

# KIC 009413057

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009413057-01	OBS	No	0.547080	131.966661	151.2	0.728	10.4	15.3	3.90	8631	5.63	0.00
009413057-02	OBS	No	0.547081	131.808691	197.3	0.848	10.8	21.8	3.90	8631	5.95	0.00
009413057-03	OBS	No	0.547079	131.651666	53.3	1.481	11.6	8.0	3.90	8631	2.93	0.00

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009413057-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
009413057-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD—CENT_SATURATED
009413057-03	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—SAME_NTL_PERIOD—CENT_SATURATED

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

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

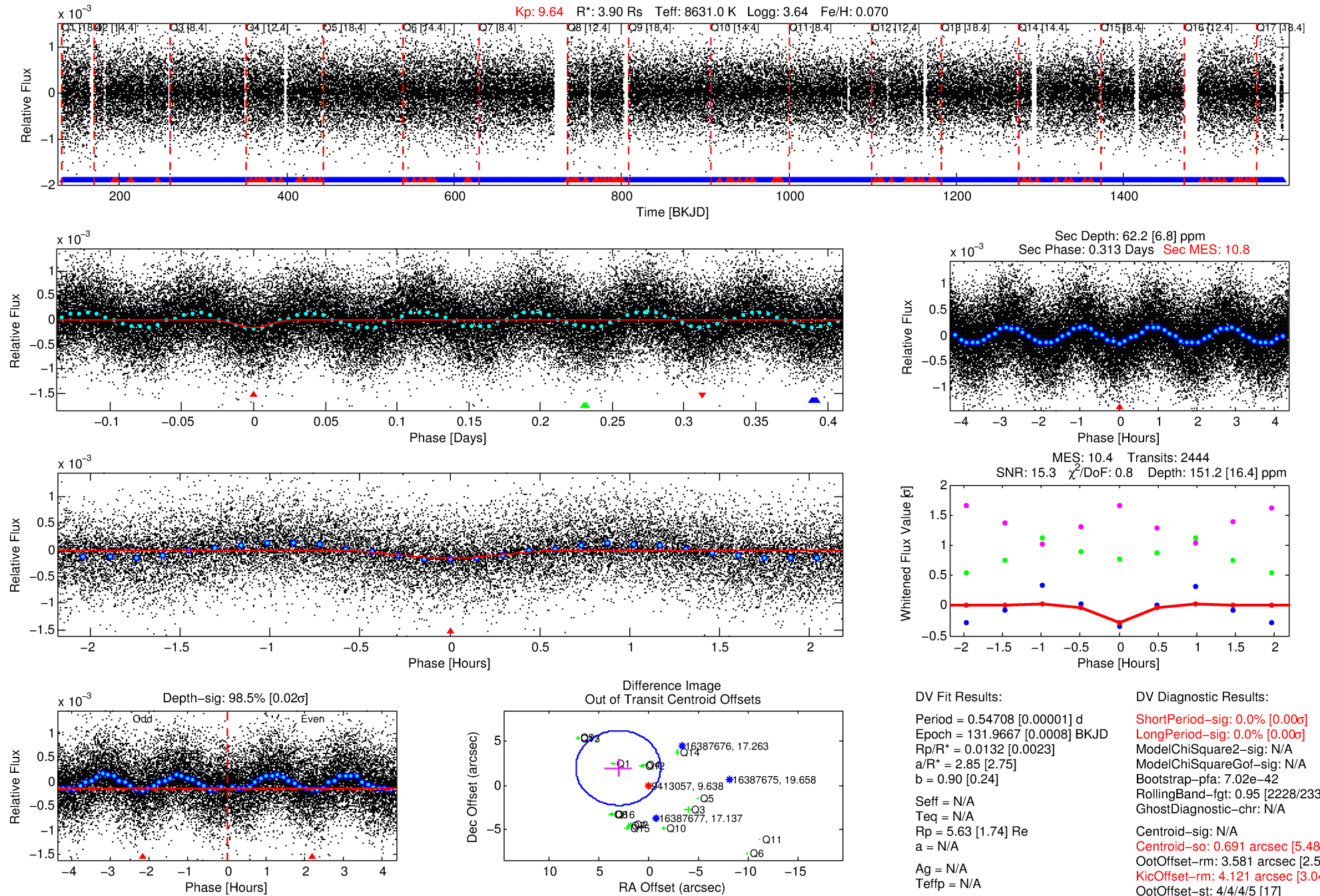
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009413057-01

No Significant Match Found

# DV One-Page Summary

KIC: 9413057 Candidate: 1 of 3 Period: 0.547 d



## DV Fit Results:

Period = 0.54708 [0.00001] d  
Epoch = 131.9667 [0.0008] BKJD  
Rp/R\* = 0.0132 [0.0023]  
a/R\* = 2.85 [2.75]  
b = 0.90 [0.24]  
Seff = N/A  
Teq = N/A  
Rp = 5.63 [1.74] Re  
a = N/A  
Ag = N/A  
Teffp = N/A

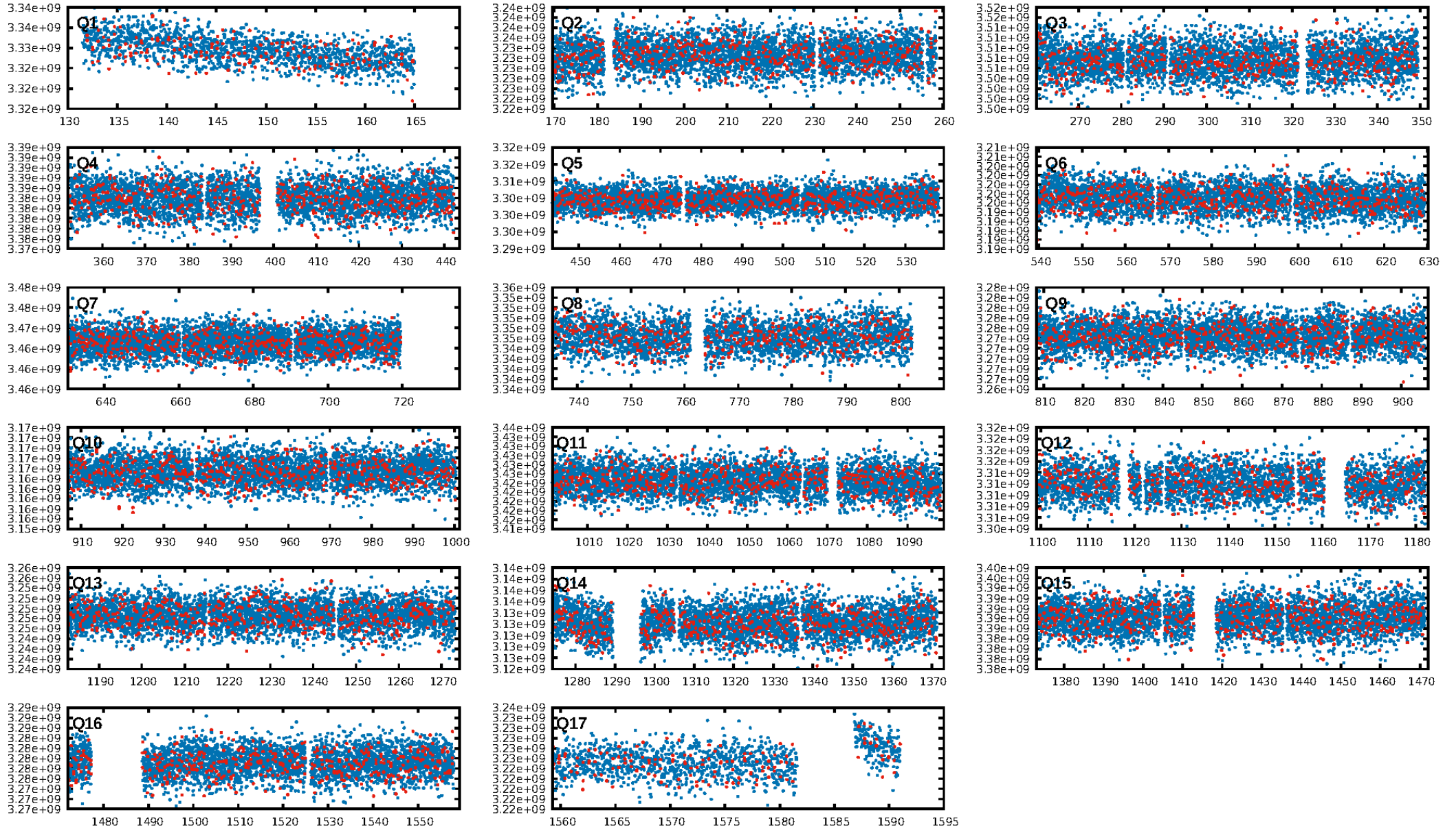
## DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]  
LongPeriod-sig: 0.0% [0.00σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 7.02e-42  
RollingBand-fgt: 0.95 [2228/2334]  
GhostDiagnostic-chr: N/A  
Centroid-sig: N/A  
Centroid-so: 0.691 arcsec [5.48σ]  
OotOffset-rm: 3.581 arcsec [2.52σ]  
KicOffset-rm: 4.121 arcsec [3.04σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 0.00 [0/17]  
DiffImageOverlap-fno: 0.00 [0/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 03-Feb-2016 04:03:31 Z

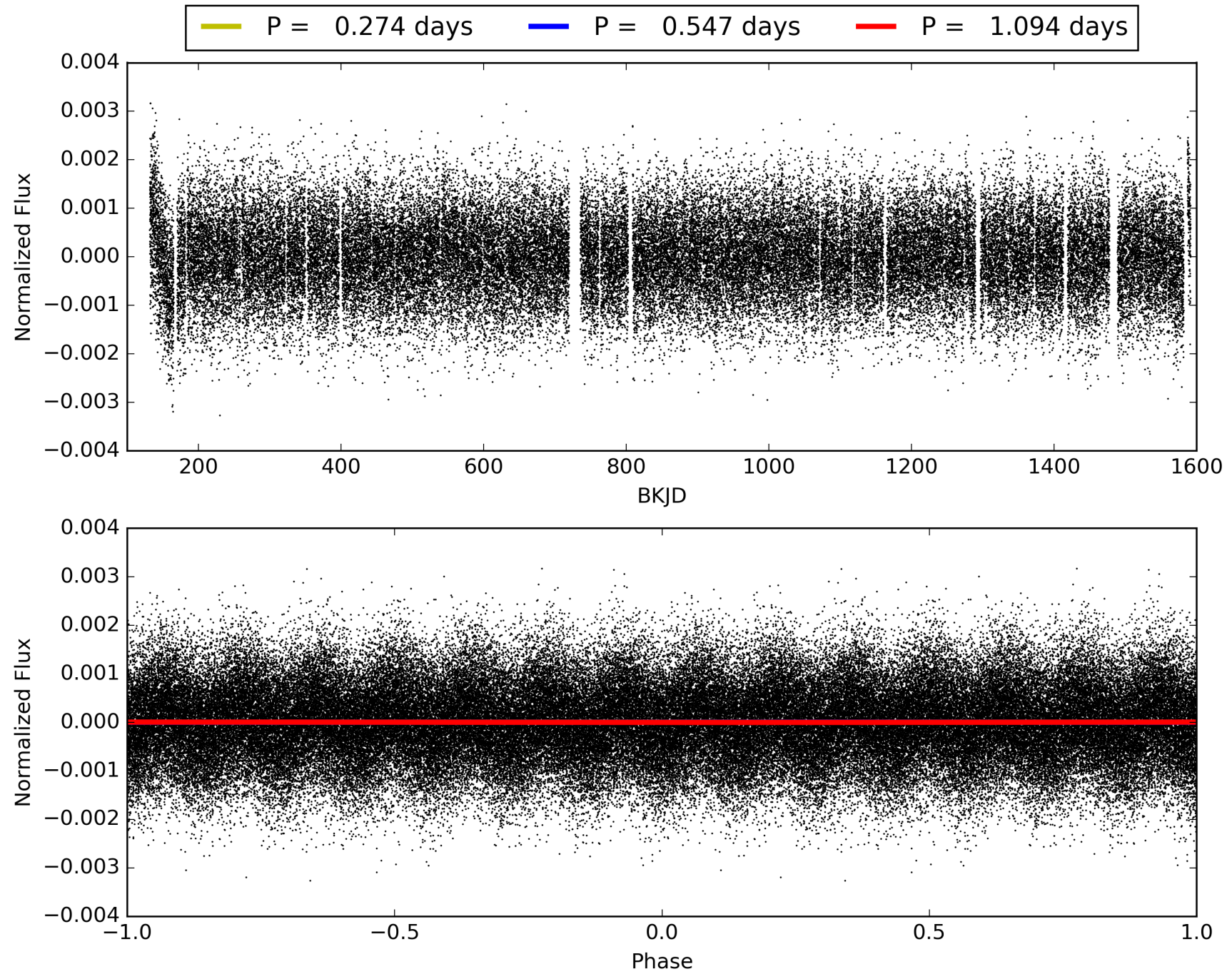
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 009413057-01, PDC Light Curves





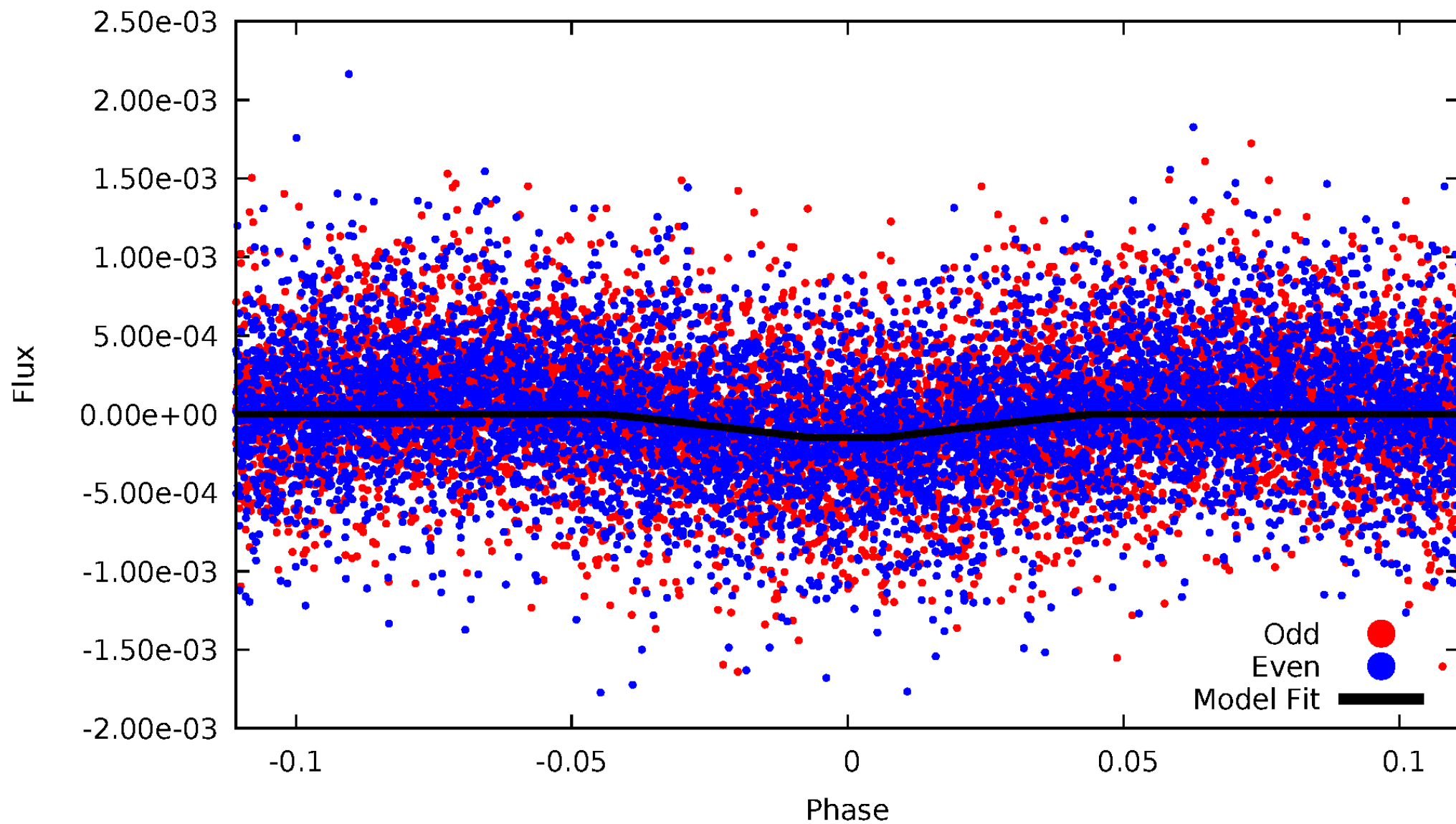
TCE 009413057-01





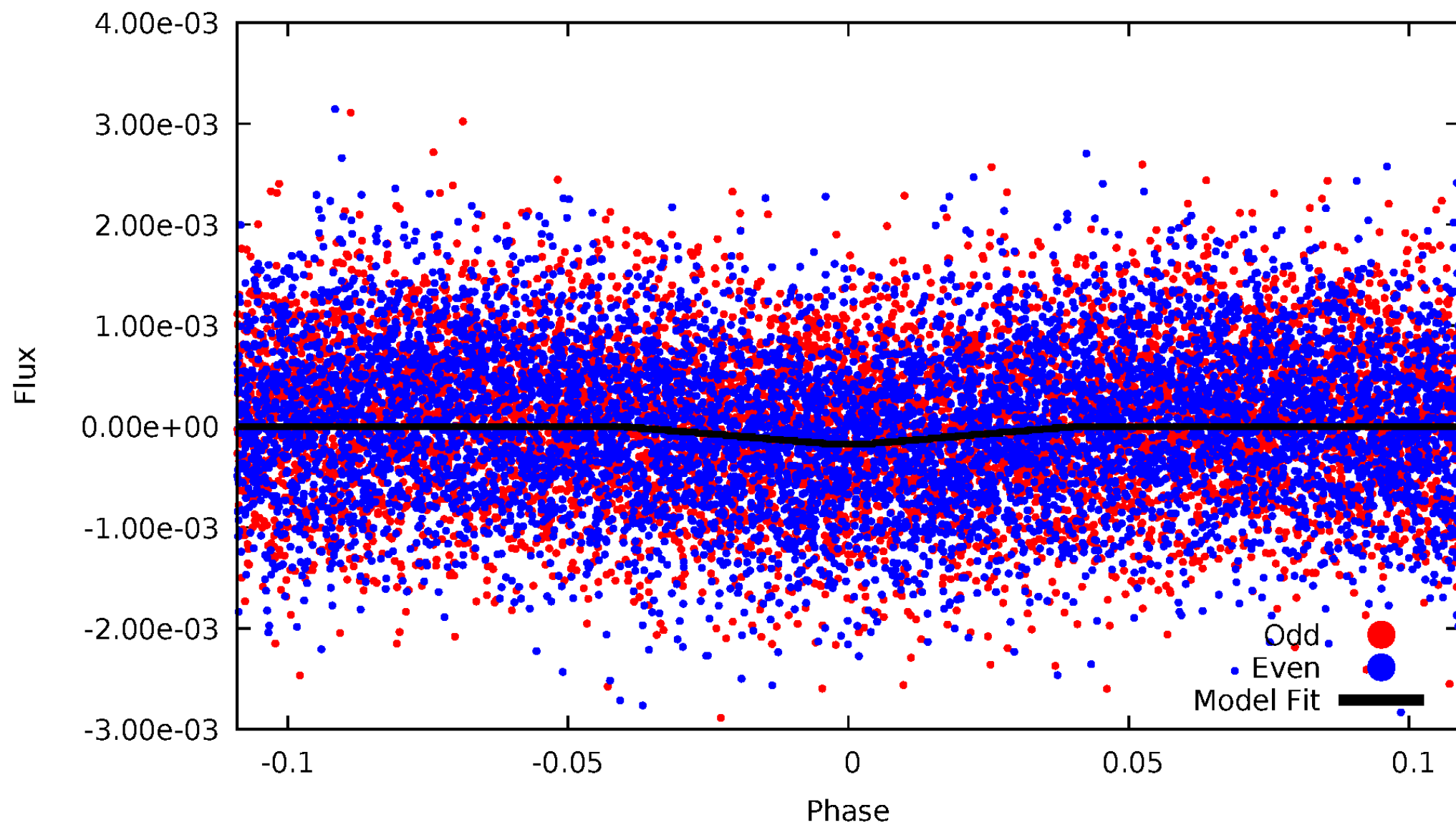
# DV Odd/Even

TCE 009413057-01



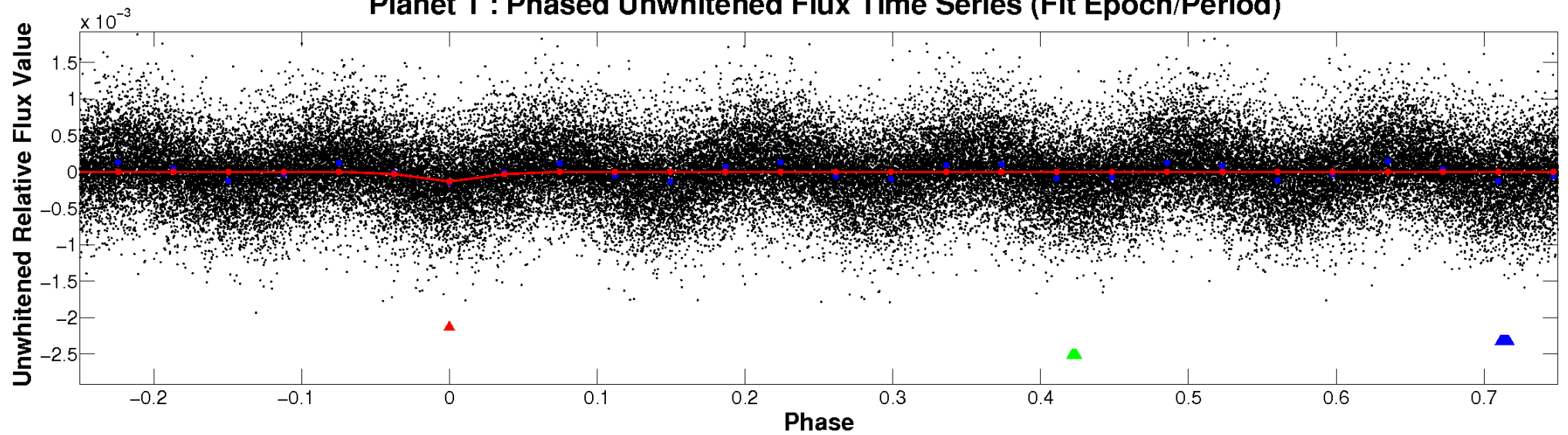
# ALT Odd/Even

TCE 009413057-01

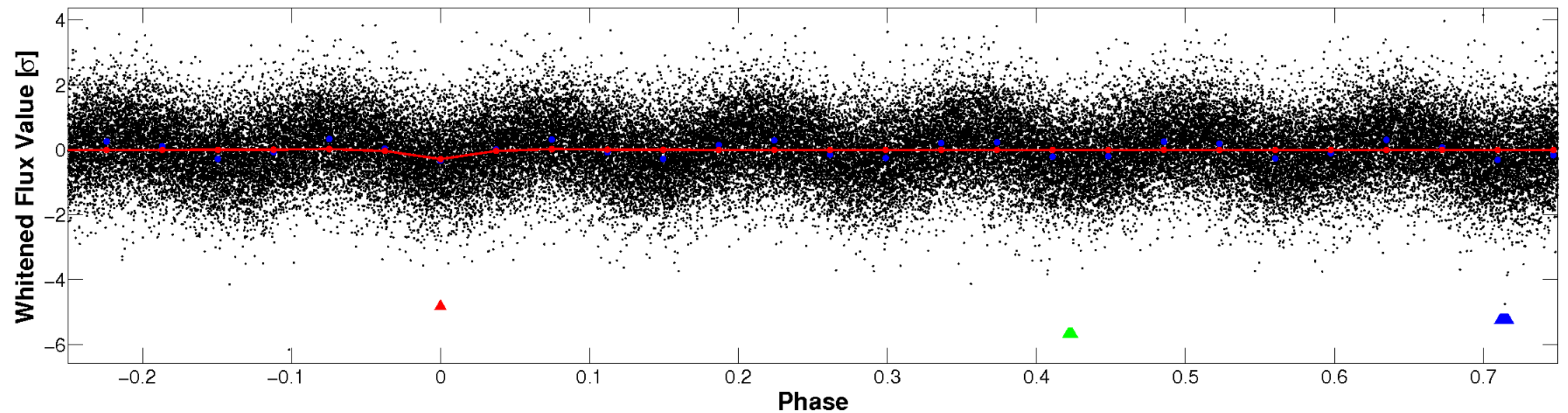


# Non-Whitened Vs. Whitened Light Curve

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



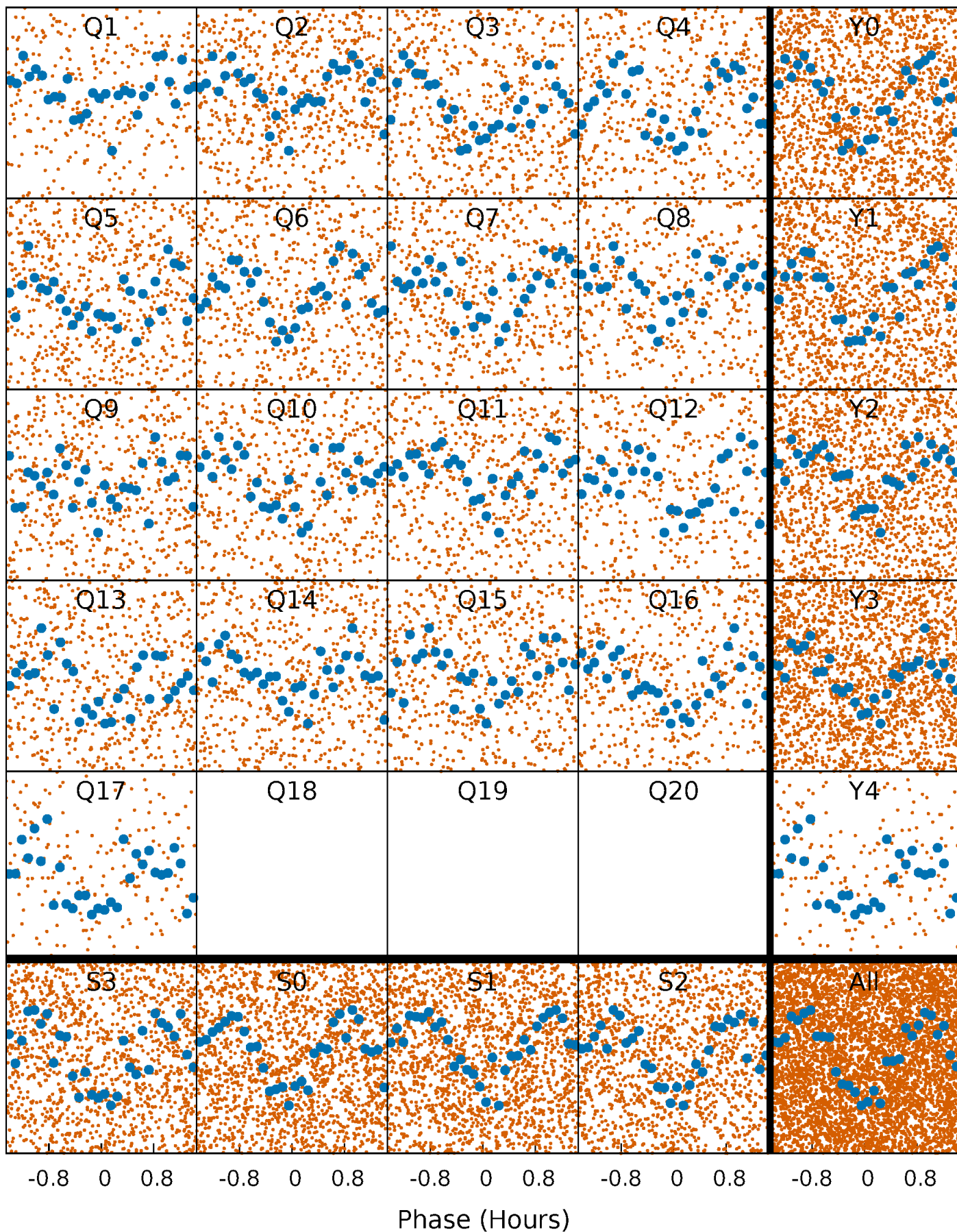
## Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)





