

# KIC 005989391

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005989391-01	OBS	No	3.113276	131.837471	0.0	4.271	10.7	0.0	3.20	6642	0.02	8056.96
005989391-02	OBS	No	3.113575	132.243196	38.5	6.000	10.4	-1.0	3.20	6642	2.00	8055.93

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005989391-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—SWEET_NTL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
005989391-02	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_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.

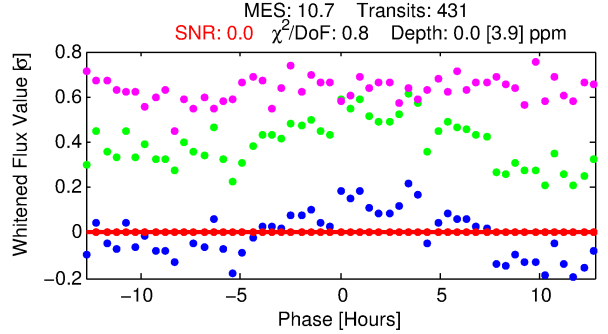
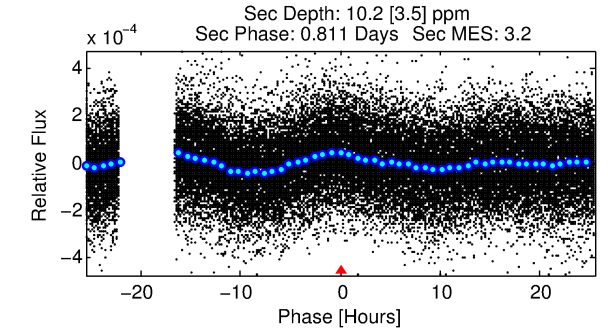
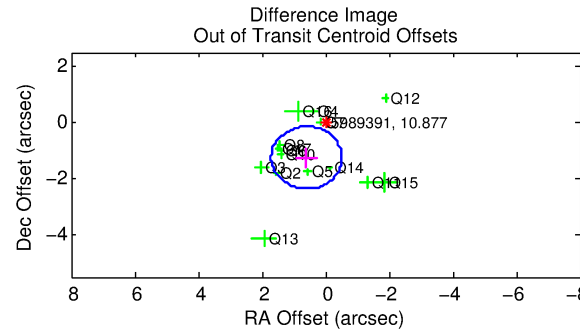
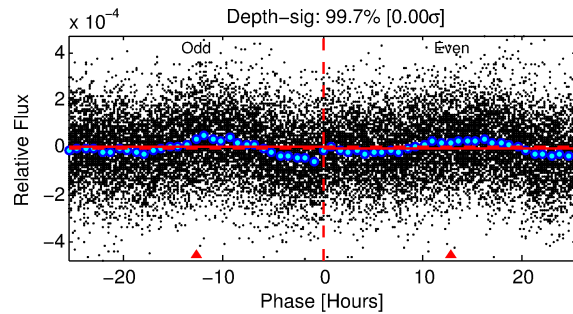
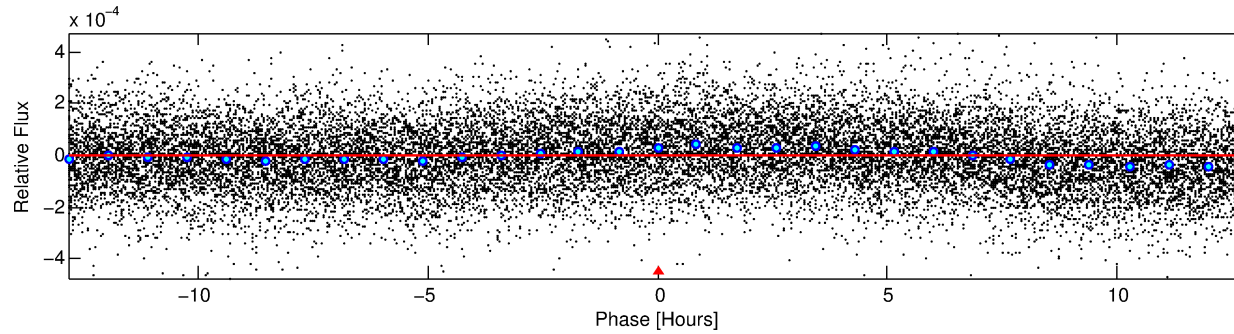
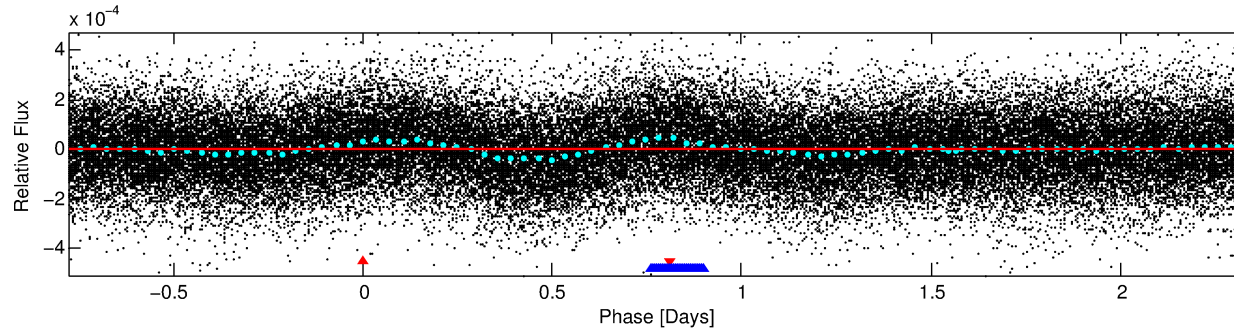
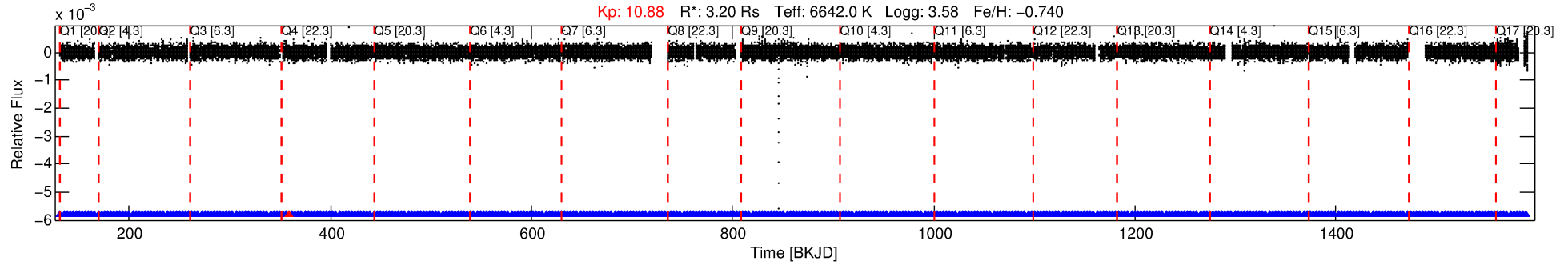
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 005989391-01

No Significant Match Found

# DV One-Page Summary

KIC: 5989391 Candidate: 1 of 2 Period: 3.113 d  
KOI: K05221 Corr: No Ephemeris Match



## DV Fit Results:

Period = 3.11328 [0.31454] d  
Epoch = 131.8375 [50.9804] BKJD  
Rp/R\* = 0.0000 [0.0461]  
a/R\* = 2.56 [232.67]  
b = 0.90 [44.47]  
Seff = 8056.96 [5077.57]  
Teq = 2416 [381] K  
Rp = 0.02 [16.10] Re  
a = 0.0471 [0.0188] AU  
Ag = 43050.68 [81544465.95] [0.00 $\sigma$ ]  
Teffp = 53803 [25478249] K [0.00 $\sigma$ ]

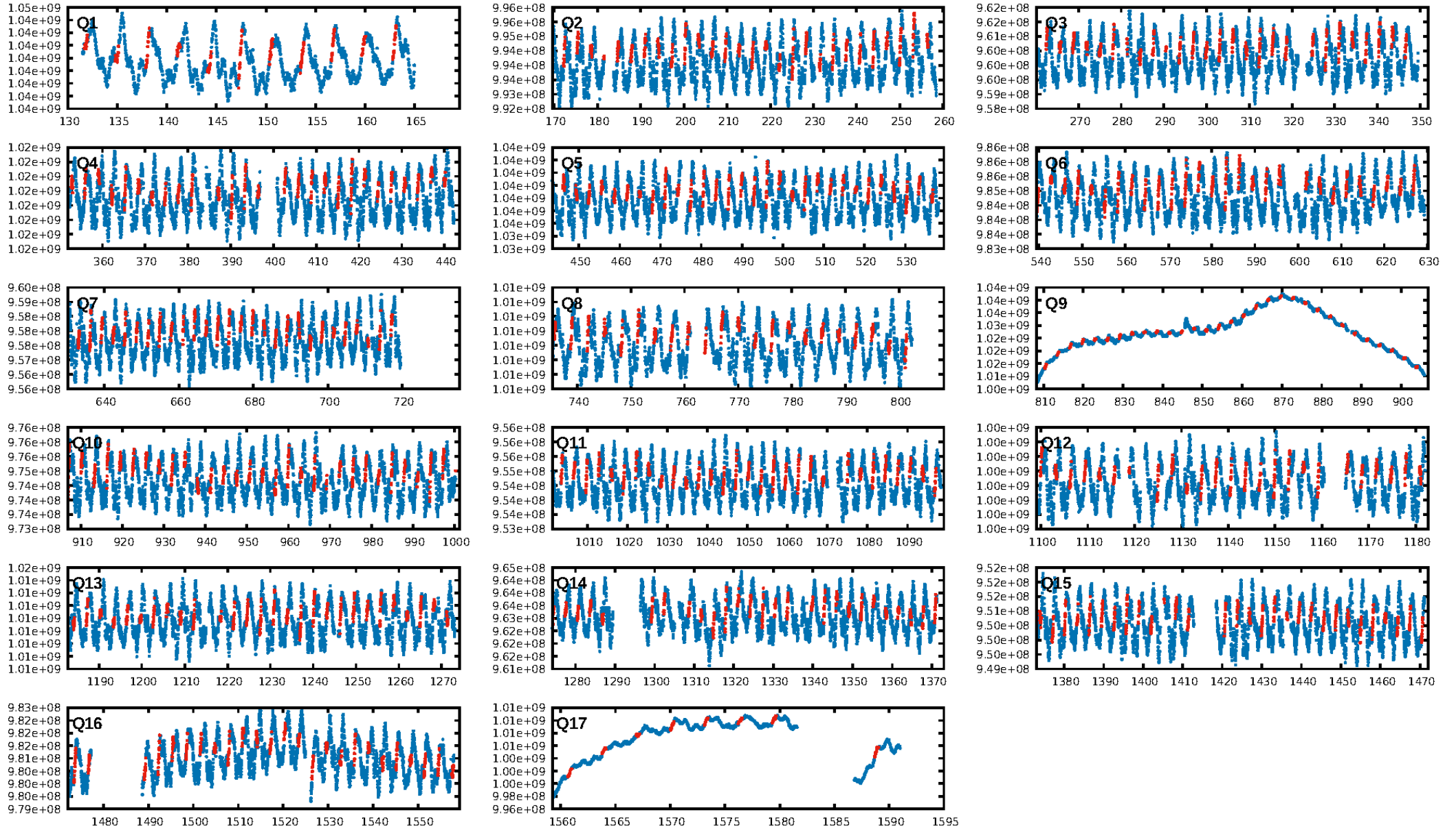
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 0.1% [0.00 $\sigma$ ]  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 1.11e-17  
RollingBand-fgt: 1.00 [411/412]  
GhostDiagnostic-chr: N/A  
Centroid-sig: N/A  
Centroid-so: N/A  
OotOffset-rm: 1.389 arcsec [3.75 $\sigma$ ]  
KicOffset-rm: 1.608 arcsec [4.68 $\sigma$ ]  
OotOffset-st: 4/4/4/3 [15]  
KicOffset-st: 4/4/4/3 [15]  
DiffImageQuality-fgm: 0.13 [2/15]  
DiffImageOverlap-fno: 1.00 [17/17]

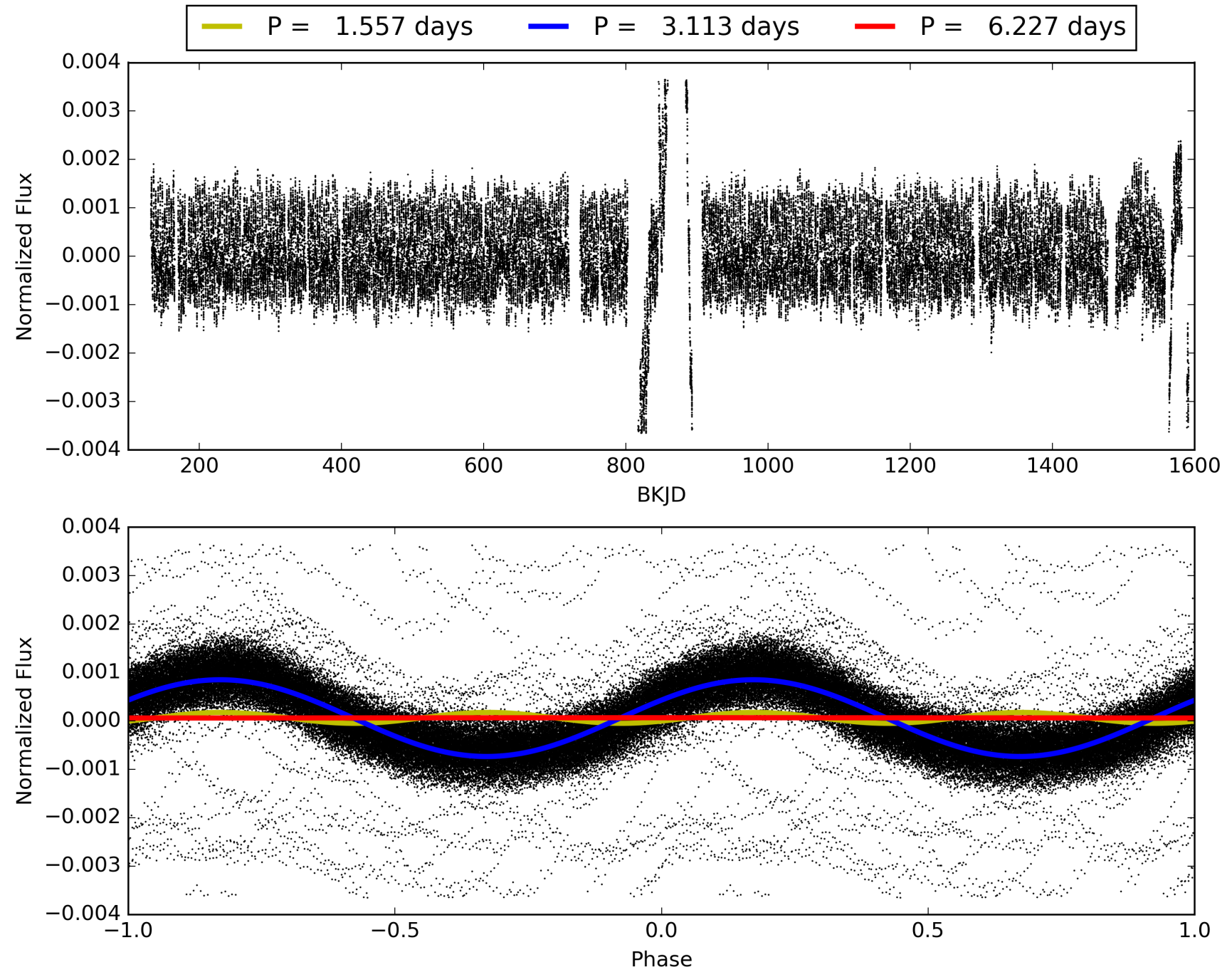
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 10:34:43 Z

