

KIC 005709664

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})
005709664-01	OBS	No	1.395896	132.006259	48.3	2.971	13.7	14.5	2.08	7437	1.70	14933.66
005709664-02	OBS	No	0.561236	131.988496	31.5	2.063	16.5	12.3	2.08	7437	1.35	50324.18
005709664-03	OBS	No	539.374336	139.960347	702.5	13.325	10.0	6.1	2.08	7437	6.27	5.31
005709664-04	OBS	No	1.395884	131.634519	41.2	3.259	8.1	8.2	2.08	7437	1.54	14933.83

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005709664-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—CENT_SATURATED
005709664-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
005709664-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
005709664-04	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—SAME_NTL_PERIOD—CENT_SATURATED

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

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

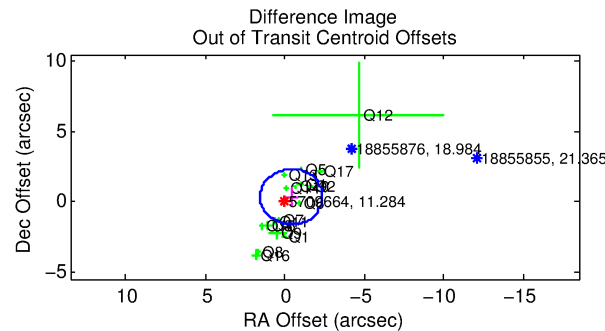
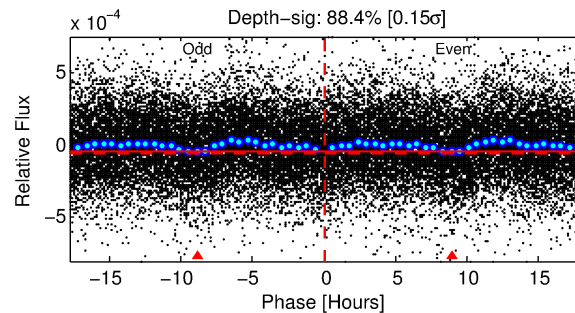
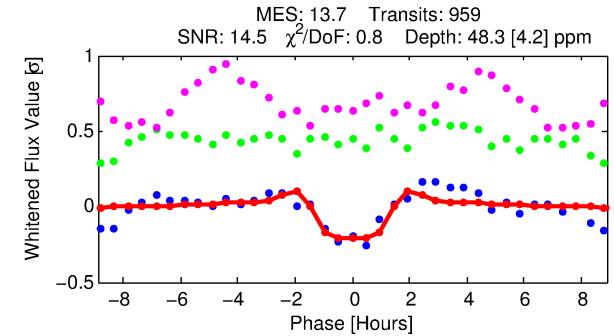
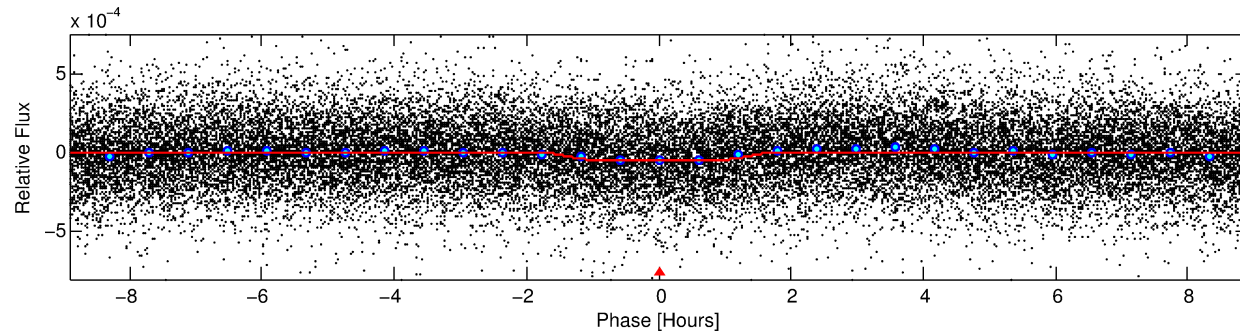
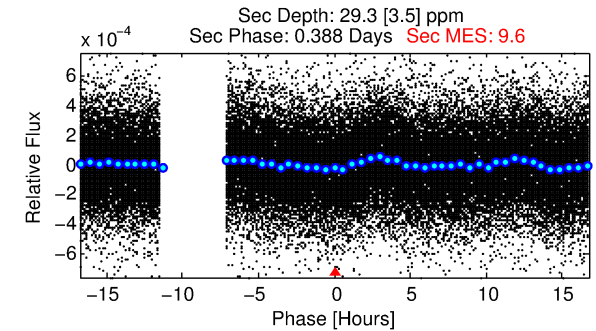
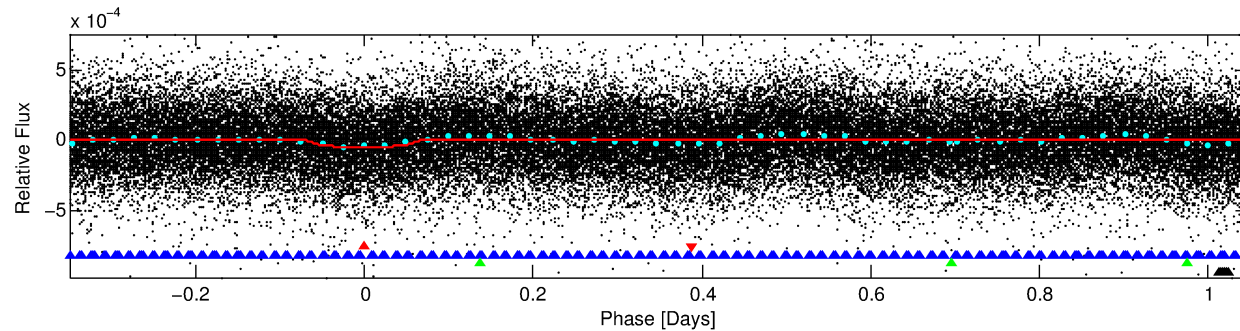
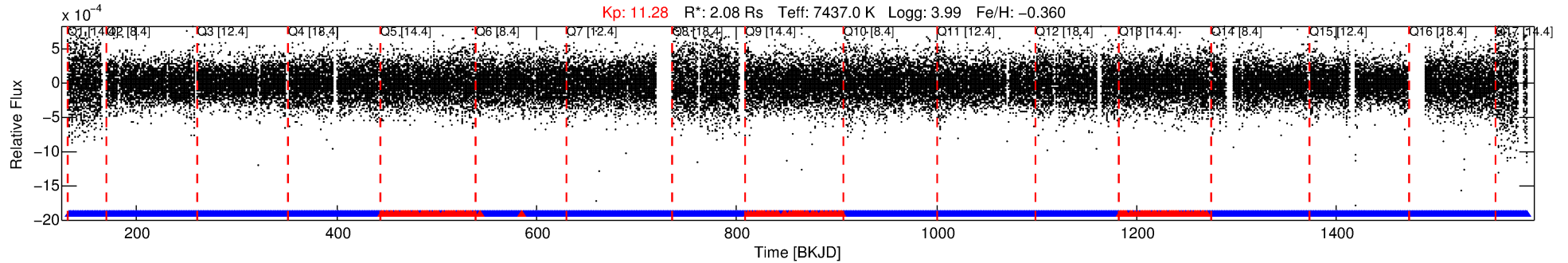
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 005709664-01

No Significant Match Found

DV One-Page Summary

KIC: 5709664 Candidate: 1 of 4 Period: 1.396 d



DV Fit Results:

Period = 1.39590 [0.00001] d
Epoch = 132.0063 [0.0021] BKJD
Rp/R* = 0.0075 [0.0018]
a/R* = 1.77 [1.85]
b = 0.92 [0.27]
Seff = 14933.66 [7602.37]
Teq = 2819 [359] K
Rp = 1.70 [0.73] Re
a = 0.0281 [0.0089] AU
Ag = 4.43 [3.08] [1.11σ]
Teffp = 6322 [835] K [3.85σ]

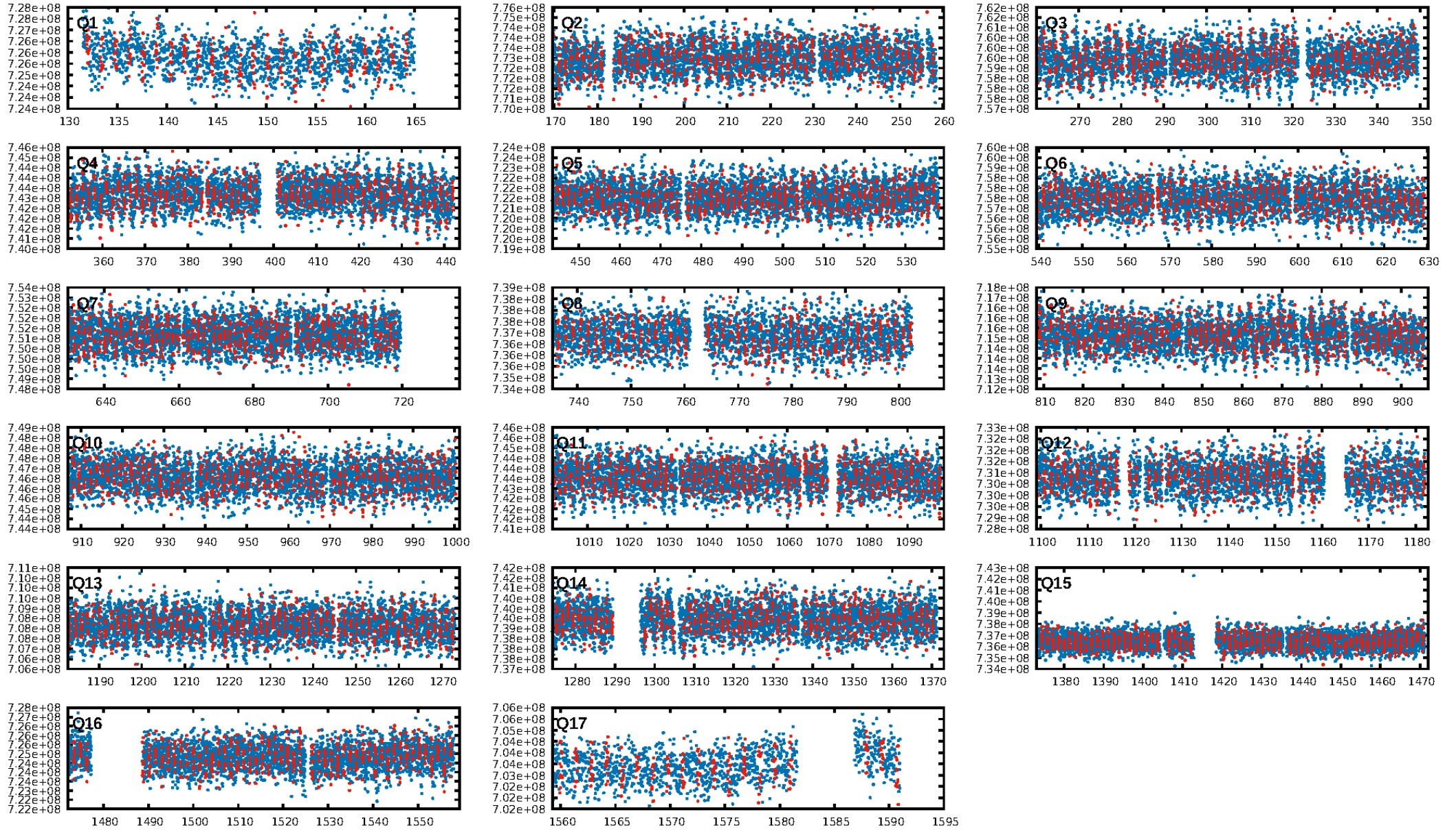
DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]
LongPeriod-sig: 100.0% [945.73σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 5.43e-41
RollingBand-fgt: 0.84 [771/916]
GhostDiagnostic-chr: 1.826
Centroid-sig: N/A
Centroid-so: 0.293 arcsec [1.40σ]
OotOffset-rm: 0.536 arcsec [0.82σ]
OotOffset-st: 4/4/4/5 [17]
KicOffset-rm: 0.188 arcsec [0.27σ]
KicOffset-st: 4/4/4/5 [17]
DiffImageQuality-fgm: 0.41 [7/17]
DiffImageOverlap-fno: 0.00 [0/17]

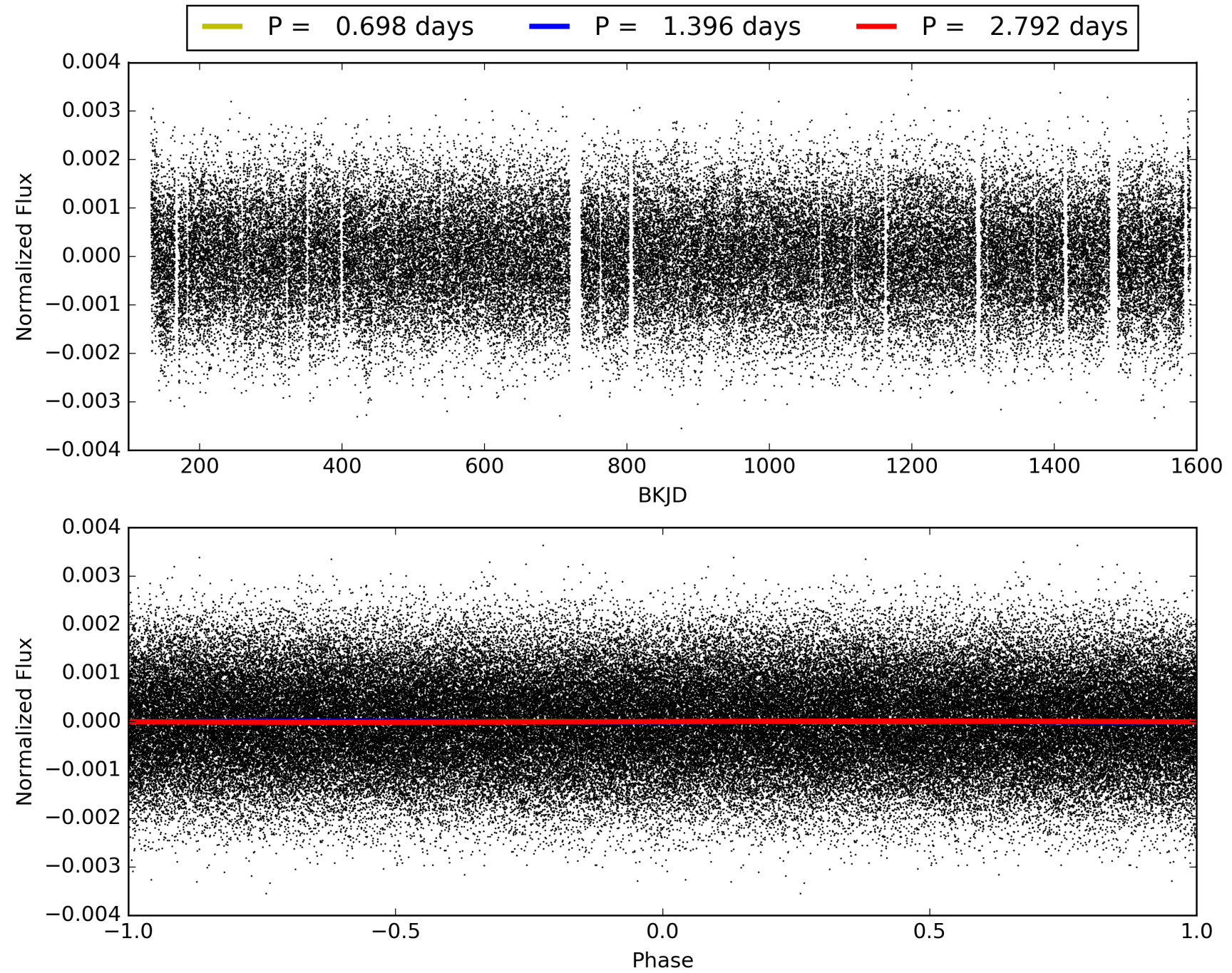
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 15:13:58 Z

