

KIC 002157247

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})
002157247-01	OBS	No	5.686358	132.769285	439.3	3.812	28.3	30.1	0.96	6052	3.01	298.09
002157247-02	OBS	No	5.686330	133.295408	443.1	3.800	30.6	30.6	0.96	6052	3.15	298.09
002157247-03	OBS	No	5.686249	132.802809	53.9	12.783	9.4	1.9	0.96	6052	0.82	298.10
002157247-04	OBS	No	2.843025	133.742883	47.2	14.771	8.5	7.5	0.96	6052	0.75	751.20

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002157247-01	OBS	FP	0.00	1	0	1	0	LPP_DV—CENT_UNRESOLVED_OFFSET
002157247-02	OBS	FP	0.00	1	0	1	0	LPP_DV—LPP_ALT—SAME_NTL_PERIOD—CENT_UNRESOLVED_OFFSET
002157247-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—SAME_NTL_PERIOD—CENT_UNRESOLVED_OFFSET
002157247-04	OBS	FP	0.00	1	0	1	0	SWEET_NTL—LPP_DV—MOD_NONUNIQ_DV—SAME_NTL_PERIOD—CENT_UNRESOLVED_OFFSET

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 002157247-01

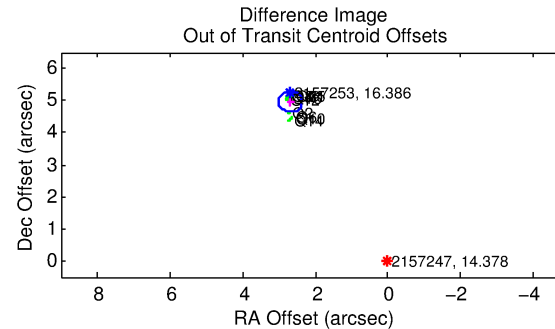
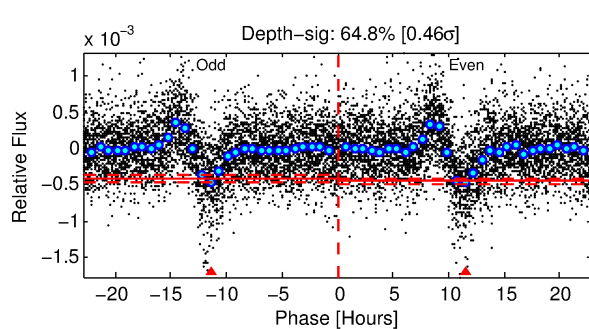
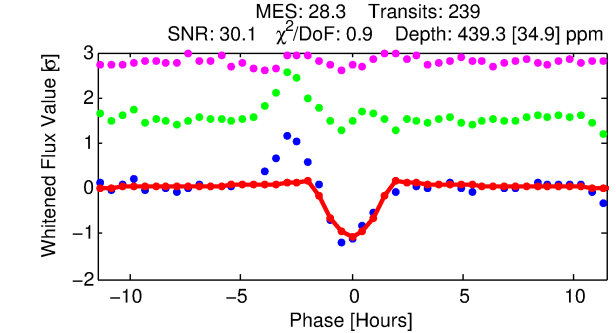
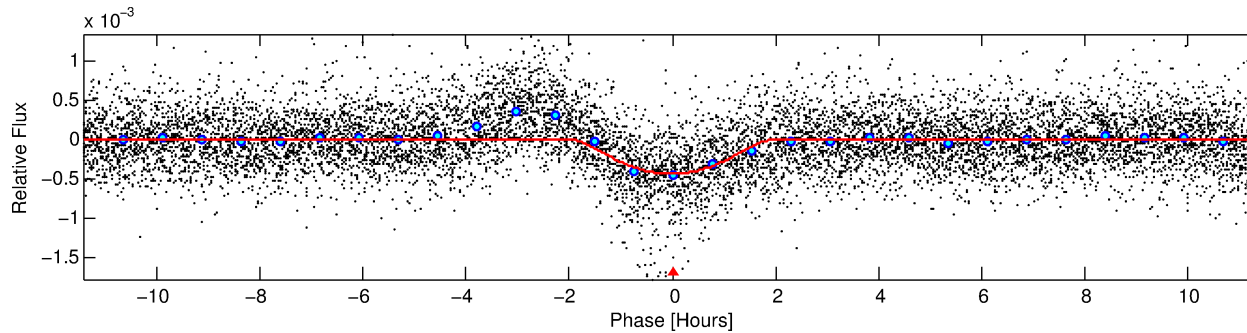
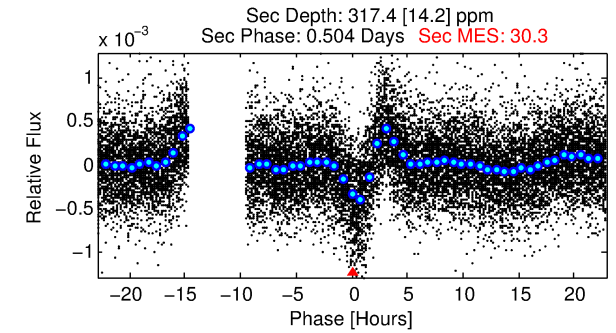
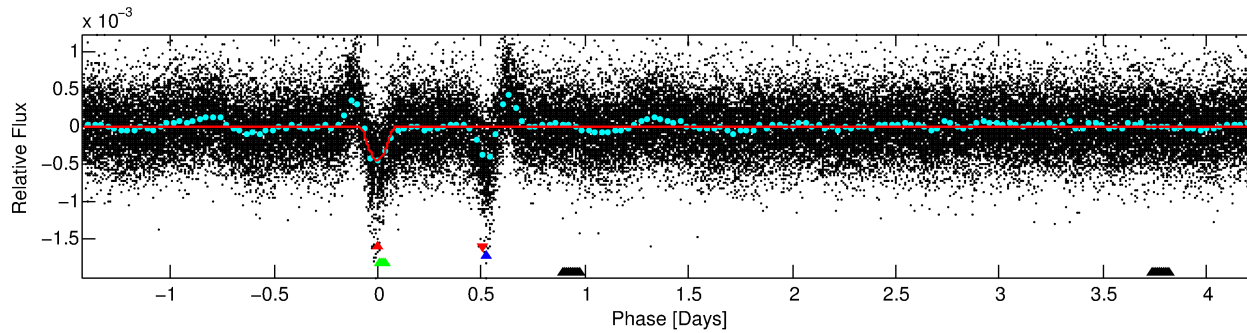
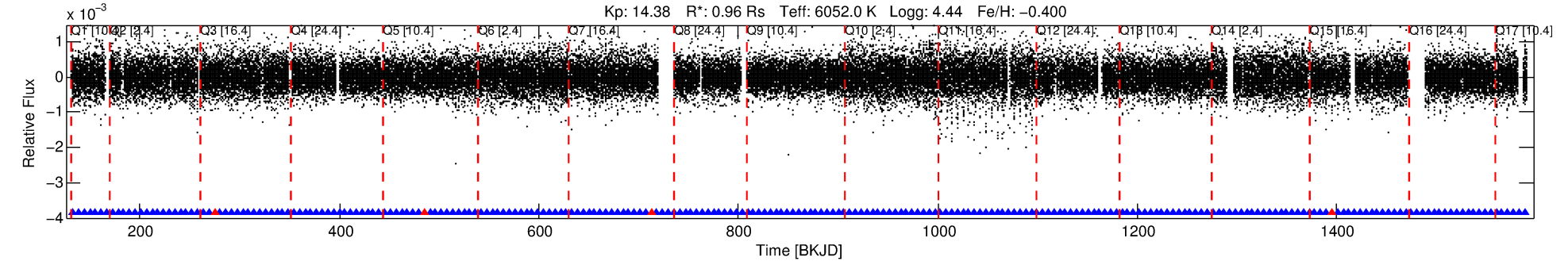
No Significant Match Found

DV One-Page Summary

KIC: 2157247 Candidate: 1 of 4 Period: 5.686 d

KOI: K00997 Corr: No Ephemeris Match

Kp: 14.38 R*: 0.96 Rs Teff: 6052.0 K Logg: 4.44 Fe/H: -0.400



DV Fit Results:

Period = 5.68636 [0.00002] d
Epoch = 132.7693 [0.0025] BKJD
Rp/R* = 0.0289 [0.0088]
a/R* = 3.54 [0.46]
b = 0.98 [0.02]
Seff = 298.09 [110.75]
Teq = 1060 [98] K
Rp = 3.01 [1.23] Re
a = 0.0607 [0.0143] AU
Ag = 71.03 [50.13] [1.40σ]
Teffp = 4756 [742] K [4.94σ]

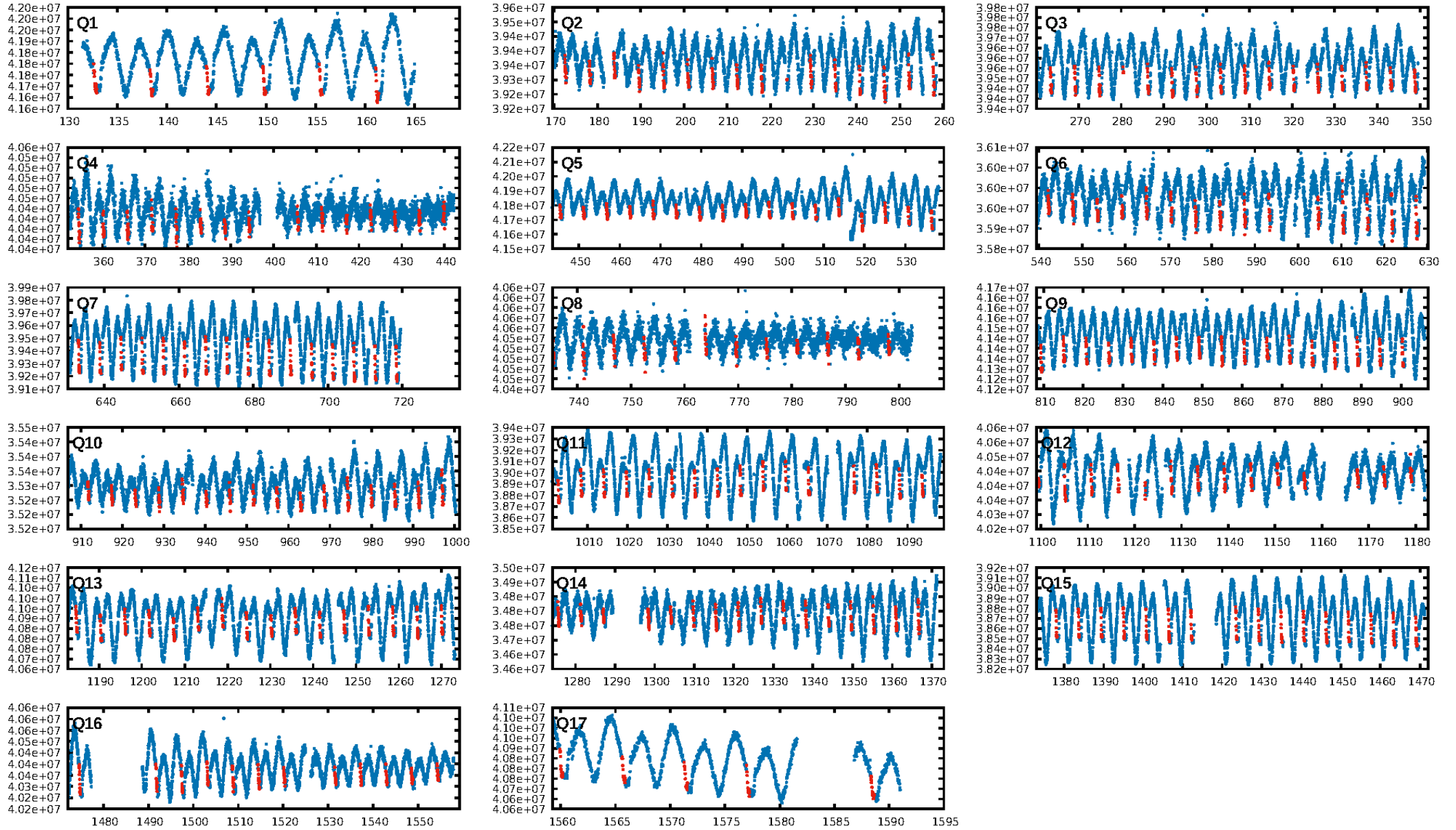
DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 7.67e-78
RollingBand-fgt: 0.98 [224/228]
GhostDiagnostic-chr: -0.5954
Centroid-sig: 0.0%
Centroid-so: 13.298 arcsec [12.61σ]
OotOffset-rm: 5.640 arcsec [51.46σ]
KicOffset-rm: 5.929 arcsec [70.99σ]
OotOffset-st: 4/4/4/0 [12]
KicOffset-st: 4/4/4/0 [12]
DiffImageQuality-fgm: 1.00 [12/12]
DiffImageOverlap-fno: 0.00 [0/17]

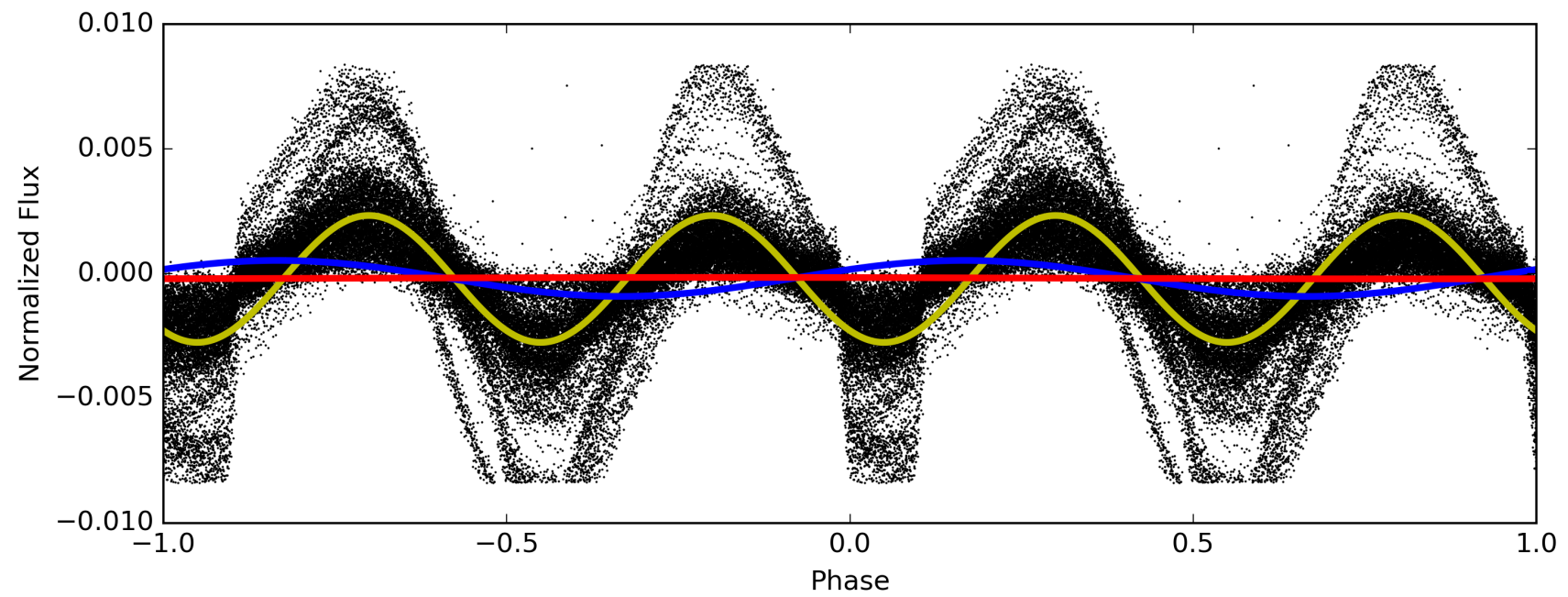
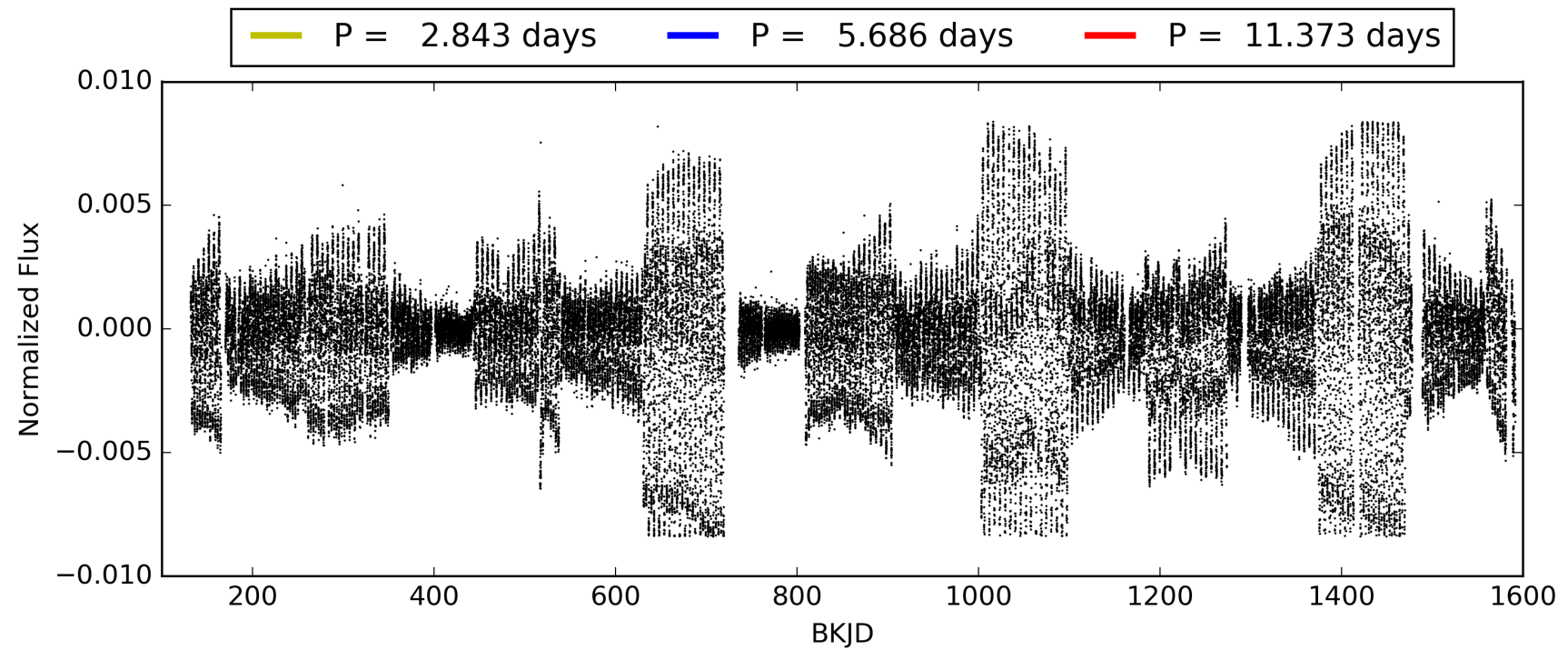
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 18:12:25 Z

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

TCE 002157247-01, PDC Light Curves

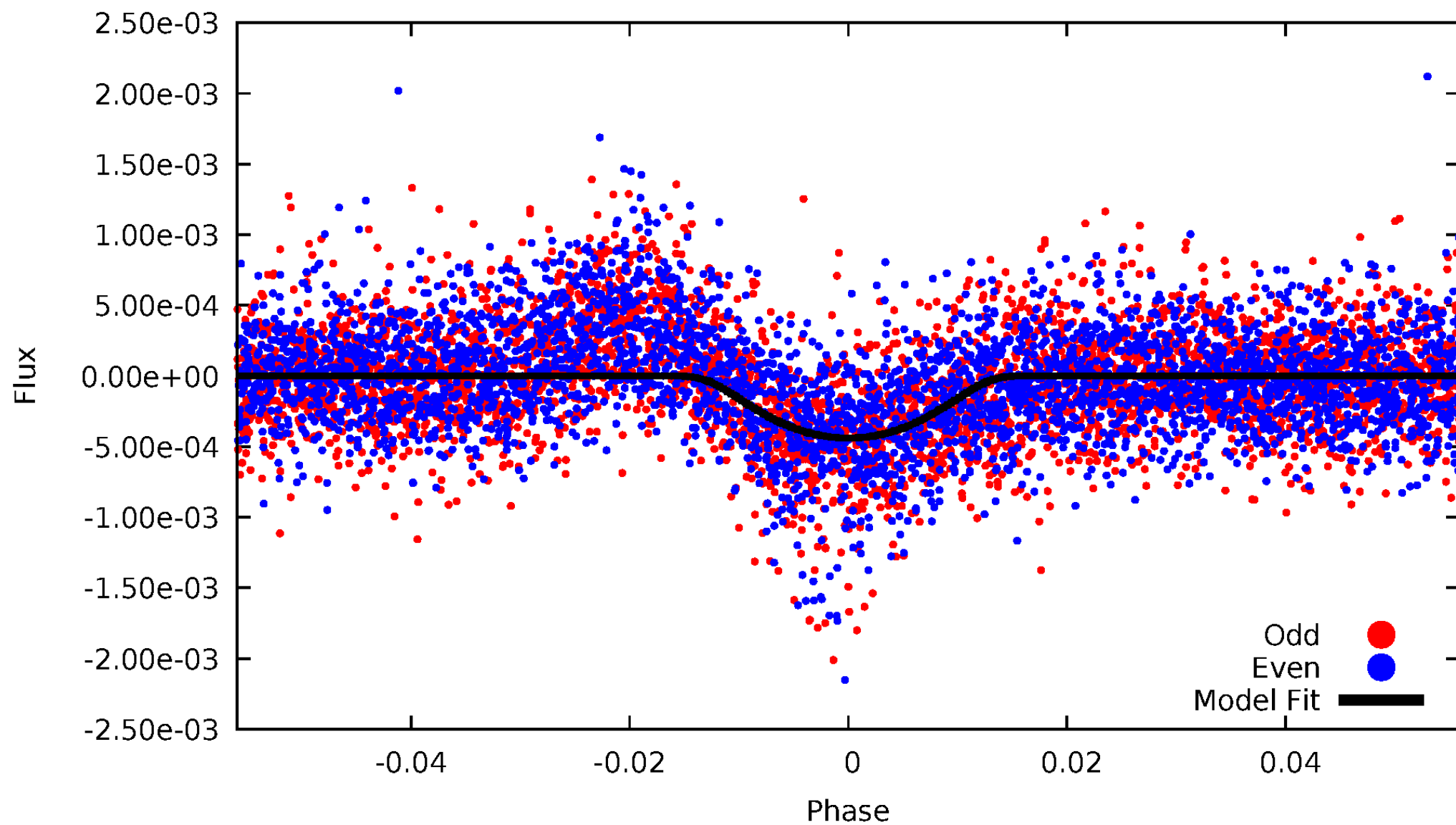


TCE 002157247-01



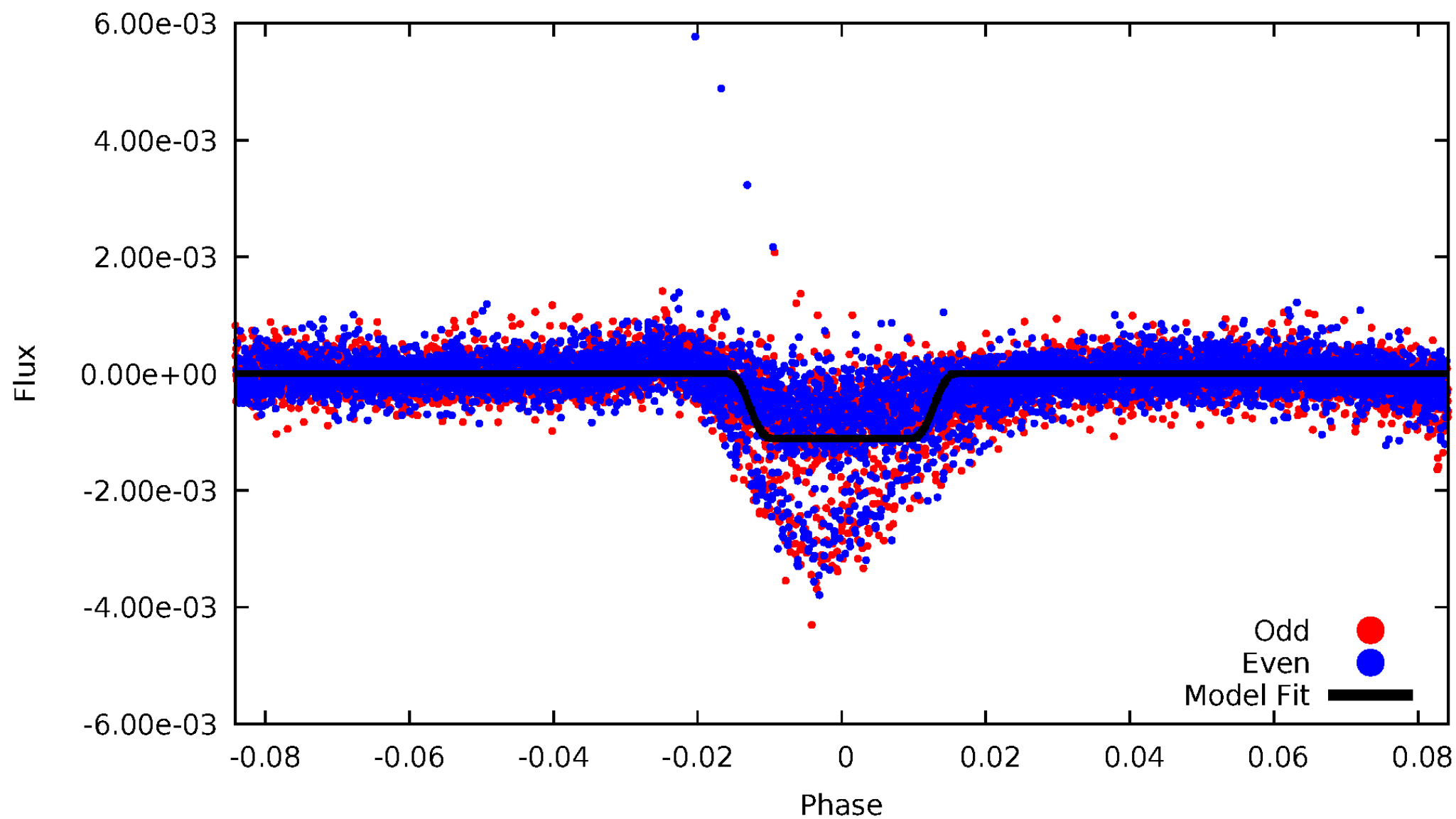
DV Odd/Even

TCE 002157247-01



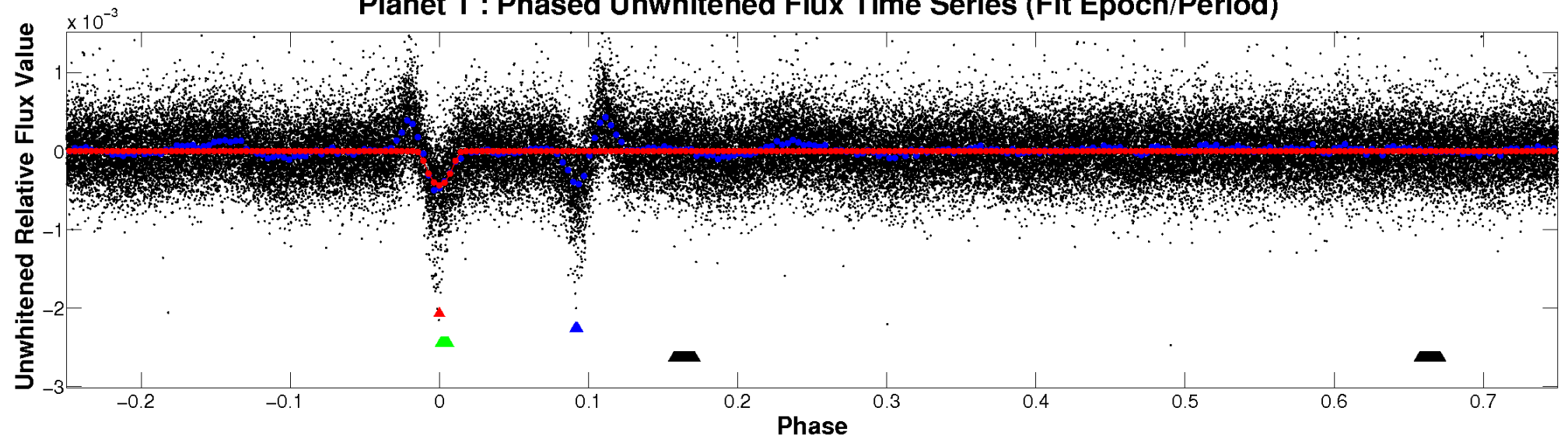
ALT Odd/Even

TCE 002157247-01

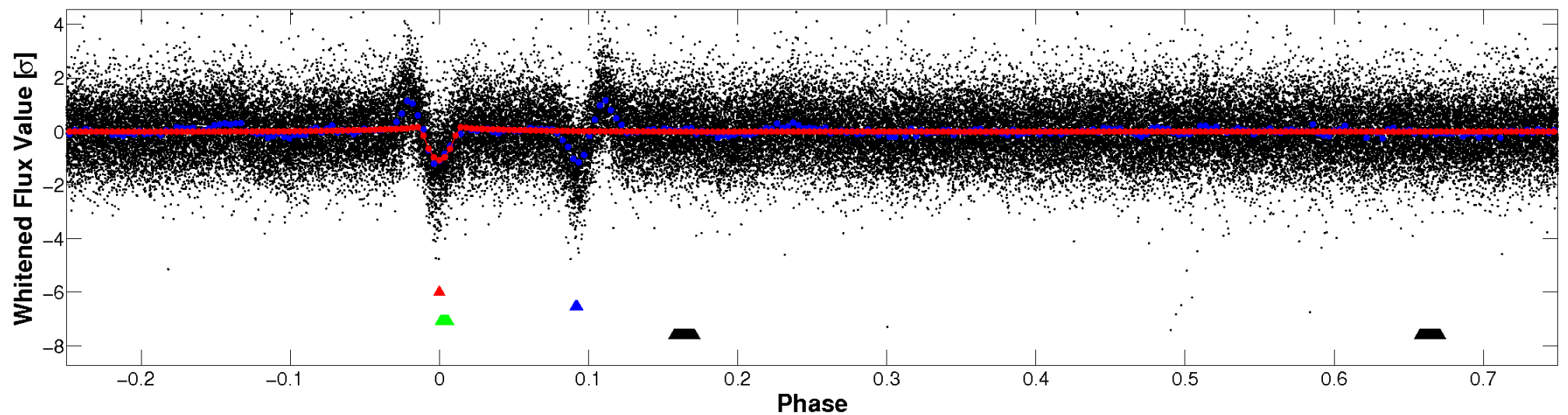


Non-Whitened Vs. Whitened Light Curve

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

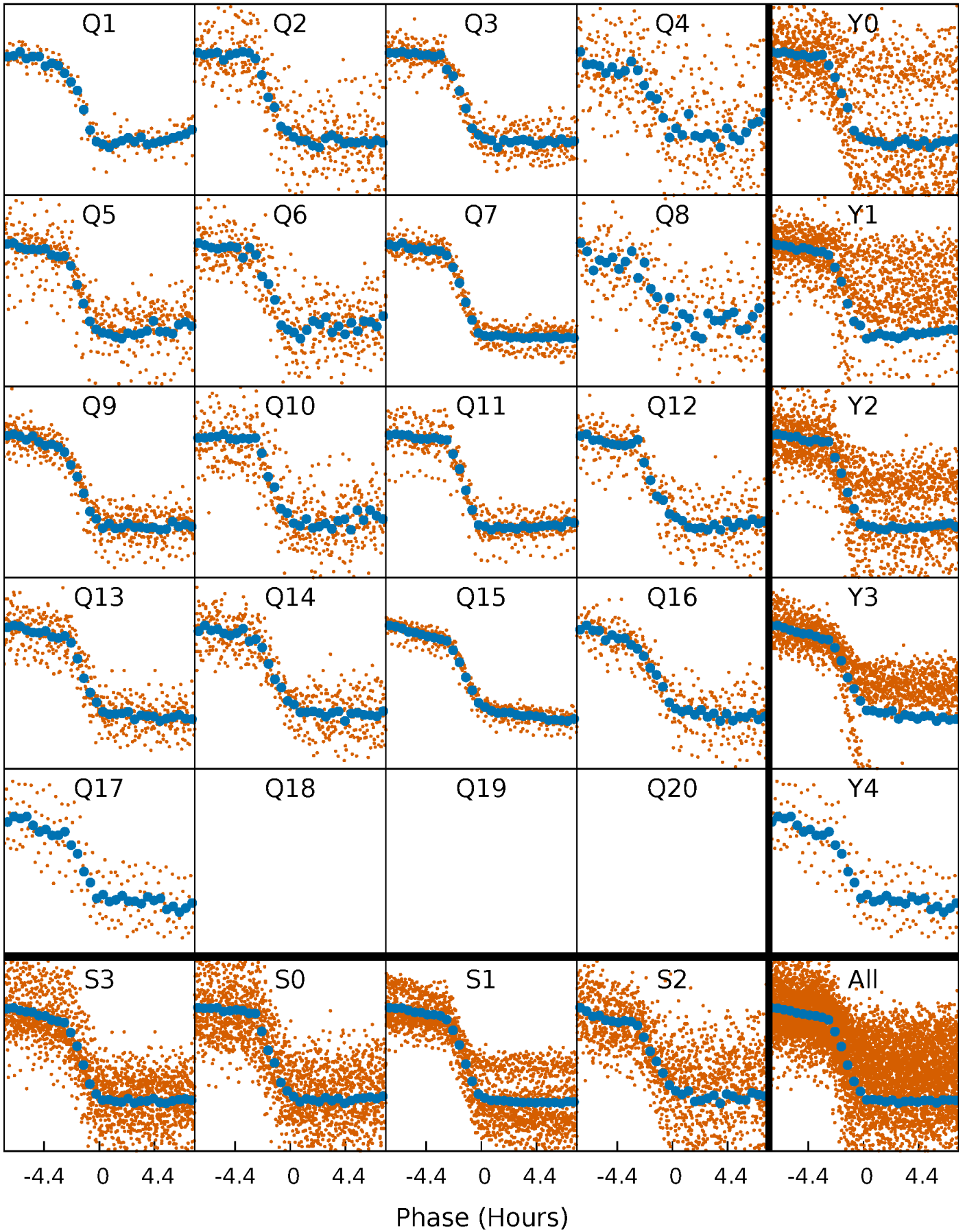


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



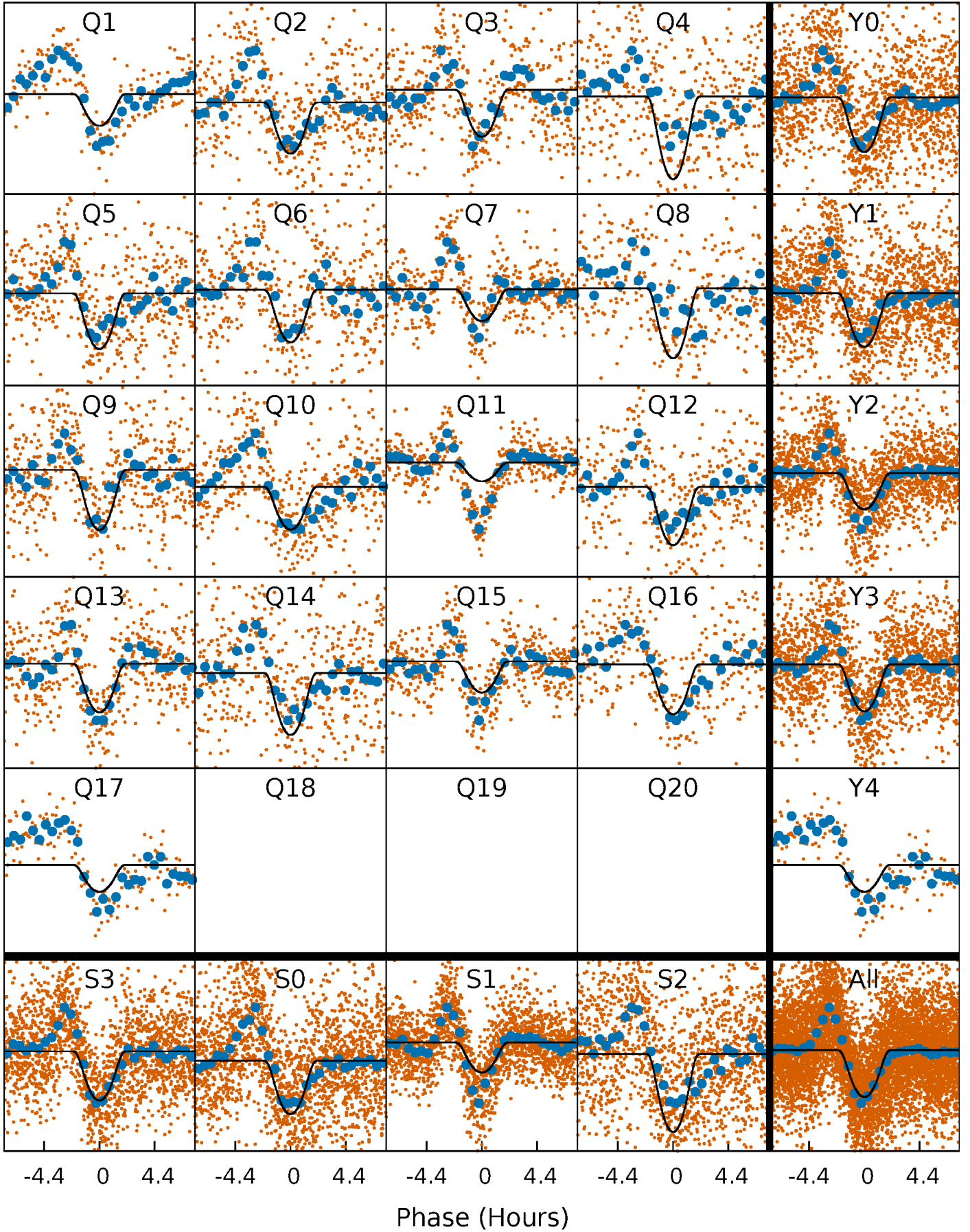
PDC Quarter-Phased Transit Curves

TCE 002157247-01 P= 5.686358 Days $T_0=132.769285$ (BKJD)



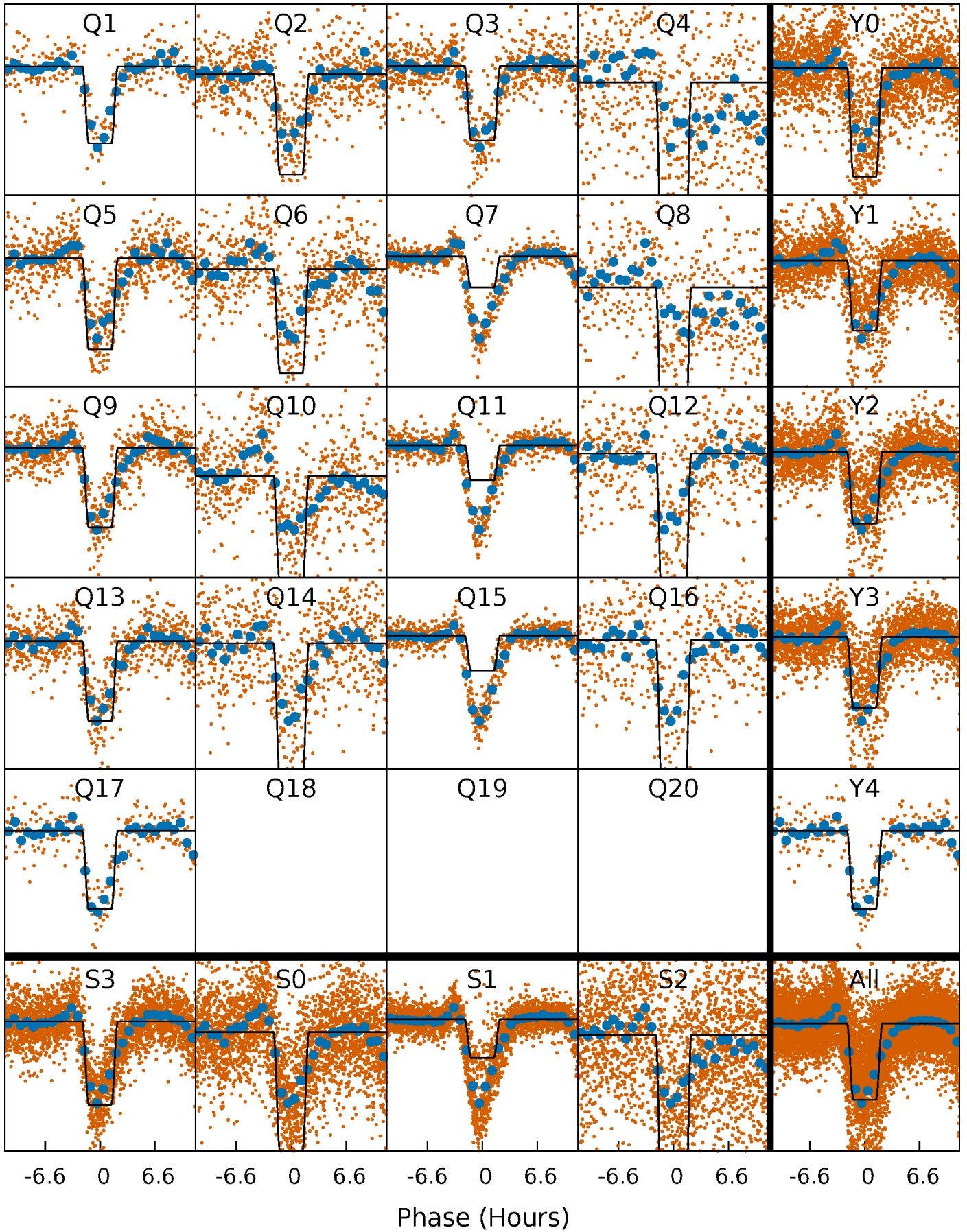
DV Quarter-Phased Transit Curves

TCE 002157247-01 P= 5.686358 Days $T_0=132.769285$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

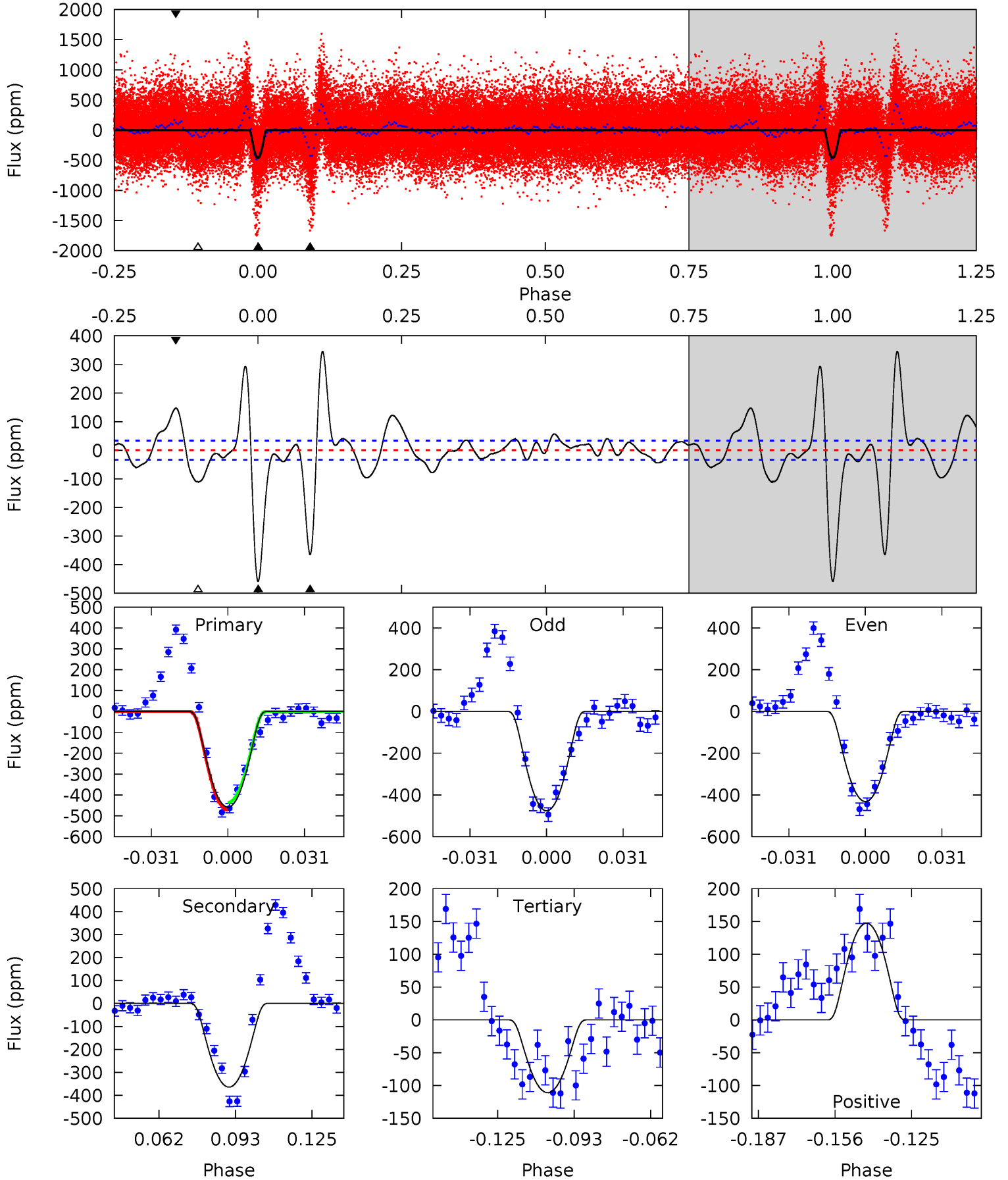
TCE 002157247-01 P= 5.686425 Days $T_0=132.774693$ (BKJD)



