

KIC 009716358

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})
009716358-01	OBS	No	0.785806	131.863328	28.4	4.510	9.4	7.5	2.21	6725	1.24	24293.63
009716358-02	OBS	No	75.217320	158.473313	385.7	6.022	9.5	4.7	2.21	6725	5.44	55.48
009716358-03	OBS	No	257.807312	155.400821	2795.6	27.319	7.9	8.2	2.21	6725	21.31	10.74

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009716358-01	OBS	FP	0.00	1	0	0	0	LPP_DV
009716358-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
009716358-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT

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

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

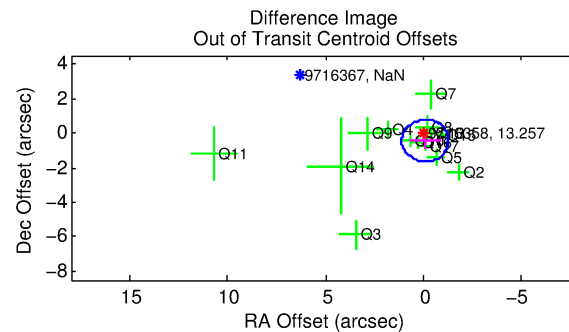
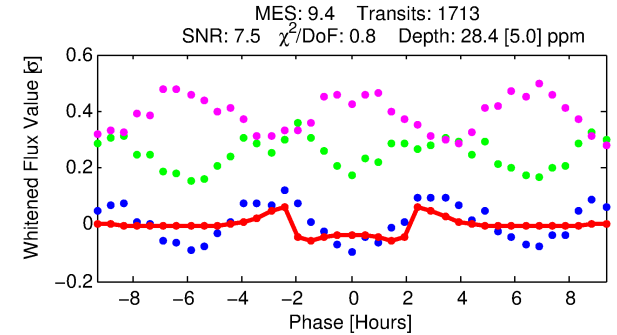
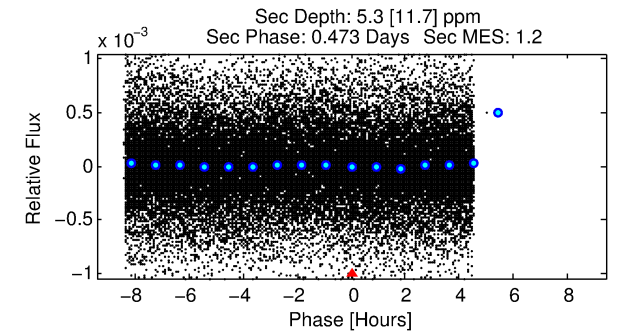
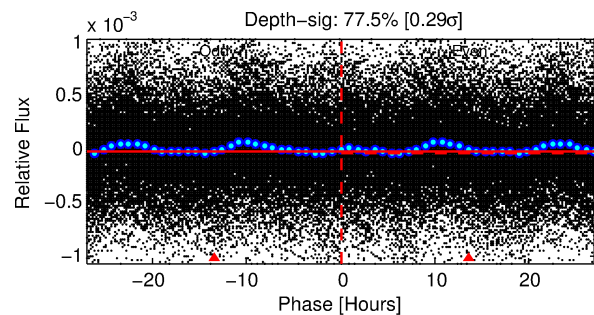
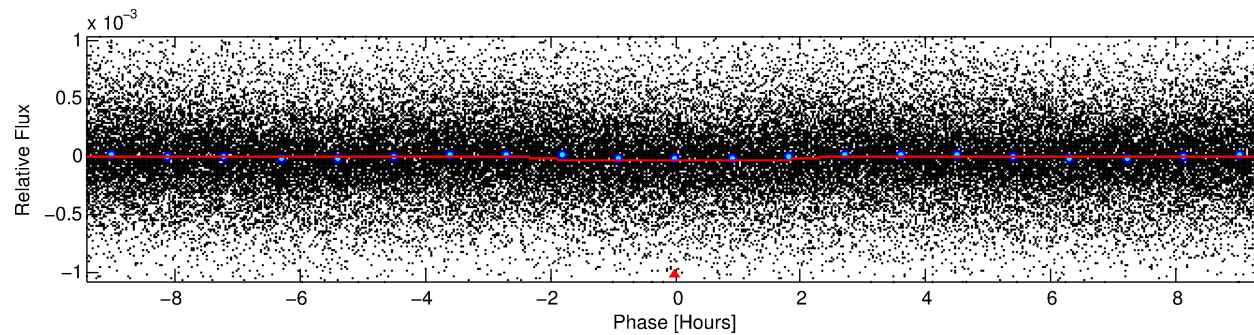
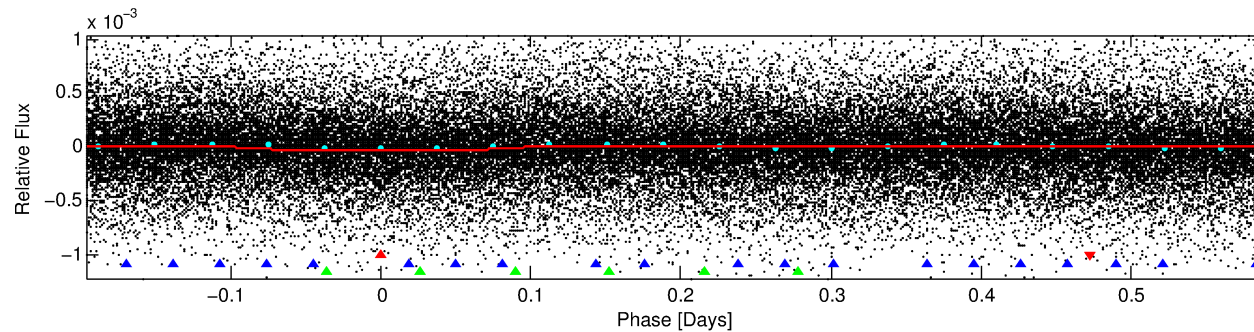
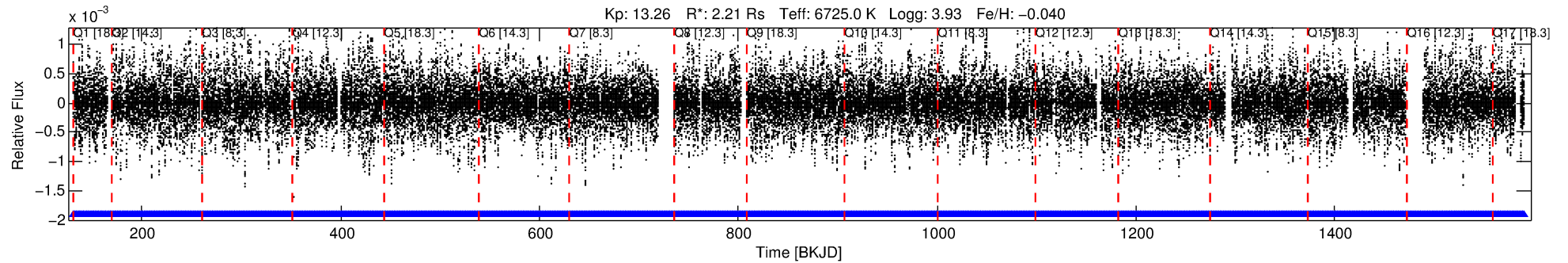
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009716358-01

No Significant Match Found

DV One-Page Summary

KIC: 9716358 Candidate: 1 of 3 Period: 0.786 d



DV Fit Results:

Period = 0.78581 [0.00001] d
Epoch = 131.8633 [0.0024] BKJD
Rp/R* = 0.0051 [0.0014]
a/R* = 1.32 [0.82]
b = 0.62 [1.49]
Seff = 24293.63 [13836.77]
Teq = 3183 [453] K
Rp = 1.24 [0.59] Re
a = 0.0192 [0.0068] AU
Ag = 0.70 [1.63] [-0.18 σ]
Teffp = 4502 [2557] K [0.51 σ]

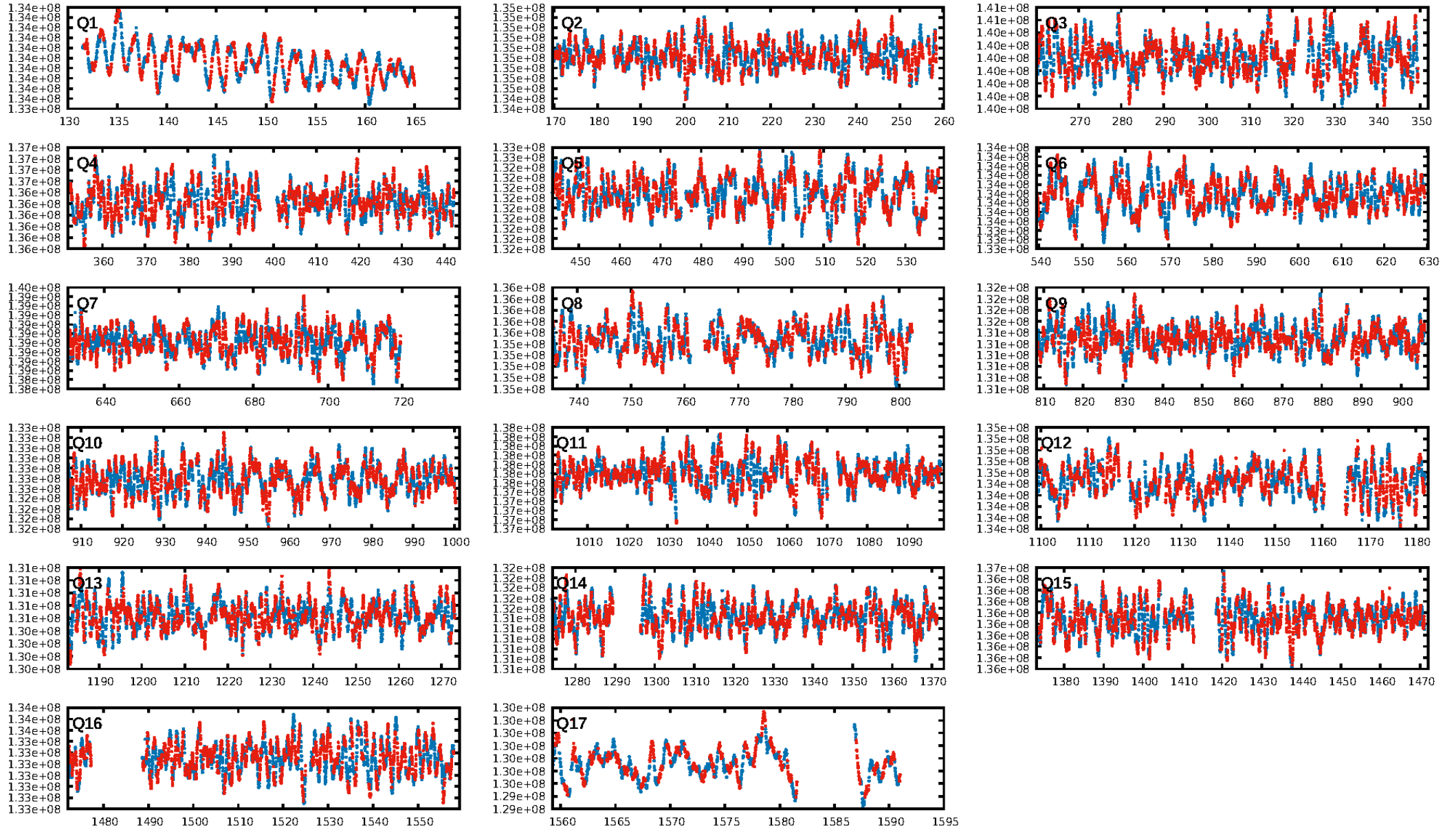
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [237.42 σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 9.75e-23
RollingBand-fgt: 1.00 [1635/1635]
GhostDiagnostic-chr: 10.6
Centroid-sig: 0.4%
Centroid-so: 0.963 arcsec [1.97 σ]
OotOffset-rm: 0.445 arcsec [1.10 σ]
KicOffset-rm: 0.501 arcsec [1.02 σ]
OotOffset-st: 3/4/3/4 [14]
KicOffset-st: 3/4/3/4 [14]
DiffImageQuality-fgm: 0.21 [3/14]
DiffImageOverlap-fno: 1.00 [17/17]

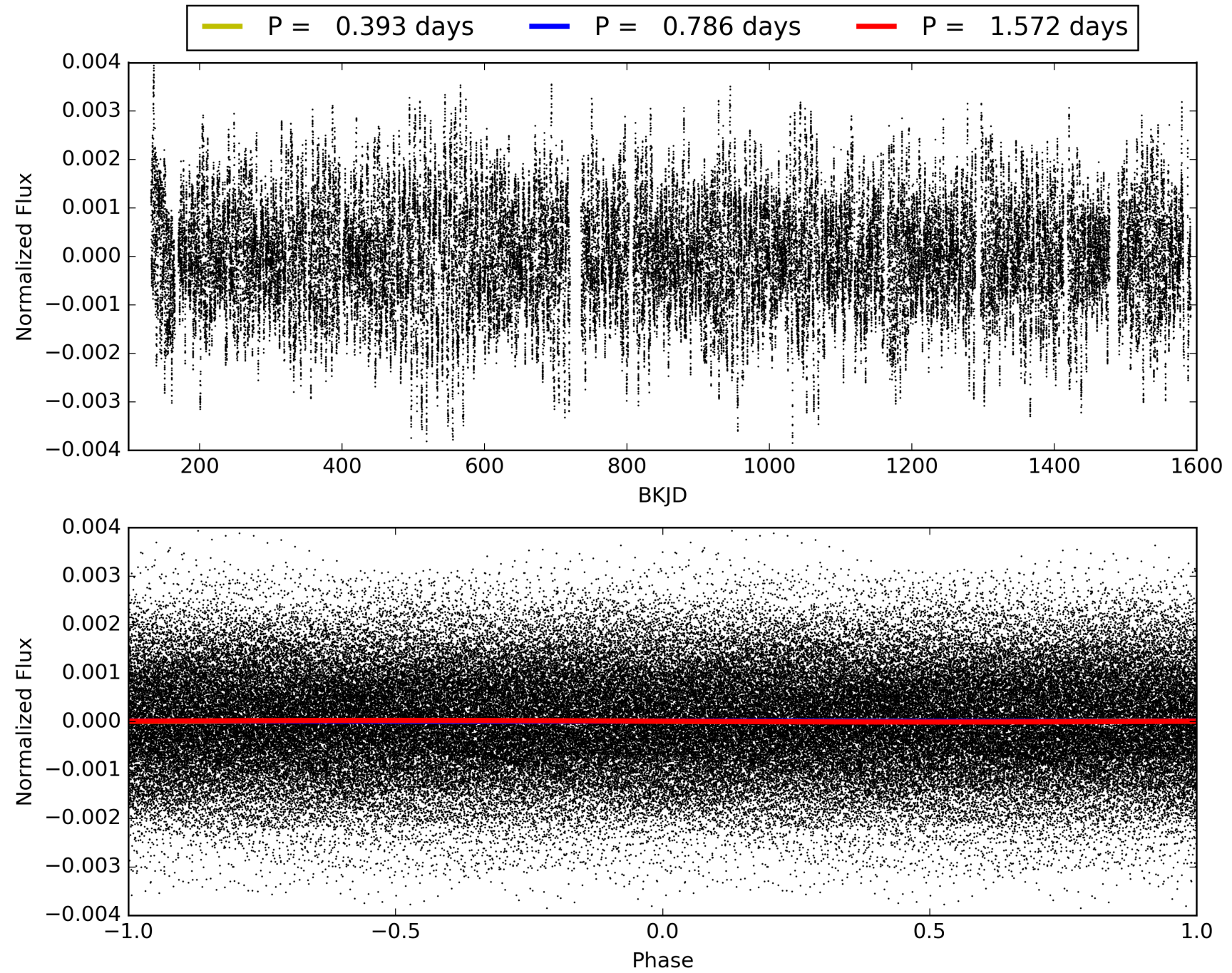
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 04:22:56 Z

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

TCE 009716358-01, PDC Light Curves

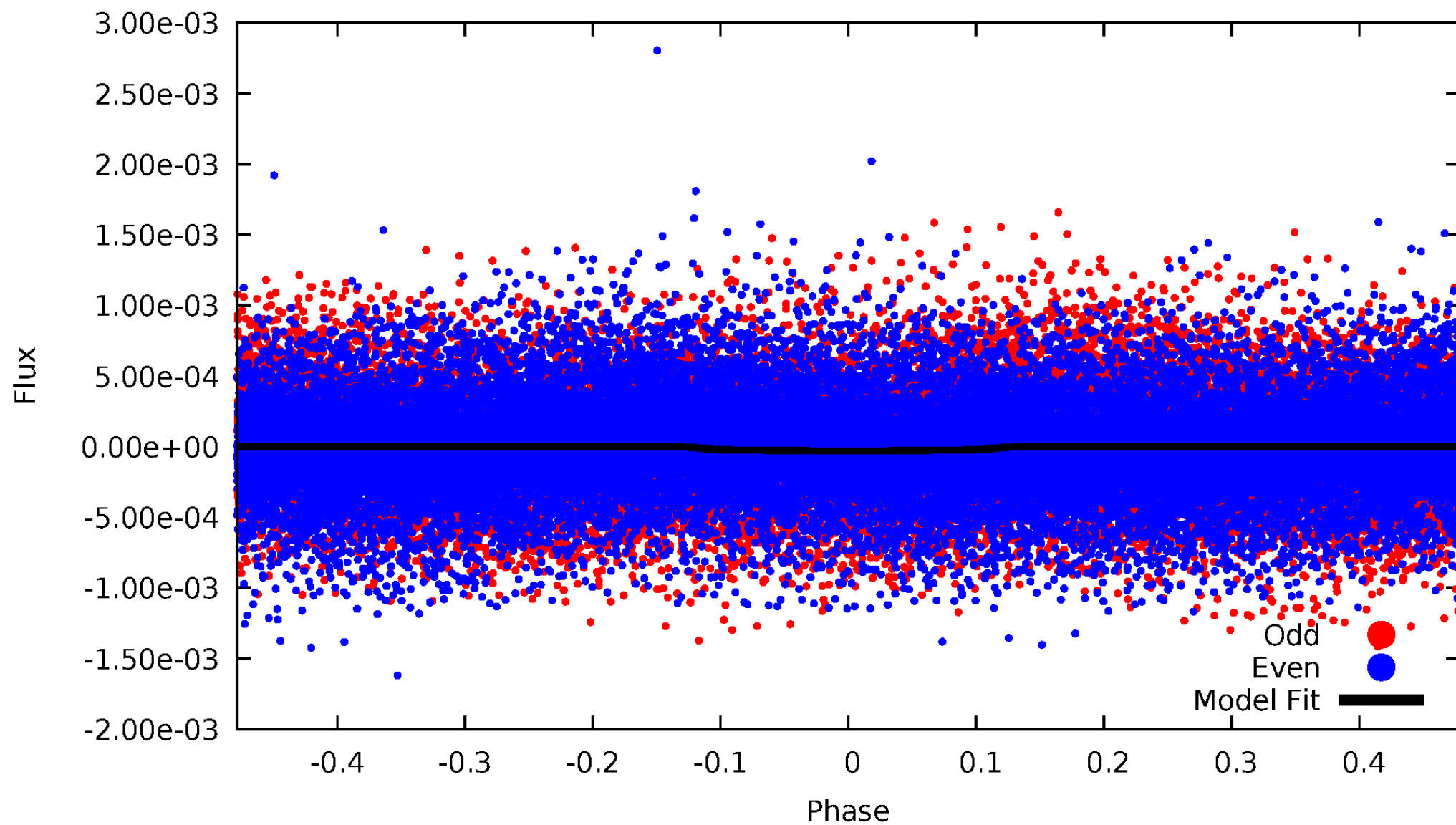


TCE 009716358-01



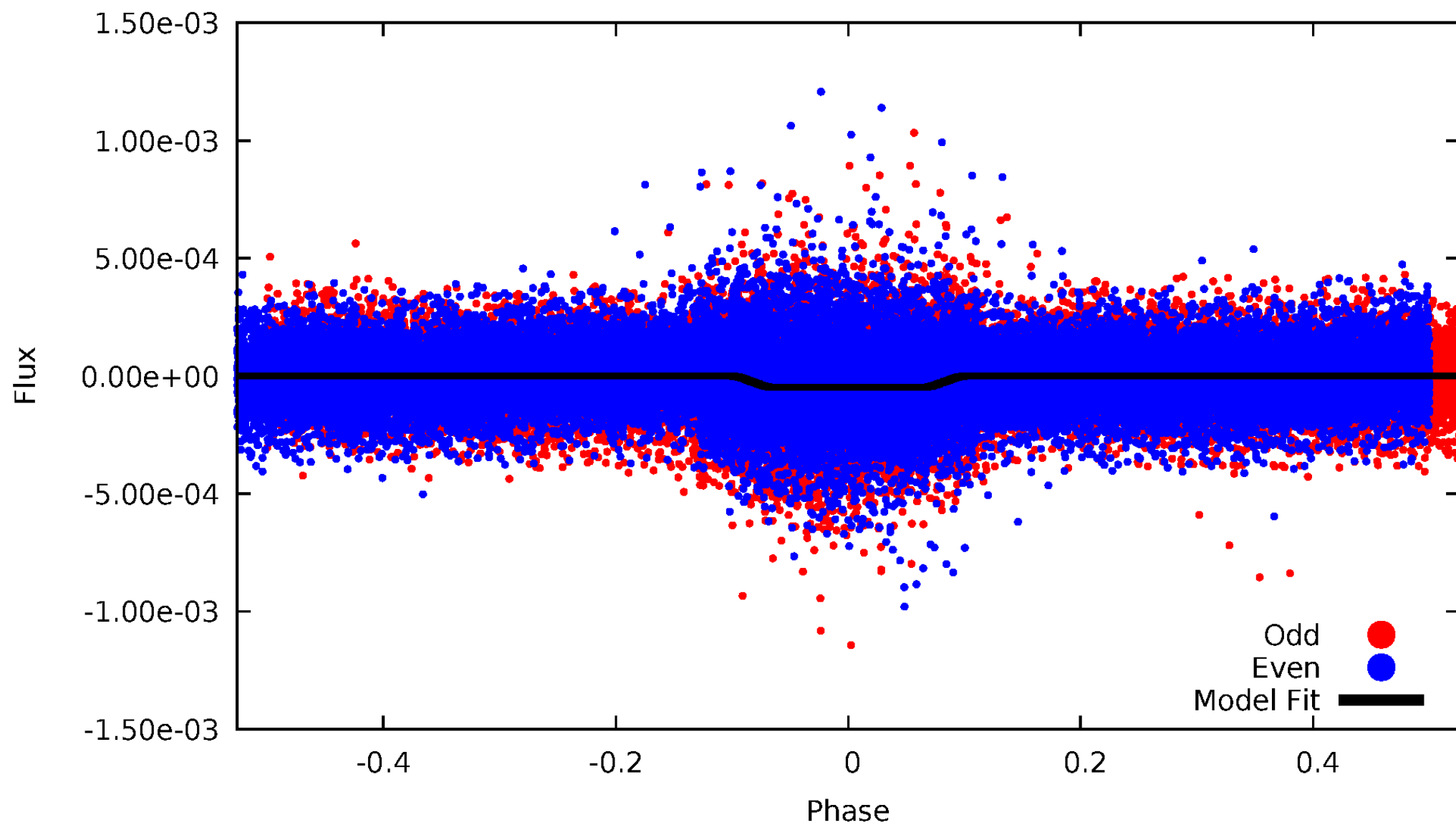
DV Odd/Even

TCE 009716358-01

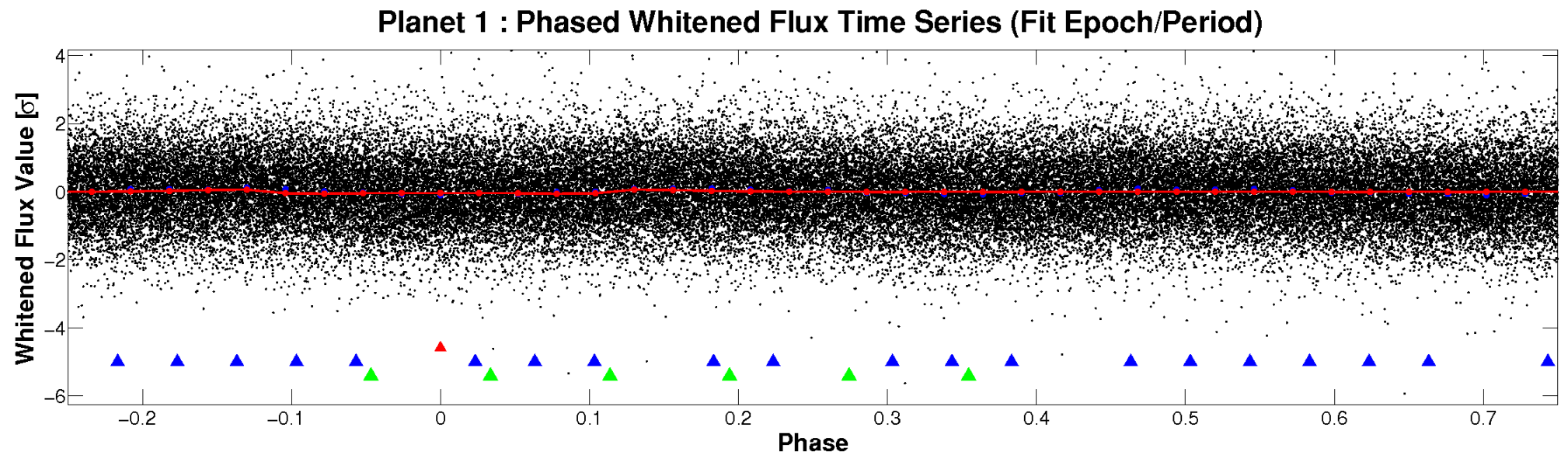
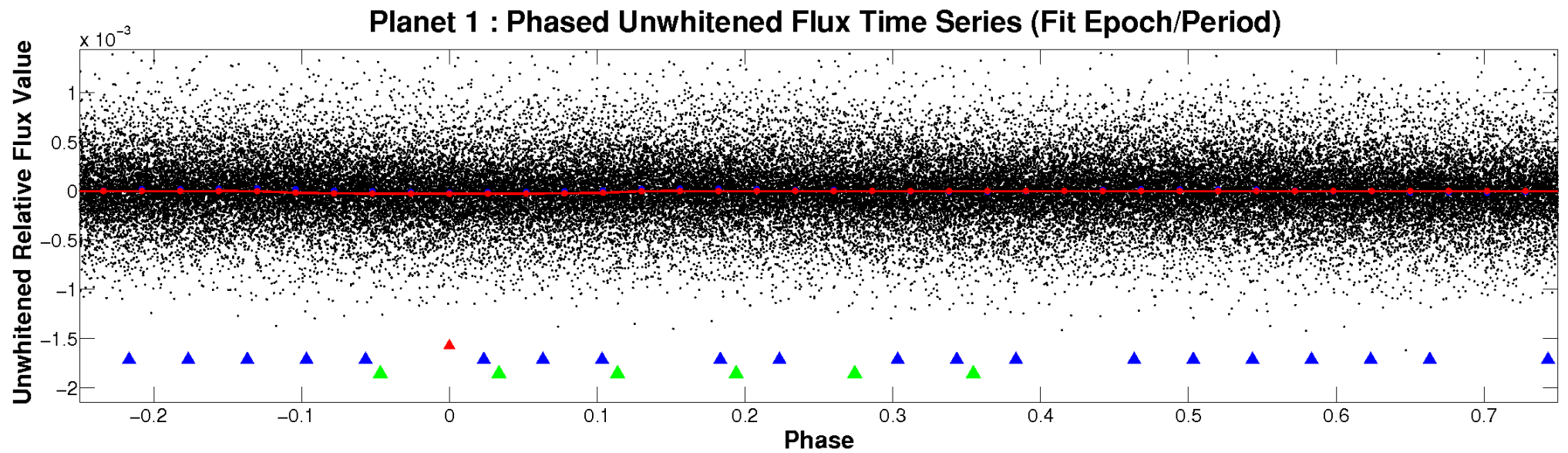


