

# KIC 005001655

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005001655-01	OBS	No	2.290476	133.192958	39.0	15.911	9.5	12.8	2.48	5845	1.55	4546.20
005001655-02	OBS	No	40.591664	148.481950	323.5	6.171	9.6	9.8	2.48	5845	4.99	98.39
005001655-03	OBS	No	38.520553	154.185867	509.6	2.225	10.1	8.2	2.48	5845	10.63	105.51
005001655-04	OBS	No	26.505407	151.282364	509.2	1.593	8.2	9.9	2.48	5845	6.61	173.69

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005001655-01	OBS	FP	0.00	1	0	1	0	LPP_DV—CENT_FEW_DIFFS—HALO_GHOST
005001655-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
005001655-03	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
005001655-04	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—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.

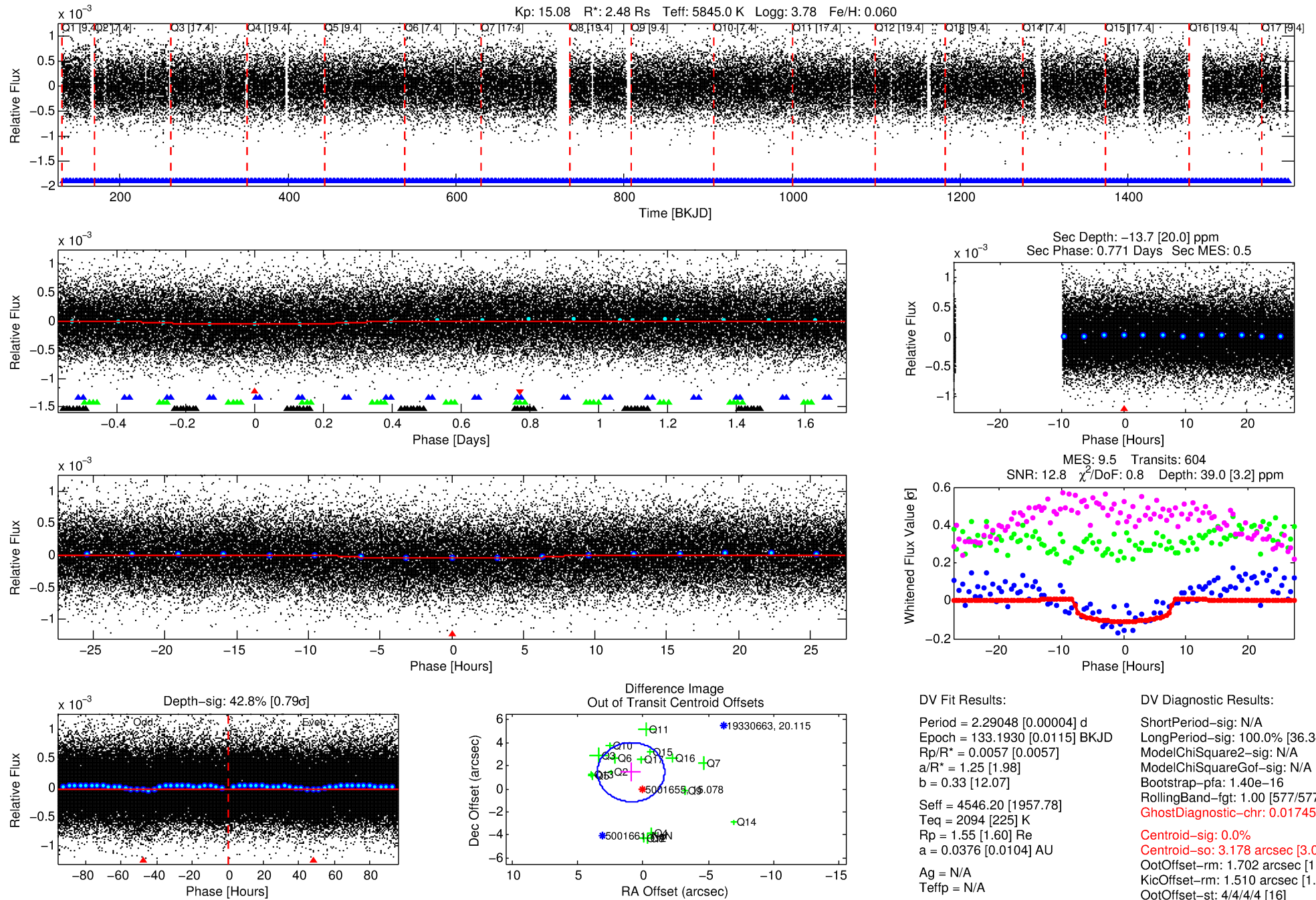
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 005001655-01

No Significant Match Found

# DV One-Page Summary

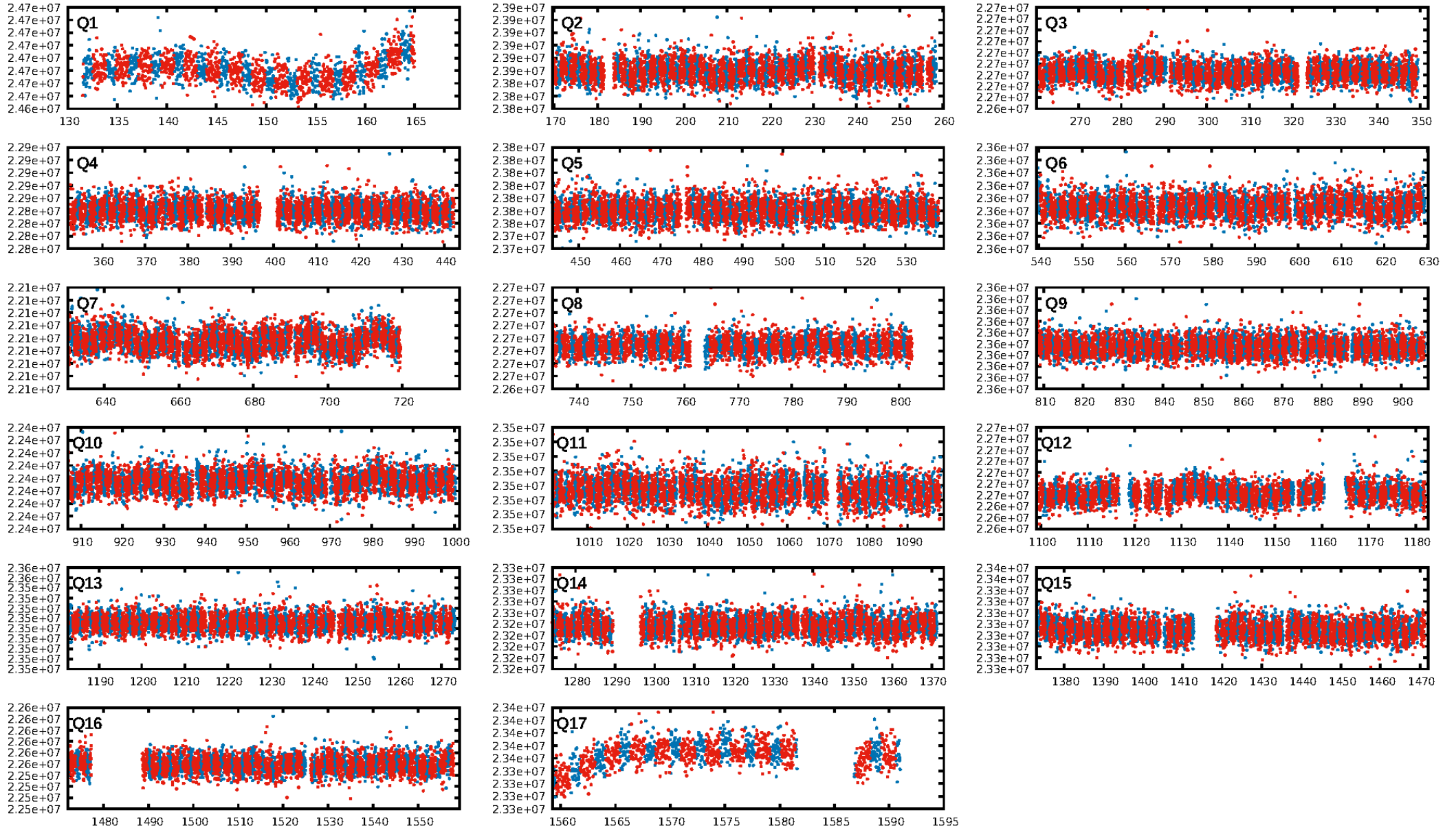
KIC: 5001655 Candidate: 1 of 4 Period: 2.290 d



Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 07:06:20 Z

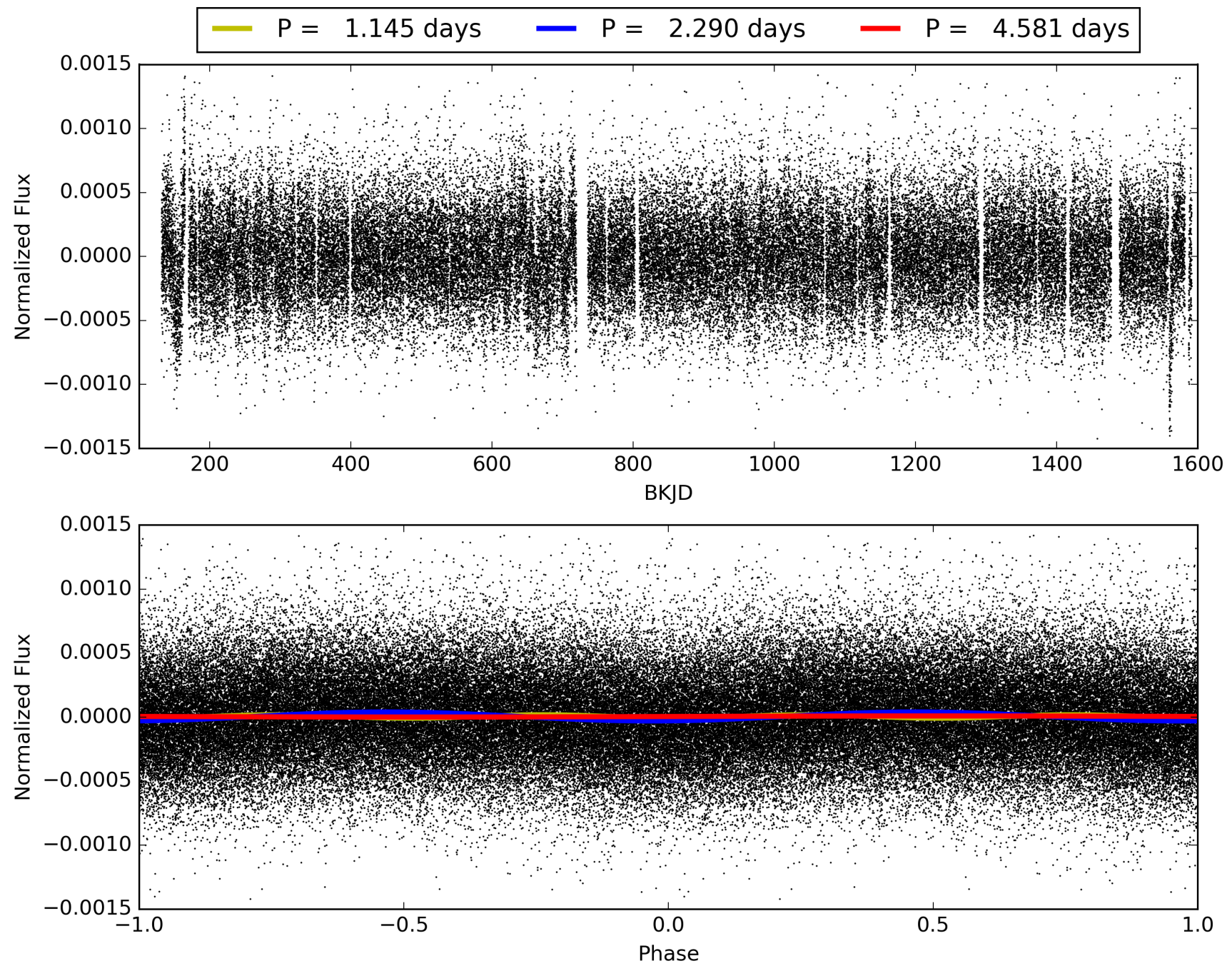
This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

# TCE 005001655-01, PDC Light Curves





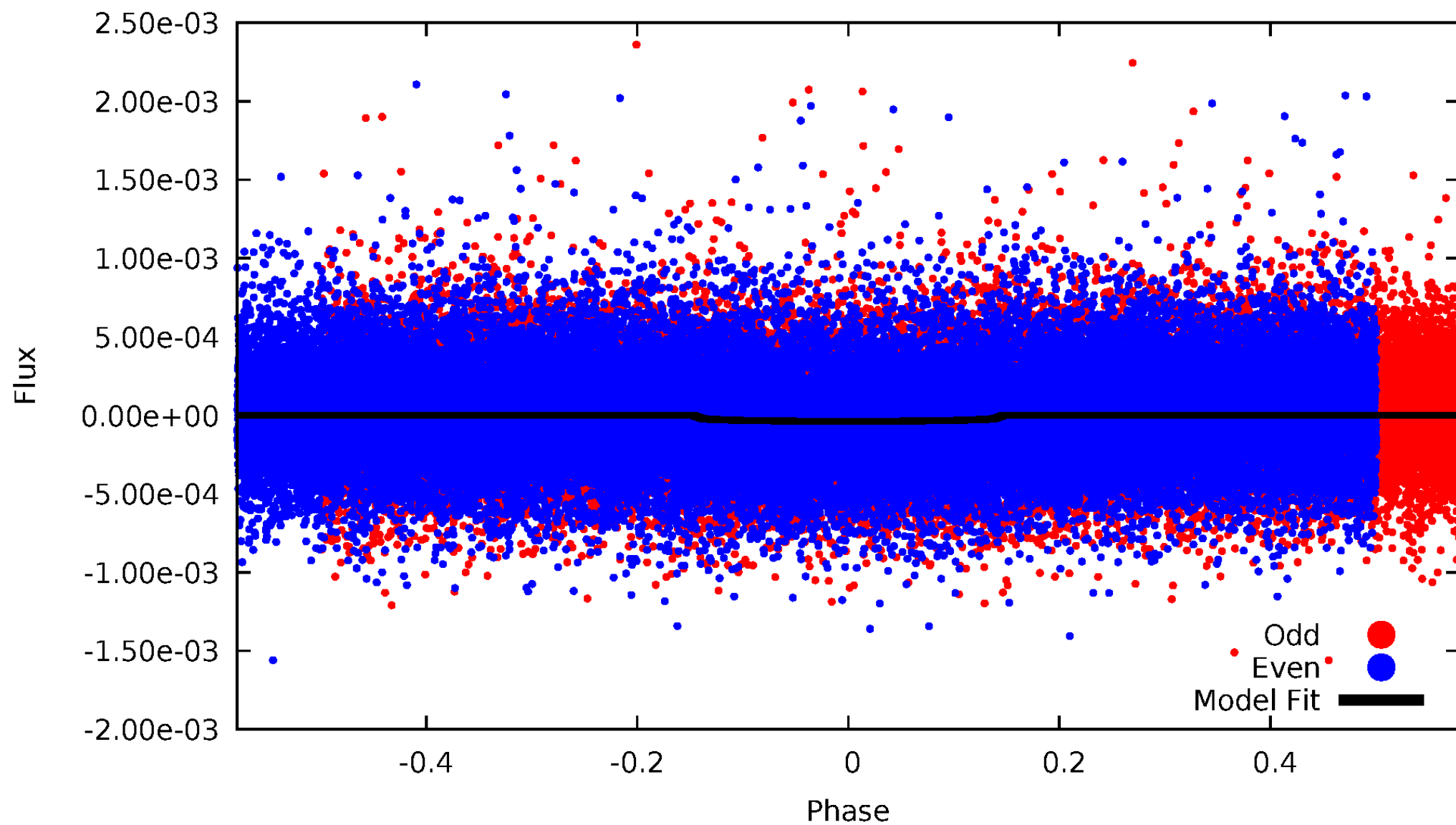
TCE 005001655-01





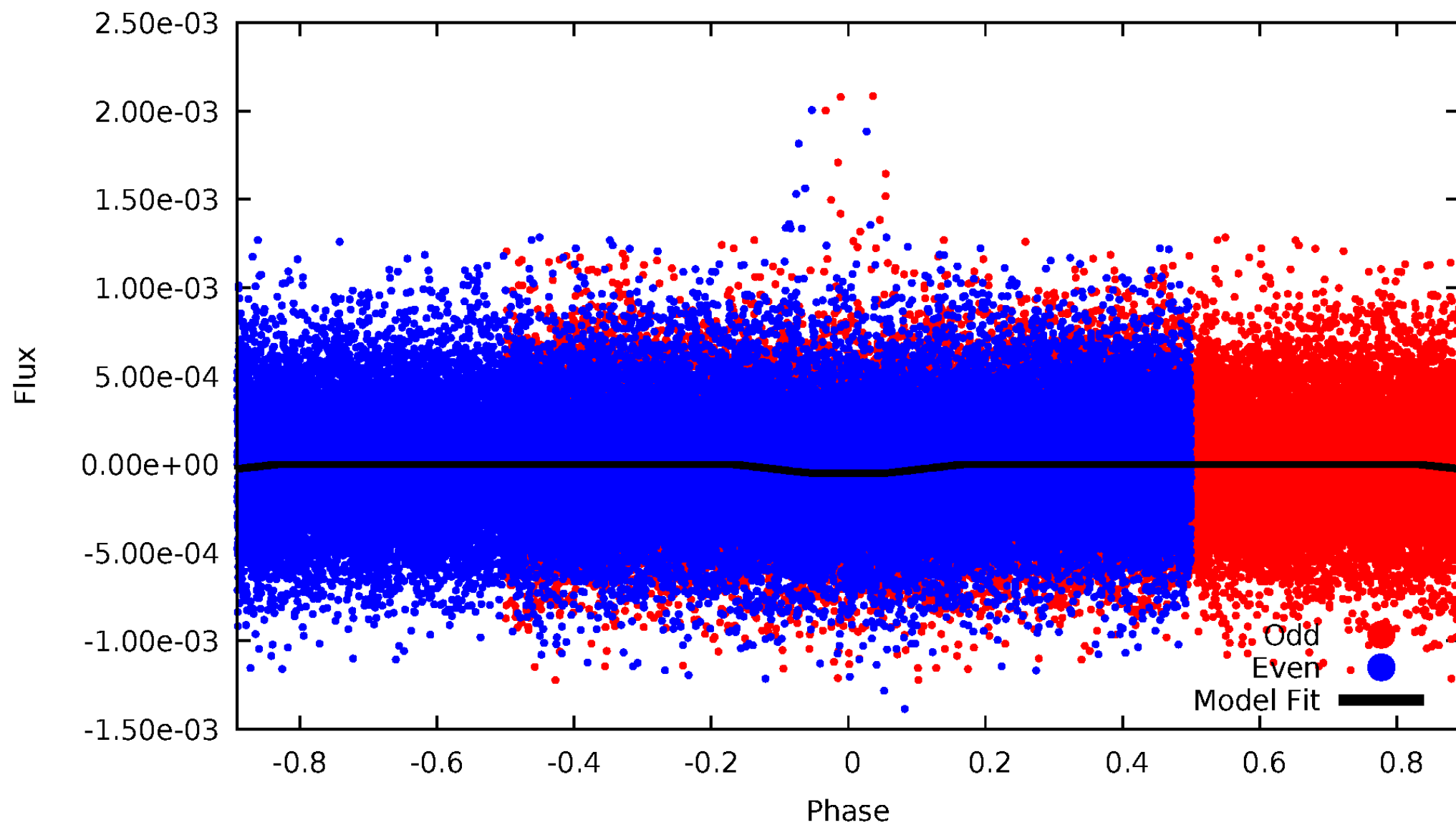
# DV Odd/Even

TCE 005001655-01



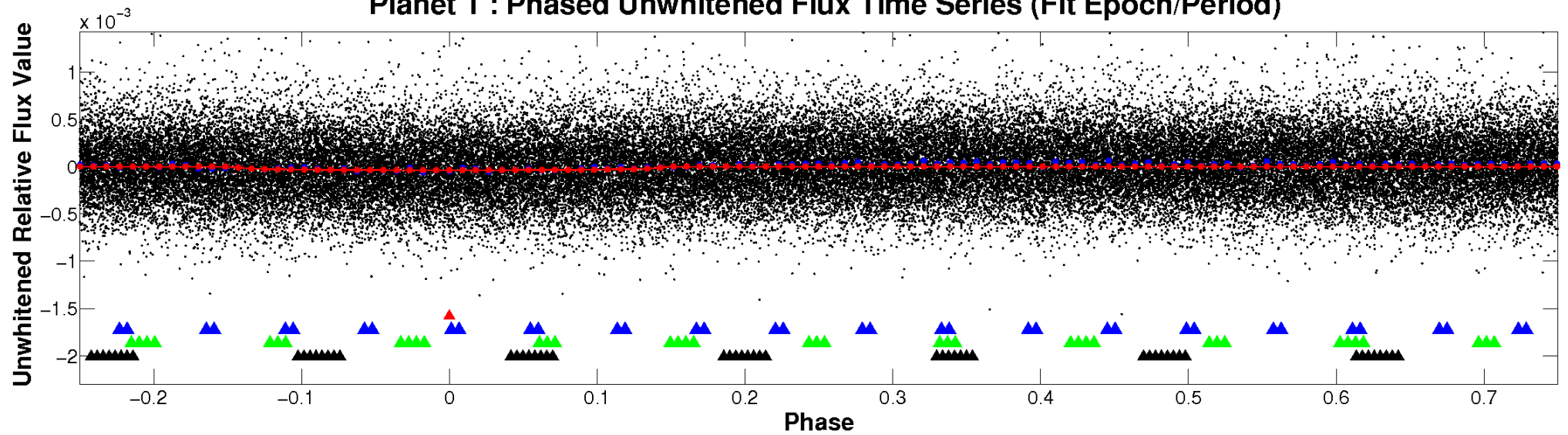
# ALT Odd/Even

TCE 005001655-01

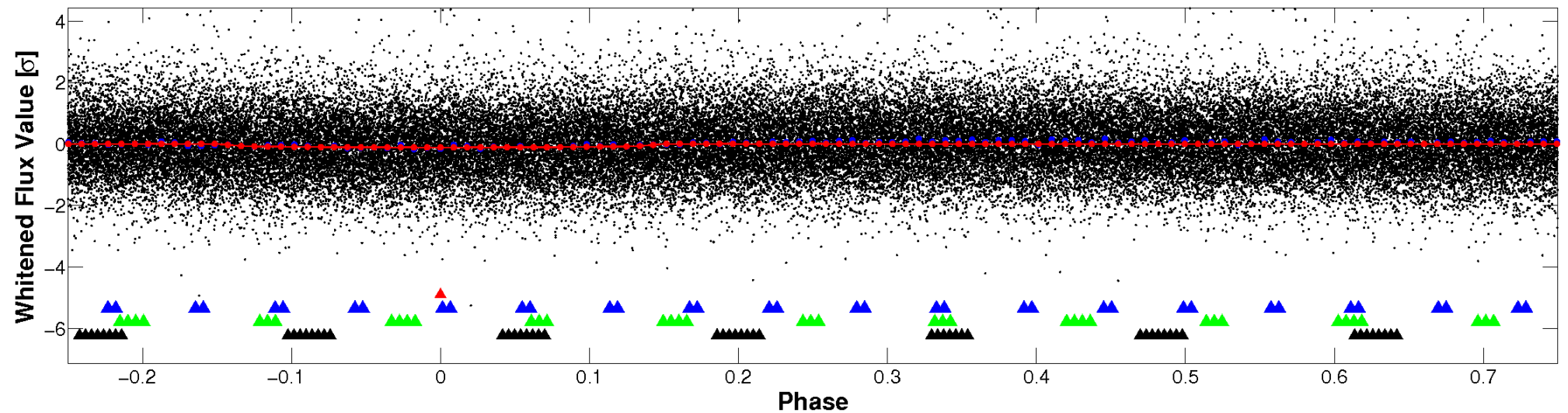


# Non-Whitened Vs. Whitened Light Curve

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



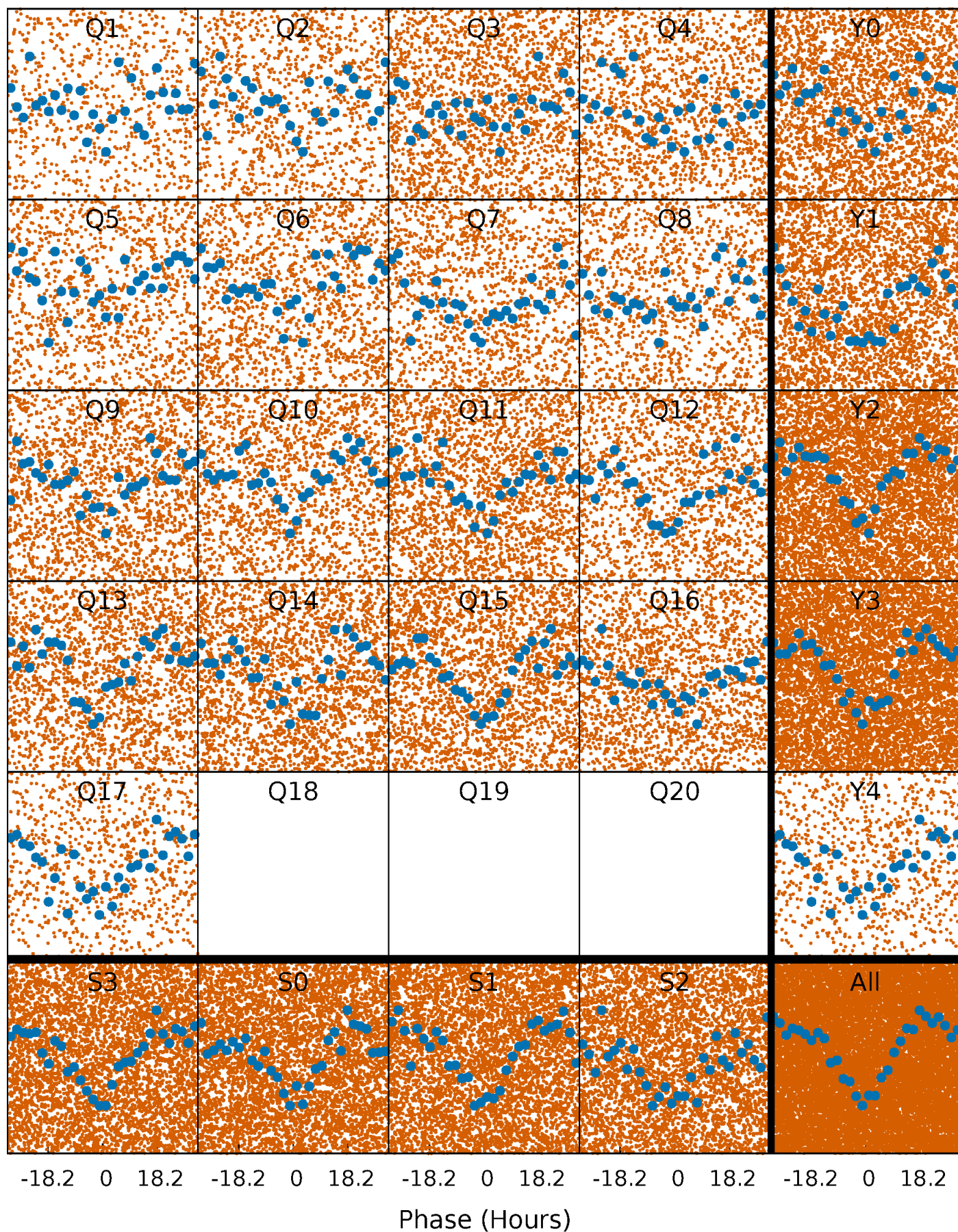
Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)





# PDC Quarter-Phased Transit Curves

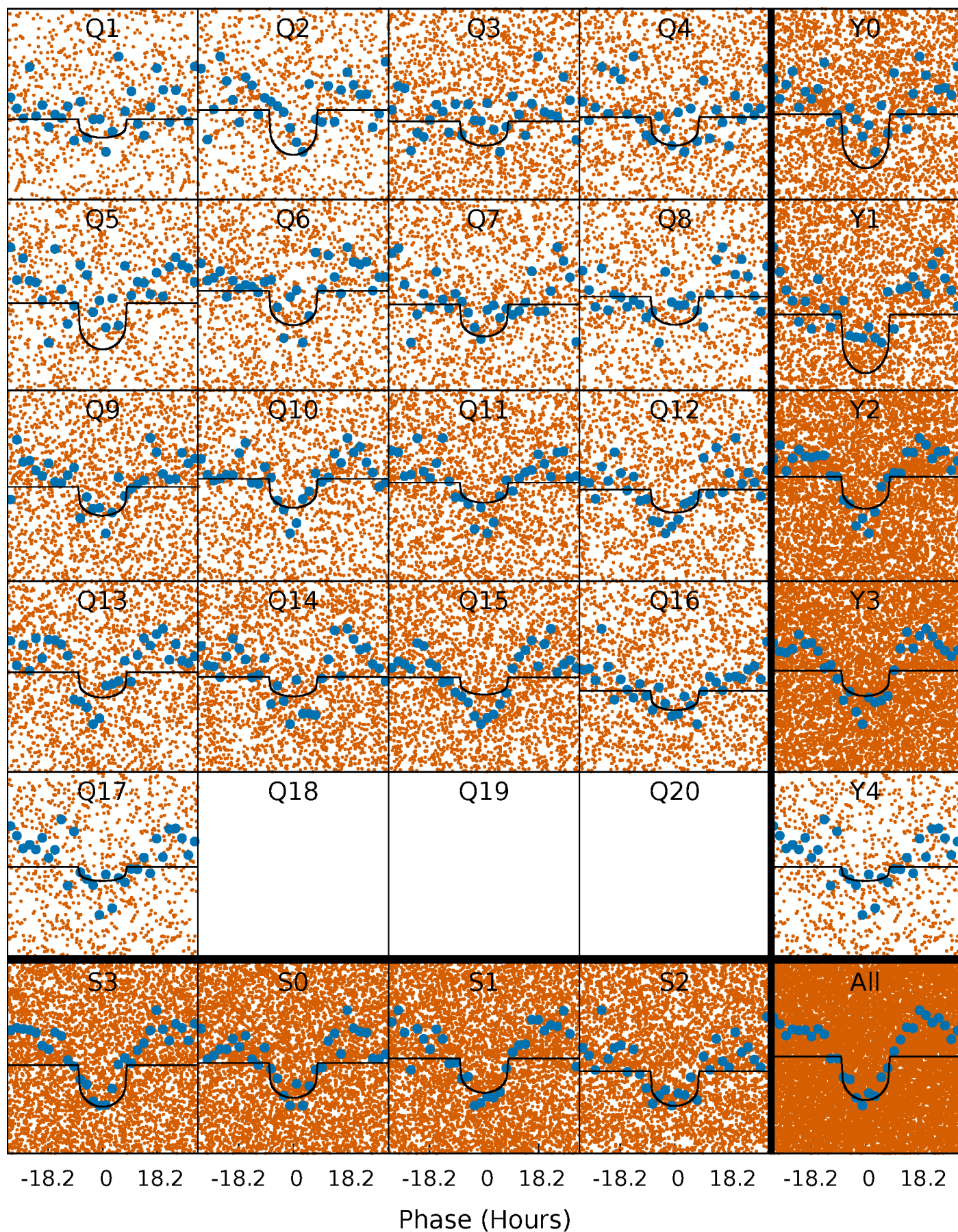
TCE 005001655-01 P= 2.290476 Days  $T_0=133.192958$  (BKJD)





# DV Quarter-Phased Transit Curves

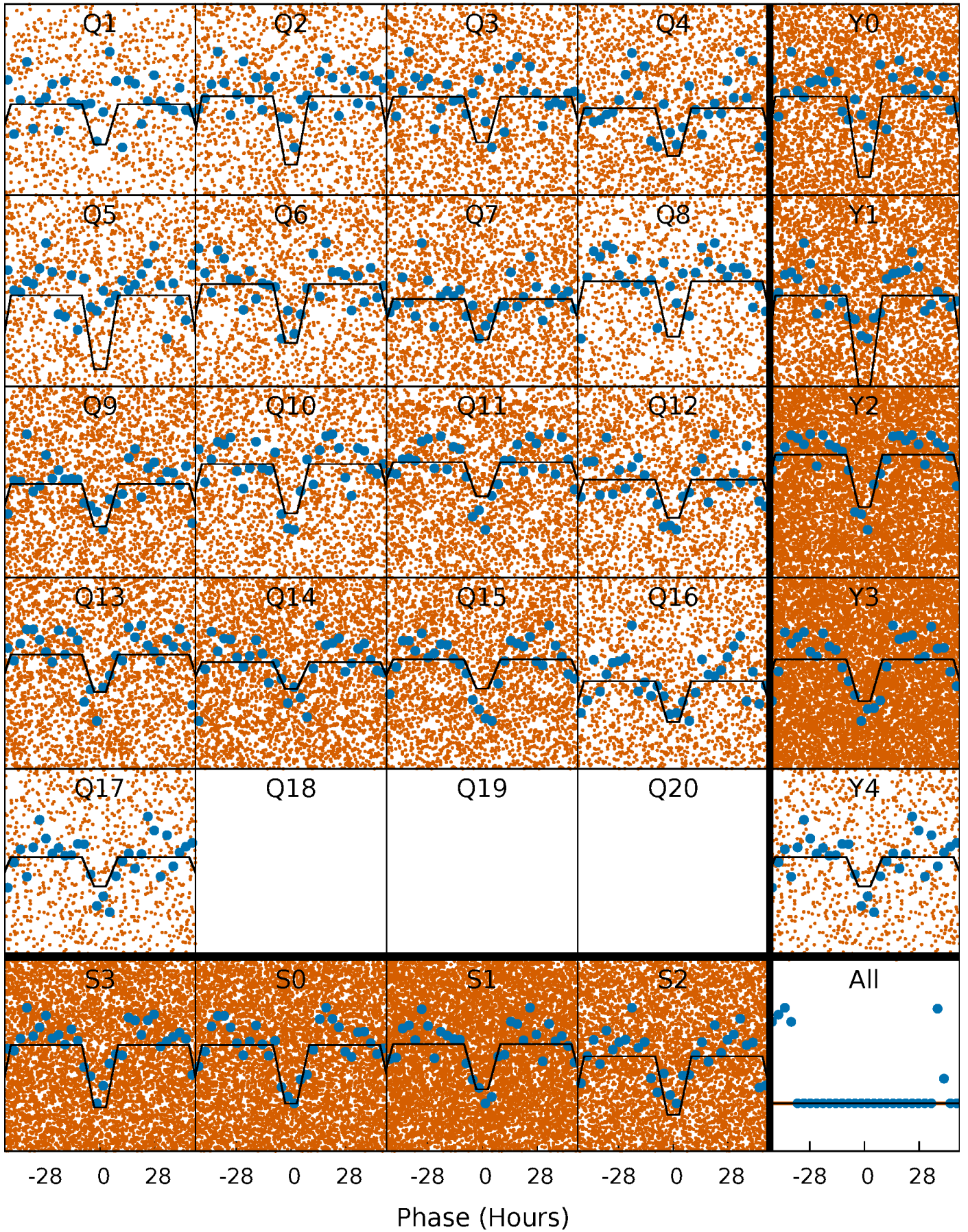
TCE 005001655-01 P= 2.290476 Days  $T_0=133.192958$  (BKJD)





# Alt. Detrend Quarter-Phased Transit Curves

TCE 005001655-01 P= 2.290236 Days  $T_0=133.267989$  (BKJD)

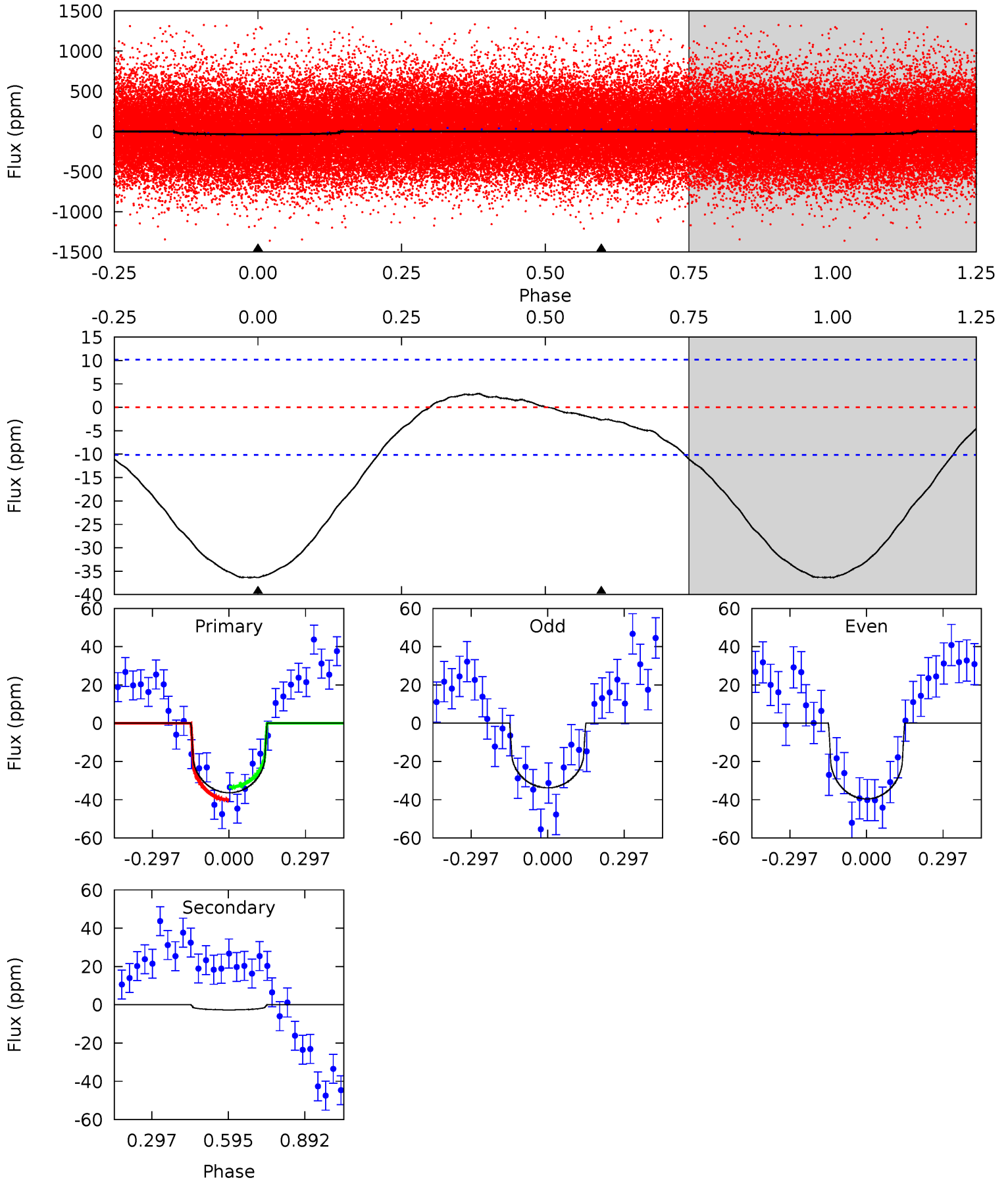




# DV Model-Shift Uniqueness Test

005001655-01, P = 2.290476 Days, E = 130.902482 Days

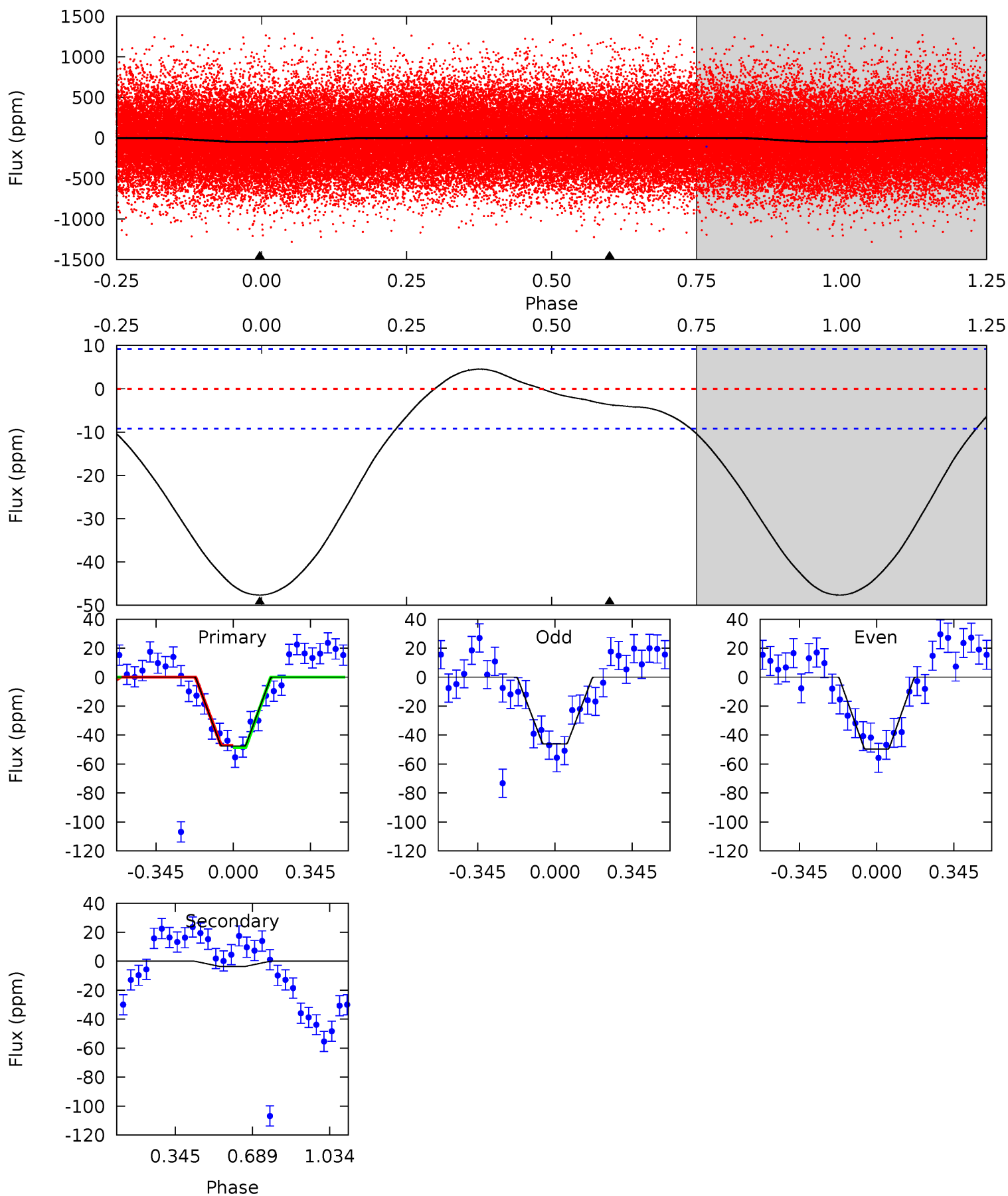
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
15.5	1.14	0	0	4.33	1.04	0.94	15.5	15.5	1.14	1.14	1.25	1.01	0.07	1.42



# Alt Model-Shift Uniqueness Test

005001655-01, P = 2.290236 Days, E = 130.977753 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
22.3	1.71	0	0	4.30	0.94	1.51	22.3	22.3	1.71	1.71	0.83	1.04	0.09	0.41



### Stellar Parameters For KIC 005001655

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5845^{+87}_{-78}$	$3.780^{+0.245}_{-0.105}$	$0.060^{+0.200}_{-0.150}$	$2.479^{+0.403}_{-0.748}$	$1.351^{+0.105}_{-0.244}$	$0.125^{+0.208}_{-0.040}$
	+1%/-1%	+6%/-3%	+333%/-250%	+16%/-30%	+8%/-18%	+167%/-32%
Source	SPE68	SPE68	SPE68	DSEP		

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

### Secondary Eclipse Parameters for KIC 005001655-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-3 \pm 2$	$1.90^{+1.32}_{-1.23}$	$2908^{+145}_{-235}$	$2800^{+1663}_{-5793}$	$0.481^{+3.542}_{-0.437}$
Alt.	$-4 \pm 2$	$1.86^{+1.51}_{-1.12}$	$2900^{+156}_{-225}$	$3073^{+1532}_{-5815}$	$0.651^{+3.513}_{-0.494}$

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



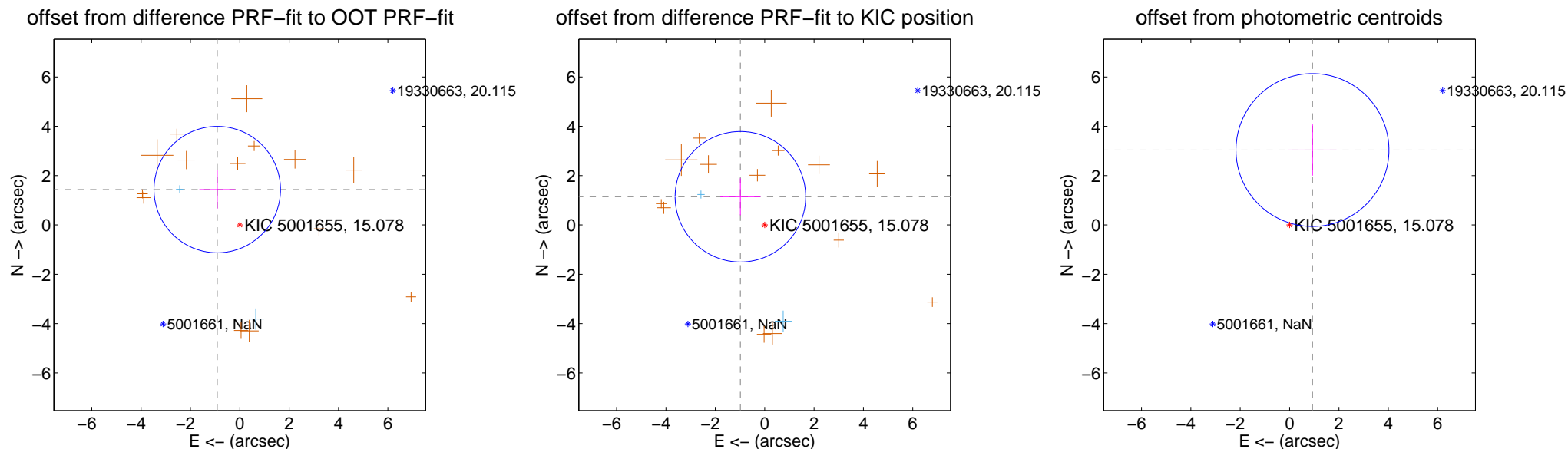
## DV Centroid Data

Supplemental centroid analysis for 005001655-01. Kepler magnitude: 15.08. Transit SNR 12.80

