

KIC 004659837

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})
004659837-01	OBS	No	1.835581	132.056857	16.0	7.617	8.1	6.2	2.77	6859	1.28	12839.83
004659837-02	OBS	No	130.678516	165.874337	125.6	9.521	13.3	3.9	2.77	6859	3.42	43.52
004659837-03	OBS	No	318.109462	294.519022	228.1	6.651	9.6	6.2	2.77	6859	4.75	13.29
004659837-04	OBS	No	138.938162	133.207213	171.0	7.742	8.1	6.4	2.77	6859	4.20	40.10
004659837-05	OBS	No	63.925988	179.038178	165.3	5.494	7.2	7.5	2.77	6859	4.12	112.90
004659837-06	OBS	No	41.395366	153.532238	79.5	13.609	7.2	5.8	2.77	6859	2.78	201.52

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004659837-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
004659837-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
004659837-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_TRACKER—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
004659837-04	OBS	FP	0.00	1	0	1	0	TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED—HALO_GHOST
004659837-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
004659837-06	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—CENT_SATURATED—HALO_GHOST

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

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

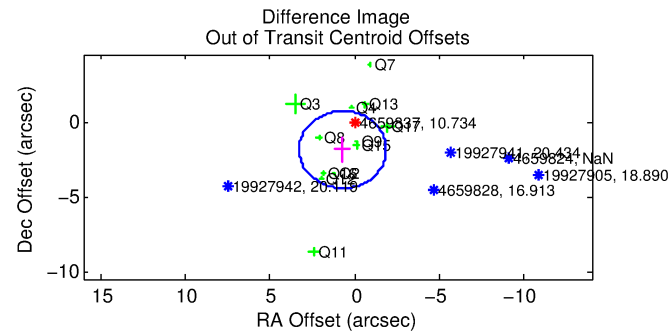
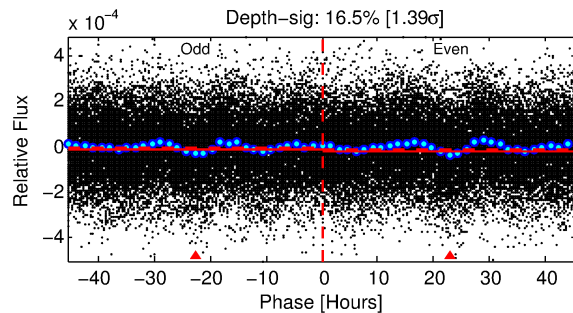
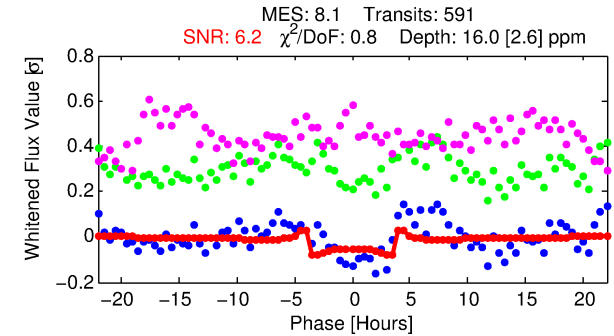
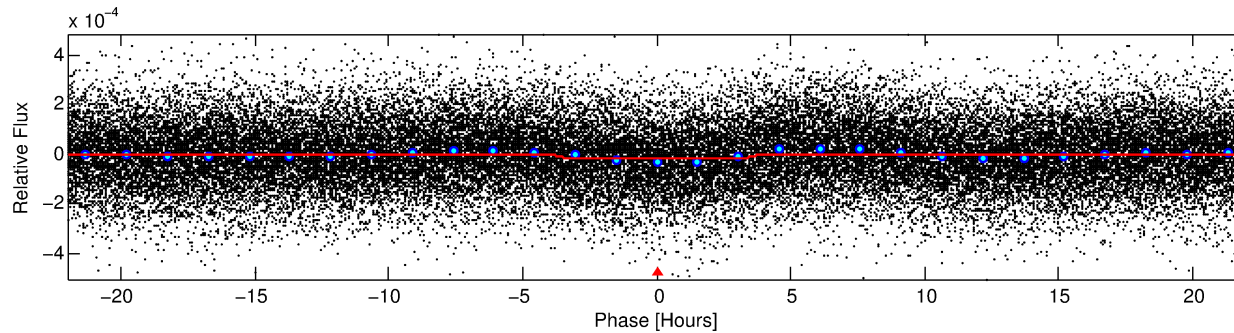
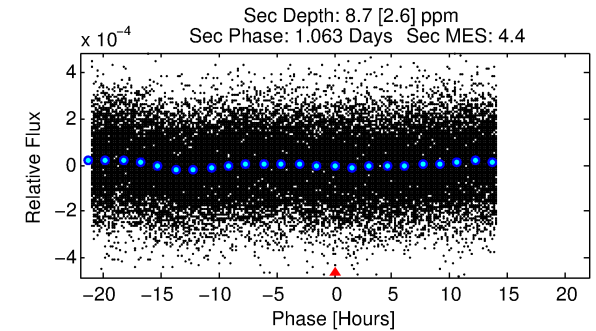
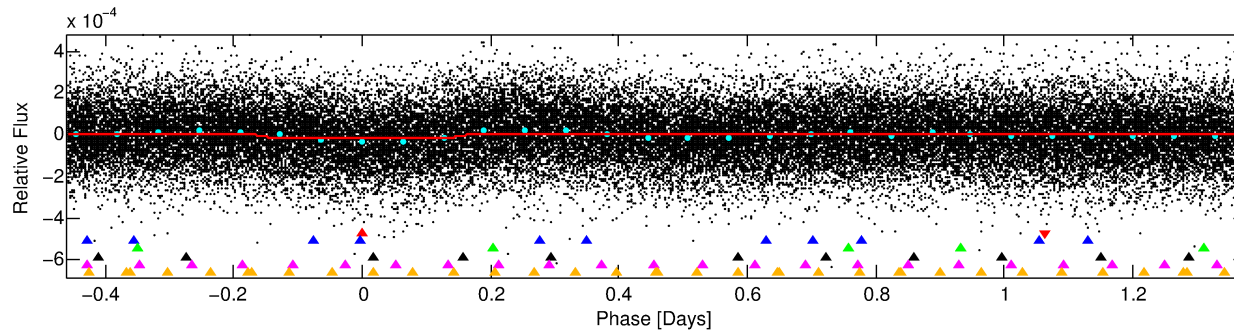
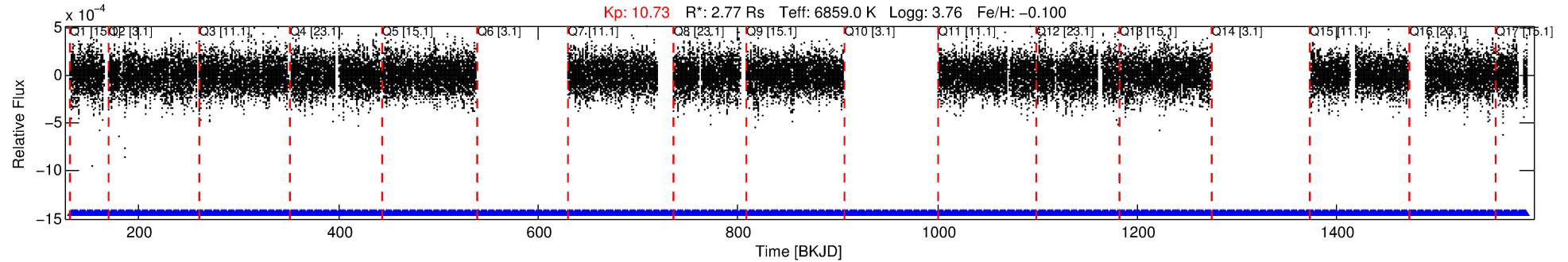
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 004659837-01

No Significant Match Found

DV One-Page Summary

KIC: 4659837 Candidate: 1 of 6 Period: 1.836 d



DV Fit Results:

Period = 1.83558 [0.00002] d
Epoch = 132.0569 [0.0044] BKJD
Rp/R* = 0.0042 [0.0009]
a/R* = 1.27 [0.55]
b = 0.89 [0.28]
Seff = 12839.83 [6487.96]
Teq = 2714 [343] K
Rp = 1.28 [0.50] Re
a = 0.0344 [0.0108] AU
Ag = 3.48 [2.44] [1.01σ]
Teffp = 5730 [741] K [3.69σ]

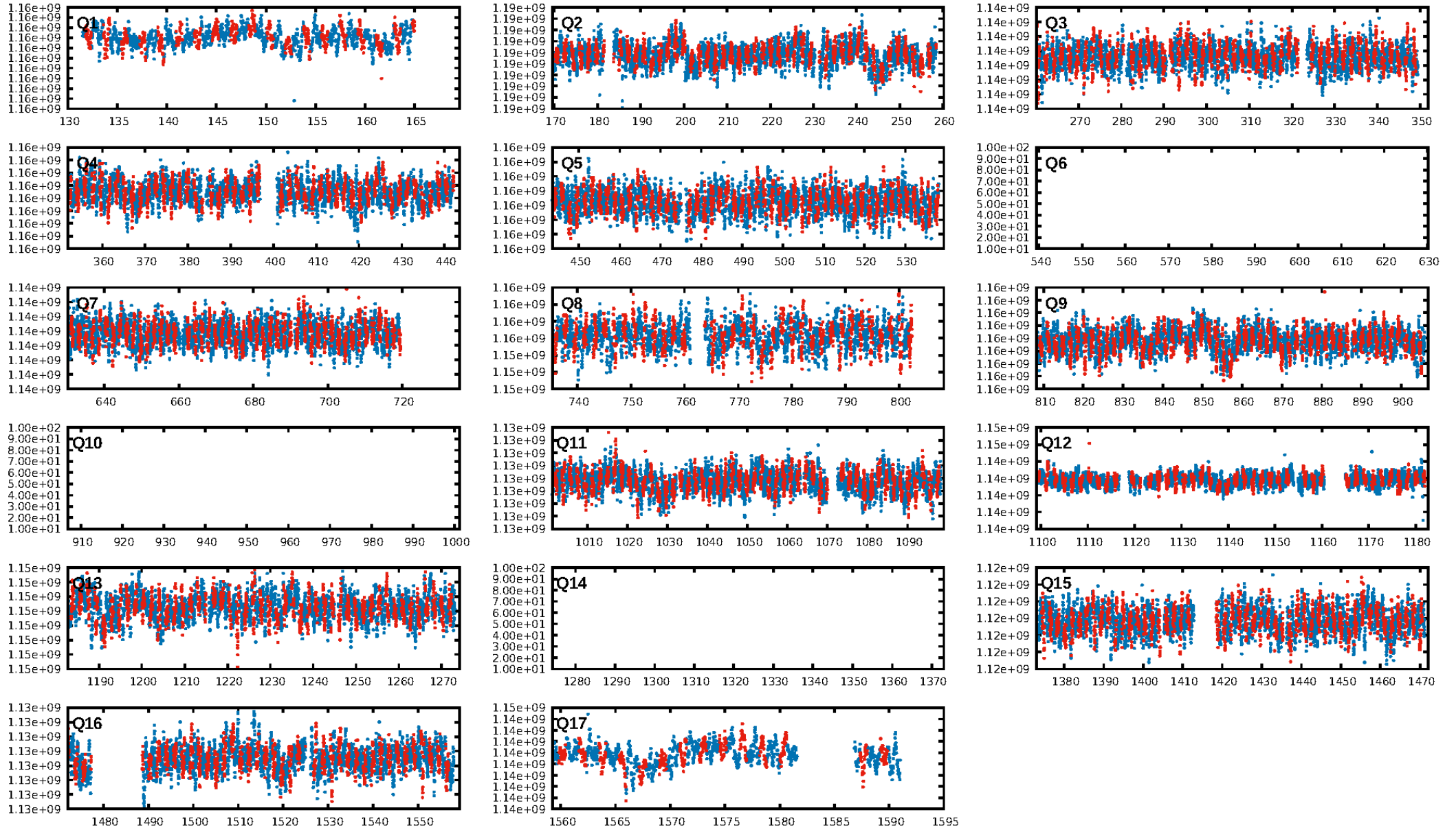
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [60.88σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 1.83e-10
RollingBand-fgt: 1.00 [558/558]
GhostDiagnostic-chr: 1.696
Centroid-sig: 25.8%
Centroid-so: 0.730 arcsec [0.89σ]
OotOffset-rm: 1.998 arcsec [2.33σ]
KicOffset-rm: 1.908 arcsec [2.00σ]
OotOffset-st: 1/4/4/3 [12]
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DiffImageQuality-fgm: 0.42 [5/12]
DiffImageOverlap-fno: 1.00 [14/14]

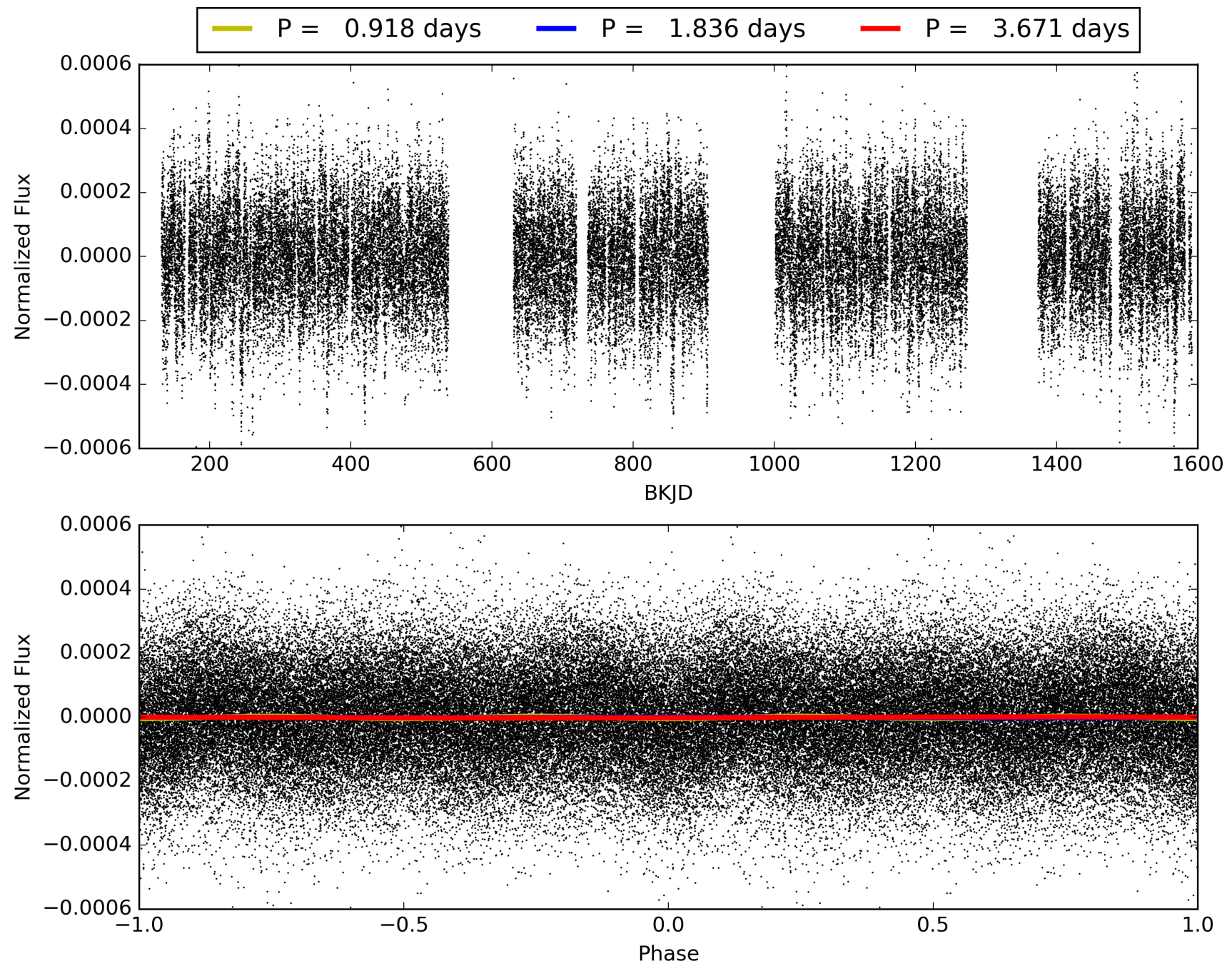
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

TCE 004659837-01, PDC Light Curves

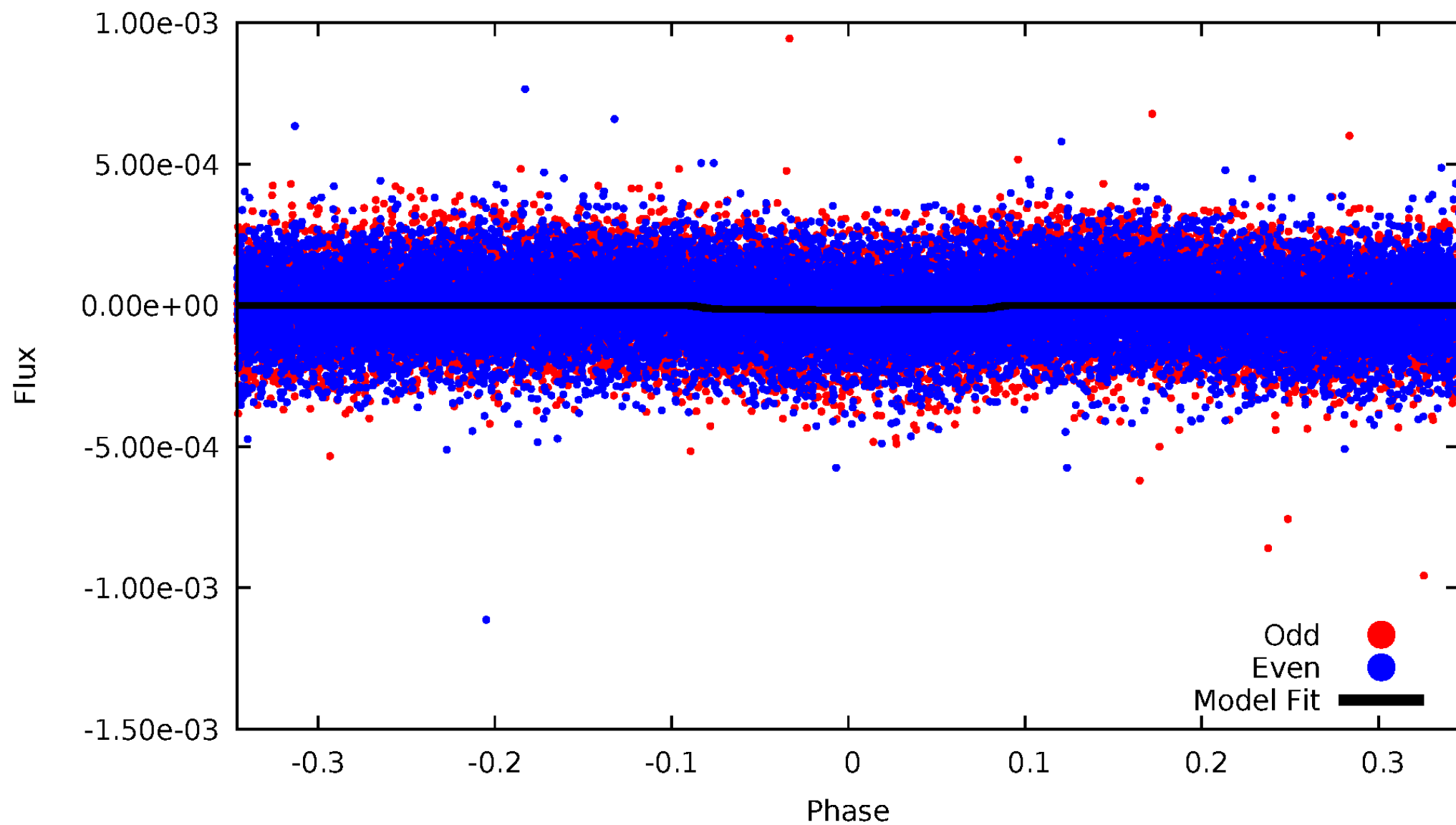


TCE 004659837-01



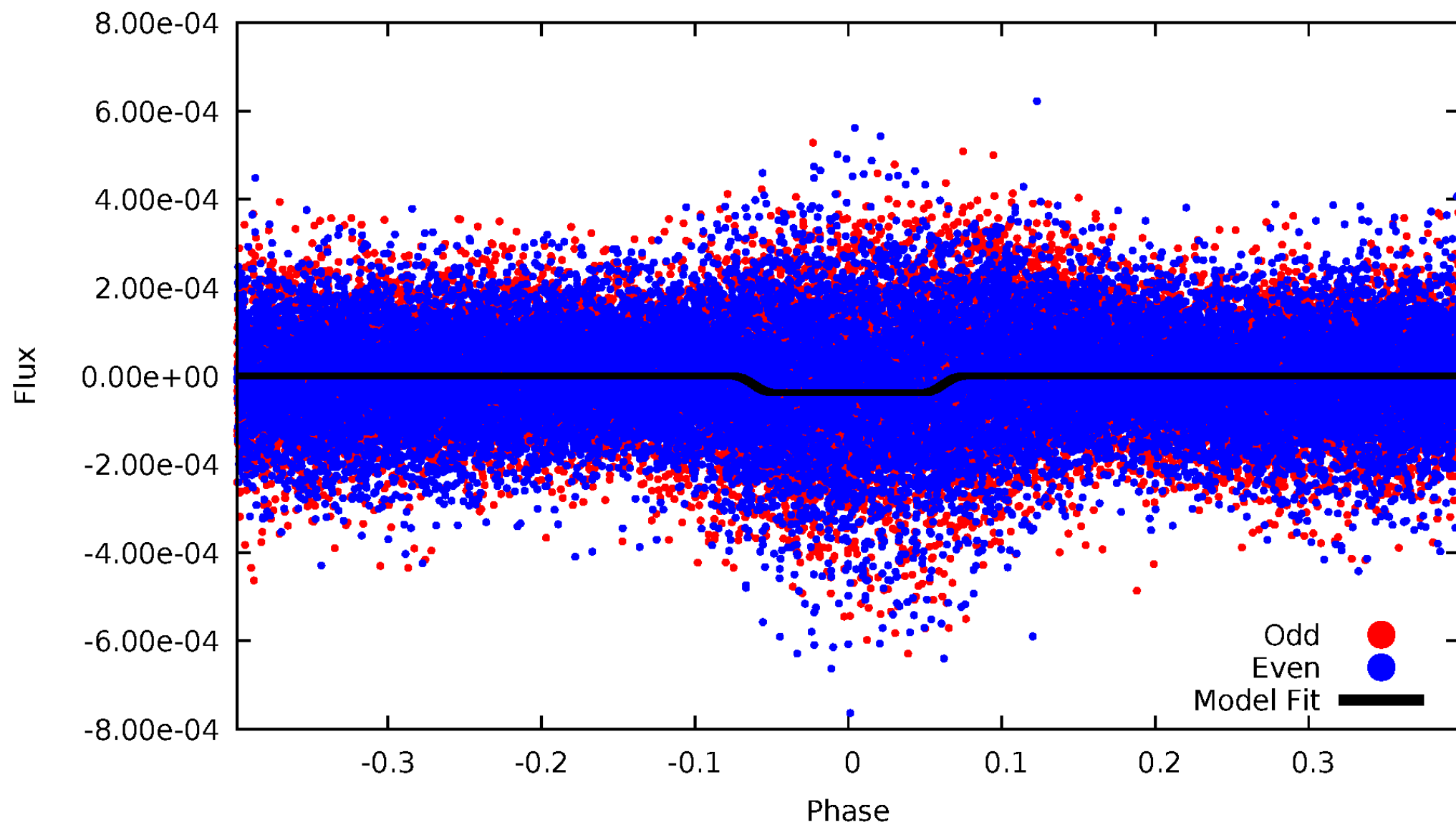
DV Odd/Even

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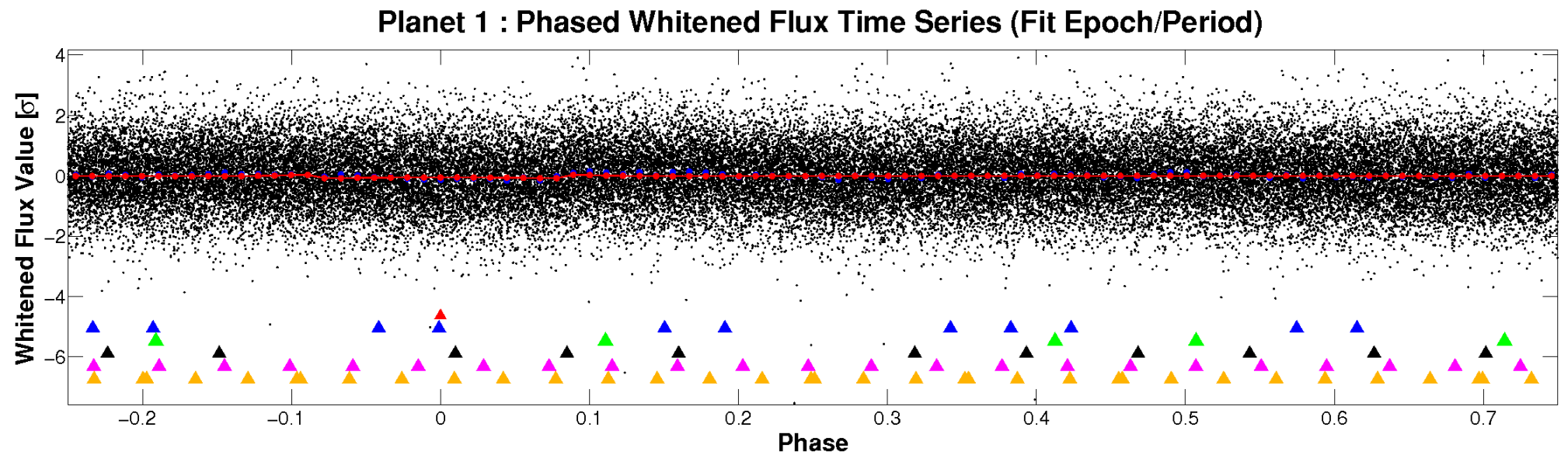
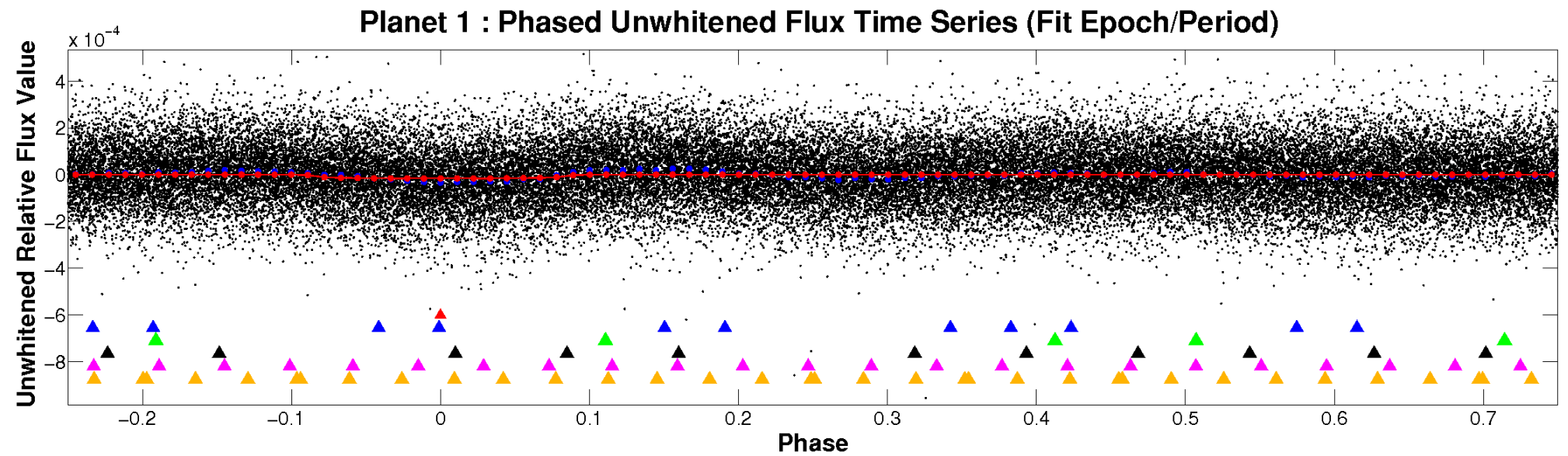


ALT Odd/Even

TCE 004659837-01

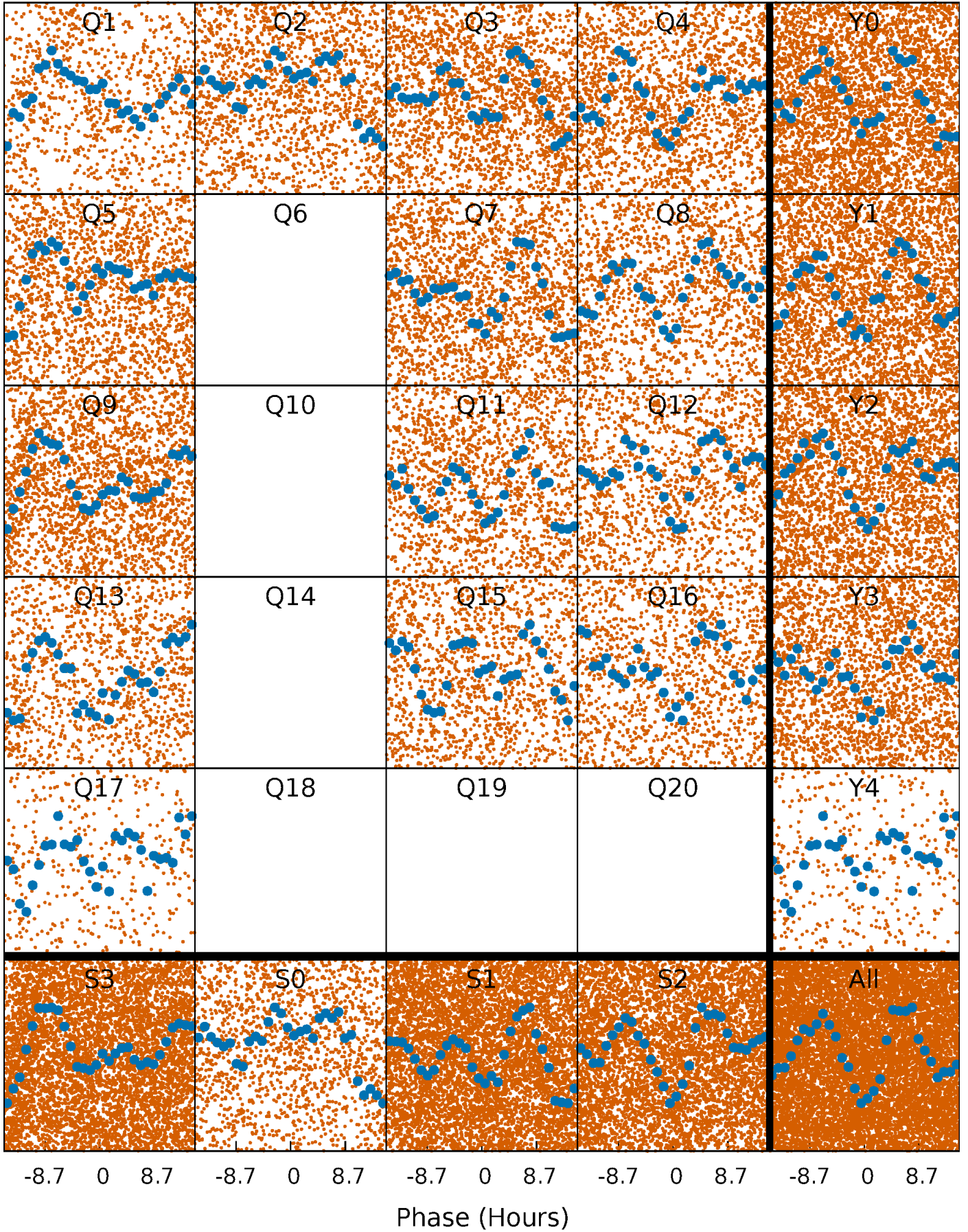


Non-Whitened Vs. Whitened Light Curve



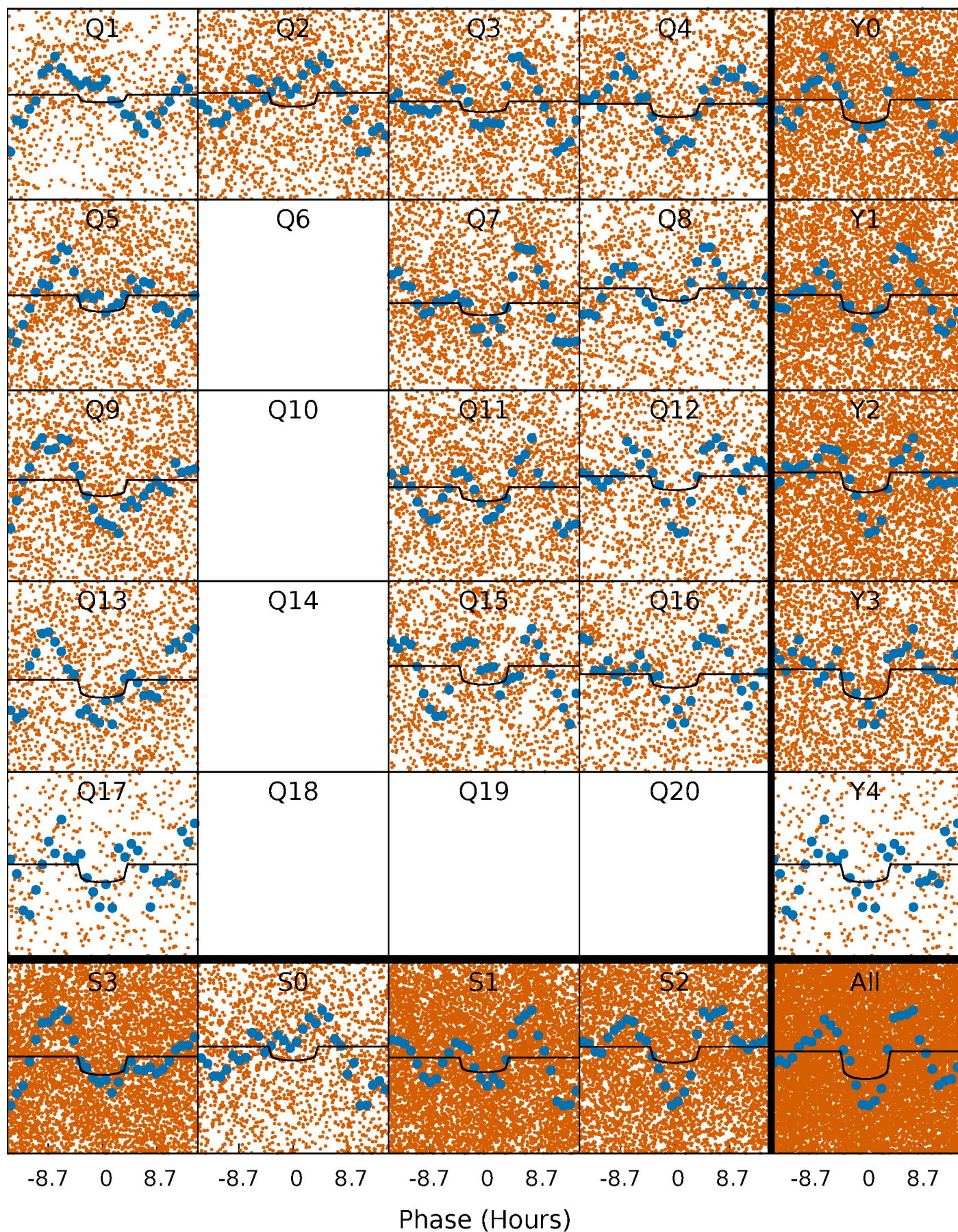
PDC Quarter-Phased Transit Curves

TCE 004659837-01 P= 1.835581 Days $T_0=132.056857$ (BKJD)



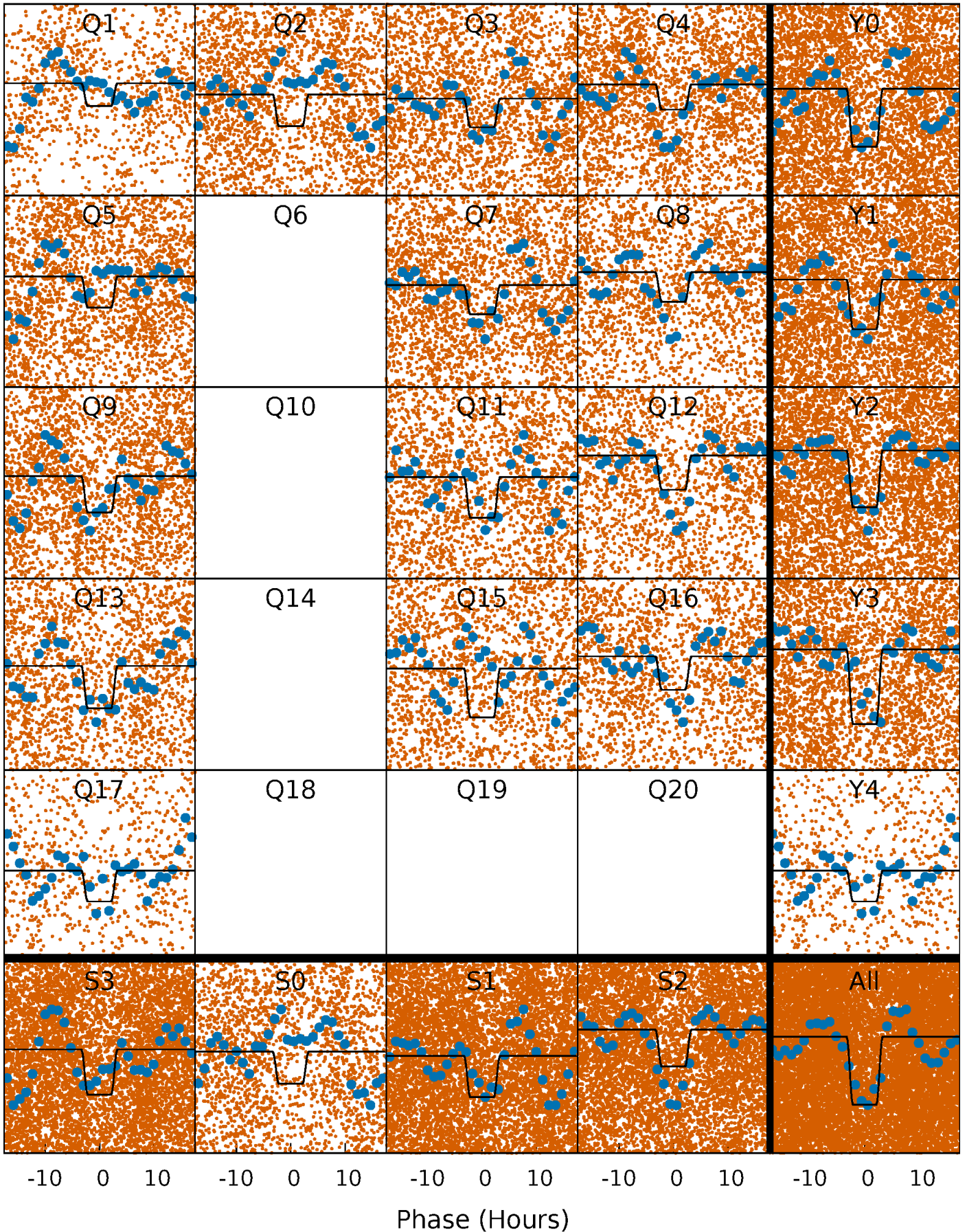
DV Quarter-Phased Transit Curves

TCE 004659837-01 P= 1.835581 Days $T_0=132.056857$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

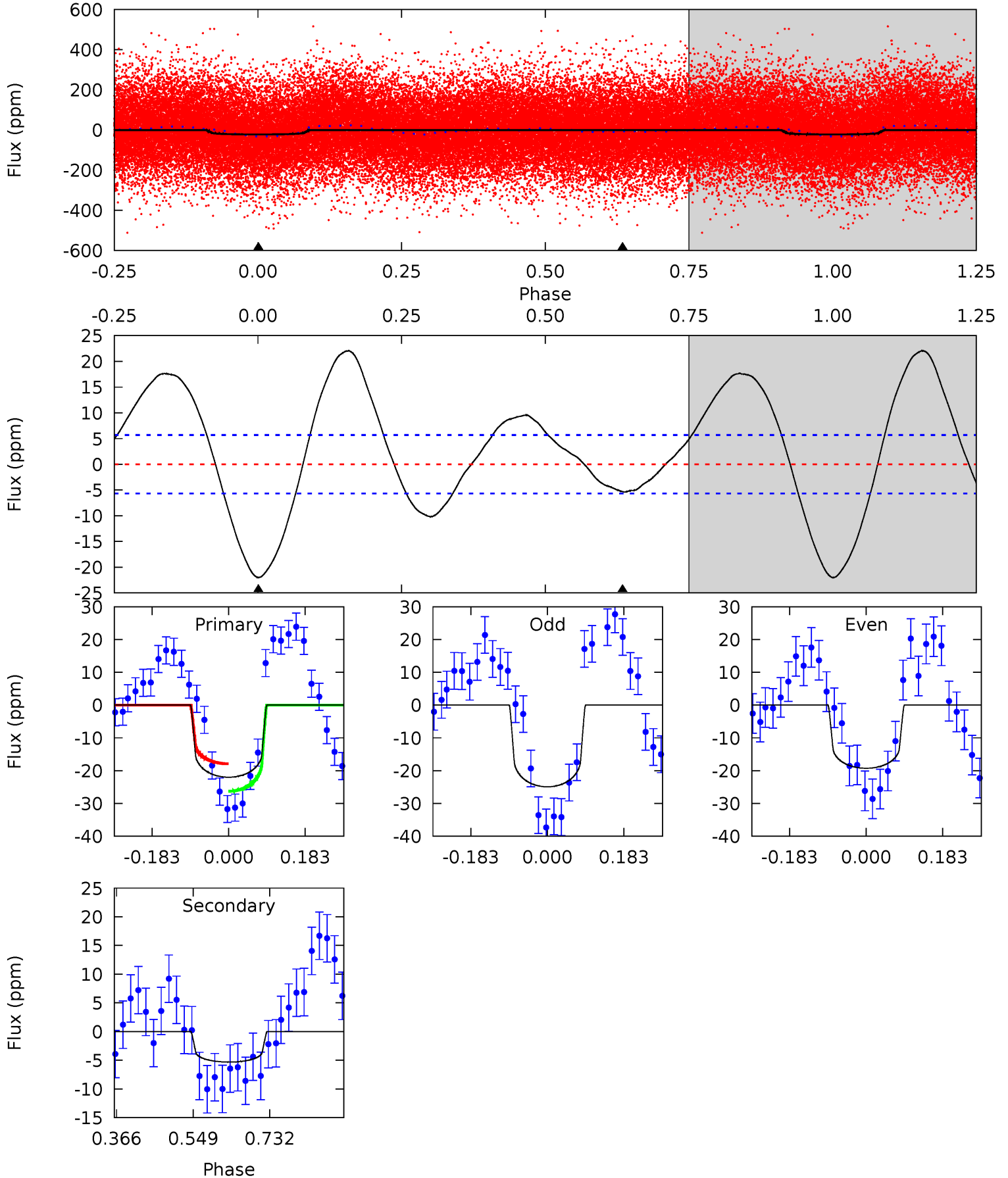
TCE 004659837-01 P= 1.835544 Days $T_0=132.063864$ (BKJD)



DV Model-Shift Uniqueness Test

004659837-01, P = 1.835581 Days, E = 130.221276 Days

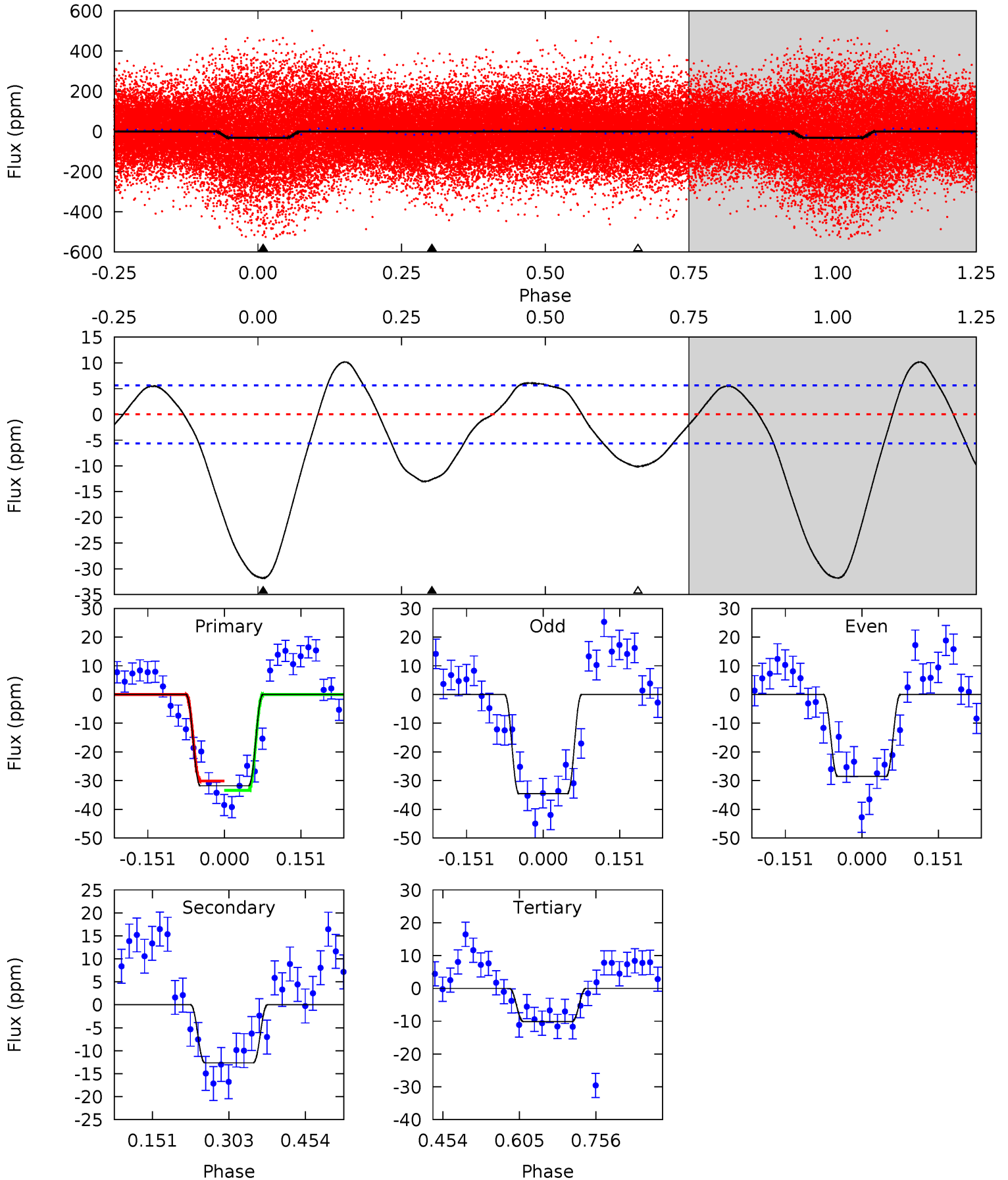
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
17.2	4.16	0	0	4.44	1.33	5.85	17.2	17.2	4.16	4.16	2.21	1.13	0.50	3.29



Alt Model-Shift Uniqueness Test

004659837-01, P = 1.835544 Days, E = 130.228320 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
25.3	10.0	8.04	0	4.48	1.44	4.67	17.2	25.3	1.99	10.0	2.39	1.29	0.24	1.32



Stellar Parameters For KIC 004659837

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6859^{+153}_{-204}	$3.761^{+0.285}_{-0.095}$	$-0.100^{+0.300}_{-0.250}$	$2.770^{+0.499}_{-0.927}$	$1.613^{+0.232}_{-0.283}$	$0.107^{+0.216}_{-0.033}$
	+2%/-3%	+8%/-3%	+300%/-250%	+18%/-33%	+14%/-18%	+202%/-31%
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 004659837-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-5 ± 1	$1.18^{+0.33}_{-0.28}$	3697^{+229}_{-325}	4953^{+665}_{-532}	$2.444^{+1.847}_{-1.075}$
Alt.	-13 ± 1	$1.79^{+0.36}_{-0.36}$	3737^{+214}_{-313}	5077^{+426}_{-352}	$2.589^{+1.430}_{-0.826}$

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

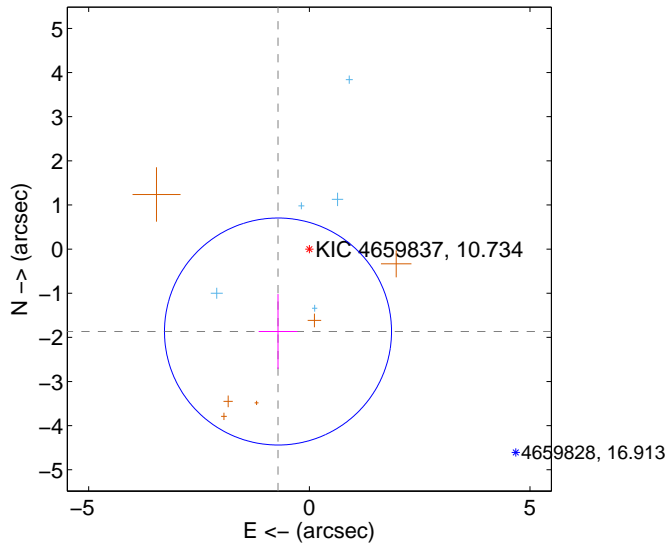
Supplemental centroid analysis for 004659837-01. **Kepler magnitude: 10.73.** Transit SNR 6.24

There are 5 quarters with good PRF difference image offsets

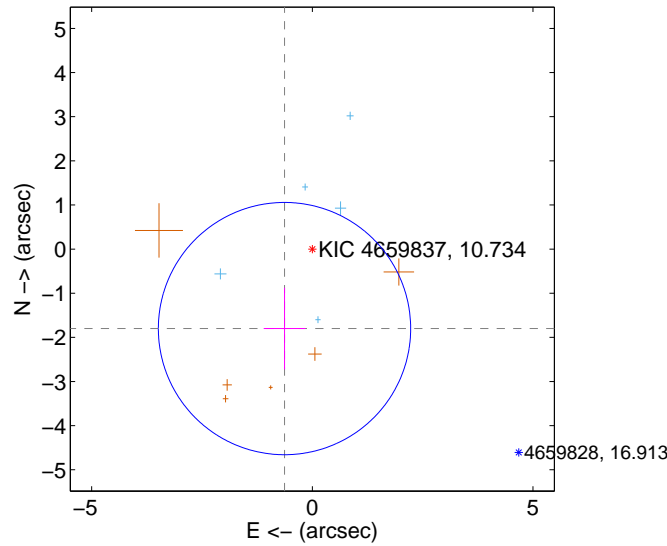
The direct PRF centroid is offset from the target star catalog position by about 0.19 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.998 ± 0.857	2.33	0.710 ± 0.439	-1.867 ± 0.848
PRF-fit source offset from KIC position	1.908 ± 0.953	2.00	0.630 ± 0.472	-1.801 ± 0.925
photometric centroid source offset	0.73 ± 0.82	0.89	0.57 ± 0.73	-0.45 ± 0.94

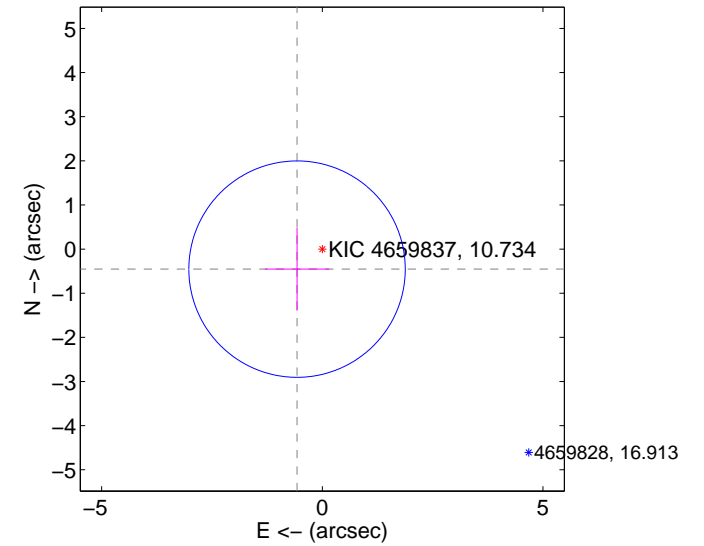
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

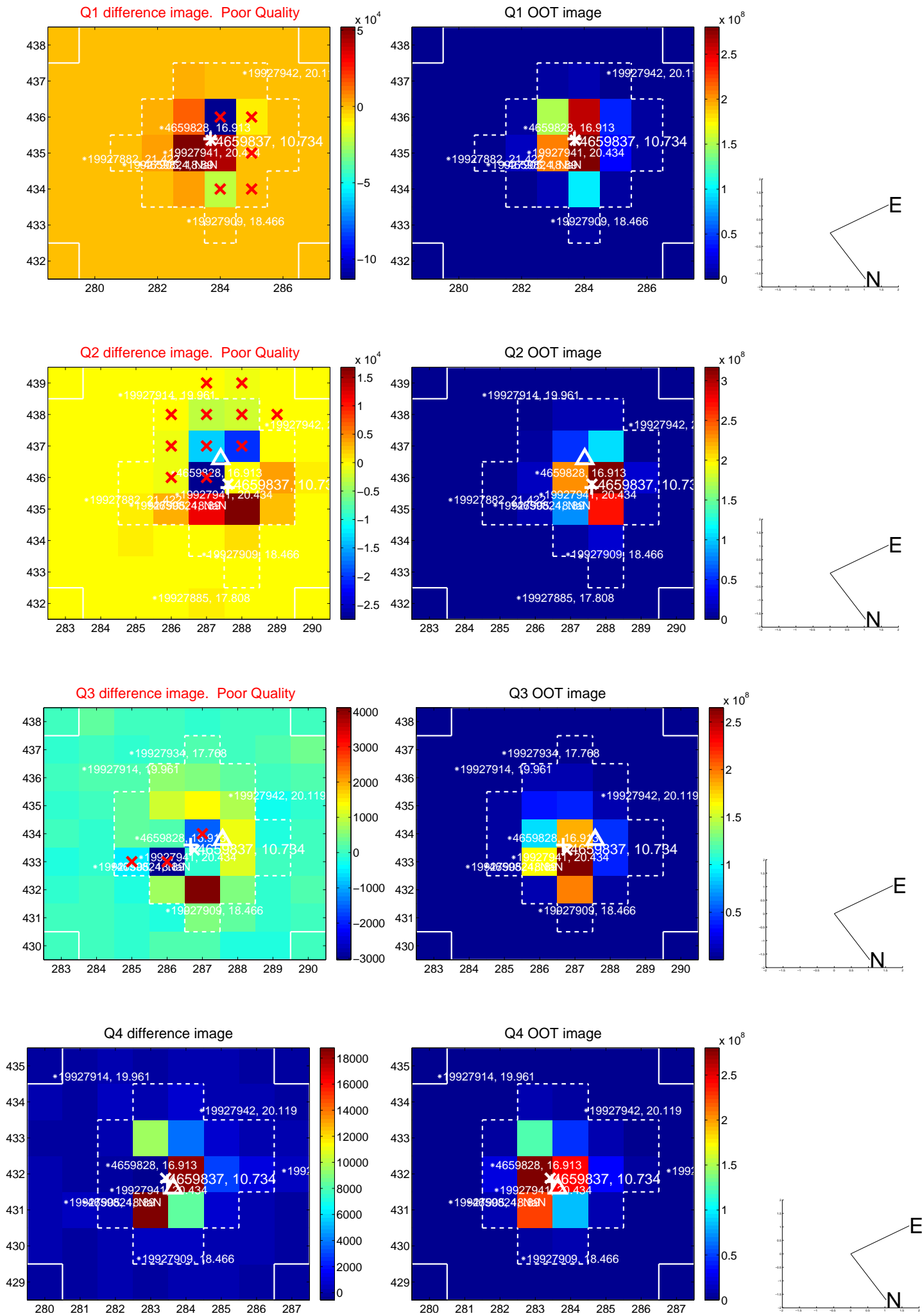


offset from photometric centroids

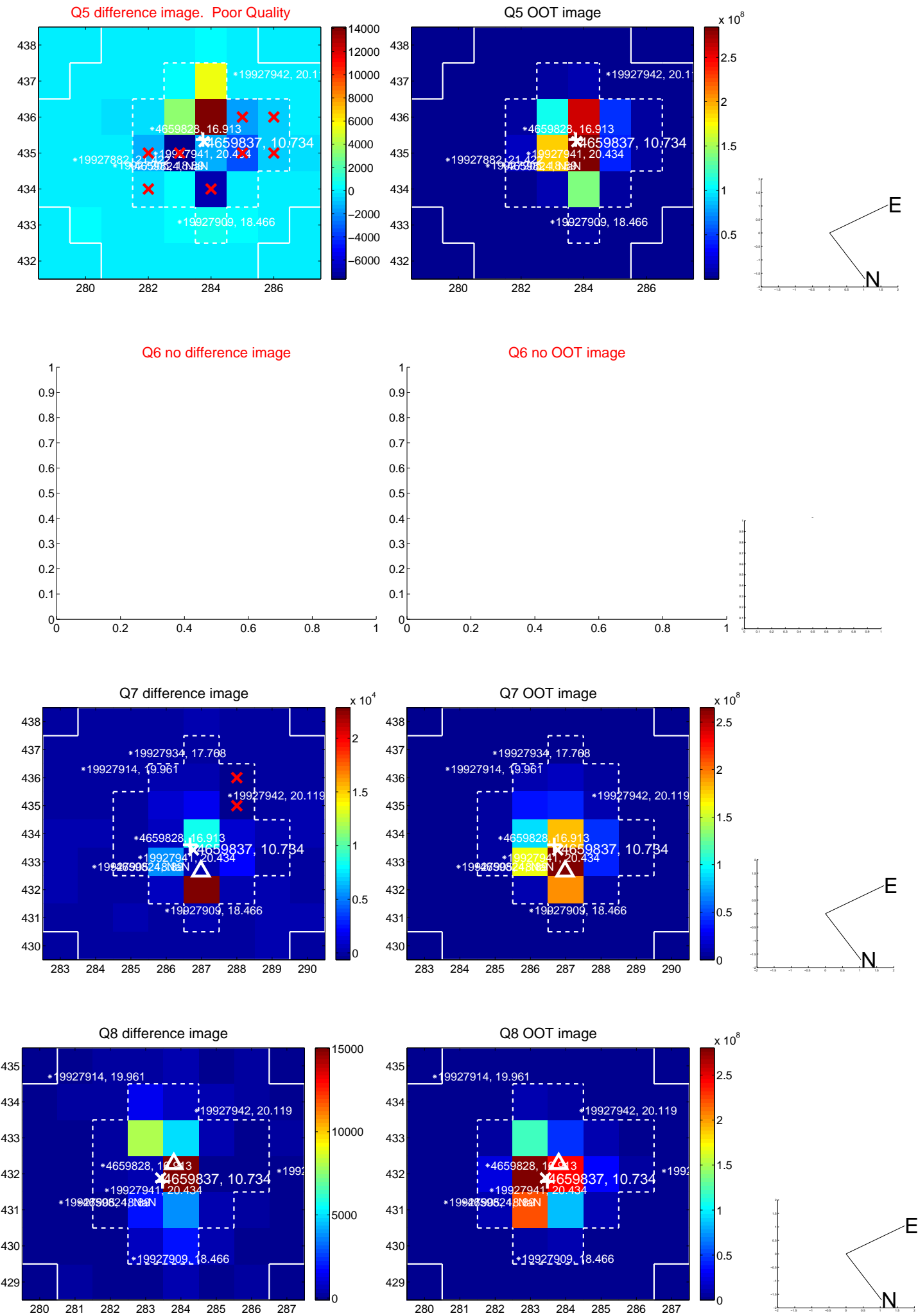


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

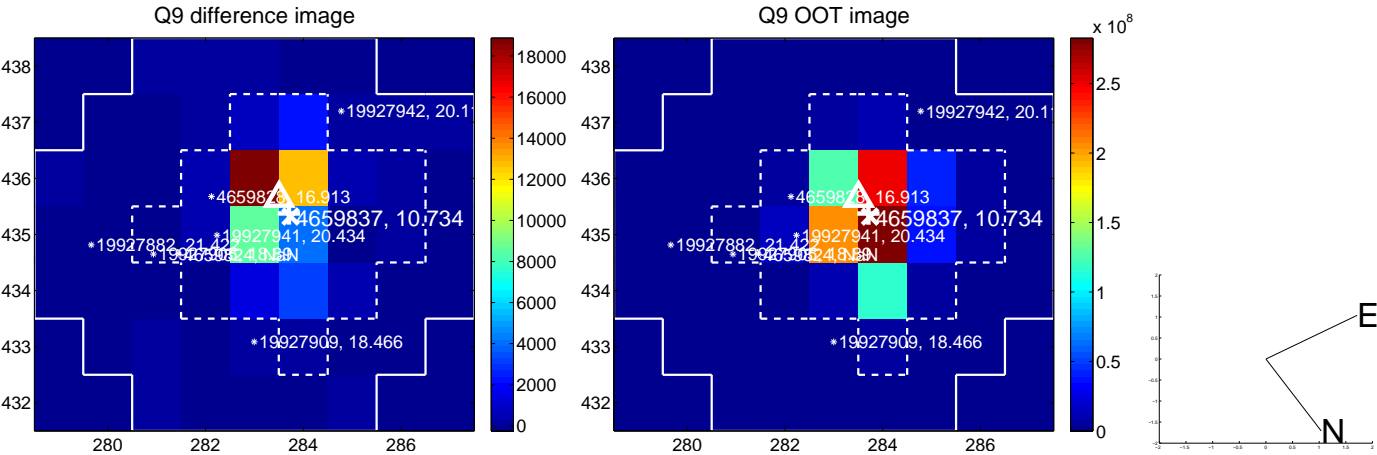
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



