

KIC 010616656

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})
010616656-01	OBS	5814.01	25.285232	135.966211	62786.5	4.756	7212.3	6077.1	1.14	6486	45.47	70.89
010616656-02	OBS	No	411.760107	158.357131	197.8	6.693	8.0	8.4	1.14	6486	1.77	1.72

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010616656-01	OBS	FP	0.00	0	1	0	0	DEEP_V_SHAPED
010616656-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—ALL_TRANS_CHASES—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 for comment definitions.

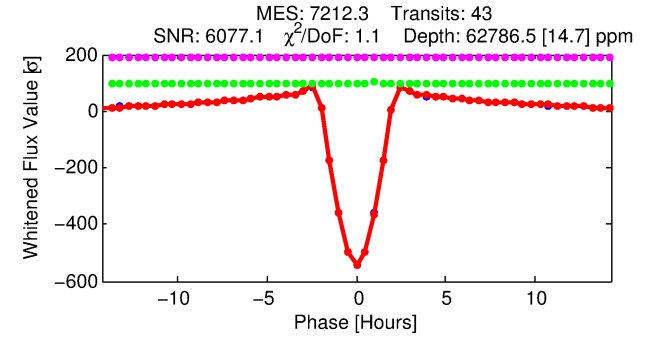
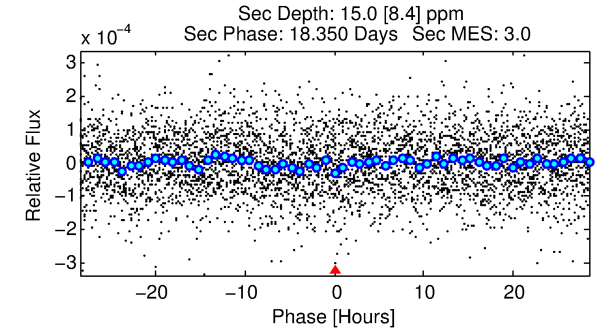
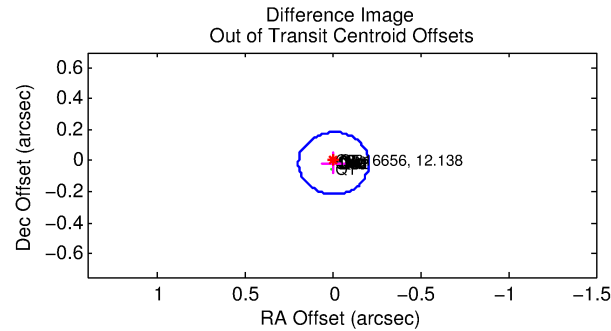
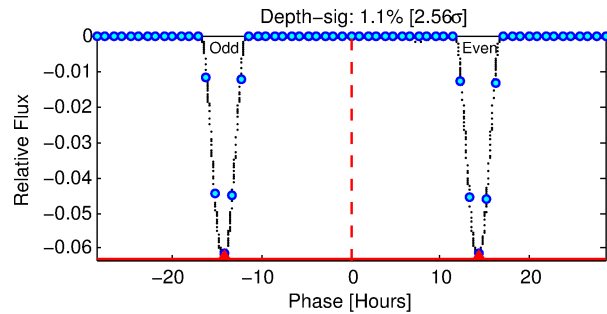
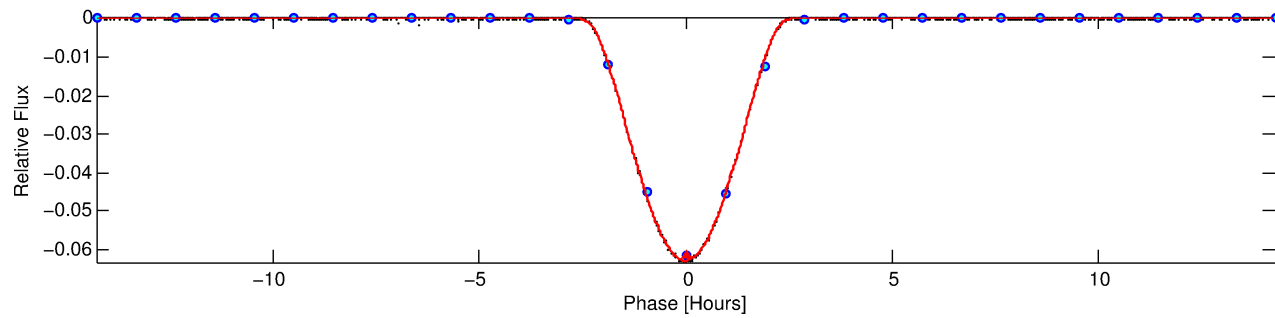
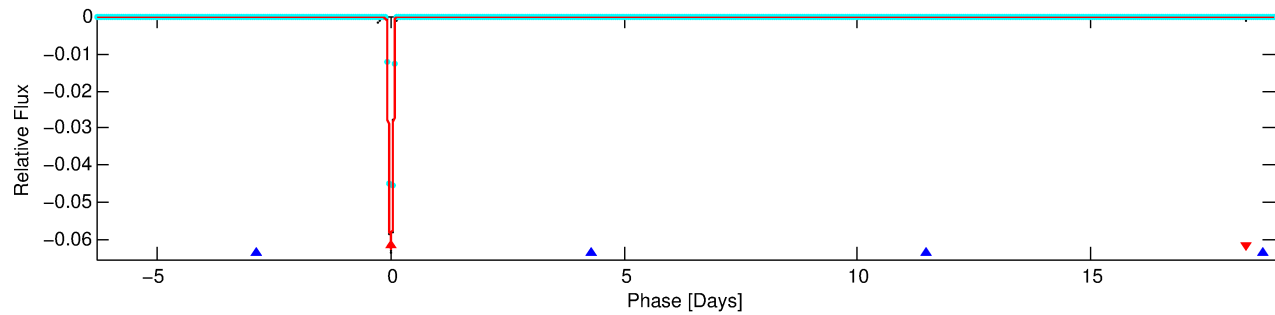
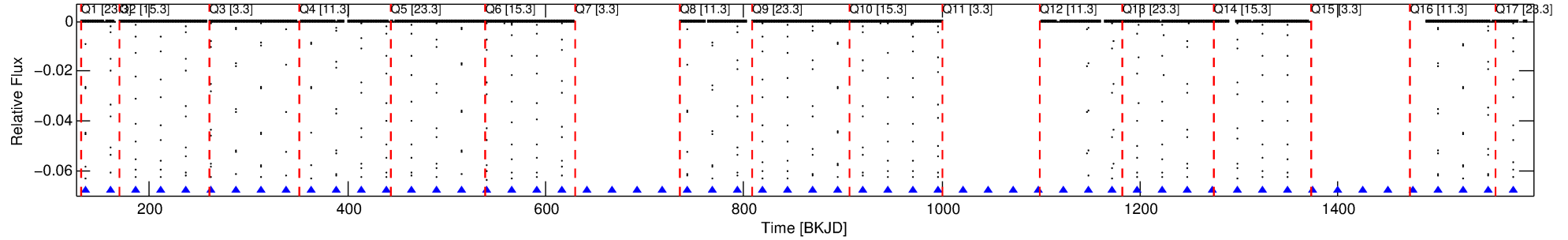
Ephemeris Match Information For 010616656-01

No Significant Match Found

DV One-Page Summary

KIC: 10616656 Candidate: 1 of 2 Period: 25.285 d
KOI: K05814.01 Corr: 0.999

Kp: 12.14 R*: 1.14 Rs Teff: 6486.0 K Logg: 4.34 Fe/H: -0.460



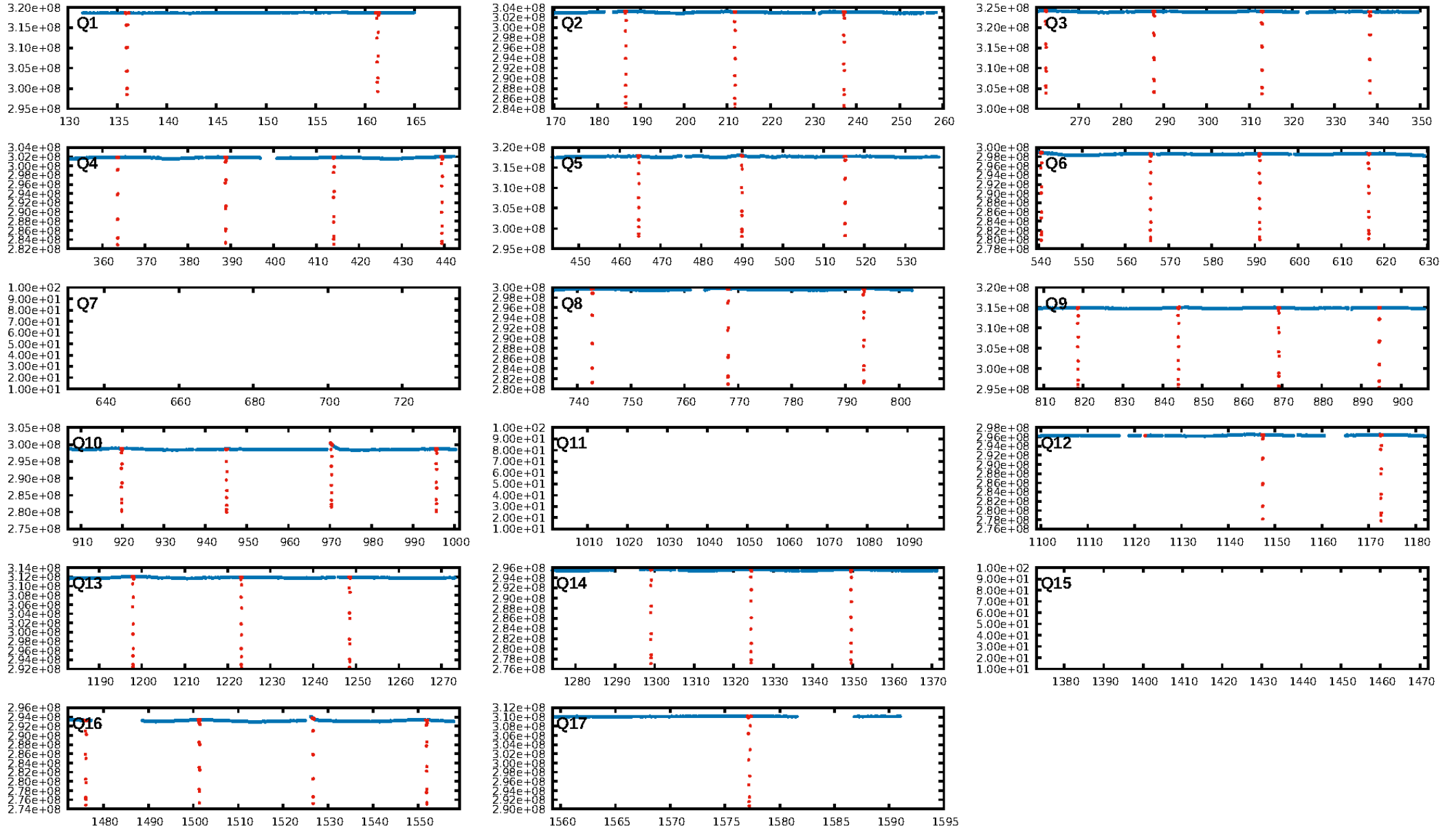
DV Fit Results:

Period = 25.28523 [0.00000] d
Epoch = 135.9662 [0.0000] BKJD
Rp/R* = 0.3668 [0.0046]
a/R* = 39.22 [0.01]
b = 0.97 [0.01]
Seff = 70.89 [18.87]
Teq = 740 [49] K
Rp = 45.47 [9.30] Re
a = 0.1699 [0.0284] AU
Ag = 0.12 [0.07] [-12.62 σ]
Teffp = 667 [95] K [-0.68 σ]

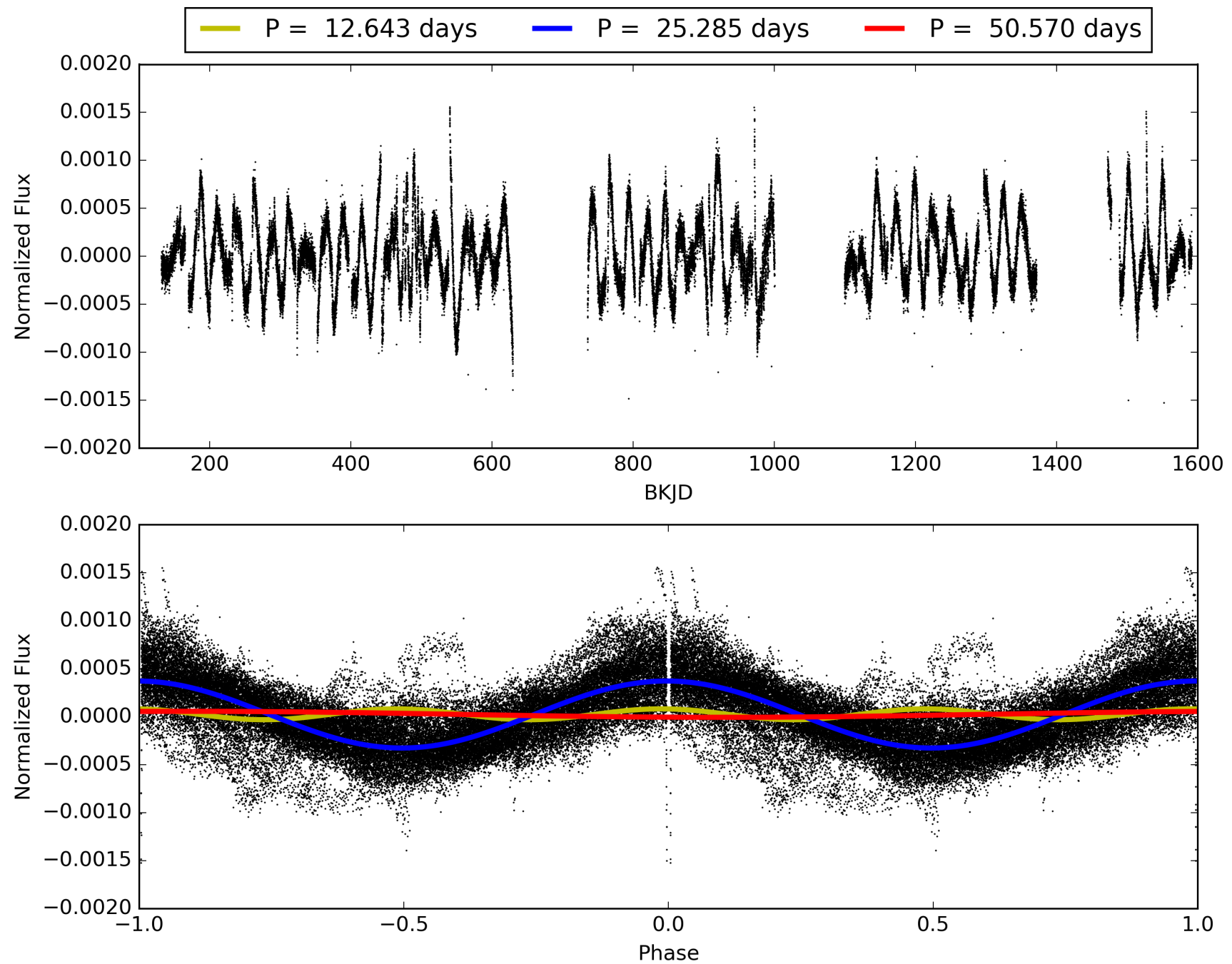
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [1129.66 σ]
ModelChiSquare2-sig: 0.0%
ModelChiSquareGoF-sig: 0.0%
Bootstrap-pfa: 0.00e+00
RollingBand-fgt: 1.00 [40/40]
GhostDiagnostic-chr: 8.104
Centroid-sig: 0.0%
Centroid-so: 0.050 arcsec [36.87 σ]
OotOffset-rm: 0.017 arcsec [0.26 σ]
KicOffset-rm: 0.135 arcsec [1.95 σ]
OotOffset-st: 4/1/4/5 [14]
KicOffset-st: 4/1/4/5 [14]
DiffImageQuality-fgm: 1.00 [14/14]
DiffImageOverlap-fno: 1.00 [14/14]

