

# KIC 008879976

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008879976-01	OBS	No	499.629434	142.102639	414.7	4.566	10.6	5.7	1.44	6200	3.17	1.53
008879976-02	OBS	No	354.159555	370.530374	698.0	5.500	16.6	9.4	1.44	6200	3.99	2.42
008879976-03	OBS	No	672.266947	223.970877	531.5	6.474	11.9	7.2	1.44	6200	3.67	1.03
008879976-04	OBS	No	568.697799	405.990628	572.2	13.754	9.7	6.4	1.44	6200	3.50	1.28
008879976-06	OBS	No	601.258445	137.780047	482.7	11.771	9.1	6.3	1.44	6200	3.75	1.19
008879976-07	OBS	No	239.327245	282.546057	553.2	10.694	8.8	7.5	1.44	6200	6.63	4.08

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008879976-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—CENT_FEW_DIFFS
008879976-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—CENT_FEW_DIFFS
008879976-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
008879976-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
008879976-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—CENT_FEW_DIFFS
008879976-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

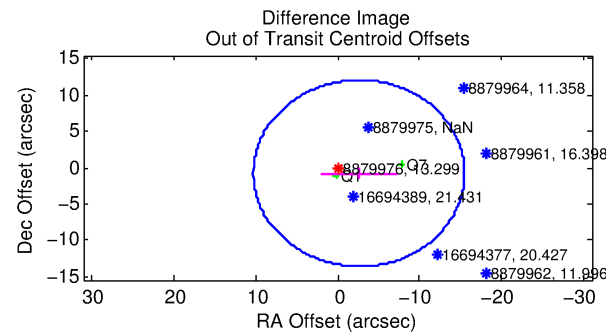
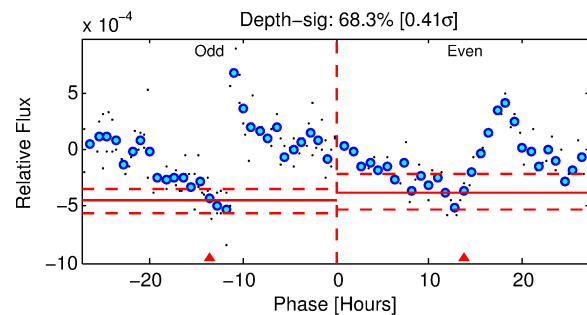
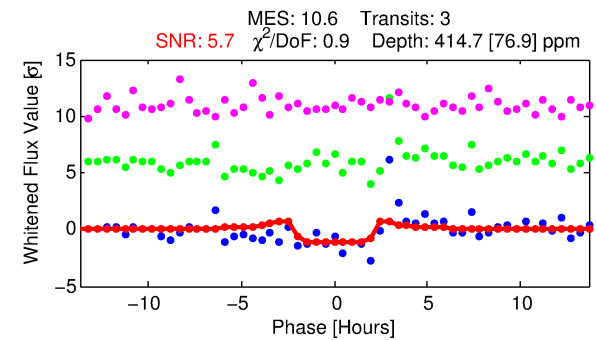
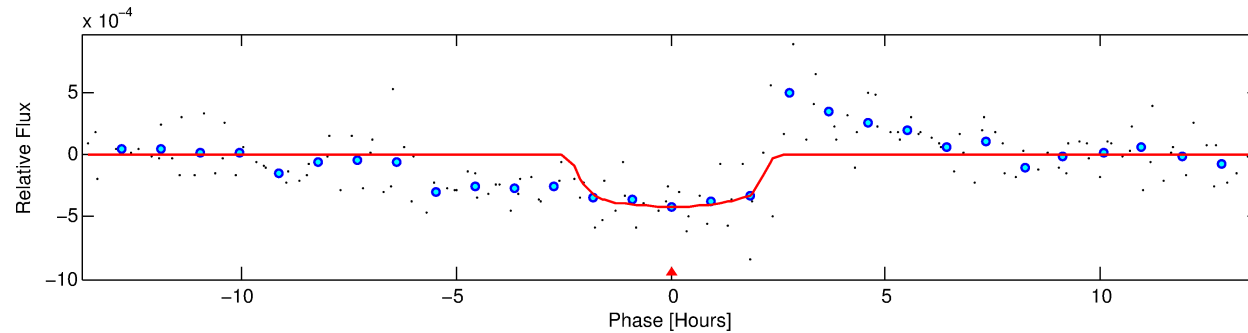
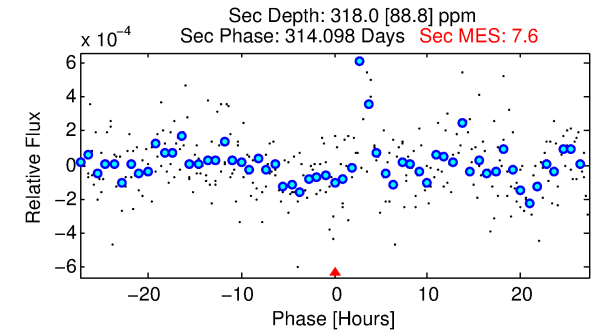
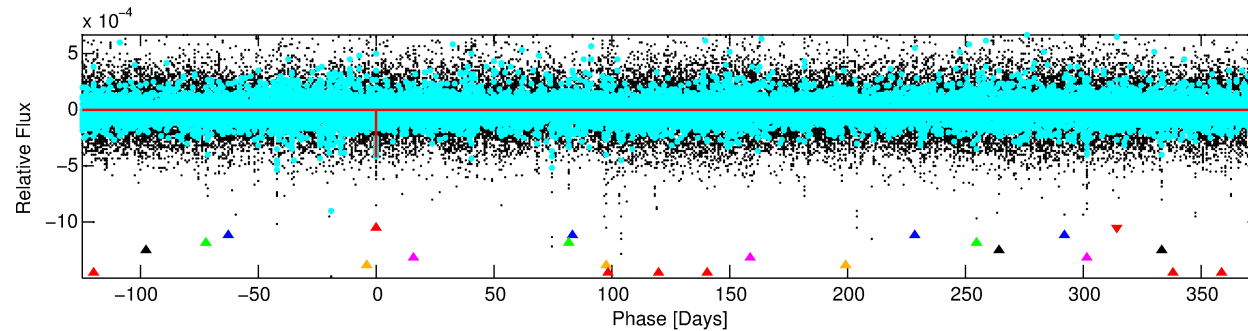
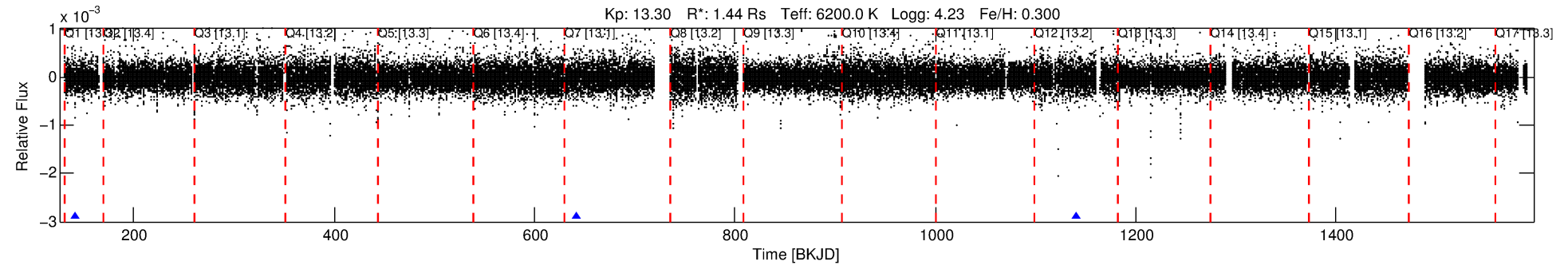
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 008879976-01

No Significant Match Found

# DV One-Page Summary

KIC: 8879976 Candidate: 1 of 7 Period: 499.629 d



## DV Fit Results:

Period = 499.62943 [0.00597] d  
Epoch = 142.1026 [0.0076] BKJD  
Rp/R\* = 0.0202 [0.0268]  
a/R\* = 580.56 [3715.63]  
b = 0.75 [3.82]  
Seff = 1.53 [0.64]  
Teq = 283 [30] K  
Rp = 3.17 [4.33] Re  
a = 1.3379 [0.3643] AU  
Ag = 31073.66 [83531.23] [0.37σ]  
Teffp = 5819 [3876] K [1.43σ]

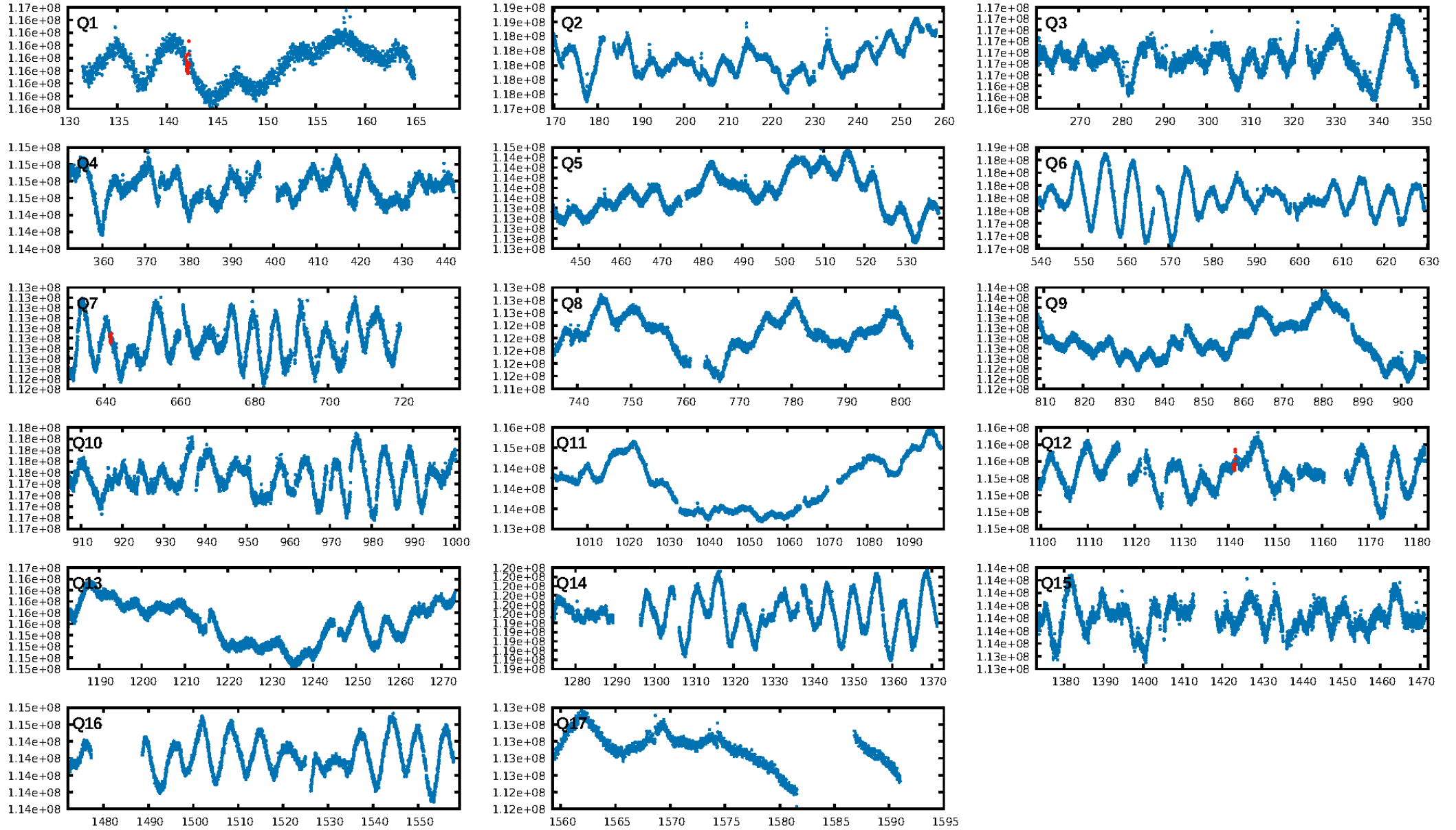
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [488.36σ]  
LongPeriod-sig: 100.0% [114.38σ]  
ModelChiSquare2-sig: 67.9%  
ModelChiSquareGoF-sig: 98.9%  
**Bootstrap-pfa: 7.70e-10**  
RollingBand-fgt: 1.00 [2/2]  
**GhostDiagnostic-chr: 0.5269**  
Centroid-sig: 51.5%  
Centroid-so: 0.827 arcsec [0.51σ]  
OotOffset-rm: 2.714 arcsec [0.63σ]  
OotOffset-st: 0/1/0/1 [2]  
KicOffset-rm: 2.684 arcsec [0.63σ]  
KicOffset-st: 0/1/0/1 [2]  
DiffImageQuality-fgm: 0.50 [1/2]  
DiffImageOverlap-fno: 1.00 [3/3]

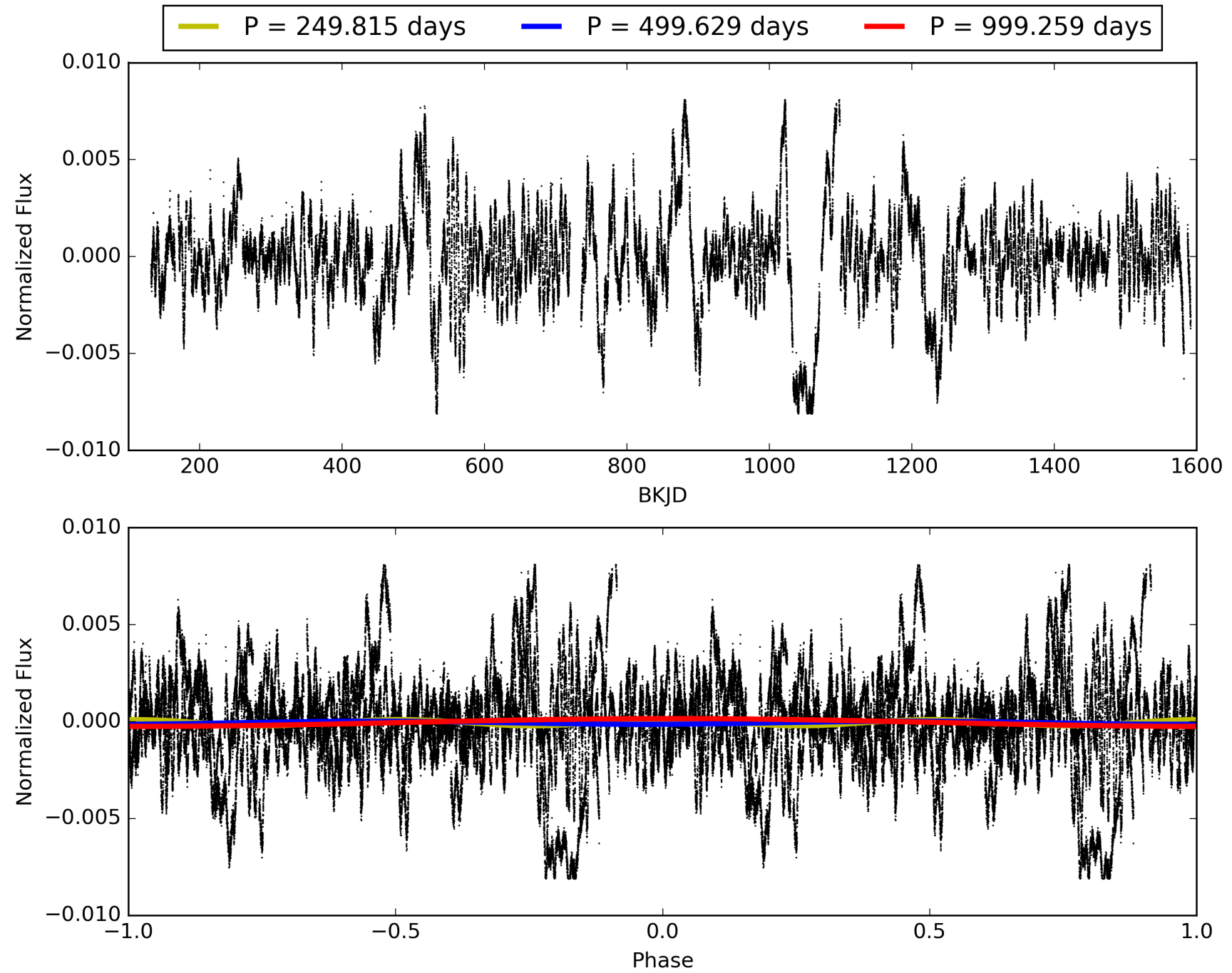
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 20:46:06 Z

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

# TCE 008879976-01, PDC Light Curves



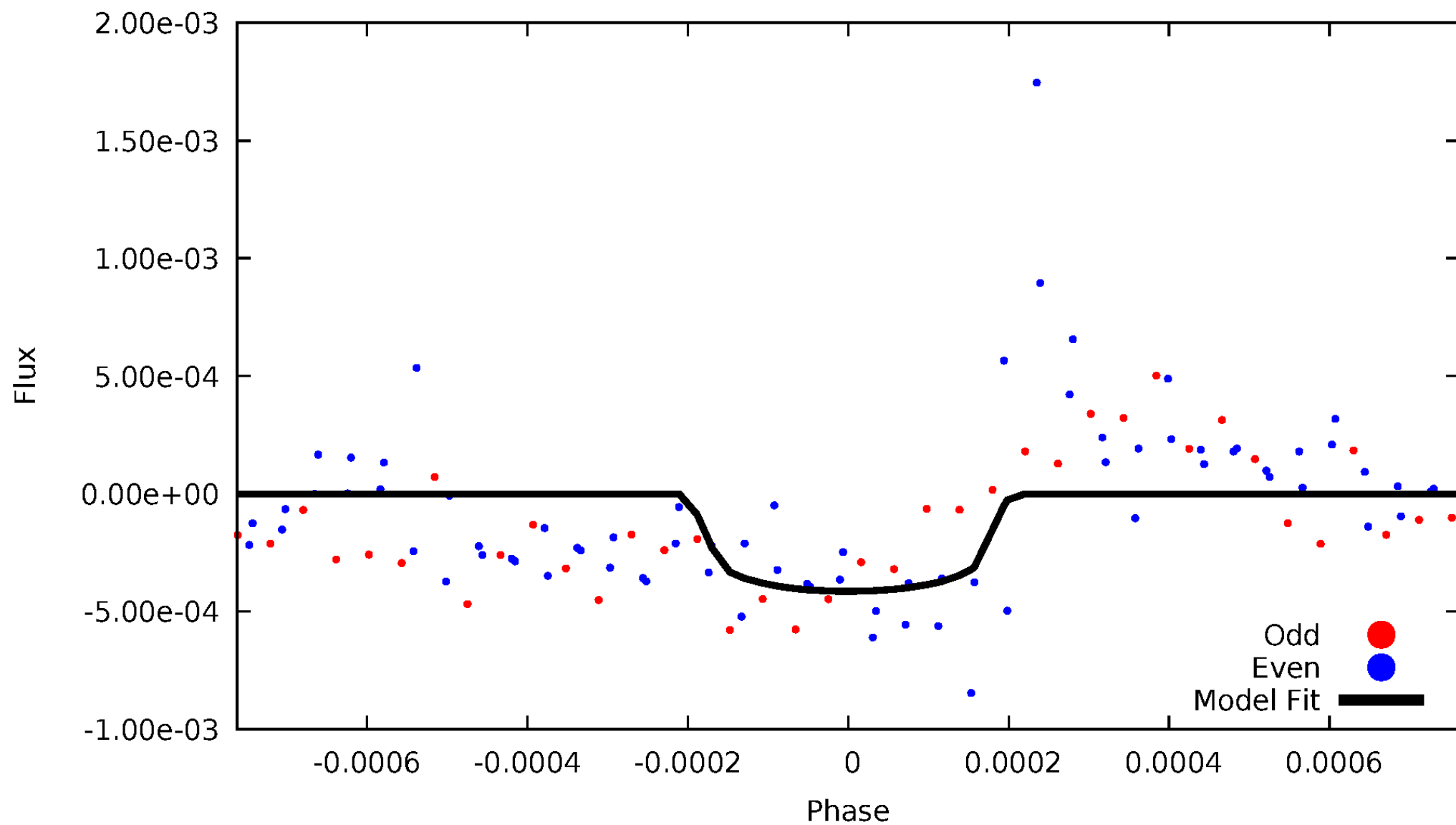
TCE 008879976-01





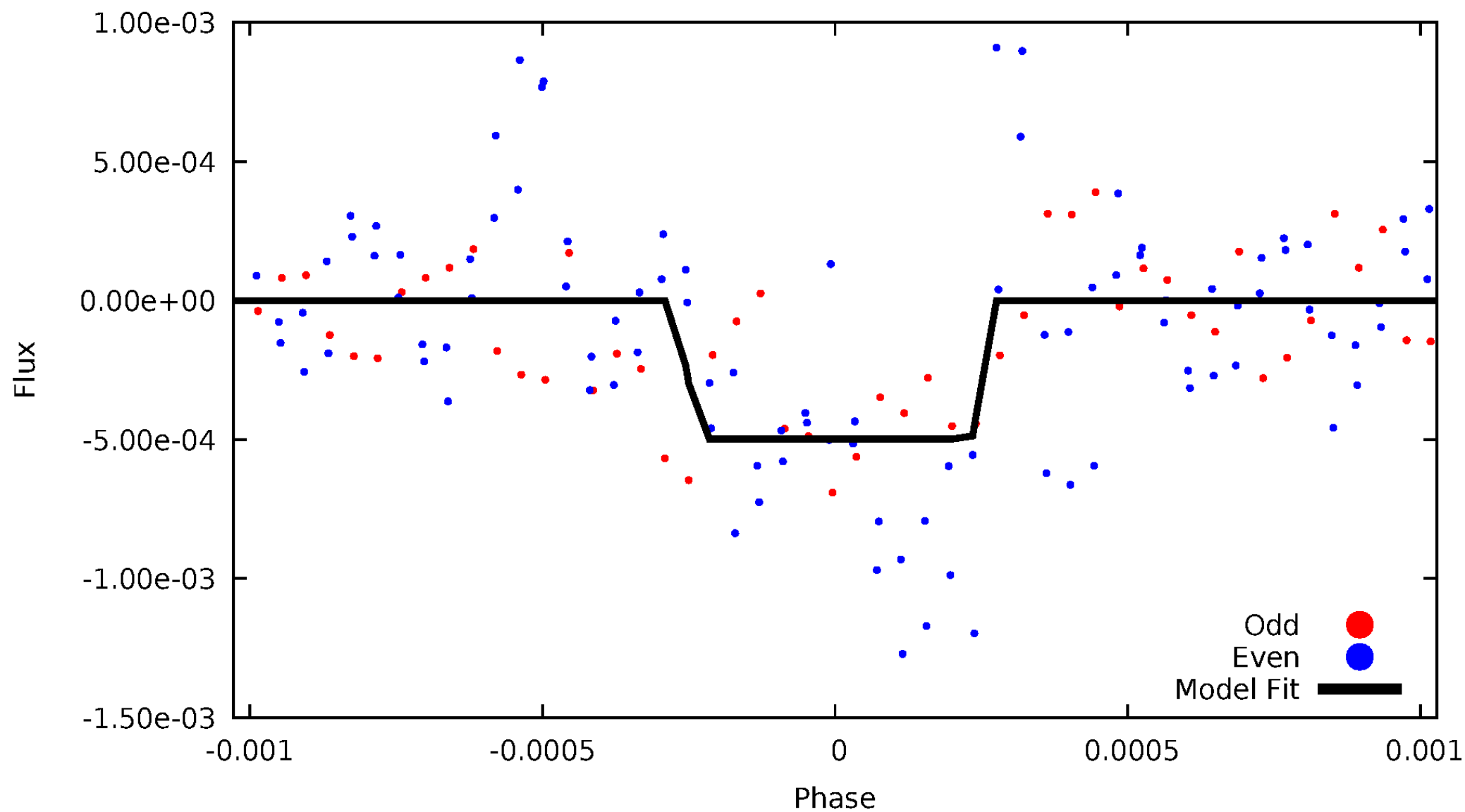
# DV Odd/Even

TCE 008879976-01



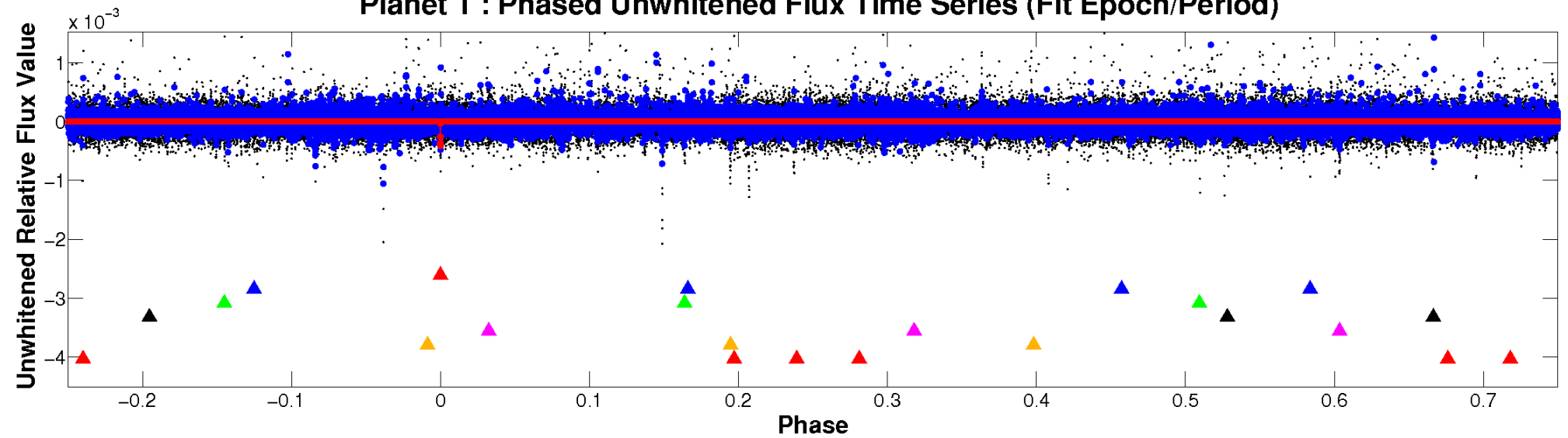
# ALT Odd/Even

TCE 008879976-01

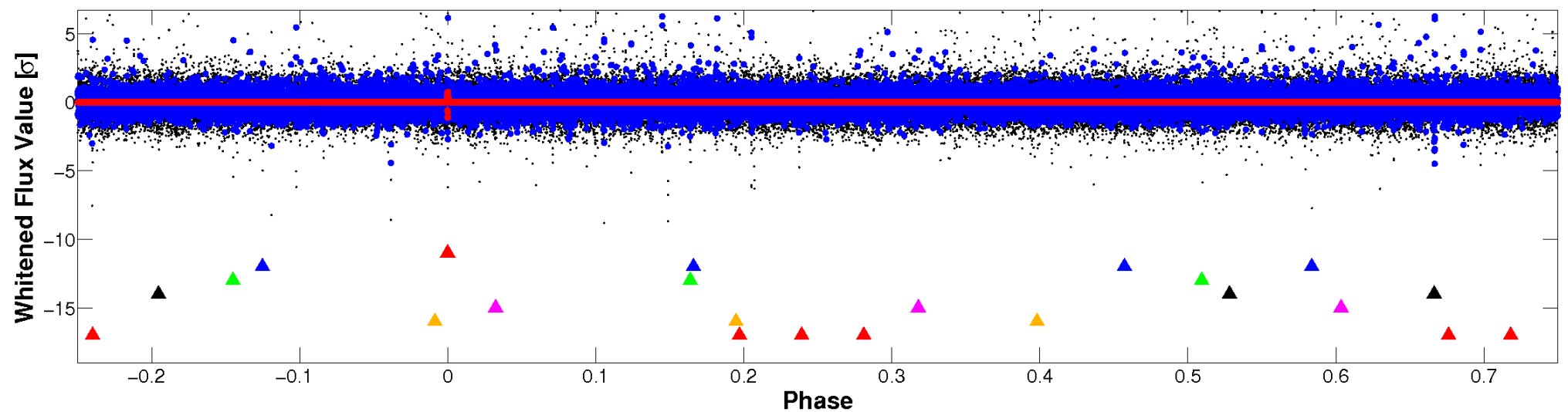


# Non-Whitened Vs. Whitened Light Curve

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

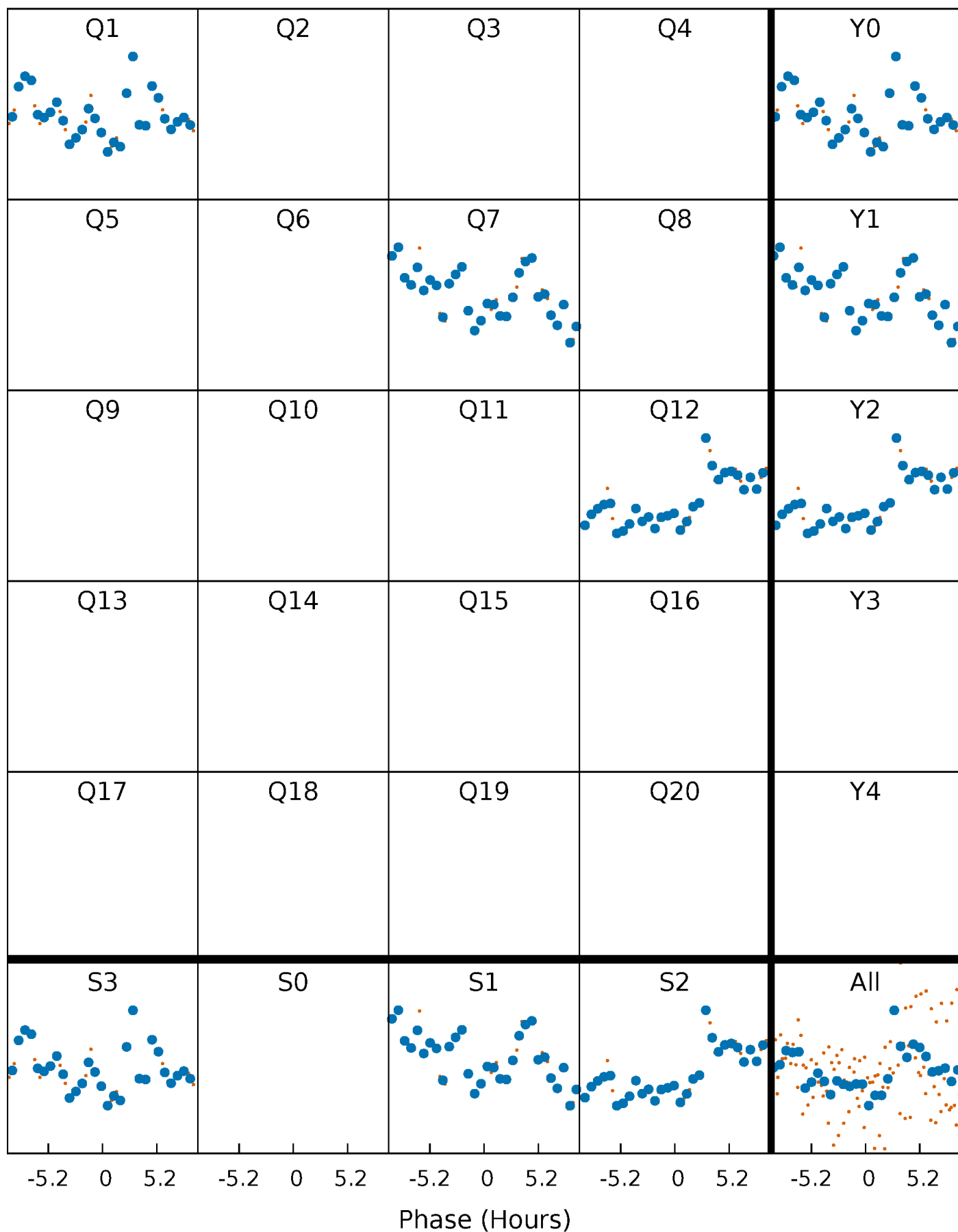


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



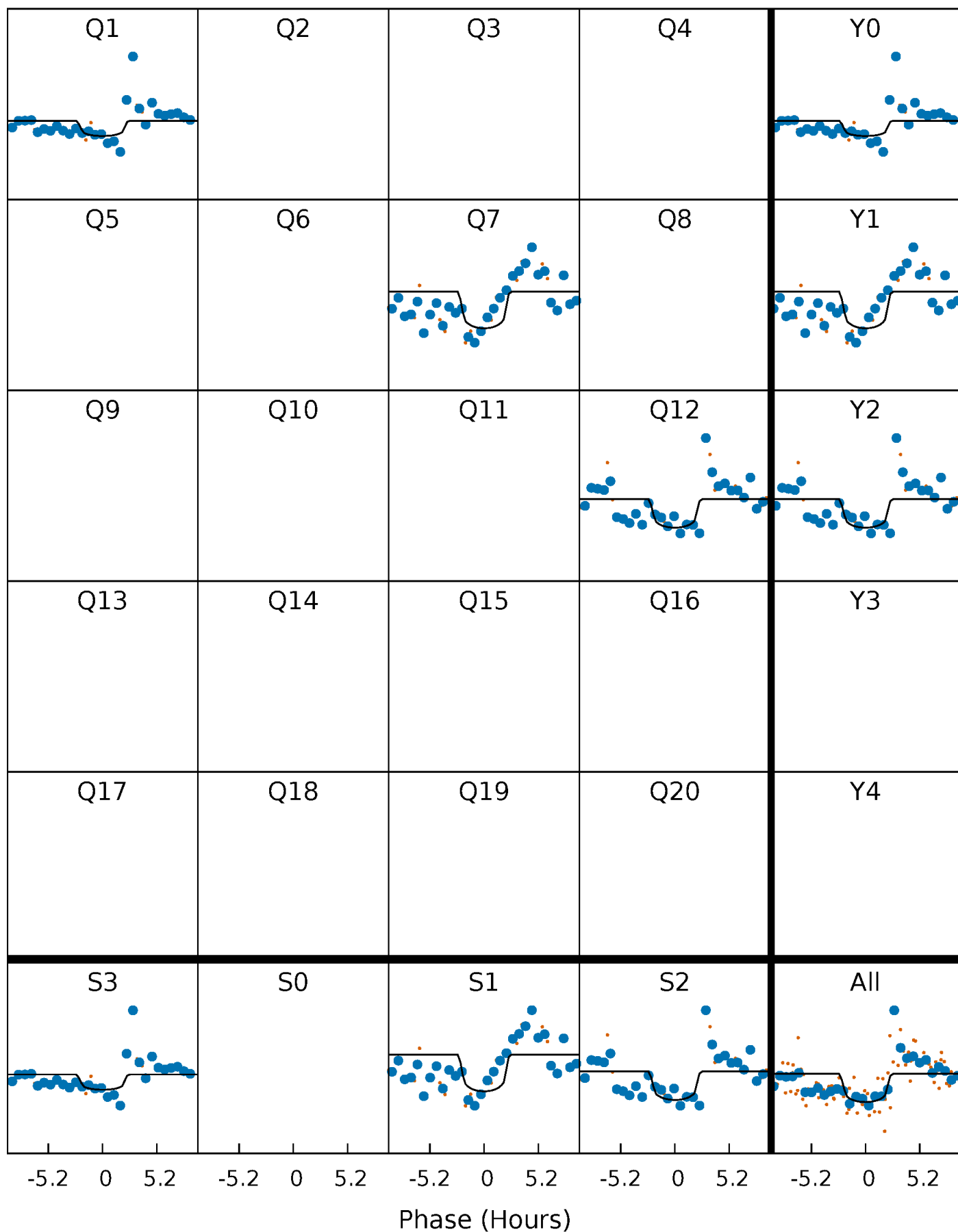
# PDC Quarter-Phased Transit Curves

TCE 008879976-01 P=499.629434 Days  $T_0=142.102639$  (BKJD)



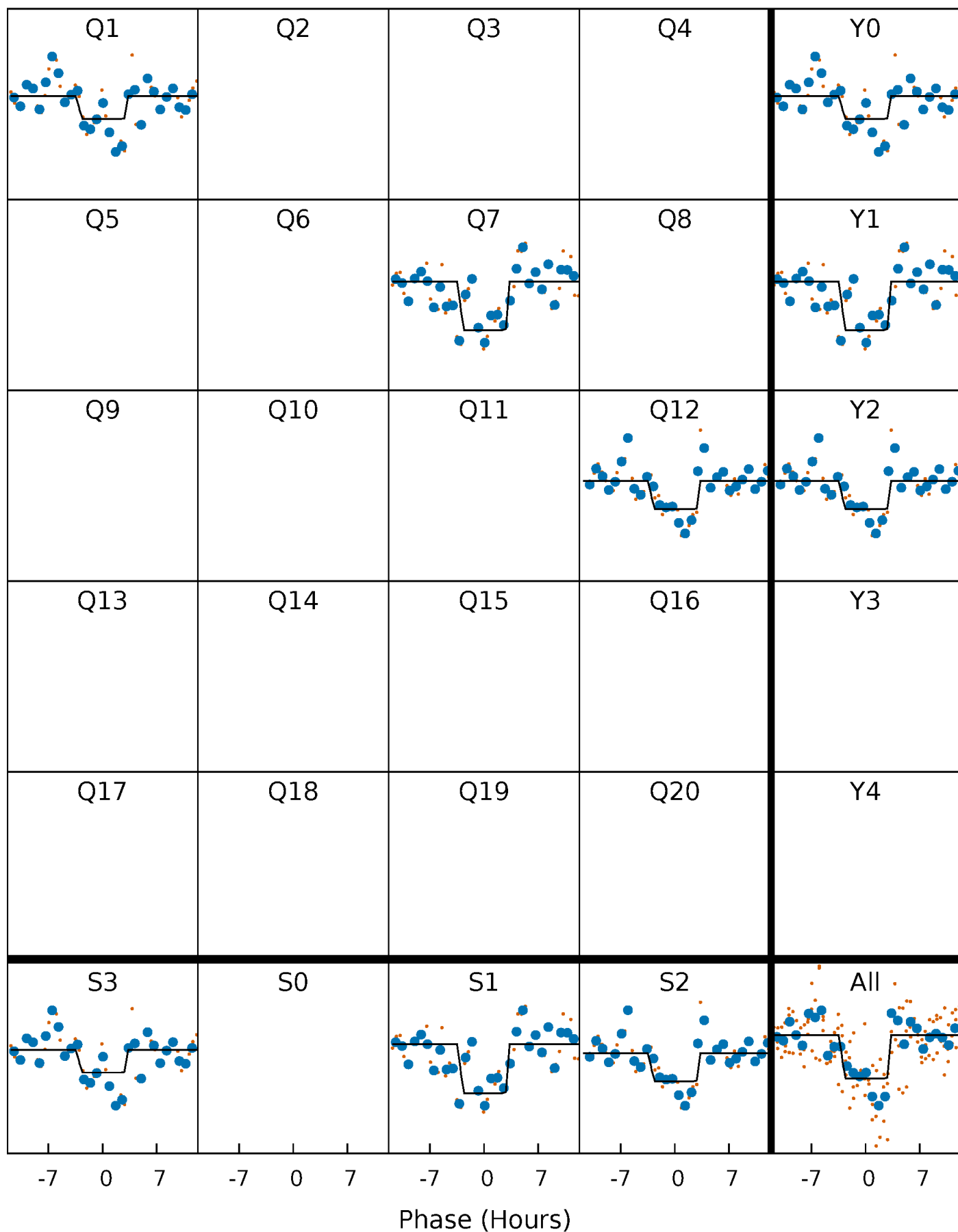
# DV Quarter-Phased Transit Curves

TCE 008879976-01     $P=499.629434$  Days     $T_0=142.102639$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 008879976-01 P=499.641409 Days  $T_0=142.060119$  (BKJD)

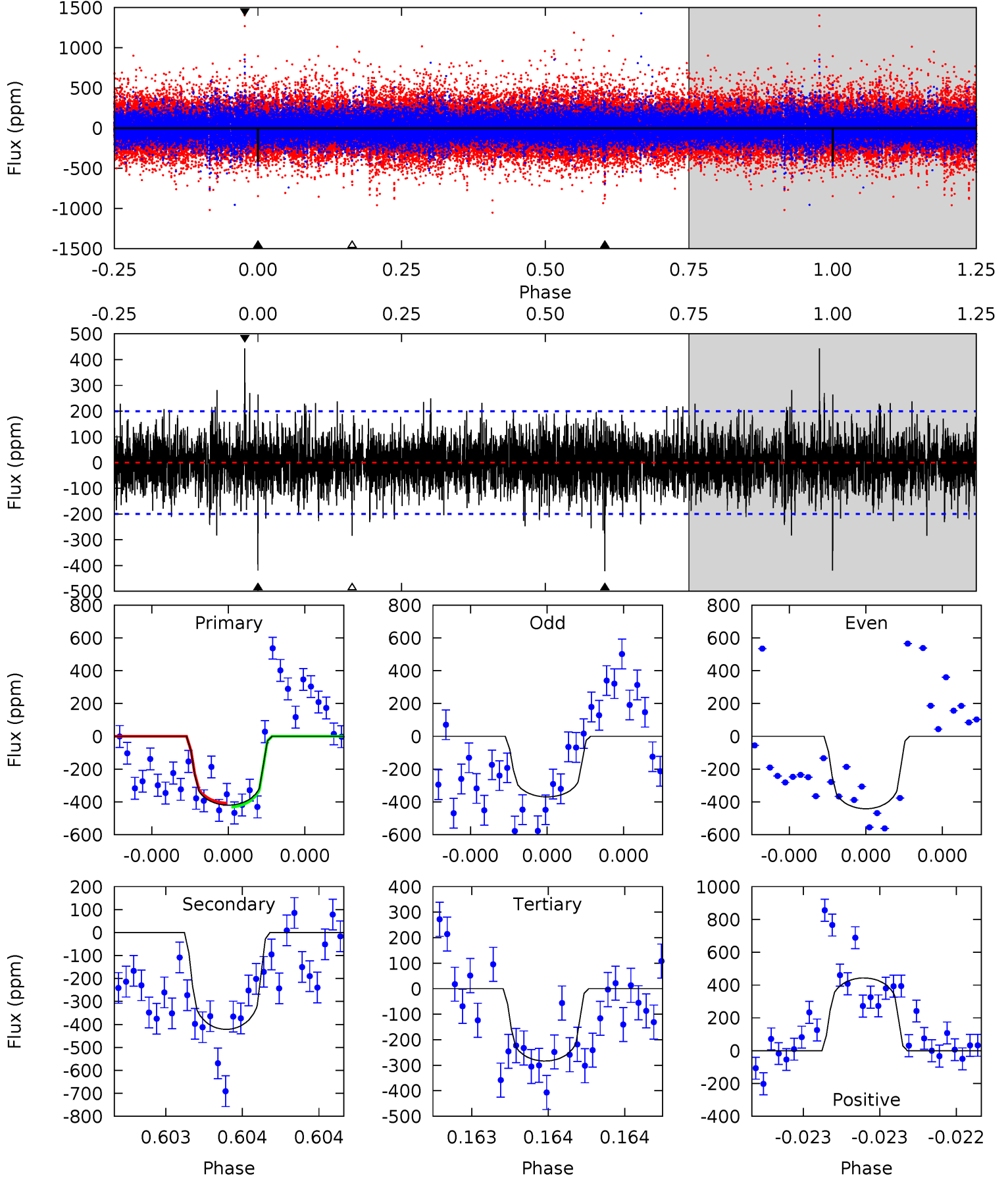




# DV Model-Shift Uniqueness Test

008879976-01, P = 499.629434 Days, E = 142.102639 Days

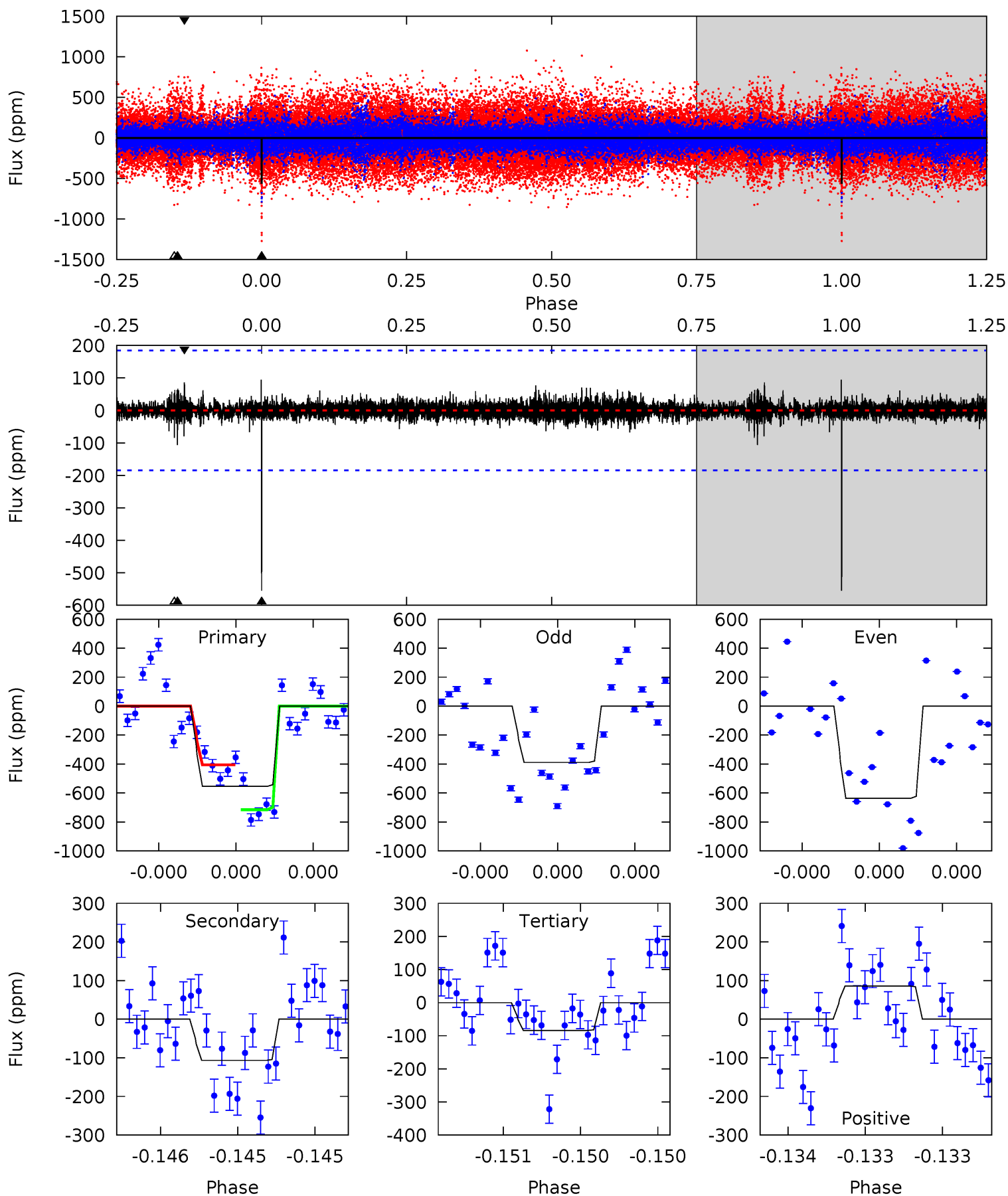
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.8	11.9	7.98	12.5	5.62	3.55	1.91	3.83	-0.67	3.89	-0.61	0.92	1.10	0.51	0.34



# Alt Model-Shift Uniqueness Test

008879976-01, P = 499.641409 Days, E = 142.060119 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
16.8	3.22	2.54	2.59	5.58	3.48	0.45	14.2	14.2	0.69	0.63	3.52	0.99	0.15	4.66



### Stellar Parameters For KIC 008879976

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6200^{+150}_{-236}$	$4.230^{+0.140}_{-0.210}$	$0.300^{+0.150}_{-0.300}$	$1.437^{+0.473}_{-0.276}$	$1.281^{+0.163}_{-0.181}$	$0.608^{+0.430}_{-0.339}$
	+2%/-4%	+3%/-5%	+50%/-100%	+33%/-19%	+13%/-14%	+71%/-56%
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 008879976-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-421 \pm 36$	$4.50^{+3.54}_{-2.90}$	$396^{+32}_{-25}$	$5281^{+3998}_{-1095}$	$20779^{+132464}_{-14455}$
Alt.	$-107 \pm 33$	$4.65^{+3.91}_{-2.99}$	$398^{+32}_{-27}$	$3966^{+2057}_{-704}$	$4628^{+32743}_{-3275}$

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

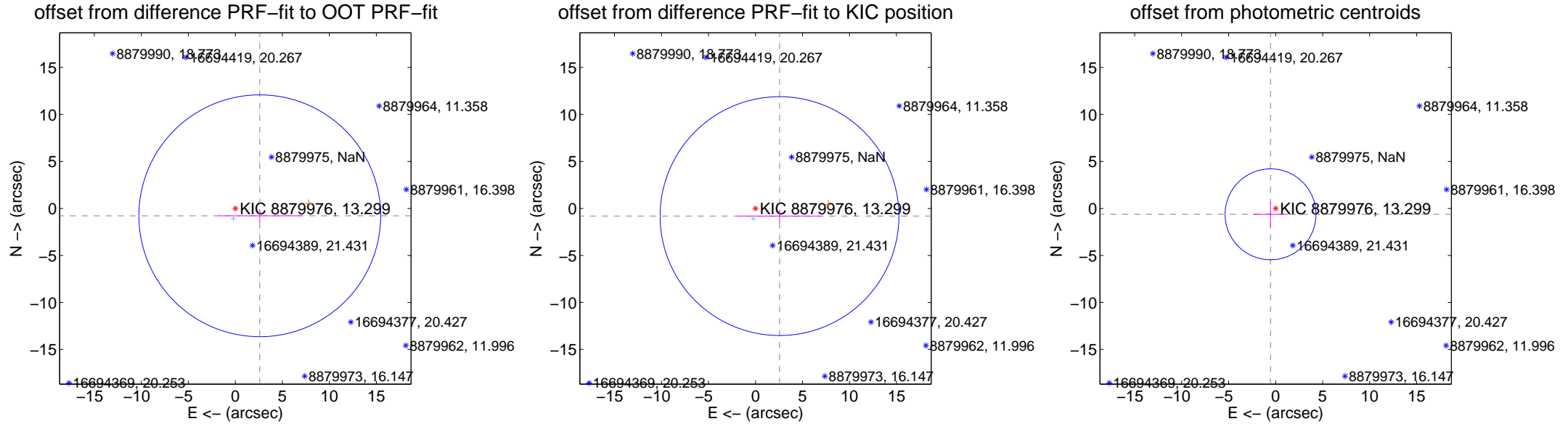
## DV Centroid Data

Supplemental centroid analysis for 008879976-01. Kepler magnitude: 13.30. Transit SNR 5.71

