

KIC 005094751

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})
005094751-01	OBS	0123.01	6.481620	135.942206	290.0	3.901	92.5	102.2	1.30	5945	2.64	407.07
005094751-02	OBS	0123.02	21.222624	137.573475	367.1	6.681	82.1	84.2	1.30	5945	2.74	83.72

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005094751-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
005094751-02	OBS	PC	1.00	0	0	0	0	NO_COMMENT

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.

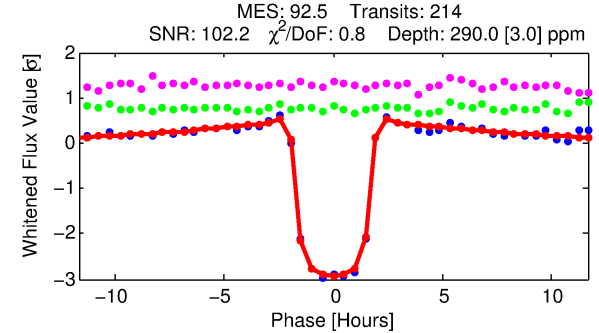
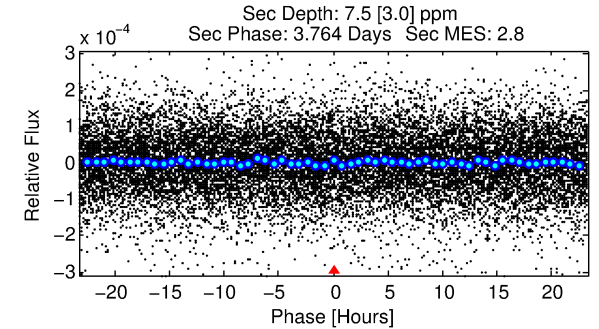
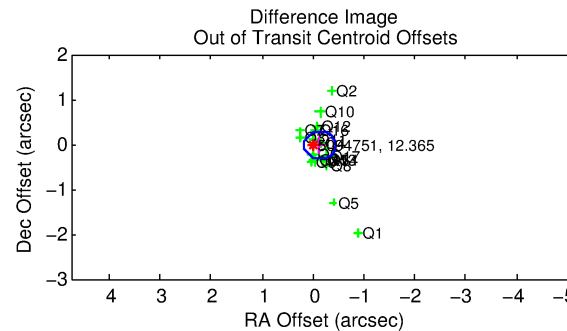
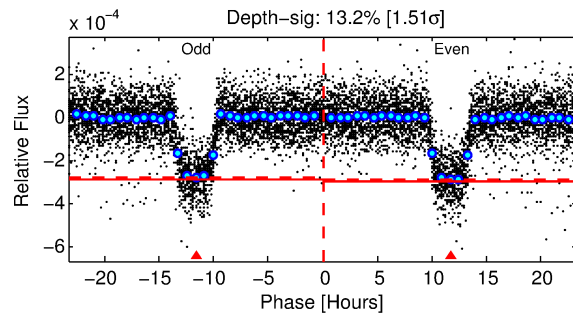
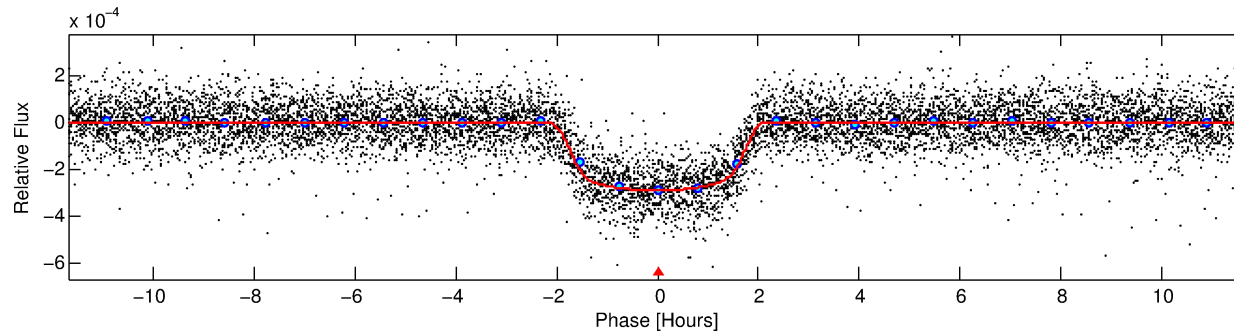
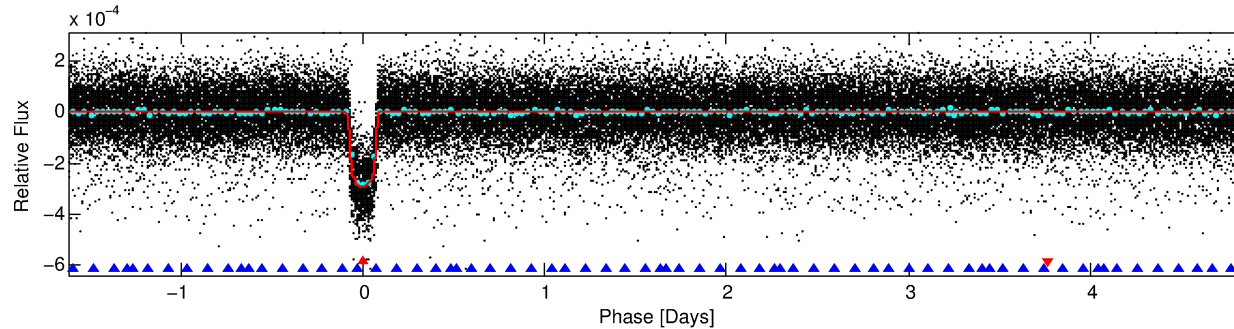
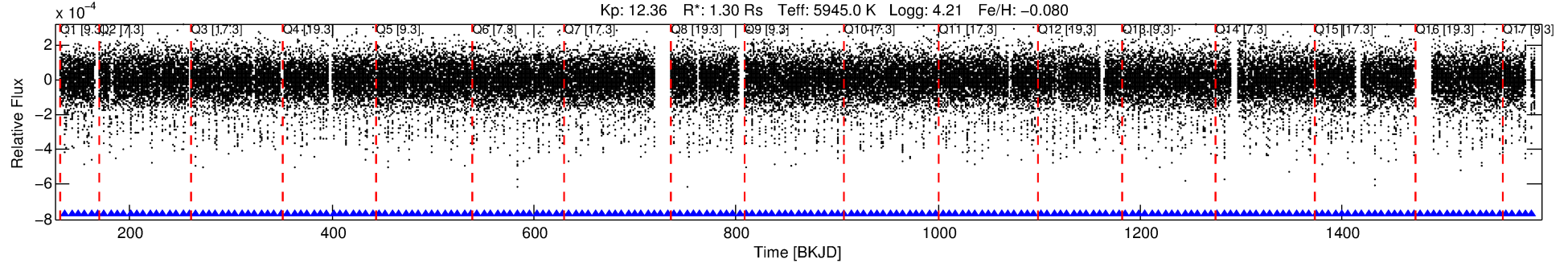
Ephemeris Match Information For 005094751-01

No Significant Match Found

DV One-Page Summary

KIC: 5094751 Candidate: 1 of 2 Period: 6.482 d
KOI: K00123.01 Name: Kepler-109b Corr: 0.967

Kp: 12.36 R*: 1.30 Rs Teff: 5945.0 K Logg: 4.21 Fe/H: -0.080



DV Fit Results:

Period = 6.48162 [0.00001] d
Epoch = 135.9422 [0.0006] BKJD
Rp/R* = 0.0186 [0.0005]
a/R* = 5.96 [0.74]
b = 0.91 [0.03]
Seff = 407.07 [30.81]
Teq = 1145 [22] K
Rp = 2.64 [0.14] Re
a = 0.0683 [0.0027] AU
Ag = 2.77 [1.14] [1.54σ]
Teffp = 2284 [235] K [4.82σ]

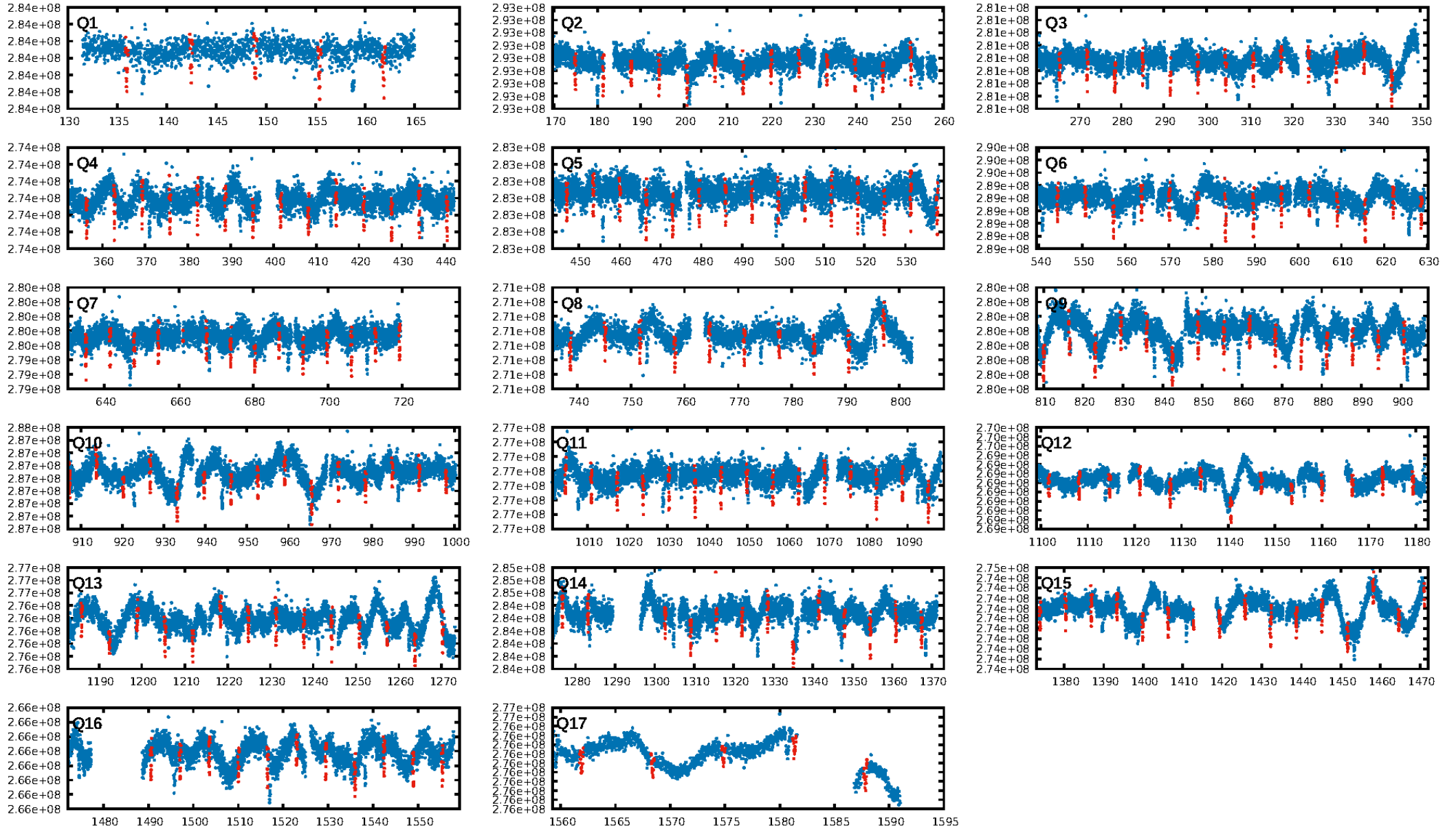
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [45.73σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 0.00e+00
RollingBand-fgt: 1.00 [204/204]
GhostDiagnostic-chr: 4.84
Centroid-sig: 0.1%
Centroid-so: 0.218 arcsec [2.51σ]
OotOffset-rm: 0.134 arcsec [1.31σ]
KicOffset-rm: 0.204 arcsec [1.65σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 1.00 [17/17]
DiffImageOverlap-fno: 1.00 [17/17]

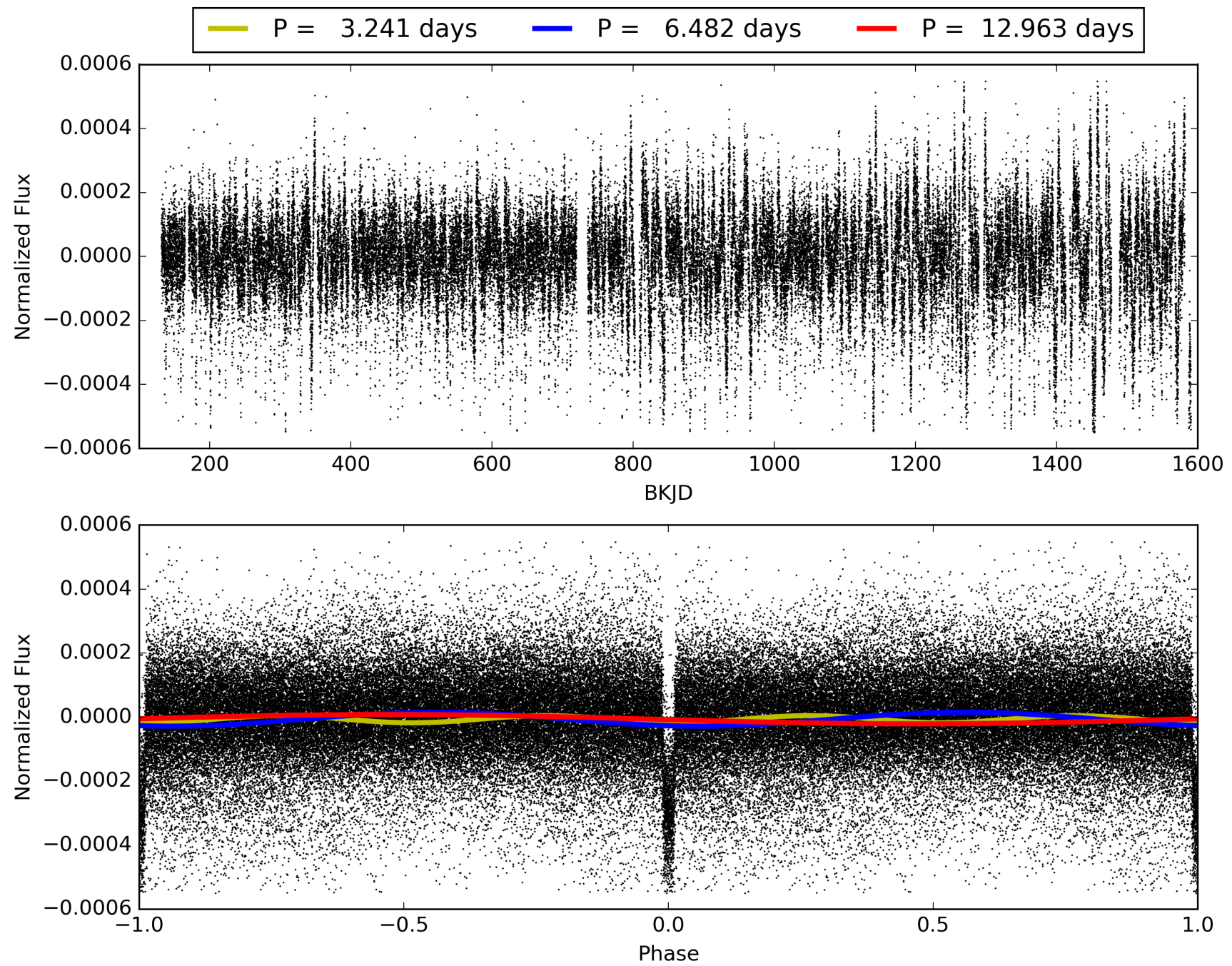
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 10:25:09 Z