TCE 010616656-01, PDC Light Curves

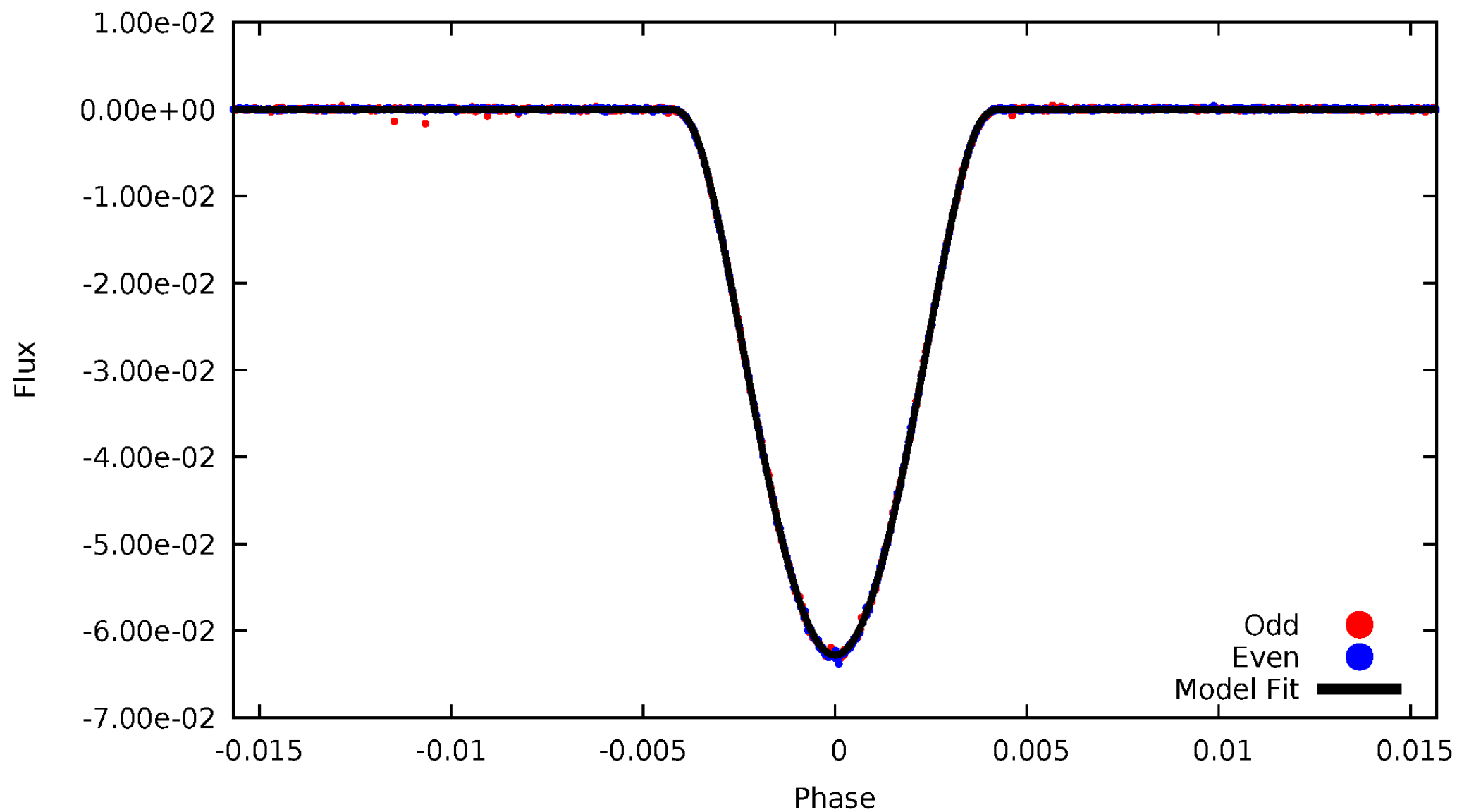


TCE 010616656-01



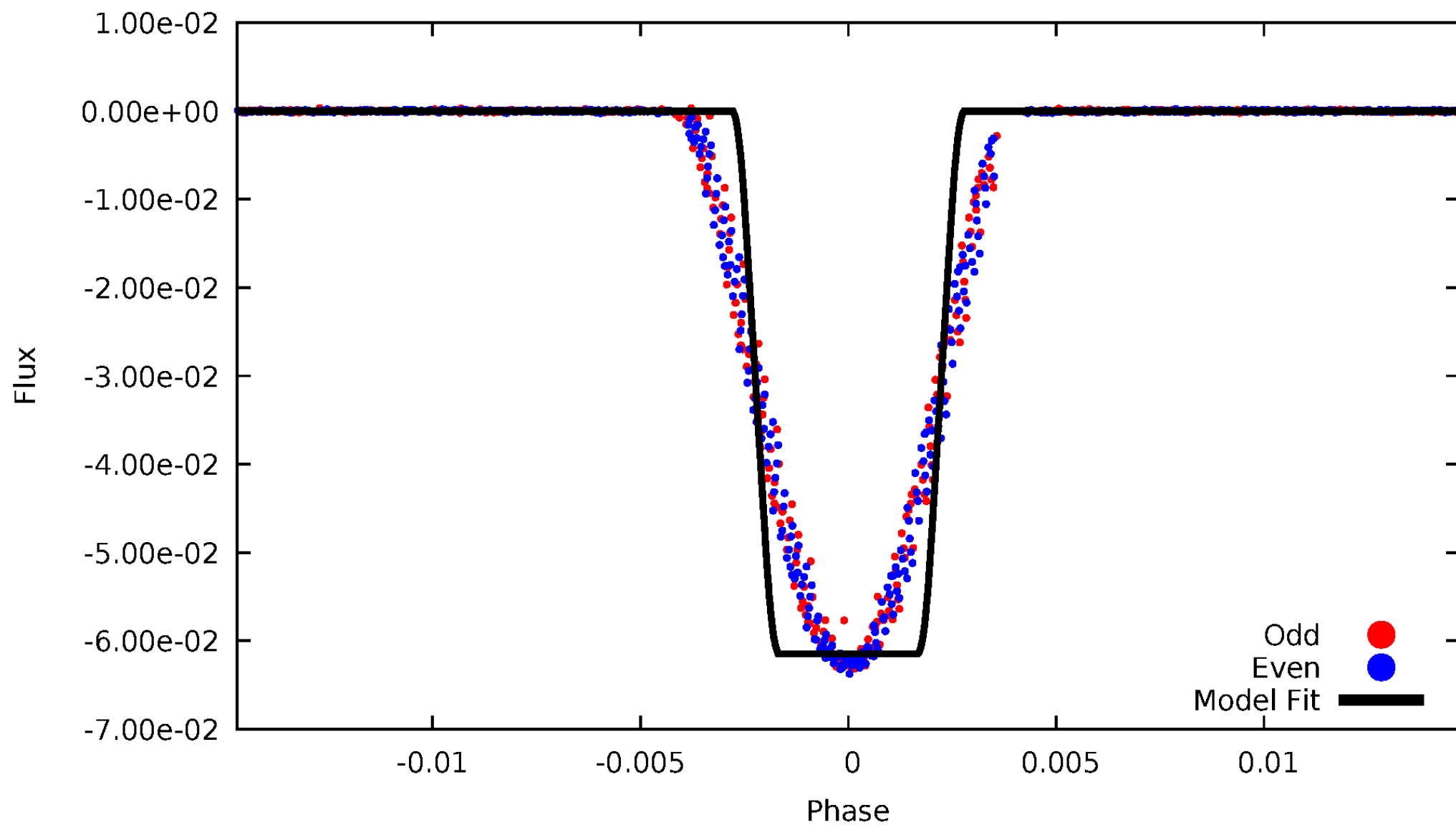
DV Odd/Even

TCE 010616656-01



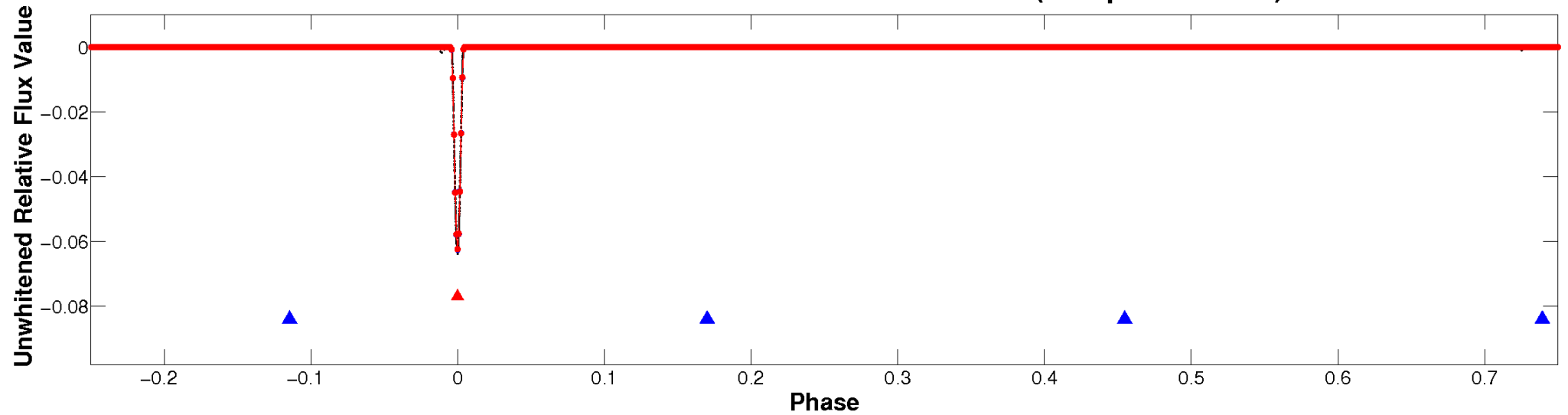
ALT Odd/Even

TCE 010616656-01

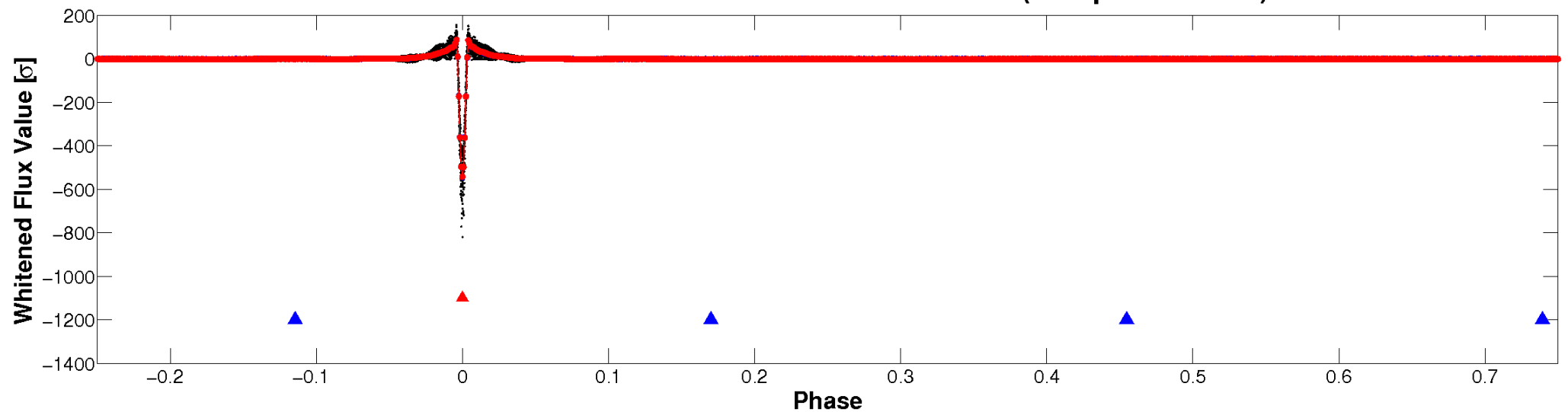


Non-Whitened Vs. Whitened Light Curve

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

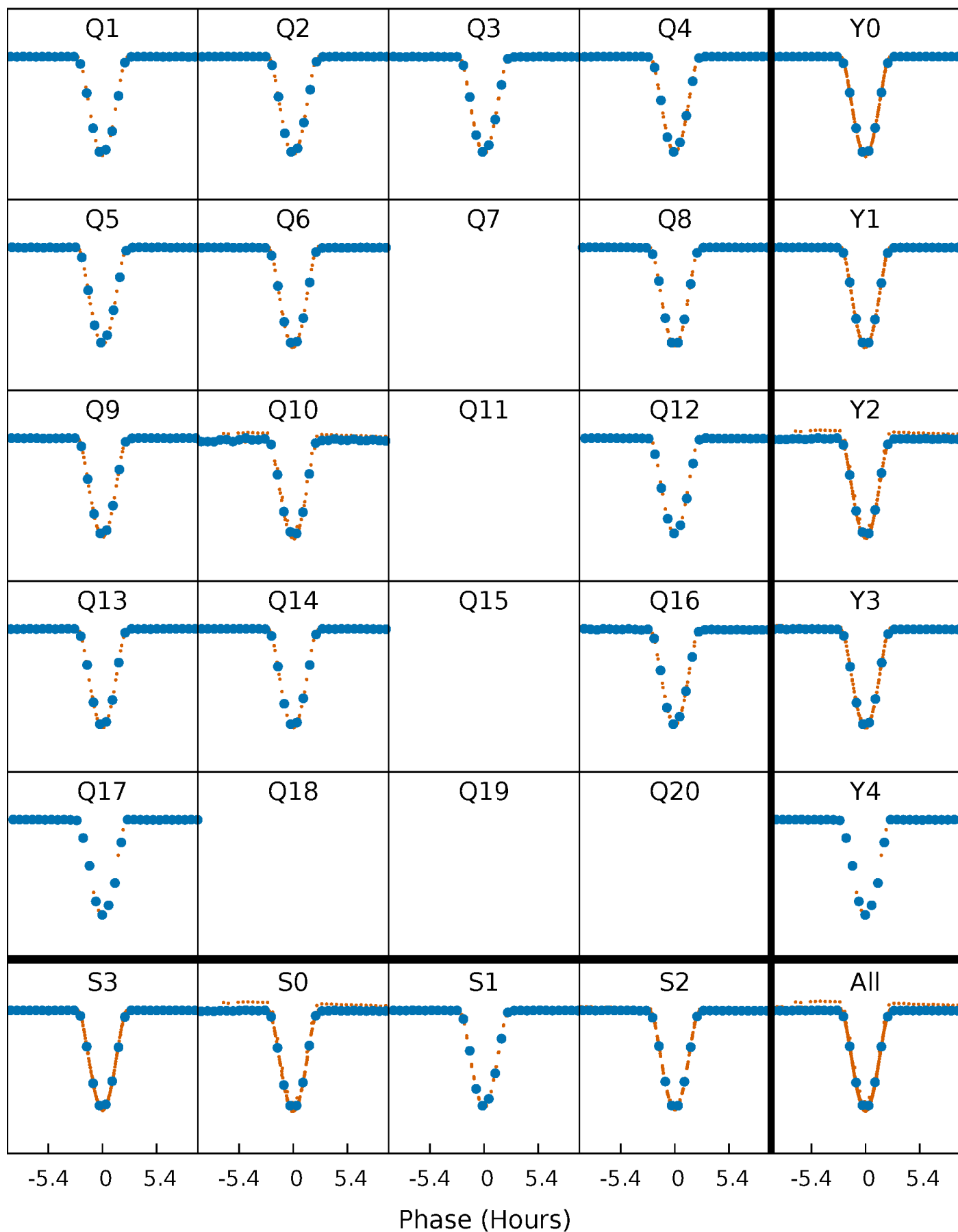


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



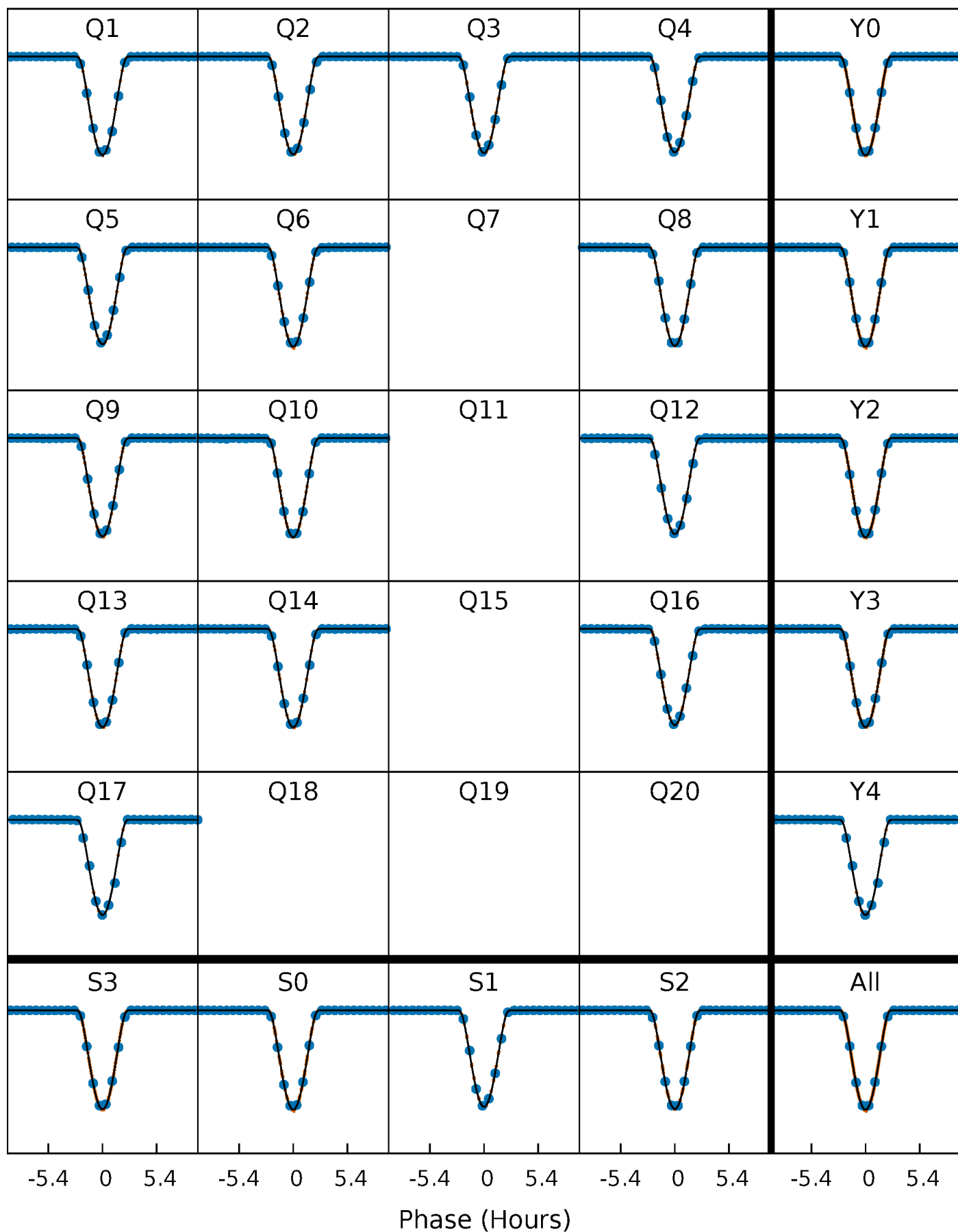
PDC Quarter-Phased Transit Curves

TCE 010616656-01 P= 25.285232 Days $T_0=135.966211$ (BKJD)



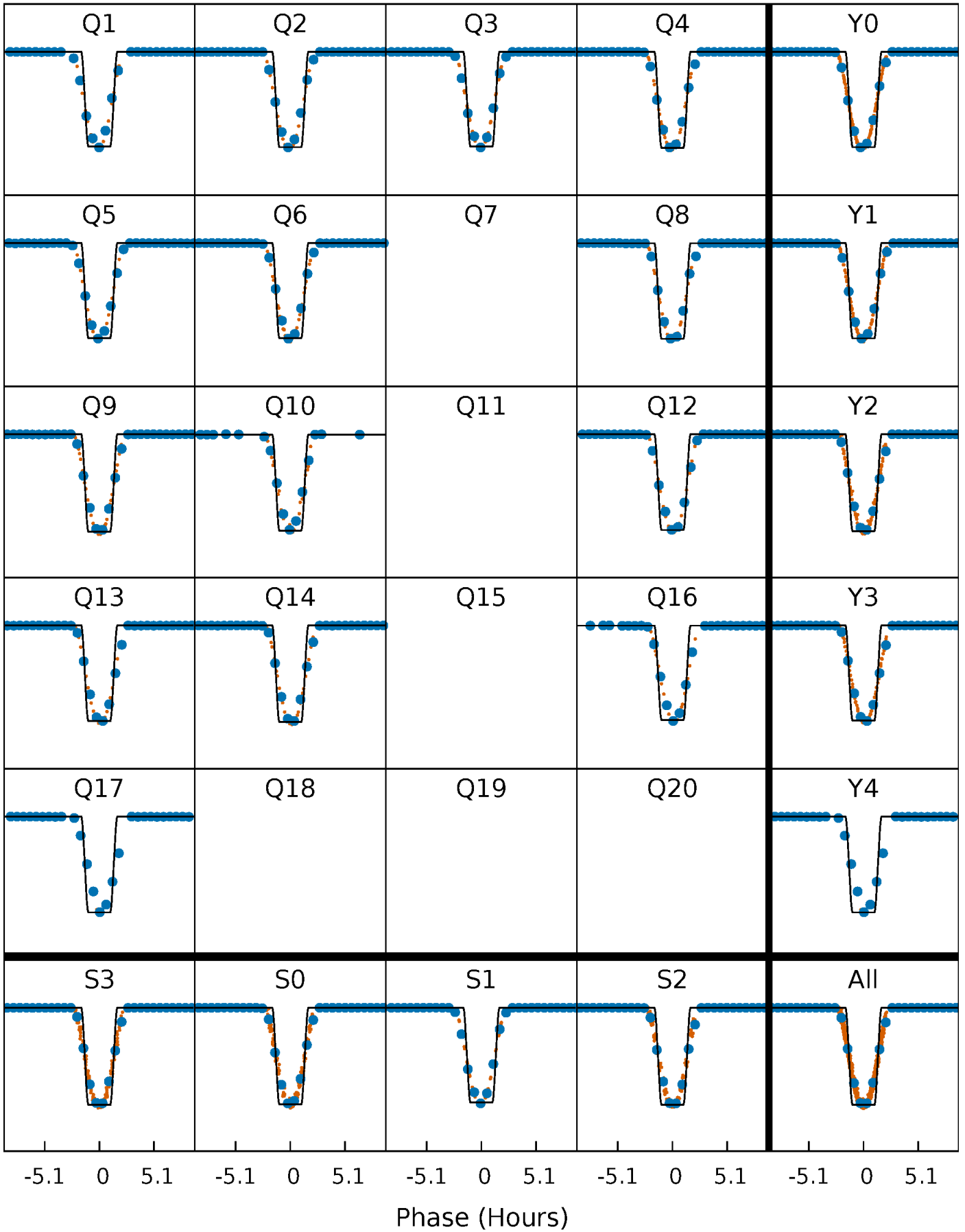
DV Quarter-Phased Transit Curves

TCE 010616656-01 P= 25.285232 Days $T_0=135.966211$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