ALT Odd/Even

TCE 009716358-01

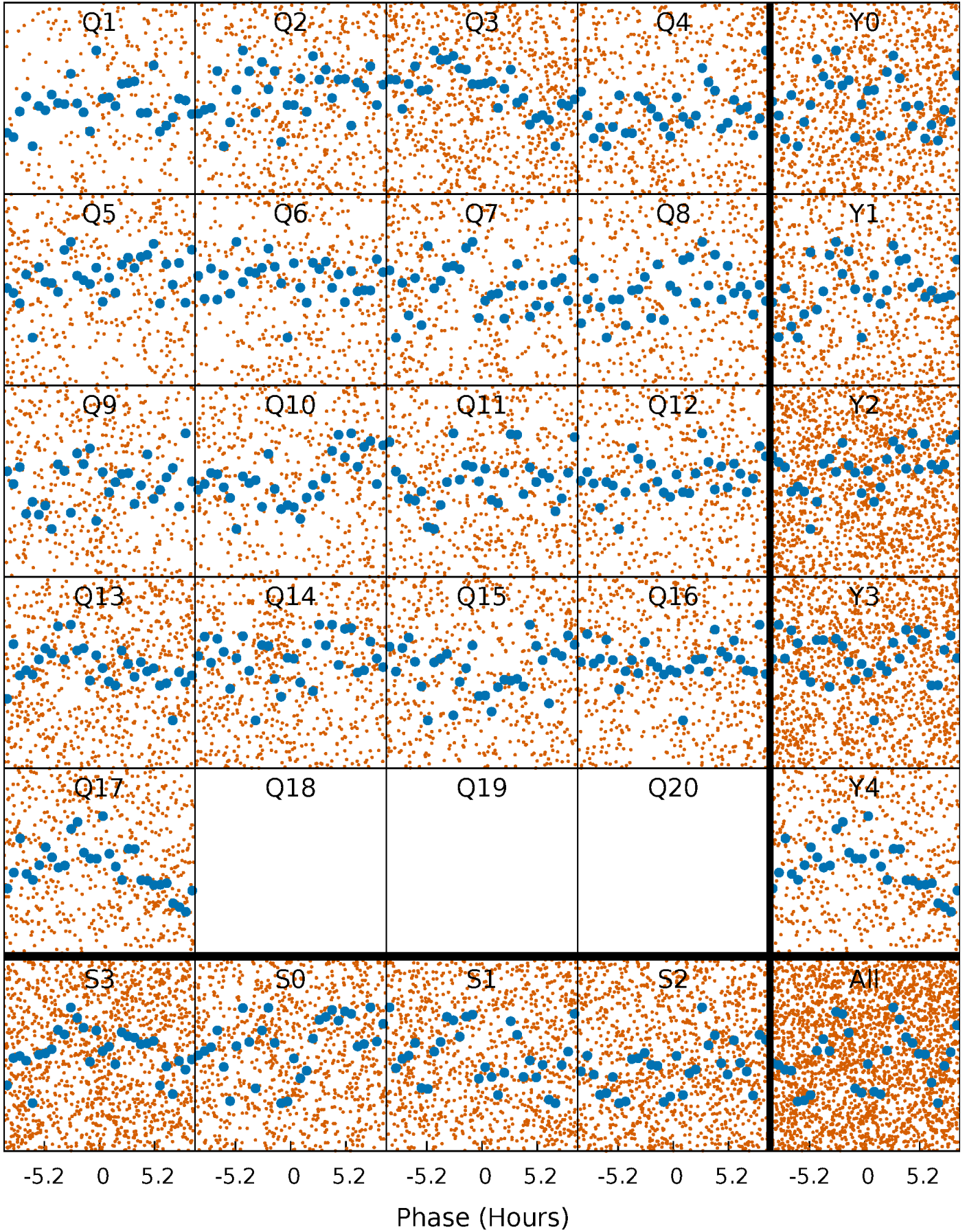


Non-Whitened Vs. Whitened Light Curve



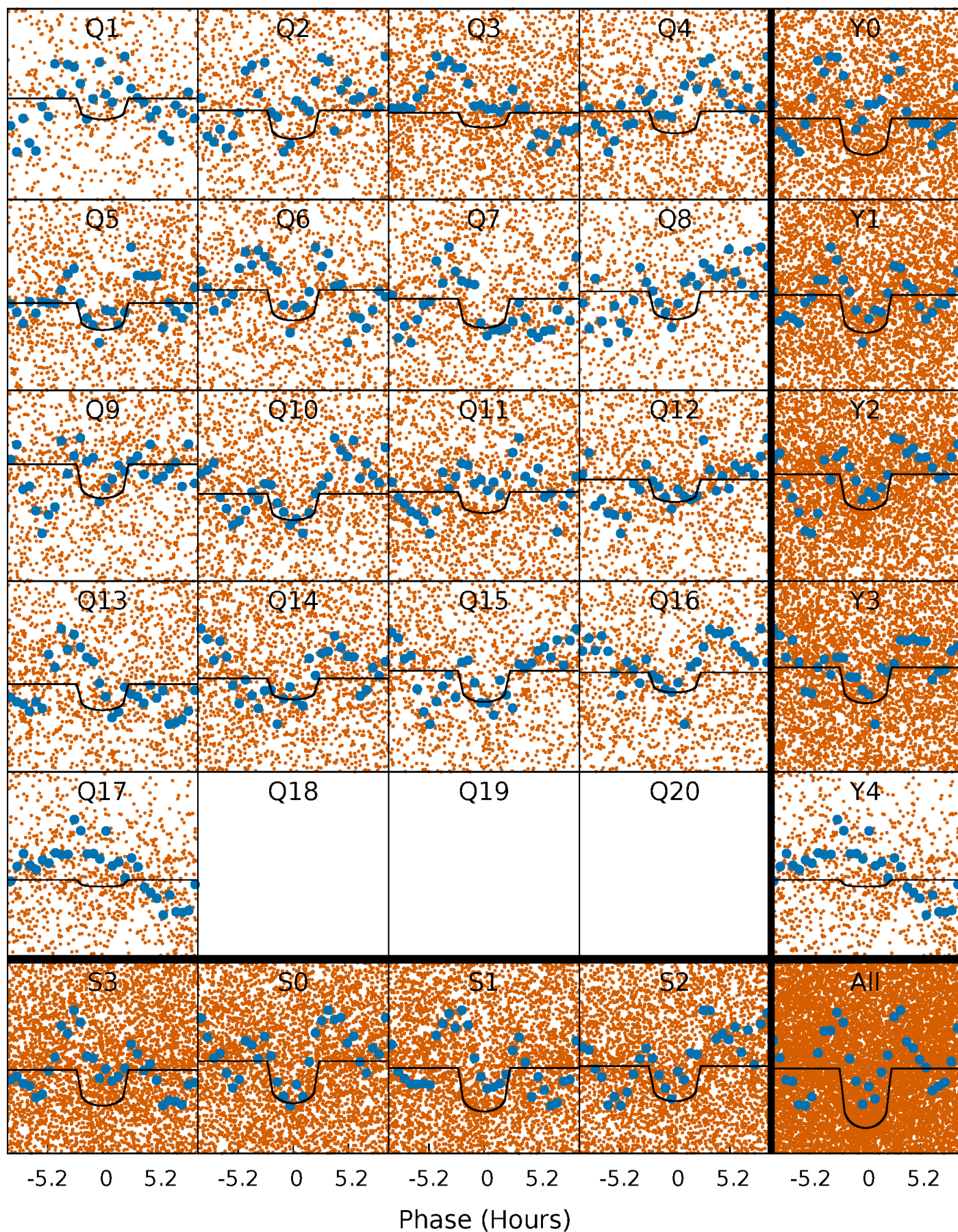
PDC Quarter-Phased Transit Curves

TCE 009716358-01 P= 0.785806 Days $T_0=131.863327$ (BKJD)



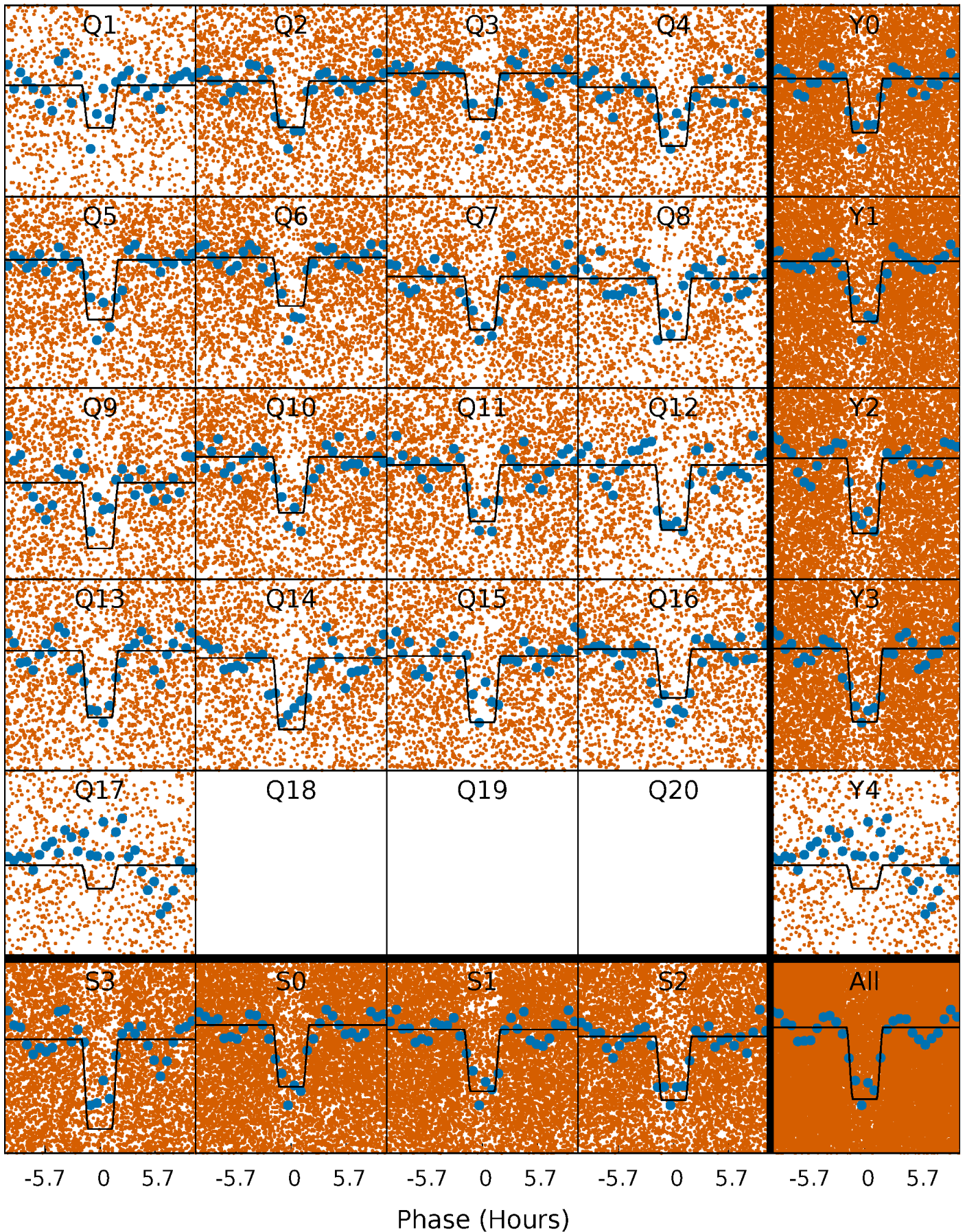
DV Quarter-Phased Transit Curves

TCE 009716358-01 P= 0.785806 Days $T_0=131.863327$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

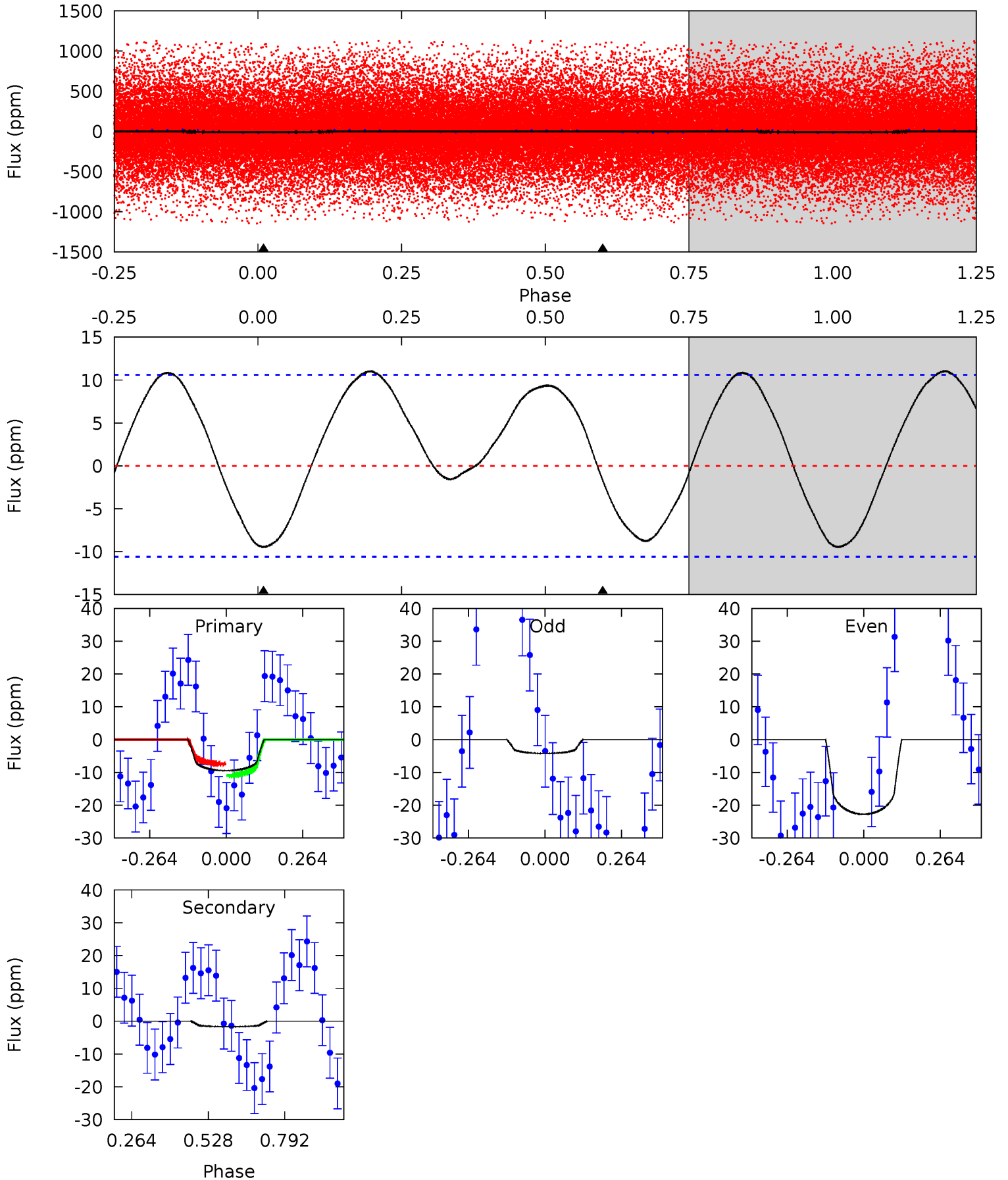
TCE 009716358-01 P= 0.785839 Days $T_0=131.845732$ (BKJD)



DV Model-Shift Uniqueness Test

009716358-01, P = 0.785806 Days, E = 131.077521 Days

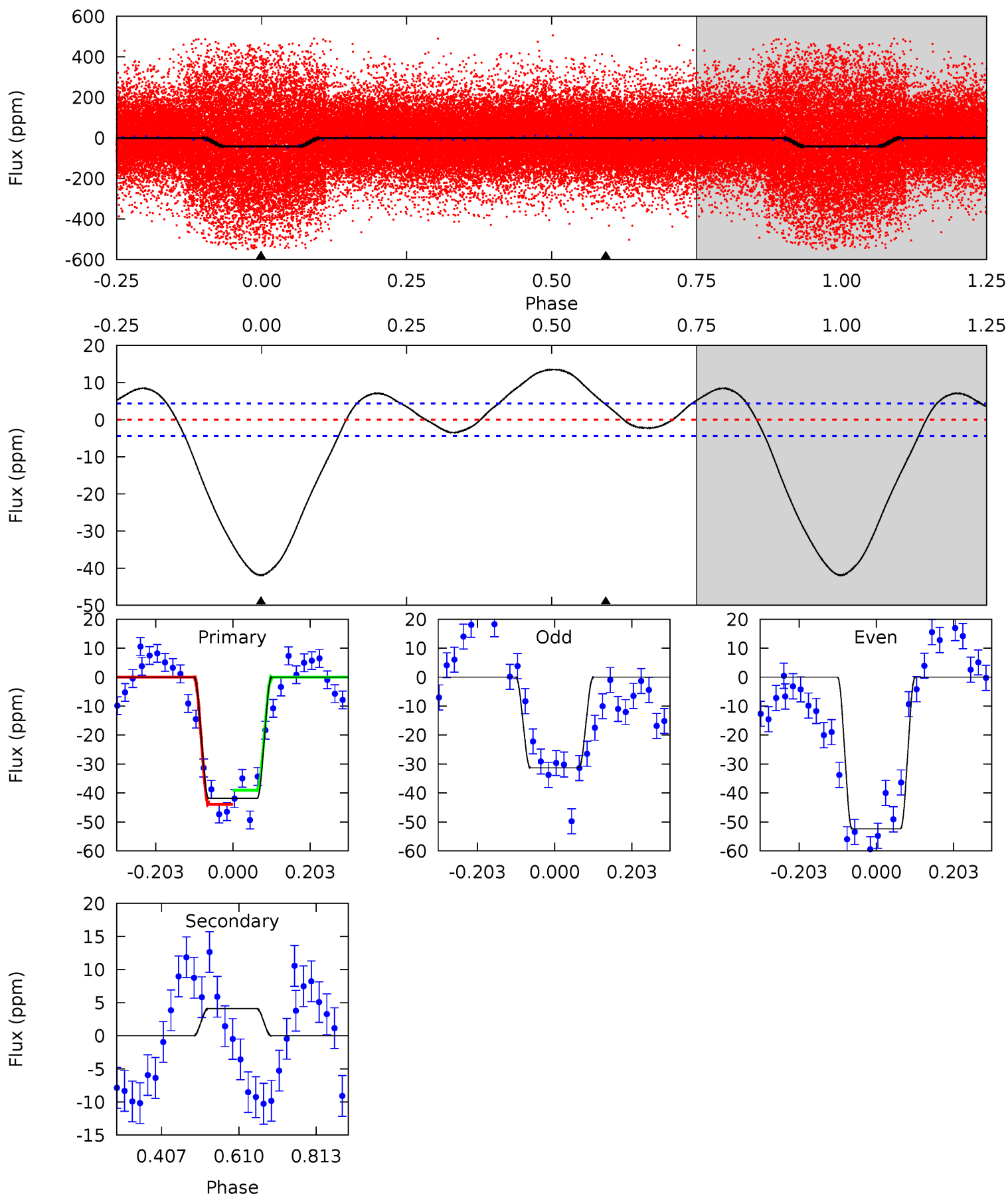
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
3.89	0.70	0	0	4.36	1.12	1.01	3.89	3.89	0.70	0.70	3.81	0.49	0.54	0.72



Alt Model-Shift Uniqueness Test

009716358-01, P = 0.785839 Days, E = 131.059893 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
42.4	-4.14	0	0	4.41	1.27	3.42	42.4	42.4	-4.14	-4.14	10.7	1.08	0.24	2.46



Stellar Parameters For KIC 009716358

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6725^{+189}_{-283}	$3.934^{+0.312}_{-0.144}$	$-0.040^{+0.250}_{-0.300}$	$2.215^{+0.572}_{-0.858}$	$1.535^{+0.200}_{-0.371}$	$0.199^{+0.523}_{-0.086}$
	+3%/-4%	+8%/-4%	+625%/-750%	+26%/-39%	+13%/-24%	+263%/-43%
Source	PHO54	PHO54	PHO54	DSEP		

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

Secondary Eclipse Parameters for KIC 009716358-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-2 ± 2	$1.18^{+0.40}_{-0.39}$	4348^{+371}_{-401}	-3173^{+7251}_{-963}	$0.220^{+0.513}_{-0.296}$
Alt.	4 ± 1	$1.58^{+0.45}_{-0.44}$	4371^{+334}_{-455}	-4471^{+272}_{-318}	$-0.327^{+0.148}_{-0.299}$

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

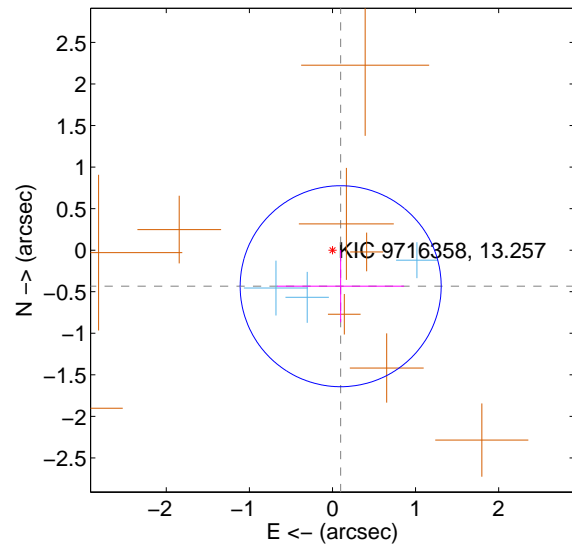
Supplemental centroid analysis for 009716358-01. Kepler magnitude: 13.26. Transit SNR 7.51

There are 3 quarters with good PRF difference image offsets

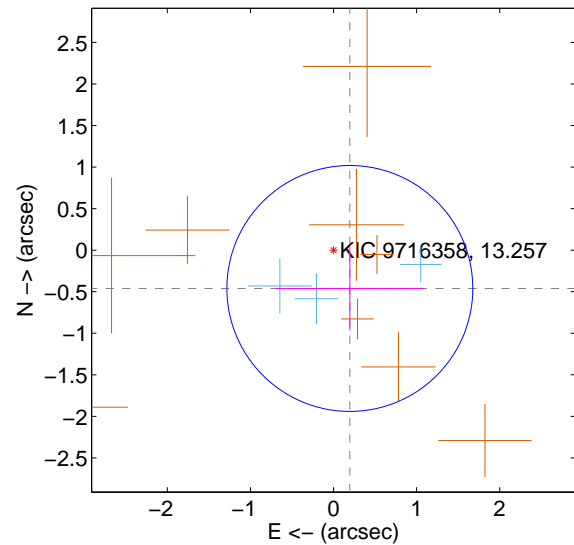
The direct PRF centroid is offset from the target star catalog position by about 0.16 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.445 ± 0.403	1.10	-0.099 ± 0.763	-0.434 ± 0.434
PRF-fit source offset from KIC position	0.501 ± 0.493	1.02	-0.196 ± 0.893	-0.461 ± 0.506
photometric centroid source offset	0.96 ± 0.49	1.97	-0.42 ± 0.45	-0.87 ± 0.50

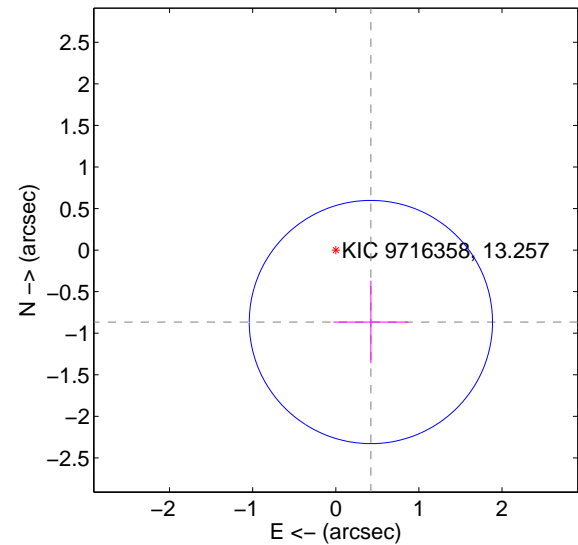
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