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

TCE 005094751-01, PDC Light Curves

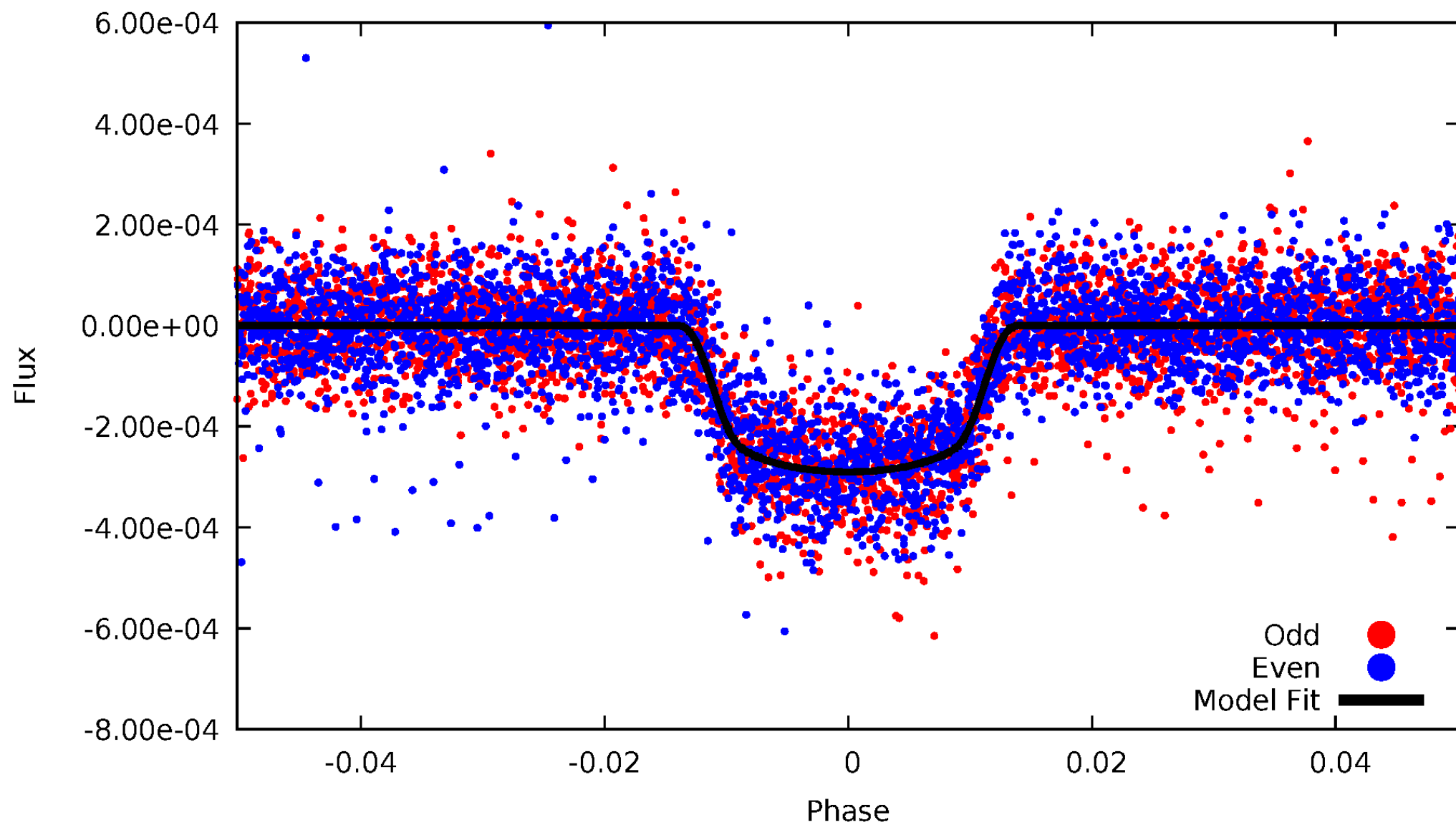


TCE 005094751-01



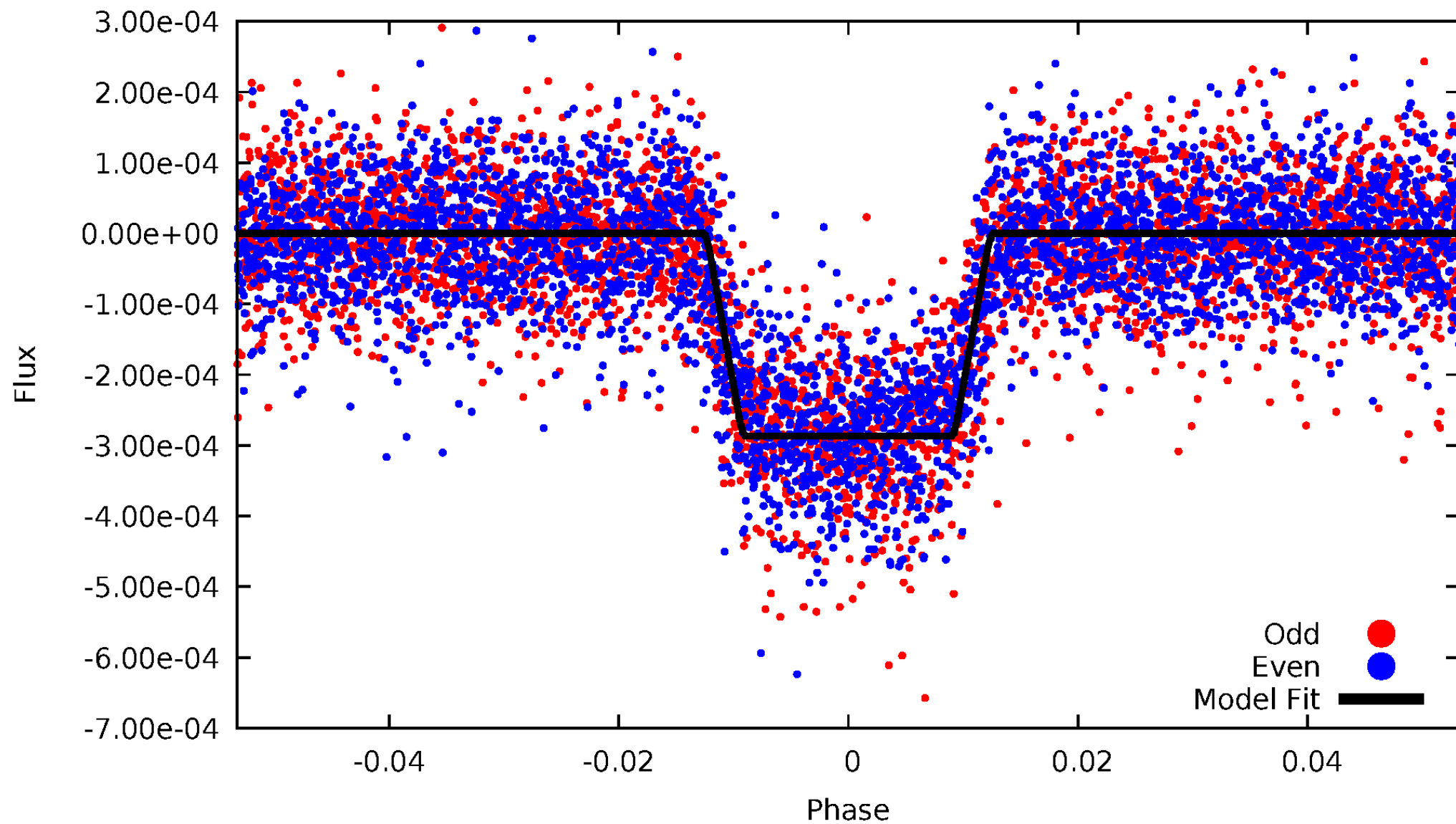
DV Odd/Even

TCE 005094751-01



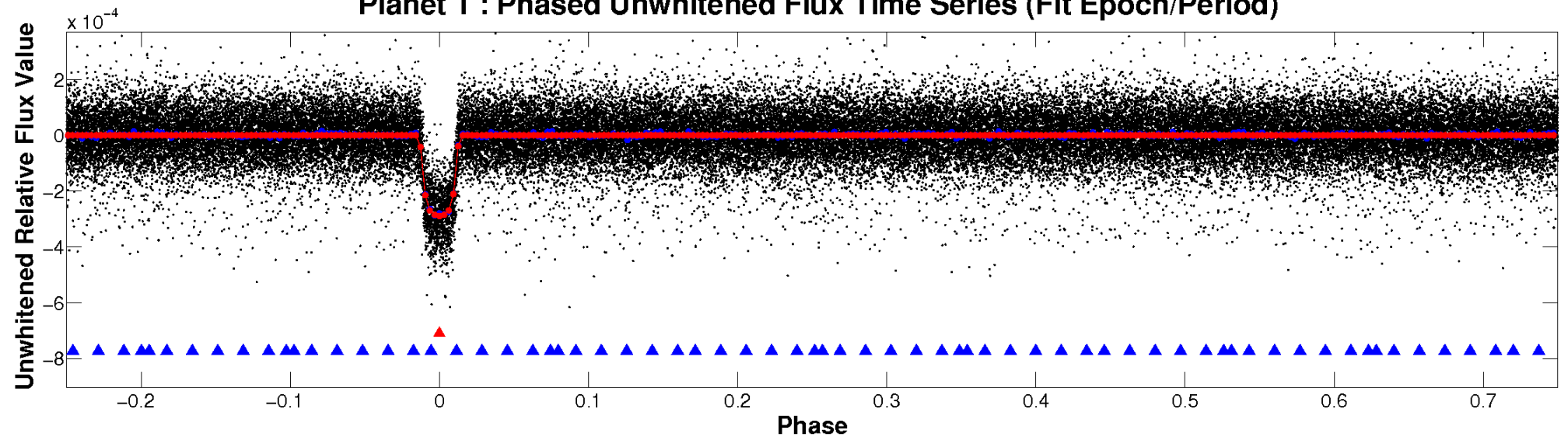
ALT Odd/Even

TCE 005094751-01

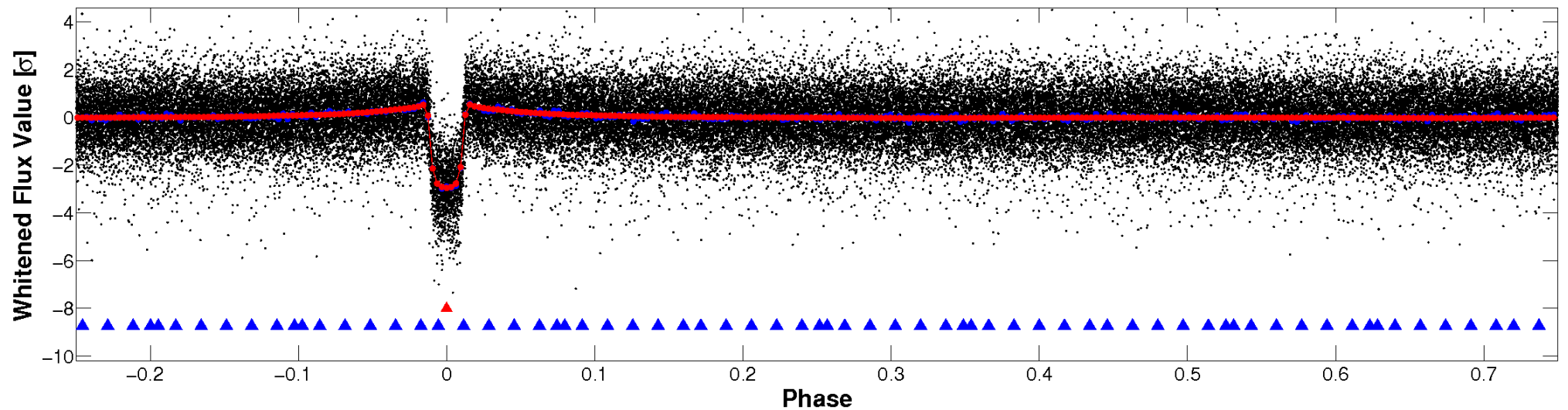


Non-Whitened Vs. Whitened Light Curve

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

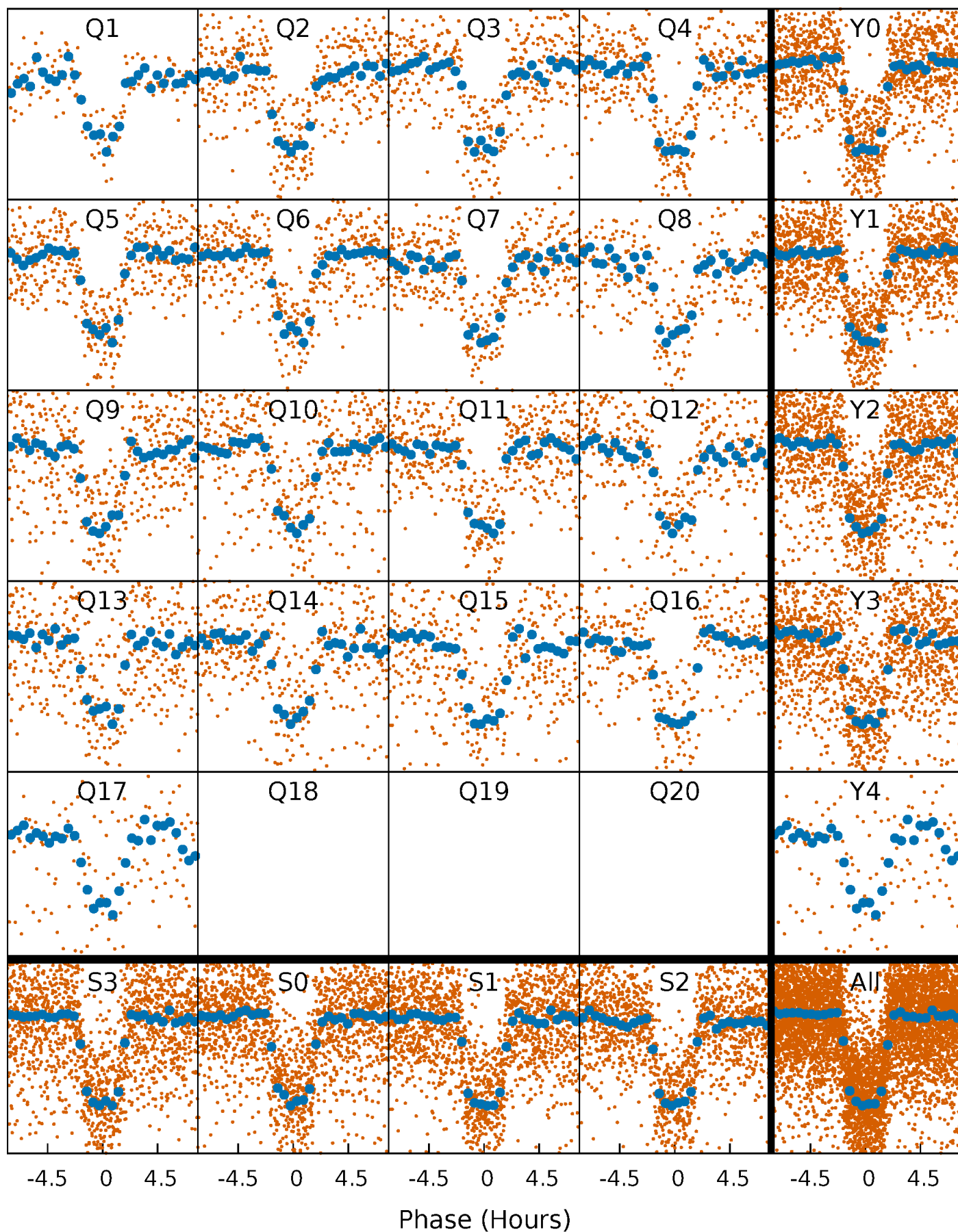


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



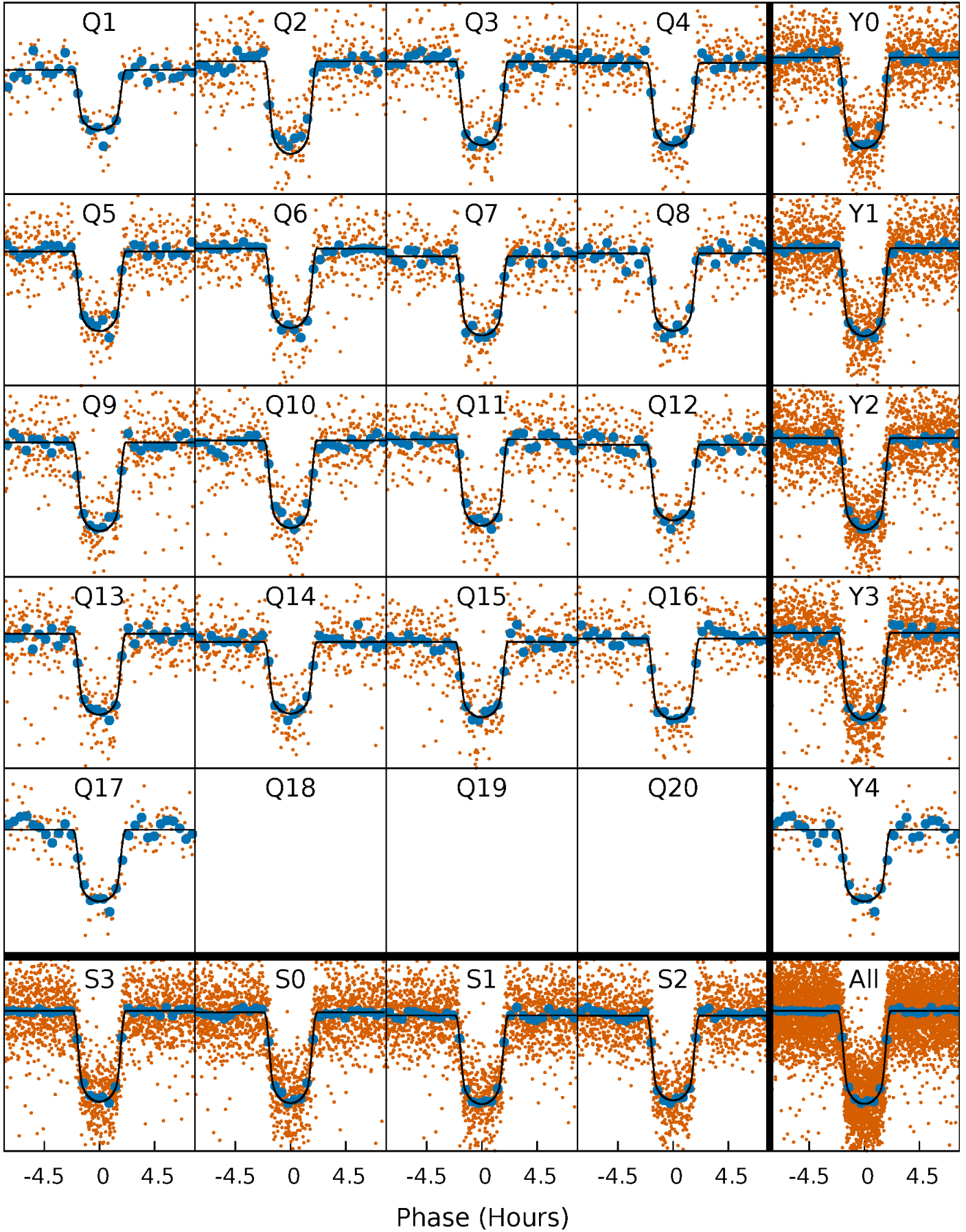
PDC Quarter-Phased Transit Curves

TCE 005094751-01 P= 6.481620 Days $T_0=135.942206$ (BKJD)



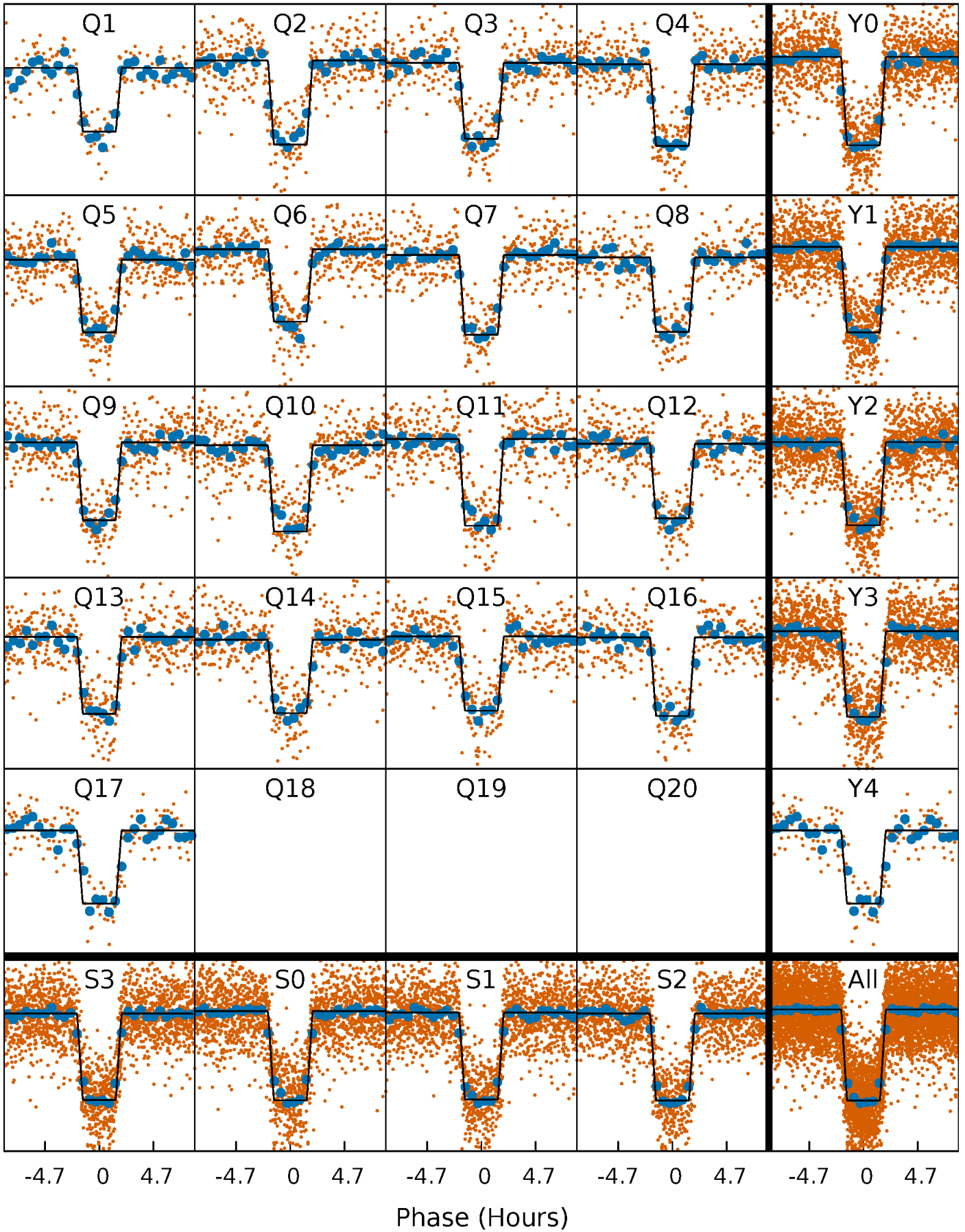
DV Quarter-Phased Transit Curves

TCE 005094751-01 P= 6.481620 Days $T_0=135.942206$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