There are 1 quarters with good PRF difference image offsets

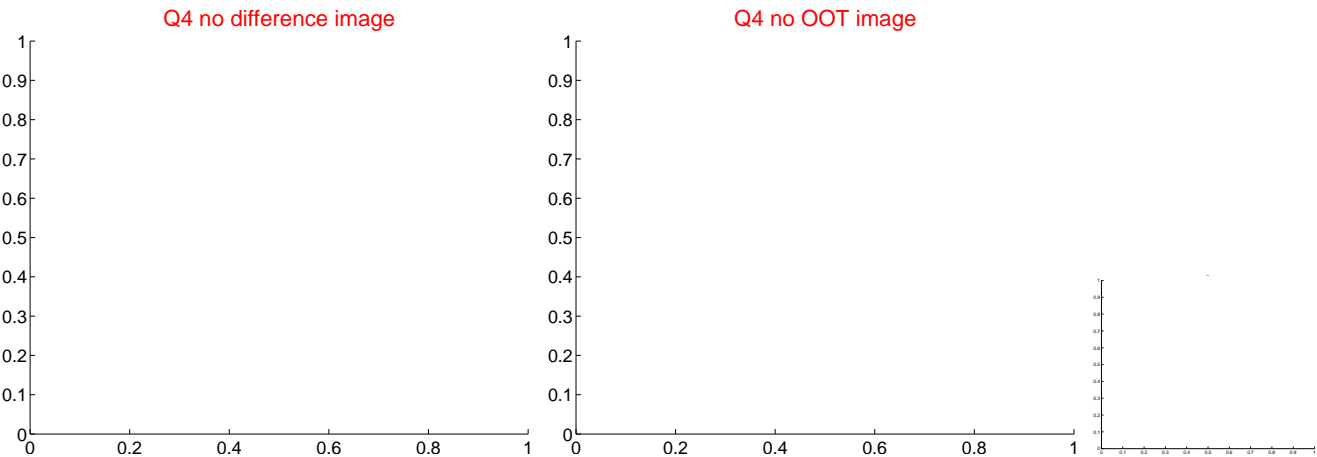
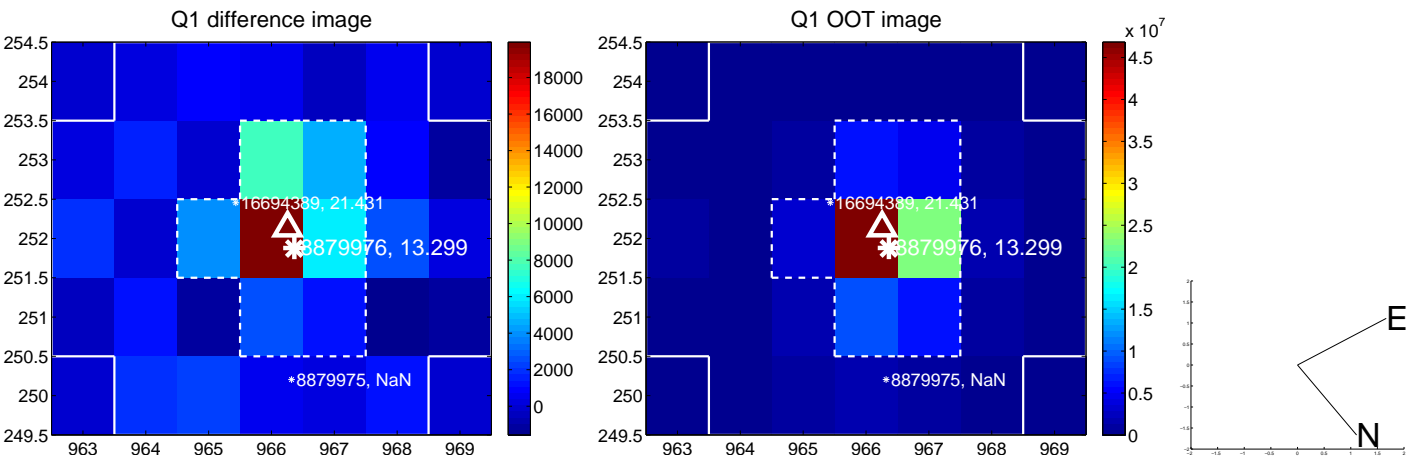
The direct PRF centroid is offset from the target star catalog position by about 0.12 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.714 \pm 4.289$	0.63	$-2.600 \pm 4.472$	$-0.780 \pm 0.734$
PRF-fit source offset from KIC position	$2.684 \pm 4.235$	0.63	$-2.557 \pm 4.440$	$-0.815 \pm 0.700$
photometric centroid source offset	$0.83 \pm 1.61$	0.51	$0.54 \pm 1.87$	$-0.63 \pm 1.39$

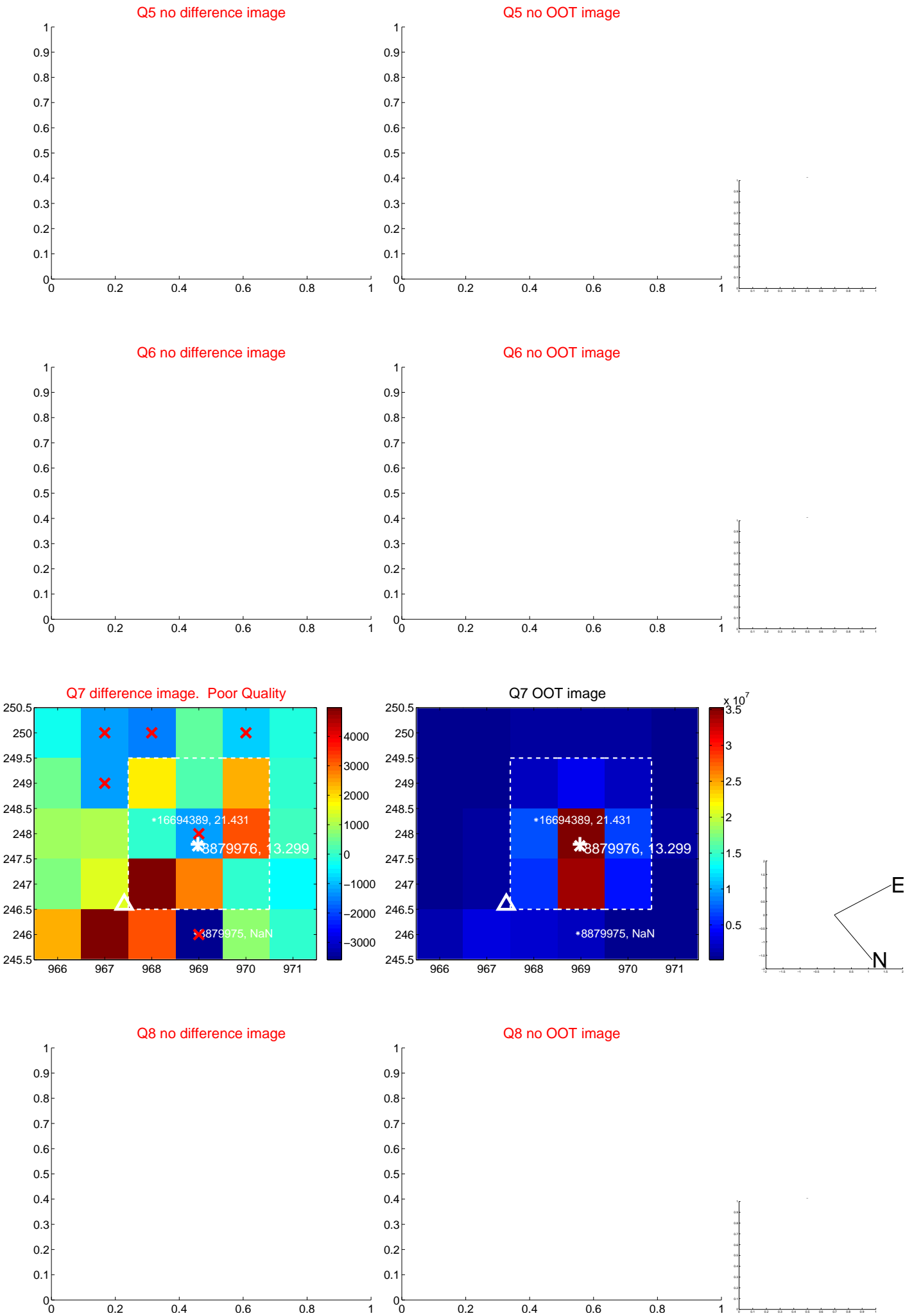


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

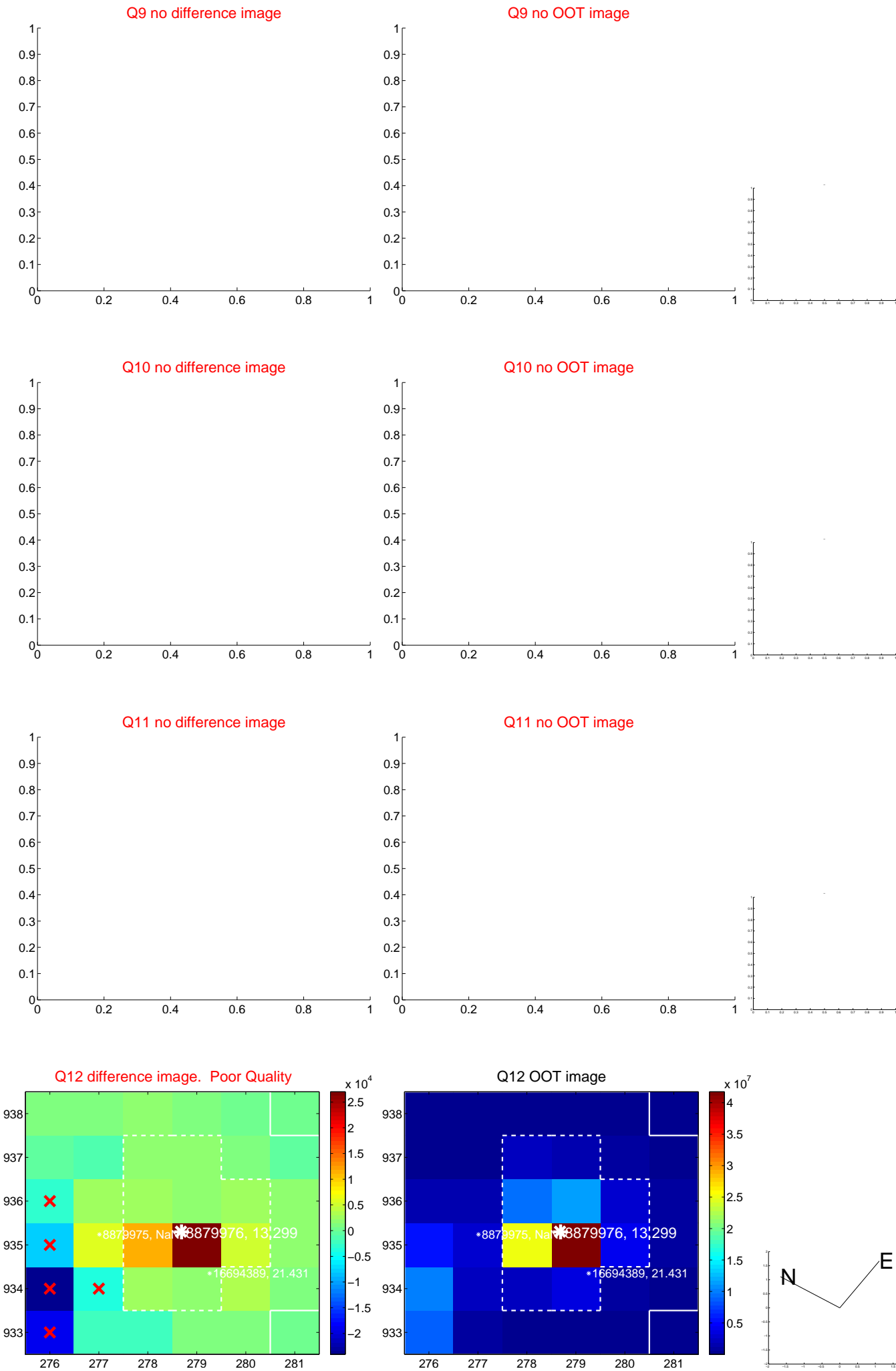


white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.

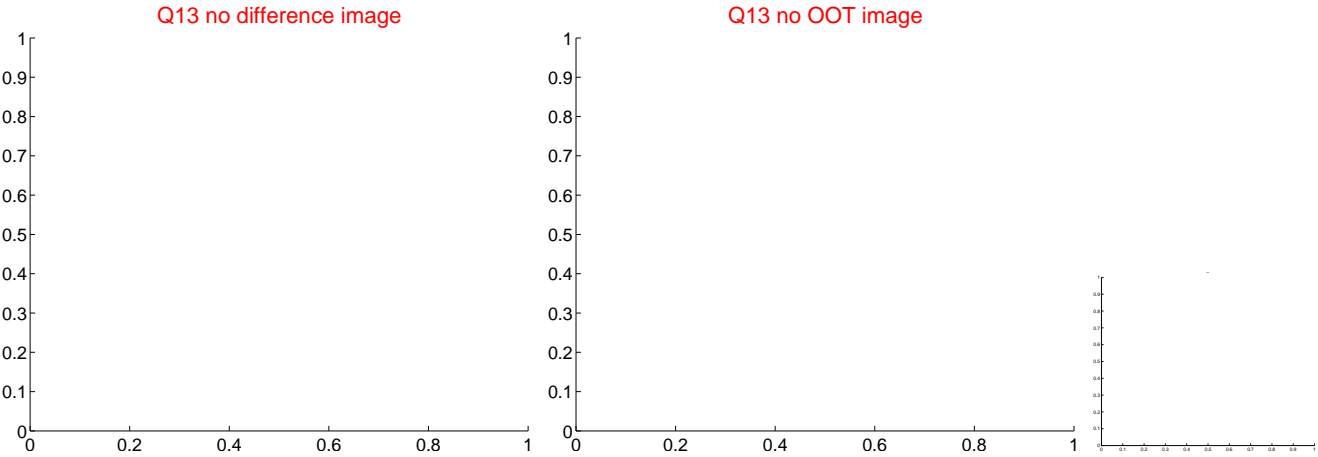




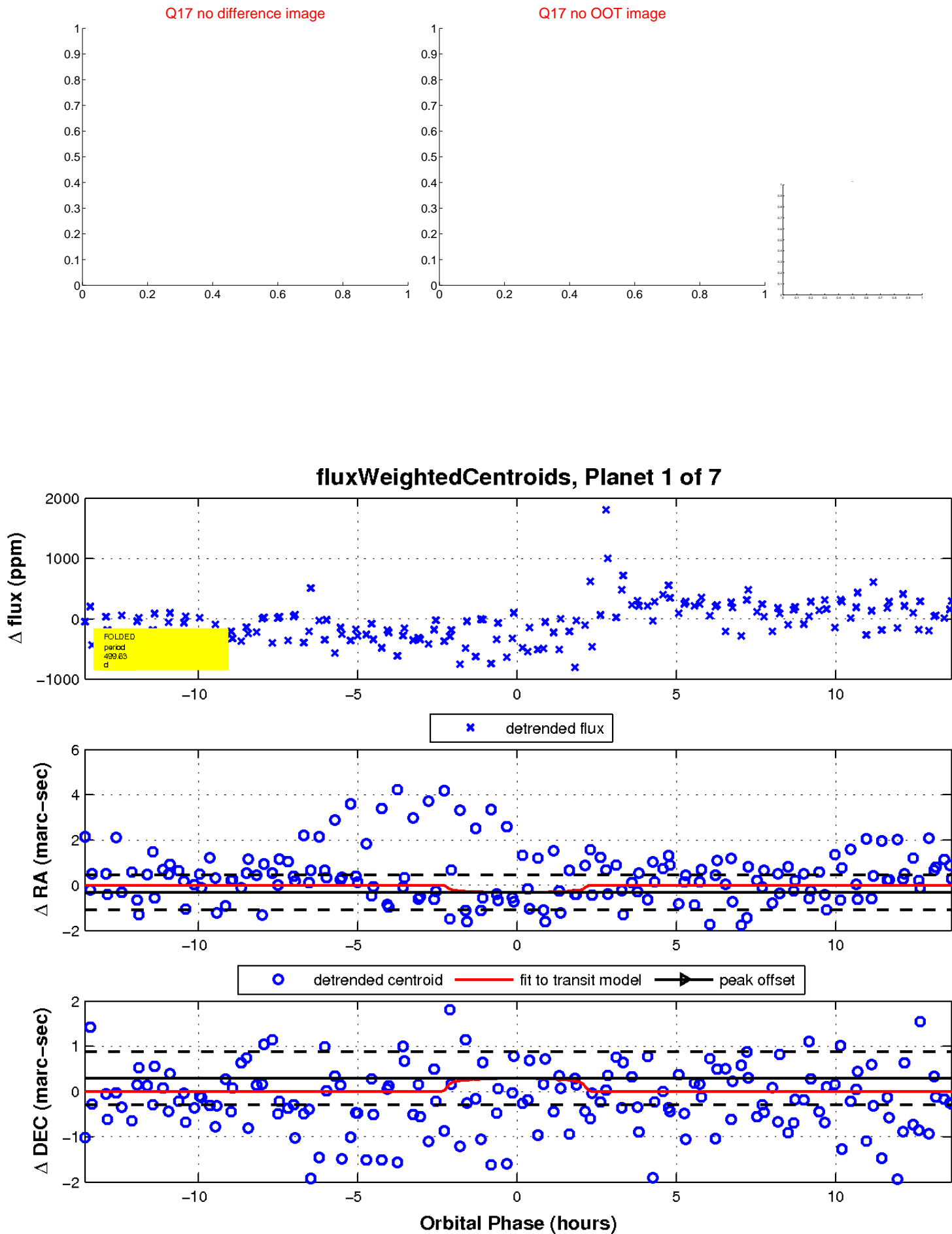
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

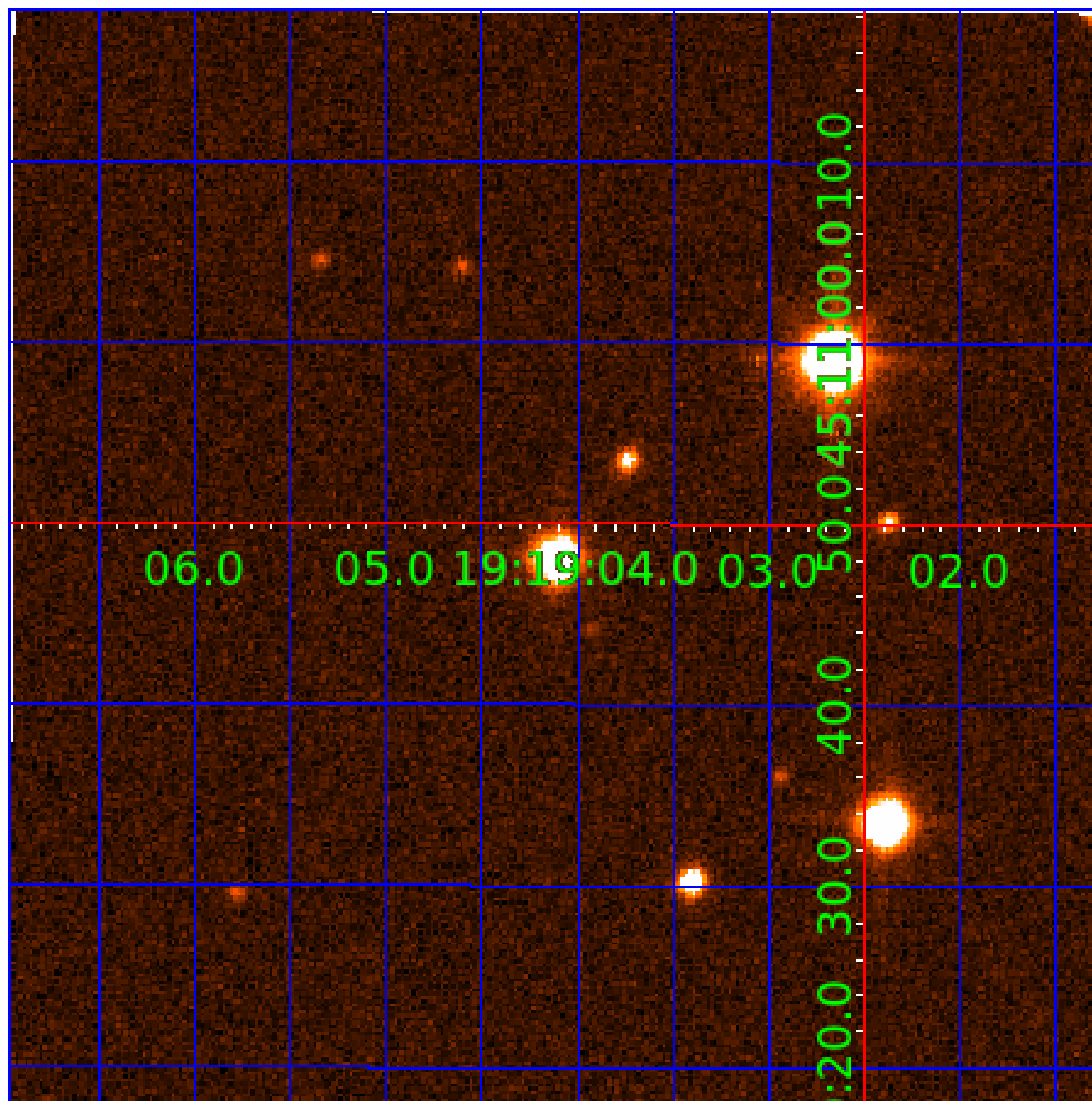


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 008879976

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008879976-01	OBS	No	499.629434	142.102639	414.7	4.566	10.6	5.7	1.44	6200	3.17	1.53
008879976-02	OBS	No	354.159555	370.530374	698.0	5.500	16.6	9.4	1.44	6200	3.99	2.42
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008879976-06	OBS	No	601.258445	137.780047	482.7	11.771	9.1	6.3	1.44	6200	3.75	1.19
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## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008879976-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—CENT_FEW_DIFFS
008879976-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—CENT_FEW_DIFFS
008879976-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
008879976-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
008879976-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—CENT_FEW_DIFFS
008879976-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

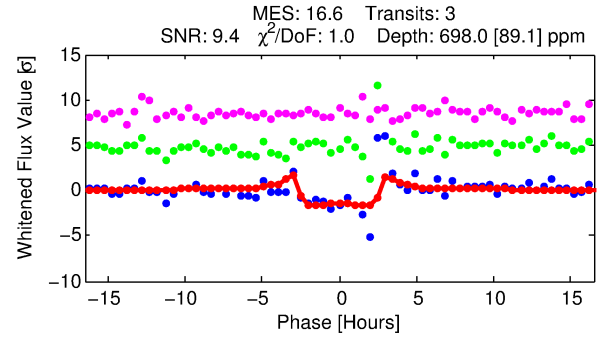
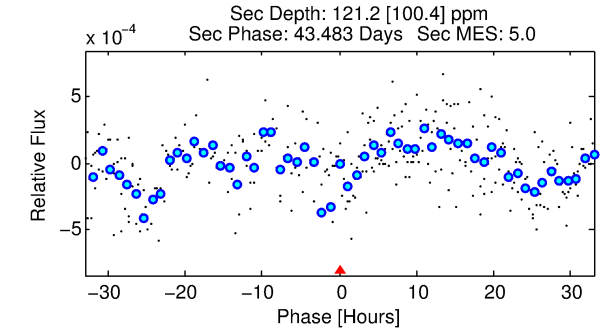
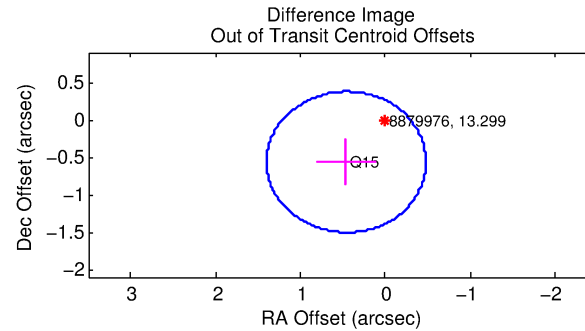
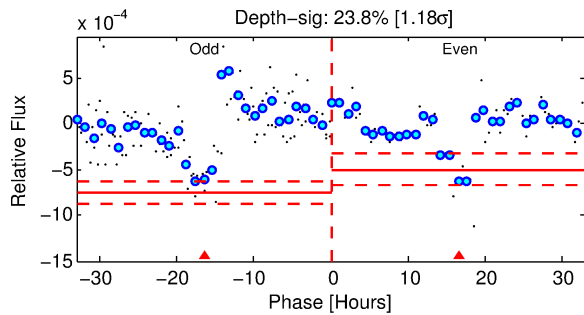
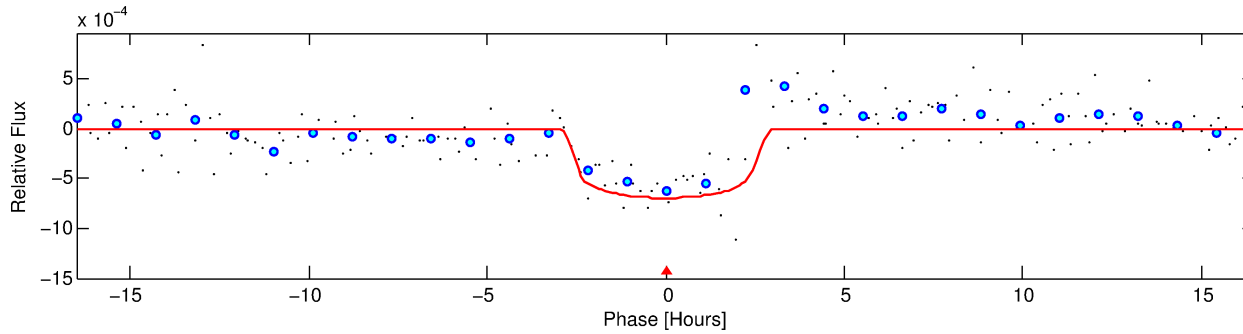
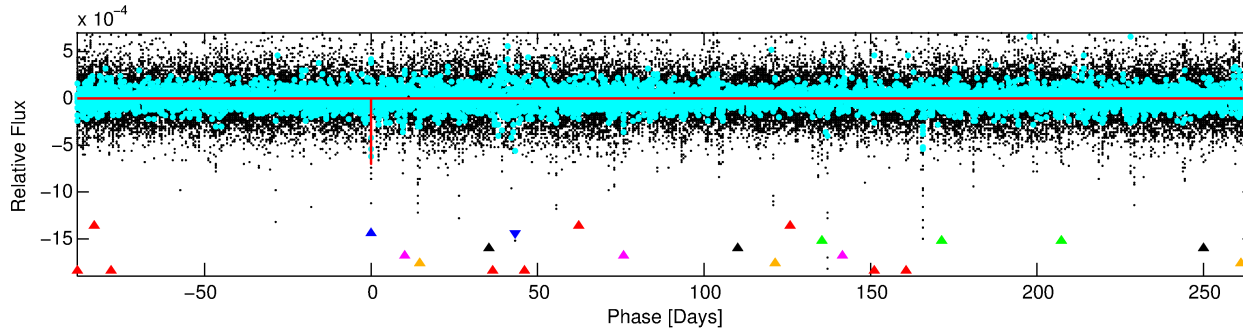
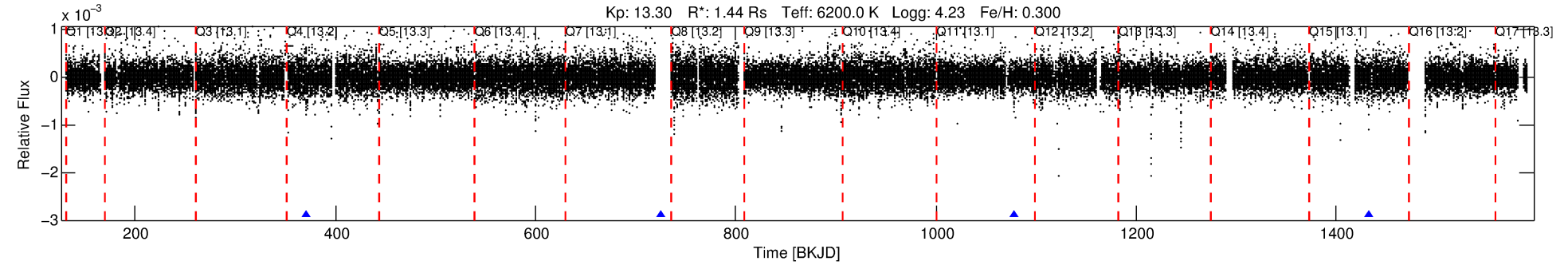
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 008879976-02

No Significant Match Found

# DV One-Page Summary

KIC: 8879976 Candidate: 2 of 7 Period: 354.160 d



## DV Fit Results:

Period = 354.15956 [0.00279] d  
Epoch = 370.5304 [0.0068] BKJD  
Rp/R\* = 0.0255 [0.0135]  
a/R\* = 394.90 [967.97]  
b = 0.64 [2.29]  
Seff = 2.42 [1.01]  
Teff = 318 [33] K  
Rp = 3.99 [2.49] Re  
a = 1.0637 [0.2896] AU  
Ag = 4729.22 [6612.60] [0.72 $\sigma$ ]  
Teffp = 4076 [1377] K [2.73 $\sigma$ ]

## DV Diagnostic Results:

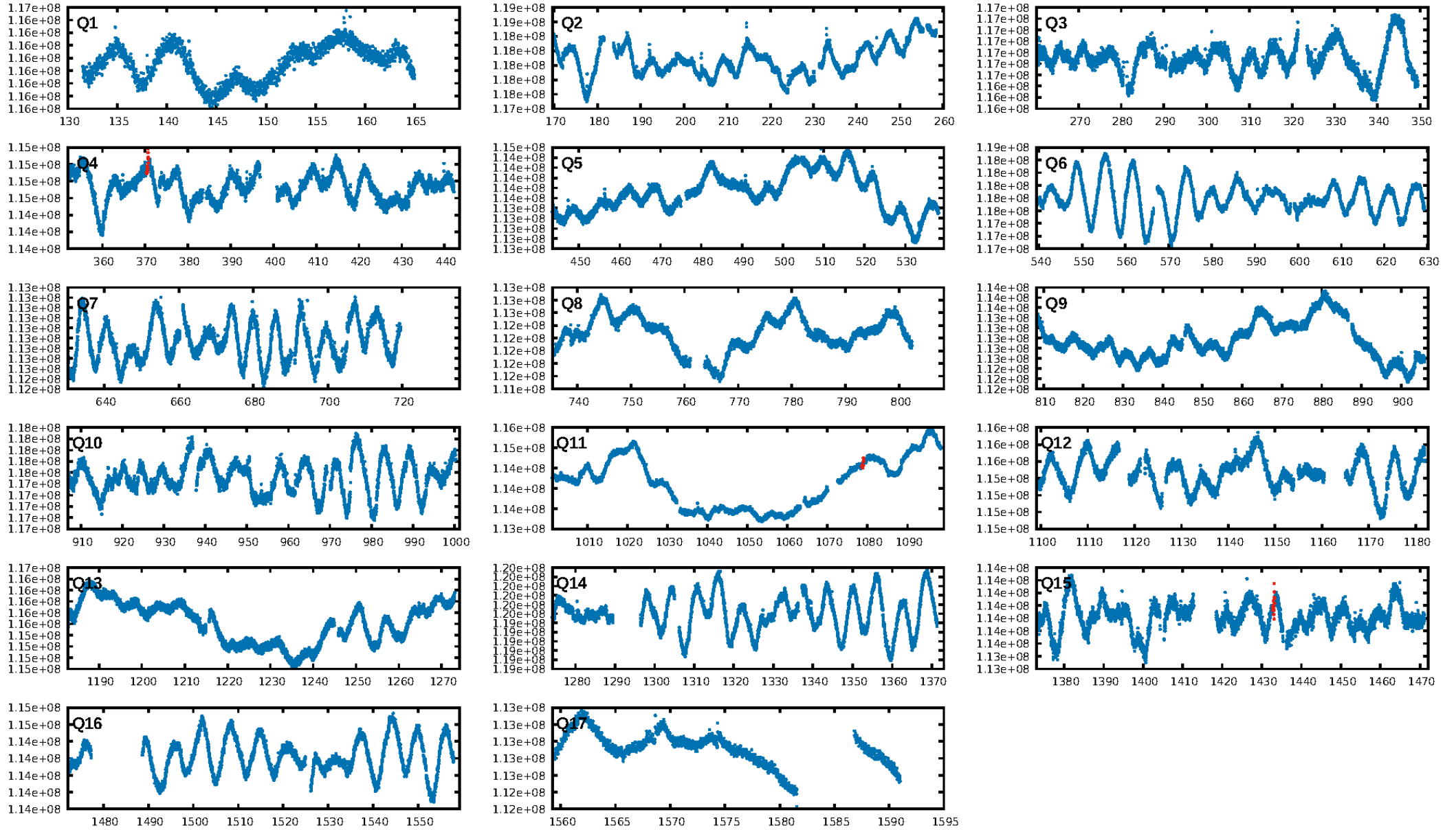
ShortPeriod-sig: 100.0% [229.18 $\sigma$ ]  
LongPeriod-sig: 100.0% [488.36 $\sigma$ ]  
ModelChiSquare2-sig: 95.0%  
ModelChiSquareGof-sig: 98.8%  
Bootstrap-pfa: 7.02e-22  
RollingBand-fgt: 1.00 [3/3]  
GhostDiagnostic-chr: 8.663  
Centroid-sig: 59.5%  
Centroid-so: 0.895 arcsec [0.56 $\sigma$ ]  
OotOffset-rm: 0.727 arcsec [2.32 $\sigma$ ]  
KicOffset-rm: 0.838 arcsec [2.69 $\sigma$ ]  
OotOffset-st: 0/1/0/0 [1]  
KicOffset-st: 0/1/0/0 [1]  
DiffImageQuality-fgm: 1.00 [1/1]  
DiffImageOverlap-fno: 1.00 [3/3]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 20:46:18 Z

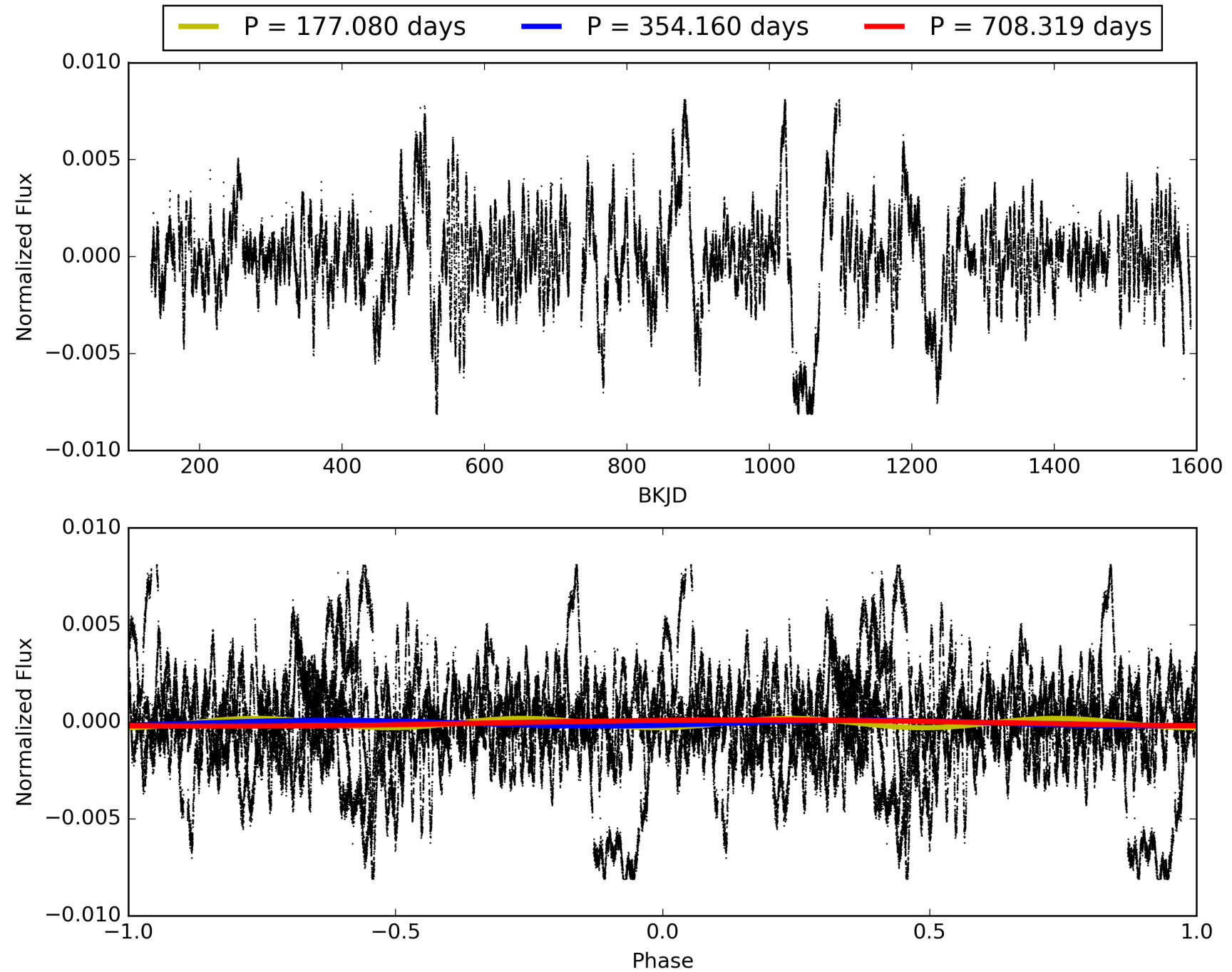
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 008879976-02, PDC Light Curves

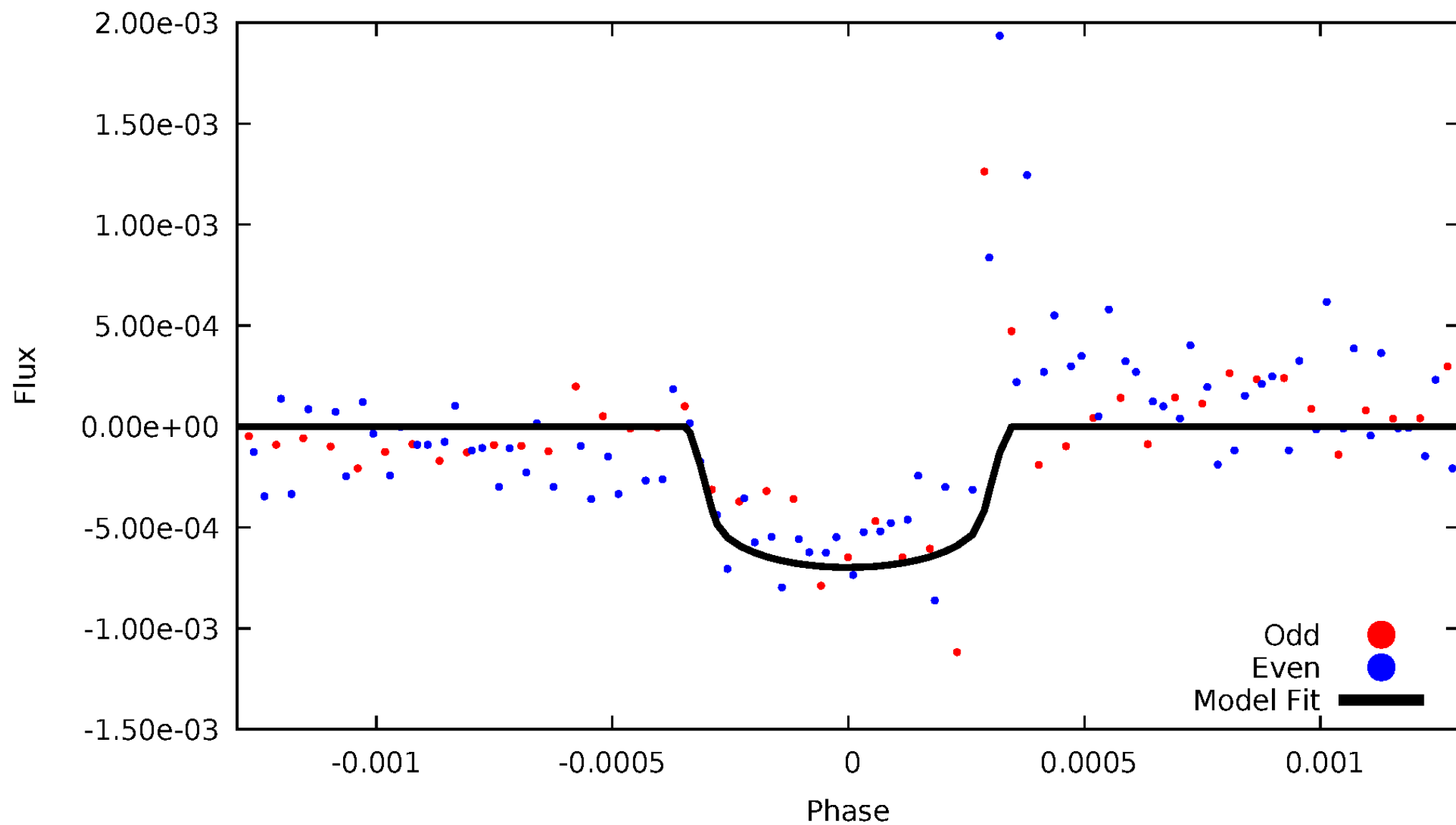


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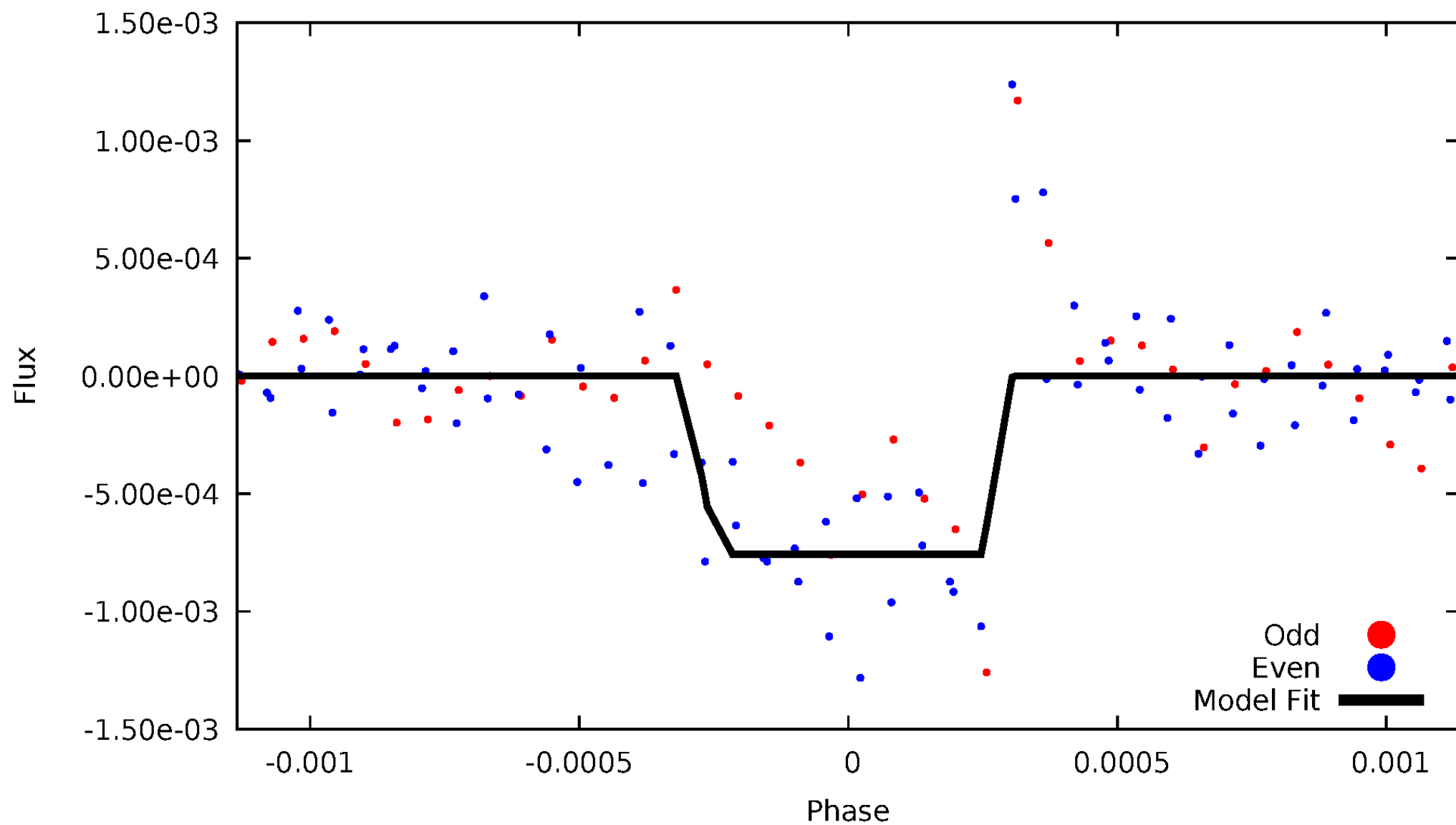
# DV Odd/Even