DV Model-Shift Uniqueness Test

002157247-01, P = 5.686358 Days, E = 127.082927 Days

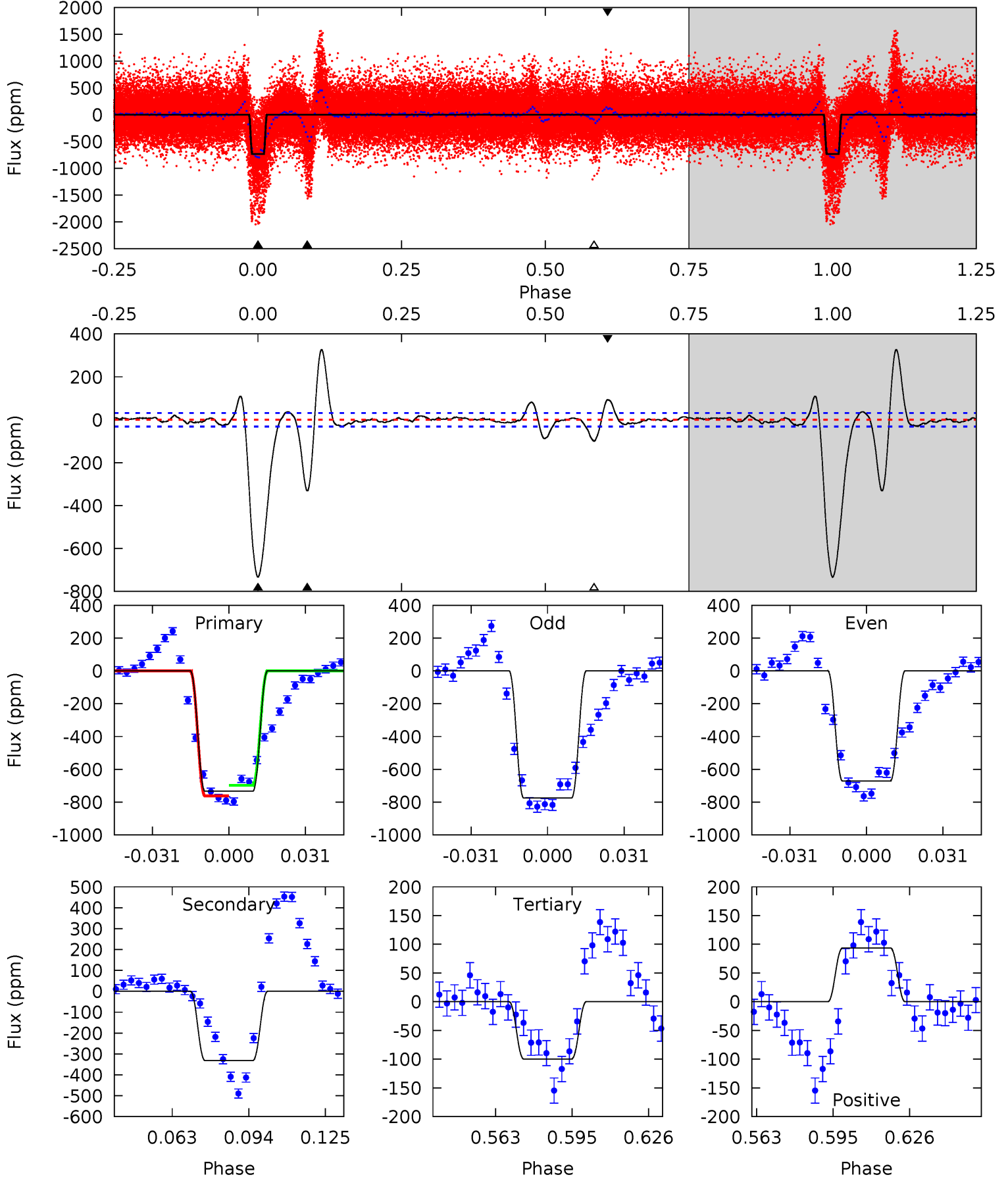
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
65.6	52.2	15.9	21.1	4.80	2.16	6.90	49.8	44.6	36.3	31.1	3.20	1.09	0.43	2.55



Alt Model-Shift Uniqueness Test

002157247-01, P = 5.686425 Days, E = 127.088268 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
110.9	50.1	15.1	14.1	4.80	2.15	4.69	95.8	96.7	35.0	36.0	7.80	1.30	0.31	0



Stellar Parameters For KIC 002157247

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6052^{+164}_{-183}	$4.442^{+0.084}_{-0.196}$	$-0.400^{+0.300}_{-0.300}$	$0.956^{+0.260}_{-0.120}$	$0.923^{+0.119}_{-0.097}$	$1.488^{+0.662}_{-0.742}$
	+3%/-3%	+2%/-4%	+75%/-75%	+27%/-13%	+13%/-11%	+44%/-50%
Source	PHO1	KIC0	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 002157247-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-364 ± 7	$3.13^{+1.06}_{-1.01}$	1497^{+104}_{-77}	4986^{+941}_{-530}	77^{+81}_{-34}
Alt.	-331 ± 7	$3.64^{+1.08}_{-1.10}$	1501^{+111}_{-80}	4587^{+728}_{-383}	50^{+52}_{-20}

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

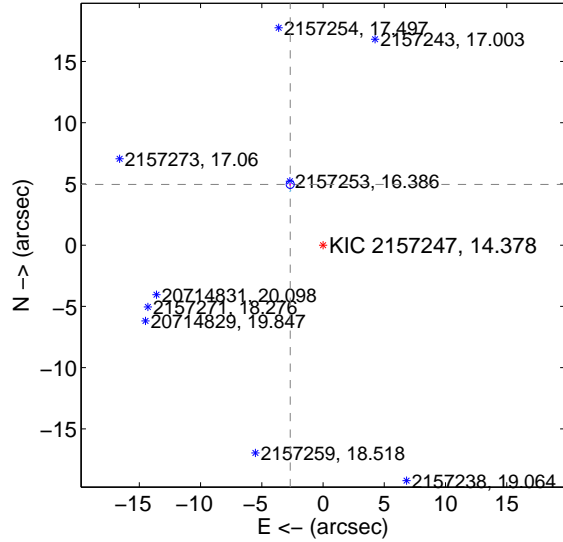
Supplemental centroid analysis for 002157247-01. Kepler magnitude: 14.38. Transit SNR 30.14

There are 12 quarters with good PRF difference image offsets

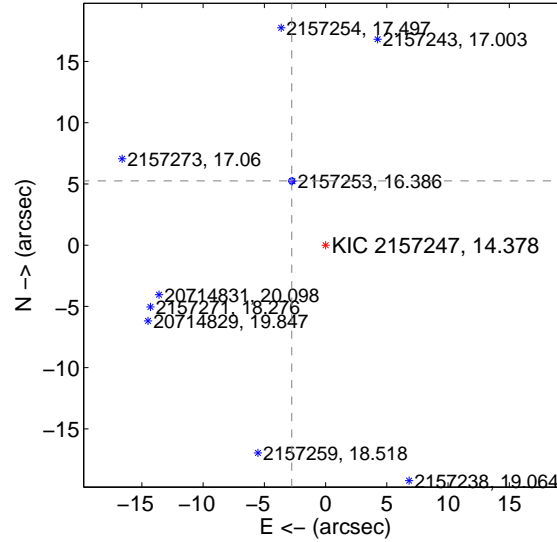
The direct PRF centroid is offset from the target star catalog position by about 0.22 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	5.640 \pm 0.110	51.46	2.682 \pm 0.068	4.962 \pm 0.119
PRF-fit source offset from KIC position	5.929 \pm 0.084	70.99	2.762 \pm 0.069	5.247 \pm 0.087
photometric centroid source offset	13.30 \pm 1.05	12.61	7.31 \pm 0.74	11.11 \pm 1.16

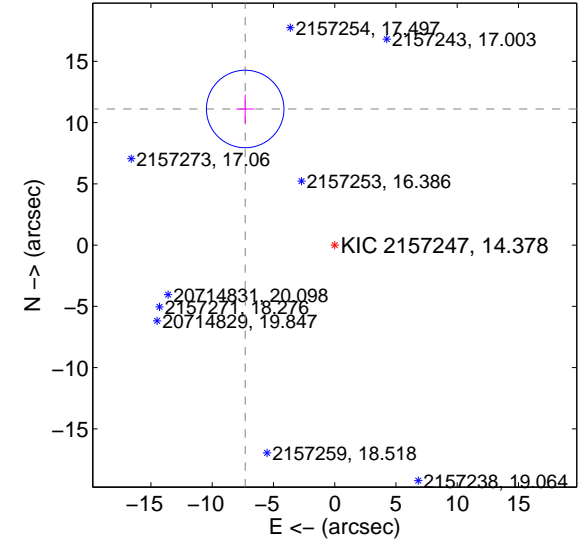
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

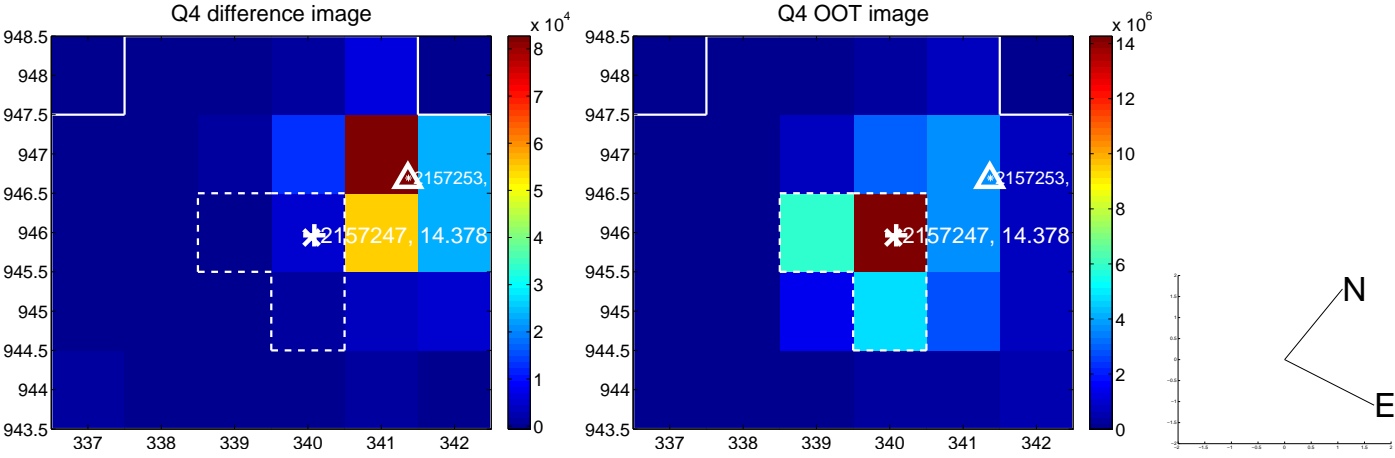
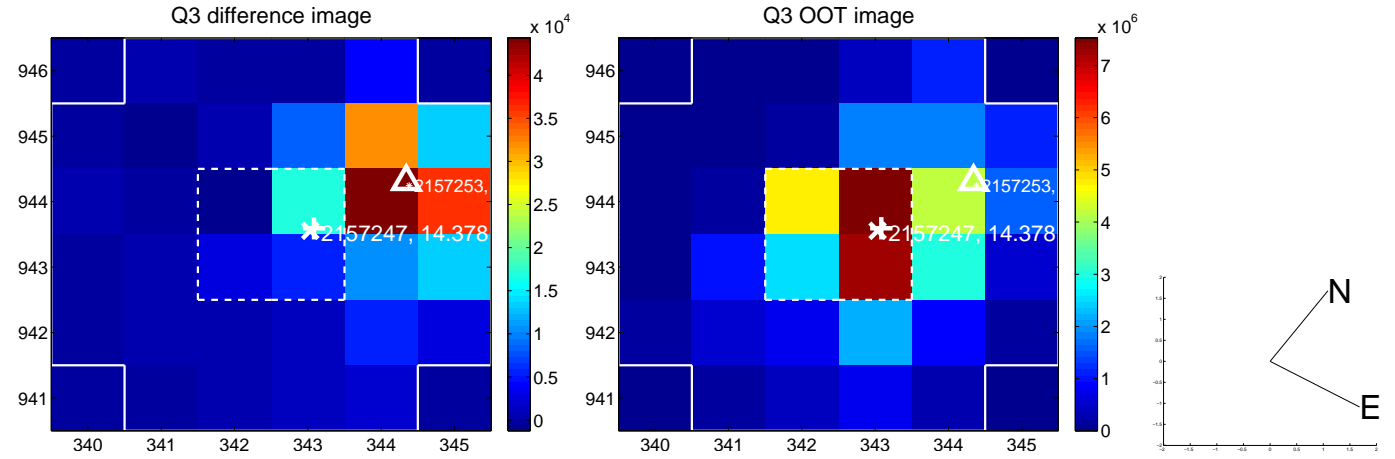
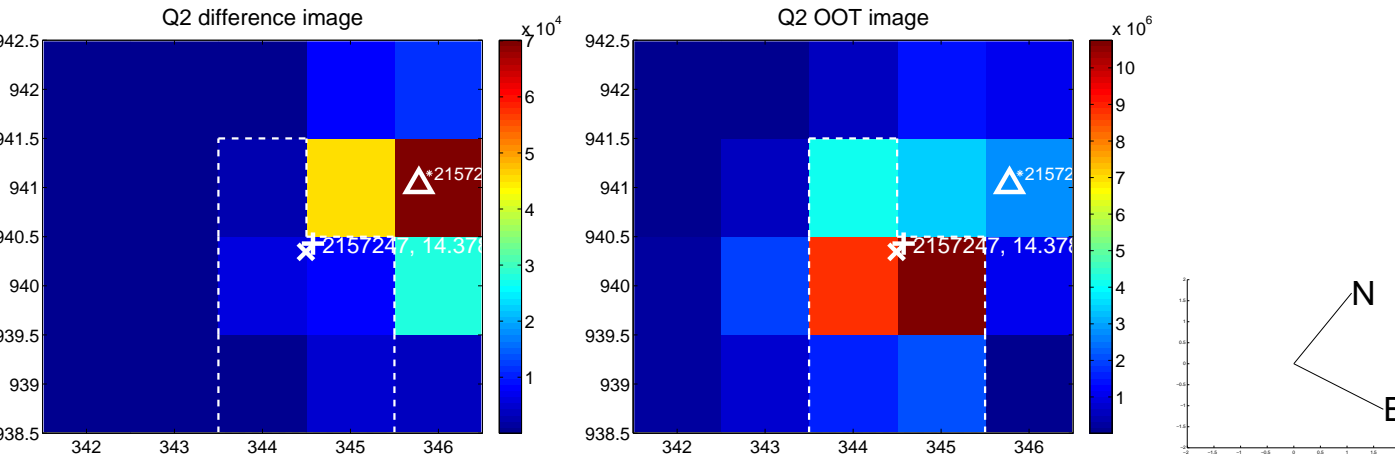
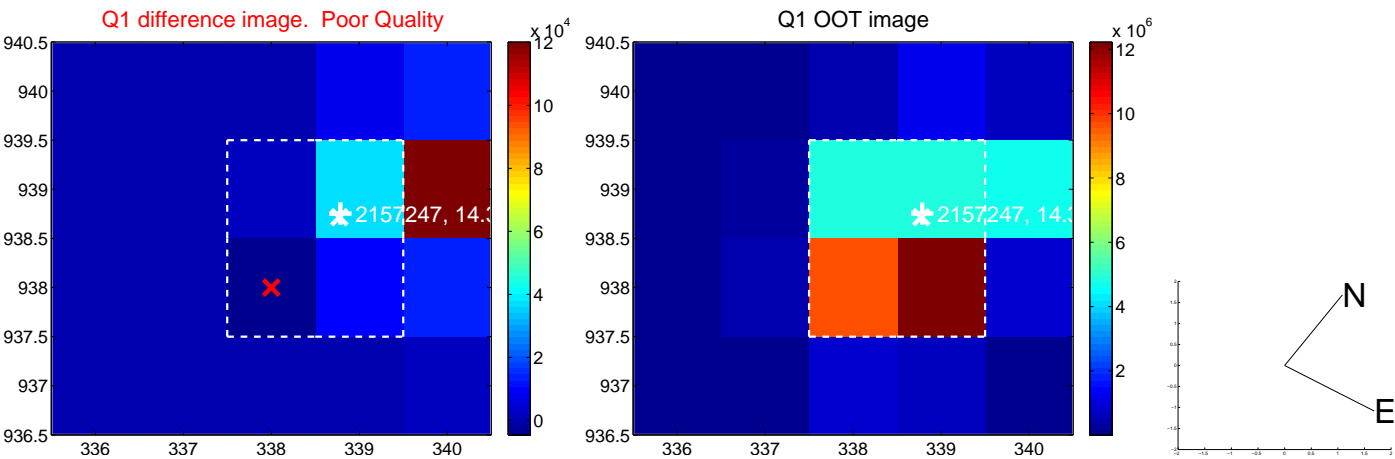


offset from photometric centroids

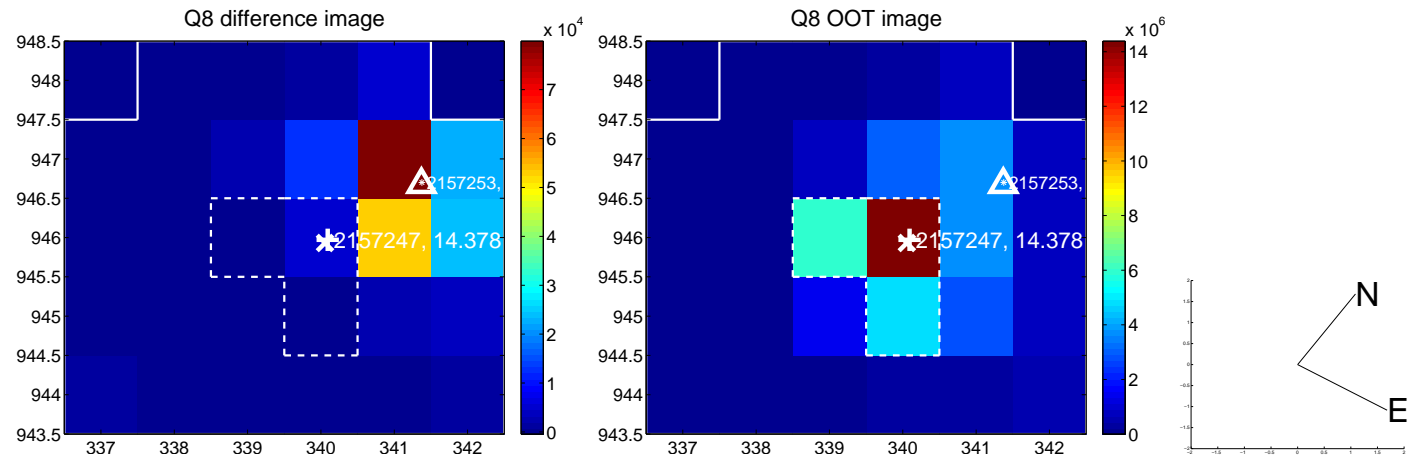
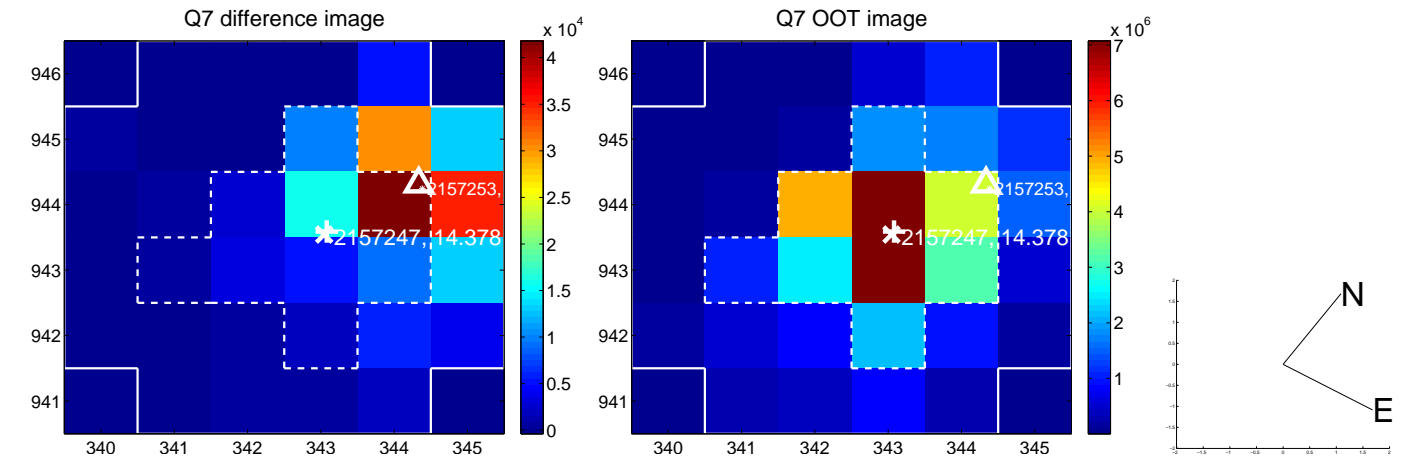
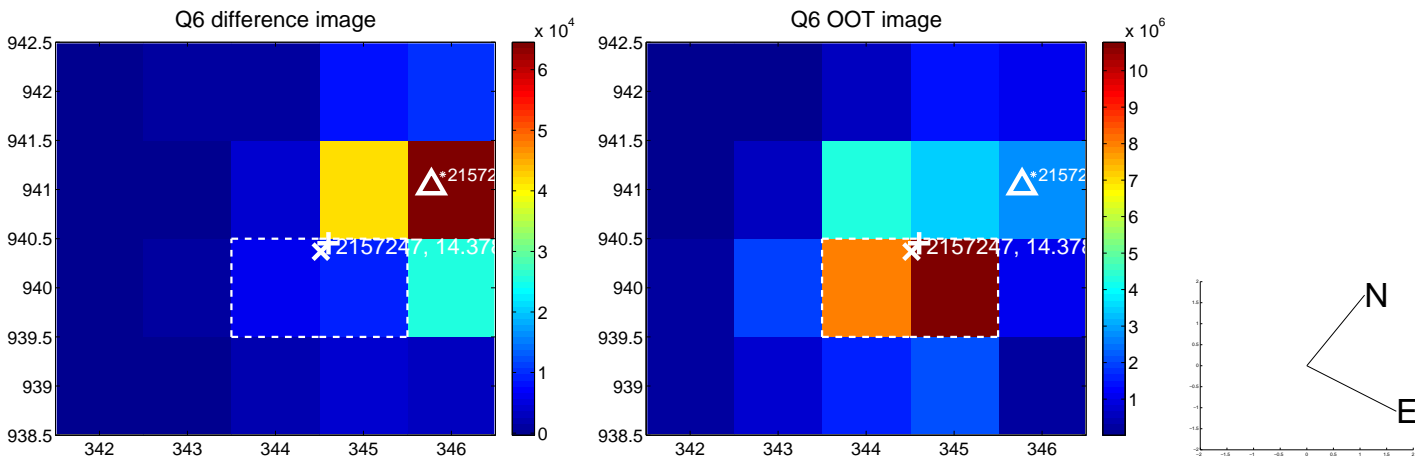
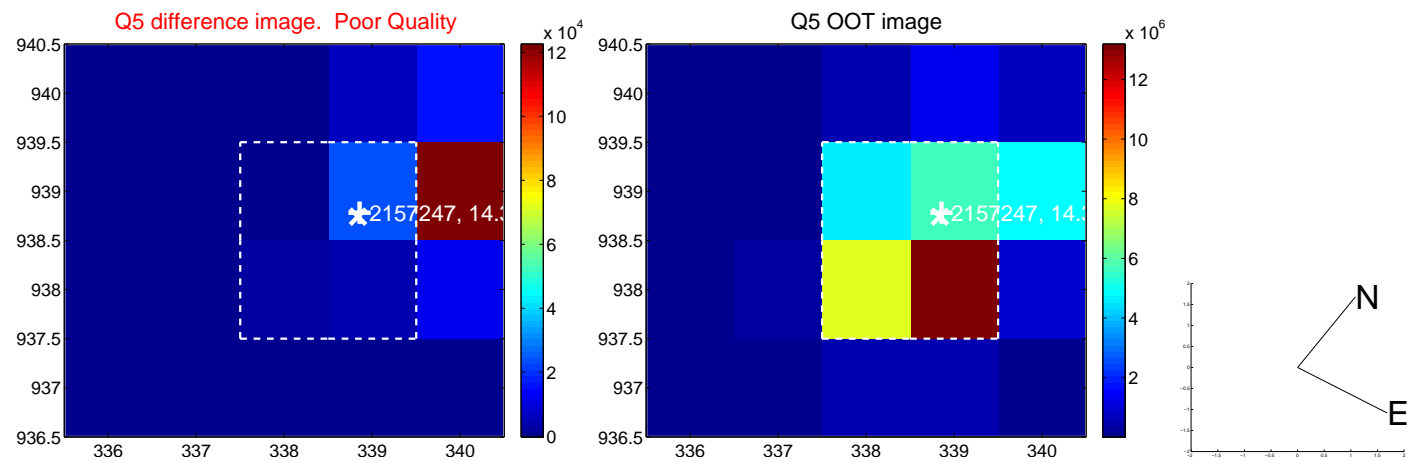


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

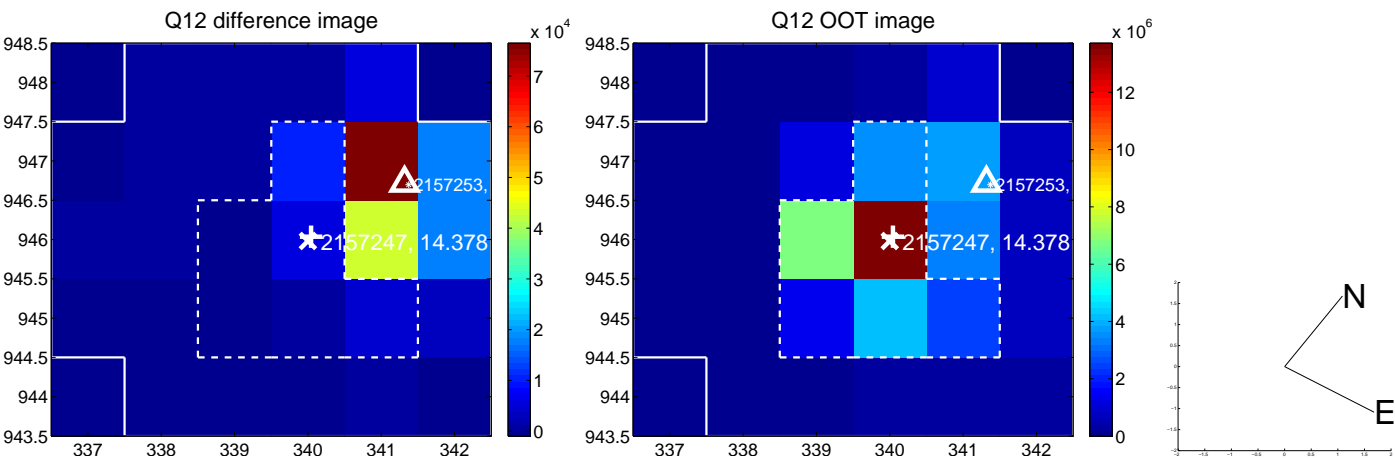
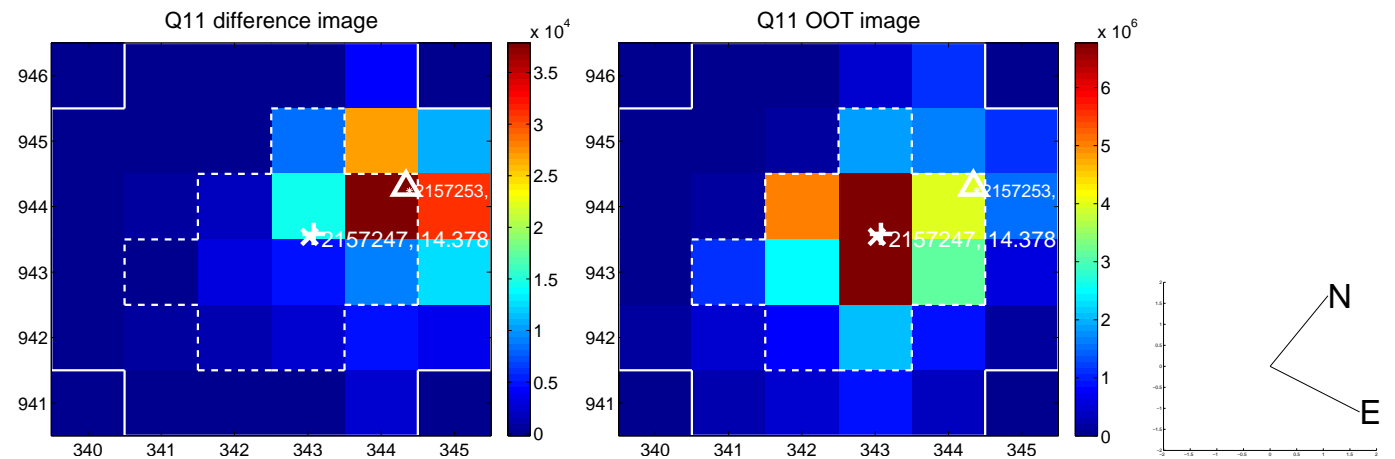
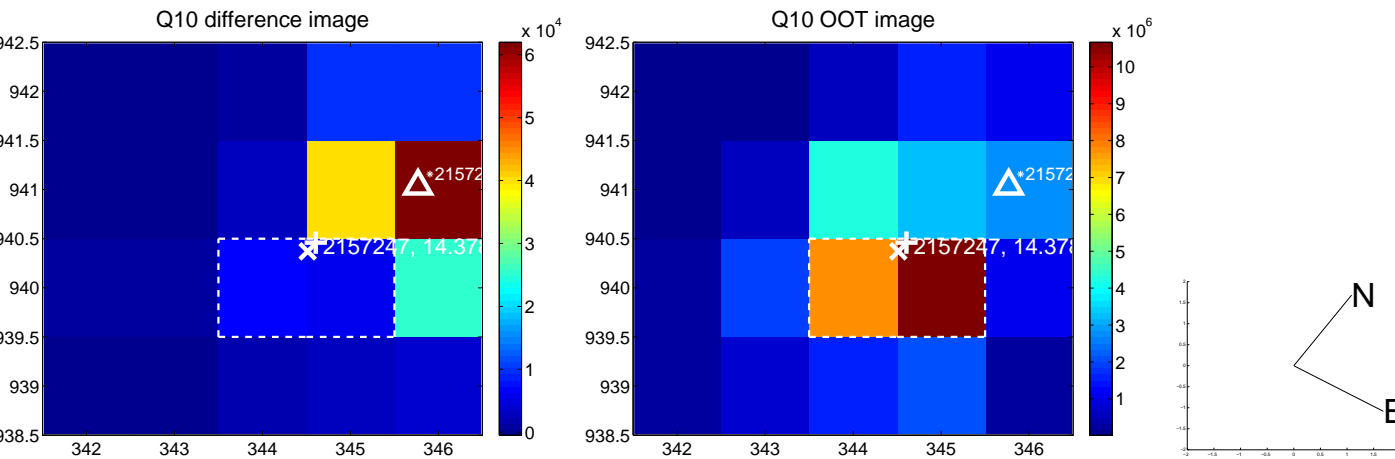
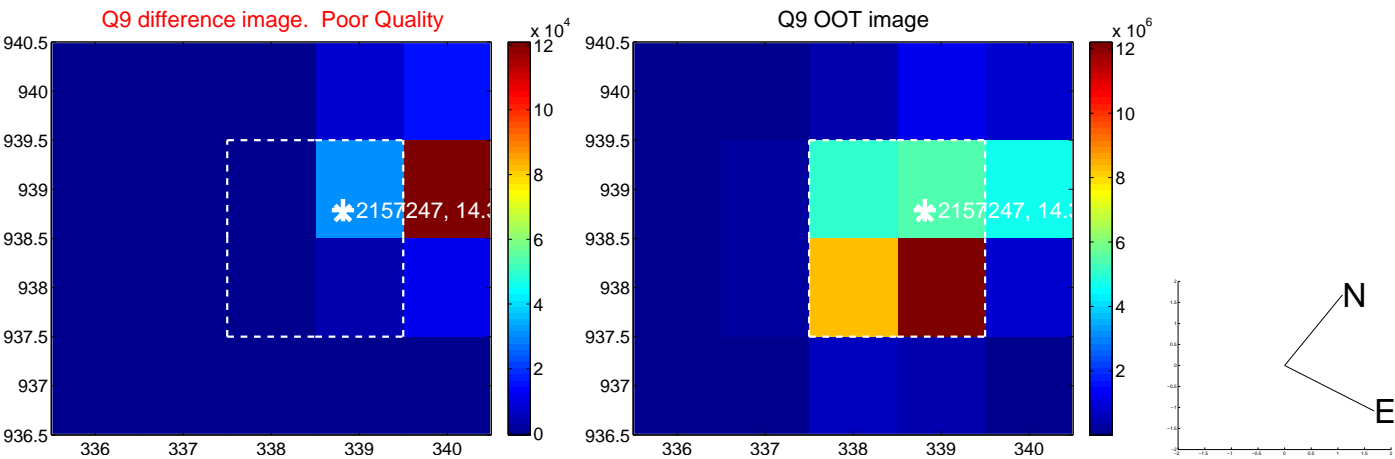
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



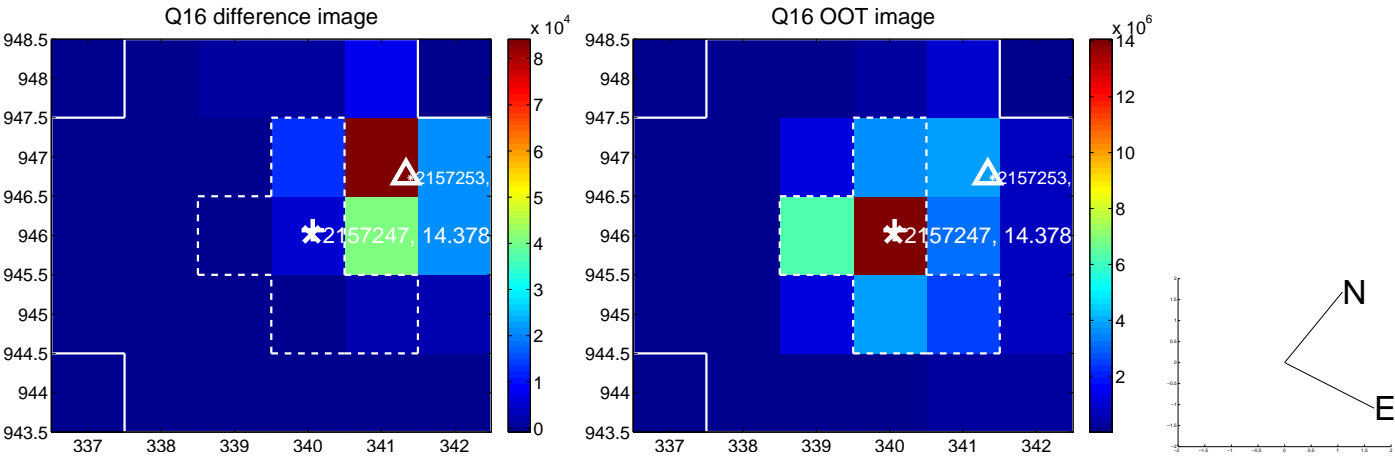
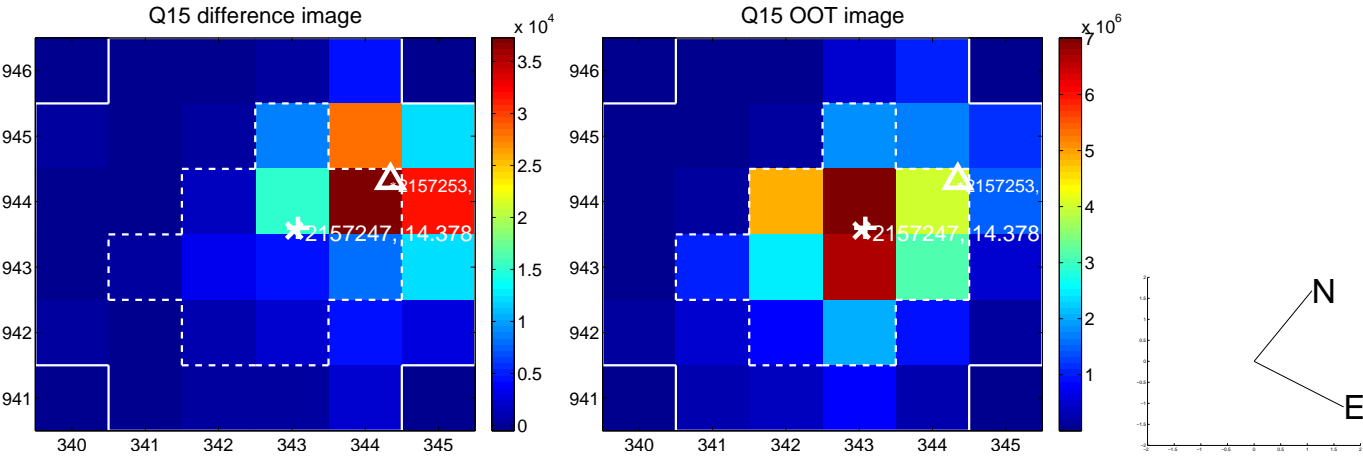
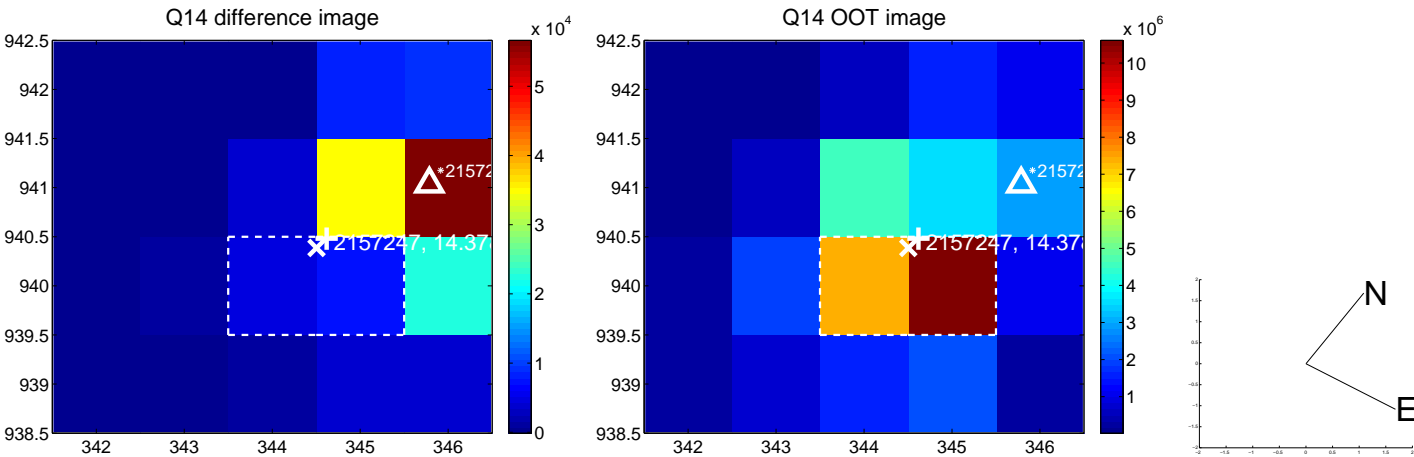
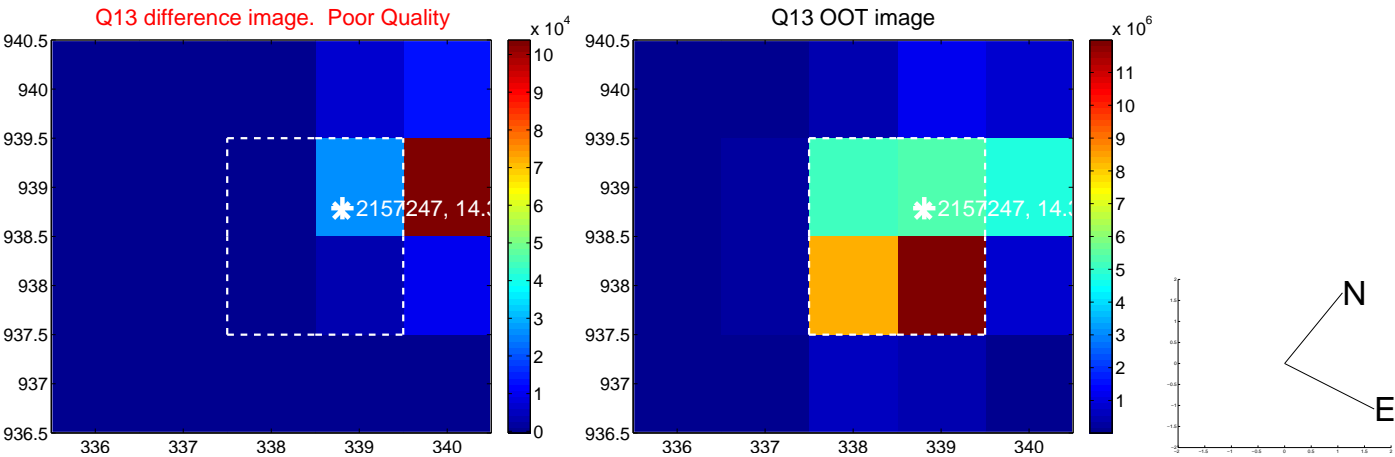
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



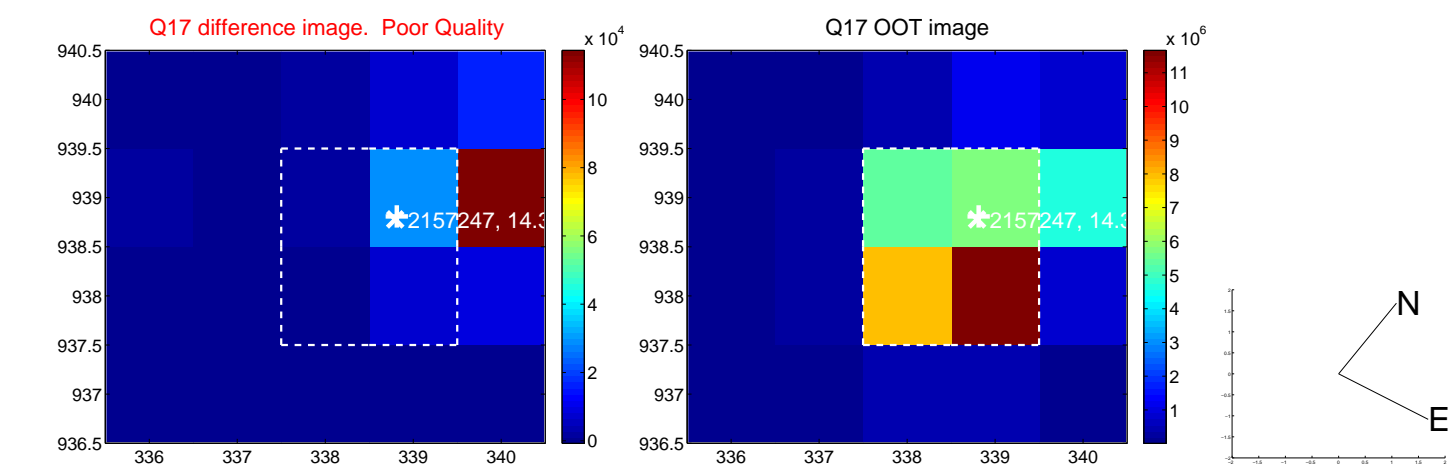
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



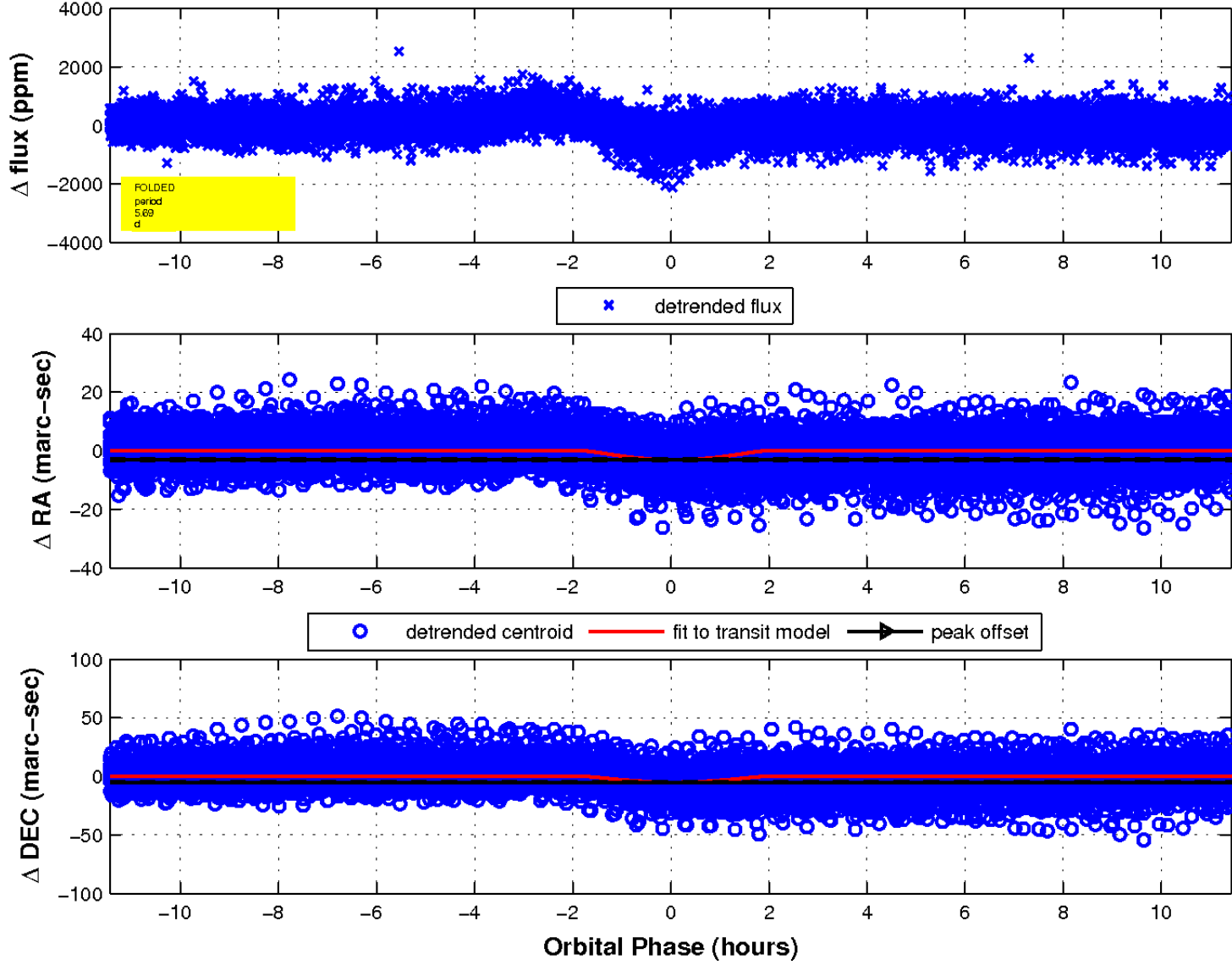
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

