

# KIC 009006206

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009006206-01	OBS	No	496.290409	150.449057	21.0	6.374	14.4	5.1	1.78	6228	0.95	2.71
009006206-02	OBS	No	362.672223	224.062753	133.7	11.318	12.6	8.5	1.78	6228	2.28	4.12
009006206-03	OBS	No	190.199077	132.021695	42.0	20.825	11.5	15.1	1.78	6228	1.24	9.74

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009006206-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
009006206-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_SATURATED
009006206-03	OBS	FP	0.00	1	0	0	0	MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_SATURATED

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

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

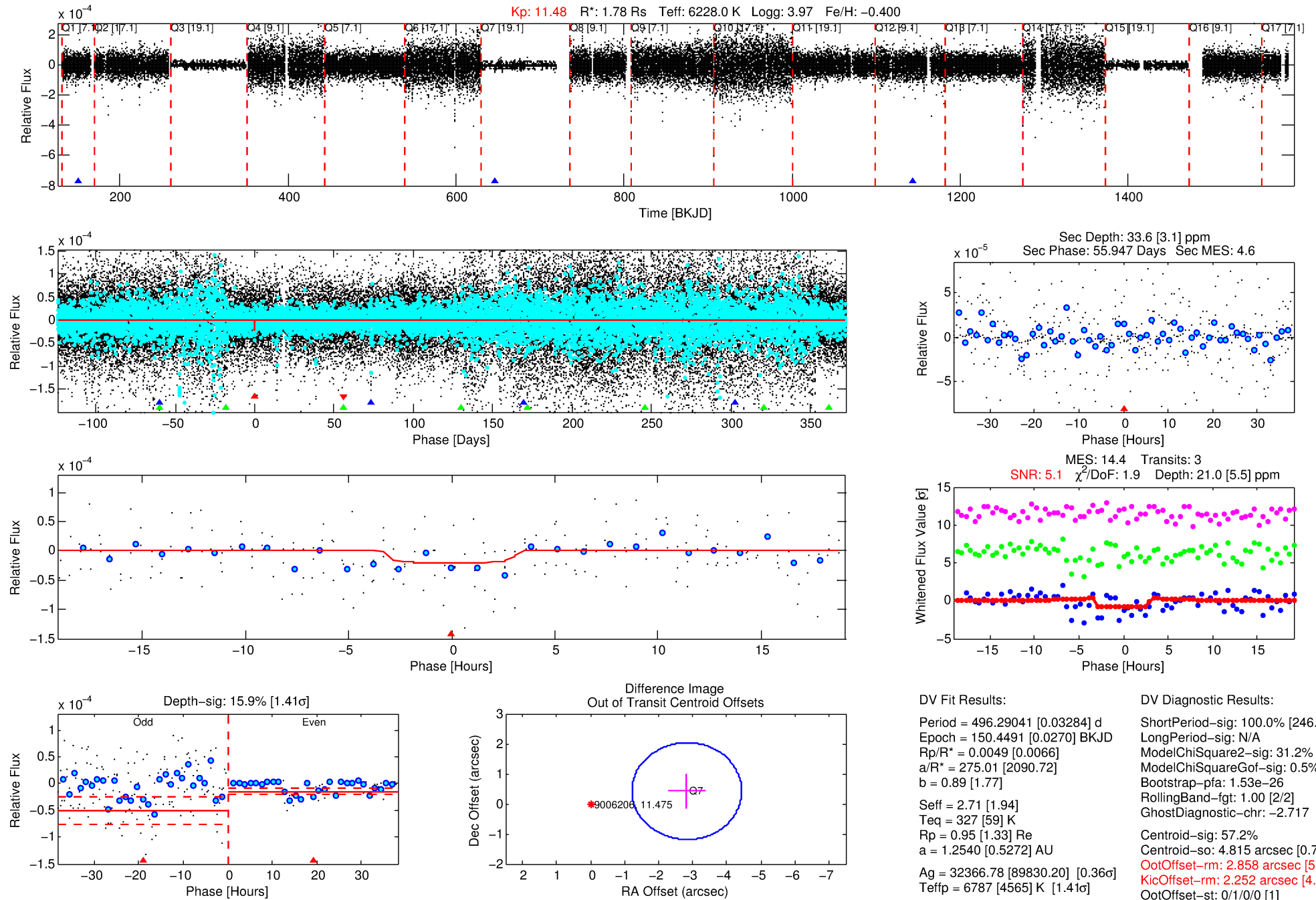
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 009006206-01

No Significant Match Found

# DV One-Page Summary

KIC: 9006206 Candidate: 1 of 3 Period: 496.290 d



## DV Fit Results:

Period = 496.29041 [0.03284] d  
Epoch = 150.4491 [0.0270] BKJD  
Rp/R\* = 0.0049 [0.0066]  
a/R\* = 275.01 [2090.72]  
b = 0.89 [1.77]  
Seff = 2.71 [1.94]  
T<sub>eq</sub> = 327 [59] K  
Rp = 0.95 [1.33] Re  
a = 1.2540 [0.5272] AU  
Ag = 32366.78 [89830.20] [0.36σ]  
T<sub>eff</sub> = 6787 [4565] K [1.41σ]

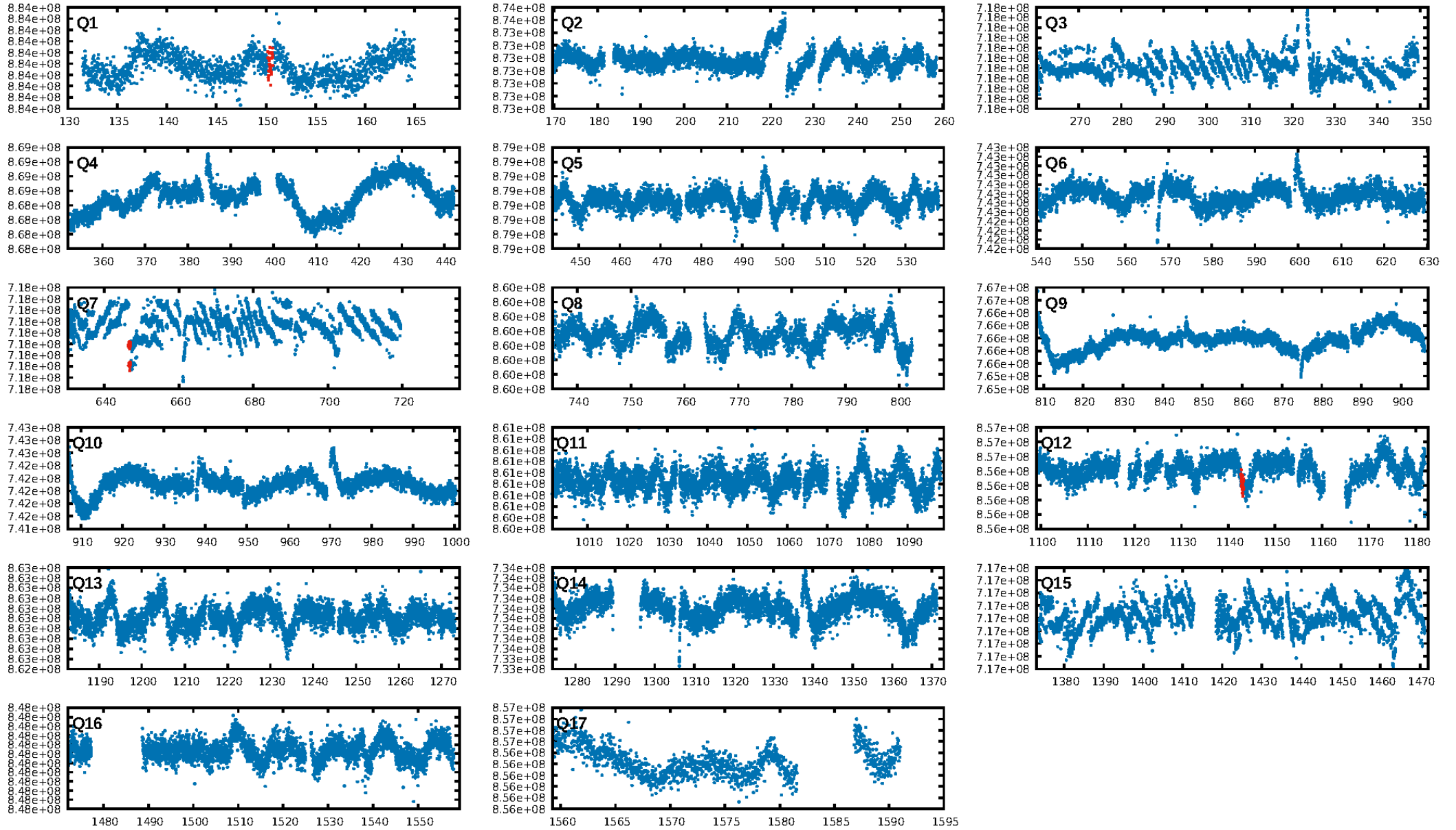
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [246.88σ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 31.2%  
ModelChiSquareGof-sig: 0.5%  
Bootstrap-pfa: 1.53e-26  
RollingBand-fgt: 1.00 [2/2]  
GhostDiagnostic-chr: -2.717  
Centroid-sig: 57.2%  
Centroid-so: 4.815 arcsec [0.73σ]  
OotOffset-rm: 2.858 arcsec [5.32σ]  
KicOffset-rm: 2.252 arcsec [4.17σ]  
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]

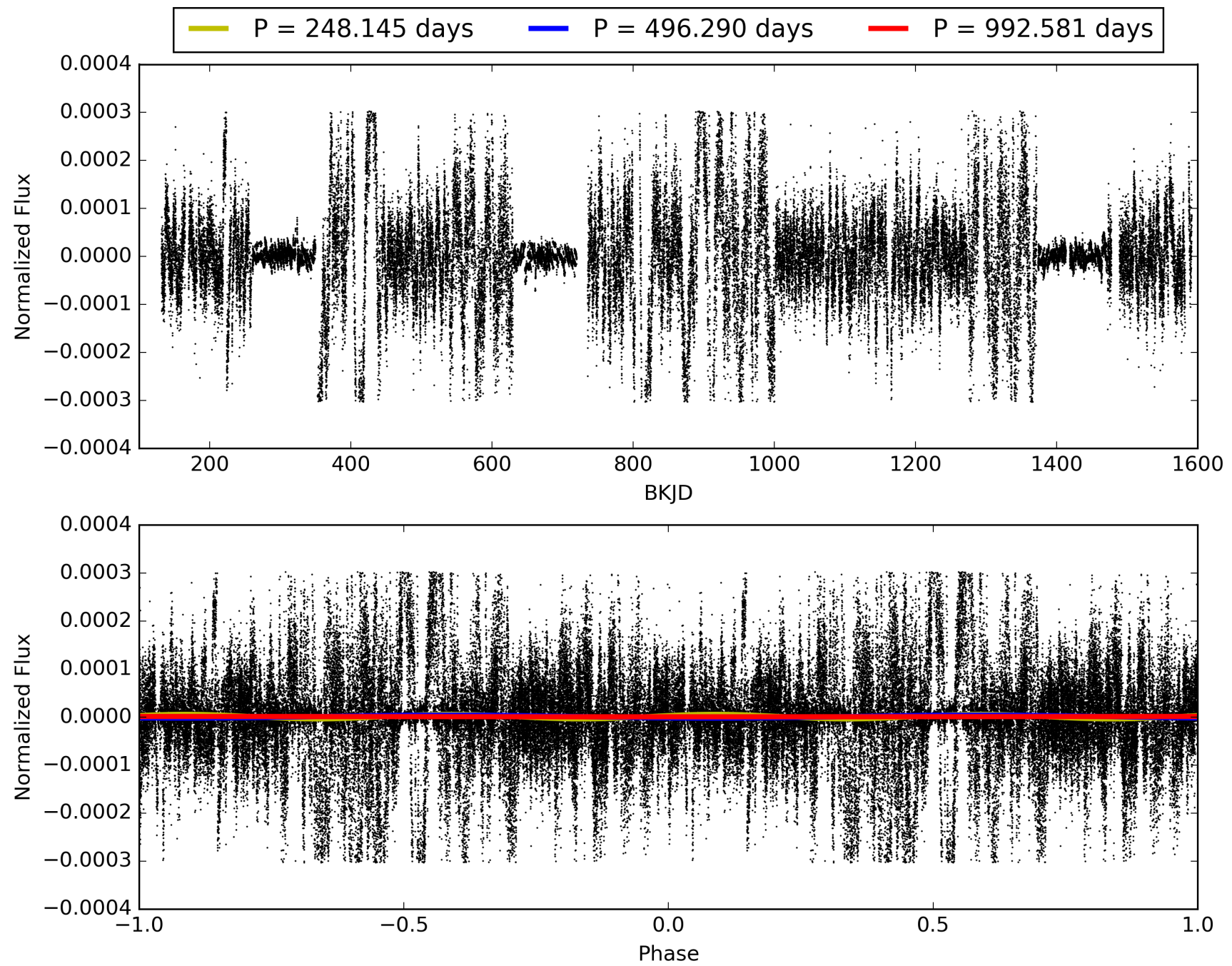
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 05:36:59 Z

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

# TCE 009006206-01, PDC Light Curves

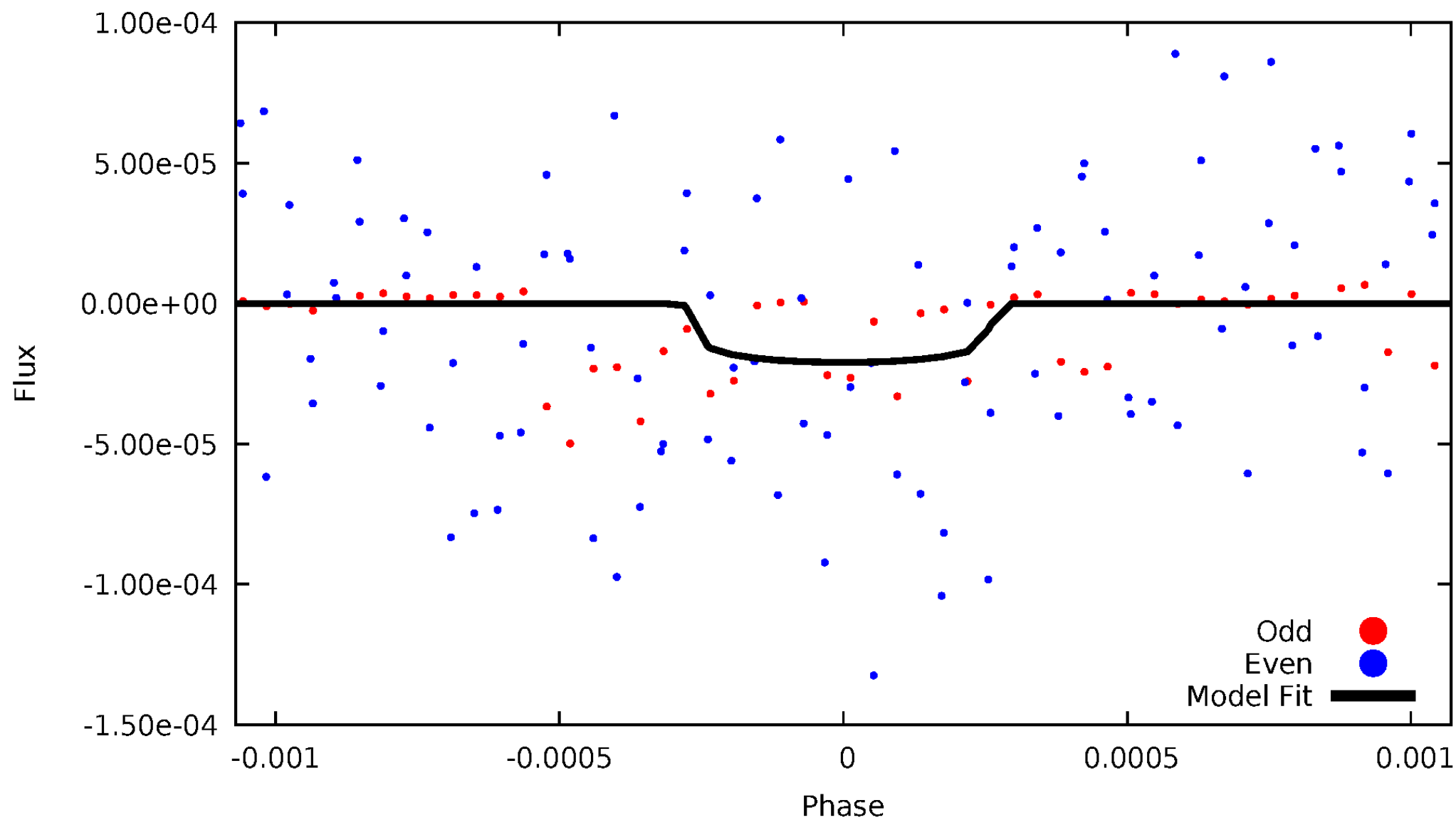


TCE 009006206-01



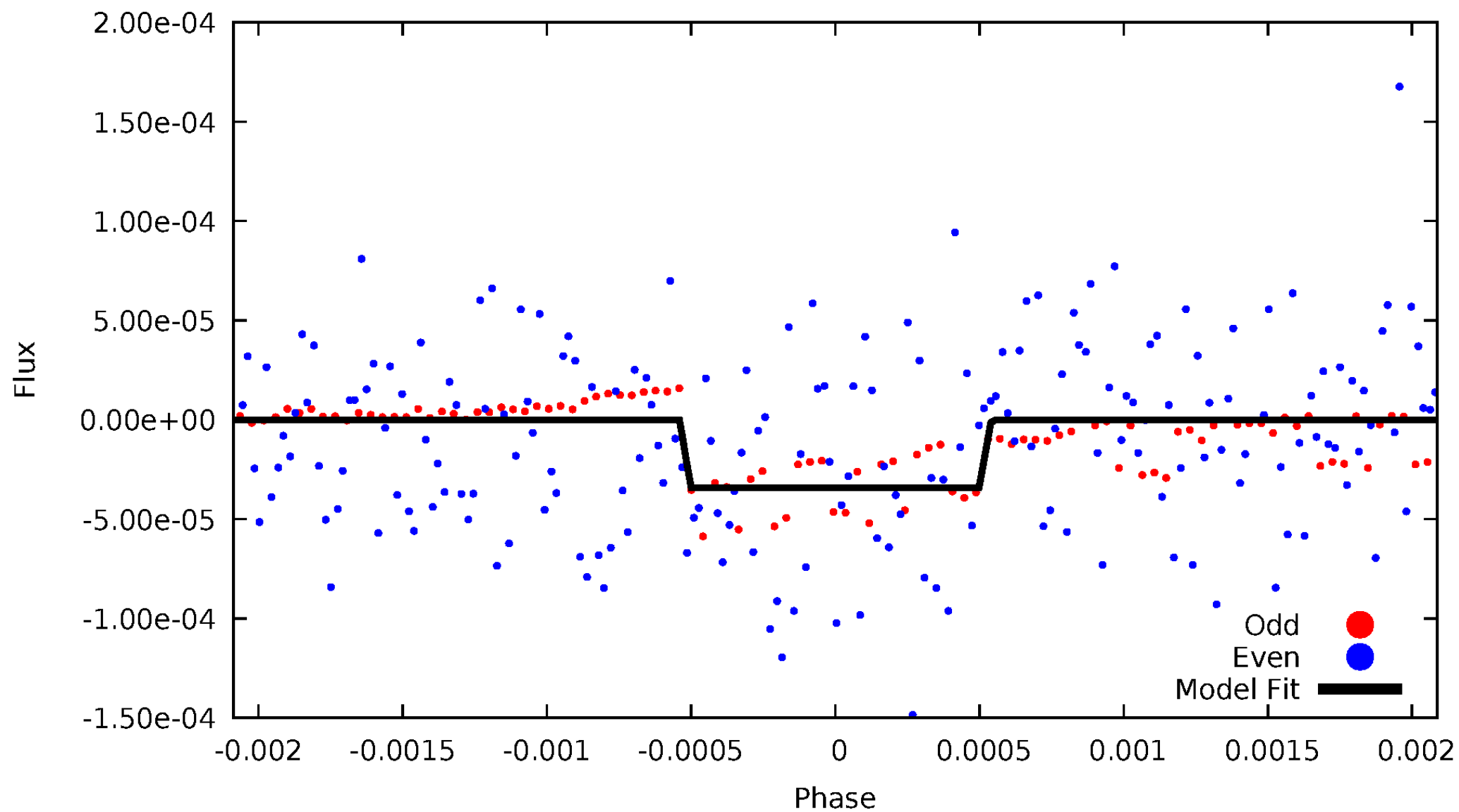
# DV Odd/Even

TCE 009006206-01

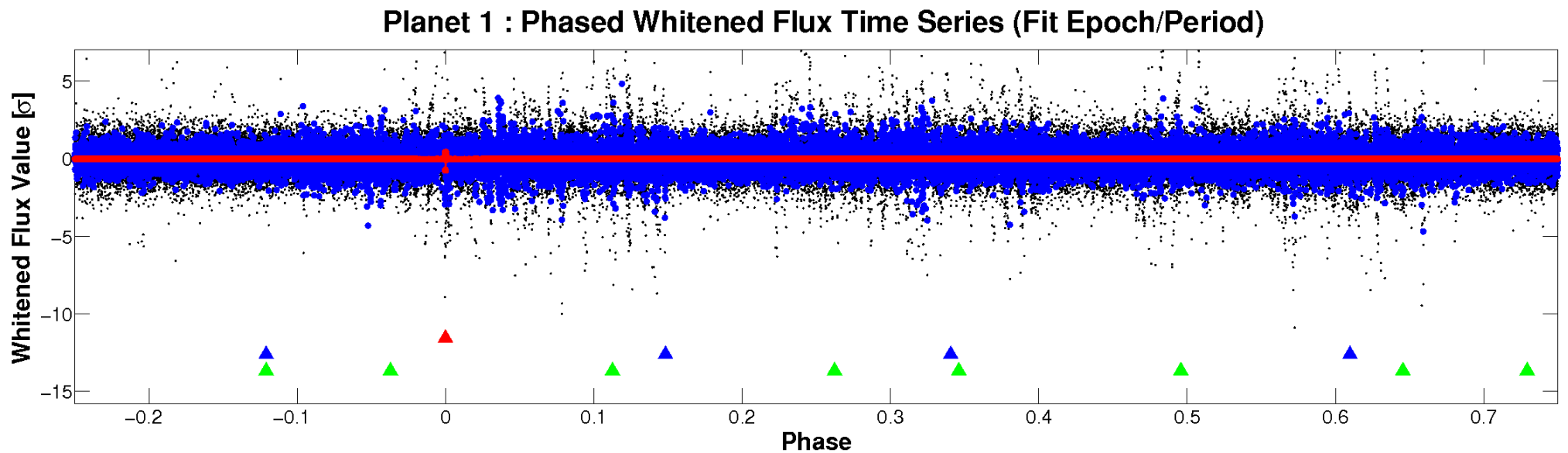
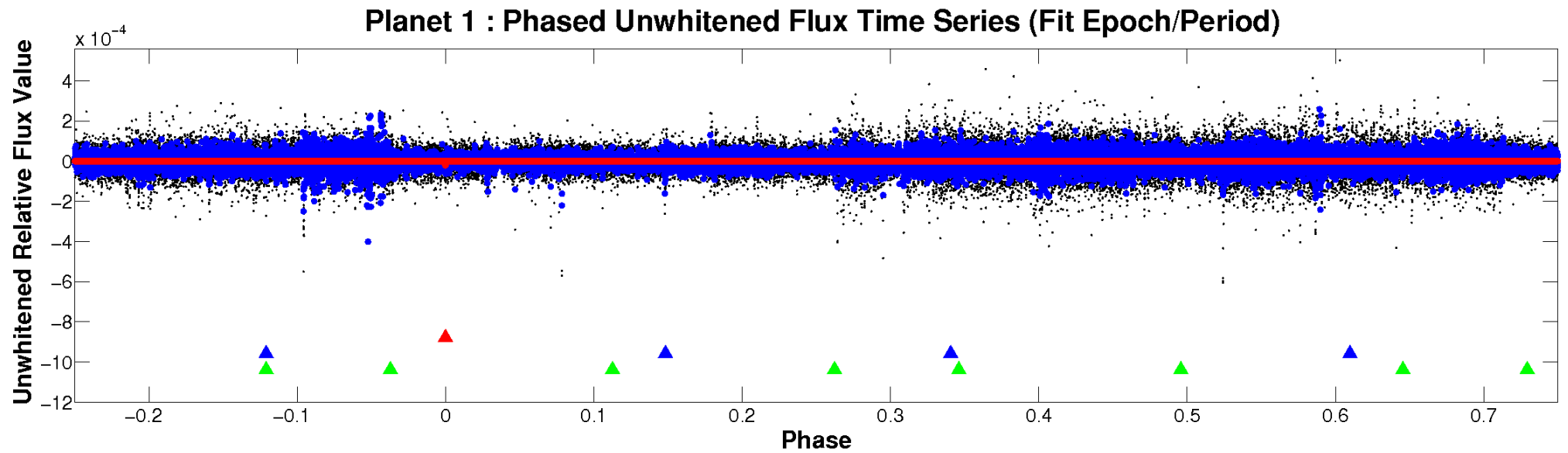