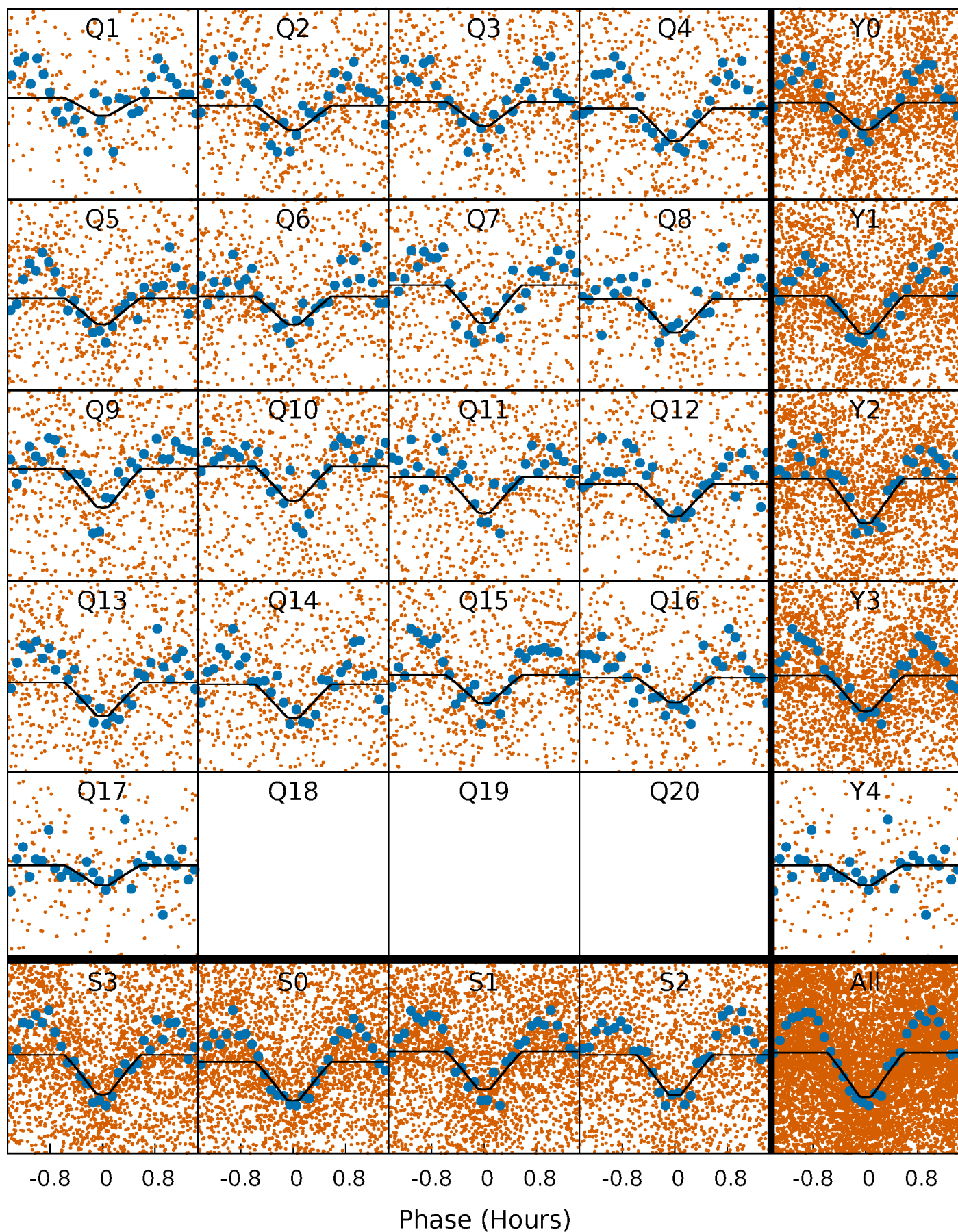
# PDC Quarter-Phased Transit Curves

TCE 009413057-01 P= 0.547080 Days  $T_0=131.966661$  (BKJD)



# DV Quarter-Phased Transit Curves

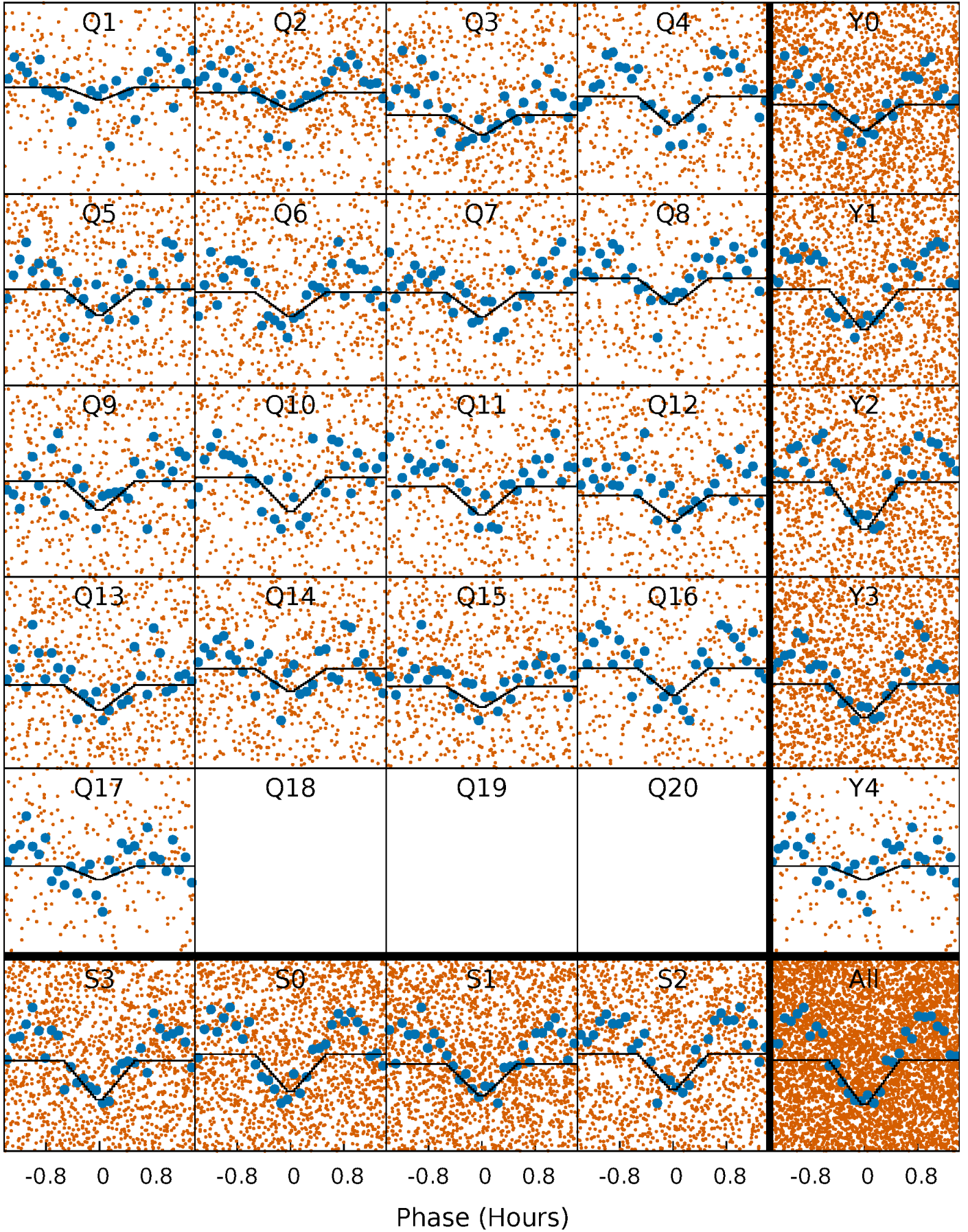
TCE 009413057-01 P= 0.547080 Days  $T_0=131.966661$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

TCE 009413057-01 P= 0.547081 Days  $T_0=131.966698$  (BKJD)

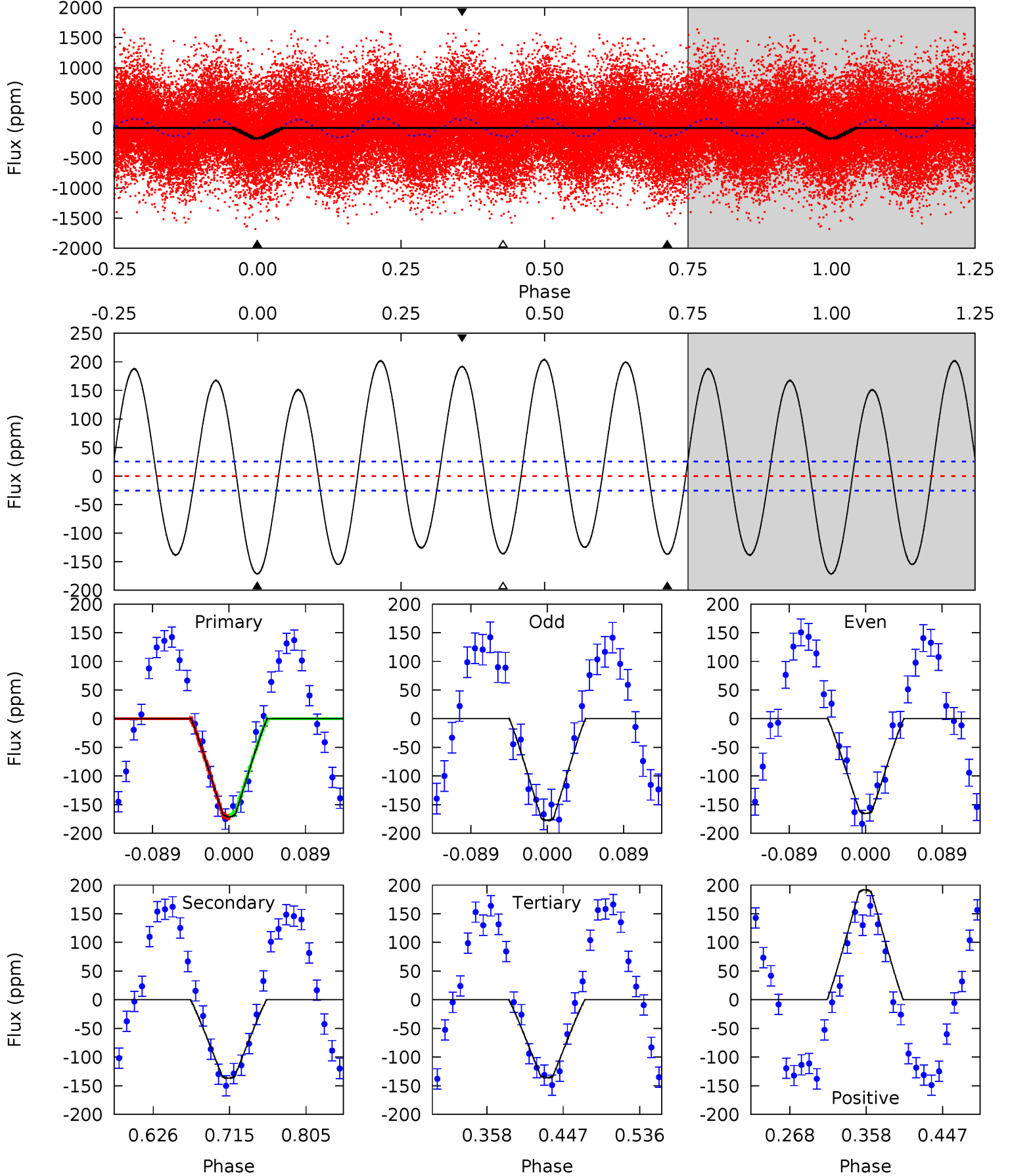




# DV Model-Shift Uniqueness Test

009413057-01, P = 0.547080 Days, E = 131.419581 Days

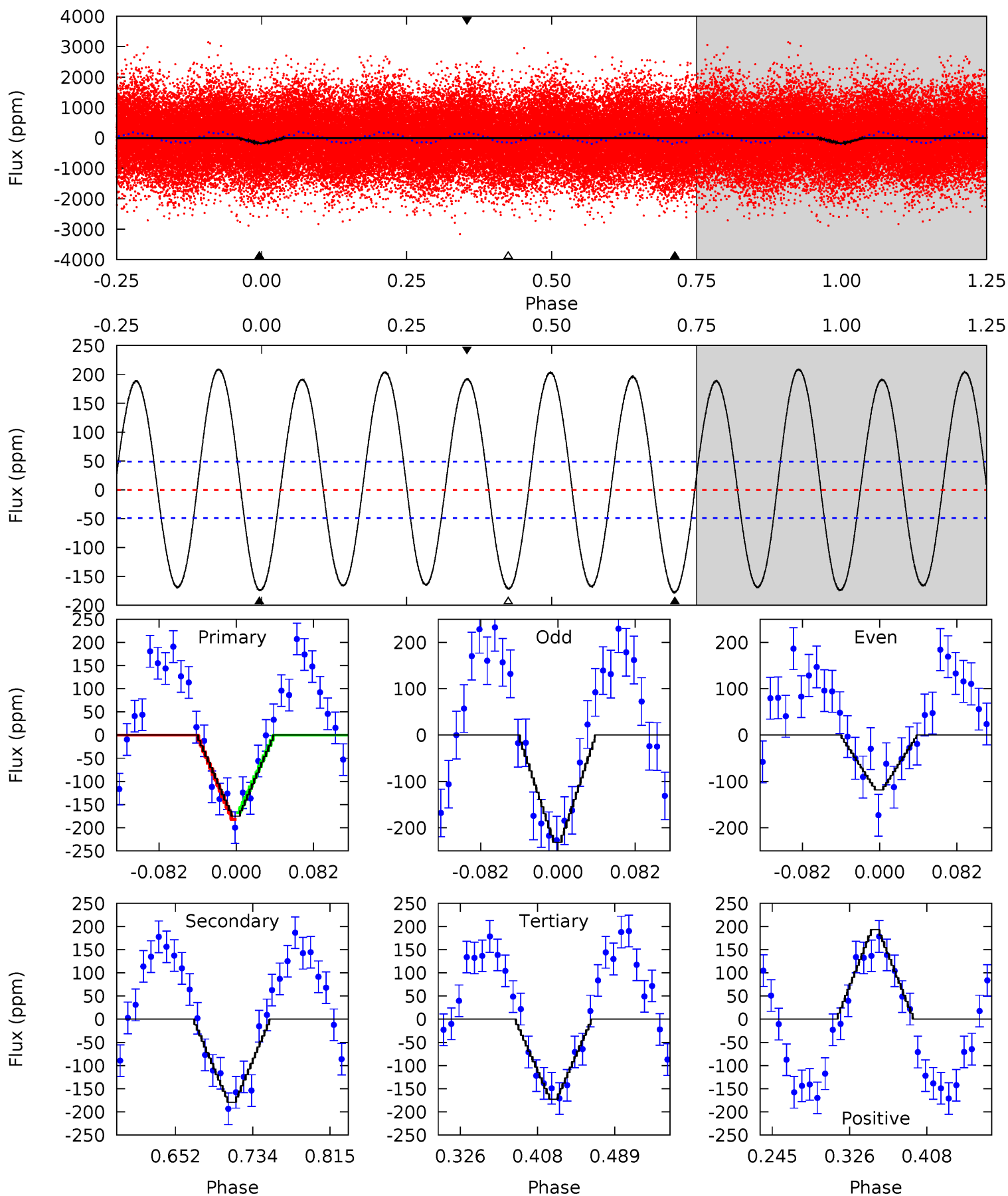
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
31.0	24.8	24.6	34.7	4.59	1.70	20.4	6.37	-3.70	0.13	-9.94	1.11	1.01	0.54	0.36



# Alt Model-Shift Uniqueness Test

009413057-01, P = 0.547081 Days, E = 131.419617 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
16.5	16.9	16.3	18.2	4.61	1.74	11.9	0.24	-1.71	0.64	-1.30	5.30	1.02	0.54	0.68



### Stellar Parameters For KIC 009413057

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$8631^{+172}_{-206}$	$3.644^{+0.210}_{-0.090}$	$0.070^{+0.050}_{-0.450}$	$3.904^{+0.666}_{-1.000}$	$2.449^{+0.293}_{-0.403}$	$0.058^{+0.064}_{-0.019}$
	+2%/-2%	+6%/-2%	+71%/-643%	+17%/-26%	+12%/-16%	+111%/-33%
Source	SPE4	SPE4	SPE4	DSEP		

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

### Secondary Eclipse Parameters for KIC 009413057-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-137 \pm 6$	$5.40^{+1.21}_{-1.15}$	$7806^{+368}_{-489}$	$6938^{+1307}_{-1055}$	$0.805^{+0.451}_{-0.253}$
Alt.	$-179 \pm 11$	$5.32^{+1.12}_{-1.13}$	$7799^{+421}_{-456}$	$7913^{+1493}_{-1067}$	$1.096^{+0.595}_{-0.362}$

$T_{max}$  = 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

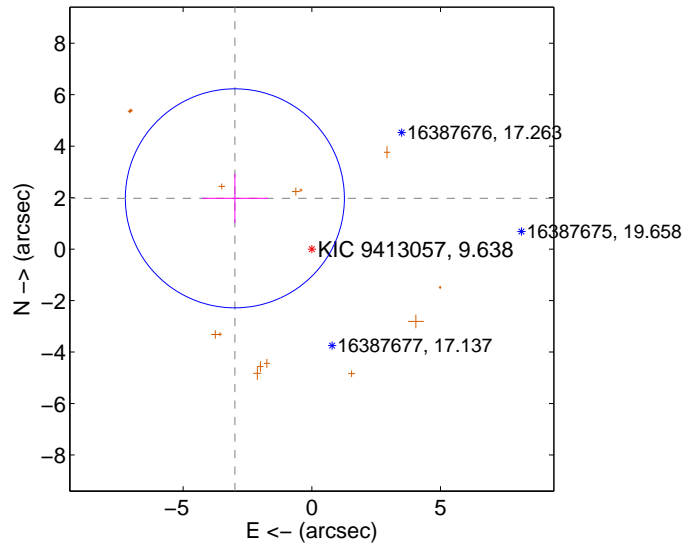
Supplemental centroid analysis for 009413057-01. **Kepler magnitude: 9.64.** Transit SNR 15.31

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

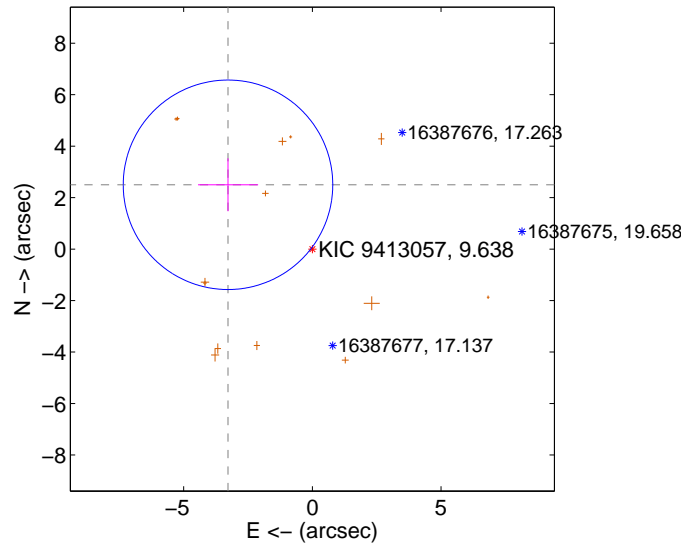
The direct PRF centroid is offset from the target star catalog position by about 1.83 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$3.581 \pm 1.418$	2.52	$2.989 \pm 1.280$	$1.972 \pm 0.953$
PRF-fit source offset from KIC position	$4.121 \pm 1.357$	3.04	$3.277 \pm 1.168$	$2.499 \pm 1.027$
photometric centroid source offset	$0.69 \pm 0.13$	5.48	$0.68 \pm 0.13$	$0.15 \pm 0.09$

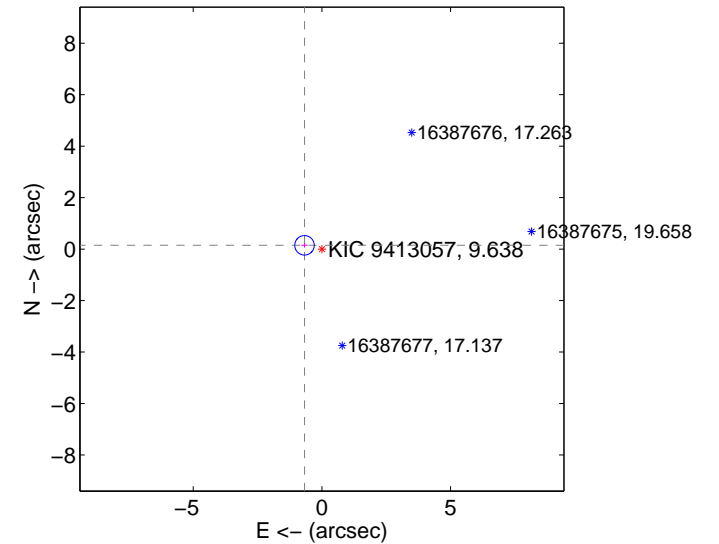
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

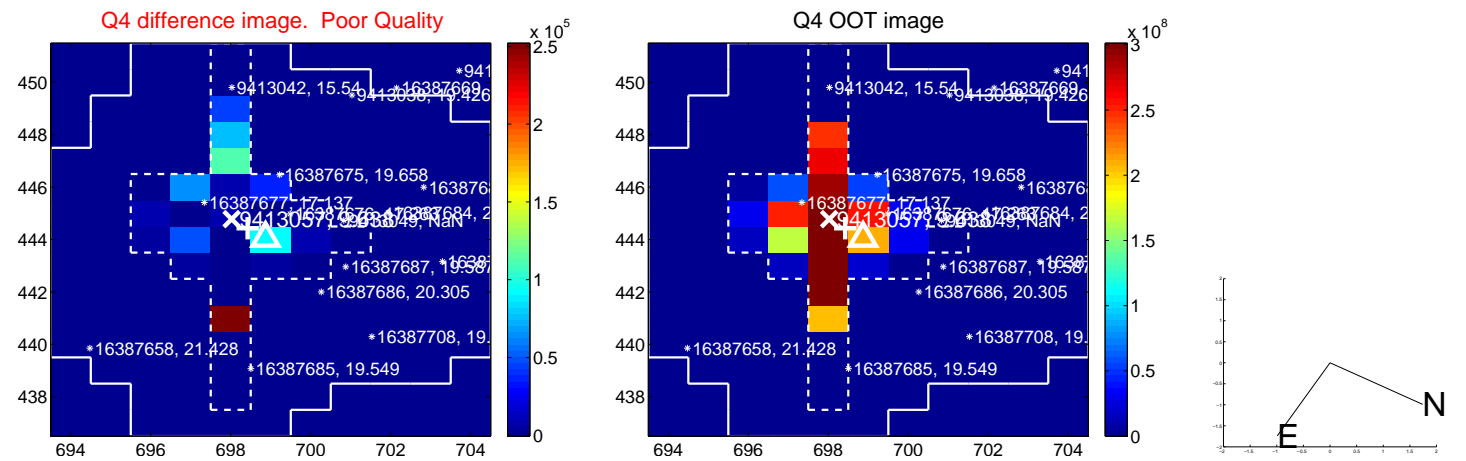
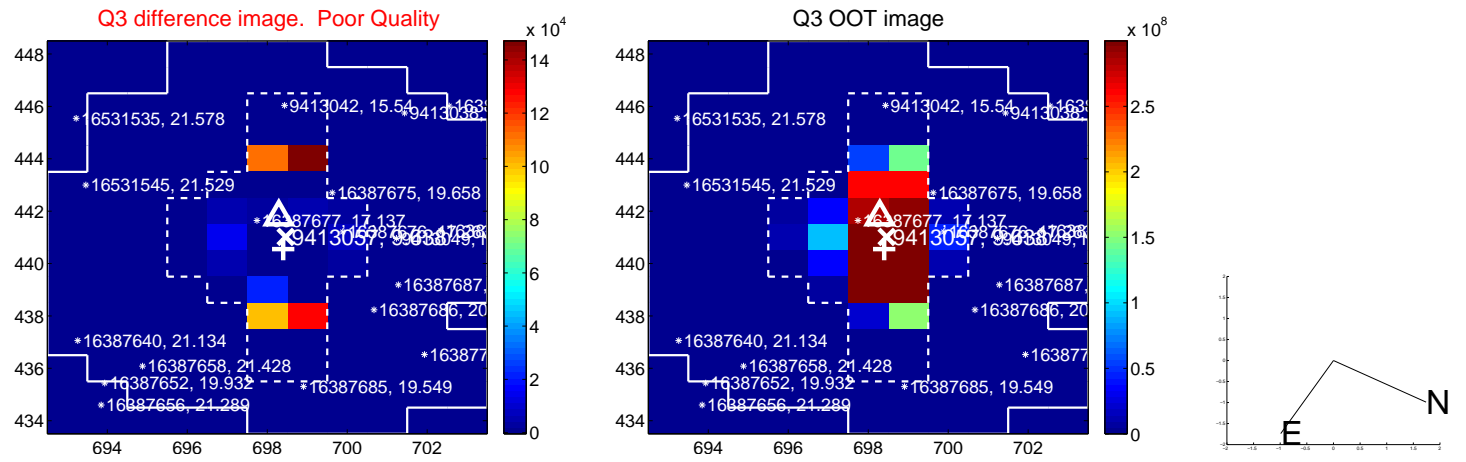
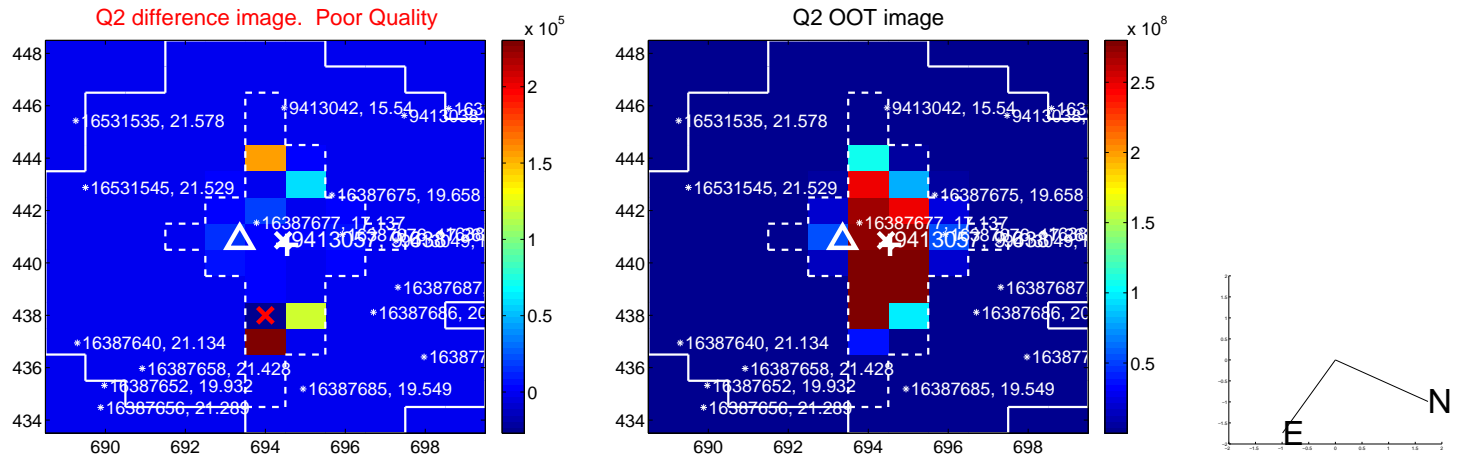
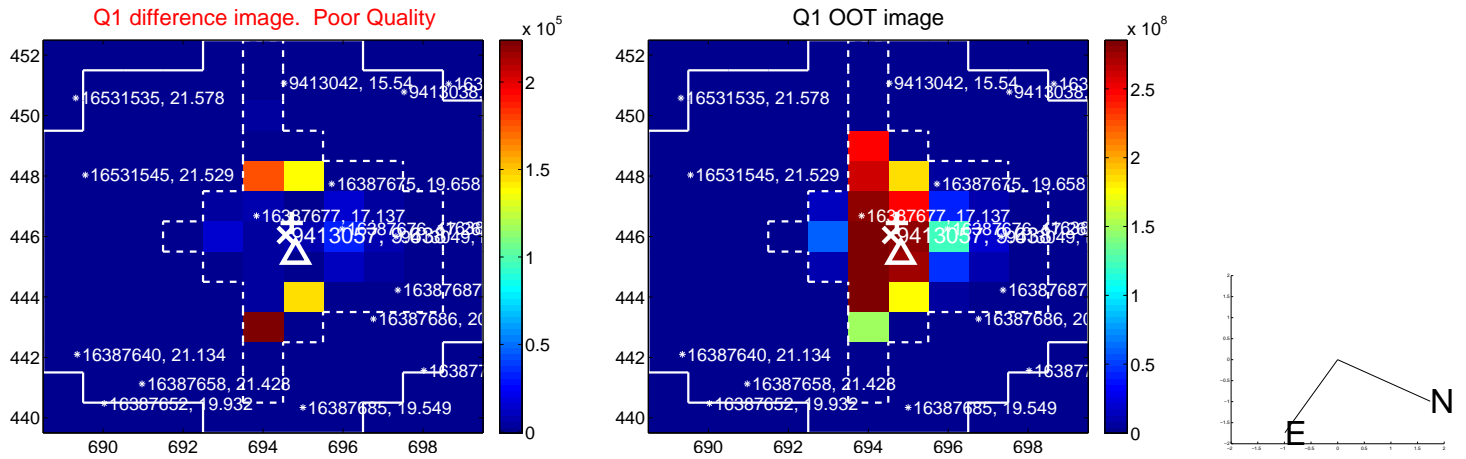