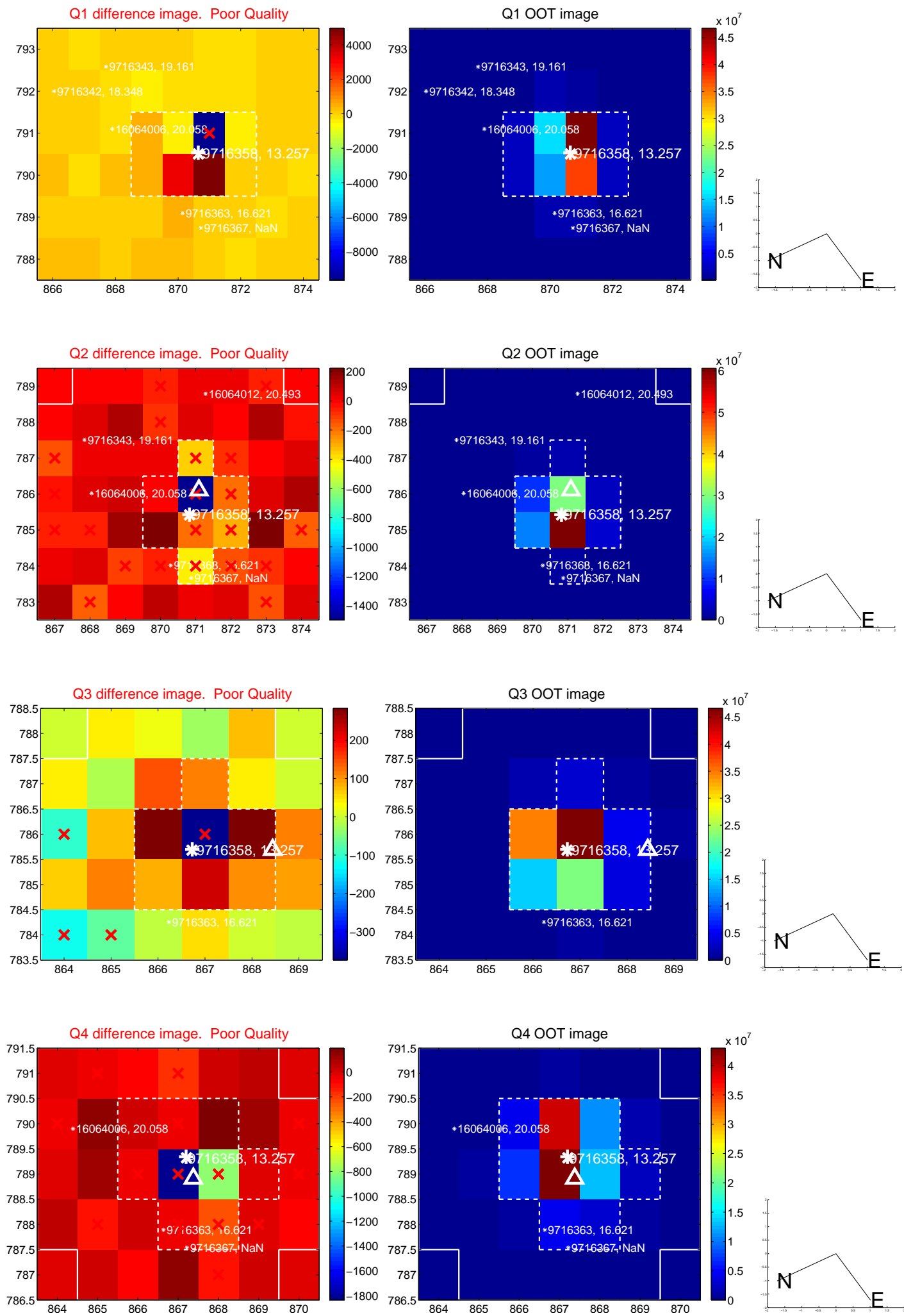


offset from photometric centroids

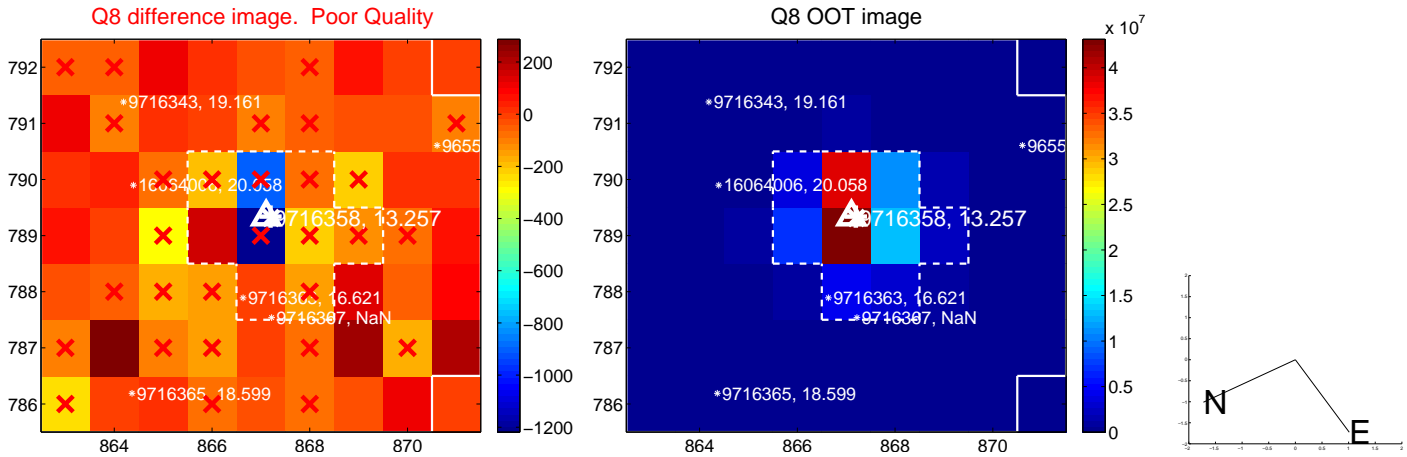
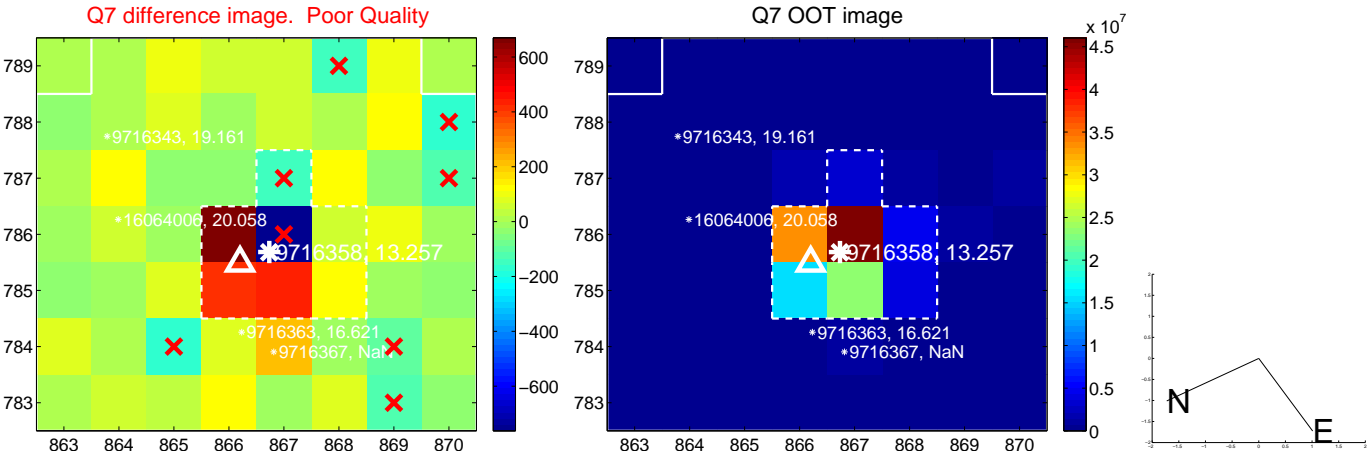
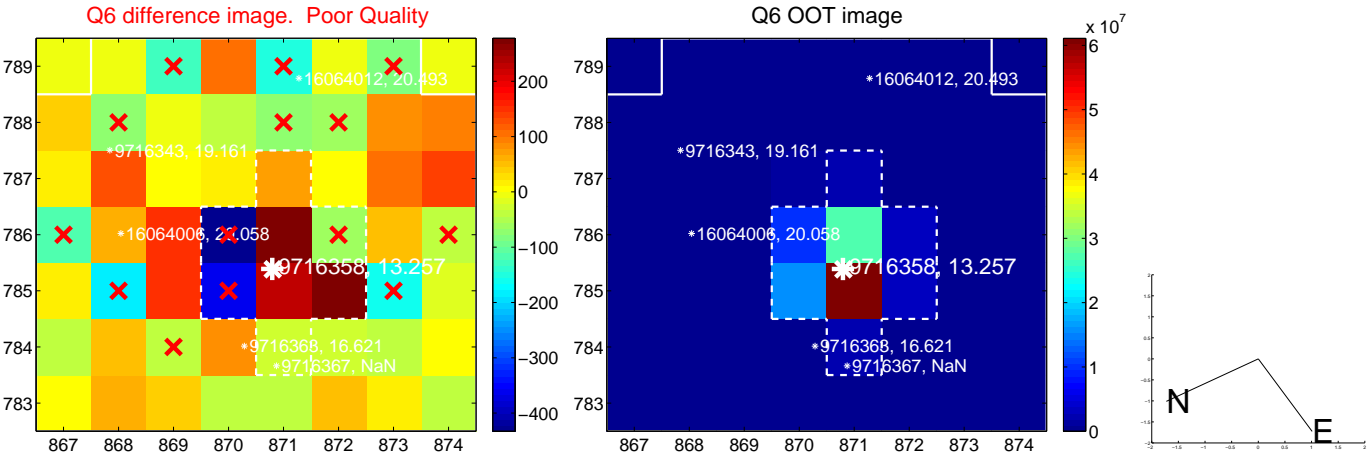
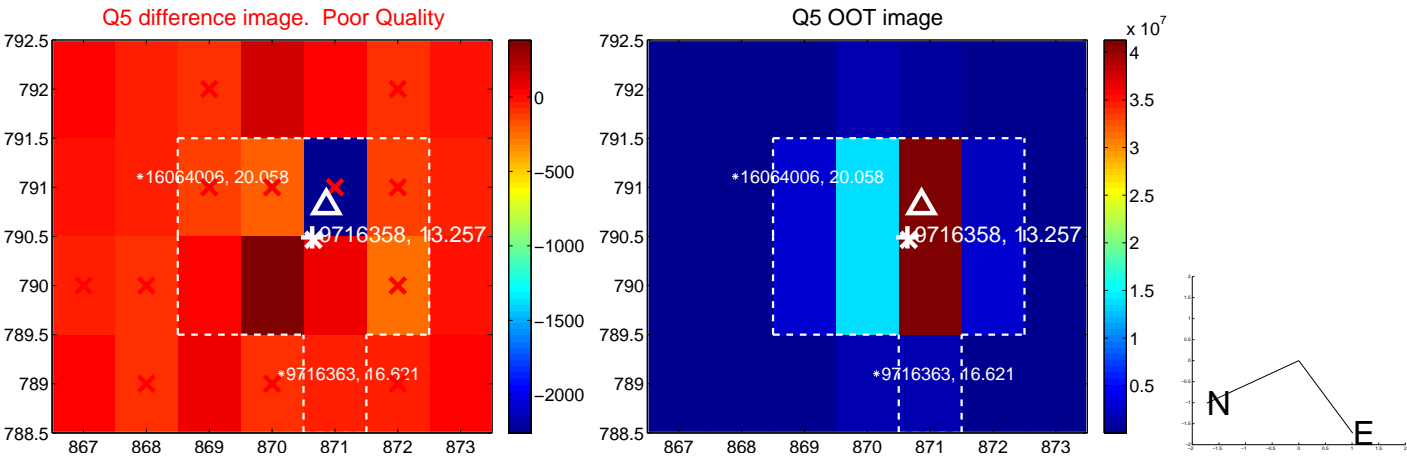


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

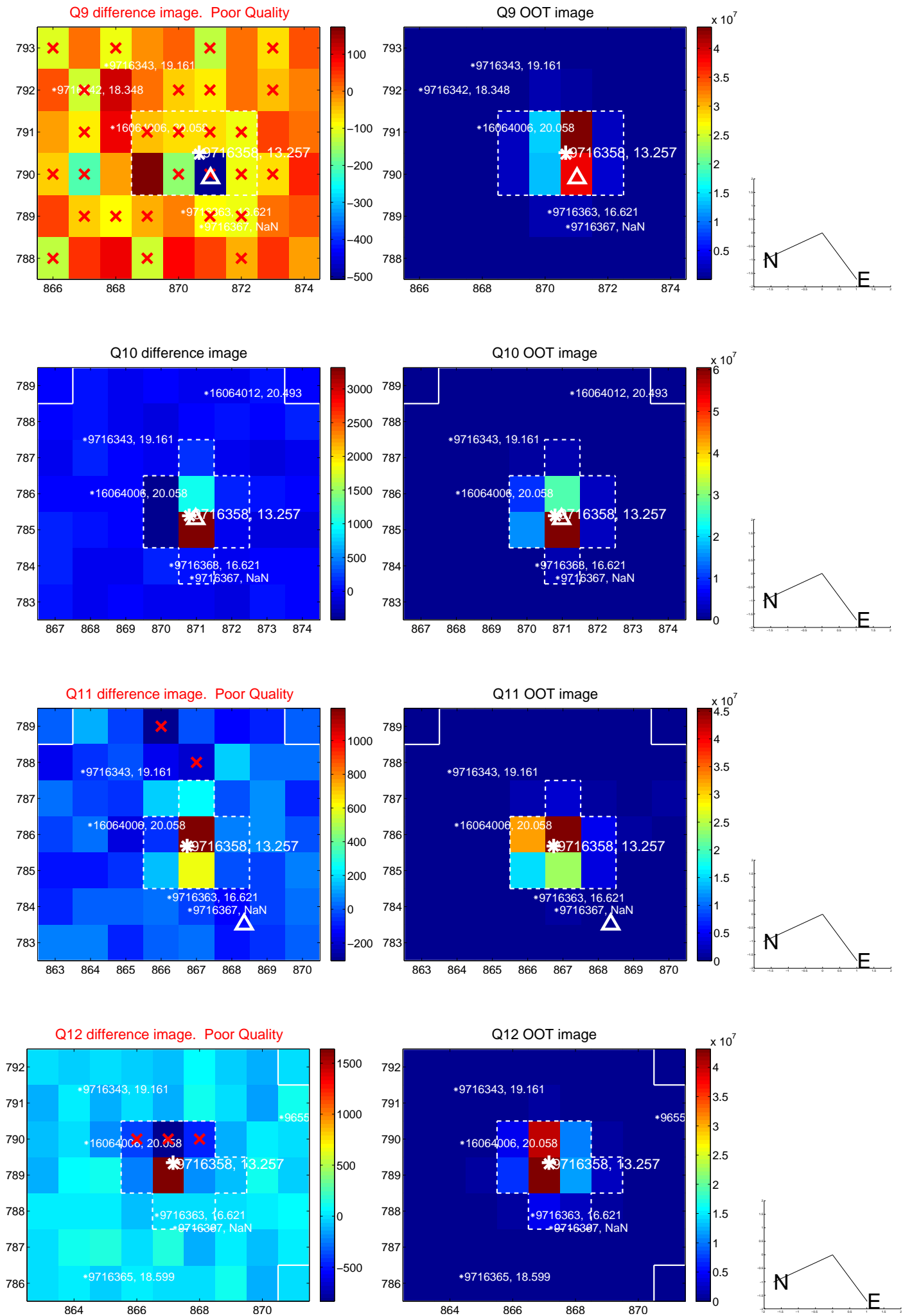
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



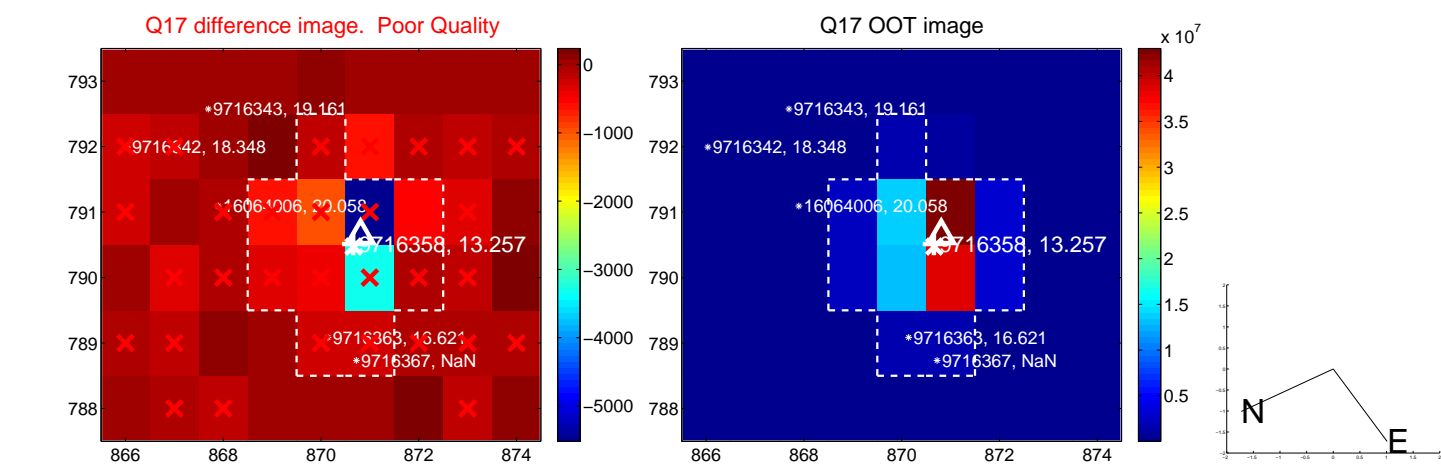
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



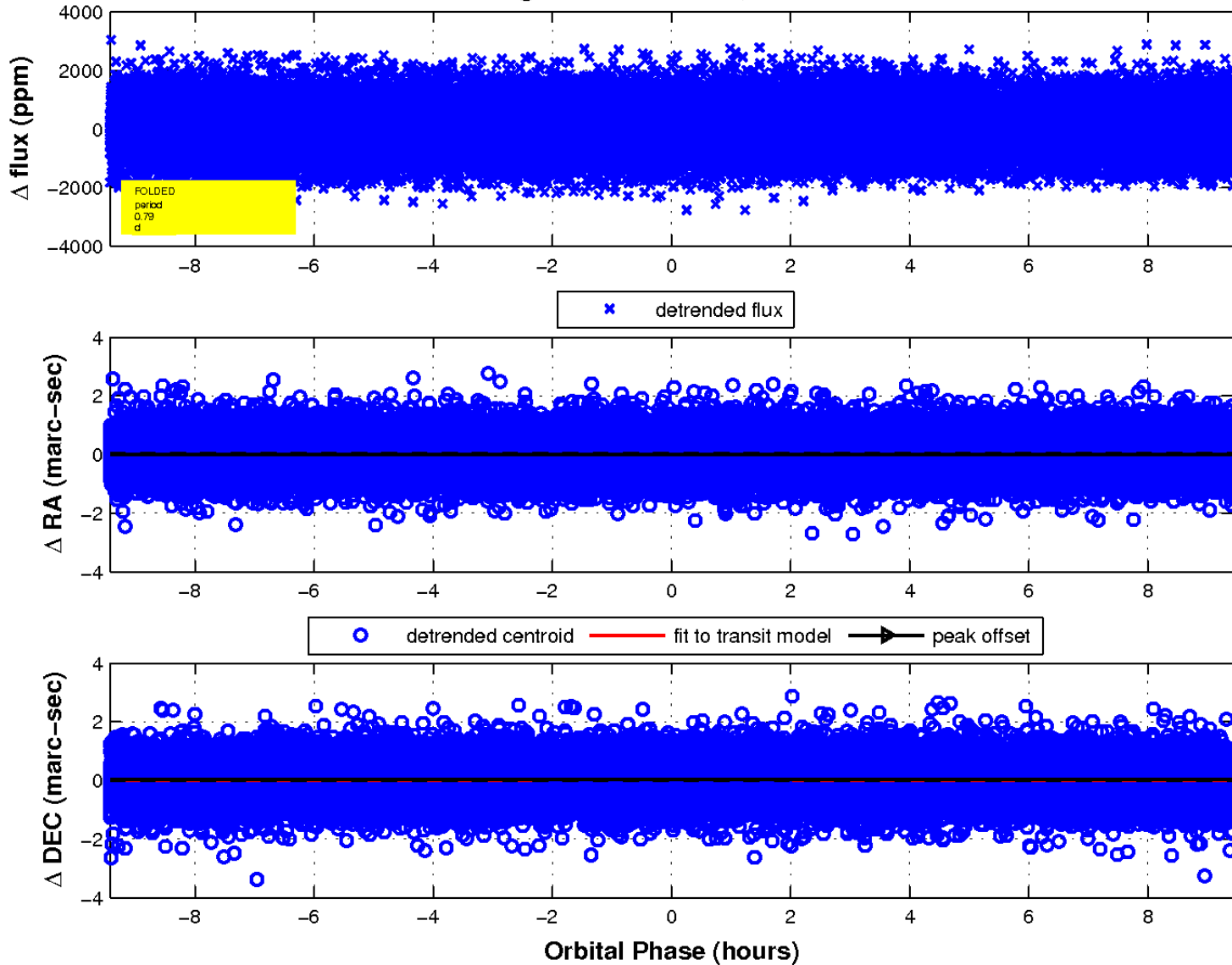
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

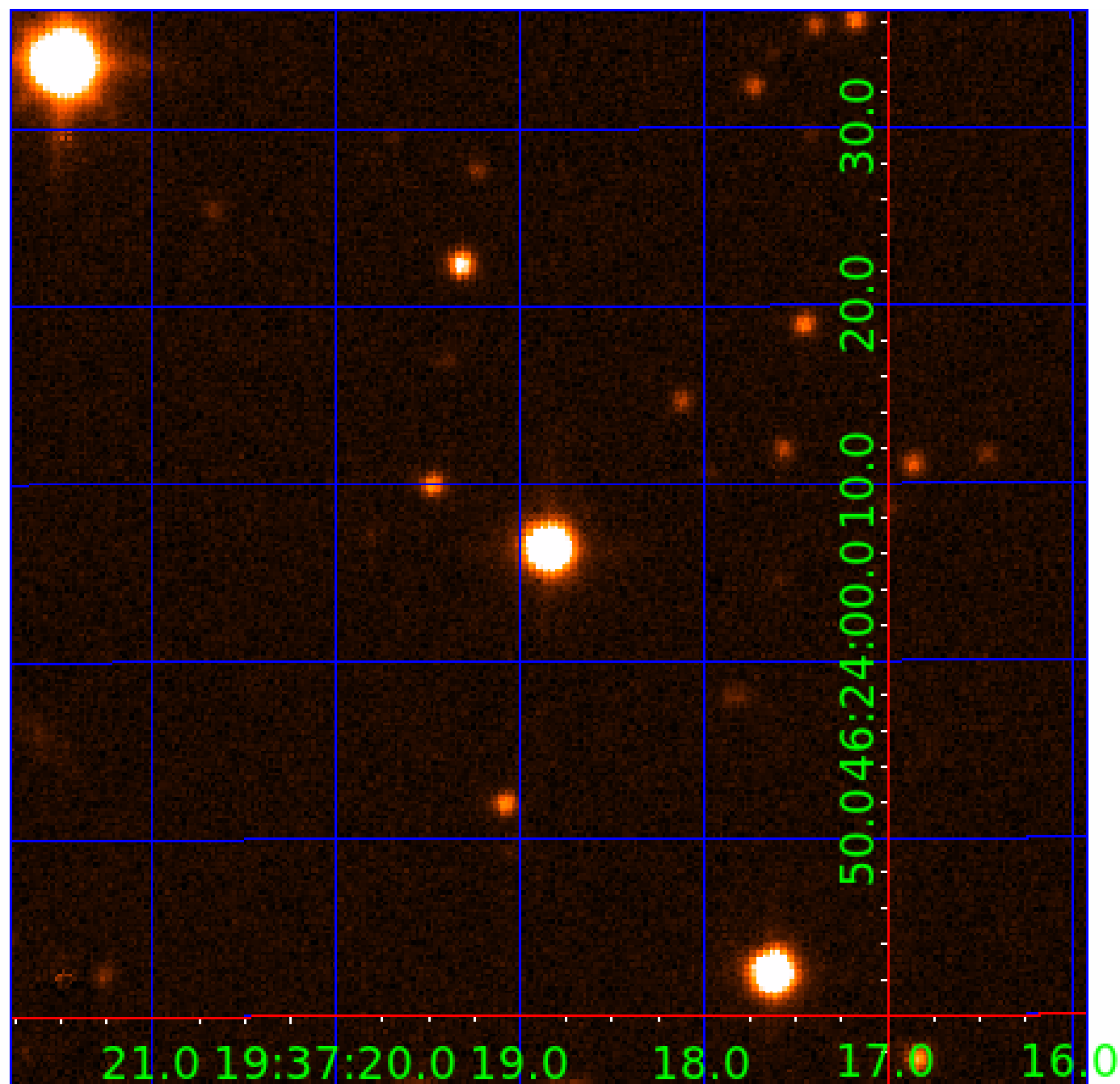


fluxWeightedCentroids, Planet 1 of 3



UKIRT Image

Declination



KIC 009716358

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})
009716358-01	OBS	No	0.785806	131.863328	28.4	4.510	9.4	7.5	2.21	6725	1.24	24293.63
009716358-02	OBS	No	75.217320	158.473313	385.7	6.022	9.5	4.7	2.21	6725	5.44	55.48
009716358-03	OBS	No	257.807312	155.400821	2795.6	27.319	7.9	8.2	2.21	6725	21.31	10.74

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009716358-01	OBS	FP	0.00	1	0	0	0	LPP_DV
009716358-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
009716358-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT

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

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

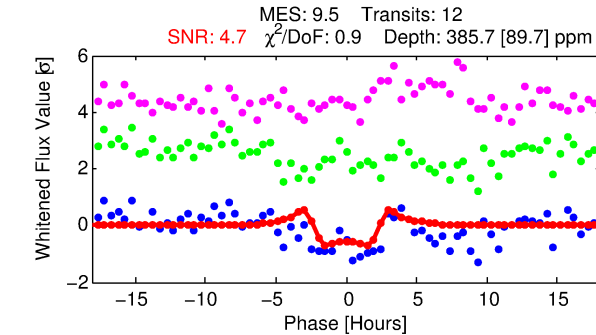
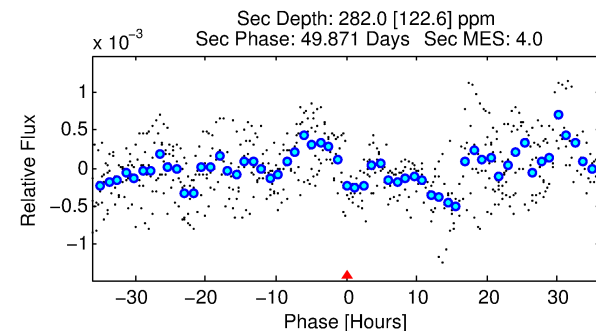
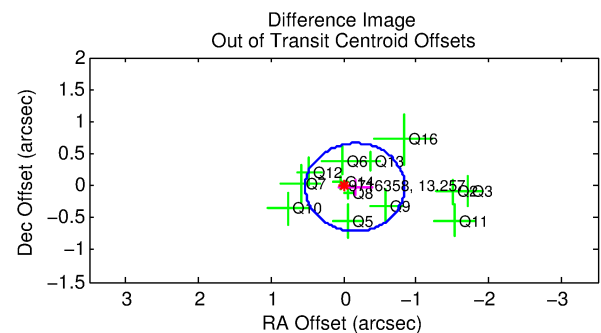
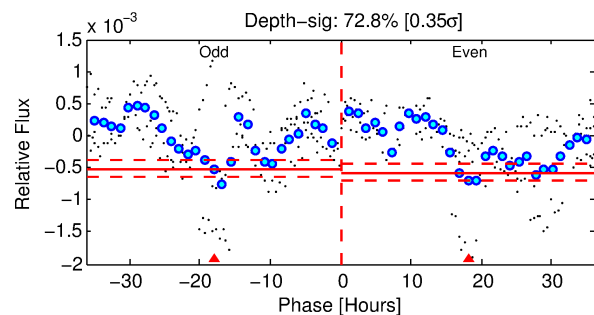
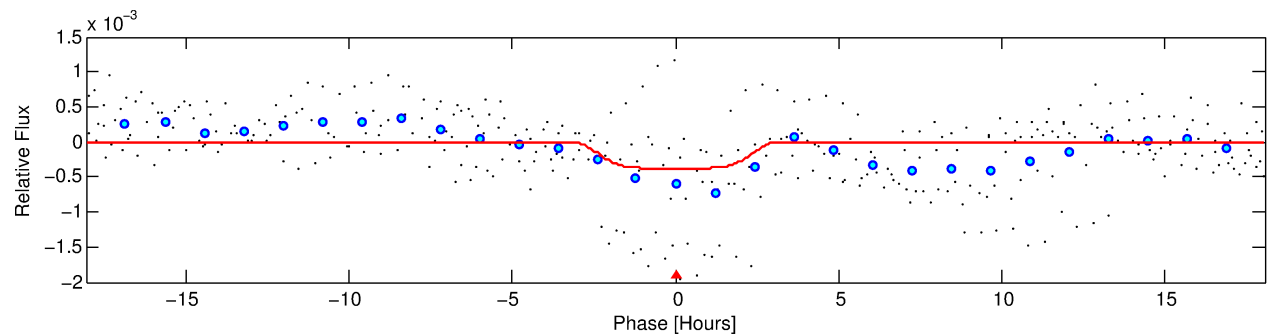
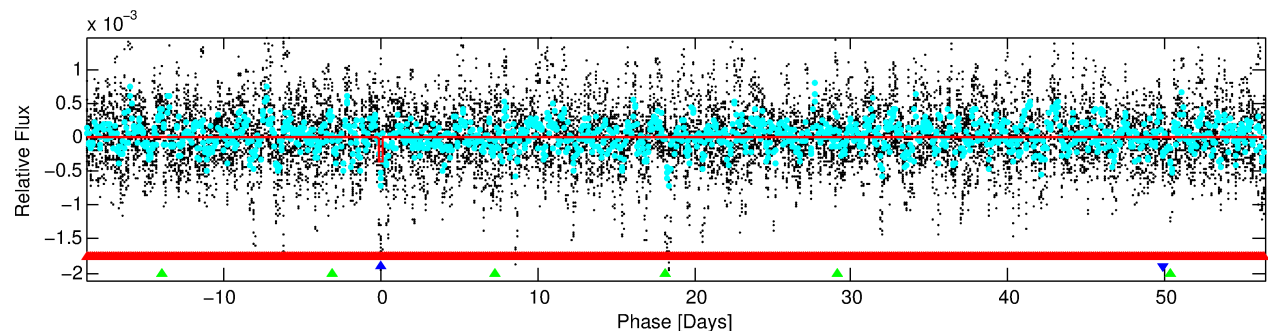
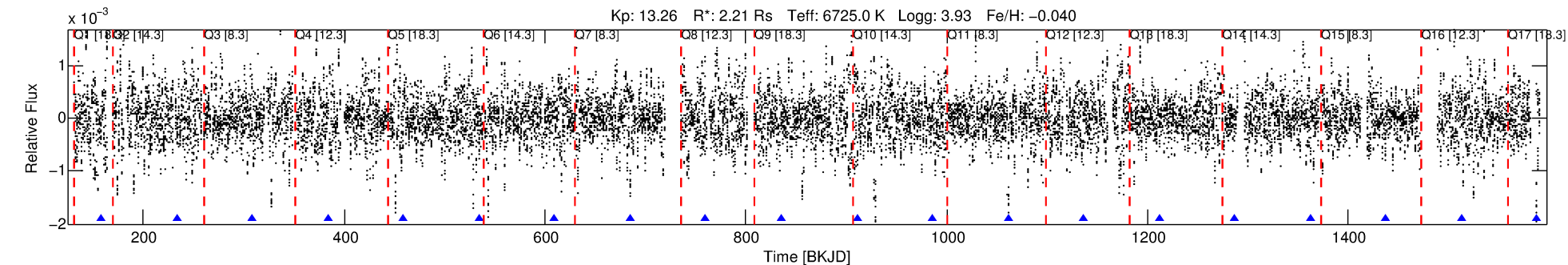
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009716358-02

No Significant Match Found

DV One-Page Summary

KIC: 9716358 Candidate: 2 of 3 Period: 75.217 d



DV Fit Results:

Period = 75.21732 [0.00148] d
Epoch = 158.4733 [0.0159] BKJD
Rp/R* = 0.0225 [0.0031]
a/R* = 33.84 [10.26]
b = 0.96 [0.03]
Seff = 55.48 [31.60]
Teq = 696 [99] K
Rp = 5.44 [2.24] Re
a = 0.4026 [0.1418] AU
Ag = 848.99 [636.15] [1.33 σ]
Teffp = 5808 [787] K [6.45 σ]

