

KIC 012020590

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})
012020590-01	OBS	No	3.337661	134.447718	9.6	18.282	10.7	10.2	3.30	8226	1.04	14387.36
012020590-02	OBS	No	194.825343	162.037617	150.4	6.326	13.9	11.1	3.30	8226	4.63	63.54
012020590-03	OBS	No	0.984450	132.425968	15.7	3.411	10.9	11.3	3.30	8226	1.52	73278.91

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
012020590-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—CENT_SATURATED
012020590-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
012020590-03	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—CENT_SATURATED

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

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

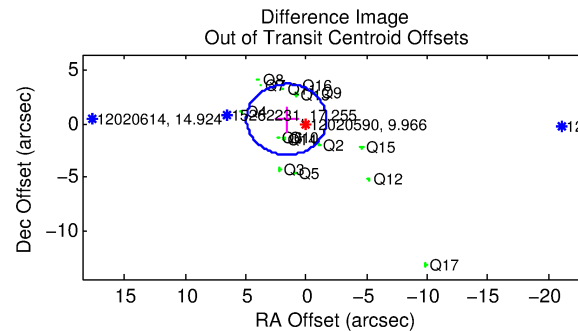
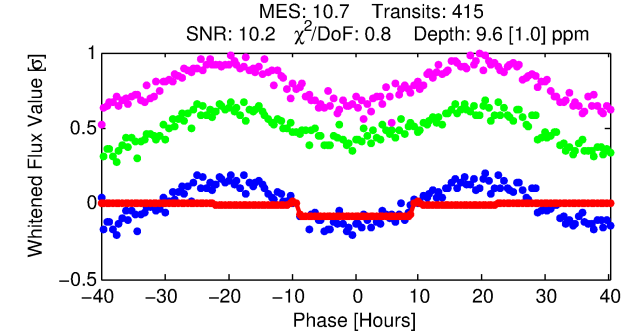
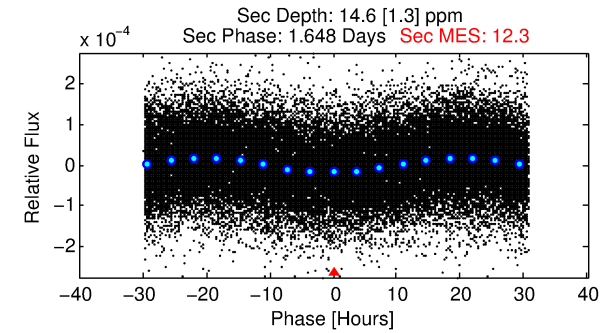
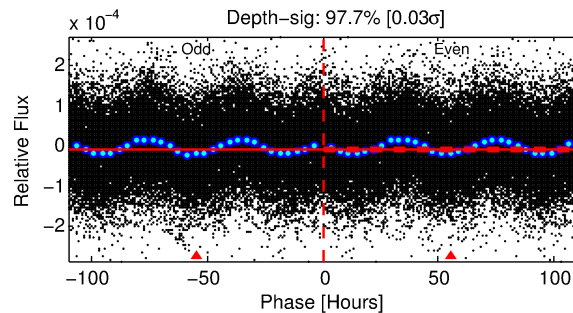
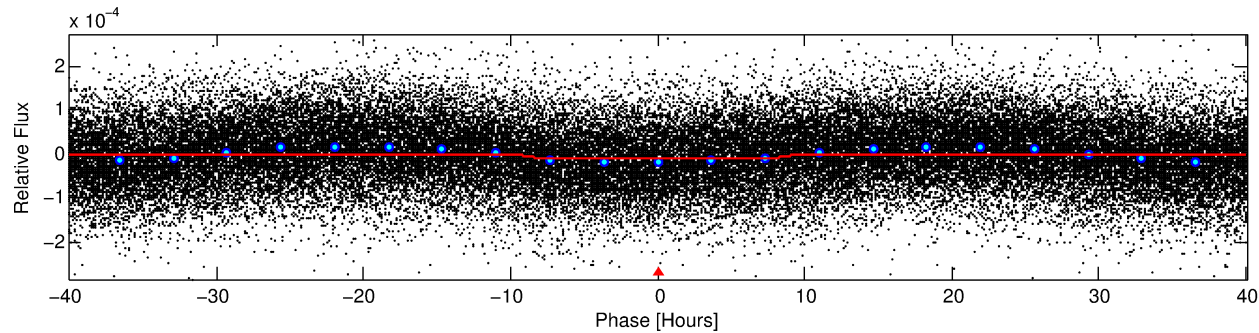
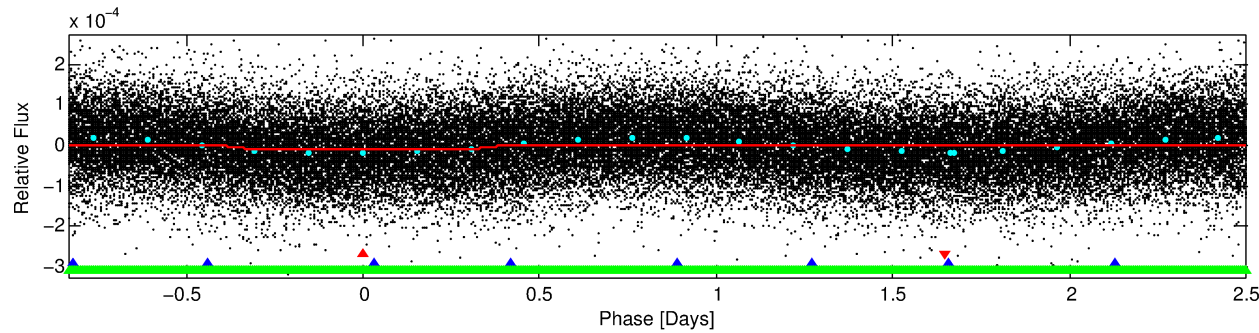
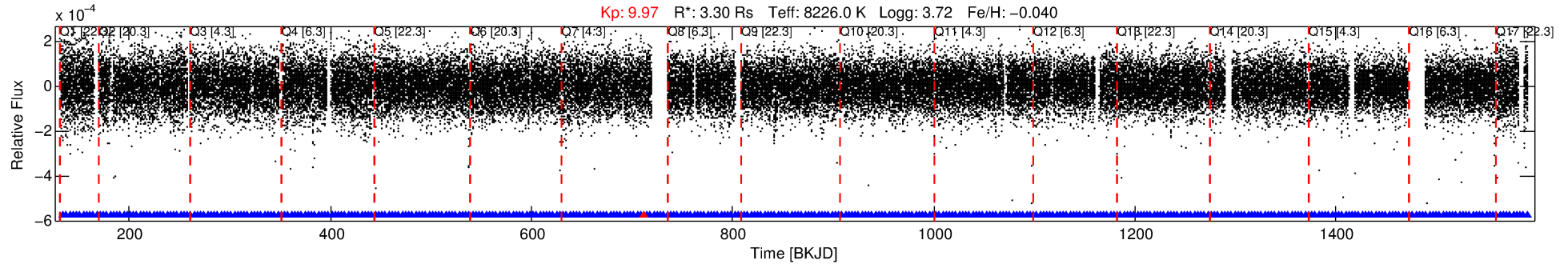
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 012020590-01

No Significant Match Found

DV One-Page Summary

KIC: 12020590 Candidate: 1 of 3 Period: 3.338 d



DV Fit Results:

Period = 3.33766 [0.00005] d
Epoch = 134.4477 [0.0100] BKJD
 $R_p/R^* = 0.0029$ [0.0015]
 $a/R^* = 1.49$ [2.51]
 $b = 0.30$ [9.31]
 $\text{Seff} = 14387.36$ [10682.35]
 $T_{\text{eq}} = 2793$ [518] K
 $R_p = 1.04$ [0.75] R_e
 $a = 0.0557$ [0.0254] AU
 $A_g = 22.87$ [29.43] [0.74 σ]
 $T_{\text{eff}} = 9443$ [2553] K [2.55 σ]

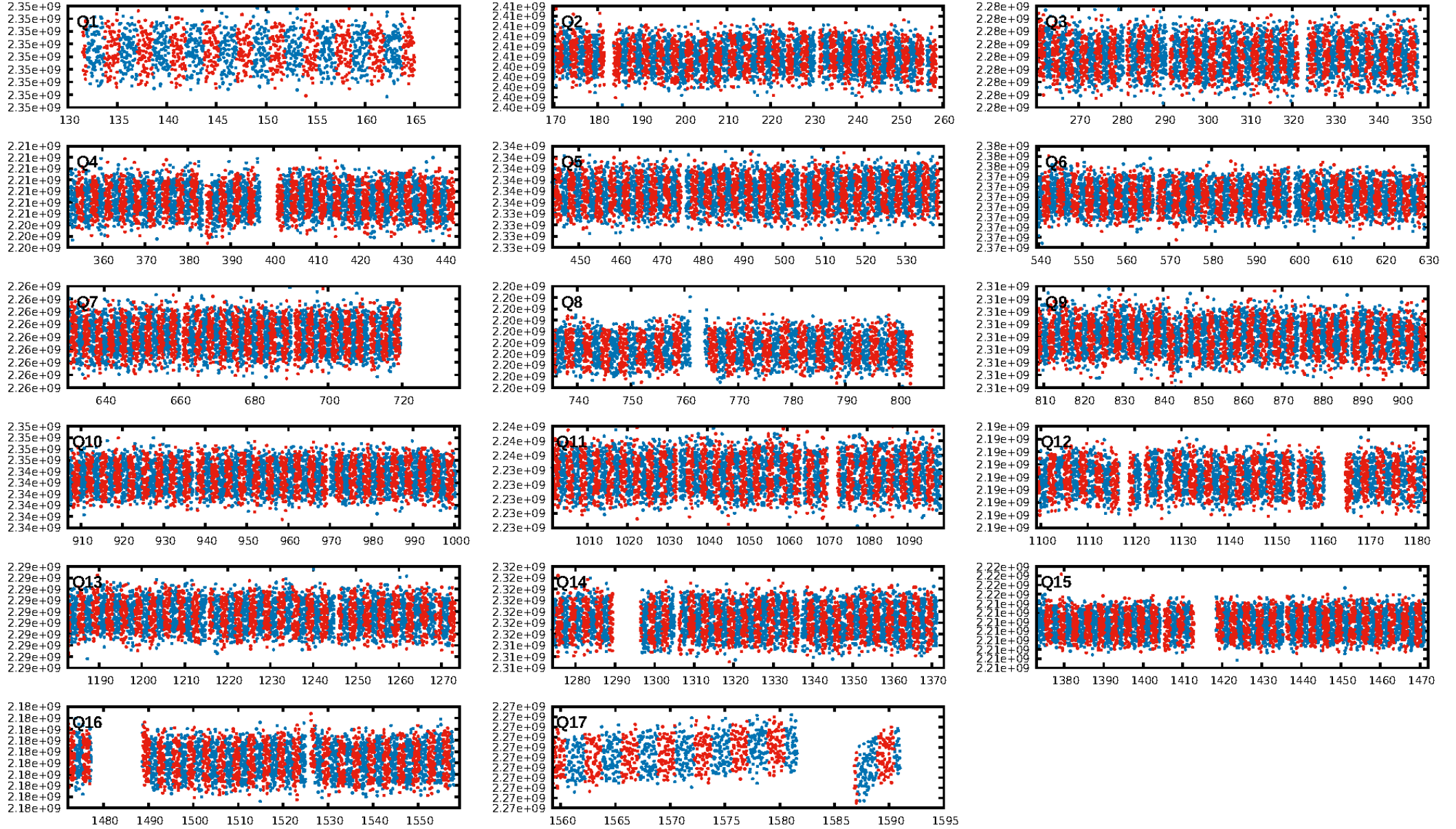
DV Diagnostic Results:

ShortPeriod-sig: 99.8% [3.04 σ]
LongPeriod-sig: 100.0% [237.57 σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 3.53e-14
RollingBand-fgt: 1.00 [396/397]
GhostDiagnostic-chr: N/A
Centroid-sig: 14.7%
Centroid-so: 2.245 arcsec [1.55 σ]
OotOffset-rm: 1.677 arcsec [1.52 σ]
KicOffset-rm: 1.957 arcsec [1.83 σ]
OotOffset-st: 4/4/4/4 [16]
KicOffset-st: 4/4/4/4 [16]
DiffImageQuality-fgm: 0.31 [5/16]
DiffImageOverlap-fno: 0.00 [0/17]

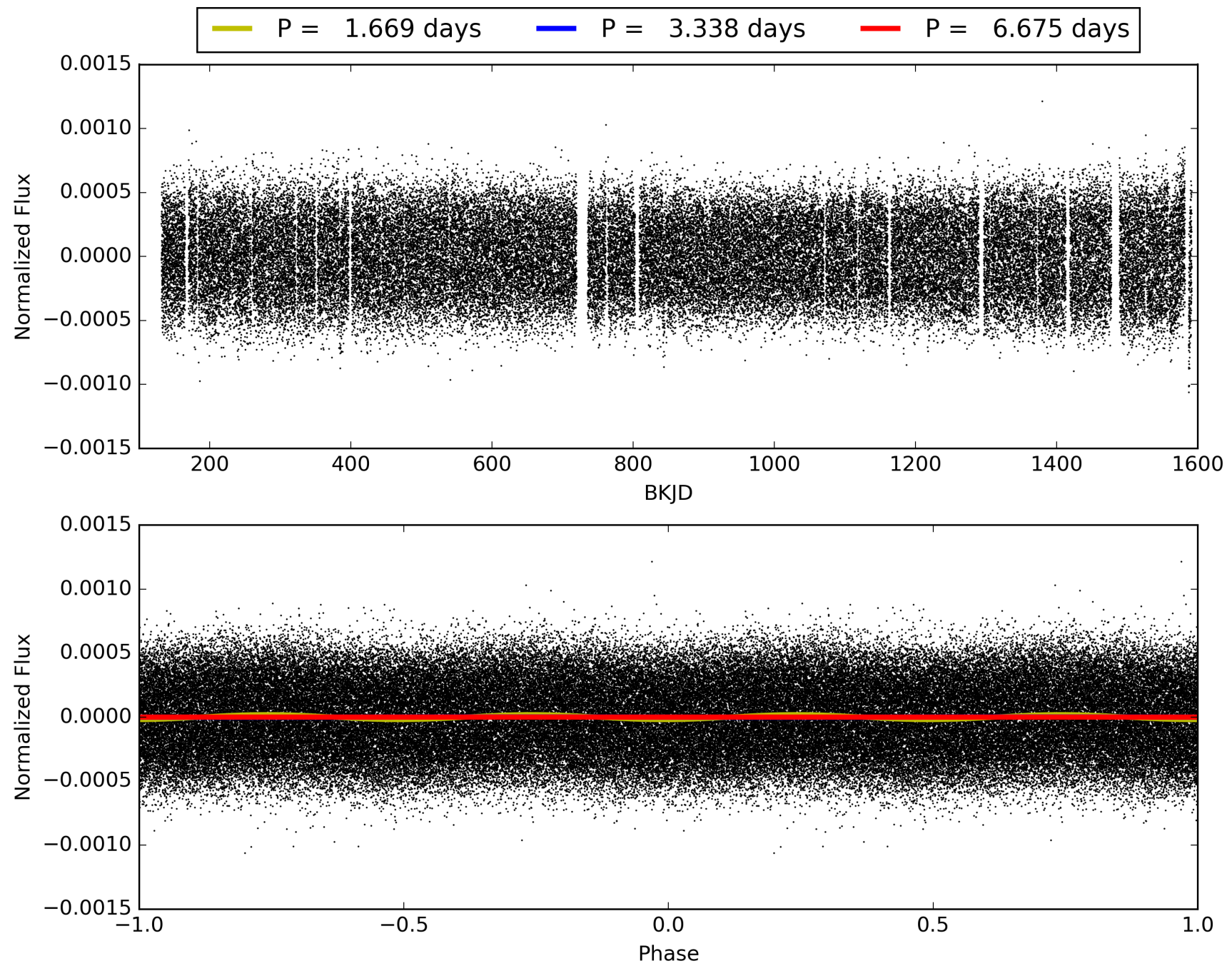
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 11:45:18 Z