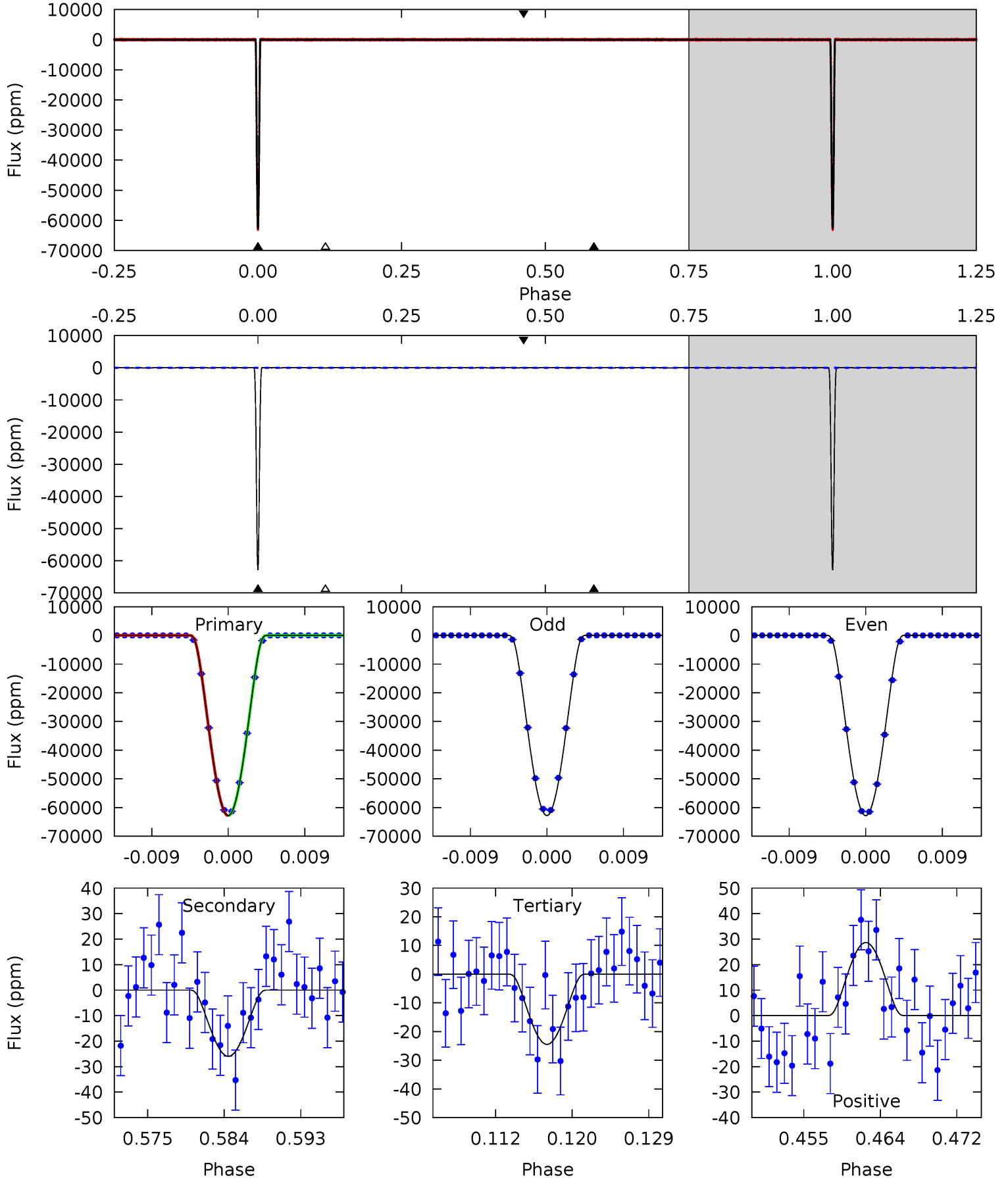
TCE 010616656-01 P= 25.285025 Days $T_0=135.971330$ (BKJD)



DV Model-Shift Uniqueness Test

010616656-01, P = 25.285232 Days, E = 110.680979 Days

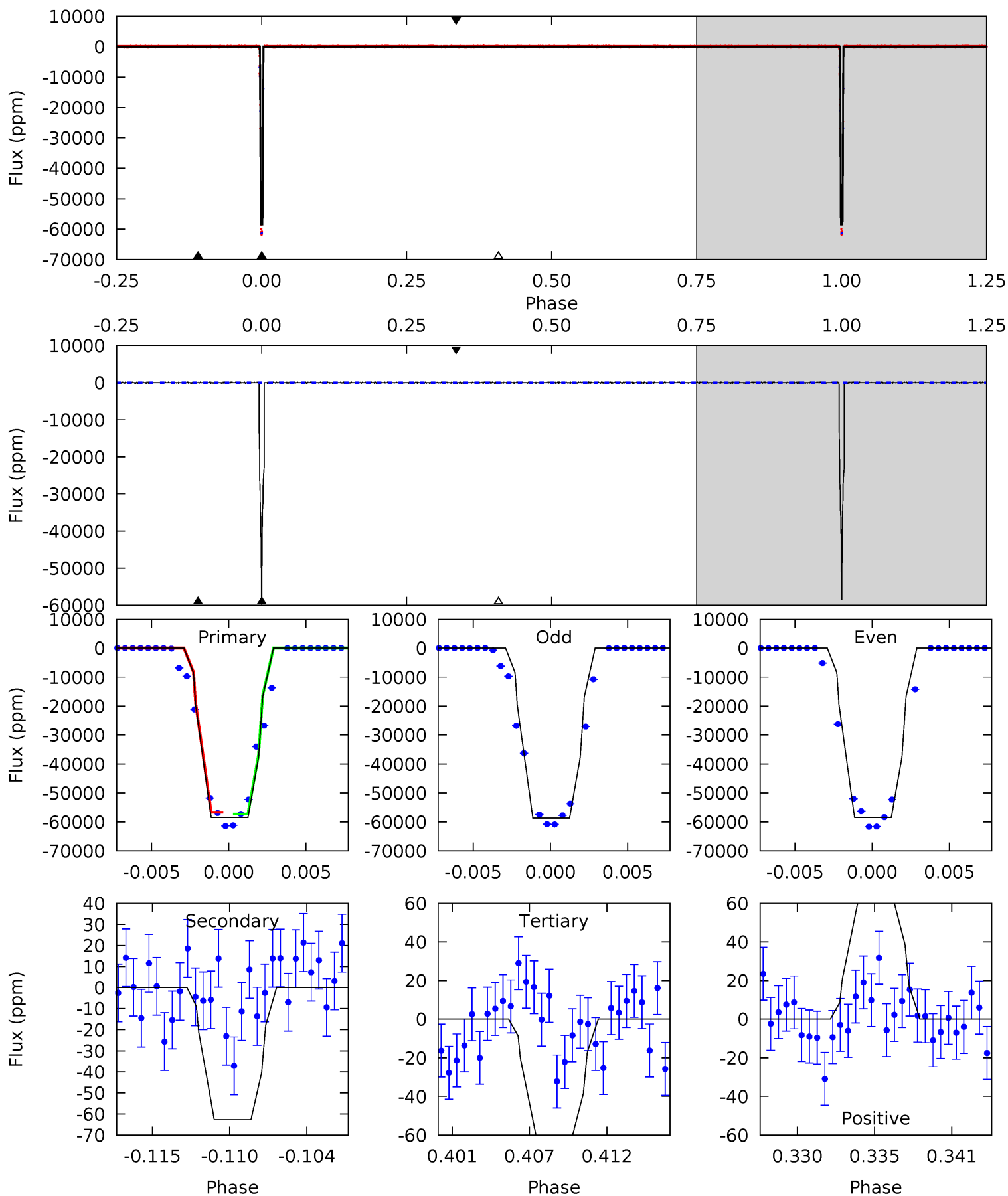
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
15554	6.43	6.06	7.10	5.06	2.63	2.20	15547	15546	0.37	-0.66	4.21	1.00	0.00	1.18



Alt Model-Shift Uniqueness Test

010616656-01, P = 25.285025 Days, E = 110.686305 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
4107	4.40	4.21	4.21	5.14	2.78	1.13	4103	4103	0.19	0.19	6.97	1.00	0.00	0



Stellar Parameters For KIC 010616656

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6486^{+146}_{-194}	$4.337^{+0.104}_{-0.127}$	$-0.460^{+0.250}_{-0.300}$	$1.136^{+0.232}_{-0.155}$	$1.021^{+0.137}_{-0.103}$	$0.981^{+0.465}_{-0.368}$
	+2%/-3%	+2%/-3%	+54%/-65%	+20%/-14%	+13%/-10%	+47%/-37%
Source	PHO1	FLK73	KIC0	DSEP		

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

Secondary Eclipse Parameters for KIC 010616656-01 / KOI 5814.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-26 ± 4	$45.41^{+5.12}_{-3.33}$	1034^{+51}_{-50}	-1693^{+112}_{-84}	$0.198^{+0.049}_{-0.046}$
Alt.	-63 ± 14	$30.61^{+3.84}_{-2.32}$	1034^{+54}_{-48}	2053^{+61}_{-87}	$1.038^{+0.307}_{-0.270}$

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

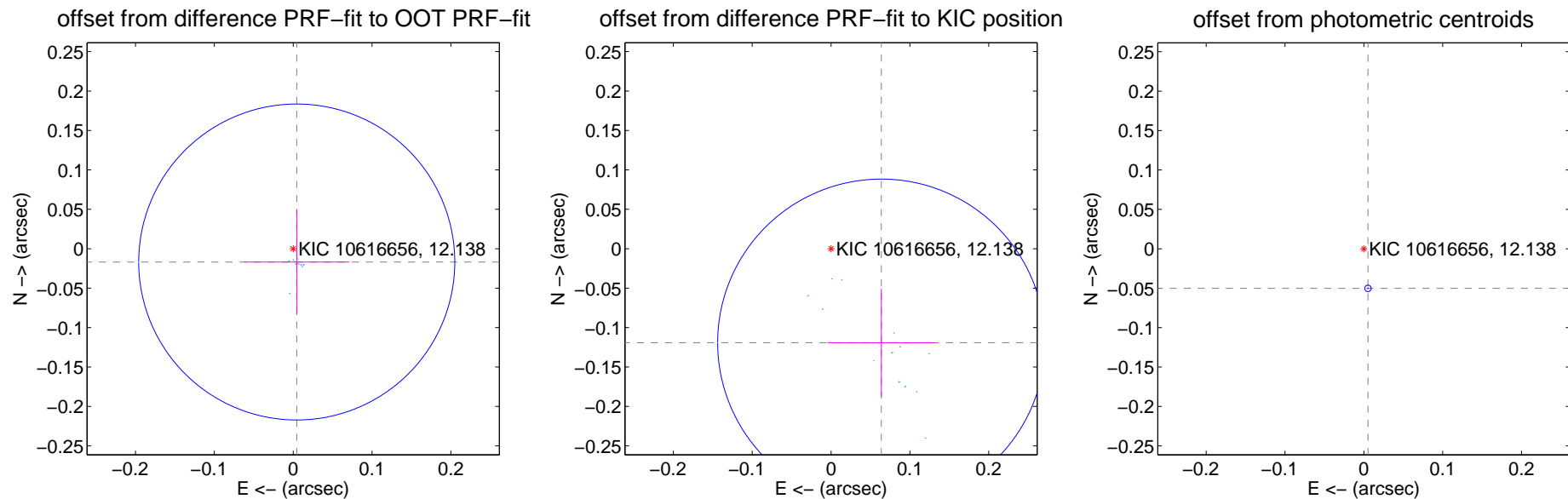
DV Centroid Data

Supplemental centroid analysis for 010616656-01. Kepler magnitude: 12.14. Transit SNR 6077.10

There are 14 quarters with good PRF difference image offsets

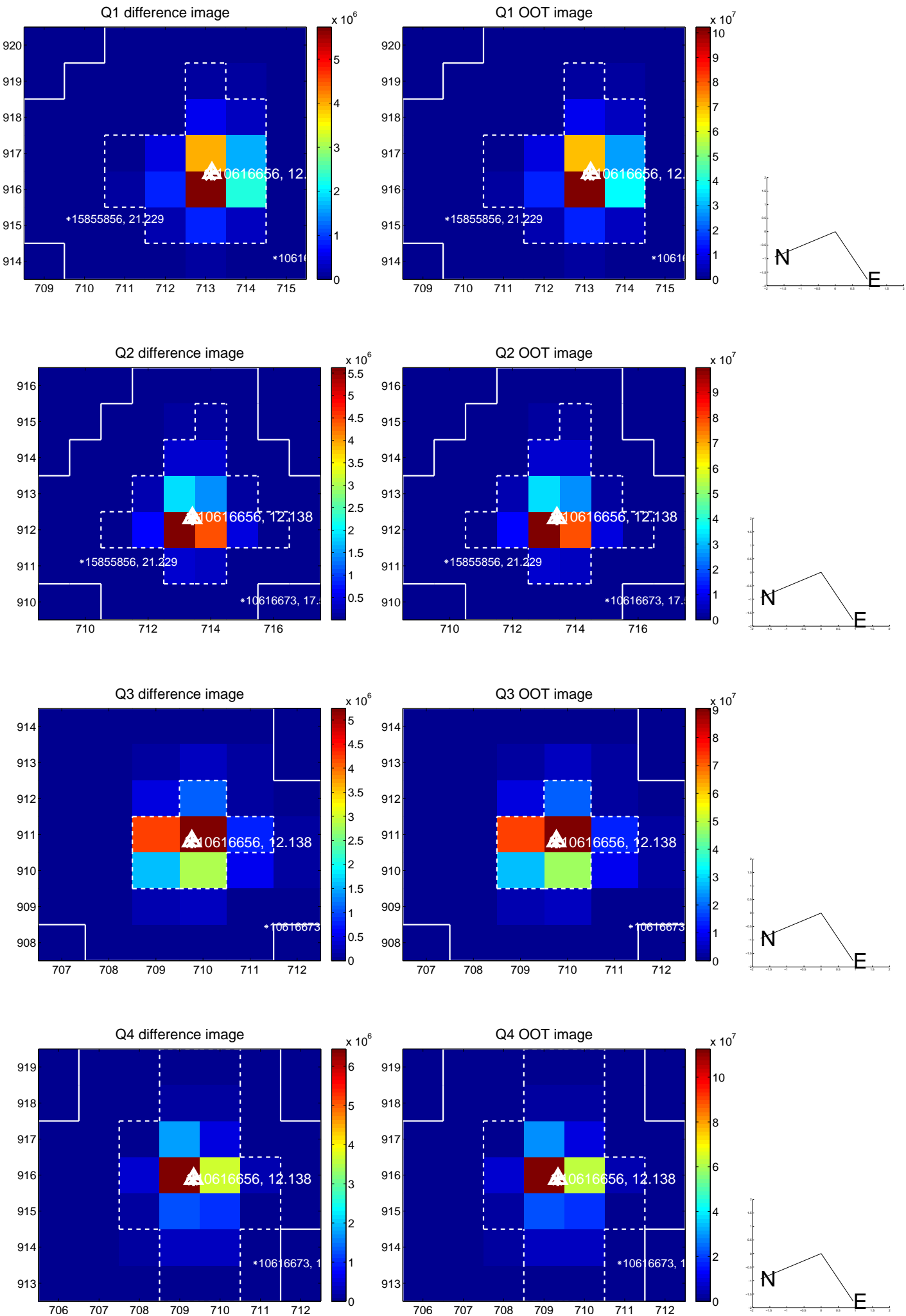
The direct PRF centroid is offset from the target star catalog position by about 0.14 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.017 ± 0.067	0.26	-0.005 ± 0.067	-0.017 ± 0.067
PRF-fit source offset from KIC position	0.135 ± 0.069	1.95	-0.064 ± 0.068	-0.119 ± 0.068
photometric centroid source offset	0.05 ± 0.00	36.87	-0.01 ± 0.00	-0.05 ± 0.00