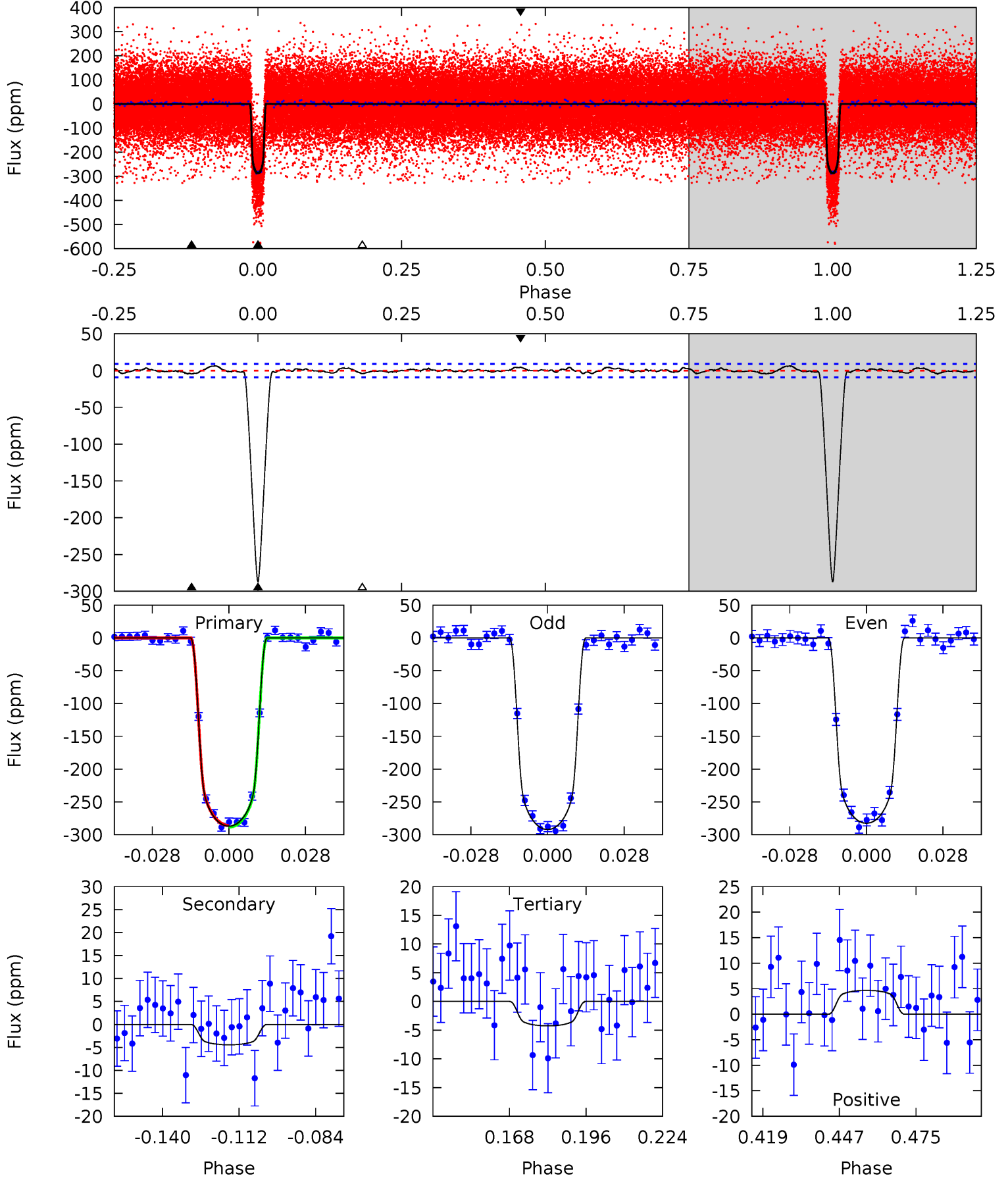
TCE 005094751-01 P= 6.481564 Days $T_0=135.948555$ (BKJD)



DV Model-Shift Uniqueness Test

005094751-01, P = 6.481620 Days, E = 129.460586 Days

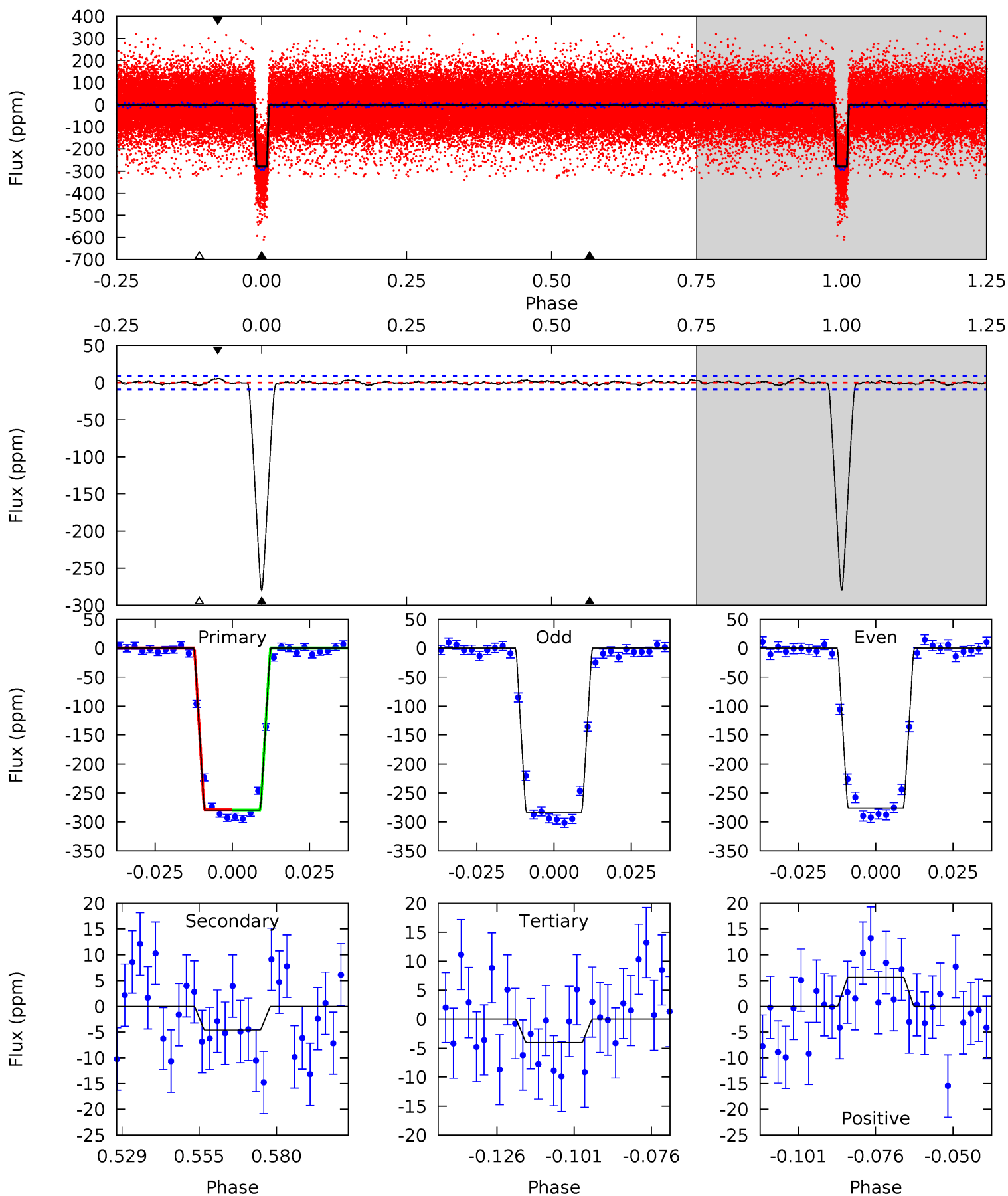
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
151.4	2.34	2.24	2.47	4.83	2.20	1.04	149.2	149.0	0.10	-0.13	2.52	1.00	0.02	0.59



Alt Model-Shift Uniqueness Test

005094751-01, P = 6.481564 Days, E = 129.466991 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
142.3	2.35	2.05	2.88	4.85	2.24	0.90	140.3	139.4	0.30	-0.53	1.81	1.00	0.02	0.14



Stellar Parameters For KIC 005094751

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5945^{+71}_{-71}	$4.213^{+0.033}_{-0.027}$	$-0.080^{+0.100}_{-0.100}$	$1.302^{+0.058}_{-0.058}$	$1.009^{+0.057}_{-0.047}$	$0.644^{+0.079}_{-0.064}$
	+1%/-1%	+1%/-1%	+125%/-125%	+4%/-4%	+6%/-5%	+12%/-10%
Source	SPE8	AST69	SPE69	DSEP		

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

Secondary Eclipse Parameters for KIC 005094751-01 / KOI 0123.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-4 ± 2	$2.64^{+0.11}_{-0.10}$	1599^{+25}_{-27}	2687^{+169}_{-244}	$1.617^{+0.785}_{-0.691}$
Alt.	-5 ± 2	$2.41^{+0.10}_{-0.10}$	1598^{+27}_{-25}	2794^{+159}_{-261}	$2.077^{+0.859}_{-0.941}$

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 $A_{obs} \gg 1.0$

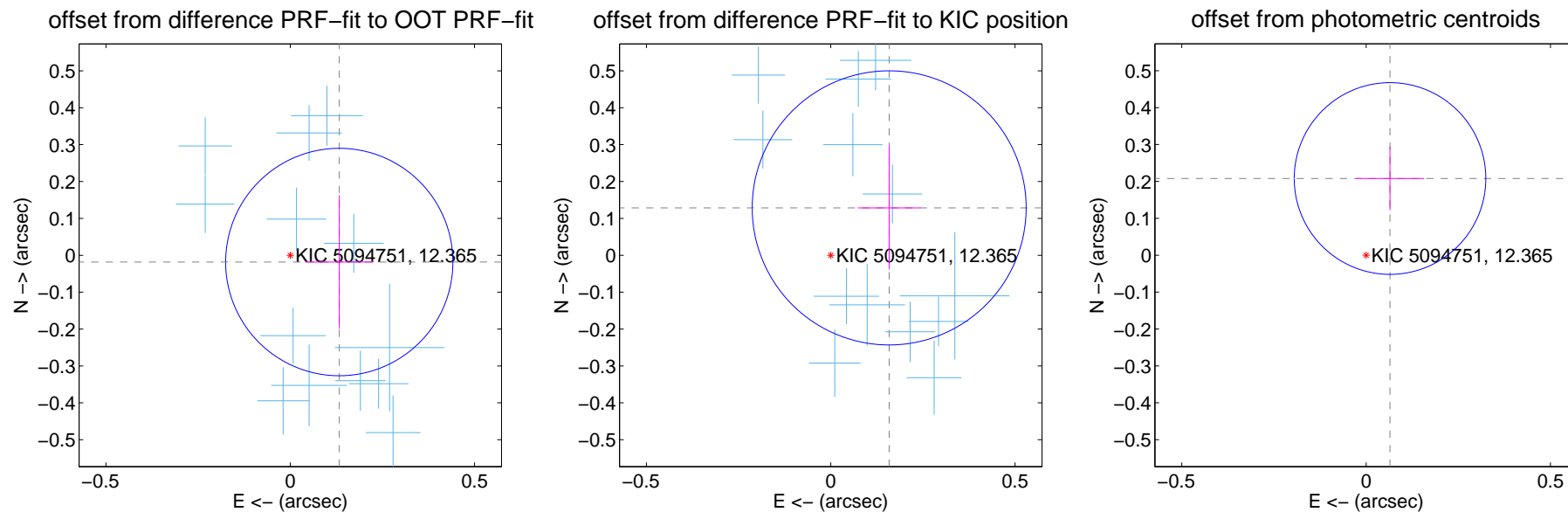
DV Centroid Data

Supplemental centroid analysis for 005094751-01. Kepler magnitude: 12.37. Transit SNR 102.17

There are 17 quarters with good PRF difference image offsets

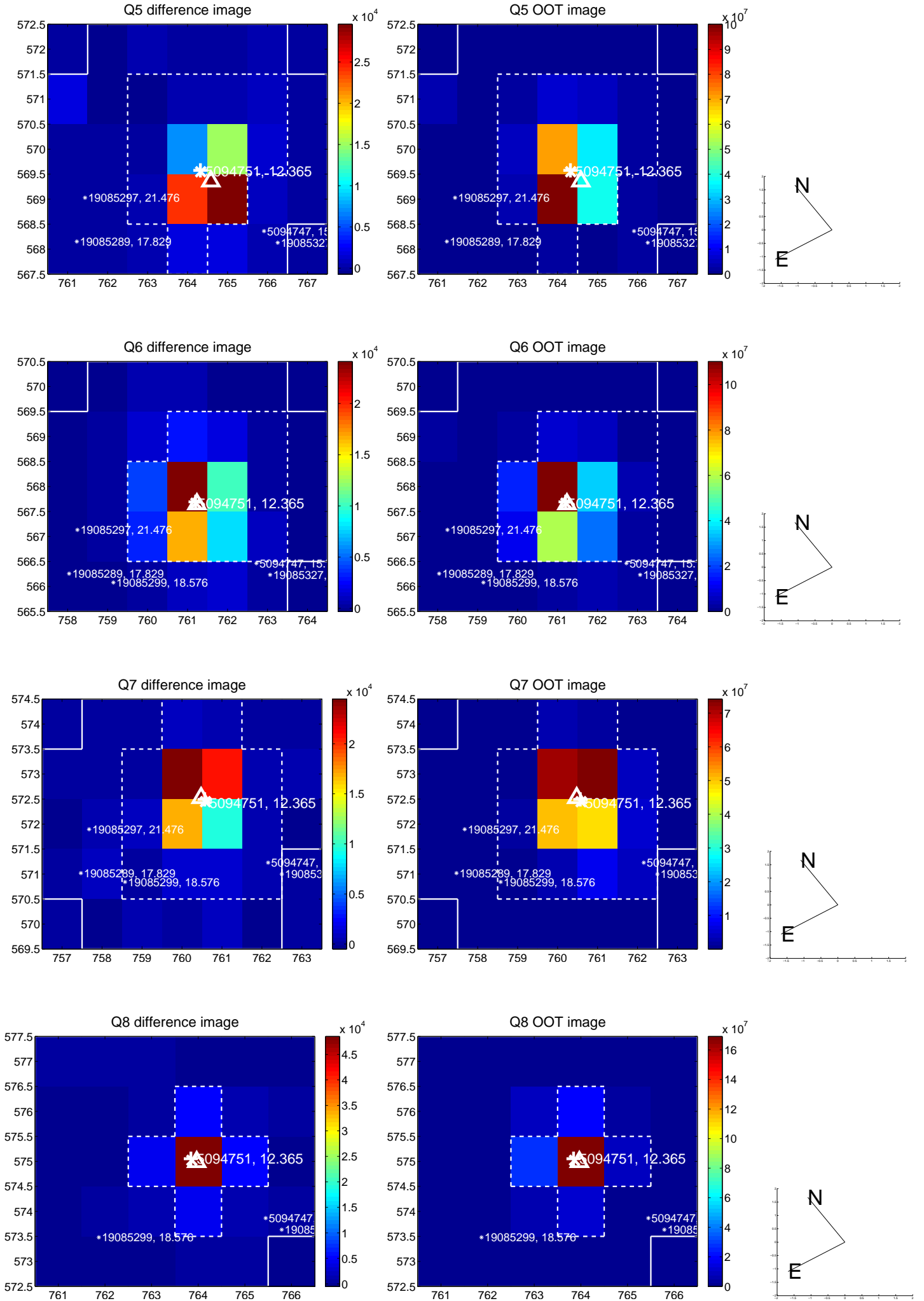
The direct PRF centroid is offset from the target star catalog position by about 0.16 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.134 ± 0.103	1.31	-0.133 ± 0.092	-0.018 ± 0.181
PRF-fit source offset from KIC position	0.204 ± 0.124	1.65	-0.159 ± 0.085	0.129 ± 0.166
photometric centroid source offset	0.22 ± 0.09	2.51	-0.06 ± 0.09	0.21 ± 0.09

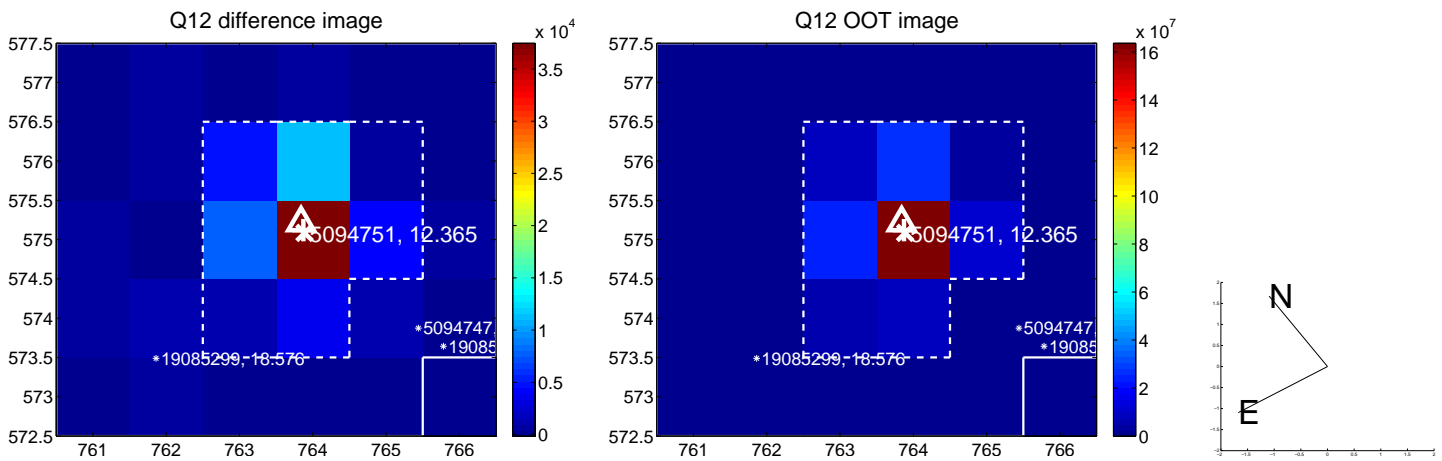
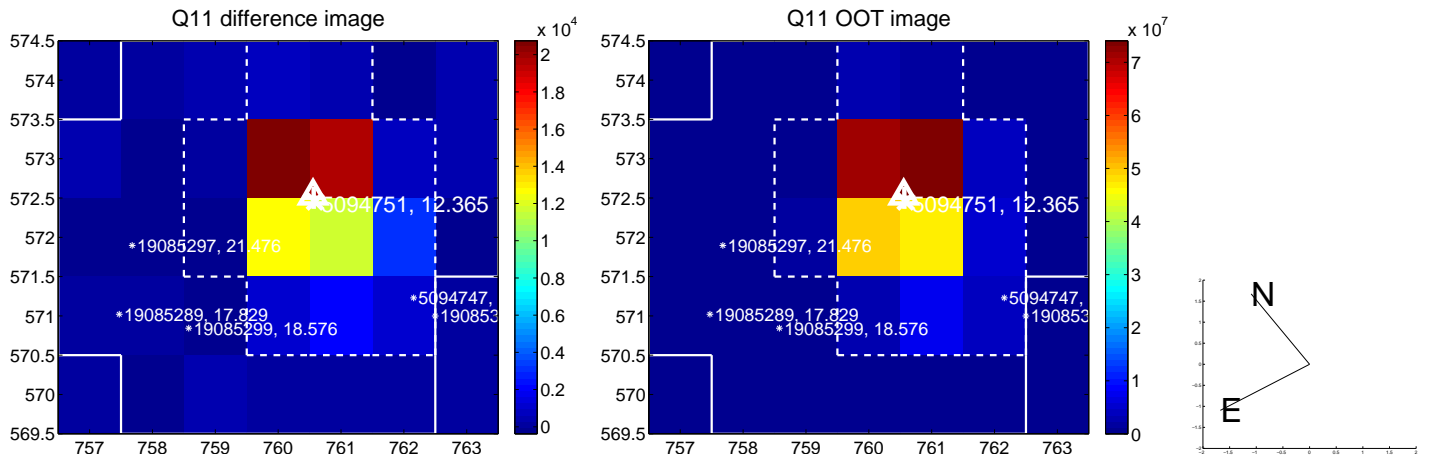
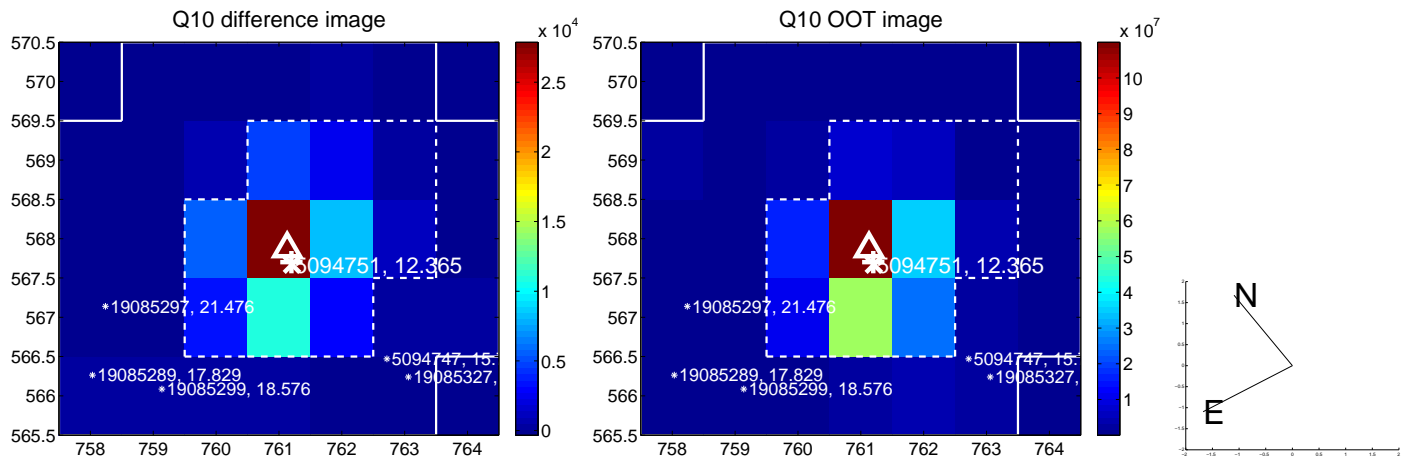
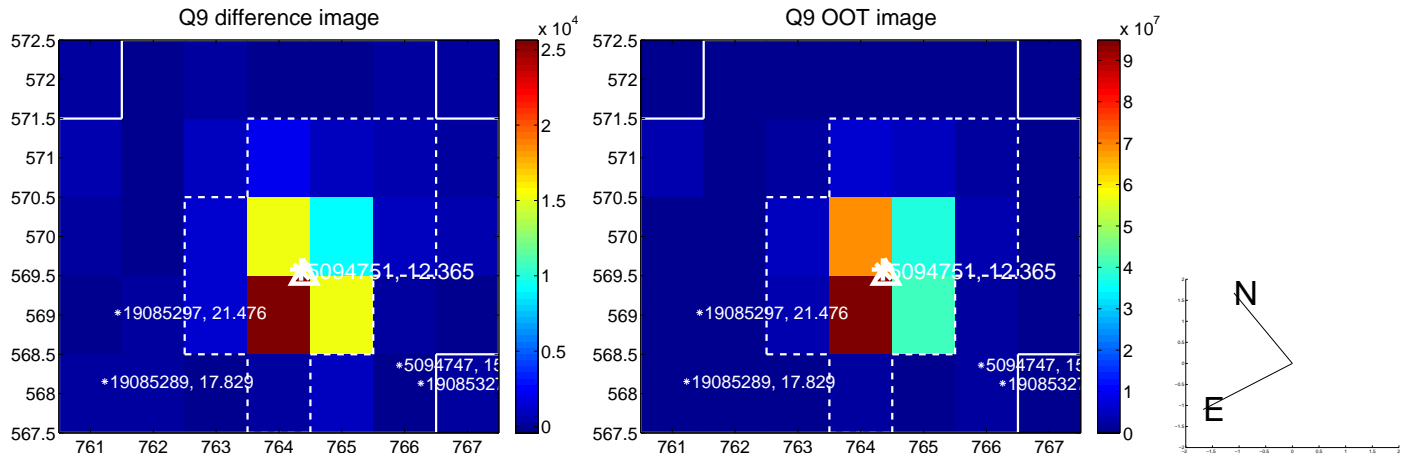