There are 2 quarters with good PRF difference image offsets

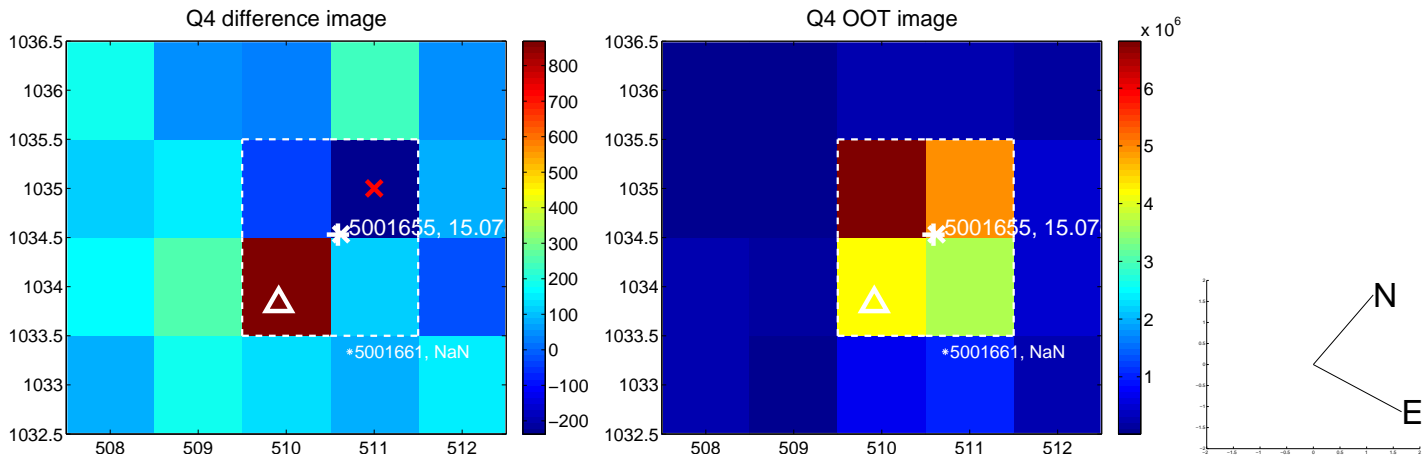
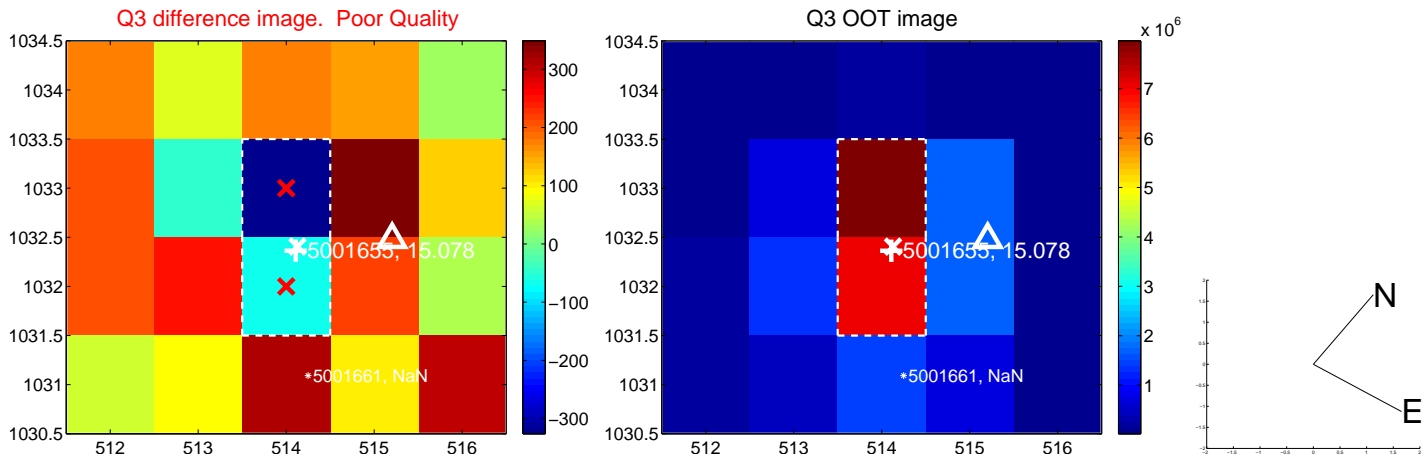
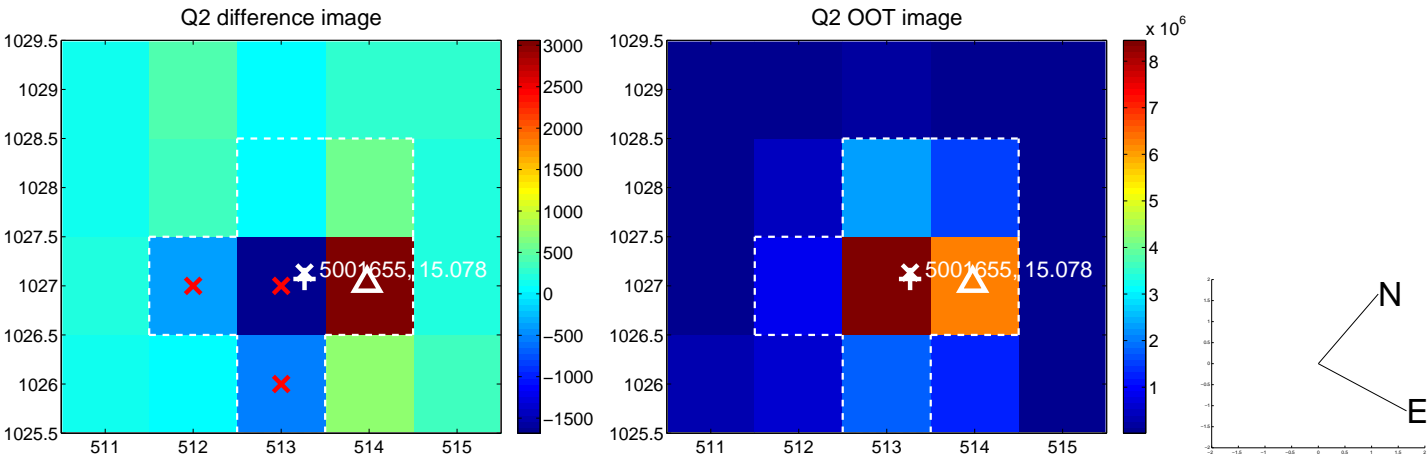
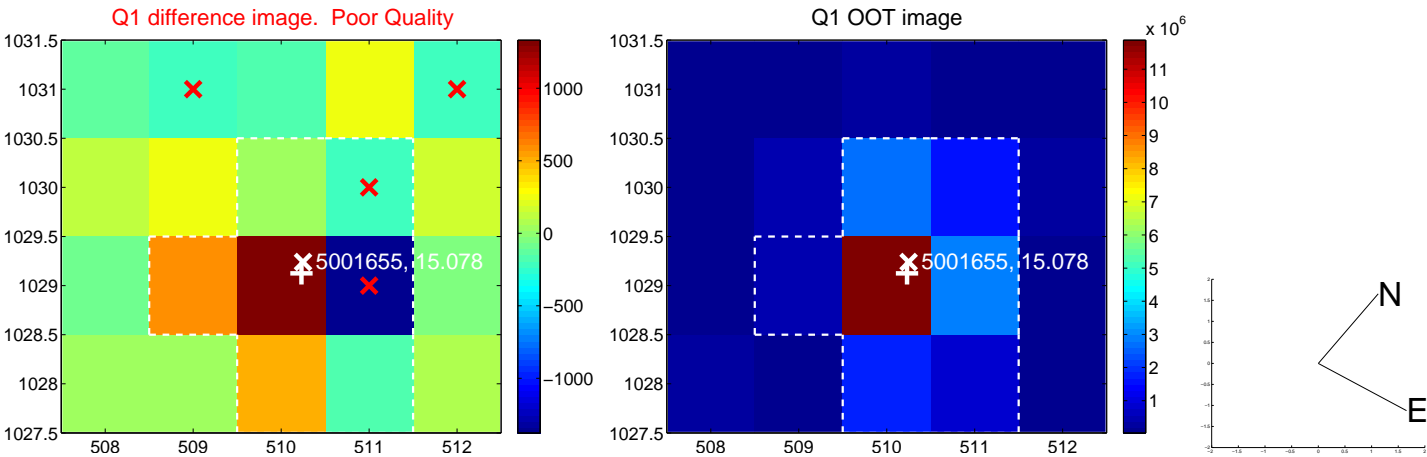
The direct PRF centroid is offset from the target star catalog position by about 0.52 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.702 \pm 0.855$	1.99	$0.914 \pm 0.728$	$1.435 \pm 0.776$
PRF-fit source offset from KIC position	$1.510 \pm 0.882$	1.71	$0.984 \pm 0.815$	$1.145 \pm 0.747$
photometric centroid source offset	$3.18 \pm 1.03$	3.08	$-0.93 \pm 0.99$	$3.04 \pm 1.04$

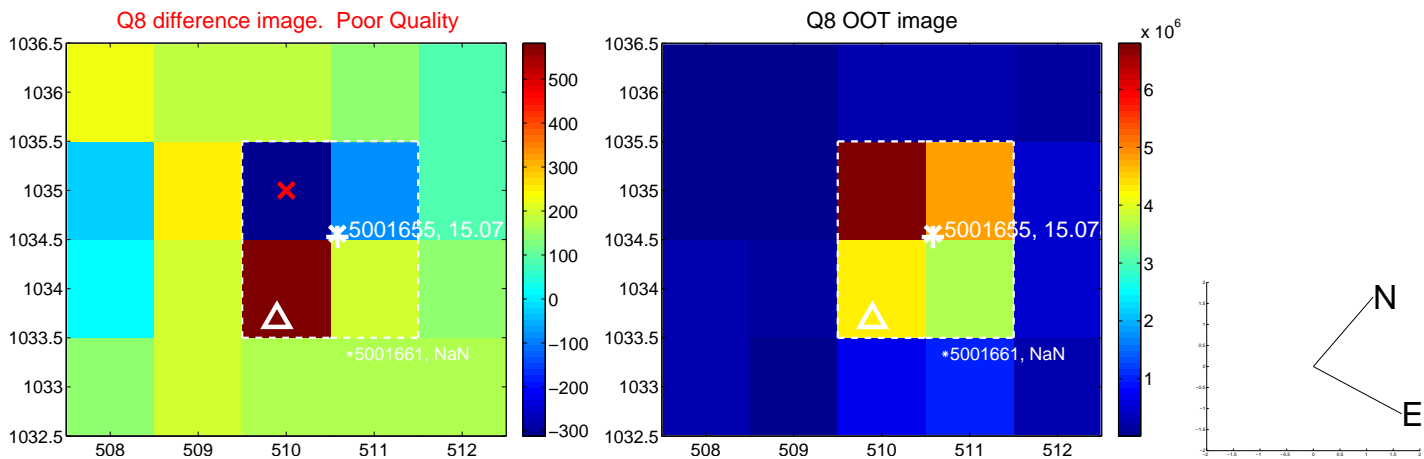
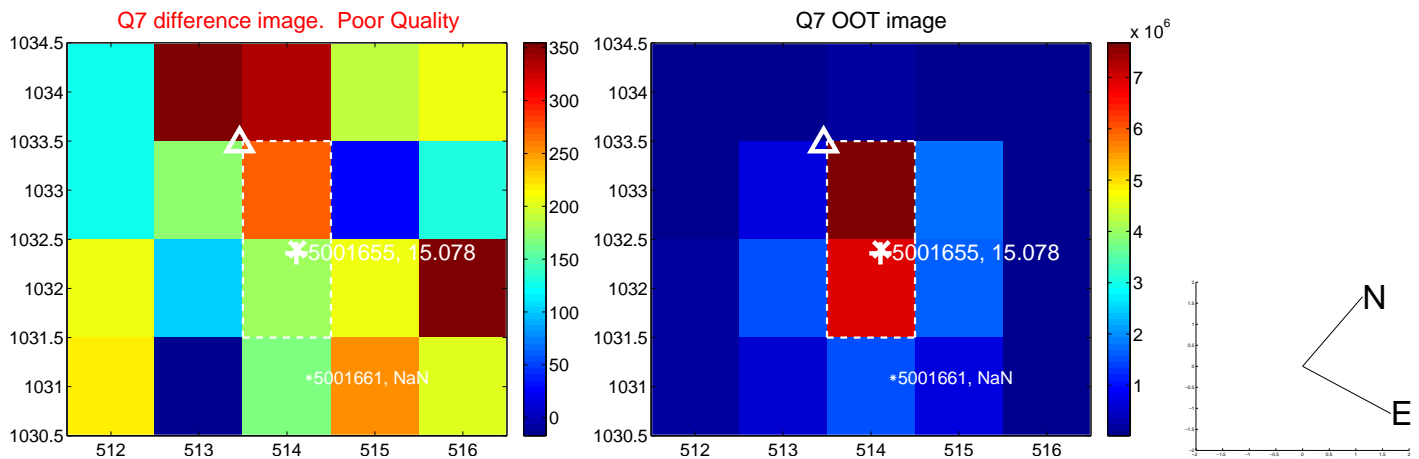
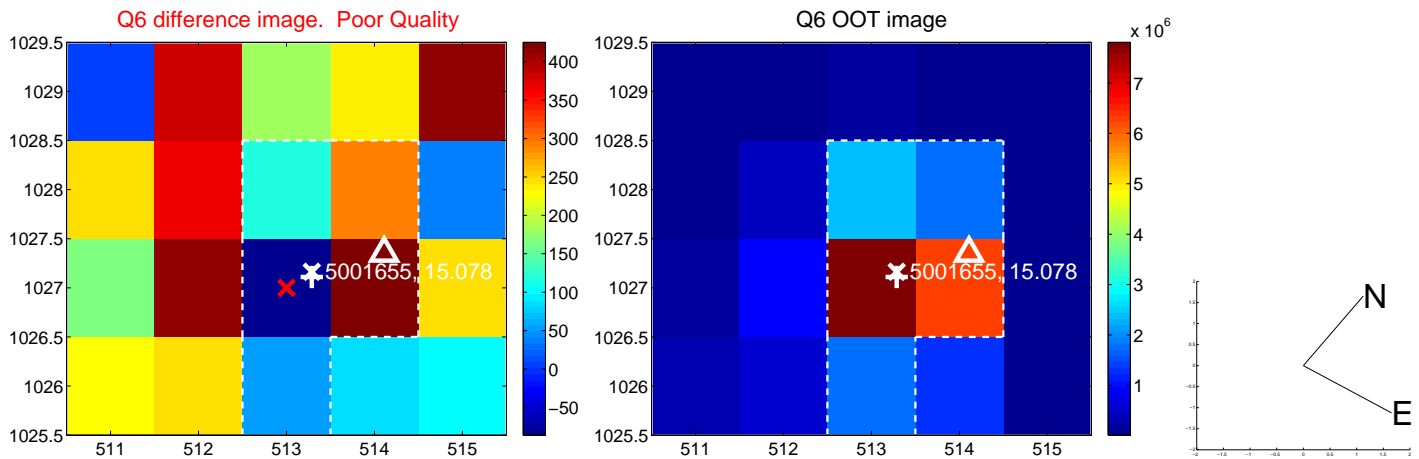
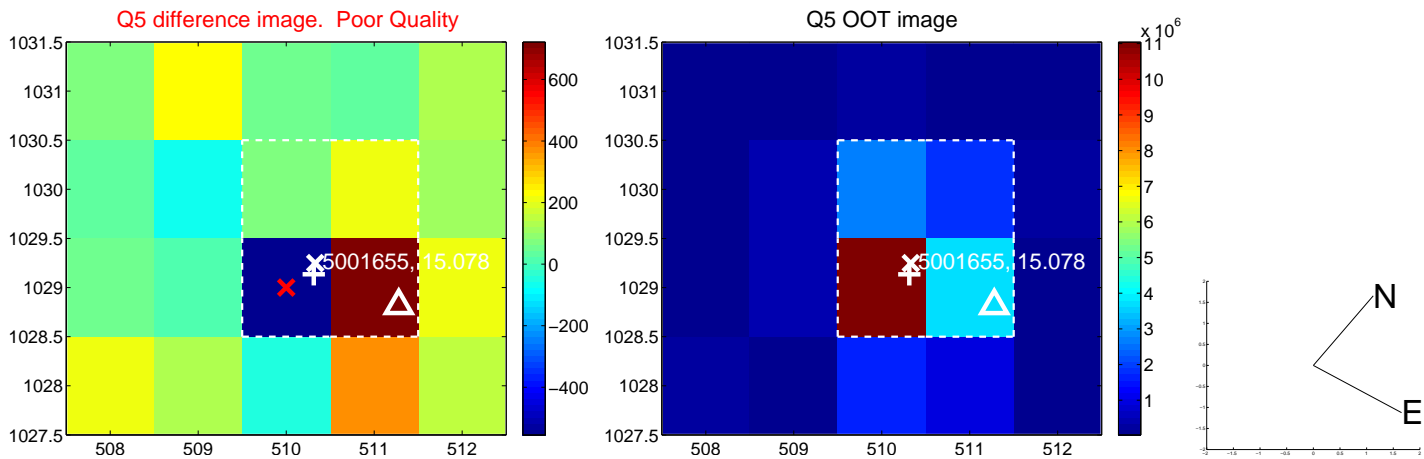


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

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

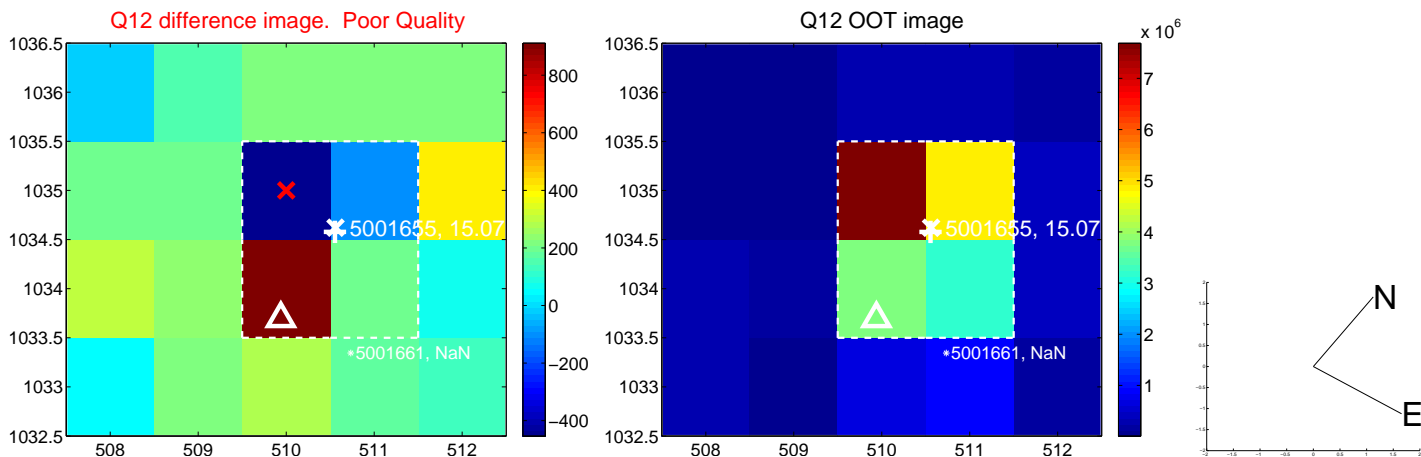
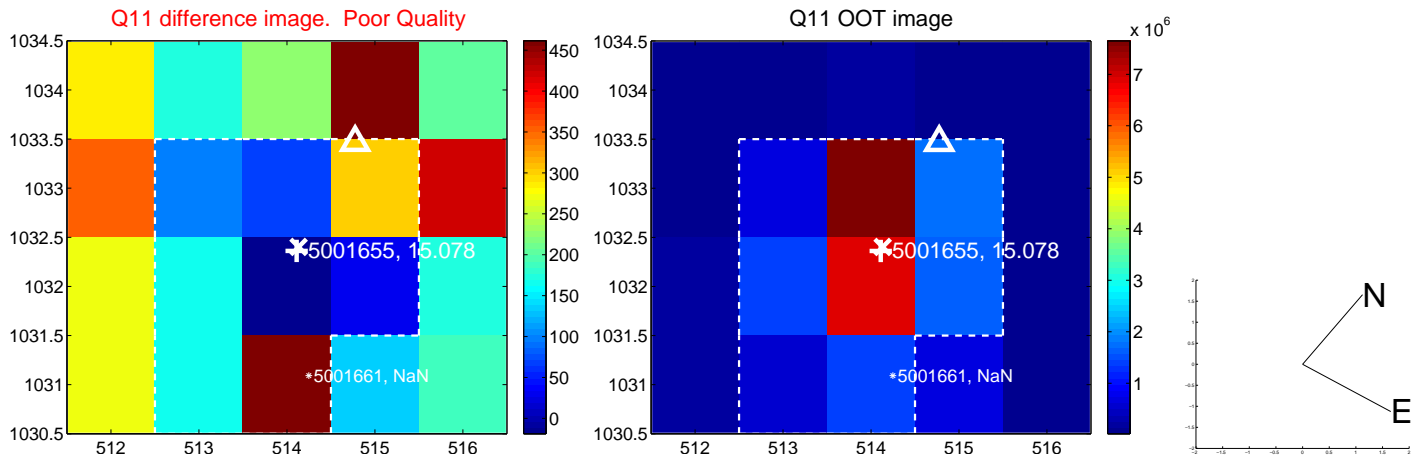
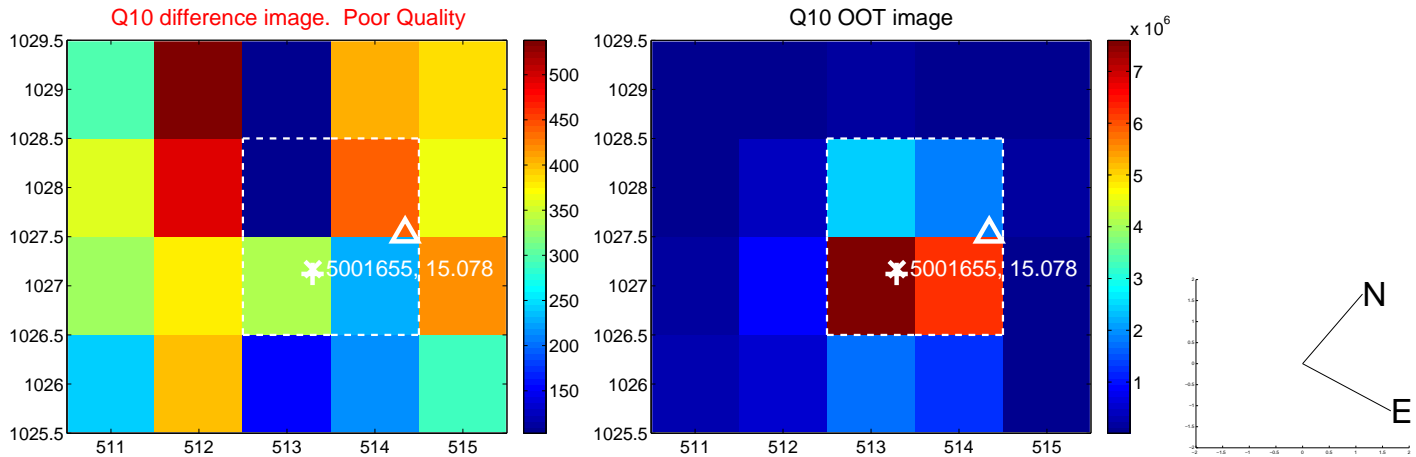
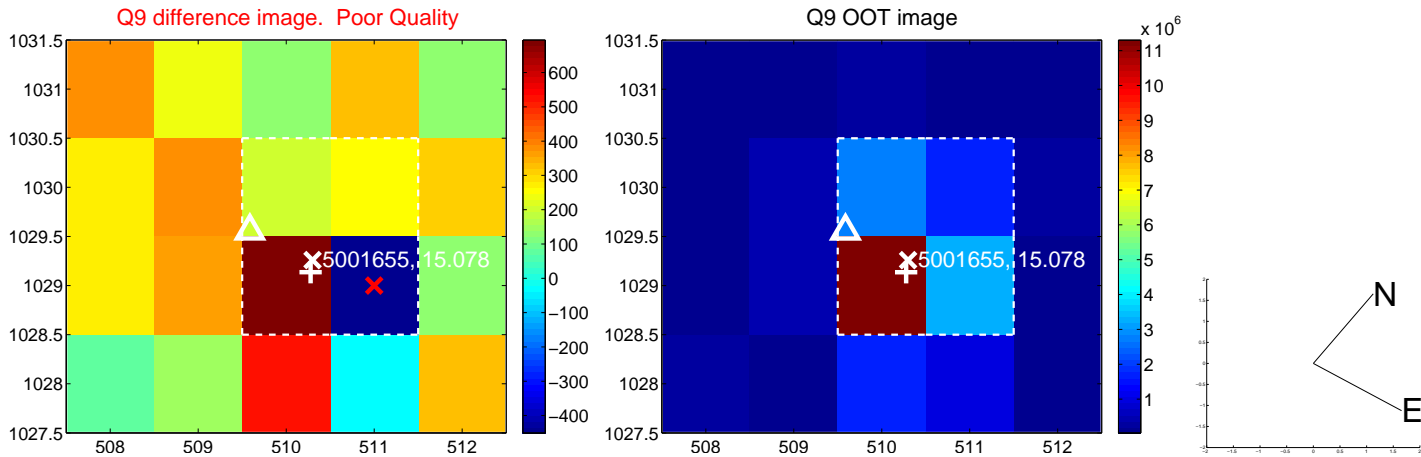


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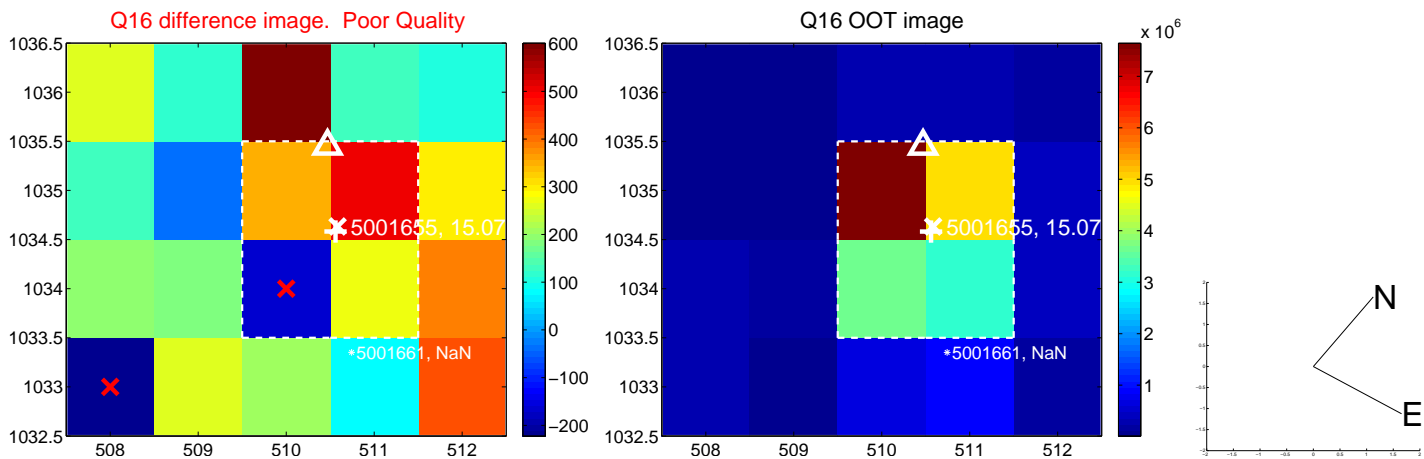
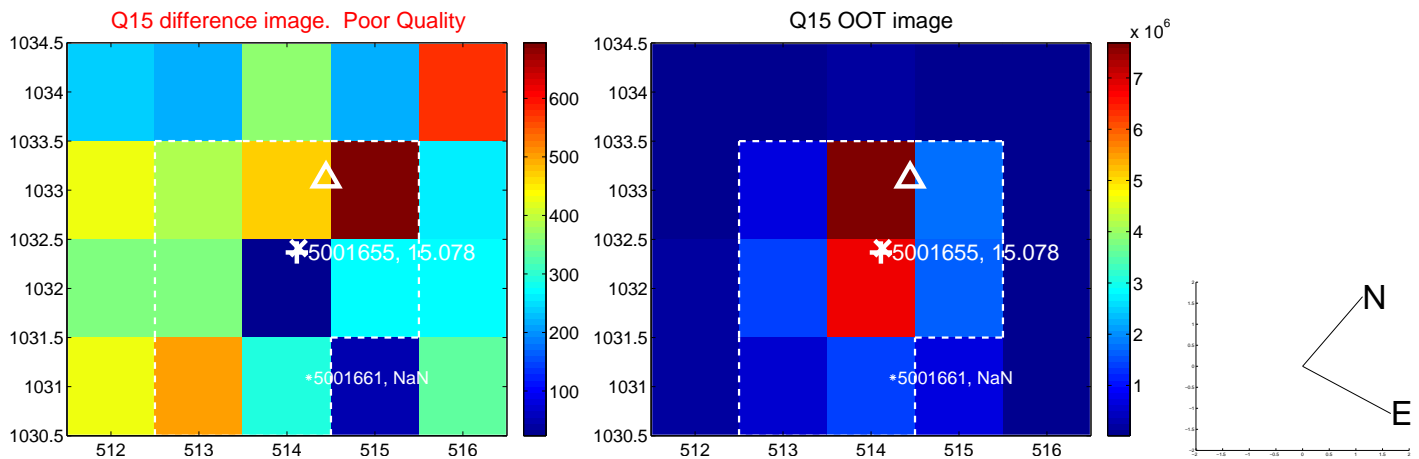
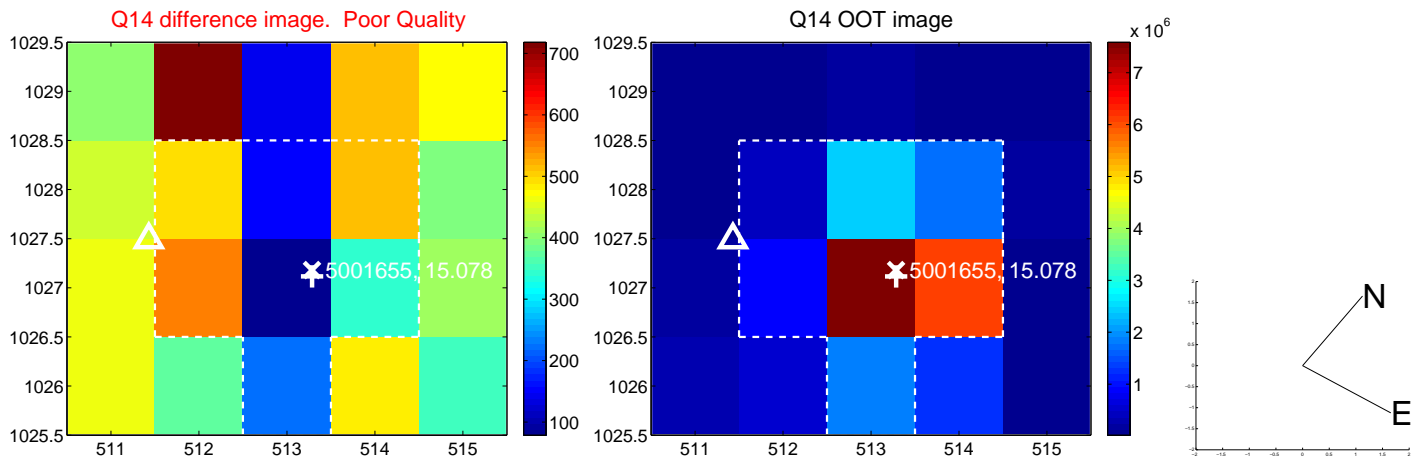
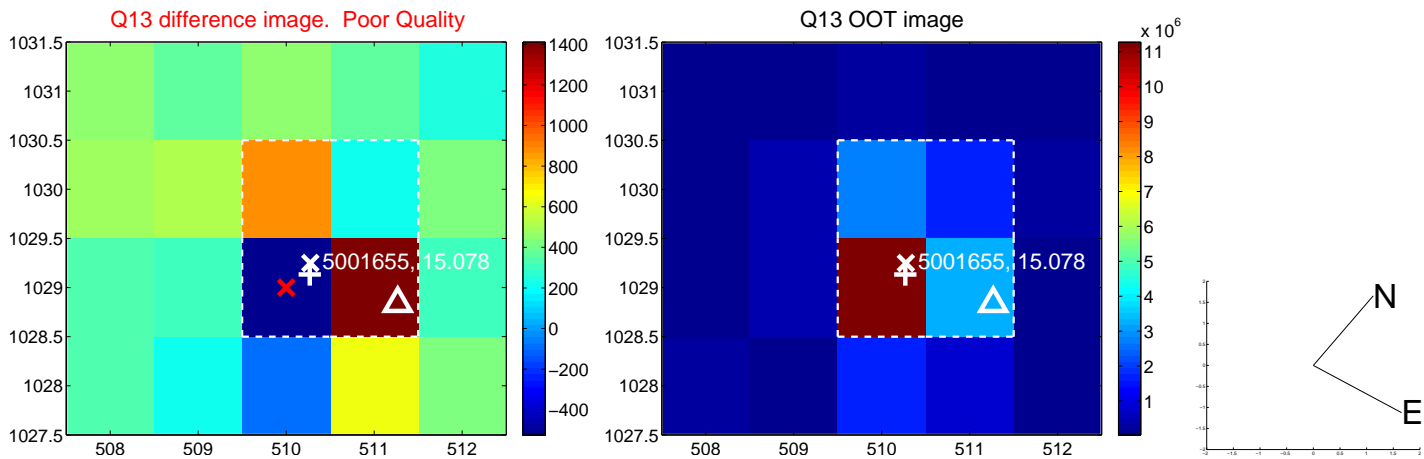




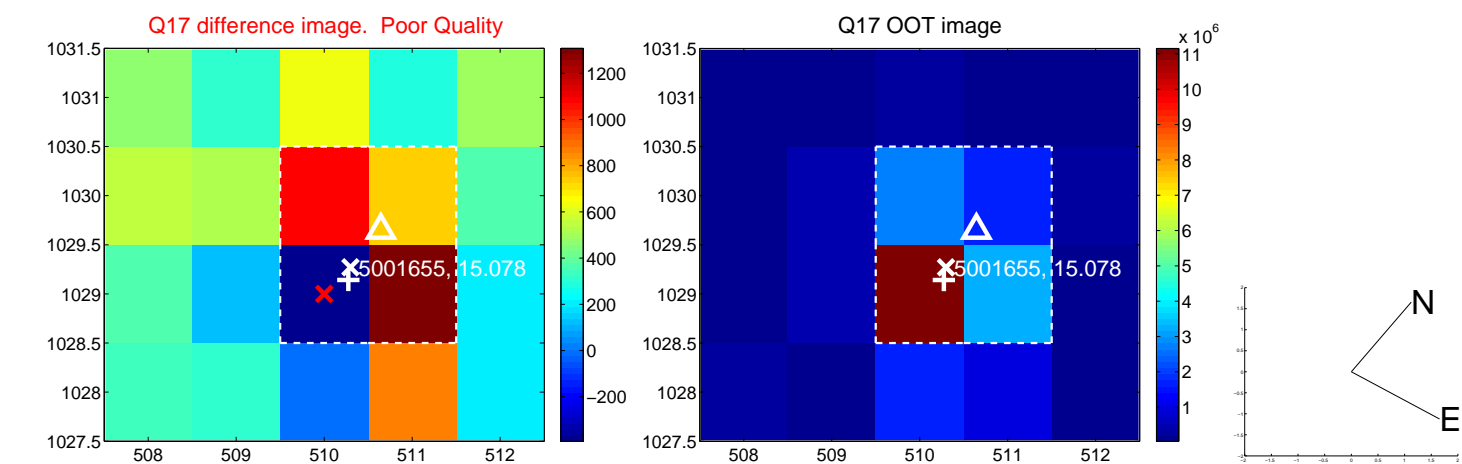
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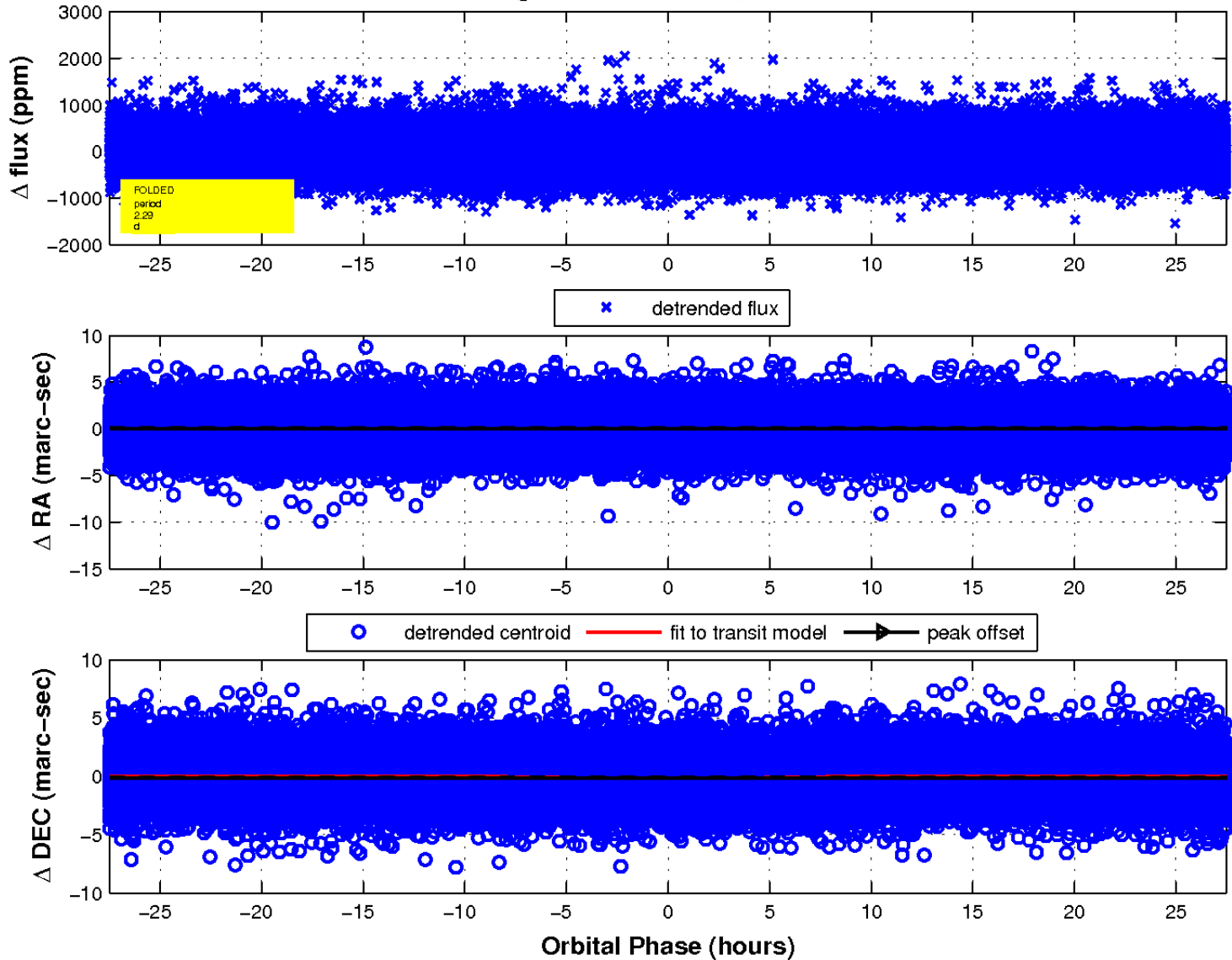
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white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

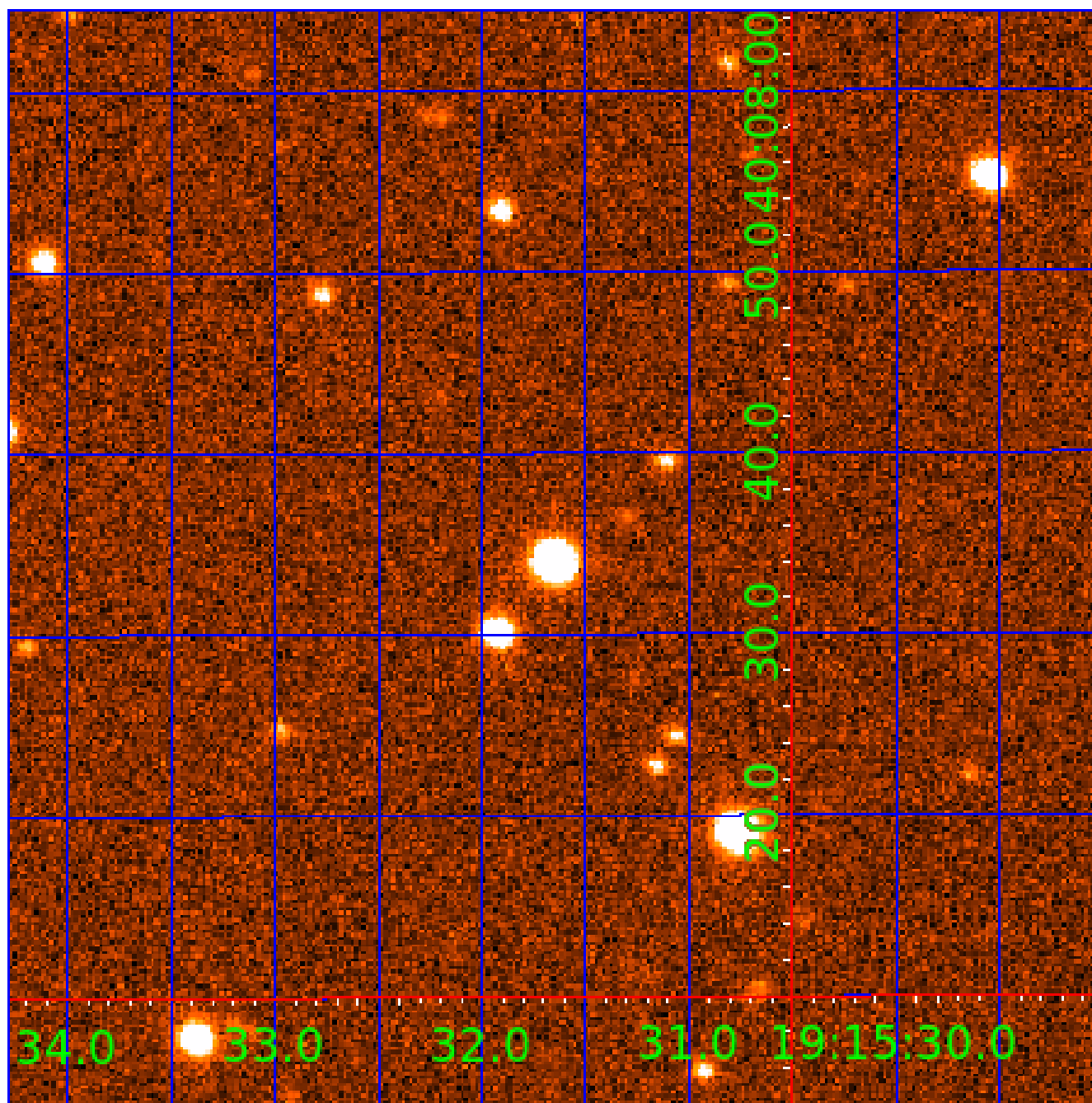


fluxWeightedCentroids, Planet 1 of 4



UKIRT Image

Declination



# KIC 005001655

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005001655-01	OBS	No	2.290476	133.192958	39.0	15.911	9.5	12.8	2.48	5845	1.55	4546.20
005001655-02	OBS	No	40.591664	148.481950	323.5	6.171	9.6	9.8	2.48	5845	4.99	98.39
005001655-03	OBS	No	38.520553	154.185867	509.6	2.225	10.1	8.2	2.48	5845	10.63	105.51
005001655-04	OBS	No	26.505407	151.282364	509.2	1.593	8.2	9.9	2.48	5845	6.61	173.69

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005001655-01	OBS	FP	0.00	1	0	1	0	LPP_DV—CENT_FEW_DIFFS—HALO_GHOST
005001655-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
005001655-03	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
005001655-04	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—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.