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

# TCE 005989391-01, PDC Light Curves

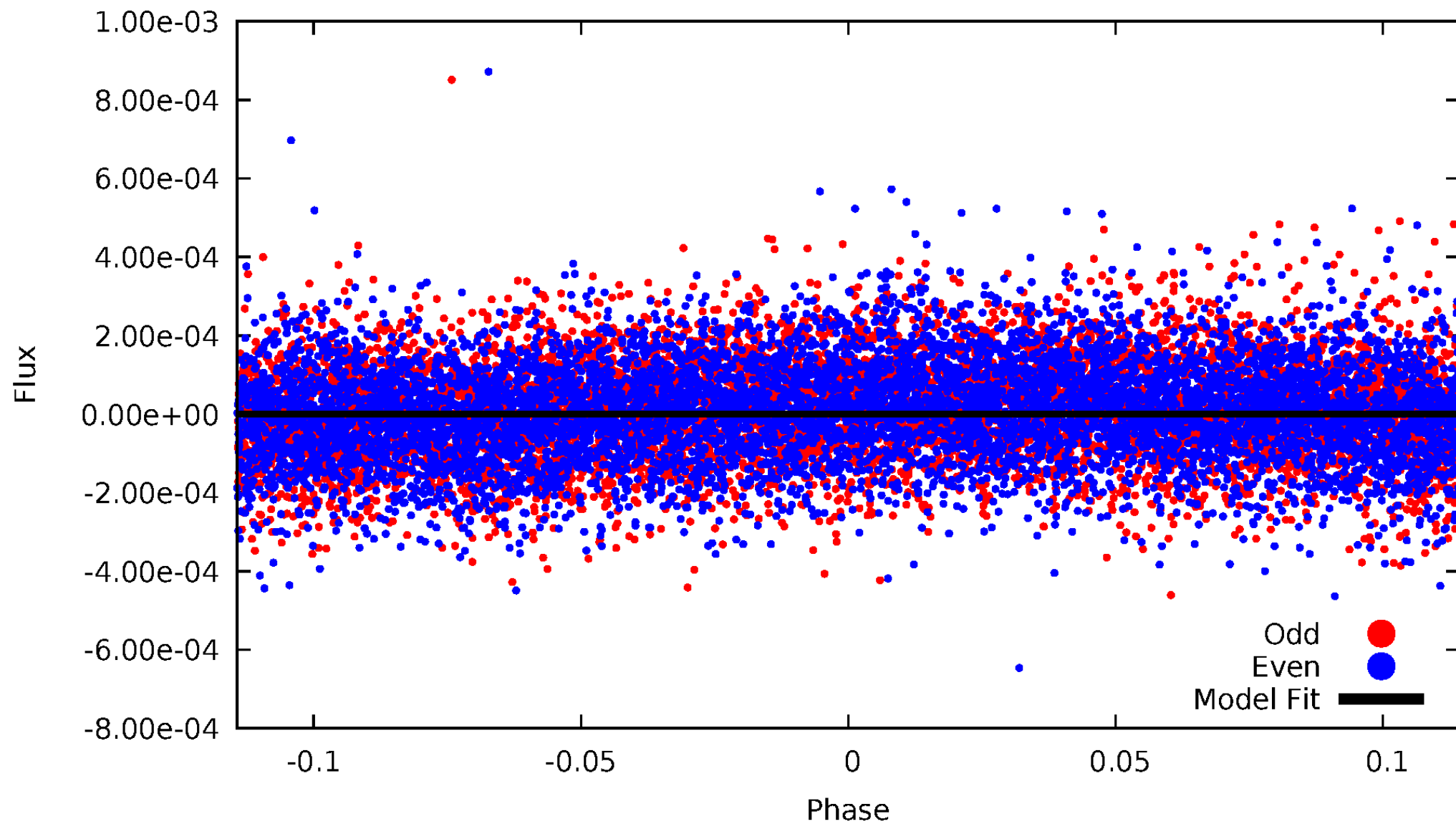


# TCE 005989391-01



# DV Odd/Even

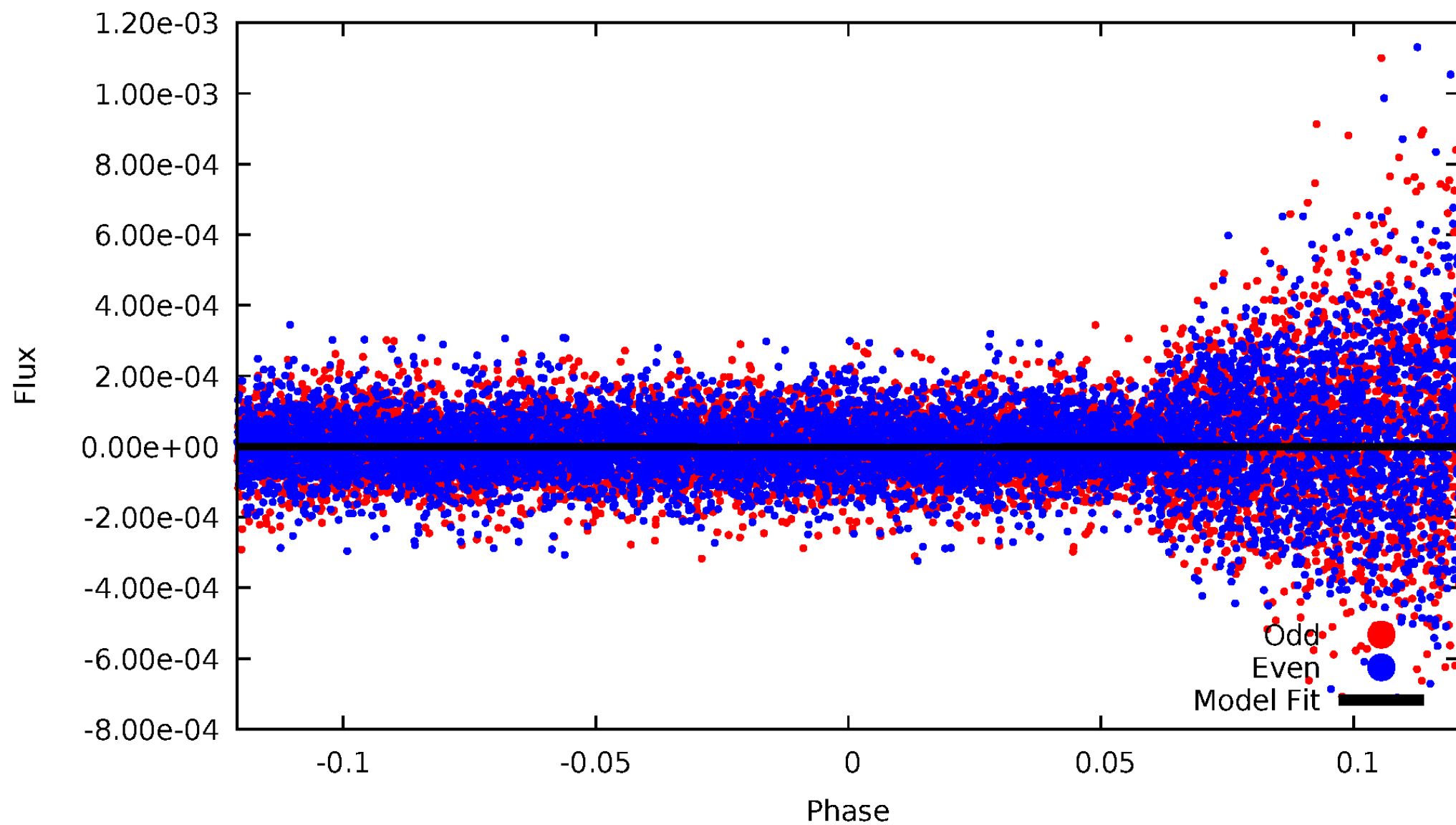
TCE 005989391-01





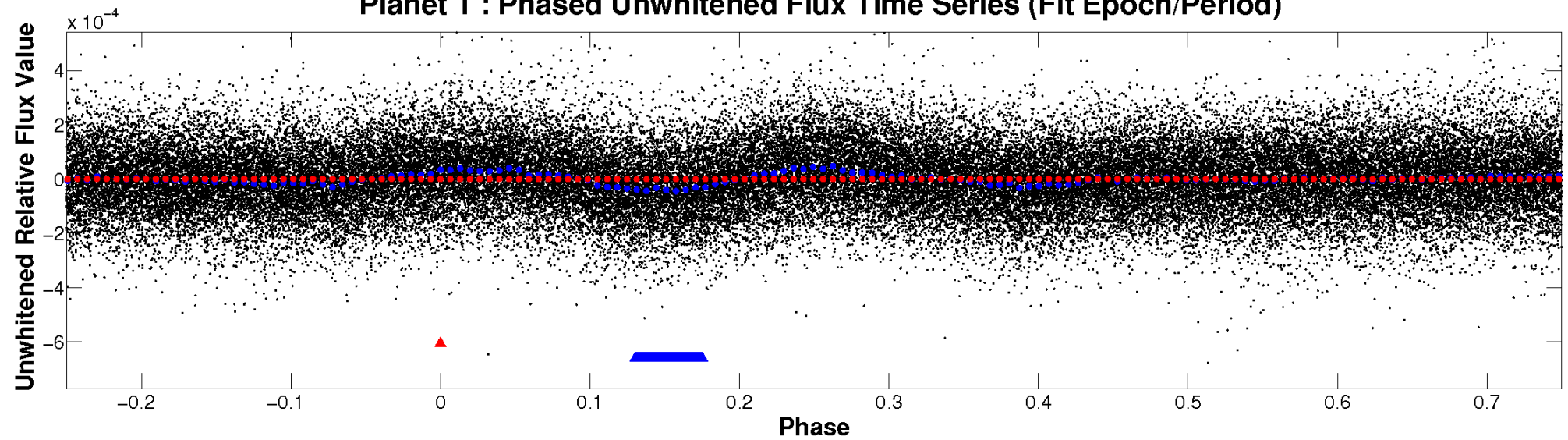
# ALT Odd/Even

TCE 005989391-01

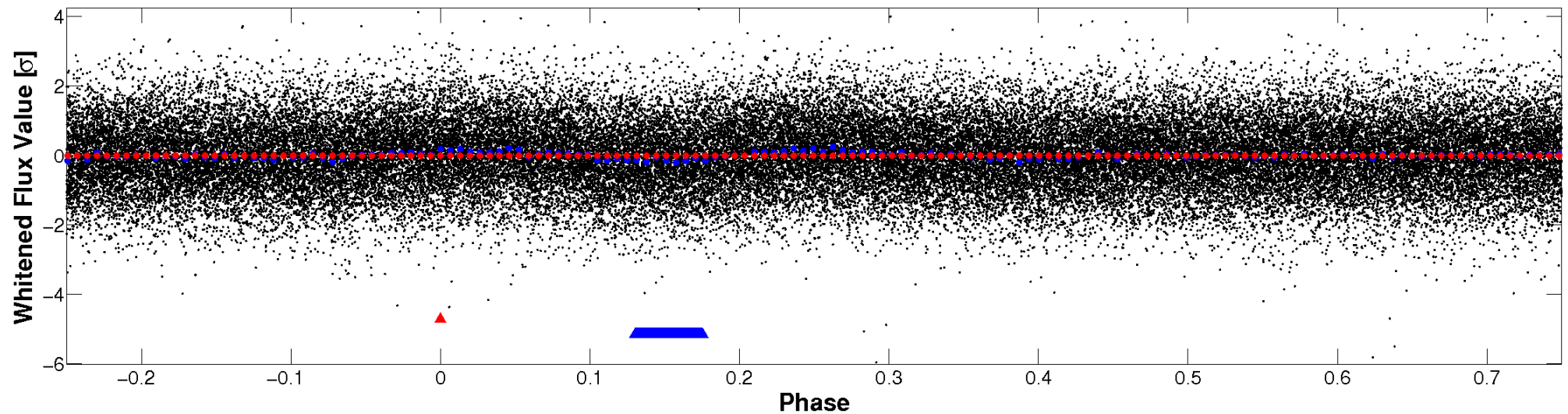


# Non-Whitened Vs. Whitened Light Curve

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

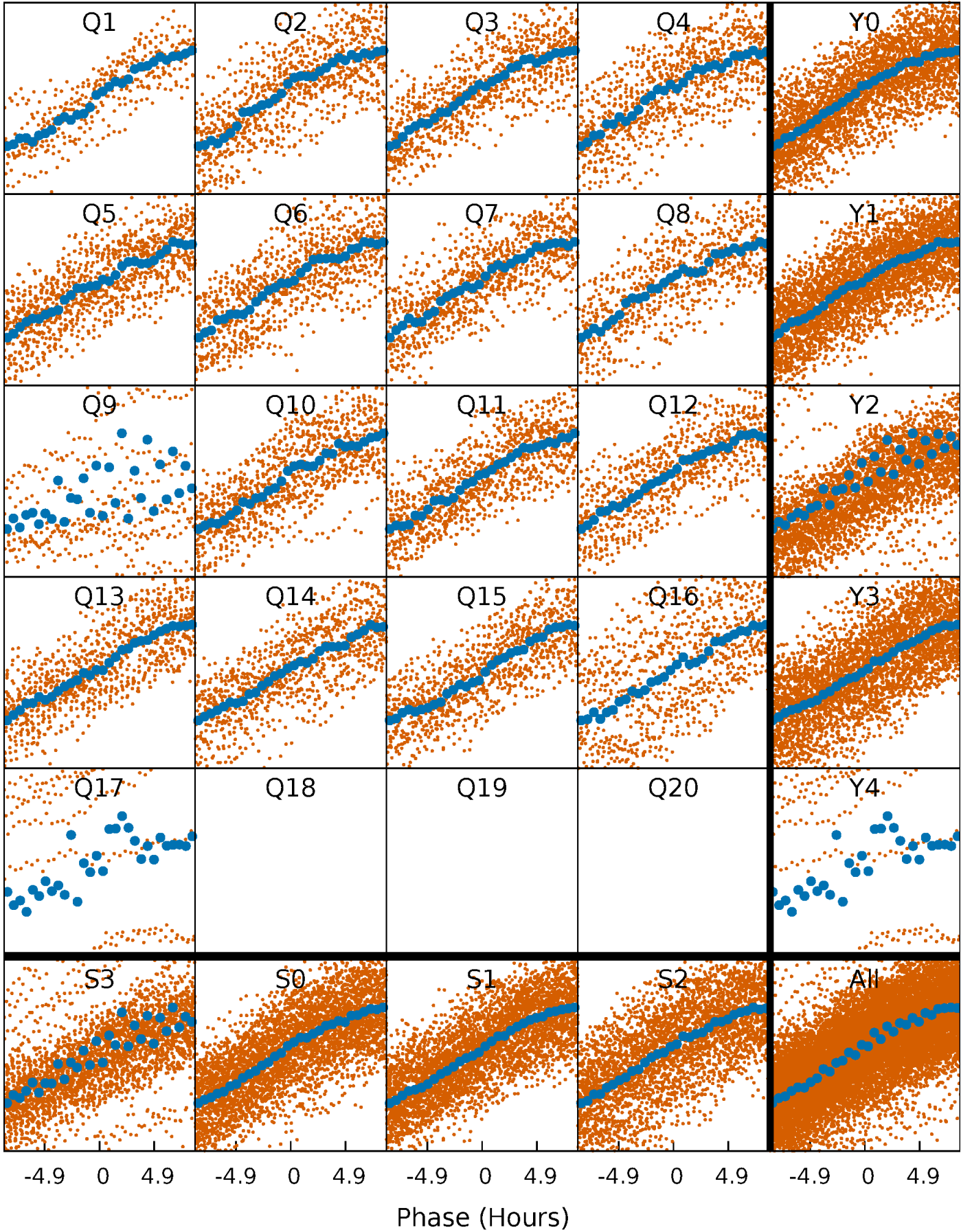


**Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



# PDC Quarter-Phased Transit Curves

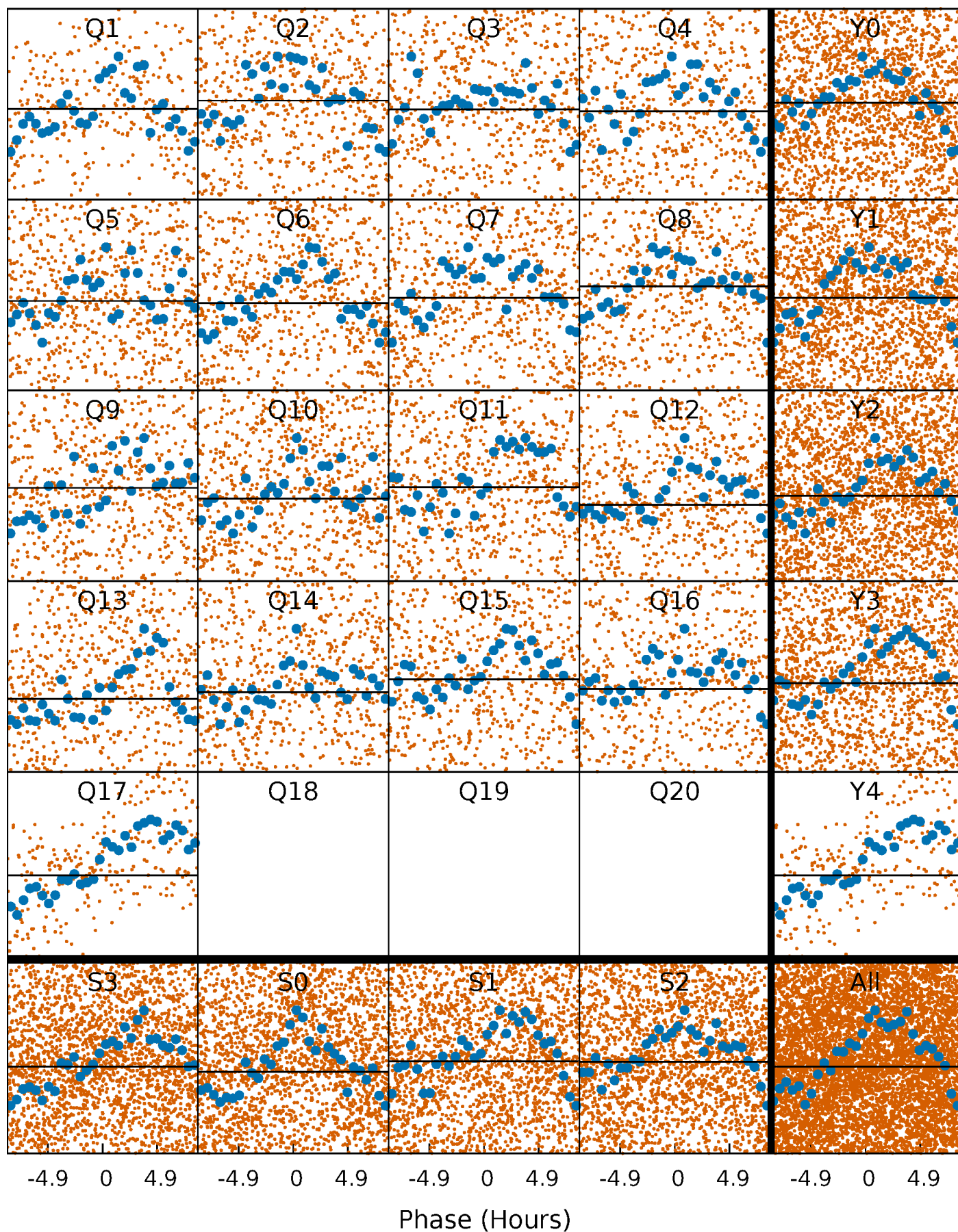
TCE 005989391-01   P= 3.113276 Days    $T_0=131.837471$  (BKJD)