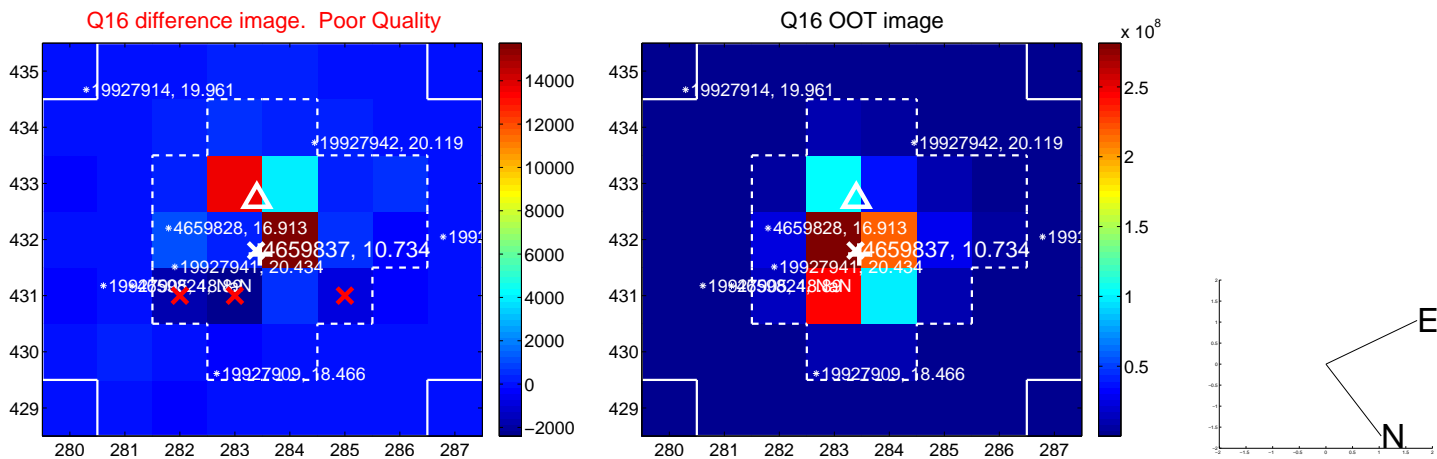
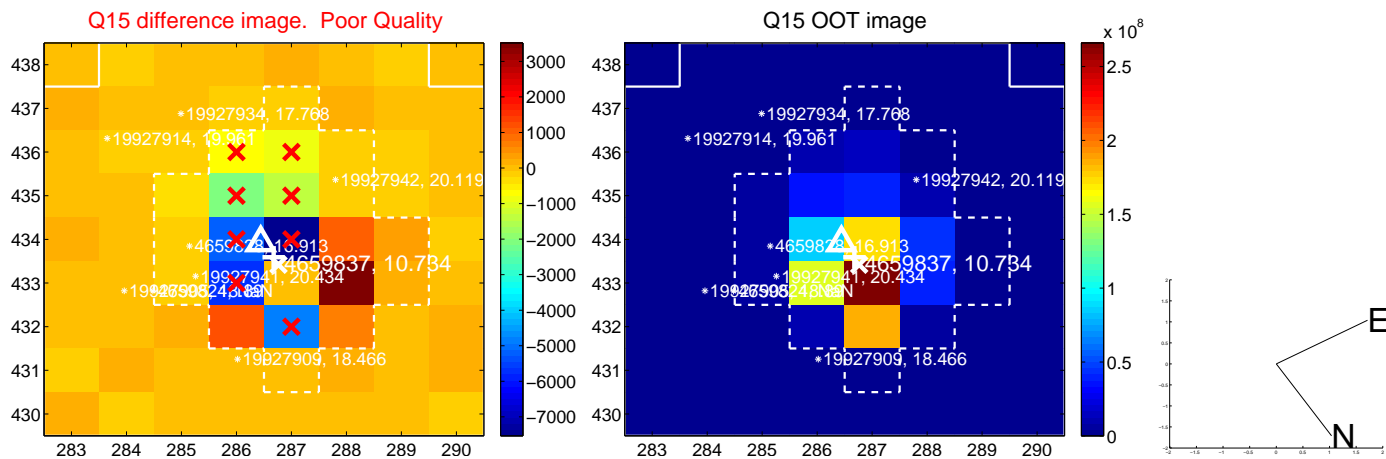
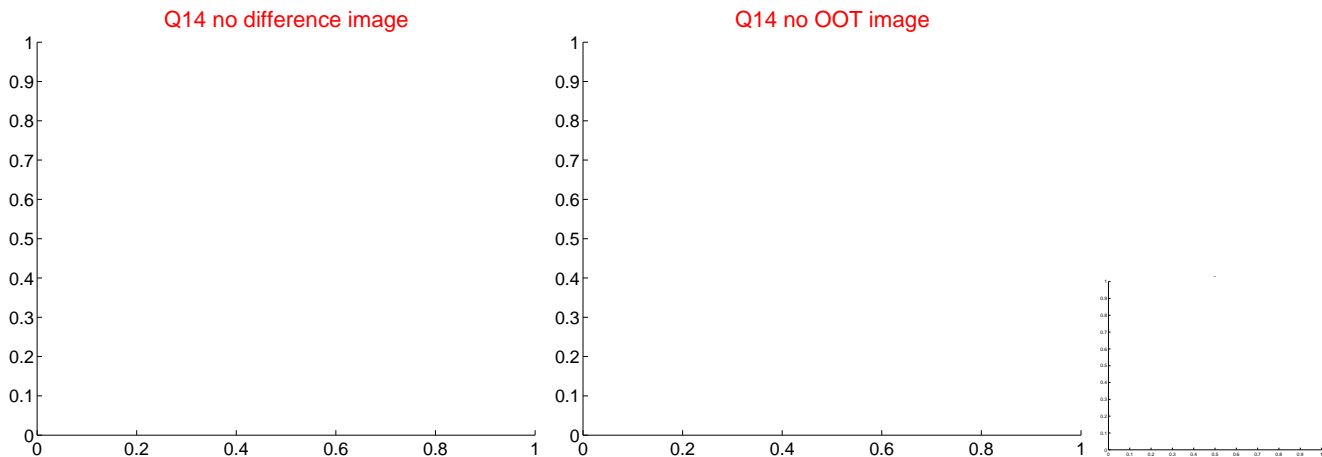
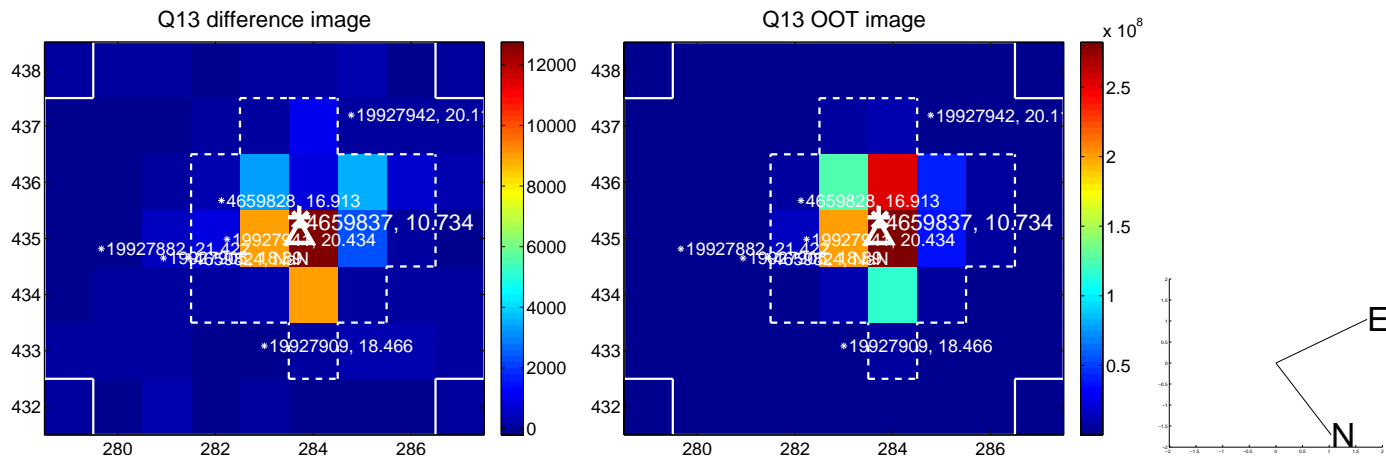
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



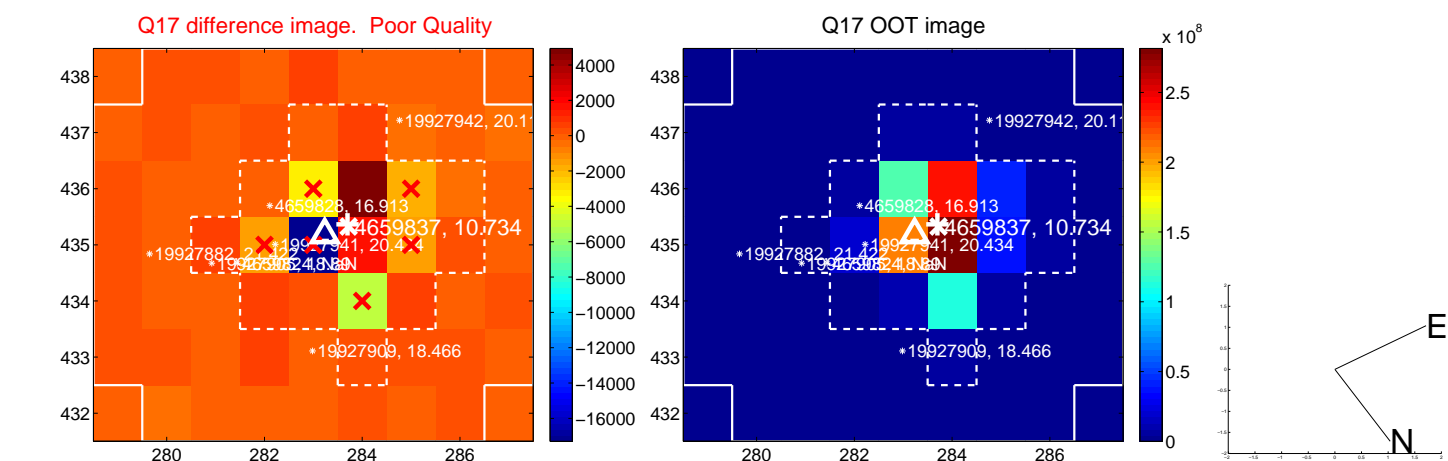
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



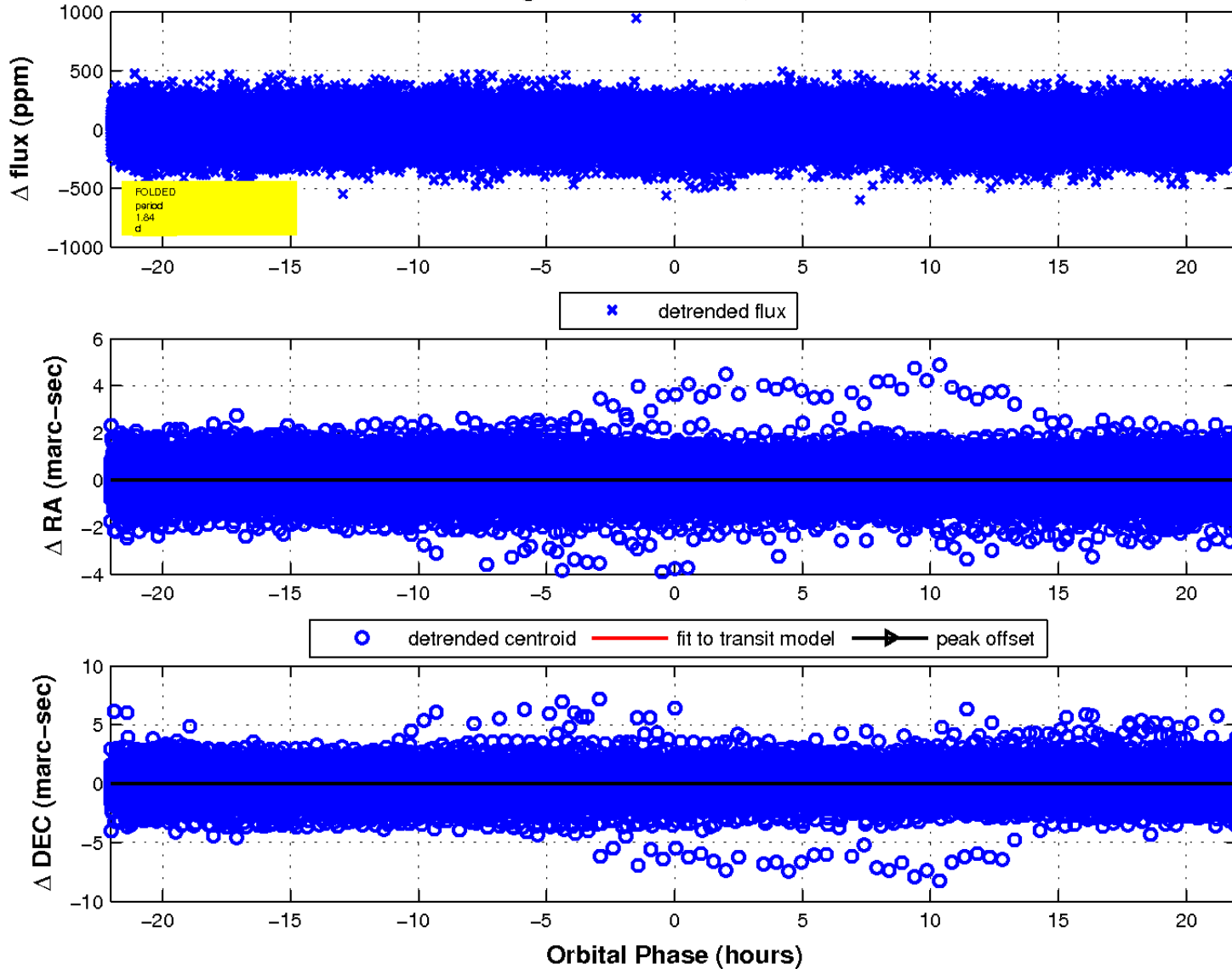
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



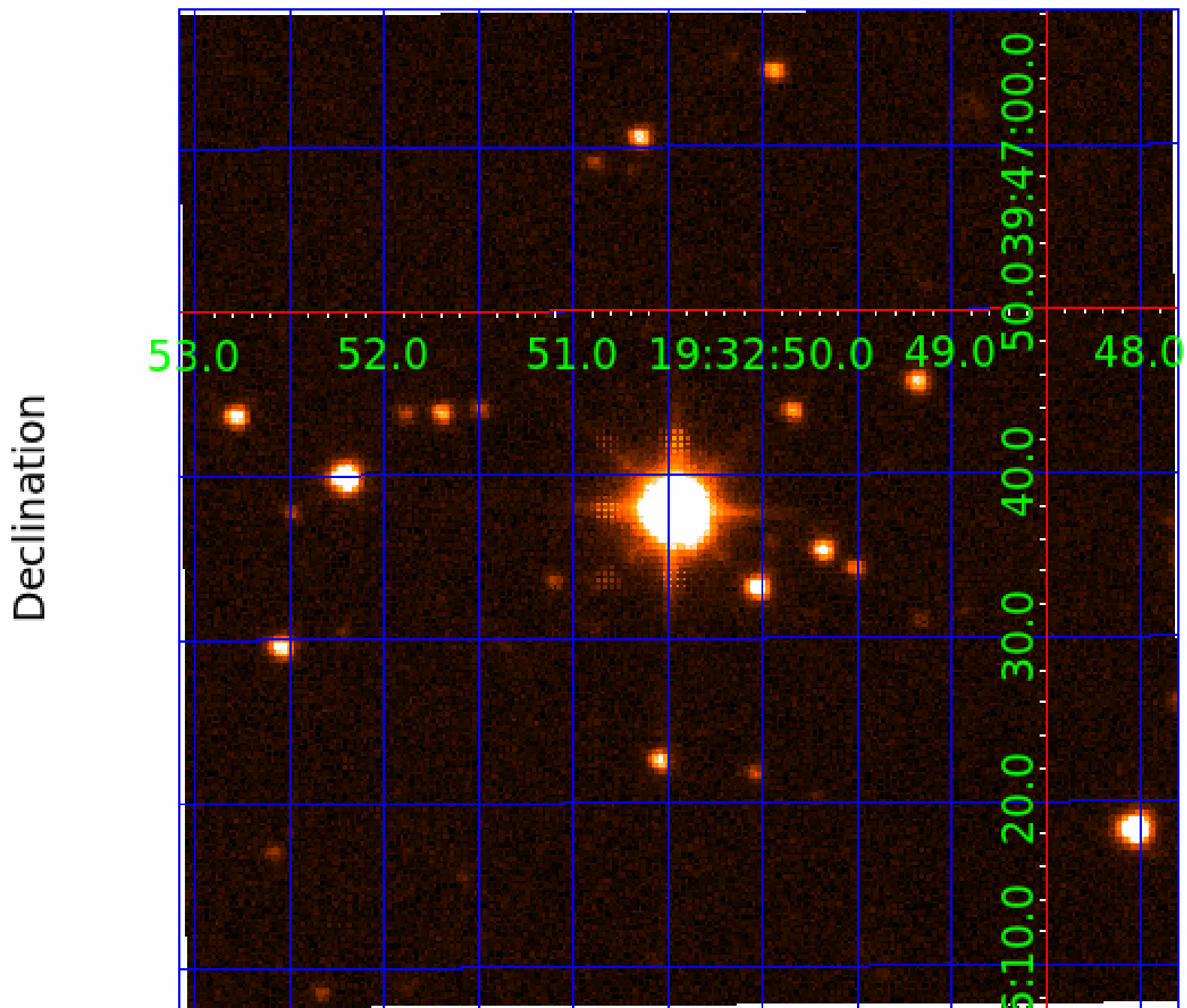
white \times : KIC target position; $+$: OOT centroid; Δ : difference centroid. red \times : large negative pixel value.



fluxWeightedCentroids, Planet 1 of 6



UKIRT Image



KIC 004659837

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})
004659837-01	OBS	No	1.835581	132.056857	16.0	7.617	8.1	6.2	2.77	6859	1.28	12839.83
004659837-02	OBS	No	130.678516	165.874337	125.6	9.521	13.3	3.9	2.77	6859	3.42	43.52
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Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004659837-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
004659837-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
004659837-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_TRACKER—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
004659837-04	OBS	FP	0.00	1	0	1	0	TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED—HALO_GHOST
004659837-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
004659837-06	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—CENT_SATURATED—HALO_GHOST

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

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

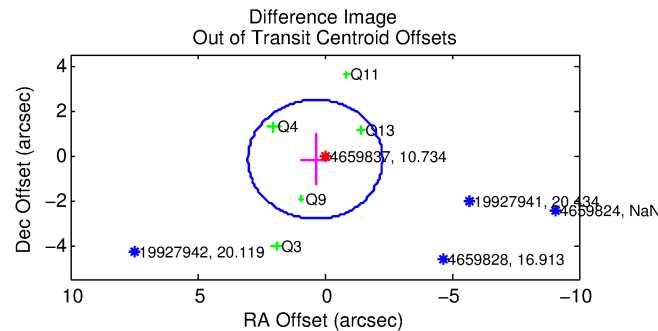
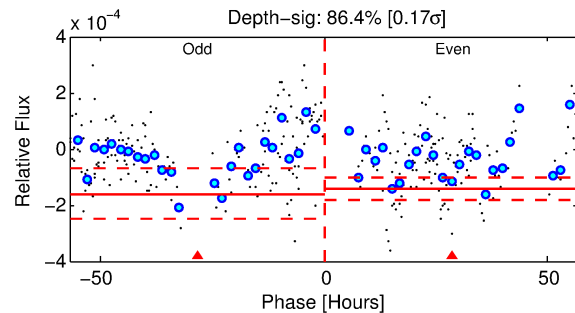
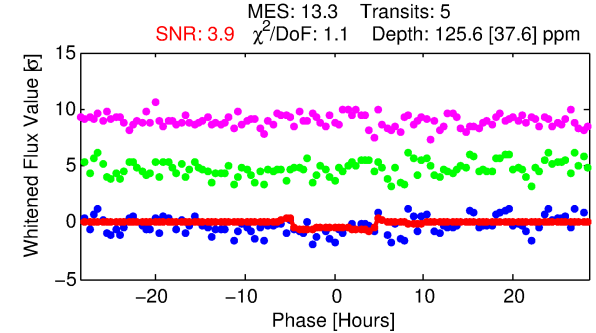
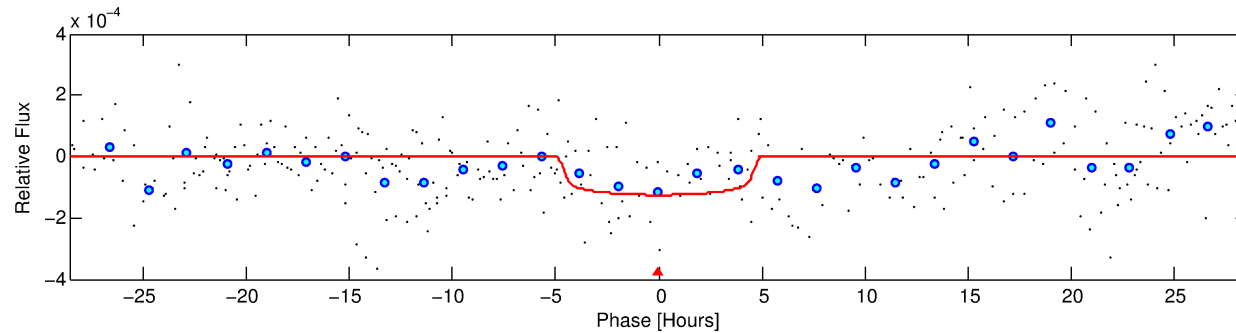
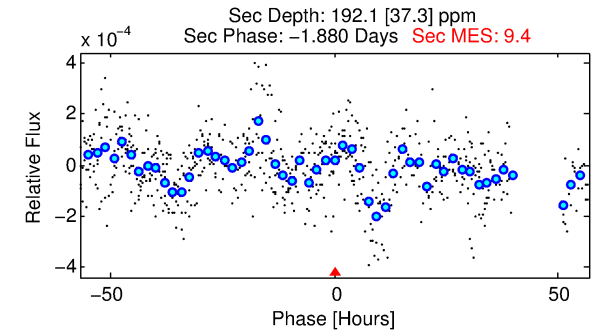
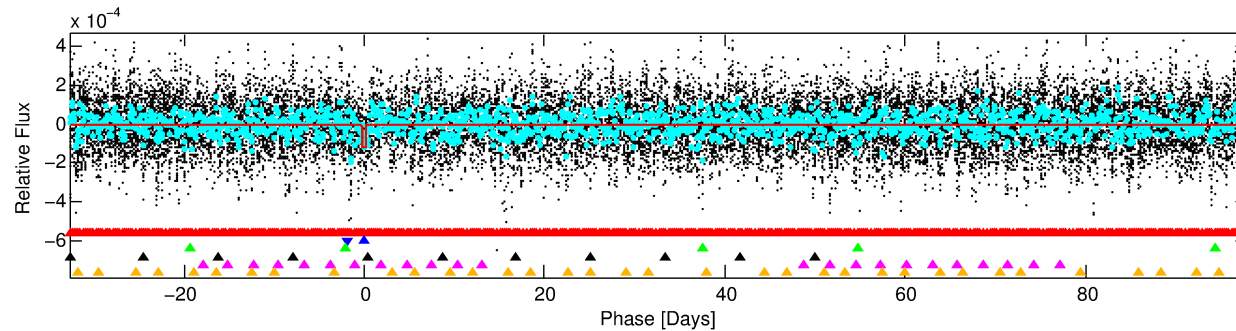
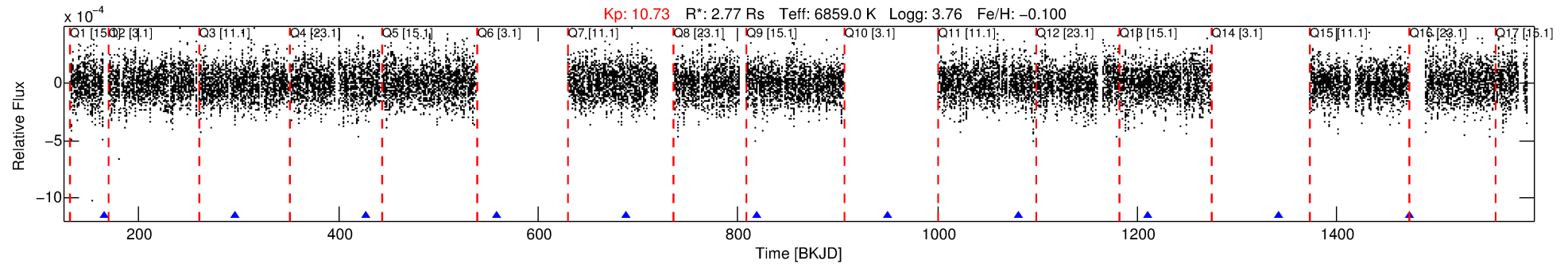
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 004659837-02

No Significant Match Found

DV One-Page Summary

KIC: 4659837 Candidate: 2 of 6 Period: 130.679 d



DV Fit Results:

Period = 130.67852 [0.00423] d
Epoch = 165.8743 [0.0183] BKJD
Rp/R* = 0.0113 [0.0045]
a/R* = 65.42 [132.87]
b = 0.80 [0.94]
Seff = 43.52 [21.99]
Teq = 655 [83] K
Rp = 3.42 [1.78] Re
a = 0.5913 [0.1848] AU
Ag = 3160.45 [3013.76] [1.05σ]
Teffp = 7592 [1568] K [4.42σ]

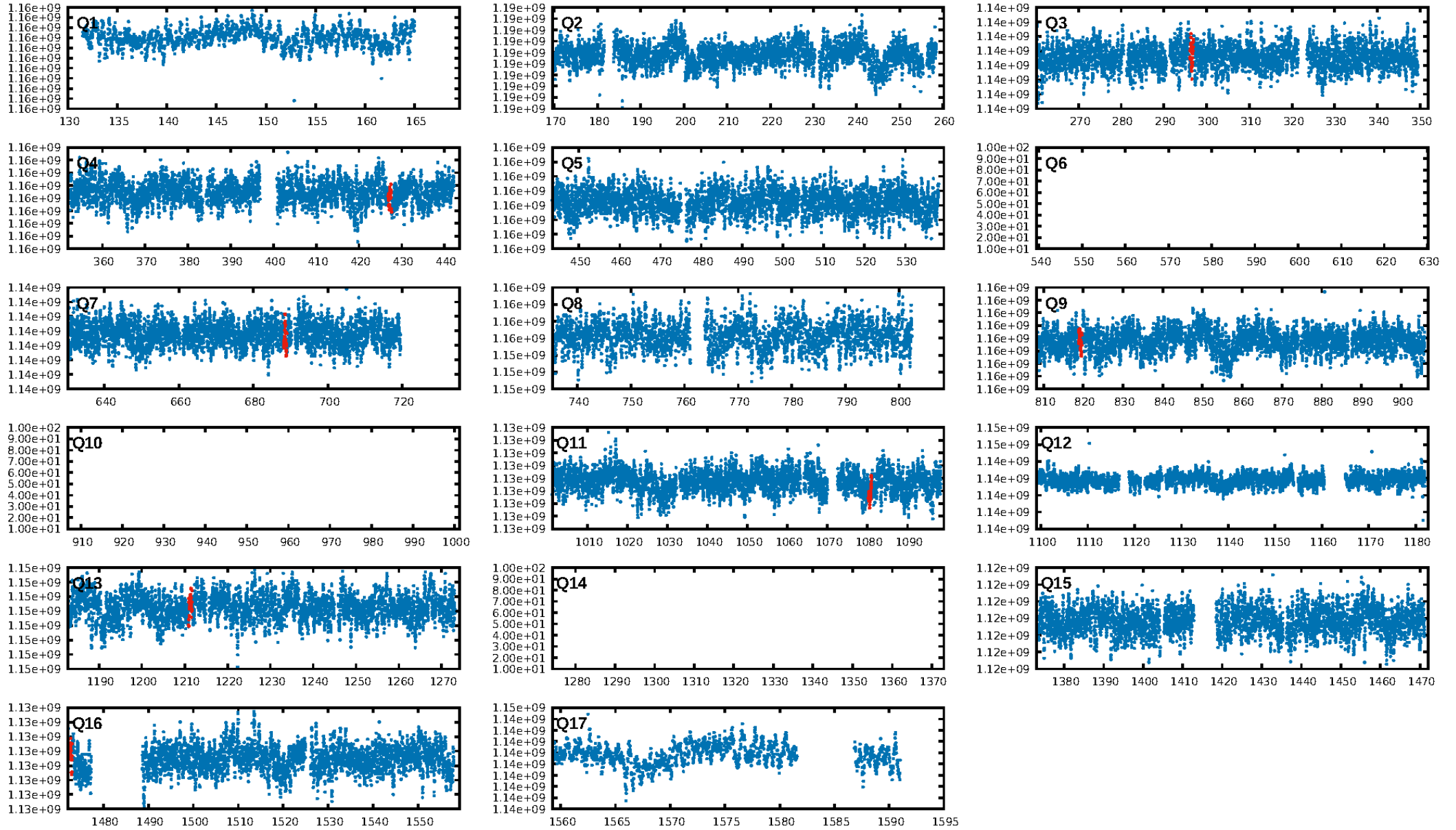
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [145.74σ]
LongPeriod-sig: 100.0% [16.15σ]
ModelChiSquare2-sig: 0.3%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 1.40e-29
RollingBand-fgt: 1.00 [5/5]
GhostDiagnostic-chr: -1.422
Centroid-sig: 63.5%
Centroid-so: 0.500 arcsec [0.41σ]
OotOffset-rm: 0.408 arcsec [0.46σ]
KicOffset-rm: 0.654 arcsec [0.50σ]
OotOffset-st: 0/2/1/2 [5]
KicOffset-st: 0/2/1/2 [5]
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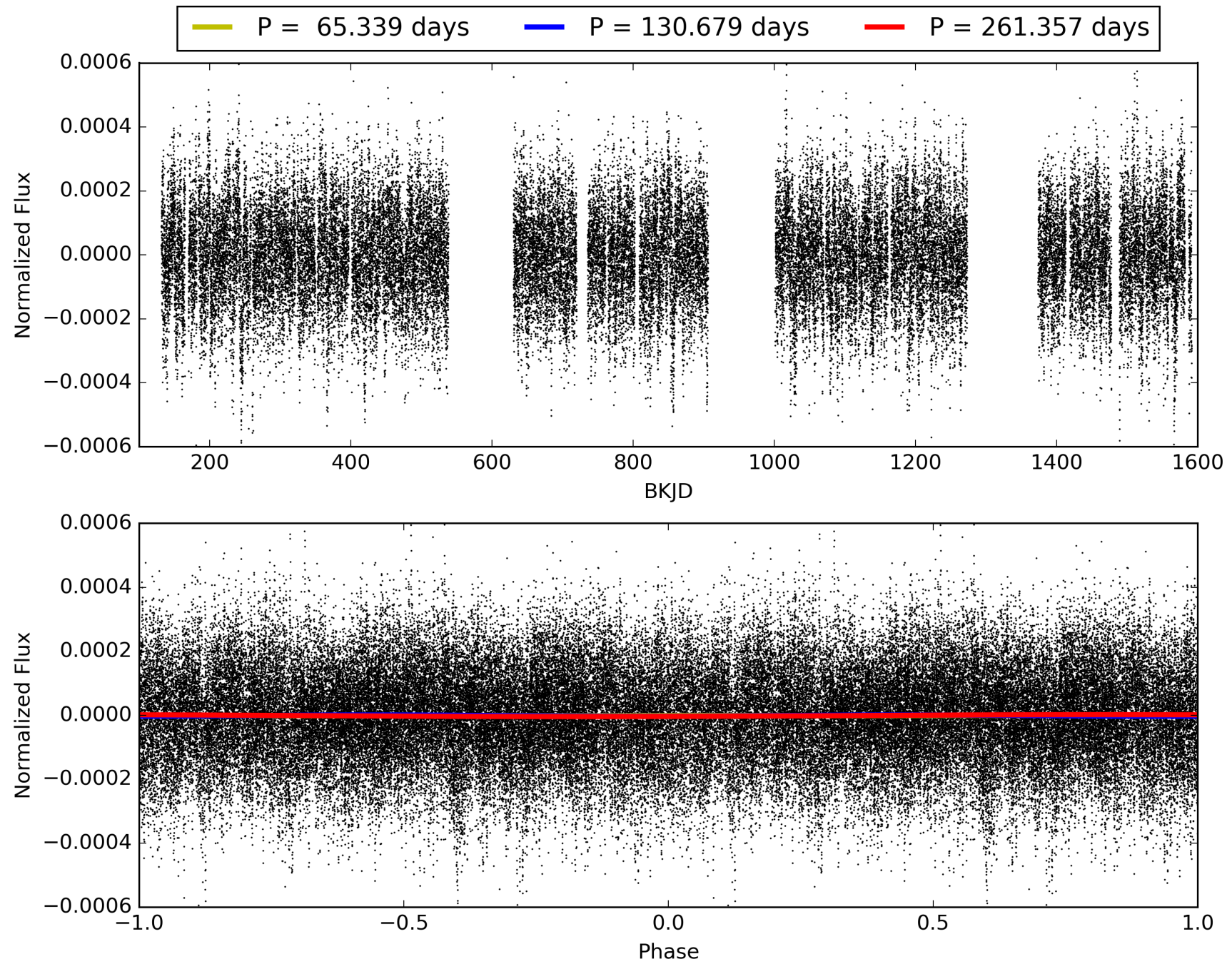
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

TCE 004659837-02, PDC Light Curves

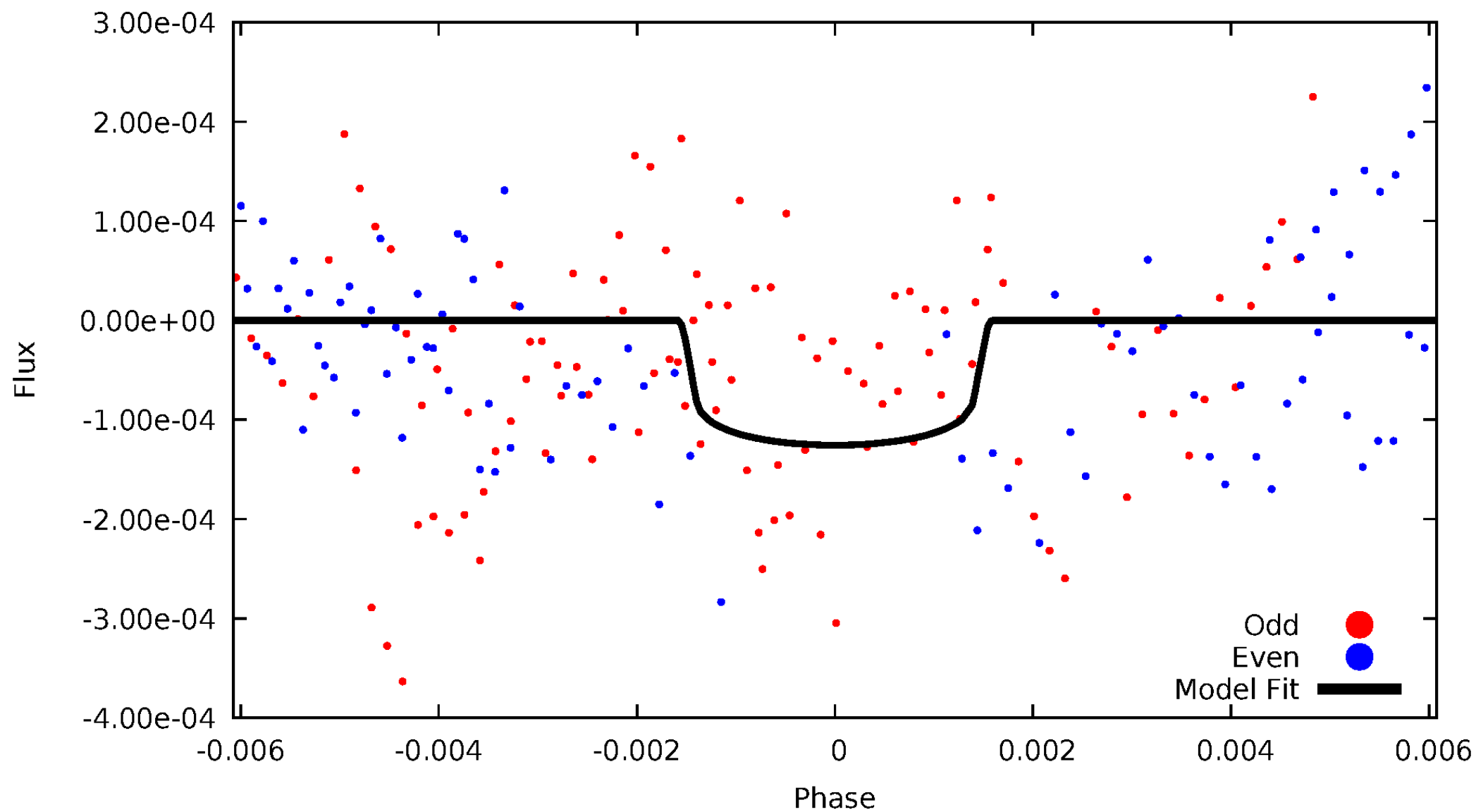


TCE 004659837-02



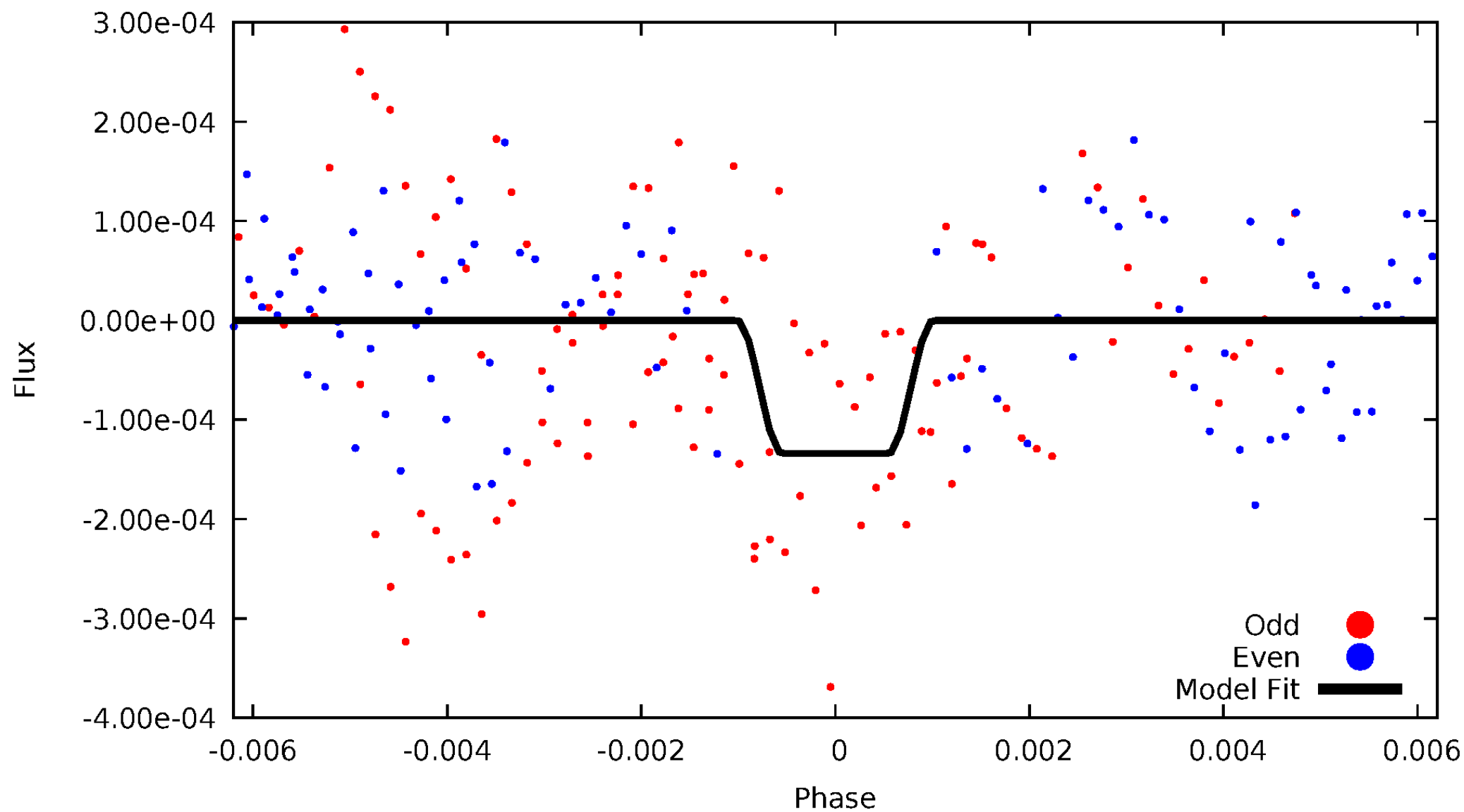
DV Odd/Even

TCE 004659837-02



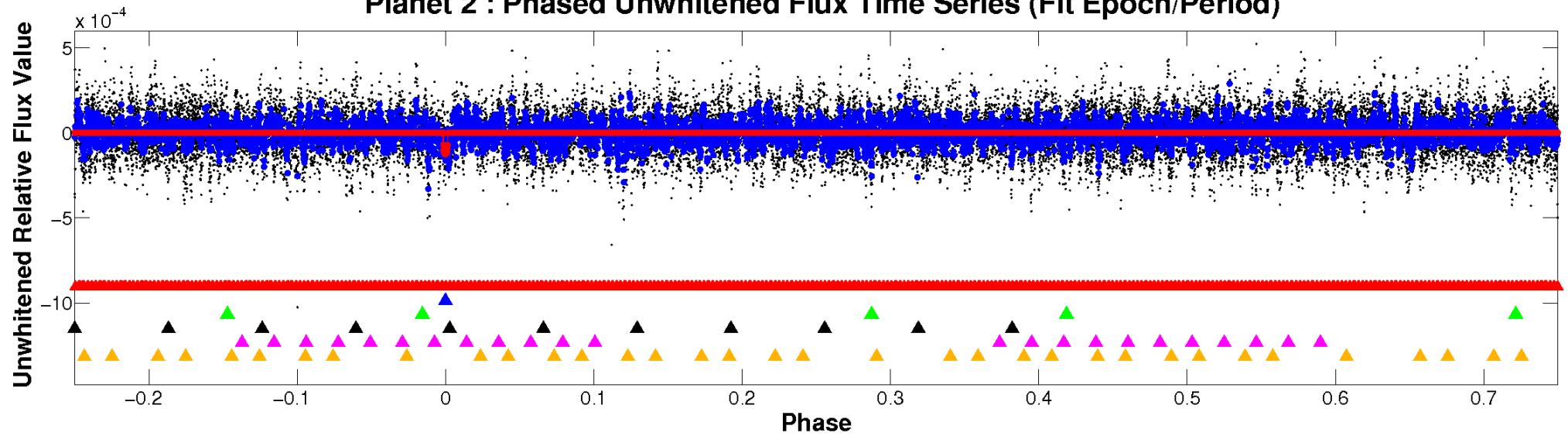
ALT Odd/Even

TCE 004659837-02

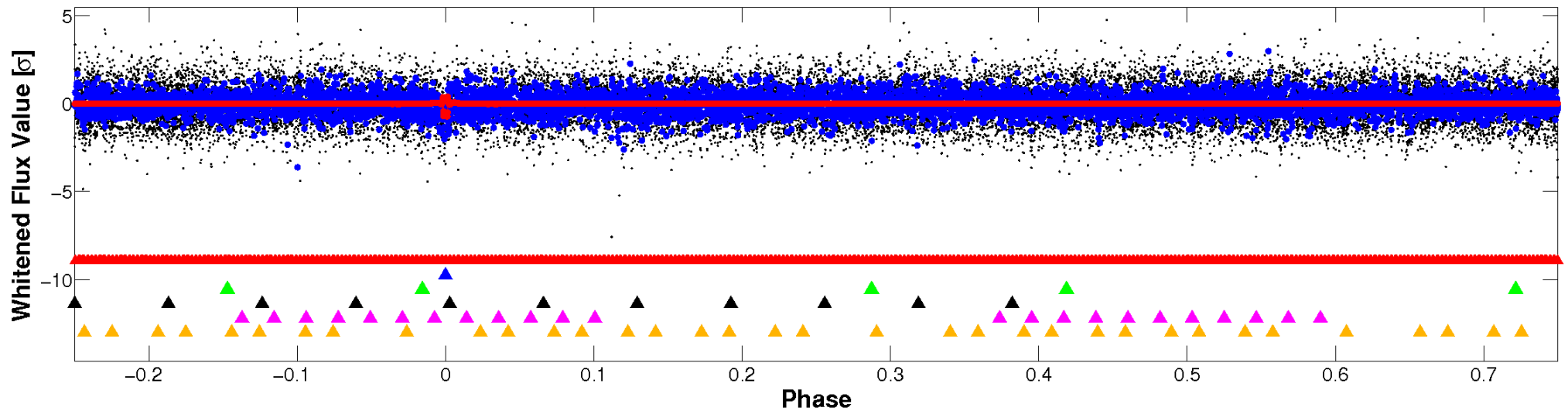


Non-Whitened Vs. Whitened Light Curve

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

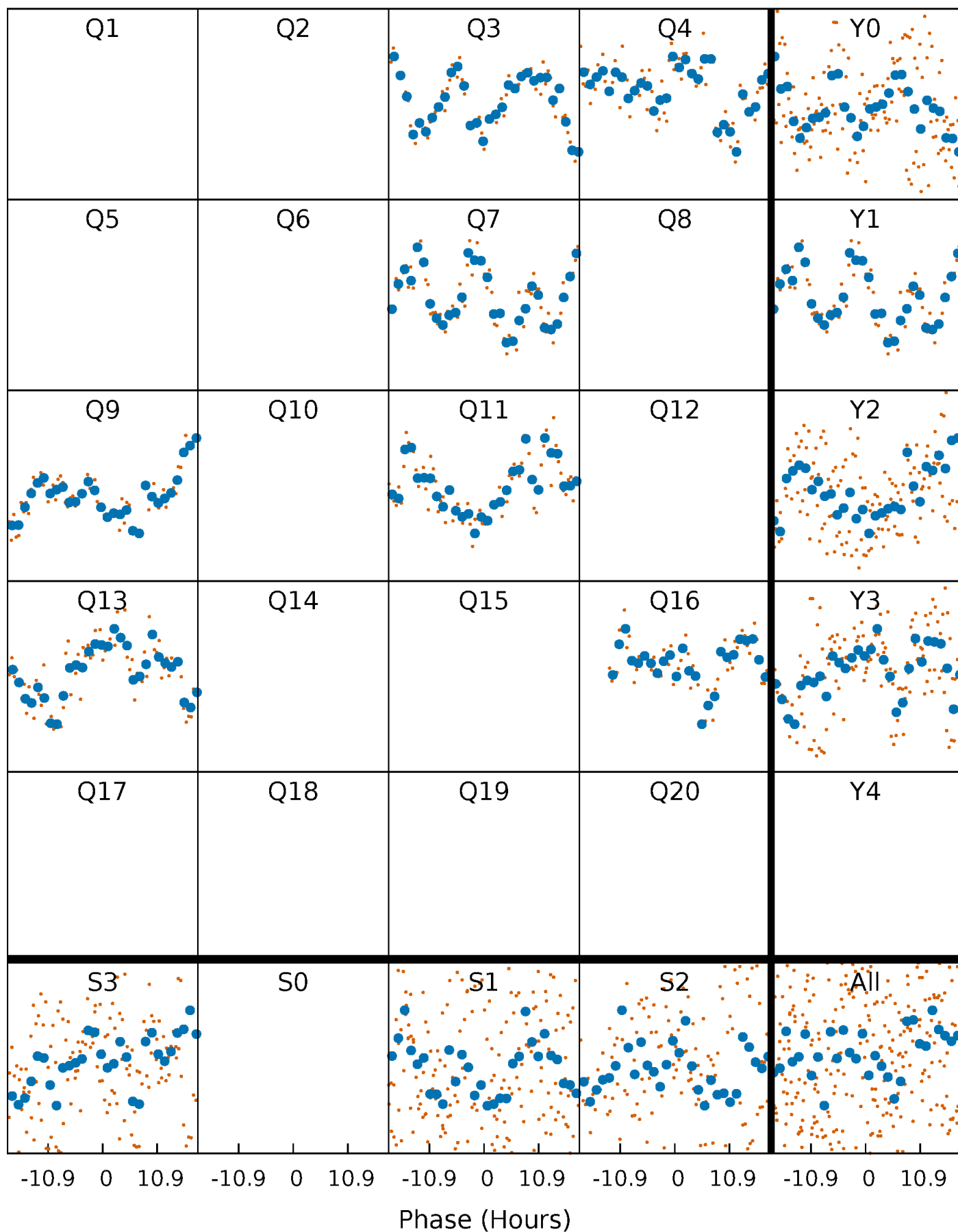


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



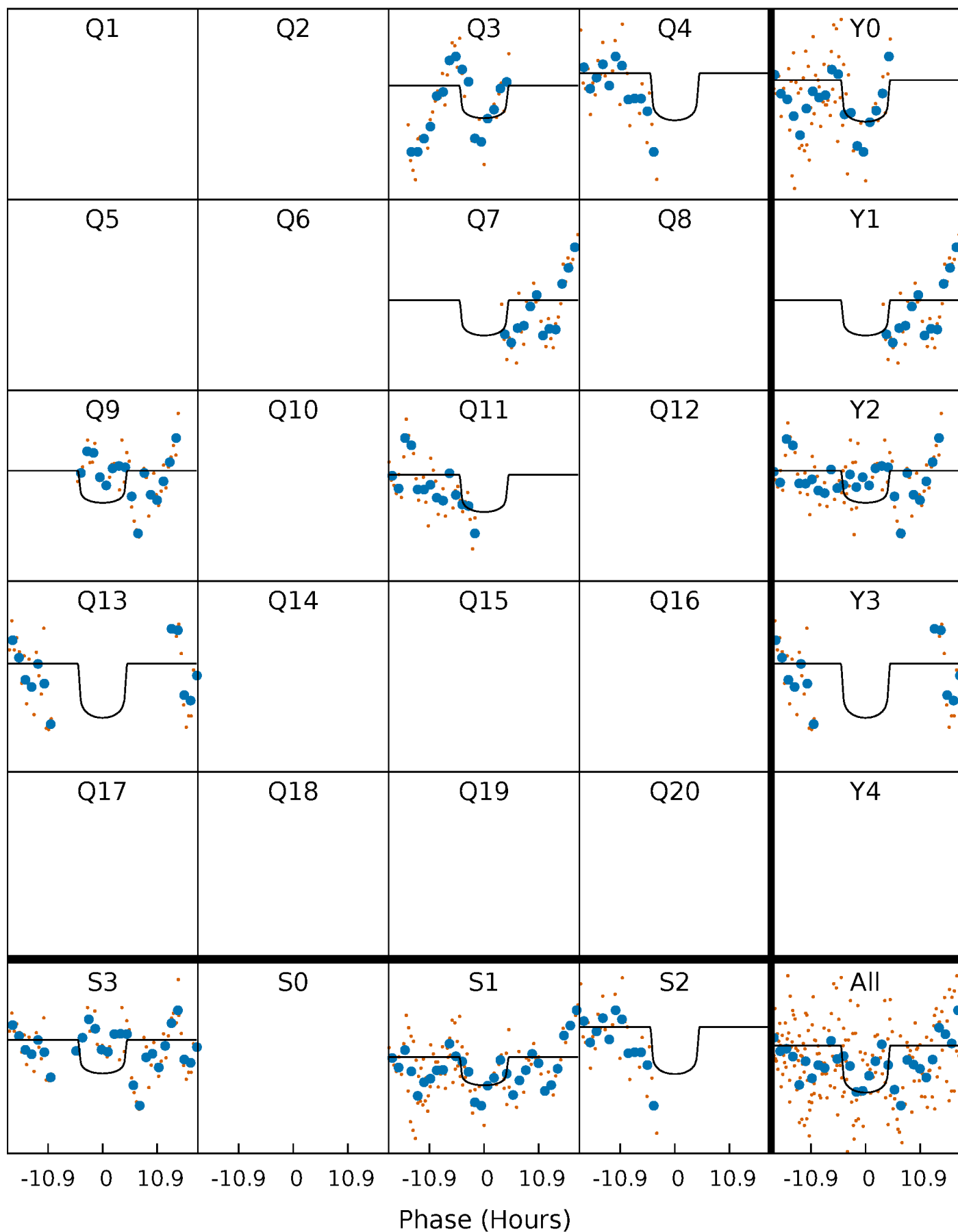
PDC Quarter-Phased Transit Curves

TCE 004659837-02 $P=130.678516$ Days $T_0=165.874337$ (BKJD)



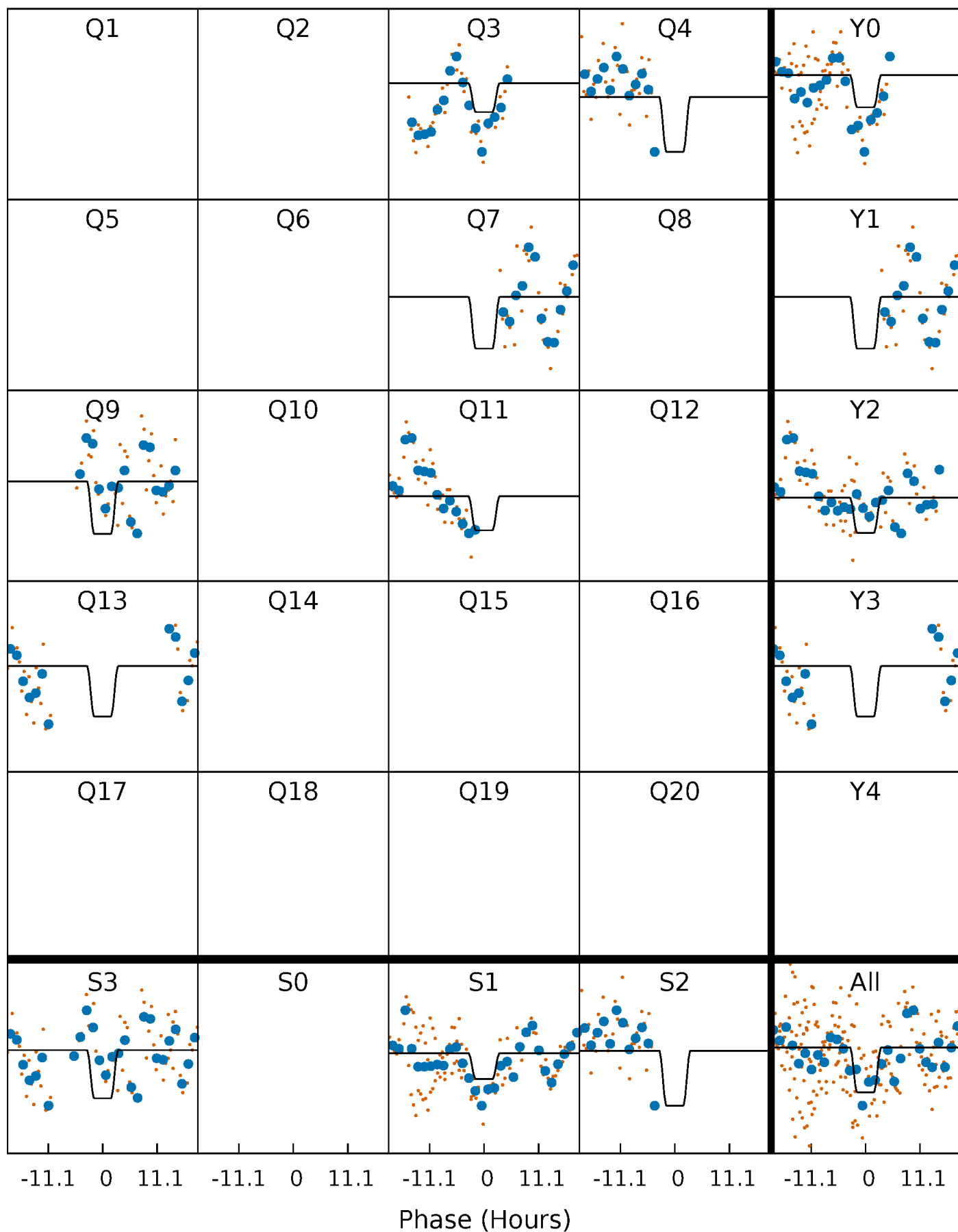
DV Quarter-Phased Transit Curves

TCE 004659837-02 $P=130.678516$ Days $T_0=165.874337$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

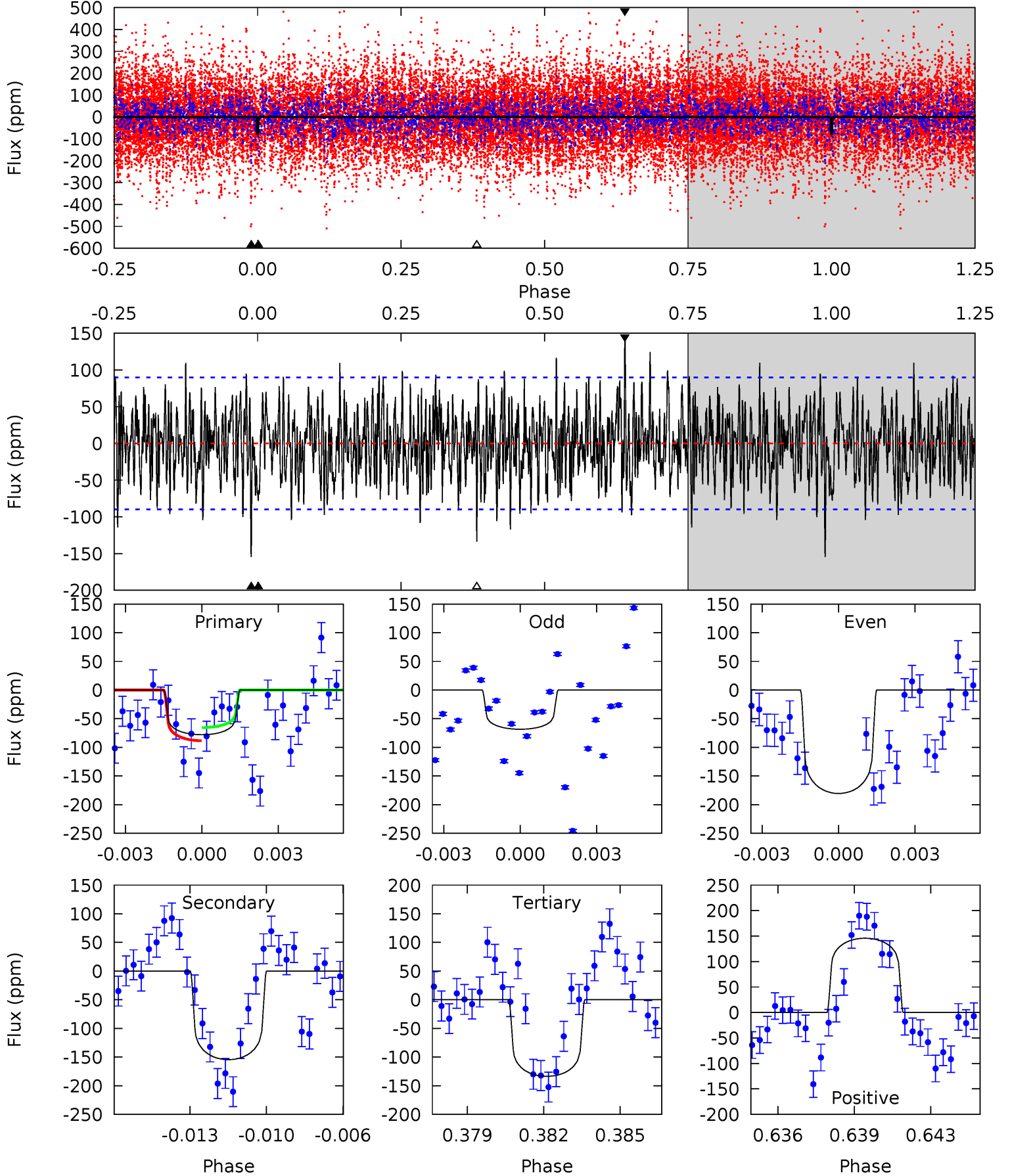
TCE 004659837-02 P=130.679427 Days $T_0=165.881476$ (BKJD)



DV Model-Shift Uniqueness Test

004659837-02, $P = 130.678516$ Days, $E = 35.195821$ Days

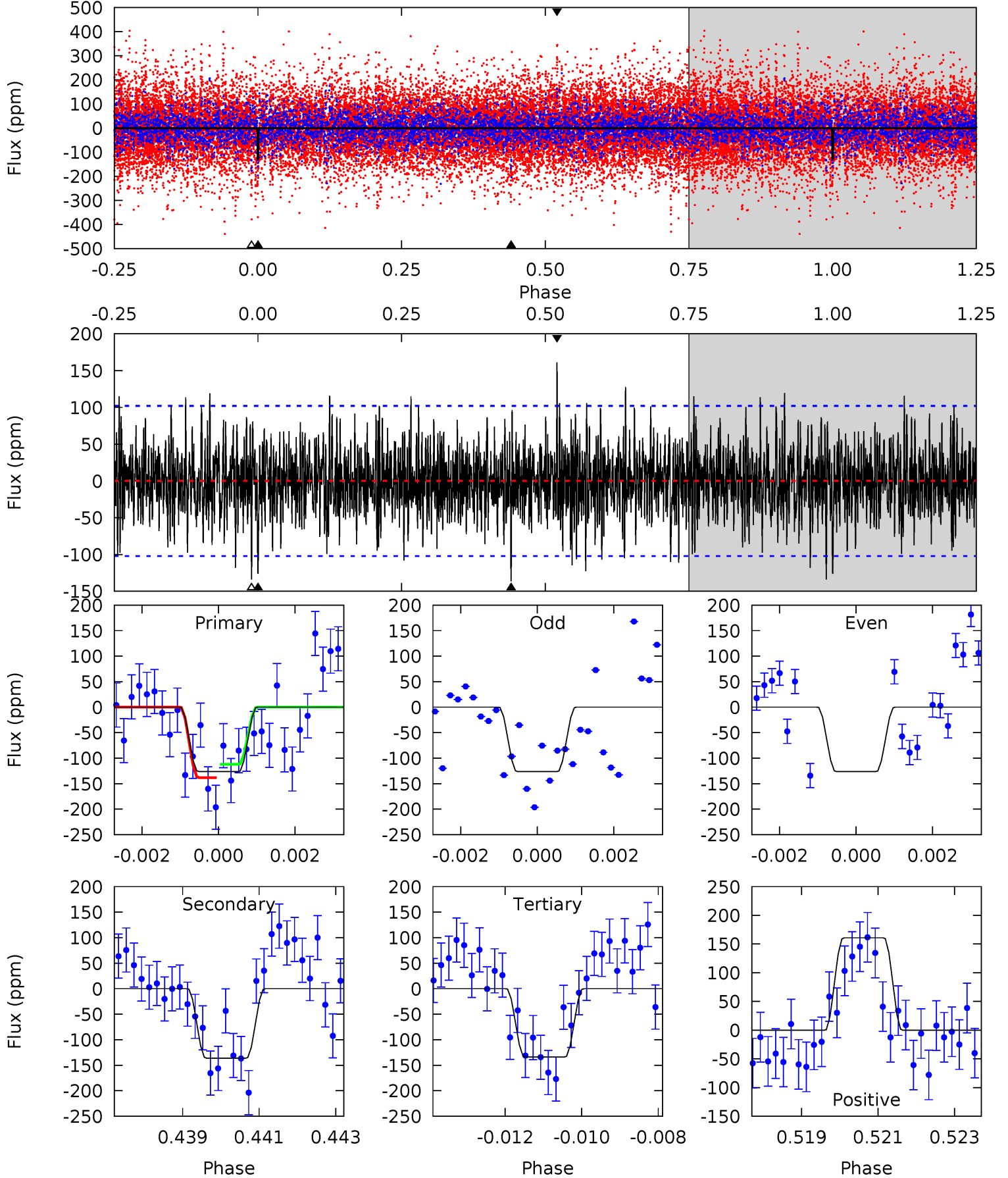
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
4.56	9.02	7.80	8.51	5.24	2.95	2.33	-3.24	-3.96	1.22	0.51	1.95	1.07	0.49	0.67



Alt Model-Shift Uniqueness Test

004659837-02, P = 130.679427 Days, E = 35.202049 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.58	7.10	6.98	8.39	5.32	3.09	1.92	-0.40	-1.80	0.12	-1.29	0	0.69	0.54	0.68



Stellar Parameters For KIC 004659837

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6859^{+153}_{-204}	$3.761^{+0.285}_{-0.095}$	$-0.100^{+0.300}_{-0.250}$	$2.770^{+0.499}_{-0.927}$	$1.613^{+0.232}_{-0.283}$	$0.107^{+0.216}_{-0.033}$
	+2%/-3%	+8%/-3%	+300%/-250%	+18%/-33%	+14%/-18%	+202%/-31%
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 004659837-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-155 ± 17	$3.24^{+1.40}_{-1.38}$	899^{+50}_{-73}	7251^{+3097}_{-1271}	2897^{+5804}_{-1520}
Alt.	-136 ± 19	$3.23^{+1.54}_{-1.26}$	897^{+54}_{-71}	6839^{+2477}_{-1080}	2448^{+4238}_{-1334}

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 $A_{\text{obs}} \gg 1.0$

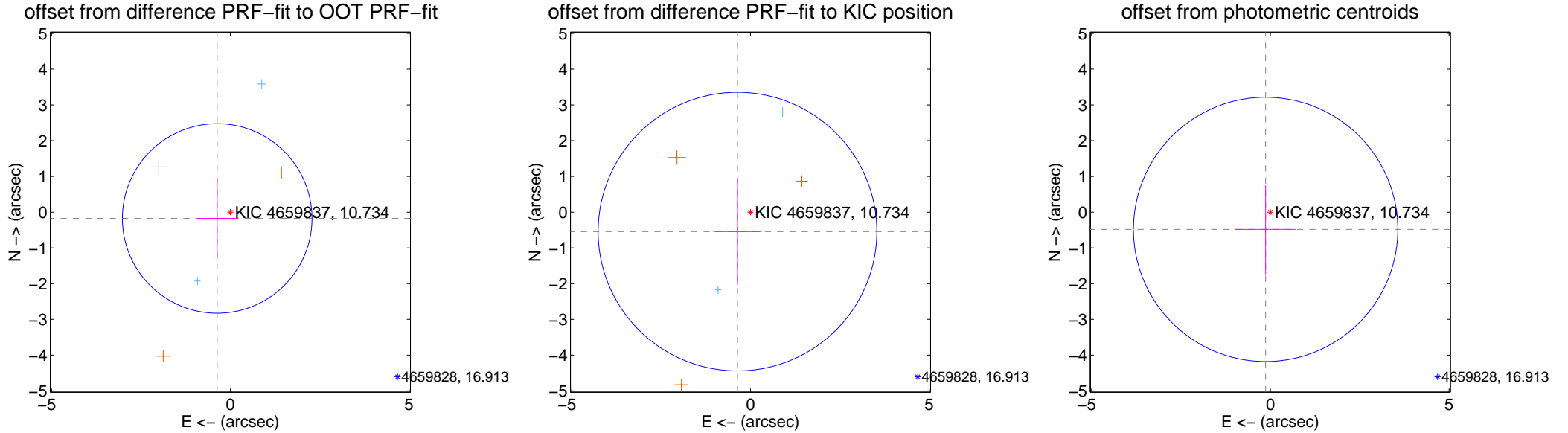
DV Centroid Data

Supplemental centroid analysis for 004659837-02. **Kepler magnitude: 10.73.** Transit SNR 3.95

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 / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.408 ± 0.884	0.46	0.368 ± 0.576	-0.176 ± 1.145
PRF-fit source offset from KIC position	0.654 ± 1.299	0.50	0.364 ± 0.669	-0.544 ± 1.497
photometric centroid source offset	0.50 ± 1.23	0.41	0.13 ± 0.86	-0.48 ± 1.26



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.

