.906^{+0.158}_{-0.097}$	$0.890^{+0.068}_{-0.068}$	$1.686^{+0.570}_{-0.594}$
	+3%/-3%	+2%/-3%	+54%/-107%	+17%/-11%	+8%/-8%	+34%/-35%
Source	PHO1	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 005194220-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-8 \pm 5$	$1.05^{+0.75}_{-0.64}$	$2452^{+135}_{-114}$	$2965^{+1308}_{-5439}$	$0.807^{+4.678}_{-0.646}$
Alt.	$-34 \pm 6$	$1.24^{+0.76}_{-0.71}$	$2448^{+125}_{-111}$	$3823^{+1590}_{-666}$	$3.072^{+12.444}_{-1.956}$

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

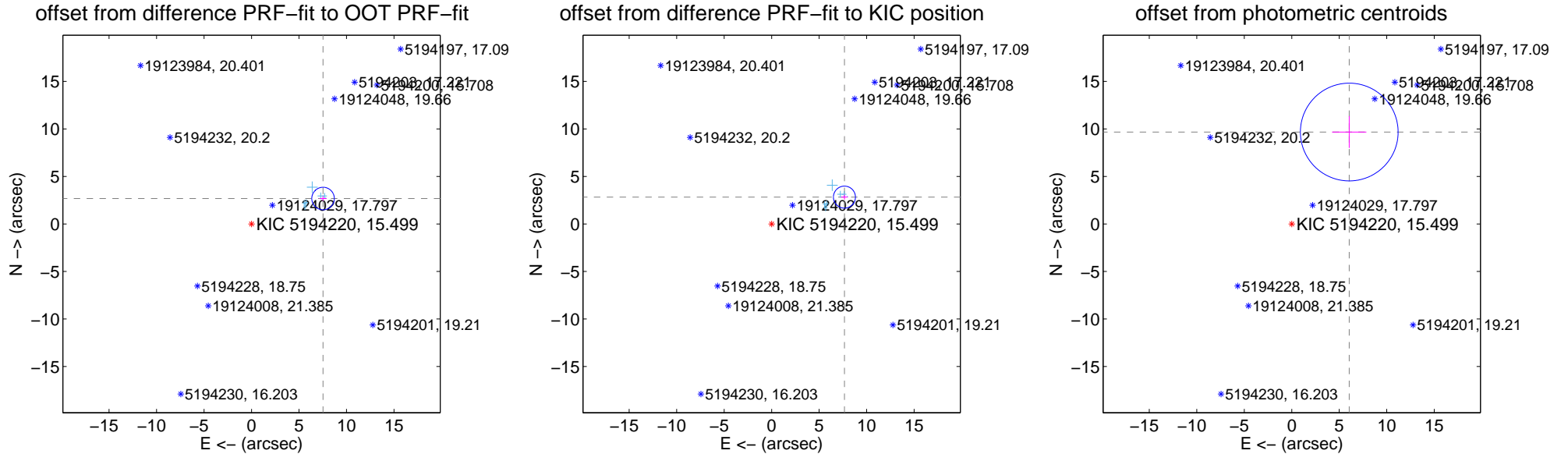
## DV Centroid Data

Supplemental centroid analysis for 005194220-02. Kepler magnitude: 15.50. Transit SNR 8.88

There are 7 quarters with good PRF difference image offsets