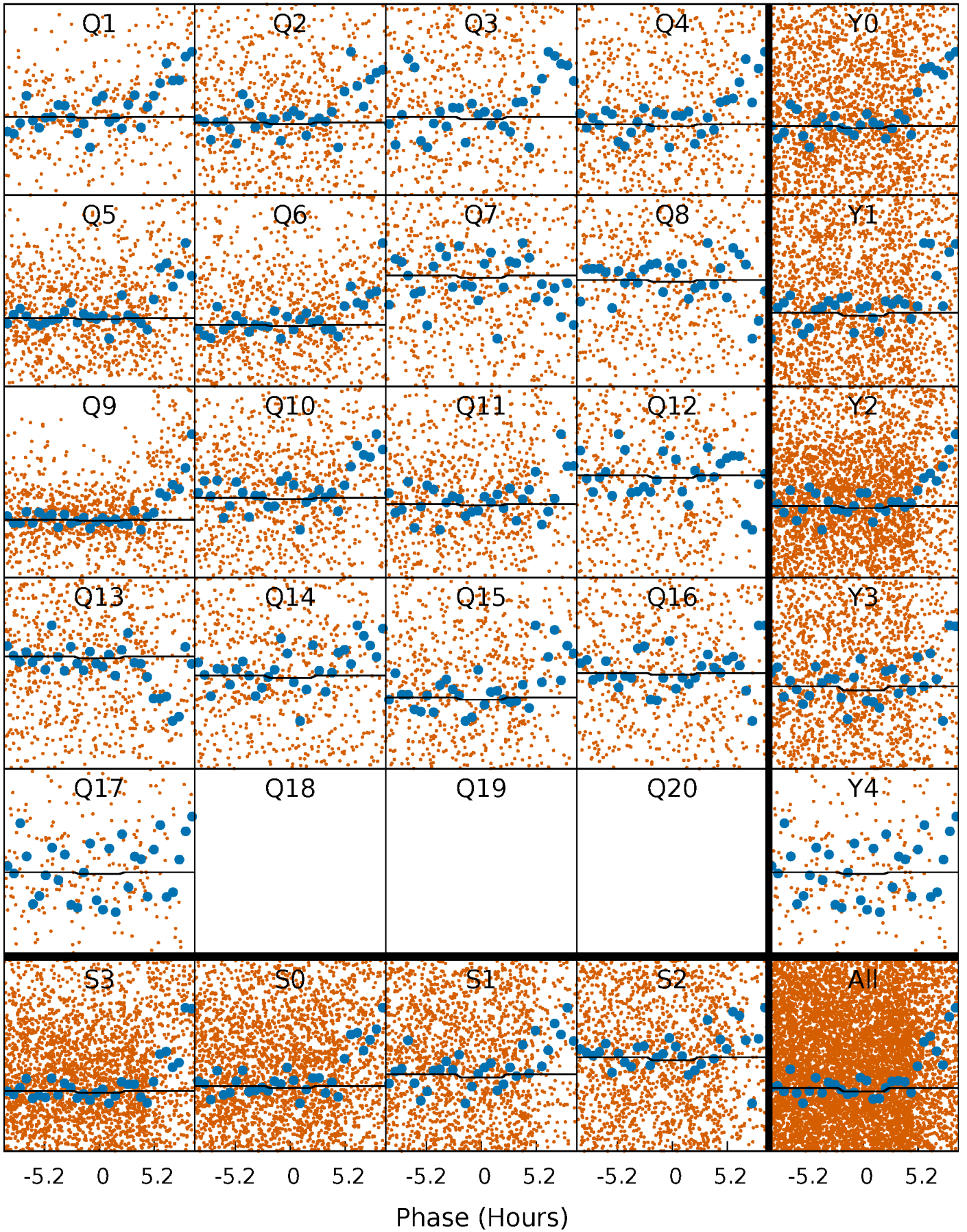
# DV Quarter-Phased Transit Curves

TCE 005989391-01   P= 3.113276 Days    $T_0=131.837471$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

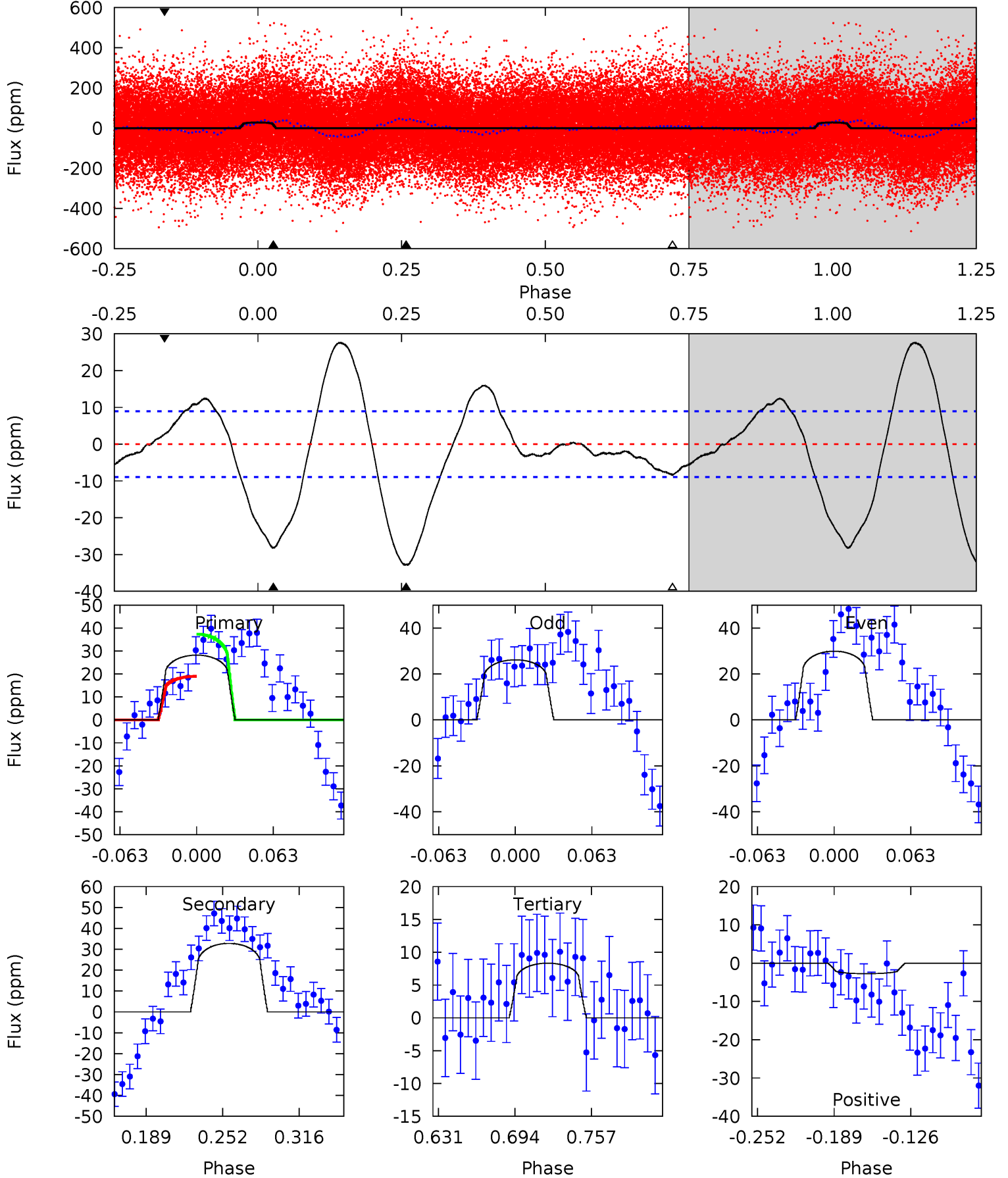
TCE 005989391-01 P= 3.113366 Days  $T_0=131.843166$  (BKJD)



# DV Model-Shift Uniqueness Test

005989391-01, P = 3.113276 Days, E = 128.724195 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
14.7	17.1	4.33	1.43	4.66	1.86	4.63	10.3	13.2	12.7	15.6	0.98	1.06	0.46	4.77

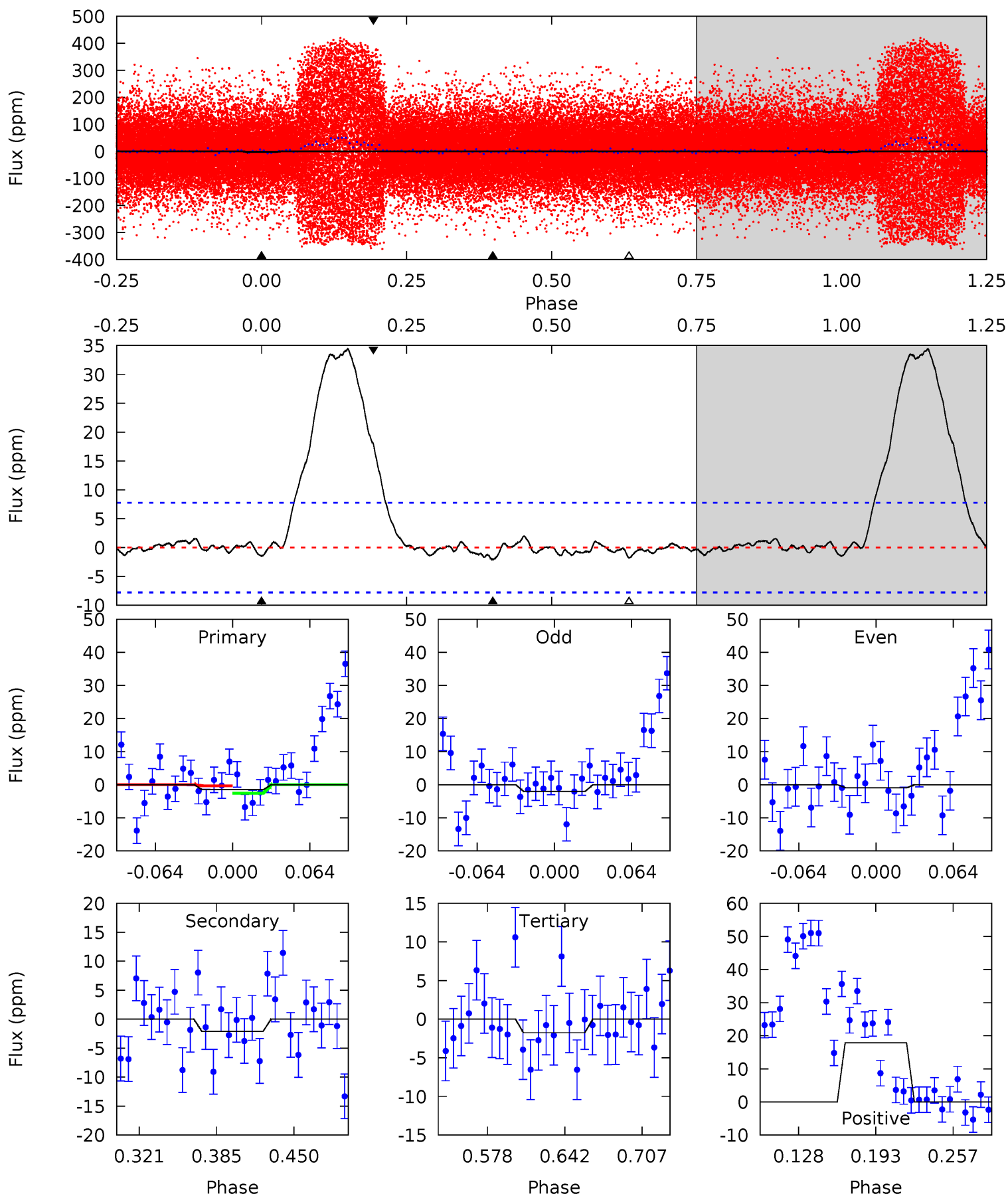




# Alt Model-Shift Uniqueness Test

005989391-01, P = 3.113366 Days, E = 128.729800 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
0.88	1.25	1.06	10.8	4.66	1.85	6.02	-0.17	-9.88	0.20	-9.51	0.34	1.35	0.94	0.62



### Stellar Parameters For KIC 005989391

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6642^{+179}_{-199}$	$3.585^{+0.345}_{-0.115}$	$-0.740^{+0.350}_{-0.300}$	$3.203^{+0.558}_{-1.394}$	$1.439^{+0.192}_{-0.384}$	$0.062^{+0.186}_{-0.018}$
	+3%/-3%	+10%/-3%	+47%/-41%	+17%/-44%	+13%/-27%	+302%/-29%
Source	PHO1	FLK73	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 005989391-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-33 \pm 2$	$9.70^{+11.22}_{-7.09}$	$3305^{+272}_{-323}$	$2888^{+2637}_{-6025}$	$0.441^{+5.462}_{-0.350}$
Alt.	$-2 \pm 2$	$9.65^{+11.63}_{-6.65}$	$3326^{+243}_{-338}$	$-3194^{+746}_{-199}$	$0.019^{+0.227}_{-0.018}$

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



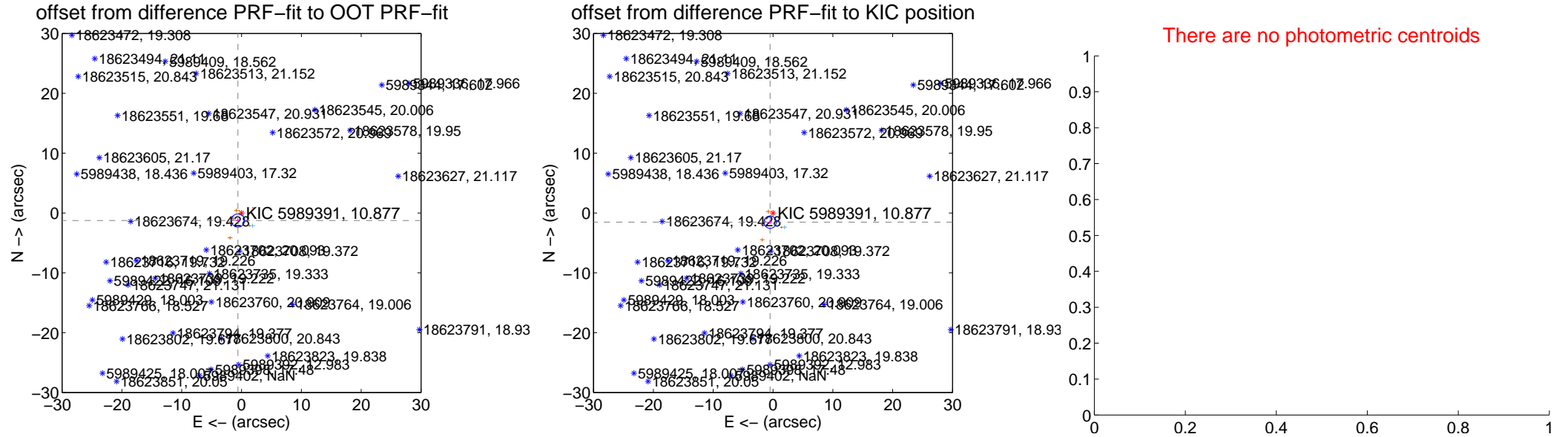
## DV Centroid Data

Supplemental centroid analysis for 005989391-01. **Kepler magnitude: 10.88.** Transit SNR 0.00