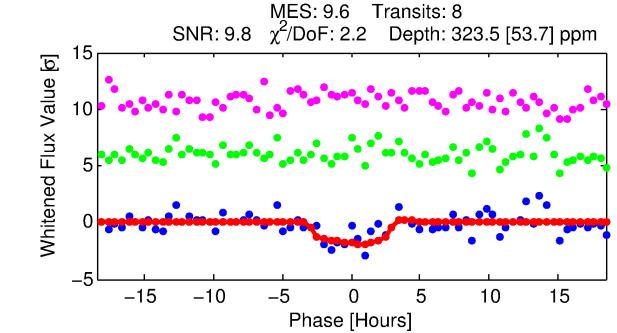
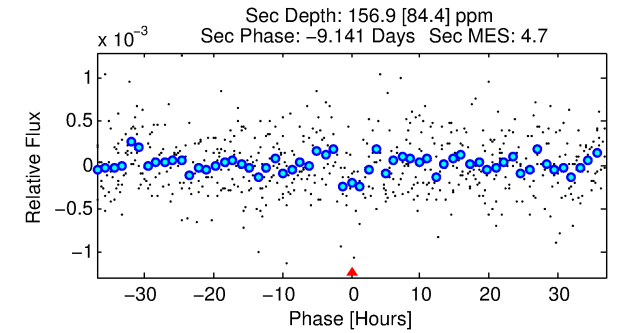
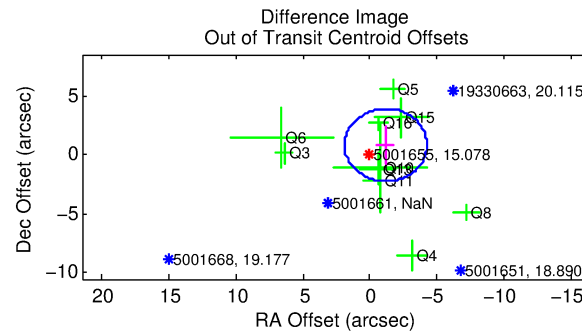
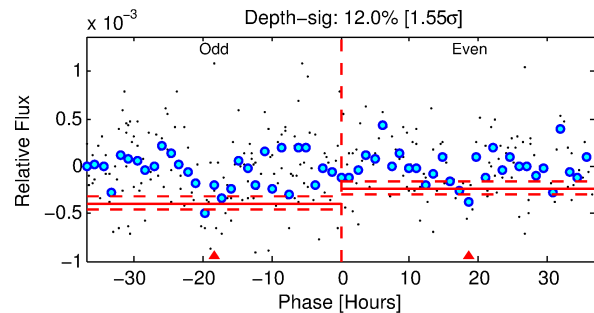
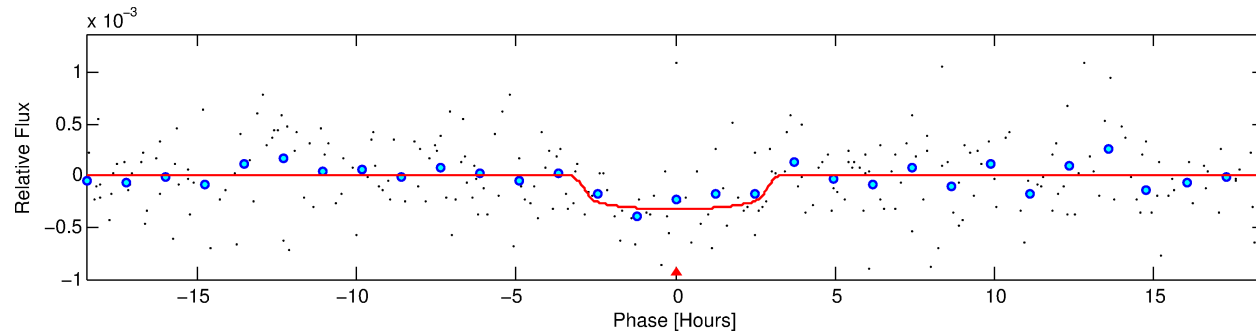
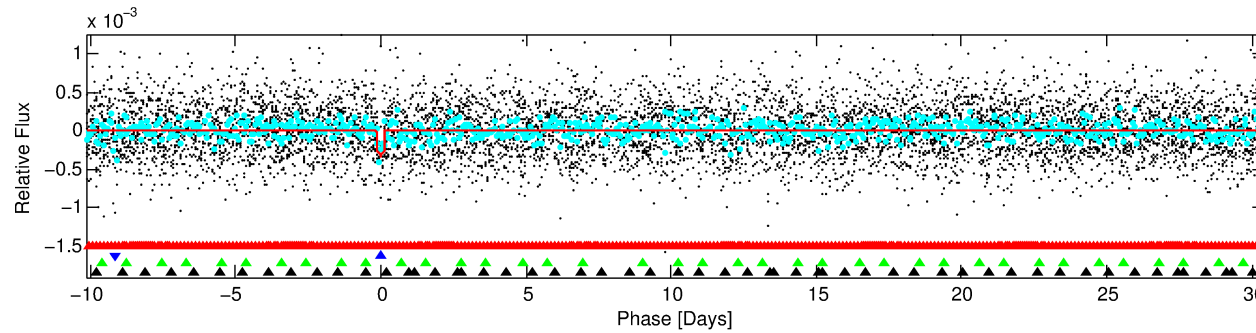
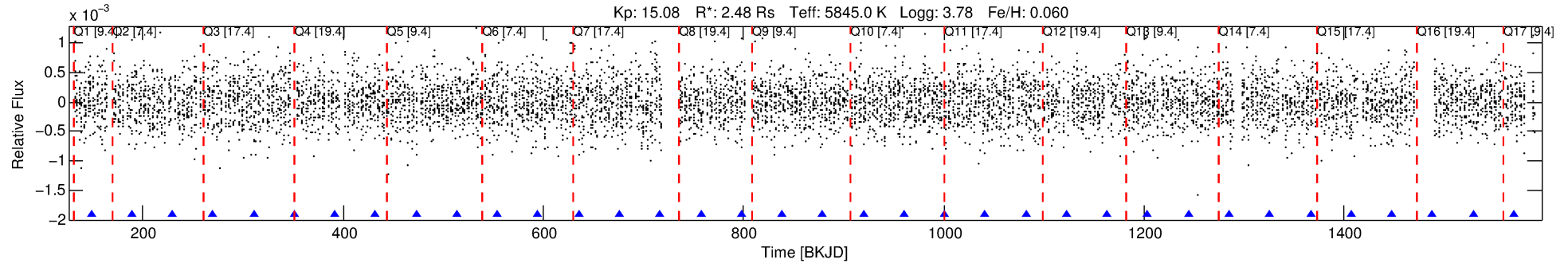
Ephemeris Match Information For 005001655-02

No Significant Match Found



# DV One-Page Summary

KIC: 5001655 Candidate: 2 of 4 Period: 40.592 d



## DV Fit Results:

Period = 40.59166 [0.00115] d  
Epoch = 148.4819 [0.0197] BKJD  
Rp/R\* = 0.0185 [0.0162]  
a/R\* = 30.39 [123.72]  
b = 0.82 [1.65]  
Seff = 98.39 [42.37]  
Teq = 803 [86] K  
Rp = 4.99 [4.64] Re  
a = 0.2556 [0.0704] AU  
Ag = 226.01 [426.39] [0.53 $\sigma$ ]  
Teffp = 4814 [2213] K [1.81 $\sigma$ ]

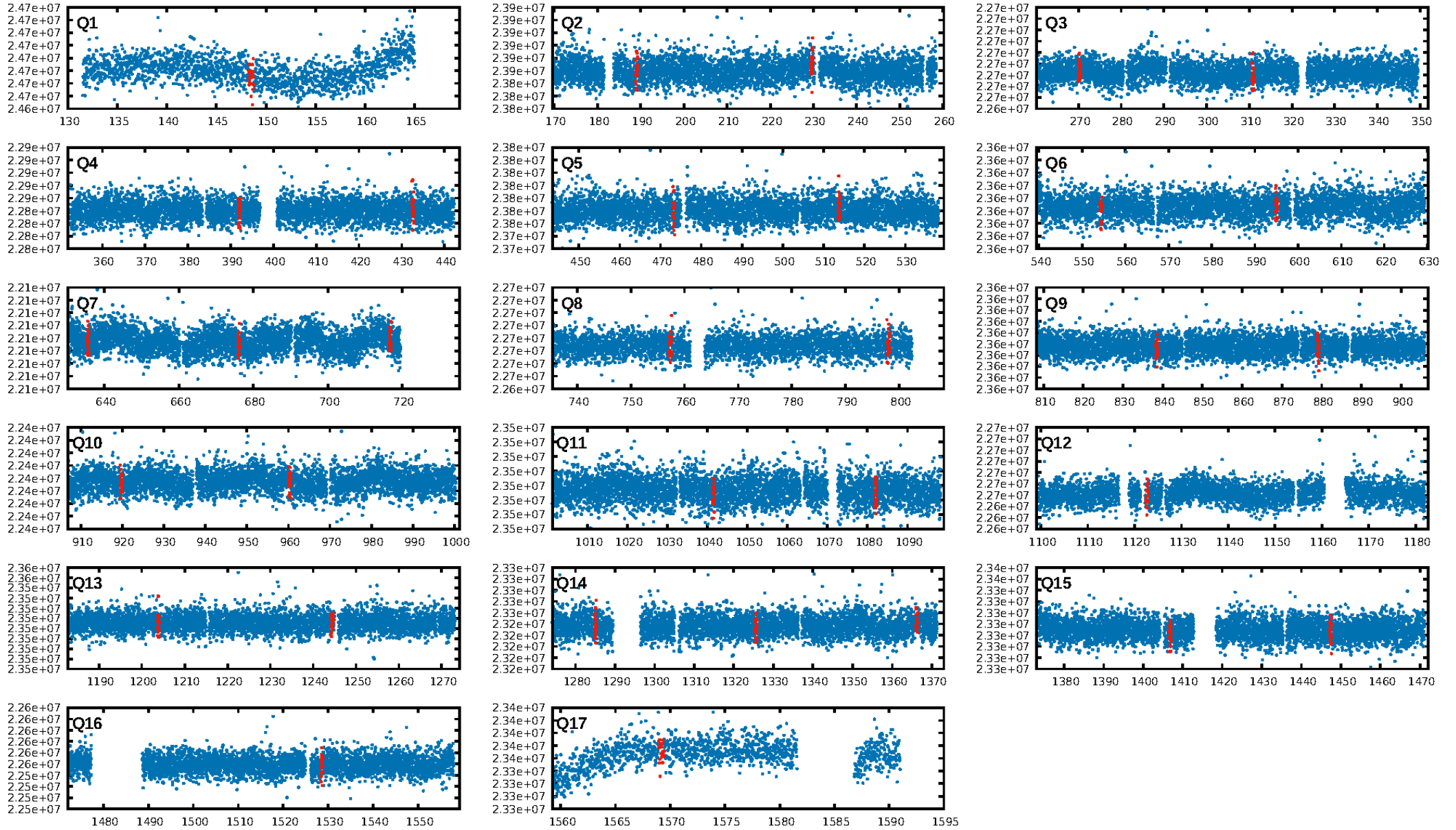
## DV Diagnostic Results:

ShortPeriod-sig: 100.0% [7.58 $\sigma$ ]  
LongPeriod-sig: N/A  
ModelChiSquare2-sig: 18.6%  
ModelChiSquareGof-sig: 100.0%  
**Bootstrap-pfa: 3.44e-09**  
RollingBand-fgt: 1.00 [8/8]  
GhostDiagnostic-chr: -0.5166  
Centroid-sig: 35.1%  
Centroid-so: 0.891 arcsec [1.11 $\sigma$ ]  
OotOffset-rm: 1.438 arcsec [1.40 $\sigma$ ]  
KicOffset-rm: 1.224 arcsec [1.13 $\sigma$ ]  
OotOffset-st: 2/3/3/2 [10]  
KicOffset-st: 2/3/3/2 [10]  
DiffImageQuality-fgm: 0.10 [1/10]  
DiffImageOverlap-fno: 0.35 [6/17]

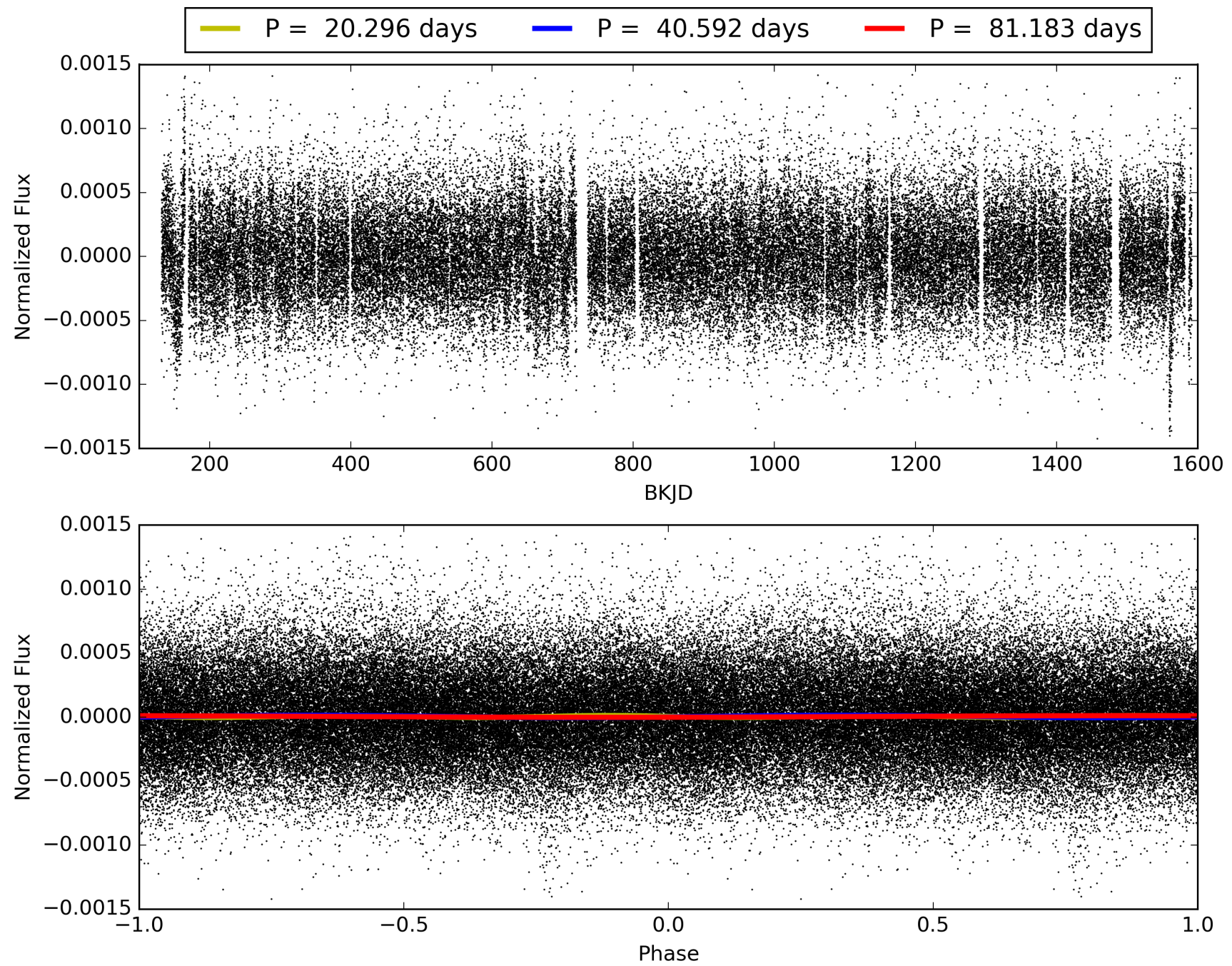
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 07:06:31 Z

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

# TCE 005001655-02, PDC Light Curves

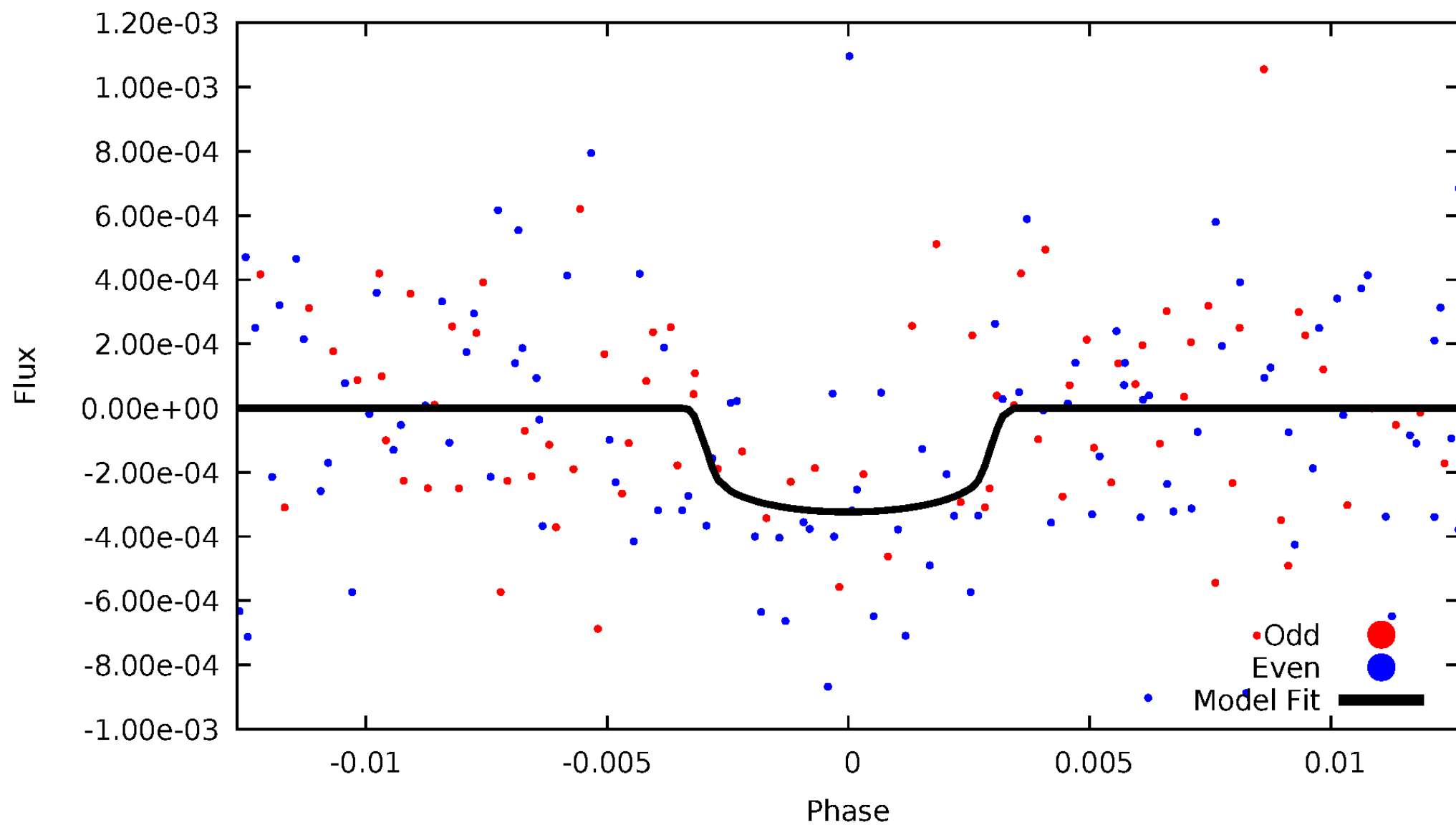


TCE 005001655-02



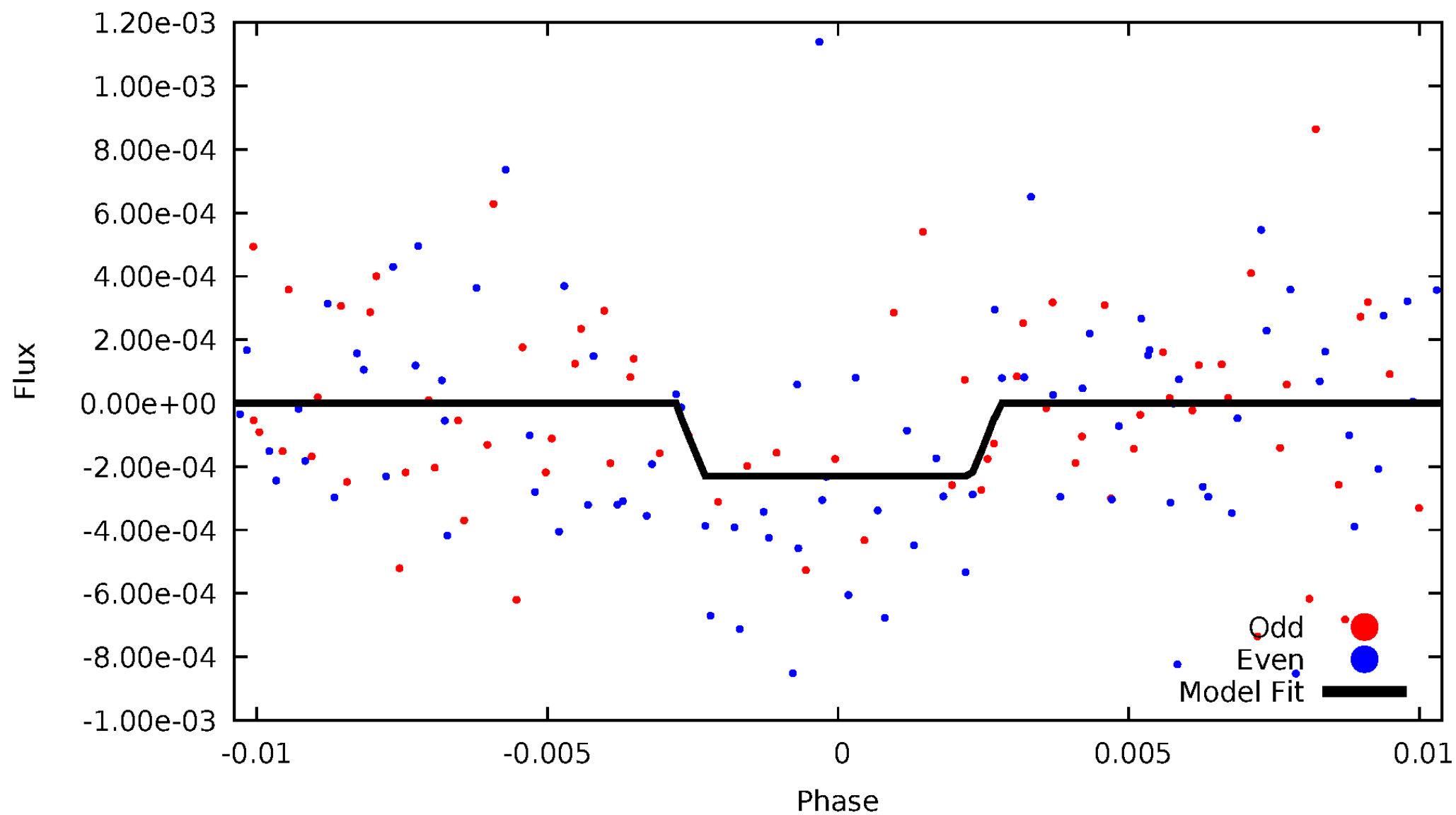
# DV Odd/Even

TCE 005001655-02



# ALT Odd/Even

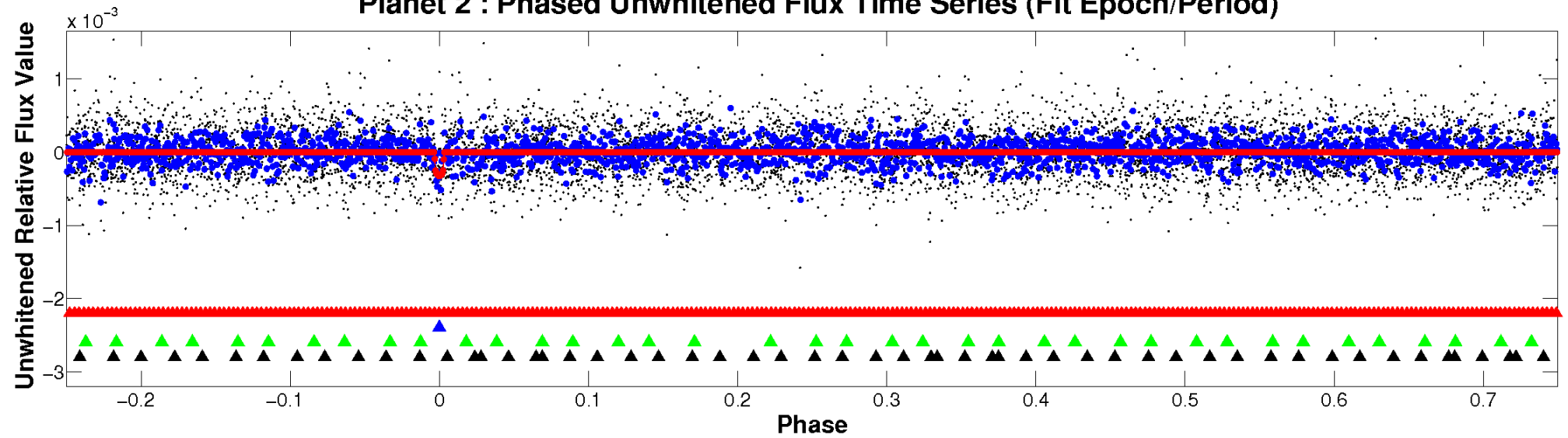
TCE 005001655-02



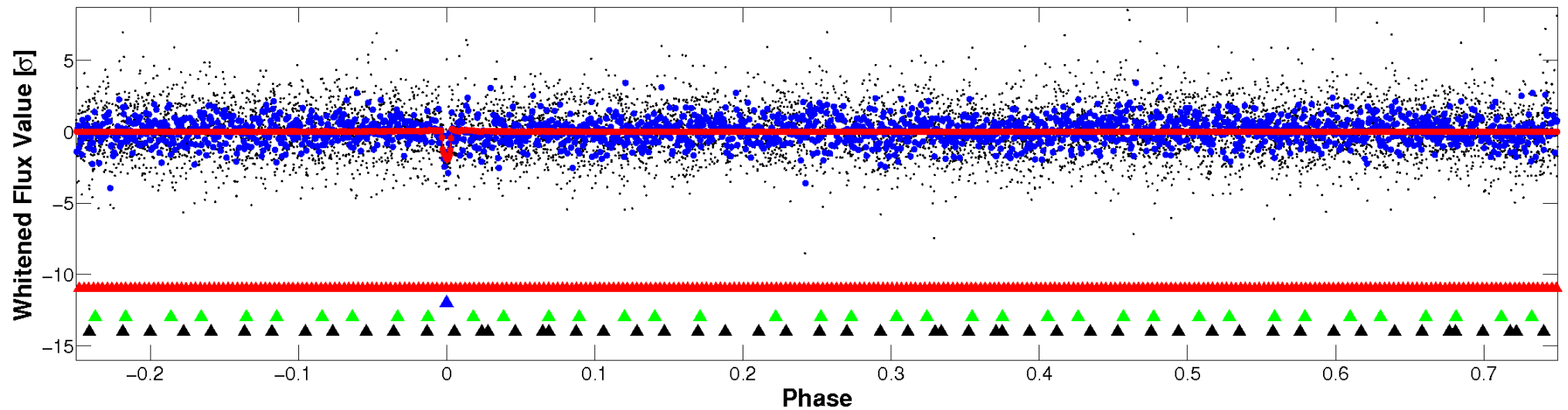


# Non-Whitened Vs. Whitened Light Curve

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

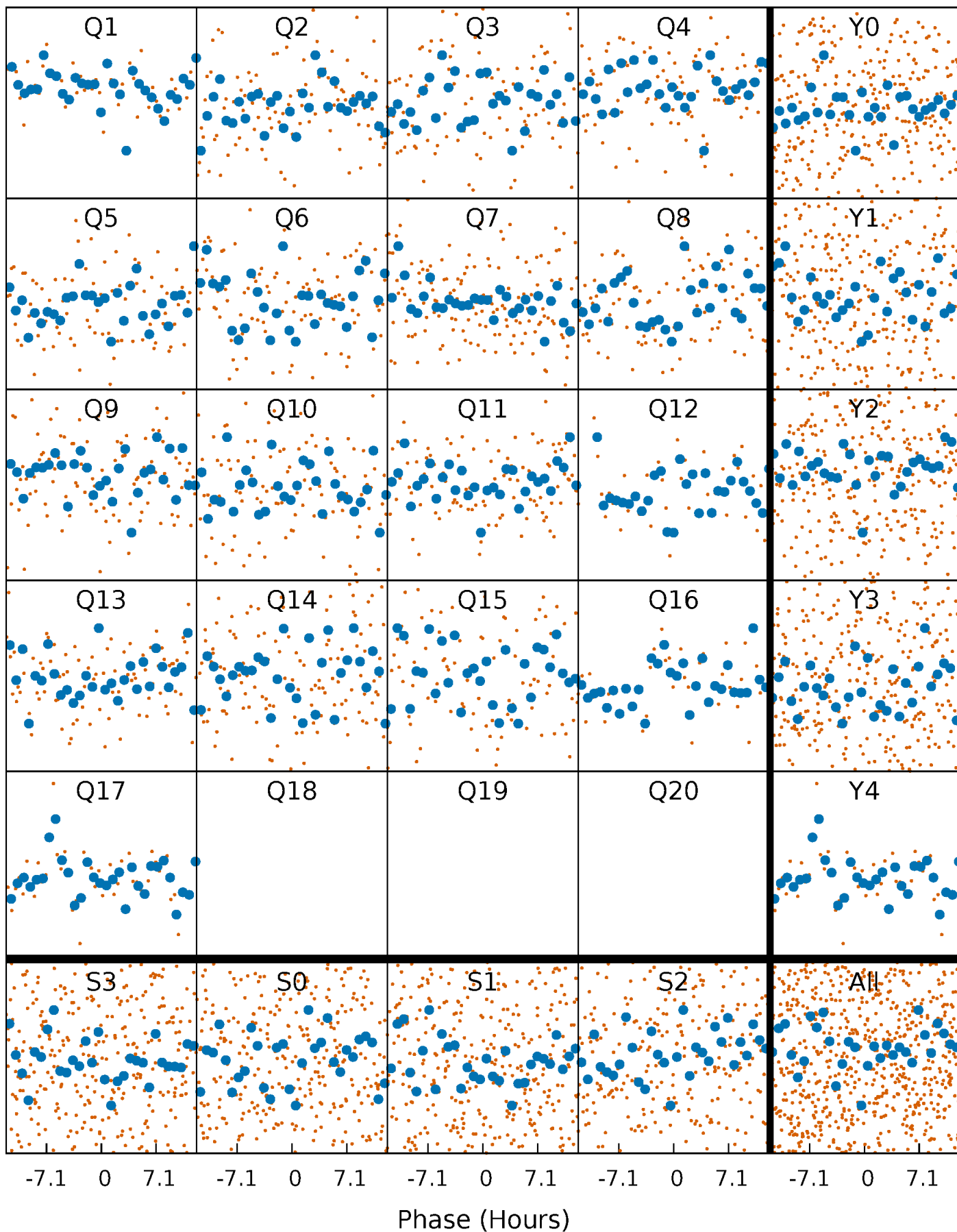


## Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



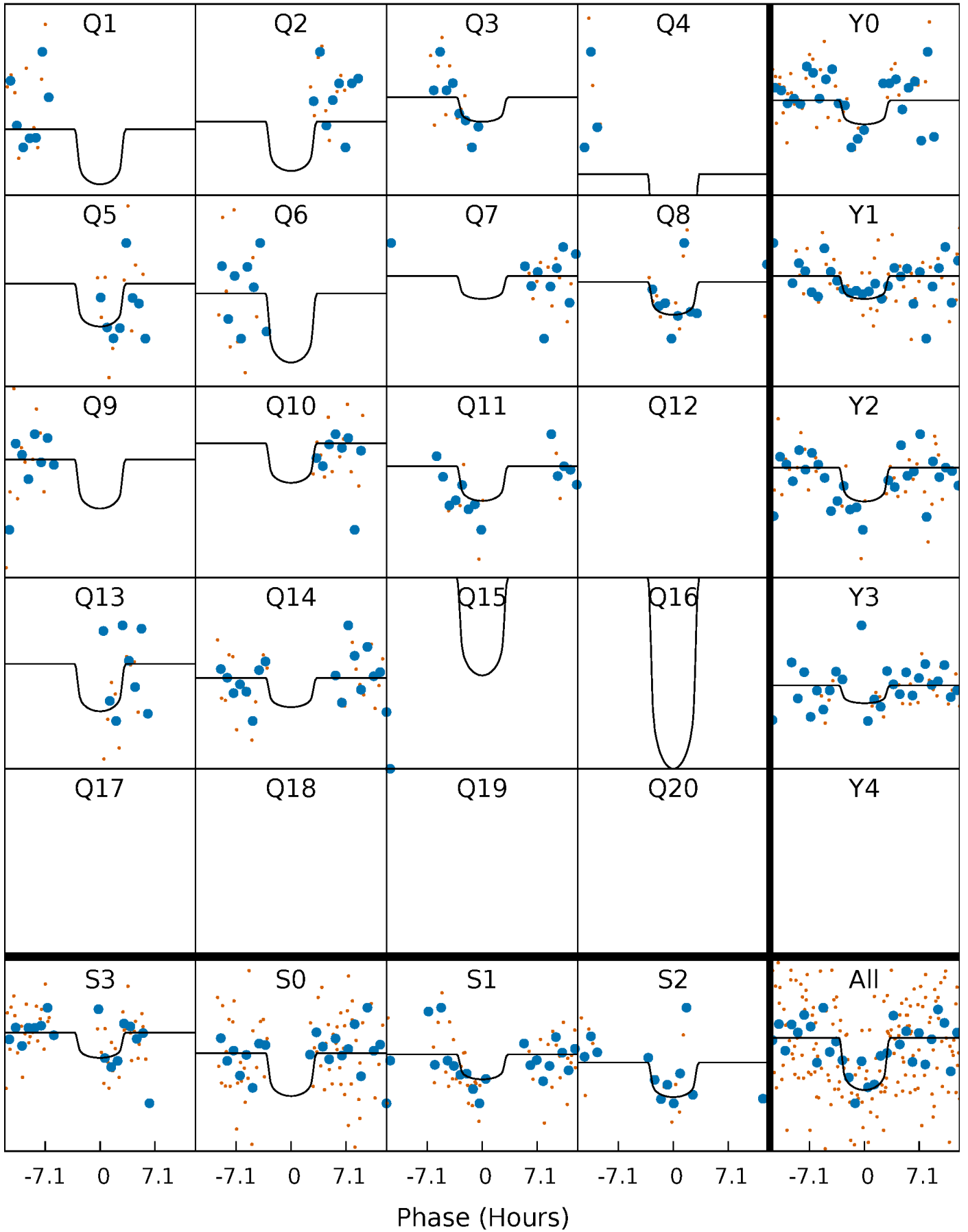
# PDC Quarter-Phased Transit Curves

TCE 005001655-02 P= 40.591664 Days  $T_0=148.481950$  (BKJD)



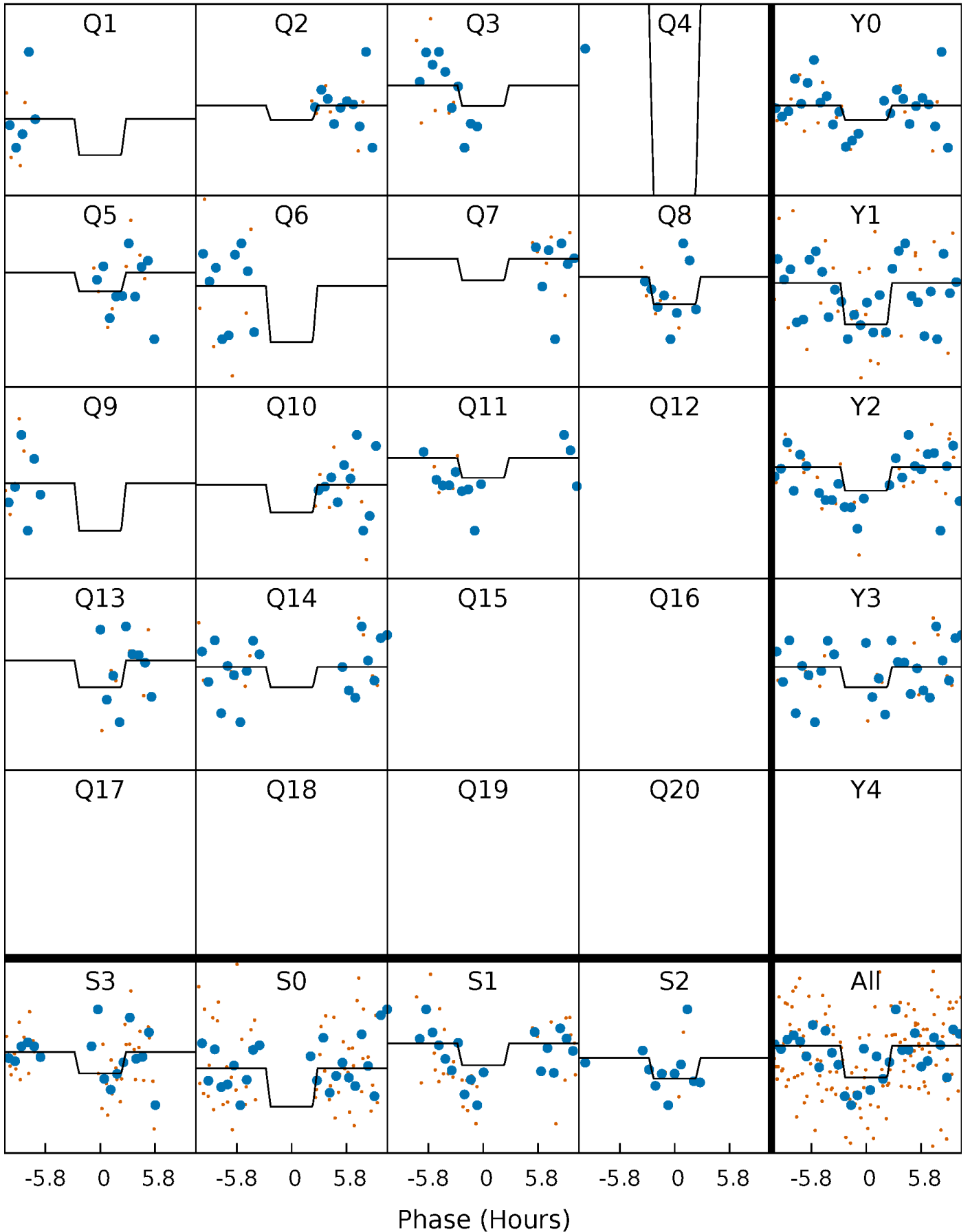
# DV Quarter-Phased Transit Curves

TCE 005001655-02   P= 40.591664 Days    $T_0=148.481950$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 005001655-02   P= 40.591584 Days    $T_0=148.497976$  (BKJD)

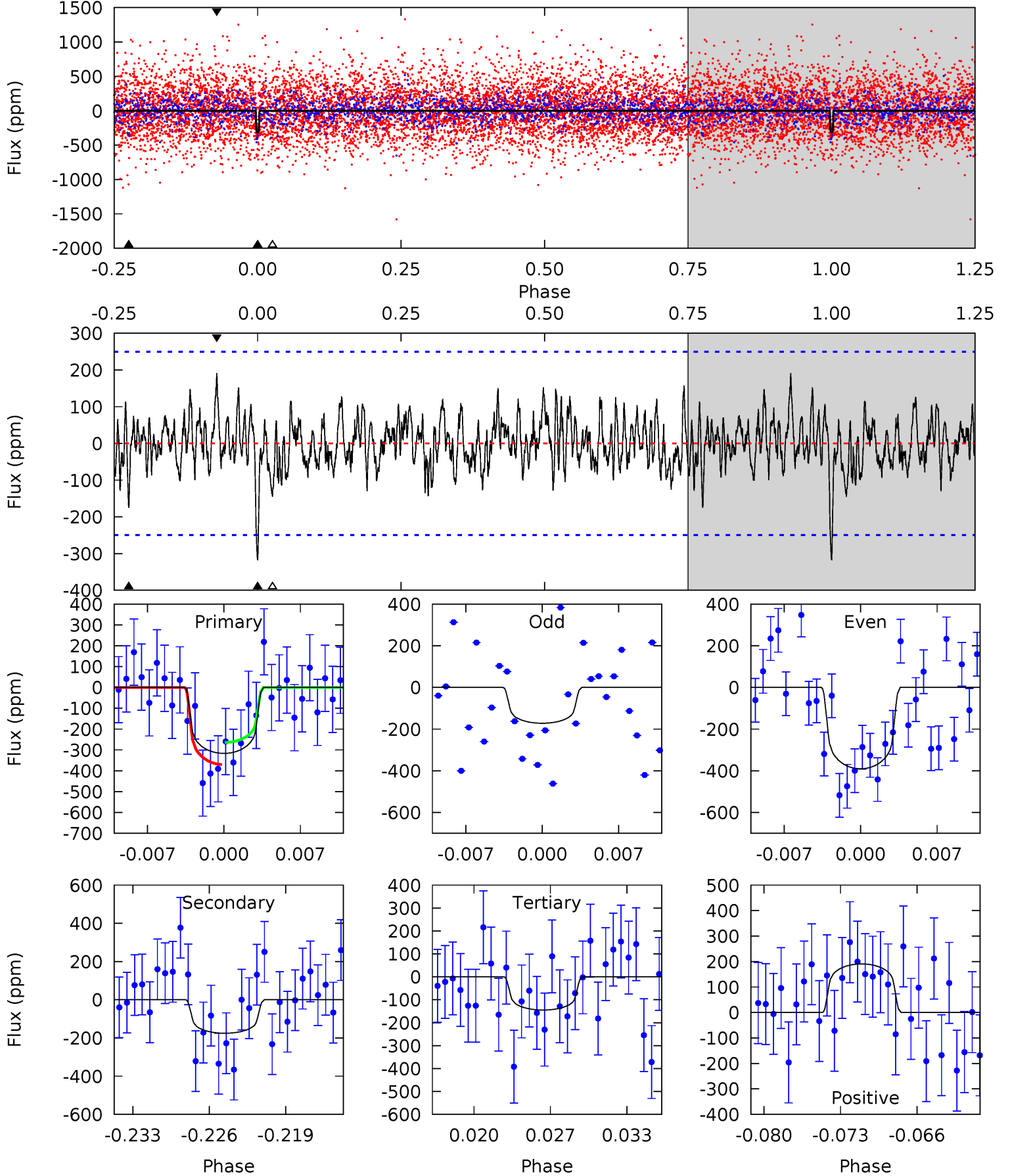




# DV Model-Shift Uniqueness Test

005001655-02, P = 40.591664 Days, E = 107.890286 Days

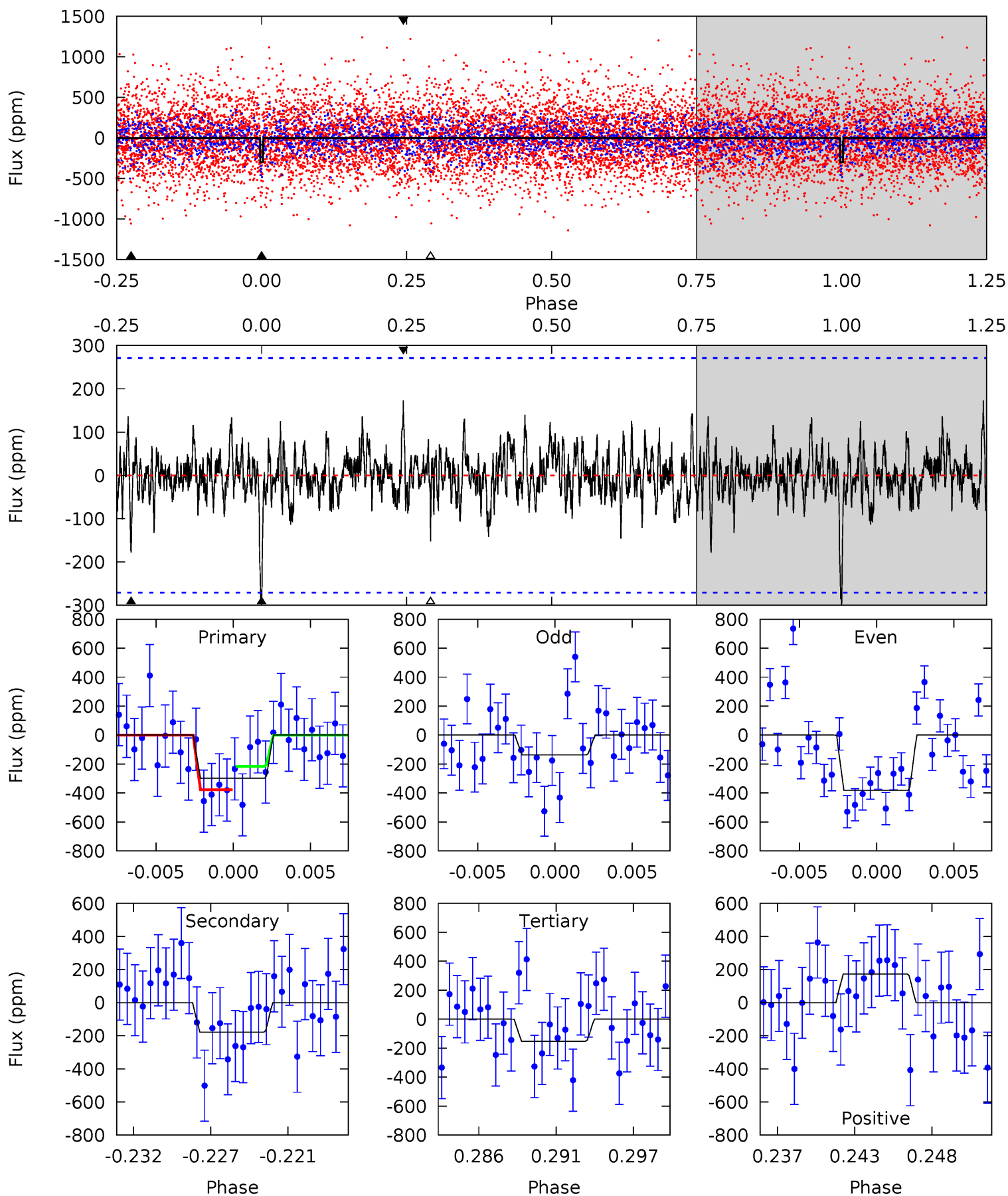
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.47	3.58	2.96	3.90	5.10	2.71	1.17	3.51	2.57	0.62	-0.31	2.18	0.80	0.38	1.08