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

TCE 012020590-01, PDC Light Curves

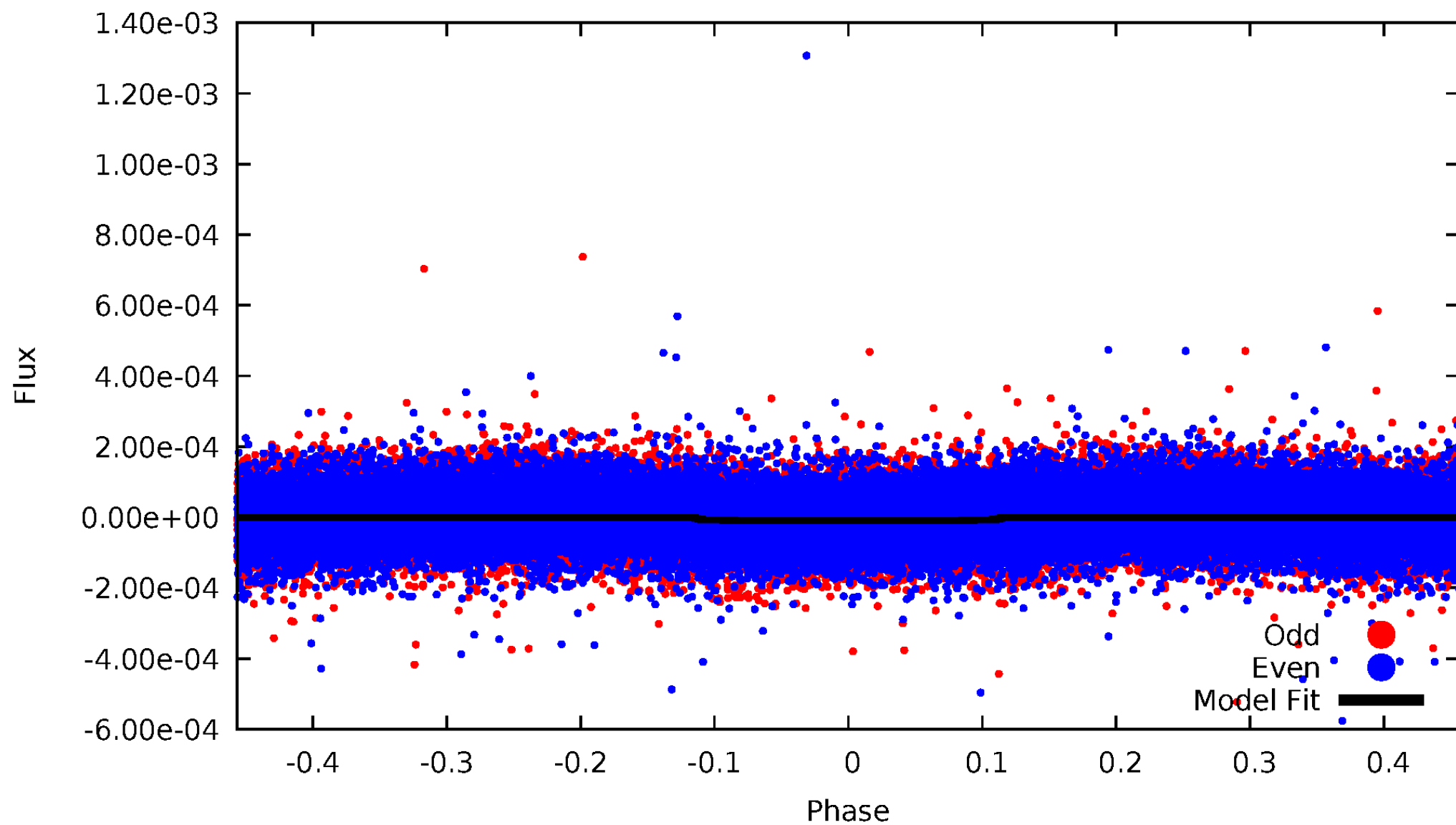


TCE 012020590-01



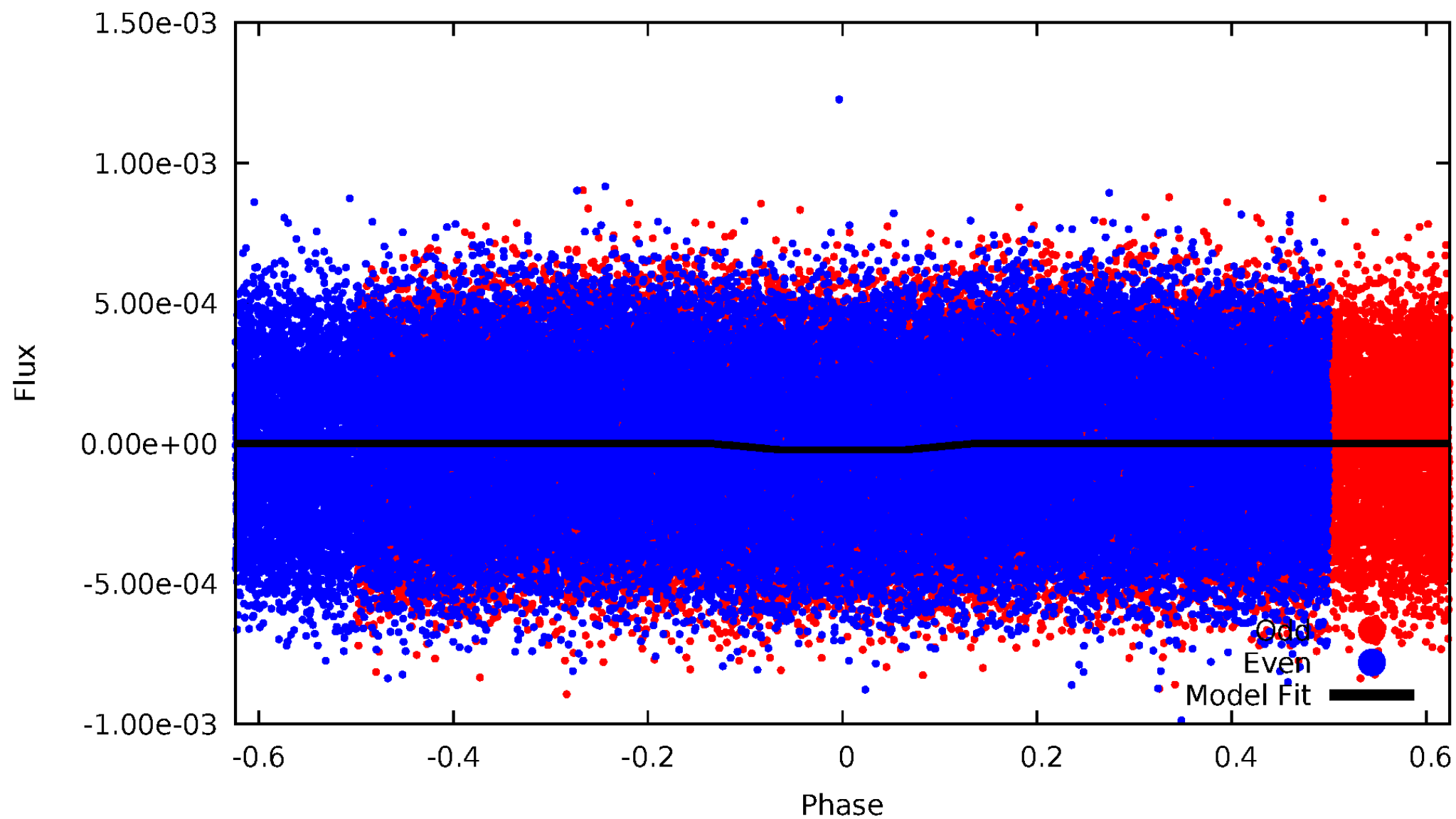
DV Odd/Even

TCE 012020590-01



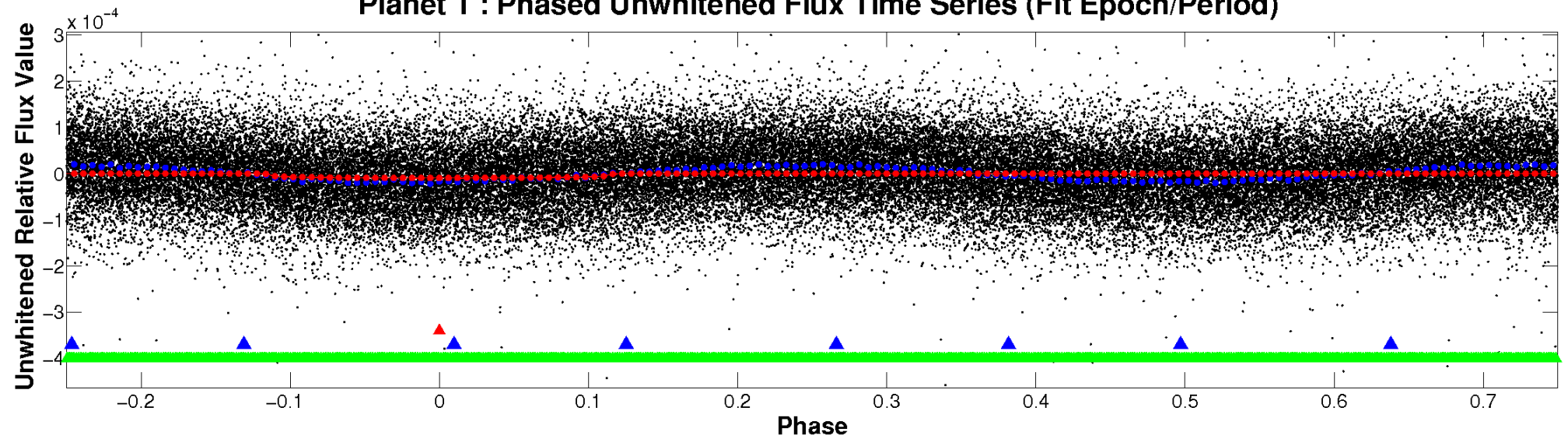
ALT Odd/Even

TCE 012020590-01

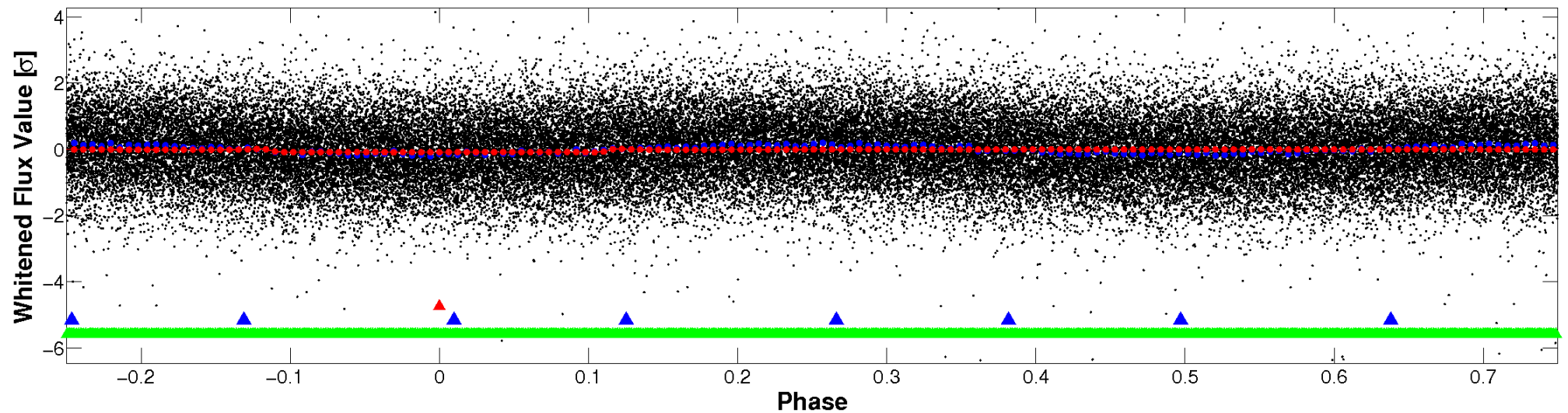


Non-Whitened Vs. Whitened Light Curve

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

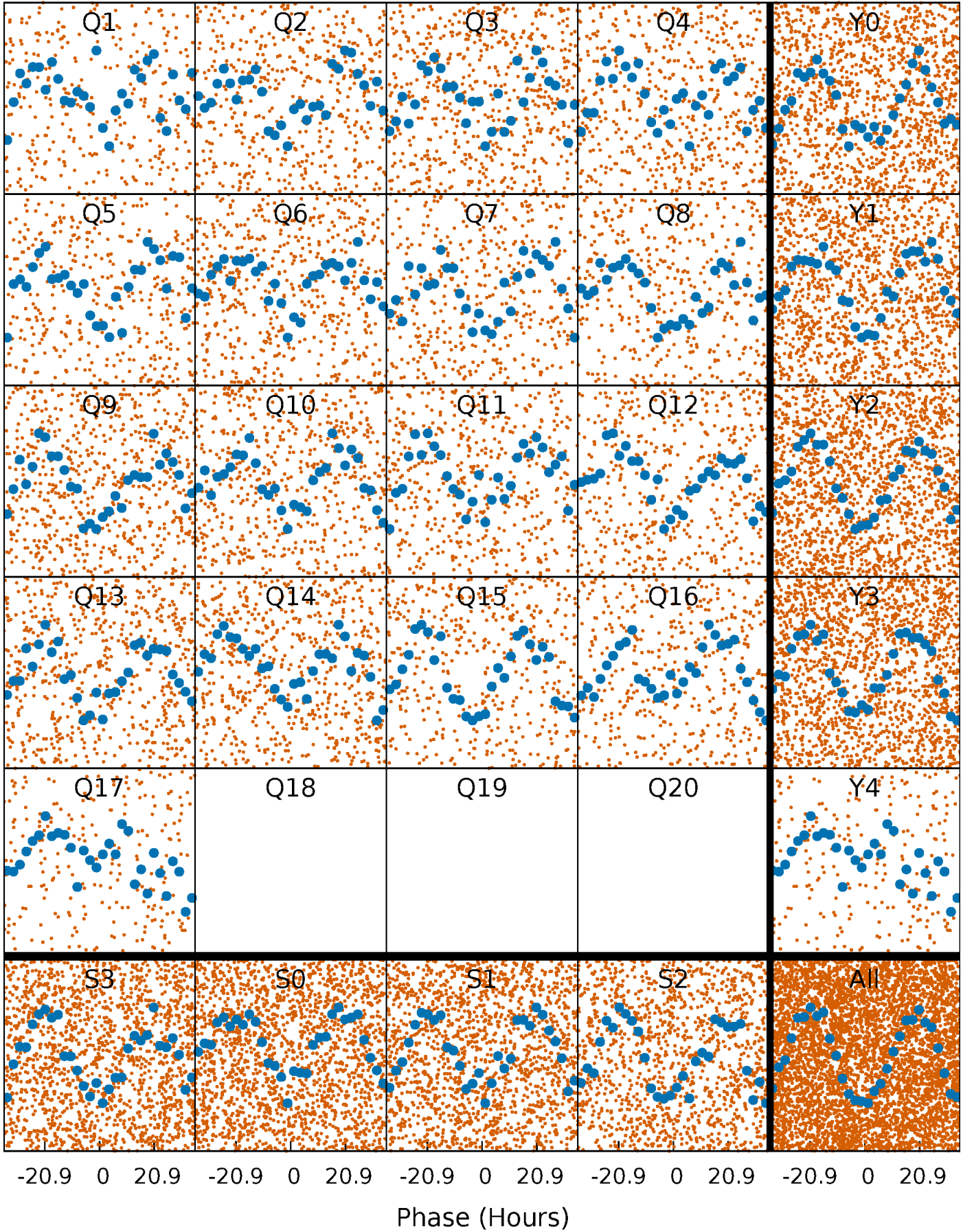


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



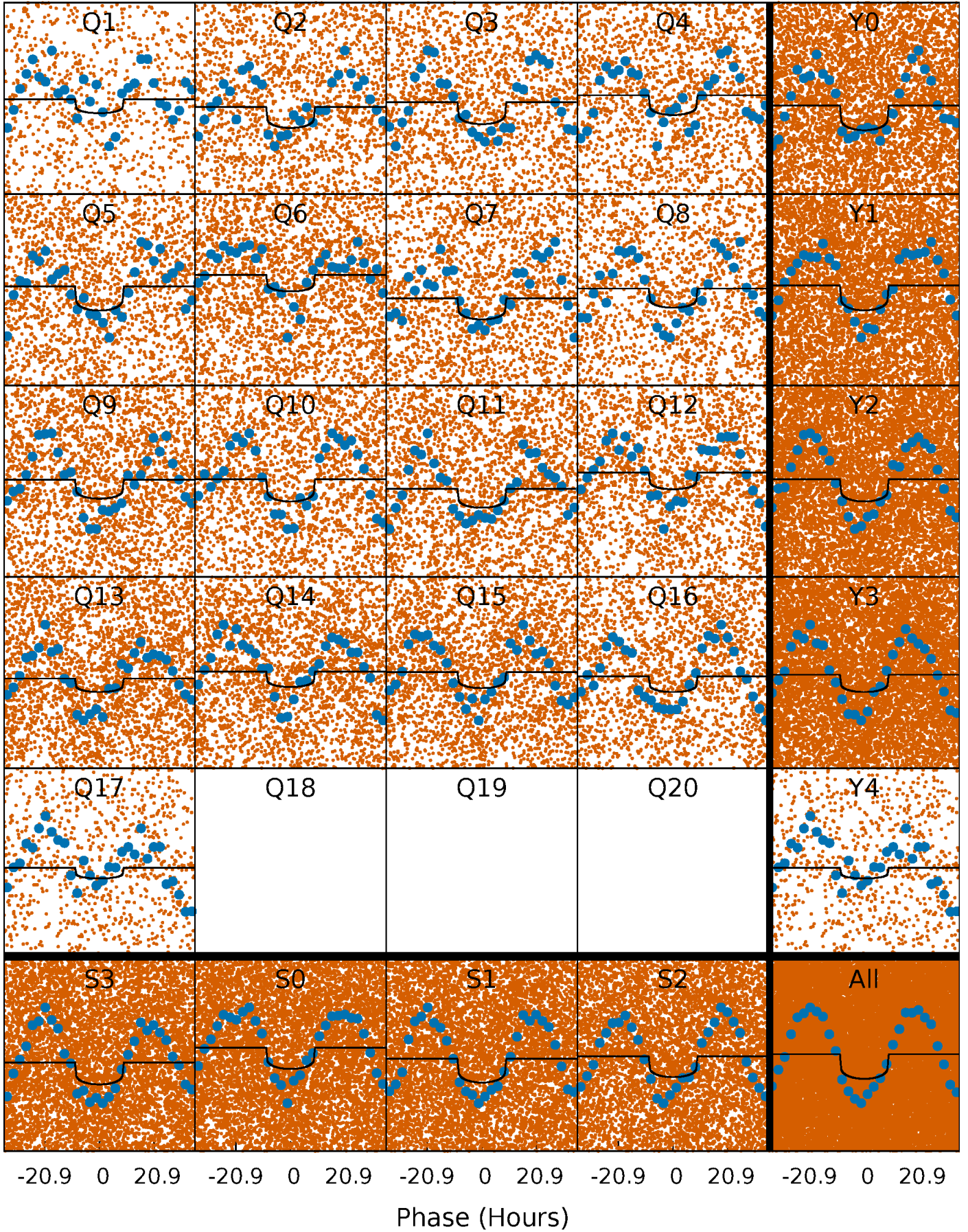
PDC Quarter-Phased Transit Curves

TCE 012020590-01 P= 3.337661 Days $T_0=134.447718$ (BKJD)



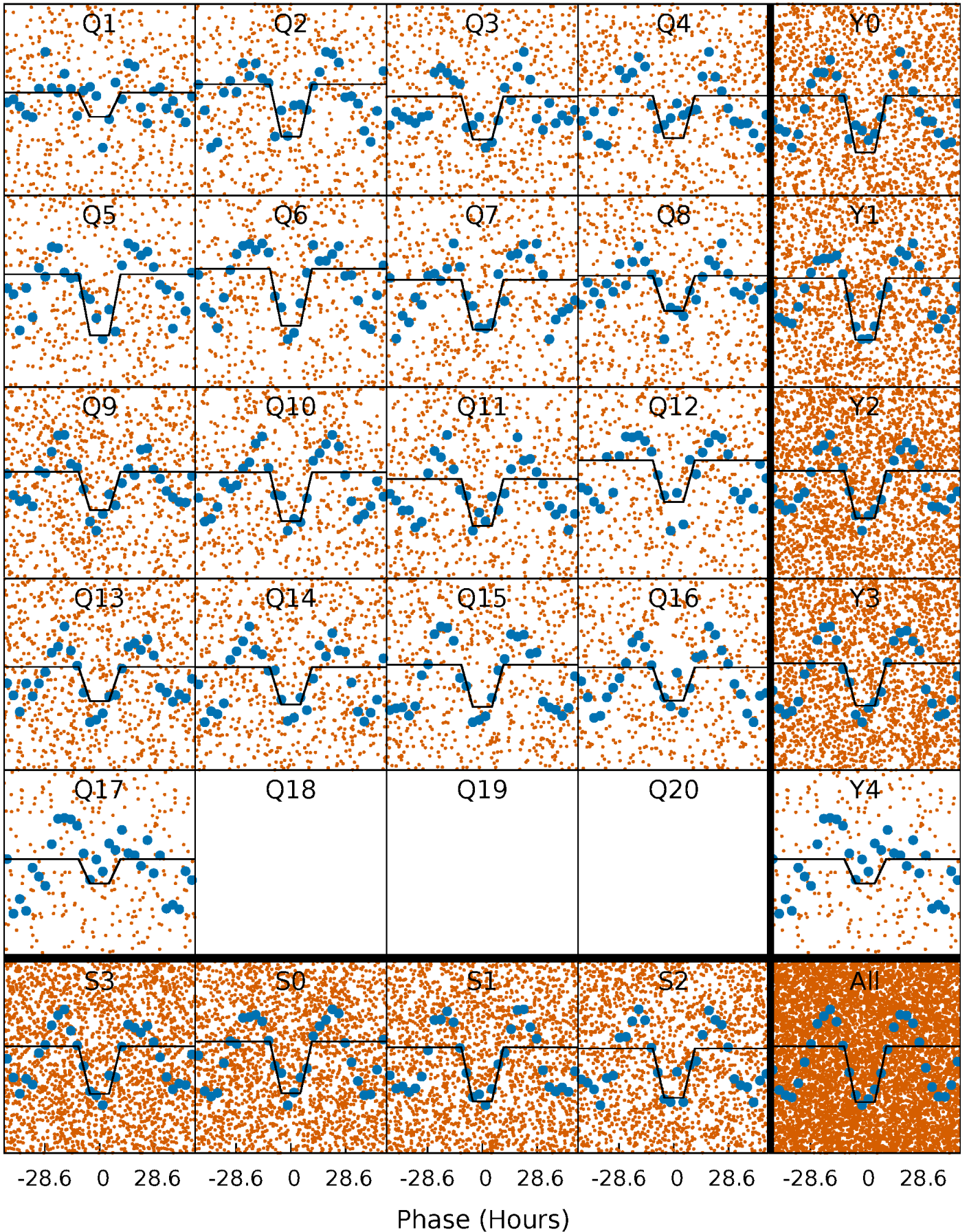
DV Quarter-Phased Transit Curves

TCE 012020590-01 P= 3.337661 Days $T_0=134.447718$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

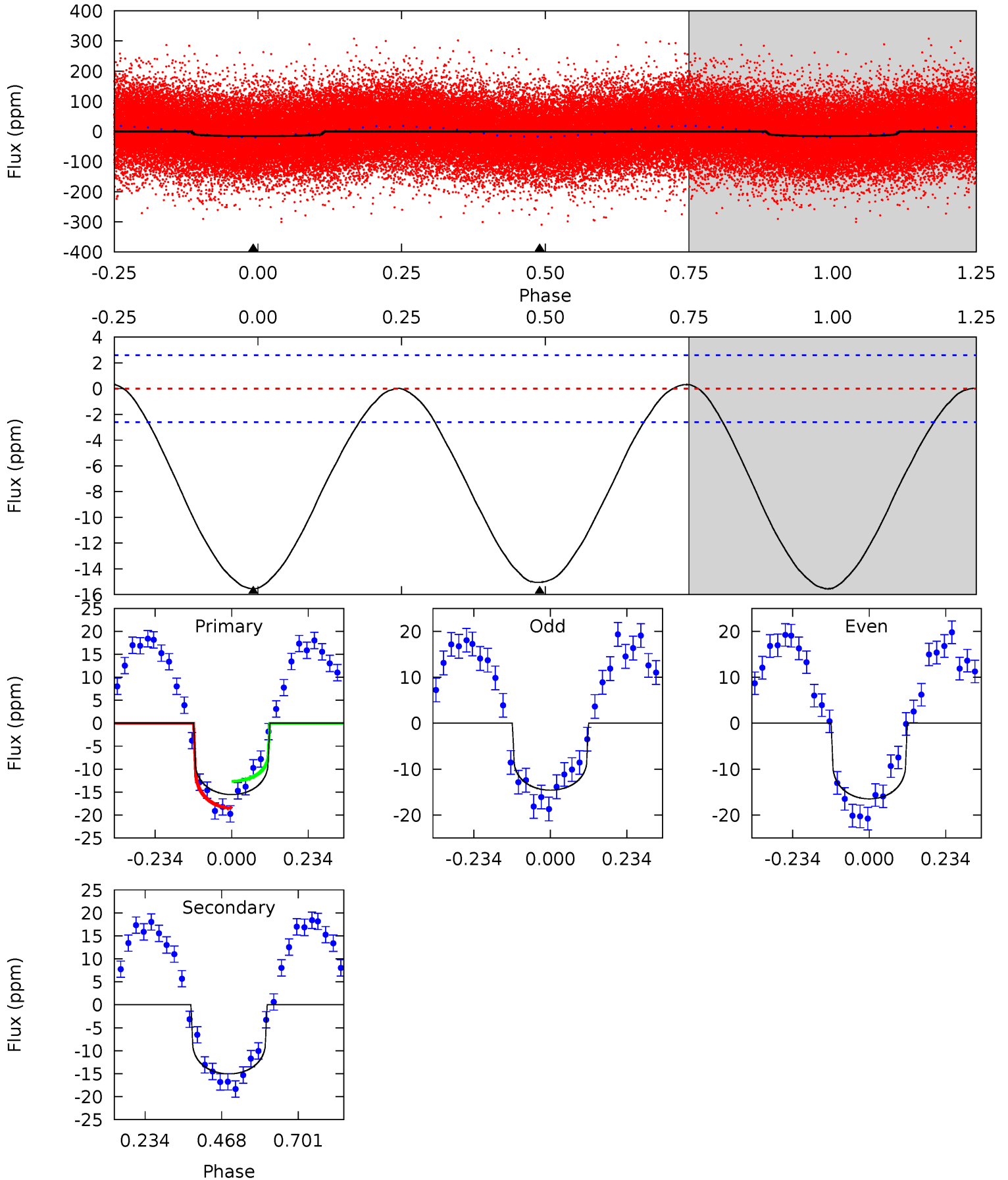
TCE 012020590-01 P= 3.337212 Days $T_0=134.522830$ (BKJD)



DV Model-Shift Uniqueness Test

012020590-01, P = 3.337661 Days, E = 131.110057 Days

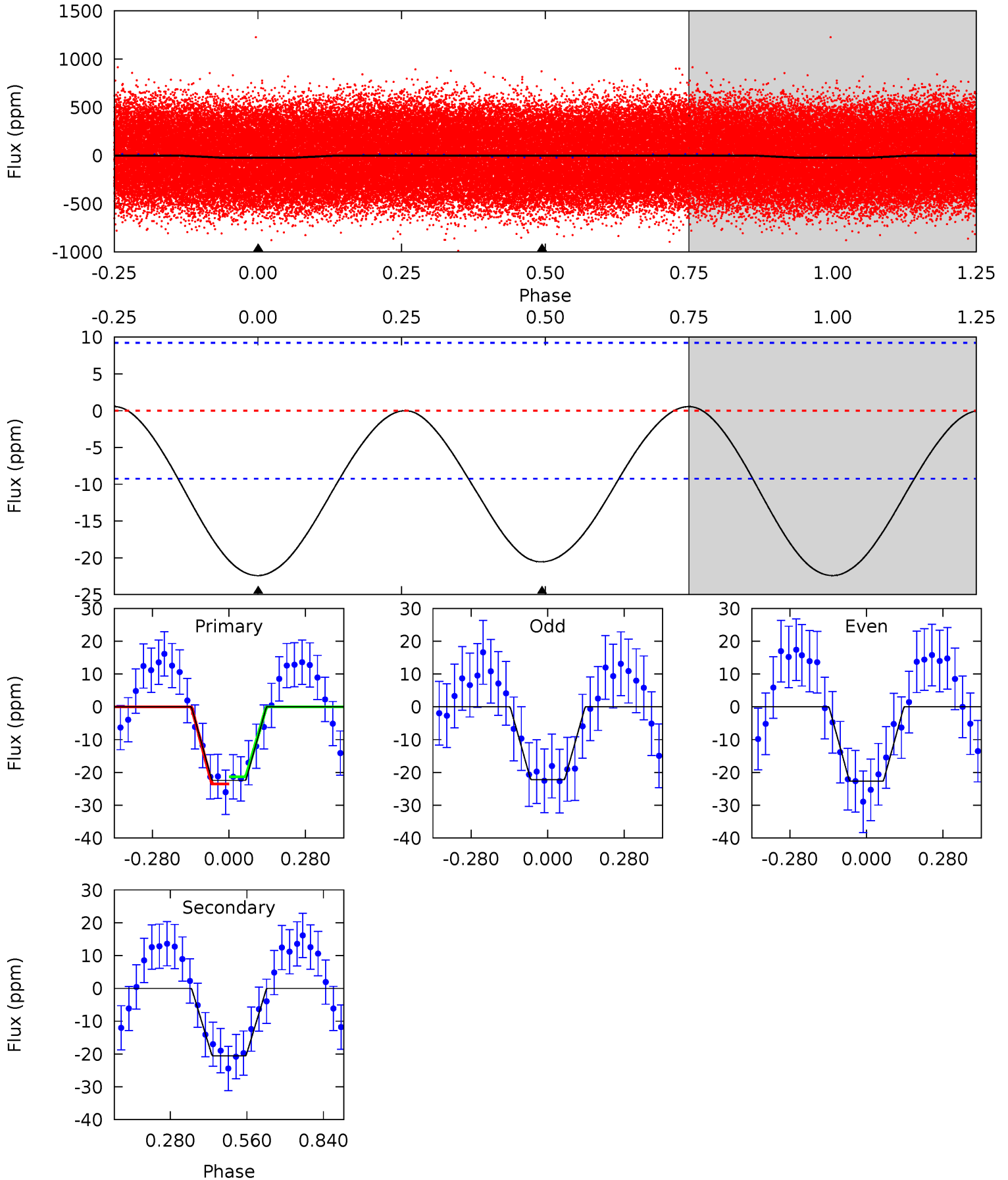
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
26.2	25.4	0	0	4.38	1.19	0.35	26.2	26.2	25.4	25.4	1.60	1.03	0.02	5.15



Alt Model-Shift Uniqueness Test

012020590-01, P = 3.337212 Days, E = 131.185618 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.5	9.66	0	0	4.34	1.08	0.17	10.5	10.5	9.66	9.66	0.11	1.10	0.02	0.52



Stellar Parameters For KIC 012020590

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	8226^{+228}_{-370}	$3.717^{+0.420}_{-0.140}$	$-0.040^{+0.250}_{-0.400}$	$3.299^{+0.978}_{-1.590}$	$2.067^{+0.361}_{-0.496}$	$0.081^{+0.313}_{-0.032}$
	+3%/-4%	+11%/-4%	+625%/-1000%	+30%/-48%	+17%/-24%	+386%/-40%
Source	KIC0	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 012020590-01 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-15 ± 1	$0.94^{+0.61}_{-0.46}$	3785^{+331}_{-461}	9885^{+6813}_{-2294}	29^{+81}_{-17}
Alt.	-21 ± 2	$1.58^{+0.71}_{-0.60}$	3792^{+330}_{-471}	7812^{+2519}_{-1204}	14^{+21}_{-7}

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

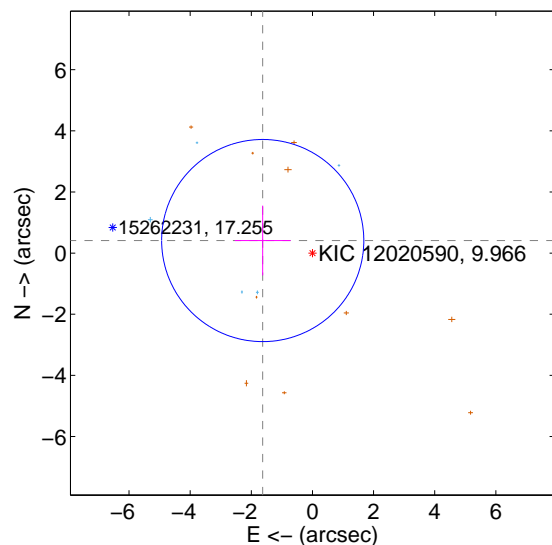
Supplemental centroid analysis for 012020590-01. **Kepler magnitude: 9.97.** Transit SNR 10.18

There are 5 quarters with good PRF difference image offsets

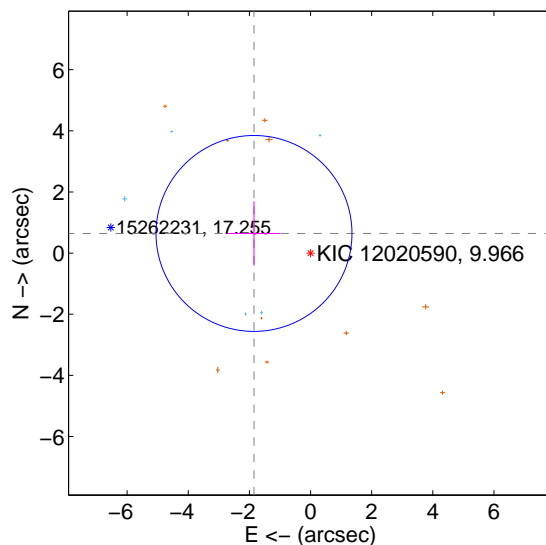
The direct PRF centroid is offset from the target star catalog position by about 1.13 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.677 ± 1.102	1.52	1.626 ± 0.913	0.410 ± 1.141
PRF-fit source offset from KIC position	1.957 ± 1.068	1.83	1.849 ± 0.855	0.643 ± 1.051
photometric centroid source offset	2.24 ± 1.45	1.55	-2.22 ± 1.45	-0.34 ± 1.40

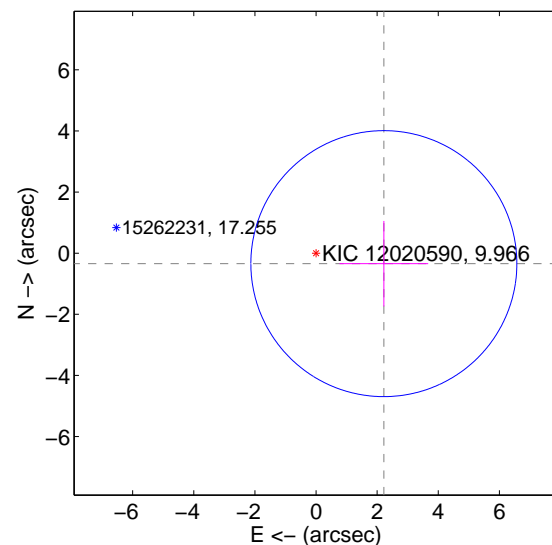
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

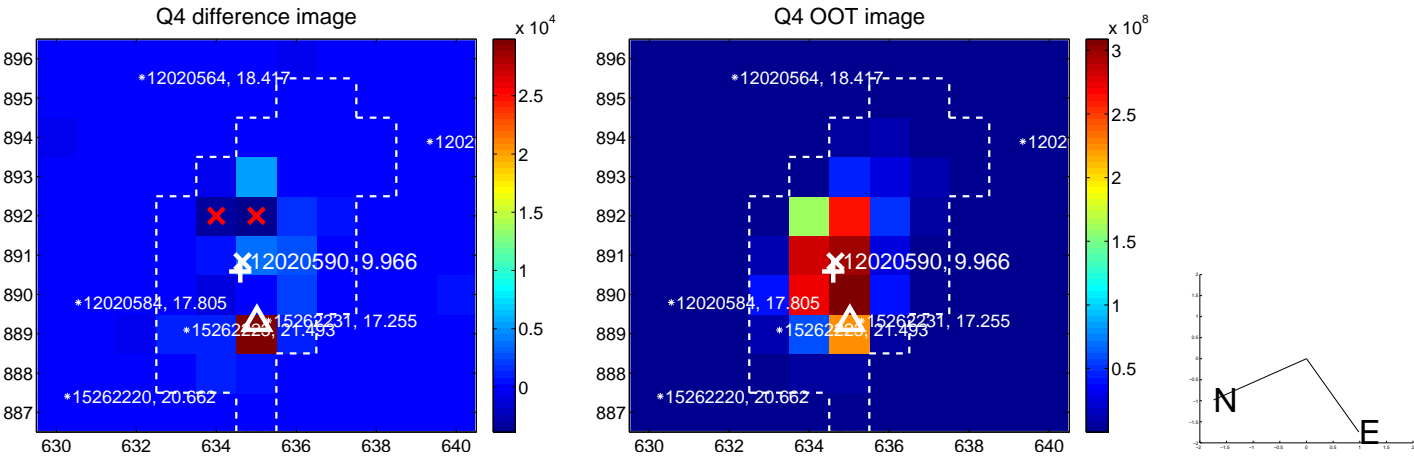
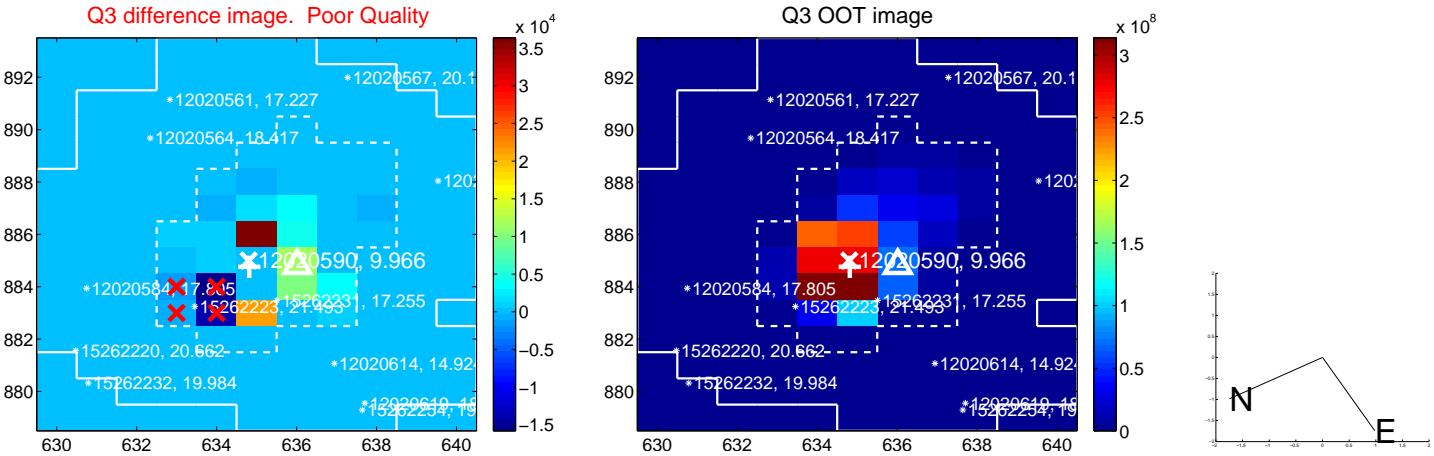
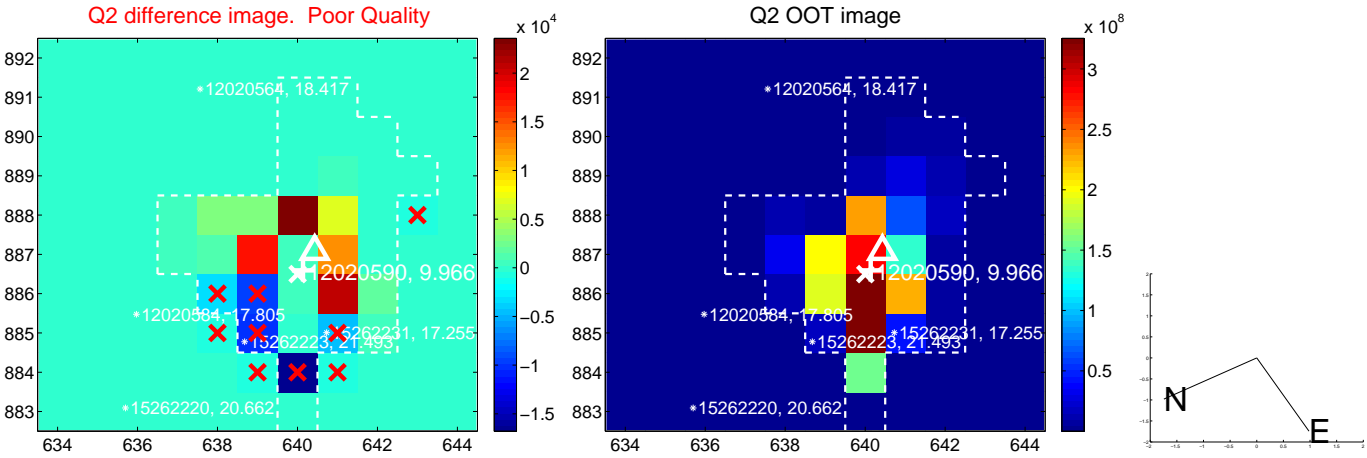
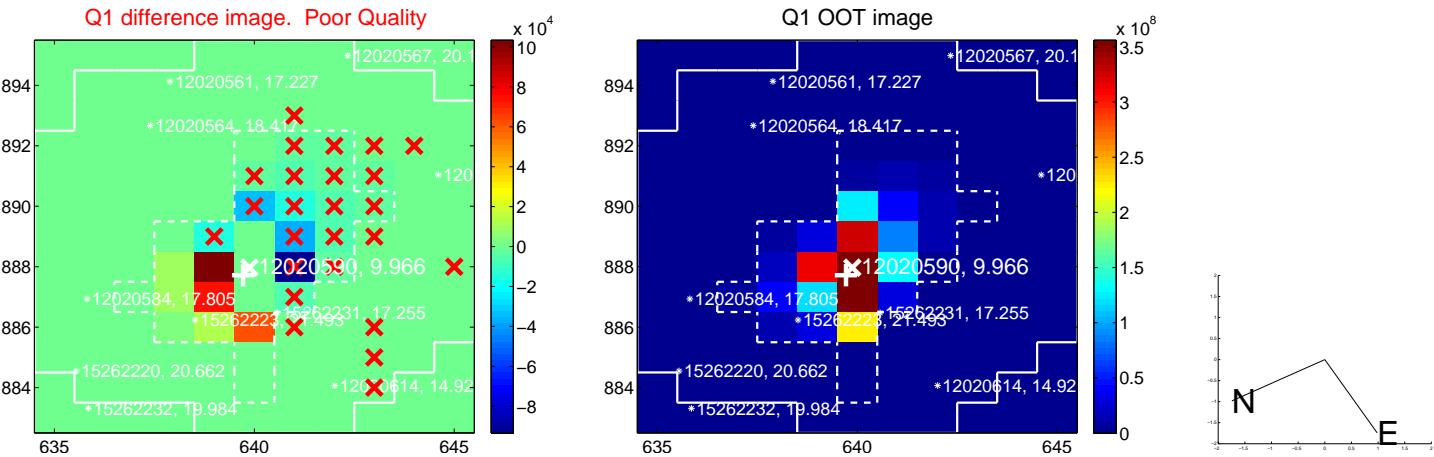