**There are 2 quarters with good PRF difference image offsets**

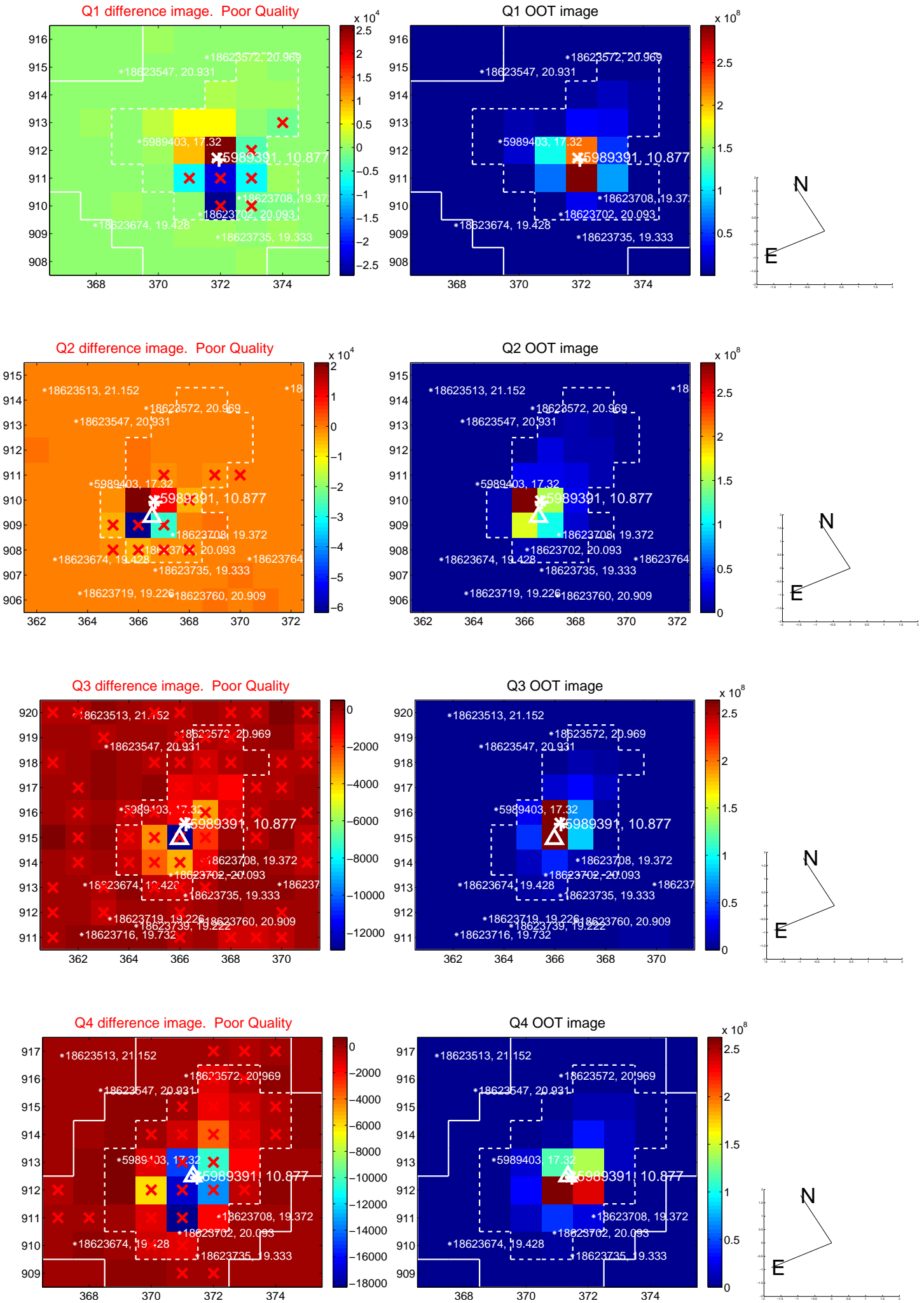
The direct PRF centroid is offset from the target star catalog position by about 0.29 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b>1.389 <math>\pm</math> 0.370</b>	<b>3.75</b>	0.599 $\pm$ 0.335	-1.254 $\pm$ 0.336
PRF-fit source offset from KIC position	<b>1.608 <math>\pm</math> 0.343</b>	<b>4.68</b>	0.490 $\pm$ 0.329	-1.531 $\pm$ 0.324
photometric centroid source offset	—	—	—	—

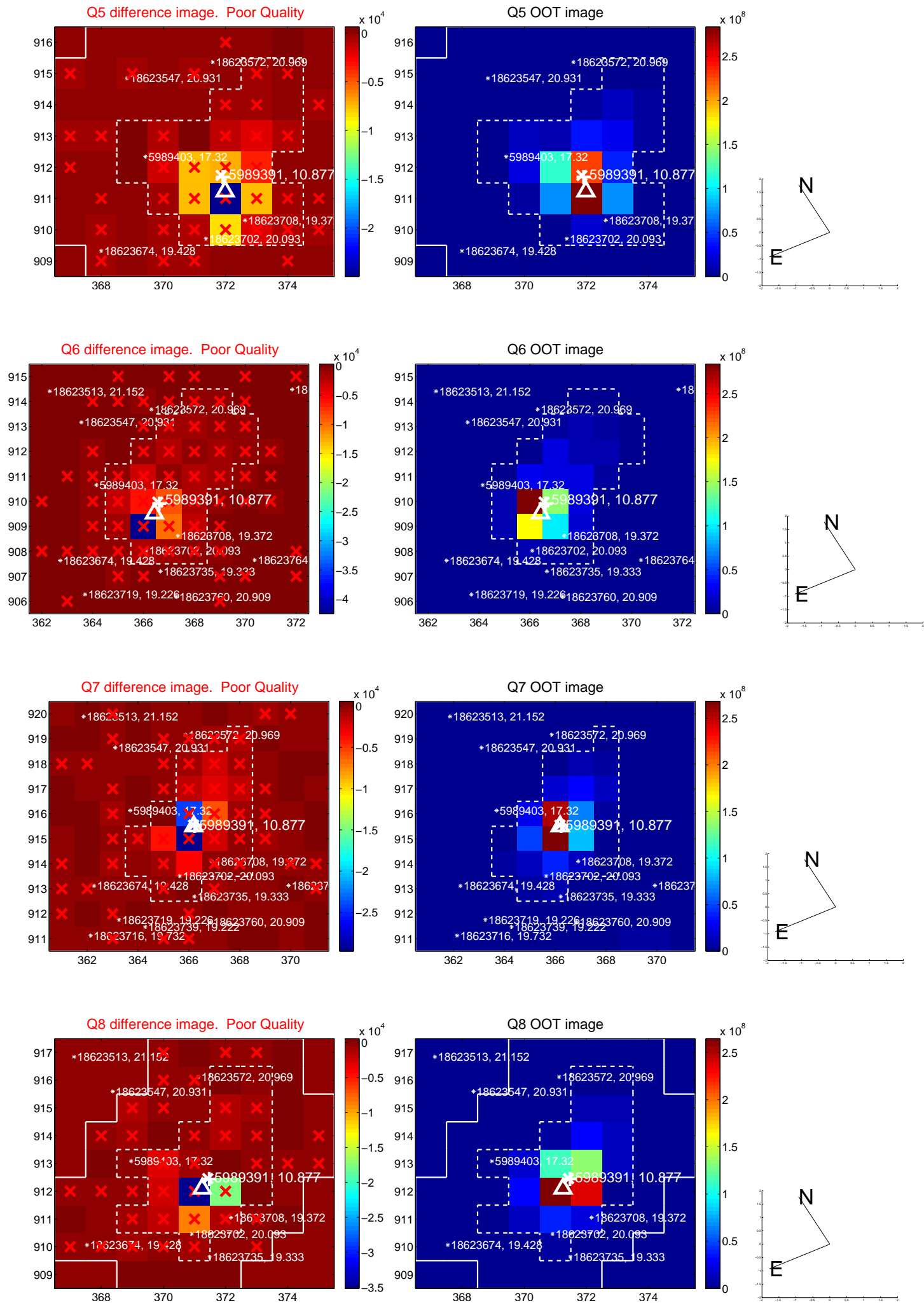


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

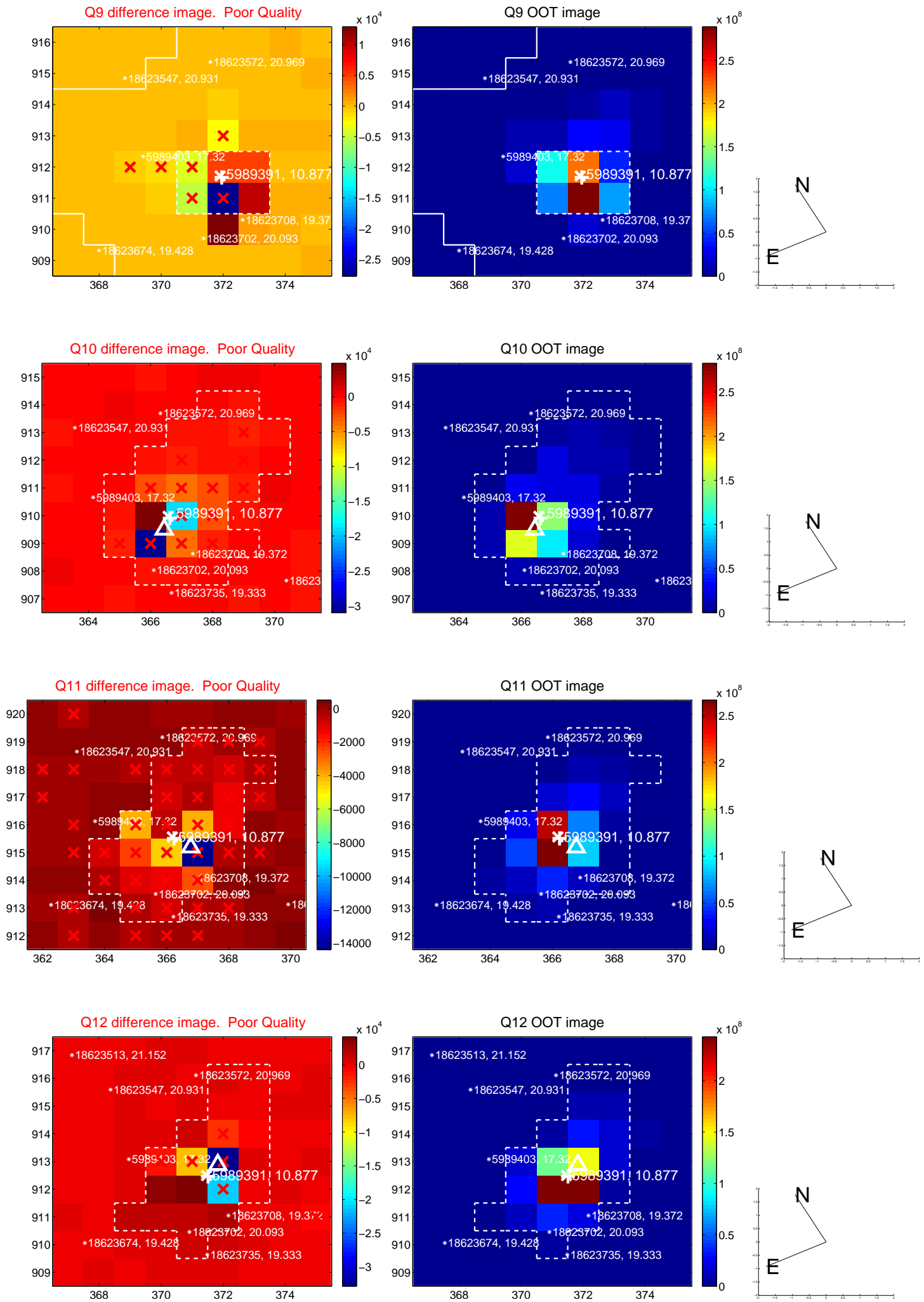
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



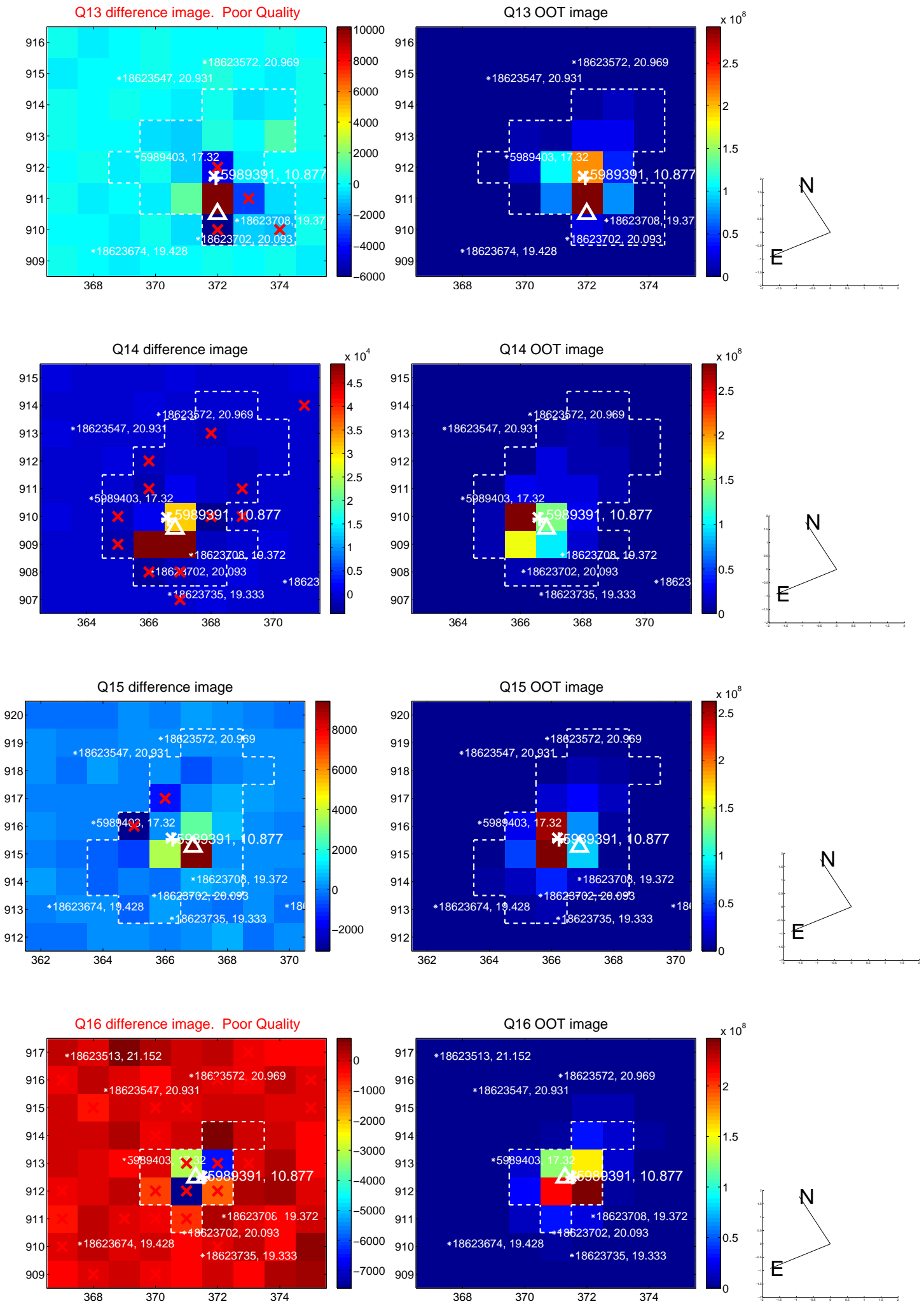
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

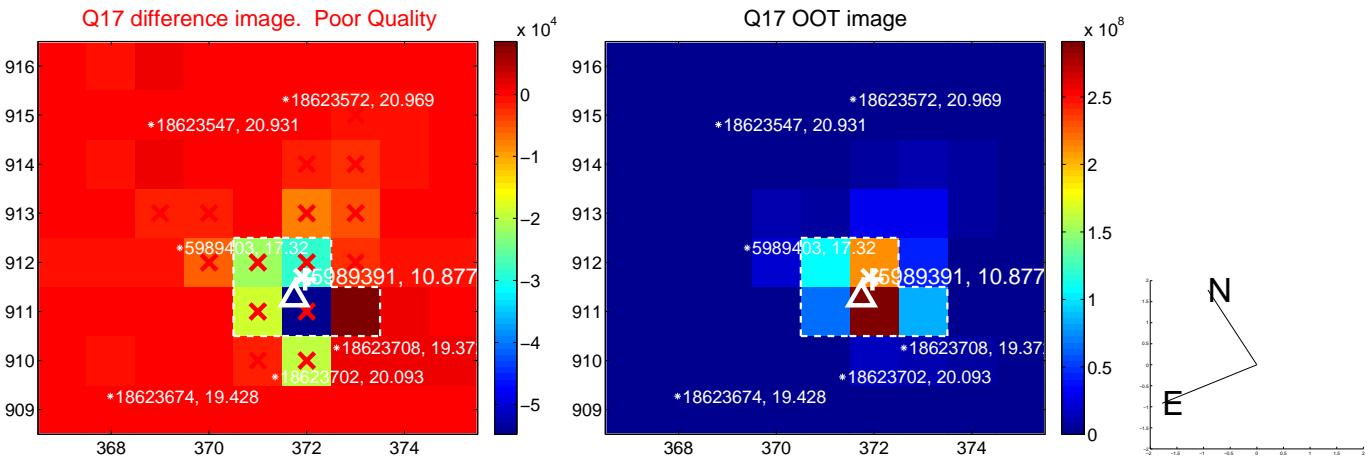


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



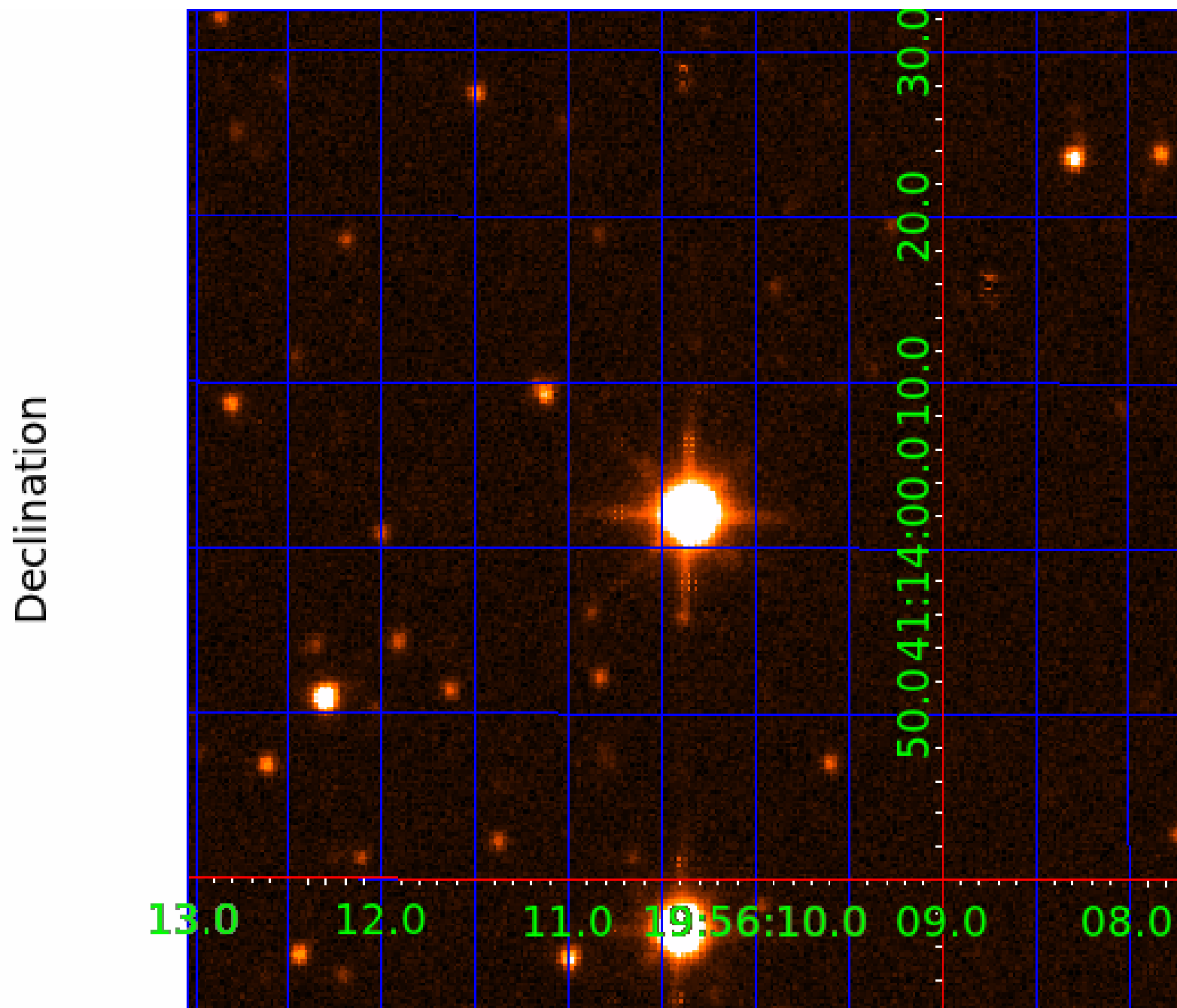


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



folded centroid time series figure for this object.