# Alt Model-Shift Uniqueness Test

005001655-02, P = 40.591584 Days, E = 107.906392 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
5.66	3.39	2.89	3.28	5.14	2.78	0.88	2.78	2.38	0.50	0.11	2.30	1.20	0.37	1.54



### Stellar Parameters For KIC 005001655

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R$ ( $R_{\odot}$ )	$M$ ( $M_{\odot}$ )	$p_{\star}$ ( $\text{g}\cdot\text{cm}^{-3}$ )
	$5845^{+87}_{-78}$	$3.780^{+0.245}_{-0.105}$	$0.060^{+0.200}_{-0.150}$	$2.479^{+0.403}_{-0.748}$	$1.351^{+0.105}_{-0.244}$	$0.125^{+0.208}_{-0.040}$
	+1%/-1%	+6%/-3%	+333%/-250%	+16%/-30%	+8%/-18%	+167%/-32%
Source	SPE68	SPE68	SPE68	DSEP		

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

### Secondary Eclipse Parameters for KIC 005001655-02 / KOI

Detrend	Depth (ppm)	$R_p$ ( $R_{\oplus}$ )	$T_{max}$ (K)	$T_{obs}$ (K)	$A_{obs}$
DV	$-175 \pm 49$	$5.29^{+4.33}_{-3.01}$	$1113^{+56}_{-87}$	$4815^{+2329}_{-978}$	$215^{+964}_{-151}$
Alt.	$-178 \pm 53$	$4.99^{+4.04}_{-3.19}$	$1109^{+59}_{-76}$	$4907^{+3262}_{-1010}$	$240^{+1548}_{-168}$

$T_{max}$  = 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

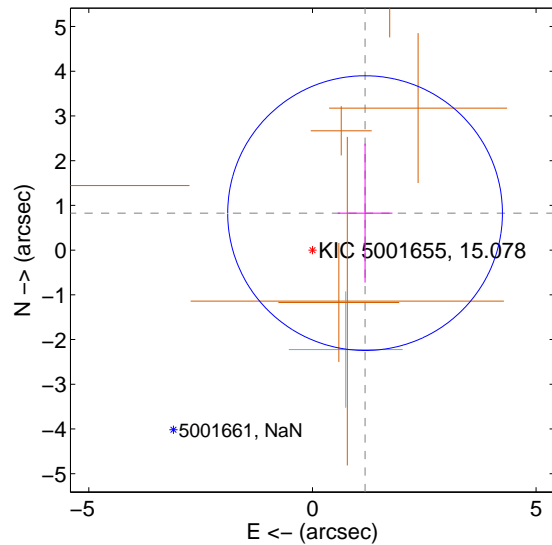
Supplemental centroid analysis for 005001655-02. Kepler magnitude: 15.08. Transit SNR 9.81

There are 1 quarters with good PRF difference image offsets

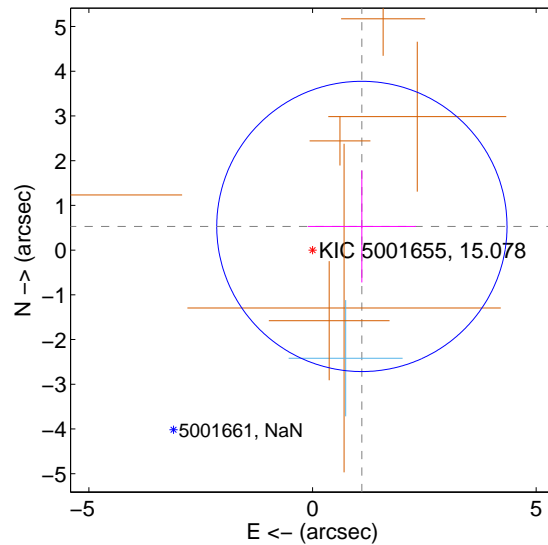
The direct PRF centroid is offset from the target star catalog position by about 0.23 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.438 \pm 1.024$	1.40	$-1.177 \pm 0.613$	$0.827 \pm 1.553$
PRF-fit source offset from KIC position	$1.224 \pm 1.082$	1.13	$-1.104 \pm 1.209$	$0.529 \pm 1.254$
photometric centroid source offset	$0.89 \pm 0.81$	1.11	$-0.81 \pm 0.79$	$-0.37 \pm 0.86$

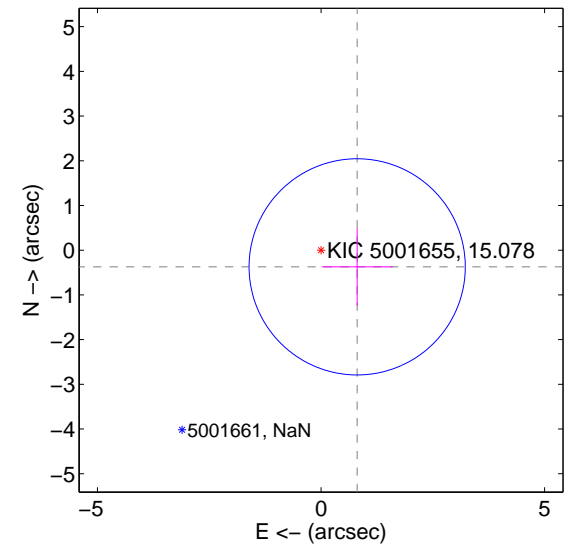
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

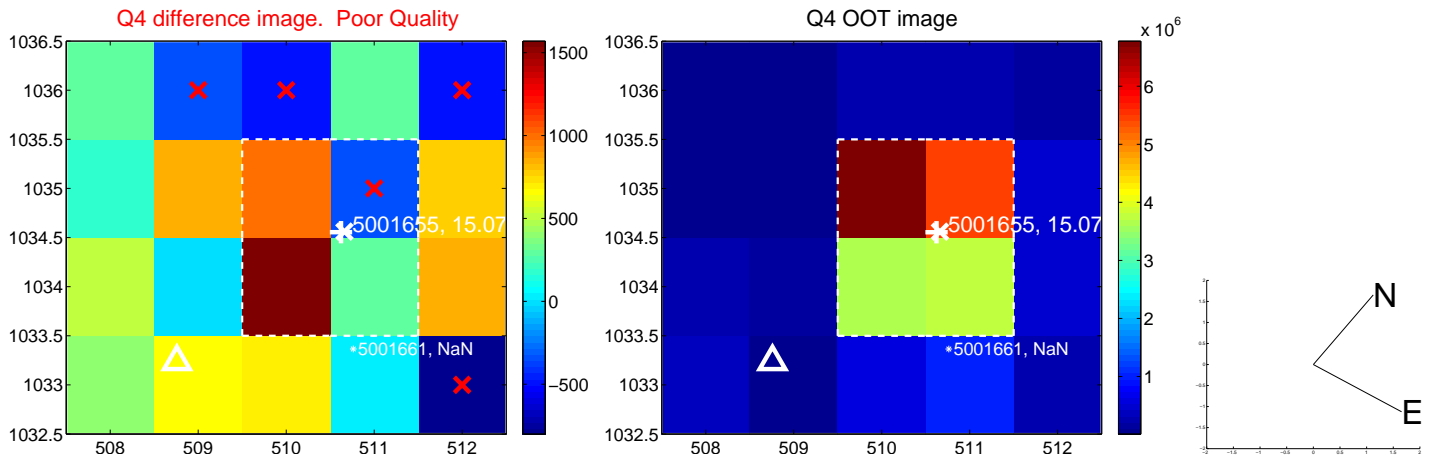
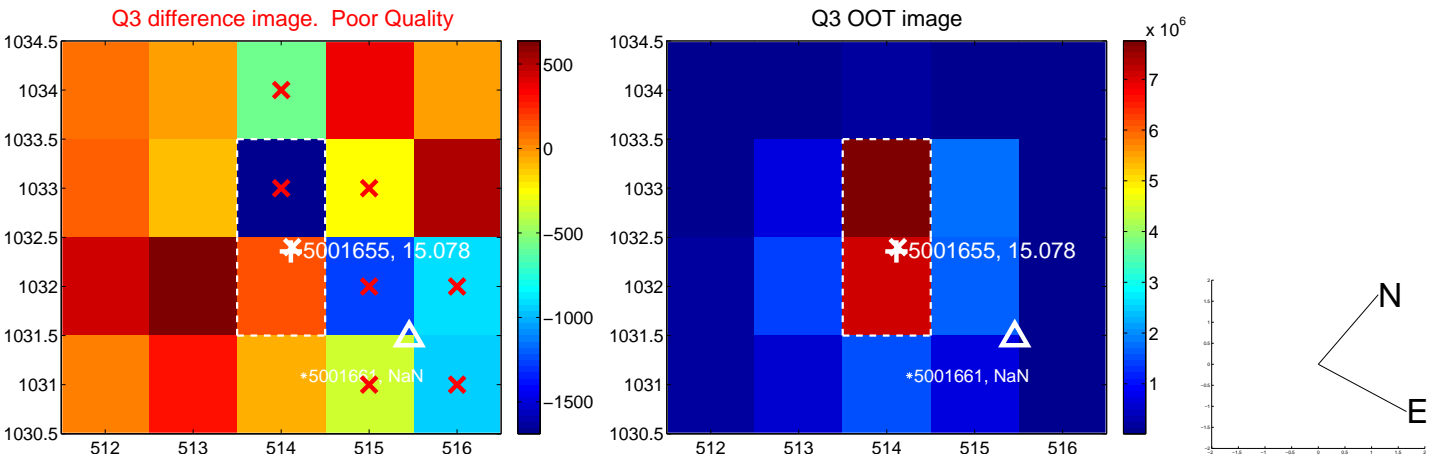
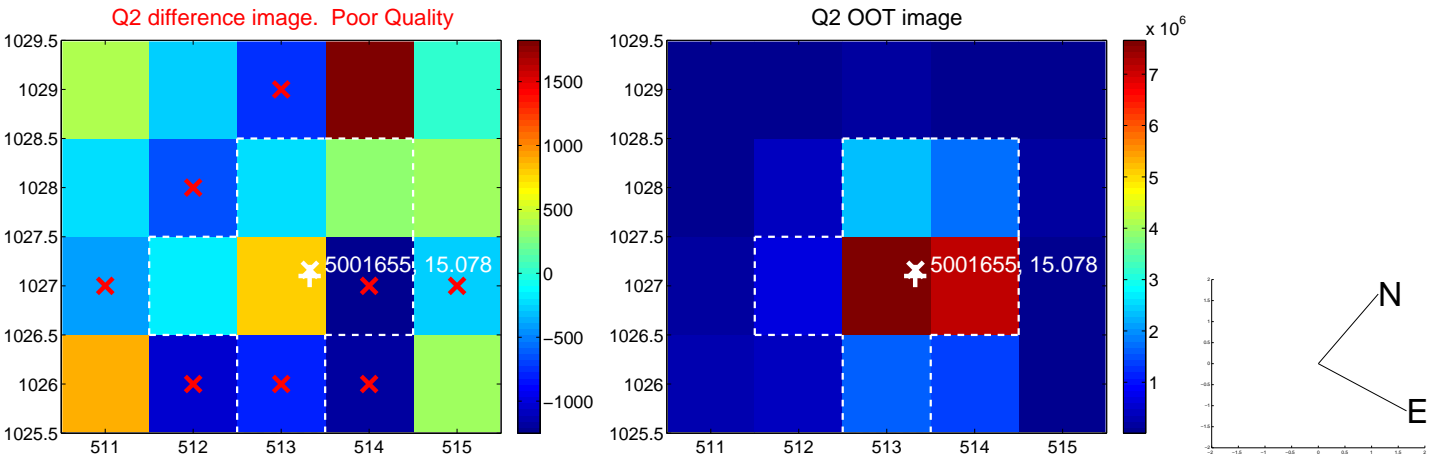
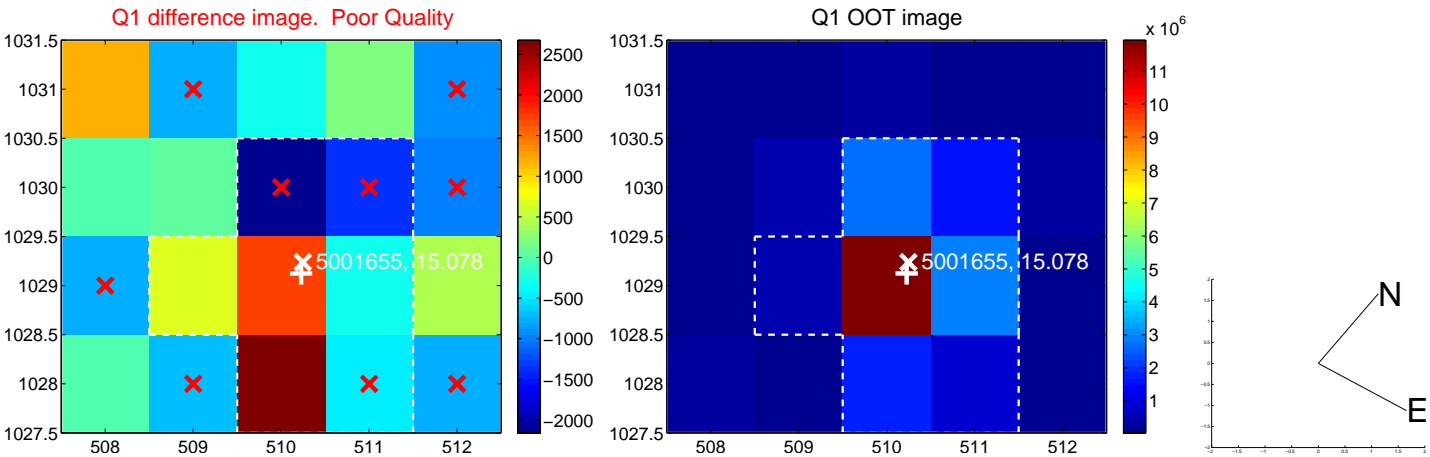


offset from photometric centroids



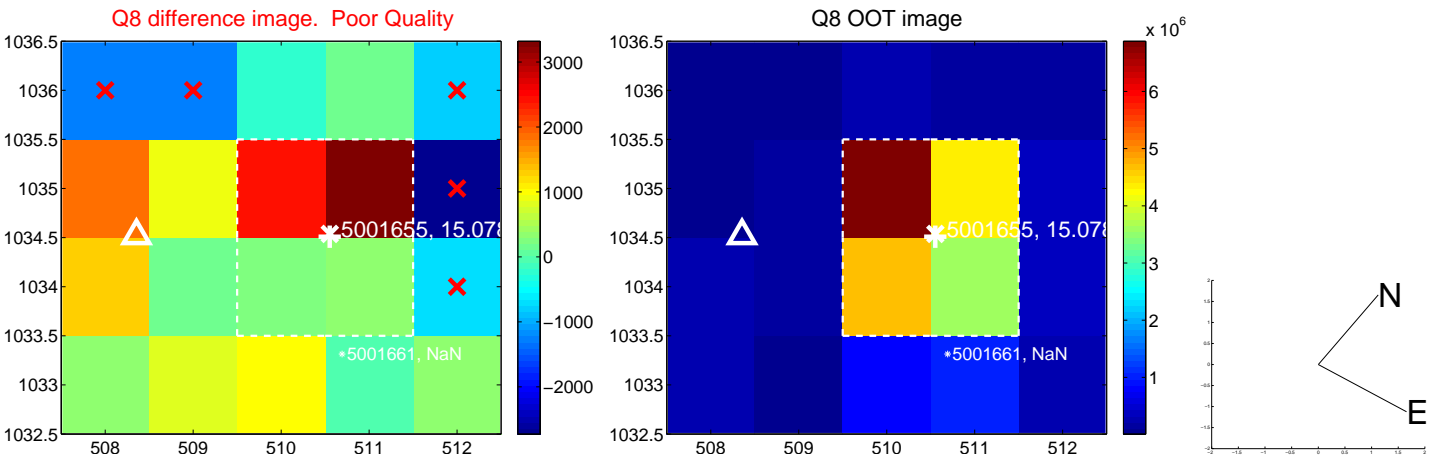
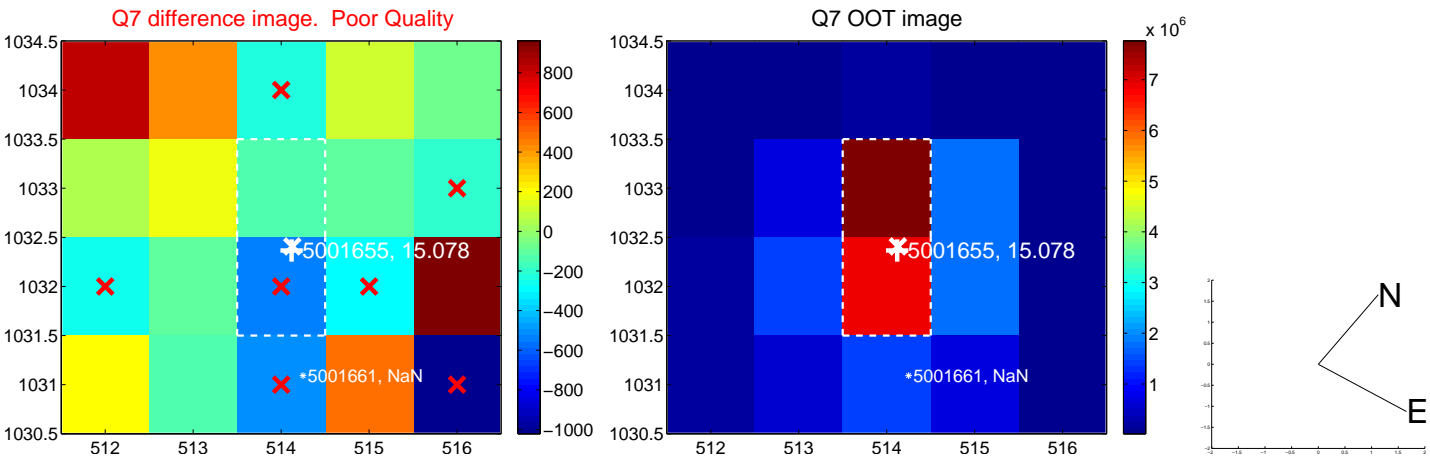
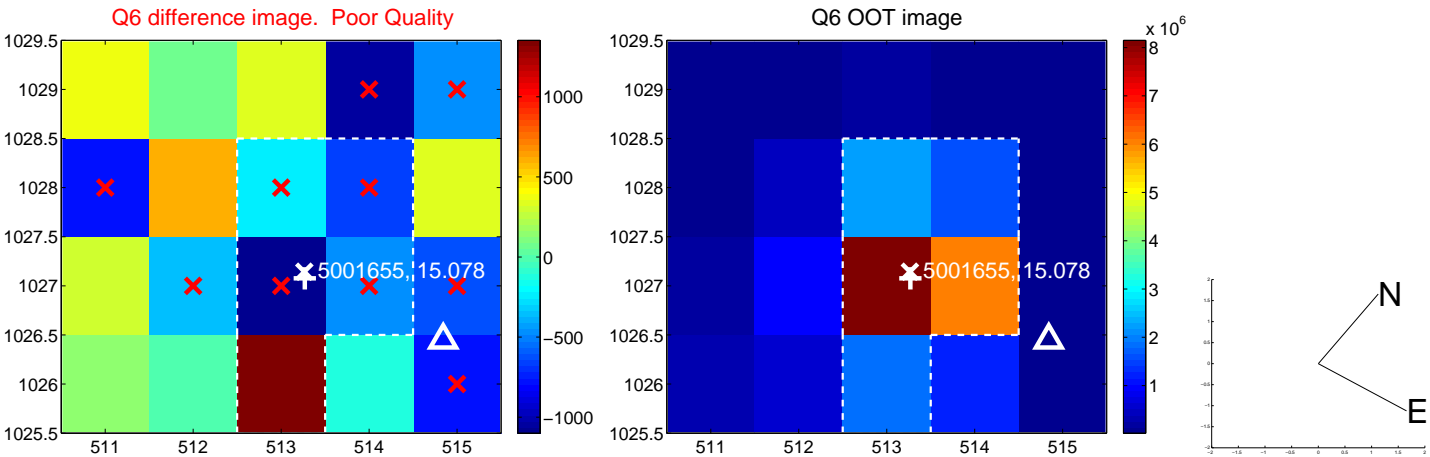
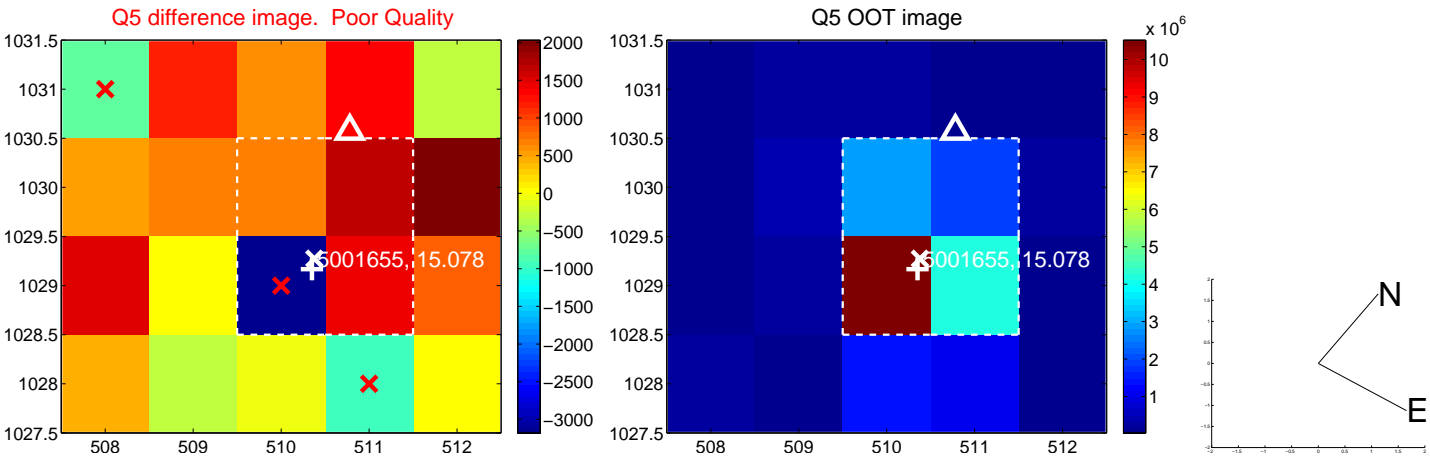
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

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

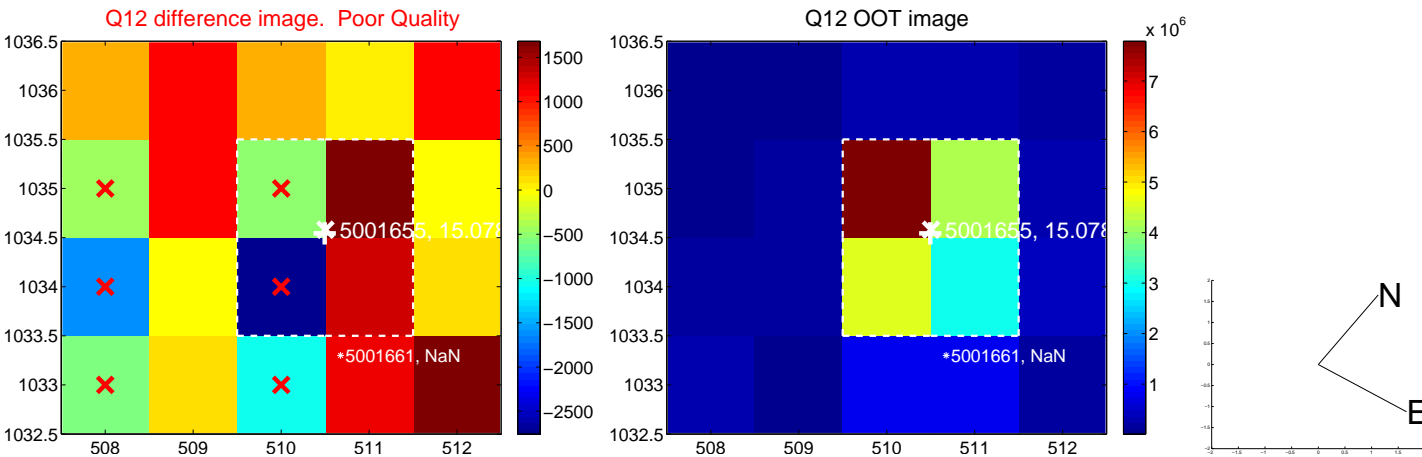
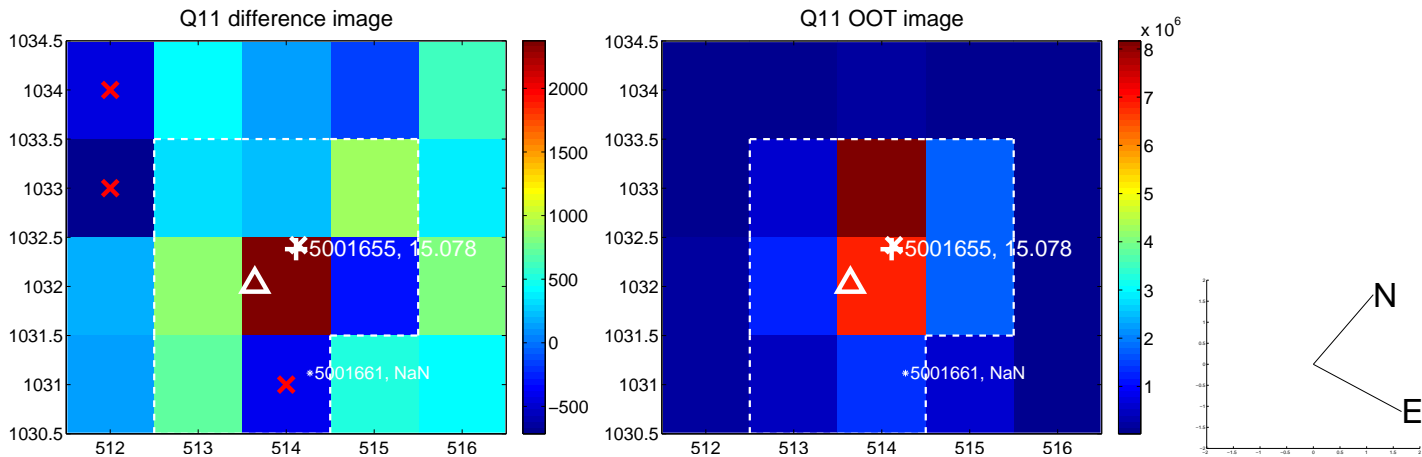
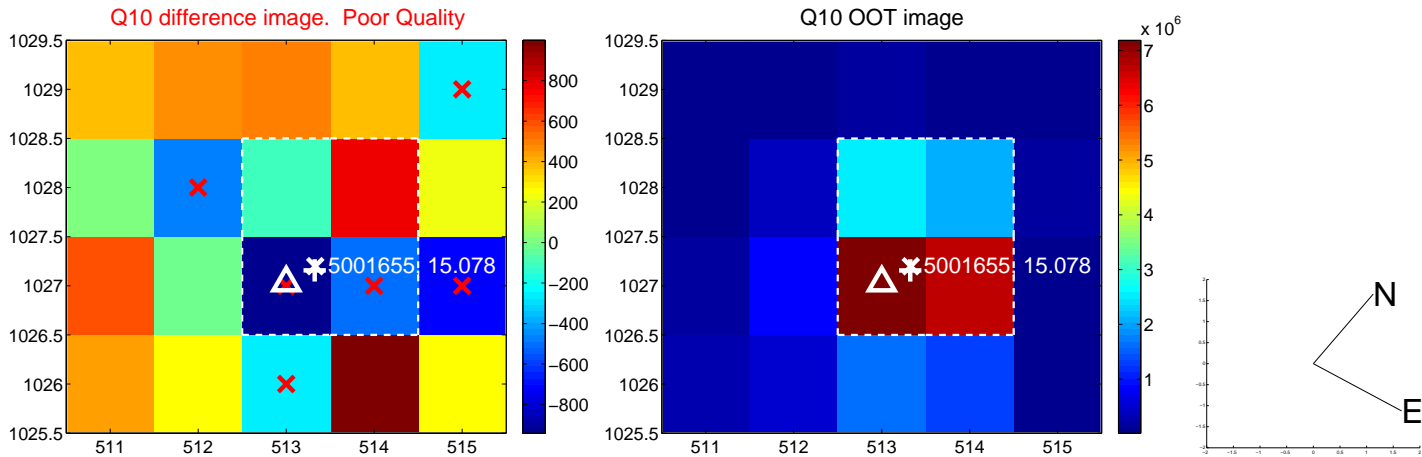
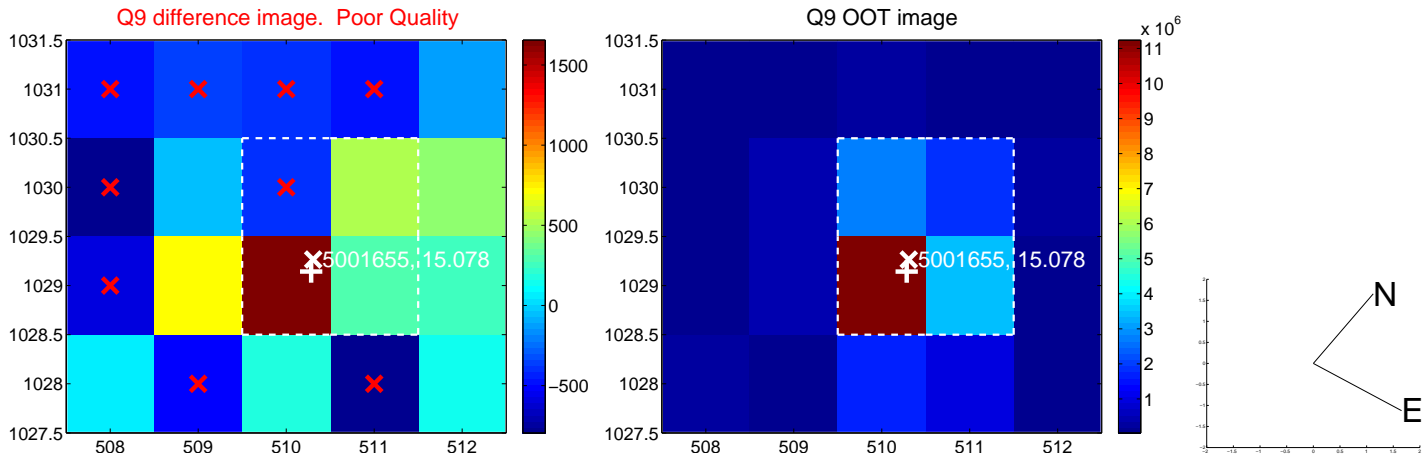




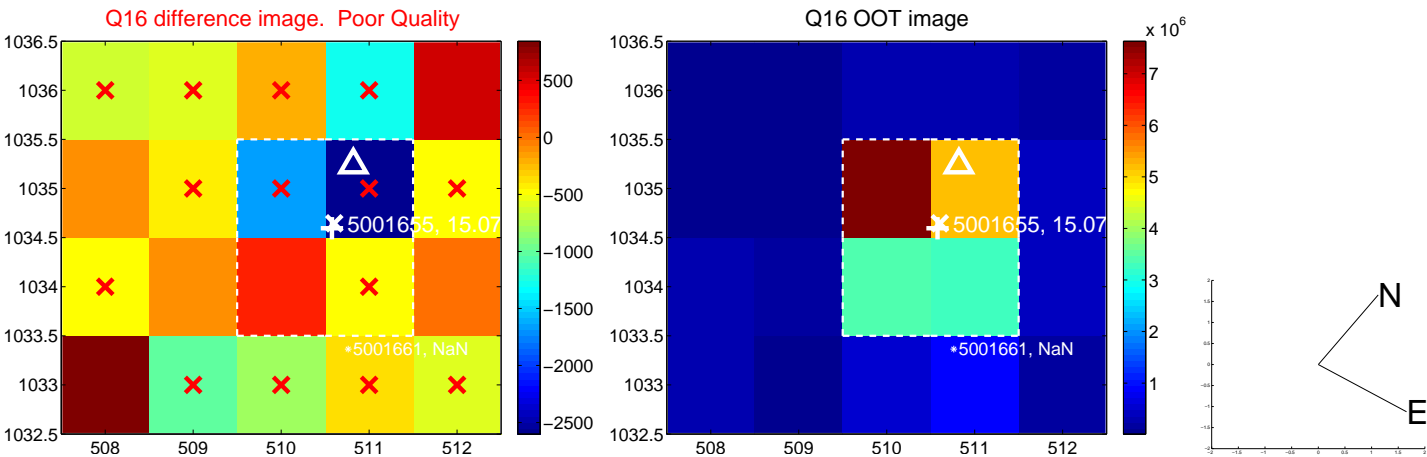
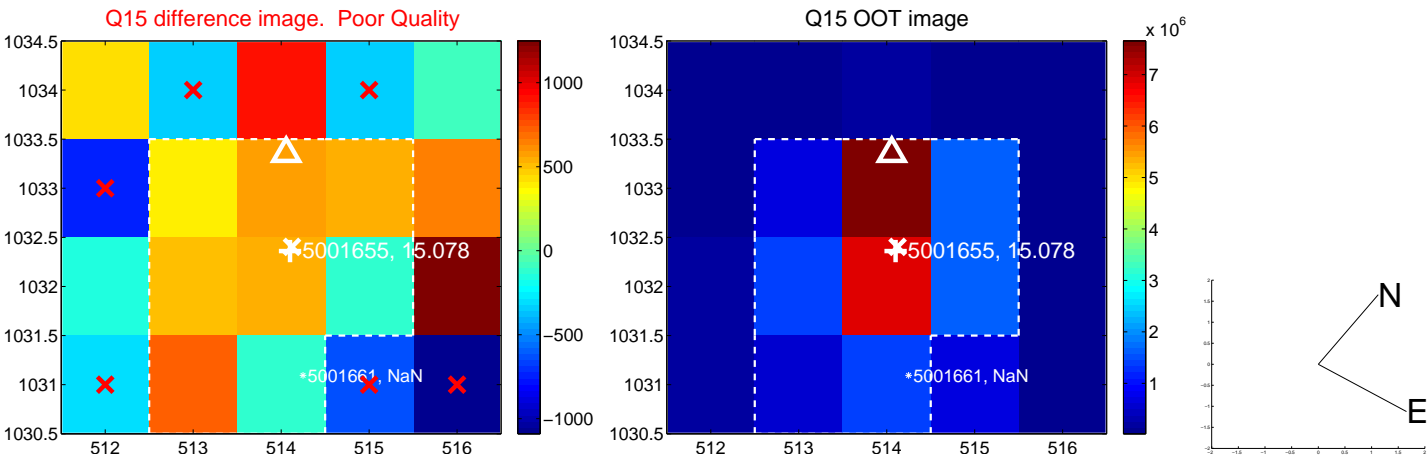
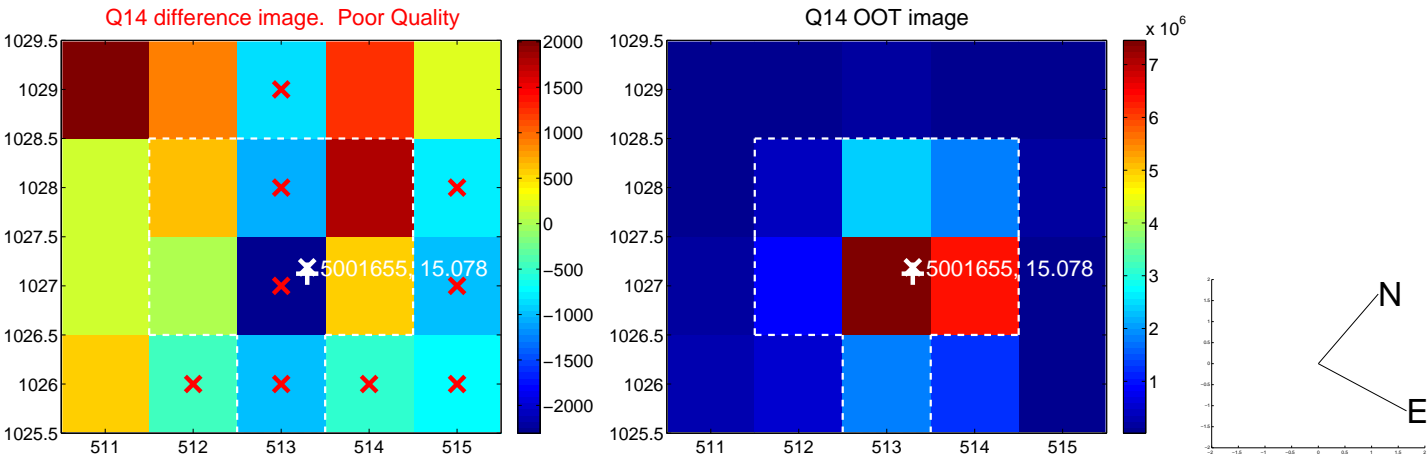
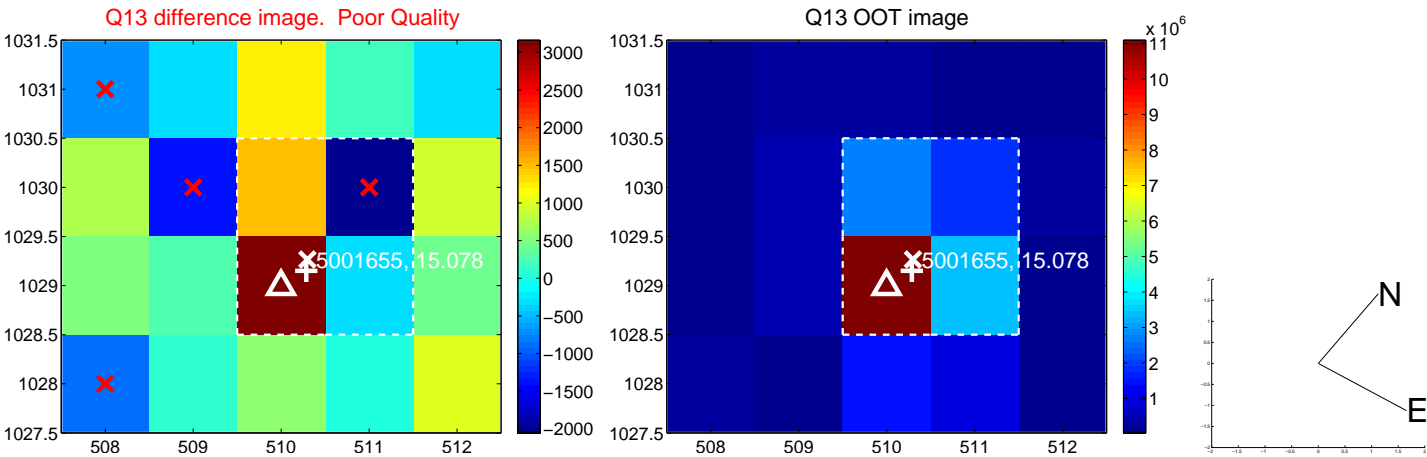
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



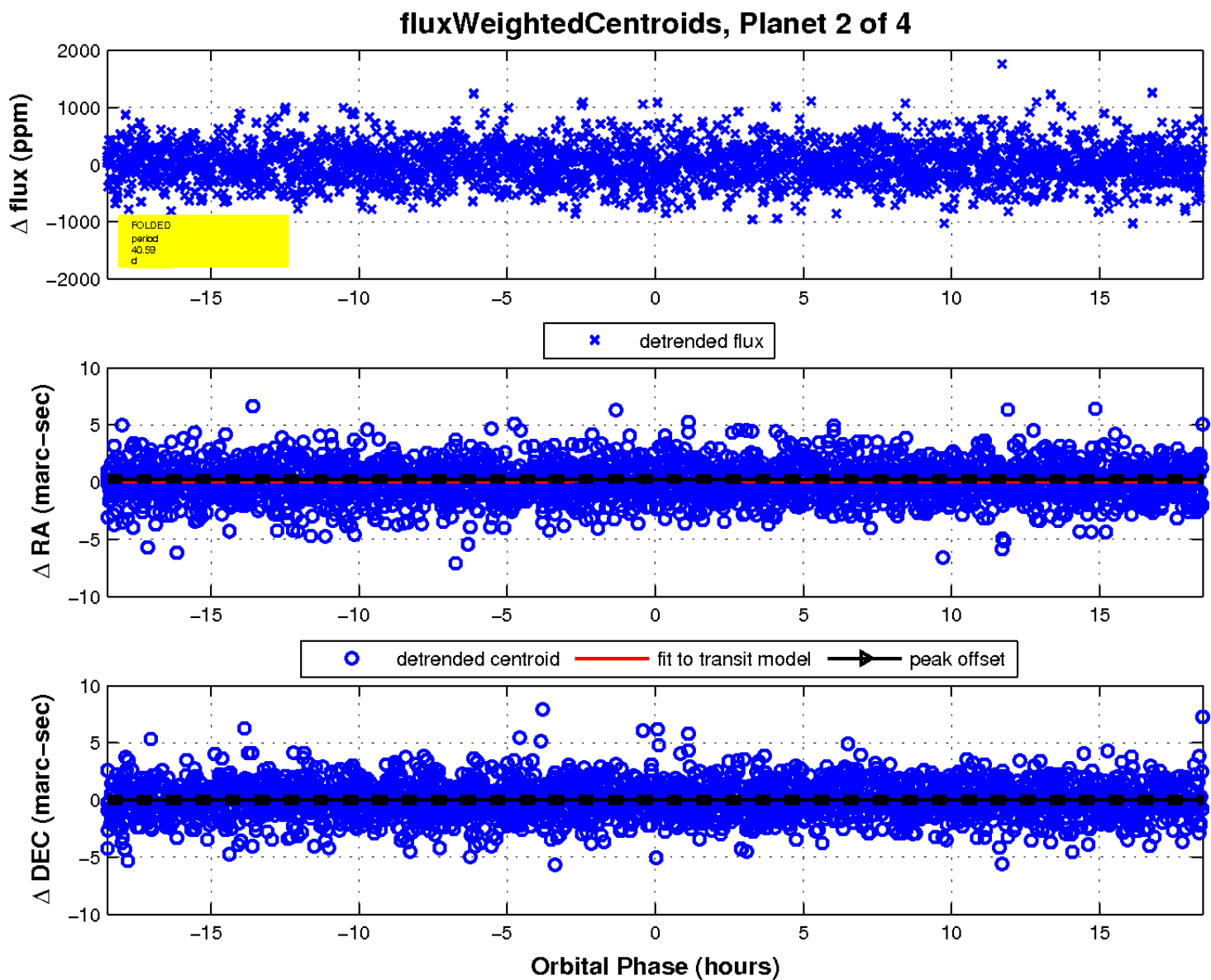
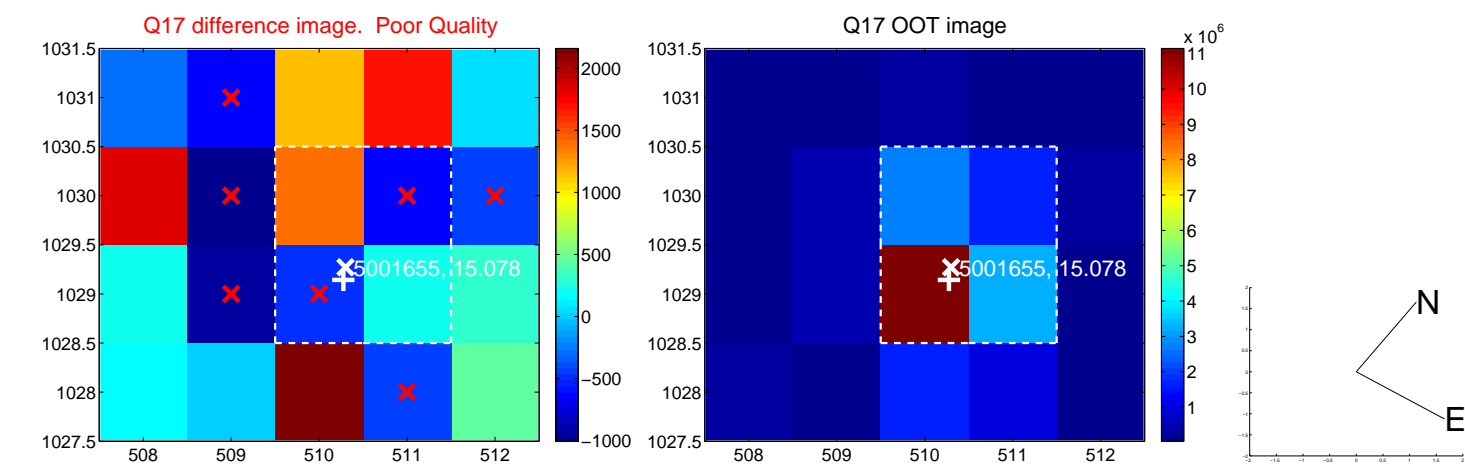
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

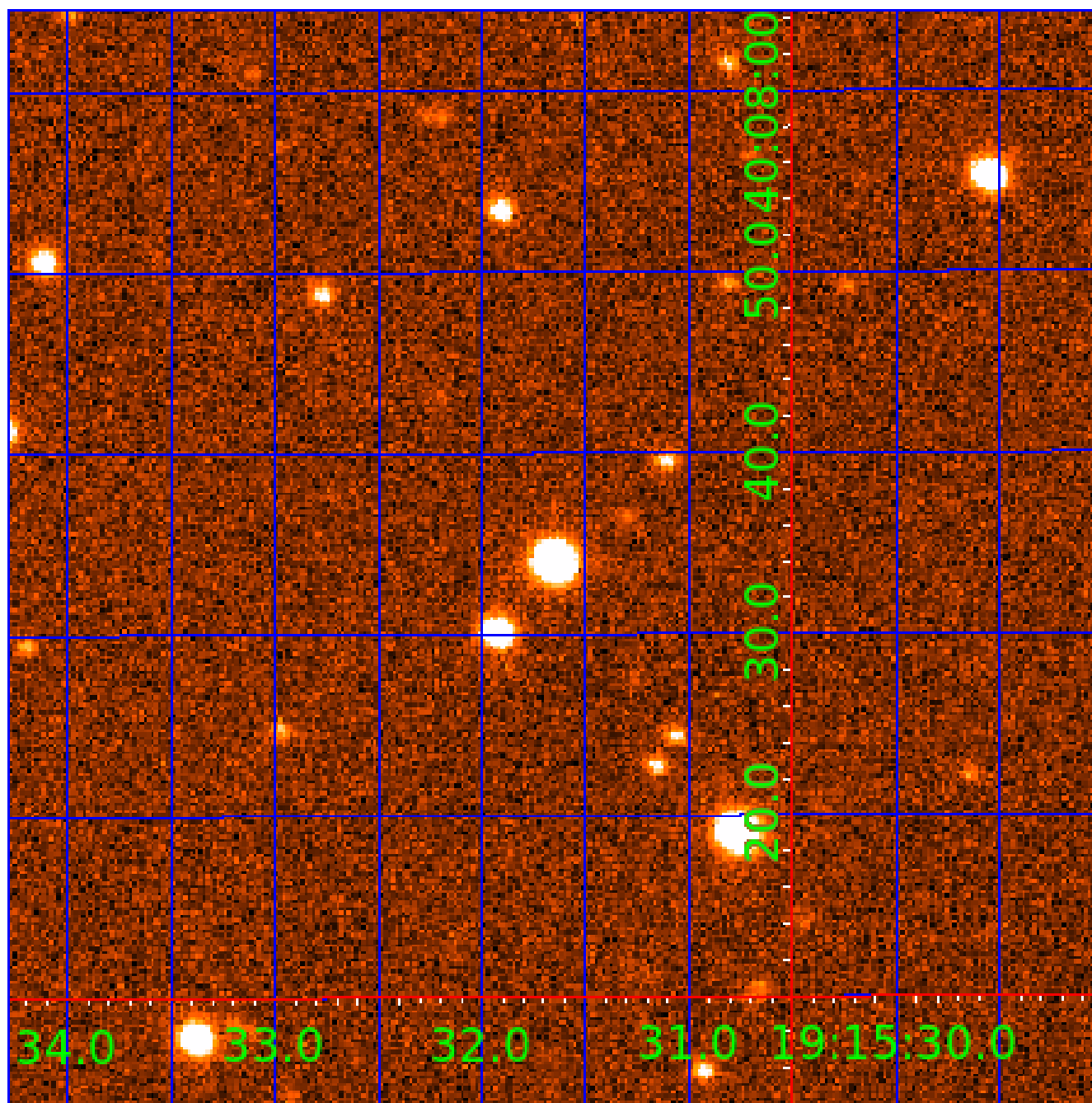


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination





# KIC 005001655

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005001655-01	OBS	No	2.290476	133.192958	39.0	15.911	9.5	12.8	2.48	5845	1.55	4546.20
005001655-02	OBS	No	40.591664	148.481950	323.5	6.171	9.6	9.8	2.48	5845	4.99	98.39
005001655-03	OBS	No	38.520553	154.185867	509.6	2.225	10.1	8.2	2.48	5845	10.63	105.51
005001655-04	OBS	No	26.505407	151.282364	509.2	1.593	8.2	9.9	2.48	5845	6.61	173.69

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005001655-01	OBS	FP	0.00	1	0	1	0	LPP_DV—CENT_FEW_DIFFS—HALO_GHOST
005001655-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
005001655-03	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
005001655-04	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—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.