TCE 008879976-02



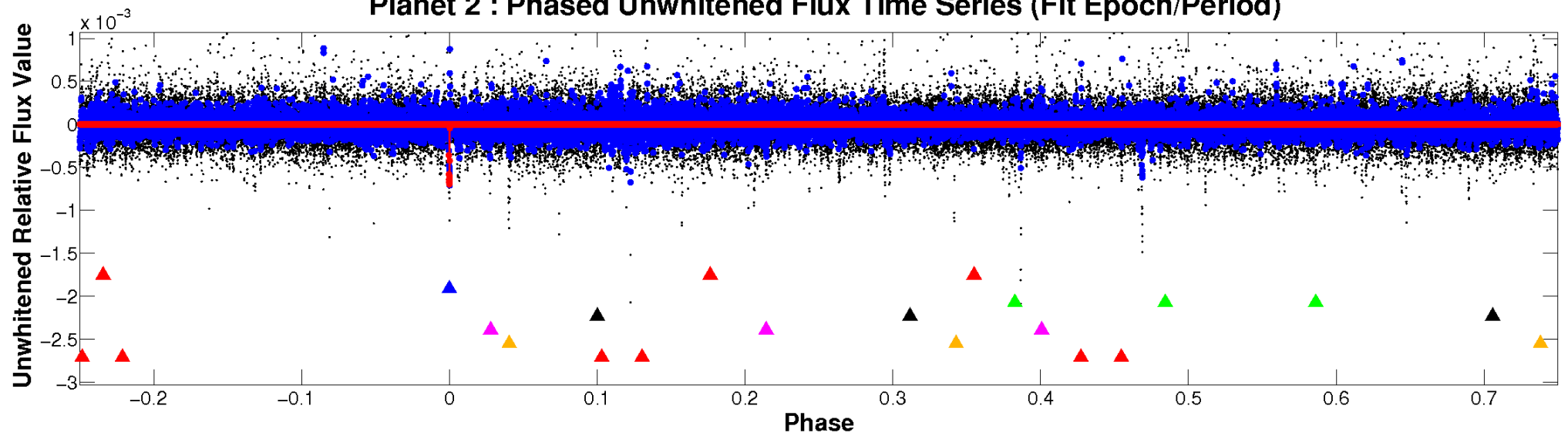
# ALT Odd/Even

TCE 008879976-02

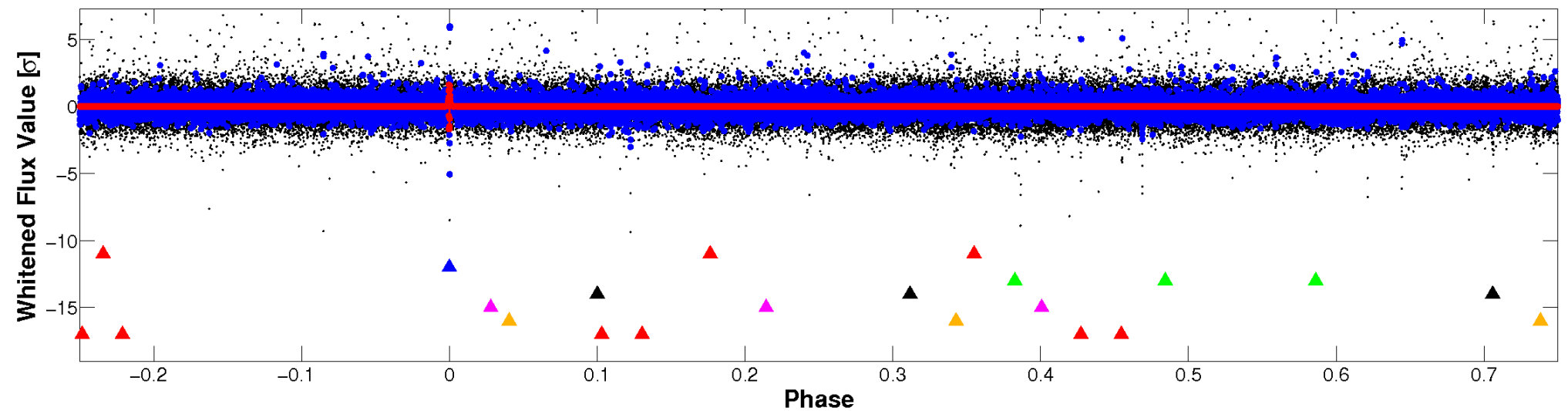


# Non-Whitened Vs. Whitened Light Curve

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

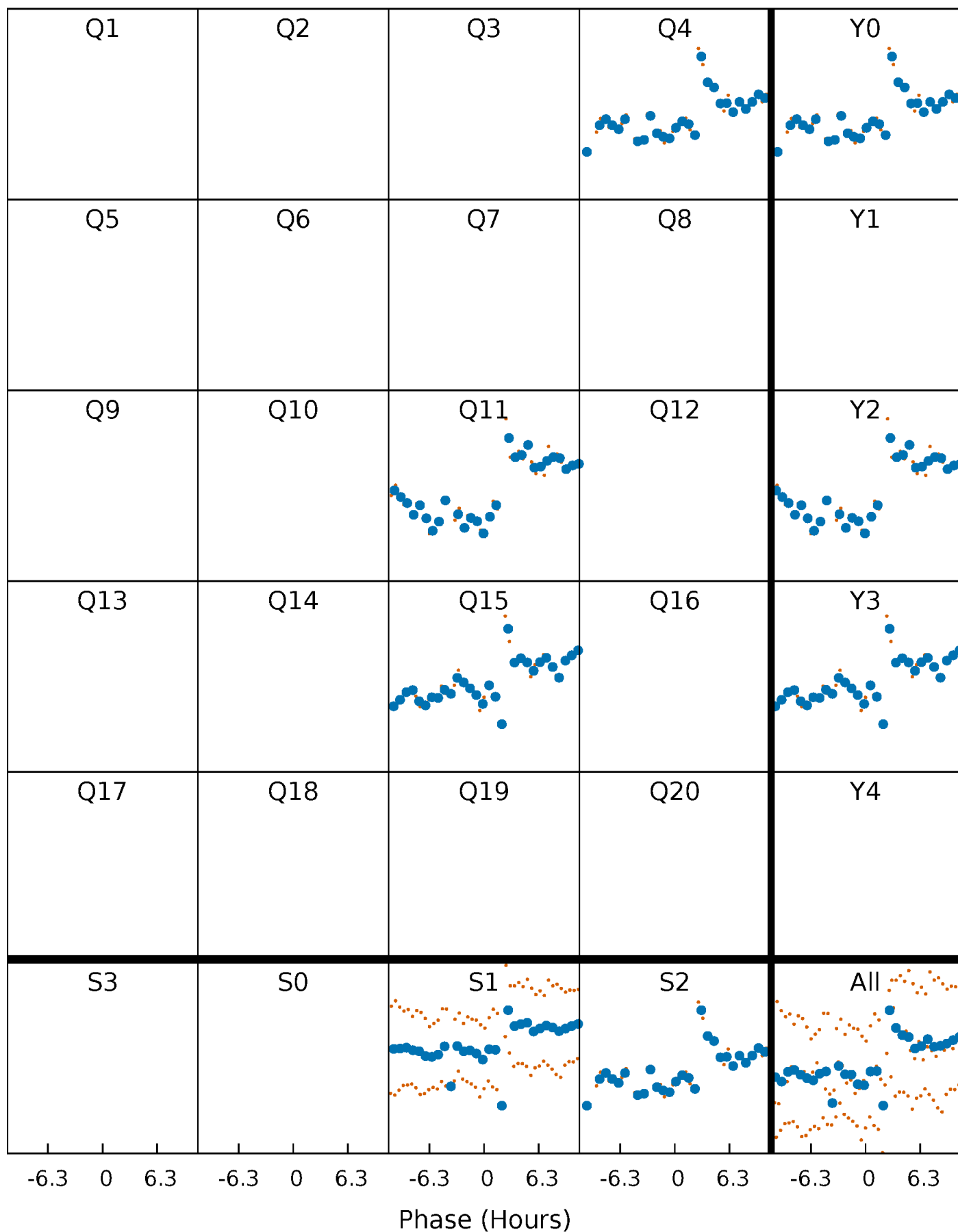


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

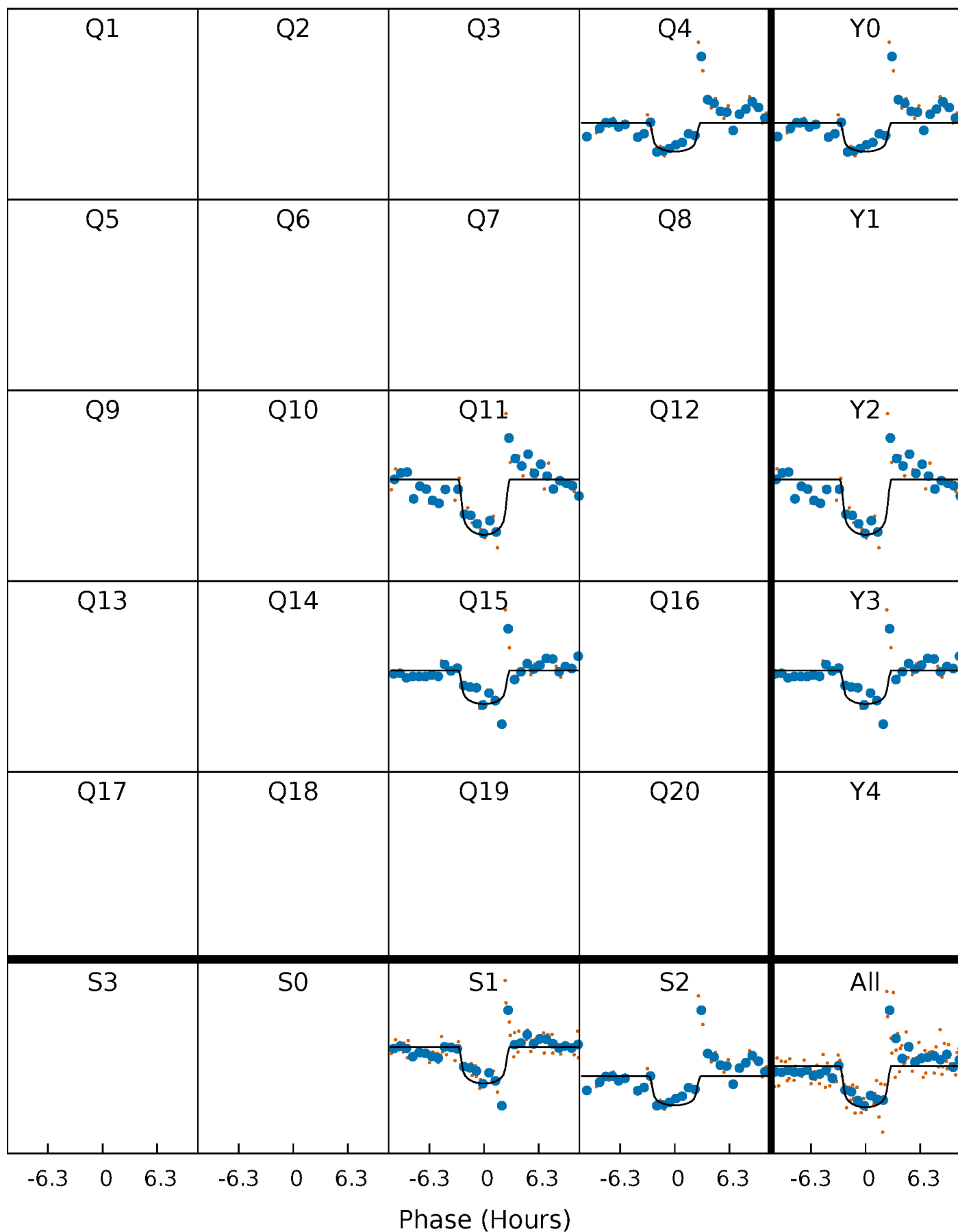
TCE 008879976-02     $P=354.159555$  Days     $T_0=370.530374$  (BKJD)





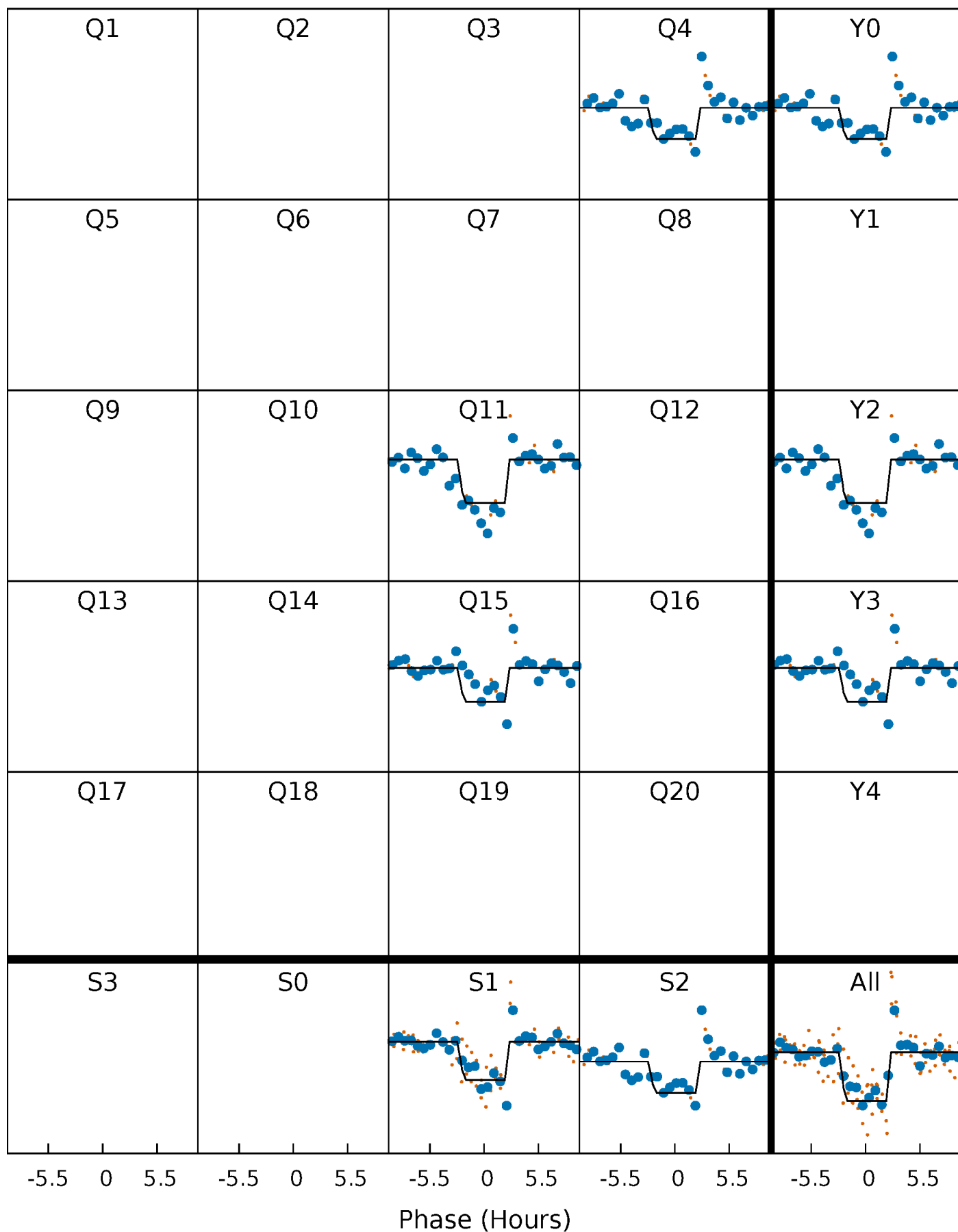
# DV Quarter-Phased Transit Curves

TCE 008879976-02     $P=354.159555$  Days     $T_0=370.530374$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

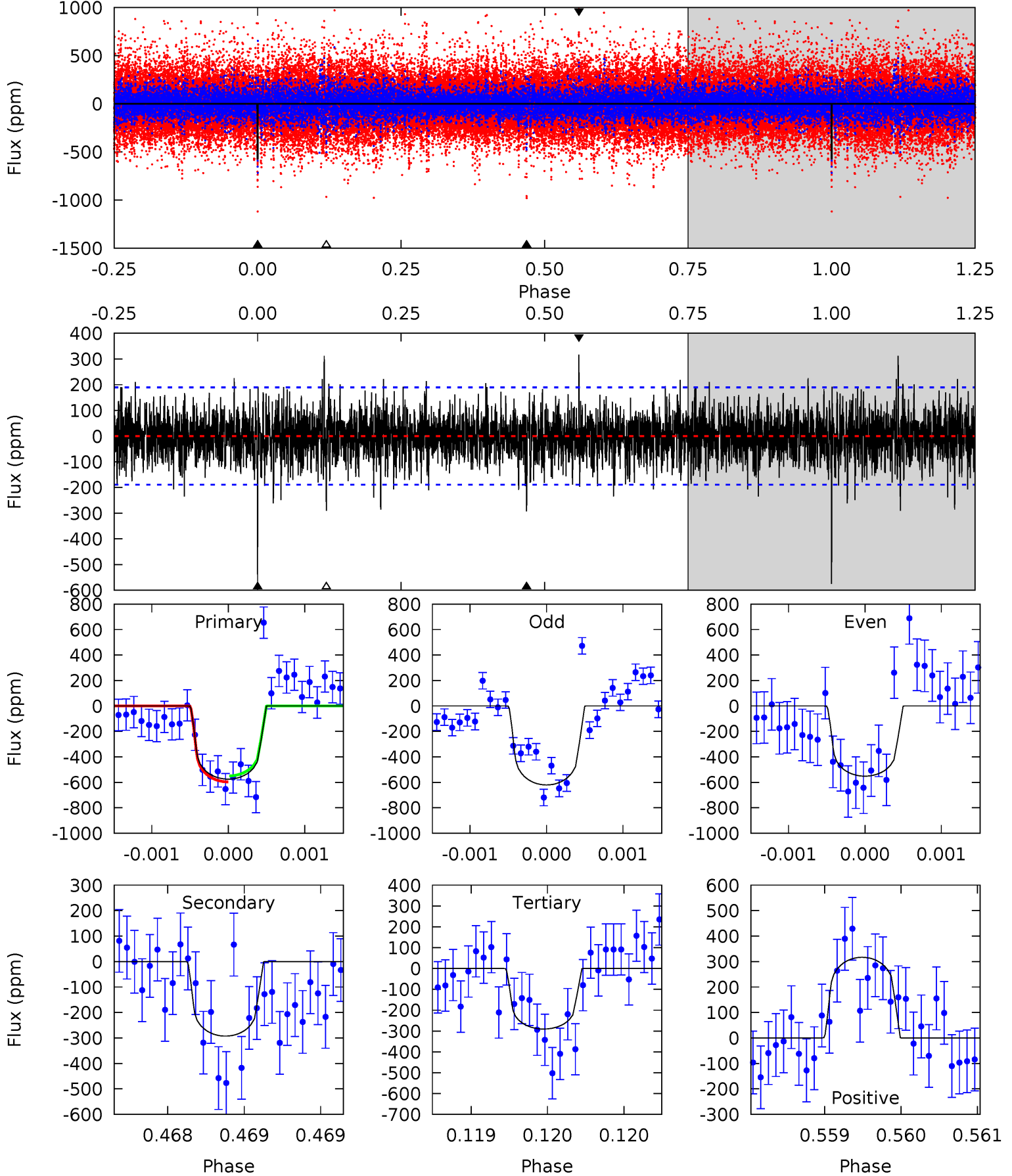
TCE 008879976-02     $P=354.154462$  Days     $T_0=370.536253$  (BKJD)



# DV Model-Shift Uniqueness Test

008879976-02, P = 354.159555 Days, E = 16.370819 Days

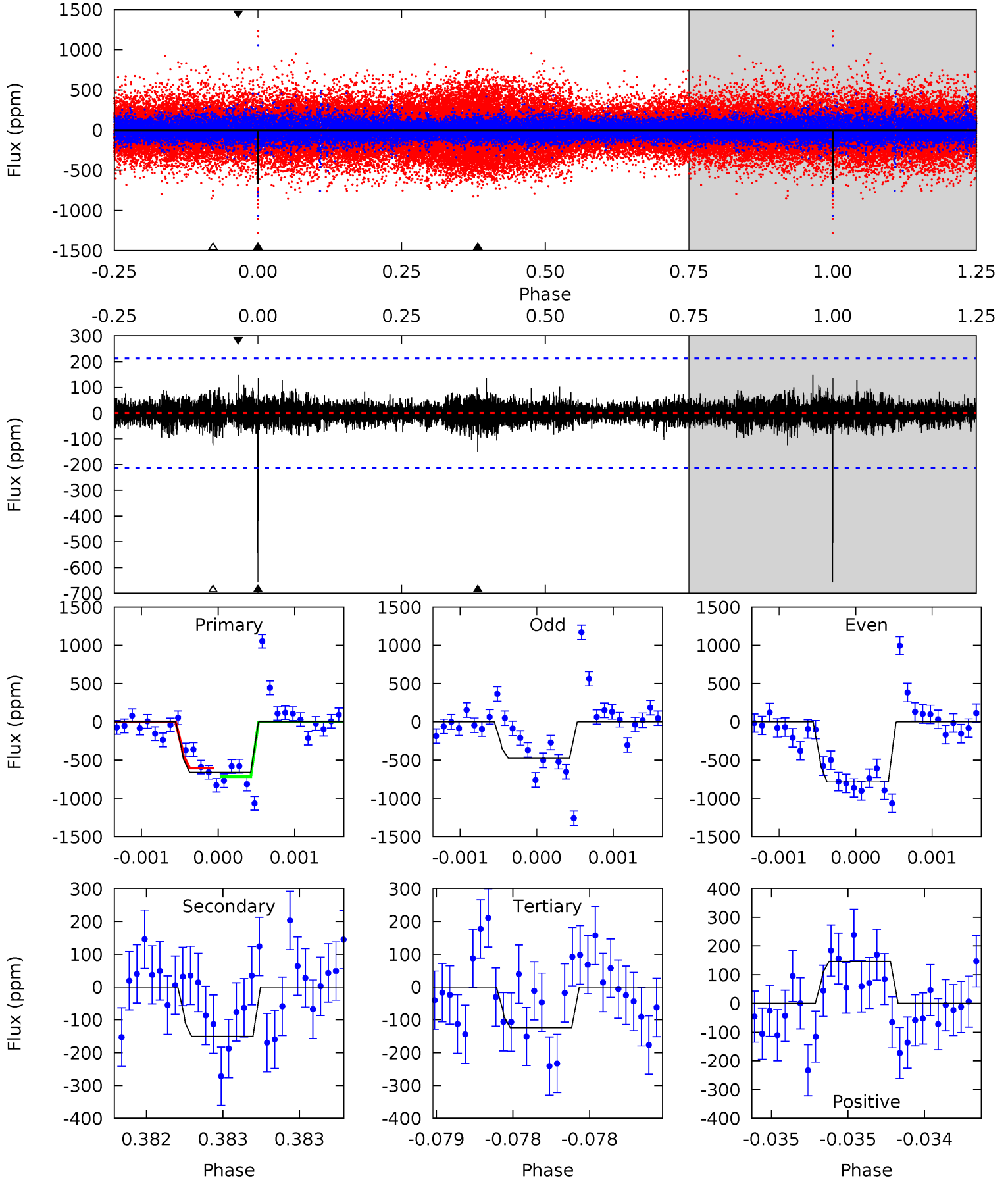
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
16.8	8.53	8.46	9.23	5.52	3.39	1.92	8.29	7.52	0.07	-0.70	0.94	1.02	0.36	0.68



# Alt Model-Shift Uniqueness Test

008879976-02, P = 354.154462 Days, E = 16.381791 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
17.2	3.94	3.25	3.84	5.55	3.44	0.67	13.9	13.4	0.69	0.09	3.95	1.04	0.18	1.46



### Stellar Parameters For KIC 008879976

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6200^{+150}_{-236}$	$4.230^{+0.140}_{-0.210}$	$0.300^{+0.150}_{-0.300}$	$1.437^{+0.473}_{-0.276}$	$1.281^{+0.163}_{-0.181}$	$0.608^{+0.430}_{-0.339}$
	+2%/-4%	+3%/-5%	+50%/-100%	+33%/-19%	+13%/-14%	+71%/-56%
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 008879976-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-293 \pm 34$	$4.12^{+2.32}_{-2.01}$	$446^{+31}_{-29}$	$5036^{+1789}_{-742}$	$10367^{+30159}_{-5946}$
Alt.	$-151 \pm 38$	$4.54^{+2.44}_{-2.00}$	$448^{+37}_{-31}$	$4285^{+1185}_{-574}$	$4478^{+10344}_{-2642}$

$T_{\text{max}}$  = 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

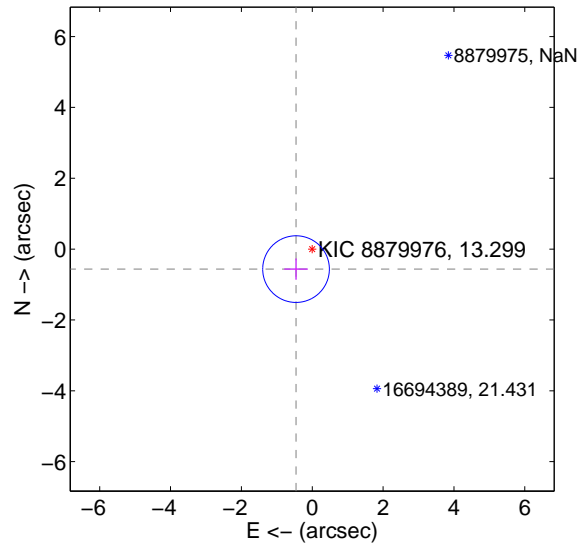
Supplemental centroid analysis for 008879976-02. Kepler magnitude: 13.30. Transit SNR 9.42

There are 1 quarters with good PRF difference image offsets

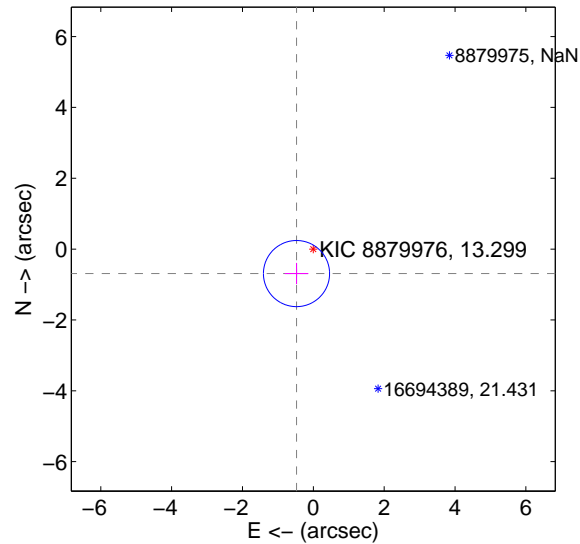
The direct PRF centroid is offset from the target star catalog position by about 0.13 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.727 \pm 0.314$	2.32	$0.458 \pm 0.333$	$-0.565 \pm 0.301$
PRF-fit source offset from KIC position	$0.838 \pm 0.311$	2.69	$0.475 \pm 0.333$	$-0.691 \pm 0.301$
photometric centroid source offset	$0.90 \pm 1.60$	0.56	$0.90 \pm 1.60$	$-0.01 \pm 0.89$

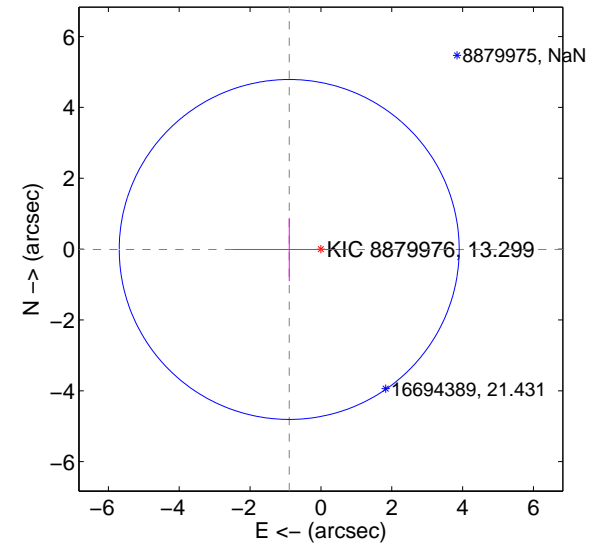
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

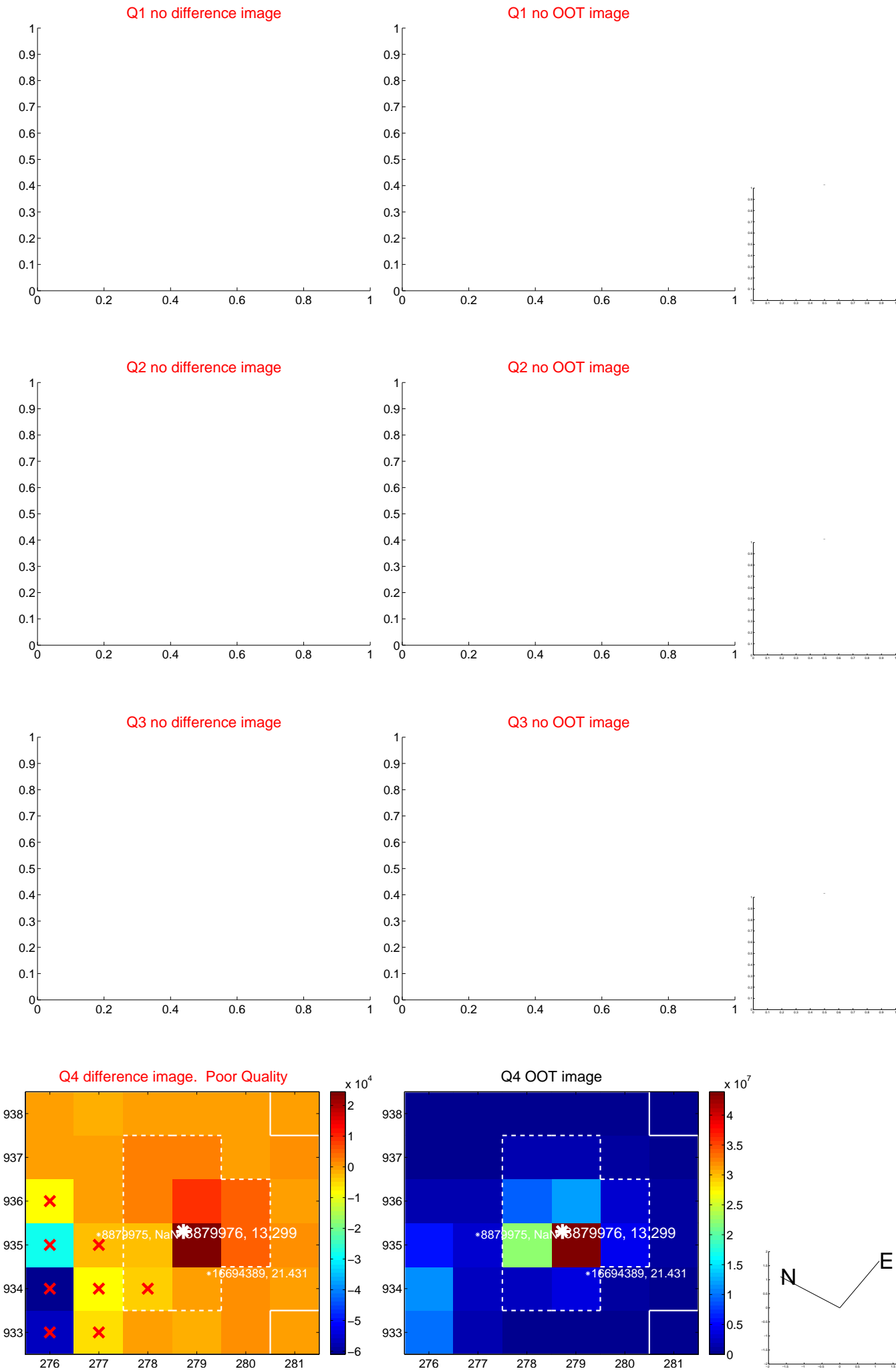


offset from photometric centroids



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.

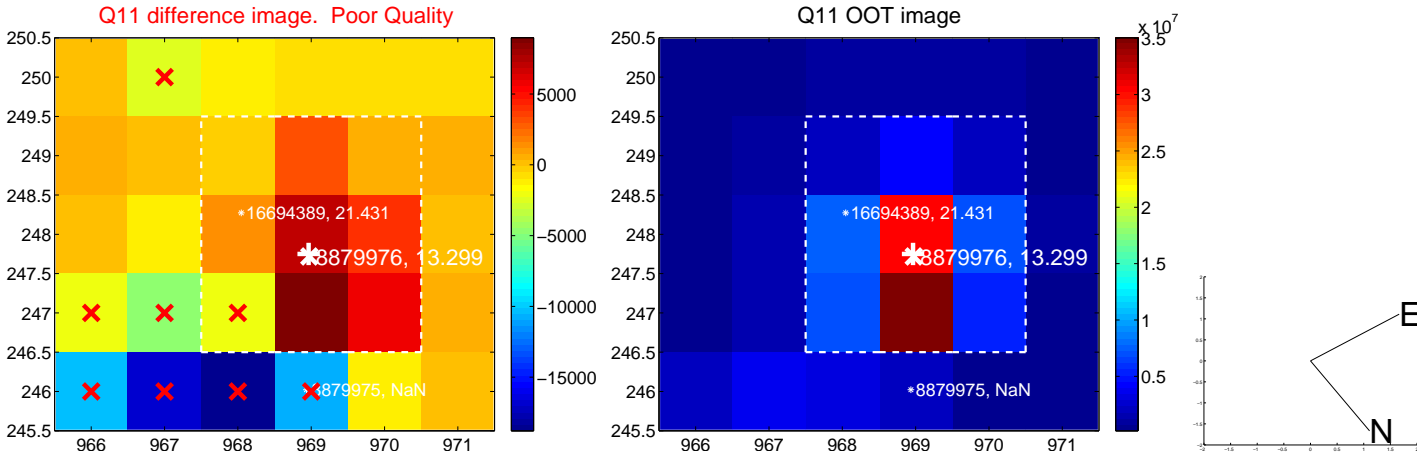


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

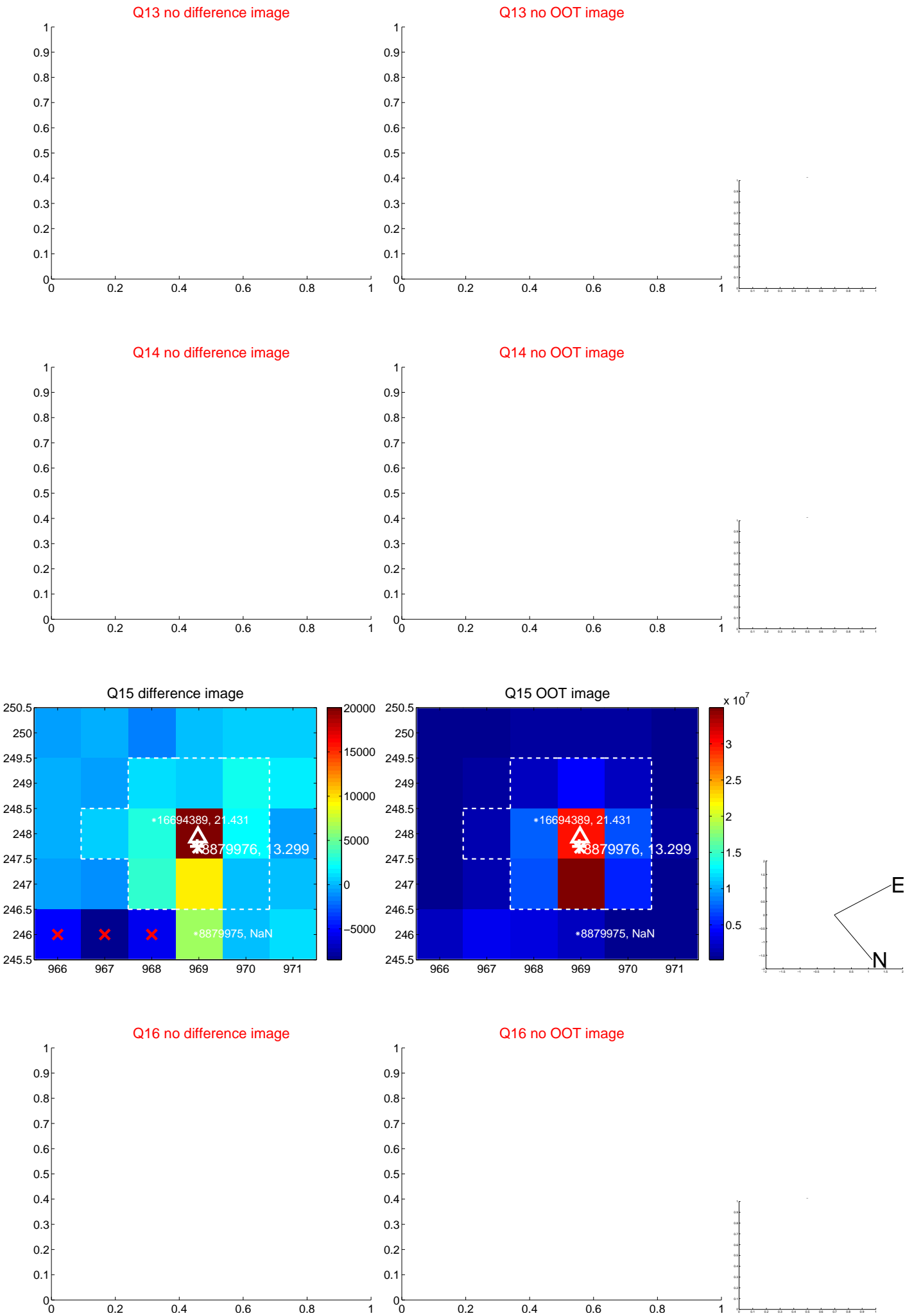




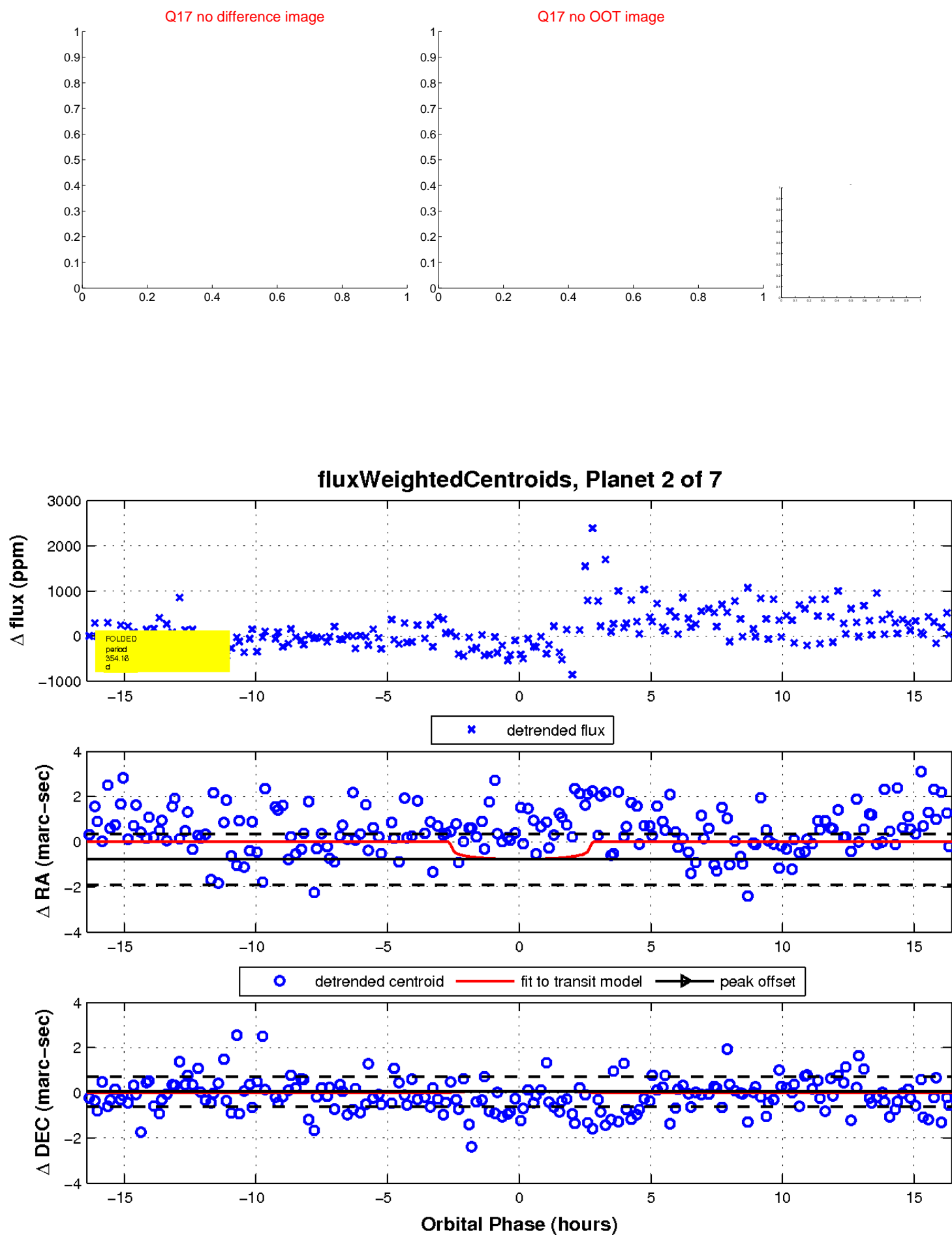
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.

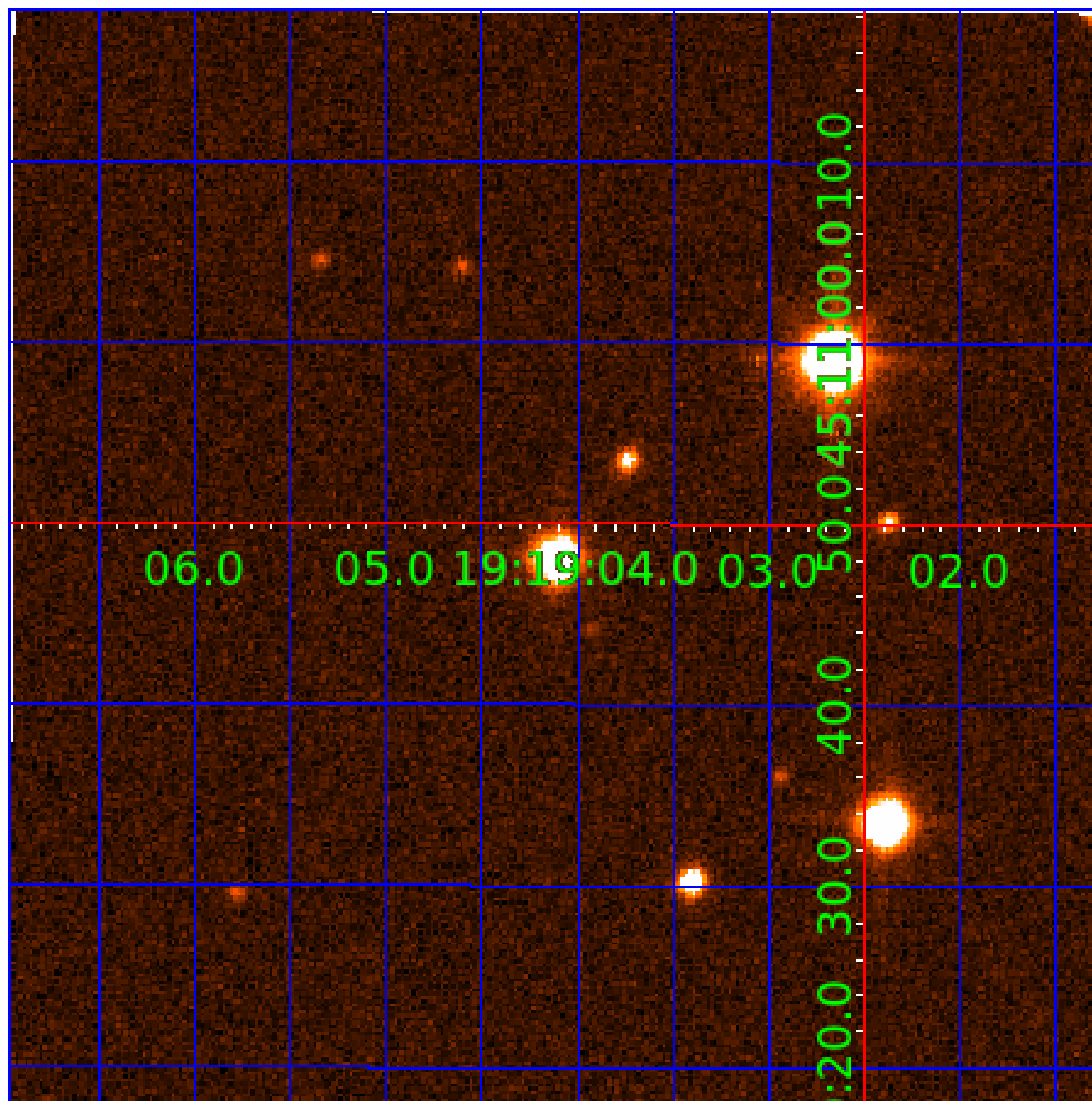


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 008879976

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008879976-01	OBS	No	499.629434	142.102639	414.7	4.566	10.6	5.7	1.44	6200	3.17	1.53
008879976-02	OBS	No	354.159555	370.530374	698.0	5.500	16.6	9.4	1.44	6200	3.99	2.42
008879976-03	OBS	No	672.266947	223.970877	531.5	6.474	11.9	7.2	1.44	6200	3.67	1.03
008879976-04	OBS	No	568.697799	405.990628	572.2	13.754	9.7	6.4	1.44	6200	3.50	1.28
008879976-06	OBS	No	601.258445	137.780047	482.7	11.771	9.1	6.3	1.44	6200	3.75	1.19
008879976-07	OBS	No	239.327245	282.546057	553.2	10.694	8.8	7.5	1.44	6200	6.63	4.08

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008879976-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—CENT_FEW_DIFFS
008879976-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—CENT_FEW_DIFFS
008879976-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
008879976-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
008879976-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—CENT_FEW_DIFFS
008879976-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

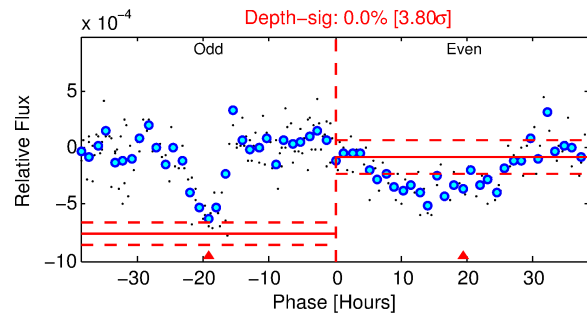
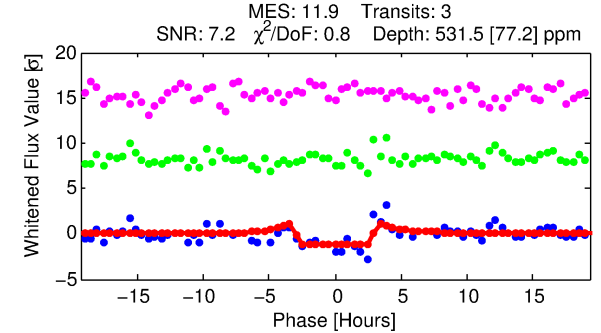
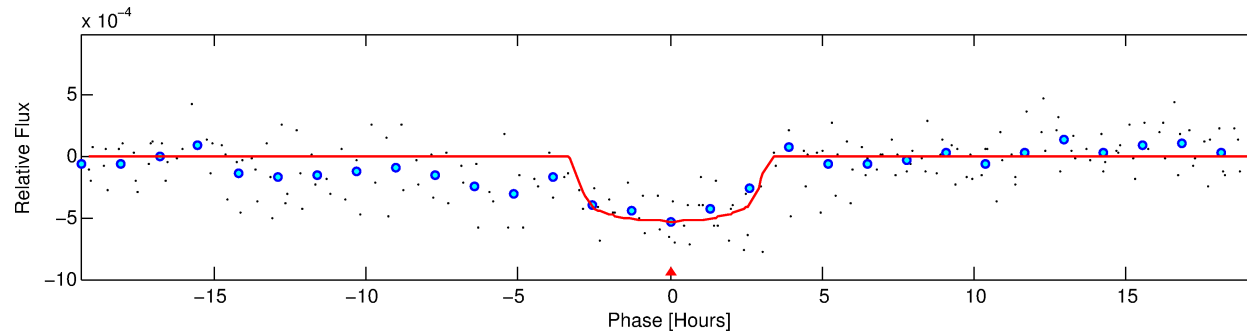
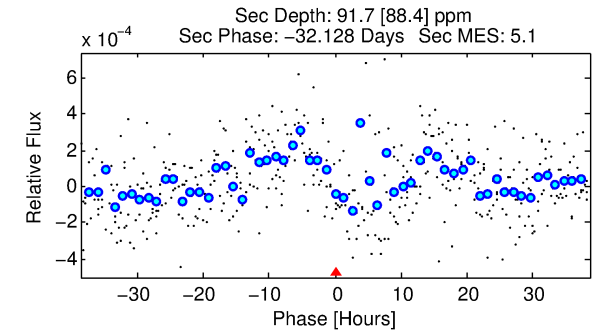
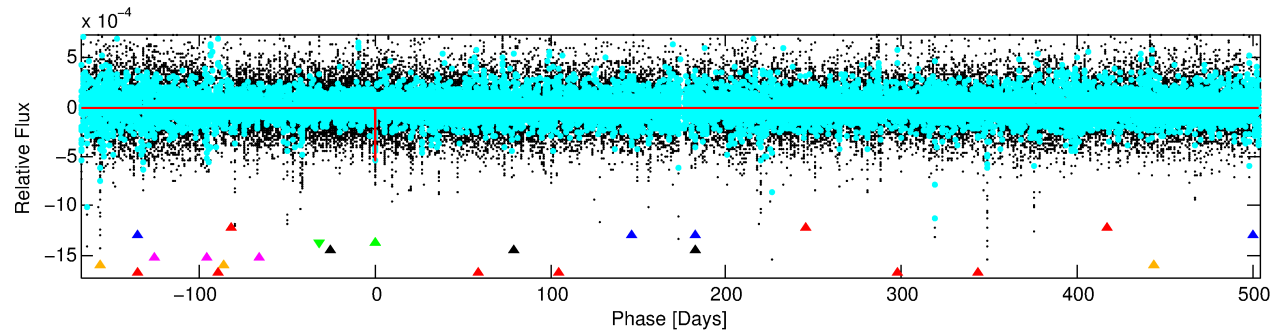
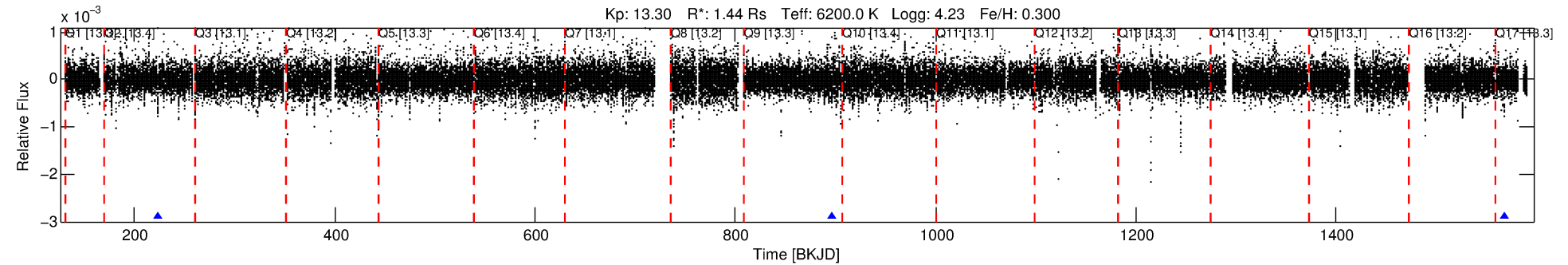
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 008879976-03

No Significant Match Found

# DV One-Page Summary

KIC: 8879976 Candidate: 3 of 7 Period: 672.267 d



## DV Fit Results:

Period = 672.26695 [0.00640] d  
Epoch = 223.9709 [0.0099] BKJD  
Rp/R\* = 0.0234 [0.0116]  
a/R\* = 503.53 [1201.69]  
b = 0.80 [1.06]  
Seff = 1.03 [0.43]  
Teq = 257 [27] K  
Rp = 3.67 [2.18] Re  
a = 1.6307 [0.4440] AU  
Ag = 9942.08 [14276.96] [0.70σ]  
Teffp = 3964 [1378] K [2.69σ]

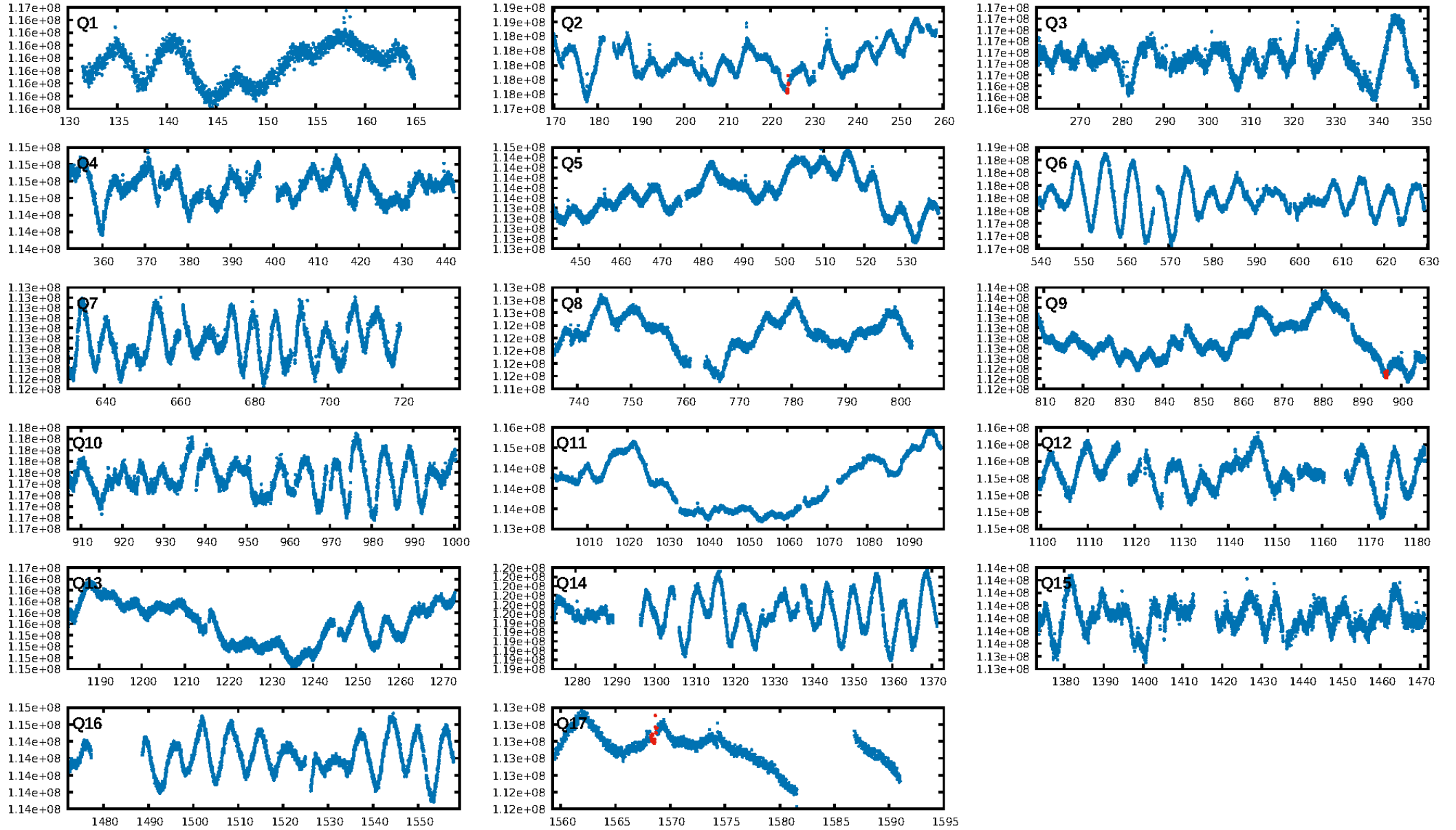
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [65.15σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 3.7%  
ModelChiSquareGof-sig: 99.9%  
**Bootstrap-pfa: 2.39e-11**  
RollingBand-fgt: 1.00 [2/2]  
GhostDiagnostic-chr: 3.929  
Centroid-sig: 82.8%  
Centroid-so: 0.236 arcsec [0.30σ]  
OotOffset-rm: N/A  
OotOffset-st: 0/0/0 [0]  
KicOffset-rm: N/A  
KicOffset-st: 0/0/0 [0]  
DiffImageQuality-fgm: N/A  
DiffImageOverlap-fno: 1.00 [2/2]