Q1 no difference image



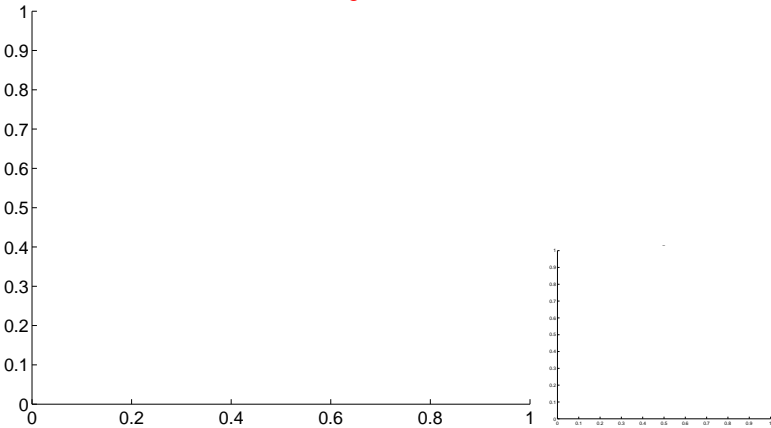
Q1 no OOT image



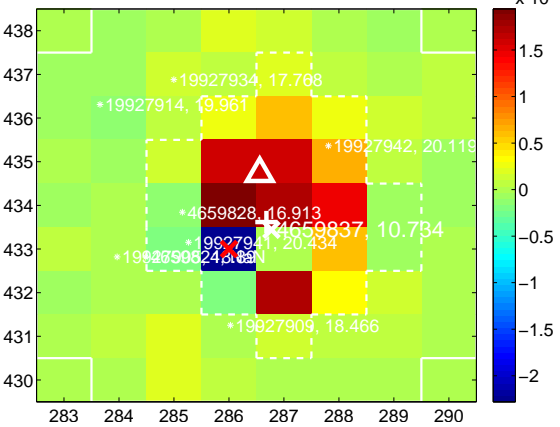
Q2 no difference image



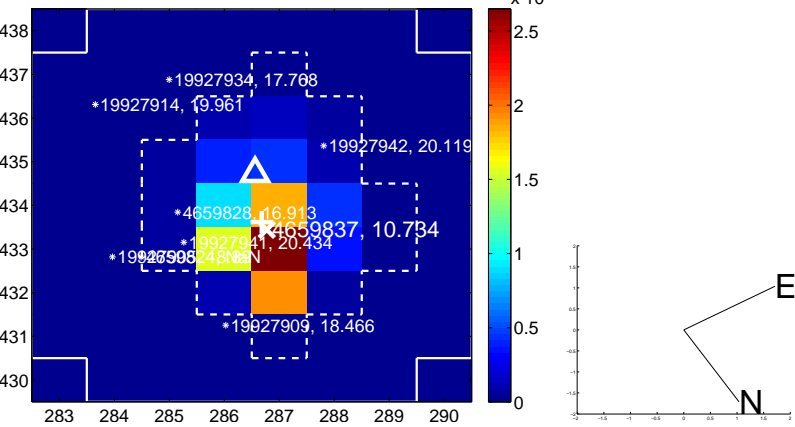
Q2 no OOT image



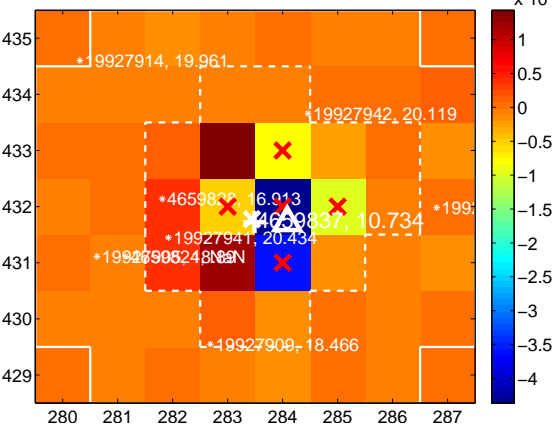
Q3 difference image. Poor Quality



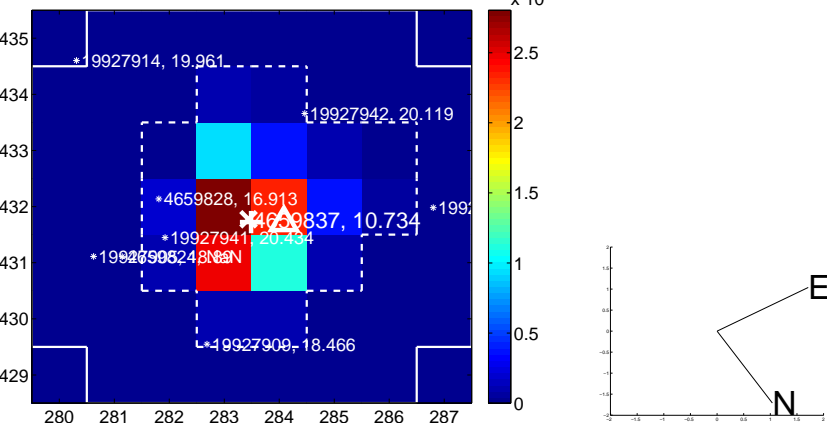
Q3 OOT image



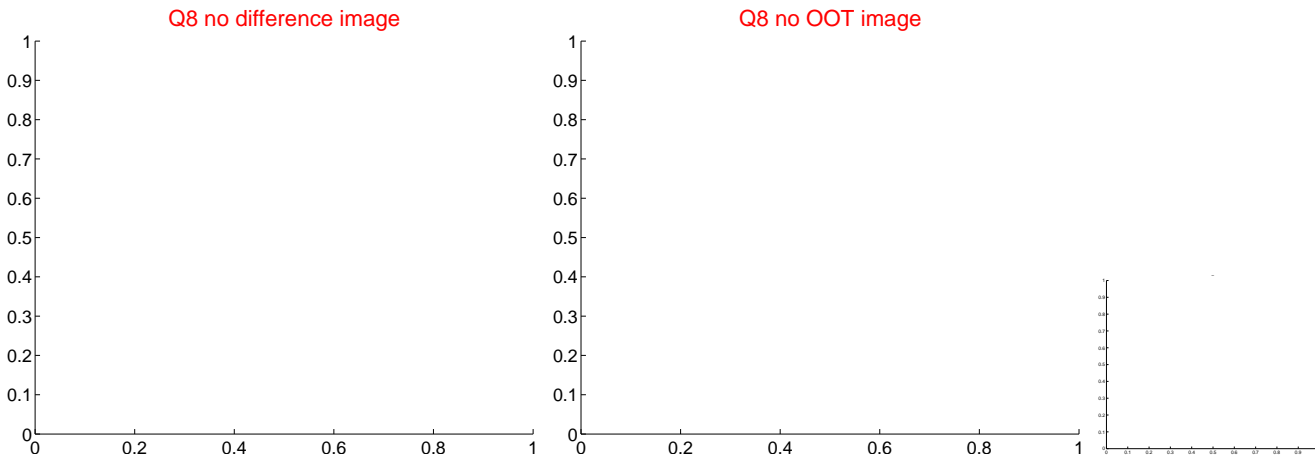
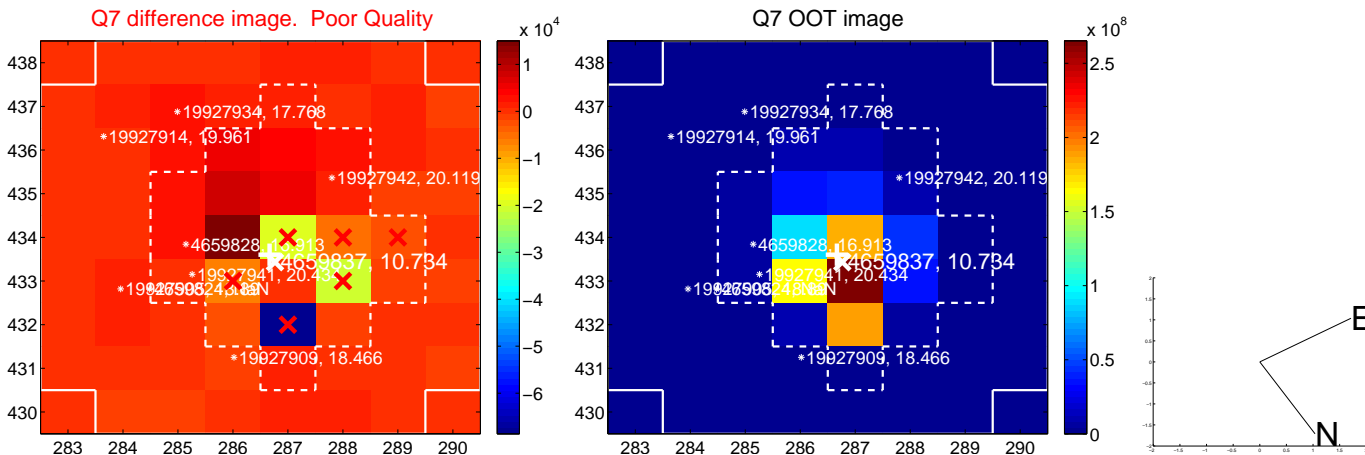
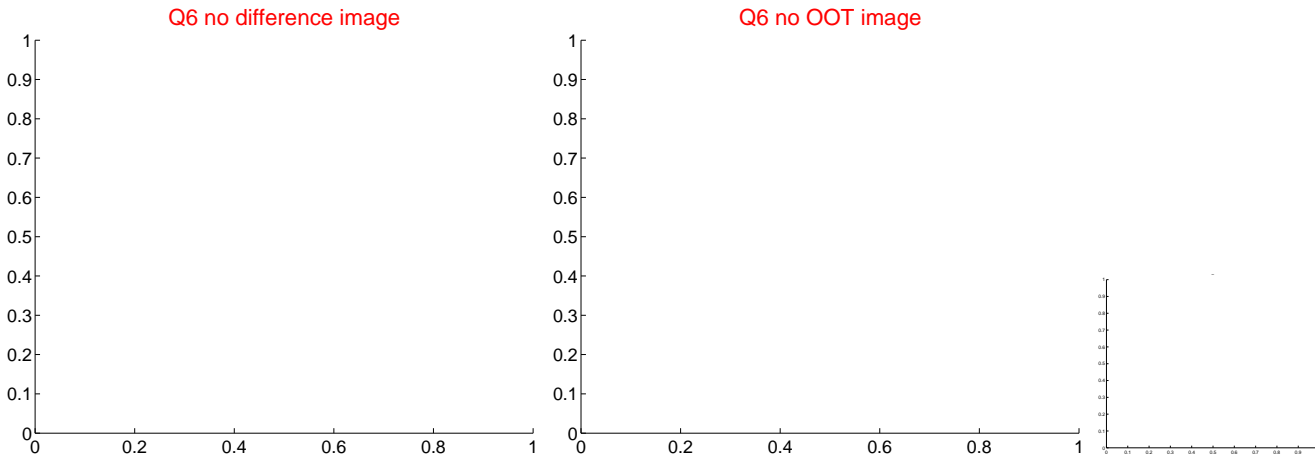
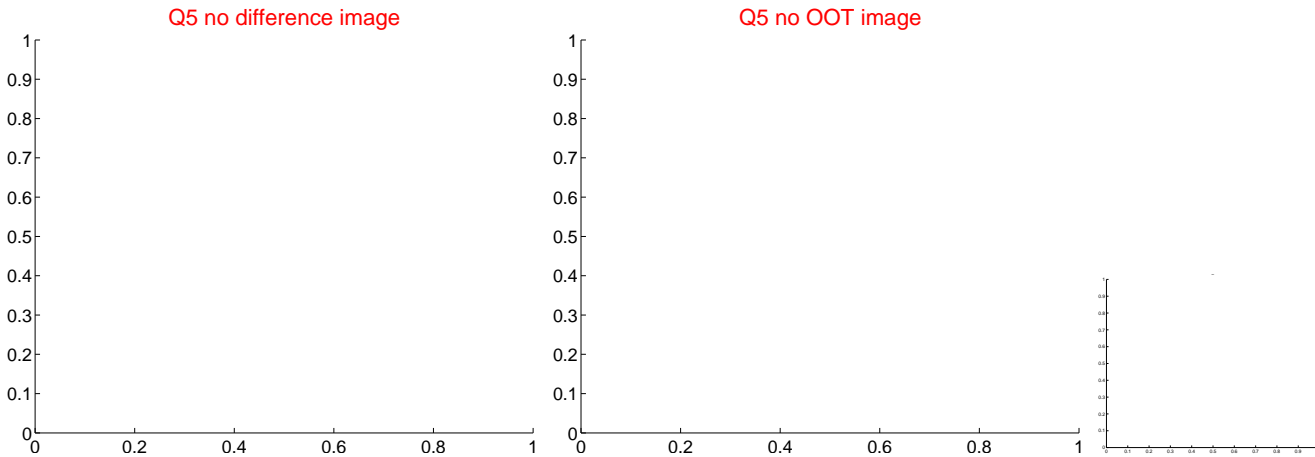
Q4 difference image. Poor Quality



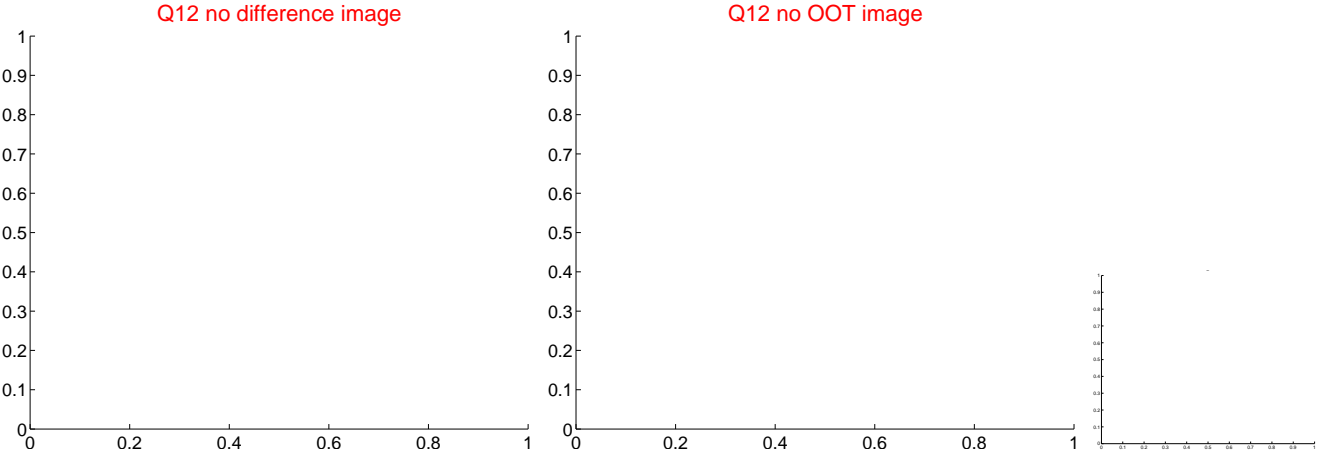
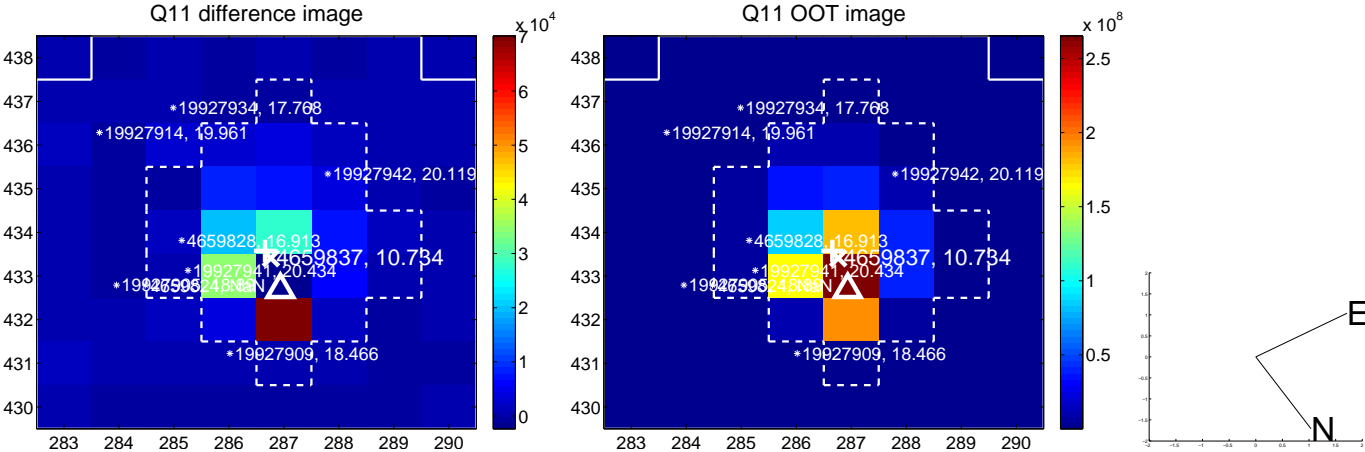
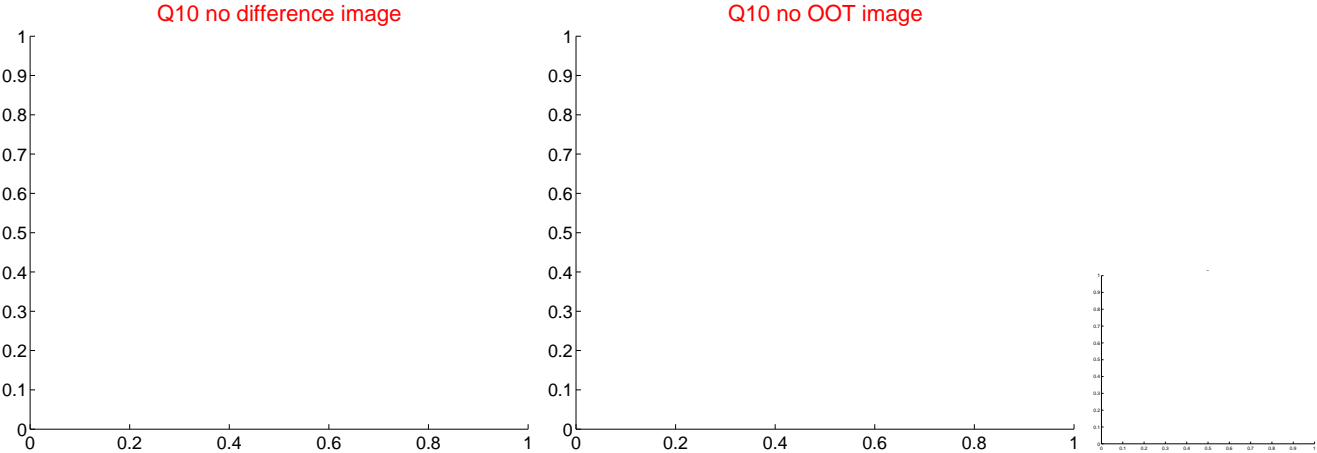
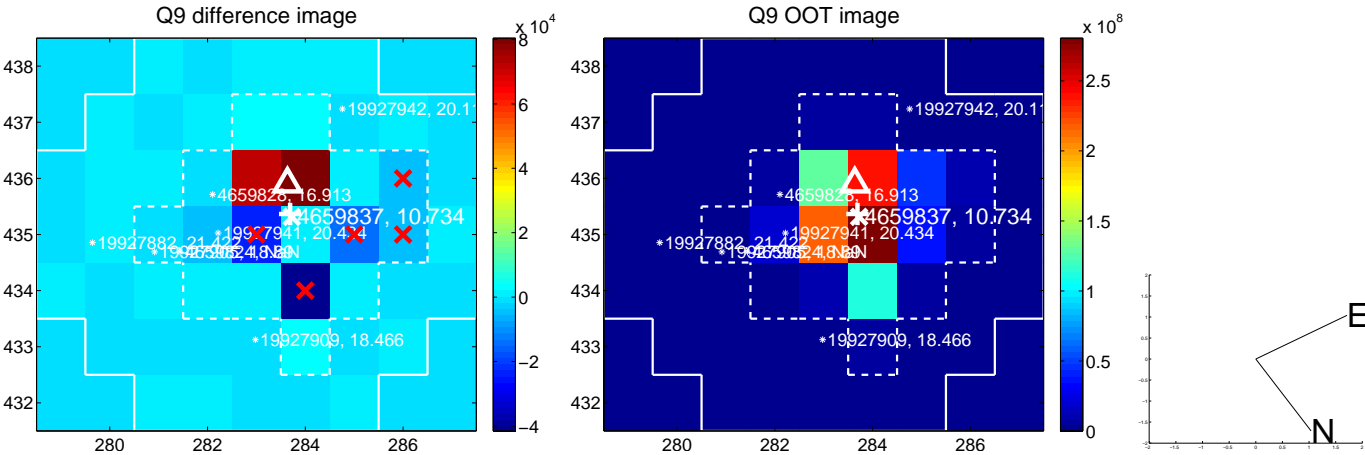
Q4 OOT image



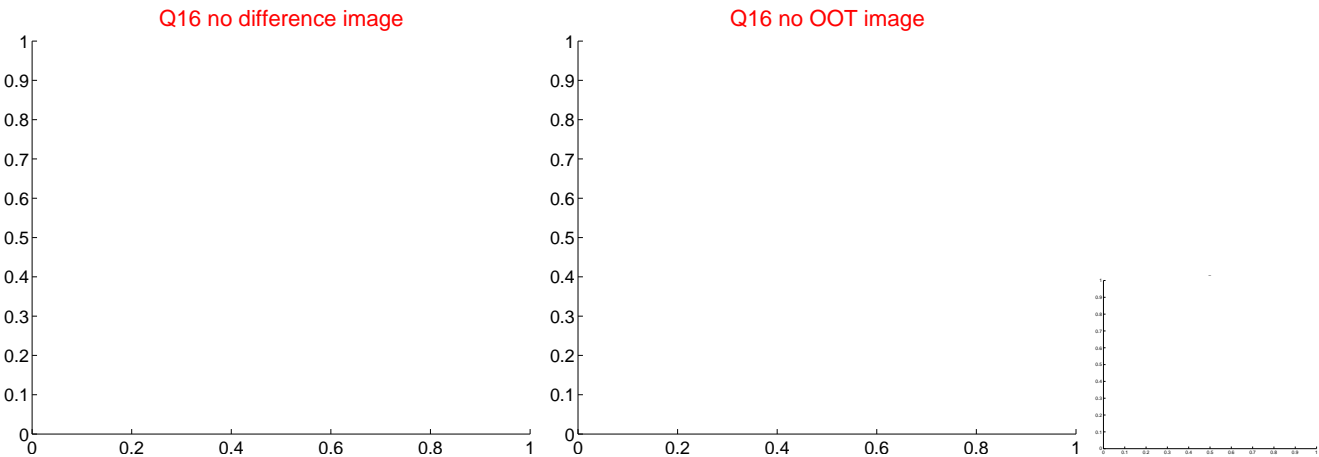
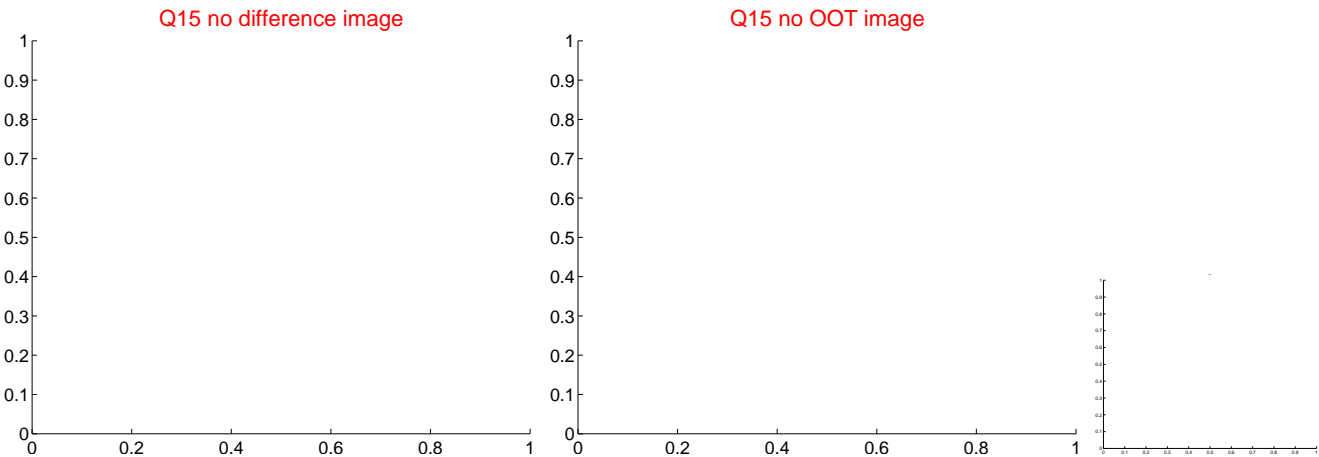
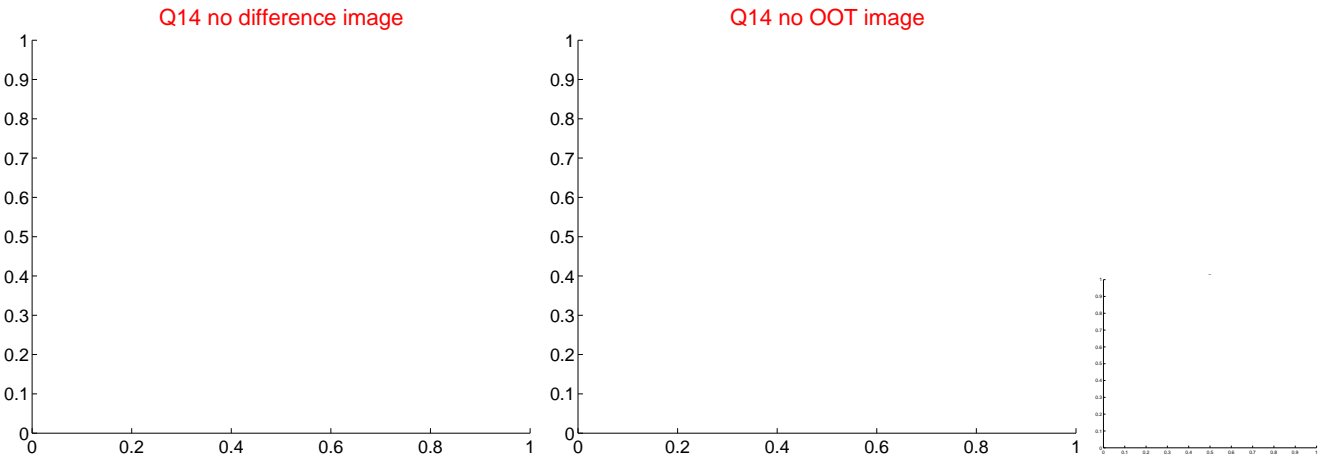
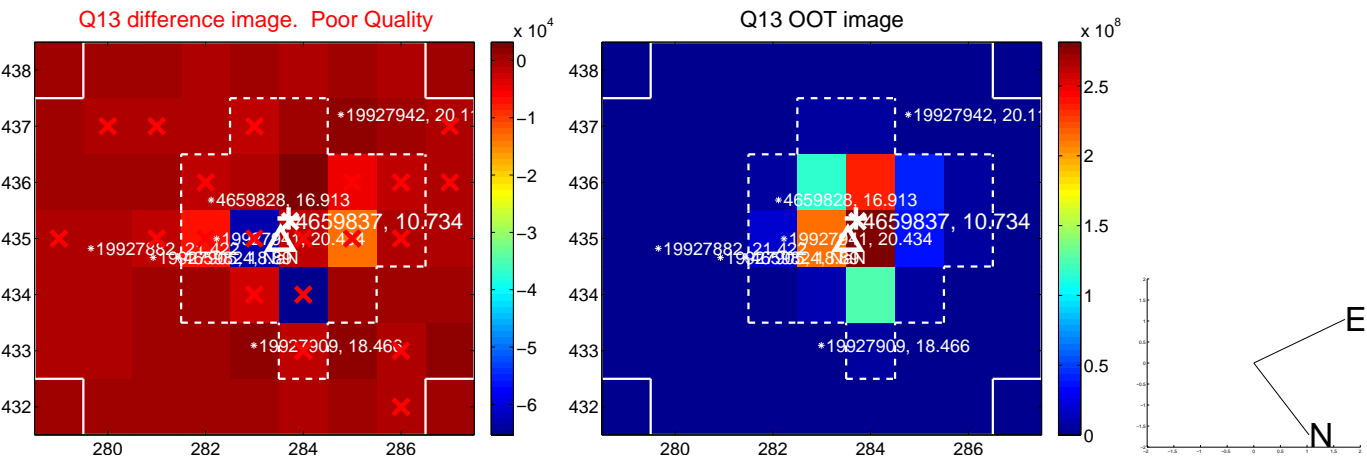
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value



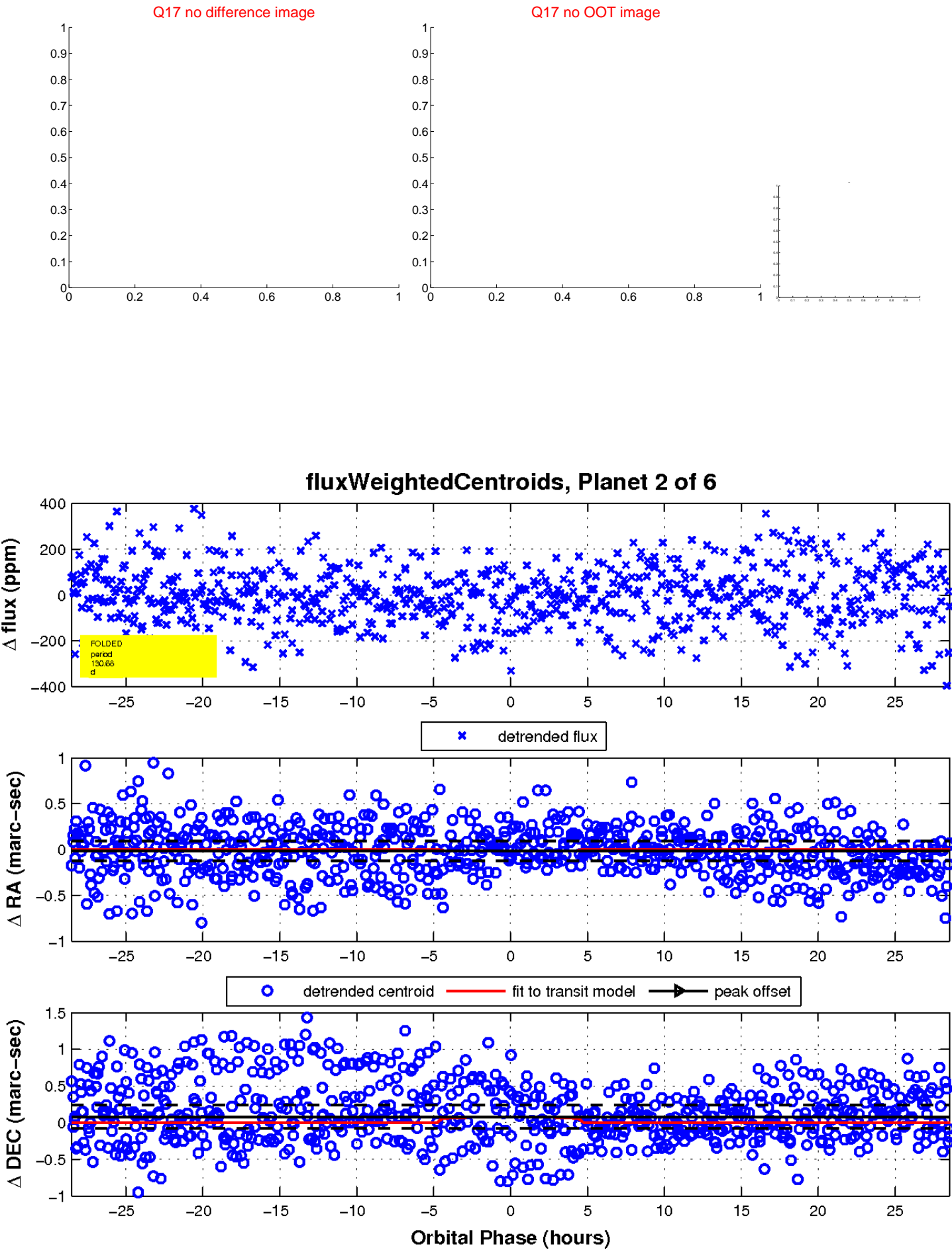
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



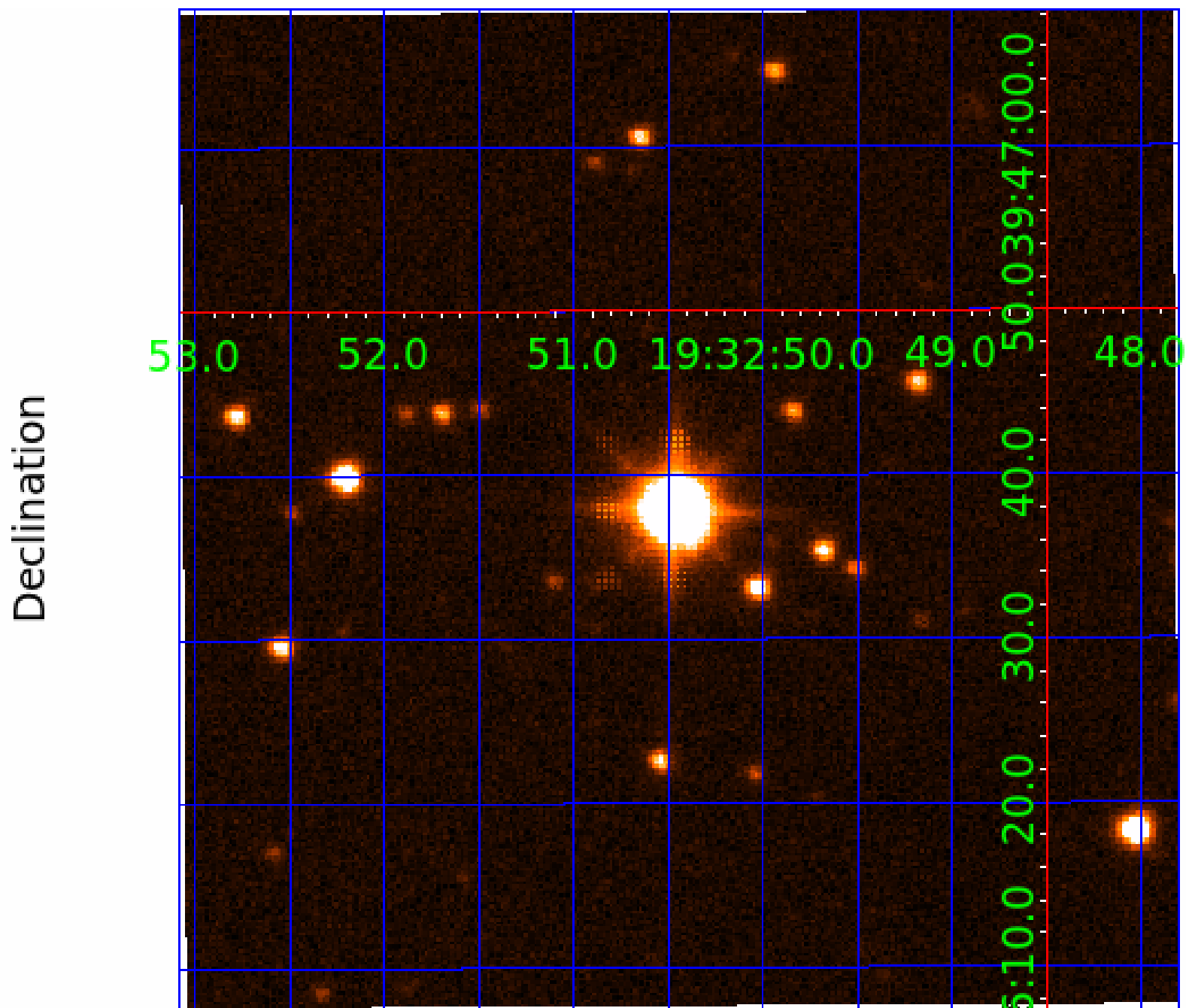
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



UKIRT Image



KIC 004659837

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})
004659837-01	OBS	No	1.835581	132.056857	16.0	7.617	8.1	6.2	2.77	6859	1.28	12839.83
004659837-02	OBS	No	130.678516	165.874337	125.6	9.521	13.3	3.9	2.77	6859	3.42	43.52
004659837-03	OBS	No	318.109462	294.519022	228.1	6.651	9.6	6.2	2.77	6859	4.75	13.29
004659837-04	OBS	No	138.938162	133.207213	171.0	7.742	8.1	6.4	2.77	6859	4.20	40.10
004659837-05	OBS	No	63.925988	179.038178	165.3	5.494	7.2	7.5	2.77	6859	4.12	112.90
004659837-06	OBS	No	41.395366	153.532238	79.5	13.609	7.2	5.8	2.77	6859	2.78	201.52

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004659837-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
004659837-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
004659837-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_TRACKER—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
004659837-04	OBS	FP	0.00	1	0	1	0	TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED—HALO_GHOST
004659837-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
004659837-06	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—CENT_SATURATED—HALO_GHOST

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

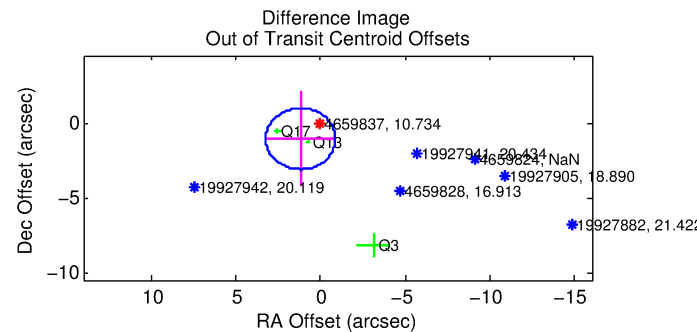
N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 004659837-03

No Significant Match Found

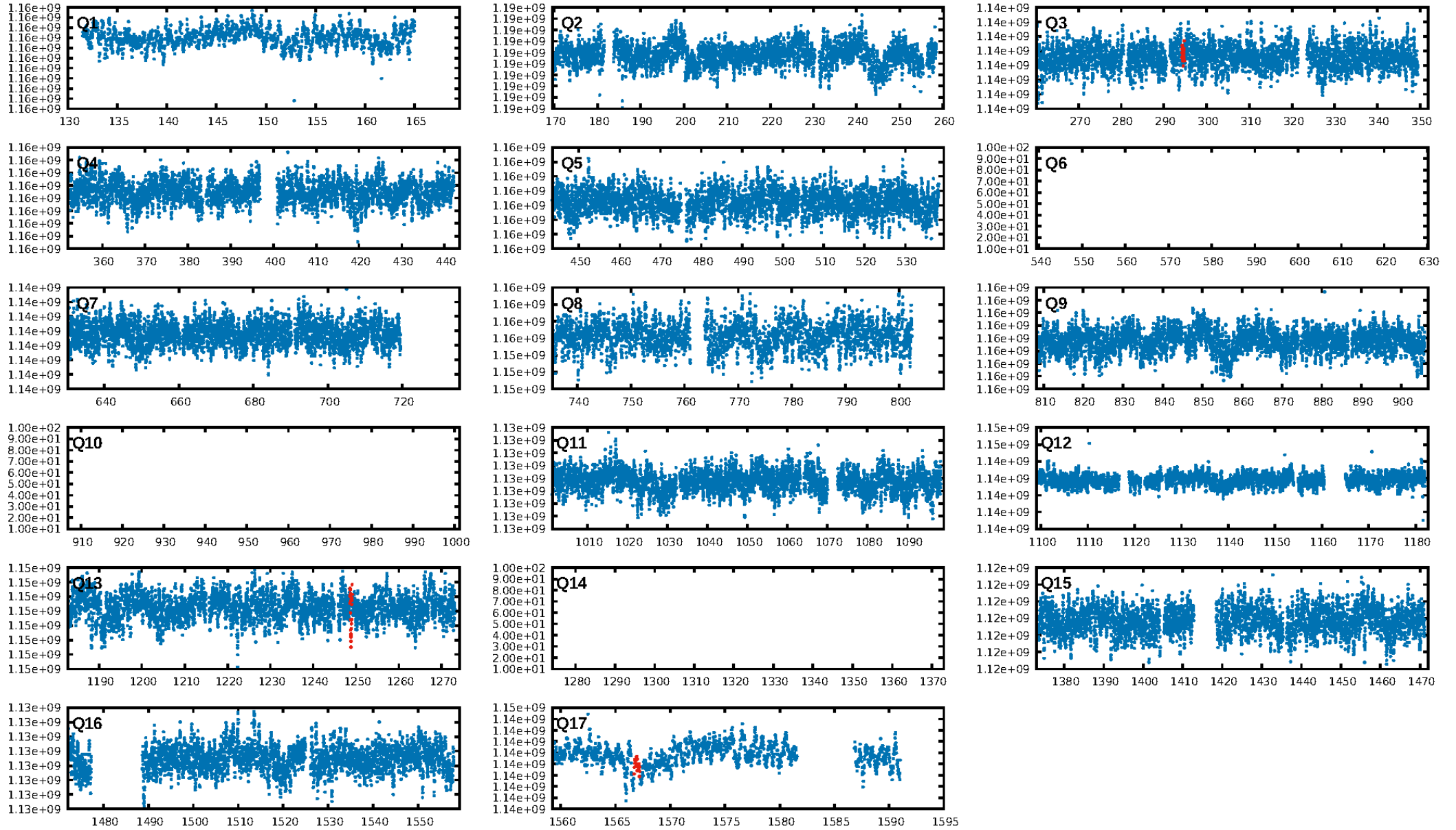
KIC: 4659837 Candidate: 3 of 6 Period: 318.109 d



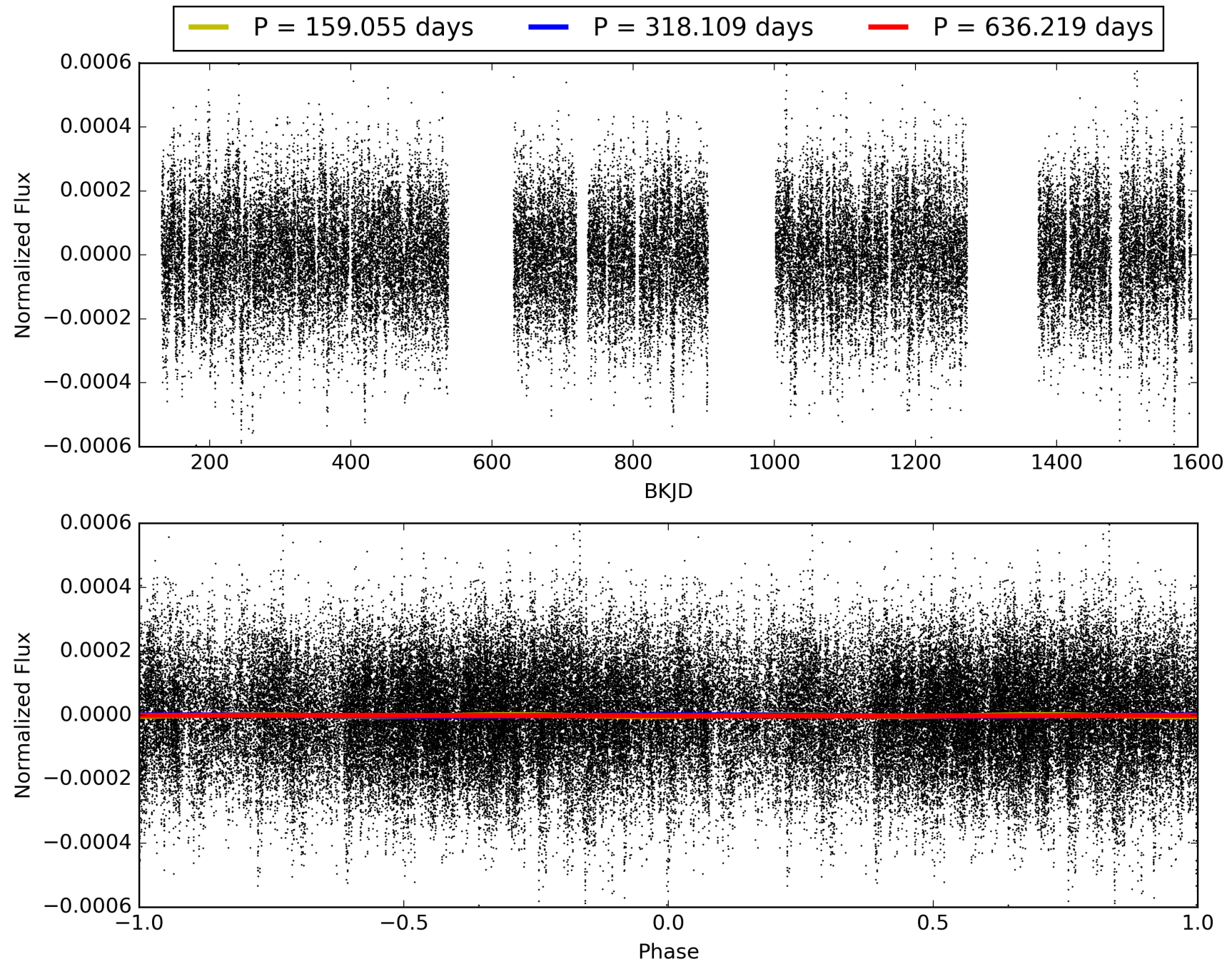
ShortPeriod-sig: 100.0% [421.31σ]
 LongPeriod-sig: N/A
 ModelChiSquare2-sig: 4.5%
 ModelChiSquareGof-sig: 98.9%
 Bootstrap-pfa: 7.30e-17
 RollingBand-fgt: 1.00 [2/2]
GhostDiagnostic-chr: 0.7931
 Centroid-sig: 36.9%
 Centroid-so: 0.695 arcsec [0.96σ]
 OotOffset-rm: 1.607 arcsec [2.35σ]
 KicOffset-rm: 1.741 arcsec [2.30σ]
 OotOffset-st: 0/1/0/2 [3]
 KicOffset-st: 0/1/0/2 [3]
 DiffImageQuality-fgm: 0.33 [1/3]
 DiffImageOverlap-fno: 0.67 [2/3]

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

TCE 004659837-03, PDC Light Curves

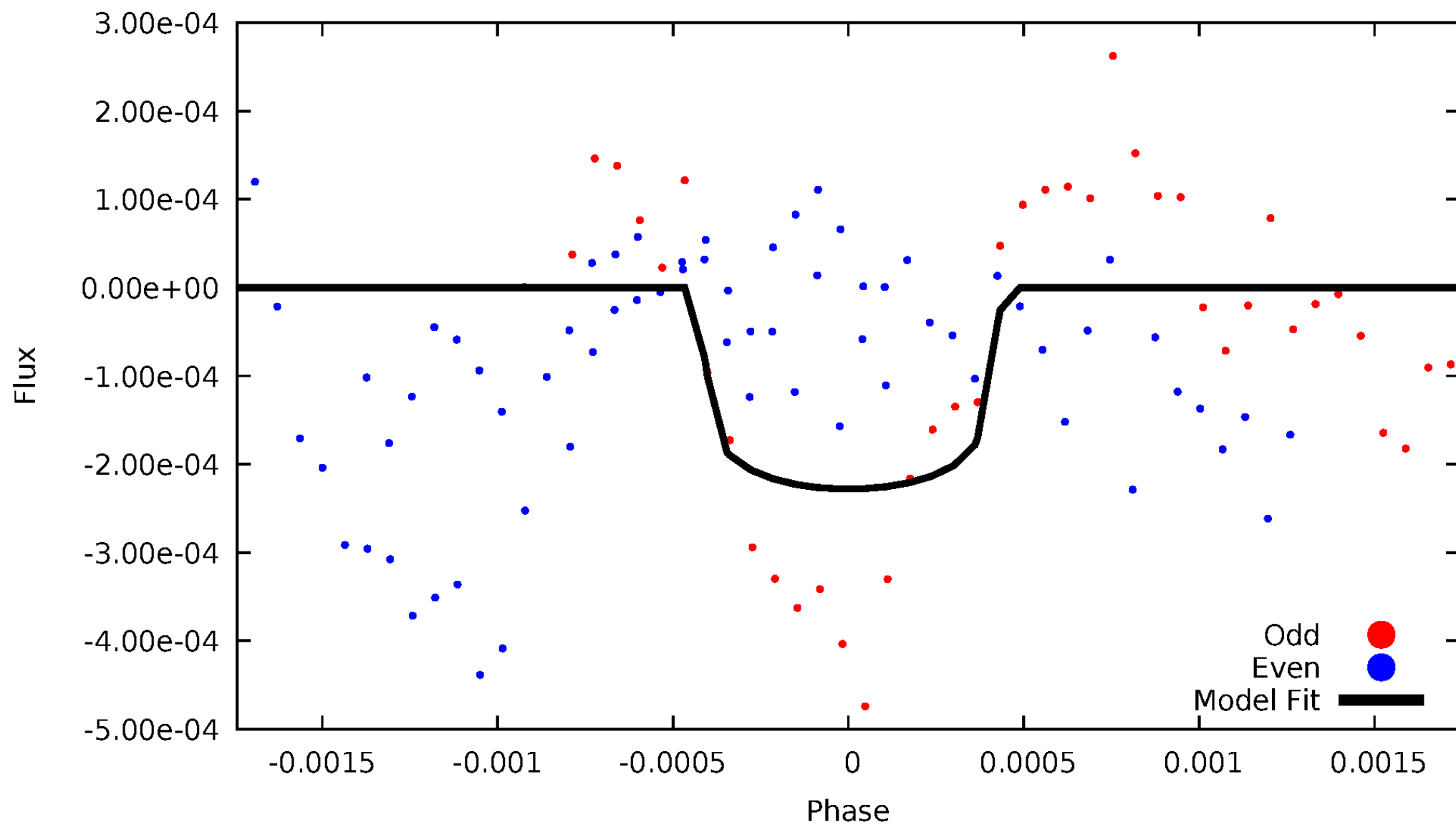


TCE 004659837-03



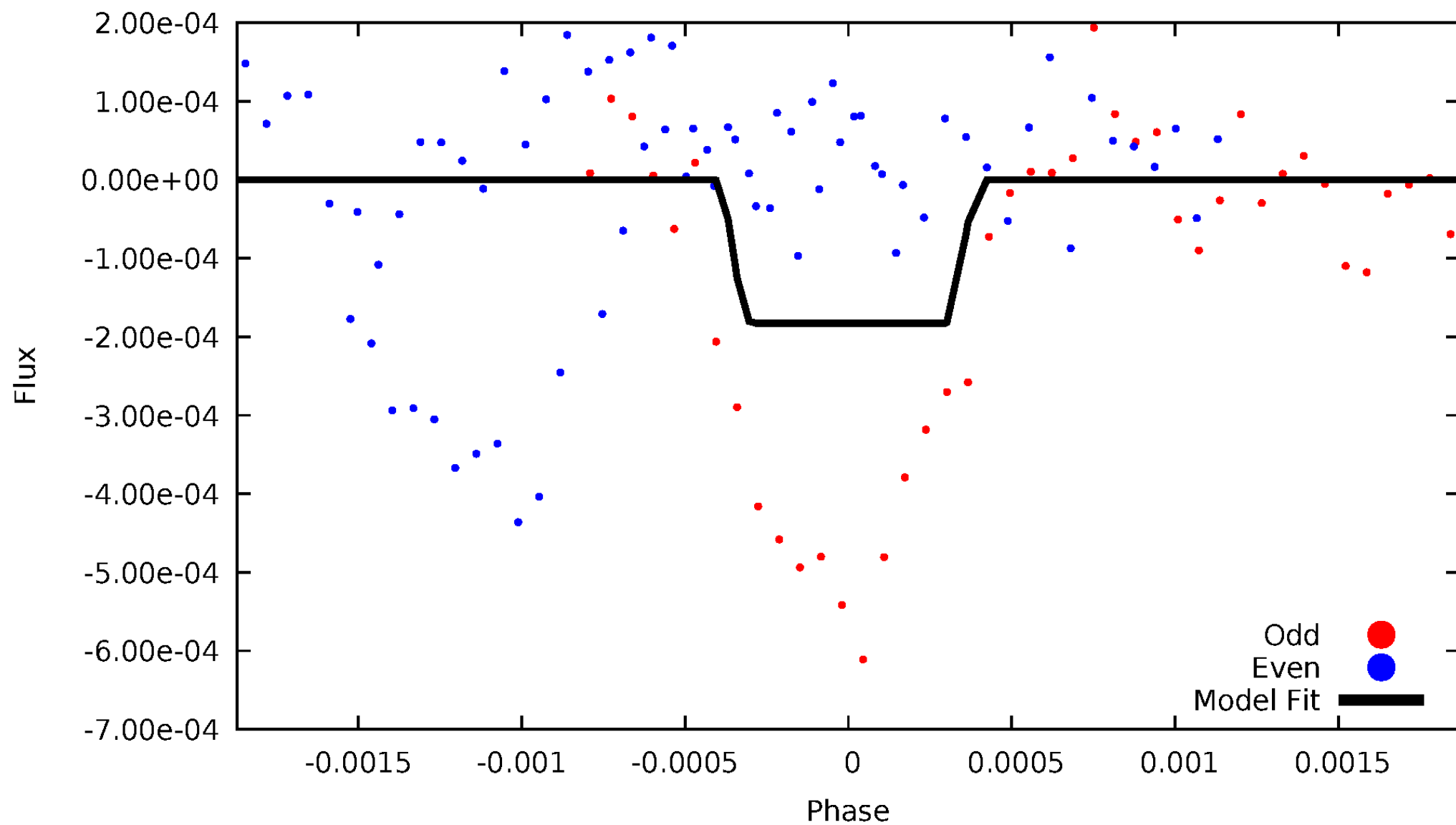
DV Odd/Even

TCE 004659837-03

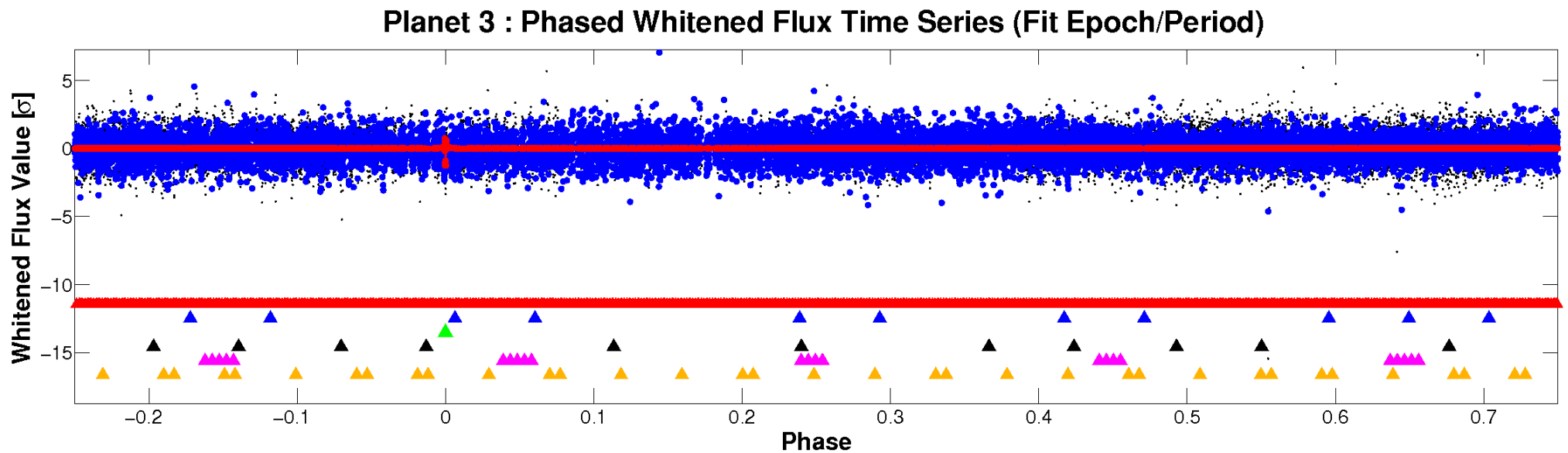
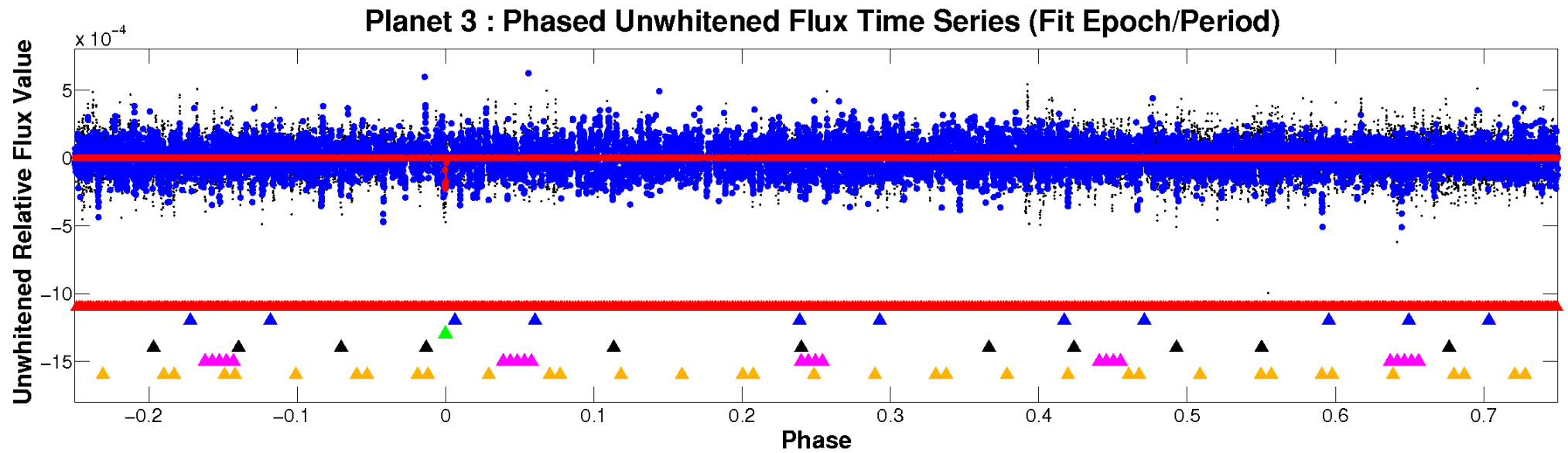