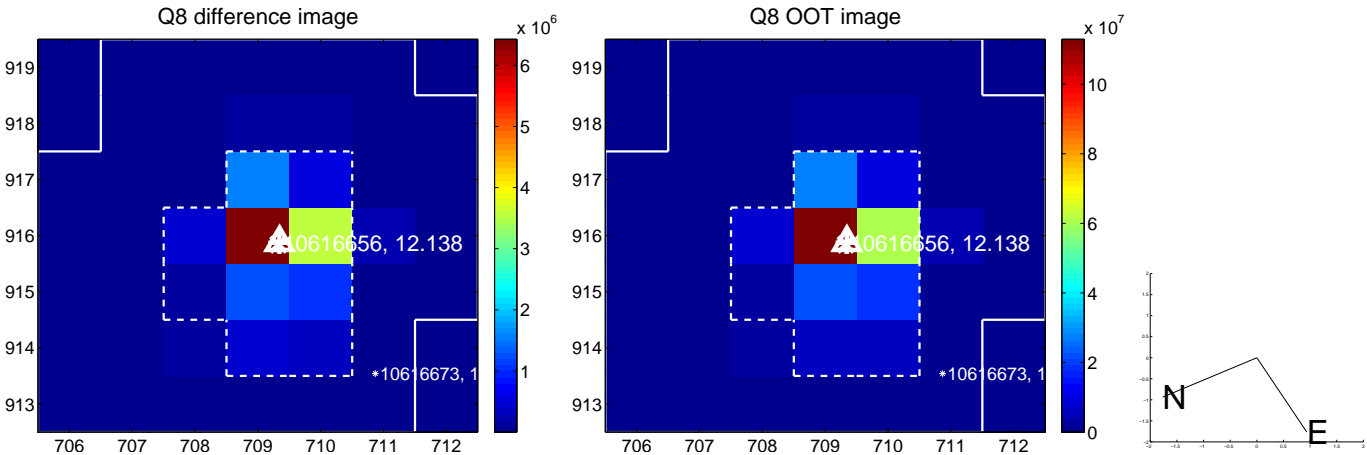
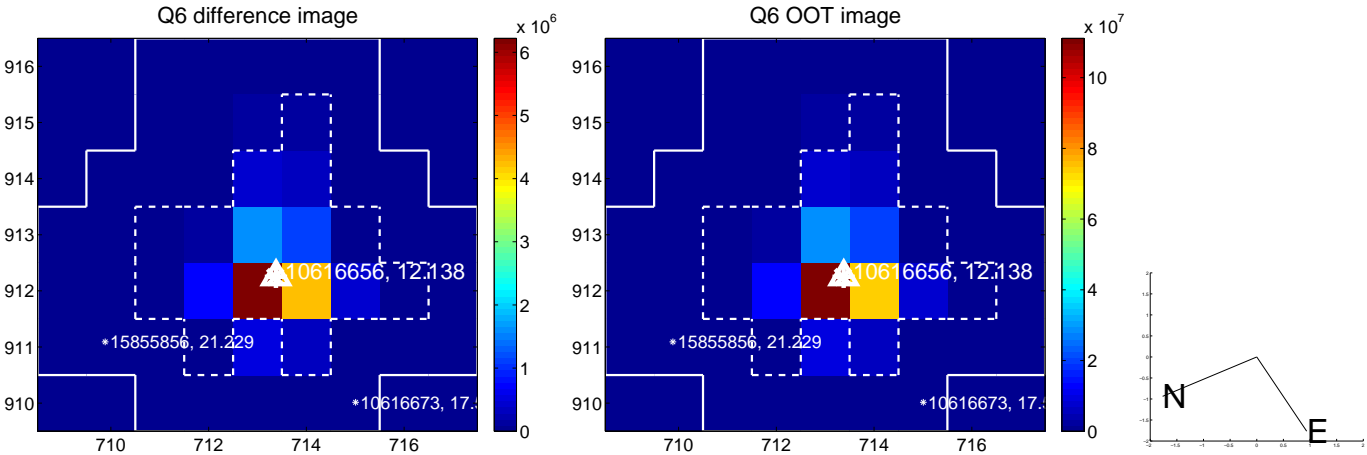
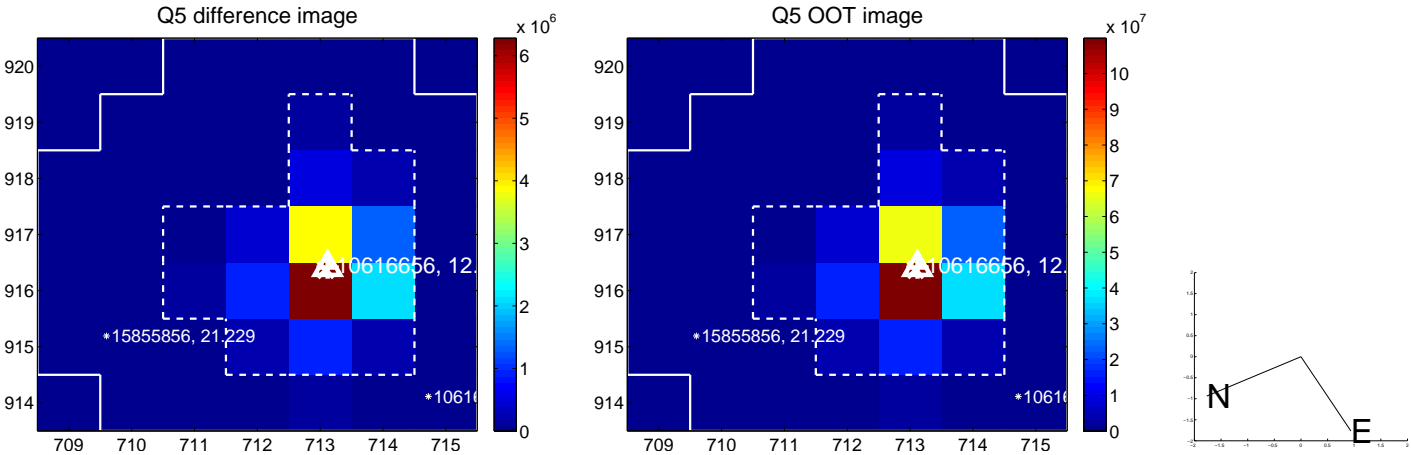


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

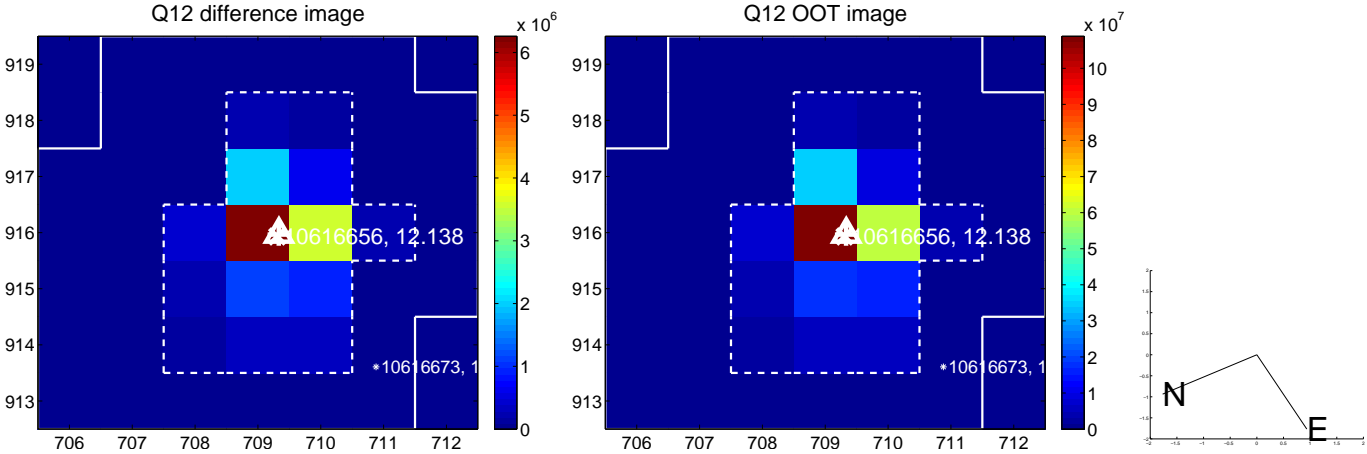
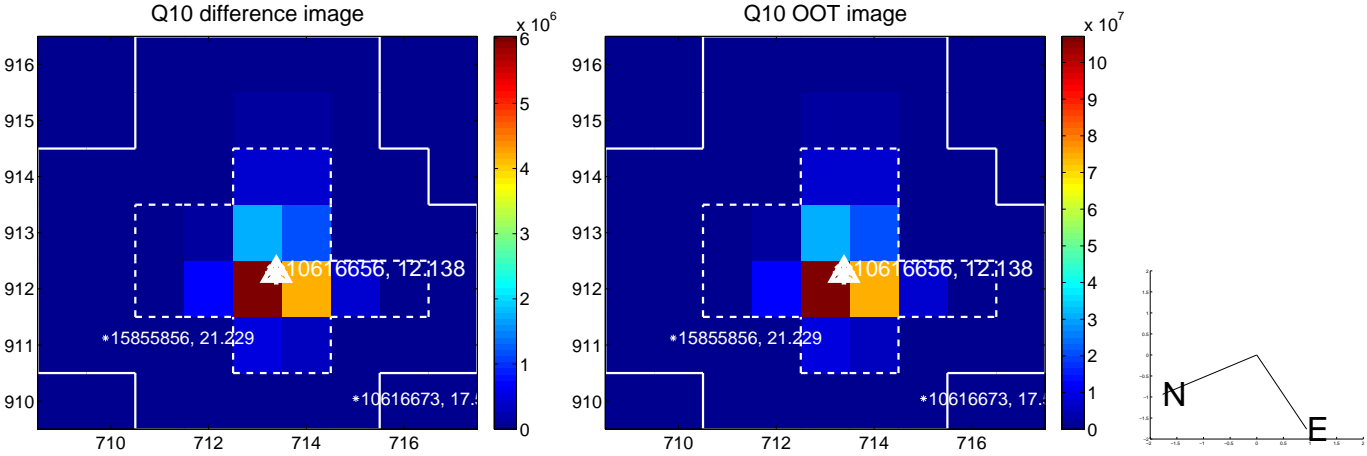
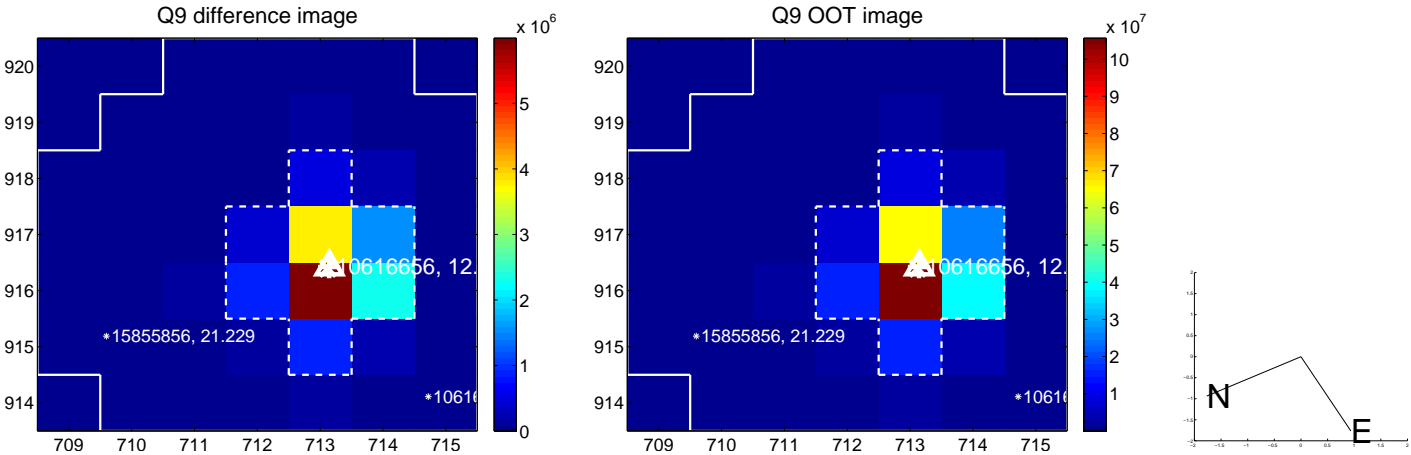
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



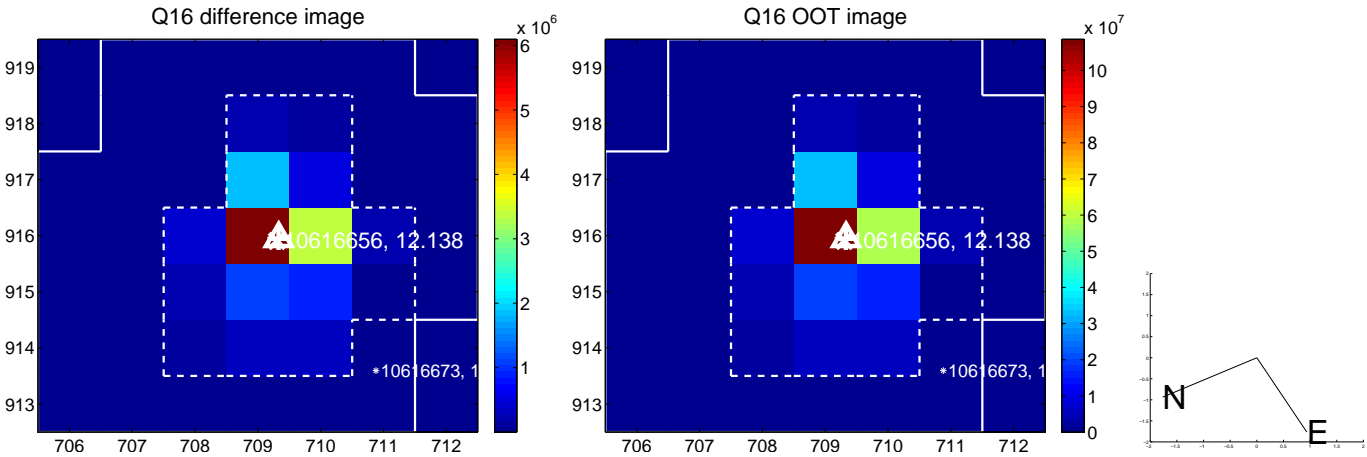
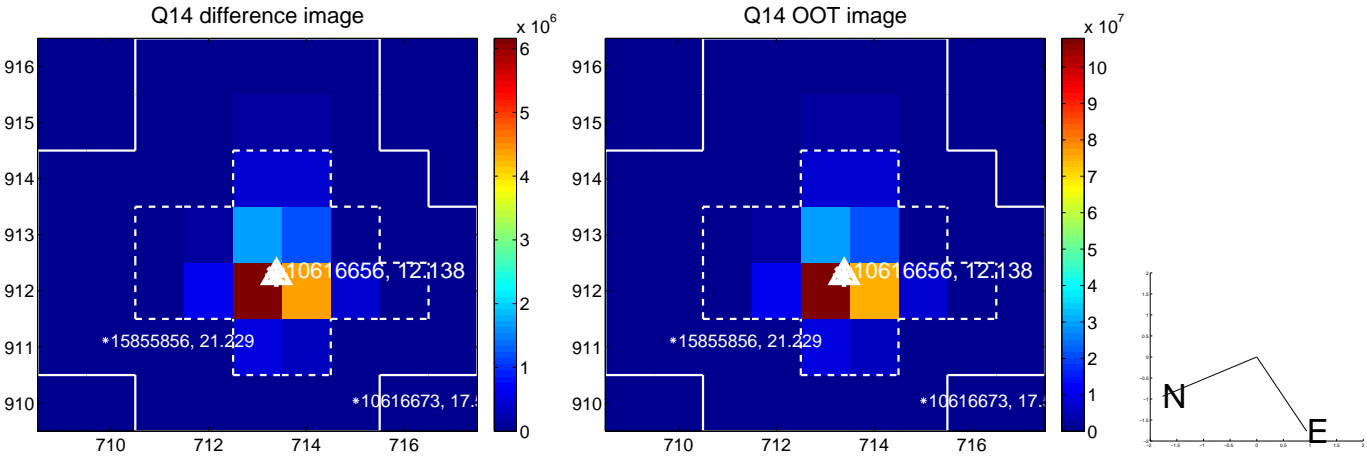
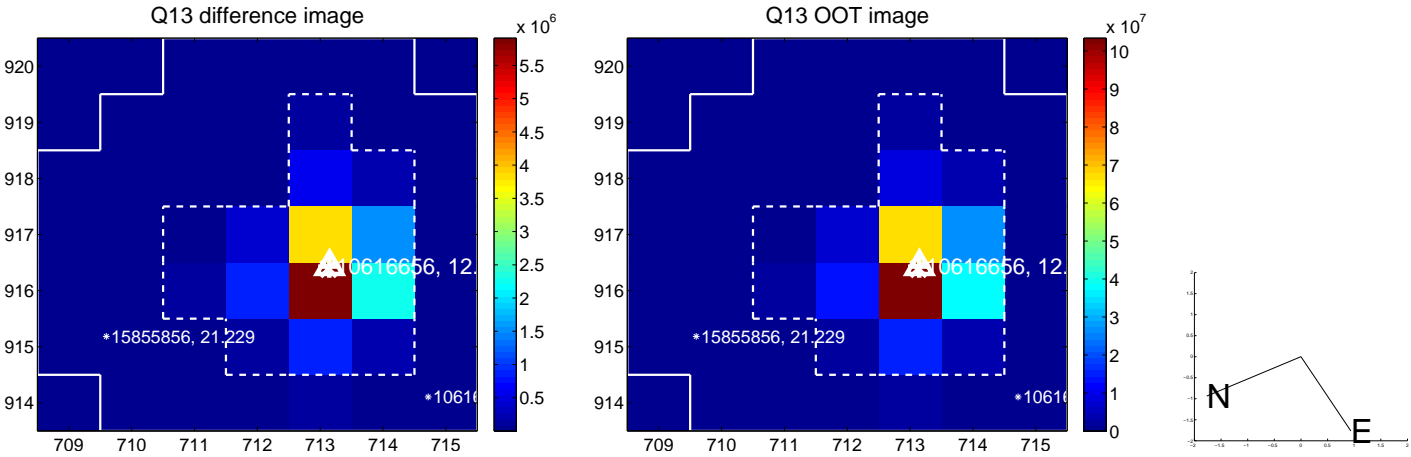
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