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

TCE 005709664-01, PDC Light Curves

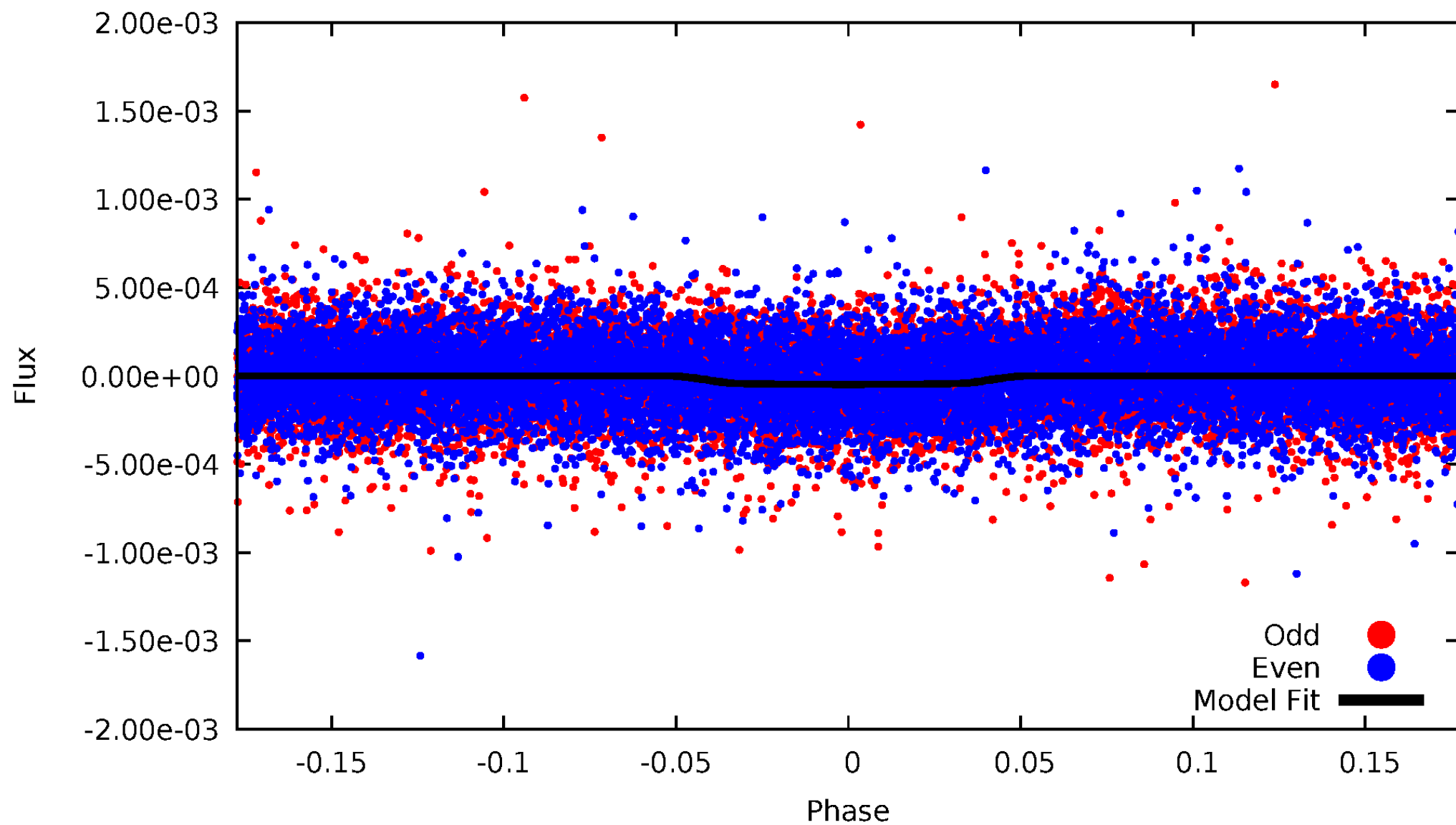


TCE 005709664-01



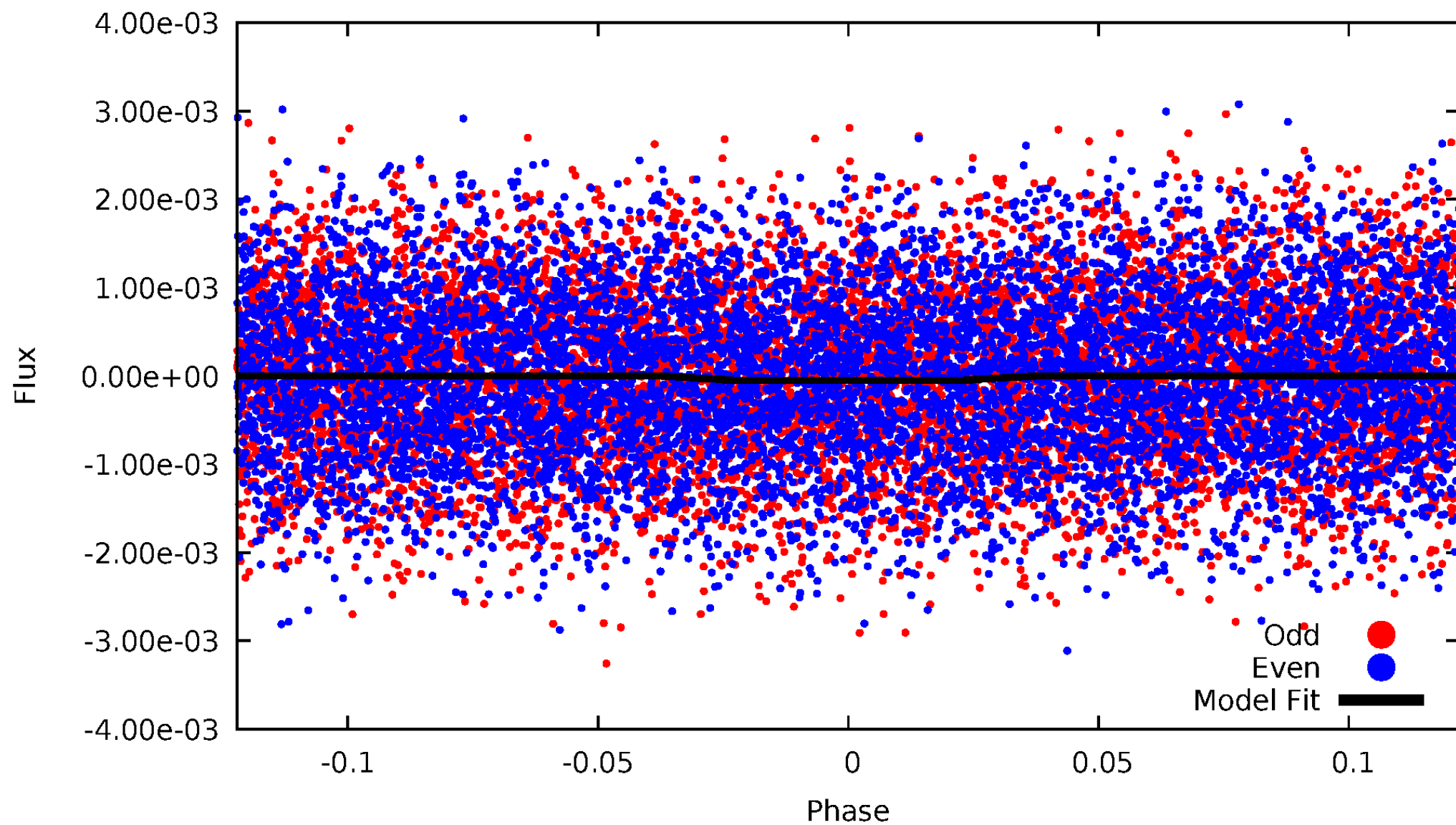
DV Odd/Even

TCE 005709664-01

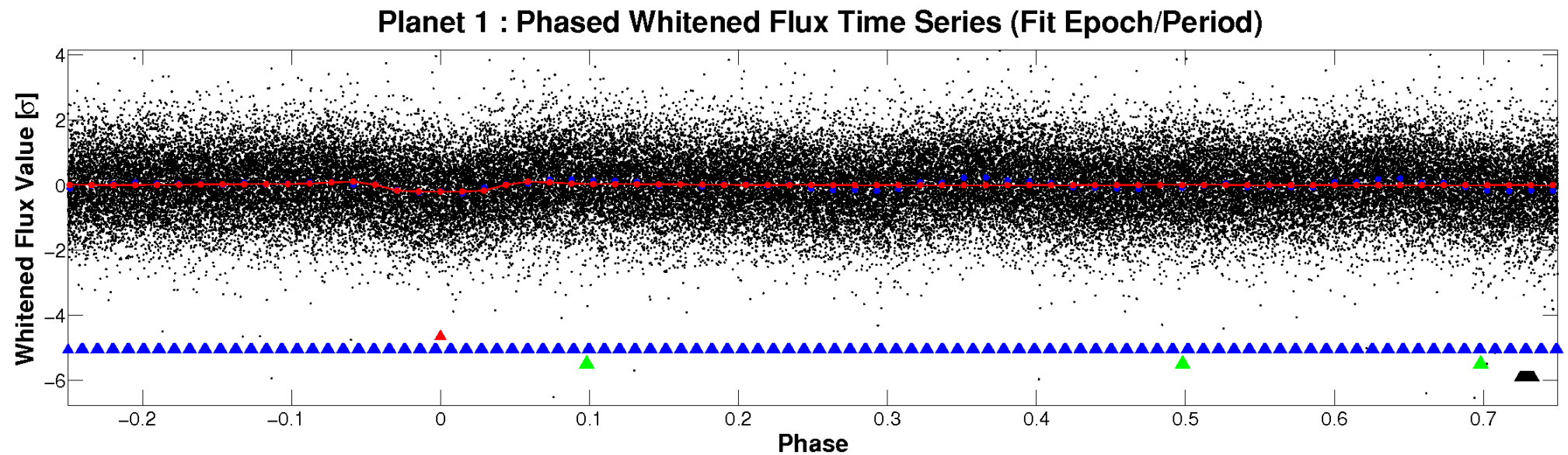
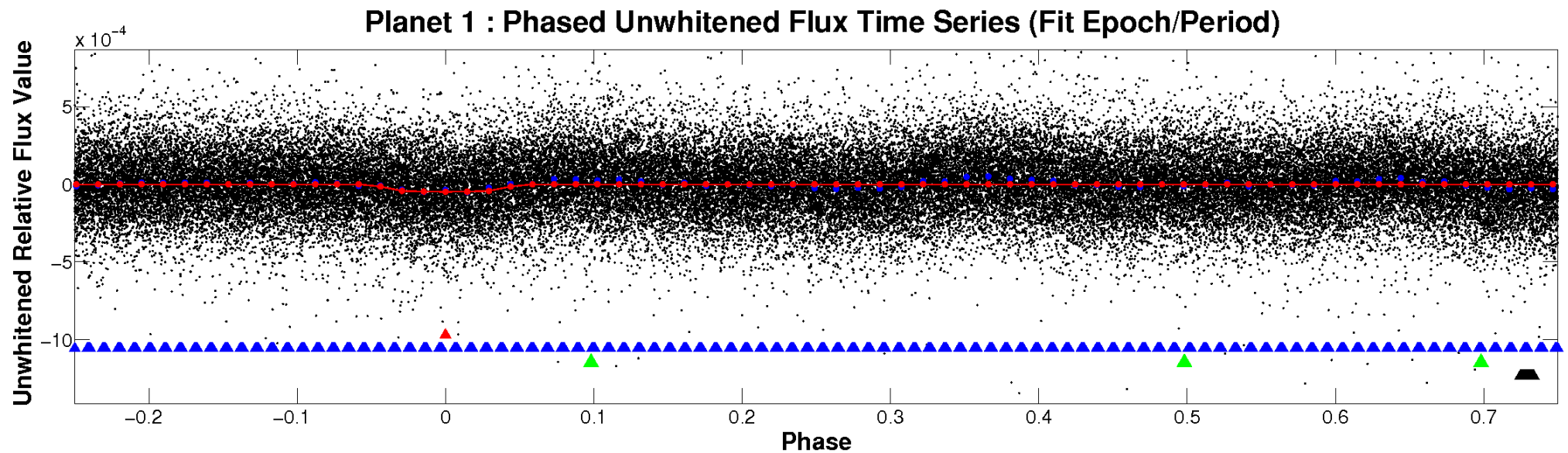


ALT Odd/Even

TCE 005709664-01

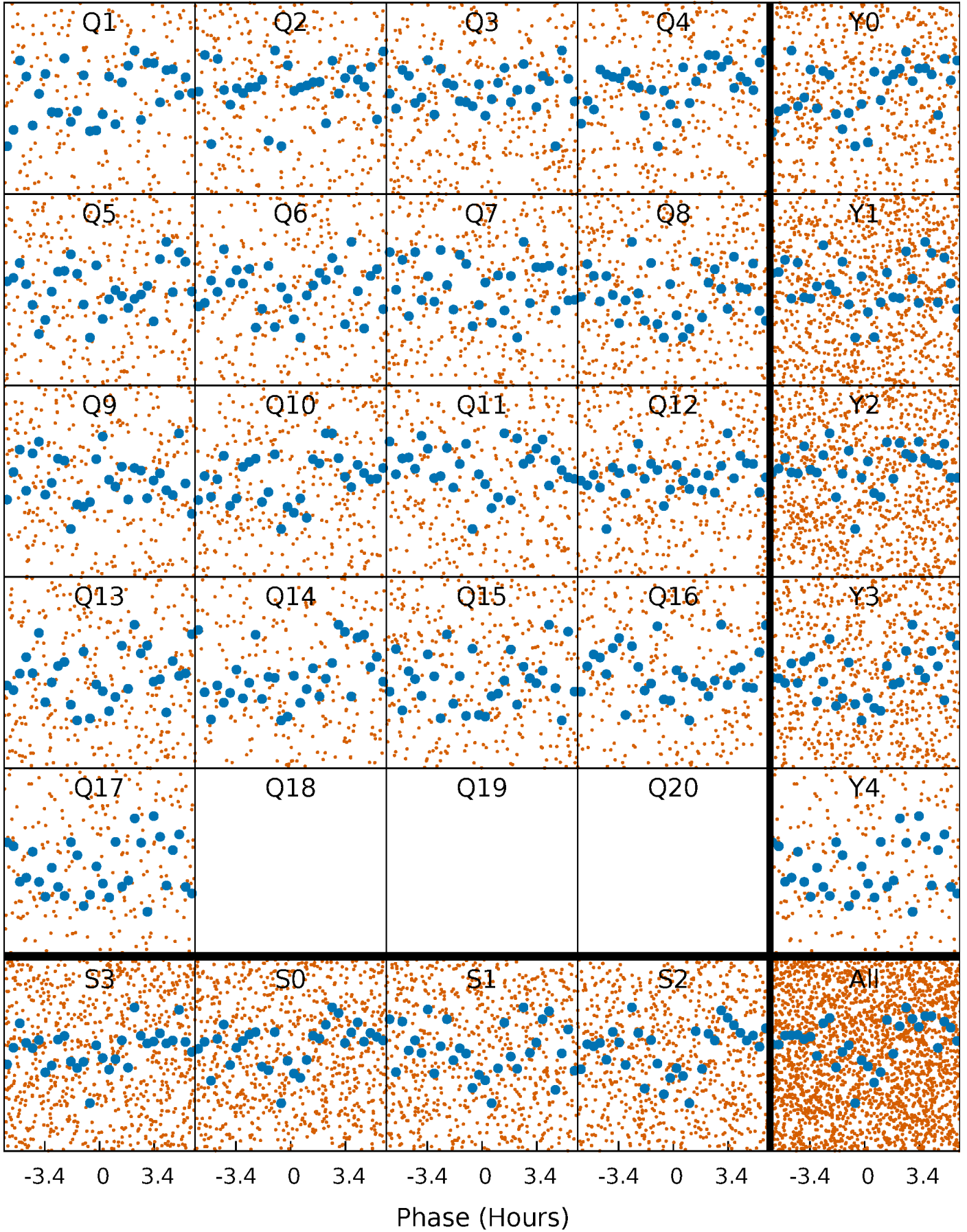


Non-Whitened Vs. Whitened Light Curve



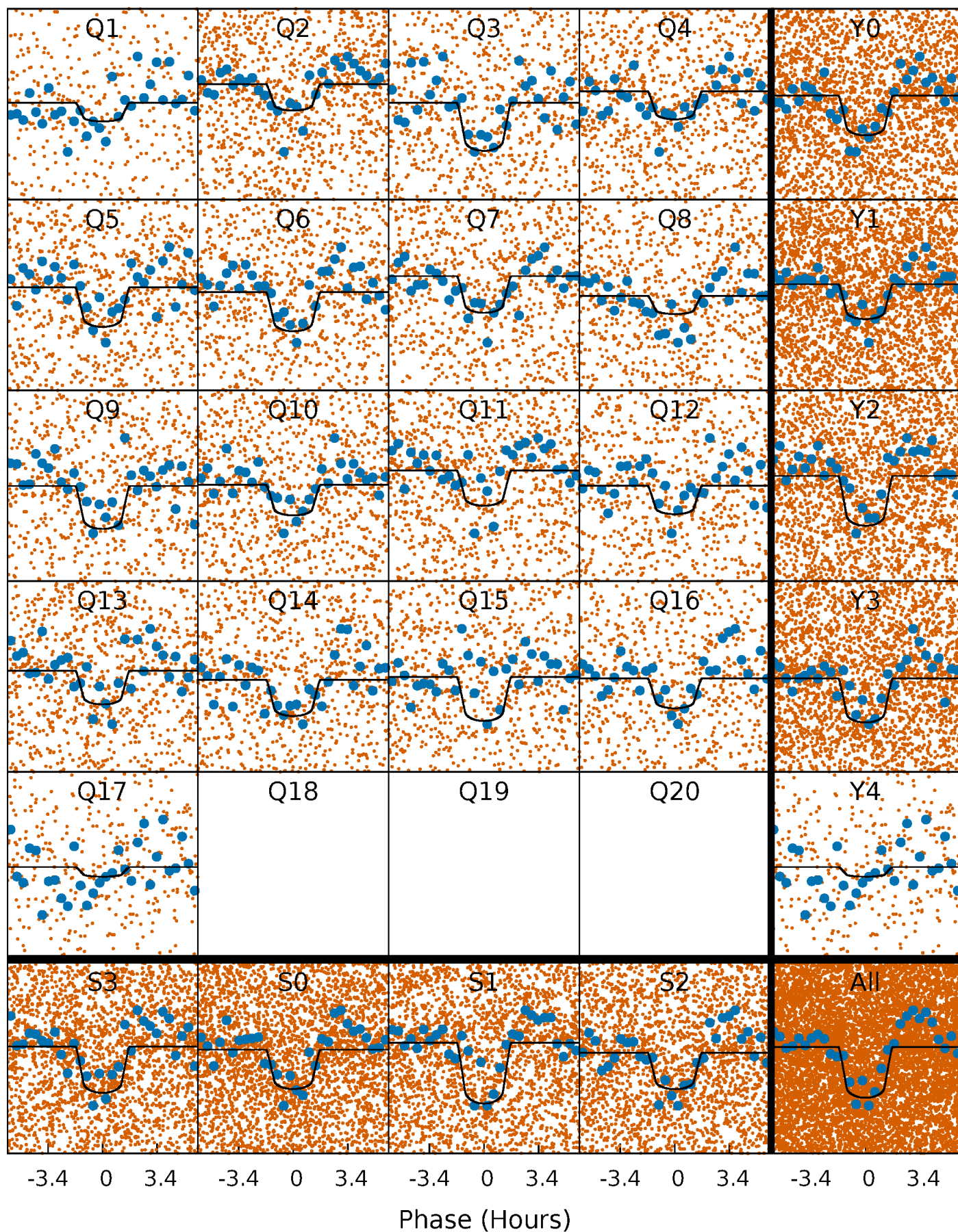
PDC Quarter-Phased Transit Curves

TCE 005709664-01 P= 1.395896 Days $T_0=132.006259$ (BKJD)



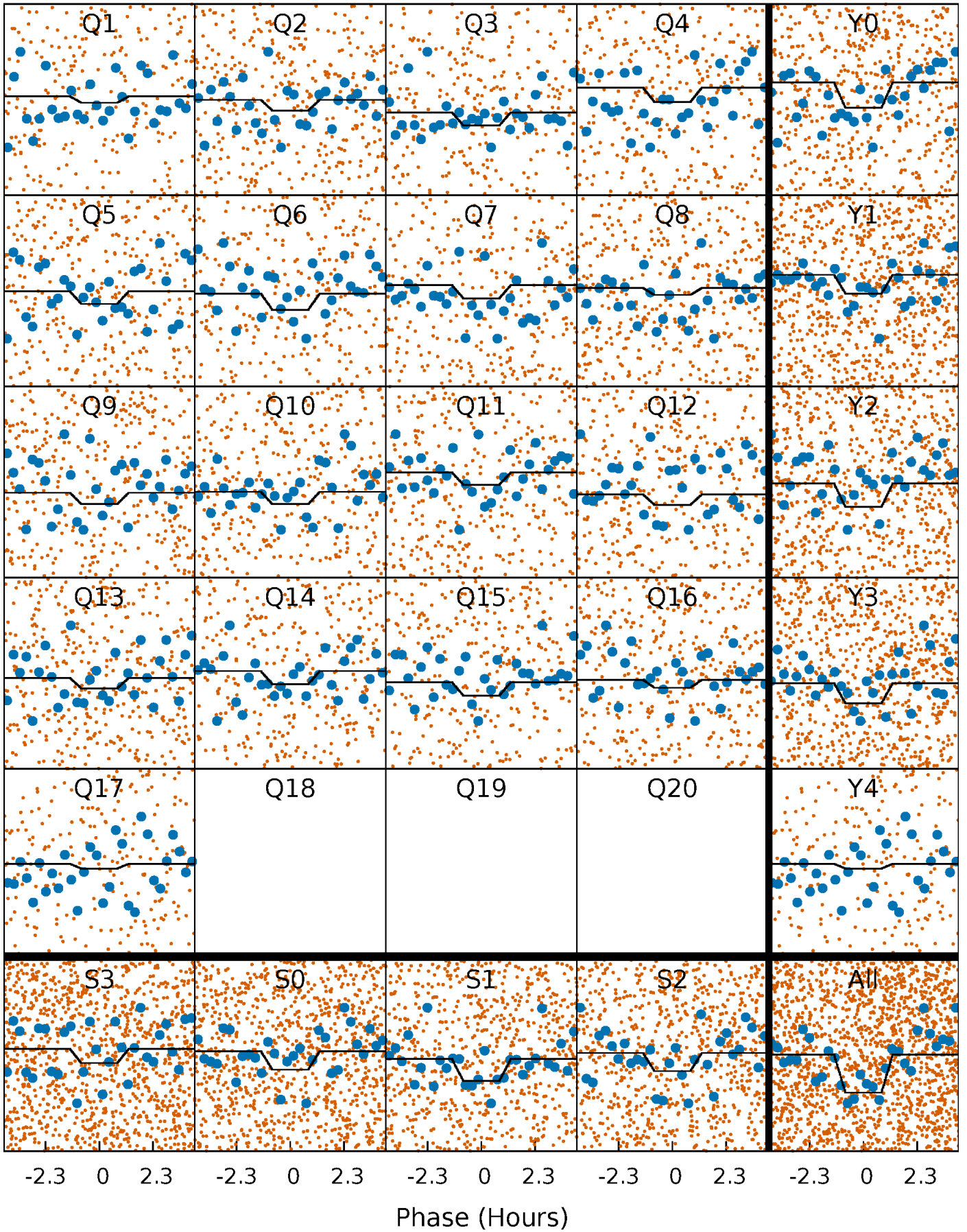
DV Quarter-Phased Transit Curves

TCE 005709664-01 P= 1.395896 Days $T_0=132.006259$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