offset from photometric centroids

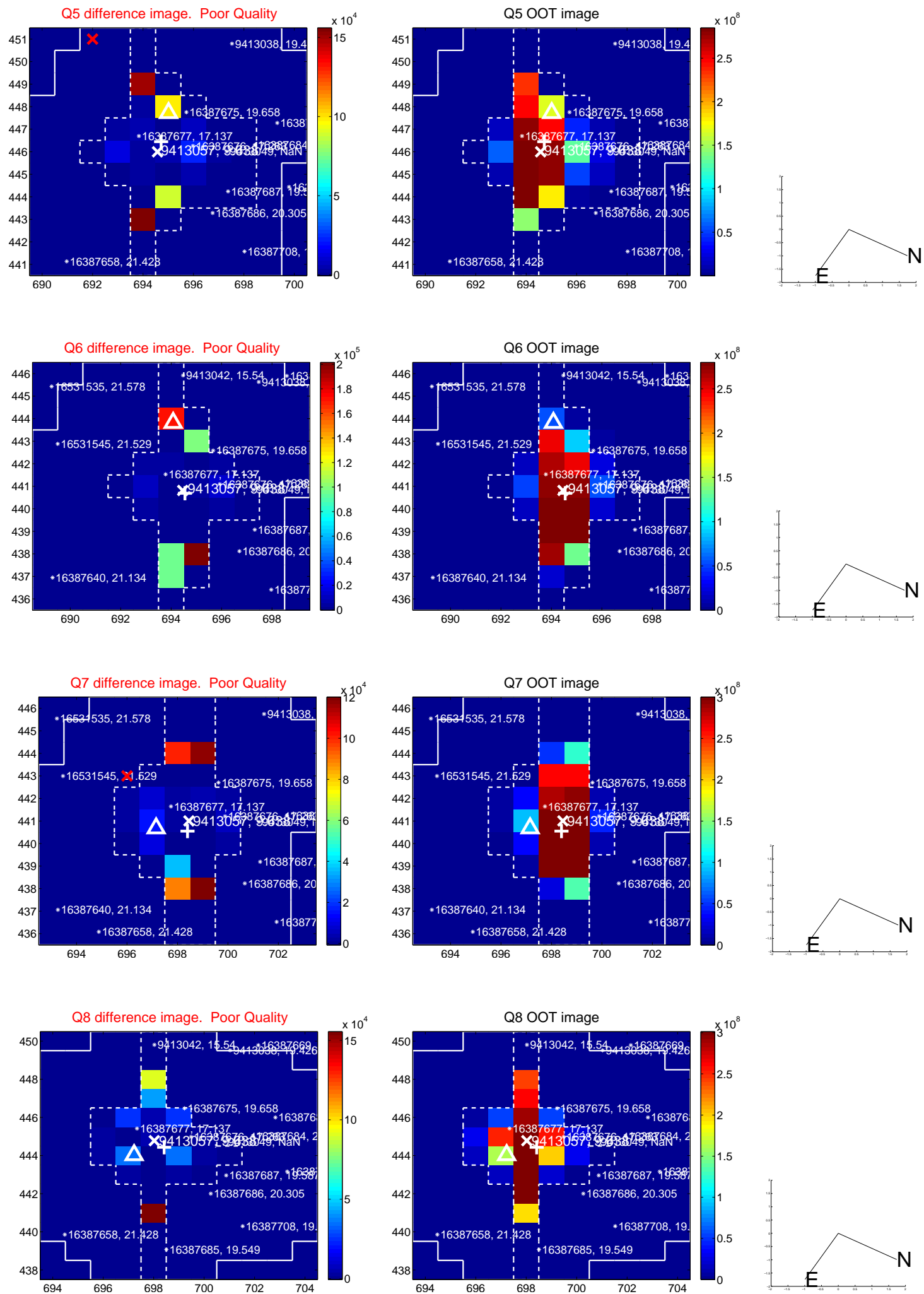


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

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

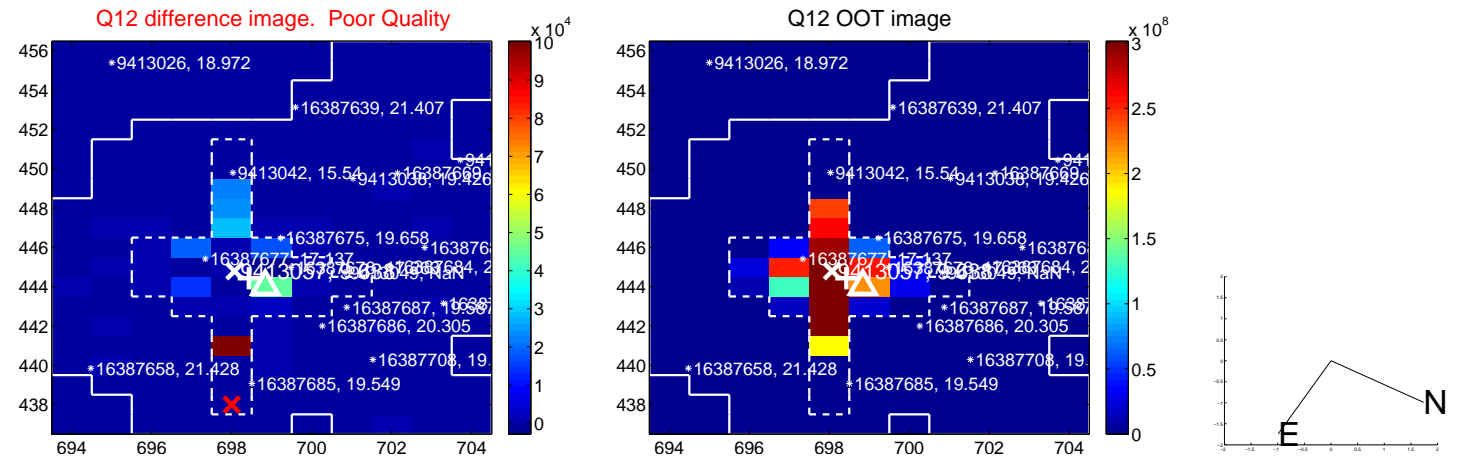
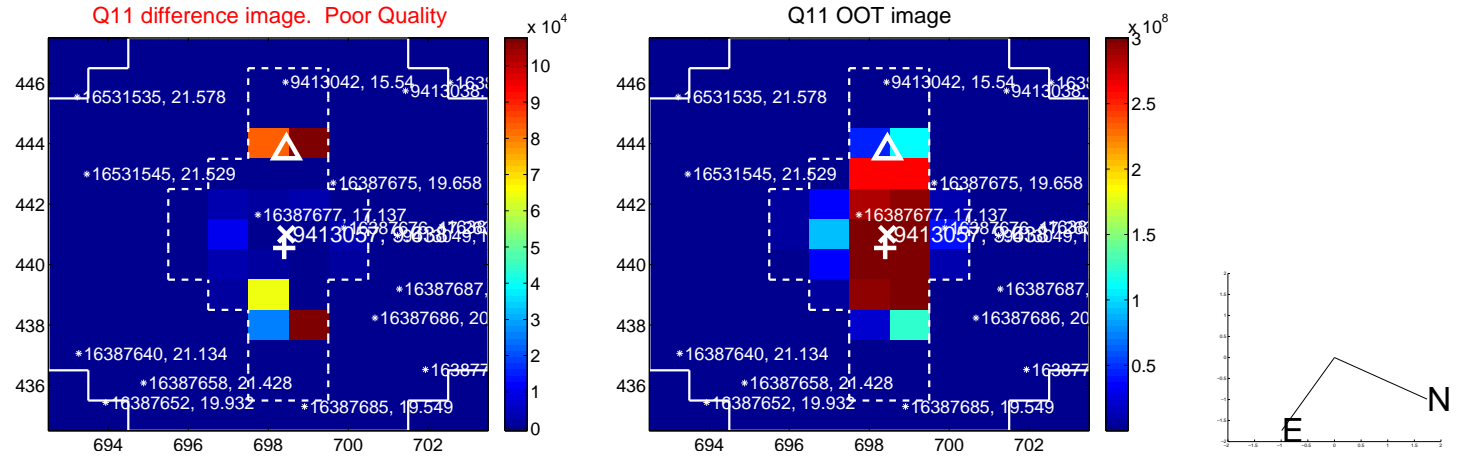
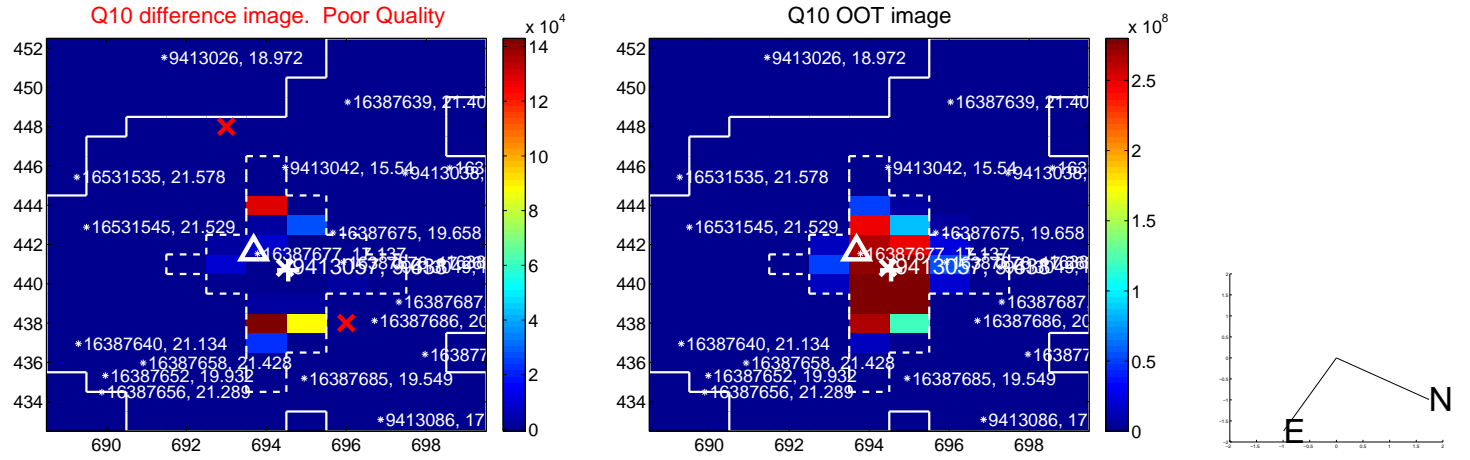
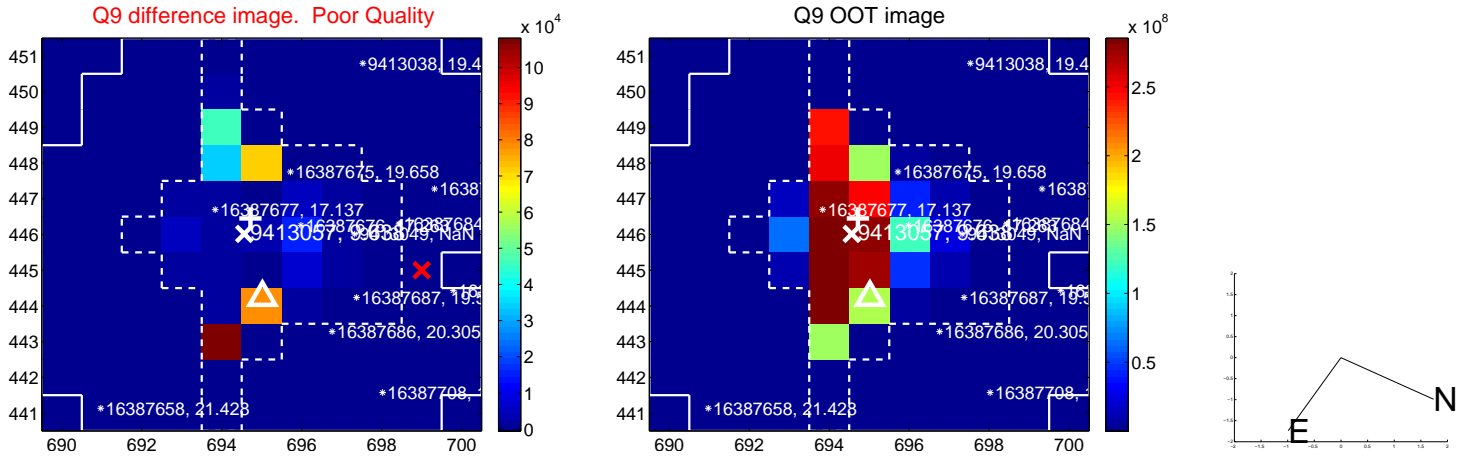


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

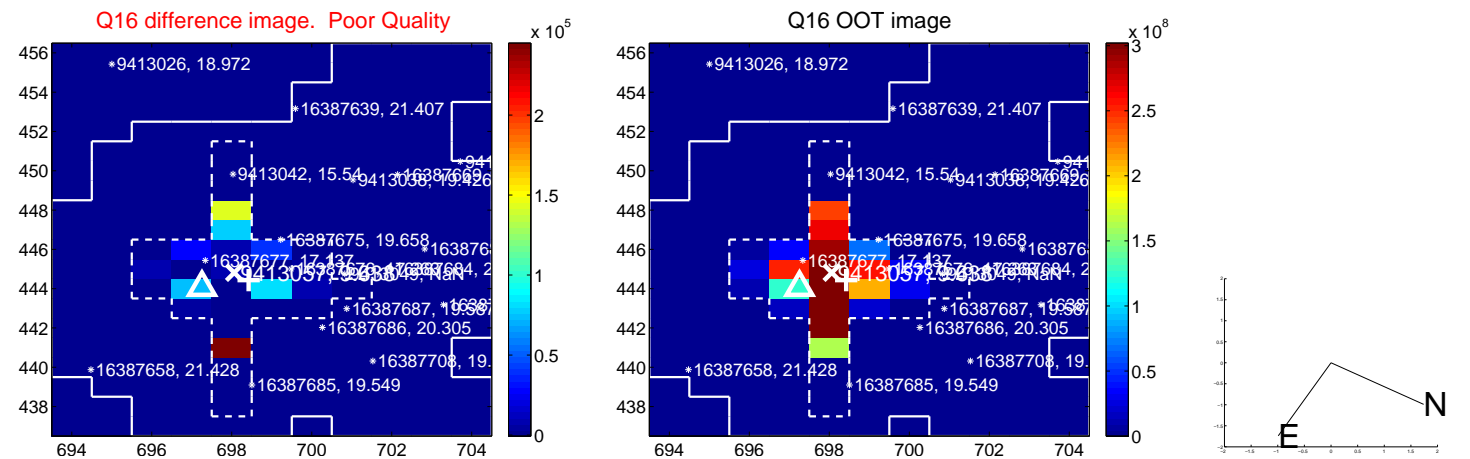
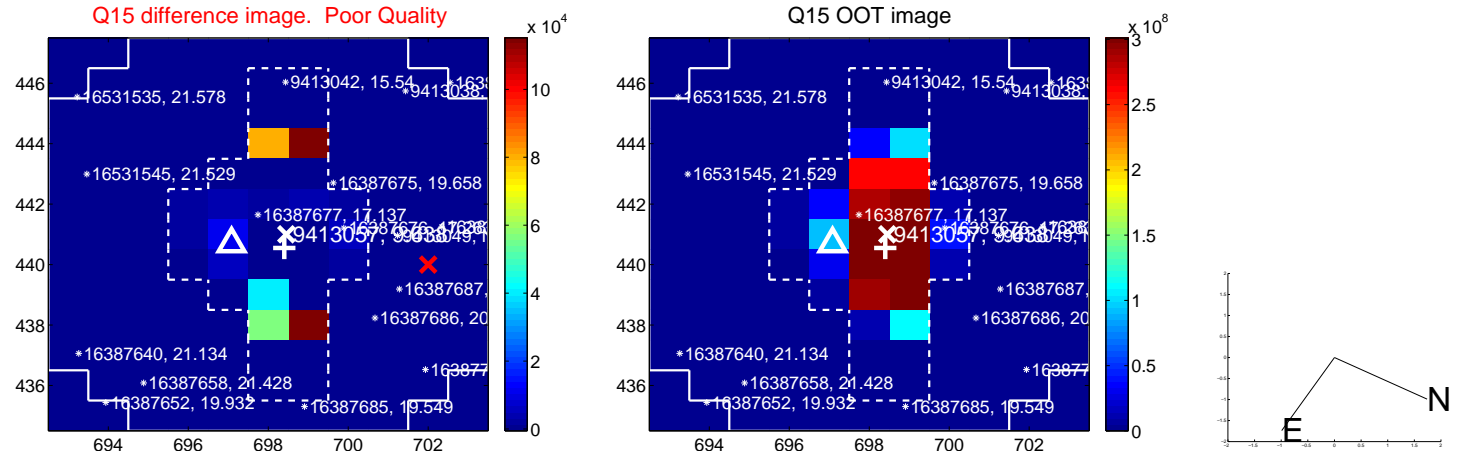
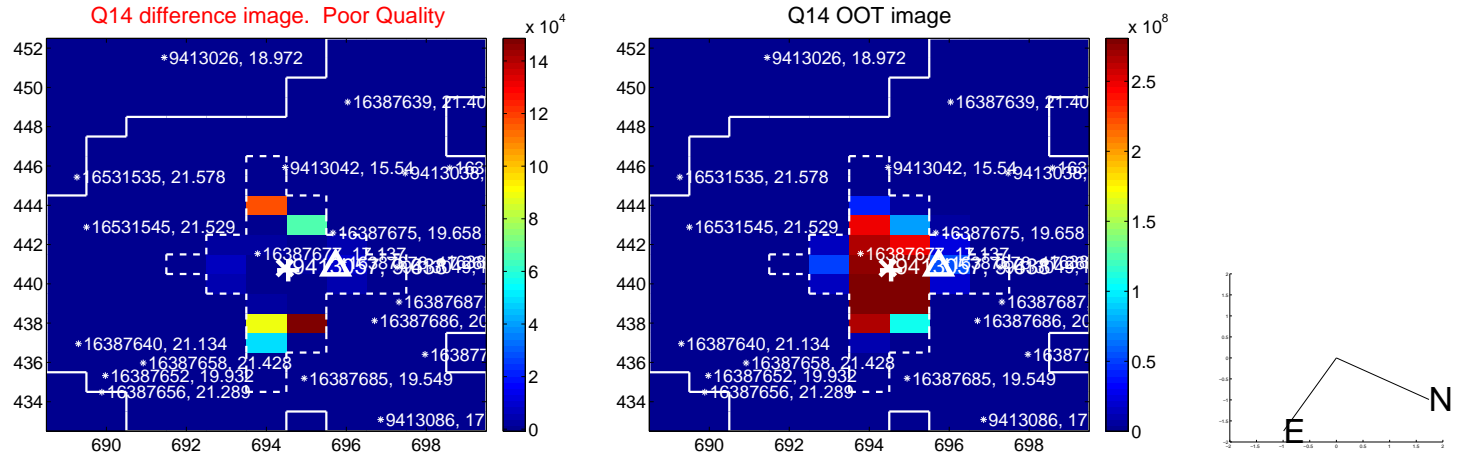
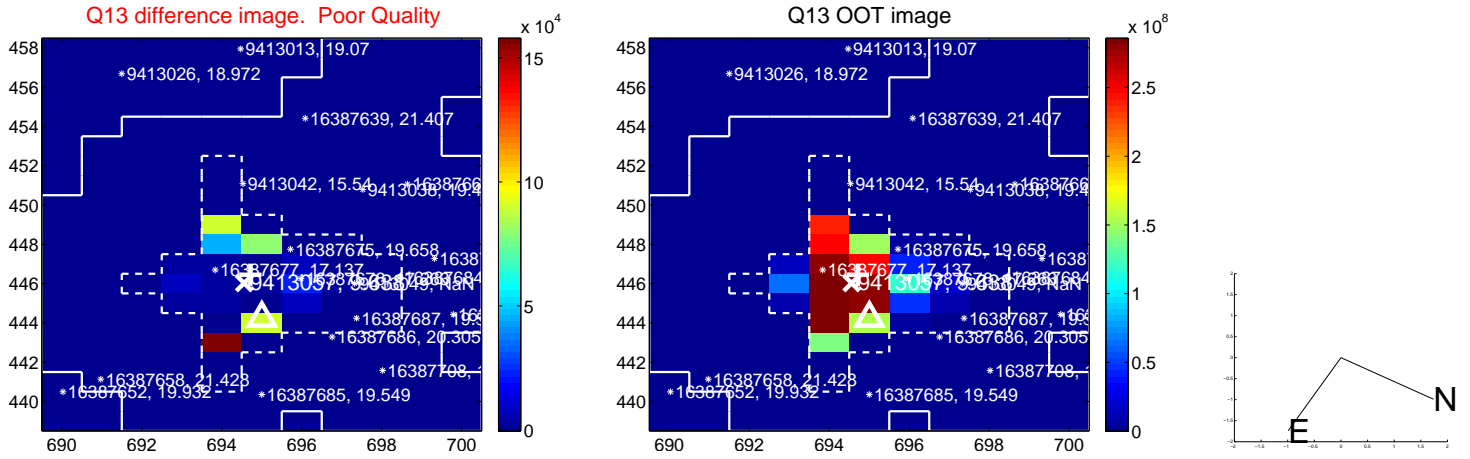




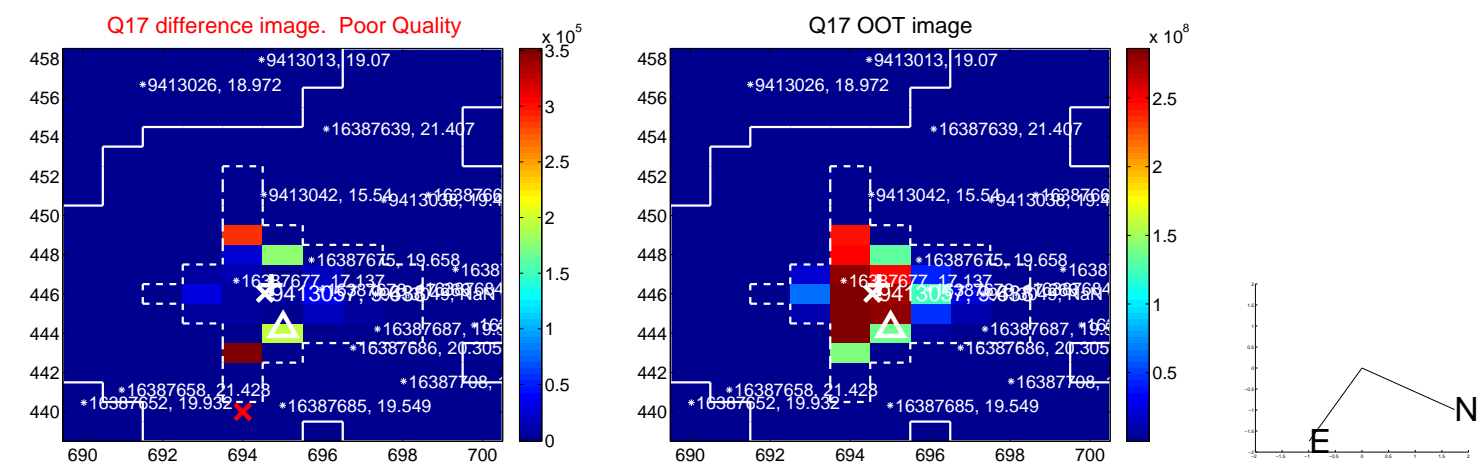
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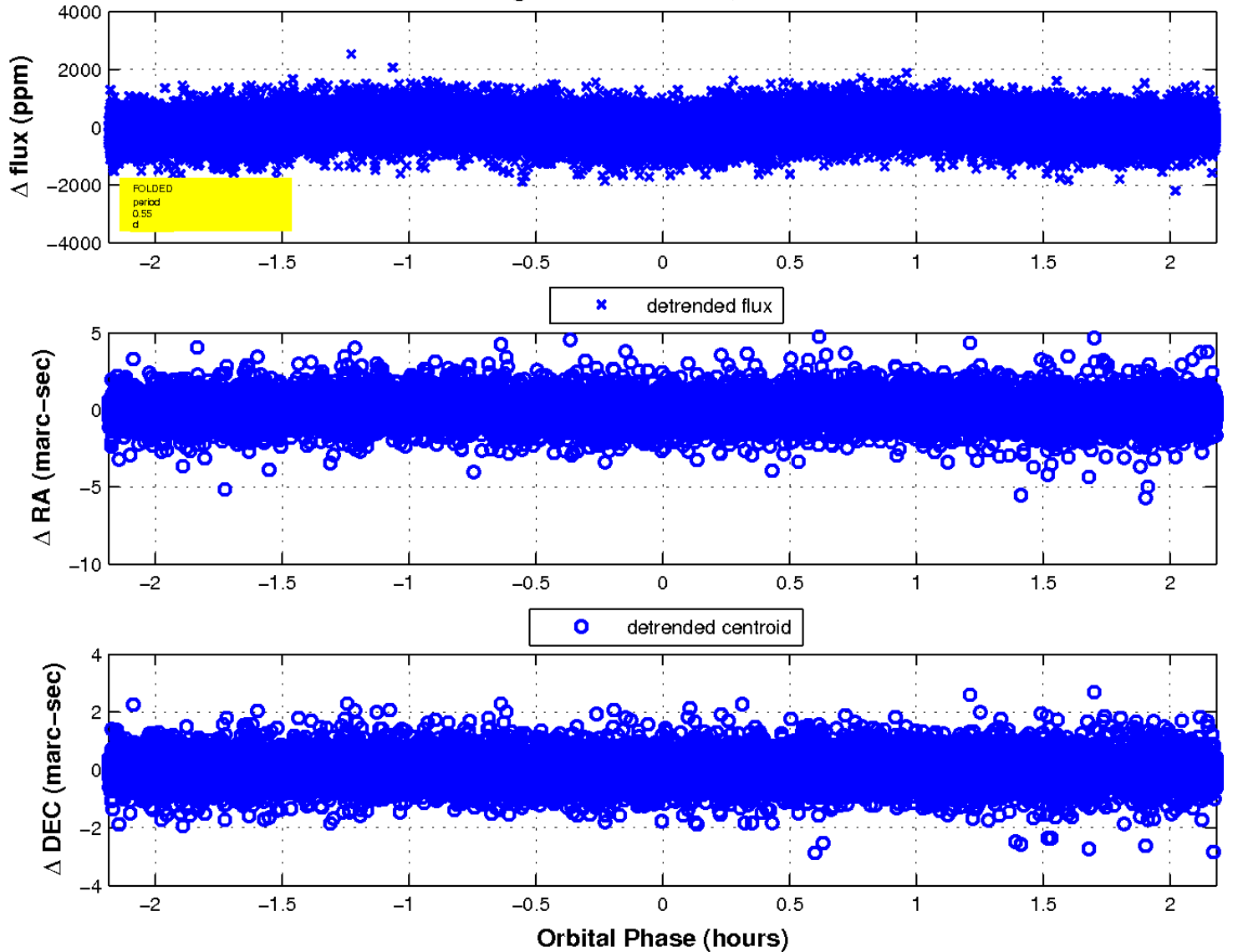
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



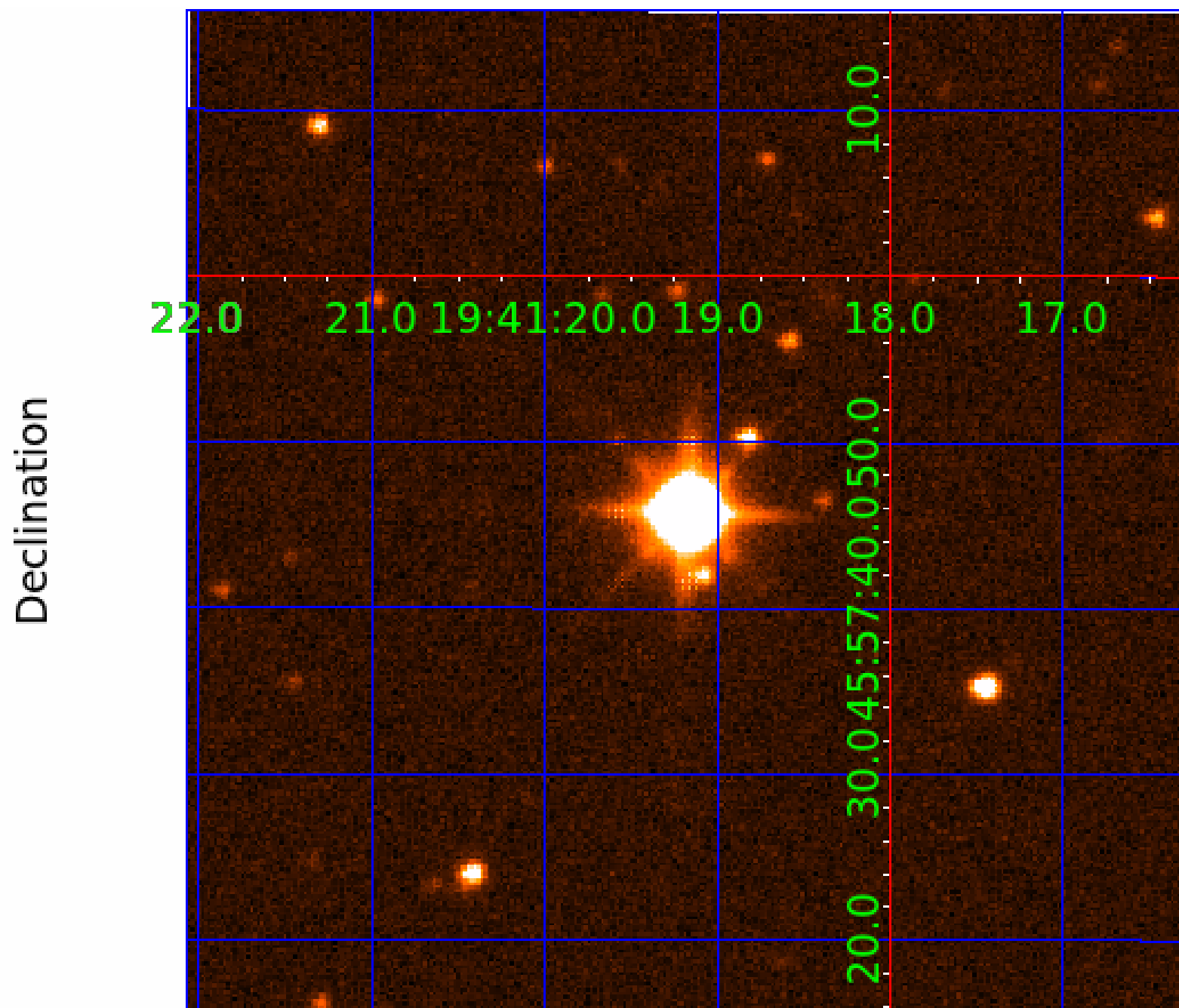
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



fluxWeightedCentroids, Planet 1 of 3



UKIRT Image



# KIC 009413057

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009413057-01	OBS	No	0.547080	131.966661	151.2	0.728	10.4	15.3	3.90	8631	5.63	0.00
009413057-02	OBS	No	0.547081	131.808691	197.3	0.848	10.8	21.8	3.90	8631	5.95	0.00
009413057-03	OBS	No	0.547079	131.651666	53.3	1.481	11.6	8.0	3.90	8631	2.93	0.00