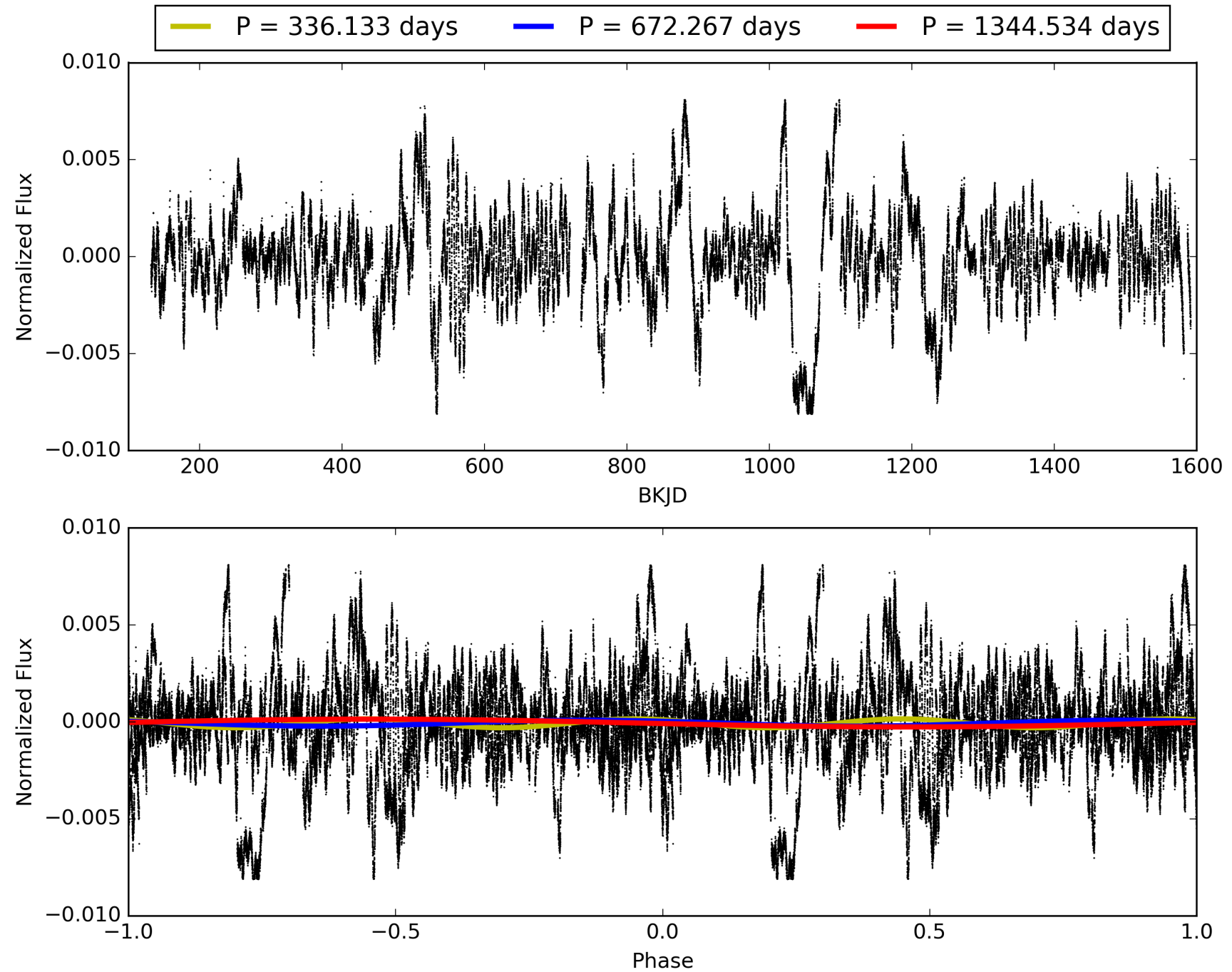
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 20:46:34 Z

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

# TCE 008879976-03, PDC Light Curves



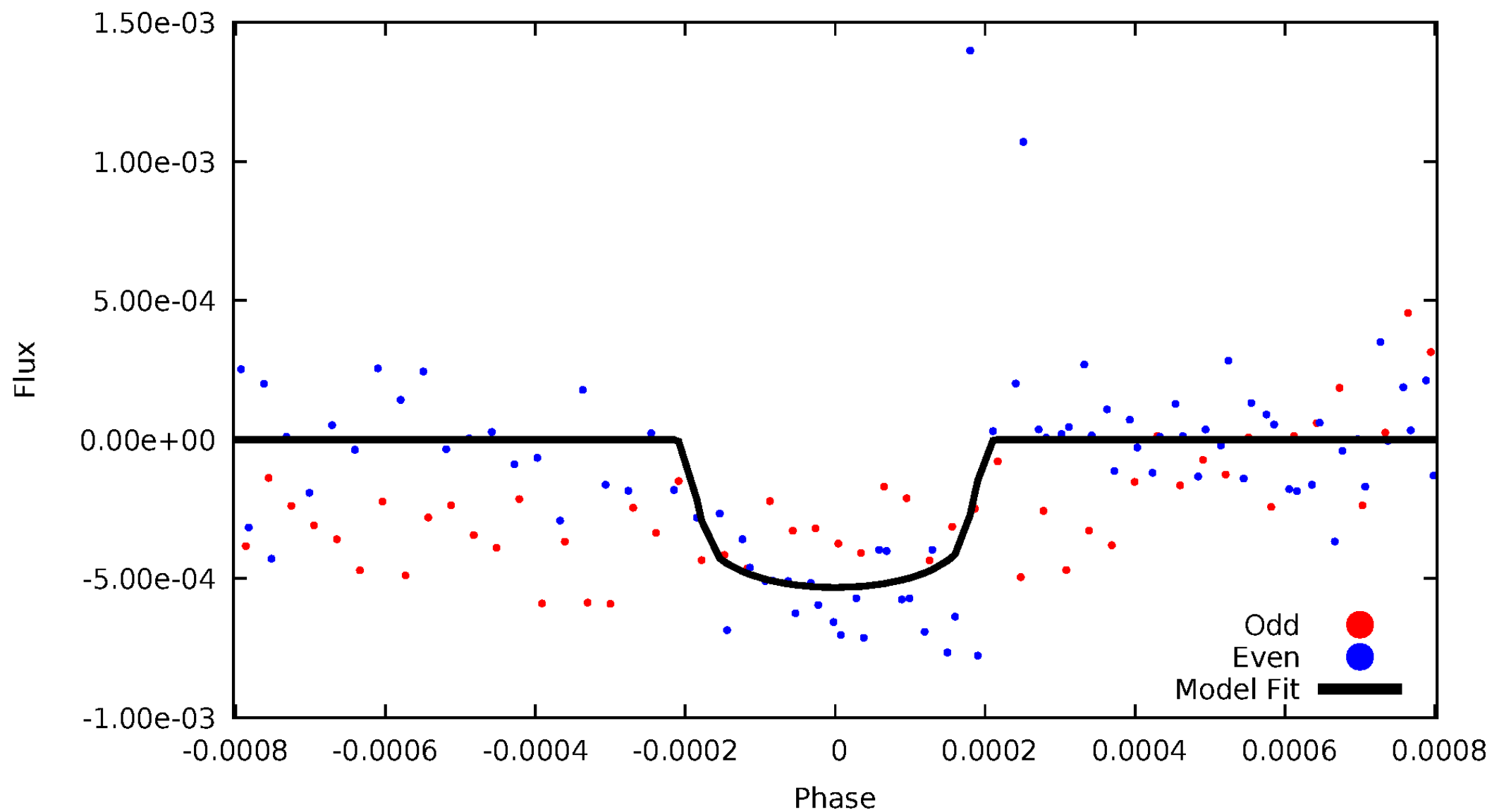
TCE 008879976-03





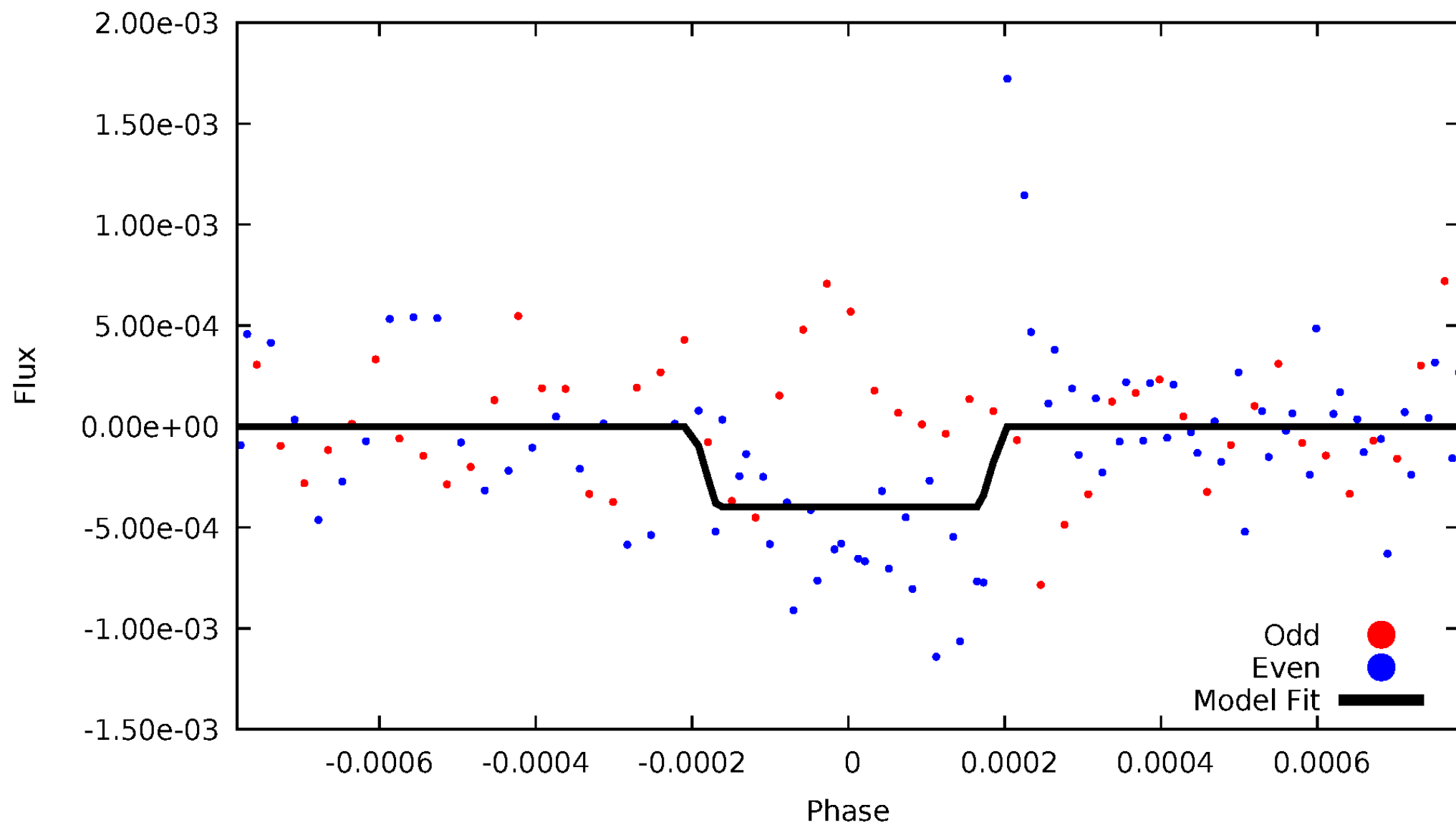
# DV Odd/Even

TCE 008879976-03



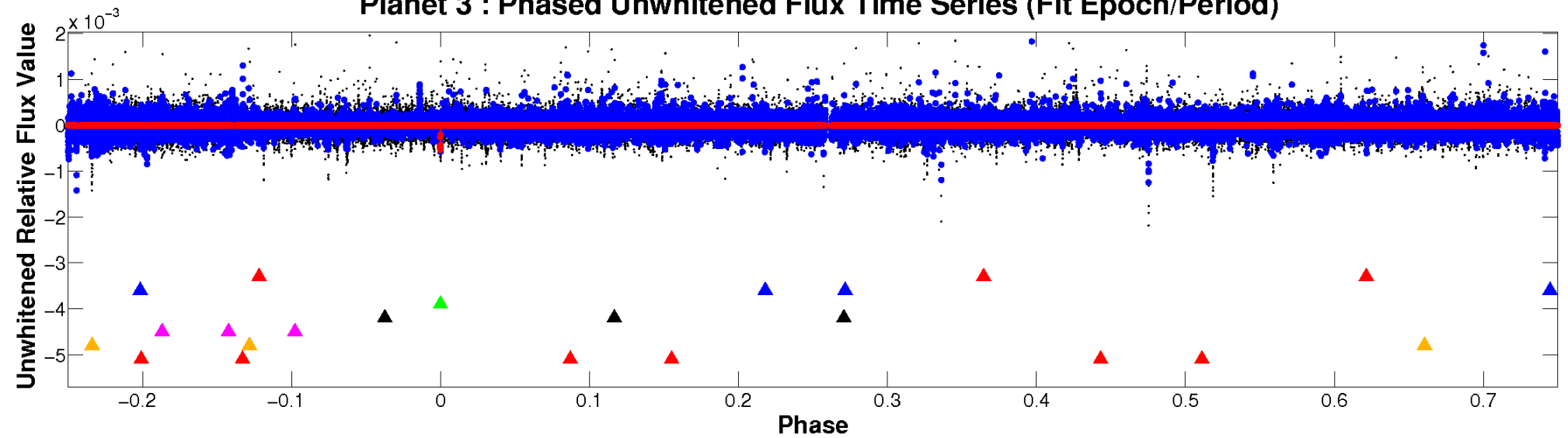
# ALT Odd/Even

TCE 008879976-03

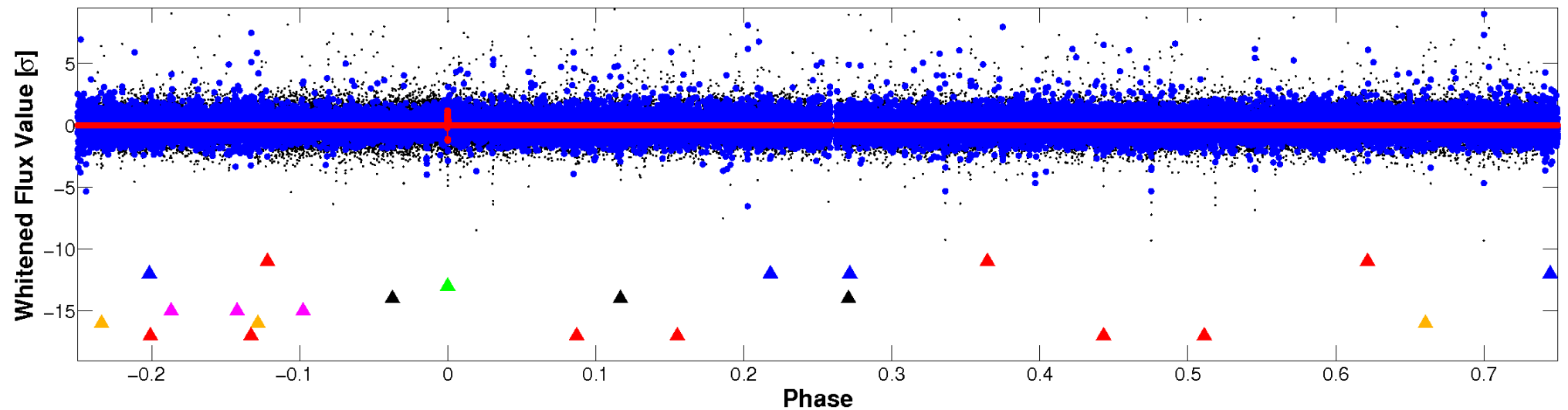


# Non-Whitened Vs. Whitened Light Curve

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

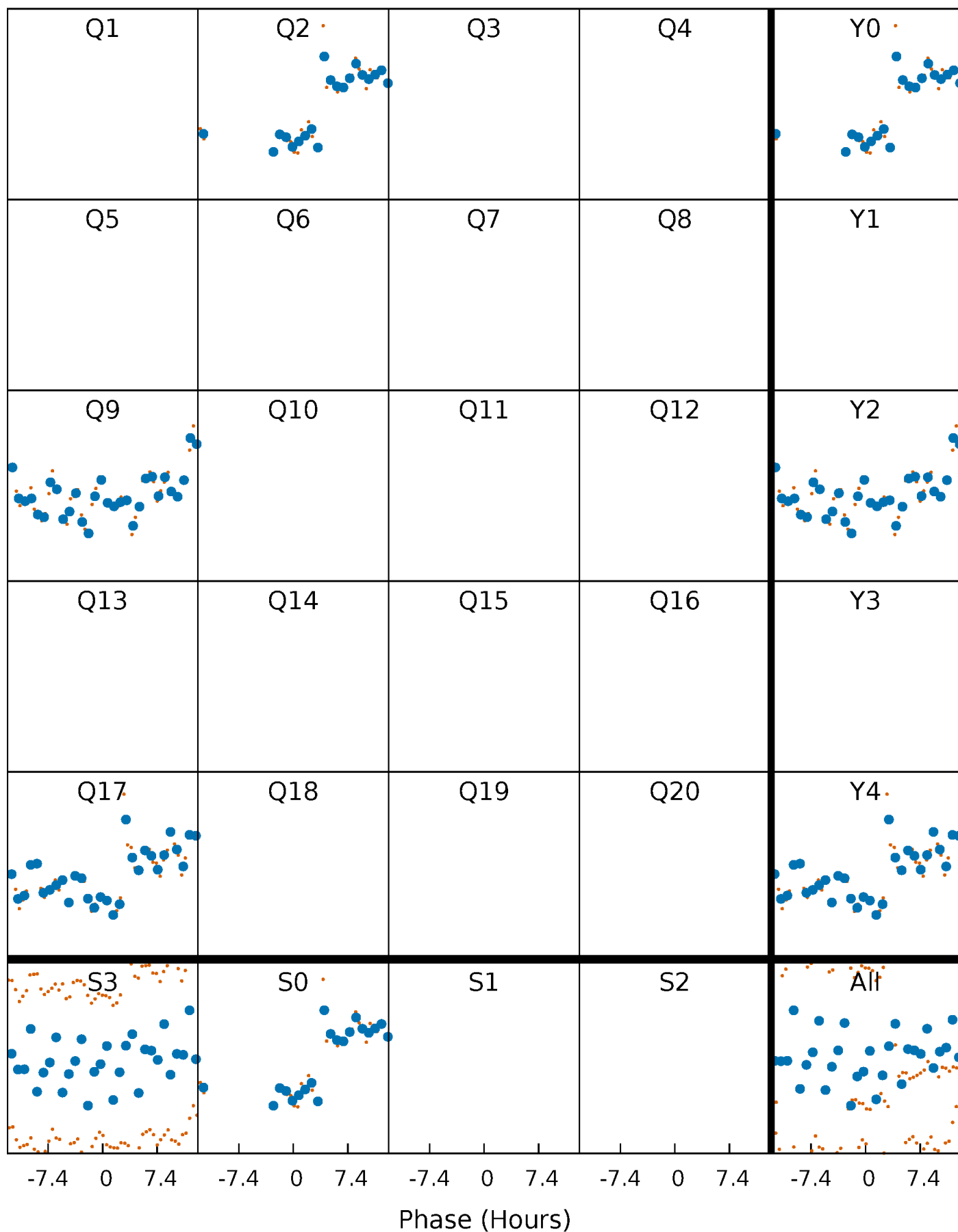


**Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



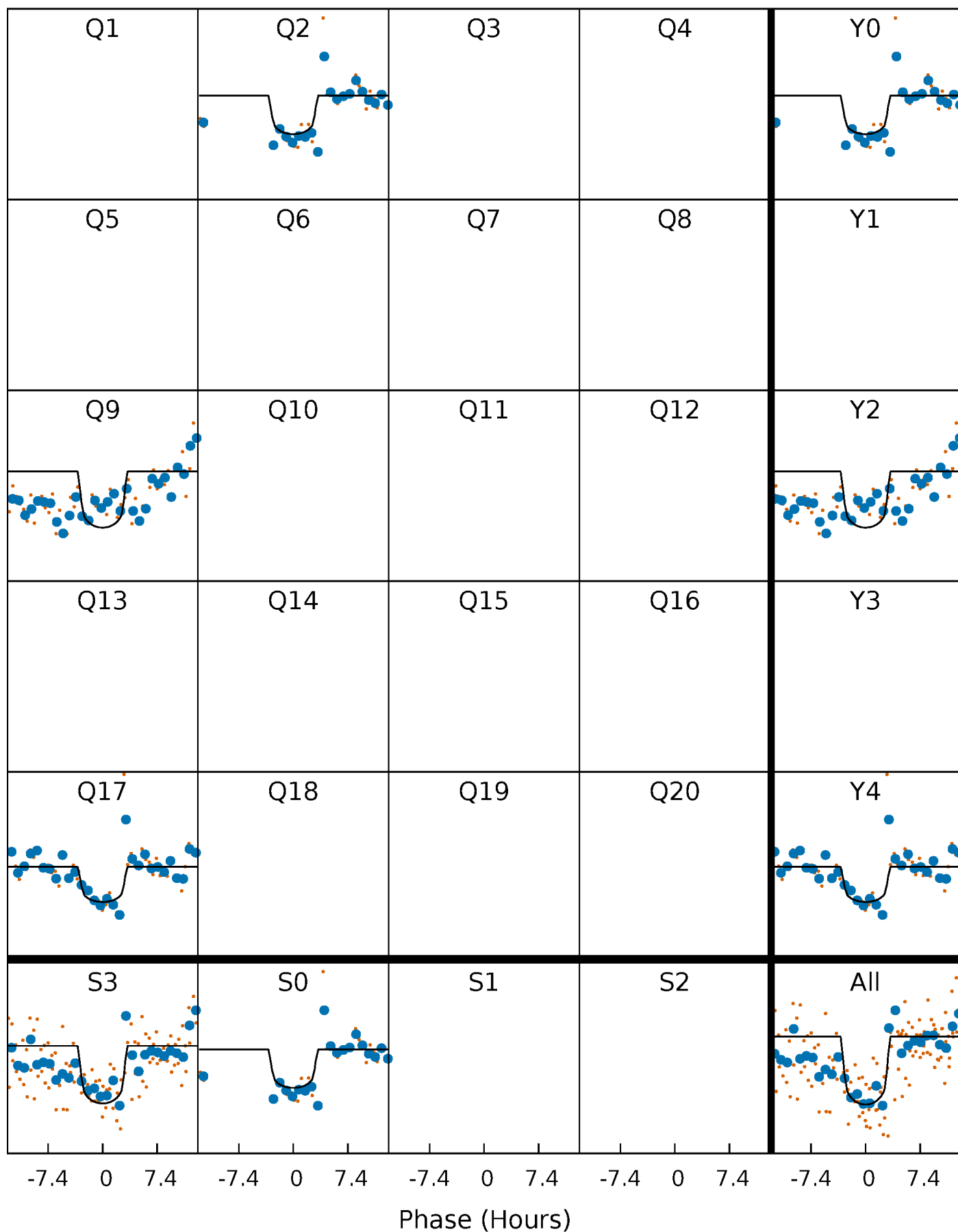
# PDC Quarter-Phased Transit Curves

TCE 008879976-03 P=672.266947 Days  $T_0=223.970877$  (BKJD)



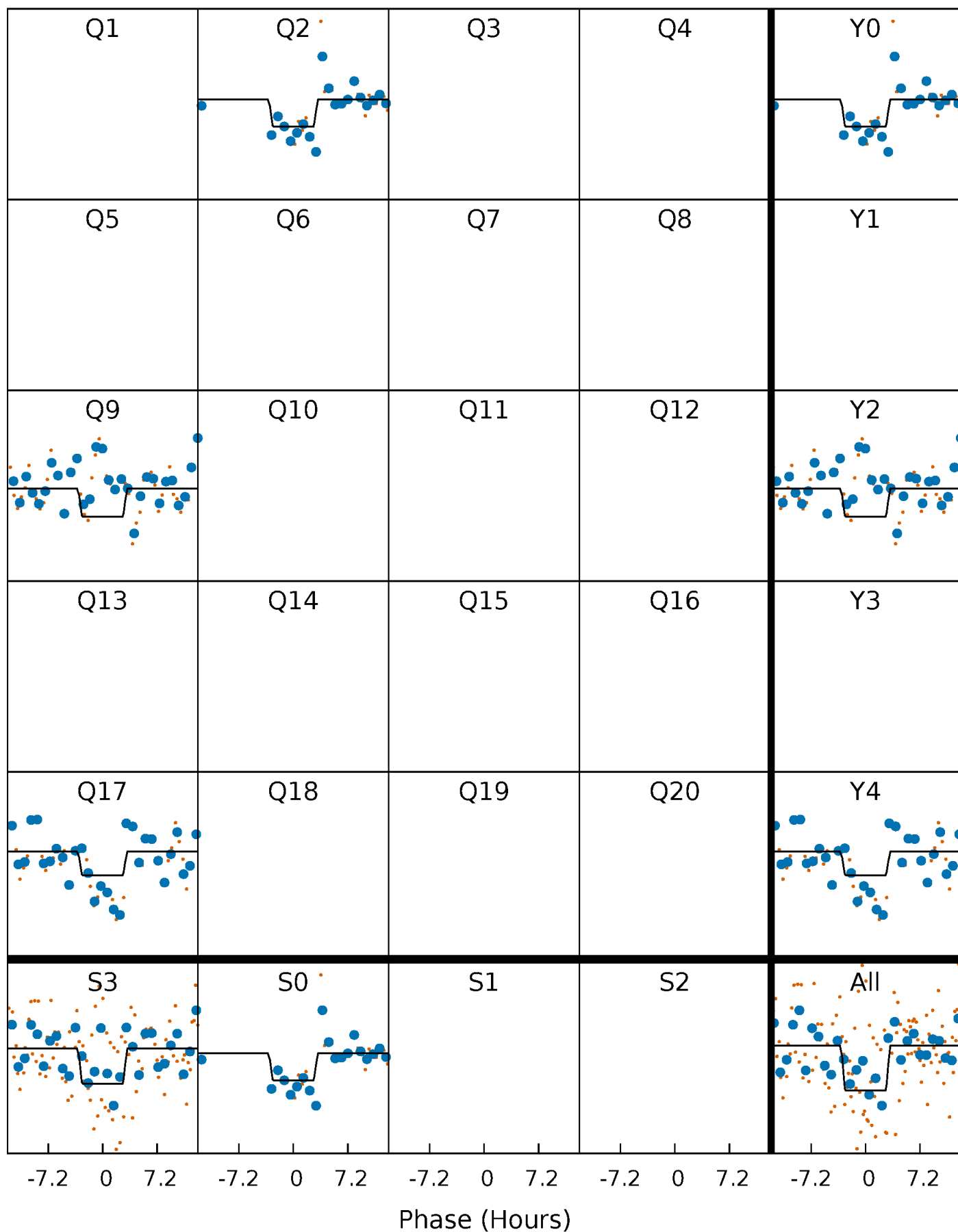
# DV Quarter-Phased Transit Curves

TCE 008879976-03 P=672.266947 Days  $T_0=223.970877$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

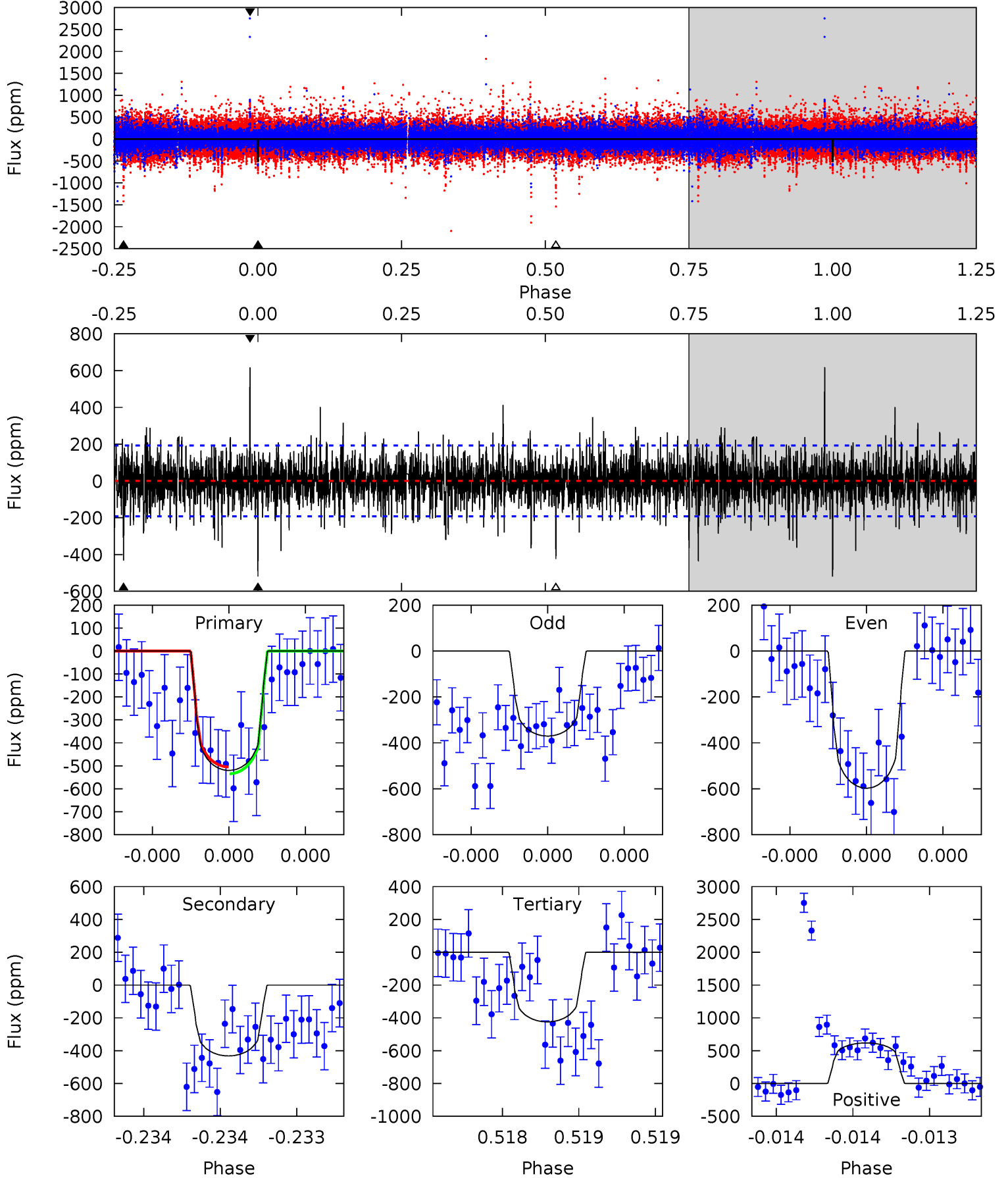
TCE 008879976-03 P=672.250502 Days  $T_0=223.988061$  (BKJD)



# DV Model-Shift Uniqueness Test

008879976-03, P = 672.266947 Days, E = 223.970877 Days

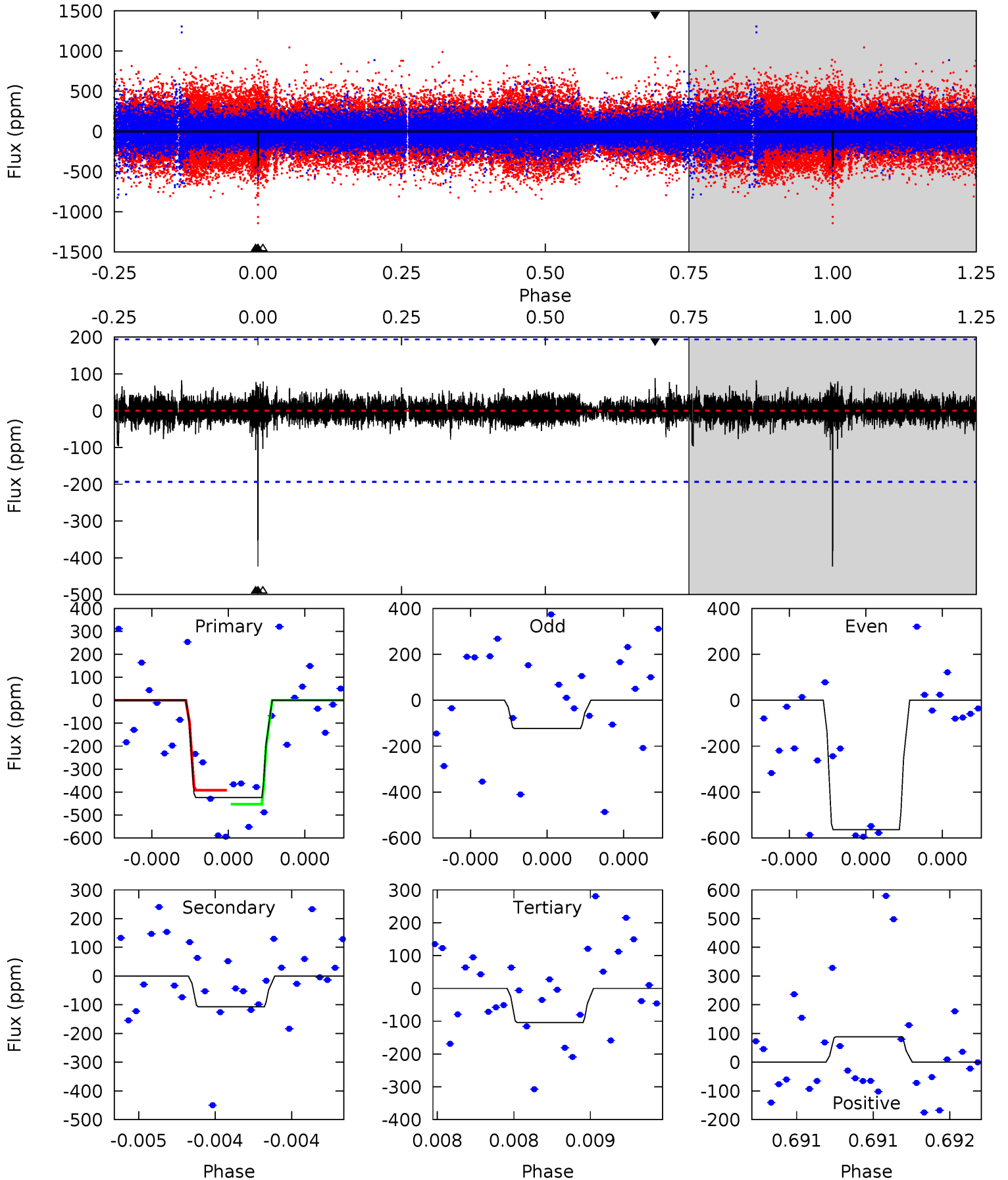
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
15.1	12.6	12.4	18.0	5.60	3.53	2.47	2.78	-2.83	0.22	-5.40	3.07	1.02	0.54	0.44



# Alt Model-Shift Uniqueness Test

008879976-03, P = 672.250502 Days, E = 223.988061 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.3	3.11	3.02	2.56	5.62	3.56	0.50	9.28	9.73	0.09	0.54	6.29	0.74	0.17	0.88





### Stellar Parameters For KIC 008879976

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6200^{+150}_{-236}$	$4.230^{+0.140}_{-0.210}$	$0.300^{+0.150}_{-0.300}$	$1.437^{+0.473}_{-0.276}$	$1.281^{+0.163}_{-0.181}$	$0.608^{+0.430}_{-0.339}$
	+2%/-4%	+3%/-5%	+50%/-100%	+33%/-19%	+13%/-14%	+71%/-56%
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 008879976-03 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-432 \pm 34$	$3.75^{+2.00}_{-1.85}$	$360^{+27}_{-23}$	$5739^{+2565}_{-882}$	$42882^{+120811}_{-23885}$
Alt.	$-107 \pm 34$	$3.31^{+1.76}_{-1.68}$	$359^{+31}_{-23}$	$4485^{+1655}_{-631}$	$13922^{+40649}_{-8466}$

$T_{max}$  = 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

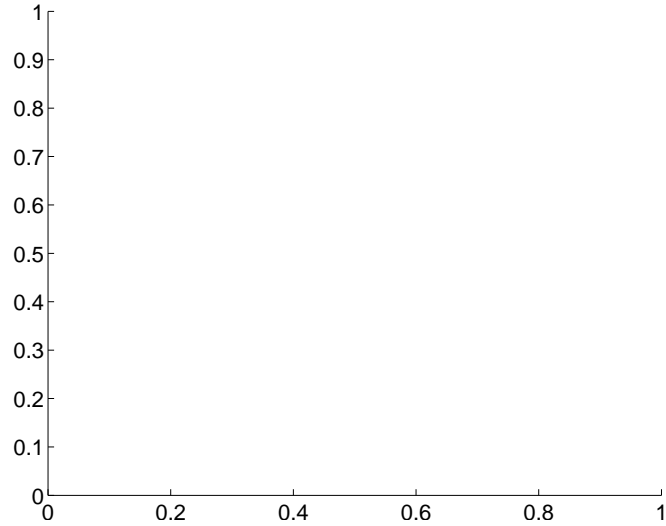
Supplemental centroid analysis for 008879976-03. Kepler magnitude: 13.30. Transit SNR 7.22

There are 0 quarters with good PRF difference image offsets

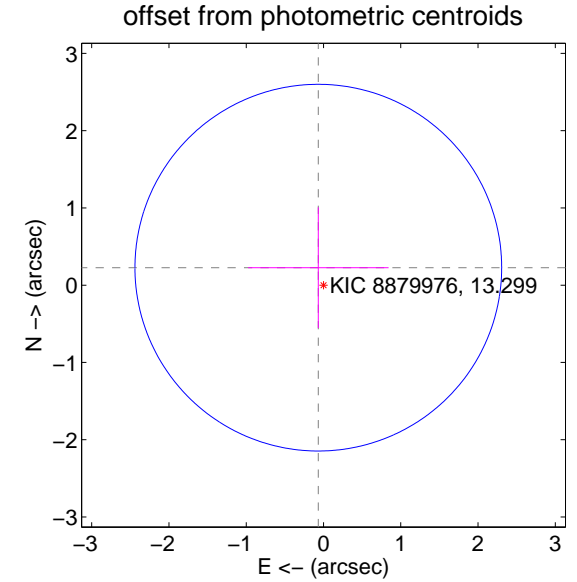
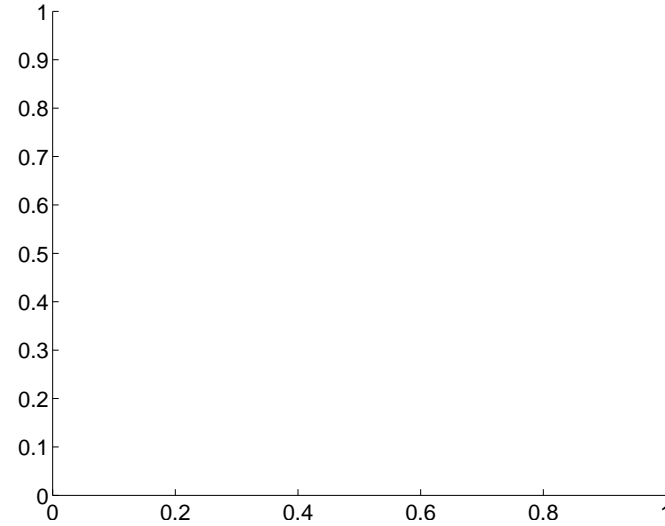
The direct PRF centroid is offset from the target star catalog position by about NaN arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	—	—	—	—
PRF-fit source offset from KIC position	—	—	—	—
photometric centroid source offset	$0.24 \pm 0.79$	0.30	$0.07 \pm 0.91$	$0.23 \pm 0.78$

There is no PRF-fit offset from OOT-fit



There is no PRF-fit offset from KIC



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.

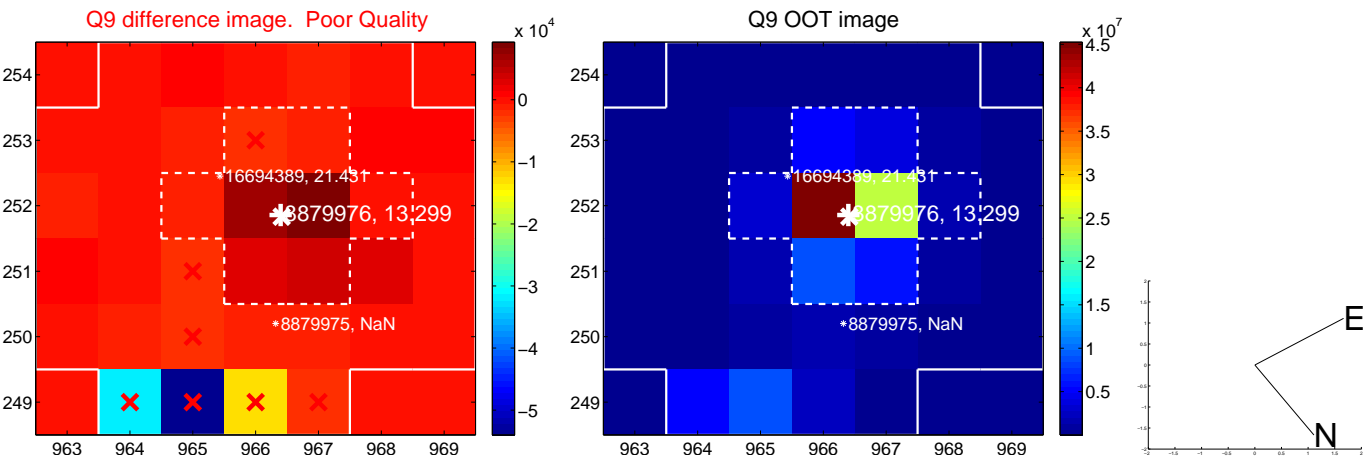
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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



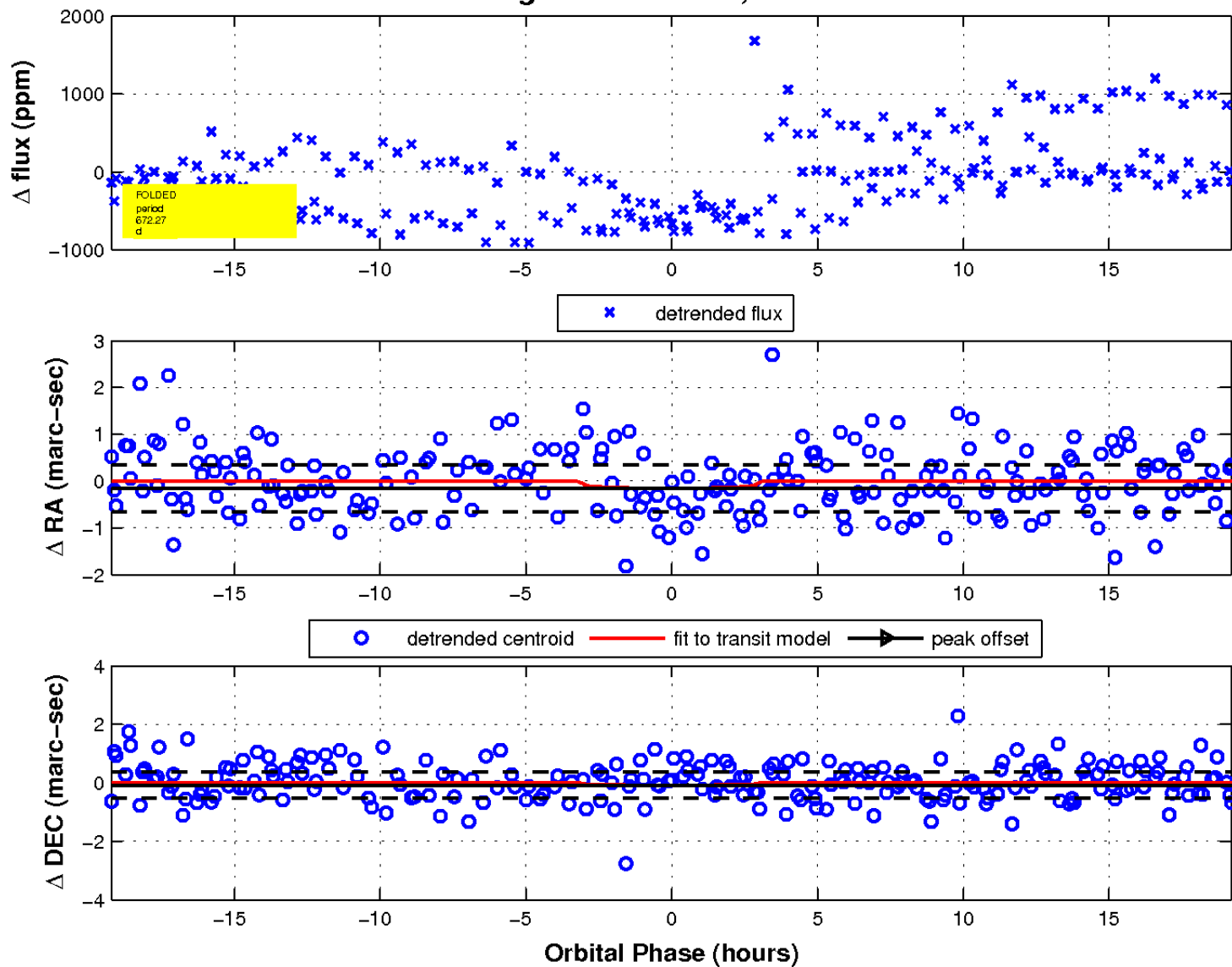
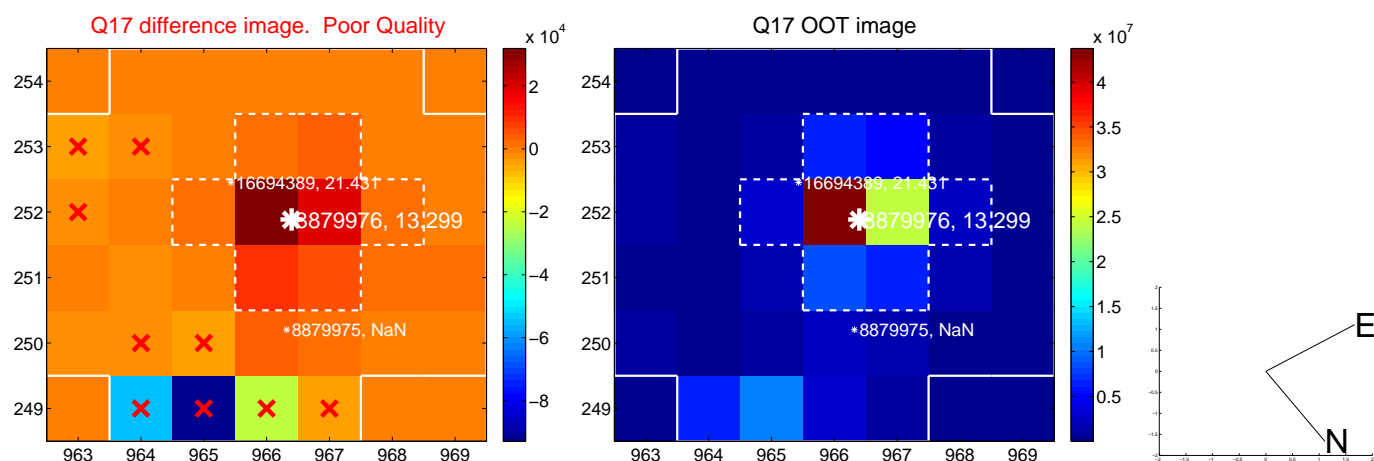
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.