# ALT Odd/Even

TCE 009006206-01



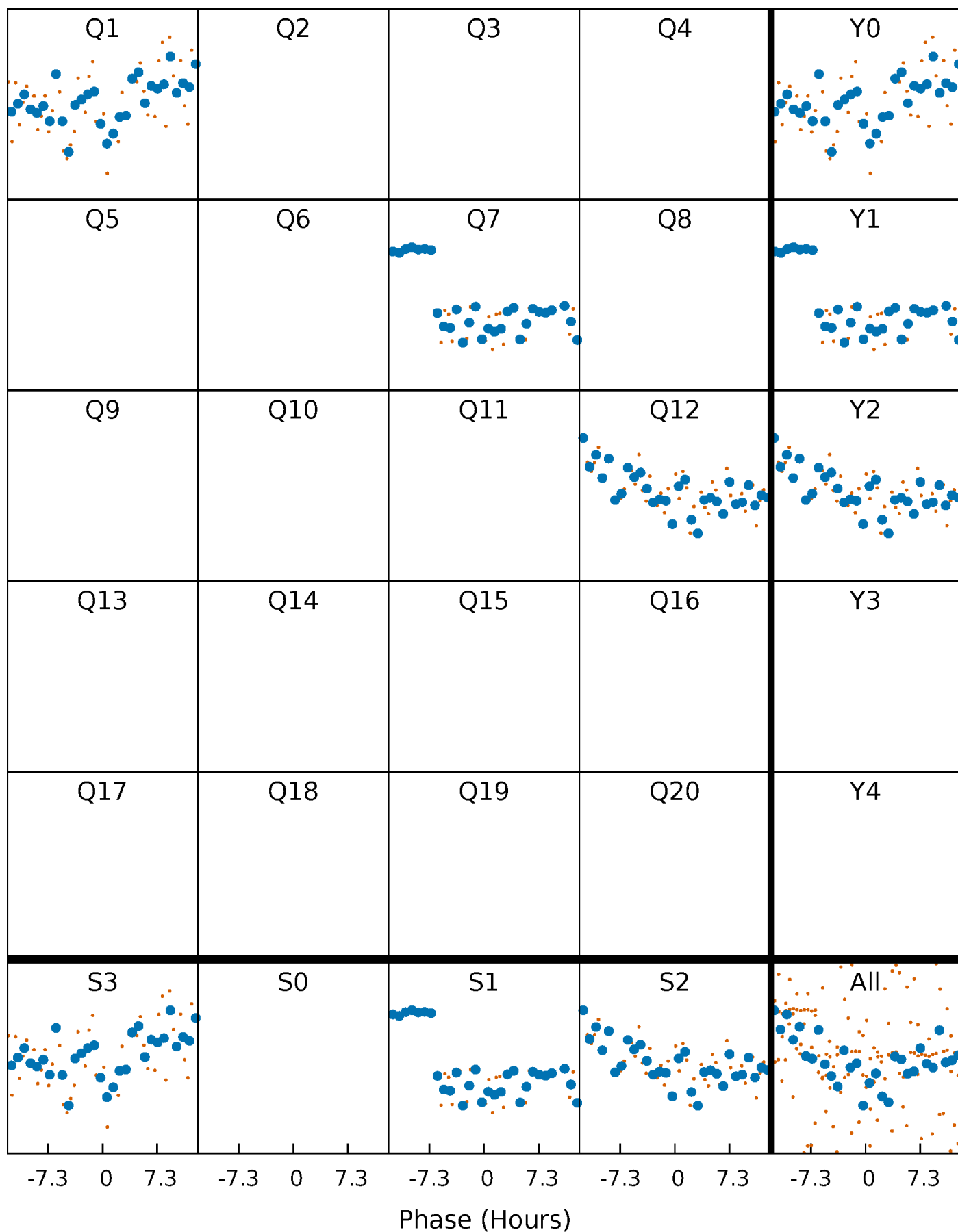
# Non-Whitened Vs. Whitened Light Curve





# PDC Quarter-Phased Transit Curves

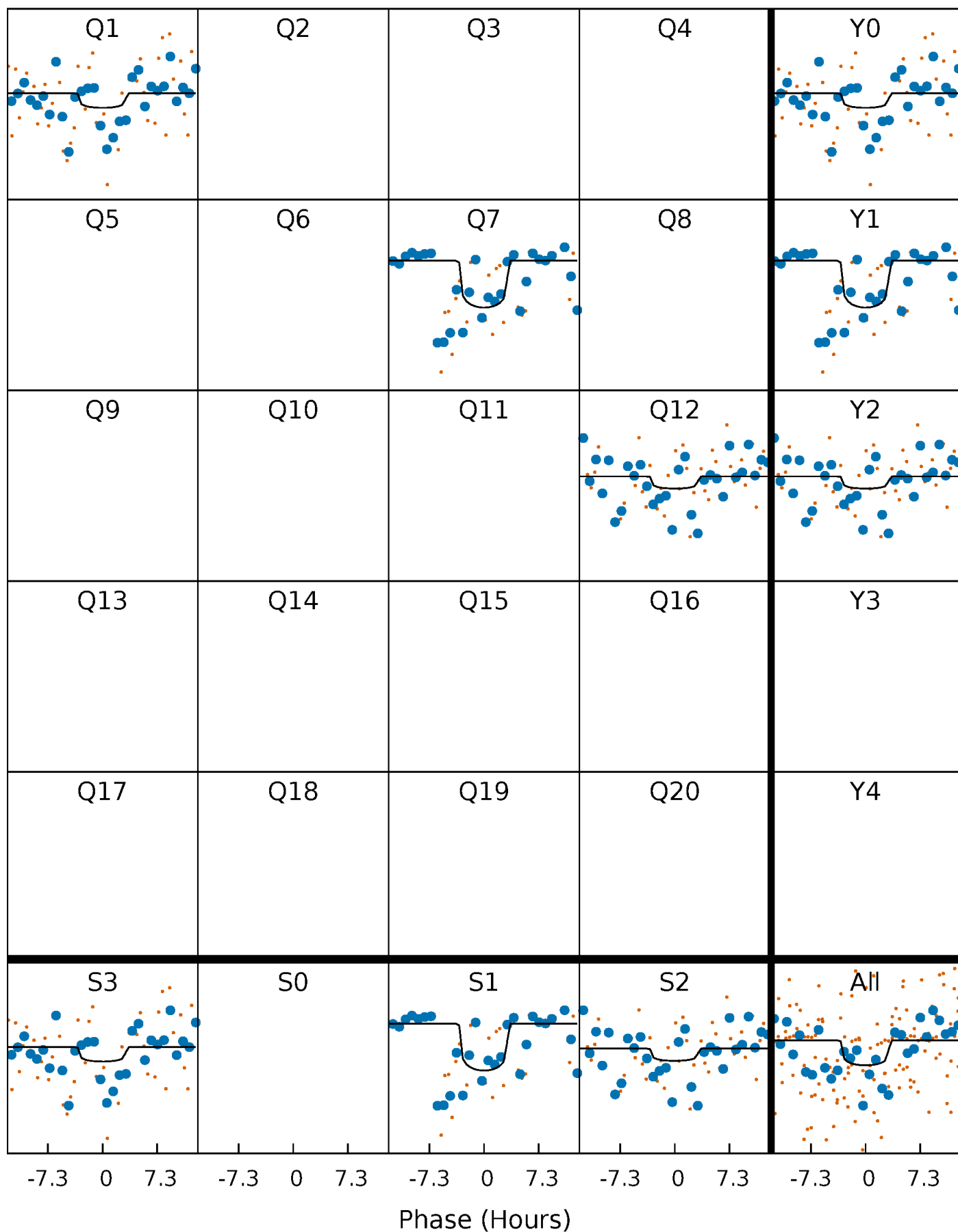
TCE 009006206-01 P=496.290409 Days  $T_0=150.449057$  (BKJD)





# DV Quarter-Phased Transit Curves

TCE 009006206-01 P=496.290409 Days  $T_0=150.449057$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

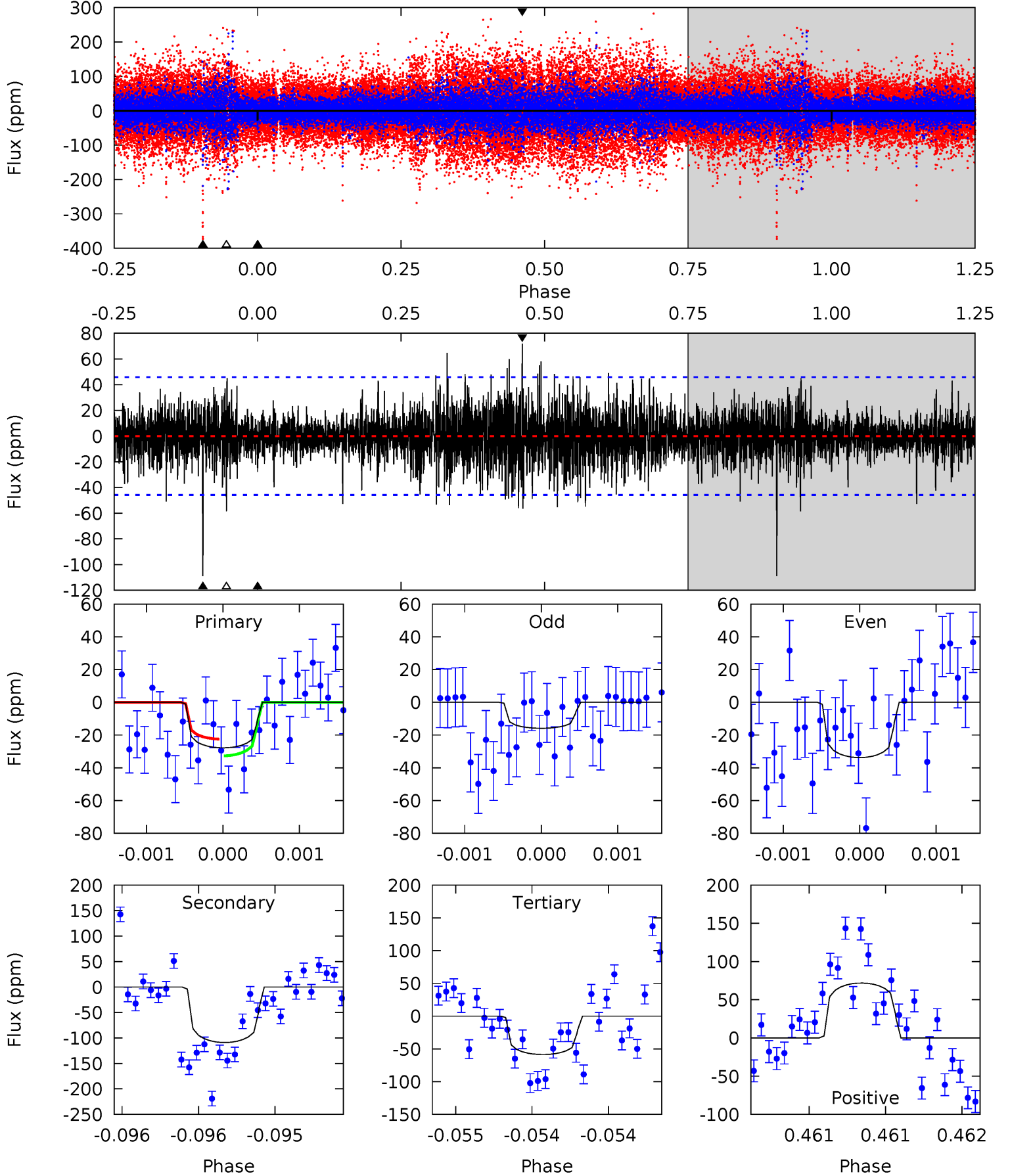
TCE 009006206-01 P=496.385662 Days  $T_0=150.342470$  (BKJD)



# DV Model-Shift Uniqueness Test

009006206-01, P = 496.290409 Days, E = 150.449057 Days

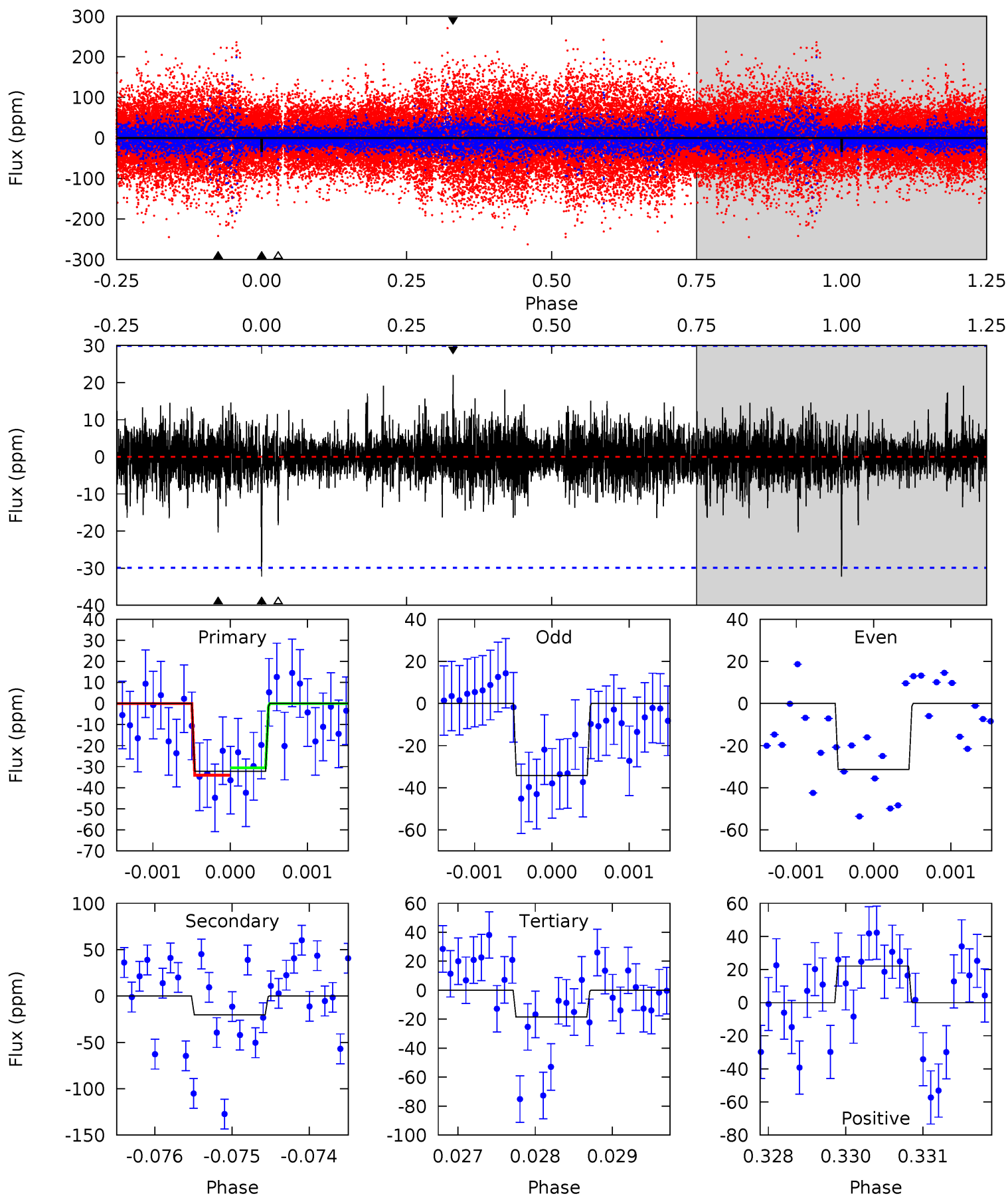
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
3.36	13.2	7.09	8.69	5.55	3.44	1.69	-3.72	-5.33	6.09	4.49	1.04	0.89	0.40	0.62



# Alt Model-Shift Uniqueness Test

009006206-01, P = 496.385662 Days, E = 150.342470 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
5.87	3.70	3.34	4.02	5.44	3.27	0.79	2.53	1.85	0.36	-0.32	0.25	0.94	0.41	0.32



### Stellar Parameters For KIC 009006206

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6228^{+198}_{-242}$	$3.966^{+0.420}_{-0.140}$	$-0.400^{+0.300}_{-0.300}$	$1.779^{+0.420}_{-0.720}$	$1.067^{+0.157}_{-0.174}$	$0.267^{+0.979}_{-0.106}$
	+3%/-4%	+11%/-4%	+75%/-75%	+24%/-40%	+15%/-16%	+366%/-40%
Source	PHO54	PHO54	PHO54	DSEP		

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

### Secondary Eclipse Parameters for KIC 009006206-01 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-109 \pm 8$	$1.23^{+1.17}_{-0.79}$	$449^{+35}_{-52}$	$7789^{+9689}_{-2127}$	$62112^{+405992}_{-45245}$
Alt.	$-20 \pm 5$	$1.34^{+1.08}_{-0.85}$	$446^{+37}_{-53}$	$4831^{+3336}_{-899}$	$9495^{+59286}_{-6735}$

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

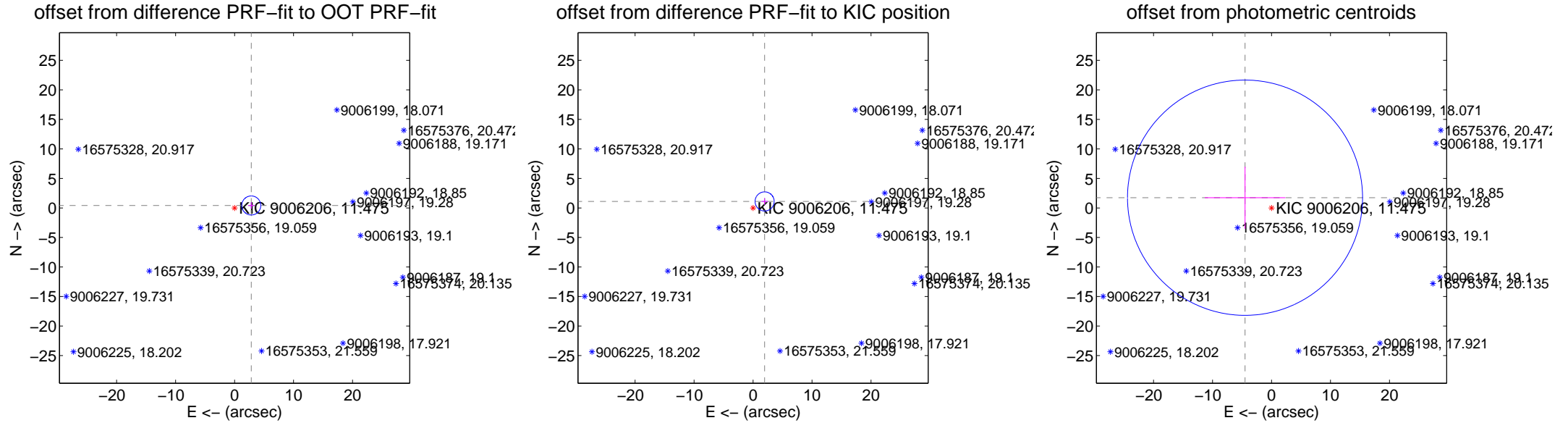
## DV Centroid Data

Supplemental centroid analysis for 009006206-01. **Kepler magnitude: 11.47.** Transit SNR 5.09

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

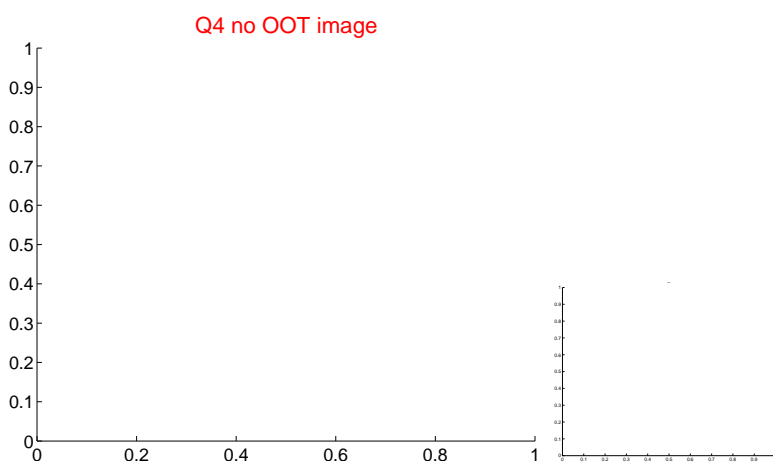
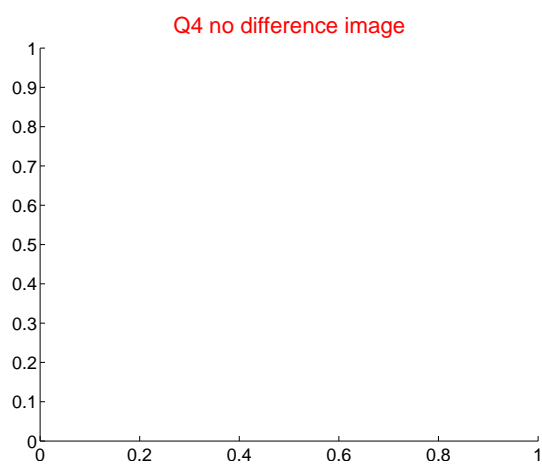
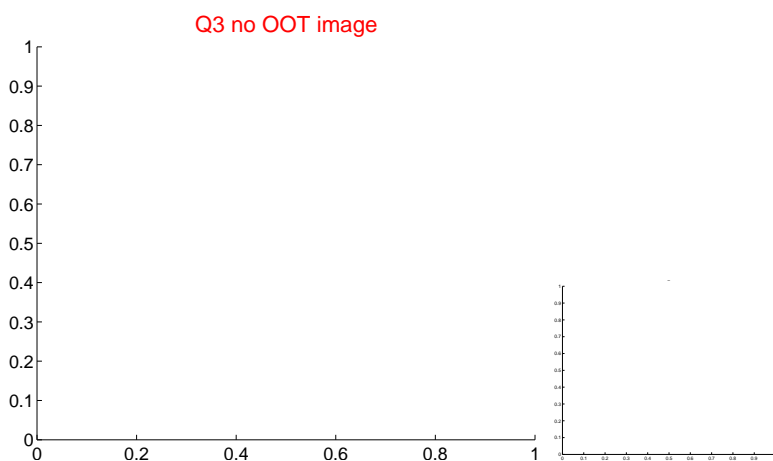
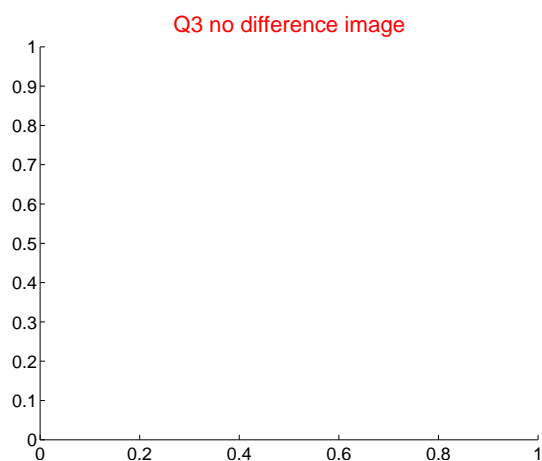
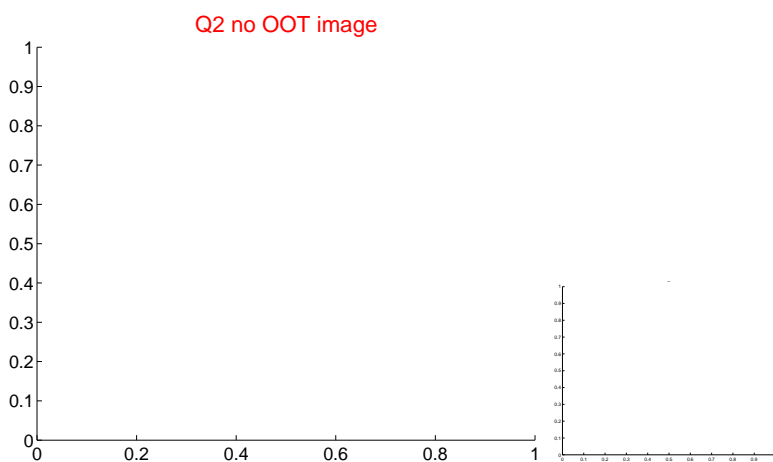
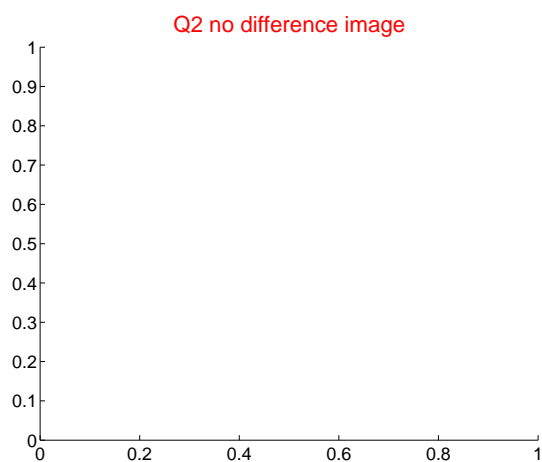
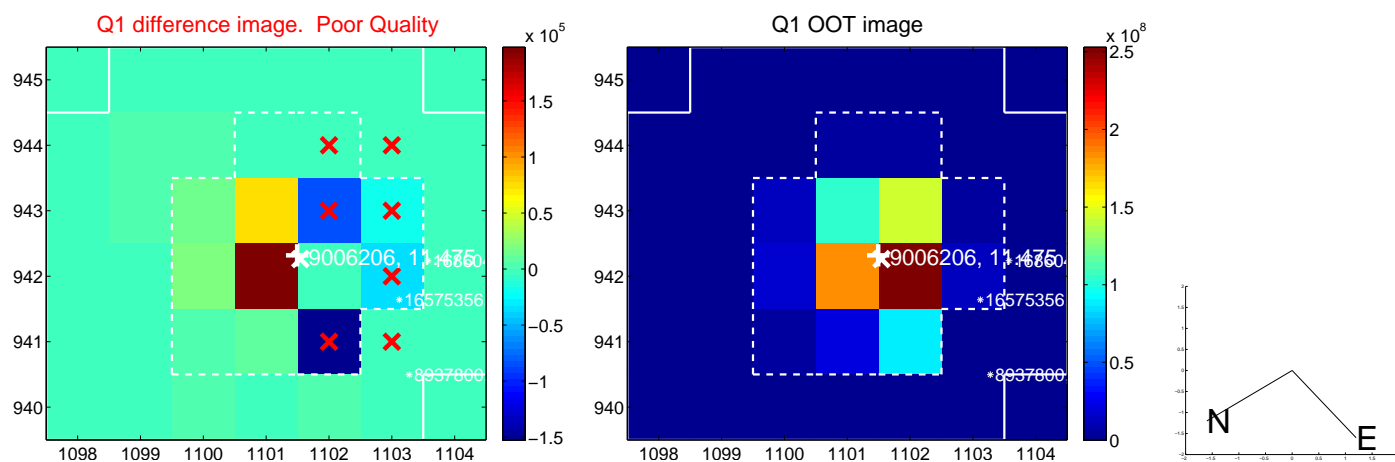
The direct PRF centroid is offset from the target star catalog position by about 1.10 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b><math>2.858 \pm 0.538</math></b>	<b>5.32</b>	$-2.827 \pm 0.537$	$0.421 \pm 0.547$
PRF-fit source offset from KIC position	<b><math>2.252 \pm 0.540</math></b>	<b>4.17</b>	$-1.963 \pm 0.537$	$1.104 \pm 0.547$
photometric centroid source offset	$4.81 \pm 6.64$	0.73	$4.49 \pm 6.82$	$1.73 \pm 5.25$