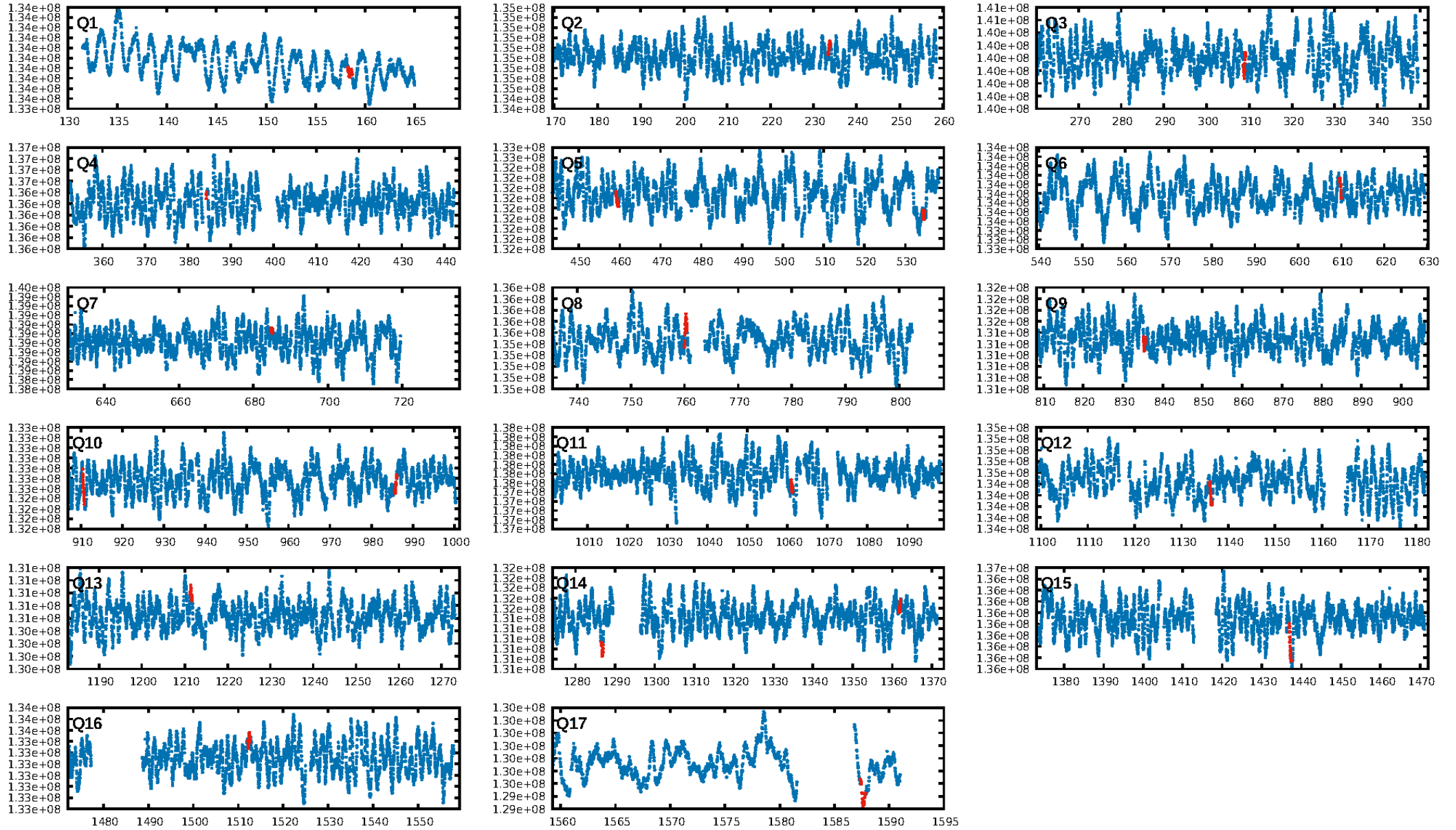
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [237.42 σ]
LongPeriod-sig: 100.0% [156.64 σ]
ModelChiSquare2-sig: 0.0%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 2.23e-13
RollingBand-fgt: 1.00 [11/11]
GhostDiagnostic-chr: -0.4412
Centroid-sig: 12.0%
Centroid-so: 0.413 arcsec [1.21 σ]
OotOffset-rm: 0.160 arcsec [0.70 σ]
KicOffset-rm: 0.275 arcsec [1.19 σ]
OotOffset-st: 4/3/3/3 [13]
KicOffset-st: 4/3/3/3 [13]
DiffImageQuality-fgm: 0.46 [6/13]
DiffImageOverlap-fno: 0.00 [0/14]

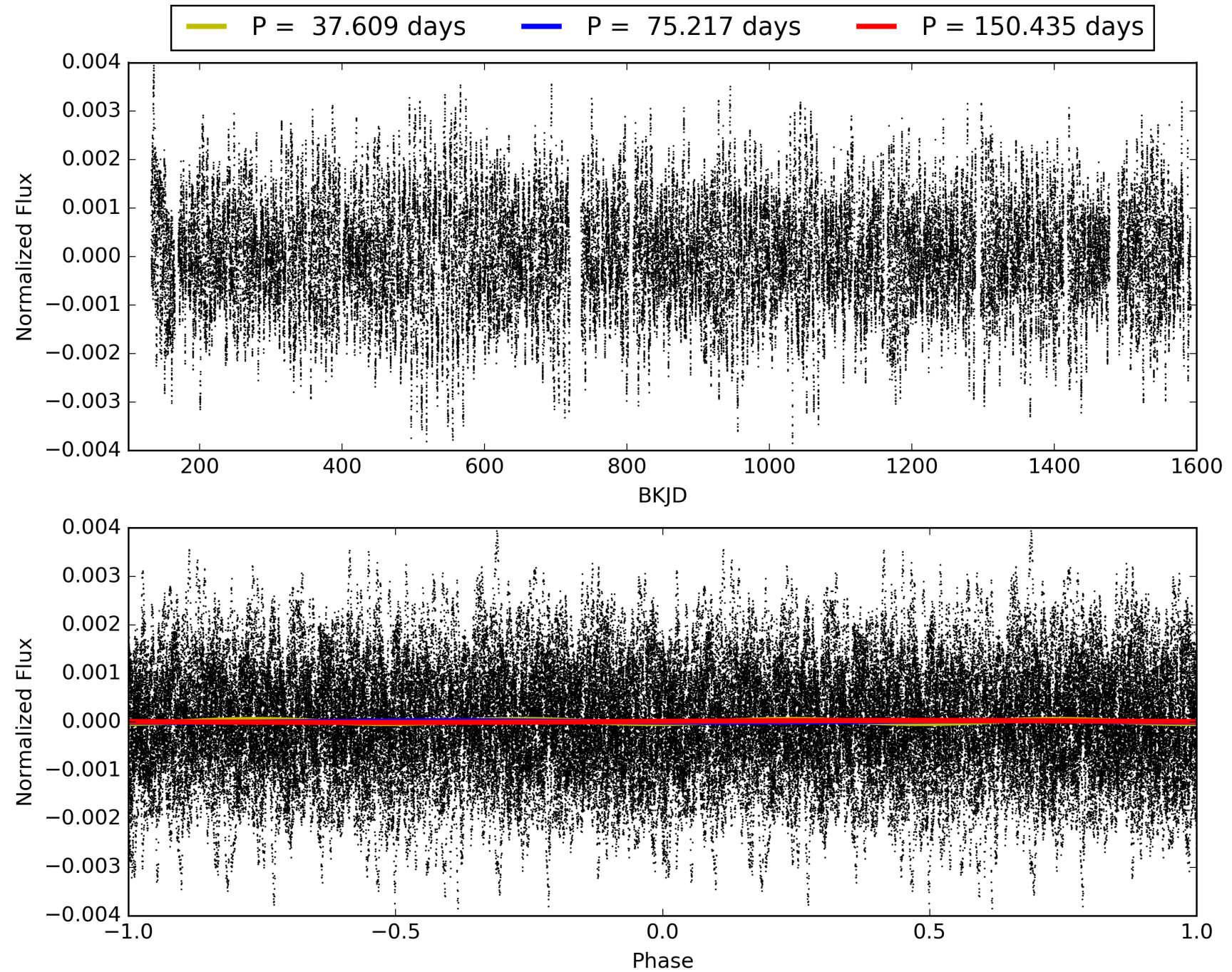
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 04:23:06 Z

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

TCE 009716358-02, PDC Light Curves

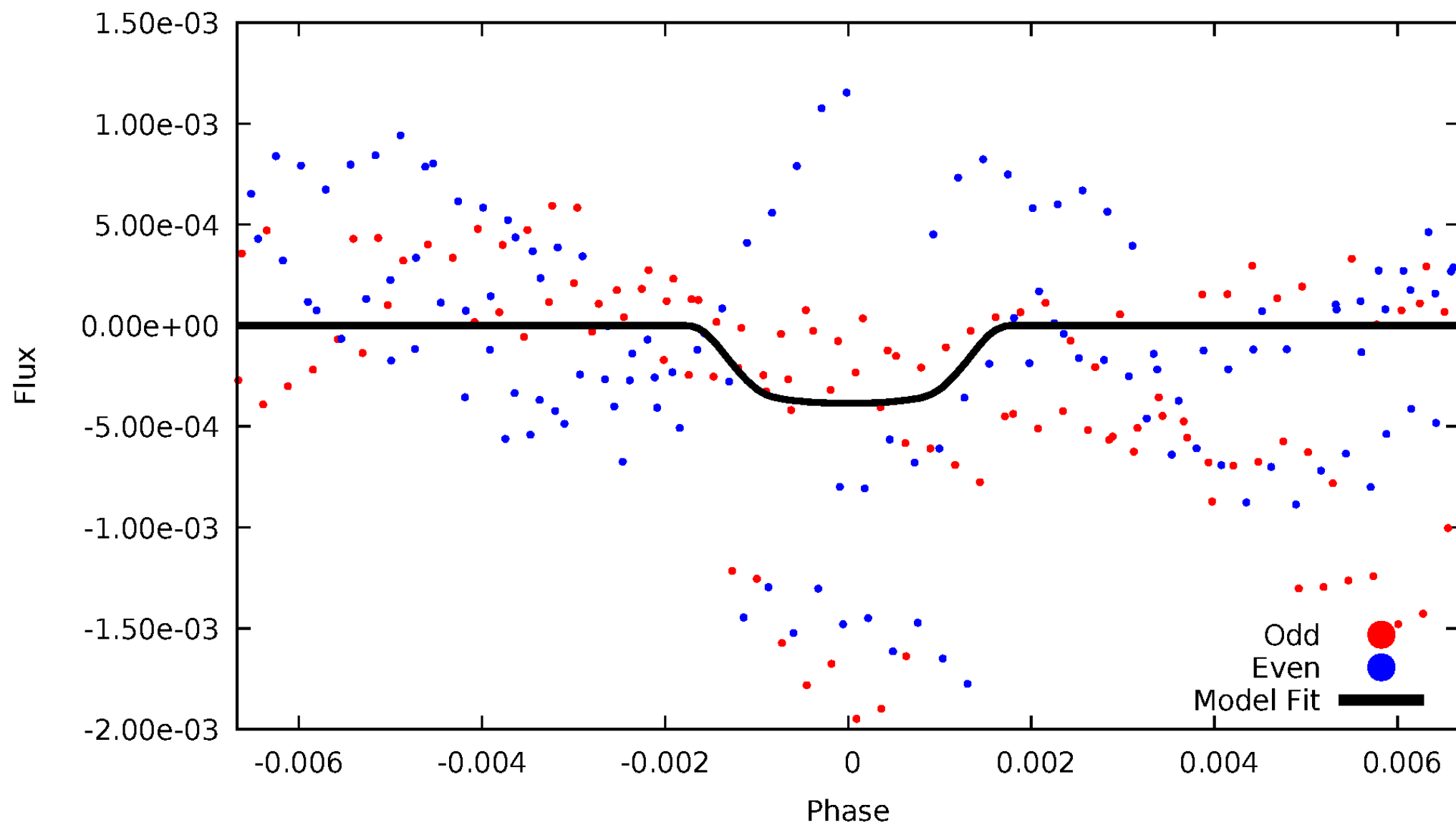


TCE 009716358-02



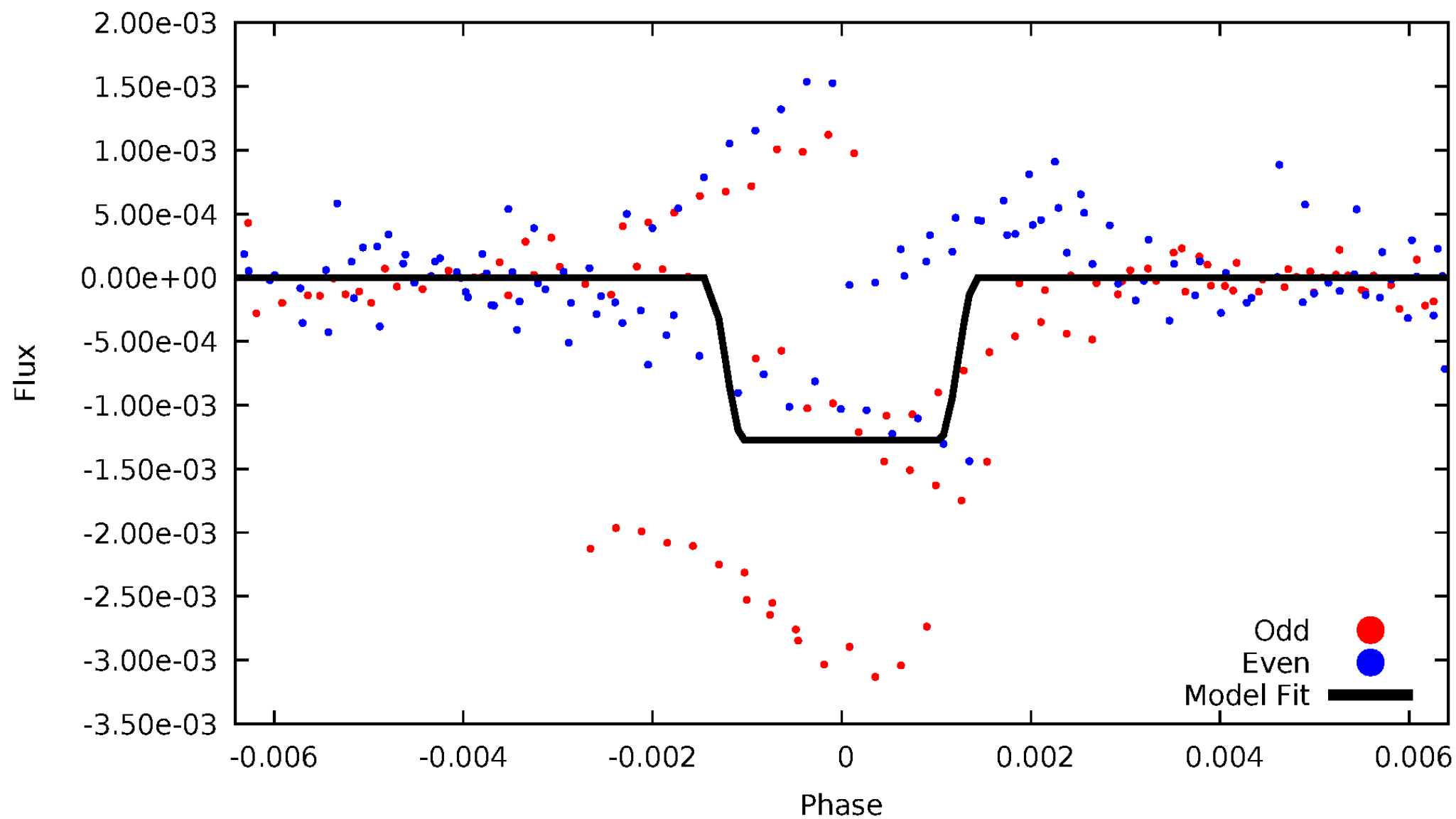
DV Odd/Even

TCE 009716358-02



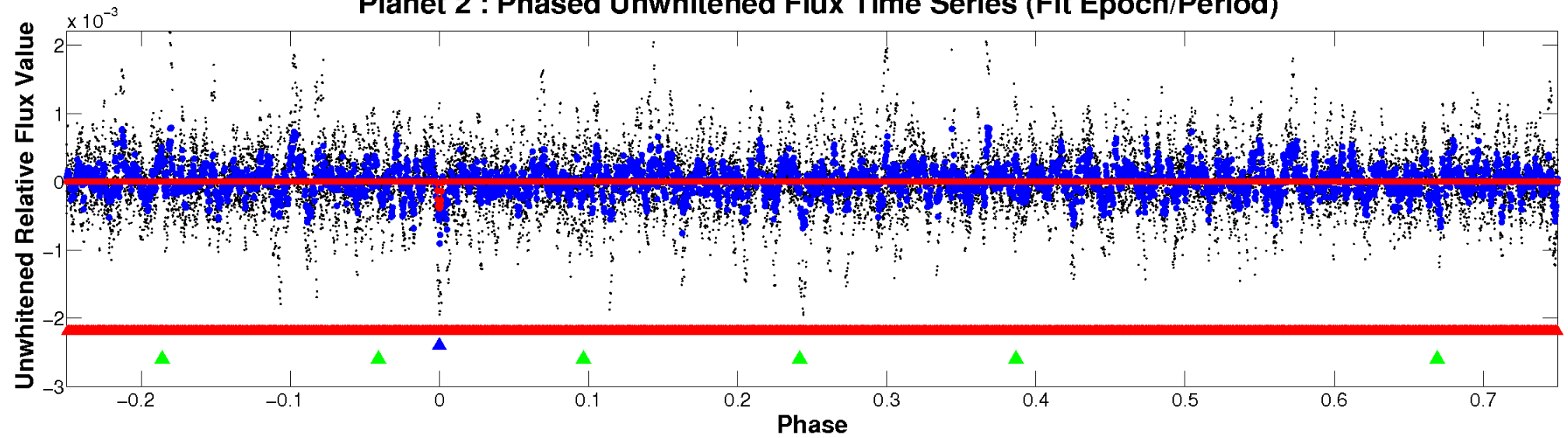
ALT Odd/Even

TCE 009716358-02

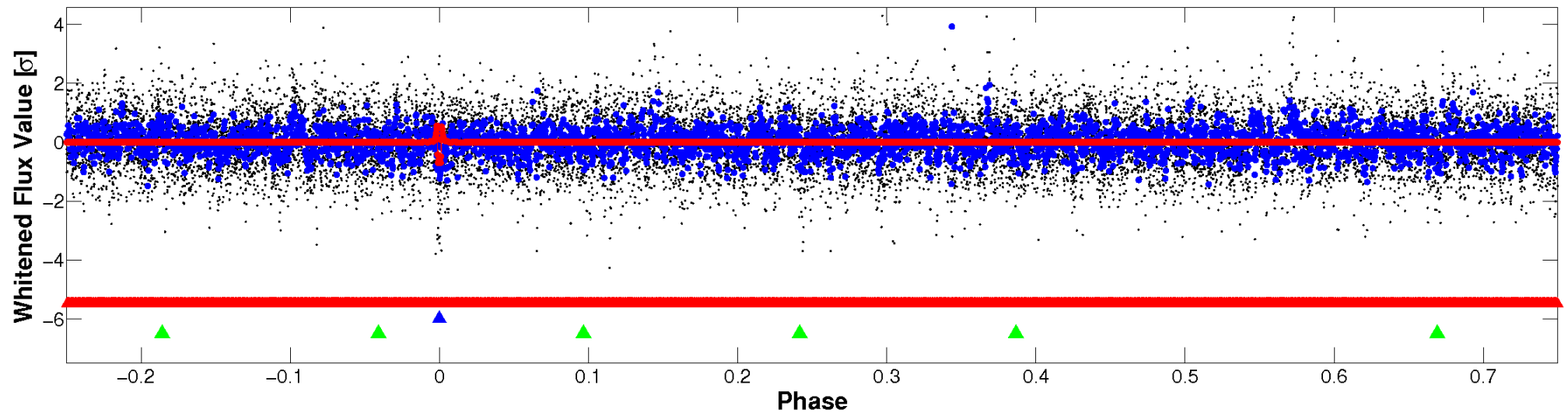


Non-Whitened Vs. Whitened Light Curve

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

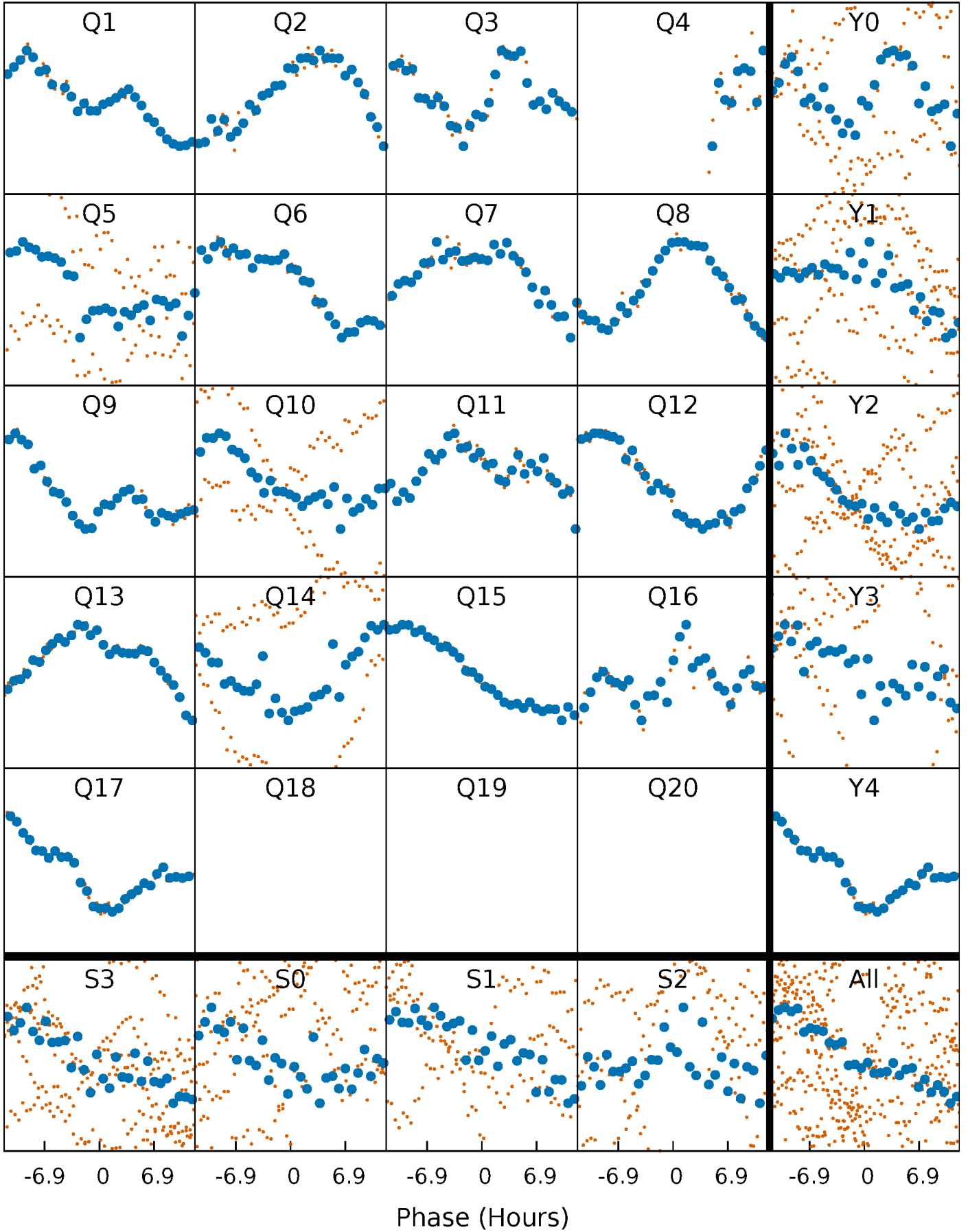


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



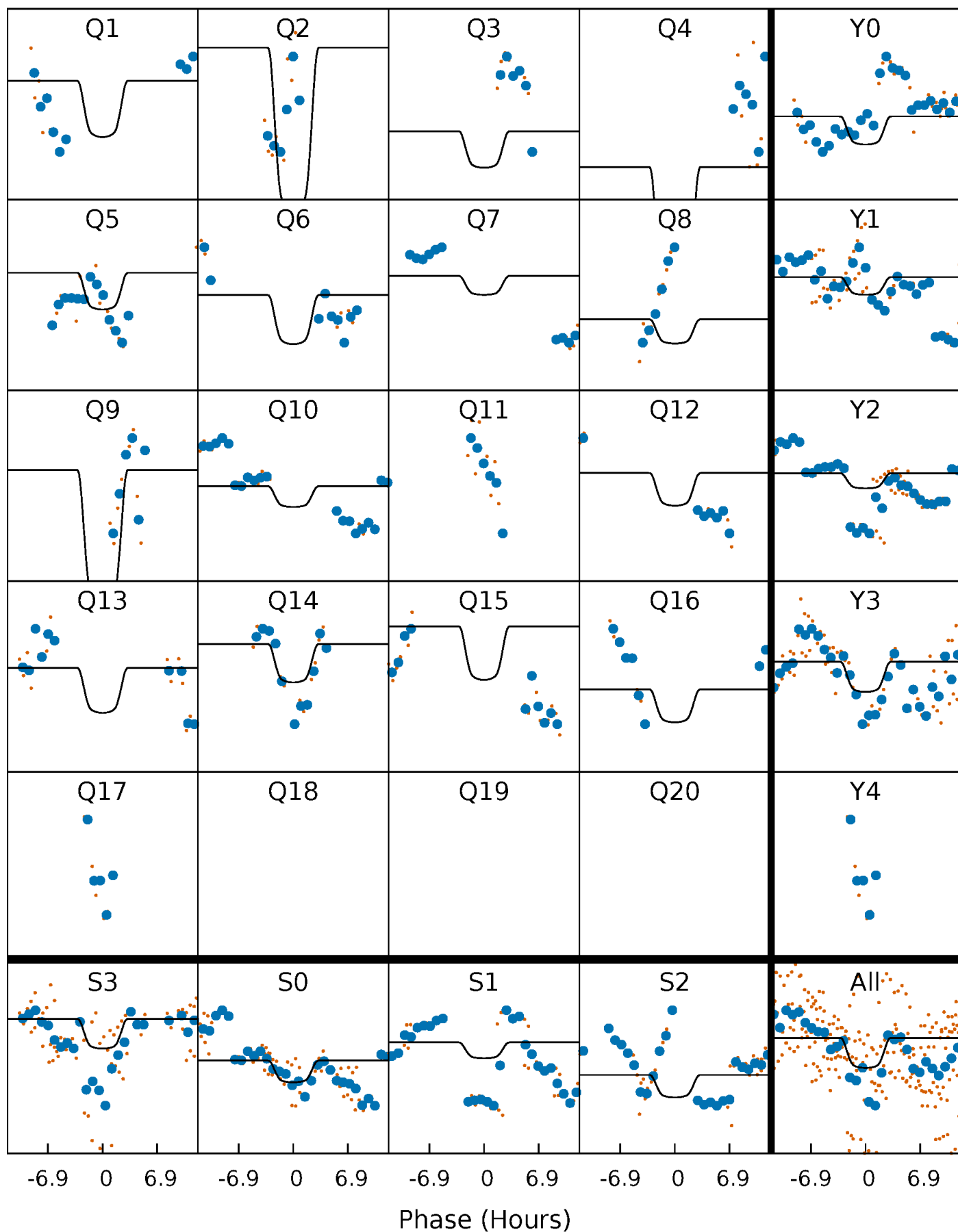
PDC Quarter-Phased Transit Curves

TCE 009716358-02 P= 75.217320 Days $T_0=158.473313$ (BKJD)



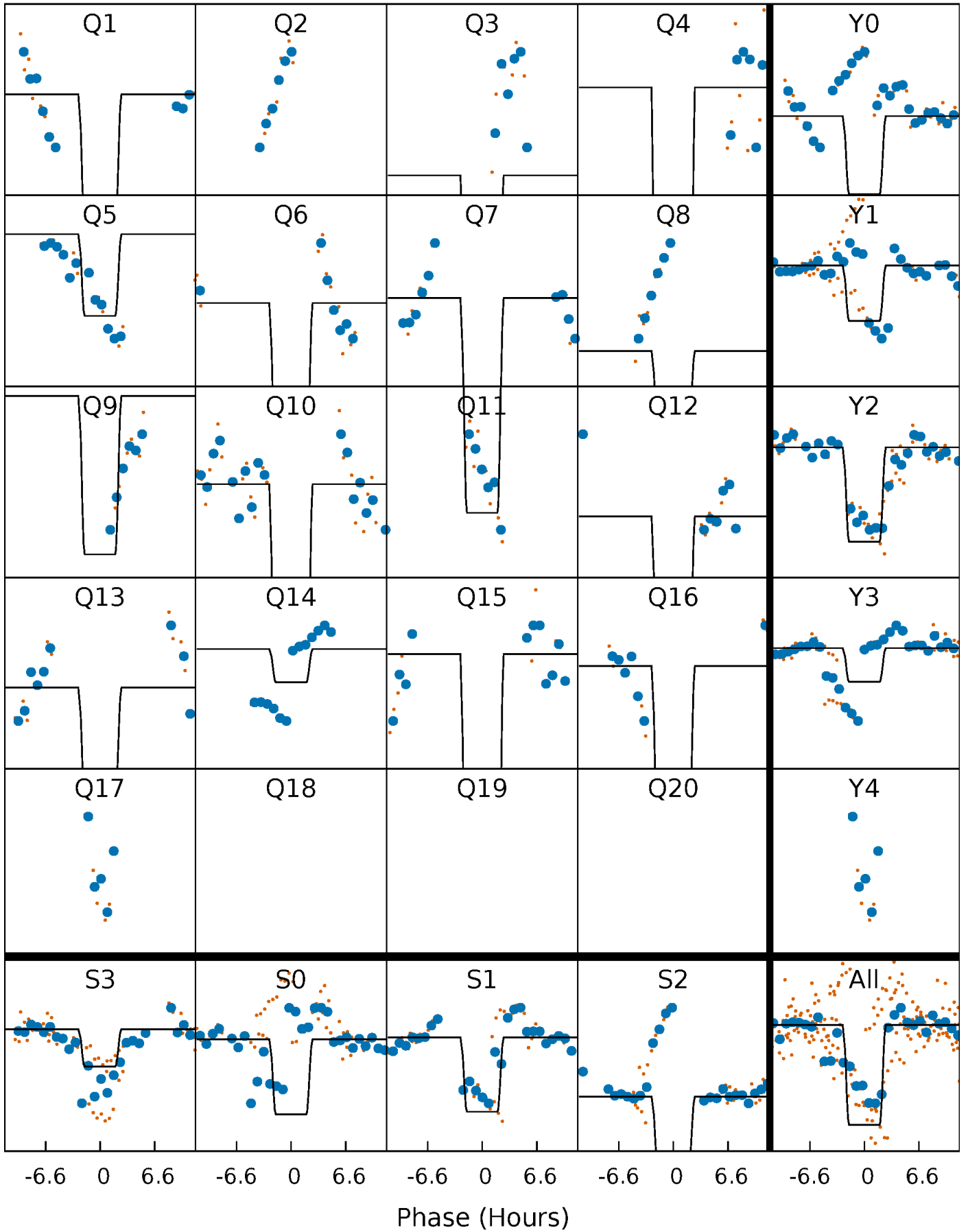
DV Quarter-Phased Transit Curves

TCE 009716358-02 P= 75.217320 Days $T_0=158.473313$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