ALT Odd/Even

TCE 004659837-03

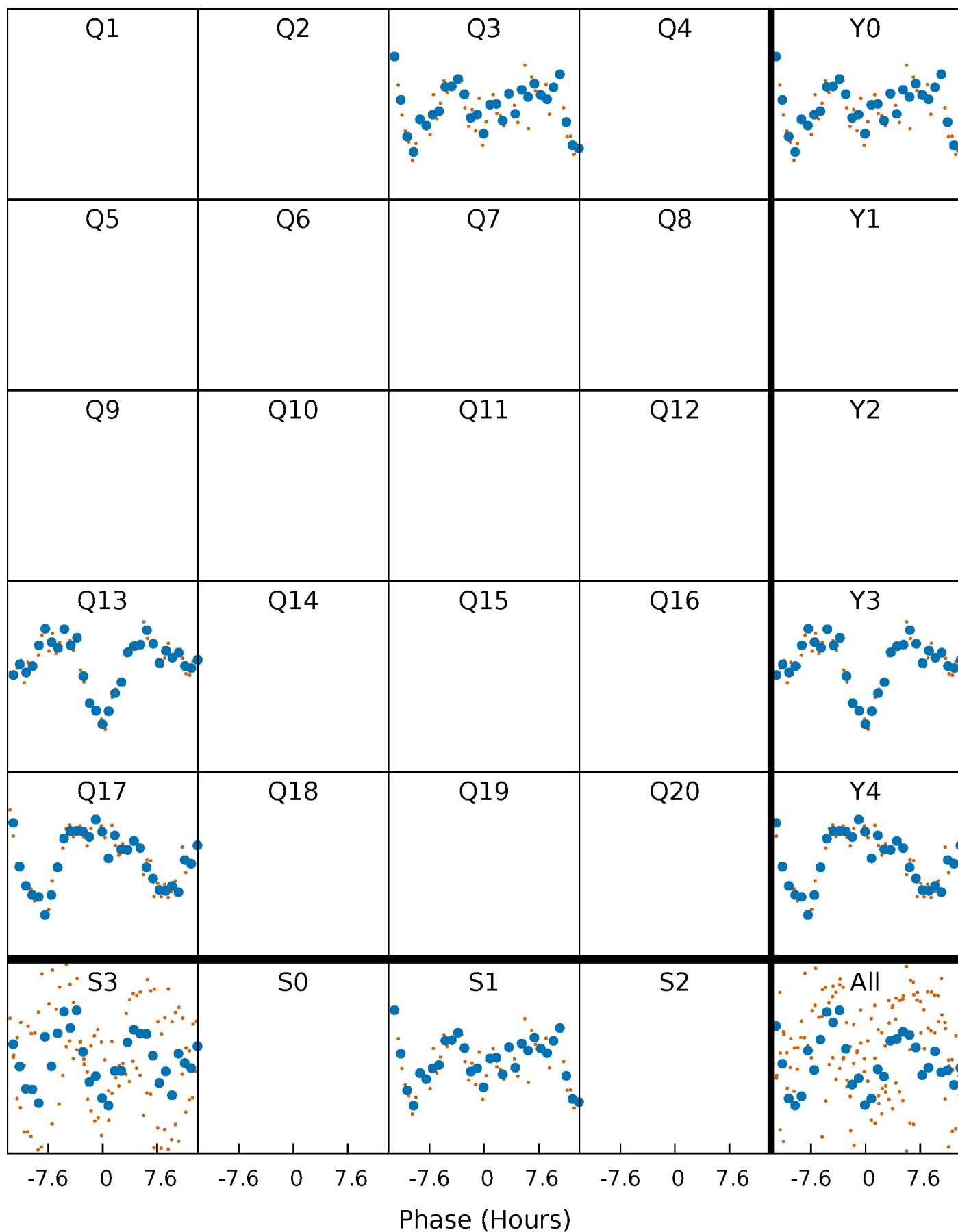


Non-Whitened Vs. Whitened Light Curve



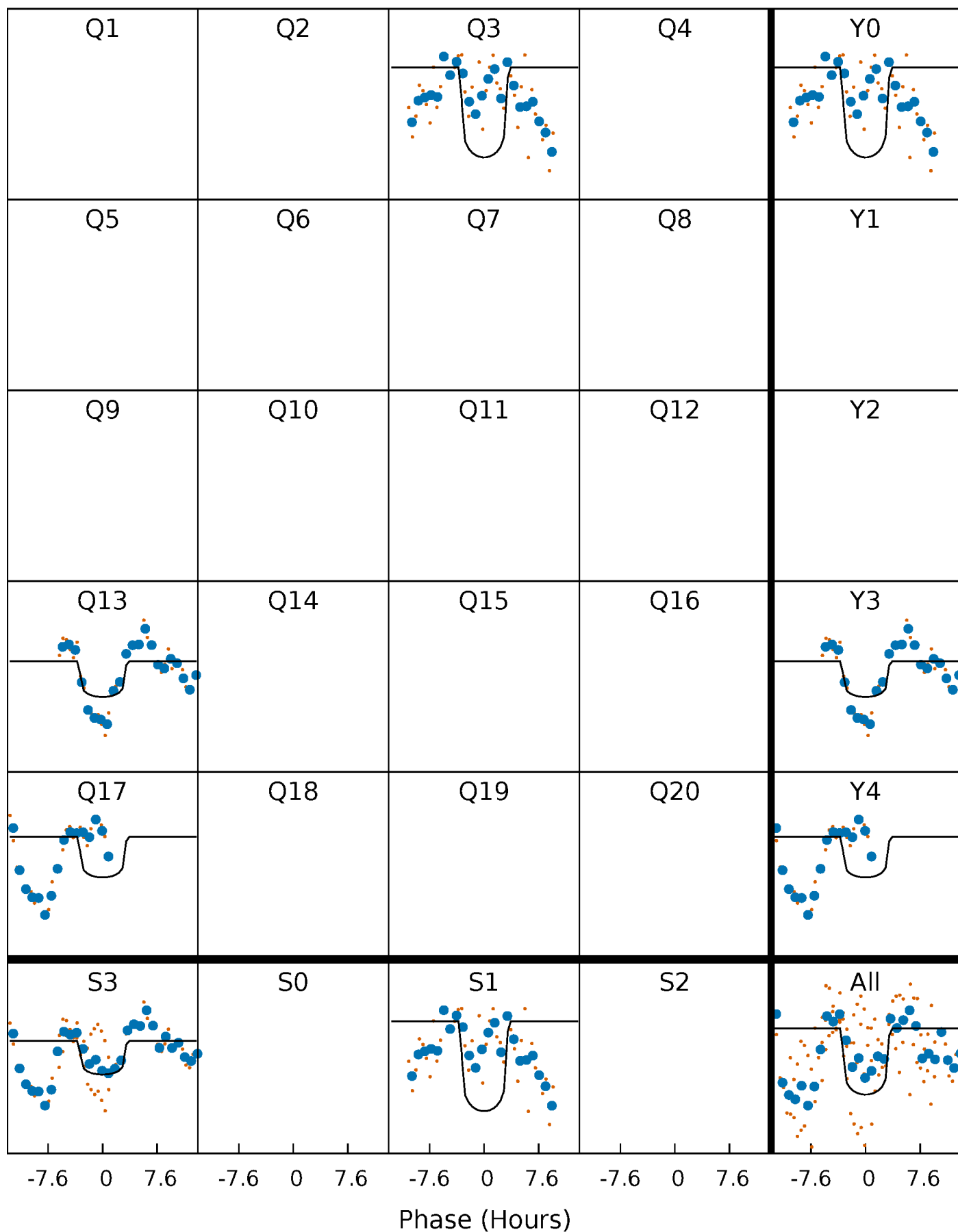
PDC Quarter-Phased Transit Curves

TCE 004659837-03 $P=318.109462$ Days $T_0=294.519022$ (BKJD)



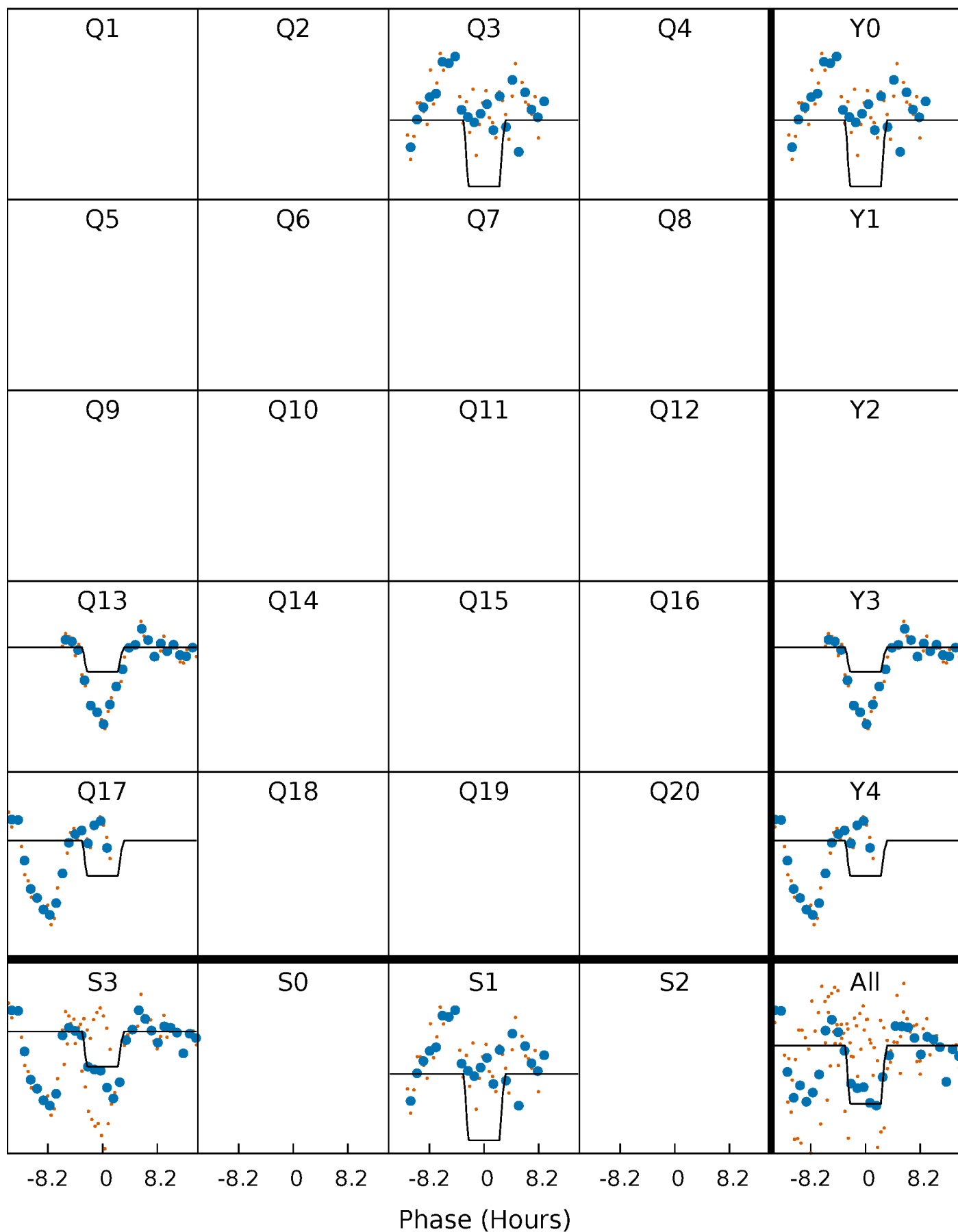
DV Quarter-Phased Transit Curves

TCE 004659837-03 $P=318.109462$ Days $T_0=294.519022$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

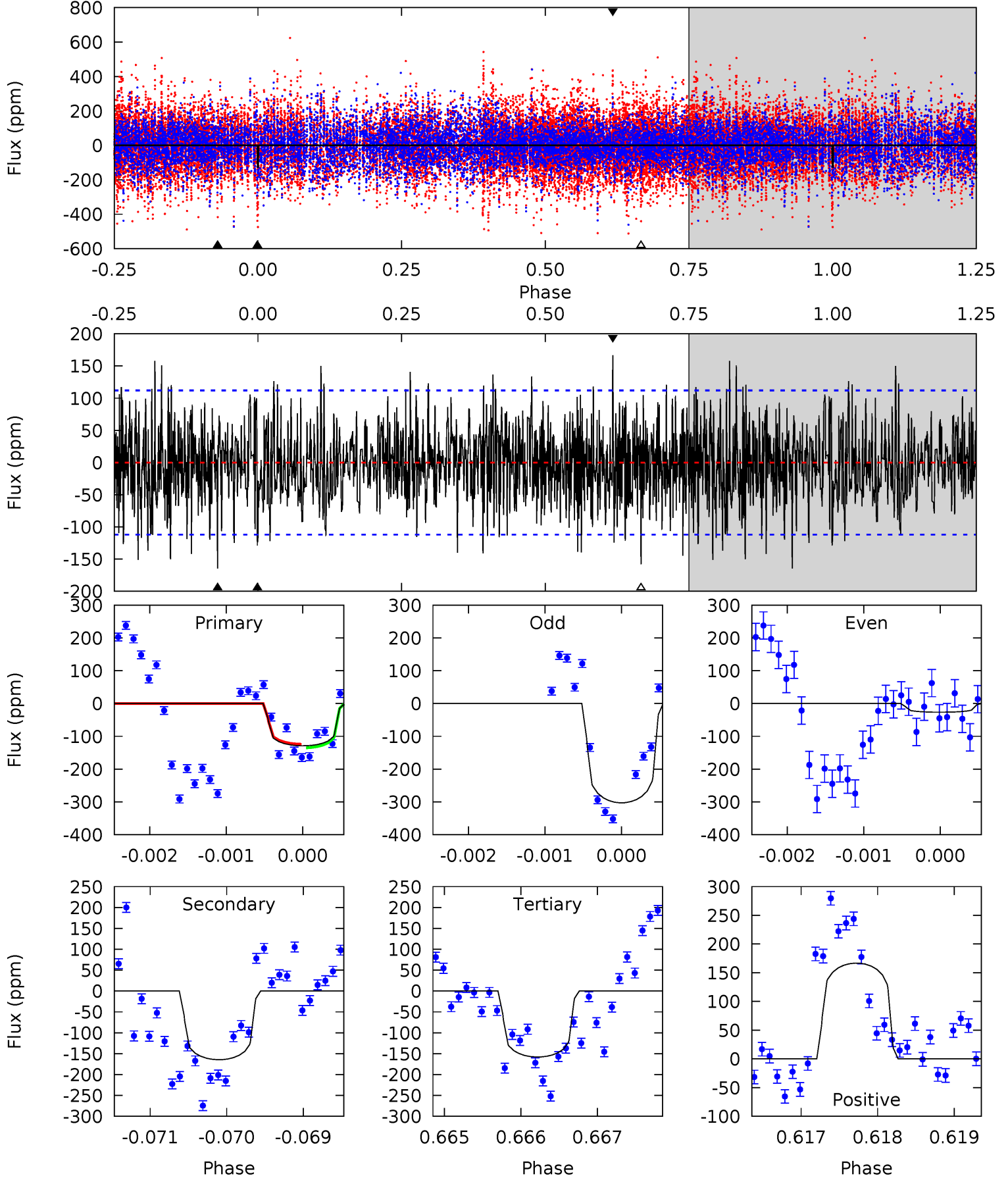
TCE 004659837-03 P=318.096040 Days $T_0=294.560170$ (BKJD)



DV Model-Shift Uniqueness Test

004659837-03, P = 318.109462 Days, E = 294.519022 Days

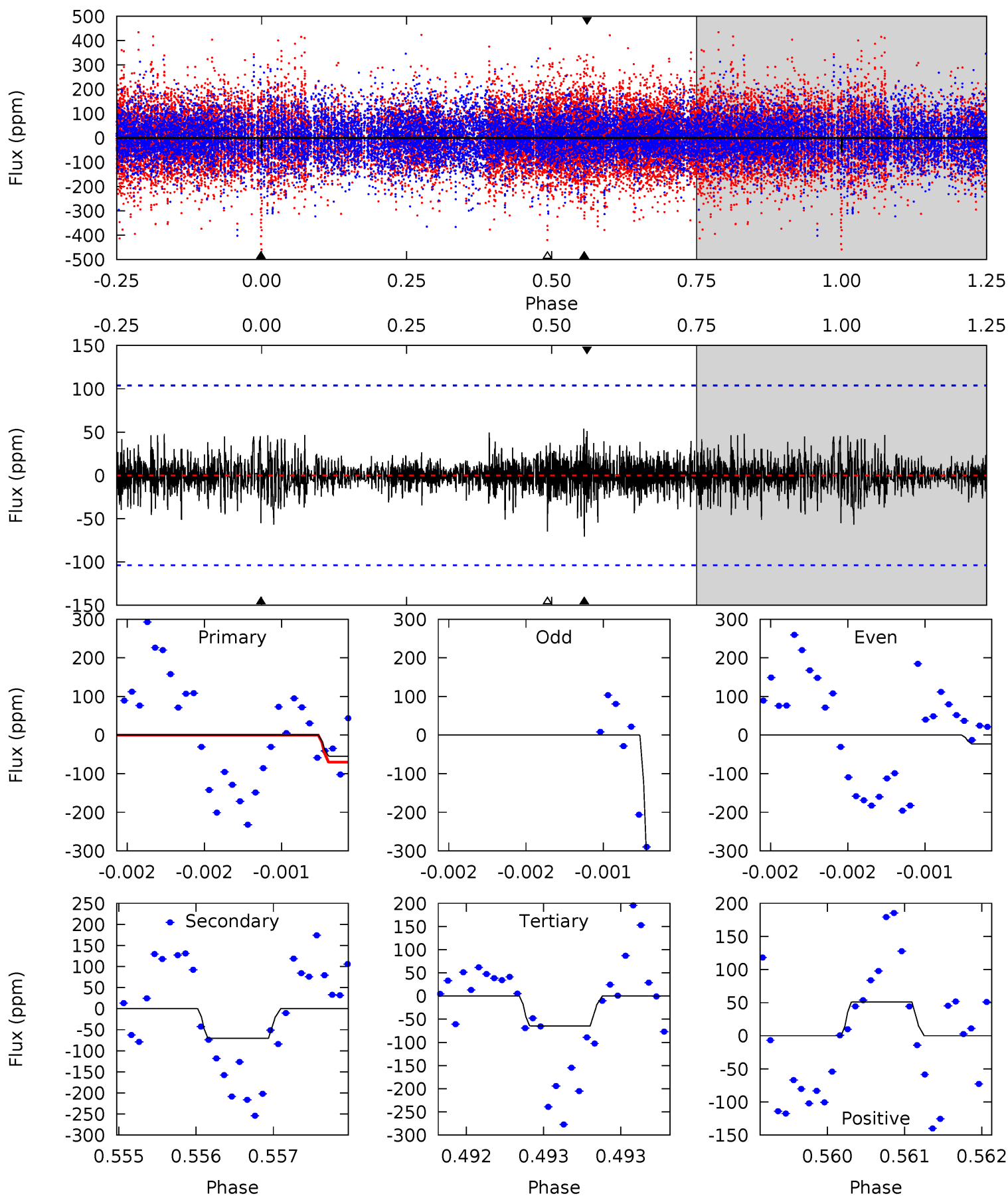
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.30	8.03	7.71	8.14	5.47	3.32	2.27	-1.42	-1.84	0.32	-0.11	6.67	1.88	0.50	0.26



Alt Model-Shift Uniqueness Test

004659837-03, P = 318.096040 Days, E = 294.560170 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2.91	3.74	3.43	2.71	5.50	3.36	0.73	-0.53	0.20	0.31	1.03	11.9	-9.06	0.43	0.28



Stellar Parameters For KIC 004659837

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6859^{+153}_{-204}	$3.761^{+0.285}_{-0.095}$	$-0.100^{+0.300}_{-0.250}$	$2.770^{+0.499}_{-0.927}$	$1.613^{+0.232}_{-0.283}$	$0.107^{+0.216}_{-0.033}$
	+2%/-3%	+8%/-3%	+300%/-250%	+18%/-33%	+14%/-18%	+202%/-31%
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 004659837-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-164 ± 20	$4.50^{+1.60}_{-1.46}$	668^{+38}_{-52}	6173^{+1230}_{-788}	5228^{+5728}_{-2414}
Alt.	-71 ± 19	$3.81^{+1.54}_{-1.39}$	665^{+40}_{-57}	5416^{+1256}_{-728}	3011^{+4672}_{-1552}

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

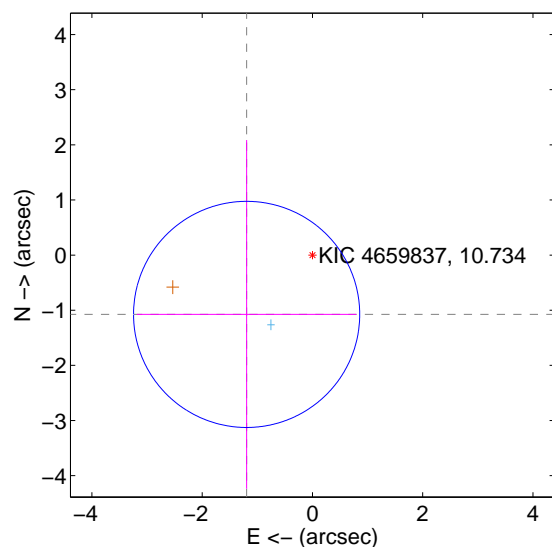
Supplemental centroid analysis for 004659837-03. **Kepler magnitude: 10.73.** Transit SNR 6.21

There are 1 quarters with good PRF difference image offsets

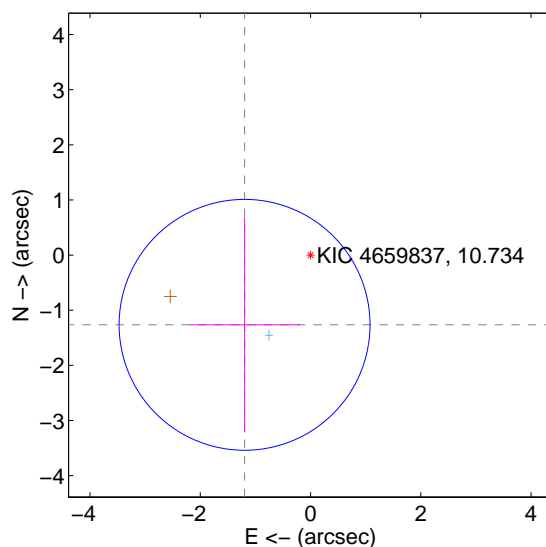
The direct PRF centroid is offset from the target star catalog position by about 0.17 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.607 ± 0.684	2.35	1.193 ± 1.991	-1.076 ± 3.162
PRF-fit source offset from KIC position	1.741 ± 0.758	2.30	1.196 ± 1.008	-1.265 ± 1.952
photometric centroid source offset	0.69 ± 0.72	0.96	-0.69 ± 0.72	-0.04 ± 0.77

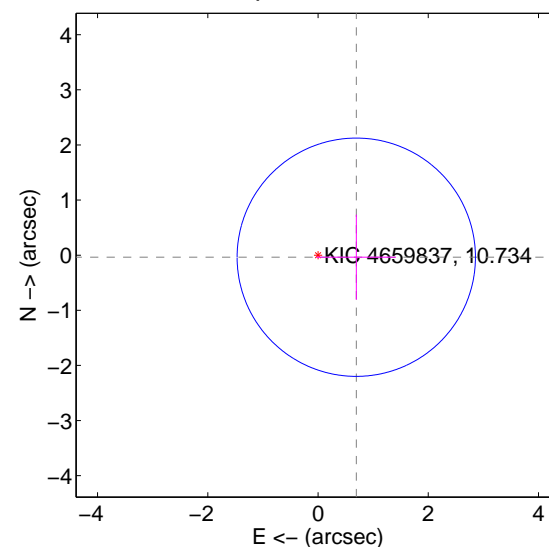
offset from difference PRF-fit to OOT PRF-fit



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.

Q1 no difference image



Q1 no OOT image



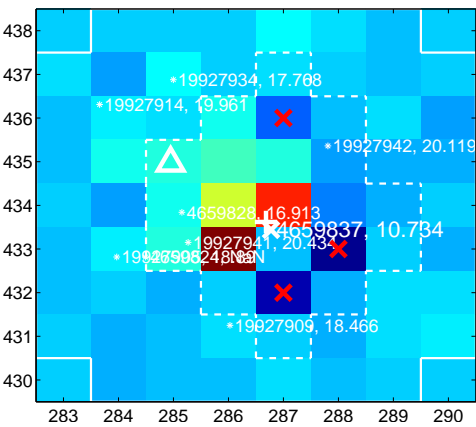
Q2 no difference image



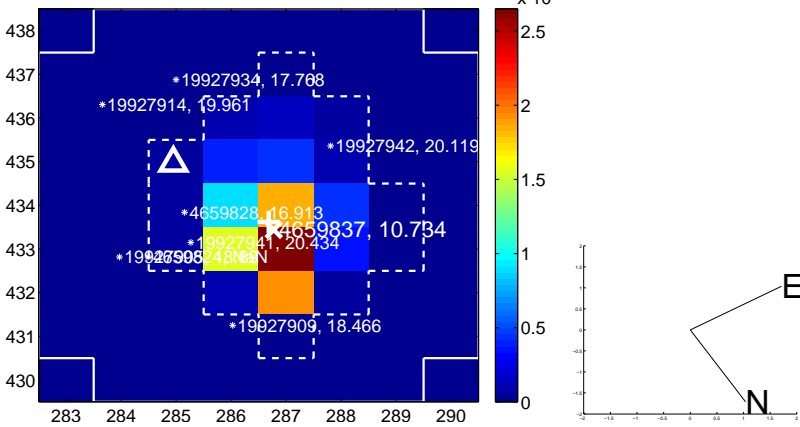
Q2 no OOT image



Q3 difference image. Poor Quality



Q3 OOT image



Q4 no difference image



Q4 no OOT image



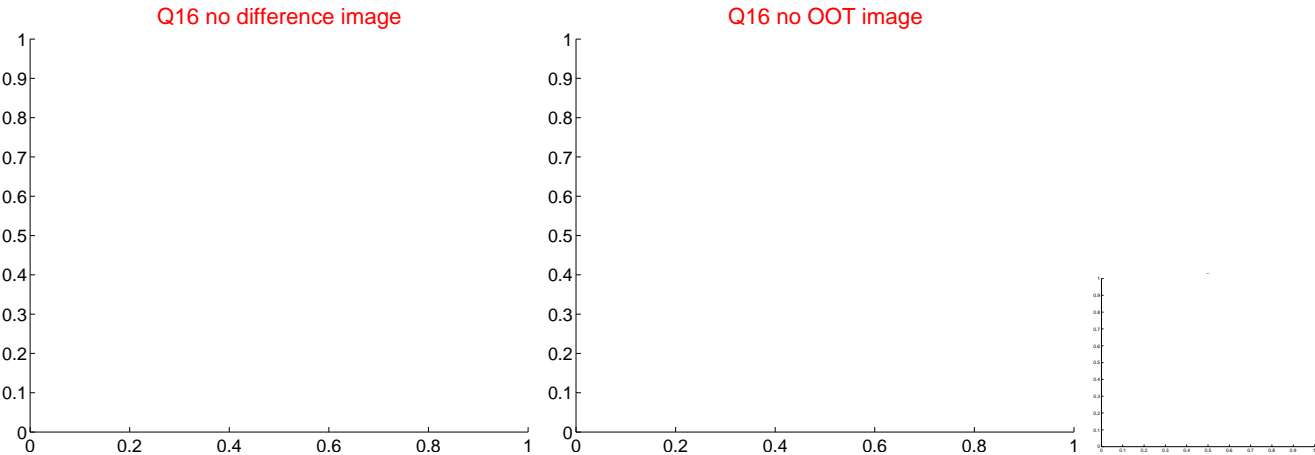
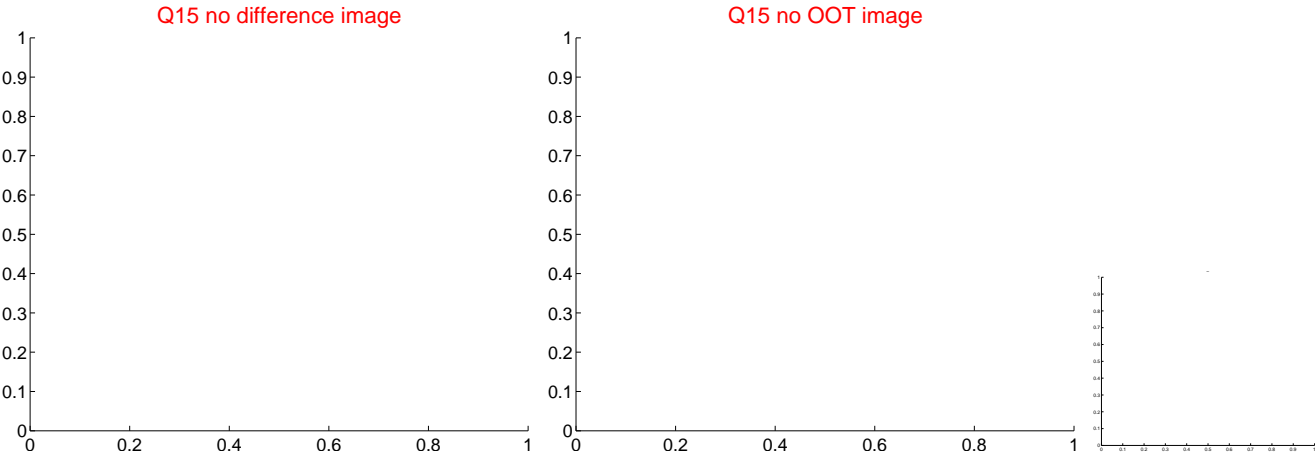
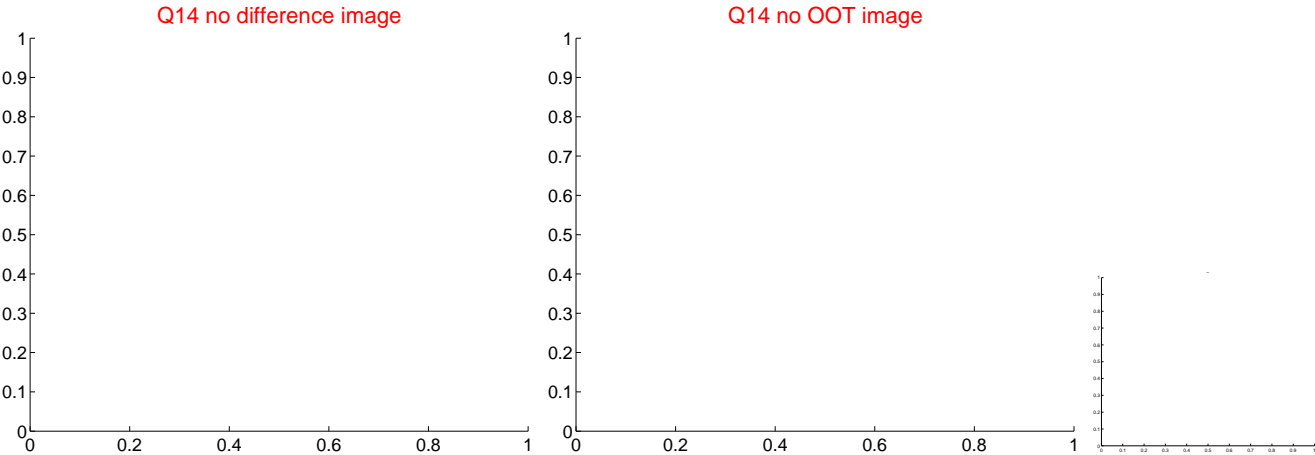
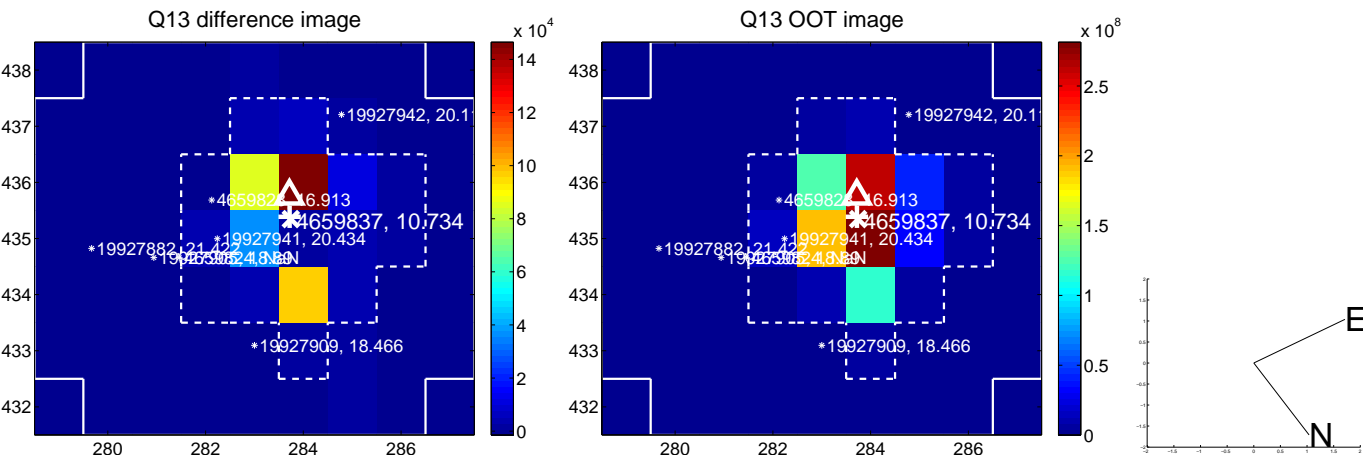
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



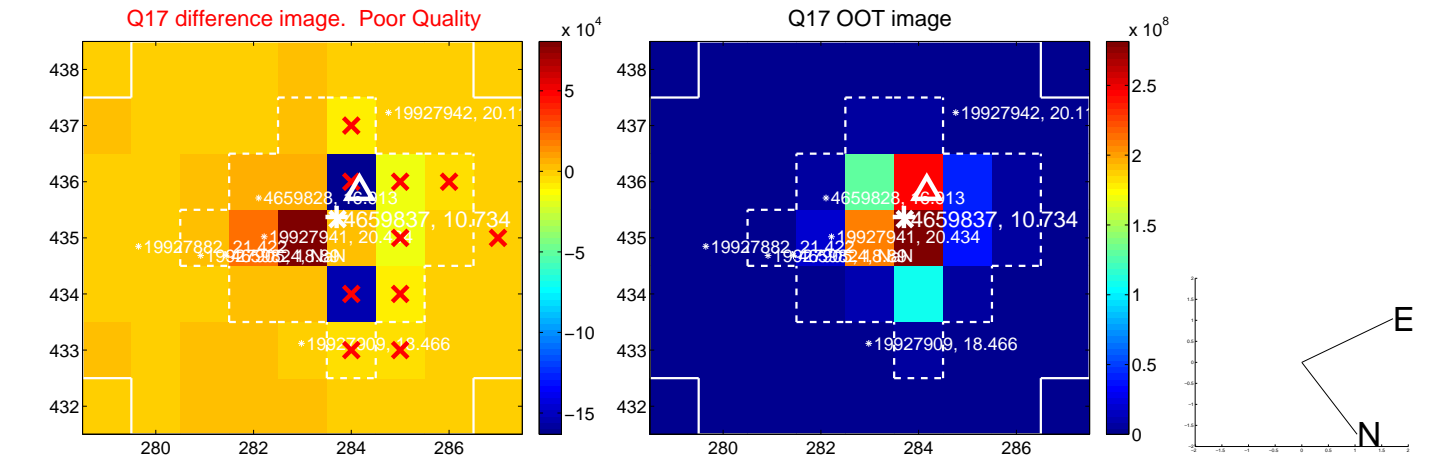
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



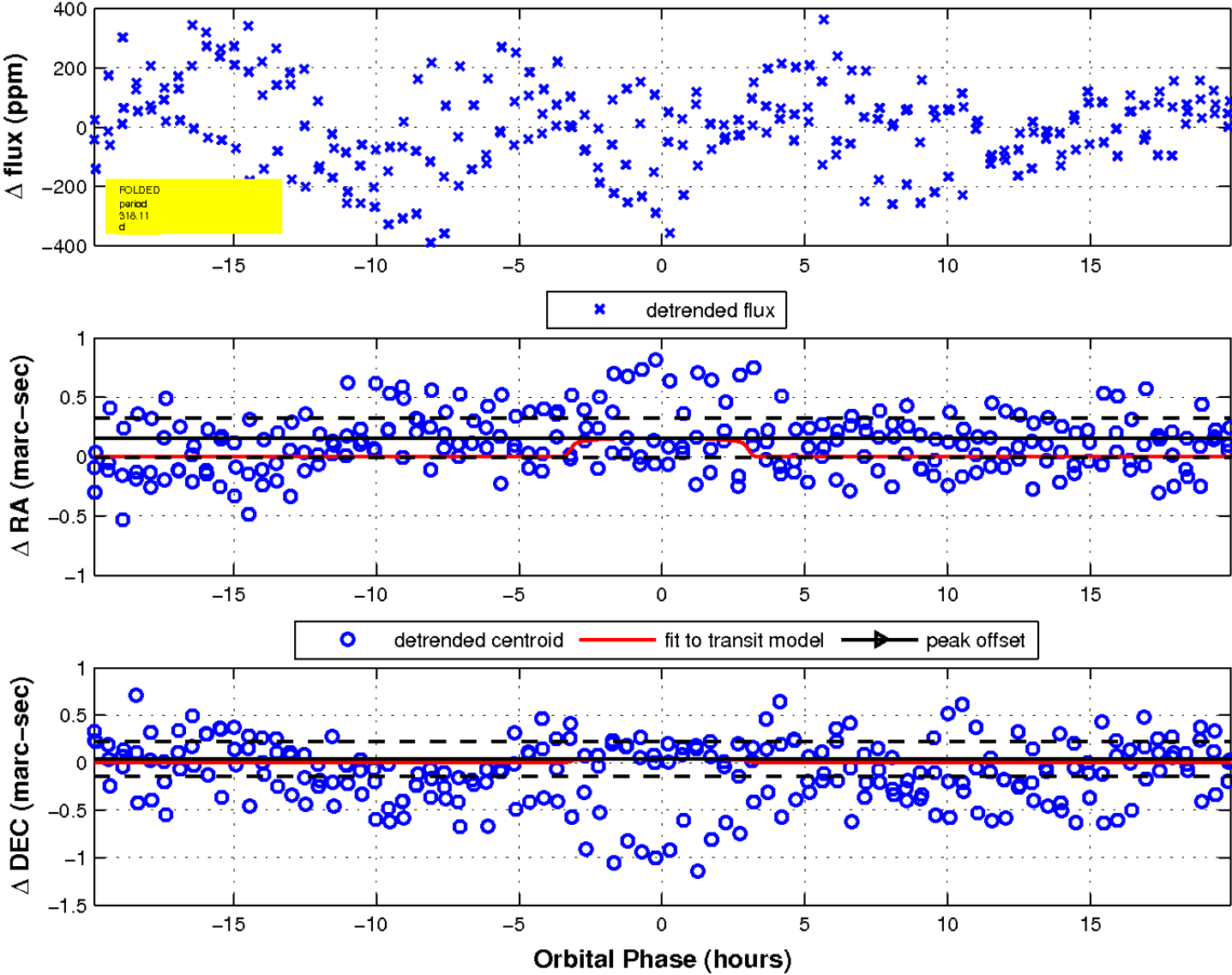
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



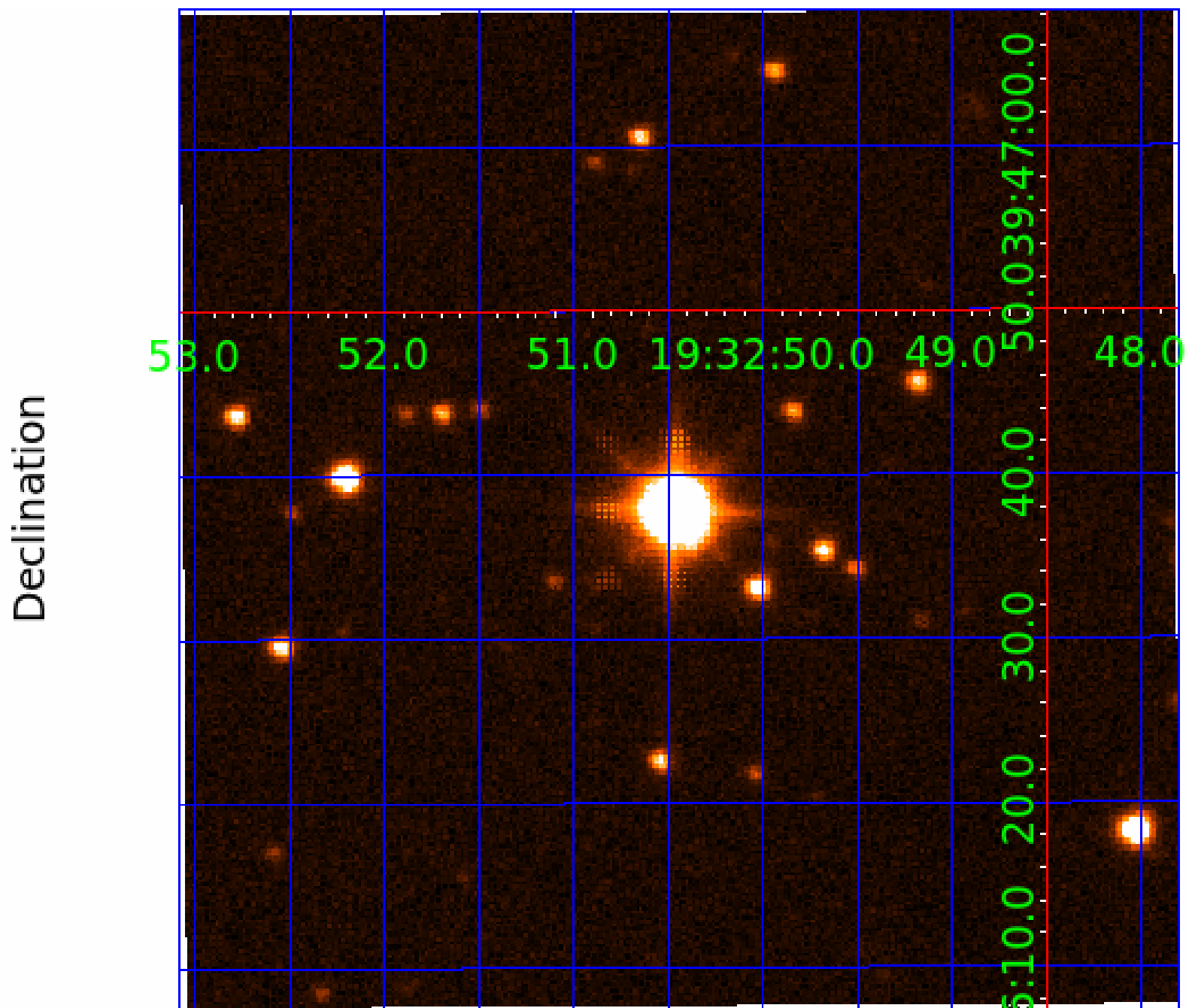
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



fluxWeightedCentroids, Planet 3 of 6



UKIRT Image



KIC 004659837

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})
004659837-01	OBS	No	1.835581	132.056857	16.0	7.617	8.1	6.2	2.77	6859	1.28	12839.83
004659837-02	OBS	No	130.678516	165.874337	125.6	9.521	13.3	3.9	2.77	6859	3.42	43.52
004659837-03	OBS	No	318.109462	294.519022	228.1	6.651	9.6	6.2	2.77	6859	4.75	13.29
004659837-04	OBS	No	138.938162	133.207213	171.0	7.742	8.1	6.4	2.77	6859	4.20	40.10
004659837-05	OBS	No	63.925988	179.038178	165.3	5.494	7.2	7.5	2.77	6859	4.12	112.90
004659837-06	OBS	No	41.395366	153.532238	79.5	13.609	7.2	5.8	2.77	6859	2.78	201.52

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004659837-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
004659837-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
004659837-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_TRACKER—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
004659837-04	OBS	FP	0.00	1	0	1	0	TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED—HALO_GHOST
004659837-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
004659837-06	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—CENT_SATURATED—HALO_GHOST

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

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

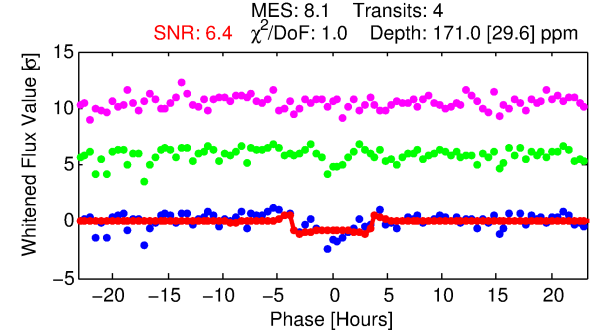
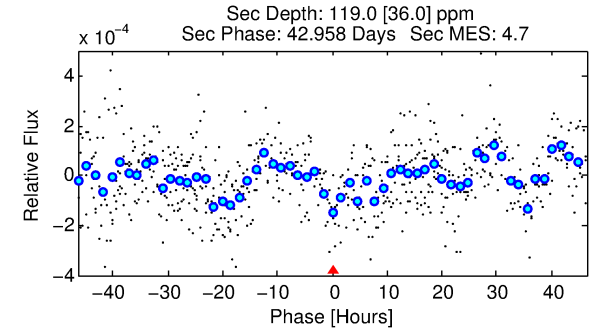
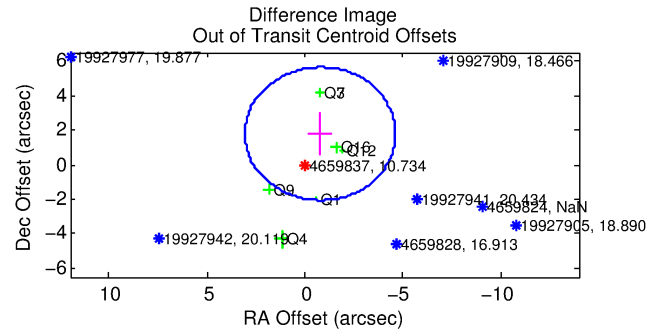
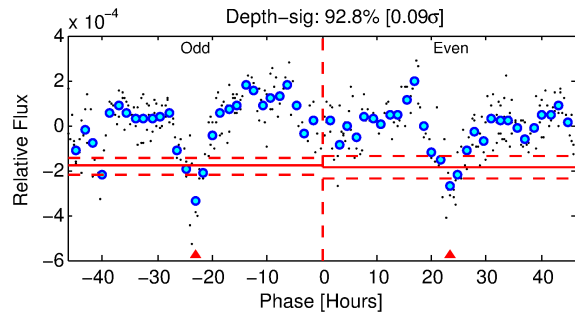
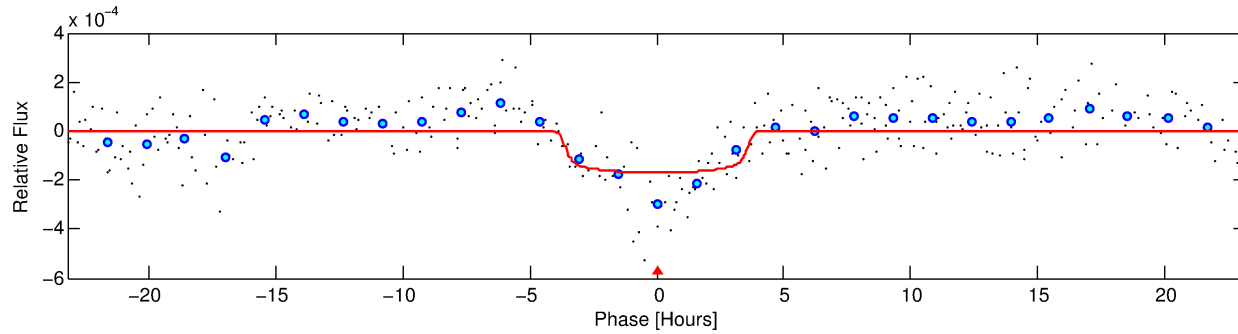
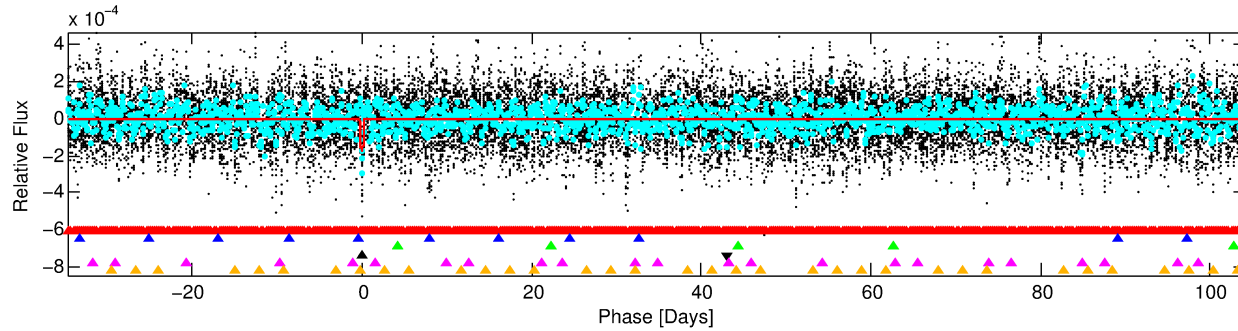
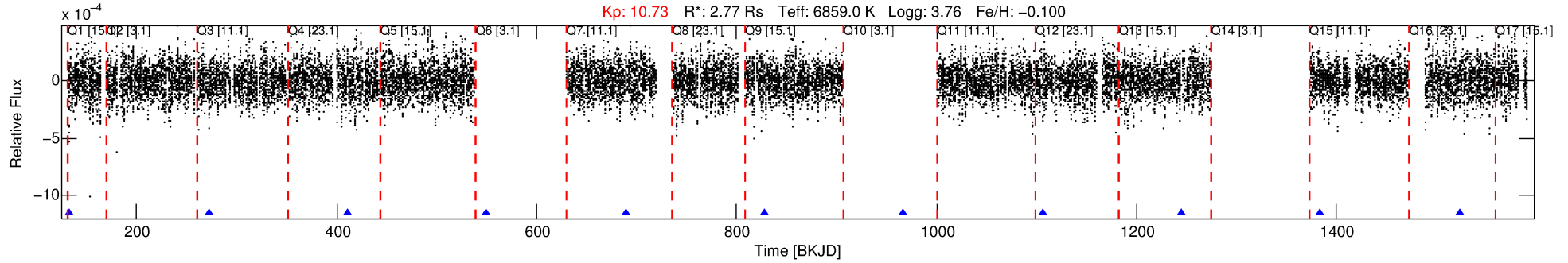
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 004659837-04

No Significant Match Found

DV One-Page Summary

KIC: 4659837 Candidate: 4 of 6 Period: 138.938 d



DV Fit Results:

Period = 138.93816 [0.00137] d
Epoch = 133.2072 [0.0094] BKJD
 $R_p/R^* = 0.0139$ [0.0022]
 $a/R^* = 65.43$ [45.94]
 $b = 0.89$ [0.16]
 $\text{Seff} = 40.10$ [20.26]
 $T_{\text{eq}} = 642$ [81] K
 $R_p = 4.20$ [1.55] R_e
 $a = 0.6160$ [0.1925] AU
 $A_g = 1410.49$ [928.30] [1.52 σ]
 $T_{\text{effp}} = 6080$ [690] K [7.83 σ]

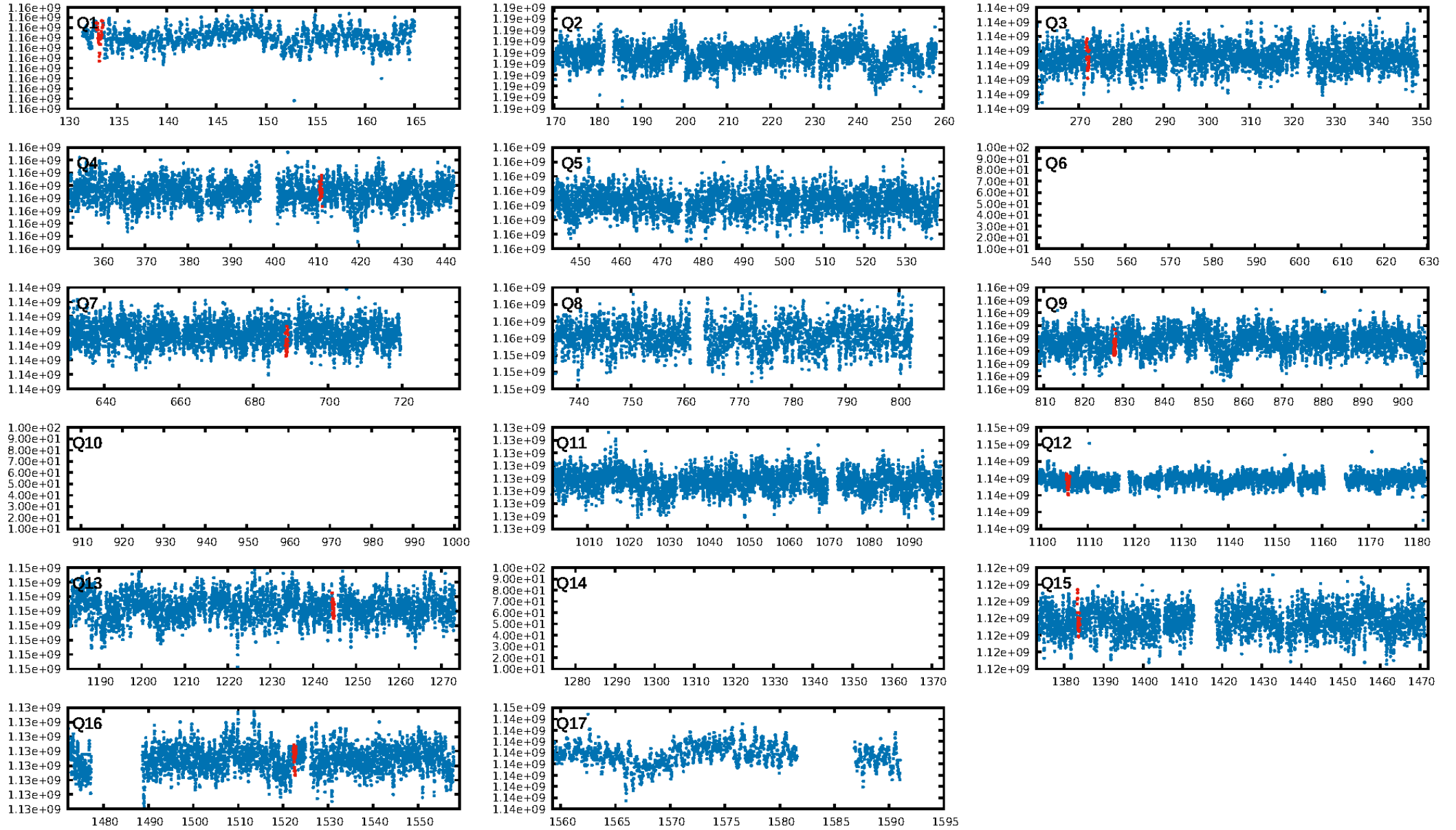
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [16.15 σ]
LongPeriod-sig: 100.0% [421.31 σ]
ModelChiSquare2-sig: 87.5%
ModelChiSquareGof-sig: 91.9%
Bootstrap-pfa: 4.03e-10
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: -0.226
Centroid-sig: 90.8%
Centroid-so: 0.063 arcsec [0.09 σ]
OotOffset-rm: 1.948 arcsec [1.52 σ]
OotOffset-st: 0.2/3/2 [7]
KicOffset-rm: 1.885 arcsec [1.88 σ]
KicOffset-st: 0.2/3/2 [7]
DiffImageQuality-fgm: 0.71 [5/7]
DiffImageOverlap-fno: 0.12 [1/8]