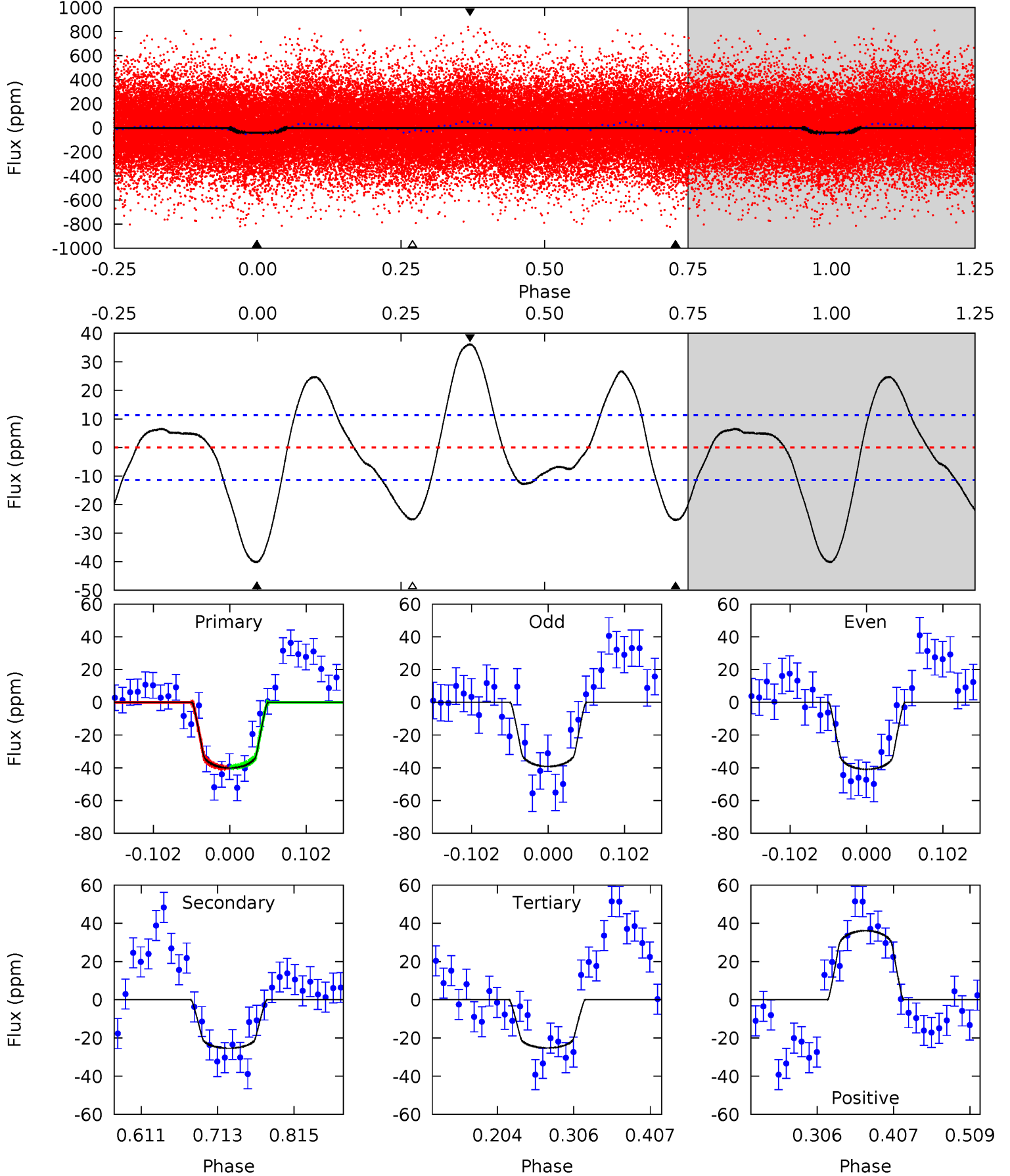
TCE 005709664-01 P= 1.395912 Days $T_0=132.001239$ (BKJD)



DV Model-Shift Uniqueness Test

005709664-01, P = 1.395896 Days, E = 130.610363 Days

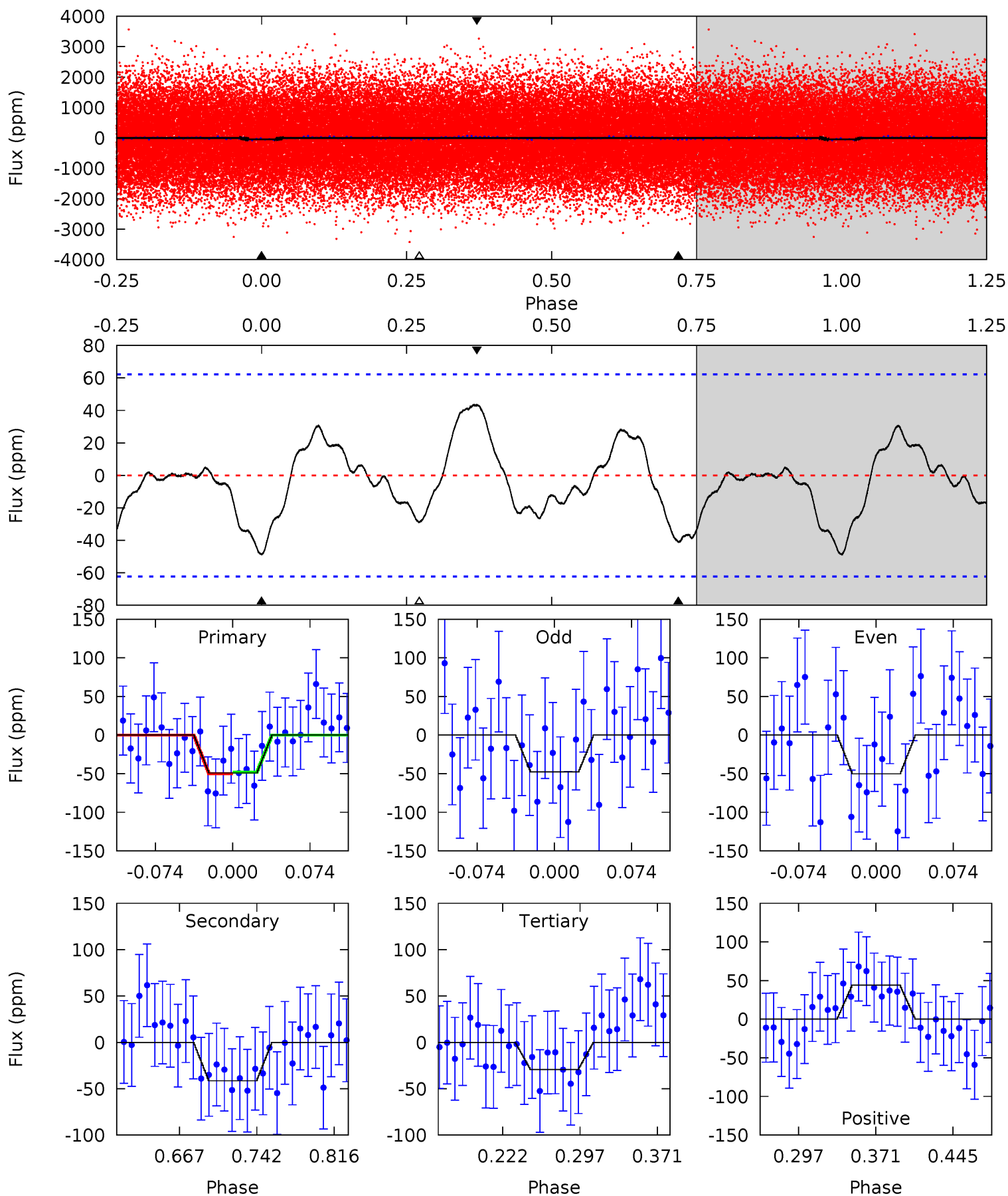
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
16.1	10.2	10.1	14.5	4.56	1.64	6.32	5.99	1.61	0.06	-4.32	0.35	1.00	0.47	0.15



Alt Model-Shift Uniqueness Test

005709664-01, P = 1.395912 Days, E = 130.605327 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
3.65	3.08	2.17	3.27	4.63	1.79	1.35	1.48	0.38	0.91	-0.19	0.09	1.24	0.47	0.06



Stellar Parameters For KIC 005709664

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	7437^{+233}_{-311}	$3.986^{+0.273}_{-0.147}$	$-0.360^{+0.250}_{-0.350}$	$2.076^{+0.489}_{-0.734}$	$1.521^{+0.198}_{-0.296}$	$0.239^{+0.448}_{-0.106}$
	+3%/-4%	+7%/-4%	+69%/-97%	+24%/-35%	+13%/-19%	+187%/-44%
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 005709664-01 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-25 ± 2	$1.64^{+0.57}_{-0.49}$	3887^{+317}_{-354}	5883^{+1046}_{-727}	$4.080^{+4.408}_{-1.850}$
Alt.	-41 ± 13	$1.53^{+0.47}_{-0.43}$	3886^{+302}_{-349}	6965^{+1536}_{-1140}	$7.739^{+7.876}_{-3.798}$

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 $A_{obs} \gg 1.0$

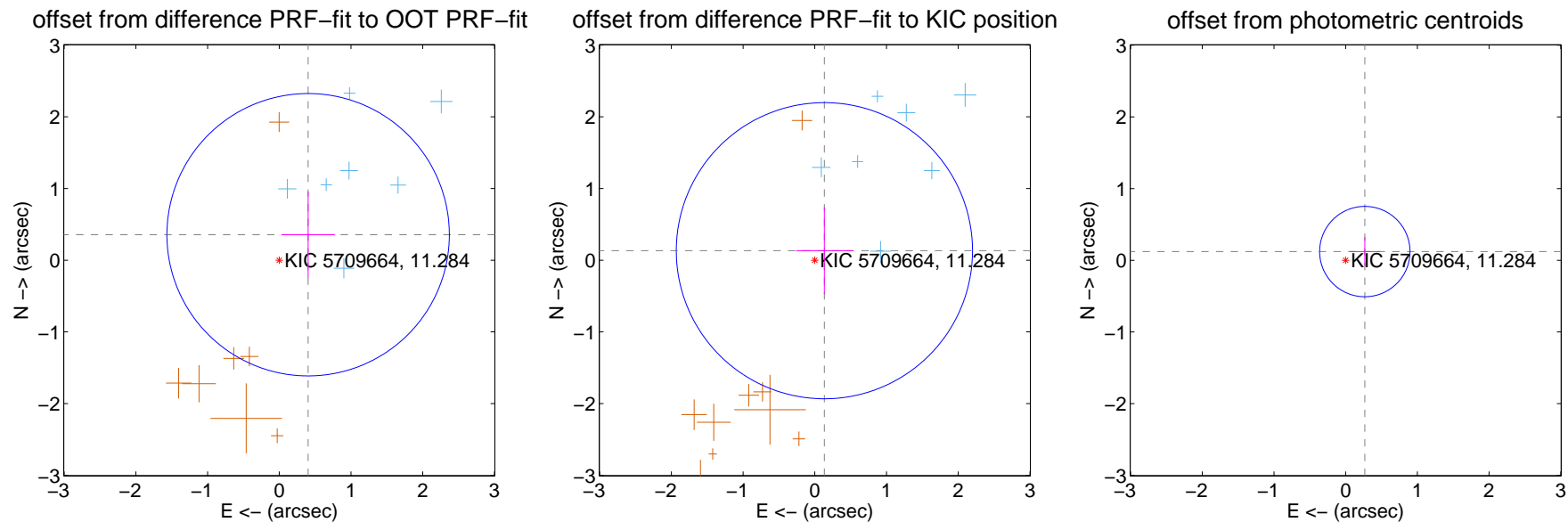
DV Centroid Data

Supplemental centroid analysis for 005709664-01. **Kepler magnitude: 11.28.** Transit SNR 14.49

There are 7 quarters with good PRF difference image offsets

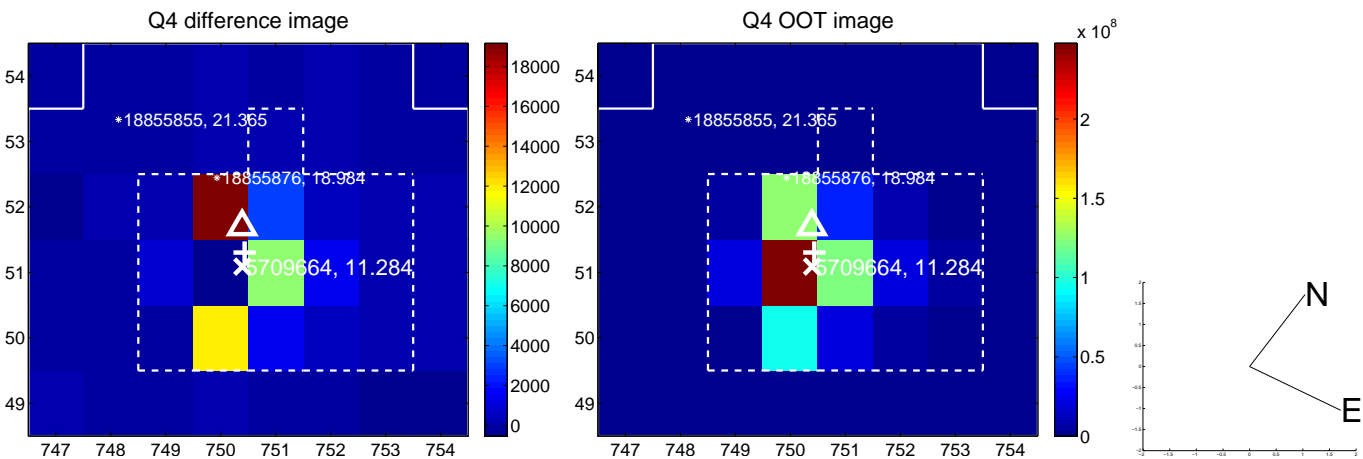
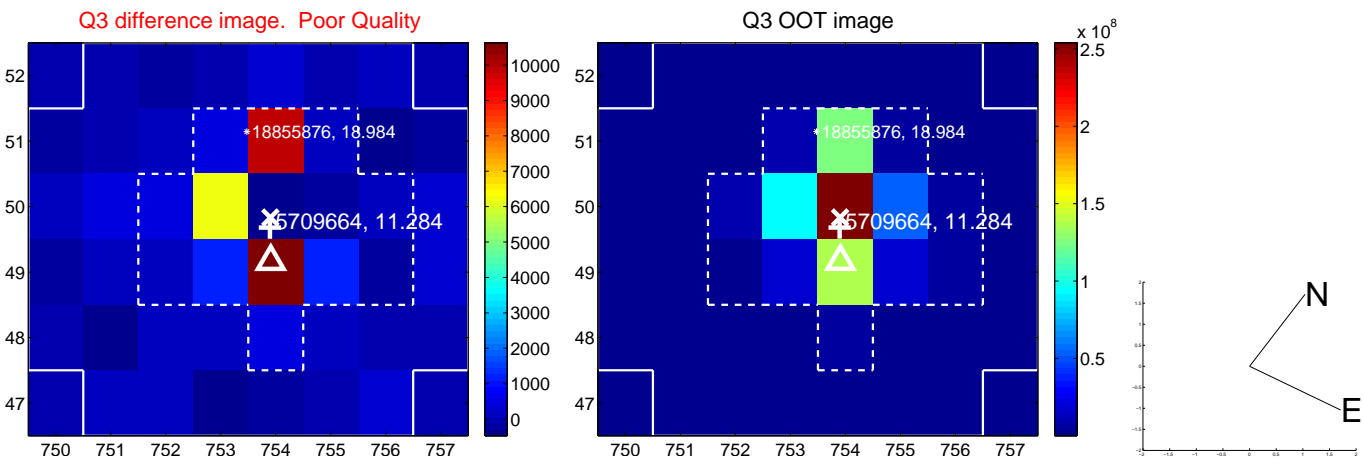
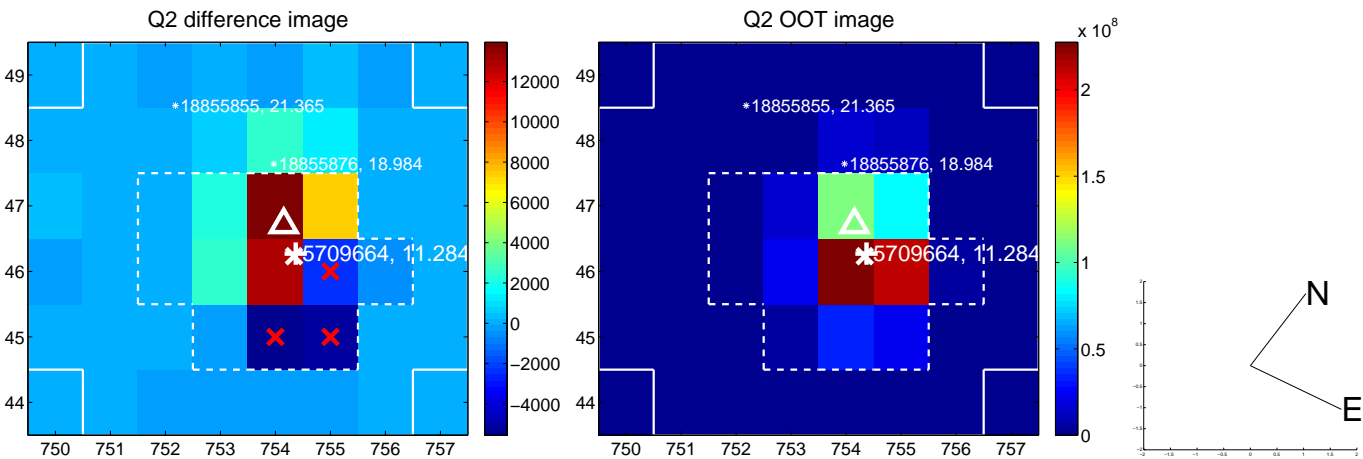
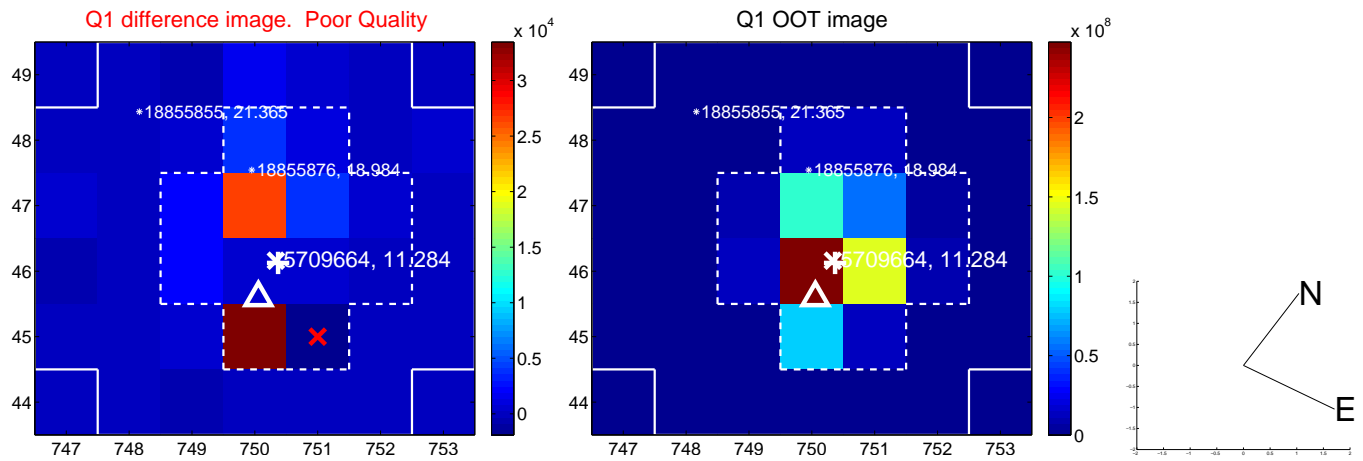
The direct PRF centroid is offset from the target star catalog position by about 0.19 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.536 ± 0.656	0.82	-0.402 ± 0.373	0.355 ± 0.600
PRF-fit source offset from KIC position	0.188 ± 0.688	0.27	-0.134 ± 0.395	0.132 ± 0.605
photometric centroid source offset	0.29 ± 0.21	1.40	-0.27 ± 0.21	0.12 ± 0.20