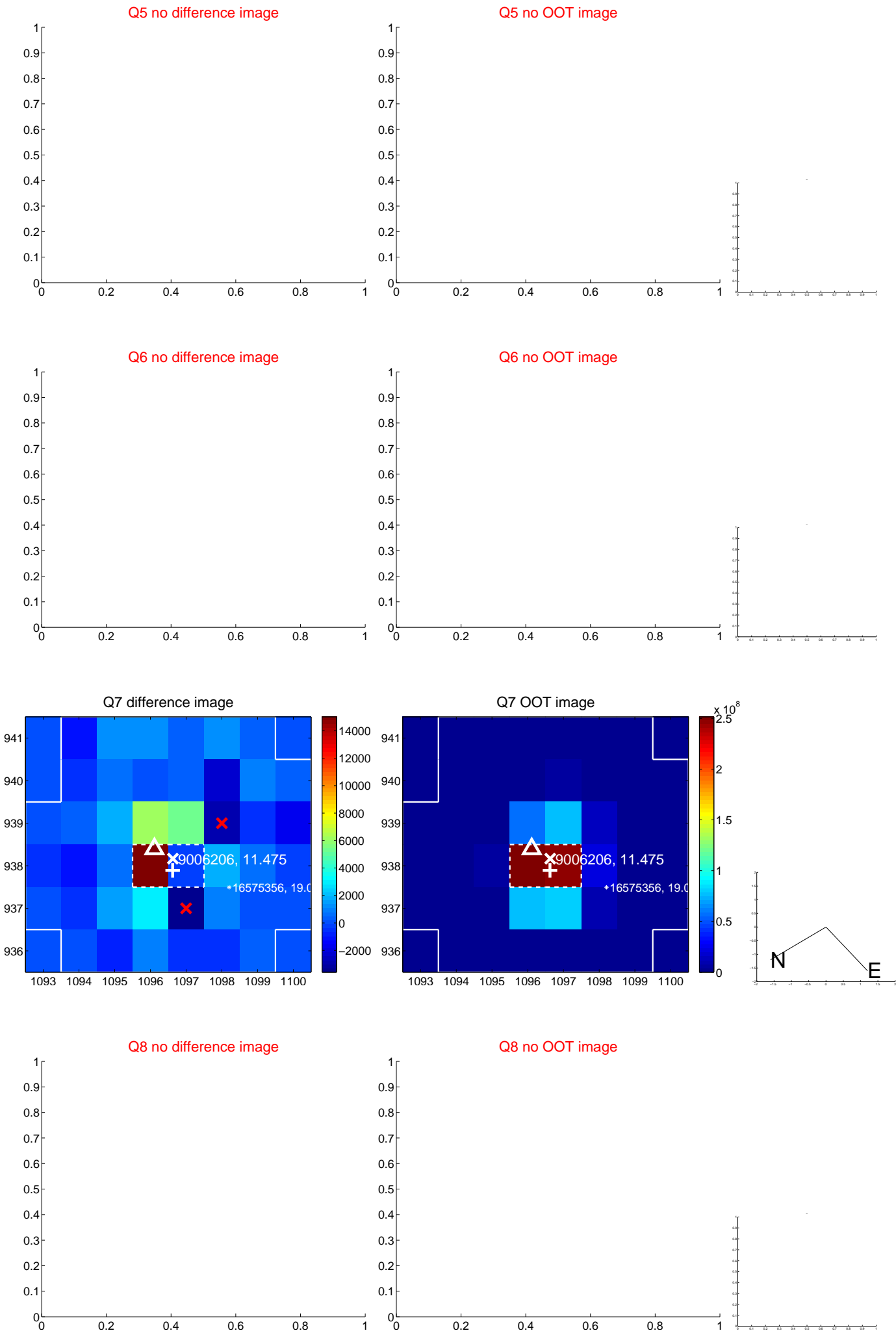
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

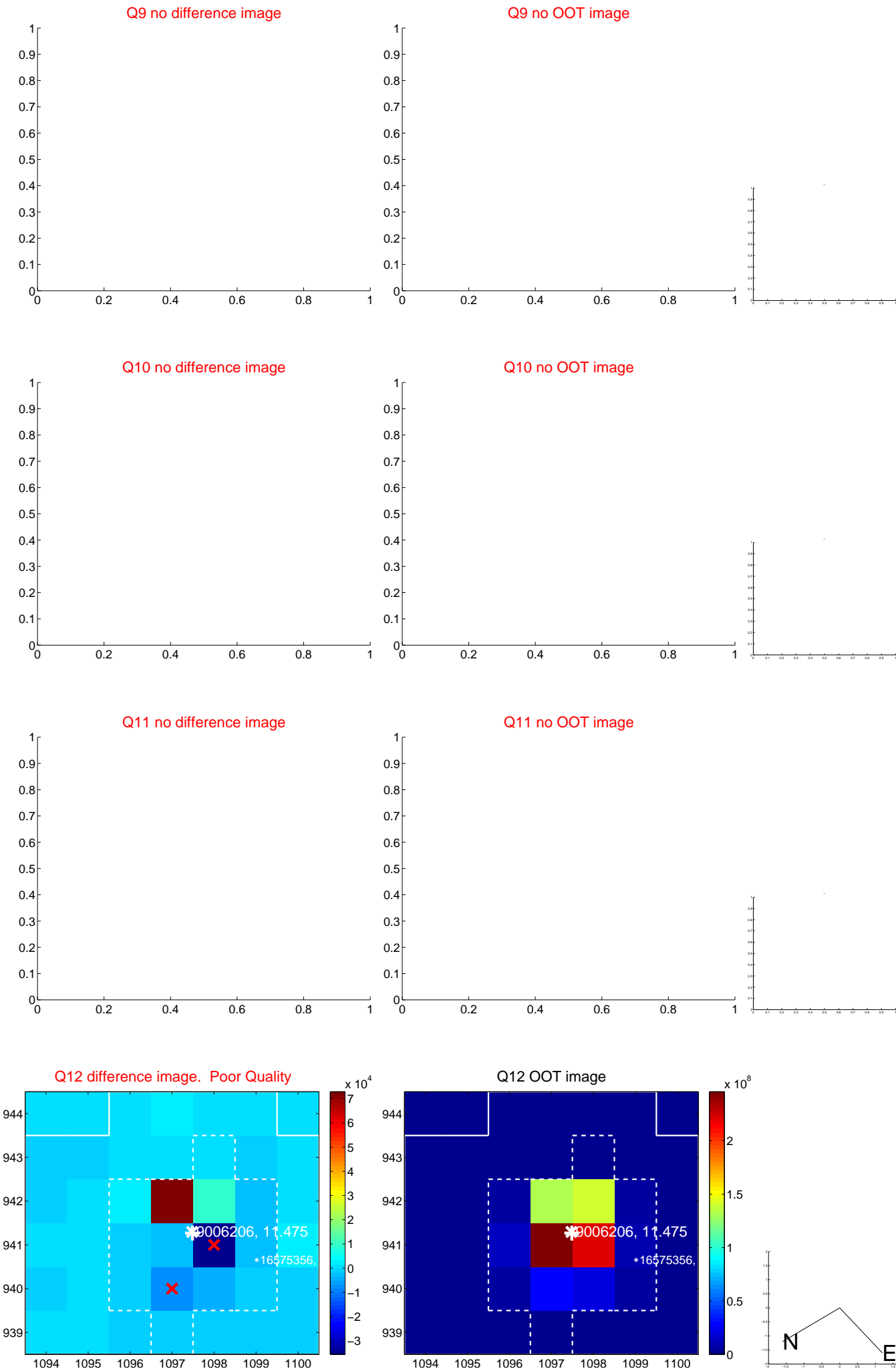




white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



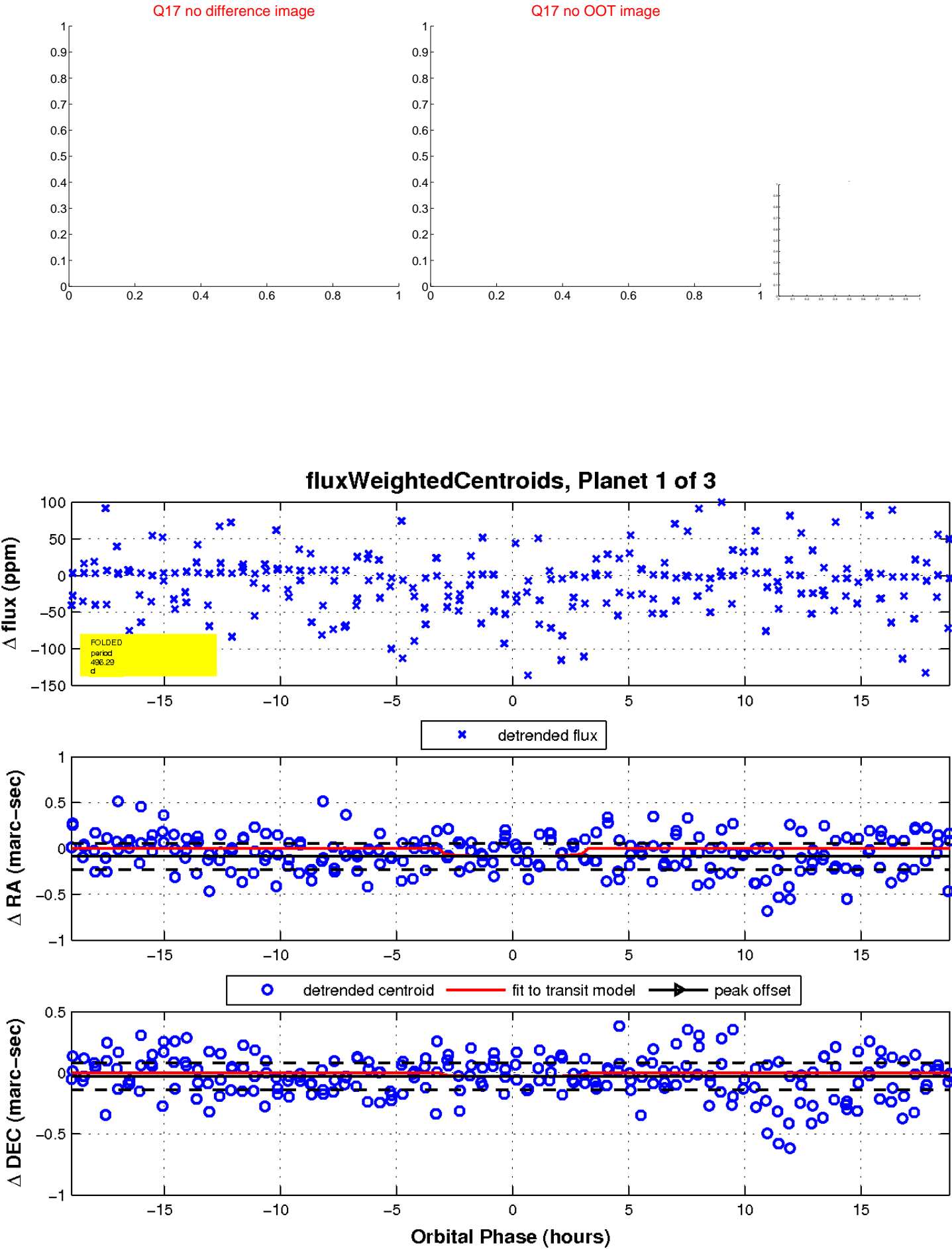
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

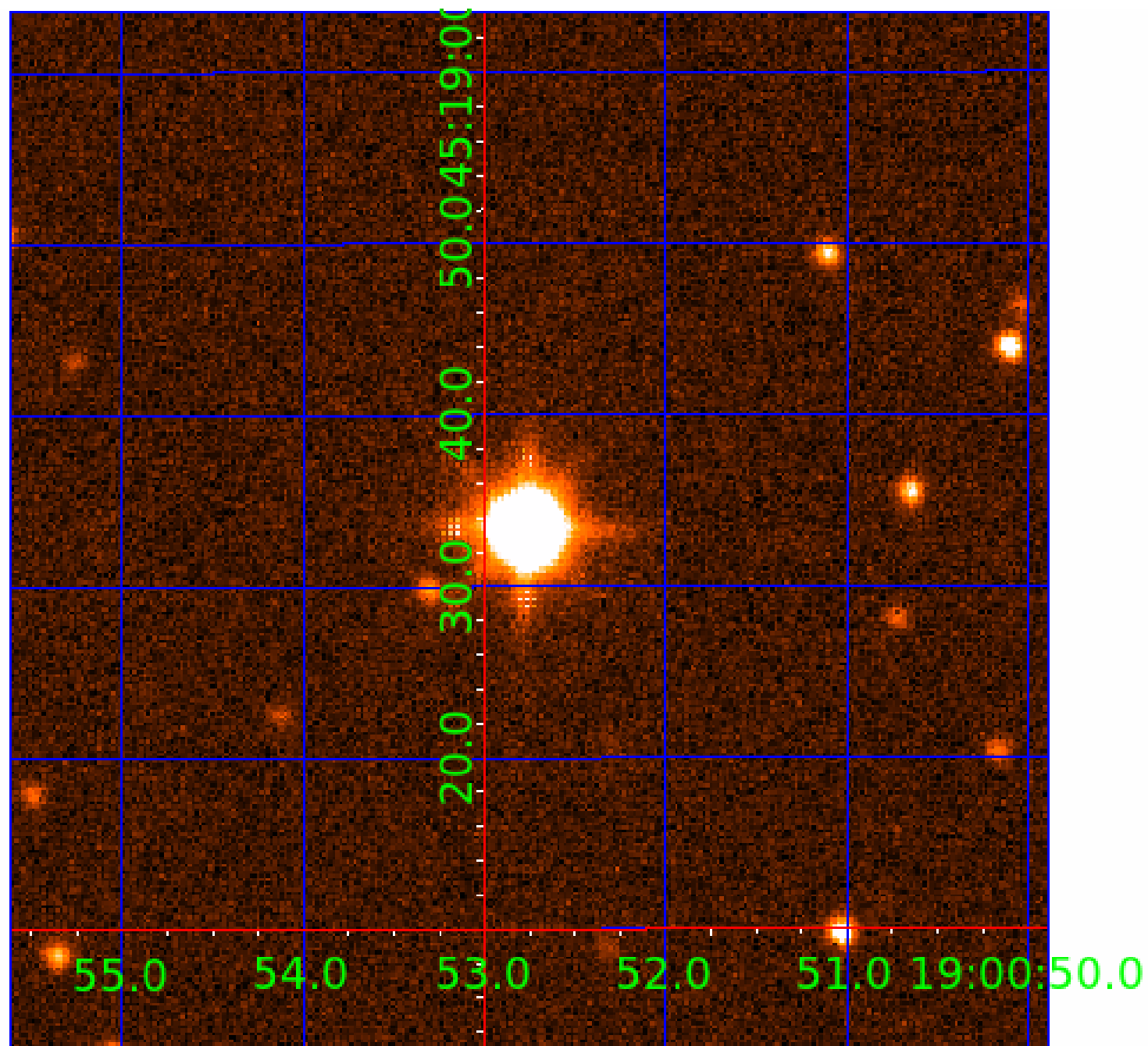


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 009006206

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009006206-01	OBS	No	496.290409	150.449057	21.0	6.374	14.4	5.1	1.78	6228	0.95	2.71
009006206-02	OBS	No	362.672223	224.062753	133.7	11.318	12.6	8.5	1.78	6228	2.28	4.12
009006206-03	OBS	No	190.199077	132.021695	42.0	20.825	11.5	15.1	1.78	6228	1.24	9.74

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009006206-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
009006206-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_SATURATED
009006206-03	OBS	FP	0.00	1	0	0	0	MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_SATURATED

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

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

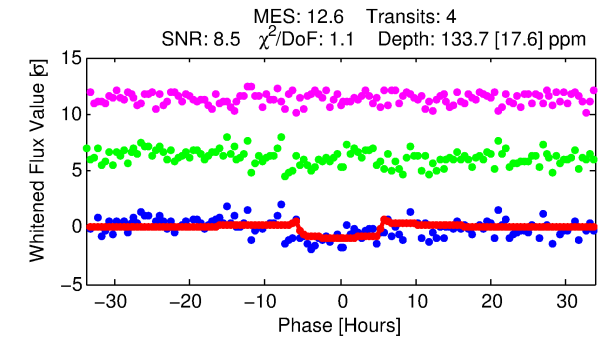
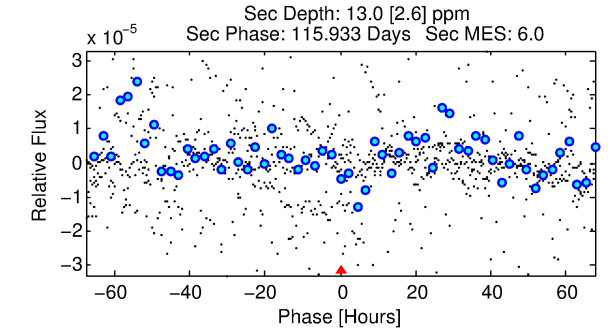
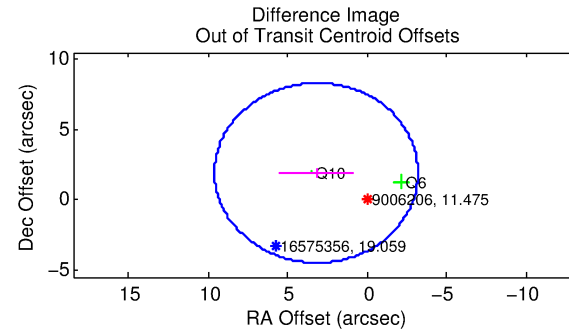
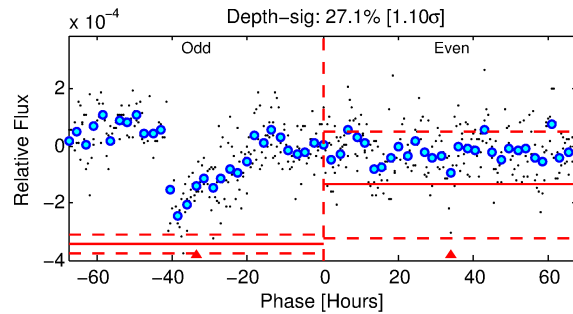
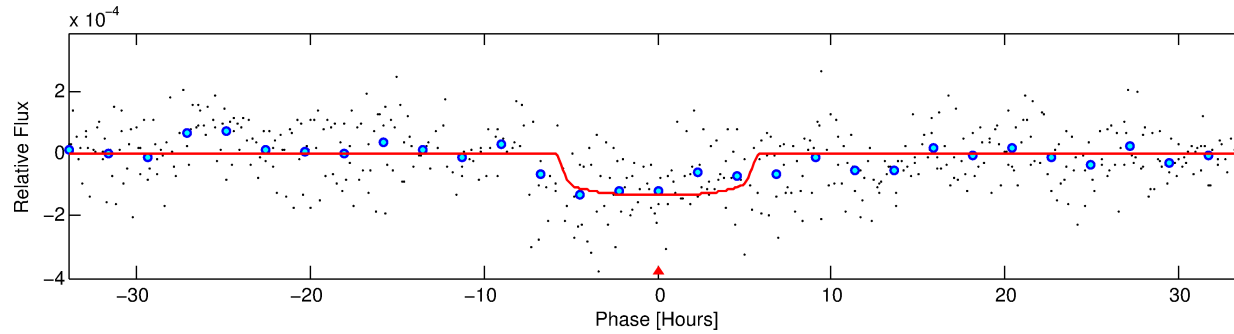
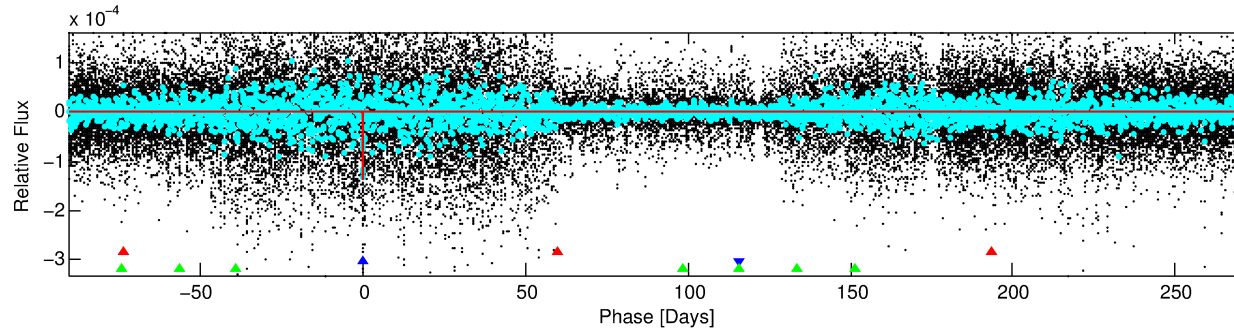
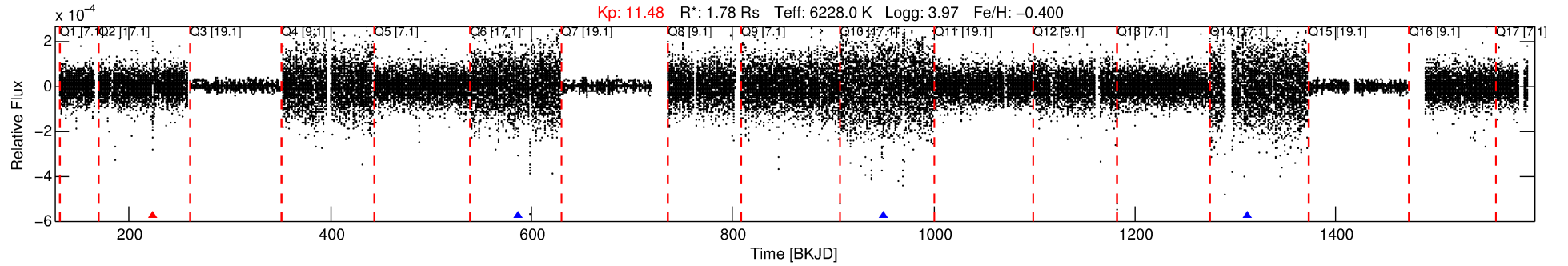
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009006206-02

No Significant Match Found

# DV One-Page Summary

KIC: 9006206 Candidate: 2 of 3 Period: 362.672 d



## DV Fit Results:

Period = 362.67222 [0.00760] d  
Epoch = 224.0628 [0.0134] BKJD  
Rp/R\* = 0.0117 [0.0035]  
a/R\* = 150.32 [231.64]  
b = 0.80 [0.68]  
Seff = 4.12 [2.95]  
Teq = 363 [65] K  
Rp = 2.28 [1.14] Re  
a = 1.0174 [0.4277] AU  
Ag = 1430.22 [1340.89] [1.07 $\sigma$ ]  
Teffp = 3454 [556] K [5.52 $\sigma$ ]

