

KIC 009776474

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})
009776474-01	OBS	No	0.676781	131.940217	21.4	2.193	10.0	8.6	3.86	7751	2.08	120465.04
009776474-02	OBS	No	1.914561	132.695966	56.9	22.975	9.6	24.8	3.86	7751	3.26	30109.22

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009776474-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT
009776474-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS

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

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

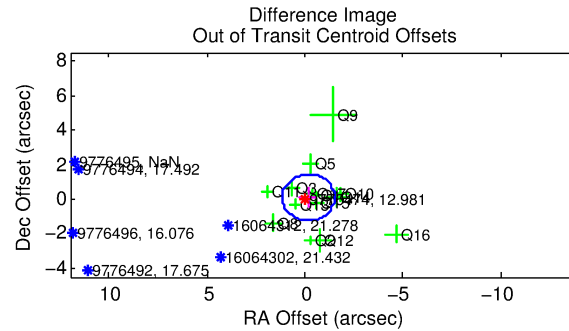
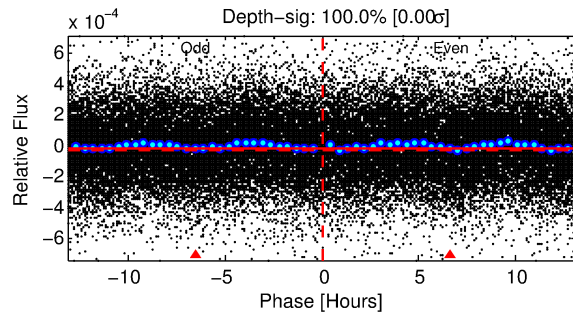
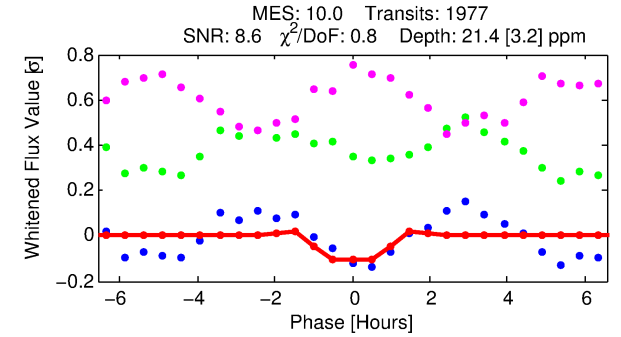
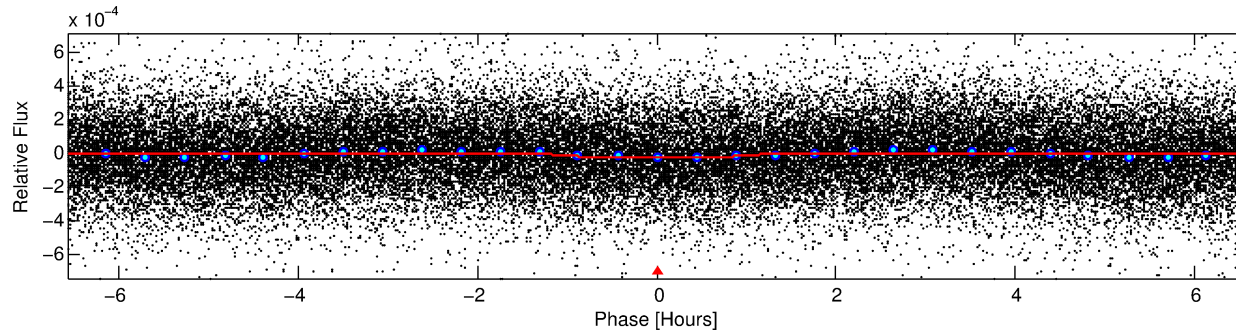
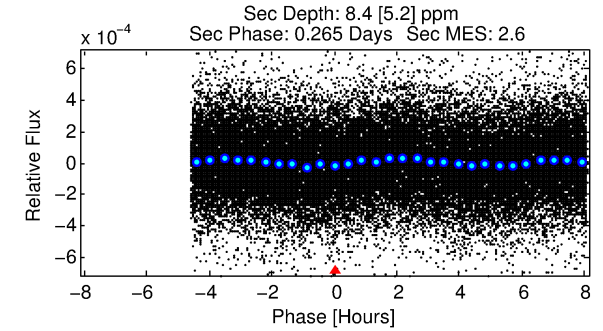
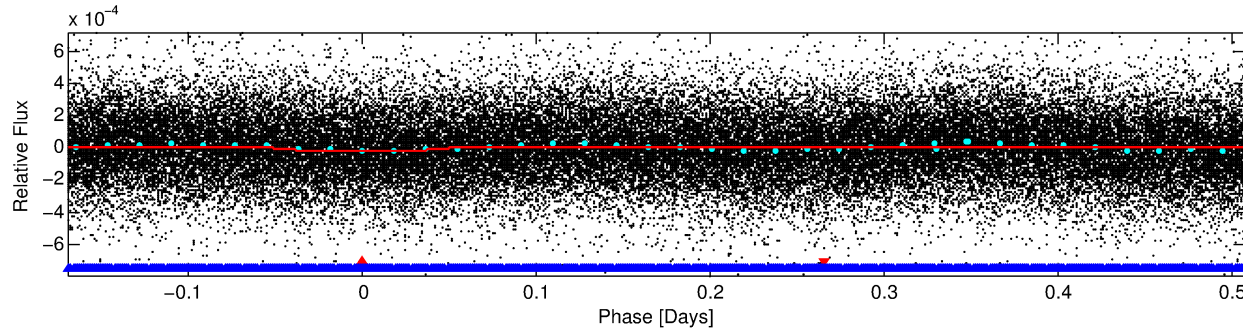
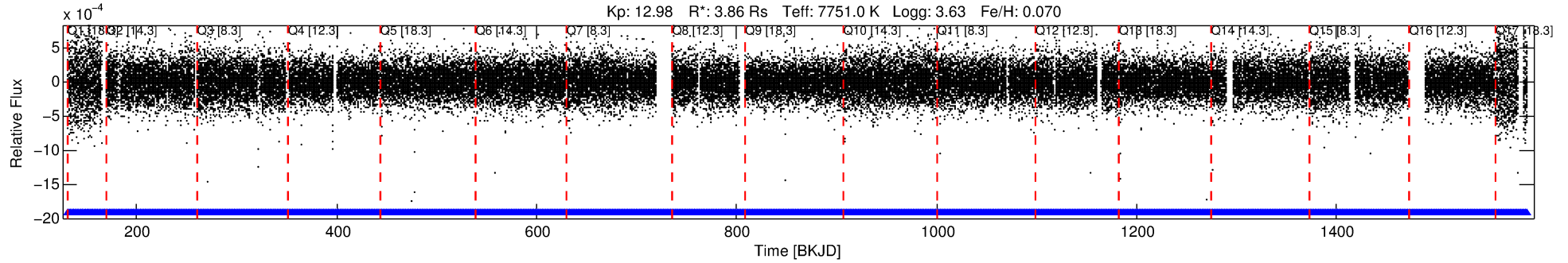
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009776474-01

No Significant Match Found

DV One-Page Summary

KIC: 9776474 Candidate: 1 of 2 Period: 0.677 d



DV Fit Results:

Period = 0.67678 [0.00001] d
Epoch = 131.9402 [0.0031] BKJD
Rp/R* = 0.0049 [0.0022]
a/R* = 1.41 [1.88]
b = 0.90 [0.58]
Seff = 120465.04 [99319.29]
Teq = 4751 [979] K
Rp = 2.08 [1.41] Re
a = 0.0200 [0.0100] AU
Ag = 0.43 [0.57] [-1.00σ]
Teff = 5933 [1622] K [0.62σ]

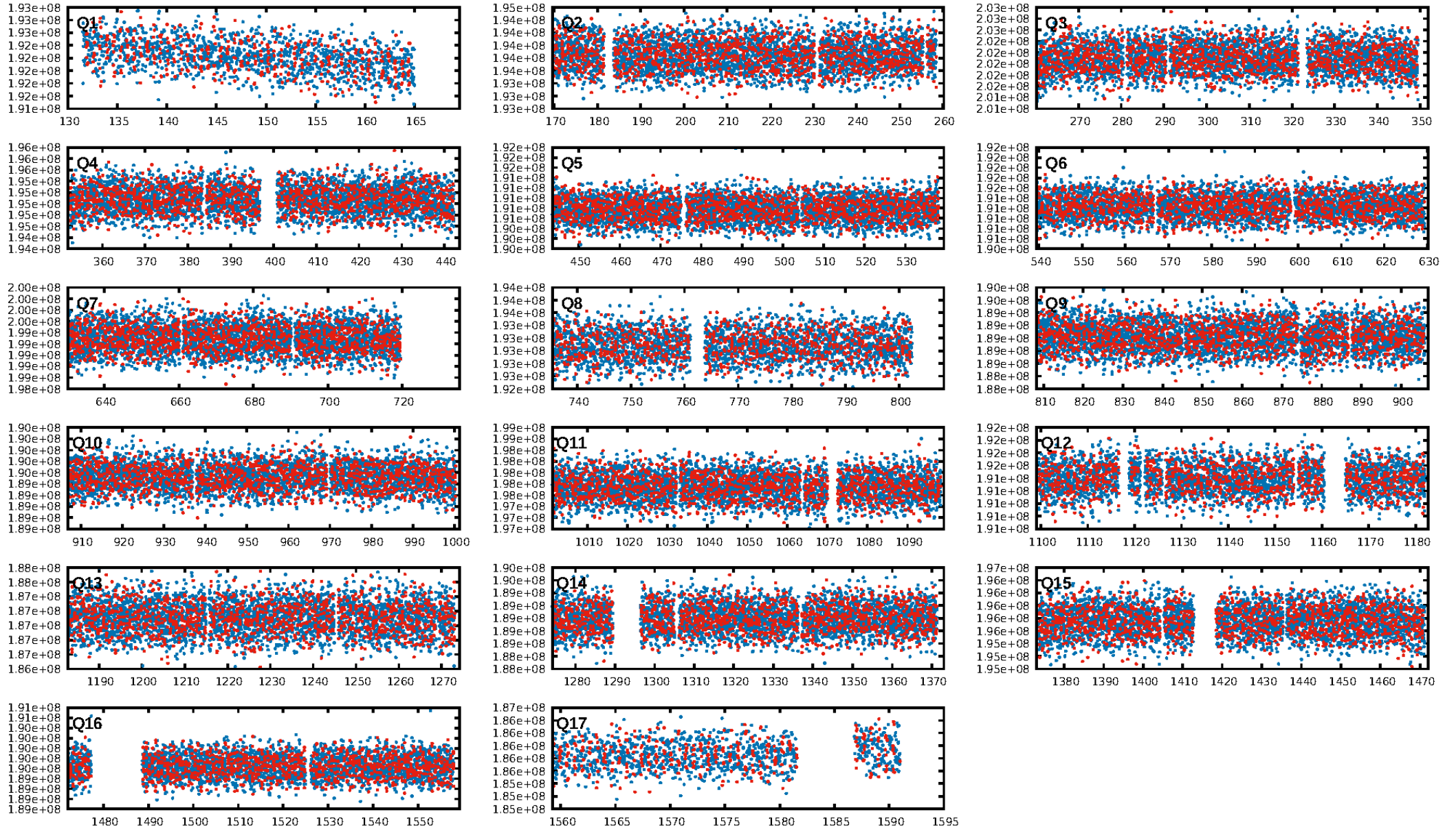
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 80.2% [1.29σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [1888/1888]
GhostDiagnostic-chr: -18.08
Centroid-sig: 43.7%
Centroid-so: 0.413 arcsec [0.57σ]
OotOffset-rm: 0.194 arcsec [0.43σ]
OotOffset-st: 3/3/3/5 [14]
KicOffset-rm: 0.243 arcsec [0.56σ]
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DiffImageQuality-fgm: 0.43 [6/14]
DiffImageOverlap-fno: 1.00 [17/17]

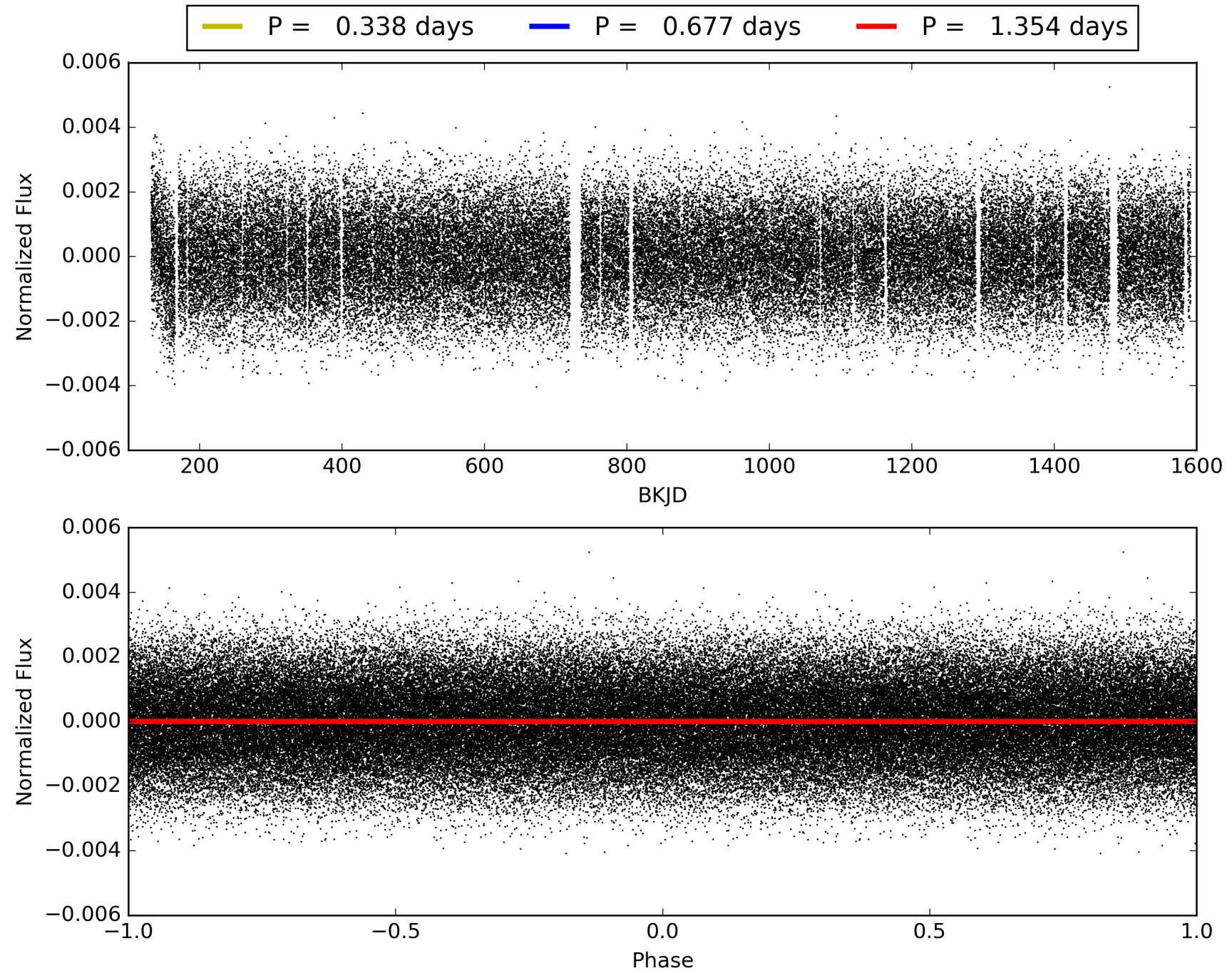
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 02:09:32 Z