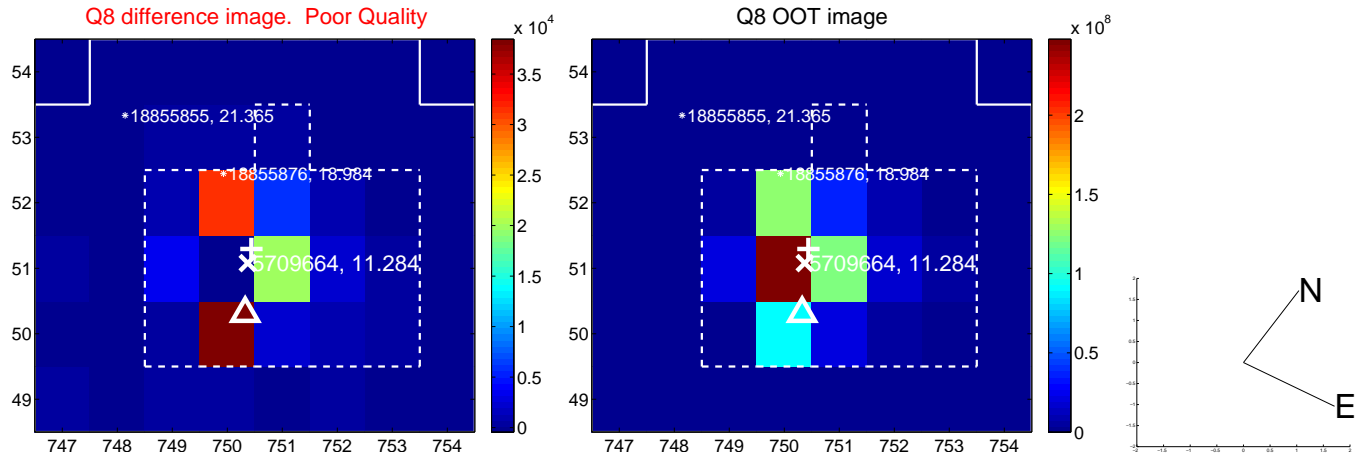
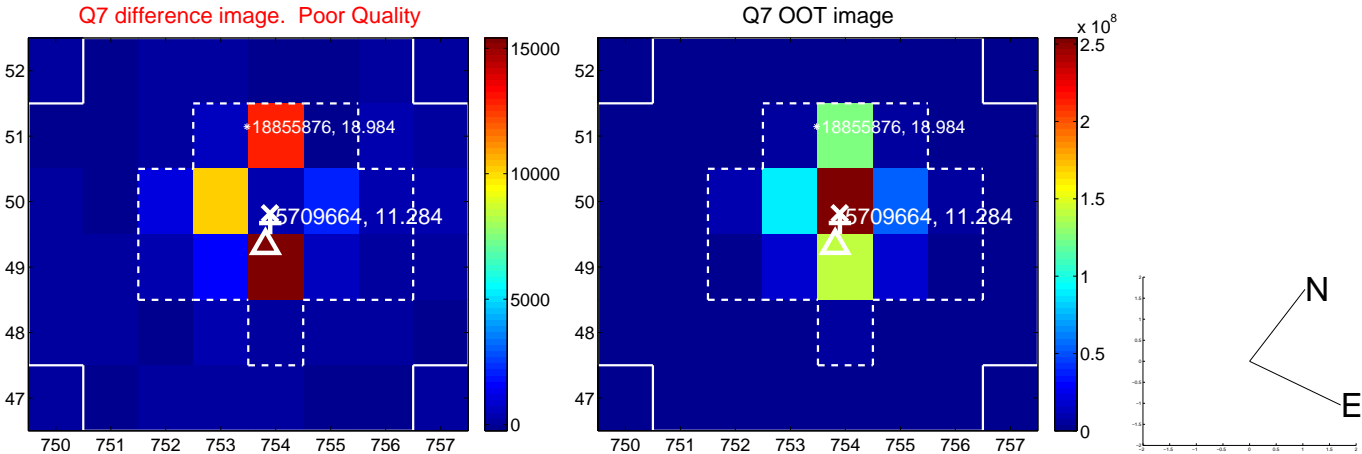
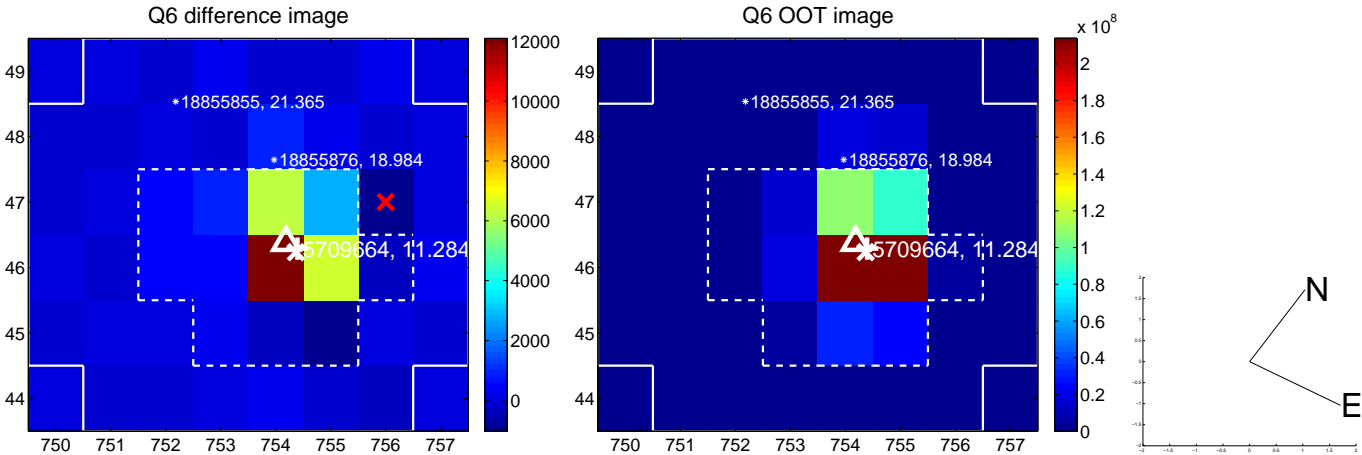
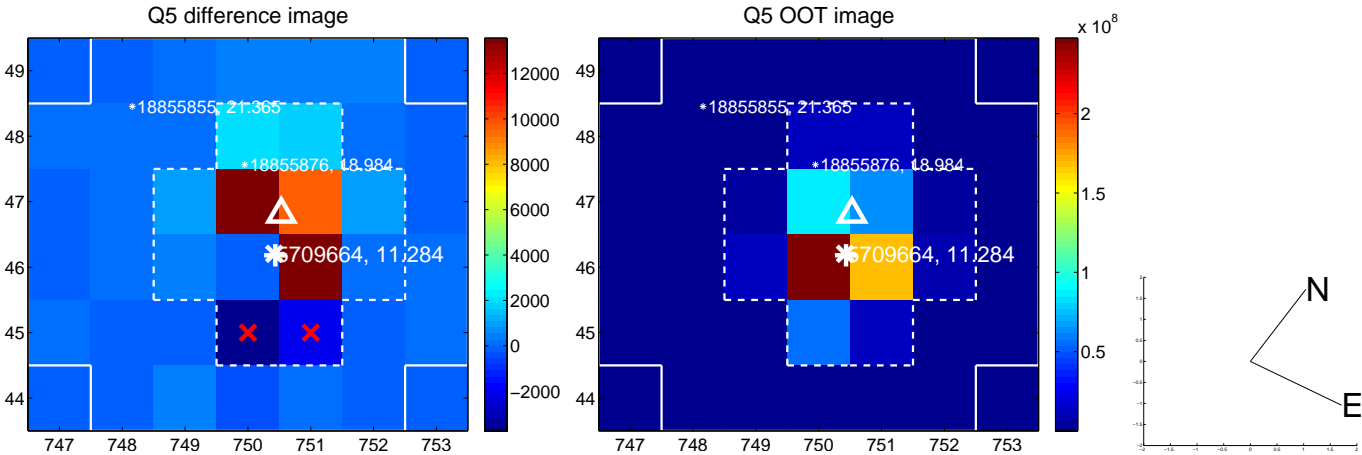


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

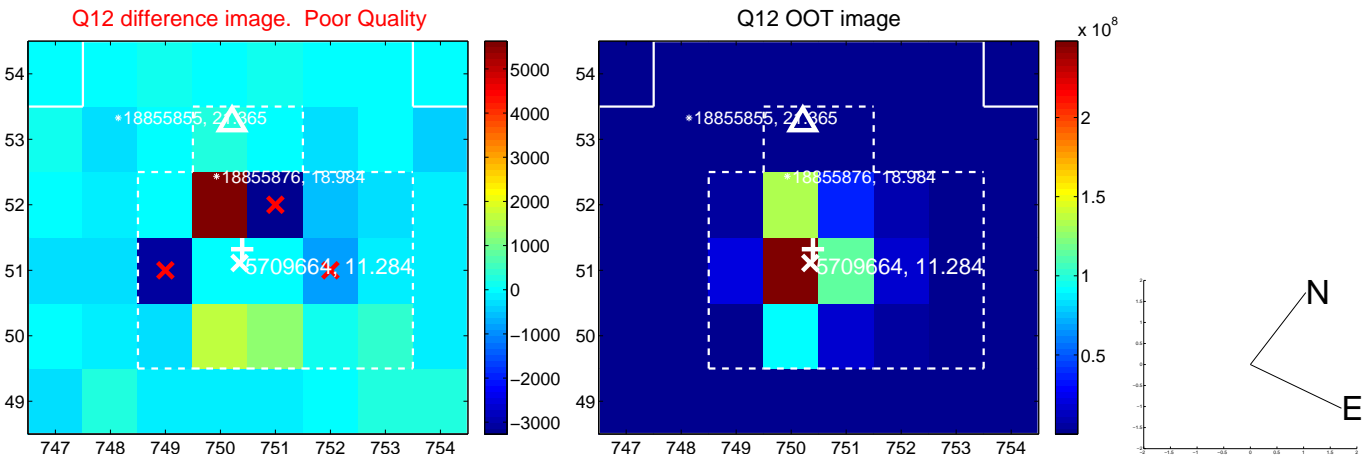
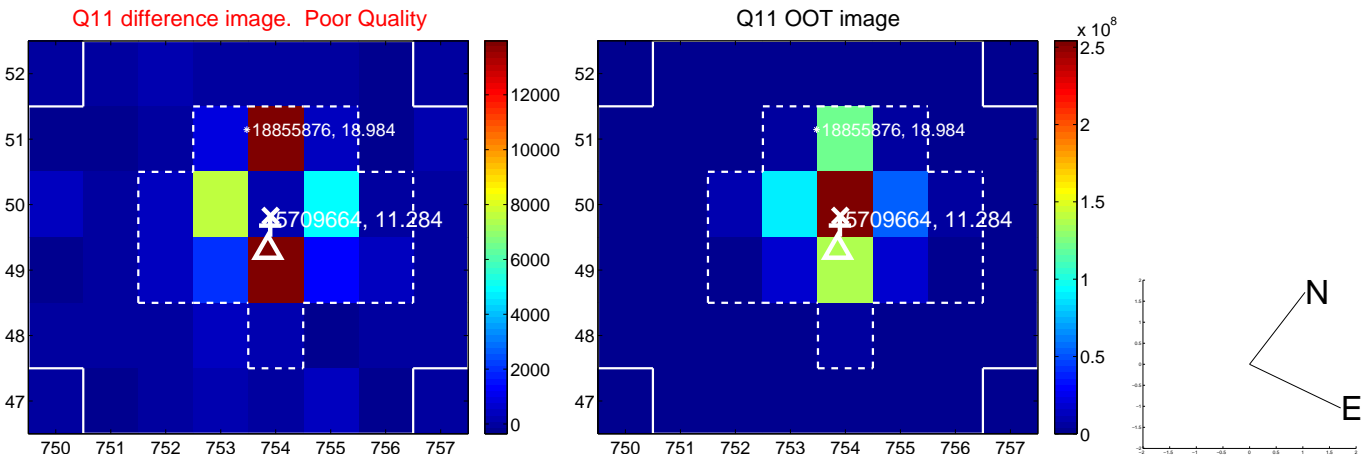
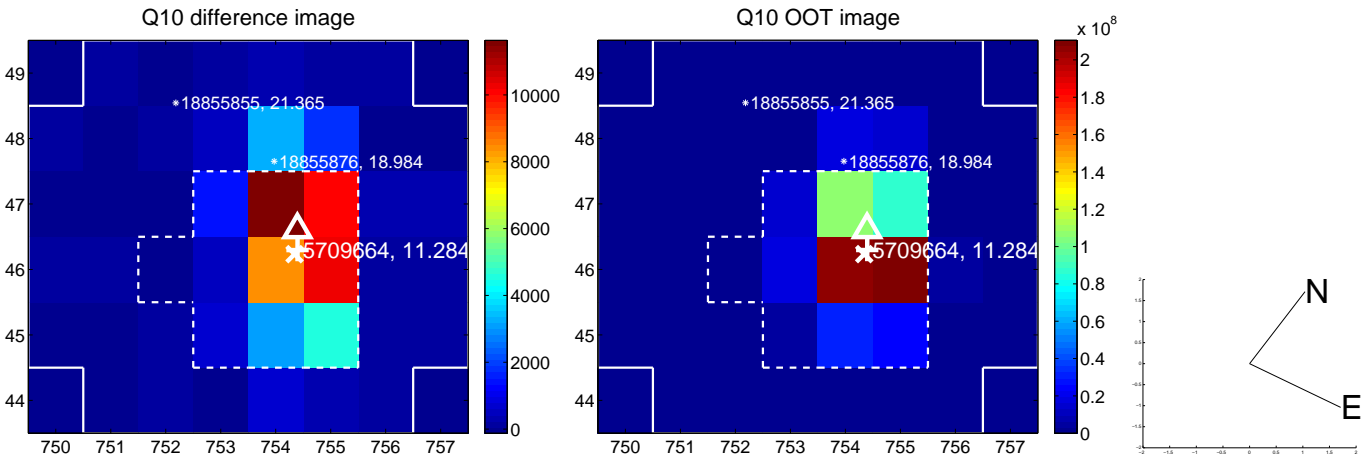
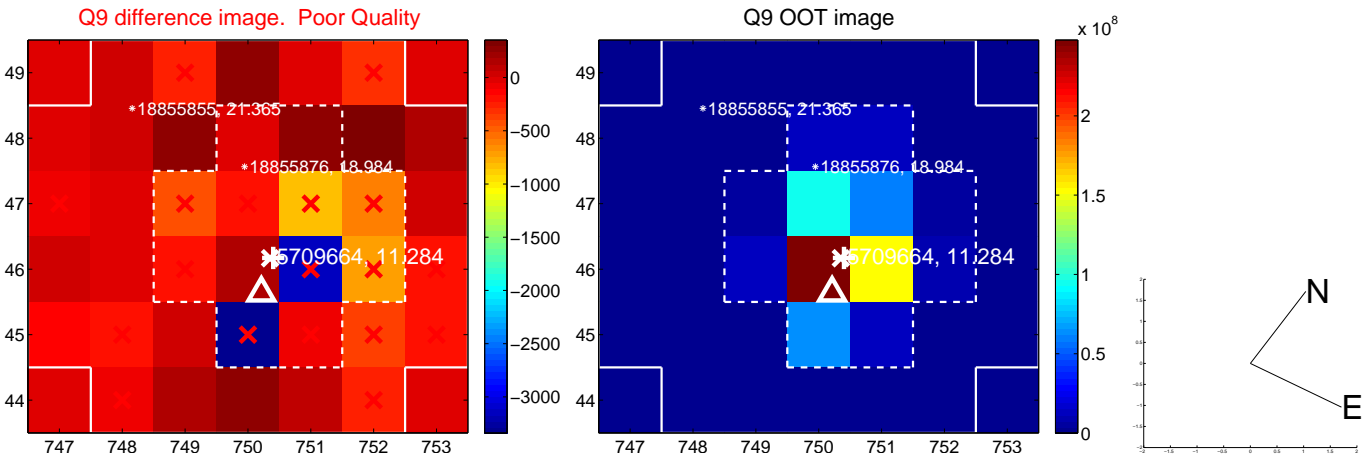
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



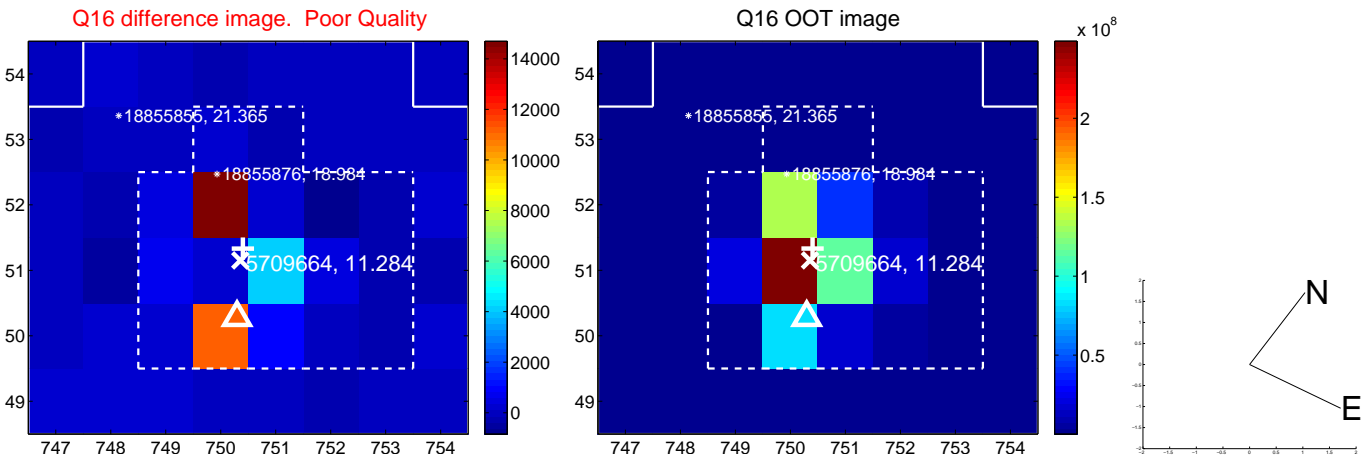
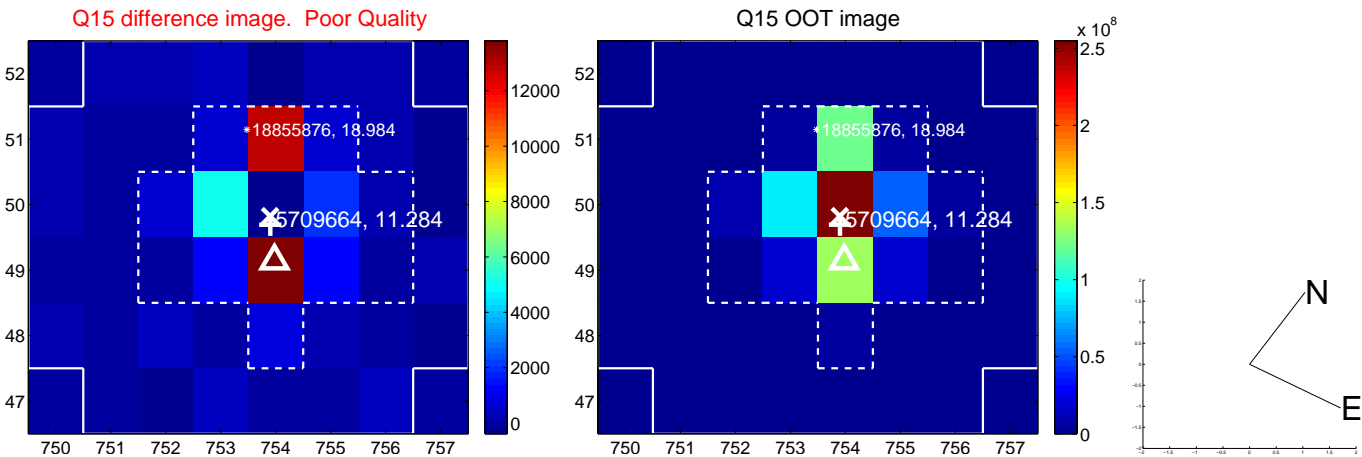
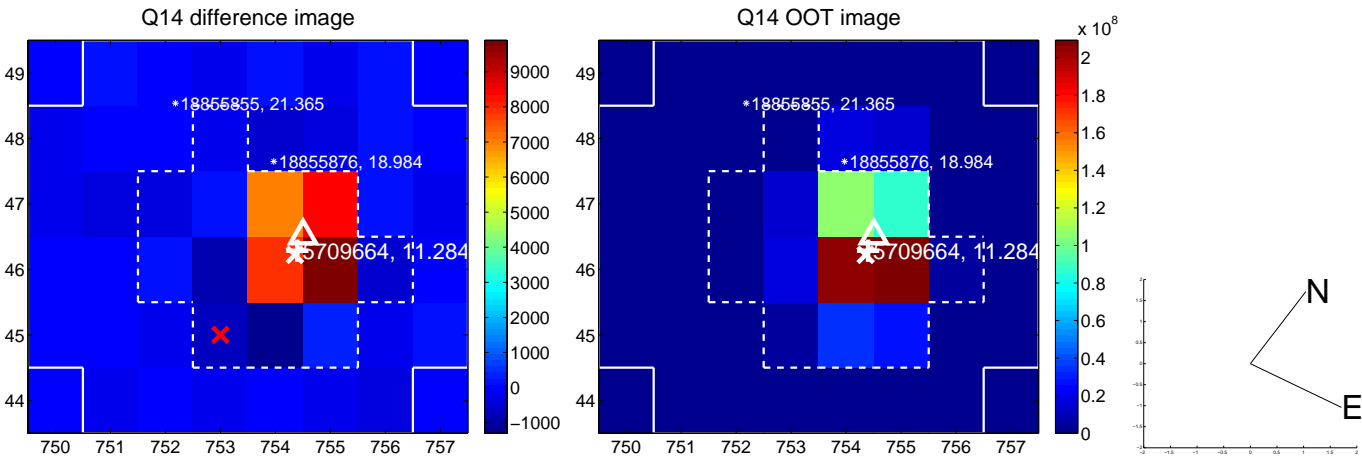
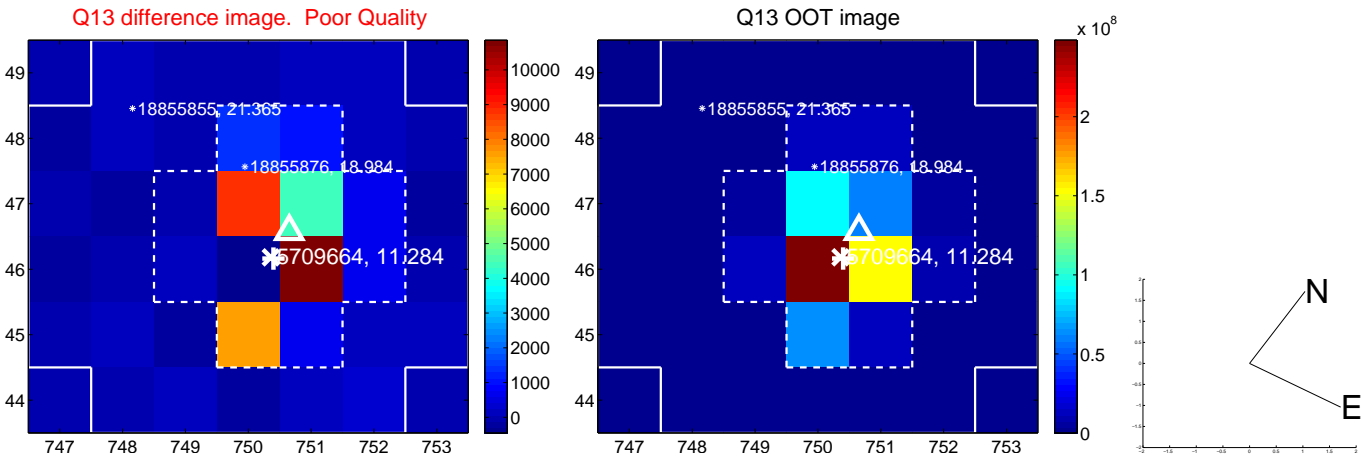
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