offset from photometric centroids

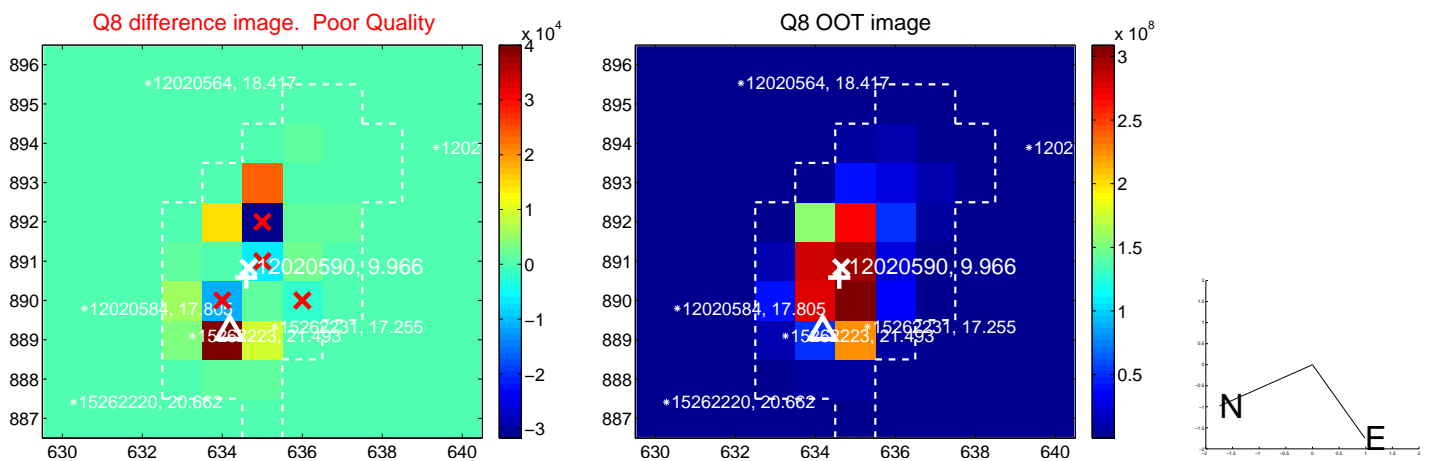
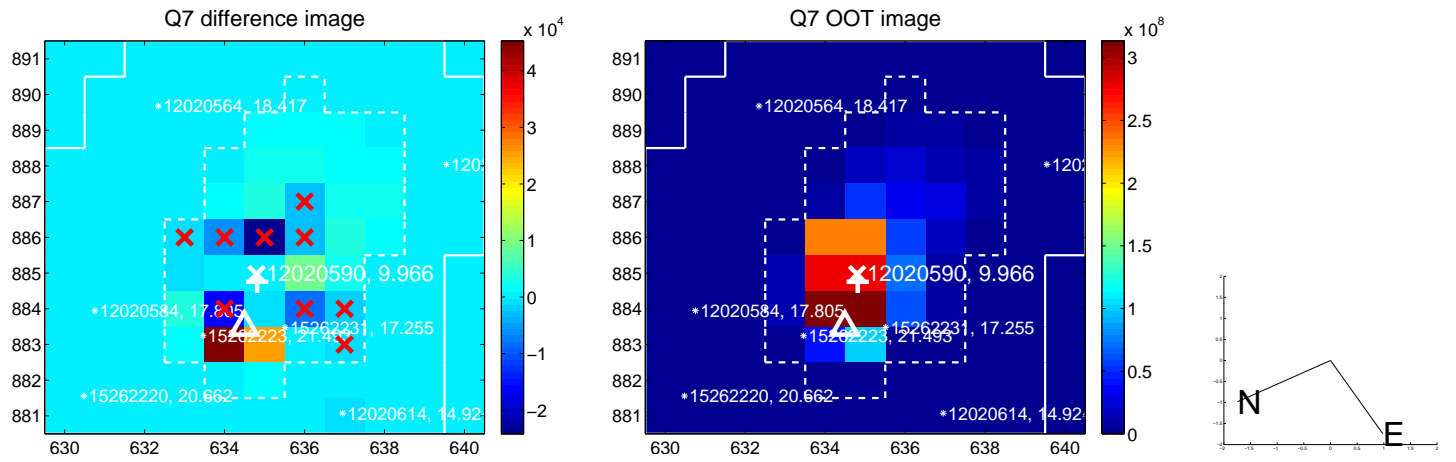
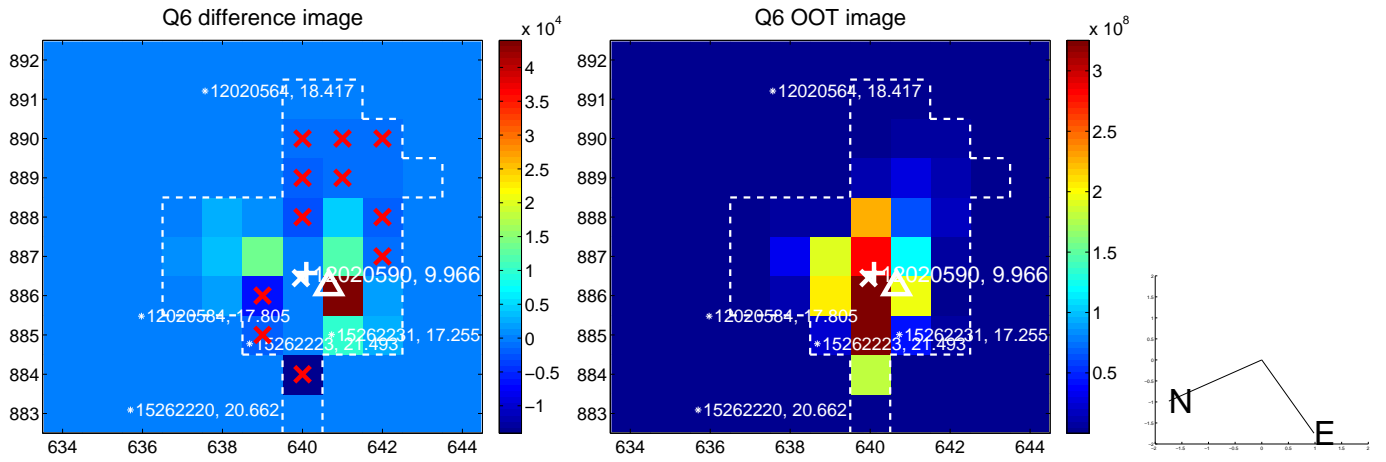
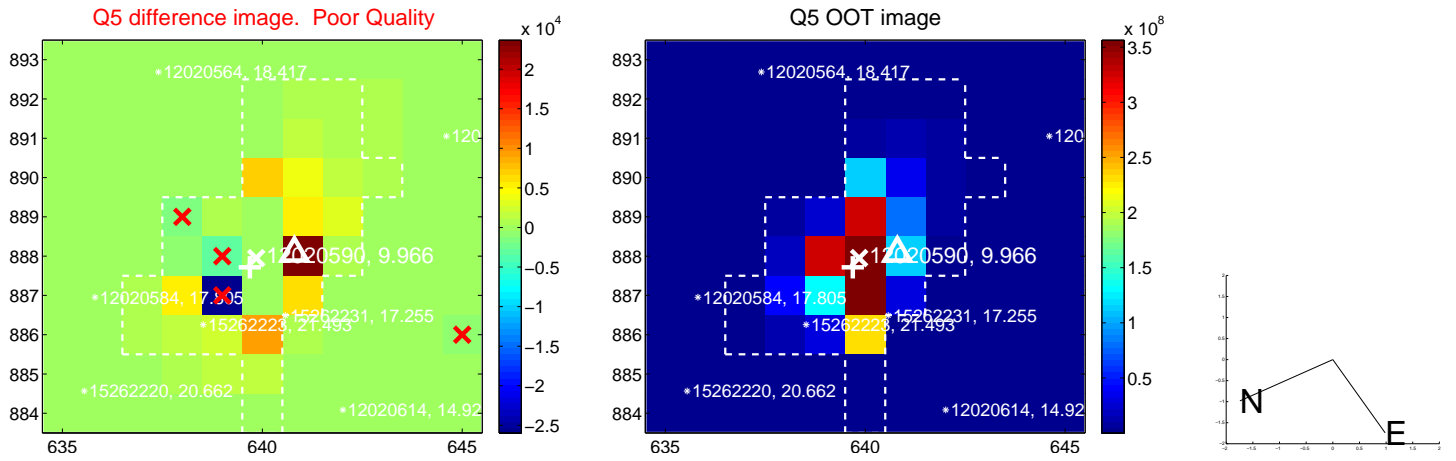


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

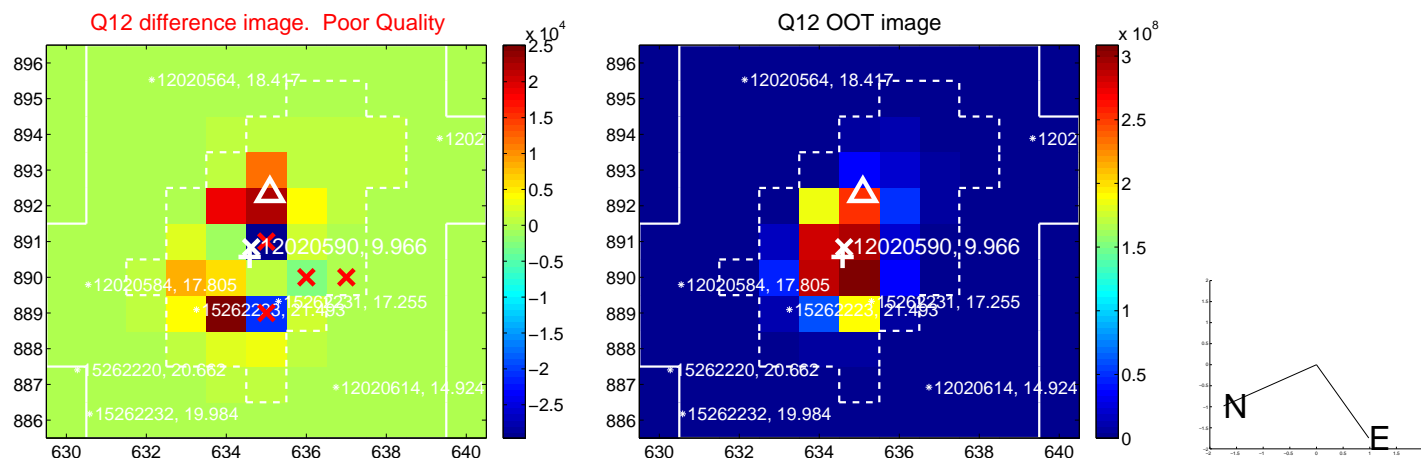
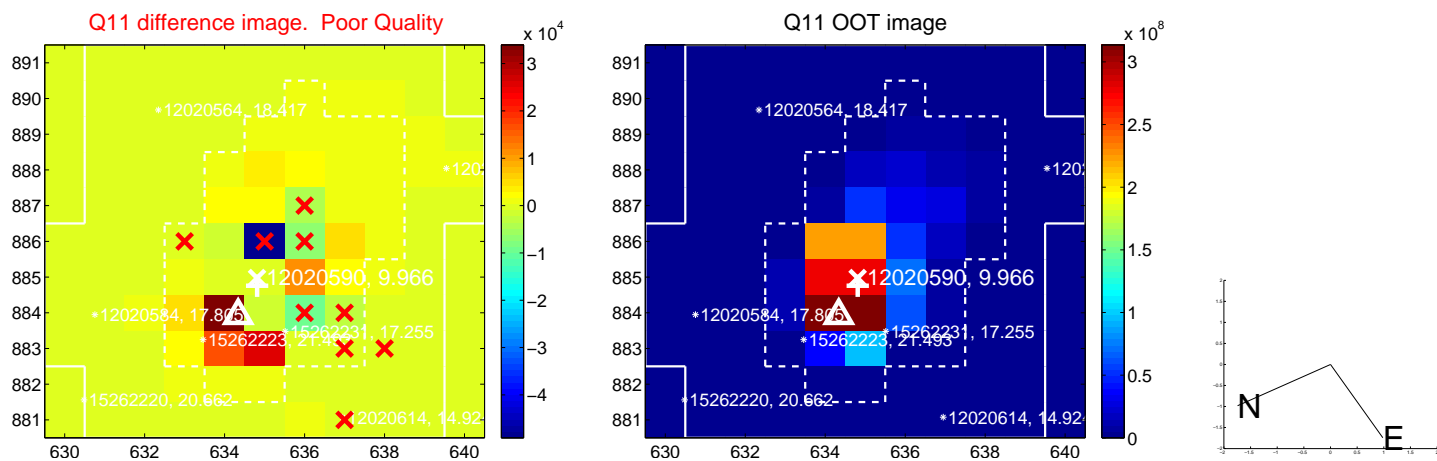
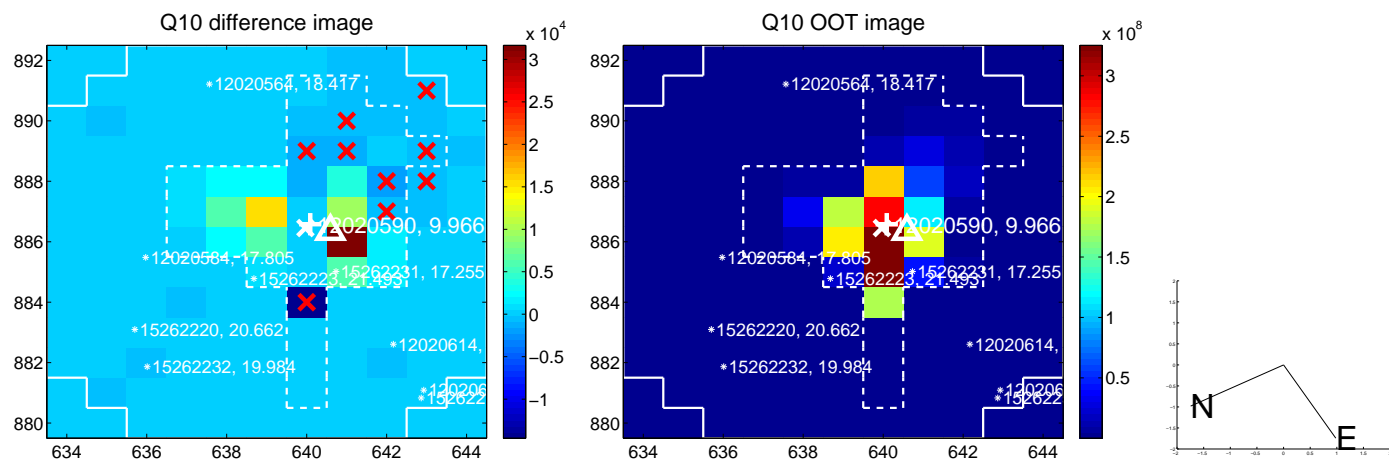
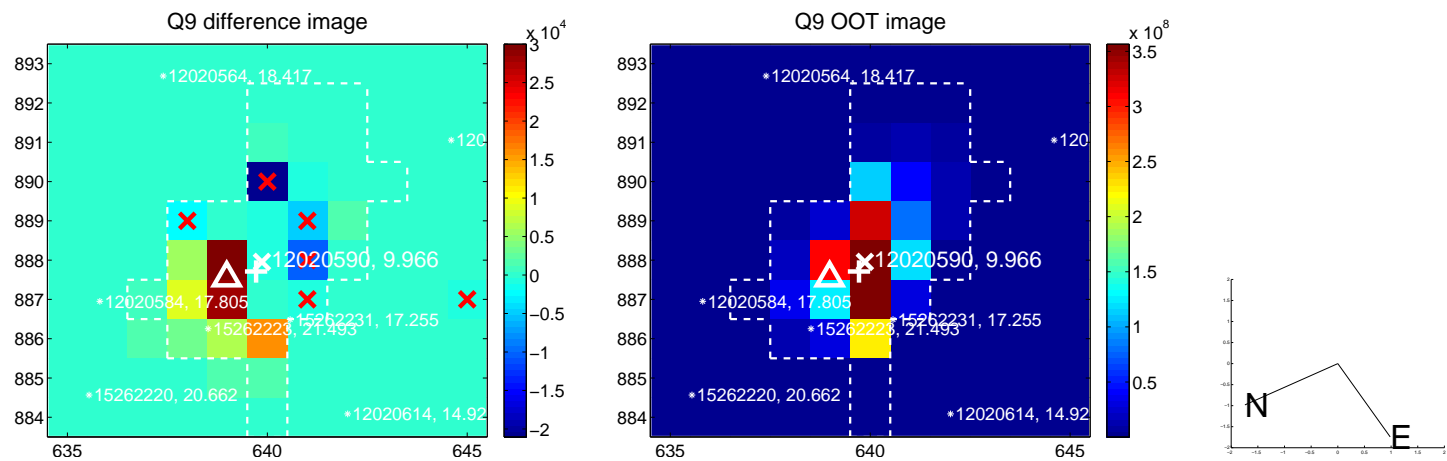
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



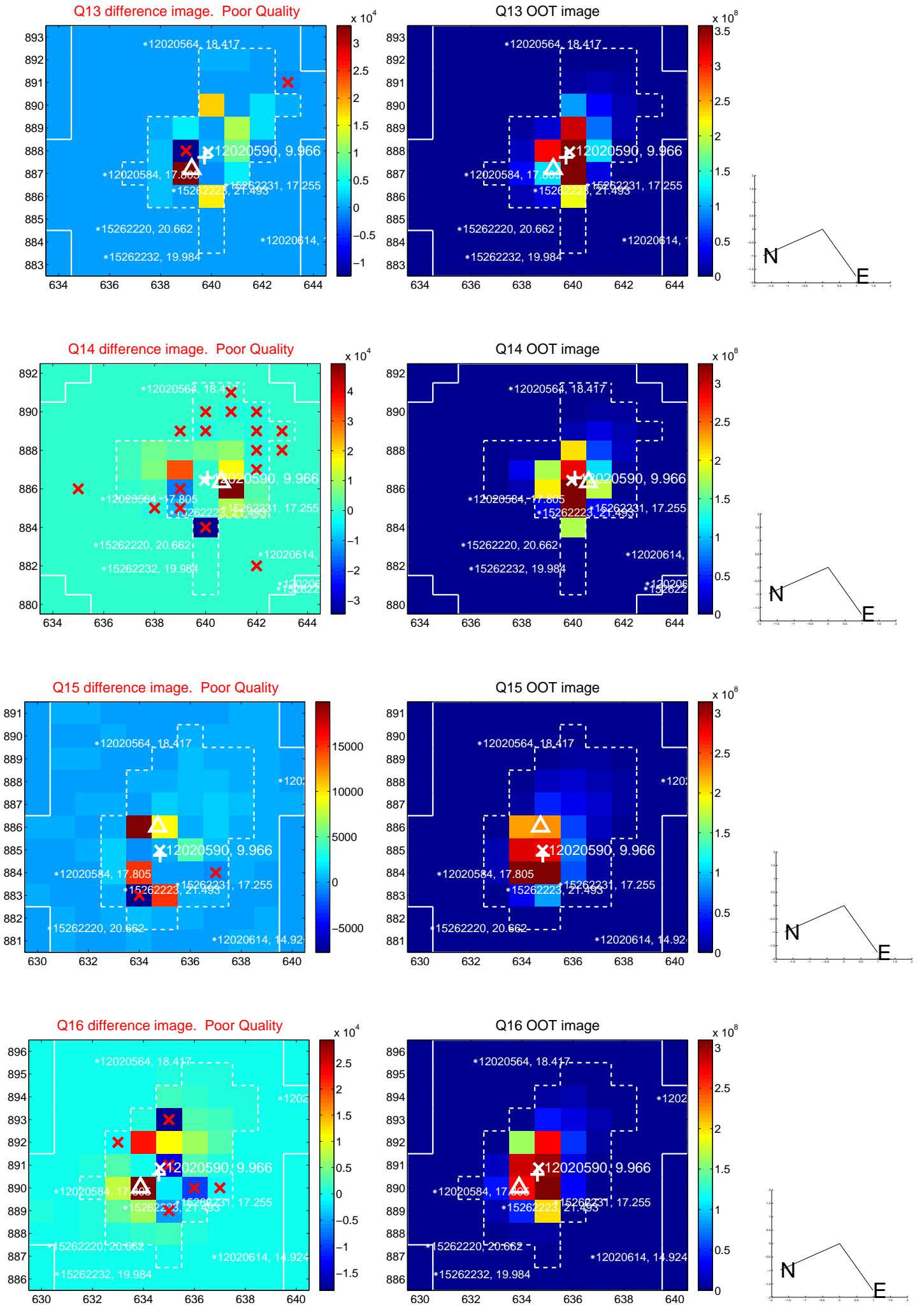
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



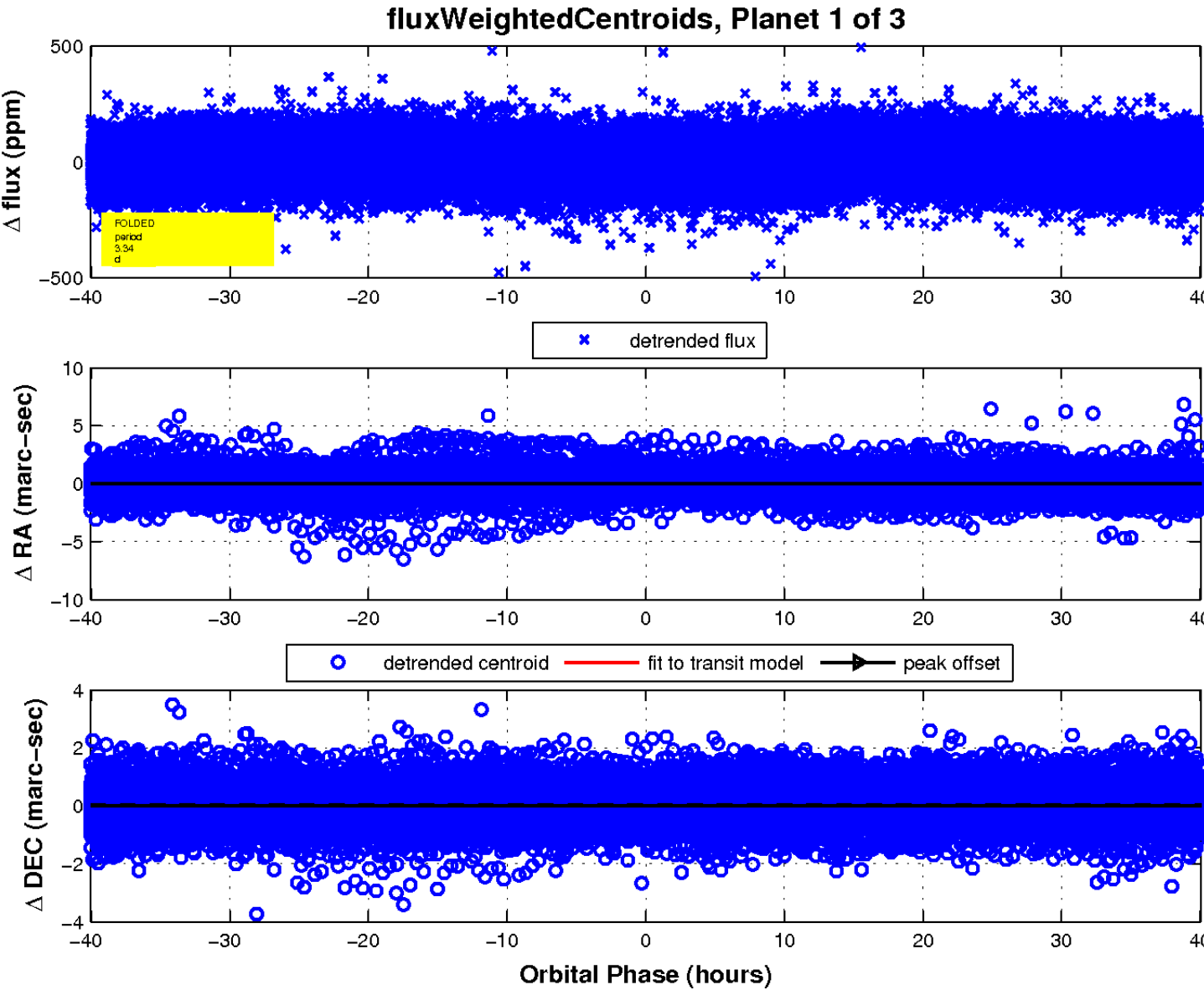
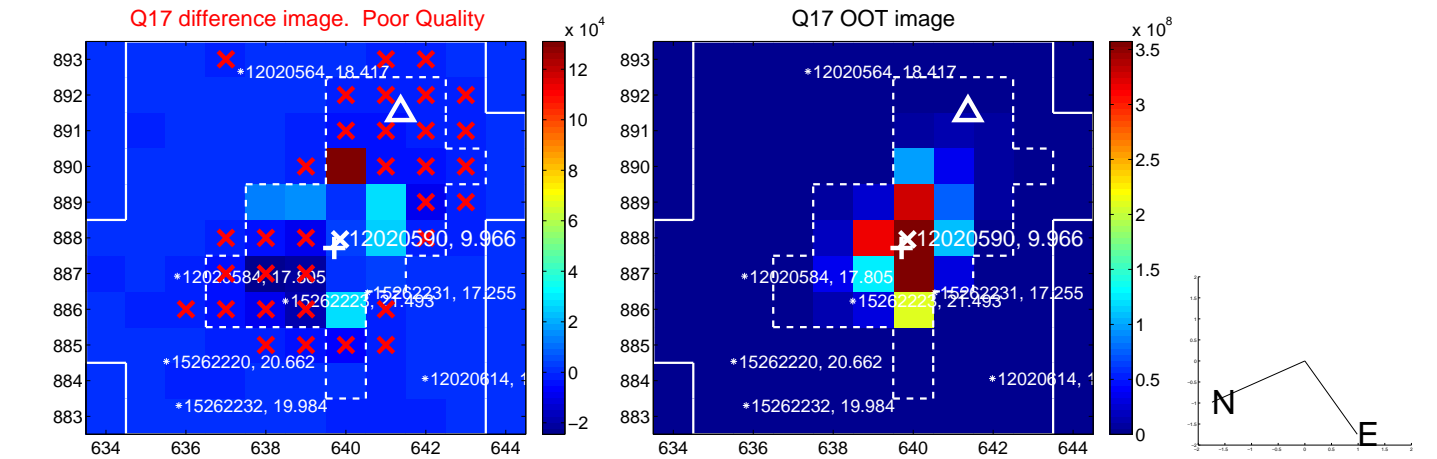
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

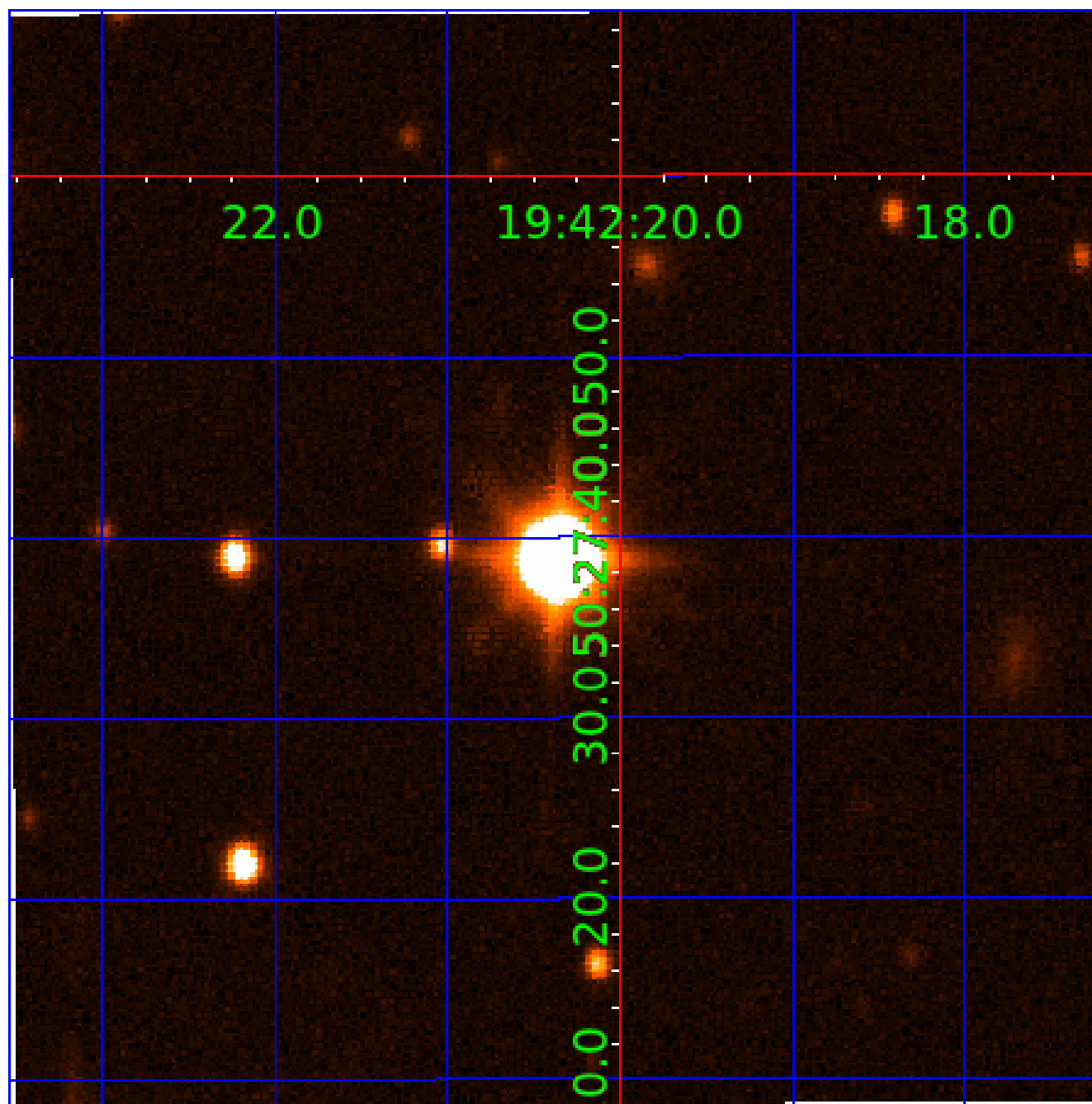


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 012020590

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})
012020590-01	OBS	No	3.337661	134.447718	9.6	18.282	10.7	10.2	3.30	8226	1.04	14387.36
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Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
012020590-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—CENT_SATURATED
012020590-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
012020590-03	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—CENT_SATURATED