## DV Diagnostic Results:

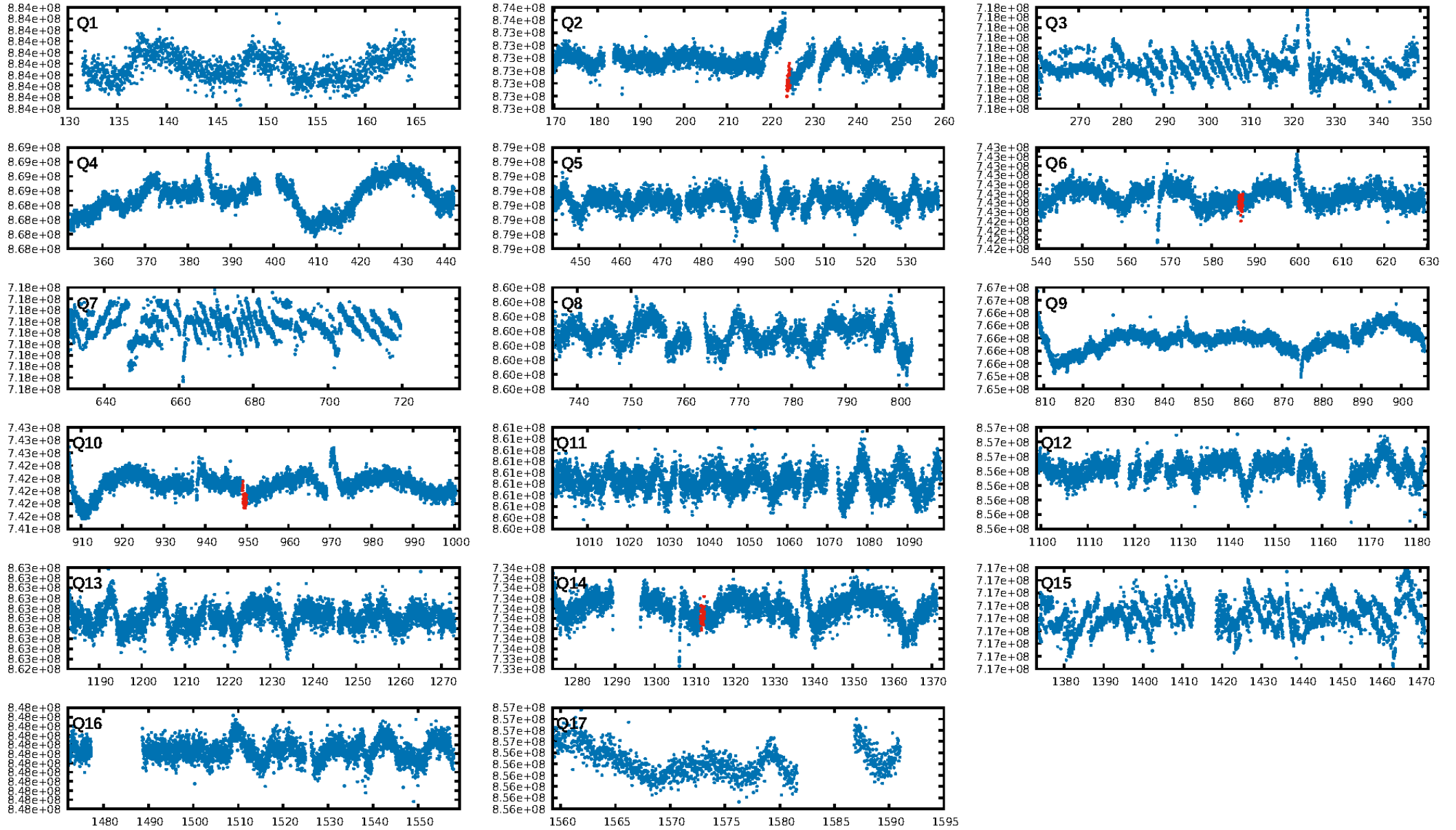
ShortPeriod-sig: 100.0% [174.65 $\sigma$ ]  
LongPeriod-sig: 100.0% [246.88 $\sigma$ ]  
ModelChiSquare2-sig: 0.4%  
ModelChiSquareGof-sig: 98.8%  
Bootstrap-pfa: 1.79e-20  
RollingBand-fgt: 0.75 [3/4]  
GhostDiagnostic-chr: 0.9294  
Centroid-sig: 34.7%  
Centroid-so: 1.361 arcsec [1.13 $\sigma$ ]  
OotOffset-rm: 3.727 arcsec [1.75 $\sigma$ ]  
KicOffset-rm: 3.326 arcsec [2.39 $\sigma$ ]  
OotOffset-st: 2/0/0/0 [2]  
KicOffset-st: 2/0/0/0 [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: 29-Jan-2016 05:37:09 Z

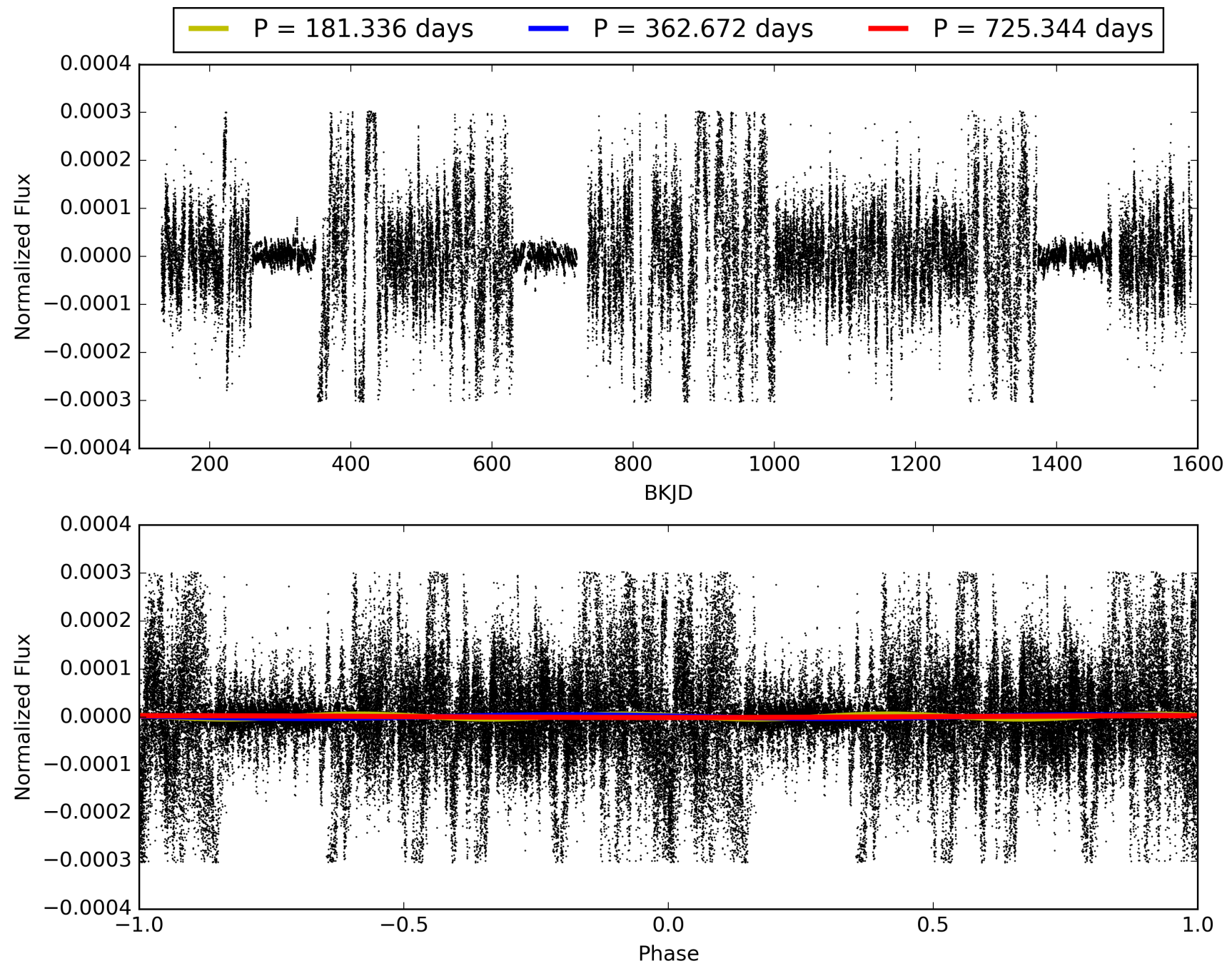
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center



# TCE 009006206-02, PDC Light Curves

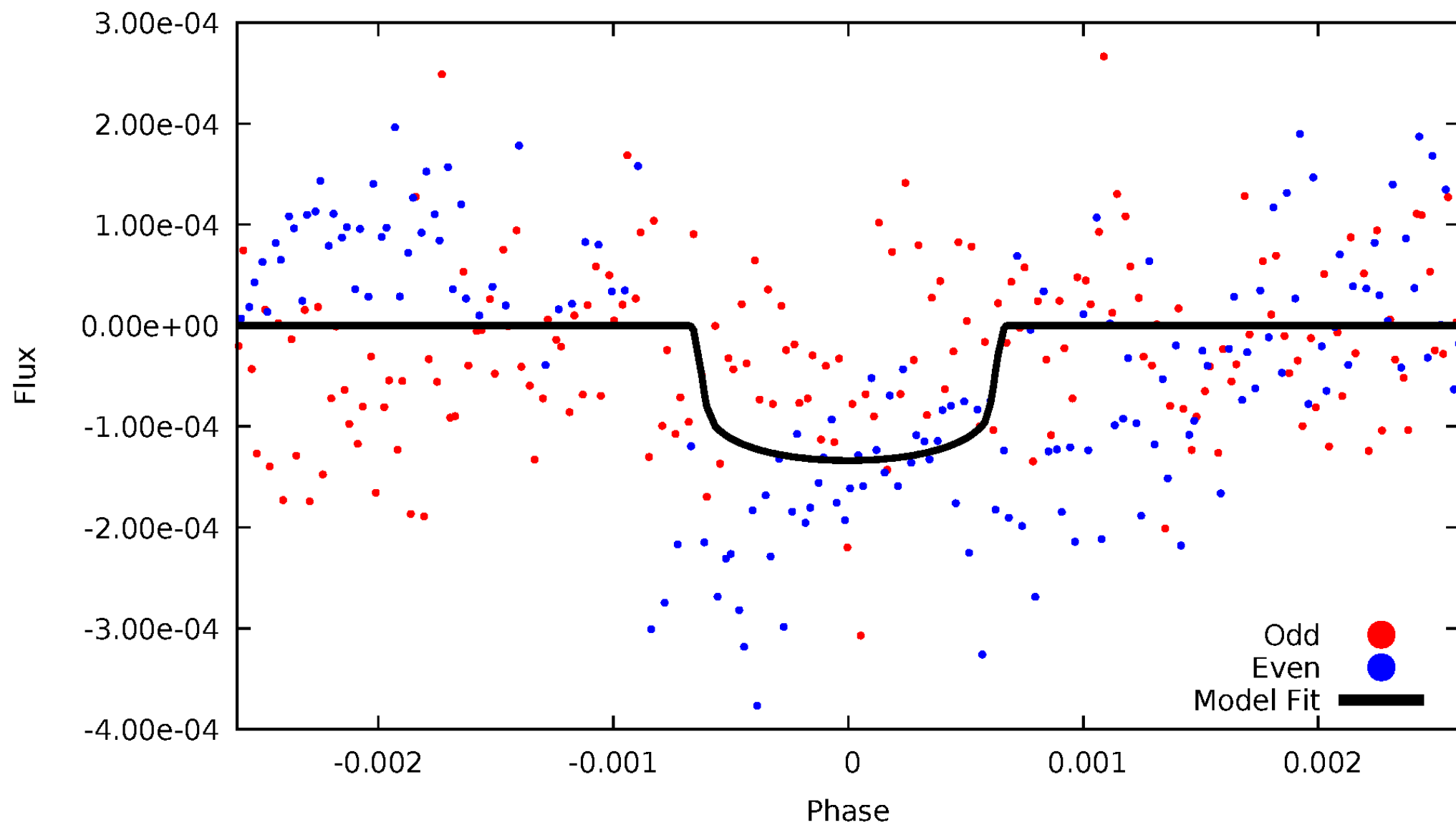


TCE 009006206-02



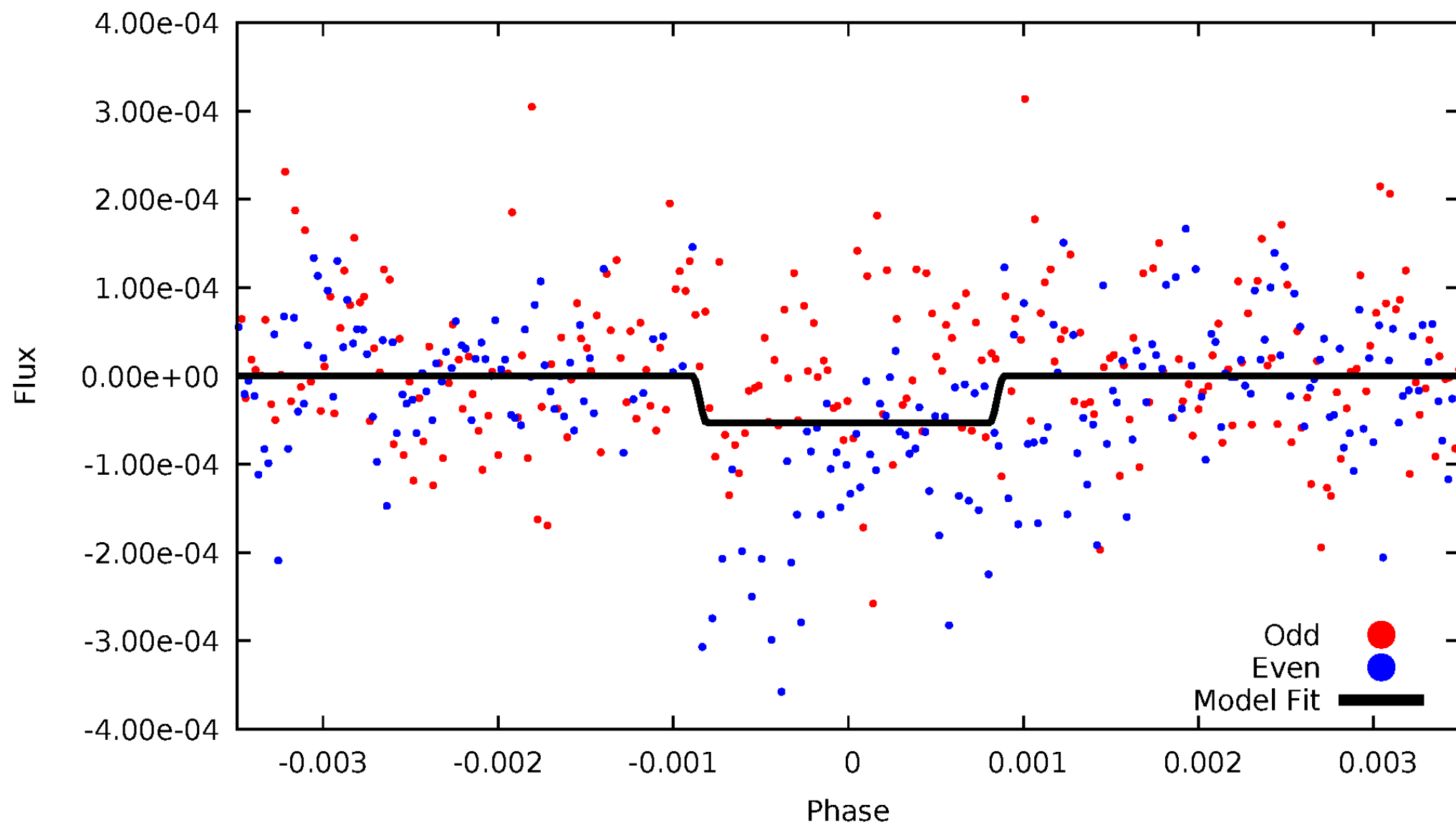
# DV Odd/Even

TCE 009006206-02



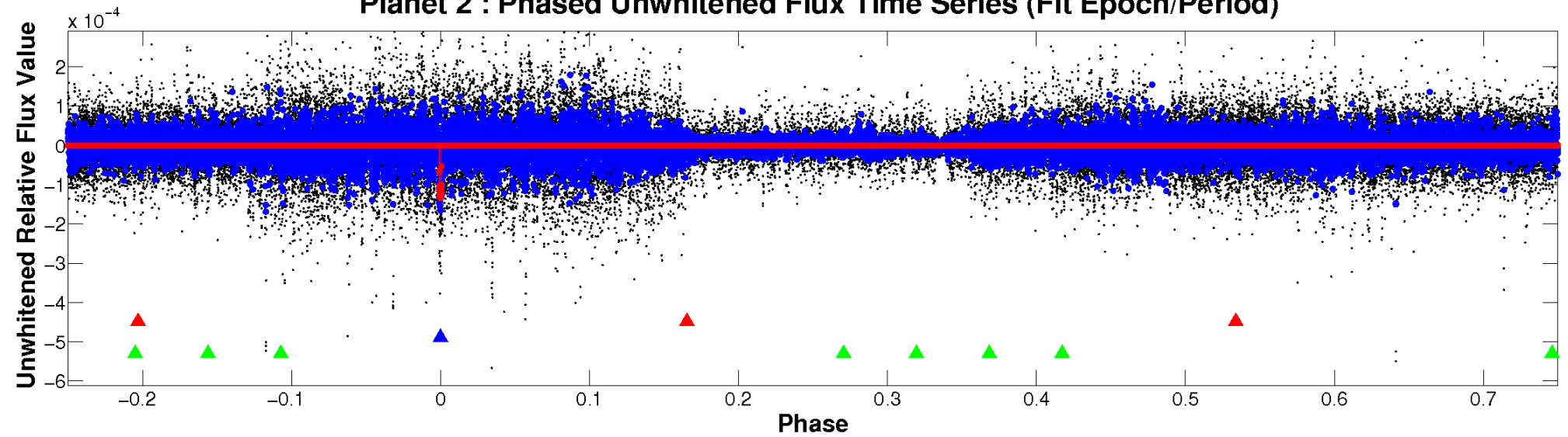
# ALT Odd/Even

TCE 009006206-02

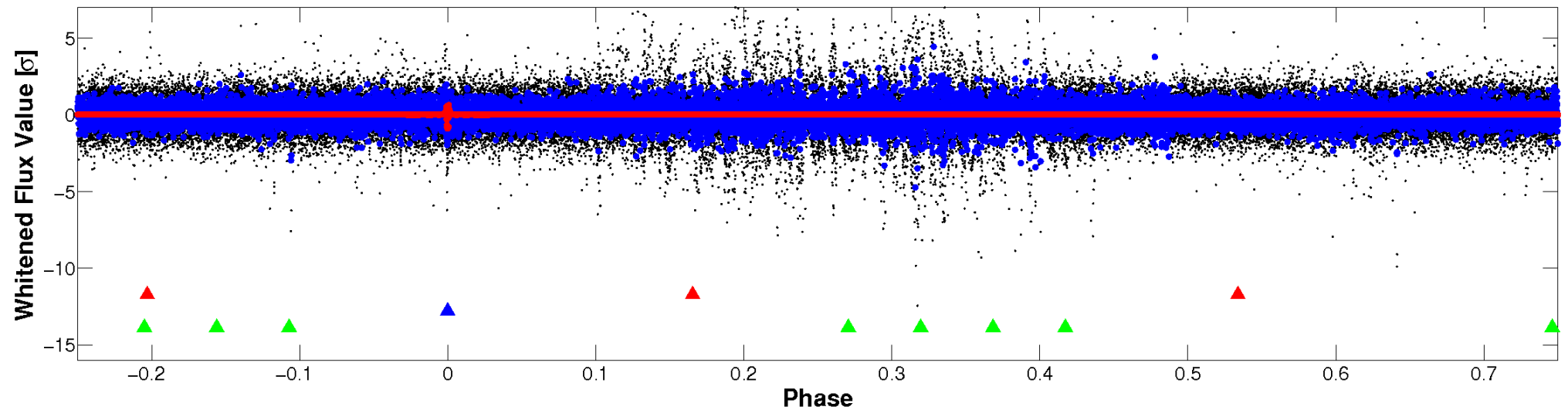


# Non-Whitened Vs. Whitened Light Curve

## 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 009006206-02 P=362.672223 Days  $T_0=224.062752$  (BKJD)



# DV Quarter-Phased Transit Curves

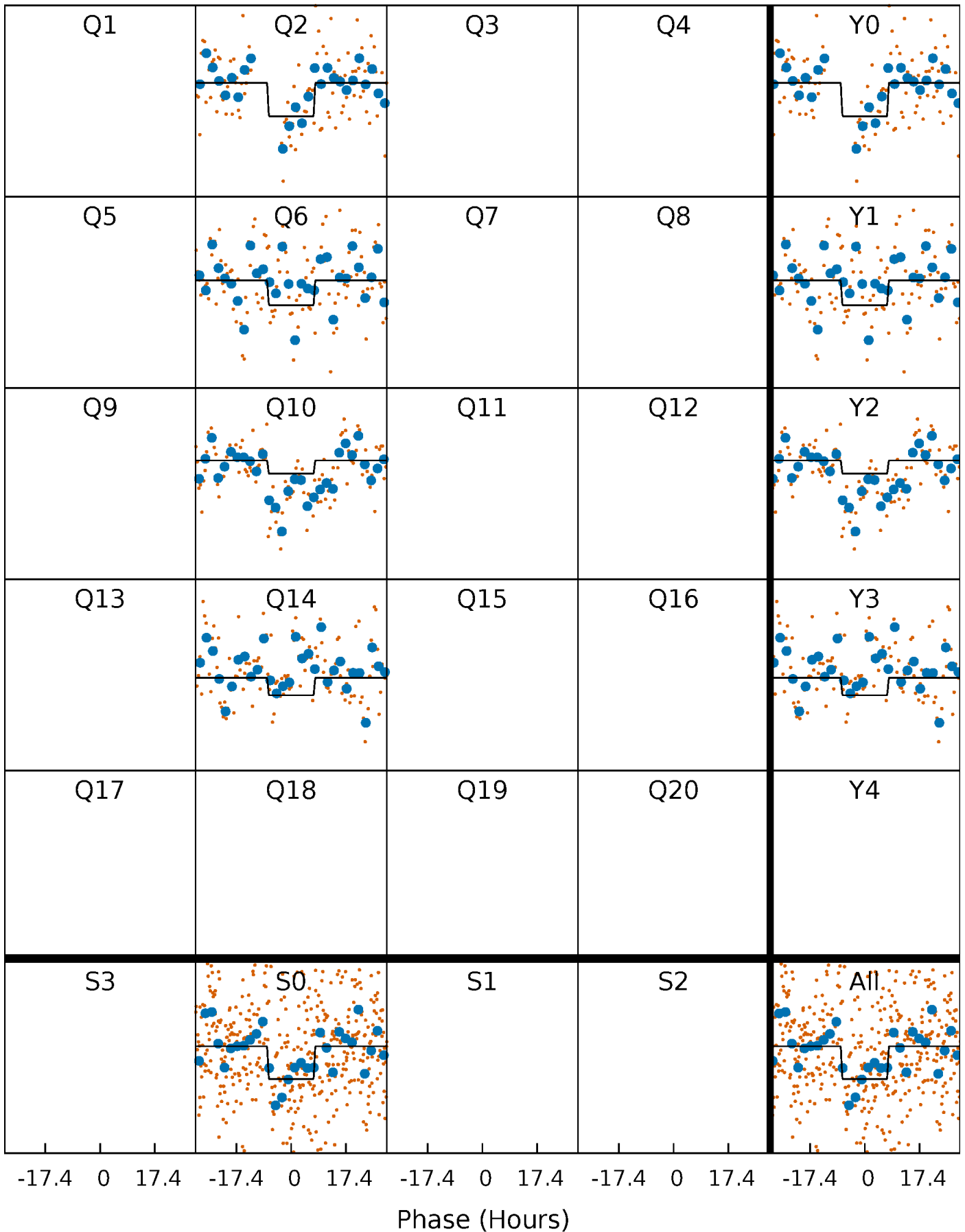
TCE 009006206-02 P=362.672223 Days  $T_0=224.062752$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

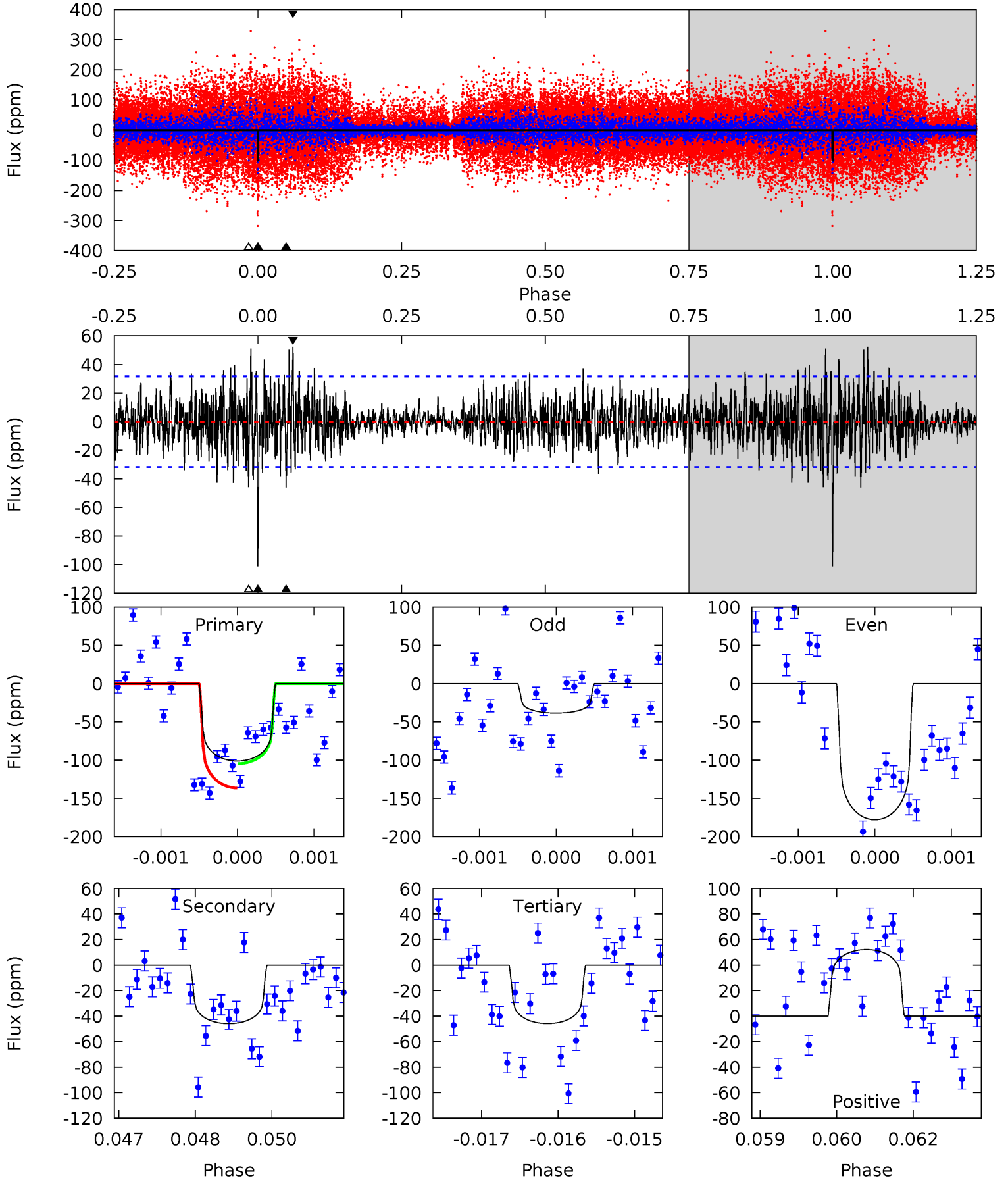
TCE 009006206-02 P=362.702501 Days  $T_0=224.000368$  (BKJD)