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

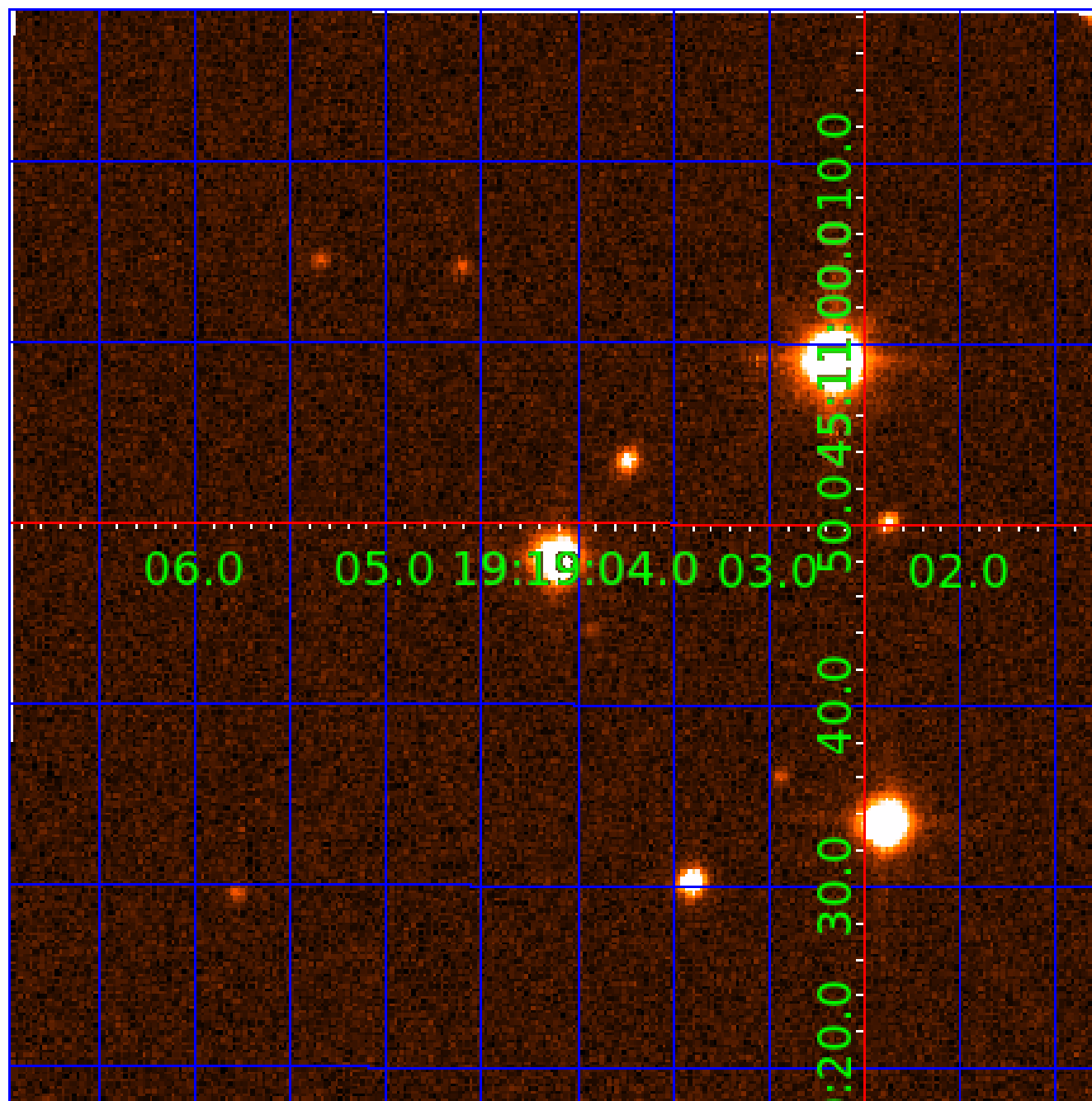


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 008879976

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008879976-01	OBS	No	499.629434	142.102639	414.7	4.566	10.6	5.7	1.44	6200	3.17	1.53
008879976-02	OBS	No	354.159555	370.530374	698.0	5.500	16.6	9.4	1.44	6200	3.99	2.42
008879976-03	OBS	No	672.266947	223.970877	531.5	6.474	11.9	7.2	1.44	6200	3.67	1.03
008879976-04	OBS	No	568.697799	405.990628	572.2	13.754	9.7	6.4	1.44	6200	3.50	1.28
008879976-06	OBS	No	601.258445	137.780047	482.7	11.771	9.1	6.3	1.44	6200	3.75	1.19
008879976-07	OBS	No	239.327245	282.546057	553.2	10.694	8.8	7.5	1.44	6200	6.63	4.08

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008879976-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—CENT_FEW_DIFFS
008879976-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—CENT_FEW_DIFFS
008879976-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
008879976-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
008879976-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—CENT_FEW_DIFFS
008879976-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

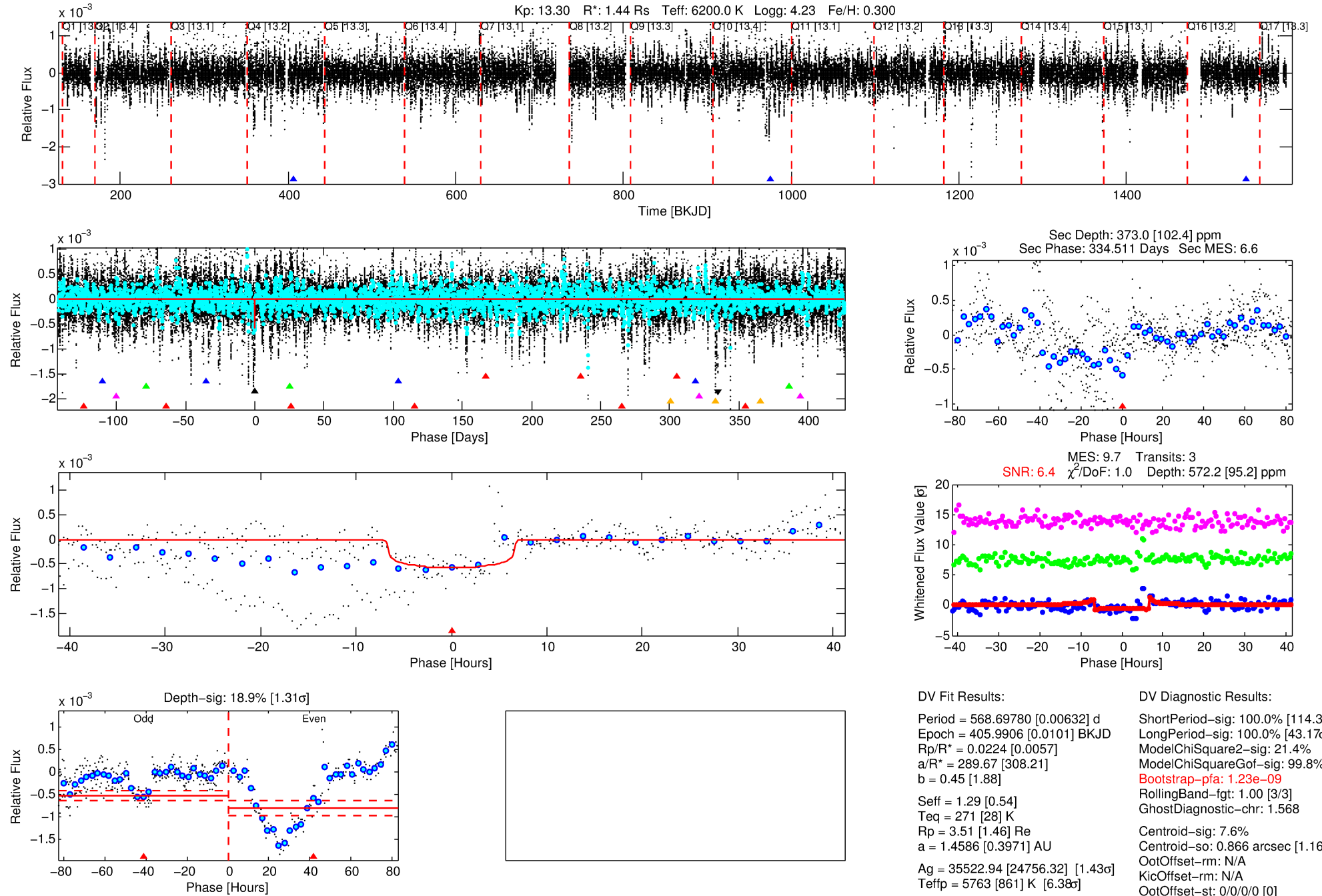
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 008879976-04

No Significant Match Found

# DV One-Page Summary

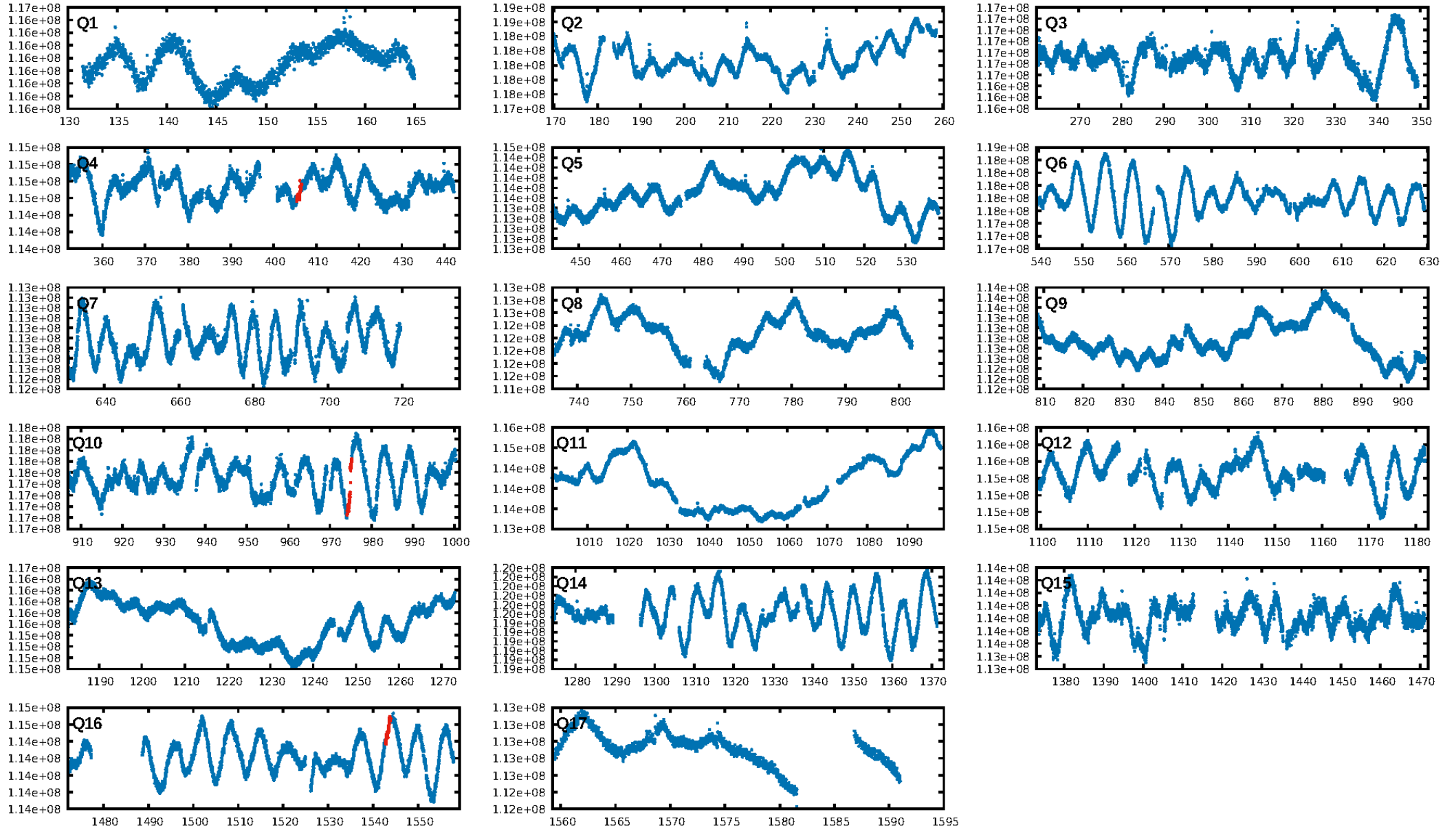
KIC: 8879976 Candidate: 4 of 7 Period: 568.698 d



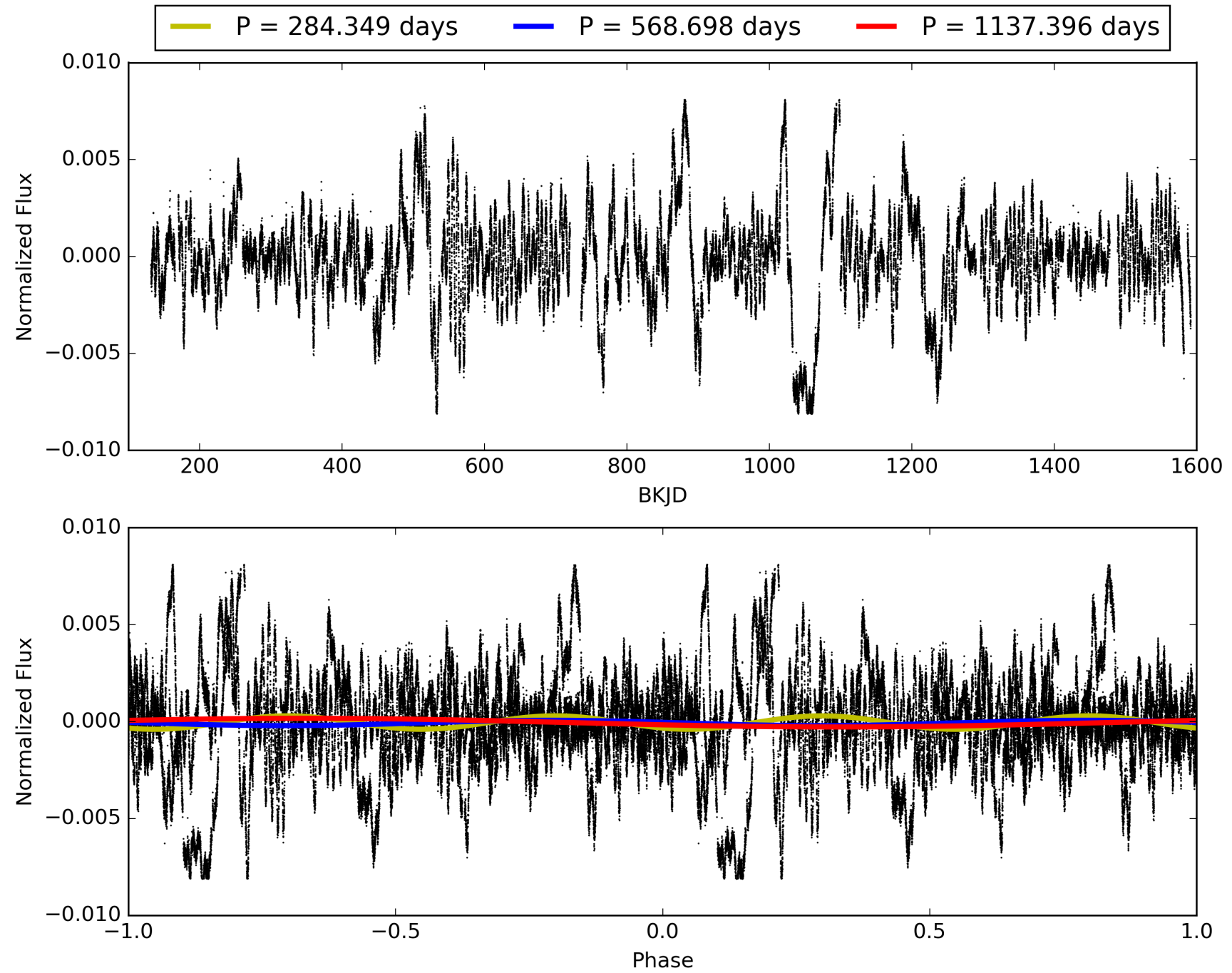
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 20:46:45 Z

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

# TCE 008879976-04, PDC Light Curves

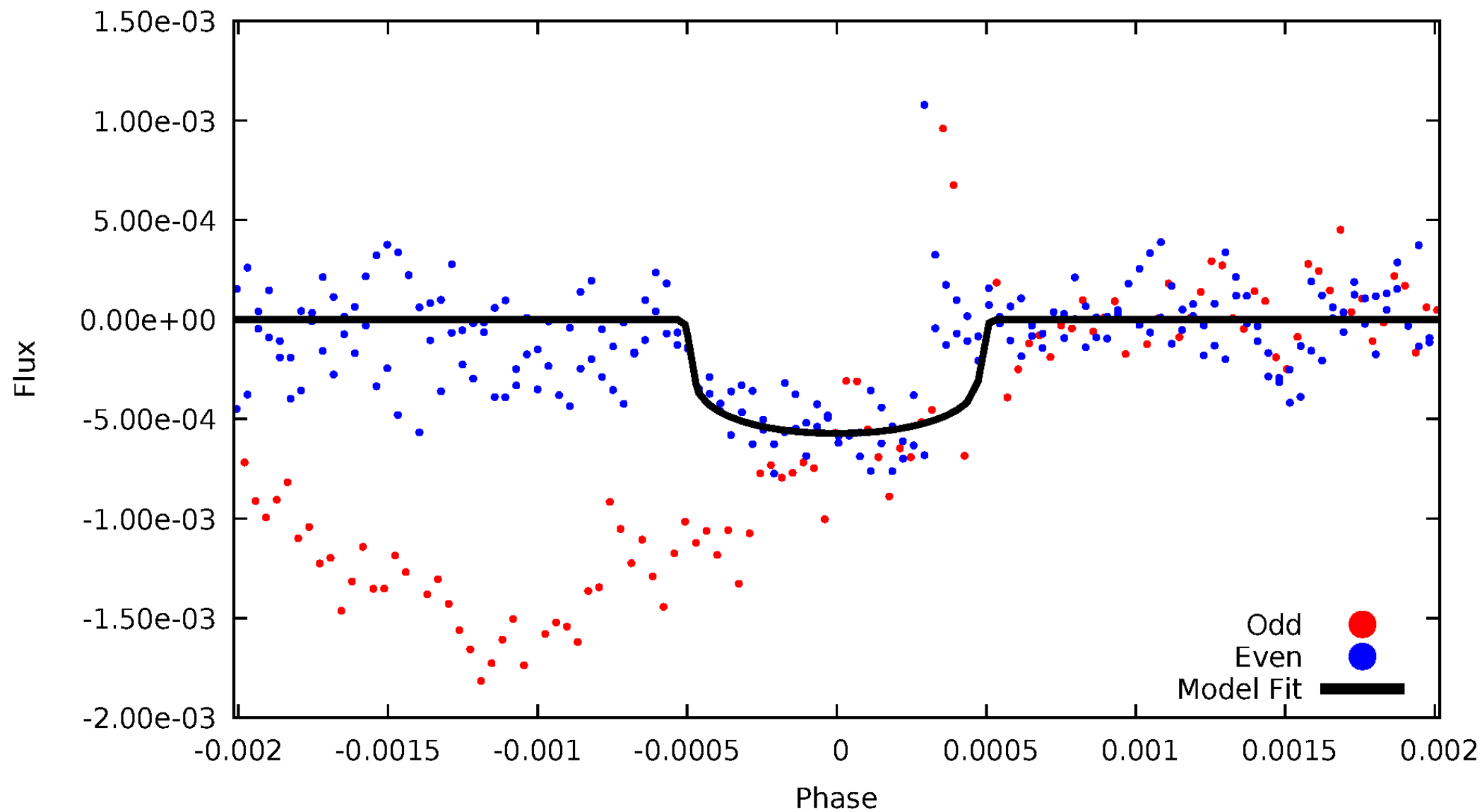


TCE 008879976-04



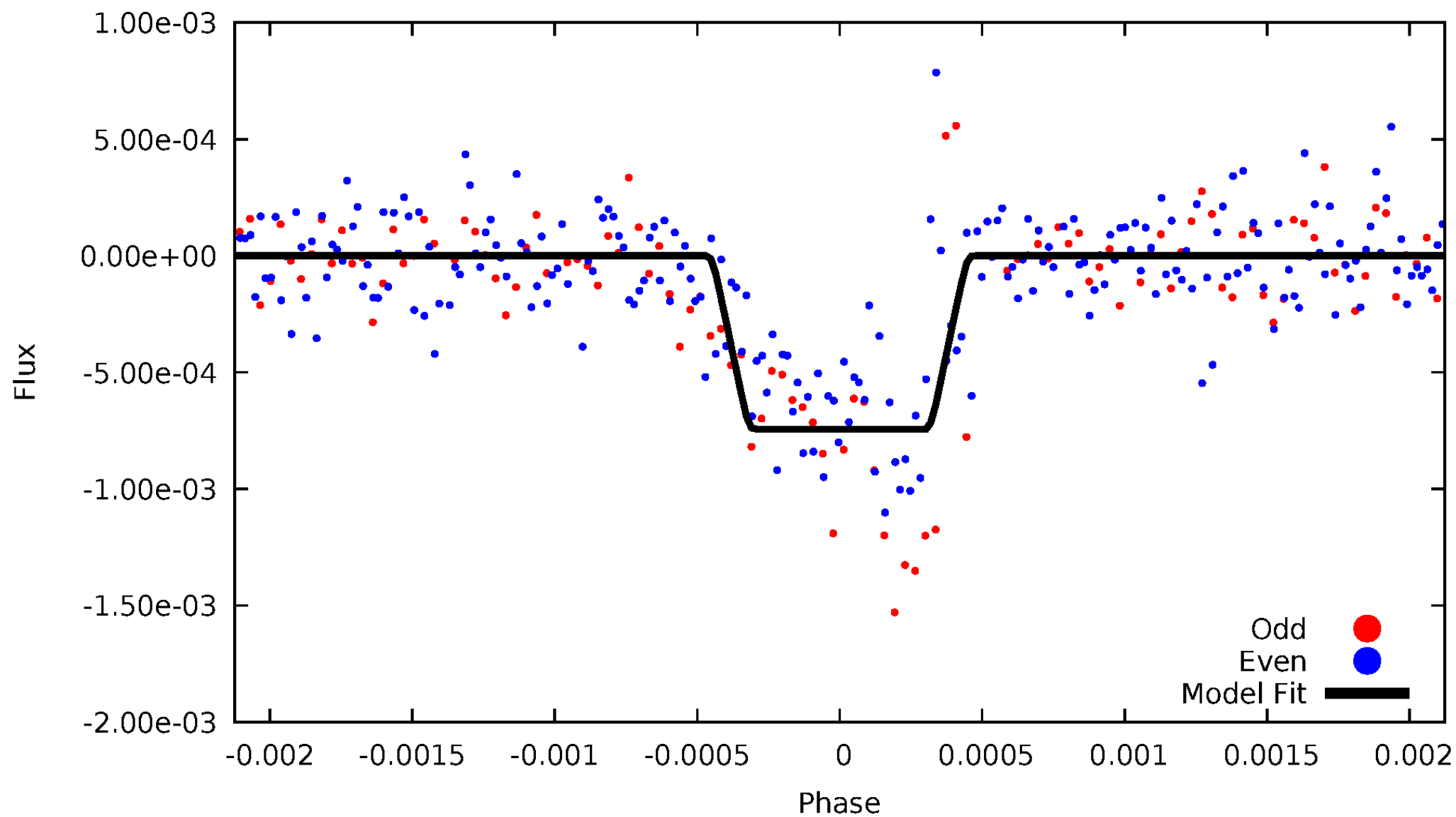
# DV Odd/Even

TCE 008879976-04



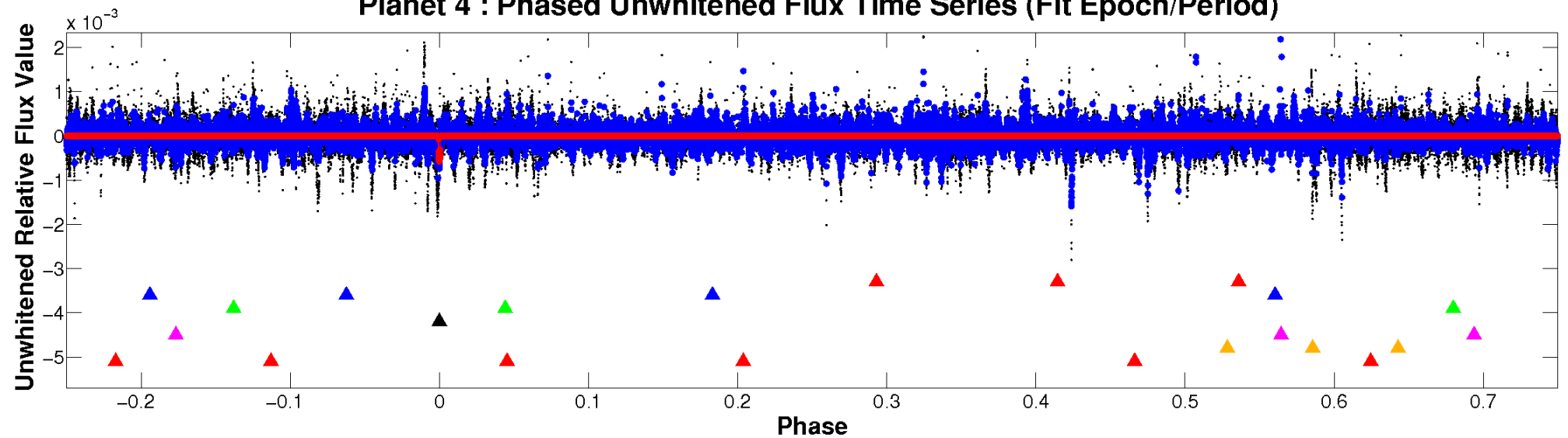
# ALT Odd/Even

TCE 008879976-04

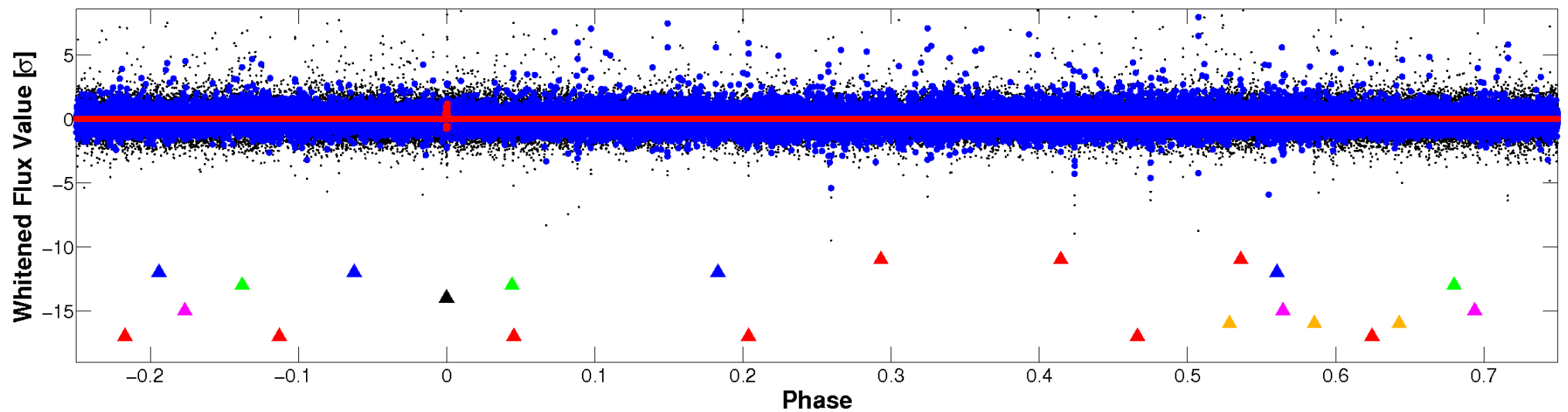


# Non-Whitened Vs. Whitened Light Curve

## Planet 4 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

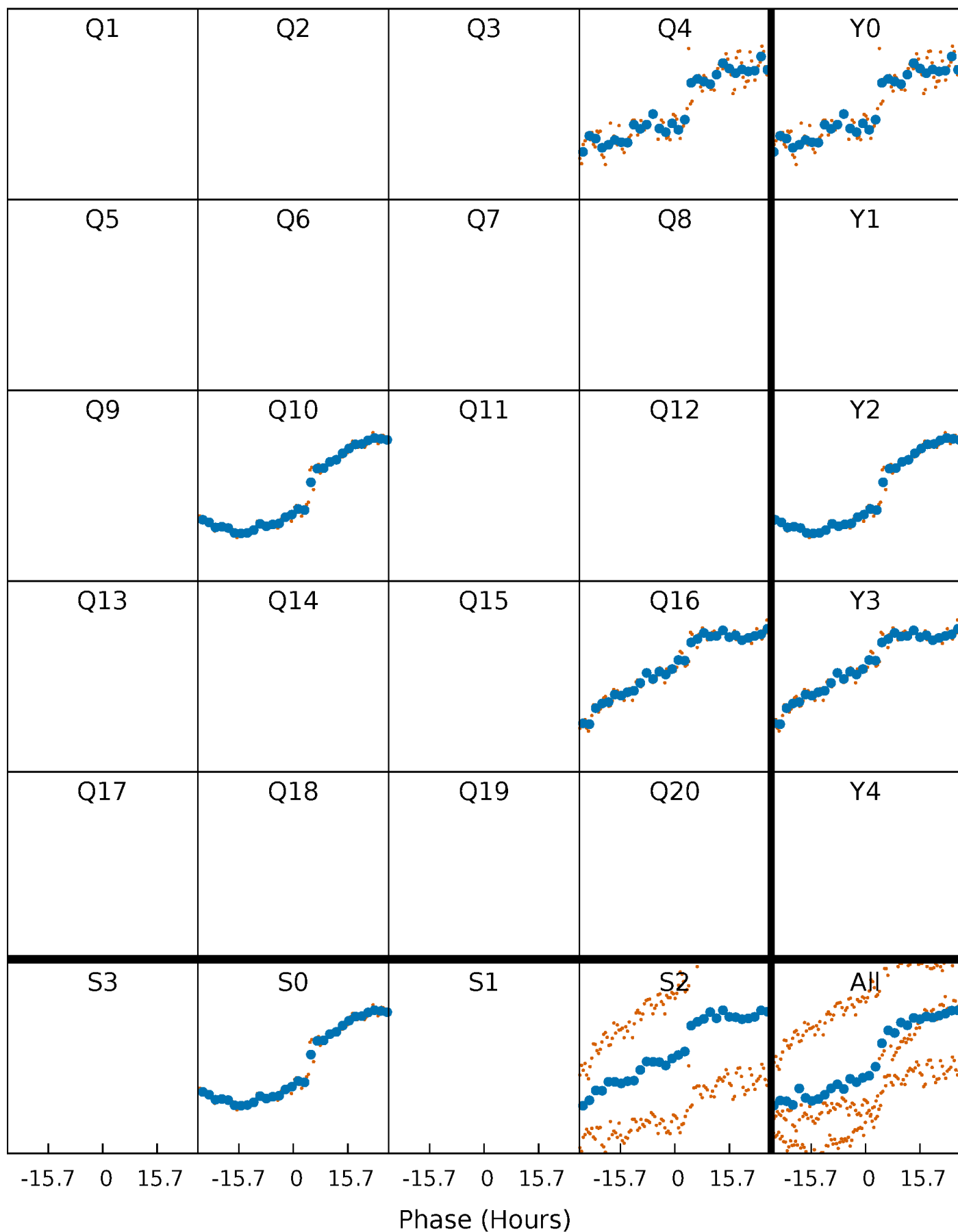


## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

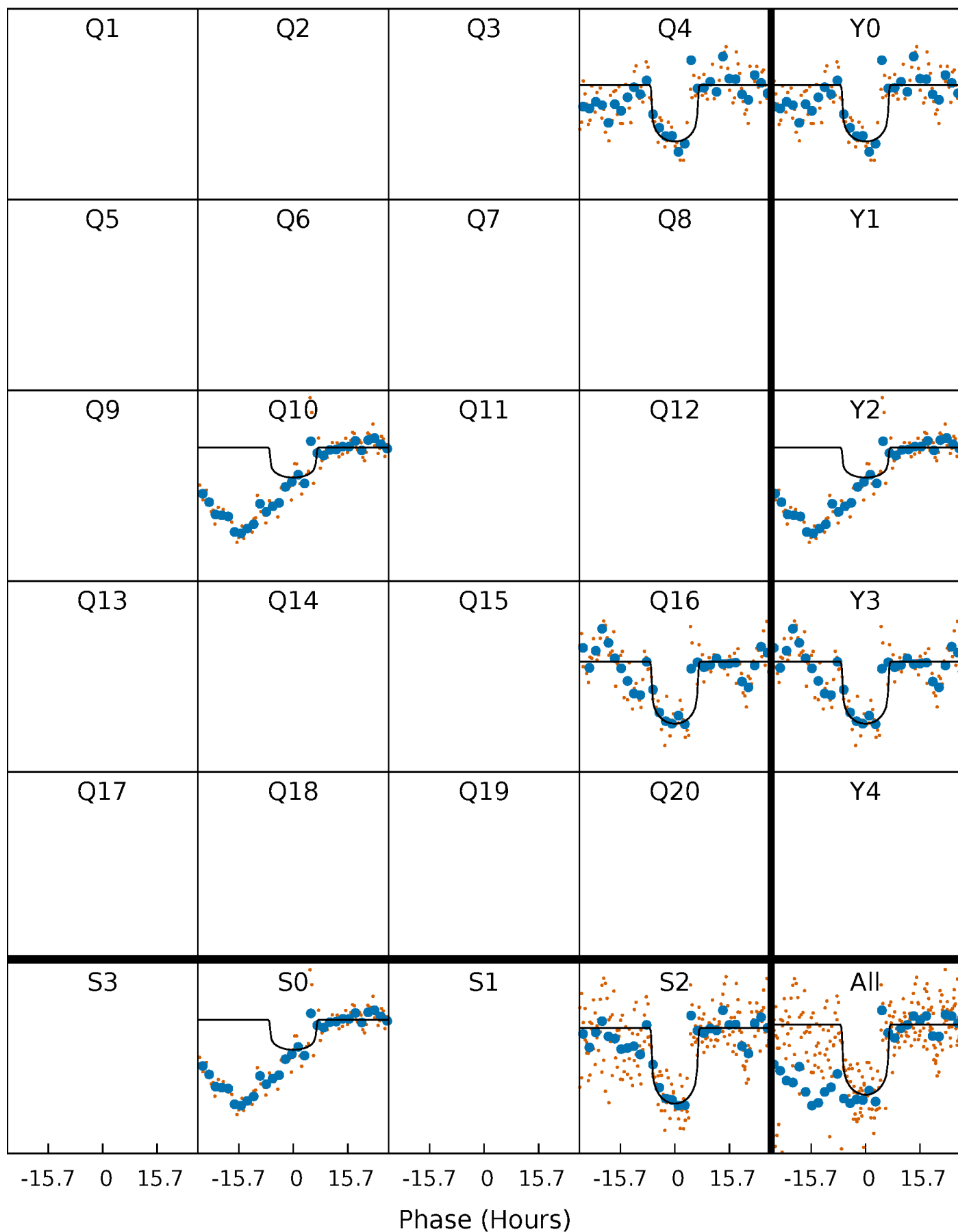
TCE 008879976-04 P=568.697798 Days  $T_0=405.990628$  (BKJD)





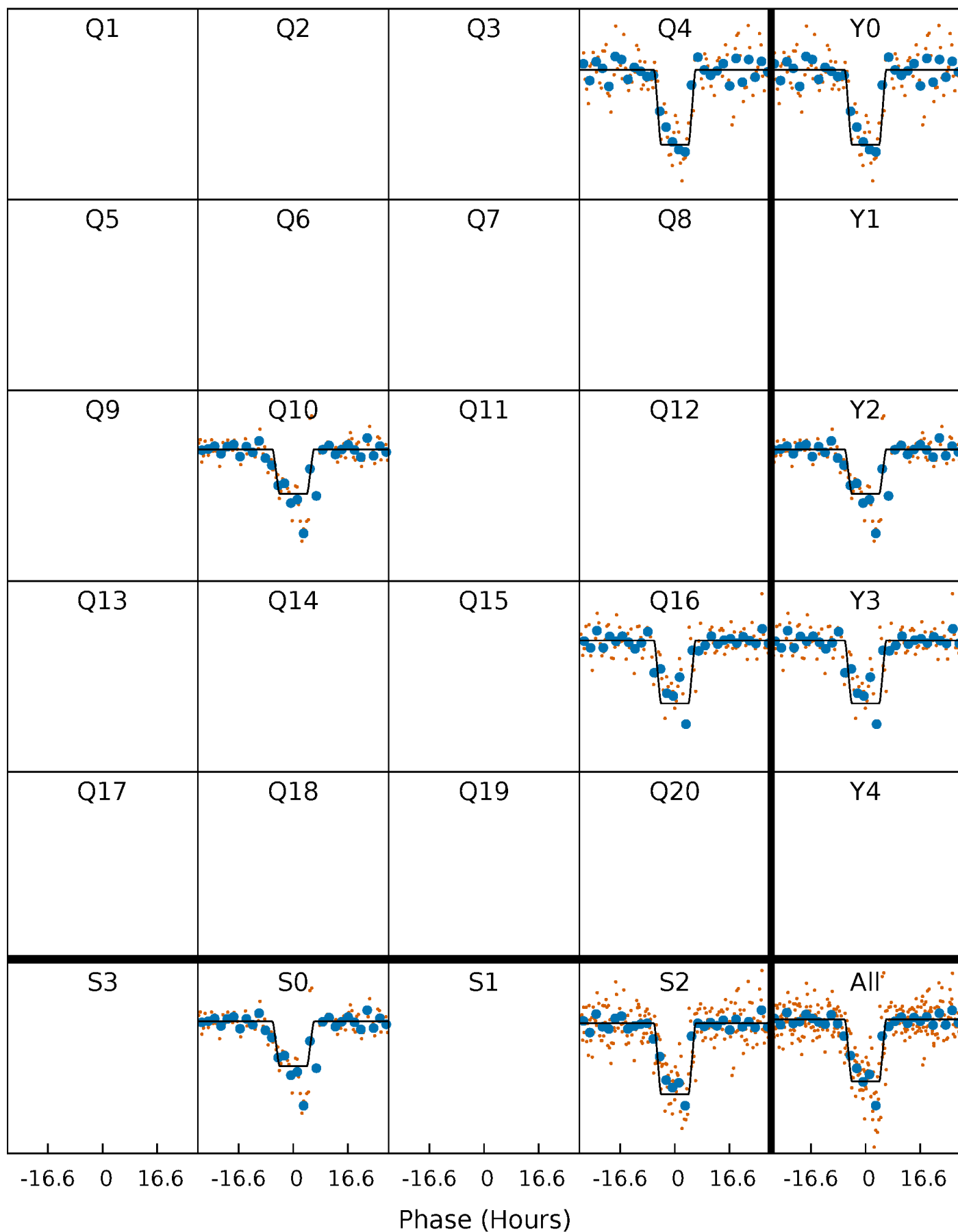
# DV Quarter-Phased Transit Curves

TCE 008879976-04 P=568.697798 Days  $T_0=405.990628$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

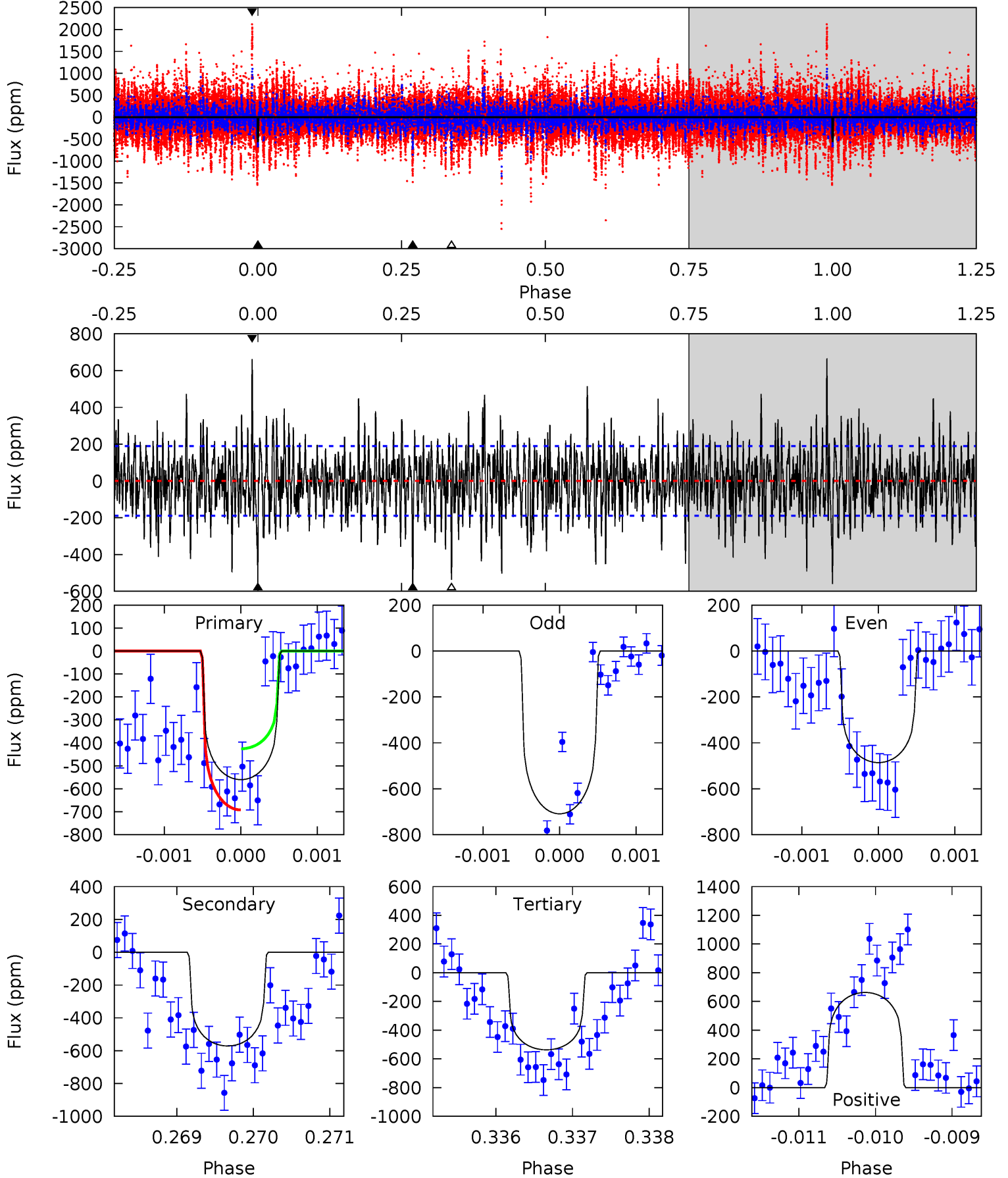
TCE 008879976-04 P=568.713653 Days  $T_0=405.964697$  (BKJD)



# DV Model-Shift Uniqueness Test

008879976-04, P = 568.697798 Days, E = 405.990628 Days

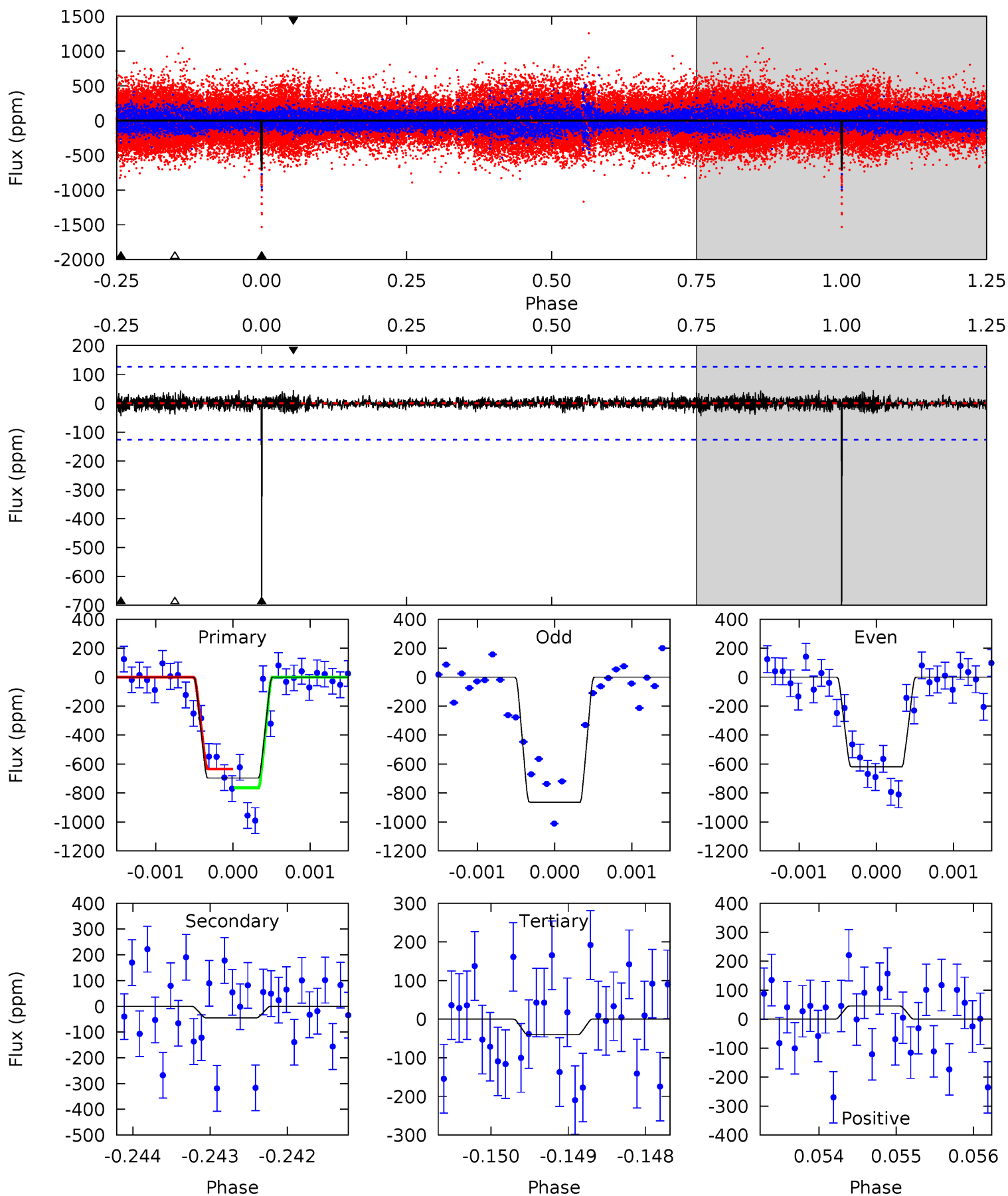
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
16.1	16.4	15.4	19.0	5.45	3.29	4.10	0.67	-2.94	0.98	-2.63	2.93	1.13	0.54	3.84



# Alt Model-Shift Uniqueness Test

008879976-04, P = 568.713653 Days, E = 405.964697 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
30.2	1.94	1.73	1.97	5.47	3.31	0.41	28.5	28.2	0.21	-0.03	4.85	1.10	0.06	2.83



### Stellar Parameters For KIC 008879976

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6200^{+150}_{-236}$	$4.230^{+0.140}_{-0.210}$	$0.300^{+0.150}_{-0.300}$	$1.437^{+0.473}_{-0.276}$	$1.281^{+0.163}_{-0.181}$	$0.608^{+0.430}_{-0.339}$
	+2%/-4%	+3%/-5%	+50%/-100%	+33%/-19%	+13%/-14%	+71%/-56%
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 008879976-04 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-571 \pm 35$	$3.49^{+1.18}_{-0.94}$	$380^{+31}_{-24}$	$6413^{+1140}_{-749}$	$54194^{+48824}_{-23467}$
Alt.	$-45 \pm 23$	$4.29^{+1.27}_{-0.99}$	$381^{+30}_{-25}$	$3508^{+445}_{-360}$	$2631^{+2791}_{-1379}$

$T_{max}$  = 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 008879976-04. Kepler magnitude: 13.30. Transit SNR 6.45

There are 0 quarters with good PRF difference image offsets

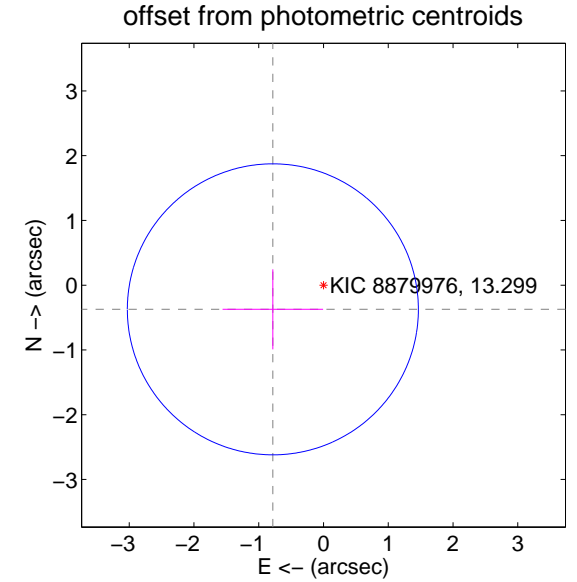
The direct PRF centroid is offset from the target star catalog position by about NaN arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	—	—	—	—
PRF-fit source offset from KIC position	—	—	—	—
photometric centroid source offset	$0.87 \pm 0.75$	1.16	$0.78 \pm 0.78$	$-0.37 \pm 0.62$

There is no PRF-fit offset from OOT-fit

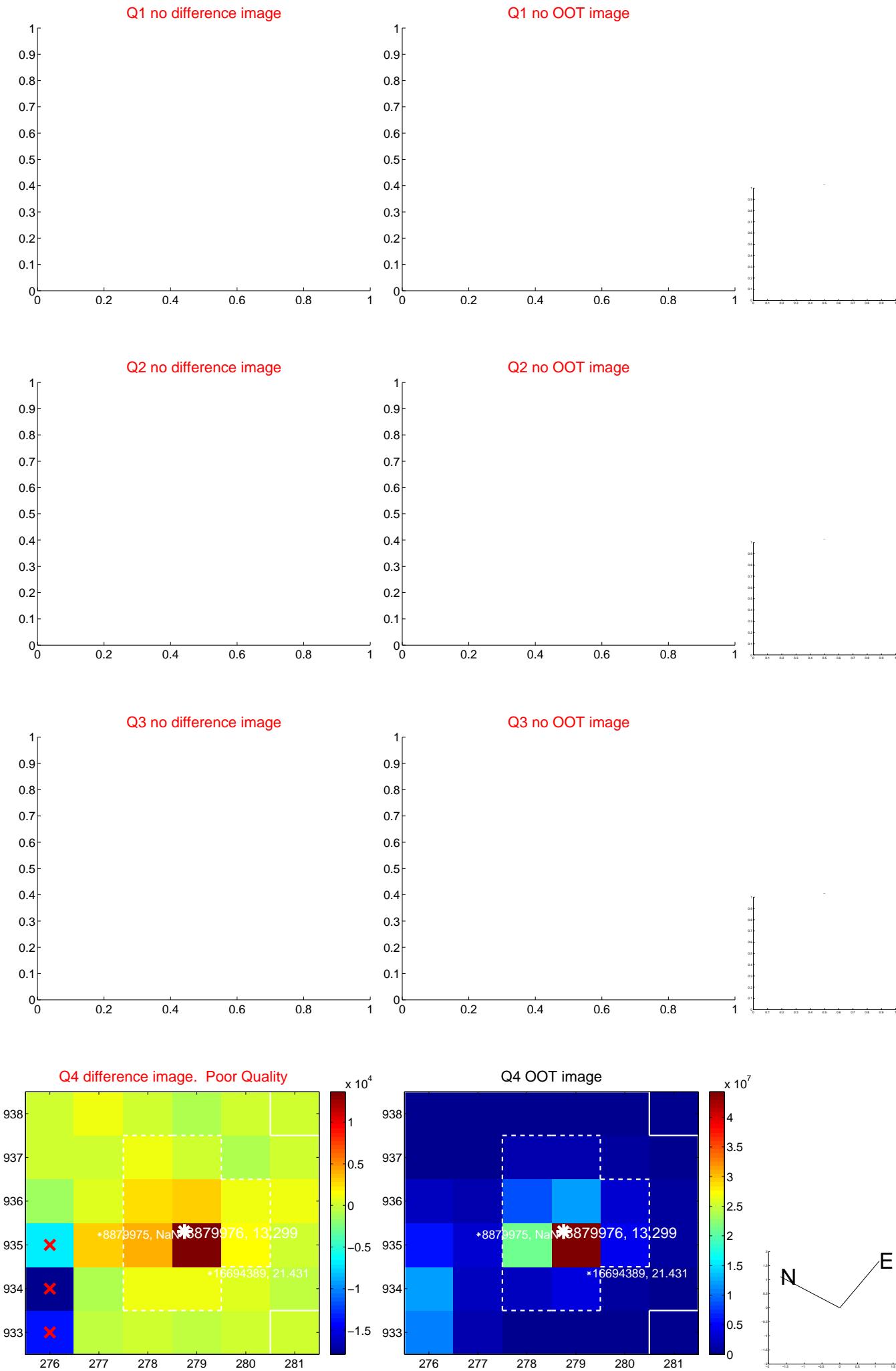


There is no PRF-fit offset from KIC



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.