UKIRT Image



# KIC 005989391

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005989391-01	OBS	No	3.113276	131.837471	0.0	4.271	10.7	0.0	3.20	6642	0.02	8056.96
005989391-02	OBS	No	3.113575	132.243196	38.5	6.000	10.4	-1.0	3.20	6642	2.00	8055.93

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005989391-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—SWEET_NTL—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
005989391-02	OBS	FP	0.00	1	0	0	0	SWEET_NTL—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_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.

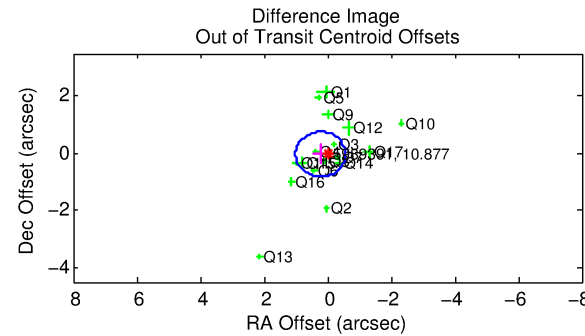
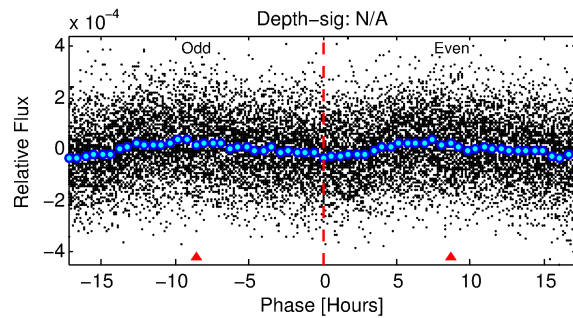
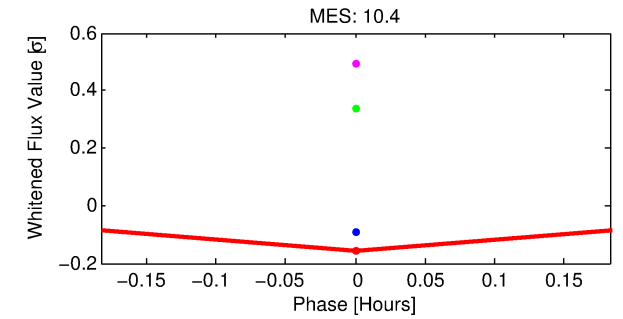
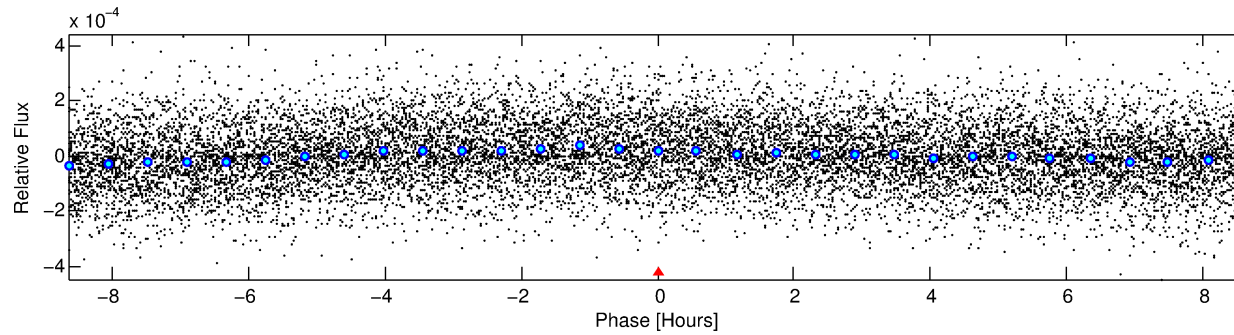
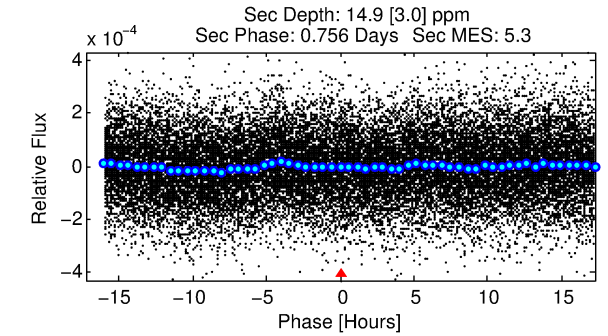
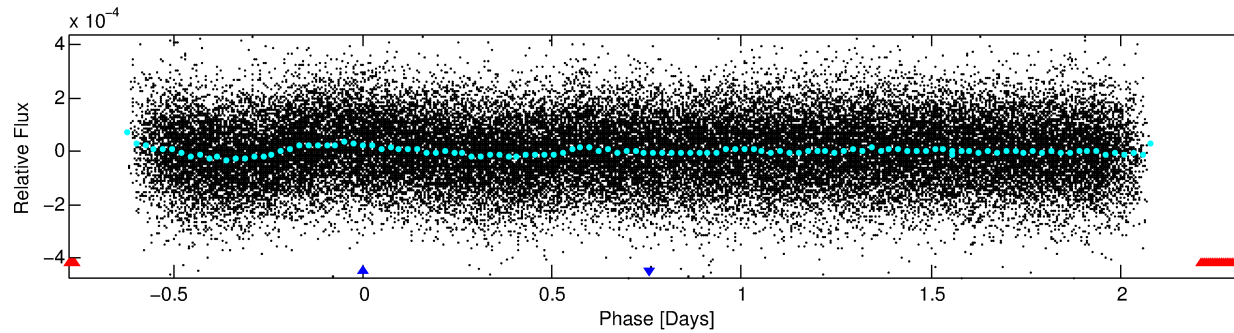
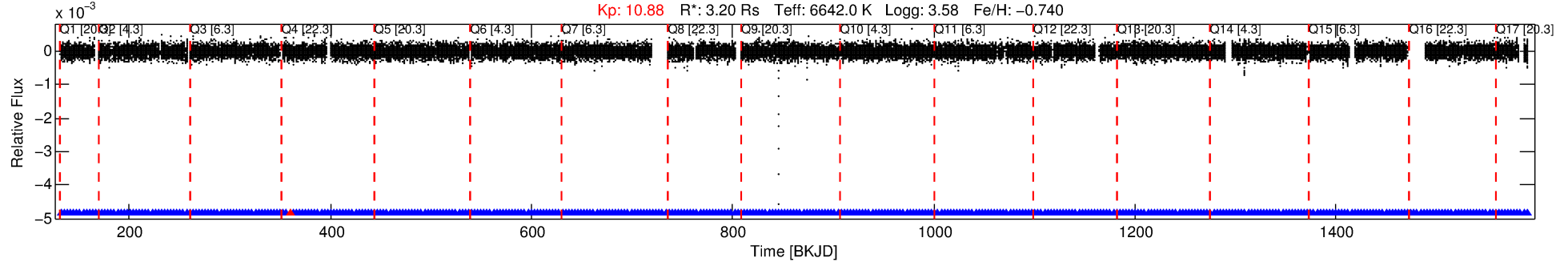
## Ephemeris Match Information For 005989391-02

No Significant Match Found

# DV One-Page Summary

KIC: 5989391 Candidate: 2 of 2 Period: 3.114 d  
KOI: K05221 Corr: No Ephemeris Match

Kp: 10.88 R\*: 3.20 Rs Teff: 6642.0 K Logg: 3.58 Fe/H: -0.740



TPS TCE Results:

Period = 3.11357 d  
Epoch = 132.2432 BKJD

DV fit results are unavailable

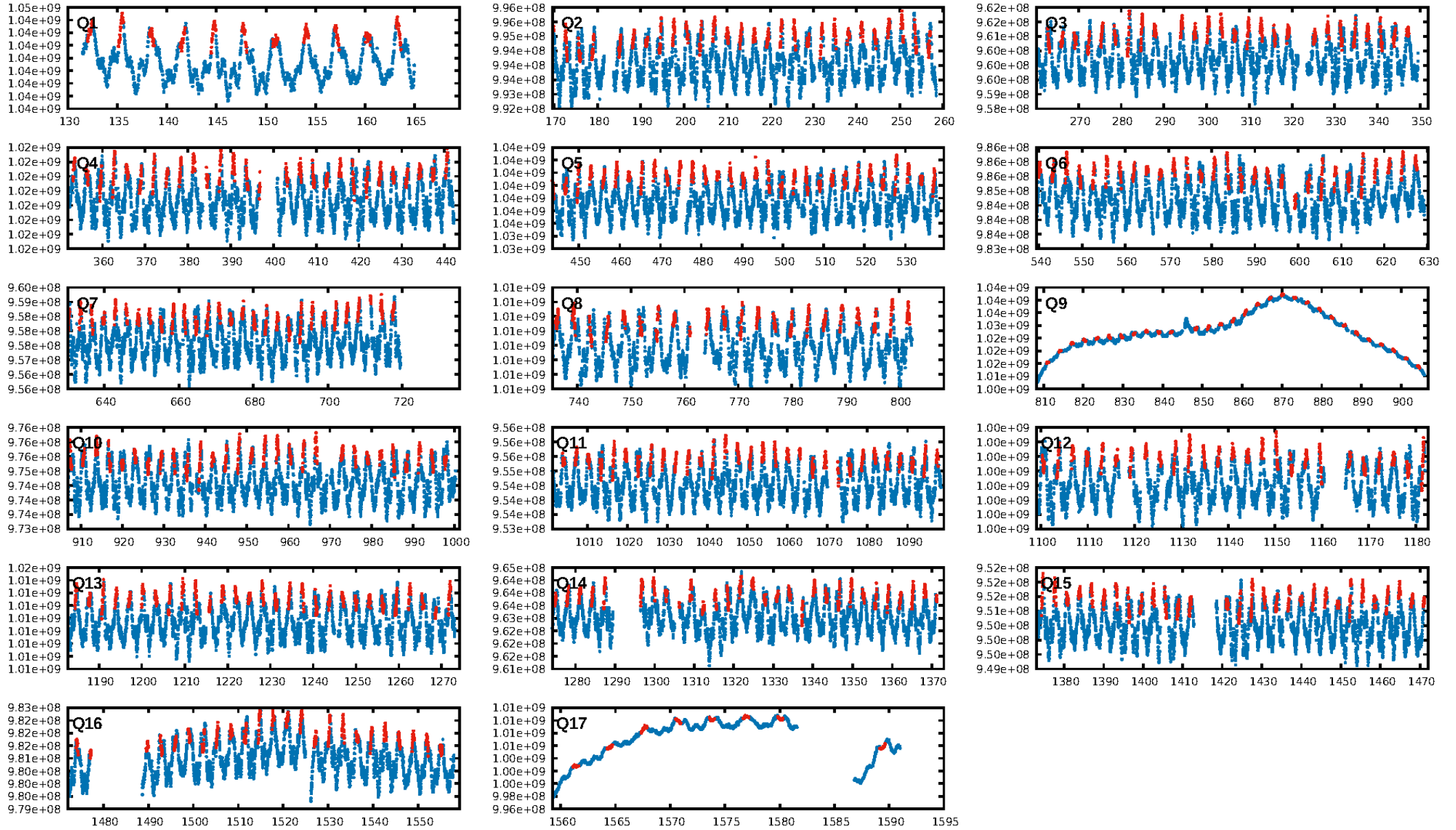
DV Diagnostic Results:

ShortPeriod-sig: 0.1% [0.00σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: N/A  
ModelChiSquareGof-sig: N/A  
Bootstrap-pfa: 1.59e-17  
RollingBand-fgt: 1.00 [415/416]  
GhostDiagnostic-chr: N/A  
Centroid-sig: N/A  
Centroid-so: N/A  
OotOffset-rm: 0.225 arcsec [0.86σ]  
KicOffset-rm: 0.265 arcsec [0.71σ]  
OotOffset-st: 4/4/4/5 [17]  
KicOffset-st: 4/4/4/5 [17]  
DiffImageQuality-fgm: 0.00 [0/17]  
DiffImageOverlap-fno: 1.00 [17/17]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 10:34:51 Z

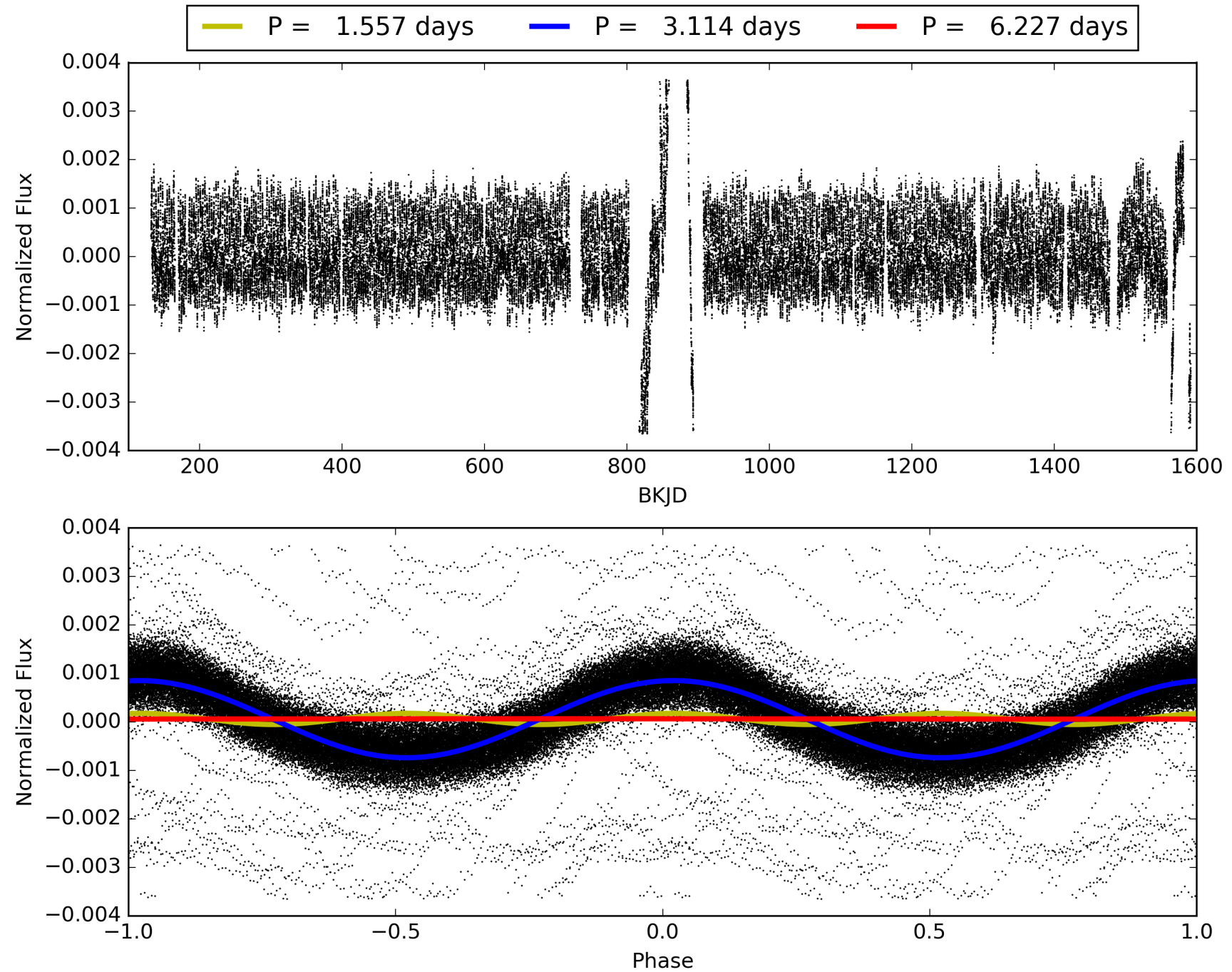
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 005989391-02, PDC Light Curves