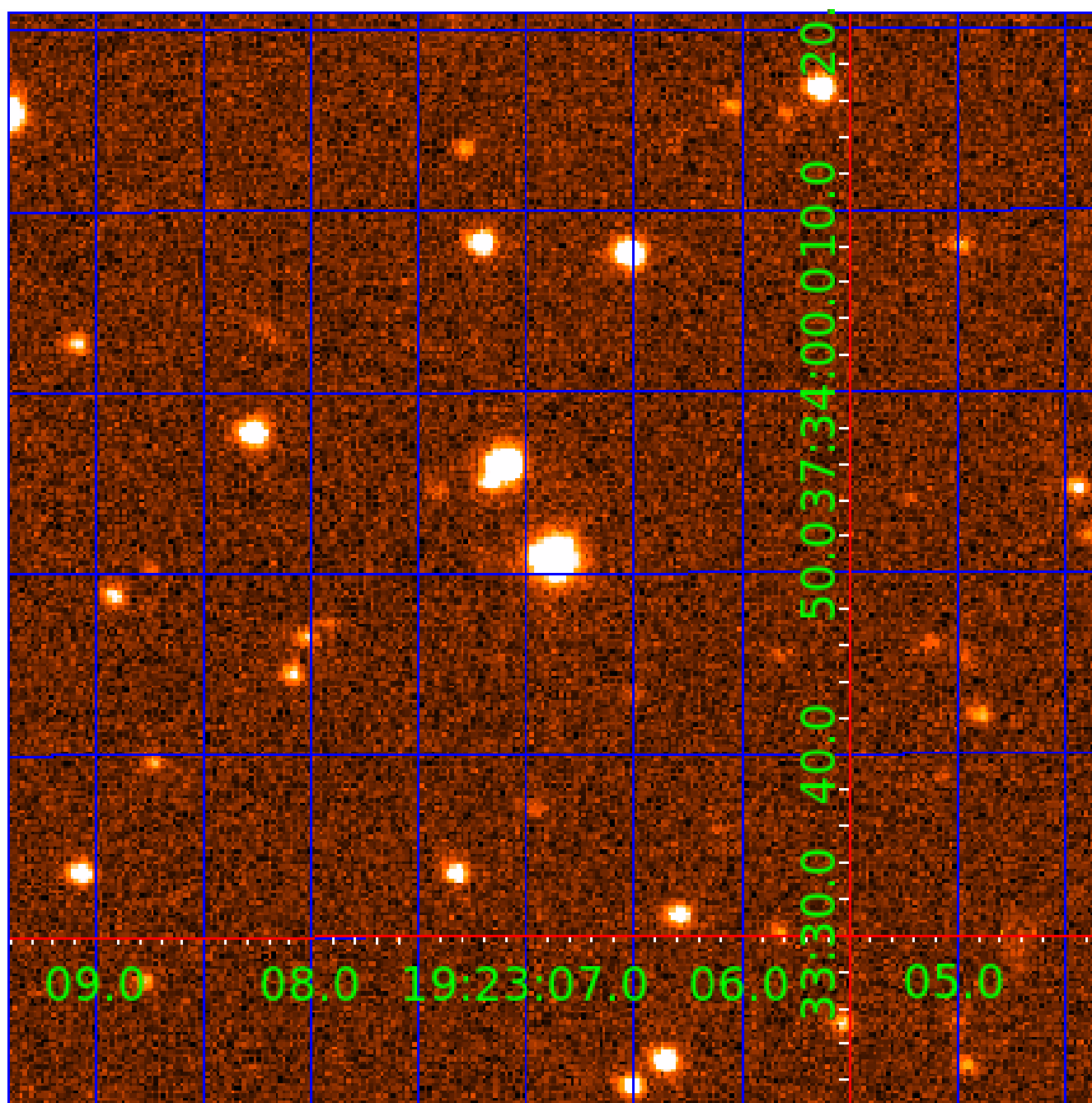


fluxWeightedCentroids, Planet 1 of 4



UKIRT Image

Declination



KIC 002157247

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})
002157247-01	OBS	No	5.686358	132.769285	439.3	3.812	28.3	30.1	0.96	6052	3.01	298.09
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002157247-03	OBS	No	5.686249	132.802809	53.9	12.783	9.4	1.9	0.96	6052	0.82	298.10
002157247-04	OBS	No	2.843025	133.742883	47.2	14.771	8.5	7.5	0.96	6052	0.75	751.20

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002157247-01	OBS	FP	0.00	1	0	1	0	LPP_DV—CENT_UNRESOLVED_OFFSET
002157247-02	OBS	FP	0.00	1	0	1	0	LPP_DV—LPP_ALT—SAME_NTL_PERIOD—CENT_UNRESOLVED_OFFSET
002157247-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—SAME_NTL_PERIOD—CENT_UNRESOLVED_OFFSET
002157247-04	OBS	FP	0.00	1	0	1	0	SWEET_NTL—LPP_DV—MOD_NONUNIQ_DV—SAME_NTL_PERIOD—CENT_UNRESOLVED_OFFSET

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 002157247-02

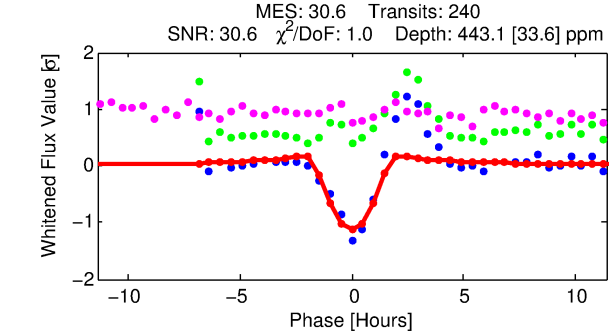
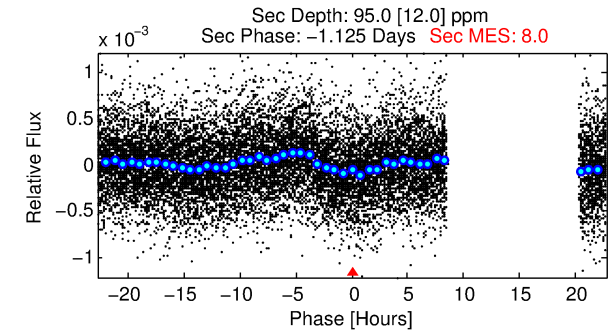
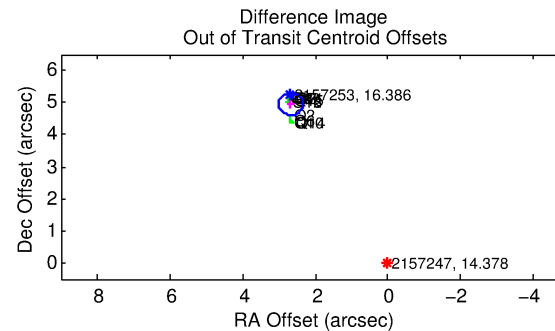
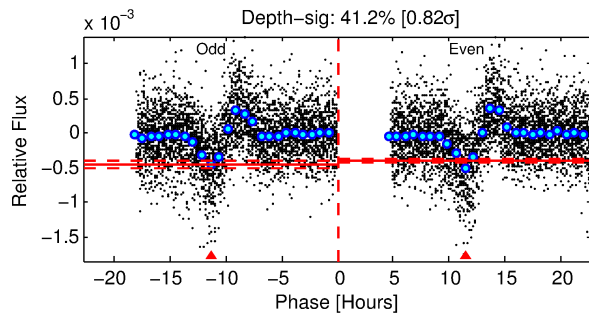
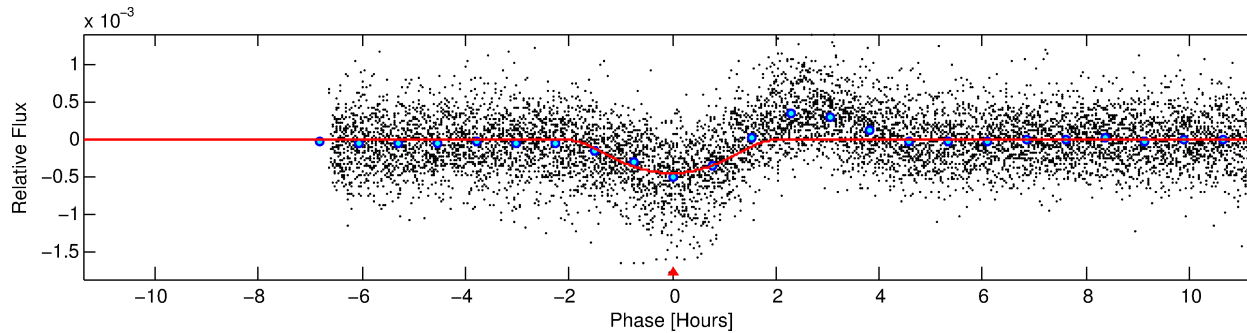
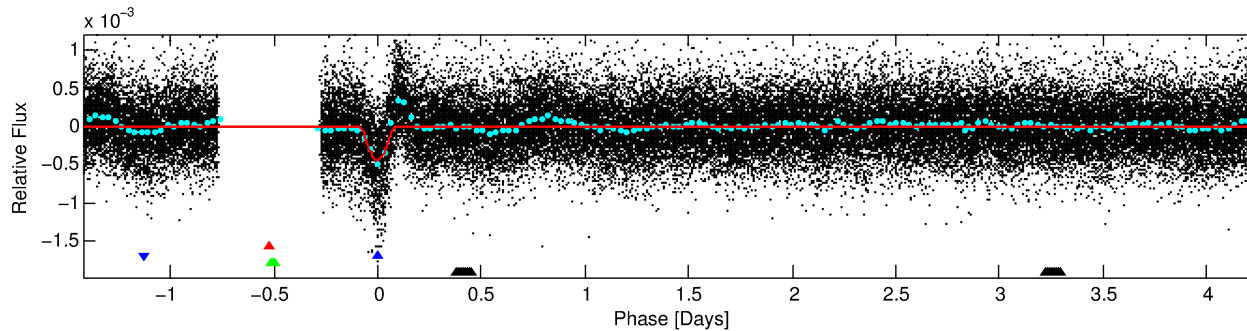
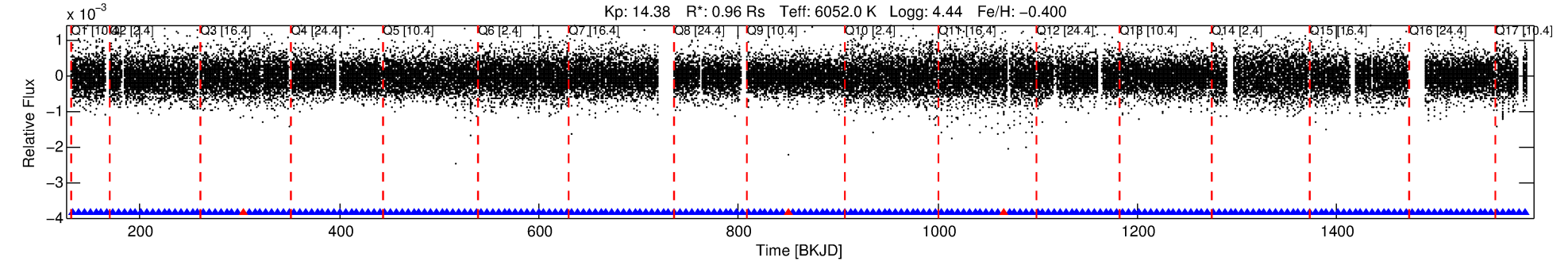
No Significant Match Found

DV One-Page Summary

KIC: 2157247 Candidate: 2 of 4 Period: 5.686 d

KOI: K00997 Corr: No Ephemeris Match

Kp: 14.38 R*: 0.96 Rs Teff: 6052.0 K Logg: 4.44 Fe/H: -0.400



DV Fit Results:

Period = 5.68633 [0.00002] d
Epoch = 133.2954 [0.0032] BKJD
Rp/R* = 0.0302 [0.0140]
a/R* = 3.51 [0.61]
b = 0.99 [0.03]
Seff = 298.09 [110.75]
Teq = 1060 [98] K
Rp = 3.15 [1.70] Re
a = 0.0607 [0.0143] AU
Ag = 19.36 [19.35] [0.95σ]
Teffp = 3436 [811] K [2.91σ]

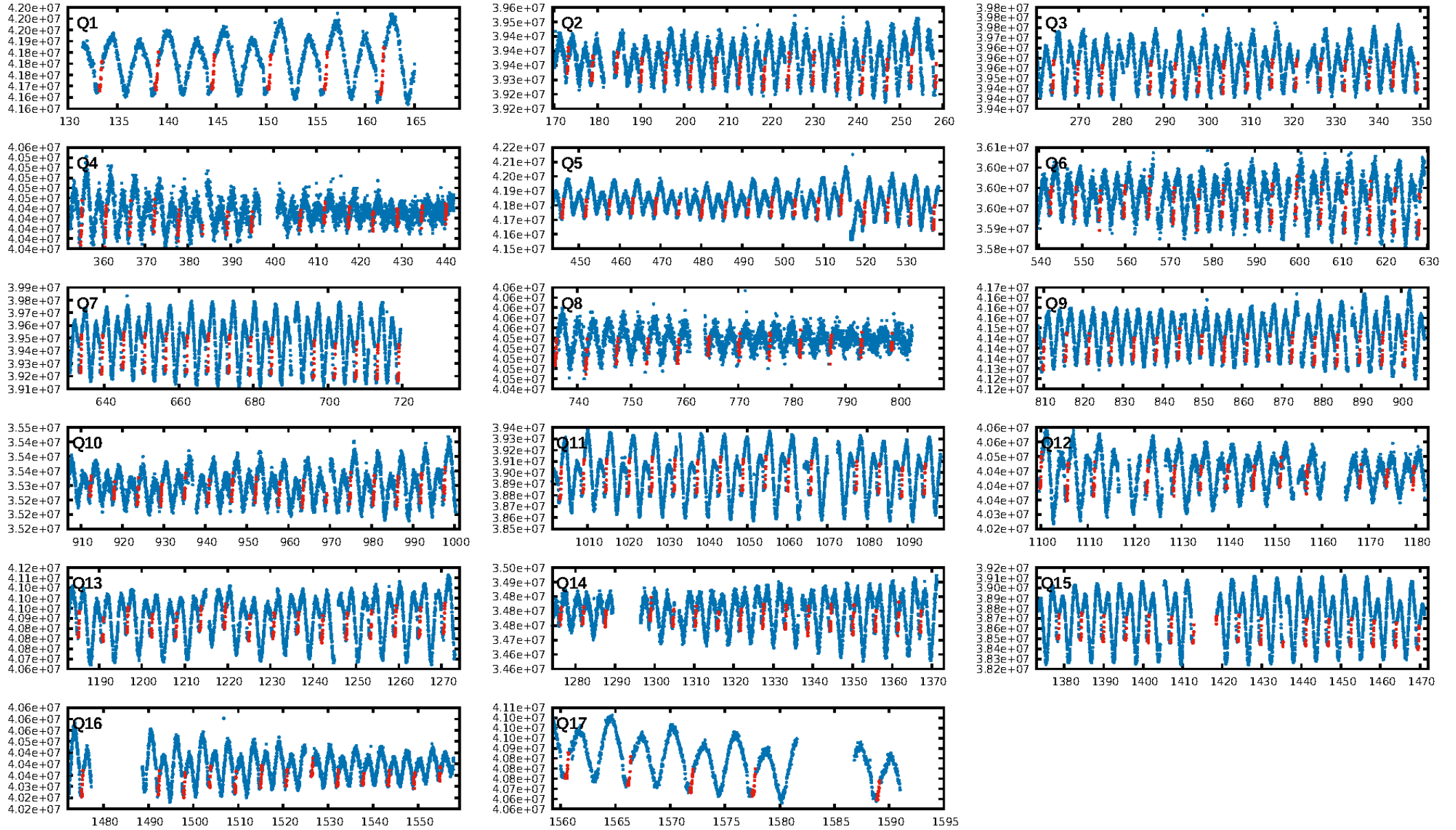
DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]
LongPeriod-sig: 0.0% [0.00σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 1.97e-95
RollingBand-fgt: 0.99 [226/229]
GhostDiagnostic-chr: -0.5138
Centroid-sig: 0.0%
Centroid-so: 13.244 arcsec [12.91σ]
OotOffset-rm: 5.626 arcsec [49.57σ]
KicOffset-rm: 5.912 arcsec [68.90σ]
OotOffset-st: 4/4/4/0 [12]
KicOffset-st: 4/4/4/0 [12]
DiffImageQuality-fgm: 1.00 [12/12]
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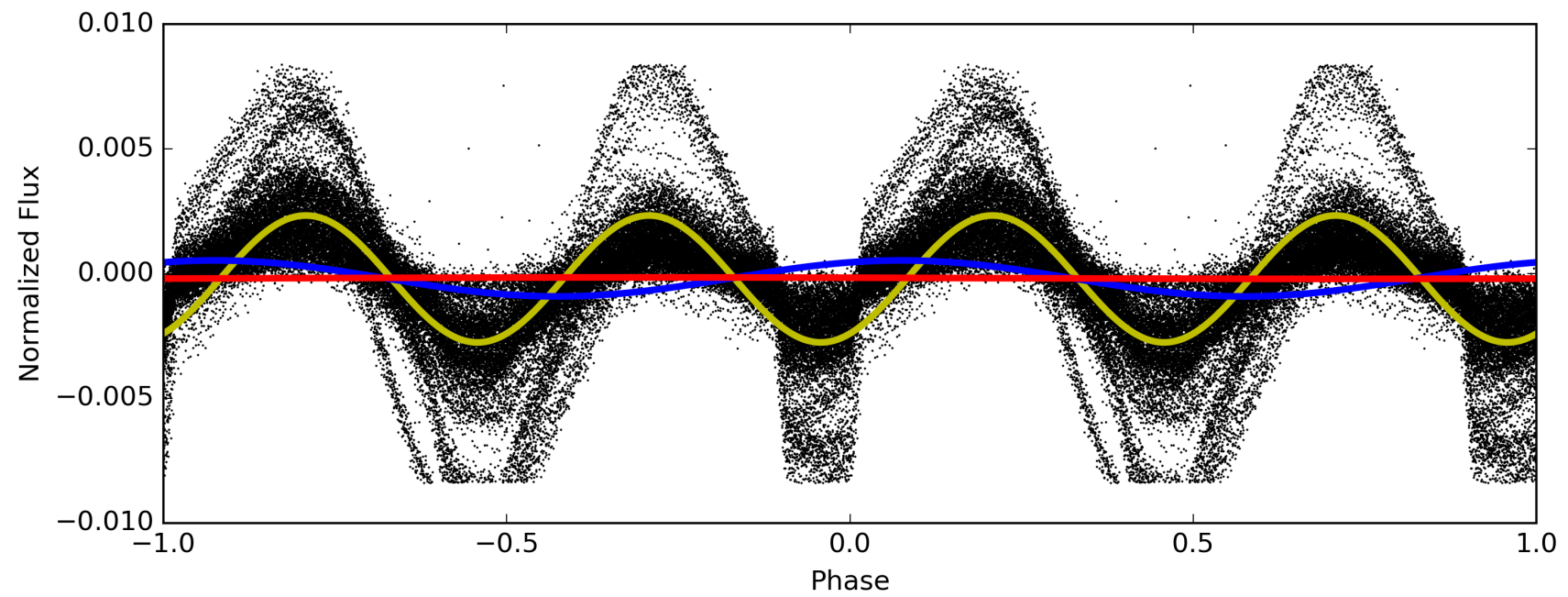
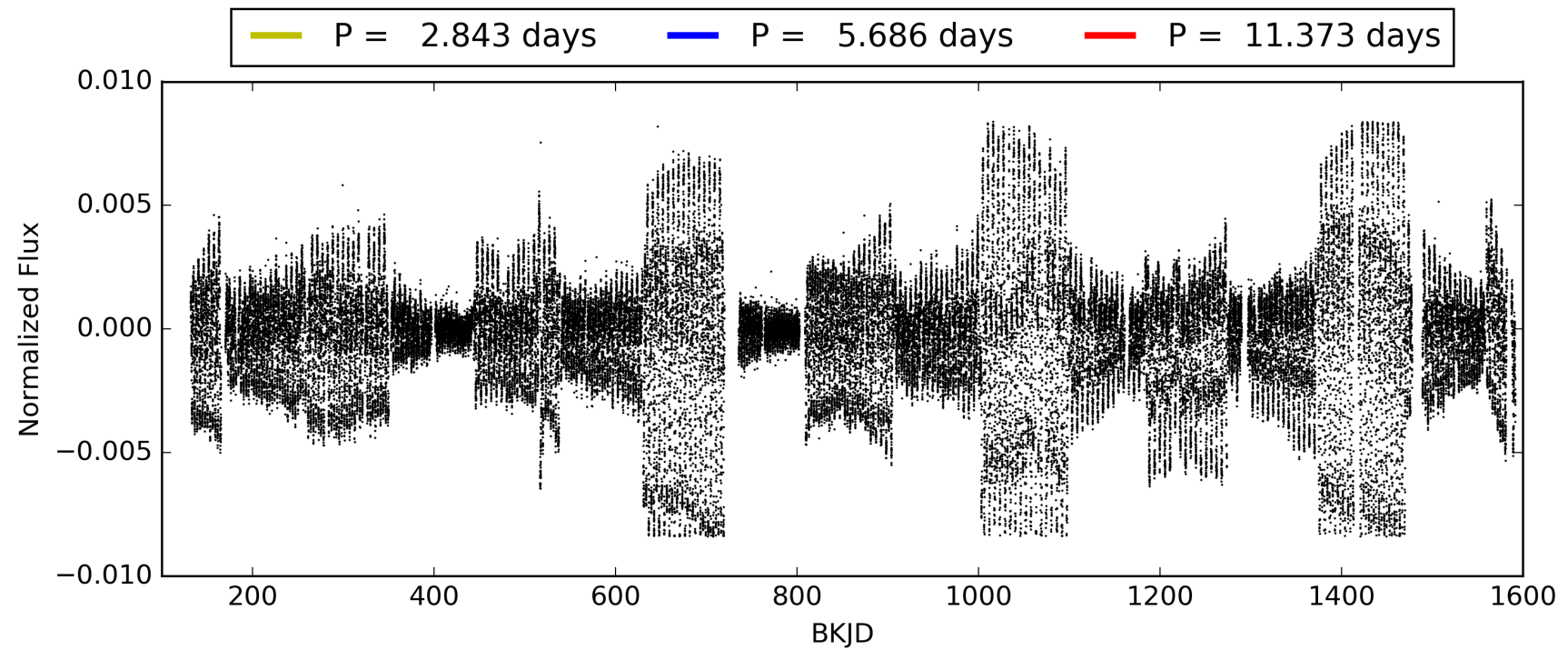
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 18:12:32 Z

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

TCE 002157247-02, PDC Light Curves

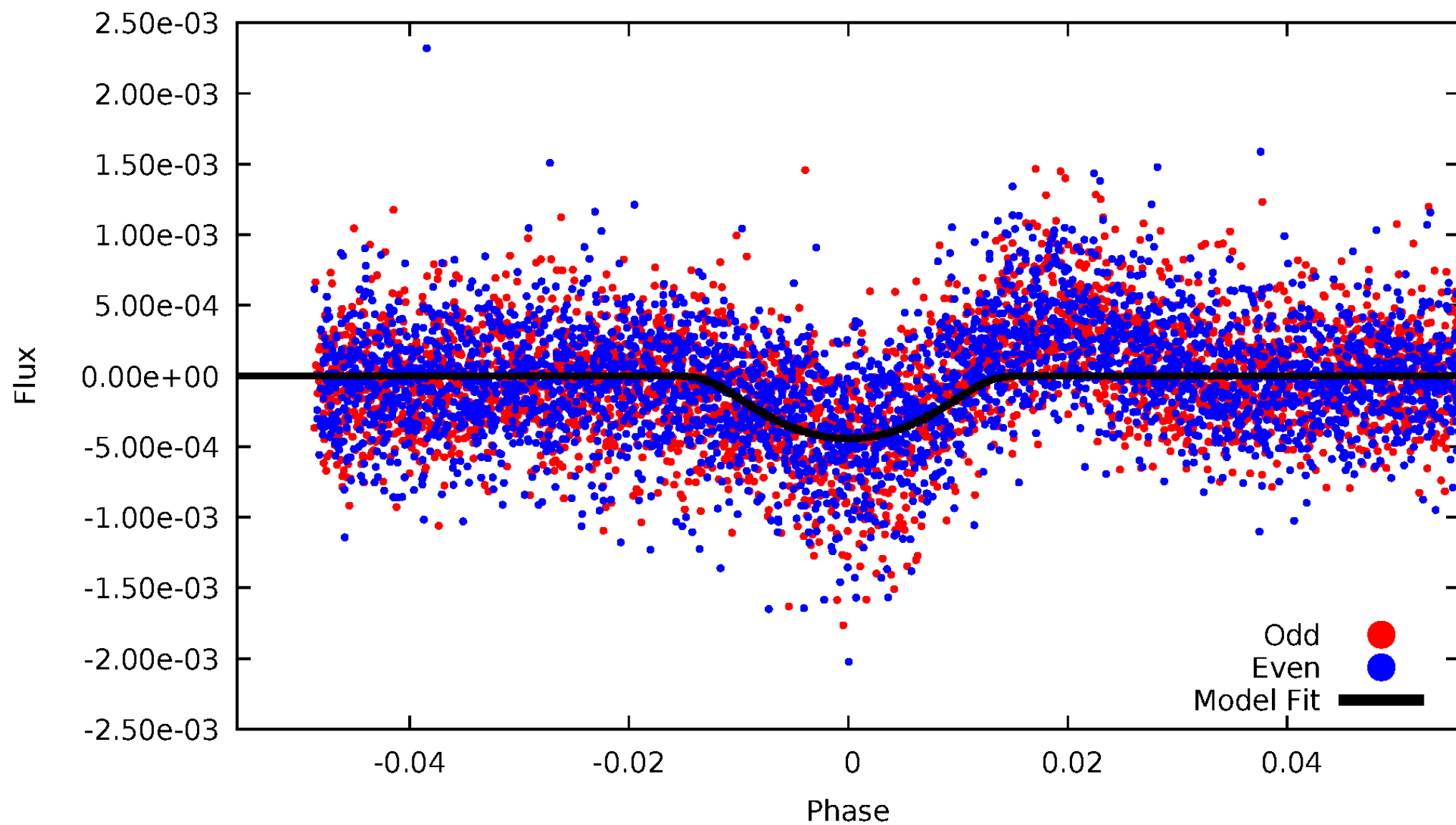


TCE 002157247-02



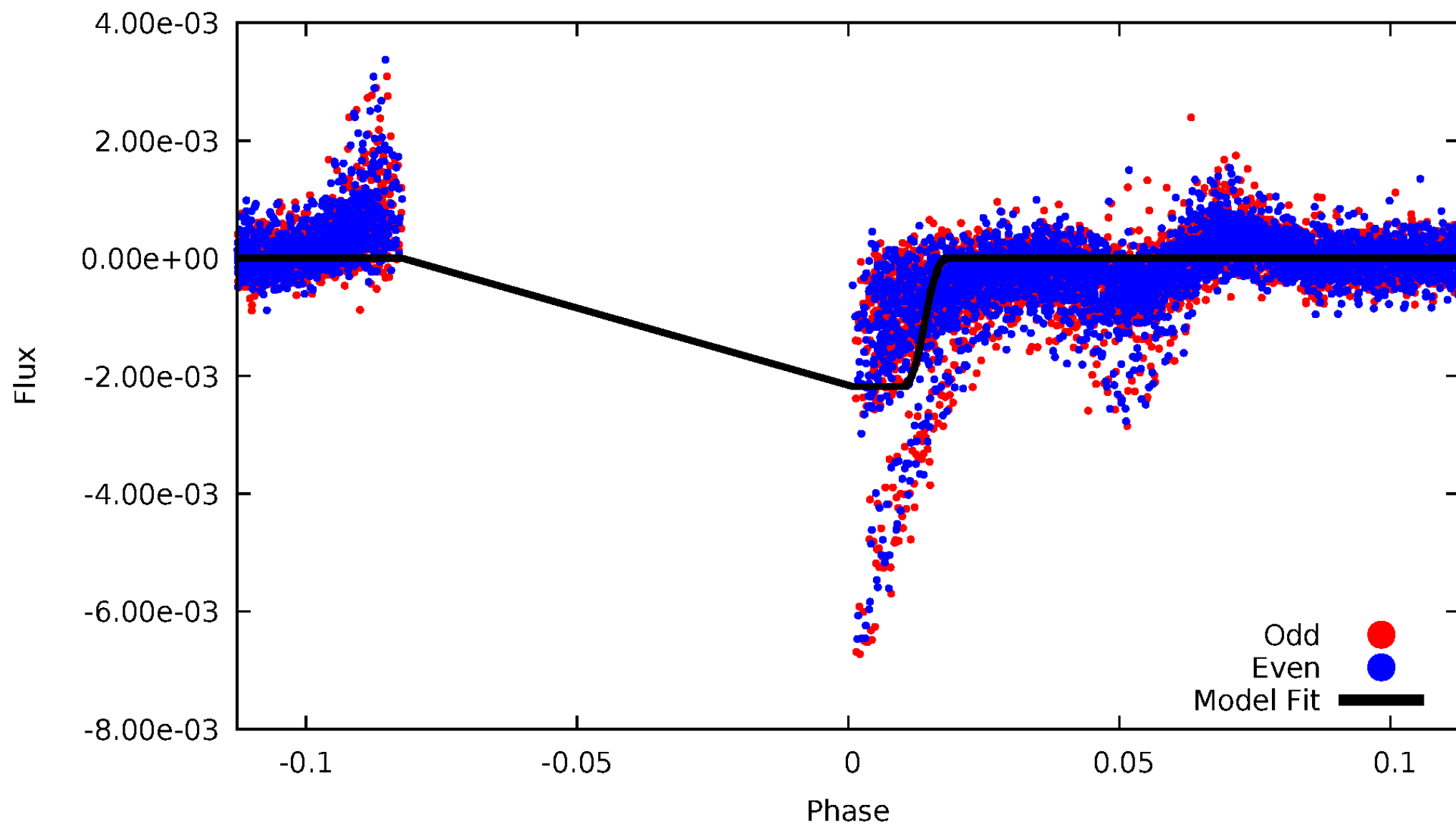
DV Odd/Even

TCE 002157247-02



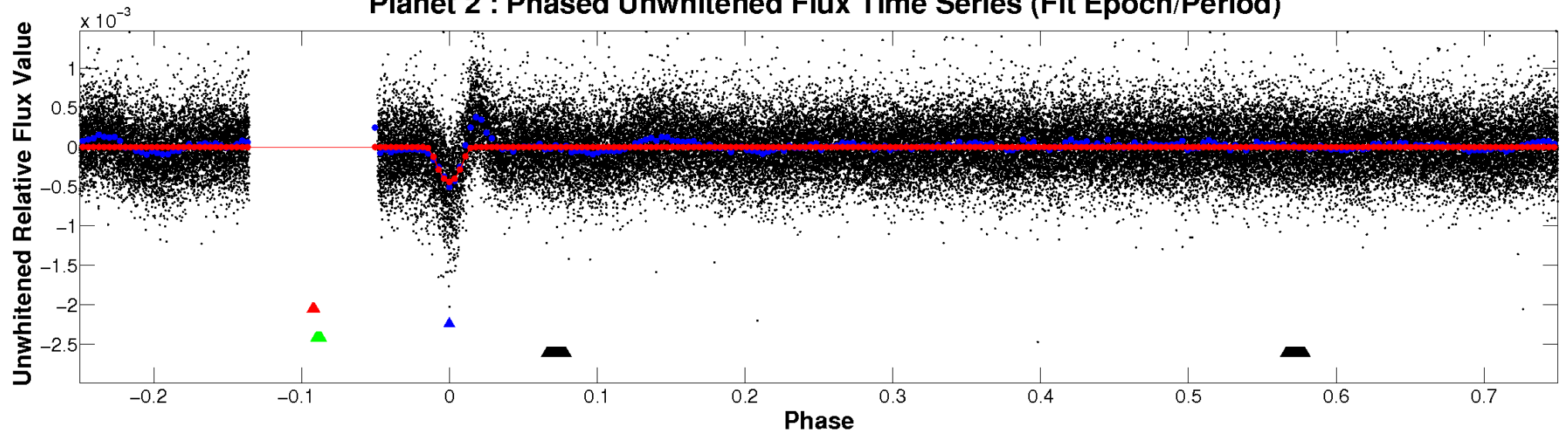
ALT Odd/Even

TCE 002157247-02

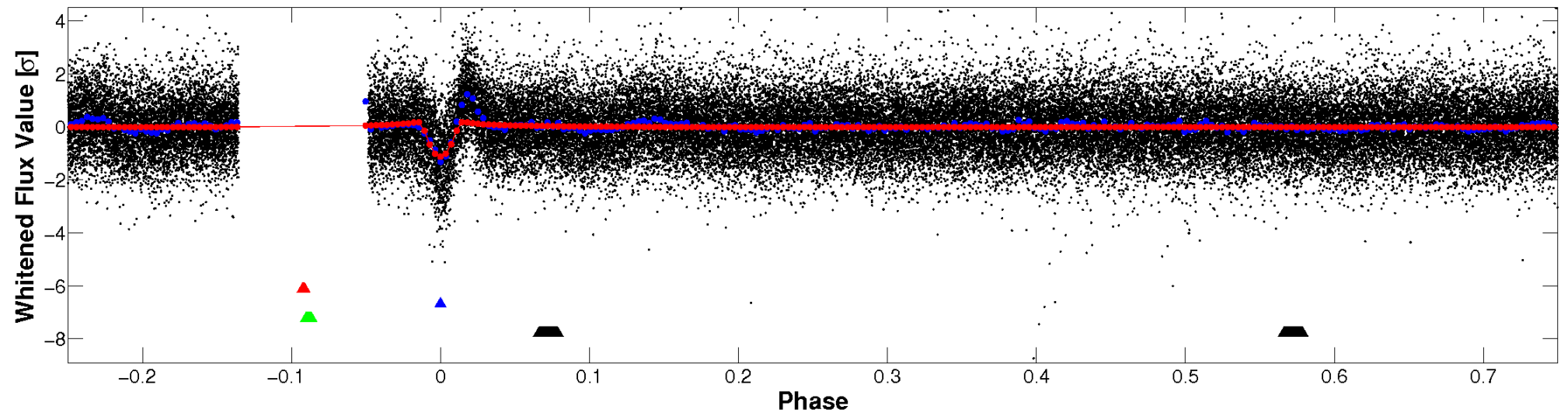


Non-Whitened Vs. Whitened Light Curve

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

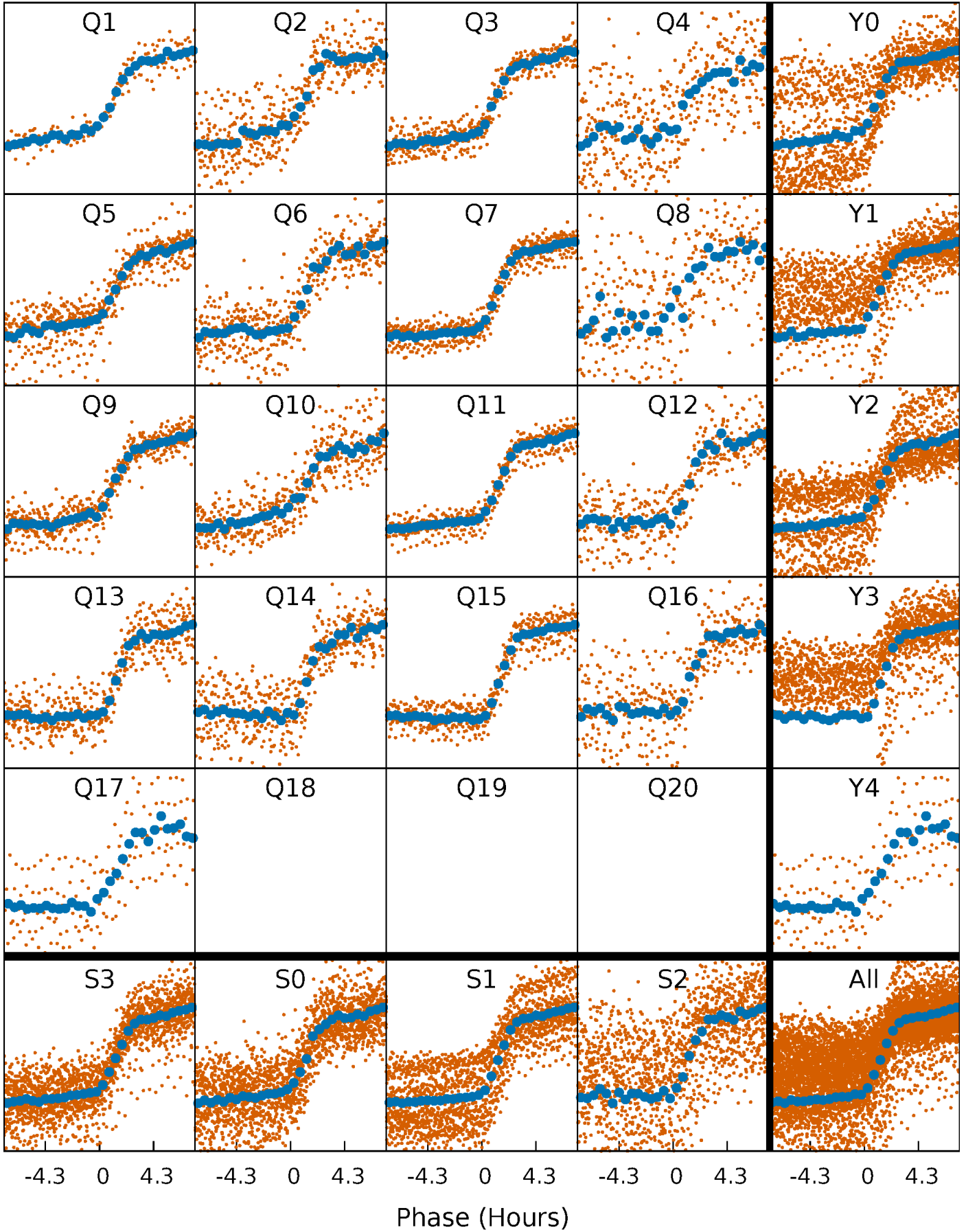


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



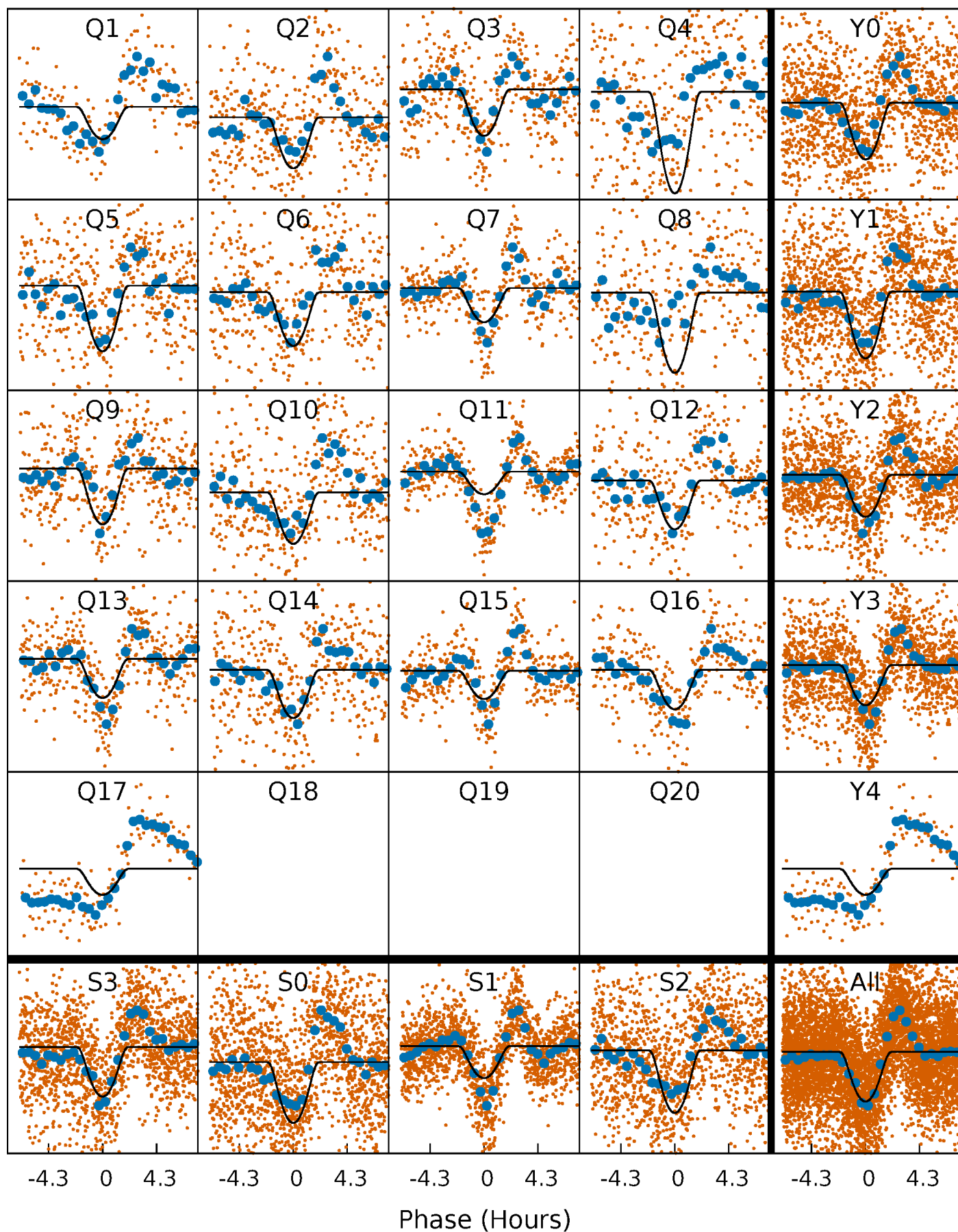
PDC Quarter-Phased Transit Curves

TCE 002157247-02 P= 5.686330 Days $T_0=133.295408$ (BKJD)



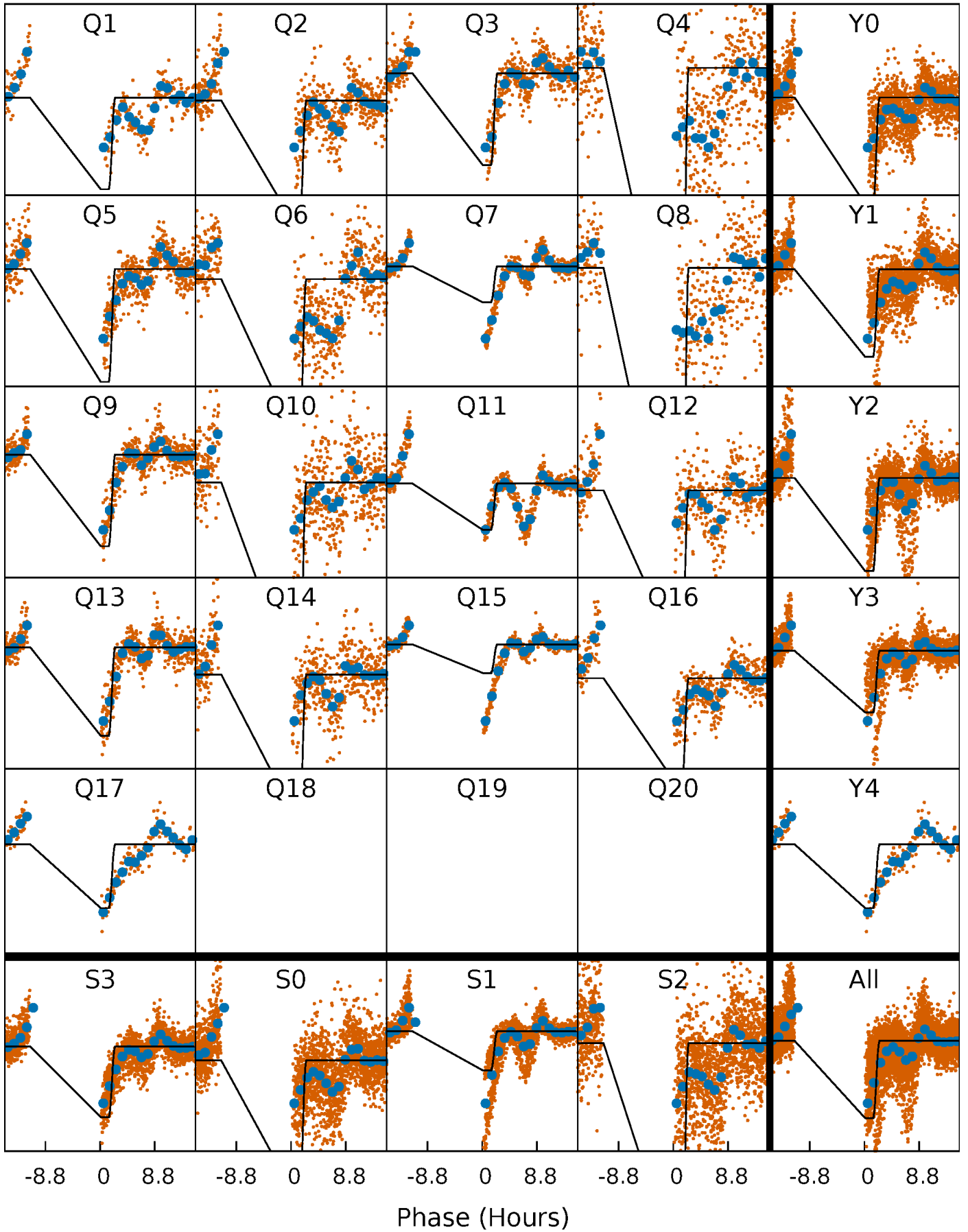
DV Quarter-Phased Transit Curves

TCE 002157247-02 $P = 5.686330$ Days $T_0 = 133.295408$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