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

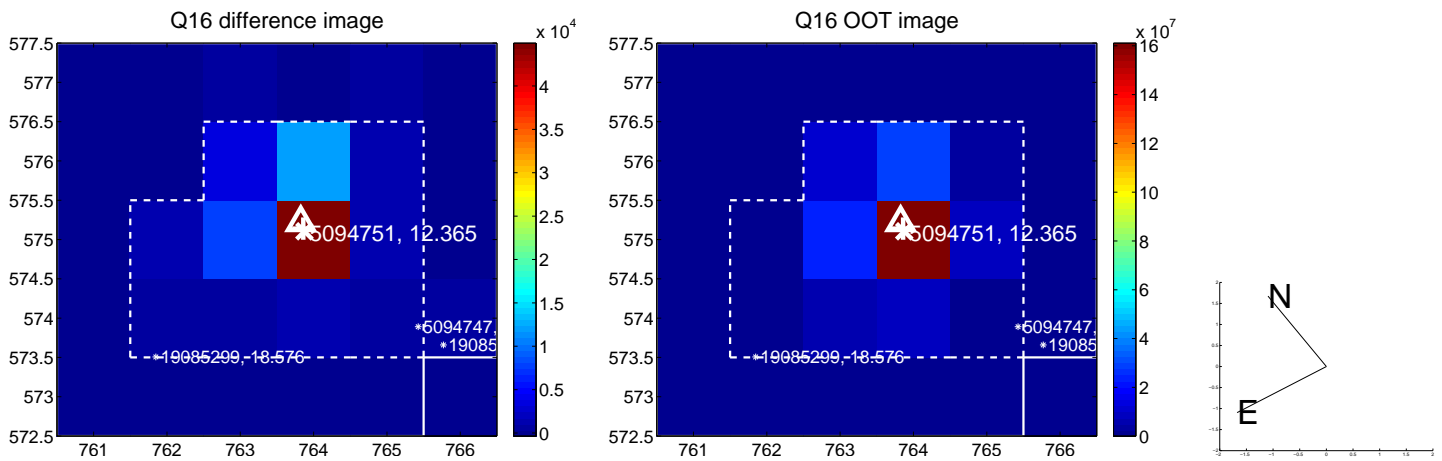
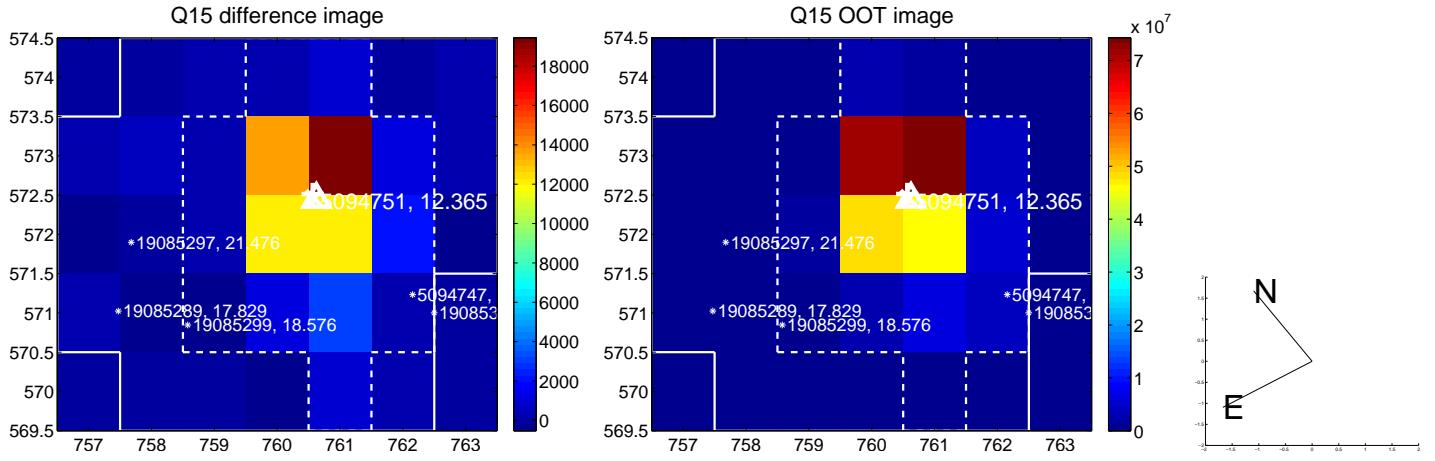
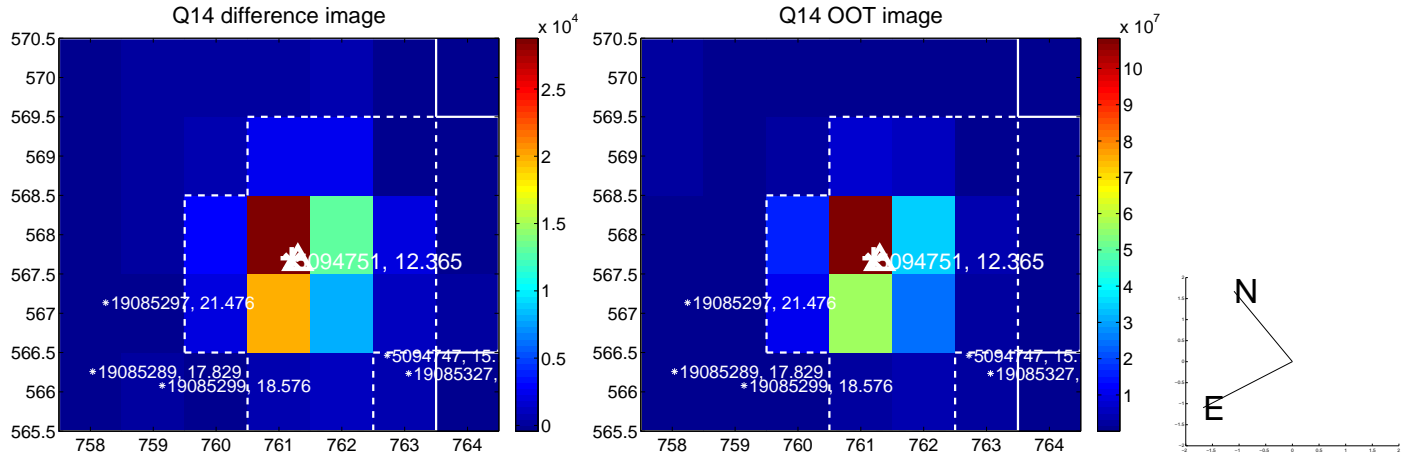
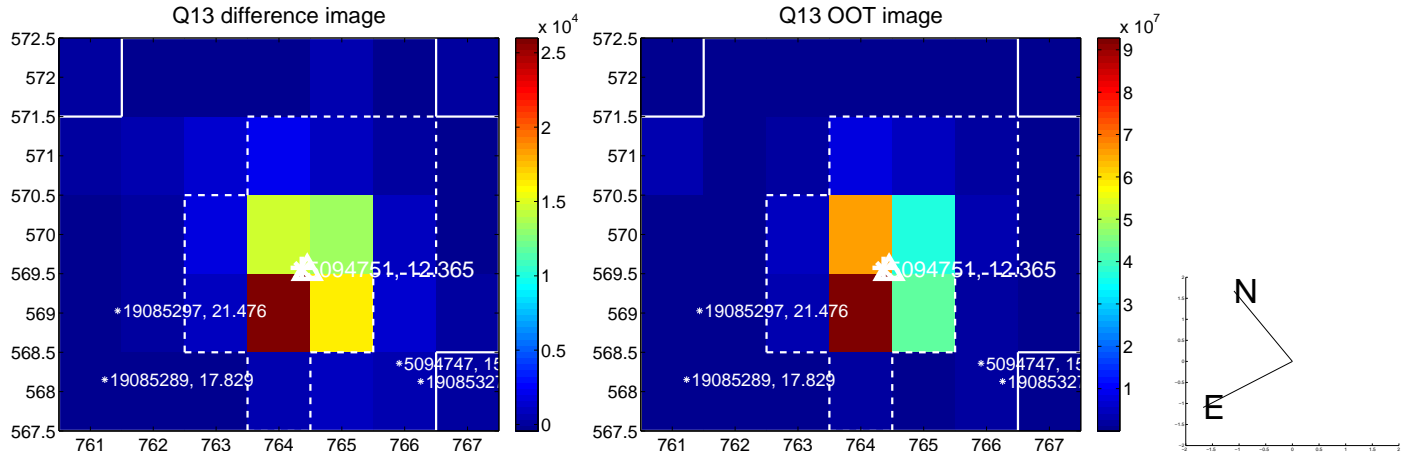
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



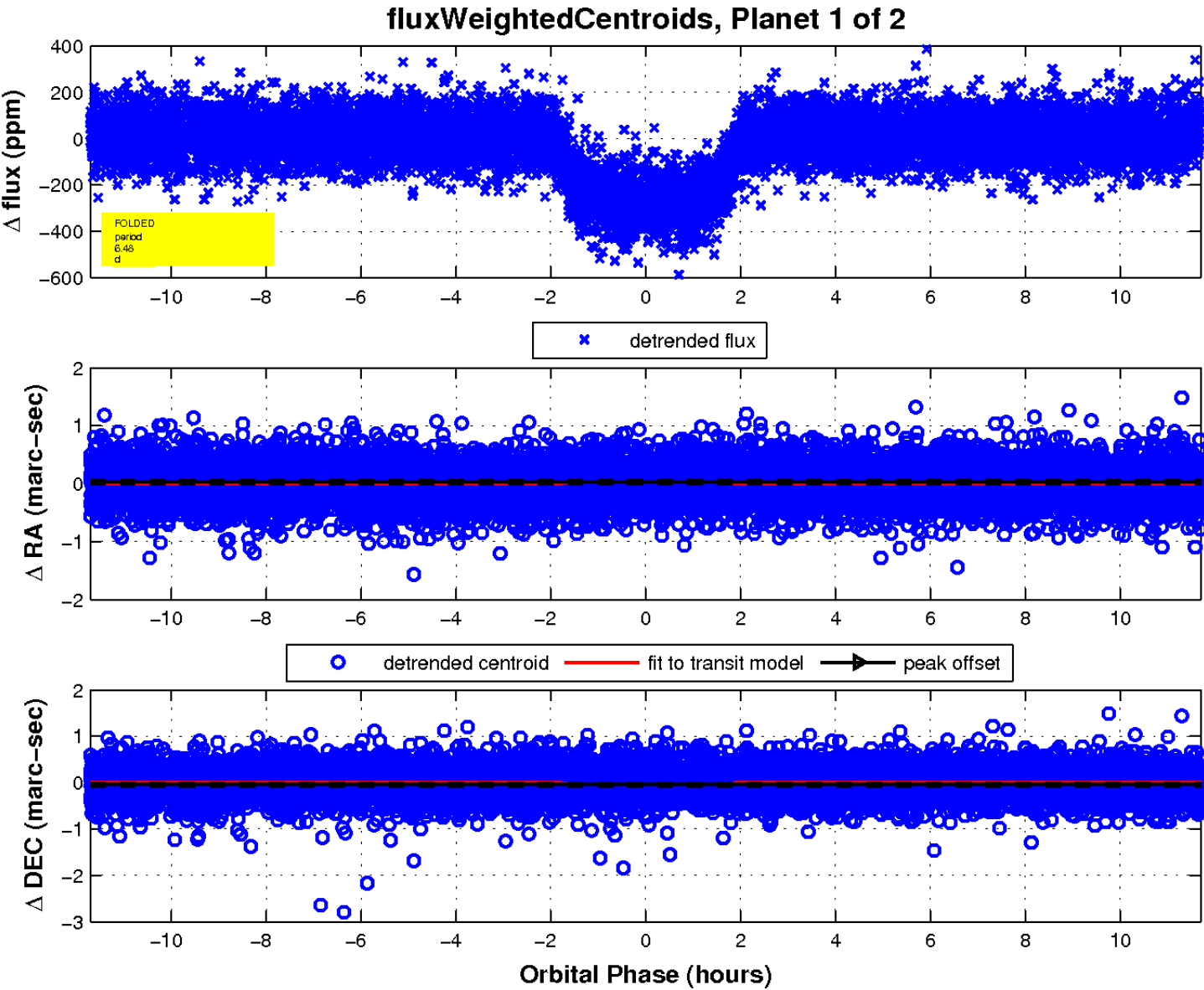
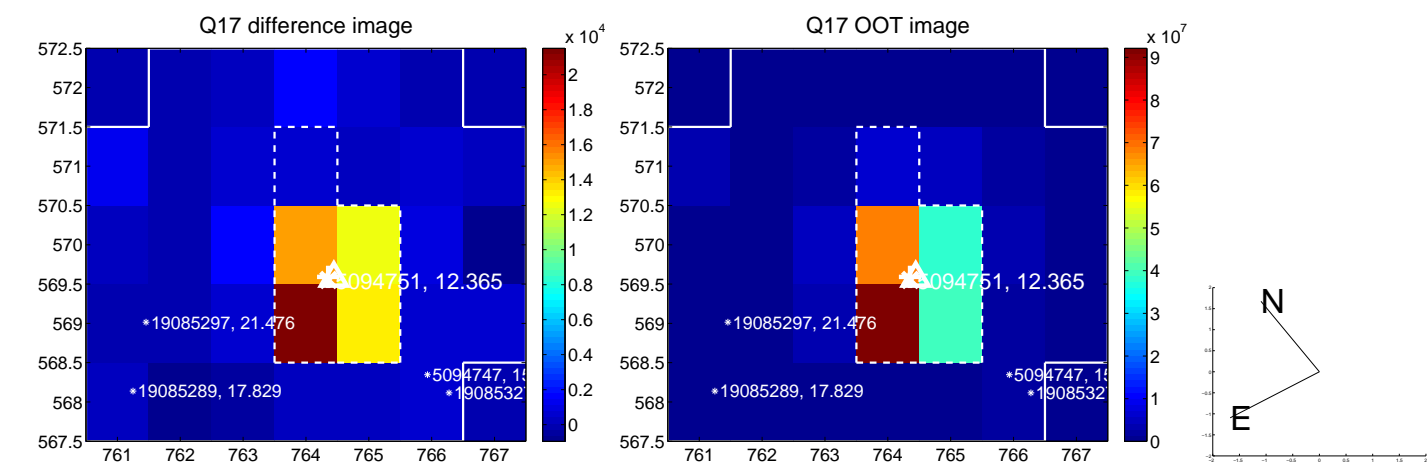
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

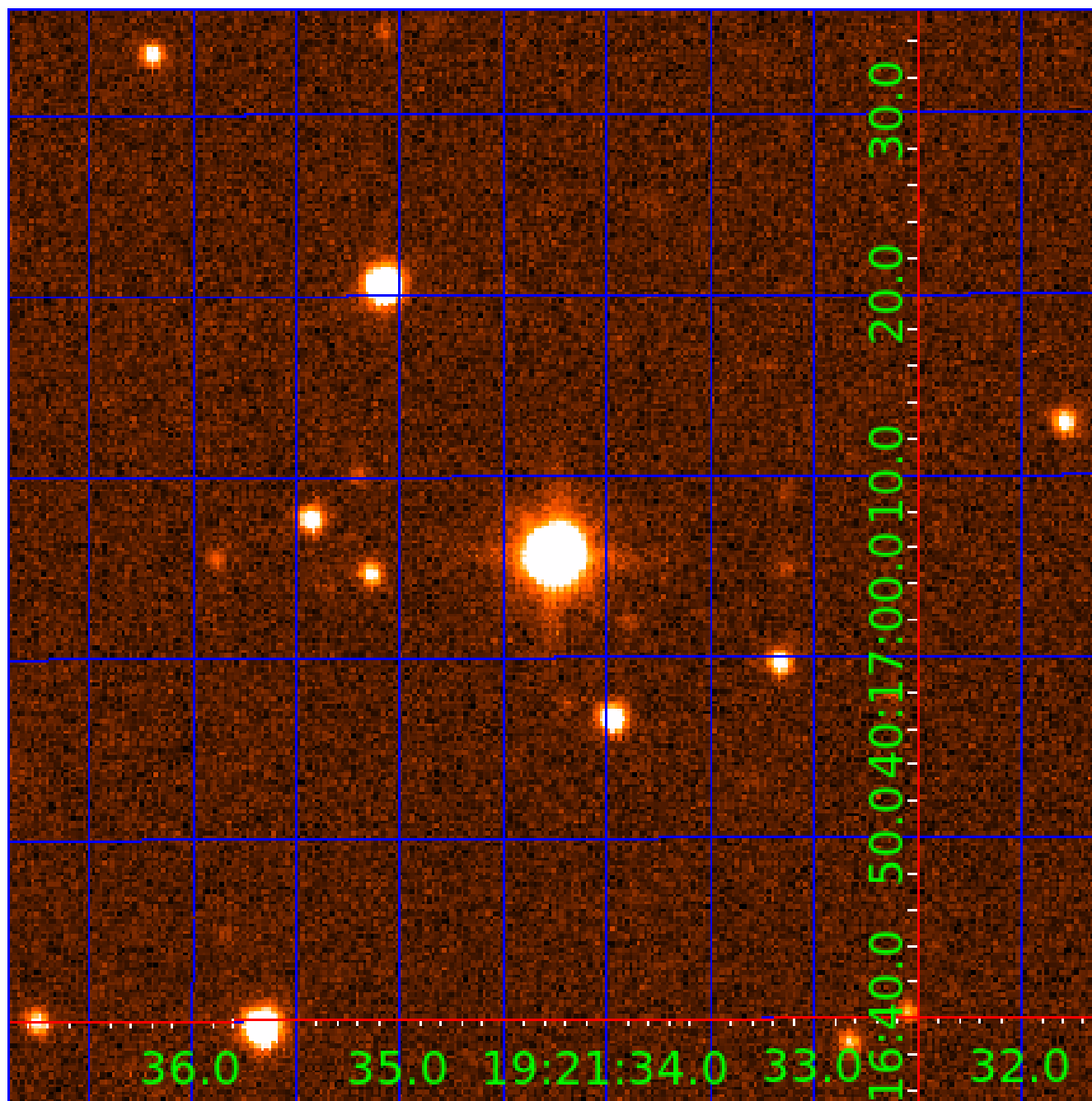


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 005094751

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})
005094751-01	OBS	0123.01	6.481620	135.942206	290.0	3.901	92.5	102.2	1.30	5945	2.64	407.07
005094751-02	OBS	0123.02	21.222624	137.573475	367.1	6.681	82.1	84.2	1.30	5945	2.74	83.72

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005094751-01	OBS	PC	1.00	0	0	0	0	NO_COMMENT
005094751-02	OBS	PC	1.00	0	0	0	0	NO_COMMENT

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.