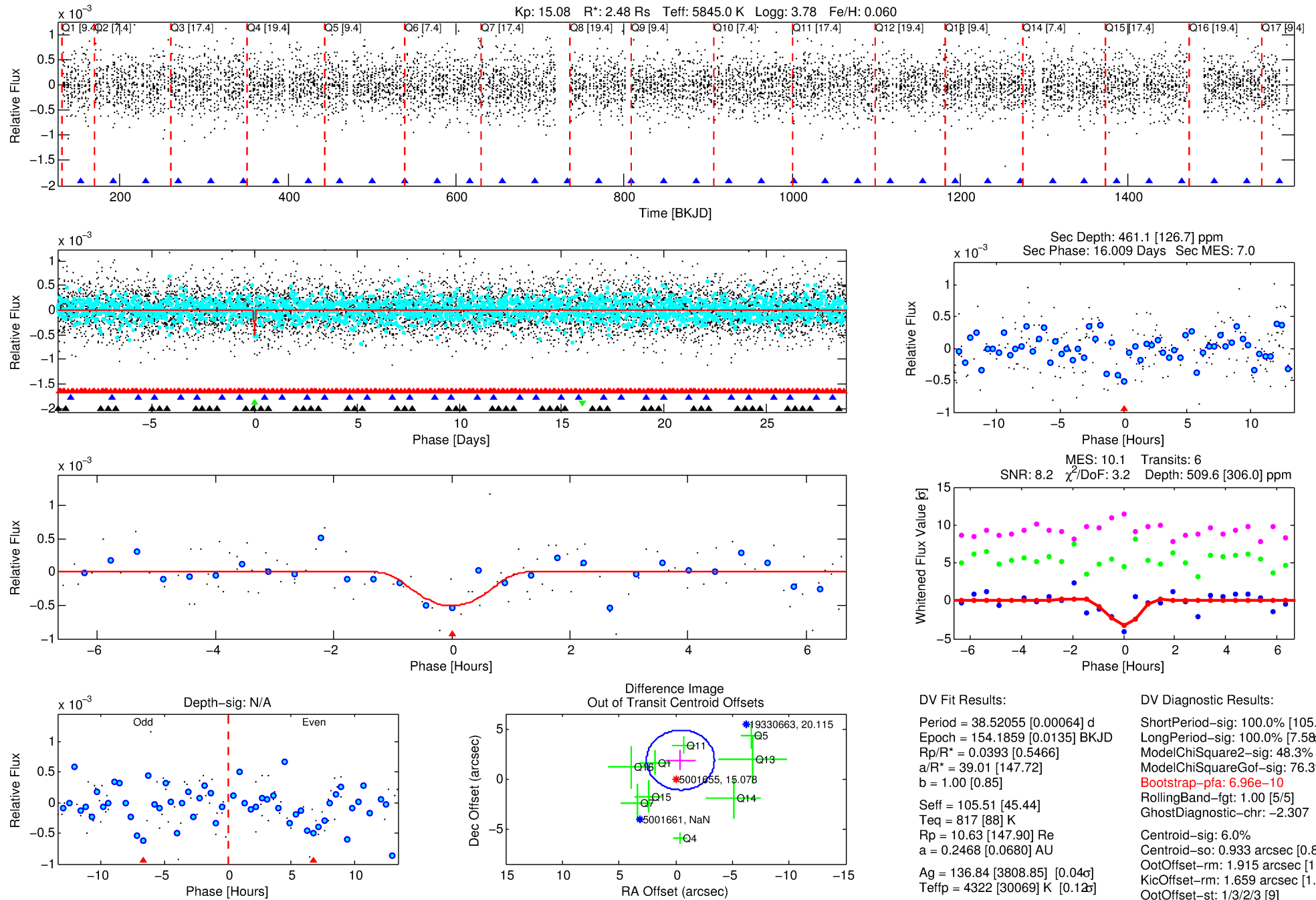
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 005001655-03

No Significant Match Found

# DV One-Page Summary

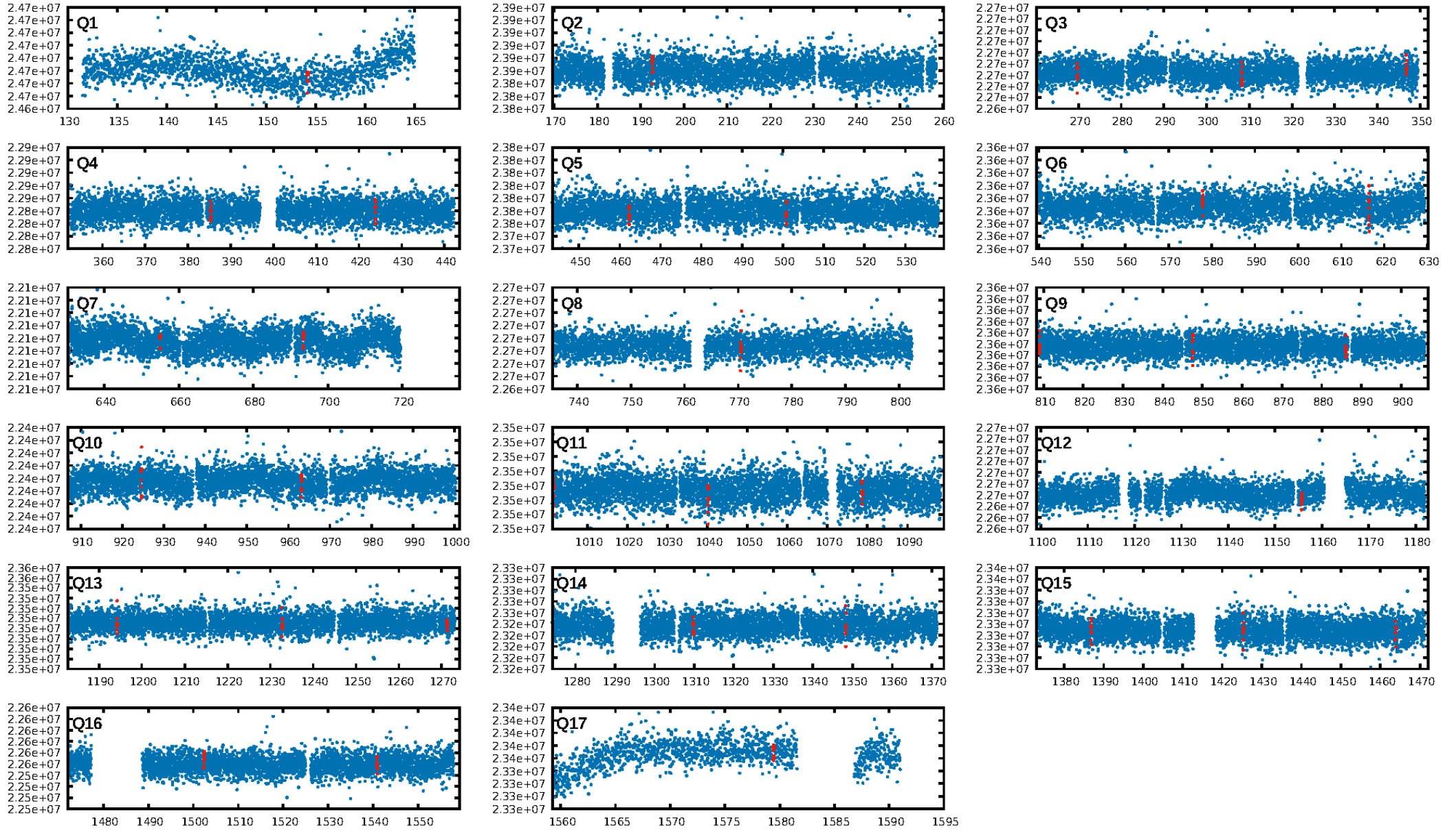
KIC: 5001655 Candidate: 3 of 4 Period: 38.521 d



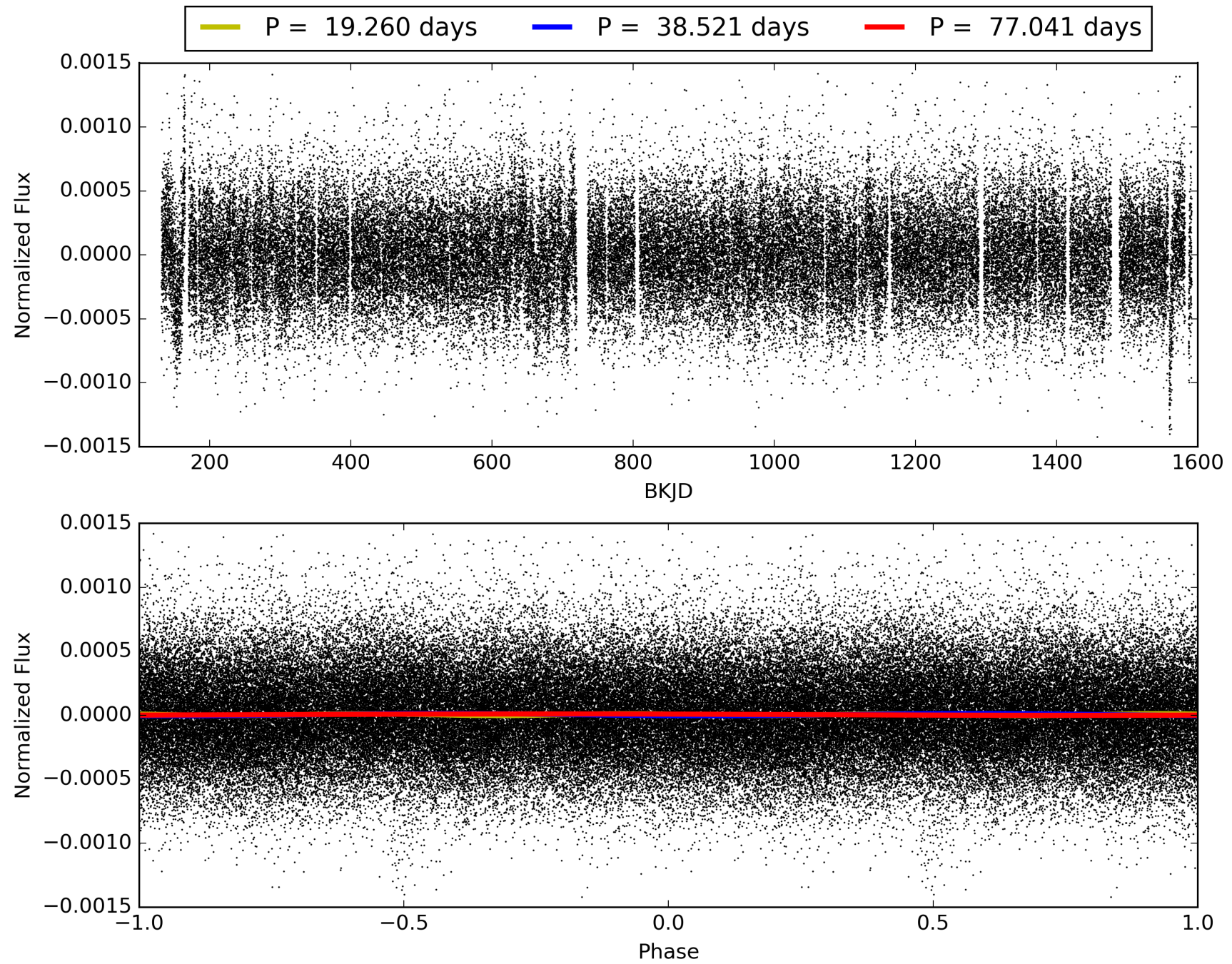
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 07:06:34 Z

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

# TCE 005001655-03, PDC Light Curves

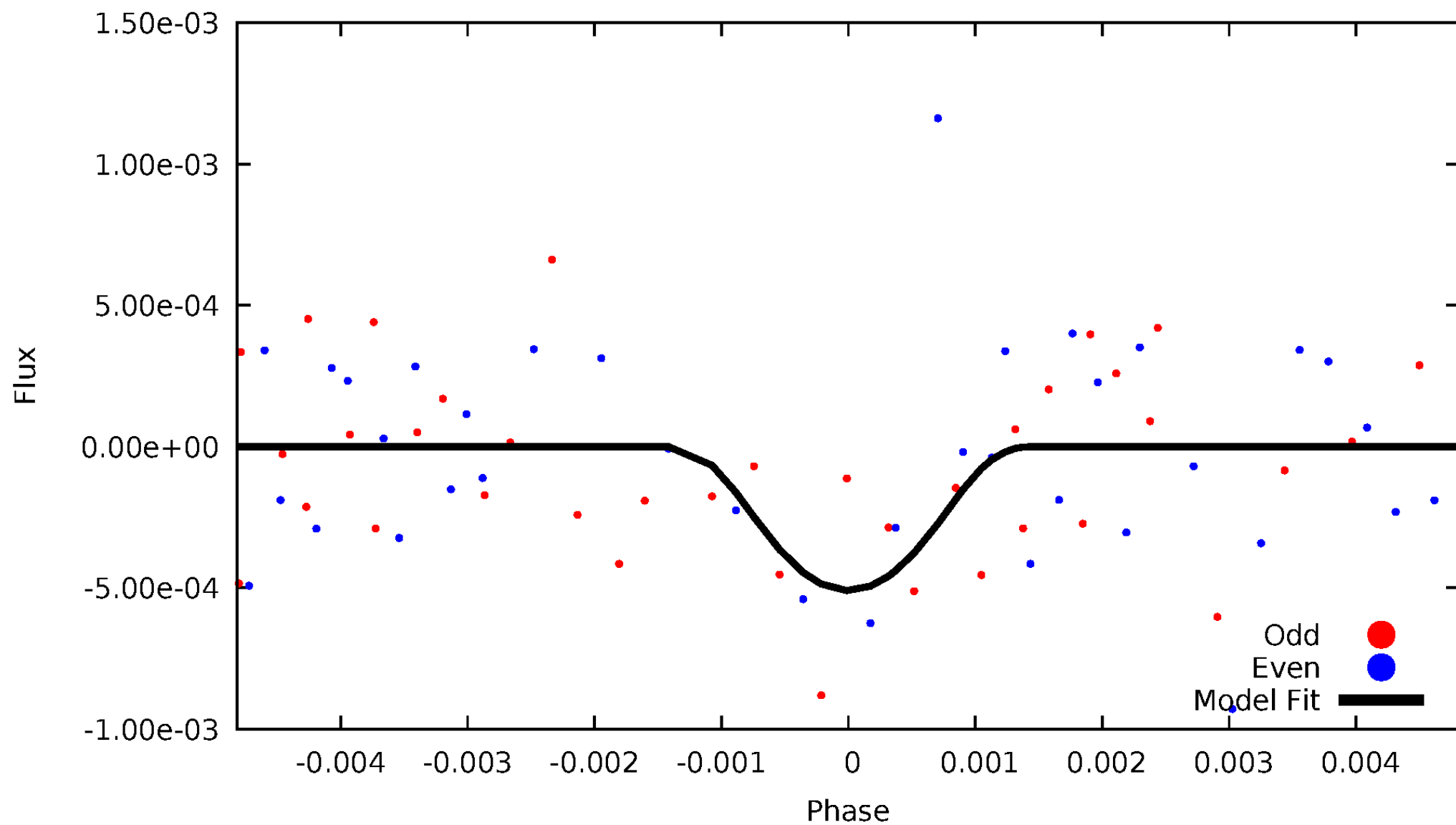


TCE 005001655-03



# DV Odd/Even

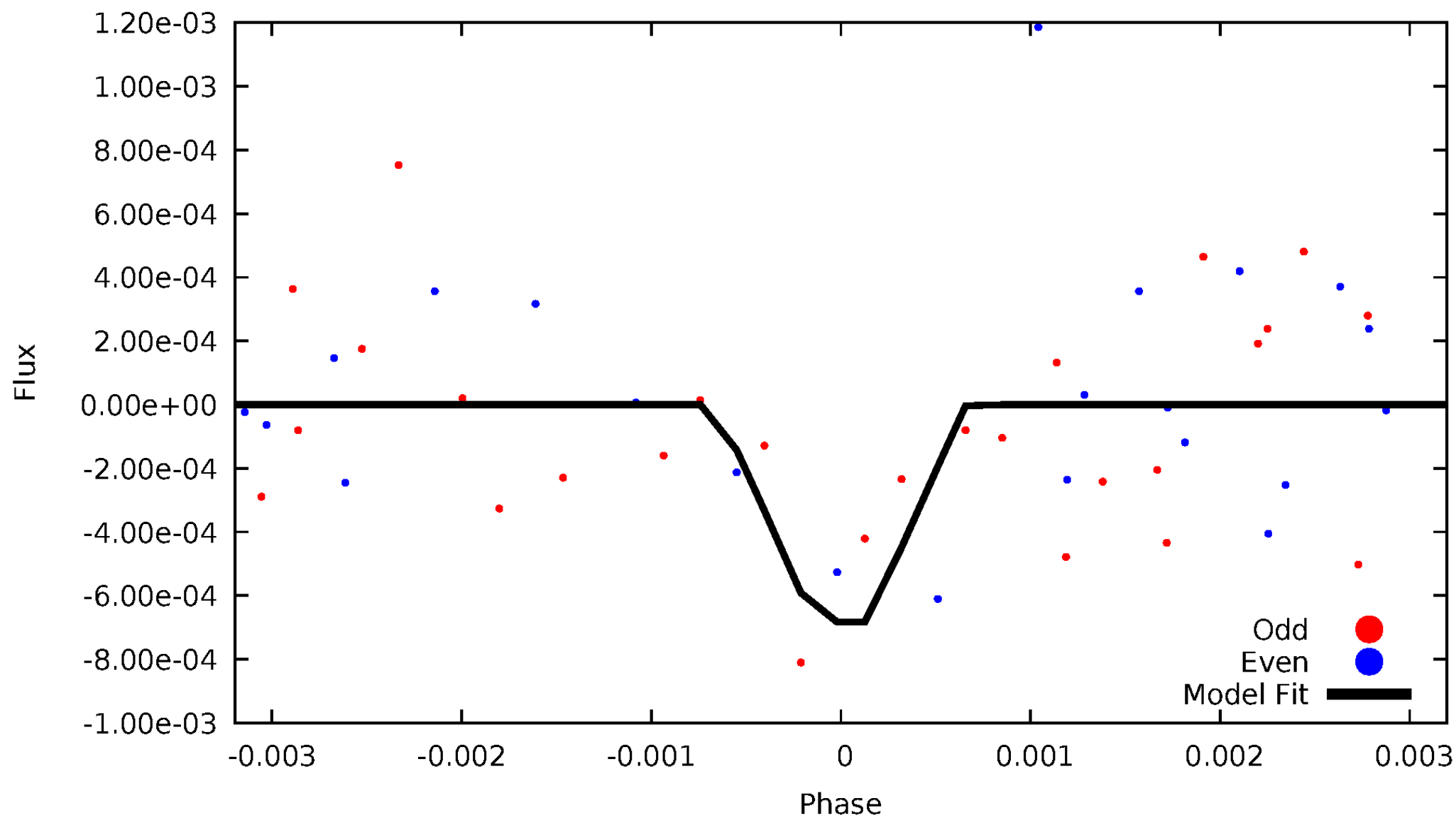
TCE 005001655-03





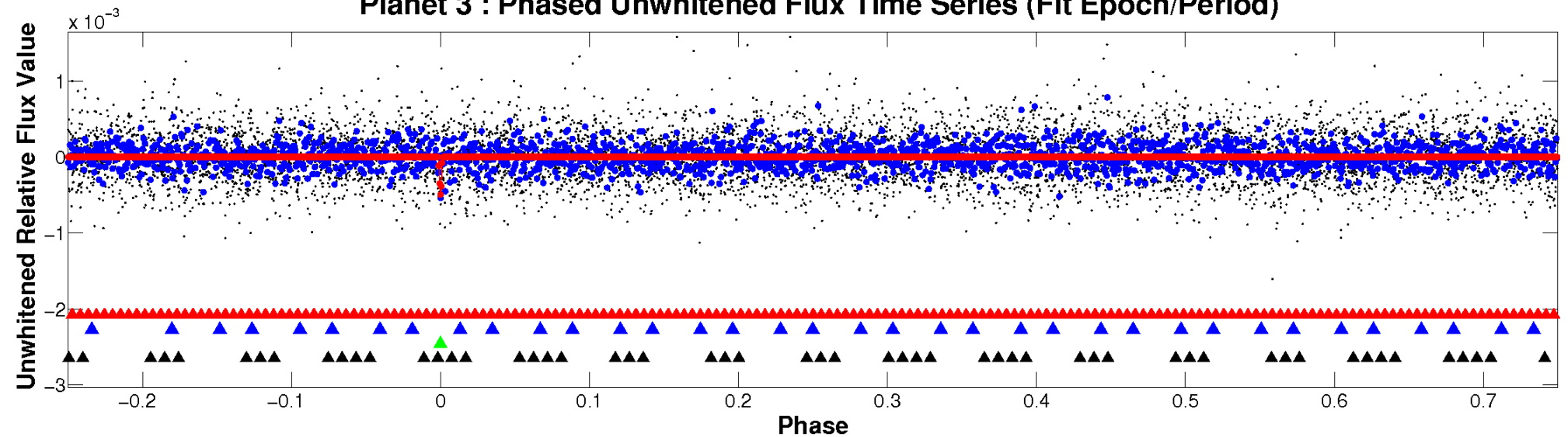
# ALT Odd/Even

TCE 005001655-03

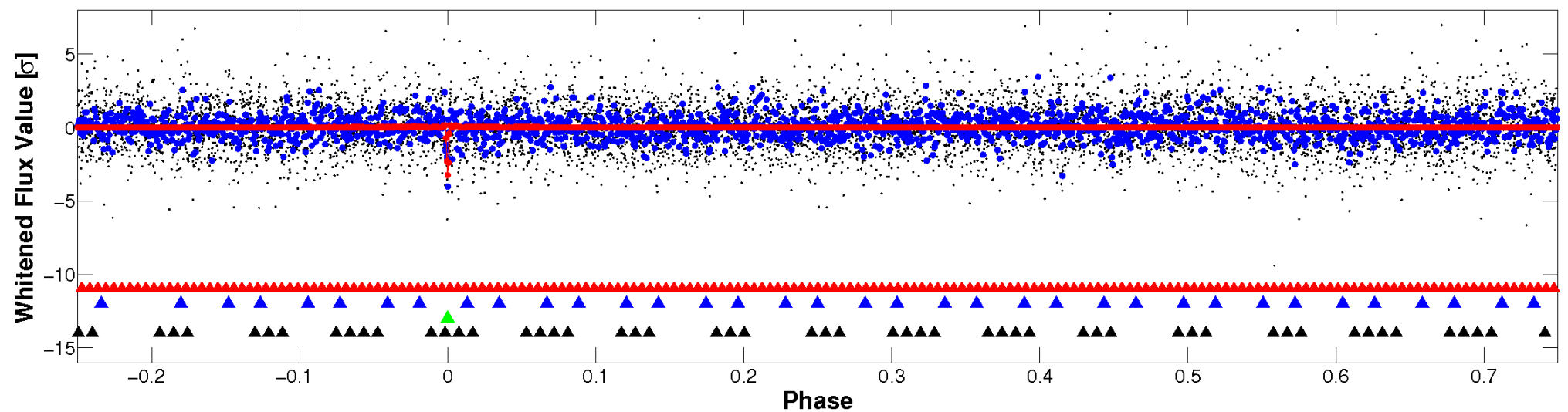


# Non-Whitened Vs. Whitened Light Curve

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

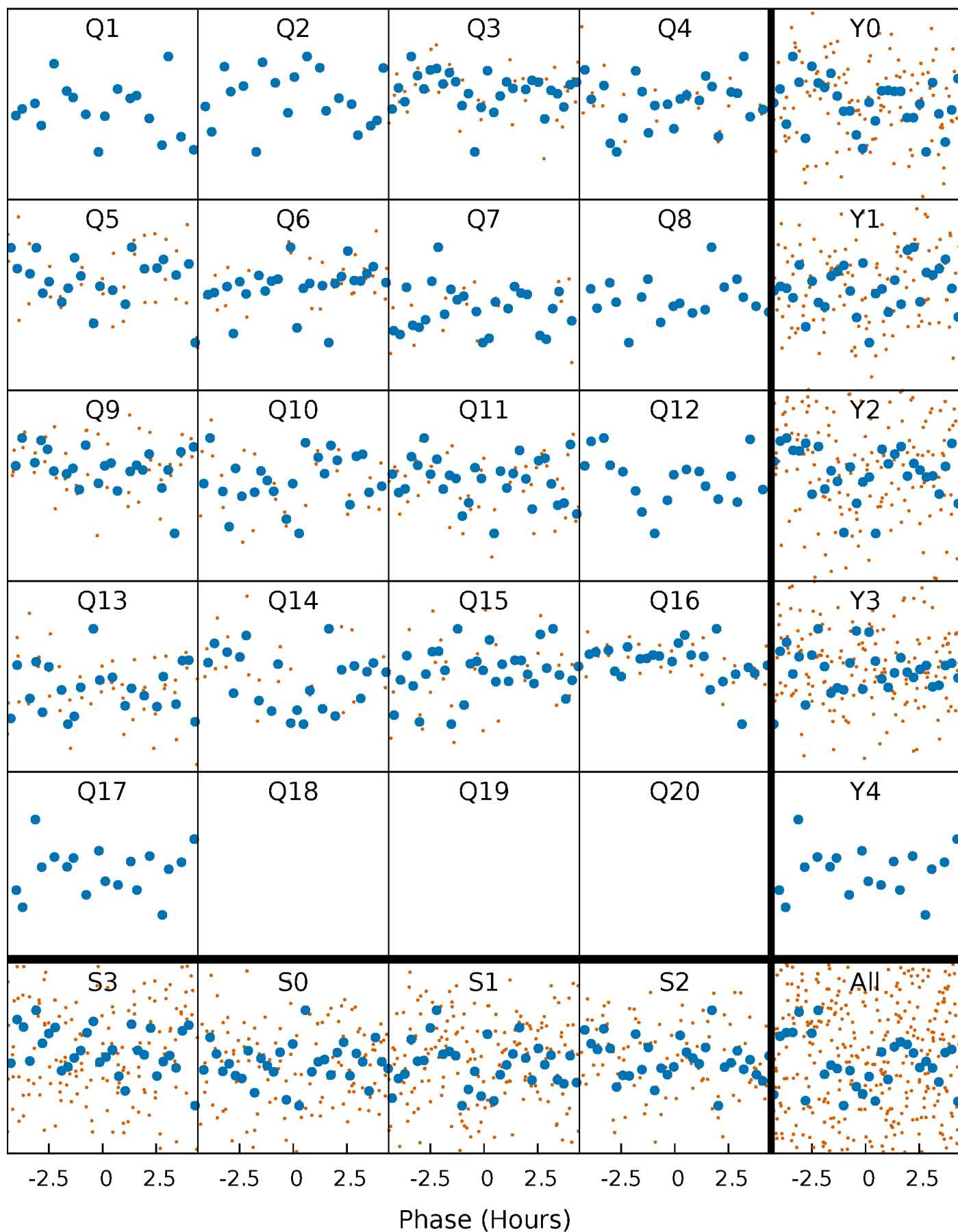


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



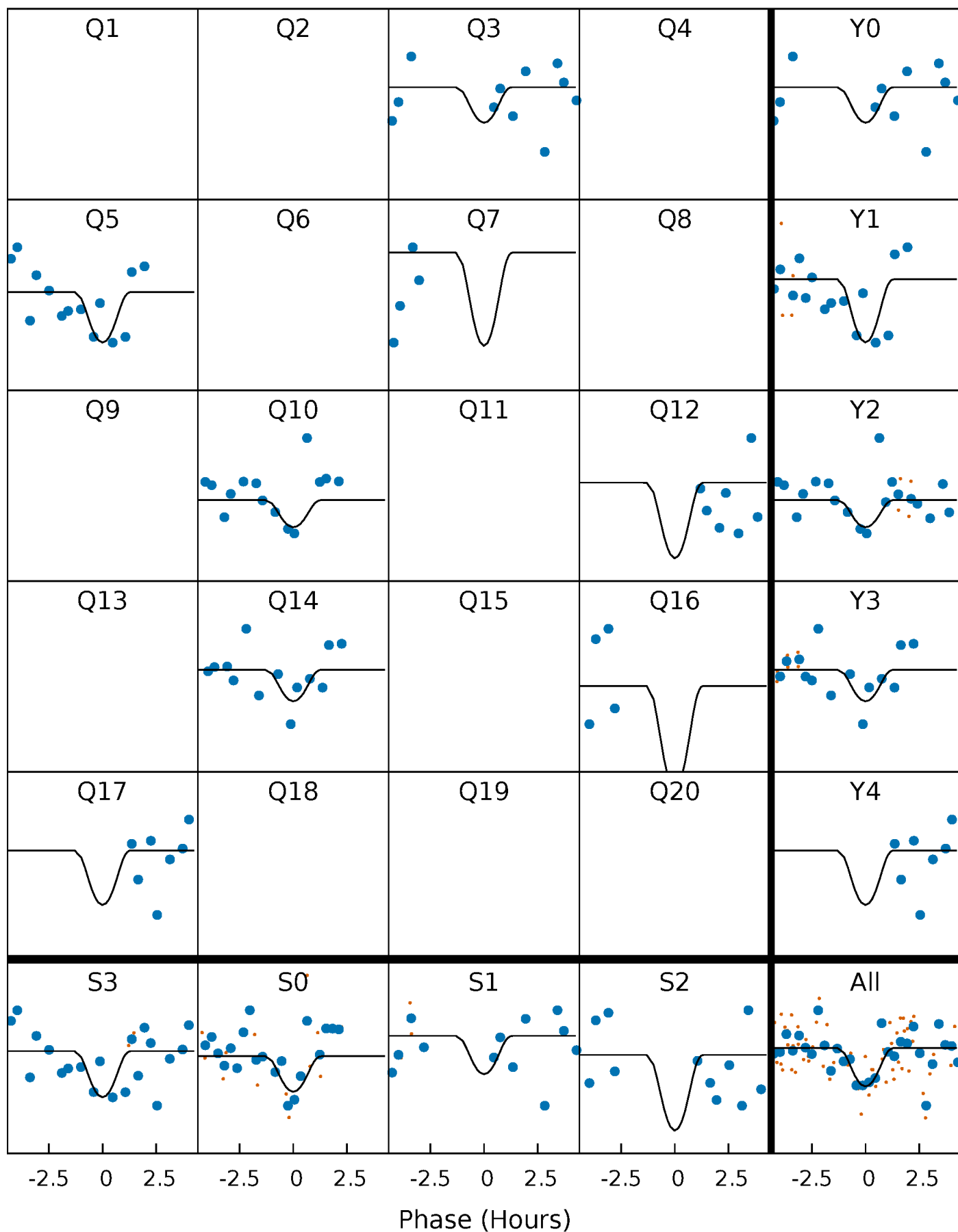
# PDC Quarter-Phased Transit Curves

TCE 005001655-03 P= 38.520553 Days  $T_0=154.185867$  (BKJD)



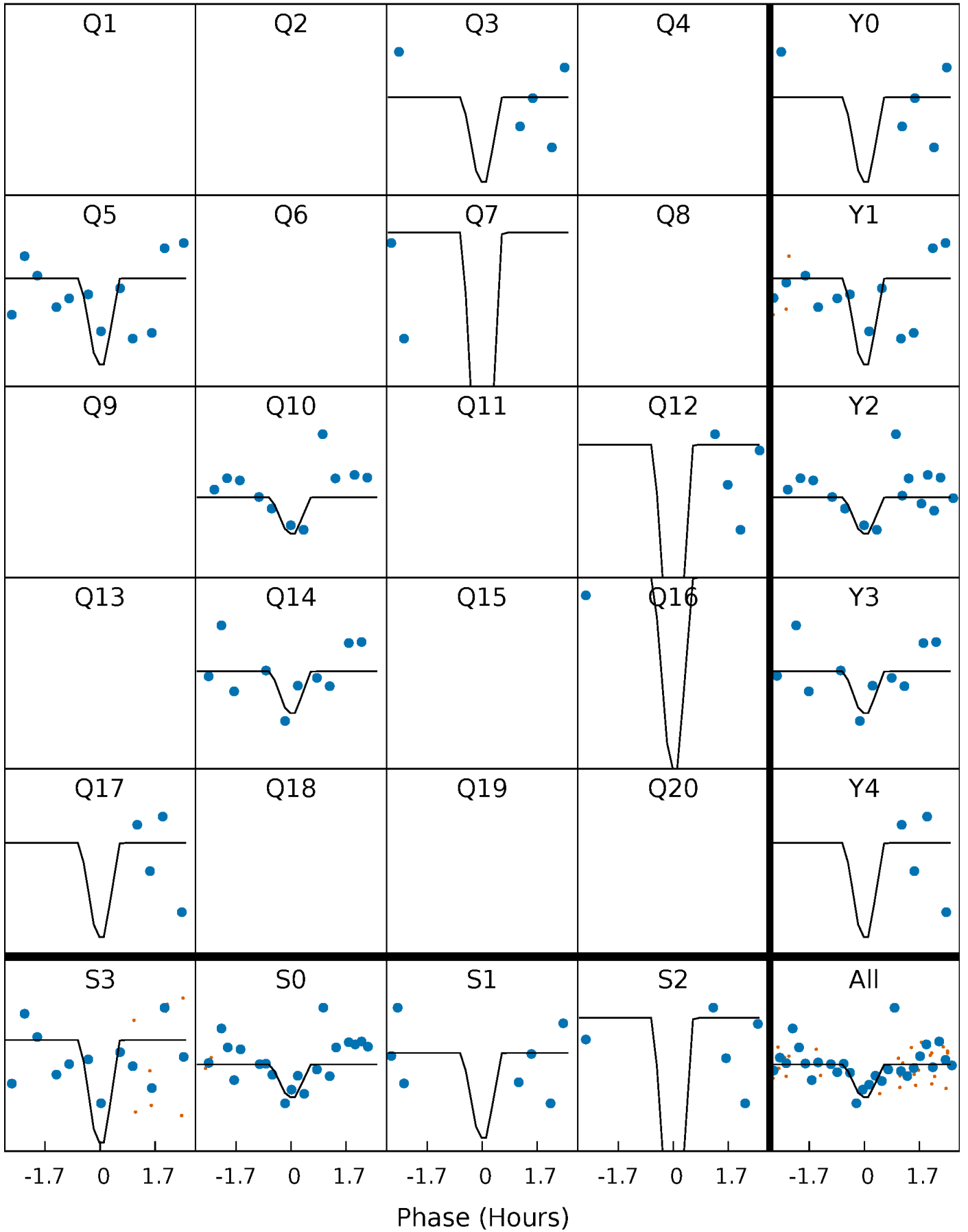
# DV Quarter-Phased Transit Curves

TCE 005001655-03     $P = 38.520553$  Days     $T_0 = 154.185867$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

TCE 005001655-03 P= 38.521718 Days  $T_0=154.149607$  (BKJD)

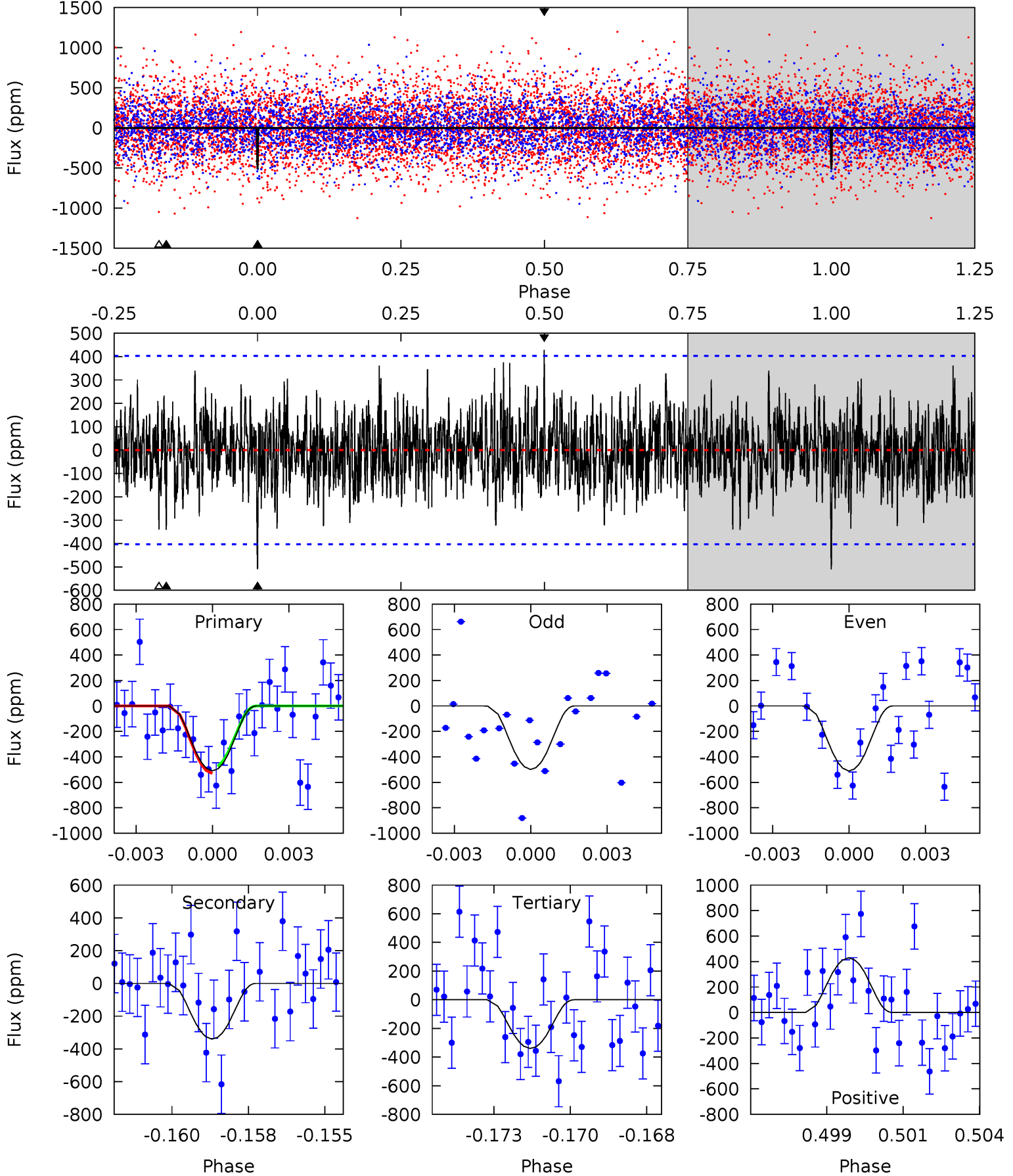




# DV Model-Shift Uniqueness Test

005001655-03, P = 38.520553 Days, E = 115.665314 Days

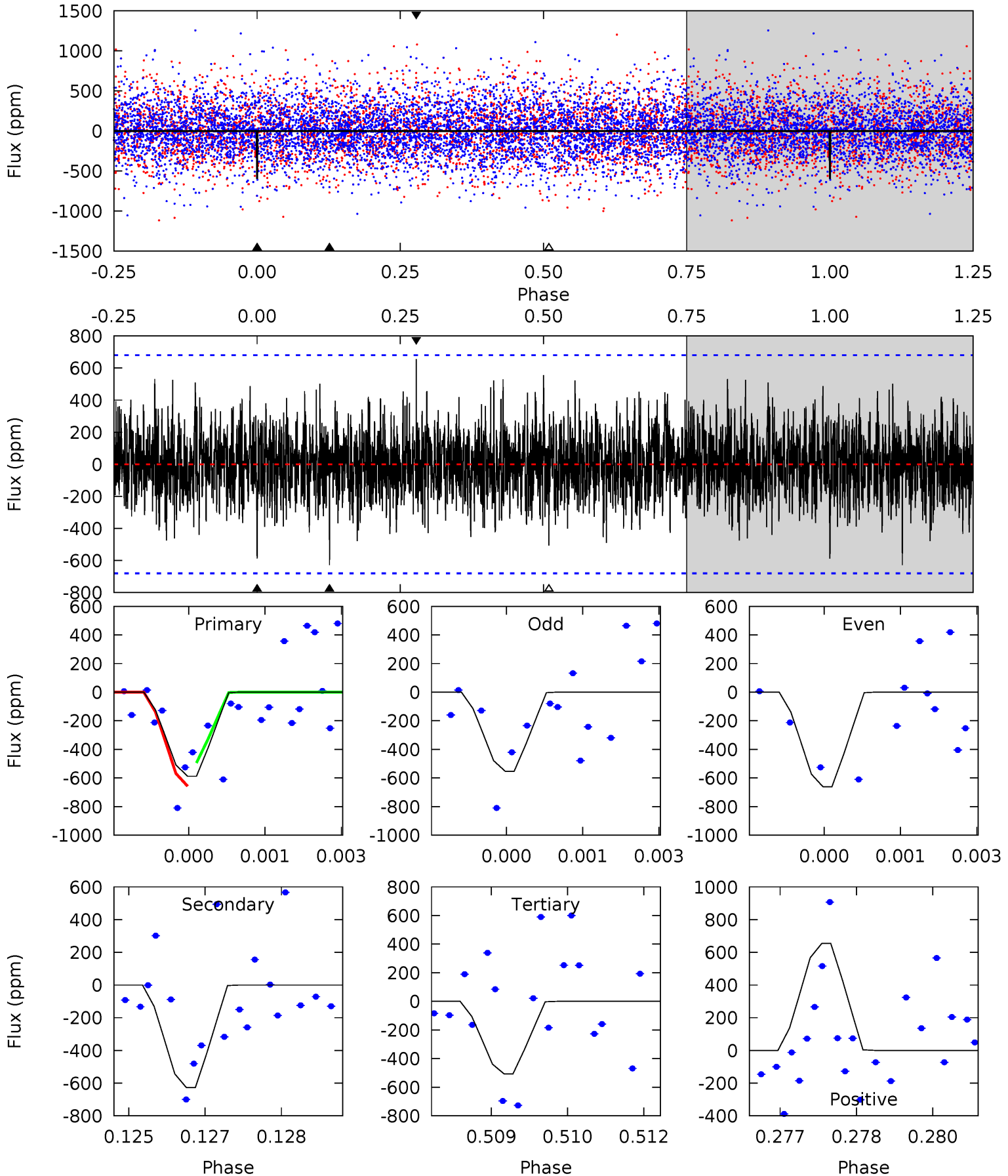
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.69	4.46	4.46	5.63	5.29	3.02	1.50	2.23	1.06	0.00	-1.16	0.08	1.05	0.46	0.35



