

# KIC 009020199

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009020199-01	OBS	No	0.537403	131.844350	179.9	1.452	14.8	12.7	2.06	6905	3.23	39507.05
009020199-02	OBS	No	0.537398	131.579631	184.0	1.187	15.7	10.7	2.06	6905	2.84	39507.52
009020199-03	OBS	No	0.537414	131.701619	30.1	1.500	13.3	-1.0	2.06	6905	1.15	39506.01

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009020199-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
009020199-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD—CENT_SATURATED
009020199-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—LPP_DV—LPP_ALT—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.

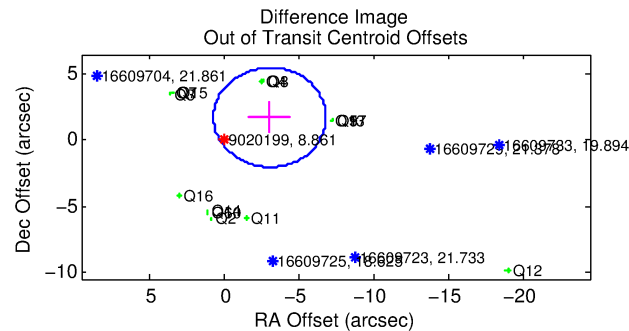
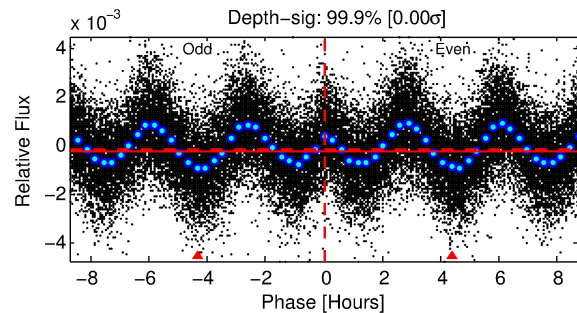
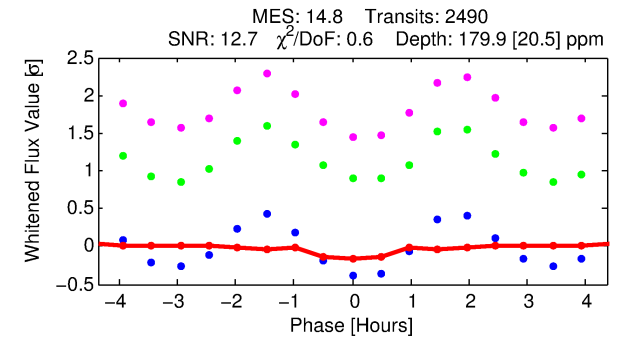
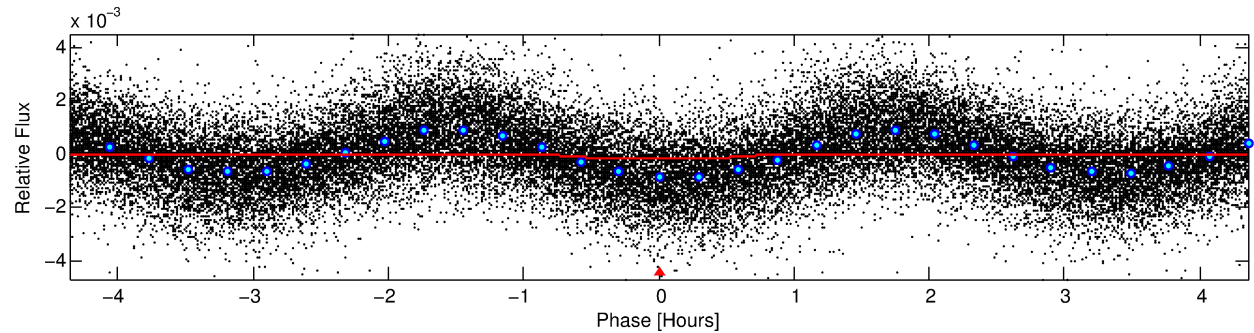
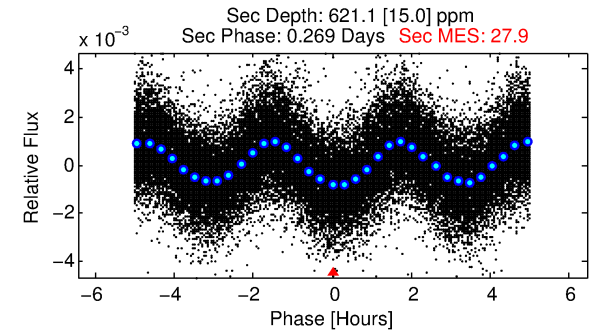
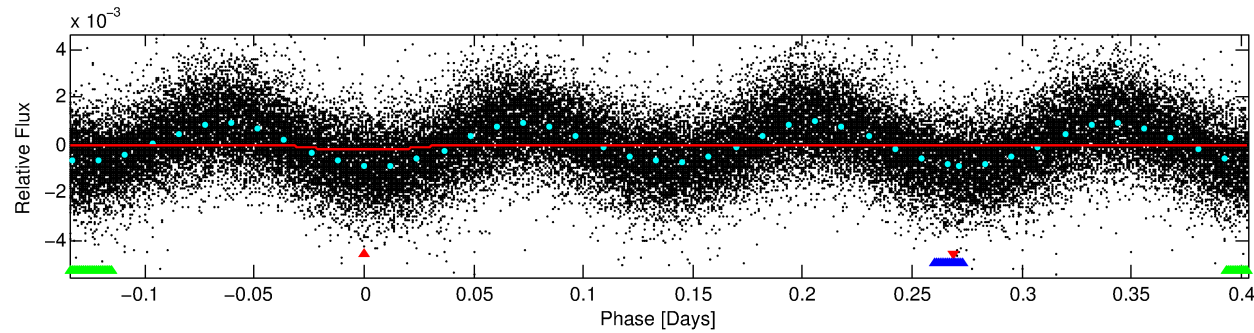
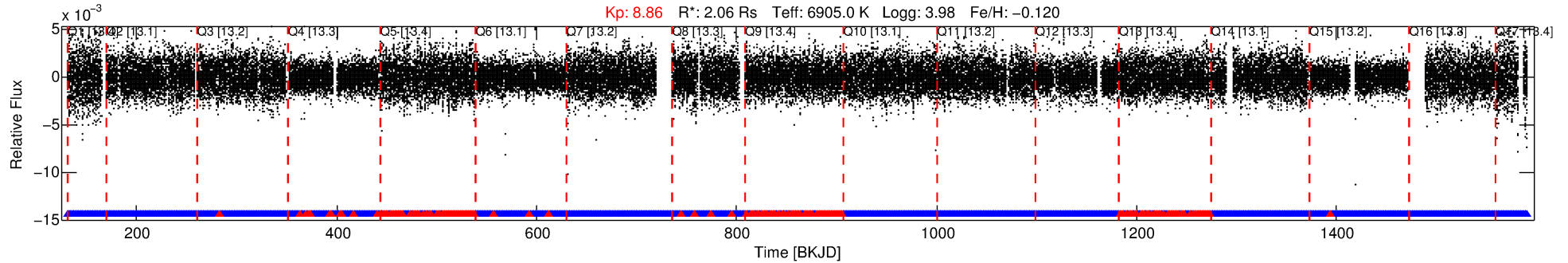
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 009020199-01

No Significant Match Found

# DV One-Page Summary

KIC: 9020199 Candidate: 1 of 3 Period: 0.537 d



## DV Fit Results:

Period = 0.53740 [0.00001] d  
Epoch = 131.8444 [0.0017] BKJD  
Rp/R\* = 0.0143 [0.0058]  
a/R\* = 1.62 [2.43]  
b = 0.90 [0.52]  
Seff = 39507.05 [19573.87]  
Teq = 3595 [445] K  
Rp = 3.23 [1.69] Re  
a = 0.0148 [0.0045] AU  
Ag = 7.19 [6.72] [0.92σ]  
Teffp = 9101 [1860] K [2.88σ]

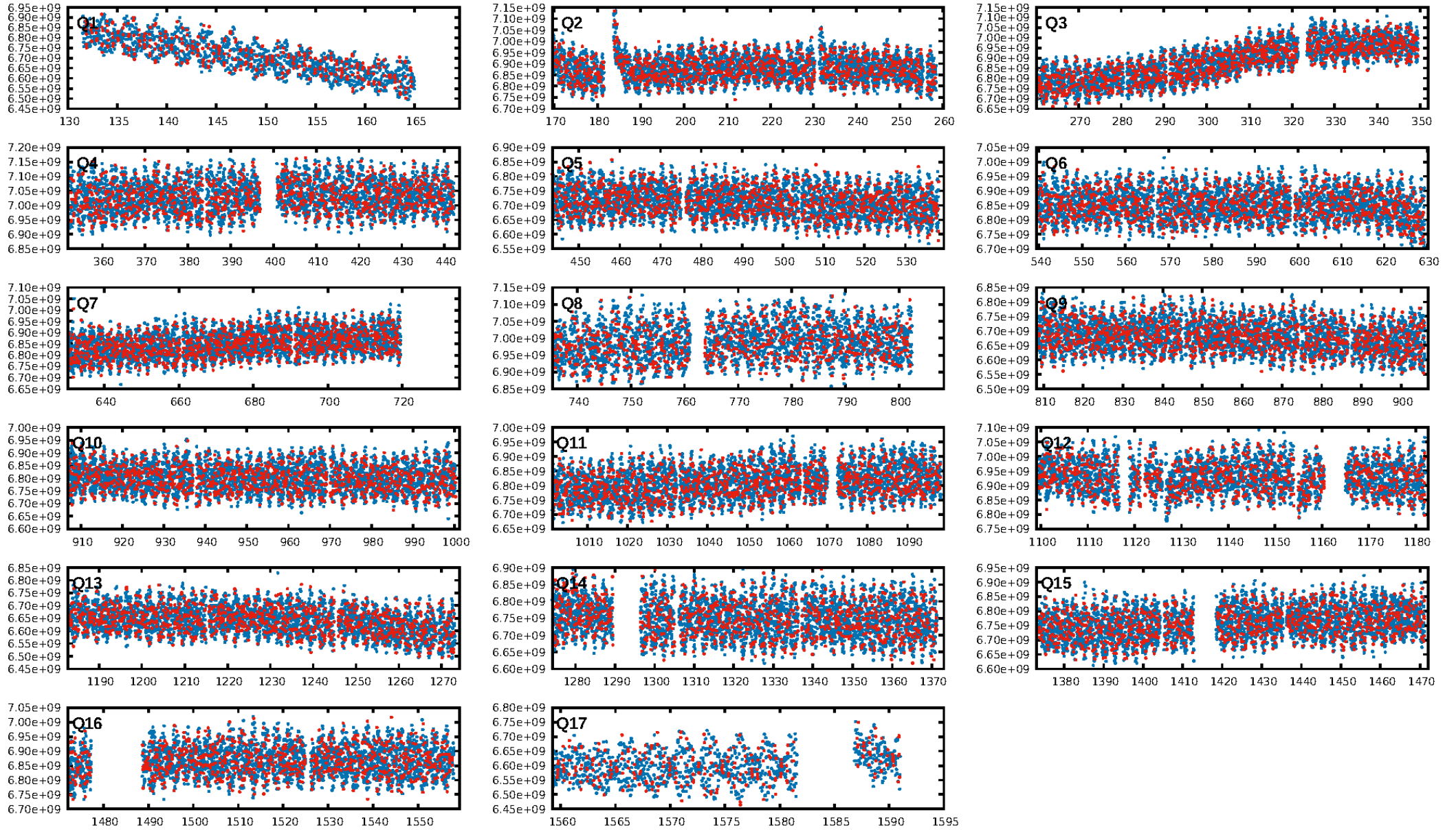
## DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]  
LongPeriod-sig: 0.0% [0.00σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 0.89 [2109/2379]  
GhostDiagnostic-chr: N/A  
Centroid-sig: N/A  
Centroid-so: 0.551 arcsec [3.80σ]  
OotOffset-rm: 3.543 arcsec [2.83σ]  
KicOffset-rm: 4.250 arcsec [4.44σ]  
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: 31-Jan-2016 23:39:43 Z

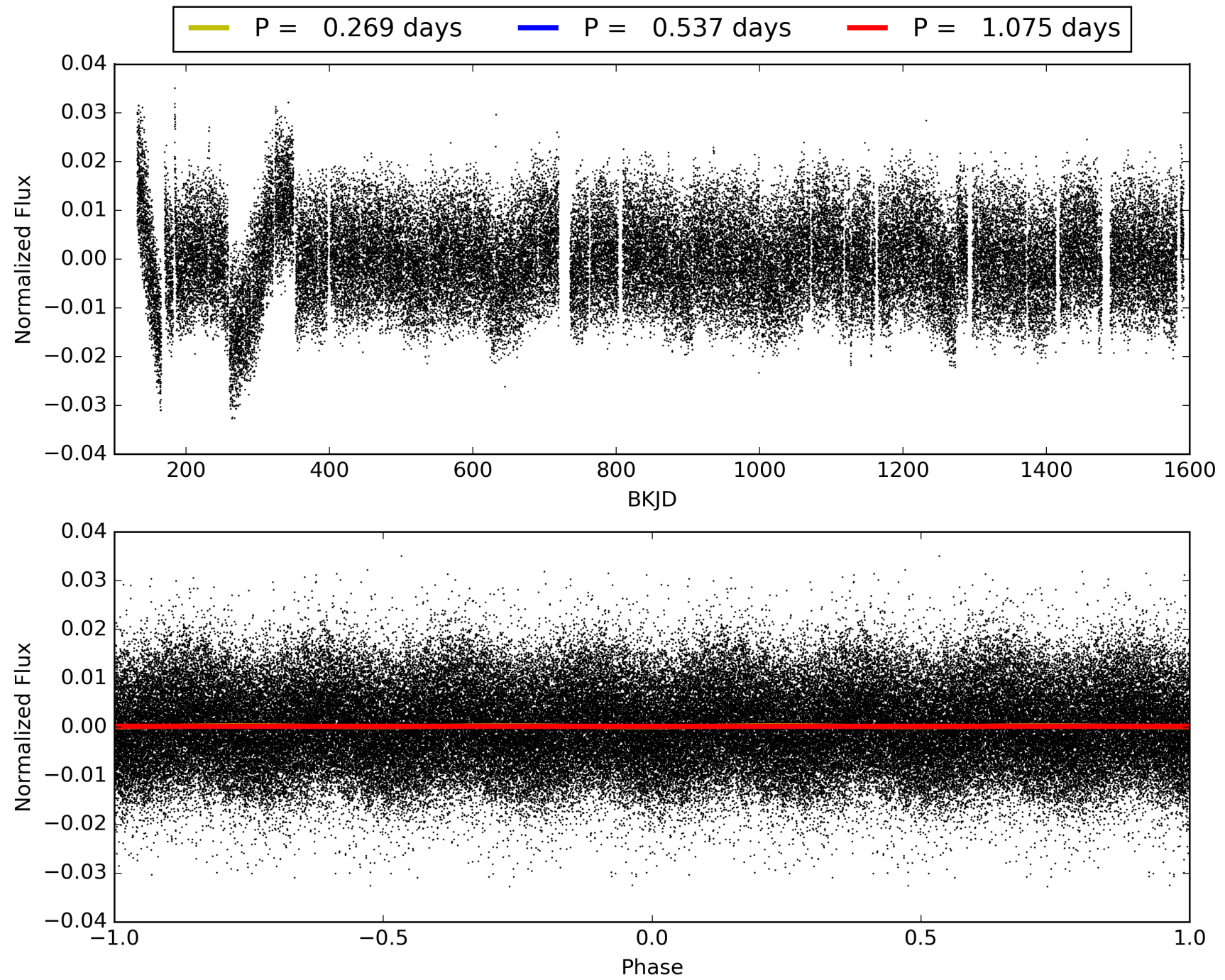
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 009020199-01, PDC Light Curves





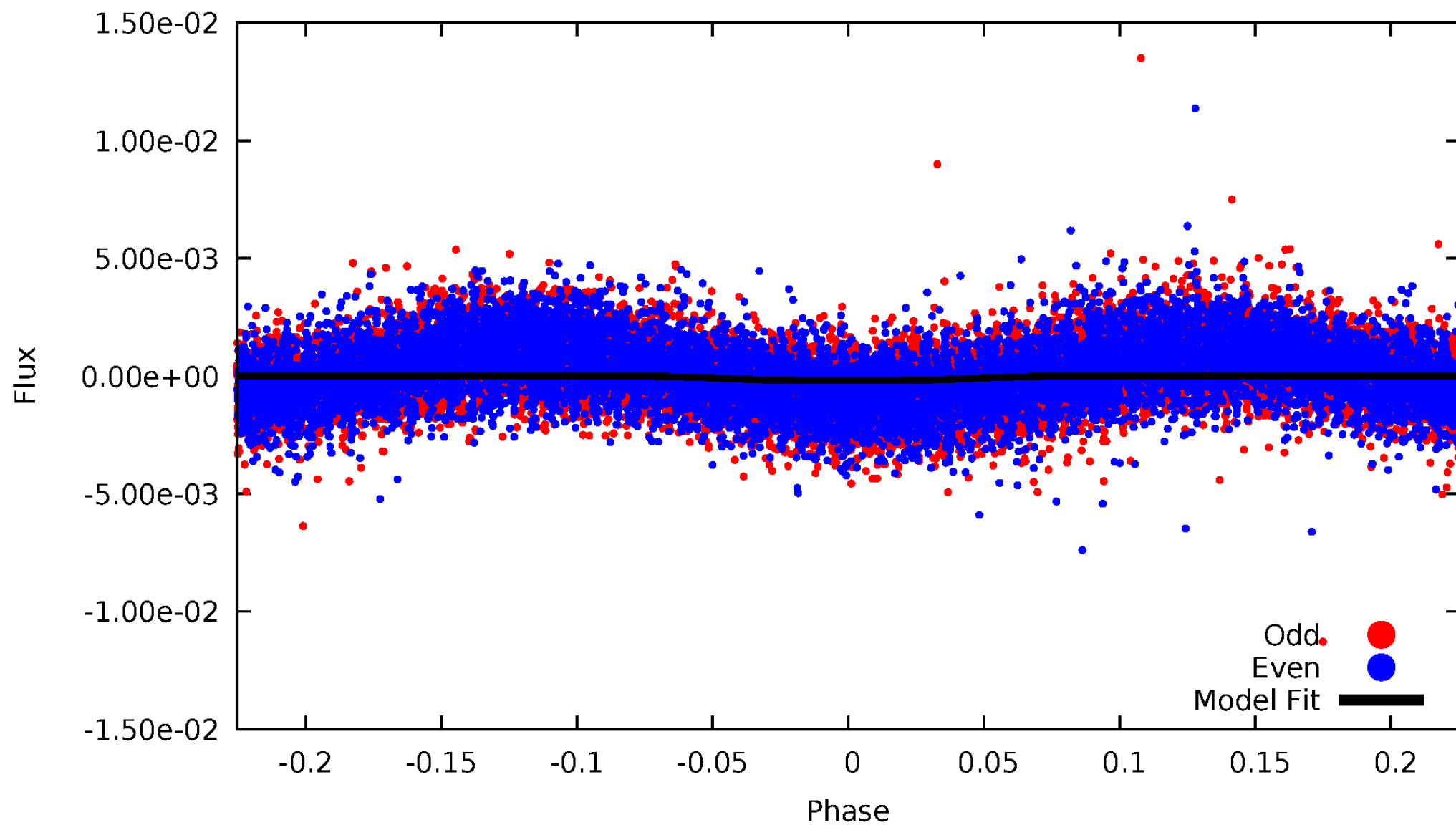
TCE 009020199-01





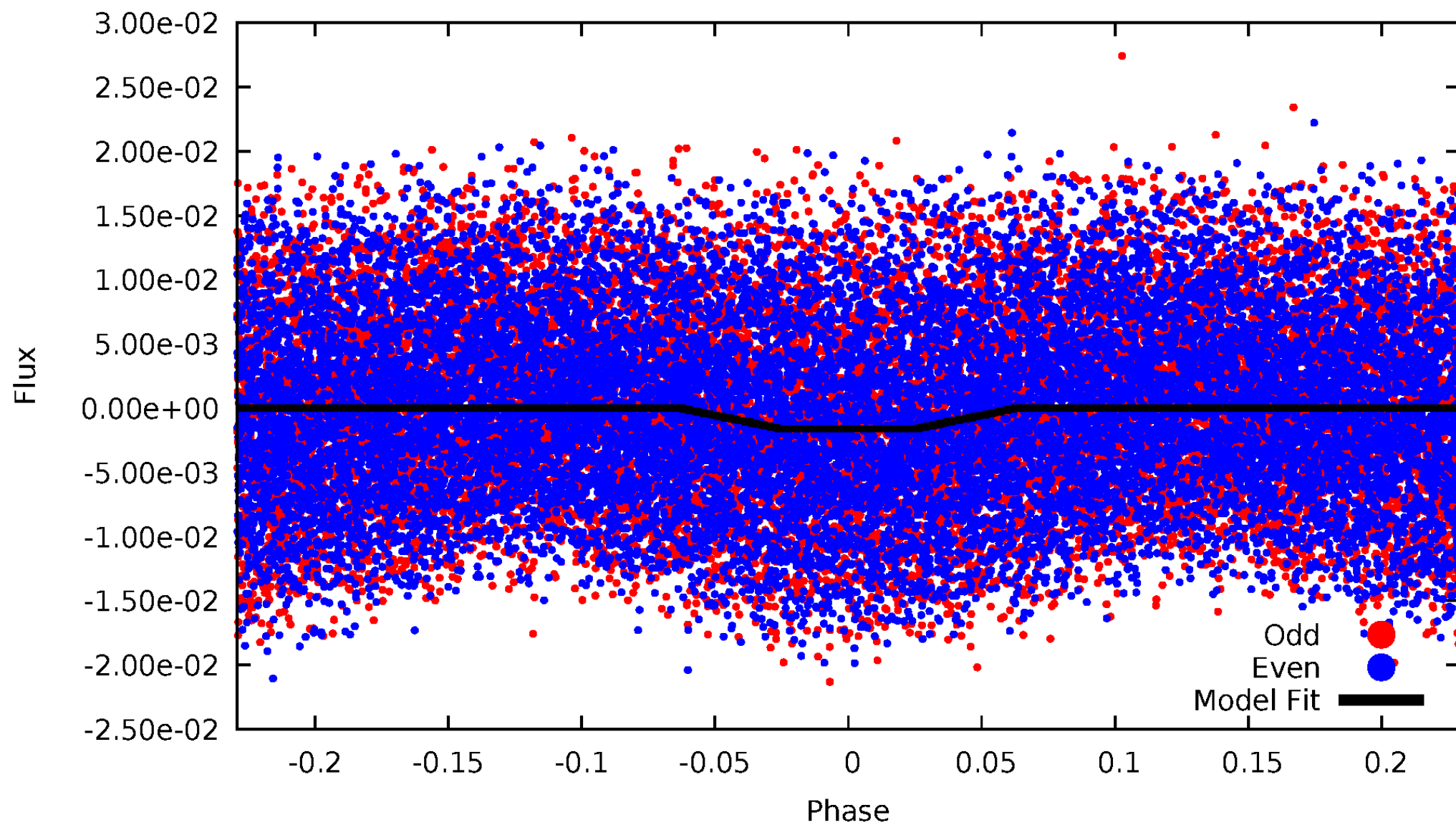
# DV Odd/Even

TCE 009020199-01



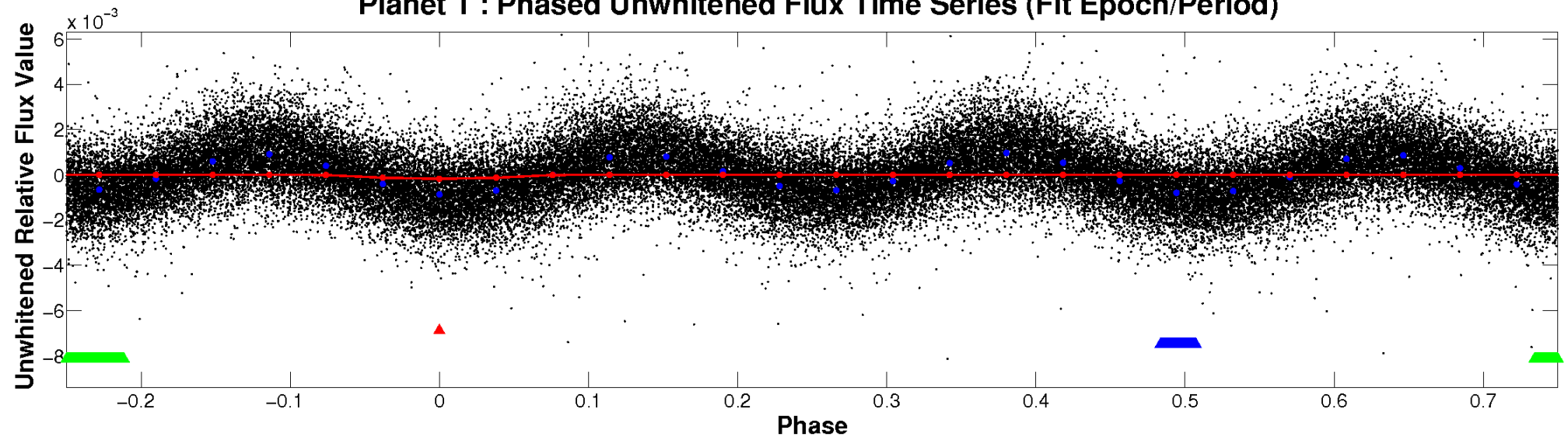
# ALT Odd/Even

TCE 009020199-01

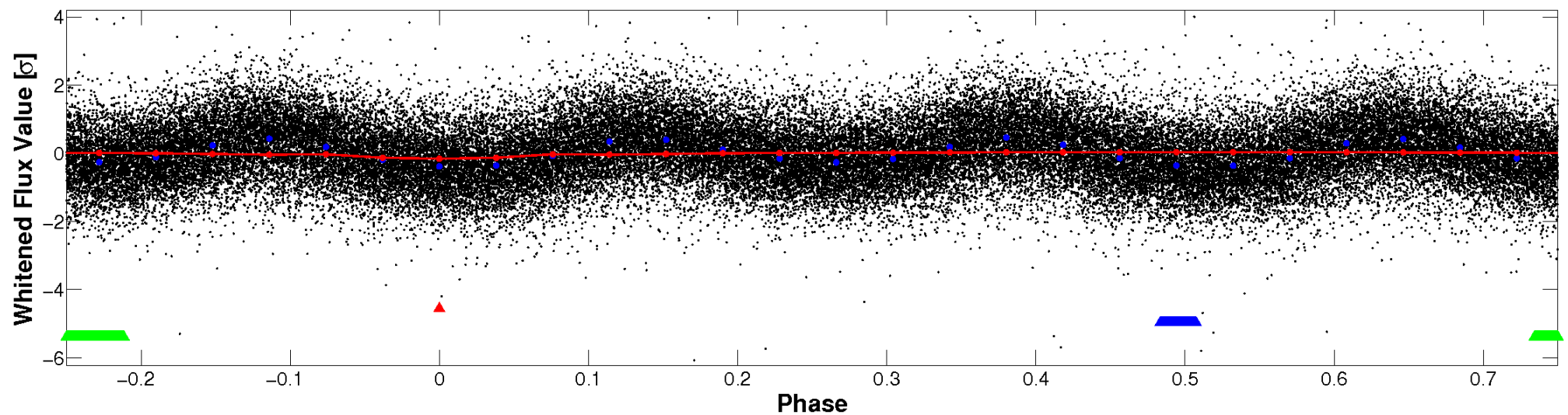


# Non-Whitened Vs. Whitened Light Curve

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



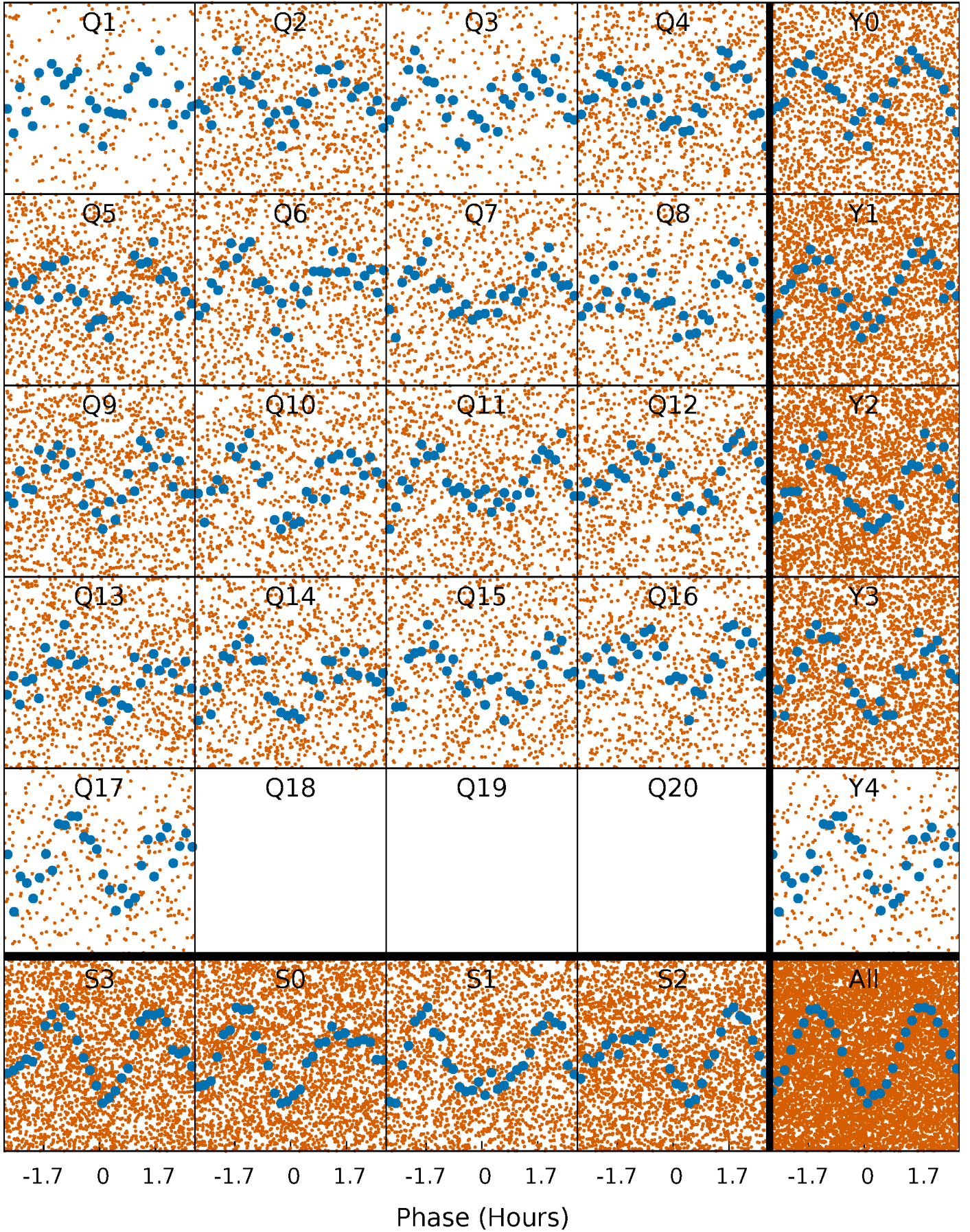
**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**