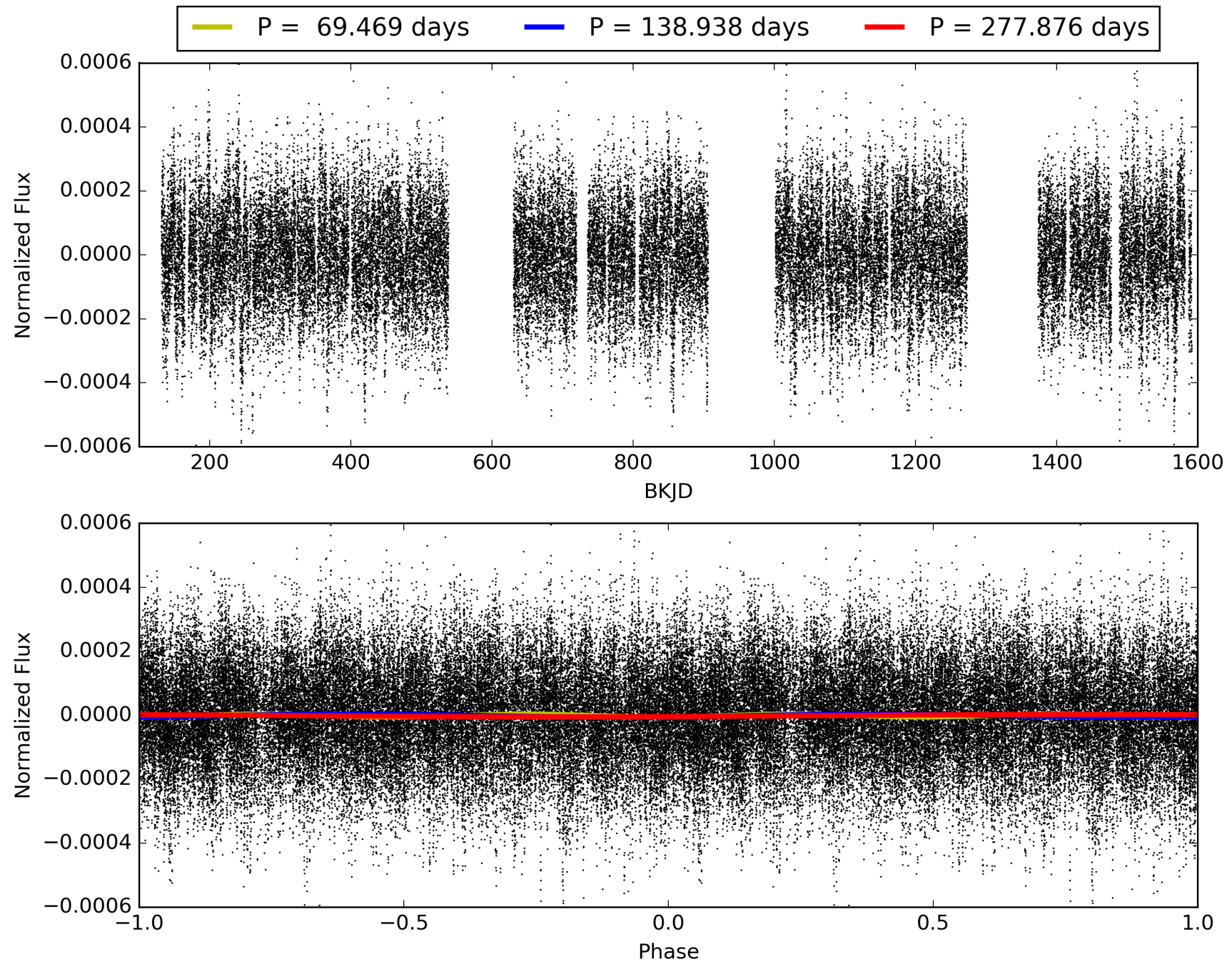
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 22:13:03 Z

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

TCE 004659837-04, PDC Light Curves

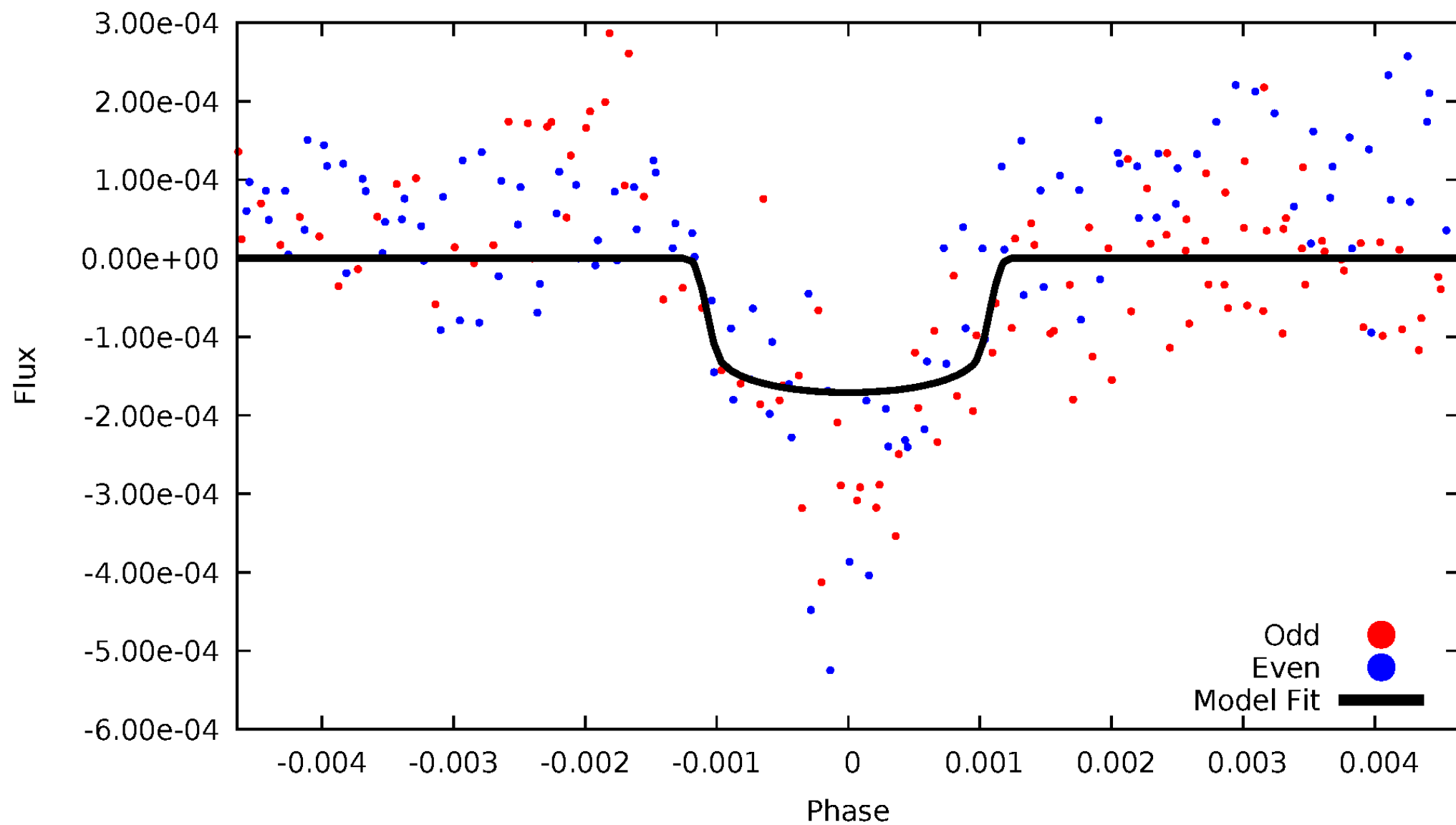


TCE 004659837-04



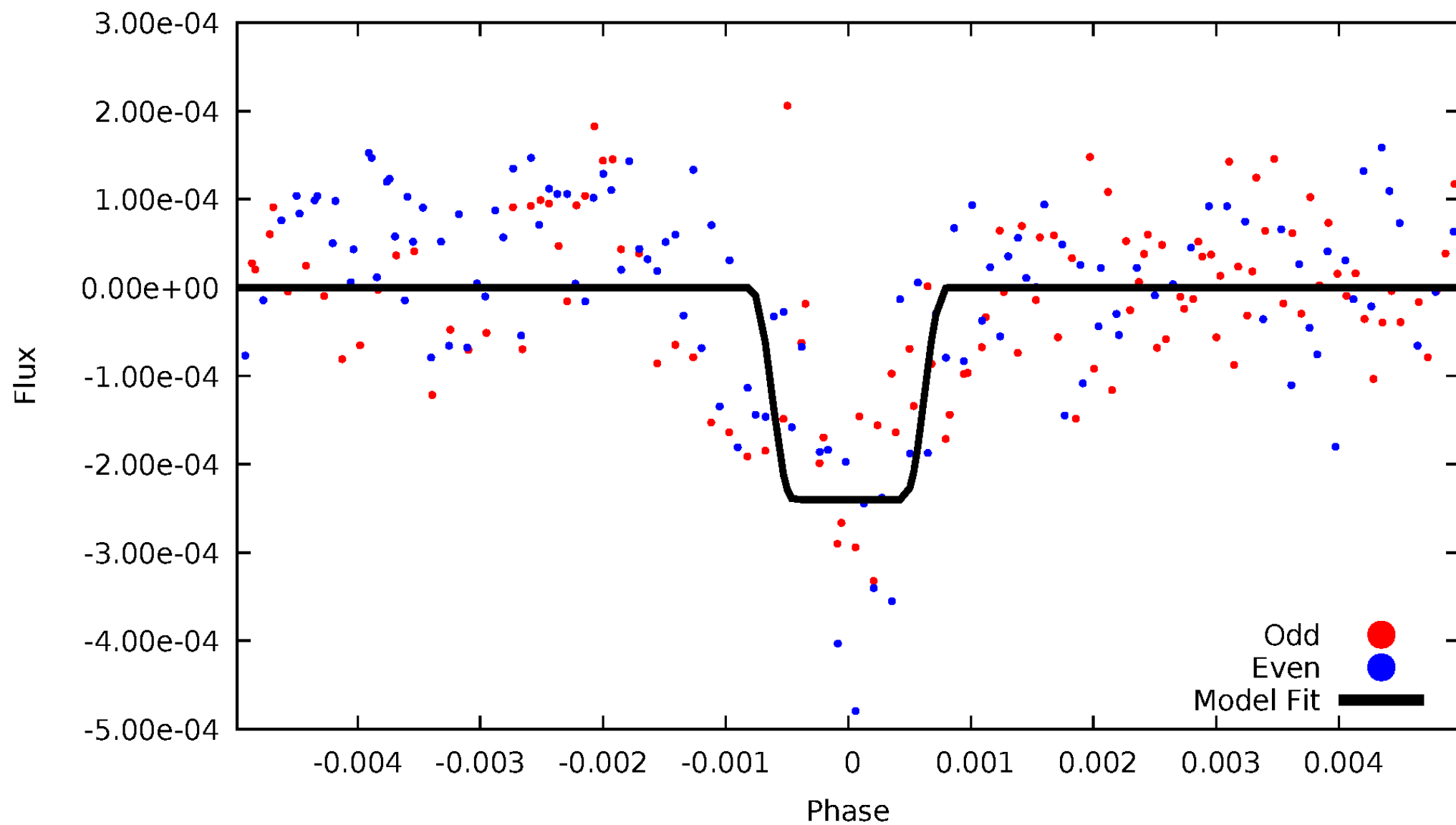
DV Odd/Even

TCE 004659837-04



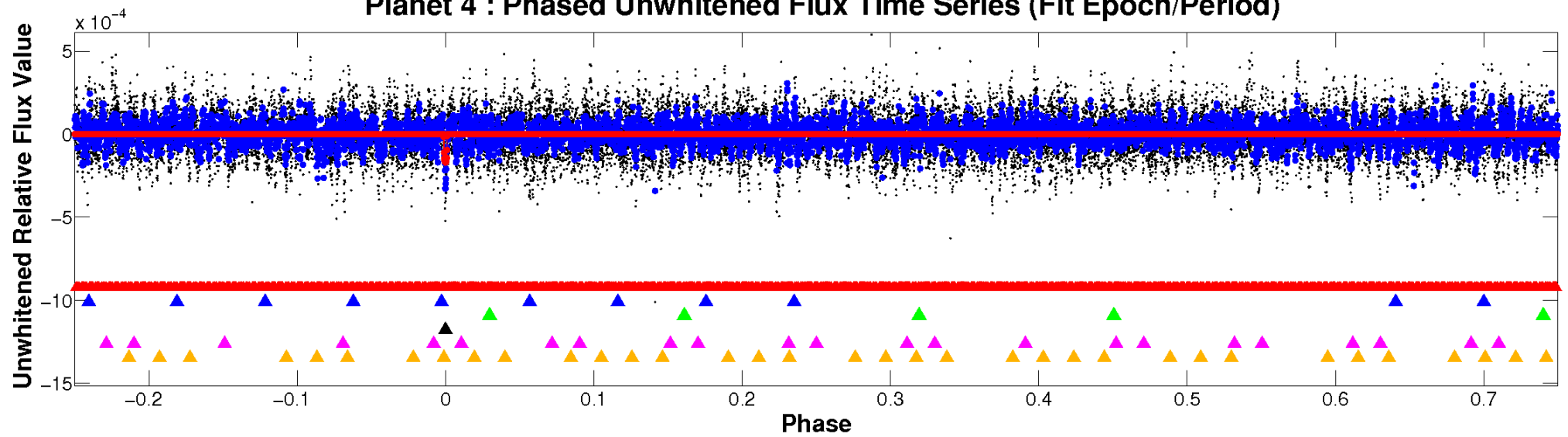
ALT Odd/Even

TCE 004659837-04

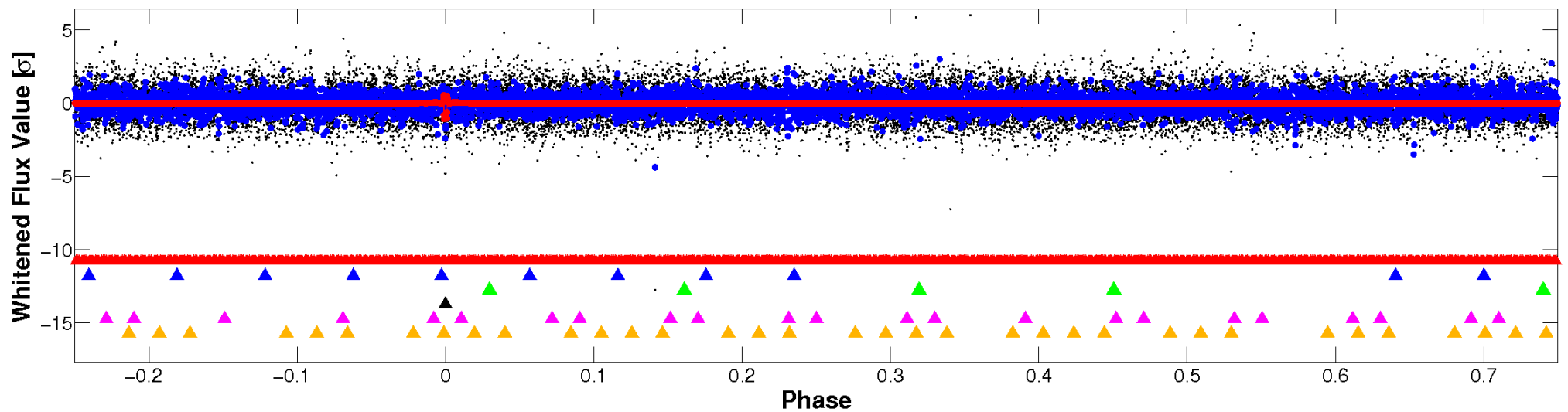


Non-Whitened Vs. Whitened Light Curve

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

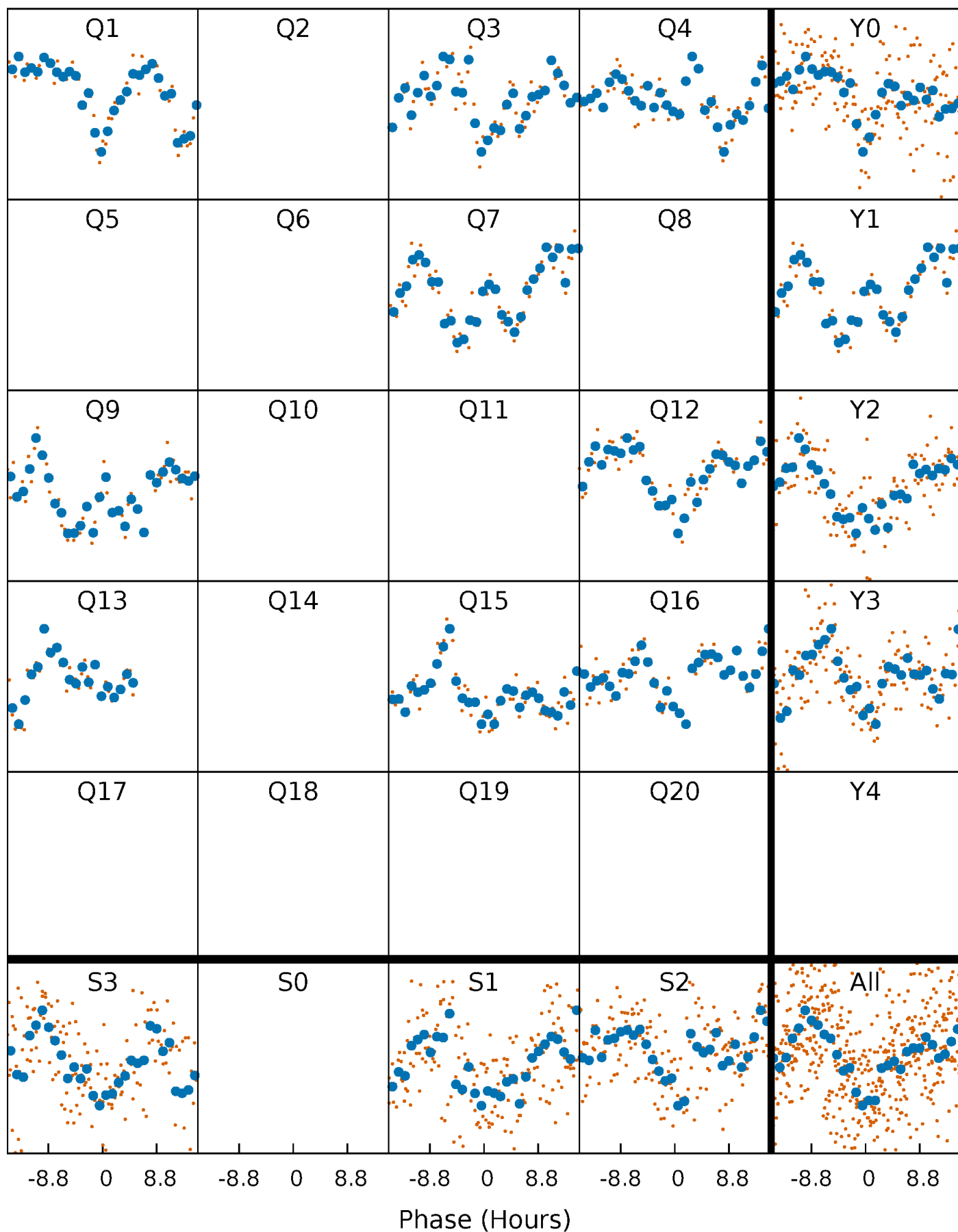


Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



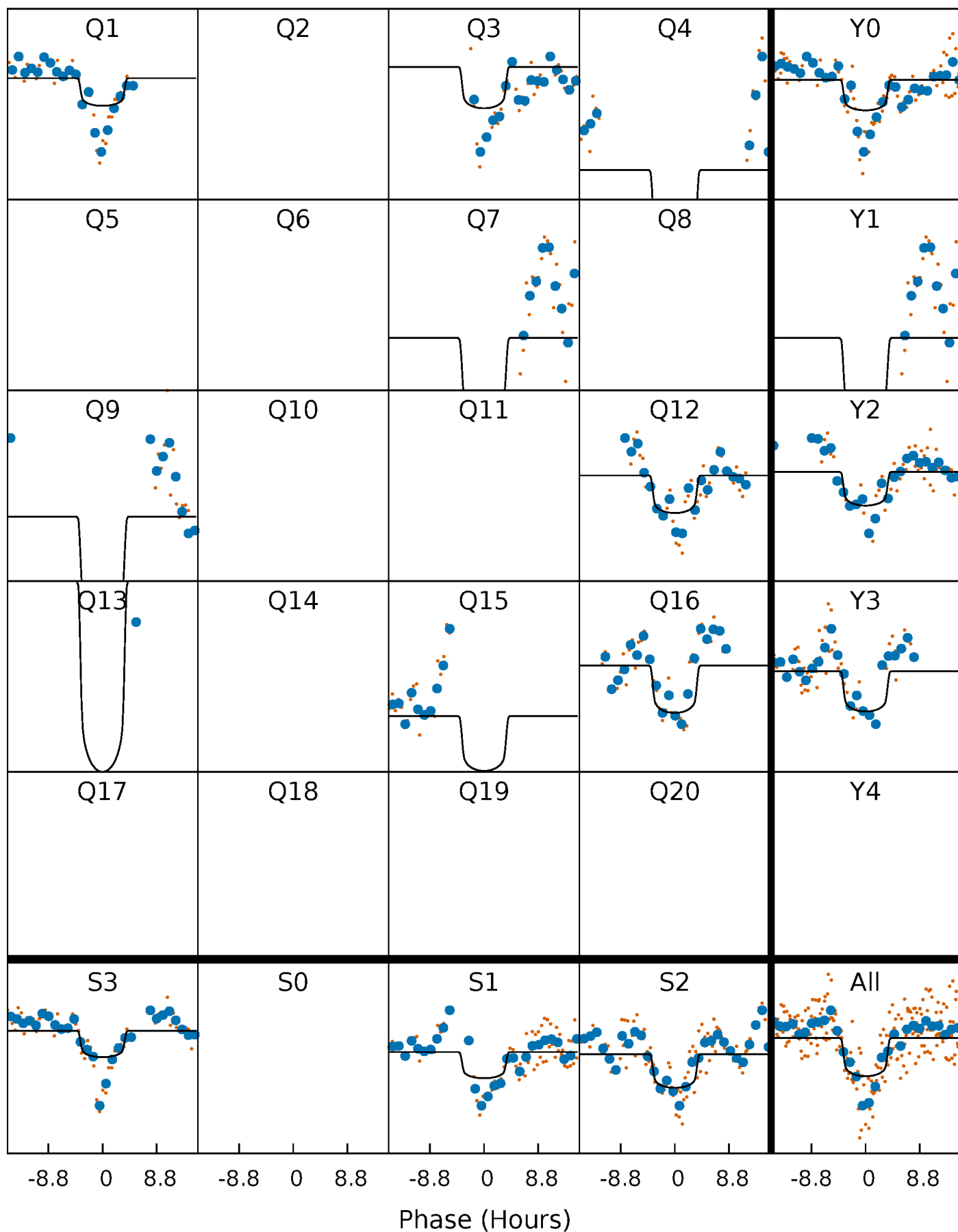
PDC Quarter-Phased Transit Curves

TCE 004659837-04 P=138.938162 Days $T_0=133.207213$ (BKJD)



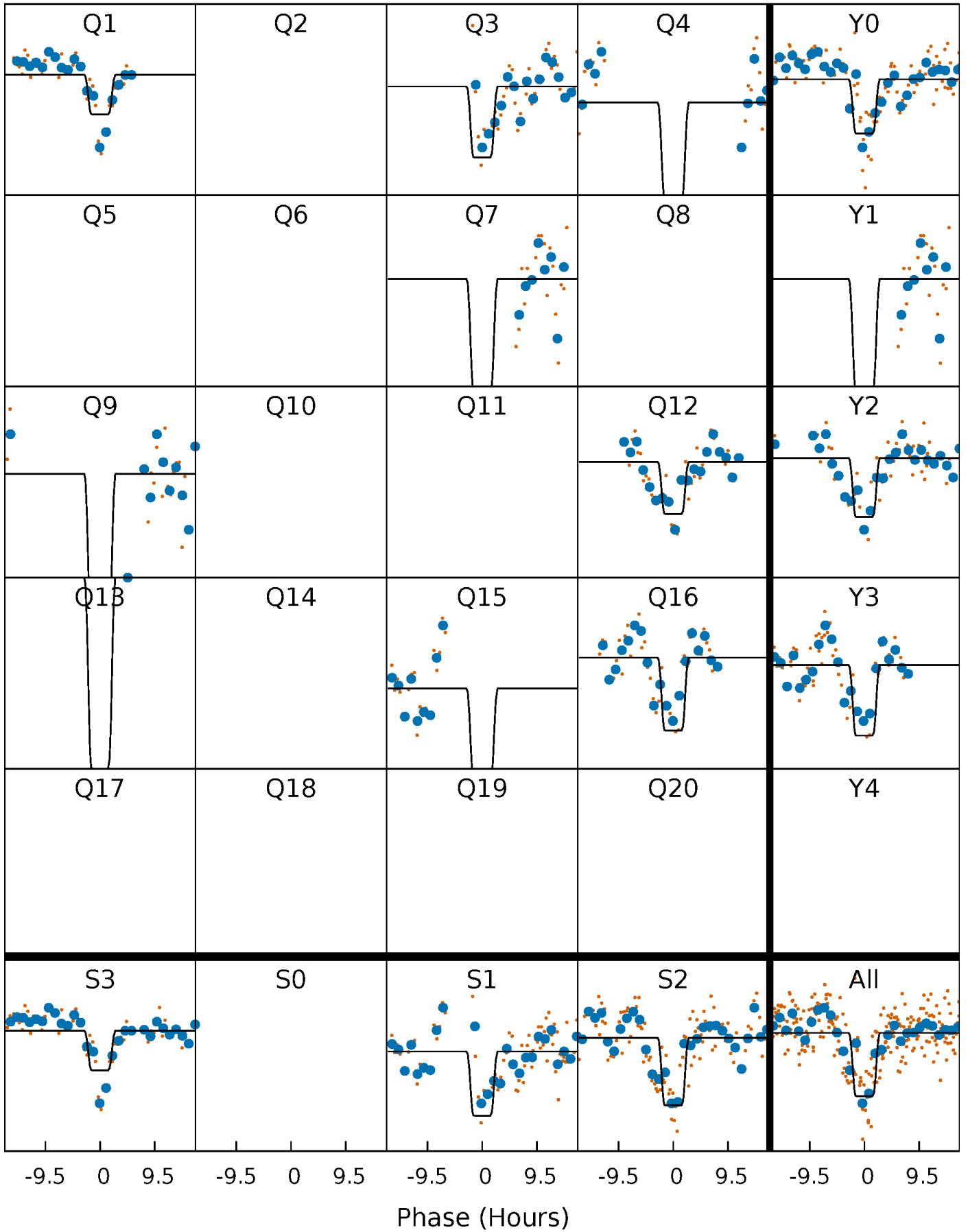
DV Quarter-Phased Transit Curves

TCE 004659837-04 $P=138.938162$ Days $T_0=133.207213$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

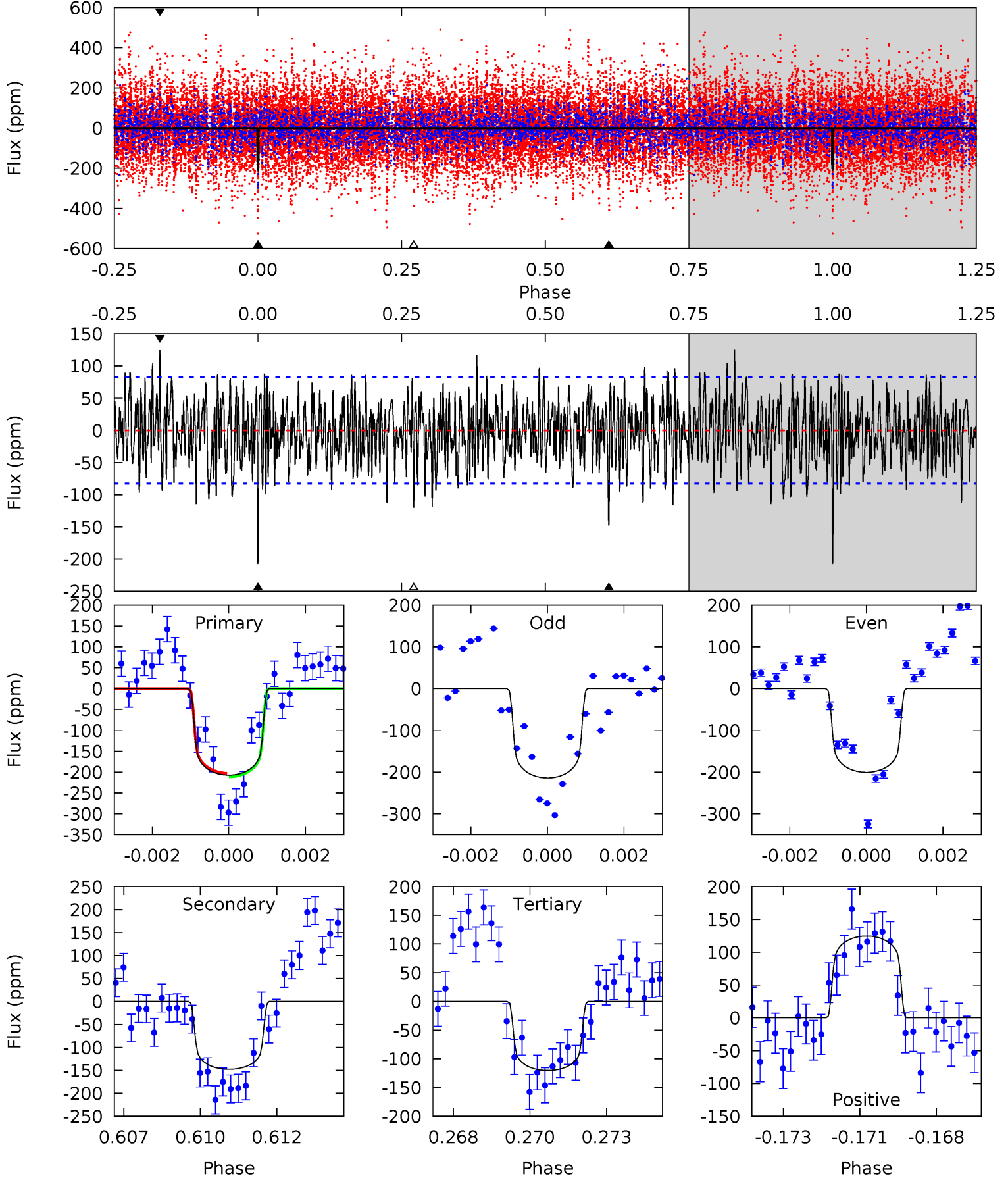
TCE 004659837-04 $P=138.945149$ Days $T_0=133.179622$ (BKJD)



DV Model-Shift Uniqueness Test

004659837-04, P = 138.938162 Days, E = 133.207213 Days

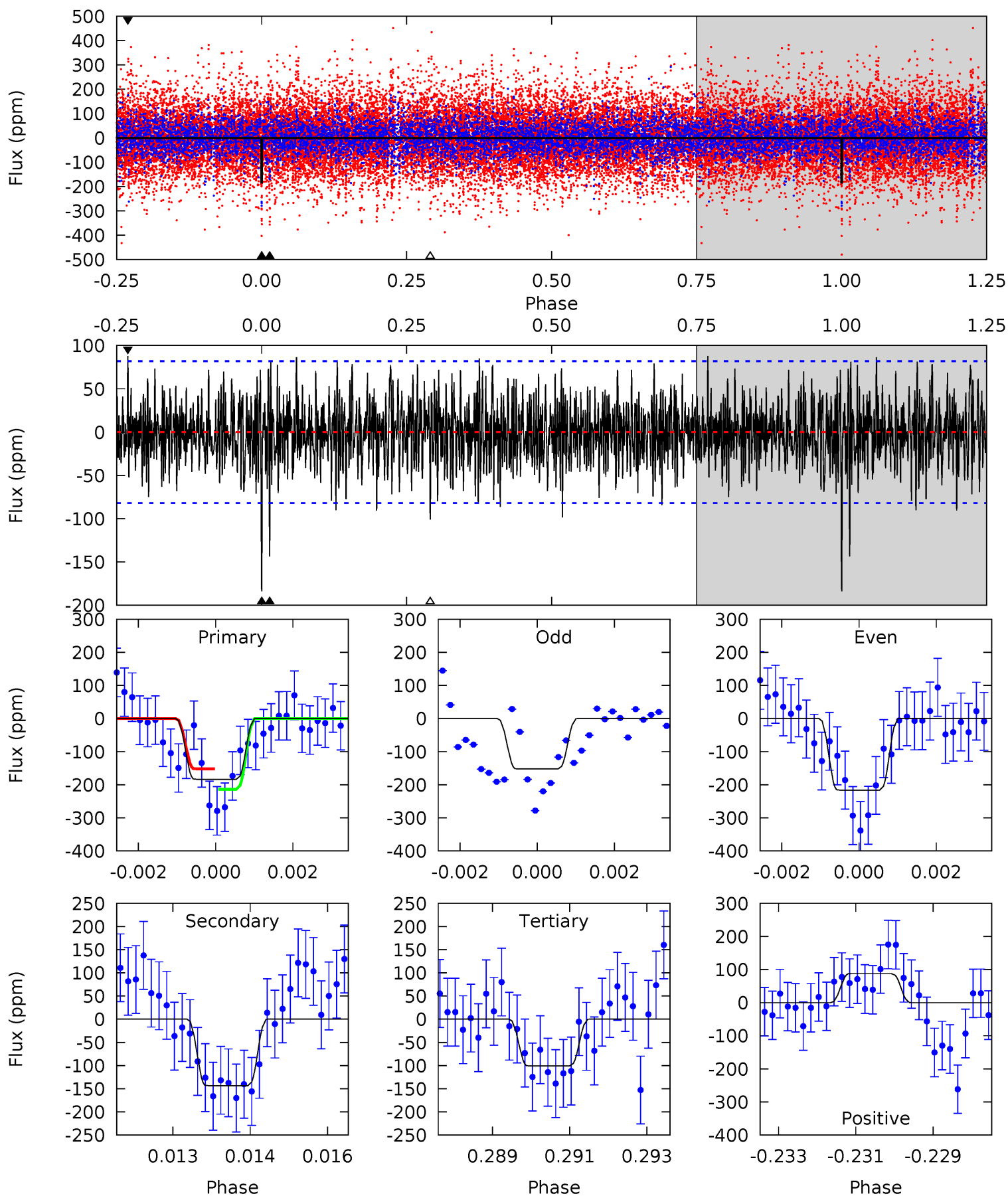
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.3	9.45	7.70	7.98	5.30	3.04	2.60	5.57	5.29	1.76	1.47	0.44	0.96	0.38	0.27



Alt Model-Shift Uniqueness Test

004659837-04, P = 138.945149 Days, E = 133.179622 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.0	9.41	6.62	5.76	5.37	3.16	1.97	5.43	6.28	2.79	3.65	2.10	1.05	0.32	2.02



Stellar Parameters For KIC 004659837

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6859^{+153}_{-204}	$3.761^{+0.285}_{-0.095}$	$-0.100^{+0.300}_{-0.250}$	$2.770^{+0.499}_{-0.927}$	$1.613^{+0.232}_{-0.283}$	$0.107^{+0.216}_{-0.033}$
	+2%/-3%	+8%/-3%	+300%/-250%	+18%/-33%	+14%/-18%	+202%/-31%
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 004659837-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-148 ± 16	$4.05^{+0.92}_{-0.82}$	880^{+49}_{-70}	6332^{+663}_{-483}	1900^{+1088}_{-644}
Alt.	-143 ± 15	$4.39^{+0.96}_{-0.87}$	878^{+51}_{-75}	6020^{+504}_{-442}	1545^{+903}_{-491}

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

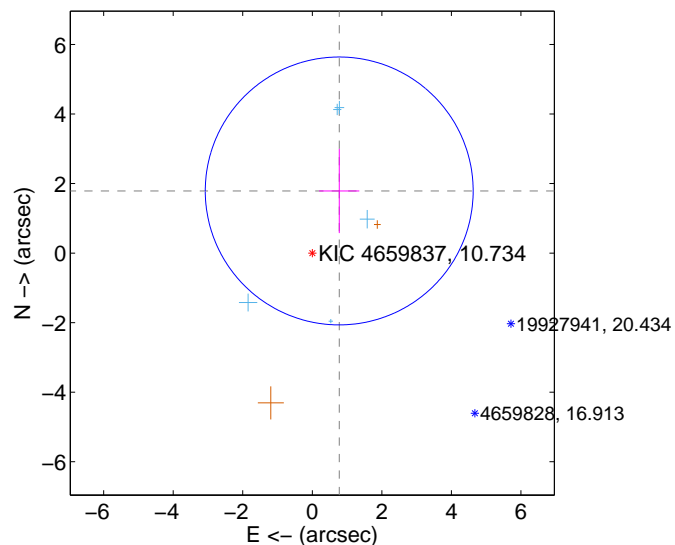
Supplemental centroid analysis for 004659837-04. **Kepler magnitude: 10.73.** Transit SNR 6.43

There are 5 quarters with good PRF difference image offsets

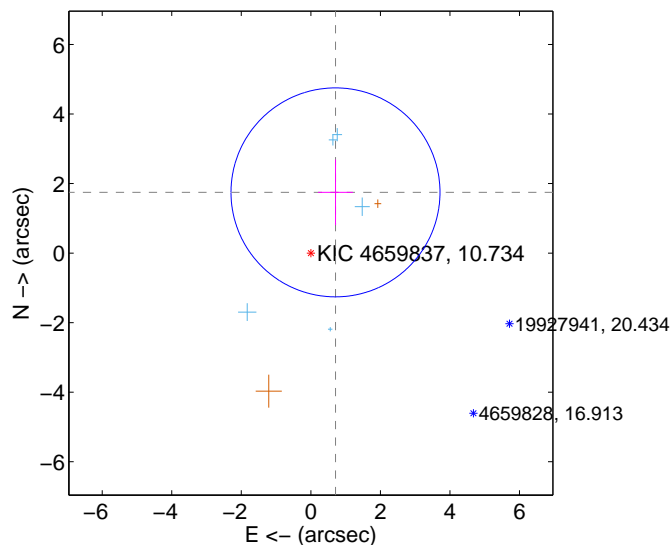
The direct PRF centroid is offset from the target star catalog position by about 0.37 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.948 ± 1.284	1.52	-0.774 ± 0.578	1.787 ± 1.211
PRF-fit source offset from KIC position	1.885 ± 1.002	1.88	-0.709 ± 0.503	1.747 ± 0.944
photometric centroid source offset	0.06 ± 0.72	0.09	0.04 ± 0.57	-0.04 ± 0.84

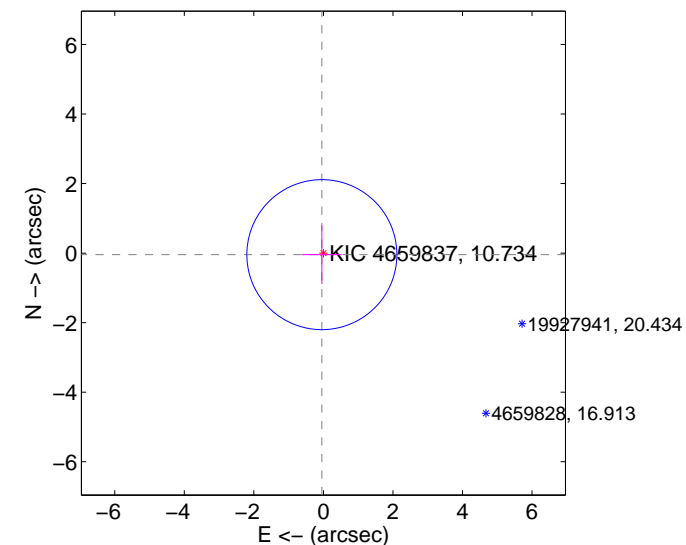
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

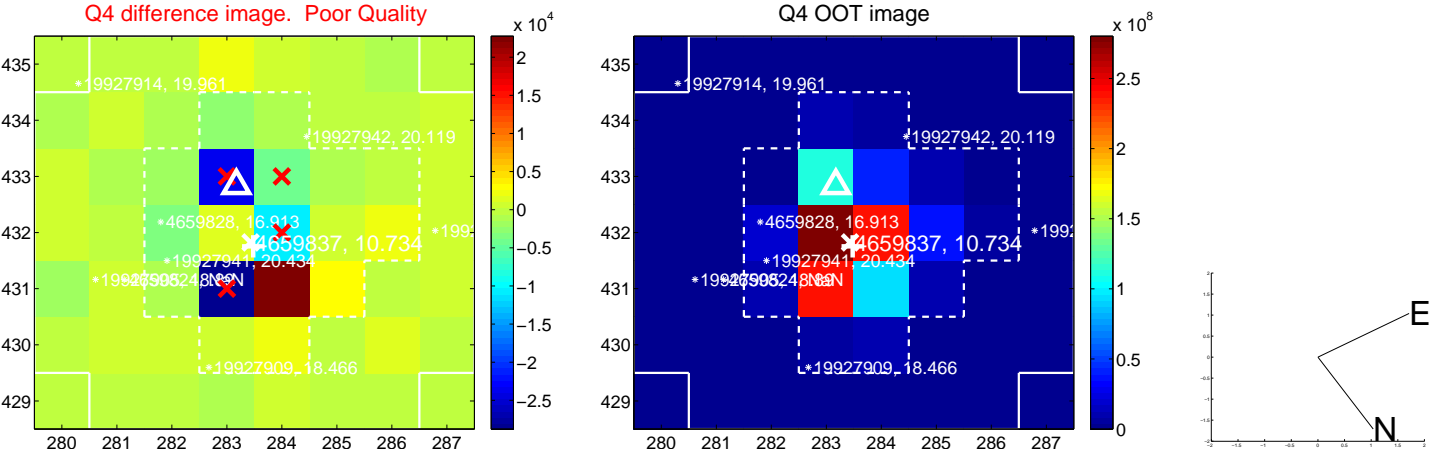
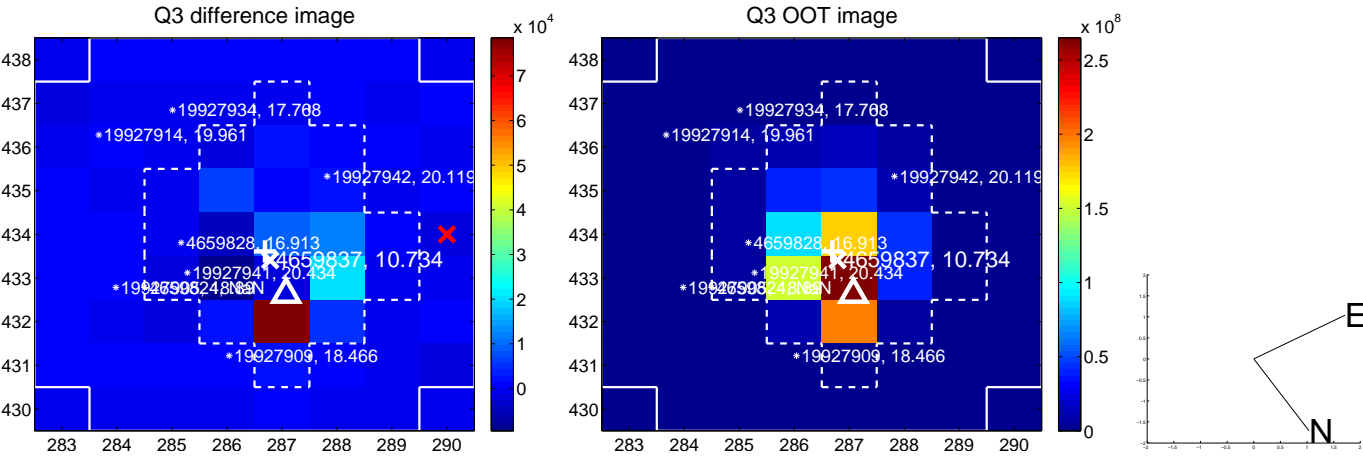
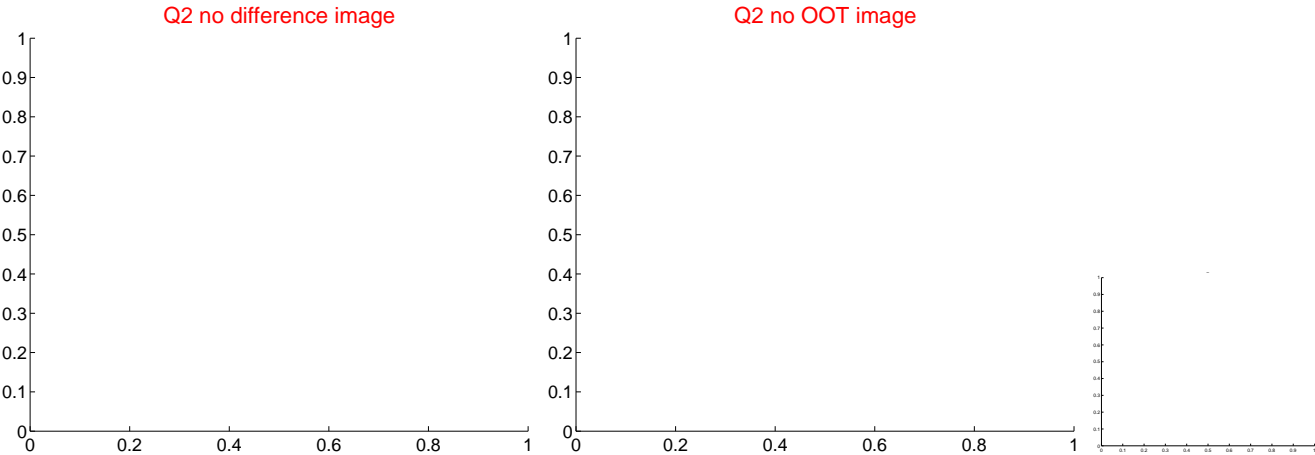
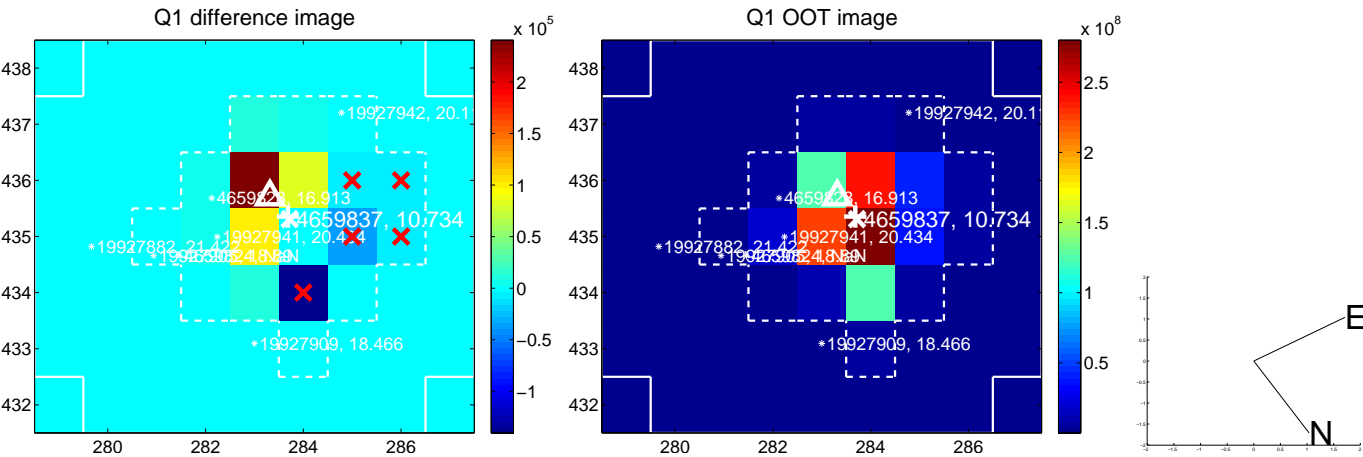


offset from photometric centroids

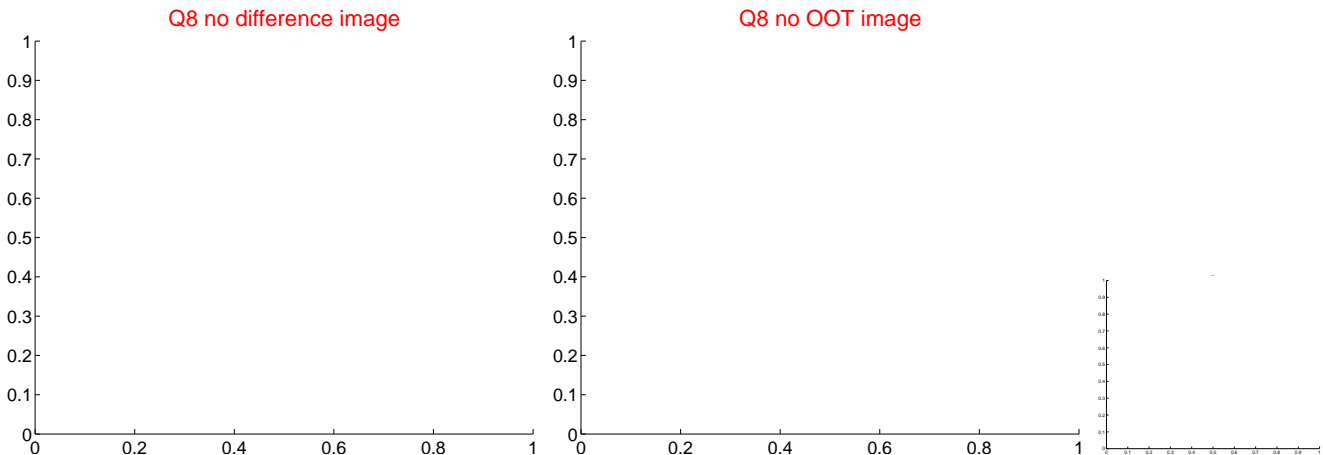
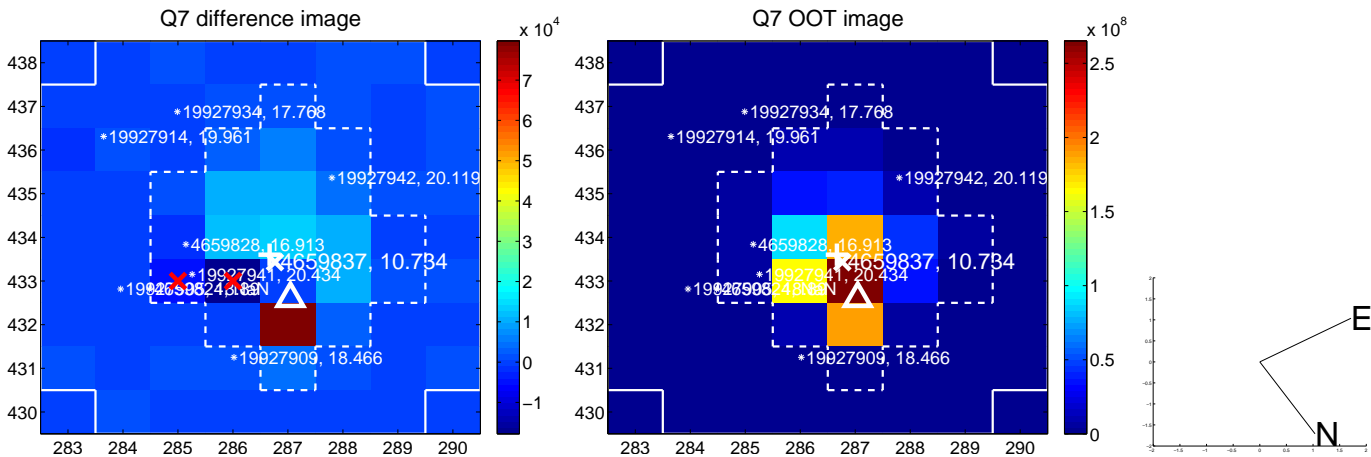
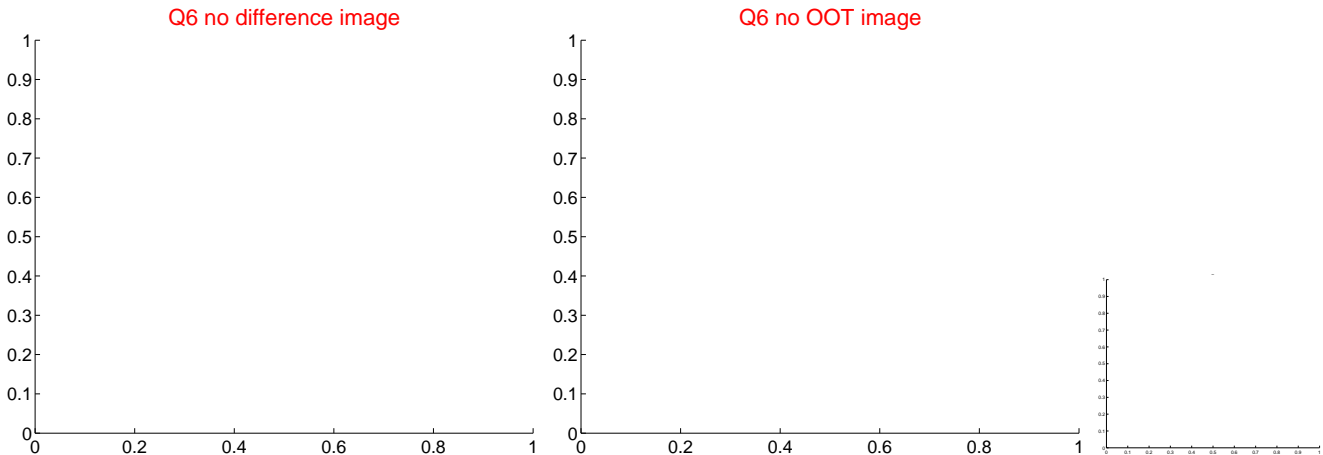
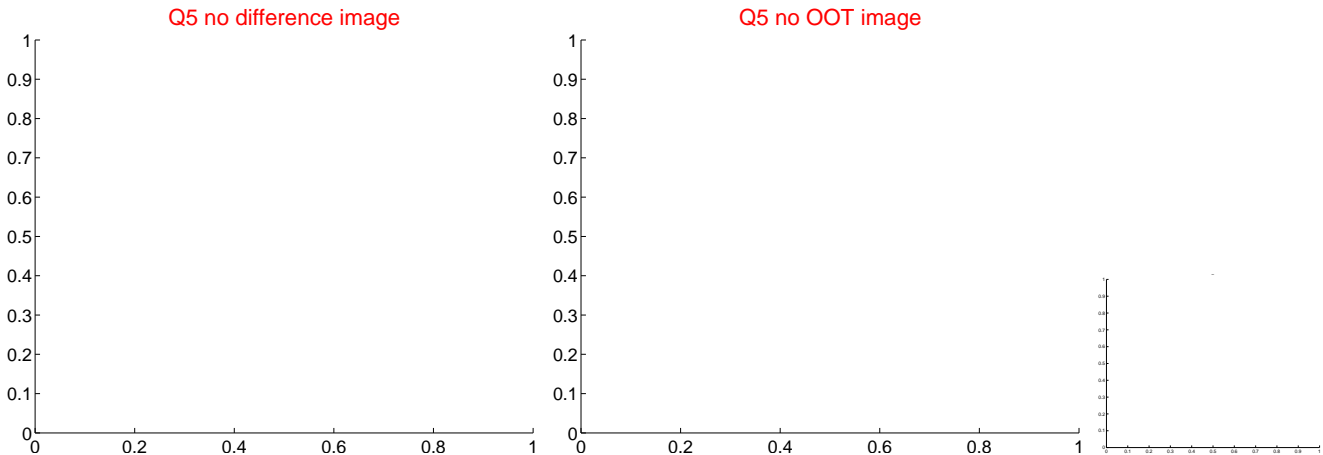


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

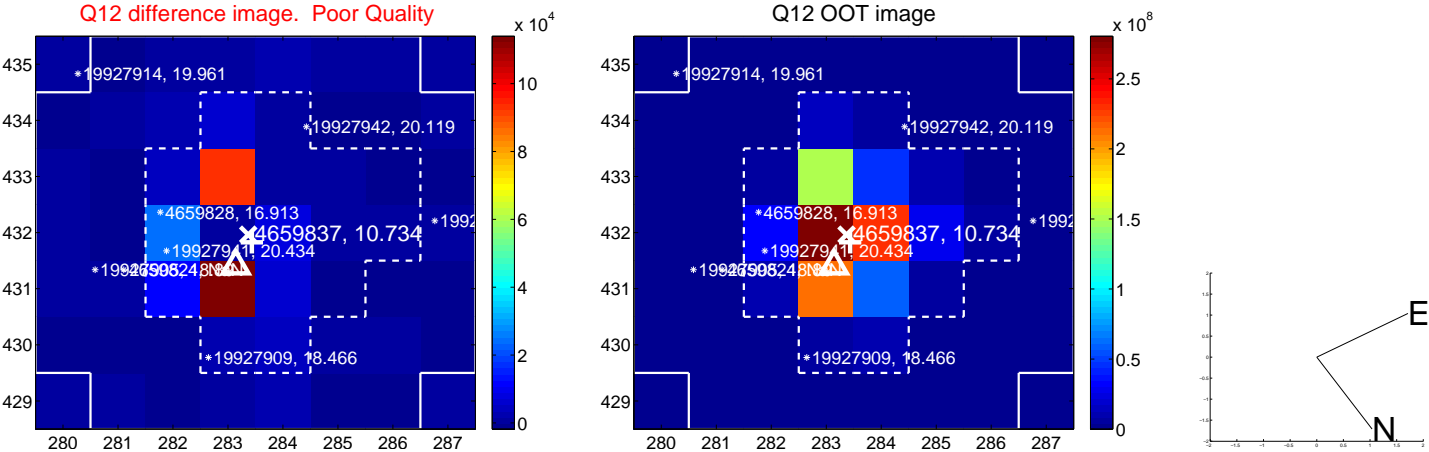
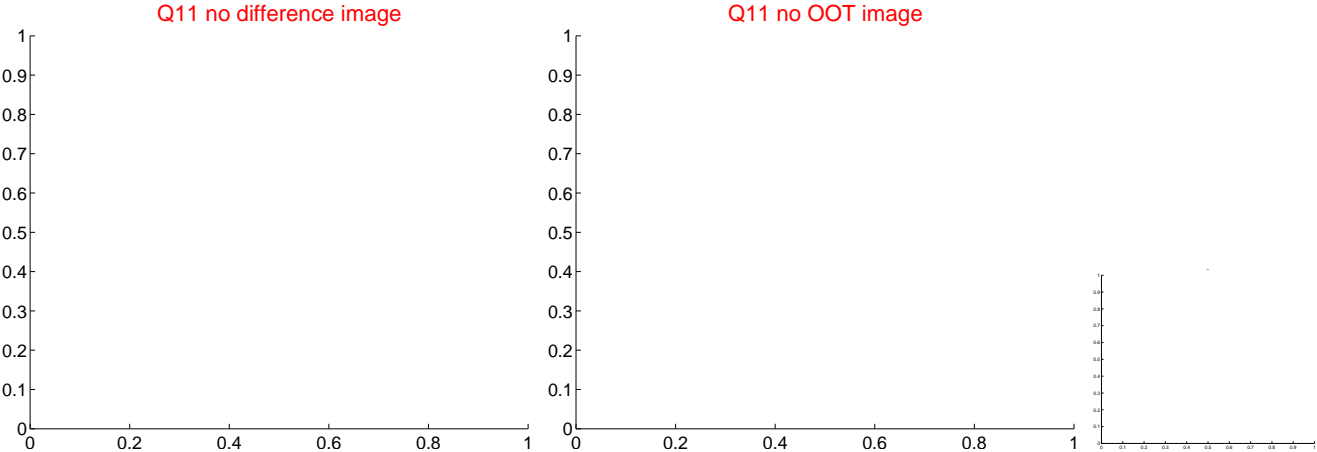
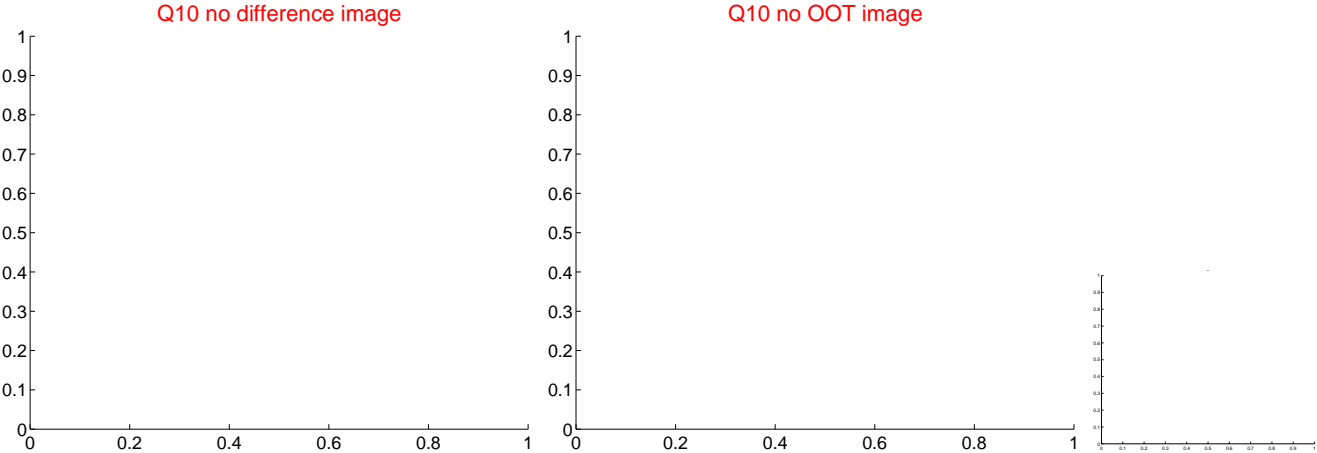
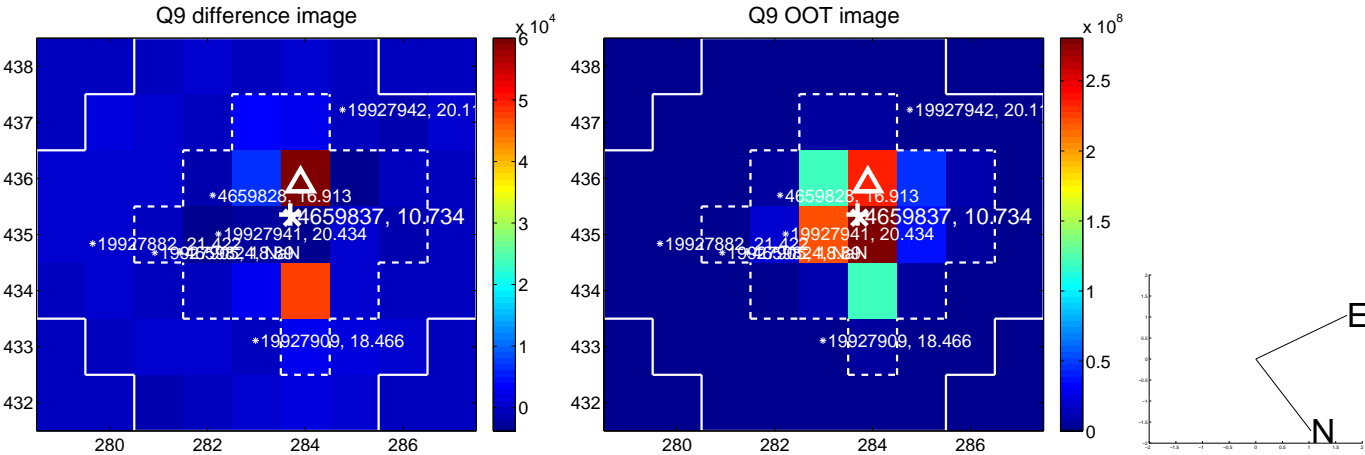
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