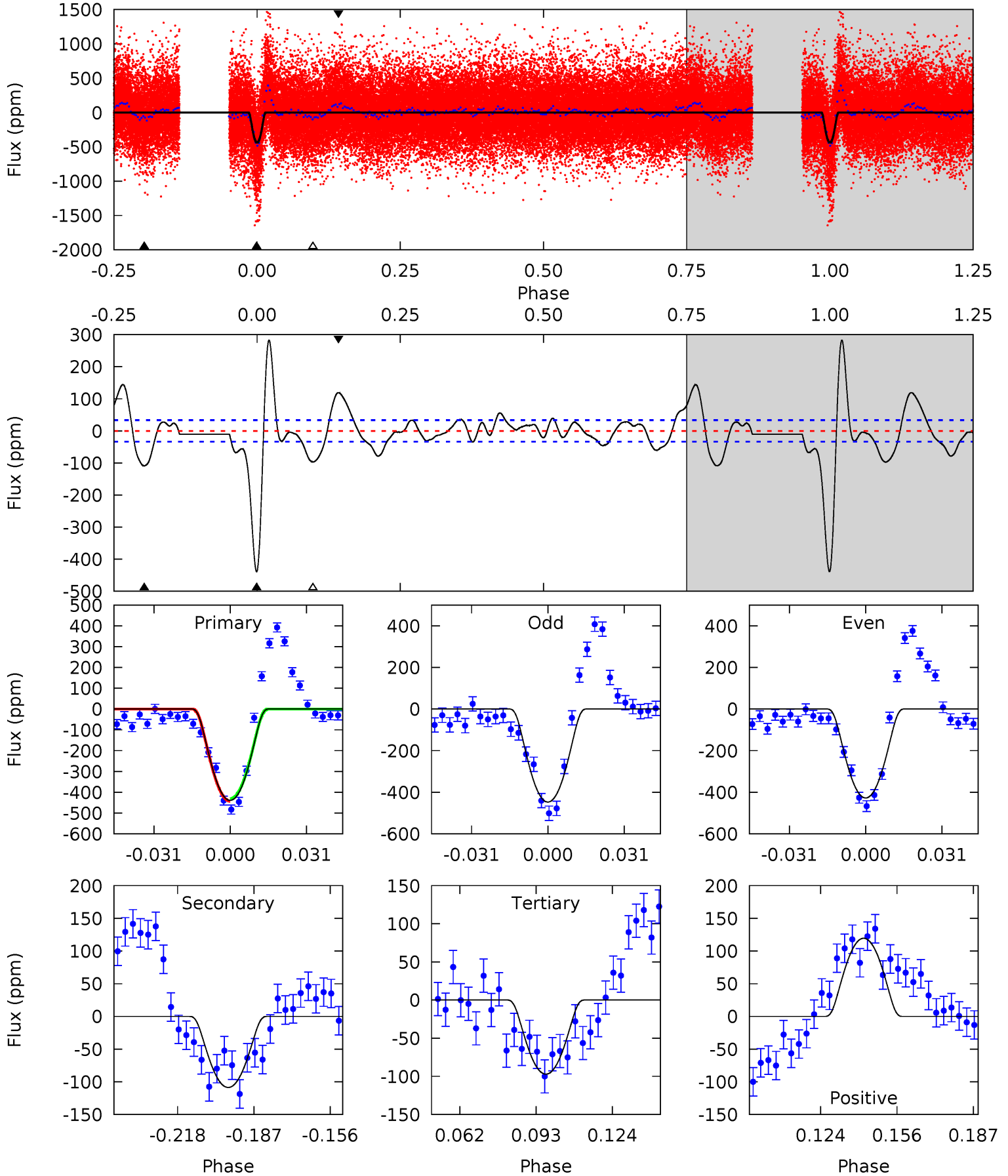
TCE 002157247-02 P= 5.686468 Days $T_0=132.986126$ (BKJD)



DV Model-Shift Uniqueness Test

002157247-02, P = 5.686330 Days, E = 127.609078 Days

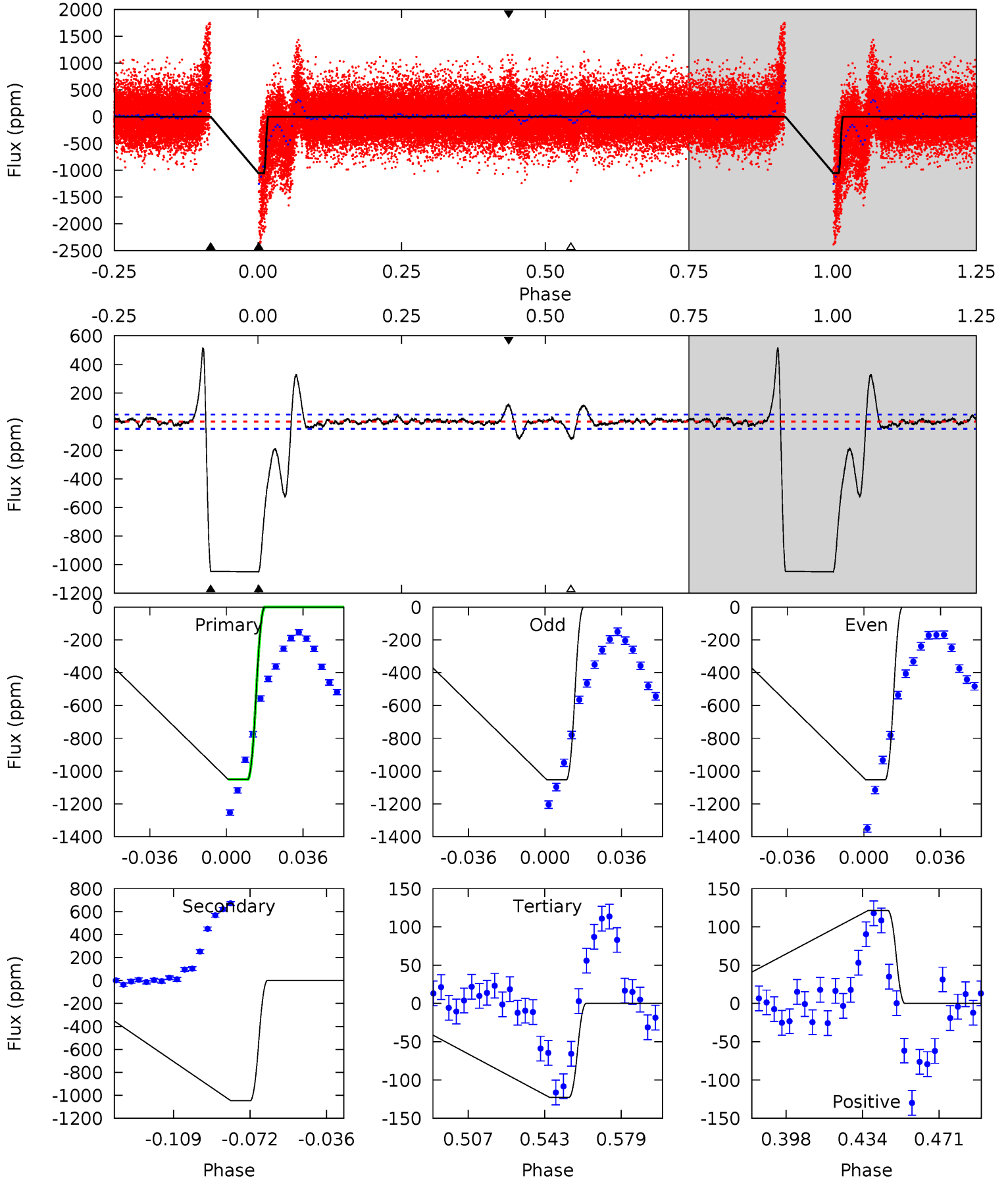
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
62.6	15.5	13.8	17.0	4.80	2.16	6.30	48.7	45.5	1.65	-1.54	1.42	1.10	0.39	0.80



Alt Model-Shift Uniqueness Test

002157247-02, P = 5.686468 Days, E = 127.299658 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
102.5	102.1	12.0	11.8	4.77	2.09	7.50	90.5	90.6	90.1	90.2	0.02	1.42	0.33	0



Stellar Parameters For KIC 002157247

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6052^{+164}_{-183}	$4.442^{+0.084}_{-0.196}$	$-0.400^{+0.300}_{-0.300}$	$0.956^{+0.260}_{-0.120}$	$0.923^{+0.119}_{-0.097}$	$1.488^{+0.662}_{-0.742}$
	+3%/-3%	+2%/-4%	+75%/-75%	+27%/-13%	+13%/-11%	+44%/-50%
Source	PHO1	KIC0	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 002157247-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-109 ± 7	$3.33^{+1.63}_{-1.60}$	1505^{+105}_{-74}	3852^{+1071}_{-454}	20^{+53}_{-11}
Alt.	-1047 ± 10	$5.03^{+1.84}_{-1.61}$	1506^{+102}_{-82}	5107^{+939}_{-551}	82^{+97}_{-36}

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

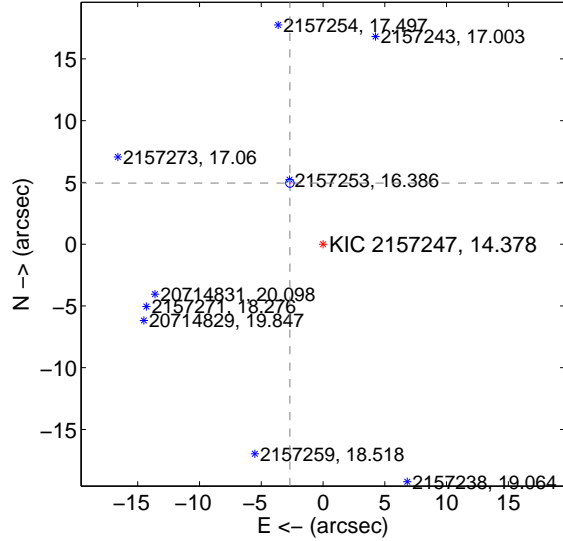
Supplemental centroid analysis for 002157247-02. Kepler magnitude: 14.38. Transit SNR 30.56

There are 12 quarters with good PRF difference image offsets

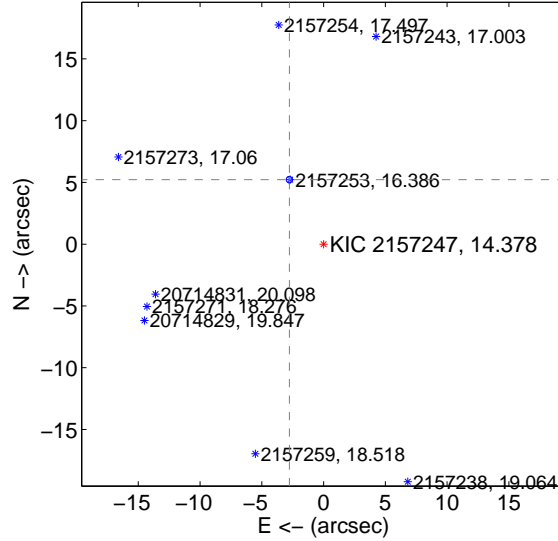
The direct PRF centroid is offset from the target star catalog position by about 0.19 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	5.626 \pm 0.113	49.57	2.683 \pm 0.068	4.945 \pm 0.124
PRF-fit source offset from KIC position	5.912 \pm 0.086	68.90	2.769 \pm 0.069	5.224 \pm 0.090
photometric centroid source offset	13.24 \pm 1.03	12.91	8.11 \pm 0.74	10.47 \pm 1.16

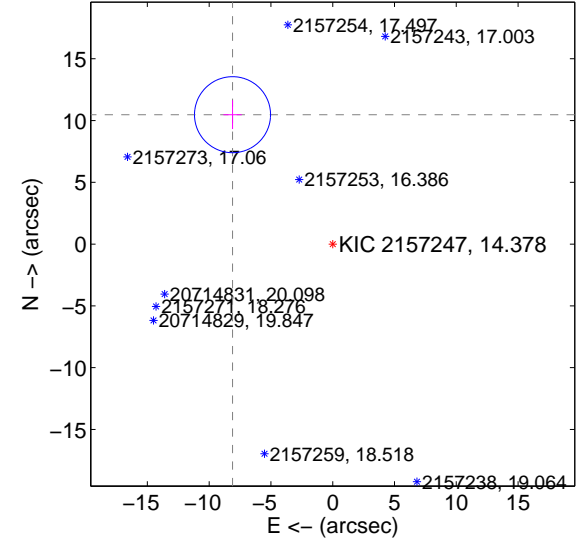
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

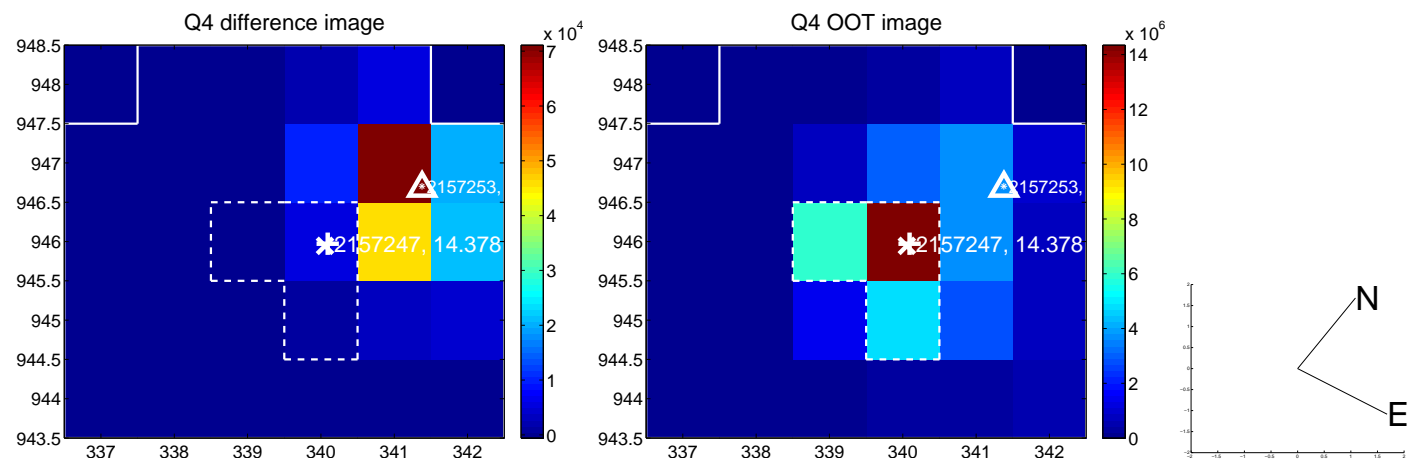
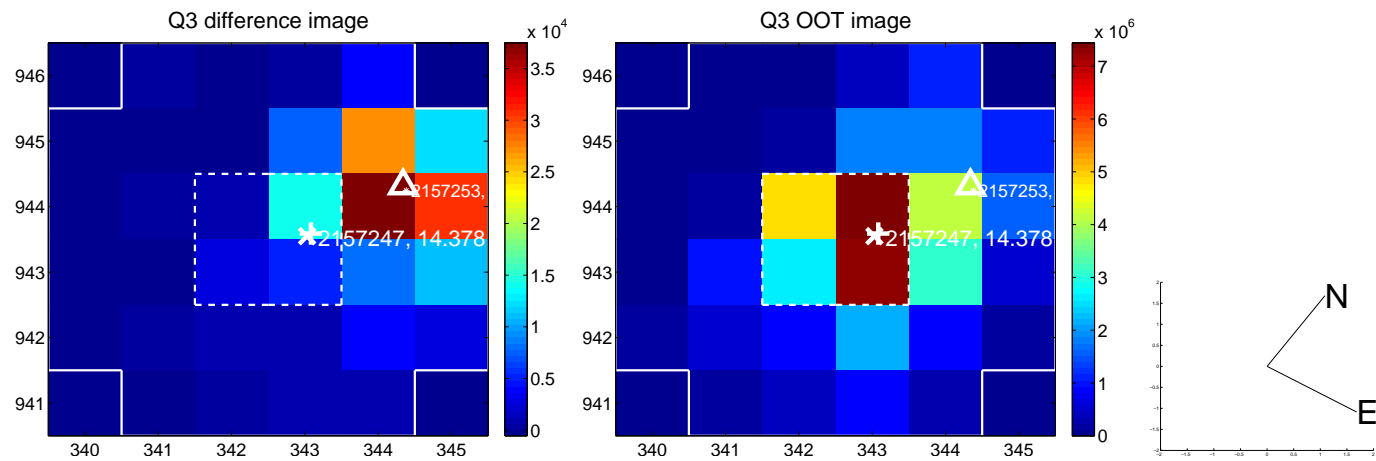
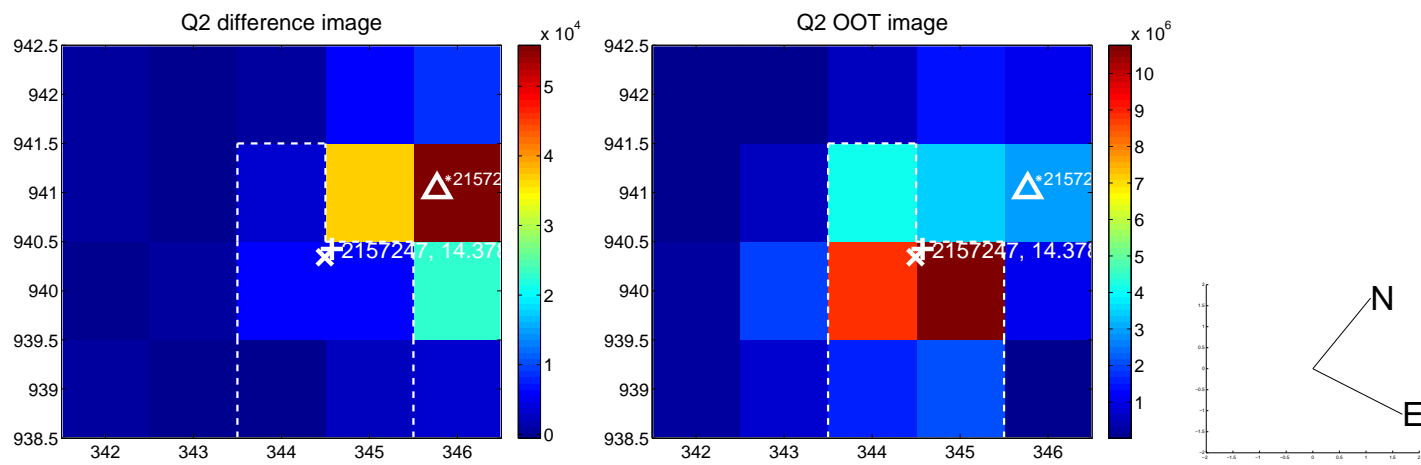
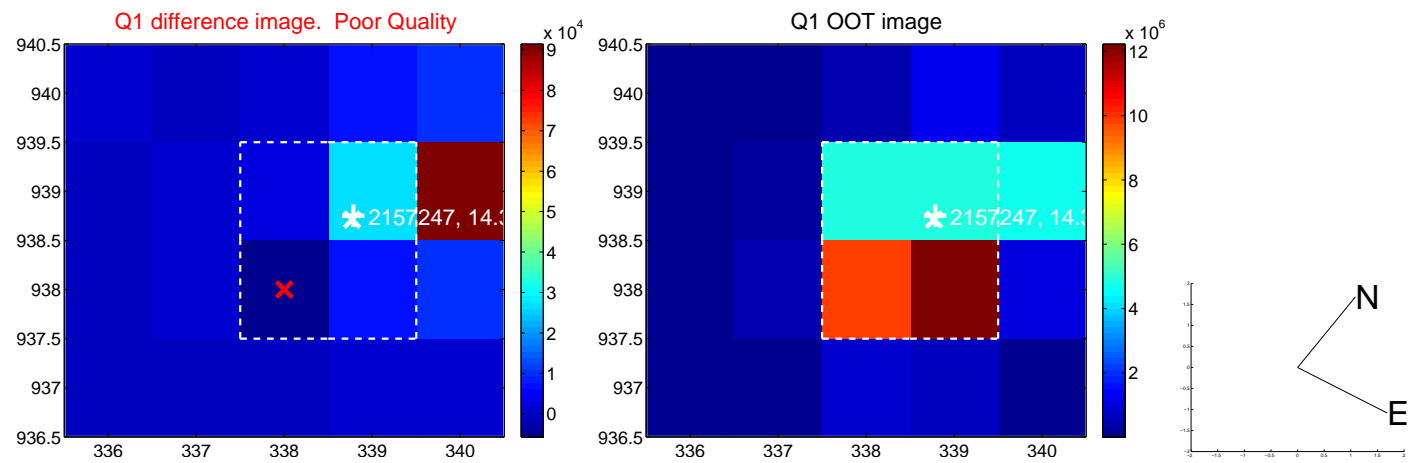


offset from photometric centroids

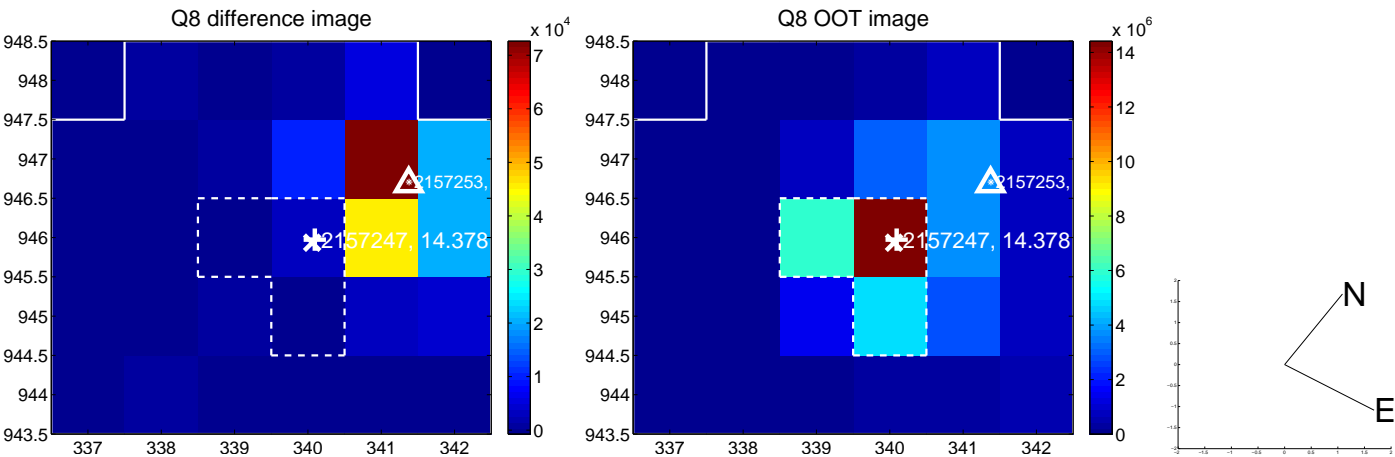
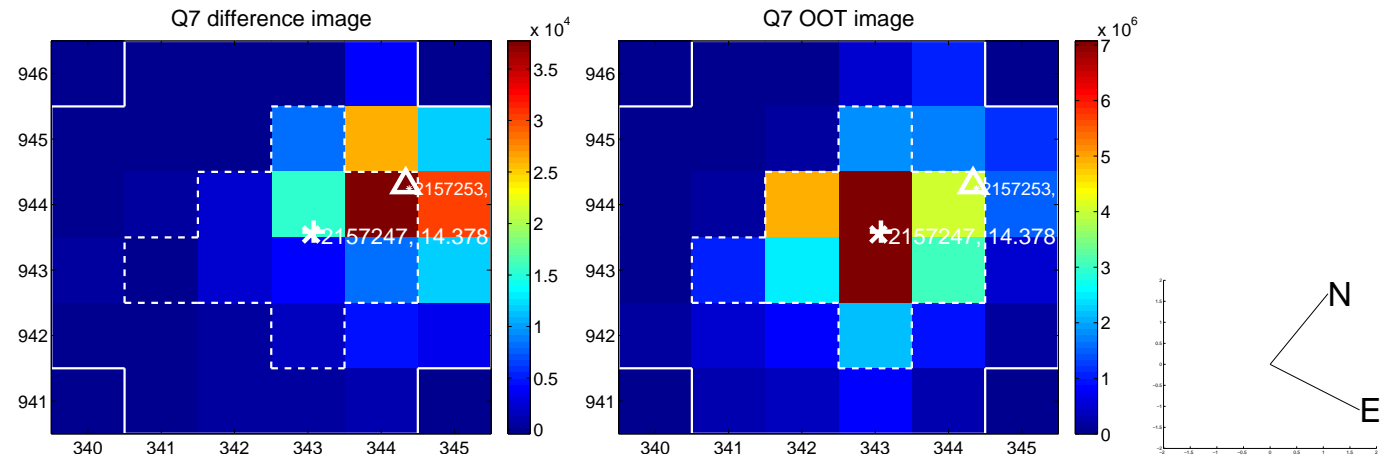
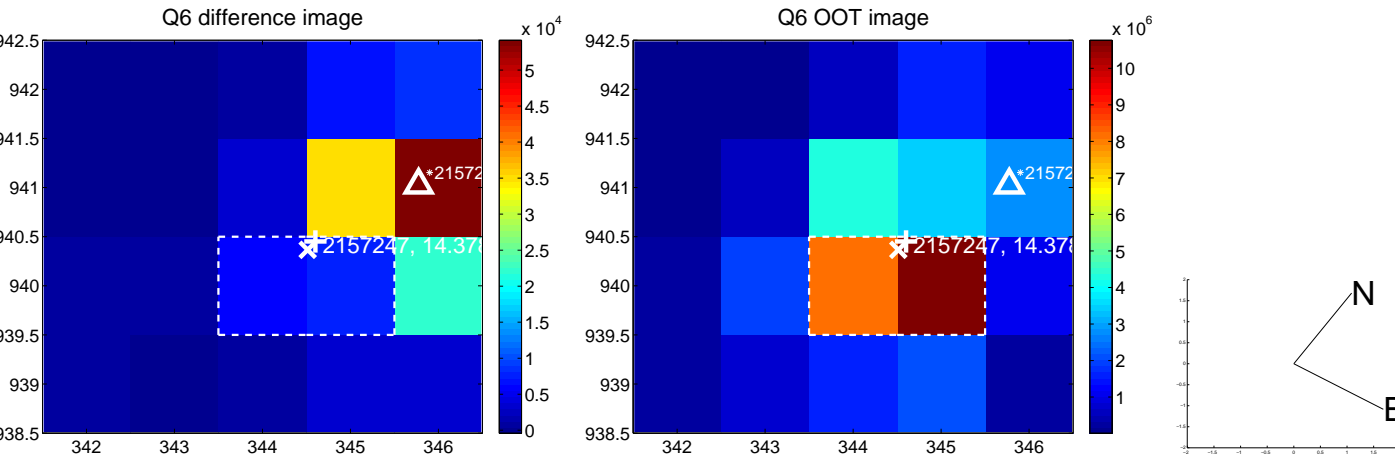
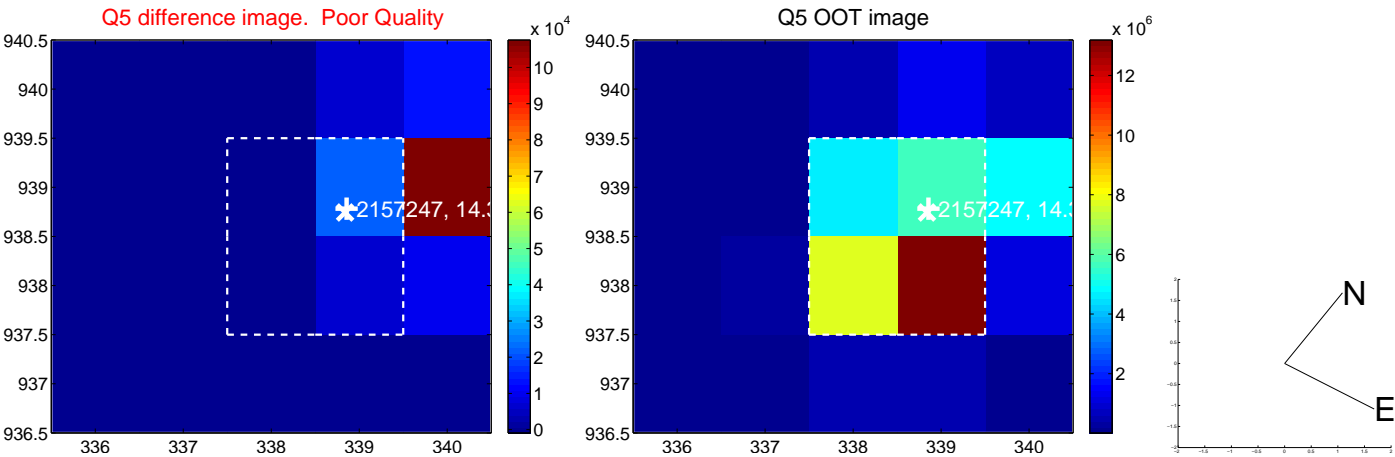


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

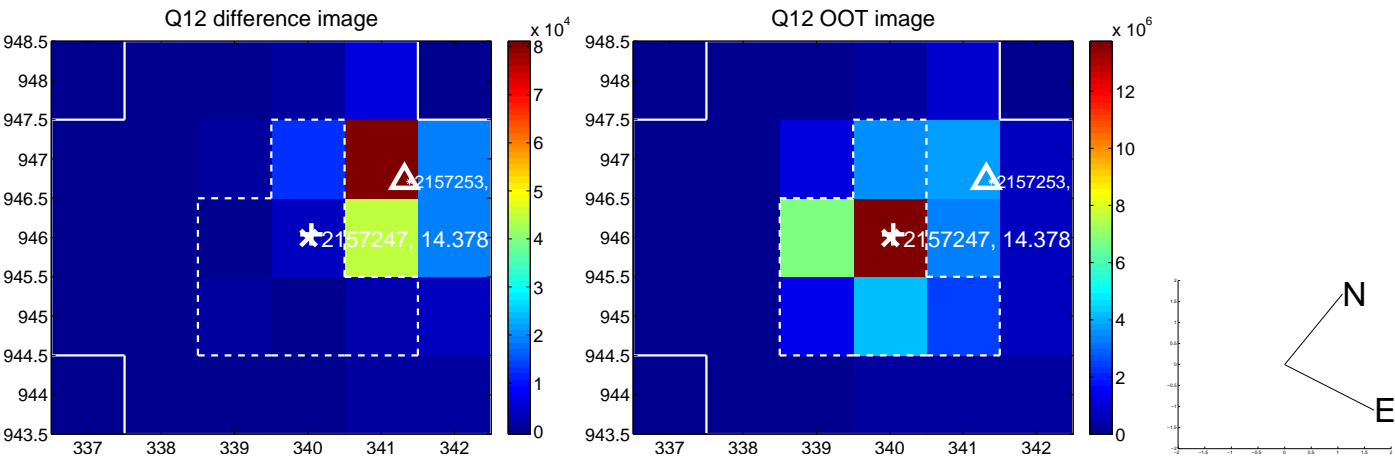
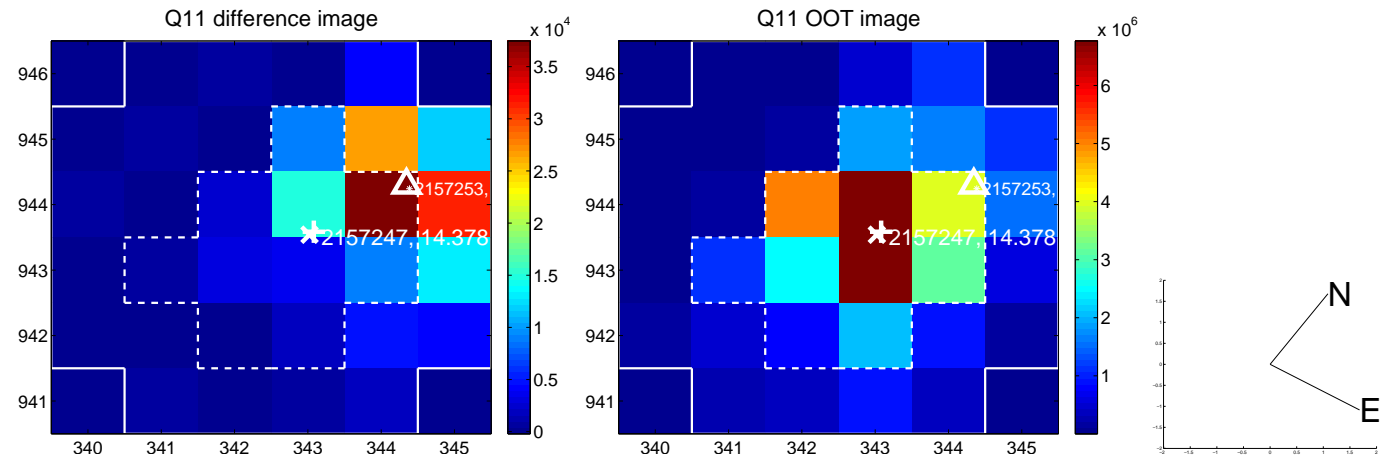
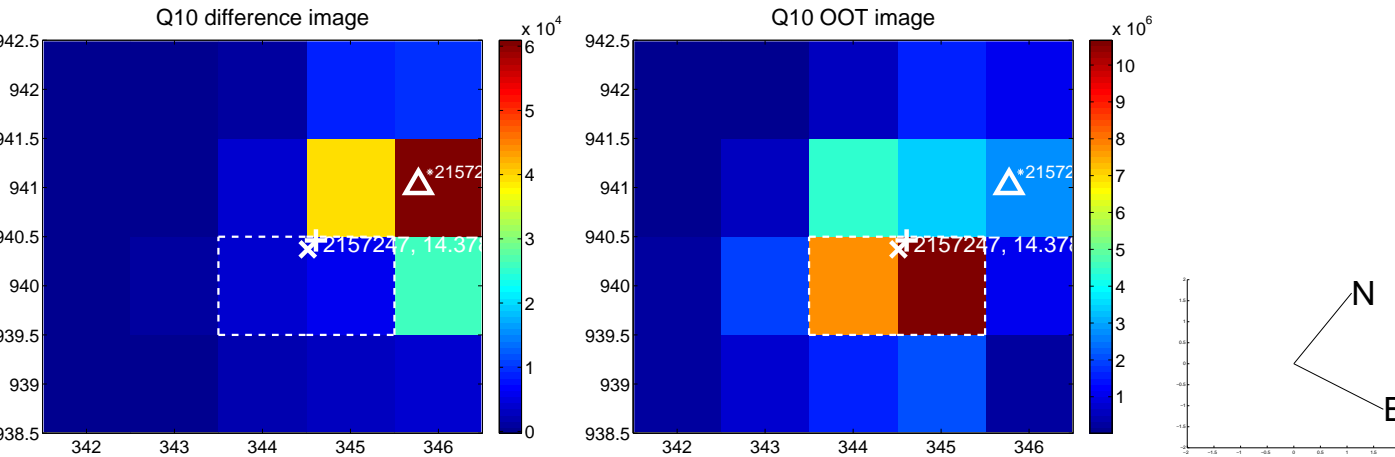
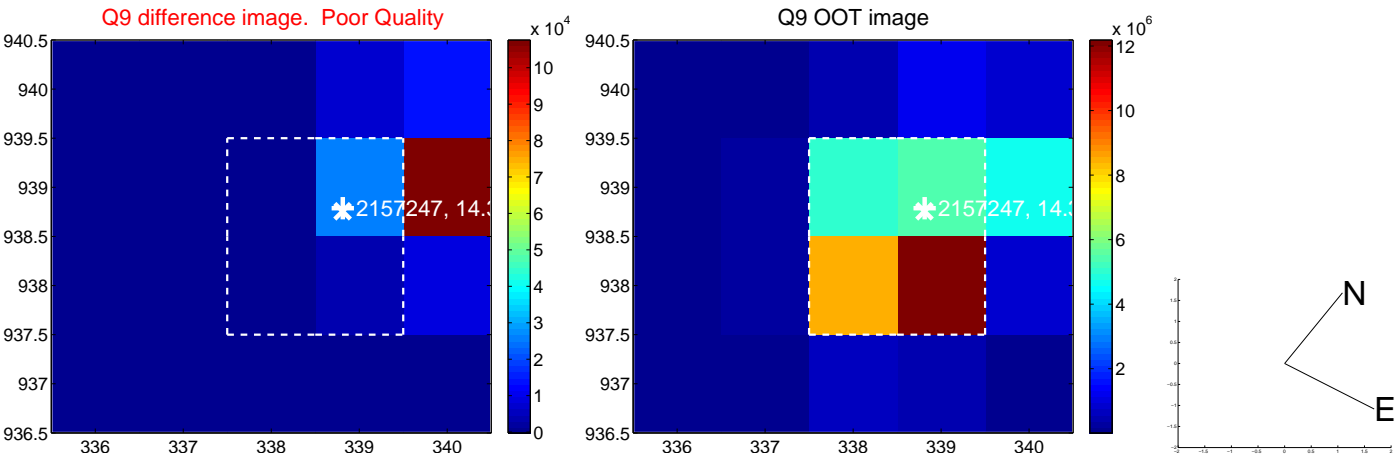
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



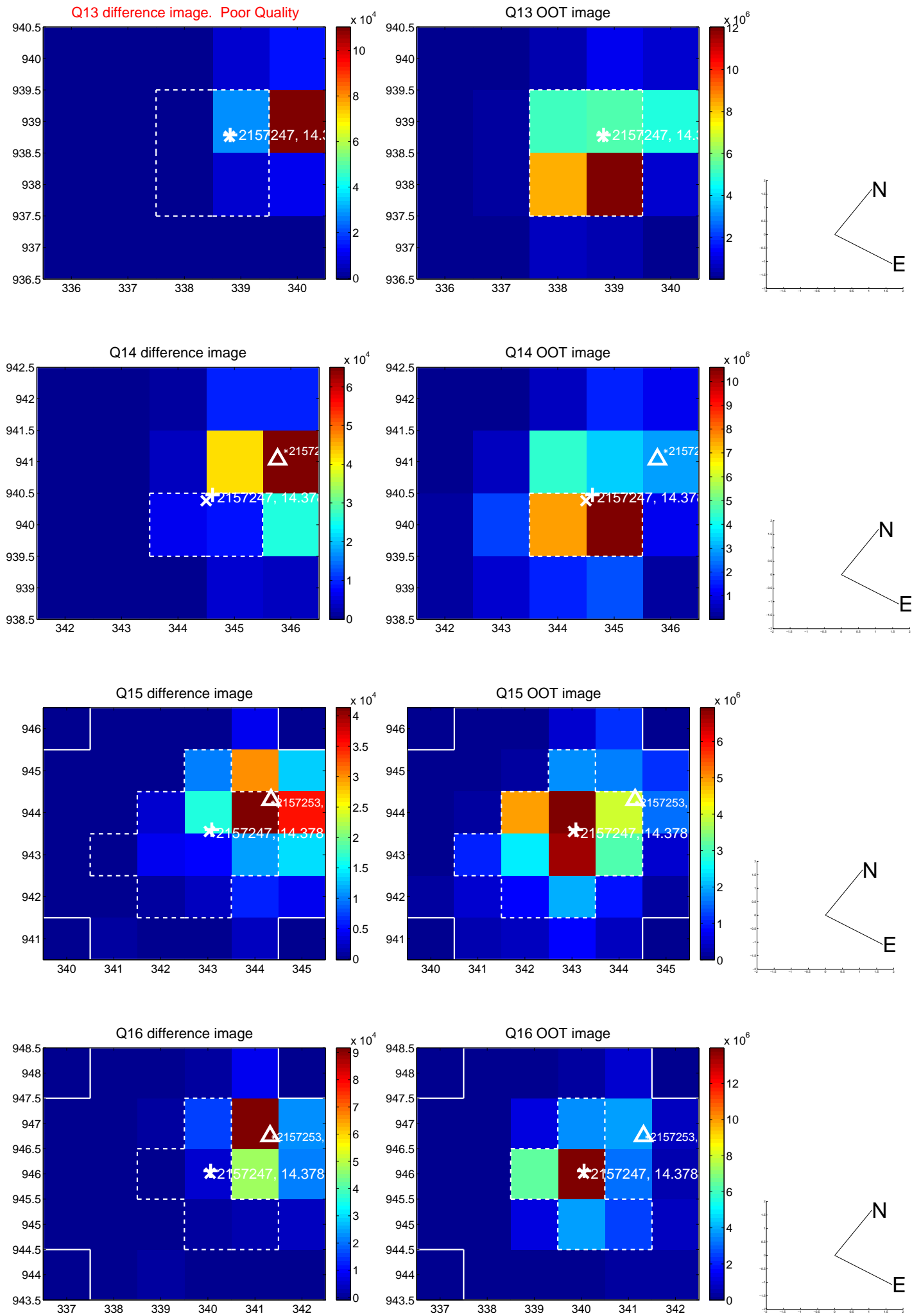
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



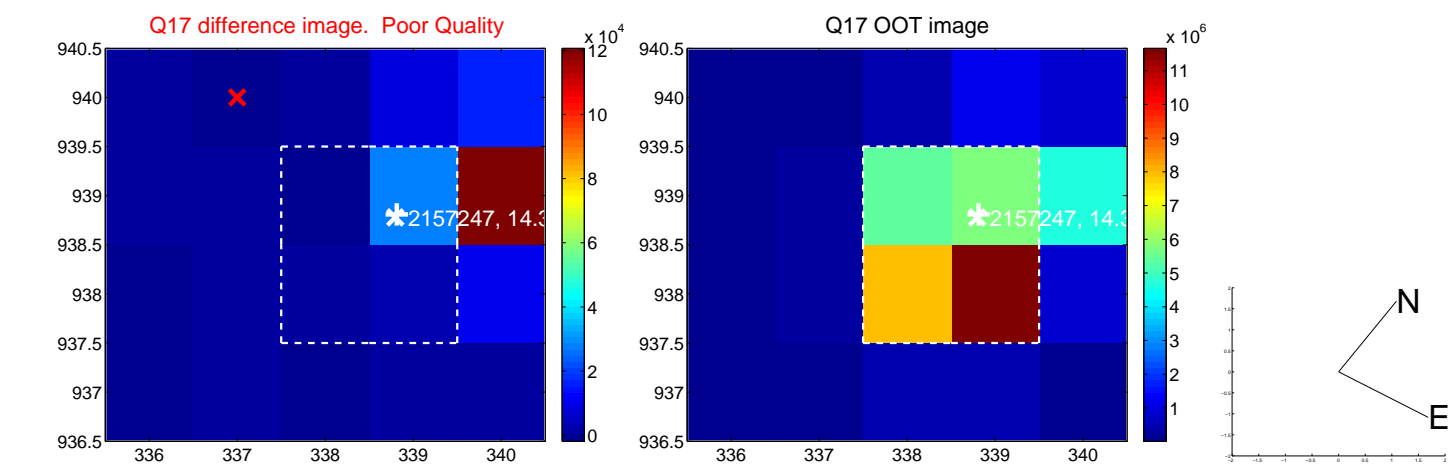
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



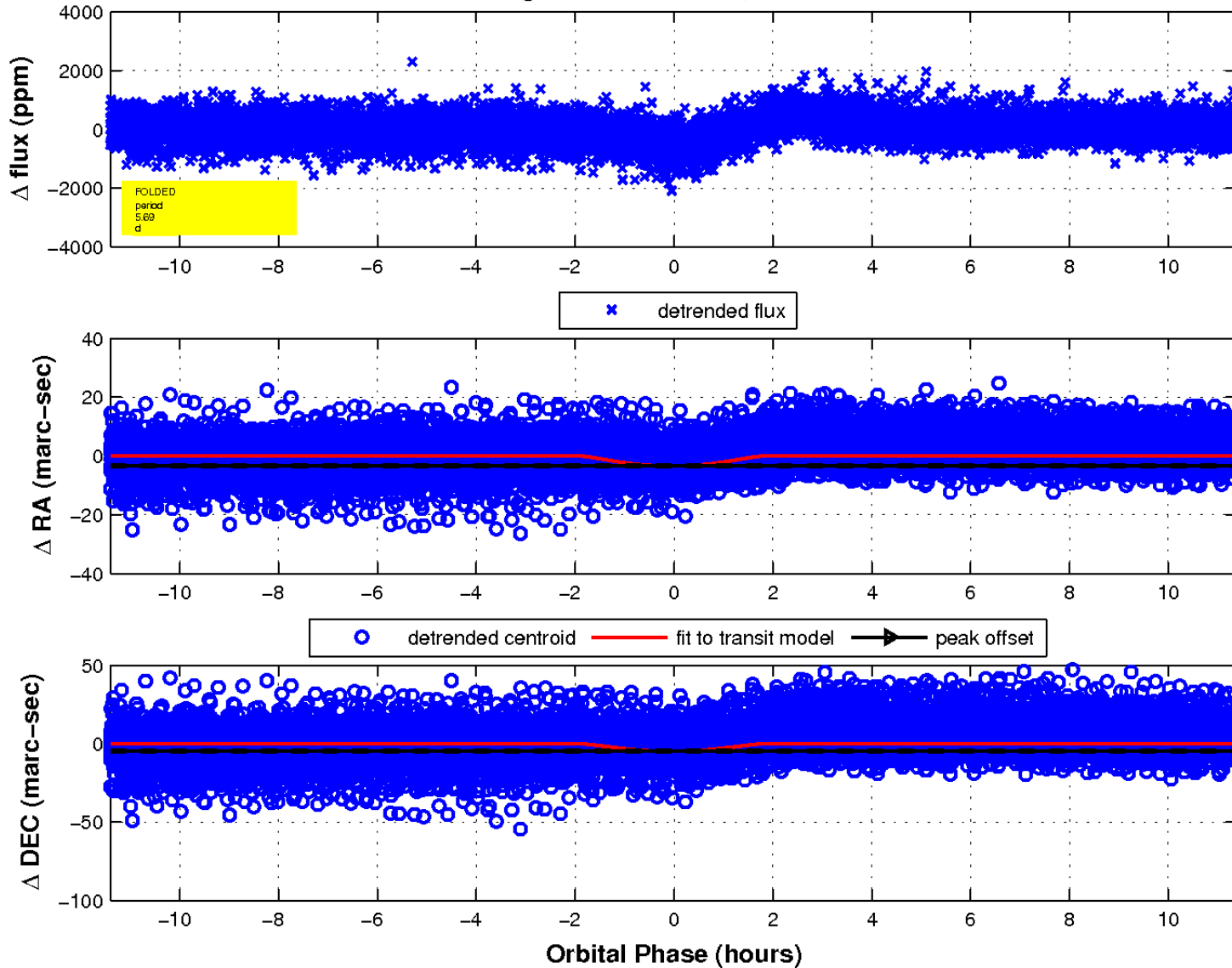
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

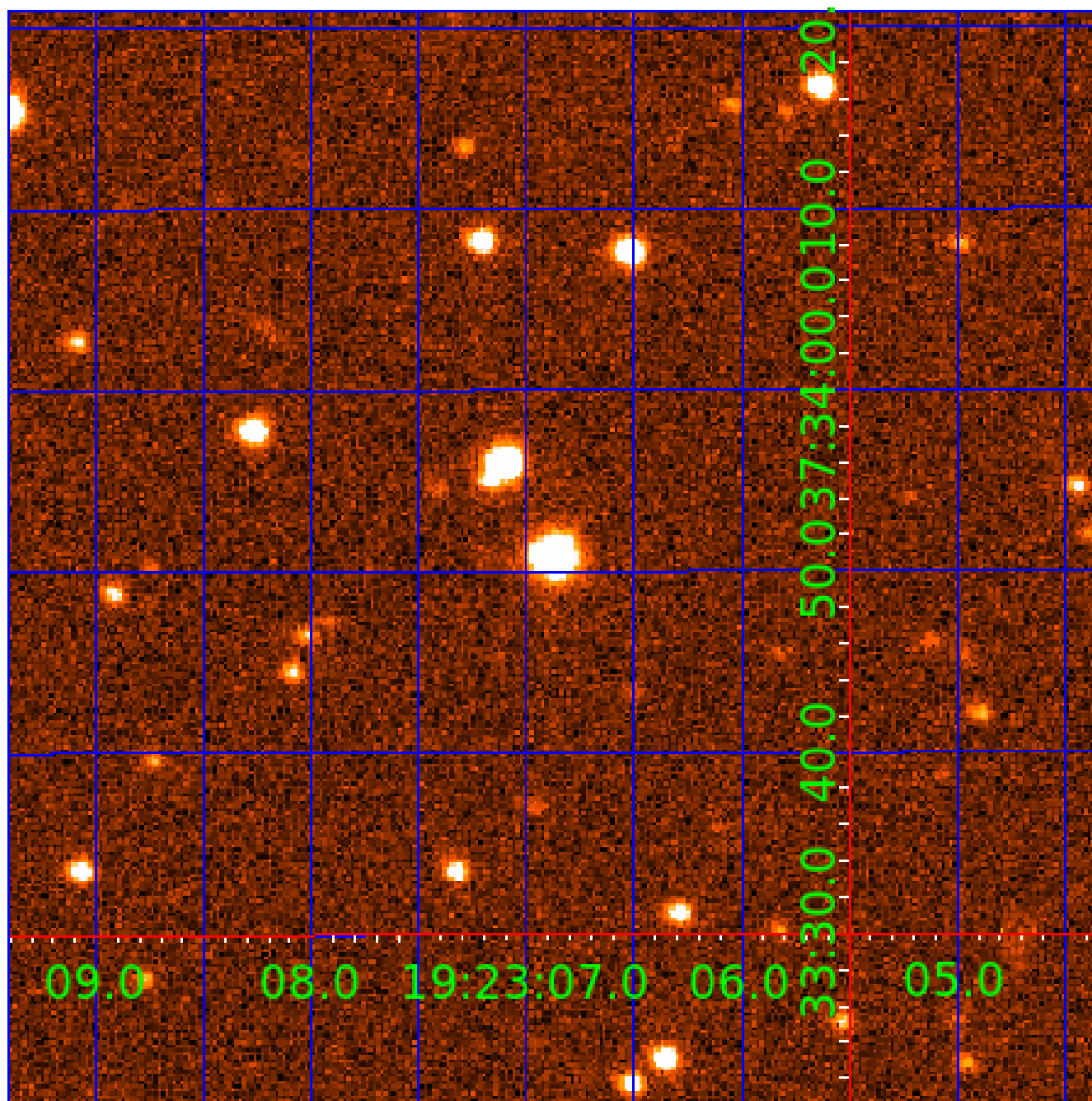


fluxWeightedCentroids, Planet 2 of 4



UKIRT Image

Declination



KIC 002157247

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})
002157247-01	OBS	No	5.686358	132.769285	439.3	3.812	28.3	30.1	0.96	6052	3.01	298.09
002157247-02	OBS	No	5.686330	133.295408	443.1	3.800	30.6	30.6	0.96	6052	3.15	298.09
002157247-03	OBS	No	5.686249	132.802809	53.9	12.783	9.4	1.9	0.96	6052	0.82	298.10
002157247-04	OBS	No	2.843025	133.742883	47.2	14.771	8.5	7.5	0.96	6052	0.75	751.20

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002157247-01	OBS	FP	0.00	1	0	1	0	LPP_DV—CENT_UNRESOLVED_OFFSET
002157247-02	OBS	FP	0.00	1	0	1	0	LPP_DV—LPP_ALT—SAME_NTL_PERIOD—CENT_UNRESOLVED_OFFSET
002157247-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—SAME_NTL_PERIOD—CENT_UNRESOLVED_OFFSET
002157247-04	OBS	FP	0.00	1	0	1	0	SWEET_NTL—LPP_DV—MOD_NONUNIQ_DV—SAME_NTL_PERIOD—CENT_UNRESOLVED_OFFSET

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.