# DV Model-Shift Uniqueness Test

009006206-02, P = 362.672223 Days, E = 224.062752 Days

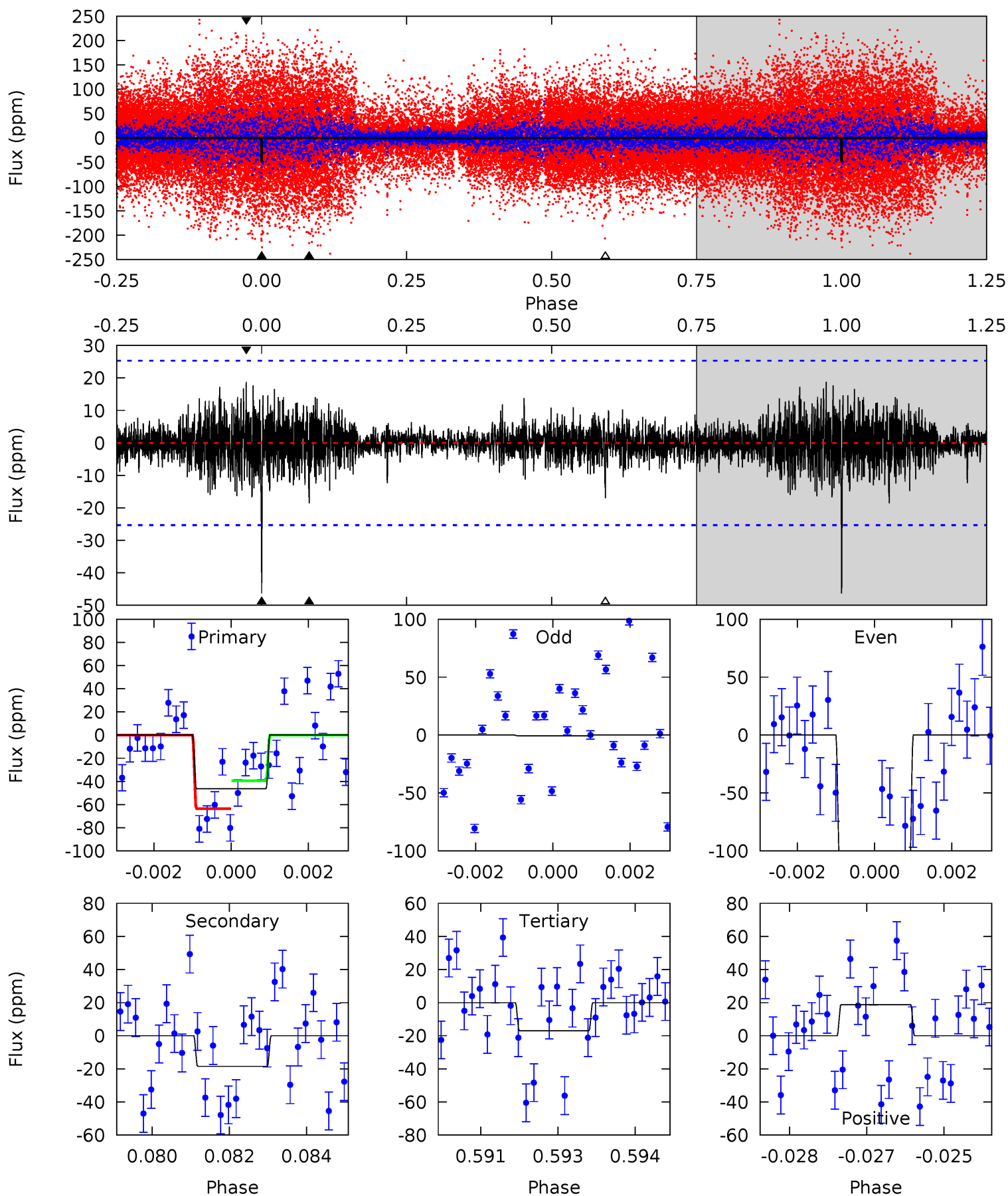
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
17.2	7.81	7.80	8.90	5.40	3.21	1.92	9.42	8.32	0.01	-1.09	11.7	0.98	0.34	2.81



# Alt Model-Shift Uniqueness Test

009006206-02, P = 362.702501 Days, E = 224.000368 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
9.79	3.91	3.58	3.97	5.35	3.12	0.82	6.21	5.82	0.33	-0.06	13.0	1.43	0.29	2.63



### Stellar Parameters For KIC 009006206

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$6228^{+198}_{-242}$	$3.966^{+0.420}_{-0.140}$	$-0.400^{+0.300}_{-0.300}$	$1.779^{+0.420}_{-0.720}$	$1.067^{+0.157}_{-0.174}$	$0.267^{+0.979}_{-0.106}$
	+3%/-4%	+11%/-4%	+75%/-75%	+24%/-40%	+15%/-16%	+366%/-40%
Source	PHO54	PHO54	PHO54	DSEP		

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

### Secondary Eclipse Parameters for KIC 009006206-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-46 \pm 6$	$2.16^{+0.83}_{-0.74}$	$497^{+42}_{-53}$	$4819^{+754}_{-487}$	$5707^{+6673}_{-2746}$
Alt.	$-19 \pm 5$	$1.31^{+0.74}_{-0.57}$	$496^{+41}_{-52}$	$4866^{+1437}_{-727}$	$5968^{+13746}_{-3632}$

$T_{max}$  = 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

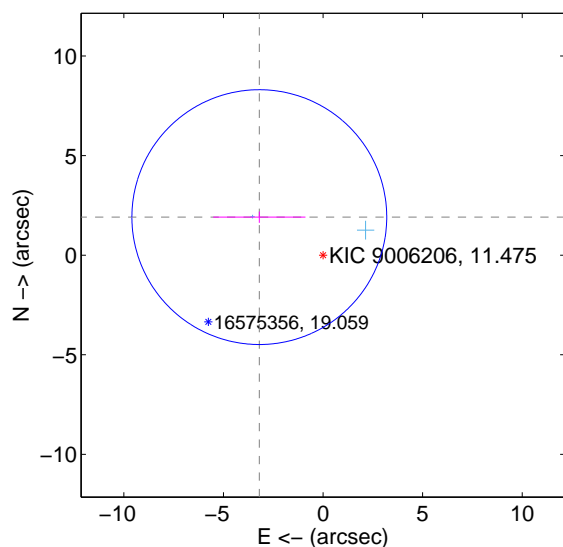
Supplemental centroid analysis for 009006206-02. **Kepler magnitude: 11.47.** Transit SNR 8.52

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

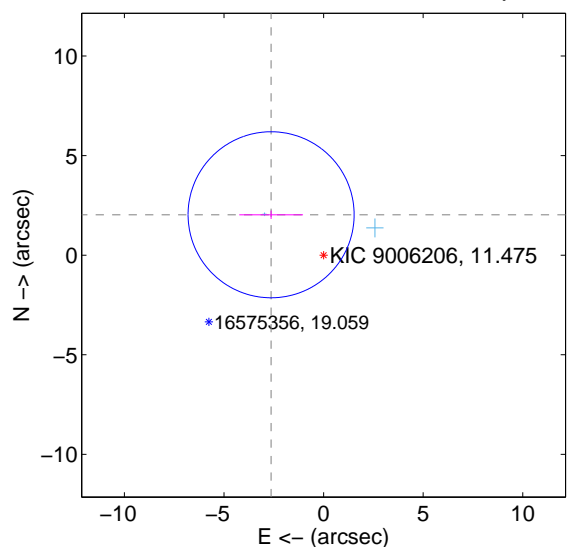
The direct PRF centroid is offset from the target star catalog position by about 0.58 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$3.727 \pm 2.133$	1.75	$3.200 \pm 2.318$	$1.911 \pm 0.285$
PRF-fit source offset from KIC position	$3.326 \pm 1.390$	2.39	$2.636 \pm 1.601$	$2.029 \pm 0.209$
photometric centroid source offset	$1.36 \pm 1.20$	1.13	$1.12 \pm 1.34$	$0.77 \pm 0.85$

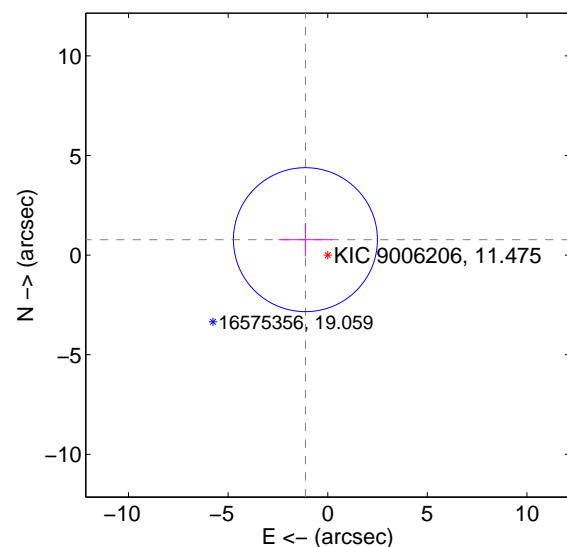
offset from difference PRF-fit to OOT PRF-fit



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.

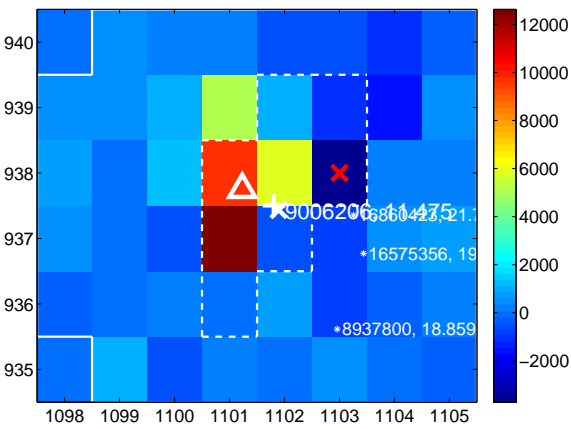
Q5 no difference image



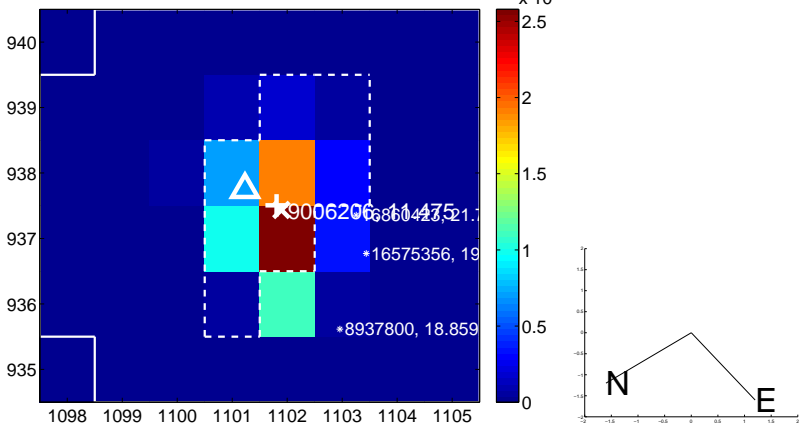
Q5 no OOT image



Q6 difference image



Q6 OOT image



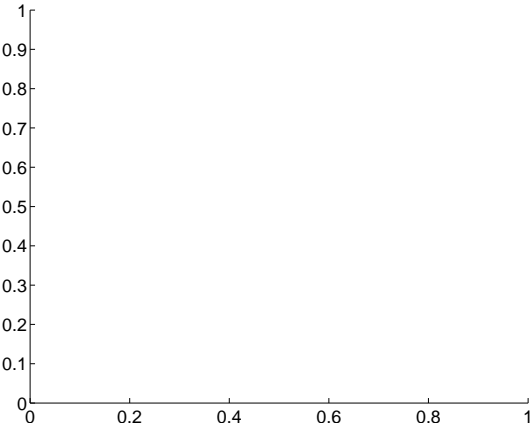
Q7 no difference image



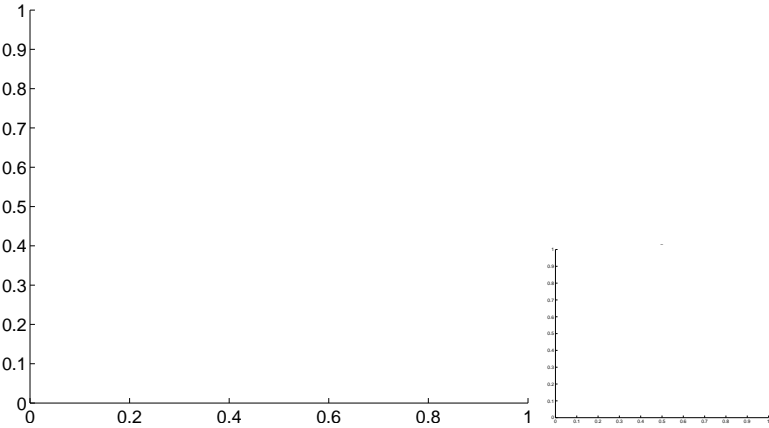
Q7 no OOT image



Q8 no difference image

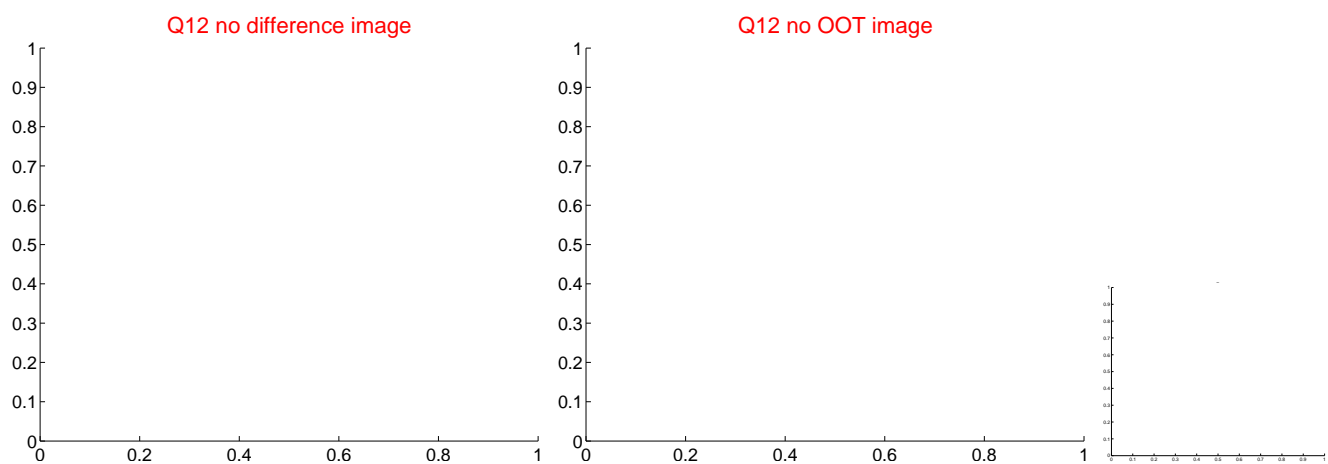
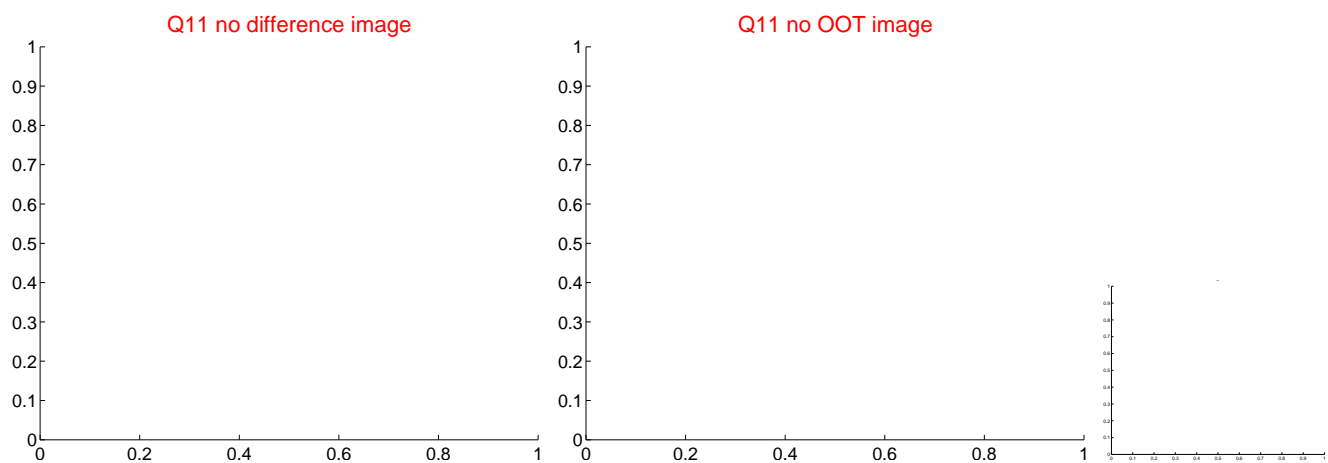
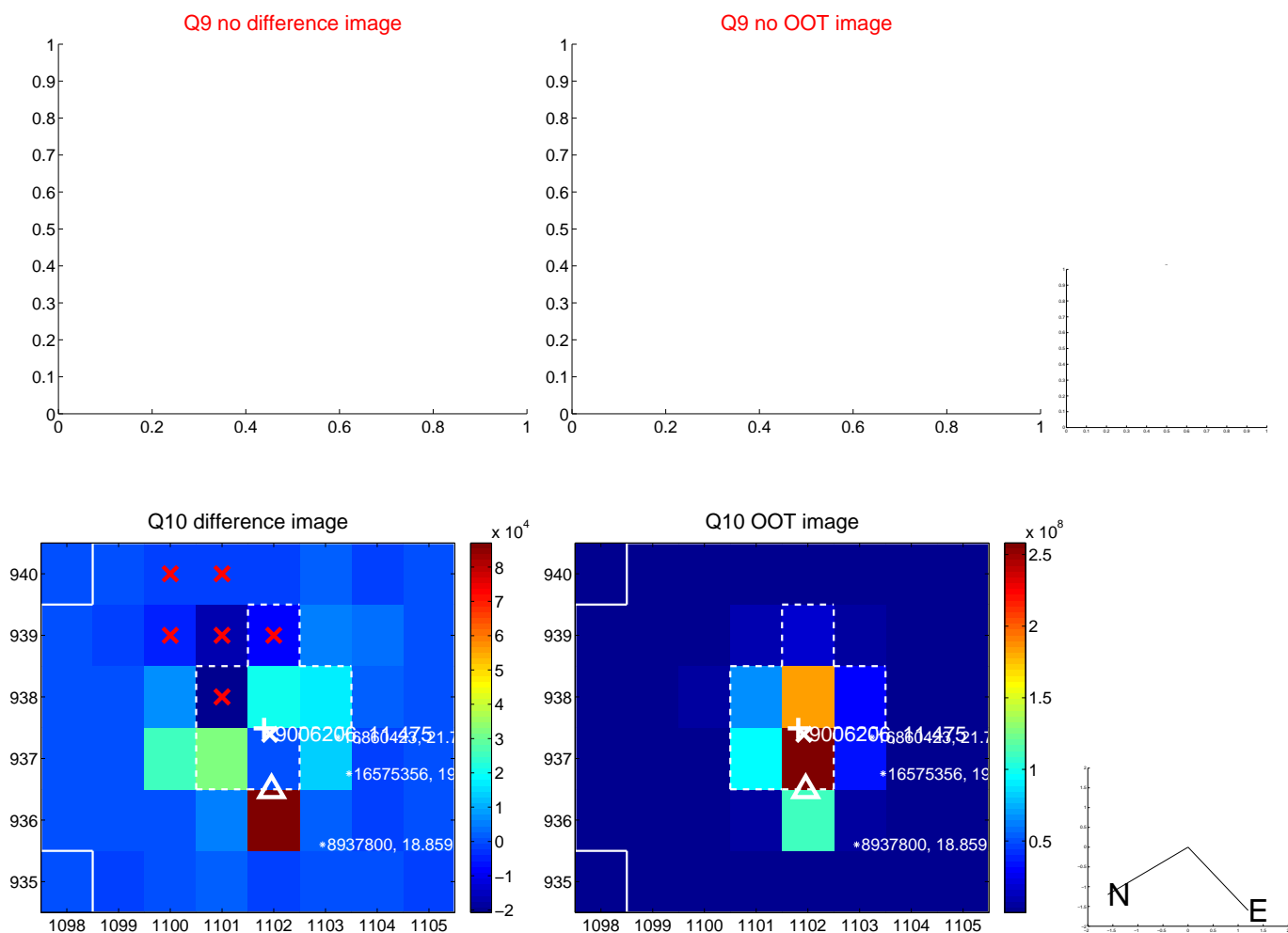


Q8 no OOT image

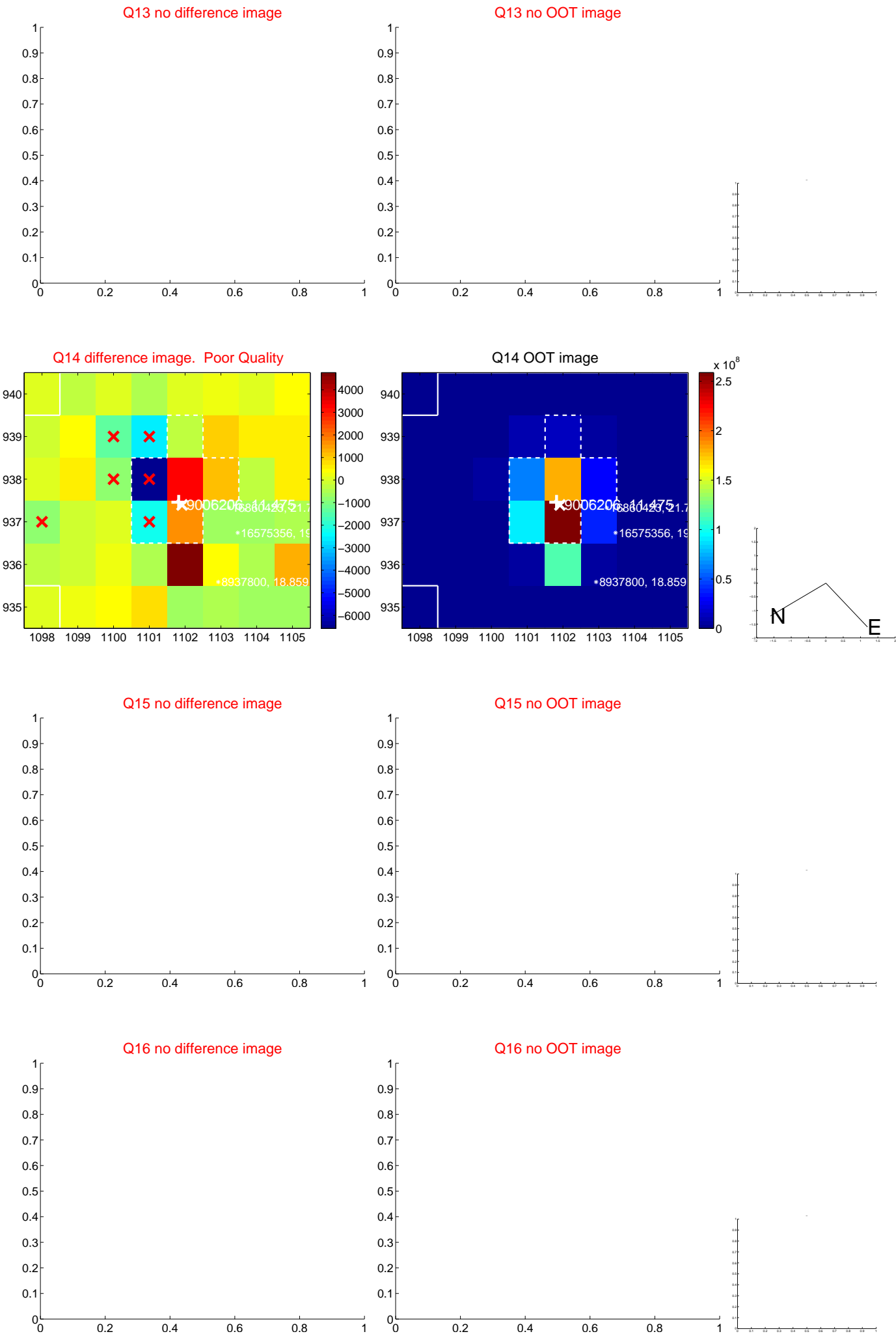




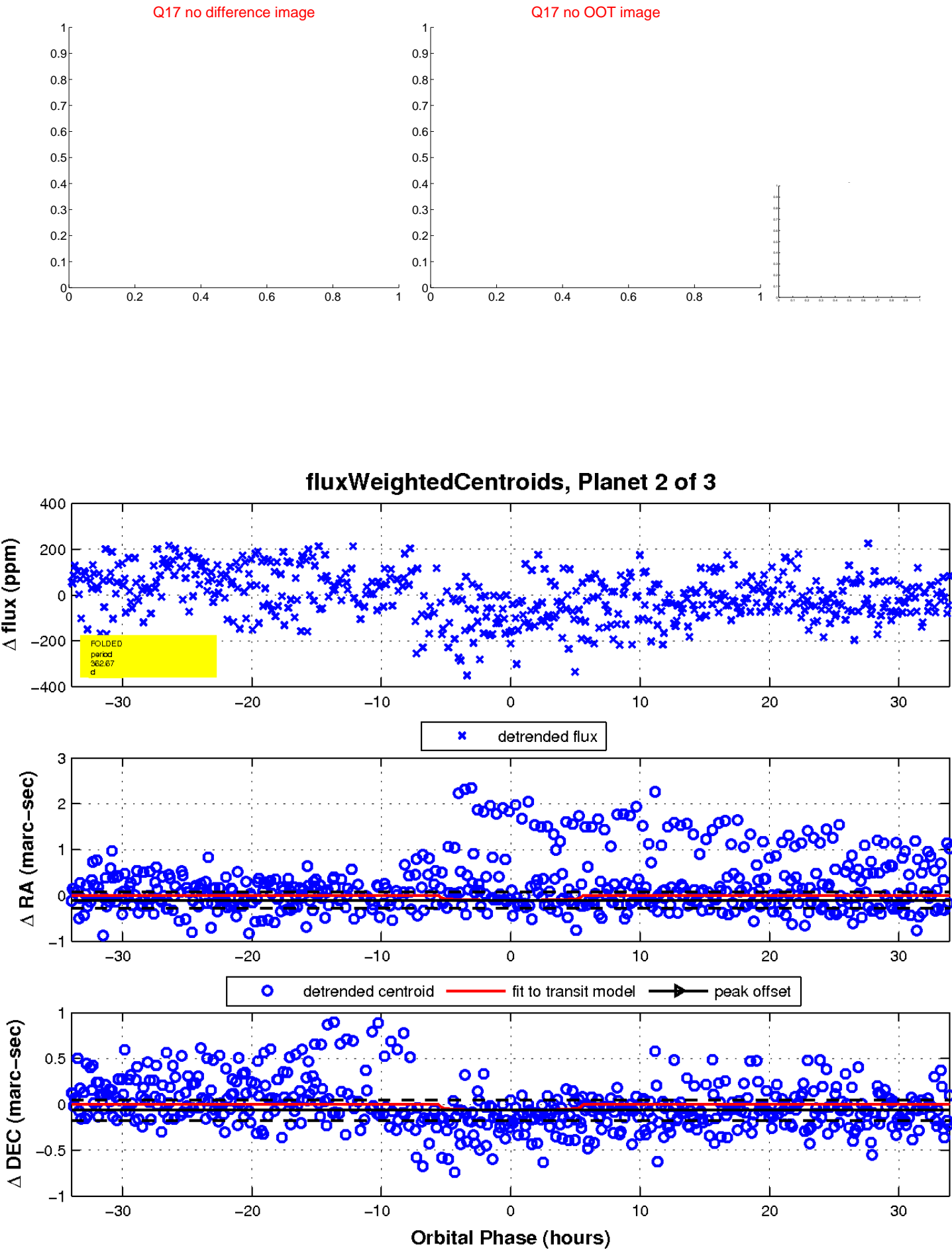
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value