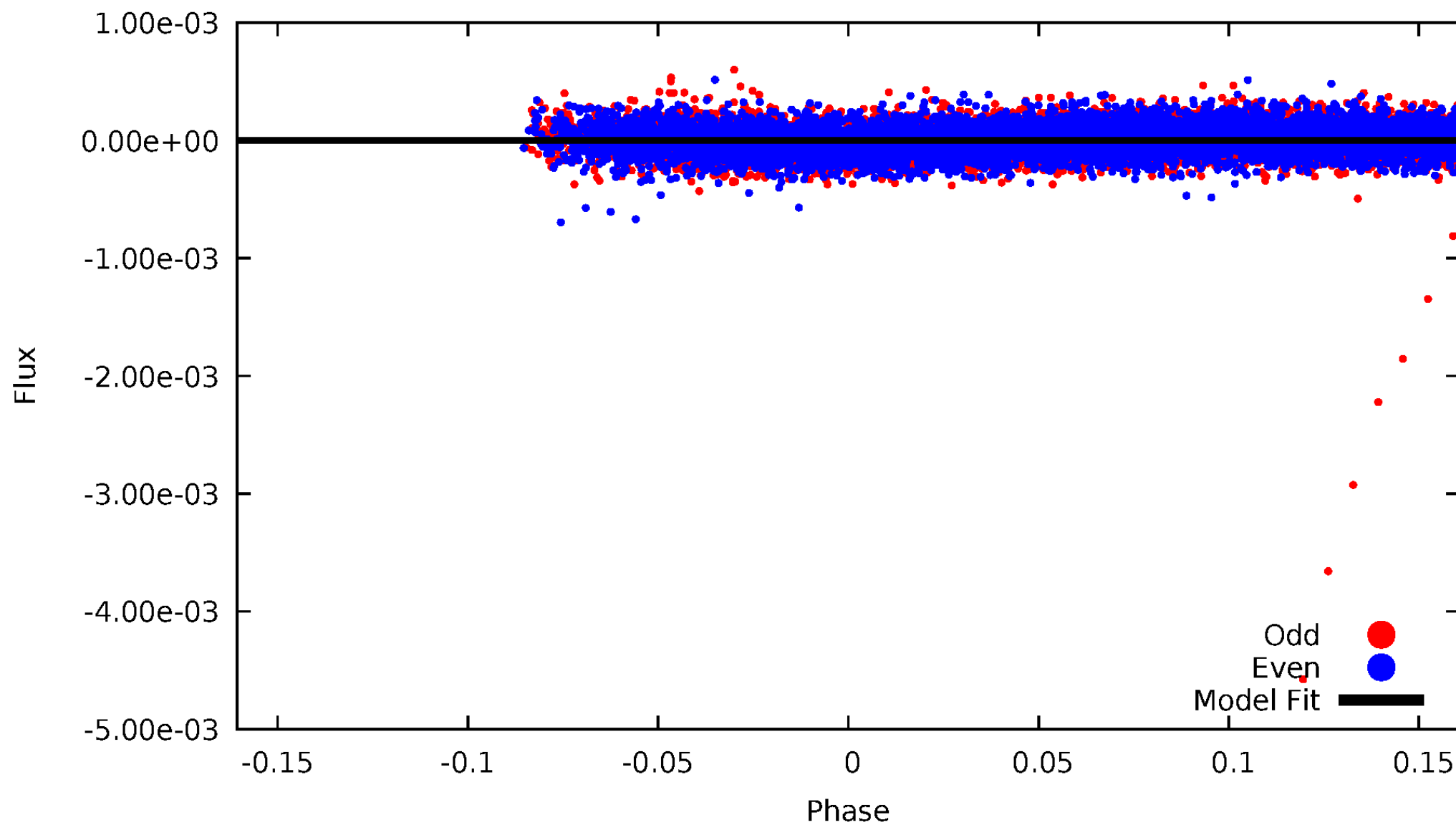


# TCE 005989391-02



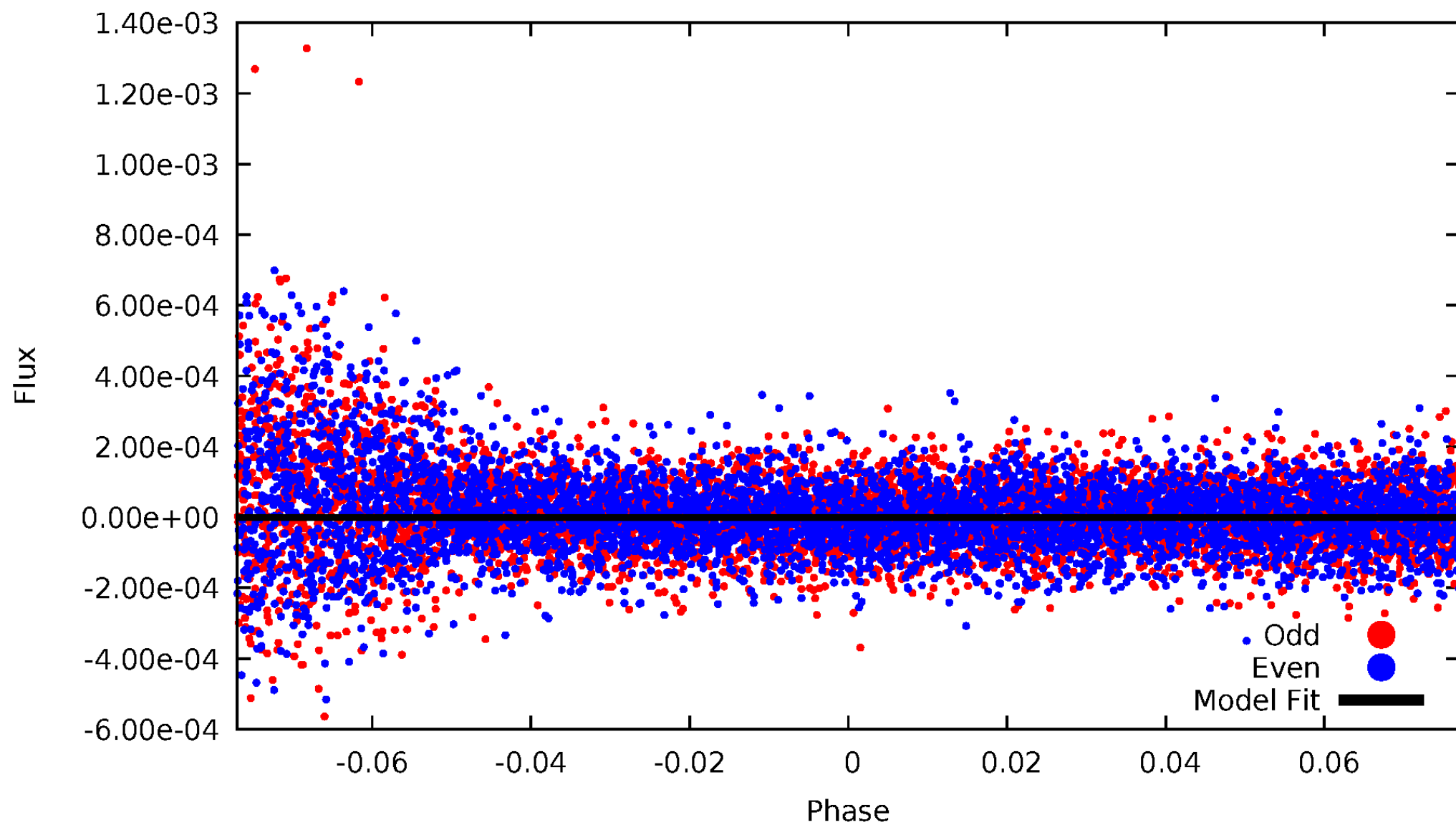
DV Odd/Even

TCE 005989391-02



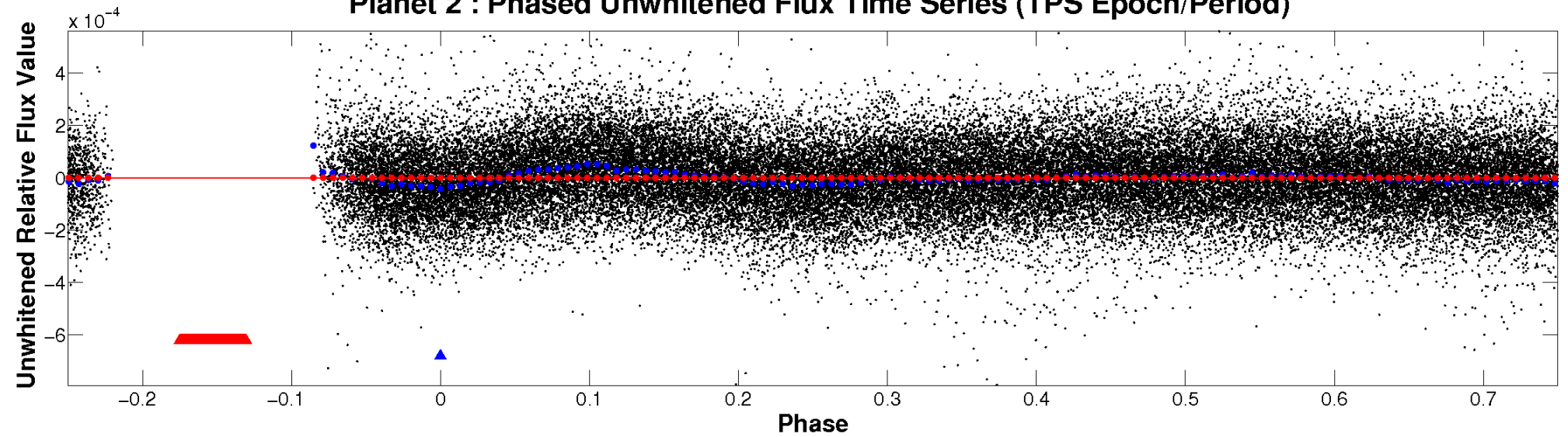
ALT Odd/Even

TCE 005989391-02

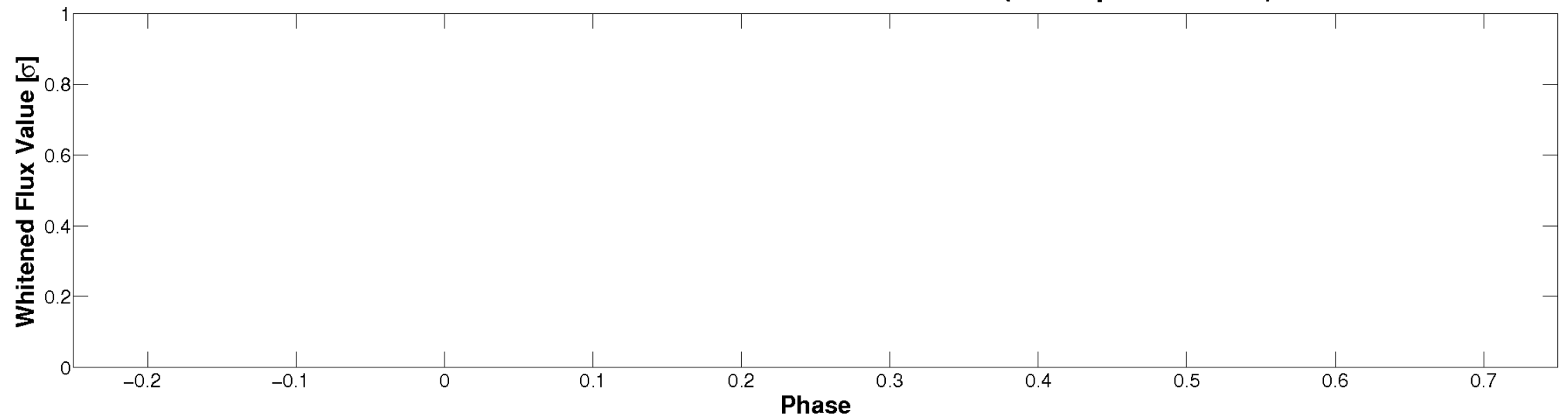


# Non-Whitened Vs. Whitened Light Curve

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

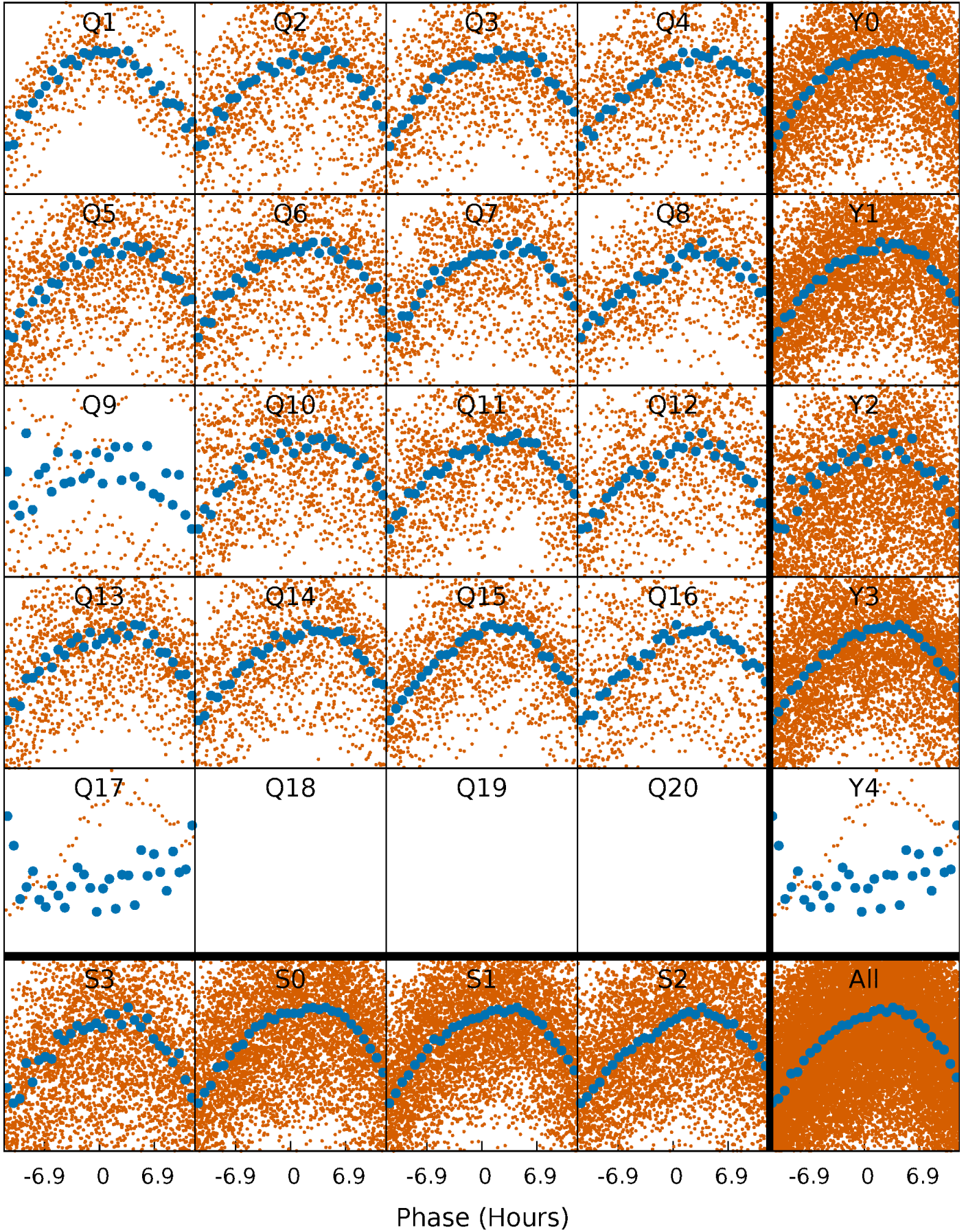


**Planet 2 : Phased Whitened Flux Time Series (TPS Epoch/Period)**



# PDC Quarter-Phased Transit Curves

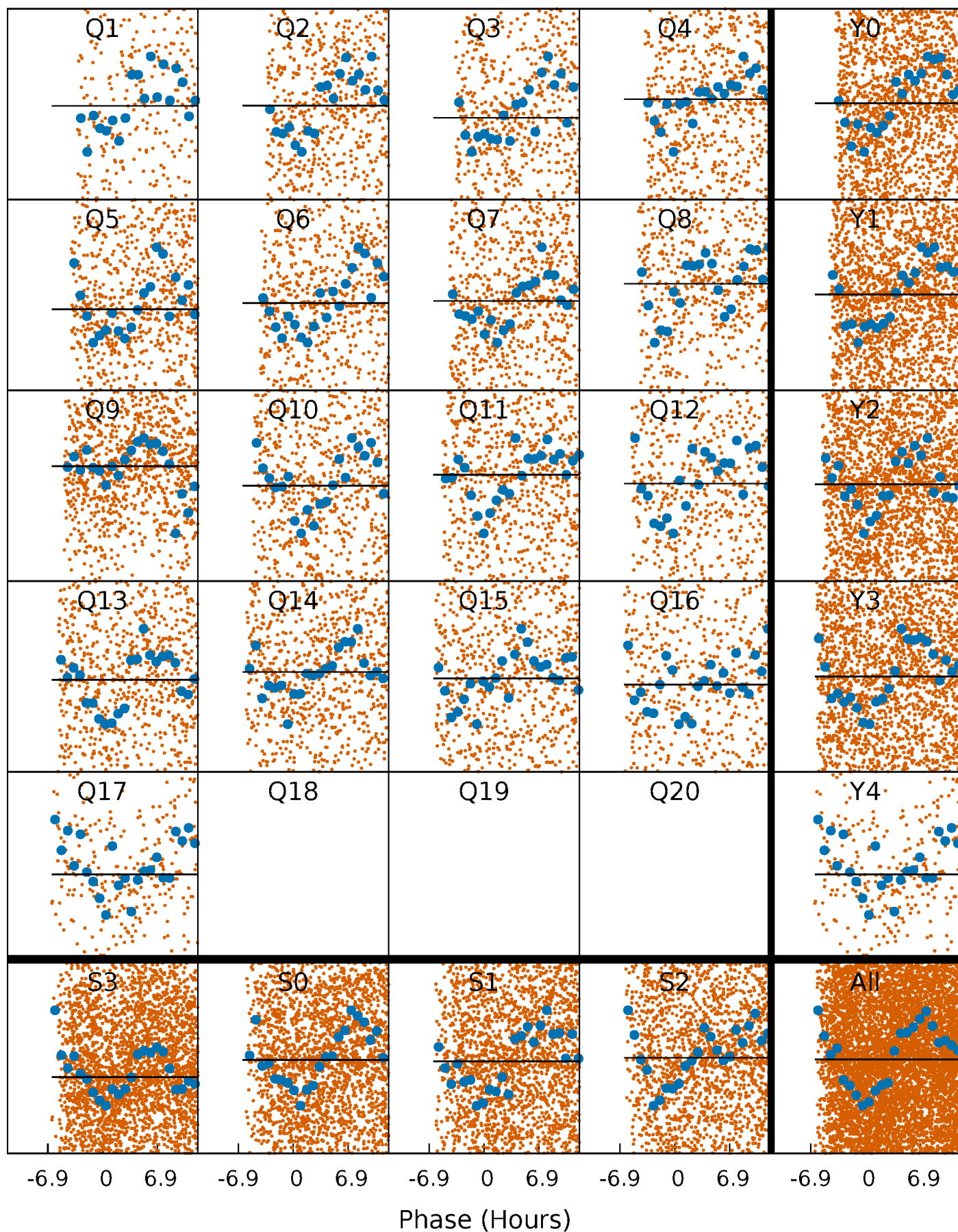
TCE 005989391-02   P= 3.113575 Days    $T_0=132.243196$  (BKJD)