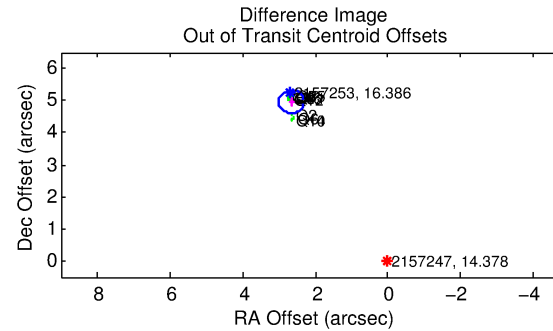
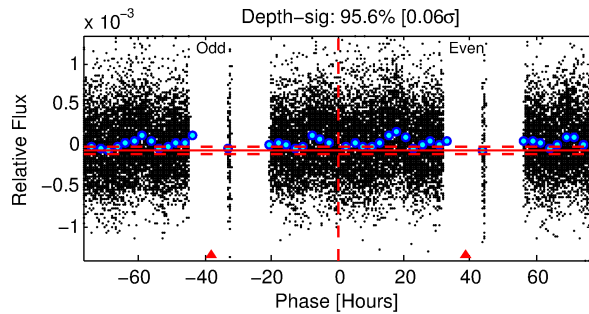
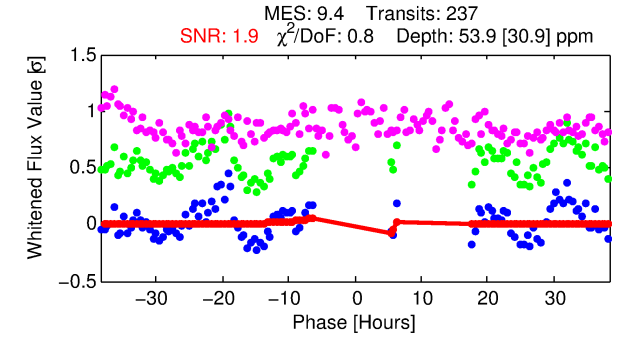
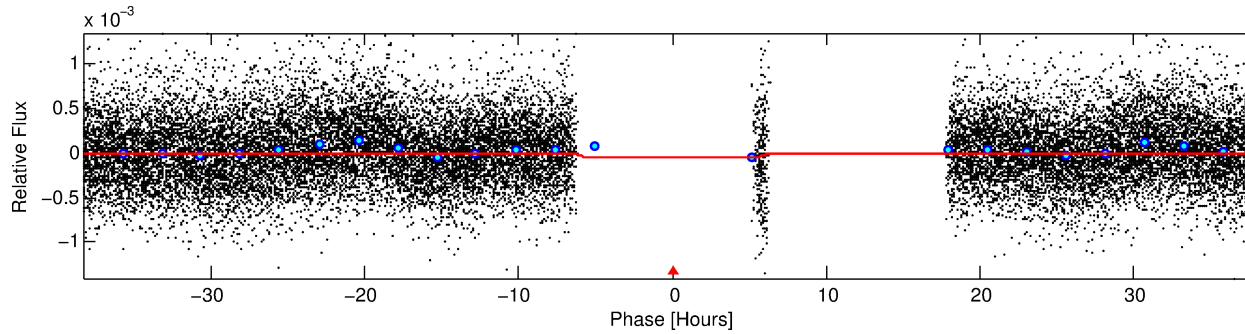
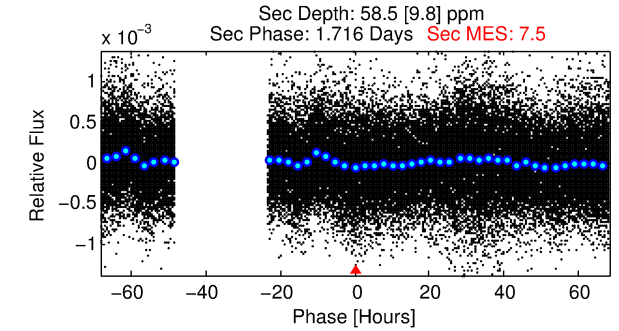
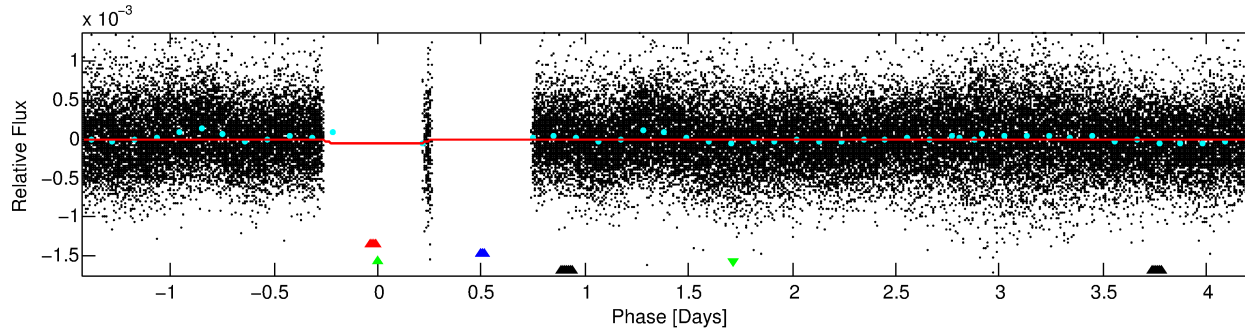
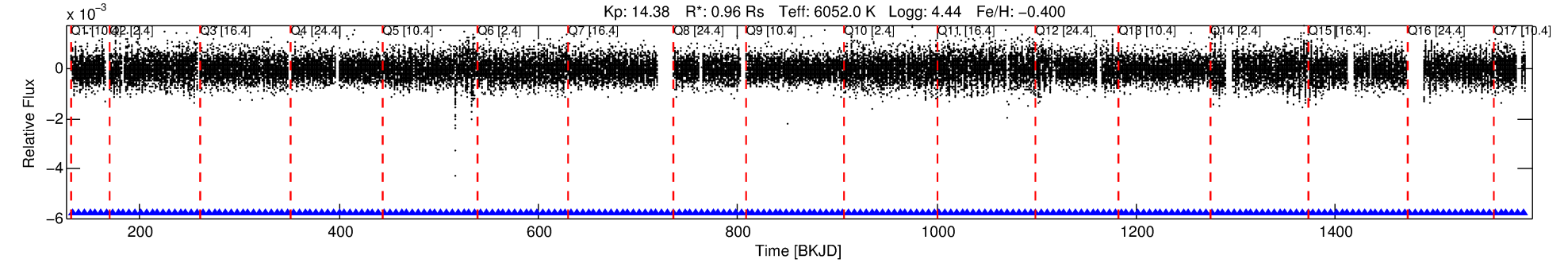
Ephemeris Match Information For 002157247-03

No Significant Match Found

DV One-Page Summary

KIC: 2157247 Candidate: 3 of 4 Period: 5.686 d

KOI: K00997 Corr: No Ephemeris Match



DV Fit Results:

Period = 5.68625 [0.00066] d
Epoch = 132.8028 [0.0842] BKJD
Rp/R* = 0.0079 [0.0052]
a/R* = 1.80 [3.80]
b = 0.90 [0.65]
Seff = 298.10 [110.75]
Teq = 1060 [98] K
Rp = 0.82 [0.59] Re
a = 0.0607 [0.0143] AU
Ag = 174.73 [239.22] [0.73σ]
Teffp = 5956 [1978] K [2.47σ]

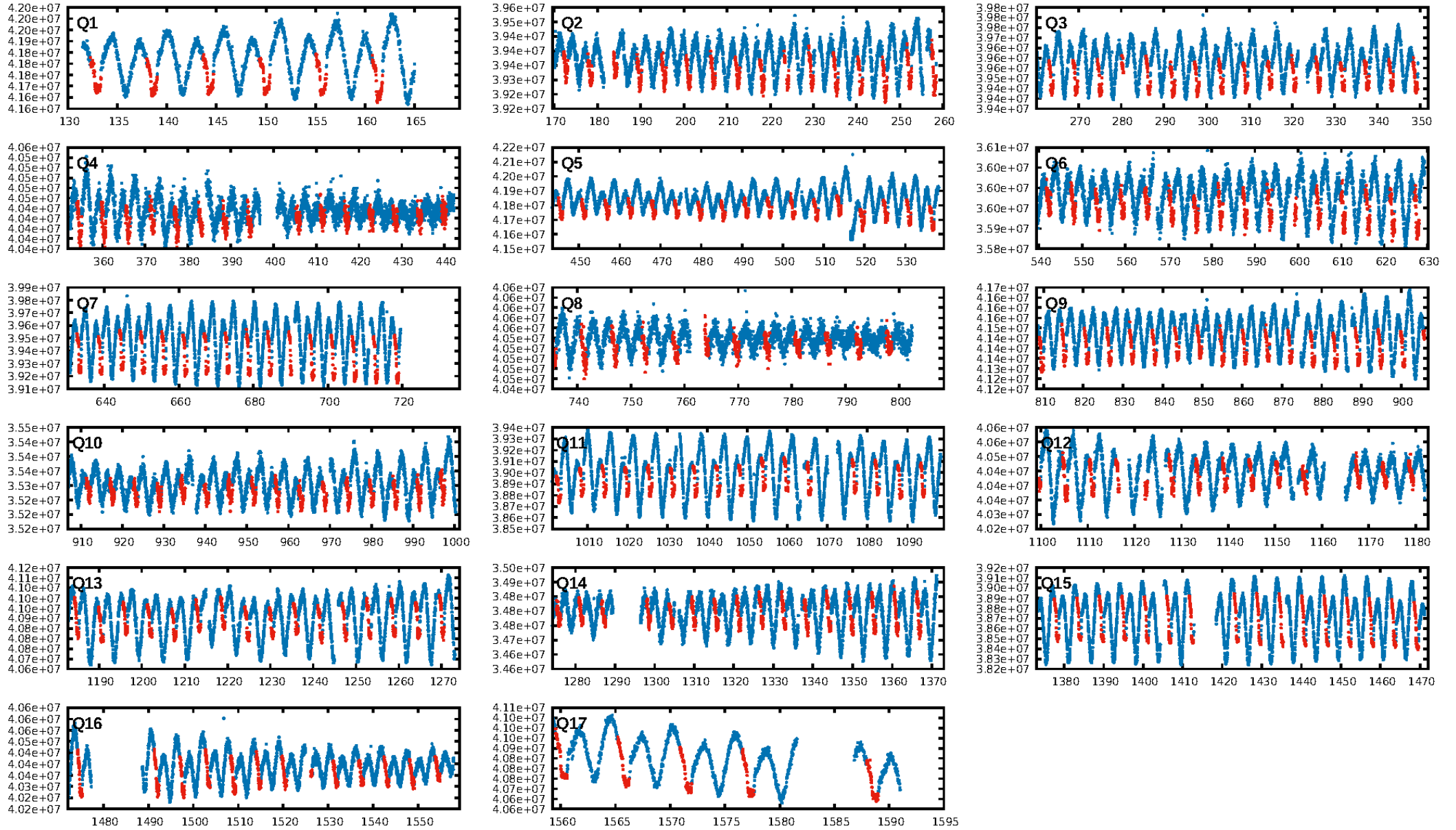
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [3.49σ]
LongPeriod-sig: 0.0% [0.00σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 2.79e-09
RollingBand-fgt: 1.00 [226/226]
GhostDiagnostic-chr: 3.01
Centroid-sig: 13.7%
Centroid-so: 7.178 arcsec [1.12σ]
OotOffset-rm: 5.625 arcsec [48.02σ]
KicOffset-rm: 5.914 arcsec [69.39σ]
OotOffset-st: 4/4/4/0 [12]
KicOffset-st: 4/4/4/0 [12]
DiffImageQuality-fgm: 1.00 [12/12]
DiffImageOverlap-fno: 0.00 [0/17]

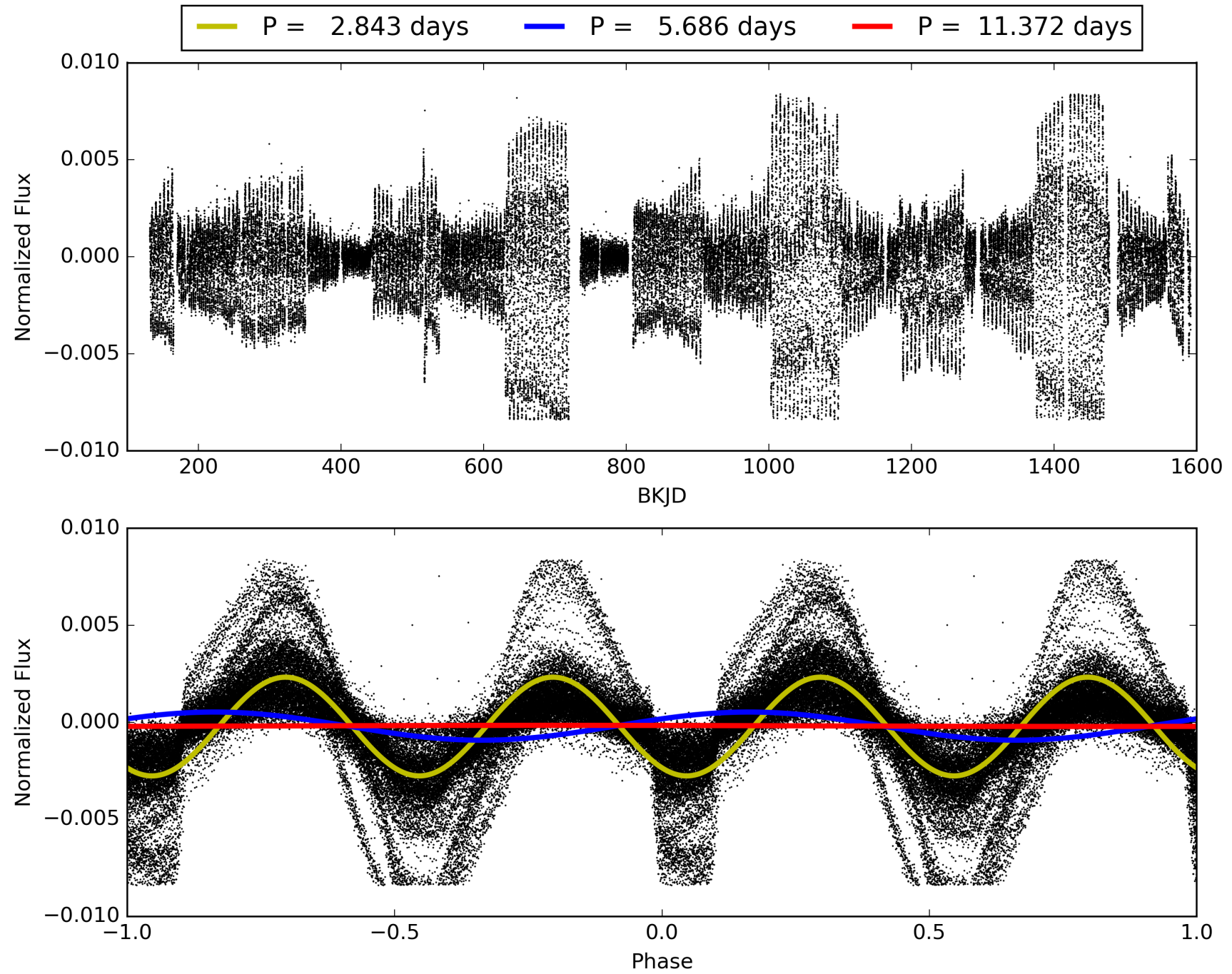
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 18:12:40 Z

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

TCE 002157247-03, PDC Light Curves

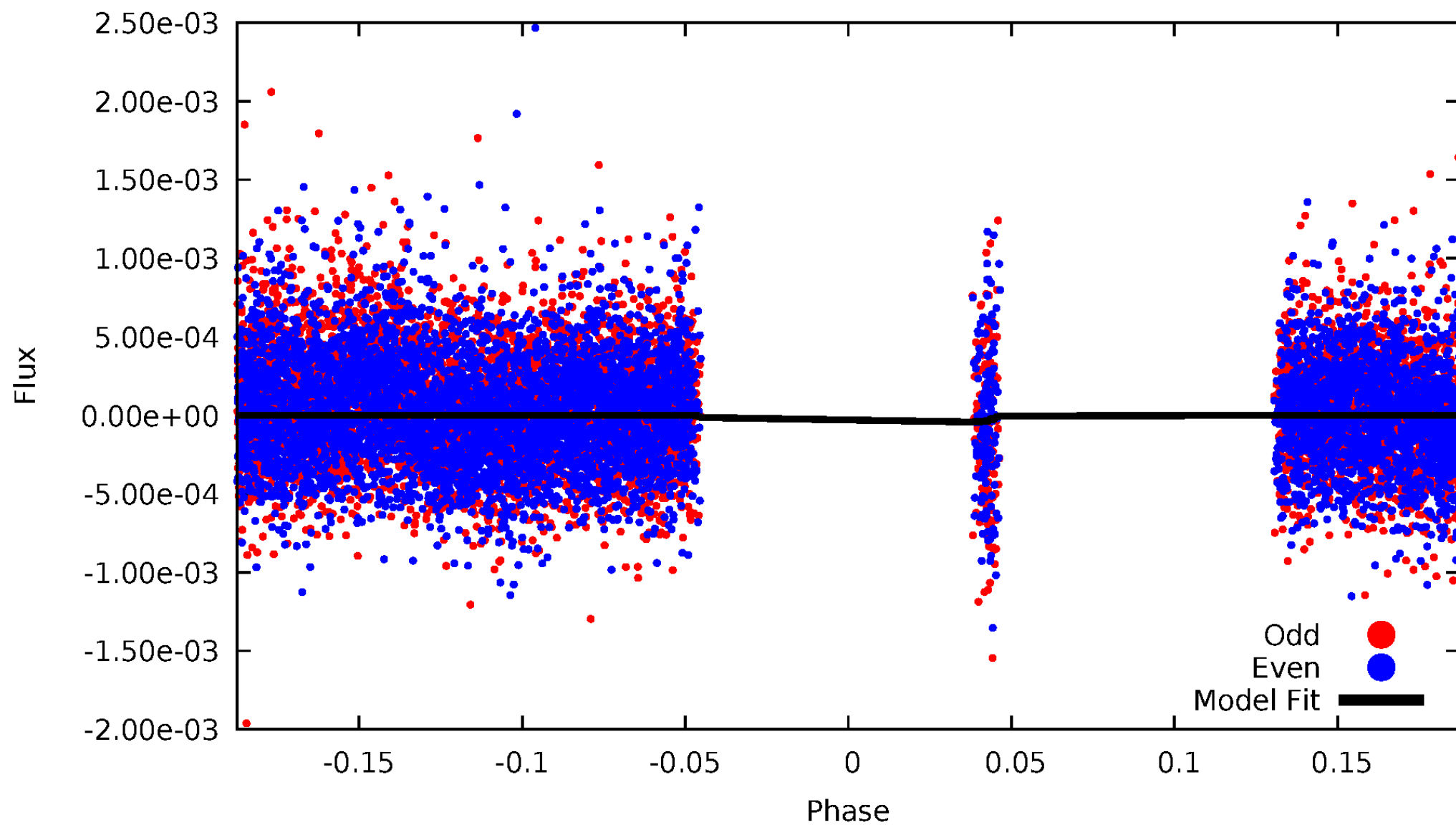


TCE 002157247-03



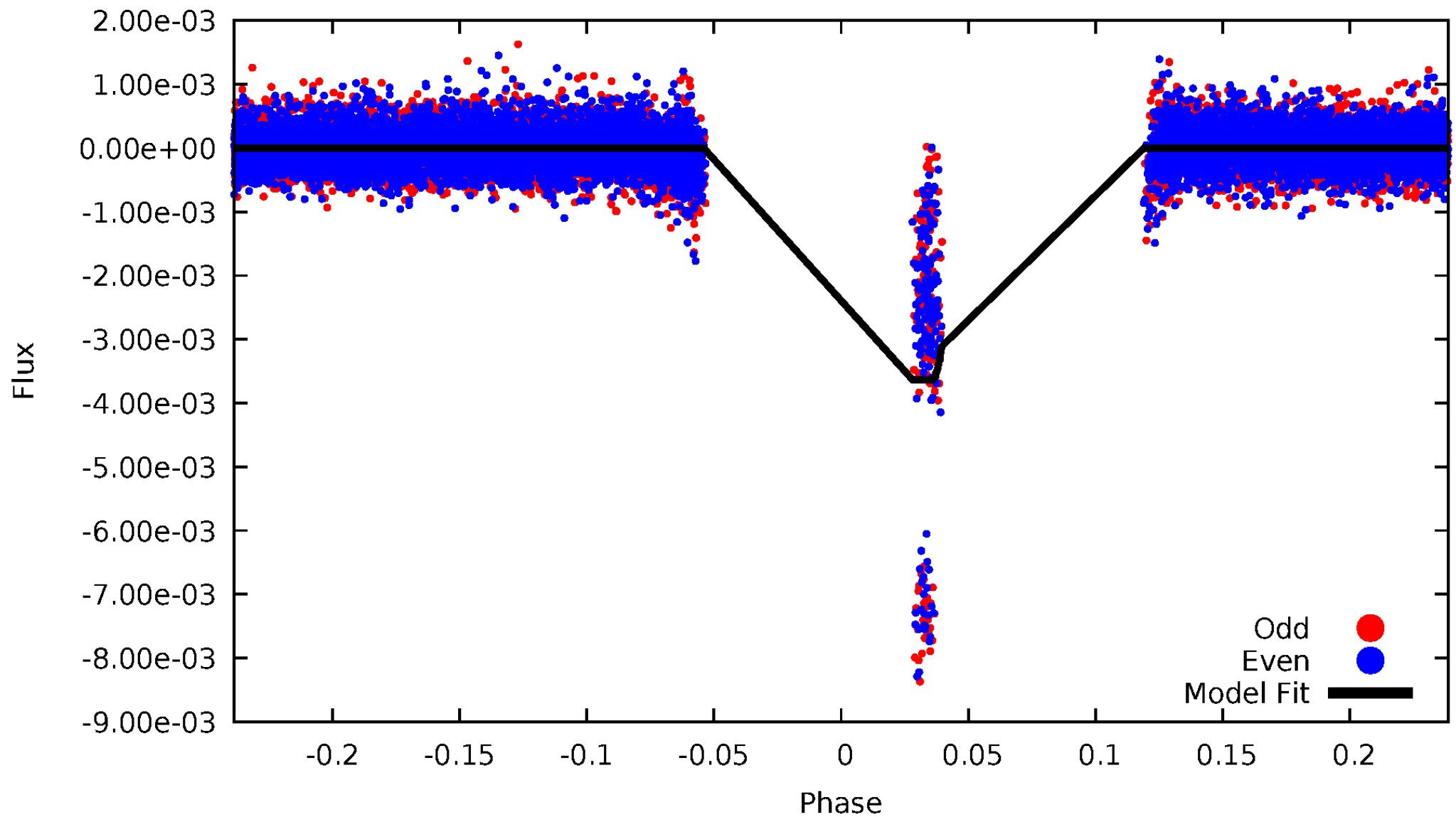
DV Odd/Even

TCE 002157247-03



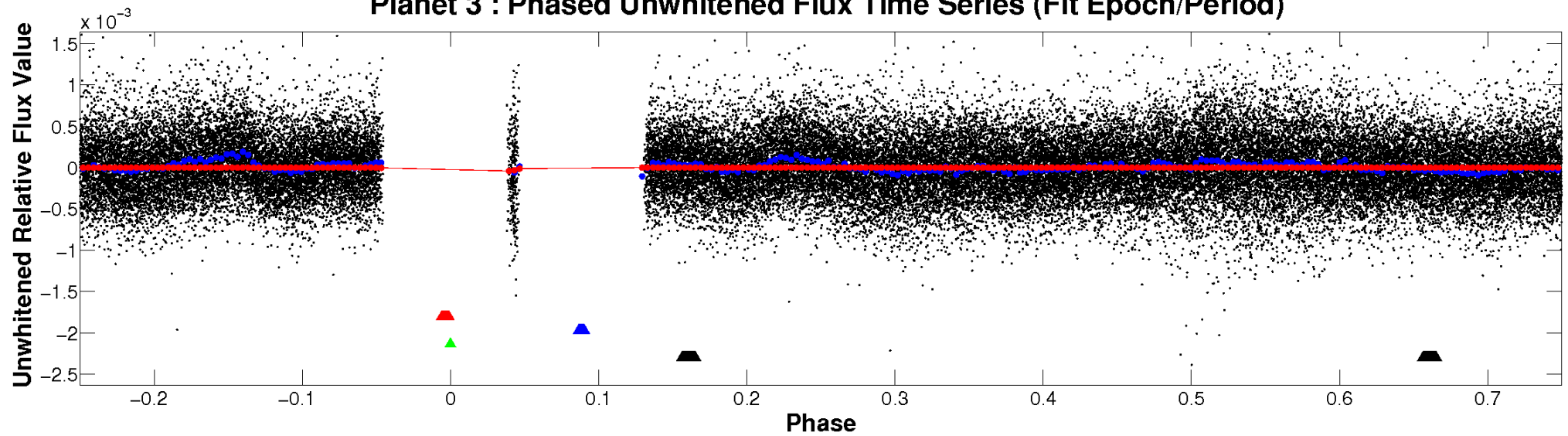
ALT Odd/Even

TCE 002157247-03

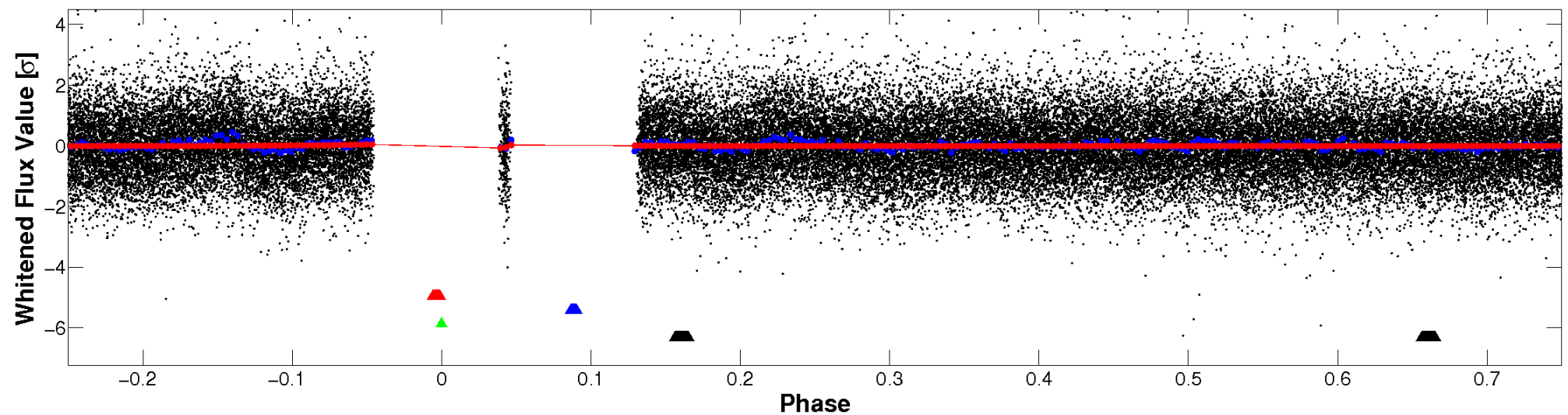


Non-Whitened Vs. Whitened Light Curve

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

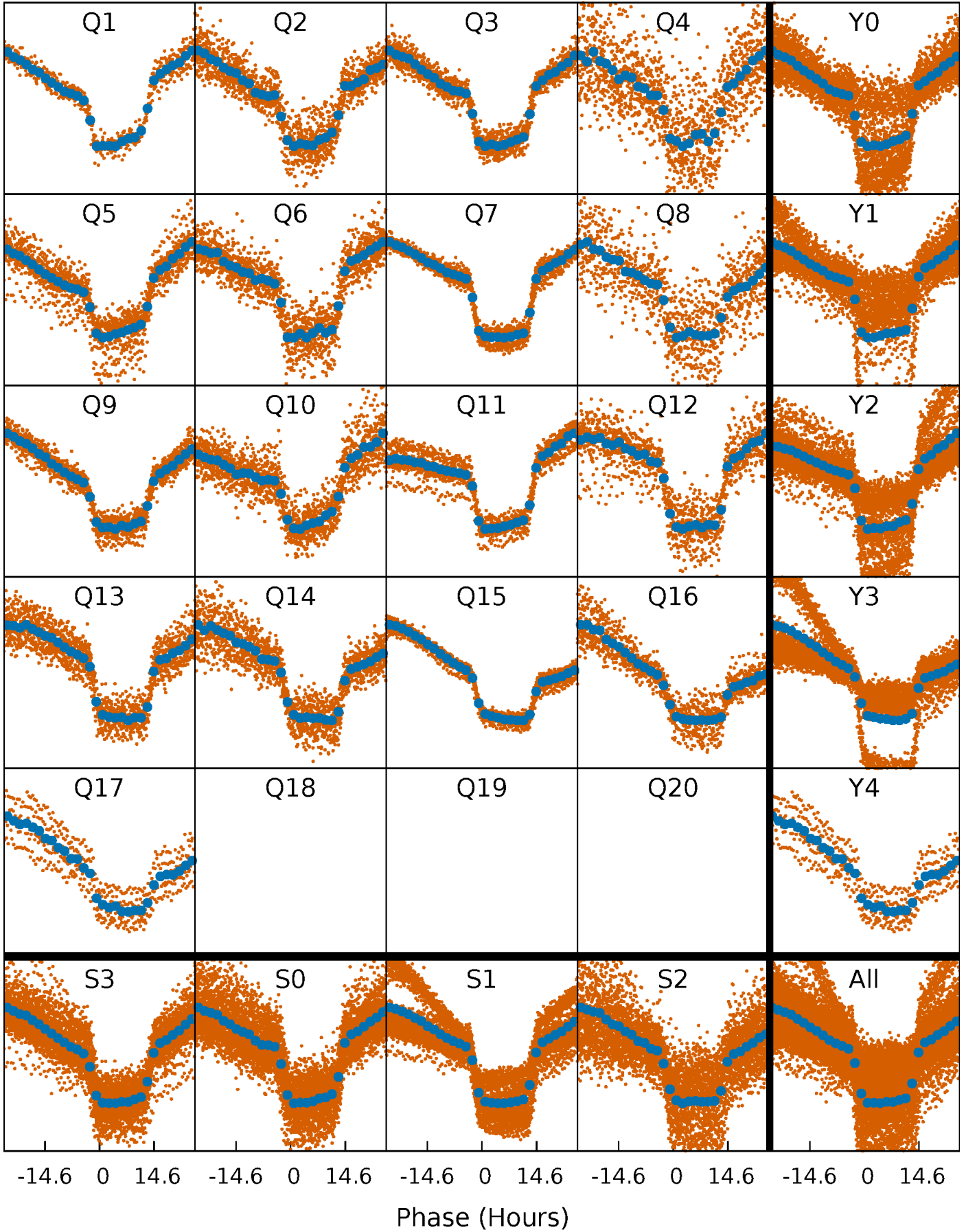


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



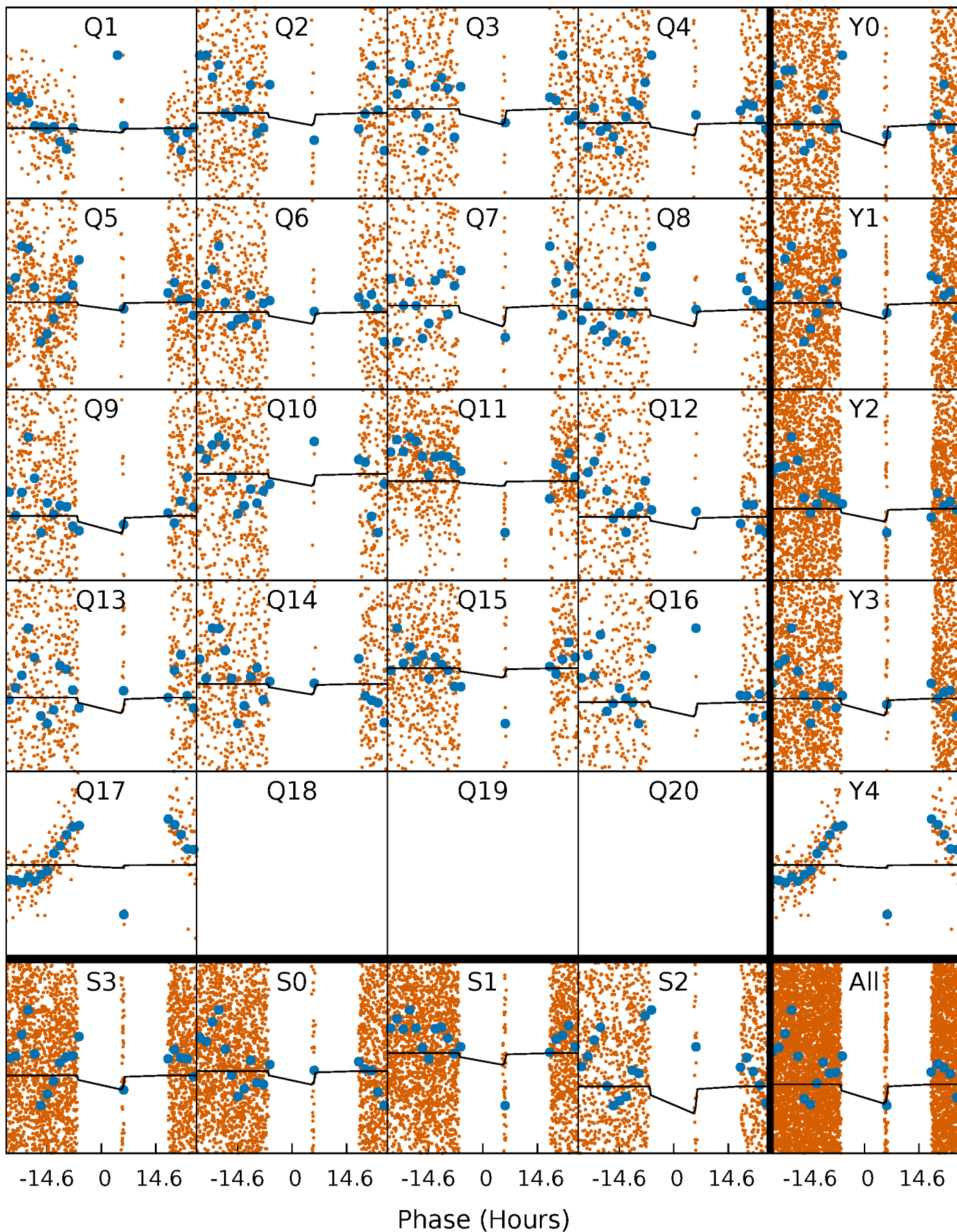
PDC Quarter-Phased Transit Curves

TCE 002157247-03 P= 5.686249 Days $T_0=132.802809$ (BKJD)



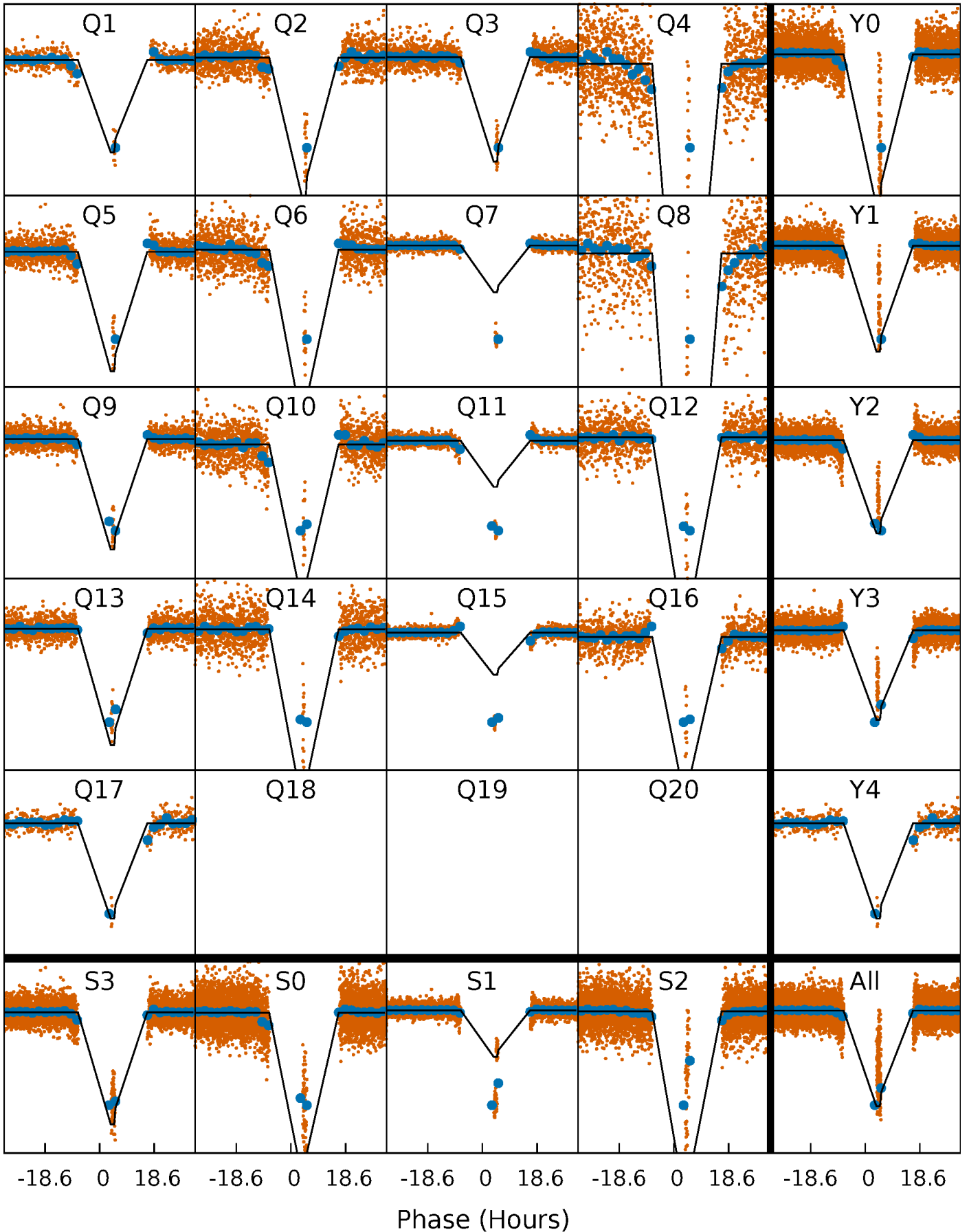
DV Quarter-Phased Transit Curves

TCE 002157247-03 P= 5.686249 Days $T_0=132.802809$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

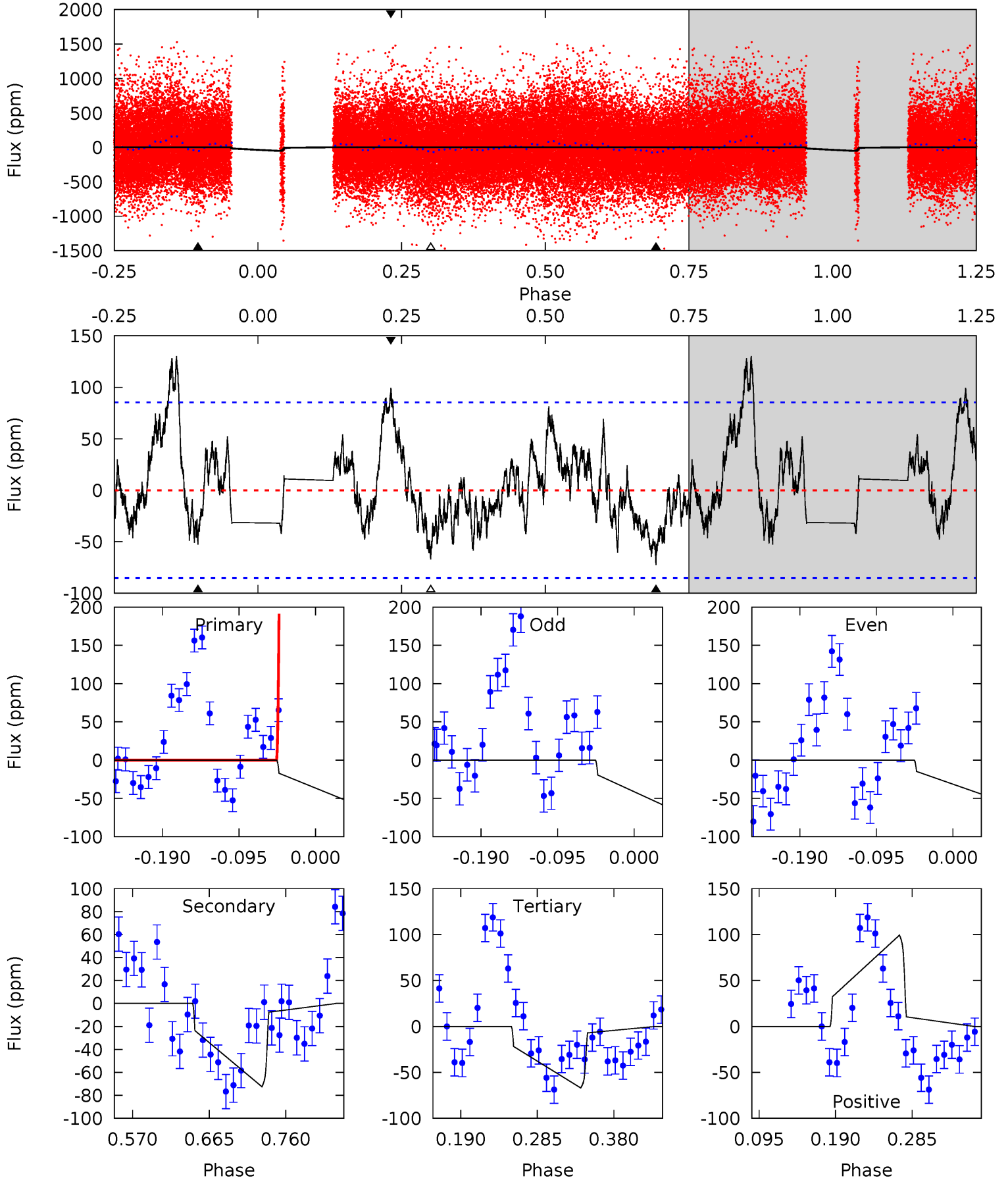
TCE 002157247-03 P= 5.686509 Days $T_0=132.820496$ (BKJD)