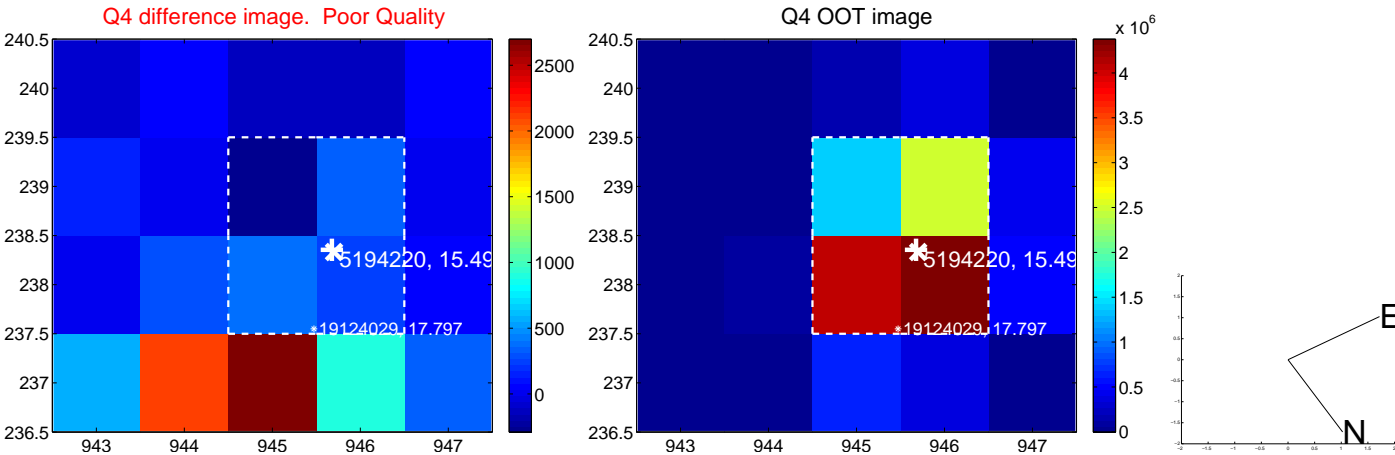
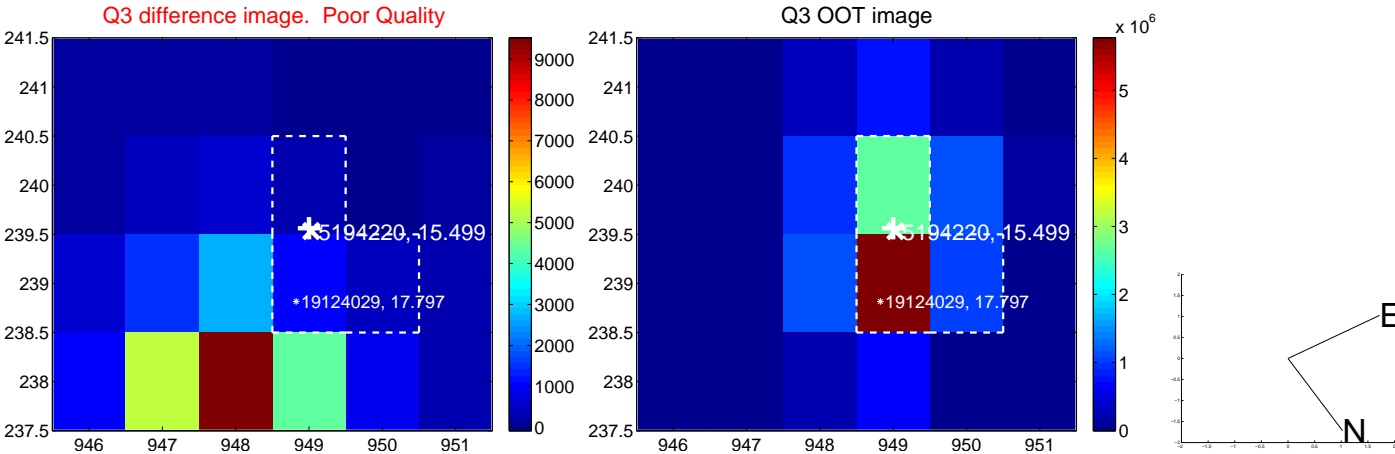
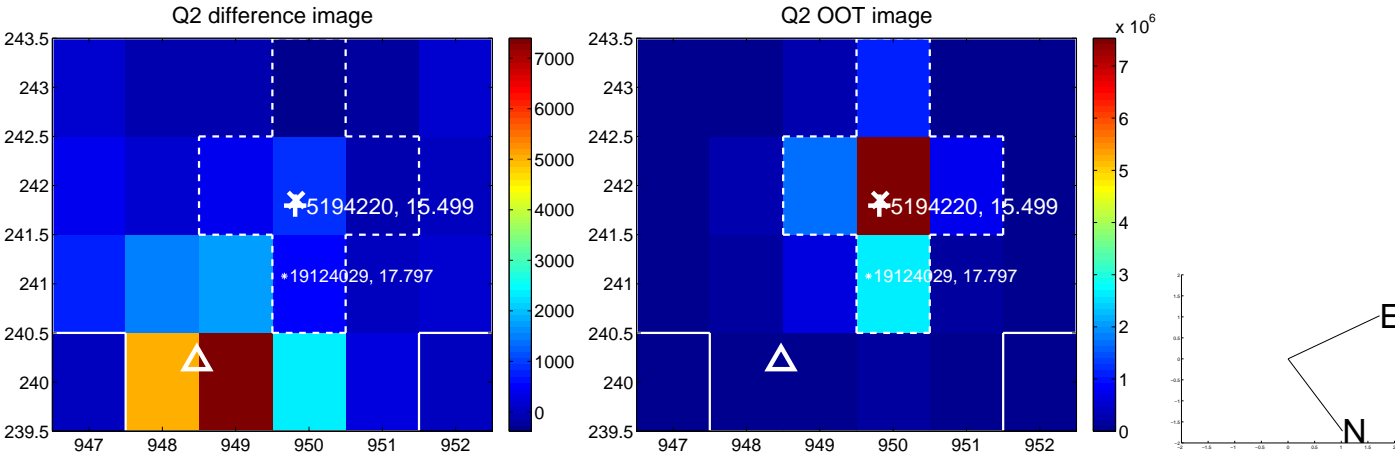
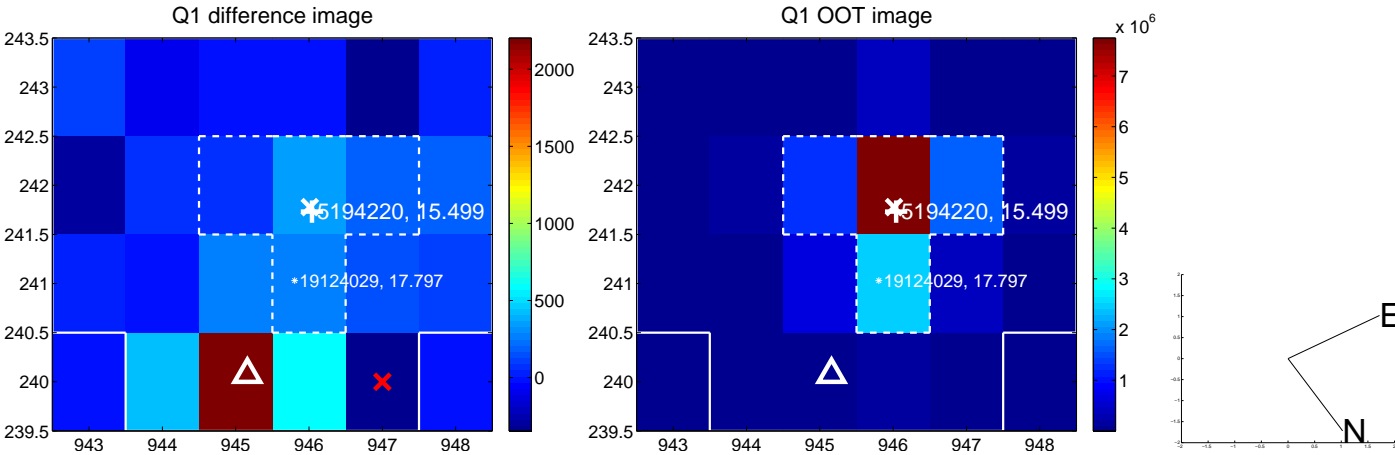
The direct PRF centroid is offset from the target star catalog position by about 0.14 