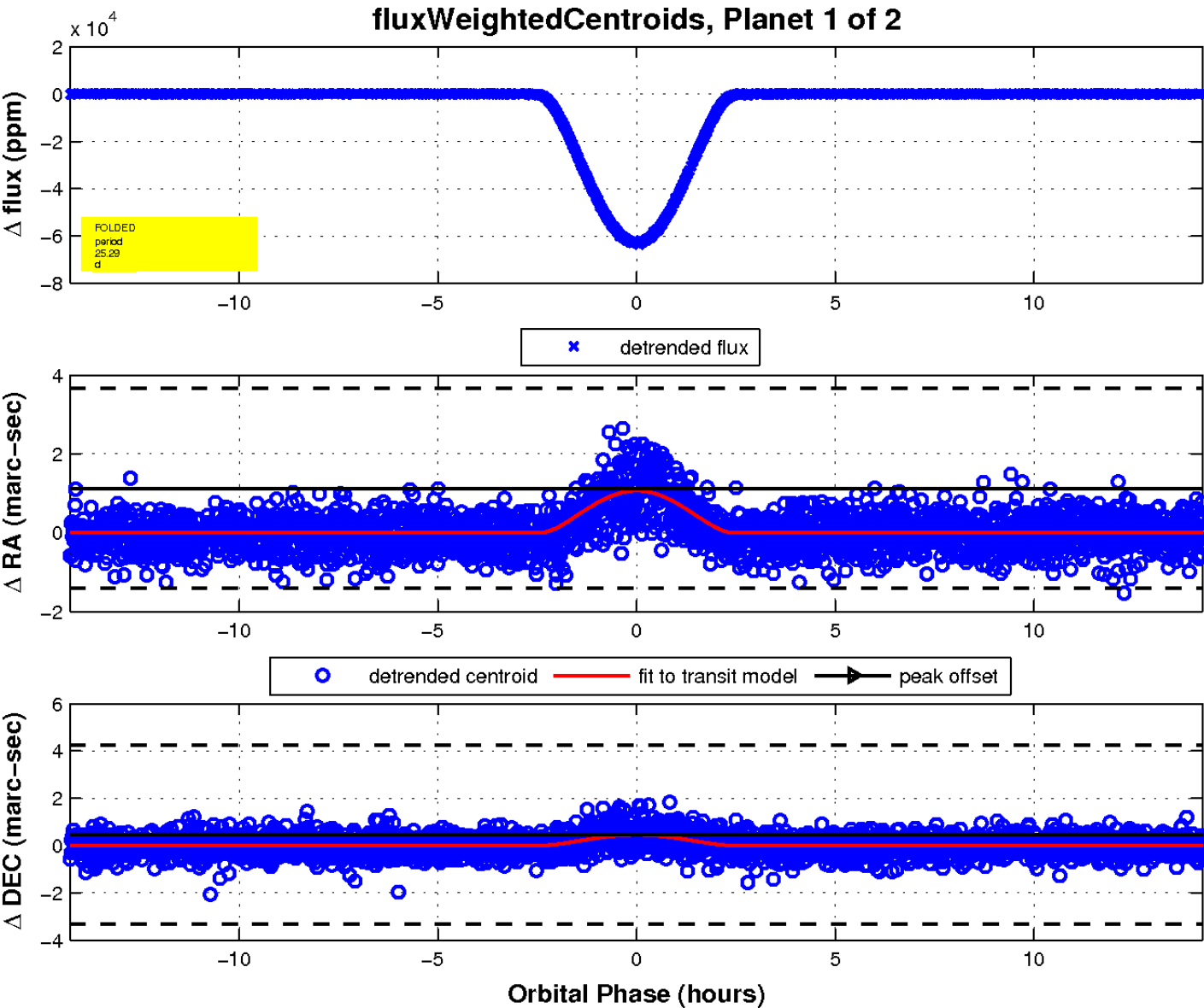
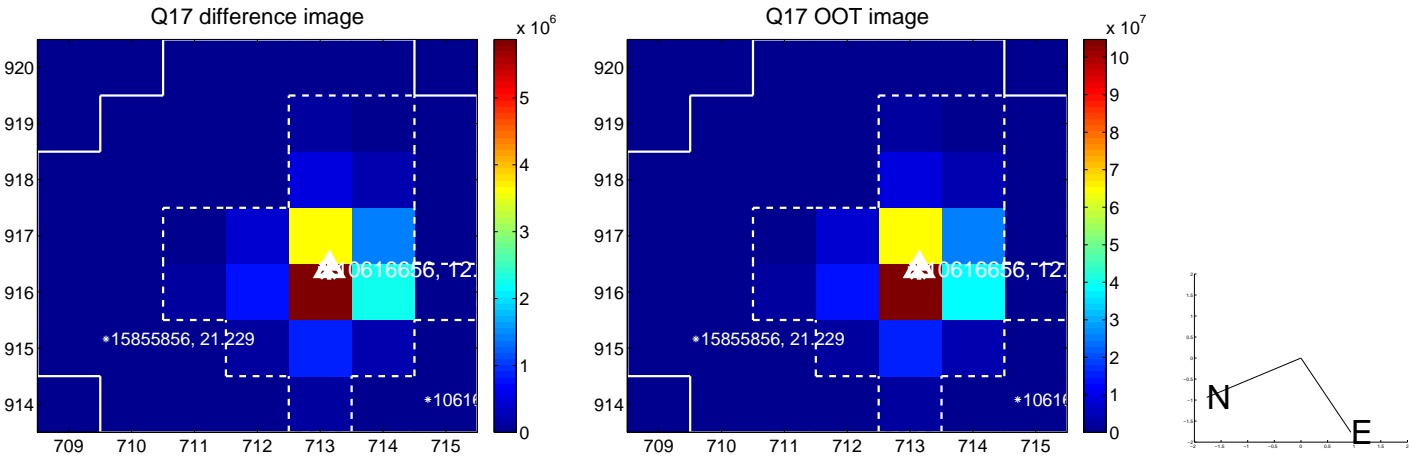
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white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.

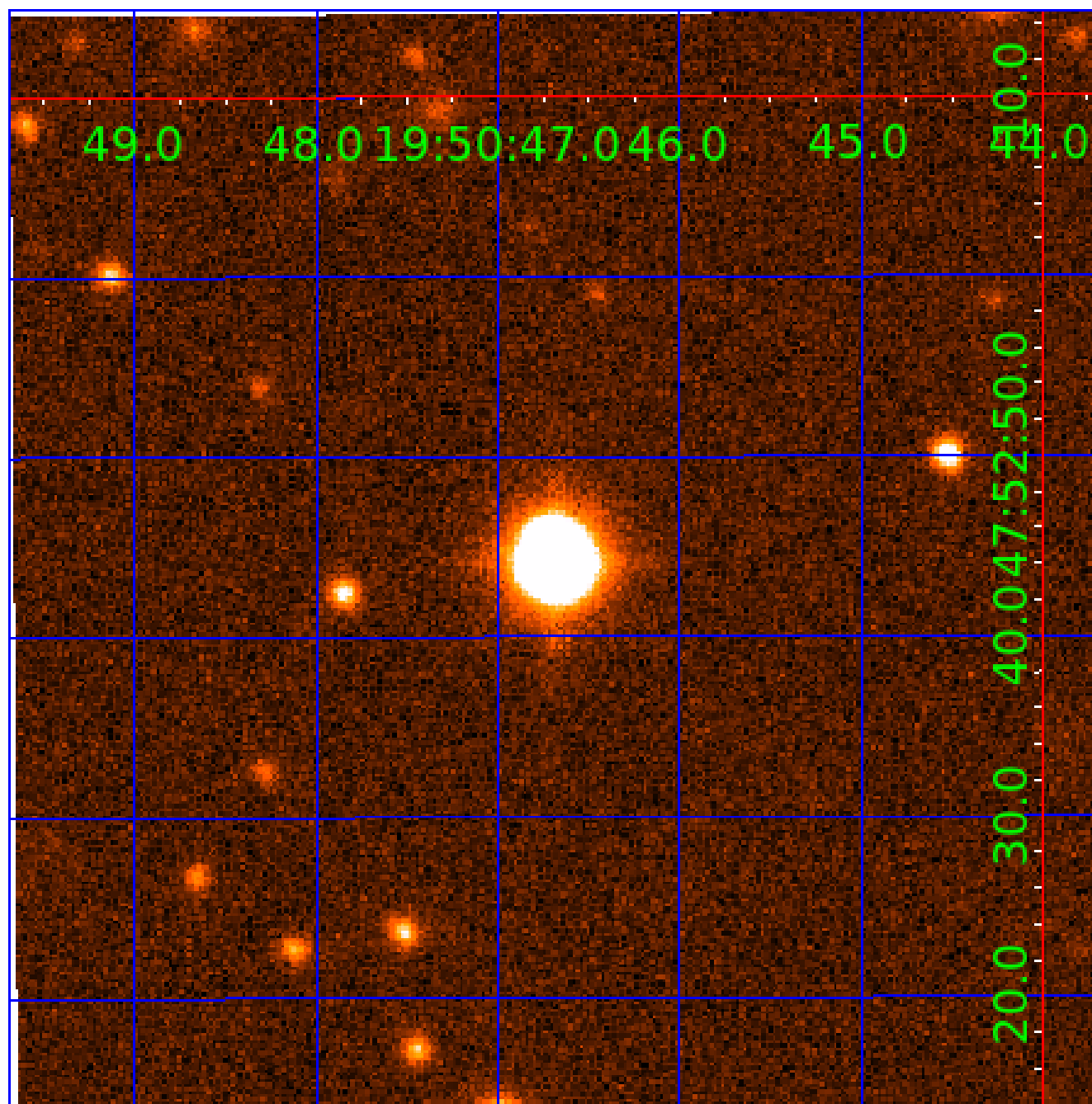


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 010616656

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})
010616656-01	OBS	5814.01	25.285232	135.966211	62786.5	4.756	7212.3	6077.1	1.14	6486	45.47	70.89
010616656-02	OBS	No	411.760107	158.357131	197.8	6.693	8.0	8.4	1.14	6486	1.77	1.72

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010616656-01	OBS	FP	0.00	0	1	0	0	DEEP_V_SHAPED
010616656-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—ALL_TRANS_CHASES—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 for comment definitions.

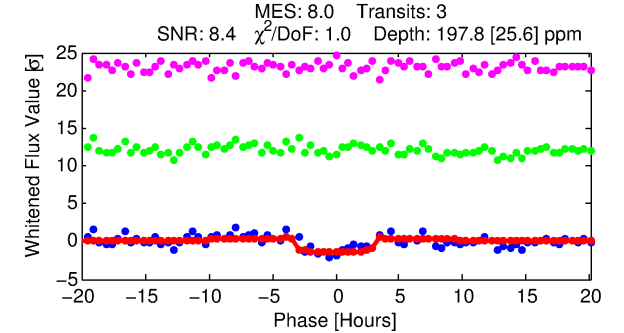
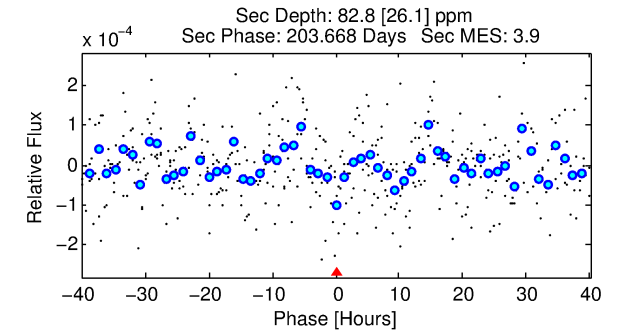
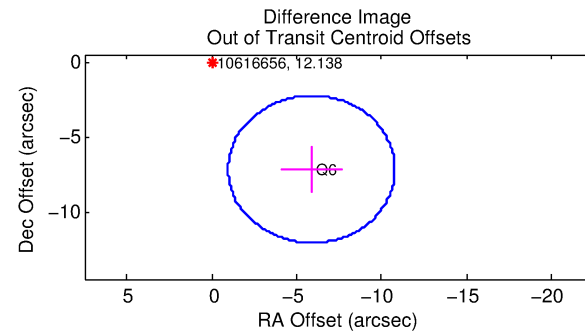
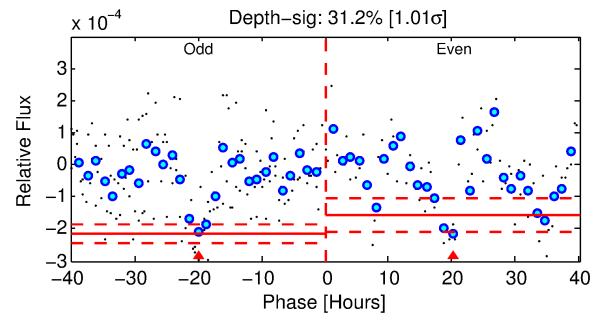
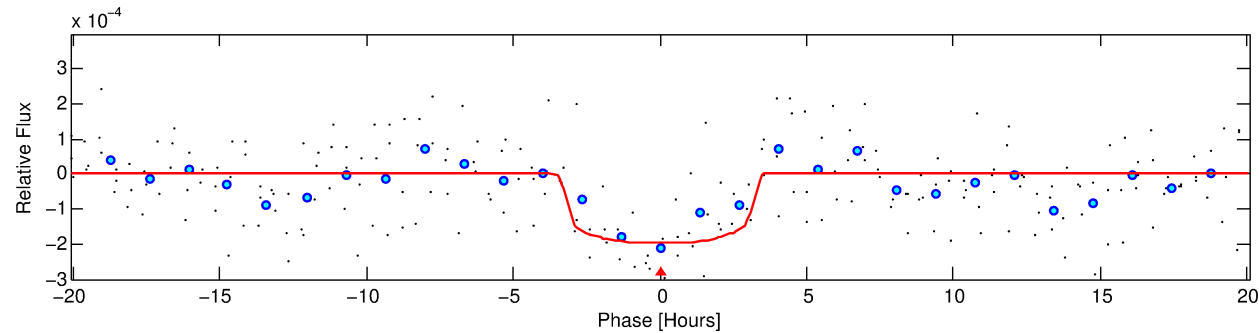
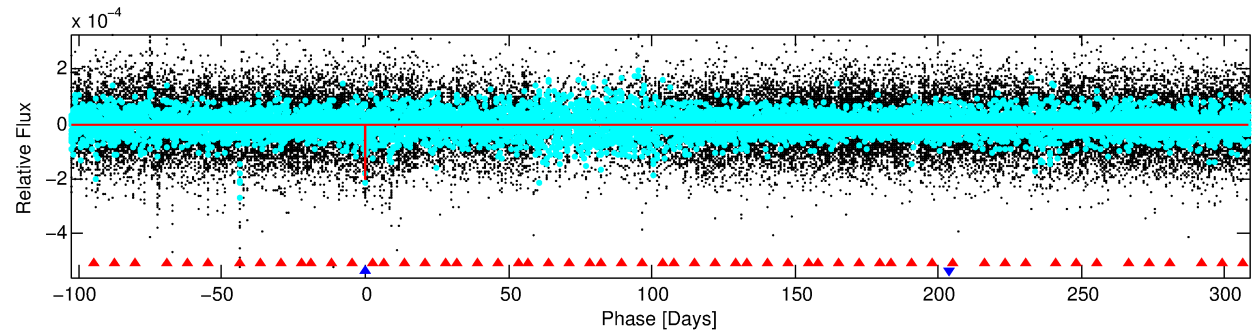
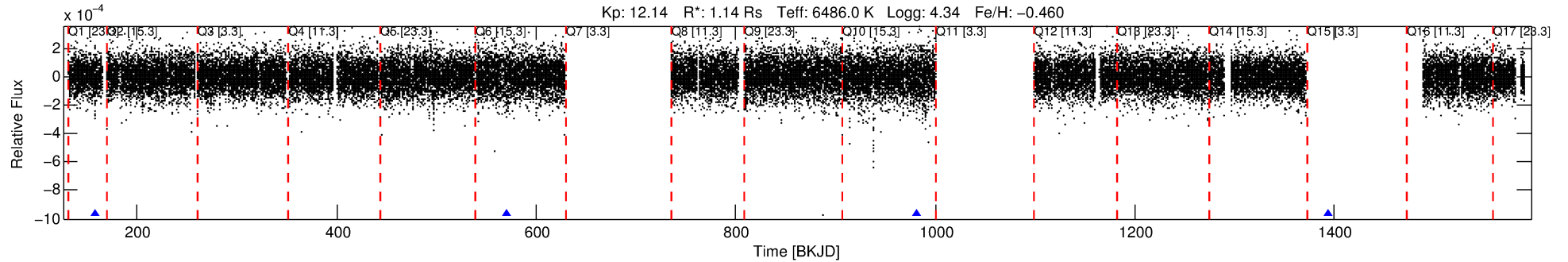
Ephemeris Match Information For 010616656-02

No Significant Match Found

DV One-Page Summary

KIC: 10616656 Candidate: 2 of 2 Period: 411.760 d

KOI: K05814 Corr: No Ephemeris Match



DV Fit Results:

Period = 411.76011 [0.00808] d
Epoch = 158.3571 [0.0085] BKJD
Rp/R* = 0.0143 [0.0057]
a/R* = 289.09 [637.81]
b = 0.81 [0.96]
Seff = 1.72 [0.46]
Teq = 292 [19] K
Rp = 1.77 [0.79] Re
a = 1.0916 [0.1828] AU
Ag = 17354.68 [15445.31] [1.12 σ]
Teffp = 5180 [1121] K [4.36 σ]

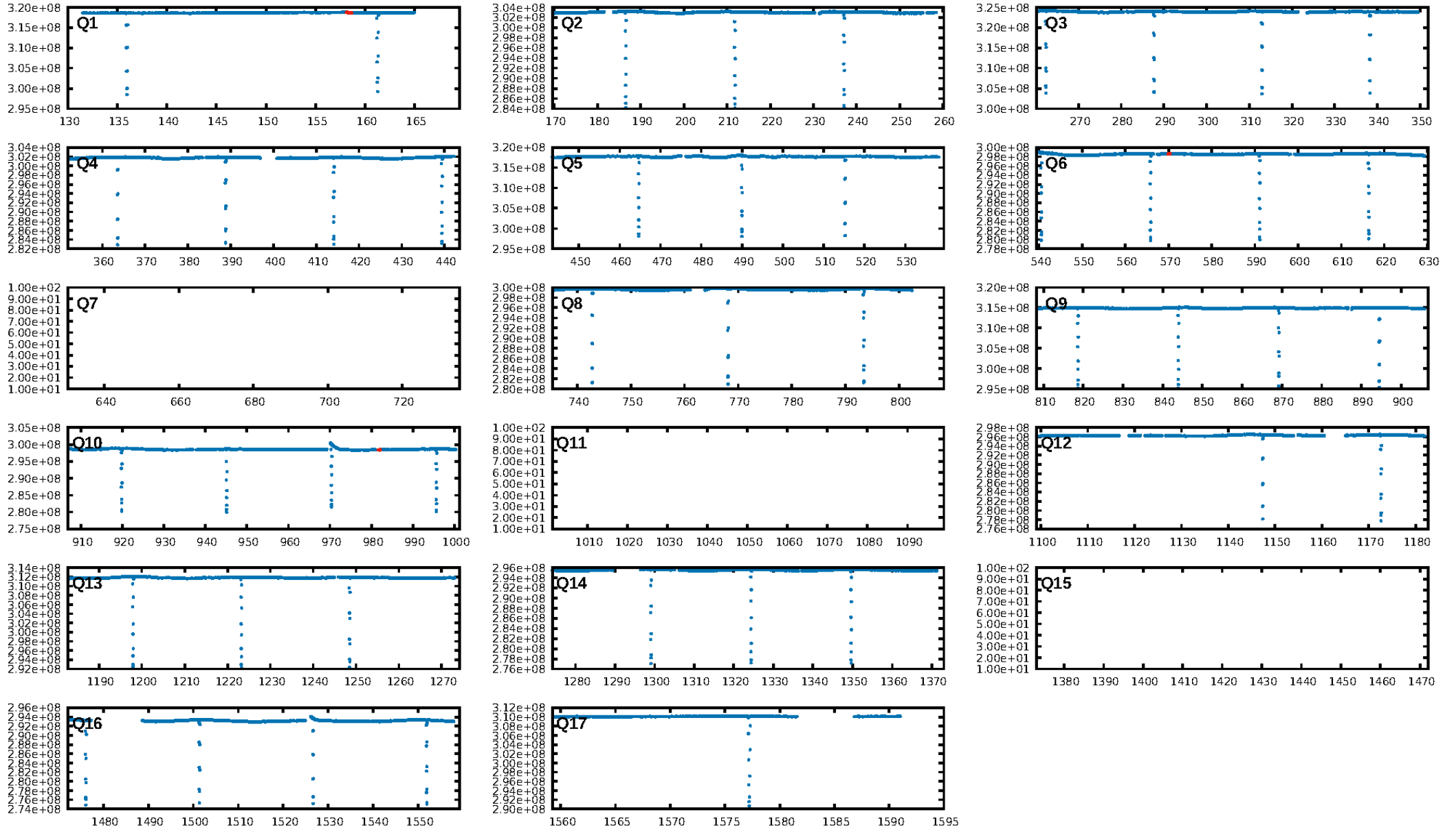
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [1129.66 σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 55.0%
ModelChiSquareGof-sig: 99.9%
Bootstrap-pfa: 5.18e-11
RollingBand-fgt: 1.00 [2/2]
GhostDiagnostic-chr: 1.747
Centroid-sig: 65.7%
Centroid-so: 0.768 arcsec [0.61 σ]
OotOffset-rm: 9.279 arcsec [5.66 σ]
KicOffset-rm: 9.269 arcsec [5.66 σ]
OotOffset-st: 1/0/0/0 [1]
KicOffset-st: 1/0/0/0 [1]
DiffImageQuality-fgm: 0.00 [0/1]
DiffImageOverlap-fno: 1.00 [3/3]