# Alt Model-Shift Uniqueness Test

005001655-03, P = 38.521718 Days, E = 115.627889 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
4.67	4.99	4.03	5.21	5.41	3.23	1.30	0.65	-0.53	0.96	-0.22	0.41	0.89	0.51	0.61



### Stellar Parameters For KIC 005001655

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5845^{+87}_{-78}$	$3.780^{+0.245}_{-0.105}$	$0.060^{+0.200}_{-0.150}$	$2.479^{+0.403}_{-0.748}$	$1.351^{+0.105}_{-0.244}$	$0.125^{+0.208}_{-0.040}$
	+1%/-1%	+6%/-3%	+333%/-250%	+16%/-30%	+8%/-18%	+167%/-32%
Source	SPE68	SPE68	SPE68	DSEP		

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

### Secondary Eclipse Parameters for KIC 005001655-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	$A_{obs}$
DV	$-340 \pm 76$	$102.88^{+101.68}_{-73.29}$	$1132^{+58}_{-85}$	$2118^{+832}_{-3705}$	$1.056^{+11.673}_{-0.793}$
Alt.	$-628 \pm 126$	$94.14^{+113.13}_{-66.04}$	$1132^{+60}_{-83}$	$2353^{+1010}_{-519}$	$2.236^{+24.867}_{-1.766}$

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

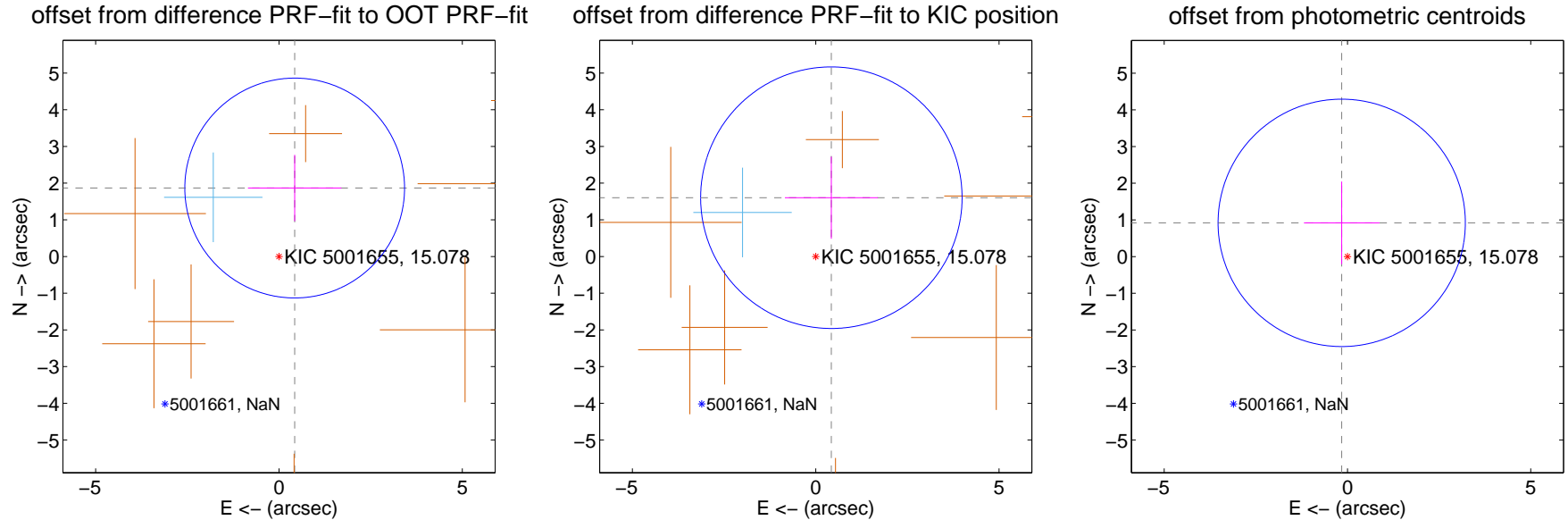
## DV Centroid Data

Supplemental centroid analysis for 005001655-03. Kepler magnitude: 15.08. Transit SNR 8.20

There are 1 quarters with good PRF difference image offsets

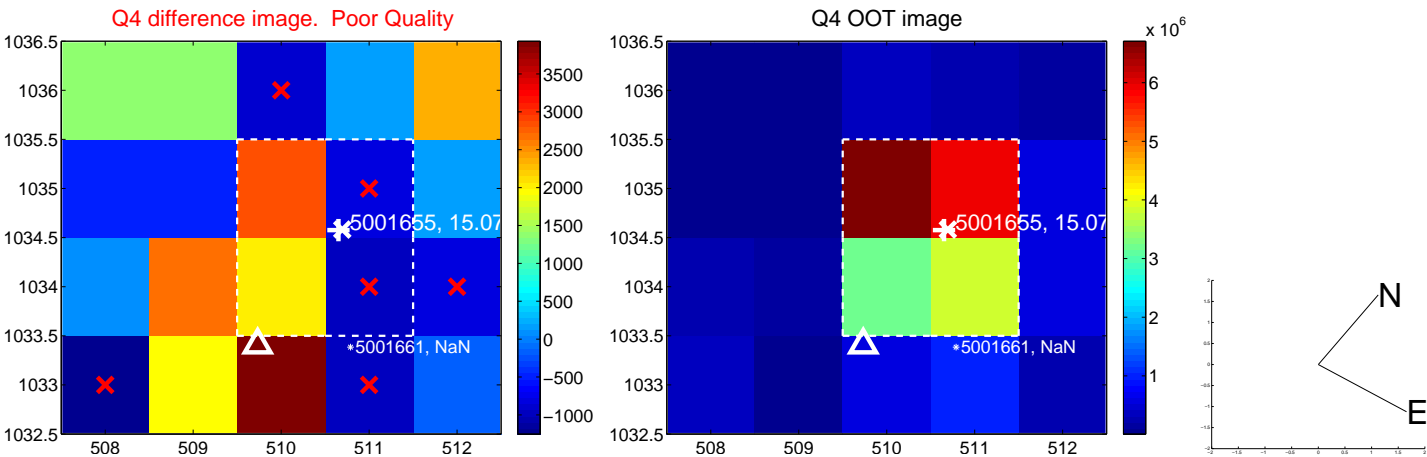
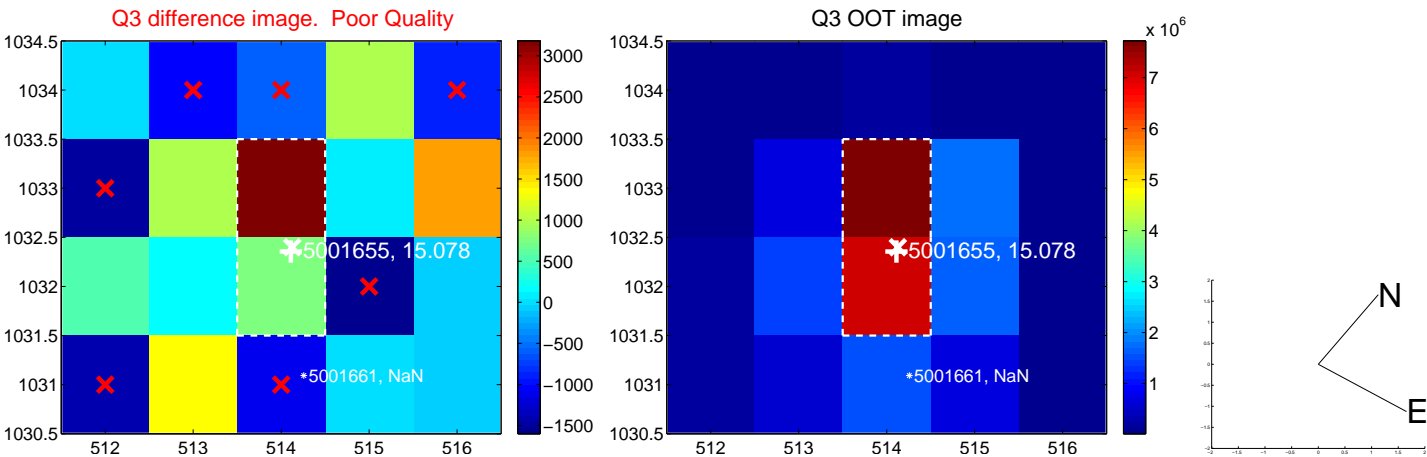
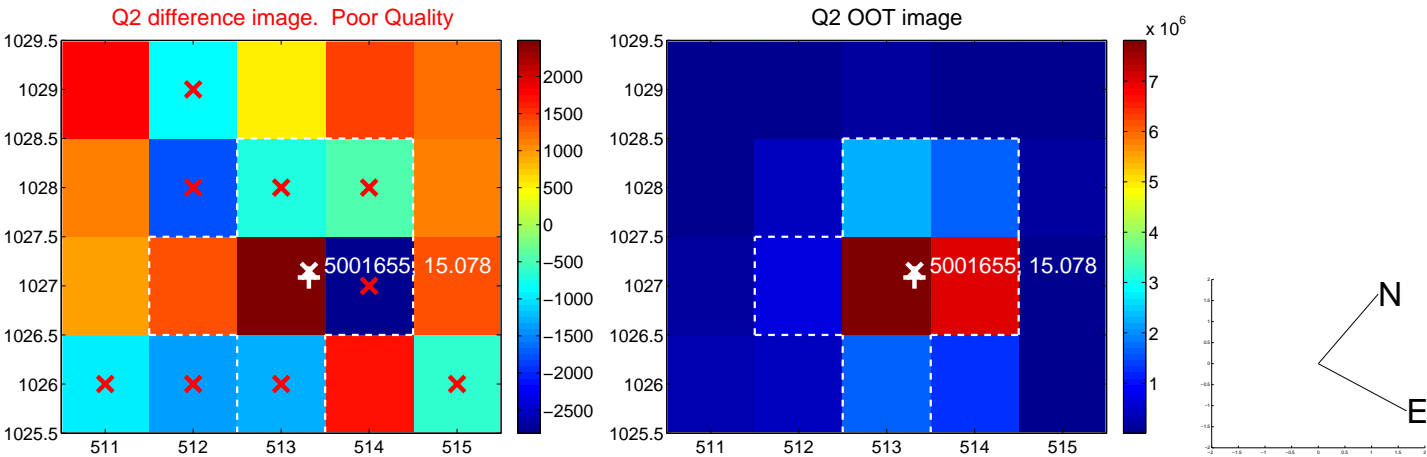
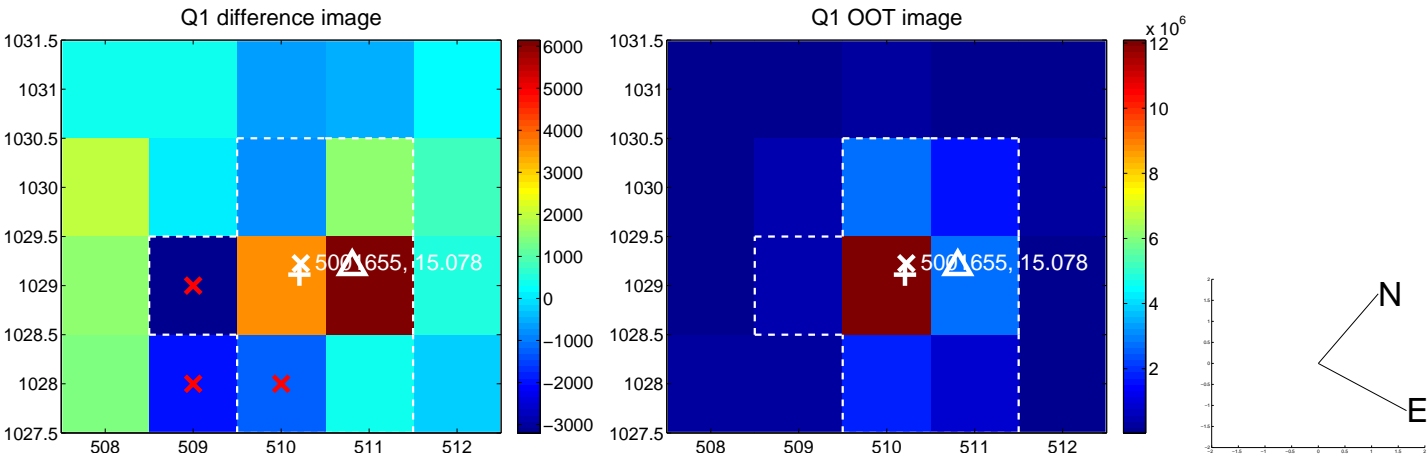
The direct PRF centroid is offset from the target star catalog position by about 0.24 arcsec

	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$1.915 \pm 0.999$	1.92	$-0.428 \pm 1.275$	$1.867 \pm 0.903$
PRF-fit source offset from KIC position	$1.659 \pm 1.188$	1.40	$-0.427 \pm 1.268$	$1.603 \pm 1.119$
photometric centroid source offset	$0.93 \pm 1.12$	0.83	$0.16 \pm 1.03$	$0.92 \pm 1.13$

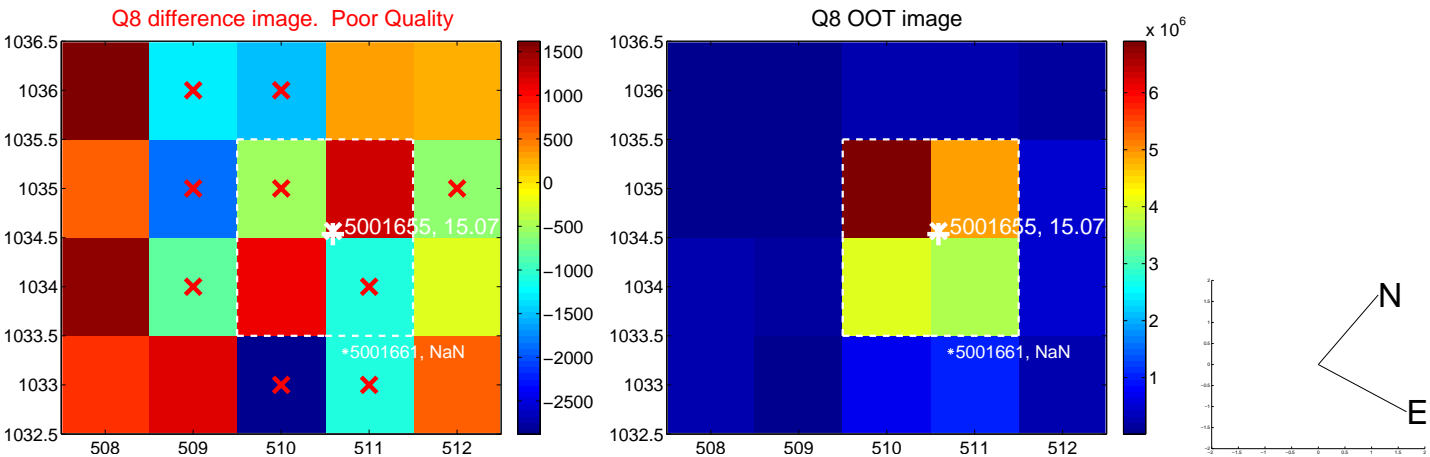
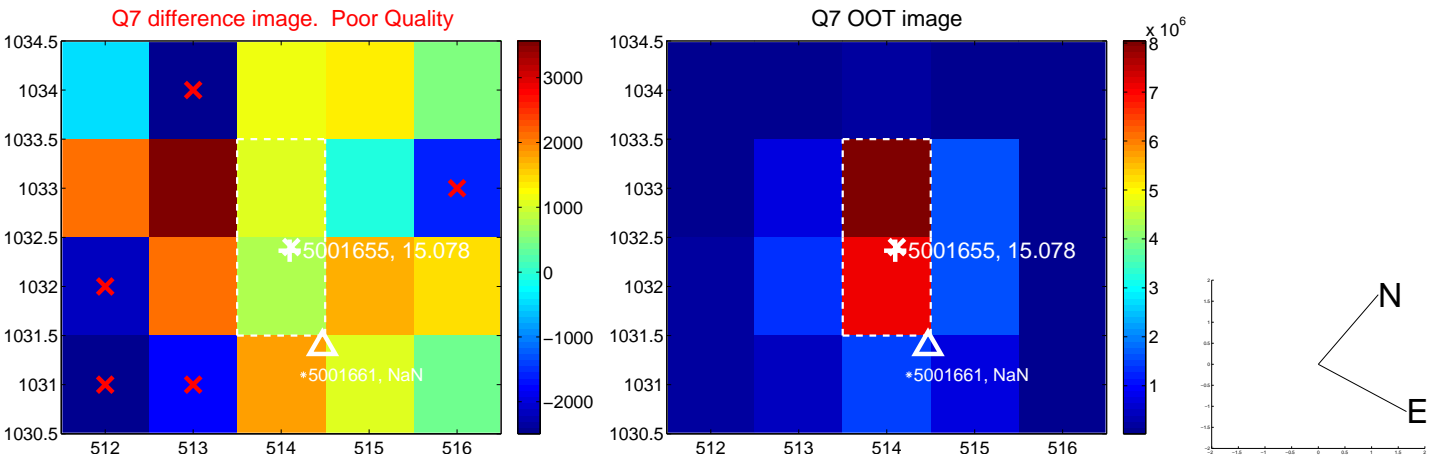
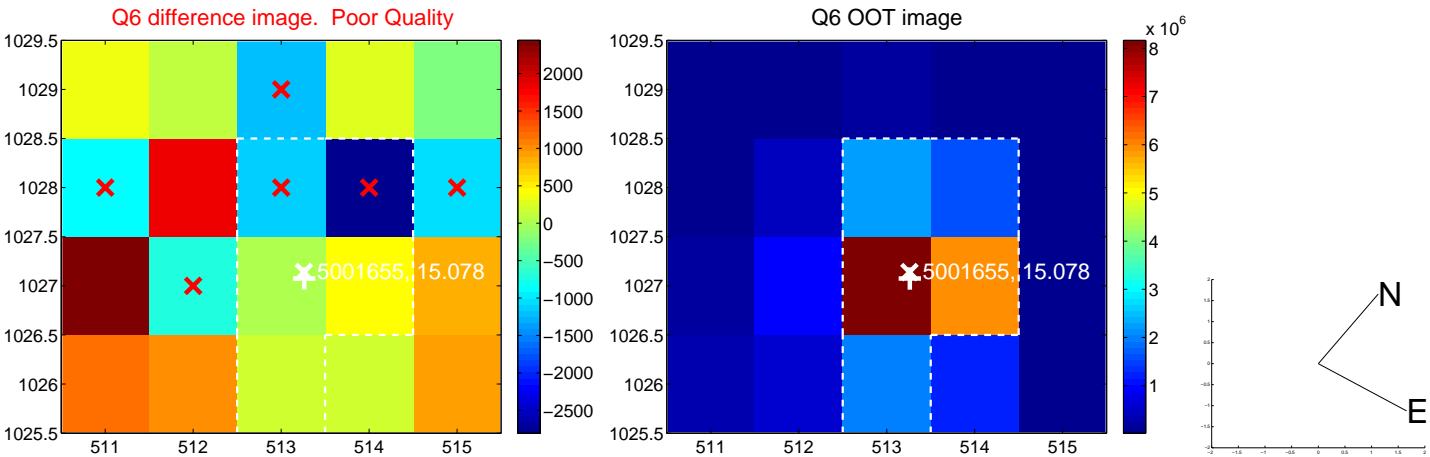
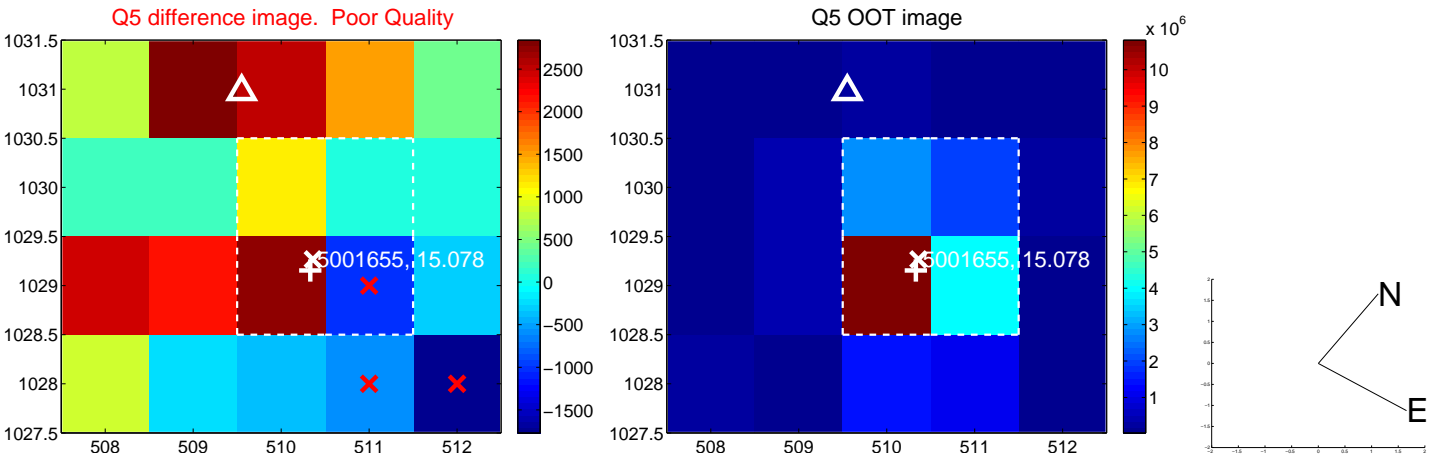


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: three-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

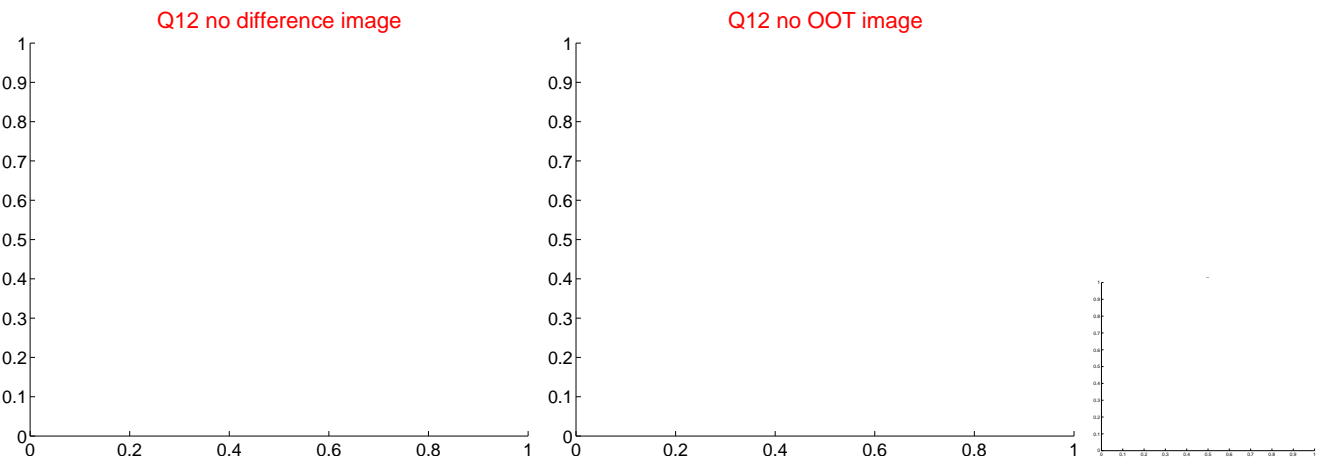
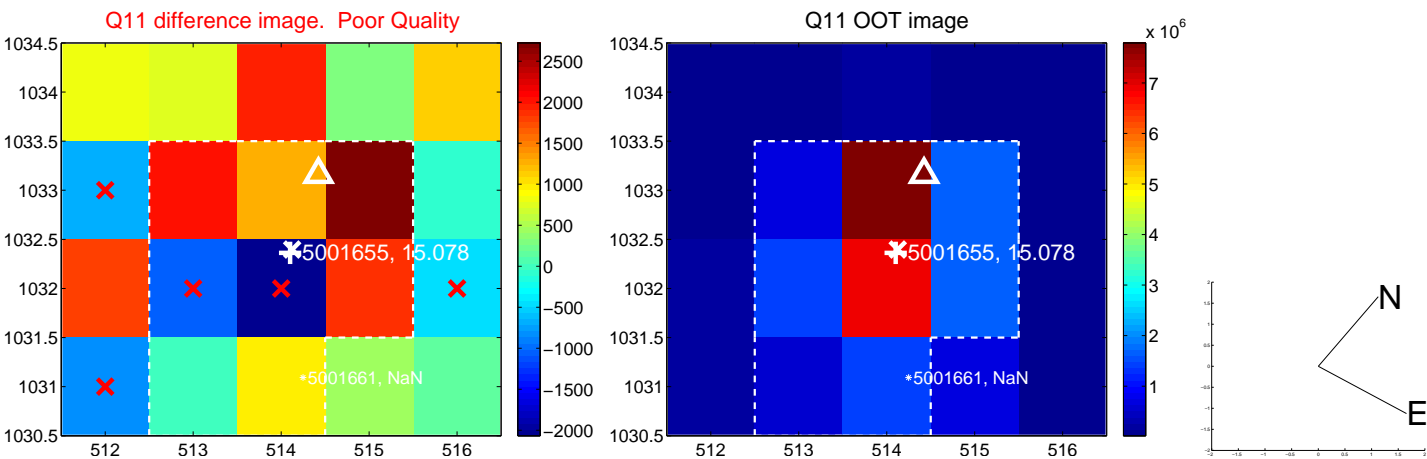
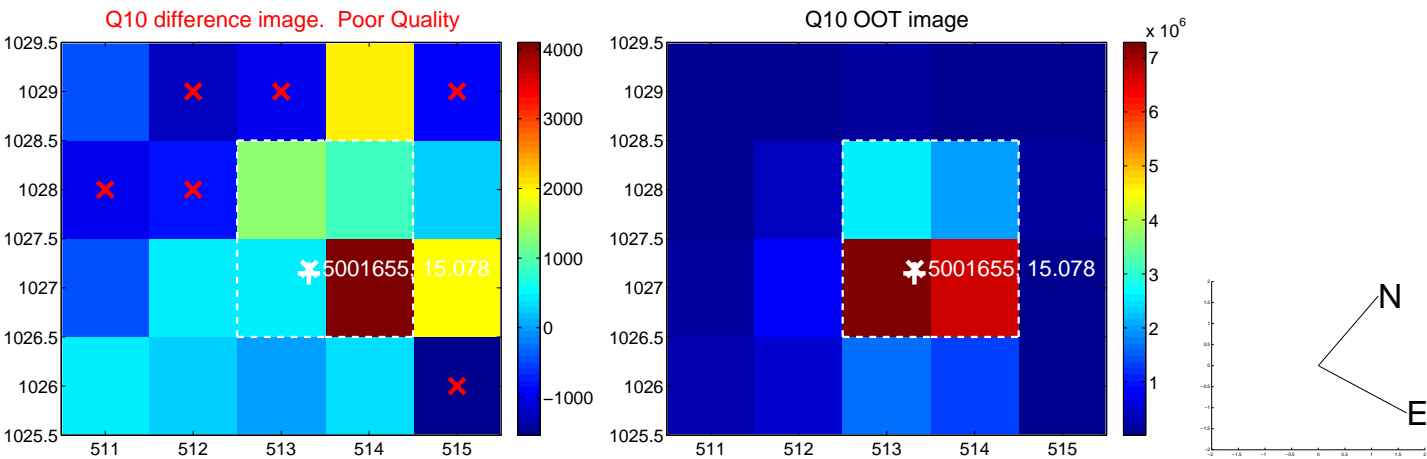
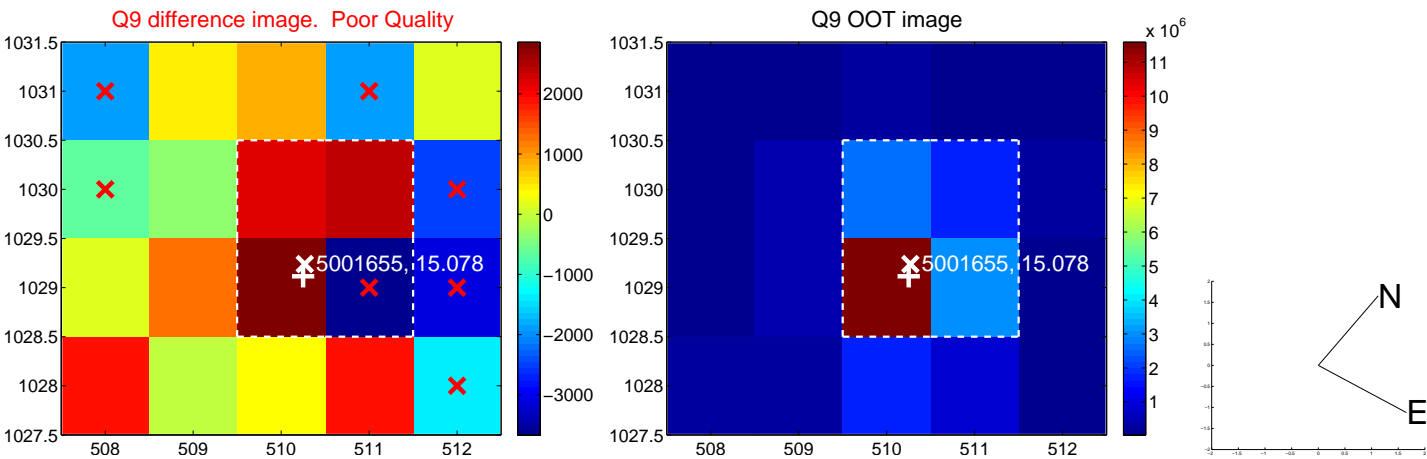


white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.

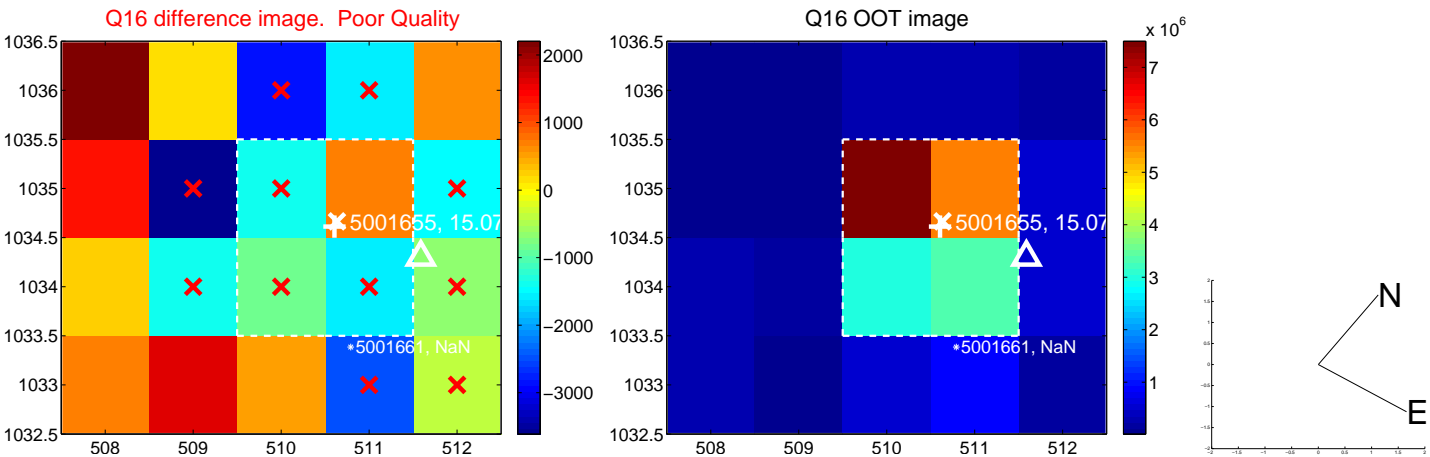
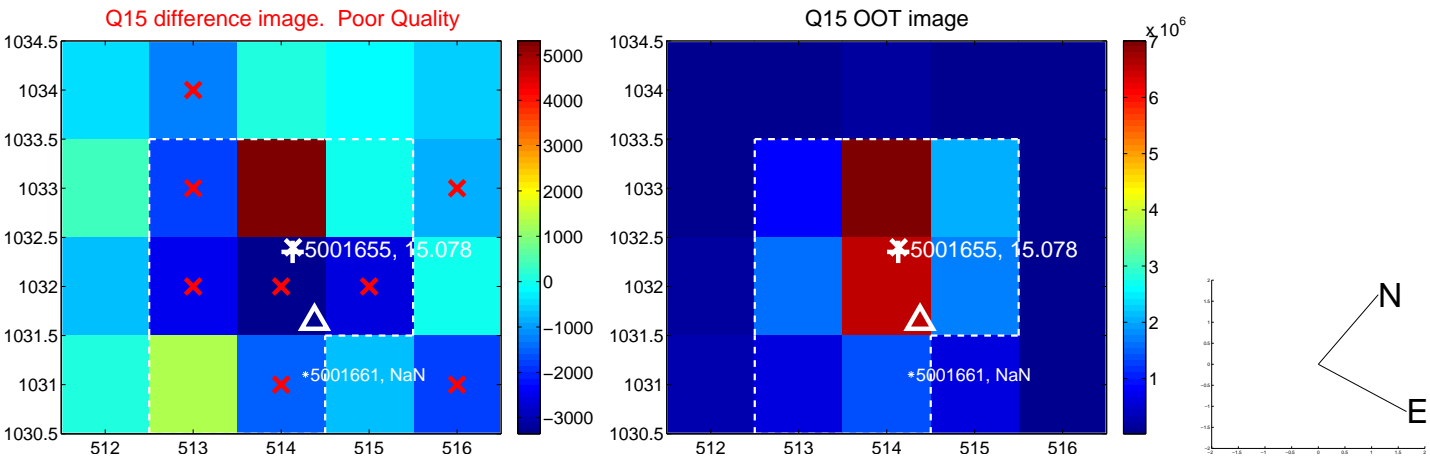
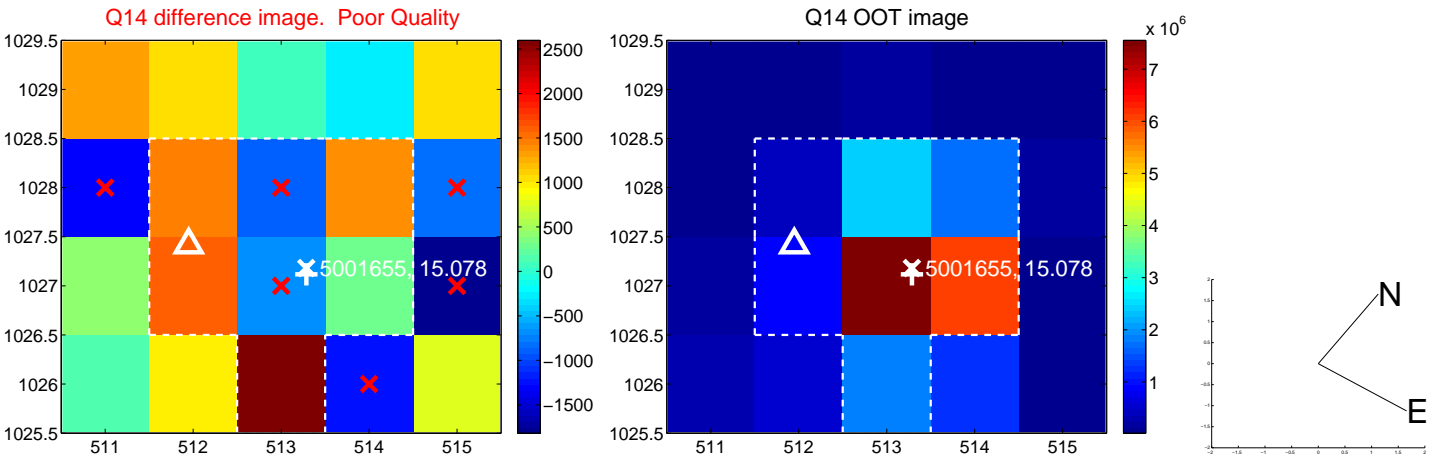
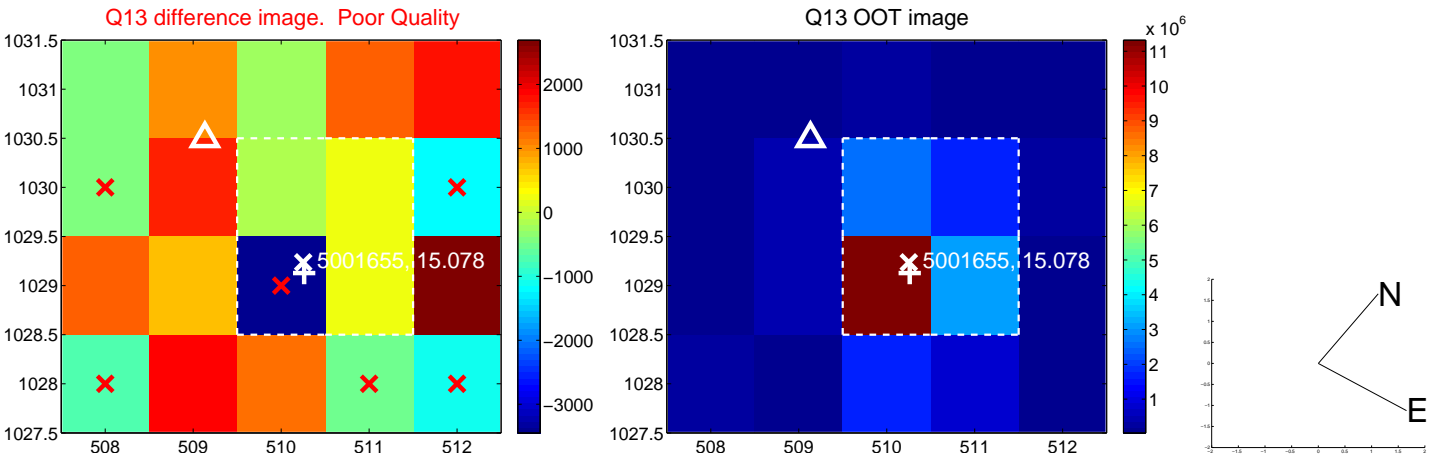




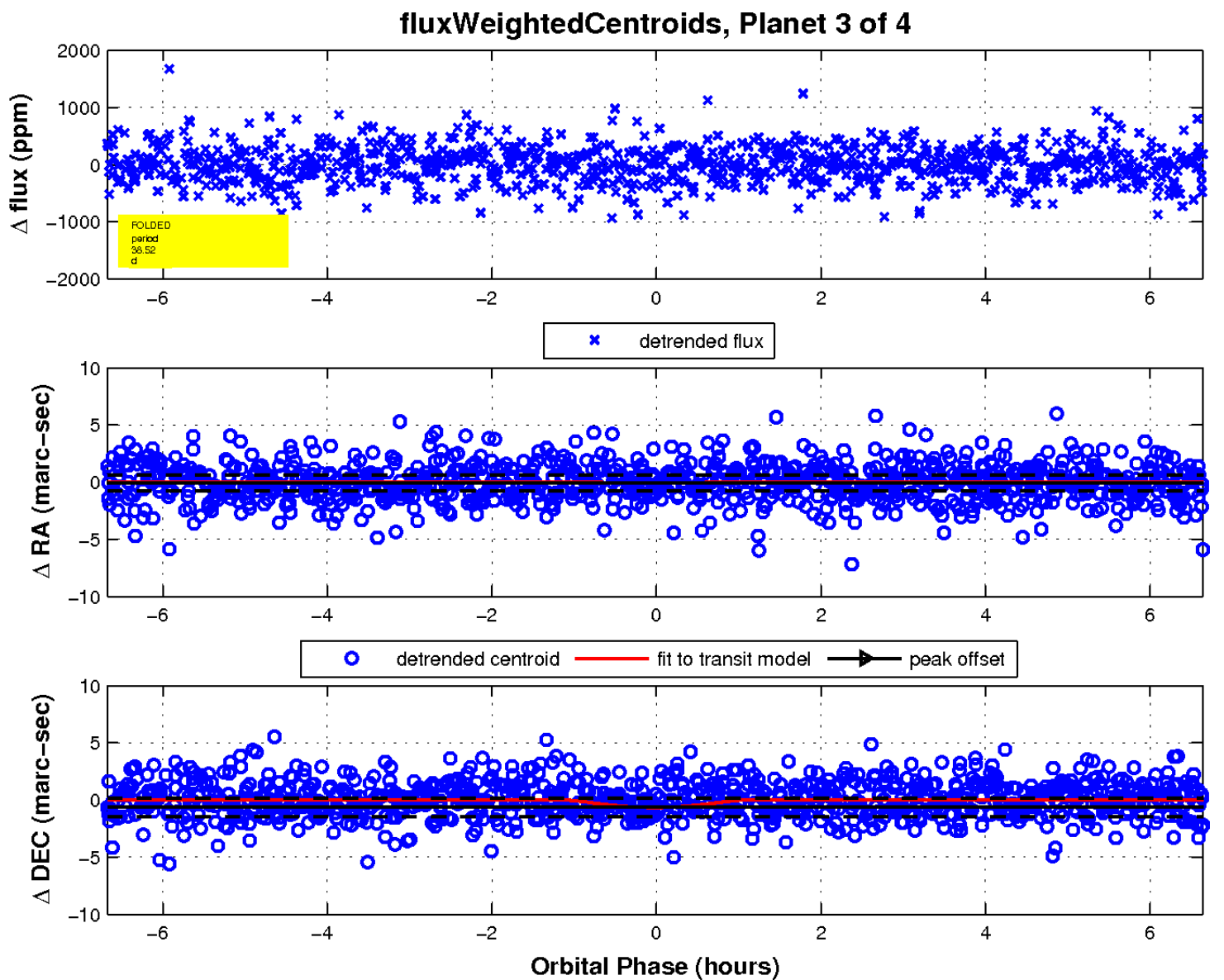
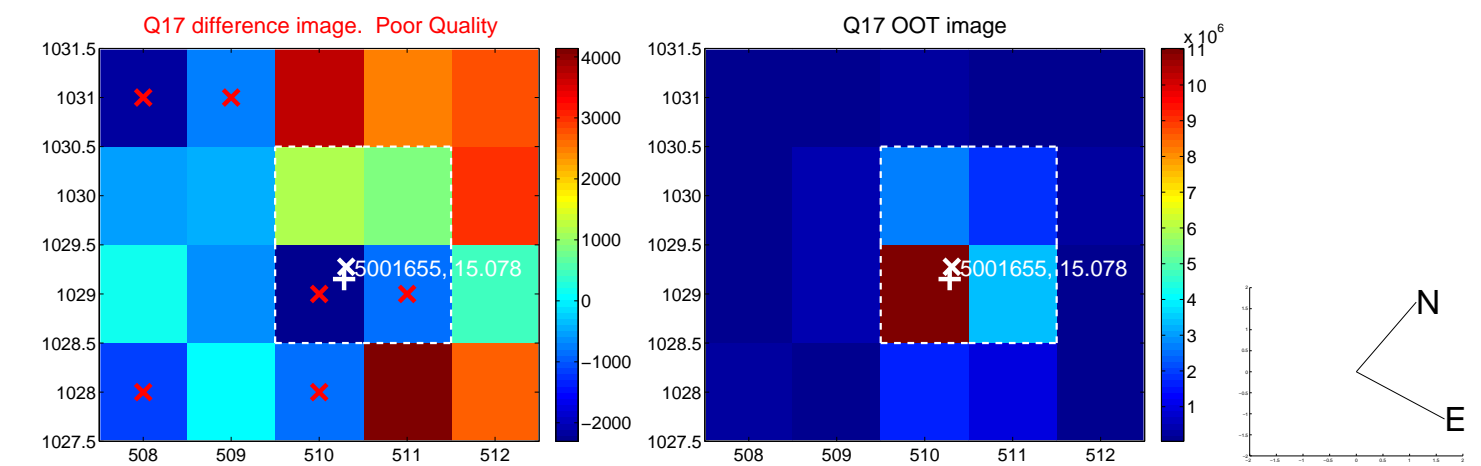
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

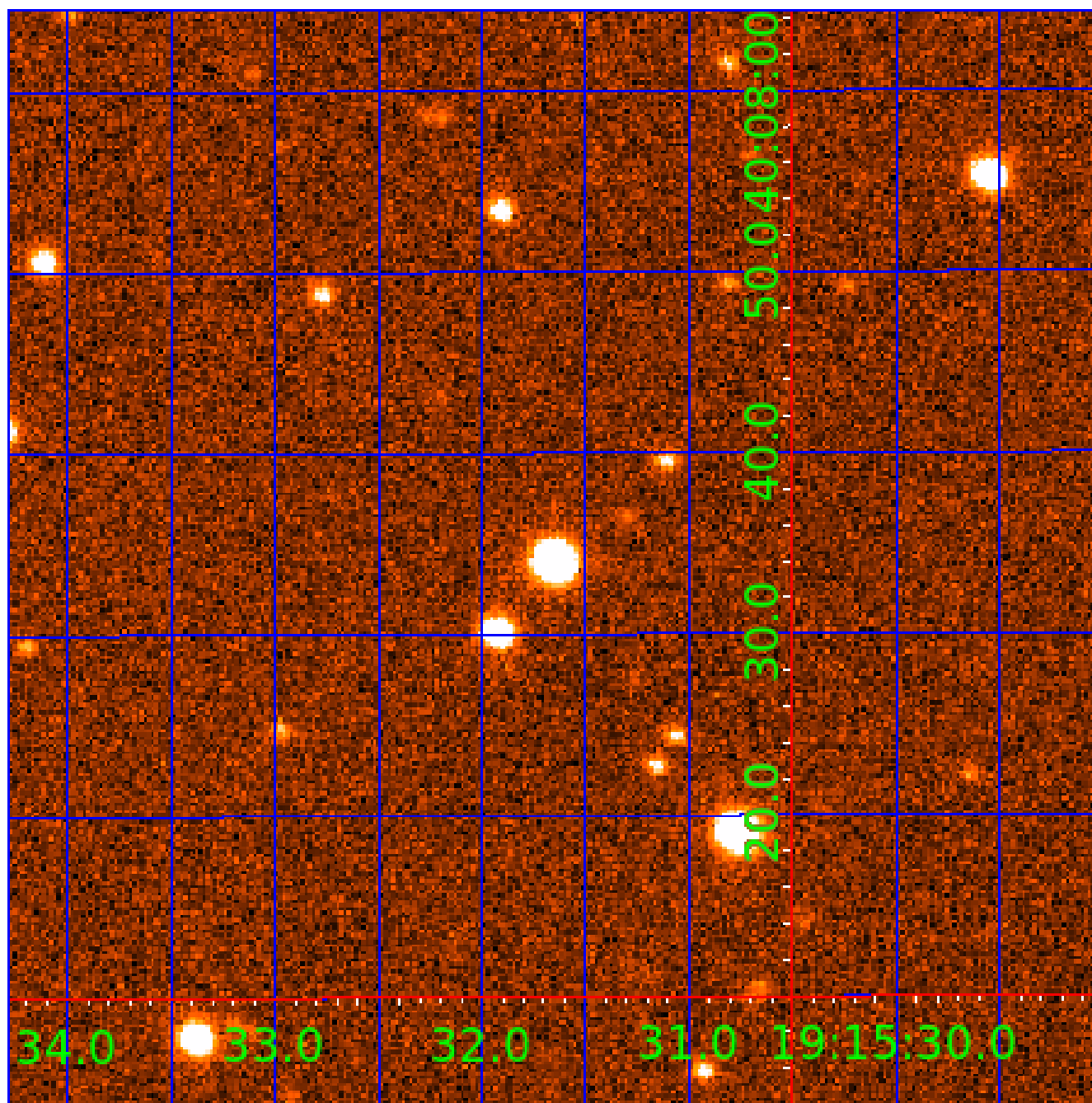


white  $\times$ : KIC target position;  $+$ : OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



UKIRT Image

Declination



# KIC 005001655

## 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)	$R_p$ ( $R_{\oplus}$ )	$S_p$ ( $S_{\oplus}$ )
005001655-01	OBS	No	2.290476	133.192958	39.0	15.911	9.5	12.8	2.48	5845	1.55	4546.20
005001655-02	OBS	No	40.591664	148.481950	323.5	6.171	9.6	9.8	2.48	5845	4.99	98.39
005001655-03	OBS	No	38.520553	154.185867	509.6	2.225	10.1	8.2	2.48	5845	10.63	105.51
005001655-04	OBS	No	26.505407	151.282364	509.2	1.593	8.2	9.9	2.48	5845	6.61	173.69

## Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005001655-01	OBS	FP	0.00	1	0	1	0	LPP_DV—CENT_FEW_DIFFS—HALO_GHOST
005001655-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS
005001655-03	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_FEW_DIFFS
005001655-04	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—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.