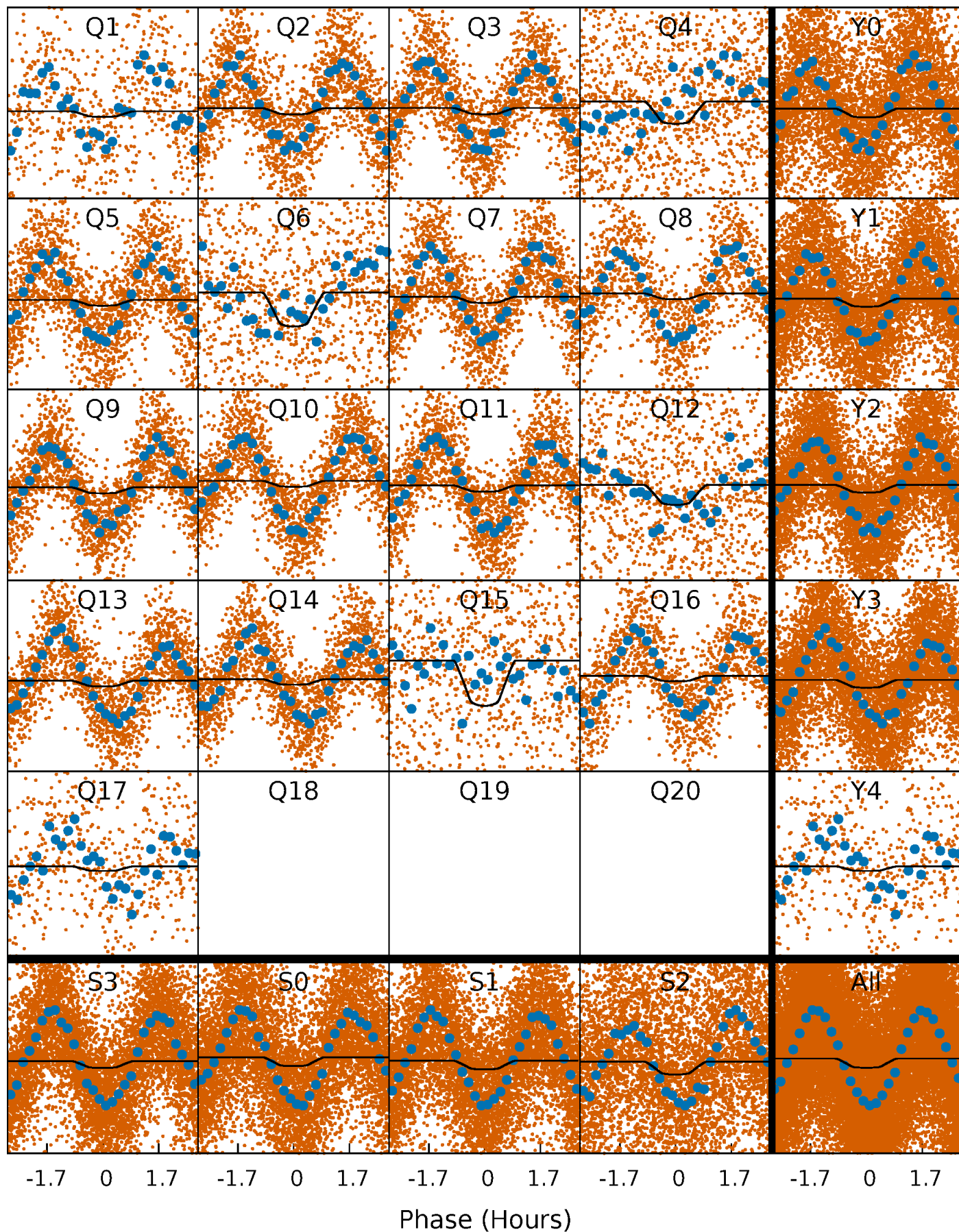
# PDC Quarter-Phased Transit Curves

TCE 009020199-01   P= 0.537403 Days    $T_0=131.844350$  (BKJD)



# DV Quarter-Phased Transit Curves

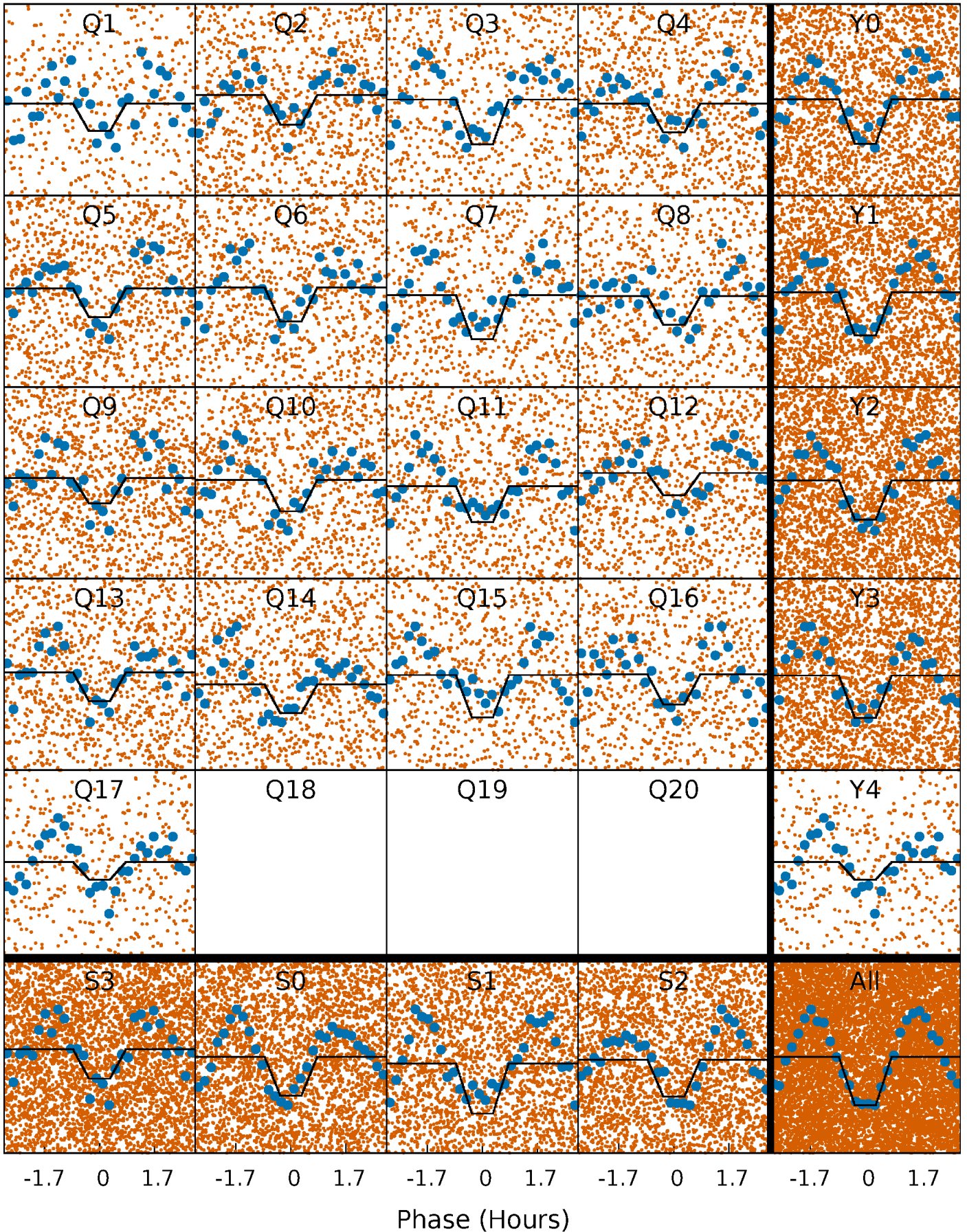
TCE 009020199-01   P= 0.537403 Days    $T_0=131.844350$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

TCE 009020199-01 P= 0.537414 Days  $T_0=131.837197$  (BKJD)

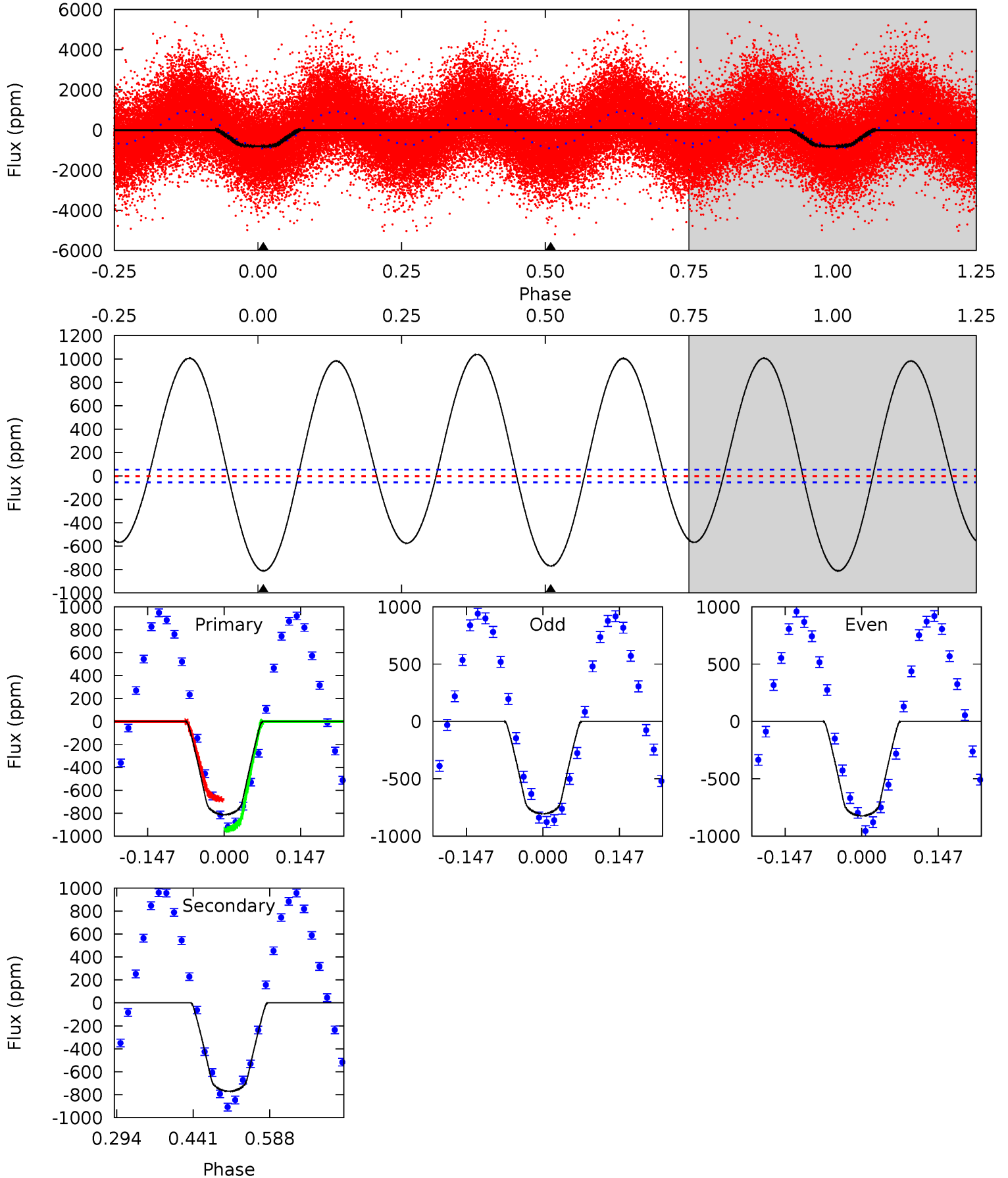




# DV Model-Shift Uniqueness Test

009020199-01, P = 0.537403 Days, E = 131.306947 Days

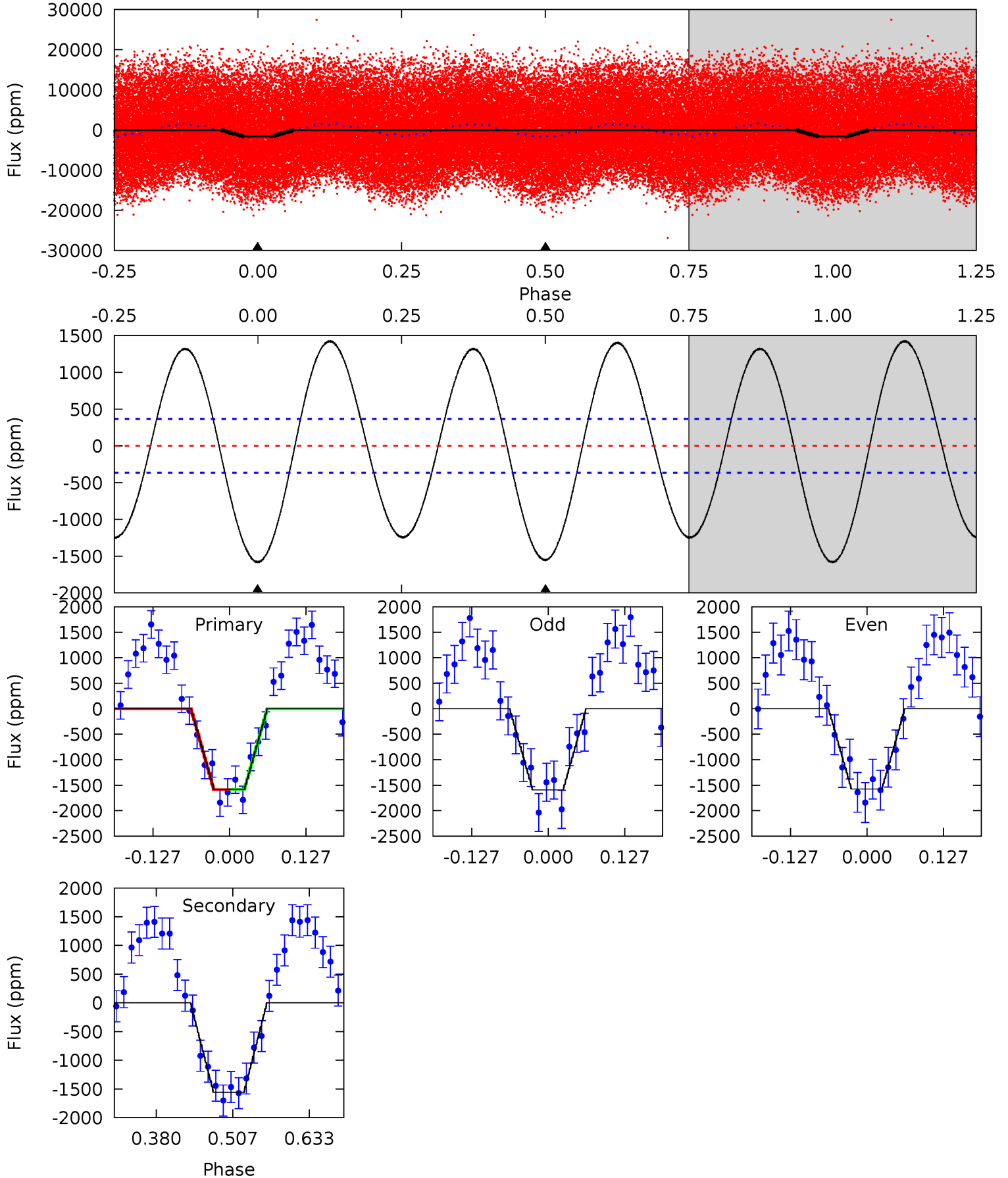
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
67.2	63.7	0	0	4.48	1.45	40.4	67.2	67.2	63.7	63.7	0.77	1.03	0.56	11.5



# Alt Model-Shift Uniqueness Test

009020199-01, P = 0.537414 Days, E = 131.299783 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
19.6	19.2	0	0	4.51	1.53	11.3	19.6	19.6	19.2	19.2	0.12	0.91	0.47	0.06



### Stellar Parameters For KIC 009020199

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6905^{+170}_{-242}$	$3.985^{+0.273}_{-0.168}$	$-0.120^{+0.250}_{-0.350}$	$2.062^{+0.567}_{-0.693}$	$1.497^{+0.196}_{-0.295}$	$0.241^{+0.411}_{-0.118}$
	+2%/-4%	+7%/-4%	+208%/-292%	+27%/-34%	+13%/-20%	+171%/-49%
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 009020199-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-770 \pm 12$	$3.07^{+1.42}_{-1.31}$	$4984^{+385}_{-465}$	$10578^{+6013}_{-2436}$	$9.714^{+19.109}_{-5.214}$
Alt.	$-1557 \pm 81$	$8.89^{+1.96}_{-1.97}$	$4969^{+378}_{-405}$	$6567^{+678}_{-546}$	$2.366^{+1.505}_{-0.749}$

$T_{\text{max}}$  = 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

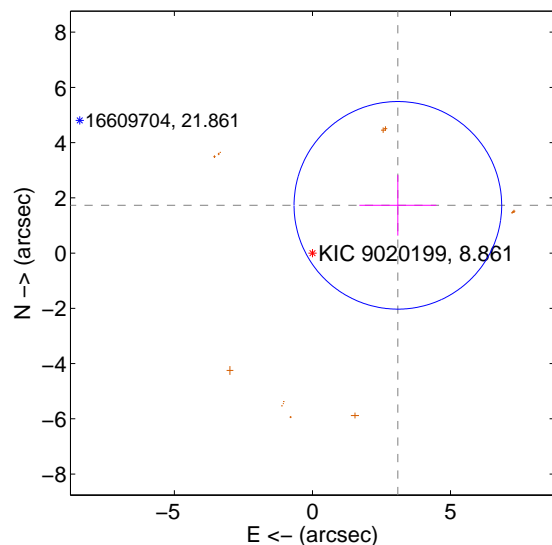
Supplemental centroid analysis for 009020199-01. **Kepler magnitude: 8.86.** Transit SNR 12.67

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

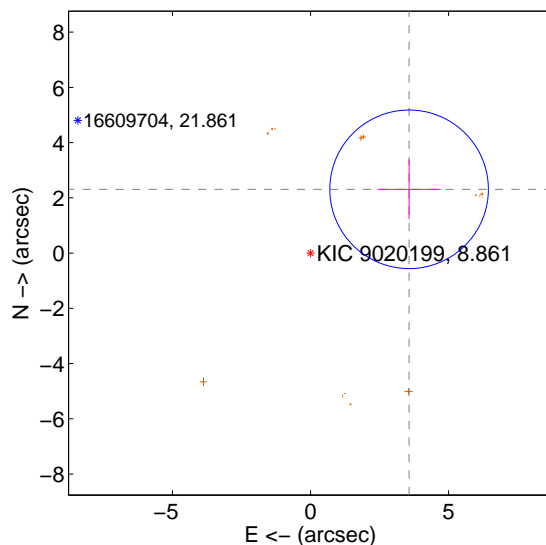
The direct PRF centroid is offset from the target star catalog position by about 1.25 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$3.543 \pm 1.253$	2.83	$-3.093 \pm 1.393$	$1.729 \pm 1.095$
PRF-fit source offset from KIC position	$4.250 \pm 0.957$	4.44	$-3.568 \pm 1.147$	$2.309 \pm 1.084$
photometric centroid source offset	$0.55 \pm 0.15$	3.80	$-0.45 \pm 0.13$	$0.32 \pm 0.16$

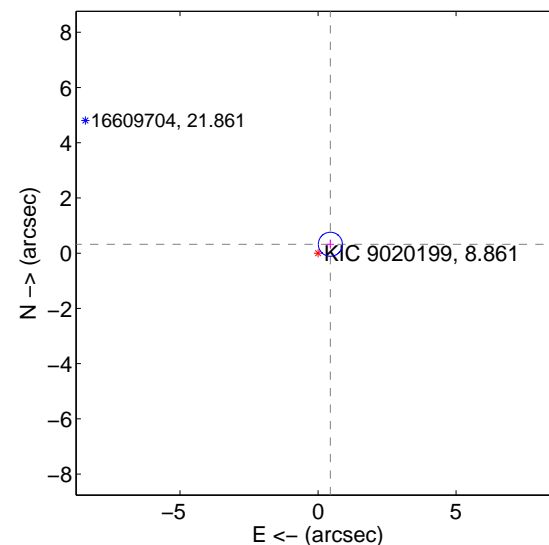
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

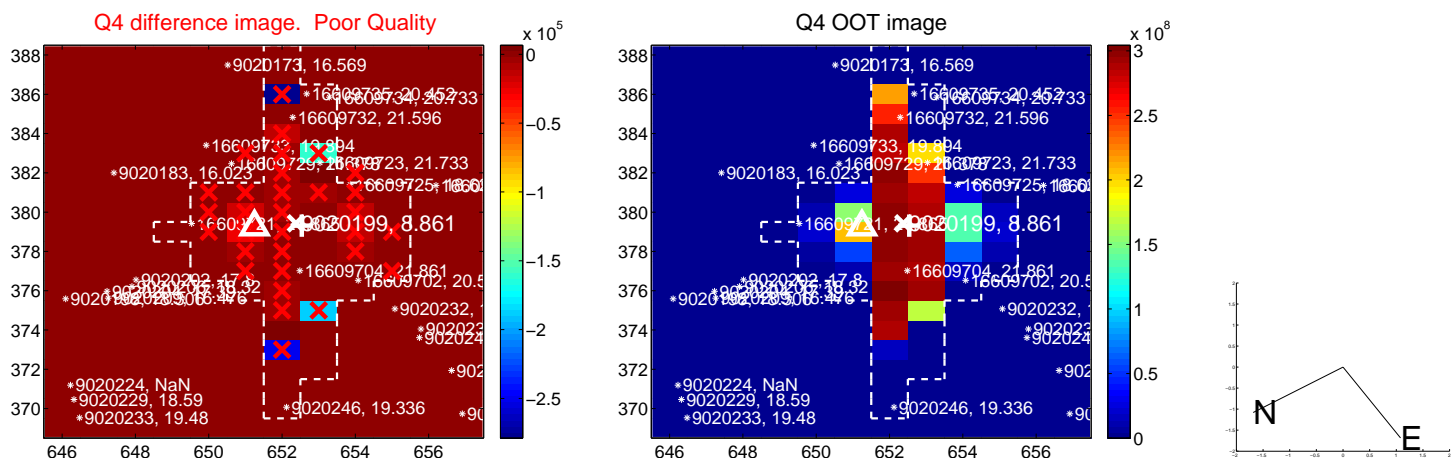
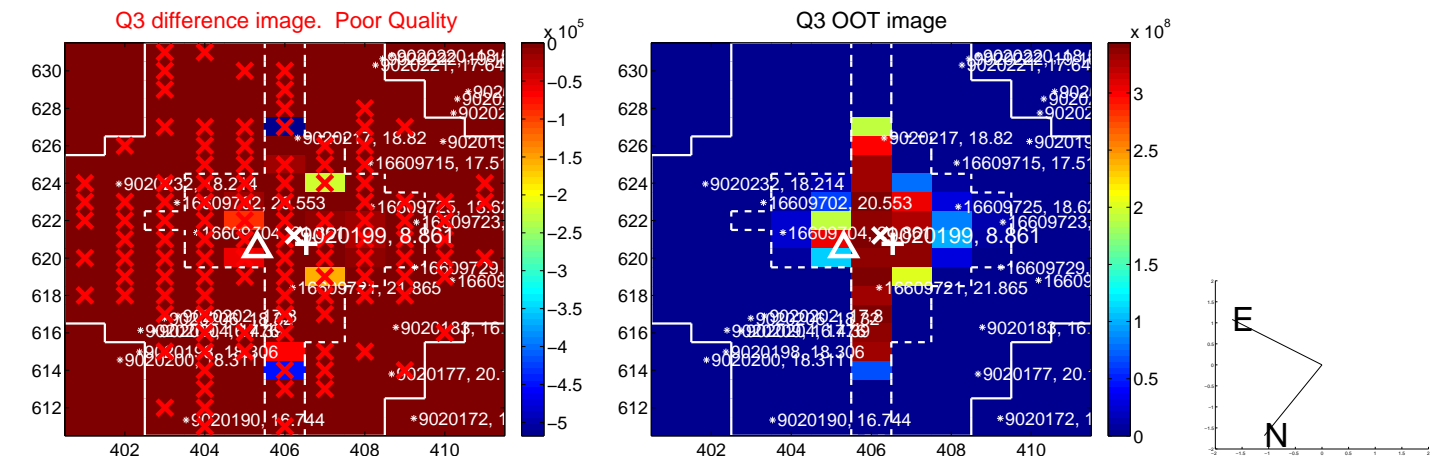
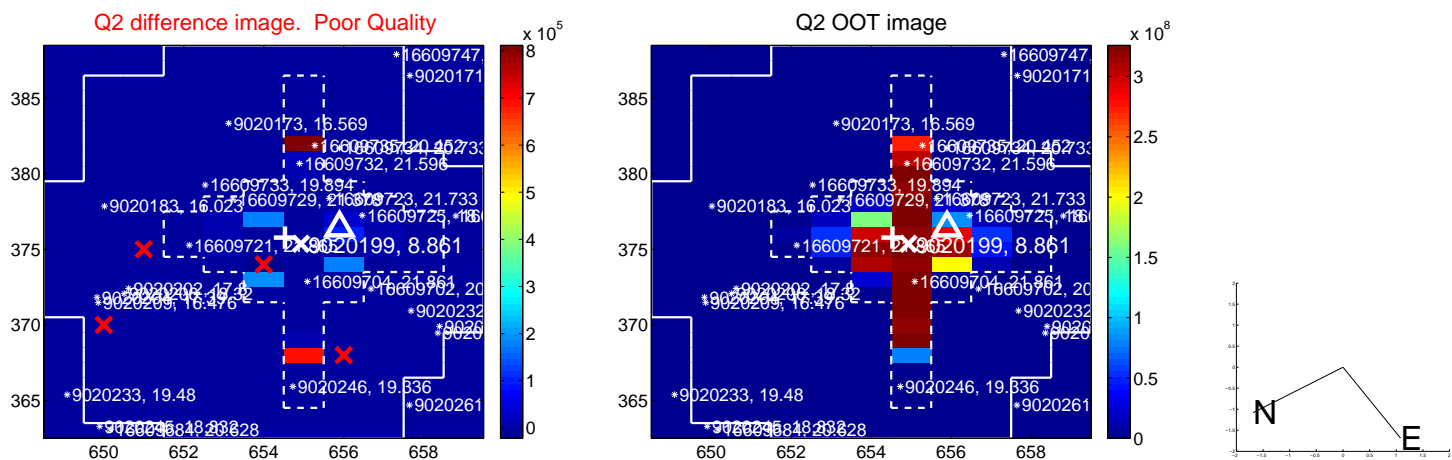
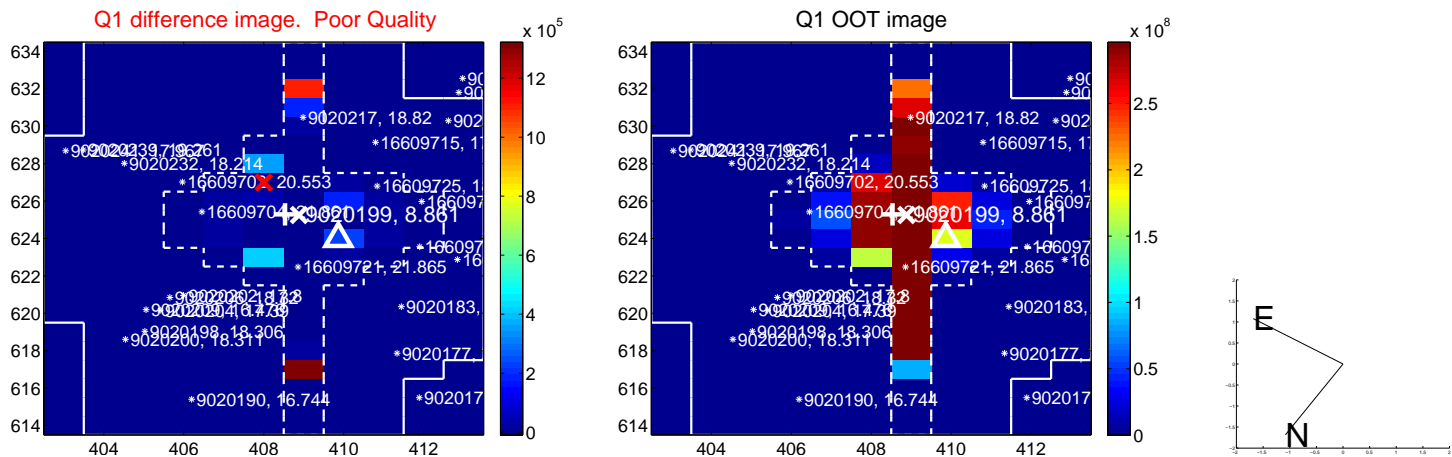