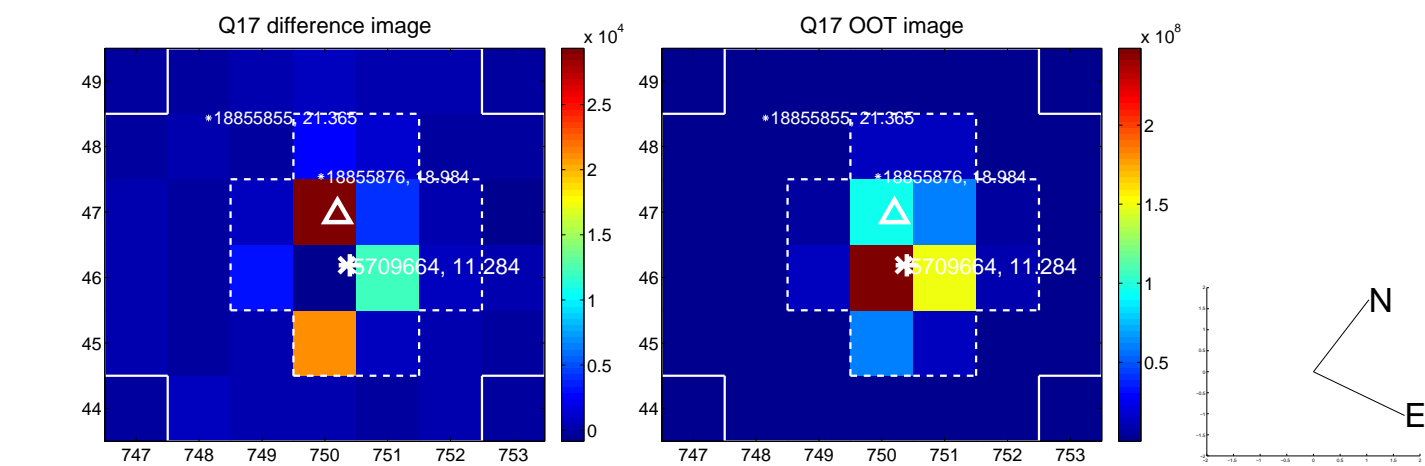
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



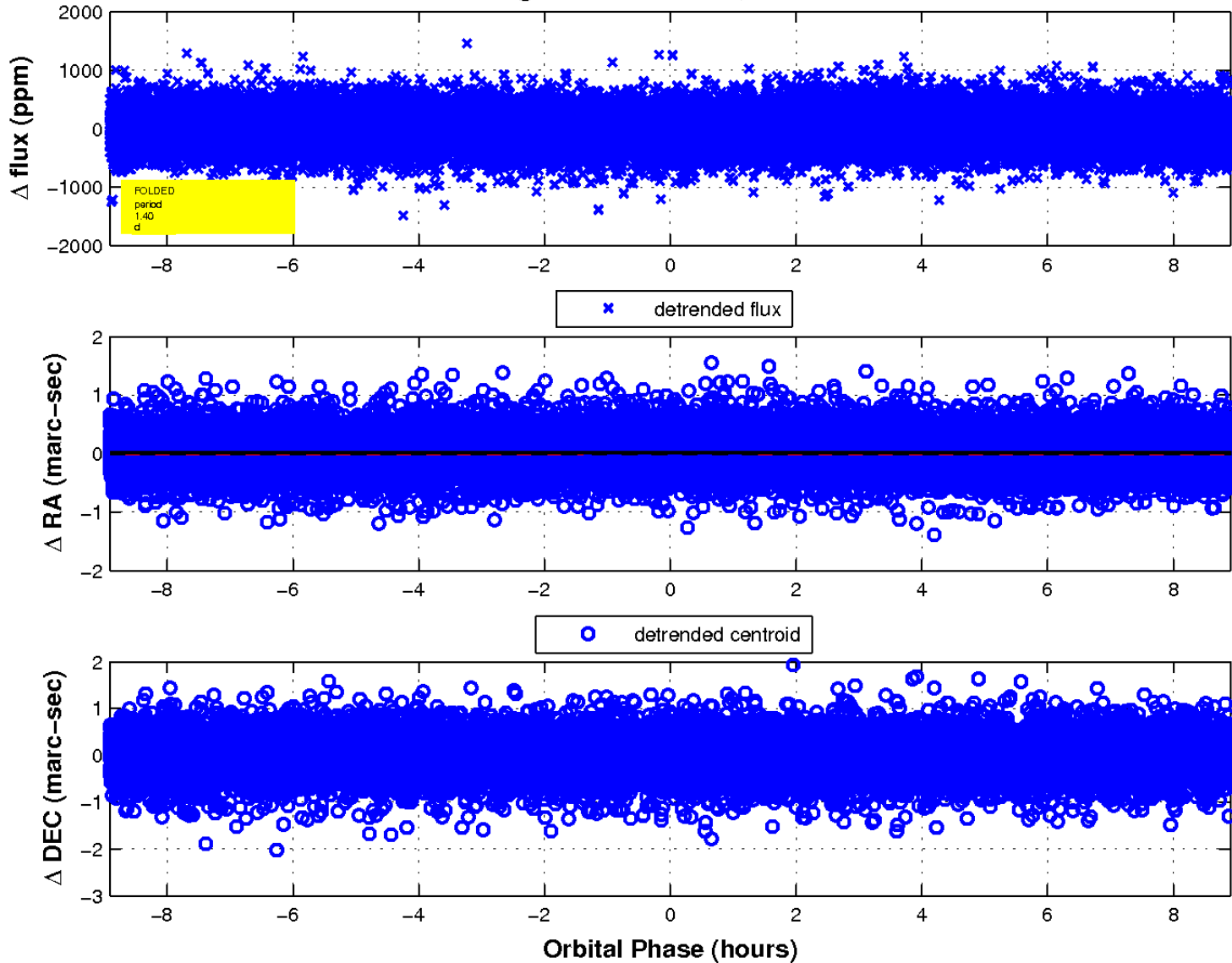
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

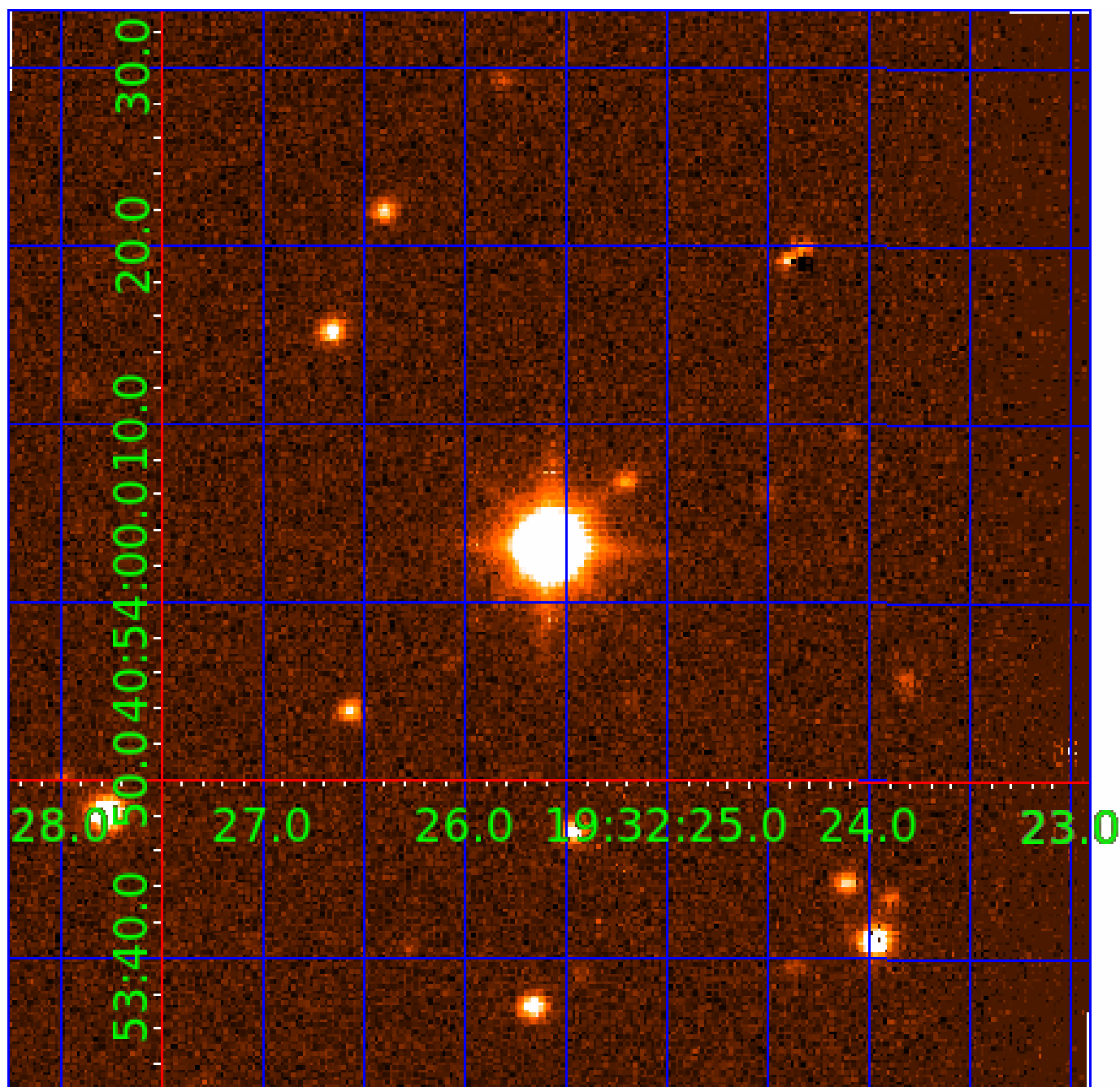


fluxWeightedCentroids, Planet 1 of 4



UKIRT Image

Declination



KIC 005709664

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})
005709664-01	OBS	No	1.395896	132.006259	48.3	2.971	13.7	14.5	2.08	7437	1.70	14933.66
005709664-02	OBS	No	0.561236	131.988496	31.5	2.063	16.5	12.3	2.08	7437	1.35	50324.18
005709664-03	OBS	No	539.374336	139.960347	702.5	13.325	10.0	6.1	2.08	7437	6.27	5.31
005709664-04	OBS	No	1.395884	131.634519	41.2	3.259	8.1	8.2	2.08	7437	1.54	14933.83

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005709664-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—CENT_SATURATED
005709664-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
005709664-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
005709664-04	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—SAME_NTL_PERIOD—CENT_SATURATED

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

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

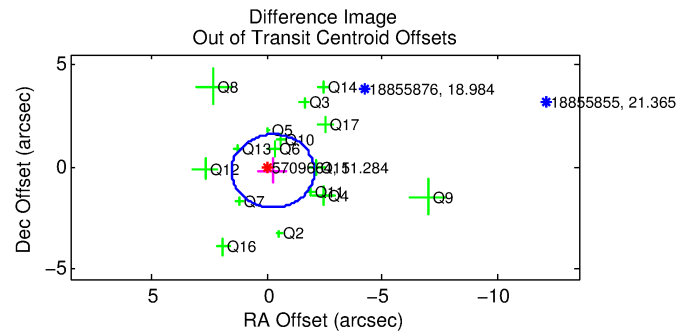
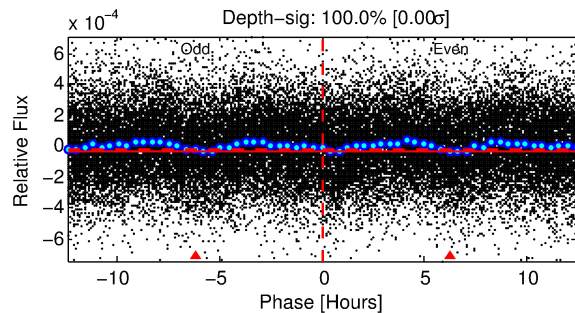
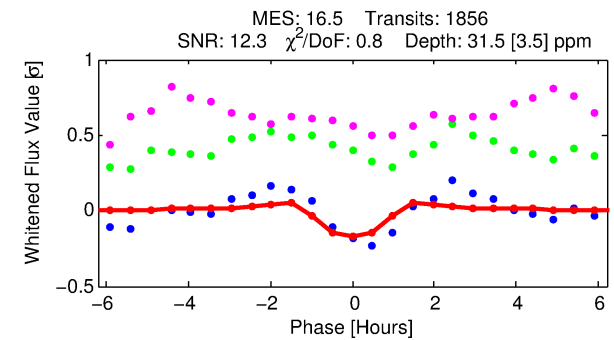
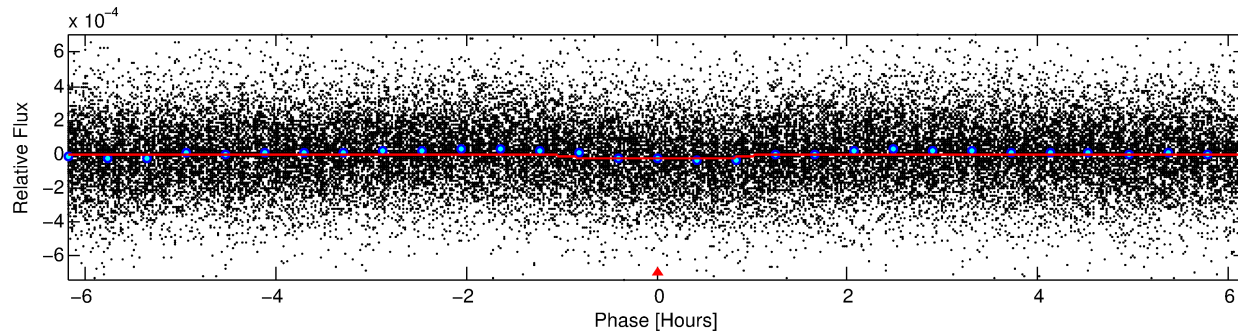
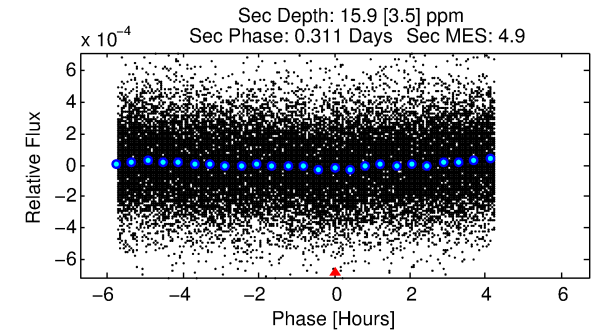
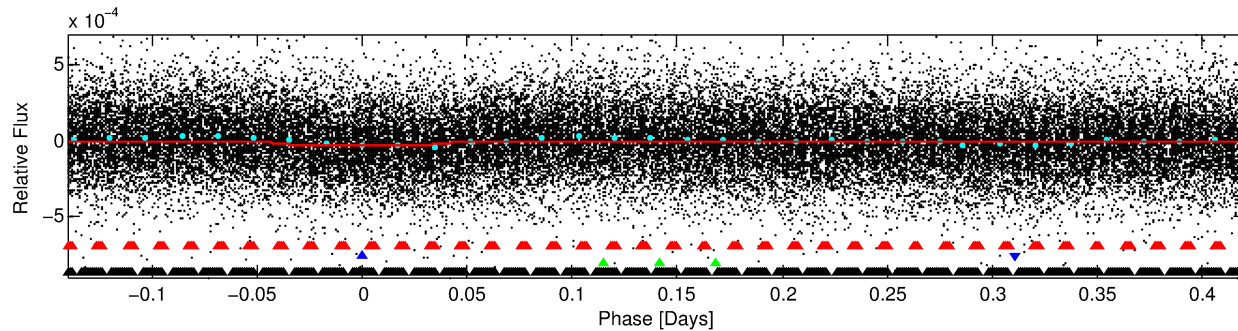
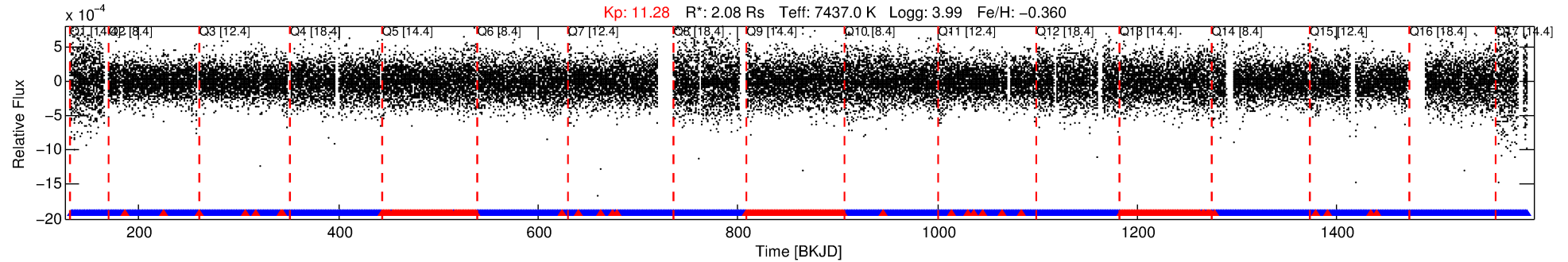
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 005709664-02