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009413057-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
009413057-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD—CENT_SATURATED
009413057-03	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—SAME_NTL_PERIOD—CENT_SATURATED

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

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

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

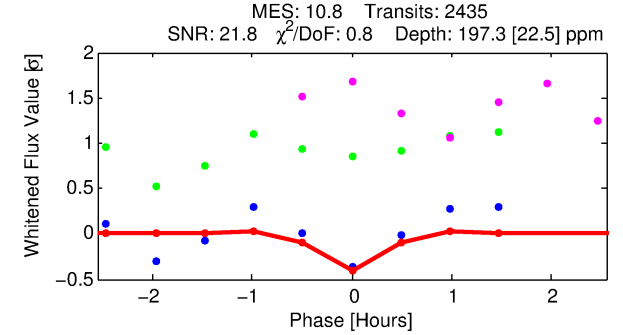
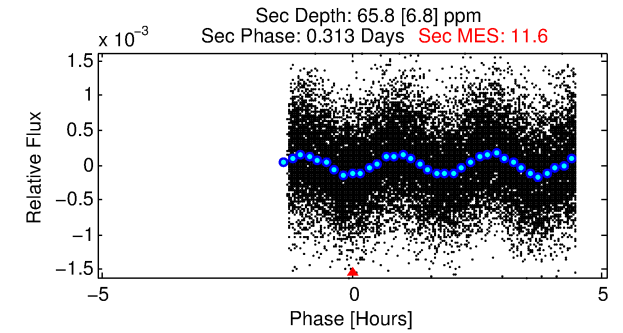
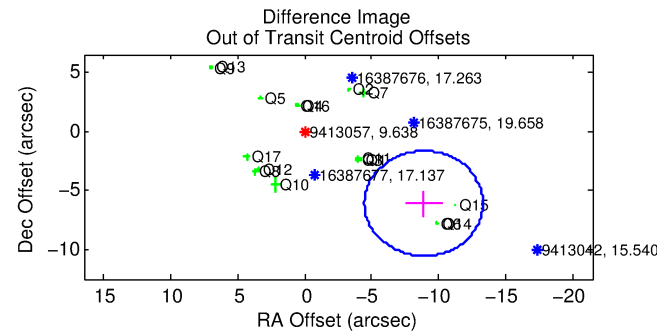
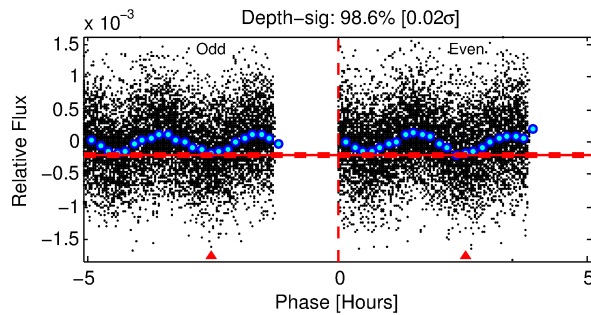
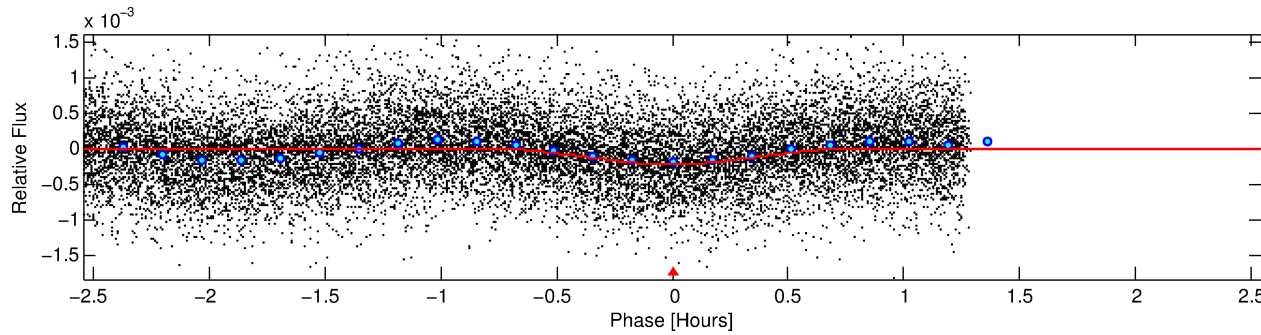
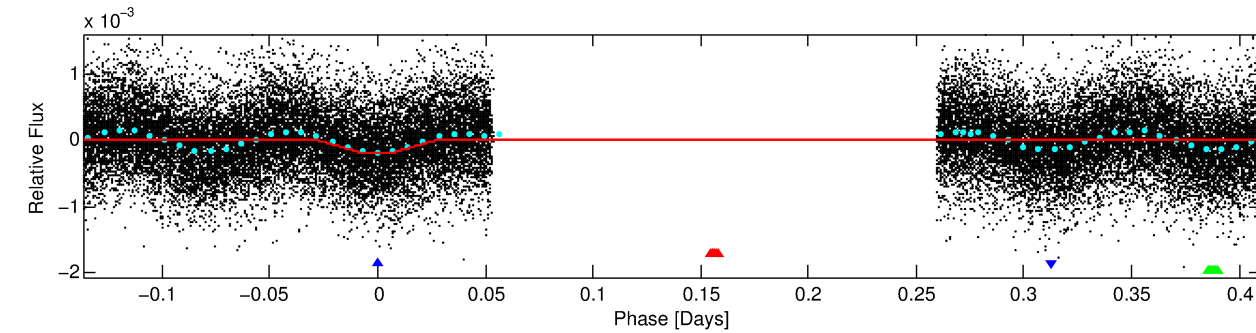
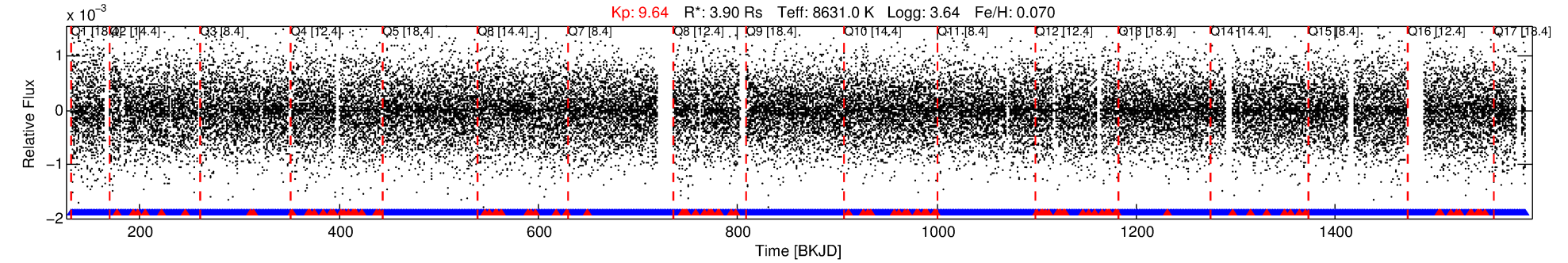
## Ephemeris Match Information For 009413057-02

No Significant Match Found



# DV One-Page Summary

KIC: 9413057 Candidate: 2 of 3 Period: 0.547 d



## DV Fit Results:

Period = 0.54708 [0.00001] d  
Epoch = 131.8087 [0.0007] BKJD  
Rp/R\* = 0.0140 [0.0023]  
a/R\* = 3.69 [3.29]  
b = 0.70 [0.70]  
Seff = N/A  
Teq = N/A  
Rp = 5.95 [1.80] Re  
a = N/A  
Ag = N/A  
Teffp = N/A

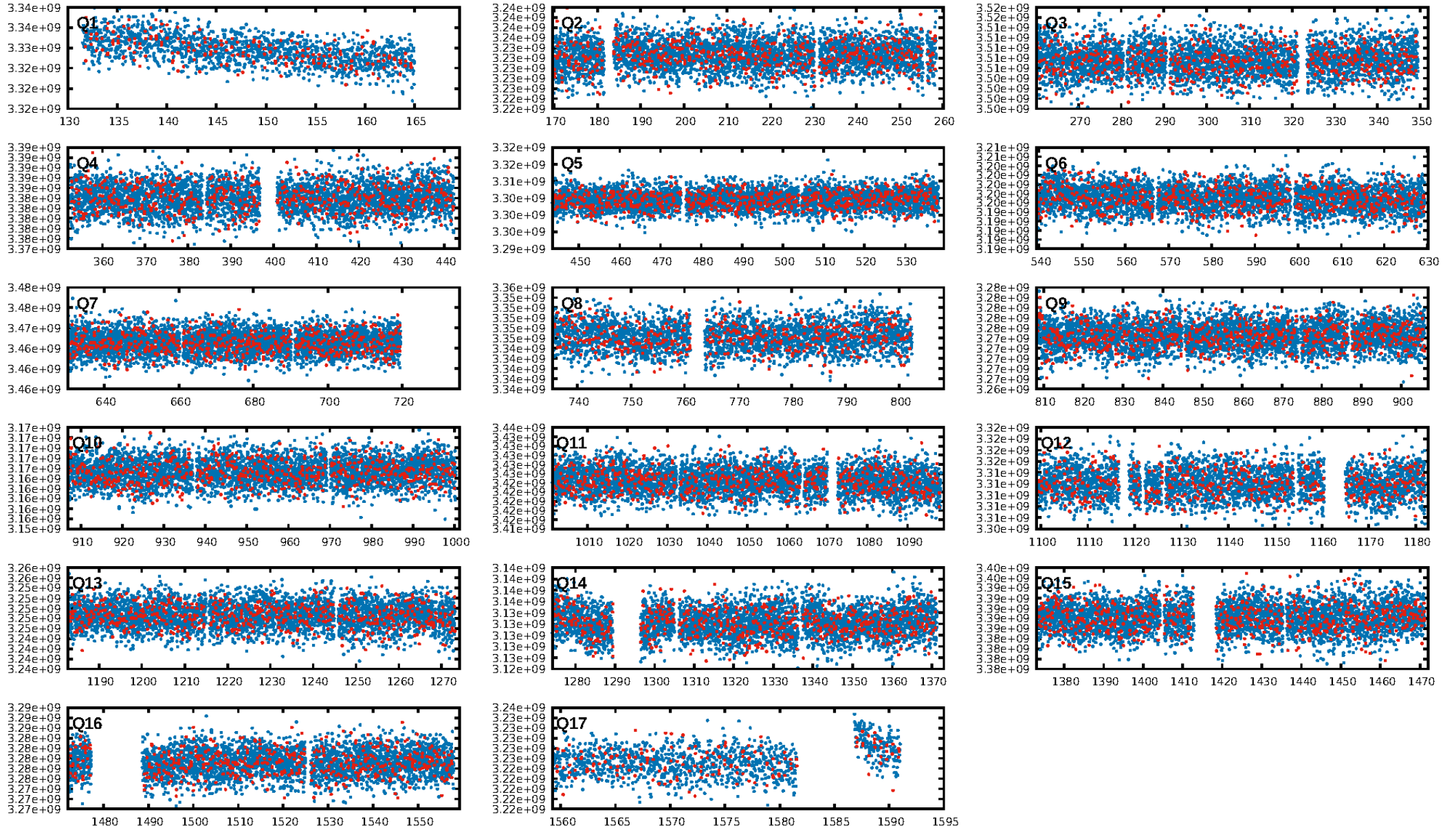
## DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 8.57e-45  
RollingBand-fgt: 0.95 [2207/2325]  
GhostDiagnostic-chr: N/A  
Centroid-sig: N/A  
Centroid-so: 0.517 arcsec [5.91 $\sigma$ ]  
OotOffset-rm: 10.784 arcsec [7.30 $\sigma$ ]  
KicOffset-rm: 10.044 arcsec [6.93 $\sigma$ ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 0.06 [1/17]  
DiffImageOverlap-fno: 0.00 [0/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 03-Feb-2016 04:03:41 Z

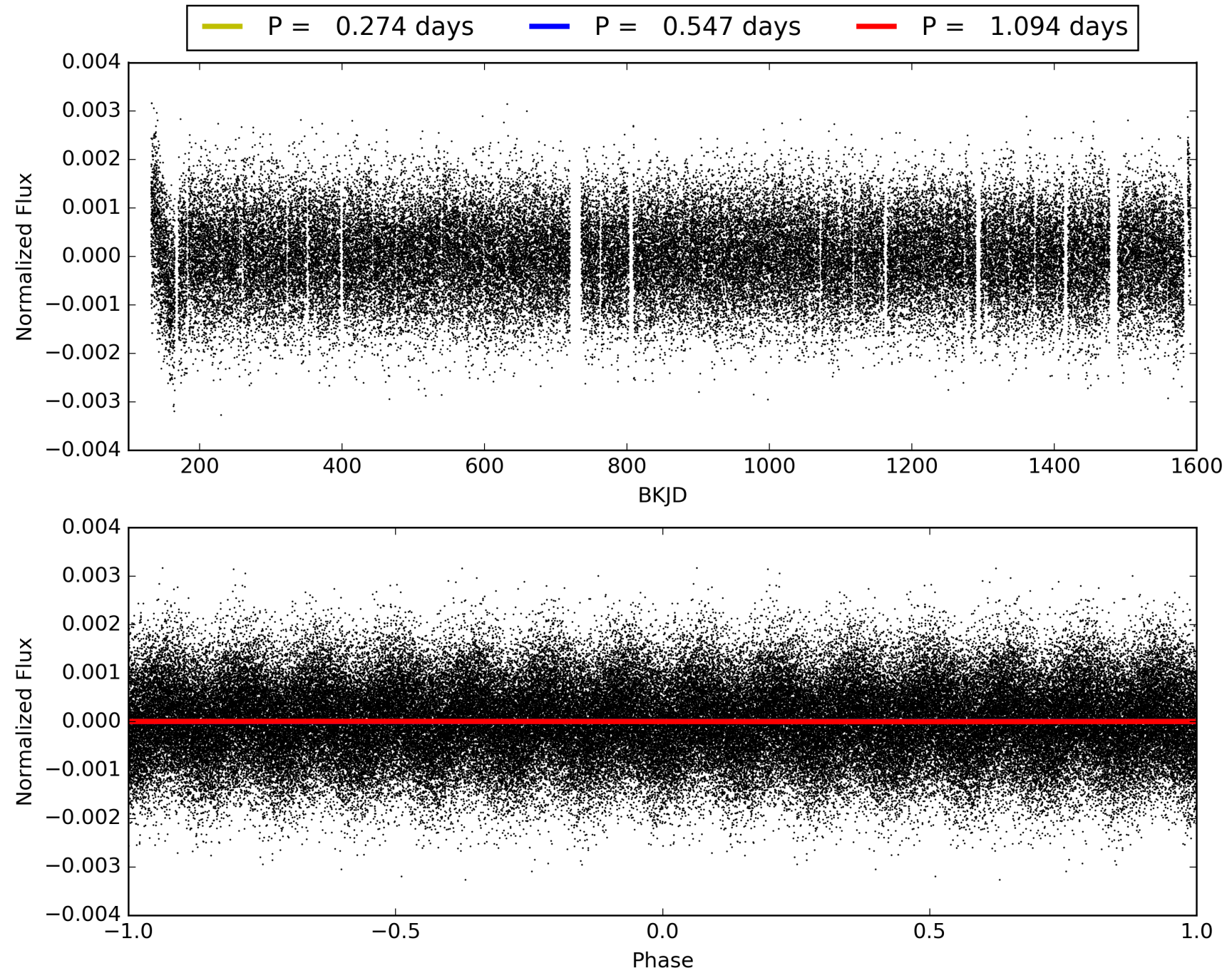
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 009413057-02, PDC Light Curves