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

TCE 009776474-01, PDC Light Curves

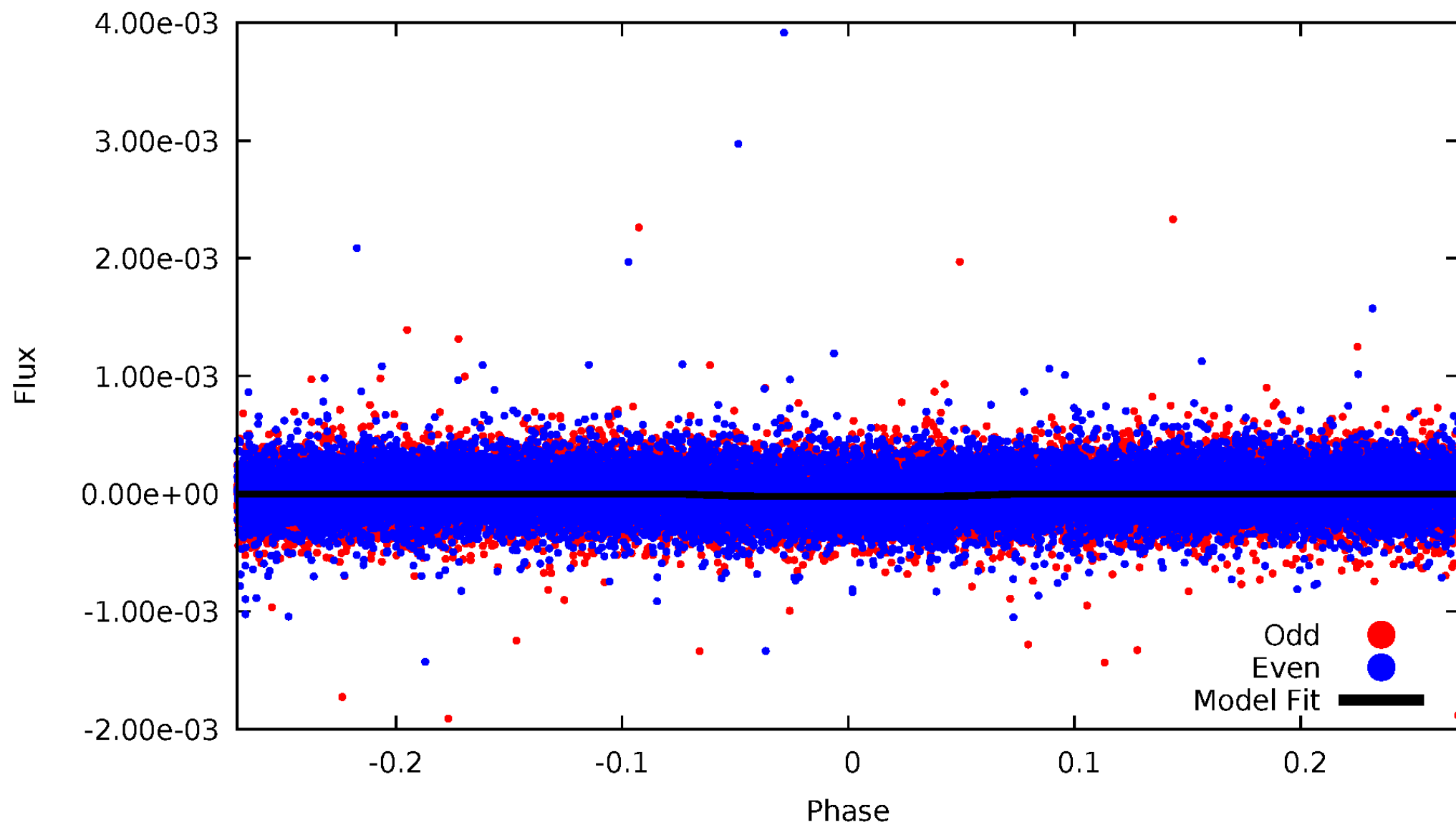


TCE 009776474-01



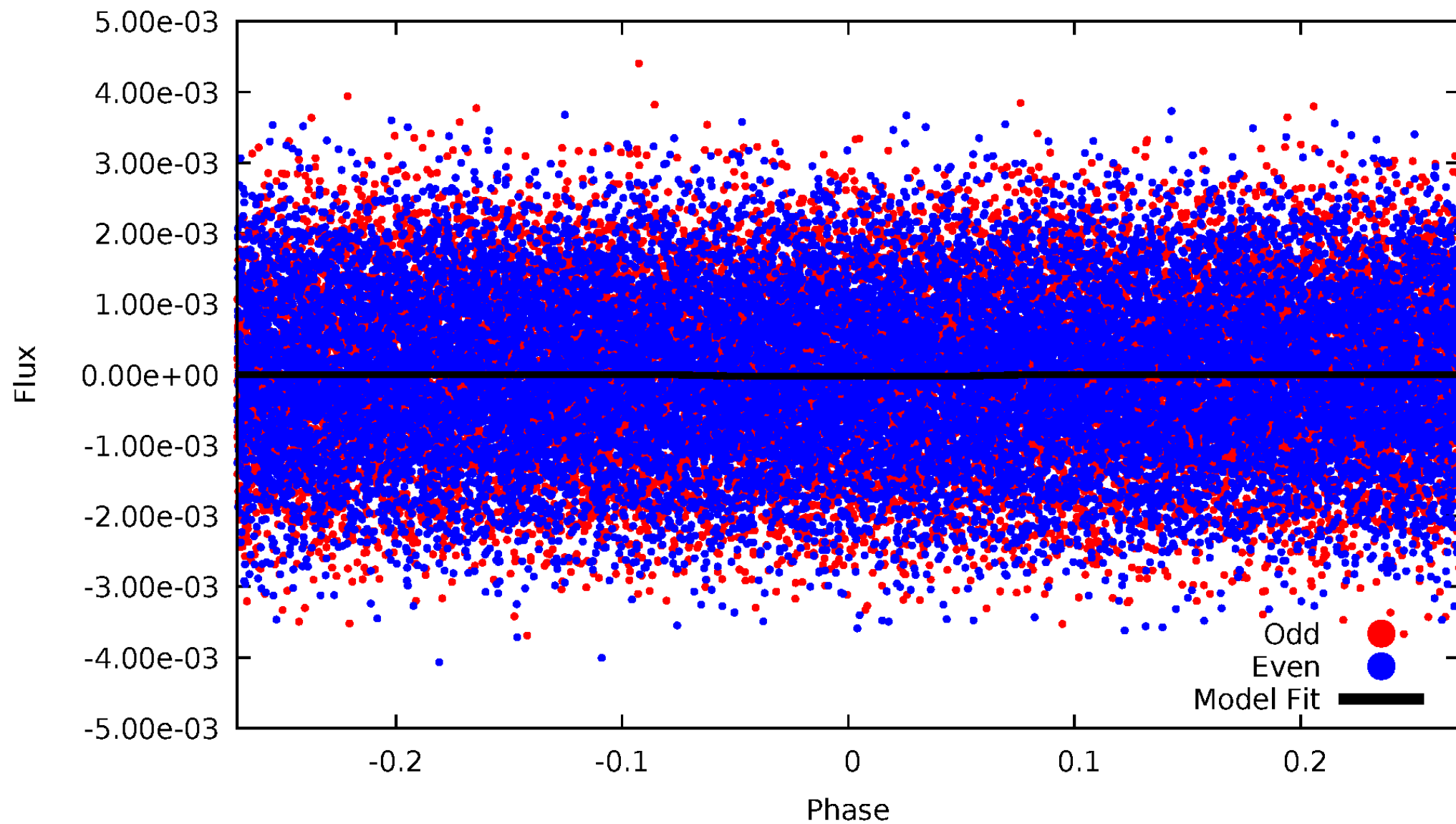
DV Odd/Even

TCE 009776474-01



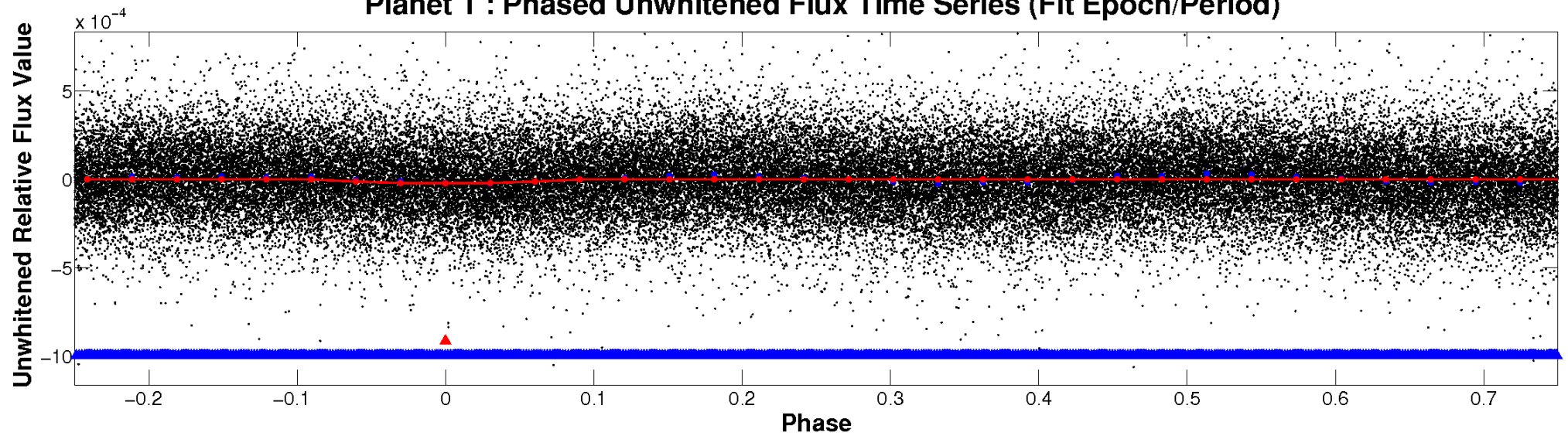
ALT Odd/Even

TCE 009776474-01

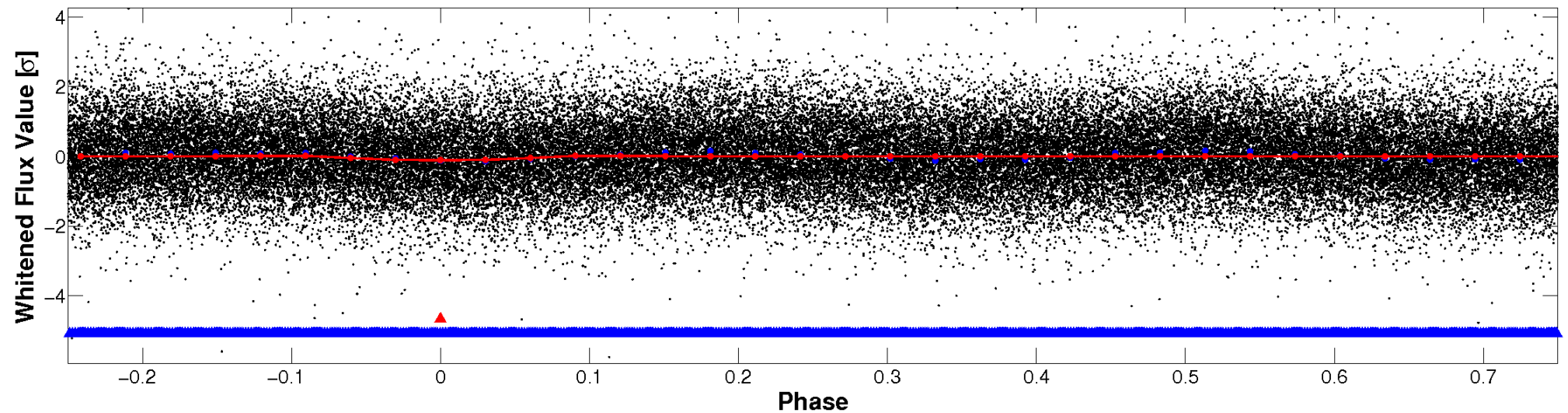


Non-Whitened Vs. Whitened Light Curve

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

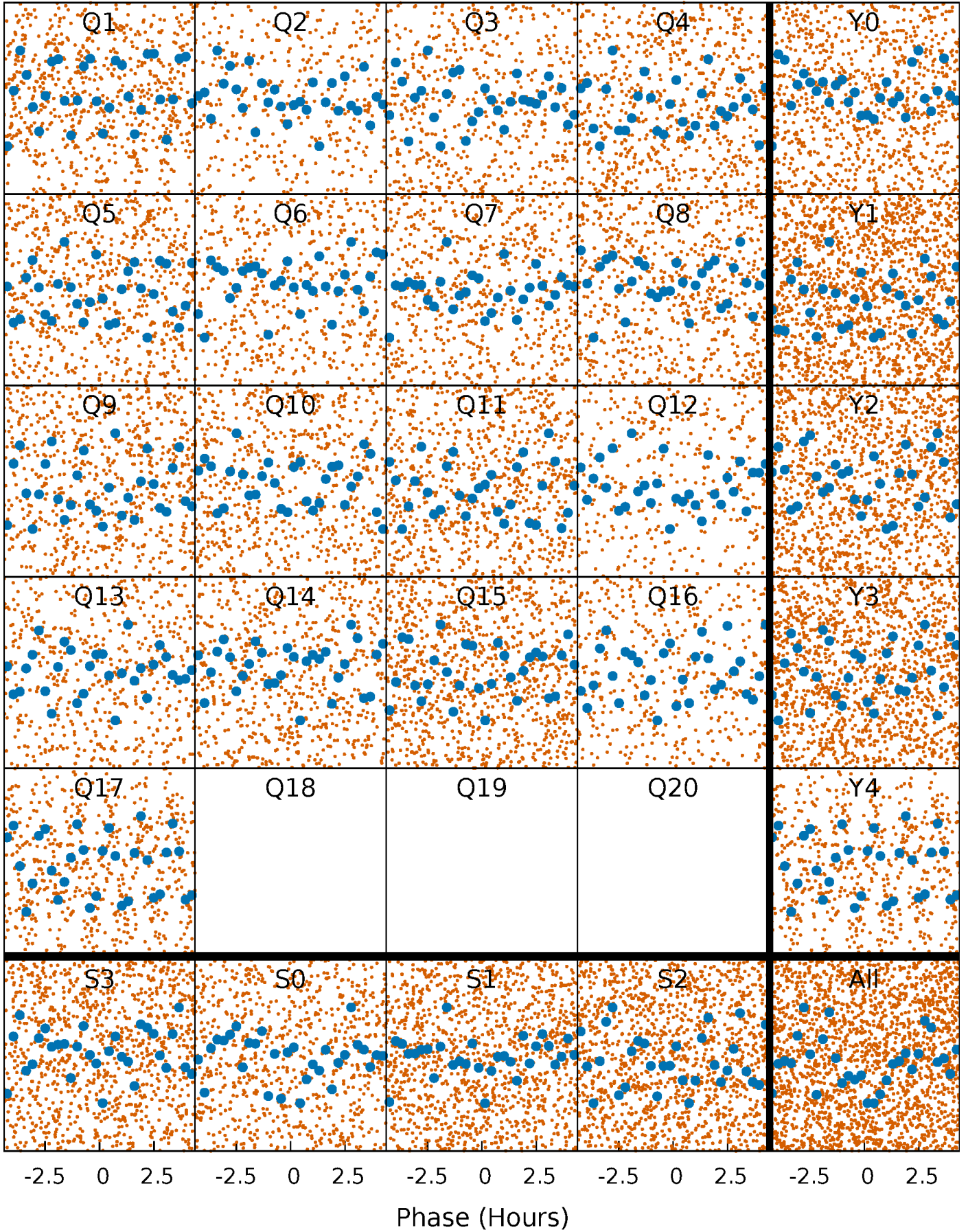


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



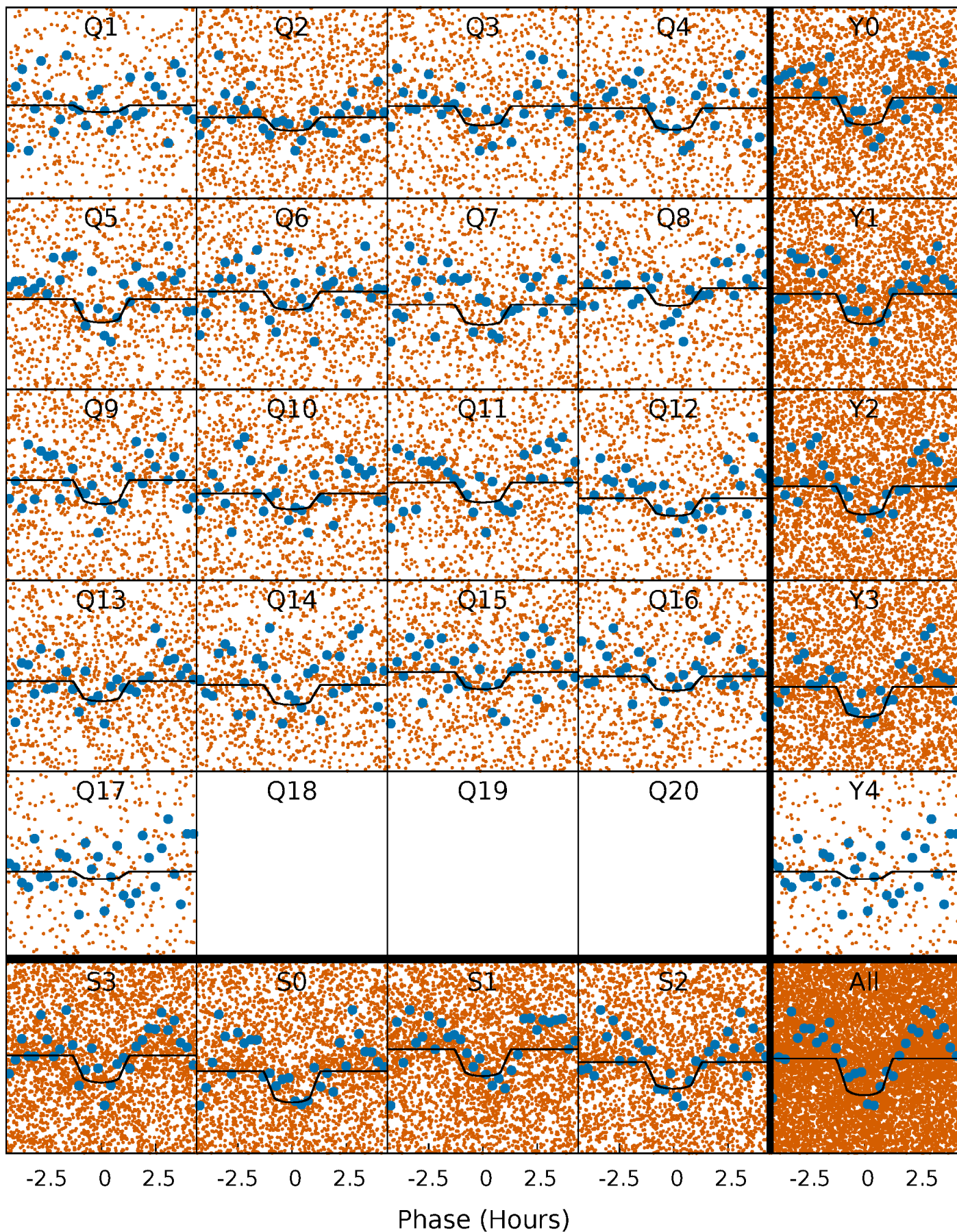
PDC Quarter-Phased Transit Curves

TCE 009776474-01 P= 0.676781 Days $T_0=131.940217$ (BKJD)



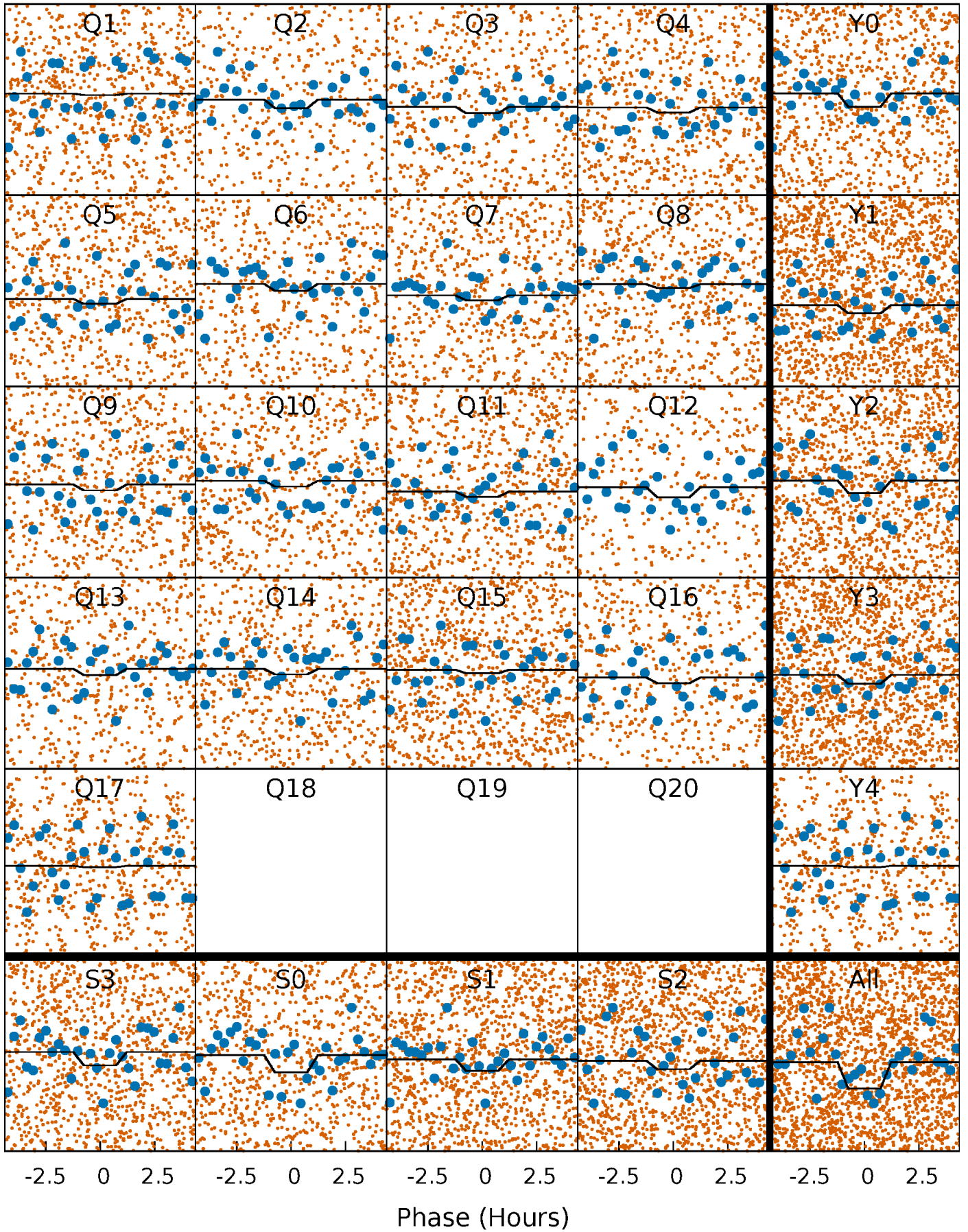
DV Quarter-Phased Transit Curves

TCE 009776474-01 P= 0.676781 Days $T_0=131.940217$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

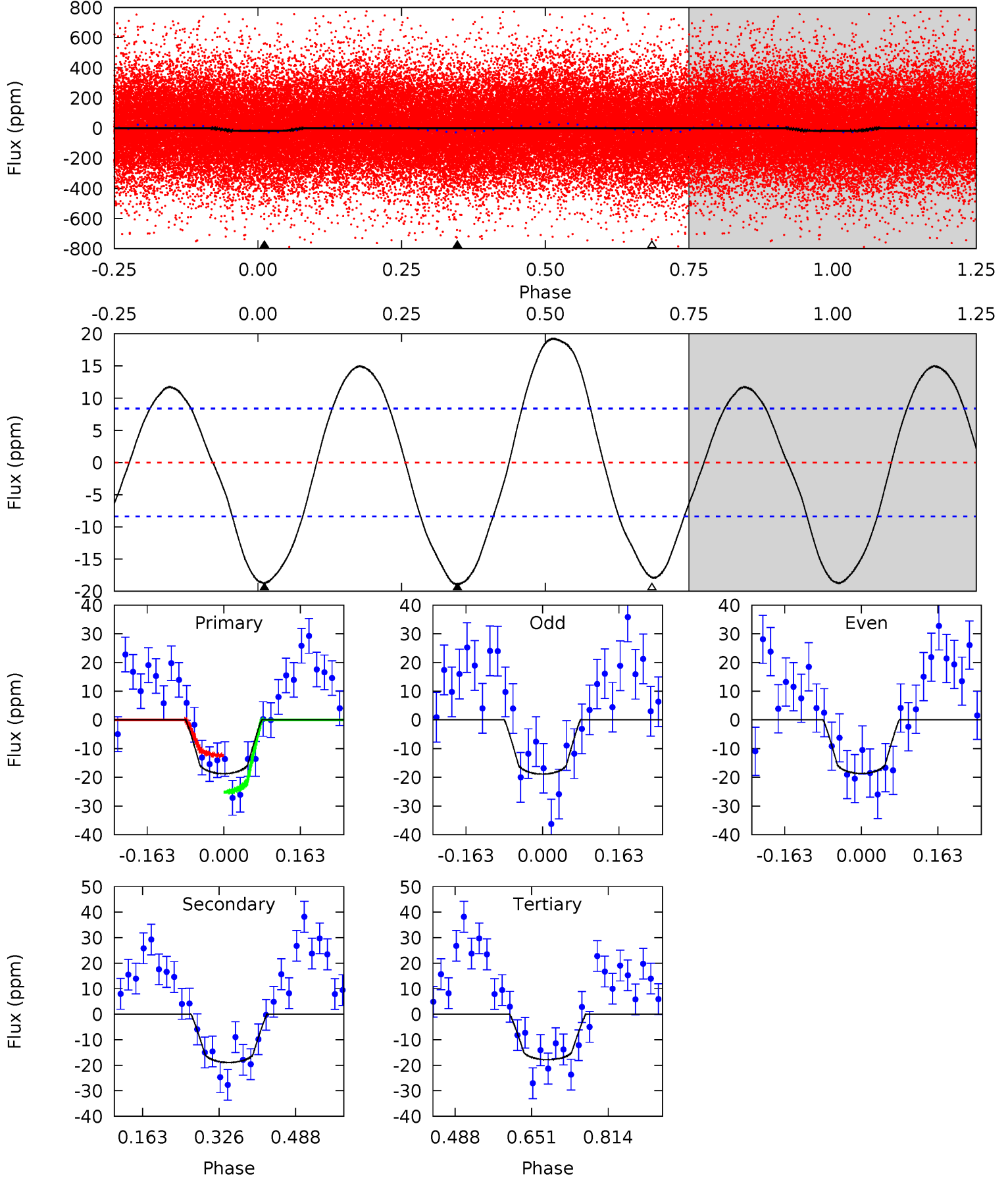
TCE 009776474-01 P= 0.676781 Days $T_0=131.940217$ (BKJD)