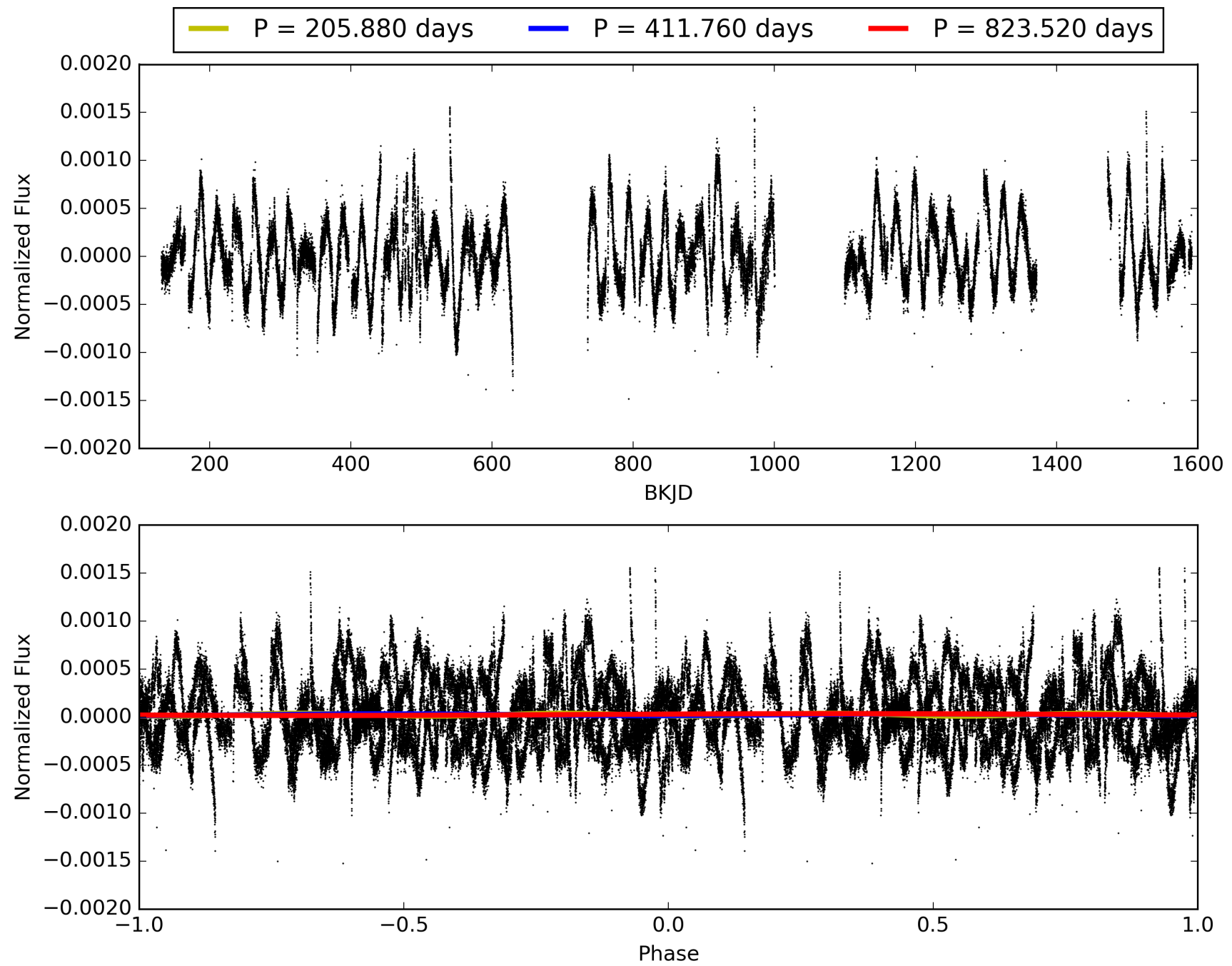
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