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

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

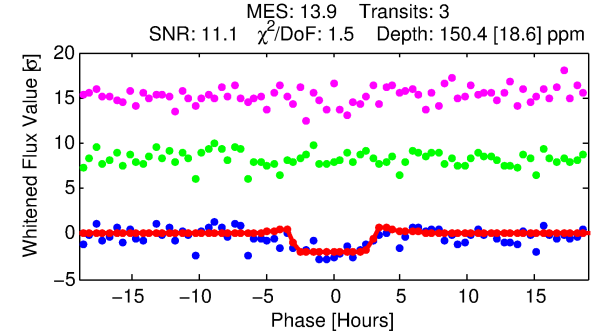
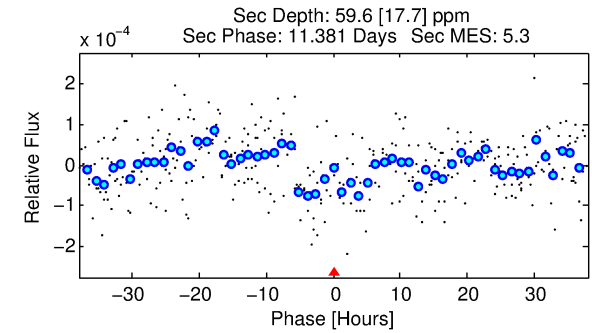
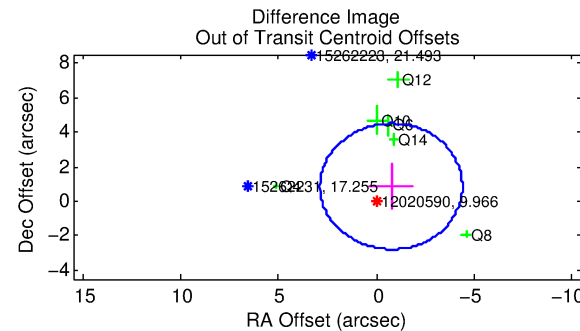
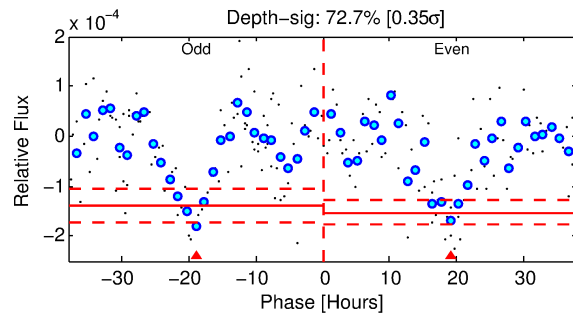
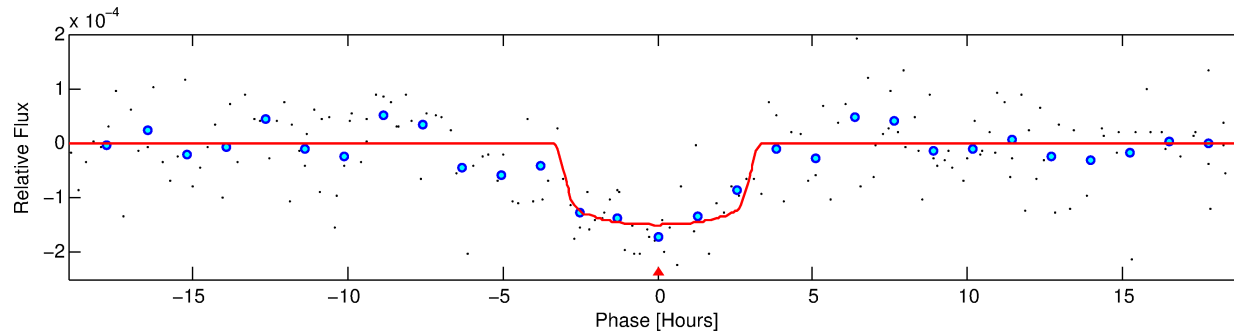
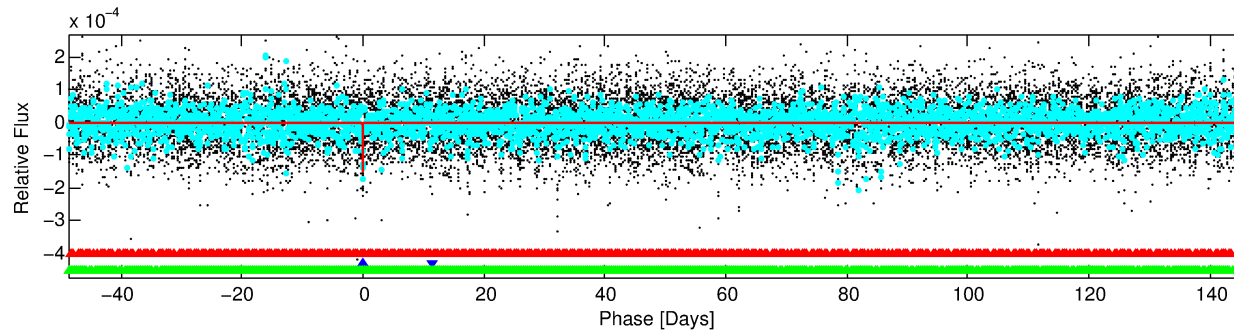
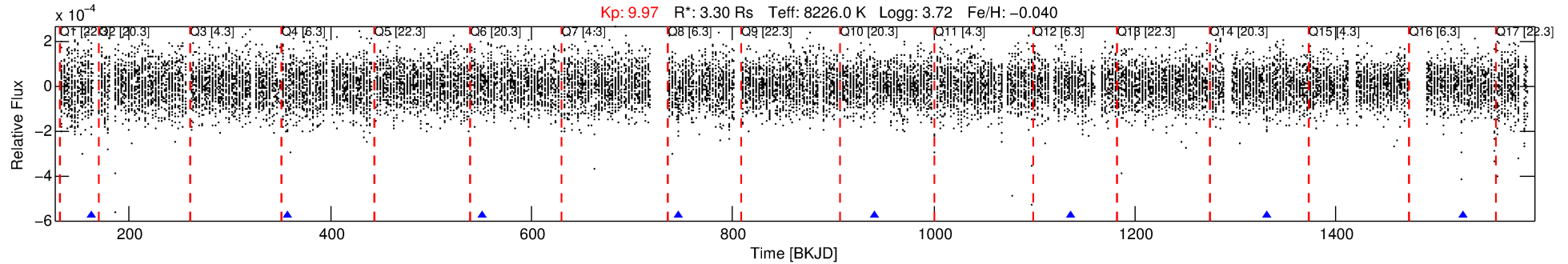
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 012020590-02

No Significant Match Found

DV One-Page Summary

KIC: 12020590 Candidate: 2 of 3 Period: 194.825 d



DV Fit Results:

Period = 194.82534 [0.00303] d
Epoch = 162.0376 [0.0153] BKJD
 $R_p/R^* = 0.0129$ [0.0048]
 $a/R^* = 119.49$ [272.03]
 $b = 0.88$ [0.61]
 $\text{Seff} = 63.54$ [47.18]
 $T_{\text{eq}} = 720$ [134] K
 $R_p = 4.63$ [2.82] R_e
 $a = 0.8383$ [0.3815] AU
 $A_g = 1074.87$ [1159.91] [0.93 σ]
 $T_{\text{eff}} = 6373$ [1312] K [4.29 σ]

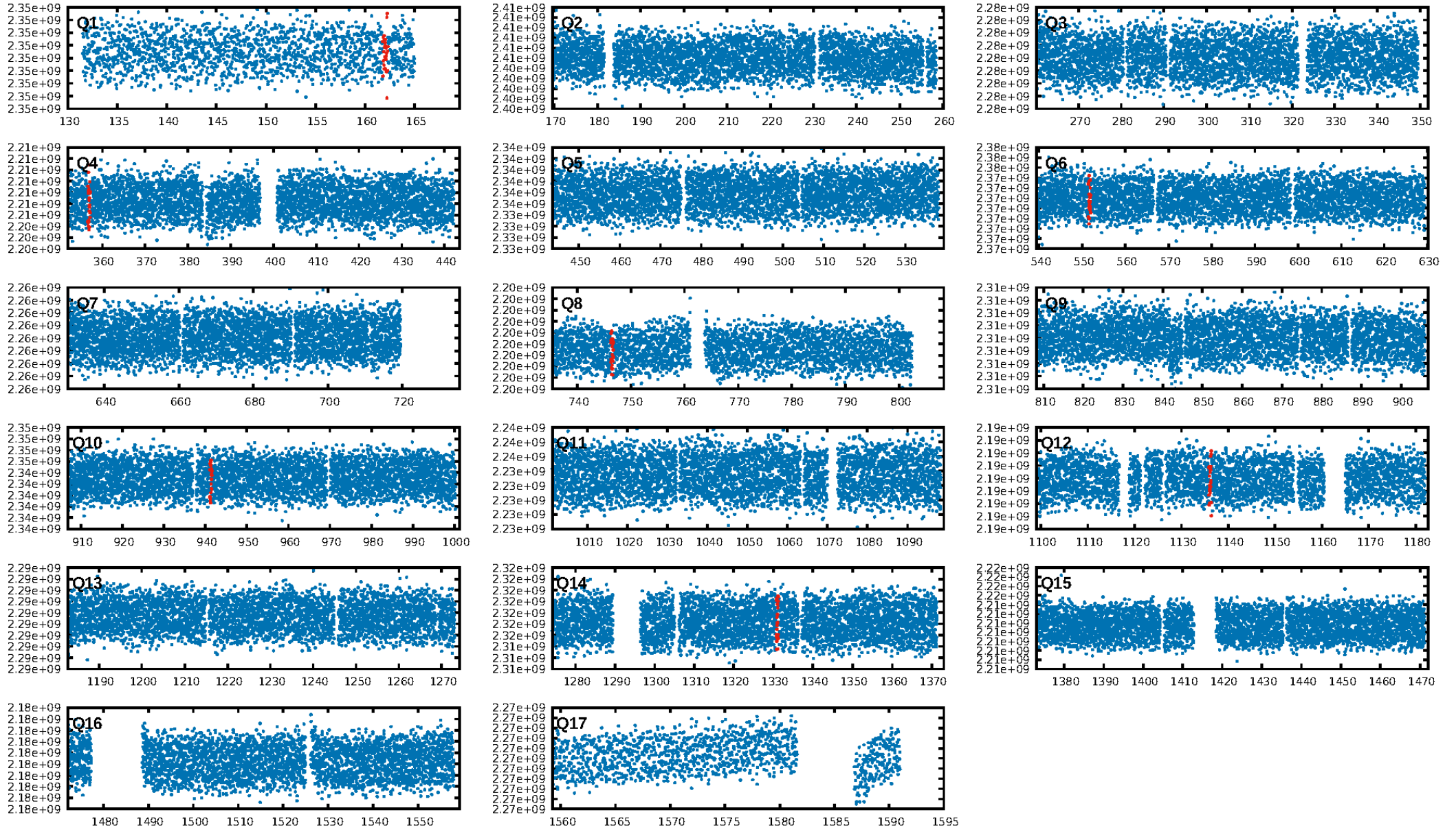
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [237.57 σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 79.5%
ModelChiSquareGof-sig: 95.4%
Bootstrap-pfa: 1.92e-15
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: N/A
Centroid-sig: 0.3%
Centroid-so: 1.751 arcsec [2.22 σ]
OotOffset-rm: 1.142 arcsec [0.94 σ]
OotOffset-st: 3/0/3/0 [6]
KicOffset-rm: 1.583 arcsec [1.22 σ]
KicOffset-st: 3/0/3/0 [6]
DiffImageQuality-fgm: 0.00 [0/6]
DiffImageOverlap-fno: 0.00 [0/7]

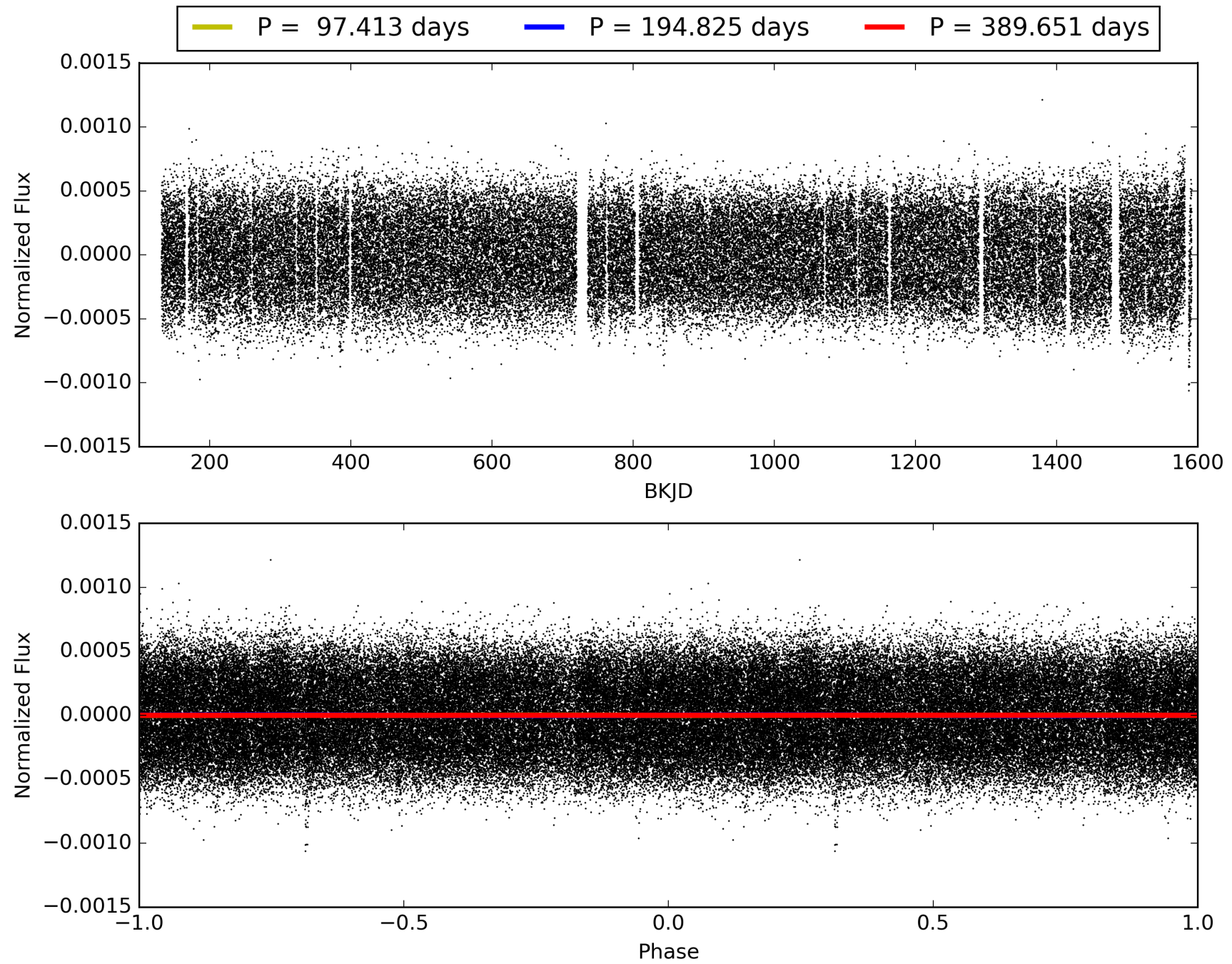
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 11:45:29 Z

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

TCE 012020590-02, PDC Light Curves

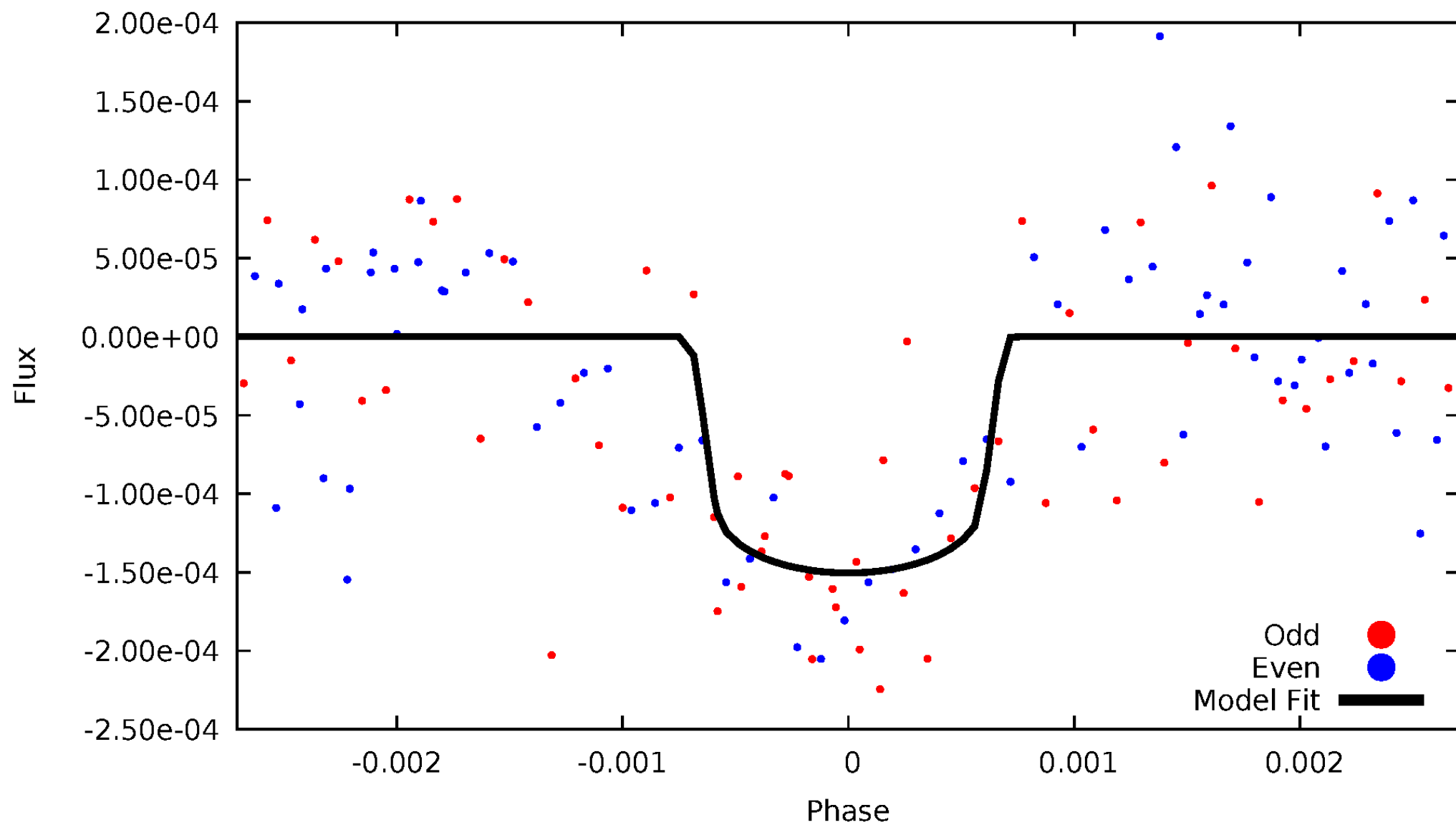


TCE 012020590-02



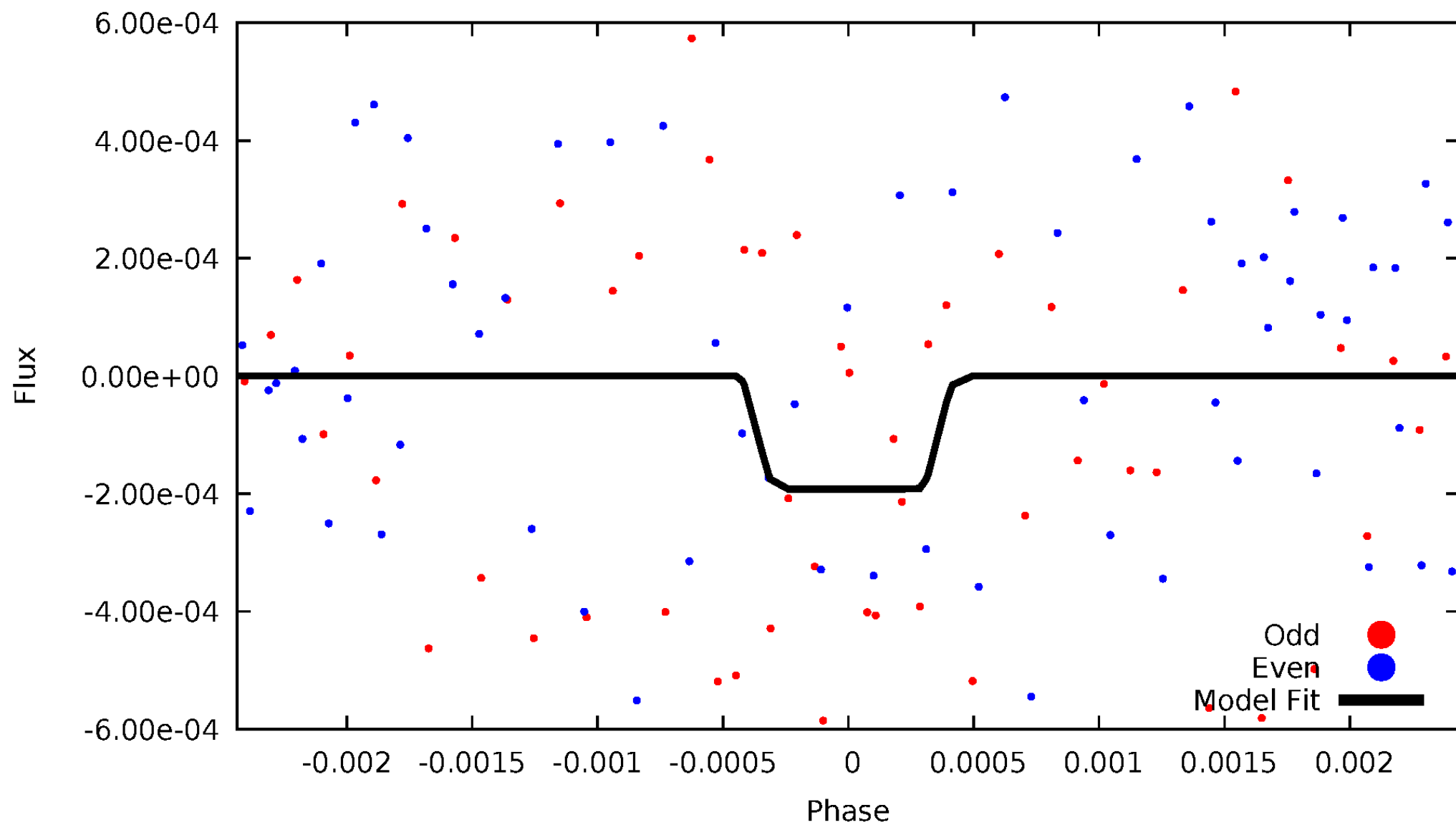
DV Odd/Even

TCE 012020590-02



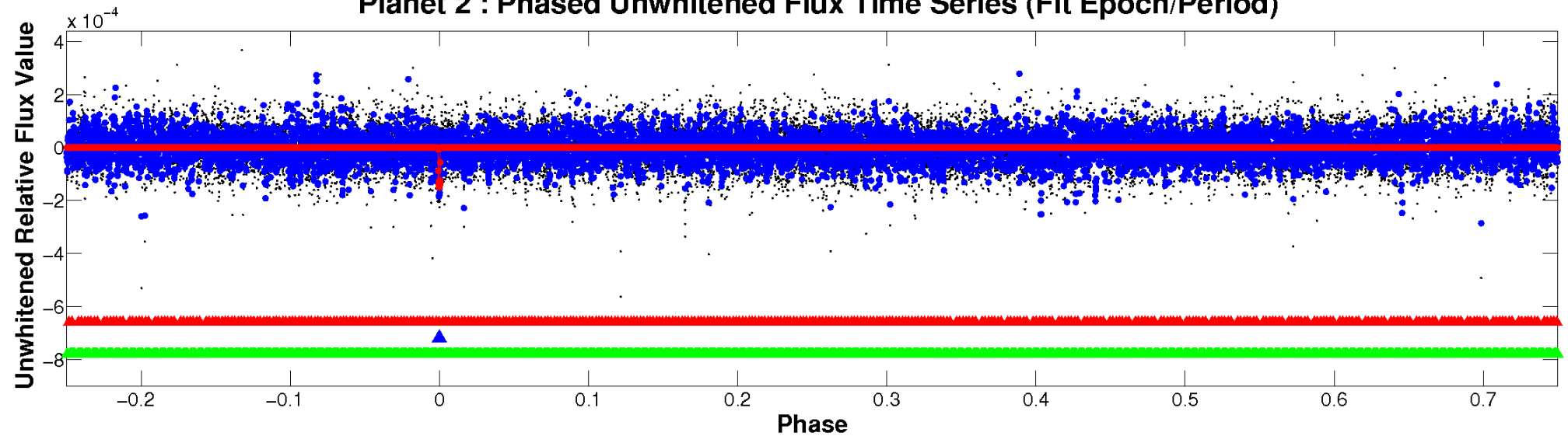
ALT Odd/Even

TCE 012020590-02

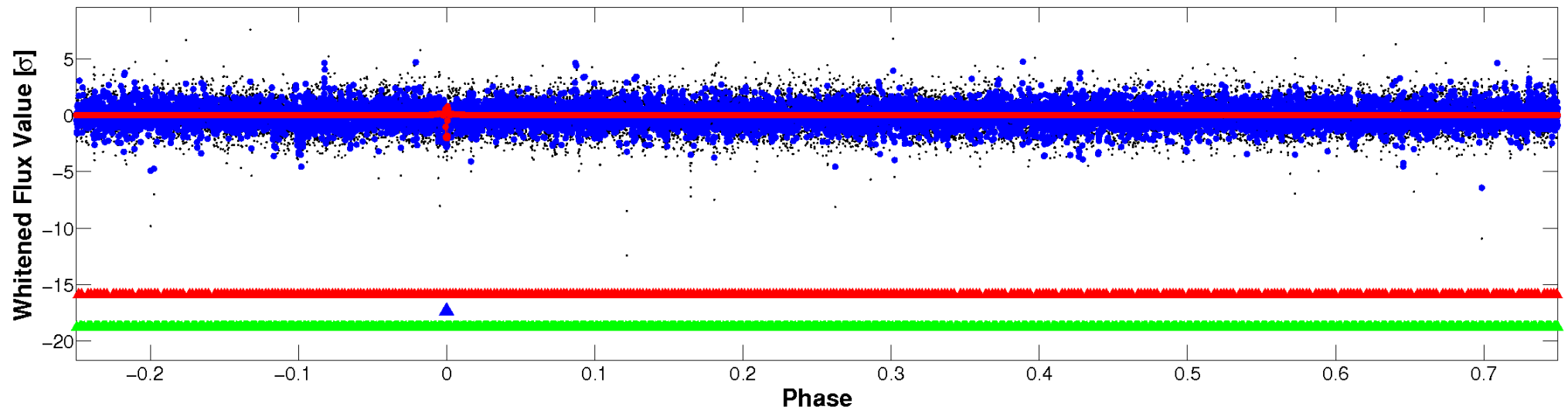


Non-Whitened Vs. Whitened Light Curve

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

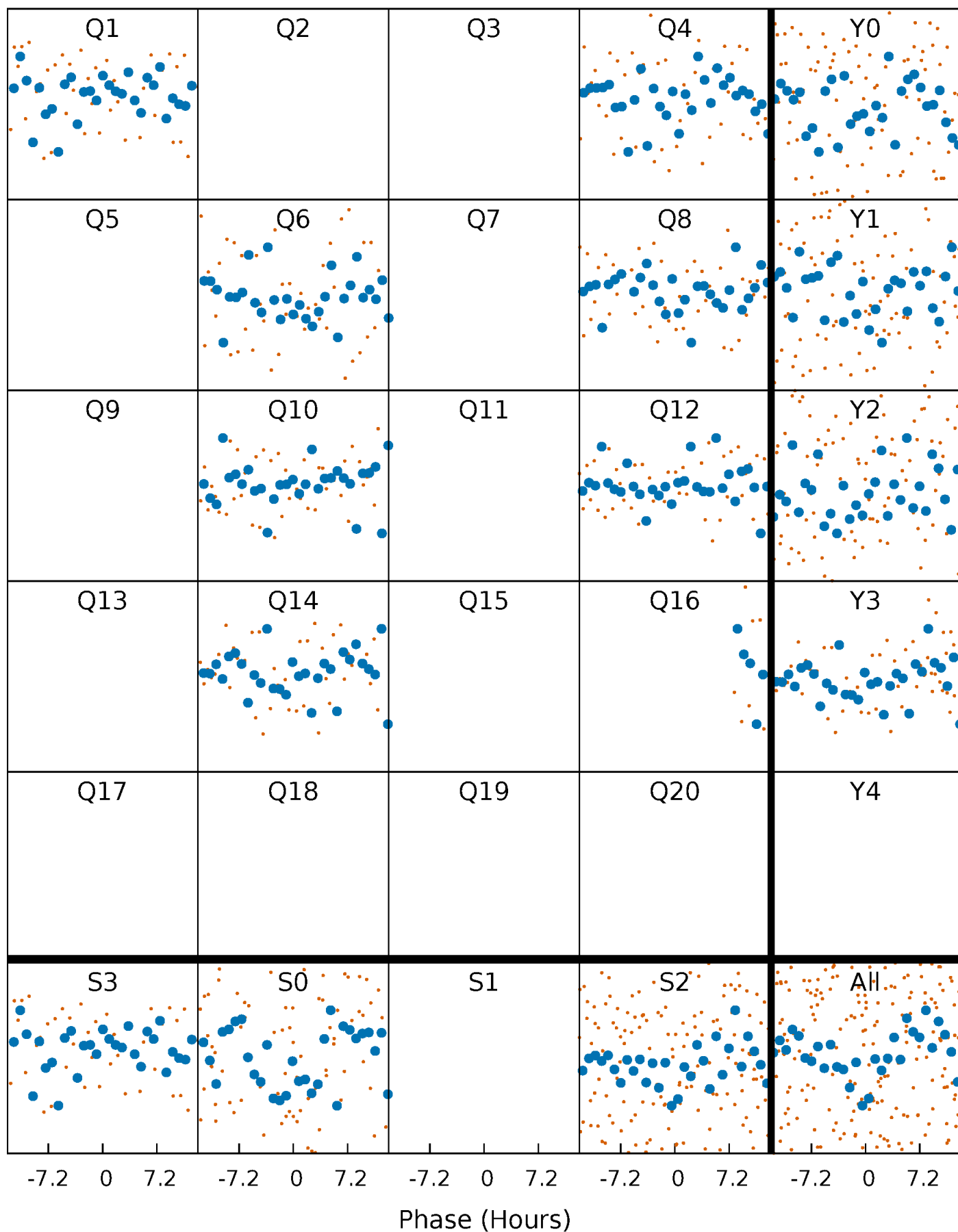


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



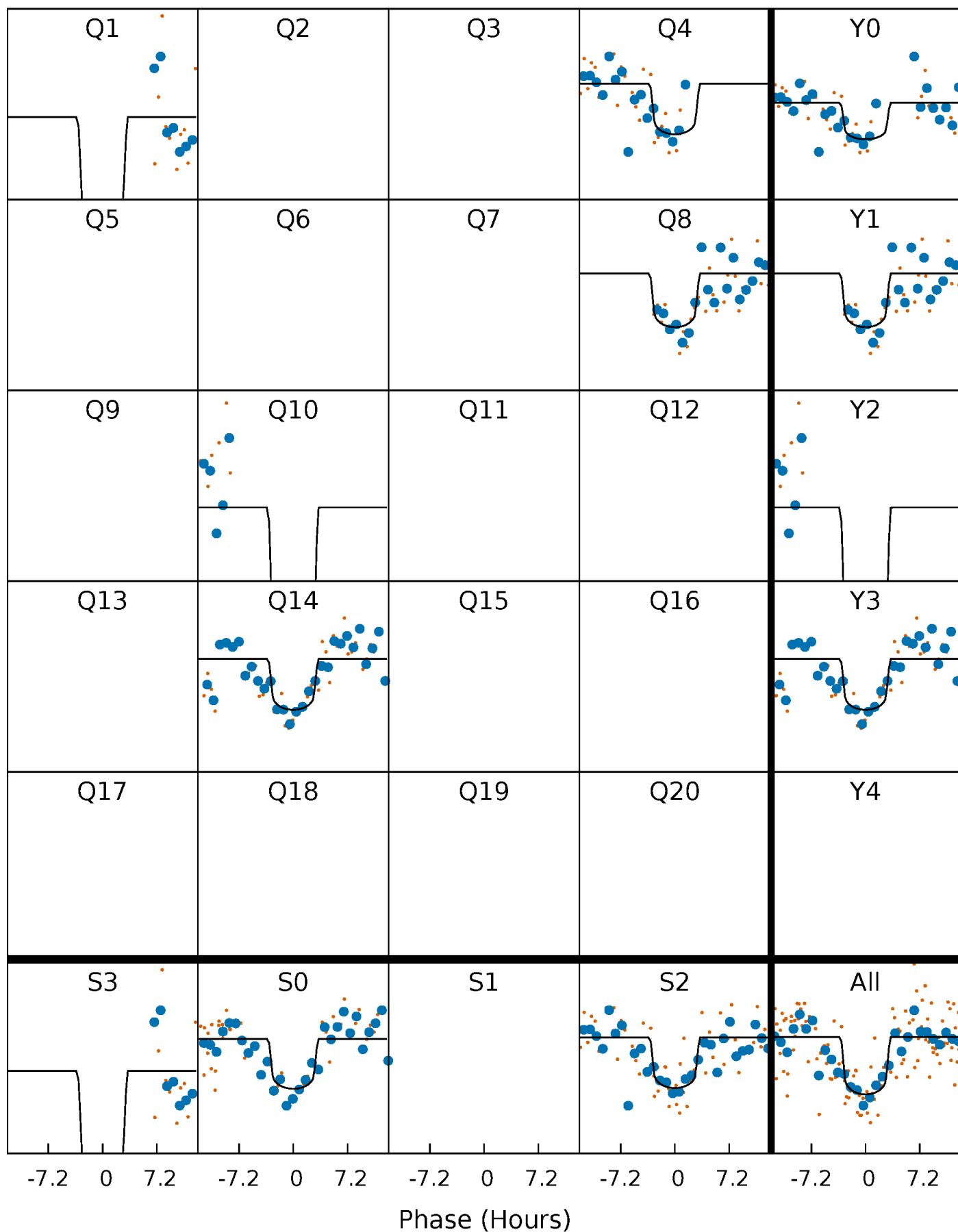
PDC Quarter-Phased Transit Curves

TCE 012020590-02 P=194.825343 Days $T_0=162.037617$ (BKJD)