DV Model-Shift Uniqueness Test

002157247-03, P = 5.686249 Days, E = 127.116560 Days

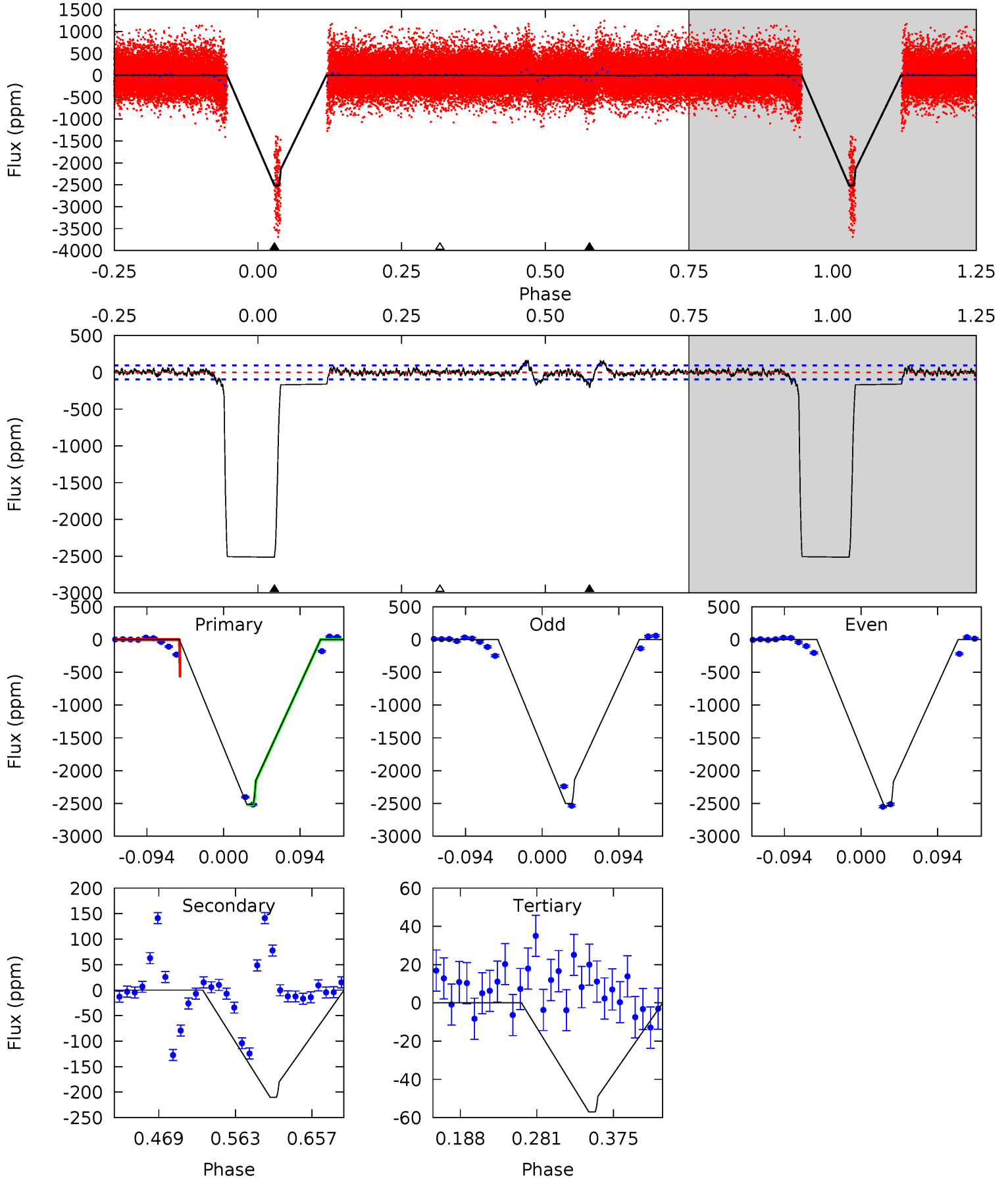
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2.83	3.89	3.59	5.33	4.58	1.67	1.75	-0.77	-2.50	0.30	-1.44	0.39	2.15	0.64	3.17



Alt Model-Shift Uniqueness Test

002157247-03, P = 5.686509 Days, E = 127.133987 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
121.5	10.2	2.76	0	4.58	1.68	1.33	118.7	121.5	7.40	10.2	0.96	1.13	0.06	23.2



Stellar Parameters For KIC 002157247

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6052^{+164}_{-183}	$4.442^{+0.084}_{-0.196}$	$-0.400^{+0.300}_{-0.300}$	$0.956^{+0.260}_{-0.120}$	$0.923^{+0.119}_{-0.097}$	$1.488^{+0.662}_{-0.742}$
	+3%/-3%	+2%/-4%	+75%/-75%	+27%/-13%	+13%/-11%	+44%/-50%
Source	PHO1	KIC0	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 002157247-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-73 ± 19	$0.88^{+0.59}_{-0.48}$	1502^{+99}_{-73}	6074^{+3790}_{-1246}	179^{+765}_{-117}
Alt.	-210 ± 21	$6.52^{+1.05}_{-0.87}$	1506^{+100}_{-79}	3447^{+140}_{-124}	$9.946^{+3.143}_{-2.528}$

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

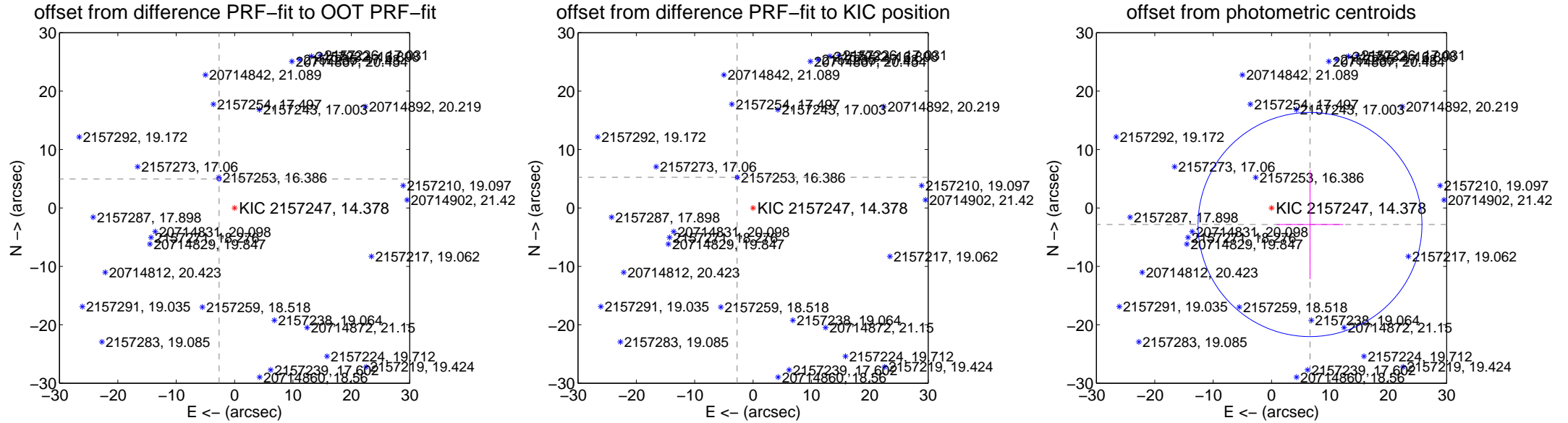
DV Centroid Data

Supplemental centroid analysis for 002157247-03. Kepler magnitude: 14.38. Transit SNR 1.95

There are 12 quarters with good PRF difference image offsets

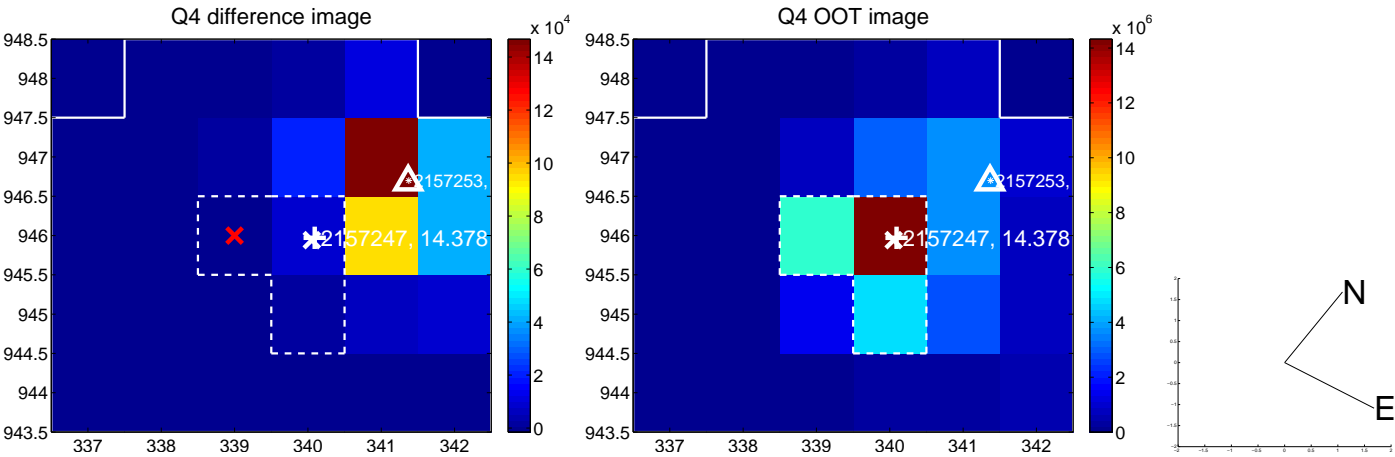
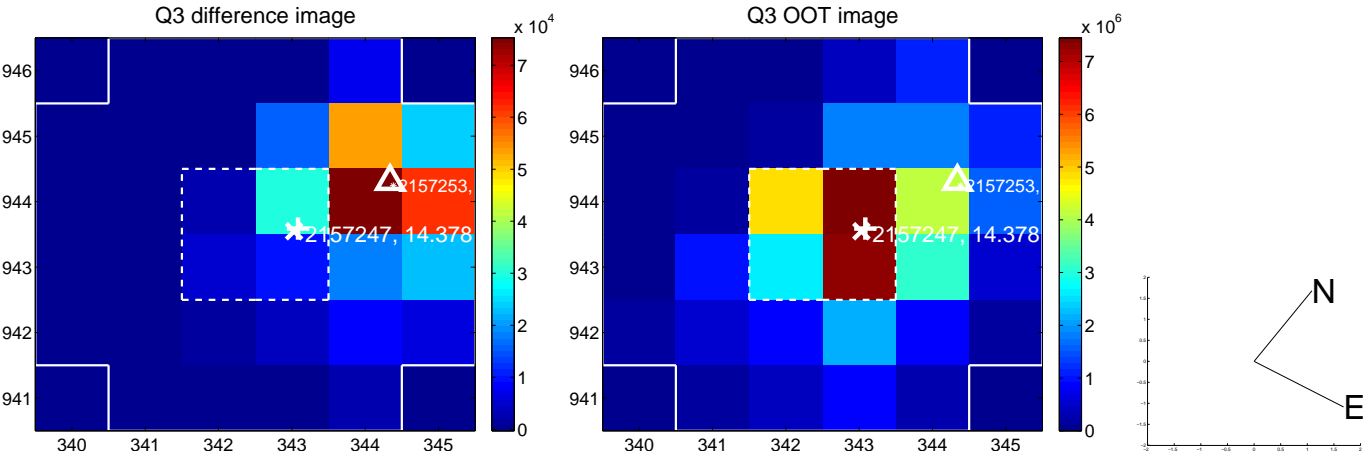
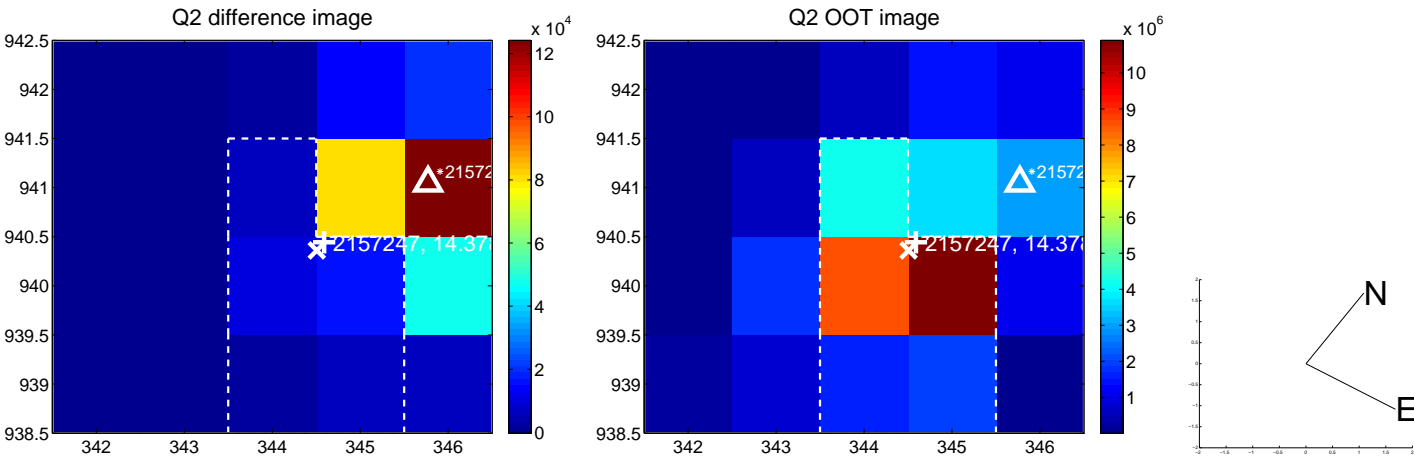
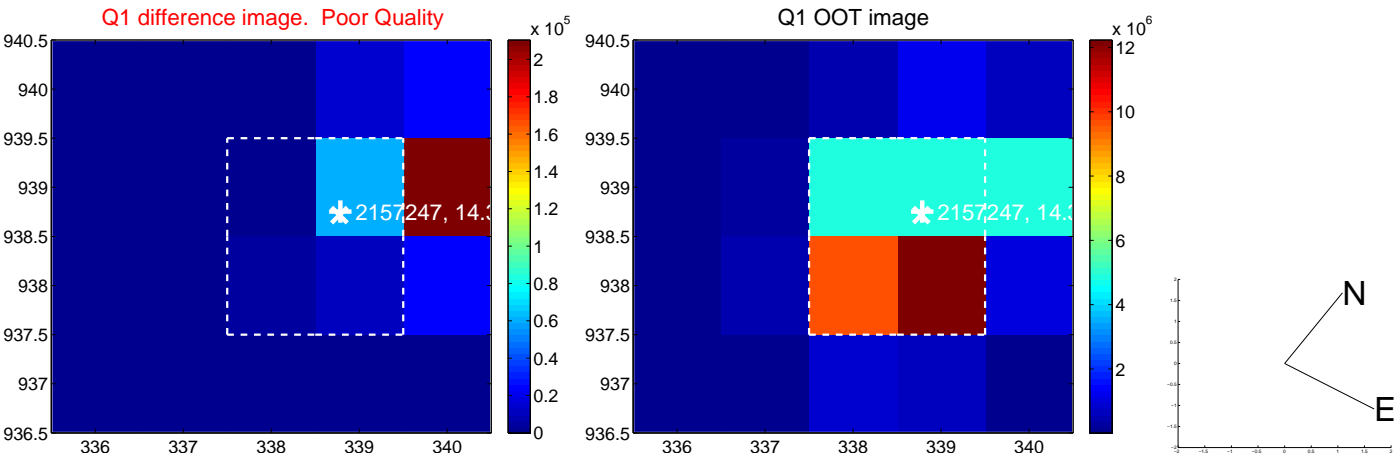
The direct PRF centroid is offset from the target star catalog position by about 0.23 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	5.625 \pm 0.117	48.02	2.652 \pm 0.068	4.961 \pm 0.124
PRF-fit source offset from KIC position	5.914 \pm 0.085	69.39	2.731 \pm 0.068	5.245 \pm 0.089
photometric centroid source offset	7.18 \pm 6.39	1.12	-6.59 \pm 5.68	-2.84 \pm 9.34

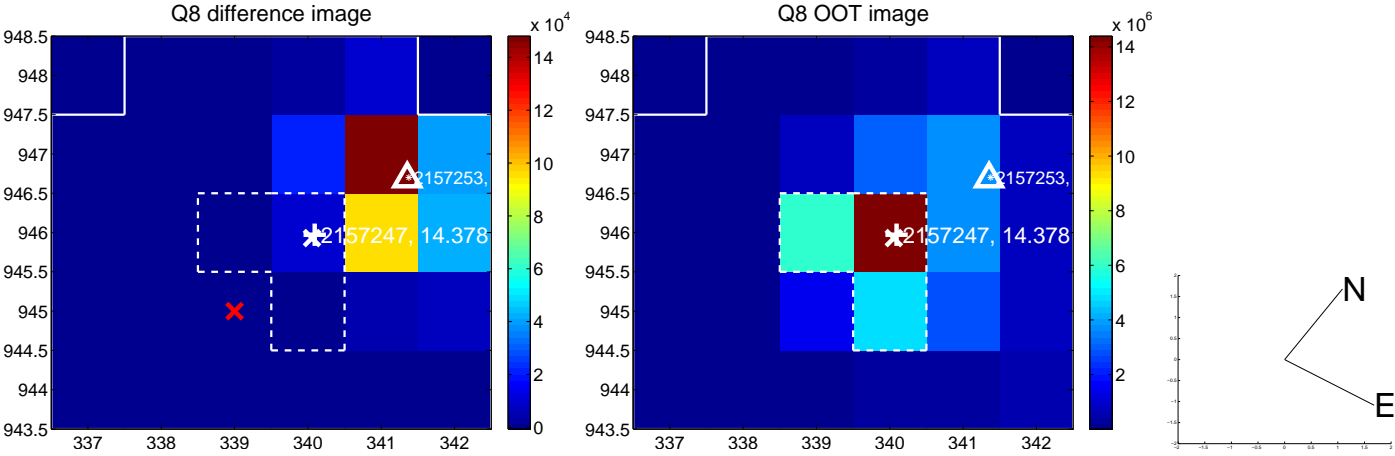
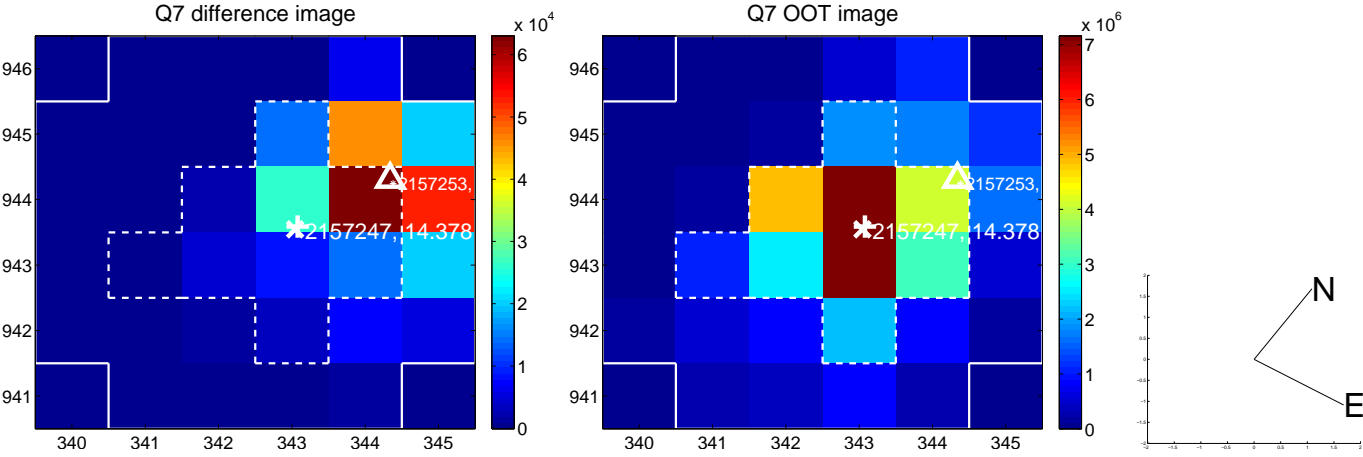
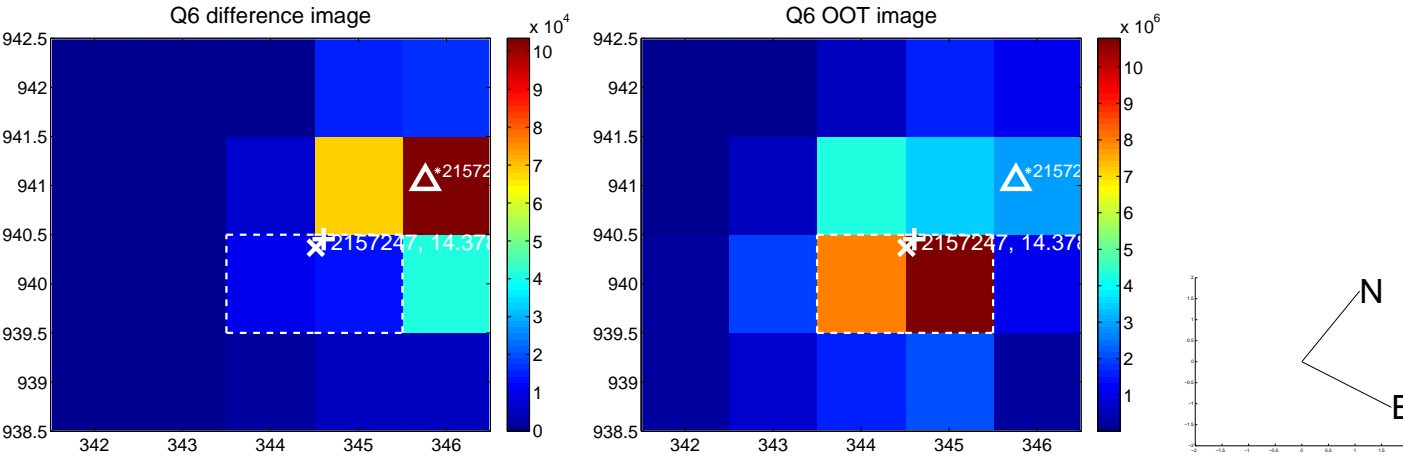
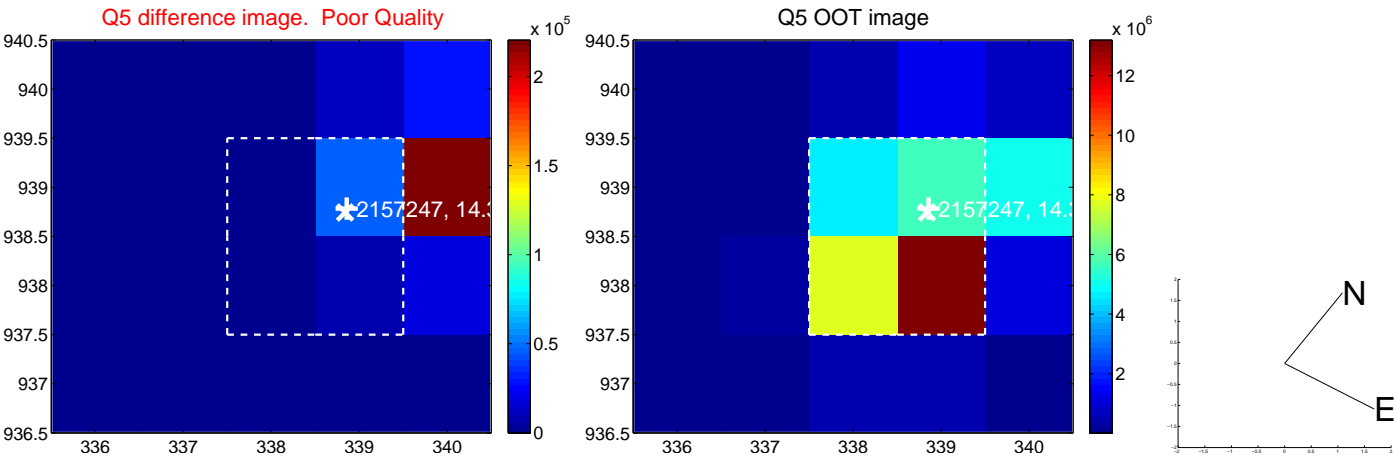


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

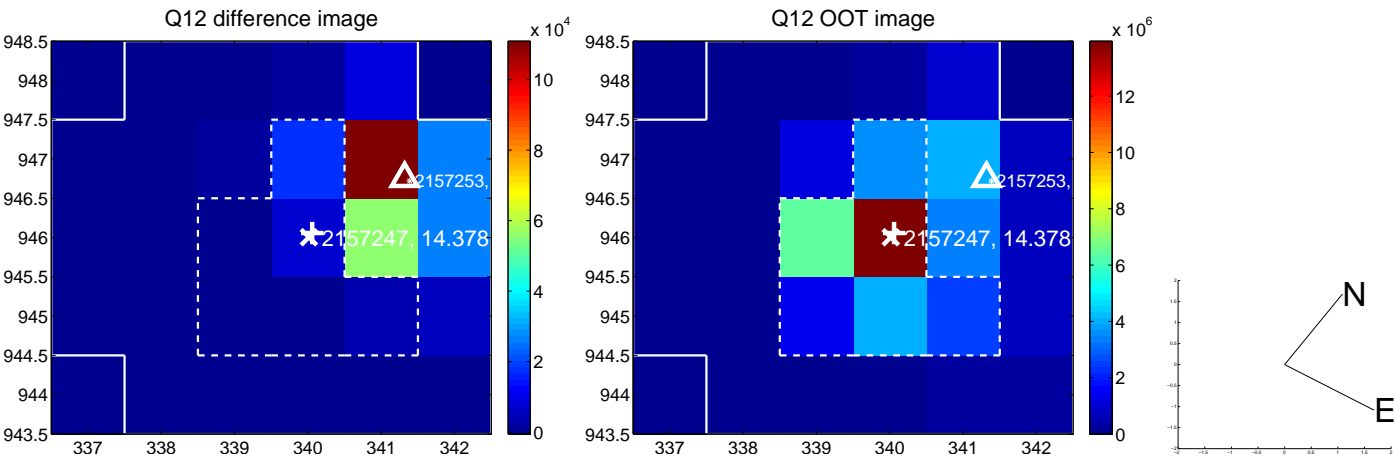
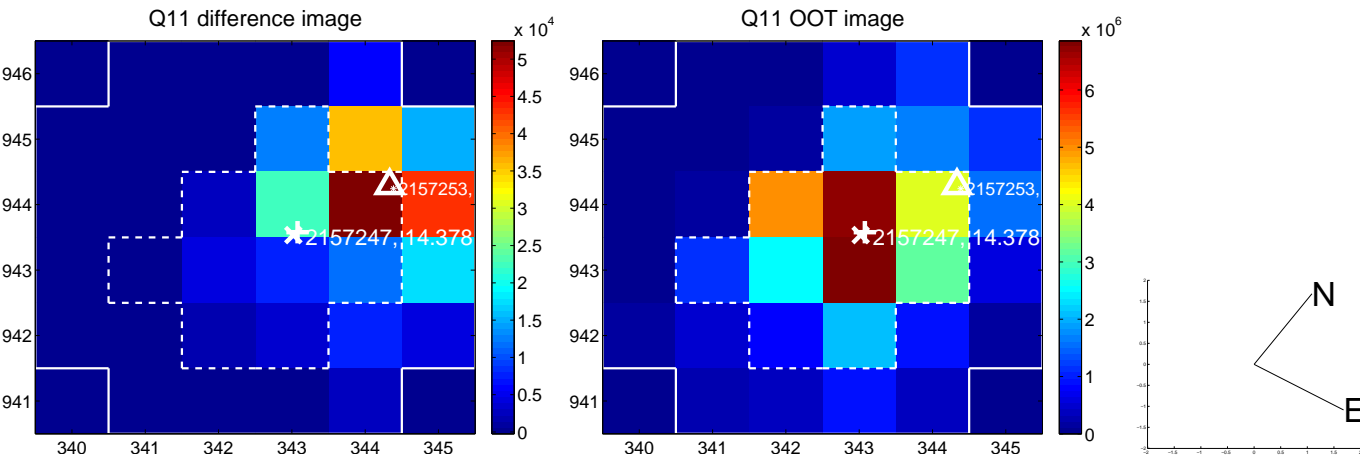
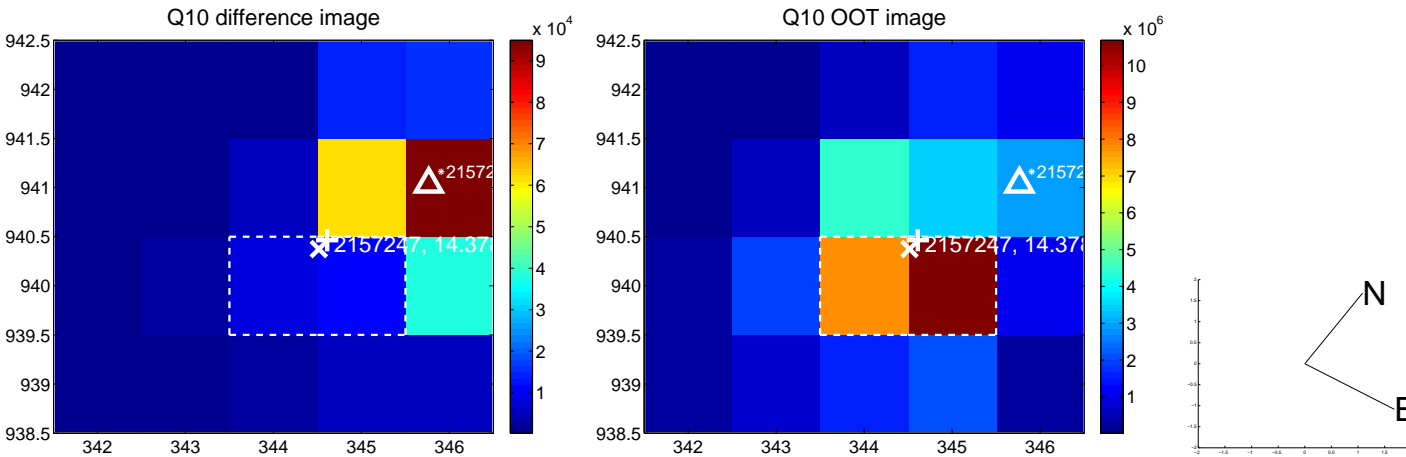
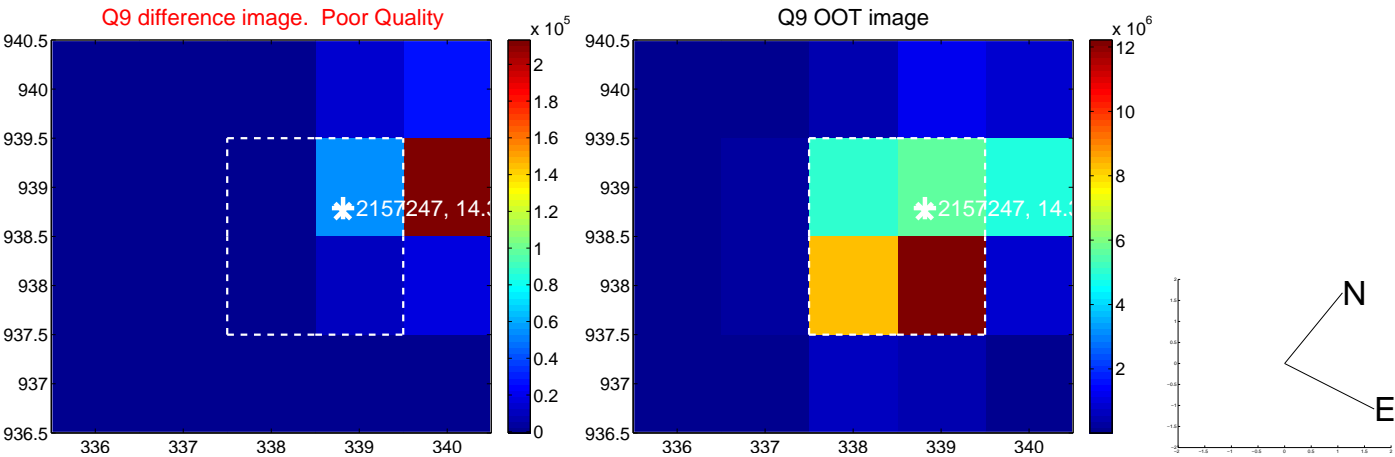
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



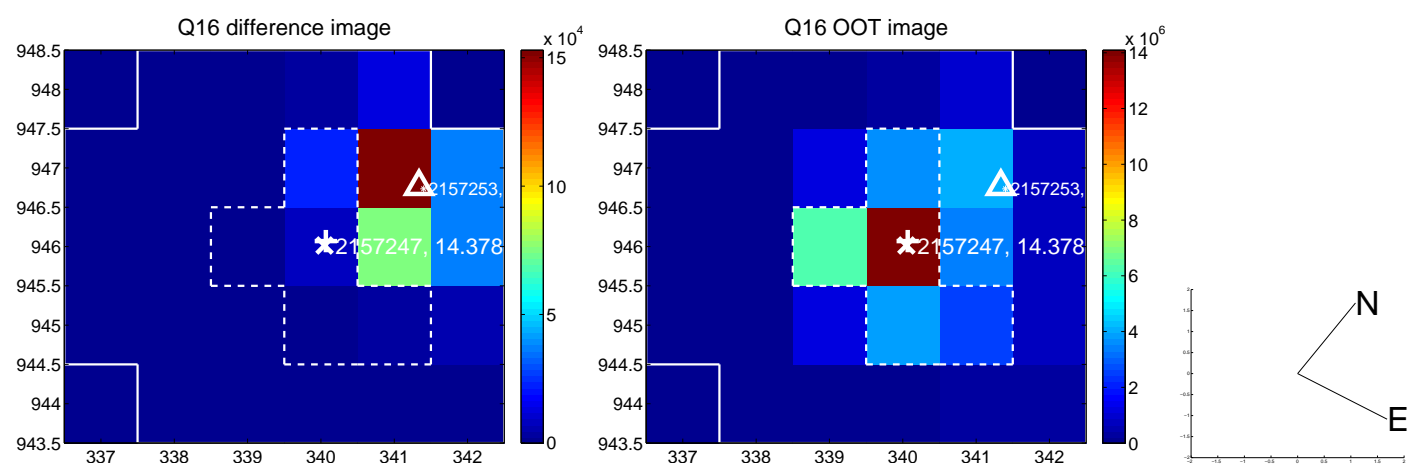
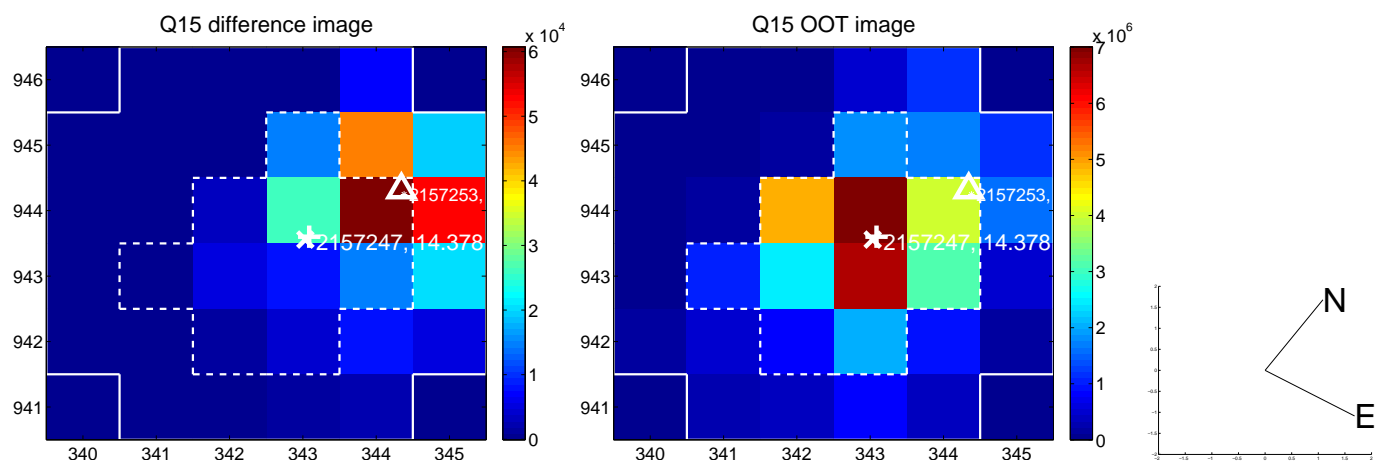
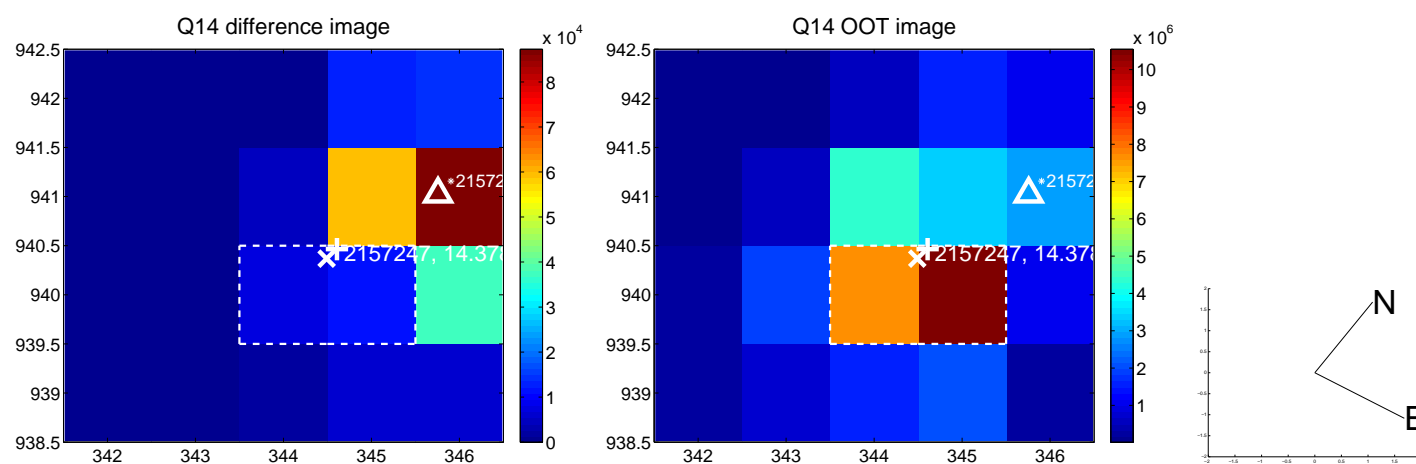
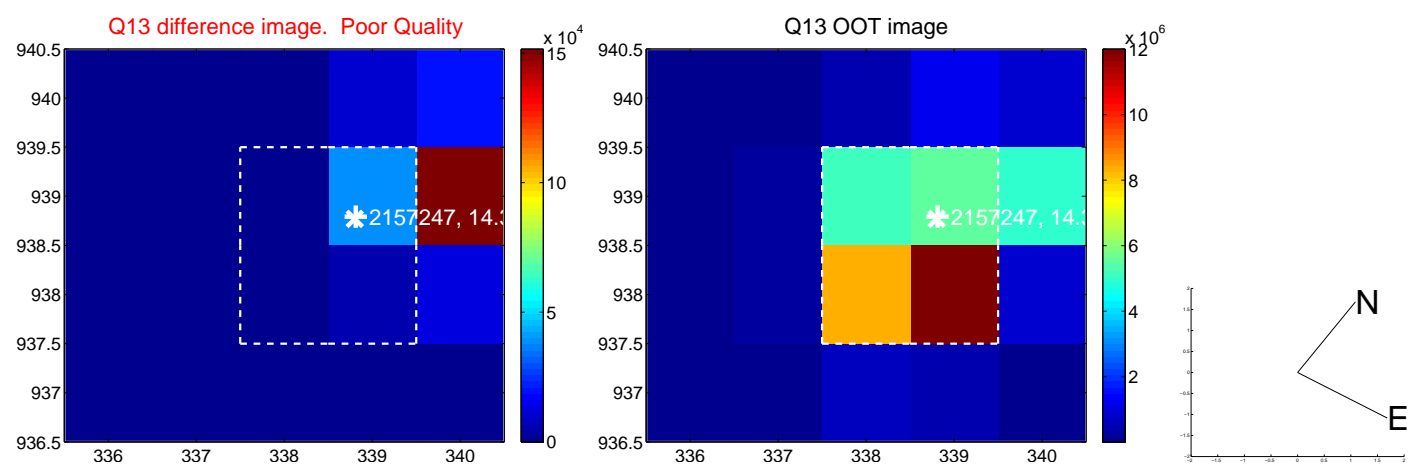
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



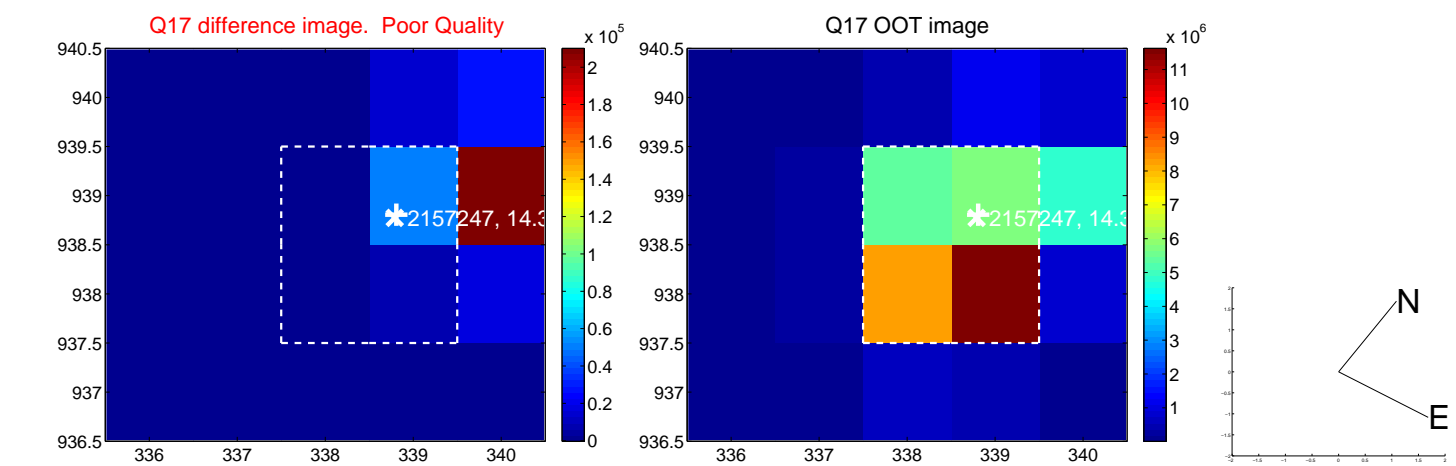
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



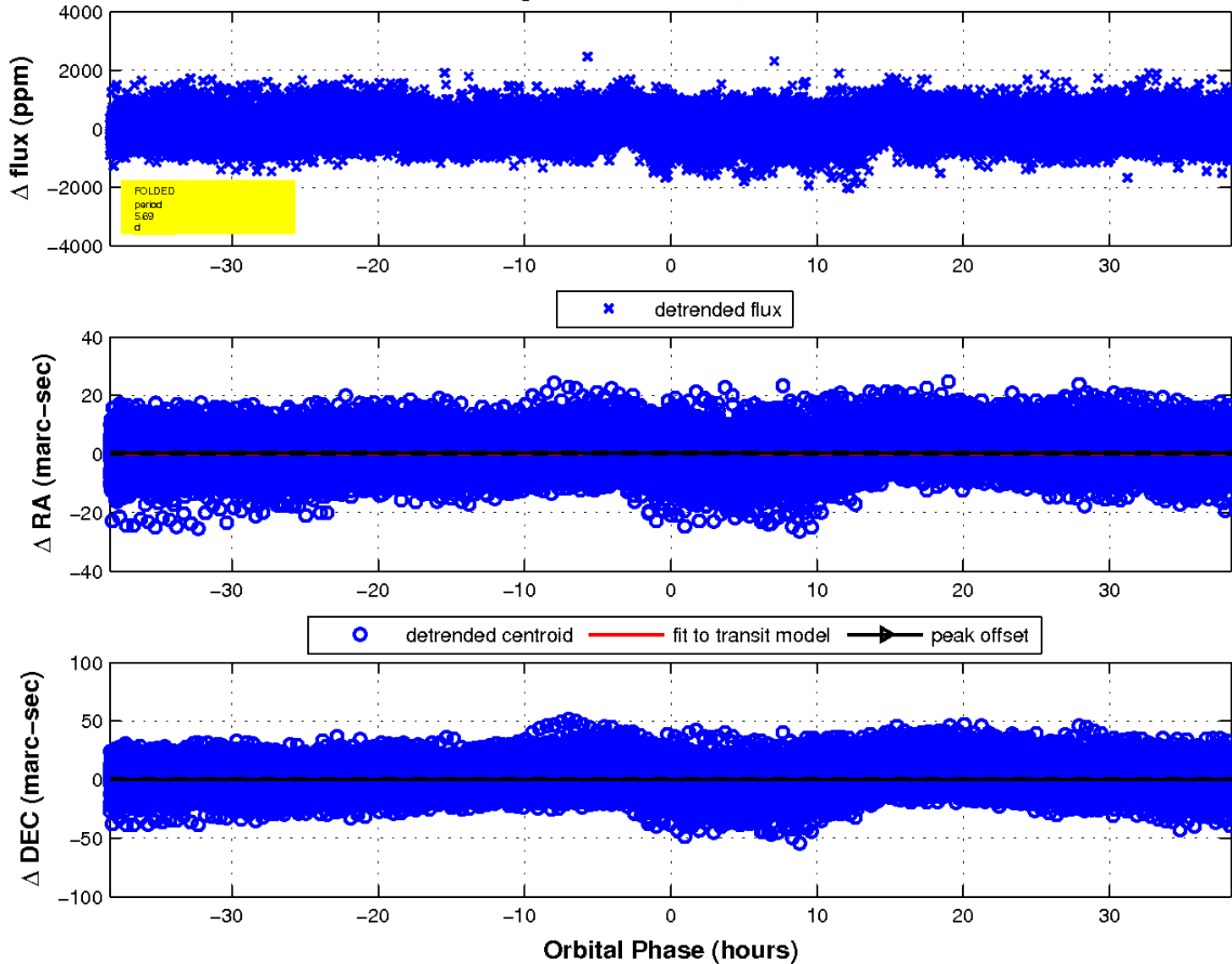
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