offset from photometric centroids

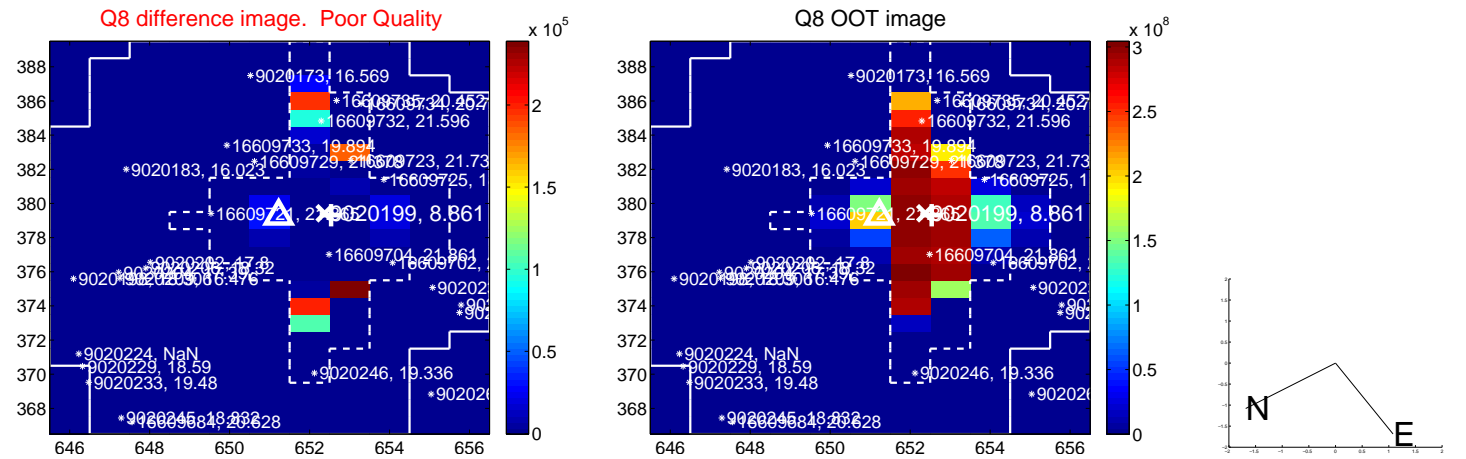
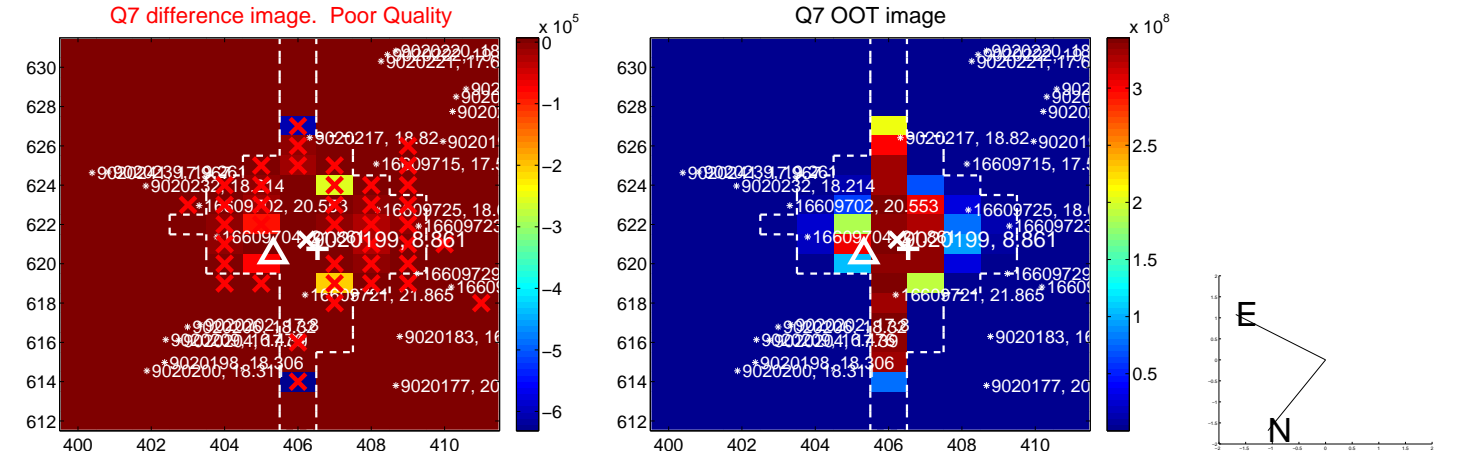
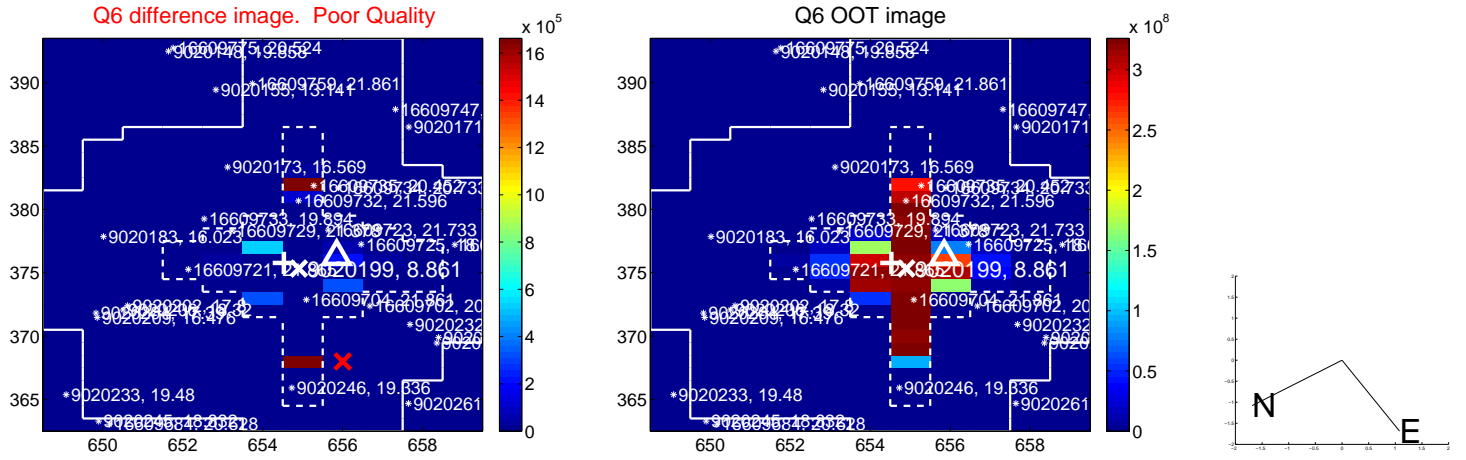
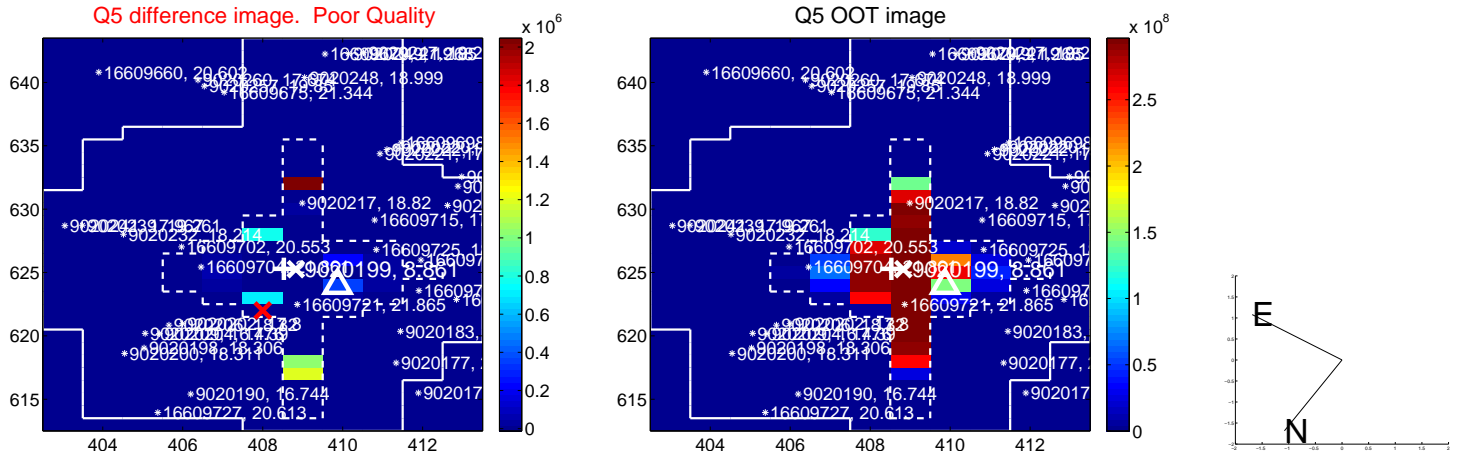


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

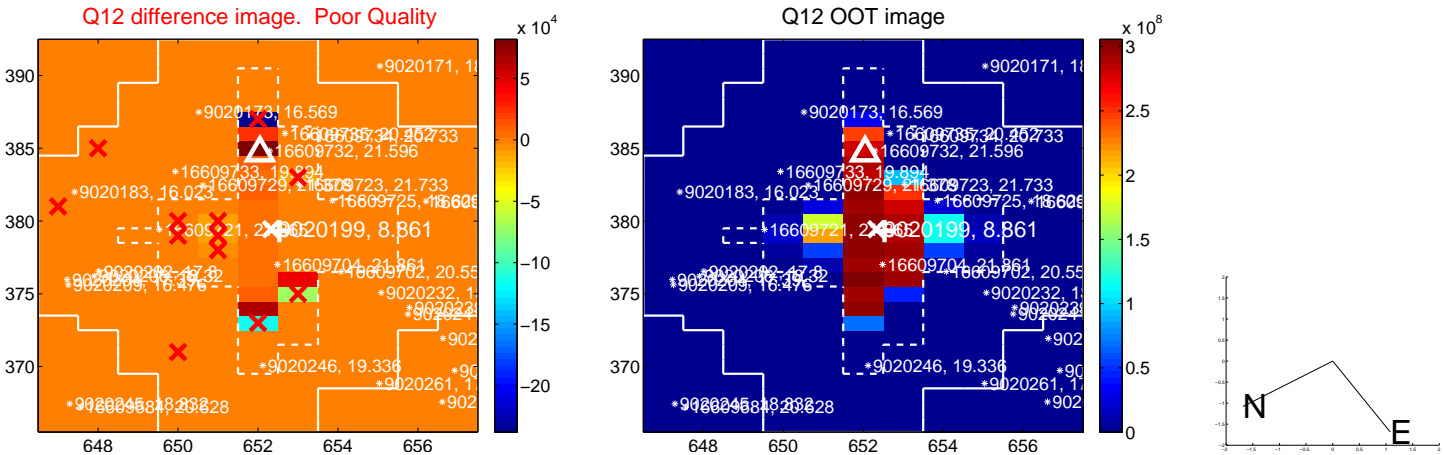
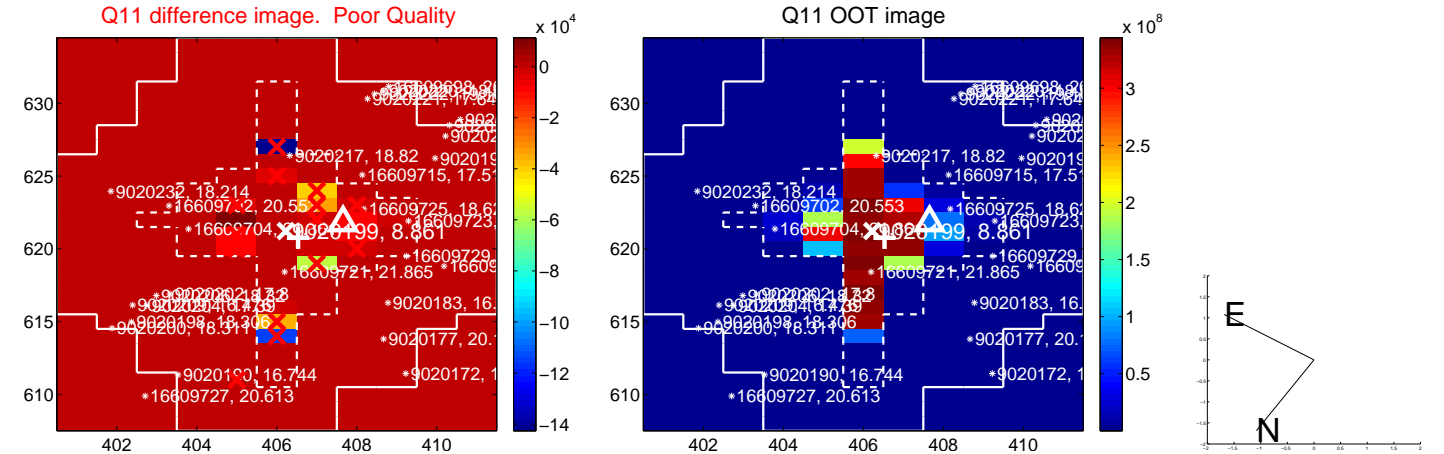
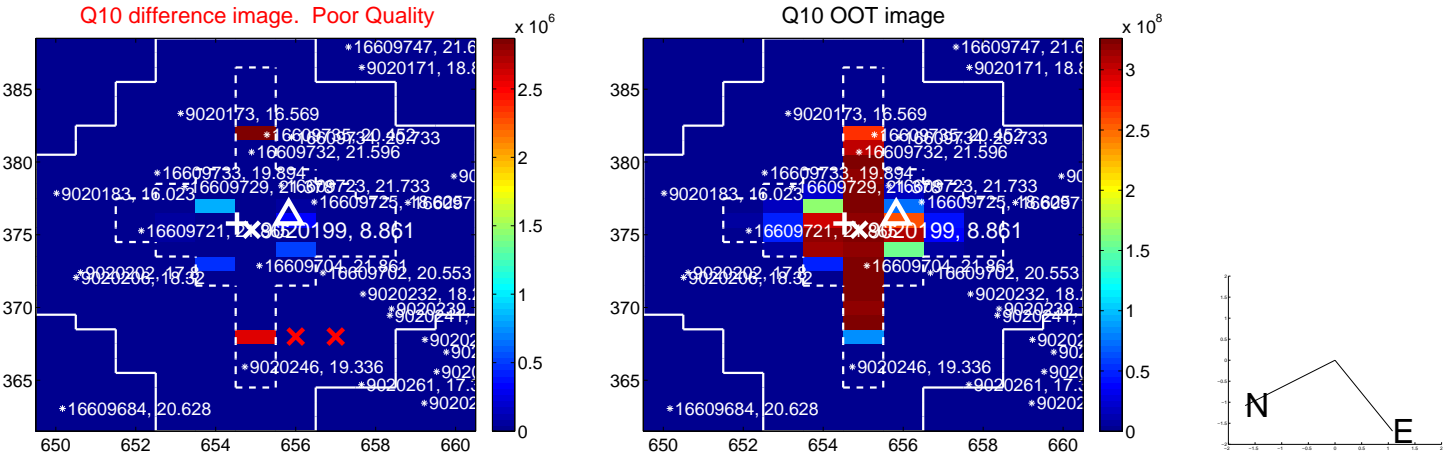
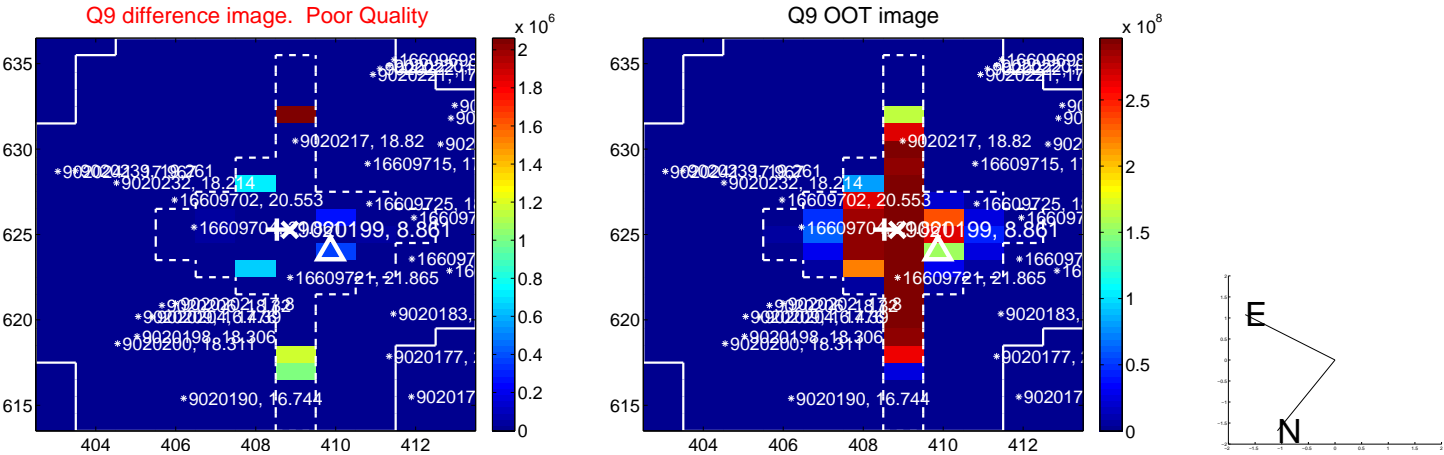


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

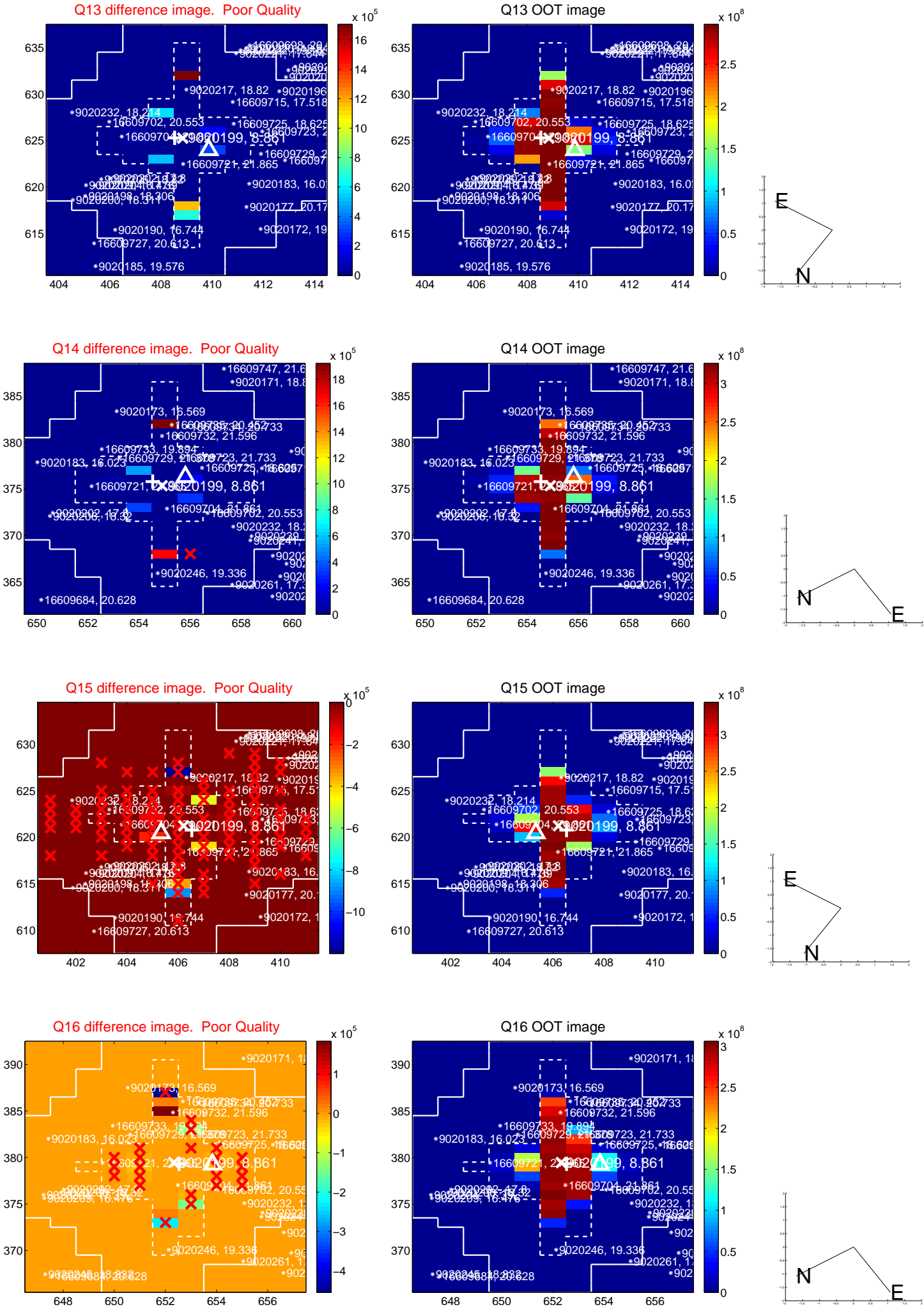




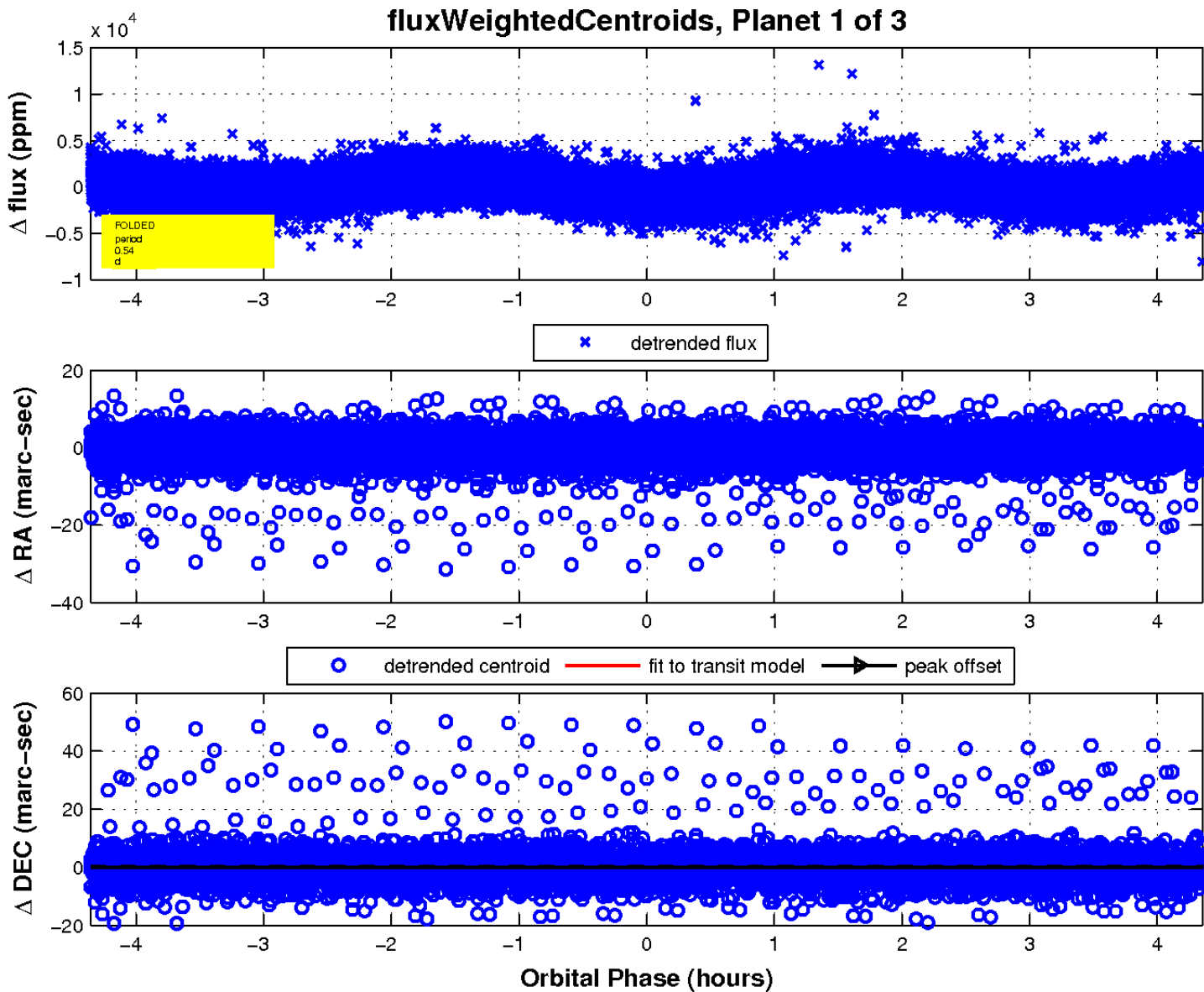
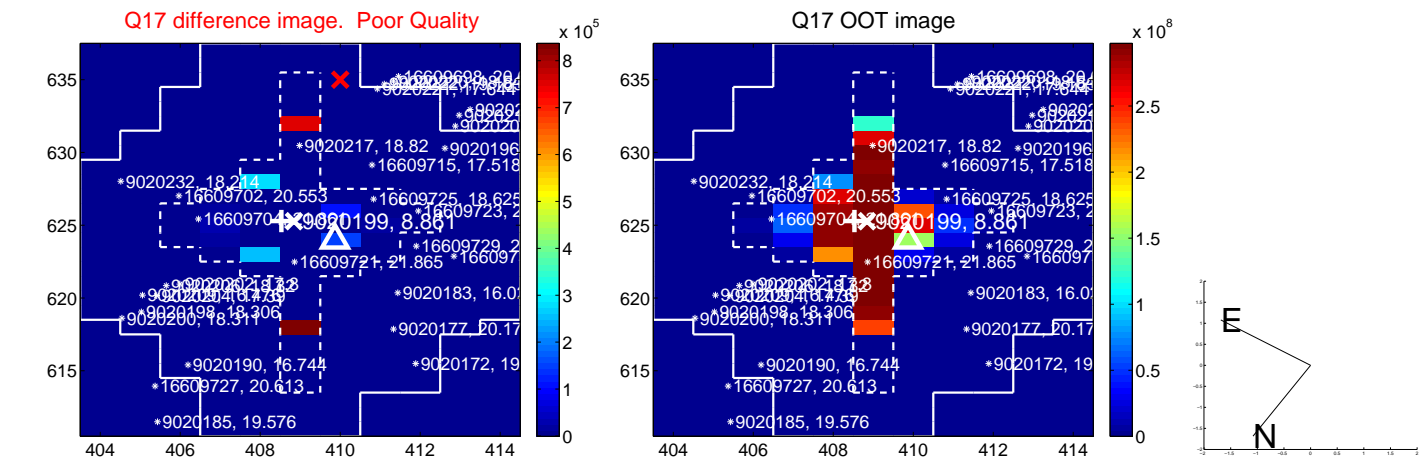
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

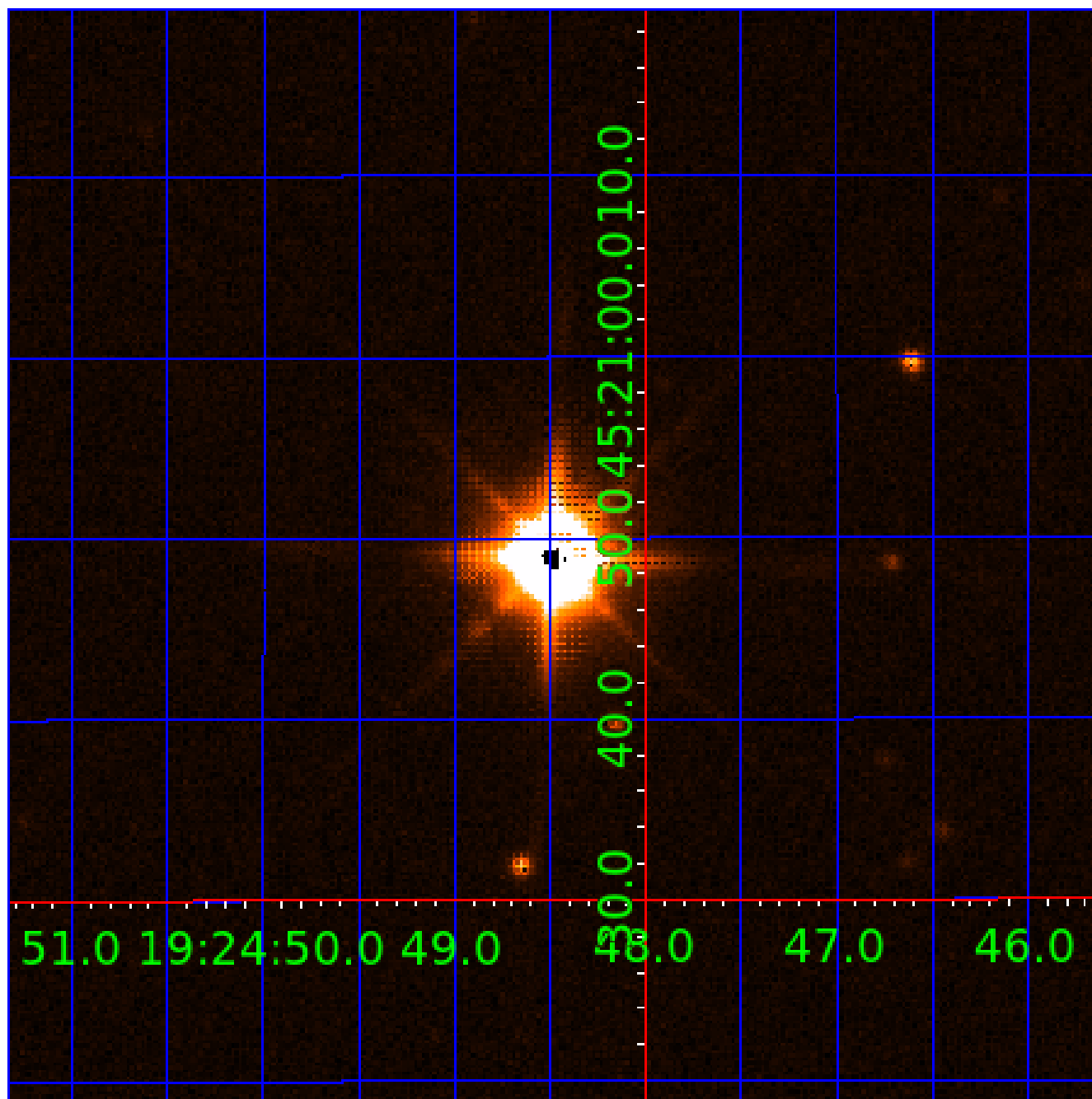


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\Delta$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 009020199

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009020199-01	OBS	No	0.537403	131.844350	179.9	1.452	14.8	12.7	2.06	6905	3.23	39507.05
009020199-02	OBS	No	0.537398	131.579631	184.0	1.187	15.7	10.7	2.06	6905	2.84	39507.52
009020199-03	OBS	No	0.537414	131.701619	30.1	1.500	13.3	-1.0	2.06	6905	1.15	39506.01

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009020199-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
009020199-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD—CENT_SATURATED
009020199-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—LPP_DV—LPP_ALT—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.