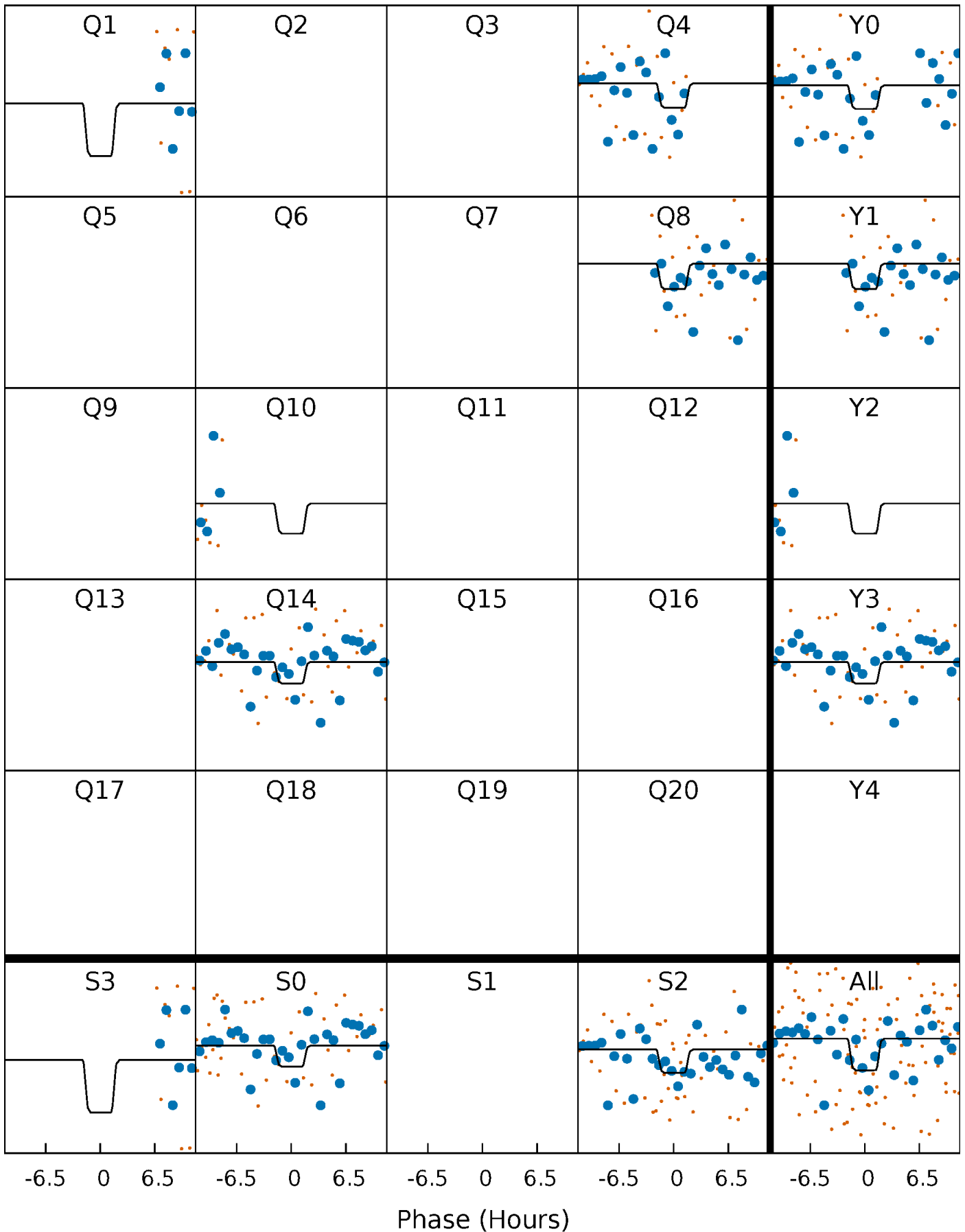
DV Quarter-Phased Transit Curves

TCE 012020590-02 $P=194.825343$ Days $T_0=162.037617$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

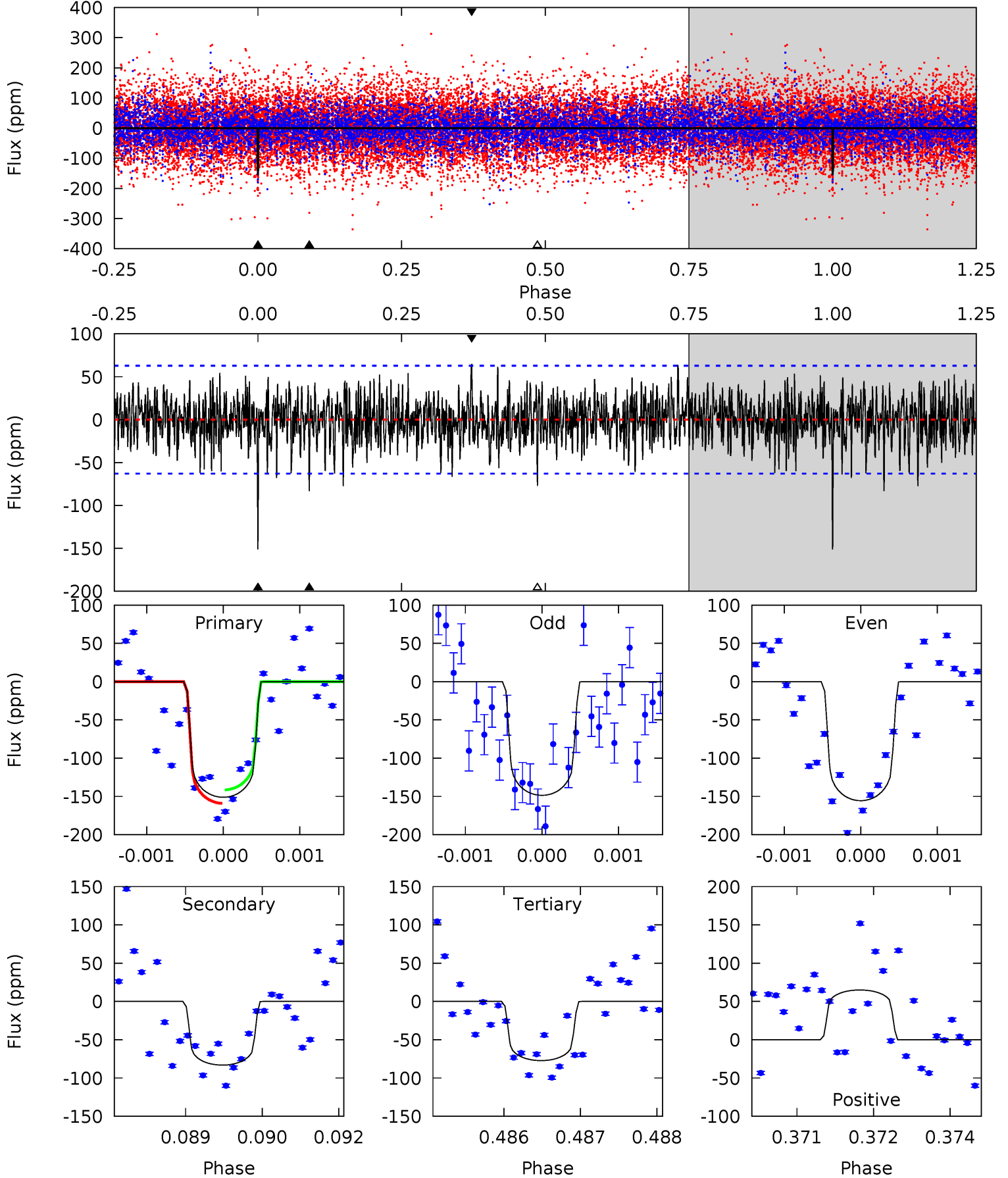
TCE 012020590-02 P=194.827183 Days $T_0=162.024211$ (BKJD)



DV Model-Shift Uniqueness Test

012020590-02, P = 194.825343 Days, E = 162.037617 Days

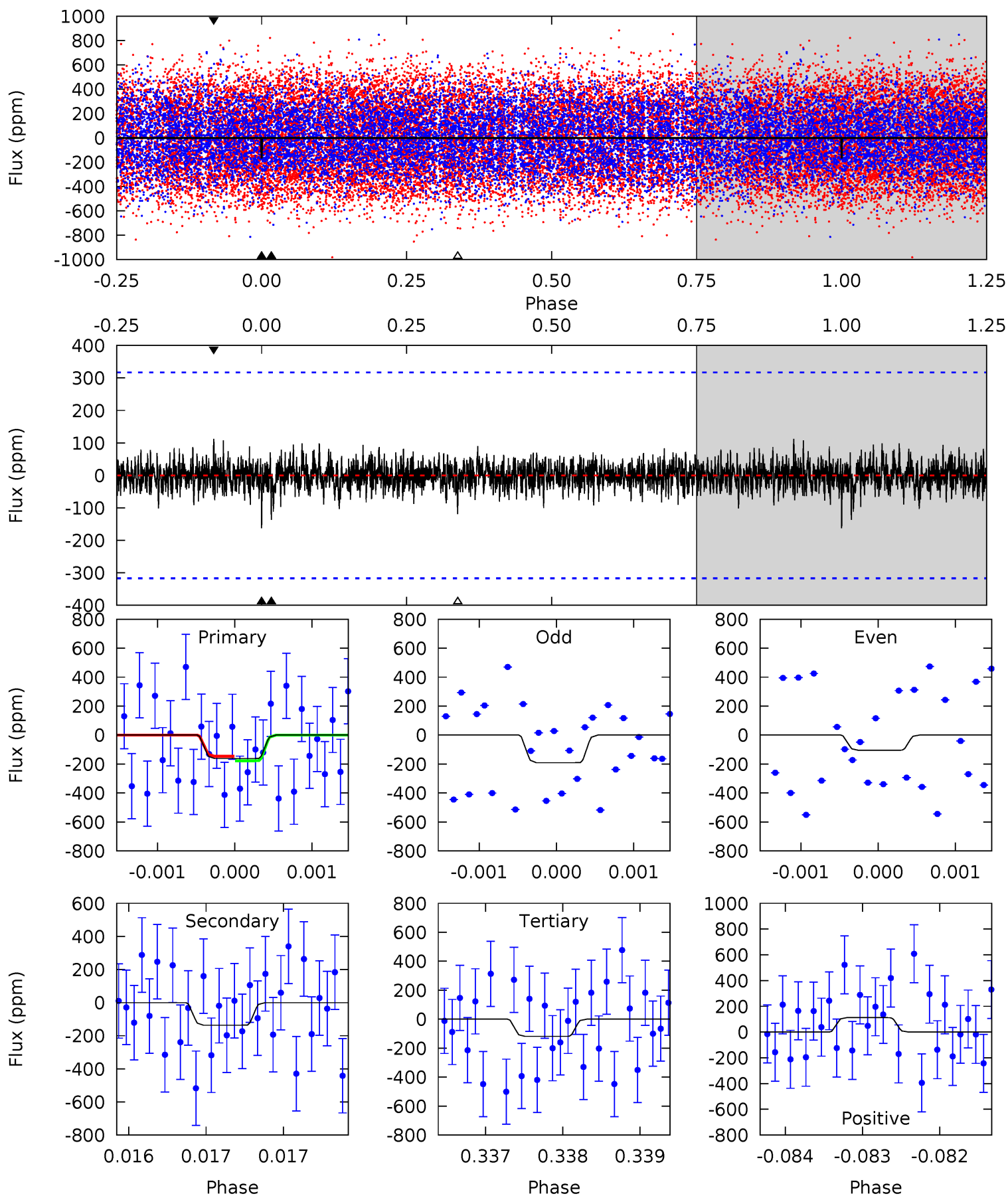
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
12.9	7.12	6.62	5.57	5.38	3.18	1.79	6.32	7.37	0.50	1.55	0.29	0.97	0.30	0.75



Alt Model-Shift Uniqueness Test

012020590-02, P = 194.827183 Days, E = 162.024211 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2.79	2.35	2.05	1.93	5.47	3.31	0.50	0.74	0.86	0.30	0.41	0.73	0.87	0.41	0.27



Stellar Parameters For KIC 012020590

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	8226^{+228}_{-370}	$3.717^{+0.420}_{-0.140}$	$-0.040^{+0.250}_{-0.400}$	$3.299^{+0.978}_{-1.590}$	$2.067^{+0.361}_{-0.496}$	$0.081^{+0.313}_{-0.032}$
	+3%/-4%	+11%/-4%	+625%/-1000%	+30%/-48%	+17%/-24%	+386%/-40%
Source	KIC0	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 012020590-02 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-83 ± 12	$4.22^{+2.01}_{-1.74}$	977^{+84}_{-122}	6689^{+2299}_{-1028}	1809^{+3549}_{-982}
Alt.	-136 ± 58	$4.62^{+2.04}_{-1.76}$	983^{+77}_{-122}	7259^{+2661}_{-1368}	2297^{+4486}_{-1340}

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

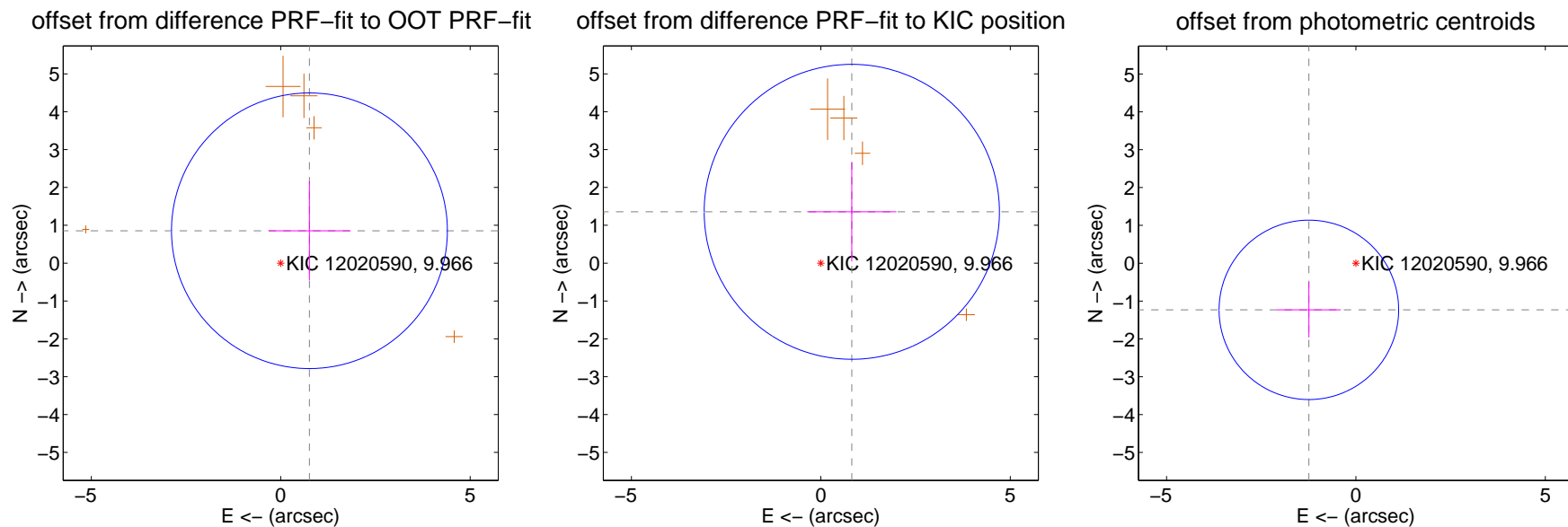
DV Centroid Data

Supplemental centroid analysis for 012020590-02. **Kepler magnitude: 9.97.** Transit SNR 11.08

There are 0 quarters with good PRF difference image offsets

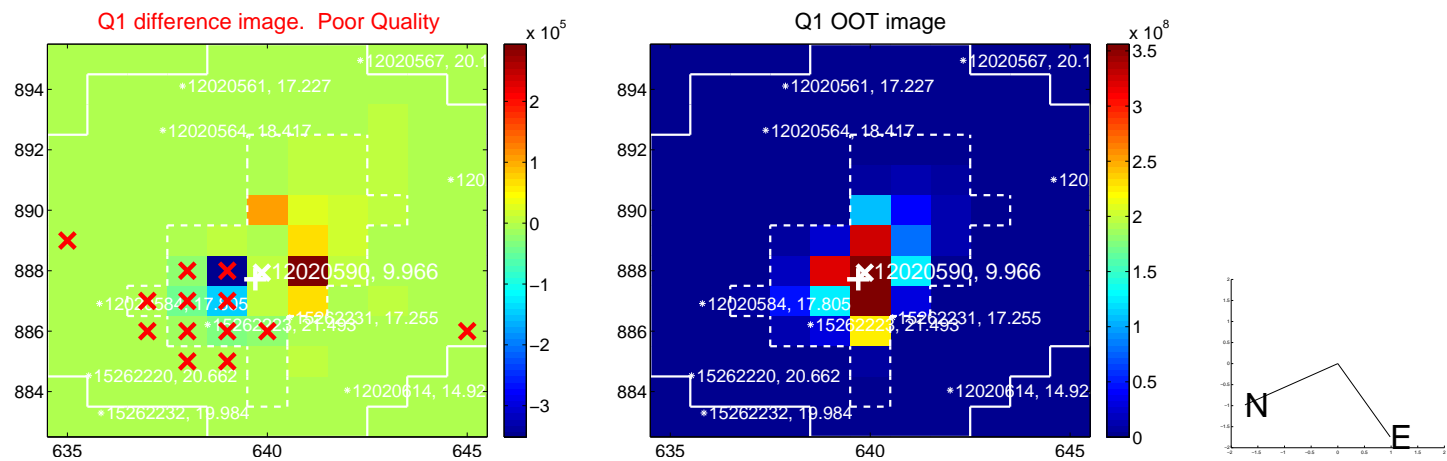
The direct PRF centroid is offset from the target star catalog position by about 0.71 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.142 ± 1.213	0.94	-0.757 ± 1.079	0.855 ± 1.305
PRF-fit source offset from KIC position	1.583 ± 1.299	1.22	-0.816 ± 1.177	1.356 ± 1.310
photometric centroid source offset	1.75 ± 0.79	2.22	1.24 ± 0.84	-1.23 ± 0.73



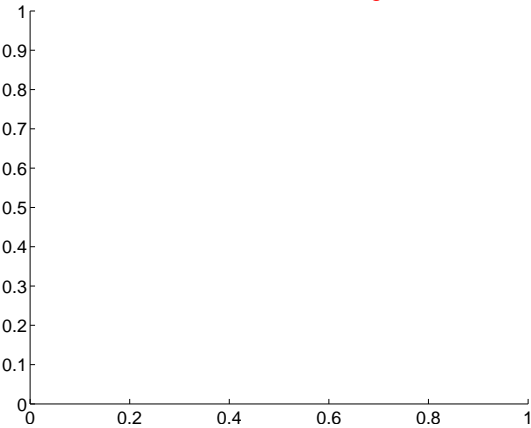
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

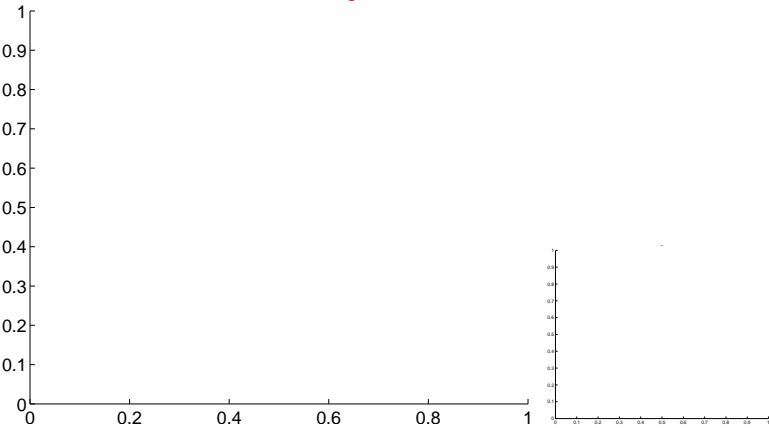


white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.