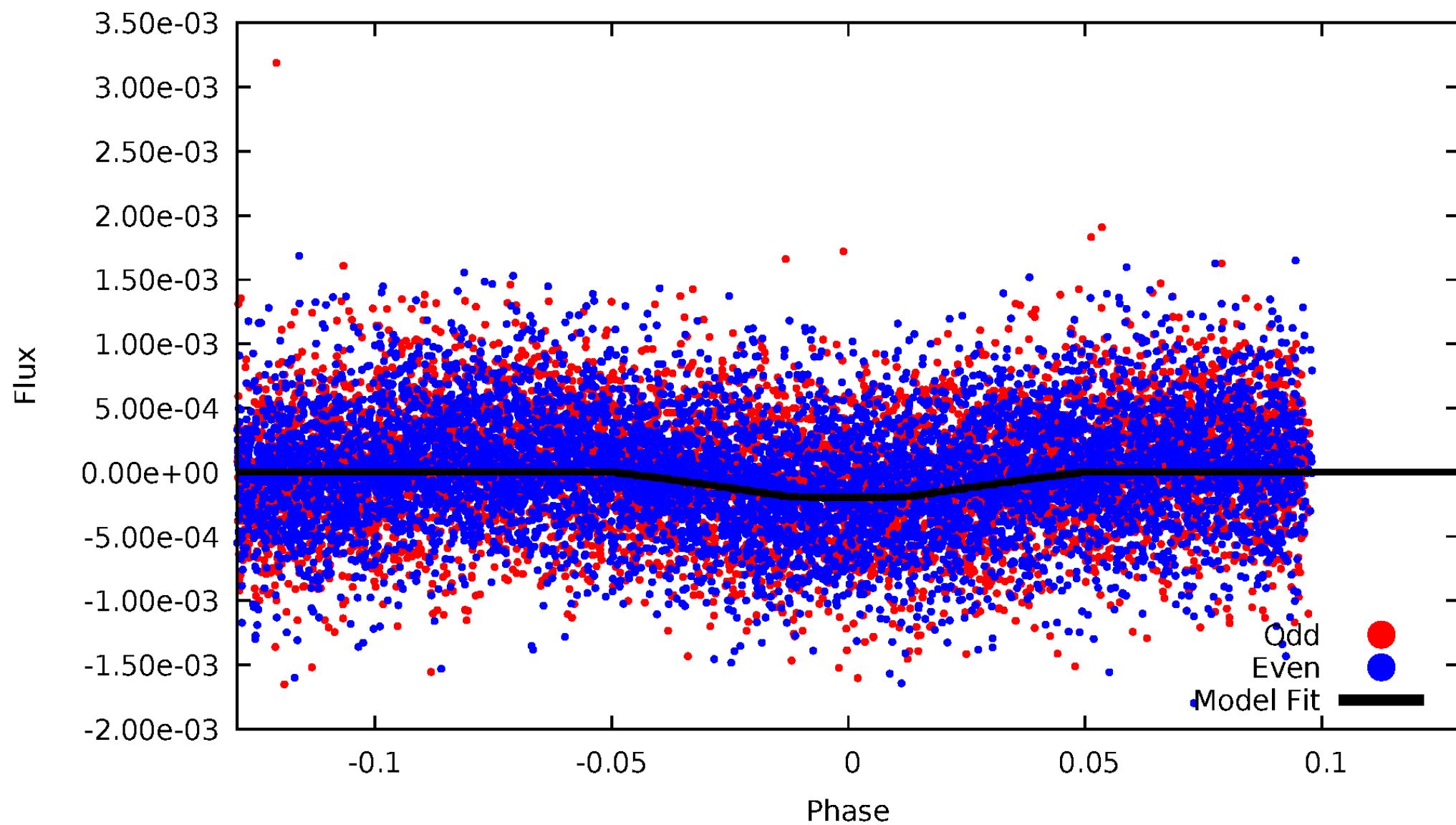


TCE 009413057-02



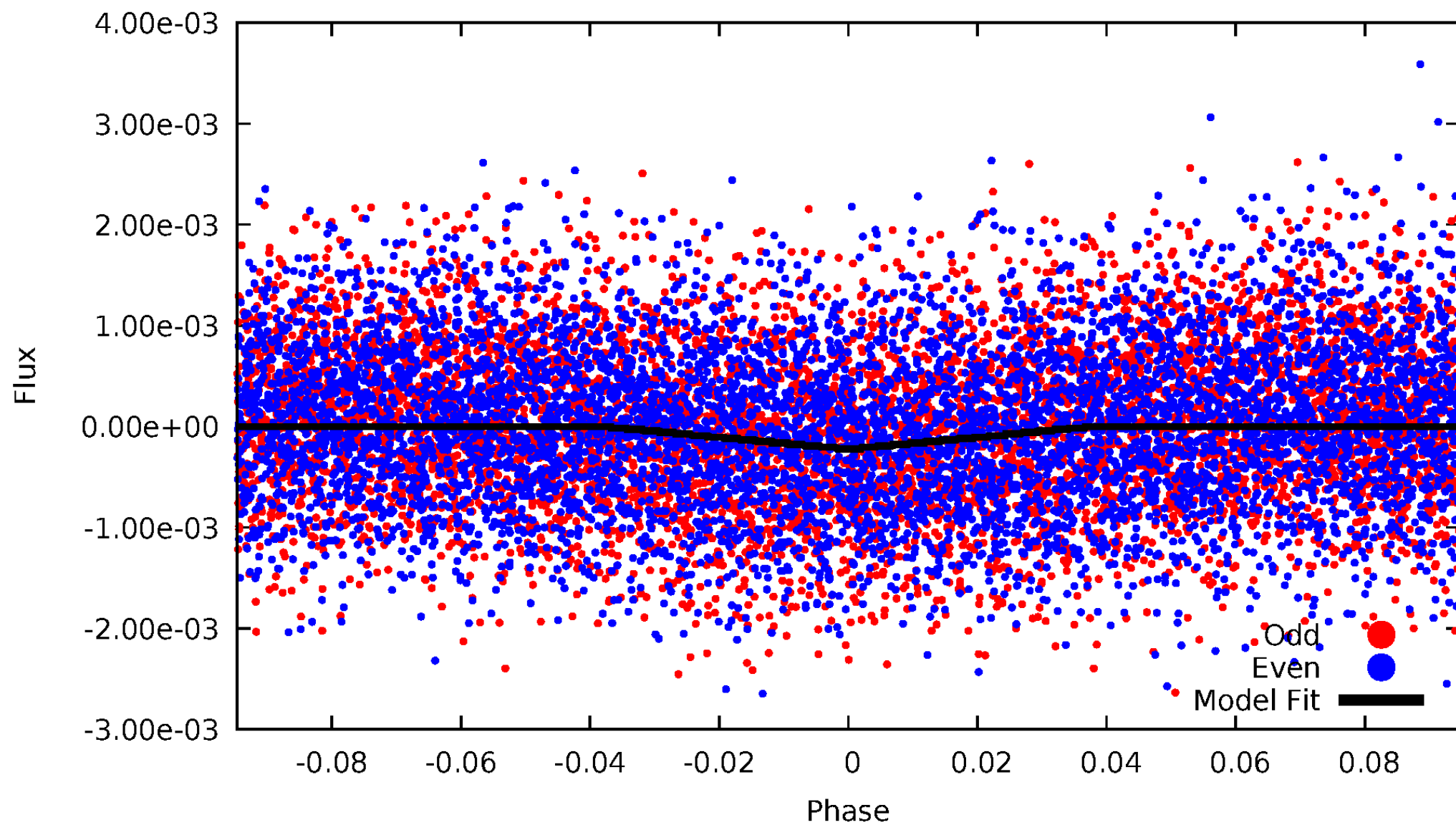
# DV Odd/Even

TCE 009413057-02



# ALT Odd/Even

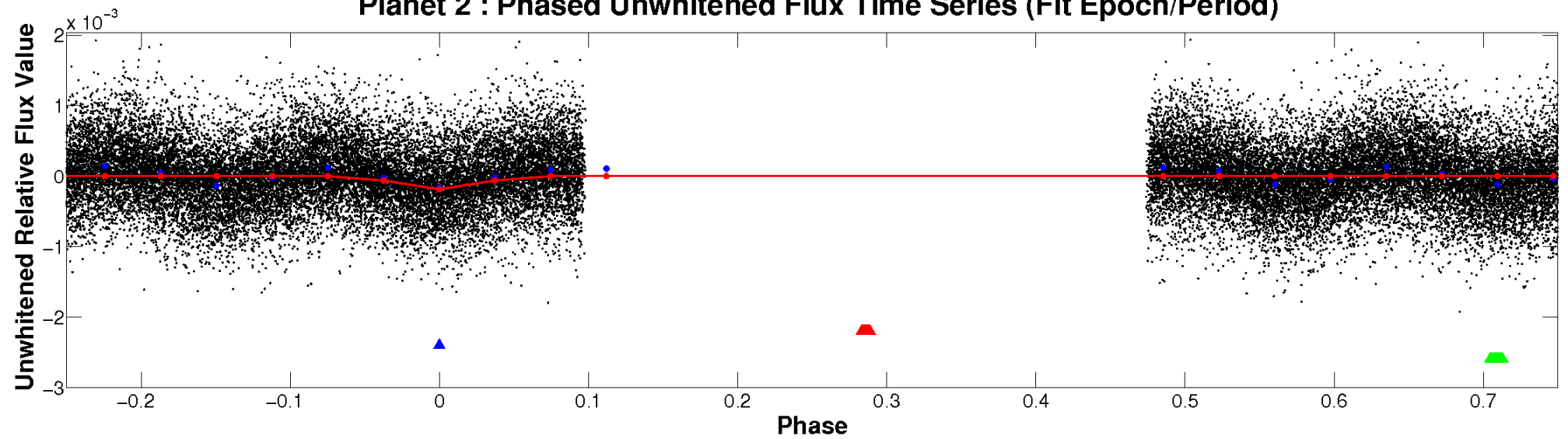
TCE 009413057-02



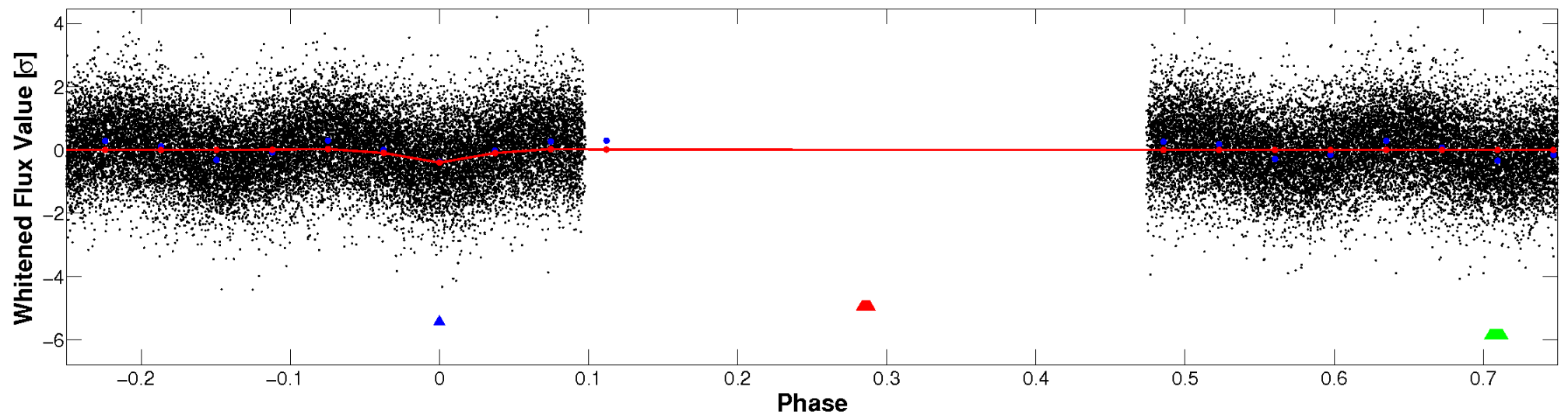


# Non-Whitened Vs. Whitened Light Curve

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

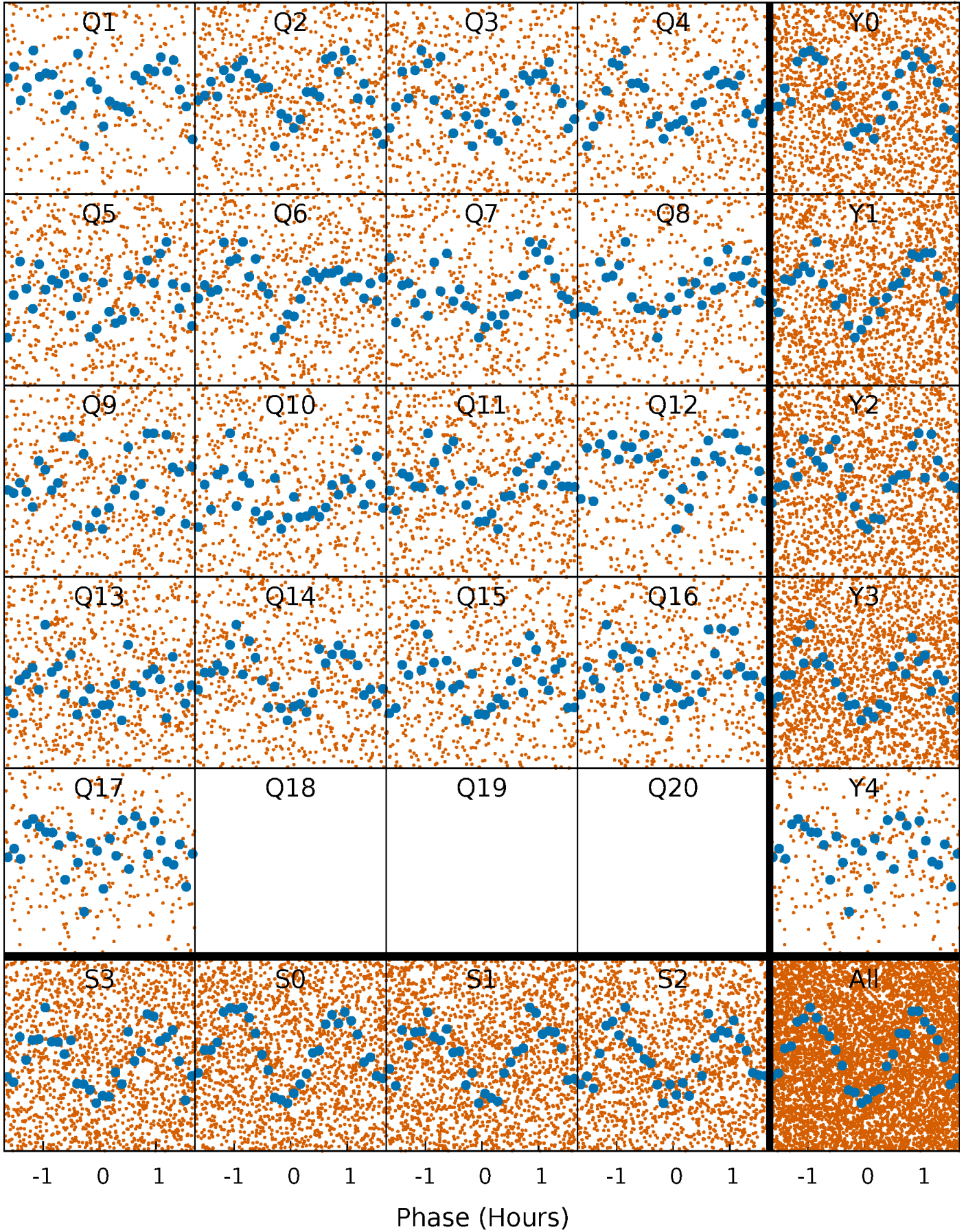


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



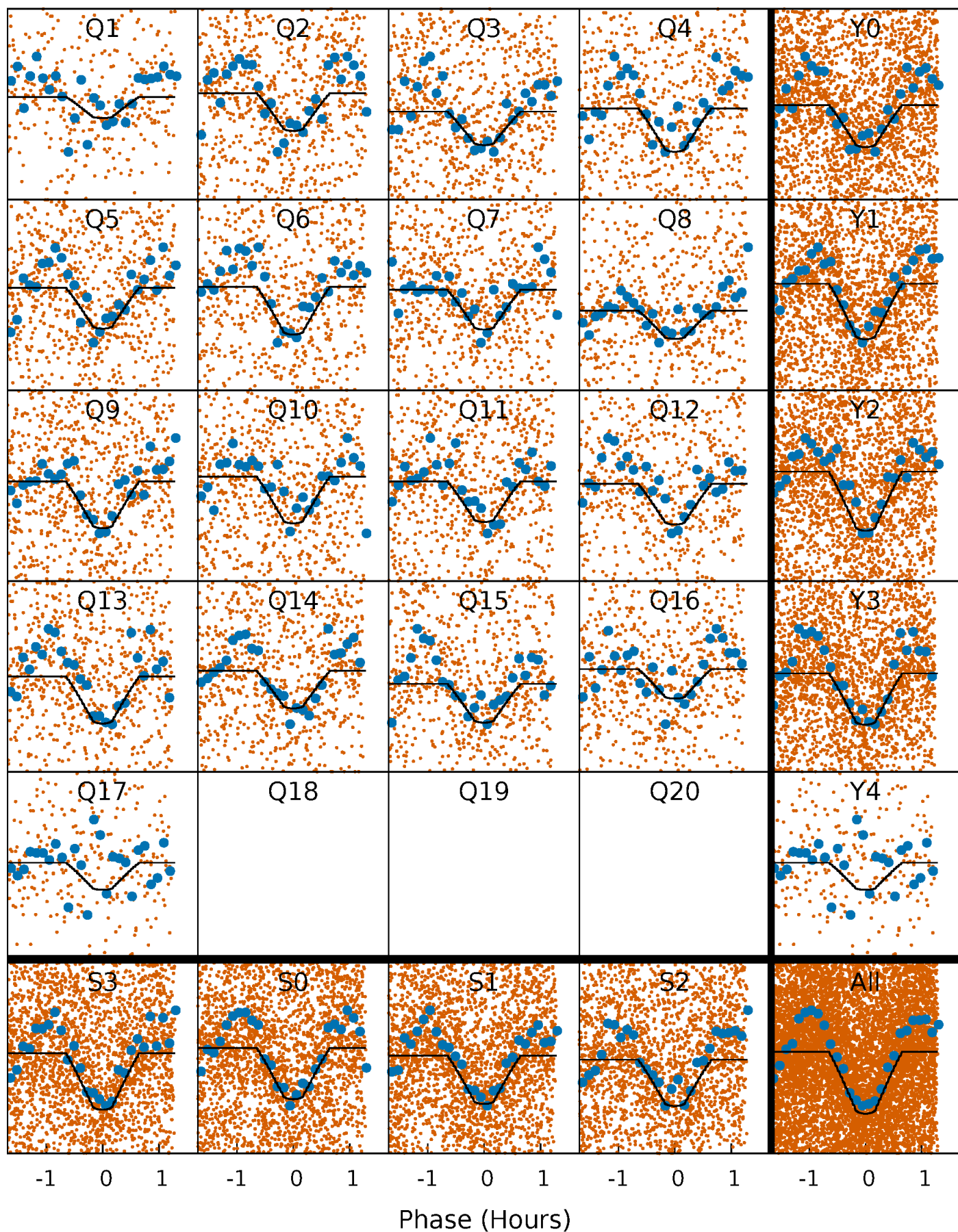
# PDC Quarter-Phased Transit Curves

TCE 009413057-02   P= 0.547081 Days    $T_0=131.808691$  (BKJD)



# DV Quarter-Phased Transit Curves

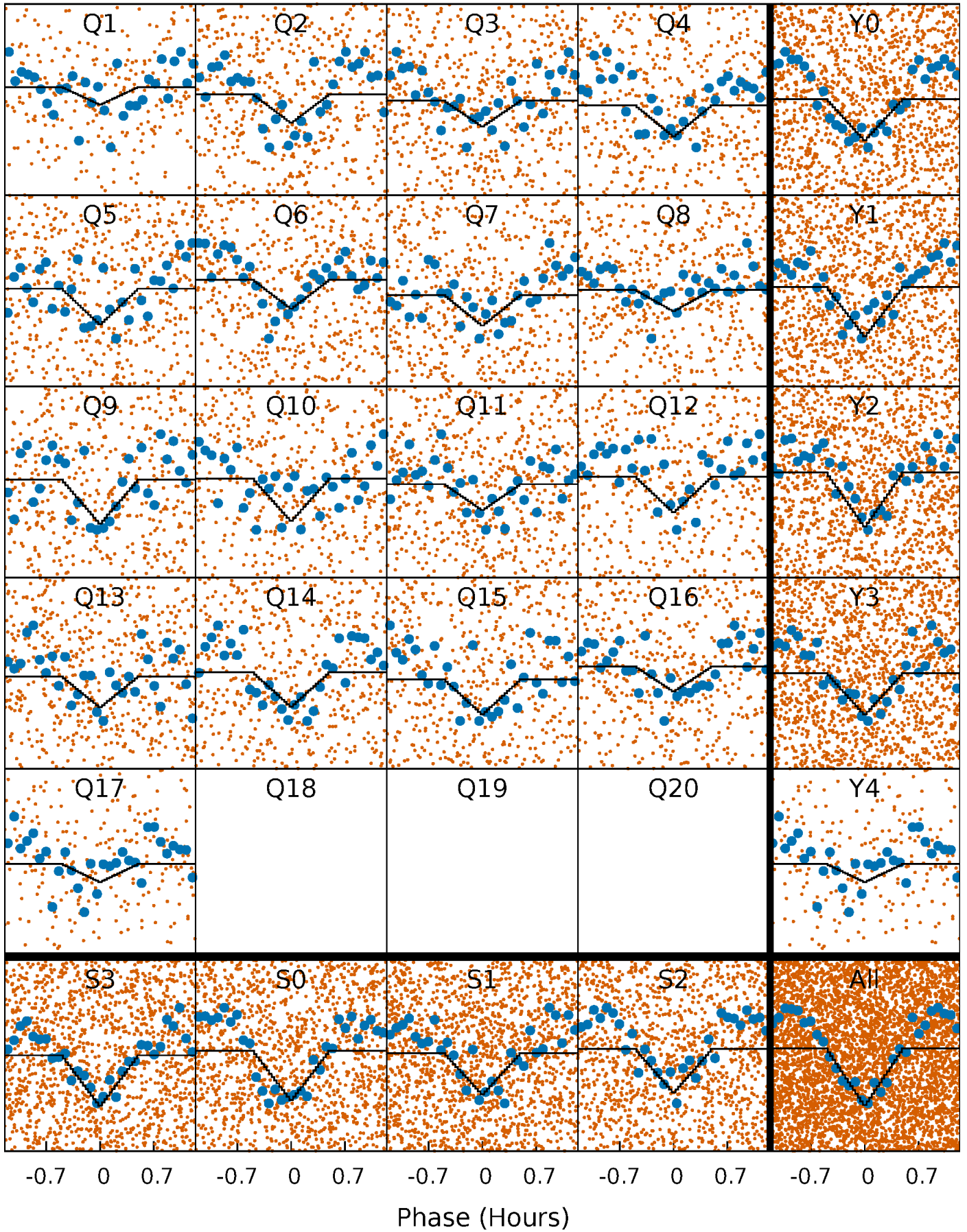
TCE 009413057-02   P= 0.547081 Days    $T_0=131.808691$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

TCE 009413057-02   P= 0.547081 Days    $T_0=131.809301$  (BKJD)

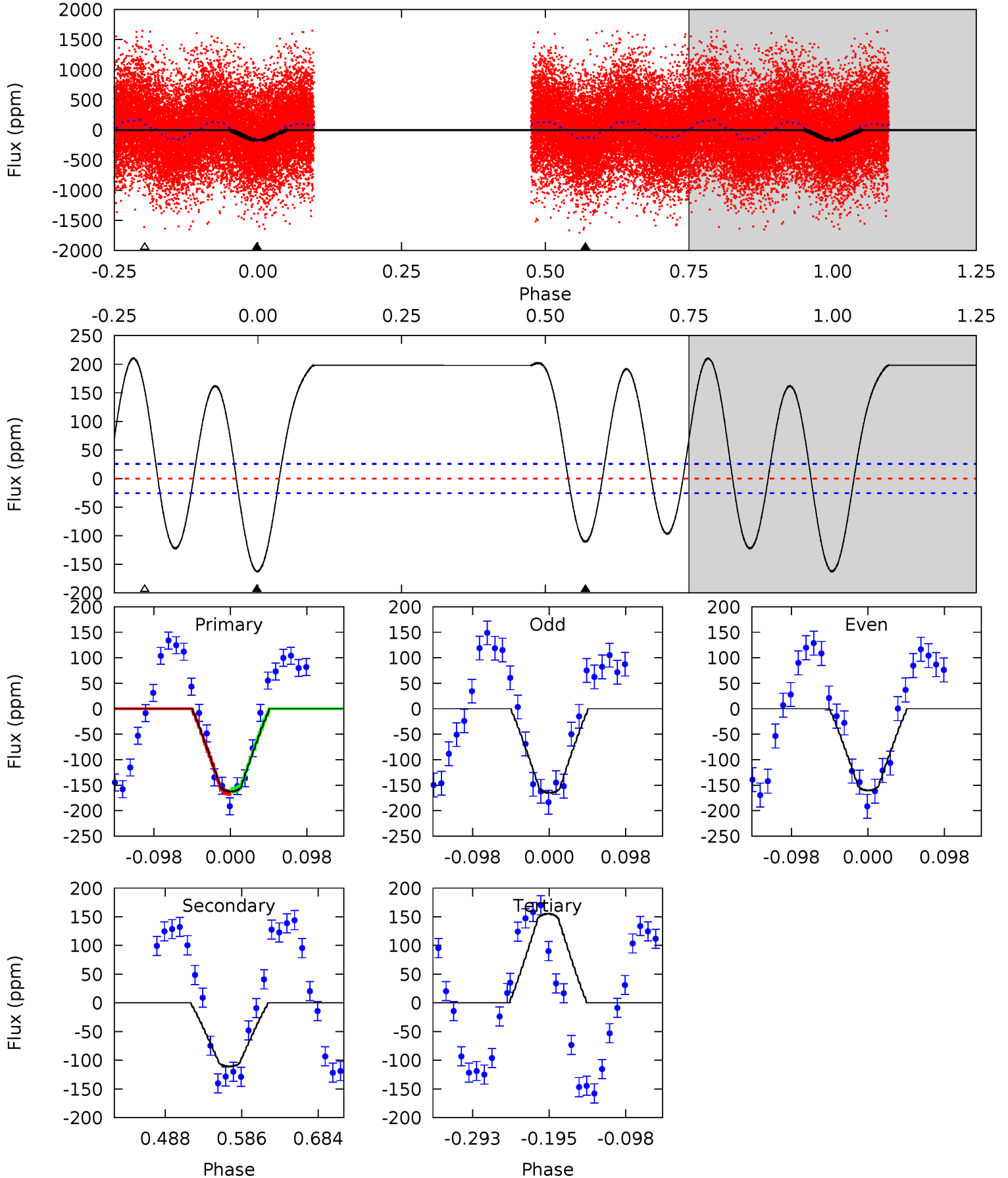




# DV Model-Shift Uniqueness Test

009413057-02, P = 0.547081 Days, E = 131.261610 Days

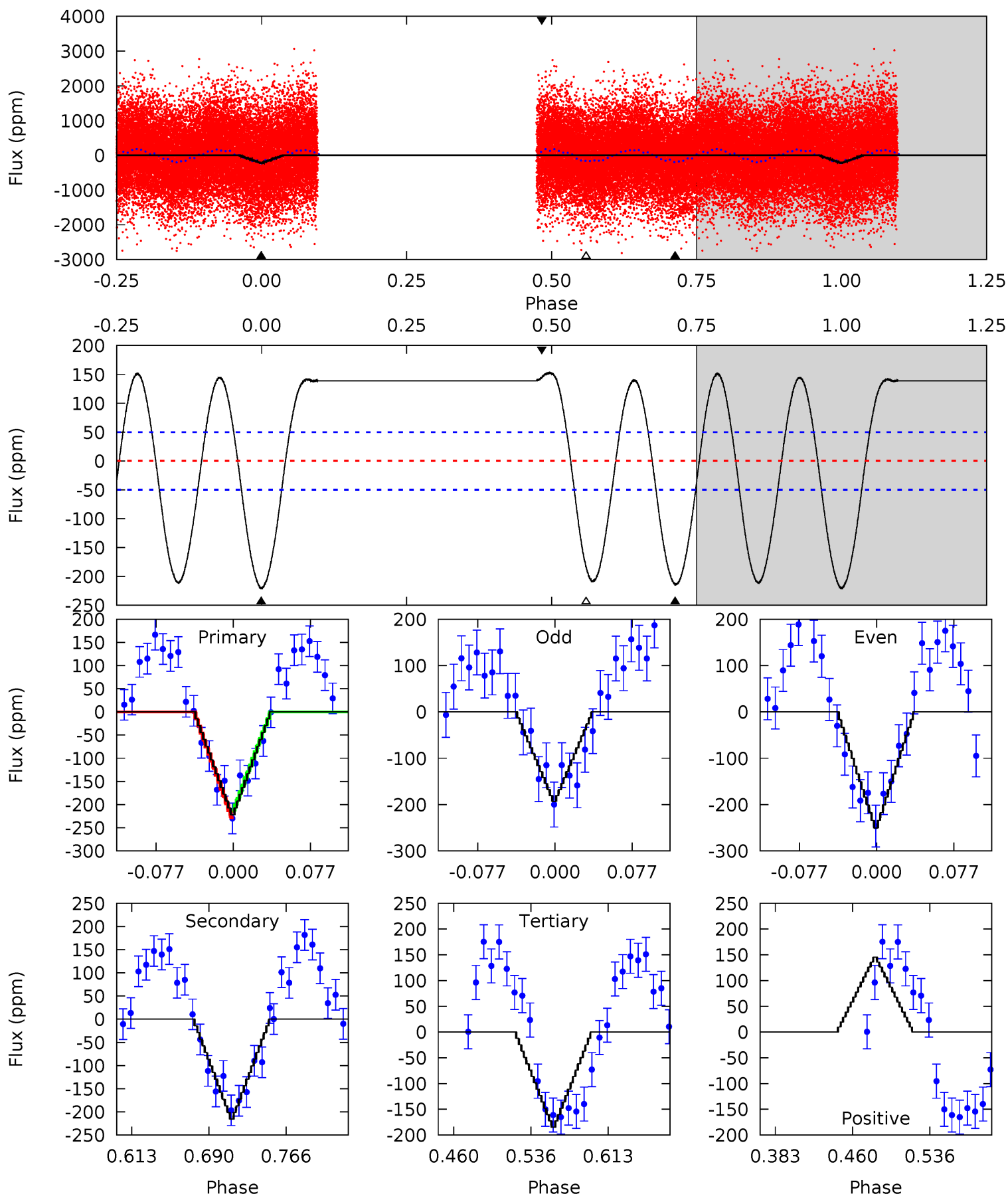
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
29.0	19.7	-27.7	0	4.57	1.66	18.9	56.7	29.0	47.4	19.7	0.42	0.97	0.56	0.45



# Alt Model-Shift Uniqueness Test

009413057-02, P = 0.547081 Days, E = 131.262220 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
20.6	20.0	17.1	13.5	4.62	1.77	12.0	3.46	7.09	2.86	6.49	2.64	0.99	0.41	0.61



### Stellar Parameters For KIC 009413057

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$8631^{+172}_{-206}$	$3.644^{+0.210}_{-0.090}$	$0.070^{+0.050}_{-0.450}$	$3.904^{+0.666}_{-1.000}$	$2.449^{+0.293}_{-0.403}$	$0.058^{+0.064}_{-0.019}$
	+2%/-2%	+6%/-2%	+71%/-643%	+17%/-26%	+12%/-16%	+111%/-33%
Source	SPE4	SPE4	SPE4	DSEP		

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

### Secondary Eclipse Parameters for KIC 009413057-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-111 \pm 6$	$5.67^{+1.24}_{-1.14}$	$7814^{+395}_{-522}$	$6030^{+1072}_{-1179}$	$0.586^{+0.309}_{-0.187}$
Alt.	$-216 \pm 11$	$6.11^{+1.14}_{-1.11}$	$7787^{+383}_{-498}$	$7594^{+1167}_{-839}$	$0.995^{+0.482}_{-0.274}$

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

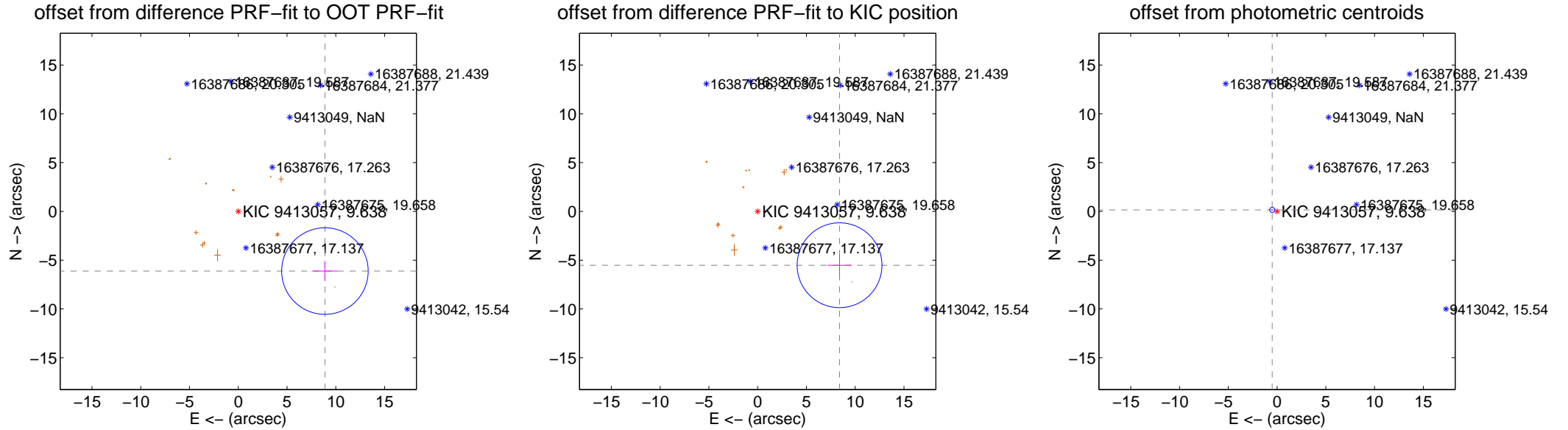
## DV Centroid Data

Supplemental centroid analysis for 009413057-02. **Kepler magnitude: 9.64.** Transit SNR 21.82

**There are 1 quarters with good PRF difference image offsets**

The direct PRF centroid is offset from the target star catalog position by about 1.83 arcsec

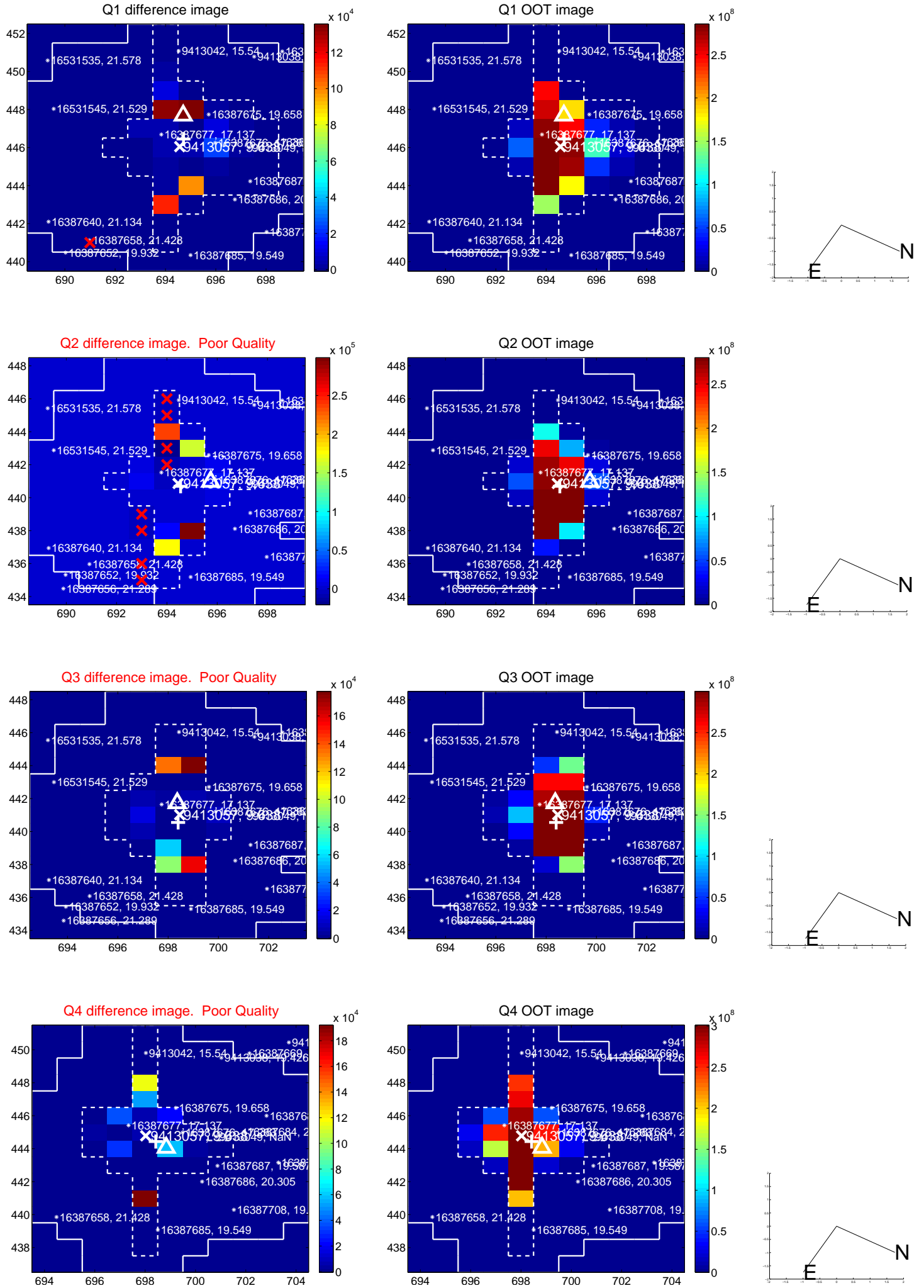
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b><math>10.784 \pm 1.478</math></b>	<b>7.30</b>	$-8.882 \pm 1.306$	$-6.117 \pm 1.028$
PRF-fit source offset from KIC position	<b><math>10.044 \pm 1.449</math></b>	<b>6.93</b>	$-8.393 \pm 1.217$	$-5.517 \pm 1.035$
photometric centroid source offset	<b><math>0.52 \pm 0.09</math></b>	<b>5.91</b>	$0.49 \pm 0.09$	$0.15 \pm 0.06$



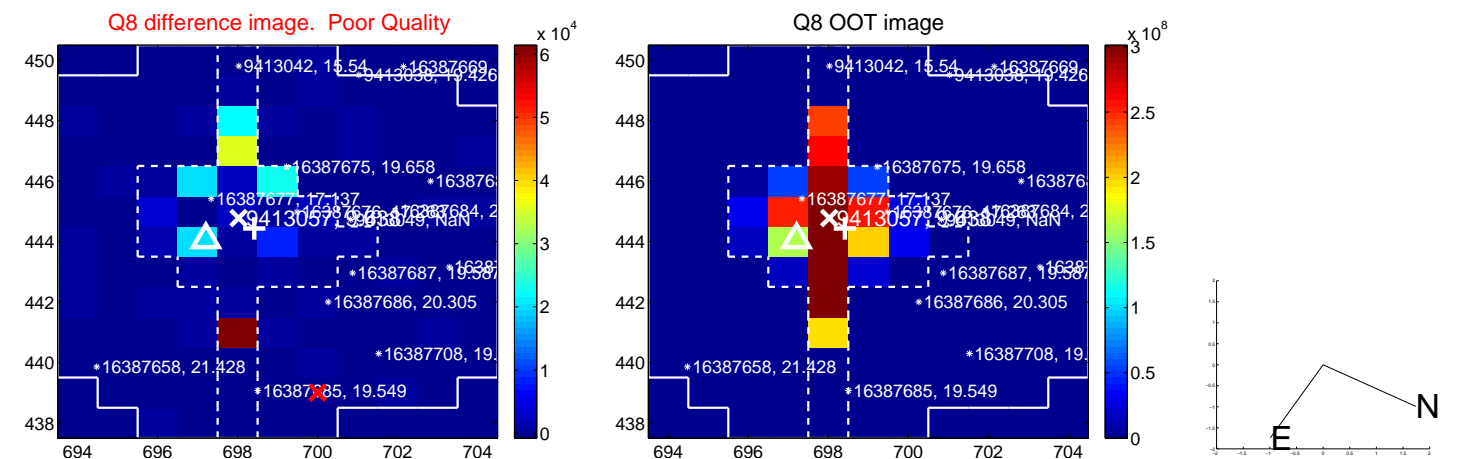
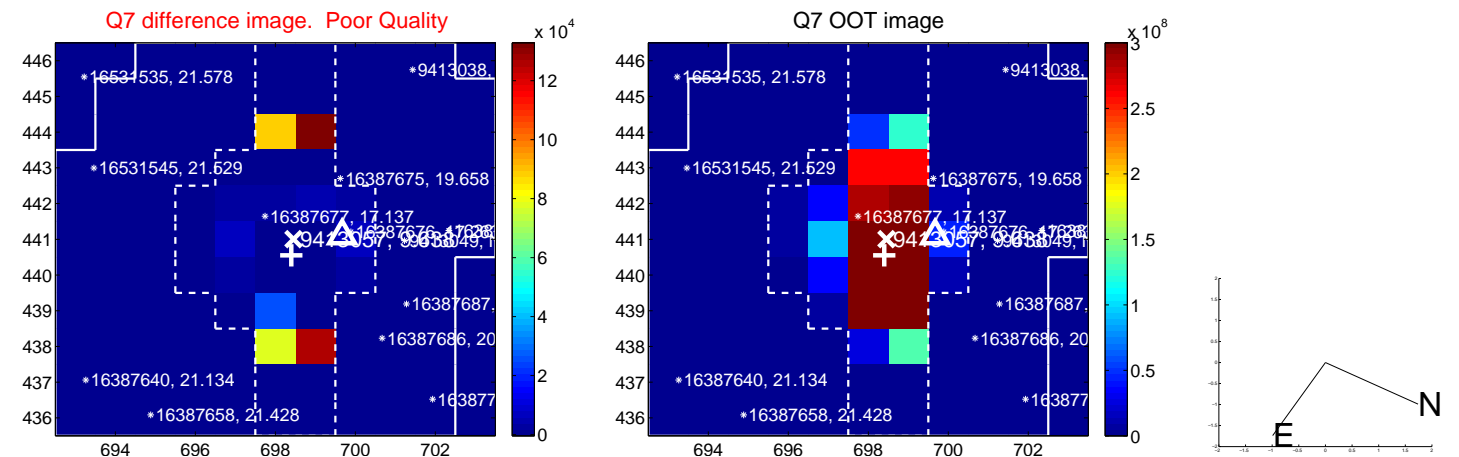
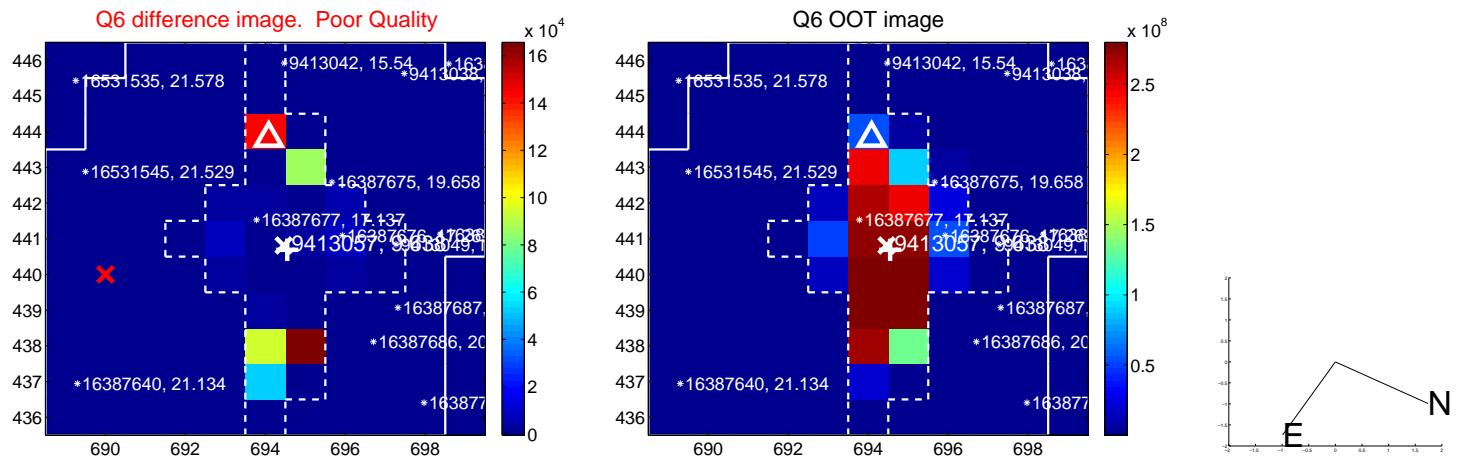
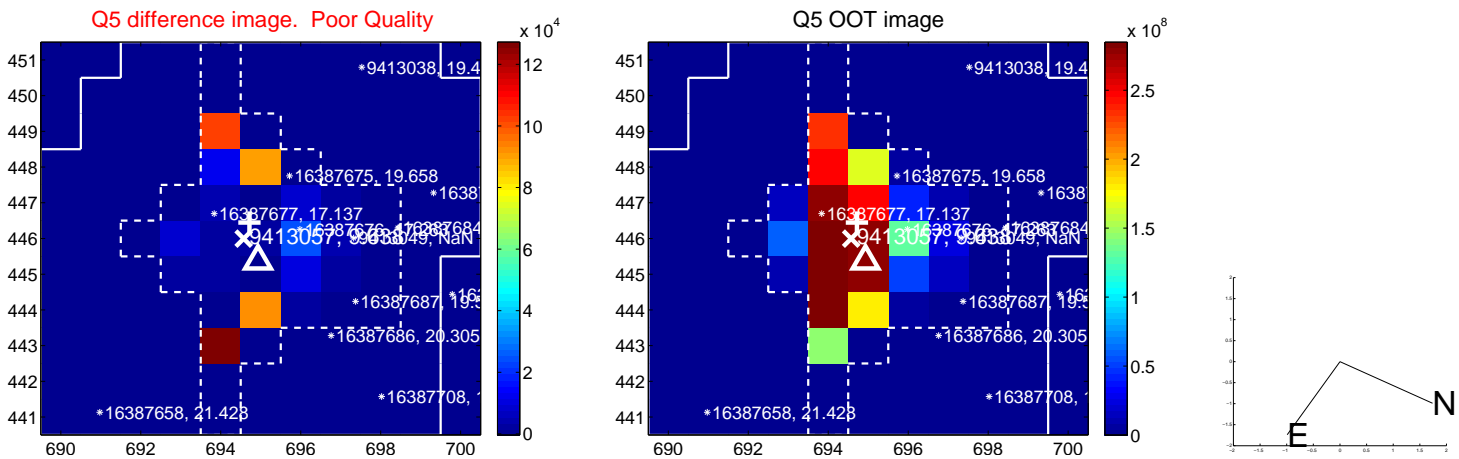
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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