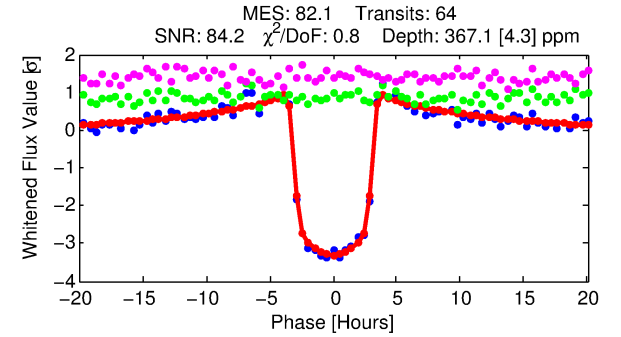
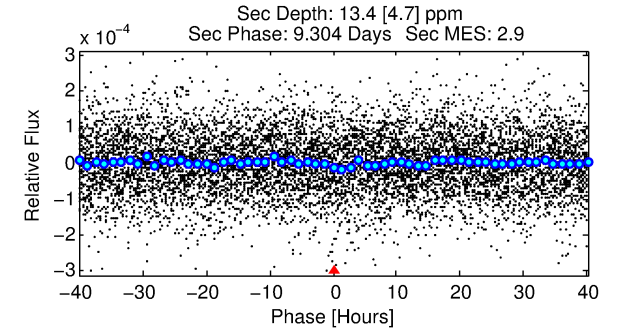
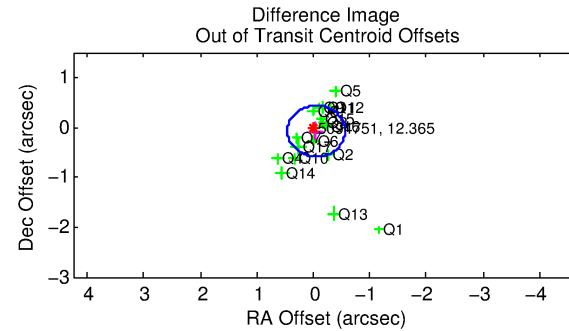
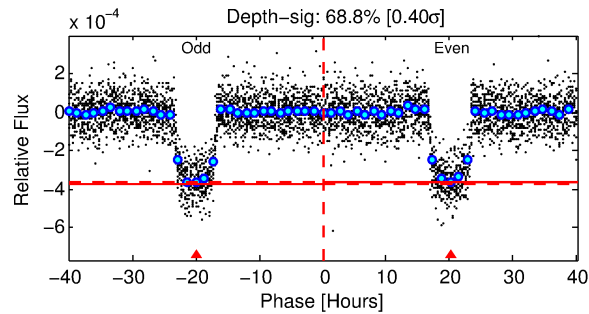
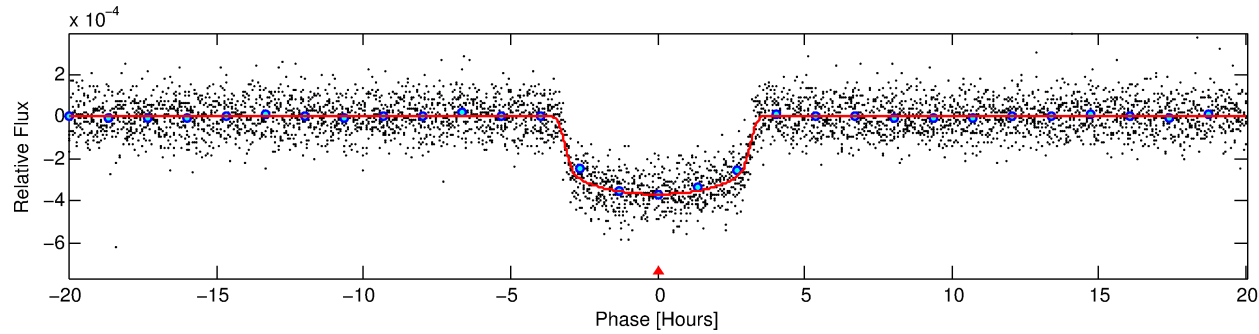
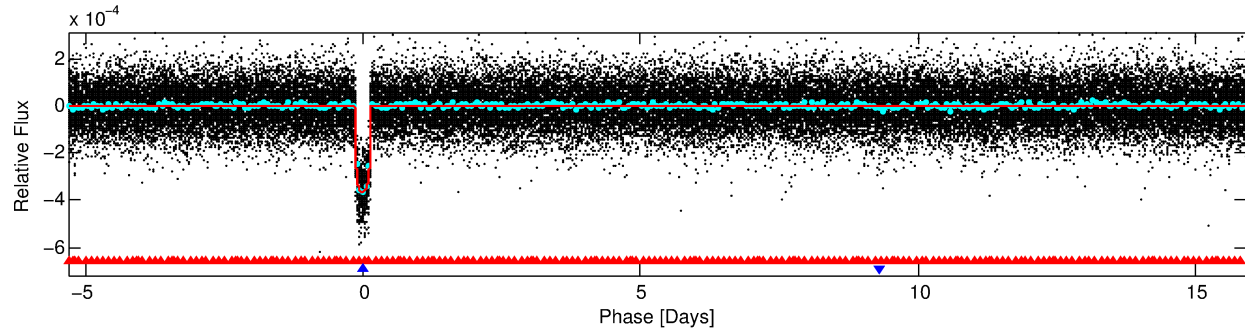
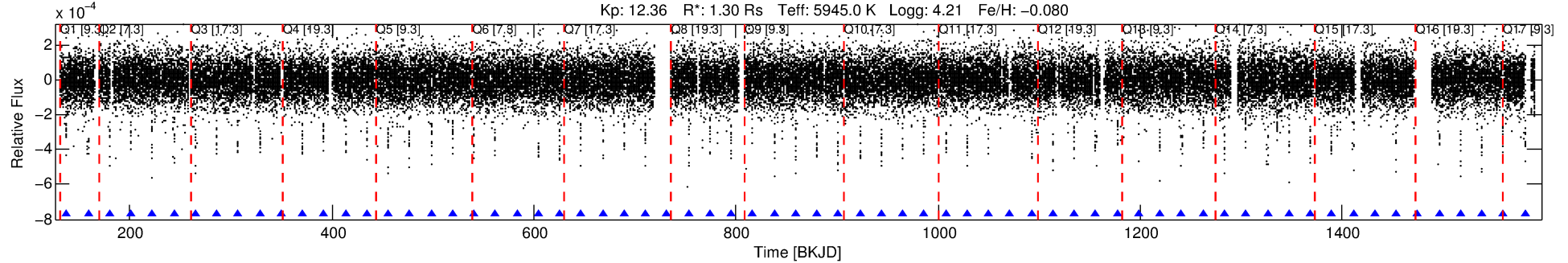
Ephemeris Match Information For 005094751-02

No Significant Match Found

DV One-Page Summary

KIC: 5094751 Candidate: 2 of 2 Period: 21.223 d
KOI: K00123.02 Name: Kepler-109c Corr: 0.986

Kp: 12.36 R*: 1.30 Rs Teff: 5945.0 K Logg: 4.21 Fe/H: -0.080



DV Fit Results:

Period = 21.22262 [0.00003] d
Epoch = 137.5735 [0.0012] BKJD
Rp/R* = 0.0193 [0.0010]
a/R* = 16.01 [3.81]
b = 0.78 [0.12]
Seff = 83.72 [6.34]
Teff = 771 [15] K
Rp = 2.74 [0.18] Re
a = 0.1505 [0.0059] AU
Ag = 22.28 [8.25] [2.58σ]
Teffp = 2591 [239] K [7.60σ]

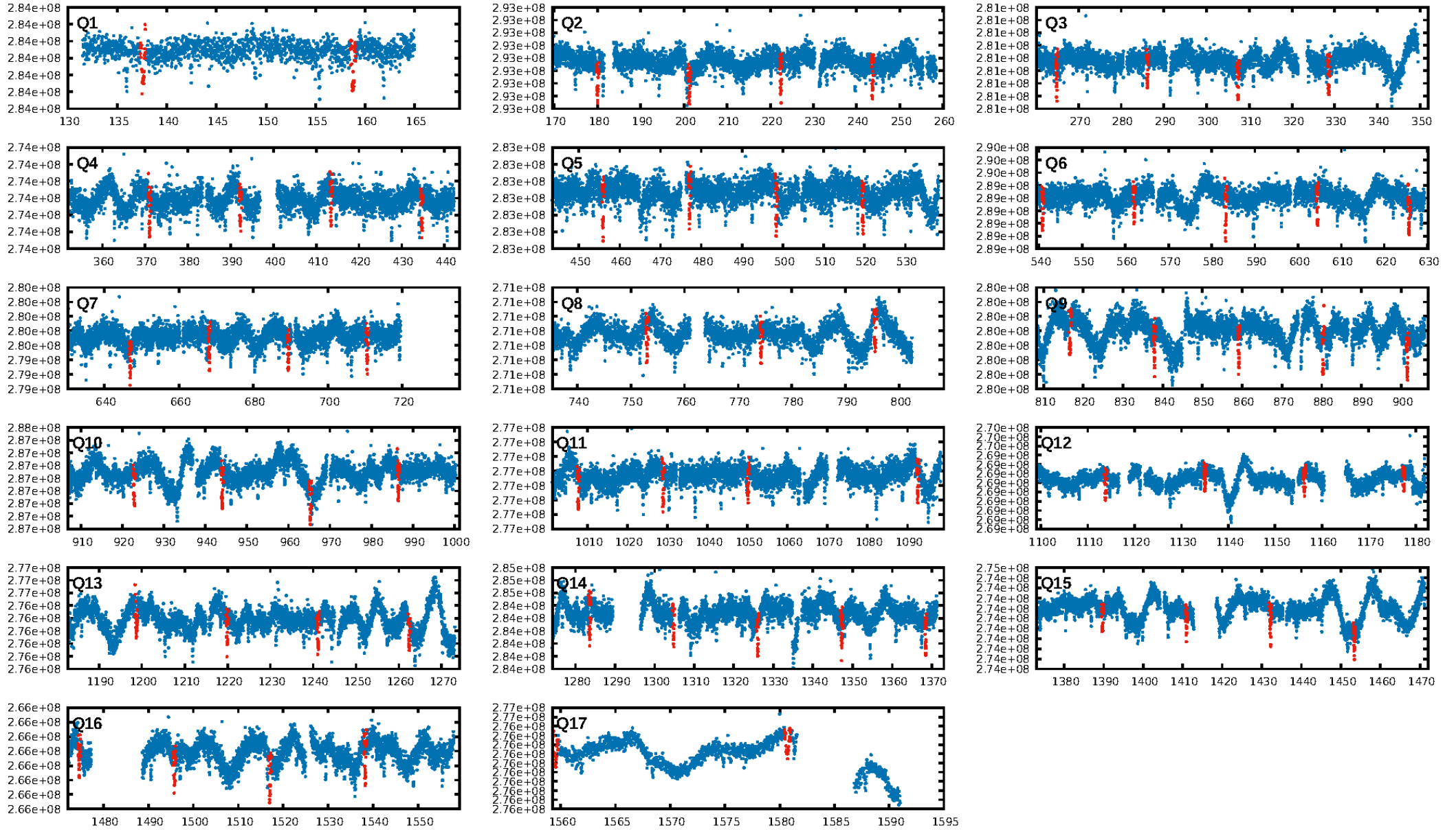
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [45.73σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 96.4%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 0.00e+00
RollingBand-fgt: 1.00 [60/60]
GhostDiagnostic-chr: 11.33
Centroid-sig: 0.0%
Centroid-so: 0.264 arcsec [2.66σ]
OotOffset-rm: 0.090 arcsec [0.53σ]
KicOffset-rm: 0.109 arcsec [0.78σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 1.00 [17/17]
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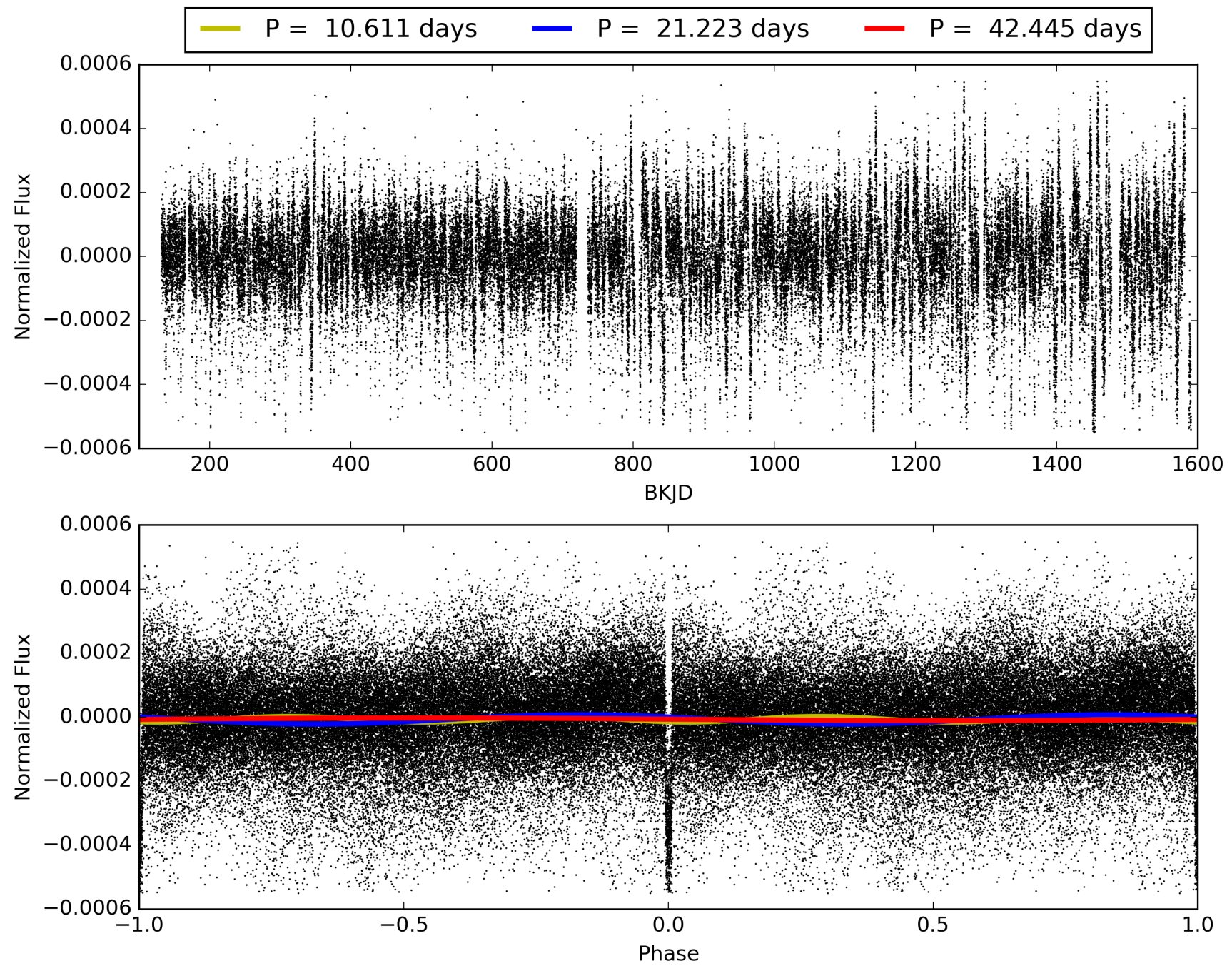
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

TCE 005094751-02, PDC Light Curves

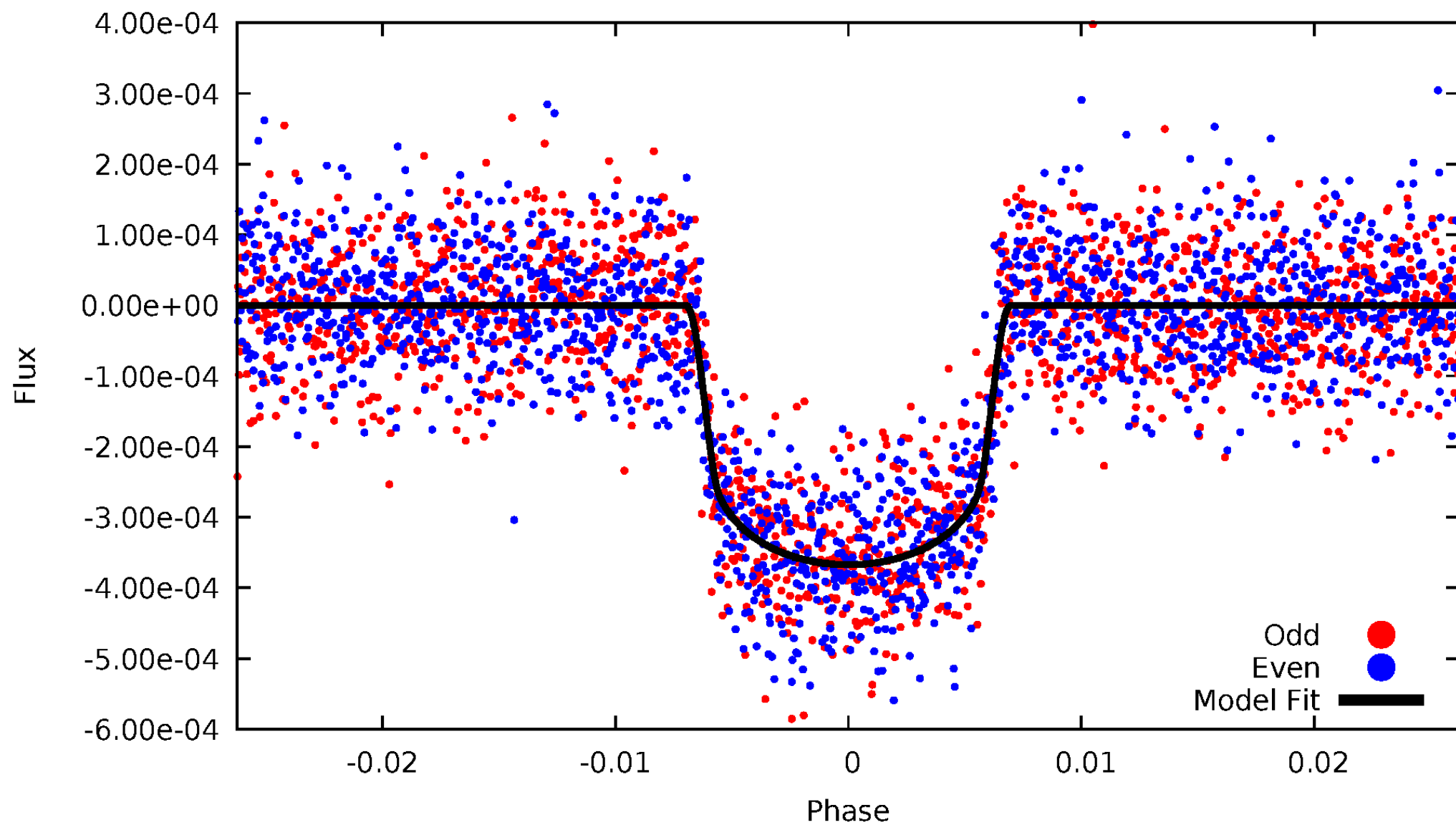


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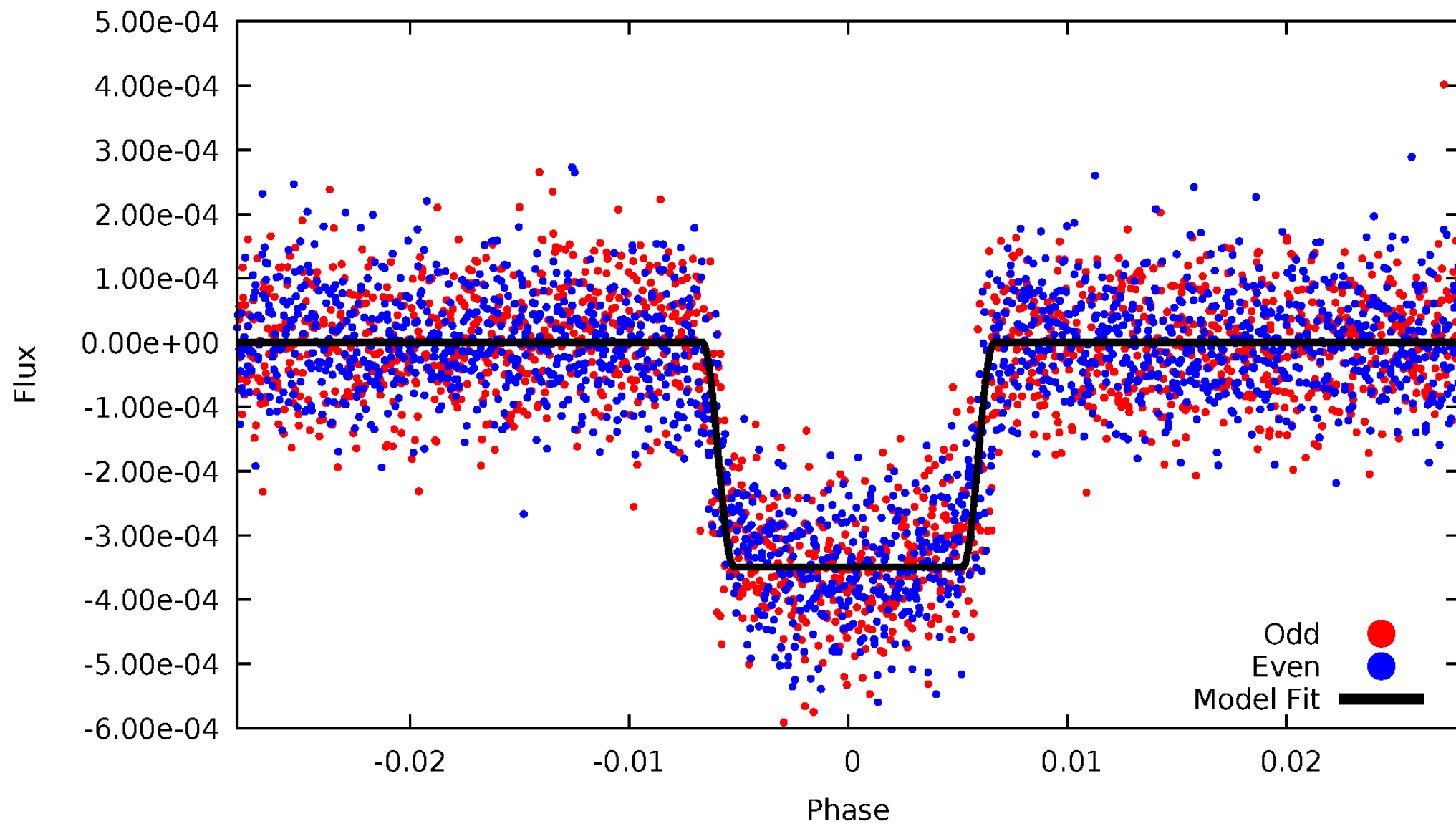
DV Odd/Even