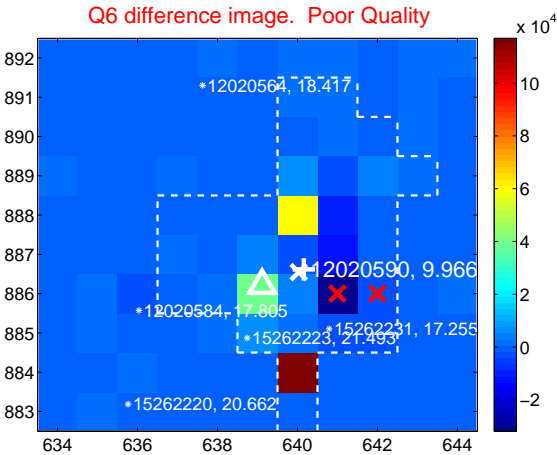
Q5 no difference image



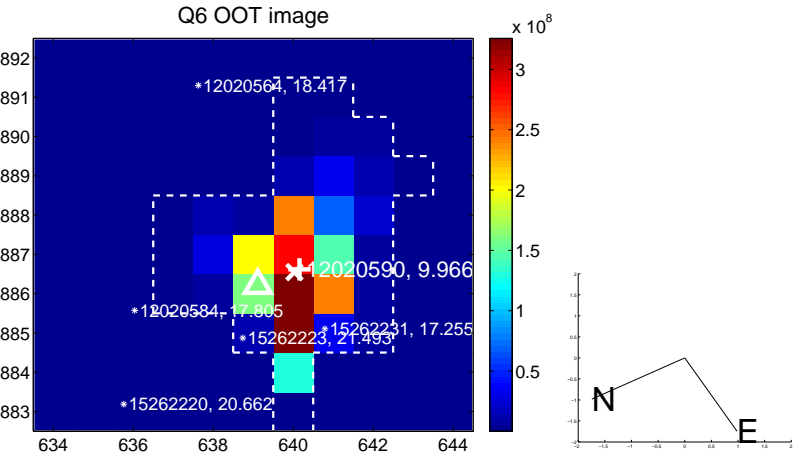
Q5 no OOT image



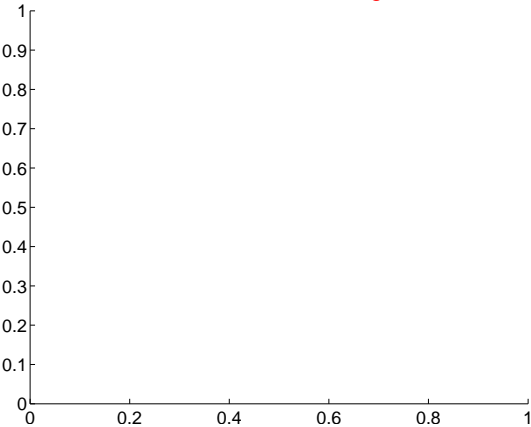
Q6 difference image. Poor Quality



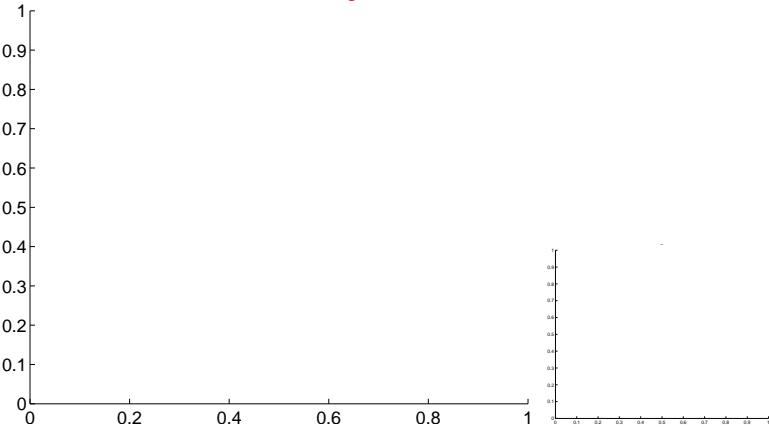
Q6 OOT image



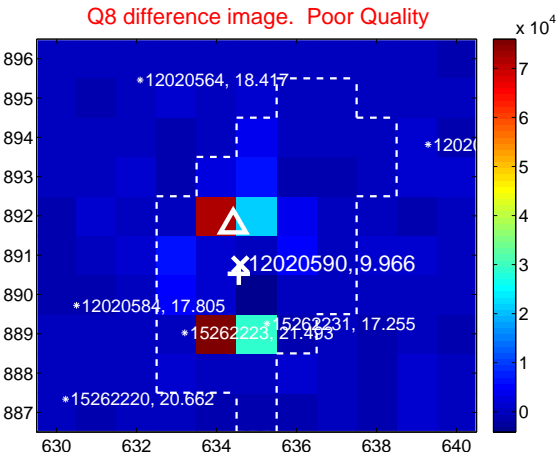
Q7 no difference image



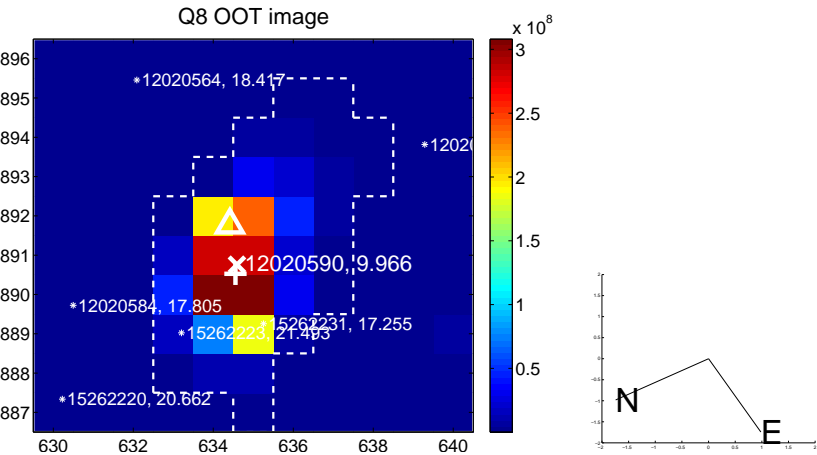
Q7 no OOT image



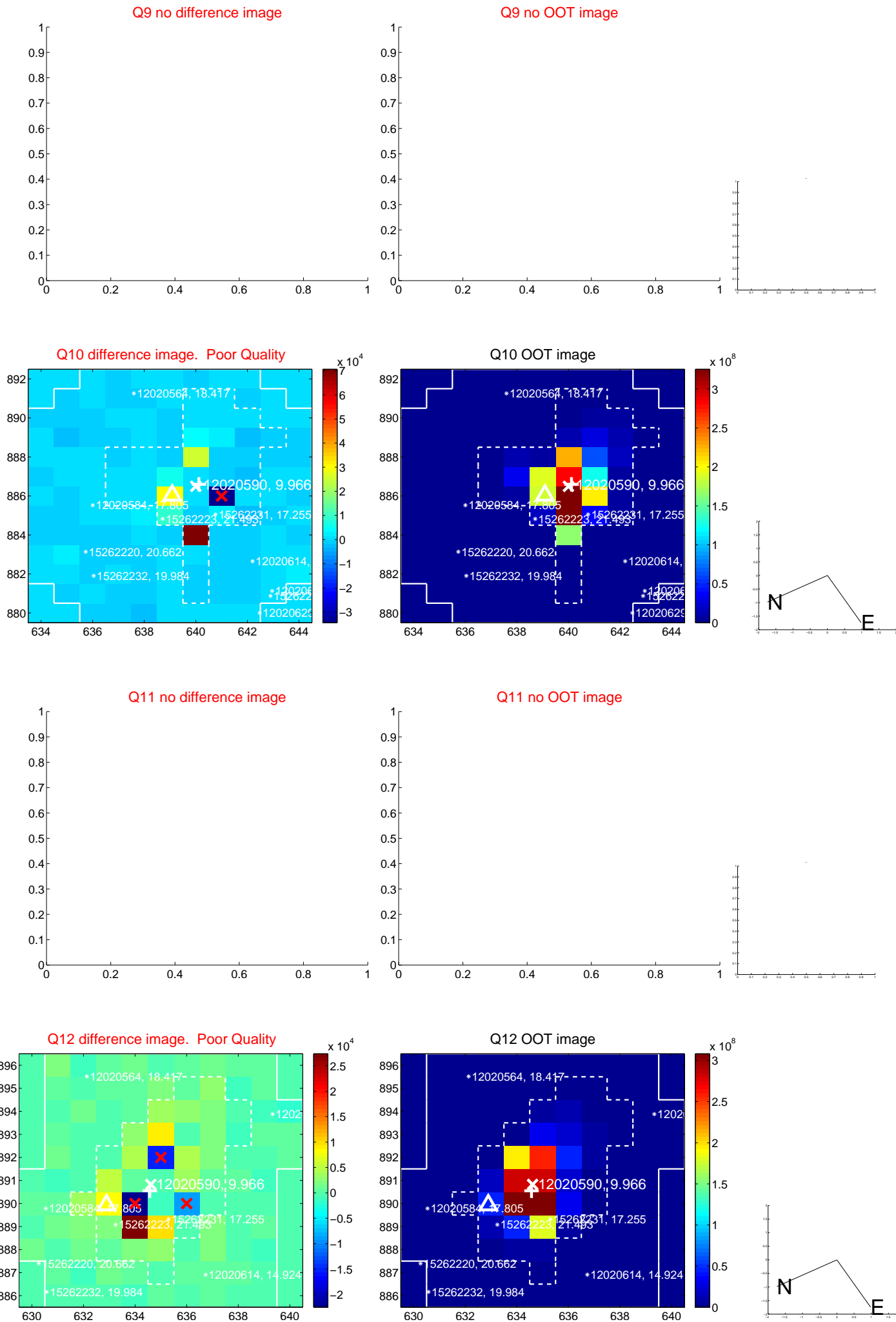
Q8 difference image. Poor Quality



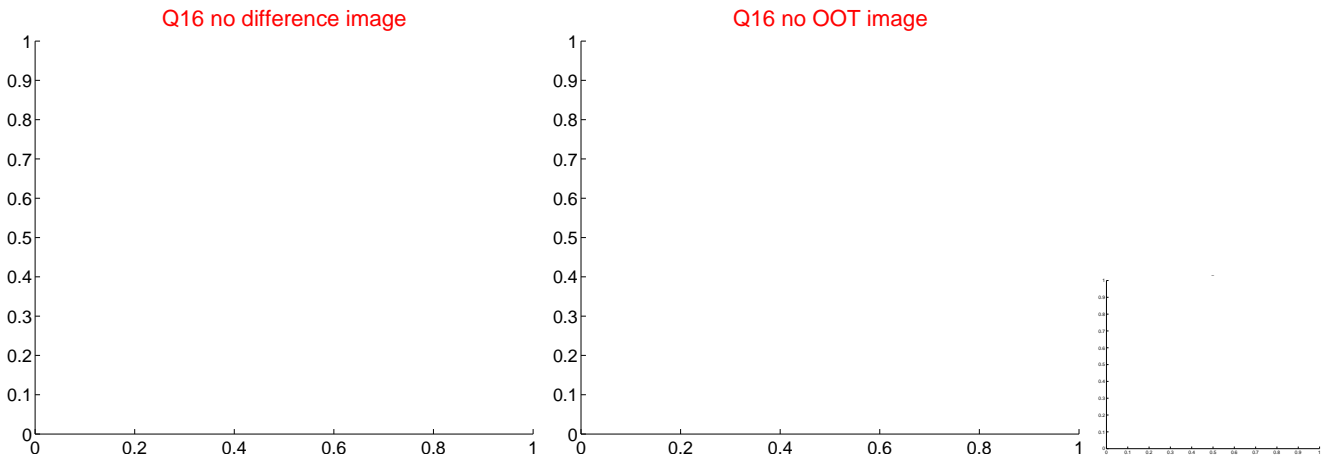
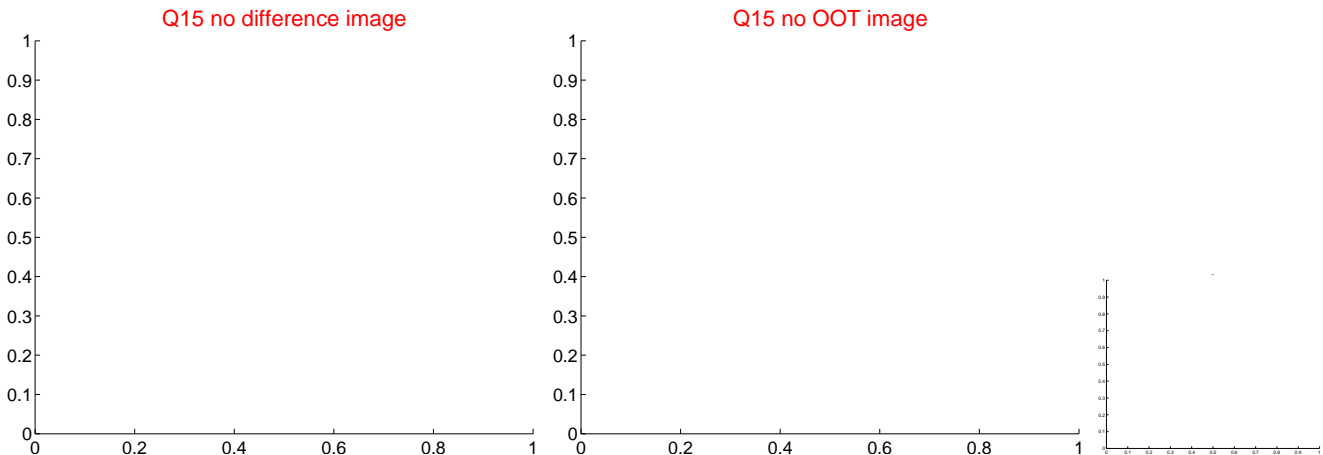
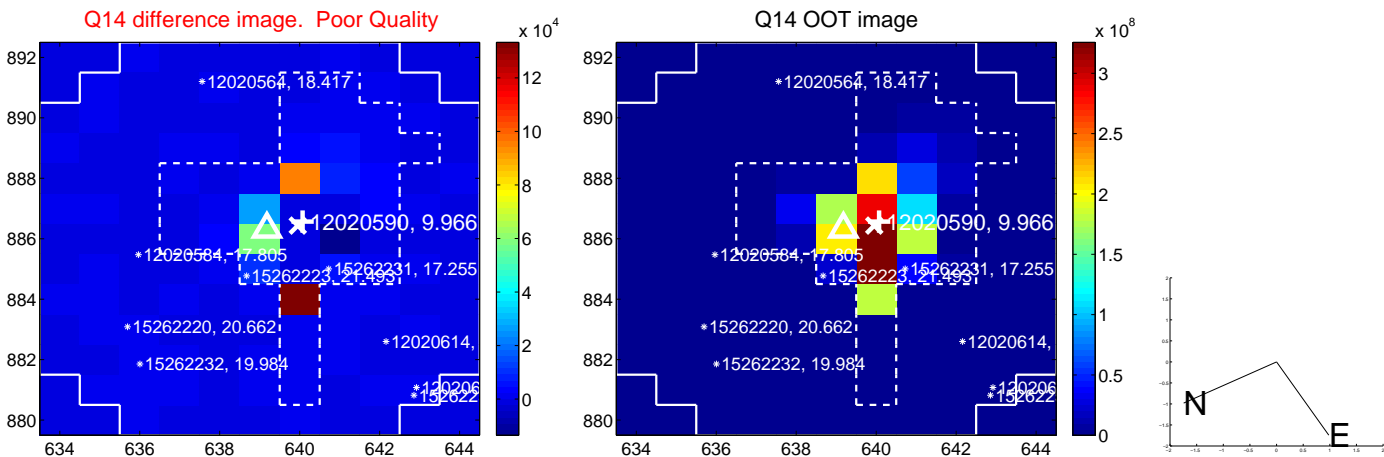
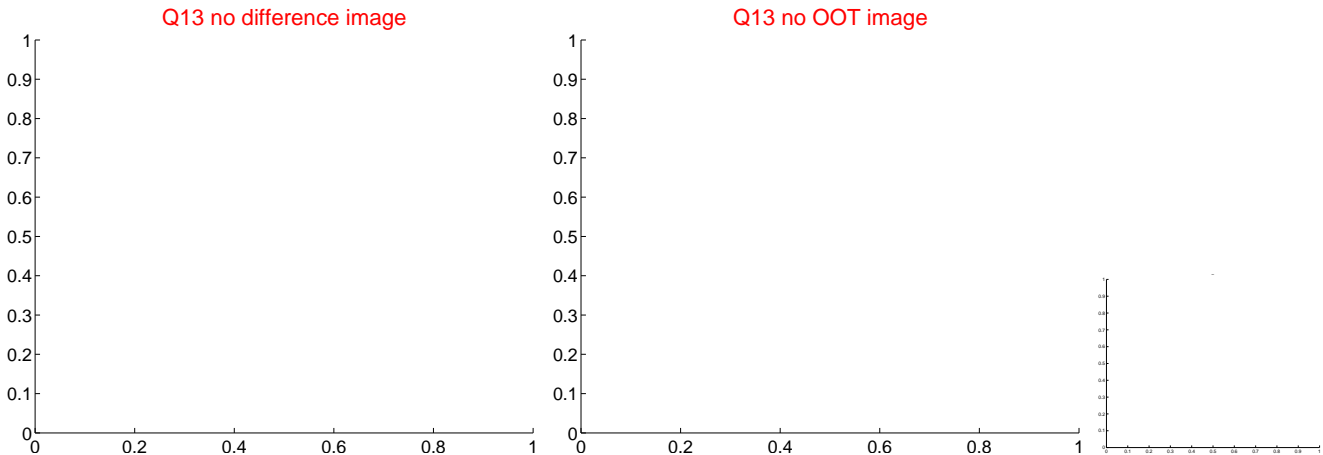
Q8 OOT image



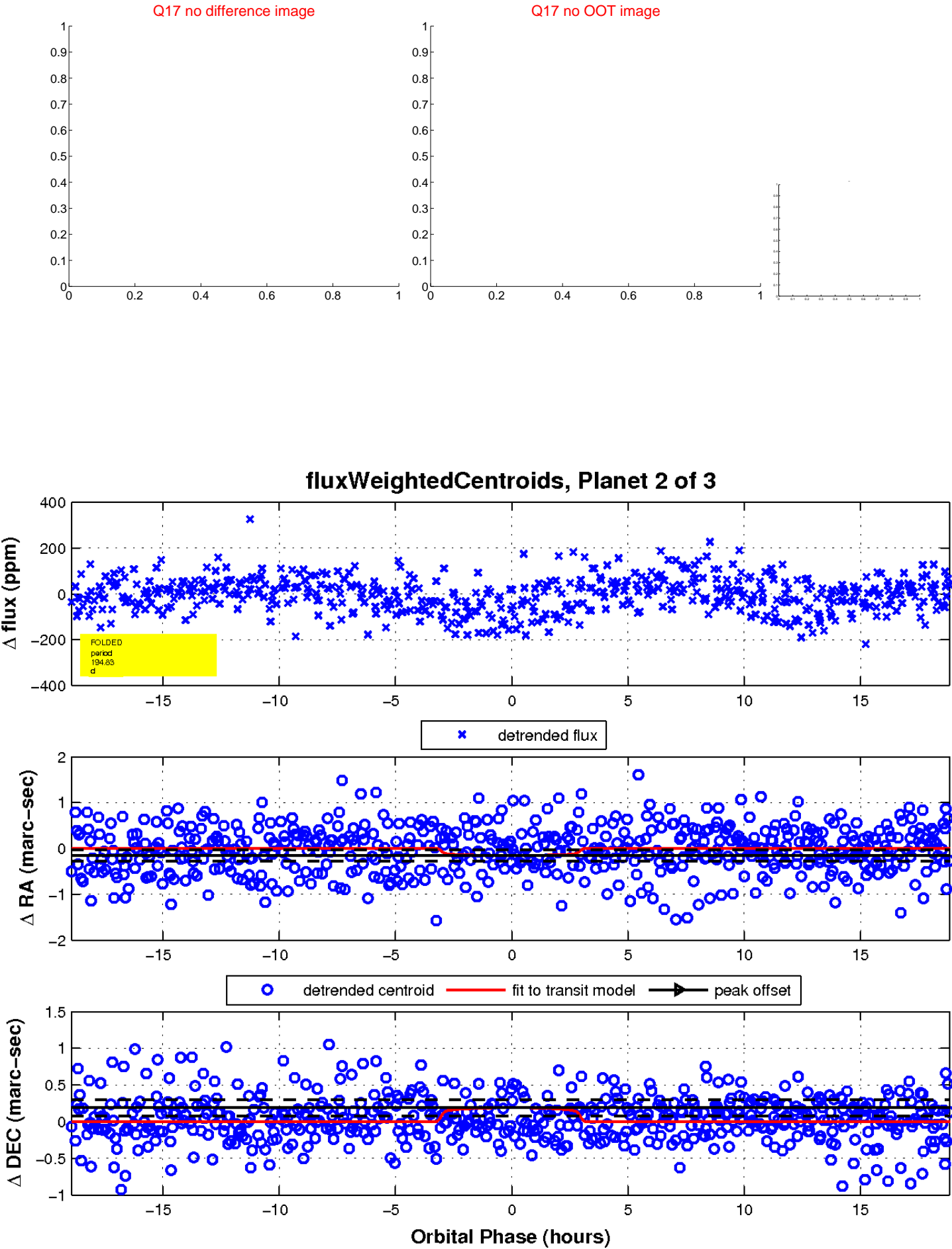
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

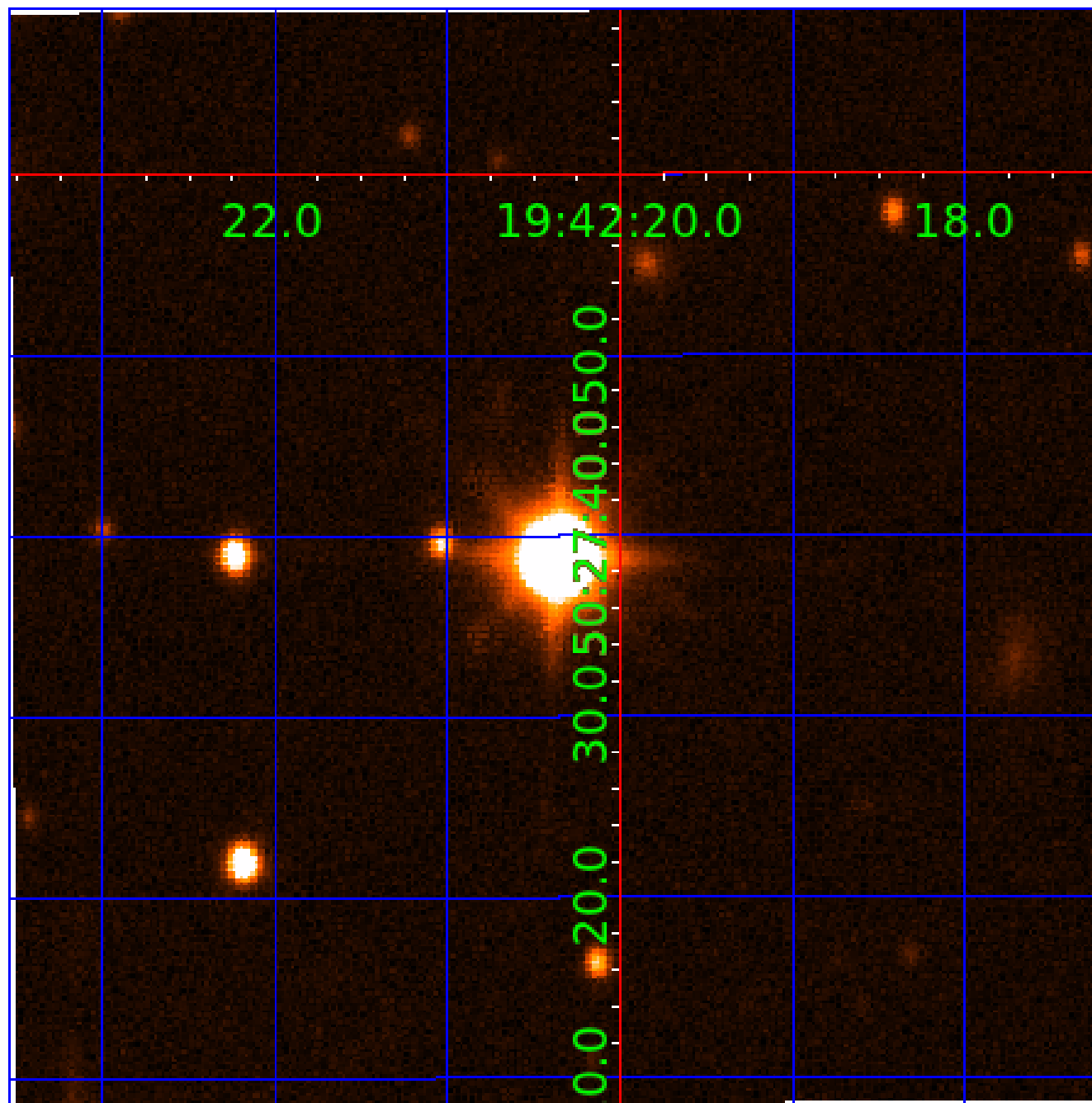


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 012020590

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})
012020590-01	OBS	No	3.337661	134.447718	9.6	18.282	10.7	10.2	3.30	8226	1.04	14387.36
012020590-02	OBS	No	194.825343	162.037617	150.4	6.326	13.9	11.1	3.30	8226	4.63	63.54
012020590-03	OBS	No	0.984450	132.425968	15.7	3.411	10.9	11.3	3.30	8226	1.52	73278.91

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
012020590-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—CENT_SATURATED
012020590-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL—TRANS_GAPPED—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
012020590-03	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—CENT_SATURATED

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

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

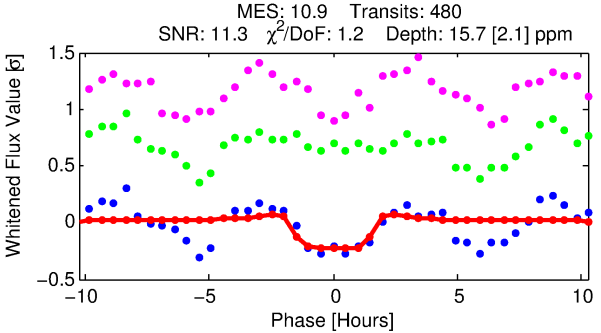
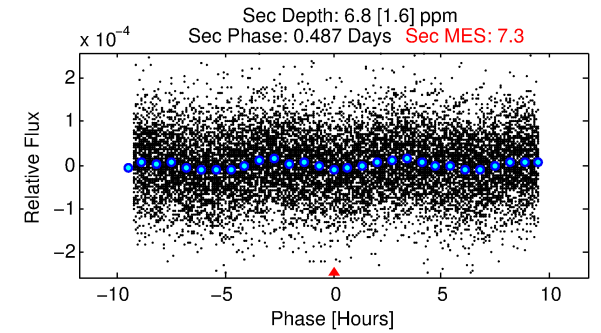
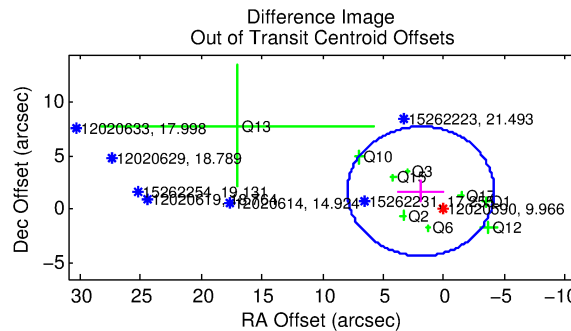
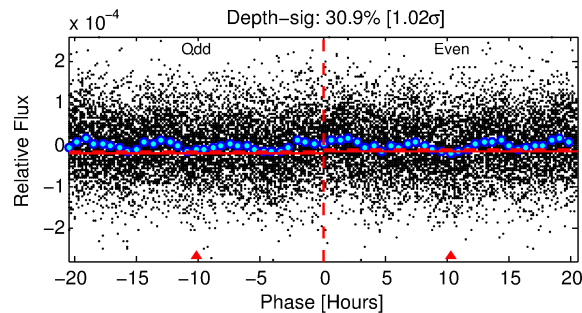
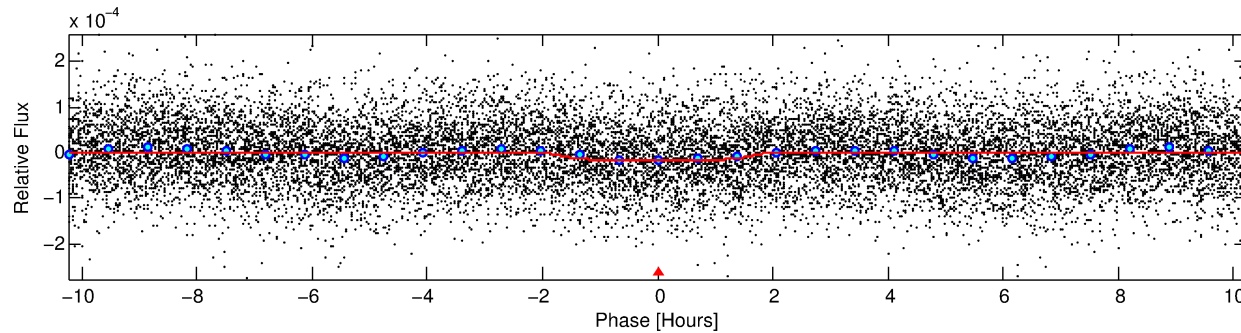
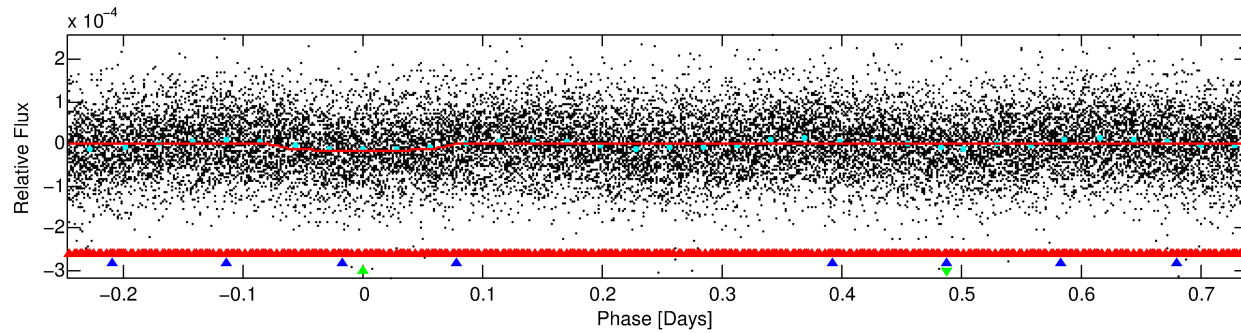
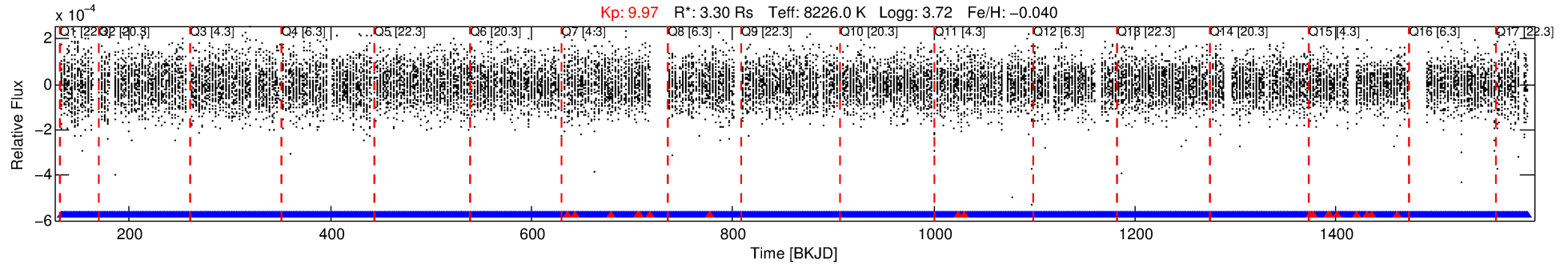
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 012020590-03

No Significant Match Found

DV One-Page Summary

KIC: 12020590 Candidate: 3 of 3 Period: 0.984 d



DV Fit Results:

Period = 0.98445 [0.00001] d
Epoch = 132.4260 [0.0037] BKJD
 $R_p/R^* = 0.0042$ [0.0011]
 $a/R^* = 1.35$ [0.96]
 $b = 0.90$ [0.33]
 $\text{Seff} = 73278.91$ [54408.24]
 $T_{\text{eq}} = 4195$ [779] K
 $R_p = 1.53$ [0.83] R_e
 $a = 0.0247$ [0.0112] AU
 $A_g = 0.98$ [0.89] $[-0.02\sigma]$
 $T_{\text{eff}} = 6454$ [945] K $[1.84\sigma]$

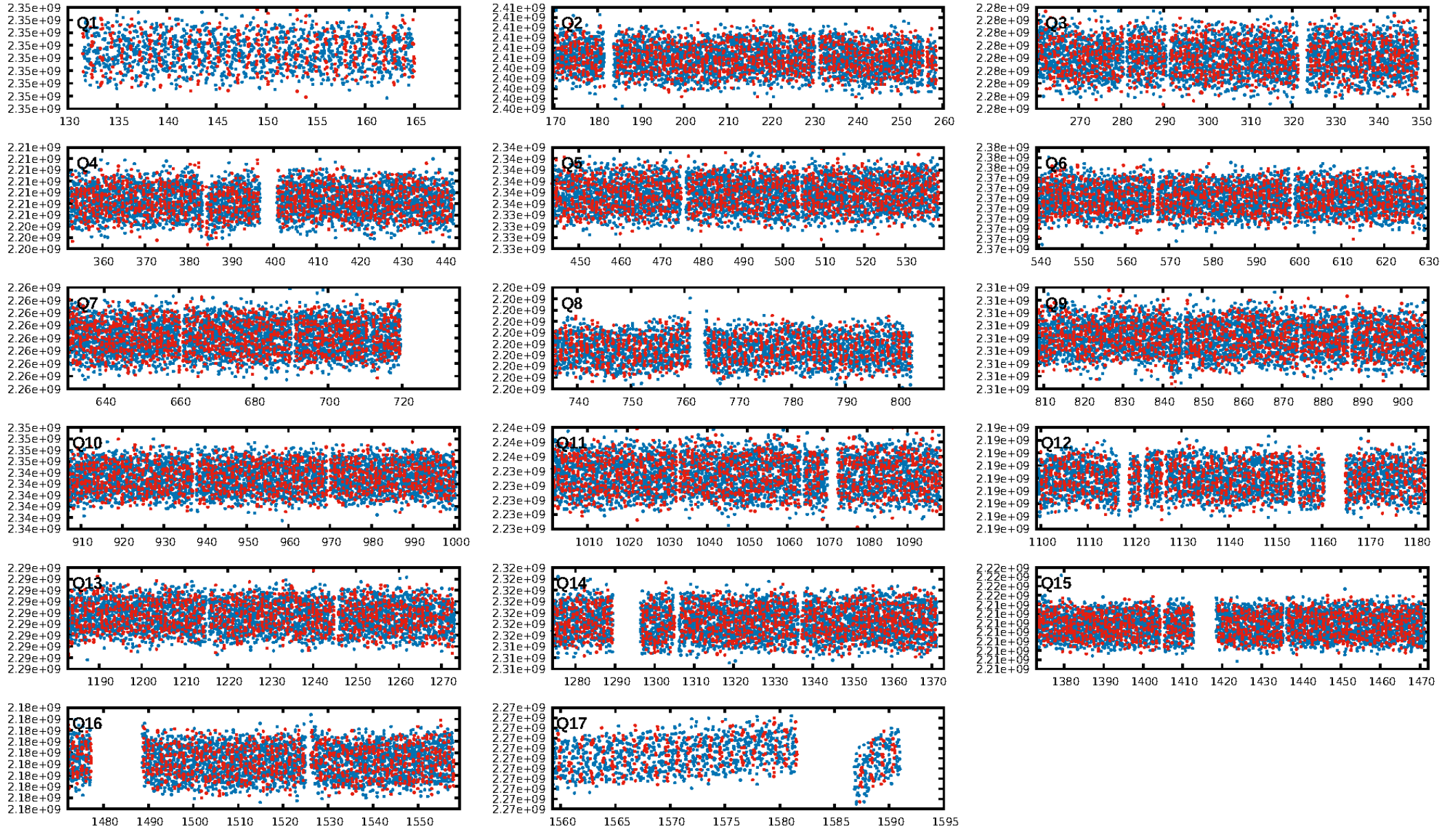
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 99.8% [3.04 σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 4.23e-11
RollingBand-fgt: 0.96 [440/458]
GhostDiagnostic-chr: N/A
Centroid-sig: 0.2%
Centroid-so: 1.007 arcsec [1.75 σ]
OotOffset-rm: 2.545 arcsec [1.26 σ]
KicOffset-rm: 3.092 arcsec [1.18 σ]
OotOffset-st: 3/2/1/3 [9]
KicOffset-st: 3/2/1/3 [9]
DiffImageQuality-fgm: 0.22 [2/9]
DiffImageOverlap-fno: 1.00 [17/17]