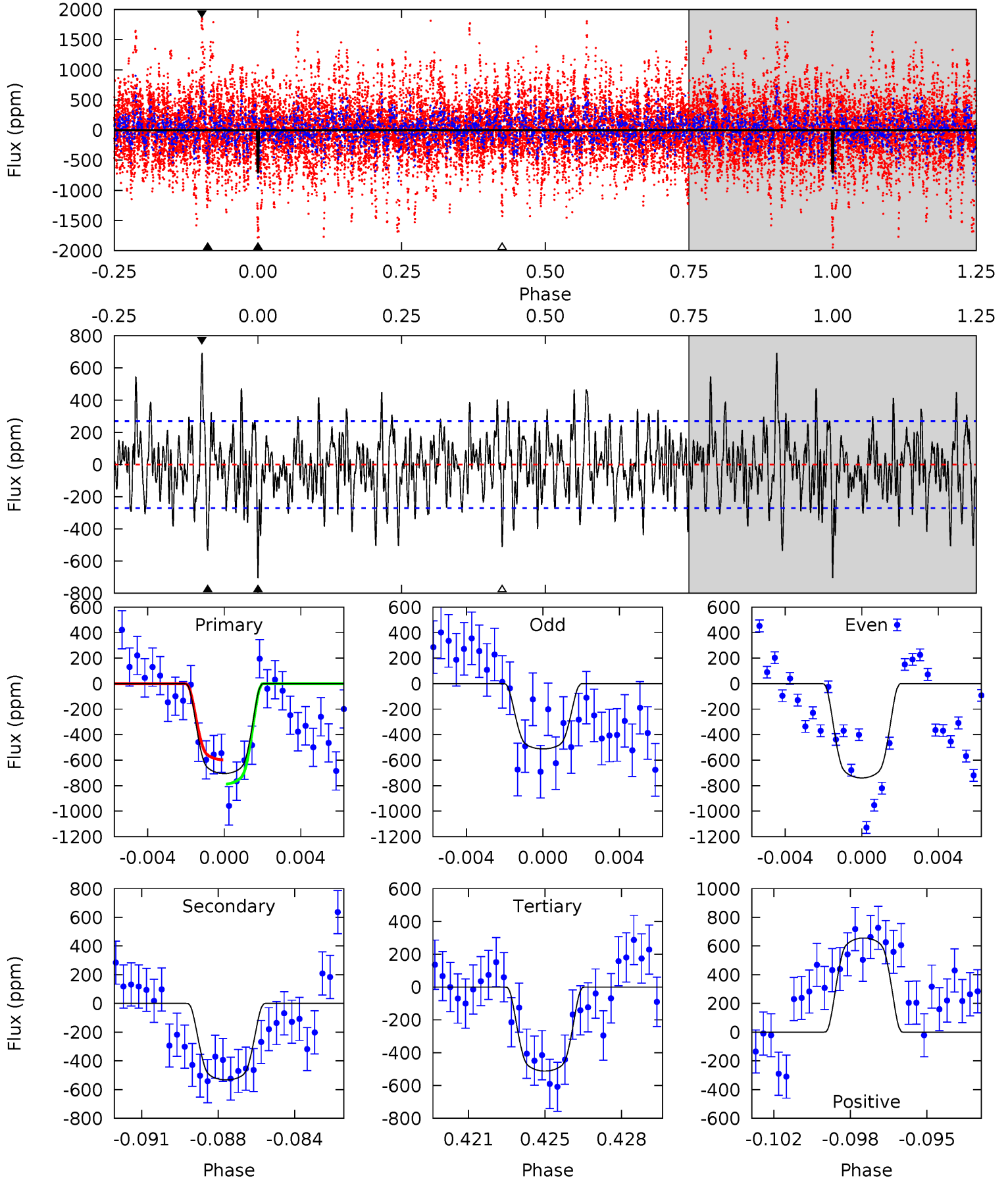
TCE 009716358-02 P= 75.214958 Days $T_0=158.498126$ (BKJD)



DV Model-Shift Uniqueness Test

009716358-02, P = 75.217320 Days, E = 83.255993 Days

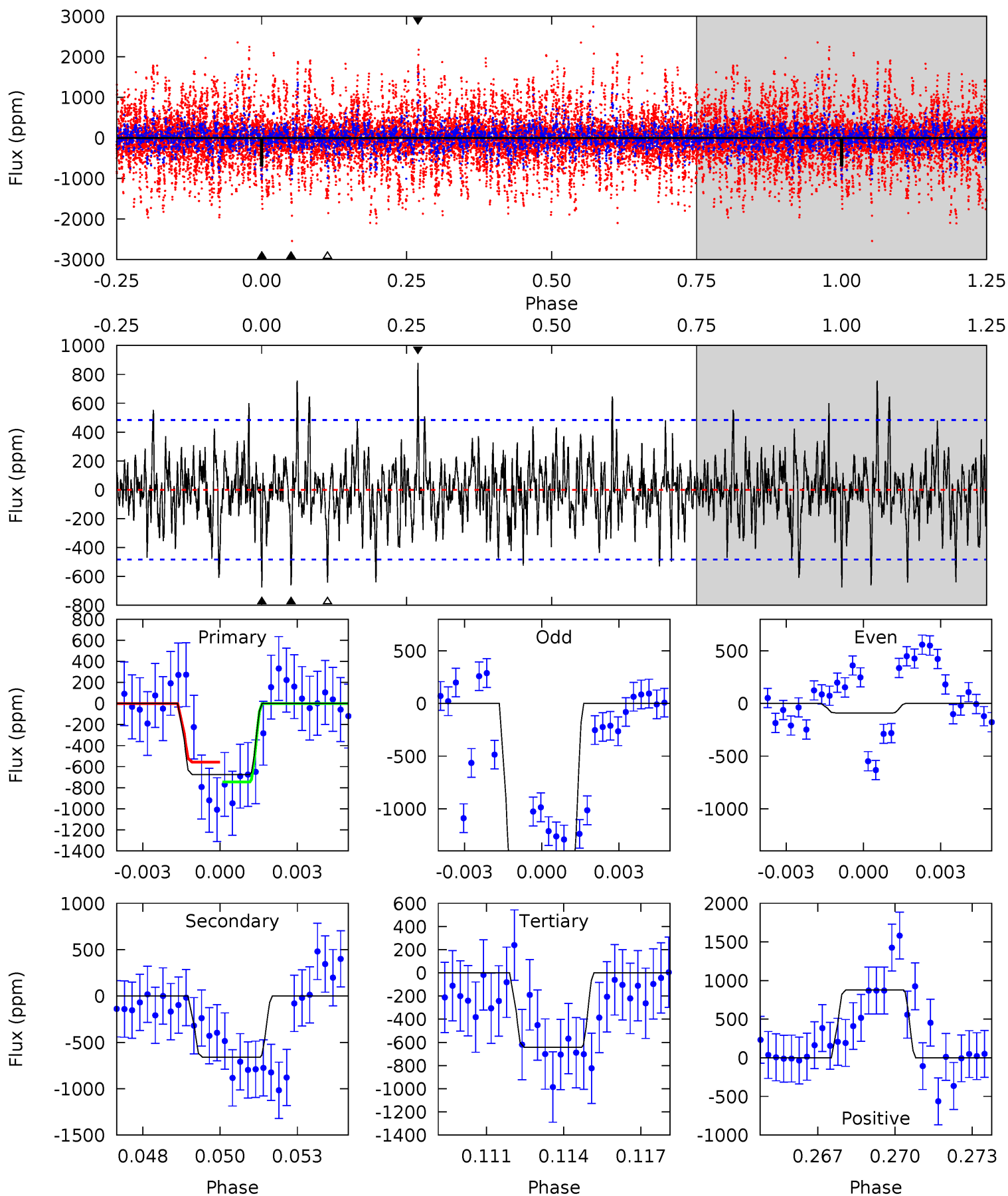
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.6	10.3	9.87	12.6	5.22	2.92	3.31	3.72	0.94	0.40	-2.37	2.12	1.16	0.50	0



Alt Model-Shift Uniqueness Test

009716358-02, P = 75.214958 Days, E = 83.283168 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.37	7.21	7.00	9.59	5.28	3.01	1.91	0.37	-2.22	0.21	-2.38	9.13	0.65	0.57	1.00



Stellar Parameters For KIC 009716358

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6725^{+189}_{-283}	$3.934^{+0.312}_{-0.144}$	$-0.040^{+0.250}_{-0.300}$	$2.215^{+0.572}_{-0.858}$	$1.535^{+0.200}_{-0.371}$	$0.199^{+0.523}_{-0.086}$
	+3%/-4%	+8%/-4%	+625%/-750%	+26%/-39%	+13%/-24%	+263%/-43%
Source	PHO54	PHO54	PHO54	DSEP		

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

Secondary Eclipse Parameters for KIC 009716358-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-533 ± 52	$5.26^{+1.23}_{-1.13}$	960^{+73}_{-92}	6790^{+631}_{-534}	1718^{+1037}_{-579}
Alt.	-661 ± 92	$8.31^{+1.67}_{-1.74}$	948^{+83}_{-97}	5660^{+386}_{-367}	843^{+469}_{-258}

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

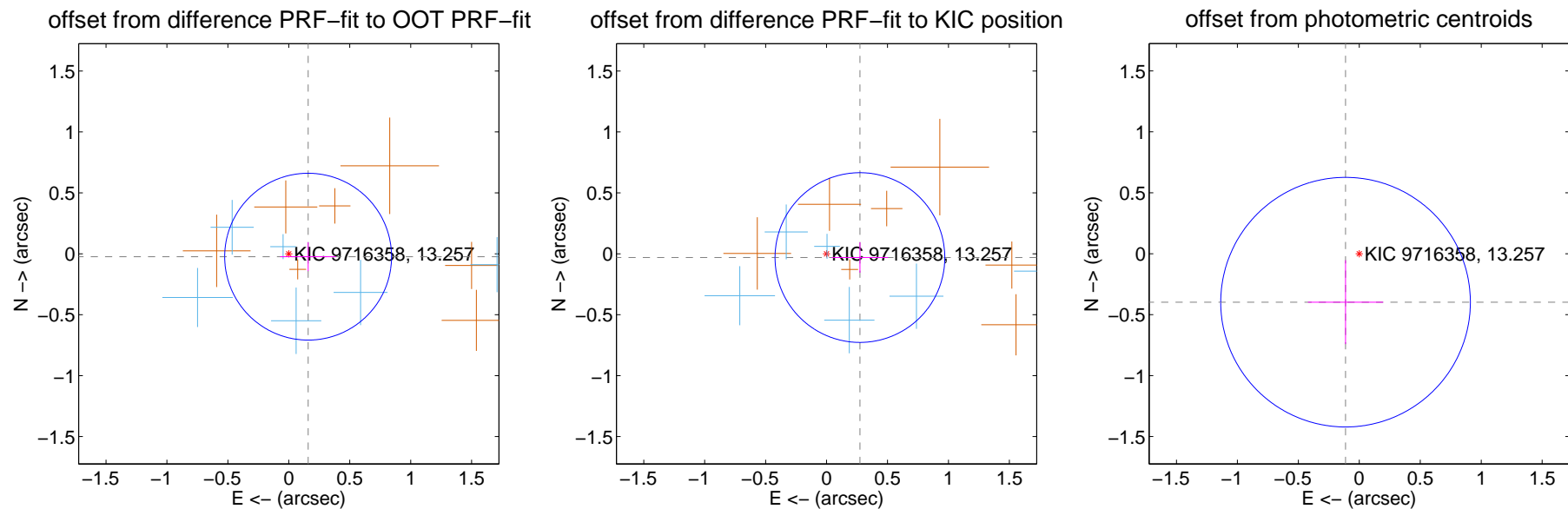
DV Centroid Data

Supplemental centroid analysis for 009716358-02. Kepler magnitude: 13.26. Transit SNR 4.73

There are 6 quarters with good PRF difference image offsets

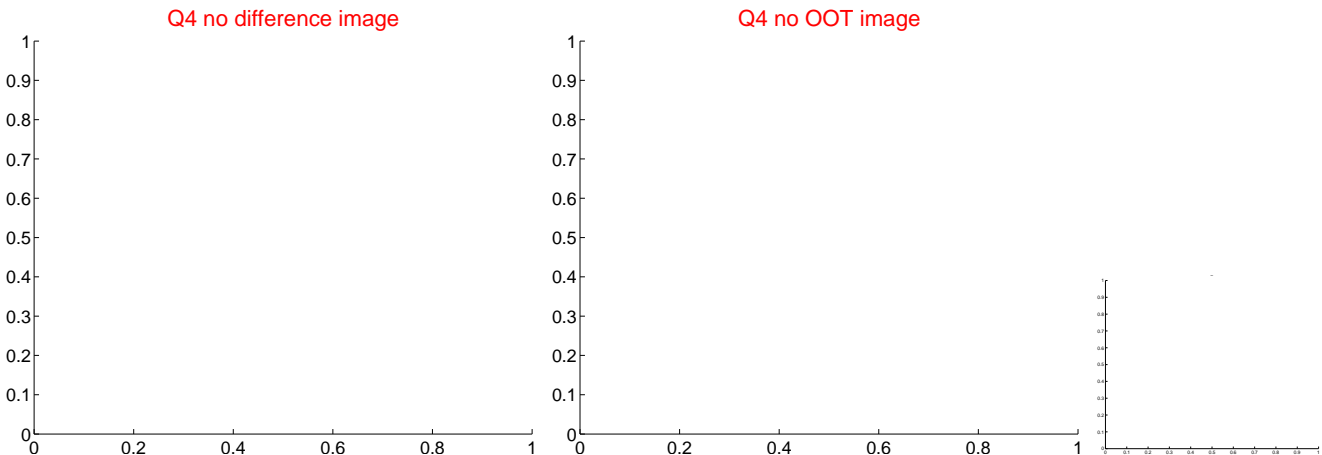
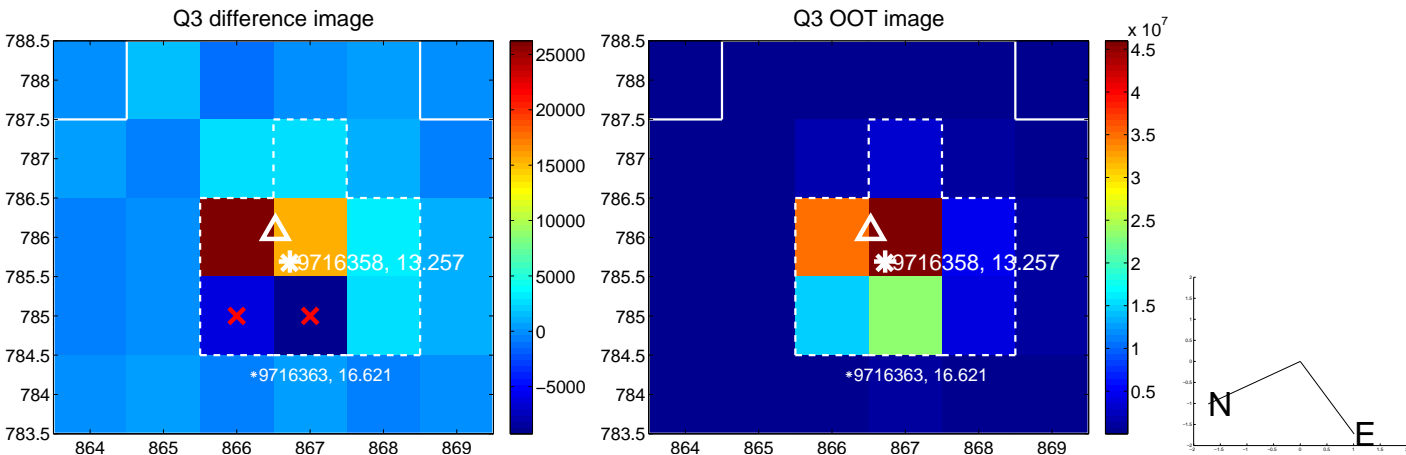
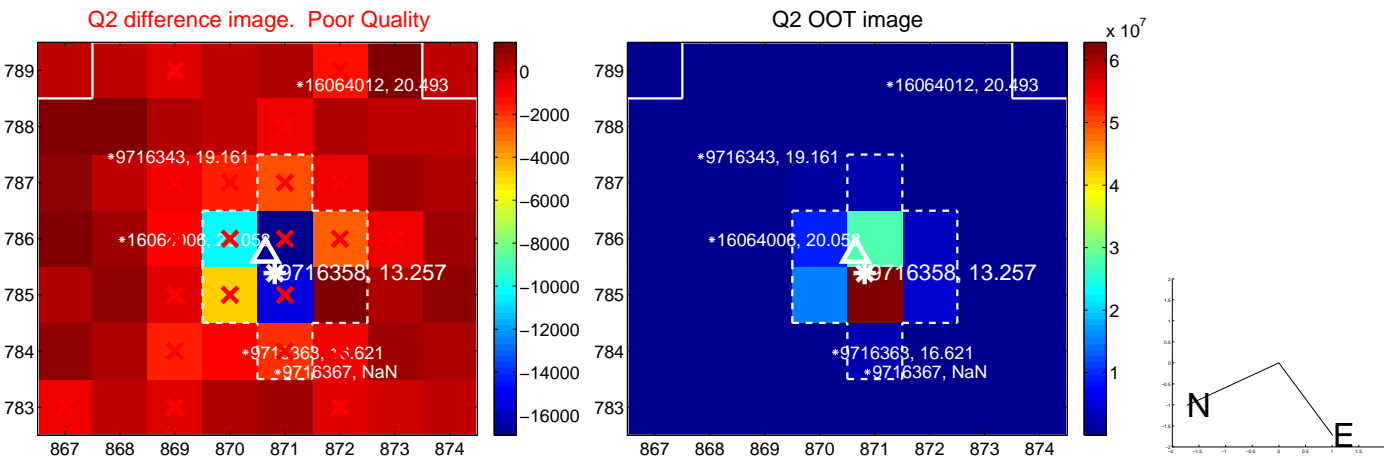
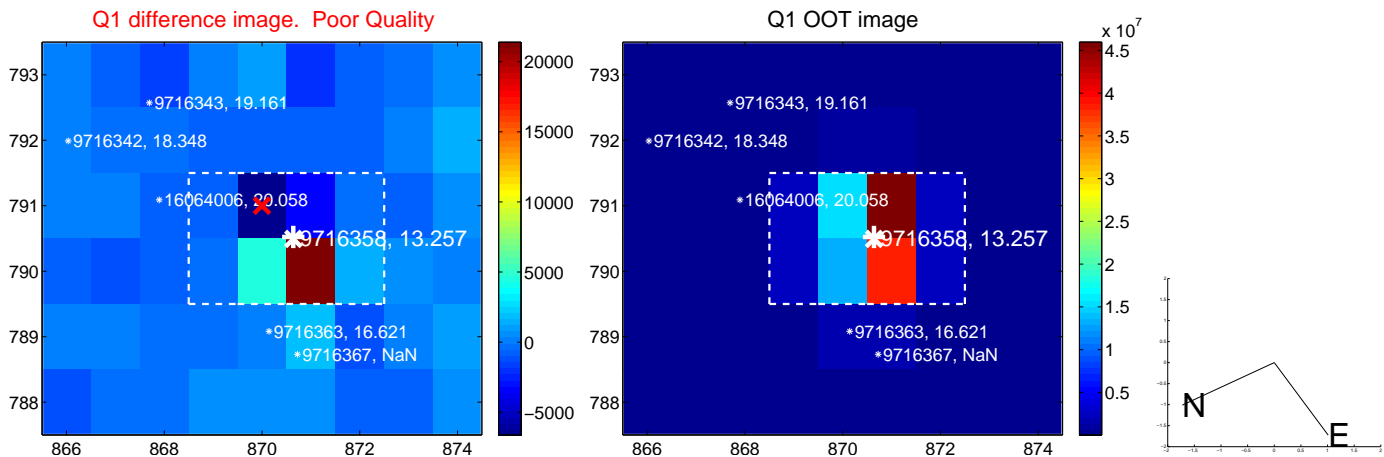
The direct PRF centroid is offset from the target star catalog position by about 0.10 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.160 ± 0.228	0.70	-0.158 ± 0.229	-0.024 ± 0.118
PRF-fit source offset from KIC position	0.275 ± 0.232	1.19	-0.274 ± 0.231	-0.031 ± 0.125
photometric centroid source offset	0.41 ± 0.34	1.21	0.11 ± 0.31	-0.40 ± 0.34

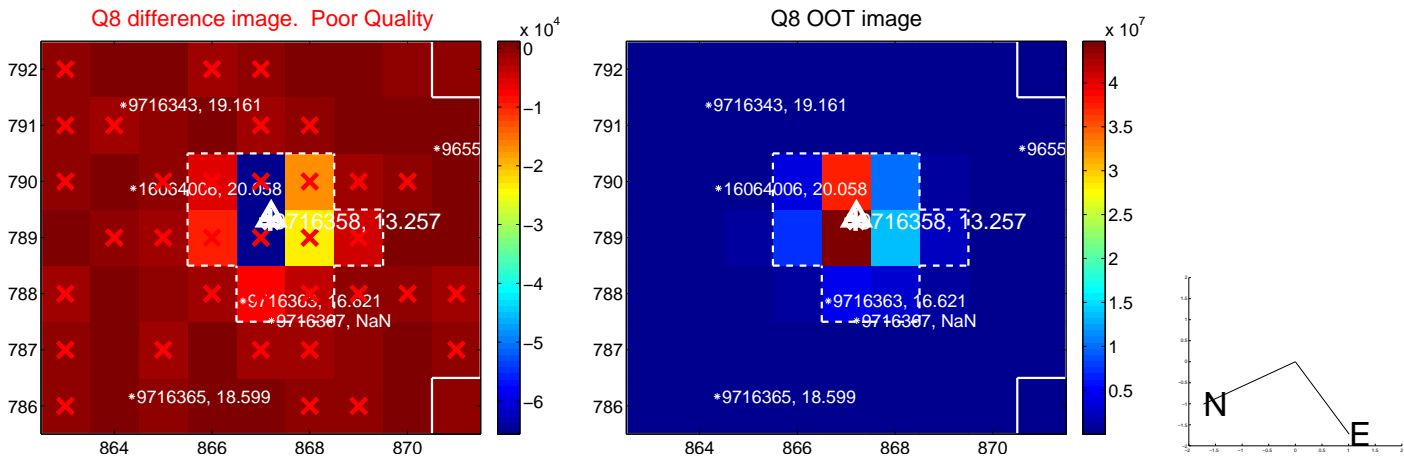
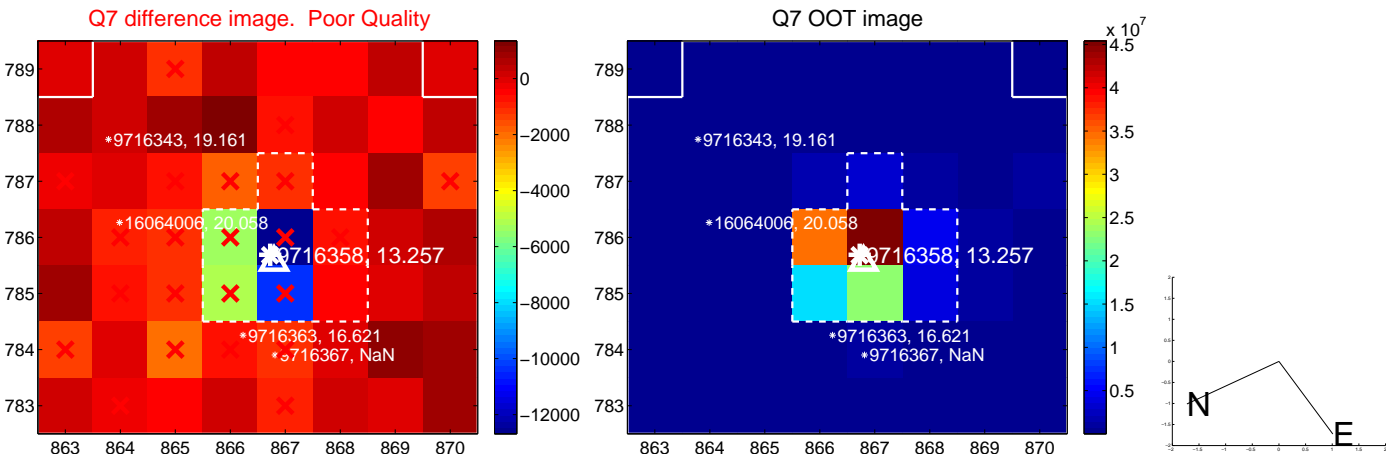
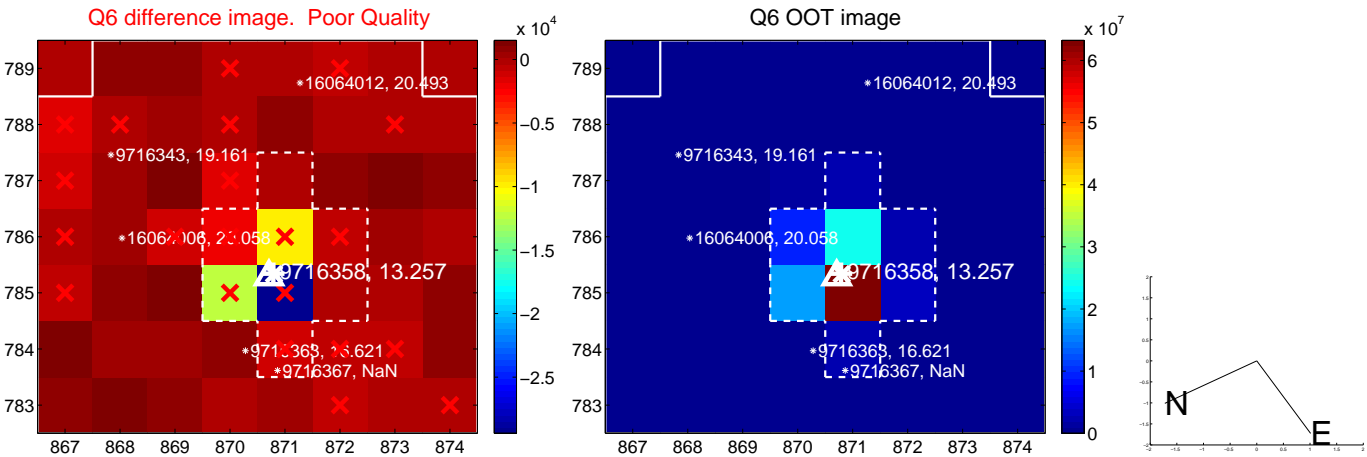
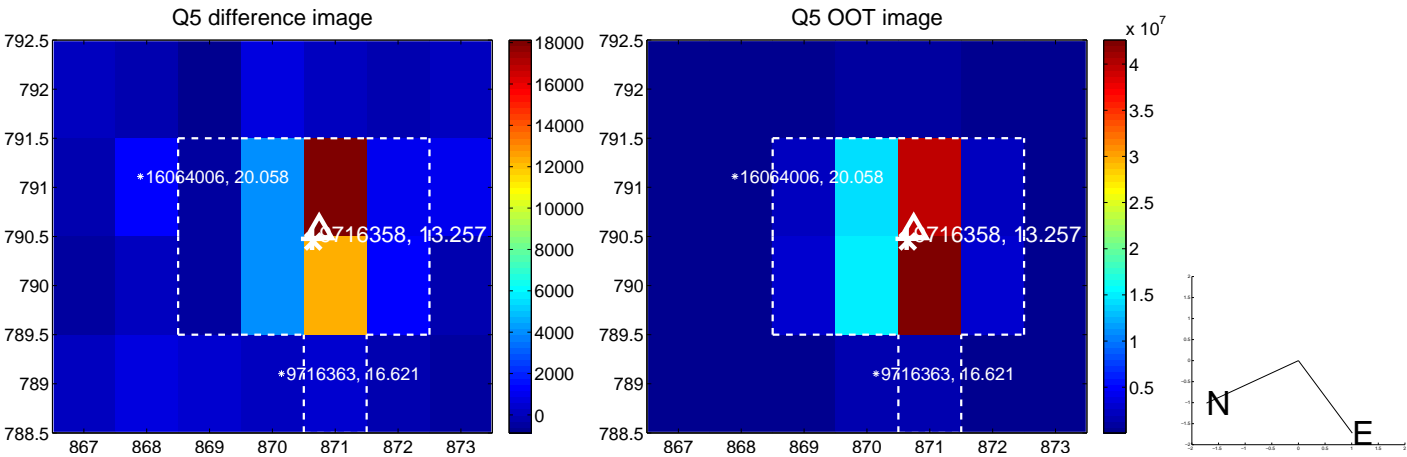