TCE 005094751-02



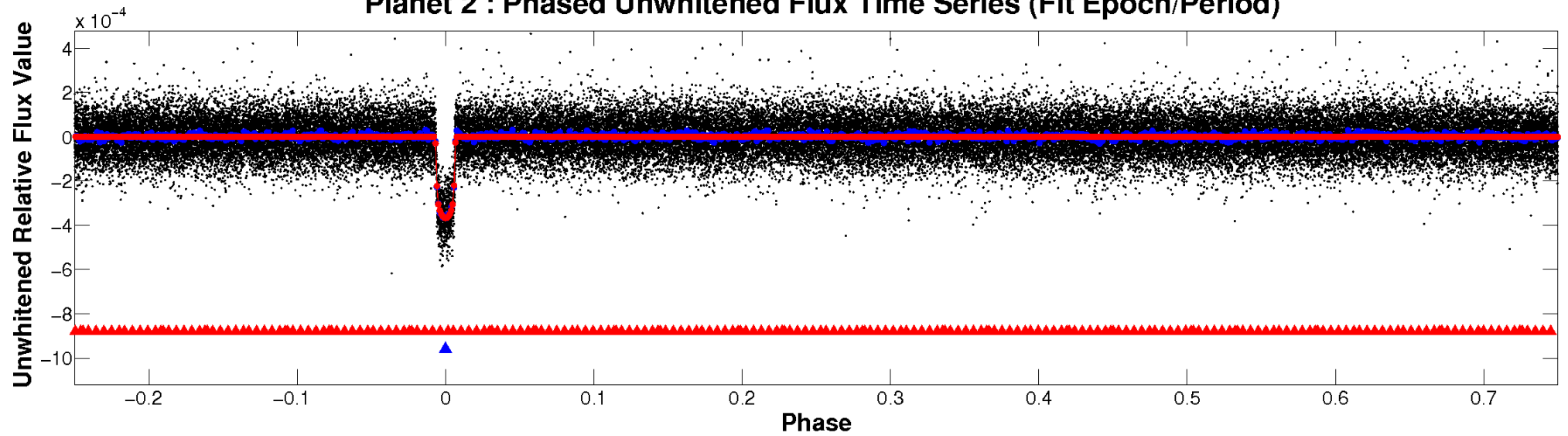
ALT Odd/Even

TCE 005094751-02

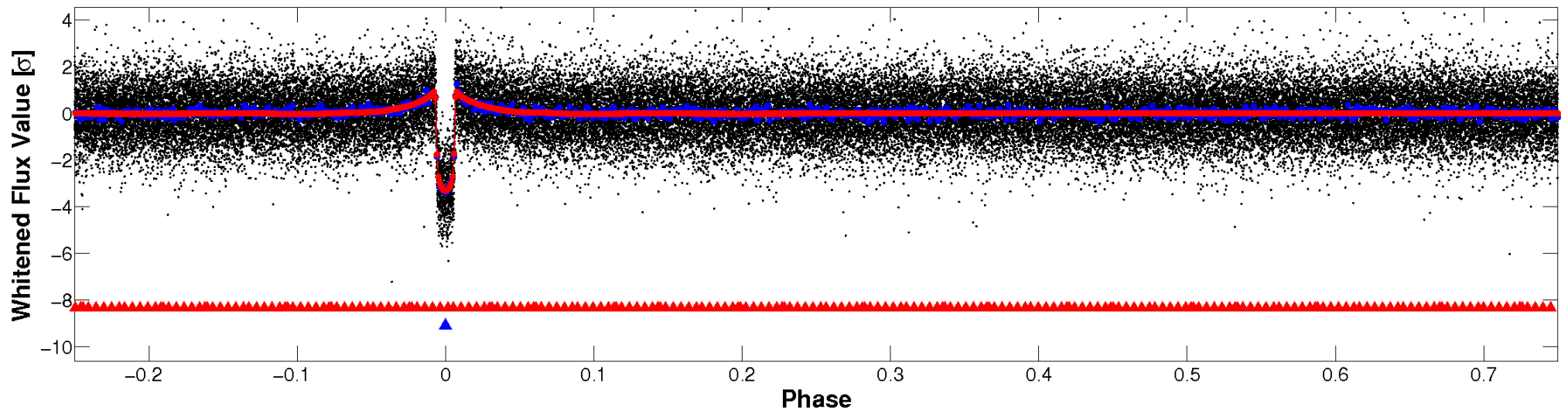


Non-Whitened Vs. Whitened Light Curve

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

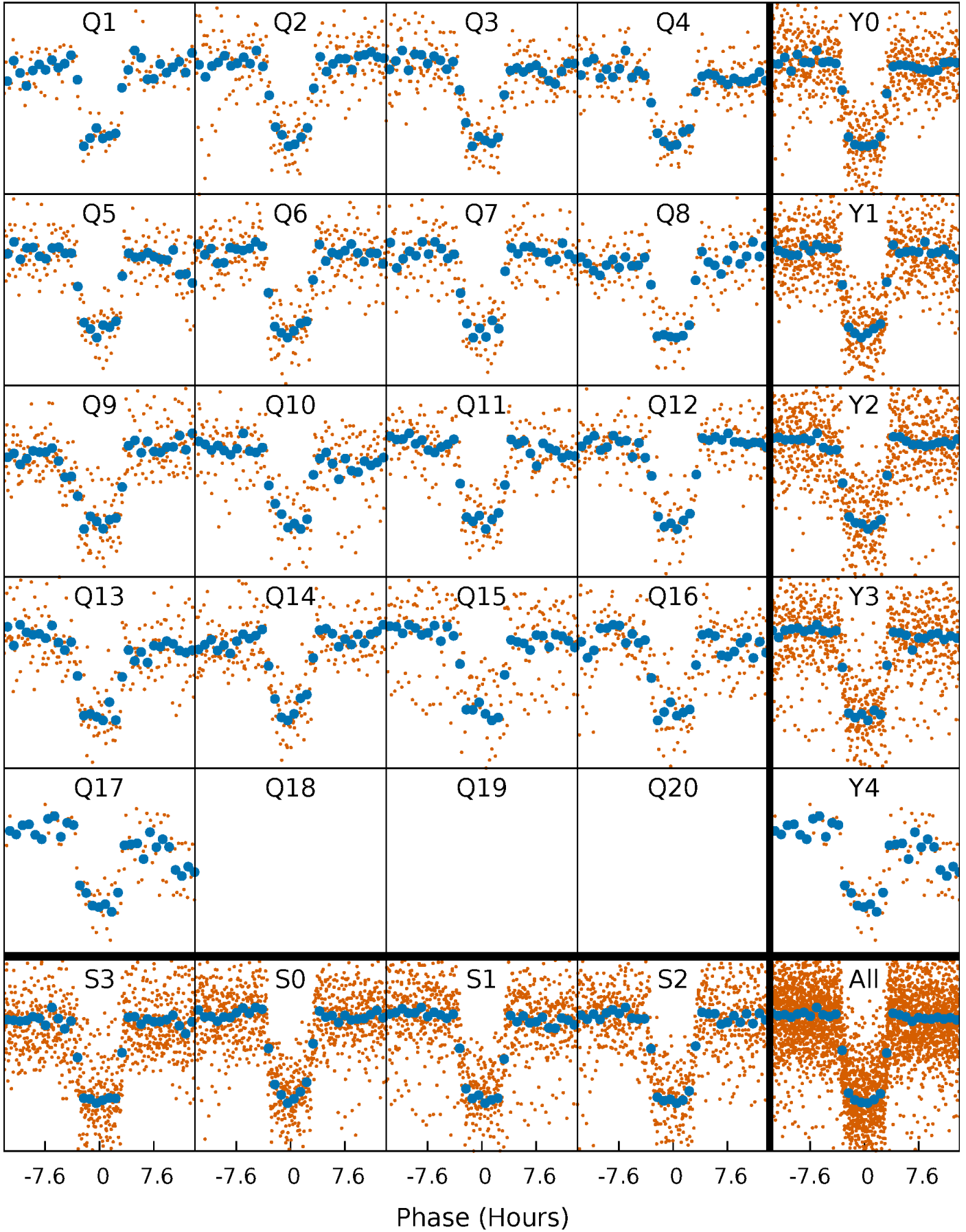


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



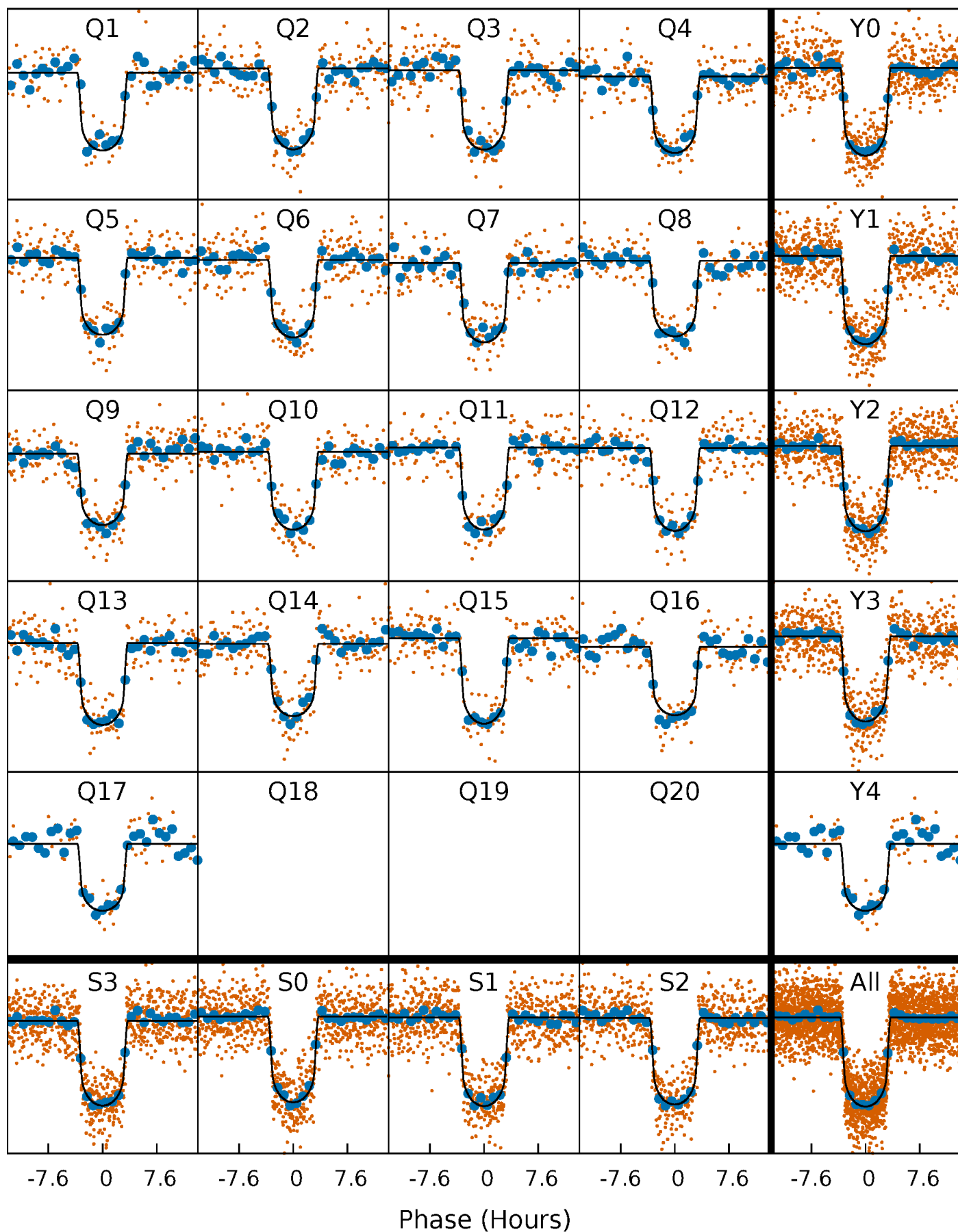
PDC Quarter-Phased Transit Curves

TCE 005094751-02 P= 21.222624 Days $T_0=137.573475$ (BKJD)



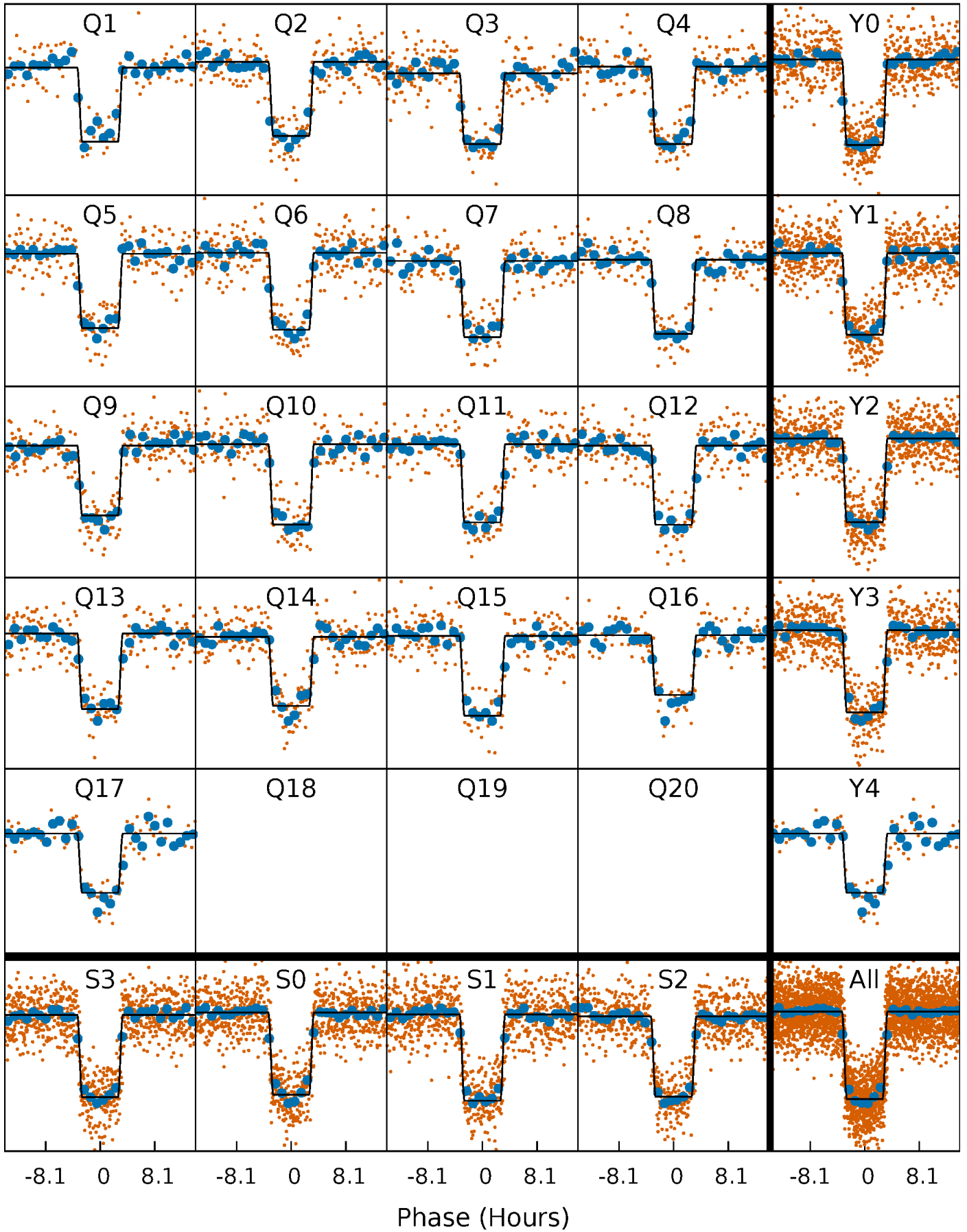
DV Quarter-Phased Transit Curves

TCE 005094751-02 P= 21.222624 Days $T_0=137.573475$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