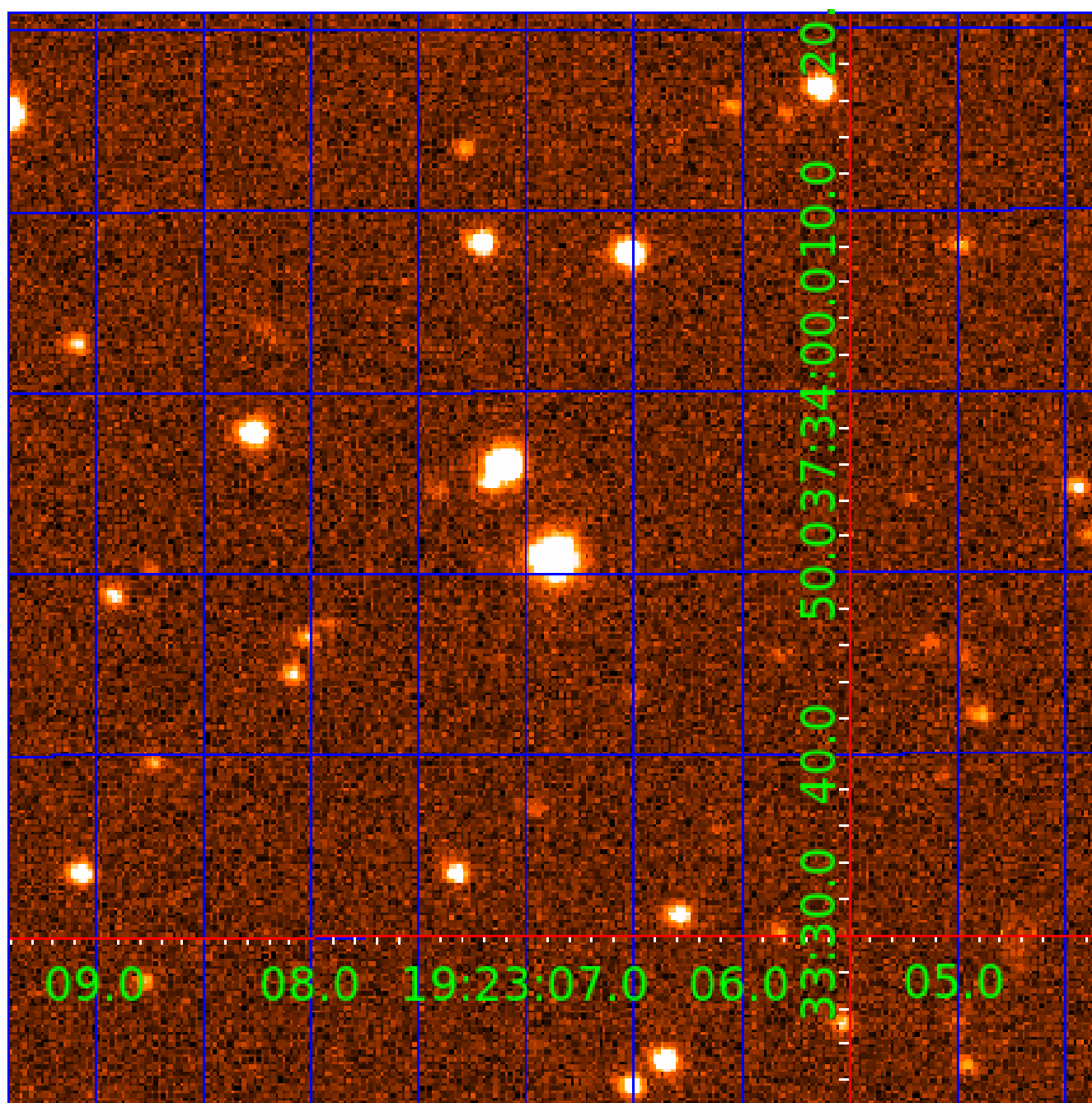


fluxWeightedCentroids, Planet 3 of 4



UKIRT Image

Declination



KIC 002157247

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})
002157247-01	OBS	No	5.686358	132.769285	439.3	3.812	28.3	30.1	0.96	6052	3.01	298.09
002157247-02	OBS	No	5.686330	133.295408	443.1	3.800	30.6	30.6	0.96	6052	3.15	298.09
002157247-03	OBS	No	5.686249	132.802809	53.9	12.783	9.4	1.9	0.96	6052	0.82	298.10
002157247-04	OBS	No	2.843025	133.742883	47.2	14.771	8.5	7.5	0.96	6052	0.75	751.20

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
002157247-01	OBS	FP	0.00	1	0	1	0	LPP_DV—CENT_UNRESOLVED_OFFSET
002157247-02	OBS	FP	0.00	1	0	1	0	LPP_DV—LPP_ALT—SAME_NTL_PERIOD—CENT_UNRESOLVED_OFFSET
002157247-03	OBS	FP	0.00	1	0	1	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA_TRACKER—LPP_DV—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—SAME_NTL_PERIOD—CENT_UNRESOLVED_OFFSET
002157247-04	OBS	FP	0.00	1	0	1	0	SWEET_NTL—LPP_DV—MOD_NONUNIQ_DV—SAME_NTL_PERIOD—CENT_UNRESOLVED_OFFSET

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 002157247-04

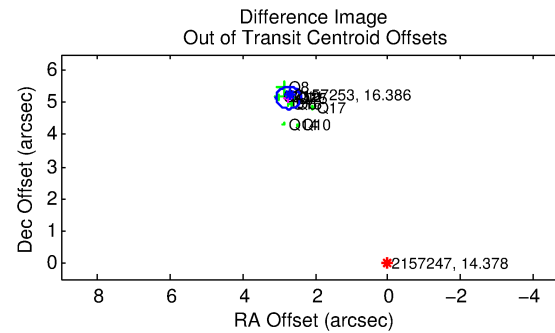
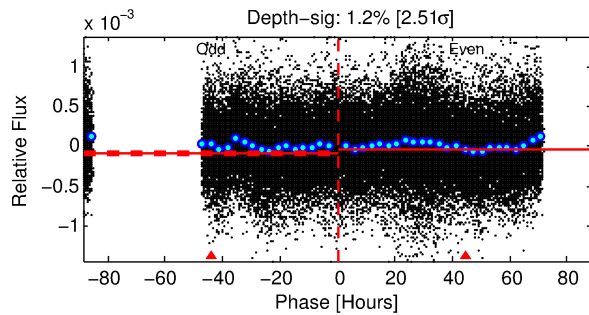
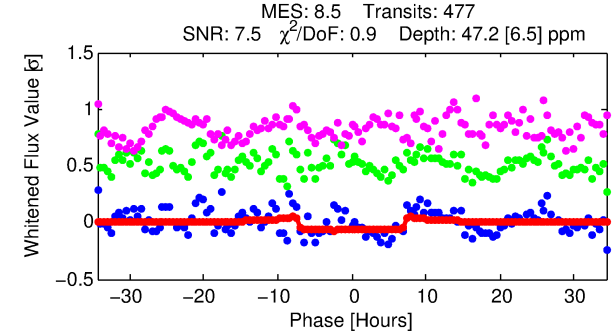
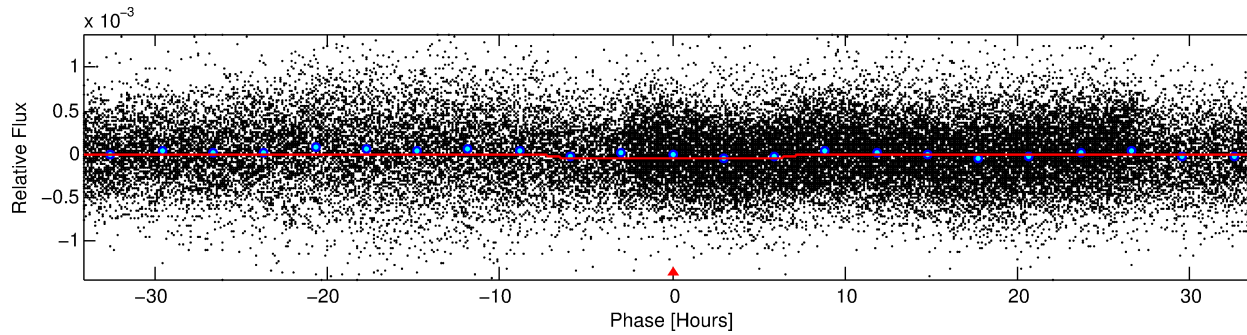
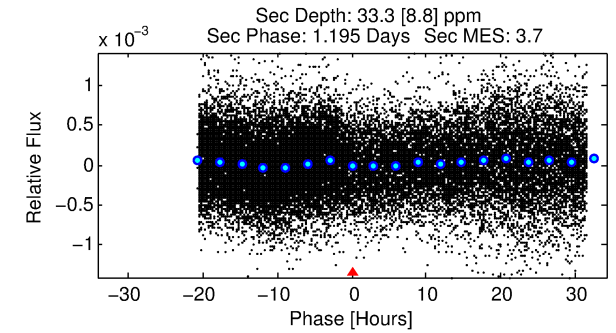
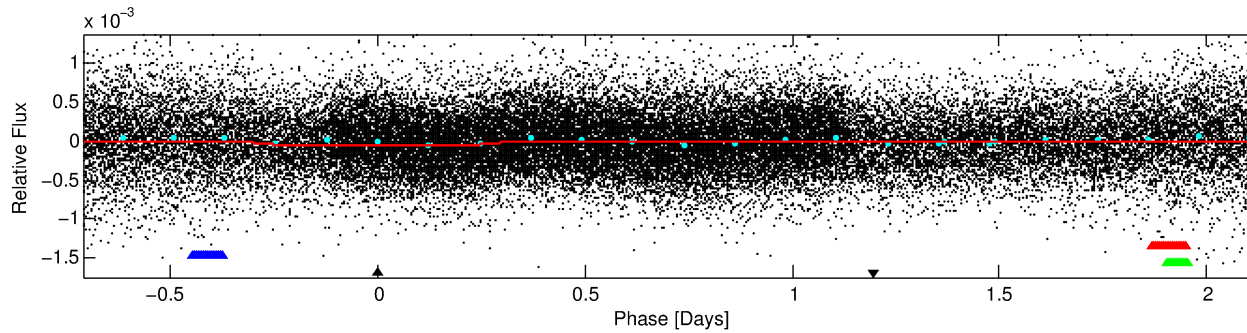
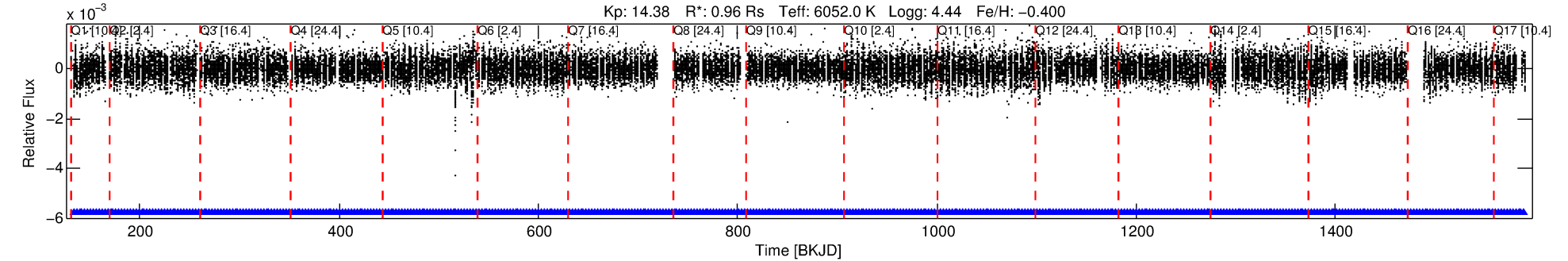
No Significant Match Found

DV One-Page Summary

KIC: 2157247 Candidate: 4 of 4 Period: 2.843 d

KOI: K00997 Corr: No Ephemeris Match

Kp: 14.38 R*: 0.96 Rs Teff: 6052.0 K Logg: 4.44 Fe/H: -0.400



DV Fit Results:

Period = 2.84302 [0.00005] d
Epoch = 133.7429 [0.0121] BKJD
Rp/R* = 0.0072 [0.0019]
a/R* = 1.20 [0.51]
b = 0.86 [0.43]
Seff = 751.20 [279.08]
Teq = 1335 [124] K
Rp = 0.75 [0.29] Re
a = 0.0382 [0.0090] AU
Ag = 47.86 [33.26] [1.41 σ]
Teffp = 5429 [830] K [4.88 σ]

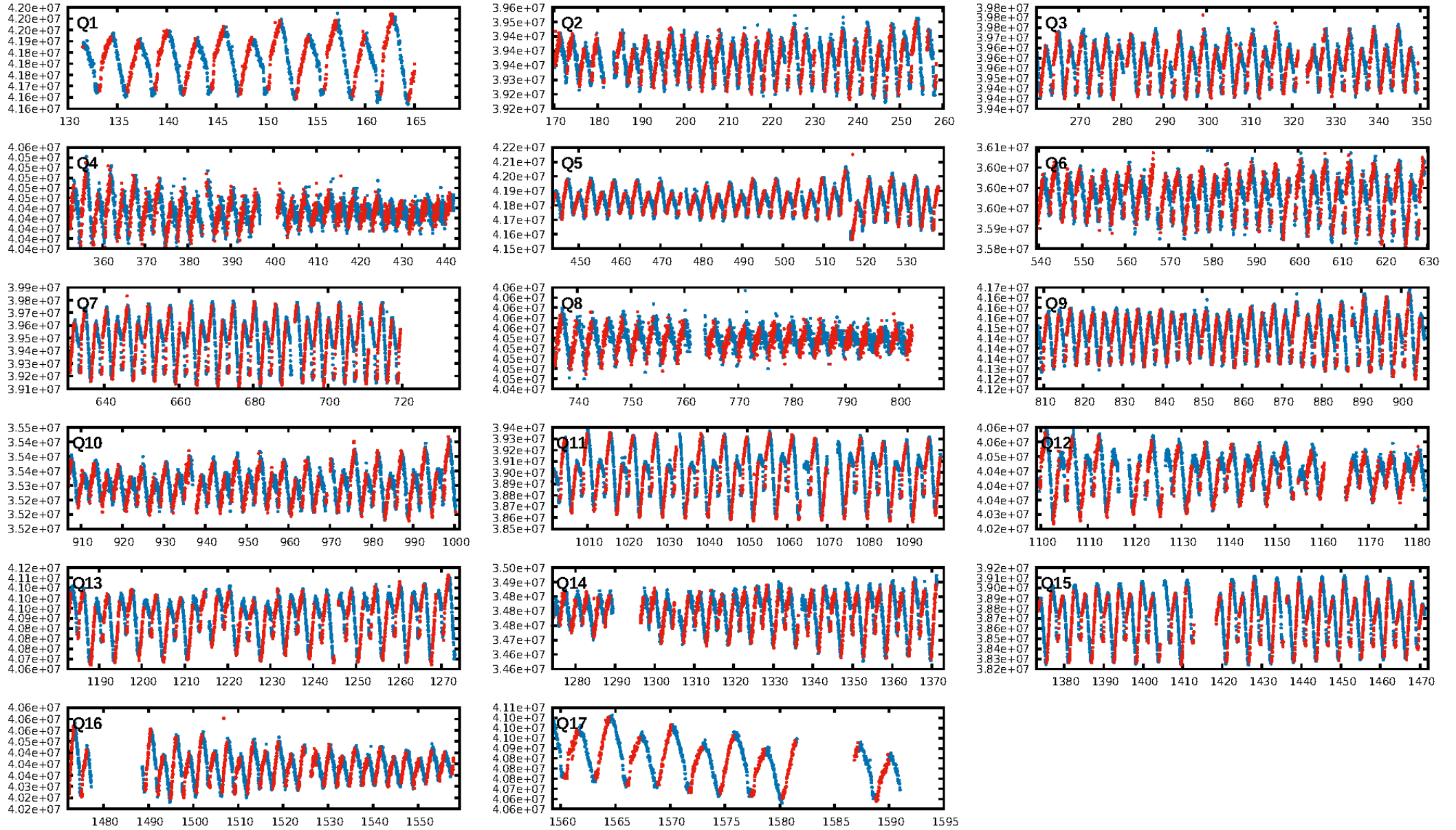
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [3.49 σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 5.91e-07
RollingBand-fgt: 1.00 [455/455]
GhostDiagnostic-chr: 0.5643
Centroid-sig: 0.0%
Centroid-so: 19.039 arcsec [2.86 σ]
OotOffset-rm: 5.829 arcsec [51.00 σ]
KicOffset-rm: 5.989 arcsec [56.56 σ]
OotOffset-st: 3/3/4/1 [11]
KicOffset-st: 3/3/4/1 [11]
DiffImageQuality-fgm: 0.73 [8/11]
DiffImageOverlap-fno: 1.00 [17/17]

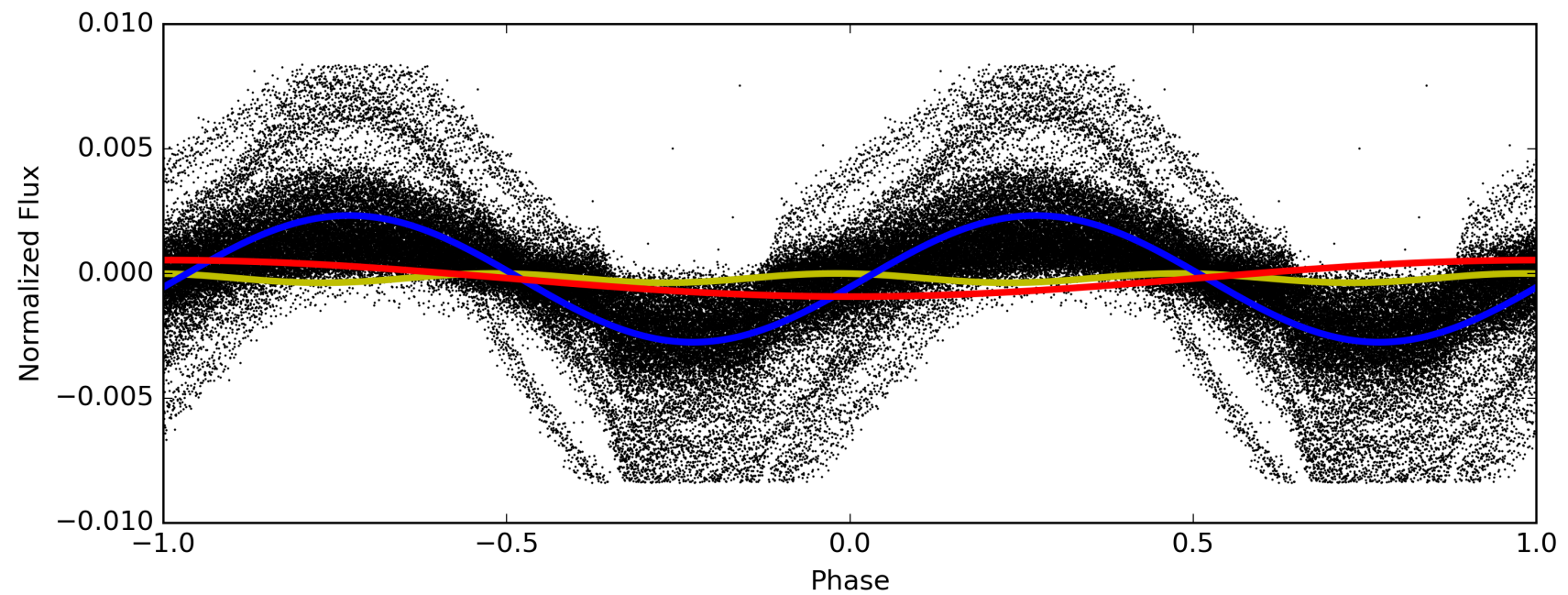
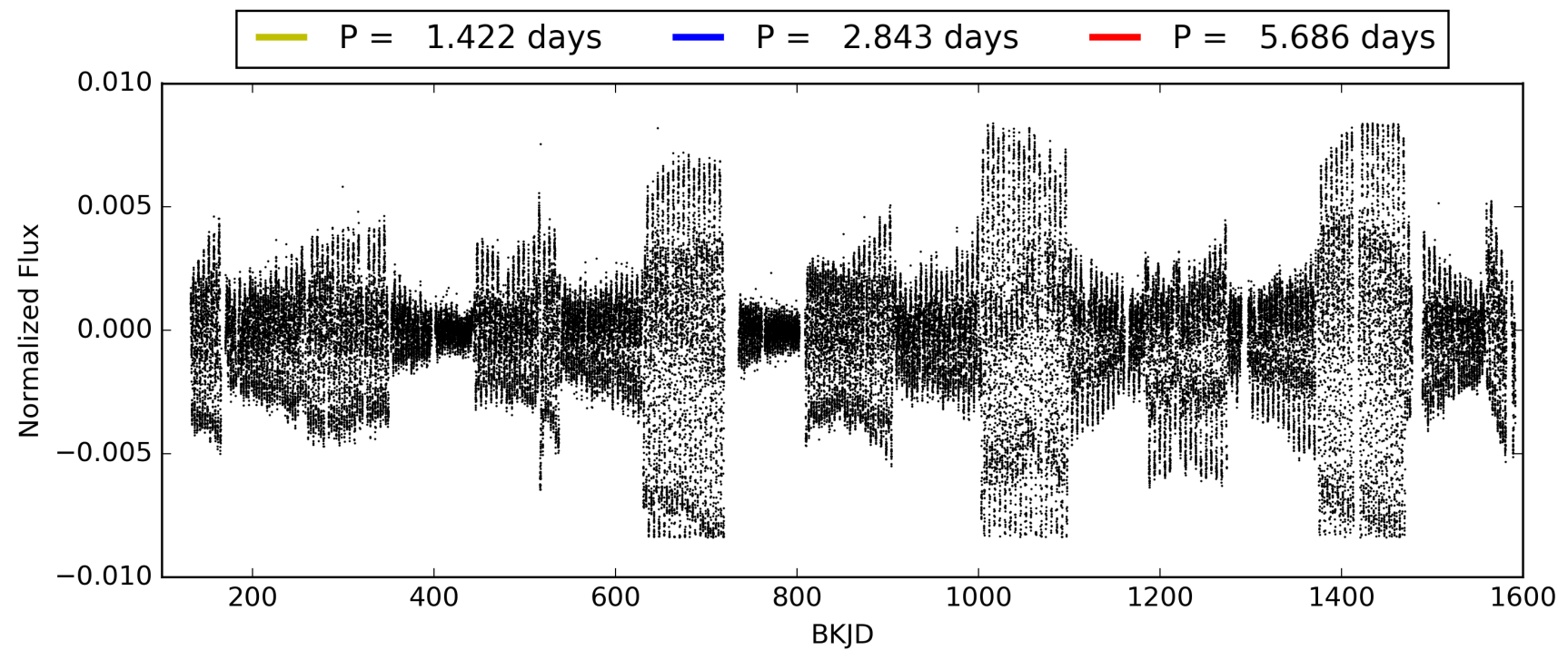
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 01-Feb-2016 18:12:51 Z

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

TCE 002157247-04, PDC Light Curves

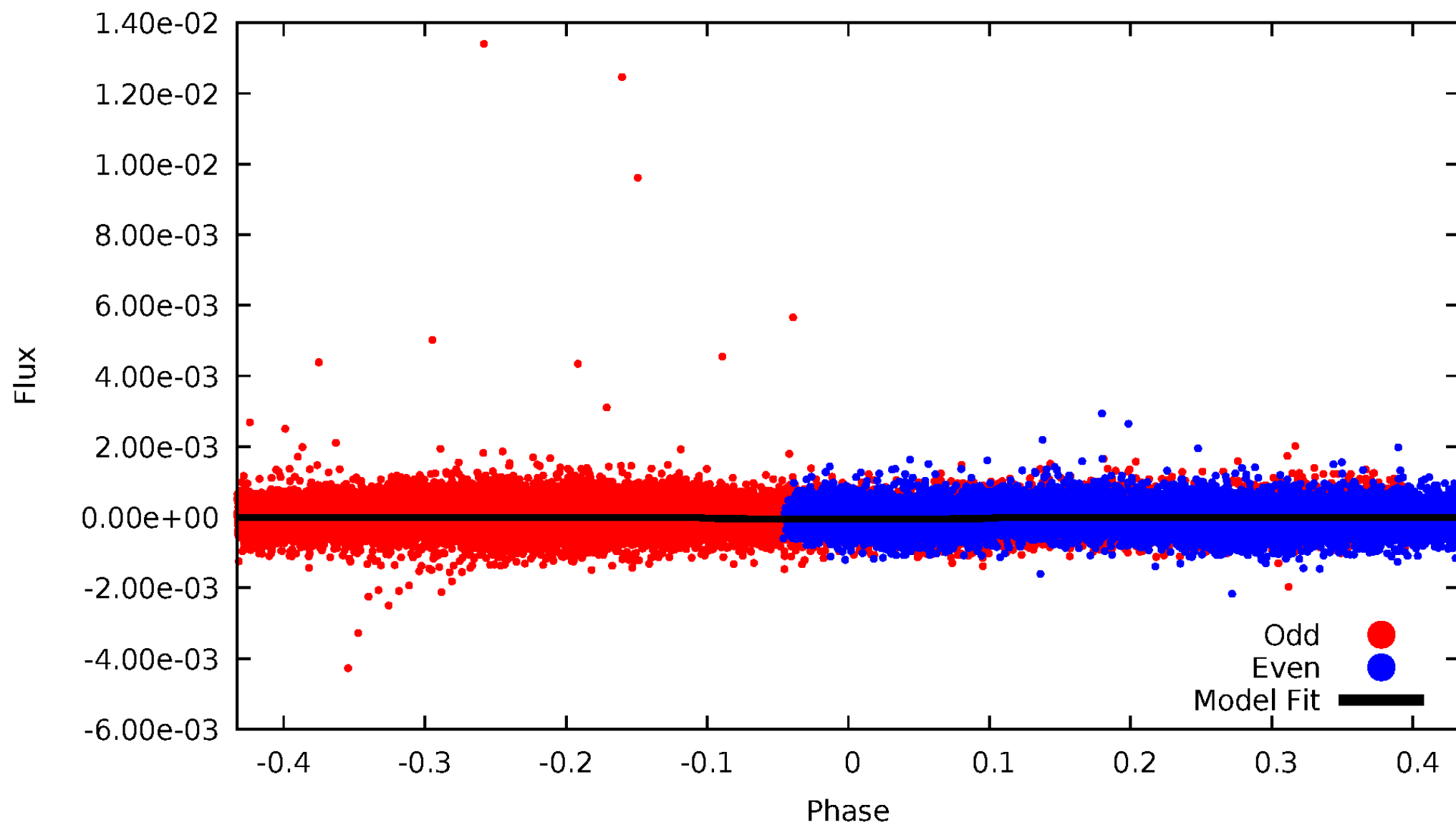


TCE 002157247-04



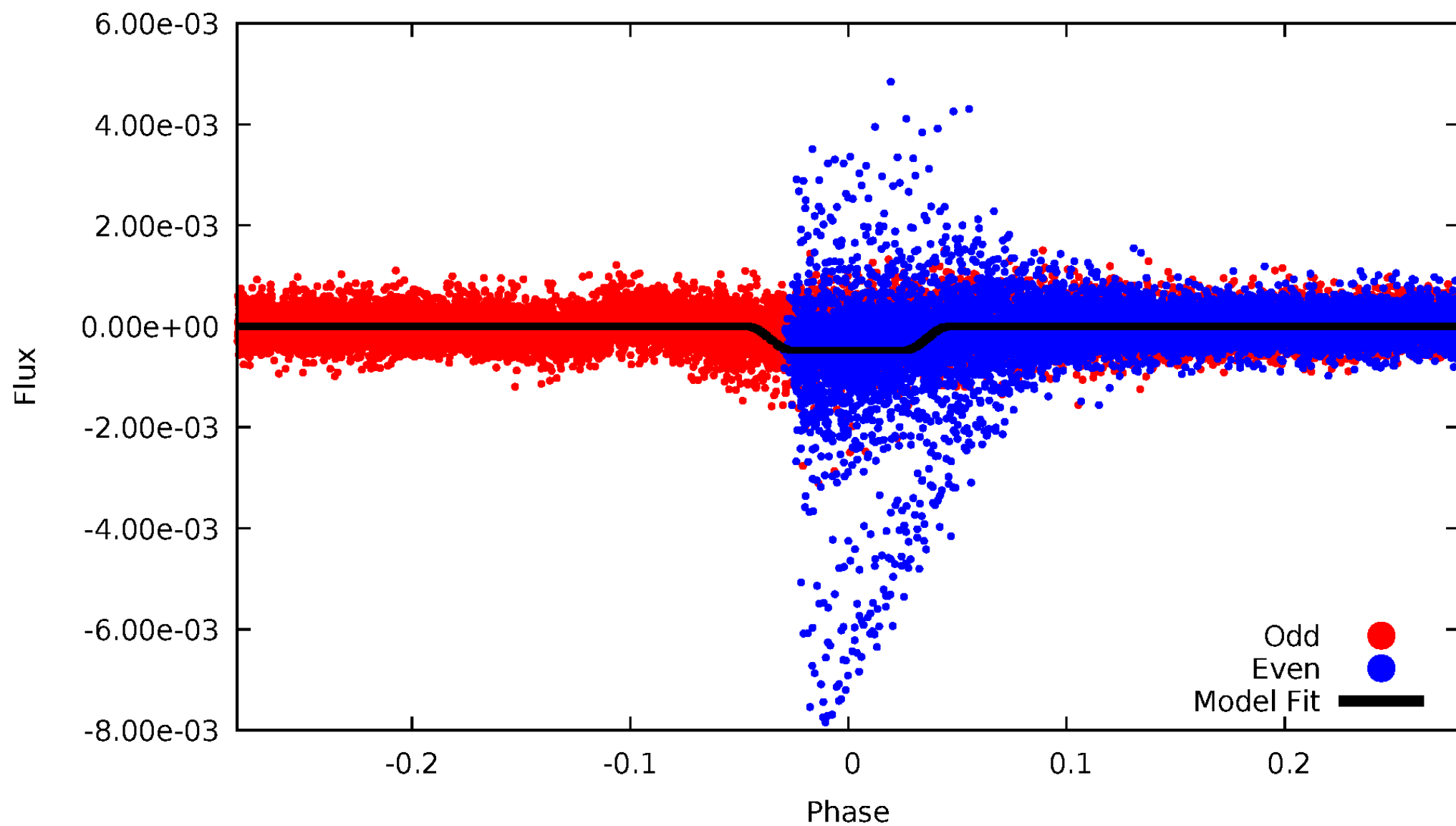
DV Odd/Even

TCE 002157247-04



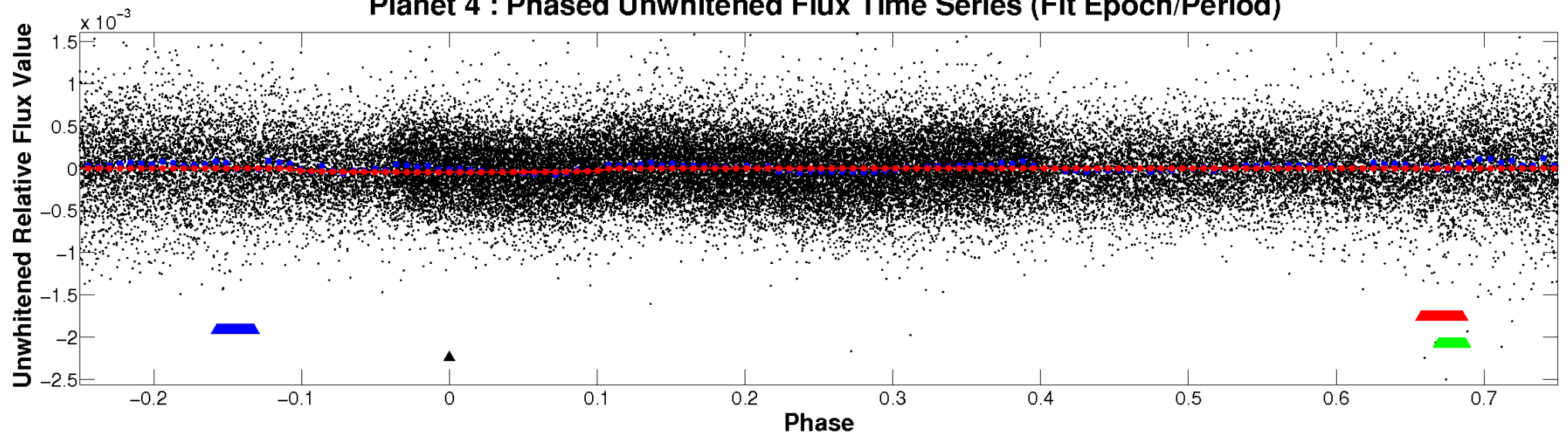
ALT Odd/Even

TCE 002157247-04

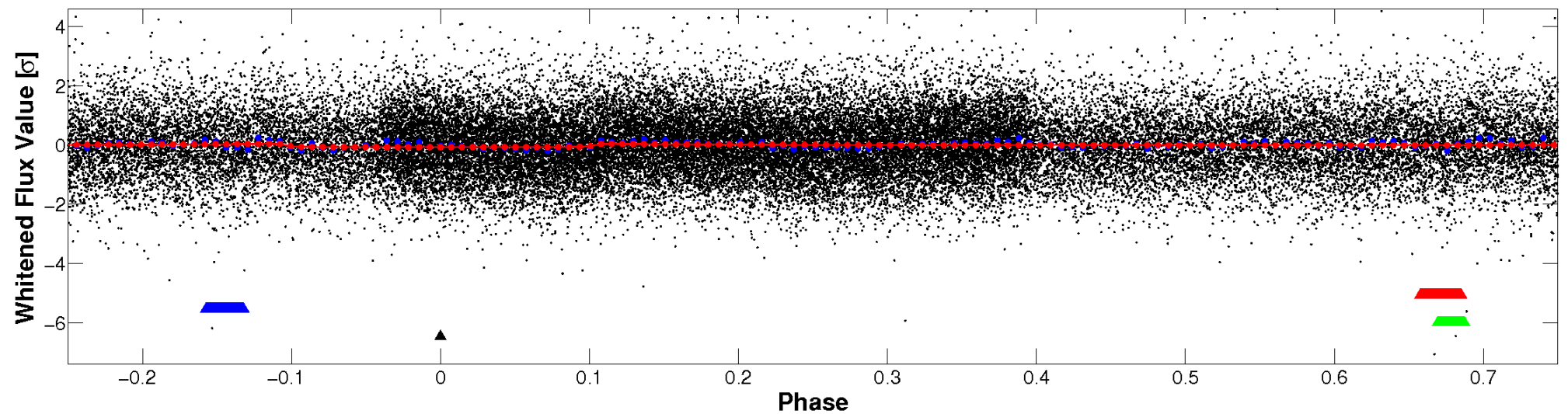


Non-Whitened Vs. Whitened Light Curve

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

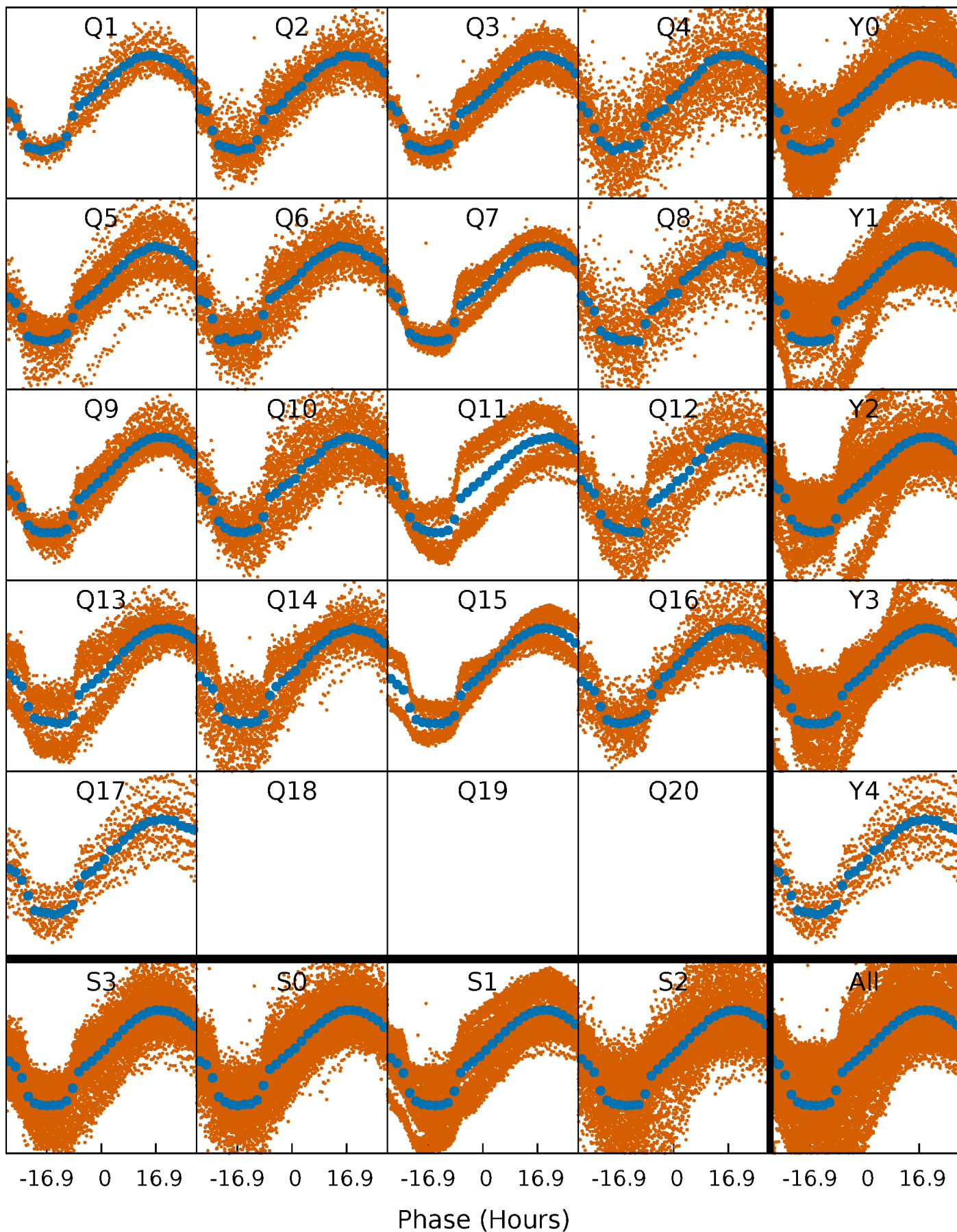


Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



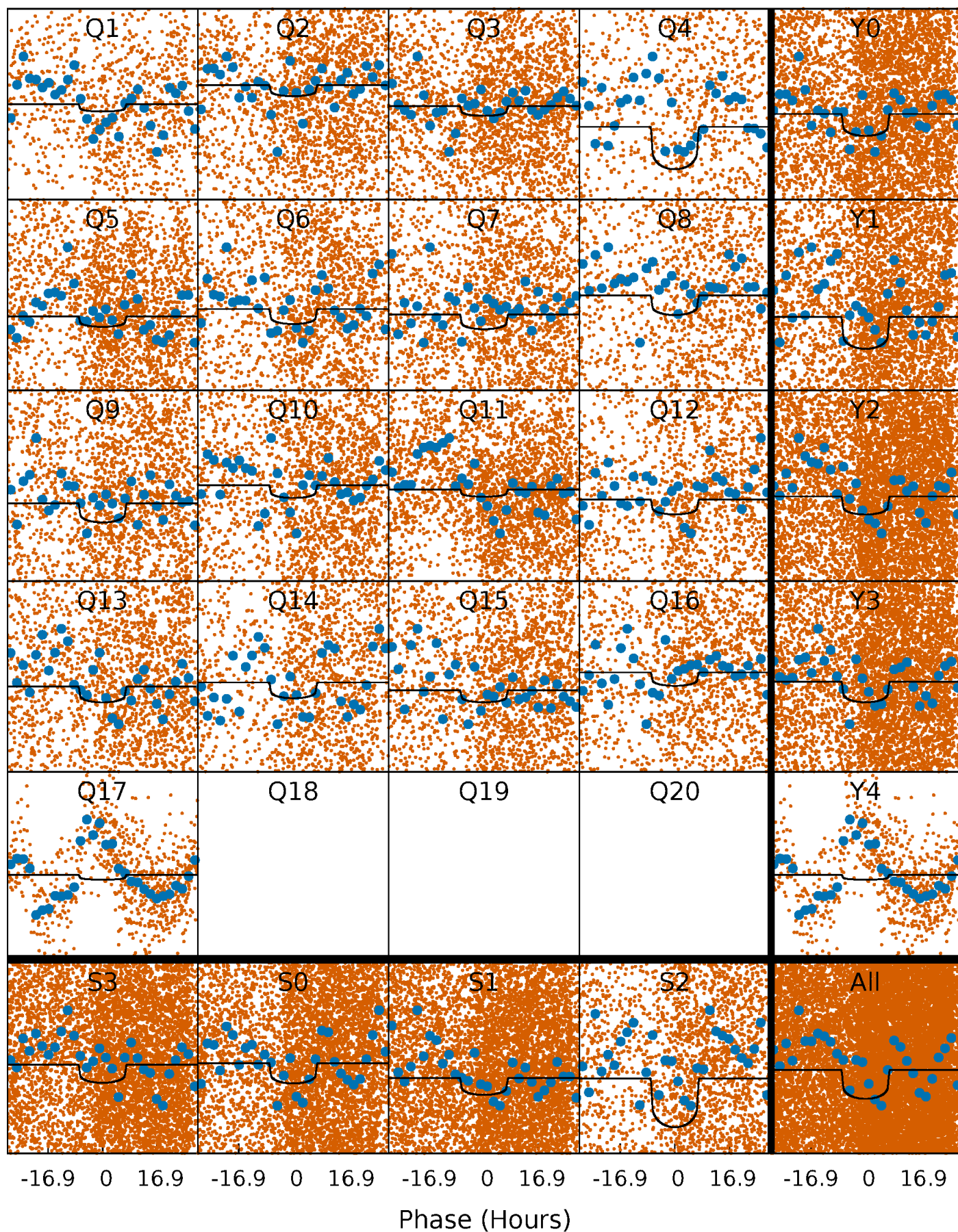
PDC Quarter-Phased Transit Curves

TCE 002157247-04 P= 2.843025 Days $T_0=133.742883$ (BKJD)



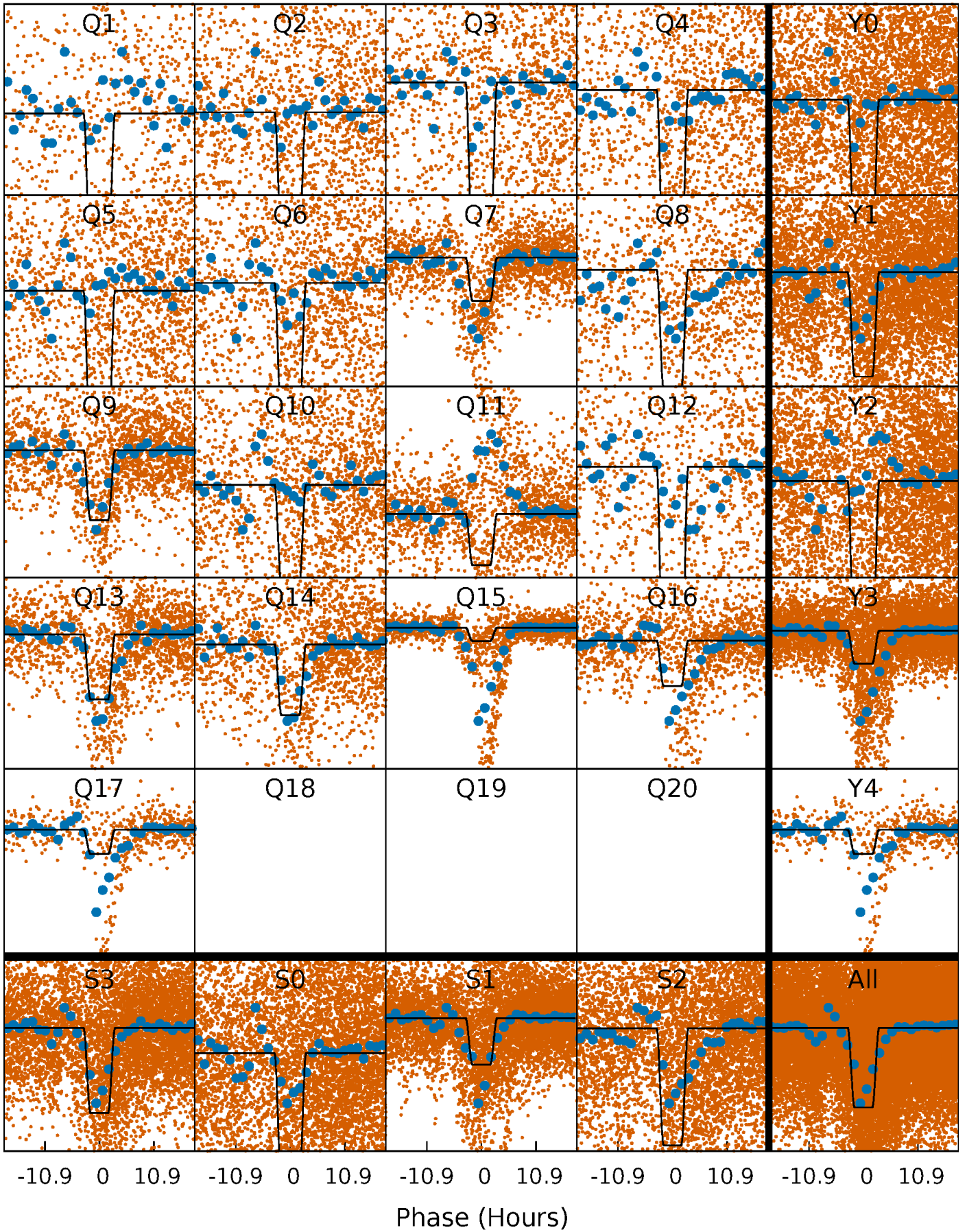
DV Quarter-Phased Transit Curves

TCE 002157247-04 P= 2.843025 Days $T_0=133.742883$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