DV Model-Shift Uniqueness Test

009776474-01, P = 0.676781 Days, E = 131.263436 Days

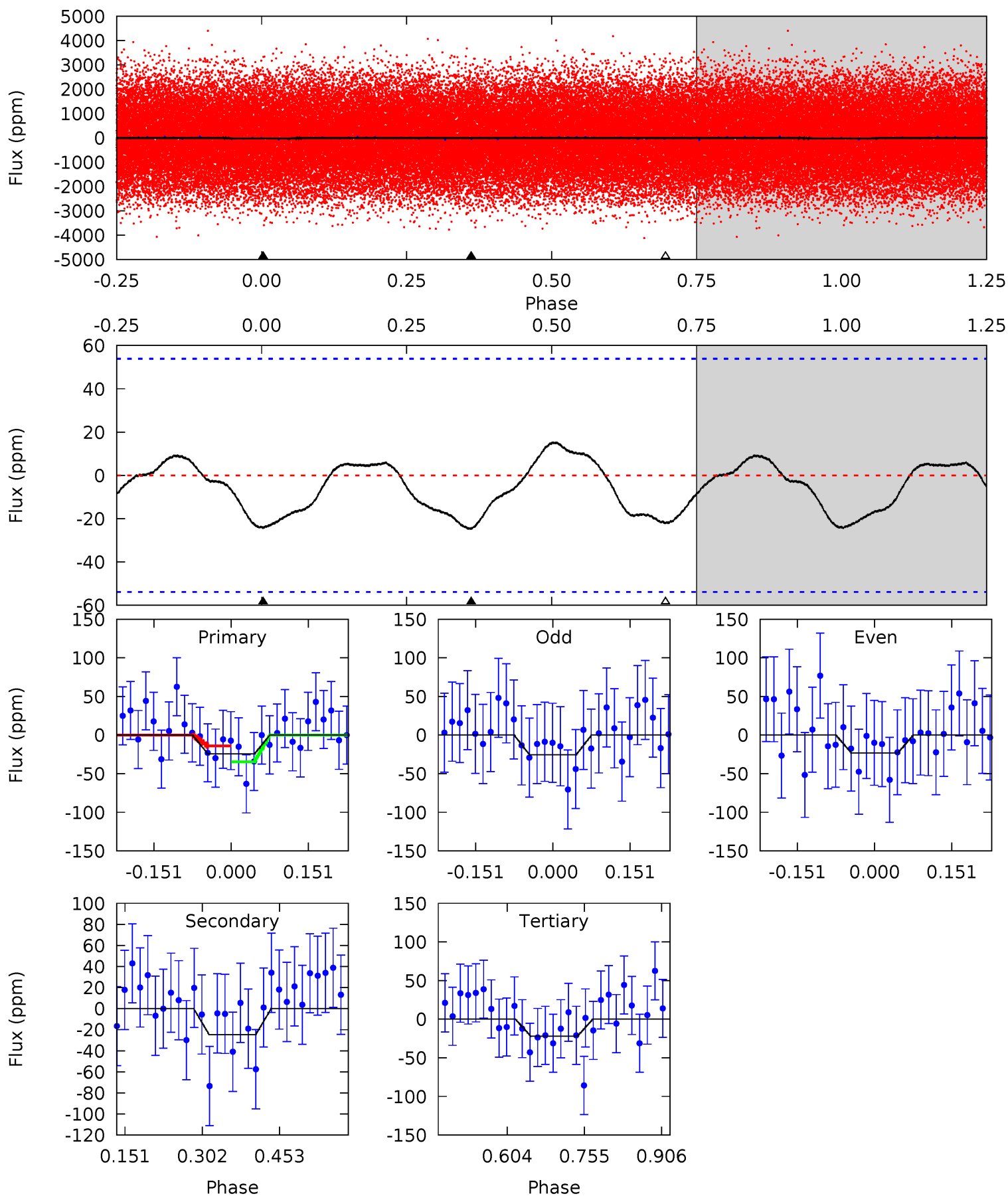
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.97	10.1	9.49	0	4.46	1.40	6.51	0.48	9.97	0.58	10.1	0.06	1.01	0.50	3.39



Alt Model-Shift Uniqueness Test

009776474-01, P = 0.676781 Days, E = 131.263436 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2.02	2.05	1.84	0	4.48	1.44	0.93	0.19	2.02	0.21	2.05	0.10	0.99	0.38	0.86



Stellar Parameters For KIC 009776474

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	7751^{+216}_{-325}	$3.632^{+0.476}_{-0.084}$	$0.070^{+0.200}_{-0.350}$	$3.861^{+0.662}_{-1.987}$	$2.331^{+0.243}_{-0.729}$	$0.057^{+0.283}_{-0.021}$
	+3%/-4%	+13%/-2%	+286%/-500%	+17%/-51%	+10%/-31%	+495%/-37%
Source	PHO54	PHO54	PHO54	DSEP		

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

Secondary Eclipse Parameters for KIC 009776474-01 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-19 ± 2	$1.78^{+1.00}_{-0.80}$	6379^{+480}_{-778}	6676^{+3085}_{-1701}	$1.288^{+2.694}_{-0.758}$
Alt.	-25 ± 12	$1.87^{+1.05}_{-0.87}$	6409^{+453}_{-796}	6988^{+3579}_{-2353}	$1.448^{+3.518}_{-0.978}$

T_{max} = Theoretical Maximum Planetary Temperature
 T_{obs} = Observed Planetary Temperature (Assuming $A=0.3$)
 A_{obs} = Observed Albedo (Assuming $T=0$)

If a secondary eclipse is present, the system is likely an EB if $T_{obs} \gg T_{max}$ AND $A_{obs} \gg 1.0$

DV Centroid Data

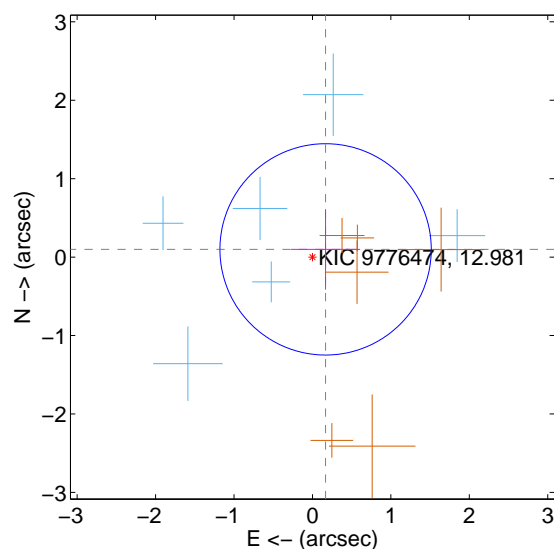
Supplemental centroid analysis for 009776474-01. Kepler magnitude: 12.98. Transit SNR 8.58

There are 6 quarters with good PRF difference image offsets

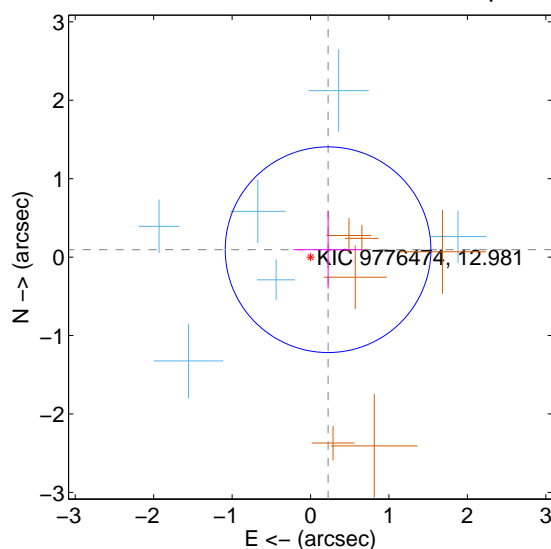
The direct PRF centroid is offset from the target star catalog position by about 0.11 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.194 ± 0.449	0.43	-0.168 ± 0.441	0.098 ± 0.513
PRF-fit source offset from KIC position	0.243 ± 0.437	0.56	-0.224 ± 0.443	0.094 ± 0.495
photometric centroid source offset	0.41 ± 0.72	0.57	-0.27 ± 0.69	0.31 ± 0.74

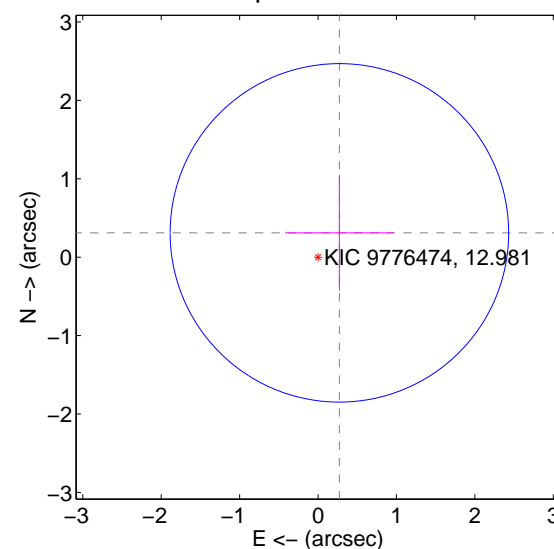
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

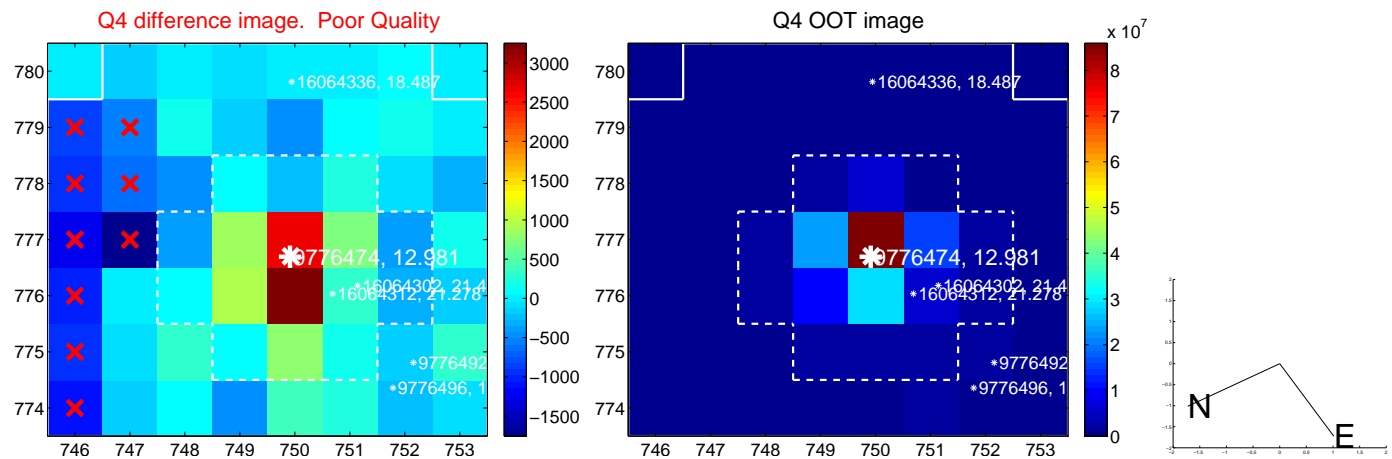
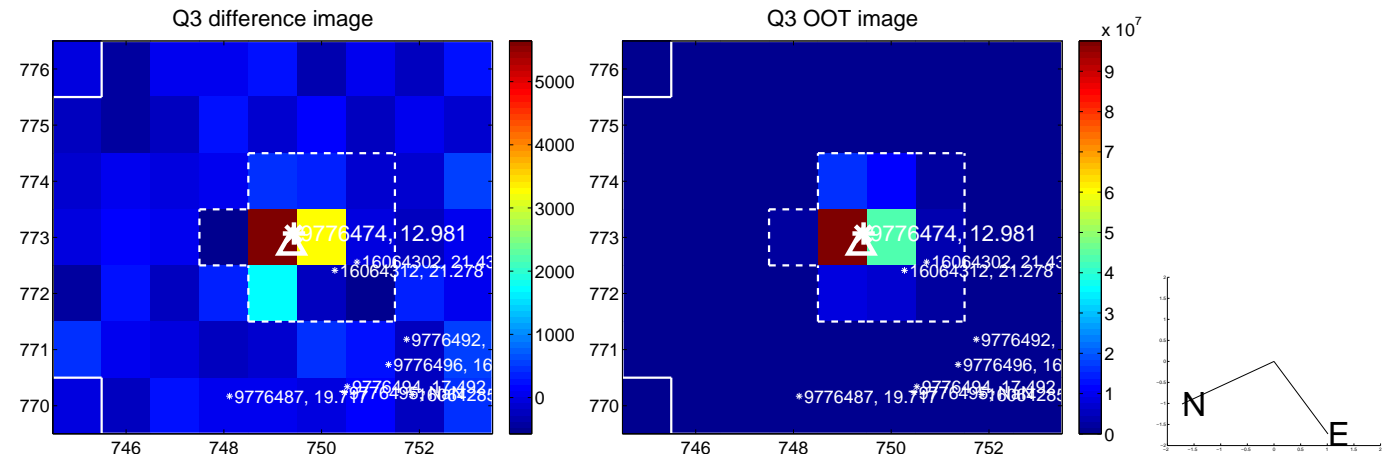
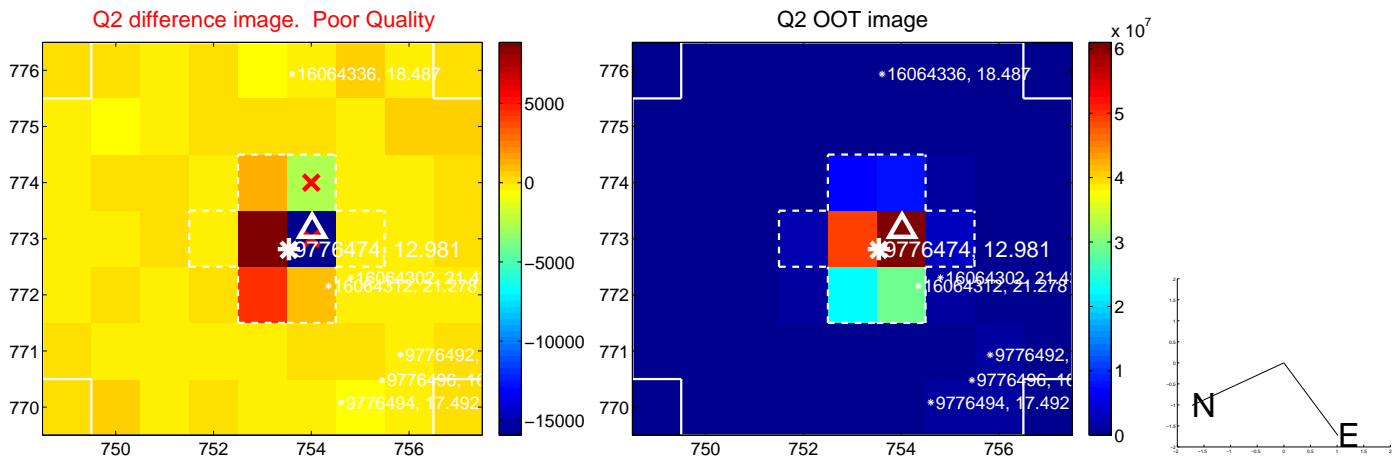
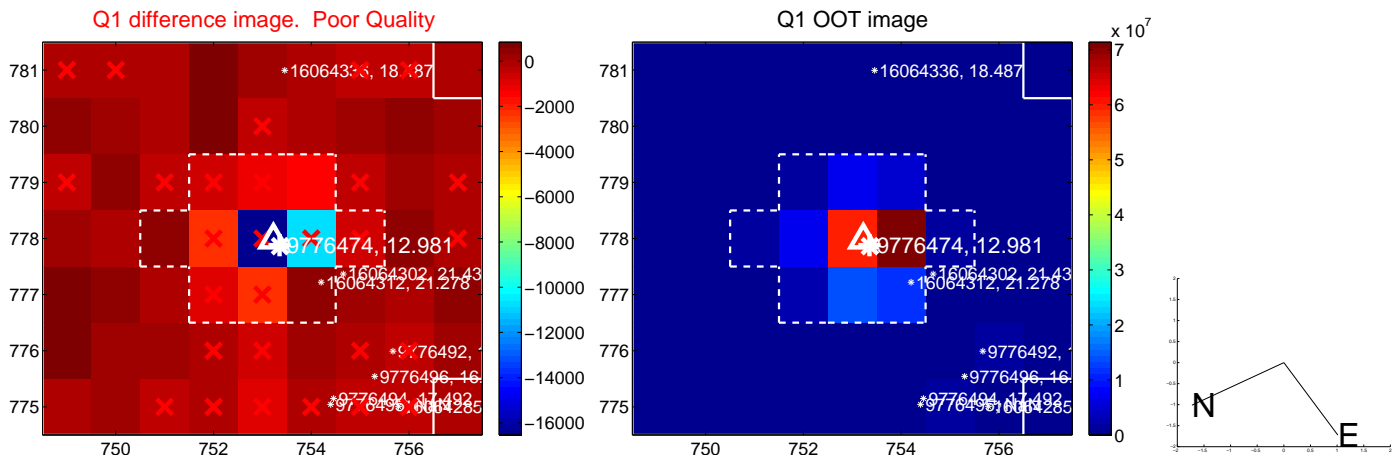