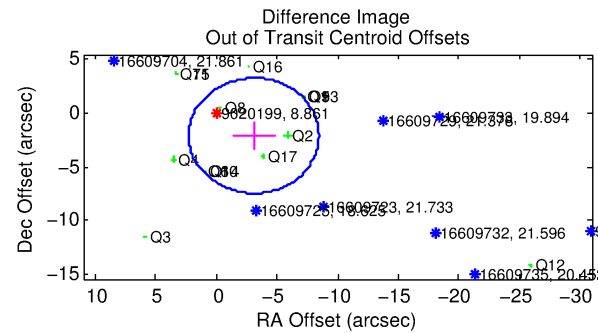
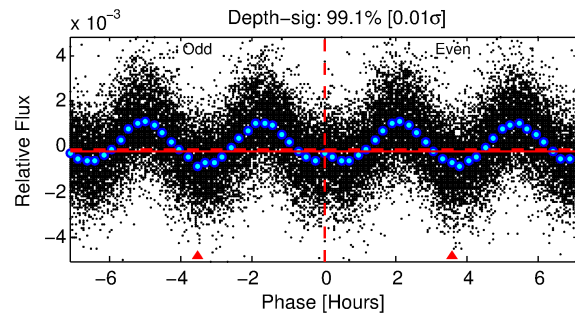
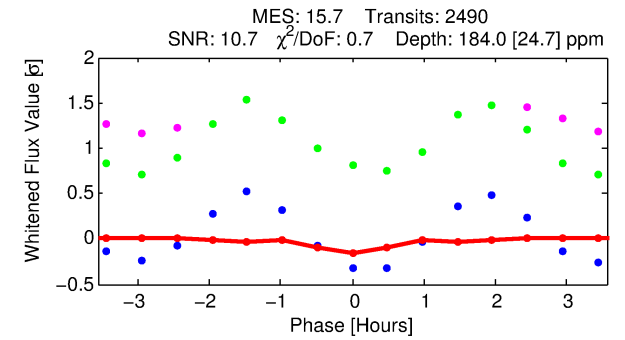
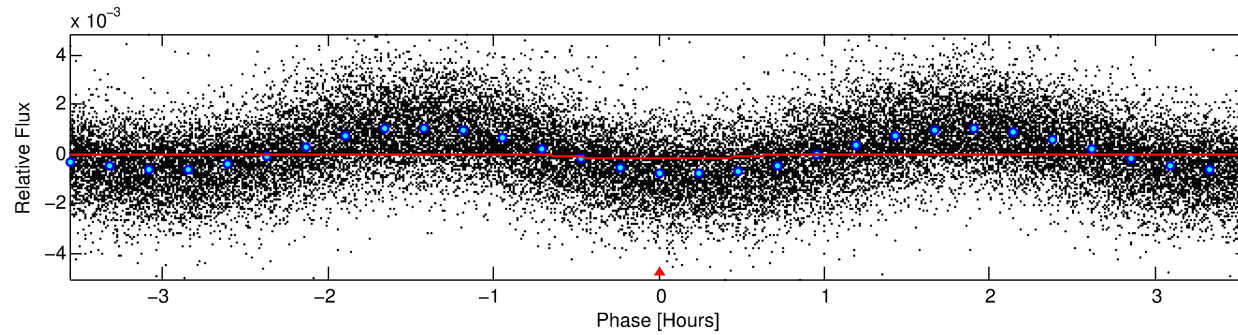
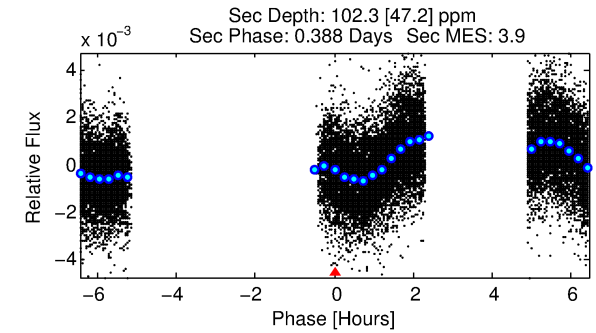
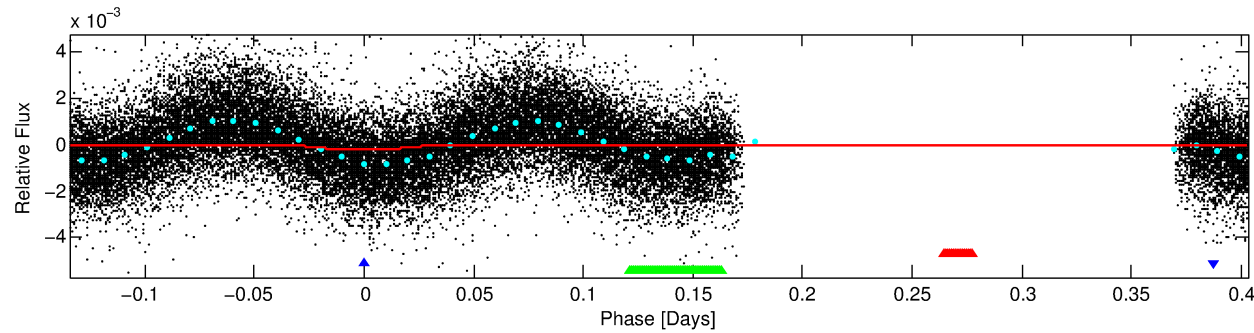
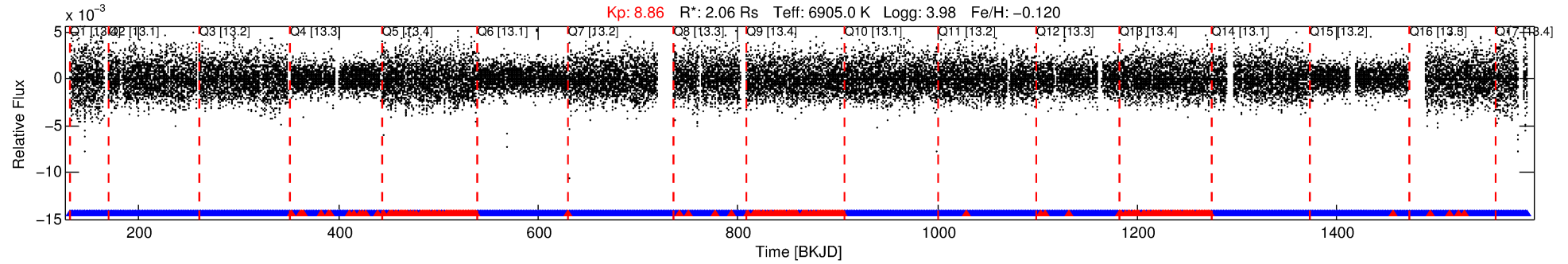
## Ephemeris Match Information For 009020199-02

No Significant Match Found



# DV One-Page Summary

KIC: 9020199 Candidate: 2 of 3 Period: 0.537 d



## DV Fit Results:

Period = 0.53740 [0.00001] d  
Epoch = 131.5796 [0.0016] BKJD  
Rp/R\* = 0.0126 [0.0095]  
a/R\* = 3.55 [13.67]  
b = 0.04 [116.95]  
Seff = 39507.52 [19574.10]  
Teq = 3595 [445] K  
Rp = 2.84 [2.35] Re  
a = 0.0148 [0.0045] AU  
Ag = 1.53 [2.53] [0.21σ]  
Teffp = 6183 [2453] K [1.04σ]

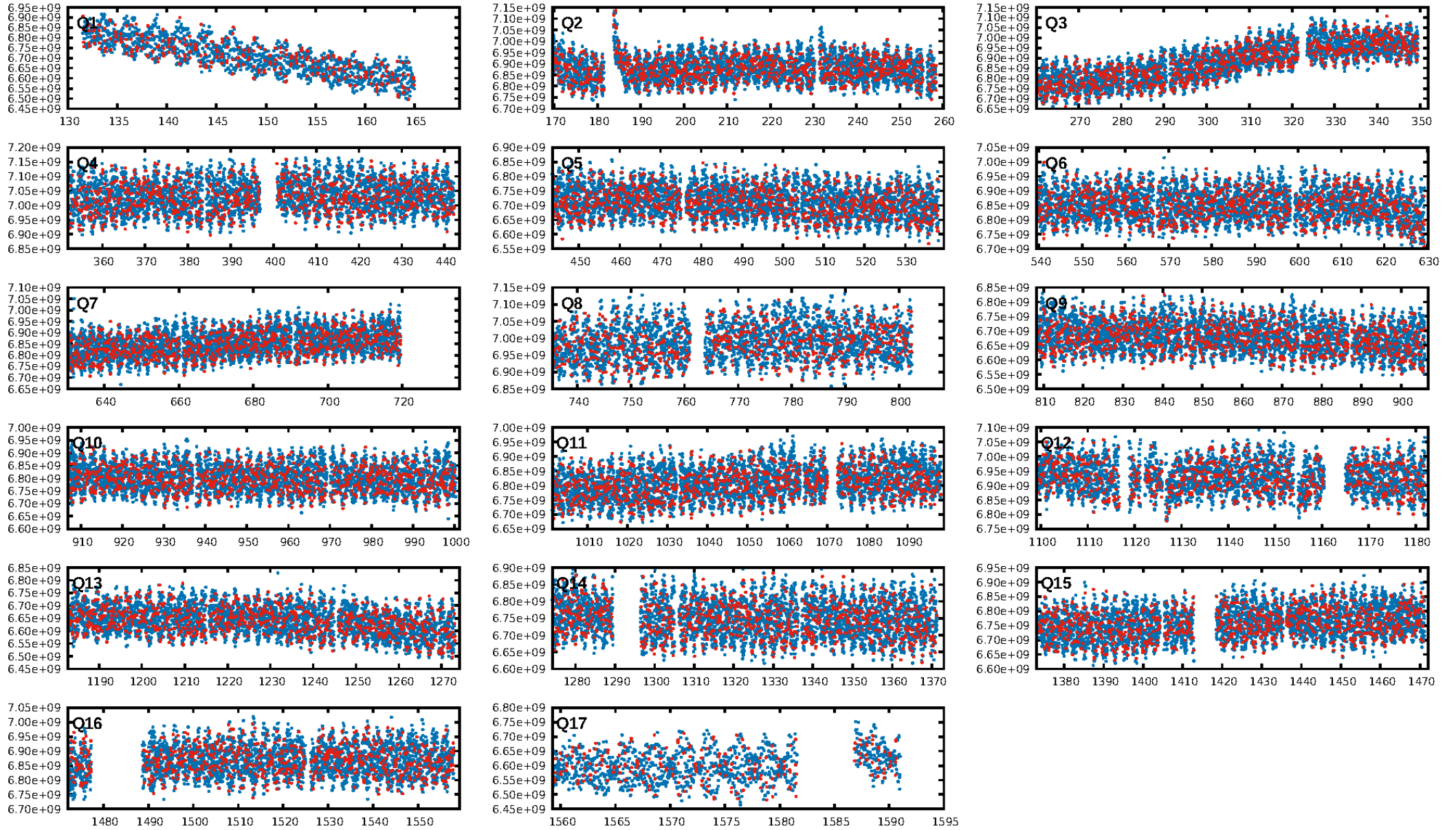
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.0% [0.00σ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 0.88 [2098/2377]  
GhostDiagnostic-chr: N/A  
Centroid-sig: N/A  
Centroid-so: 0.518 arcsec [3.67σ]  
OotOffset-rm: 3.726 arcsec [2.08σ]  
KicOffset-rm: 3.609 arcsec [2.07σ]  
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]

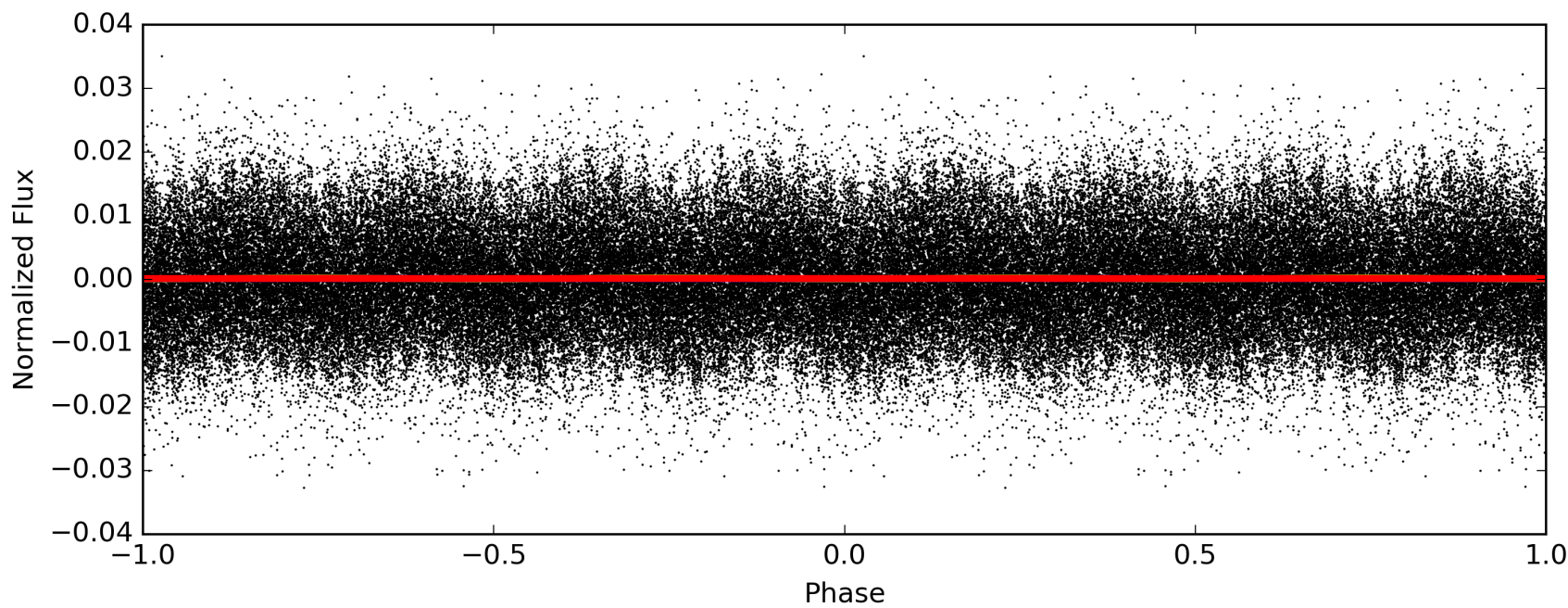
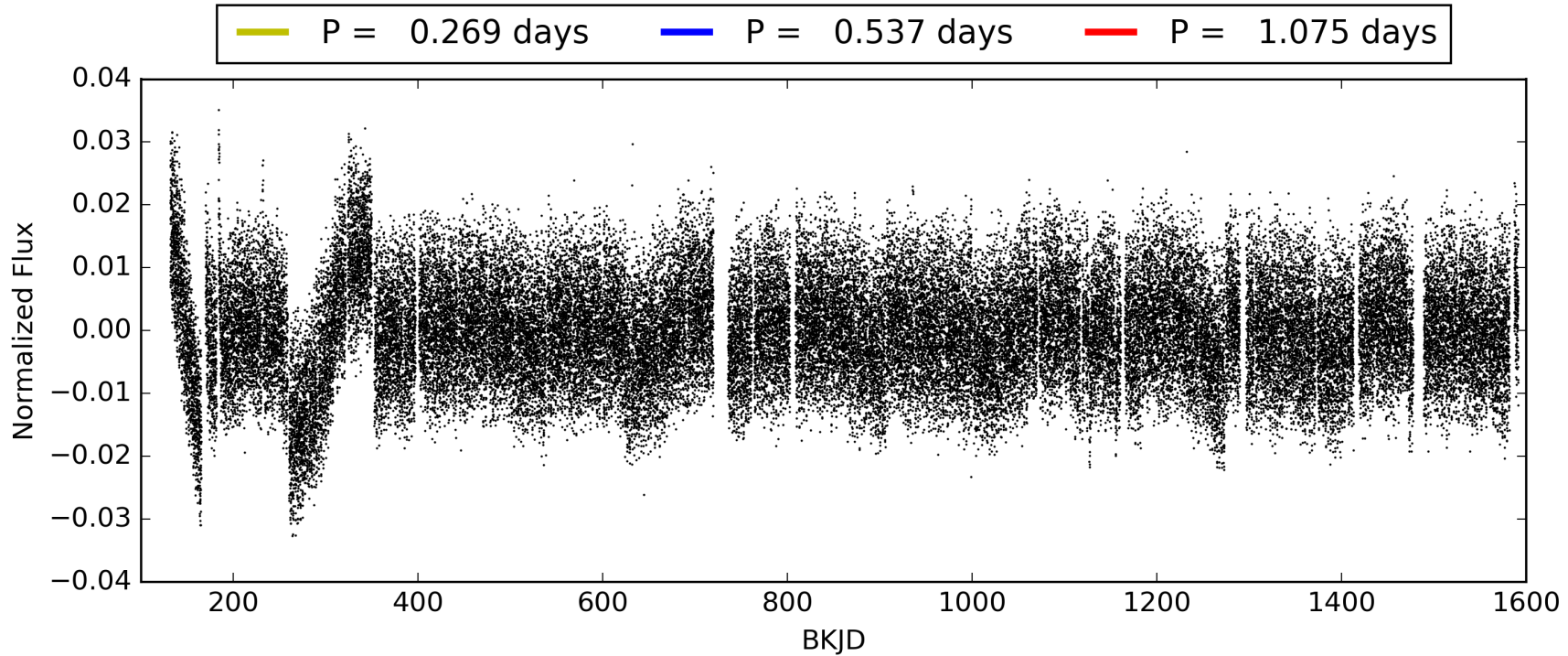
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 23:39:54 Z