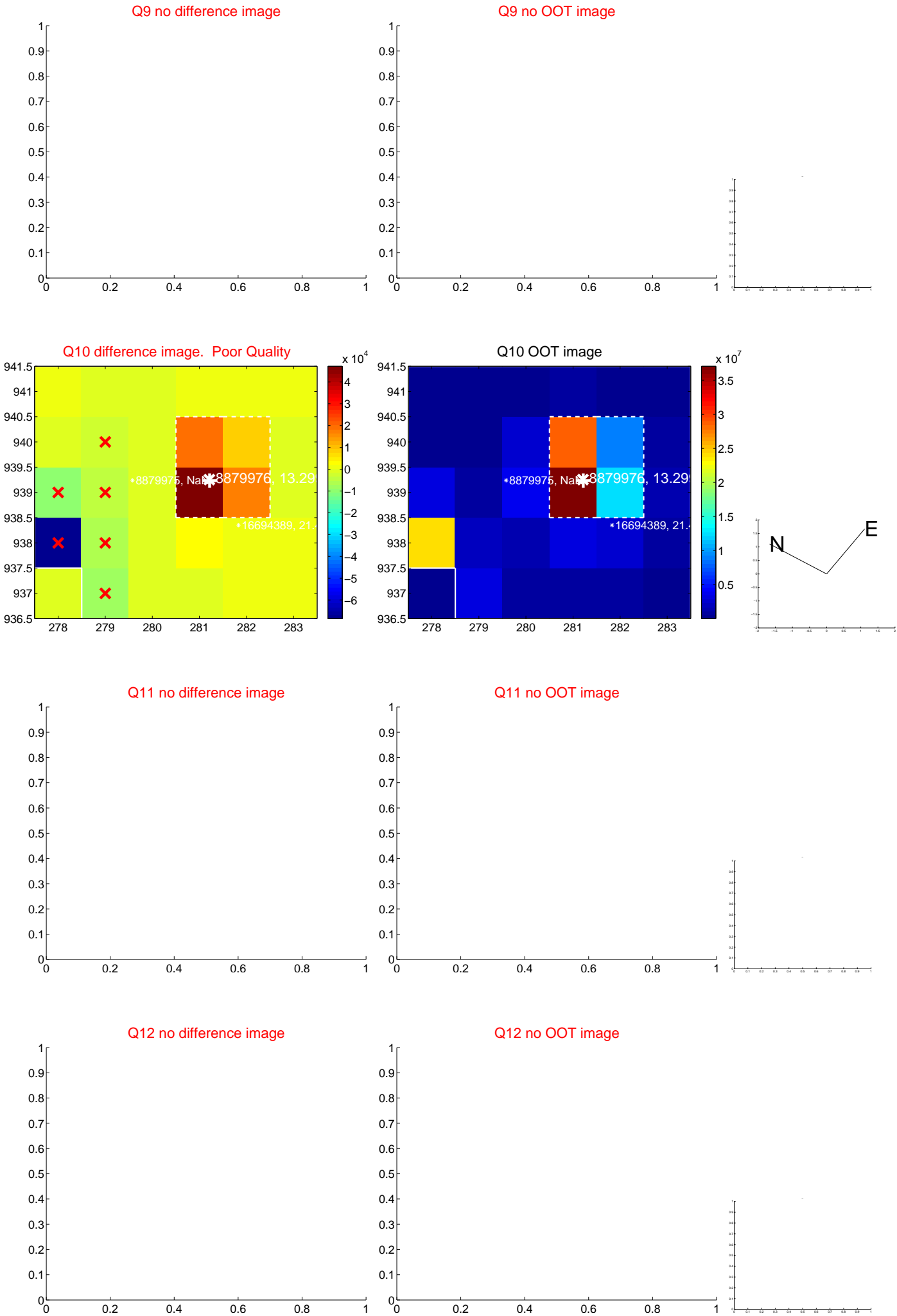


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

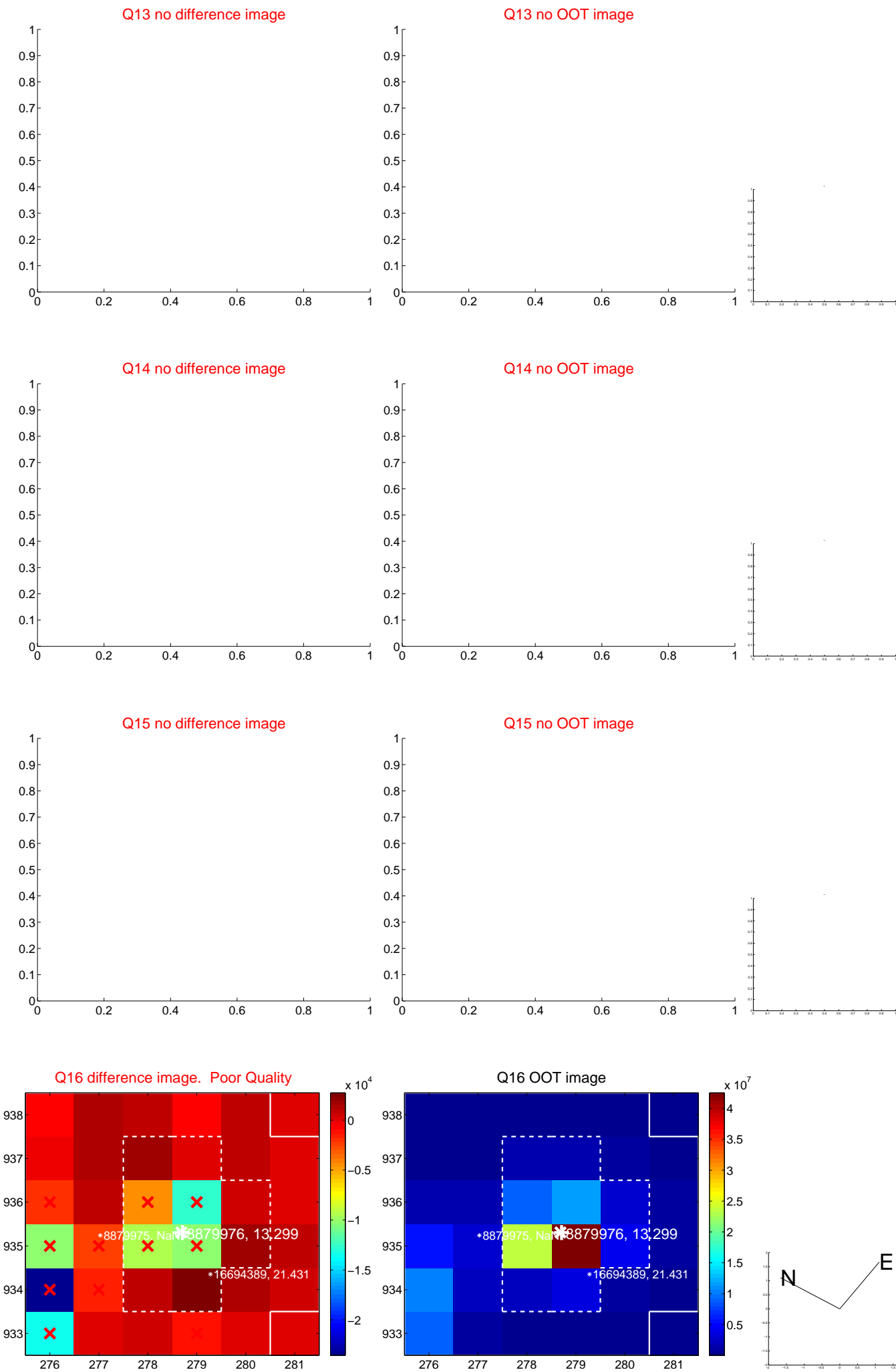




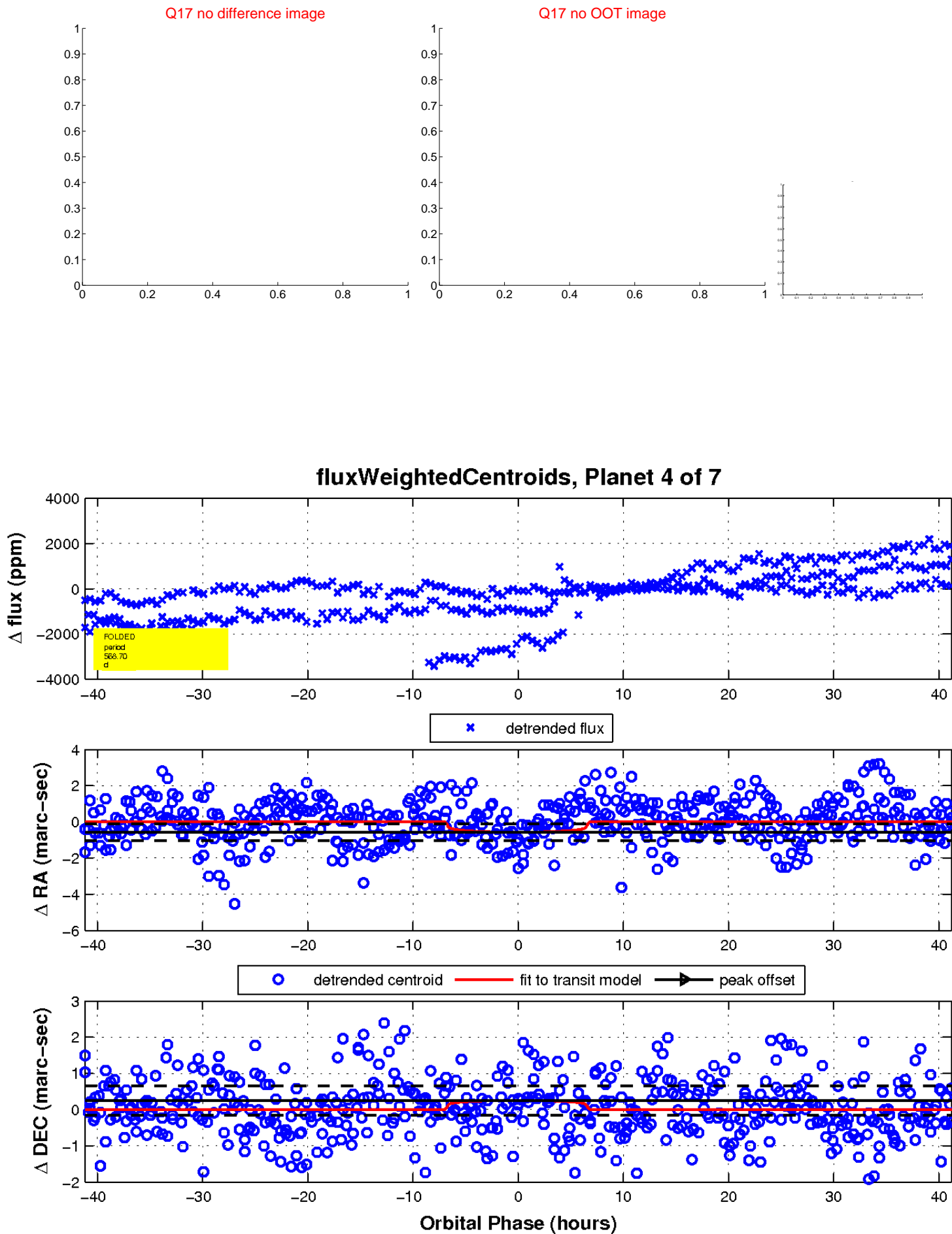
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

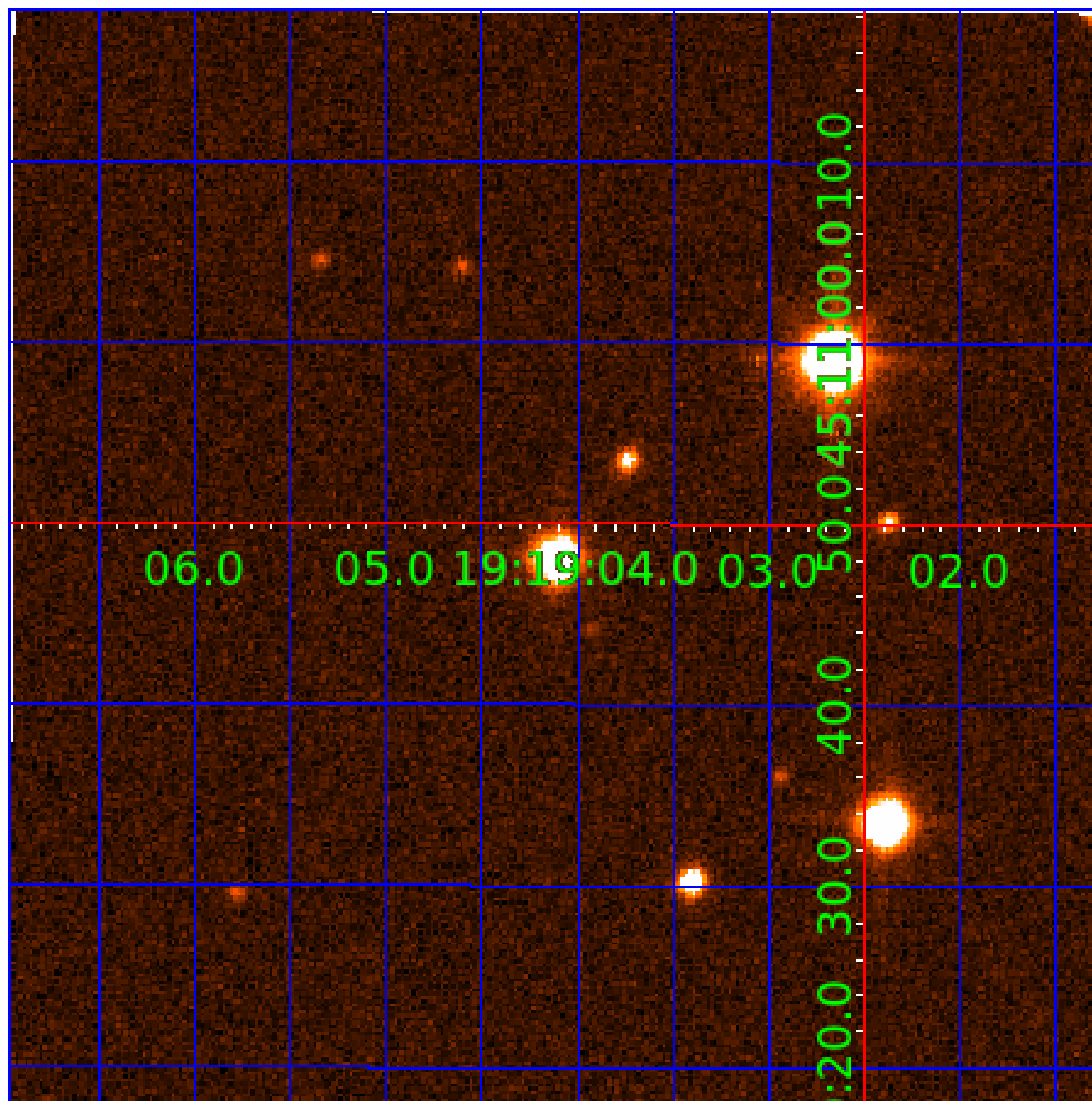


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 008879976

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008879976-01	OBS	No	499.629434	142.102639	414.7	4.566	10.6	5.7	1.44	6200	3.17	1.53
008879976-02	OBS	No	354.159555	370.530374	698.0	5.500	16.6	9.4	1.44	6200	3.99	2.42
008879976-03	OBS	No	672.266947	223.970877	531.5	6.474	11.9	7.2	1.44	6200	3.67	1.03
008879976-04	OBS	No	568.697799	405.990628	572.2	13.754	9.7	6.4	1.44	6200	3.50	1.28
008879976-06	OBS	No	601.258445	137.780047	482.7	11.771	9.1	6.3	1.44	6200	3.75	1.19
008879976-07	OBS	No	239.327245	282.546057	553.2	10.694	8.8	7.5	1.44	6200	6.63	4.08

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008879976-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—CENT_FEW_DIFFS
008879976-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—CENT_FEW_DIFFS
008879976-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
008879976-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
008879976-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—CENT_FEW_DIFFS
008879976-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

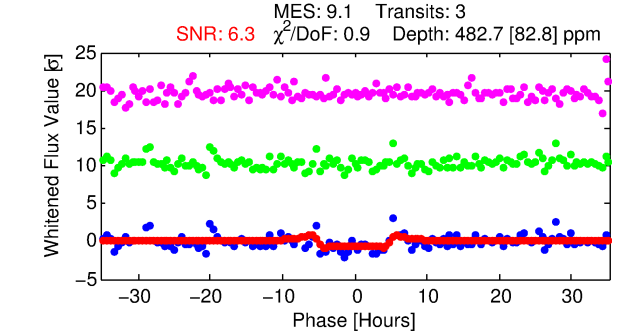
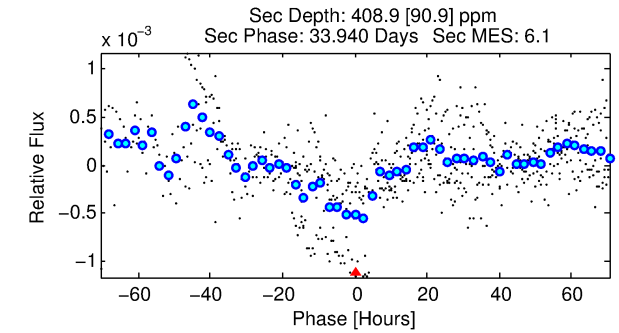
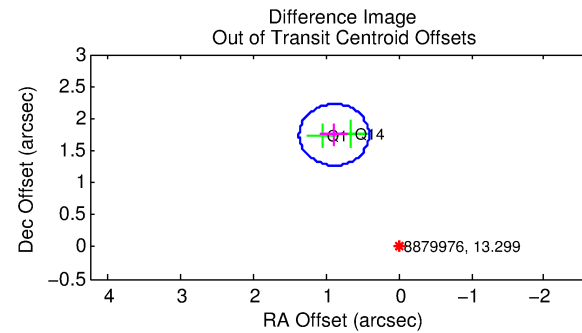
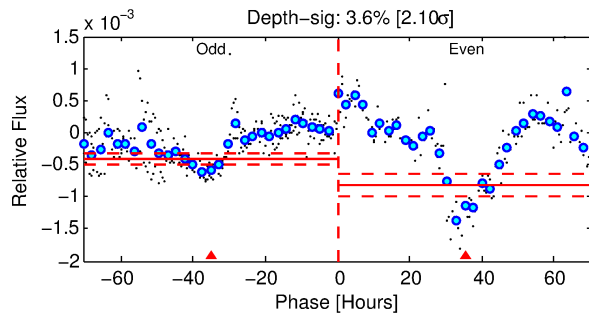
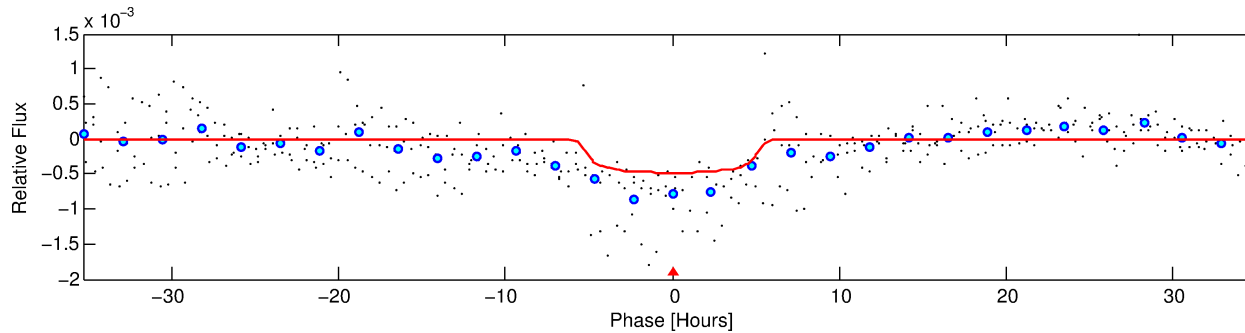
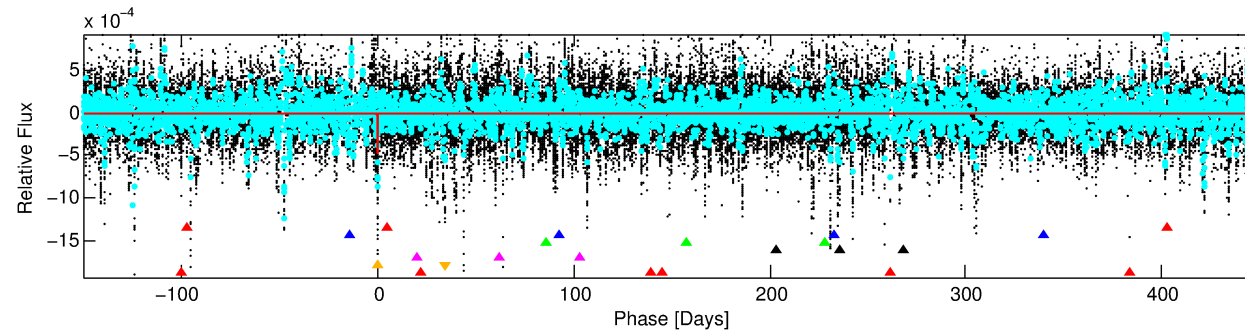
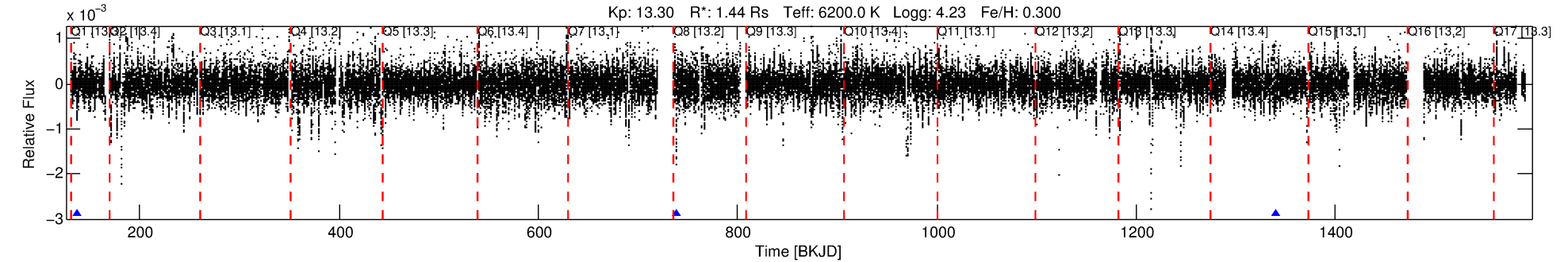
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 008879976-06

No Significant Match Found

# DV One-Page Summary

KIC: 8879976 Candidate: 6 of 7 Period: 601.258 d



## DV Fit Results:

Period = 601.25844 [0.01042] d  
Epoch = 137.7800 [0.0143] BKJD  
Rp/R\* = 0.0239 [0.0027]  
a/R\* = 186.14 [55.24]  
b = 0.91 [0.06]  
Seff = 1.19 [0.50]  
Teq = 266 [28] K  
Rp = 3.75 [1.30] Re  
a = 1.5137 [0.4121] AU  
Ag = 36737.94 [18433.63] [1.99 $\sigma$ ]  
Teffp = 5704 [500] K [10.86 $\sigma$ ]

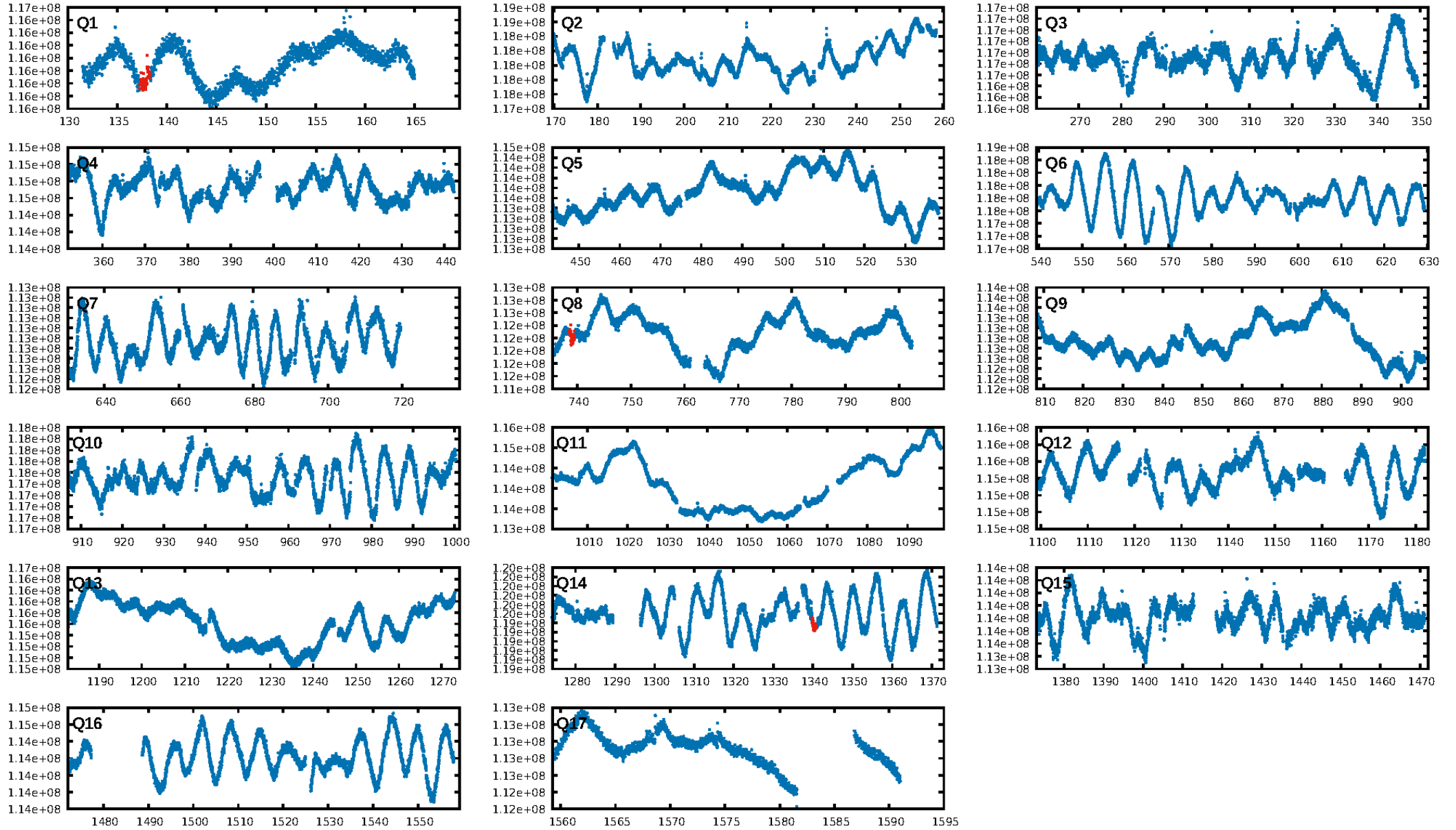
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [43.17 $\sigma$ ]  
LongPeriod-sig: 100.0% [66.67 $\sigma$ ]  
ModelChiSquare2-sig: 16.9%  
ModelChiSquareGof-sig: 99.9%  
Bootstrap-pfa: 6.72e-09  
RollingBand-fgt: 1.00 [2/2]  
GhostDiagnostic-chr: -1.415  
Centroid-sig: 4.2%  
Centroid-so: 0.955 arcsec [1.29 $\sigma$ ]  
OotOffset-rm: 1.961 arcsec [12.28 $\sigma$ ]  
KicOffset-rm: 1.952 arcsec [12.23 $\sigma$ ]  
OotOffset-st: 1/0/0/1 [2]  
KicOffset-st: 1/0/0/1 [2]  
DiffImageQuality-fgm: 1.00 [2/2]  
DiffImageOverlap-fno: 1.00 [3/3]

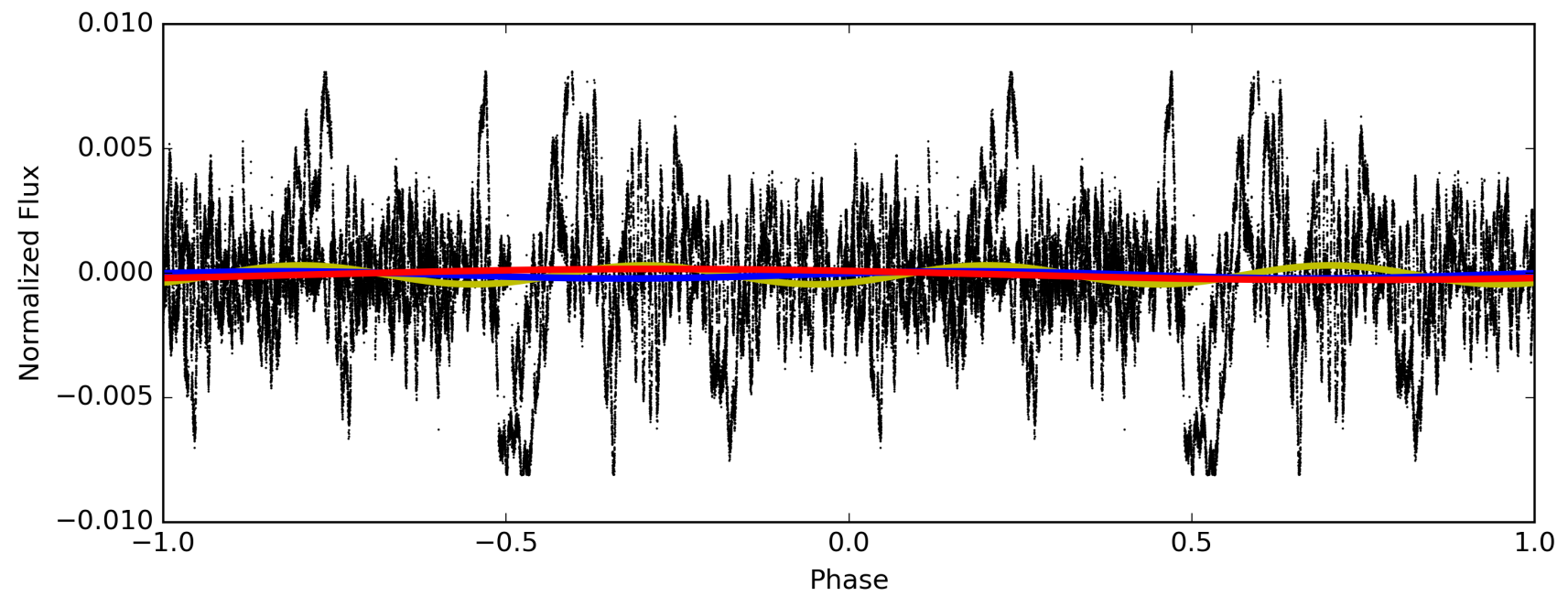
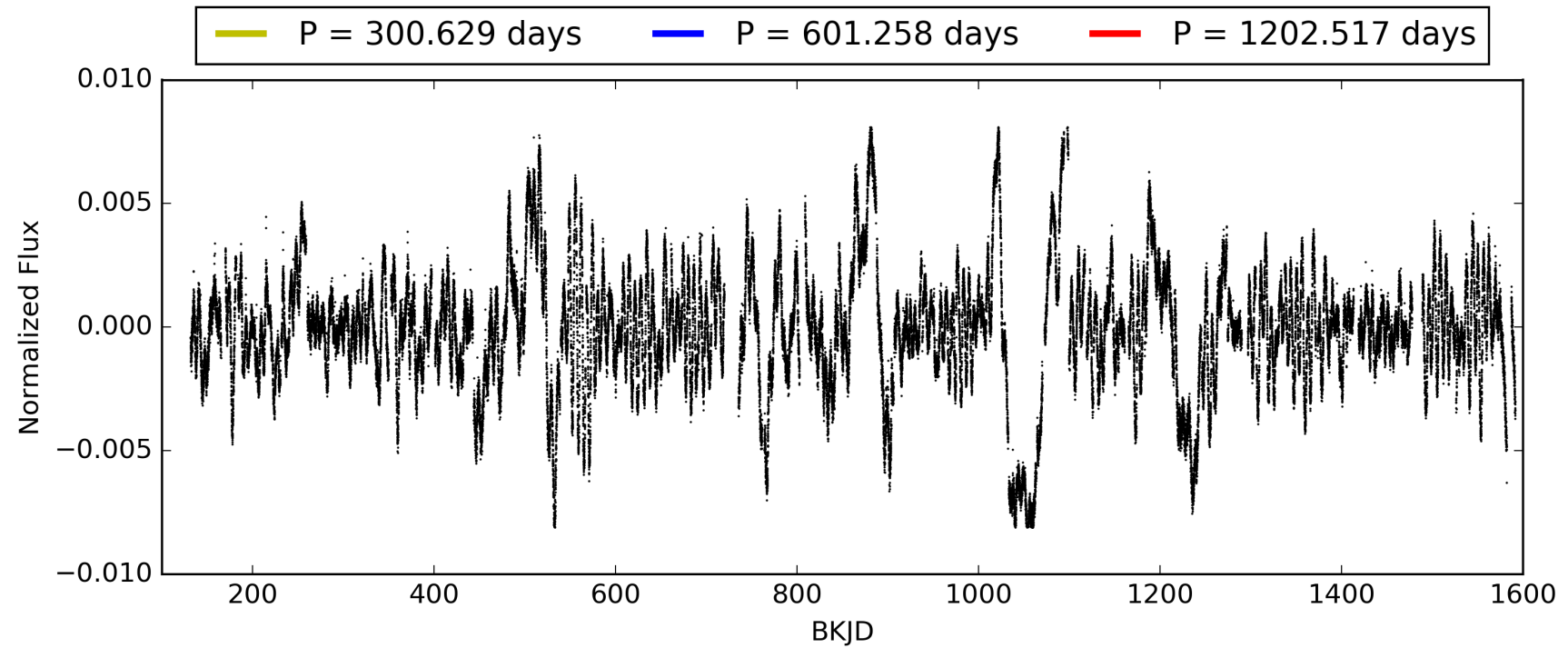
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 20:47:09 Z

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

# TCE 008879976-06, PDC Light Curves



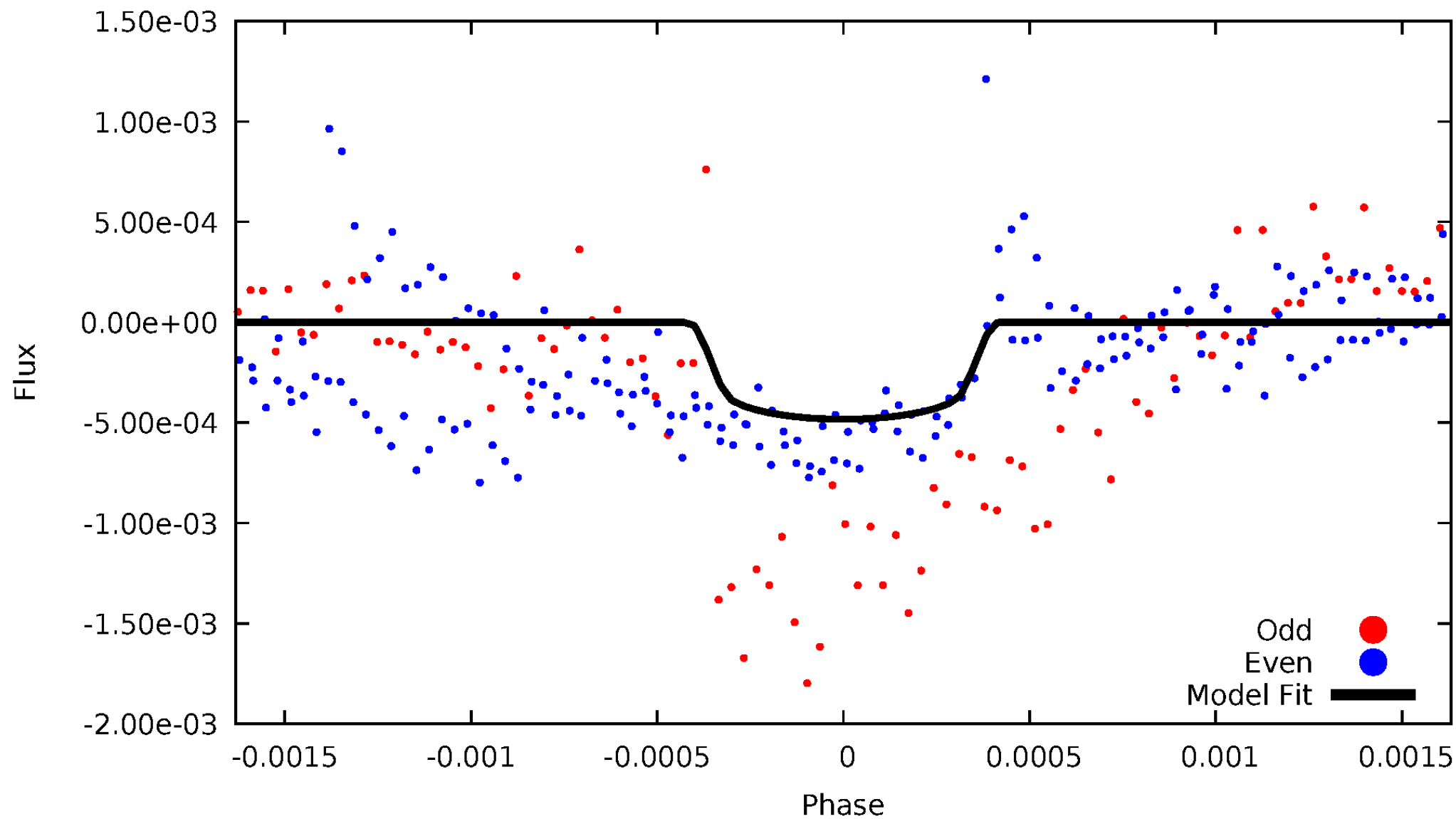
TCE 008879976-06





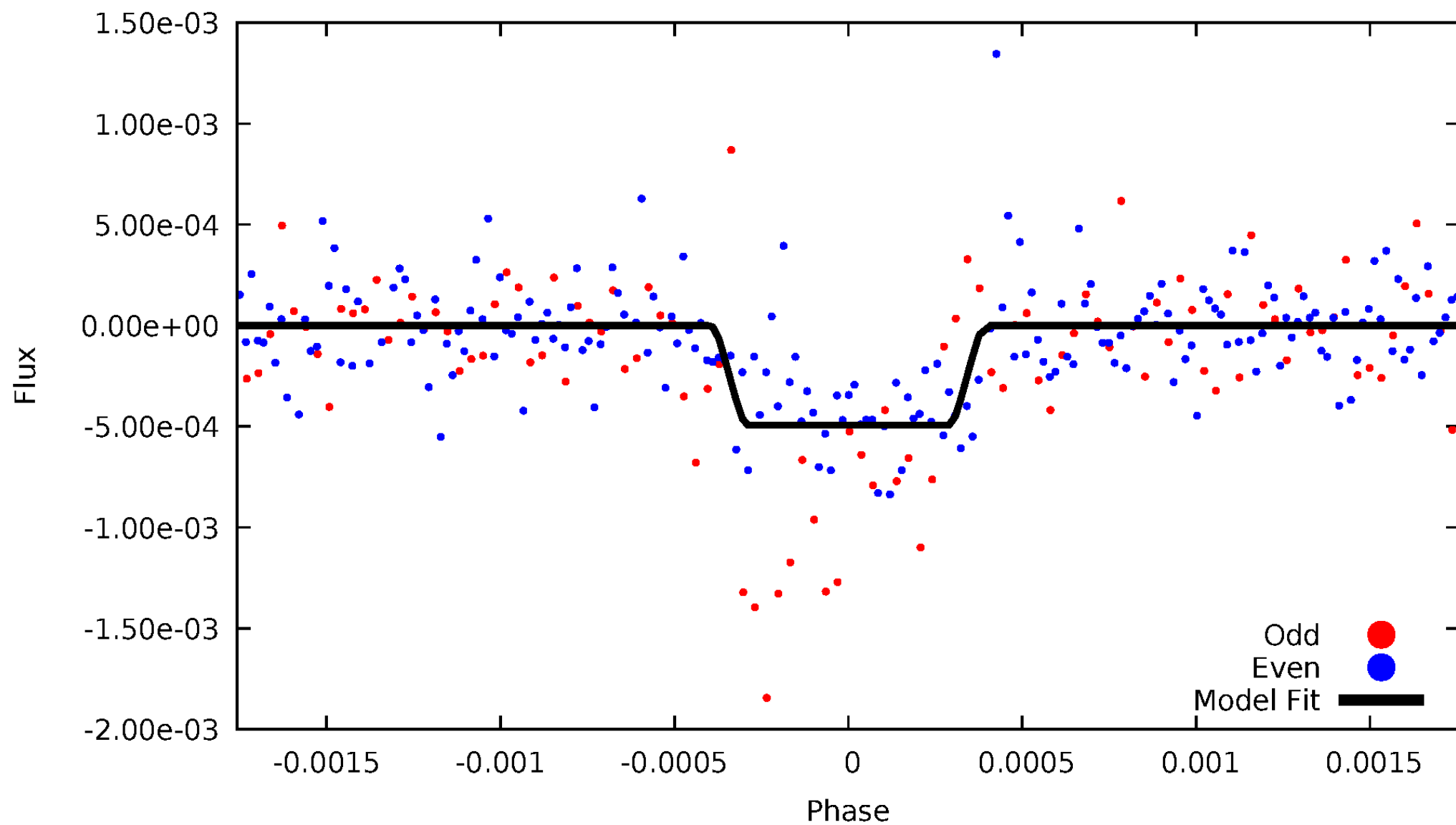
# DV Odd/Even

TCE 008879976-06



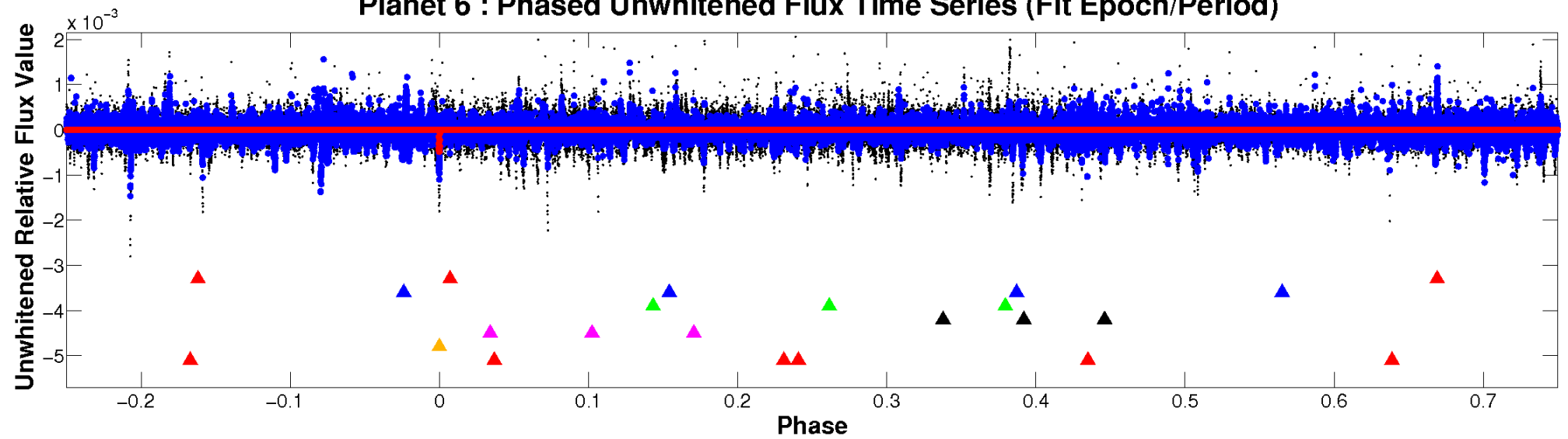
# ALT Odd/Even

TCE 008879976-06

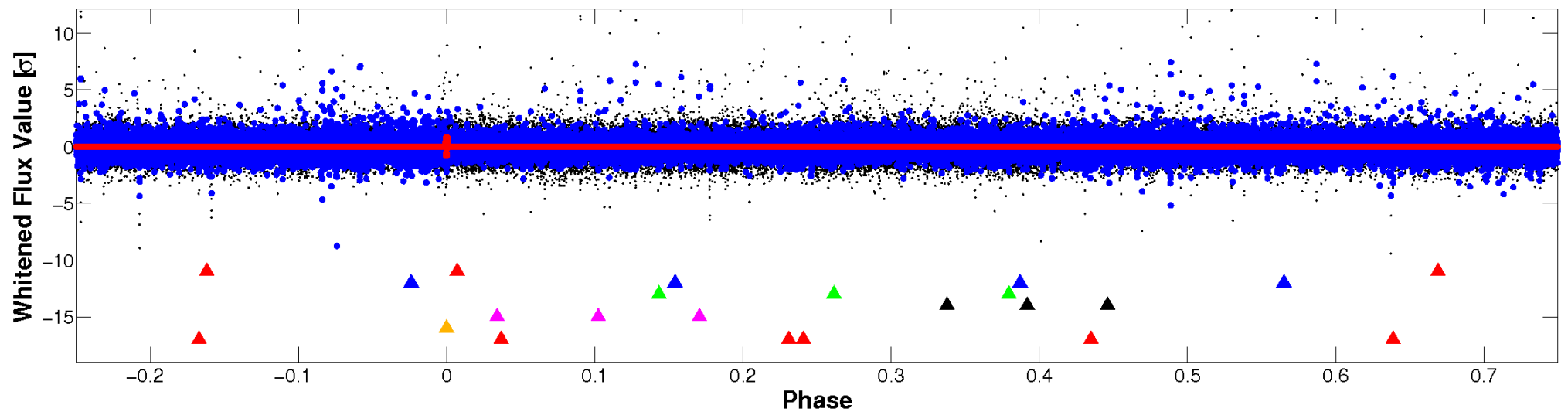


# Non-Whitened Vs. Whitened Light Curve

## Planet 6 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

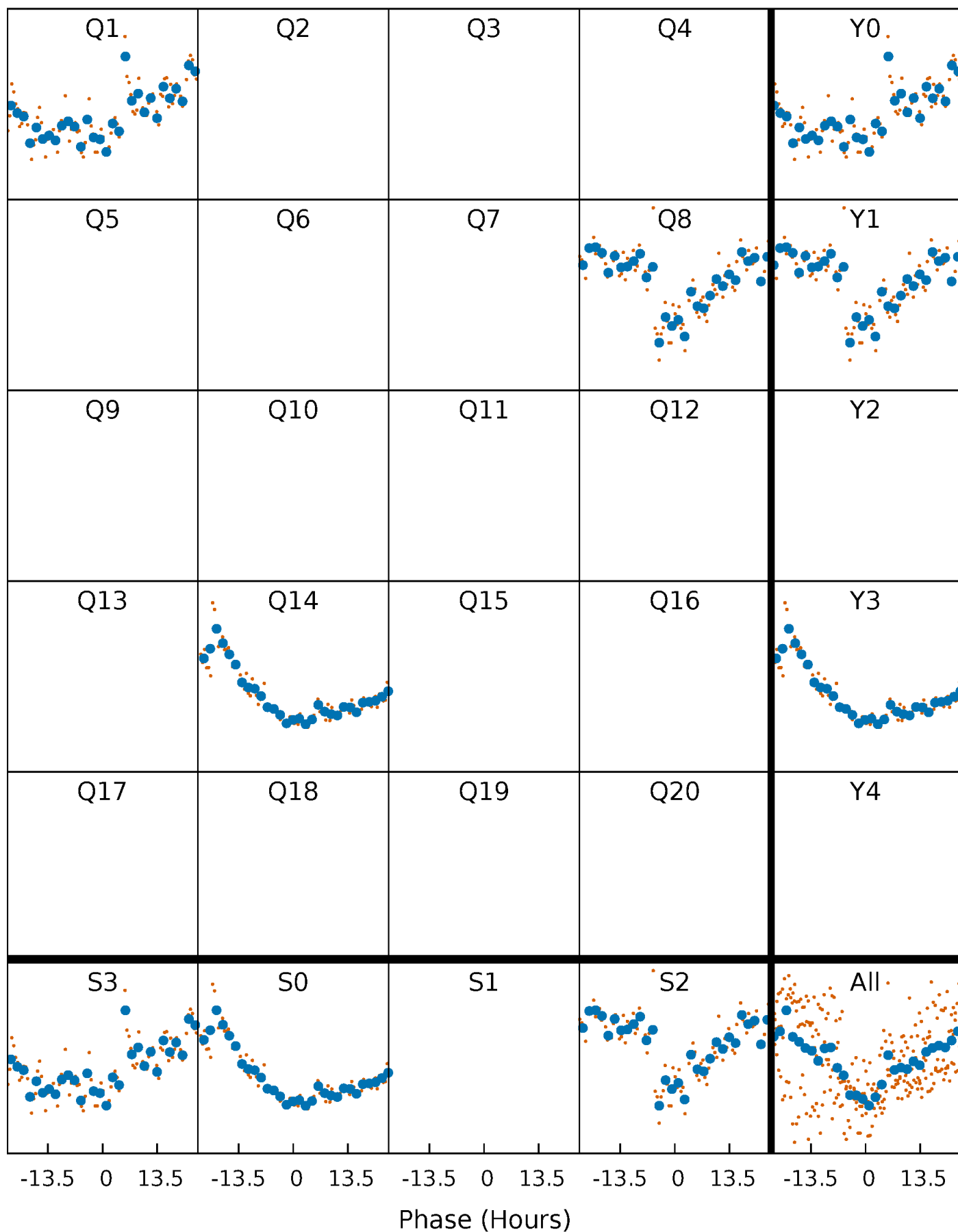


## Planet 6 : Phased Whitened Flux Time Series (Fit Epoch/Period)



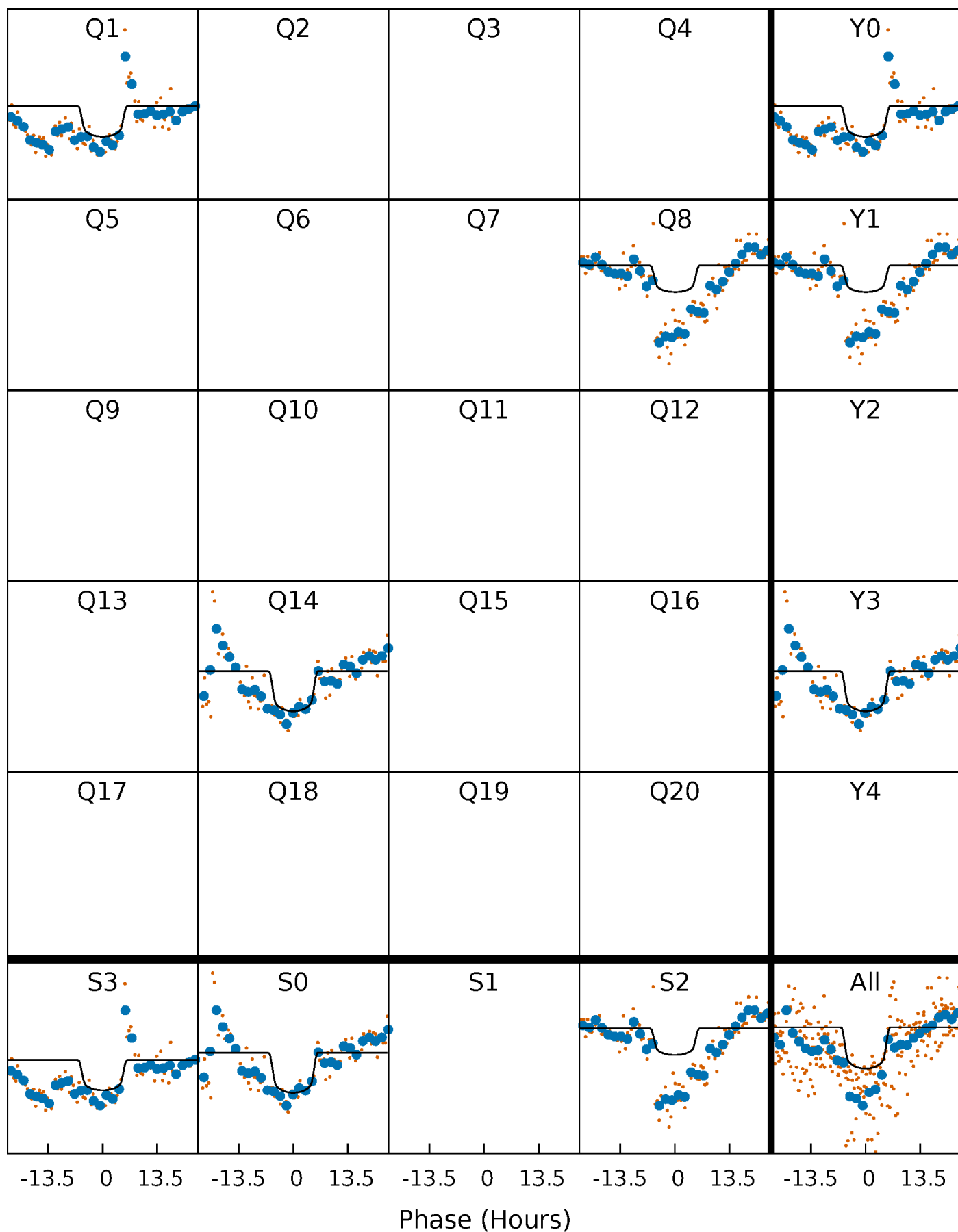
# PDC Quarter-Phased Transit Curves

TCE 008879976-06     $P=601.258445$  Days     $T_0=137.780047$  (BKJD)