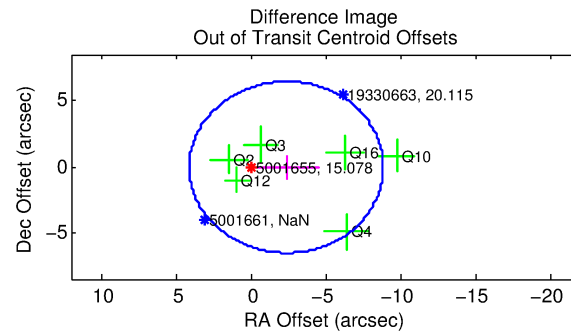
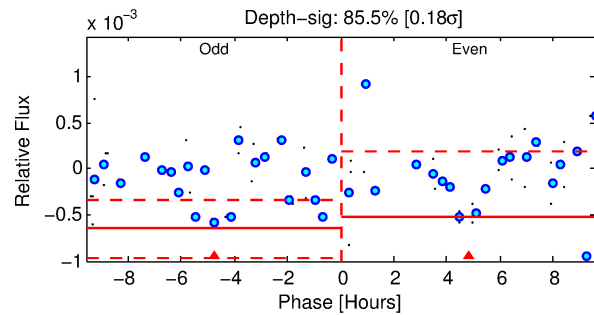
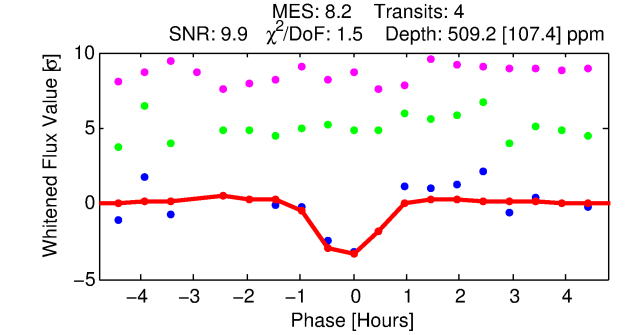
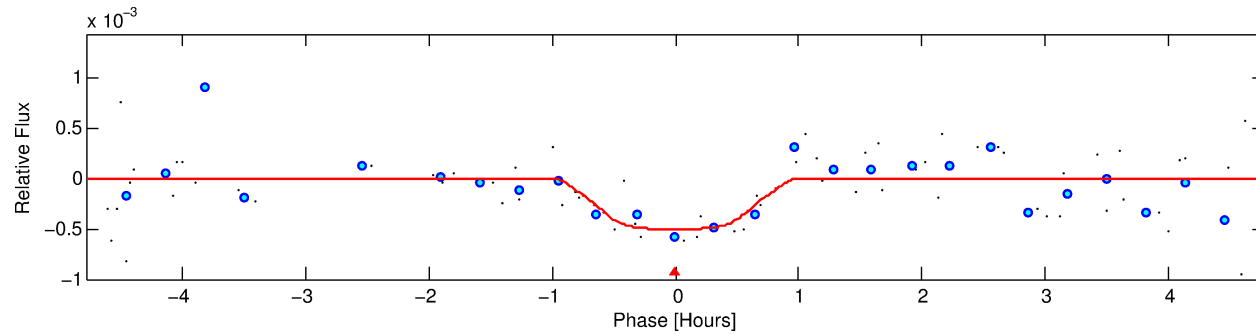
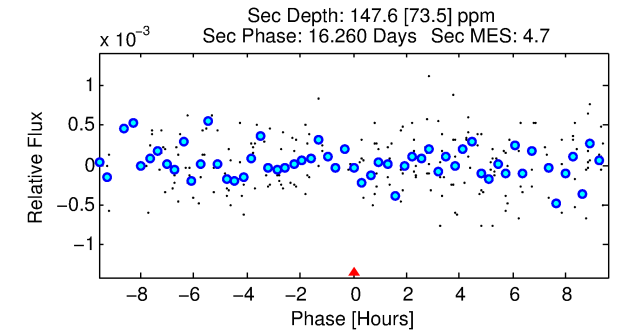
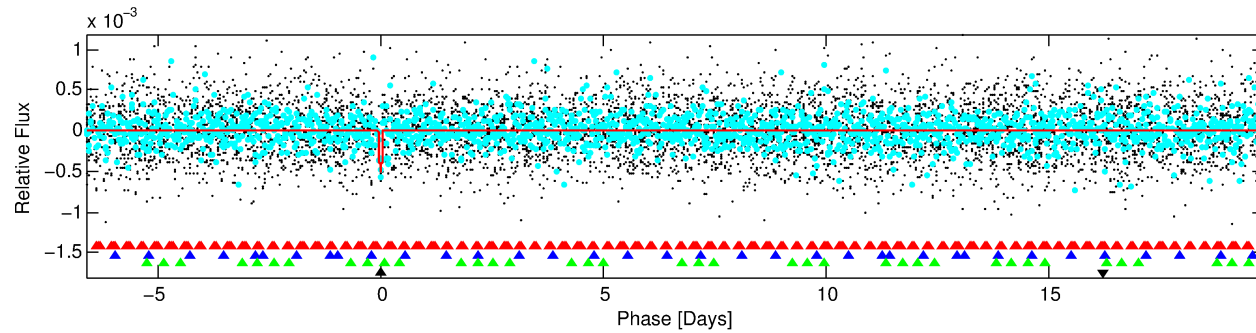
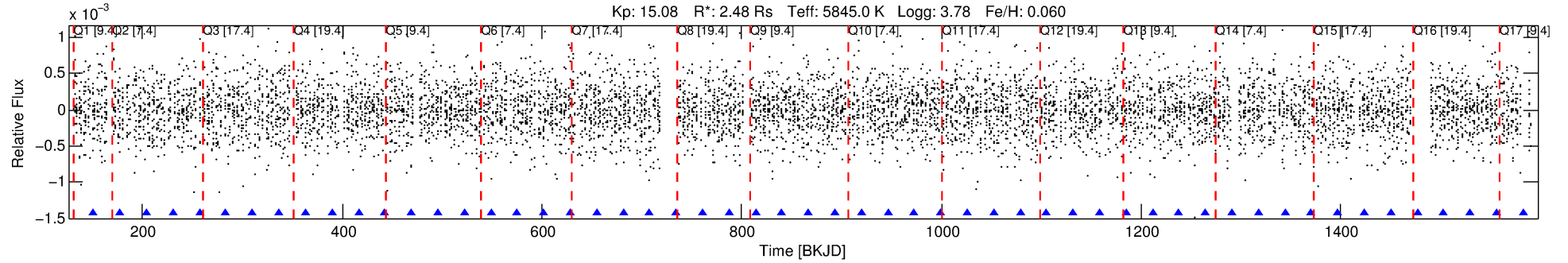
See [http://exoplanetarchive.ipac.caltech.edu/docs/API\\_kepcandidate\\_columns.html#proj\\_disp\\_col](http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col) for comment definitions.

Ephemeris Match Information For 005001655-04

No Significant Match Found

# DV One-Page Summary

KIC: 5001655 Candidate: 4 of 4 Period: 26.505 d



## DV Fit Results:

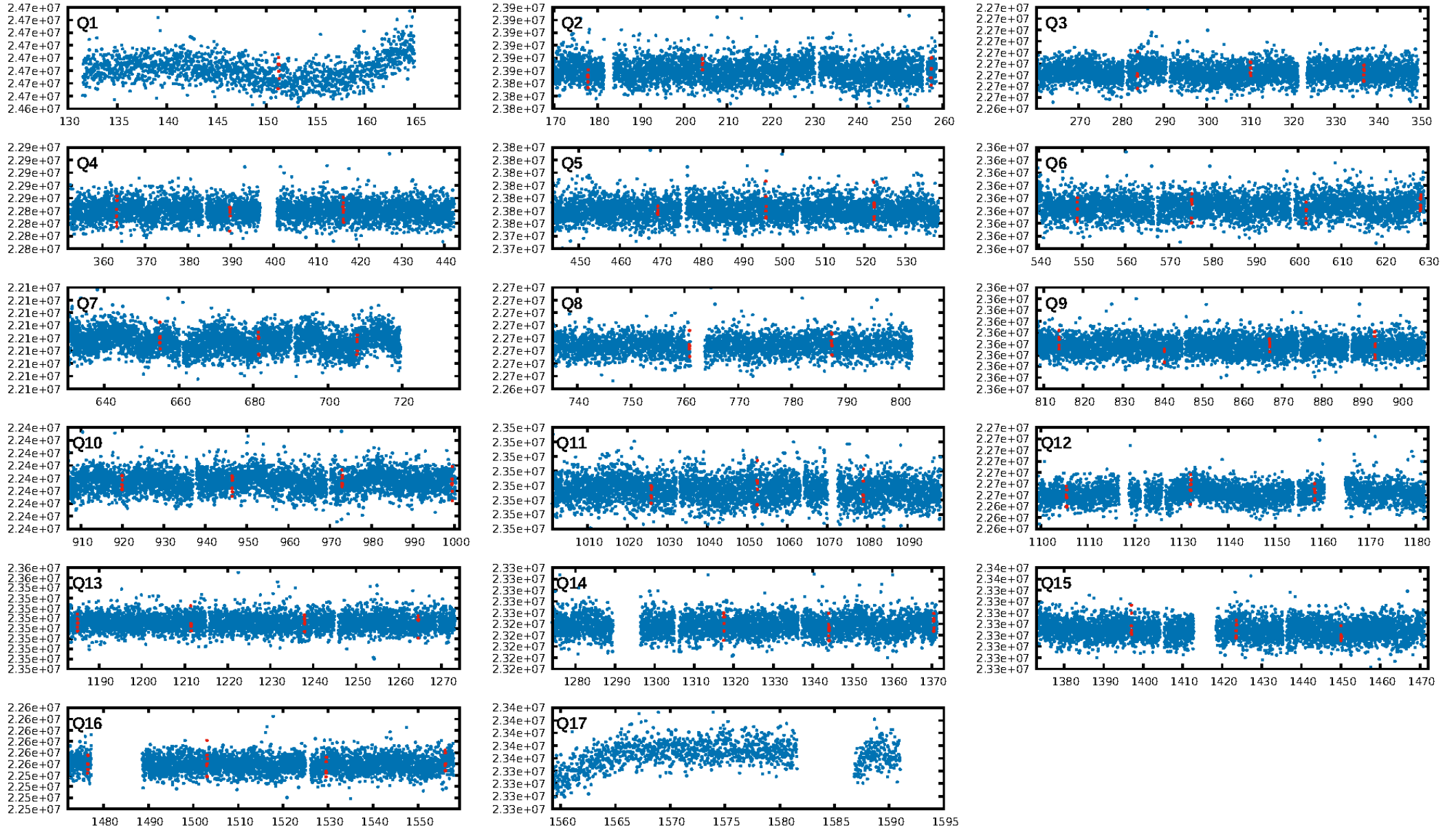
Period = 26.50541 [0.00026] d  
Epoch = 151.2824 [0.0056] BKJD  
Rp/R\* = 0.0244 [0.0320]  
a/R\* = 63.92 [391.03]  
b = 0.89 [1.43]  
Seff = 173.69 [74.80]  
Teff = 926 [100] K  
Rp = 6.61 [8.87] Re  
a = 0.1924 [0.0530] AU  
Ag = 68.70 [185.12] [0.37 $\sigma$ ]  
Teffp = 4120 [2742] K [1.16 $\sigma$ ]

## DV Diagnostic Results:

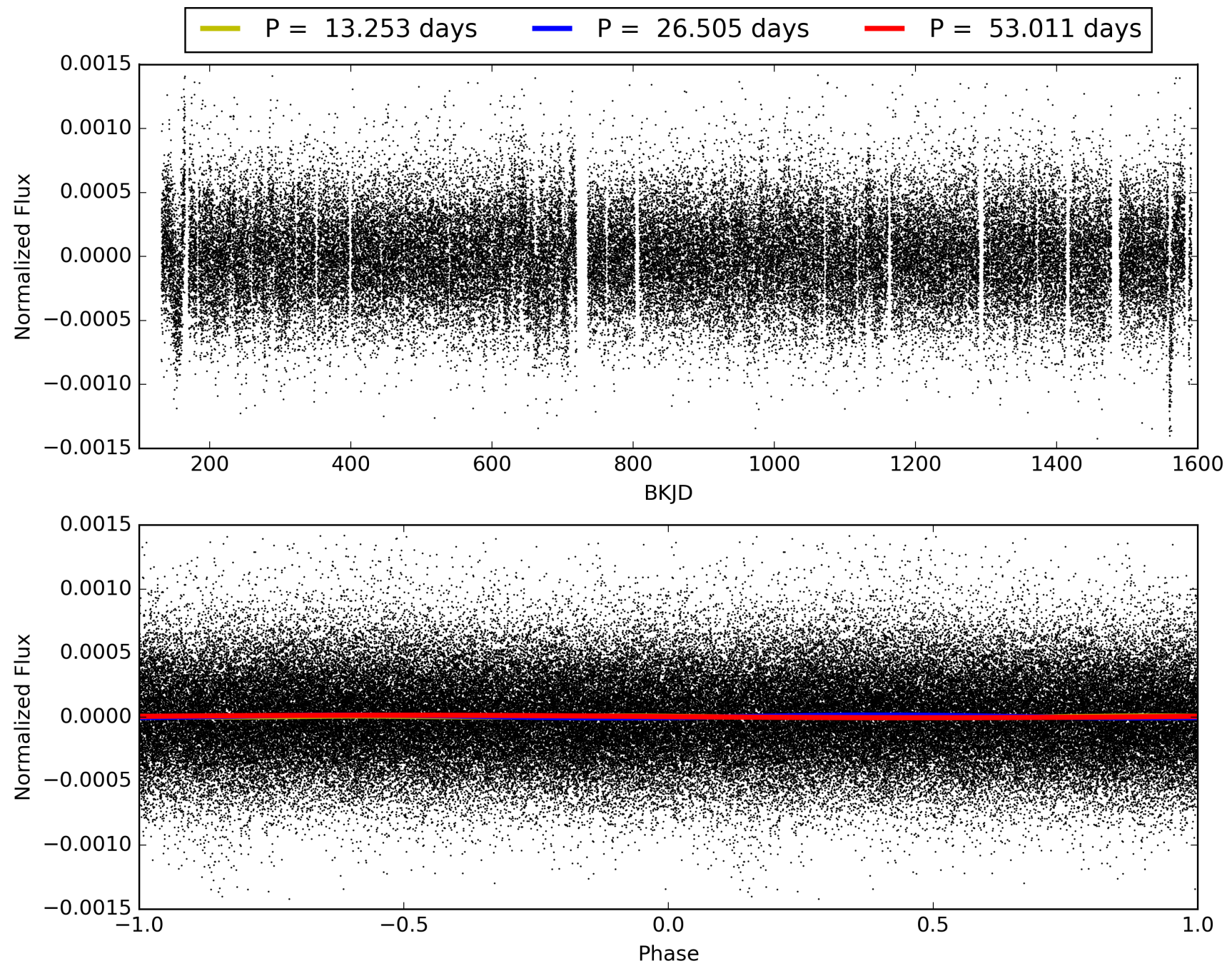
ShortPeriod-sig: 100.0% [36.34 $\sigma$ ]  
LongPeriod-sig: 100.0% [105.37 $\sigma$ ]  
ModelChiSquare2-sig: 92.8%  
ModelChiSquareGof-sig: 93.4%  
**Bootstrap-pfa: 7.33e-08**  
RollingBand-fgt: 1.00 [4/4]  
**GhostDiagnostic-chr: 2.253**  
Centroid-sig: 1.6%  
Centroid-so: 1.334 arcsec [1.58 $\sigma$ ]  
OotOffset-rm: 2.385 arcsec [1.10 $\sigma$ ]  
KicOffset-rm: 2.335 arcsec [1.08 $\sigma$ ]  
OotOffset-st: 2/1/3/0 [6]  
KicOffset-st: 2/1/3/0 [6]  
DiffImageQuality-fgm: 0.33 [2/6]  
DiffImageOverlap-fno: 0.94 [15/16]



# TCE 005001655-04, PDC Light Curves

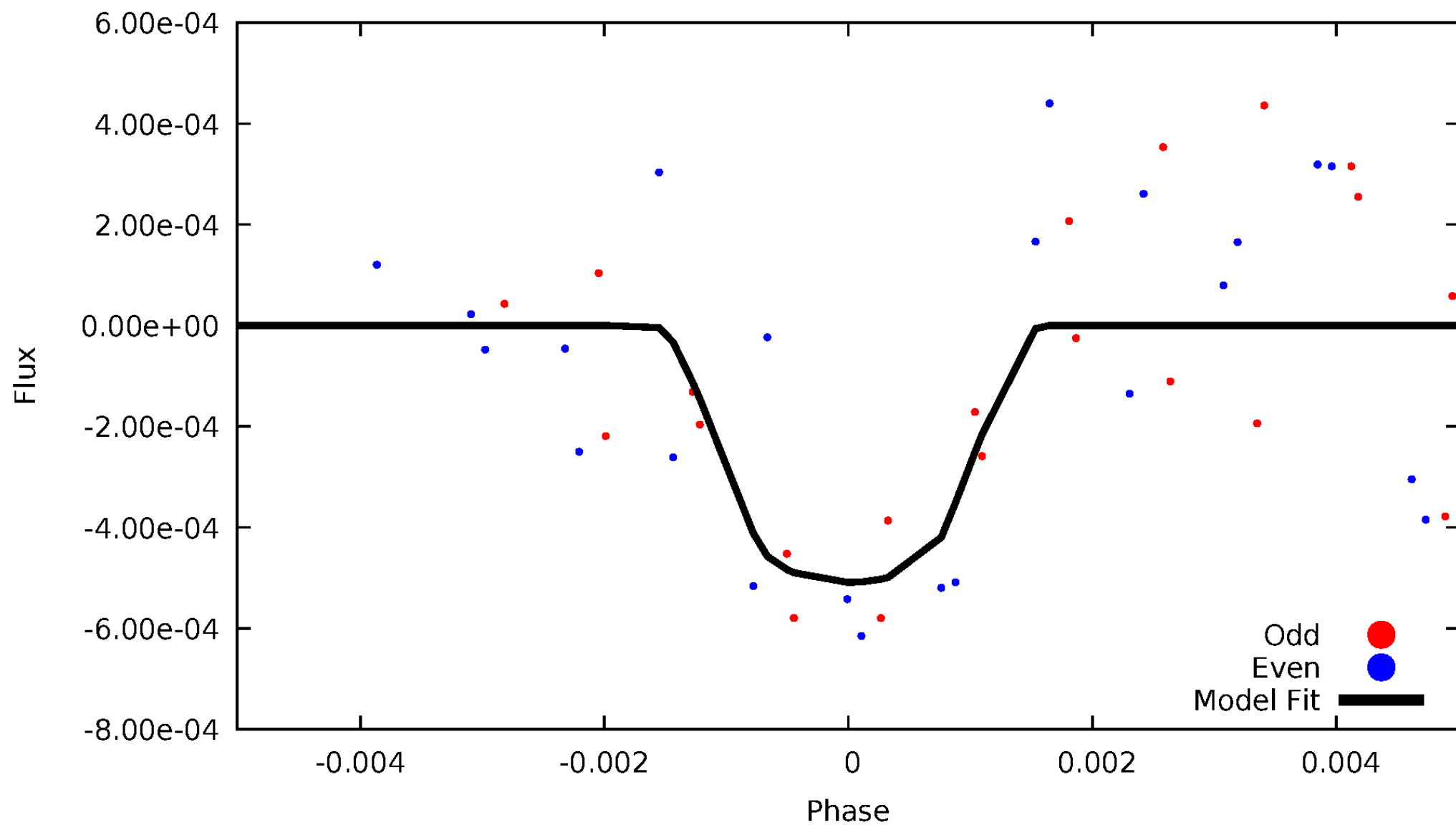


TCE 005001655-04



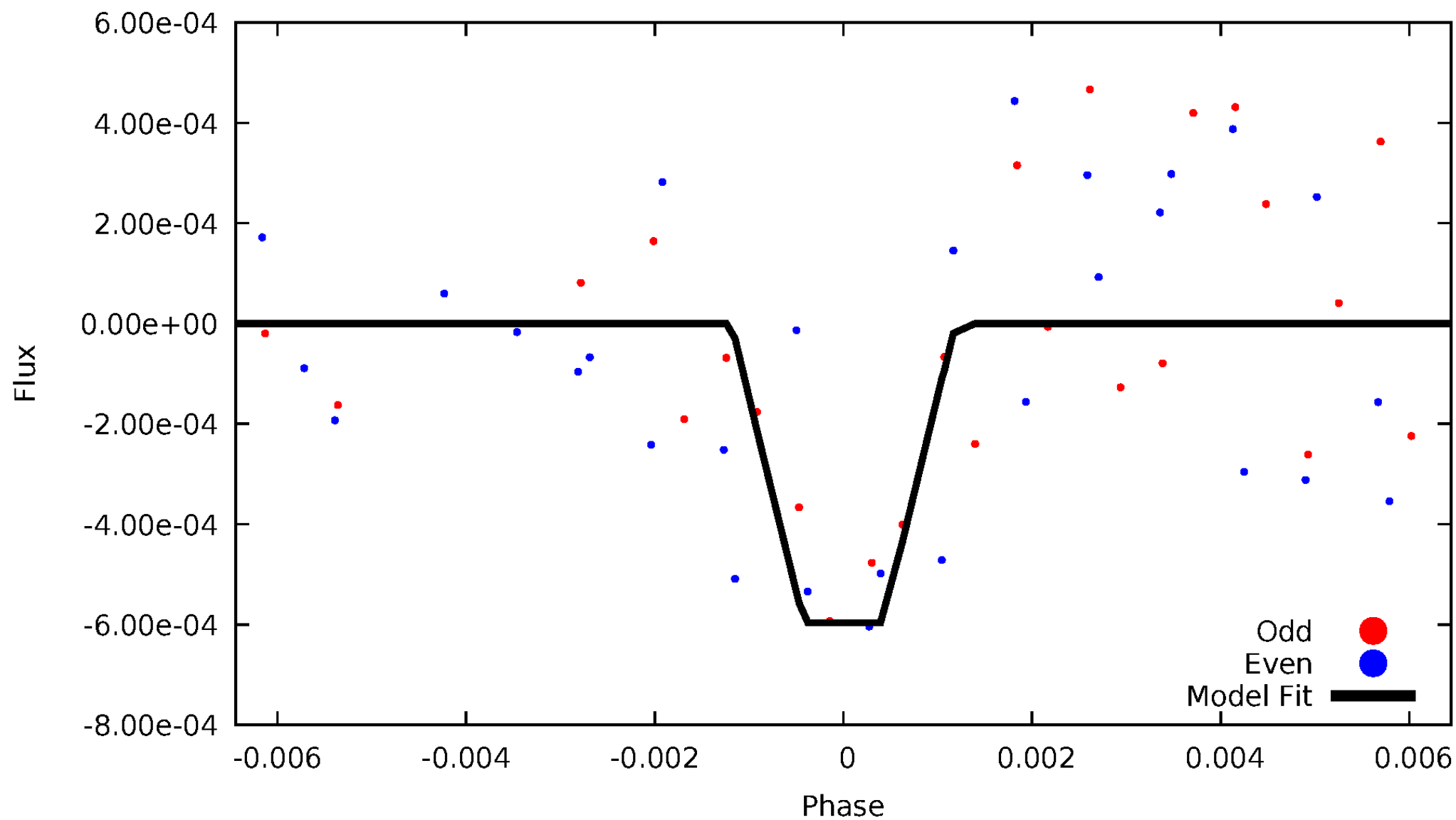
# DV Odd/Even

TCE 005001655-04



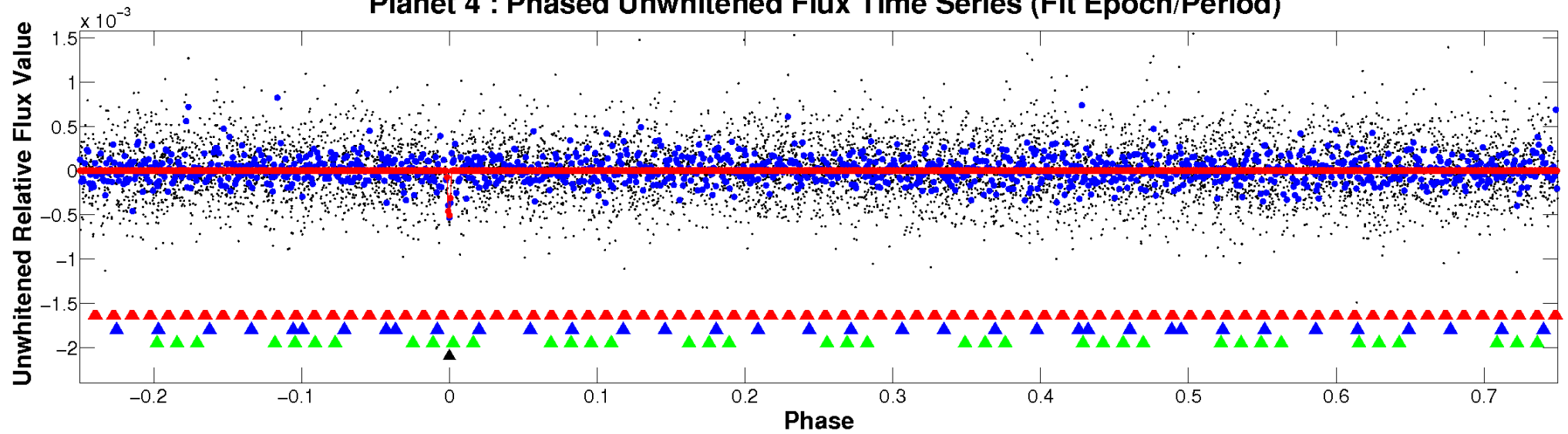
# ALT Odd/Even

TCE 005001655-04

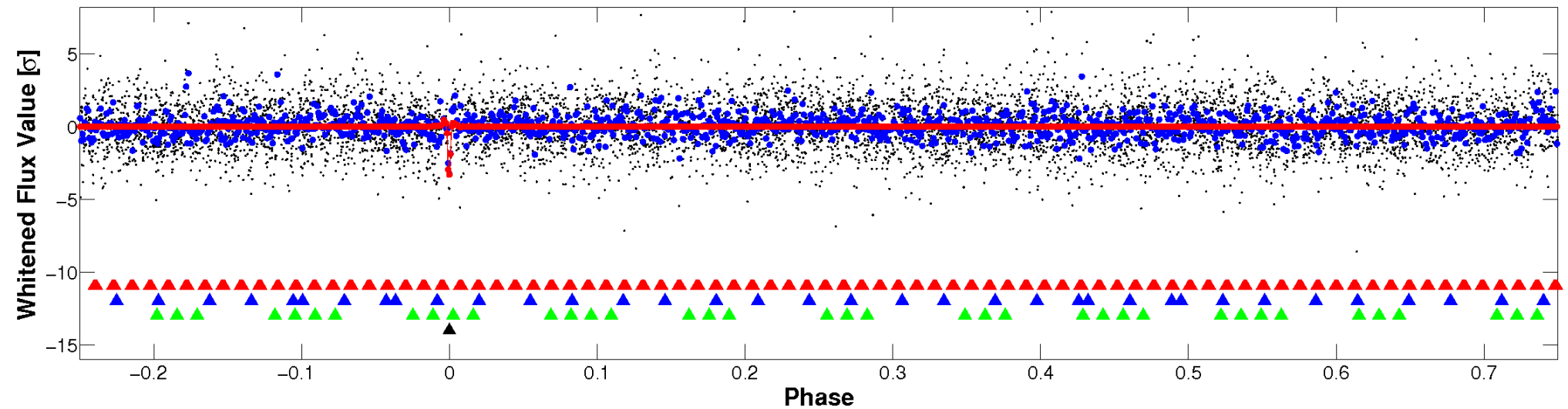


# Non-Whitened Vs. Whitened Light Curve

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

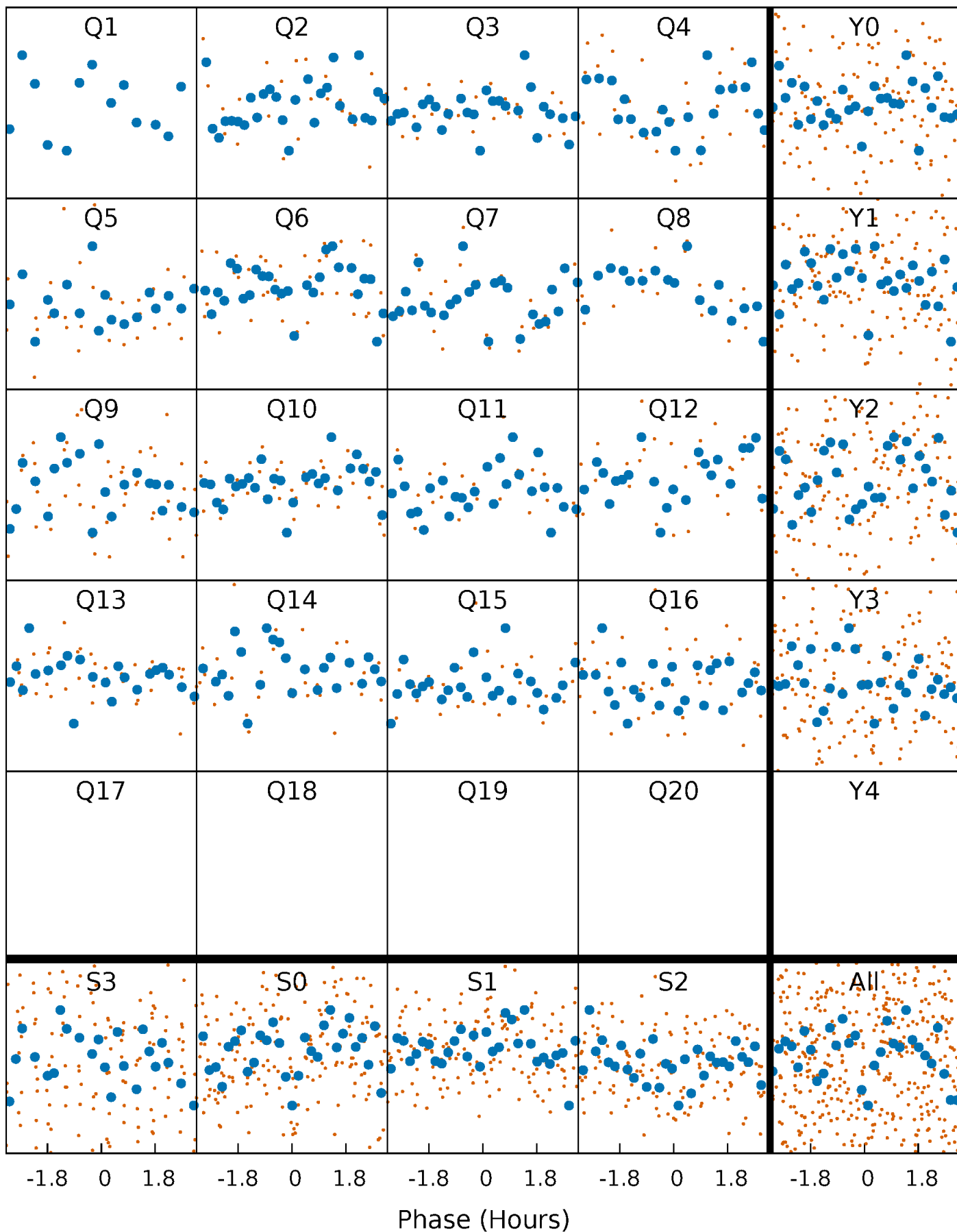


## Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



# PDC Quarter-Phased Transit Curves

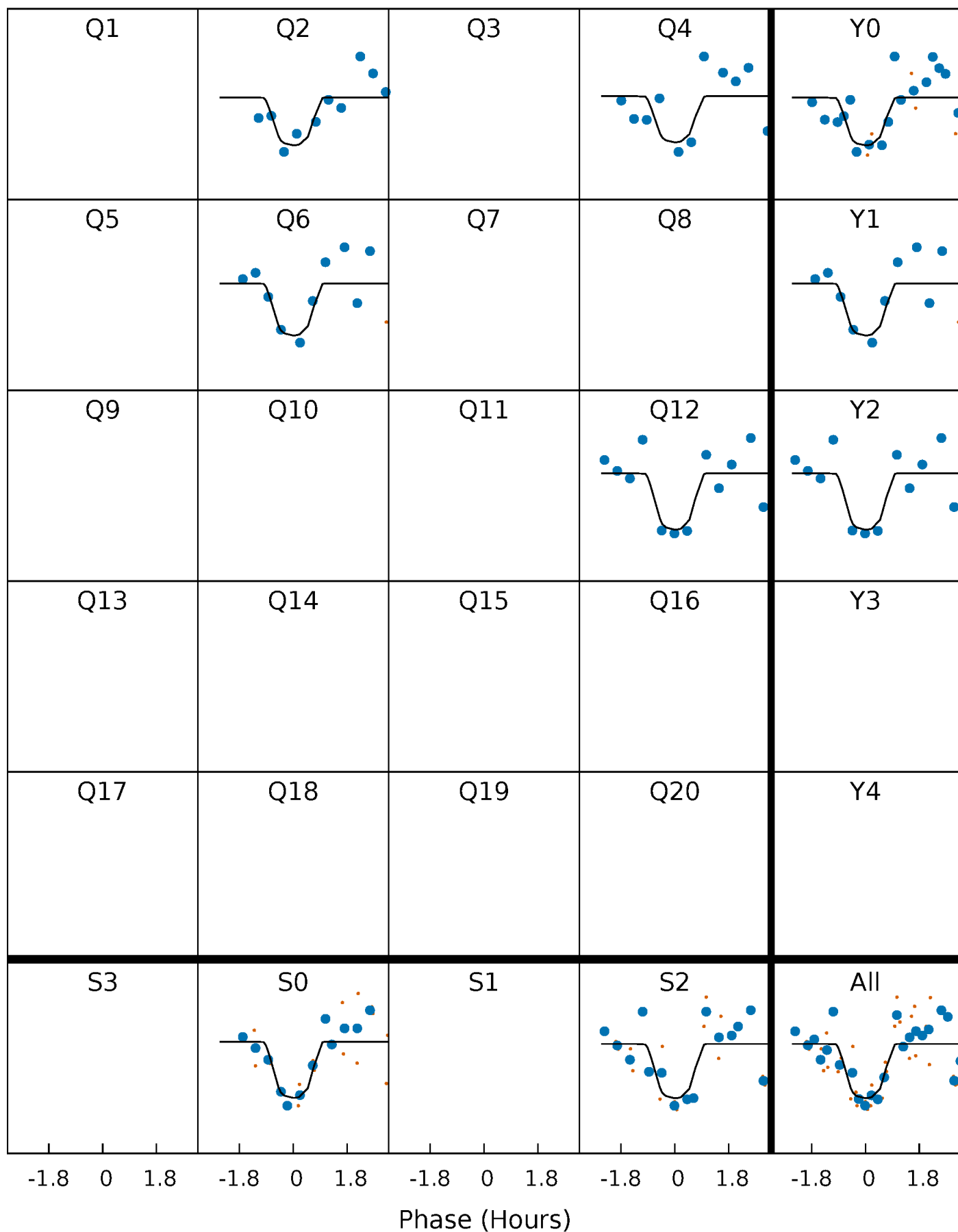
TCE 005001655-04 P= 26.505407 Days  $T_0=151.282364$  (BKJD)





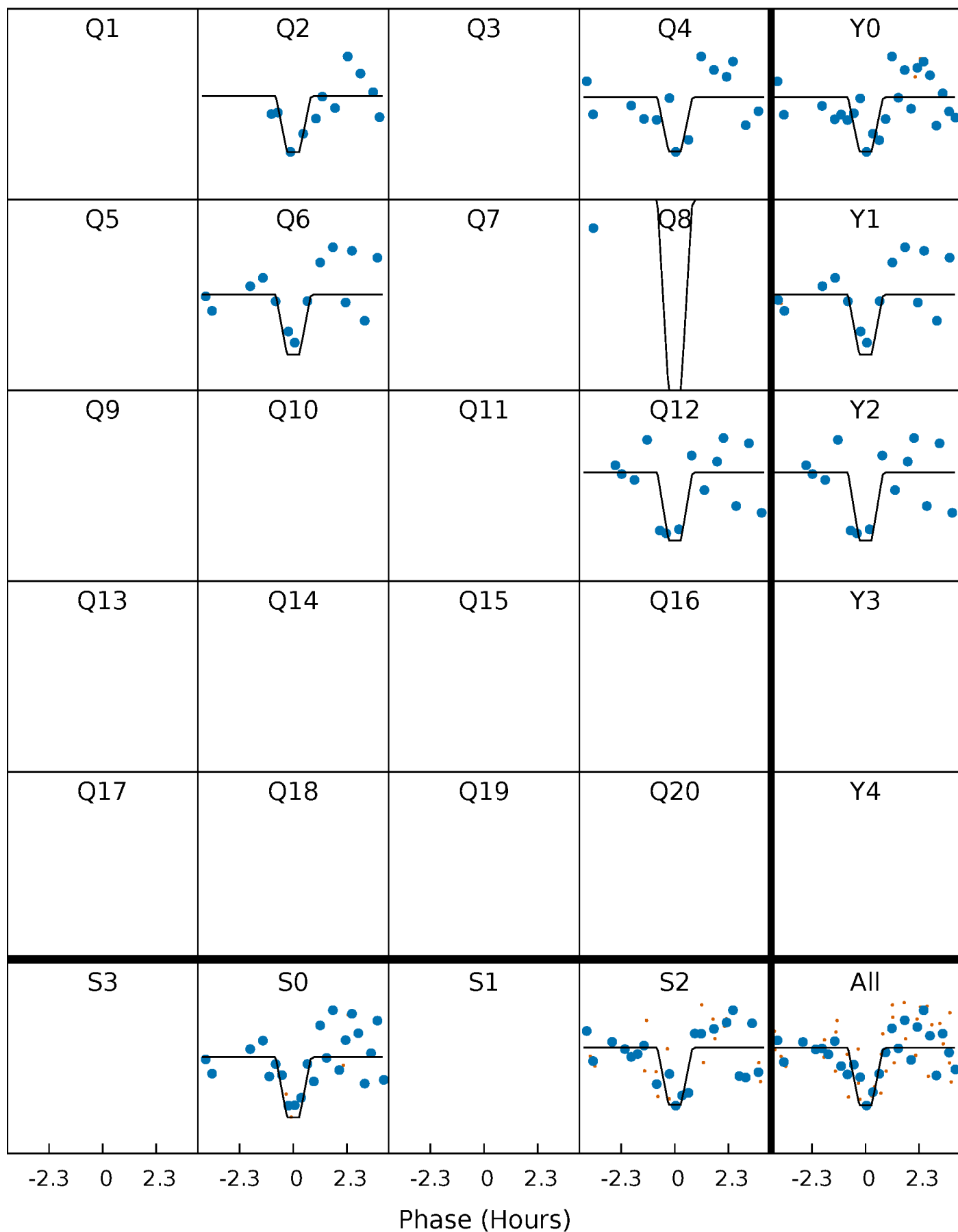
# DV Quarter-Phased Transit Curves

TCE 005001655-04 P= 26.505407 Days  $T_0=151.282364$  (BKJD)



# Alt. Detrend Quarter-Phased Transit Curves

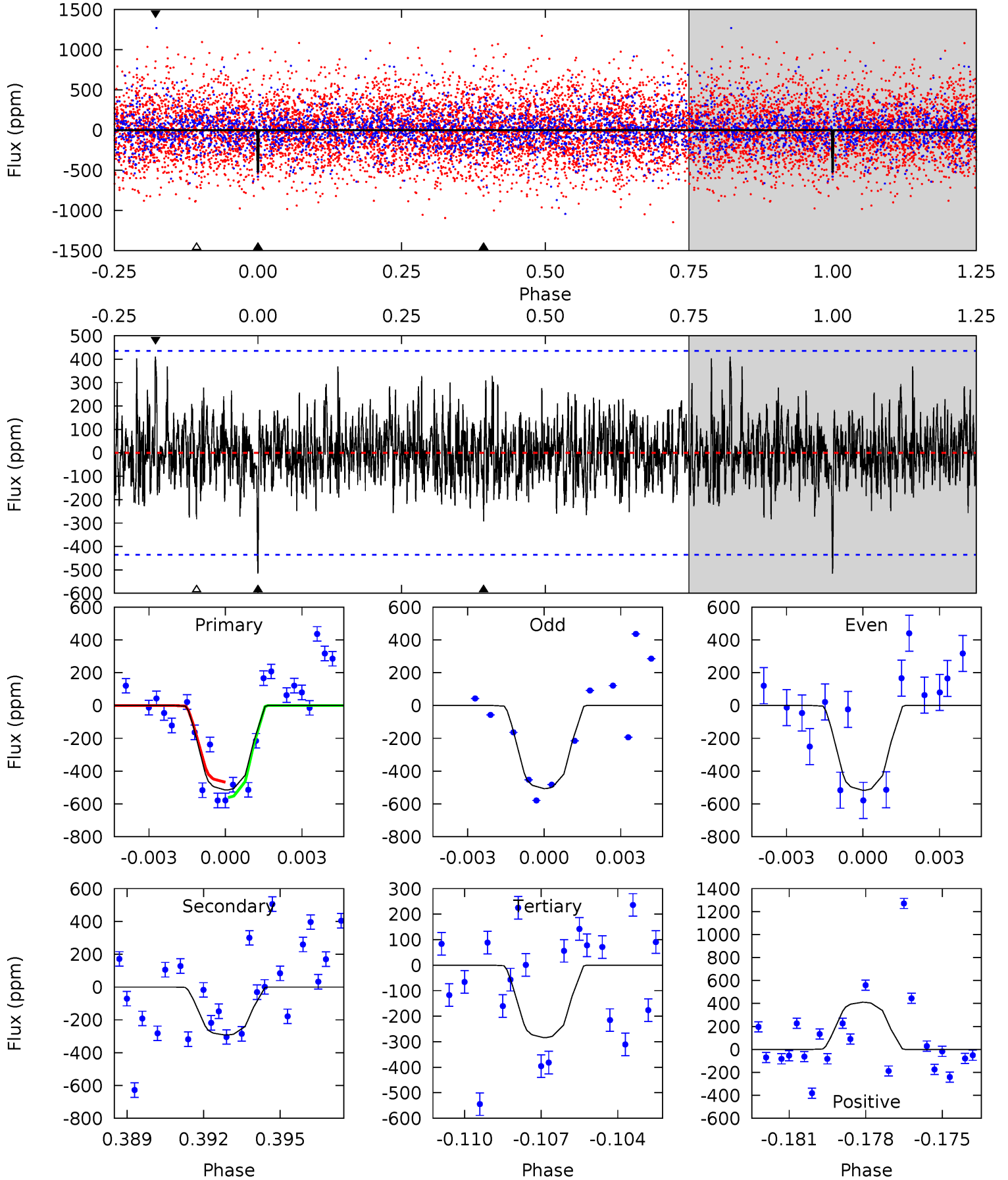
TCE 005001655-04 P= 26.505914 Days  $T_0=151.273884$  (BKJD)