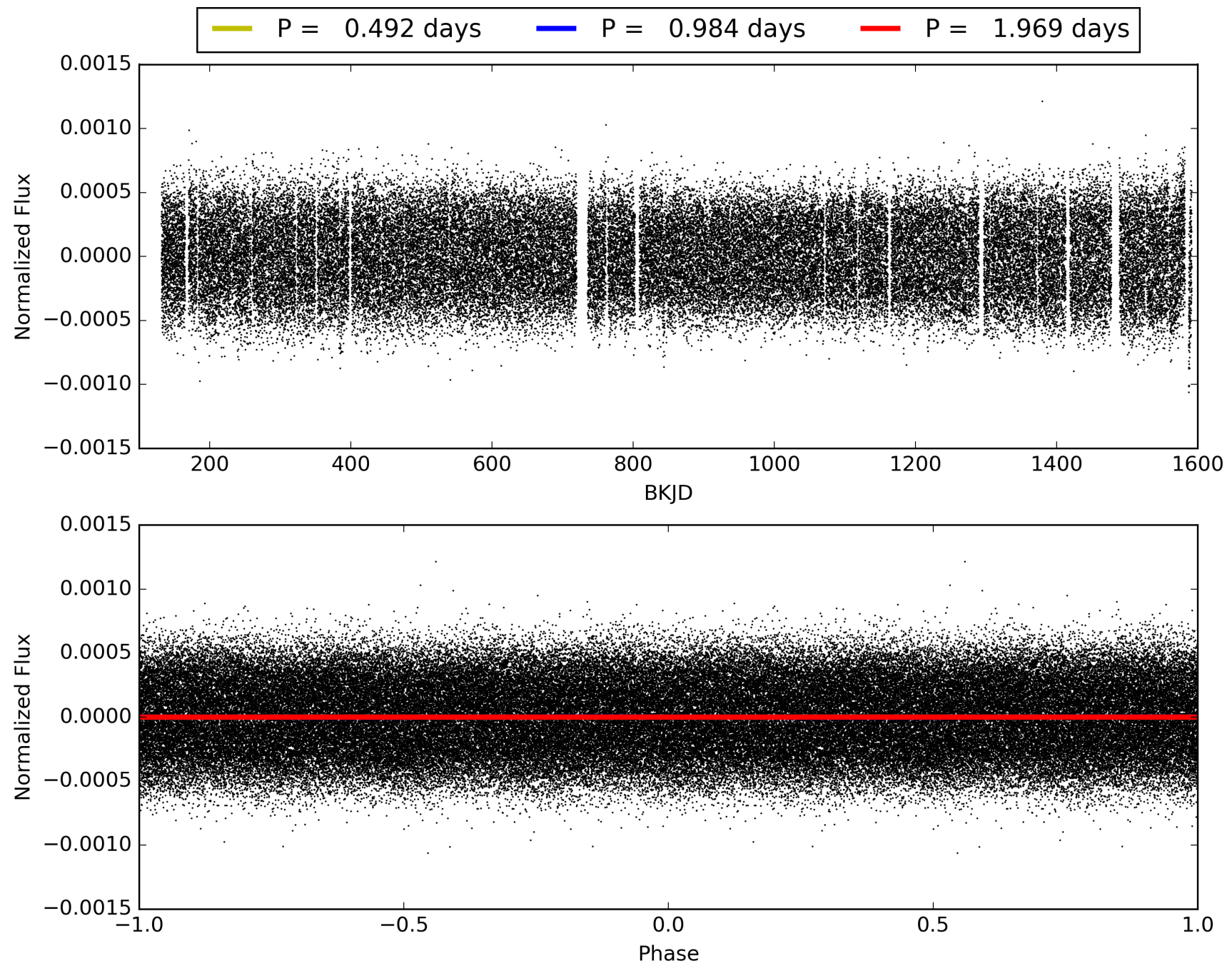
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 29-Jan-2016 11:45:36 Z

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

TCE 012020590-03, PDC Light Curves

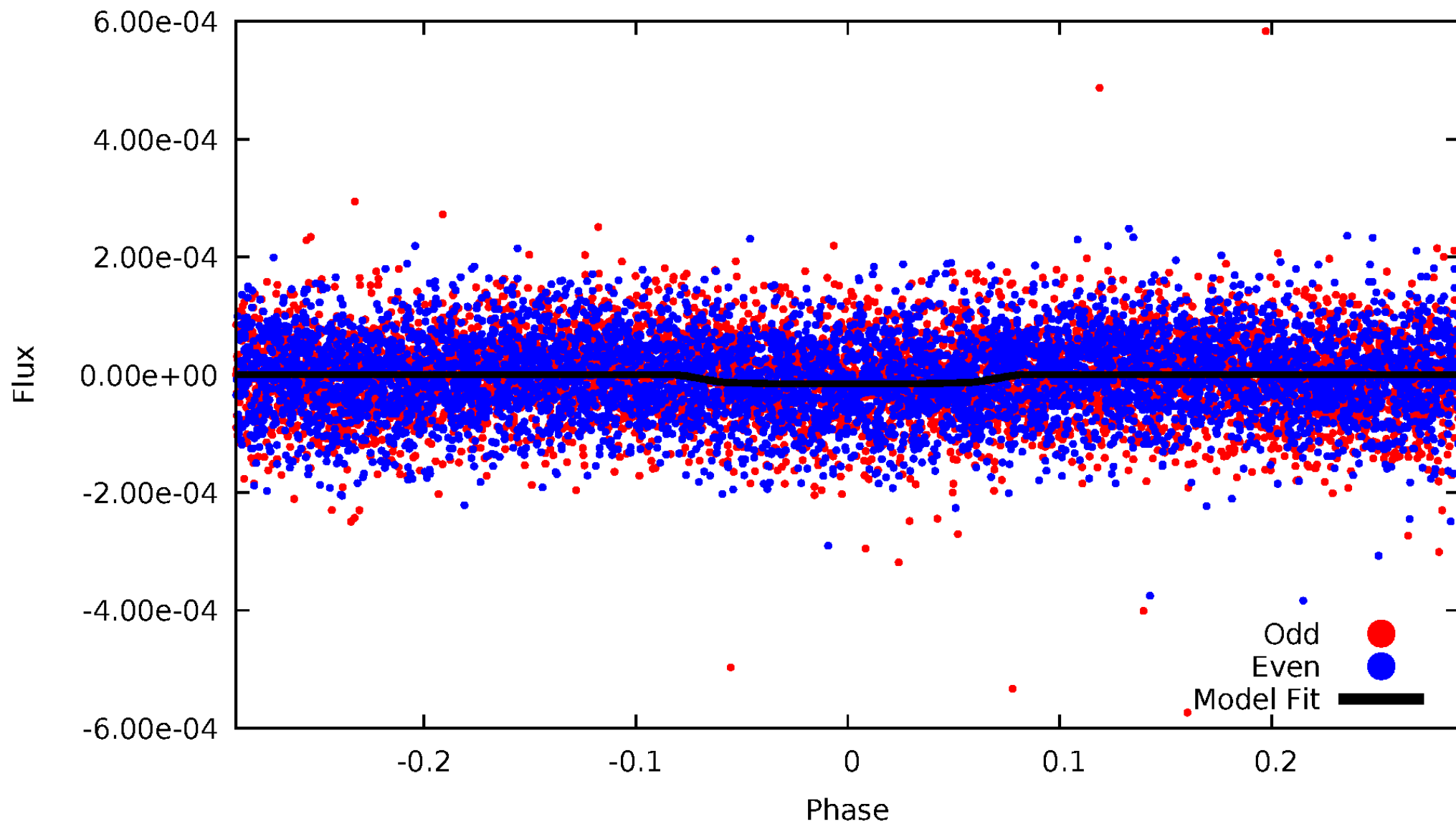


TCE 012020590-03



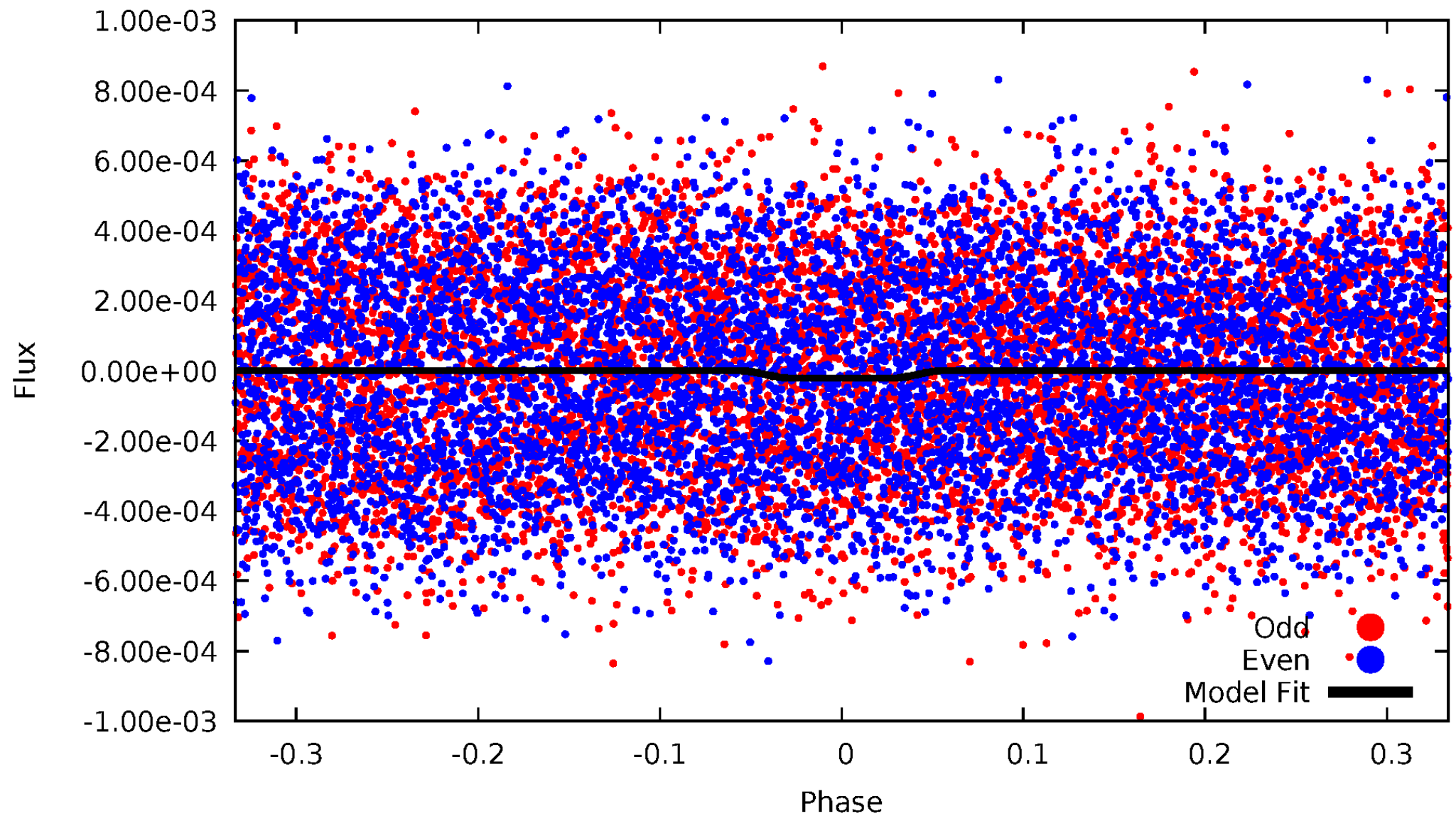
DV Odd/Even

TCE 012020590-03



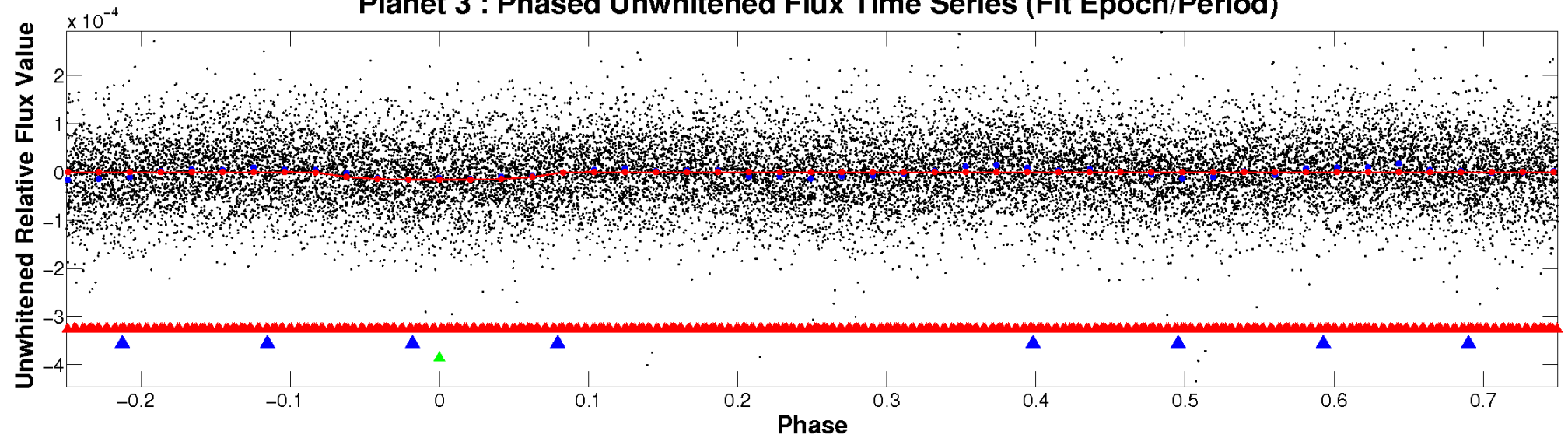
ALT Odd/Even

TCE 012020590-03

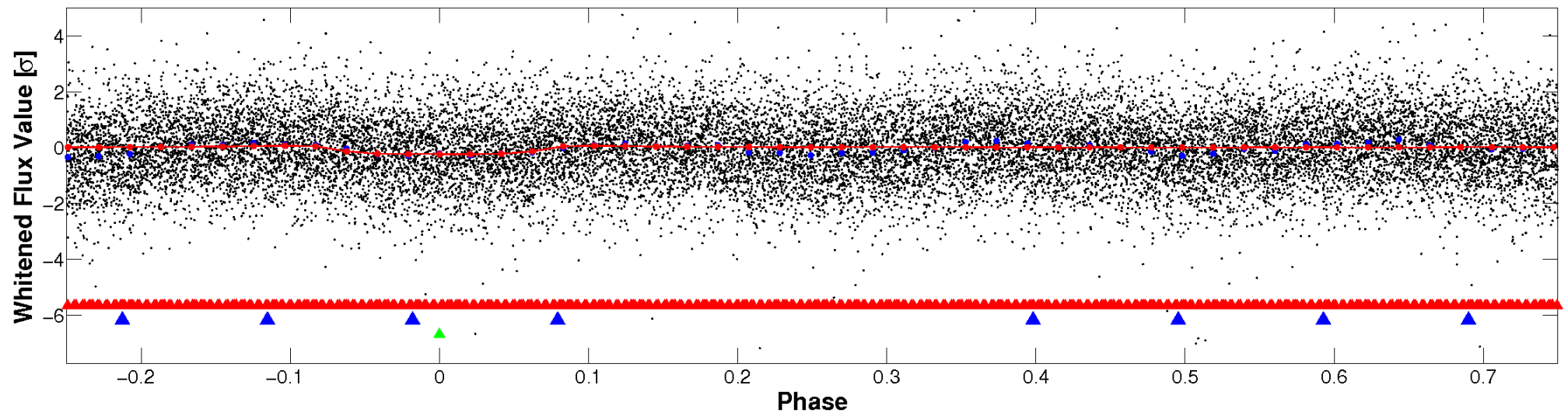


Non-Whitened Vs. Whitened Light Curve

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

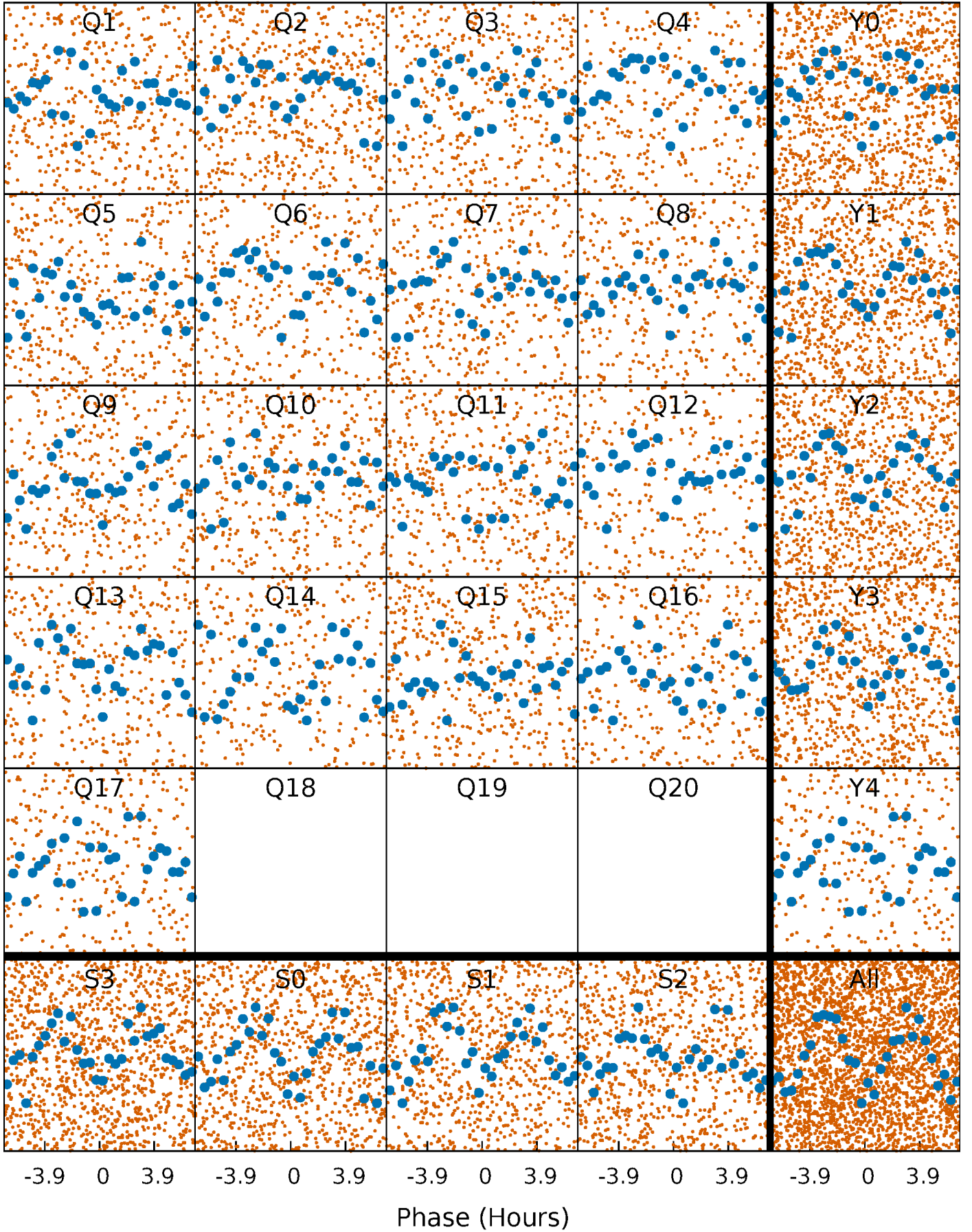


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



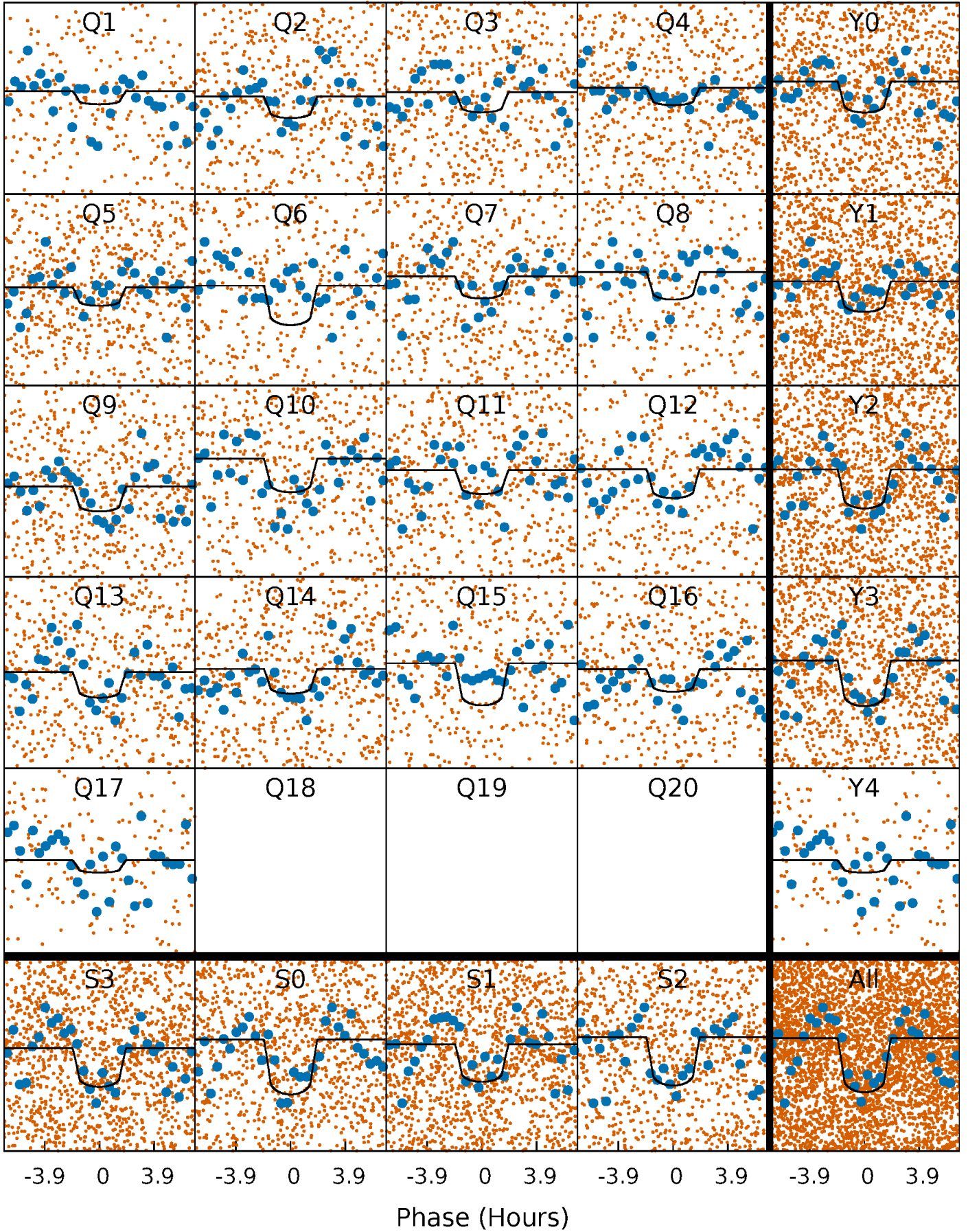
PDC Quarter-Phased Transit Curves

TCE 012020590-03 P= 0.984450 Days $T_0=132.425968$ (BKJD)



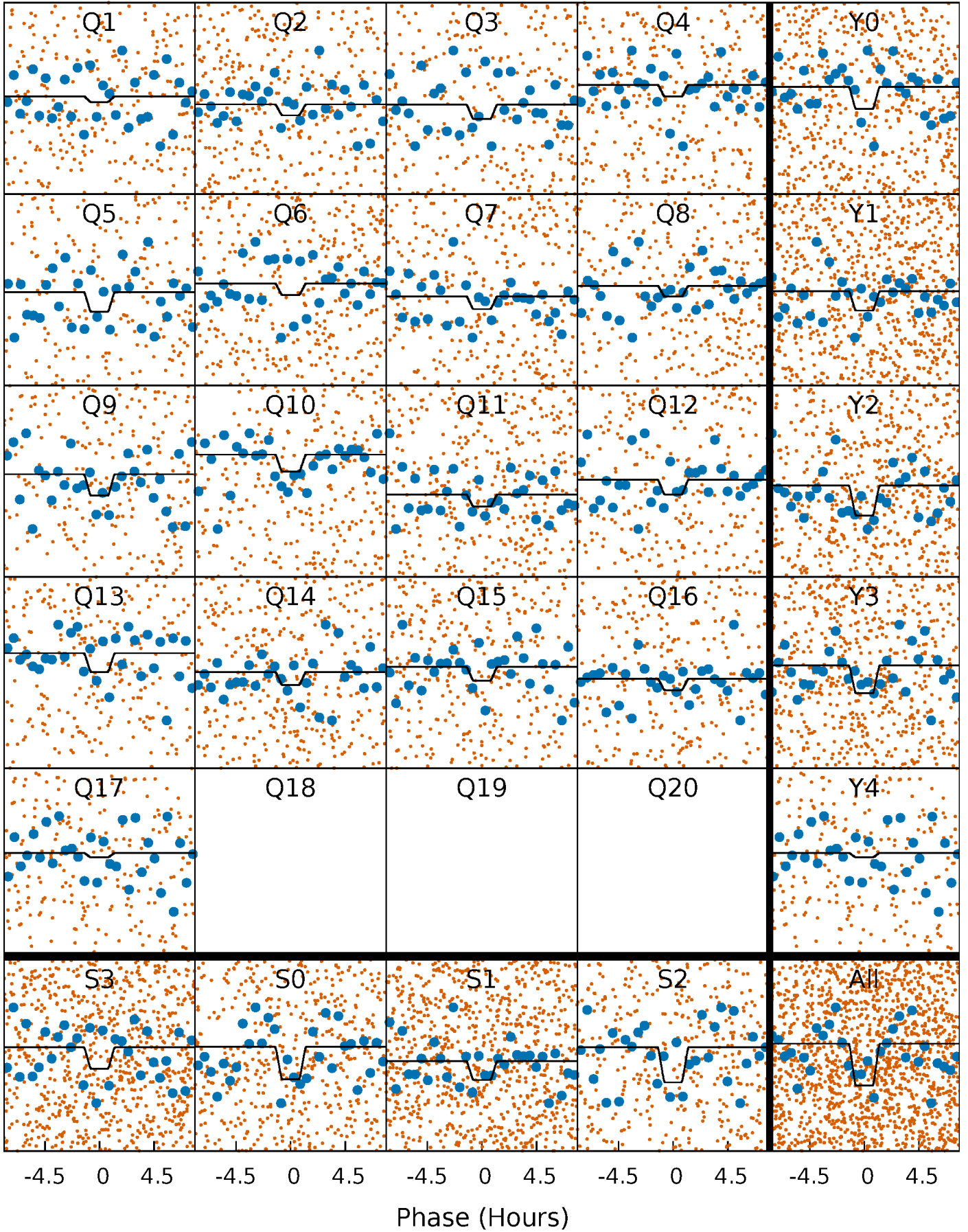
DV Quarter-Phased Transit Curves

TCE 012020590-03 P= 0.984450 Days $T_0=132.425968$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

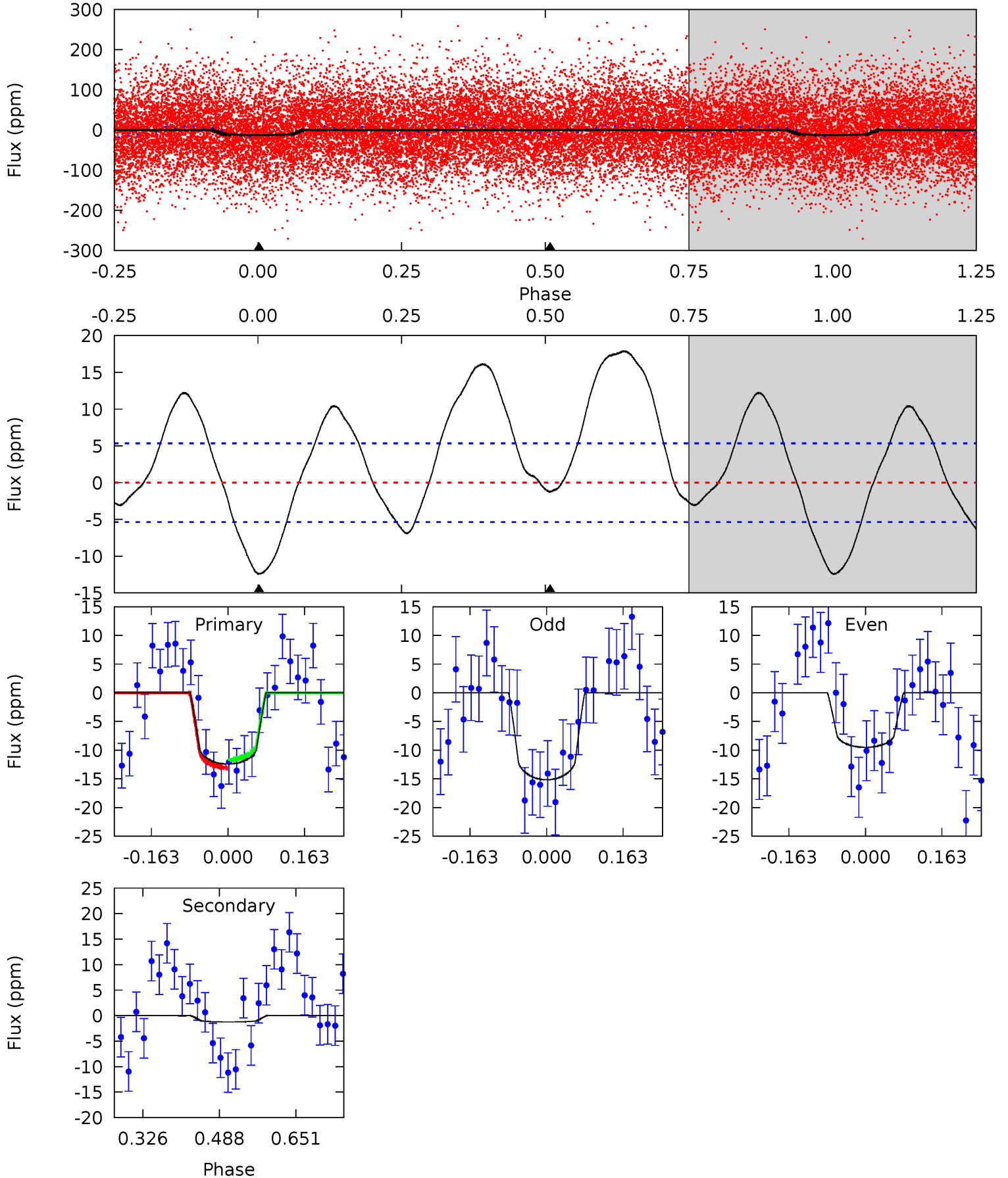
TCE 012020590-03 P= 0.984465 Days $T_0=132.421185$ (BKJD)