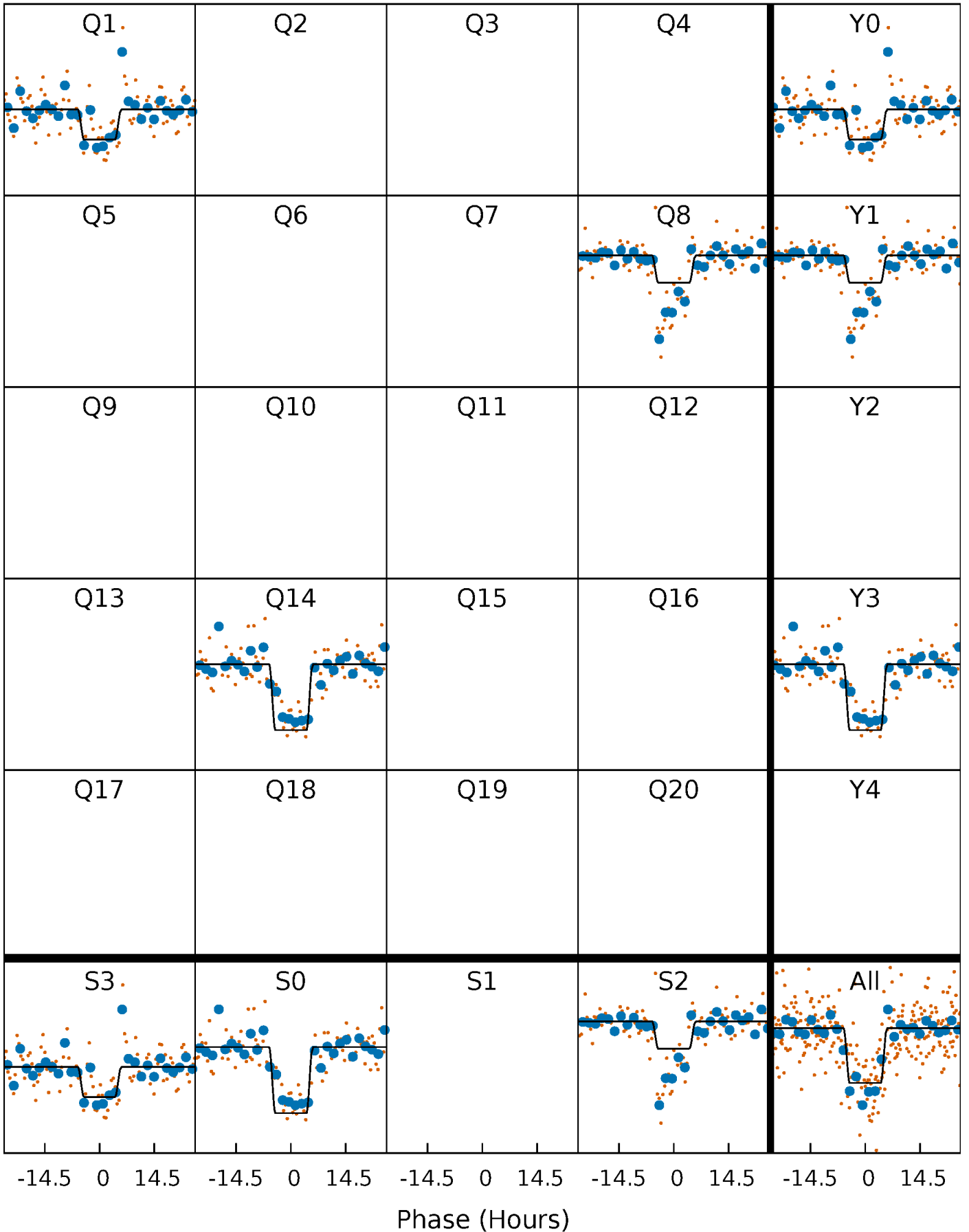
# DV Quarter-Phased Transit Curves

TCE 008879976-06 P=601.258445 Days  $T_0=137.780047$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

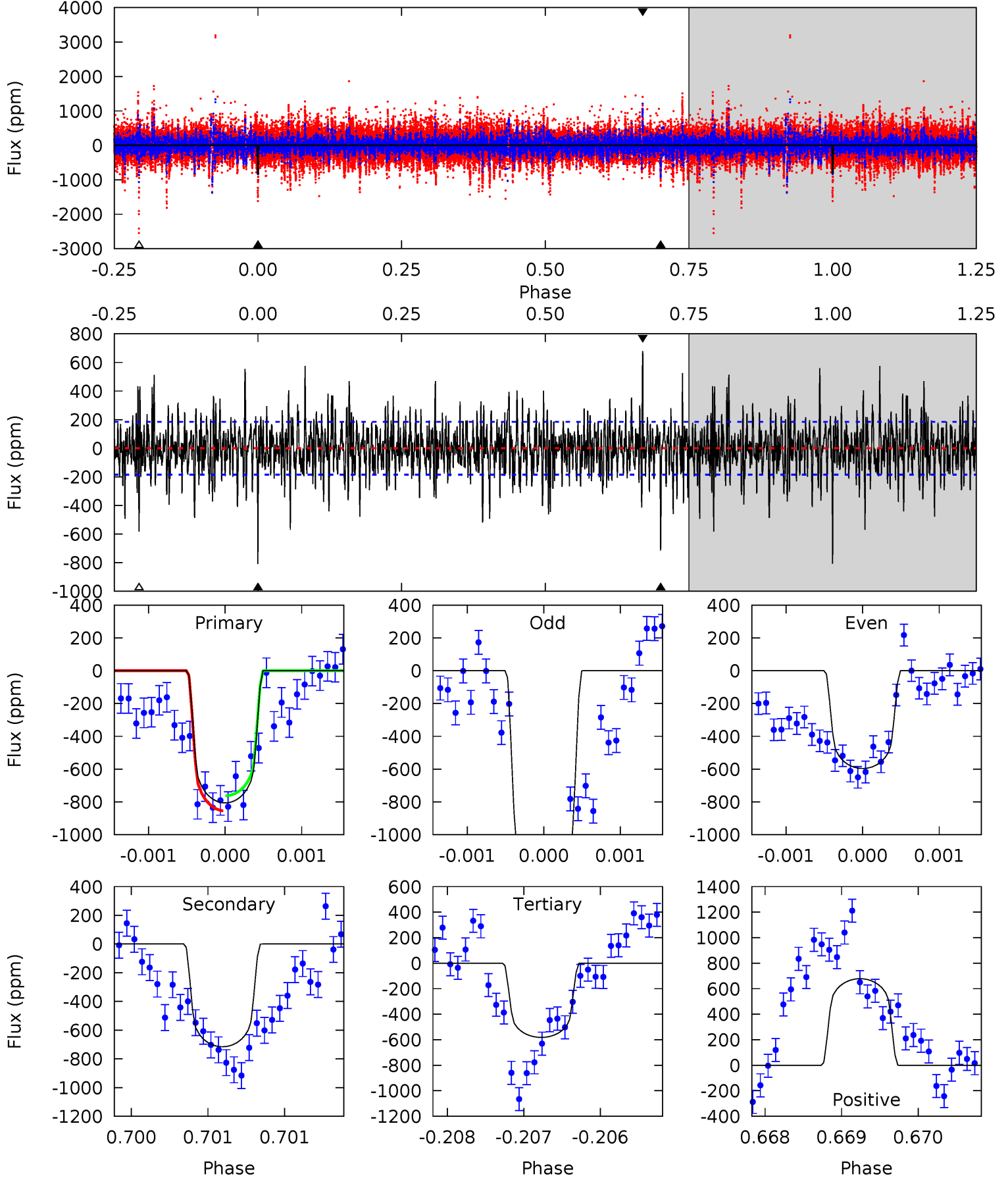
TCE 008879976-06 P=601.264314 Days  $T_0=137.754725$  (BKJD)



# DV Model-Shift Uniqueness Test

008879976-06, P = 601.258445 Days, E = 137.780047 Days

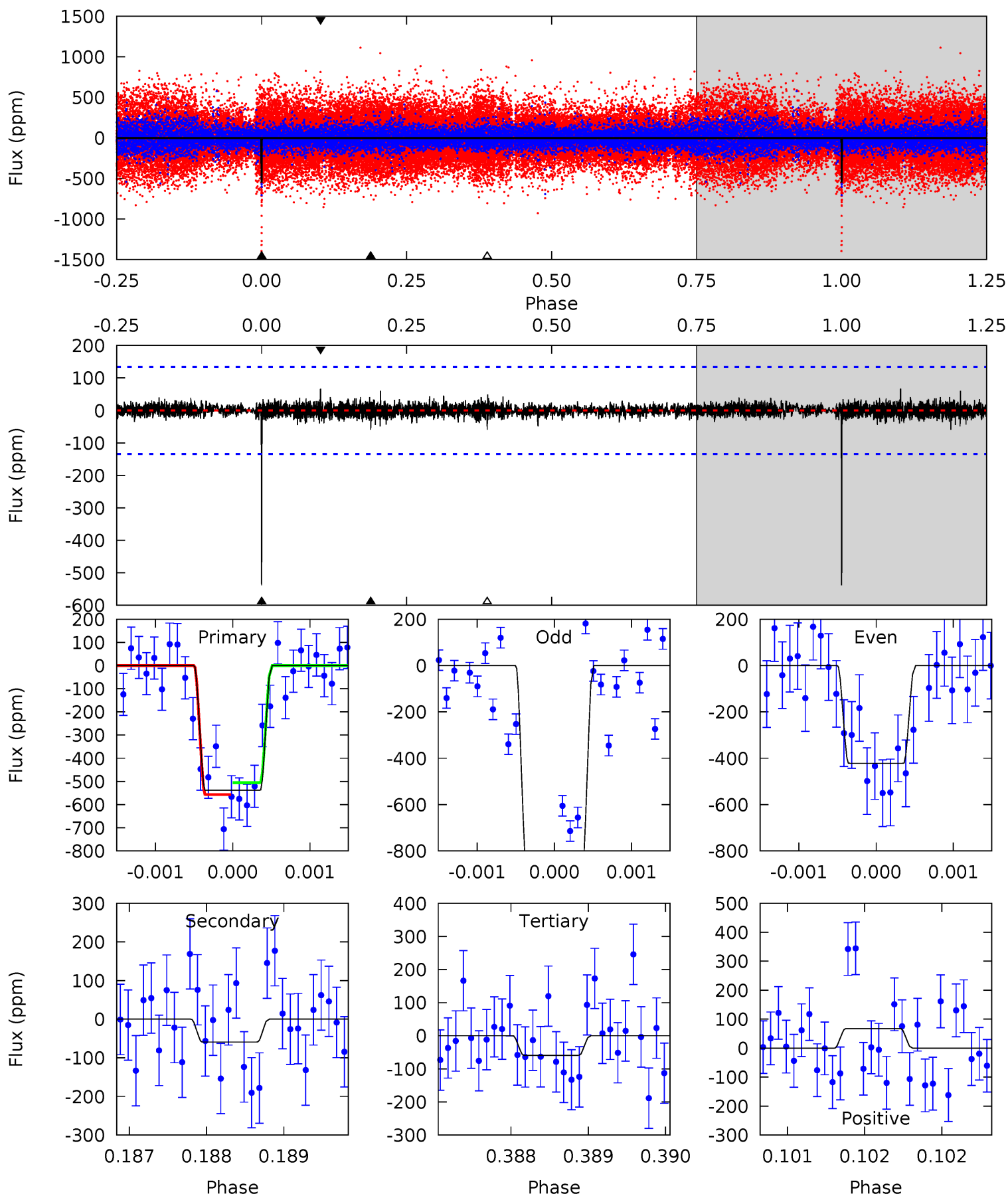
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
23.9	21.2	17.2	20.1	5.48	3.34	4.11	6.64	3.78	3.96	1.10	10.1	1.30	0.46	1.36



# Alt Model-Shift Uniqueness Test

008879976-06, P = 601.264314 Days, E = 137.754725 Days

Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
22.1	2.43	2.42	2.75	5.49	3.35	0.46	19.6	19.3	0.00	-0.32	9.28	1.27	0.11	1.02





### Stellar Parameters For KIC 008879976

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6200^{+150}_{-236}$	$4.230^{+0.140}_{-0.210}$	$0.300^{+0.150}_{-0.300}$	$1.437^{+0.473}_{-0.276}$	$1.281^{+0.163}_{-0.181}$	$0.608^{+0.430}_{-0.339}$
	+2%/-4%	+3%/-5%	+50%/-100%	+33%/-19%	+13%/-14%	+71%/-56%
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 008879976-06 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{\text{max}}$ (K)	$T_{\text{obs}}$ (K)	$A_{\text{obs}}$
DV	$-715 \pm 34$	$3.79^{+0.73}_{-0.57}$	$375^{+30}_{-25}$	$6561^{+480}_{-430}$	$62274^{+22332}_{-18148}$
Alt.	$-59 \pm 24$	$3.52^{+0.80}_{-0.61}$	$375^{+30}_{-24}$	$3952^{+352}_{-385}$	$5574^{+4008}_{-2696}$

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

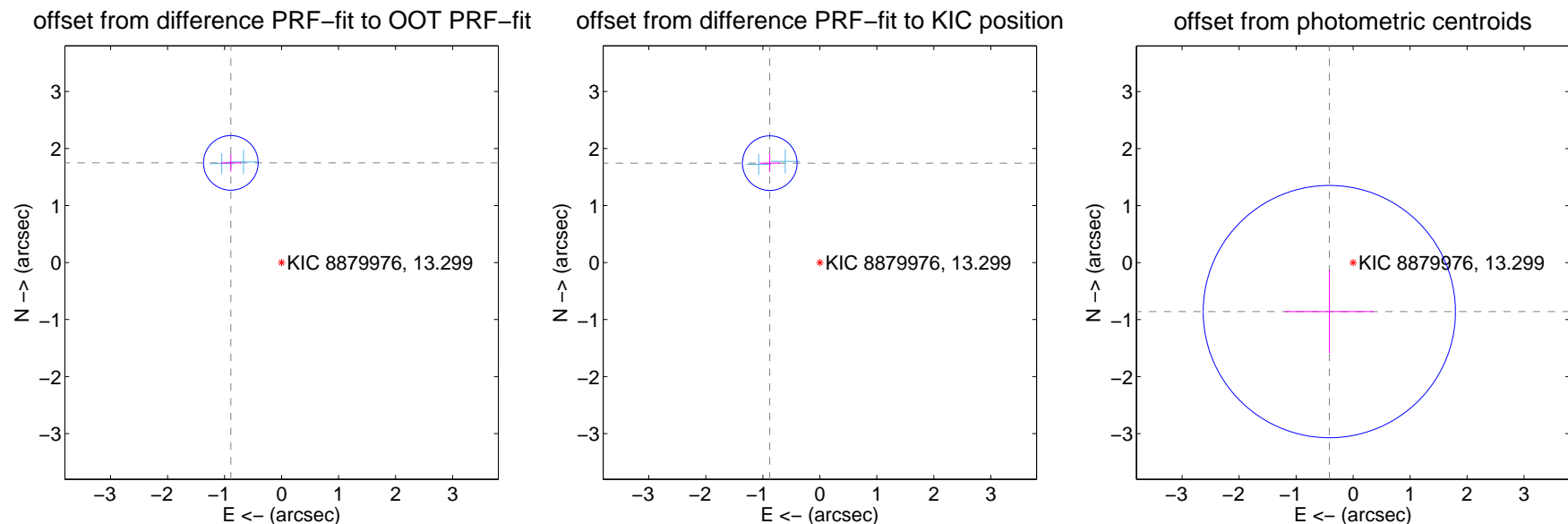
## DV Centroid Data

Supplemental centroid analysis for 008879976-06. Kepler magnitude: 13.30. Transit SNR 6.31

There are 2 quarters with good PRF difference image offsets

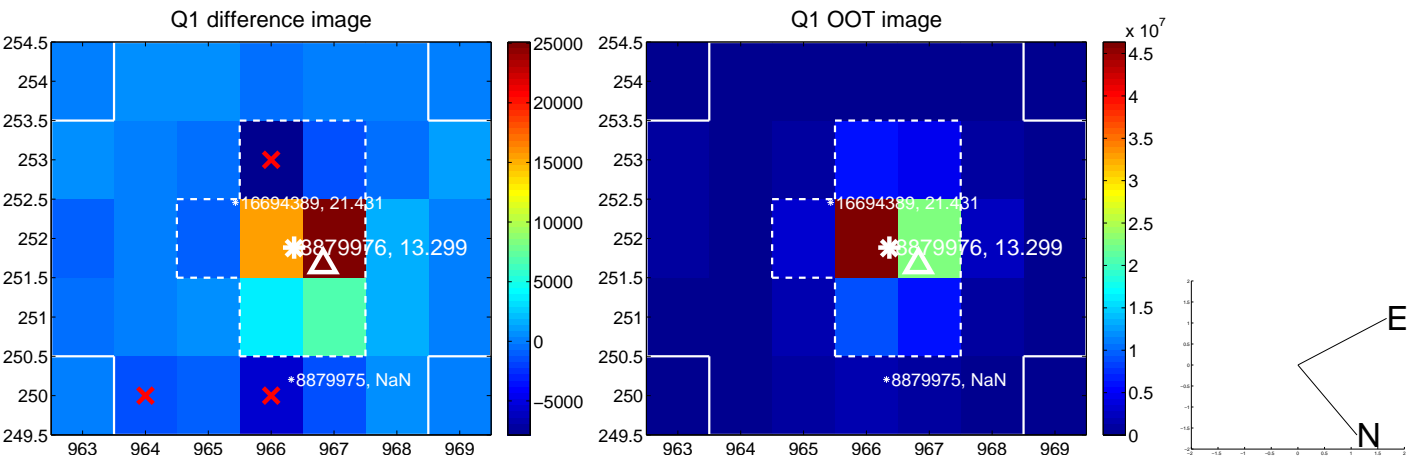
The direct PRF centroid is offset from the target star catalog position by about 0.06 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.961 \pm 0.160$	12.28	$0.890 \pm 0.178$	$1.748 \pm 0.154$
PRF-fit source offset from KIC position	$1.952 \pm 0.160$	12.23	$0.878 \pm 0.178$	$1.743 \pm 0.154$
photometric centroid source offset	$0.96 \pm 0.74$	1.29	$0.42 \pm 0.78$	$-0.86 \pm 0.73$

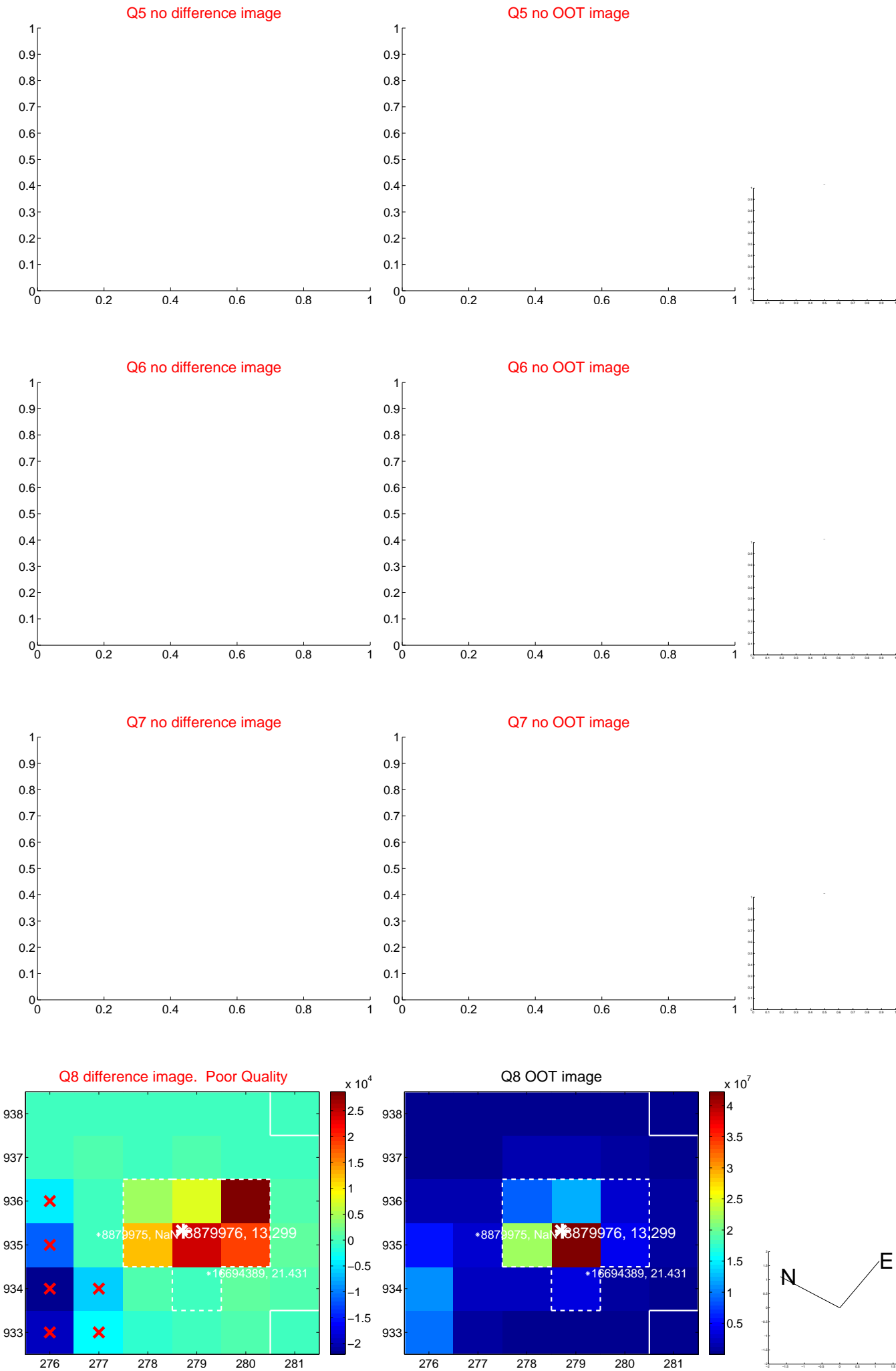


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

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



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



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

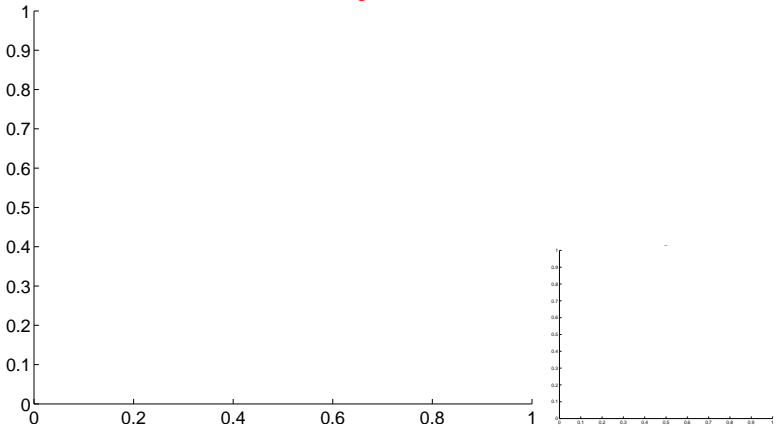


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

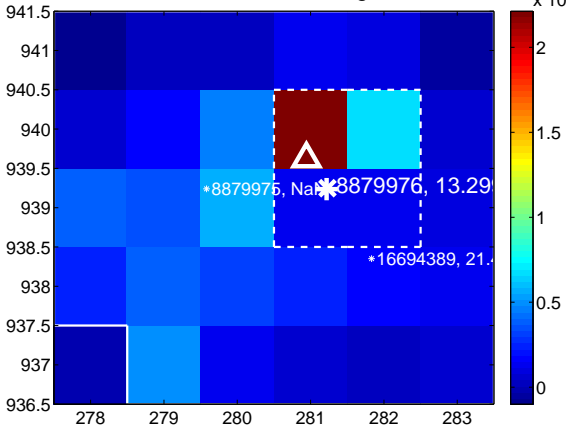
Q13 no difference image



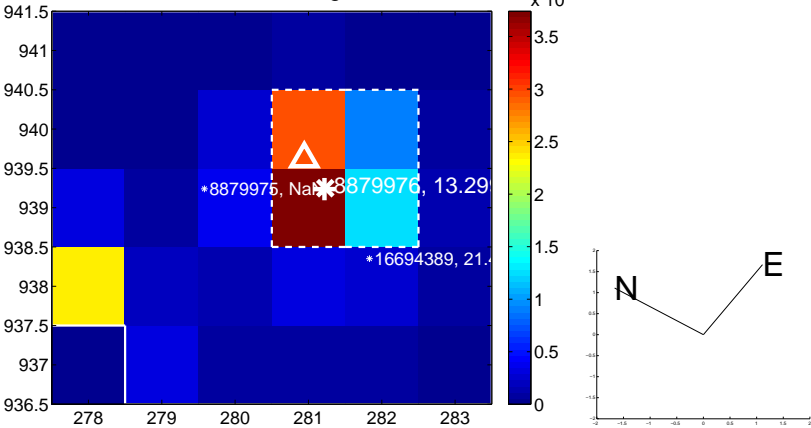
Q13 no OOT image



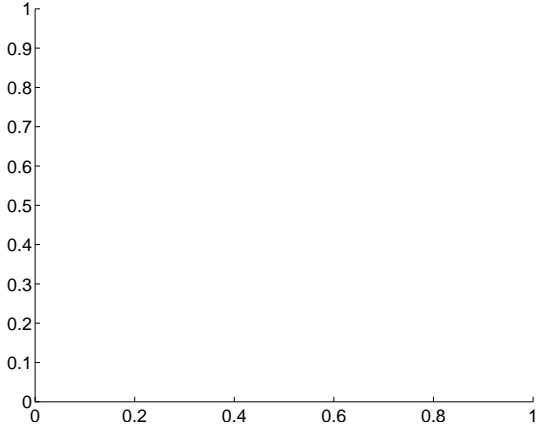
Q14 difference image



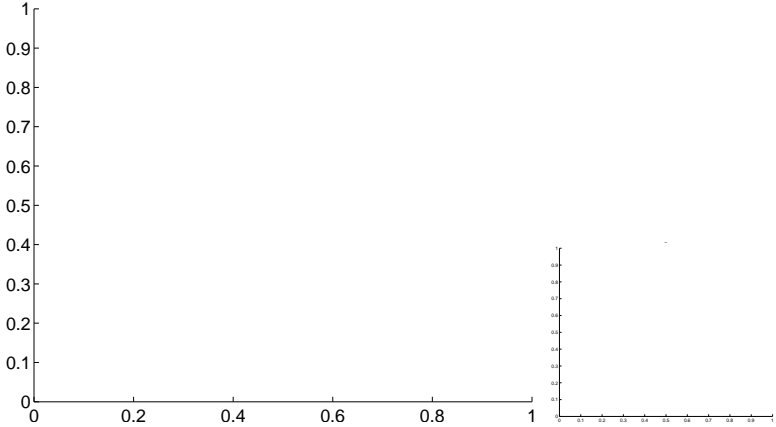
Q14 OOT image



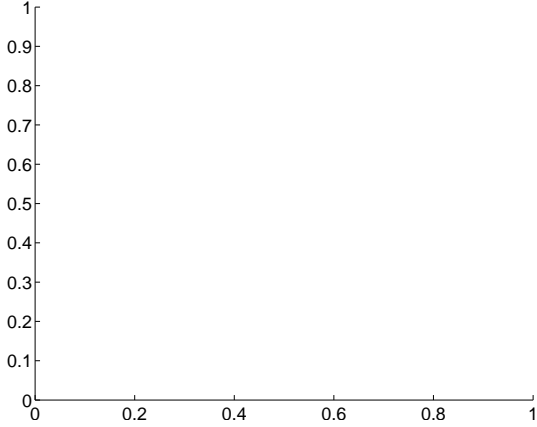
Q15 no difference image



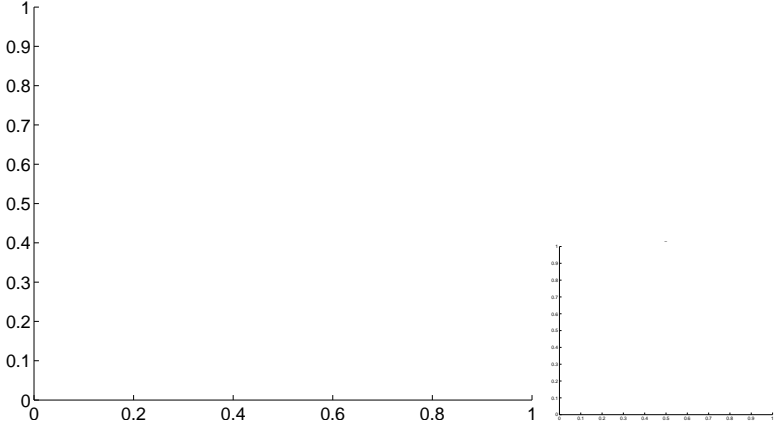
Q15 no OOT image



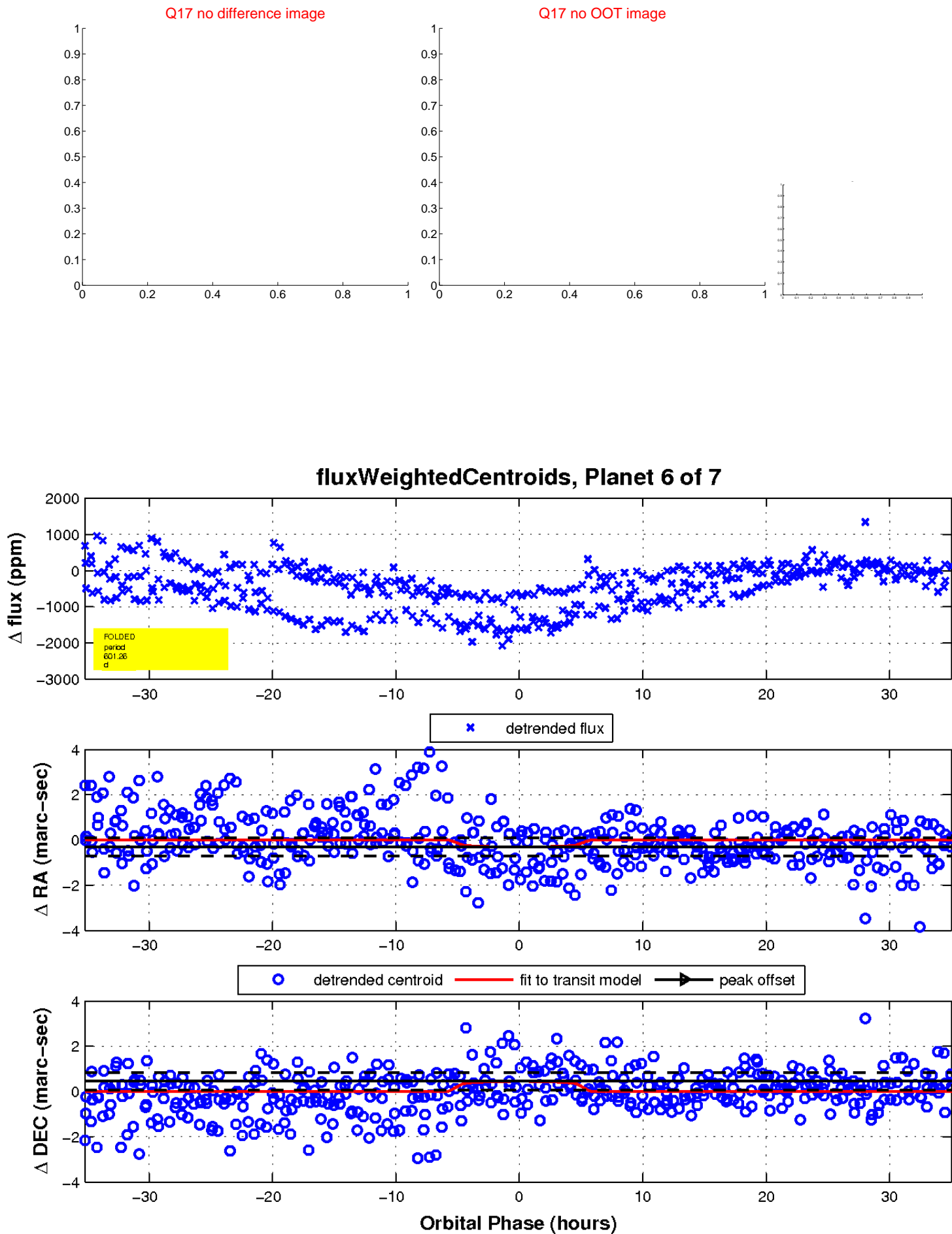
Q16 no difference image



Q16 no OOT image

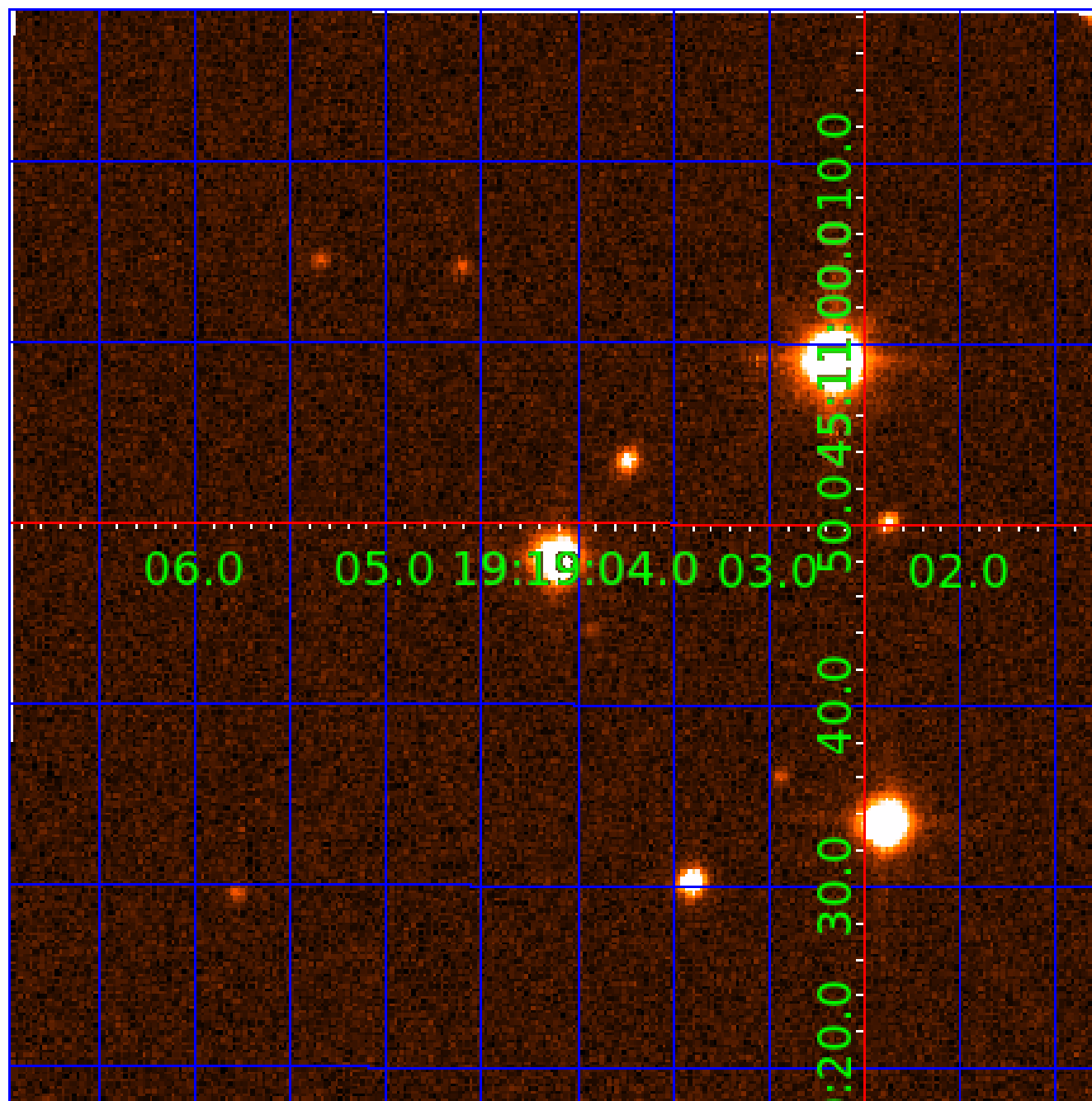


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 008879976

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
008879976-01	OBS	No	499.629434	142.102639	414.7	4.566	10.6	5.7	1.44	6200	3.17	1.53
008879976-02	OBS	No	354.159555	370.530374	698.0	5.500	16.6	9.4	1.44	6200	3.99	2.42
008879976-03	OBS	No	672.266947	223.970877	531.5	6.474	11.9	7.2	1.44	6200	3.67	1.03
008879976-04	OBS	No	568.697799	405.990628	572.2	13.754	9.7	6.4	1.44	6200	3.50	1.28
008879976-06	OBS	No	601.258445	137.780047	482.7	11.771	9.1	6.3	1.44	6200	3.75	1.19
008879976-07	OBS	No	239.327245	282.546057	553.2	10.694	8.8	7.5	1.44	6200	6.63	4.08

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
008879976-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—LPP_DV—ALL_TRANS_CHASES—MOD_POS_DV—CENT_FEW_DIFFS
008879976-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—CENT_FEW_DIFFS
008879976-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
008879976-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—CENT_FEW_DIFFS
008879976-06	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL_SKYE—CENT_FEW_DIFFS
008879976-07	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_FEW_DIFFS

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

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

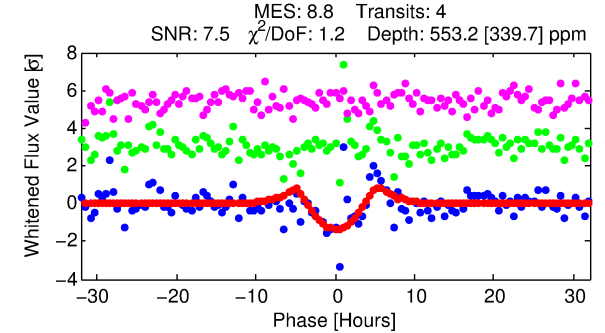
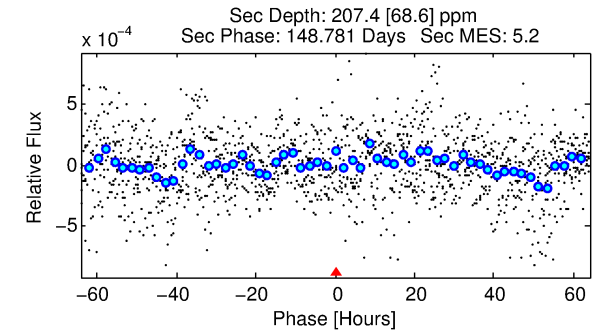
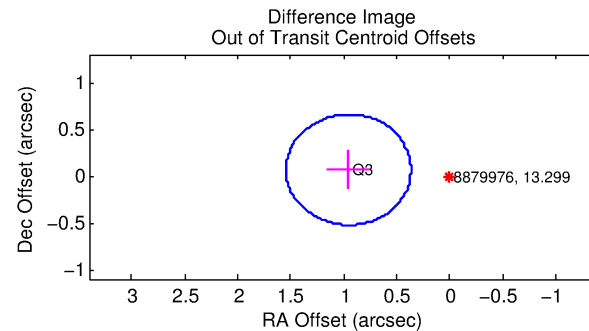
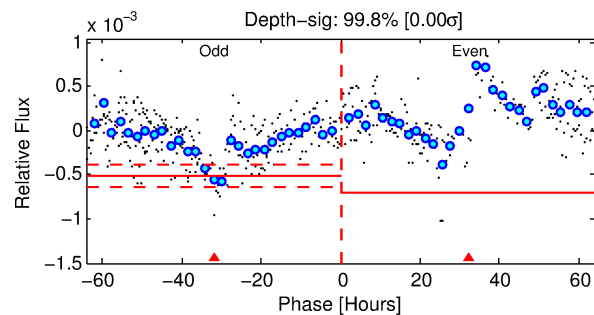
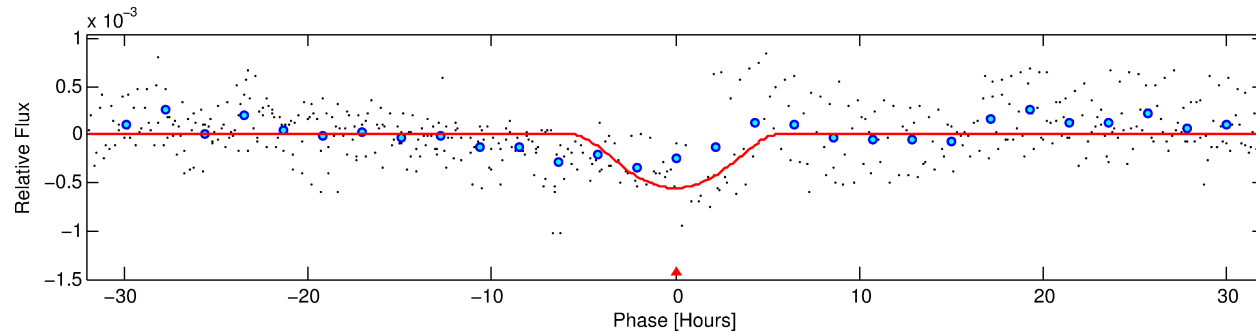
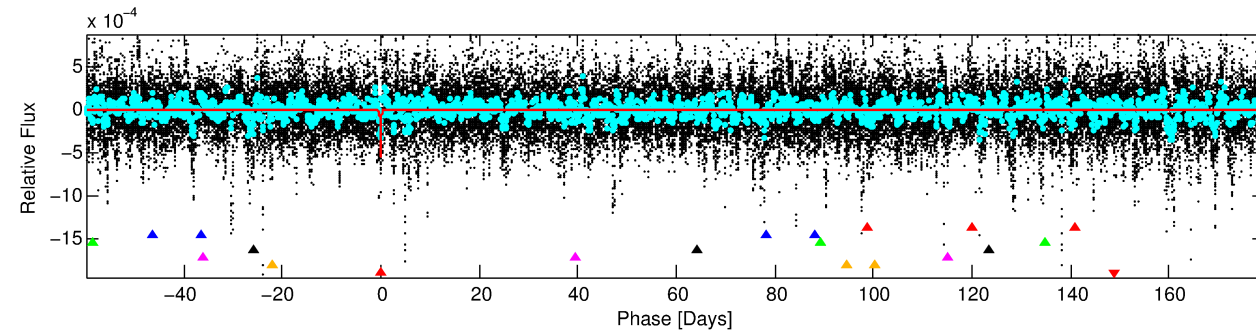
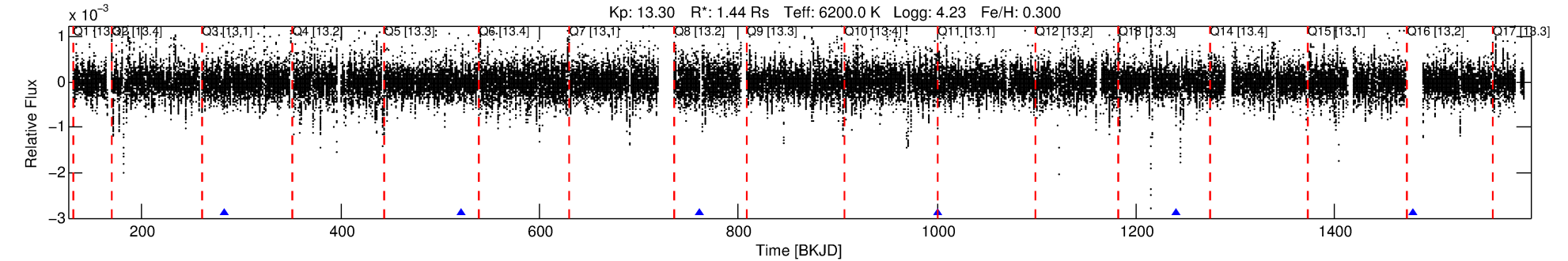
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 008879976-07

No Significant Match Found

# DV One-Page Summary

KIC: 8879976 Candidate: 7 of 7 Period: 239.327 d



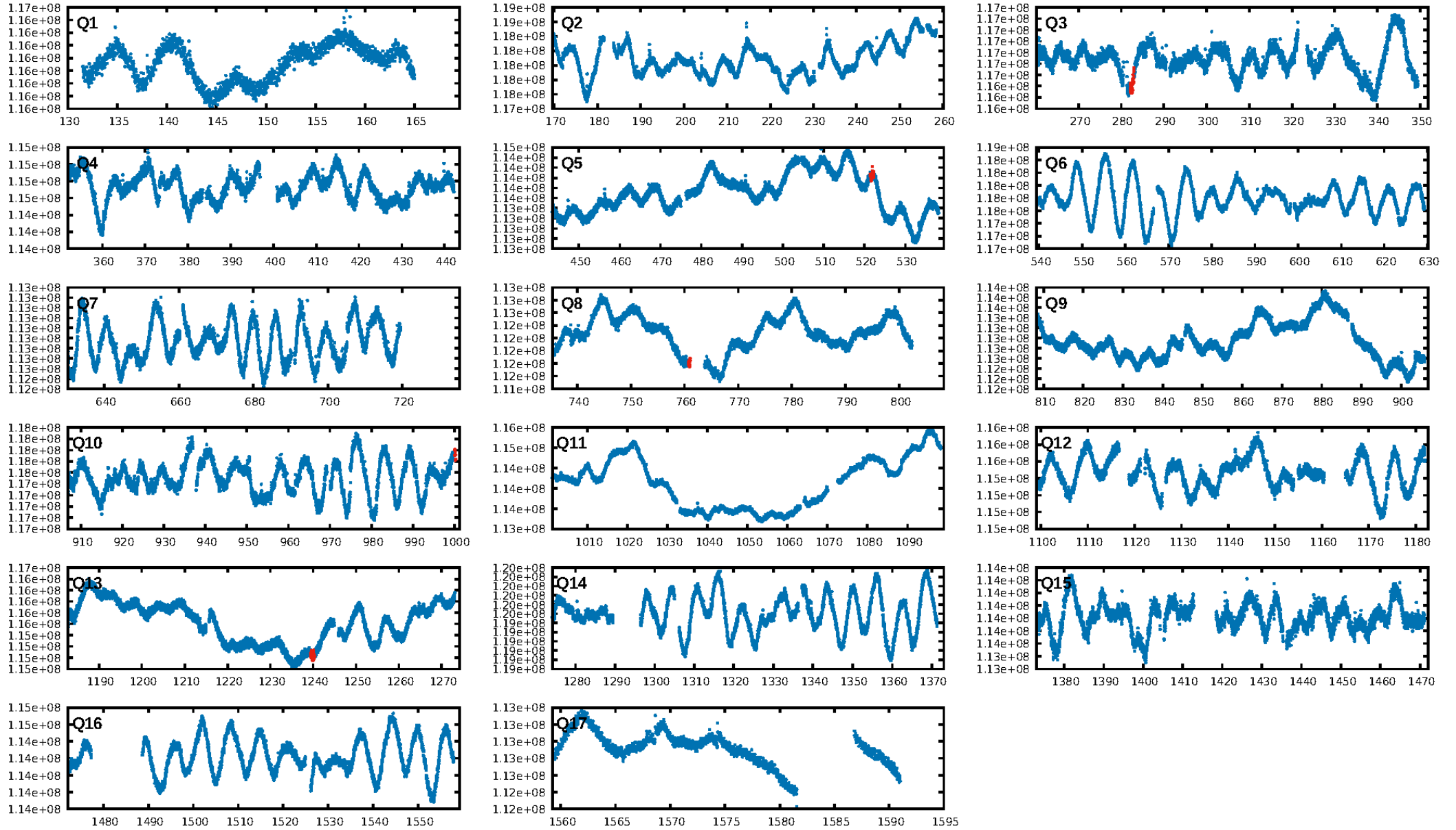
## DV Fit Results:

Period = 239.32724 [0.00924] d  
Epoch = 282.5461 [0.0310] BKJD  
Rp/R\* = 0.0423 [0.1453]  
a/R\* = 50.30 [42.94]  
b = 1.00 [0.23]  
Seff = 4.07 [1.71]  
Teq = 362 [38] K  
Rp = 6.63 [22.89] Re  
a = 0.8191 [0.2230] AU  
Ag = 1741.37 [11999.99] [0.15σ]  
Teffp = 3618 [6225] K [0.52σ]