No Significant Match Found

DV One-Page Summary

KIC: 5709664 Candidate: 2 of 4 Period: 0.561 d



DV Fit Results:

Period = 0.56124 [0.00001] d
Epoch = 131.9885 [0.0019] BKJD
 R_p/R^* = 0.0060 [0.0023]
 a/R^* = 1.32 [1.39]
 b = 0.90 [0.52]
 S_{eff} = 50324.18 [25618.86]
 T_{eq} = 3819 [486] K
 R_p = 1.35 [0.70] R_e
 a = 0.0153 [0.0048] AU
 A_g = 1.13 [1.05] [0.12σ]
 T_{eff} = 6085 [1241] K [1.70σ]

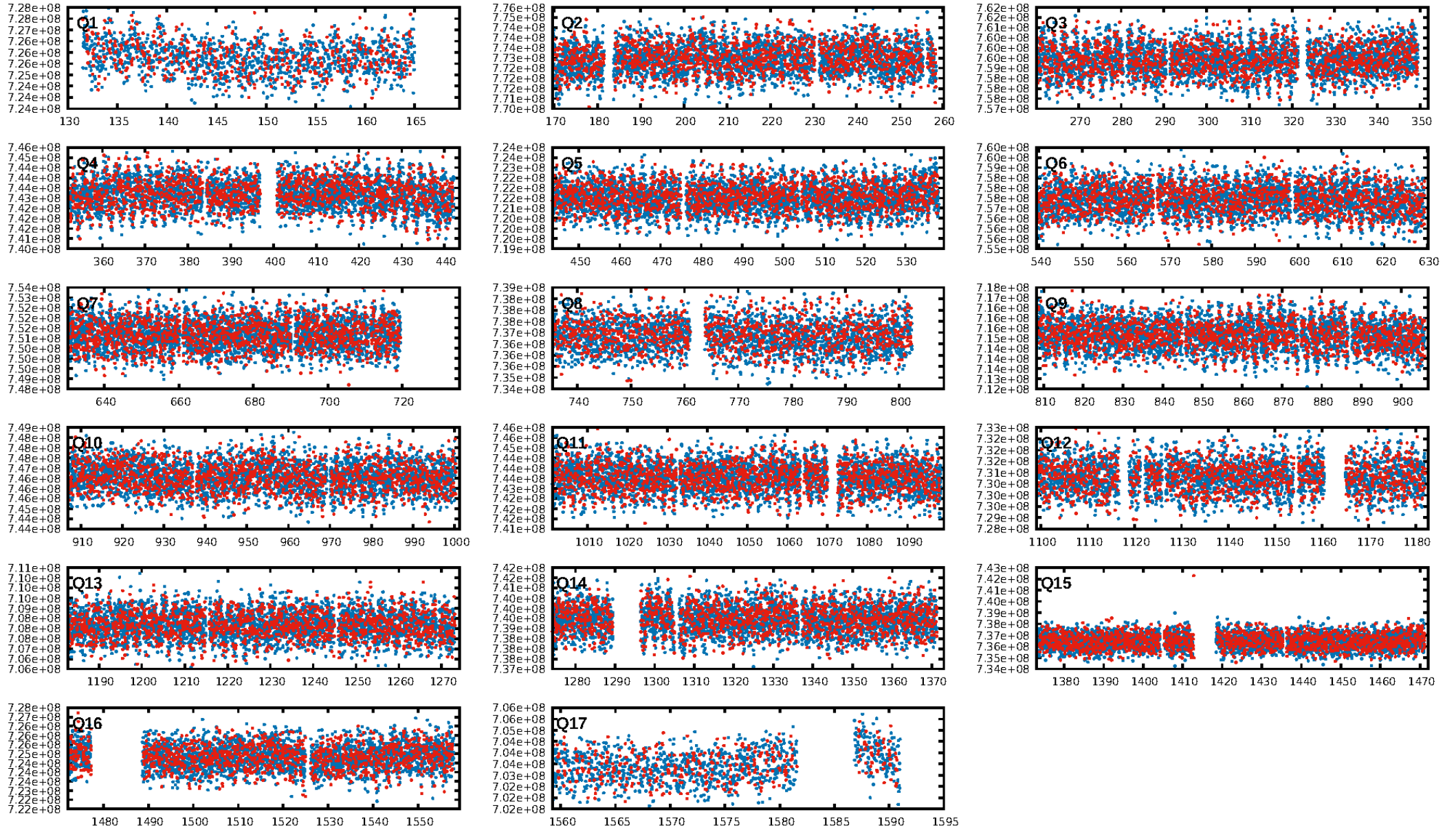
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [5.19σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 2.52e-68
RollingBand-fgt: 0.79 [1396/1775]
GhostDiagnostic-chr: 4.244
Centroid-sig: N/A
Centroid-so: 0.347 arcsec [1.56σ]
OotOffset-rm: 0.336 arcsec [0.56σ]
KicOffset-rm: 0.445 arcsec [0.73σ]
OotOffset-st: 4/4/4/4 [16]
KicOffset-st: 4/4/4/4 [16]
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DiffImageOverlap-fno: 1.00 [17/17]

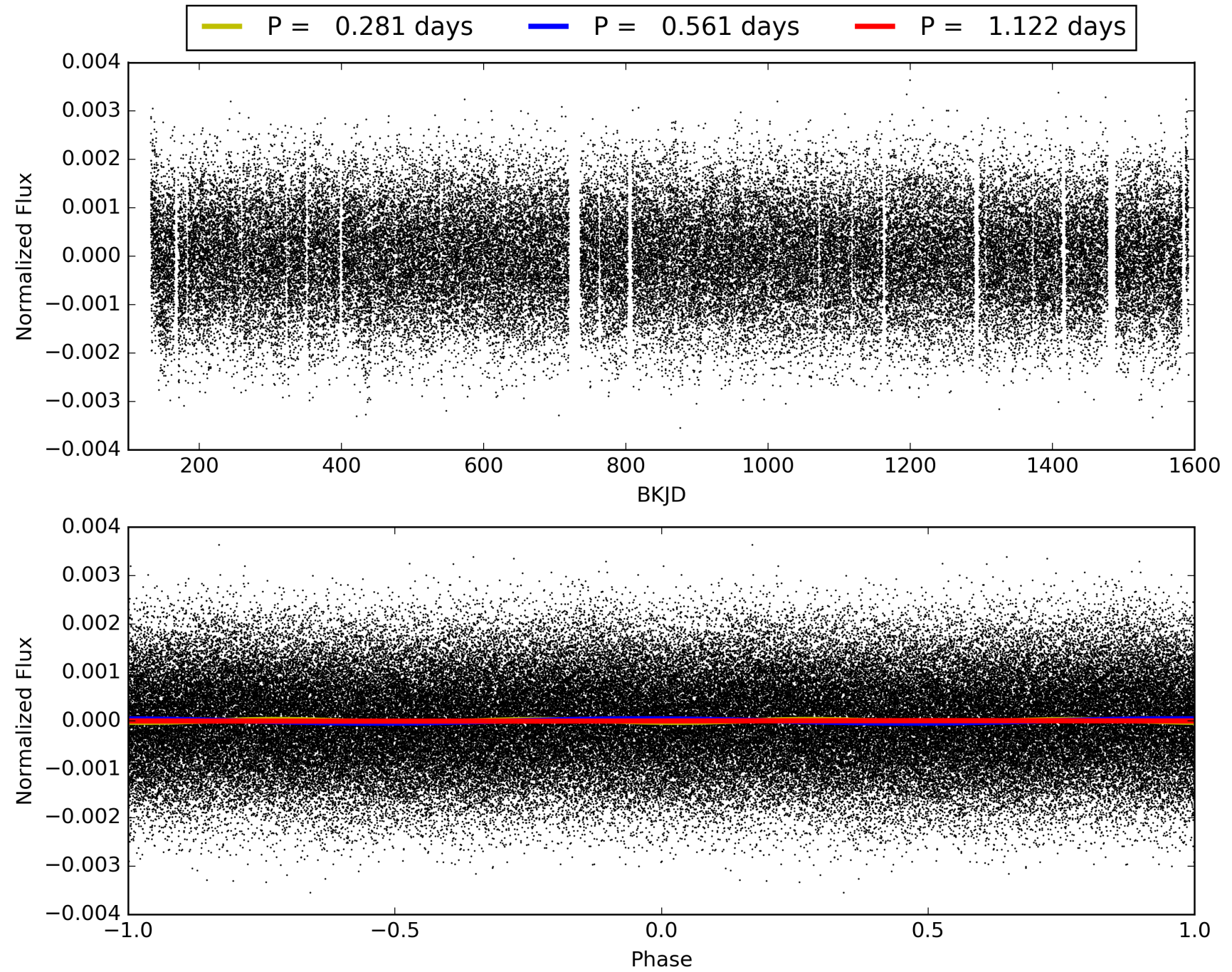
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 15:14:10 Z

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

TCE 005709664-02, PDC Light Curves

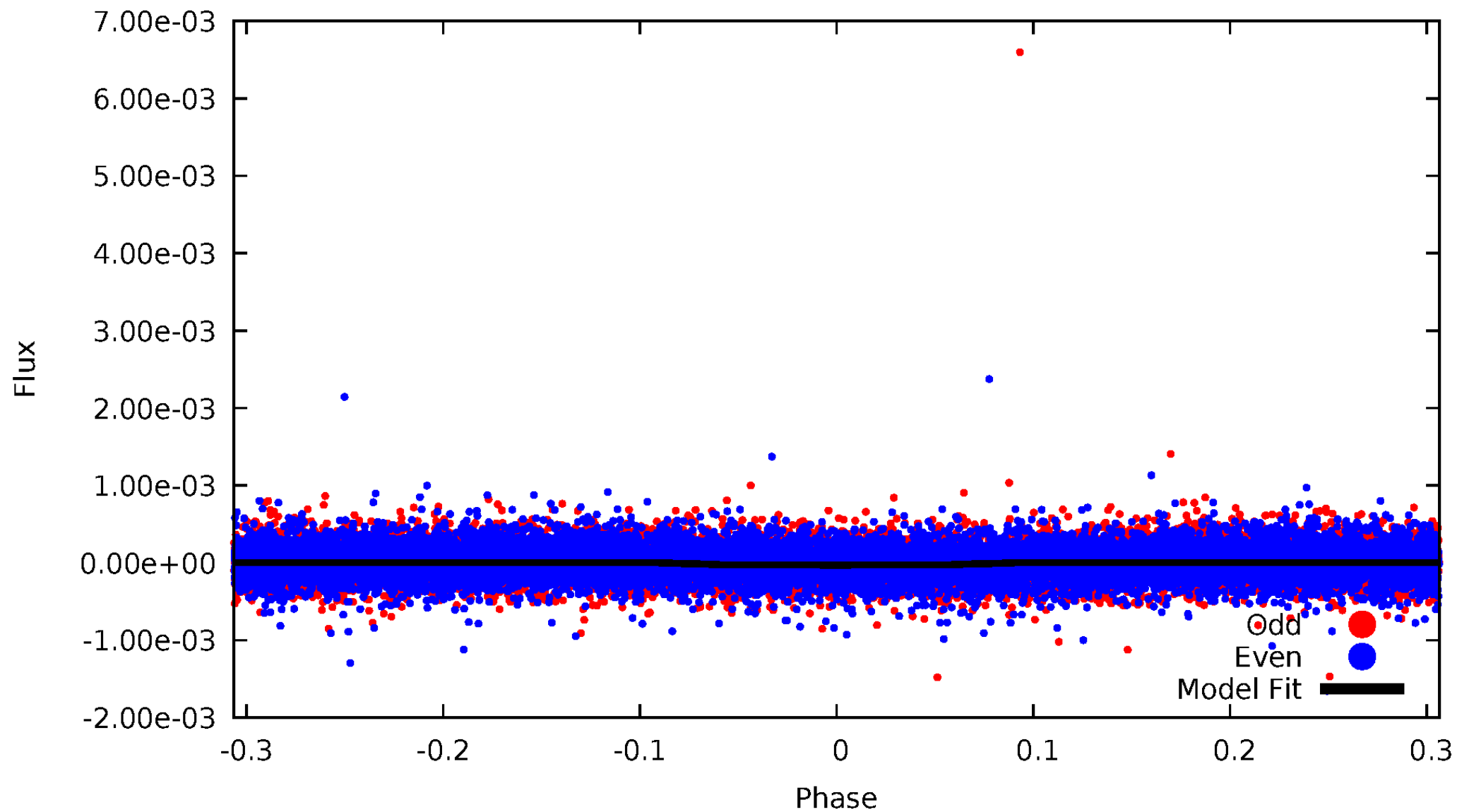


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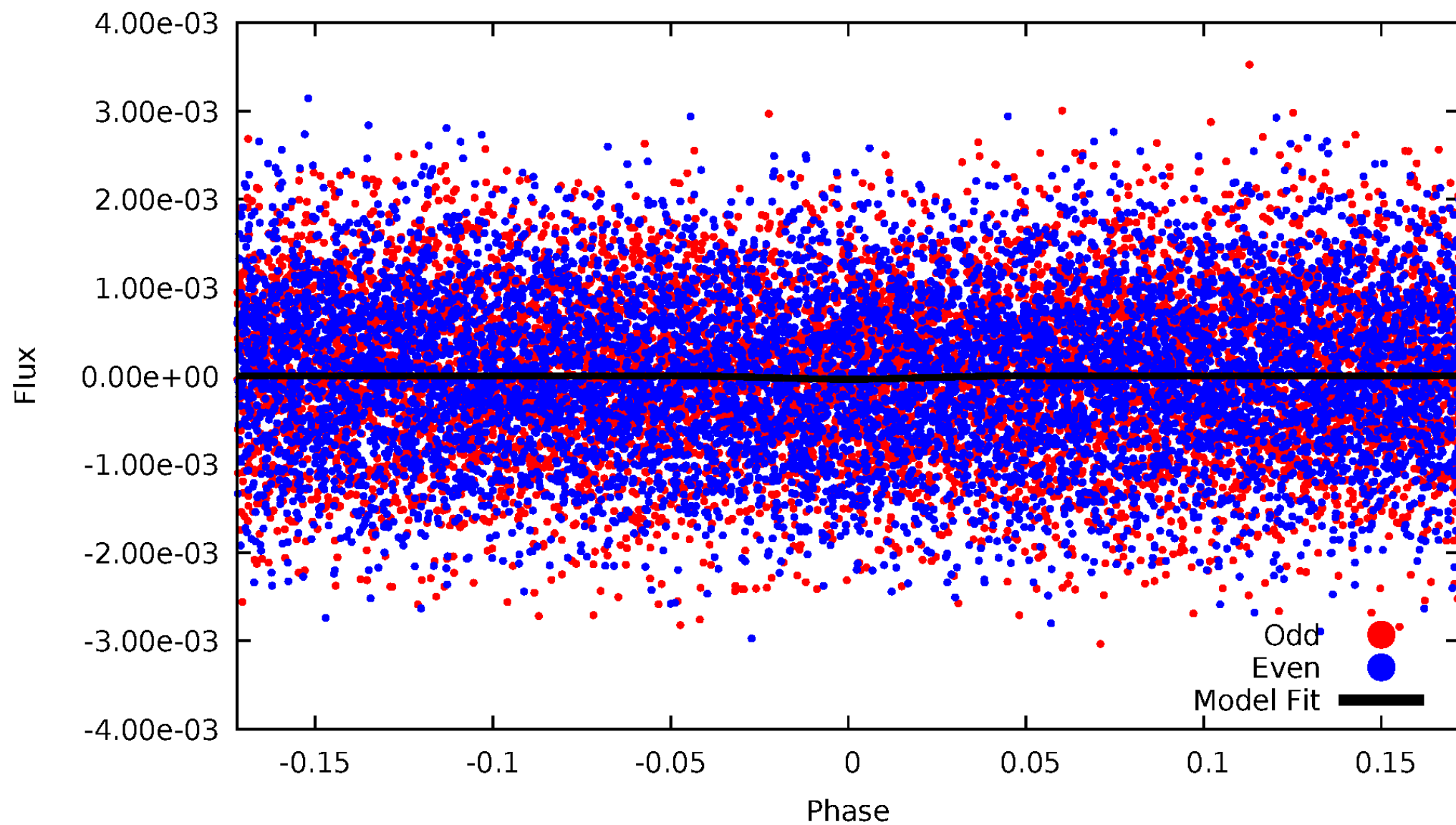
DV Odd/Even