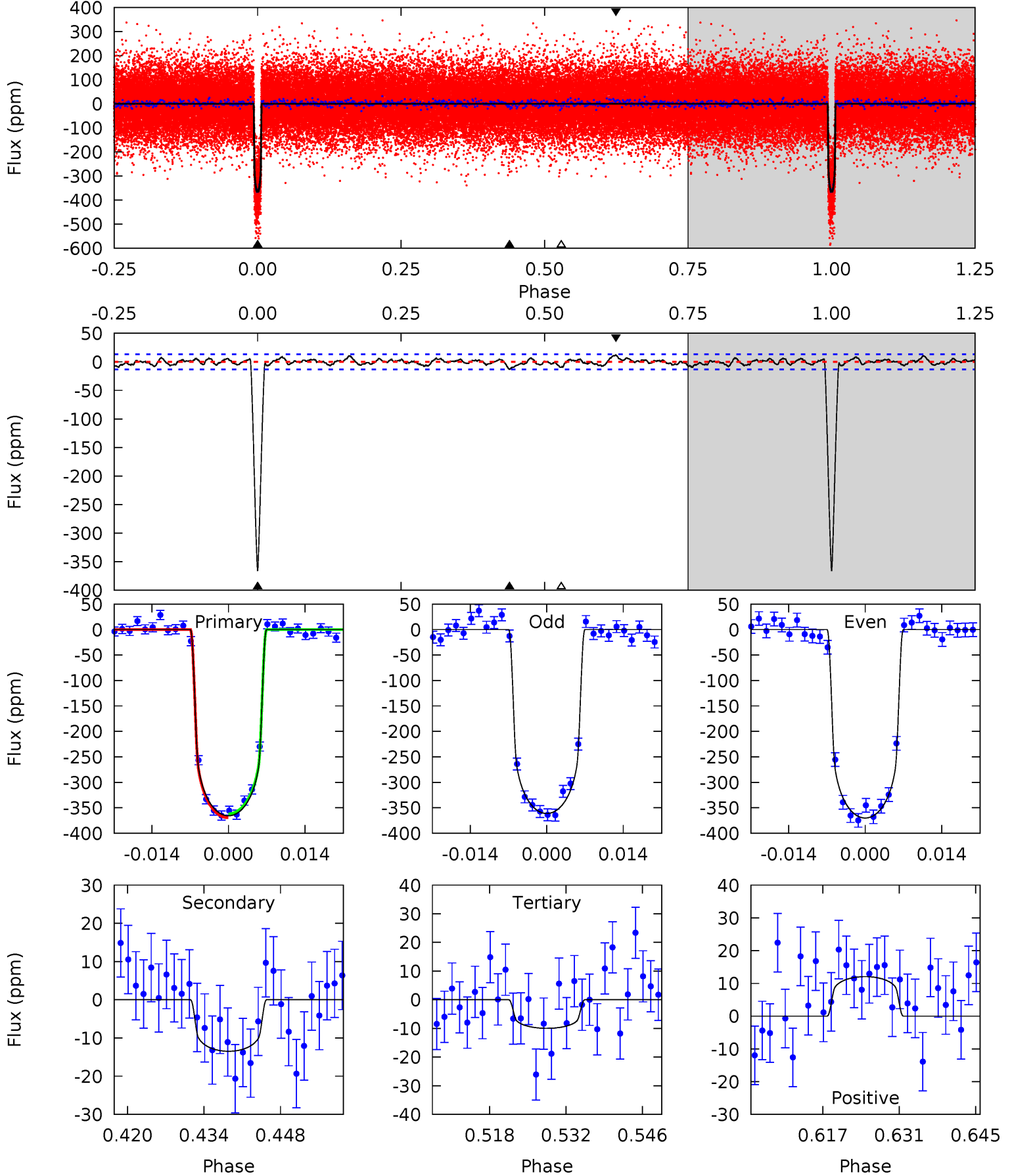
TCE 005094751-02 P= 21.222199 Days $T_0=137.587944$ (BKJD)



DV Model-Shift Uniqueness Test

005094751-02, $P = 21.222624$ Days, $E = 116.350851$ Days

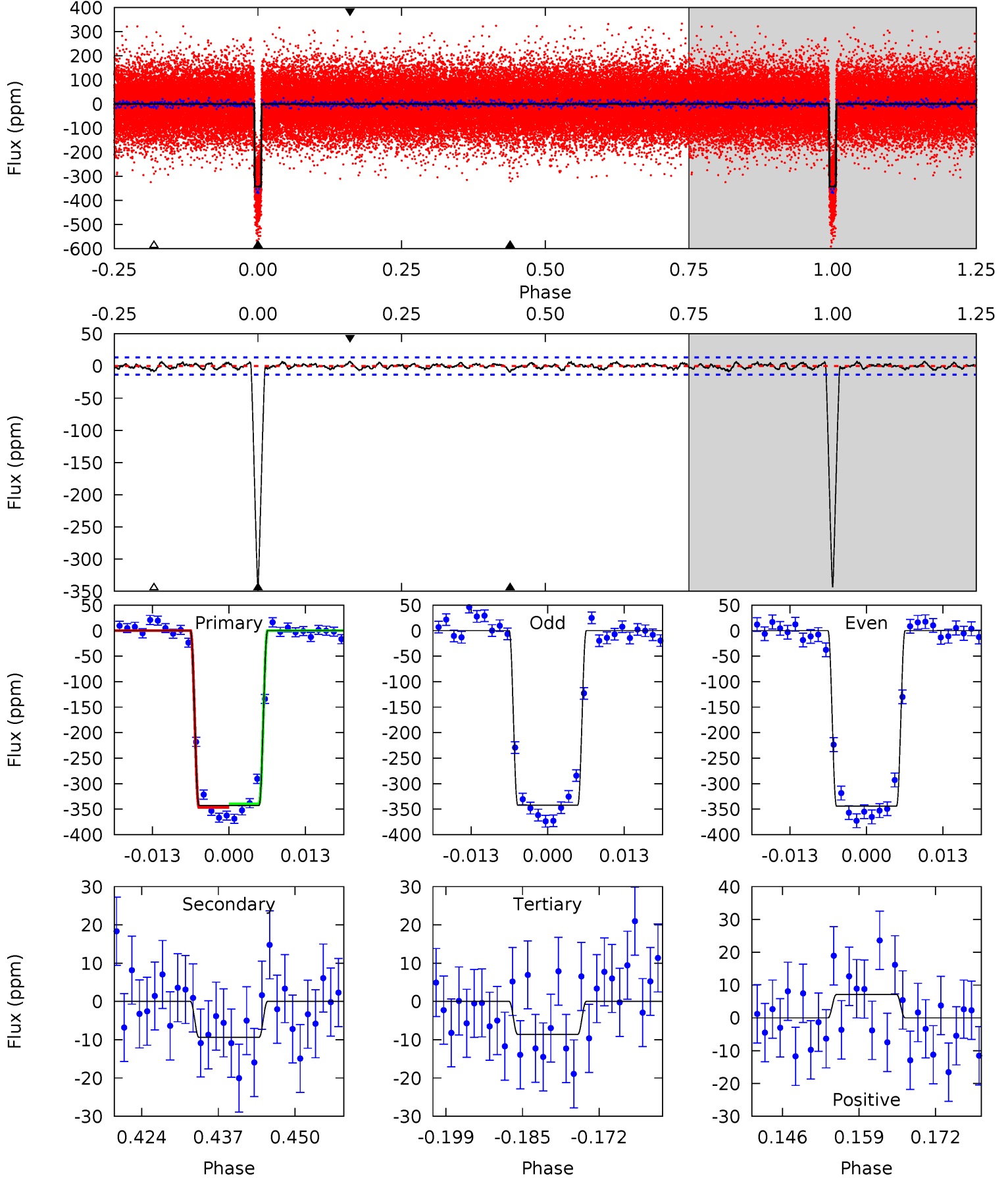
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
136.1	5.02	3.71	4.49	4.96	2.46	1.44	132.4	131.6	1.31	0.53	1.66	0.99	0.03	1.42



Alt Model-Shift Uniqueness Test

005094751-02, P = 21.222199 Days, E = 116.365745 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
126.7	3.47	3.18	2.64	4.97	2.48	1.06	123.6	124.1	0.29	0.83	0.36	1.00	0.02	1.18



Stellar Parameters For KIC 005094751

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5945^{+71}_{-71}	$4.213^{+0.033}_{-0.027}$	$-0.080^{+0.100}_{-0.100}$	$1.302^{+0.058}_{-0.058}$	$1.009^{+0.057}_{-0.047}$	$0.644^{+0.079}_{-0.064}$
	+1%/-1%	+1%/-1%	+125%/-125%	+4%/-4%	+6%/-5%	+12%/-10%
Source	SPE8	AST69	SPE69	DSEP		

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

Secondary Eclipse Parameters for KIC 005094751-02 / KOI 0123.02

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-13 ± 3	$2.74^{+0.17}_{-0.15}$	1076^{+18}_{-17}	3175^{+115}_{-111}	22^{+6}_{-5}
Alt.	-9 ± 3	$2.66^{+0.16}_{-0.15}$	1076^{+18}_{-18}	3052^{+125}_{-144}	17^{+5}_{-5}

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

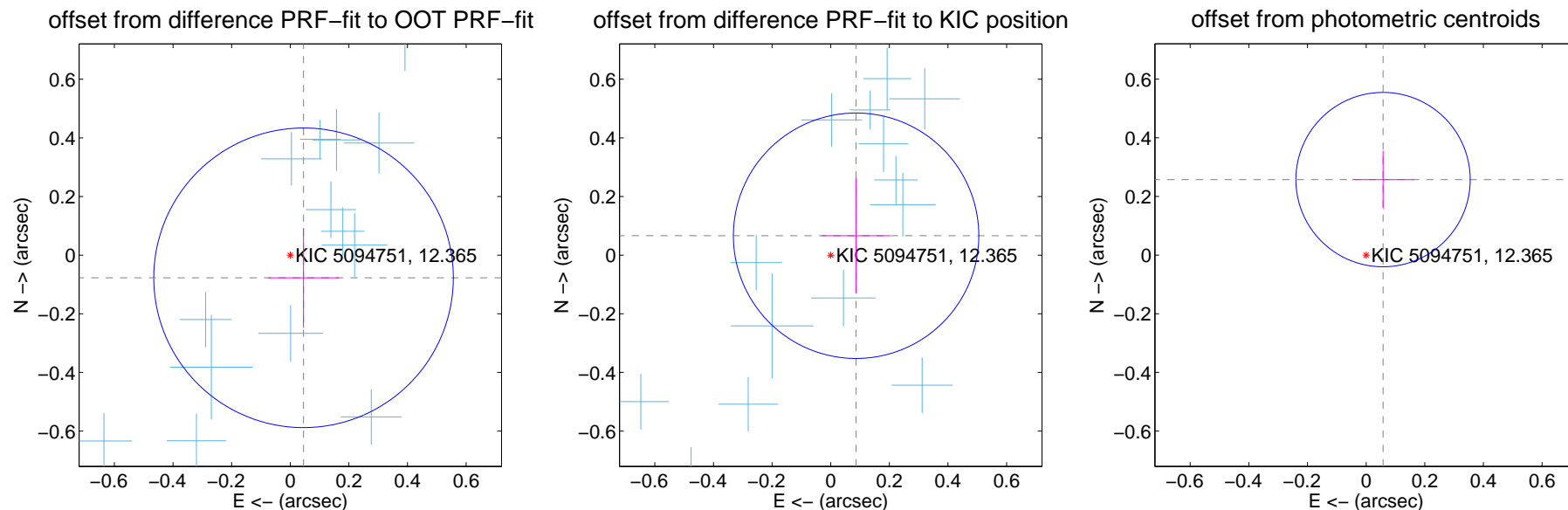
DV Centroid Data

Supplemental centroid analysis for 005094751-02. Kepler magnitude: 12.37. Transit SNR 84.17

There are 17 quarters with good PRF difference image offsets

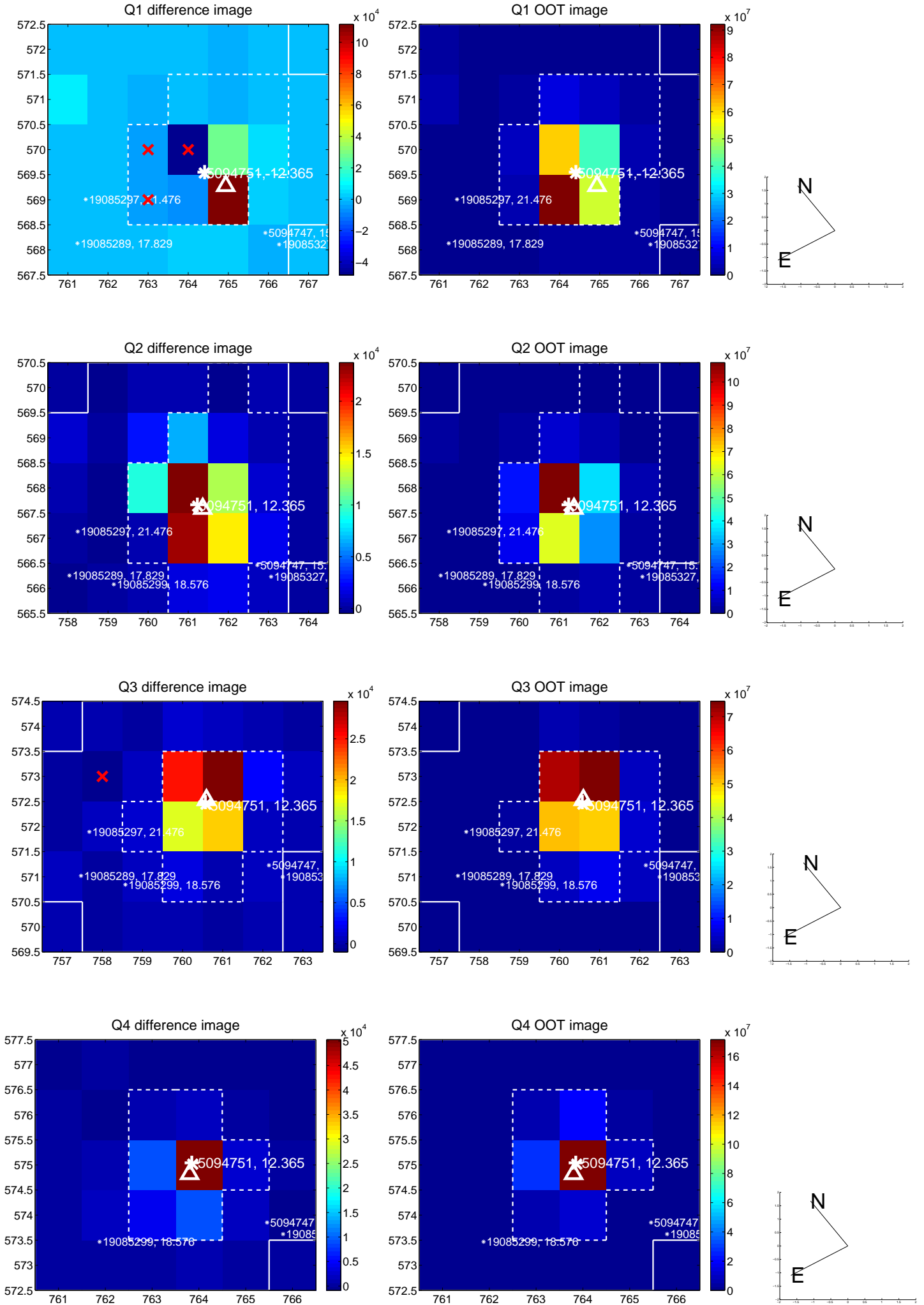
The direct PRF centroid is offset from the target star catalog position by about 0.16 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.090 ± 0.170	0.53	-0.045 ± 0.121	-0.077 ± 0.170
PRF-fit source offset from KIC position	0.109 ± 0.140	0.78	-0.087 ± 0.118	0.066 ± 0.196
photometric centroid source offset	0.26 ± 0.10	2.66	-0.06 ± 0.11	0.26 ± 0.10

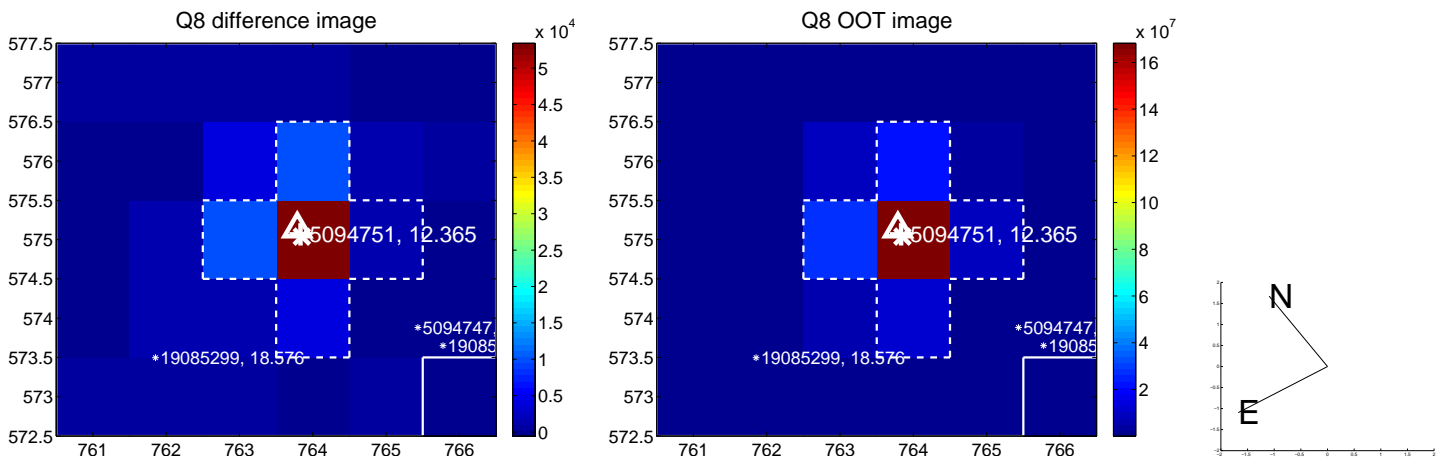
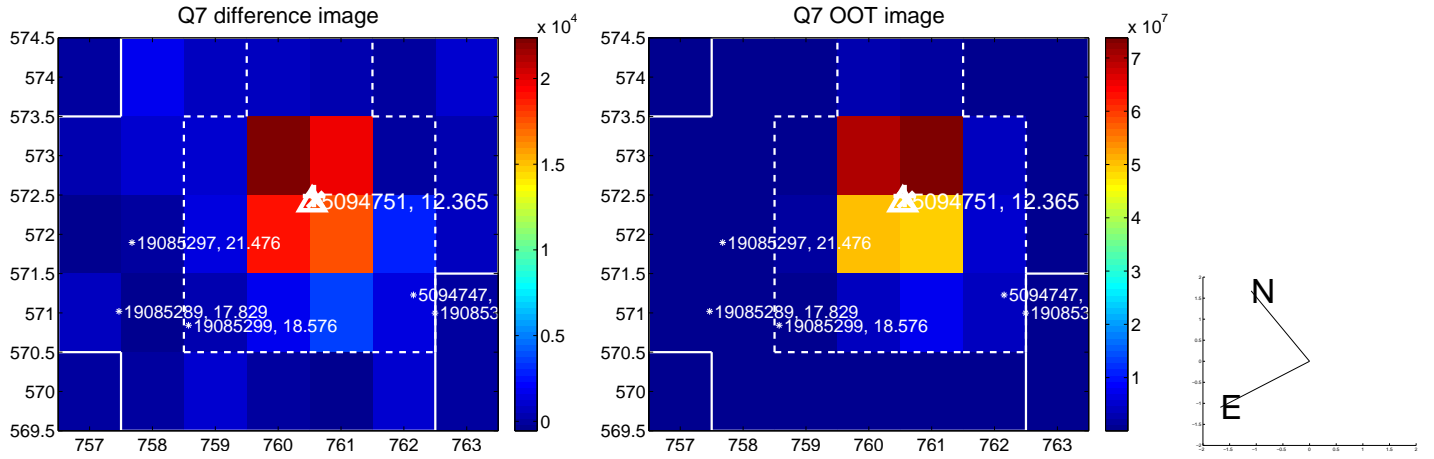
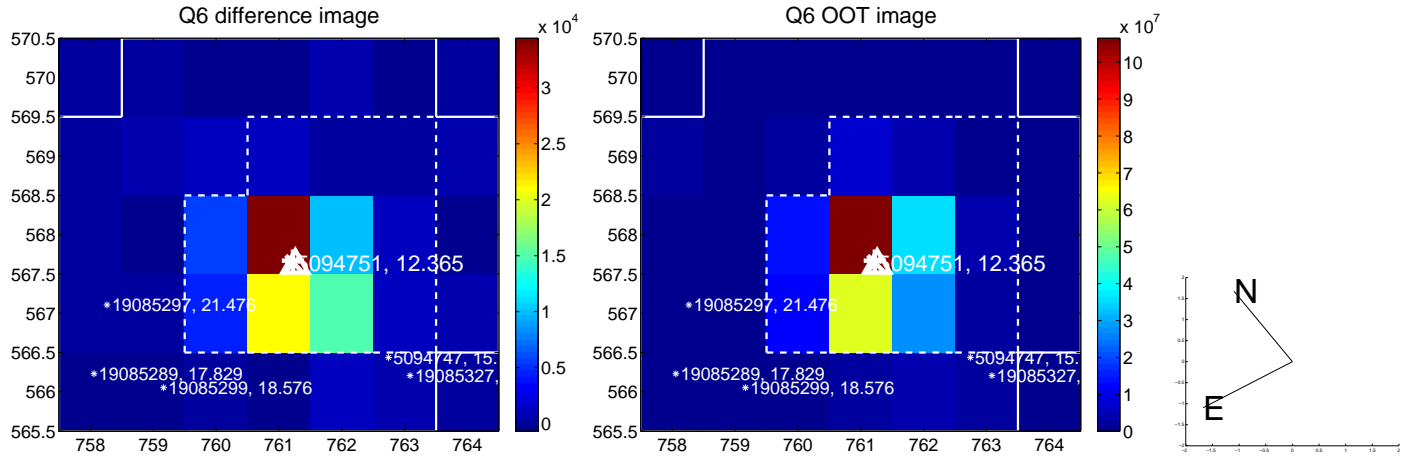
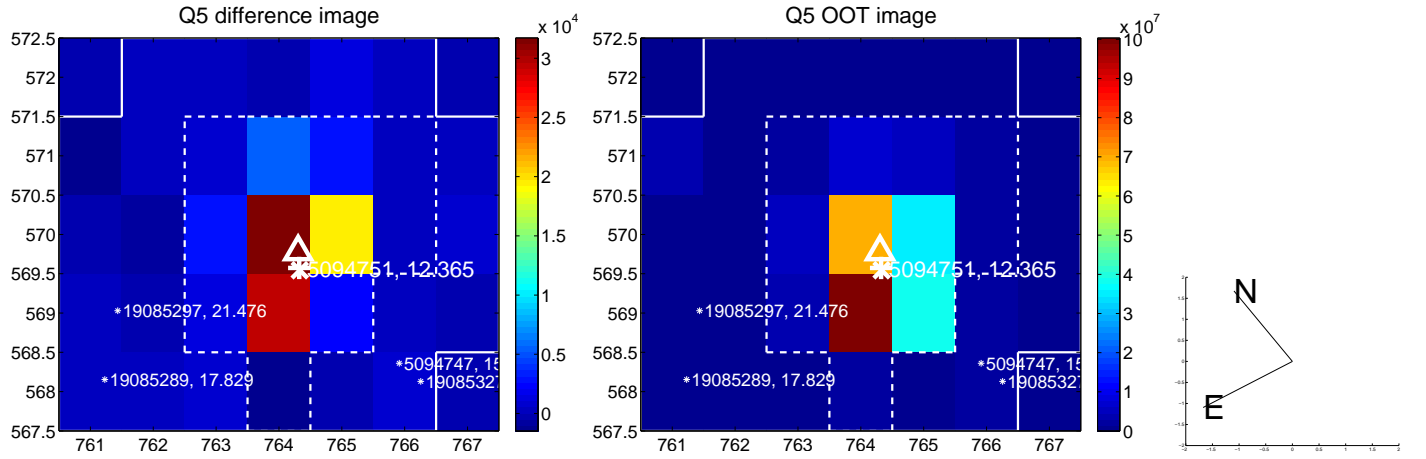