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

# TCE 009020199-02, PDC Light Curves



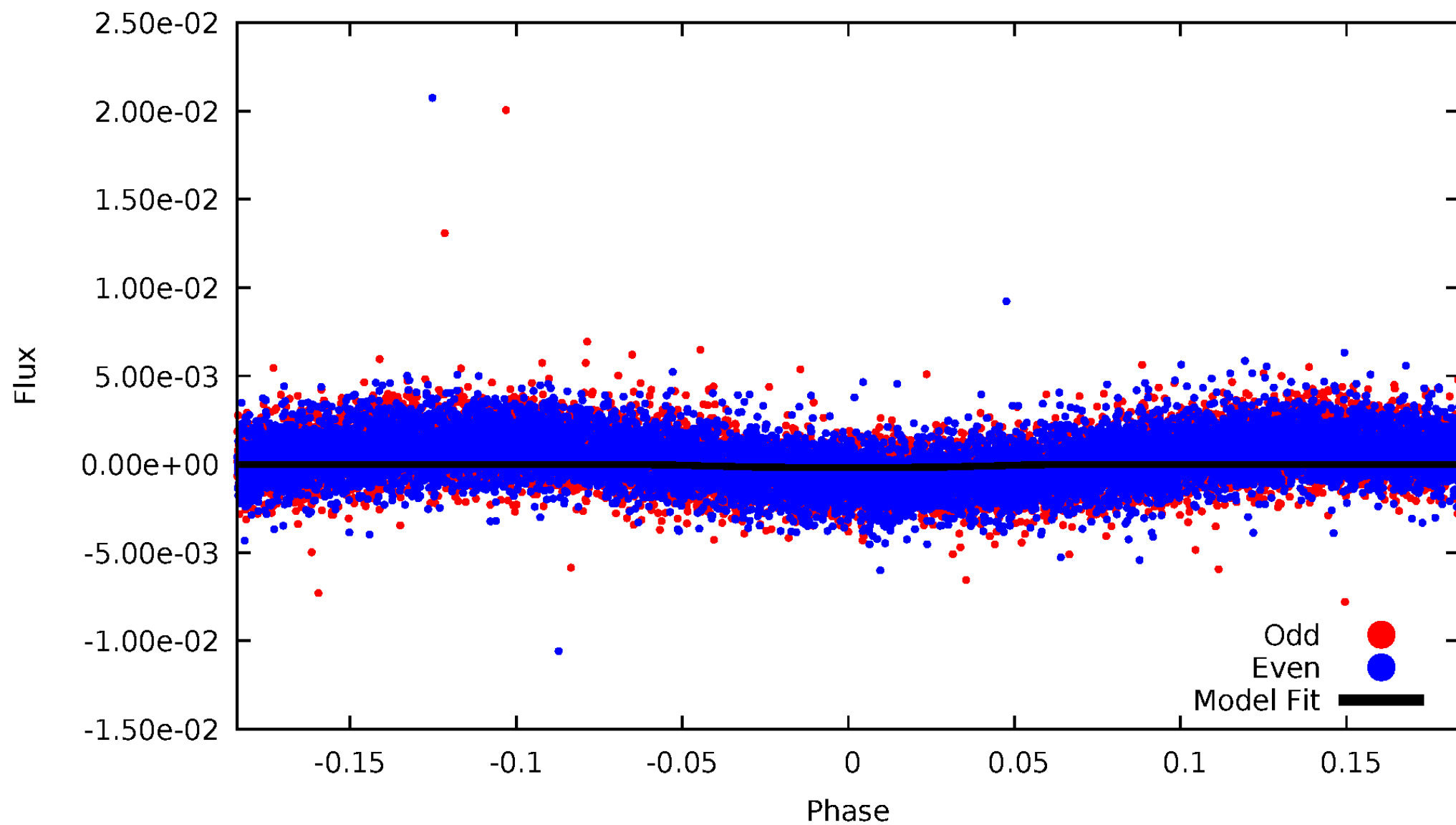
TCE 009020199-02





# DV Odd/Even

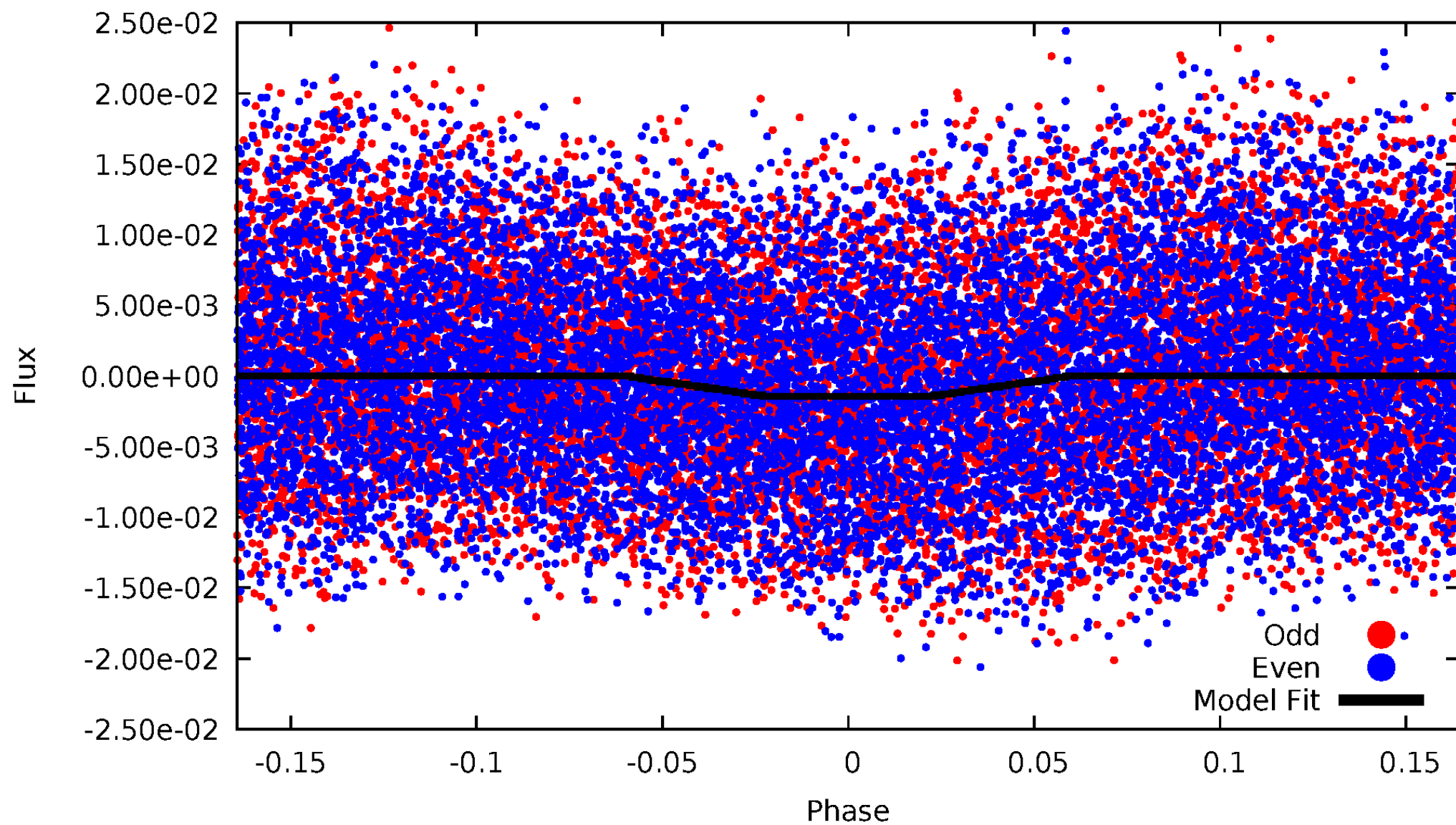
TCE 009020199-02





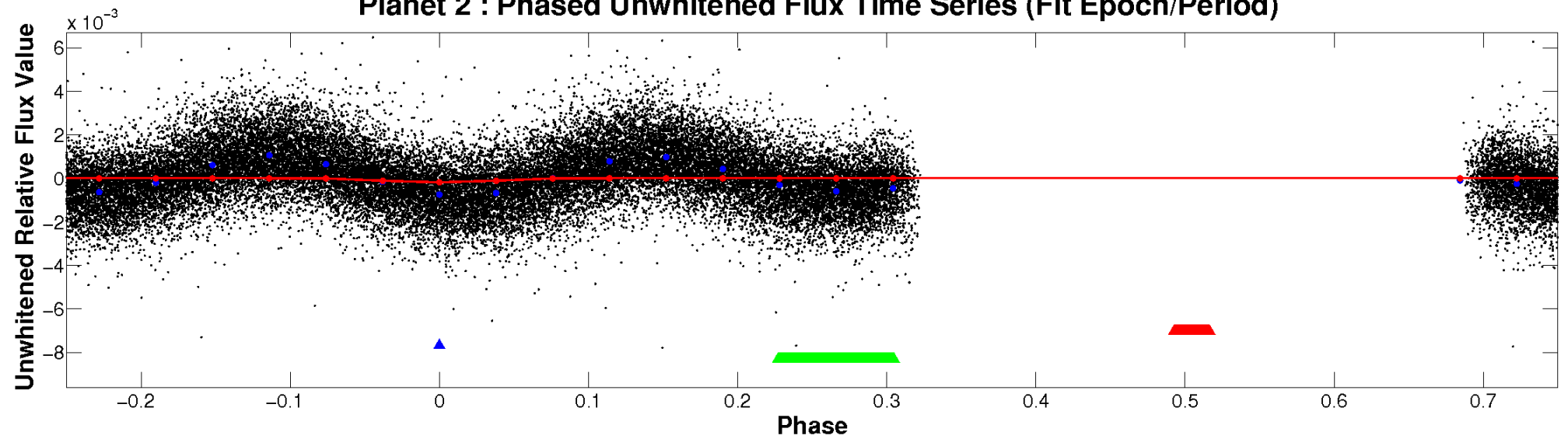
ALT Odd/Even

TCE 009020199-02

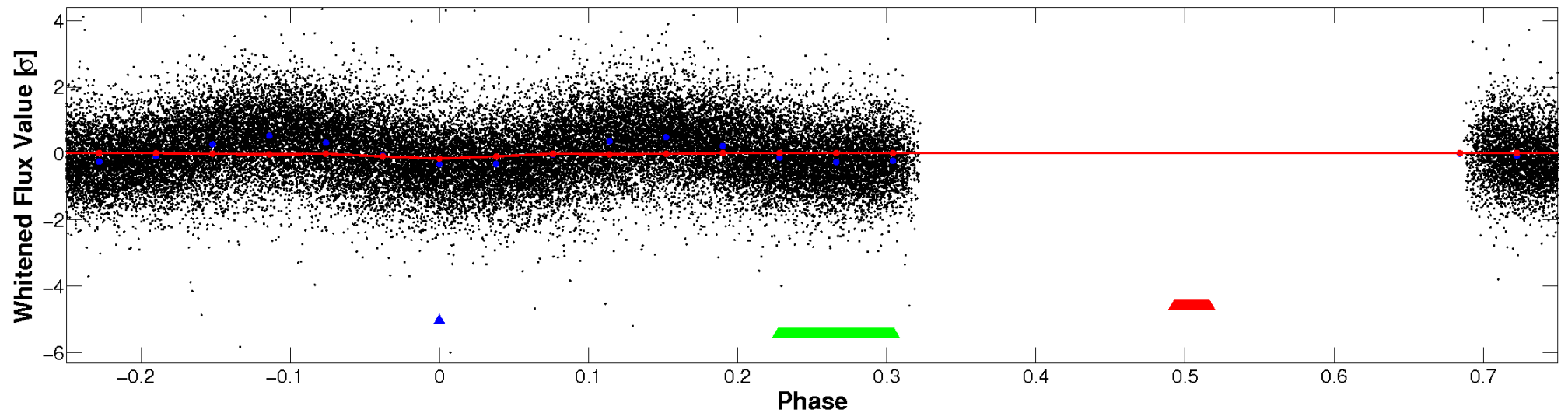


# Non-Whitened Vs. Whitened Light Curve

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

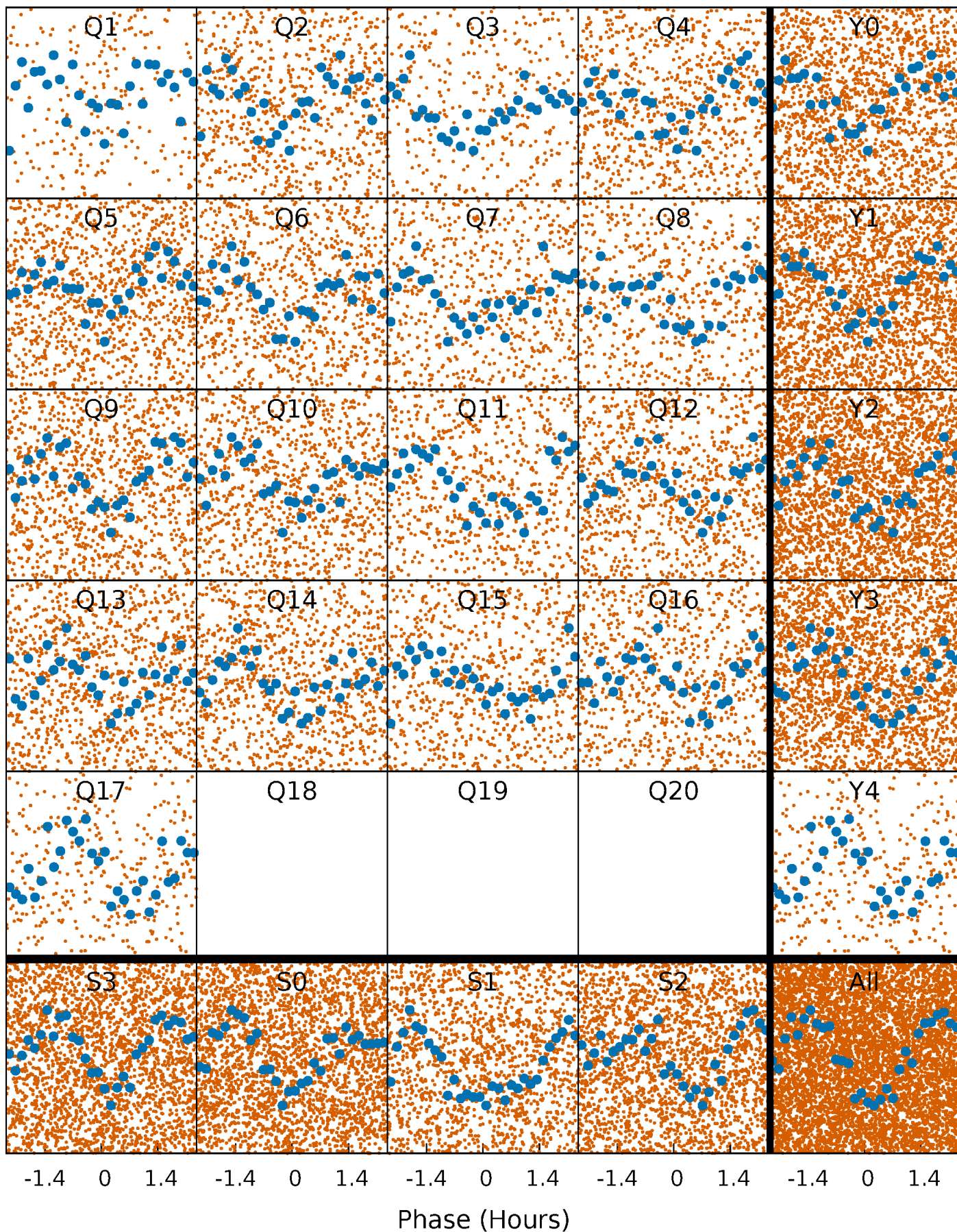


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

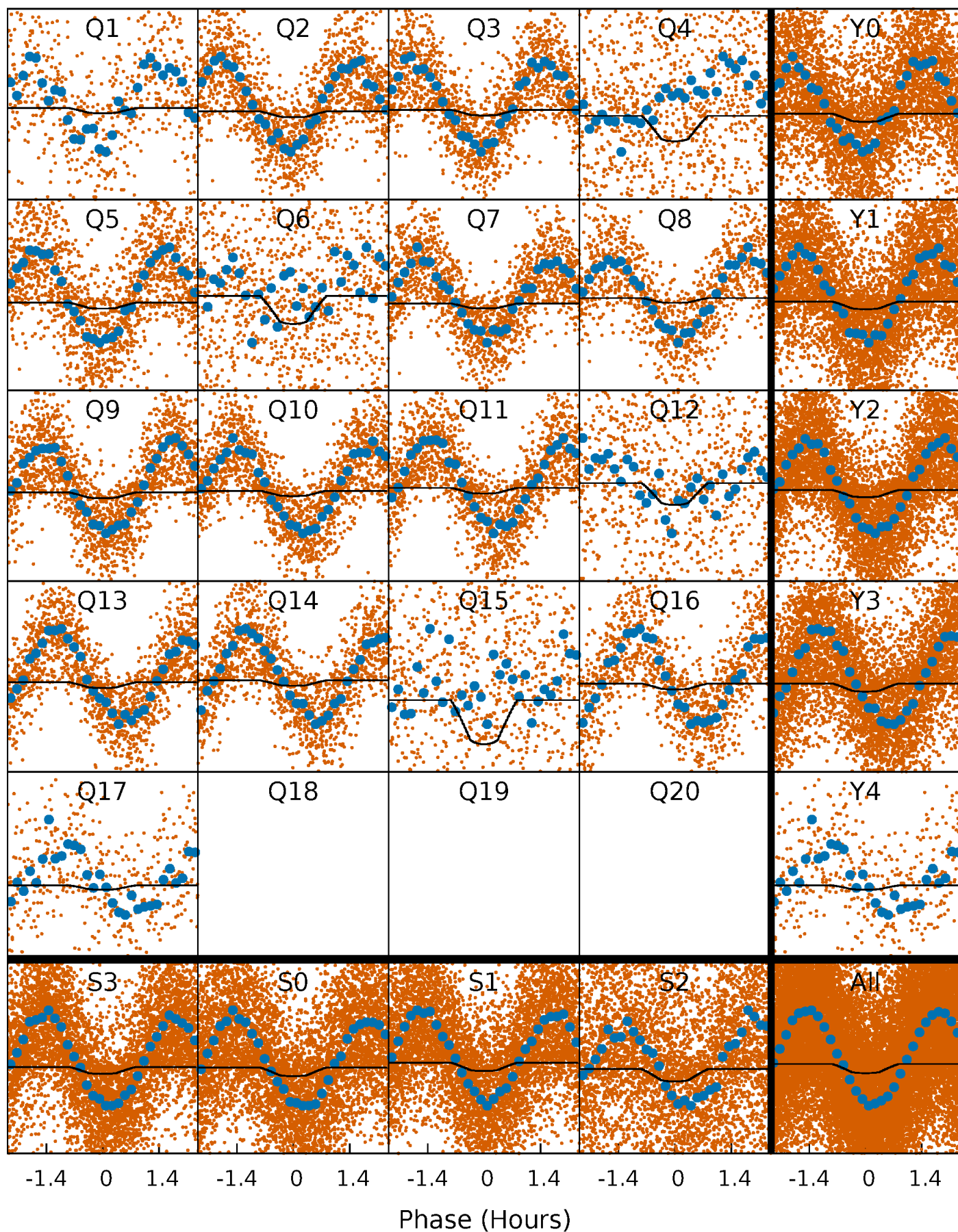
TCE 009020199-02 P= 0.537398 Days  $T_0=131.579631$  (BKJD)





# DV Quarter-Phased Transit Curves

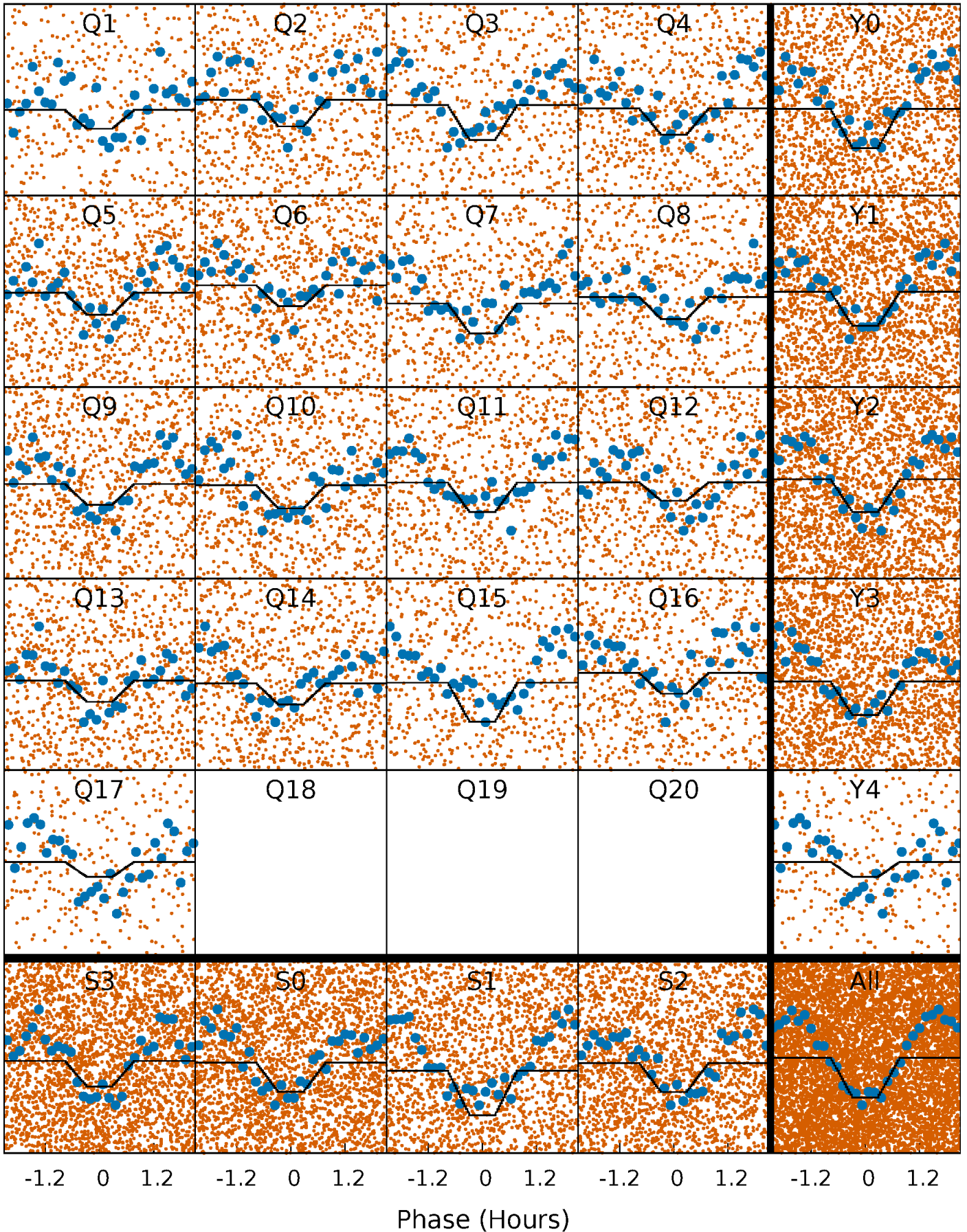
TCE 009020199-02     $P = 0.537398$  Days     $T_0 = 131.579631$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

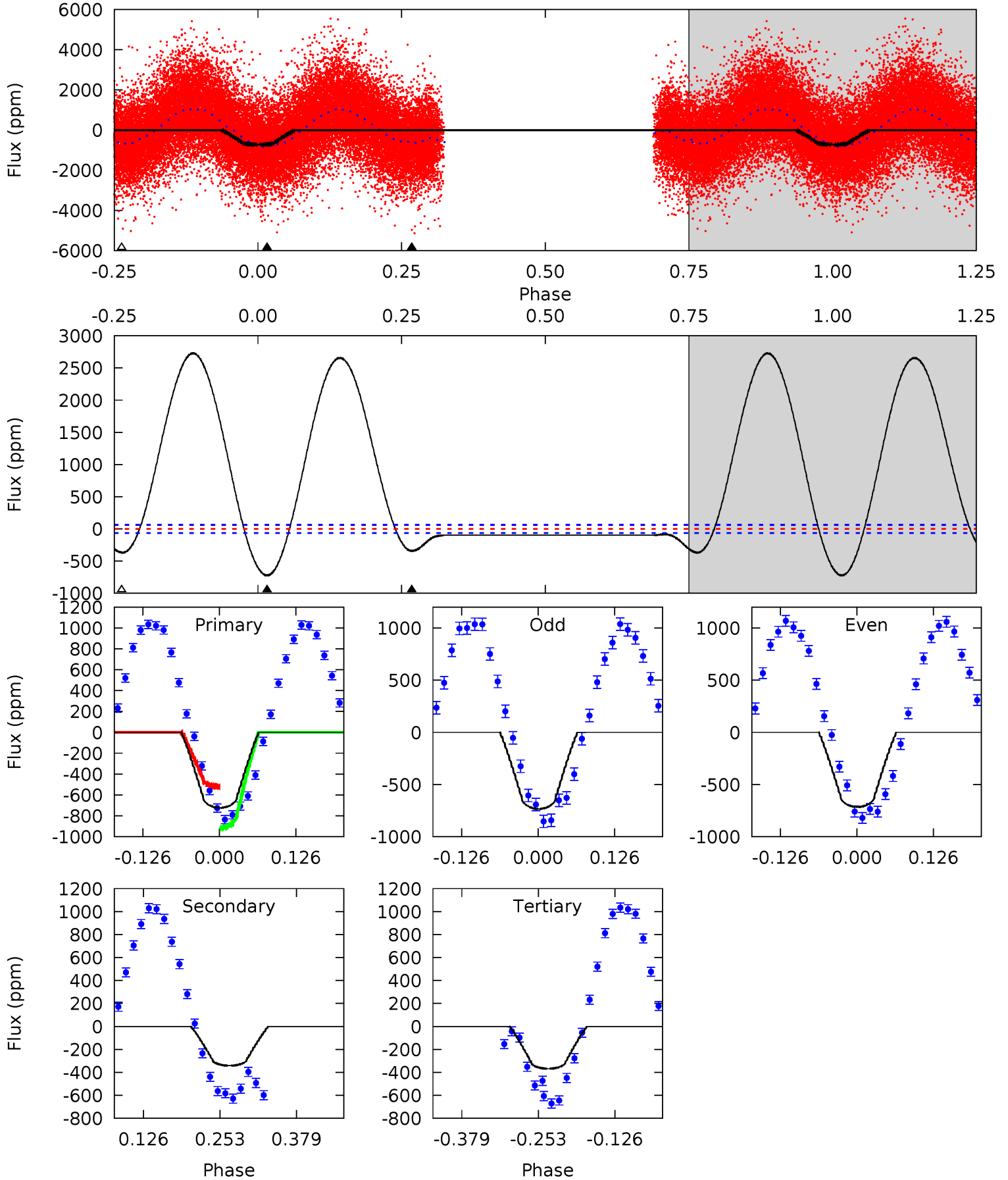
TCE 009020199-02     $P = 0.537414$  Days     $T_0 = 131.568174$  (BKJD)



# DV Model-Shift Uniqueness Test

009020199-02, P = 0.537398 Days, E = 131.042233 Days

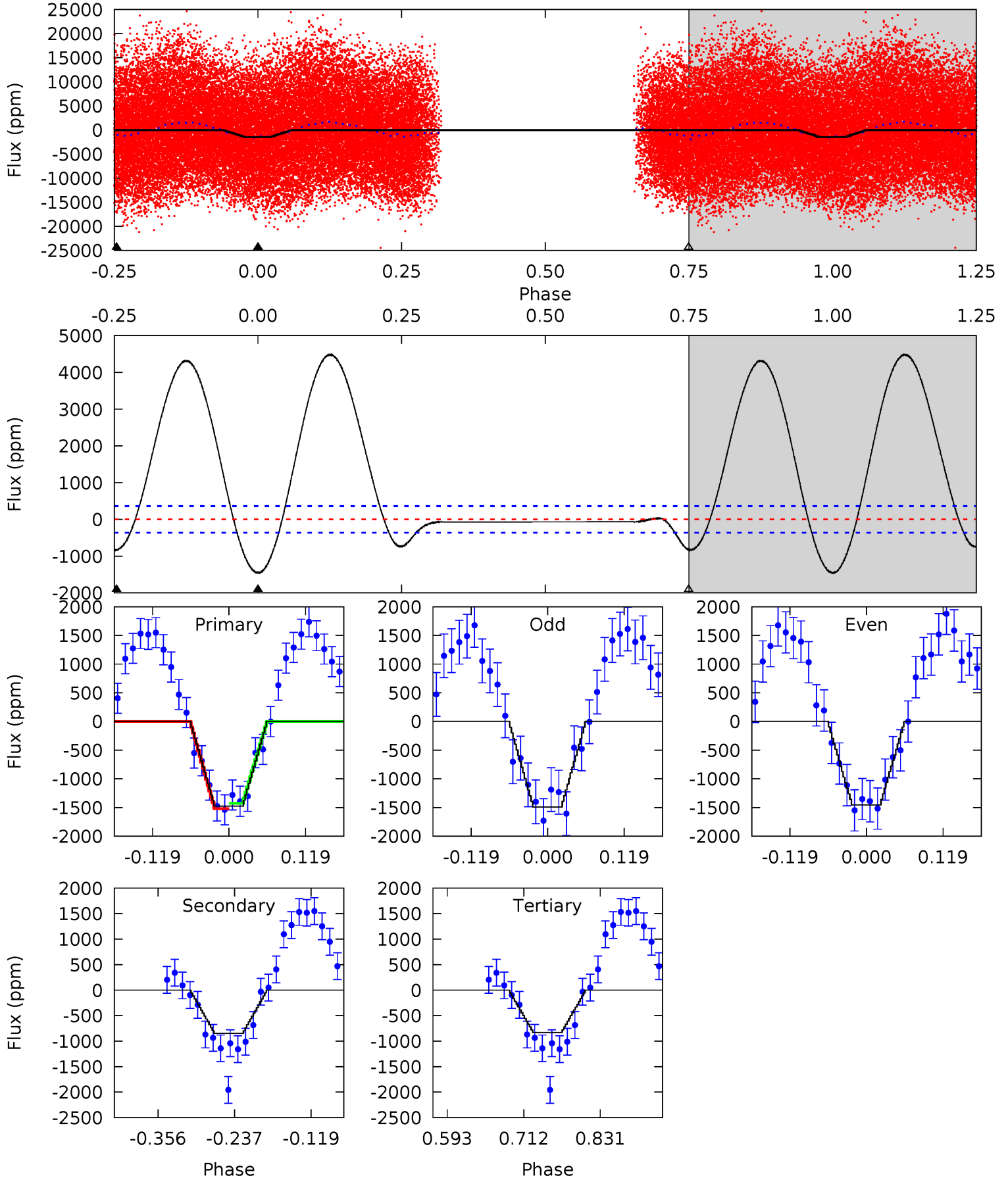
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
51.1	24.1	26.0	0	4.52	1.53	78.3	25.1	51.1	-1.86	24.1	0.66	1.06	0.79	13.3



# Alt Model-Shift Uniqueness Test

009020199-02, P = 0.537414 Days, E = 131.030760 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
18.4	10.6	10.4	0	4.53	1.56	23.5	8.01	18.4	0.20	10.6	0.23	0.93	0.75	0.54



### Stellar Parameters For KIC 009020199

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6905^{+170}_{-242}$	$3.985^{+0.273}_{-0.168}$	$-0.120^{+0.250}_{-0.350}$	$2.062^{+0.567}_{-0.693}$	$1.497^{+0.196}_{-0.295}$	$0.241^{+0.411}_{-0.118}$
	+2%/-4%	+7%/-4%	+208%/-292%	+27%/-34%	+13%/-20%	+171%/-49%
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 009020199-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-342 \pm 14$	$3.05^{+2.09}_{-1.71}$	$4961^{+417}_{-438}$	$7871^{+7411}_{-2013}$	$4.404^{+18.366}_{-2.812}$
Alt.	$-849 \pm 80$	$8.20^{+2.68}_{-2.28}$	$4977^{+408}_{-465}$	$5655^{+1145}_{-733}$	$1.479^{+1.340}_{-0.616}$

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



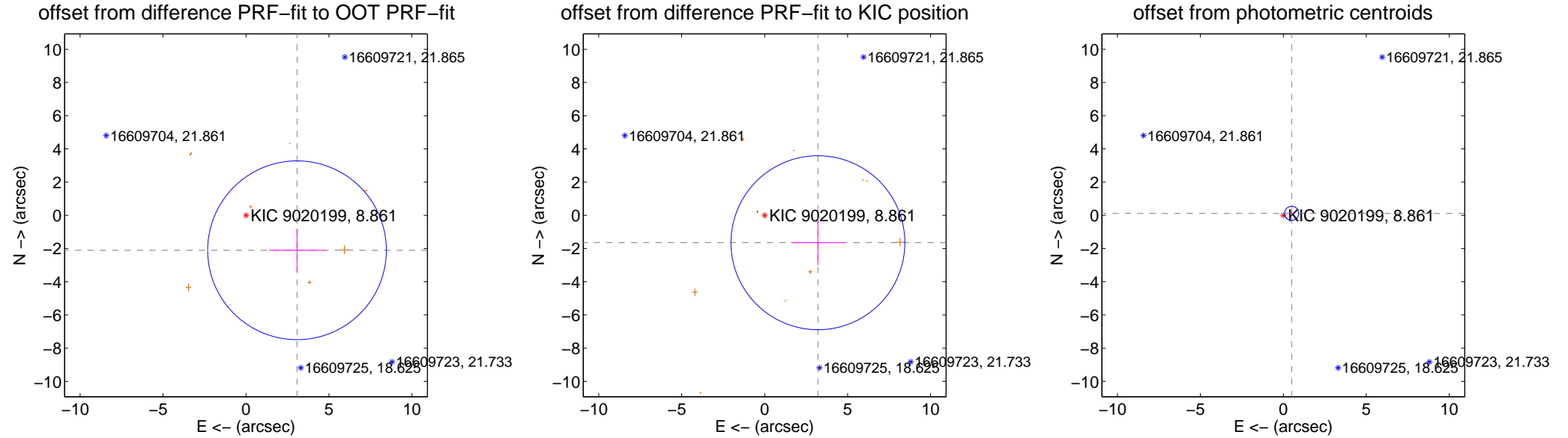
## DV Centroid Data

Supplemental centroid analysis for 009020199-02. **Kepler magnitude: 8.86.** Transit SNR 10.75

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

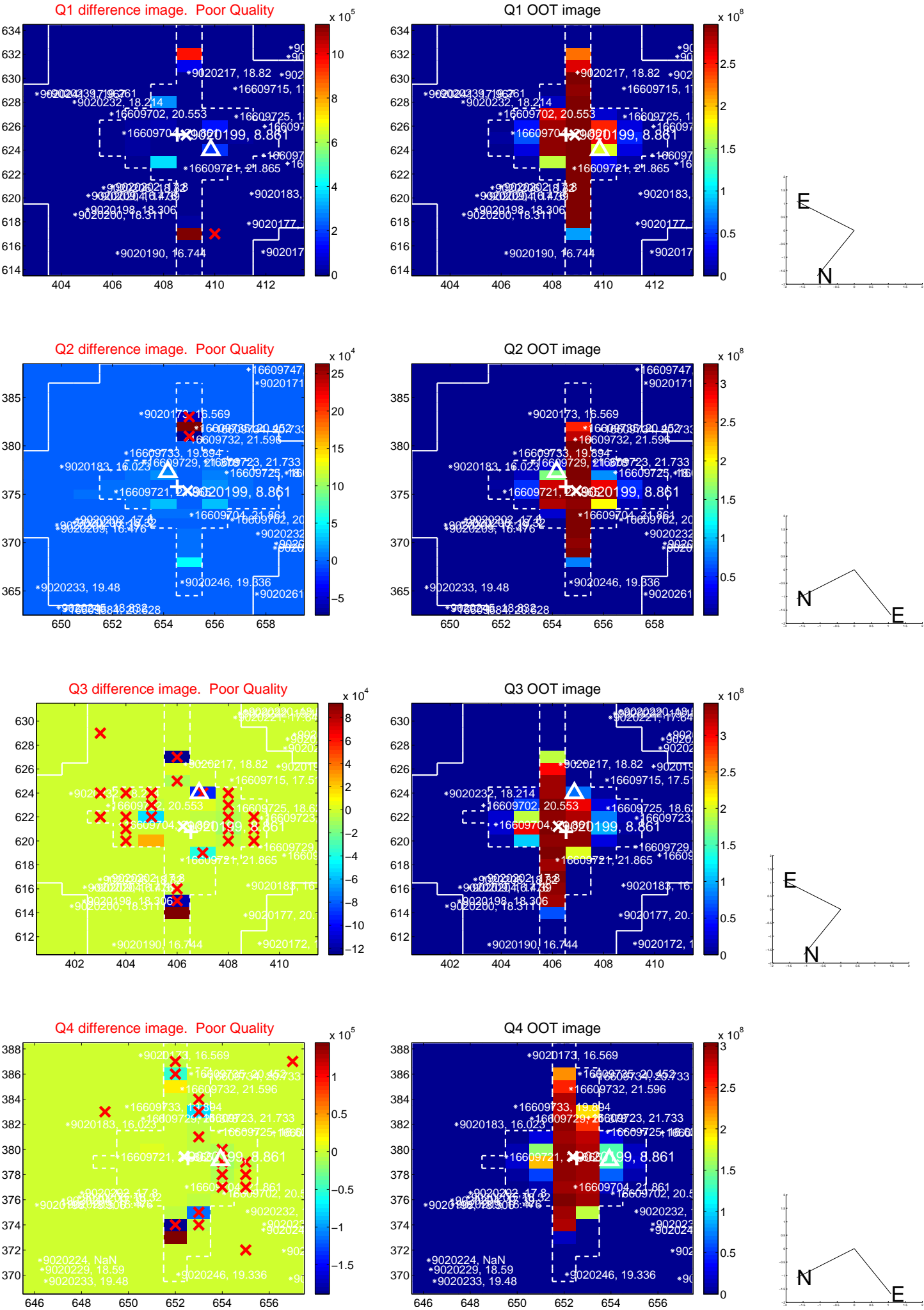
The direct PRF centroid is offset from the target star catalog position by about 1.25 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$3.726 \pm 1.795$	2.08	$-3.074 \pm 1.697$	$-2.105 \pm 1.297$
PRF-fit source offset from KIC position	$3.609 \pm 1.747$	2.07	$-3.210 \pm 1.610$	$-1.651 \pm 1.351$
photometric centroid source offset	$0.52 \pm 0.14$	<b>3.67</b>	$-0.50 \pm 0.14$	$0.12 \pm 0.17$

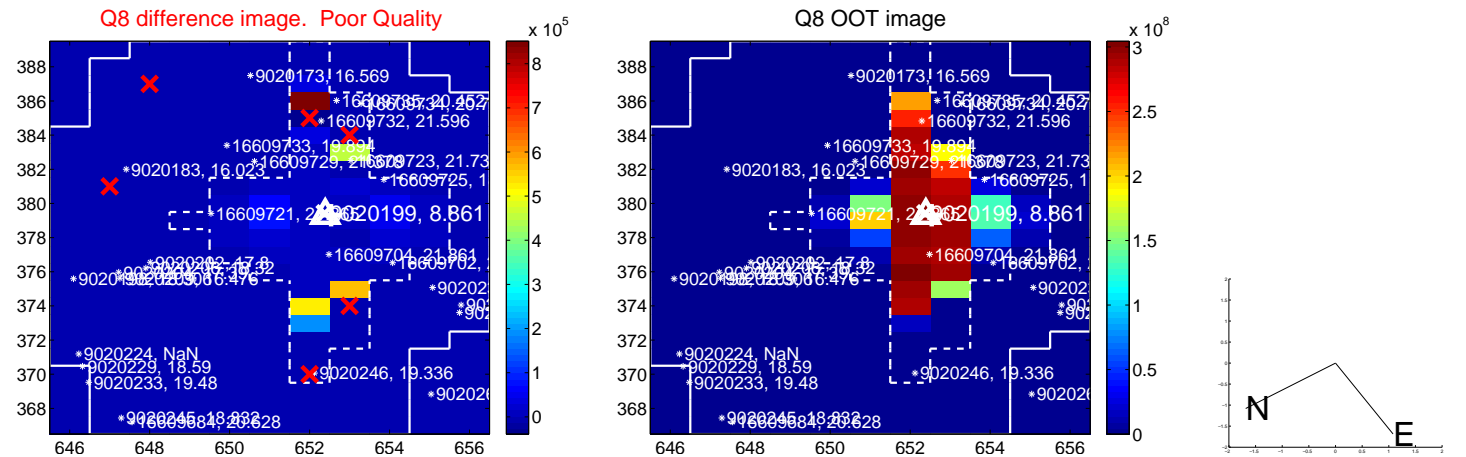
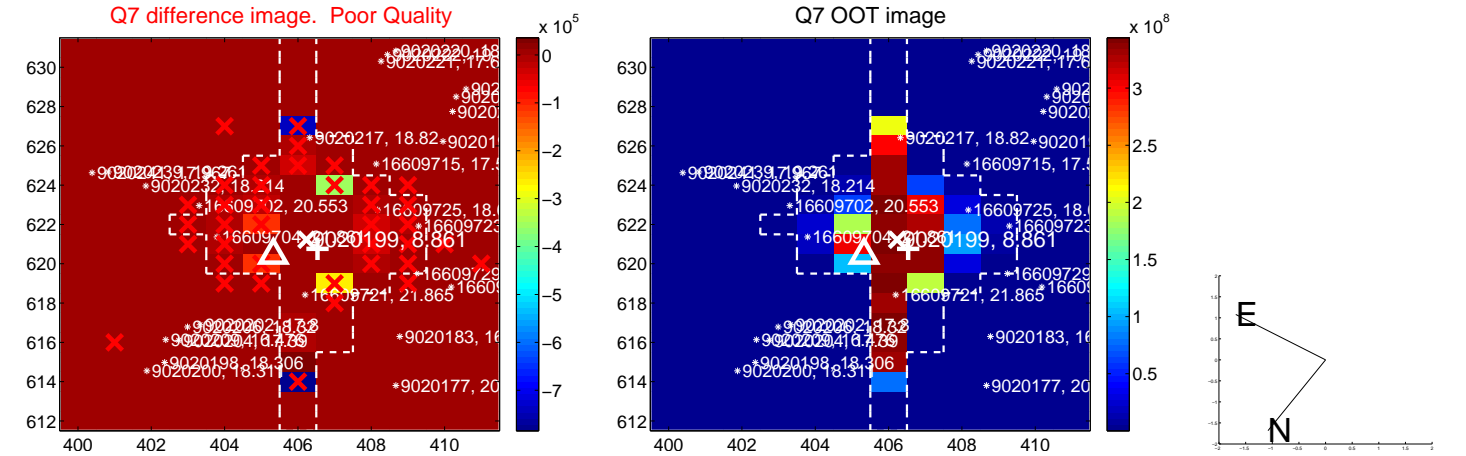
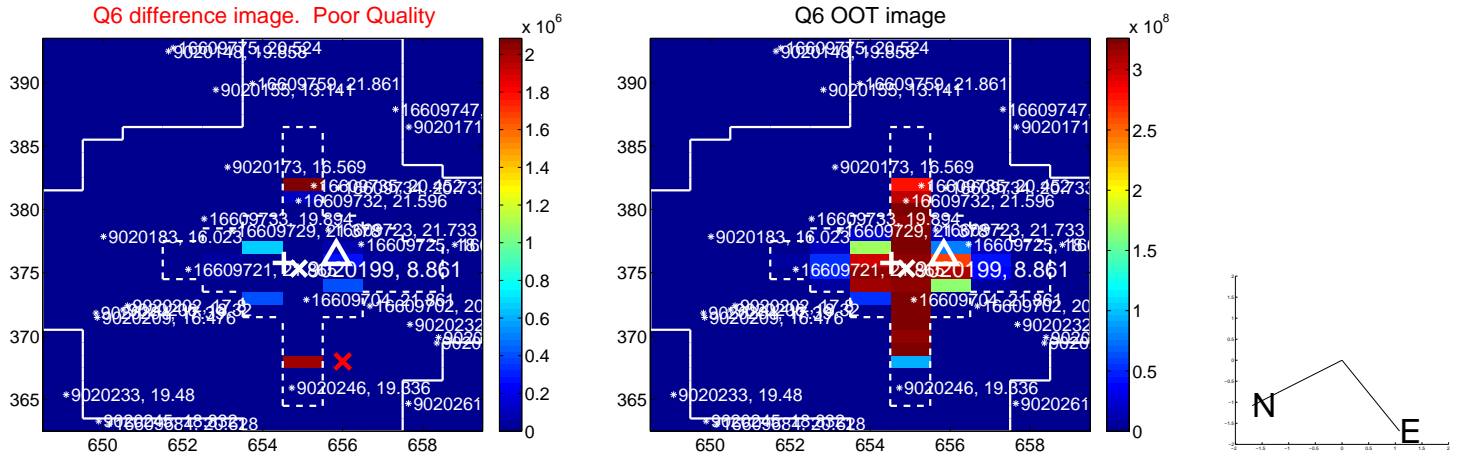
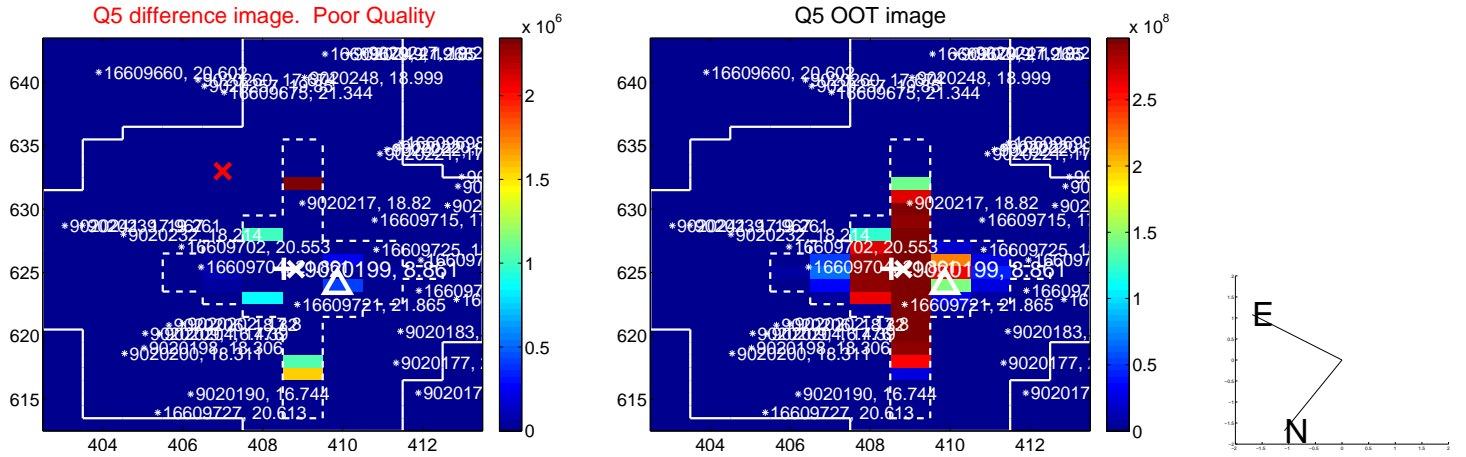