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$7.989 \pm 0.395$	20.21	$-7.528 \pm 0.376$	$2.675 \pm 0.248$
PRF-fit source offset from KIC position	$8.164 \pm 0.386$	21.14	$-7.660 \pm 0.349$	$2.823 \pm 0.266$
photometric centroid source offset	$11.41 \pm 1.71$	6.66	$-6.05 \pm 1.81$	$9.67 \pm 1.68$

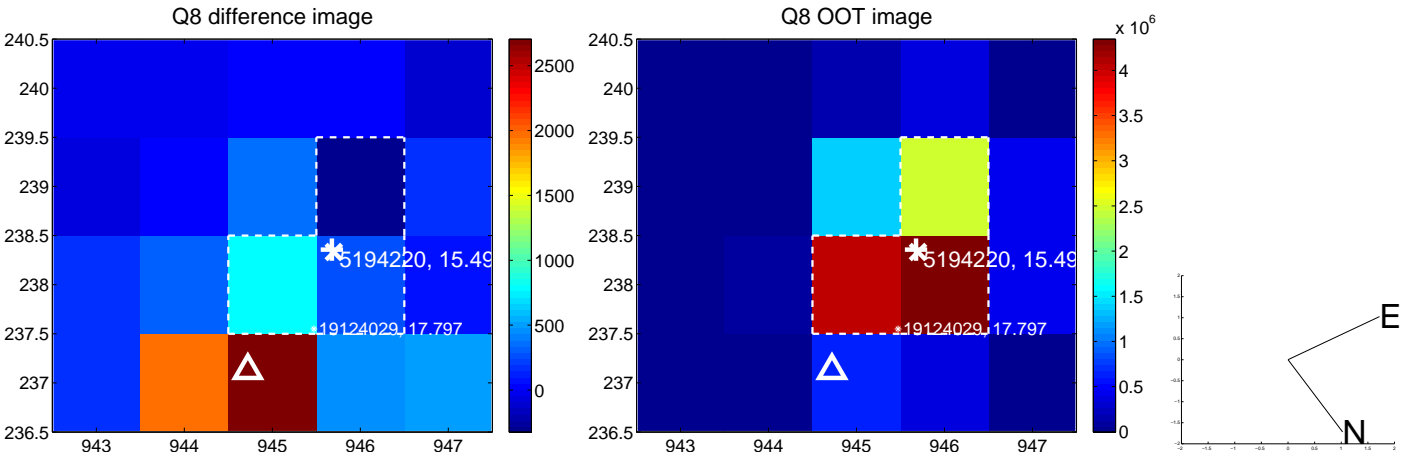
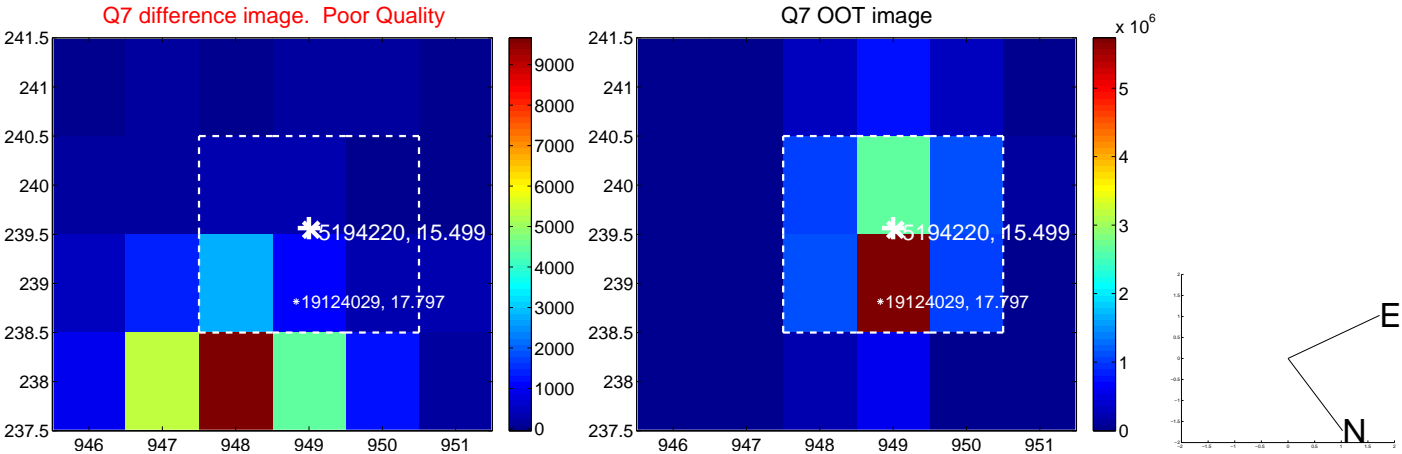
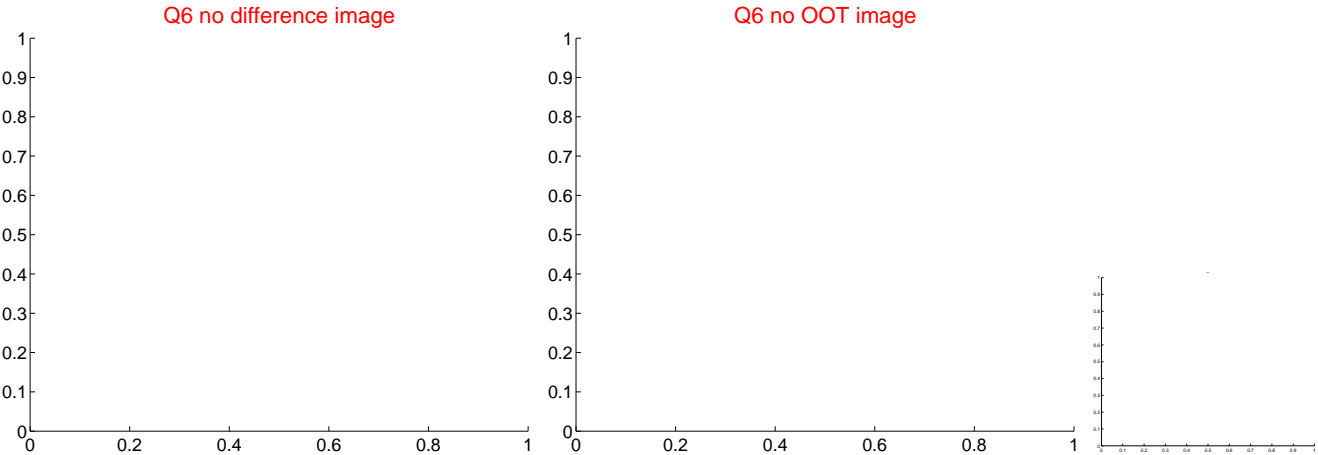
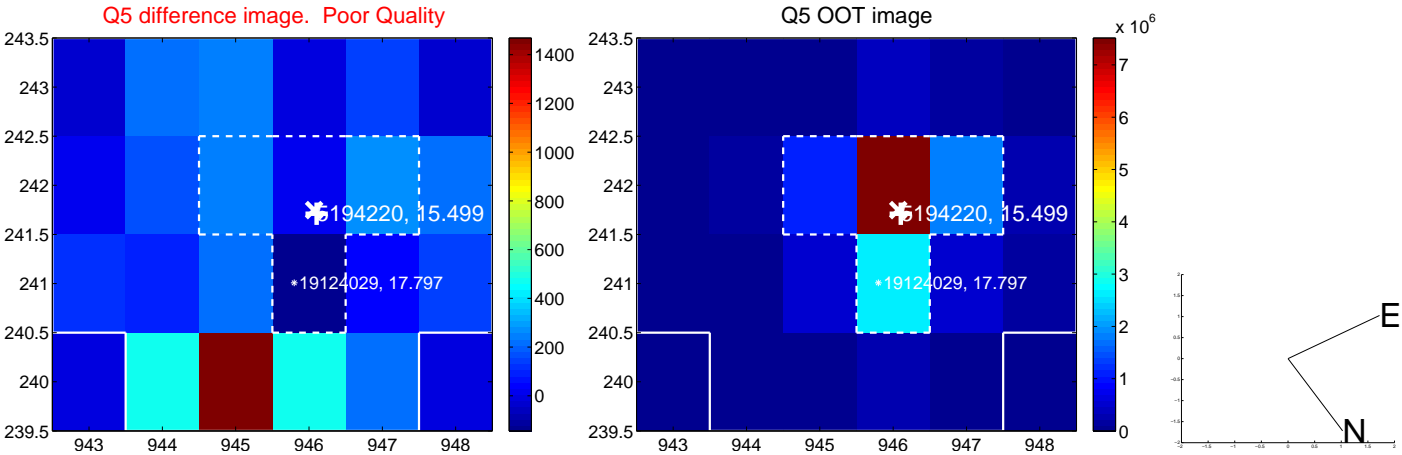


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