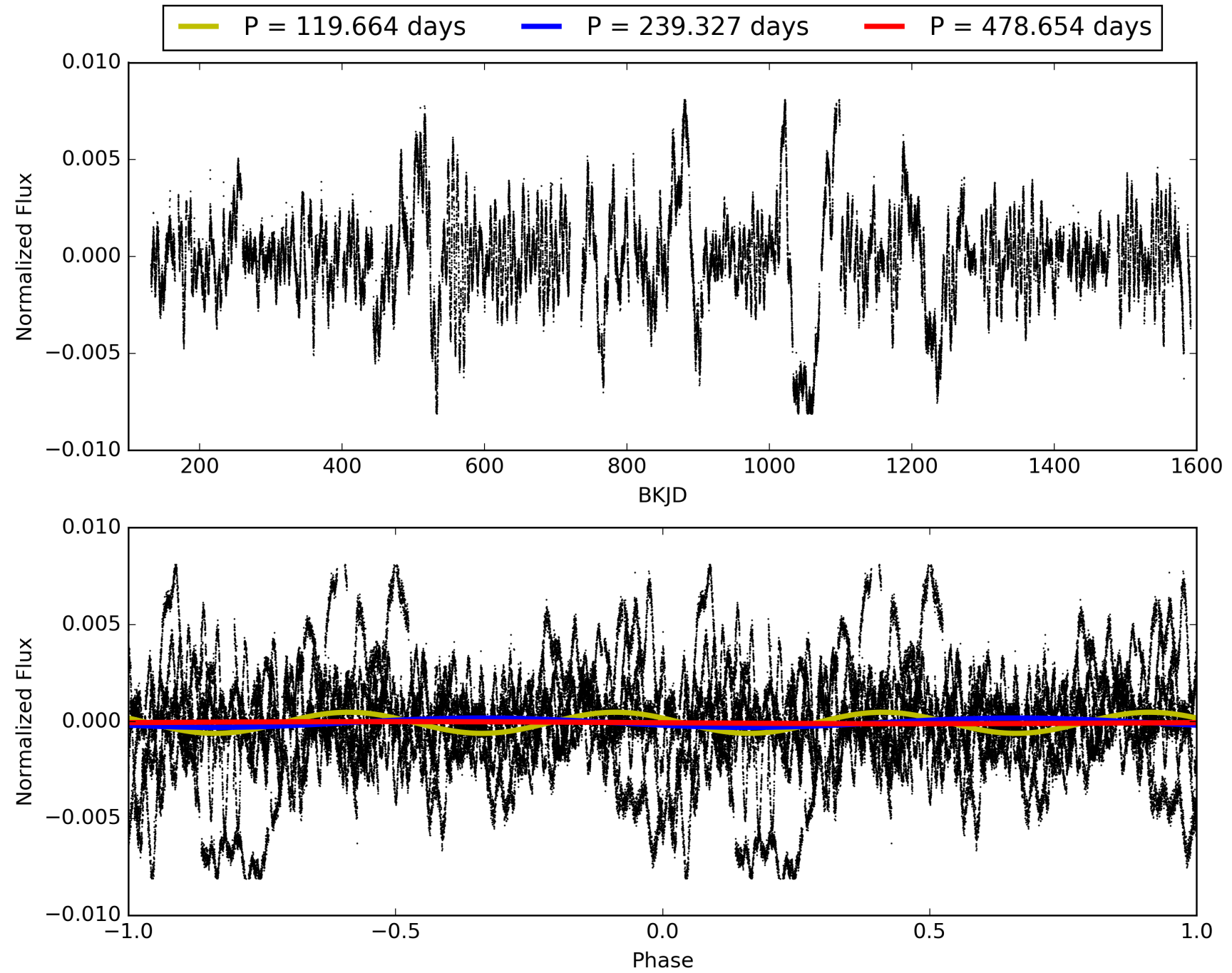
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [229.18σ]  
ModelChiSquare2-sig: 79.0%  
ModelChiSquareGof-sig: 99.9%  
**Bootstrap-pfa: 5.71e-10**  
RollingBand-fgt: 1.00 [4/4]  
GhostDiagnostic-chr: 3.012  
Centroid-sig: 14.1%  
Centroid-so: 1.416 arcsec [1.18σ]  
**OotOffset-rm: 0.955 arcsec [4.85σ]**  
**KicOffset-rm: 1.018 arcsec [5.17σ]**  
OotOffset-st: 0/1/0/0 [1]  
KicOffset-st: 0/1/0/0 [1]  
DiffImageQuality-fgm: 1.00 [1/1]  
DiffImageOverlap-fno: 1.00 [3/3]

# TCE 008879976-07, PDC Light Curves

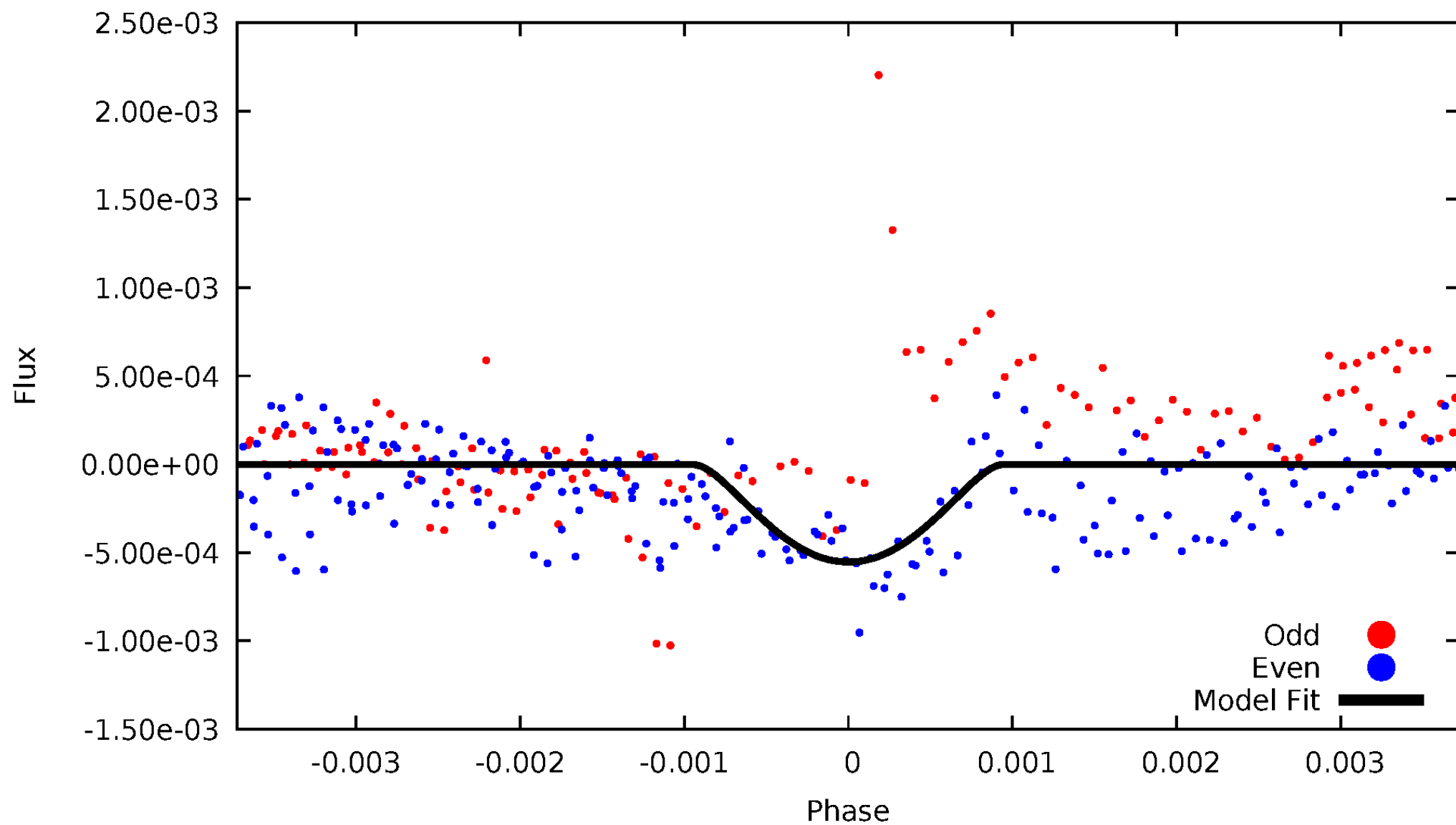


TCE 008879976-07



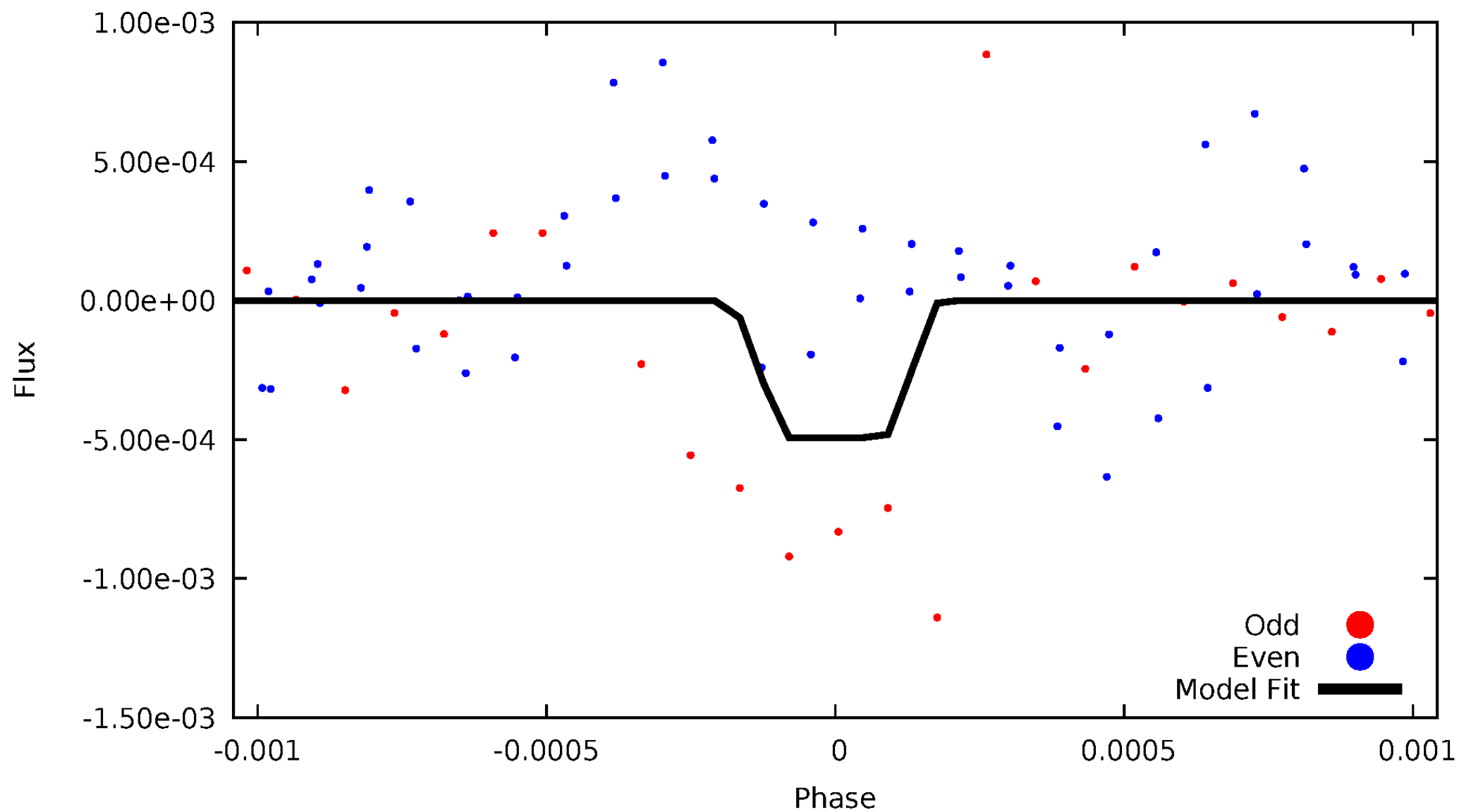
# DV Odd/Even

TCE 008879976-07



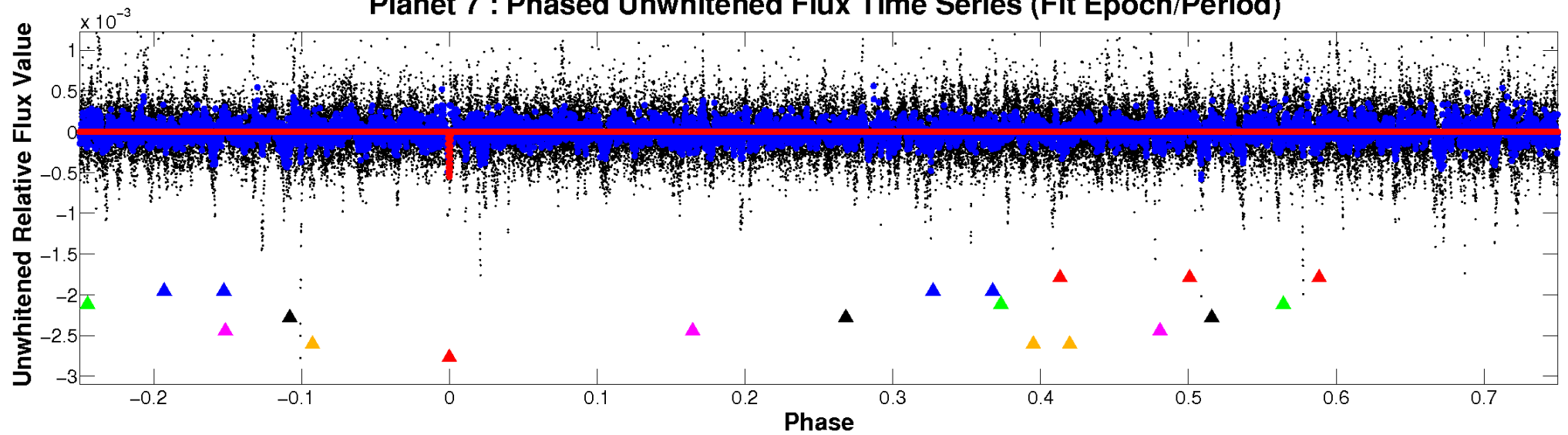
# ALT Odd/Even

TCE 008879976-07

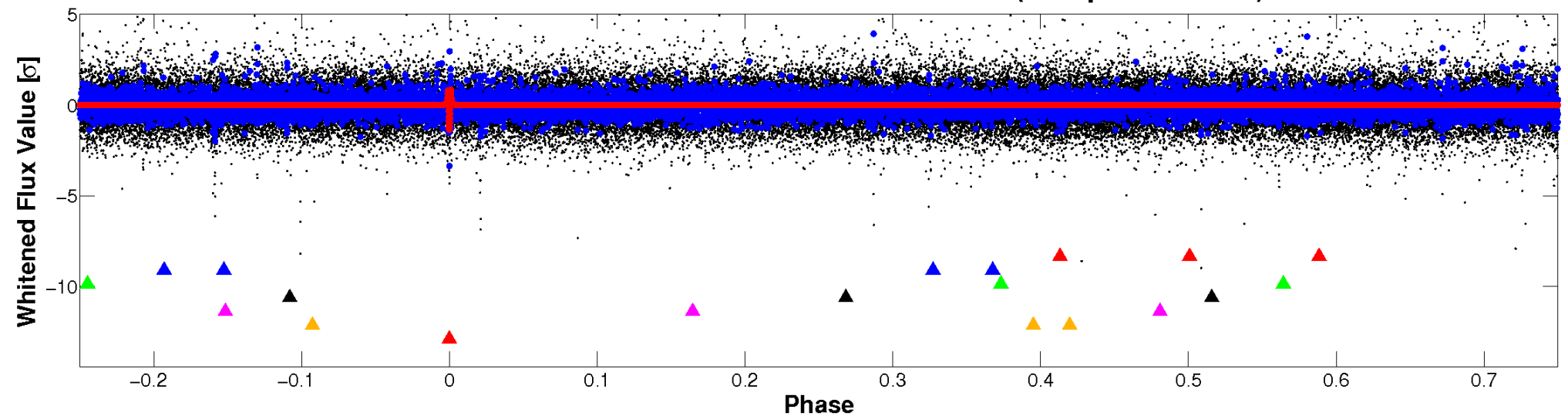


# Non-Whitened Vs. Whitened Light Curve

Planet 7 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

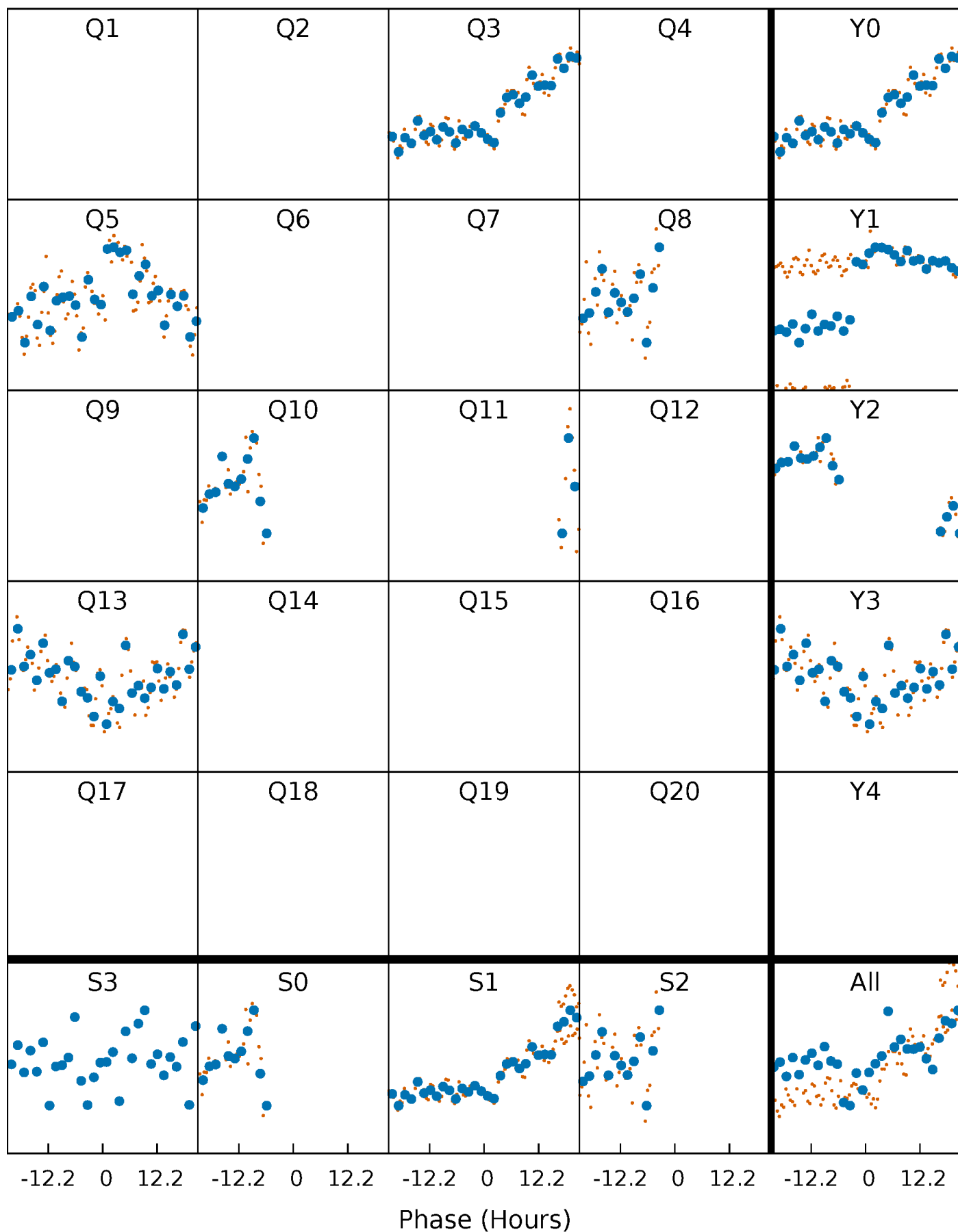


Planet 7 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

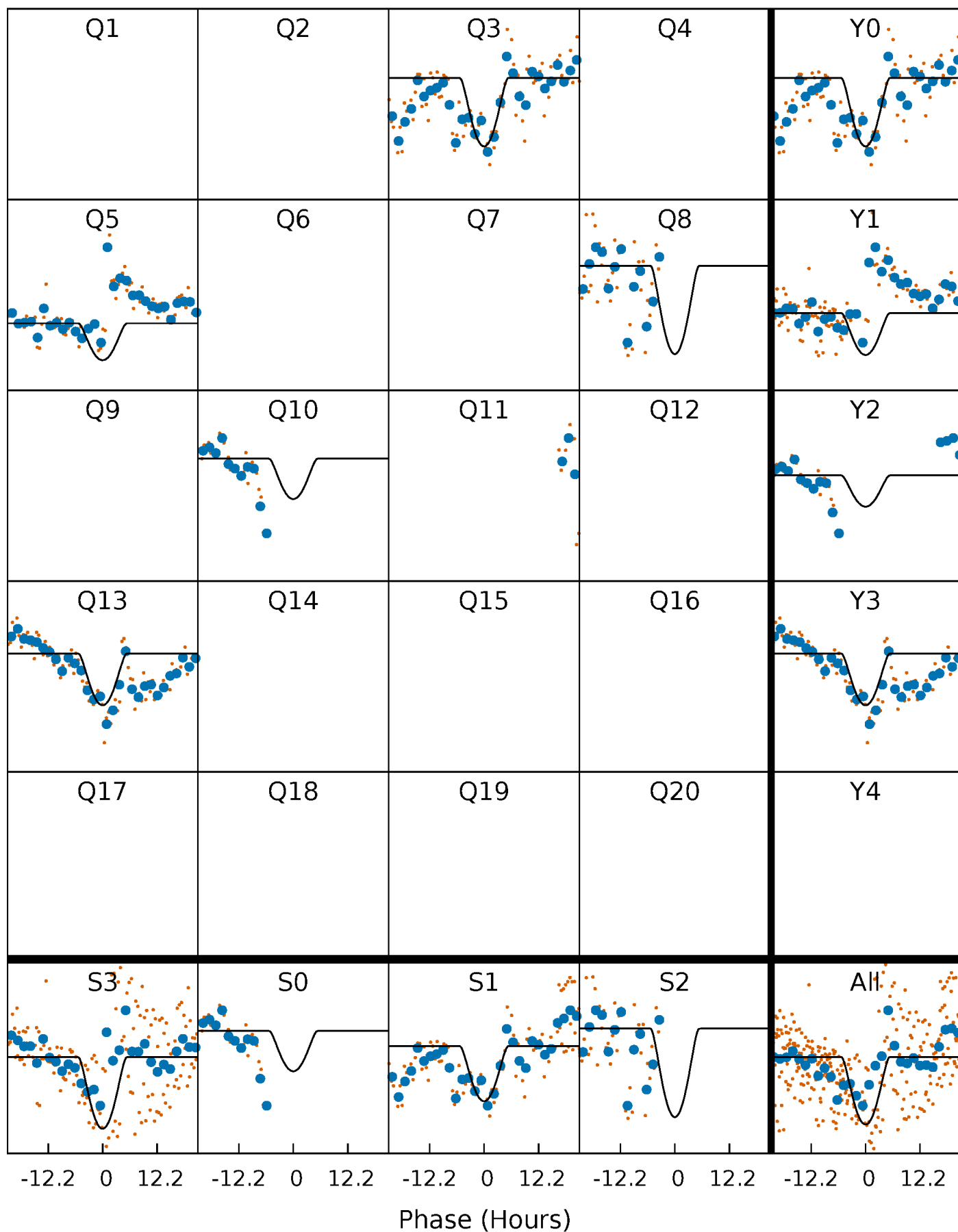
TCE 008879976-07     $P=239.327245$  Days     $T_0=282.546057$  (BKJD)





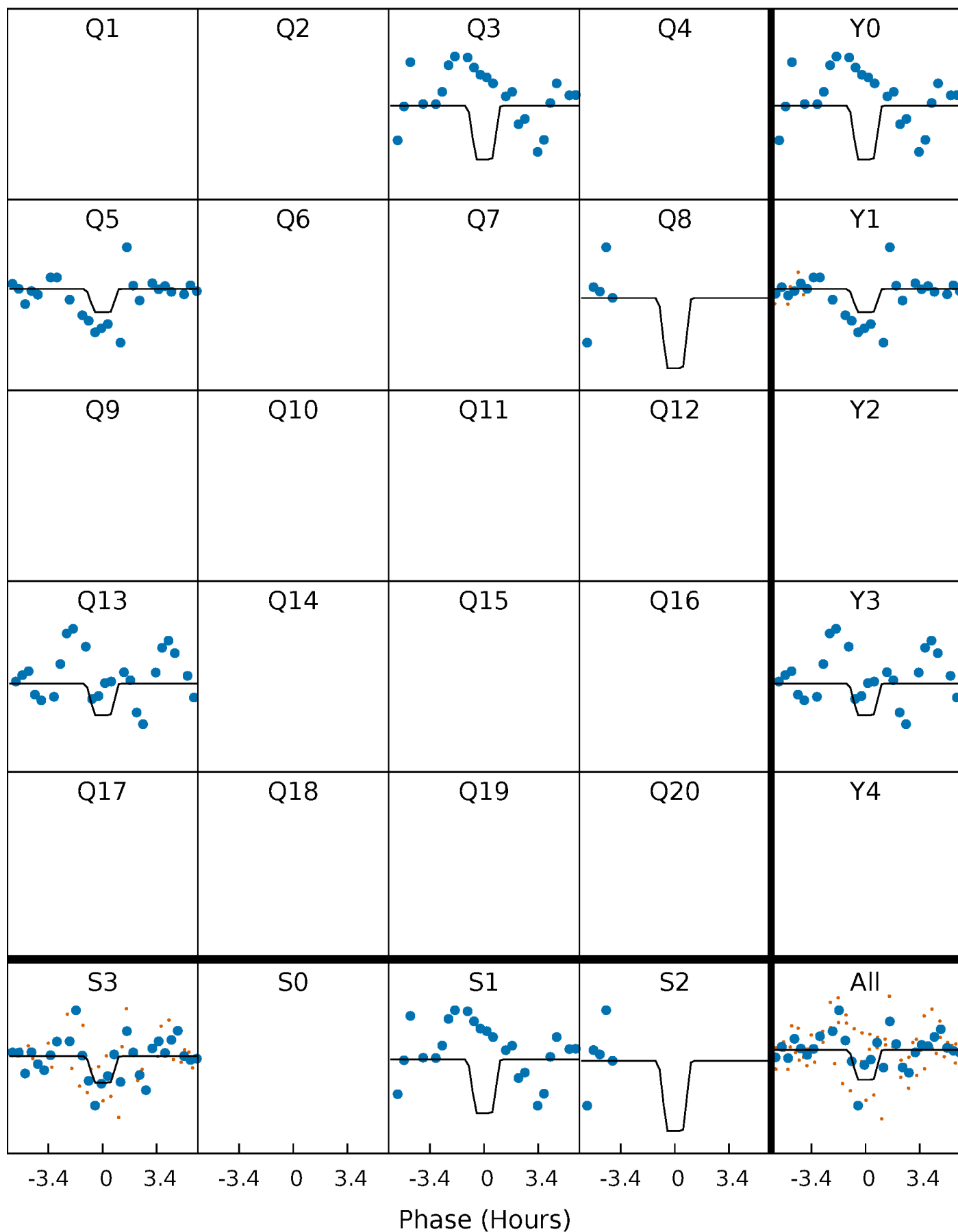
# DV Quarter-Phased Transit Curves

TCE 008879976-07     $P=239.327245$  Days     $T_0=282.546057$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

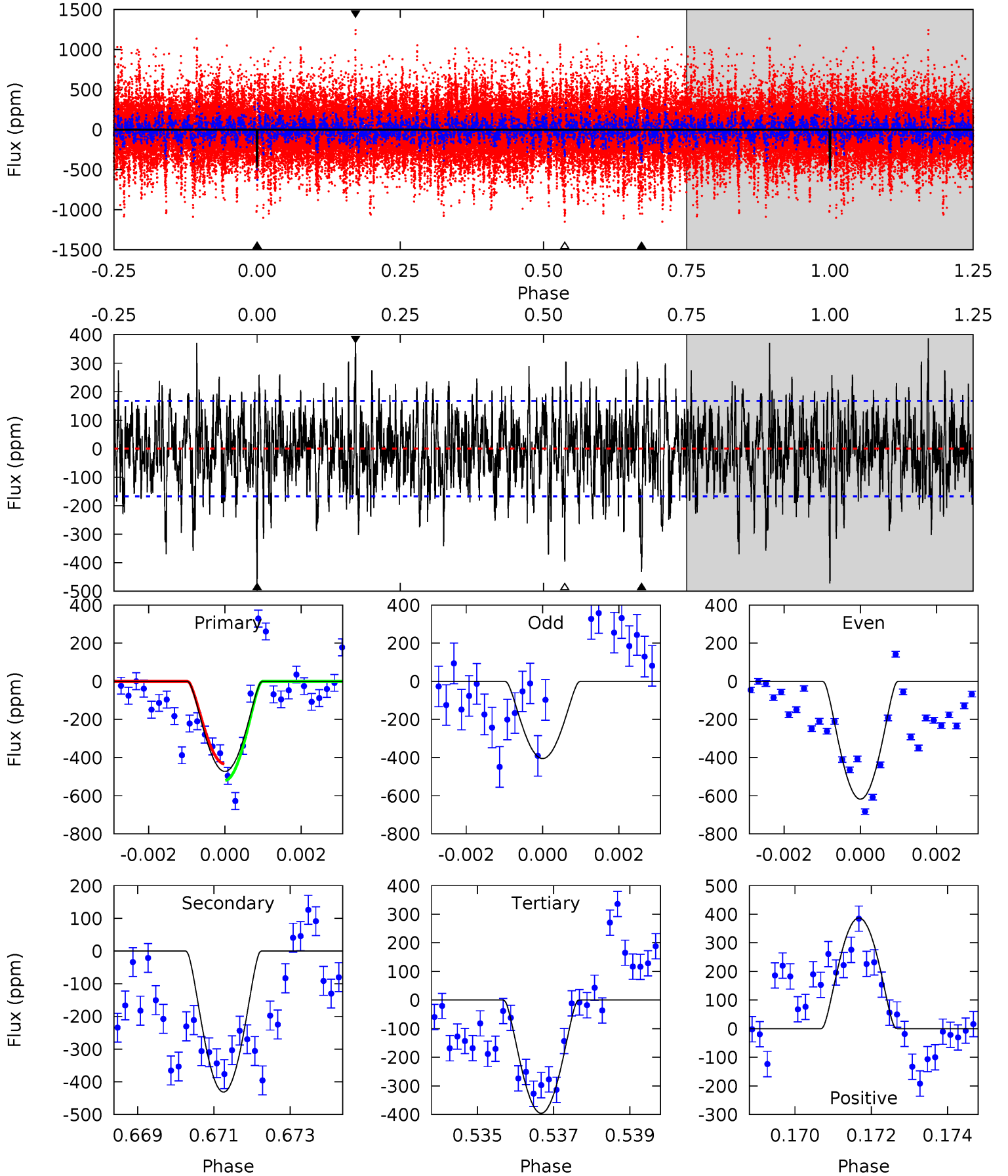
TCE 008879976-07     $P=239.349050$  Days     $T_0=282.505730$  (BKJD)



# DV Model-Shift Uniqueness Test

008879976-07, P = 239.327245 Days, E = 43.218812 Days

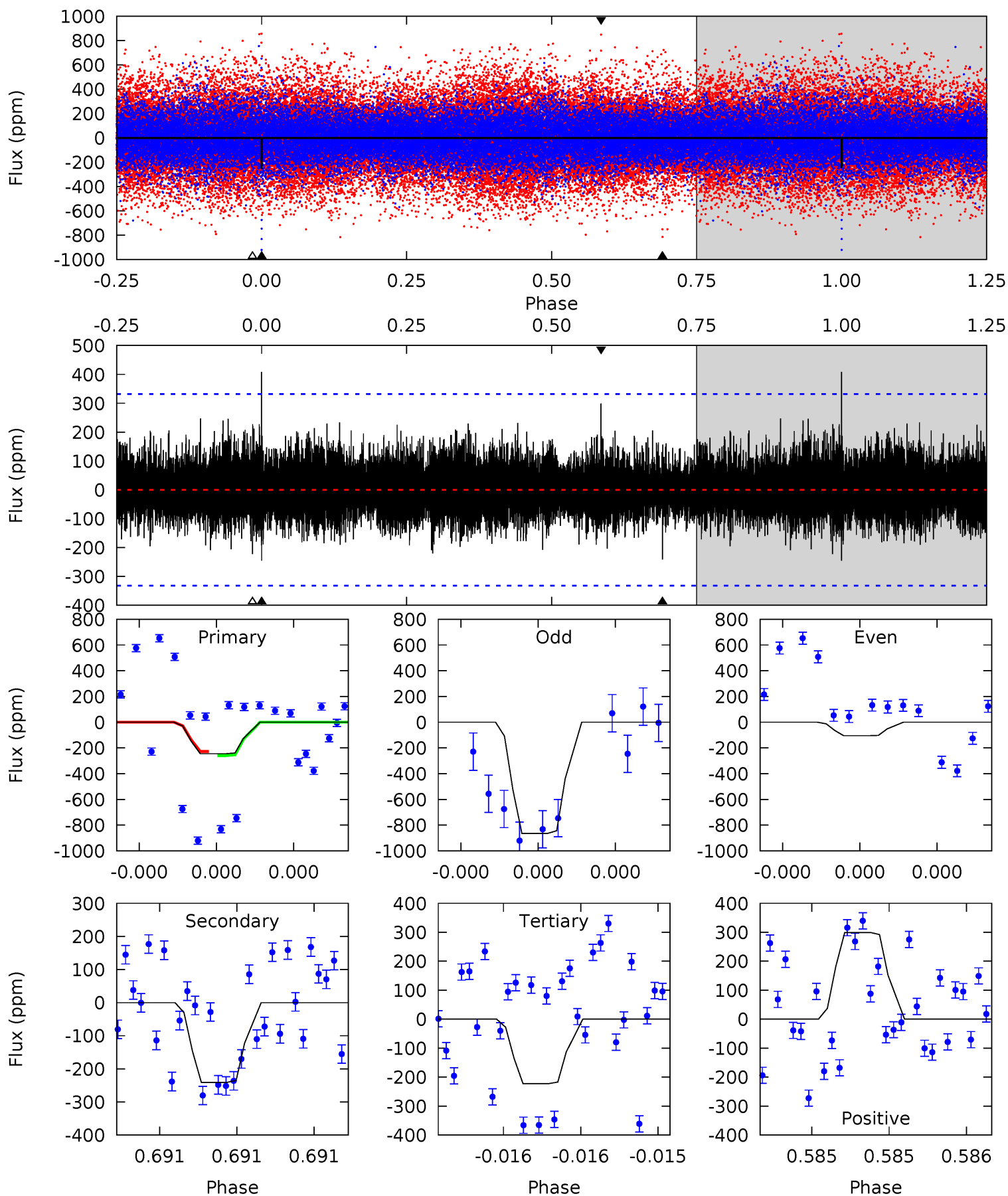
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
15.0	13.7	12.6	12.3	5.33	3.10	3.44	2.45	2.72	1.14	1.41	3.23	0.76	0.45	1.38



# Alt Model-Shift Uniqueness Test

008879976-07, P = 239.349050 Days, E = 43.156680 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
4.15	4.08	3.77	5.07	5.62	3.55	1.06	0.38	-0.92	0.31	-0.99	5.92	1.91	0.63	0.27



### Stellar Parameters For KIC 008879976

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6200^{+150}_{-236}$	$4.230^{+0.140}_{-0.210}$	$0.300^{+0.150}_{-0.300}$	$1.437^{+0.473}_{-0.276}$	$1.281^{+0.163}_{-0.181}$	$0.608^{+0.430}_{-0.339}$
	+2%/-4%	+3%/-5%	+50%/-100%	+33%/-19%	+13%/-14%	+71%/-56%
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 008879976-07 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-431 \pm 31$	$18.75^{+19.35}_{-13.23}$	$509^{+43}_{-31}$	$3218^{+1677}_{-569}$	$462^{+4996}_{-351}$
Alt.	$-241 \pm 59$	$17.29^{+17.21}_{-12.04}$	$508^{+40}_{-32}$	$2983^{+1512}_{-509}$	$295^{+2965}_{-227}$

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

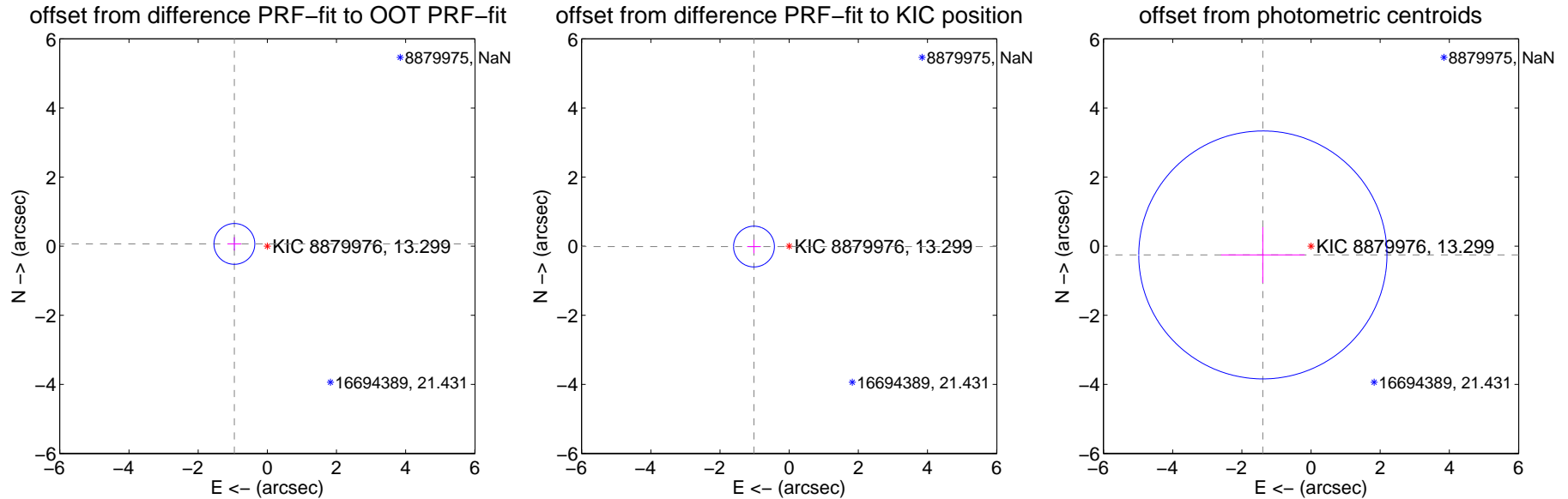
## DV Centroid Data

Supplemental centroid analysis for 008879976-07. Kepler magnitude: 13.30. Transit SNR 7.55

There are 1 quarters with good PRF difference image offsets

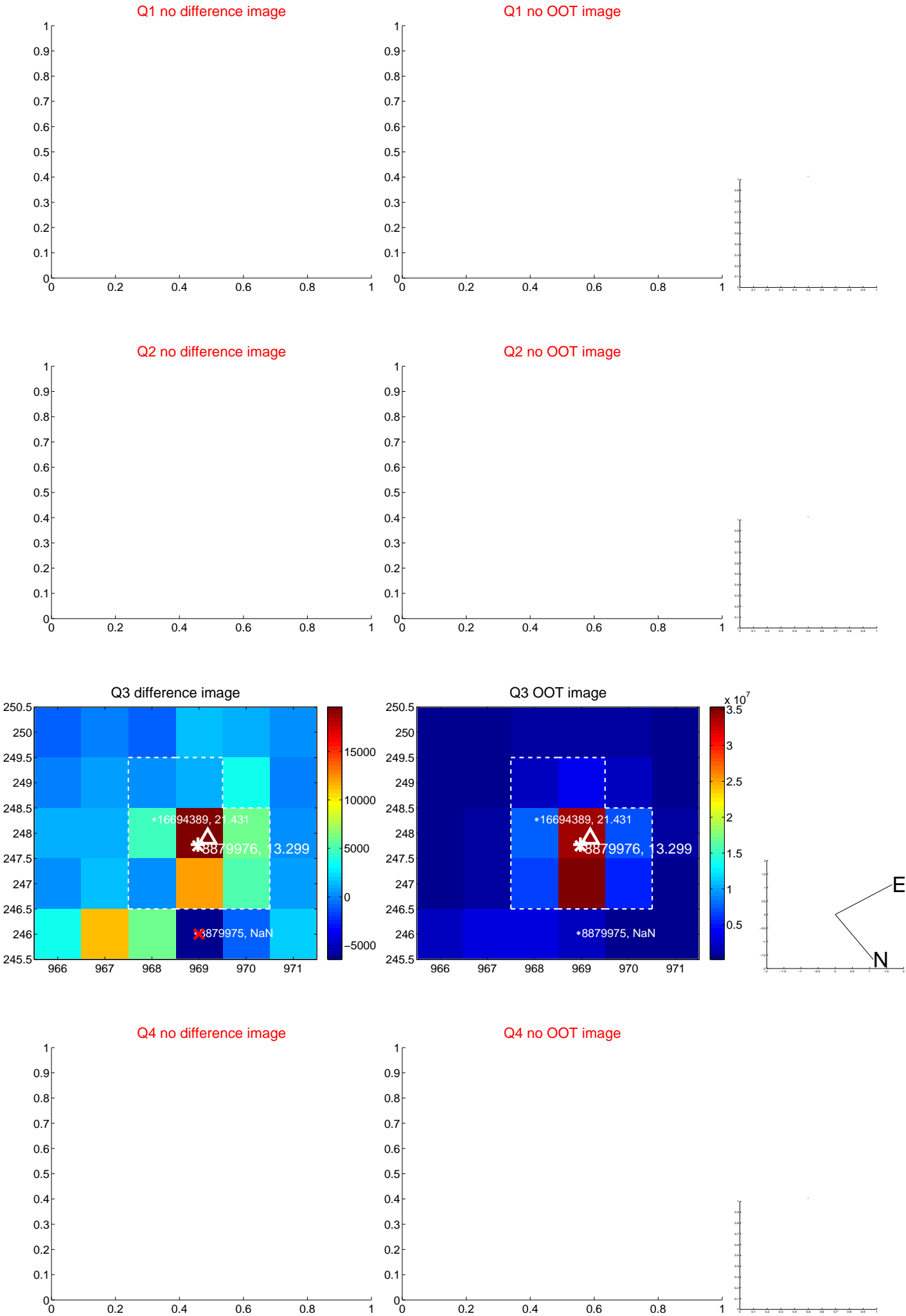
The direct PRF centroid is offset from the target star catalog position by about 0.10 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$0.955 \pm 0.197$	4.85	$0.952 \pm 0.197$	$0.067 \pm 0.195$
PRF-fit source offset from KIC position	$1.018 \pm 0.197$	5.17	$1.018 \pm 0.197$	$-0.009 \pm 0.195$
photometric centroid source offset	$1.42 \pm 1.20$	1.18	$1.39 \pm 1.21$	$-0.25 \pm 0.81$

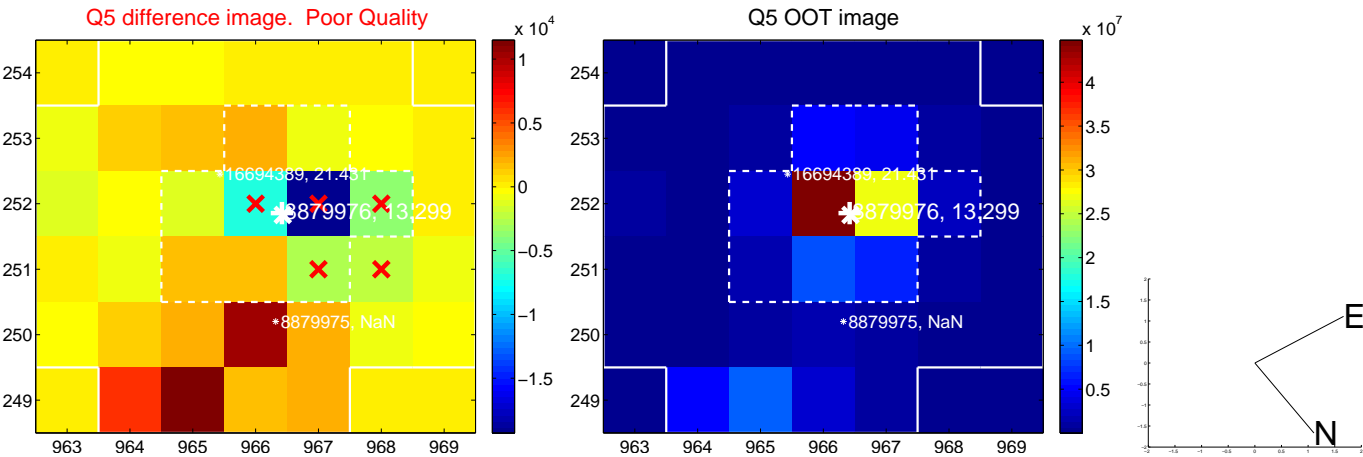


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three- $\sigma$ . 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 ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



white ×: KIC target position; +: OOT centroid; △: difference centroid. red ×: large negative pixel value.

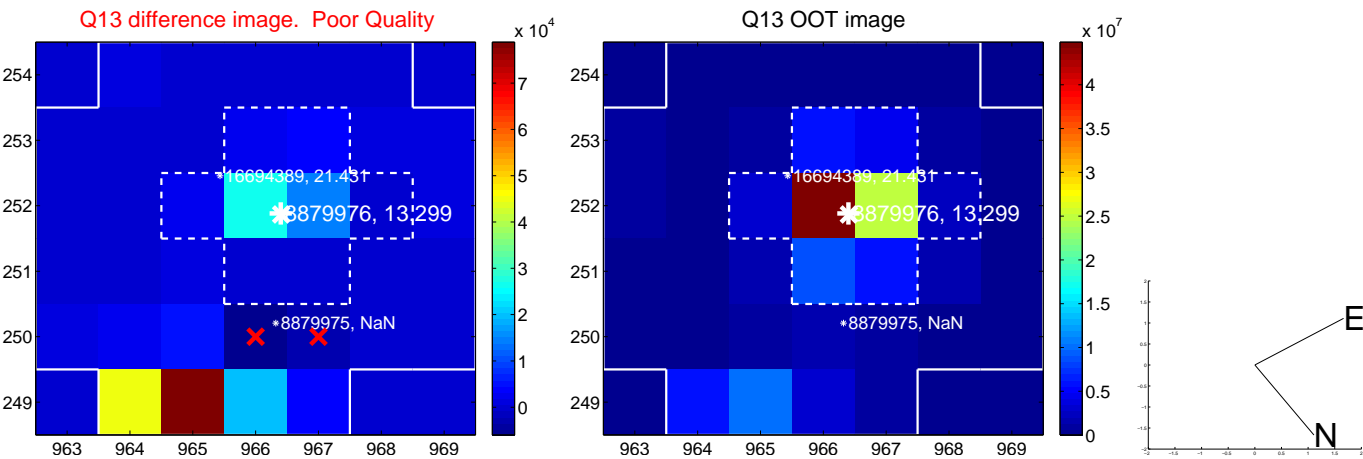




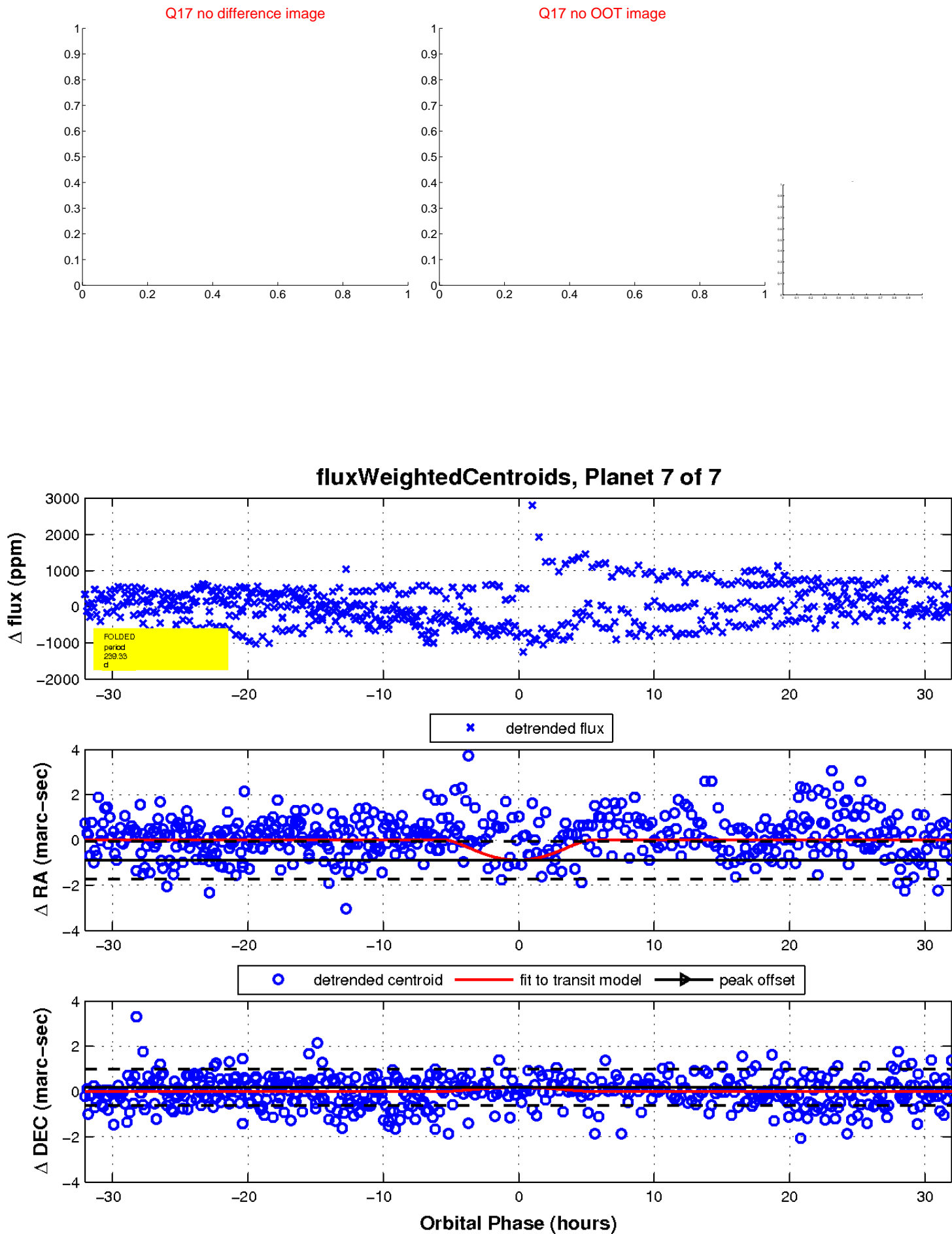
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