TCE 005709664-02



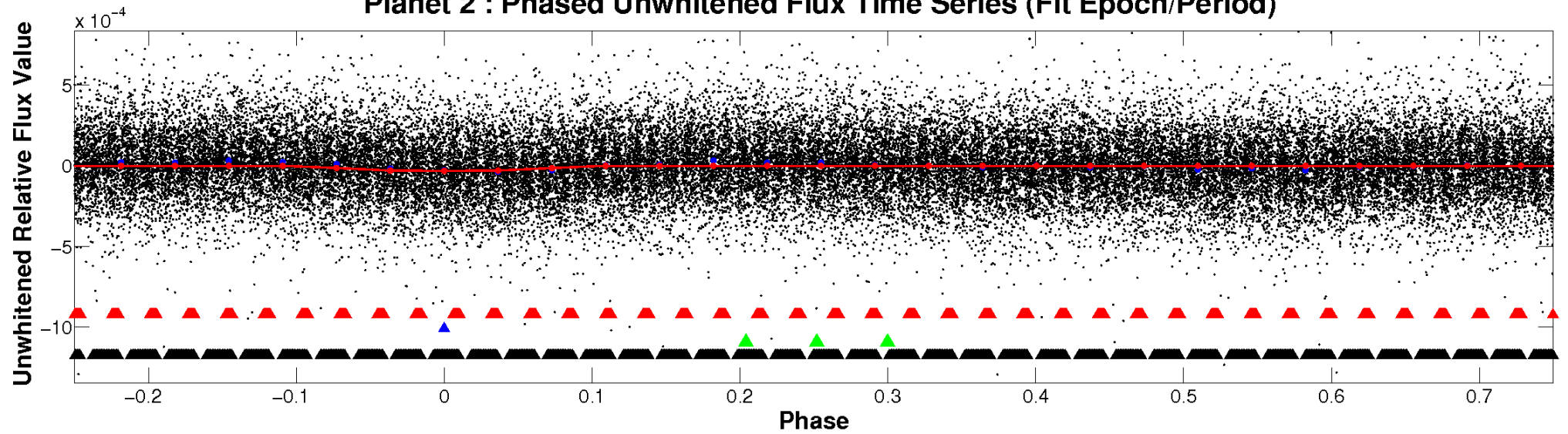
ALT Odd/Even

TCE 005709664-02

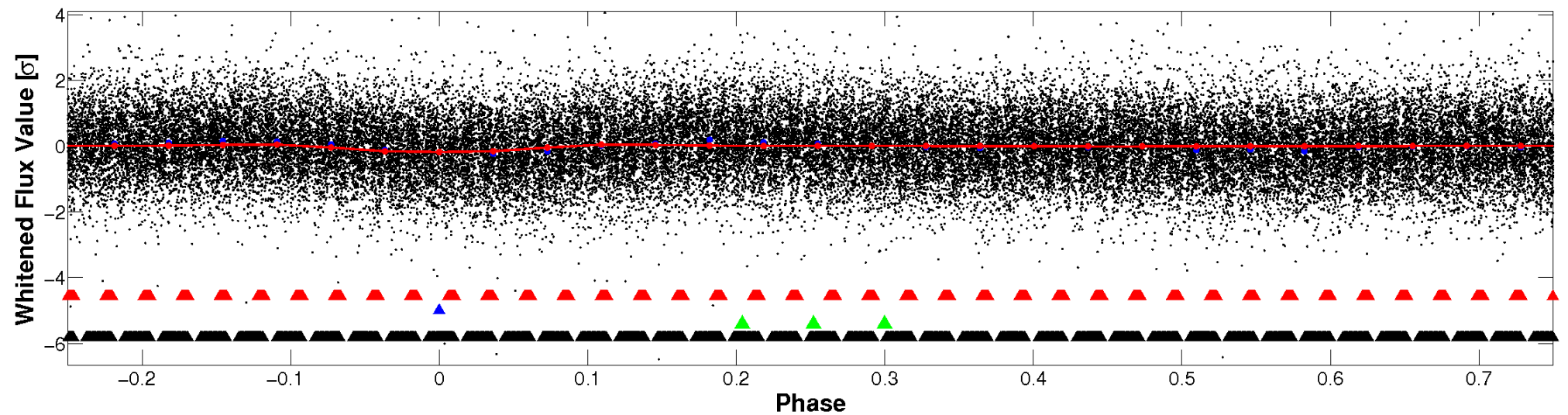


Non-Whitened Vs. Whitened Light Curve

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

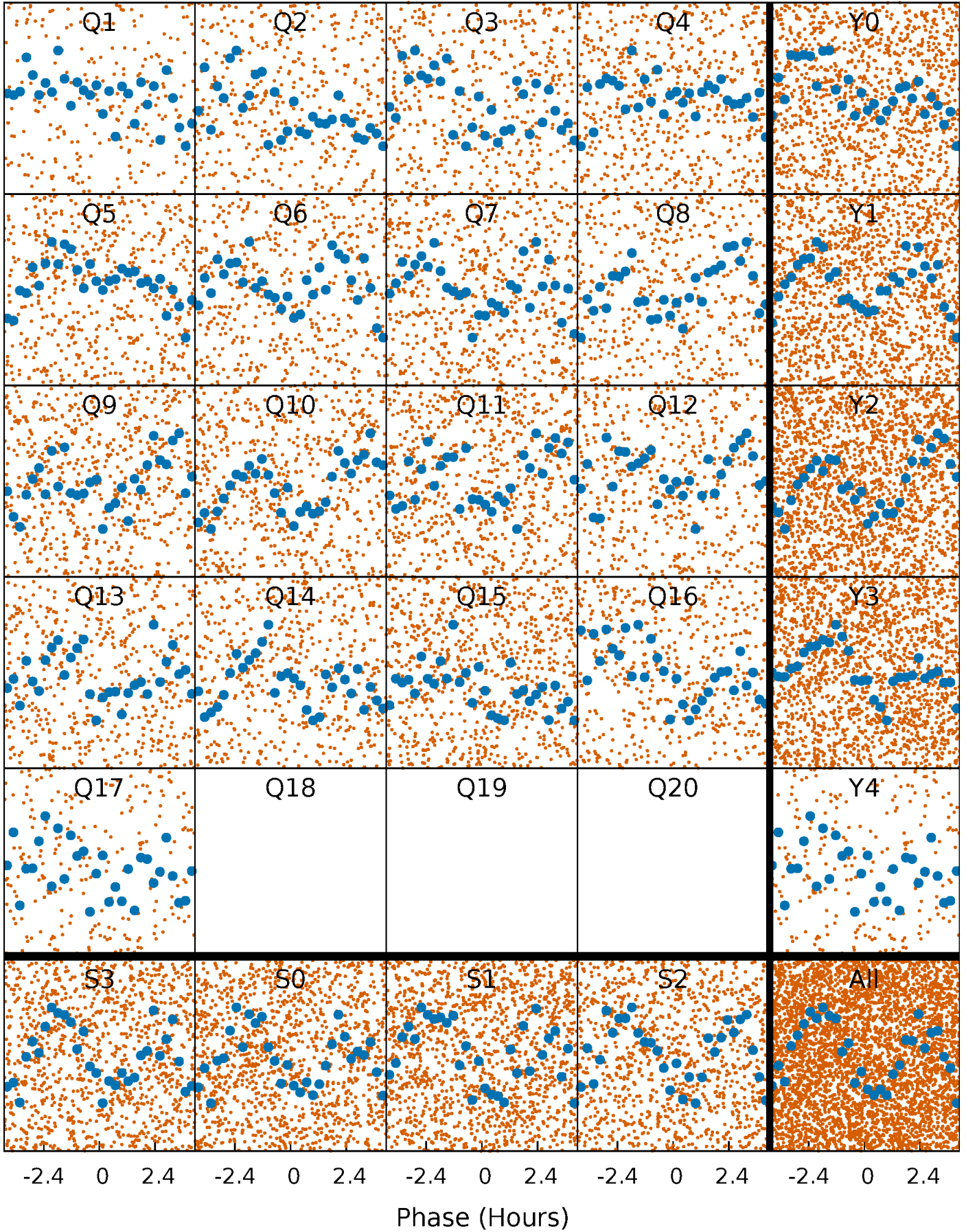


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



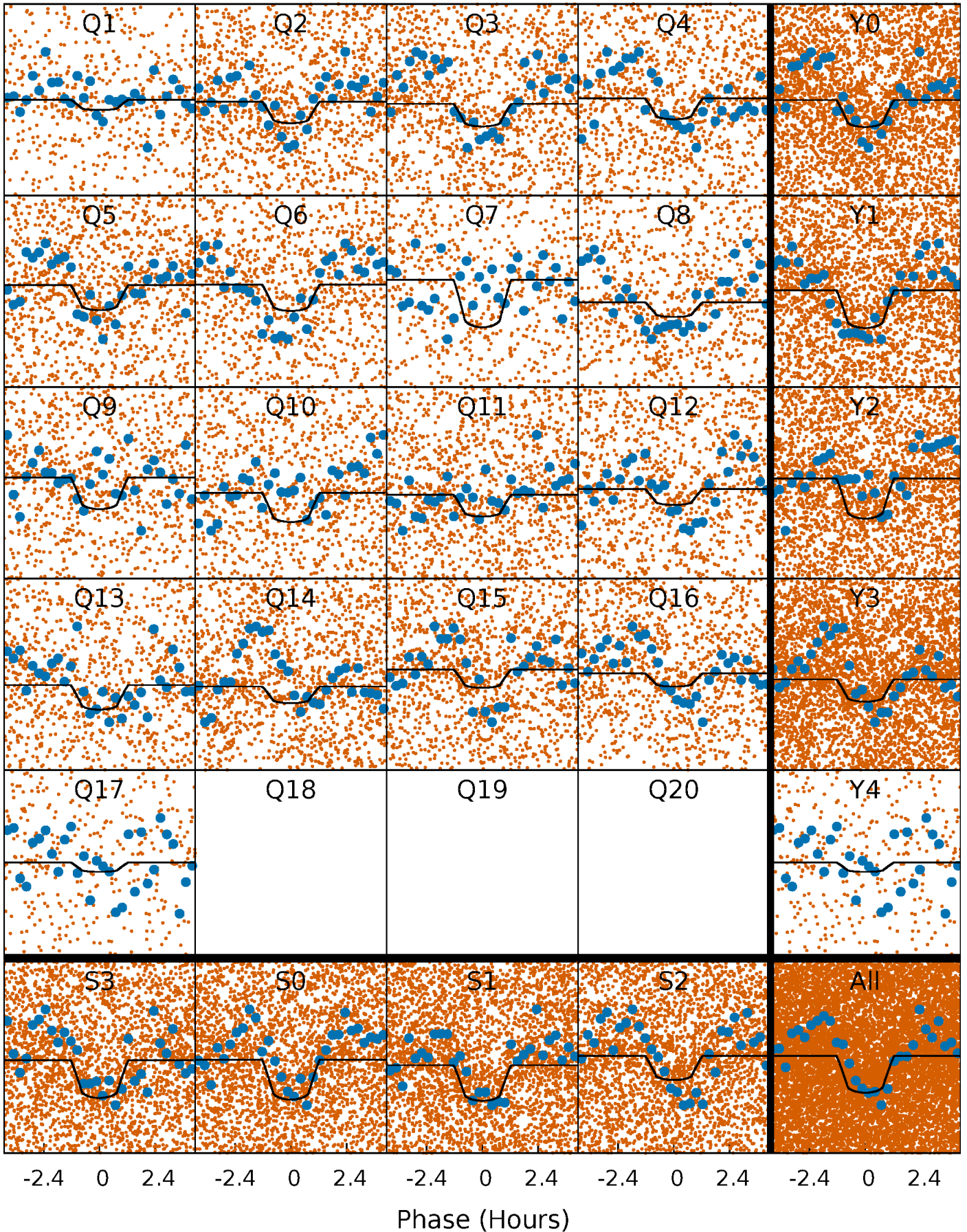
PDC Quarter-Phased Transit Curves

TCE 005709664-02 P= 0.561236 Days $T_0=131.988496$ (BKJD)



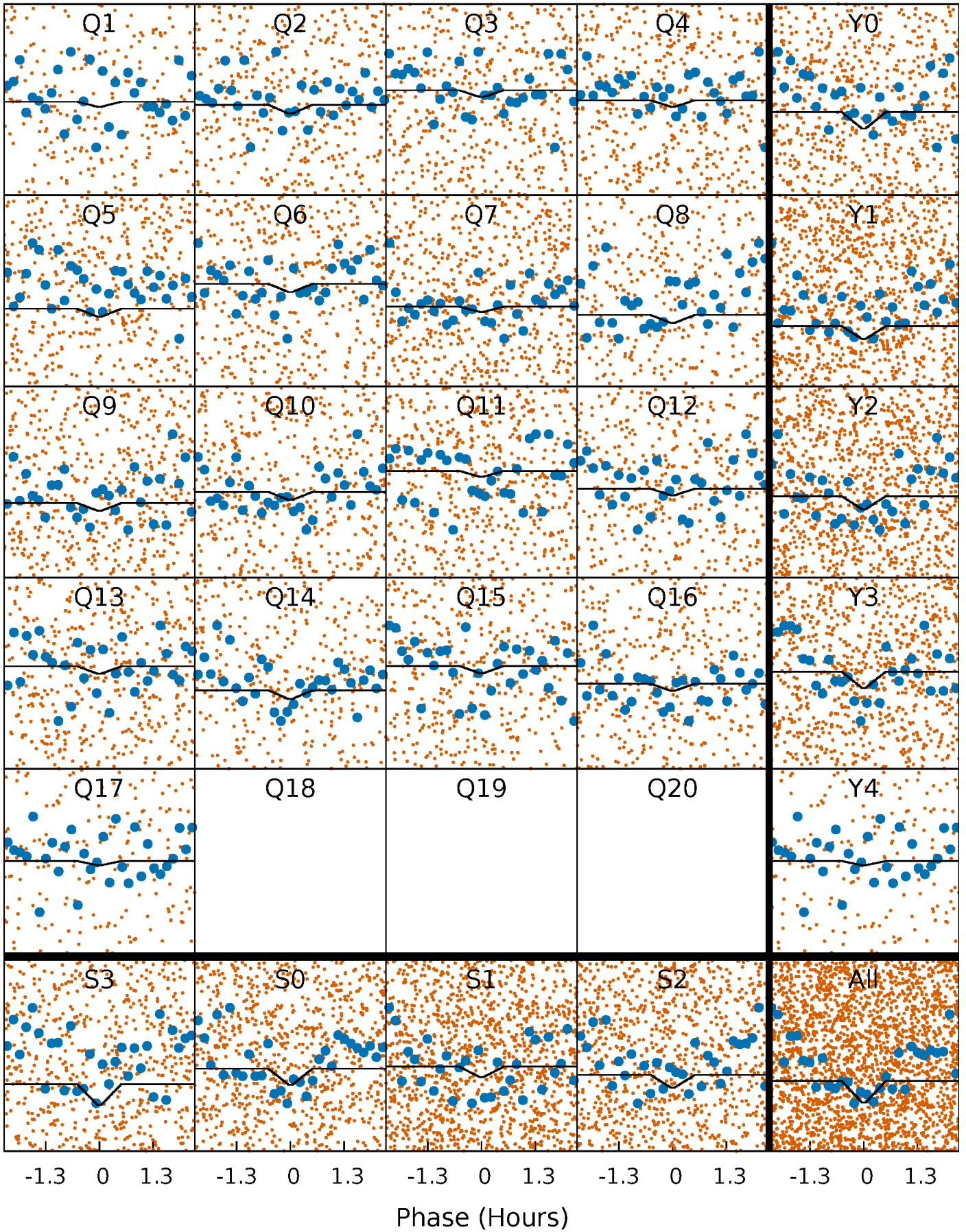
DV Quarter-Phased Transit Curves

TCE 005709664-02 $P = 0.561236$ Days $T_0 = 131.988496$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

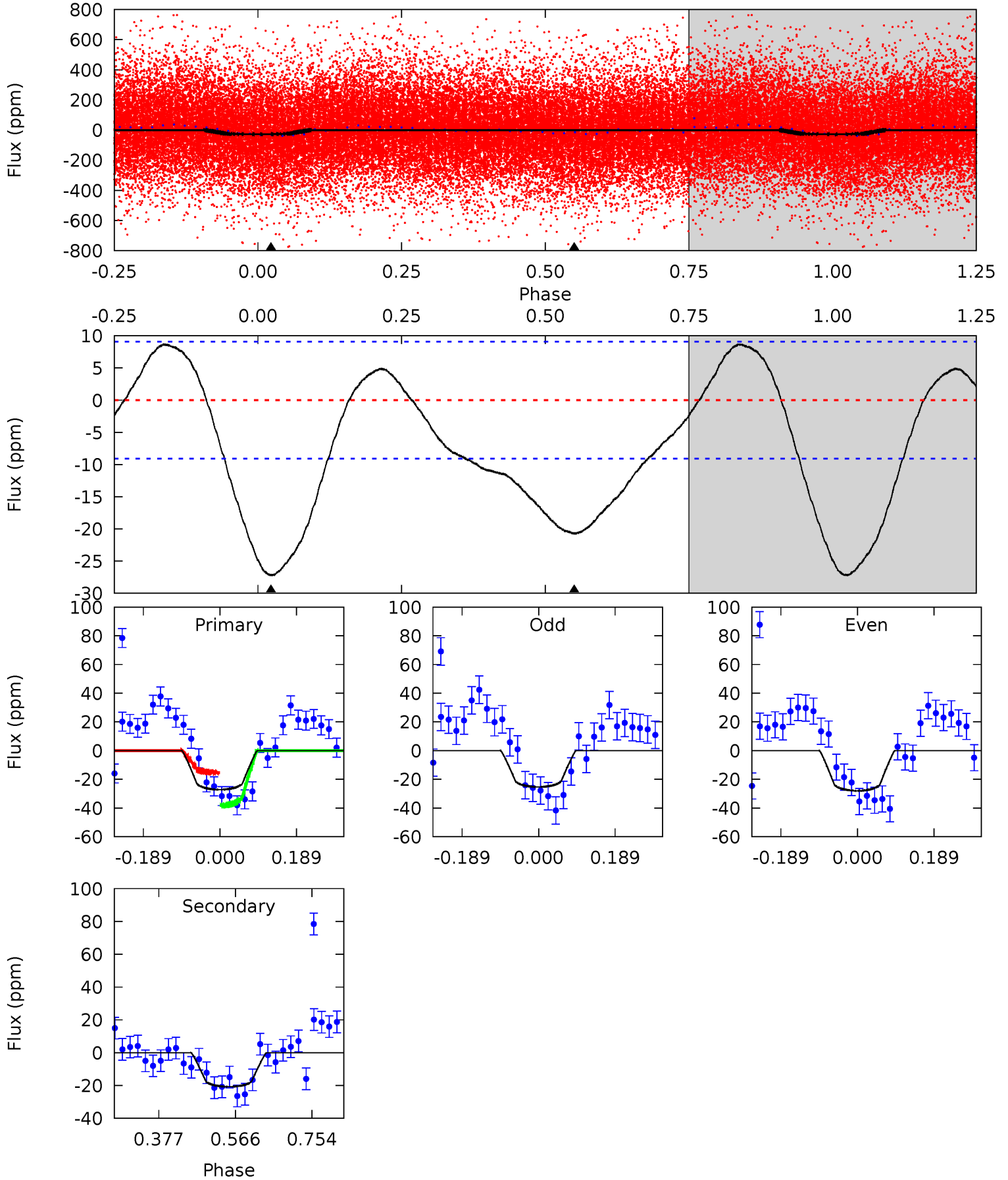
TCE 005709664-02 $P = 0.561250$ Days $T_0 = 131.992487$ (BKJD)



DV Model-Shift Uniqueness Test

005709664-02, P = 0.561236 Days, E = 131.427260 Days

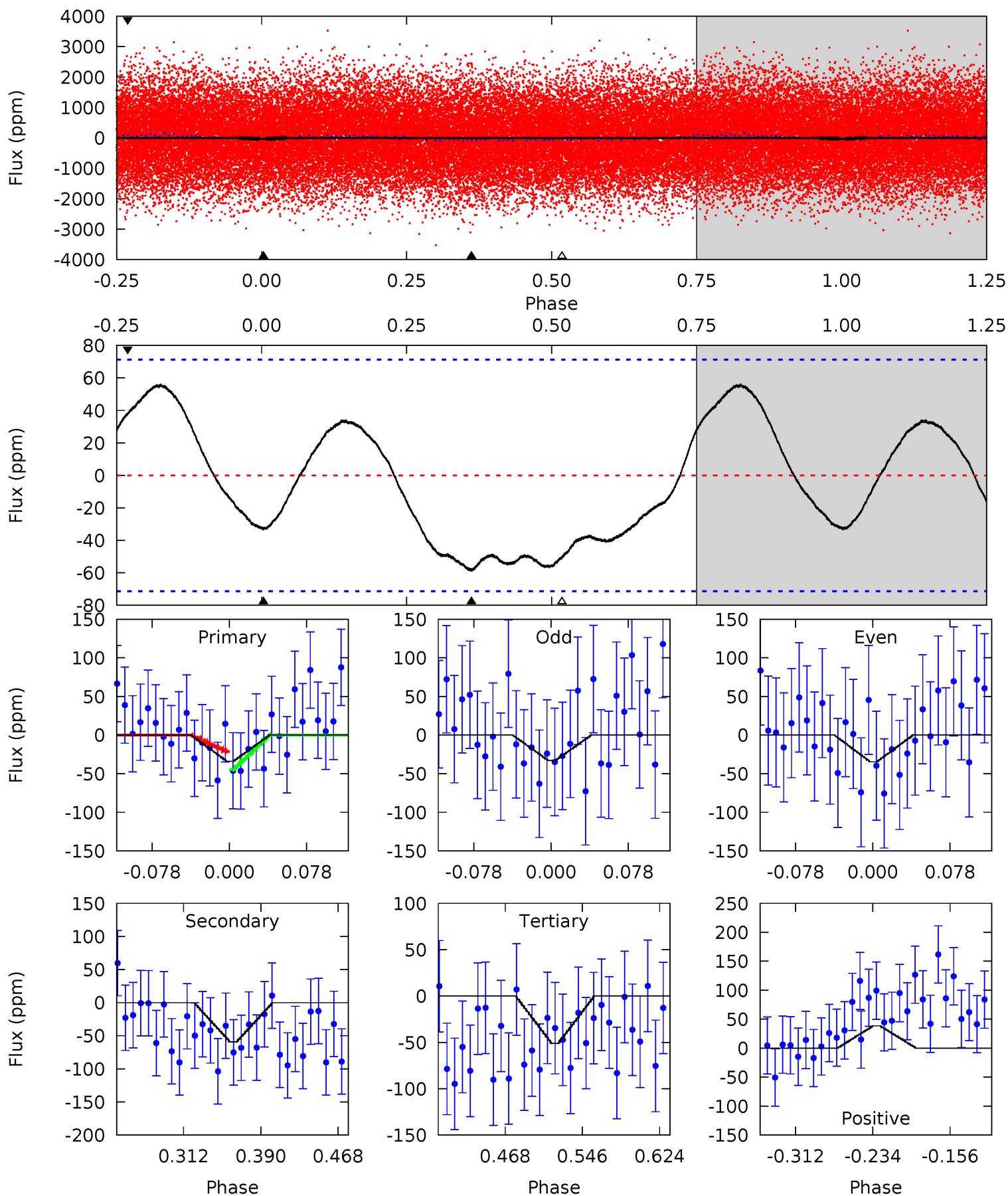
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.3	10.1	0	0	4.43	1.31	2.46	13.3	13.3	10.1	10.1	0.65	1.04	0.24	5.60