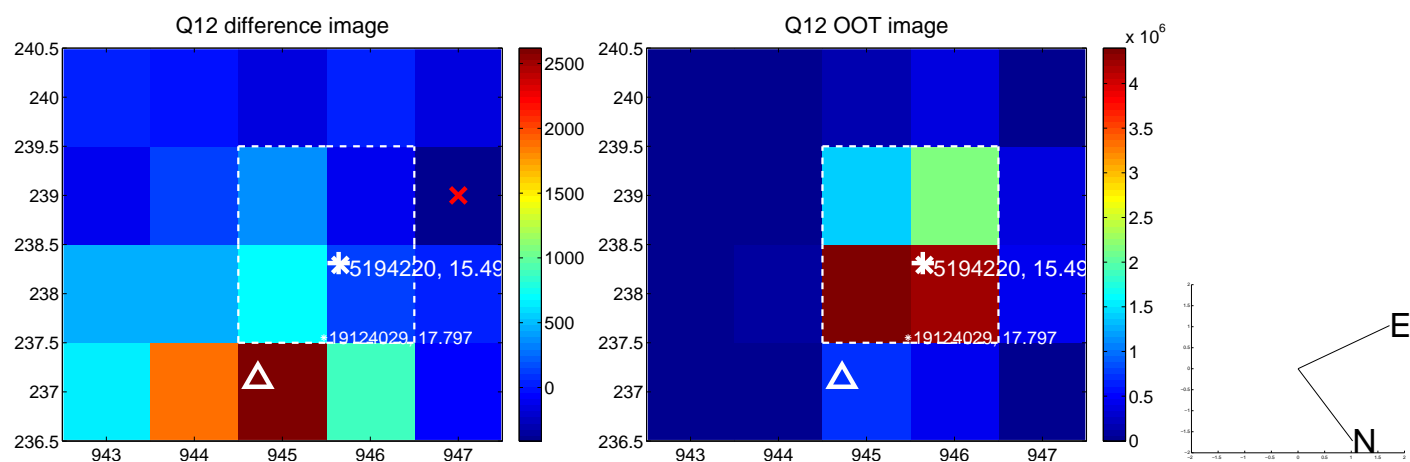
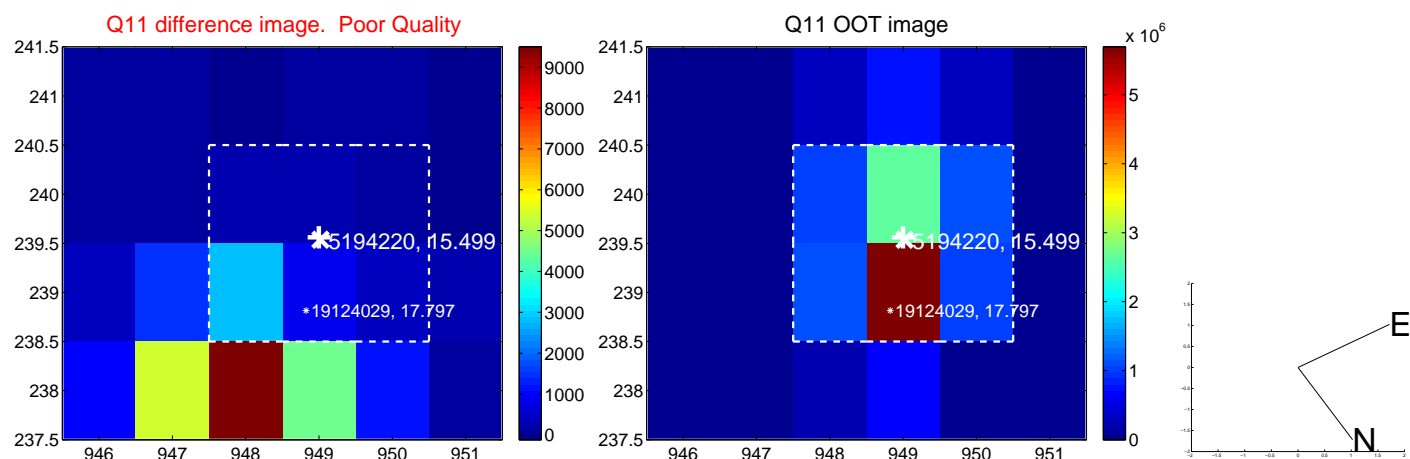
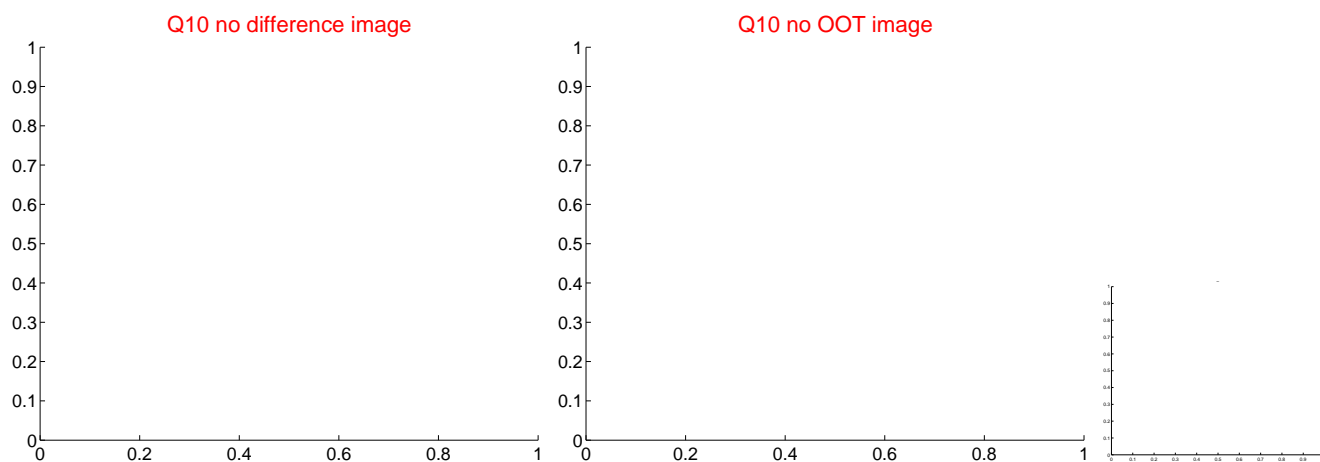
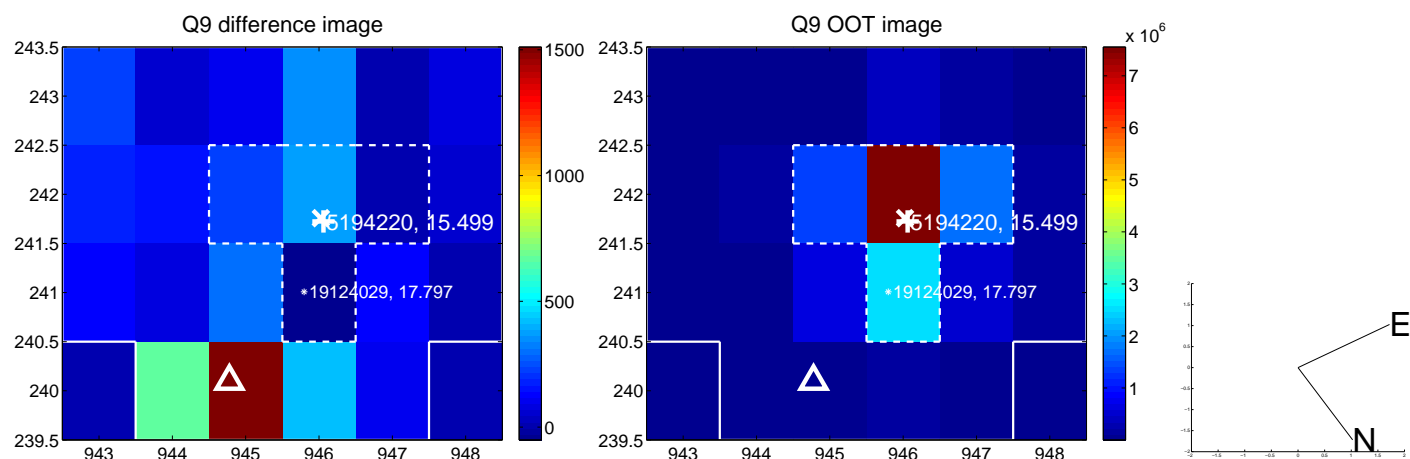


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