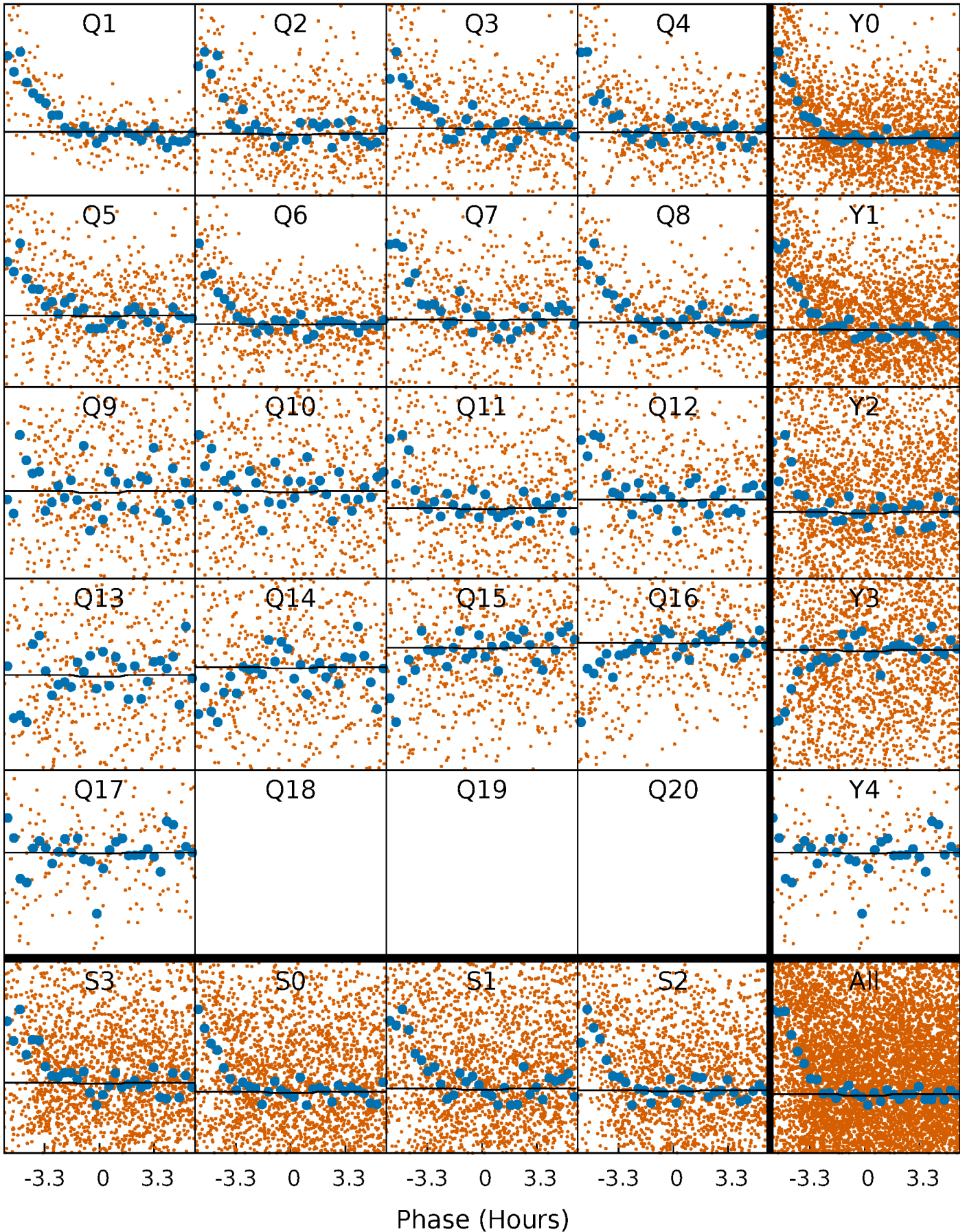
# DV Quarter-Phased Transit Curves

TCE 005989391-02     $P = 3.113575$  Days     $T_0 = 132.243196$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

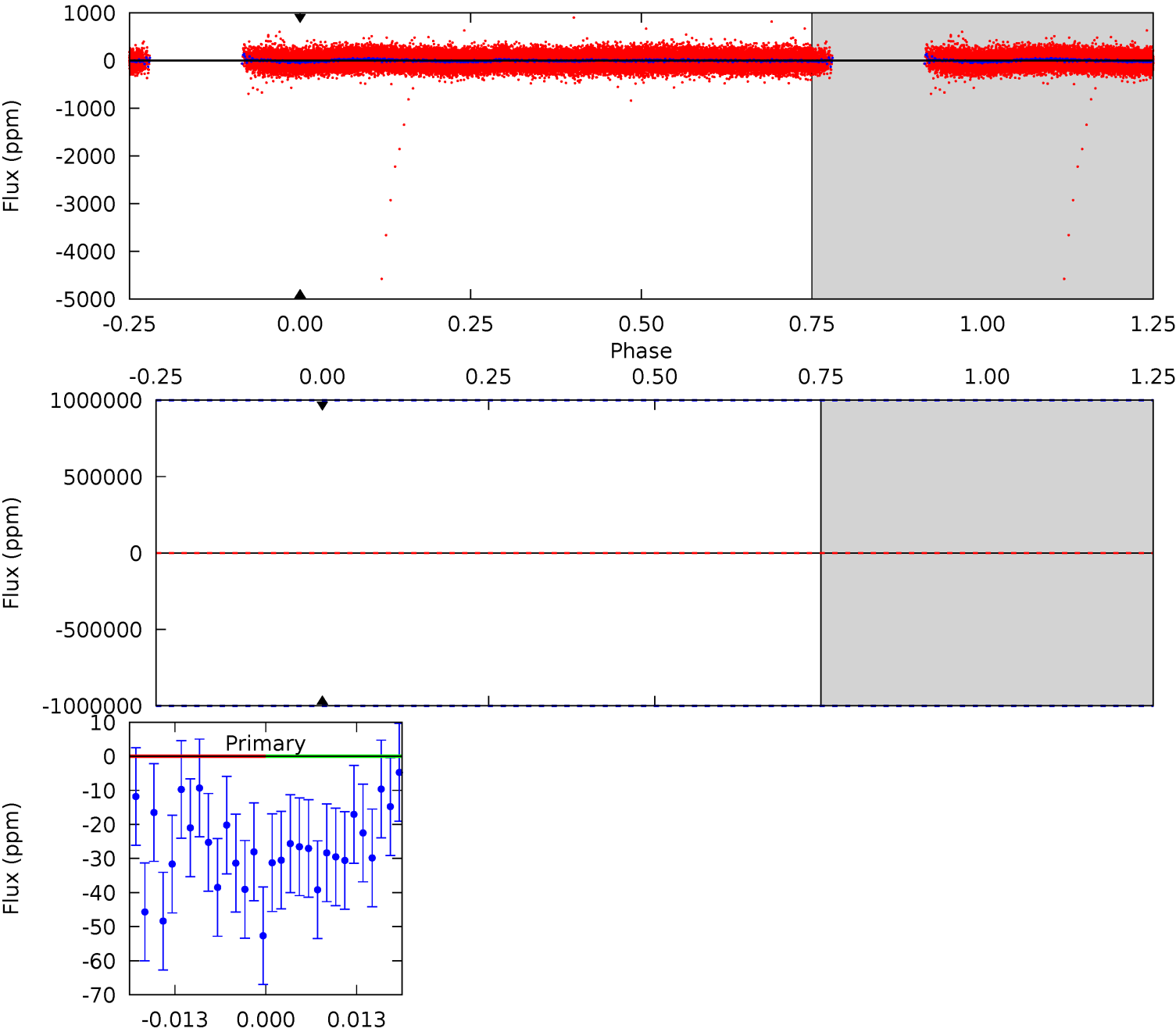
TCE 005989391-02     $P = 3.113575$  Days     $T_0 = 132.596711$  (BKJD)



DV Model-Shift Uniqueness Test

005989391-02, P = 3.113575 Days, E = 129.129621 Days

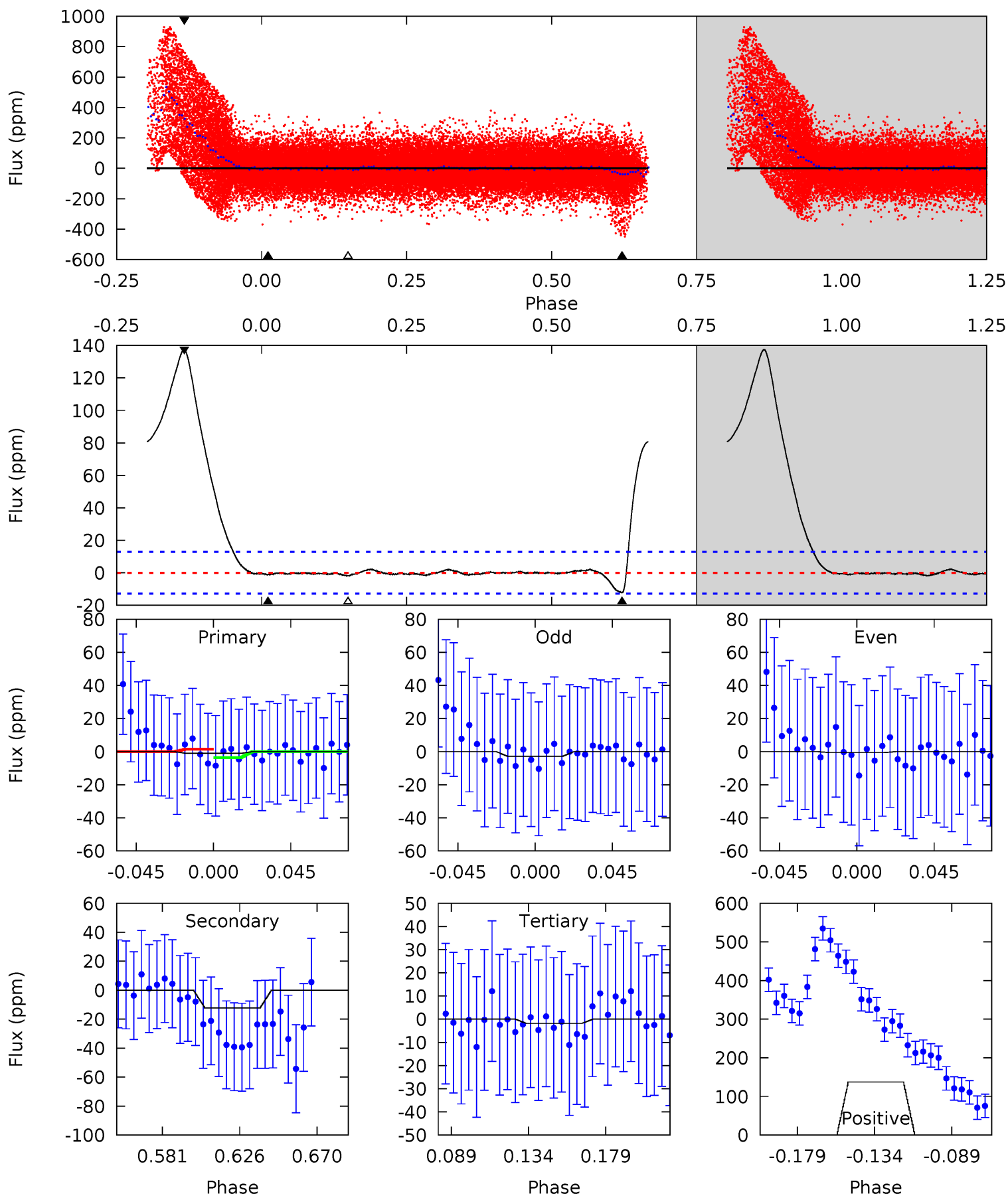
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
0	0	0	0	1.00	1.00	1.00	0	0	0	0	0	0	0	0



# Alt Model-Shift Uniqueness Test

005989391-02, P = 3.113575 Days, E = 129.483136 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
0.40	4.49	0.67	50.5	4.73	2.01	10.8	-0.27	-50.1	3.82	-46.0	0.50	0.15	0.92	0.61



### Stellar Parameters For KIC 005989391

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6642^{+179}_{-199}$	$3.585^{+0.345}_{-0.115}$	$-0.740^{+0.350}_{-0.300}$	$3.203^{+0.558}_{-1.394}$	$1.439^{+0.192}_{-0.384}$	$0.062^{+0.186}_{-0.018}$
	+3%/-3%	+10%/-3%	+47%/-41%	+17%/-44%	+13%/-27%	+302%/-29%
Source	PHO1	FLK73	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 005989391-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$0 \pm 1000000$	$21.85^{+23.93}_{-14.51}$	$3317^{+217}_{-343}$	$-5240^{+40536}_{-24101}$	$-3.139^{+519.735}_{-331.145}$
Alt.	$-12 \pm 3$	$21.19^{+23.99}_{-15.21}$	$3311^{+217}_{-334}$	$-3152^{+5825}_{-180}$	$0.033^{+0.370}_{-0.026}$

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



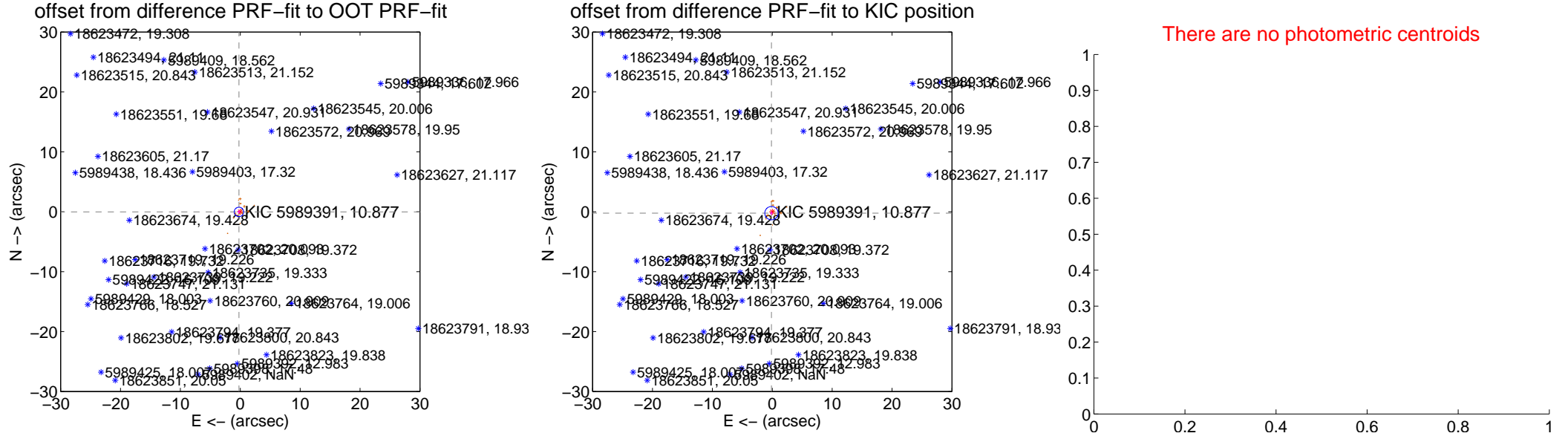
## DV Centroid Data

Supplemental centroid analysis for 005989391-02. **Kepler magnitude: 10.88.** Transit SNR -1.00