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

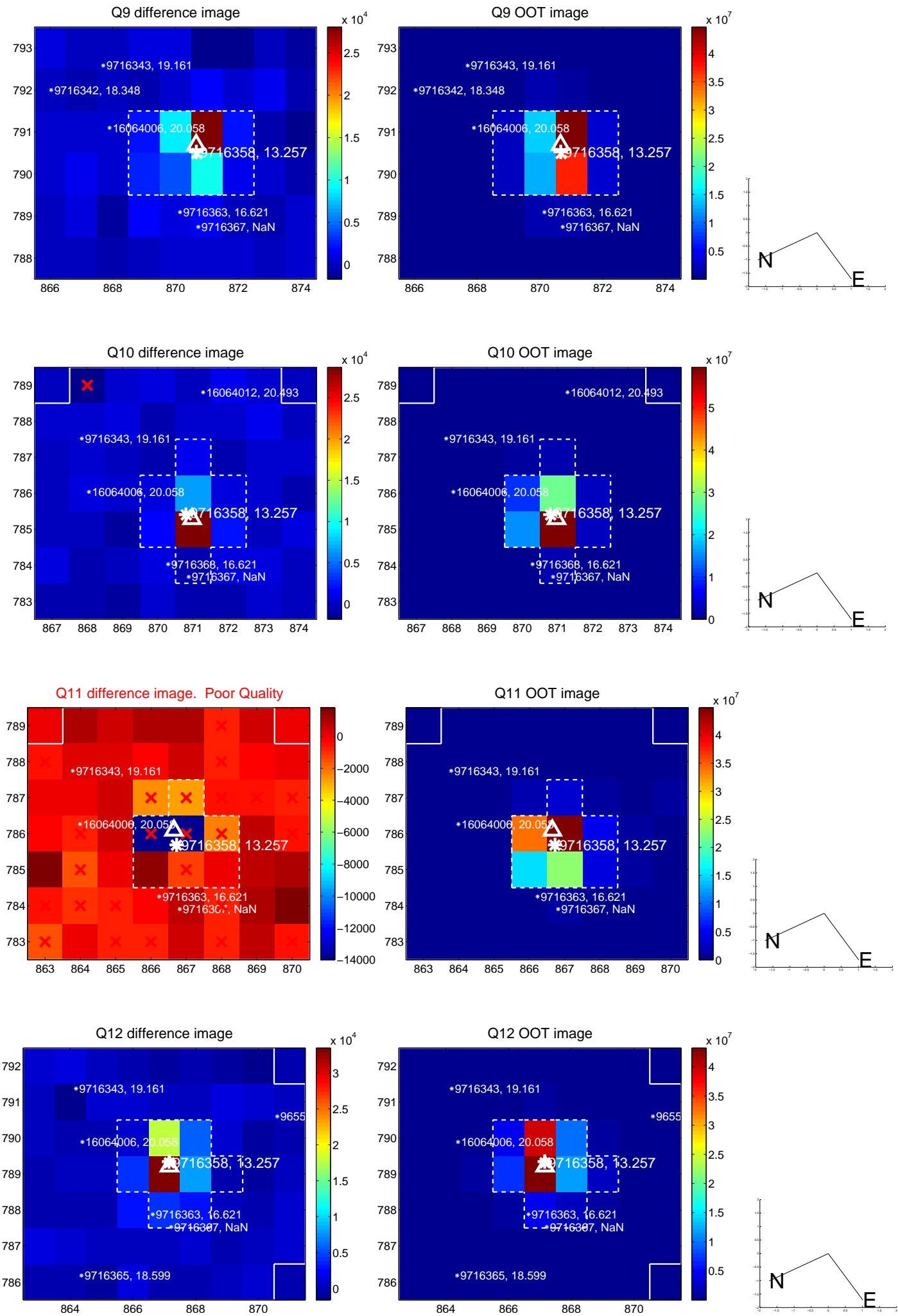
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



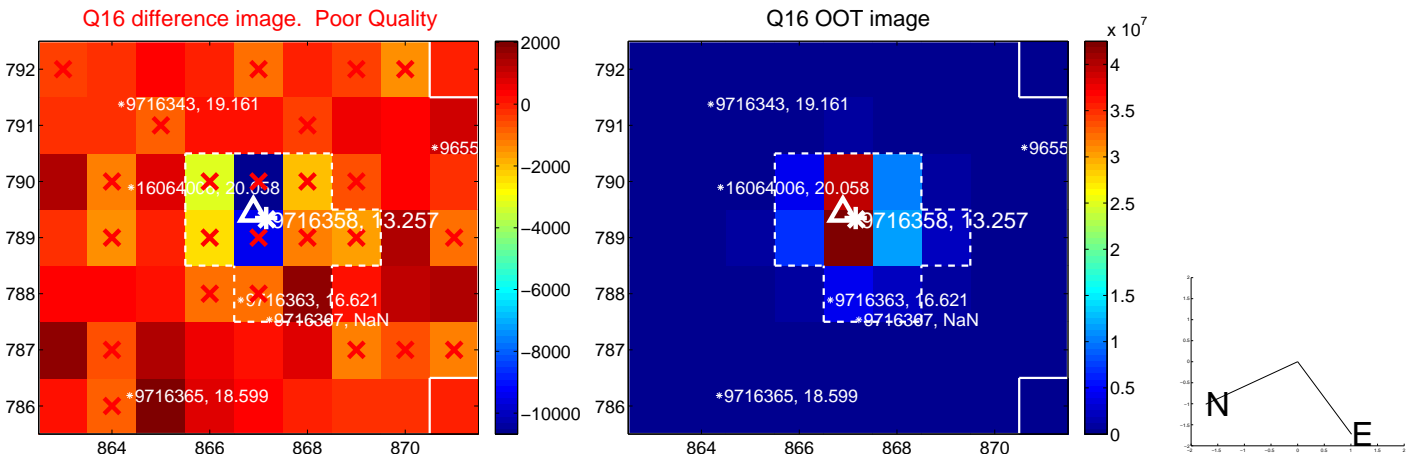
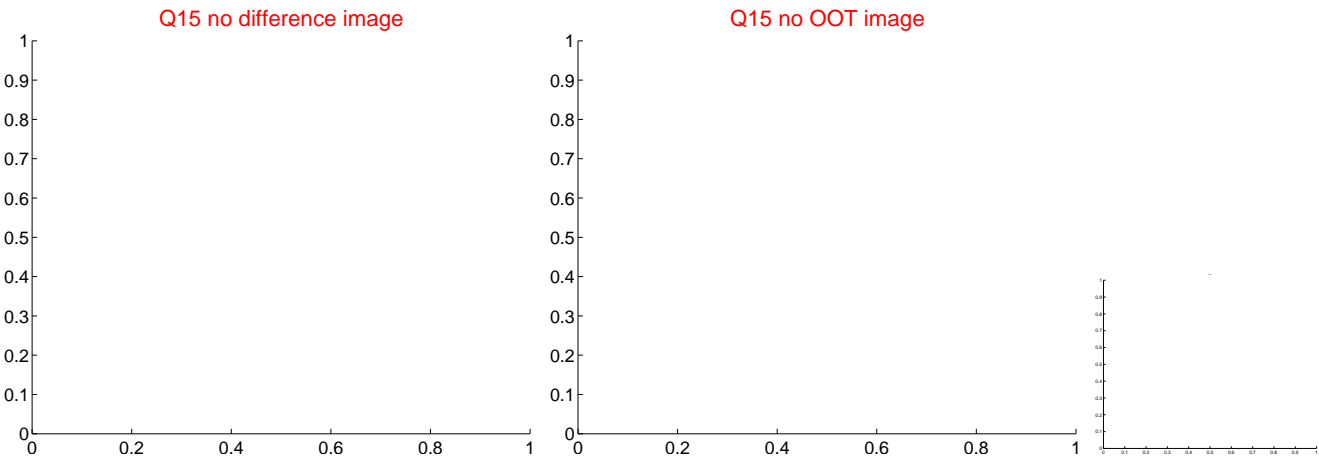
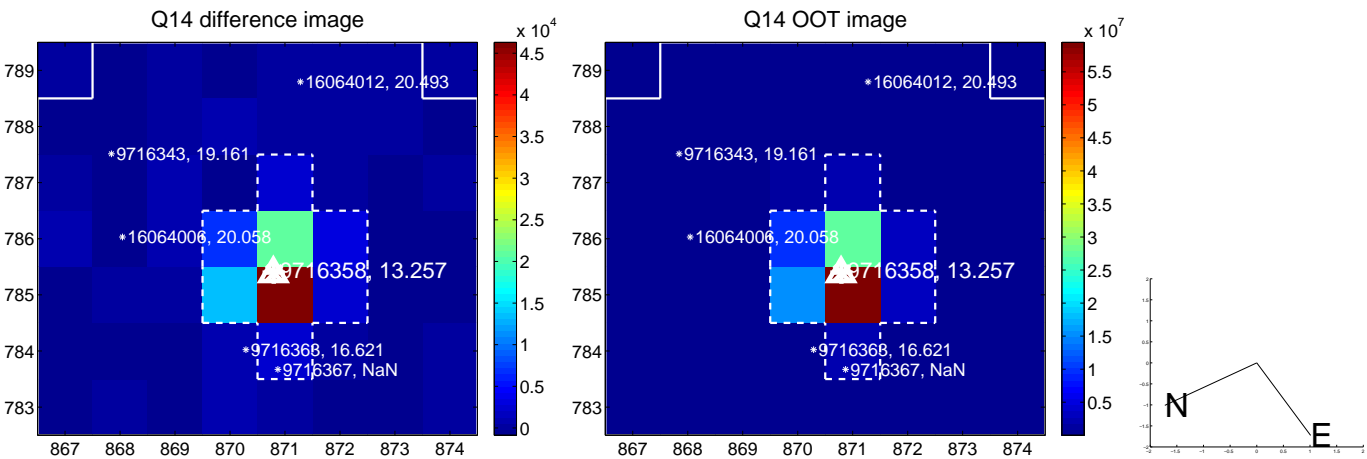
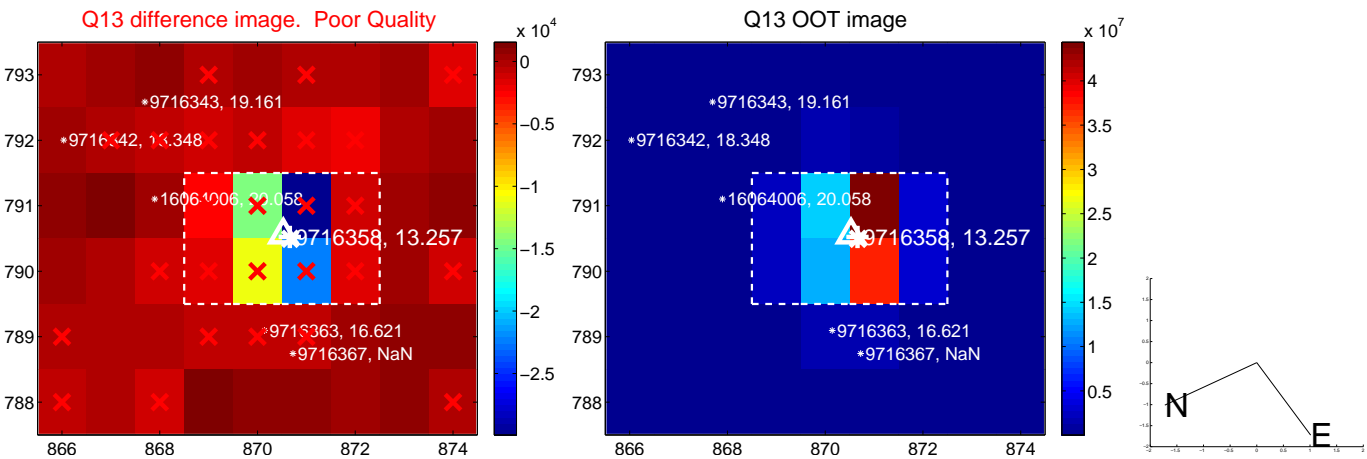
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



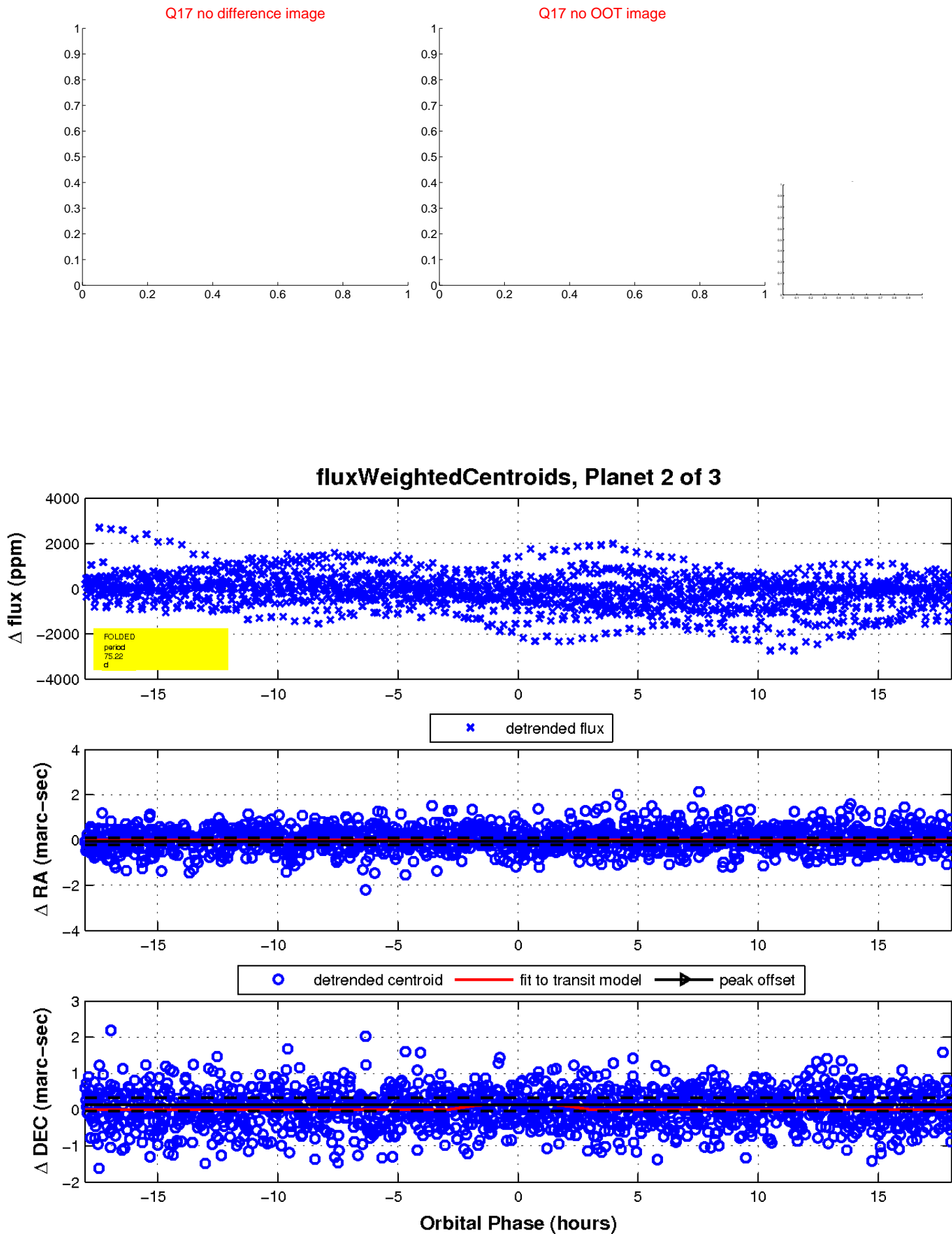
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

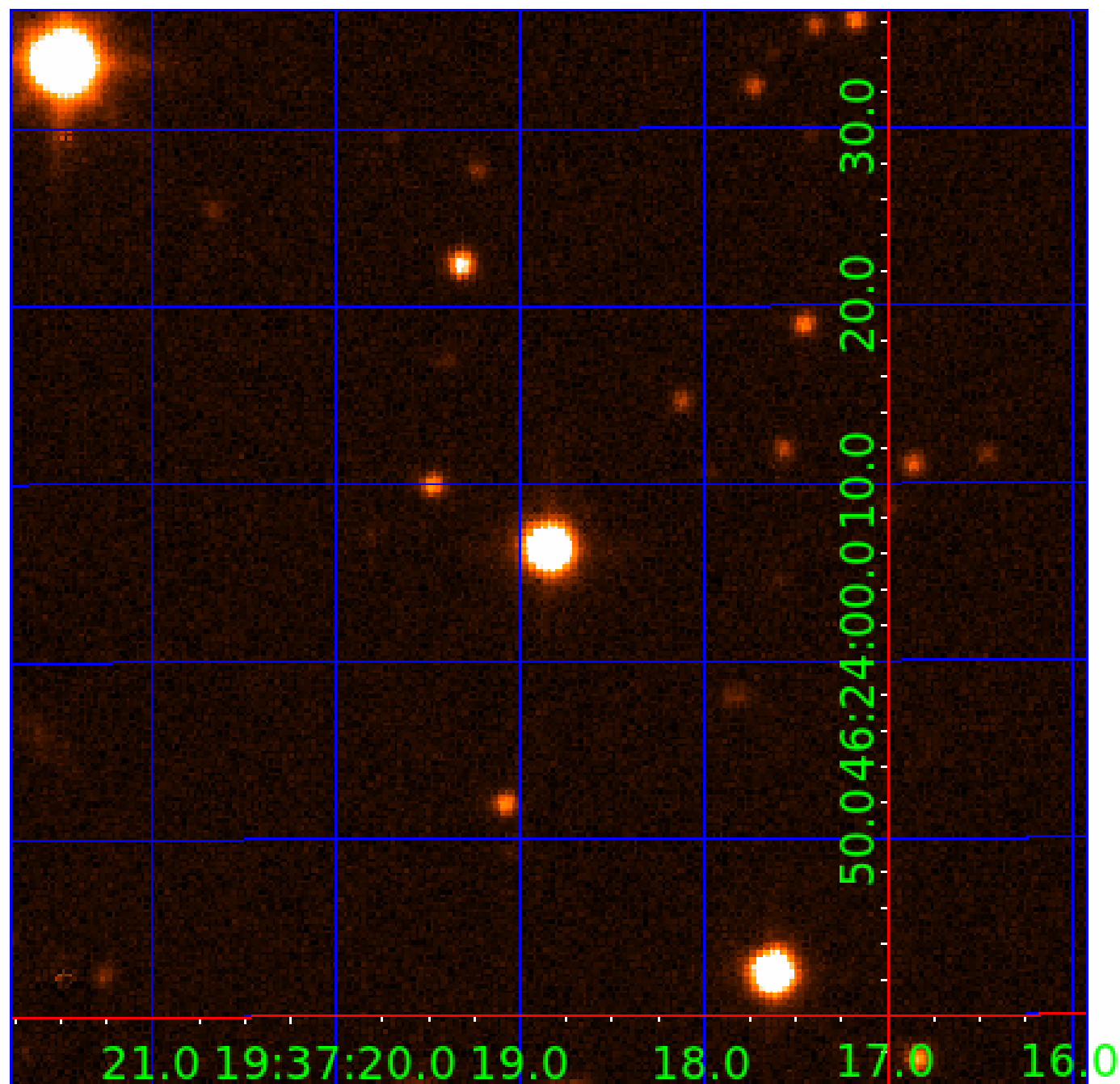


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 009716358

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})
009716358-01	OBS	No	0.785806	131.863328	28.4	4.510	9.4	7.5	2.21	6725	1.24	24293.63
009716358-02	OBS	No	75.217320	158.473313	385.7	6.022	9.5	4.7	2.21	6725	5.44	55.48
009716358-03	OBS	No	257.807312	155.400821	2795.6	27.319	7.9	8.2	2.21	6725	21.31	10.74

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009716358-01	OBS	FP	0.00	1	0	0	0	LPP_DV
009716358-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE—TRANS_GAPPED—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT
009716358-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT

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

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

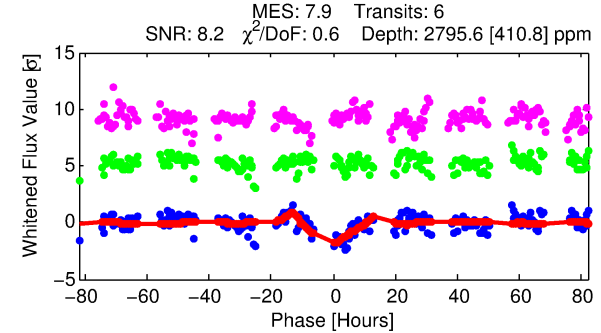
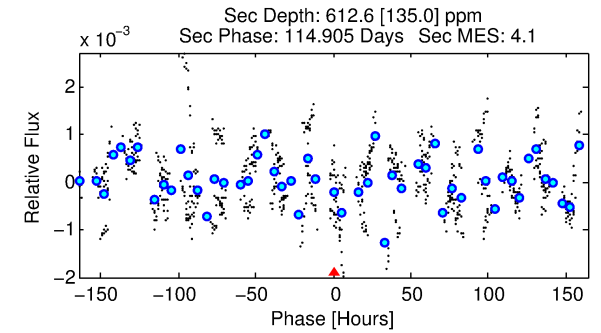
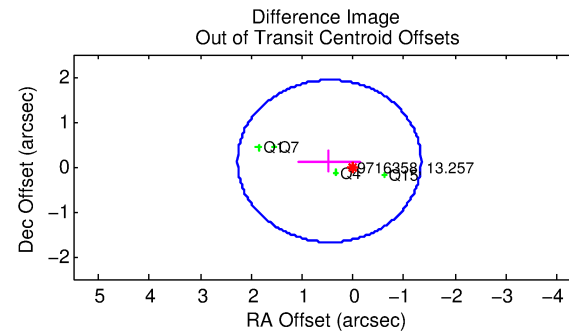
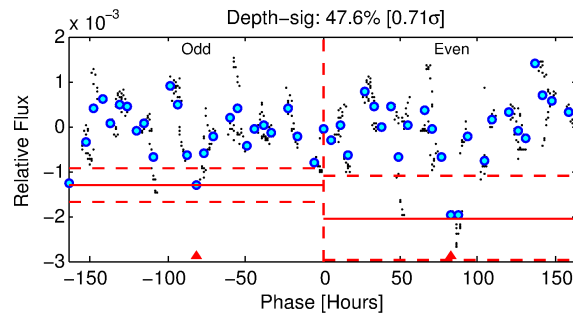
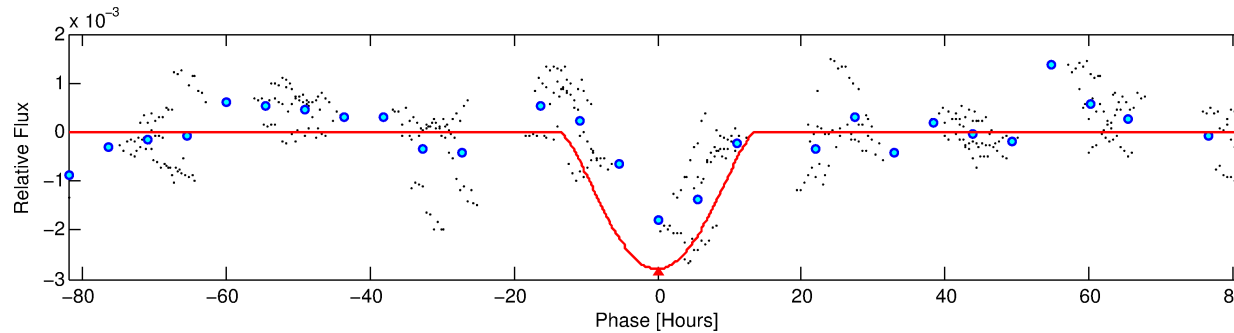
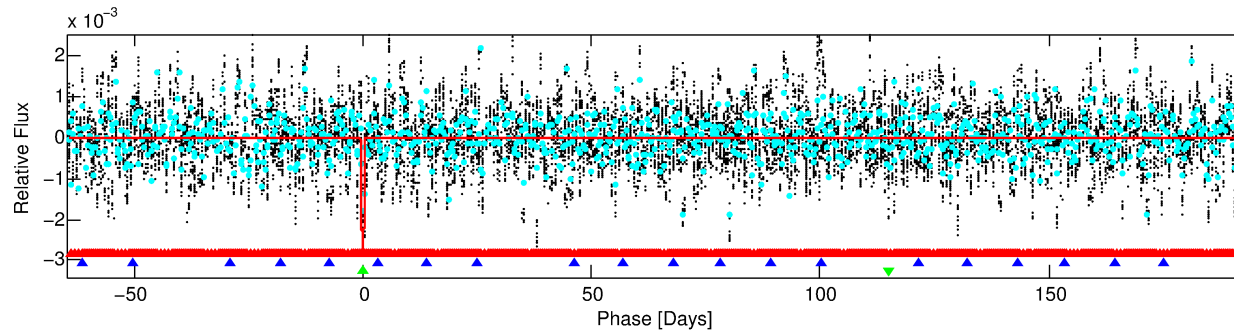
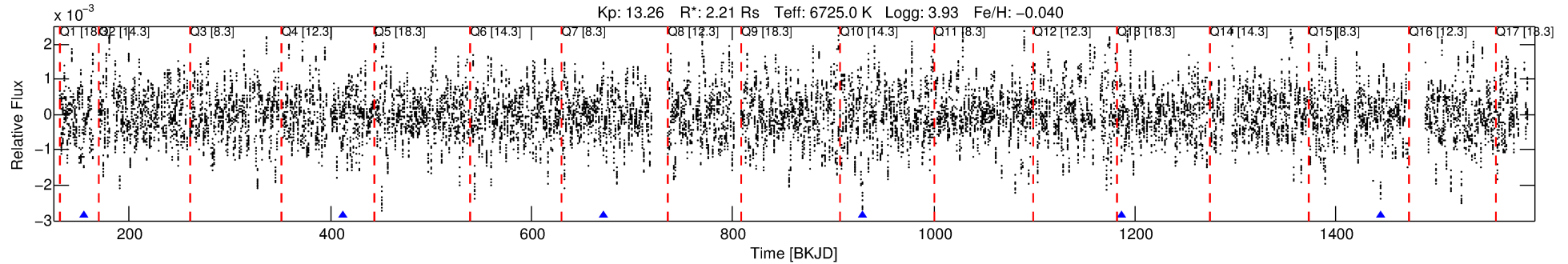
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009716358-03

No Significant Match Found

DV One-Page Summary

KIC: 9716358 Candidate: 3 of 3 Period: 257.807 d



DV Fit Results:

Period = 257.80731 [0.01016] d
Epoch = 155.4008 [0.0255] BKJD
Rp/R* = 0.0882 [0.0929]
a/R* = 30.98 [6.50]
b = 1.00 [0.13]
Seff = 10.74 [6.11]
Teq = 462 [66] K
Rp = 21.31 [23.92] Re
a = 0.9151 [0.3223] AU
Ag = 621.45 [1359.41] [0.46 σ]
Teffp = 3563 [1893] K [1.64 σ]

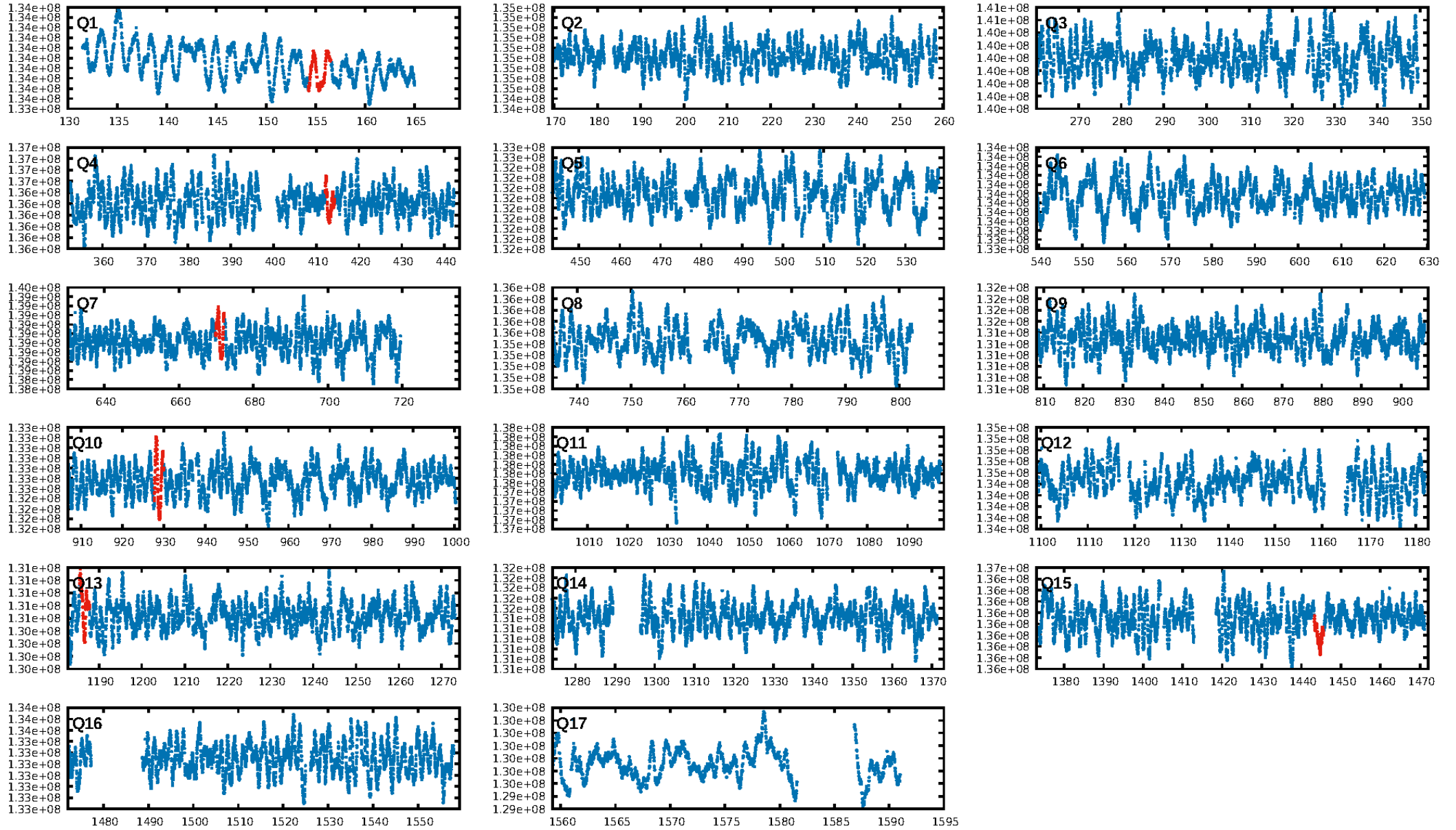
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [156.64 σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 17.4%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 3.10e-09
RollingBand-fgt: 1.00 [5/5]
GhostDiagnostic-chr: -3.78
Centroid-sig: 73.7%
Centroid-so: 0.090 arcsec [1.93 σ]
OotOffset-rm: 0.480 arcsec [0.80 σ]
OotOffset-st: 0/2/1/1 [4]
KicOffset-rm: 0.414 arcsec [0.68 σ]
KicOffset-st: 0/2/1/1 [4]
DiffImageQuality-fgm: 1.00 [4/4]
DiffImageOverlap-fno: 0.00 [0/4]