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

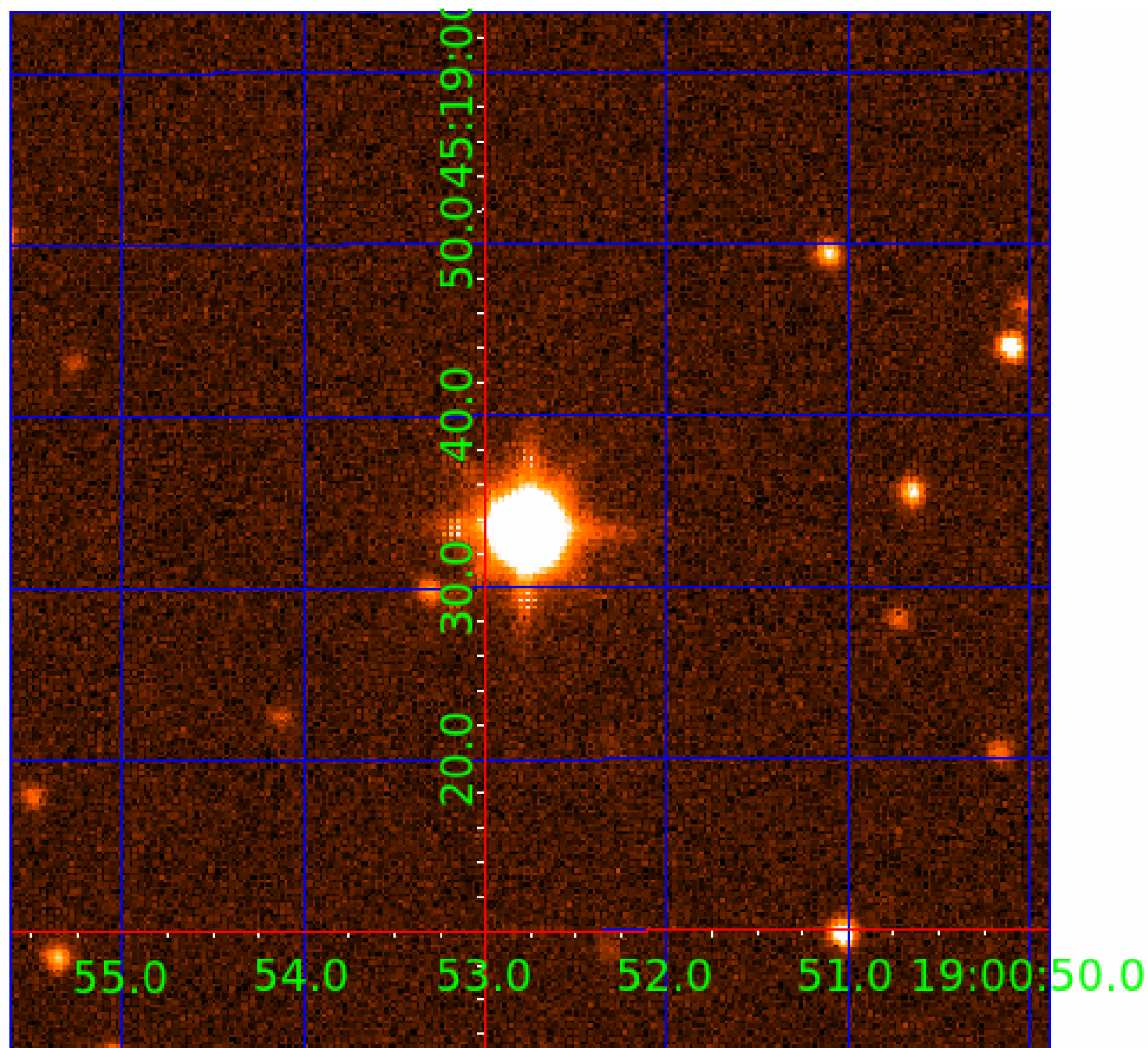


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 009006206

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
009006206-01	OBS	No	496.290409	150.449057	21.0	6.374	14.4	5.1	1.78	6228	0.95	2.71
009006206-02	OBS	No	362.672223	224.062753	133.7	11.318	12.6	8.5	1.78	6228	2.28	4.12
009006206-03	OBS	No	190.199077	132.021695	42.0	20.825	11.5	15.1	1.78	6228	1.24	9.74

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009006206-01	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
009006206-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_MARSHALL—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—INCONSISTENT_TRANS—CENT_SATURATED
009006206-03	OBS	FP	0.00	1	0	0	0	MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_SATURATED

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

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

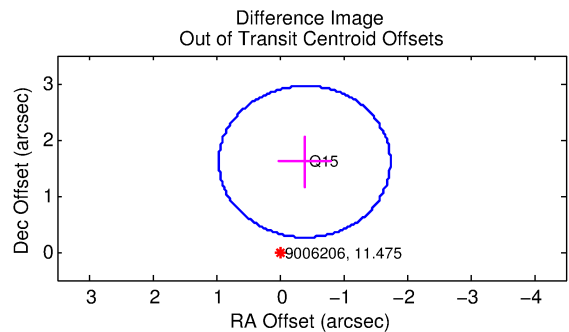
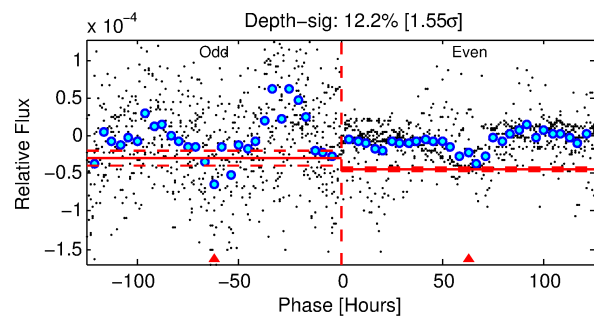
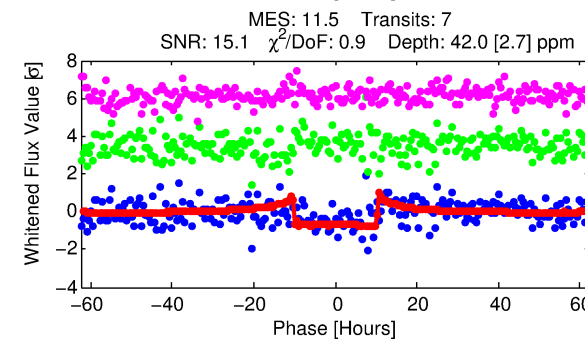
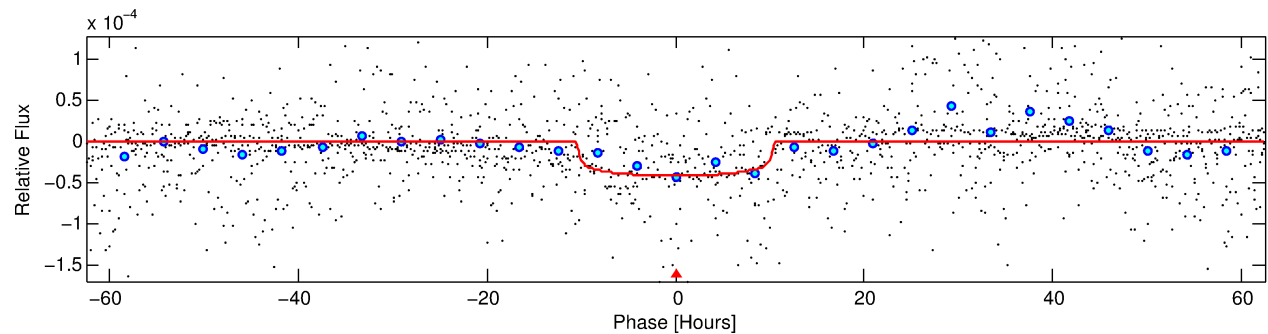
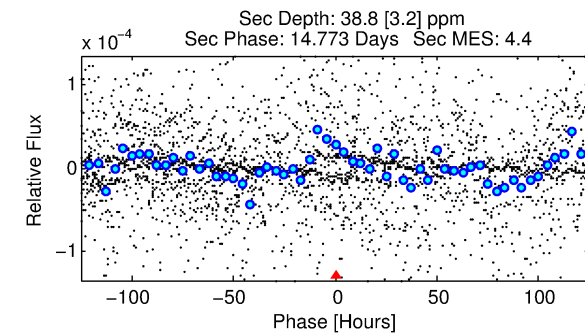
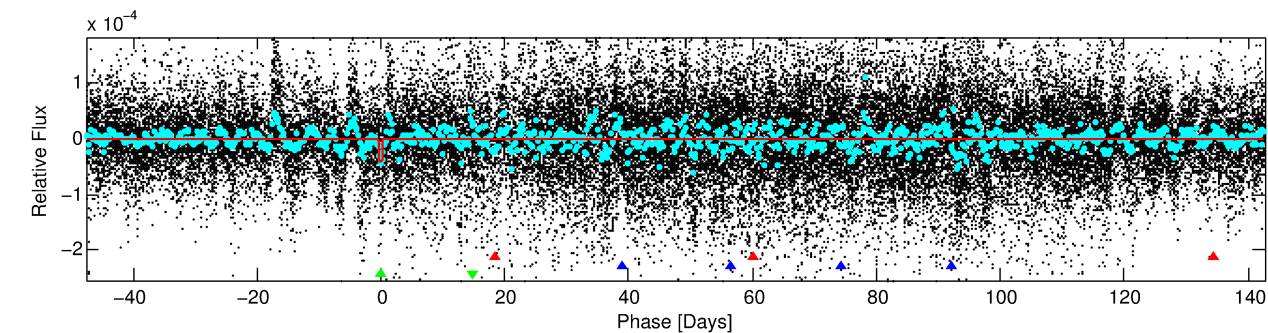
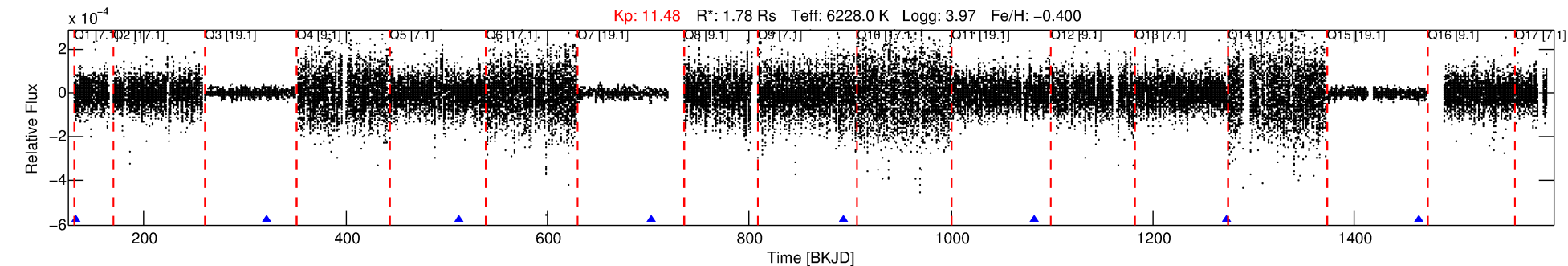
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

## Ephemeris Match Information For 009006206-03

No Significant Match Found

# DV One-Page Summary

KIC: 9006206 Candidate: 3 of 3 Period: 190.199 d



## DV Fit Results:

Period = 190.19908 [0.00151] d  
Epoch = 132.0217 [0.0065] BKJD  
Rp/R\* = 0.0064 [0.0004]  
a/R\* = 49.85 [11.52]  
b = 0.71 [0.16]  
Seff = 9.75 [6.98]  
Teq = 451 [81] K  
Rp = 1.24 [0.51] Re  
a = 0.6616 [0.2781] AU  
Ag = 6119.62 [4363.14] [1.40 $\sigma$ ]  
Teffp = 6161 [323] K [17.14 $\sigma$ ]

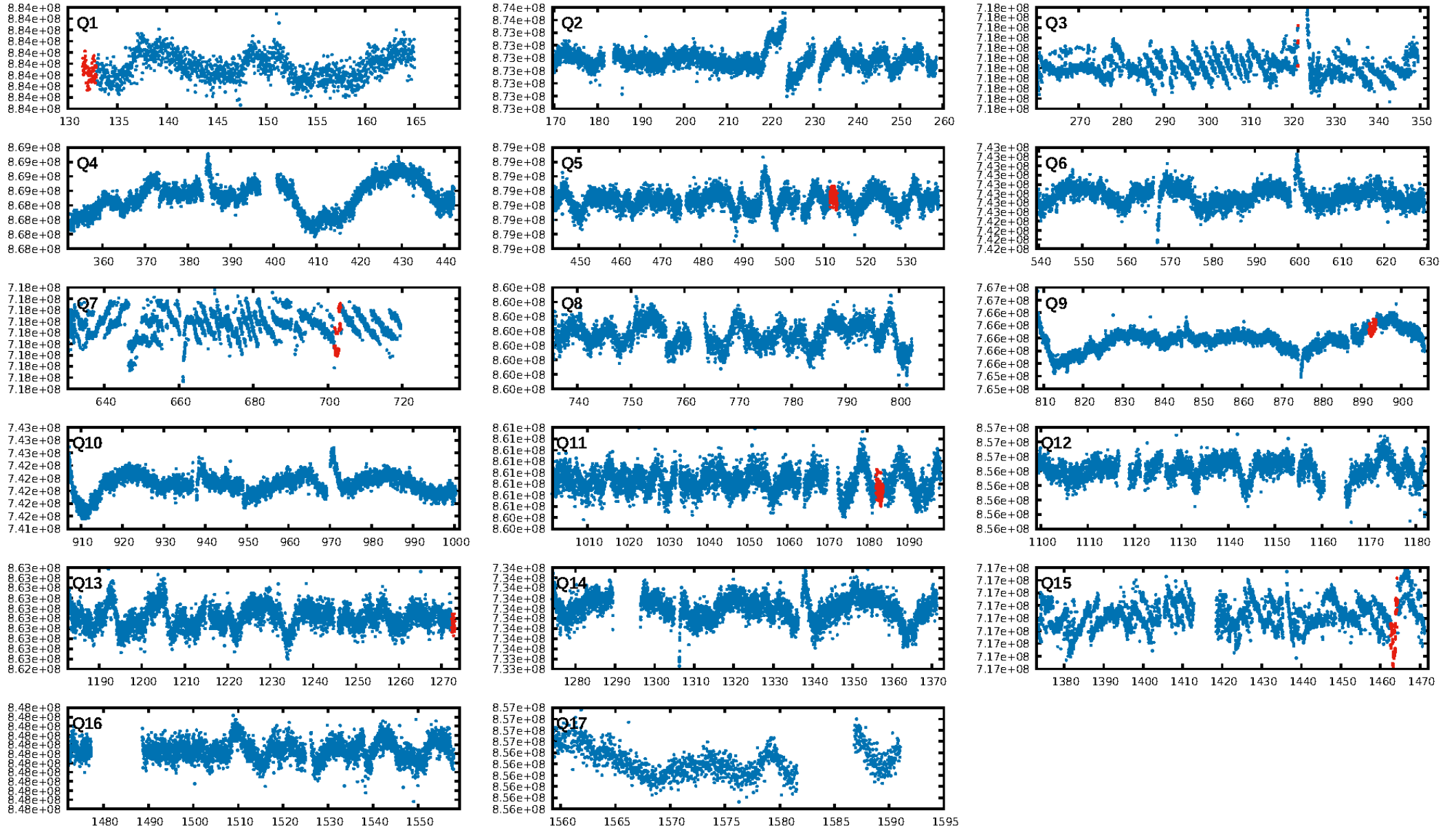
## DV Diagnostic Results:

ShortPeriod-sig: N/A  
LongPeriod-sig: 100.0% [174.65 $\sigma$ ]  
ModelChiSquare2-sig: 2.4%  
ModelChiSquareGof-sig: 100.0%  
Bootstrap-pfa: 3.03e-16  
RollingBand-fgt: 1.00 [6/6]  
GhostDiagnostic-chr: 1.86  
Centroid-sig: 19.4%  
Centroid-so: 1.920 arcsec [0.90 $\sigma$ ]  
OotOffset-rm: 1.653 arcsec [3.68 $\sigma$ ]  
KicOffset-rm: 2.043 arcsec [4.53 $\sigma$ ]  
OotOffset-st: 0/1/0/0 [1]  
KicOffset-st: 0/1/0/0 [1]  
DiffImageQuality-fgm: 1.00 [1/1]  
DiffImageOverlap-fno: 1.00 [4/4]

Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 05:37:16 Z

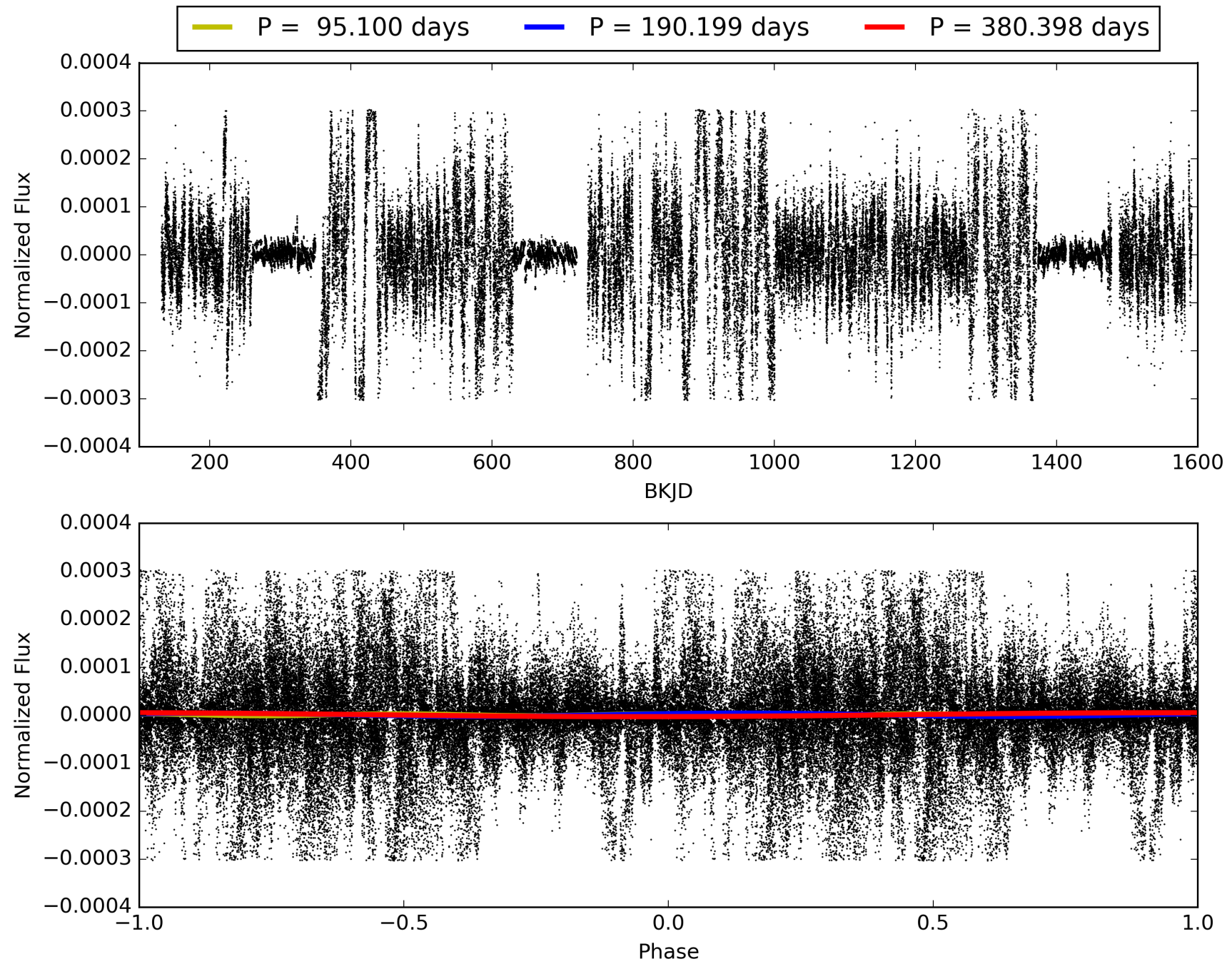
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 009006206-03, PDC Light Curves