DV Model-Shift Uniqueness Test

012020590-03, P = 0.984450 Days, E = 131.441518 Days

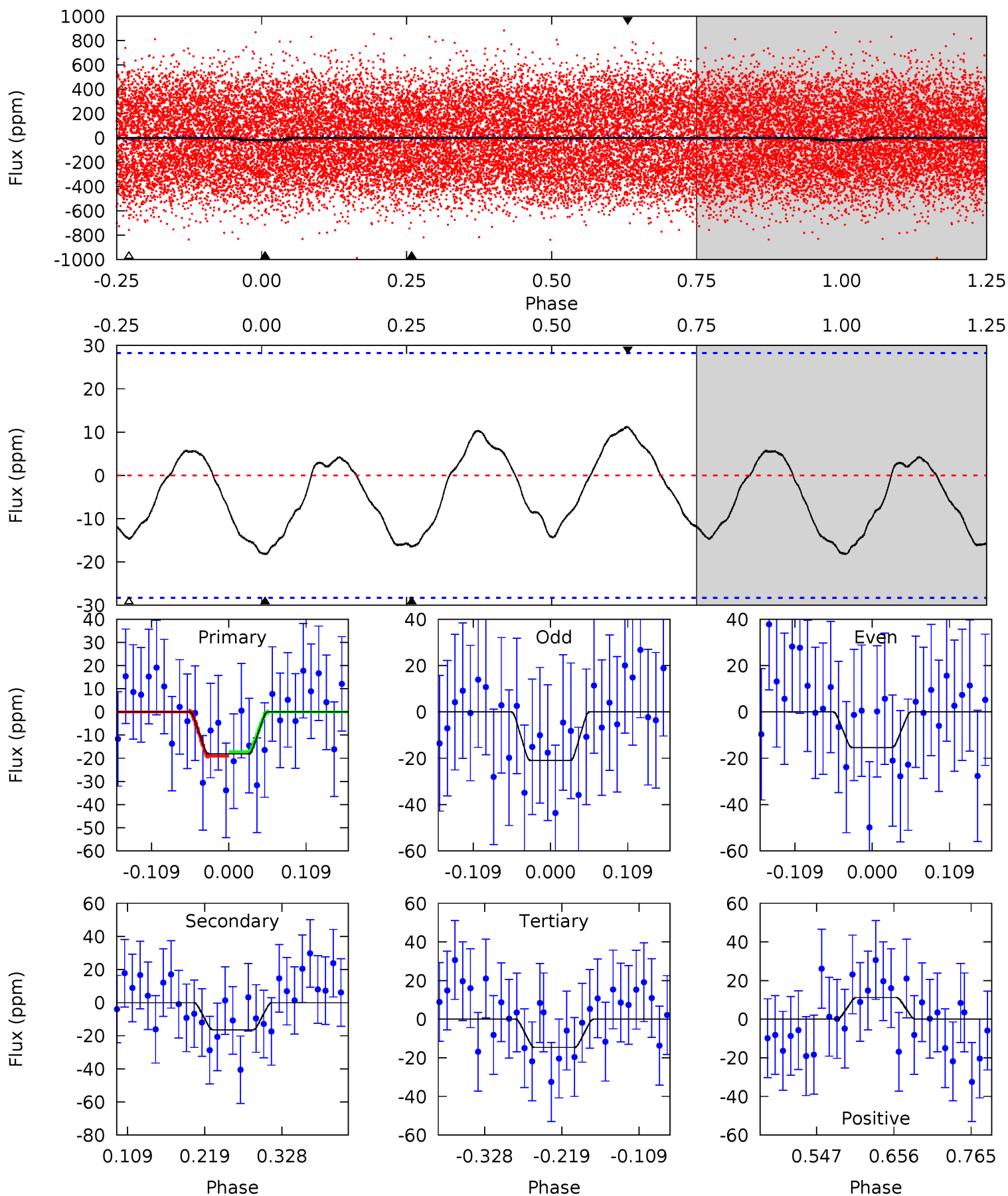
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.3	1.03	0	0	4.46	1.40	4.42	10.3	10.3	1.03	1.03	2.38	0.75	0.59	0.57



Alt Model-Shift Uniqueness Test

012020590-03, P = 0.984465 Days, E = 131.436720 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2.92	2.65	2.36	1.80	4.55	1.60	1.26	0.56	1.12	0.29	0.85	0.46	1.18	0.38	0.15



Stellar Parameters For KIC 012020590

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	8226^{+228}_{-370}	$3.717^{+0.420}_{-0.140}$	$-0.040^{+0.250}_{-0.400}$	$3.299^{+0.978}_{-1.590}$	$2.067^{+0.361}_{-0.496}$	$0.081^{+0.313}_{-0.032}$
	+3%/-4%	+11%/-4%	+625%/-1000%	+30%/-48%	+17%/-24%	+386%/-40%
Source	KIC0	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 012020590-03 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-1 ± 1	$1.40^{+0.49}_{-0.47}$	5680^{+521}_{-651}	-3757^{+8157}_{-987}	$0.200^{+0.403}_{-0.189}$
Alt.	-16 ± 6	$1.54^{+0.53}_{-0.43}$	5699^{+457}_{-696}	7120^{+1709}_{-1342}	$2.192^{+2.568}_{-1.122}$

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

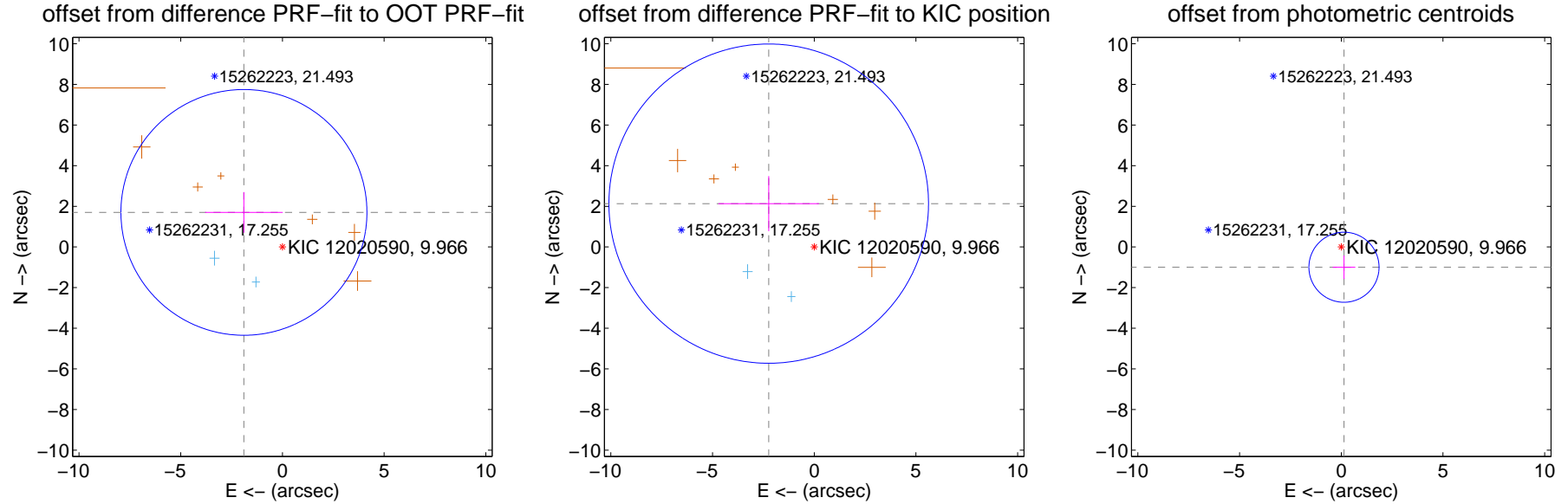
DV Centroid Data

Supplemental centroid analysis for 012020590-03. **Kepler magnitude: 9.97.** Transit SNR 11.30

There are 2 quarters with good PRF difference image offsets

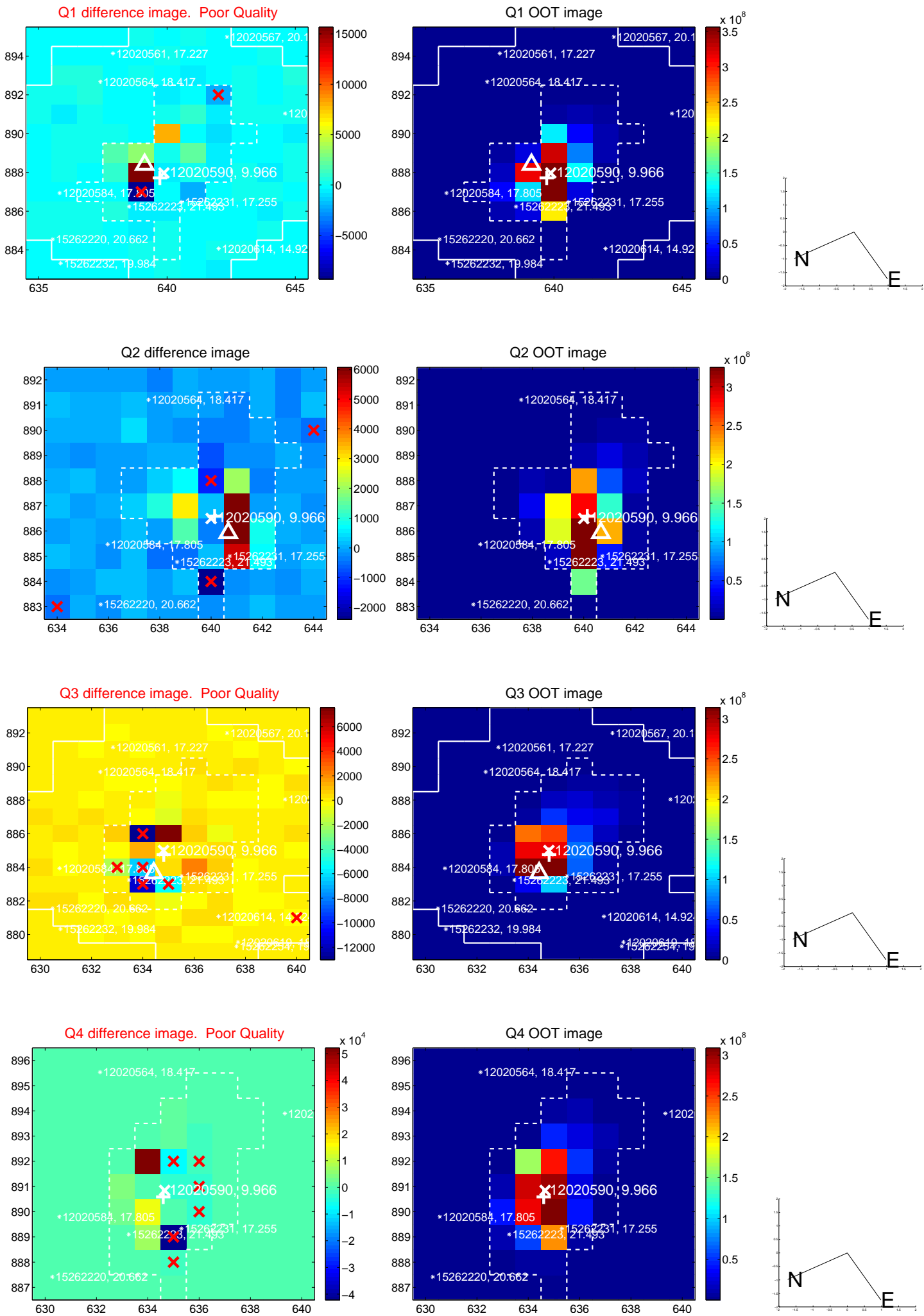
The direct PRF centroid is offset from the target star catalog position by about 1.13 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	2.545 ± 2.016	1.26	1.893 ± 1.913	1.701 ± 1.001
PRF-fit source offset from KIC position	3.092 ± 2.619	1.18	2.238 ± 2.472	2.132 ± 1.353
photometric centroid source offset	1.01 ± 0.57	1.75	-0.13 ± 0.56	-1.00 ± 0.58

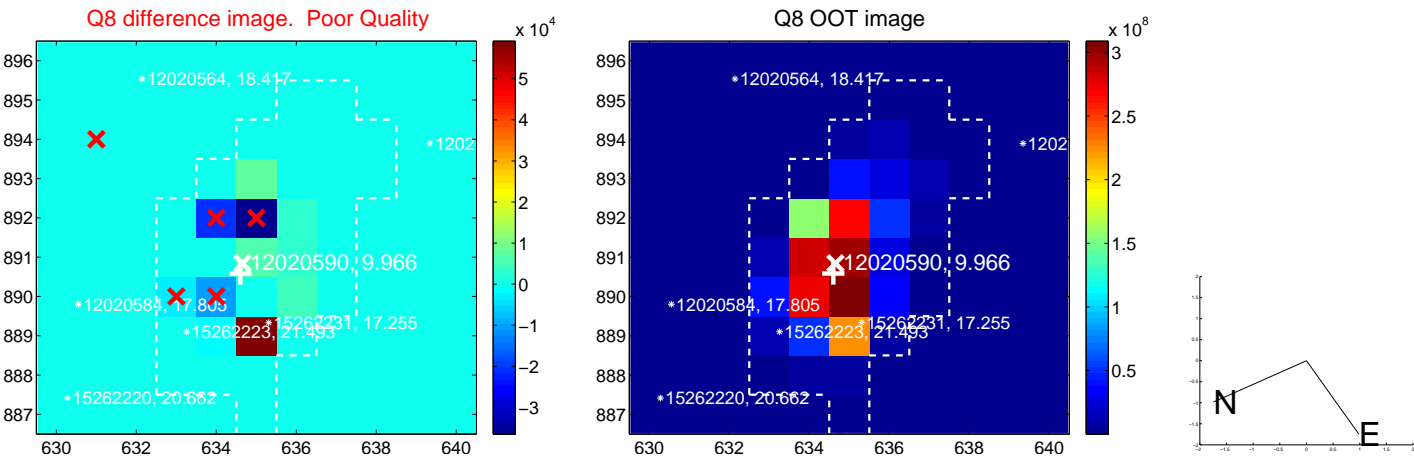
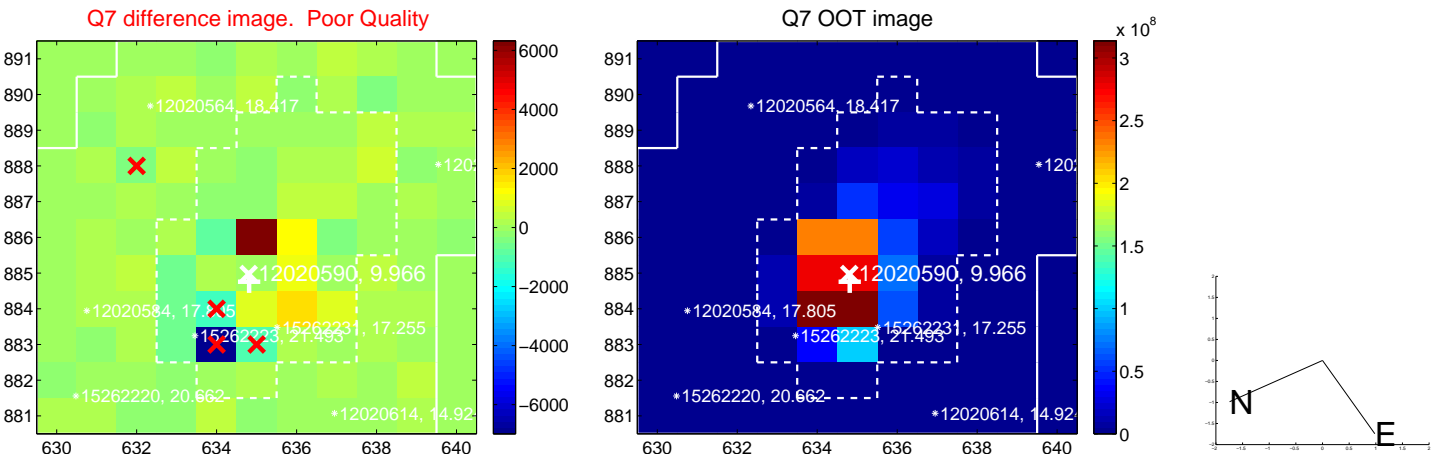
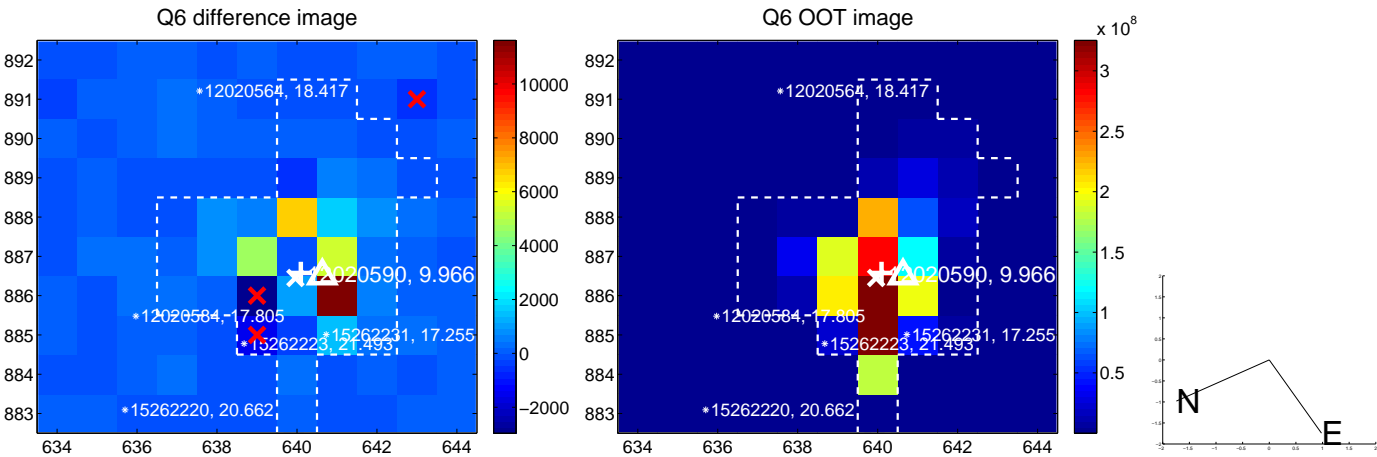
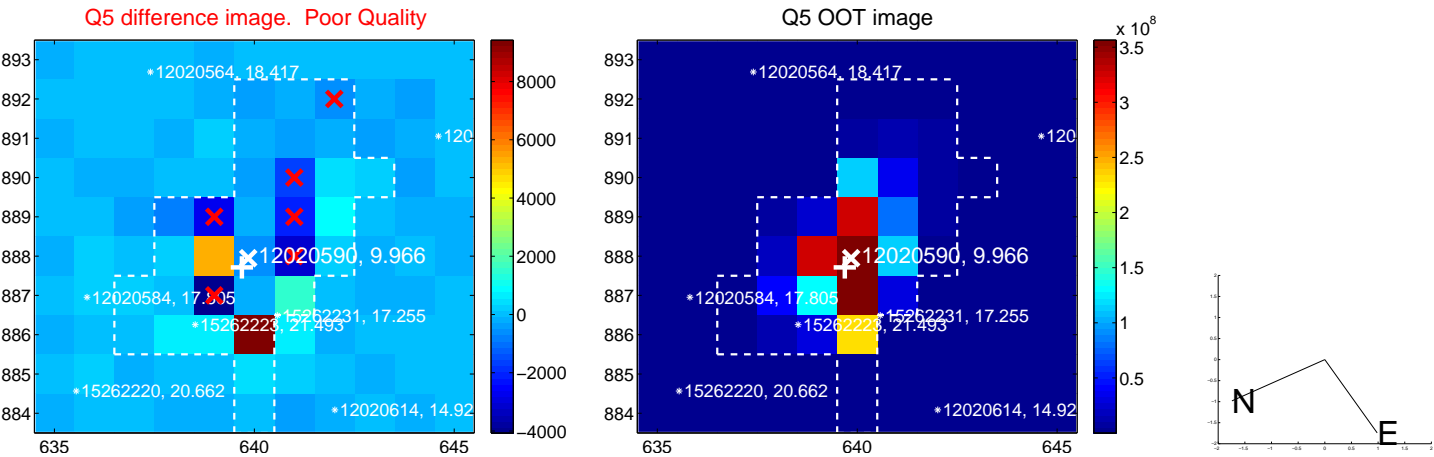


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

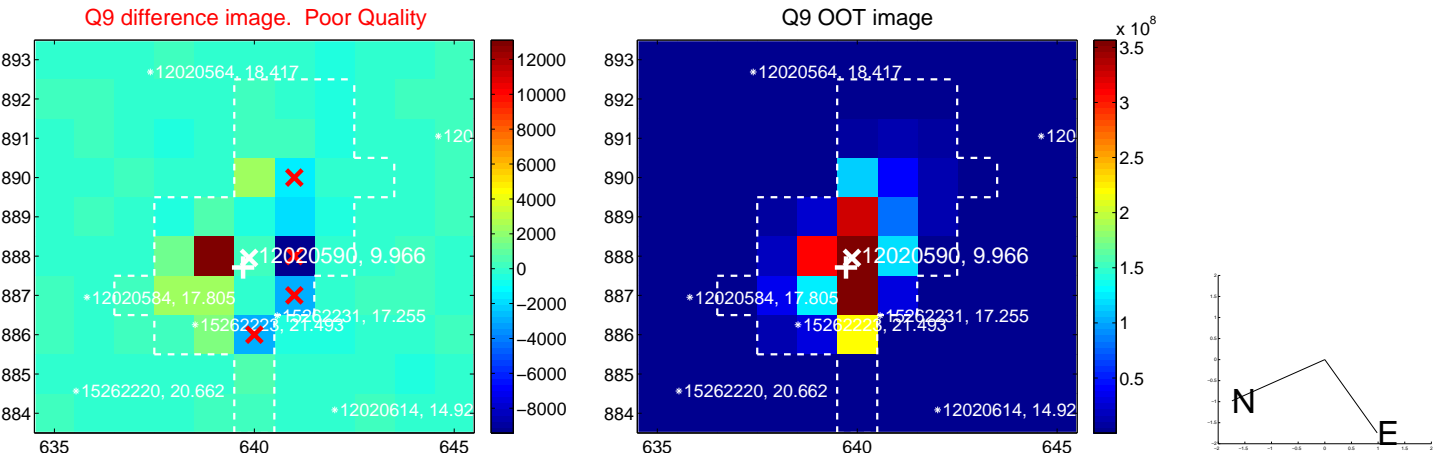
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



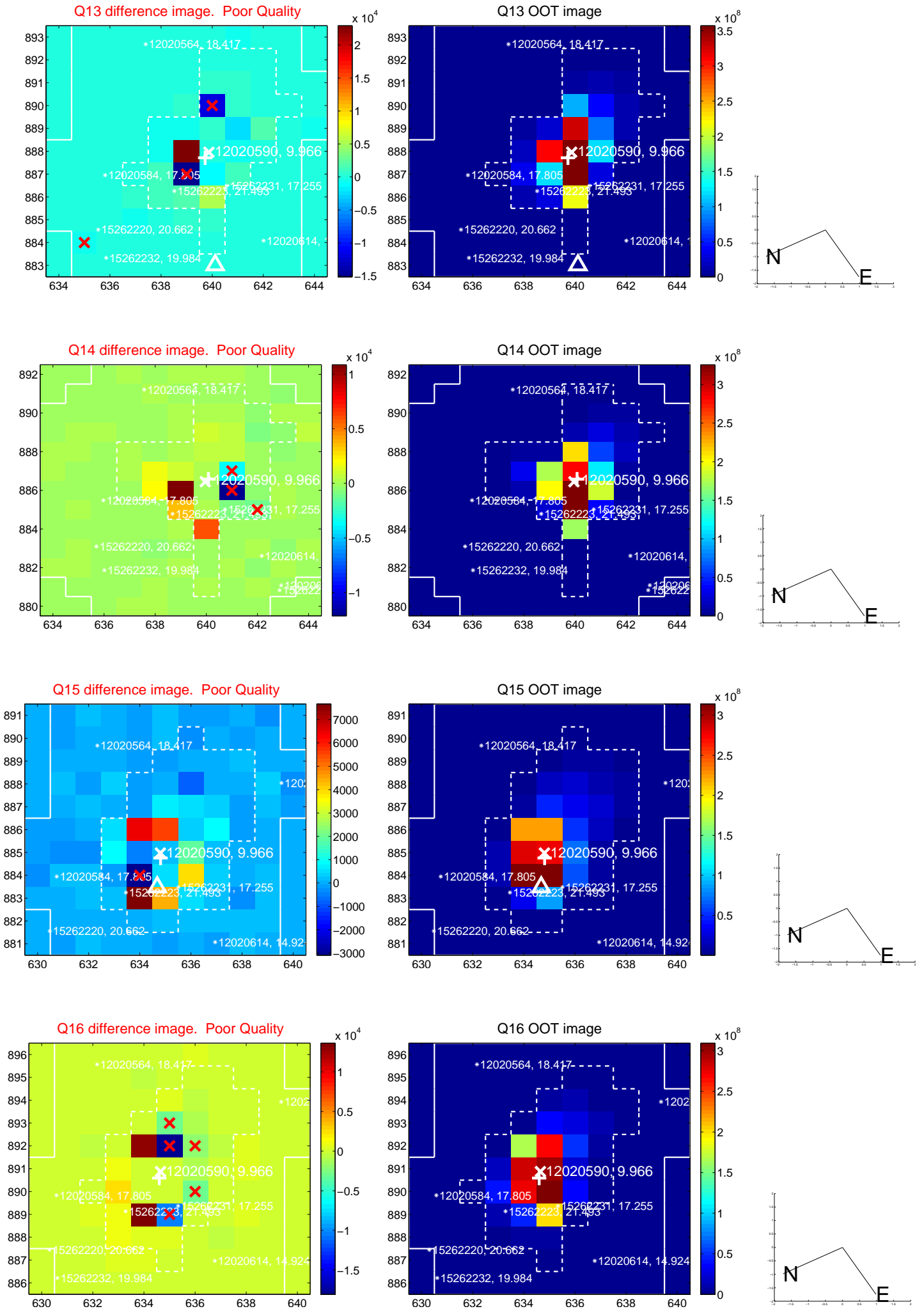
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



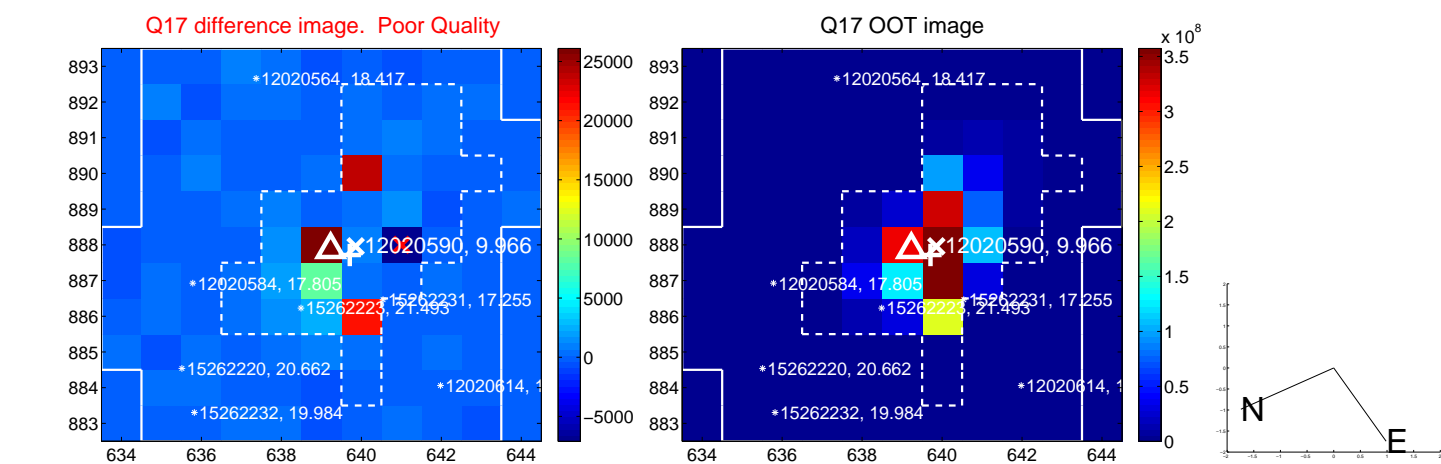
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



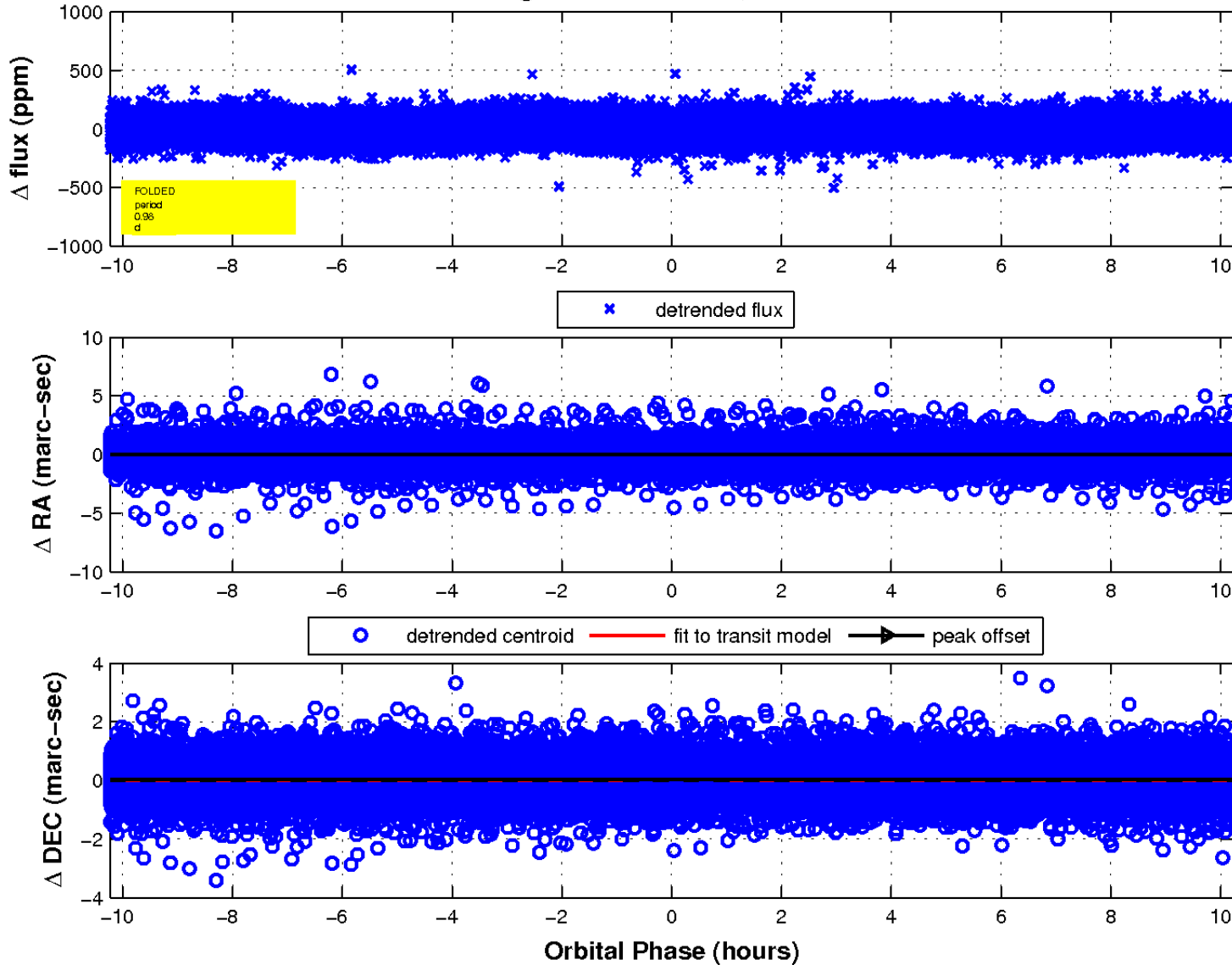
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



fluxWeightedCentroids, Planet 3 of 3



UKIRT Image

Declination