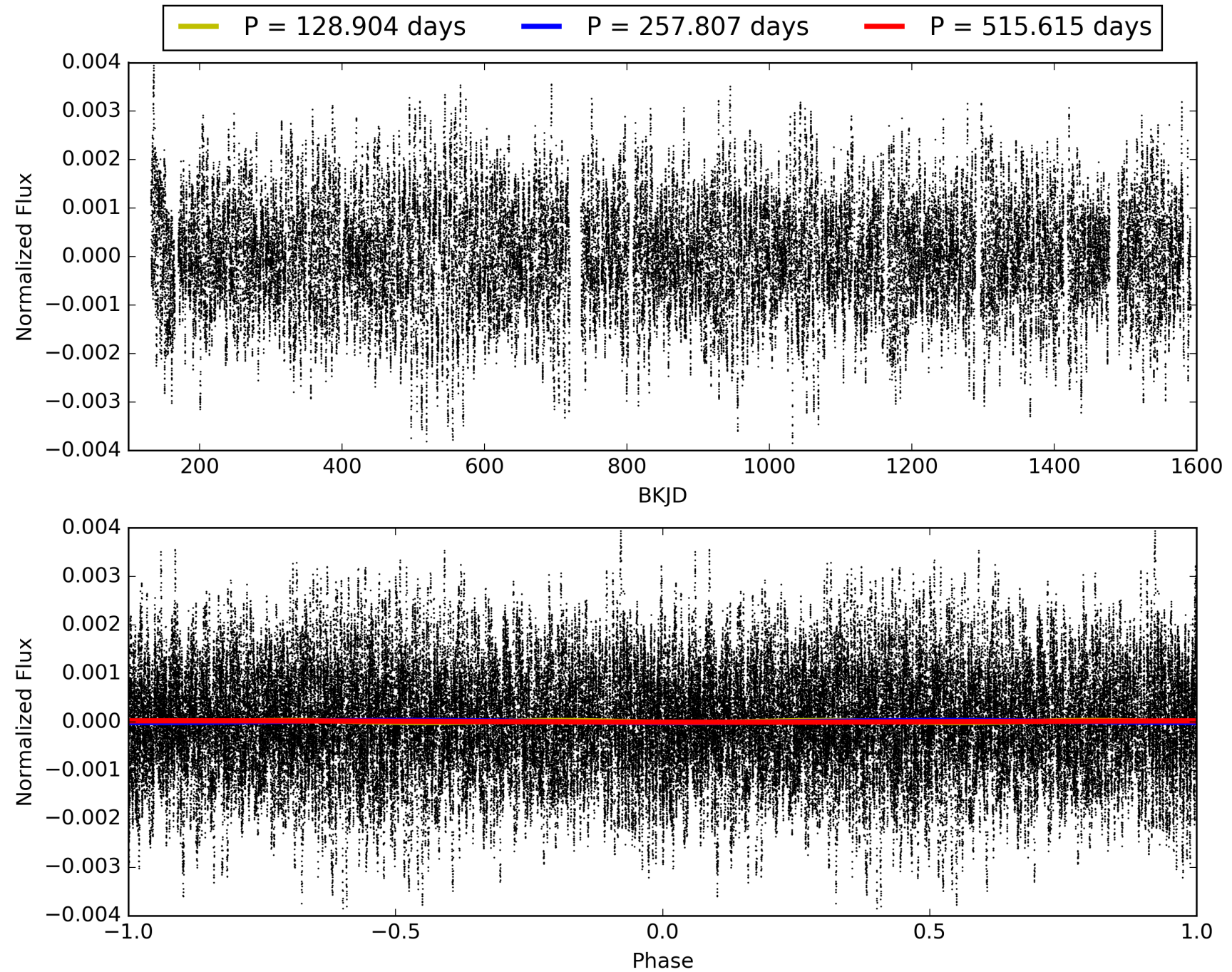
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 04:23:11 Z

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

TCE 009716358-03, PDC Light Curves

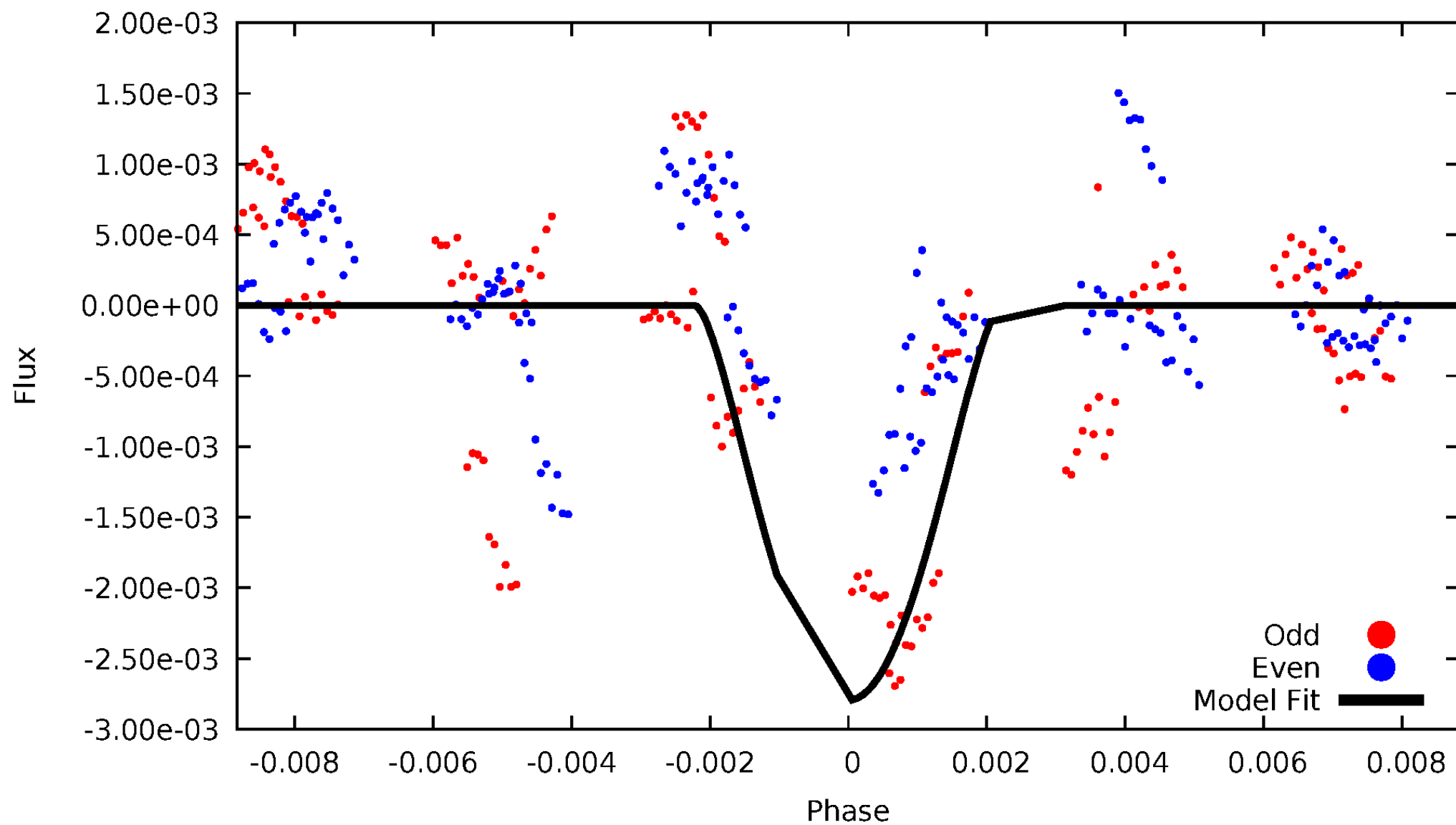


TCE 009716358-03



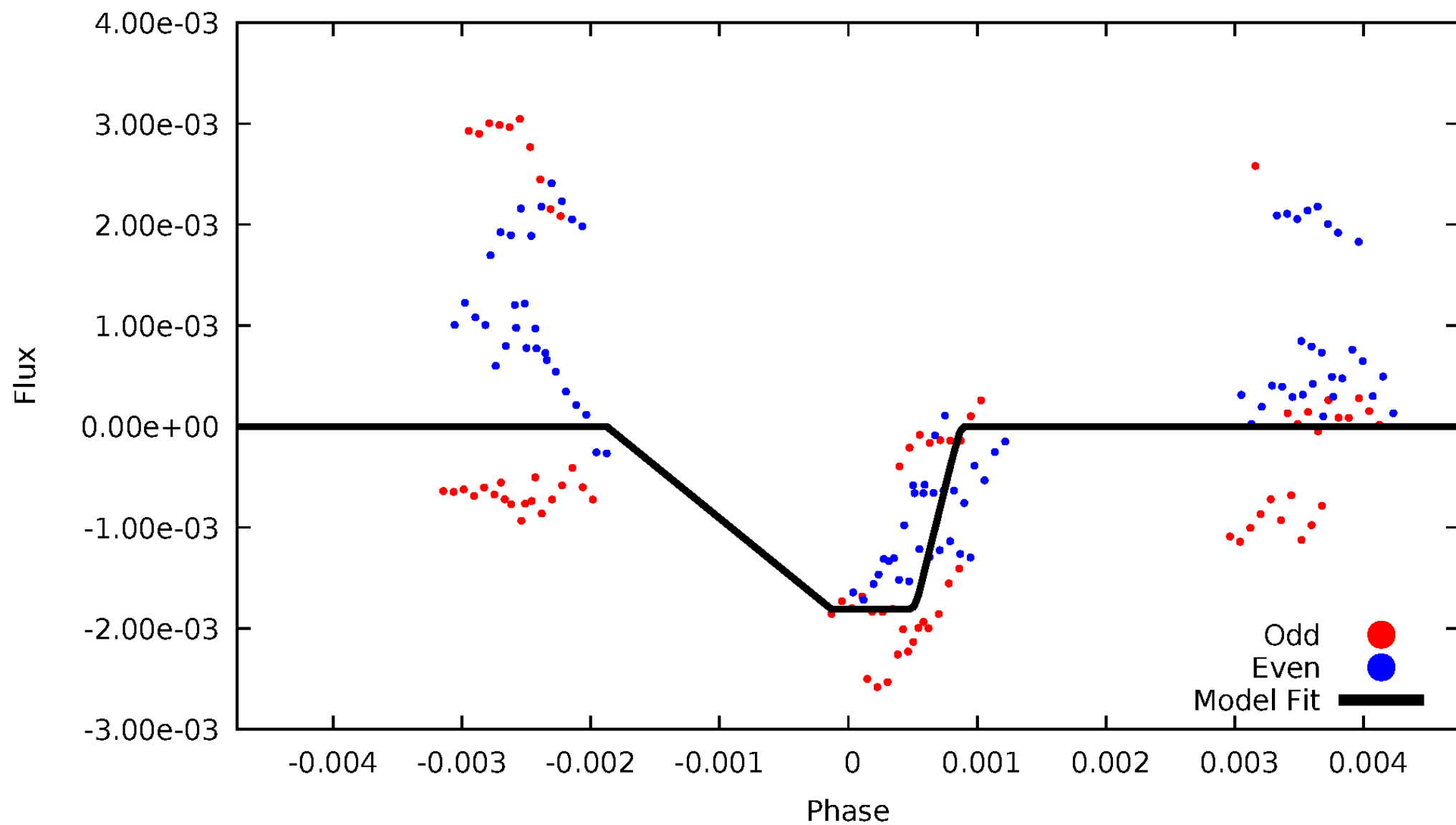
DV Odd/Even

TCE 009716358-03



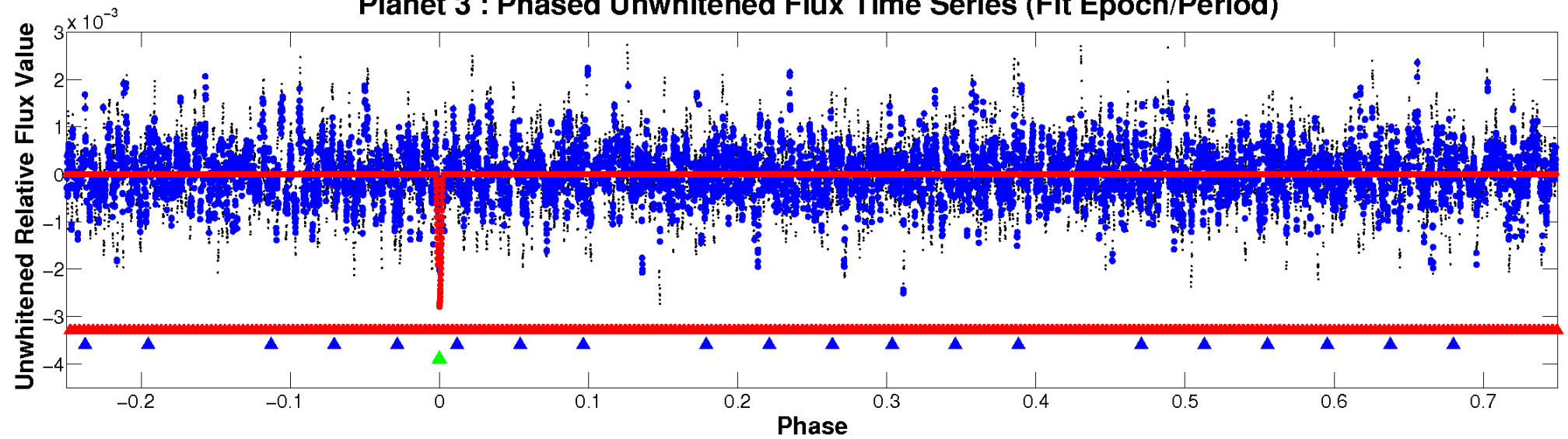
ALT Odd/Even

TCE 009716358-03

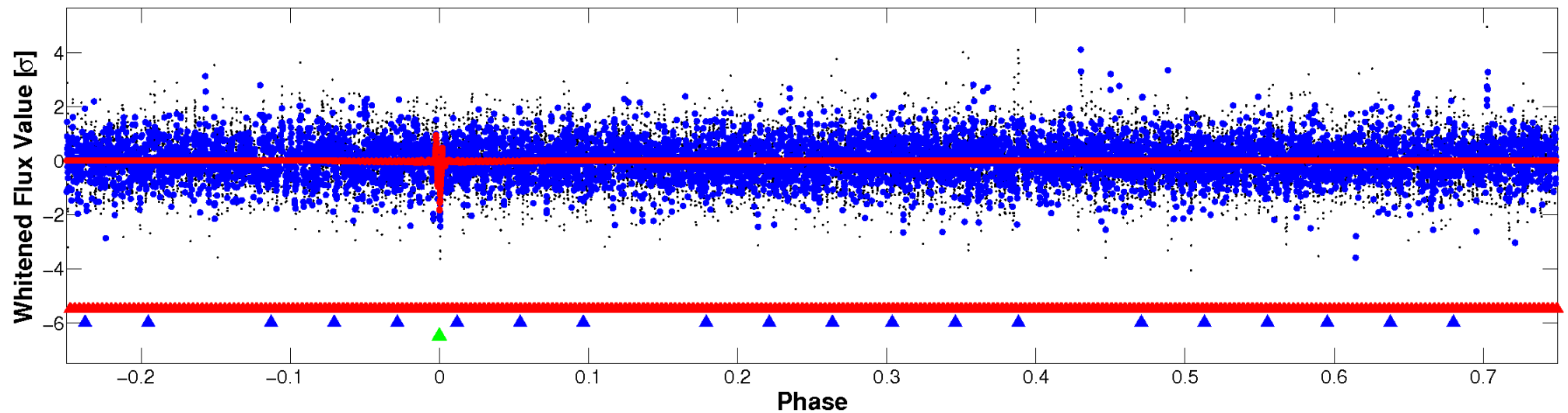


Non-Whitened Vs. Whitened Light Curve

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

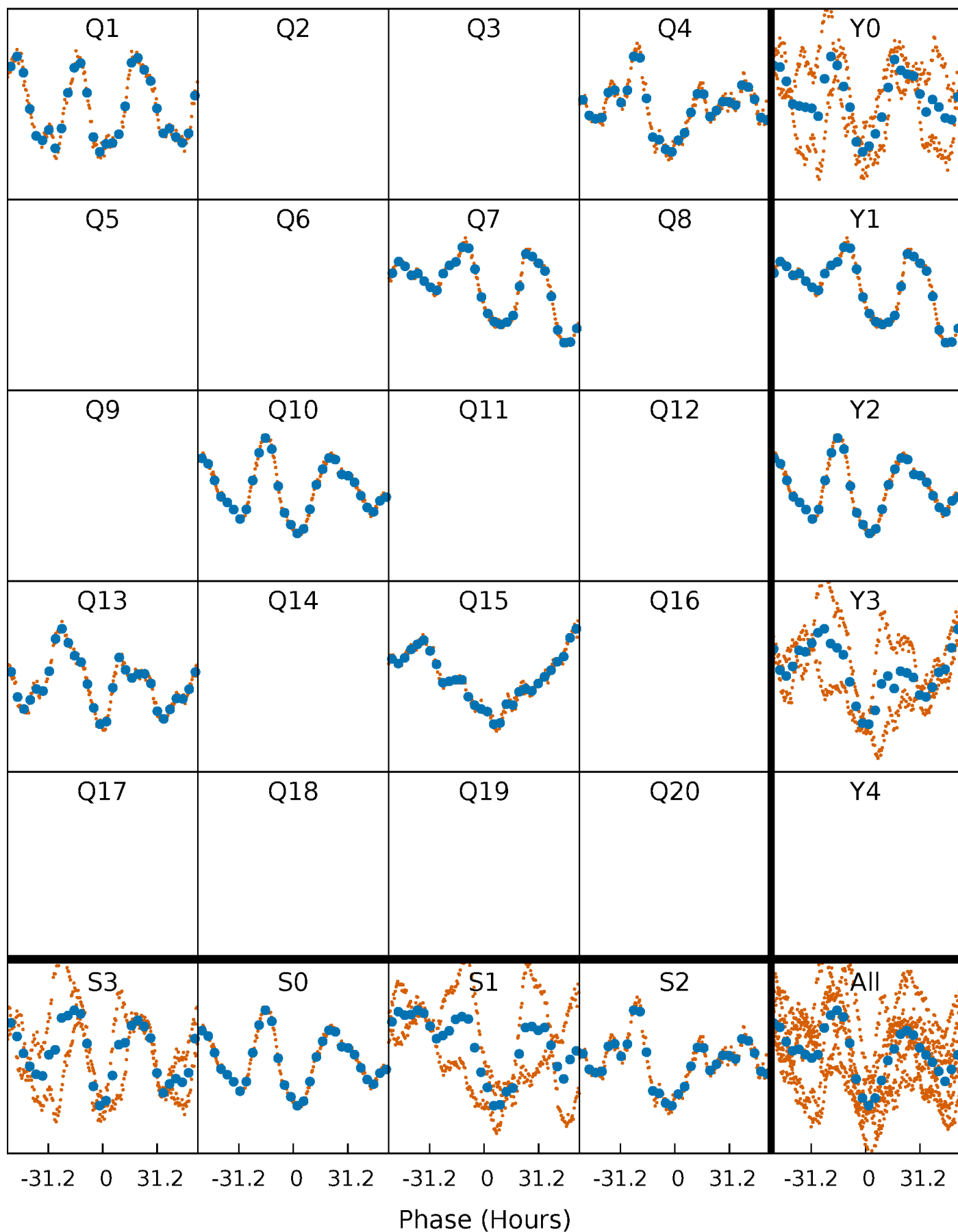


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



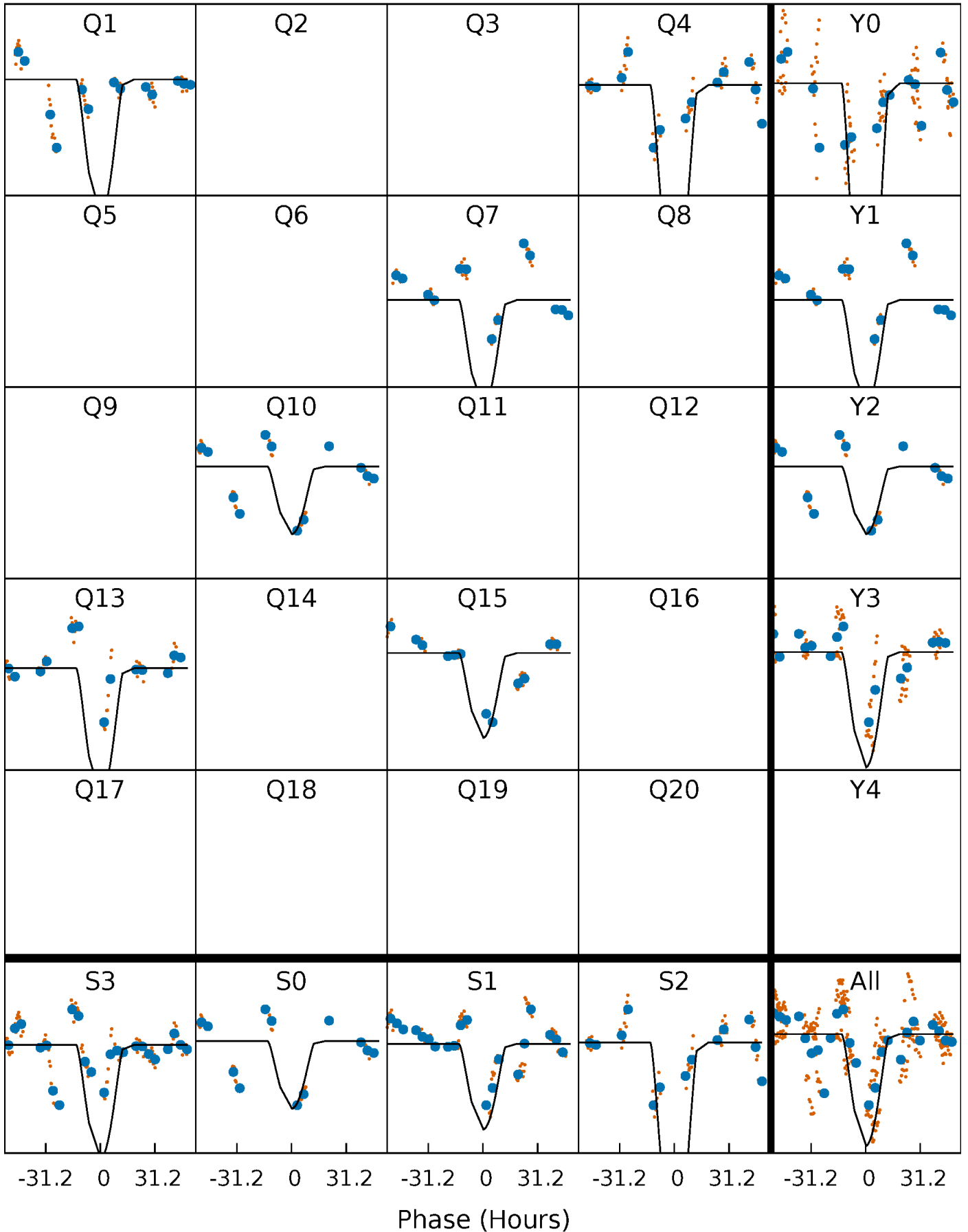
PDC Quarter-Phased Transit Curves

TCE 009716358-03 P=257.807312 Days $T_0=155.400821$ (BKJD)



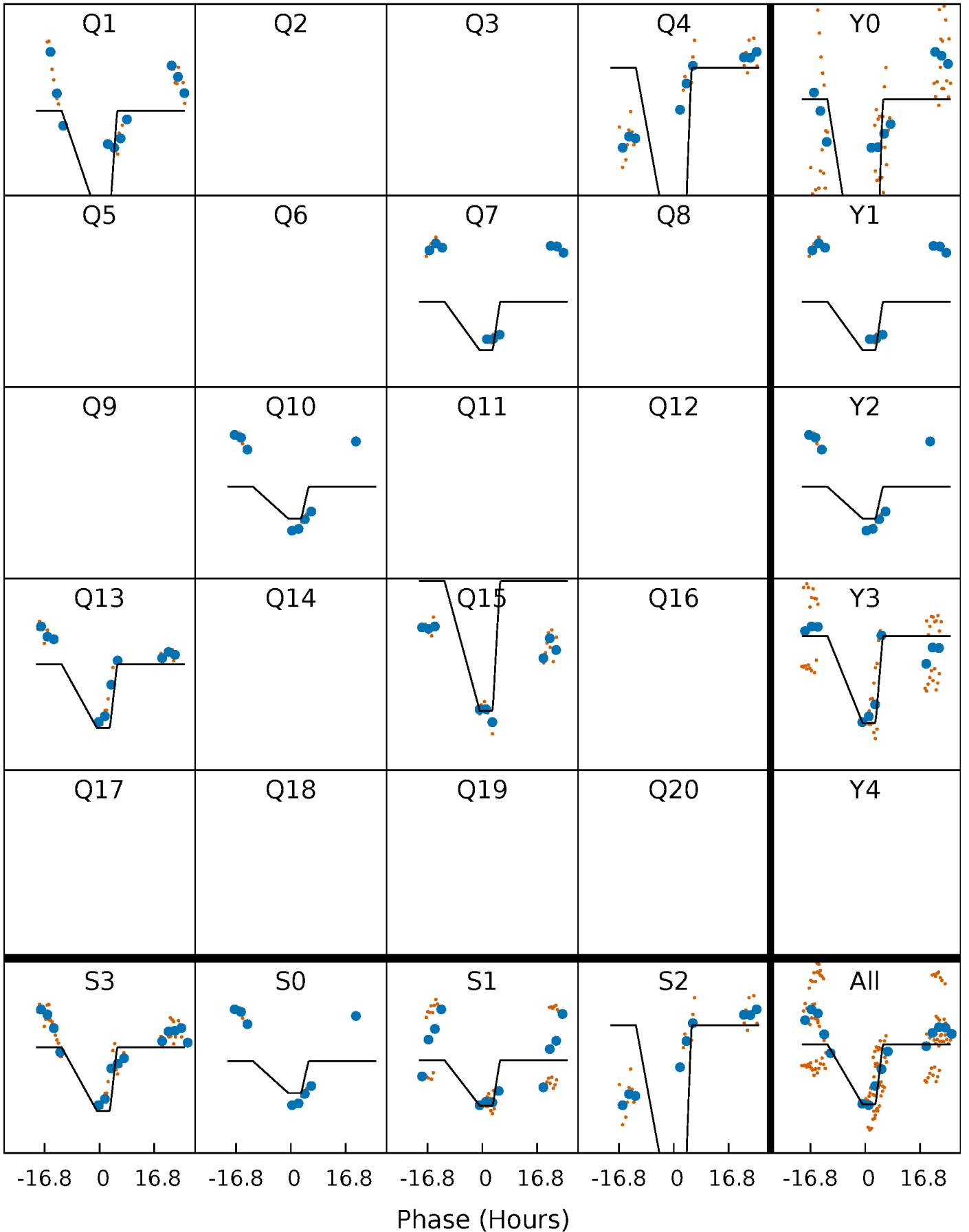
DV Quarter-Phased Transit Curves

TCE 009716358-03 $P=257.807312$ Days $T_0=155.400821$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