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses:** good quarterly centroid offsets; **Vermillion crosses:** bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

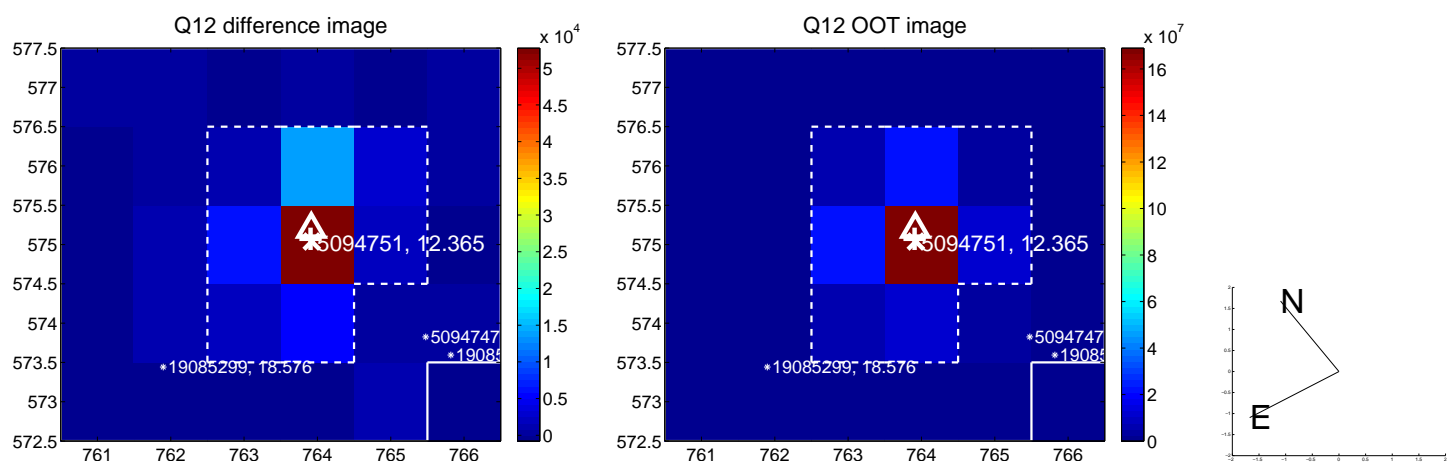
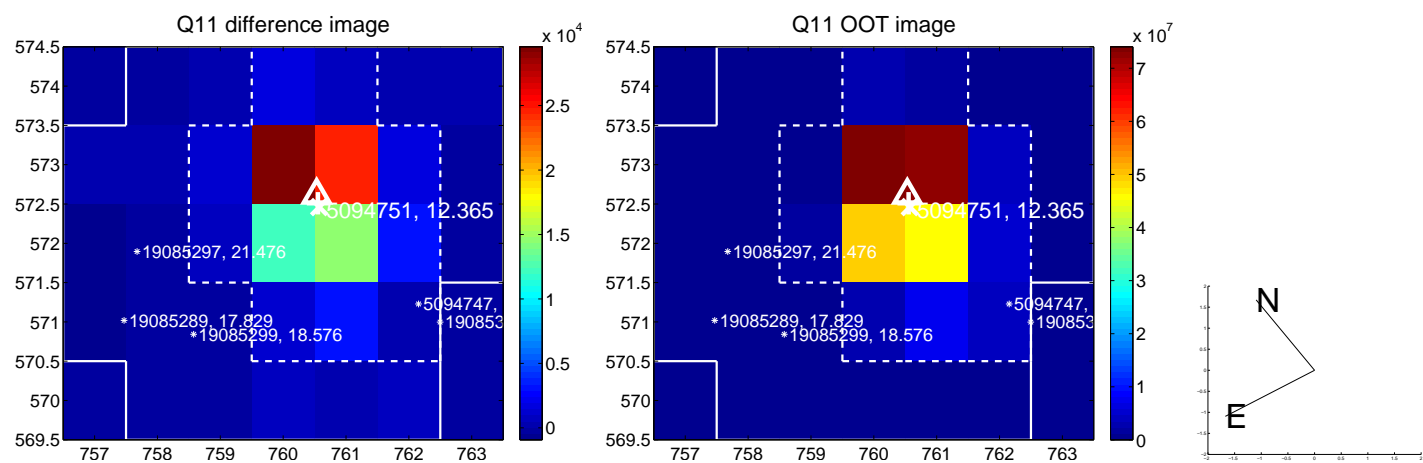
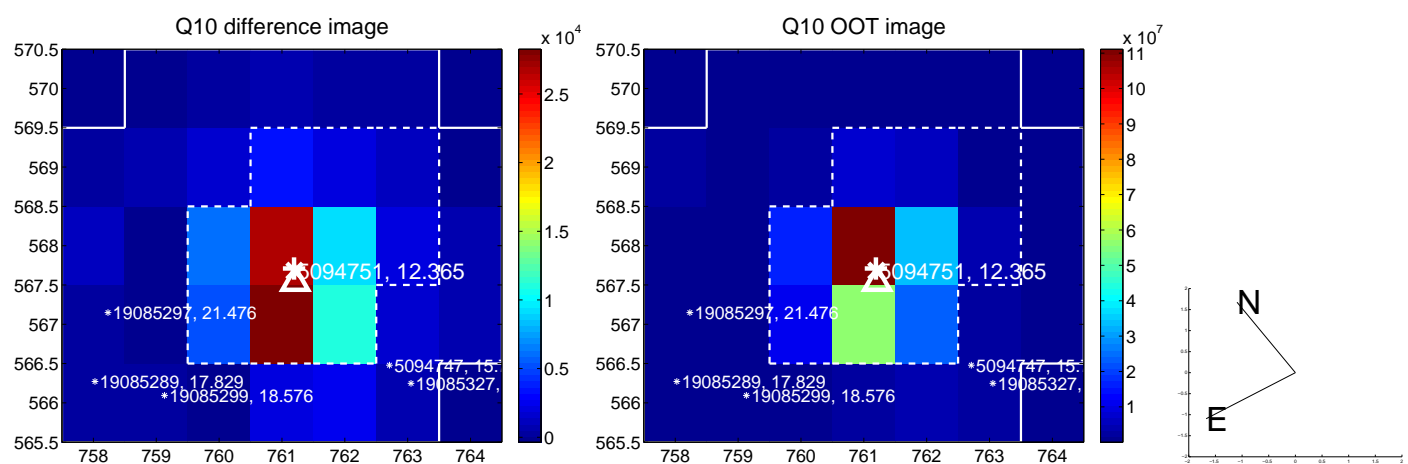
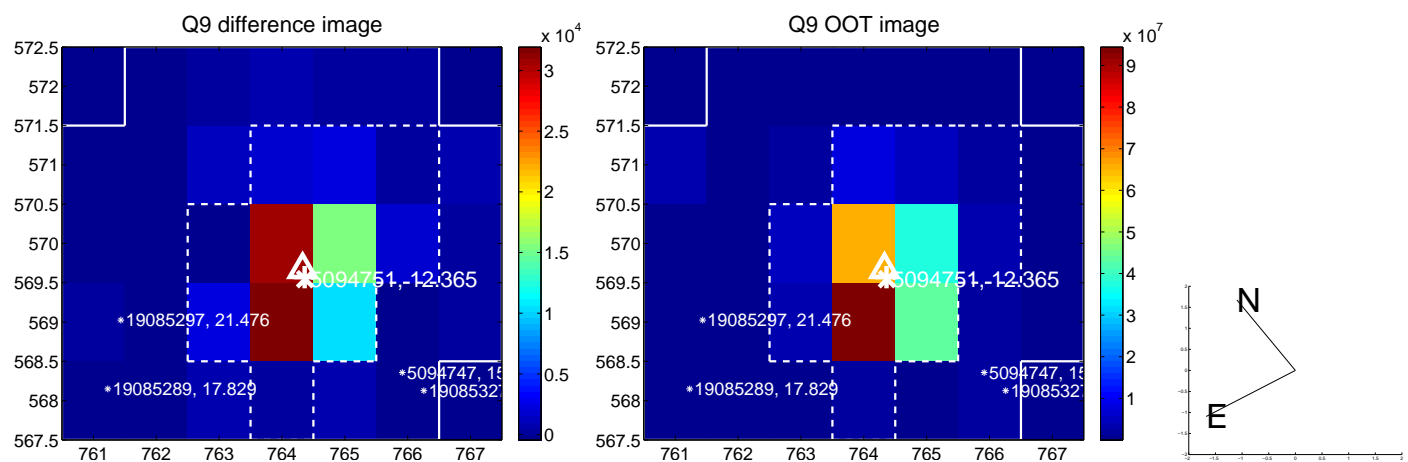
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



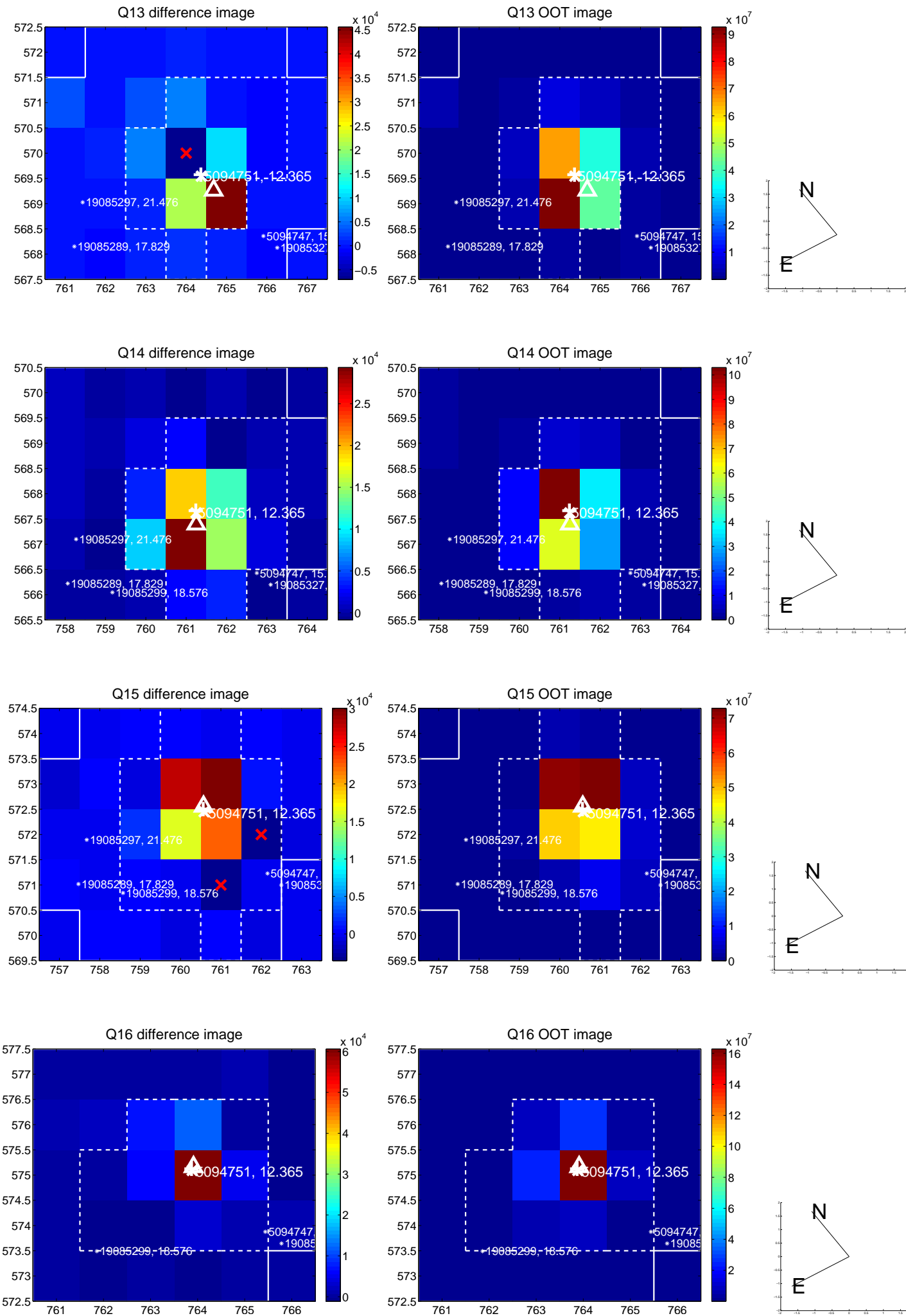
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



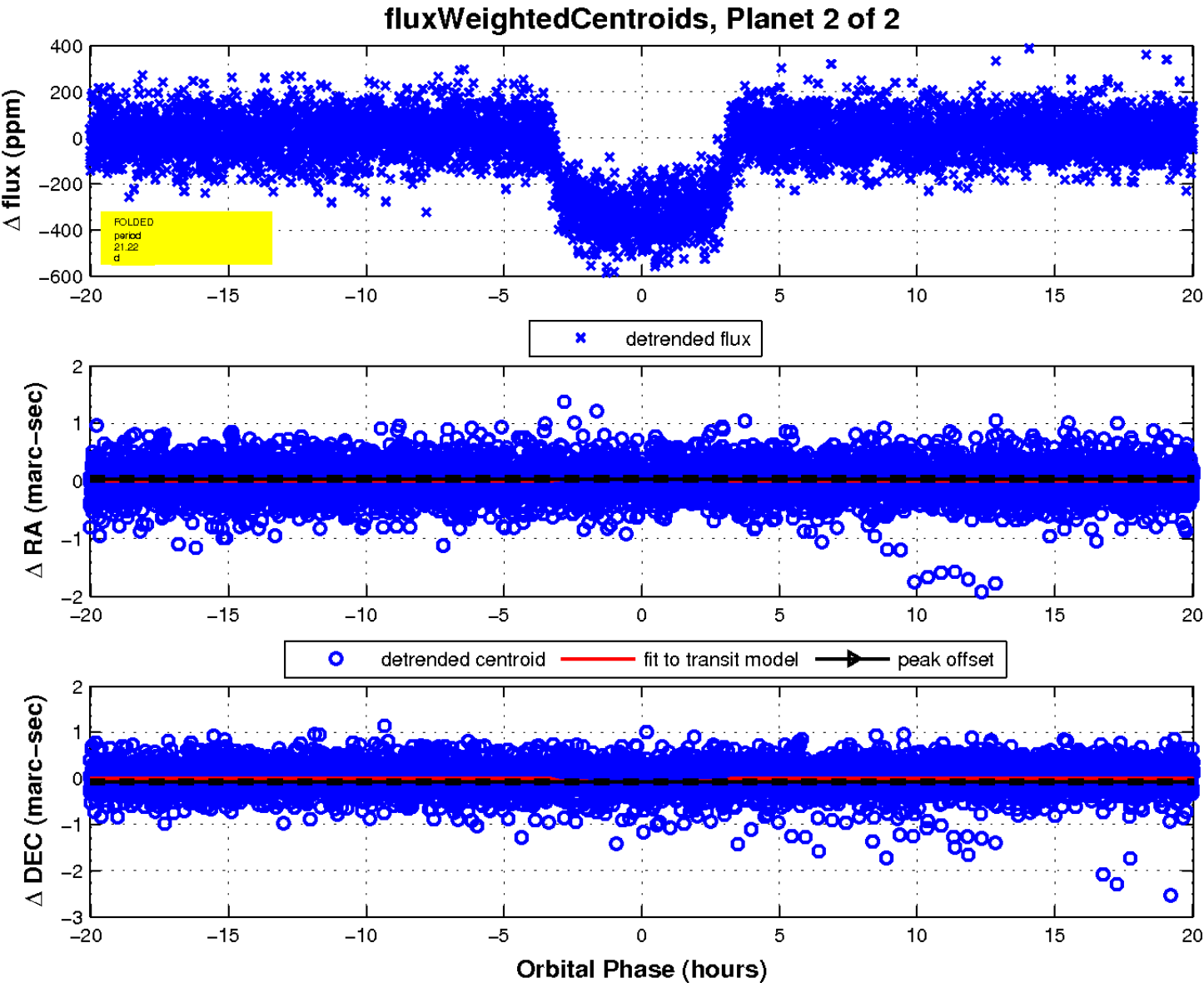
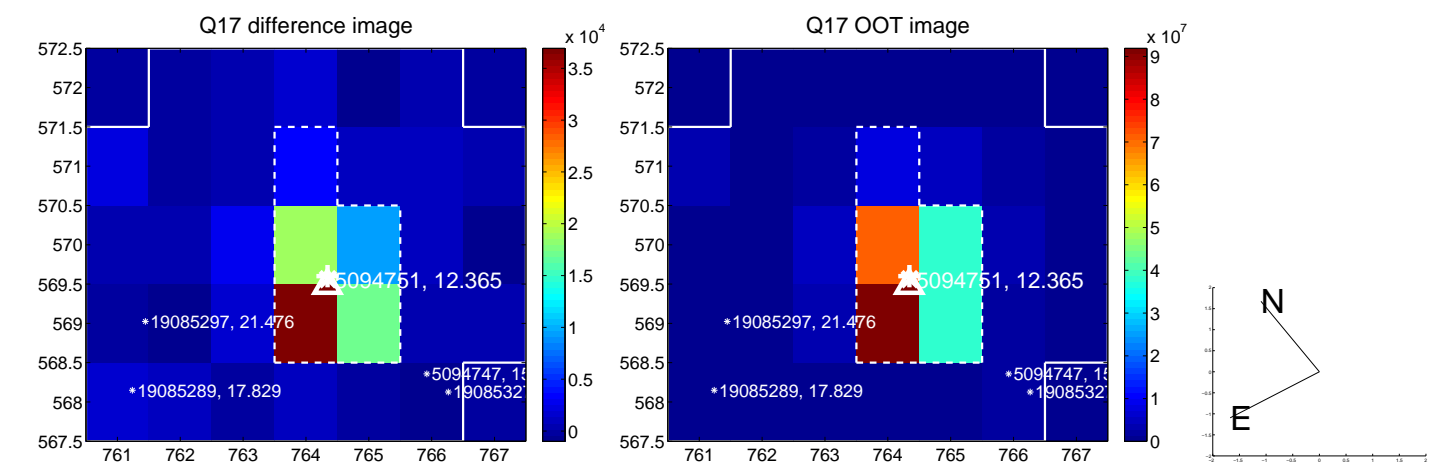
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