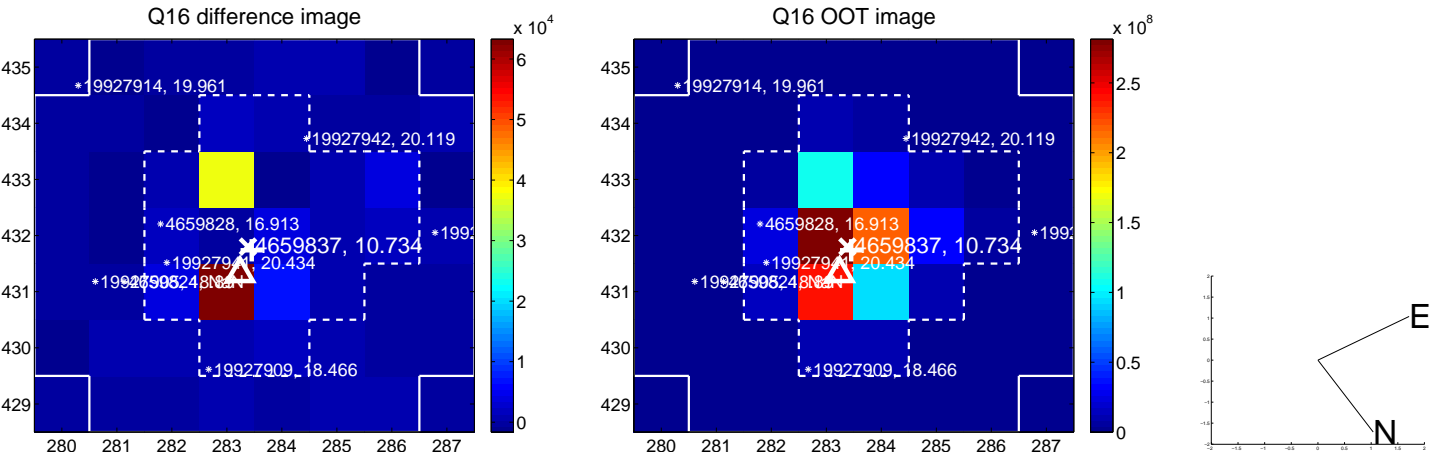
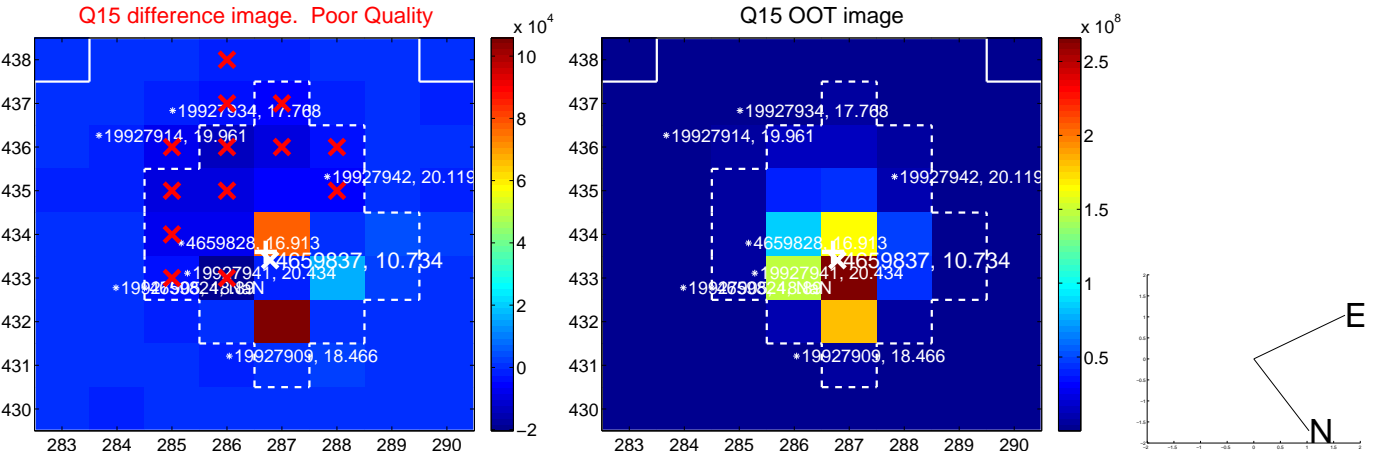
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value



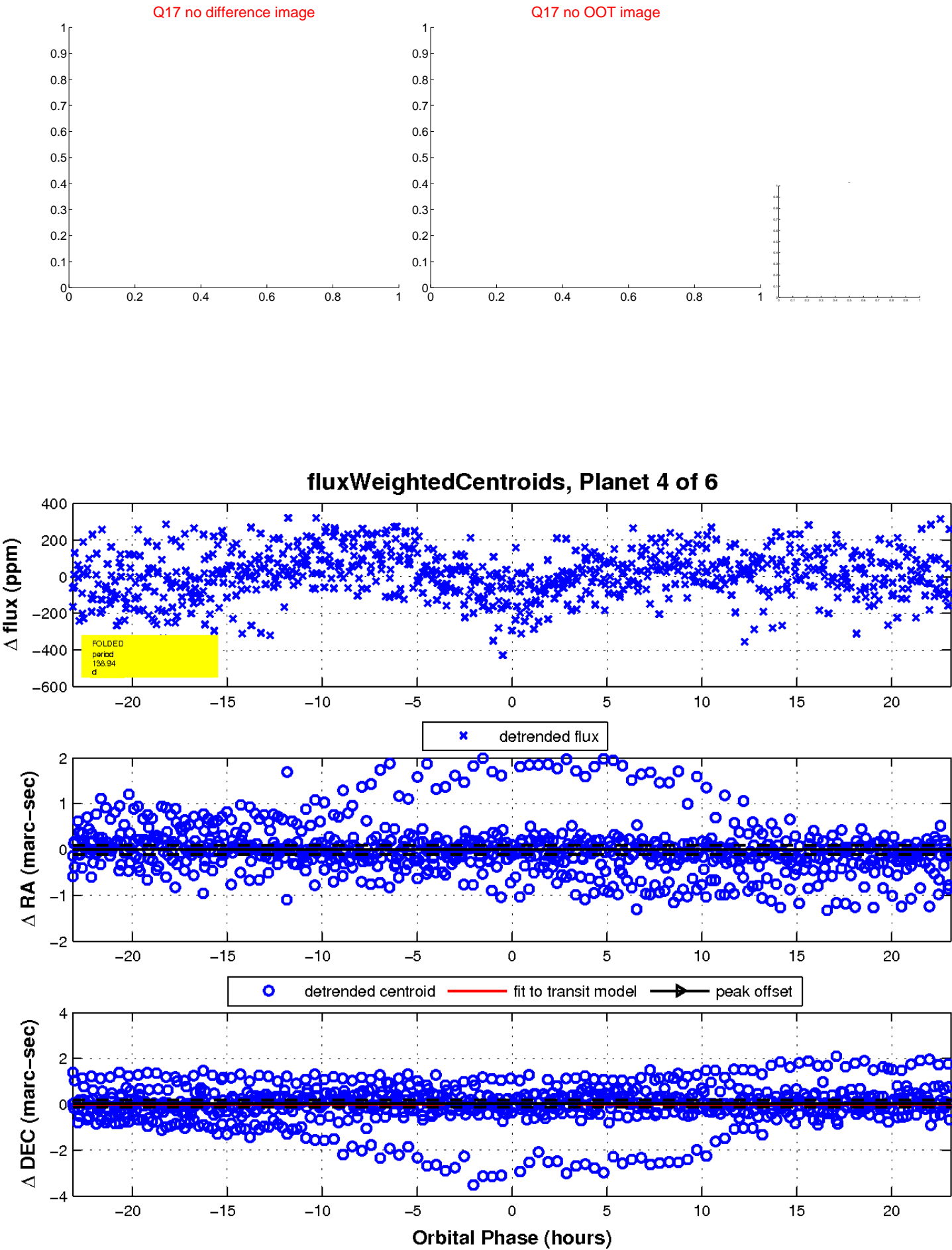
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



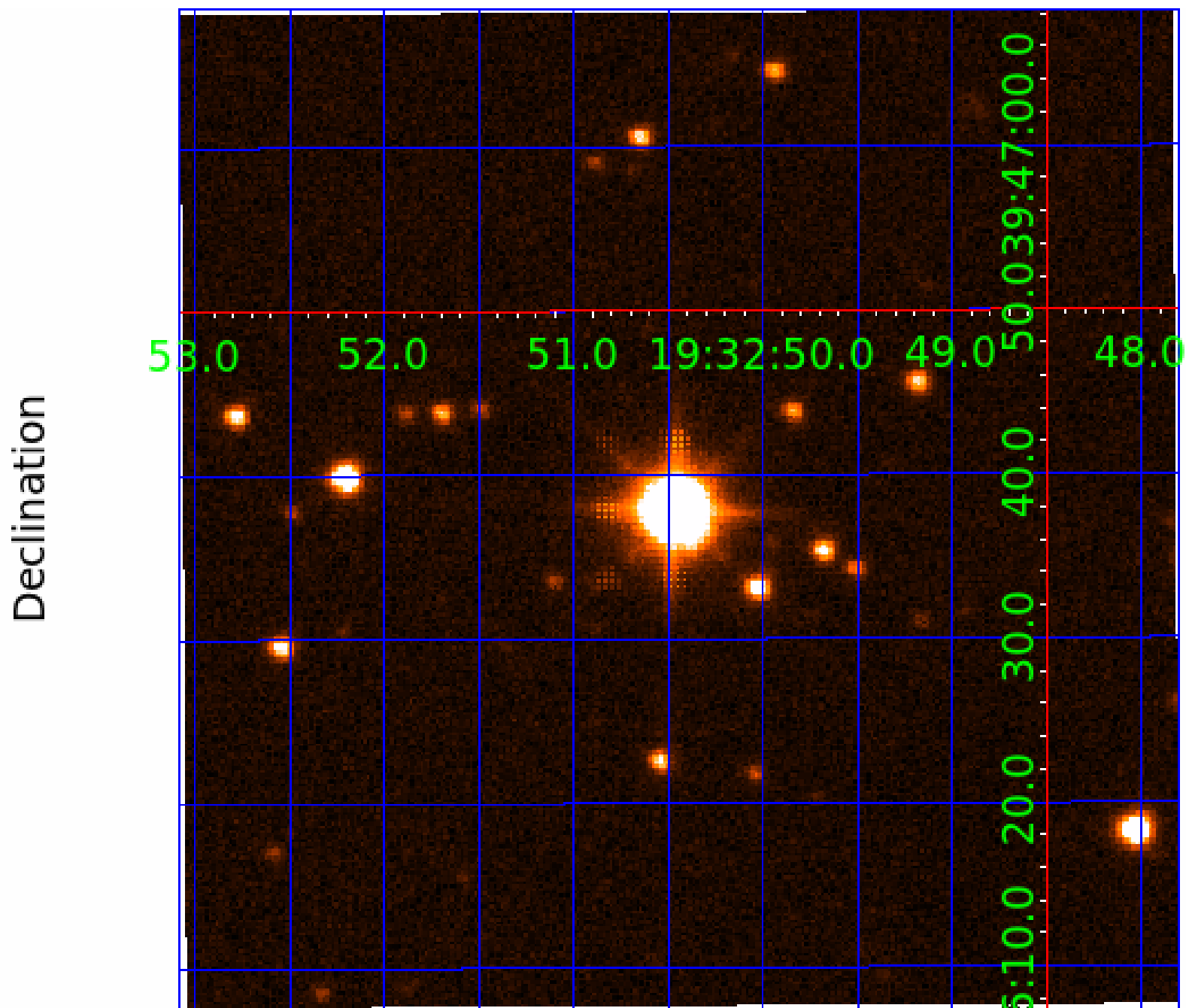
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



UKIRT Image



KIC 004659837

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})
004659837-01	OBS	No	1.835581	132.056857	16.0	7.617	8.1	6.2	2.77	6859	1.28	12839.83
004659837-02	OBS	No	130.678516	165.874337	125.6	9.521	13.3	3.9	2.77	6859	3.42	43.52
004659837-03	OBS	No	318.109462	294.519022	228.1	6.651	9.6	6.2	2.77	6859	4.75	13.29
004659837-04	OBS	No	138.938162	133.207213	171.0	7.742	8.1	6.4	2.77	6859	4.20	40.10
004659837-05	OBS	No	63.925988	179.038178	165.3	5.494	7.2	7.5	2.77	6859	4.12	112.90
004659837-06	OBS	No	41.395366	153.532238	79.5	13.609	7.2	5.8	2.77	6859	2.78	201.52

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004659837-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
004659837-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
004659837-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_TRACKER—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
004659837-04	OBS	FP	0.00	1	0	1	0	TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED—HALO_GHOST
004659837-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
004659837-06	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—CENT_SATURATED—HALO_GHOST

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

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

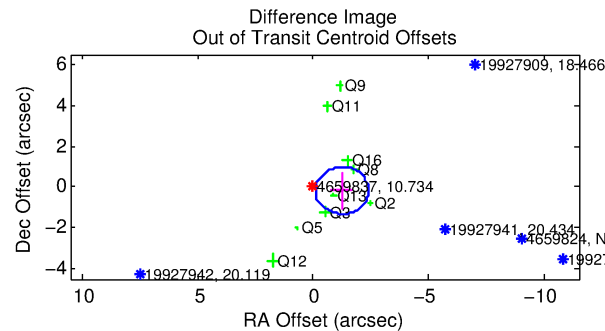
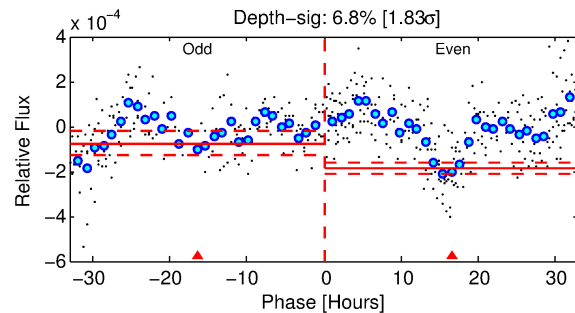
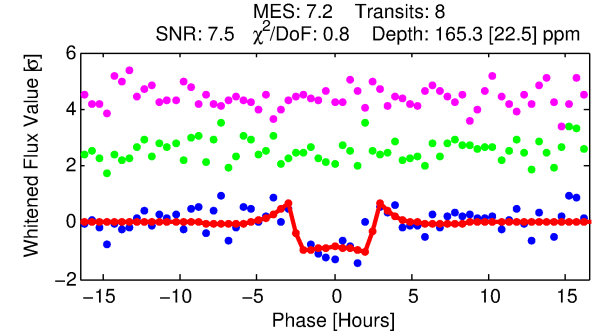
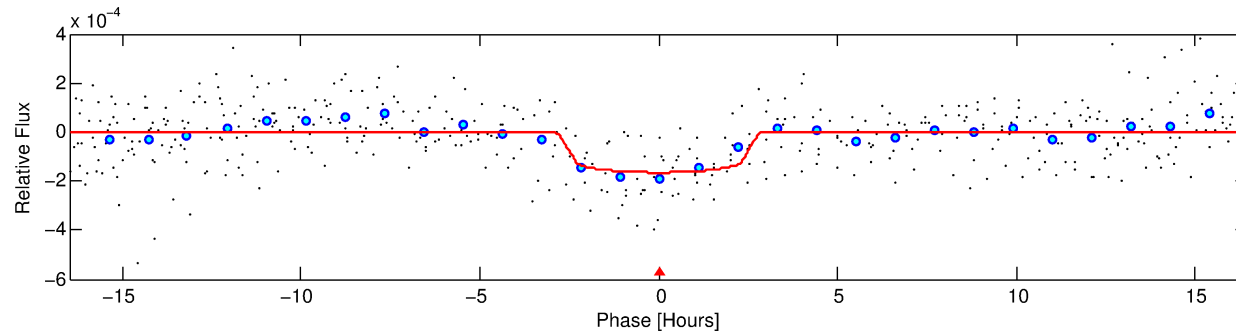
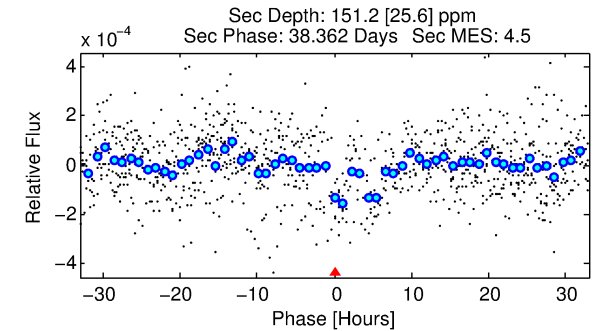
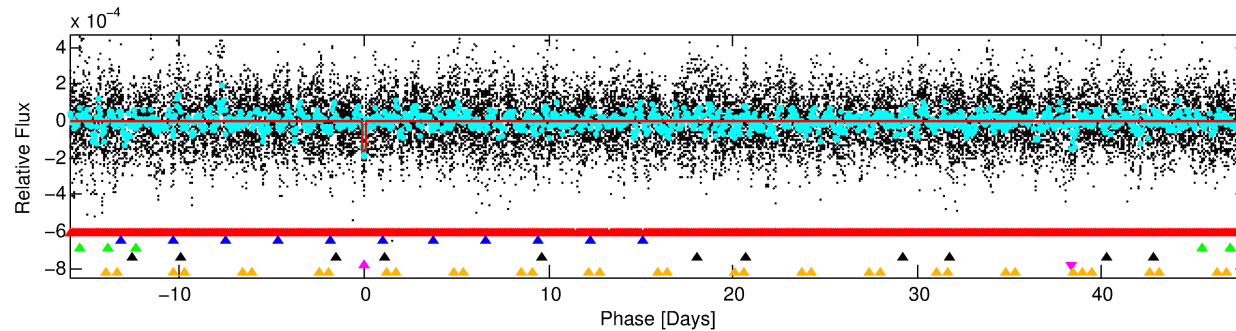
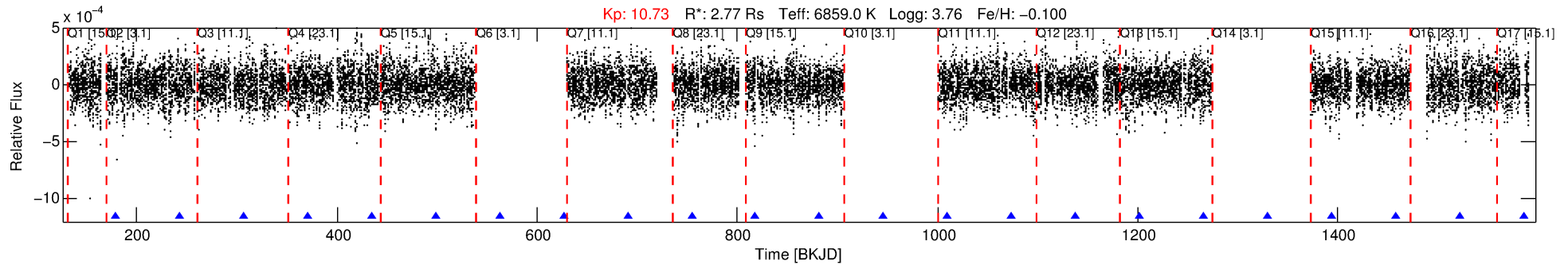
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 004659837-05

No Significant Match Found

DV One-Page Summary

KIC: 4659837 Candidate: 5 of 6 Period: 63.926 d



DV Fit Results:

Period = 63.92599 [0.00052] d
Epoch = 179.0382 [0.0061] BKJD
Rp/R* = 0.0136 [0.0031]
a/R* = 42.76 [54.18]
b = 0.89 [0.29]
Seff = 112.90 [57.05]
Teq = 831 [105] K
Rp = 4.12 [1.67] Re
a = 0.3671 [0.1147] AU
Ag = 660.98 [457.11] [1.44σ]
Teffp = 6516 [817] K [6.91σ]

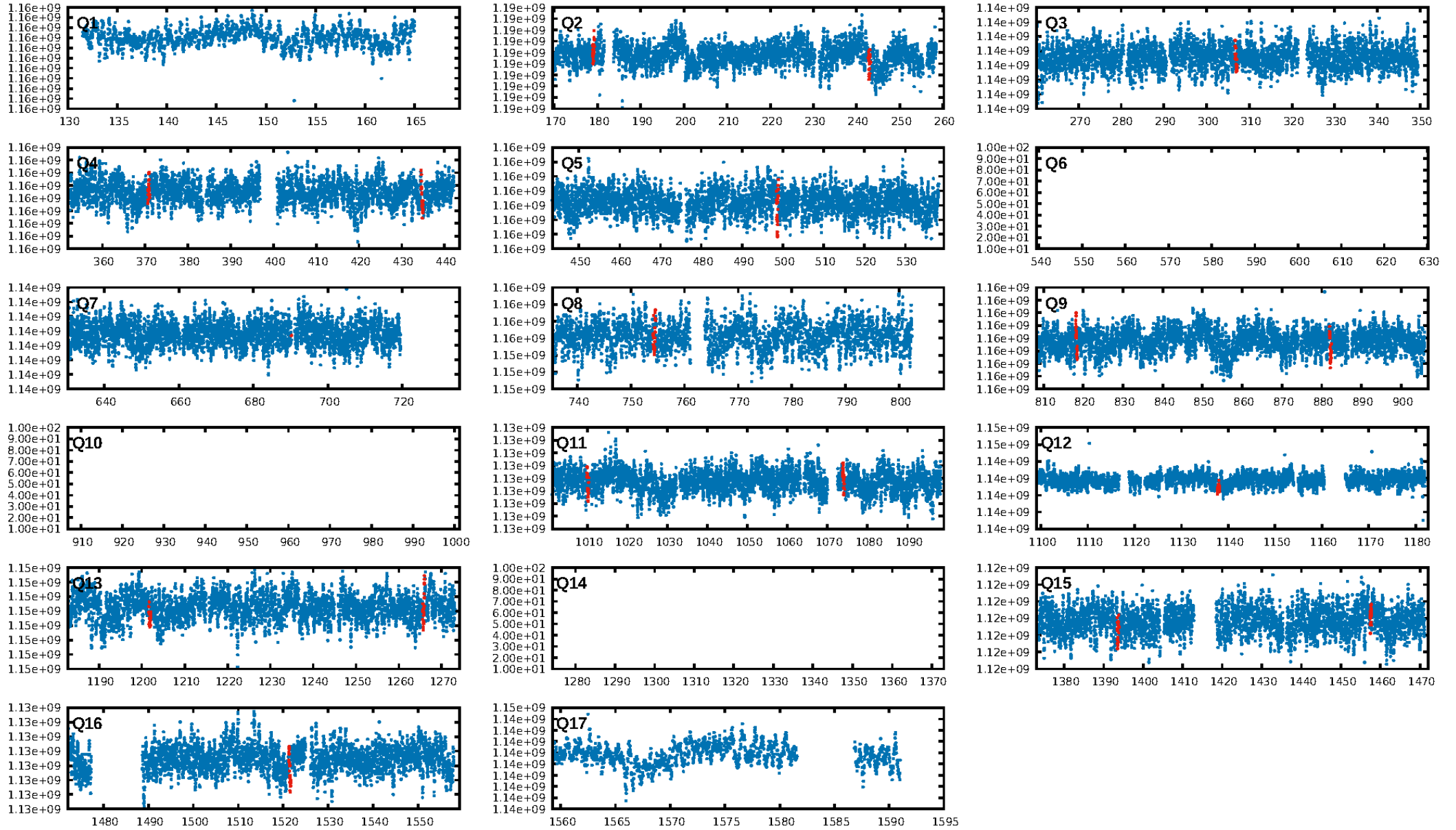
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [36.84σ]
LongPeriod-sig: 100.0% [145.74σ]
ModelChiSquare2-sig: 57.3%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 4.86e-08
RollingBand-fgt: 1.00 [8/8]
GhostDiagnostic-chr: 4.3
Centroid-sig: 12.1%
Centroid-so: 0.582 arcsec [1.25σ]
OotOffset-rm: 1.261 arcsec [3.29σ]
KicOffset-rm: 1.015 arcsec [2.62σ]
OotOffset-st: 1/2/3/3 [9]
KicOffset-st: 1/2/3/3 [9]
DiffImageQuality-fgm: 0.89 [8/9]
DiffImageOverlap-fno: 0.18 [2/11]

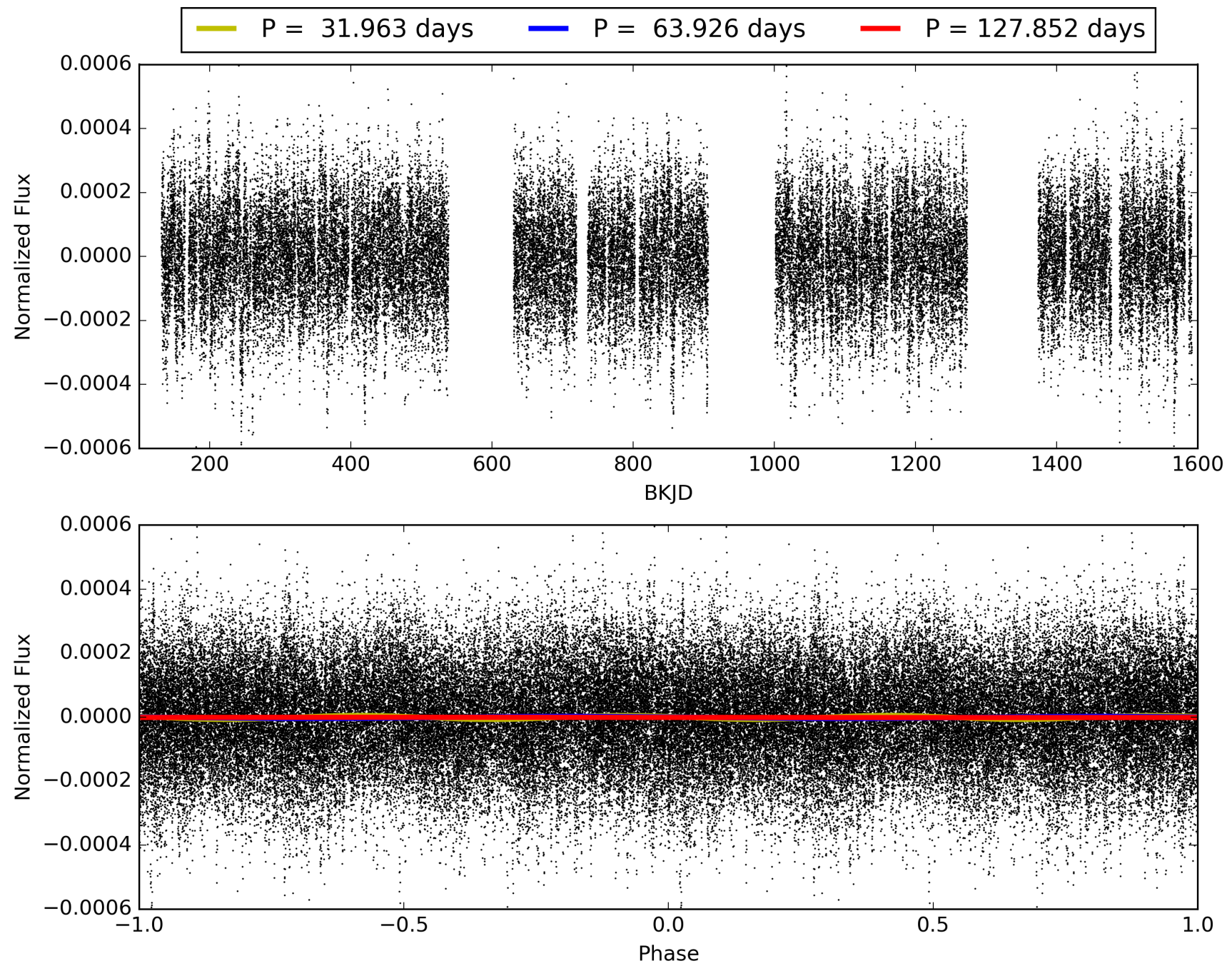
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 22:13:08 Z

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

TCE 004659837-05, PDC Light Curves

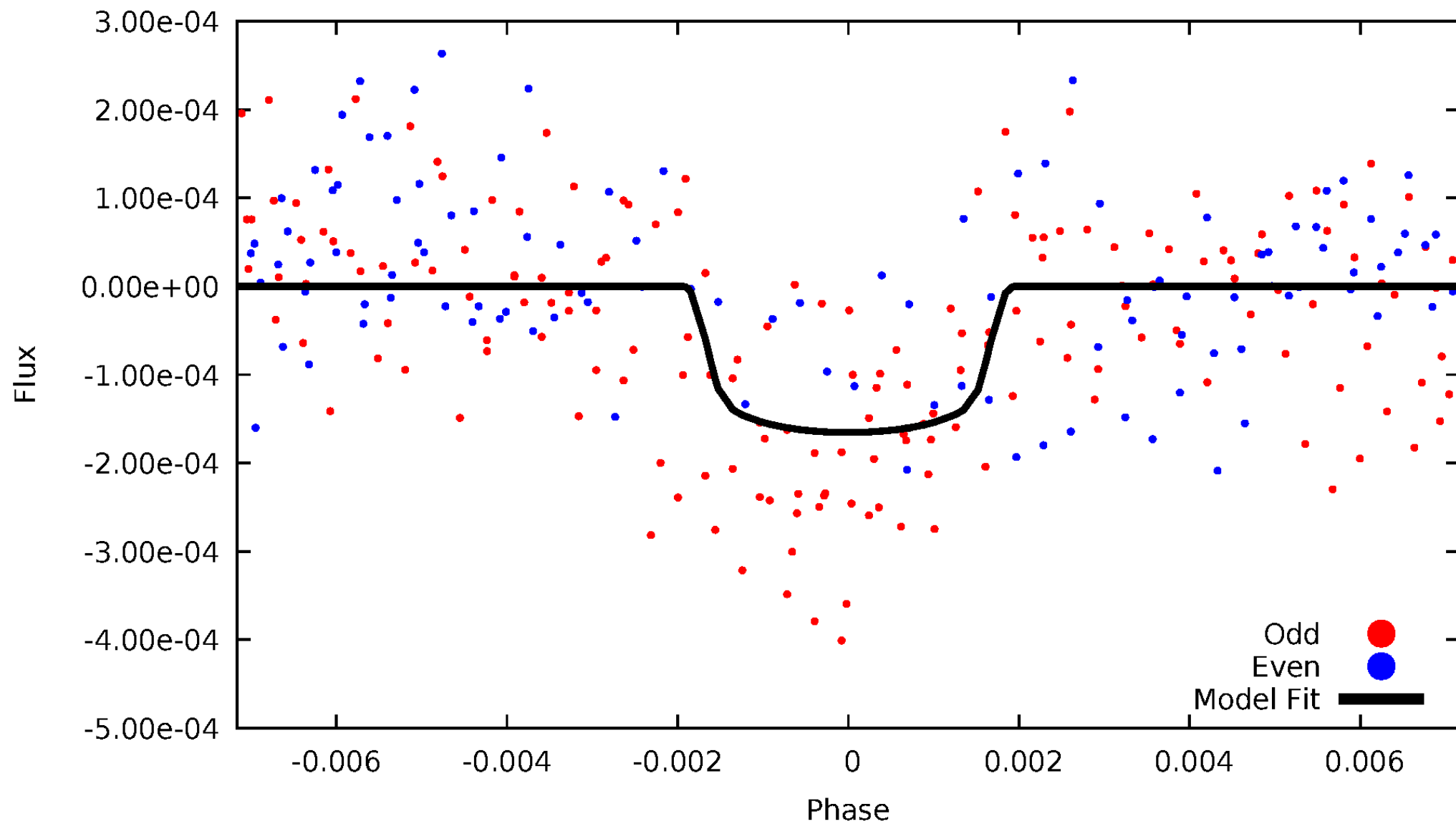


TCE 004659837-05



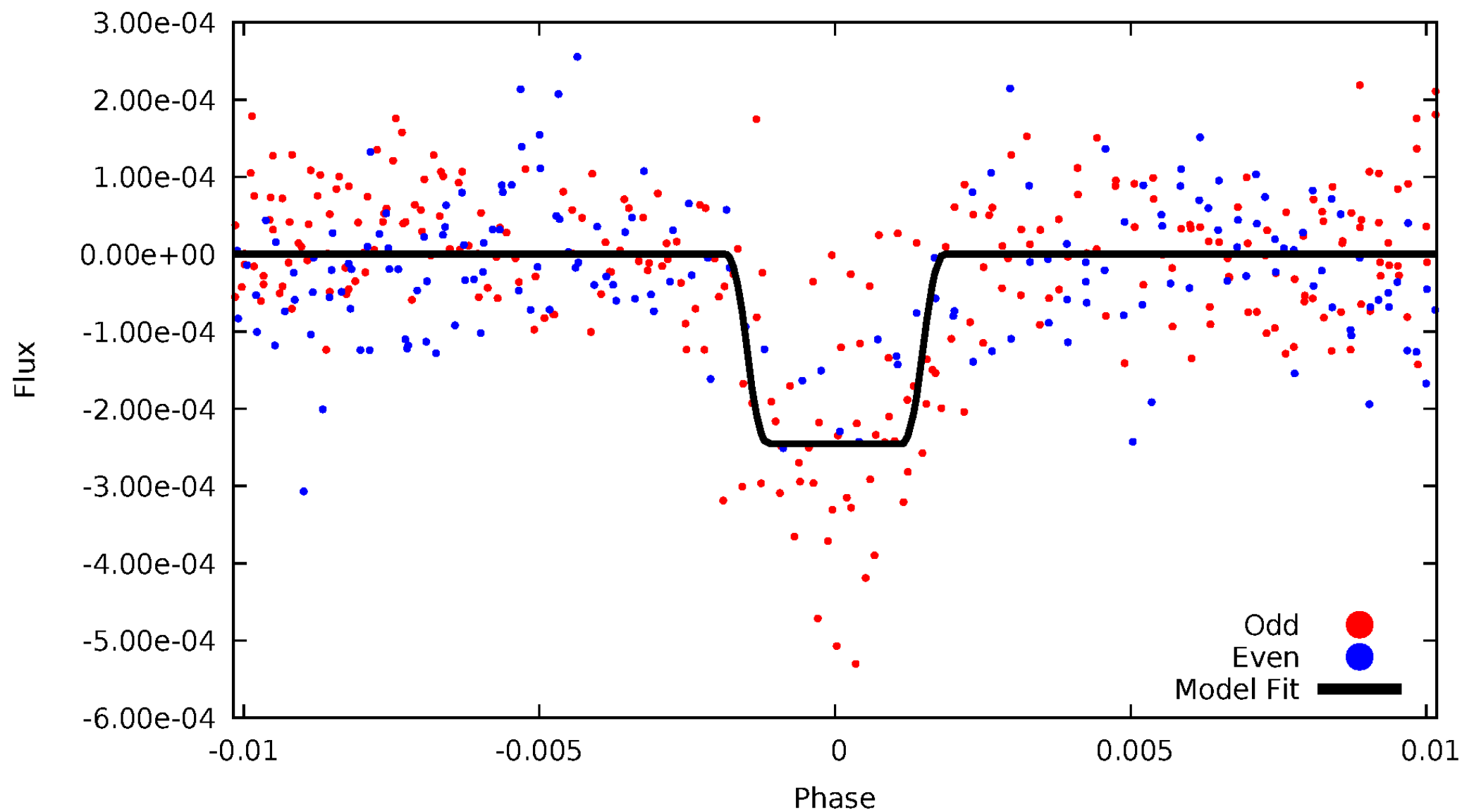
DV Odd/Even

TCE 004659837-05



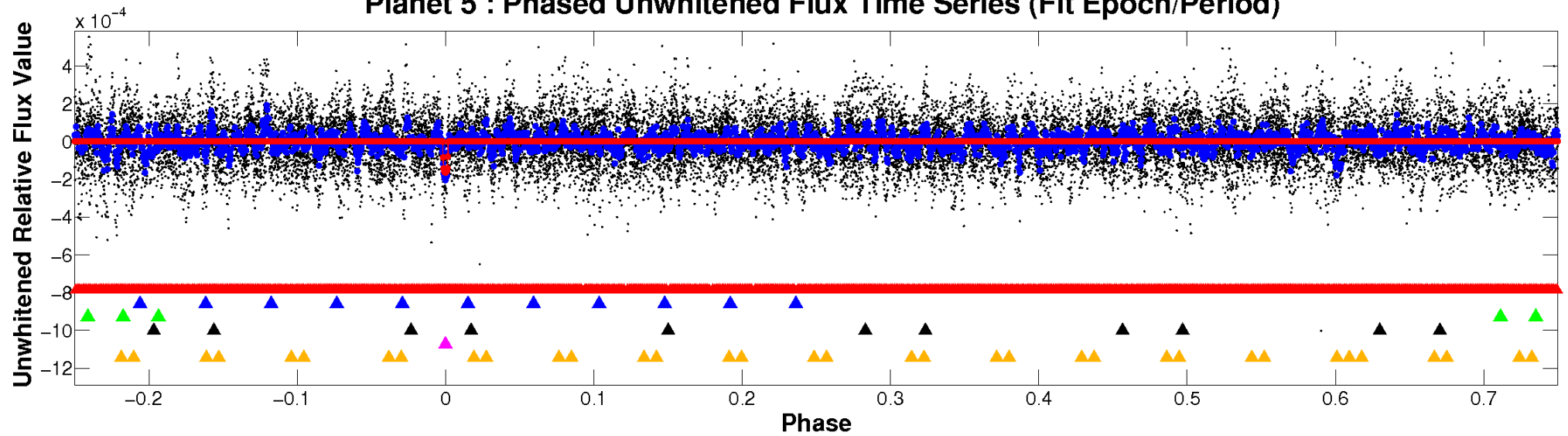
ALT Odd/Even

TCE 004659837-05

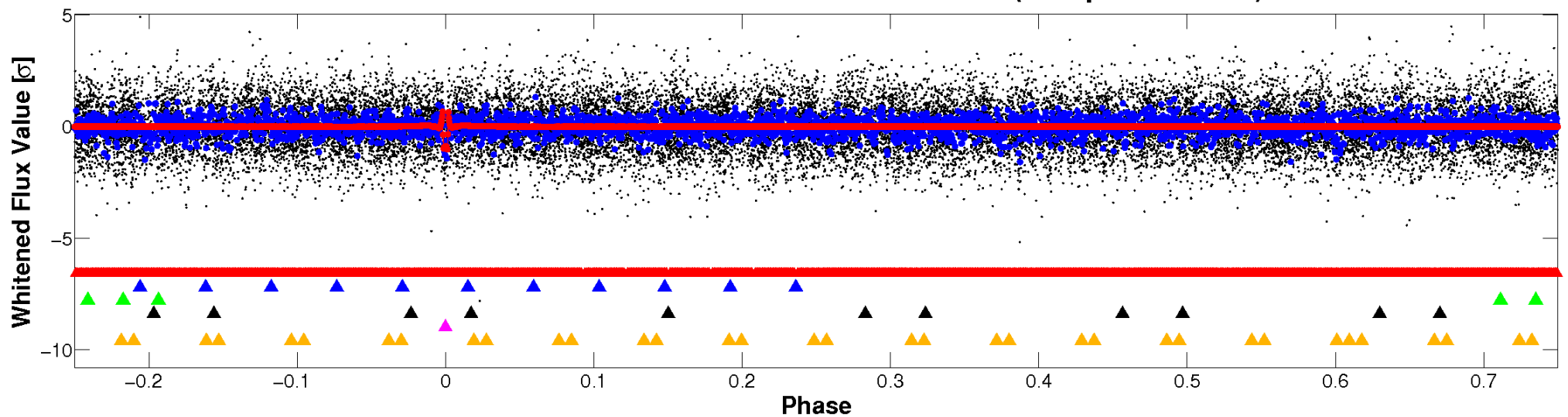


Non-Whitened Vs. Whitened Light Curve

Planet 5 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

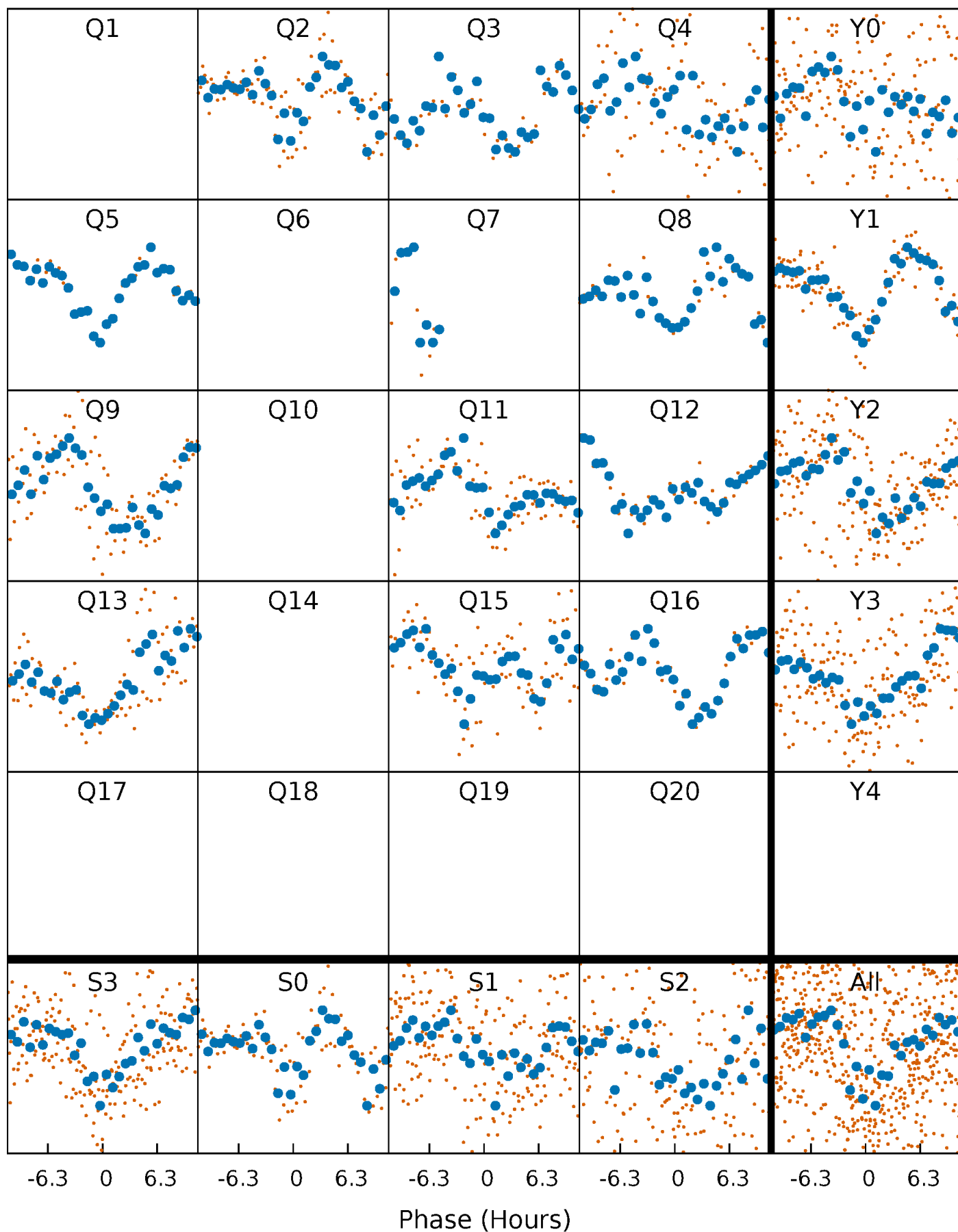


Planet 5 : Phased Whitened Flux Time Series (Fit Epoch/Period)



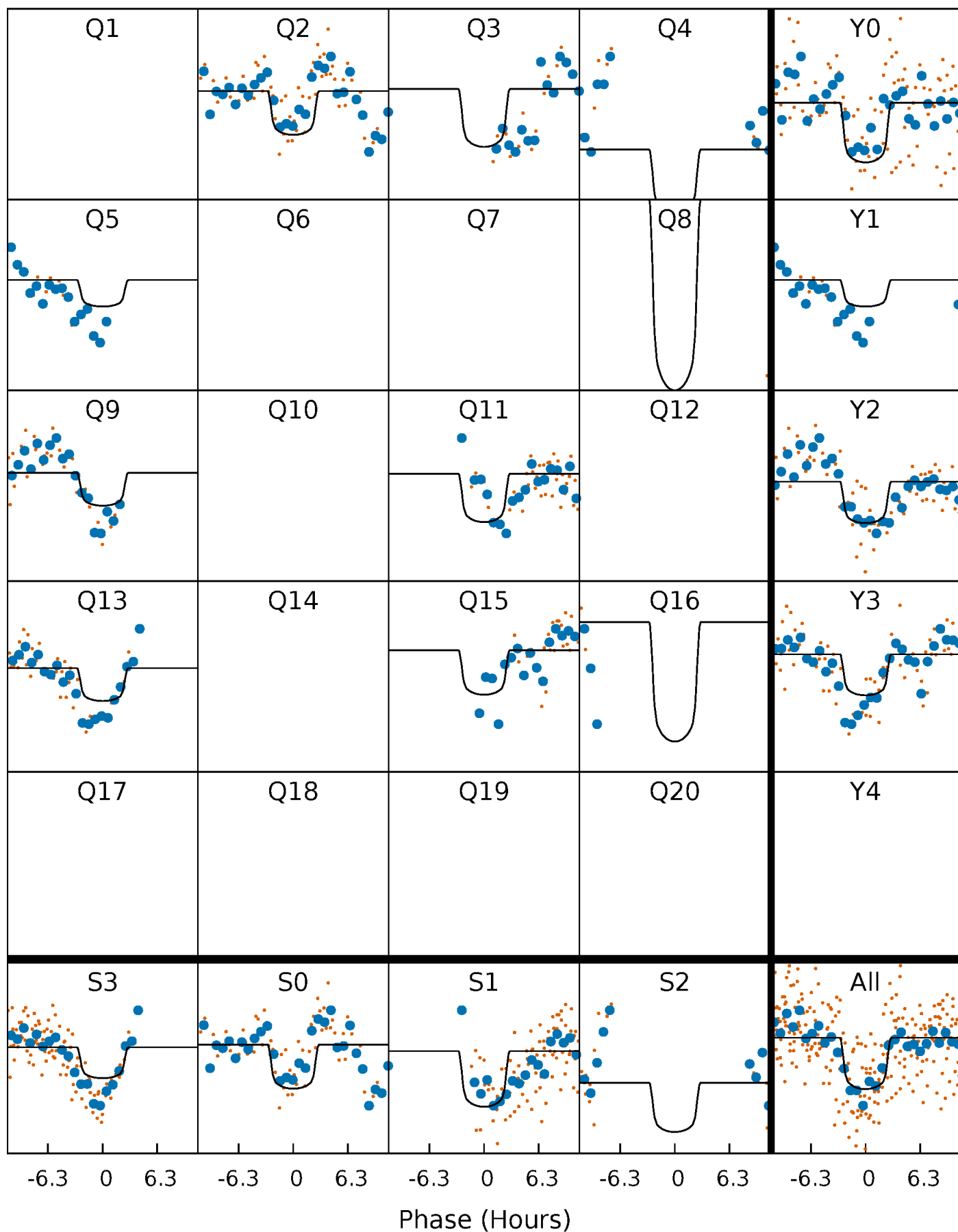
PDC Quarter-Phased Transit Curves

TCE 004659837-05 $P = 63.925988$ Days $T_0 = 179.038178$ (BKJD)



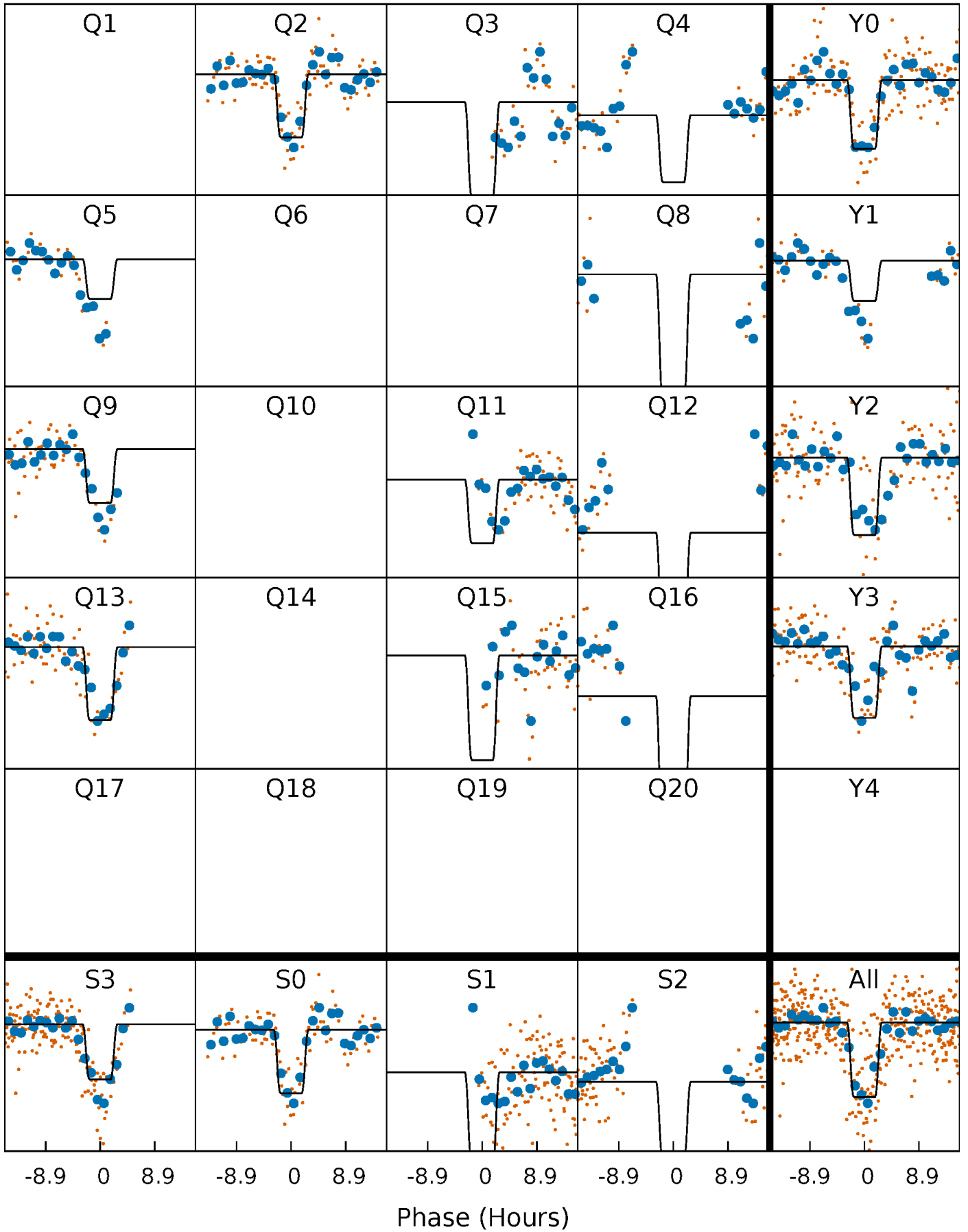
DV Quarter-Phased Transit Curves

TCE 004659837-05 $P = 63.925988$ Days $T_0 = 179.038178$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

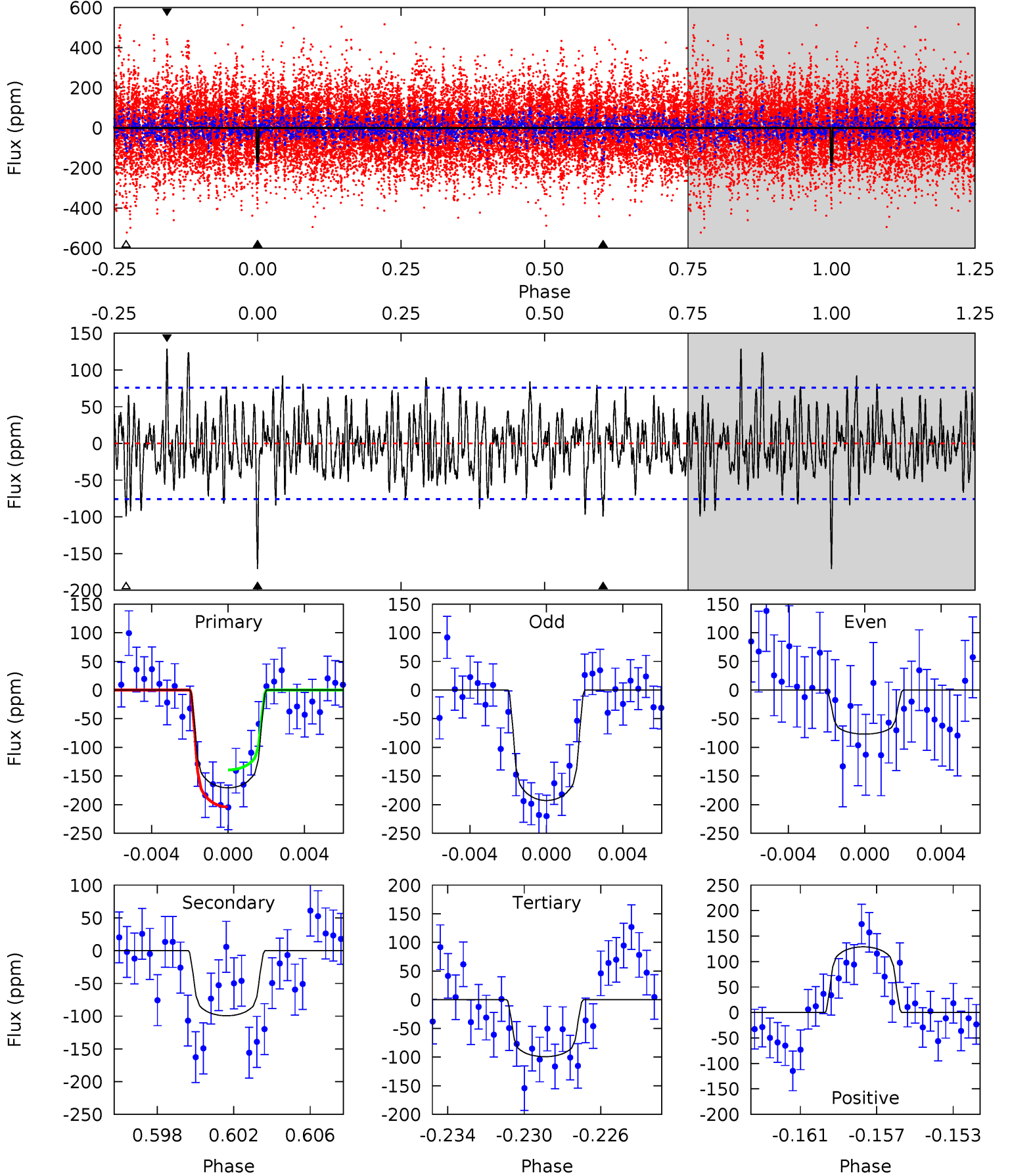
TCE 004659837-05 P= 63.924791 Days $T_0=179.016890$ (BKJD)



DV Model-Shift Uniqueness Test

004659837-05, P = 63.925988 Days, E = 115.112190 Days

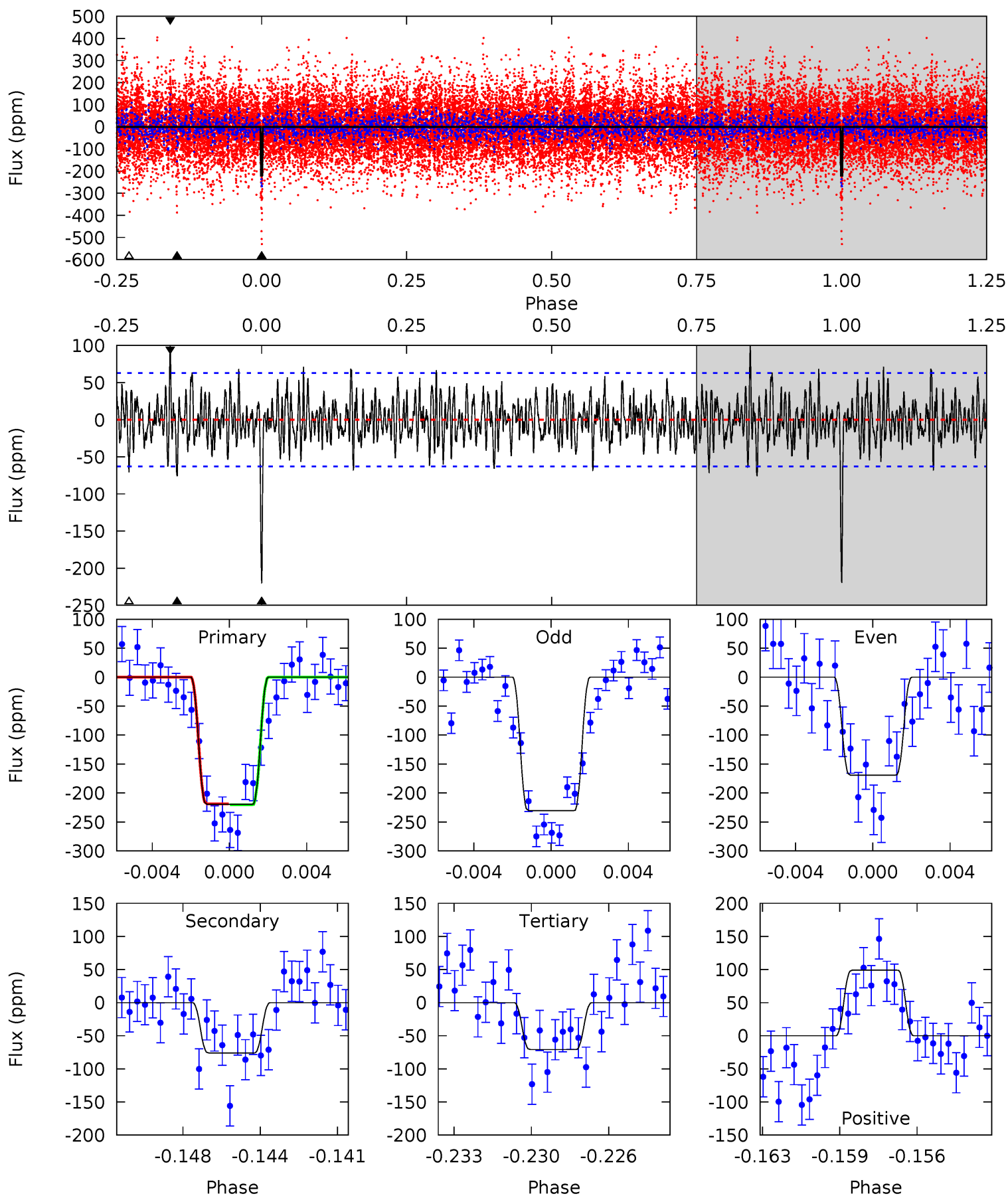
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.7	6.82	6.81	8.84	5.21	2.89	2.24	4.90	2.87	0.01	-2.02	3.22	1.02	0.43	2.22