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



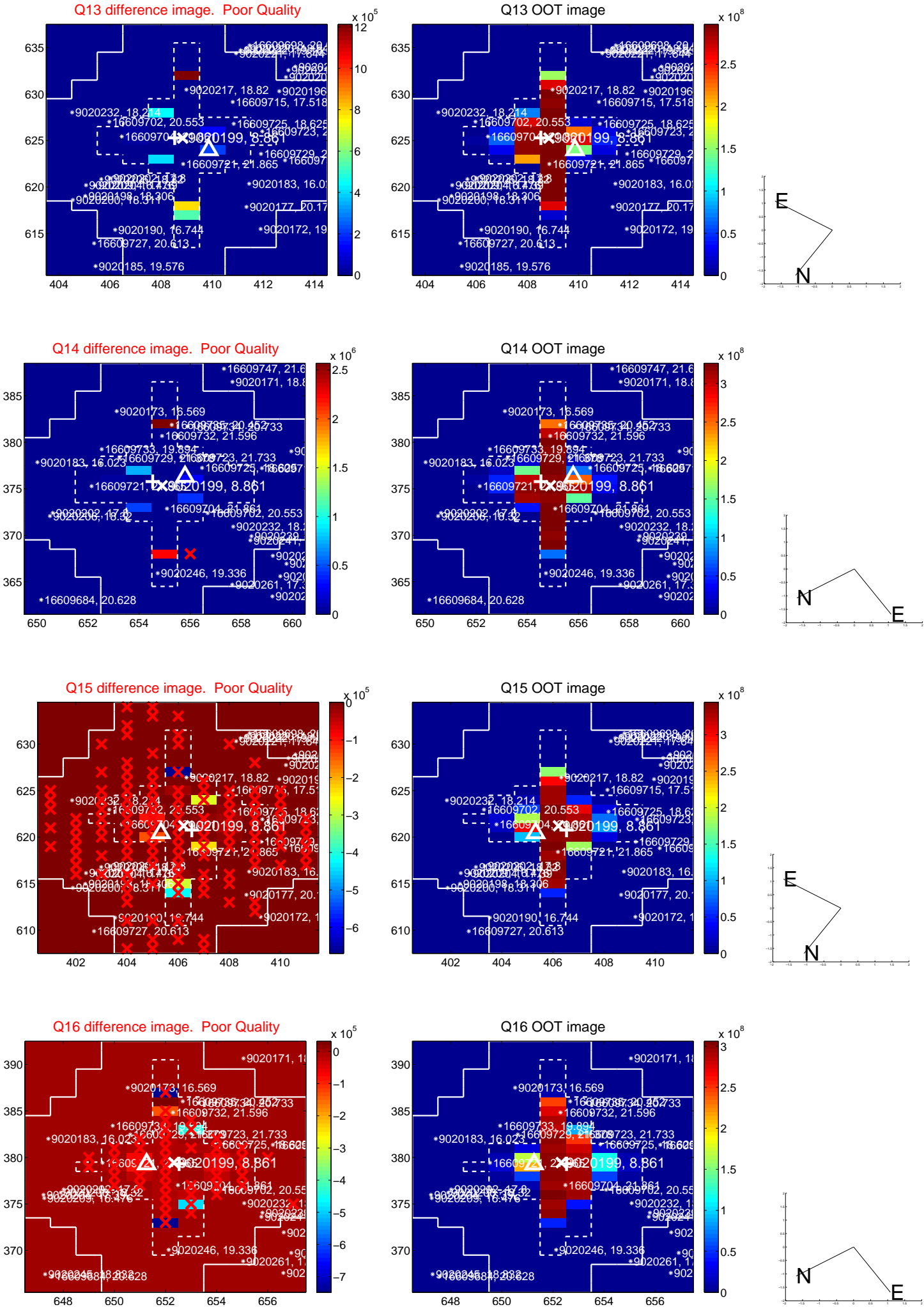
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



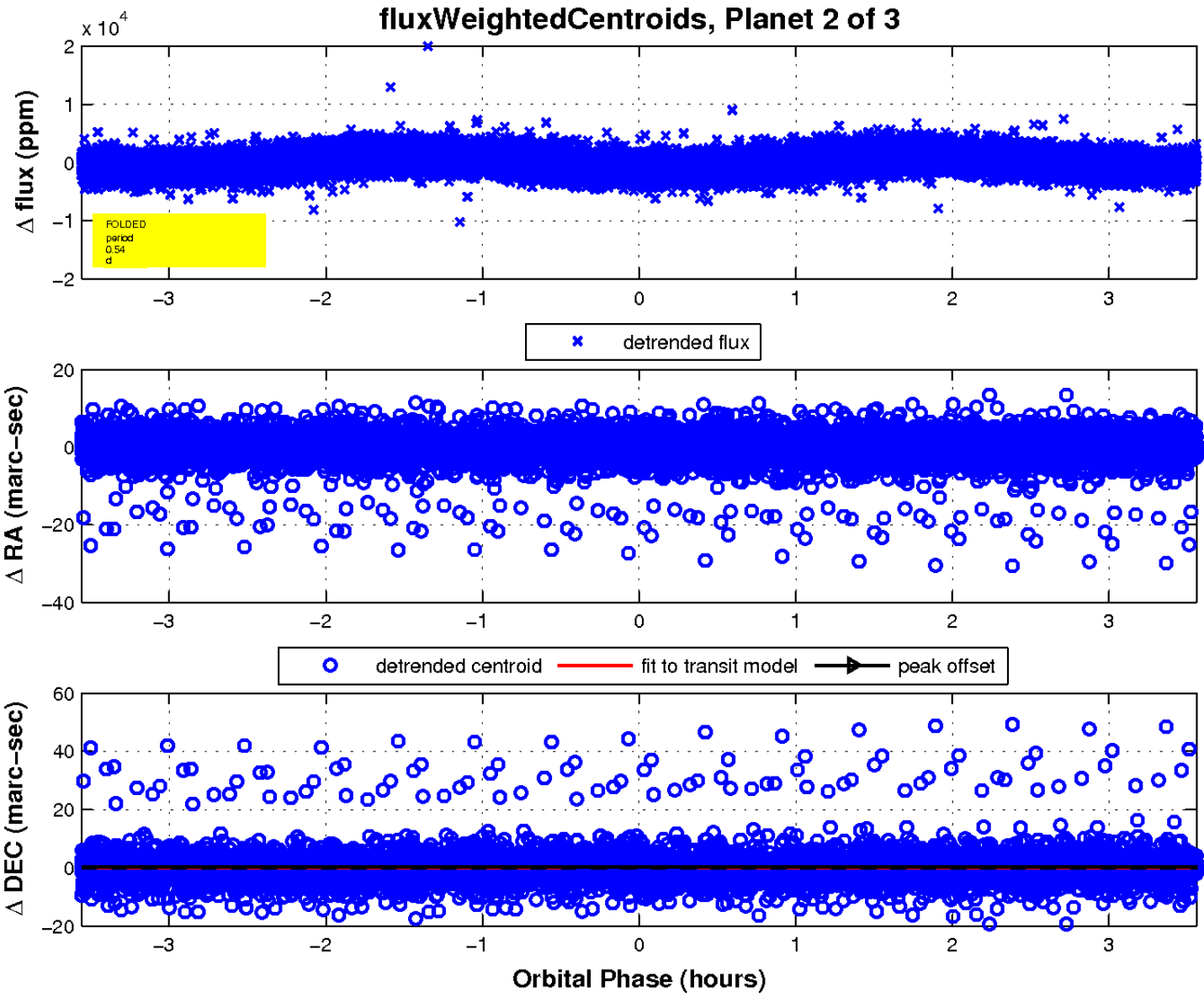
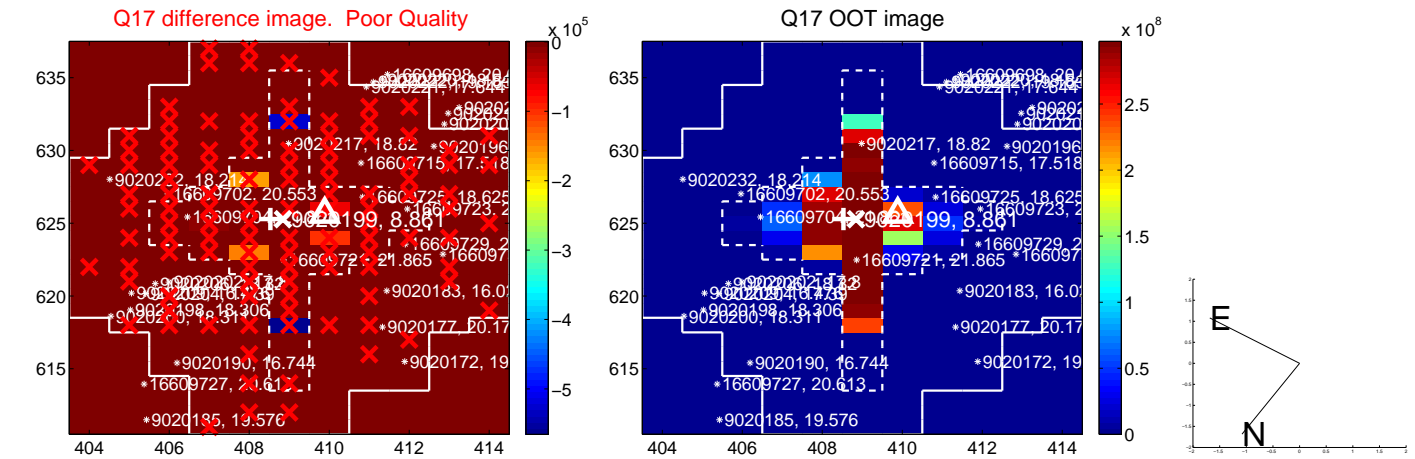




white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

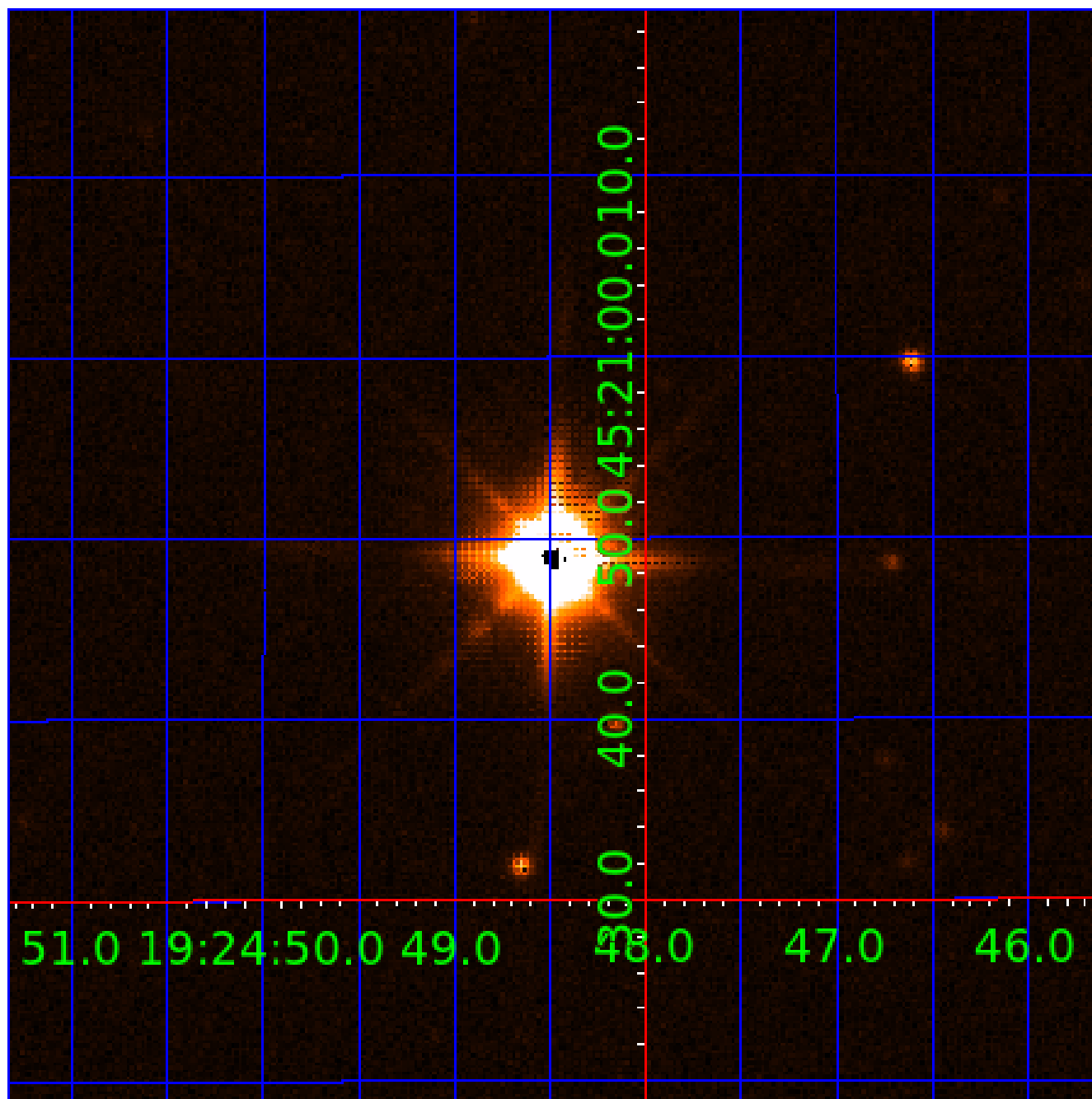


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 009020199

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009020199-01	OBS	No	0.537403	131.844350	179.9	1.452	14.8	12.7	2.06	6905	3.23	39507.05
009020199-02	OBS	No	0.537398	131.579631	184.0	1.187	15.7	10.7	2.06	6905	2.84	39507.52
009020199-03	OBS	No	0.537414	131.701619	30.1	1.500	13.3	-1.0	2.06	6905	1.15	39506.01

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009020199-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
009020199-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—SAME_NTL_PERIOD—CENT_SATURATED
009020199-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—LPP_DV—LPP_ALT—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.

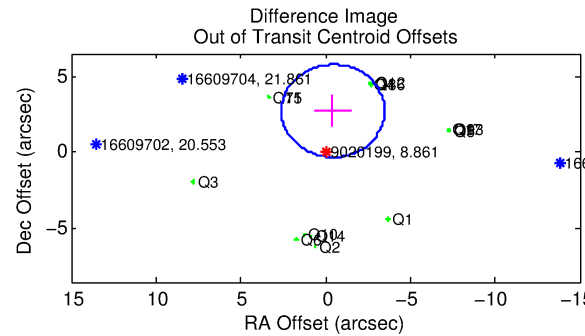
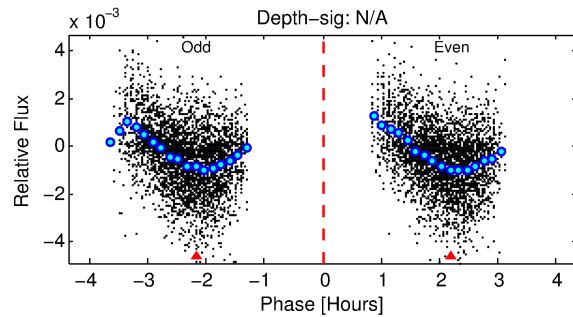
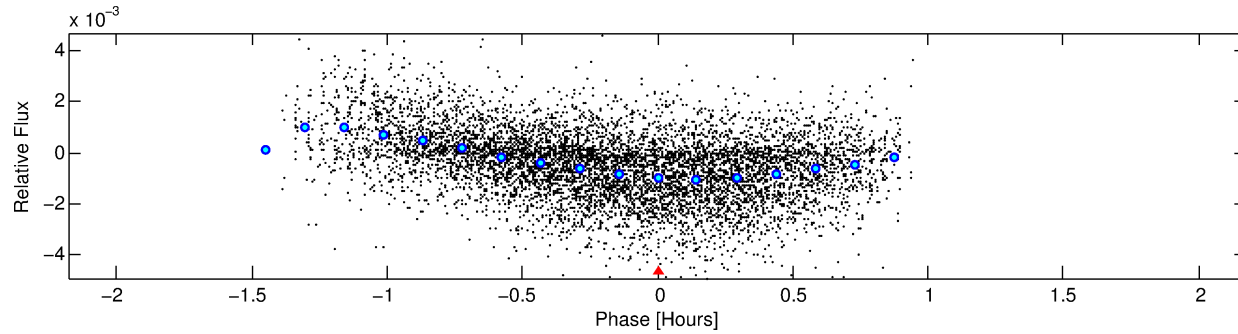
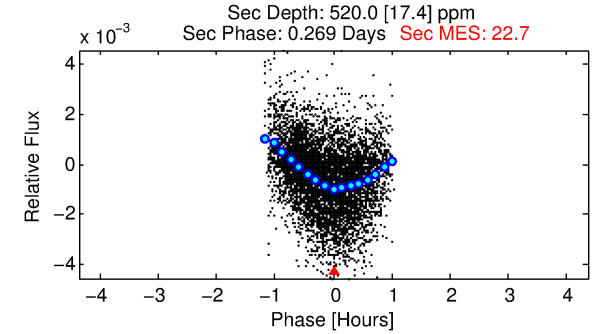
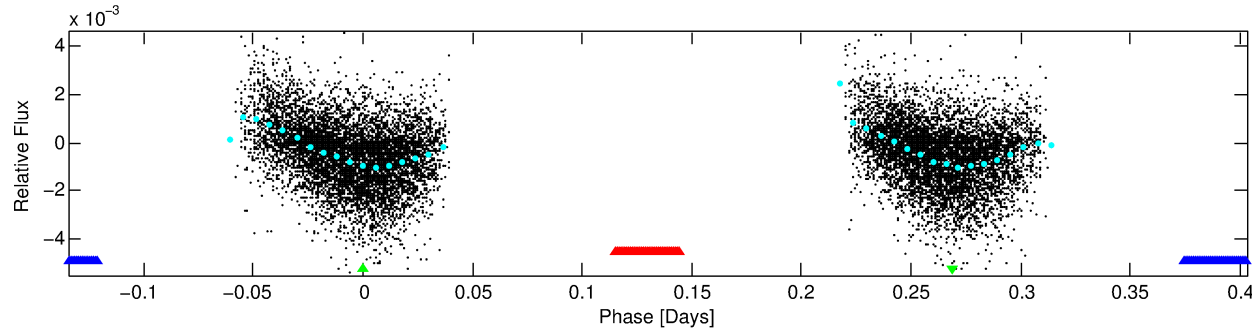
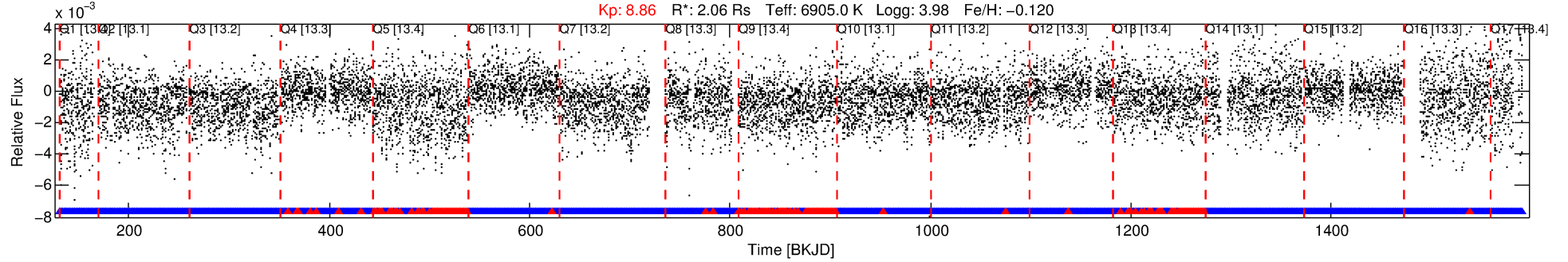
## Ephemeris Match Information For 009020199-03

No Significant Match Found



# DV One-Page Summary

KIC: 9020199 Candidate: 3 of 3 Period: 0.537 d



TPS TCE Results:

Period = 0.53741 d  
Epoch = 131.7016 BKJD

DV fit results are unavailable

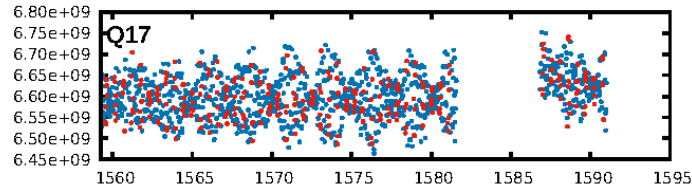
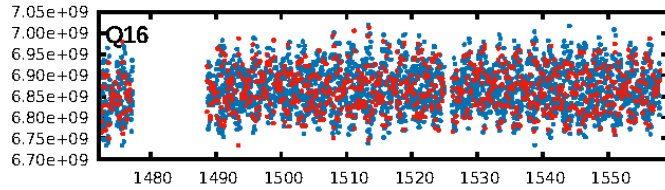
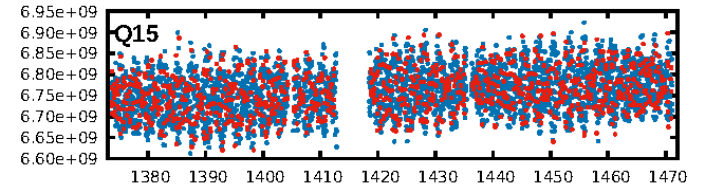
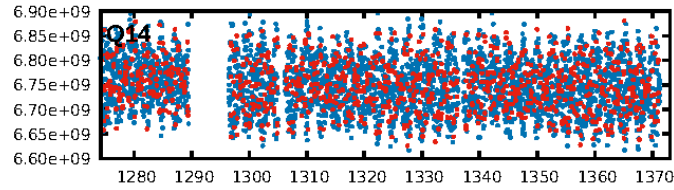
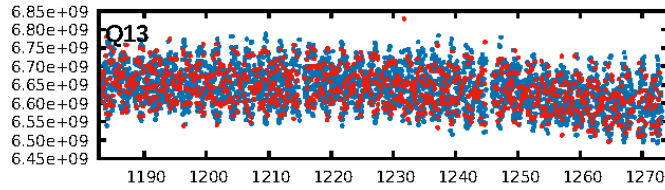
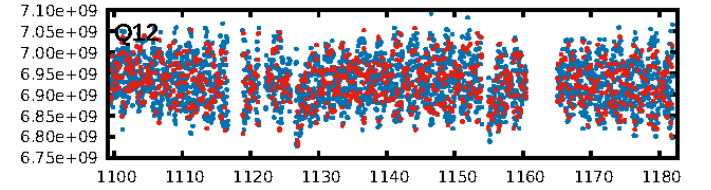
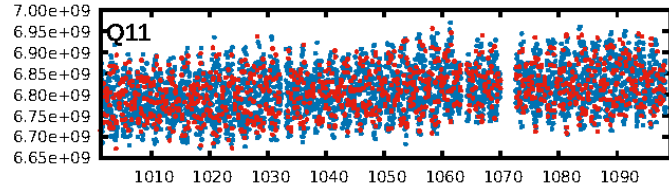
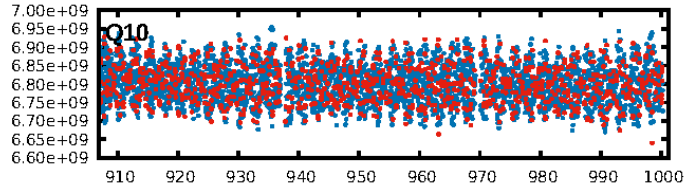
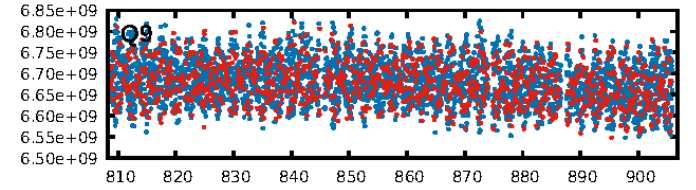
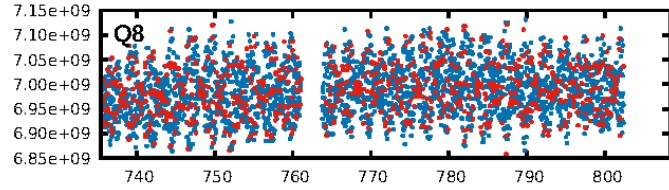
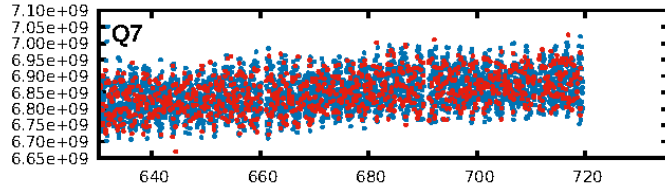
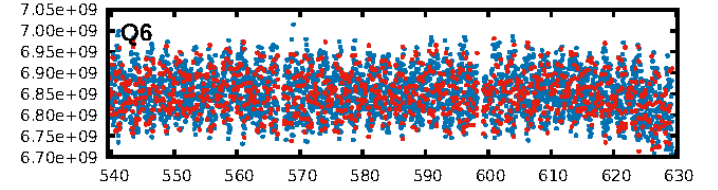
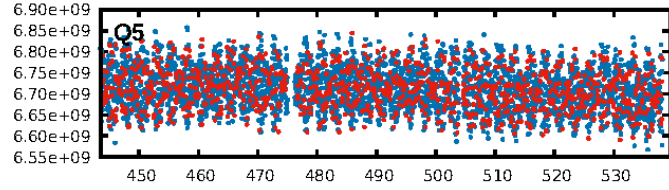
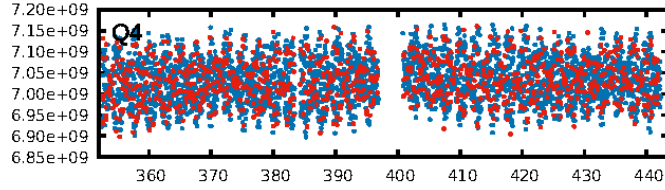
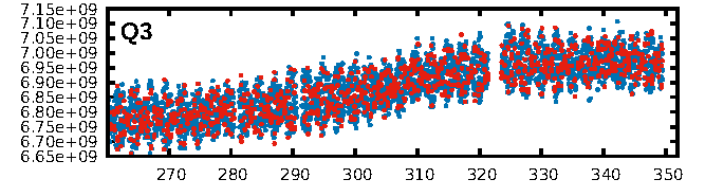
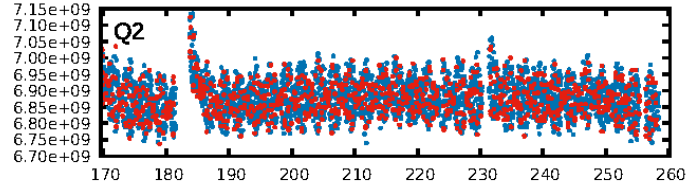
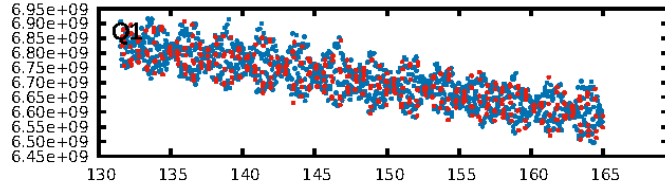
DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: N/A  
RollingBand-fgt: 0.90 [2144/2371]  
GhostDiagnostic-chr: N/A  
Centroid-sig: N/A  
Centroid-so: 0.352 arcsec [2.05σ]  
OotOffset-rm: 2.770 arcsec [2.73σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-rm: 3.294 arcsec [3.52σ]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 0.00 [0/17]  
DiffImageOverlap-fno: 0.00 [0/17]