offset from photometric centroids

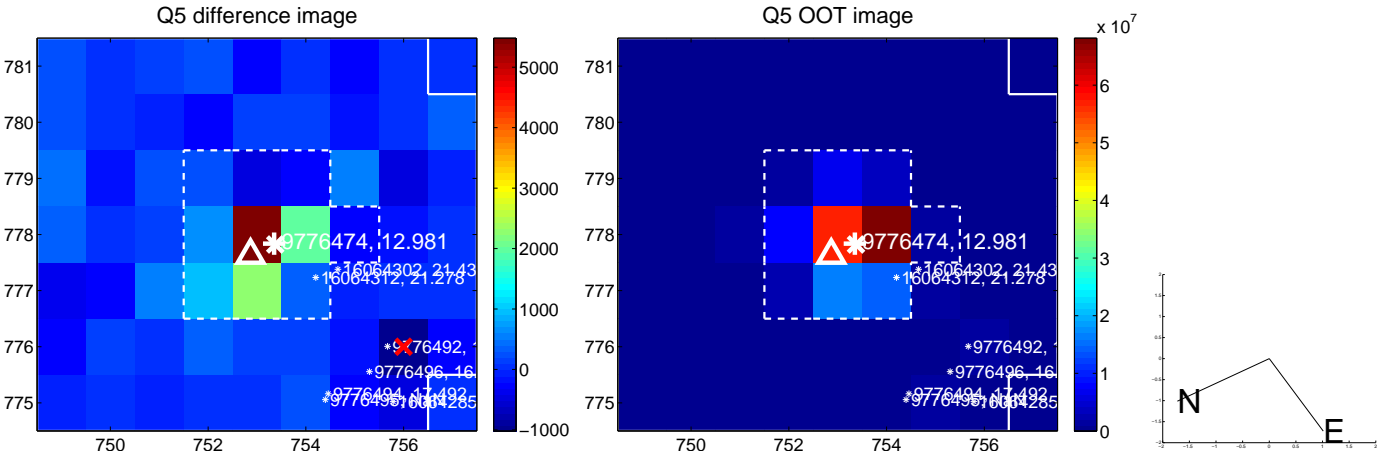


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

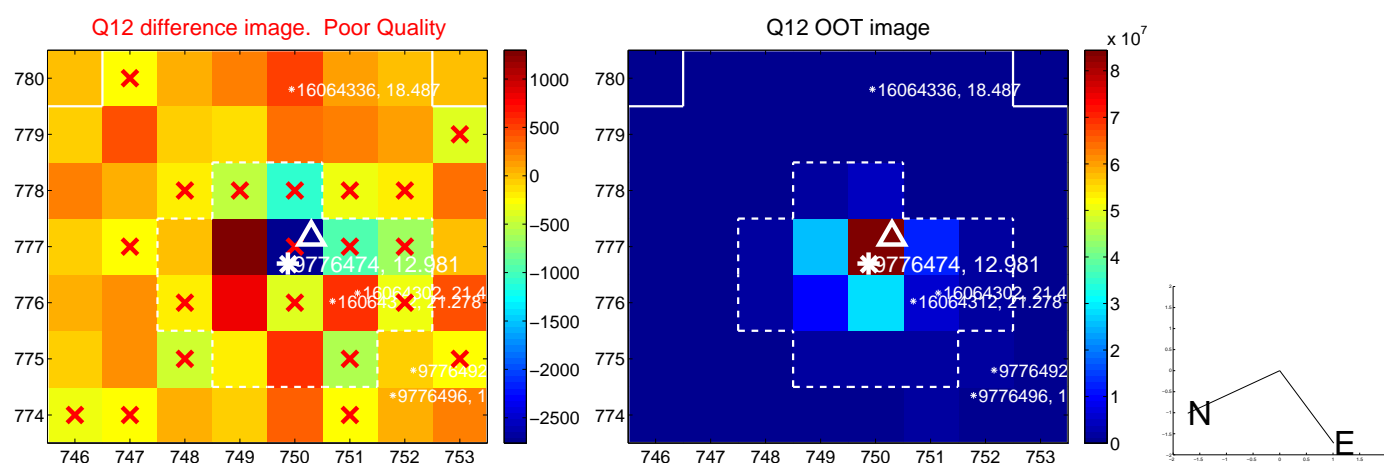
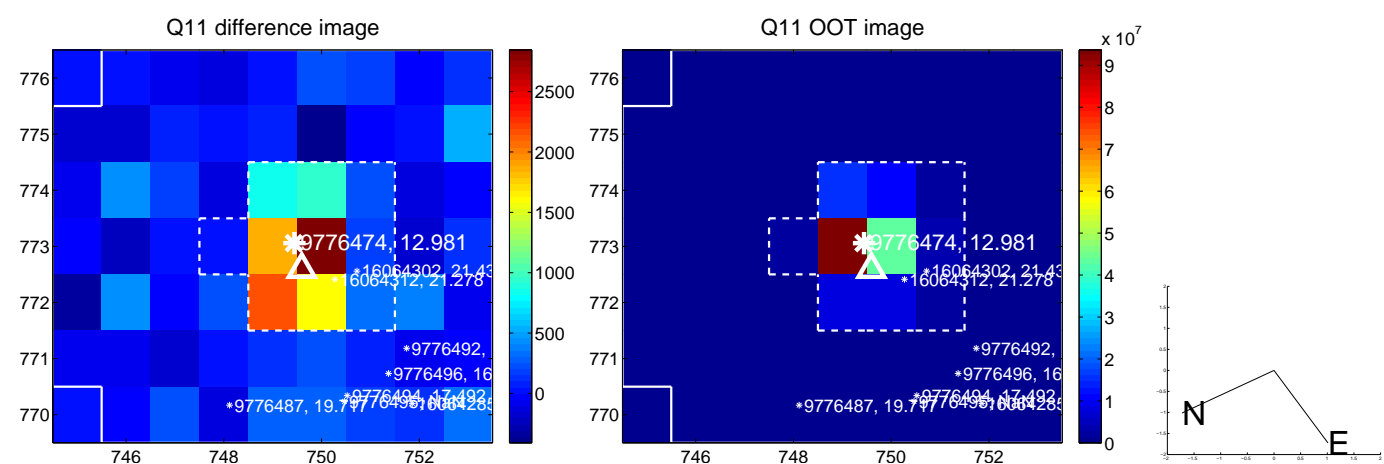
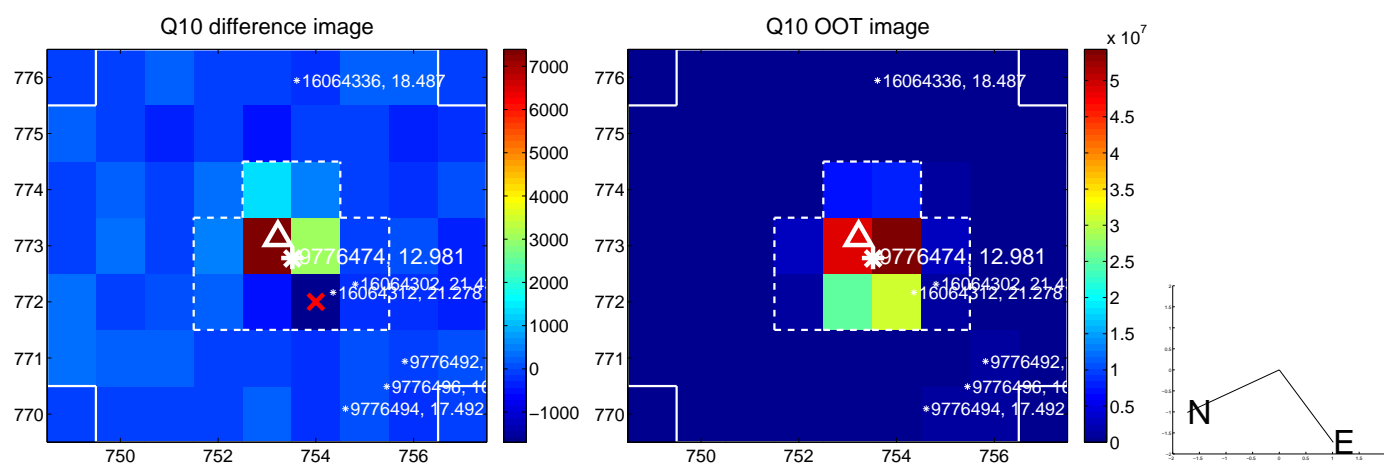
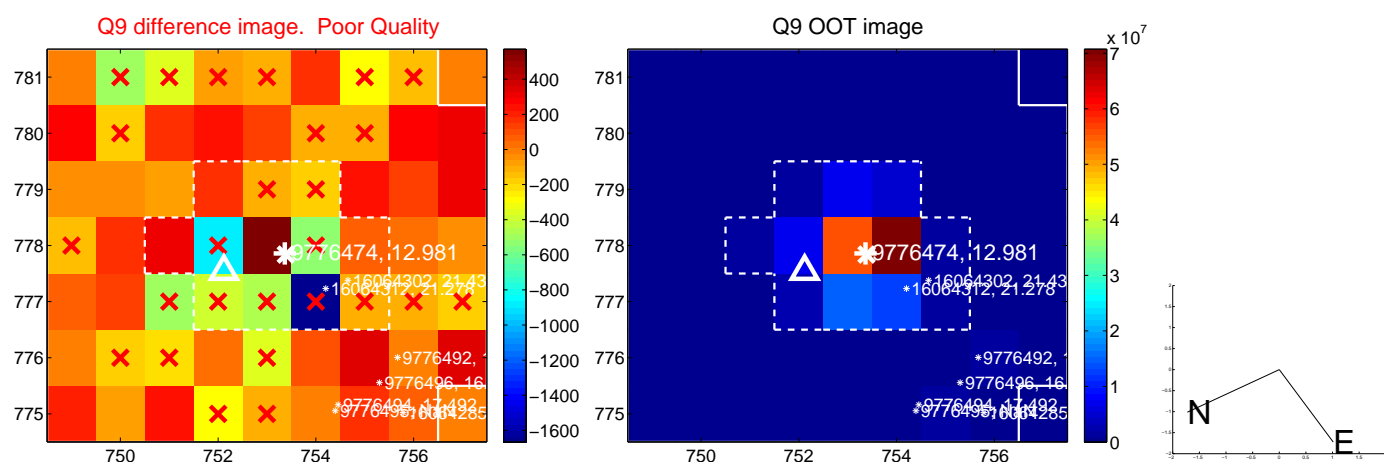
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



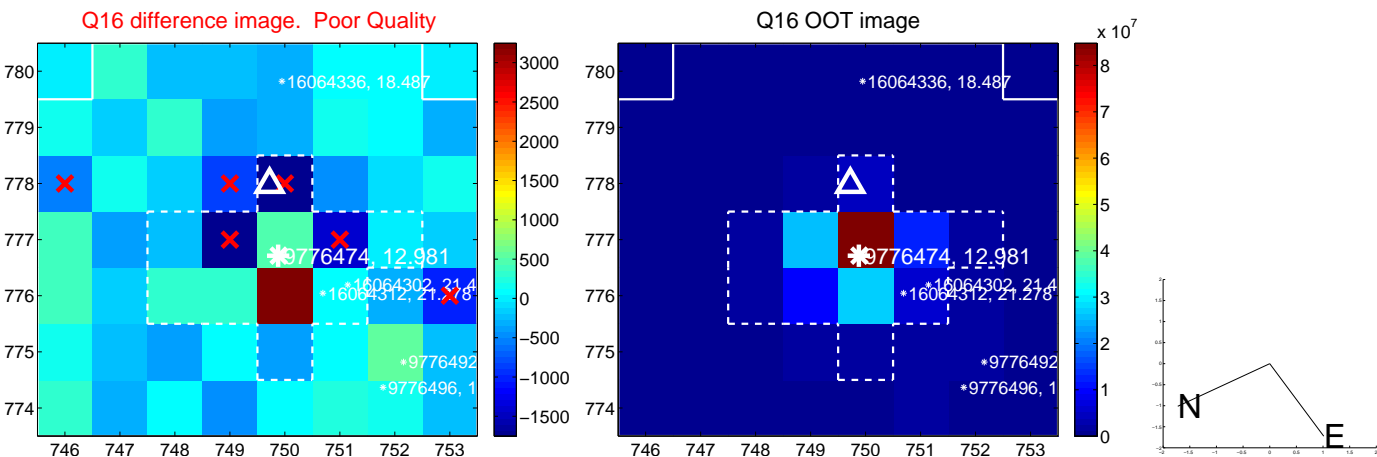
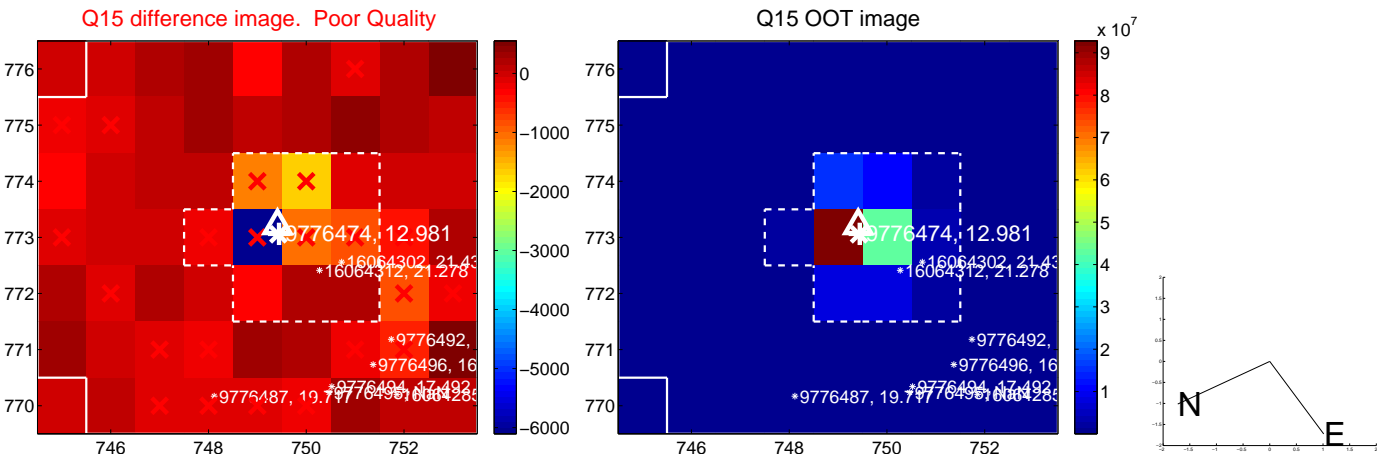
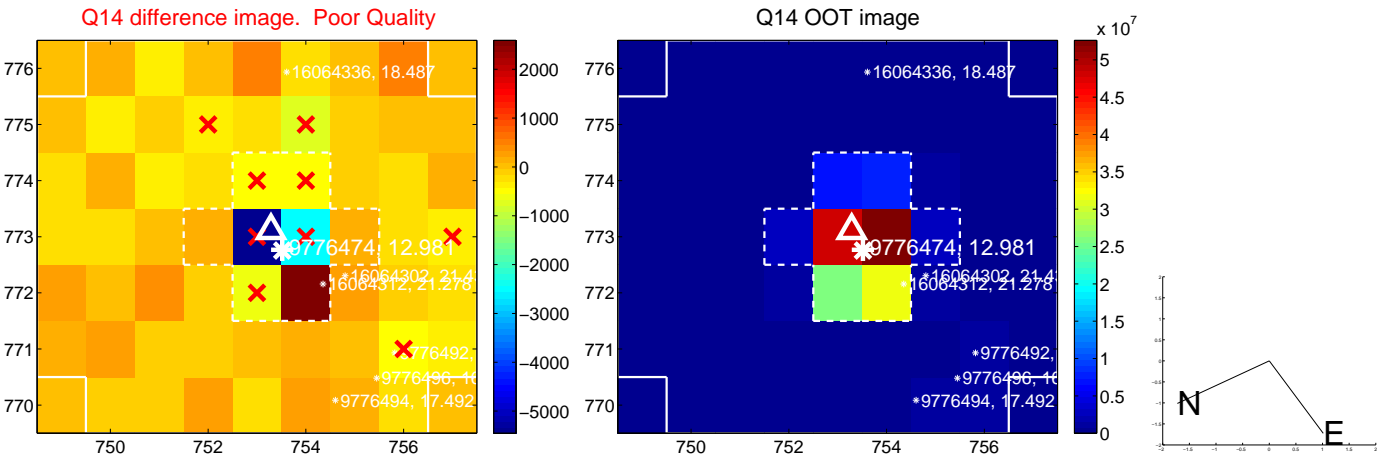
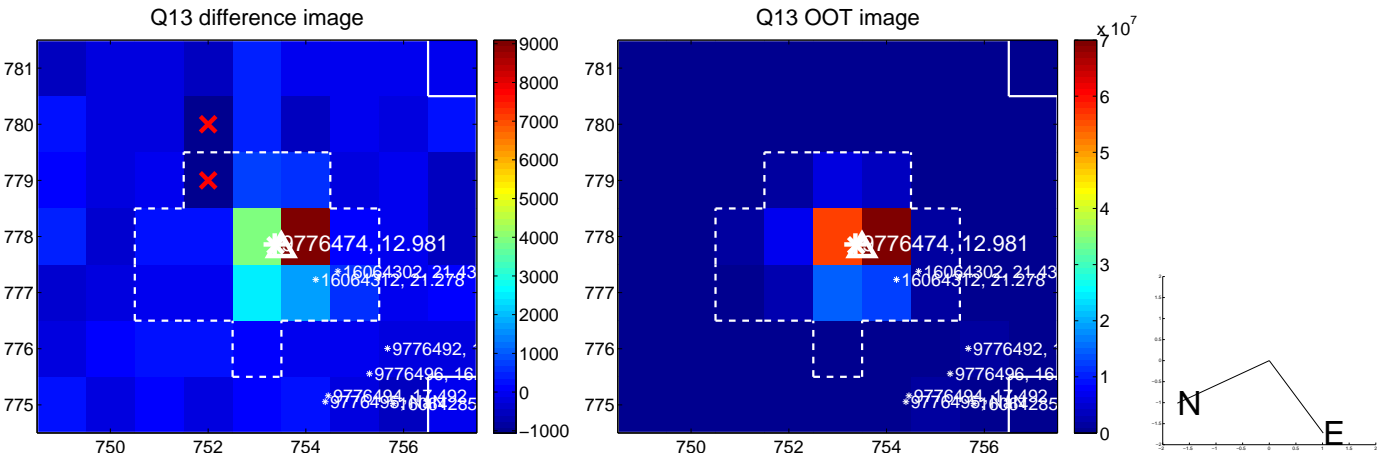
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



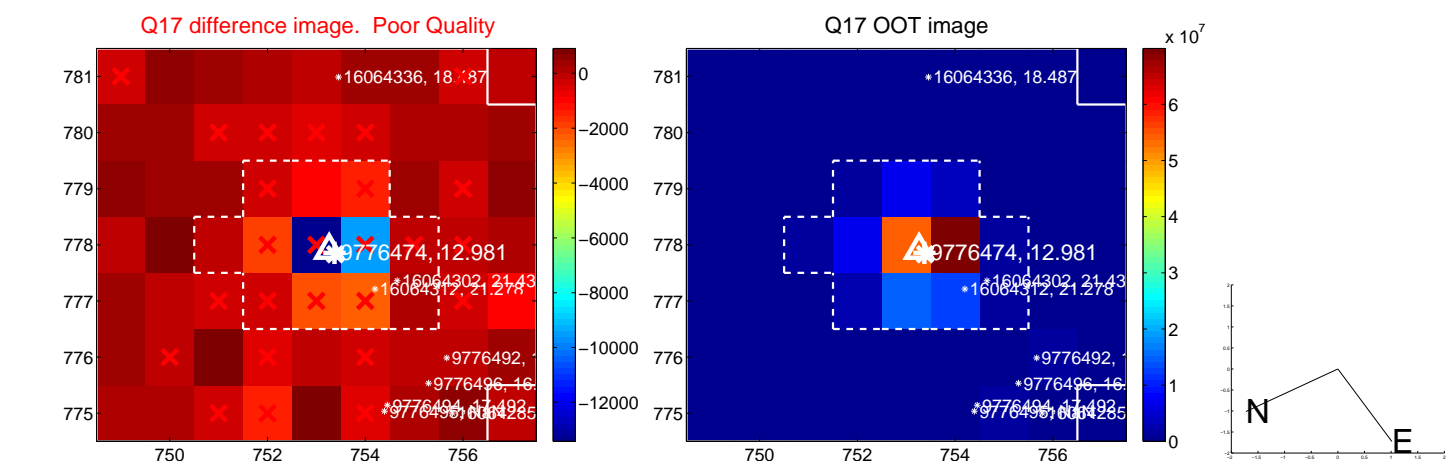
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



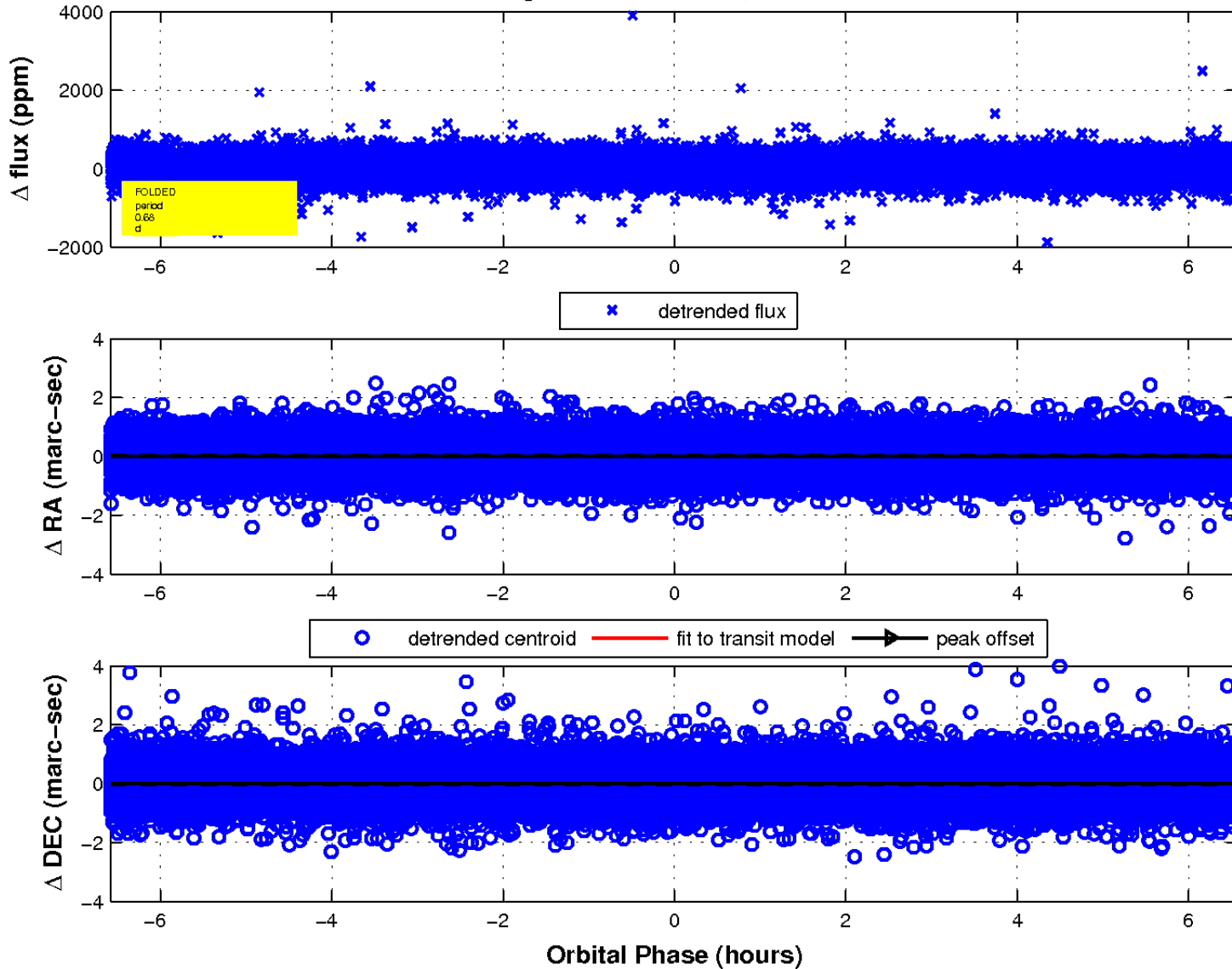
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