Alt Model-Shift Uniqueness Test

004659837-05, P = 63.924791 Days, E = 115.092099 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
18.2	6.31	5.87	8.21	5.21	2.90	1.97	12.3	10.0	0.43	-1.90	2.06	1.00	0.31	0.07



Stellar Parameters For KIC 004659837

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6859^{+153}_{-204}	$3.761^{+0.285}_{-0.095}$	$-0.100^{+0.300}_{-0.250}$	$2.770^{+0.499}_{-0.927}$	$1.613^{+0.232}_{-0.283}$	$0.107^{+0.216}_{-0.033}$
	+2%/-3%	+8%/-3%	+300%/-250%	+18%/-33%	+14%/-18%	+202%/-31%
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 004659837-05 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-99 ± 15	$3.82^{+1.19}_{-1.04}$	1137^{+65}_{-96}	5852^{+897}_{-576}	498^{+447}_{-206}
Alt.	-76 ± 12	$4.62^{+1.03}_{-1.14}$	1142^{+70}_{-92}	5120^{+509}_{-399}	268^{+188}_{-94}

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 $A_{obs} \gg 1.0$

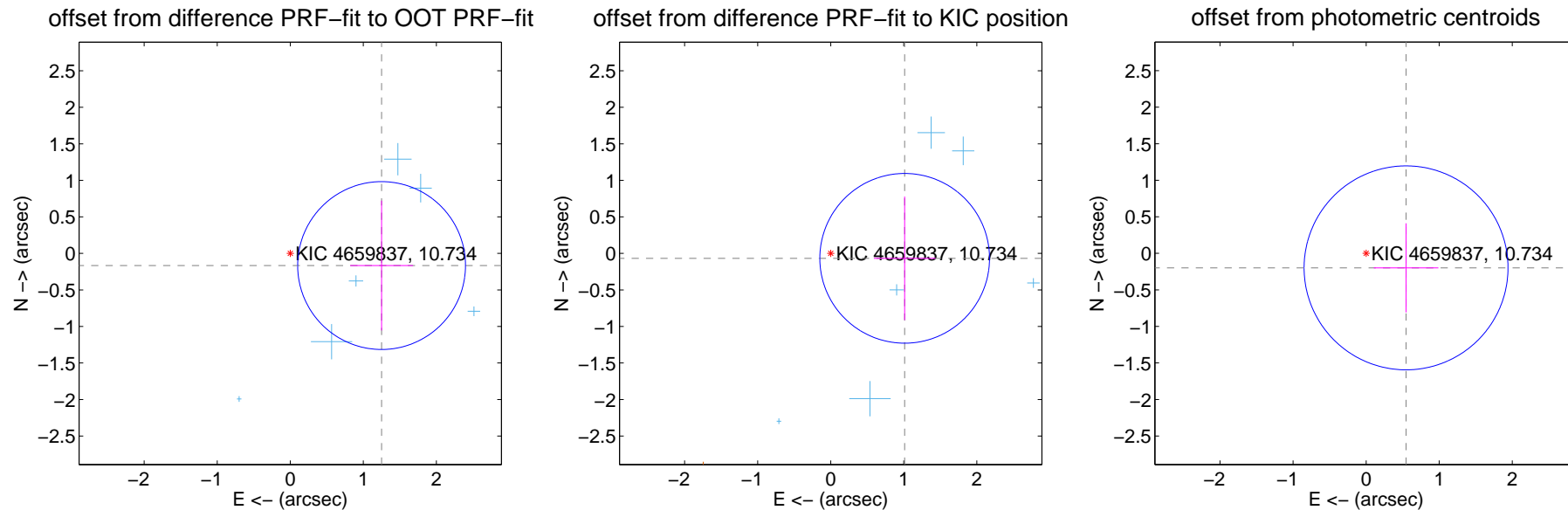
DV Centroid Data

Supplemental centroid analysis for 004659837-05. **Kepler magnitude: 10.73**. Transit SNR 7.53

There are 8 quarters with good PRF difference image offsets

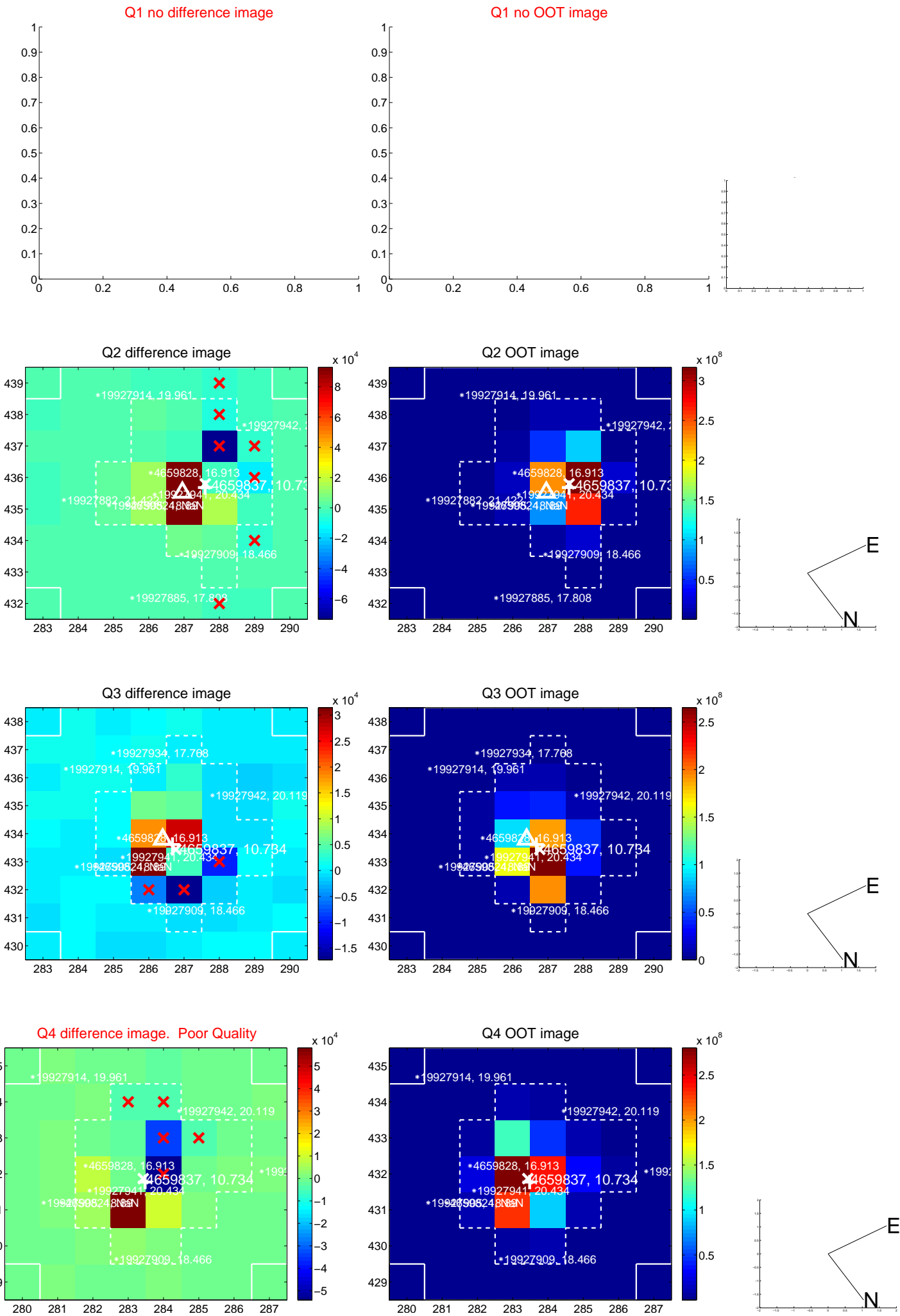
The direct PRF centroid is offset from the target star catalog position by about 0.38 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.261 ± 0.383	3.29	-1.250 ± 0.430	-0.166 ± 0.889
PRF-fit source offset from KIC position	1.015 ± 0.387	2.62	-1.012 ± 0.421	-0.067 ± 0.845
photometric centroid source offset	0.58 ± 0.47	1.25	-0.55 ± 0.44	-0.20 ± 0.61

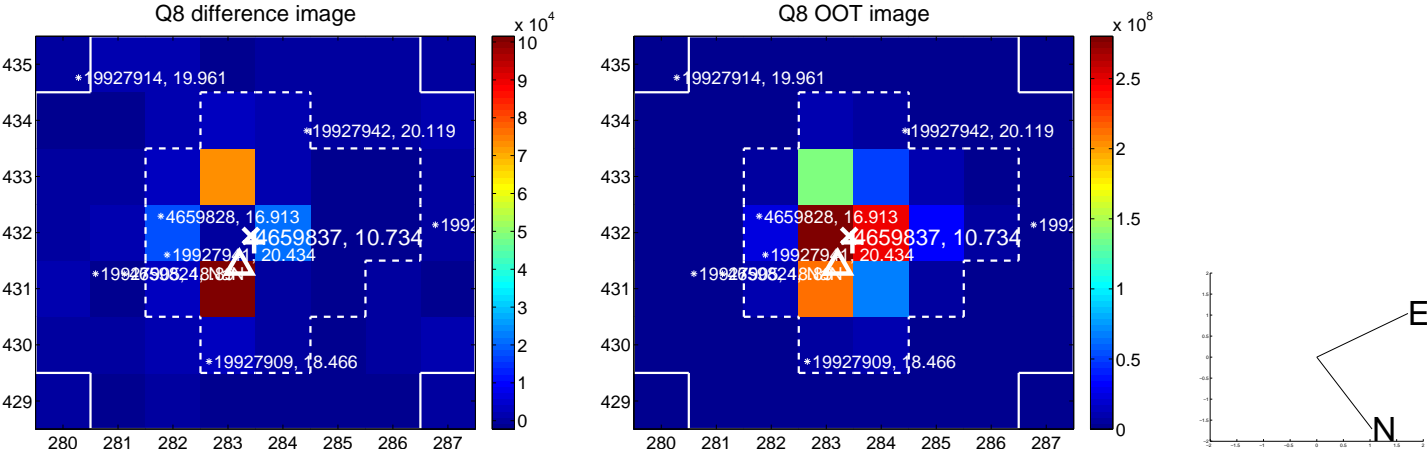
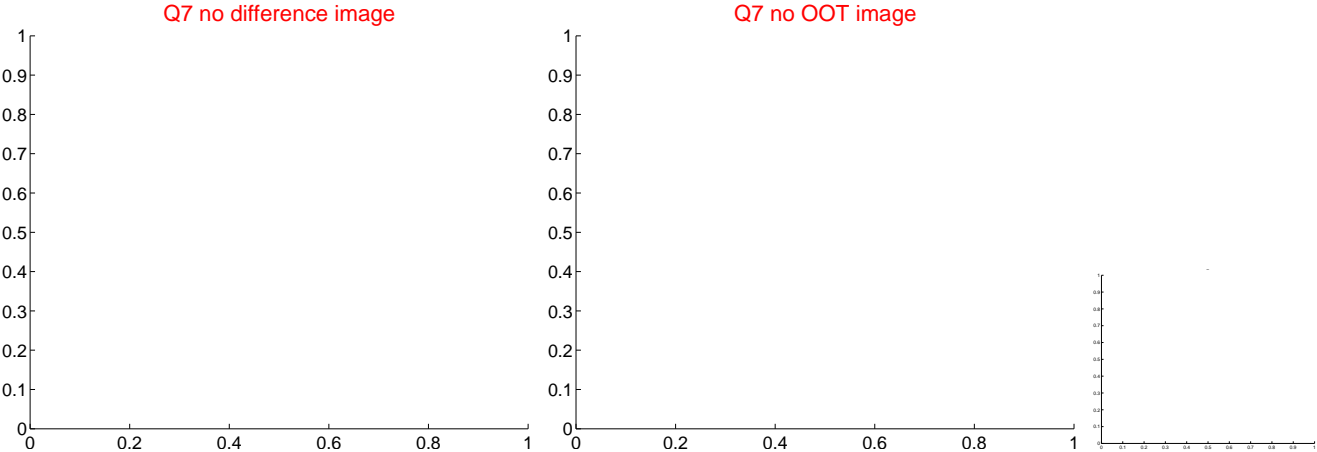
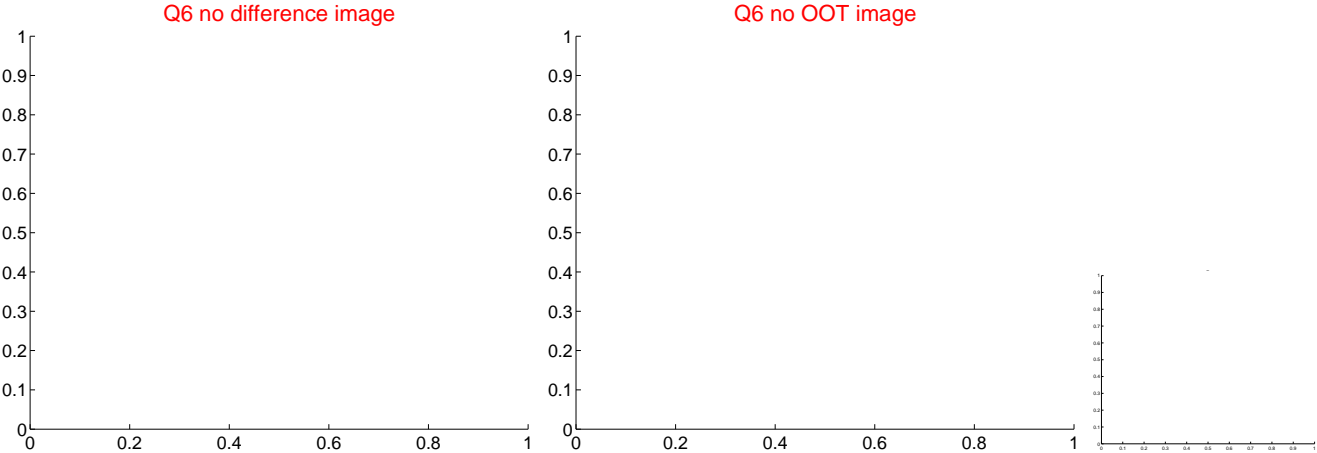
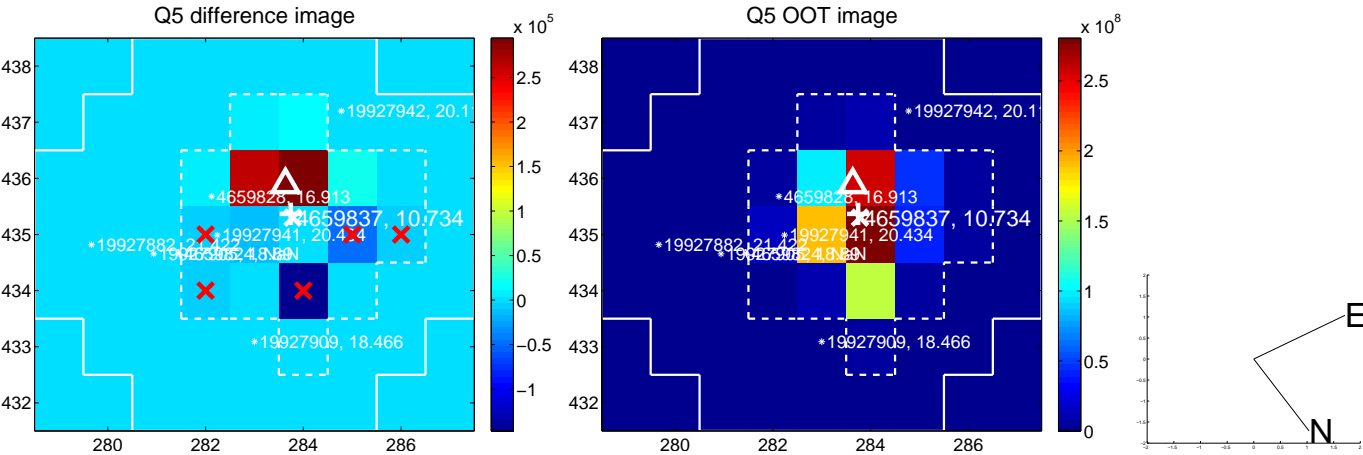


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

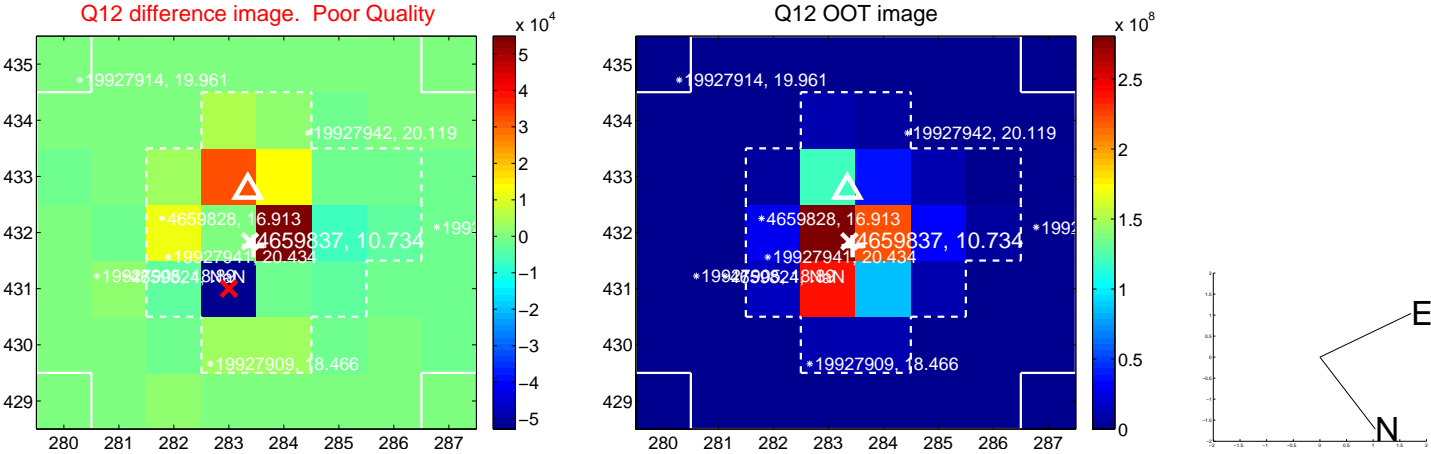
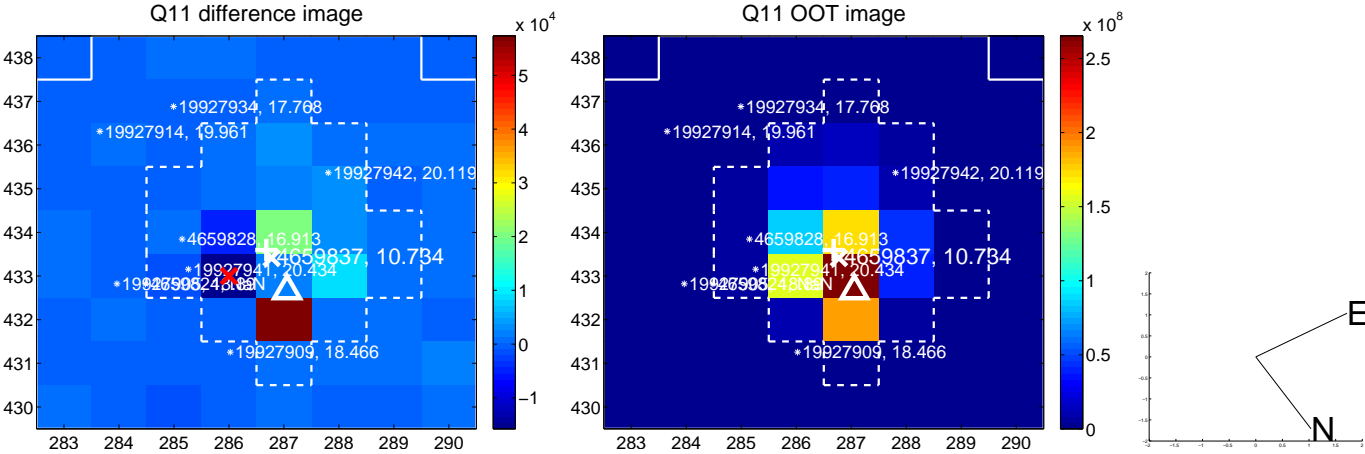
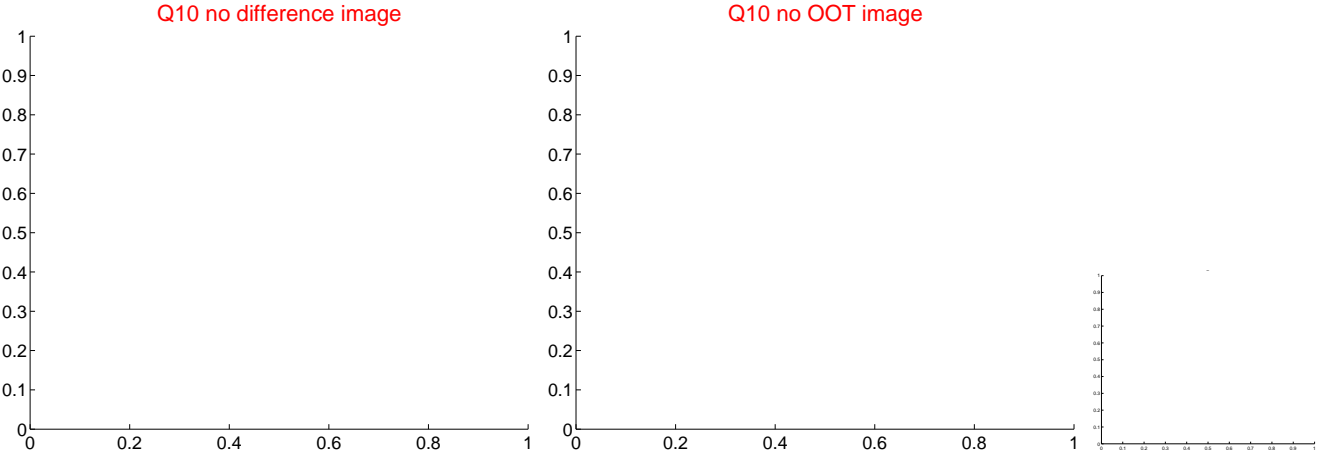
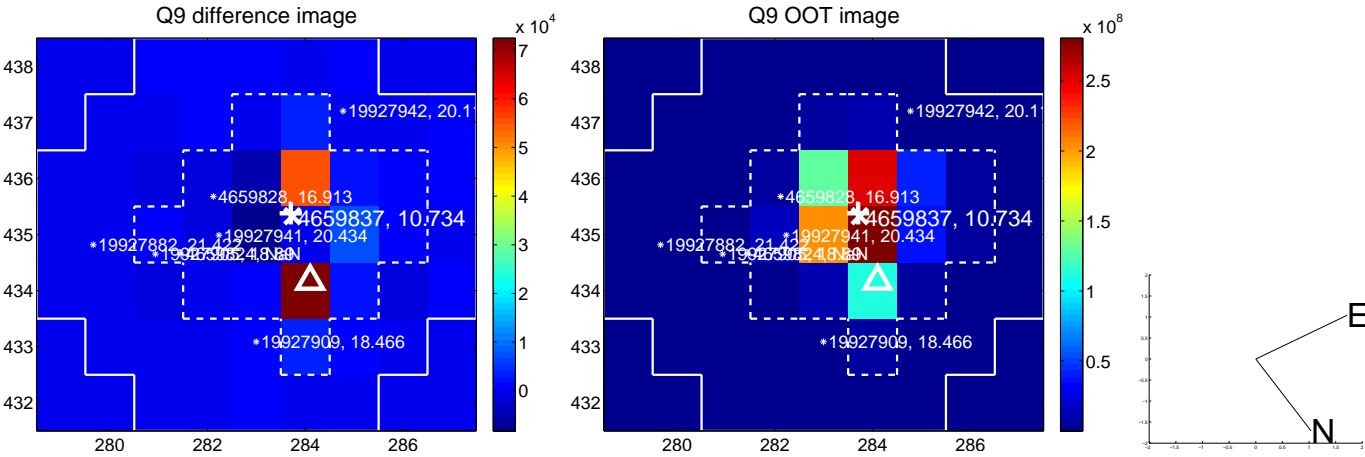
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



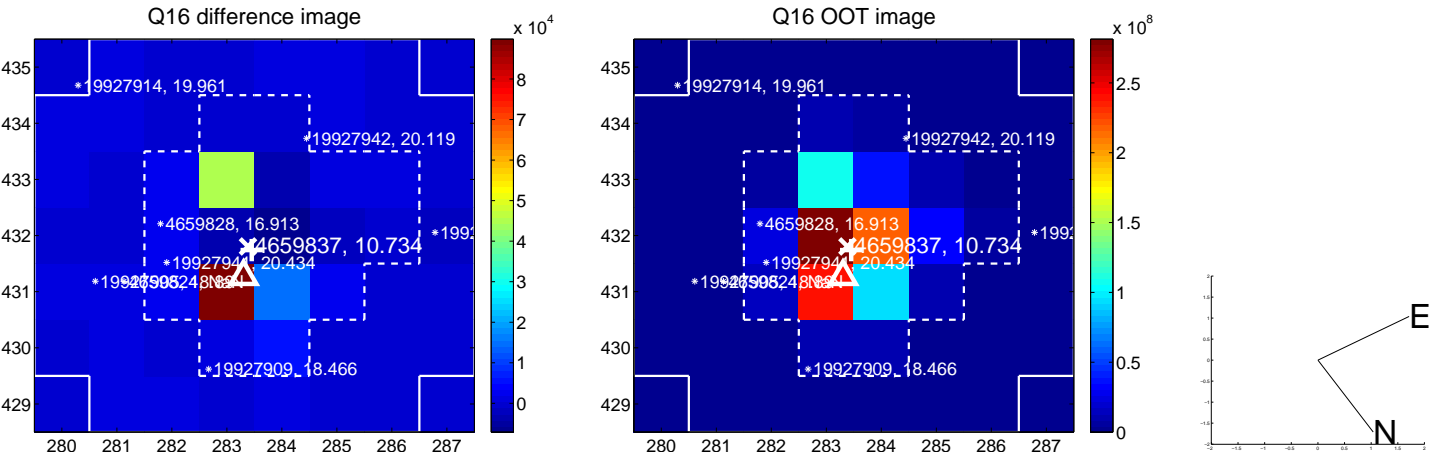
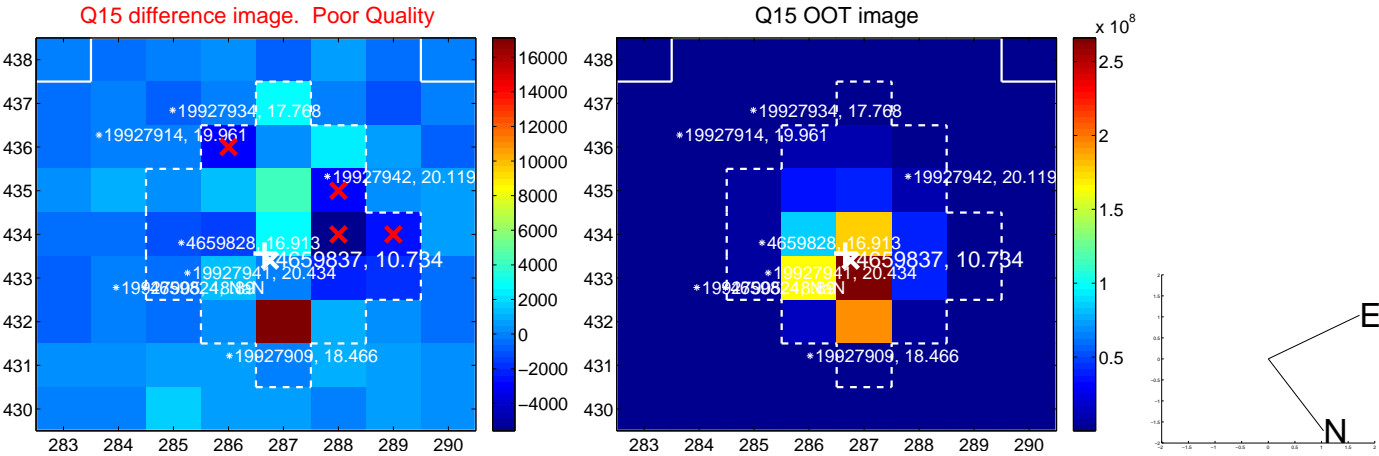
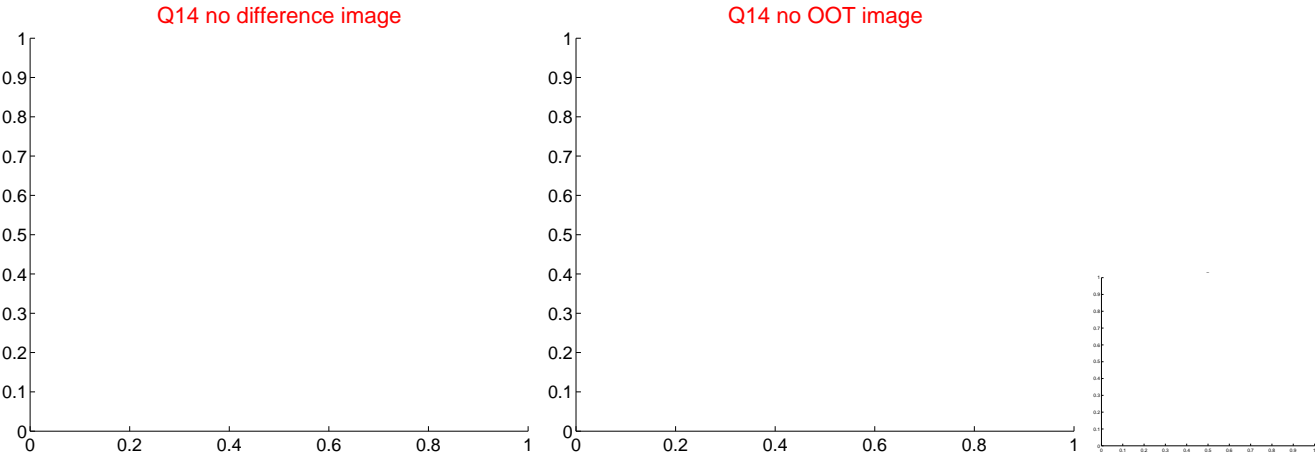
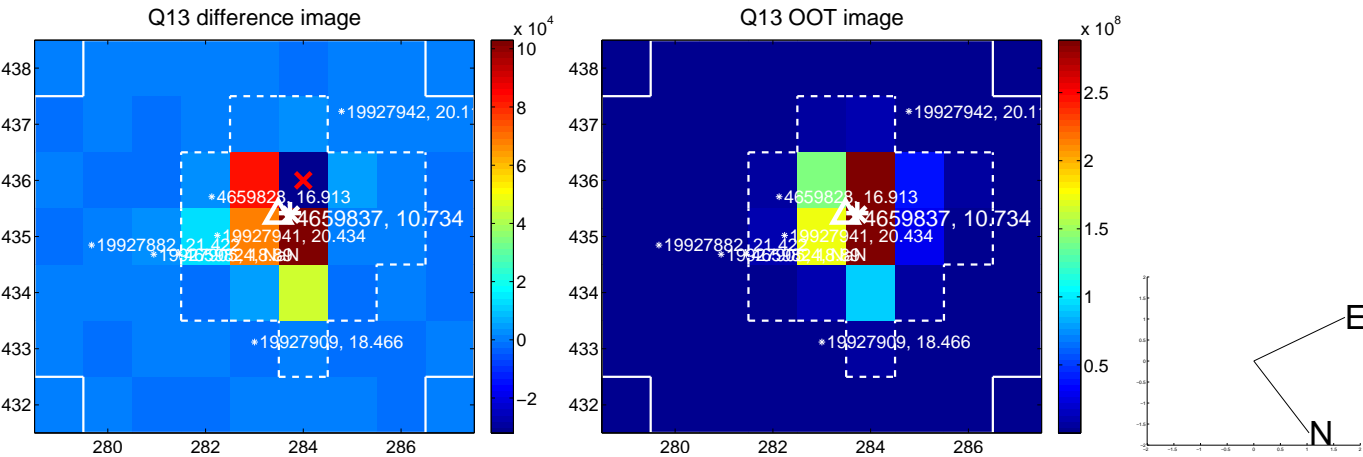
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



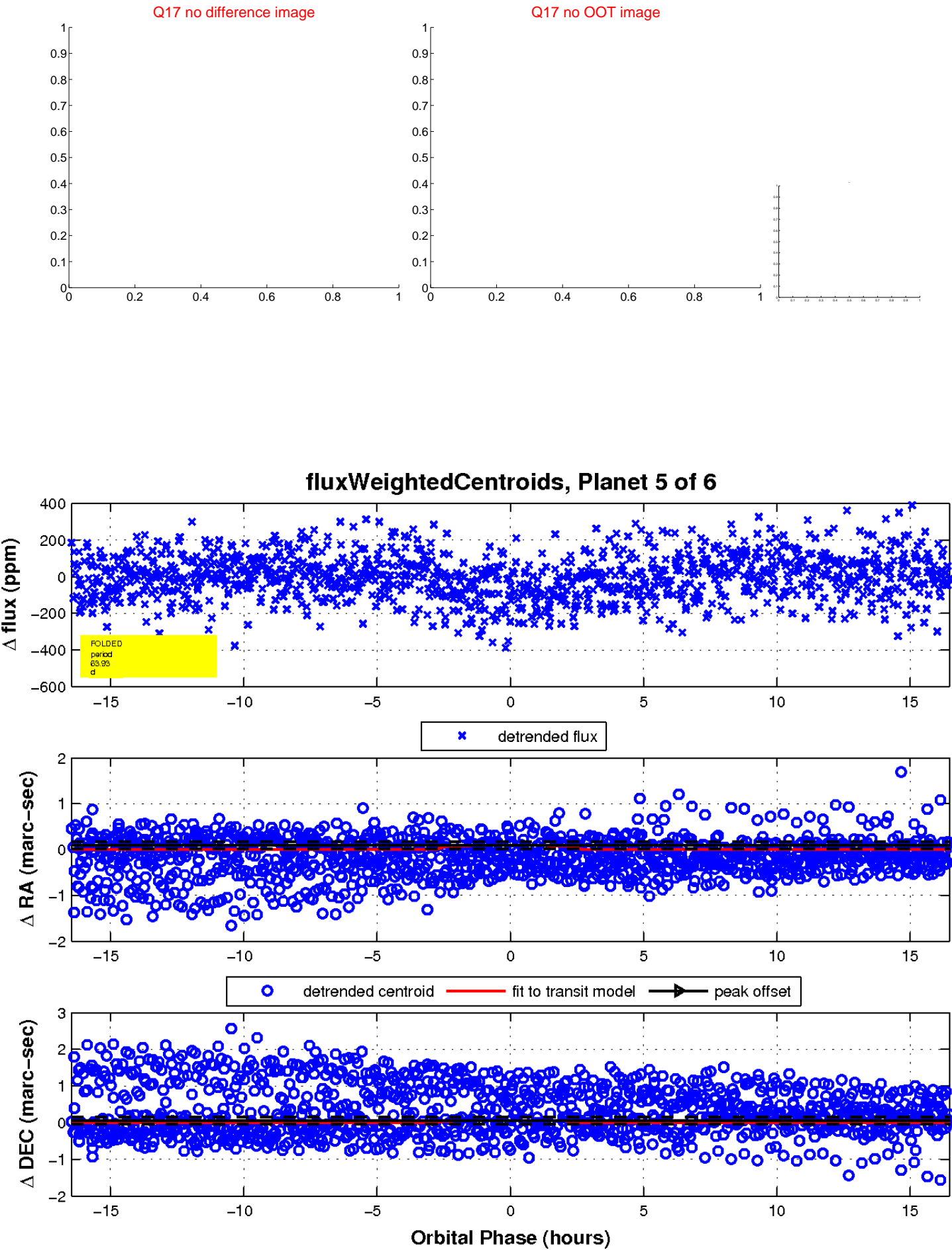
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



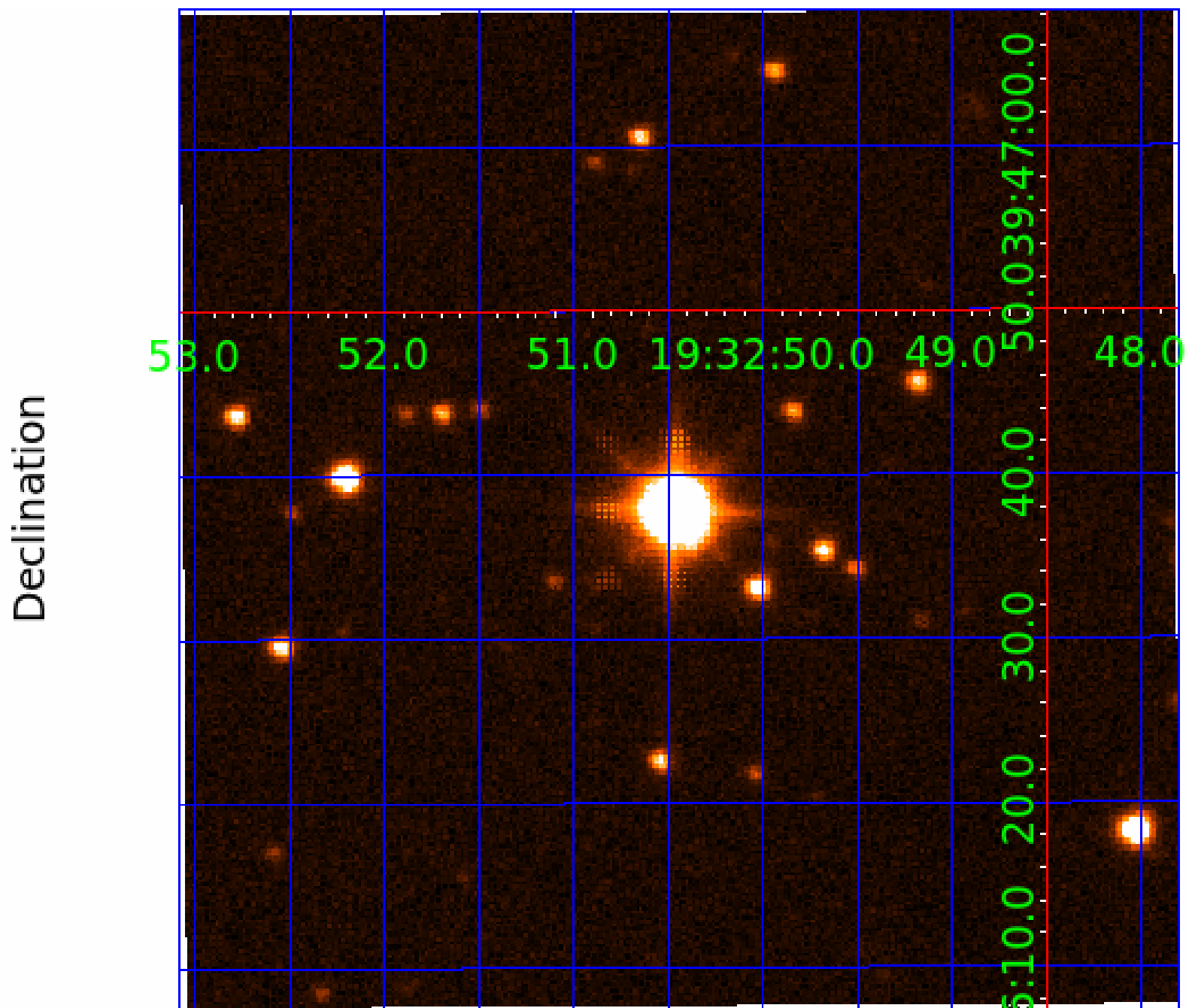
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



UKIRT Image



KIC 004659837

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})
004659837-01	OBS	No	1.835581	132.056857	16.0	7.617	8.1	6.2	2.77	6859	1.28	12839.83
004659837-02	OBS	No	130.678516	165.874337	125.6	9.521	13.3	3.9	2.77	6859	3.42	43.52
004659837-03	OBS	No	318.109462	294.519022	228.1	6.651	9.6	6.2	2.77	6859	4.75	13.29
004659837-04	OBS	No	138.938162	133.207213	171.0	7.742	8.1	6.4	2.77	6859	4.20	40.10
004659837-05	OBS	No	63.925988	179.038178	165.3	5.494	7.2	7.5	2.77	6859	4.12	112.90
004659837-06	OBS	No	41.395366	153.532238	79.5	13.609	7.2	5.8	2.77	6859	2.78	201.52

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004659837-01	OBS	FP	0.00	1	0	0	0	LPP_DV—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
004659837-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_TRACKER—TRANS_GAPPED—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
004659837-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_TRACKER—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
004659837-04	OBS	FP	0.00	1	0	1	0	TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED—HALO_GHOST
004659837-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—CENT_SATURATED
004659837-06	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—MOD_NONUNIQ_DV—CENT_SATURATED—HALO_GHOST

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

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

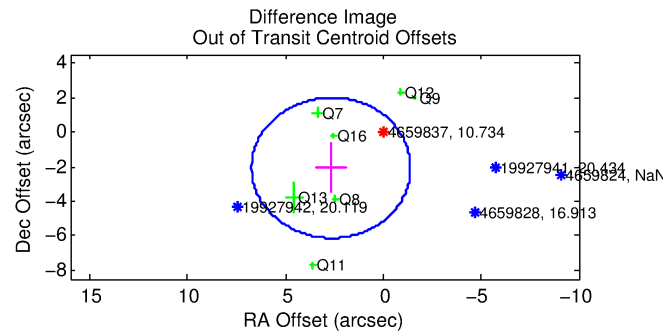
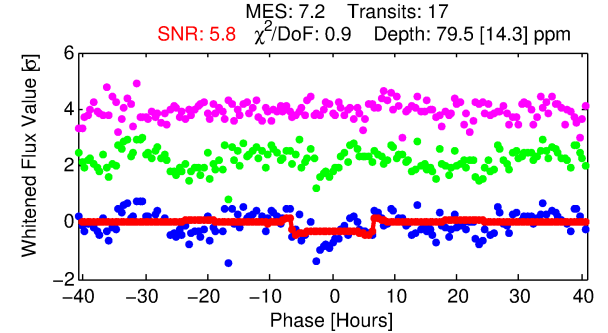
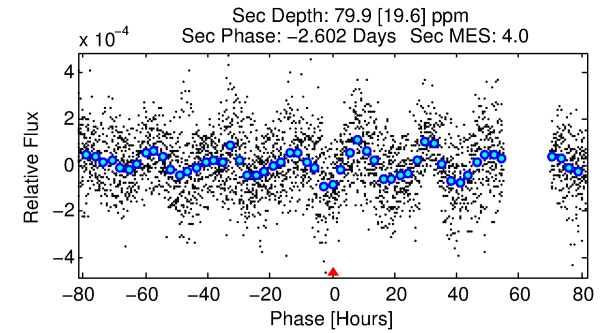
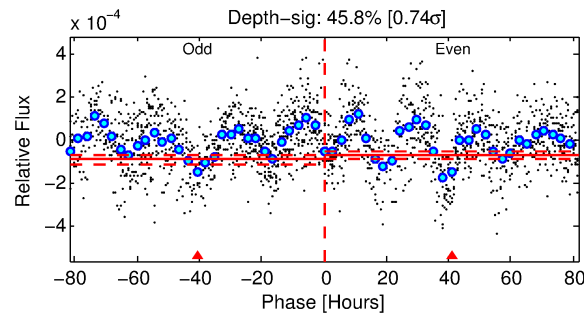
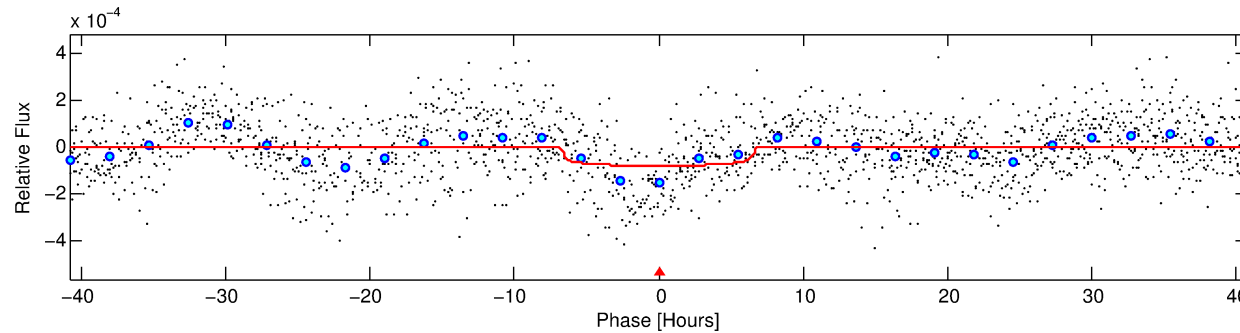
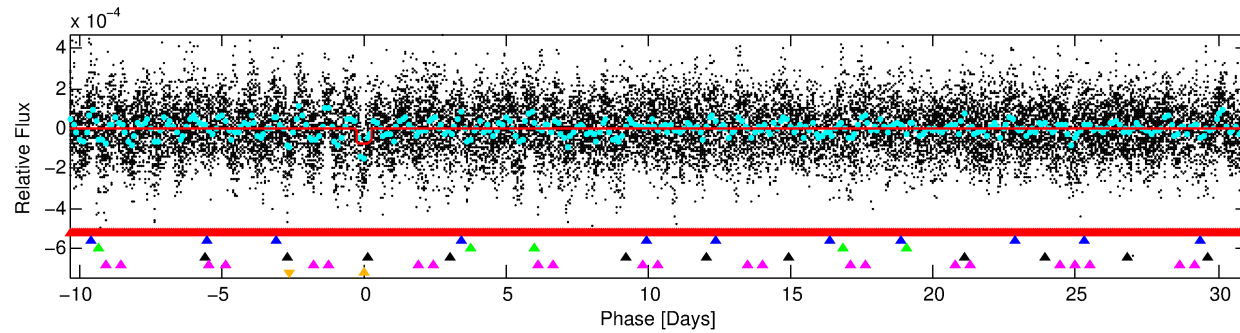
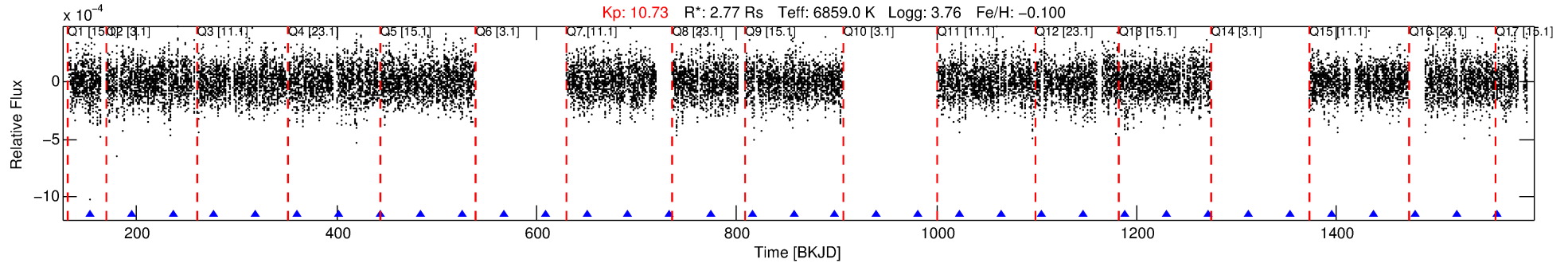
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 004659837-06

No Significant Match Found

DV One-Page Summary

KIC: 4659837 Candidate: 6 of 6 Period: 41.395 d



DV Fit Results:

Period = 41.39537 [0.00072] d
Epoch = 153.5322 [0.0137] BKJD
 $R_p/R^* = 0.0092$ [0.0016]
 $a/R^* = 12.77$ [10.28]
 $b = 0.85$ [0.27]
 $\text{Seff} = 201.52$ [101.83]
 $T_{\text{eq}} = 961$ [121] K
 $R_p = 2.78$ [1.05] R_e
 $a = 0.2748$ [0.0859] AU
 $A_g = 429.18$ [278.65] [1.54 σ]
 $T_{\text{effp}} = 6761$ [745] K [7.68 σ]

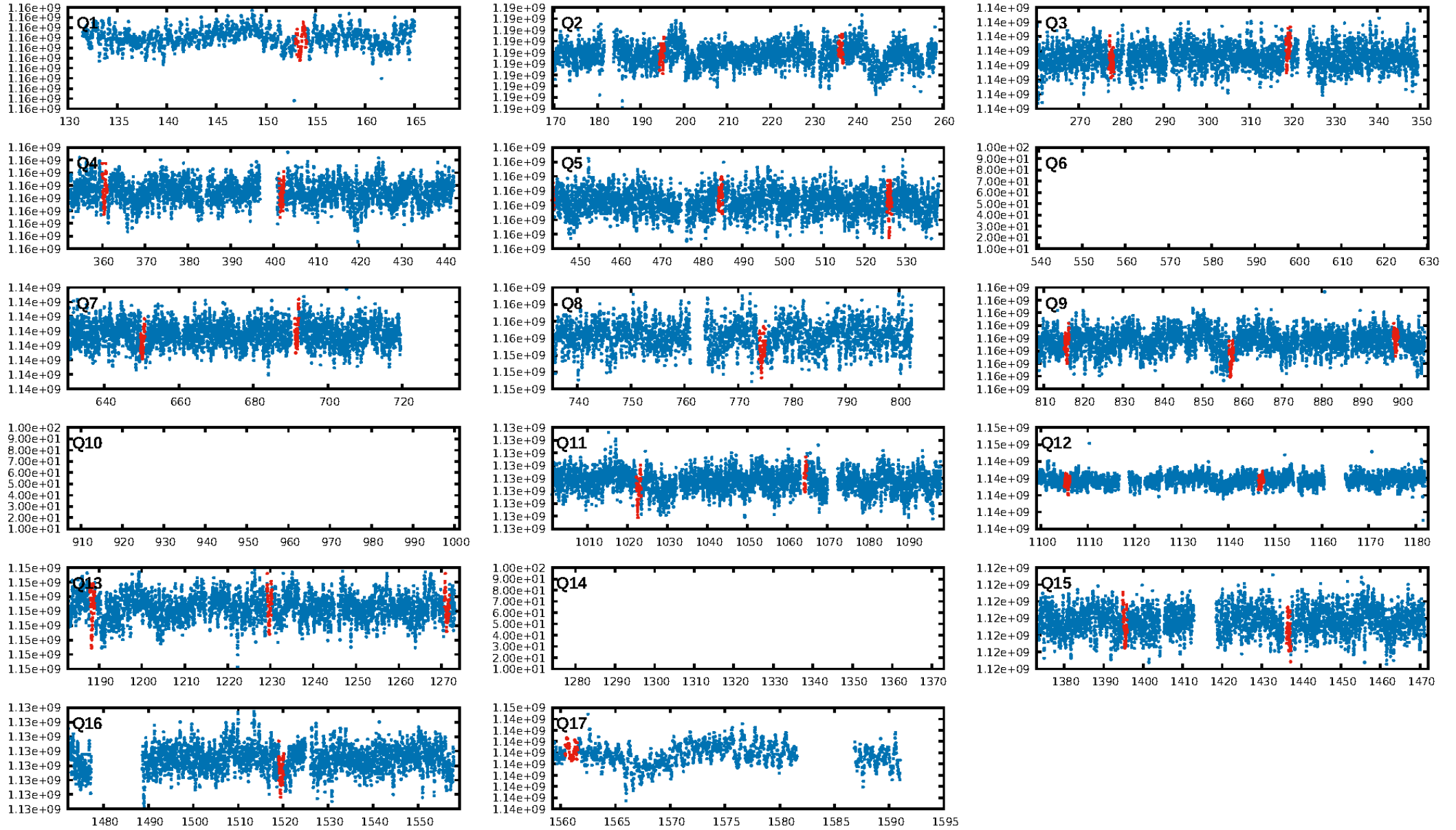
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [60.88 σ]
LongPeriod-sig: 100.0% [36.84 σ]
ModelChiSquare2-sig: 39.6%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 2.38e-08
RollingBand-fgt: 1.00 [15/15]
GhostDiagnostic-chr: 0.2394
Centroid-sig: 15.5%
Centroid-so: 1.152 arcsec [1.19 σ]
OotOffset-rm: 3.382 arcsec [2.50 σ]
OotOffset-st: 0/2/3/2 [7]
KicOffset-rm: 3.192 arcsec [6.44 σ]
KicOffset-st: 0/2/3/2 [7]
DiffImageQuality-fgm: 0.29 [2/7]
DiffImageOverlap-fno: 0.00 [0/12]

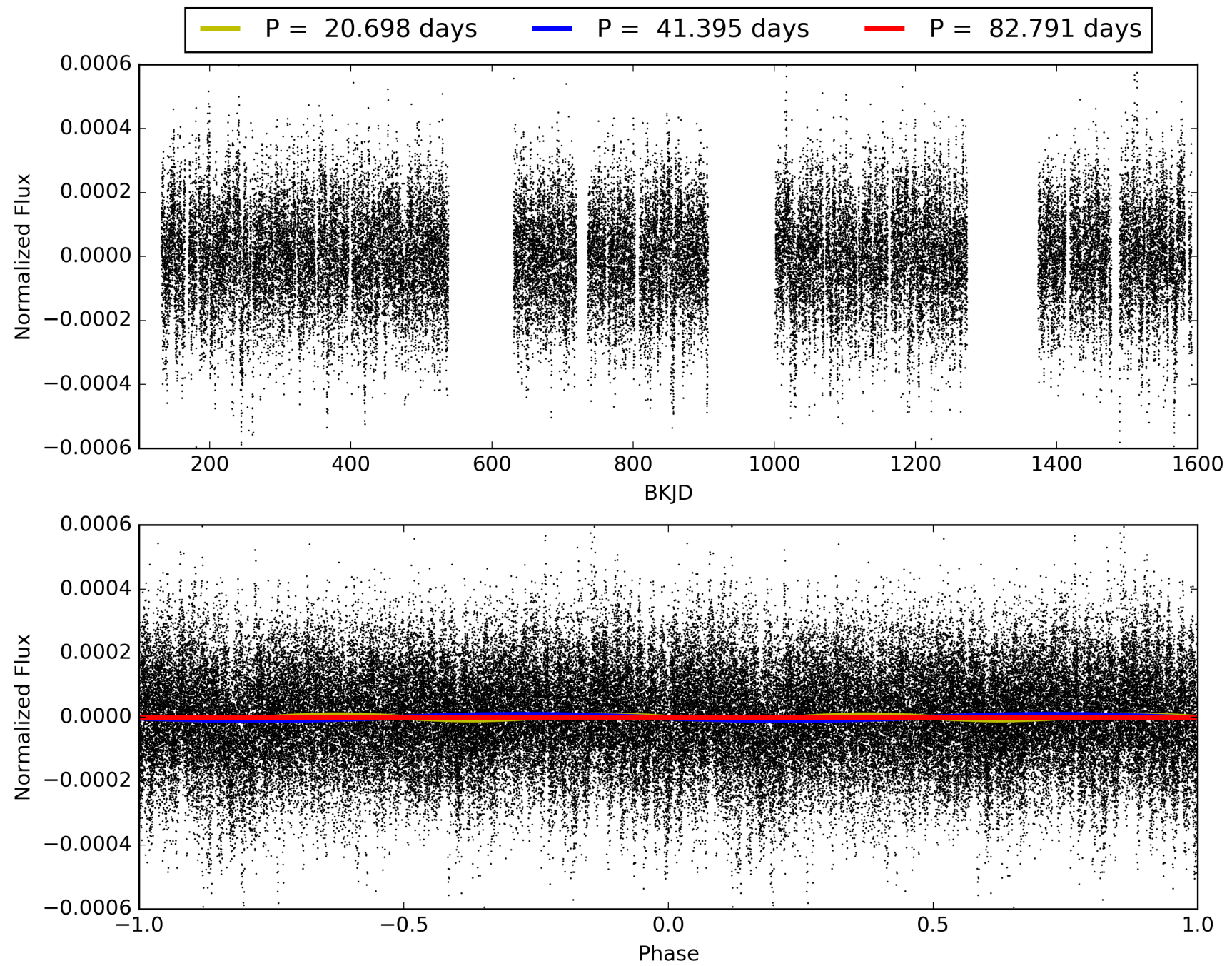
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 22:13:12 Z