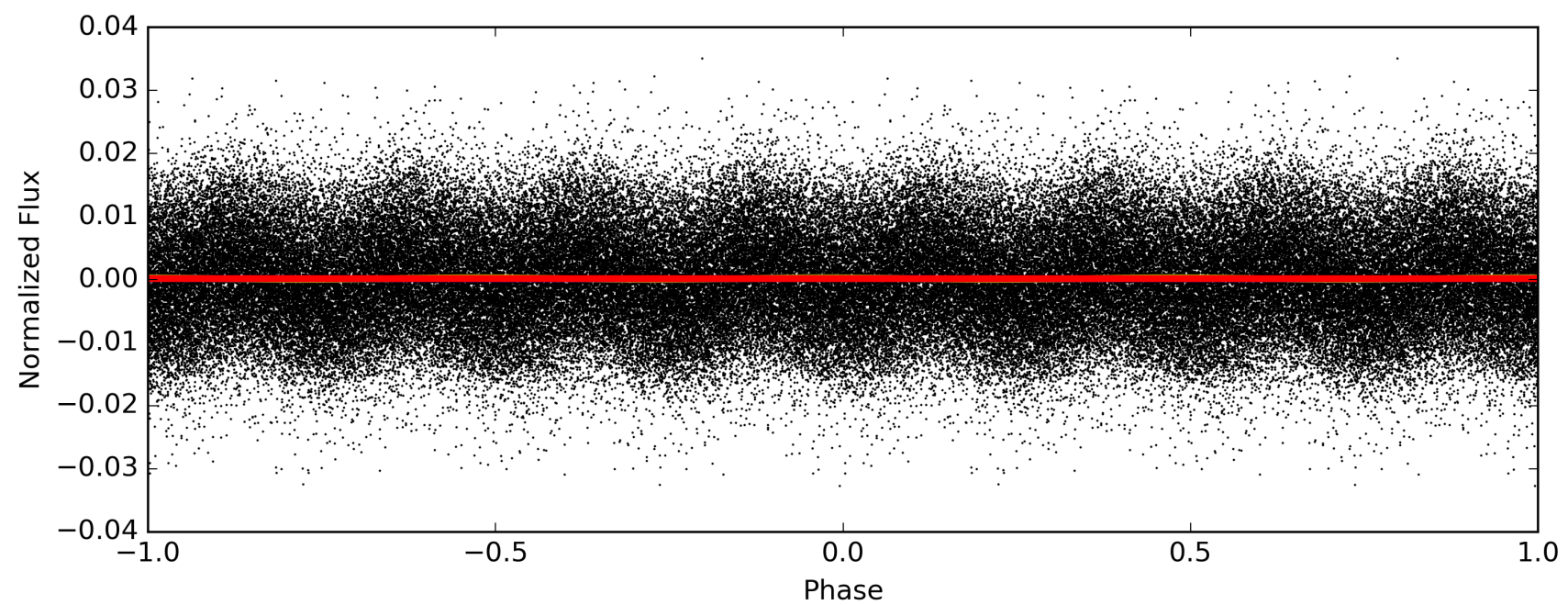
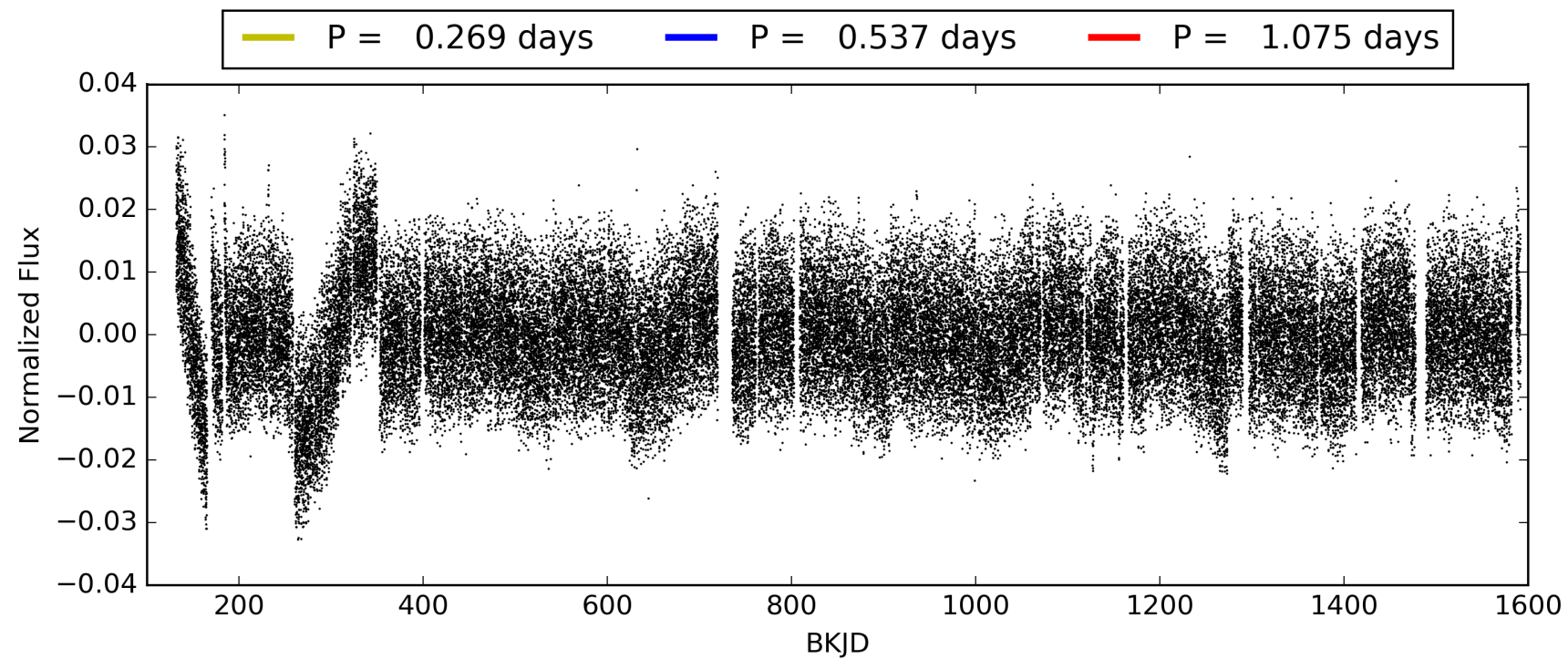
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 23:40:03 Z

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

# TCE 009020199-03, PDC Light Curves

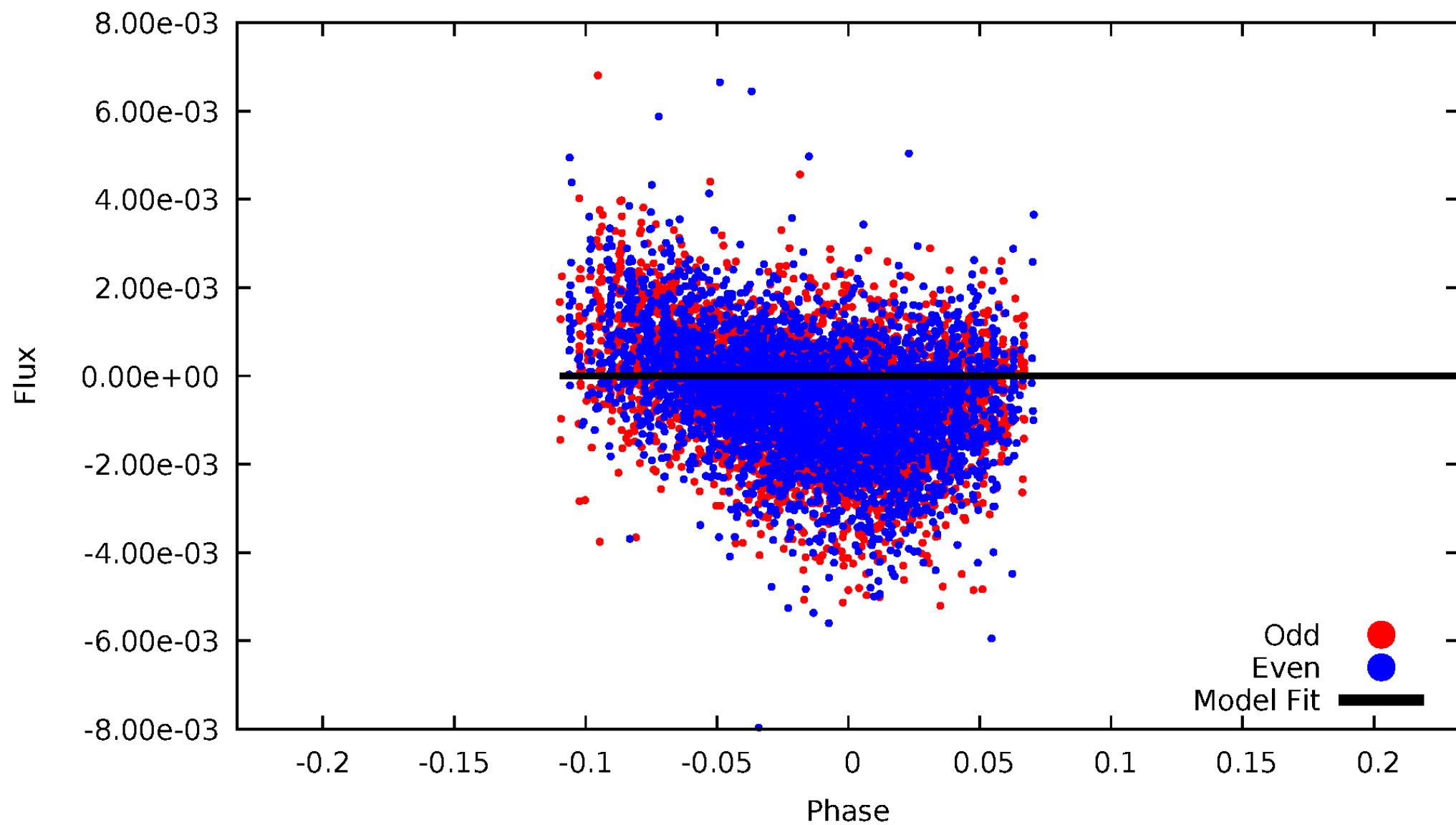


TCE 009020199-03



DV Odd/Even

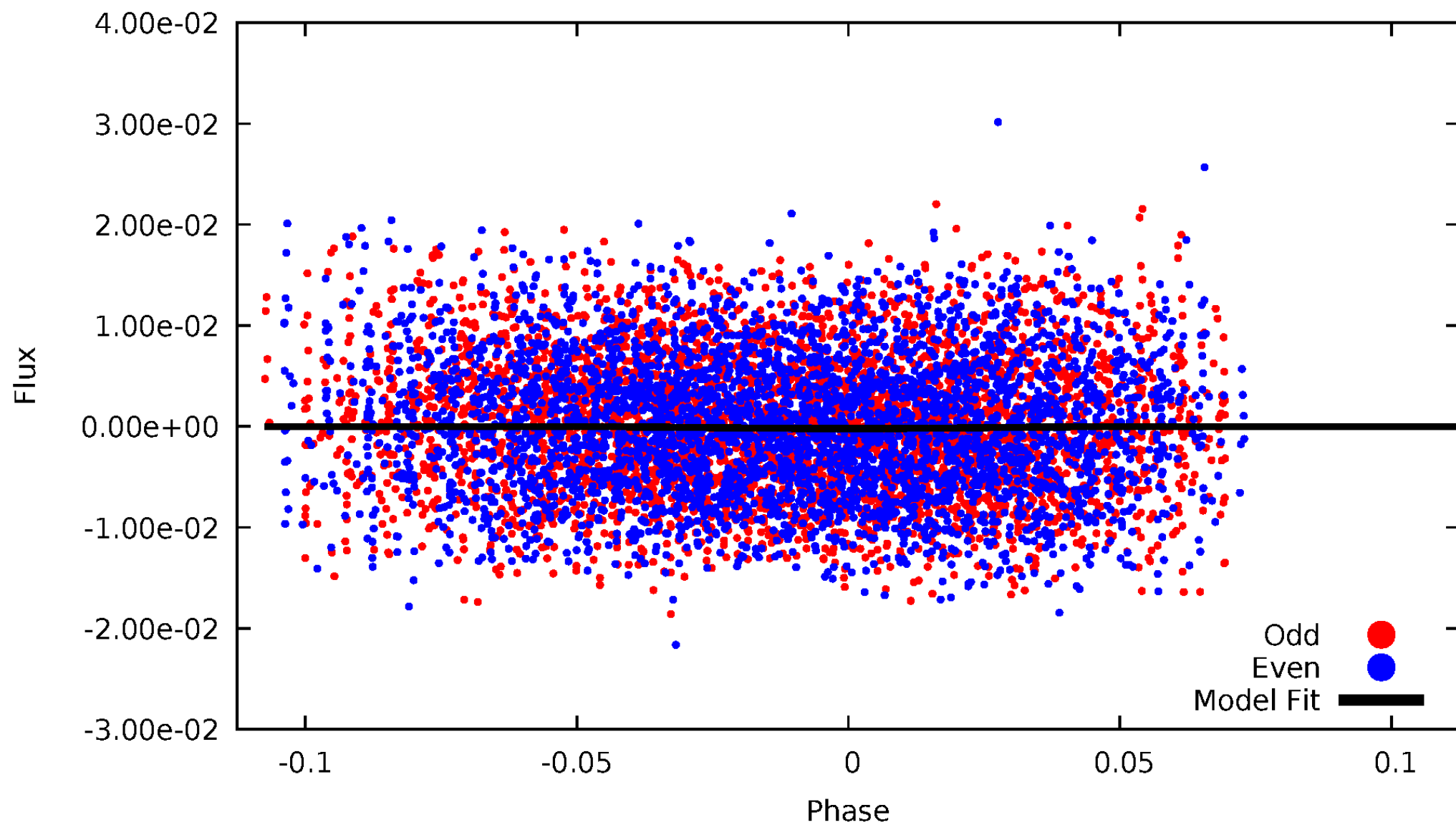
TCE 009020199-03





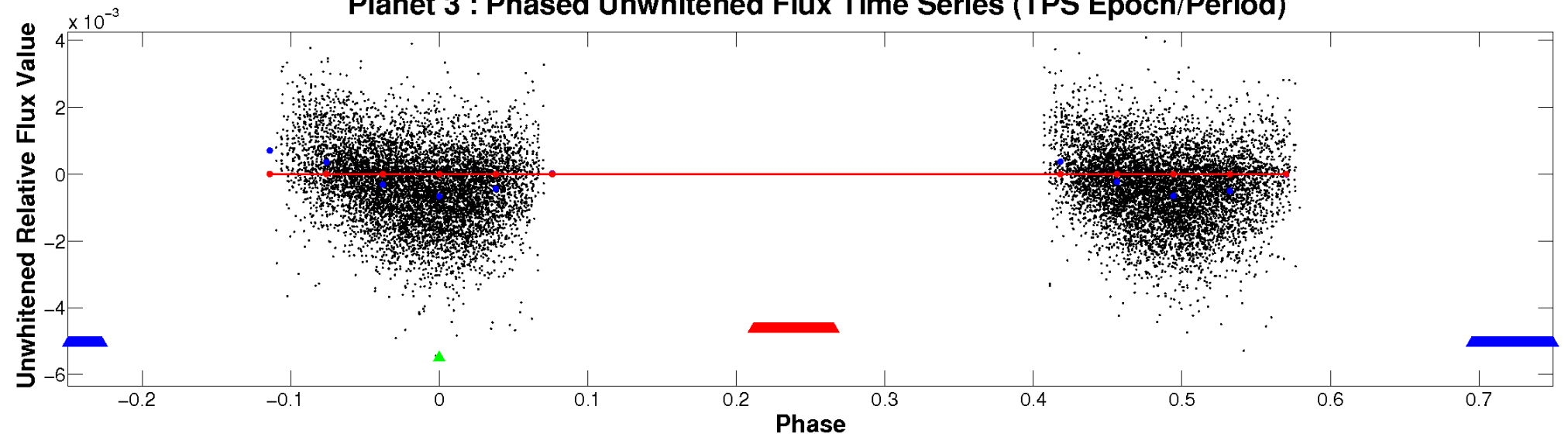
# ALT Odd/Even

TCE 009020199-03

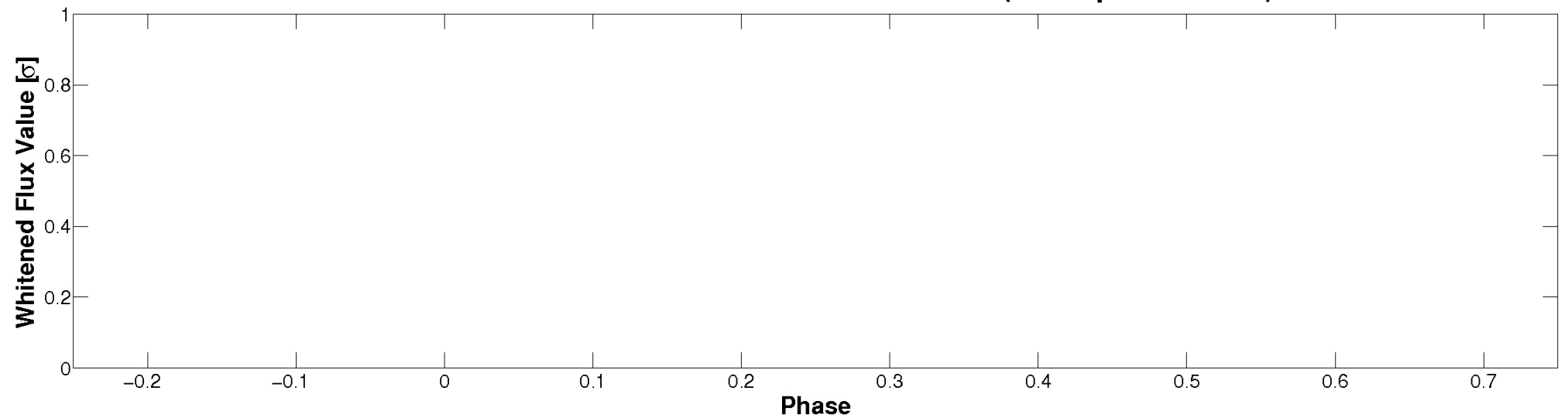


# Non-Whitened Vs. Whitened Light Curve

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

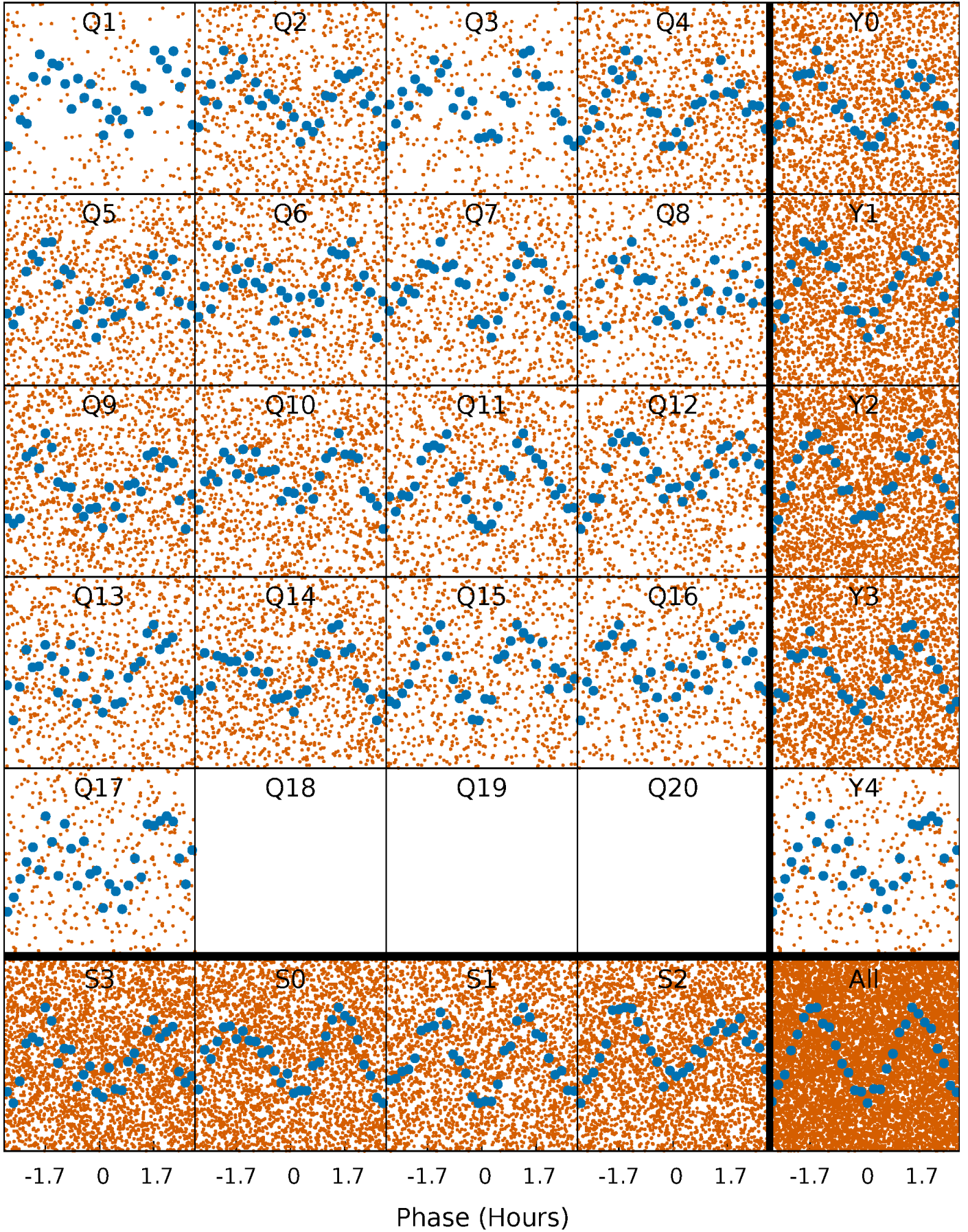


**Planet 3 : Phased Whitened Flux Time Series (TPS Epoch/Period)**



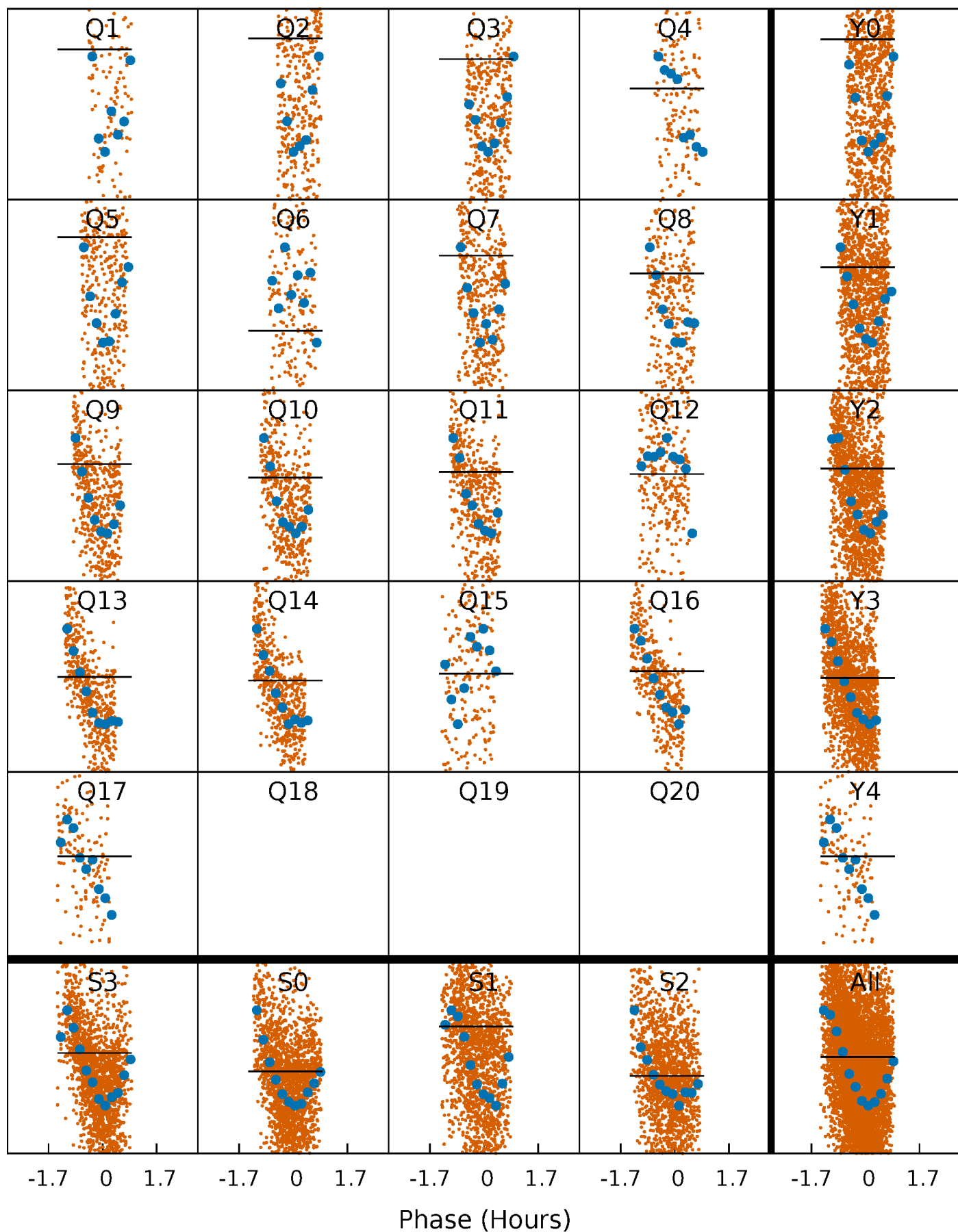
# PDC Quarter-Phased Transit Curves

TCE 009020199-03 P= 0.537414 Days  $T_0=131.701619$  (BKJD)



# DV Quarter-Phased Transit Curves

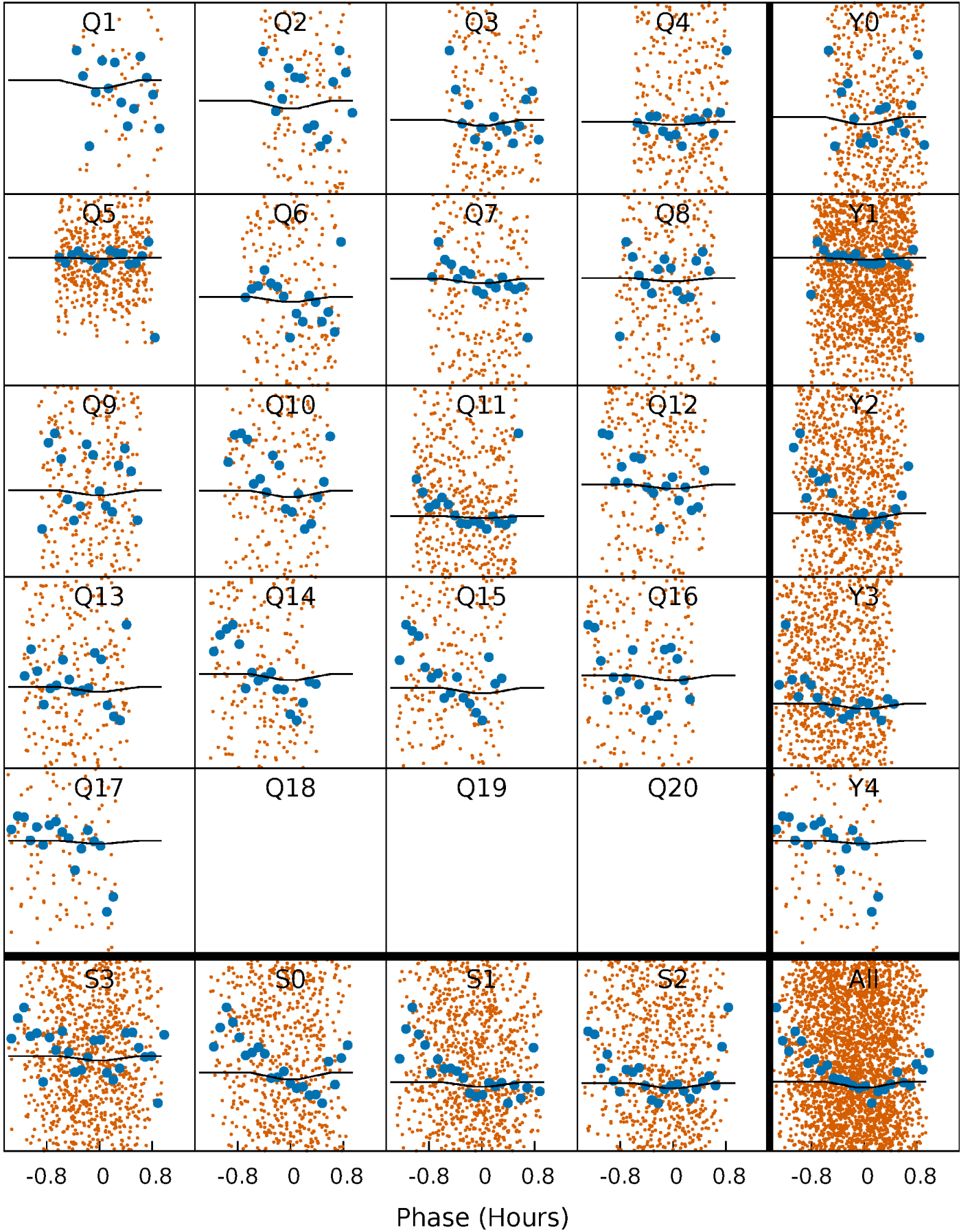
TCE 009020199-03    P= 0.537414 Days     $T_0=131.701619$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

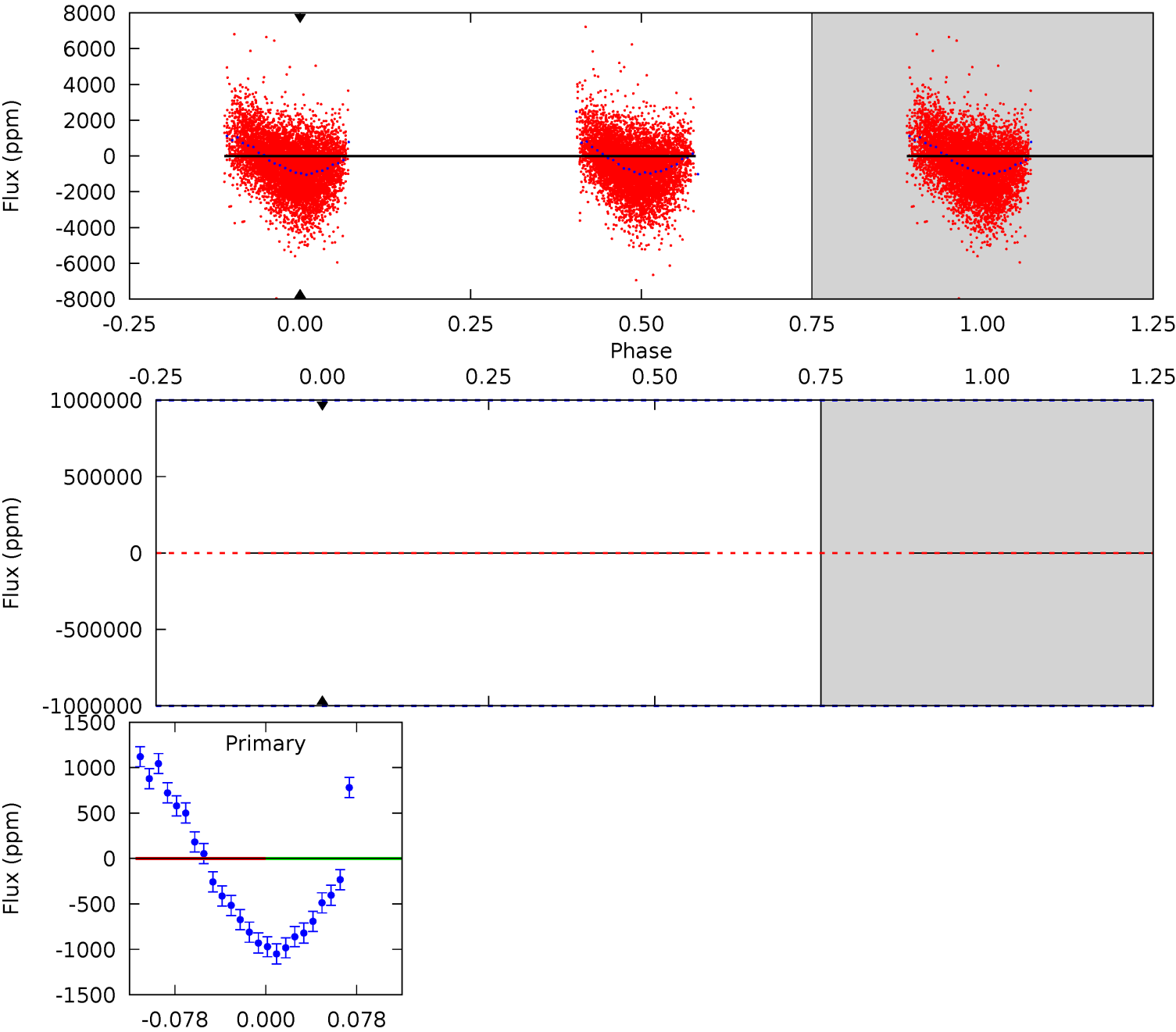
TCE 009020199-03     $P = 0.537414$  Days     $T_0 = 131.700353$  (BKJD)