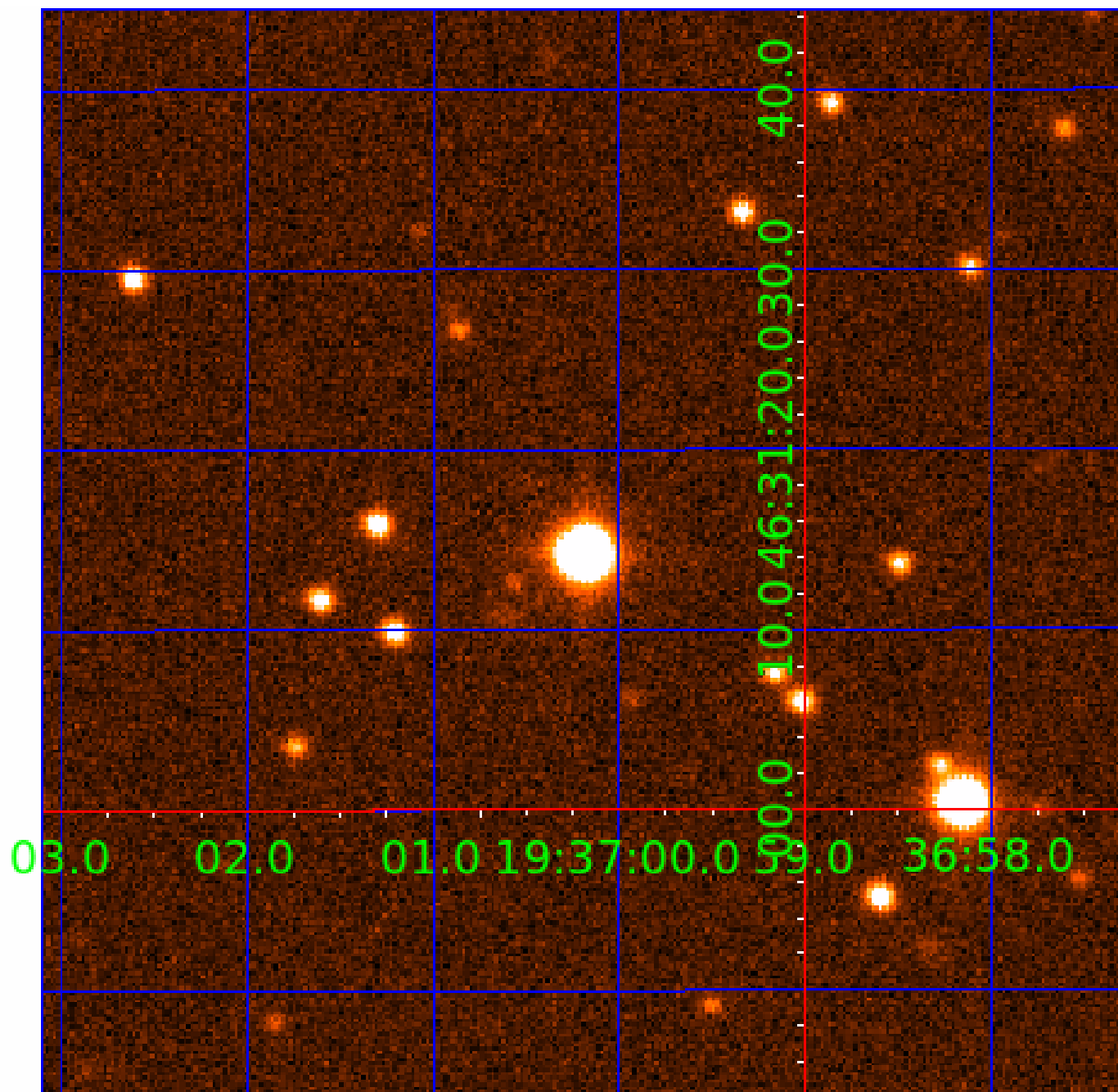


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination



KIC 009776474

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})
009776474-01	OBS	No	0.676781	131.940217	21.4	2.193	10.0	8.6	3.86	7751	2.08	120465.04
009776474-02	OBS	No	1.914561	132.695966	56.9	22.975	9.6	24.8	3.86	7751	3.26	30109.22

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009776474-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT
009776474-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_SKYE_ZUMA—LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—CENT_FEW_DIFFS

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

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

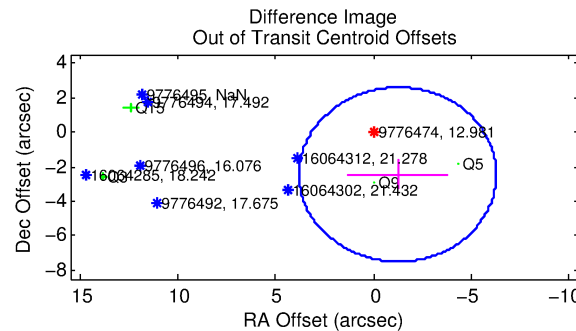
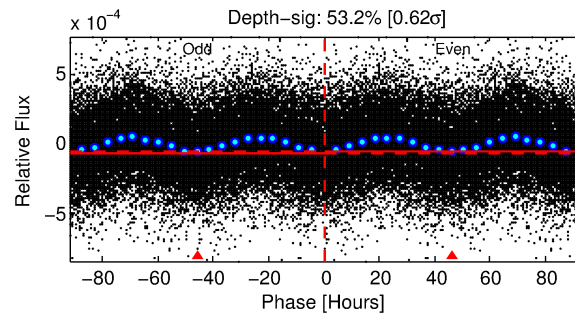
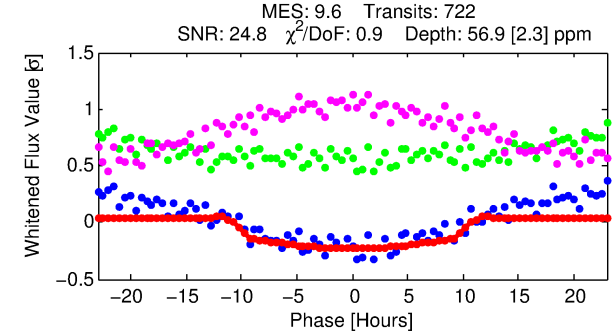
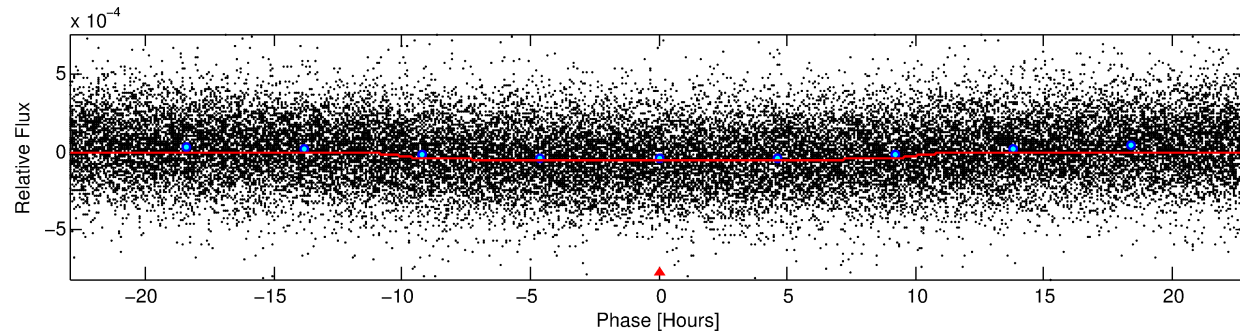
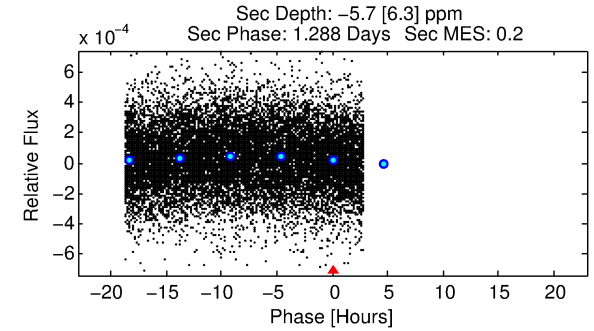
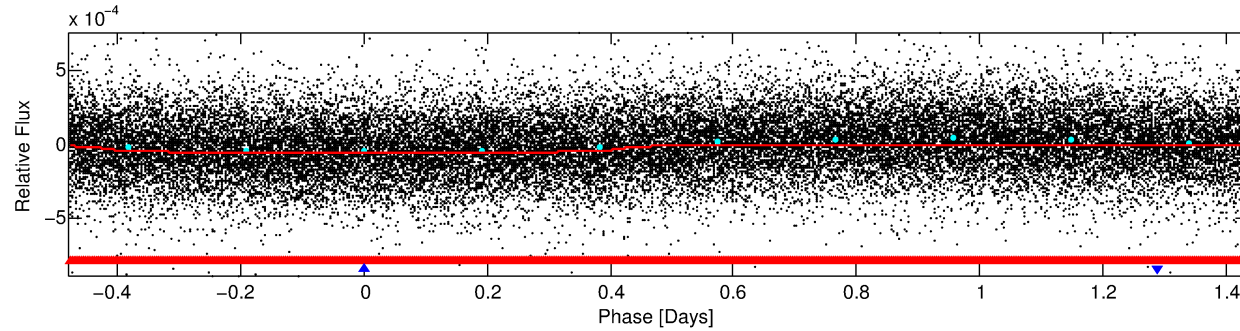
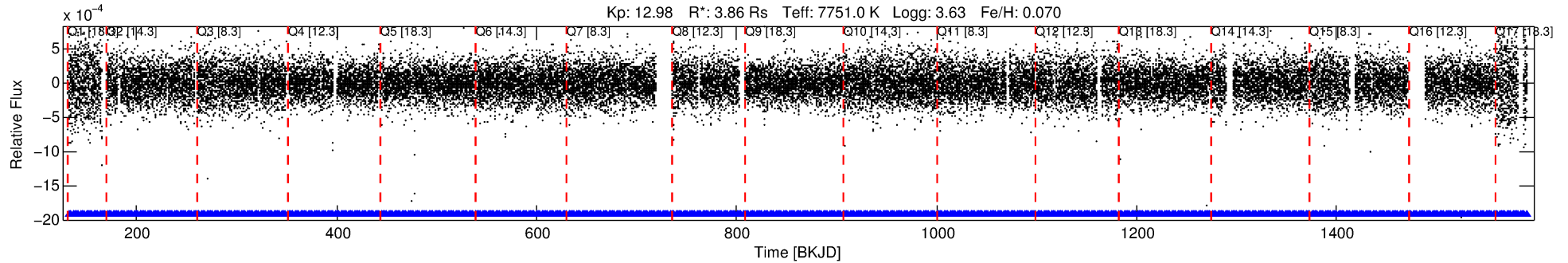
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009776474-02

No Significant Match Found

DV One-Page Summary

KIC: 9776474 Candidate: 2 of 2 Period: 1.915 d



DV Fit Results:

Period = 1.91456 [0.00003] d
Epoch = 132.6960 [0.0119] BKJD
Rp/R* = 0.0077 [0.0004]
a/R* = 1.00 [0.00]
b = 0.83 [0.09]
Seff = 30109.22 [24824.02]
Teff = 3359 [692] K
Rp = 3.26 [1.69] Re
a = 0.0400 [0.0201] AU
Ag = N/A
Teffp = N/A

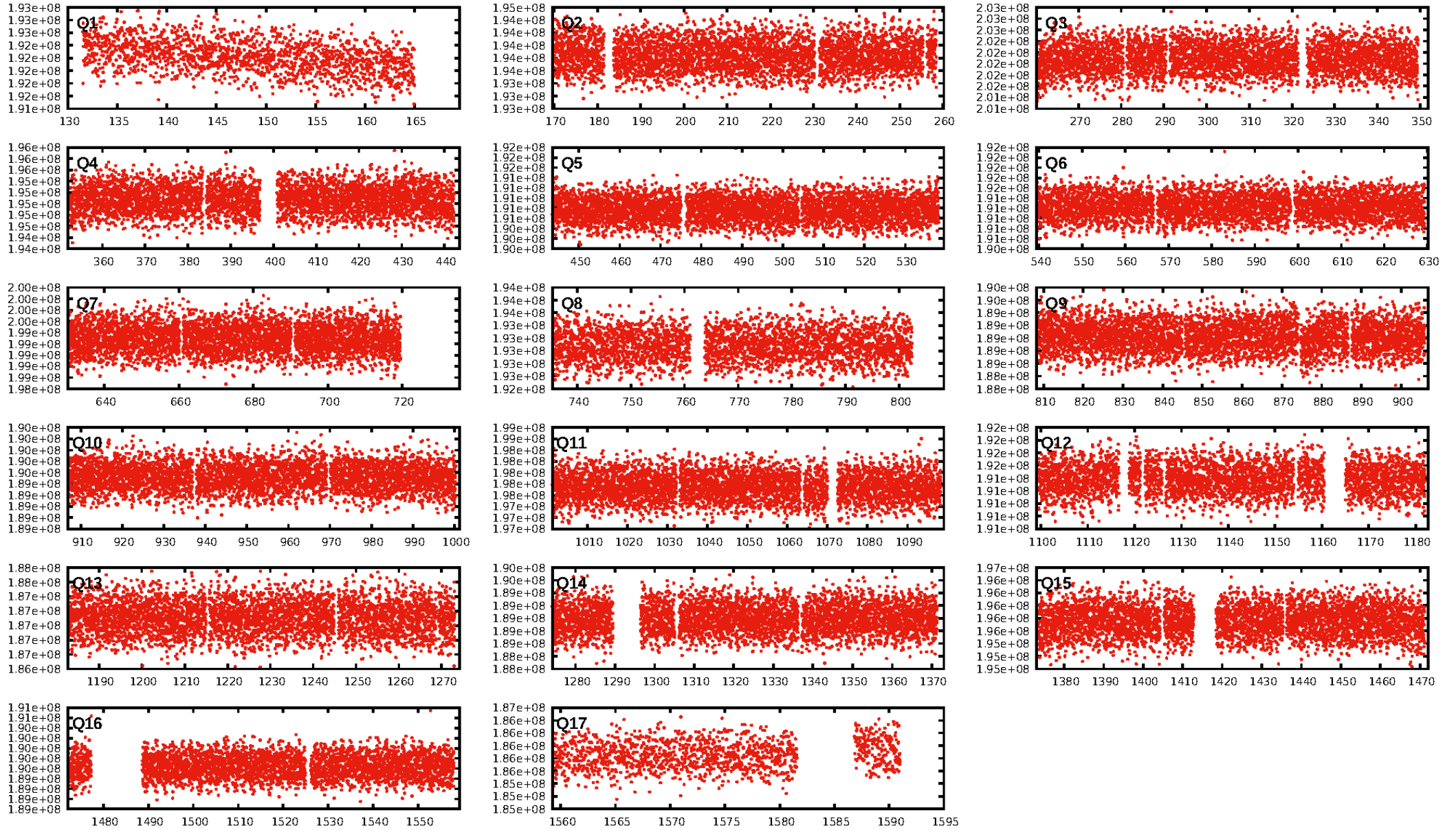
DV Diagnostic Results:

ShortPeriod-sig: 80.2% [1.29σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [690/690]
GhostDiagnostic-chr: 5.177
Centroid-sig: 54.4%
Centroid-so: 0.188 arcsec [1.05σ]
OotOffset-rm: 2.749 arcsec [1.64σ]
KicOffset-rm: 2.763 arcsec [1.78σ]
OotOffset-st: 0/2/0/2 [4]
KicOffset-st: 0/2/0/2 [4]
DiffImageQuality-fgm: 0.00 [0/4]
DiffImageOverlap-fno: 0.00 [0/17]

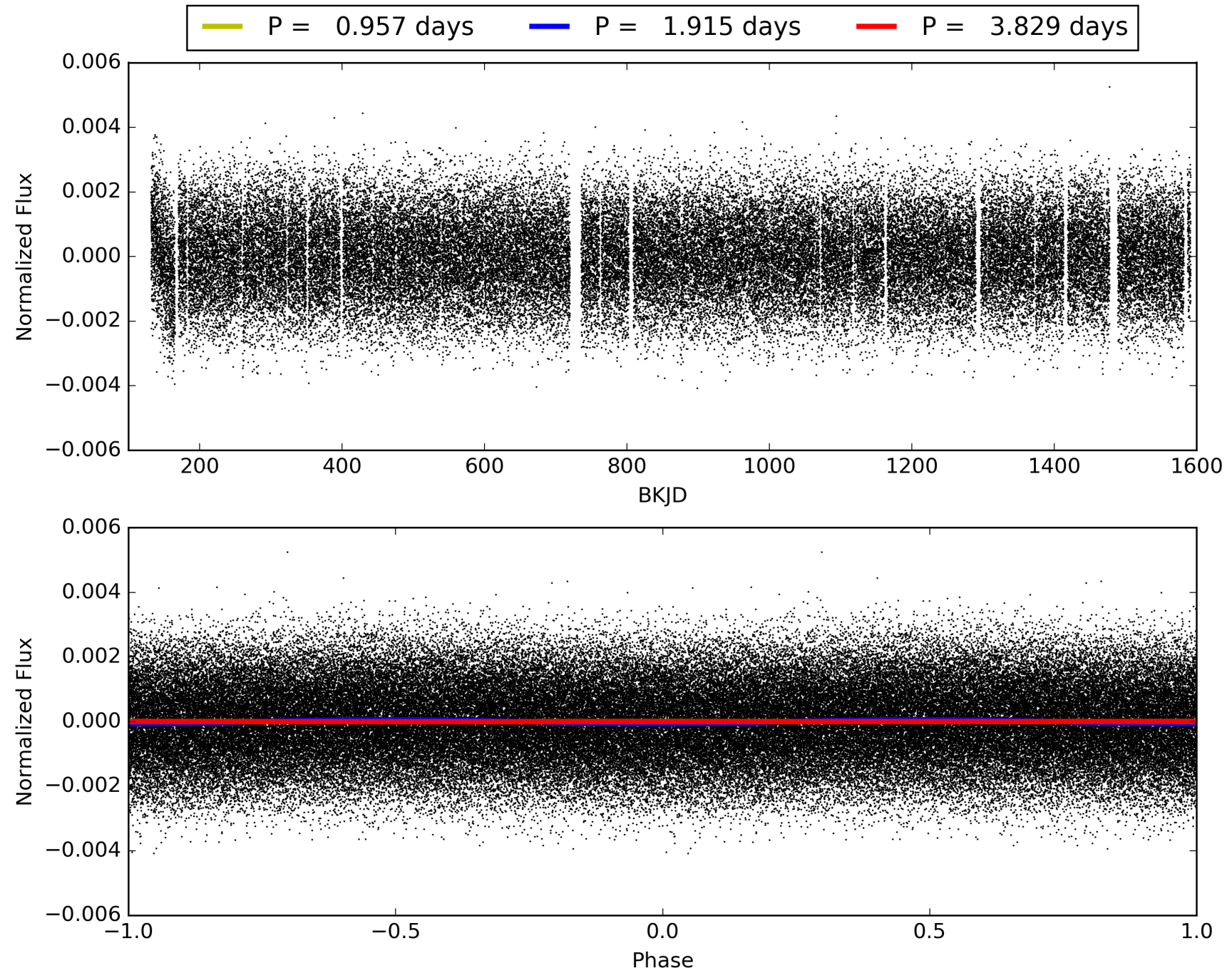
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 02:09:48 Z