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

TCE 004659837-06, PDC Light Curves

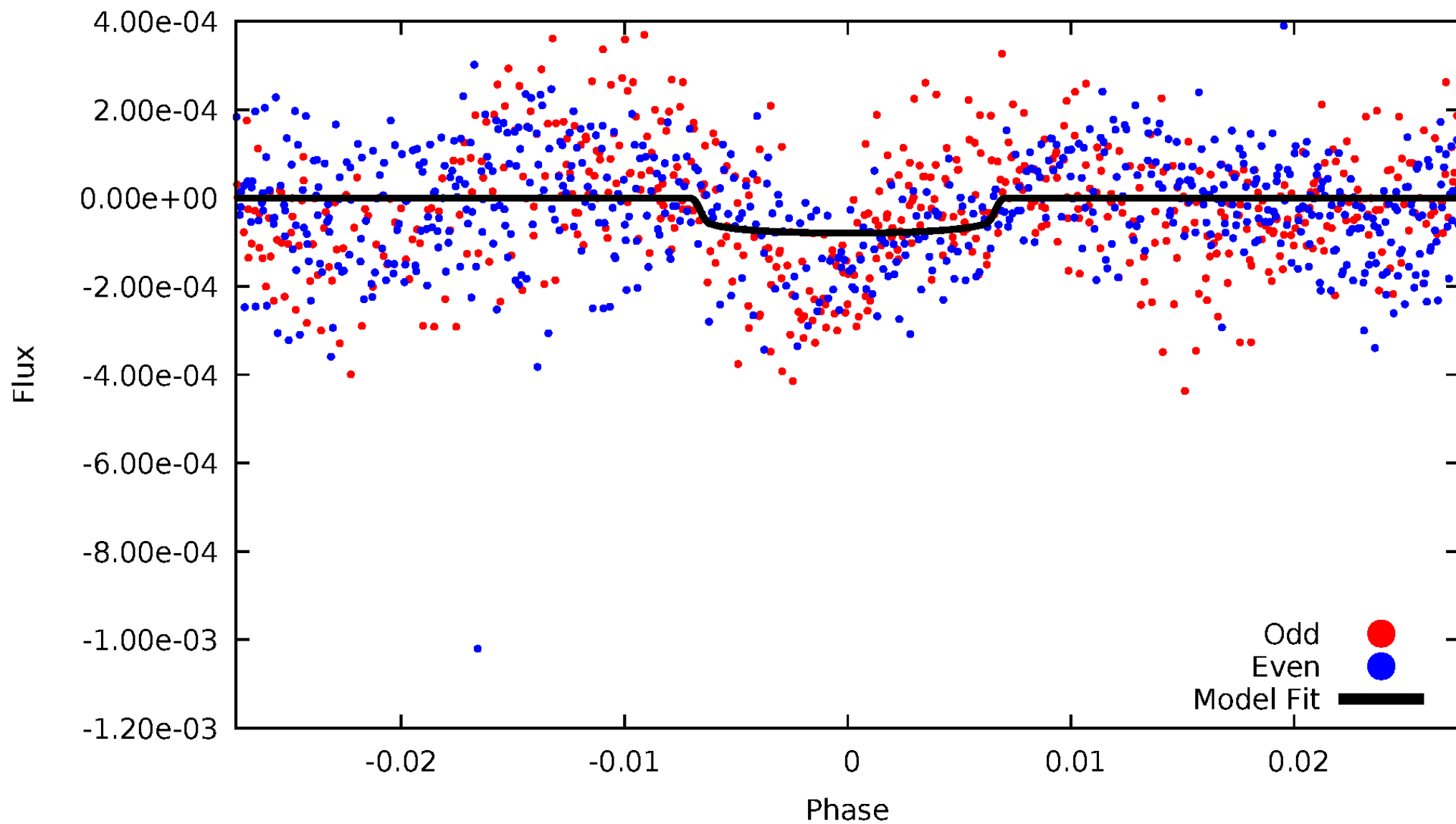


TCE 004659837-06



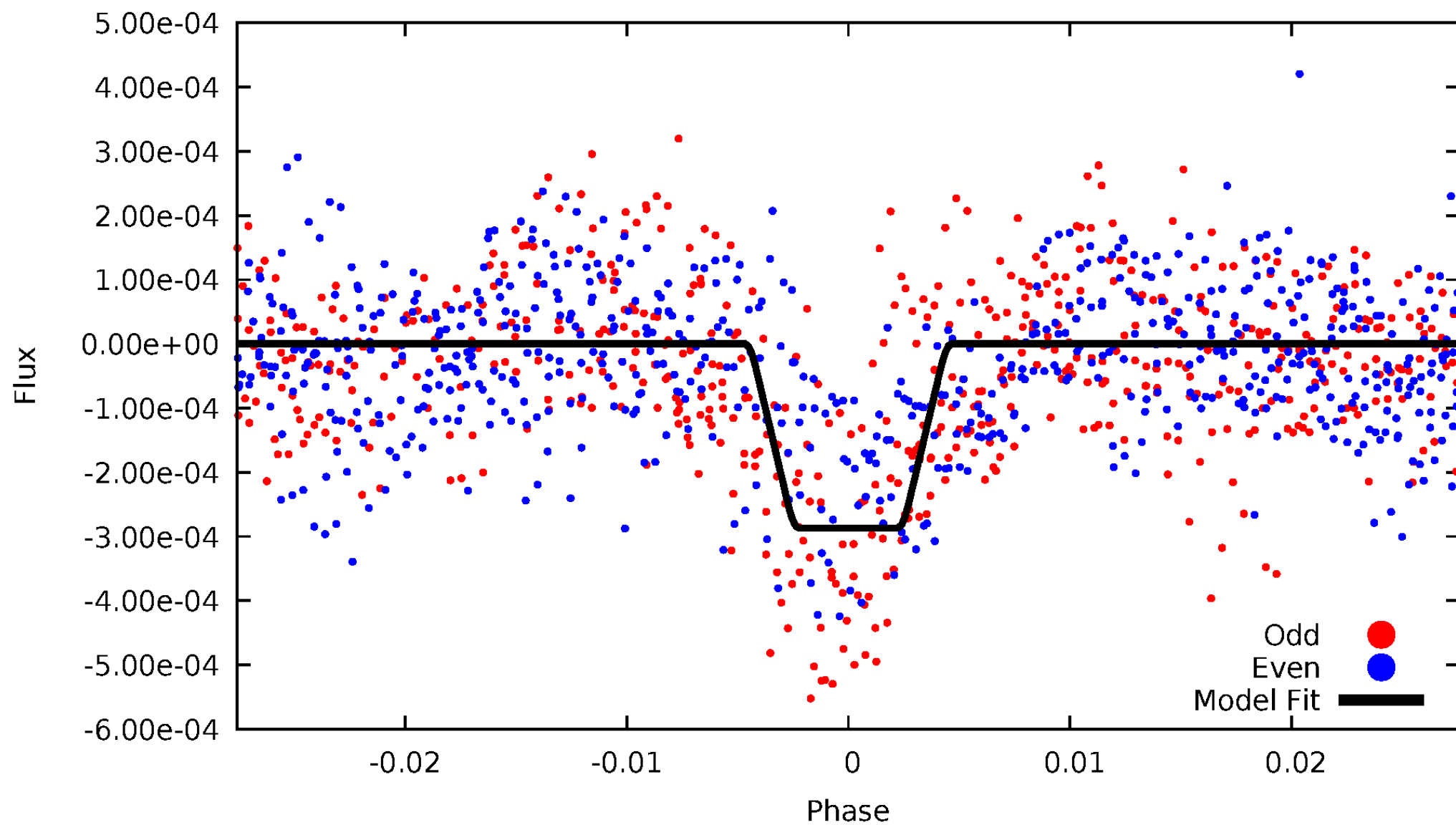
DV Odd/Even

TCE 004659837-06



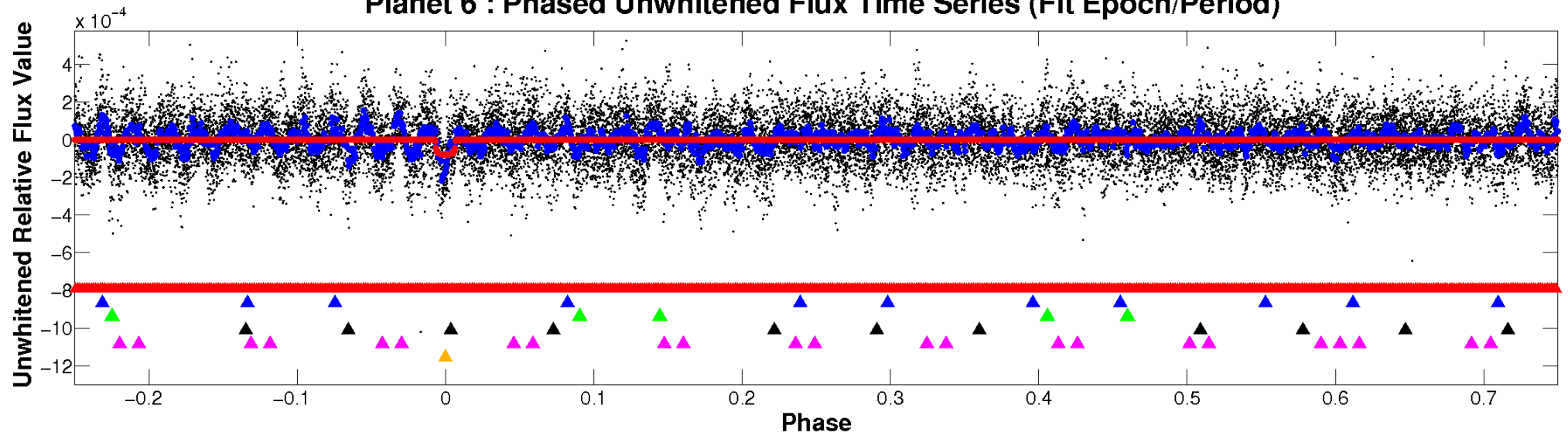
ALT Odd/Even

TCE 004659837-06

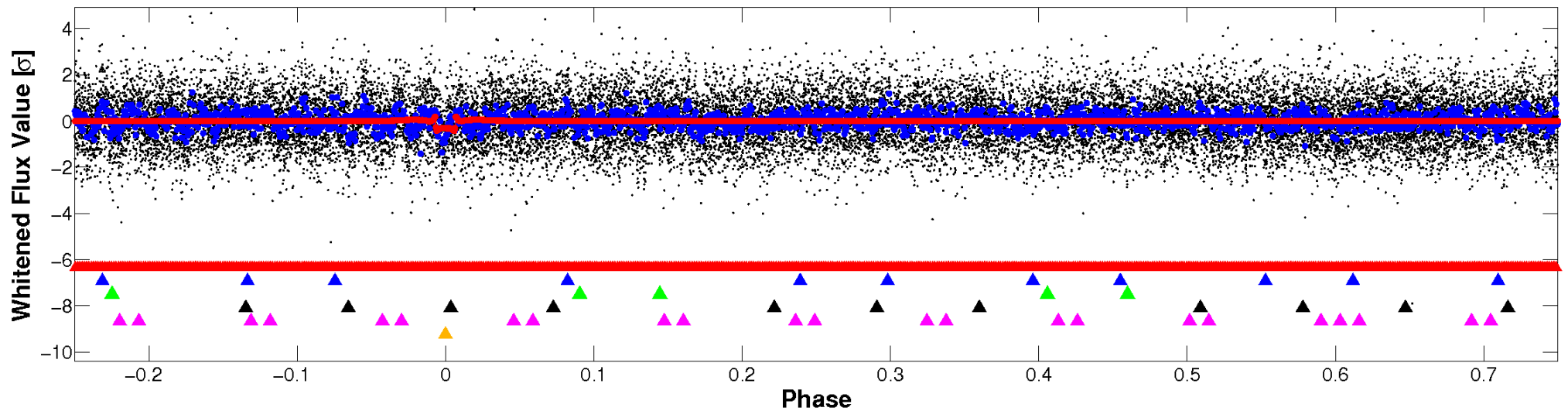


Non-Whitened Vs. Whitened Light Curve

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

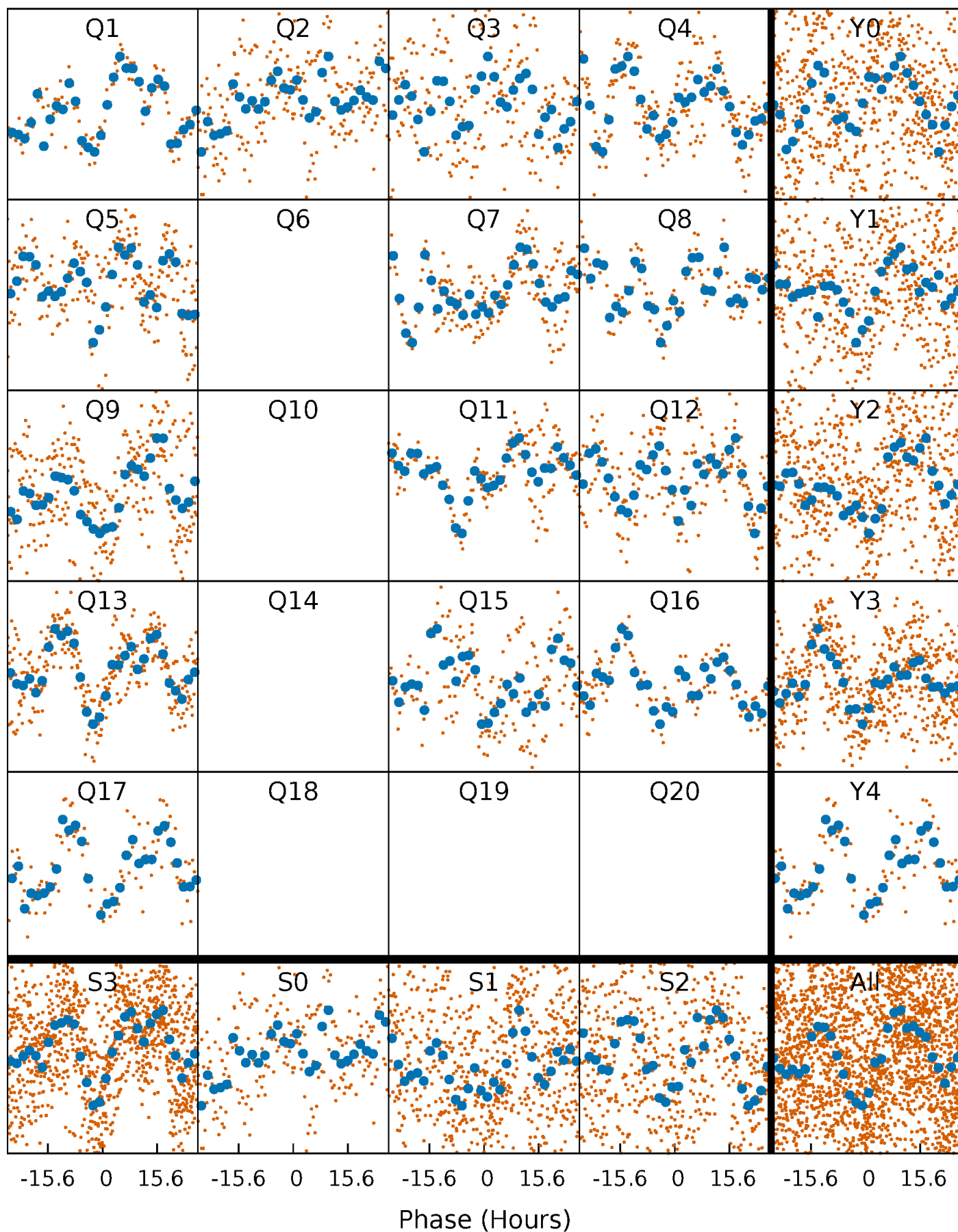


Planet 6 : Phased Whitened Flux Time Series (Fit Epoch/Period)



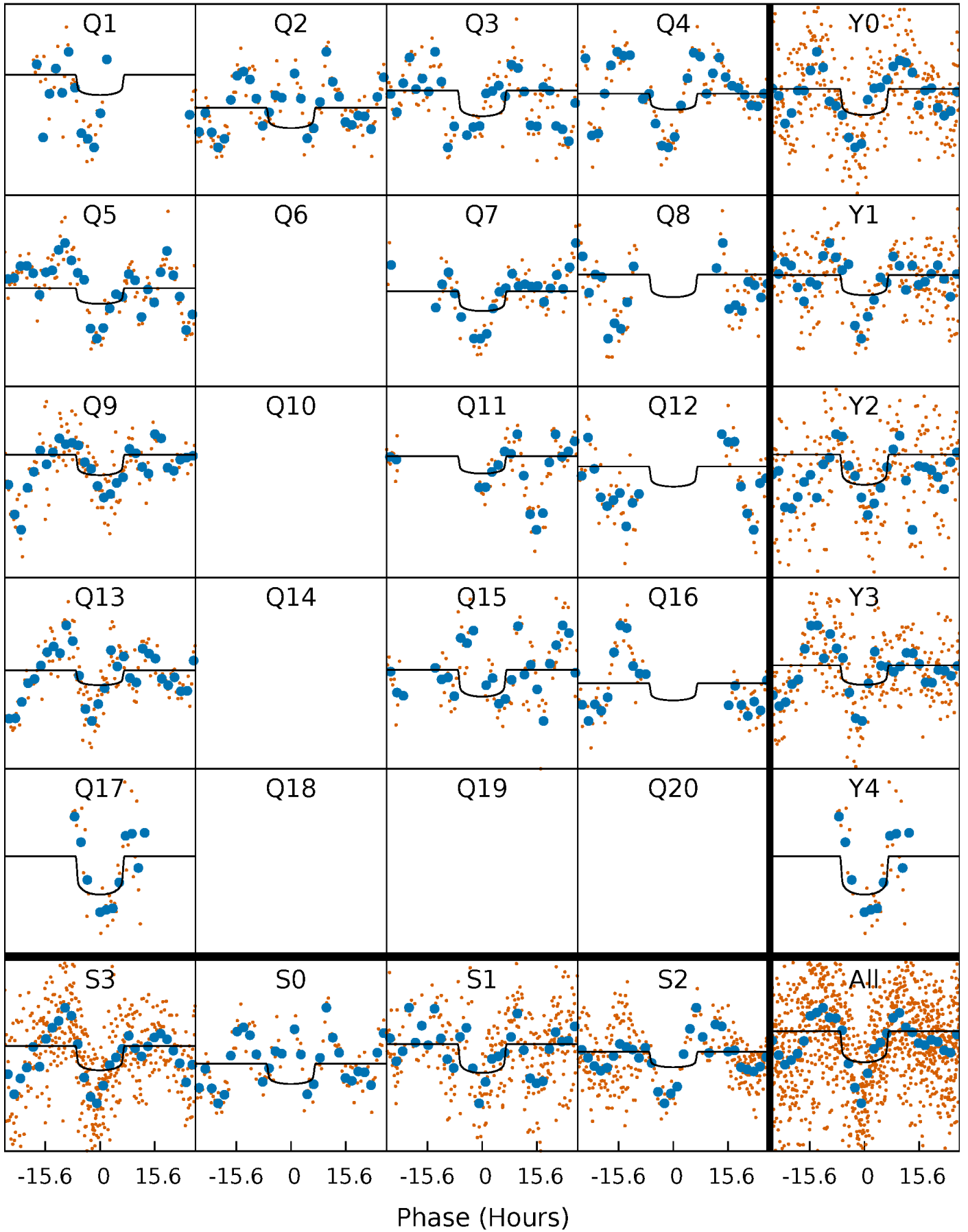
PDC Quarter-Phased Transit Curves

TCE 004659837-06 P= 41.395366 Days $T_0=153.532238$ (BKJD)



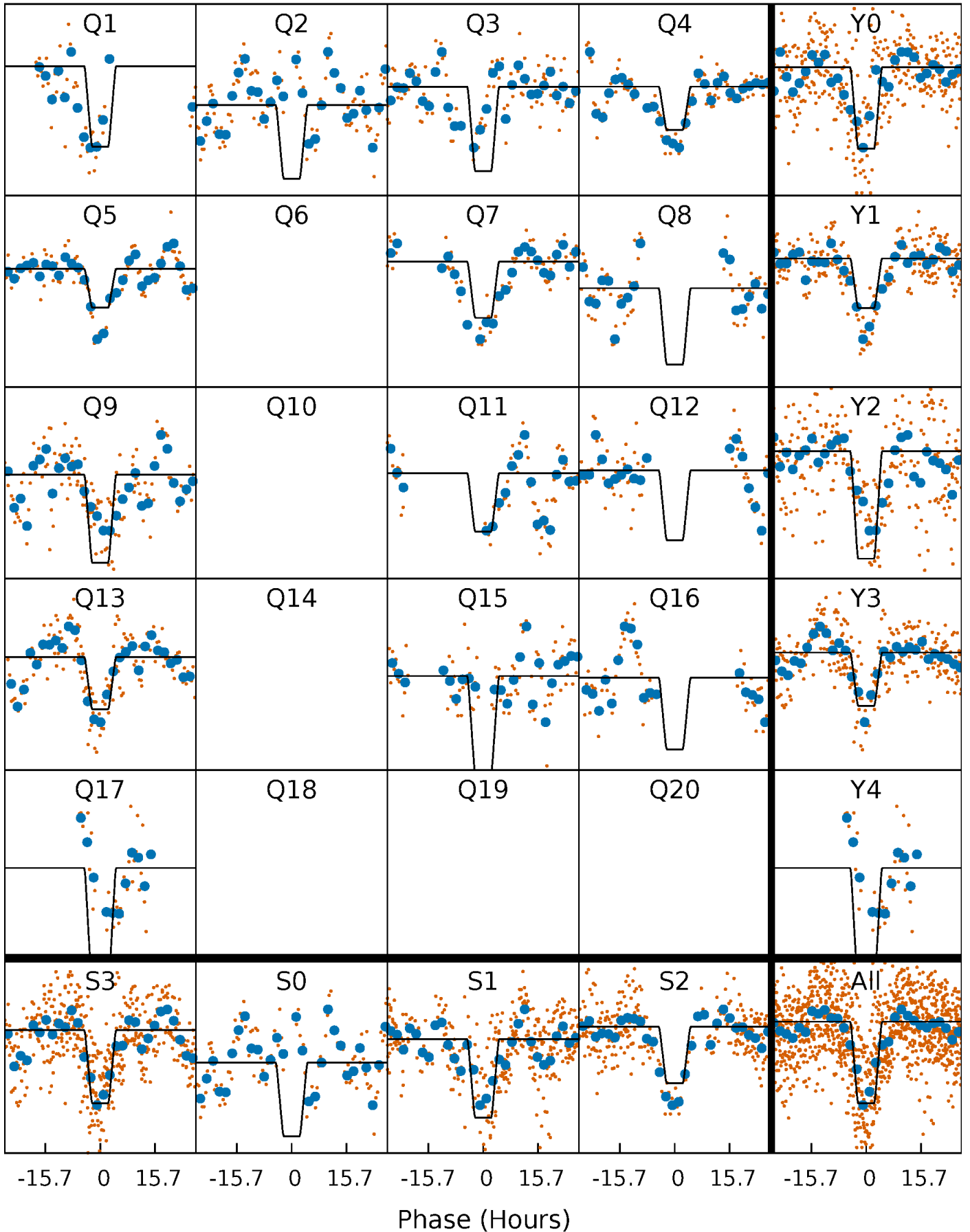
DV Quarter-Phased Transit Curves

TCE 004659837-06 P= 41.395366 Days $T_0=153.532238$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

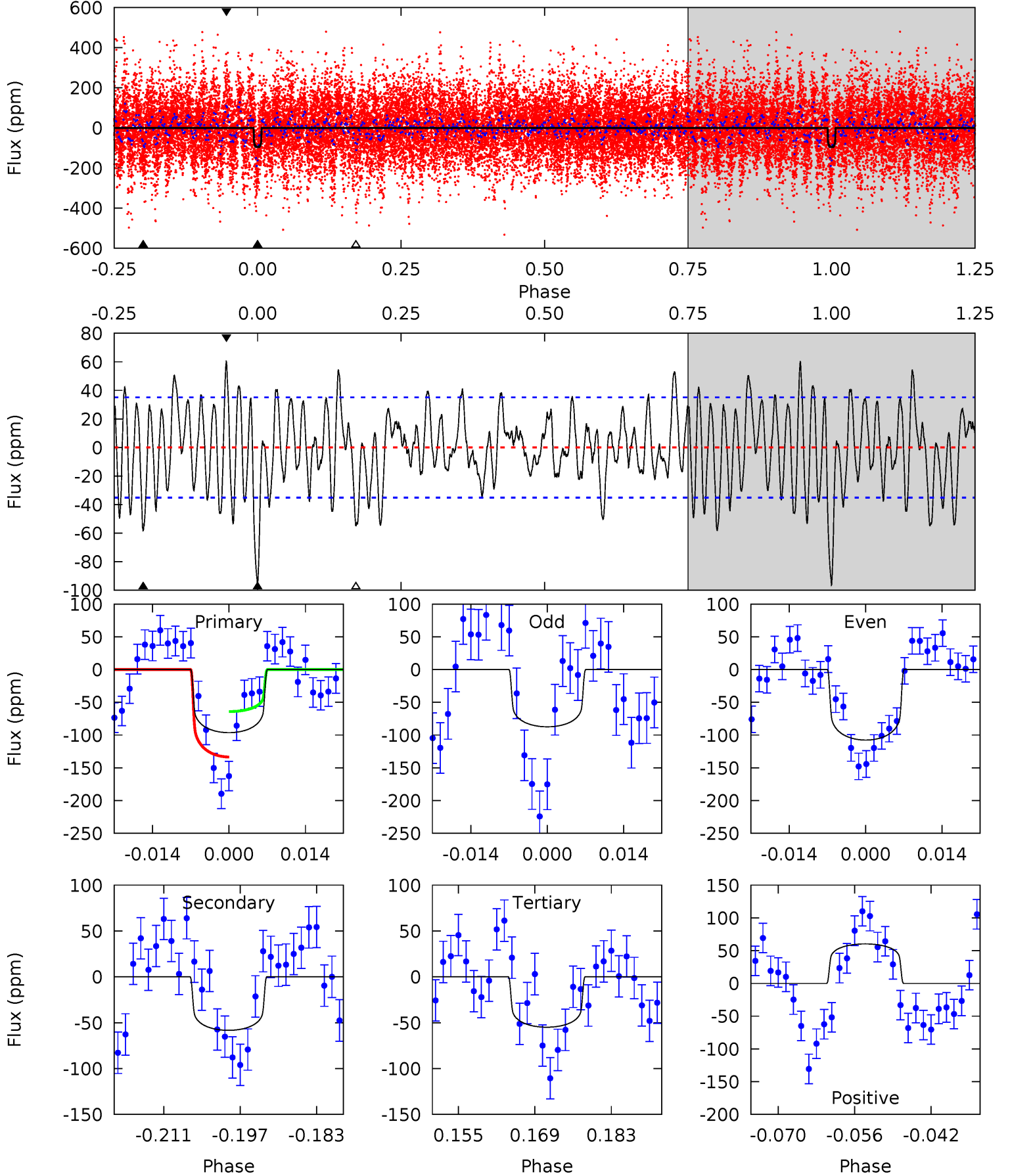
TCE 004659837-06 P= 41.394012 Days $T_0=153.508351$ (BKJD)



DV Model-Shift Uniqueness Test

004659837-06, P = 41.395366 Days, E = 112.136872 Days

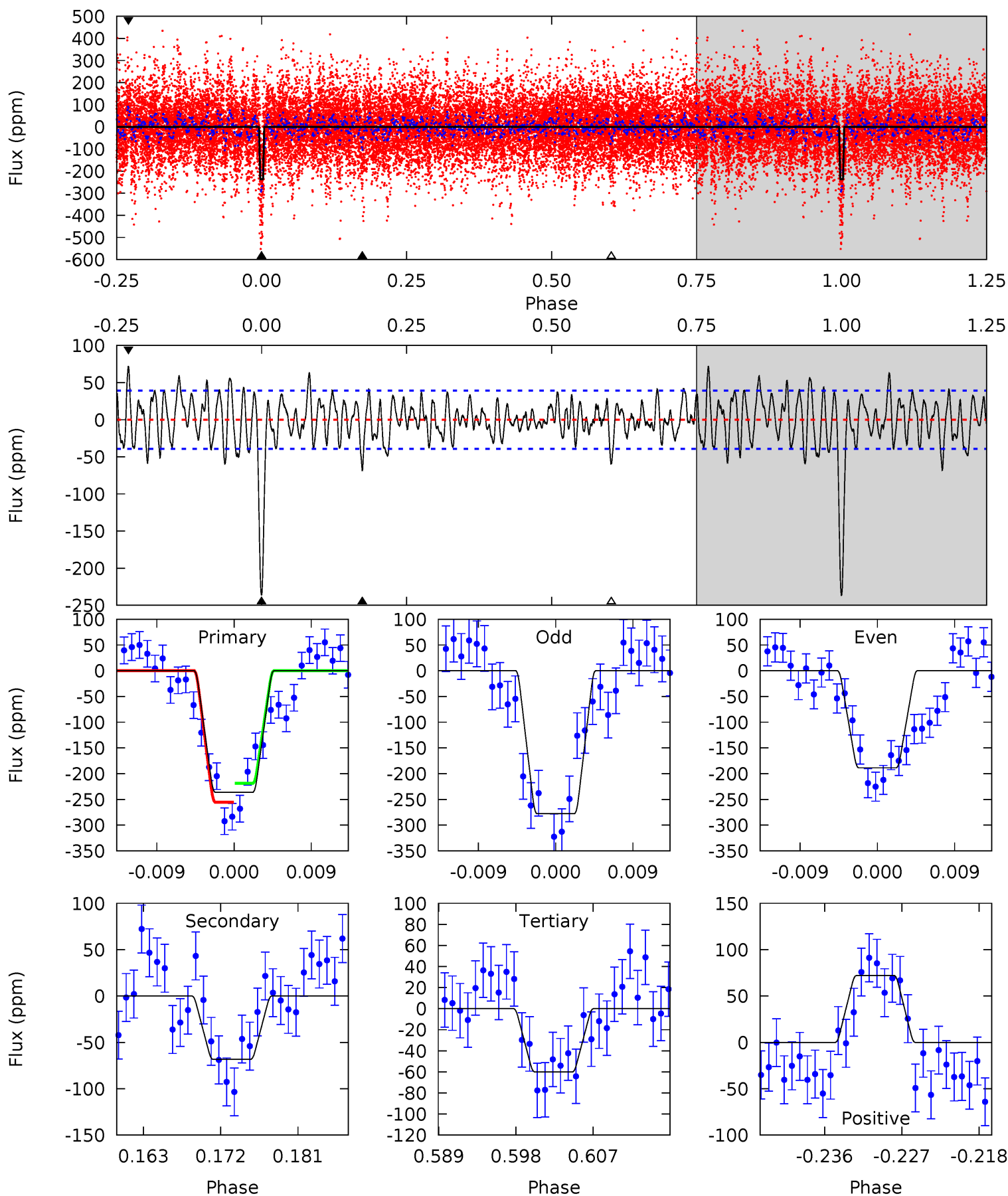
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.6	8.25	7.77	8.52	4.96	2.46	3.15	5.86	5.11	0.48	-0.27	1.43	0.95	0.38	4.91



Alt Model-Shift Uniqueness Test

004659837-06, P = 41.394012 Days, E = 112.114339 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
30.3	8.77	7.70	9.25	5.05	2.61	2.90	22.6	21.1	1.06	-0.48	5.68	1.00	0.23	2.34



Stellar Parameters For KIC 004659837

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6859^{+153}_{-204}	$3.761^{+0.285}_{-0.095}$	$-0.100^{+0.300}_{-0.250}$	$2.770^{+0.499}_{-0.927}$	$1.613^{+0.232}_{-0.283}$	$0.107^{+0.216}_{-0.033}$
	+2%/-3%	+8%/-3%	+300%/-250%	+18%/-33%	+14%/-18%	+202%/-31%
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 004659837-06 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-58 ± 7	$2.65^{+0.72}_{-0.61}$	1314^{+80}_{-108}	6195^{+689}_{-558}	343^{+242}_{-124}
Alt.	-68 ± 8	$4.92^{+0.85}_{-0.94}$	1316^{+78}_{-123}	4861^{+245}_{-220}	117^{+57}_{-31}

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

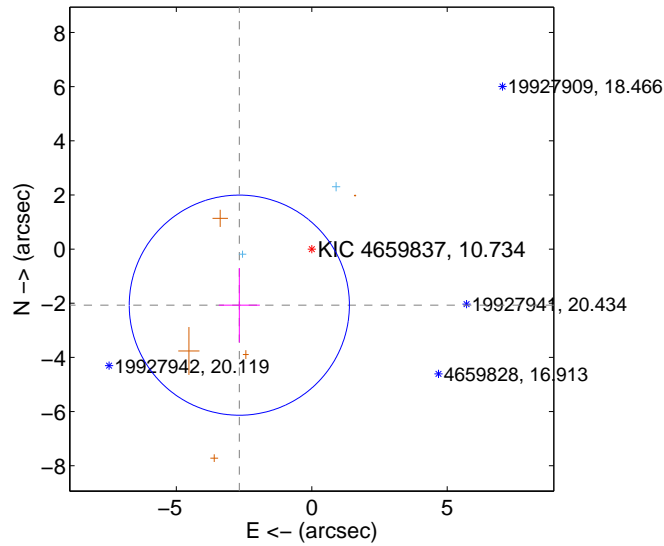
Supplemental centroid analysis for 004659837-06. **Kepler magnitude: 10.73.** Transit SNR 5.83

There are 2 quarters with good PRF difference image offsets

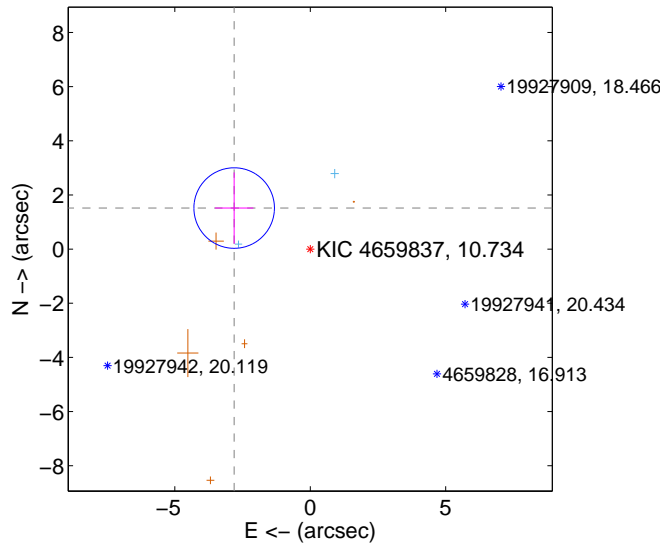
The direct PRF centroid is offset from the target star catalog position by about 0.38 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	3.382 ± 1.355	2.50	2.675 ± 0.755	-2.070 ± 1.372
PRF-fit source offset from KIC position	3.192 ± 0.495	6.44	2.809 ± 0.709	1.516 ± 1.317
photometric centroid source offset	1.15 ± 0.97	1.19	0.32 ± 0.74	1.11 ± 0.99

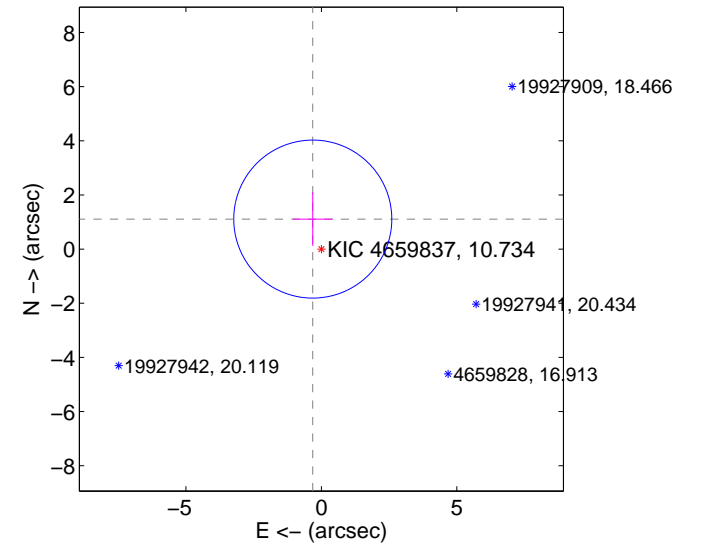
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

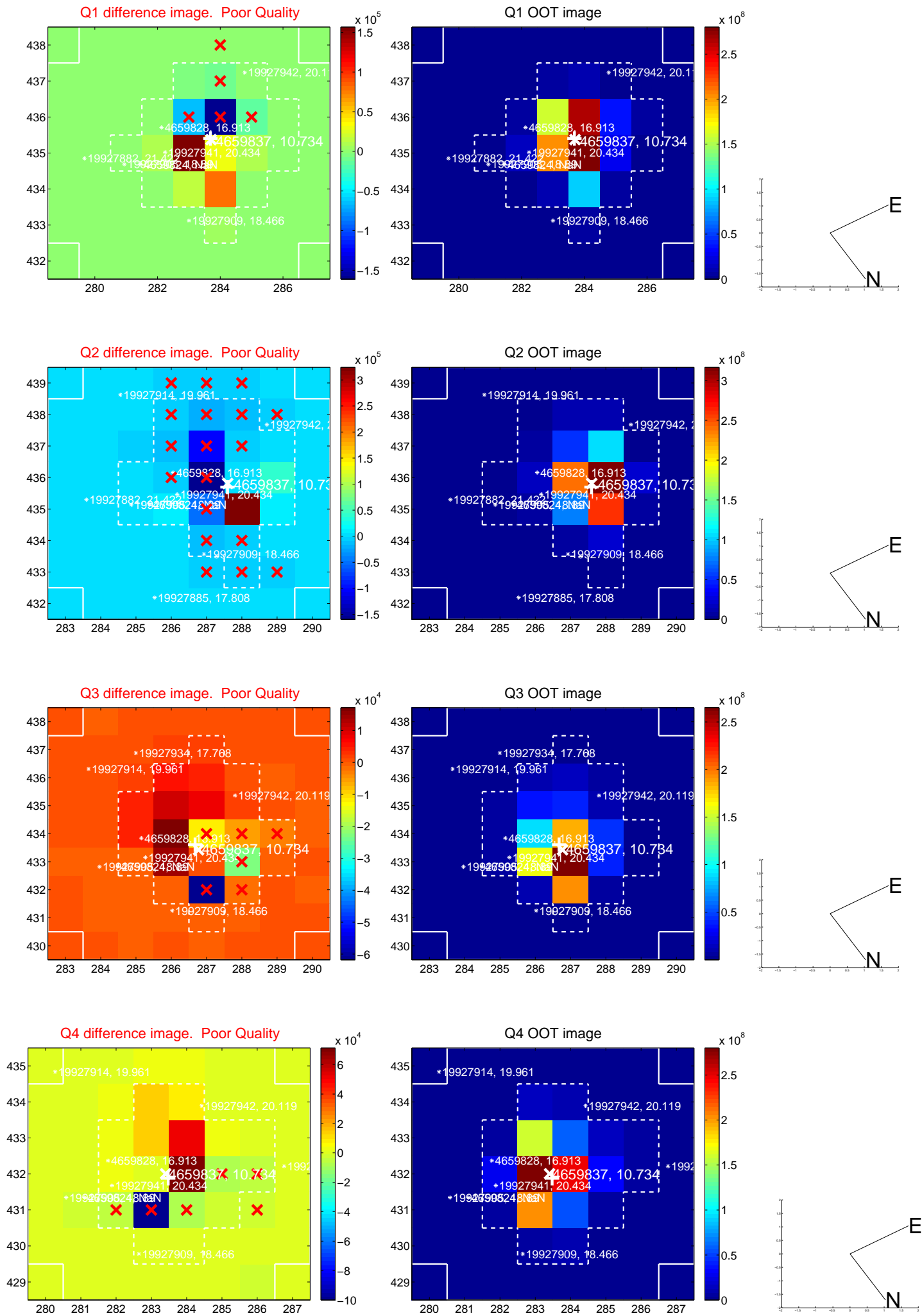


offset from photometric centroids

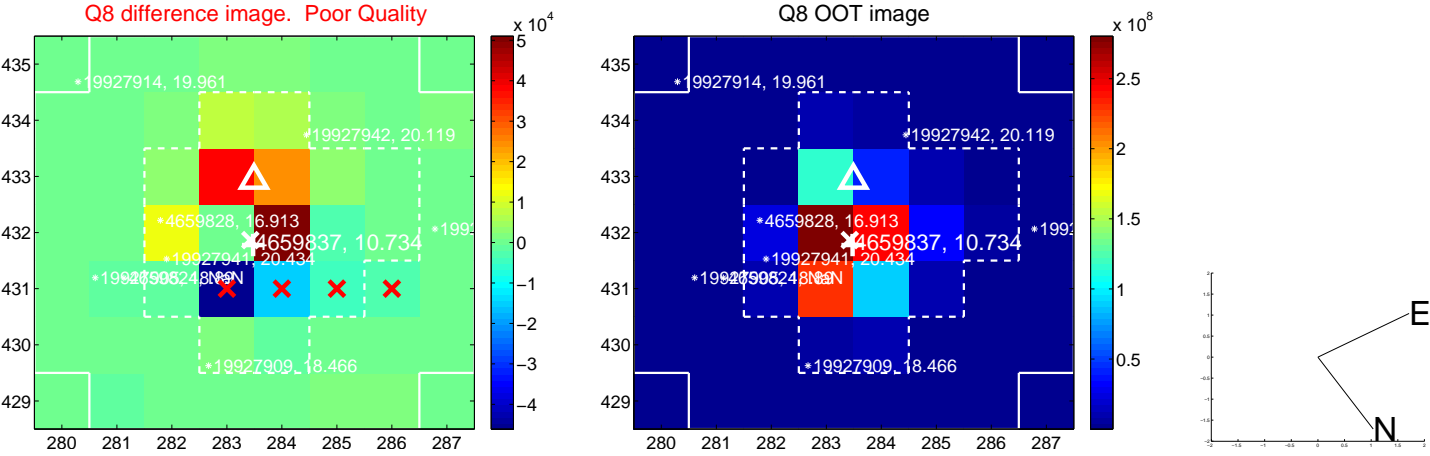
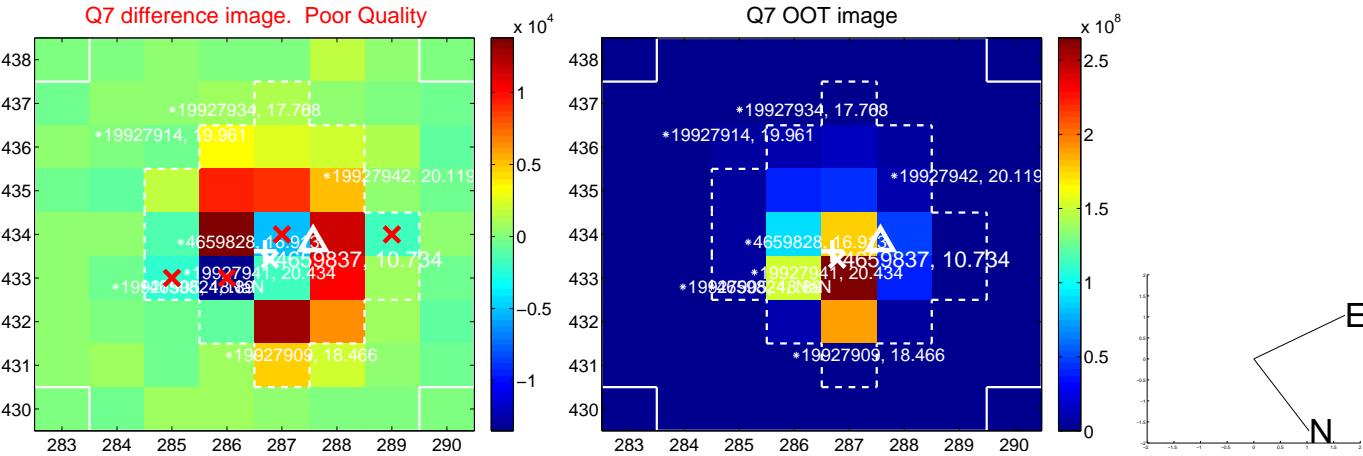
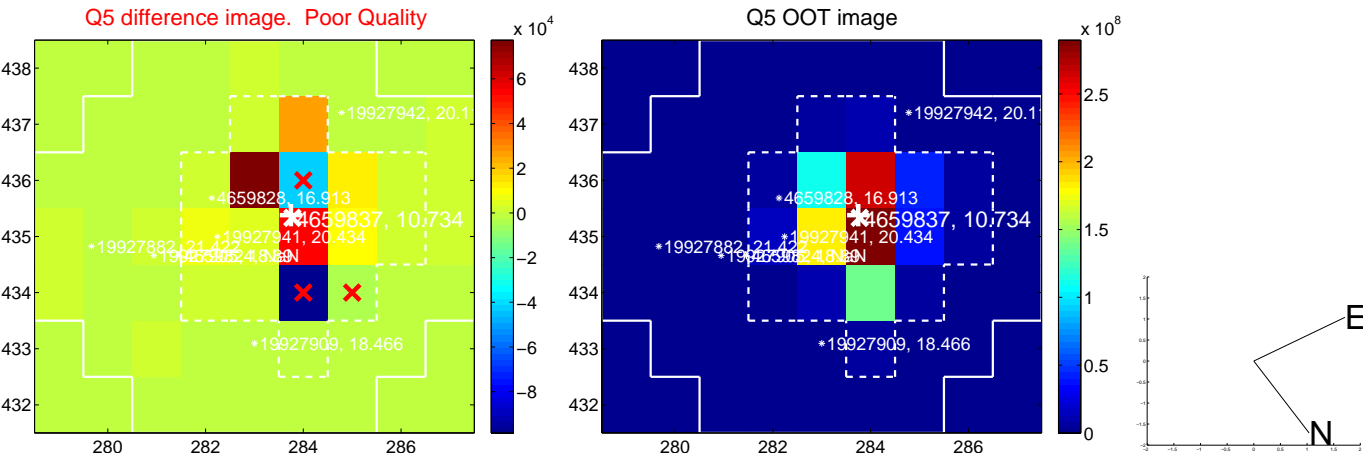


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

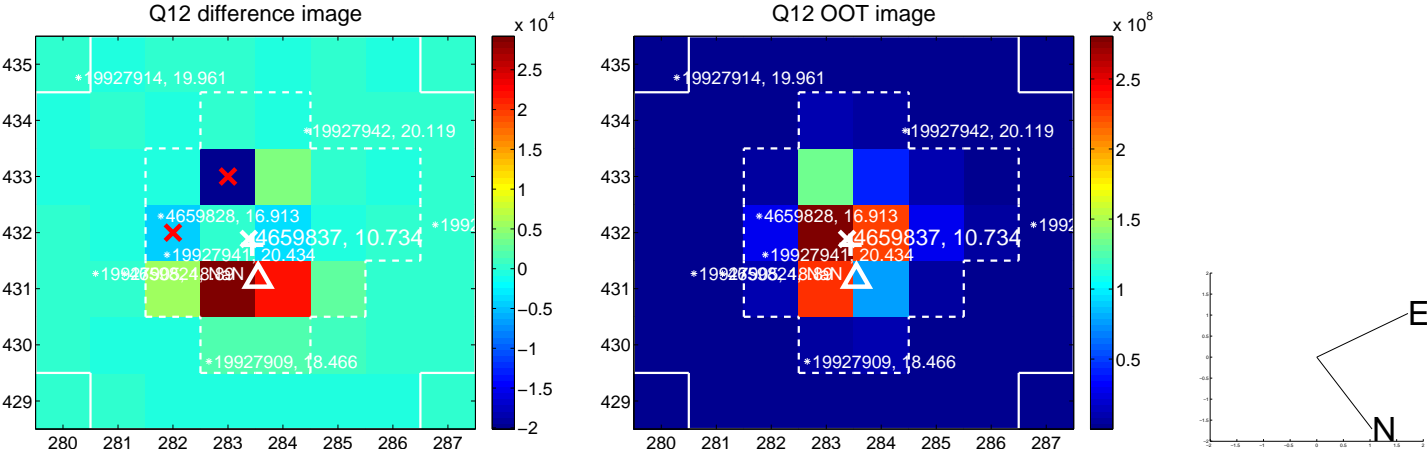
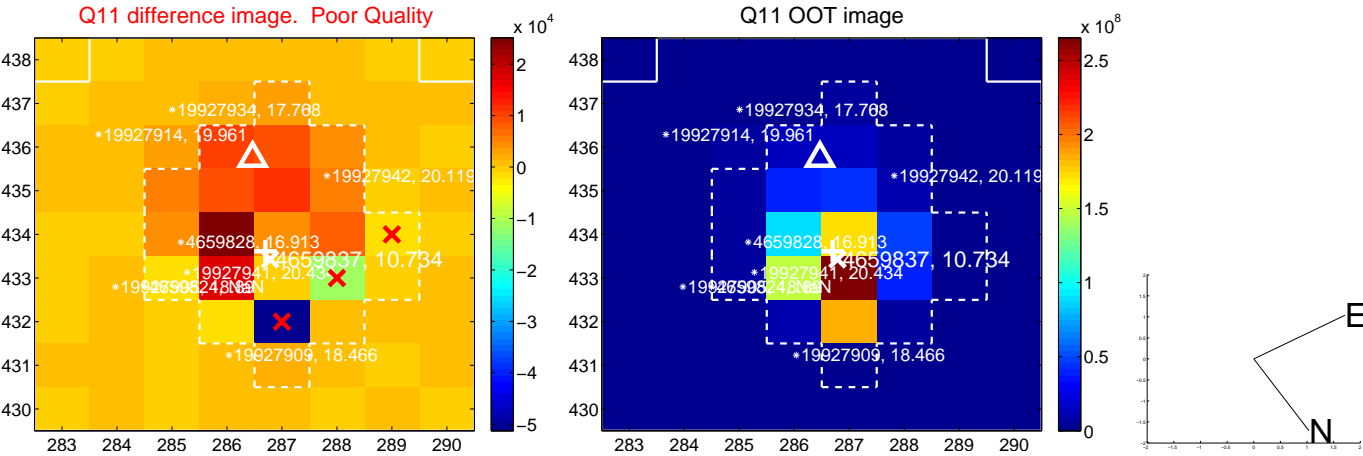
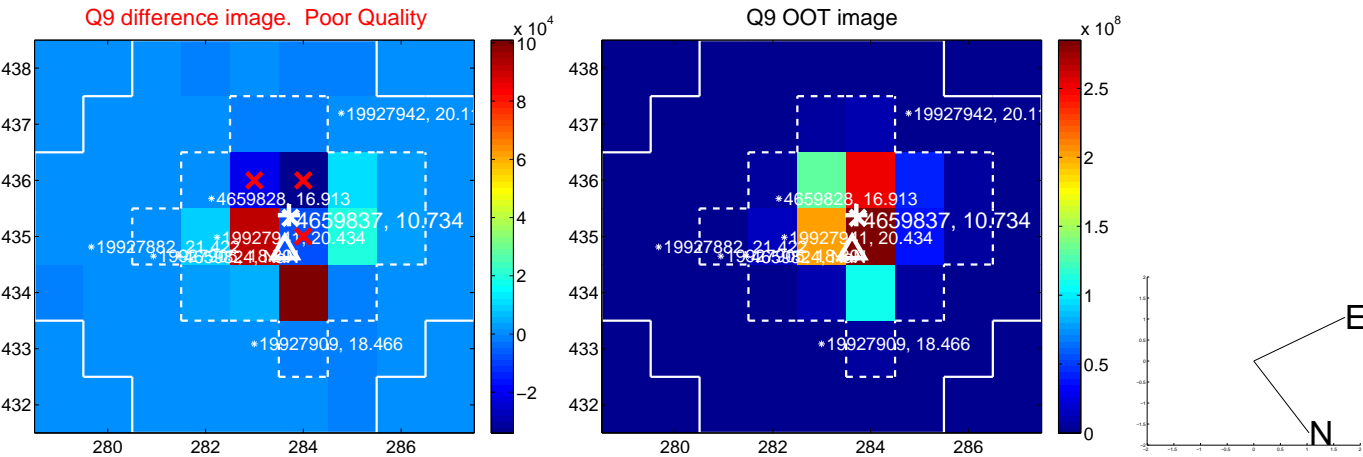
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



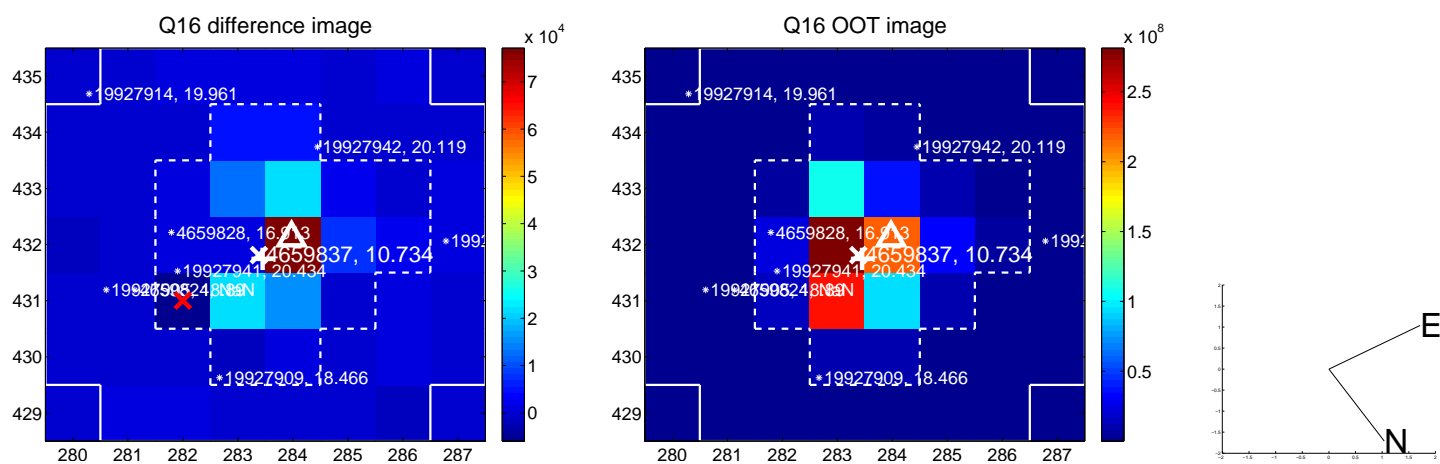
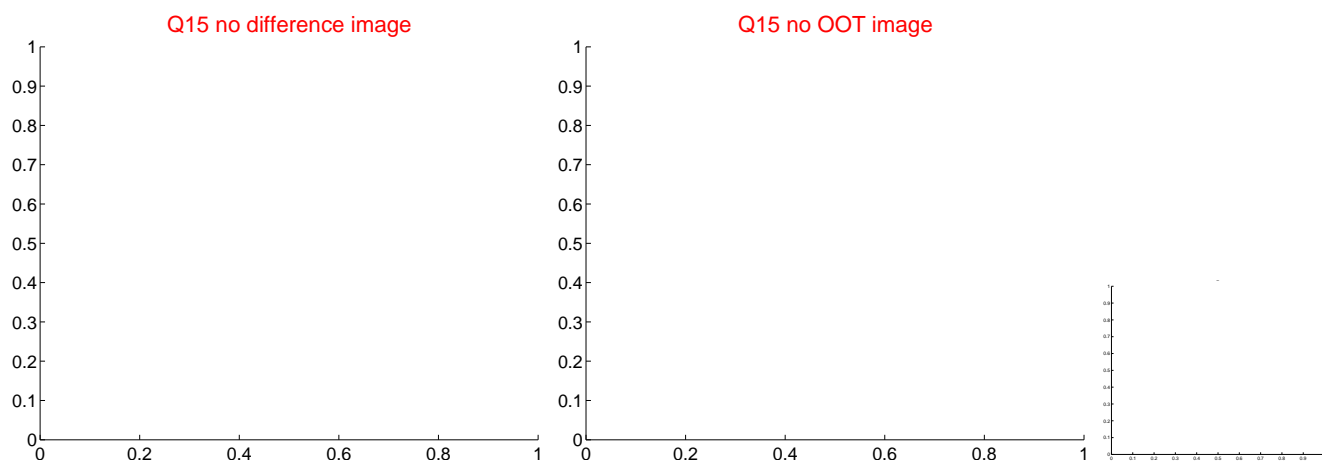
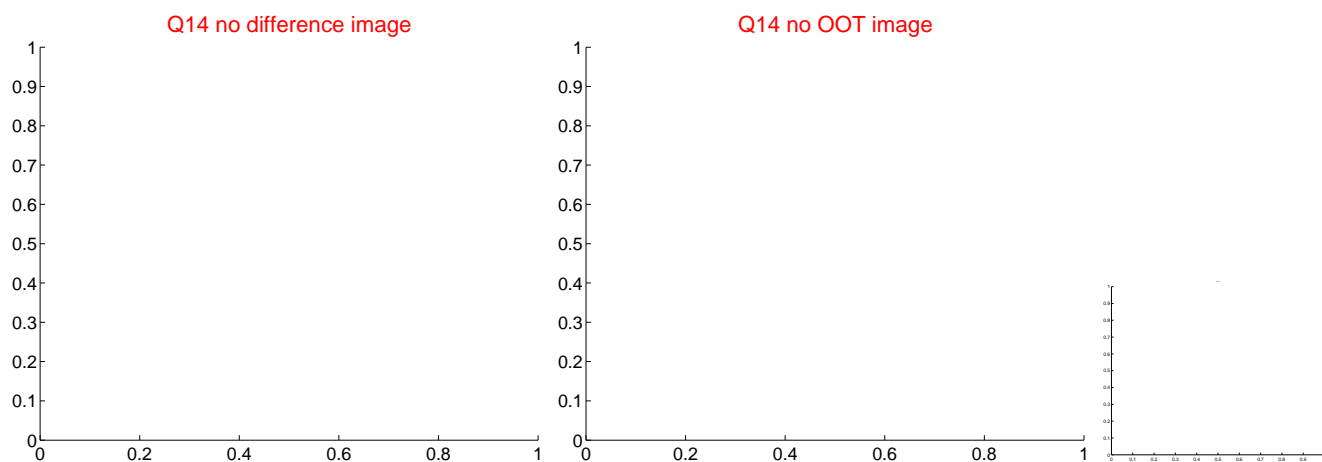
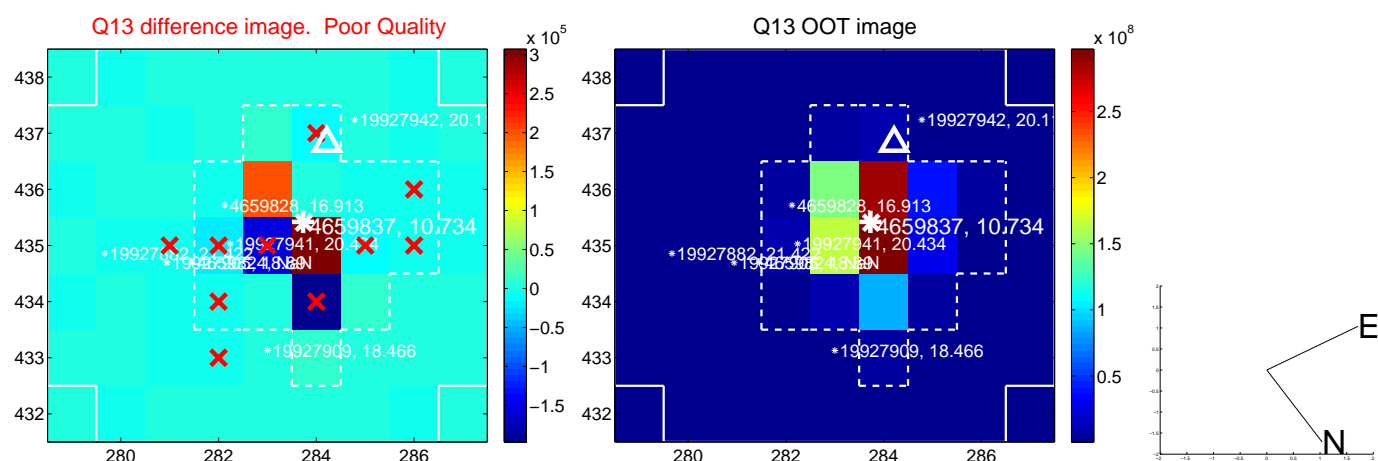
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



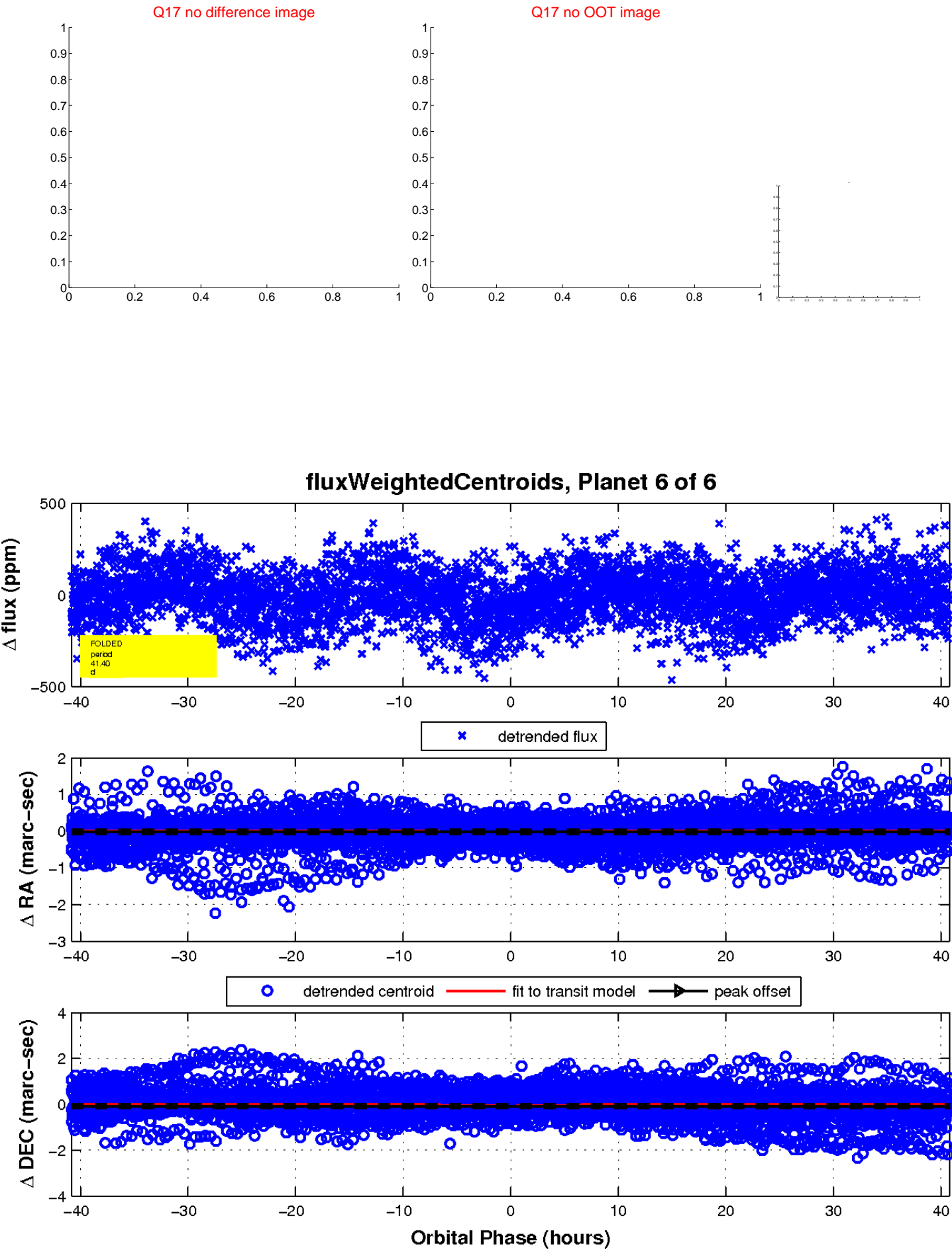
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