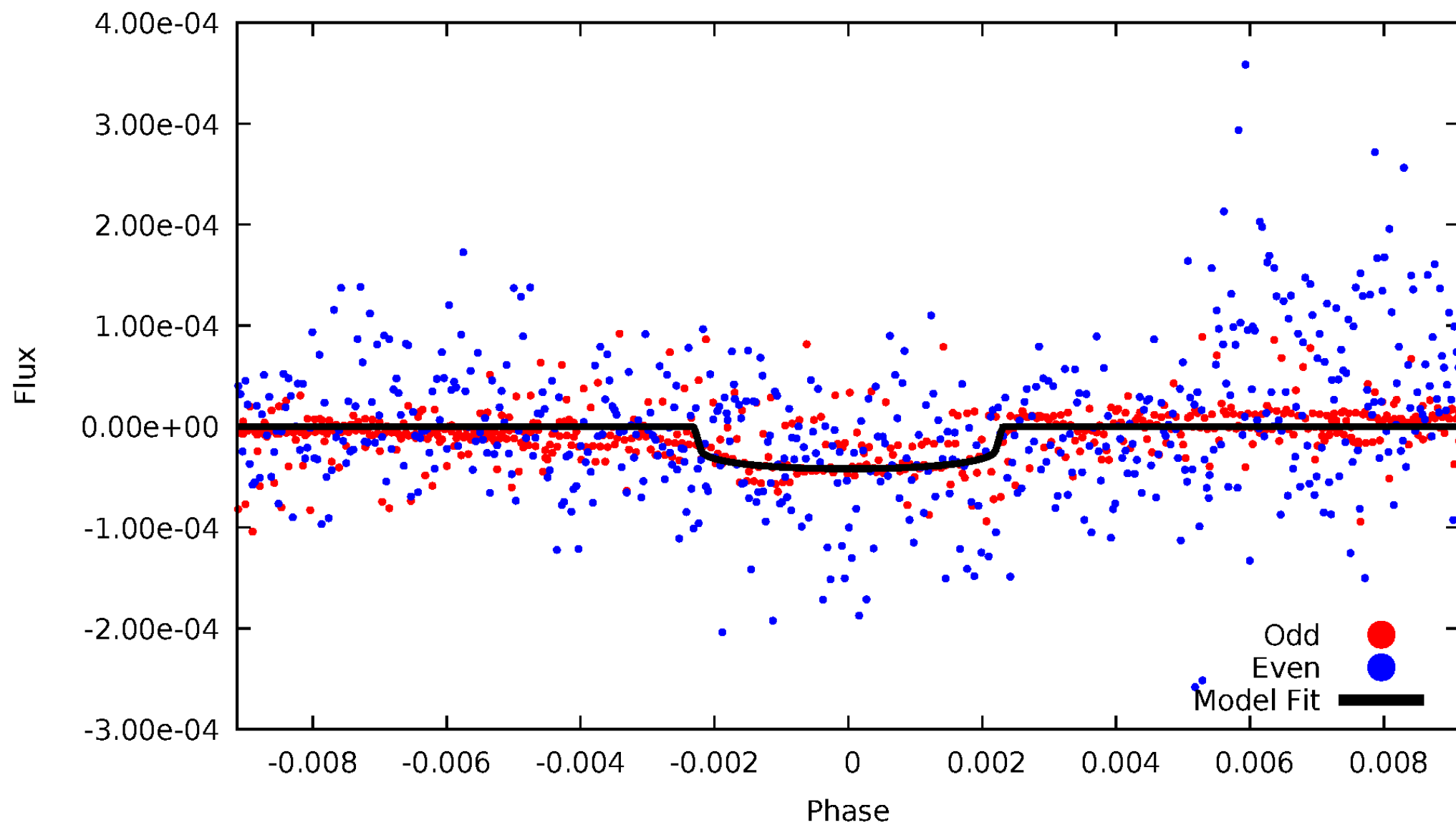
TCE 009006206-03





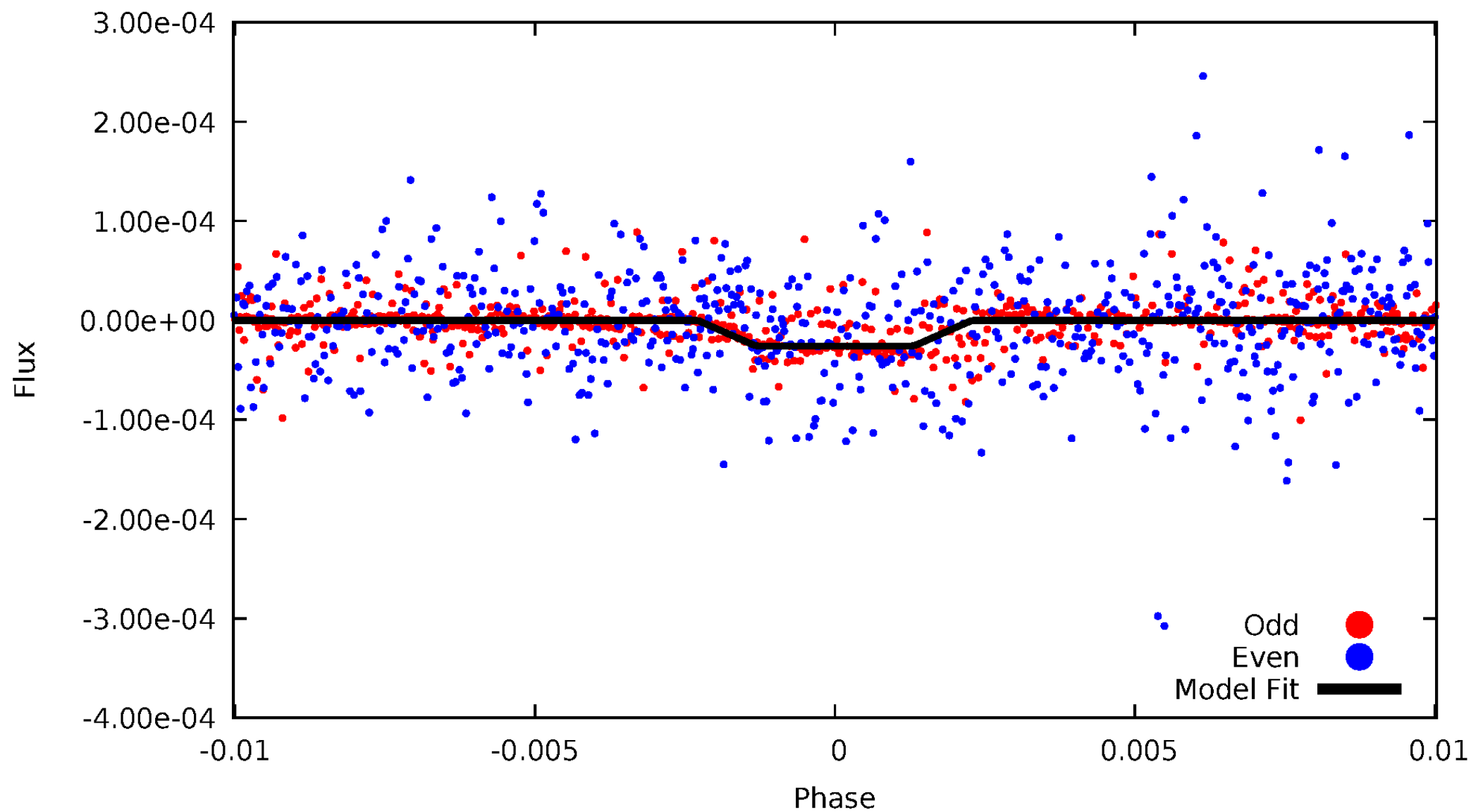
DV Odd/Even

TCE 009006206-03



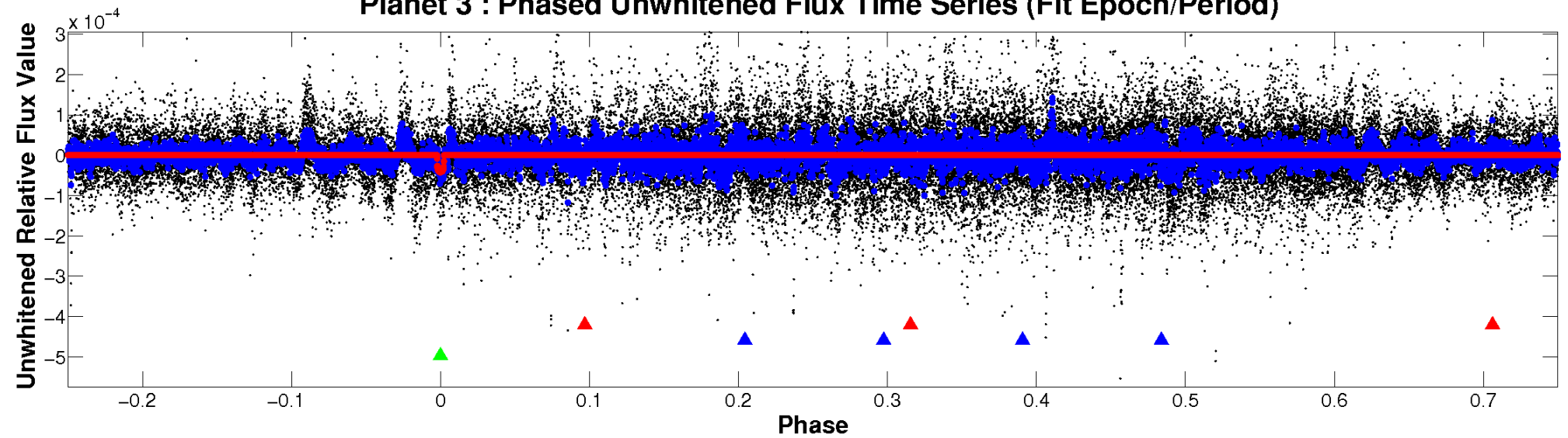
# ALT Odd/Even

TCE 009006206-03

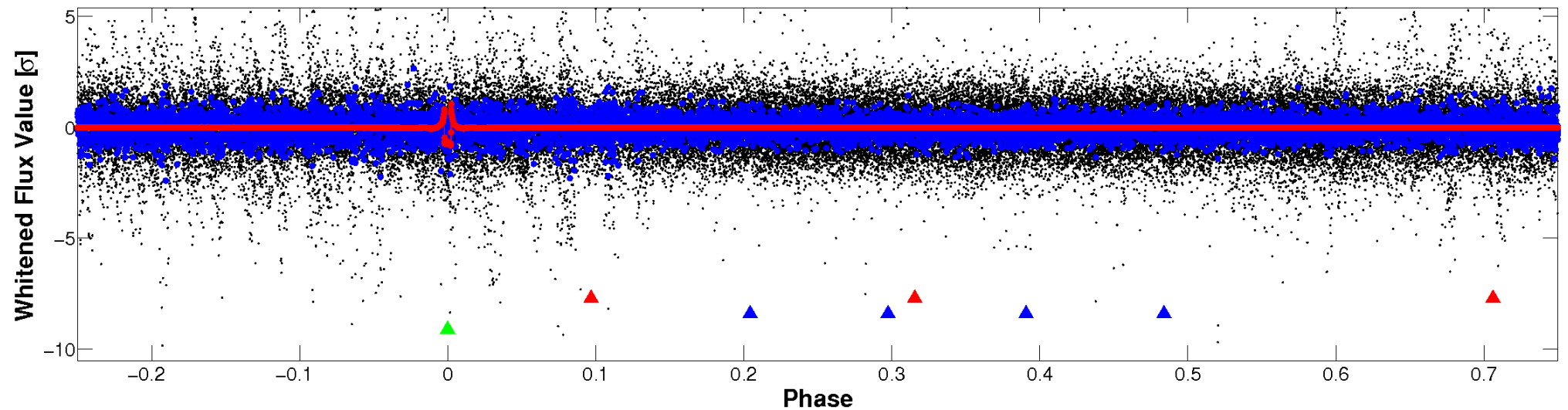


# Non-Whitened Vs. Whitened Light Curve

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

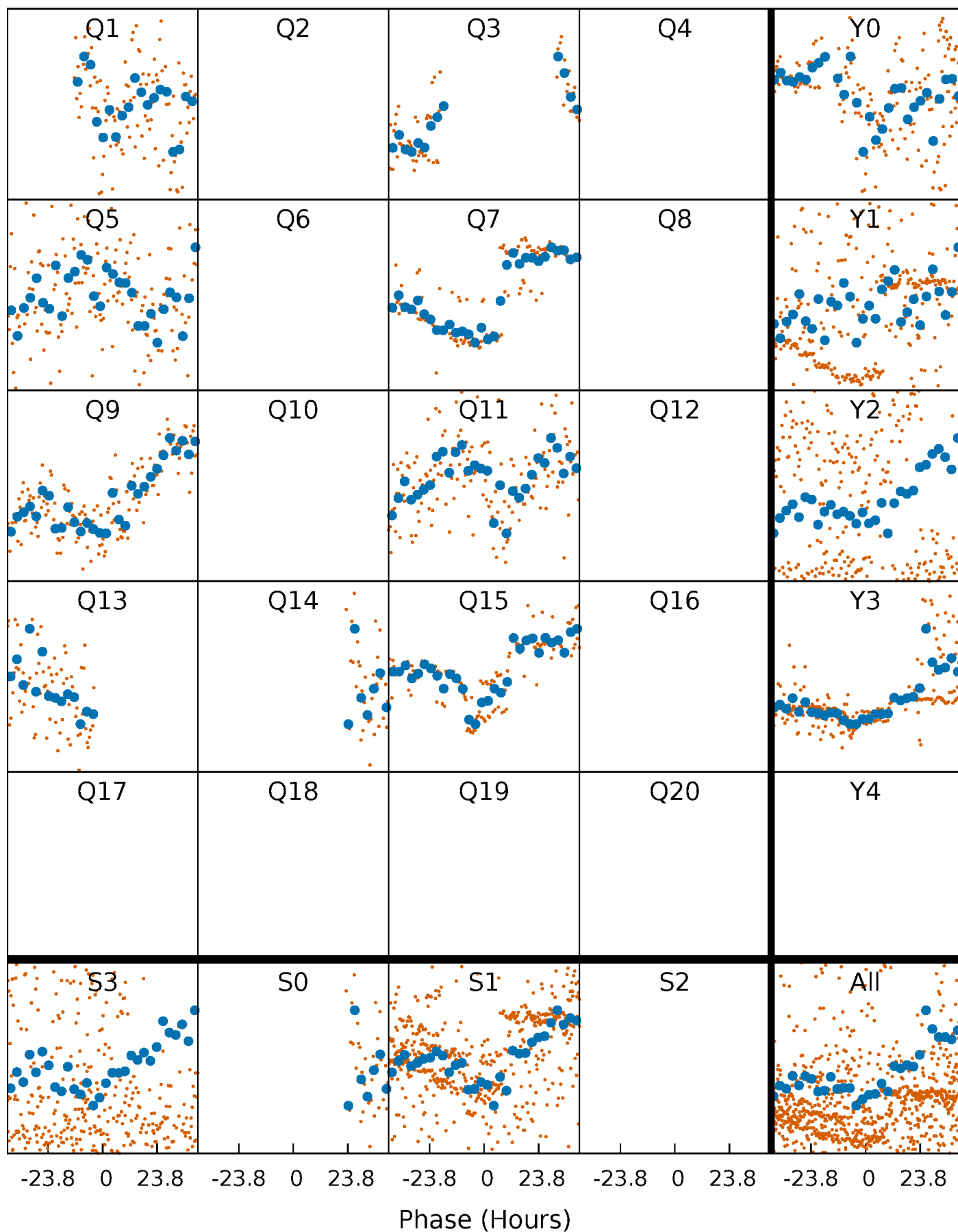


**Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)**



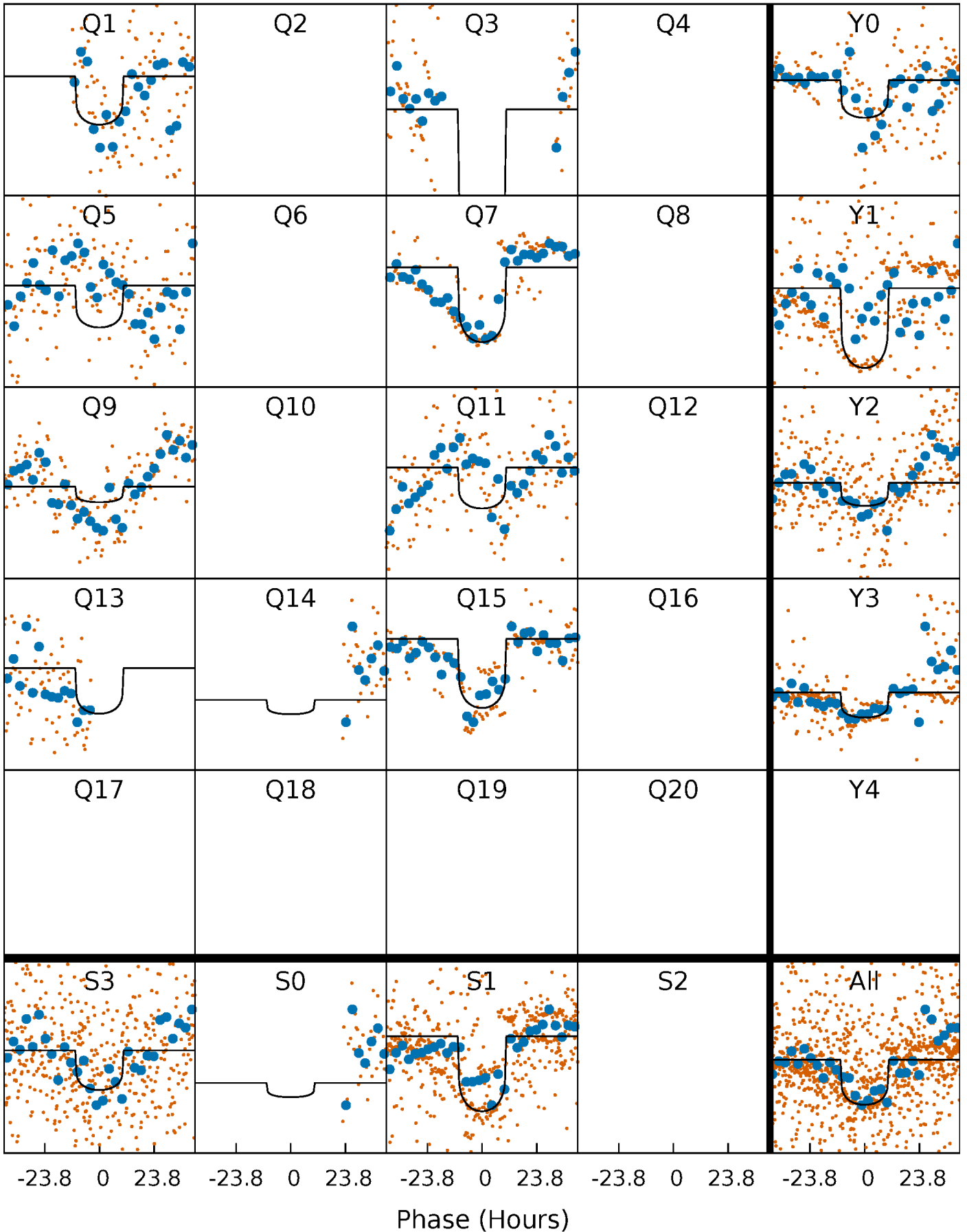
# PDC Quarter-Phased Transit Curves

TCE 009006206-03 P=190.199077 Days  $T_0=132.021695$  (BKJD)



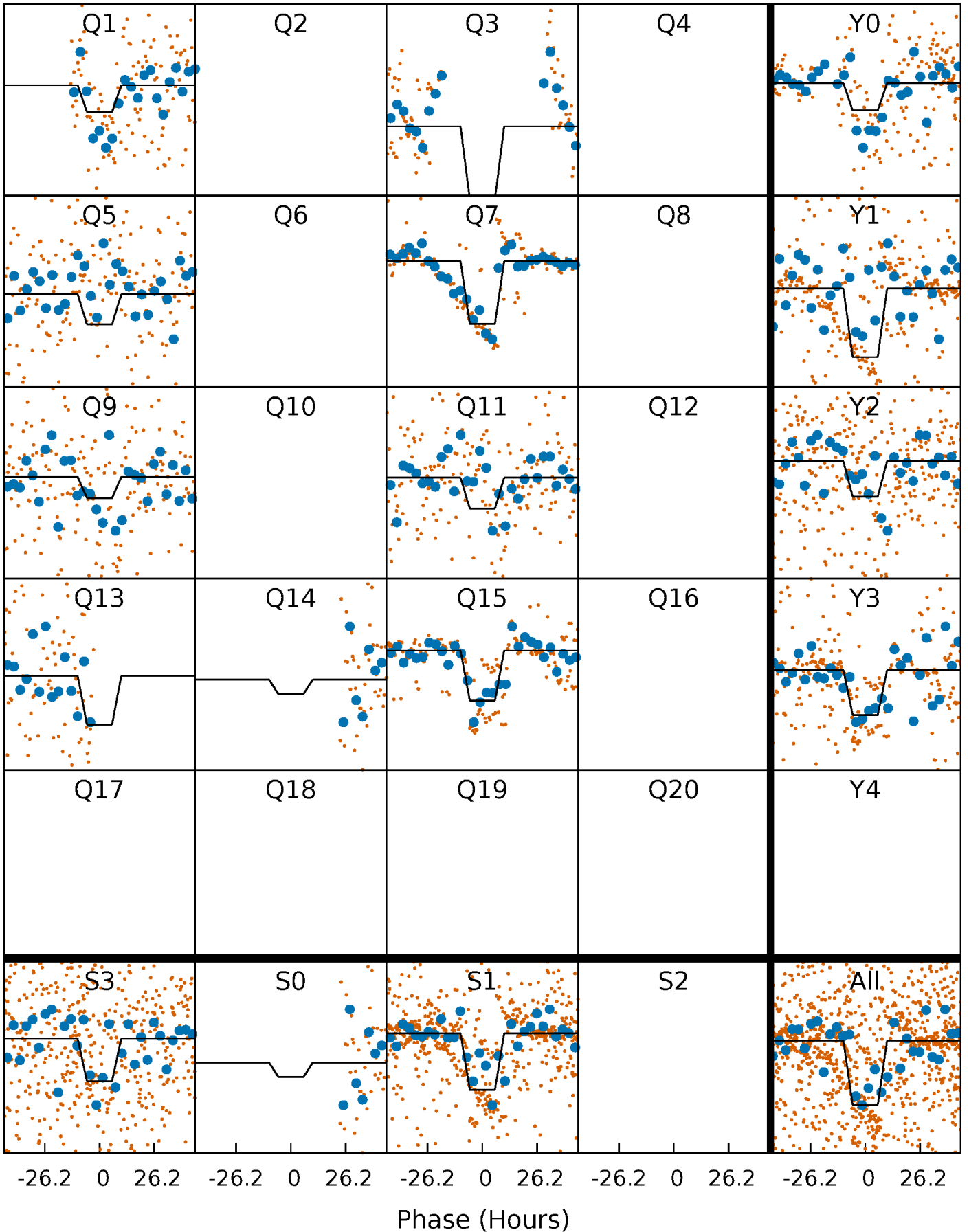
# DV Quarter-Phased Transit Curves

TCE 009006206-03     $P=190.199077$  Days     $T_0=132.021695$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

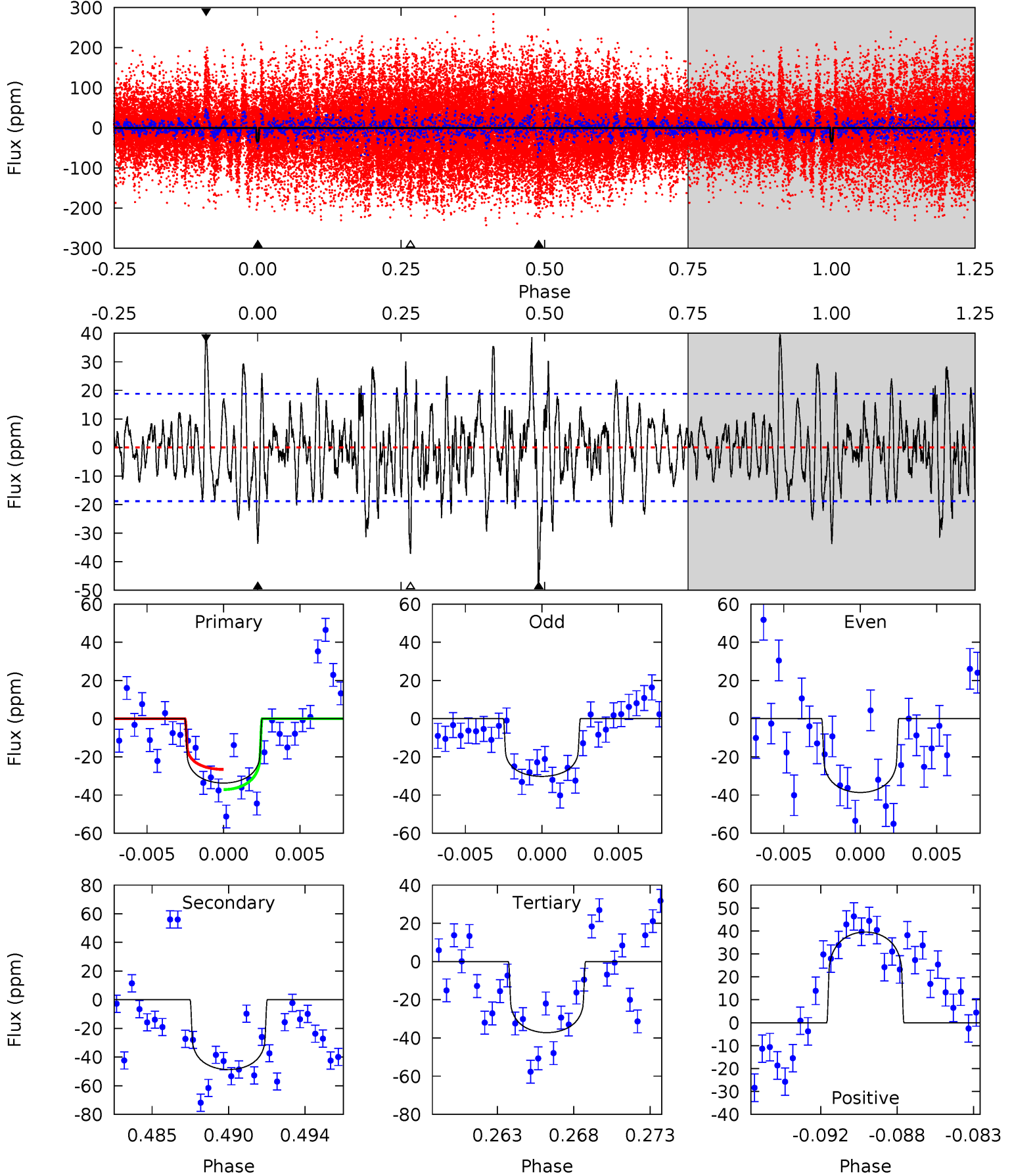
TCE 009006206-03 P=190.181954 Days  $T_0=132.085170$  (BKJD)



# DV Model-Shift Uniqueness Test

009006206-03, P = 190.199077 Days, E = 132.021695 Days

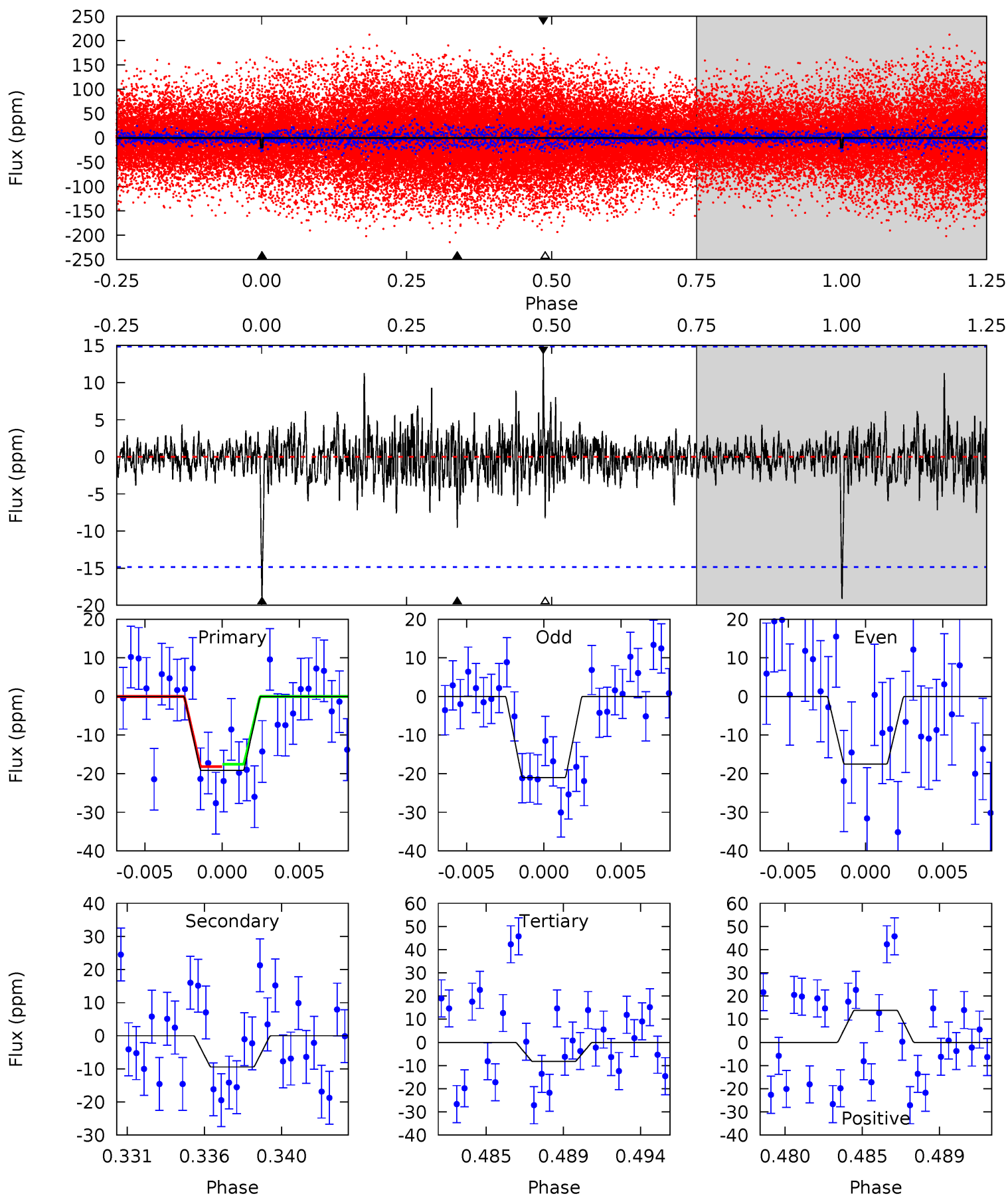
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.28	13.4	10.2	10.9	5.17	2.83	3.11	-0.97	-1.61	3.17	2.53	1.14	1.00	0.45	1.43