# DV Model-Shift Uniqueness Test

005001655-04, P = 26.505407 Days, E = 124.776957 Days

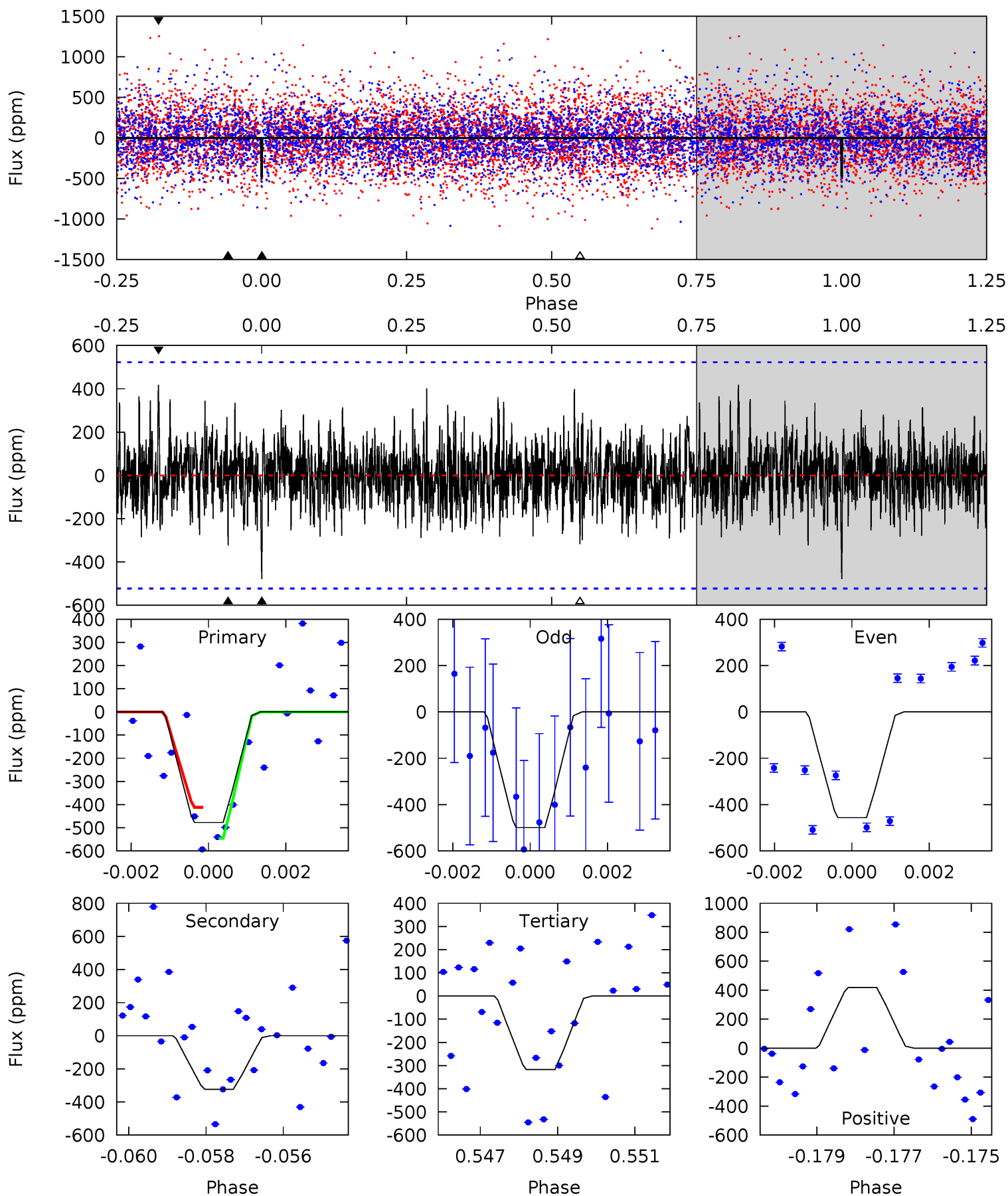
Pri	Sec	Ter	Pos	FA <sub>1</sub>	FA <sub>2</sub>	F <sub>Red</sub>	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.22	3.53	3.42	4.95	5.25	2.97	1.23	2.79	1.27	0.11	-1.42	0.06	1.00	0.44	0.57



# Alt Model-Shift Uniqueness Test

005001655-04, P = 26.505914 Days, E = 124.767970 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
4.86	3.29	3.23	4.26	5.32	3.08	1.08	1.63	0.60	0.06	-0.97	0.22	0.99	0.47	0.67



### Stellar Parameters For KIC 005001655

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	$5845^{+87}_{-78}$	$3.780^{+0.245}_{-0.105}$	$0.060^{+0.200}_{-0.150}$	$2.479^{+0.403}_{-0.748}$	$1.351^{+0.105}_{-0.244}$	$0.125^{+0.208}_{-0.040}$
	+1%/-1%	+6%/-3%	+333%/-250%	+16%/-30%	+8%/-18%	+167%/-32%
Source	SPE68	SPE68	SPE68	DSEP		

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

### Secondary Eclipse Parameters for KIC 005001655-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	$A_{\text{obs}}$
DV	-293±83	$8.67^{+7.04}_{-5.75}$	$1280^{+64}_{-99}$	$4358^{+2731}_{-852}$	$76^{+609}_{-55}$
Alt.	-323±98	$8.18^{+7.30}_{-5.46}$	$1283^{+67}_{-97}$	$4571^{+3360}_{-986}$	$98^{+785}_{-73}$

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

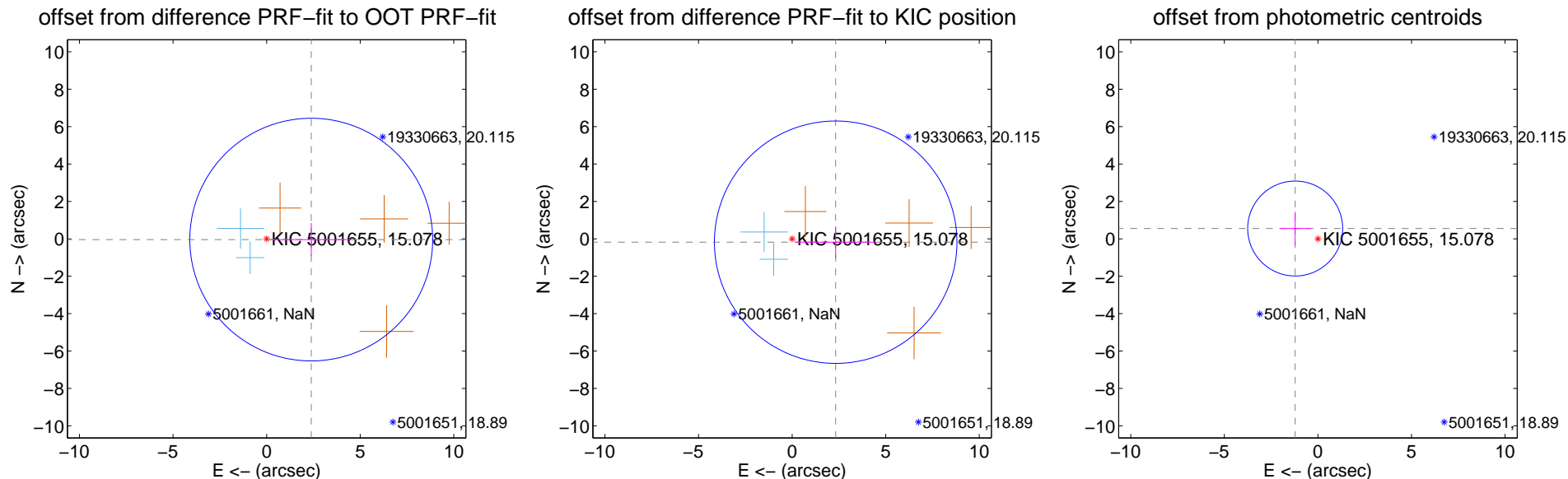
## DV Centroid Data

Supplemental centroid analysis for 005001655-04. Kepler magnitude: 15.08. Transit SNR 9.91

There are 2 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.23 arcsec

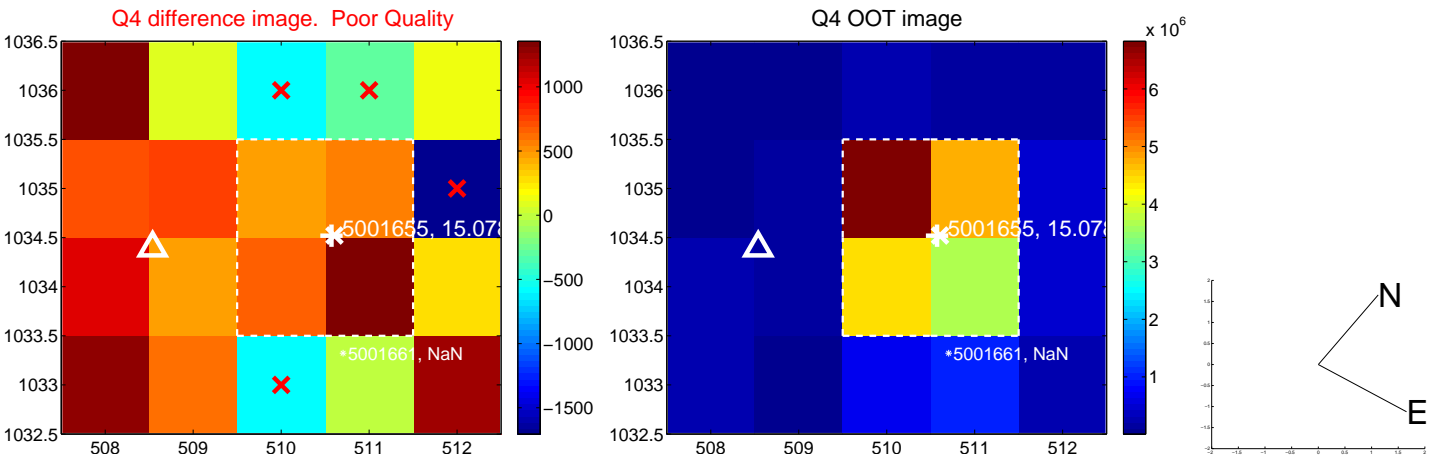
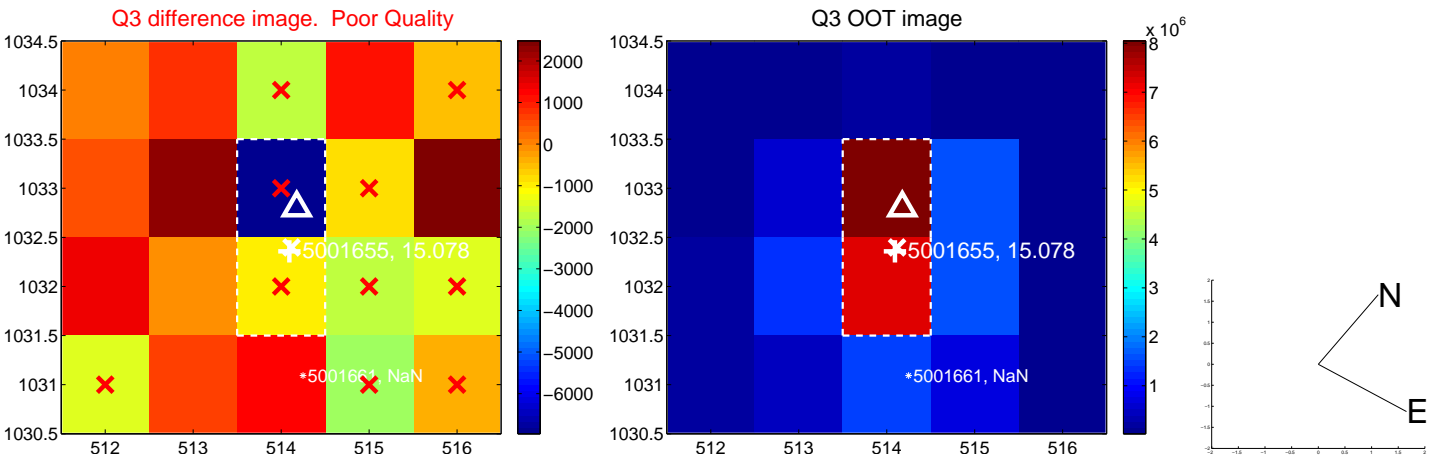
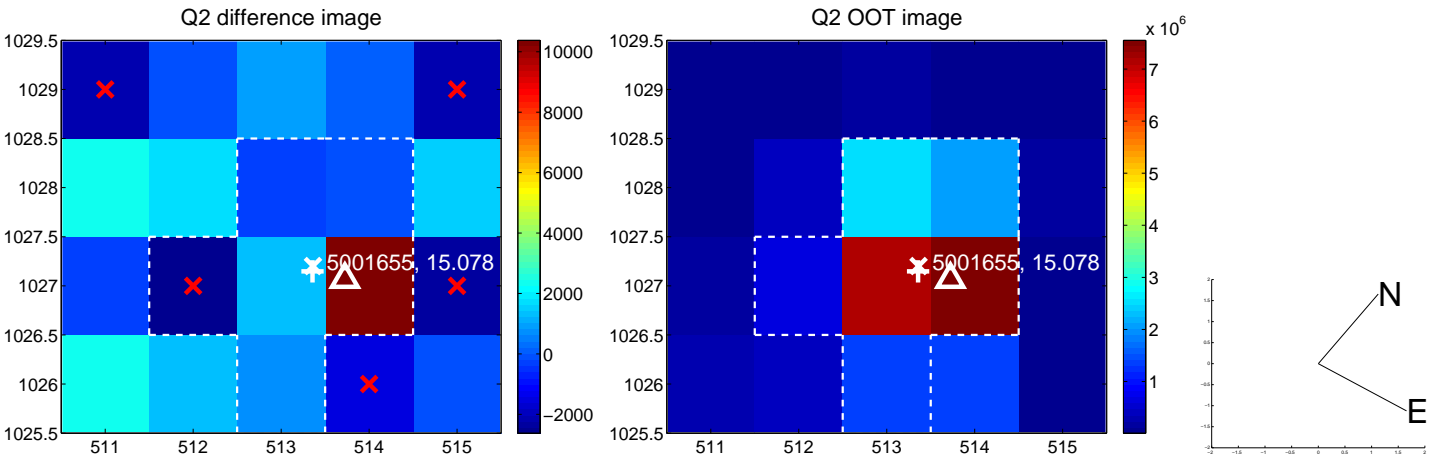
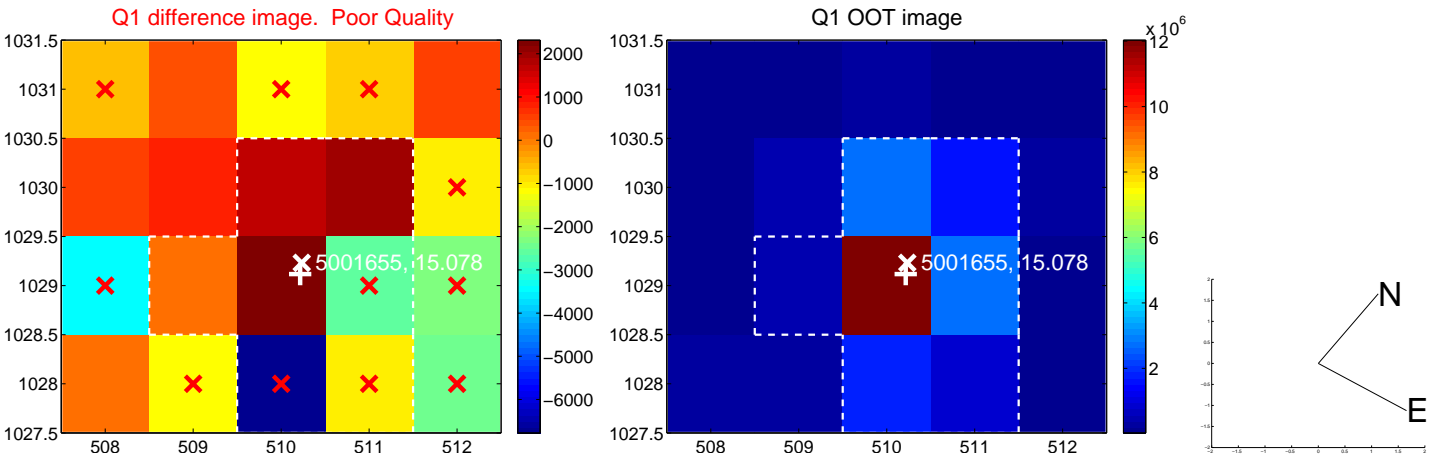
	Distance in arcsec	Distance / $\sigma$	$\Delta$ RA	$\Delta$ Dec
PRF-fit source offset from OOT	$2.385 \pm 2.163$	1.10	$-2.385 \pm 2.163$	$-0.041 \pm 0.884$
PRF-fit source offset from KIC position	$2.335 \pm 2.160$	1.08	$-2.328 \pm 2.166$	$-0.181 \pm 0.847$
photometric centroid source offset	$1.33 \pm 0.85$	1.58	$1.22 \pm 0.83$	$0.55 \pm 0.90$



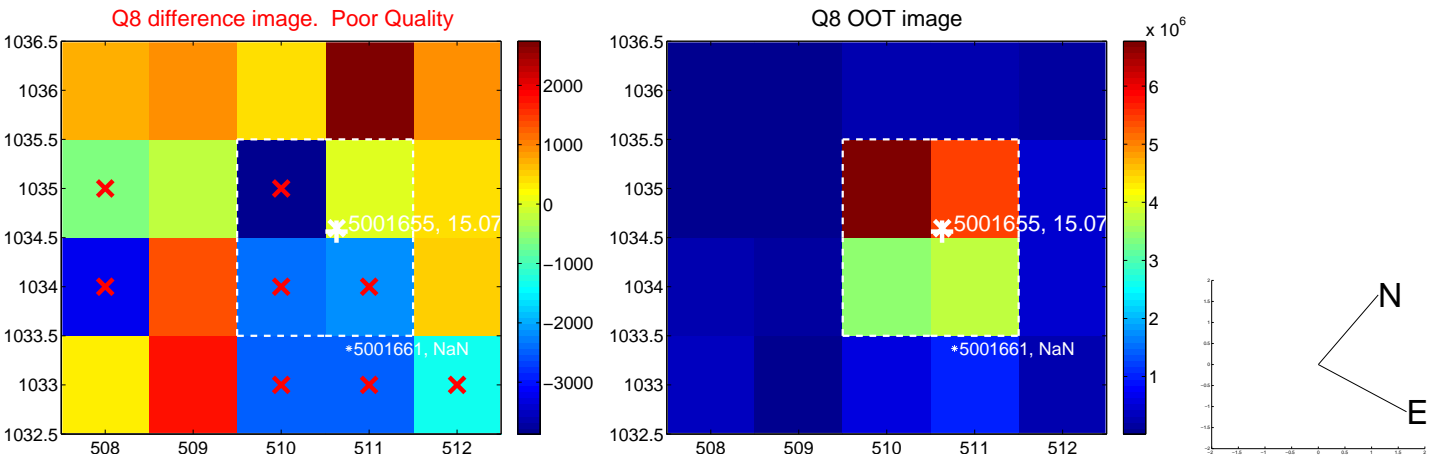
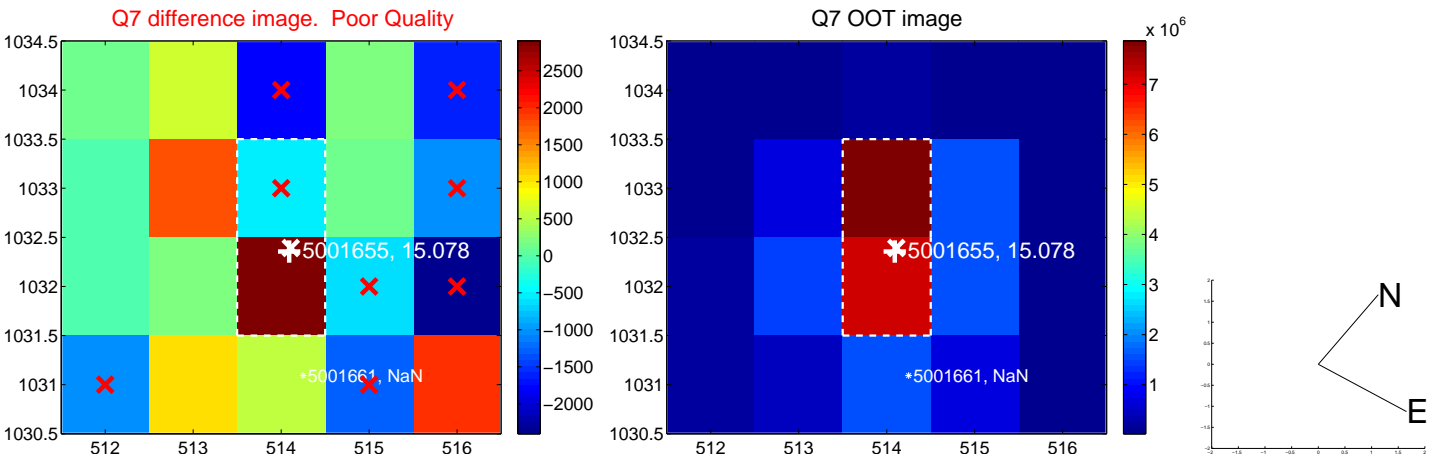
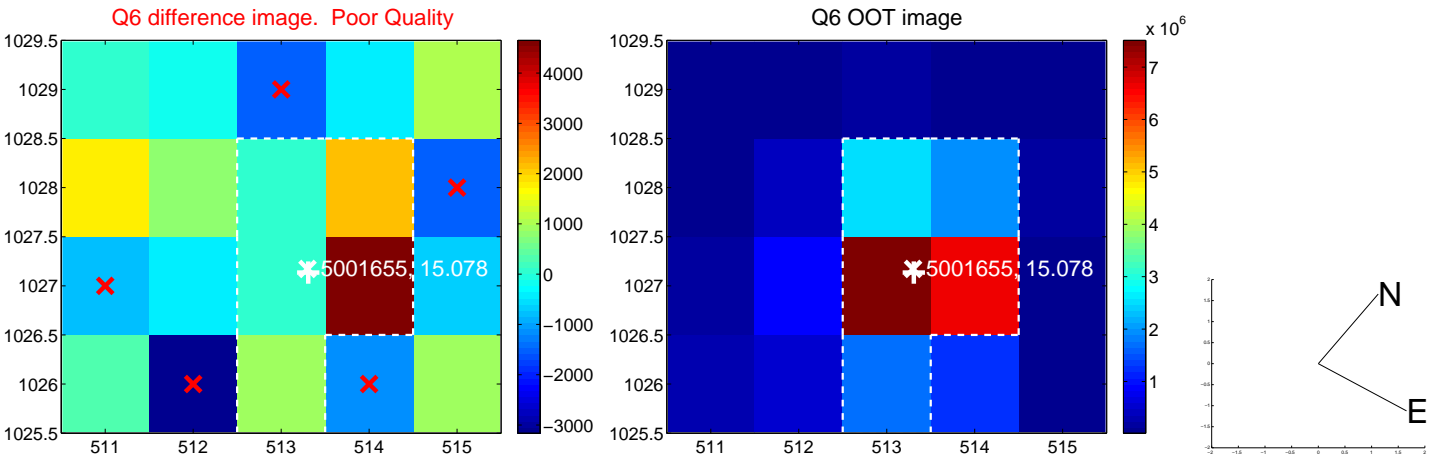
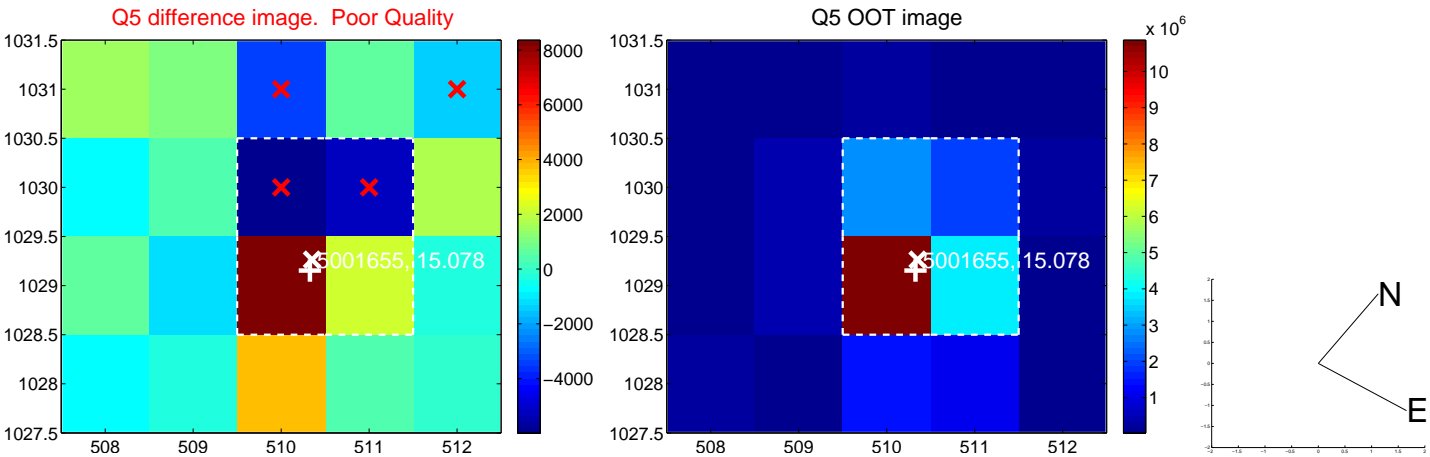
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- $\sigma$  uncertainty. Blue circle: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



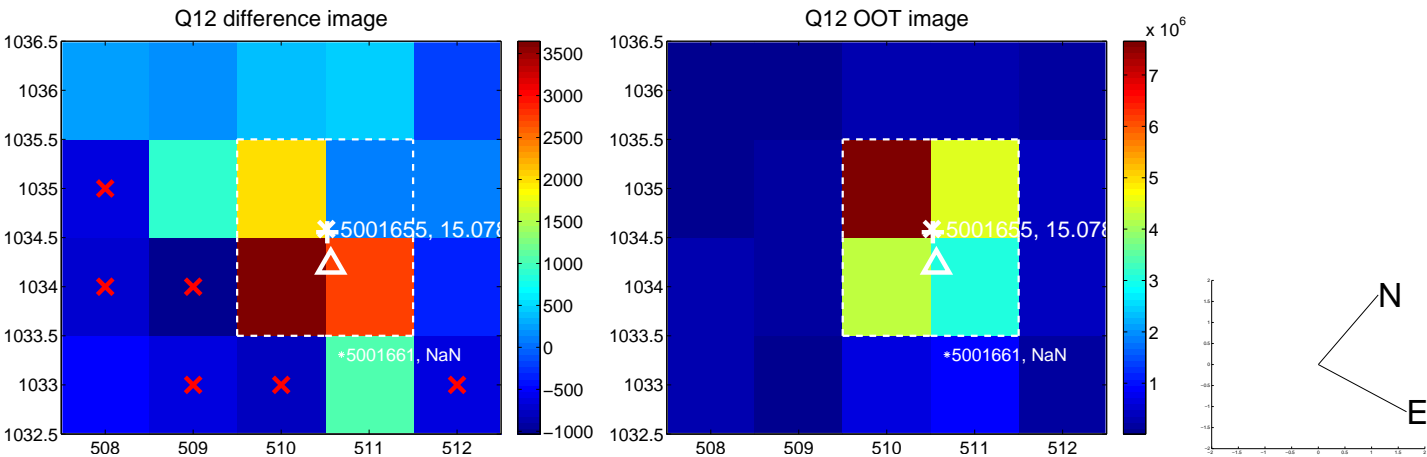
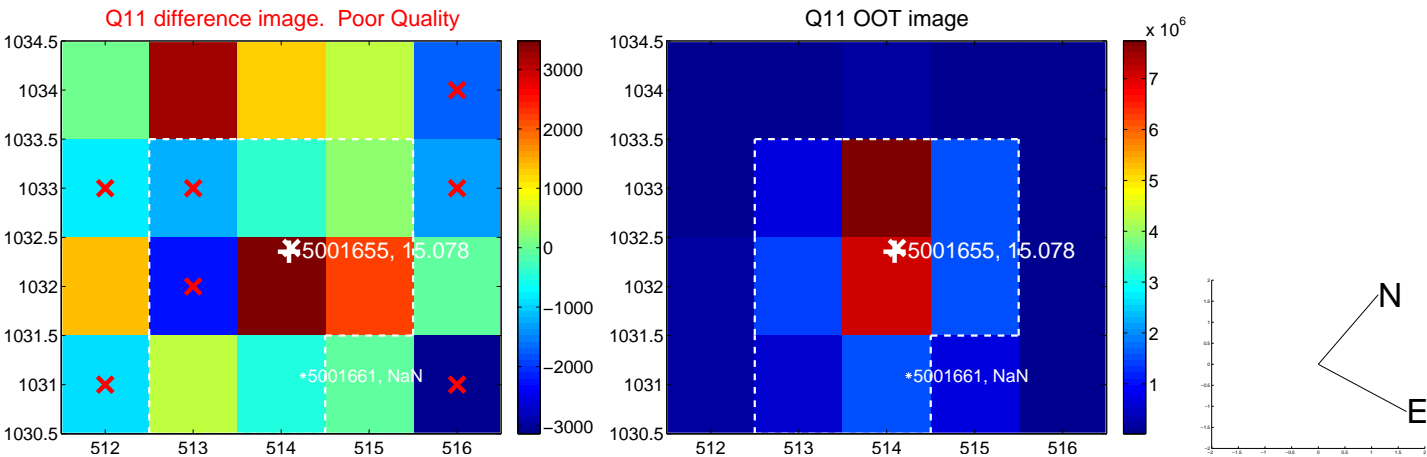
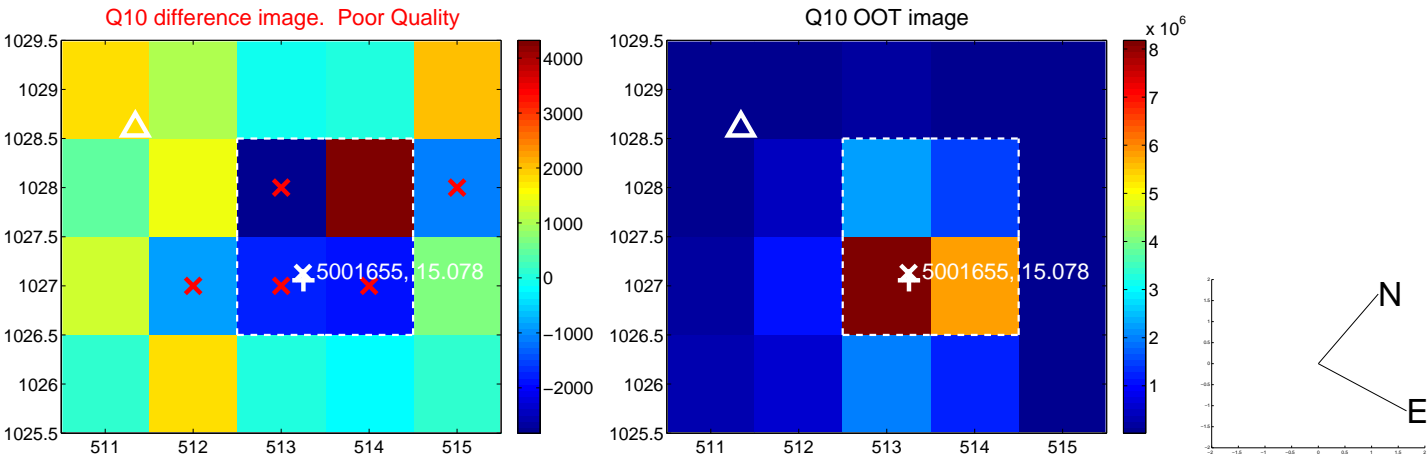
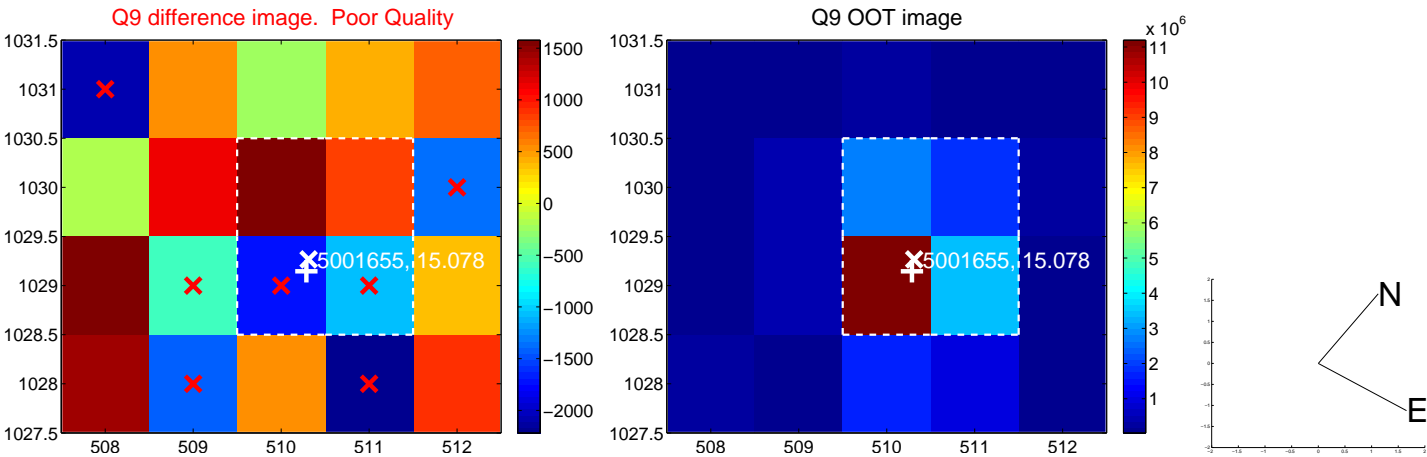
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



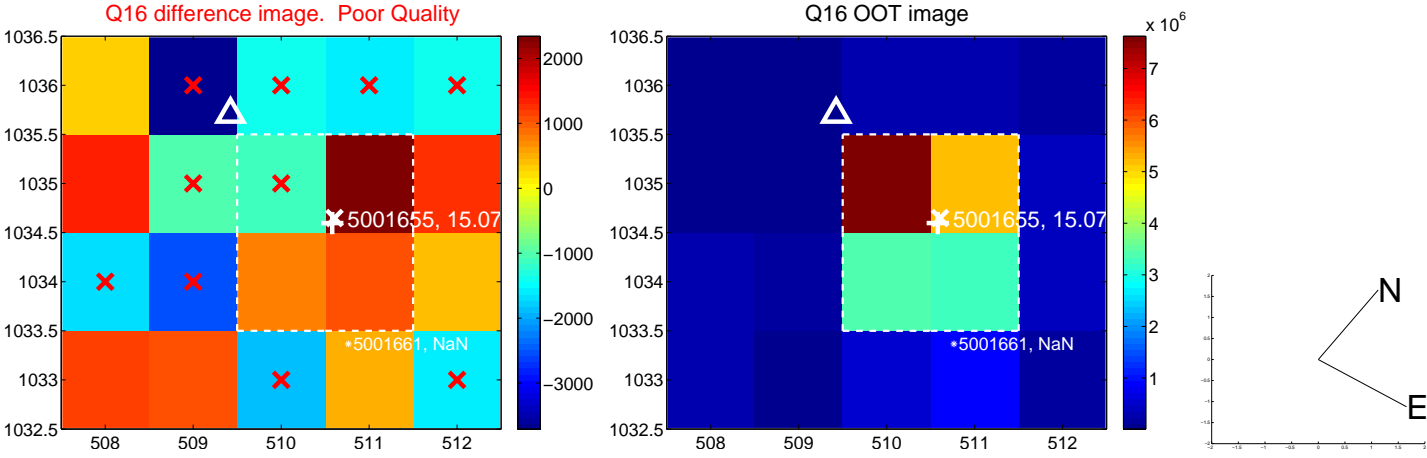
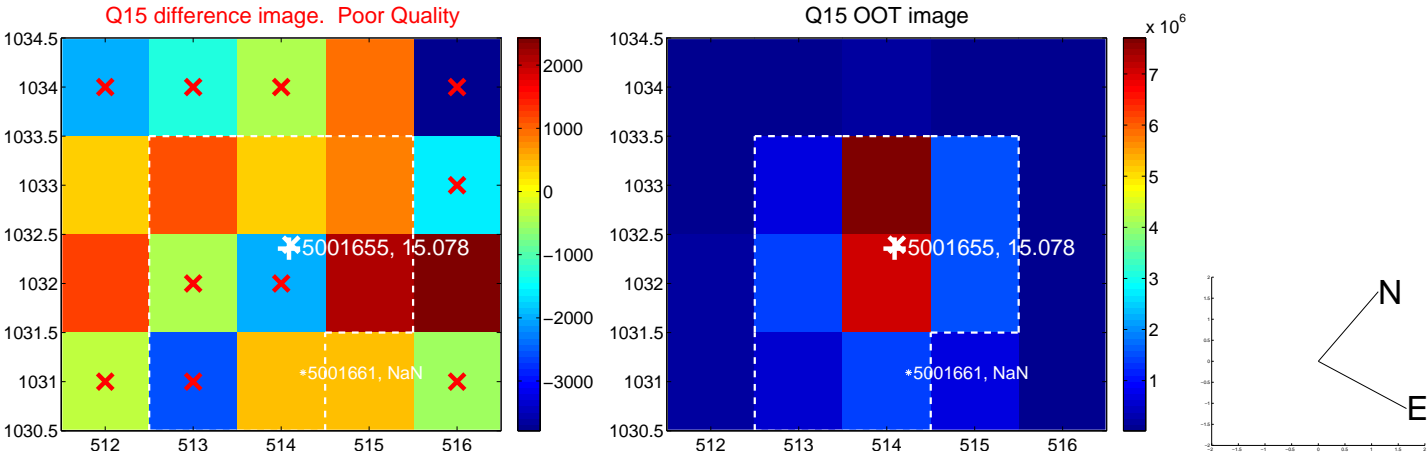
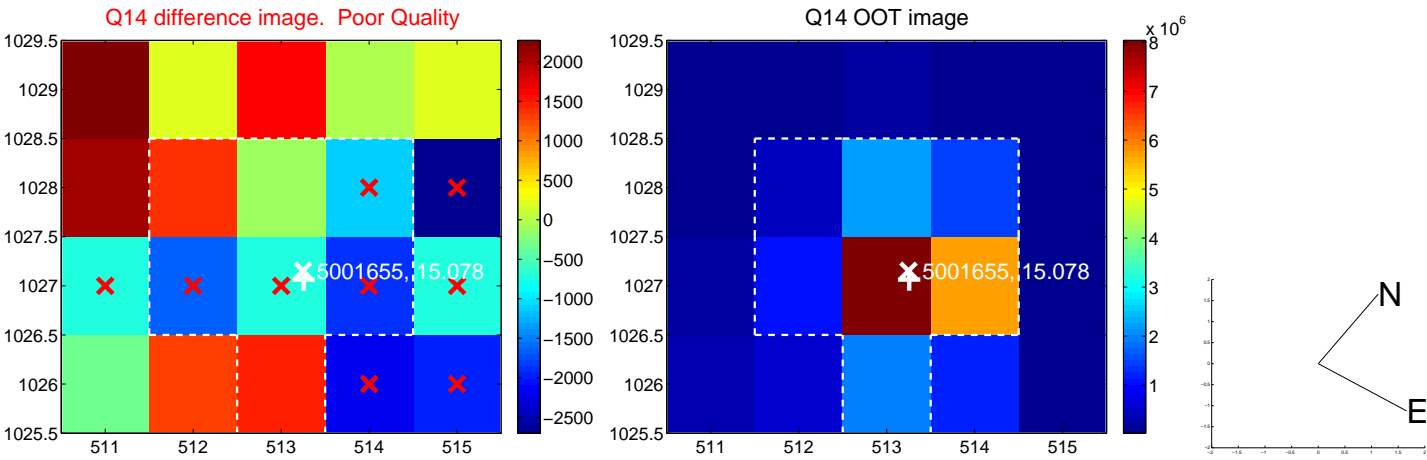
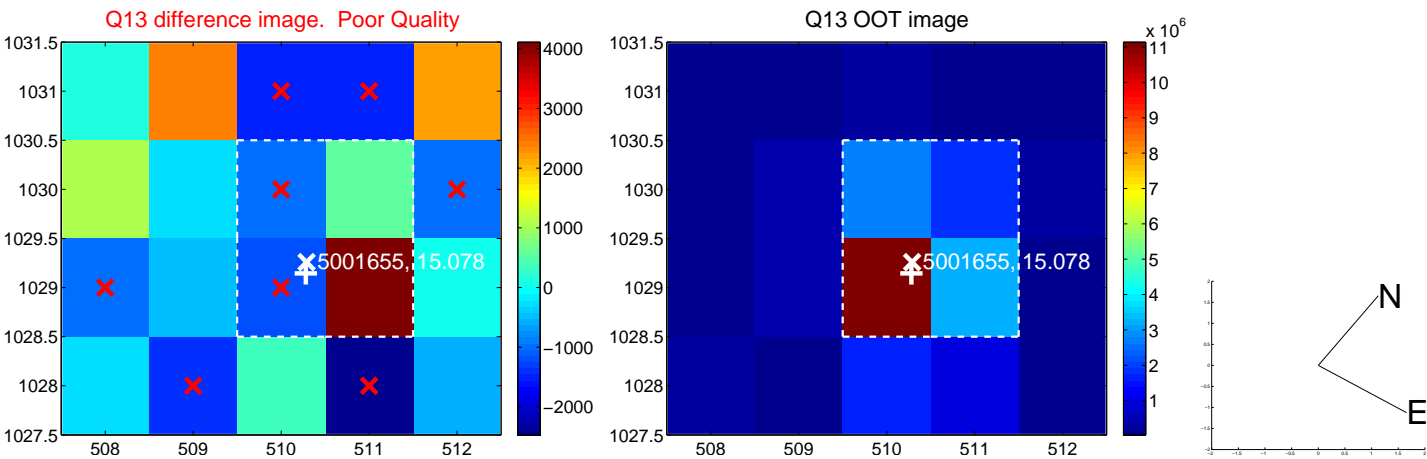
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



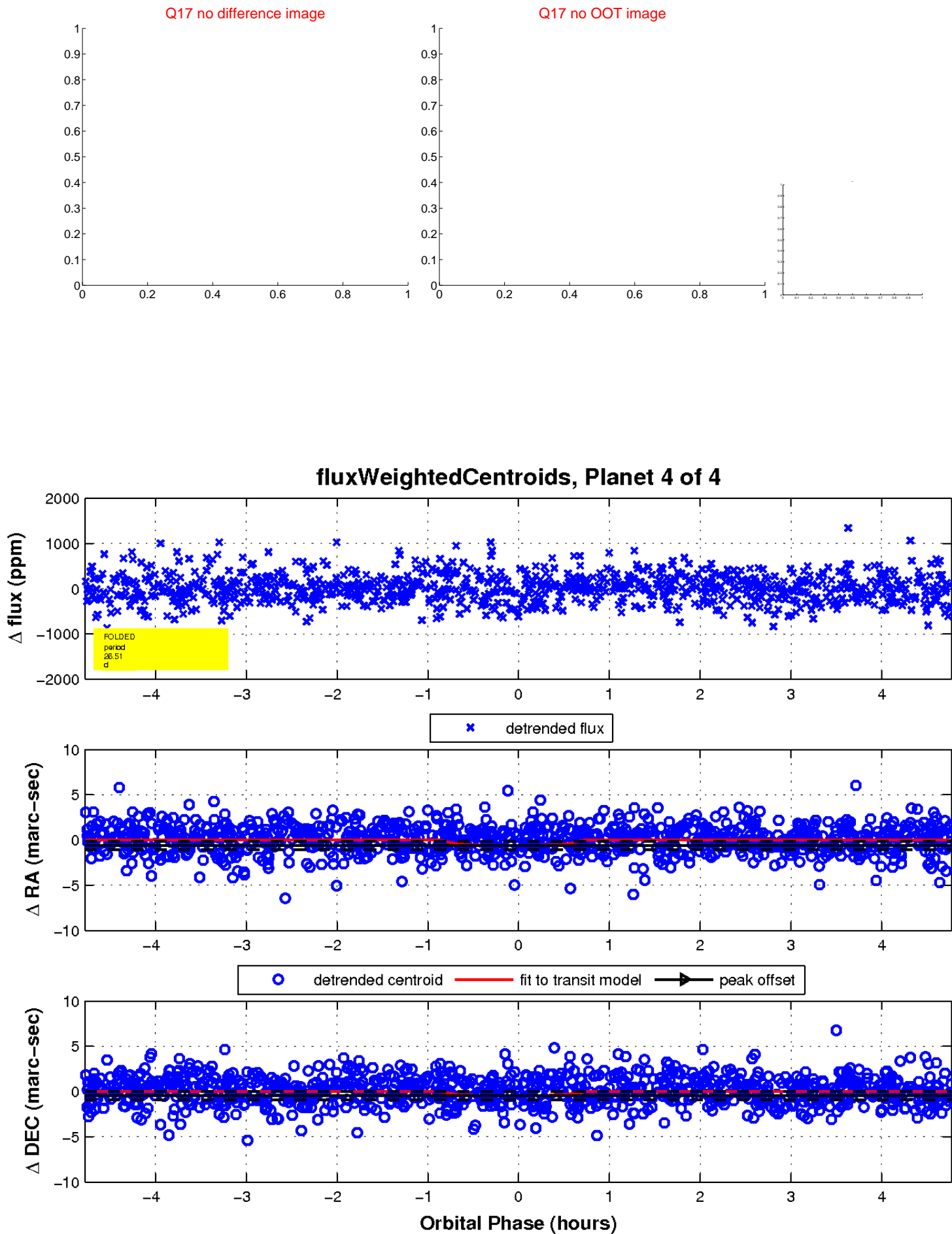
white  $\times$ : KIC target position; +: OOT centroid;  $\triangle$ : difference centroid. red  $\times$ : large negative pixel value.



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