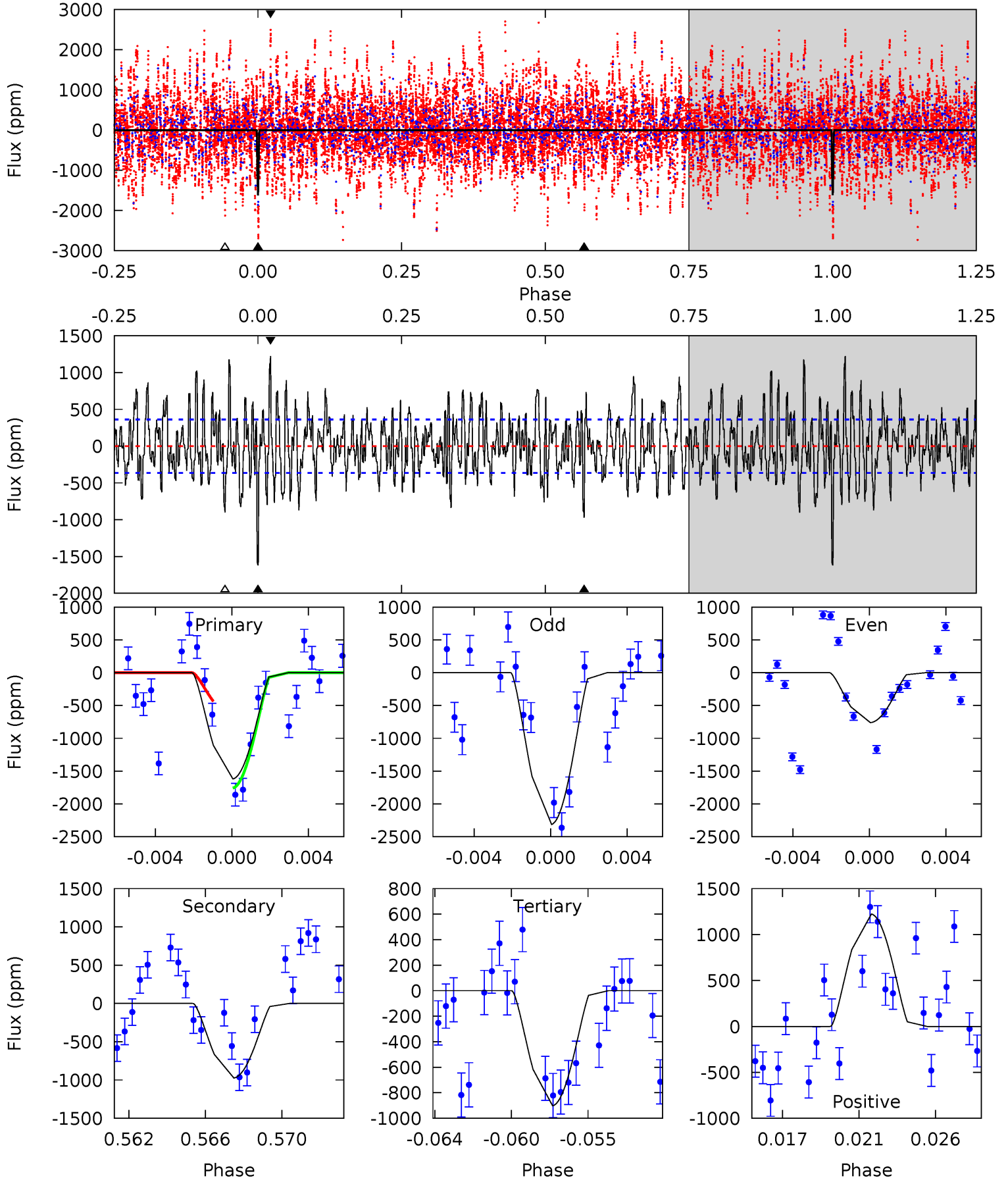
TCE 009716358-03 P=257.773547 Days $T_0=155.617488$ (BKJD)



DV Model-Shift Uniqueness Test

009716358-03, P = 257.807312 Days, E = 155.400821 Days

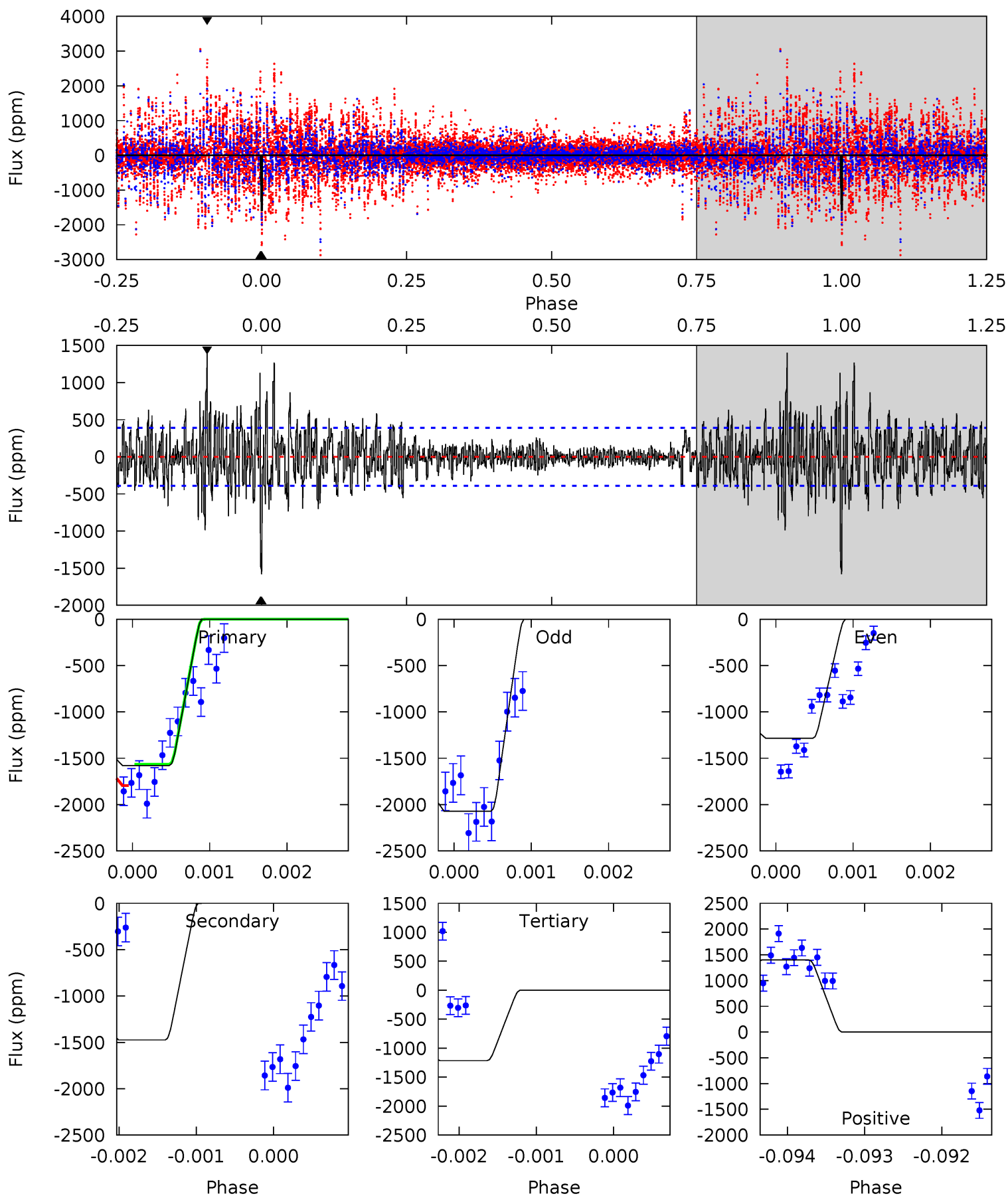
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
23.1	13.9	12.9	17.5	5.19	2.86	5.05	10.3	5.65	1.02	-3.58	11.1	1.52	0.43	9.23



Alt Model-Shift Uniqueness Test

009716358-03, $P = 257.773547$ Days, $E = 155.617488$ Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
22.1	20.6	17.0	19.6	5.45	3.29	3.24	5.08	2.49	3.61	1.02	4.95	1.00	0.47	0.00



Stellar Parameters For KIC 009716358

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6725^{+189}_{-283}	$3.934^{+0.312}_{-0.144}$	$-0.040^{+0.250}_{-0.300}$	$2.215^{+0.572}_{-0.858}$	$1.535^{+0.200}_{-0.371}$	$0.199^{+0.523}_{-0.086}$
	+3%/-4%	+8%/-4%	+625%/-750%	+26%/-39%	+13%/-24%	+263%/-43%
Source	PHO54	PHO54	PHO54	DSEP		

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

Secondary Eclipse Parameters for KIC 009716358-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-974 ± 70	$24.26^{+18.74}_{-15.41}$	633^{+47}_{-65}	3951^{+1901}_{-670}	740^{+4893}_{-502}
Alt.	-1474 ± 72	$18.81^{+19.39}_{-12.63}$	631^{+52}_{-58}	4731^{+3338}_{-1085}	1893^{+17352}_{-1421}

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 $A_{obs} \gg 1.0$

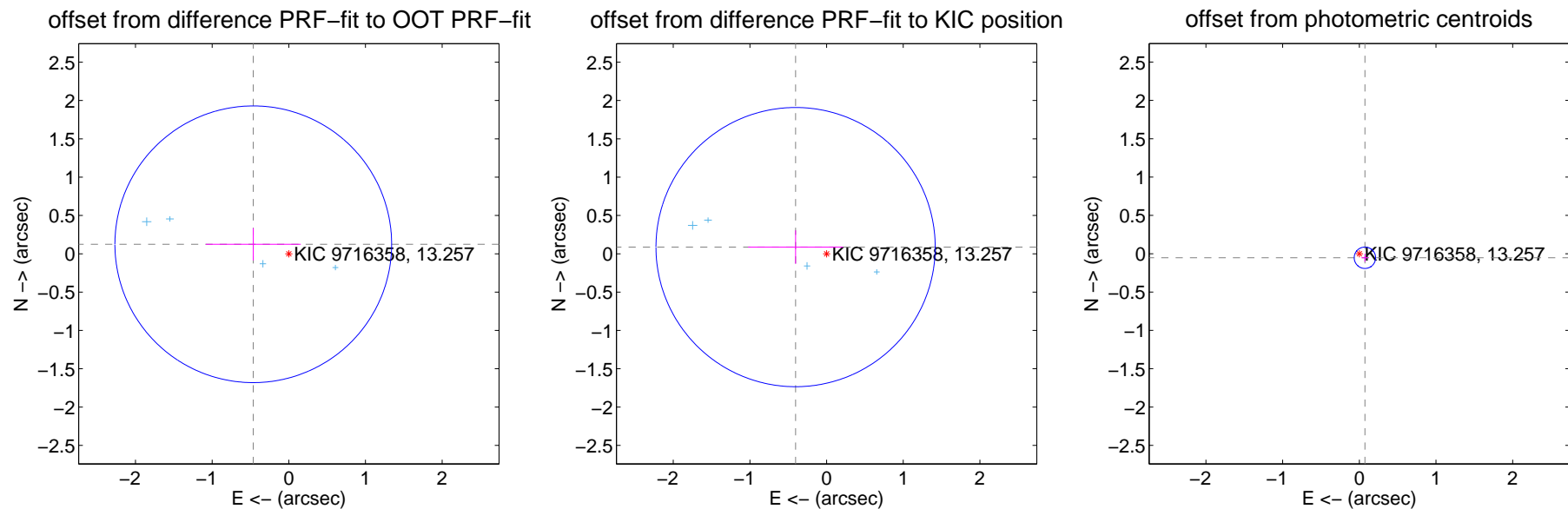
DV Centroid Data

Supplemental centroid analysis for 009716358-03. Kepler magnitude: 13.26. Transit SNR 8.24

There are 4 quarters with good PRF difference image offsets

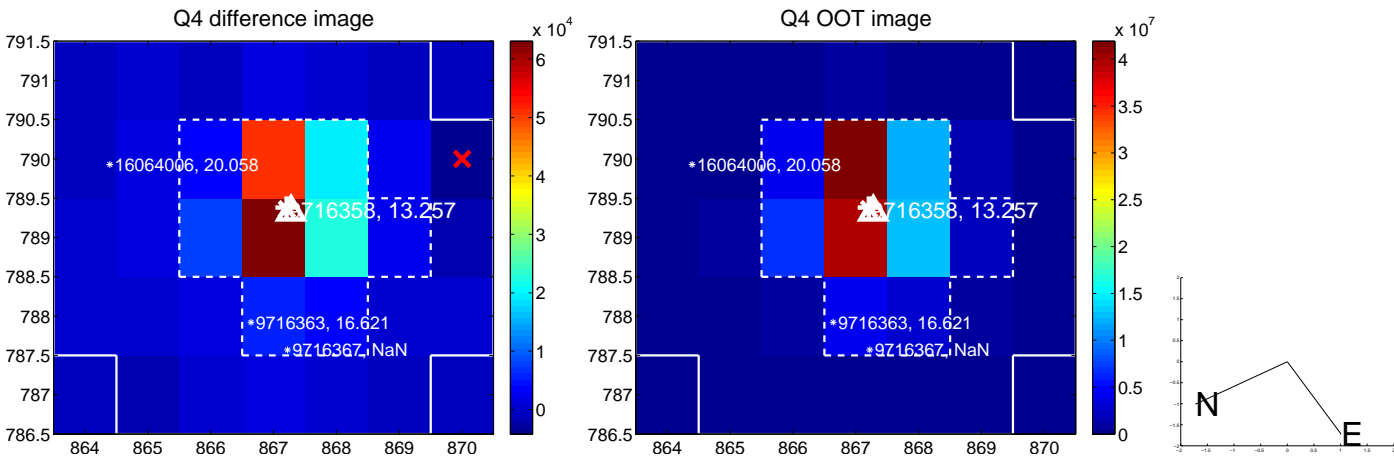
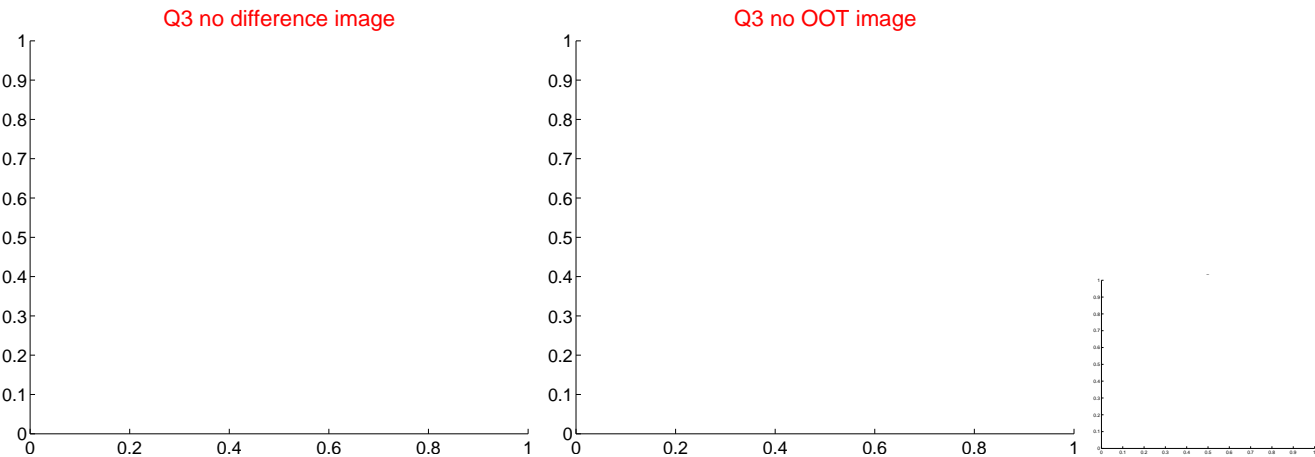
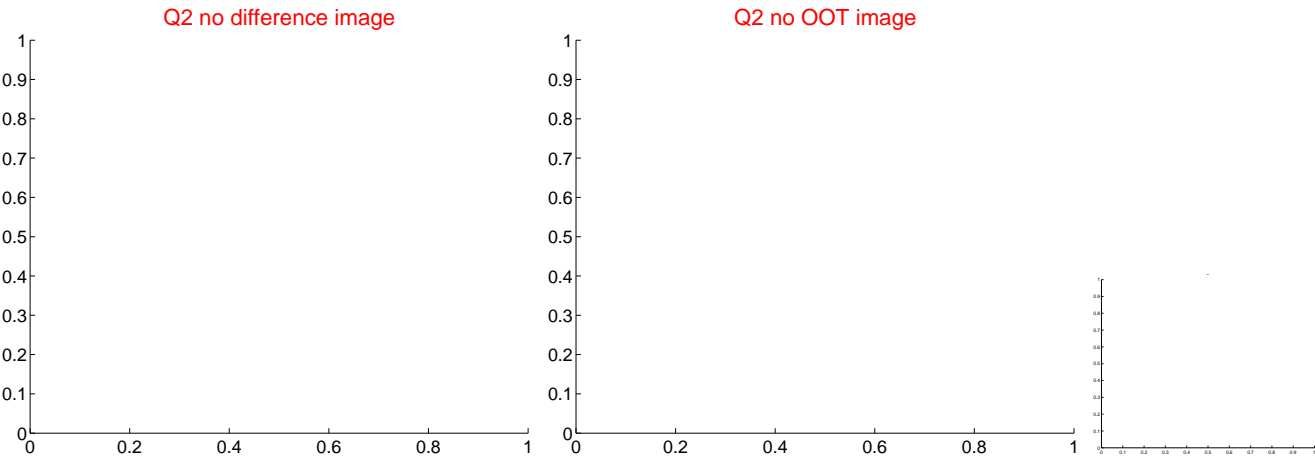
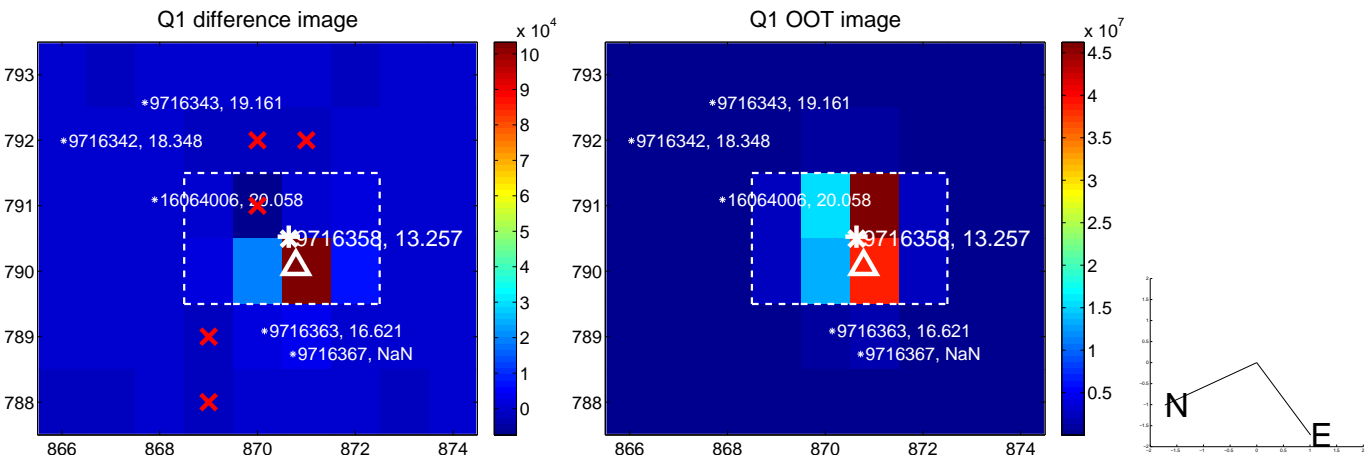
The direct PRF centroid is offset from the target star catalog position by about 0.07 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.480 ± 0.602	0.80	0.464 ± 0.620	0.124 ± 0.210
PRF-fit source offset from KIC position	0.414 ± 0.607	0.68	0.404 ± 0.619	0.087 ± 0.218
photometric centroid source offset	0.09 ± 0.05	1.93	-0.07 ± 0.04	-0.05 ± 0.05



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.

Q5 no difference image



Q5 no OOT image



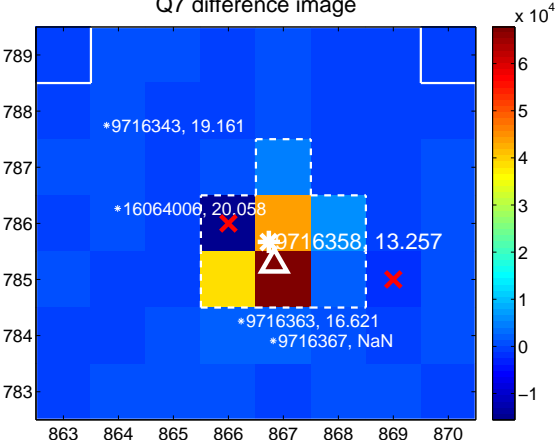
Q6 no difference image



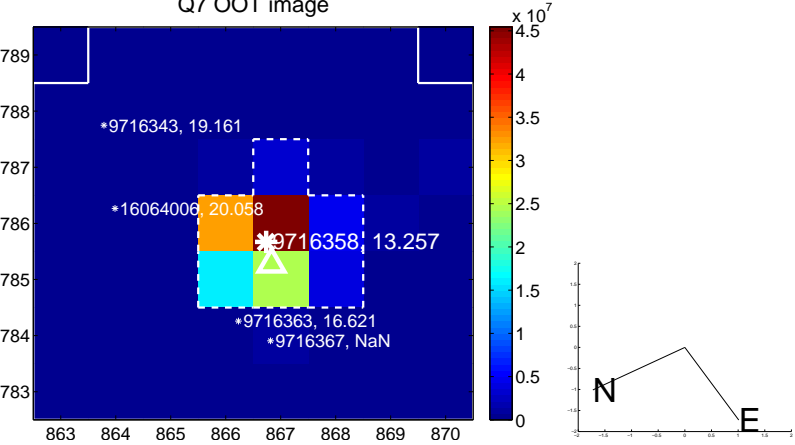
Q6 no OOT image



Q7 difference image



Q7 OOT image



Q8 no difference image



Q8 no OOT image



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

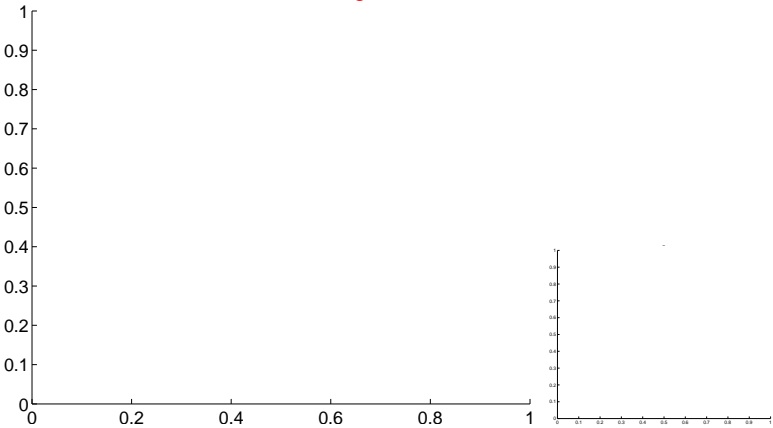


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.

Q13 no difference image



Q13 no OOT image



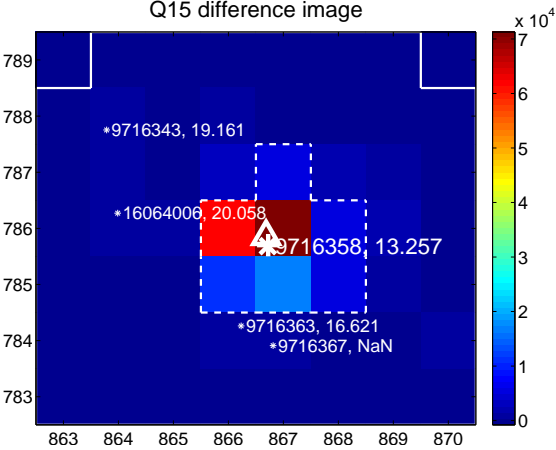
Q14 no difference image



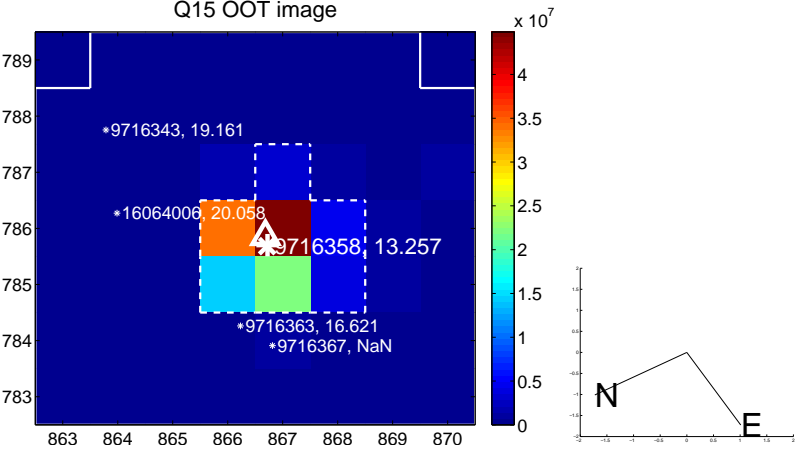
Q14 no OOT image



Q15 difference image



Q15 OOT image



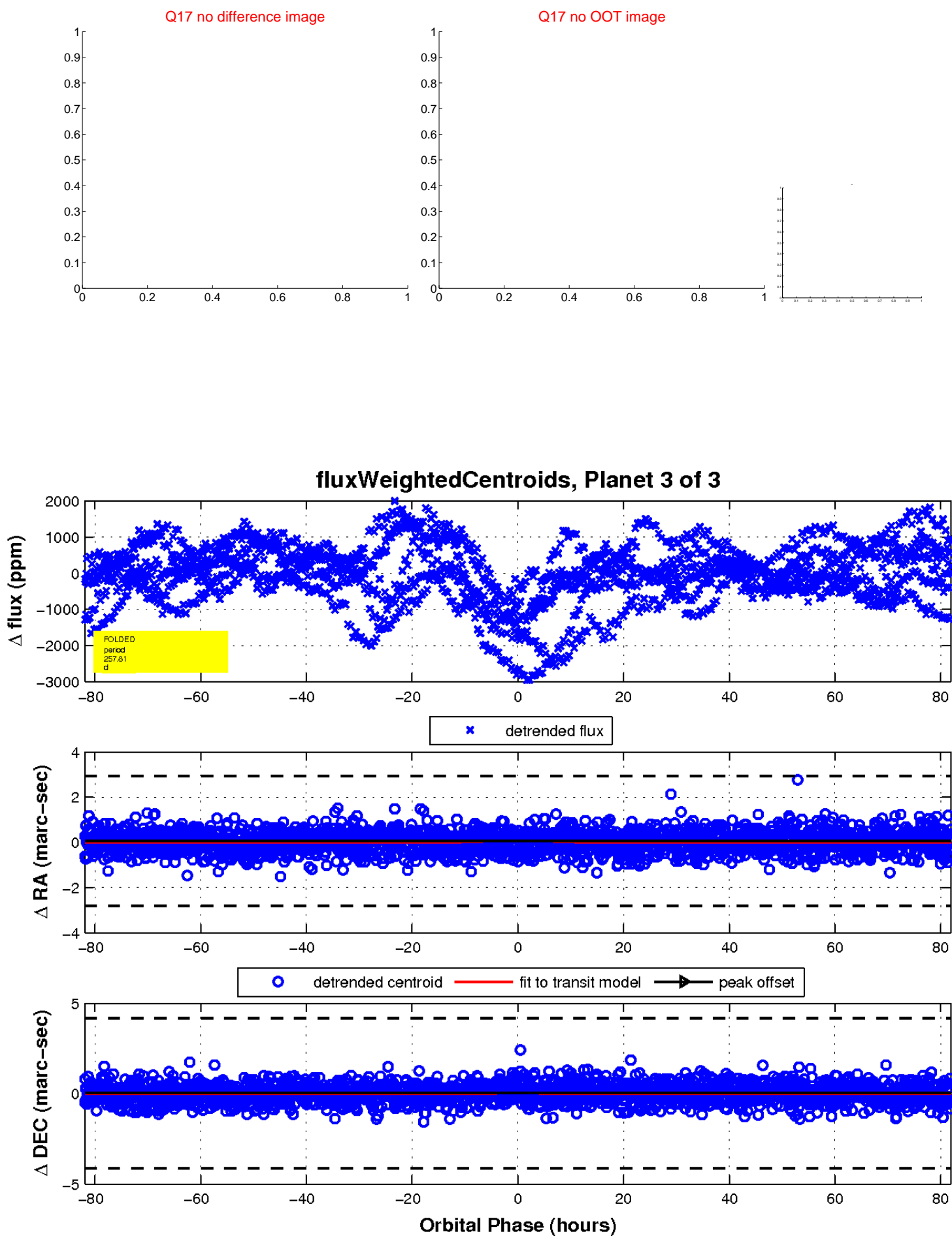
Q16 no difference image



Q16 no OOT image



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



UKIRT Image

Declination