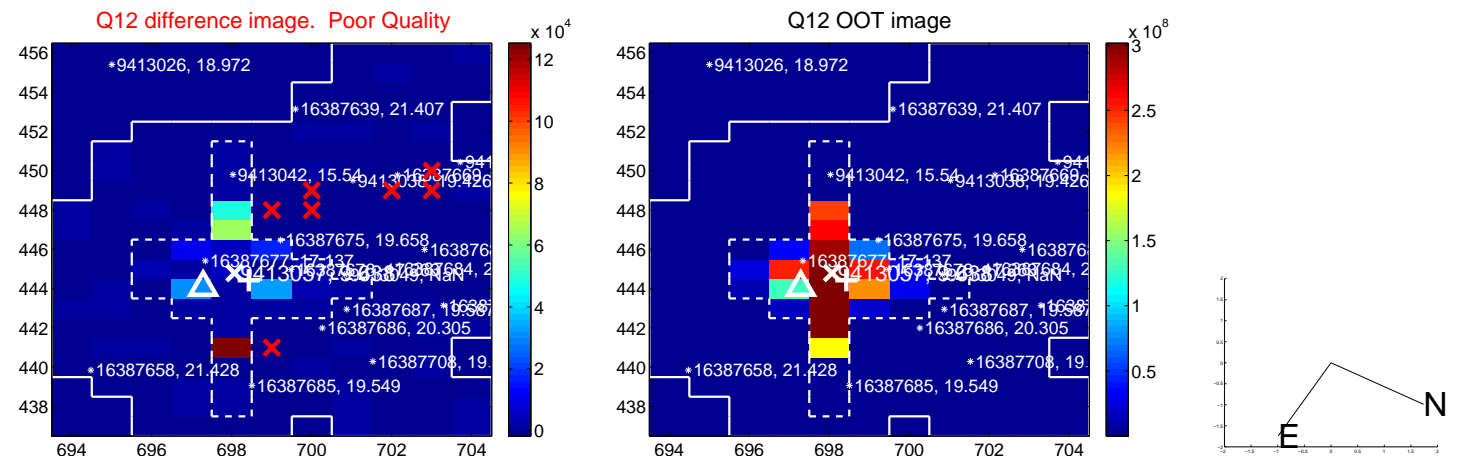
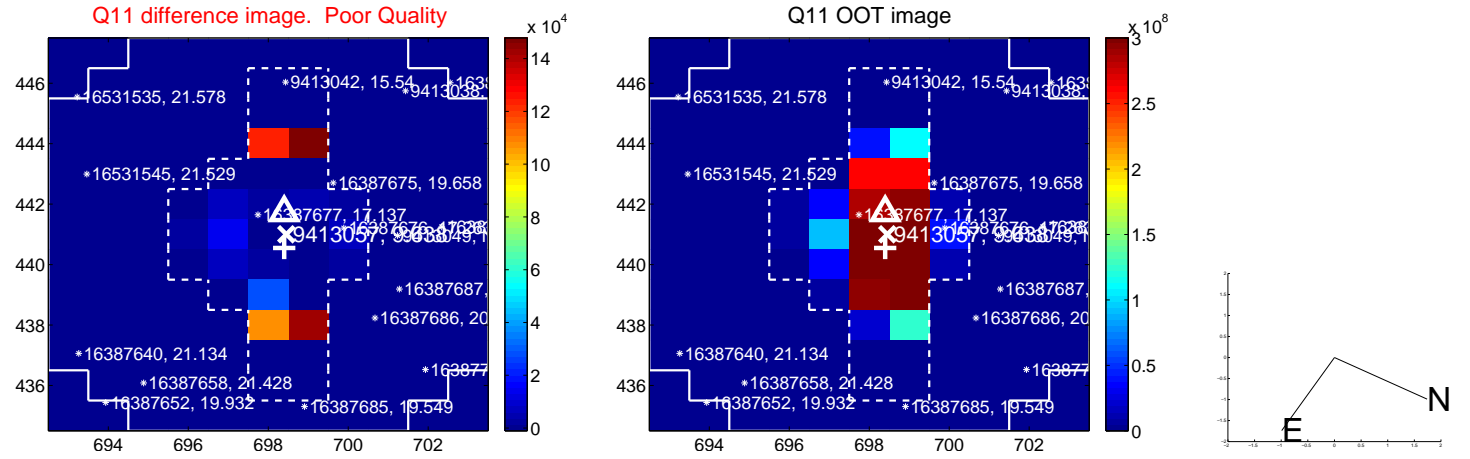
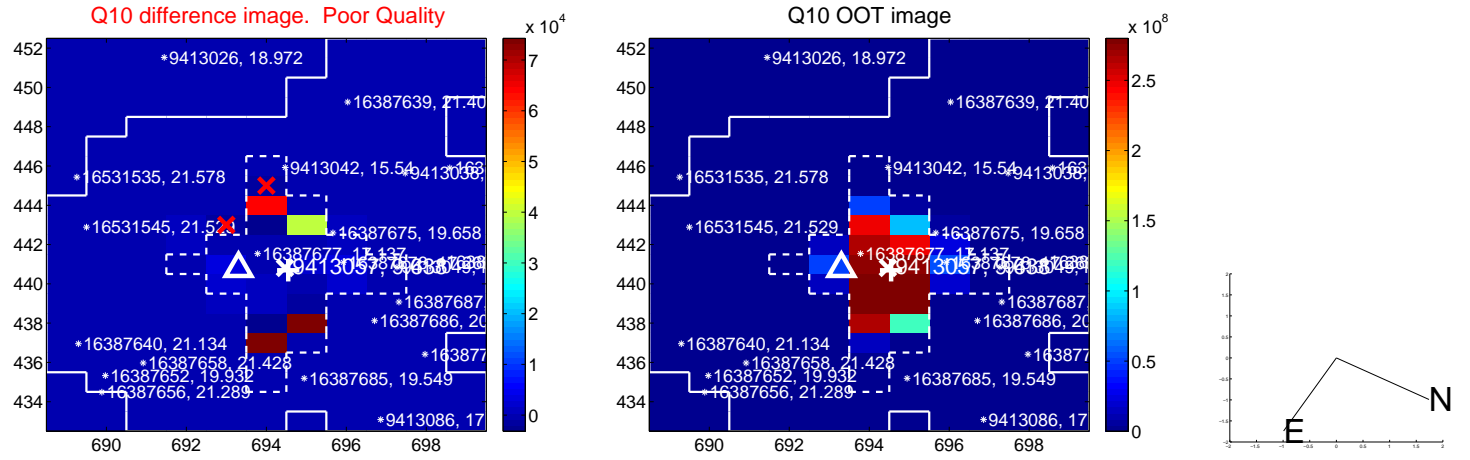
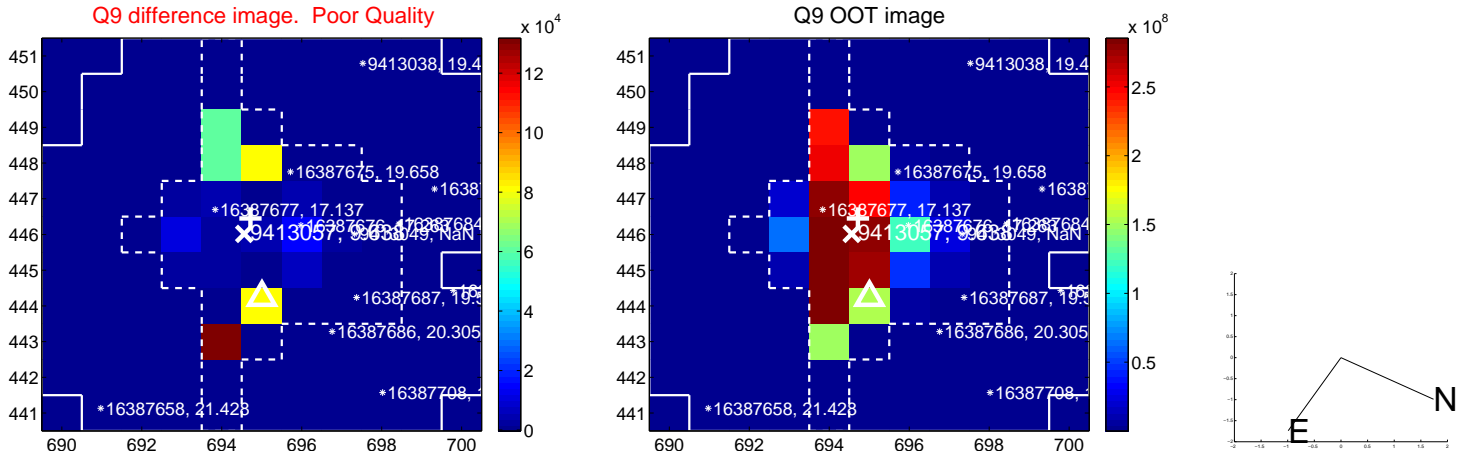
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



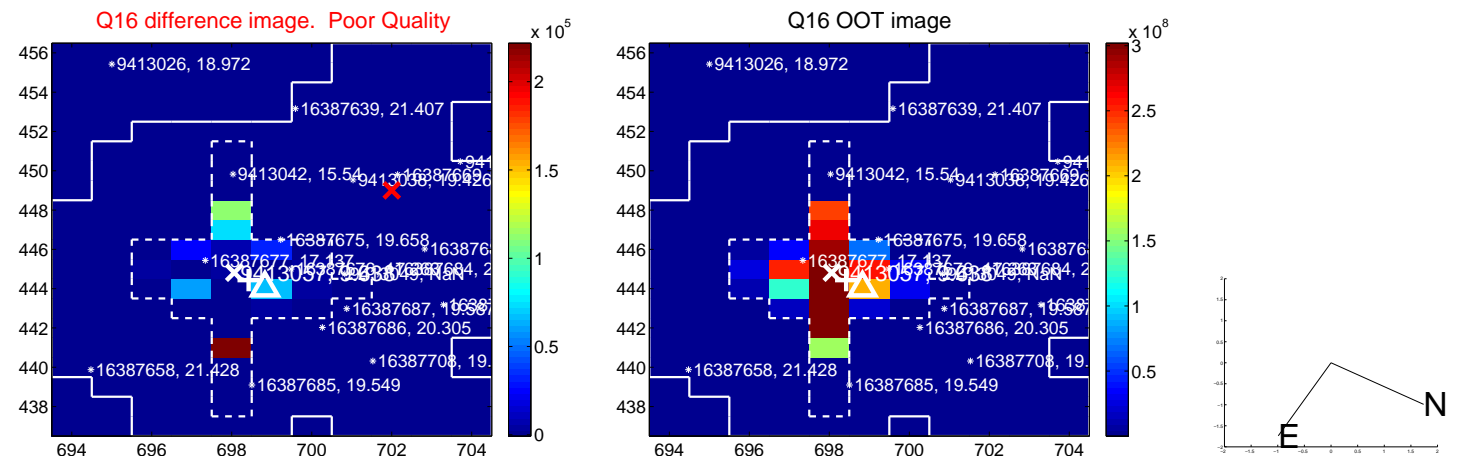
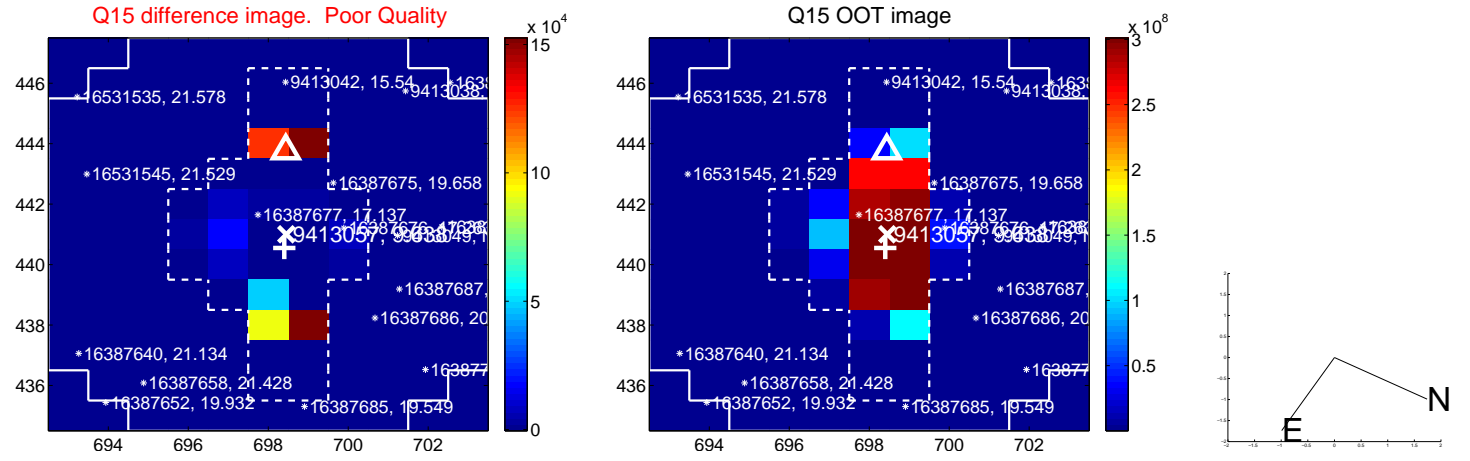
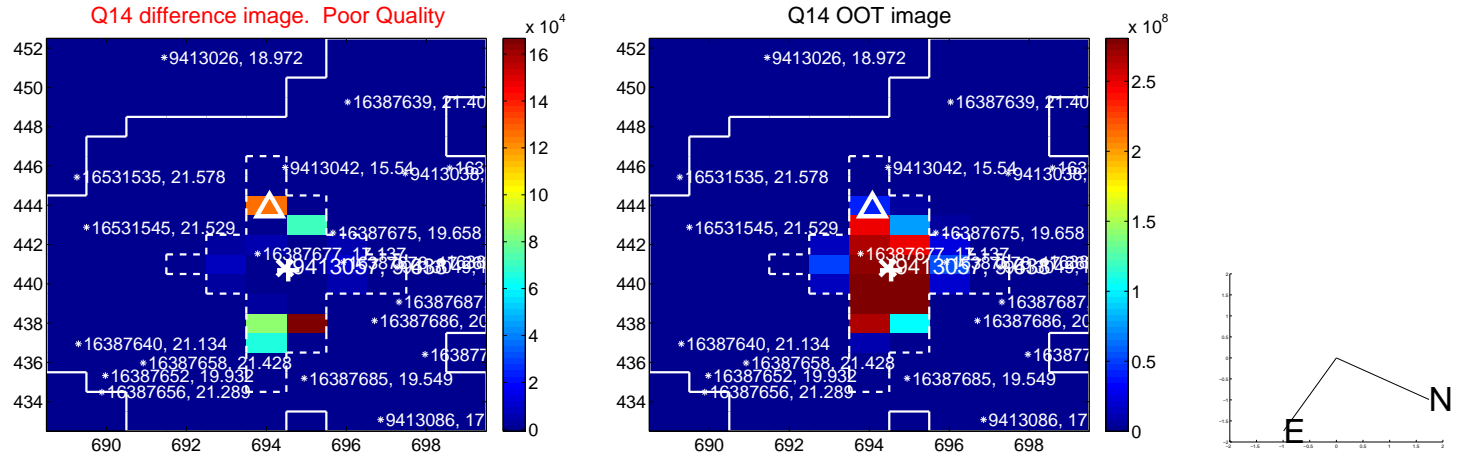
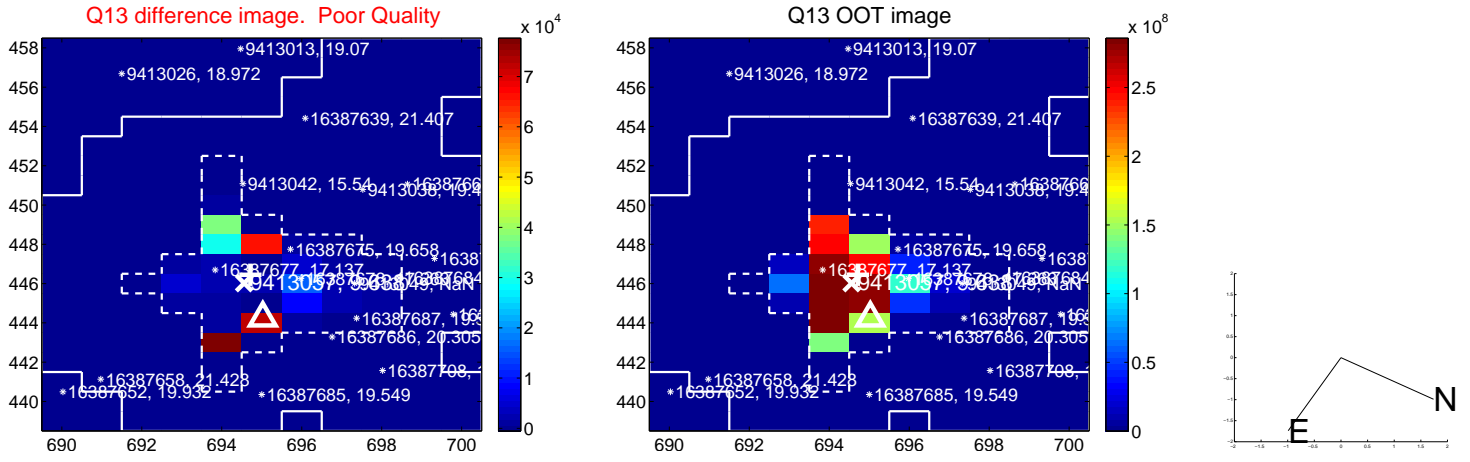
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



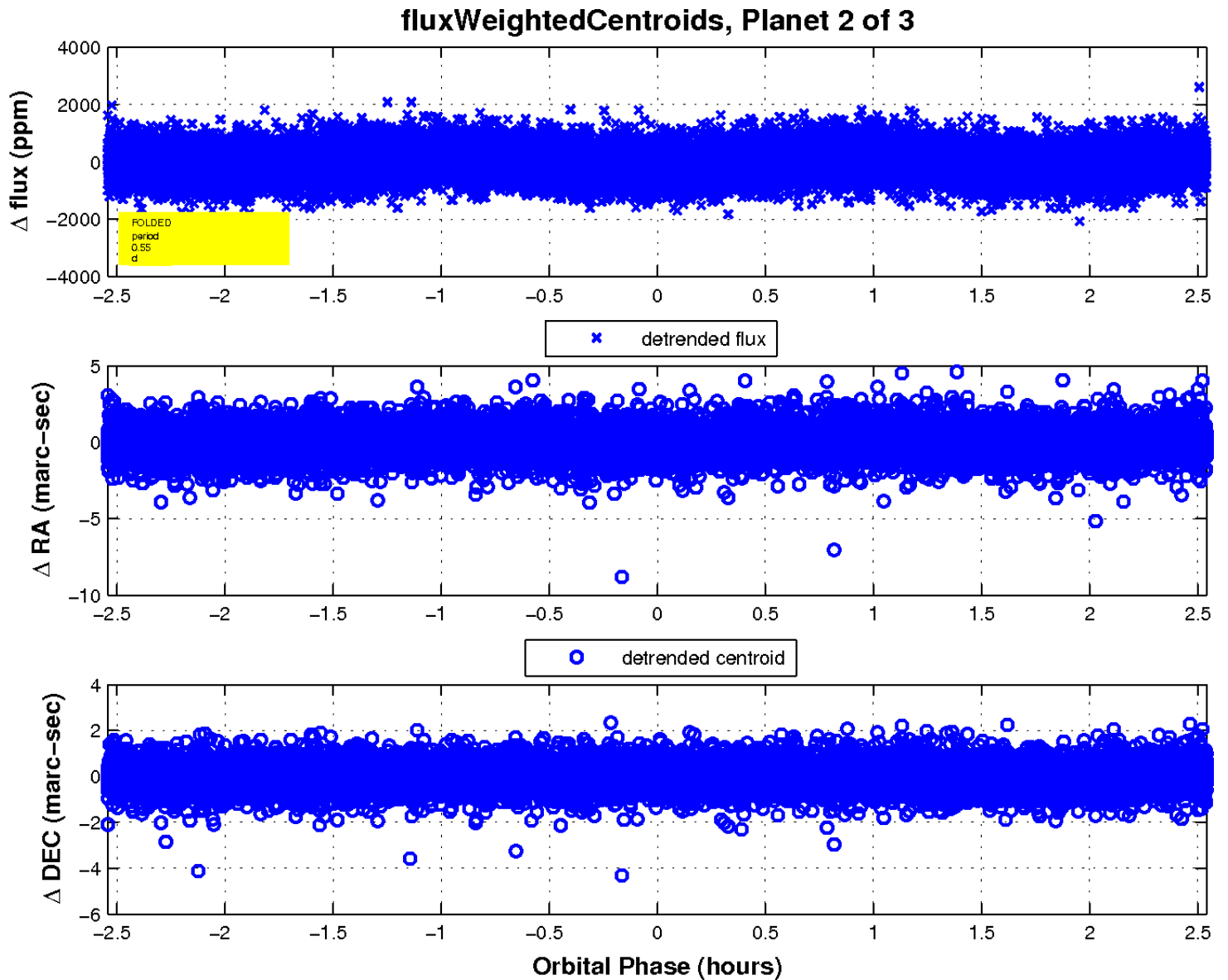
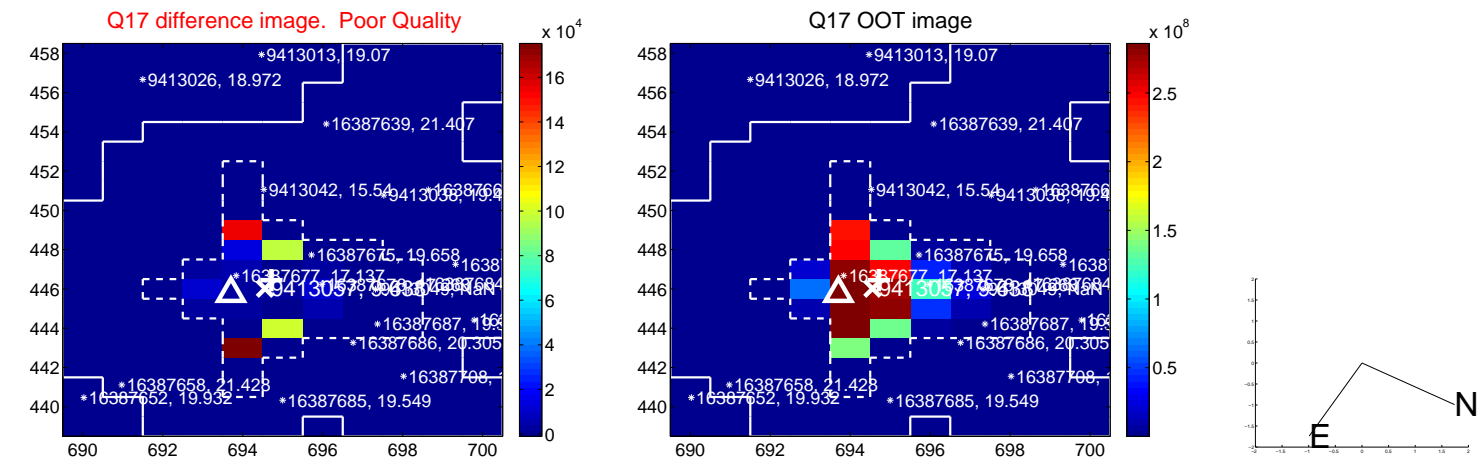
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

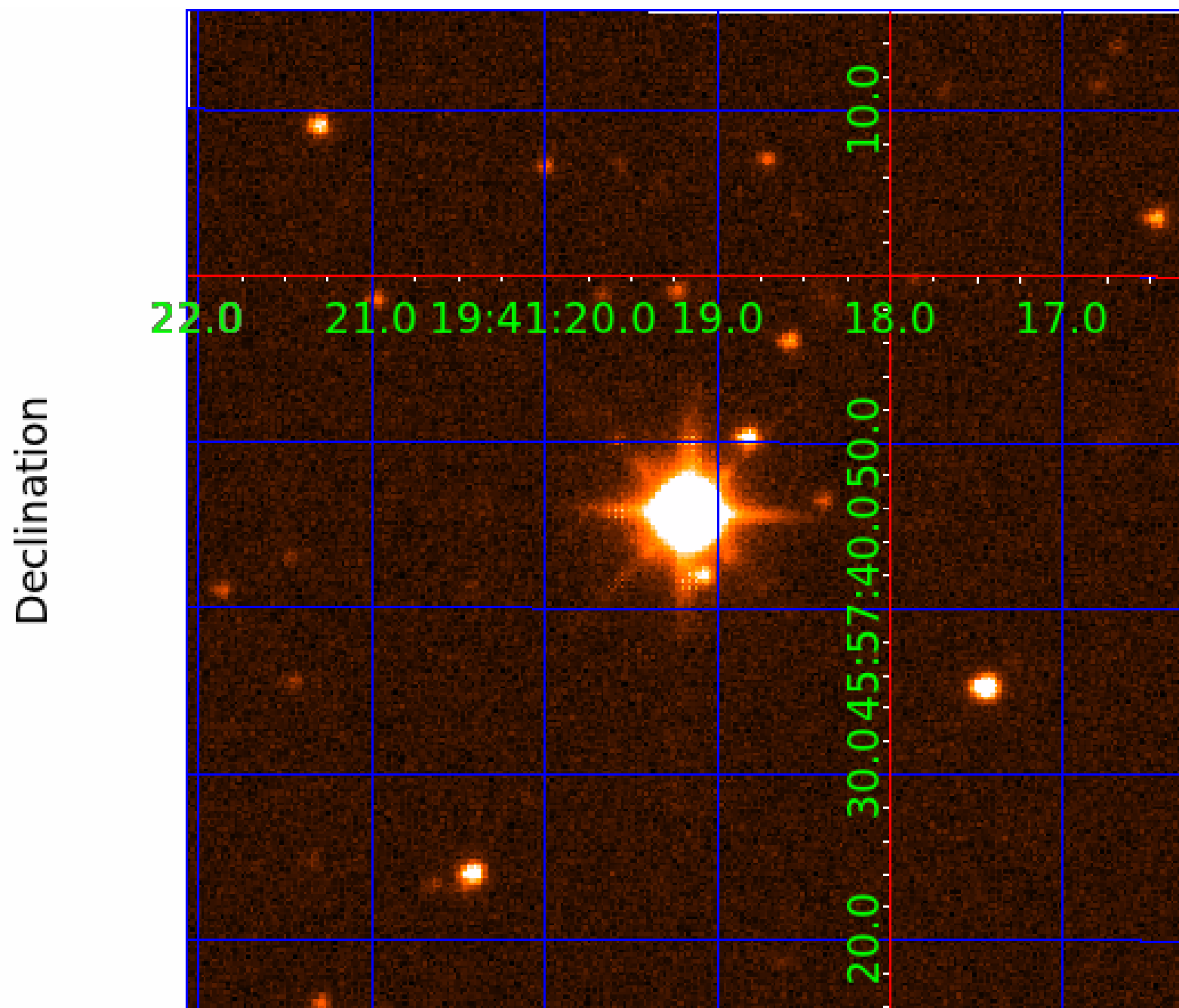


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





UKIRT Image



# KIC 009413057

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009413057-01	OBS	No	0.547080	131.966661	151.2	0.728	10.4	15.3	3.90	8631	5.63	0.00
009413057-02	OBS	No	0.547081	131.808691	197.3	0.848	10.8	21.8	3.90	8631	5.95	0.00
009413057-03	OBS	No	0.547079	131.651666	53.3	1.481	11.6	8.0	3.90	8631	2.93	0.00