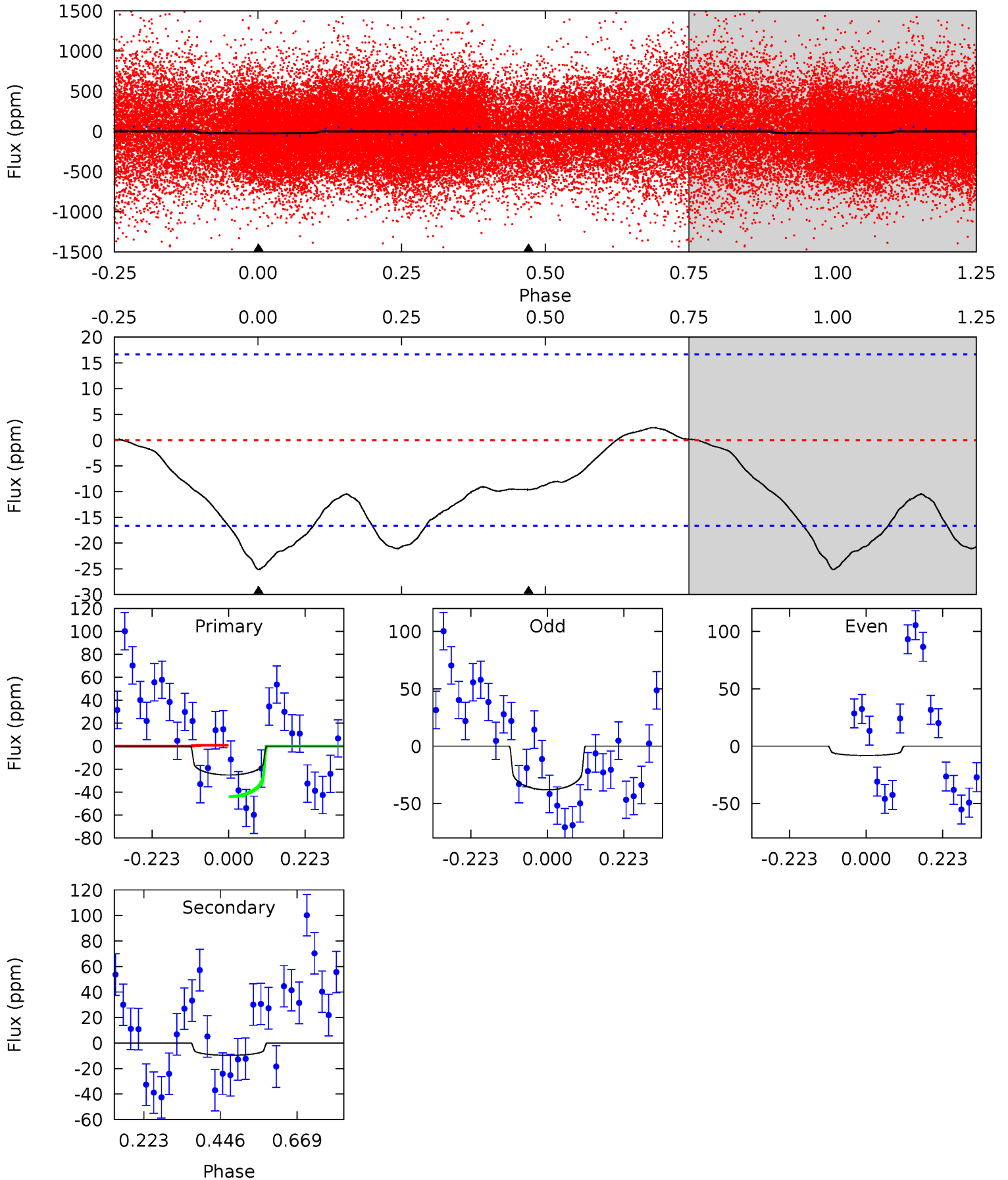
TCE 002157247-04 P= 2.843077 Days $T_0=133.696659$ (BKJD)



DV Model-Shift Uniqueness Test

002157247-04, P = 2.843025 Days, E = 130.899858 Days

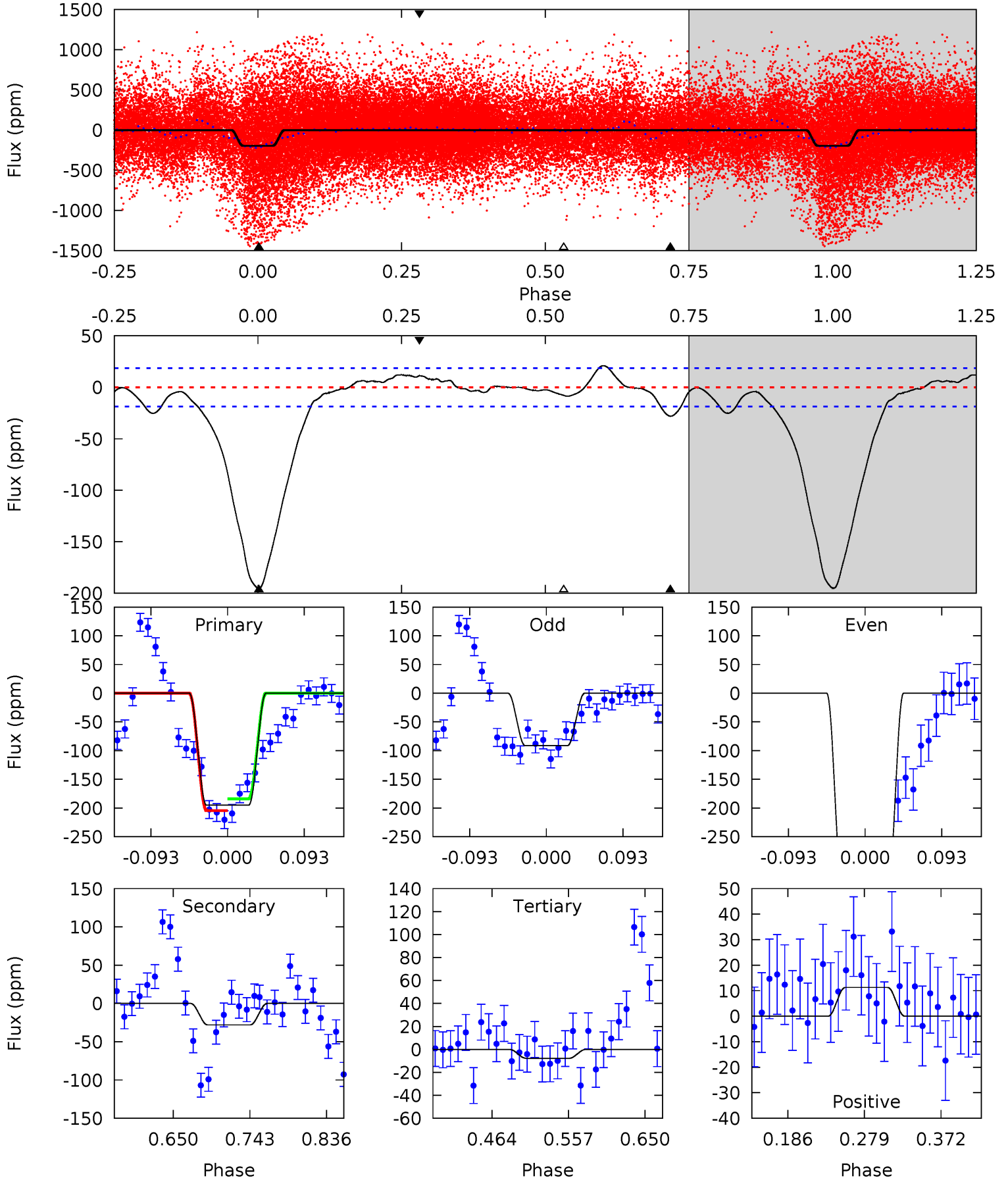
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.64	2.54	0	0	4.39	1.22	2.78	6.64	6.64	2.54	2.54	4.24	0.95	0.09	6.49



Alt Model-Shift Uniqueness Test

002157247-04, P = 2.843077 Days, E = 130.853582 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
48.0	6.91	1.92	2.78	4.58	1.68	2.17	46.1	45.2	4.99	4.14	35.3	2.31	0.10	2.47



Stellar Parameters For KIC 002157247

	$T_{\text{eff}}(K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6052^{+164}_{-183}	$4.442^{+0.084}_{-0.196}$	$-0.400^{+0.300}_{-0.300}$	$0.956^{+0.260}_{-0.120}$	$0.923^{+0.119}_{-0.097}$	$1.488^{+0.662}_{-0.742}$
	+3%/-3%	+2%/-4%	+75%/-75%	+27%/-13%	+13%/-11%	+44%/-50%
Source	PHO1	KIC0	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 002157247-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-10 ± 4	$0.77^{+0.23}_{-0.22}$	1885^{+121}_{-94}	4220^{+638}_{-521}	13^{+14}_{-7}
Alt.	-28 ± 4	$2.34^{+0.37}_{-0.29}$	1886^{+134}_{-93}	3424^{+152}_{-132}	$4.018^{+1.392}_{-1.055}$

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

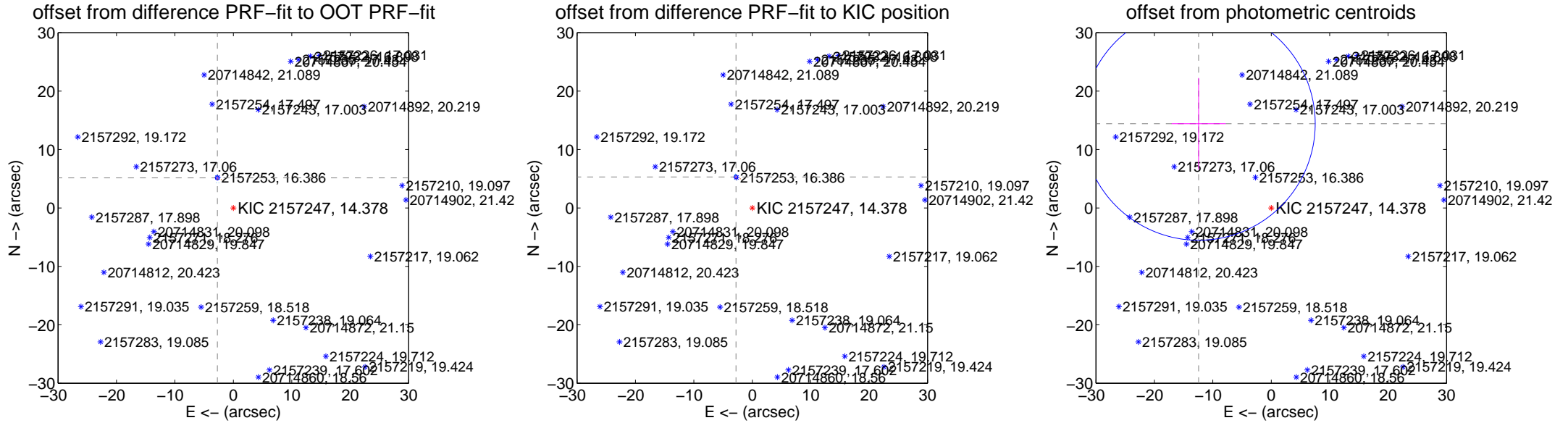
DV Centroid Data

Supplemental centroid analysis for 002157247-04. Kepler magnitude: 14.38. Transit SNR 7.54

There are 8 quarters with good PRF difference image offsets

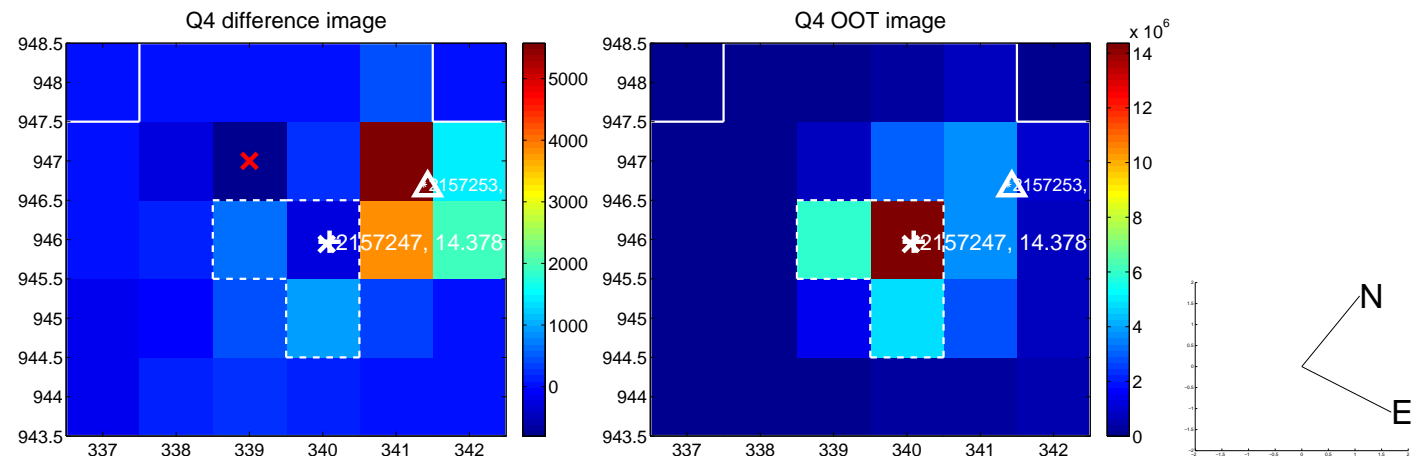
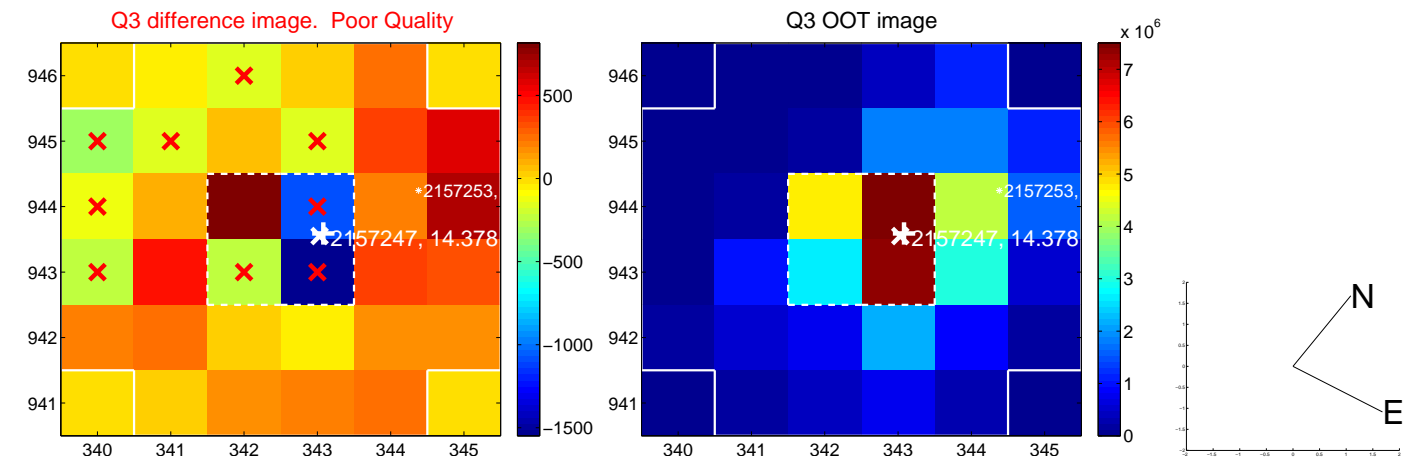
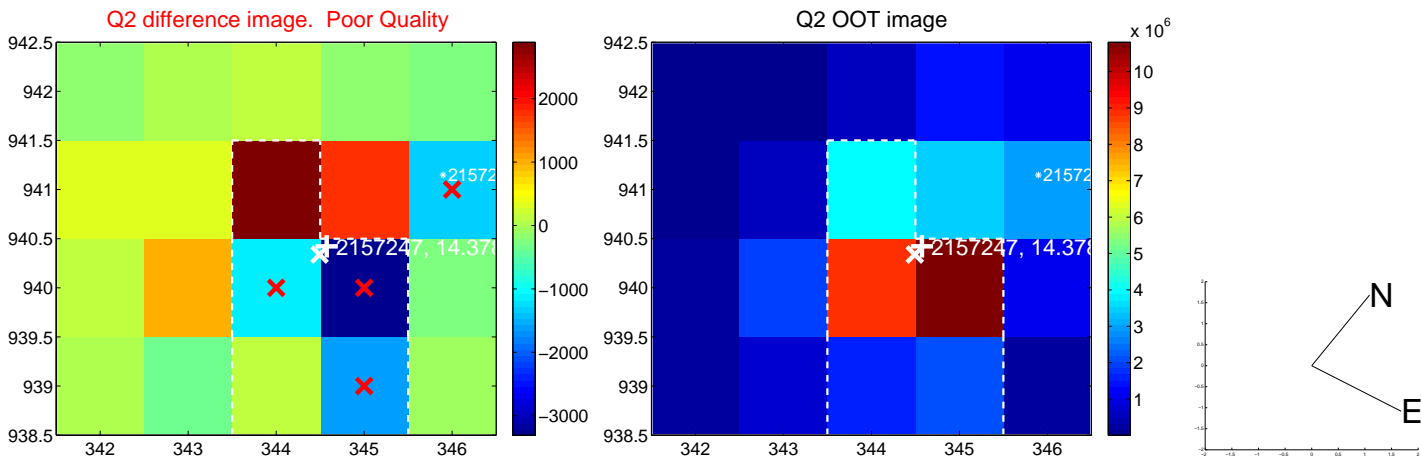
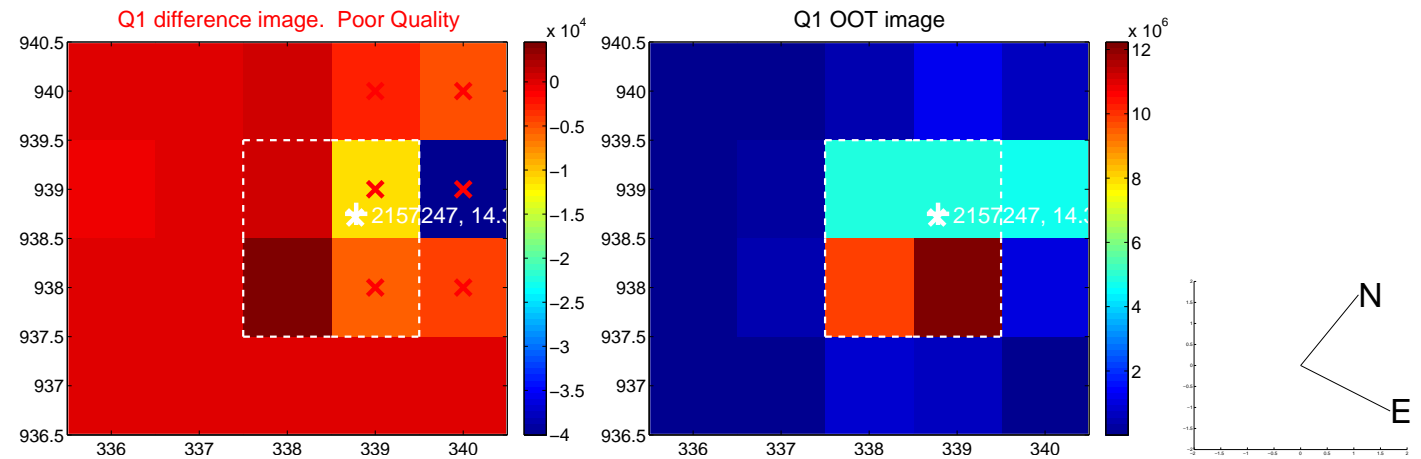
The direct PRF centroid is offset from the target star catalog position by about 0.14 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	5.829 \pm 0.114	51.00	2.739 \pm 0.102	5.146 \pm 0.111
PRF-fit source offset from KIC position	5.989 \pm 0.106	56.56	2.795 \pm 0.102	5.296 \pm 0.099
photometric centroid source offset	19.04 \pm 6.65	2.86	12.43 \pm 4.62	14.42 \pm 7.83

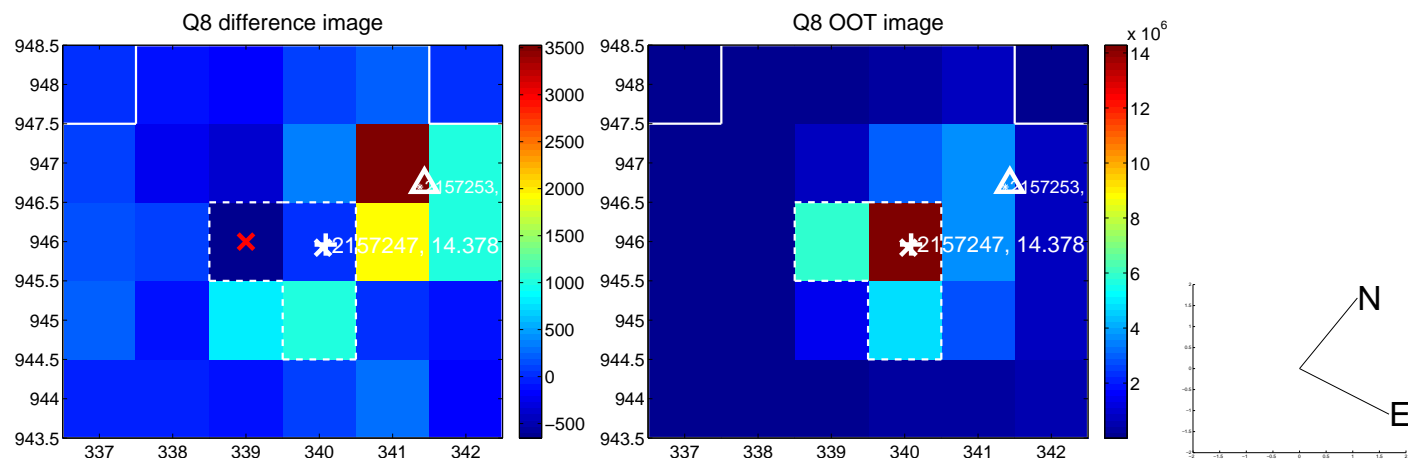
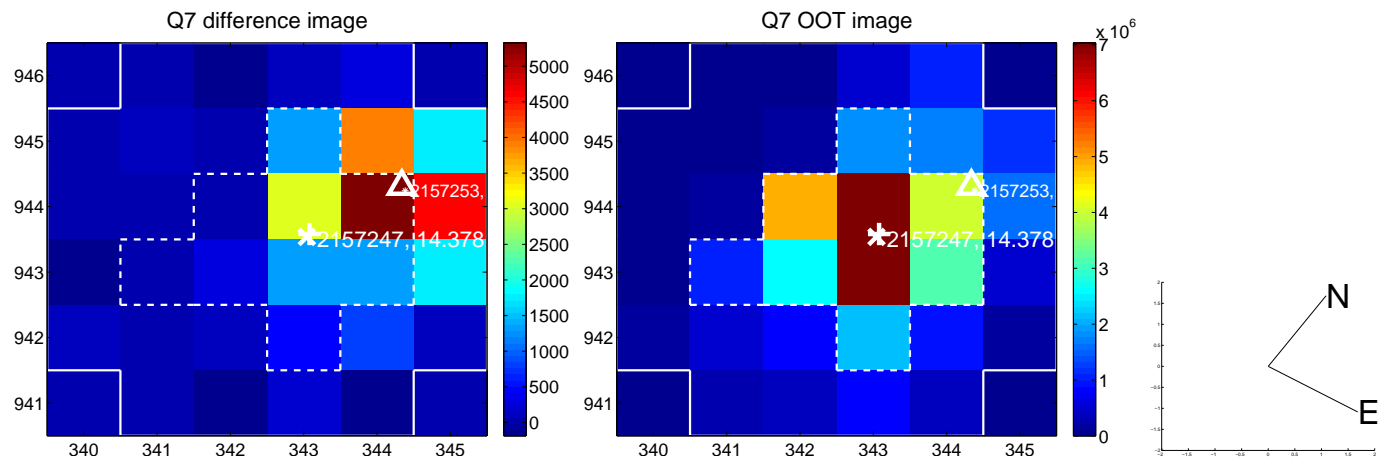
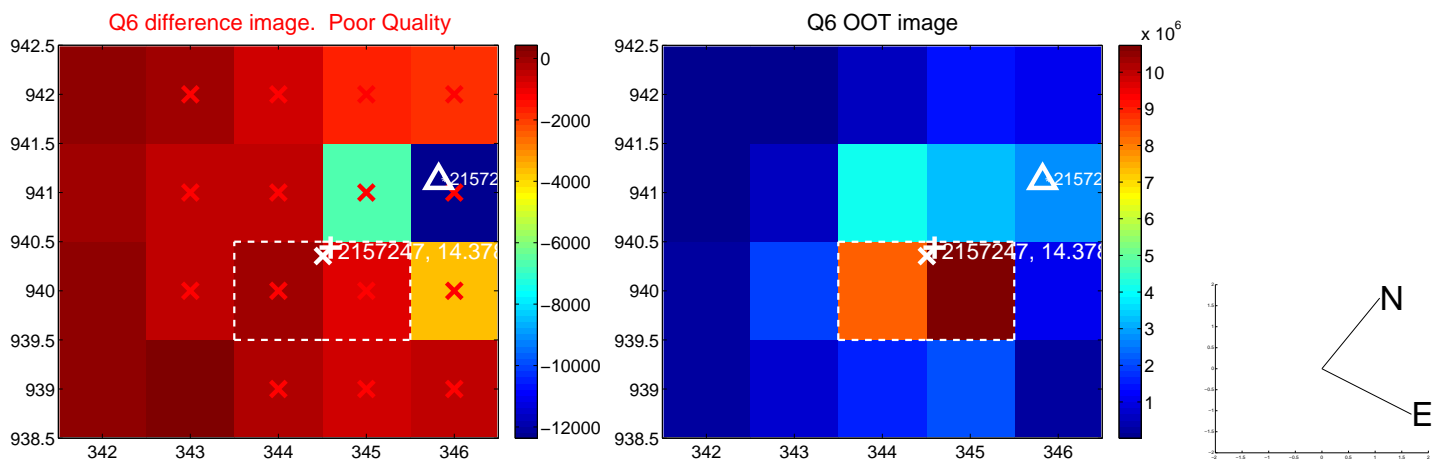
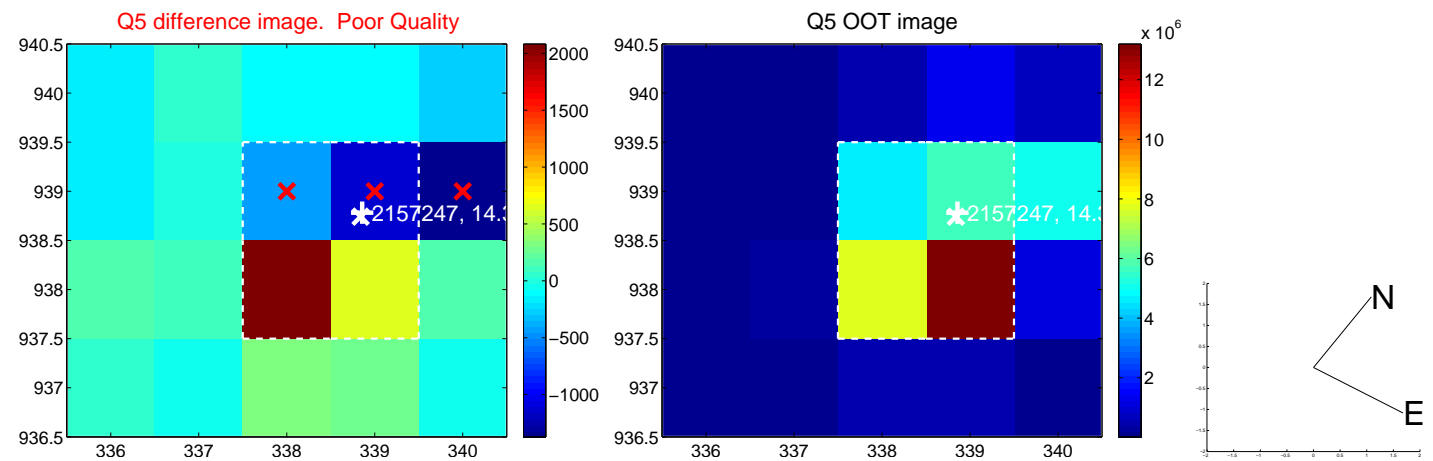


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

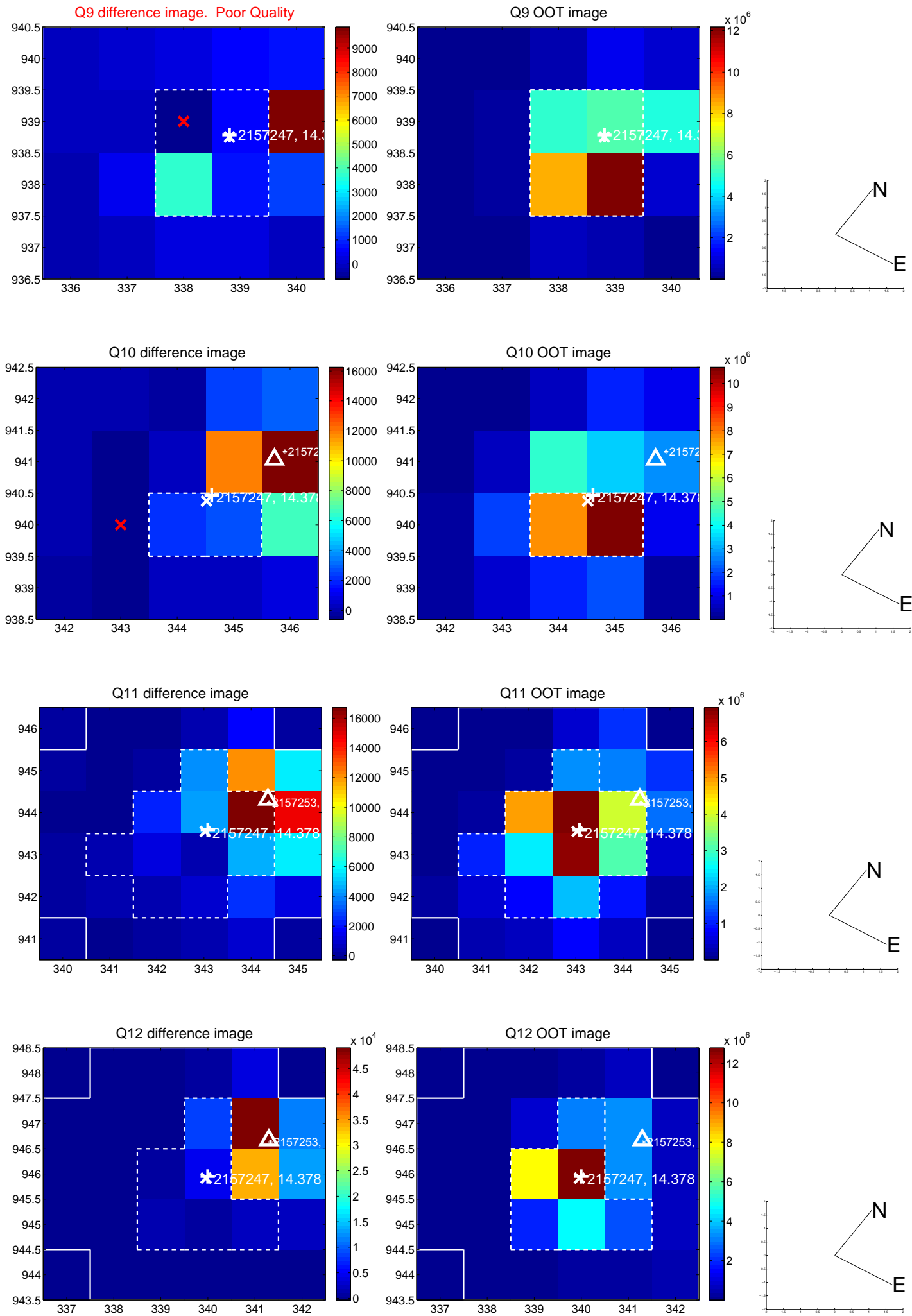
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



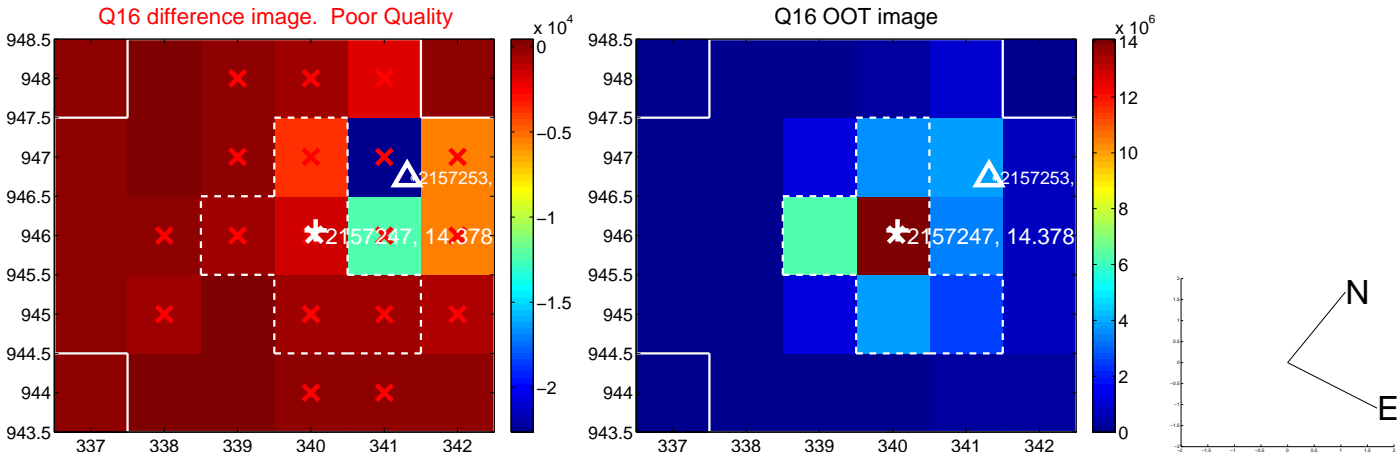
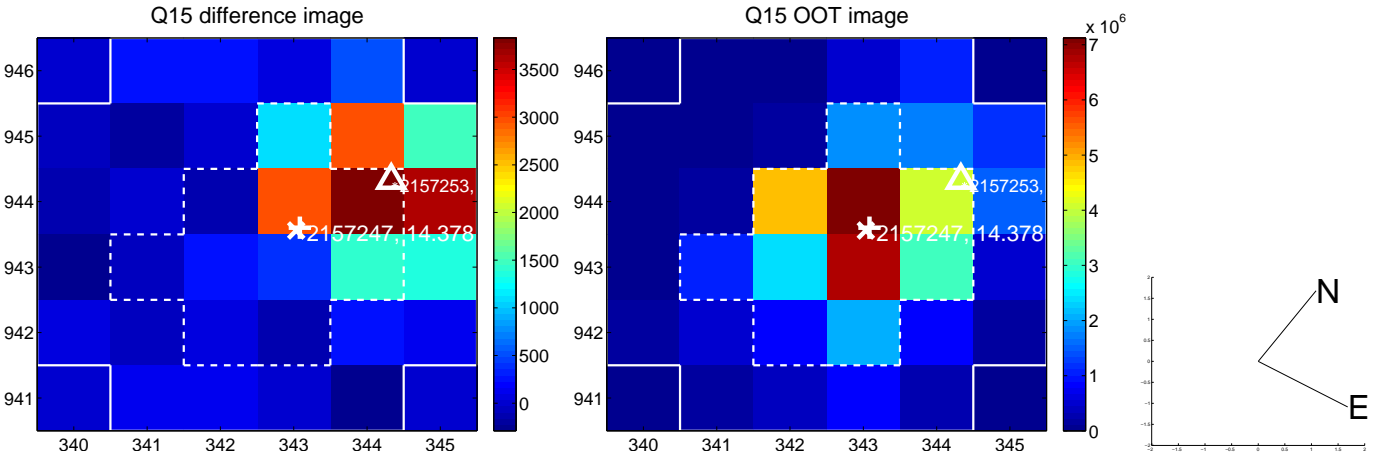
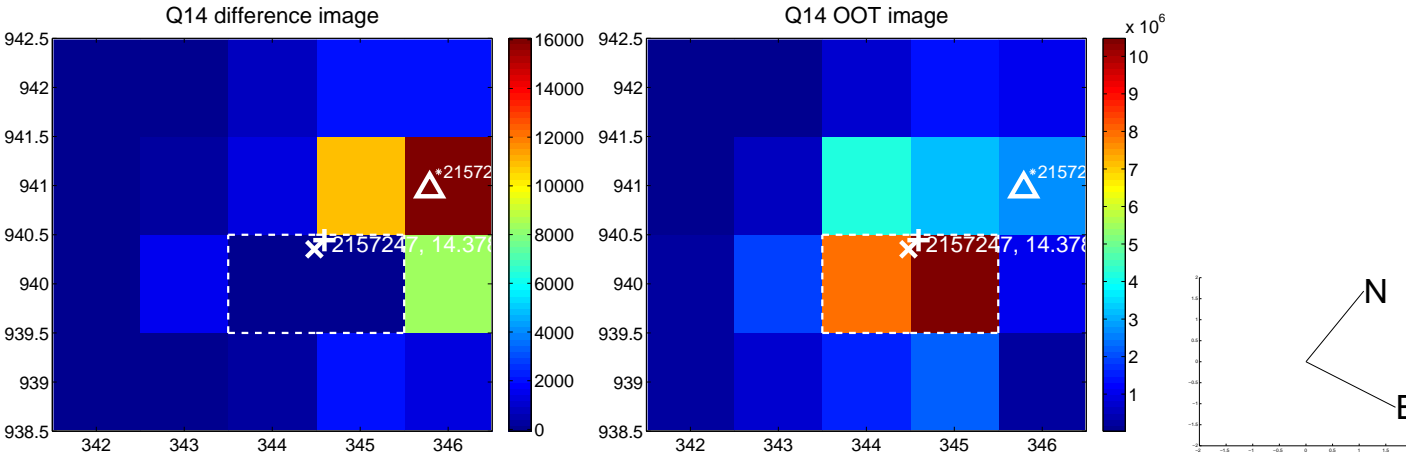
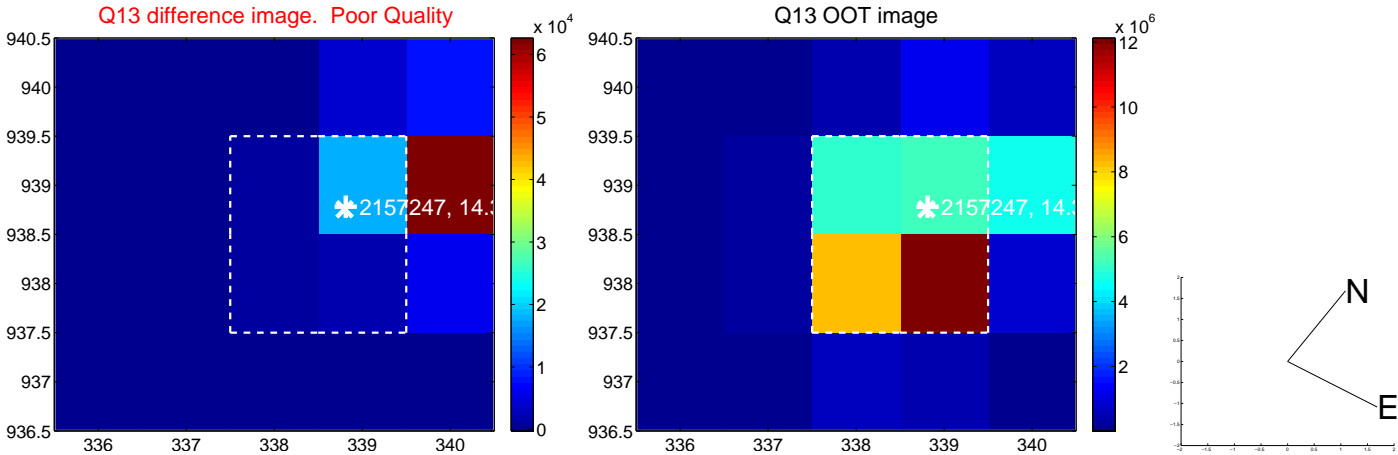
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



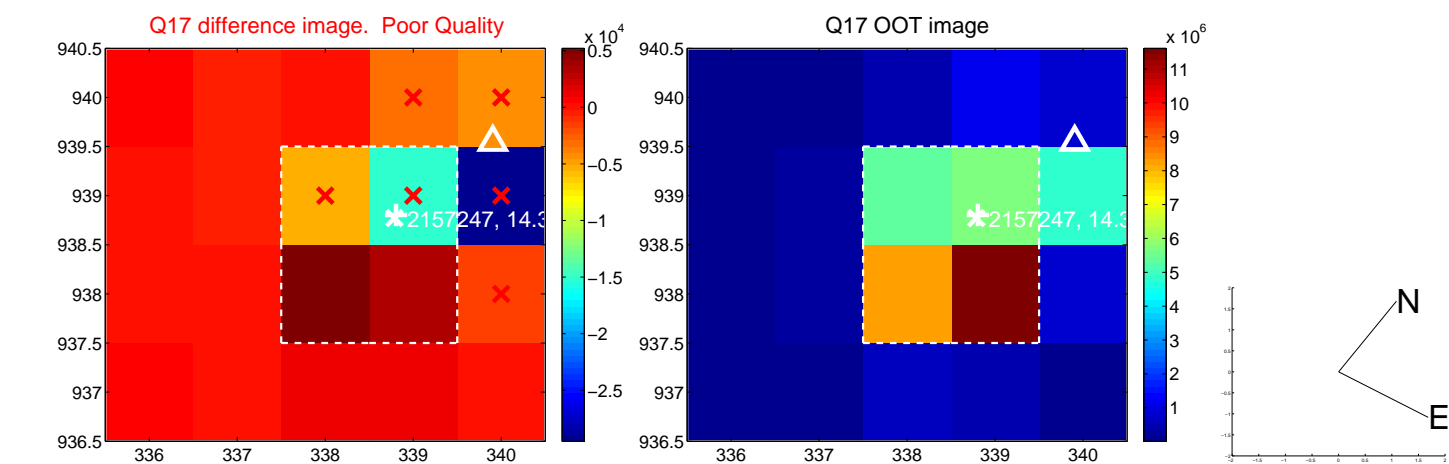
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



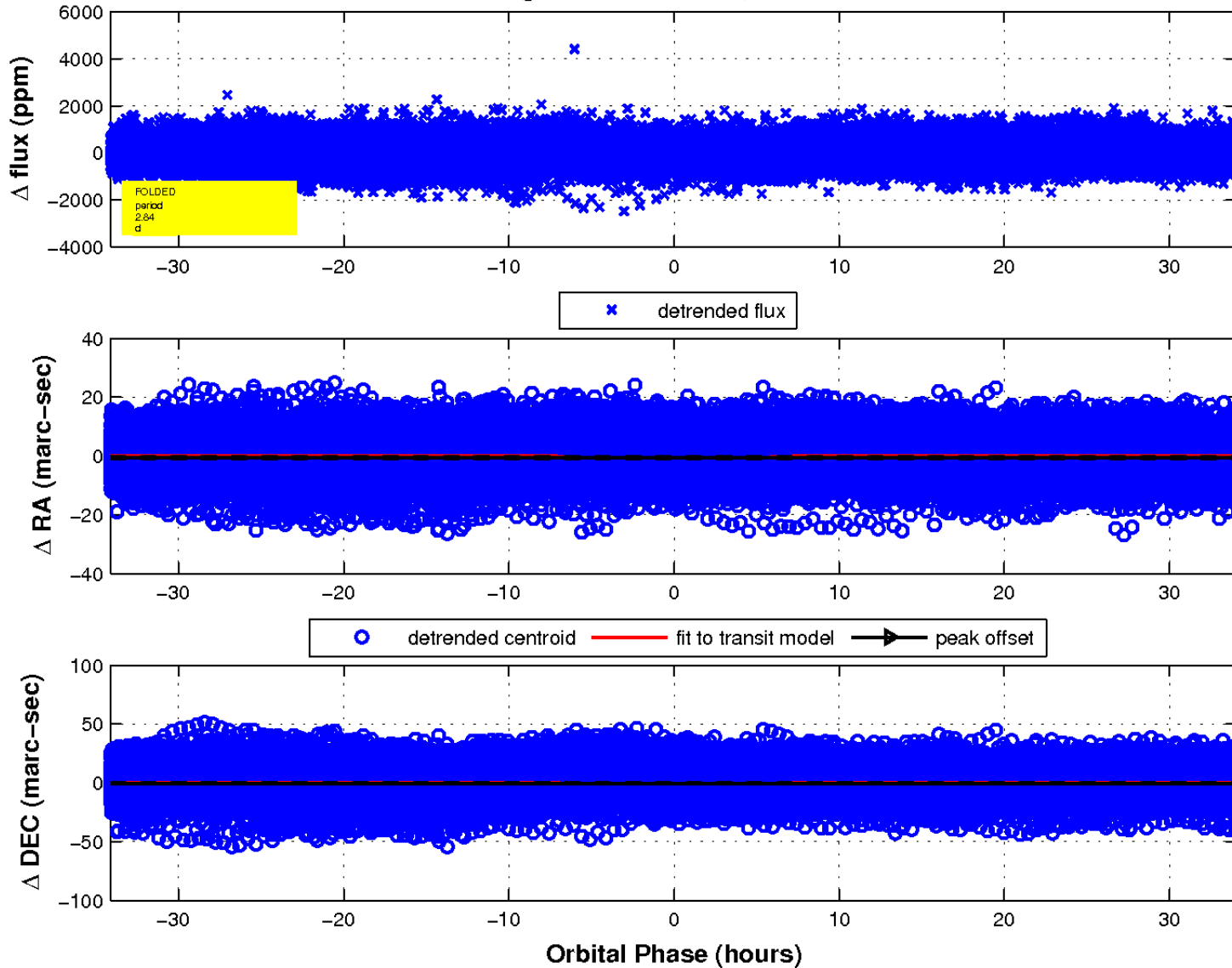
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



fluxWeightedCentroids, Planet 4 of 4



UKIRT Image

Declination