TCE 010616656-02, PDC Light Curves

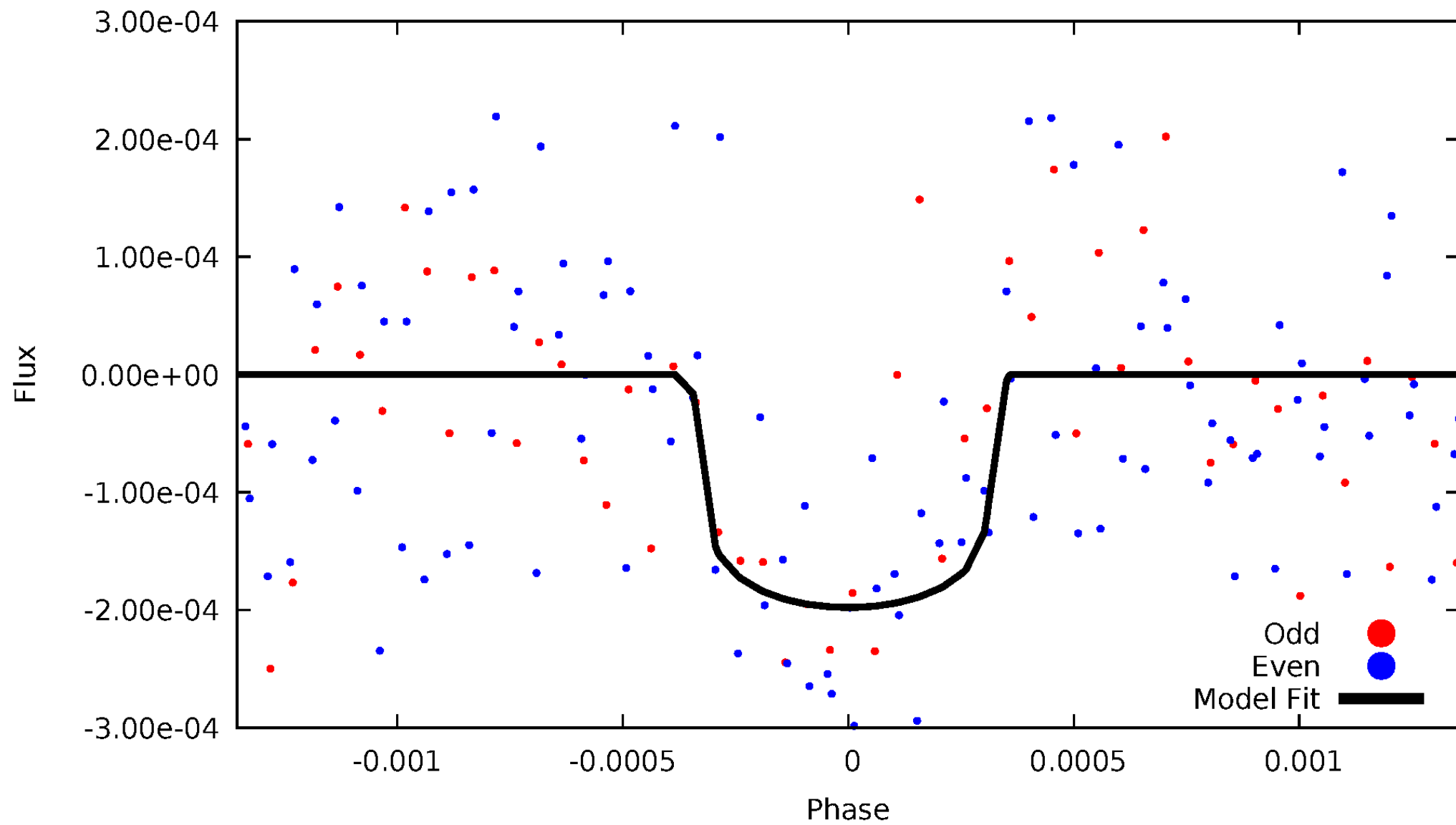


TCE 010616656-02



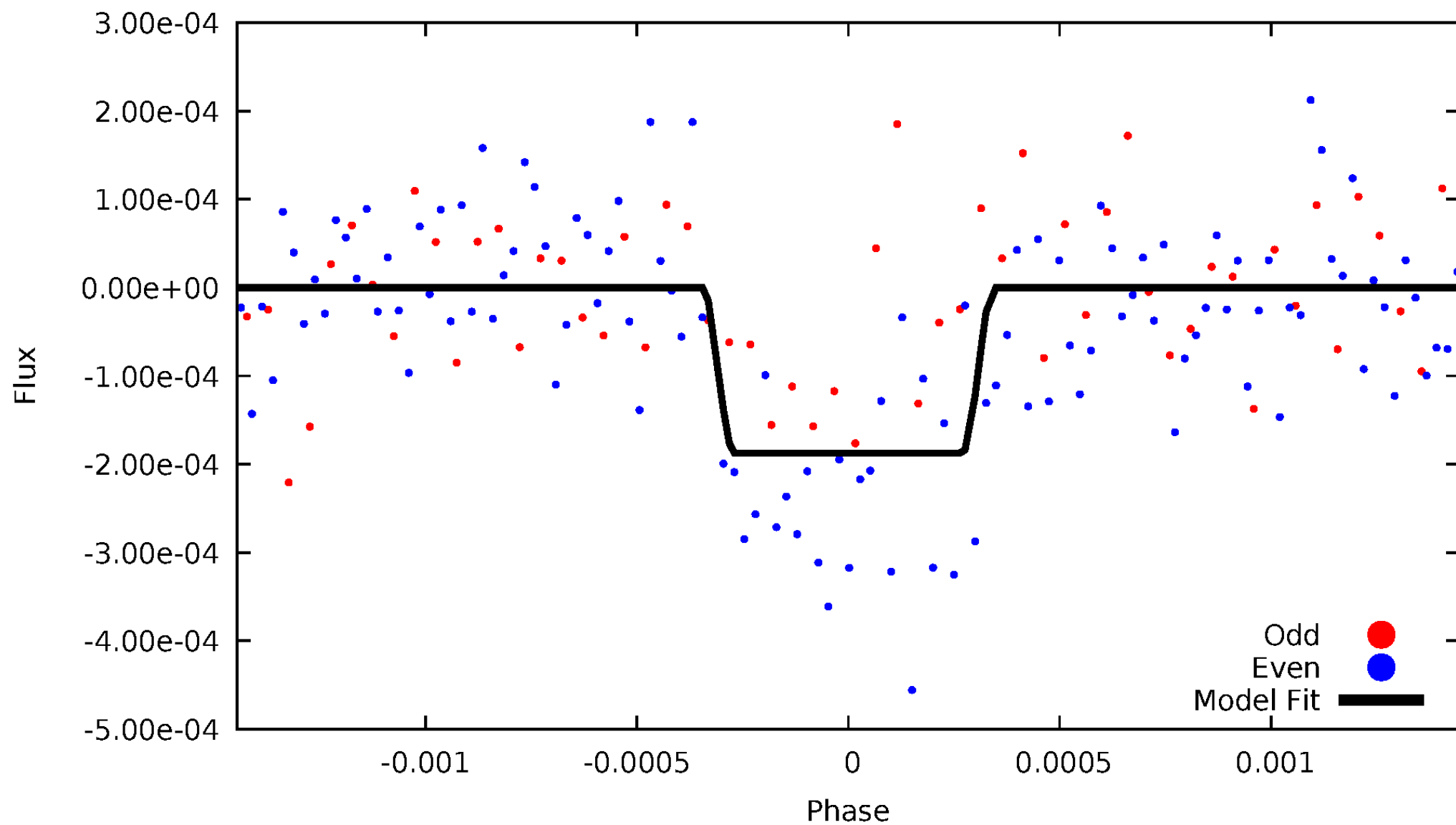
DV Odd/Even

TCE 010616656-02



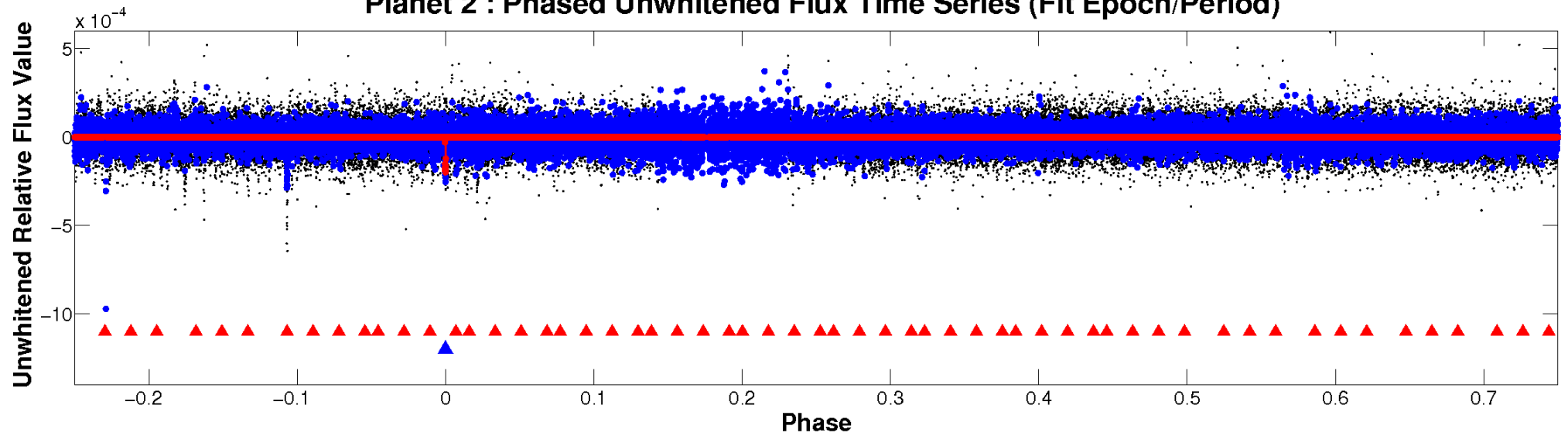
ALT Odd/Even

TCE 010616656-02

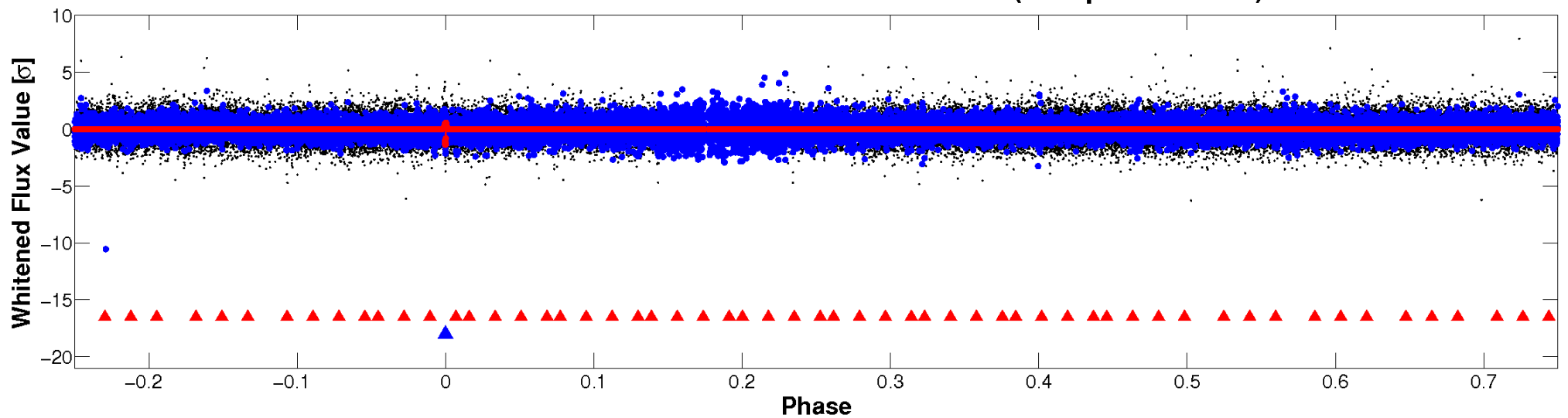


Non-Whitened Vs. Whitened Light Curve

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

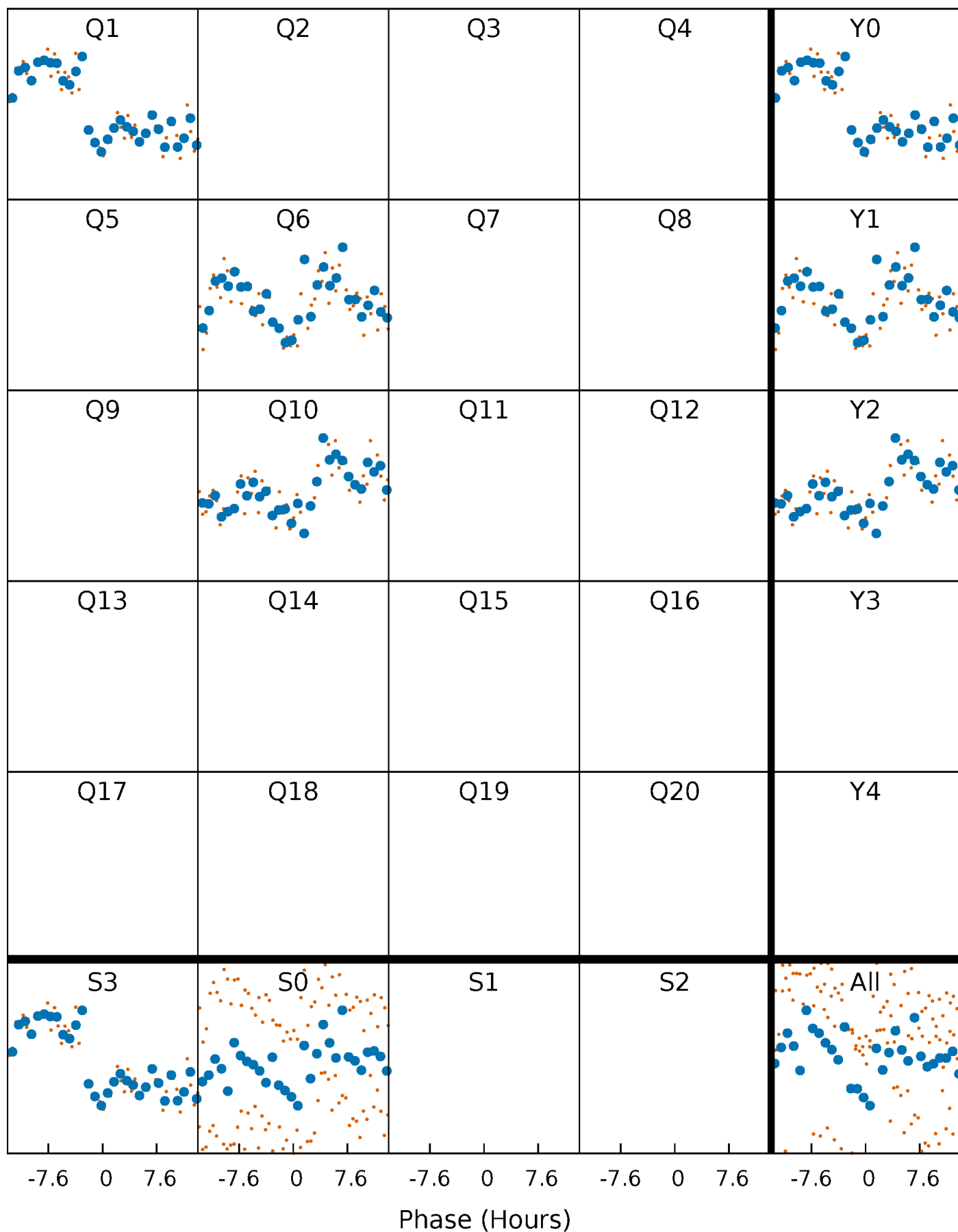


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



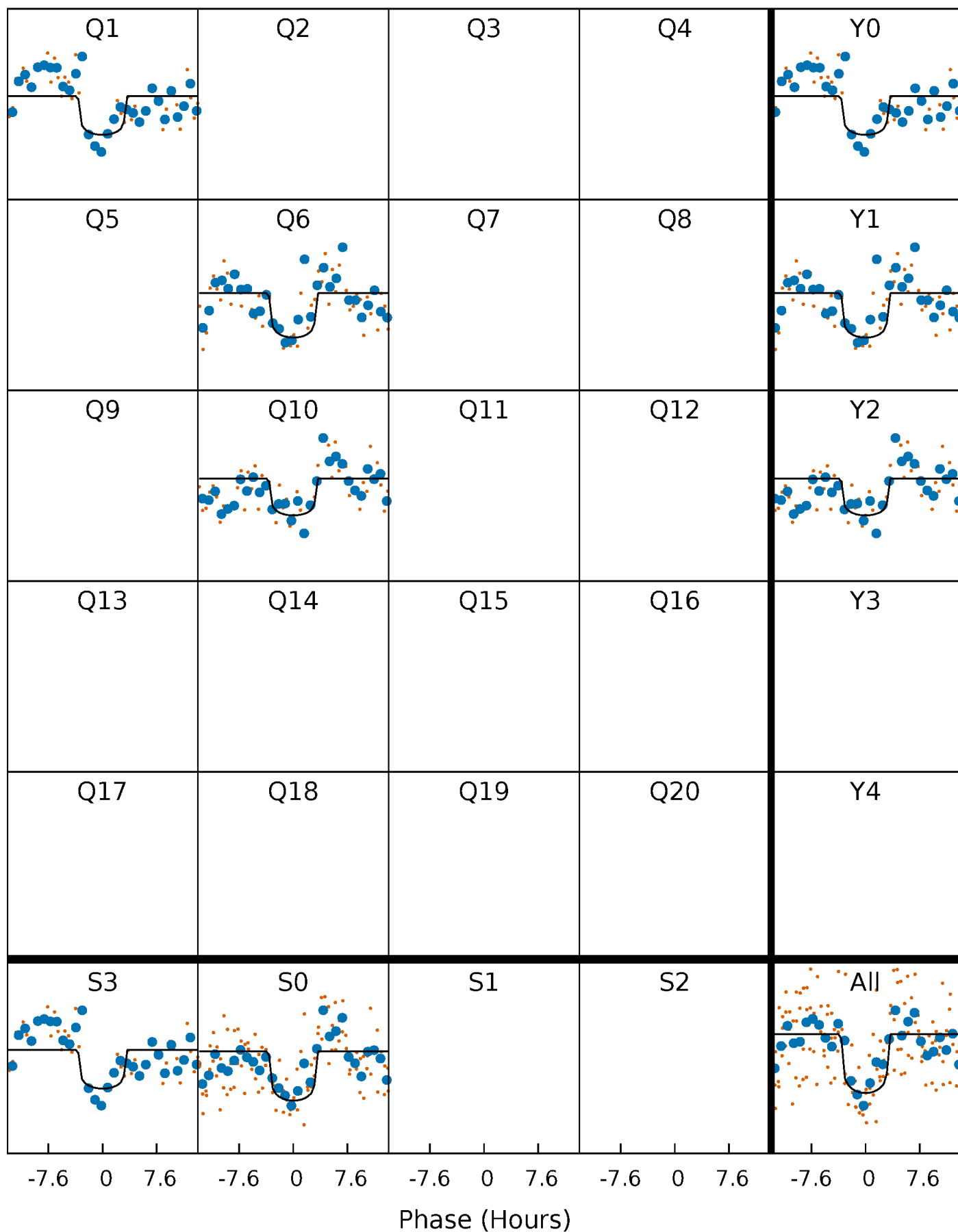
PDC Quarter-Phased Transit Curves

TCE 010616656-02 P=411.760107 Days $T_0=158.357131$ (BKJD)



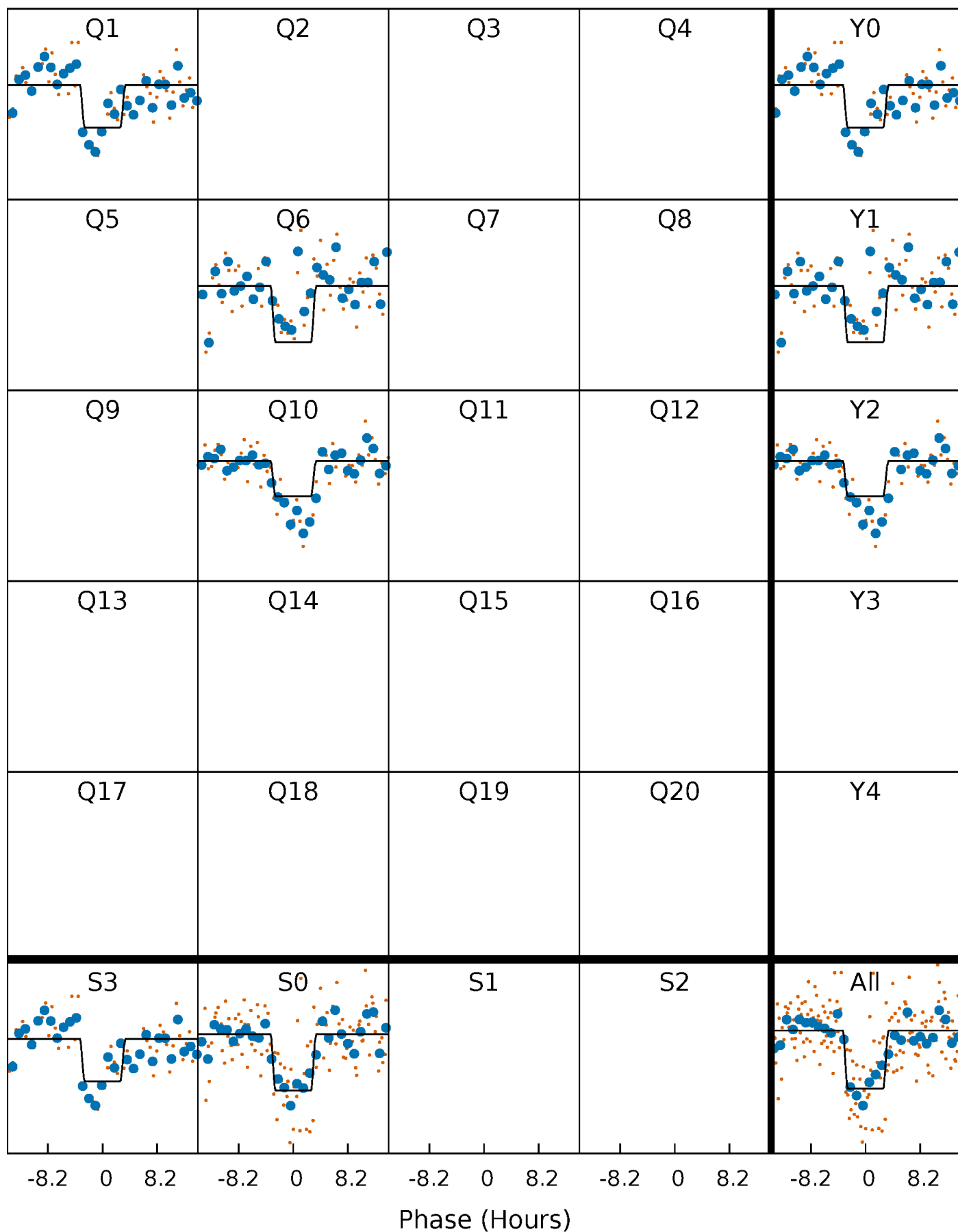
DV Quarter-Phased Transit Curves

TCE 010616656-02 P=411.760107 Days $T_0=158.357131$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

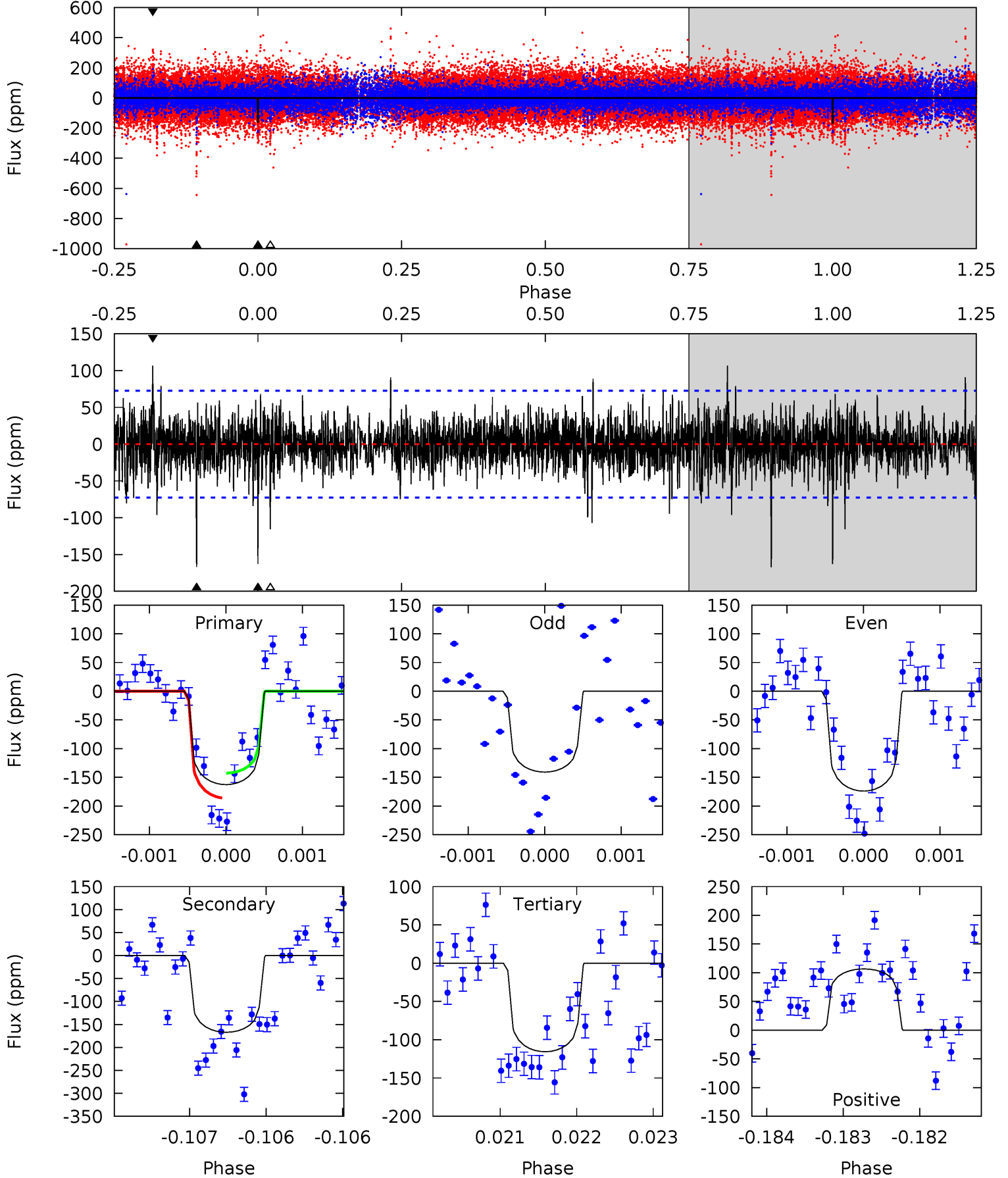
TCE 010616656-02 P=411.743045 Days $T_0=158.391759$ (BKJD)



DV Model-Shift Uniqueness Test

010616656-02, P = 411.760107 Days, E = 158.357131 Days

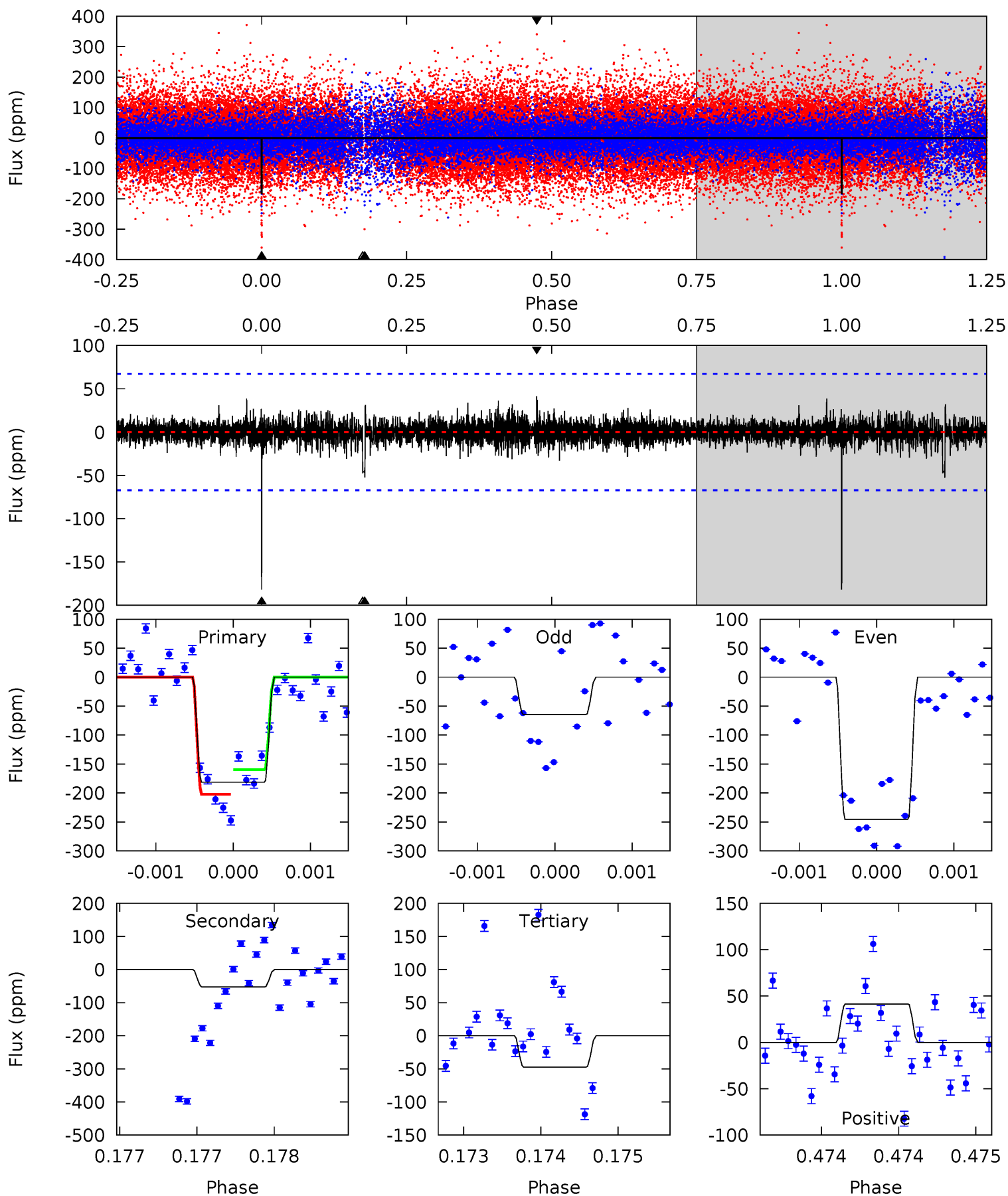
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.3	12.7	8.77	8.09	5.51	3.39	1.70	3.57	4.25	3.90	4.58	1.21	0.94	0.39	1.64



Alt Model-Shift Uniqueness Test

010616656-02, P = 411.743045 Days, E = 158.391759 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
14.9	4.31	3.89	3.40	5.53	3.41	0.66	11.0	11.5	0.42	0.91	6.34	0.98	0.19	1.74



Stellar Parameters For KIC 010616656

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6486^{+146}_{-194}	$4.337^{+0.104}_{-0.127}$	$-0.460^{+0.250}_{-0.300}$	$1.136^{+0.232}_{-0.155}$	$1.021^{+0.137}_{-0.103}$	$0.981^{+0.465}_{-0.368}$
	+2%/-3%	+2%/-3%	+54%/-65%	+20%/-14%	+13%/-10%	+47%/-37%
Source	PHO1	FLK73	KIC0	DSEP		

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

Secondary Eclipse Parameters for KIC 010616656-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-167 ± 13	$1.79^{+0.77}_{-0.68}$	408^{+21}_{-21}	6141^{+1854}_{-926}	34343^{+56915}_{-17825}
Alt.	-52 ± 12	$1.69^{+0.81}_{-0.69}$	409^{+21}_{-19}	4772^{+1533}_{-606}	11672^{+24467}_{-6507}