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009413057-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
009413057-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD—CENT_SATURATED
009413057-03	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—SAME_NTL_PERIOD—CENT_SATURATED

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

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

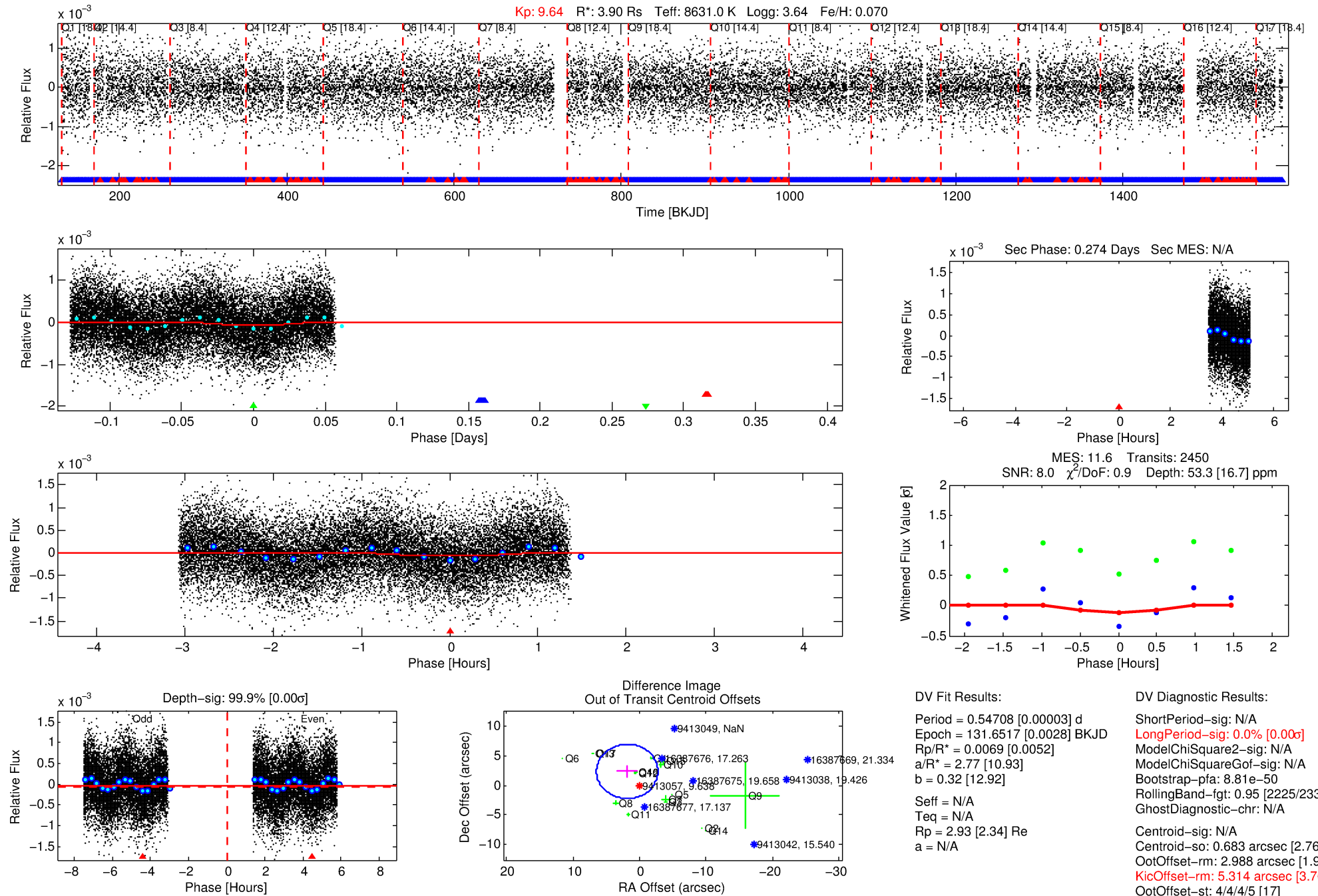
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009413057-03

No Significant Match Found

# DV One-Page Summary

KIC: 9413057 Candidate: 3 of 3 Period: 0.547 d



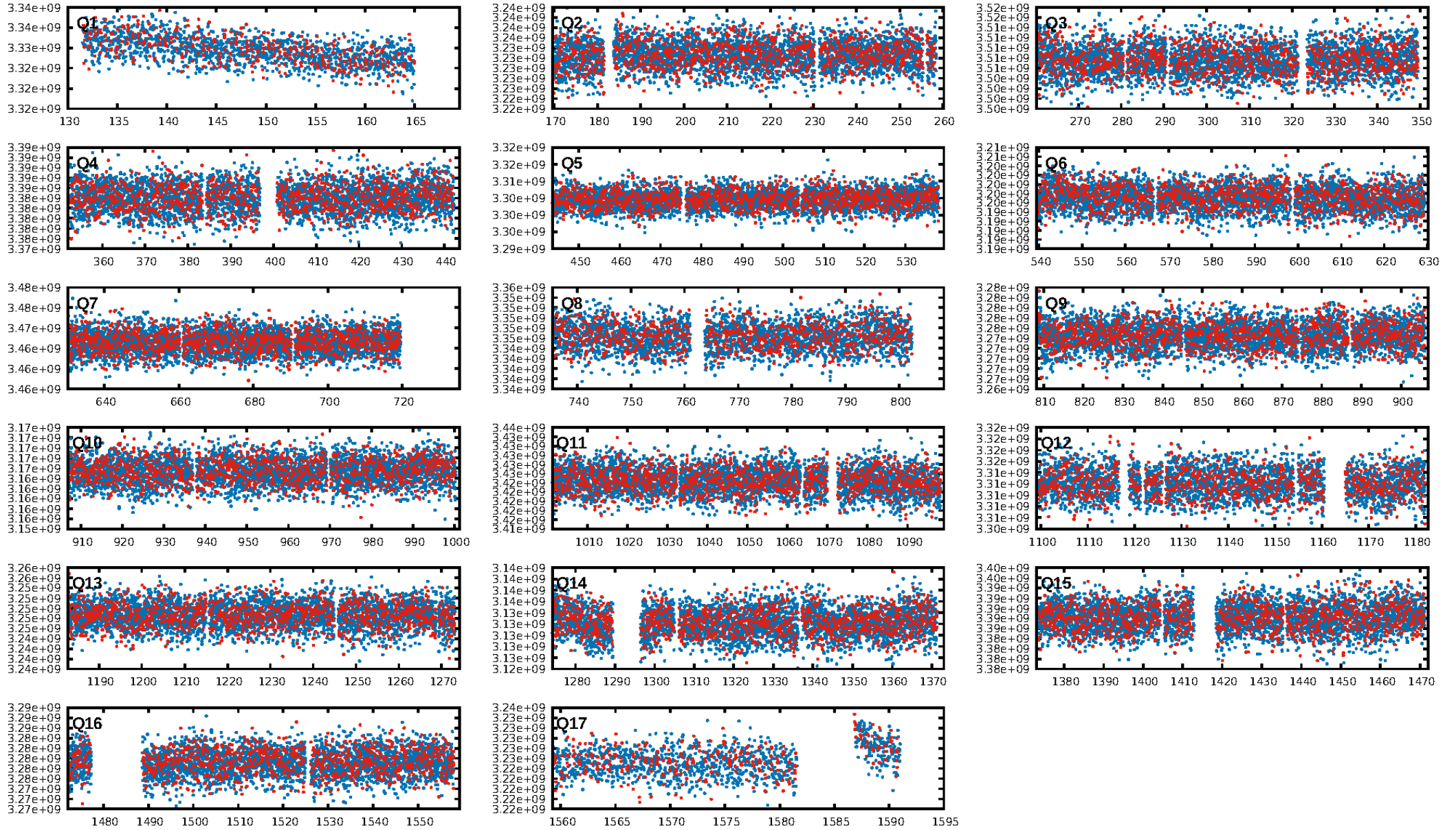
## DV Fit Results:

Period = 0.54708 [0.00003] d  
Epoch = 131.6517 [0.0028] BKJD  
Rp/R\* = 0.0069 [0.0052]  
a/R\* = 2.77 [10.93]  
b = 0.32 [12.92]  
Seff = N/A  
Teq = N/A  
Rp = 2.93 [2.34] Re  
a = N/A

## DV Diagnostic Results:

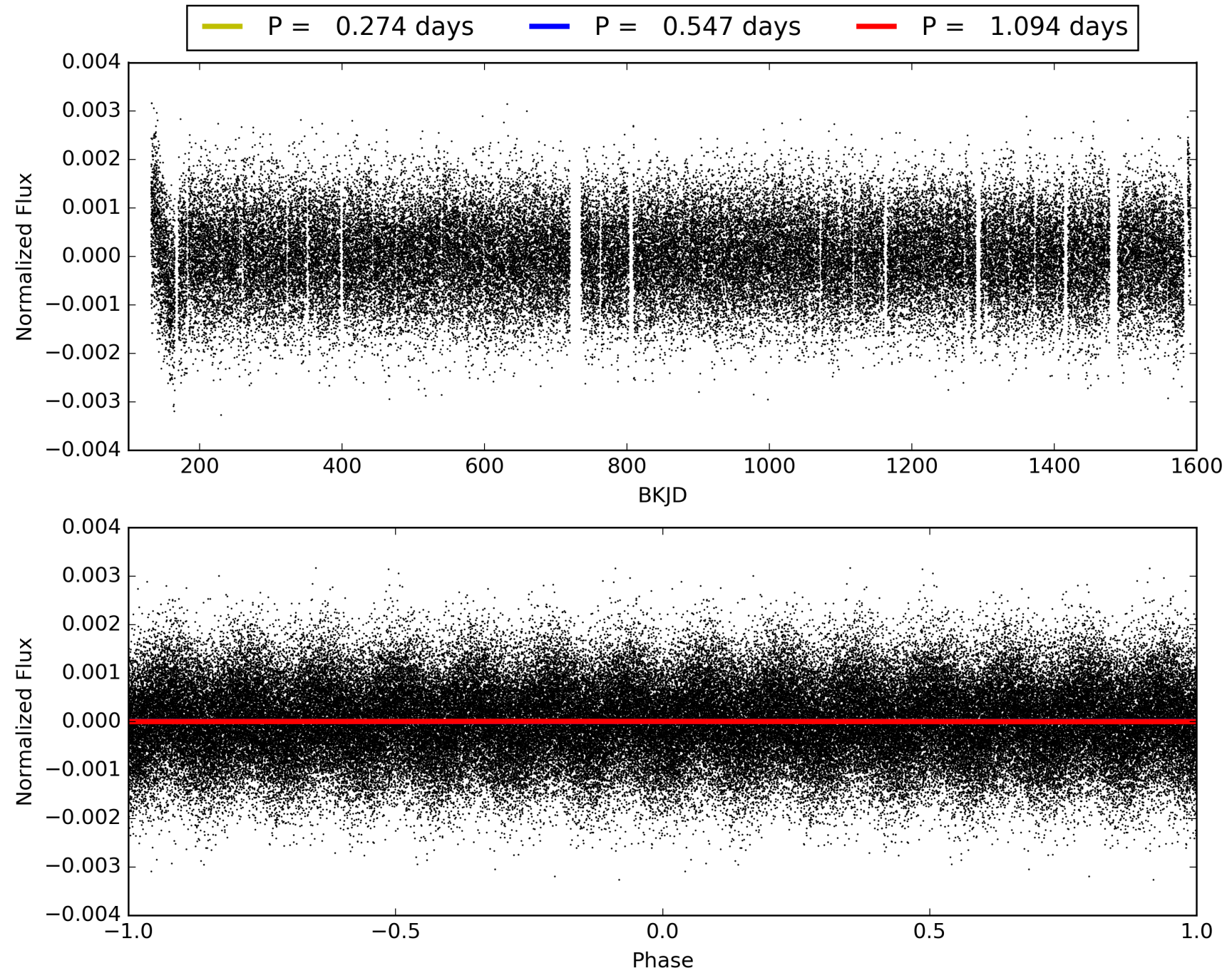
ShortPeriod-sig: N/A  
LongPeriod-sig: 0.0% [0.00σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 8.81e-50  
RollingBand-fgt: 0.95 [2225/2339]  
GhostDiagnostic-chr: N/A  
Centroid-sig: N/A  
Centroid-so: 0.683 arcsec [2.76σ]  
OotOffset-rm: 2.988 arcsec [1.94σ]  
KicOffset-rm: 5.314 arcsec [3.76σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 0.00 [0/17]  
DiffImageOverlap-fno: 0.00 [0/17]

# TCE 009413057-03, PDC Light Curves





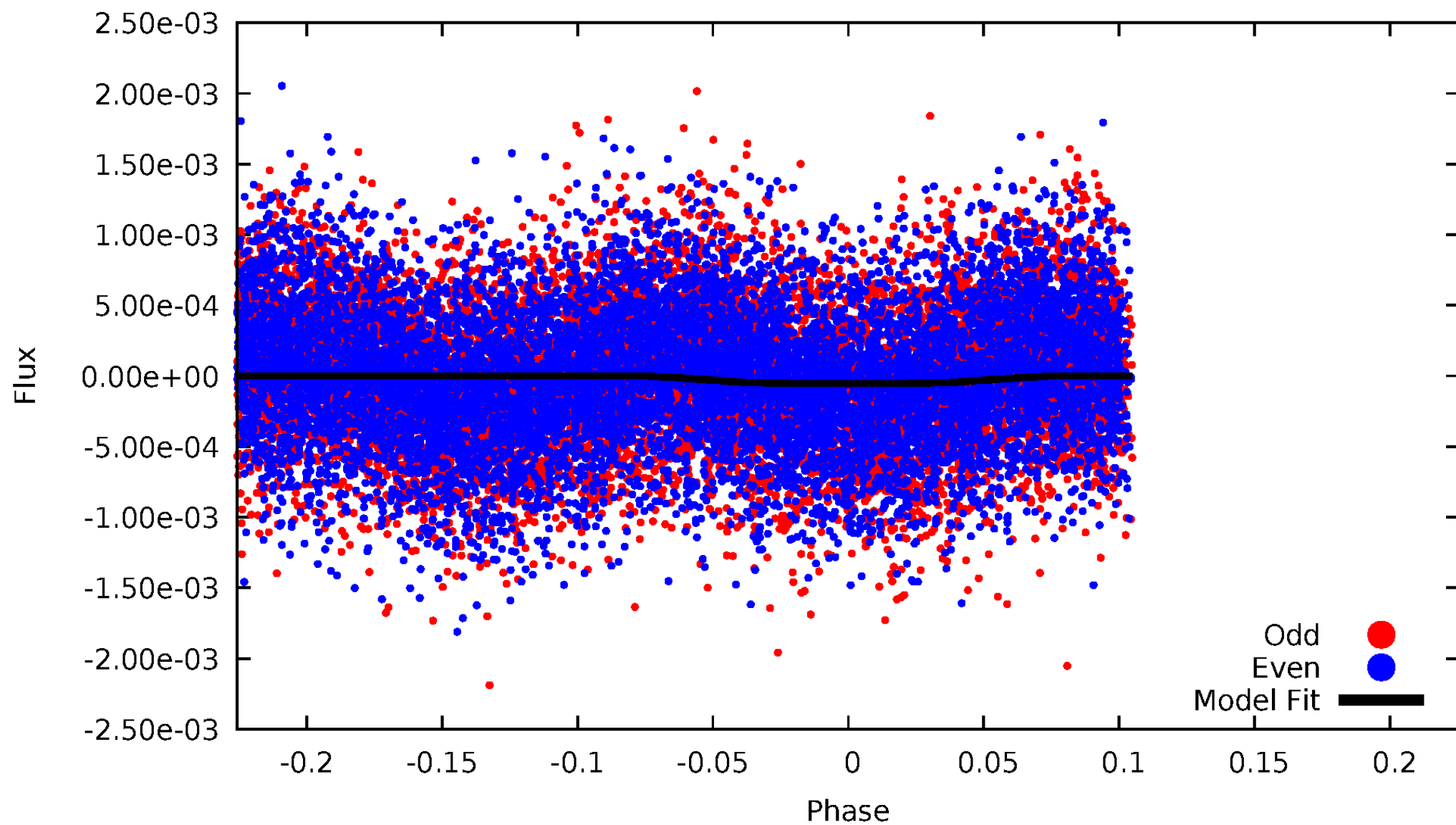
TCE 009413057-03





# DV Odd/Even

TCE 009413057-03



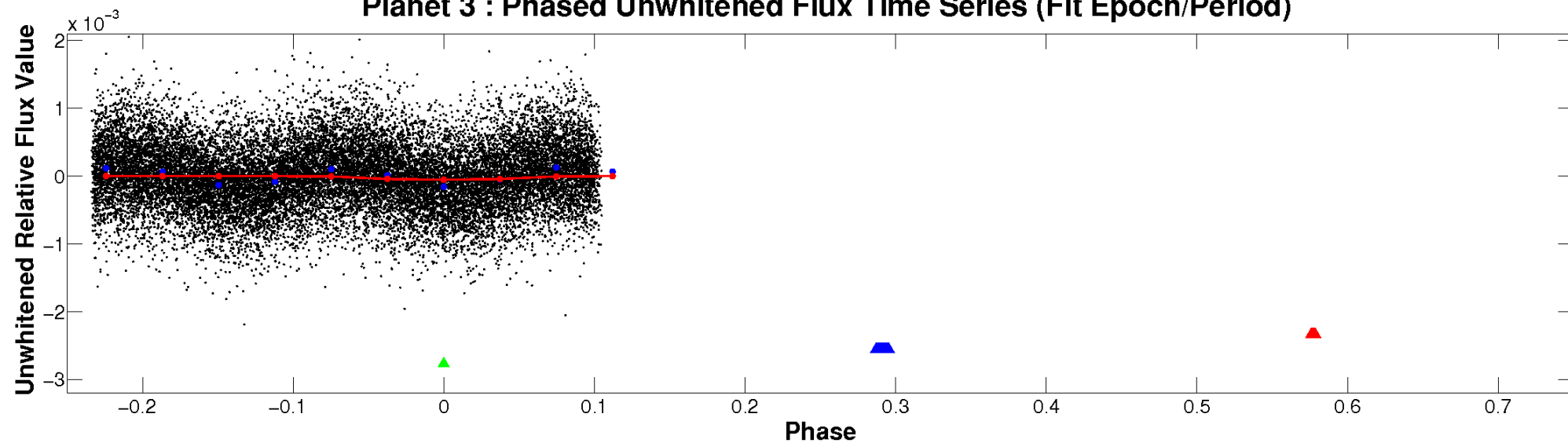


ALT Odd/Even

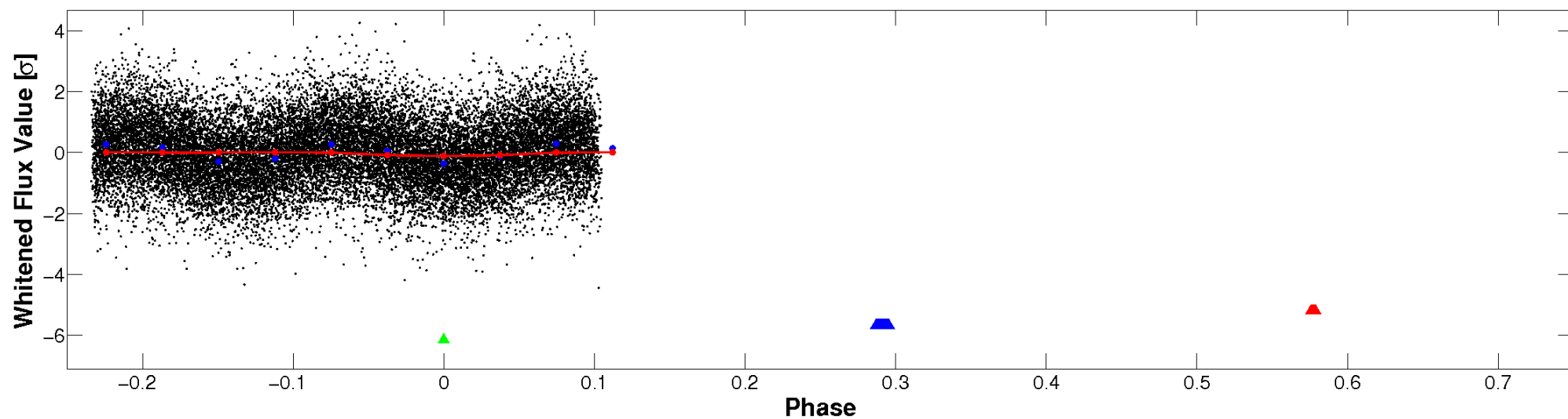
This plot does not exist for this TCE.

# Non-Whitened Vs. Whitened Light Curve

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



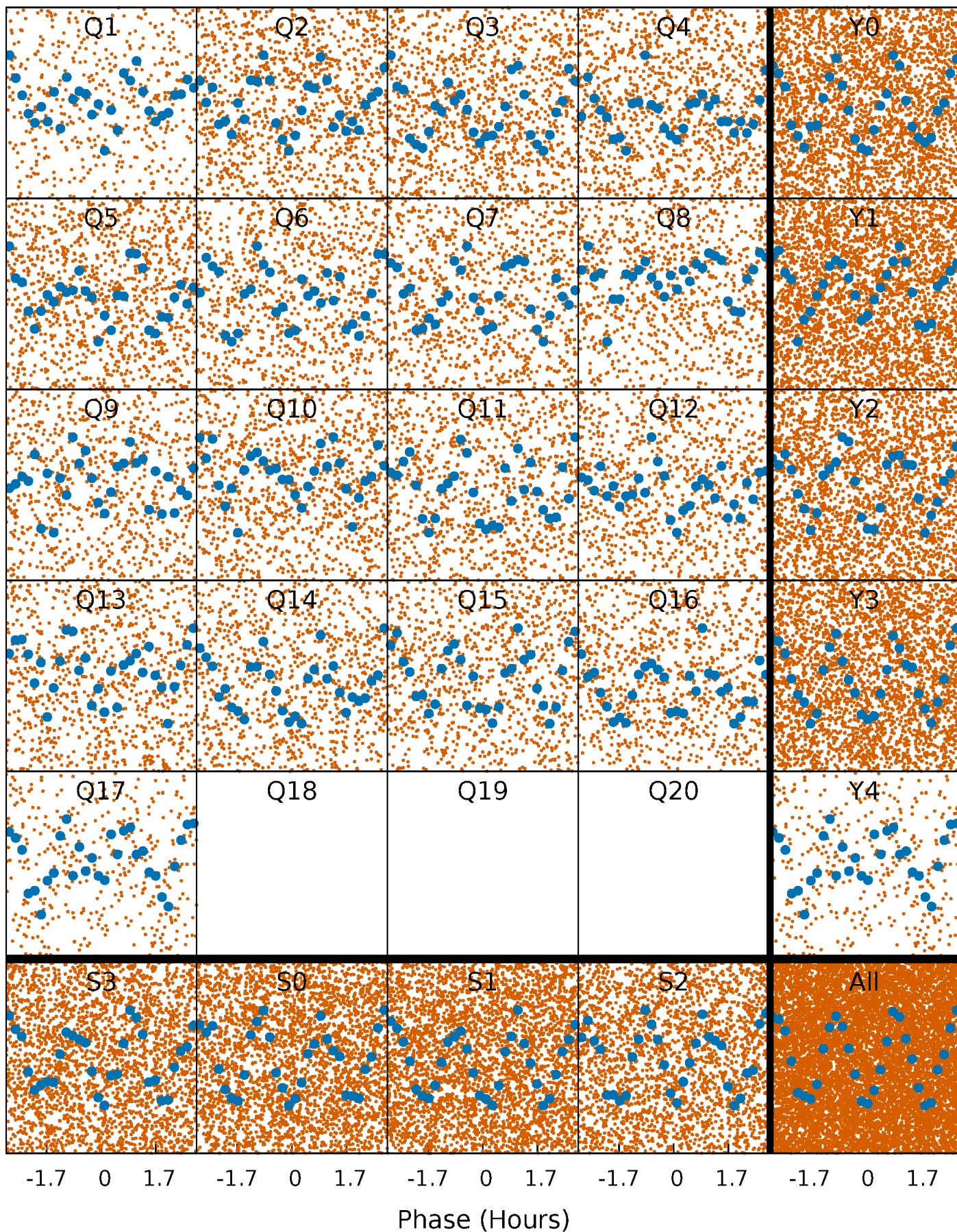
## Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)





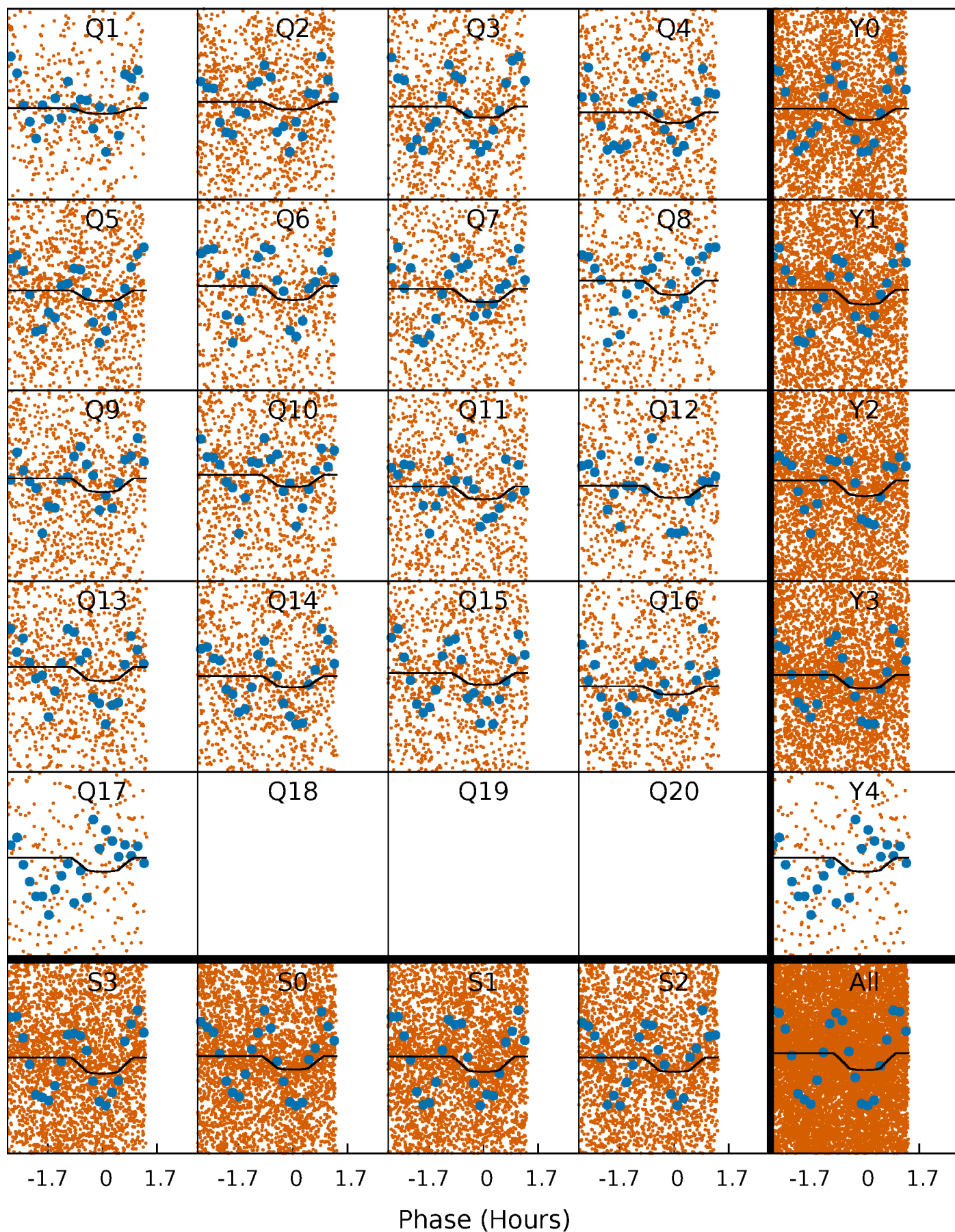
# PDC Quarter-Phased Transit Curves

TCE 009413057-03 P= 0.547079 Days  $T_0=131.651666$  (BKJD)



# DV Quarter-Phased Transit Curves

TCE 009413057-03   P= 0.547079 Days    $T_0=131.651666$  (BKJD)

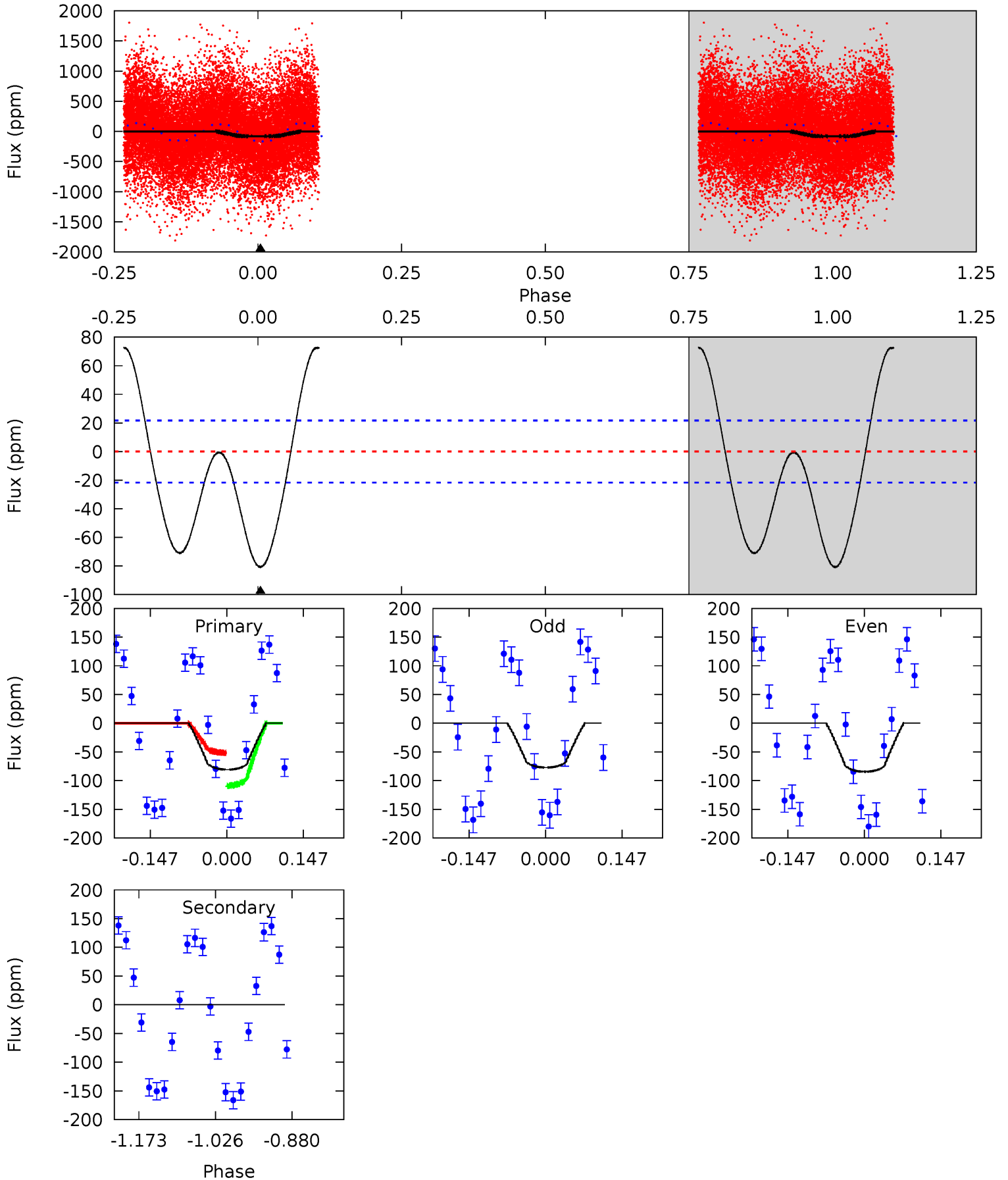


This plot does not exist for this TCE.