DV Model-Shift Uniqueness Test

009020199-03, P = 0.537414 Days, E = 131.164205 Days

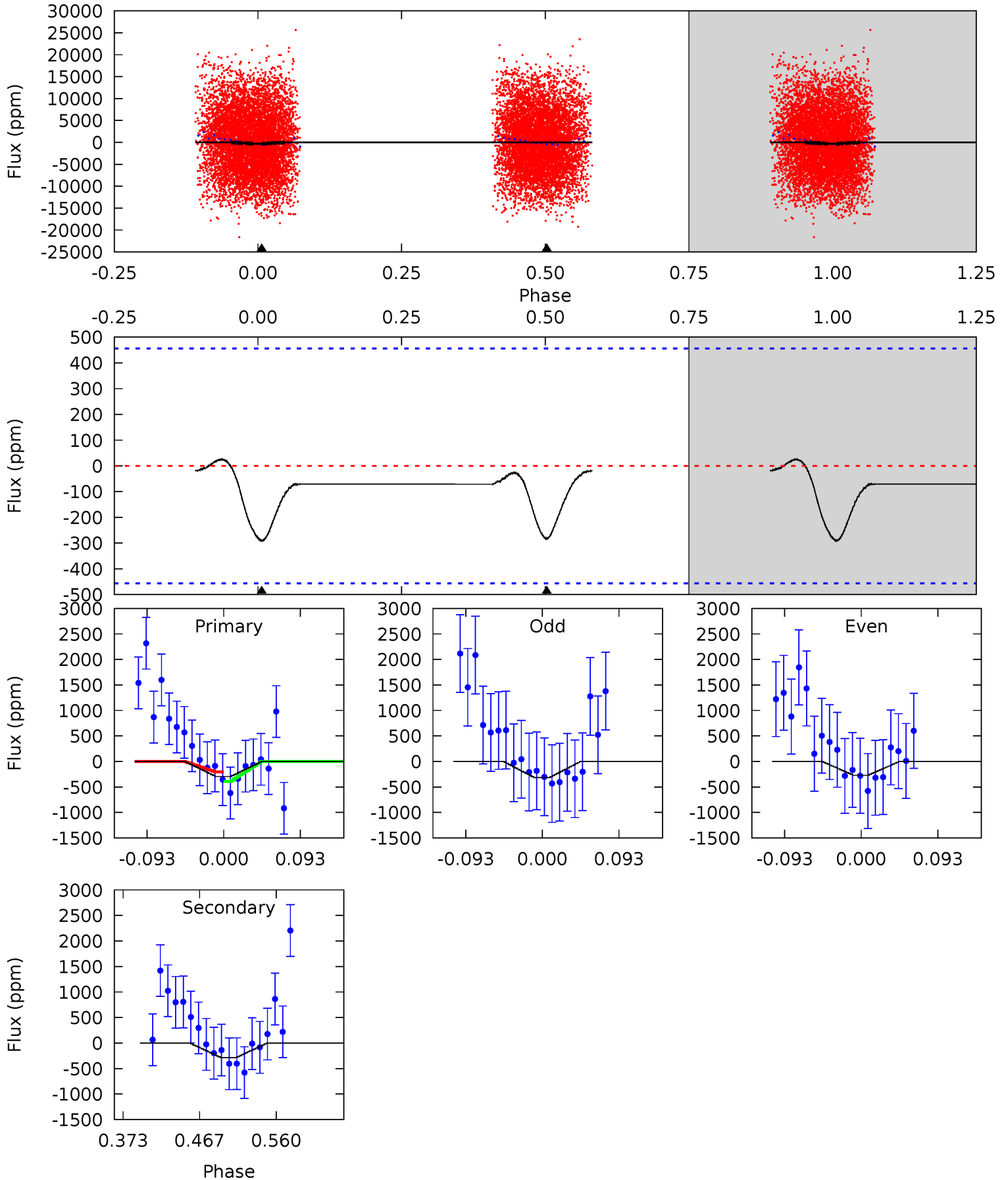
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



# Alt Model-Shift Uniqueness Test

009020199-03, P = 0.537414 Days, E = 131.162939 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
2.95	2.88	0	0	4.58	1.68	0.31	2.95	2.95	2.88	2.88	0.23	0.49	0.09	0.94



### Stellar Parameters For KIC 009020199

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6905^{+170}_{-242}$	$3.985^{+0.273}_{-0.168}$	$-0.120^{+0.250}_{-0.350}$	$2.062^{+0.567}_{-0.693}$	$1.497^{+0.196}_{-0.295}$	$0.241^{+0.411}_{-0.118}$
	+2%/-4%	+7%/-4%	+208%/-292%	+27%/-34%	+13%/-20%	+171%/-49%
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 009020199-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$0 \pm 1000000$	$15.43^{+16.27}_{-10.27}$	$4982^{+379}_{-447}$	$-5436^{+37347}_{-27652}$	$-0.626^{+74.004}_{-91.333}$
Alt.	$-287 \pm 100$	$16.09^{+18.19}_{-11.42}$	$4977^{+372}_{-445}$	$-3749^{+9280}_{-563}$	$0.134^{+1.333}_{-0.106}$

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



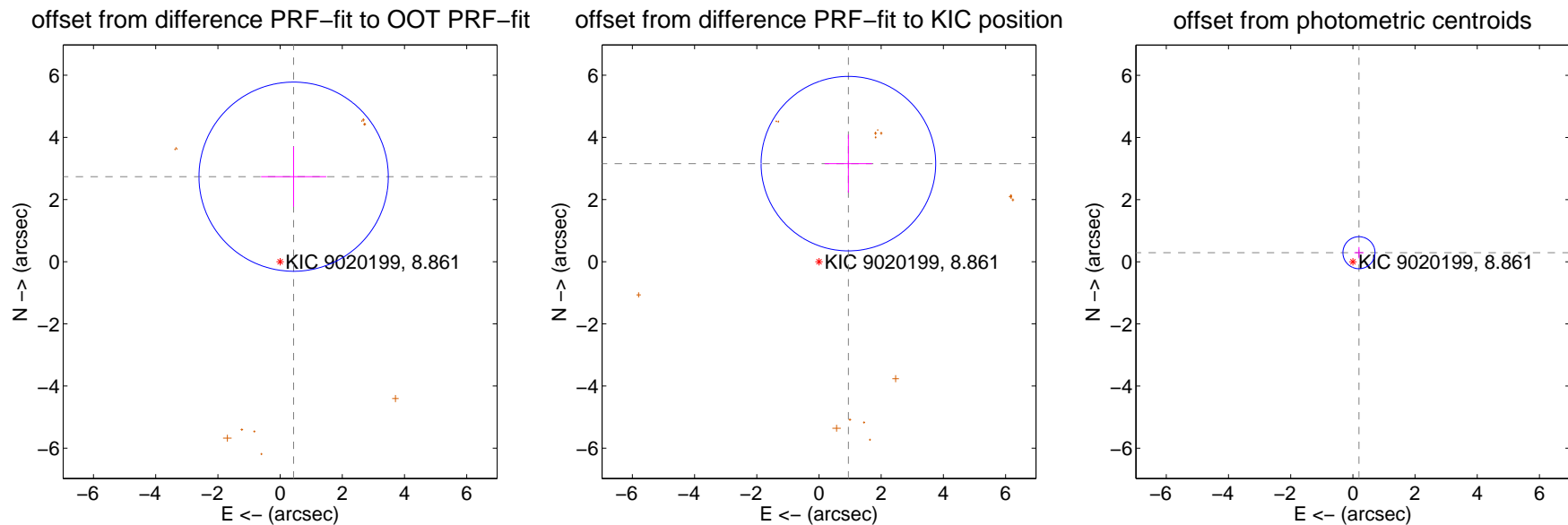
## DV Centroid Data

Supplemental centroid analysis for 009020199-03. **Kepler magnitude: 8.86.** Transit SNR -1.00

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

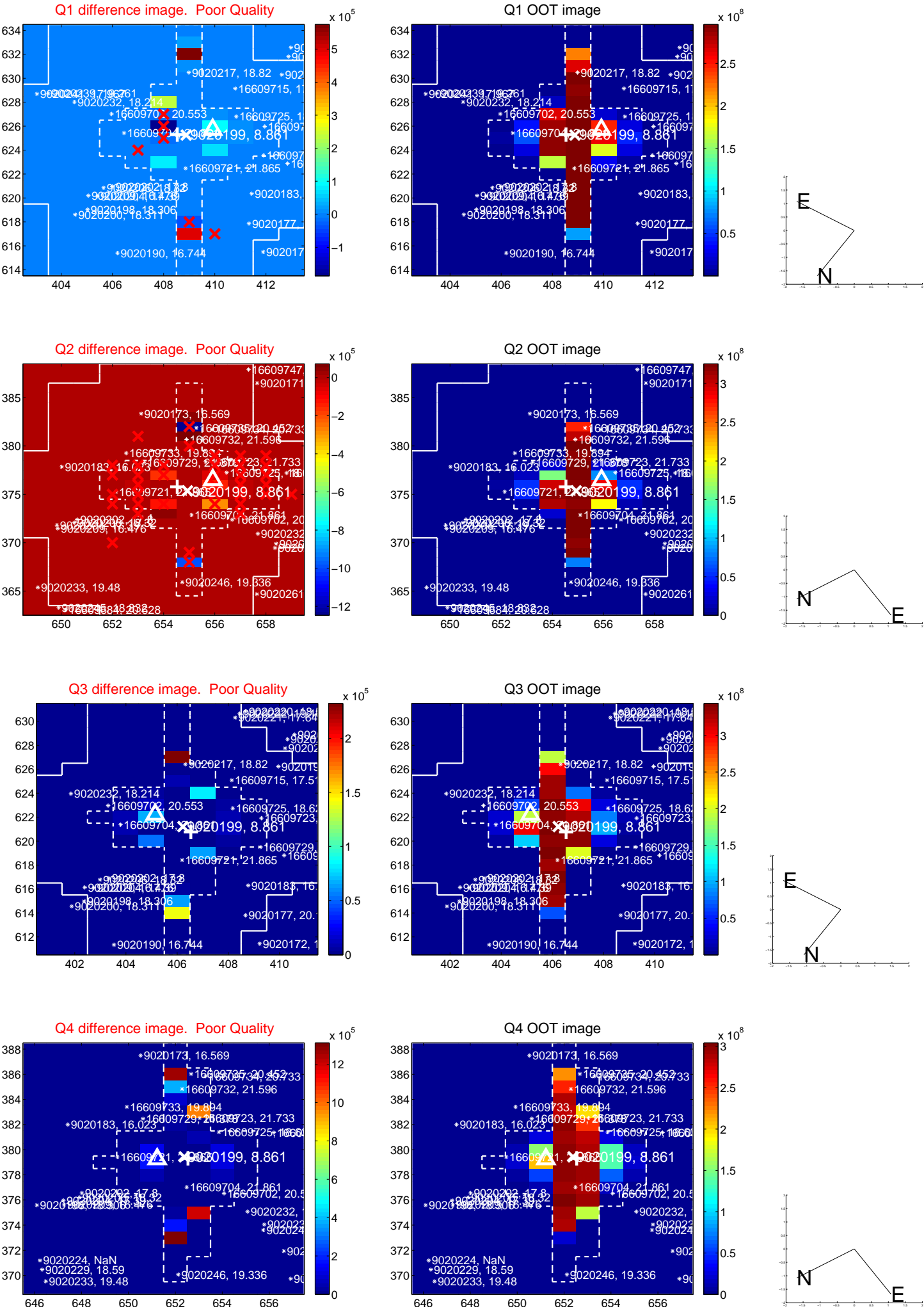
The direct PRF centroid is offset from the target star catalog position by about 1.25 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.770 \pm 1.015$	2.73	$-0.435 \pm 1.049$	$2.736 \pm 0.965$
PRF-fit source offset from KIC position	<b><math>3.294 \pm 0.936</math></b>	<b>3.52</b>	$-0.945 \pm 0.762$	$3.155 \pm 0.932$
photometric centroid source offset	$0.35 \pm 0.17$	2.05	$-0.20 \pm 0.15$	$0.29 \pm 0.18$

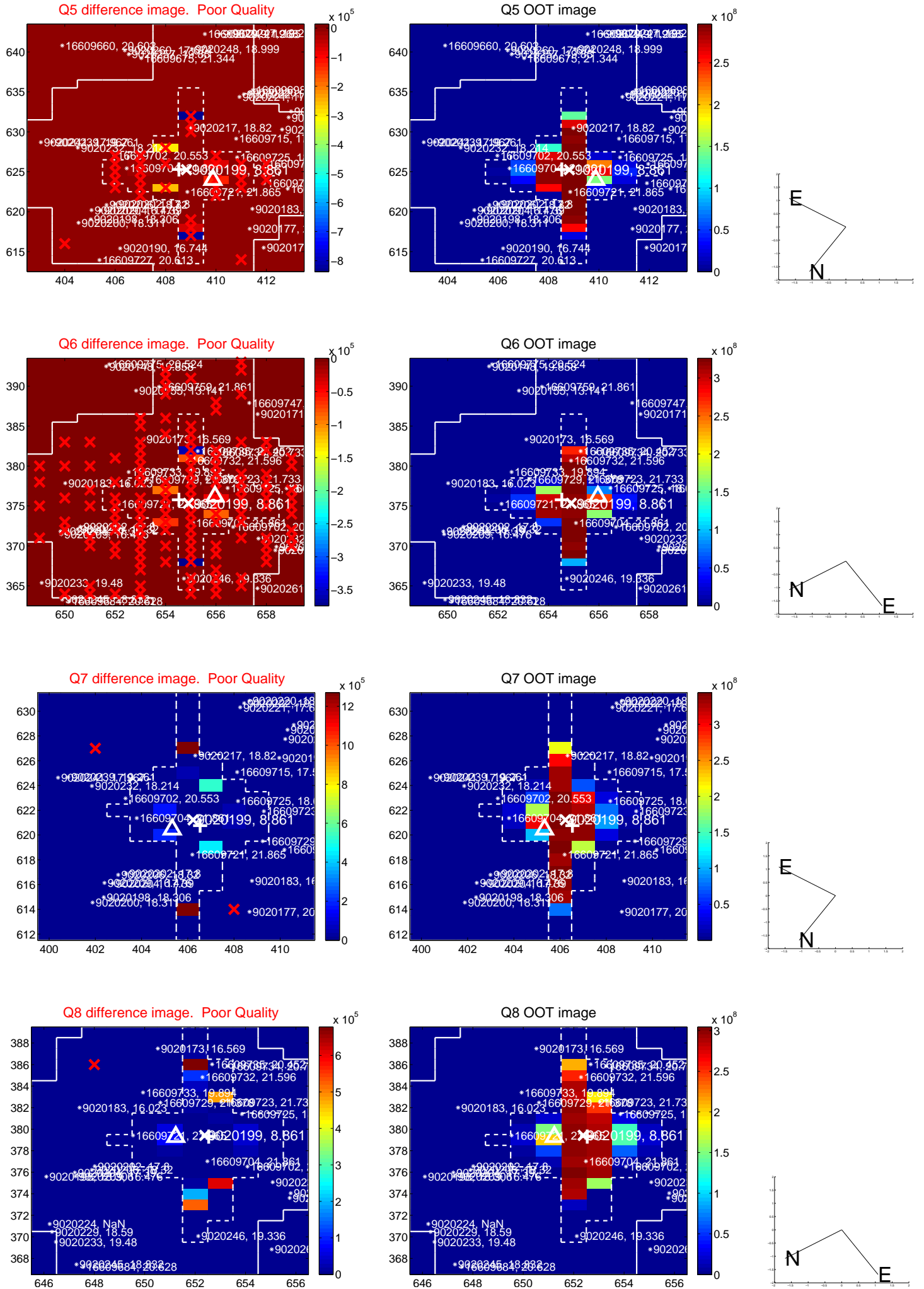


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

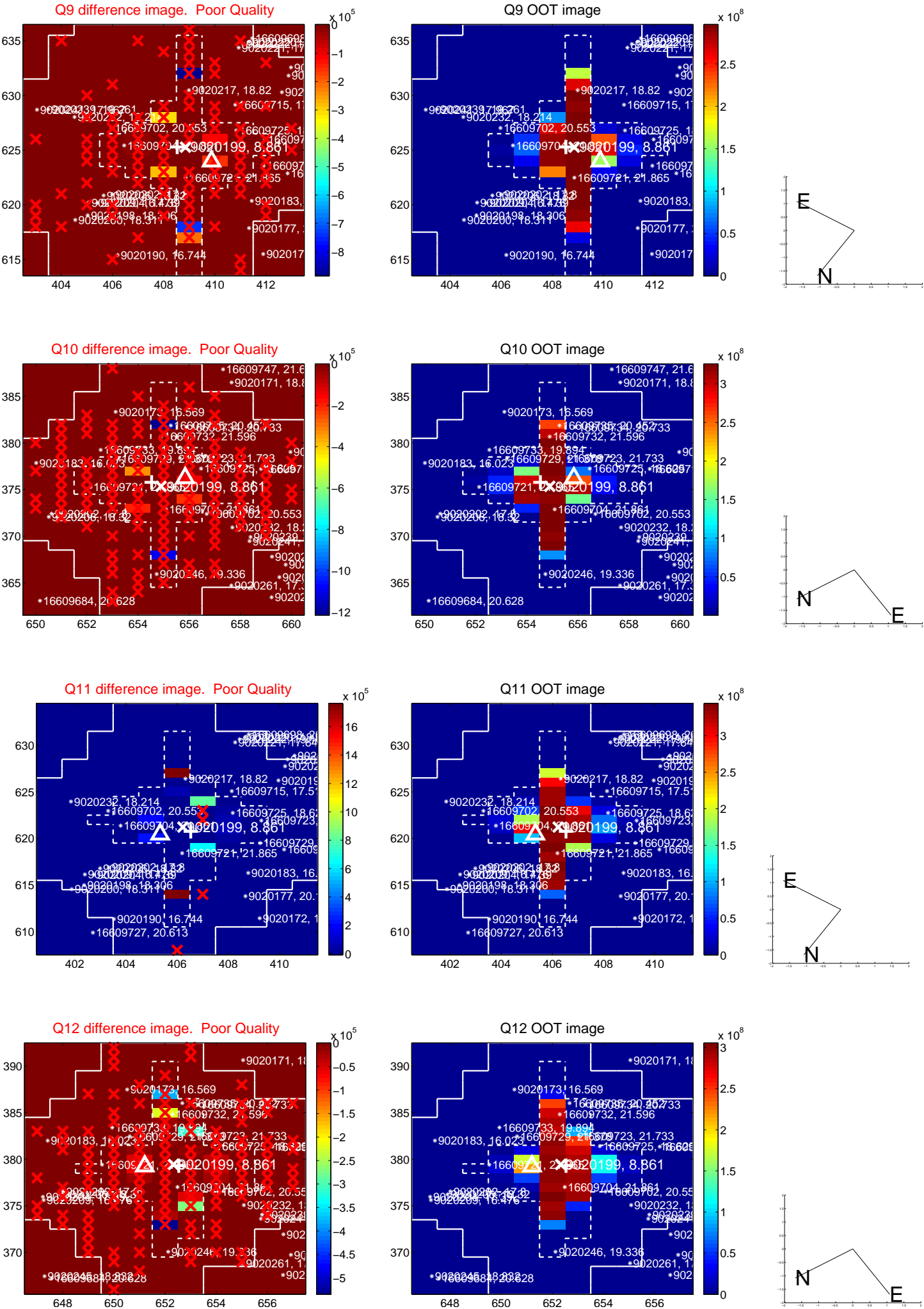
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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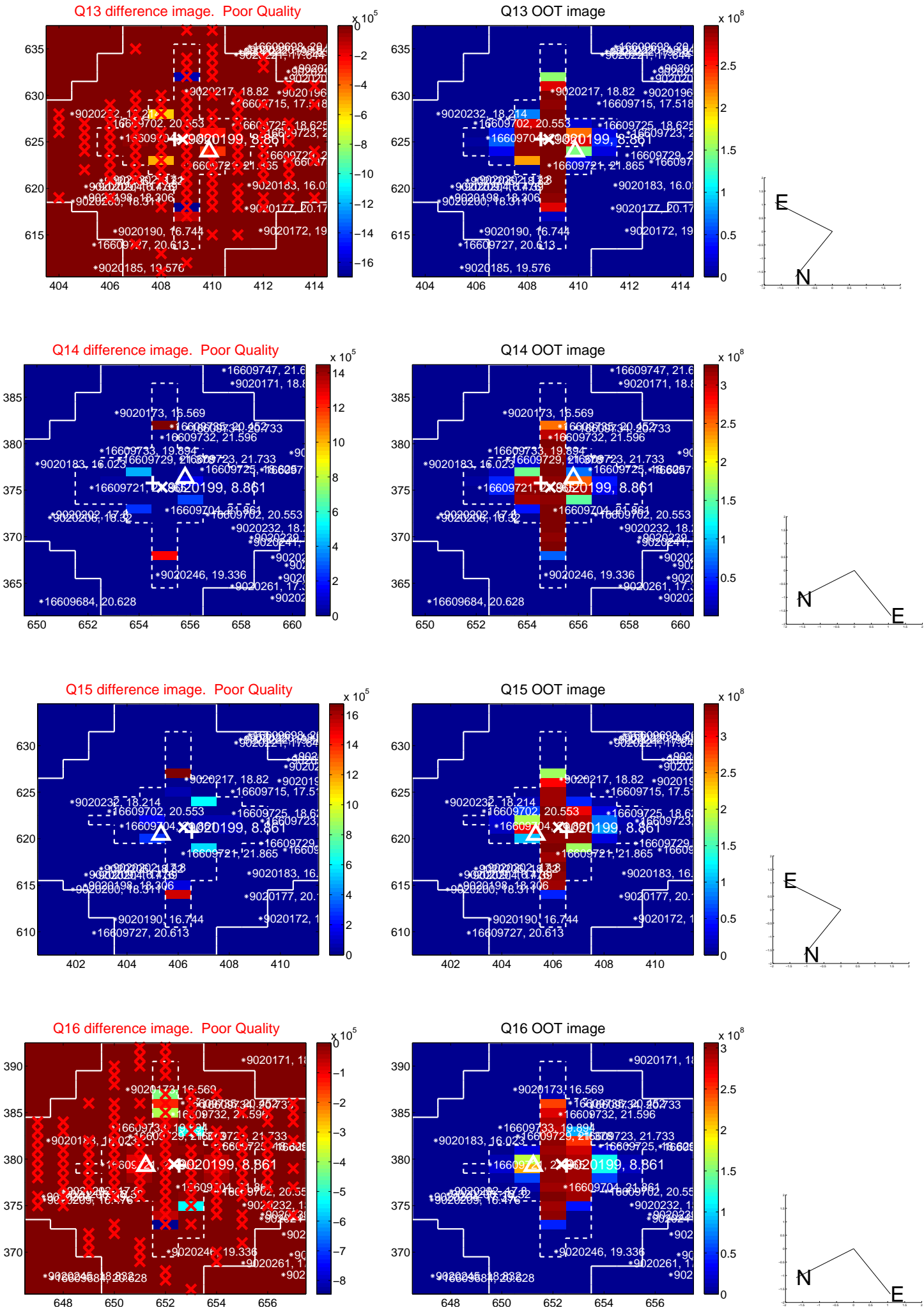


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

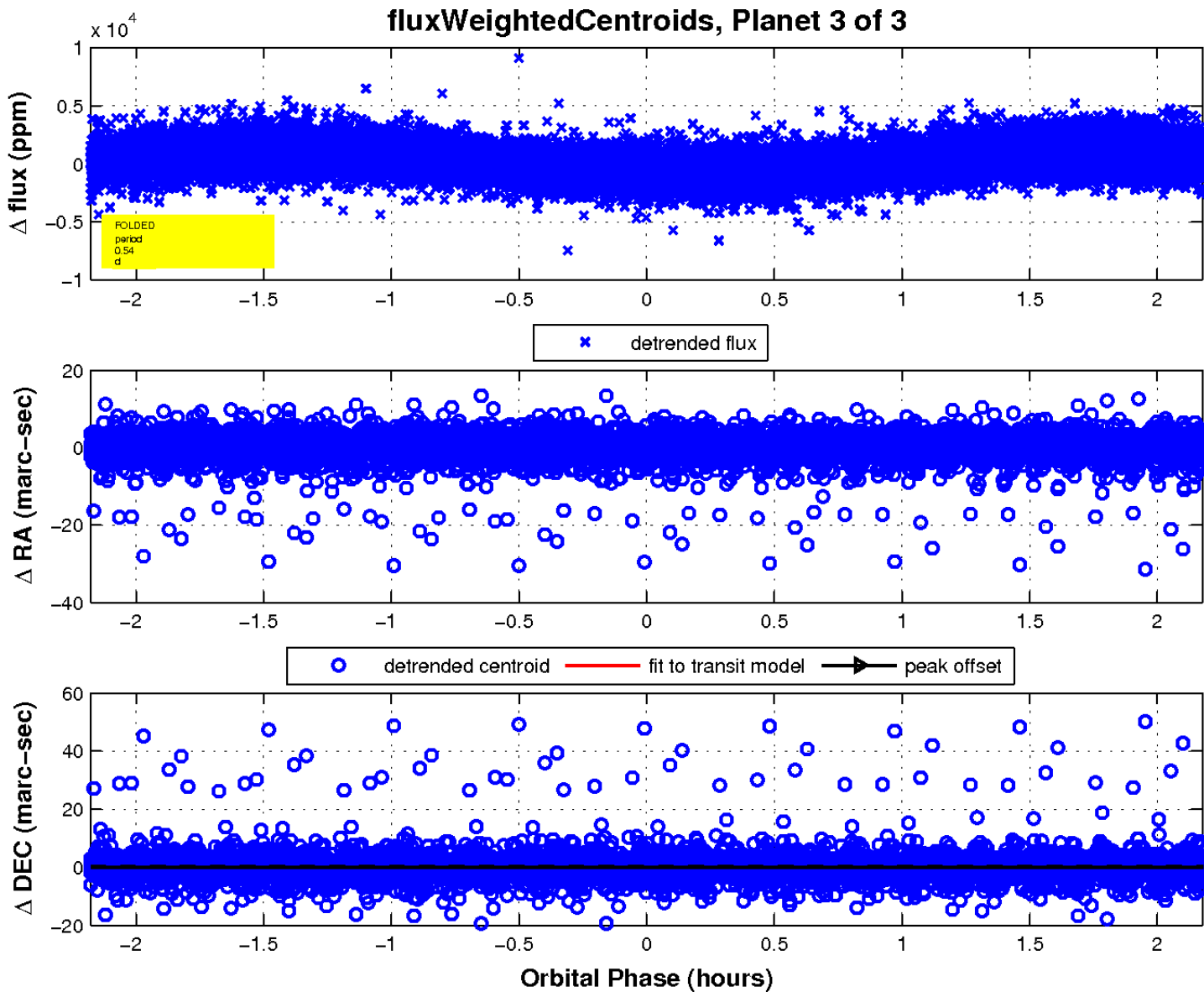
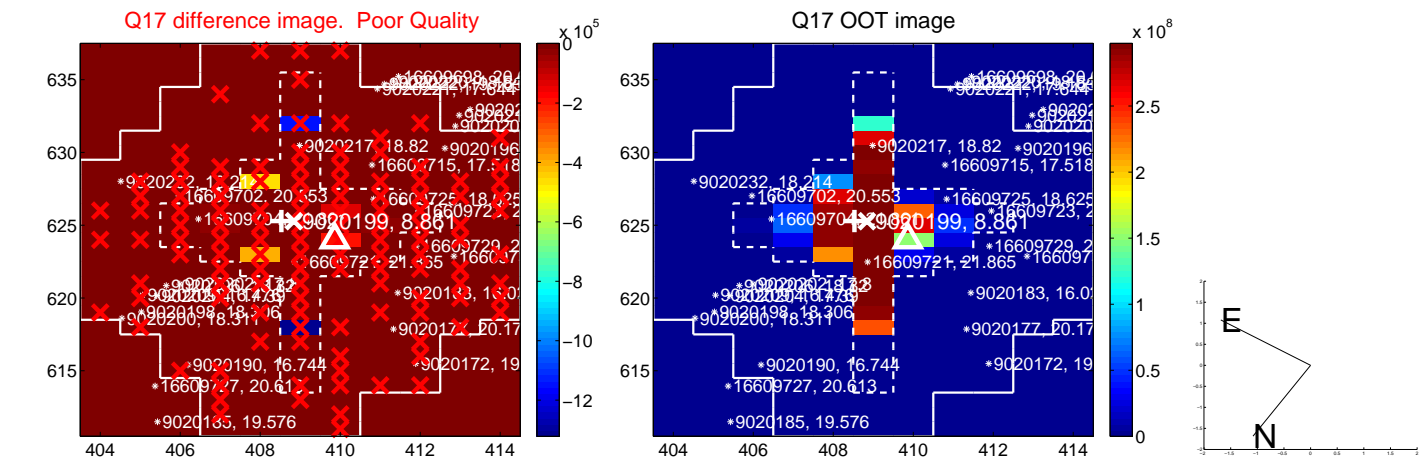




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UKIRT Image

Declination