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

DV Centroid Data

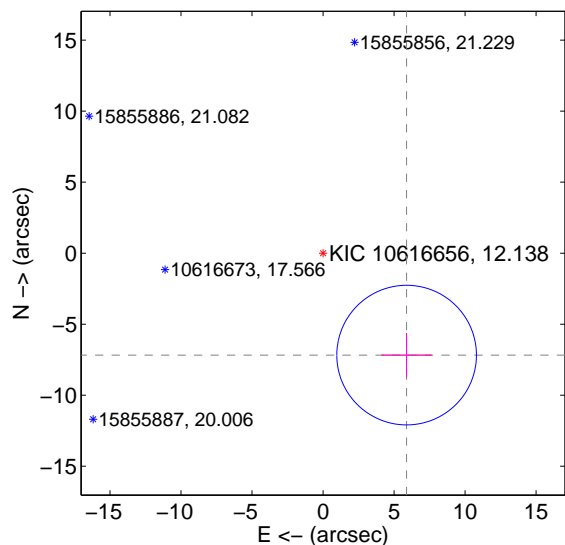
Supplemental centroid analysis for 010616656-02. Kepler magnitude: 12.14. Transit SNR 8.36

There are 0 quarters with good PRF difference image offsets

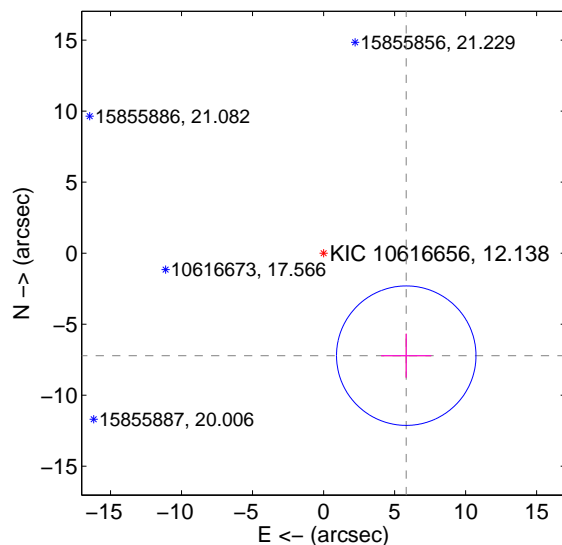
The direct PRF centroid is offset from the target star catalog position by about 0.08 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	9.279 ± 1.638	5.66	-5.884 ± 1.765	-7.175 ± 1.547
PRF-fit source offset from KIC position	9.269 ± 1.636	5.66	-5.820 ± 1.765	-7.215 ± 1.547
photometric centroid source offset	0.77 ± 1.26	0.61	-0.66 ± 1.27	0.40 ± 1.23

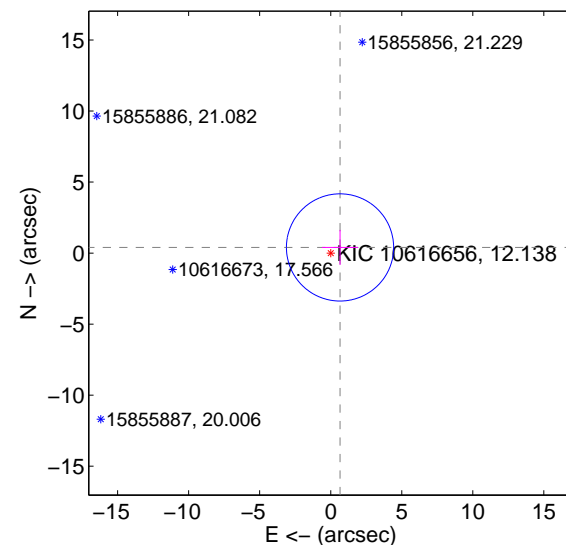
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

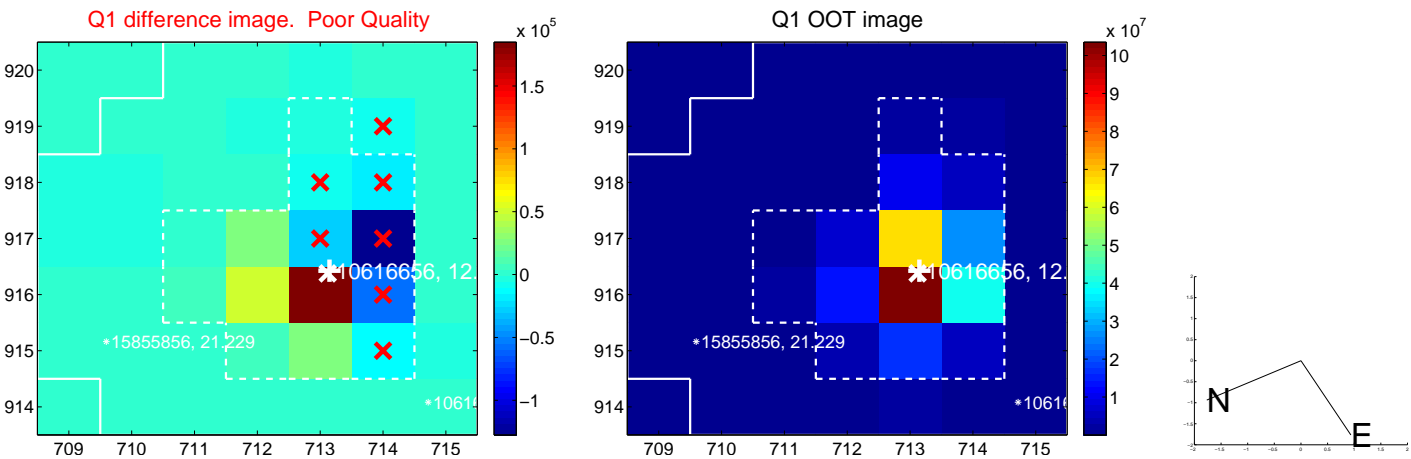


offset from photometric centroids

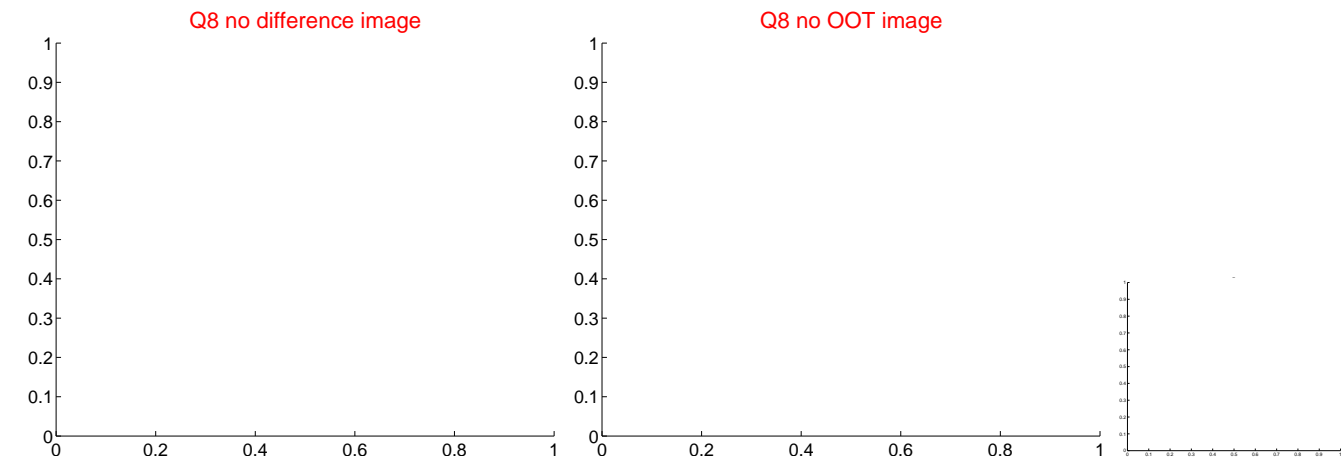
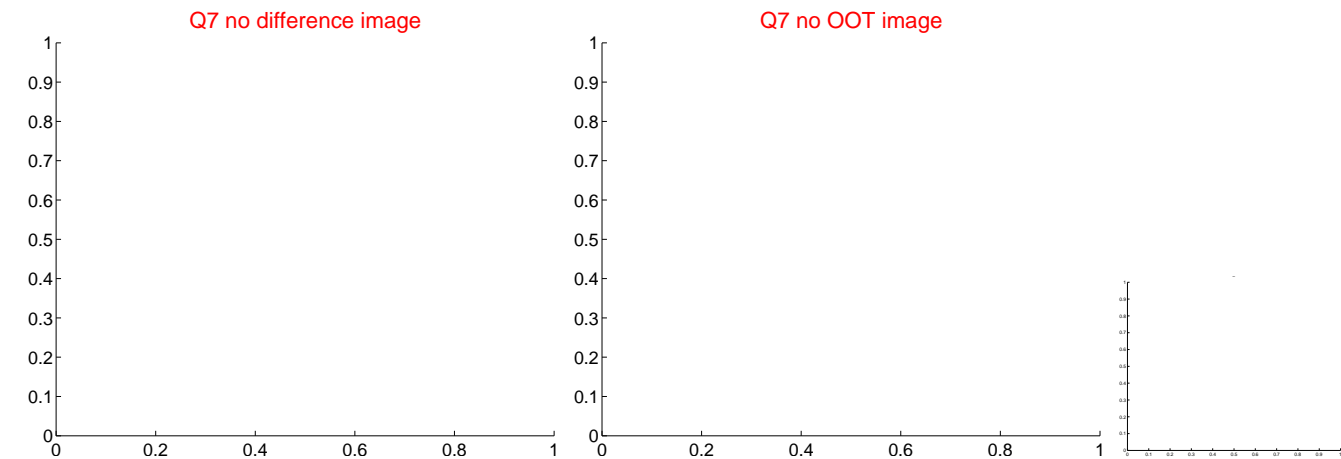
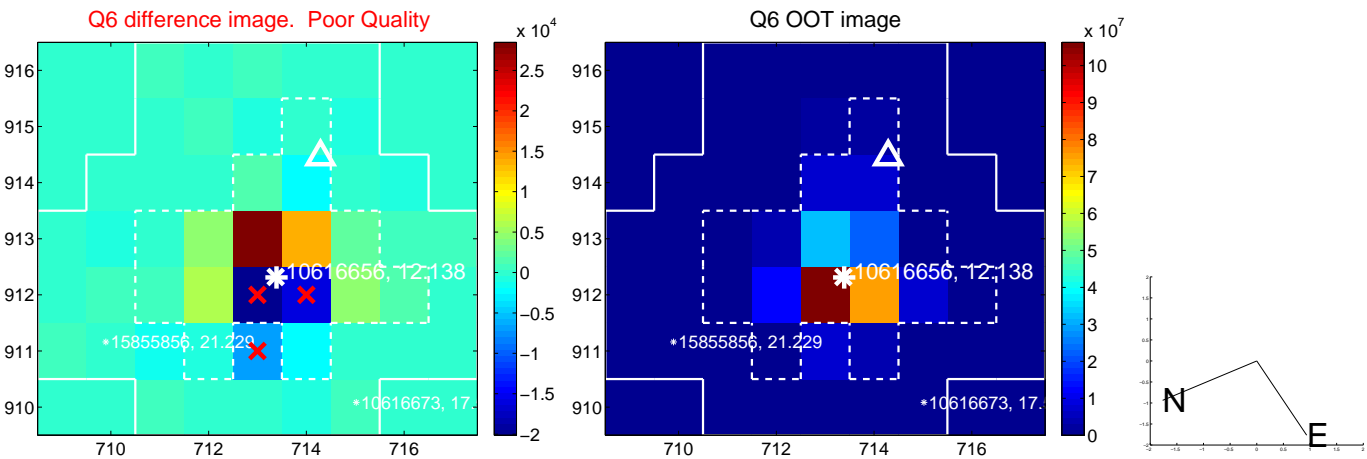


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

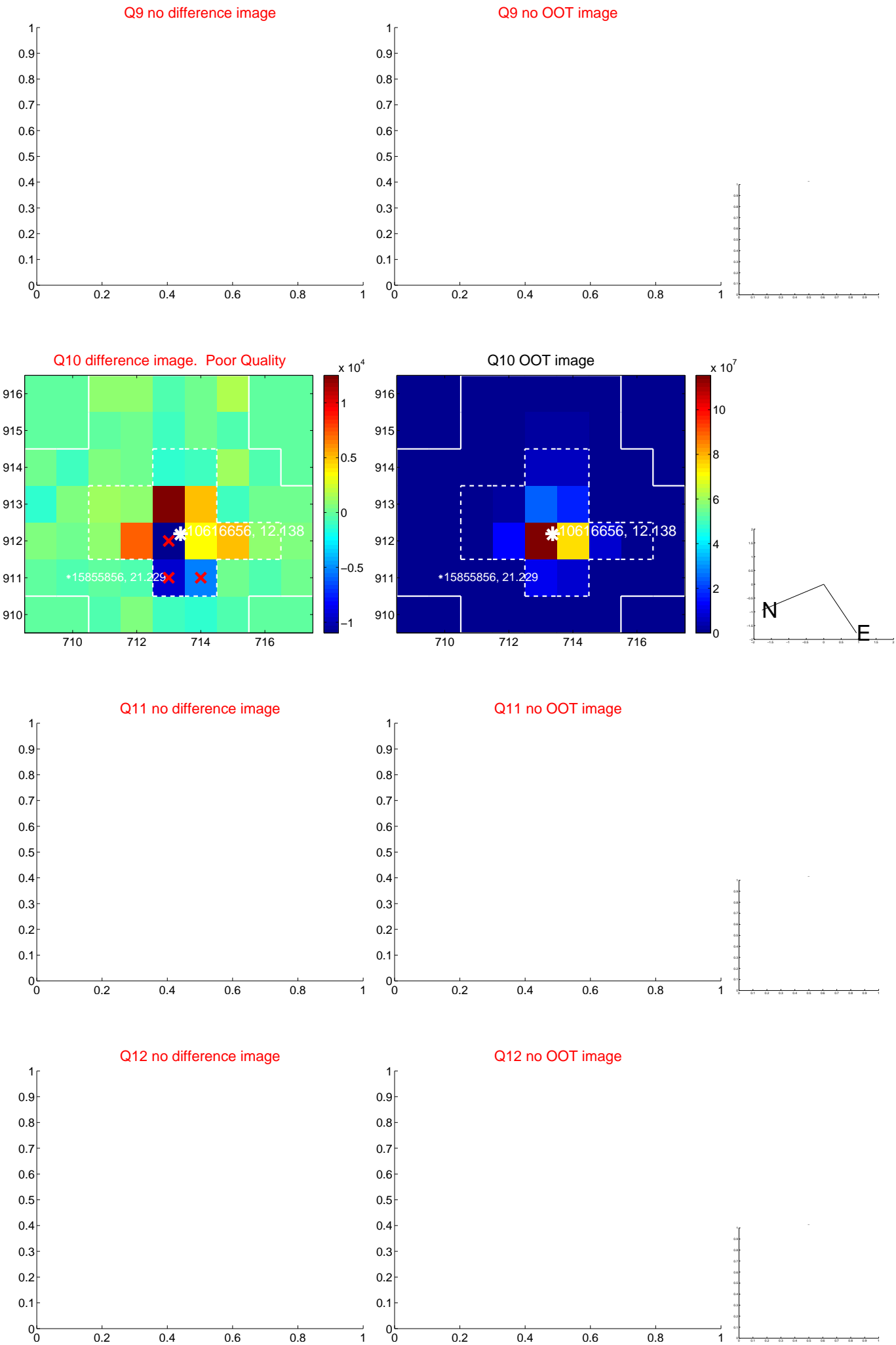
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



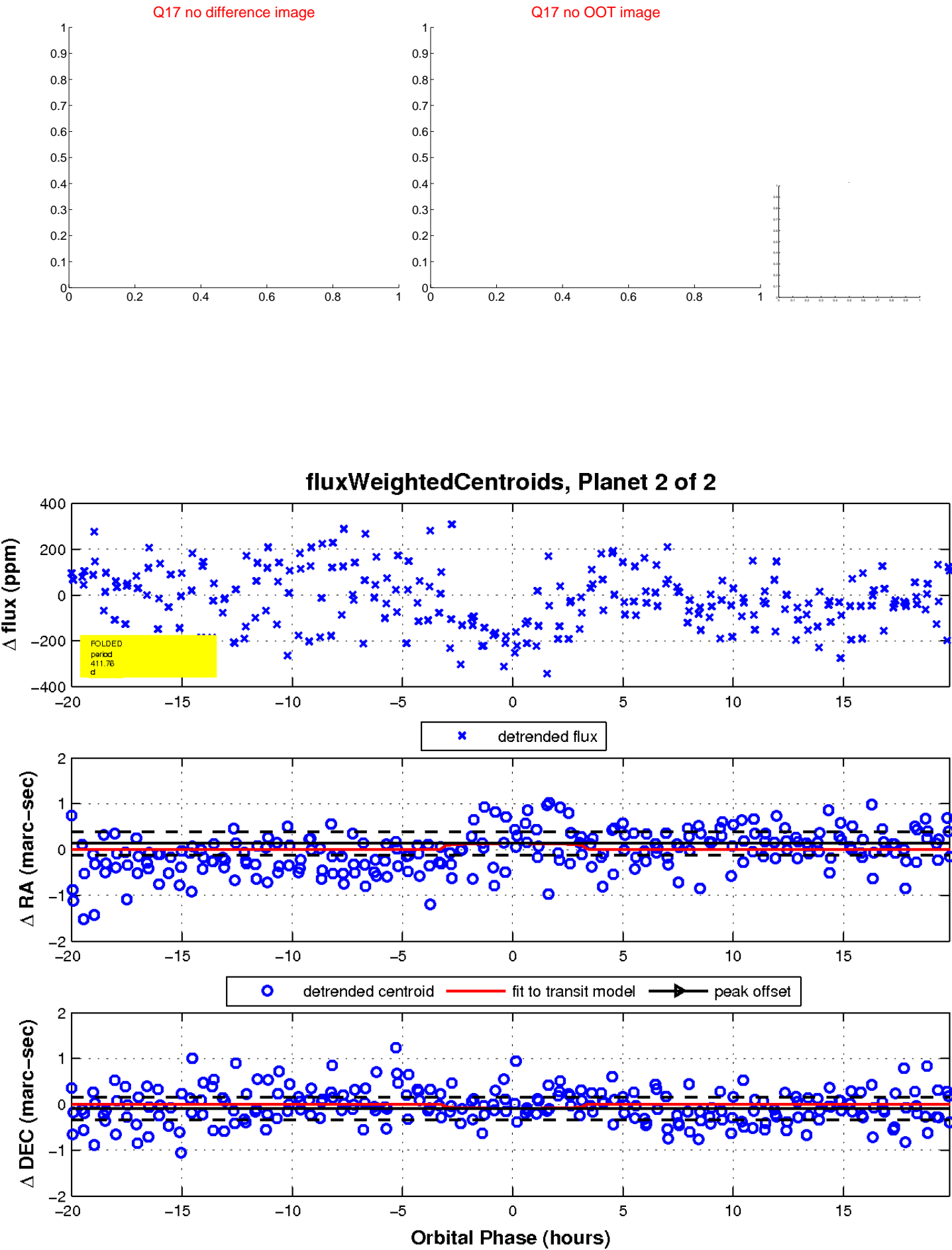
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