# DV Model-Shift Uniqueness Test

009413057-03, P = 0.547079 Days, E = 131.104587 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
16.7	0	0	0	4.48	1.45	9.92	16.7	16.7	0	0	0.77	1.15	0.47	6.14





## Alt Model-Shift Uniqueness Test

This plot does not exist for this TCE.

### Stellar Parameters For KIC 009413057

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$8631^{+172}_{-206}$	$3.644^{+0.210}_{-0.090}$	$0.070^{+0.050}_{-0.450}$	$3.904^{+0.666}_{-1.000}$	$2.449^{+0.293}_{-0.403}$	$0.058^{+0.064}_{-0.019}$
	+2%/-2%	+6%/-2%	+71%/-643%	+17%/-26%	+12%/-16%	+111%/-33%
Source	SPE4	SPE4	SPE4	DSEP		

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

### Secondary Eclipse Parameters for KIC 009413057-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$0 \pm 5$	$2.89^{+2.24}_{-1.56}$	$7822^{+379}_{-489}$	$-6129^{+1088}_{-697}$	$0.003^{+0.150}_{-0.140}$
Alt.	N/A	N/A	N/A	N/A	N/A

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

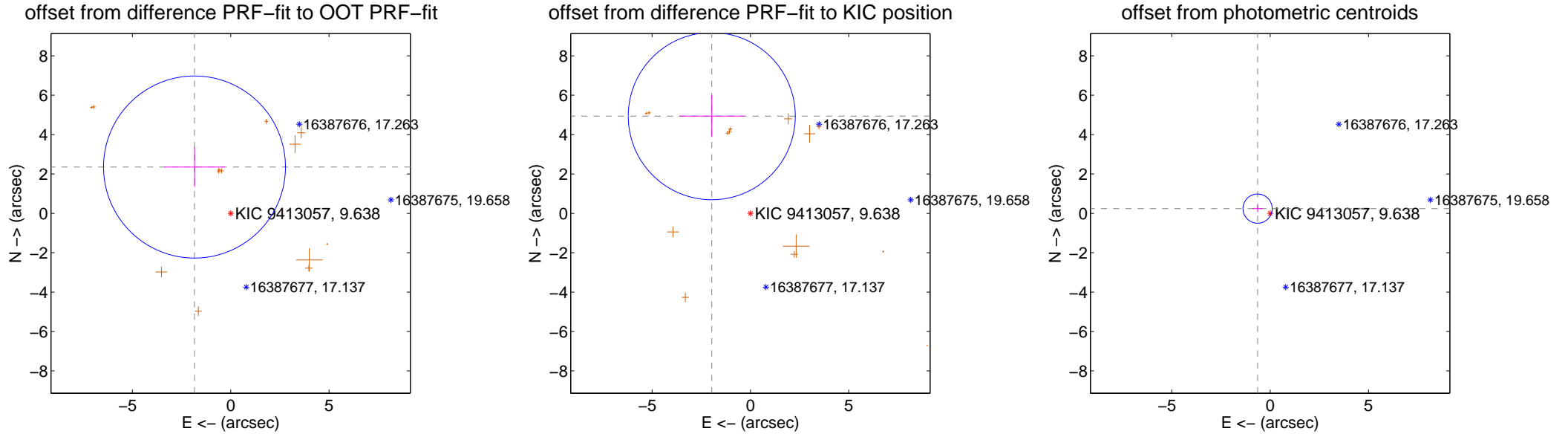
## DV Centroid Data

Supplemental centroid analysis for 009413057-03. **Kepler magnitude: 9.64.** Transit SNR 7.95

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

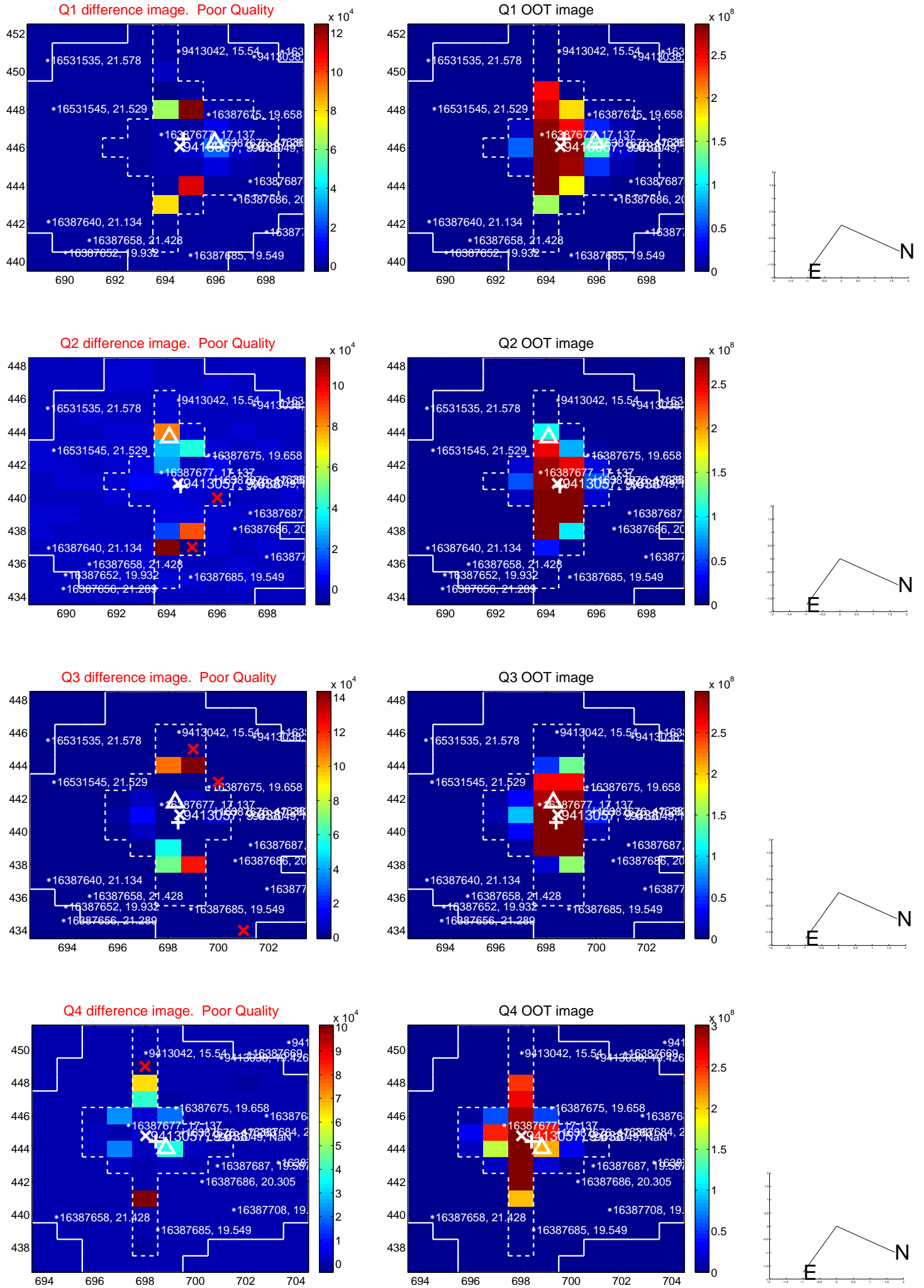
The direct PRF centroid is offset from the target star catalog position by about 1.83 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.988 \pm 1.541$	1.94	$1.840 \pm 1.547$	$2.354 \pm 1.007$
PRF-fit source offset from KIC position	<b><math>5.314 \pm 1.415</math></b>	<b>3.76</b>	$1.966 \pm 1.652$	$4.937 \pm 1.058$
photometric centroid source offset	$0.68 \pm 0.25$	2.76	$0.64 \pm 0.26$	$0.24 \pm 0.18$

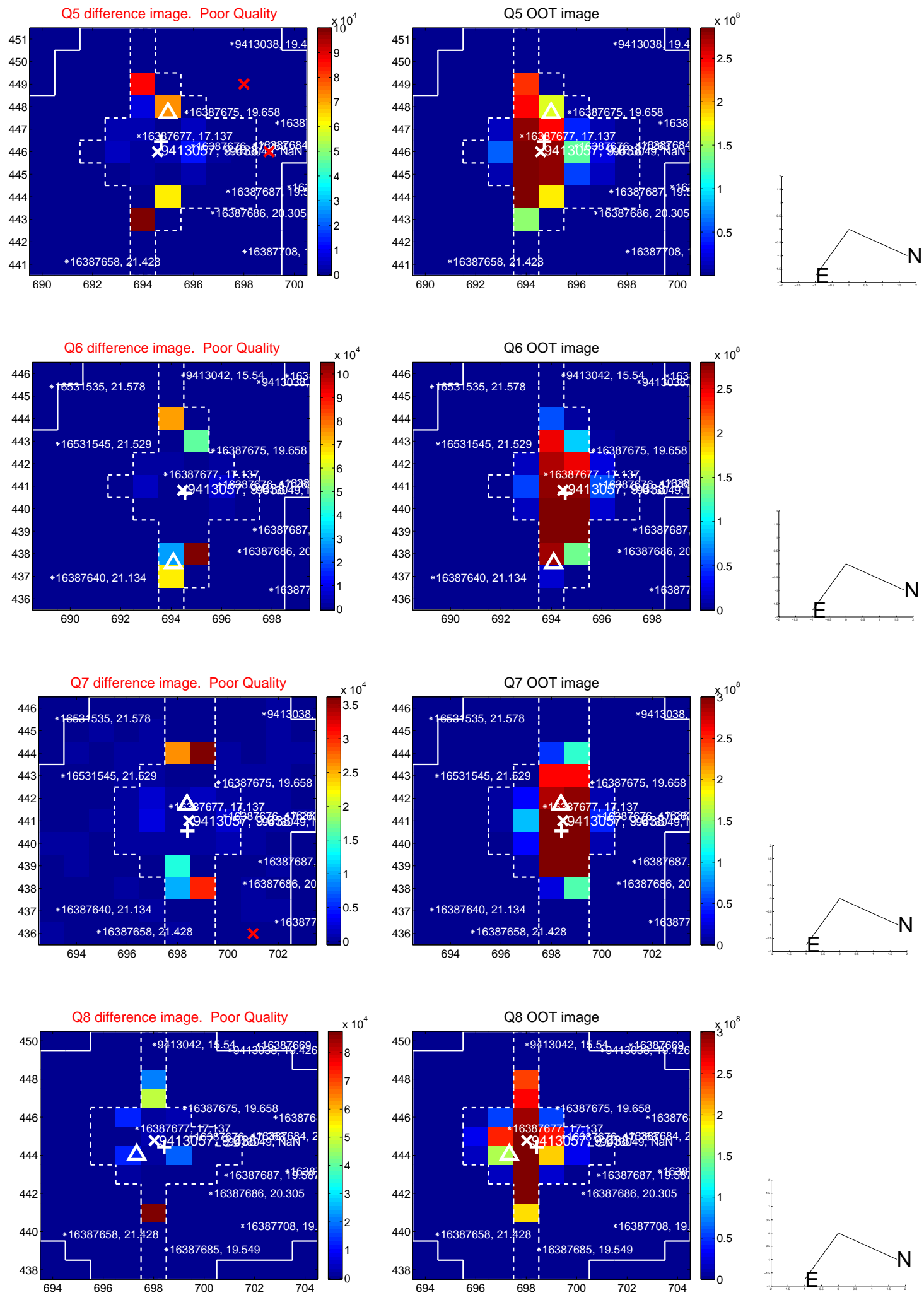


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

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



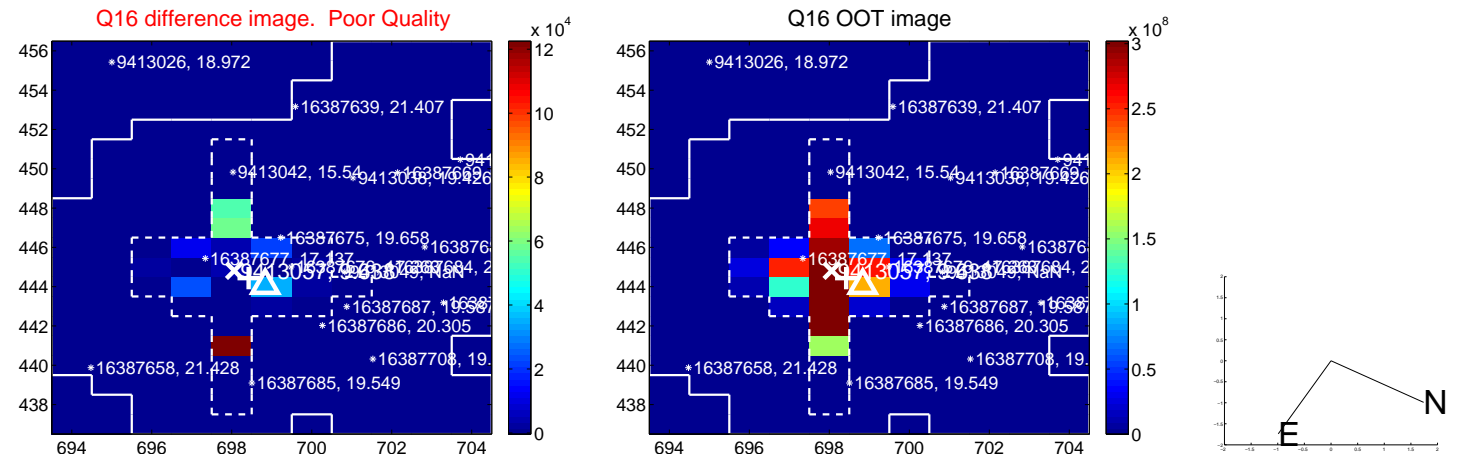
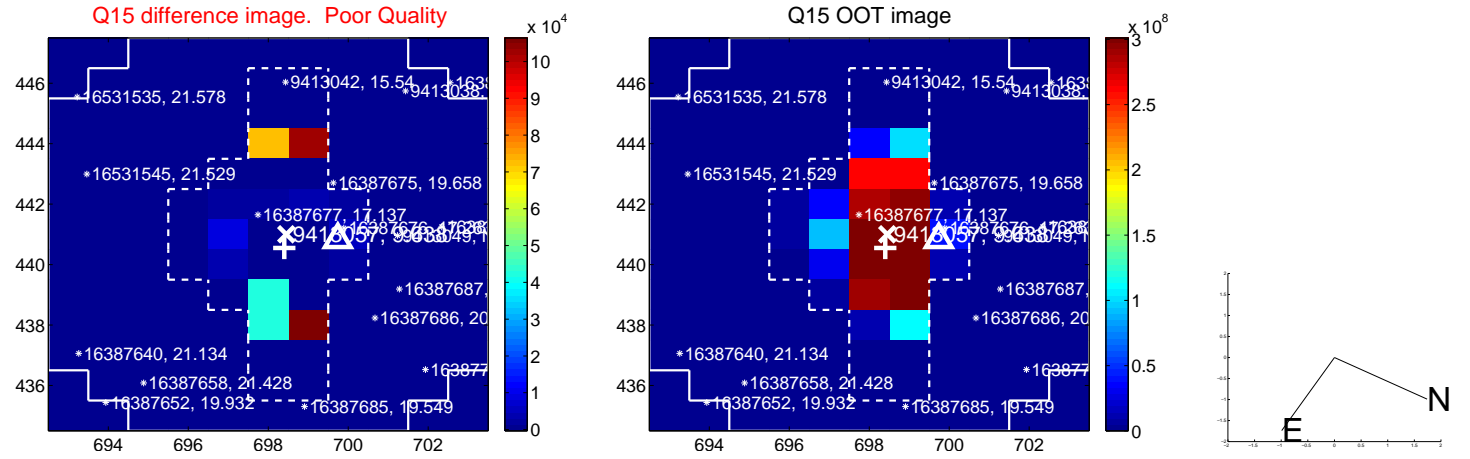
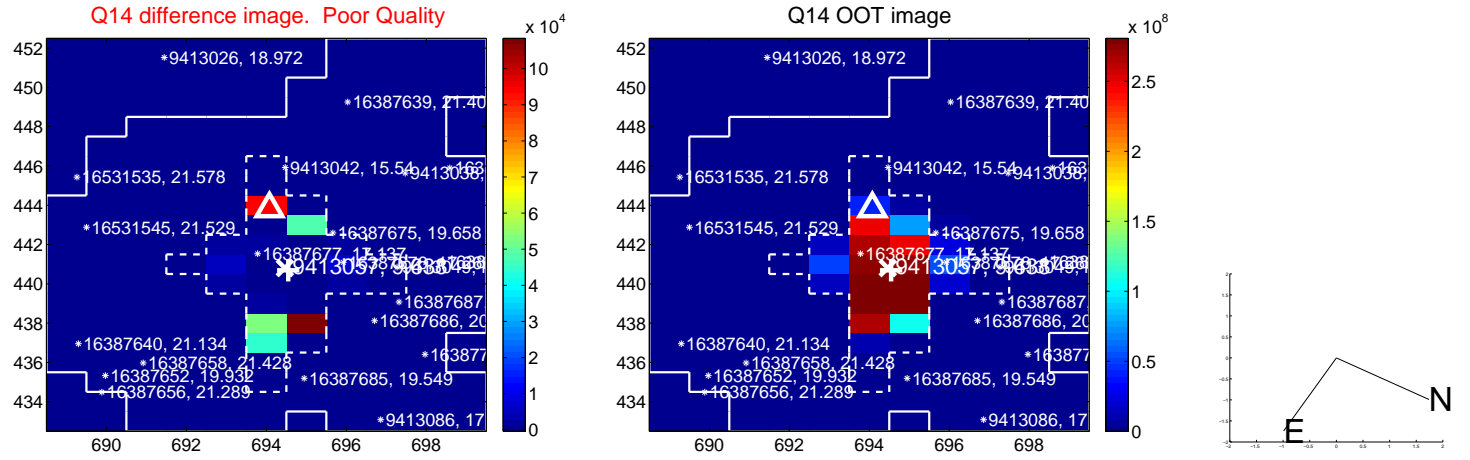
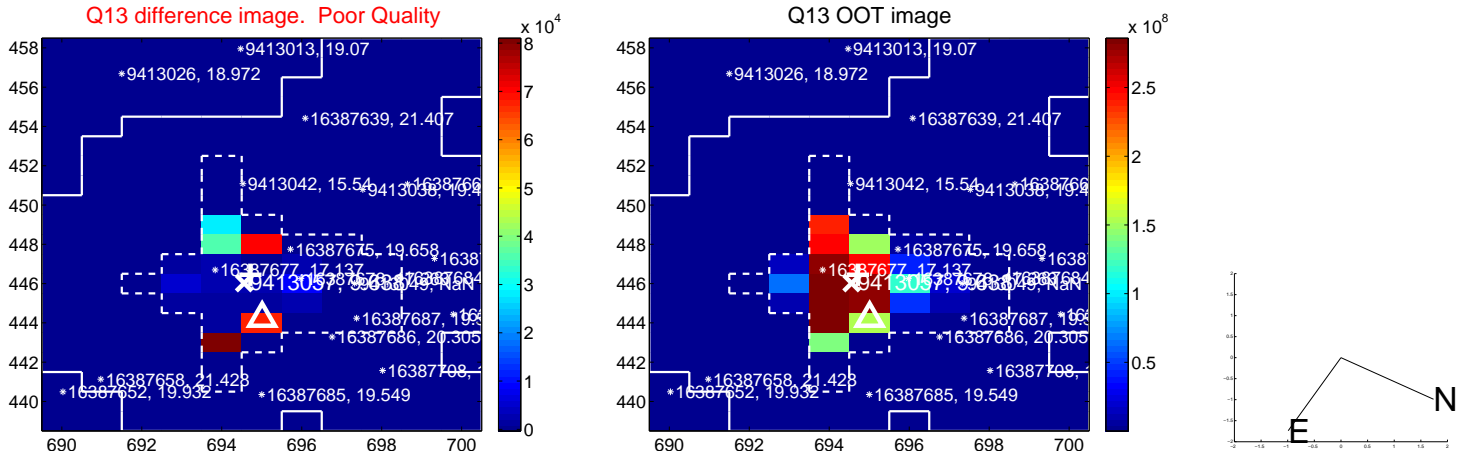
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



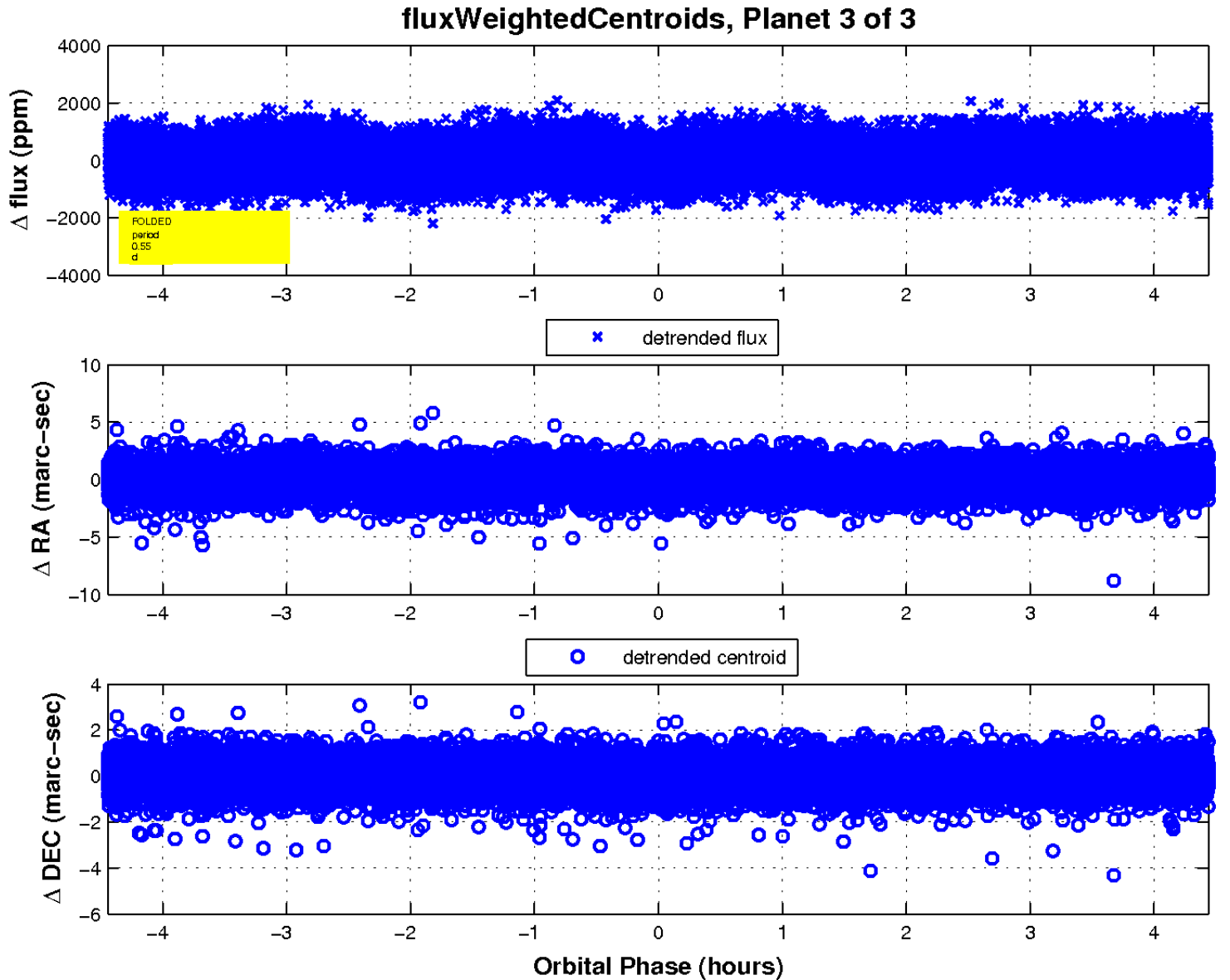
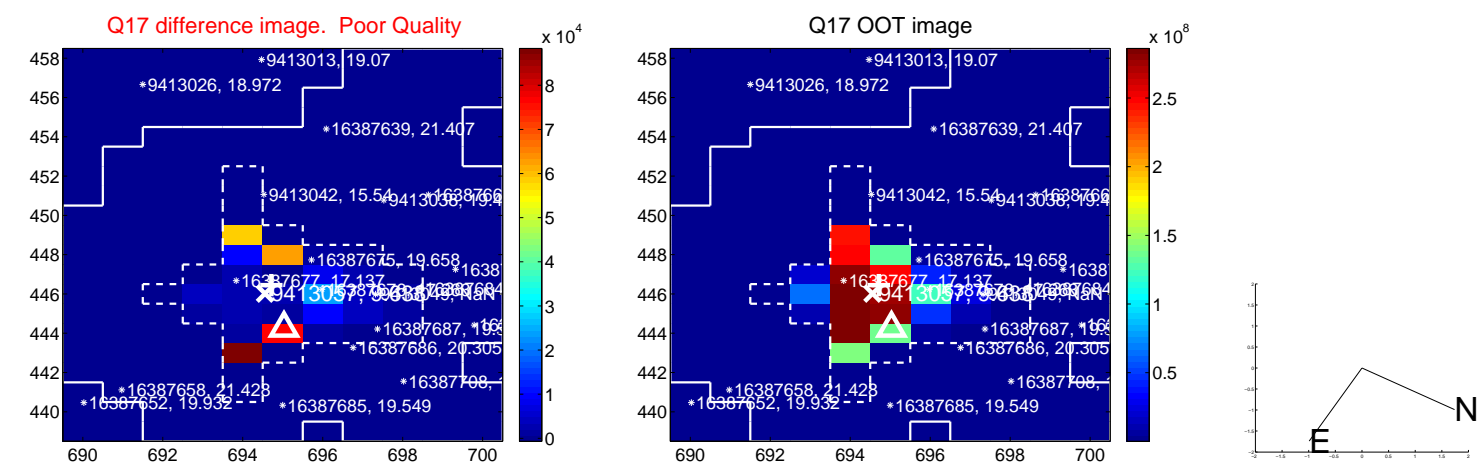




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



UKIRT Image