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

TCE 009776474-02, PDC Light Curves

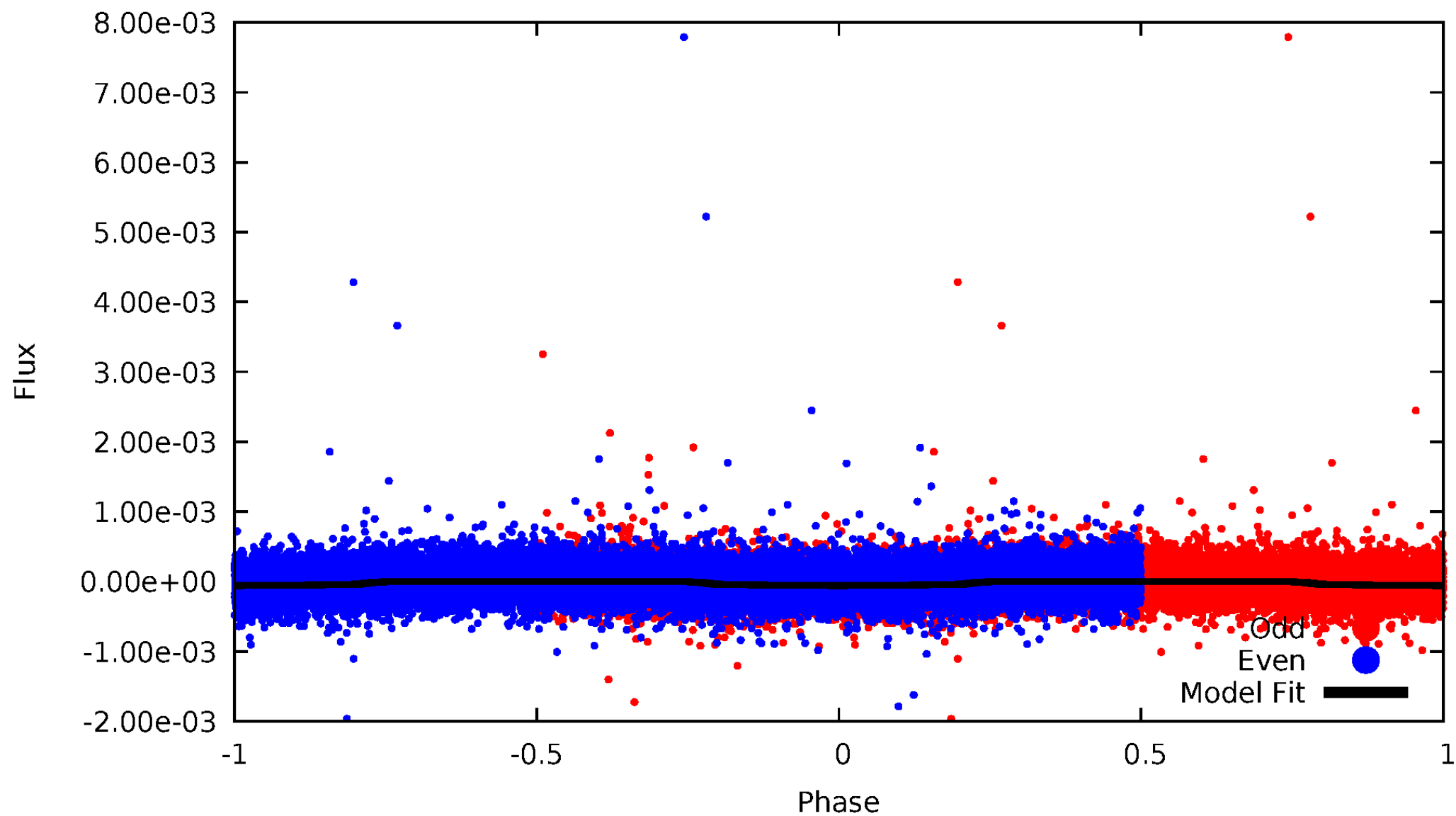


TCE 009776474-02



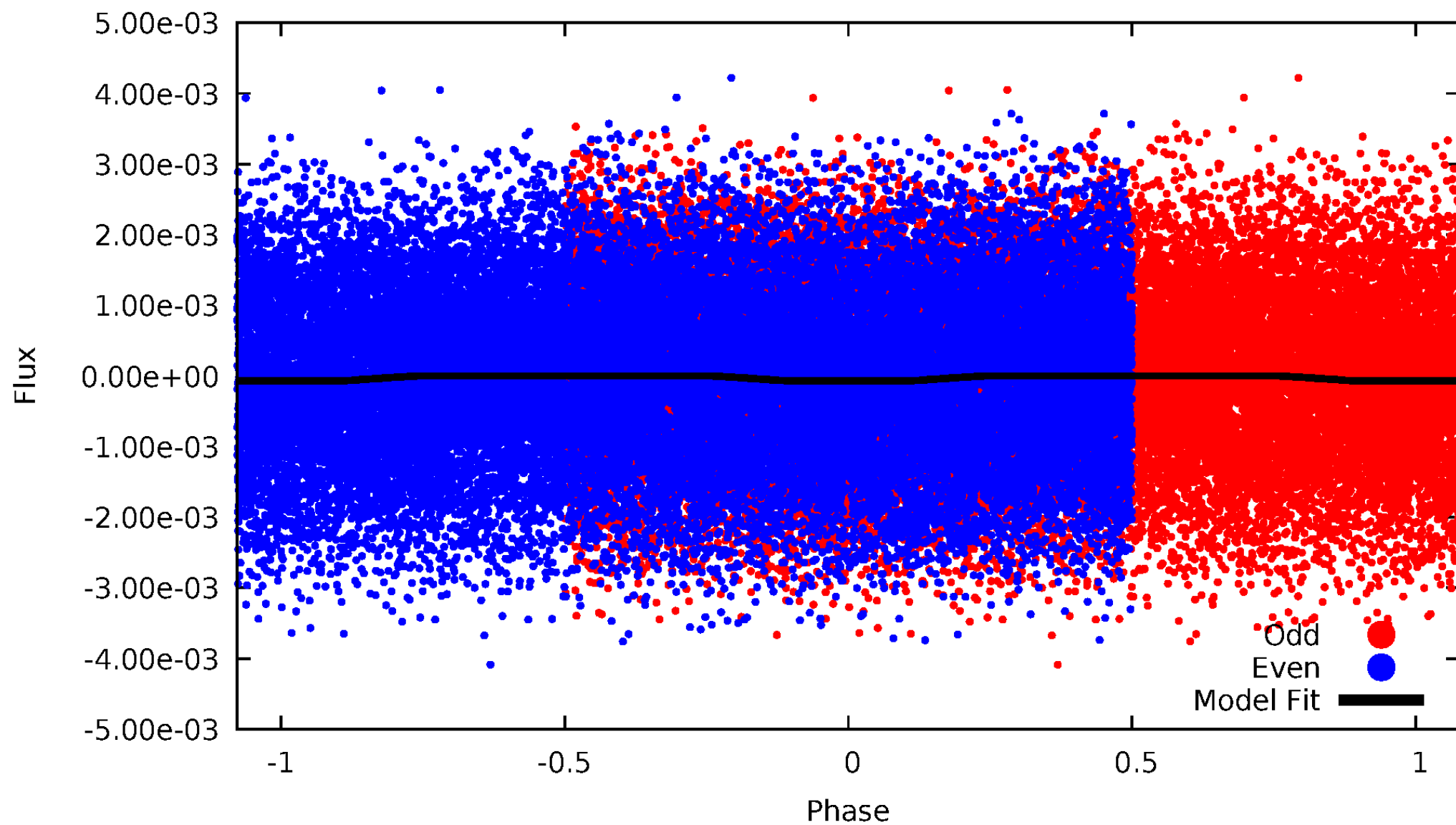
DV Odd/Even

TCE 009776474-02



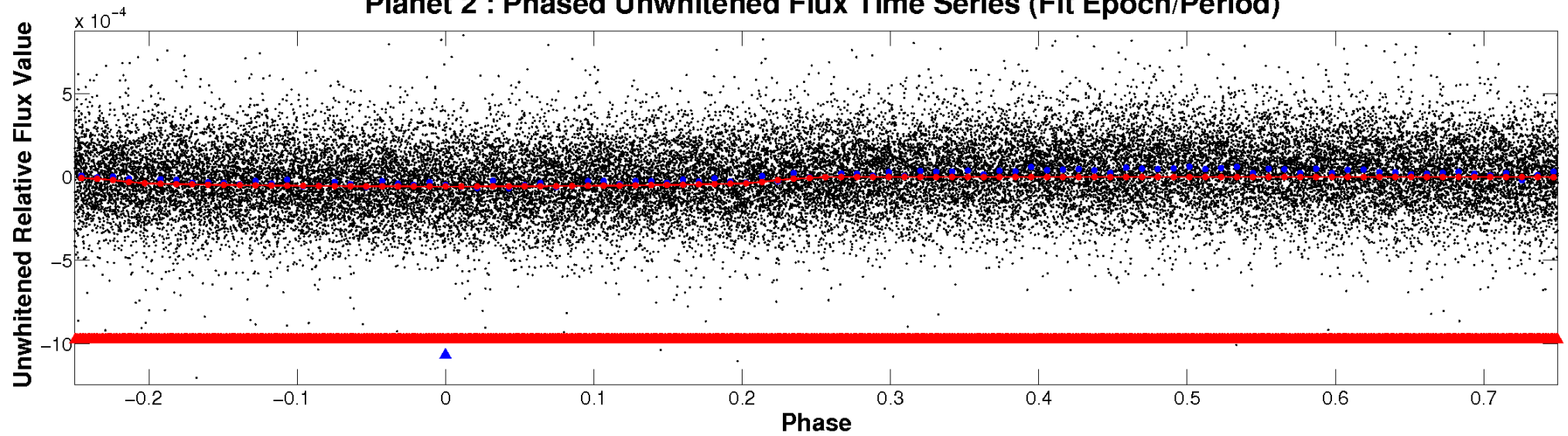
ALT Odd/Even

TCE 009776474-02

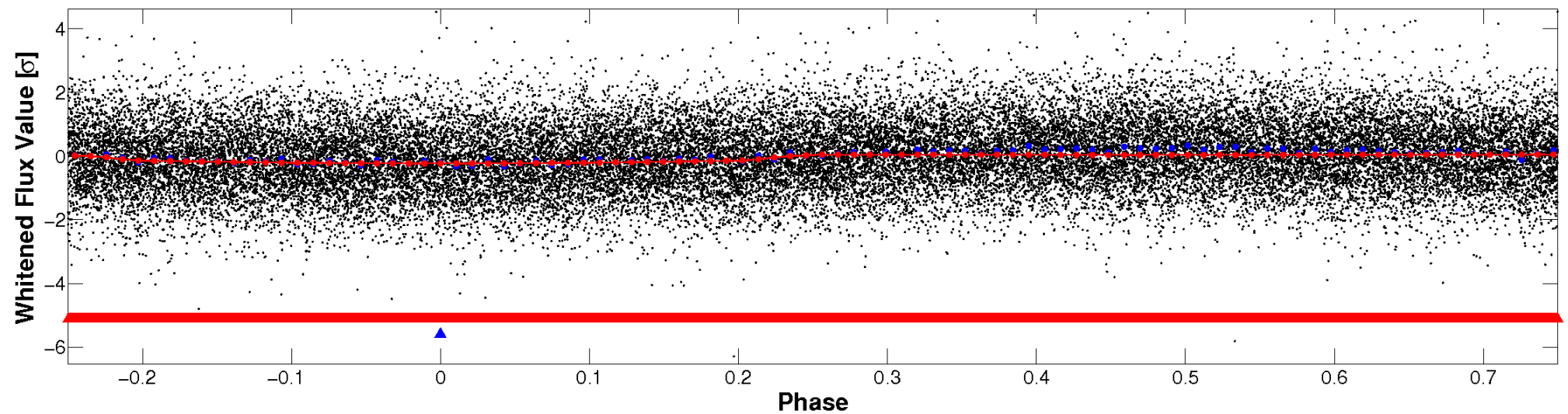


Non-Whitened Vs. Whitened Light Curve

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

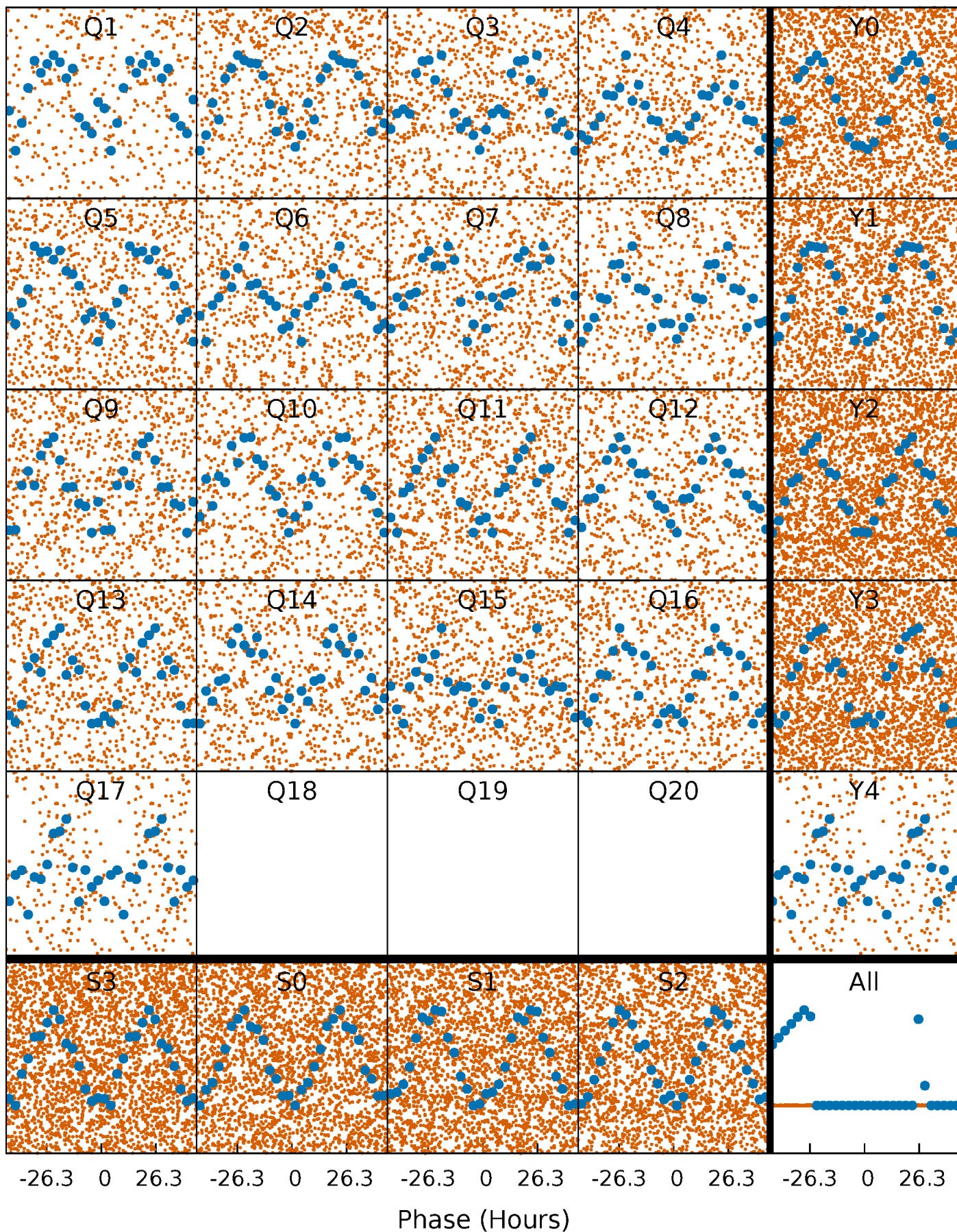


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



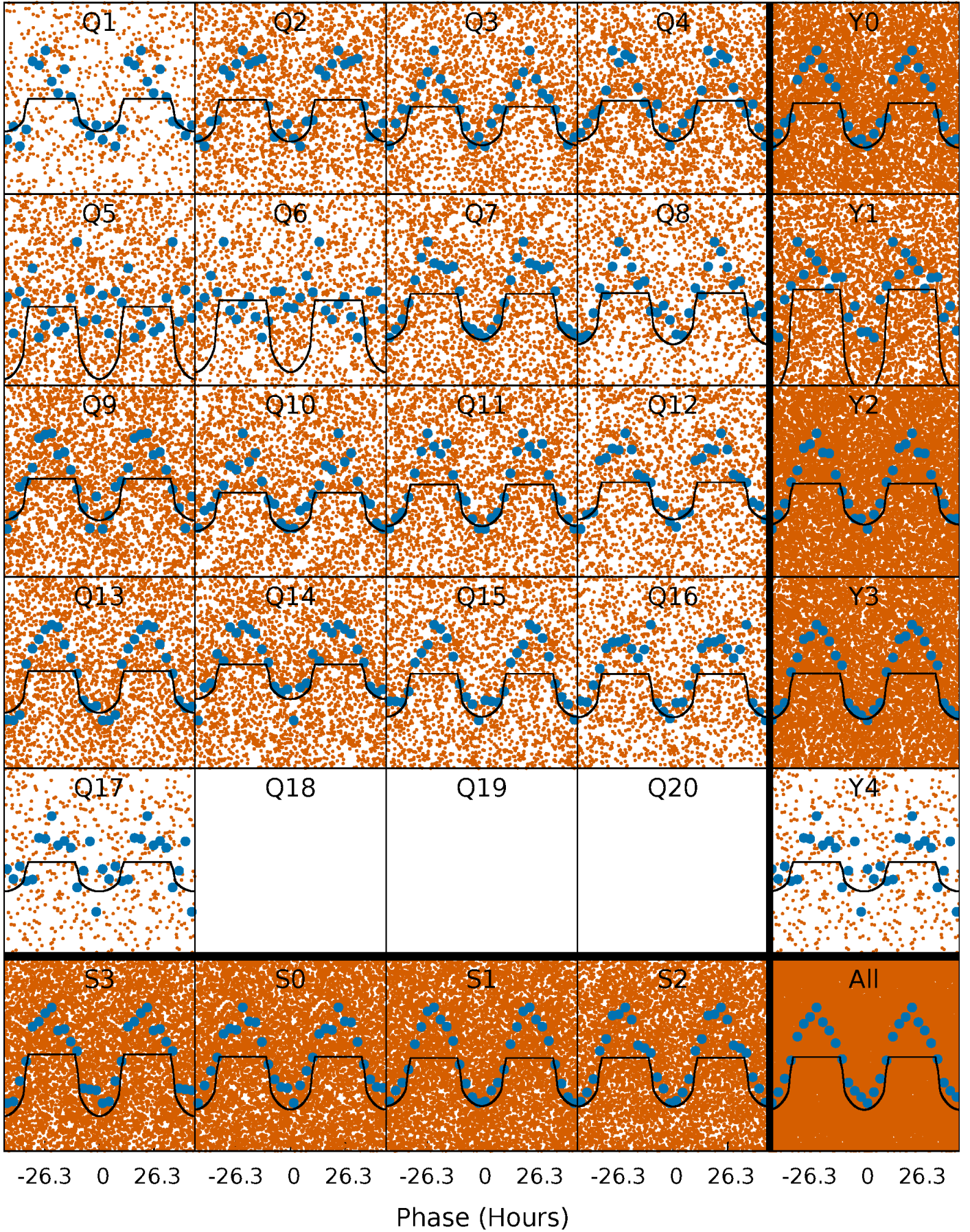
PDC Quarter-Phased Transit Curves

TCE 009776474-02 P= 1.914561 Days $T_0=132.695966$ (BKJD)



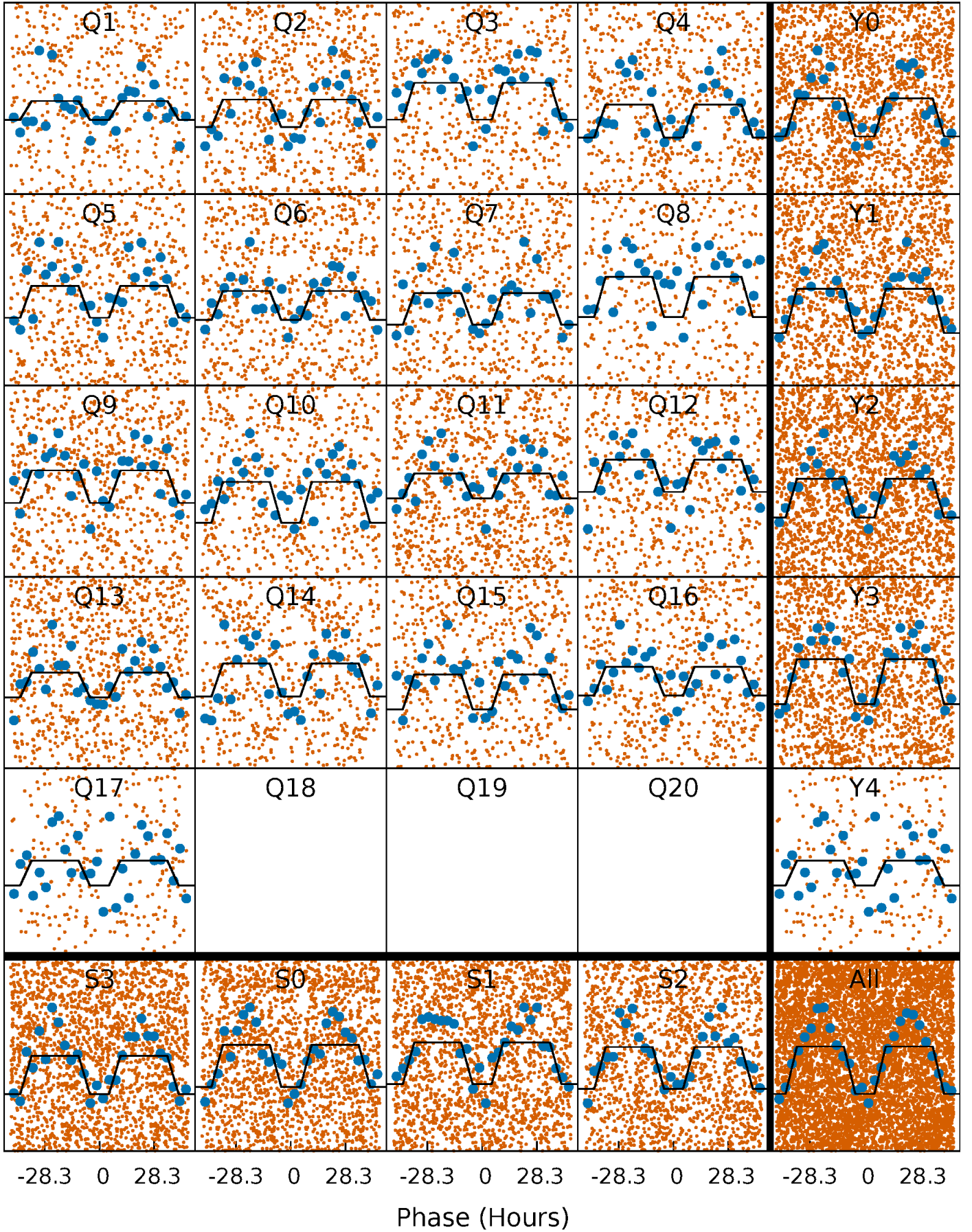
DV Quarter-Phased Transit Curves

TCE 009776474-02 P= 1.914561 Days $T_0=132.695966$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