# Alt Model-Shift Uniqueness Test

009006206-03, P = 190.181954 Days, E = 132.085170 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
6.66	3.29	2.88	4.83	5.17	2.83	0.77	3.79	1.84	0.41	-1.54	0.61	0.76	0.42	0.11





### Stellar Parameters For KIC 009006206

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$6228^{+198}_{-242}$	$3.966^{+0.420}_{-0.140}$	$-0.400^{+0.300}_{-0.300}$	$1.779^{+0.420}_{-0.720}$	$1.067^{+0.157}_{-0.174}$	$0.267^{+0.979}_{-0.106}$
	+3%/-4%	+11%/-4%	+75%/-75%	+24%/-40%	+15%/-16%	+366%/-40%
Source	PHO54	PHO54	PHO54	DSEP		

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

### Secondary Eclipse Parameters for KIC 009006206-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	$-49 \pm 4$	$1.19^{+0.22}_{-0.25}$	$614^{+51}_{-65}$	$6513^{+368}_{-324}$	$8445^{+4895}_{-2314}$
Alt.	$-9 \pm 3$	$0.94^{+0.17}_{-0.21}$	$618^{+47}_{-74}$	$4948^{+386}_{-394}$	$2606^{+1889}_{-1025}$

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

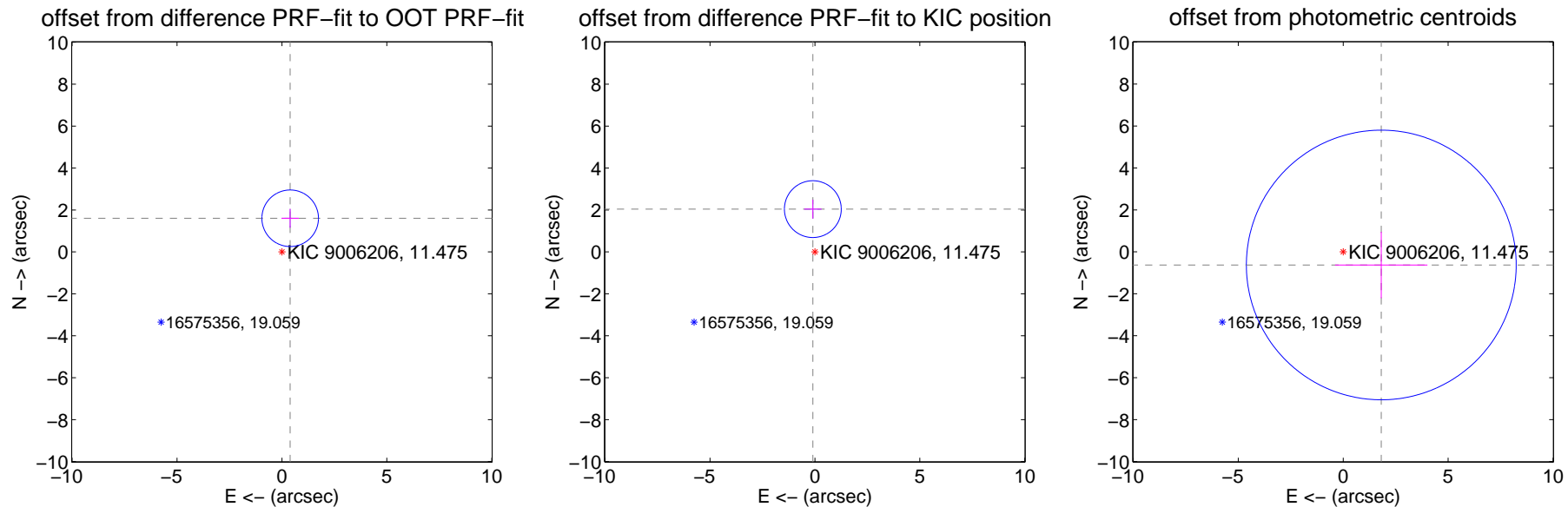
## DV Centroid Data

Supplemental centroid analysis for 009006206-03. **Kepler magnitude: 11.47.** Transit SNR 15.07

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

The direct PRF centroid is offset from the target star catalog position by about 0.66 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	<b><math>1.653 \pm 0.449</math></b>	<b>3.68</b>	$-0.393 \pm 0.412$	$1.605 \pm 0.452$
PRF-fit source offset from KIC position	<b><math>2.043 \pm 0.451</math></b>	<b>4.53</b>	$0.099 \pm 0.412$	$2.041 \pm 0.452$
photometric centroid source offset	$1.92 \pm 2.14$	0.90	$-1.81 \pm 2.20$	$-0.63 \pm 1.58$

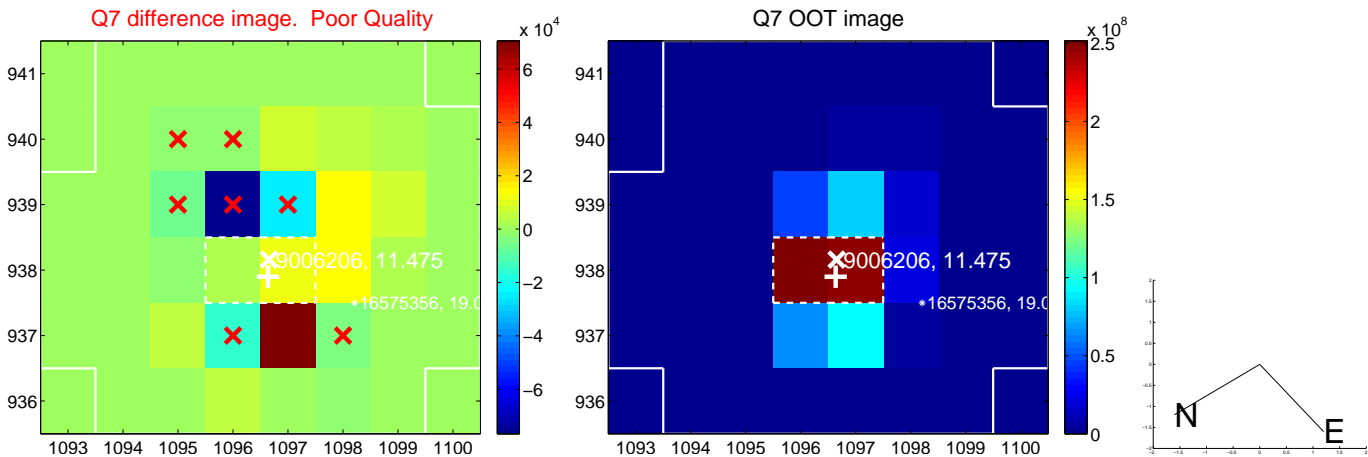
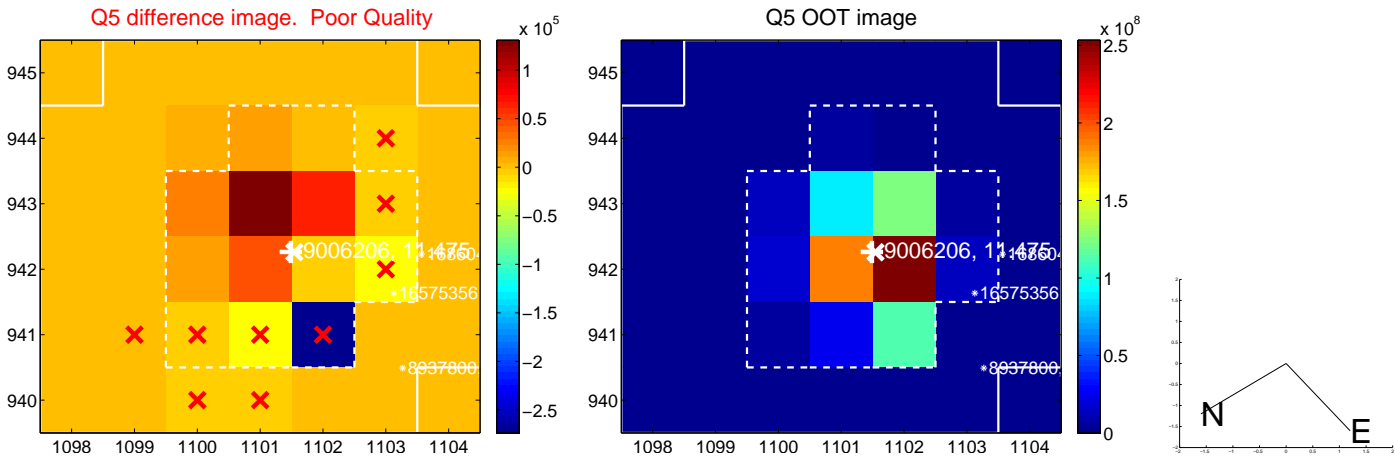


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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

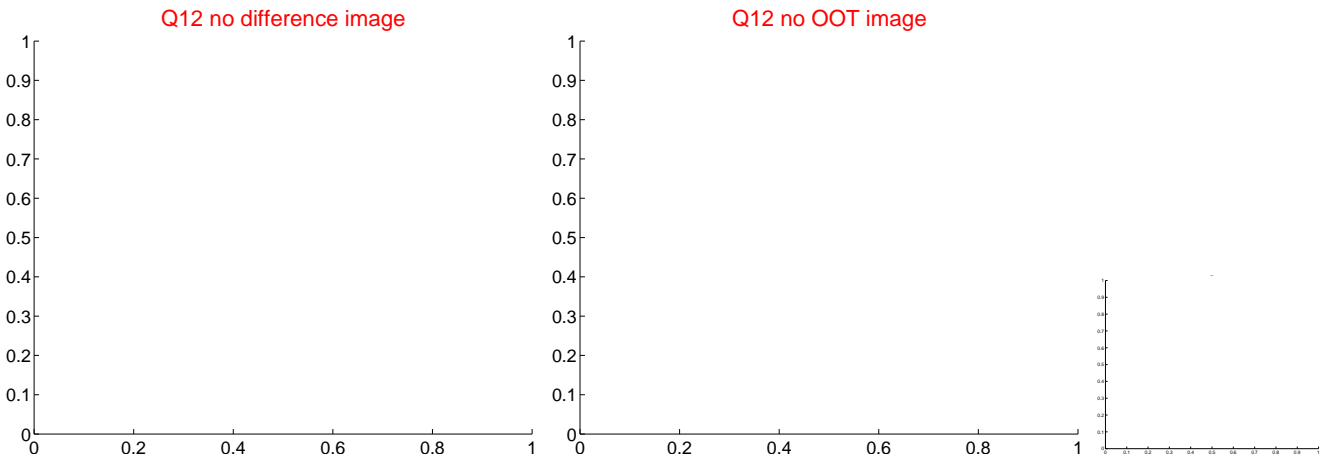
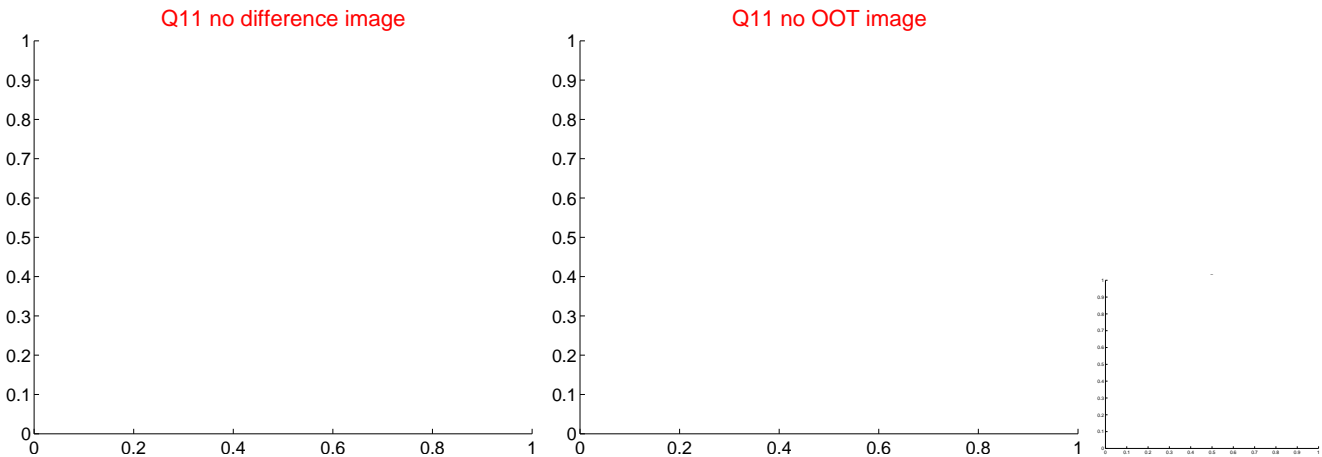
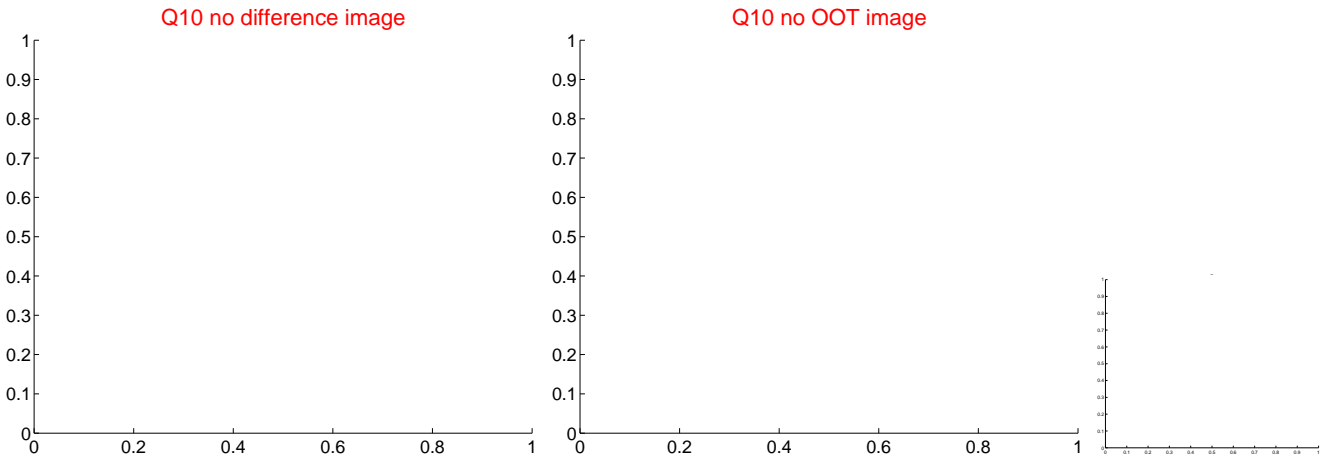
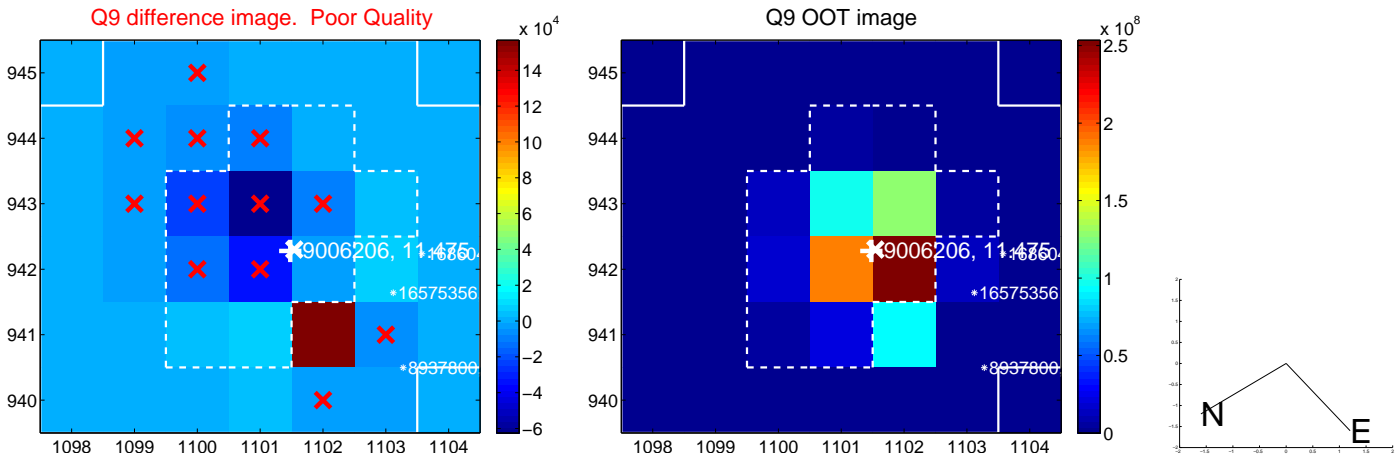
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



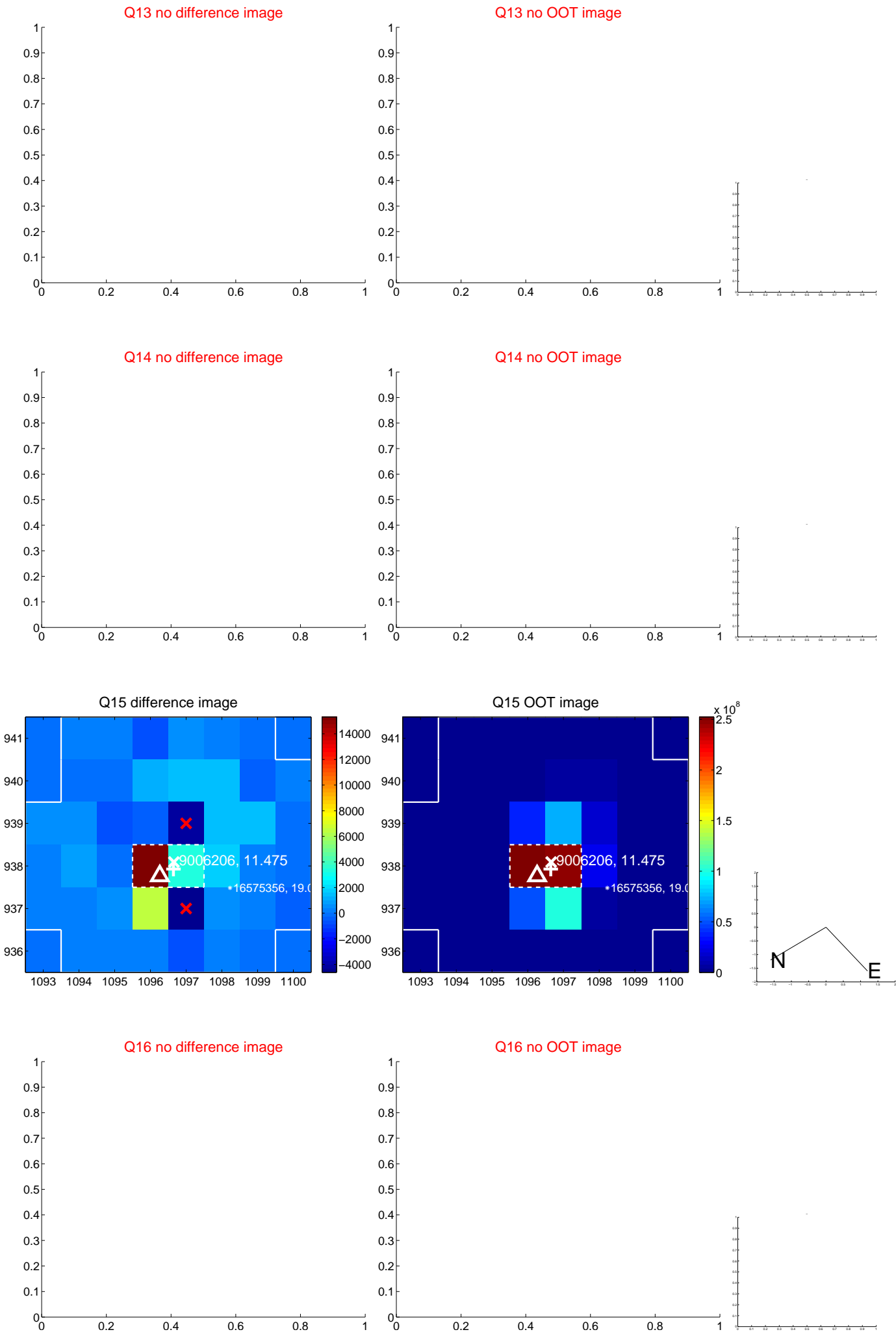
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



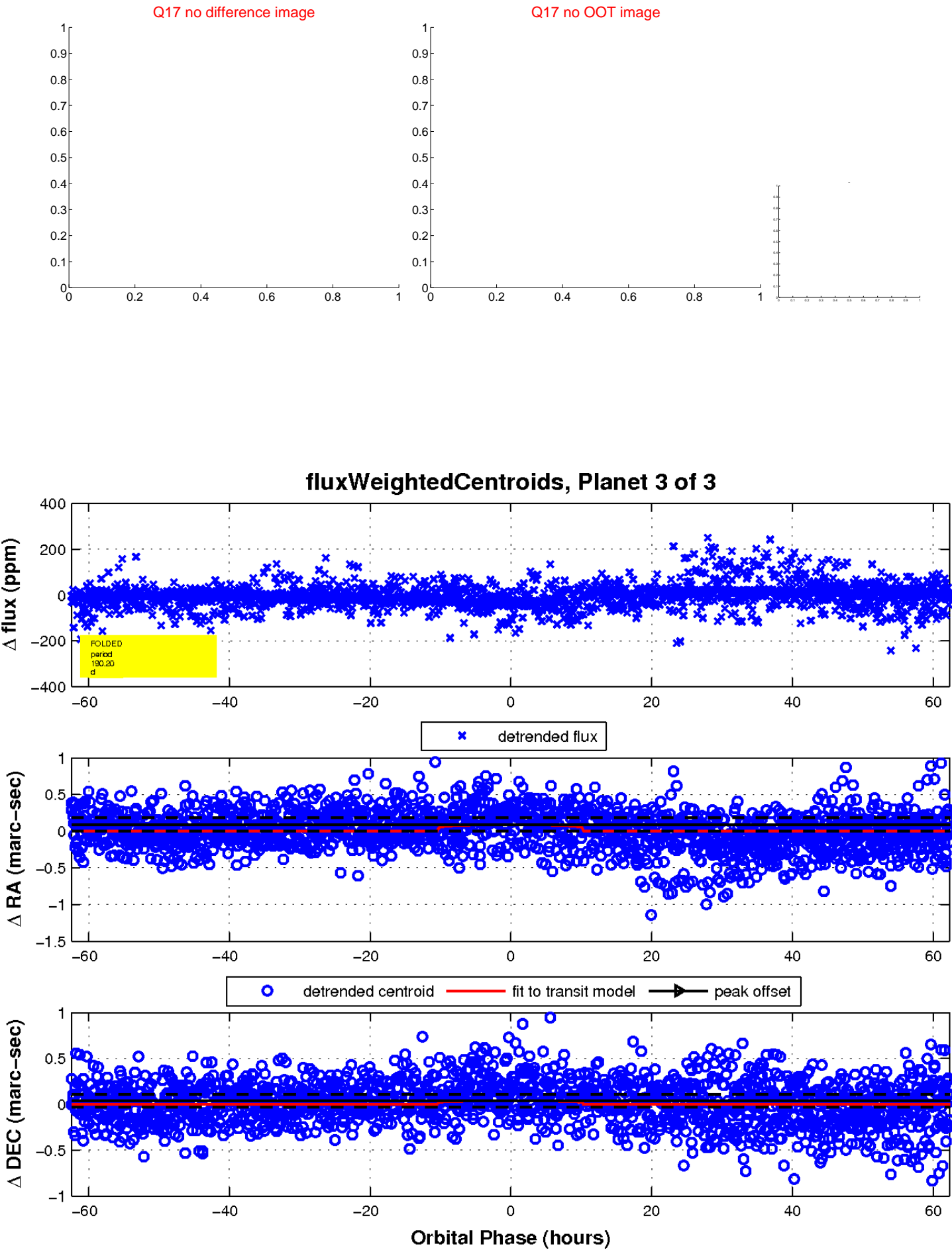
white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