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

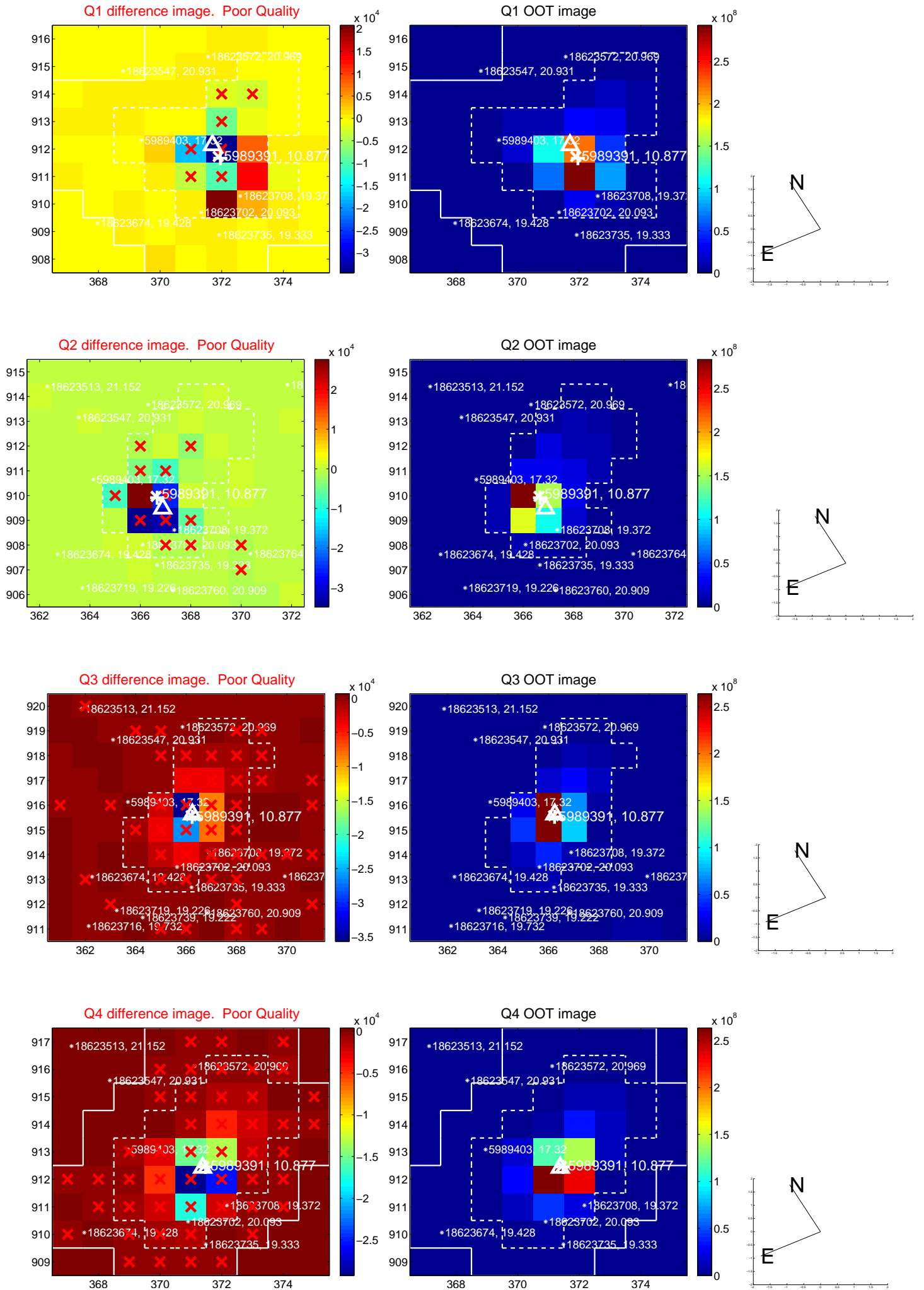
The direct PRF centroid is offset from the target star catalog position by about 0.29 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.225 \pm 0.262$	0.86	$0.224 \pm 0.246$	$-0.023 \pm 0.317$
PRF-fit source offset from KIC position	$0.265 \pm 0.372$	0.71	$0.131 \pm 0.240$	$-0.231 \pm 0.338$
photometric centroid source offset	—	—	—	—

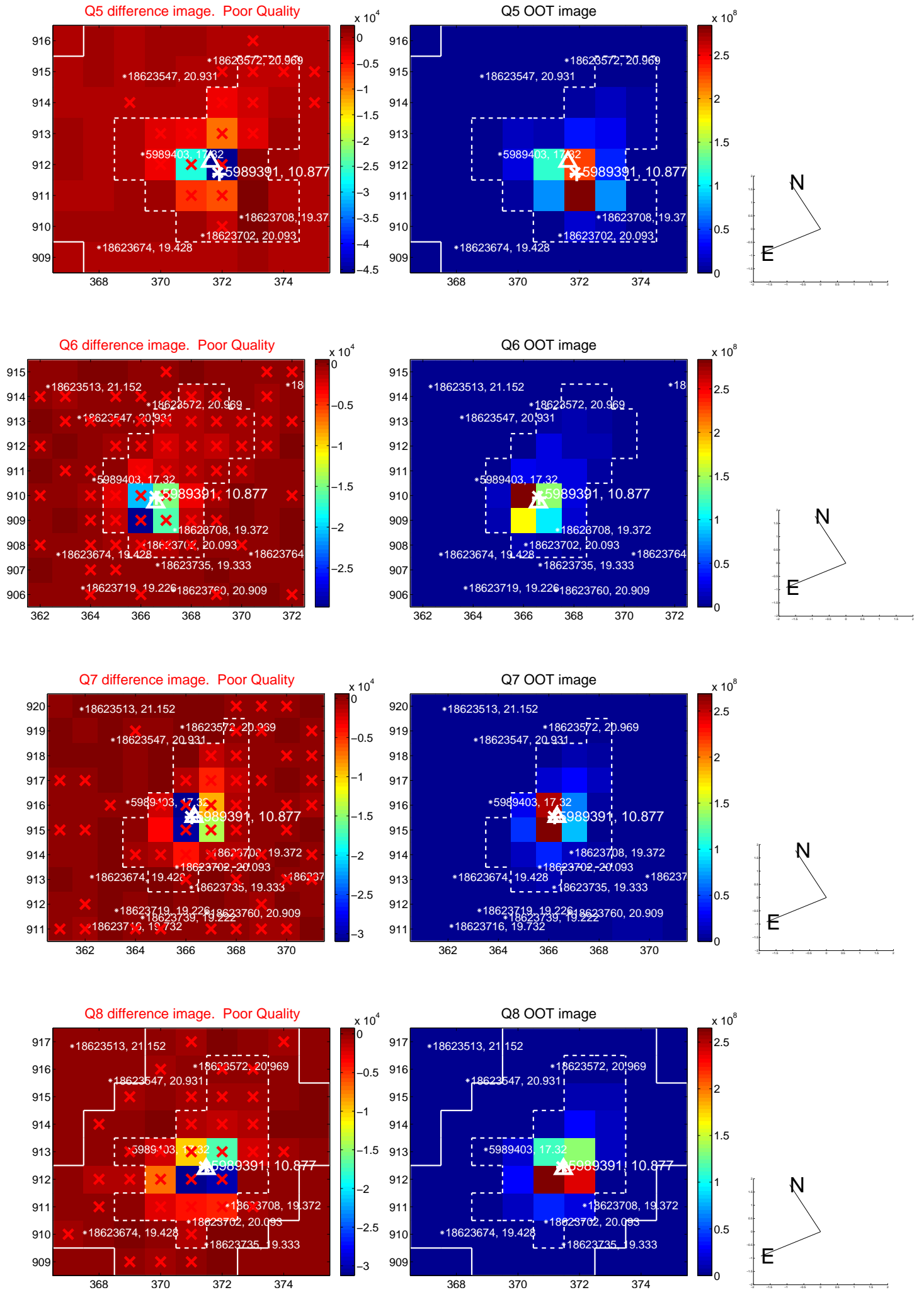


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

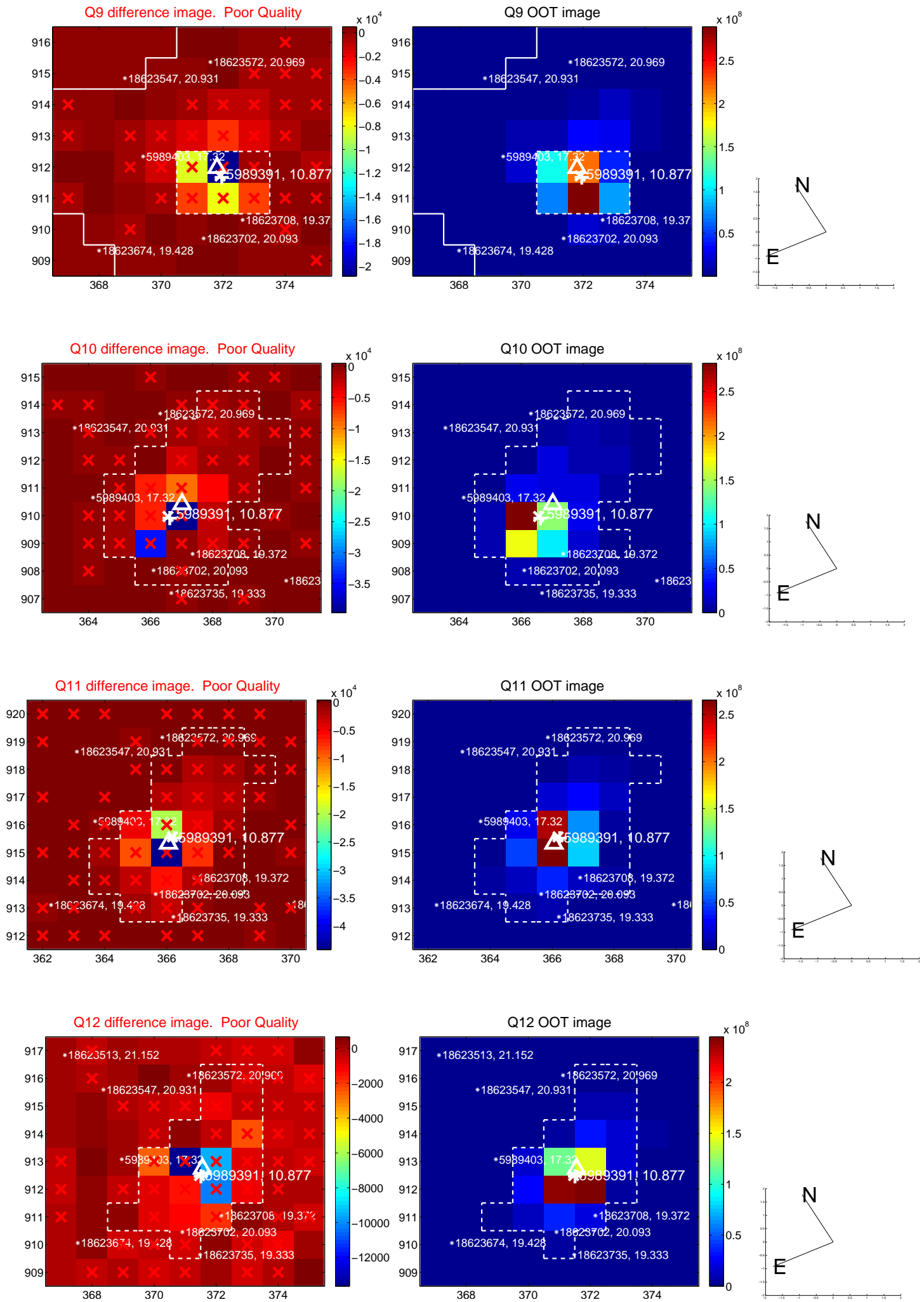
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



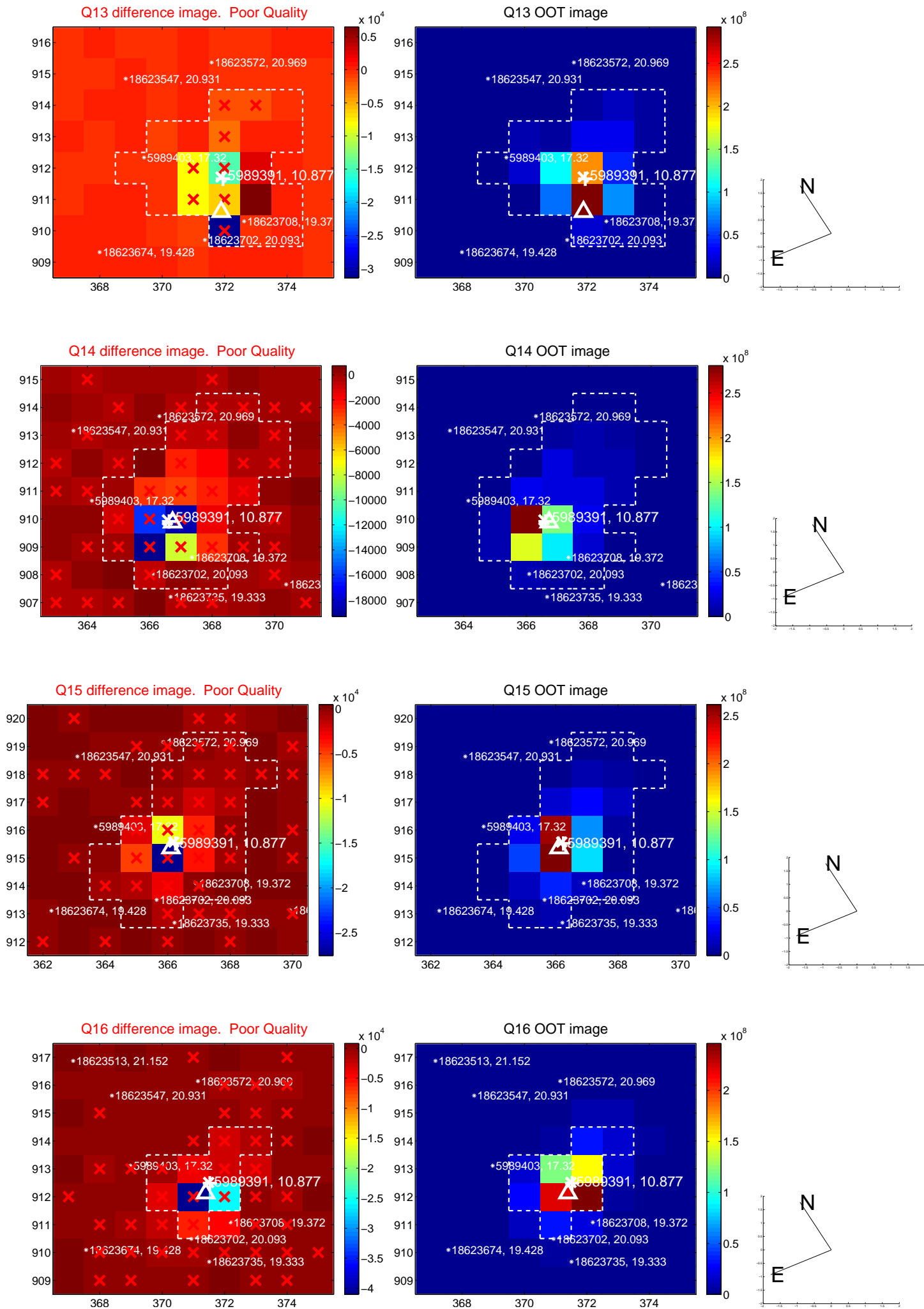
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

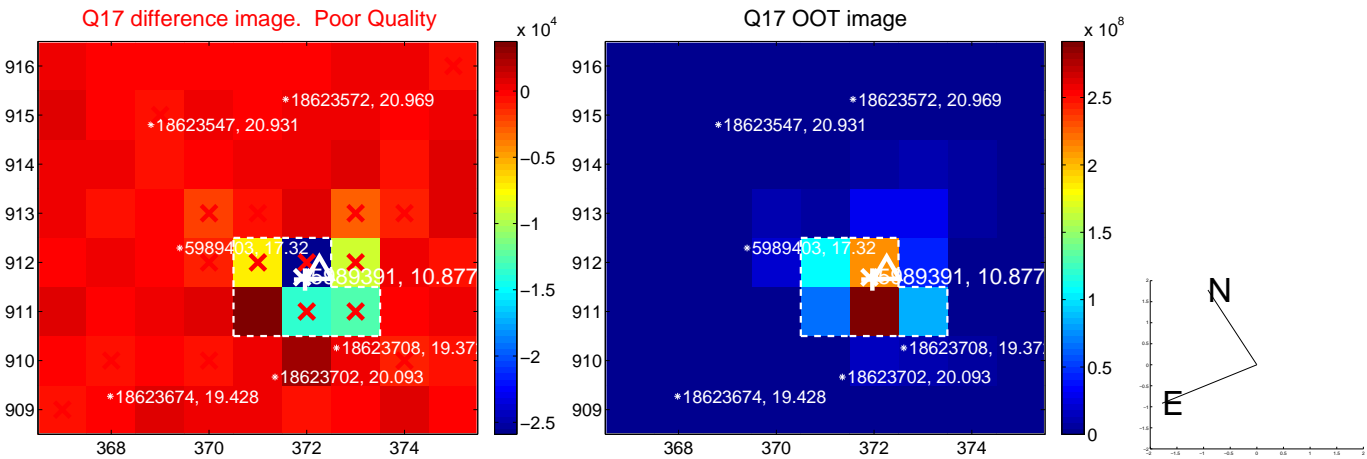


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.





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



folded centroid time series figure for this object.

UKIRT Image