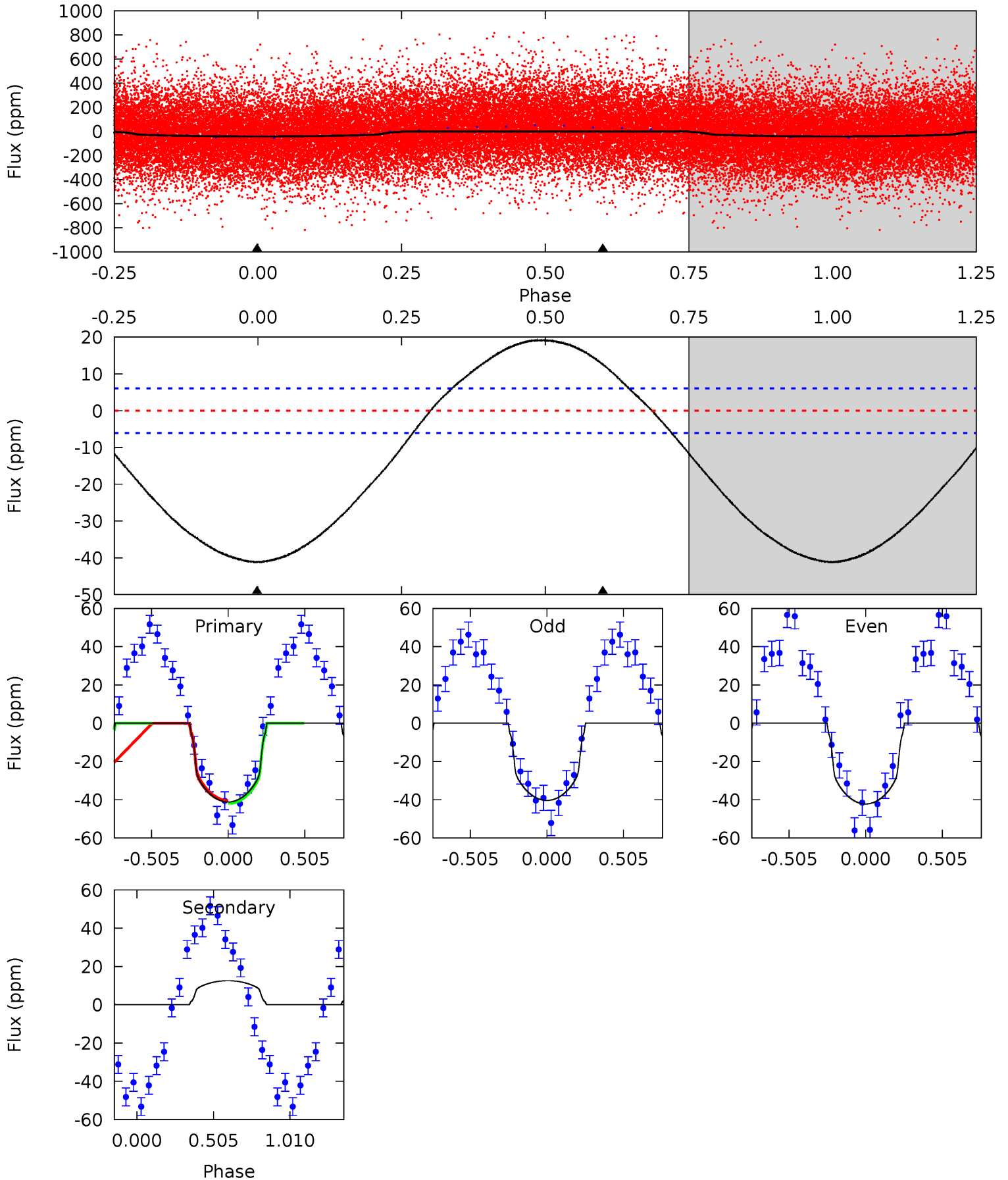
TCE 009776474-02 P= 1.914489 Days $T_0=132.704096$ (BKJD)



DV Model-Shift Uniqueness Test

009776474-02, P = 1.914561 Days, E = 130.781405 Days

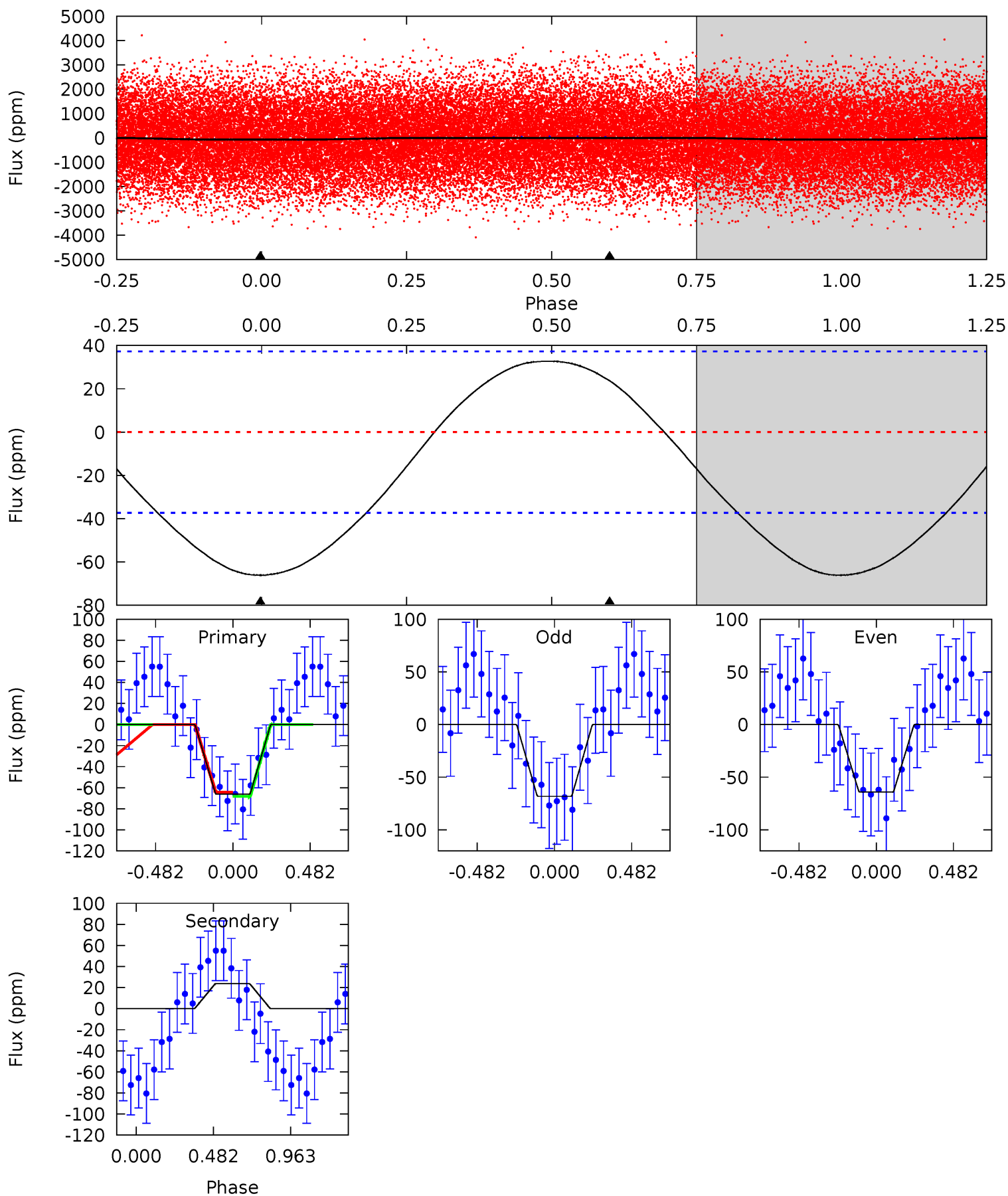
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
28.6	-8.73	0	0	4.21	0.67	3.66	28.6	28.6	-8.73	-8.73	0.65	0.75	0.32	0.45



Alt Model-Shift Uniqueness Test

009776474-02, P = 1.914489 Days, E = 130.789607 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.50	-2.69	0	0	4.22	0.70	1.03	7.50	7.50	-2.69	-2.69	0.23	0.66	0.33	0.23



Stellar Parameters For KIC 009776474

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	ρ_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	7751^{+216}_{-325}	$3.632^{+0.476}_{-0.084}$	$0.070^{+0.200}_{-0.350}$	$3.861^{+0.662}_{-1.987}$	$2.331^{+0.243}_{-0.729}$	$0.057^{+0.283}_{-0.021}$
	+3%/-4%	+13%/-2%	+286%/-500%	+17%/-51%	+10%/-31%	+495%/-37%
Source	PHO54	PHO54	PHO54	DSEP		

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

Secondary Eclipse Parameters for KIC 009776474-02 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	13 ± 1	$2.99^{+0.50}_{-0.79}$	4479^{+350}_{-535}	-5424^{+203}_{-228}	$-1.205^{+0.287}_{-0.883}$
Alt.	24 ± 9	$3.28^{+0.50}_{-0.84}$	4523^{+341}_{-568}	-5999^{+593}_{-499}	$-1.943^{+0.809}_{-1.530}$

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

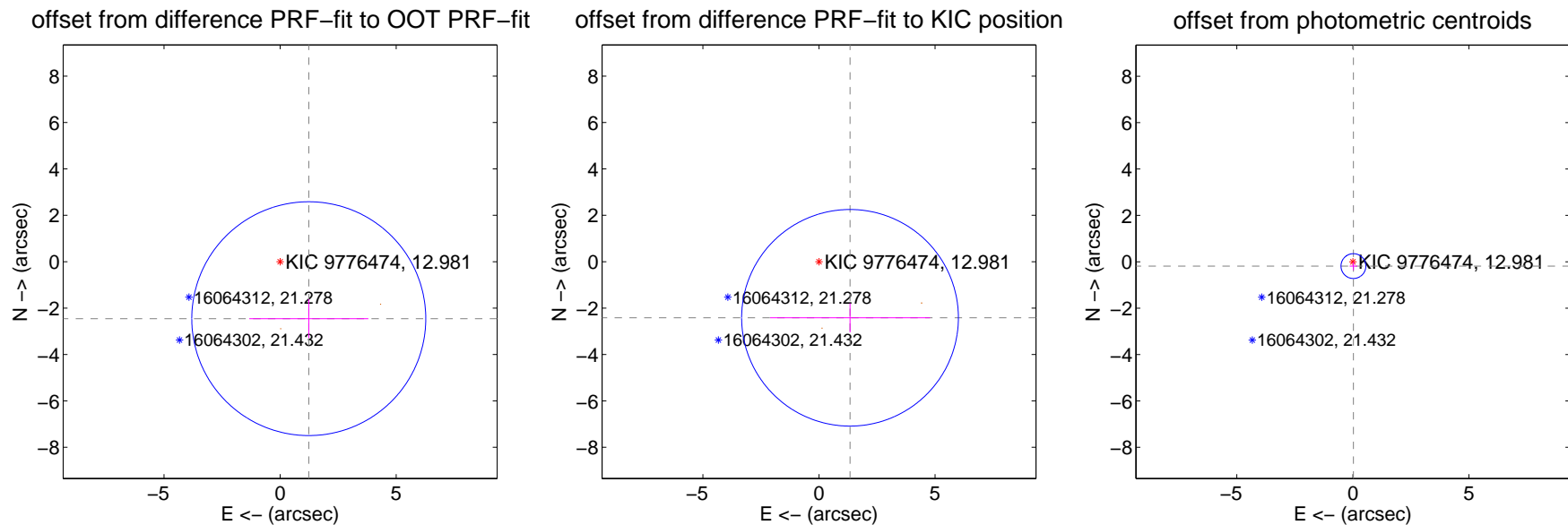
DV Centroid Data

Supplemental centroid analysis for 009776474-02. Kepler magnitude: 12.98. Transit SNR 24.79

There are 0 quarters with good PRF difference image offsets

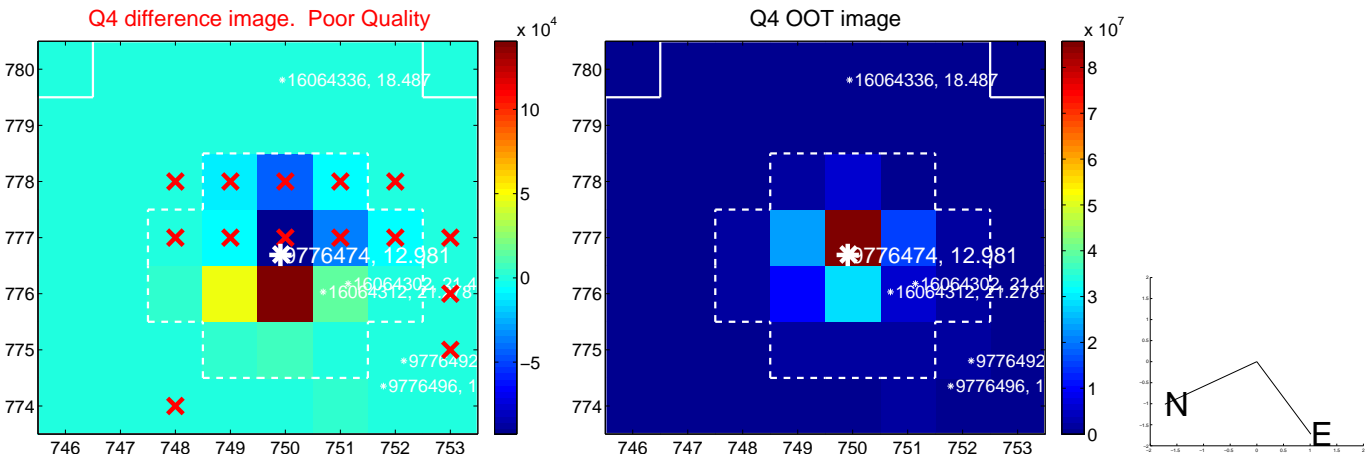
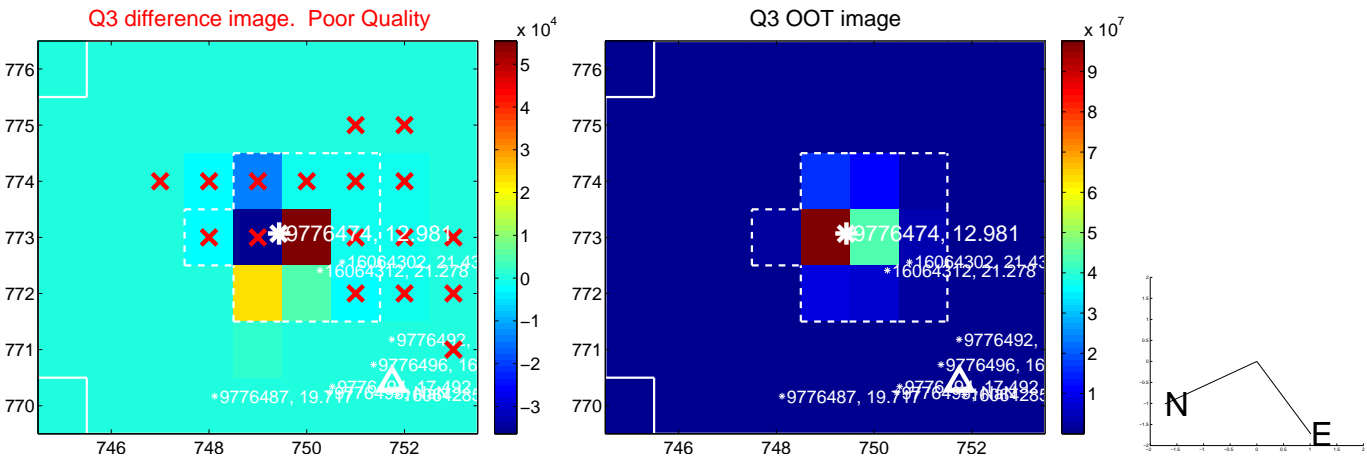
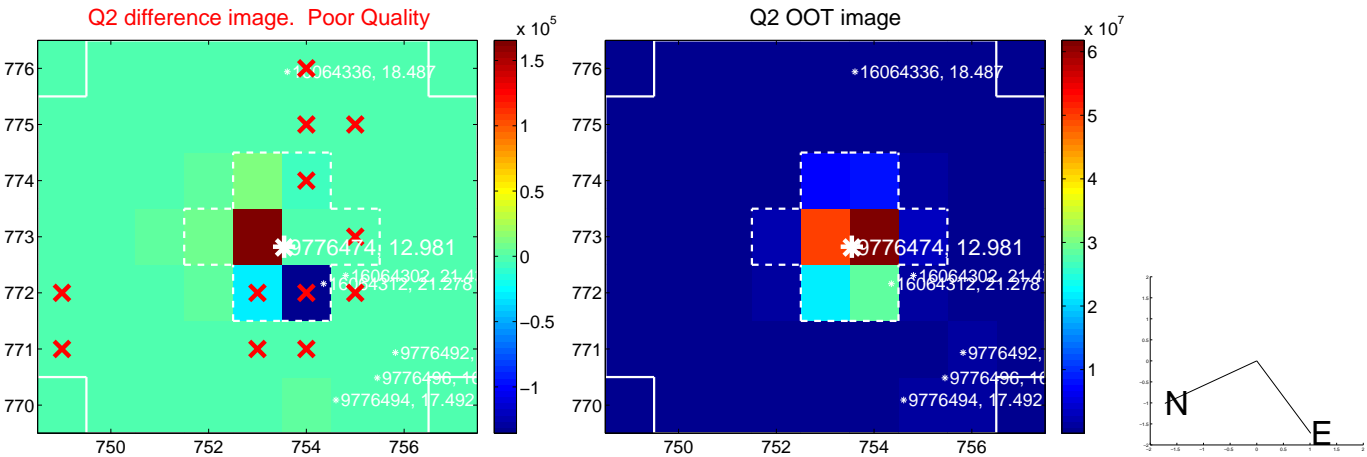
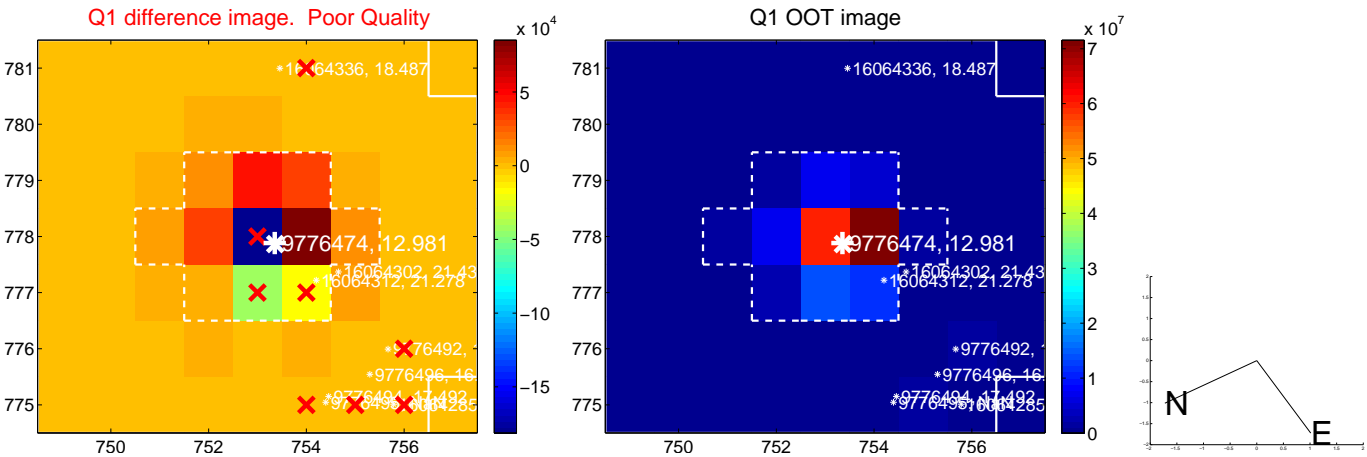
The direct PRF centroid is offset from the target star catalog position by about 0.06 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	2.749 ± 1.680	1.64	-1.235 ± 2.565	-2.456 ± 0.842
PRF-fit source offset from KIC position	2.763 ± 1.556	1.78	-1.336 ± 3.445	-2.418 ± 0.625
photometric centroid source offset	0.19 ± 0.18	1.05	-0.02 ± 0.17	-0.19 ± 0.18