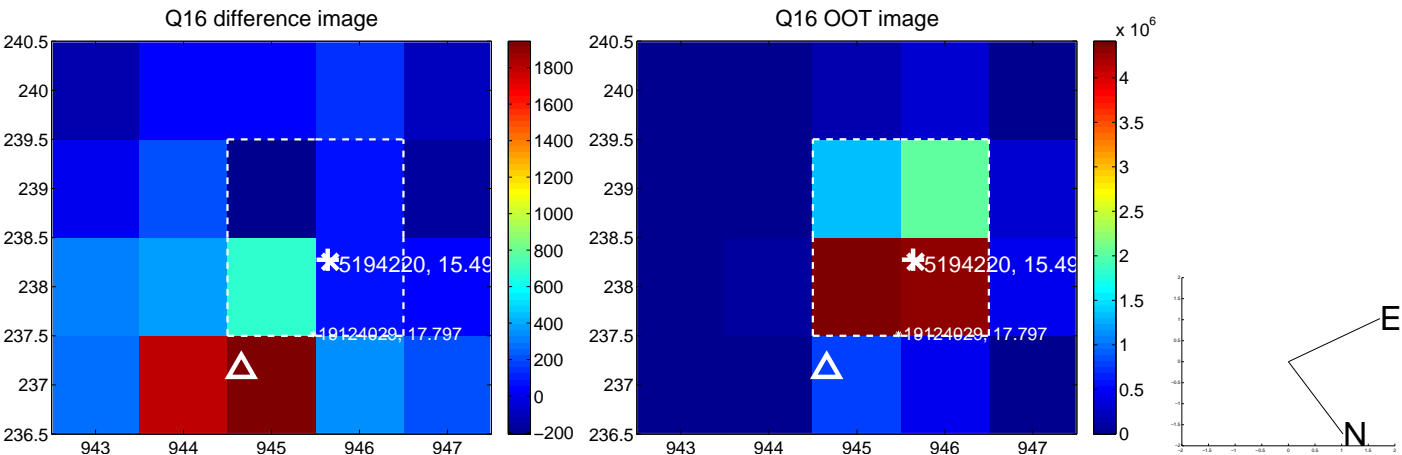
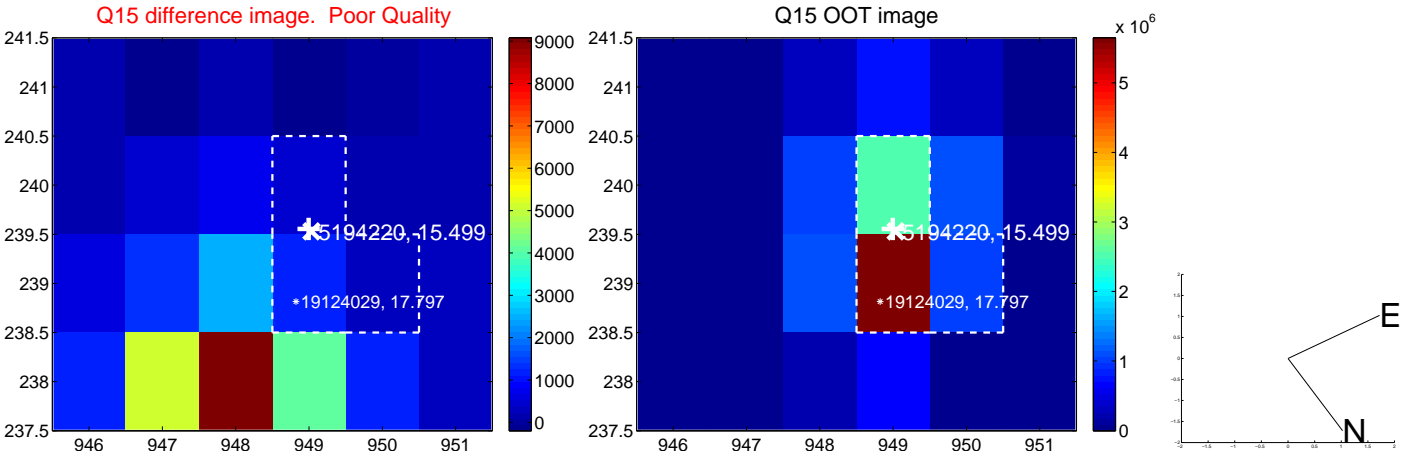
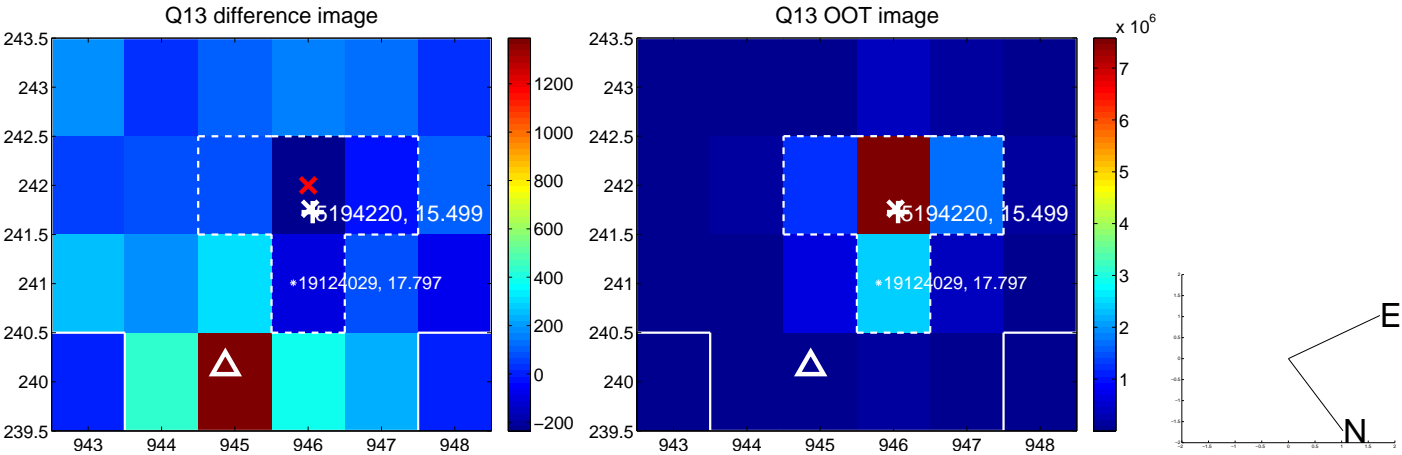




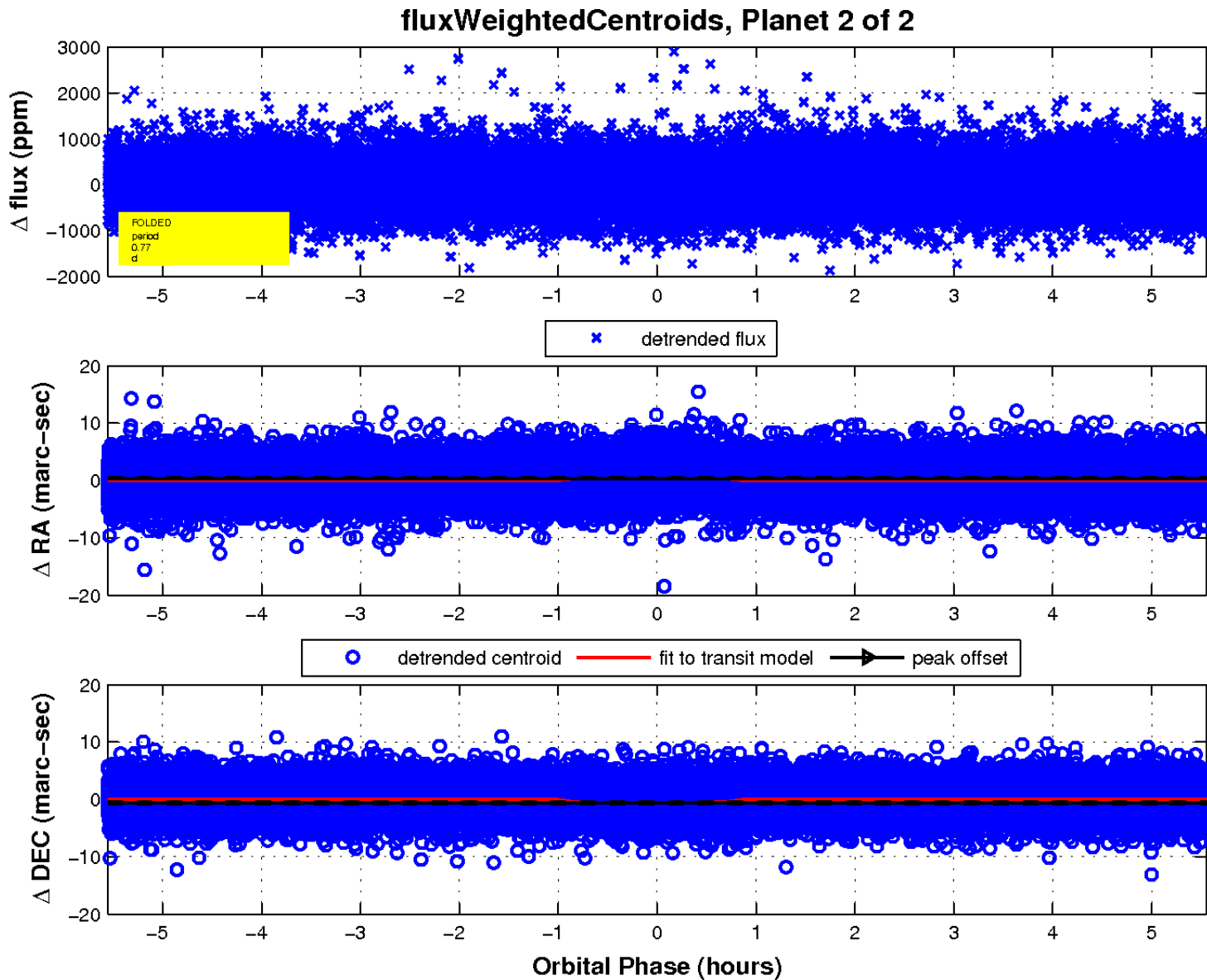
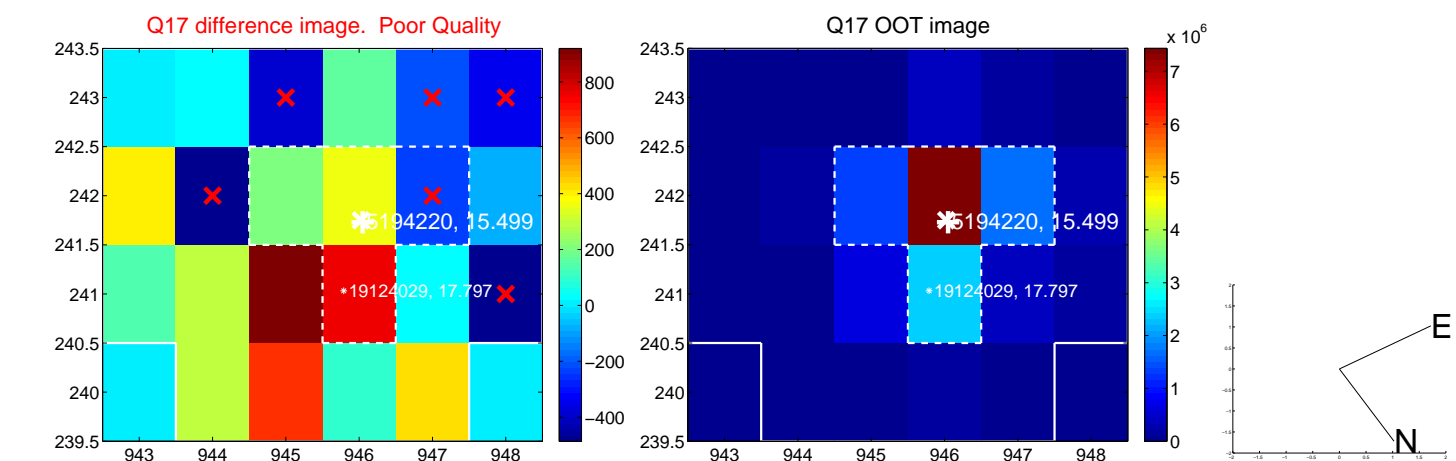
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