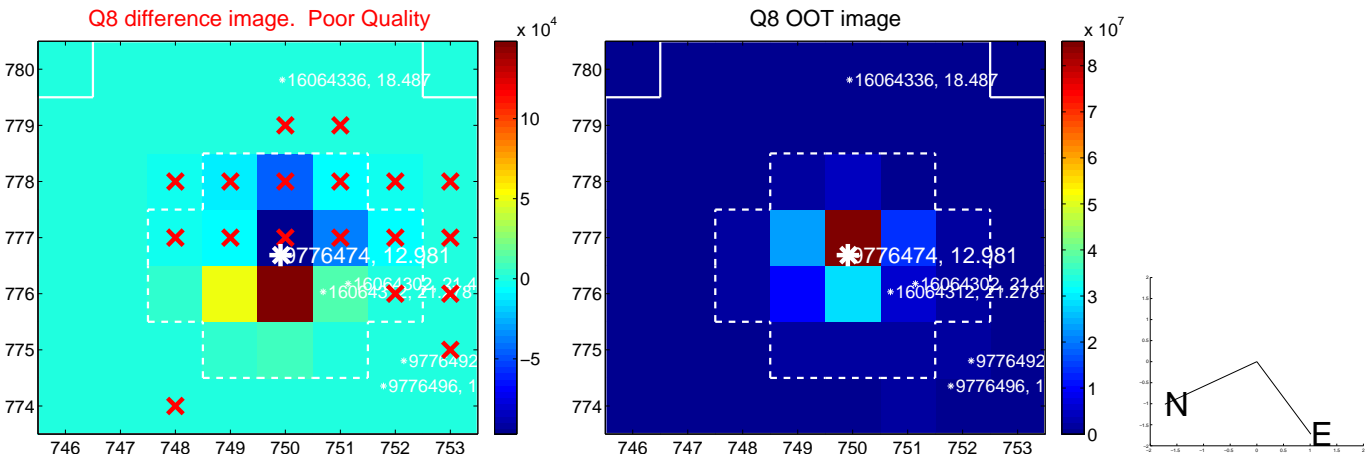
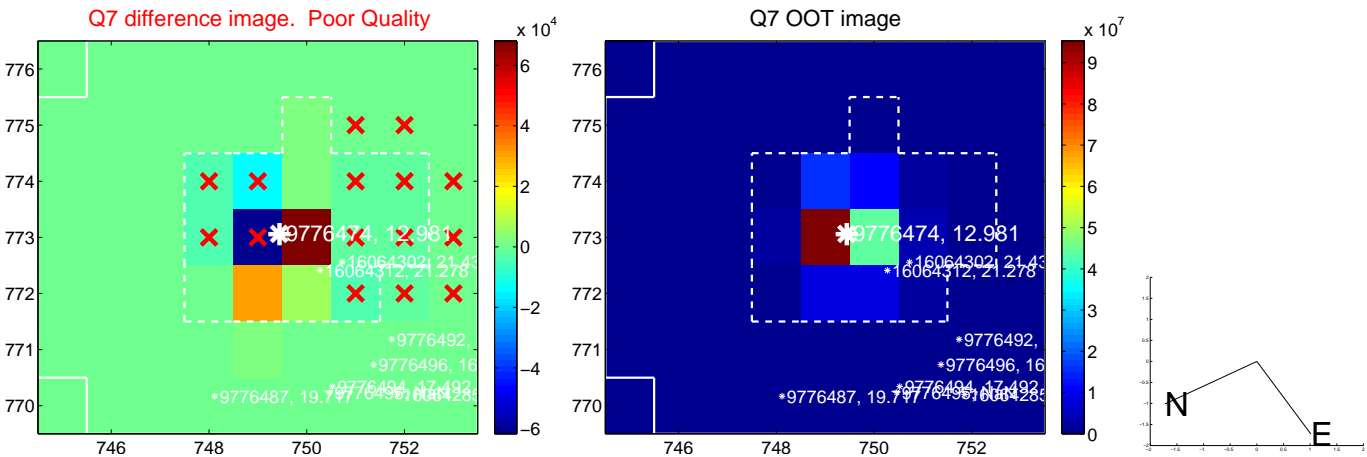
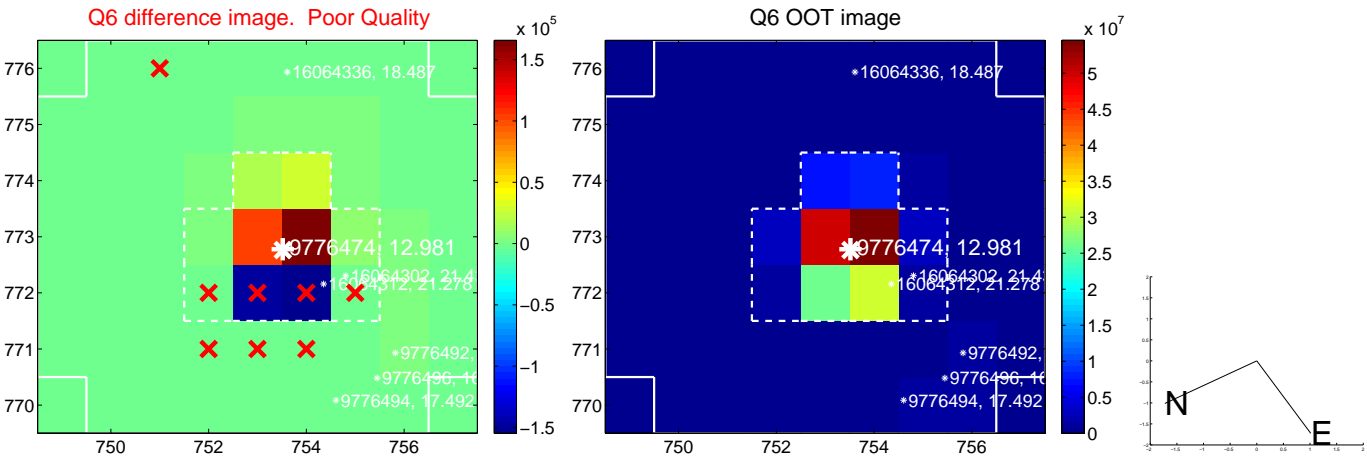
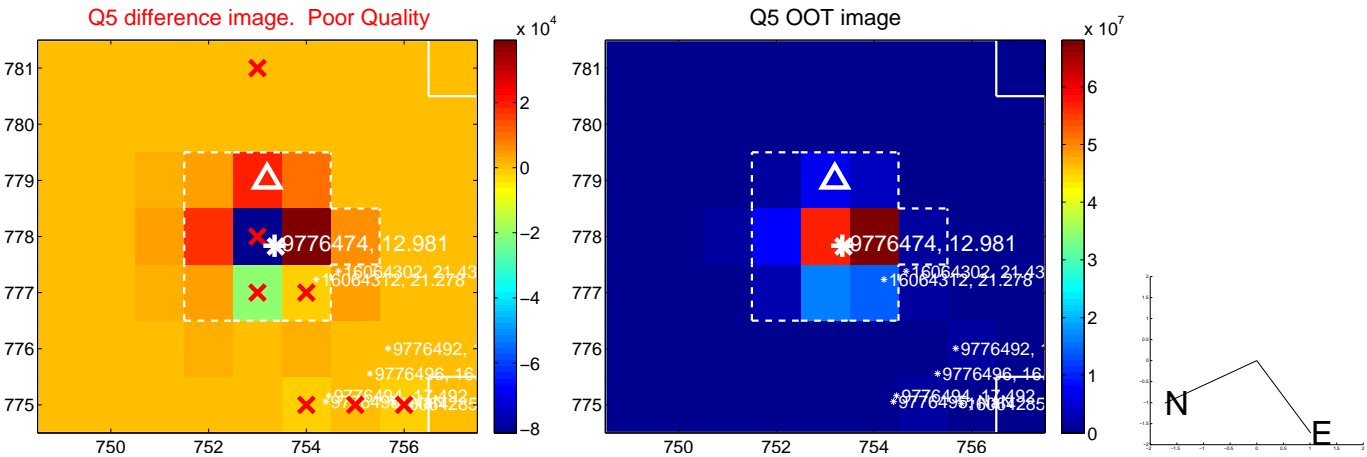


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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

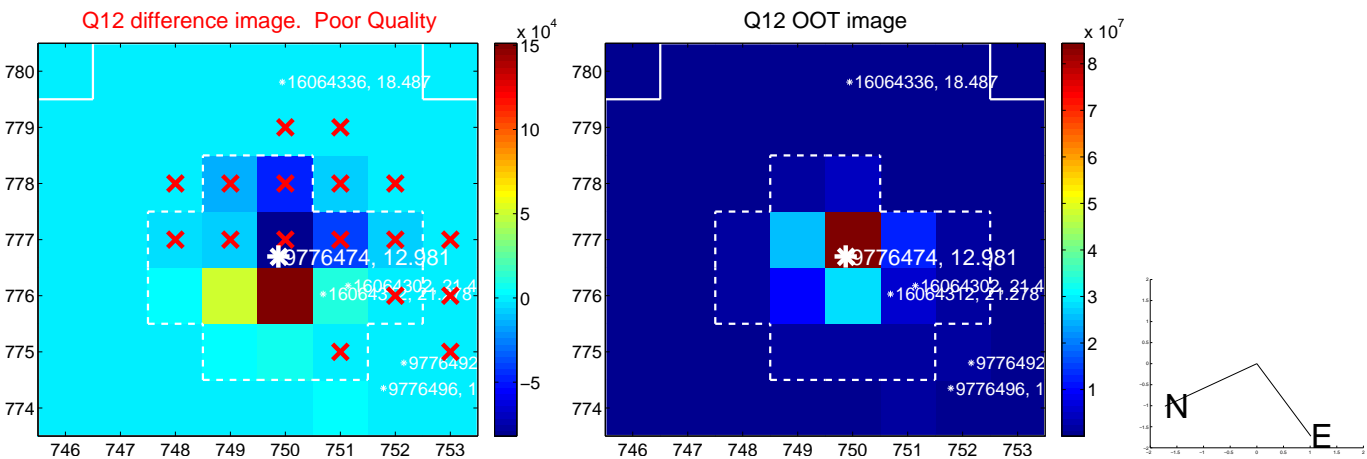
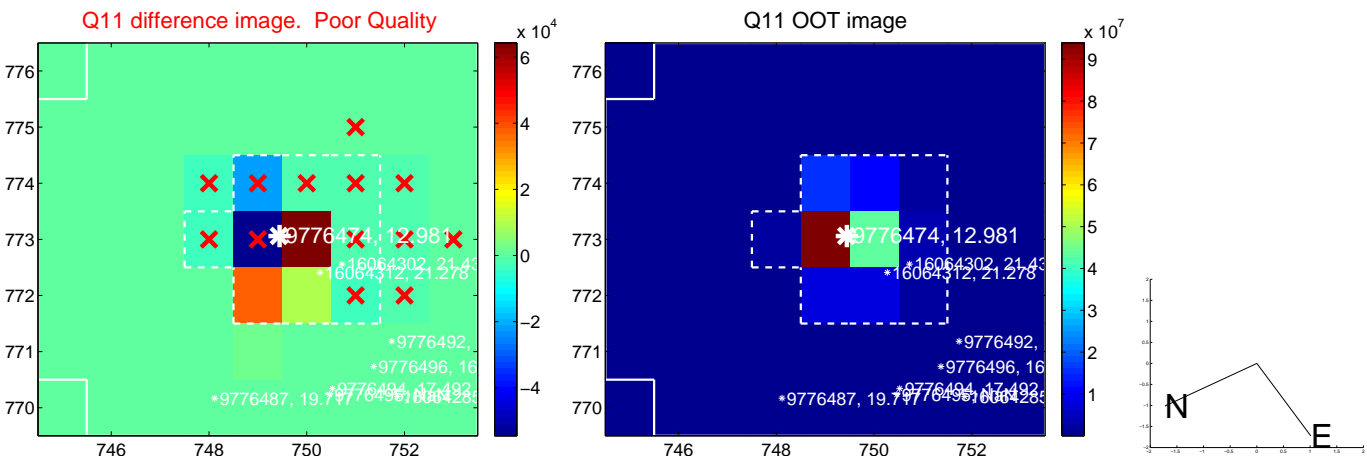
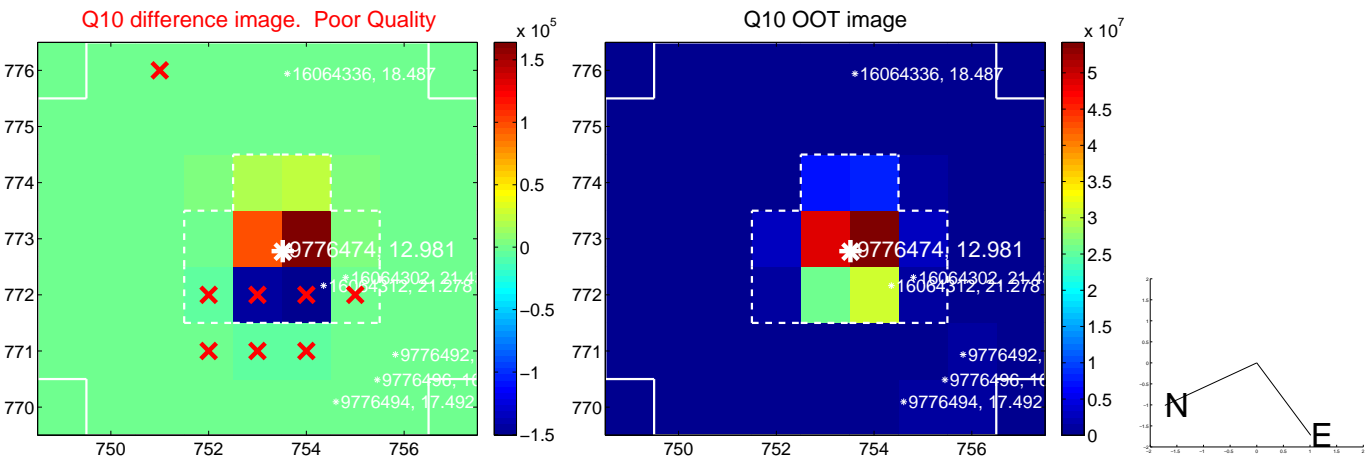
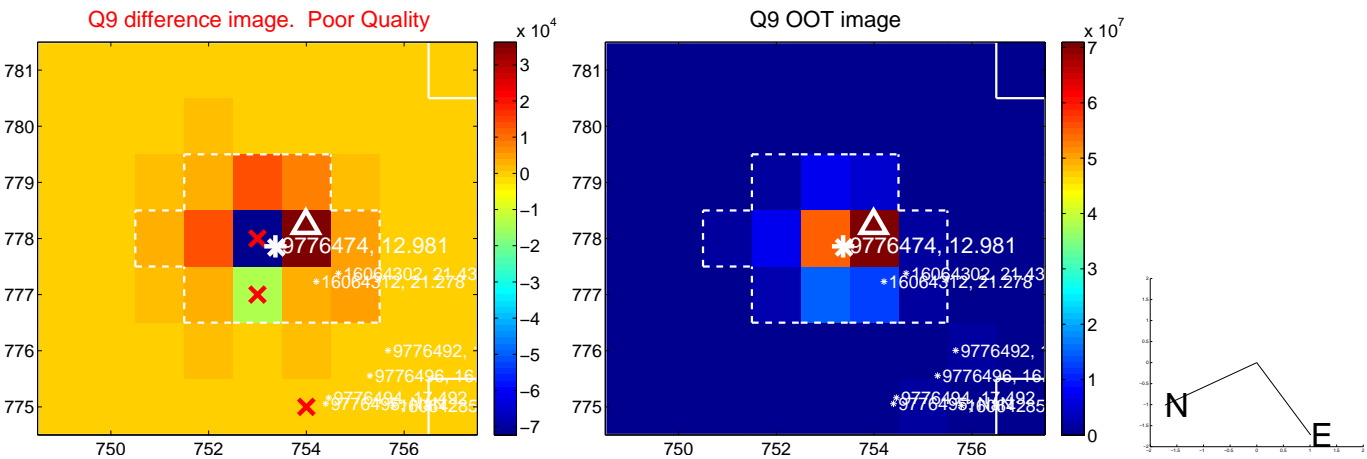
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



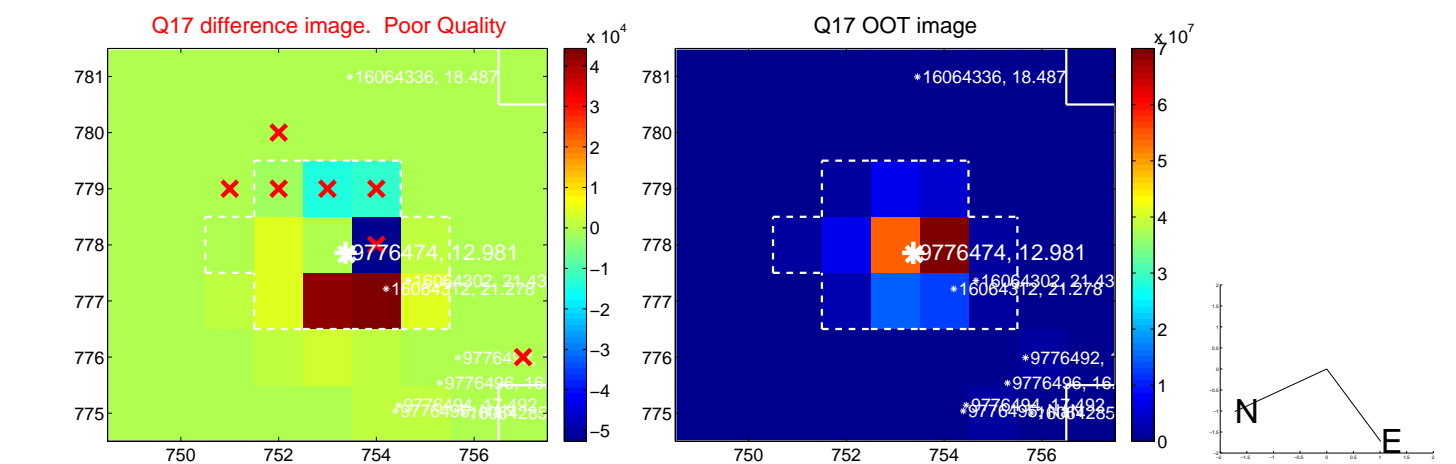
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



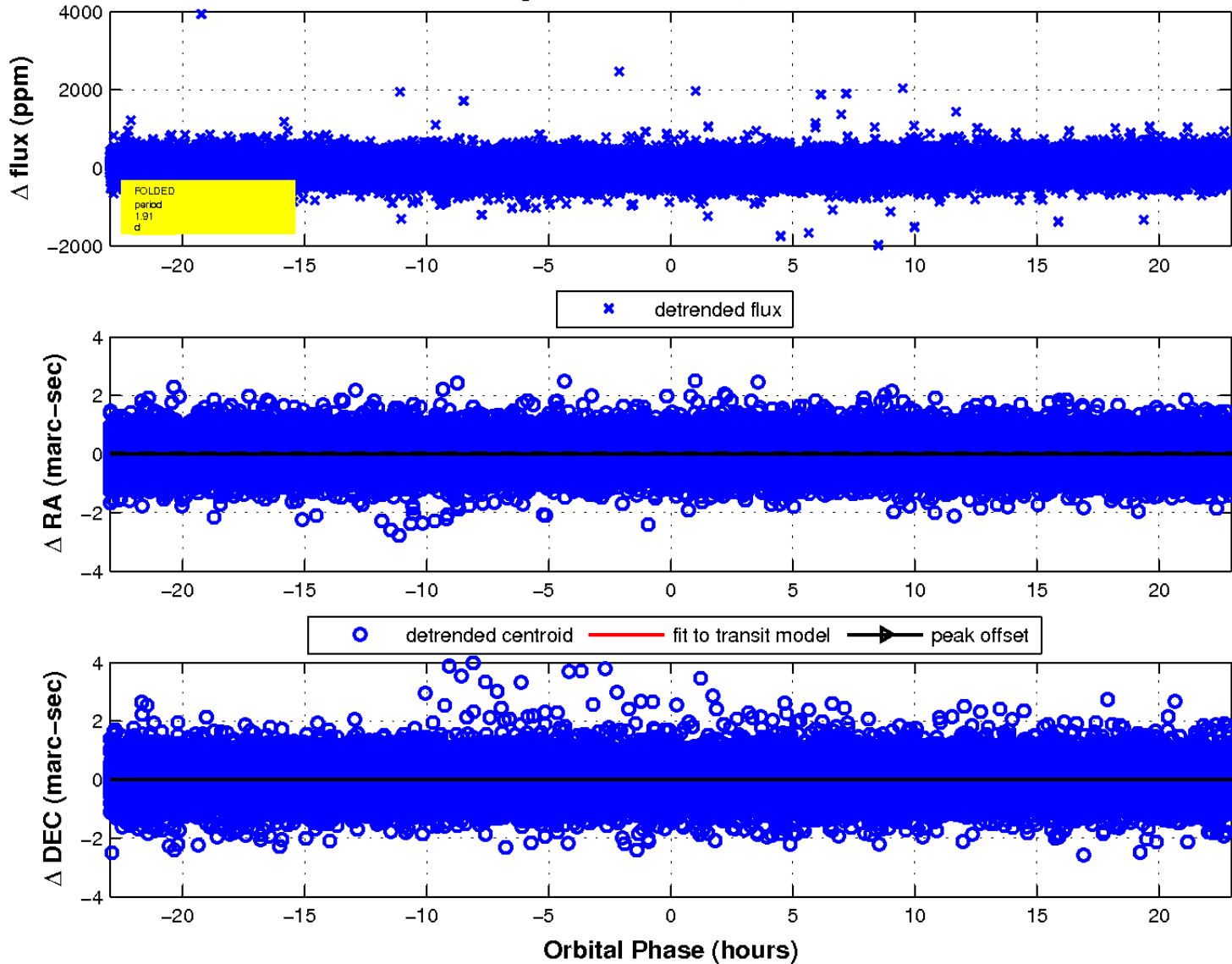
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



fluxWeightedCentroids, Planet 2 of 2



UKIRT Image

Declination