Alt Model-Shift Uniqueness Test

005709664-02, P = 0.561250 Days, E = 131.431237 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
2.19	3.83	3.30	2.49	4.62	1.76	2.27	-1.11	-0.30	0.53	1.34	0.05	0.85	0.49	0.77



Stellar Parameters For KIC 005709664

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	M (M_{\odot})	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	7437^{+233}_{-311}	$3.986^{+0.273}_{-0.147}$	$-0.360^{+0.250}_{-0.350}$	$2.076^{+0.489}_{-0.734}$	$1.521^{+0.198}_{-0.296}$	$0.239^{+0.448}_{-0.106}$
	+3%/-4%	+7%/-4%	+69%/-97%	+24%/-35%	+13%/-19%	+187%/-44%
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 005709664-02 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-21 ± 2	$1.28^{+0.60}_{-0.51}$	5282^{+378}_{-426}	6062^{+2337}_{-1213}	$1.625^{+2.976}_{-0.863}$
Alt.	-59 ± 15	$1.32^{+0.57}_{-0.51}$	5258^{+413}_{-481}	8325^{+3521}_{-1785}	$4.222^{+7.270}_{-2.183}$

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 $A_{obs} \gg 1.0$

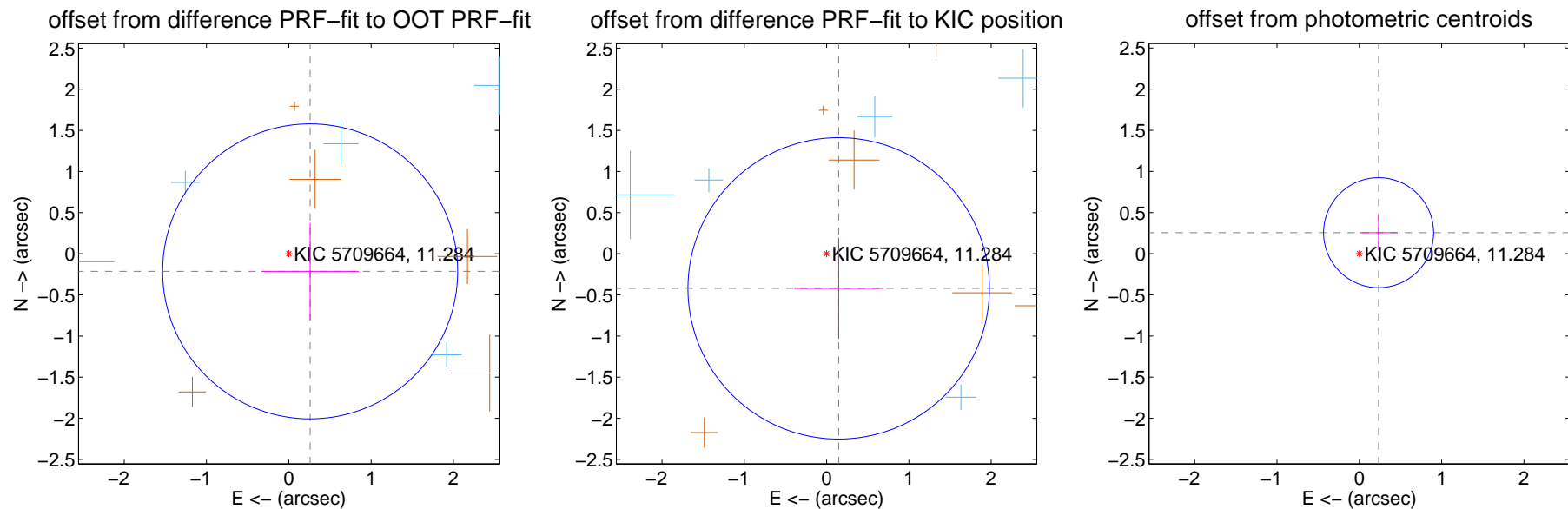
DV Centroid Data

Supplemental centroid analysis for 005709664-02. **Kepler magnitude: 11.28.** Transit SNR 12.32

There are 6 quarters with good PRF difference image offsets

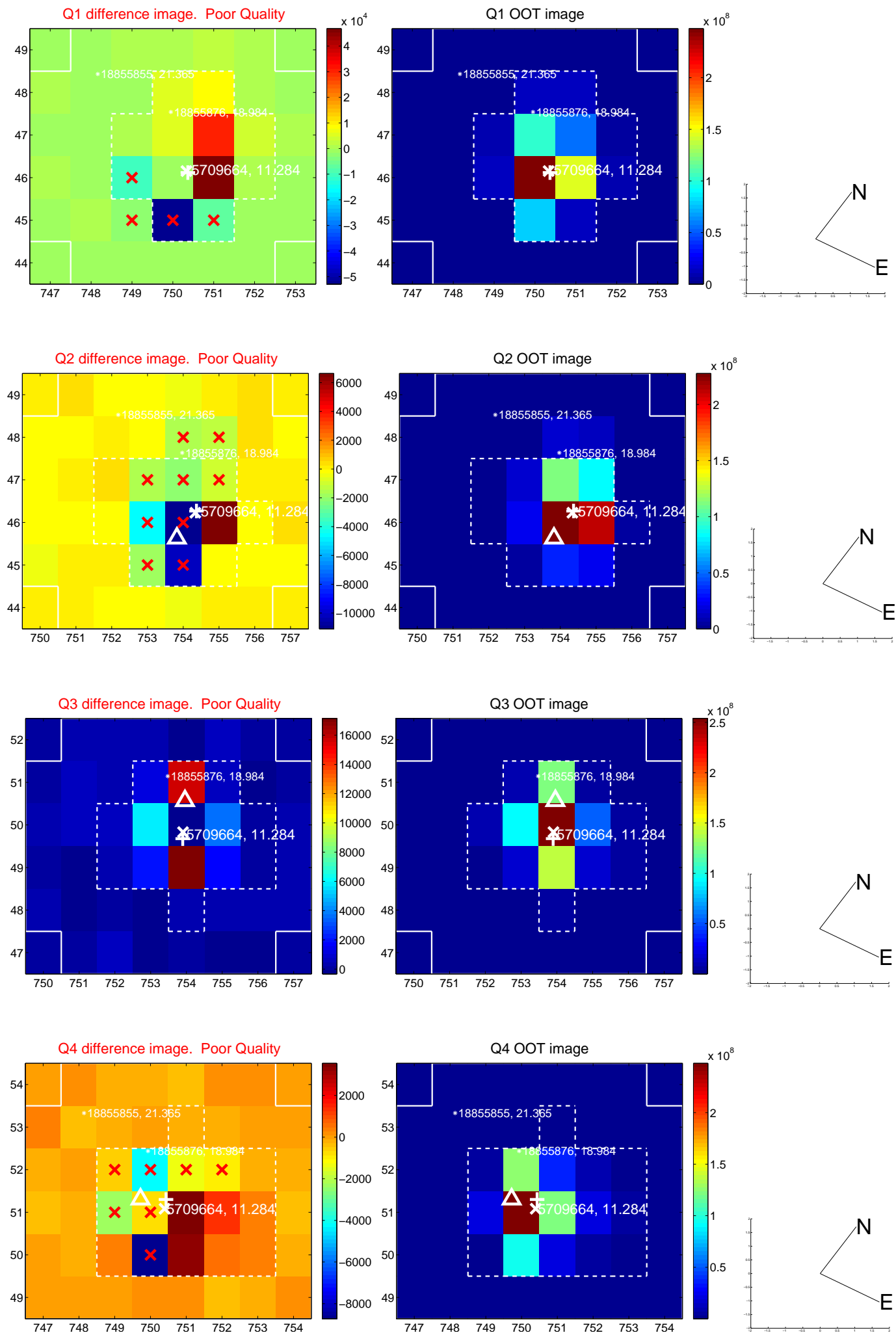
The direct PRF centroid is offset from the target star catalog position by about 0.19 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.336 ± 0.598	0.56	-0.259 ± 0.593	-0.214 ± 0.590
PRF-fit source offset from KIC position	0.445 ± 0.611	0.73	-0.147 ± 0.542	-0.420 ± 0.614
photometric centroid source offset	0.35 ± 0.22	1.56	-0.23 ± 0.23	0.26 ± 0.22

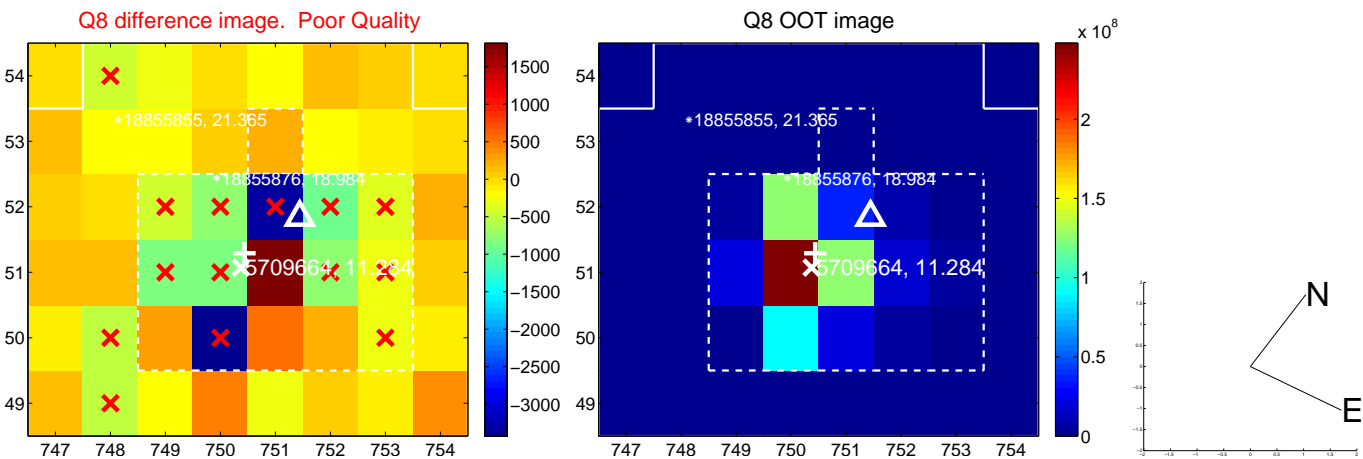
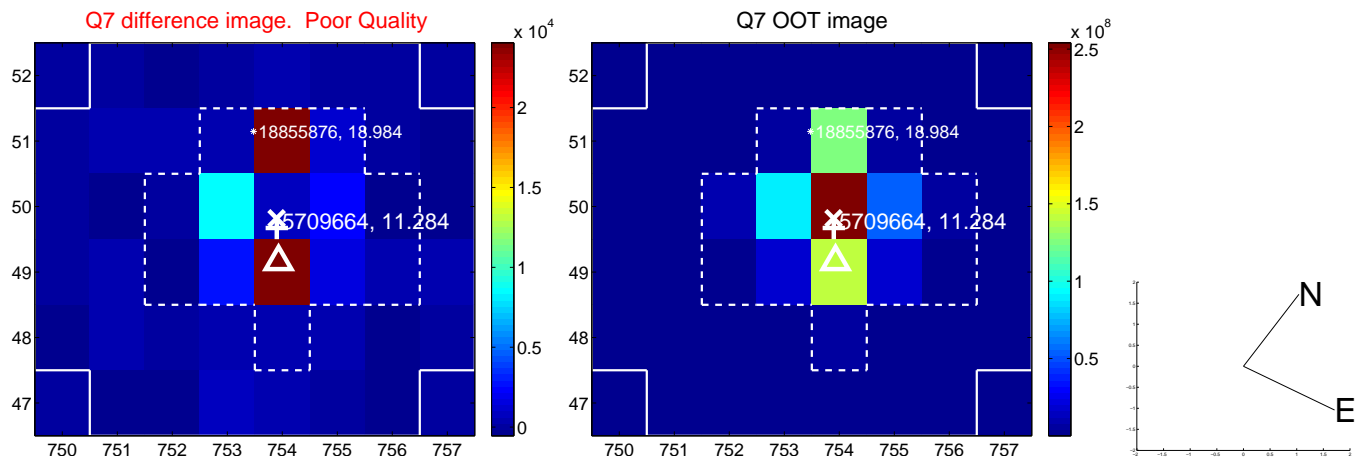
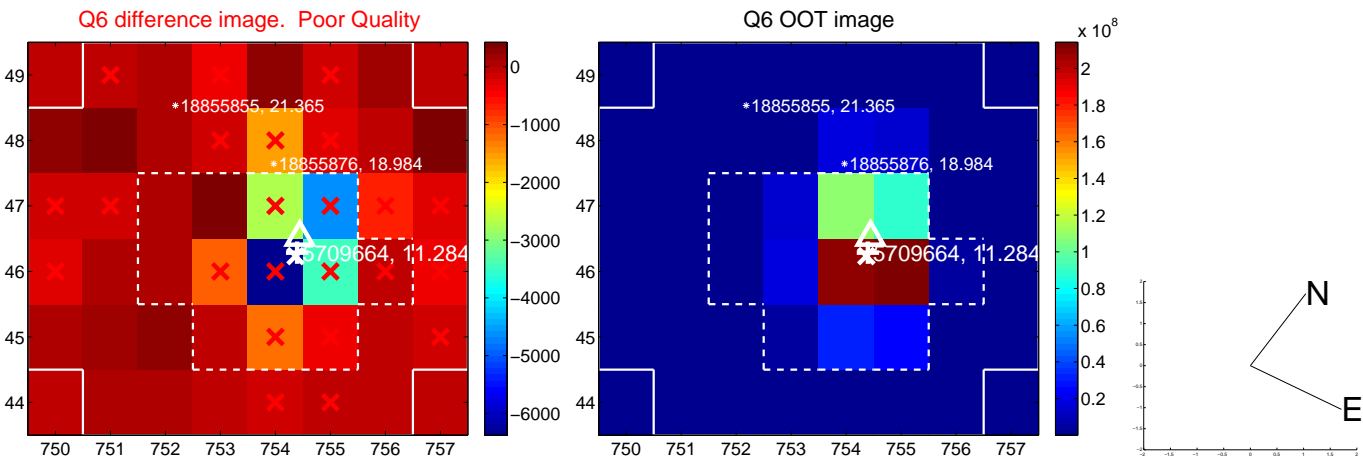
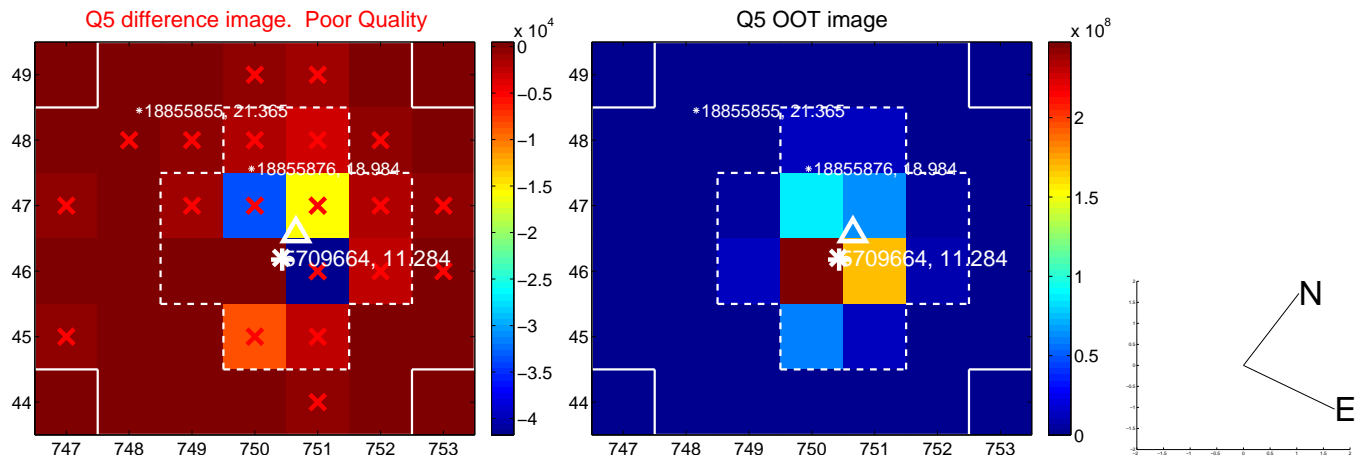


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

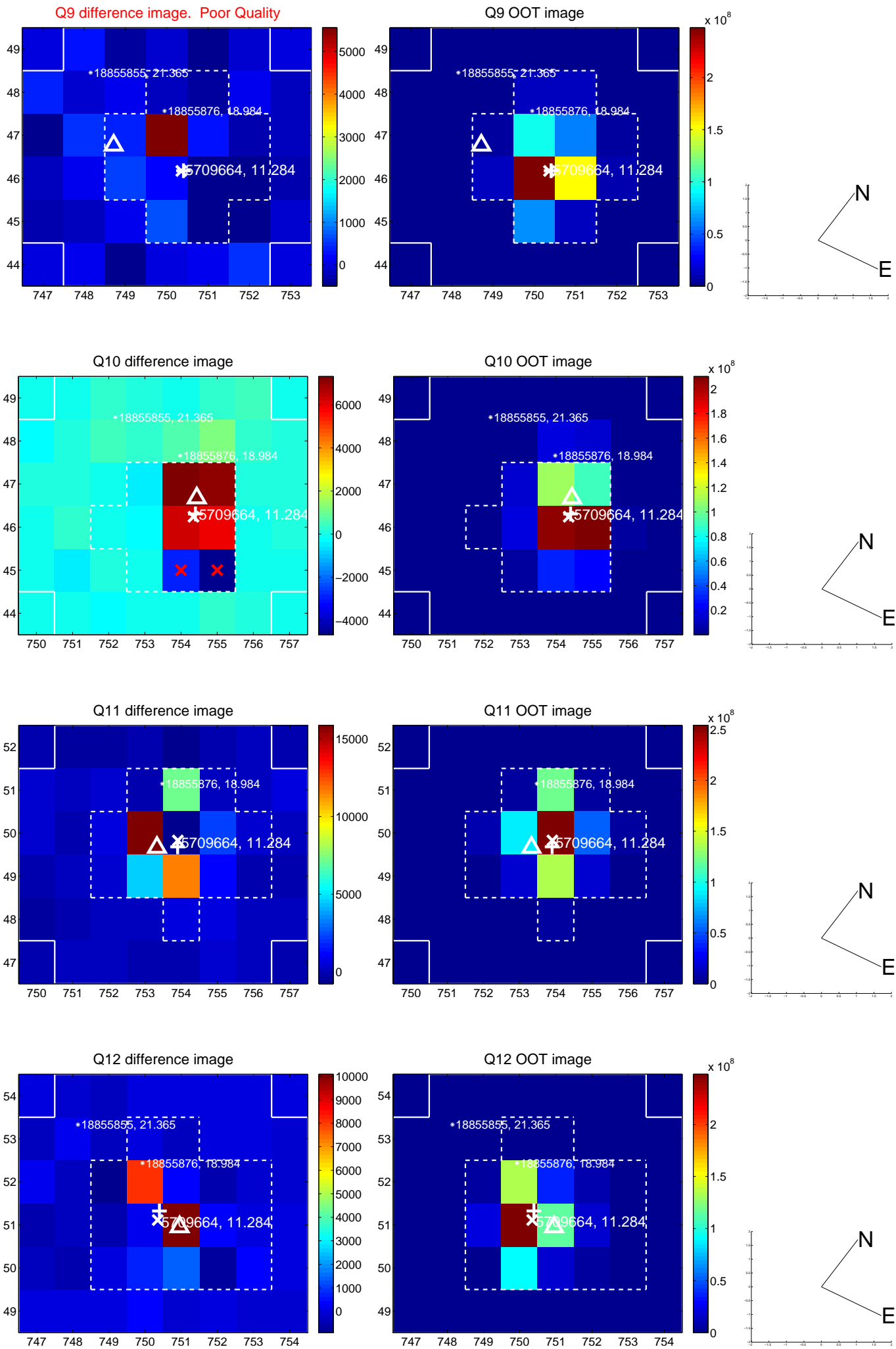
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



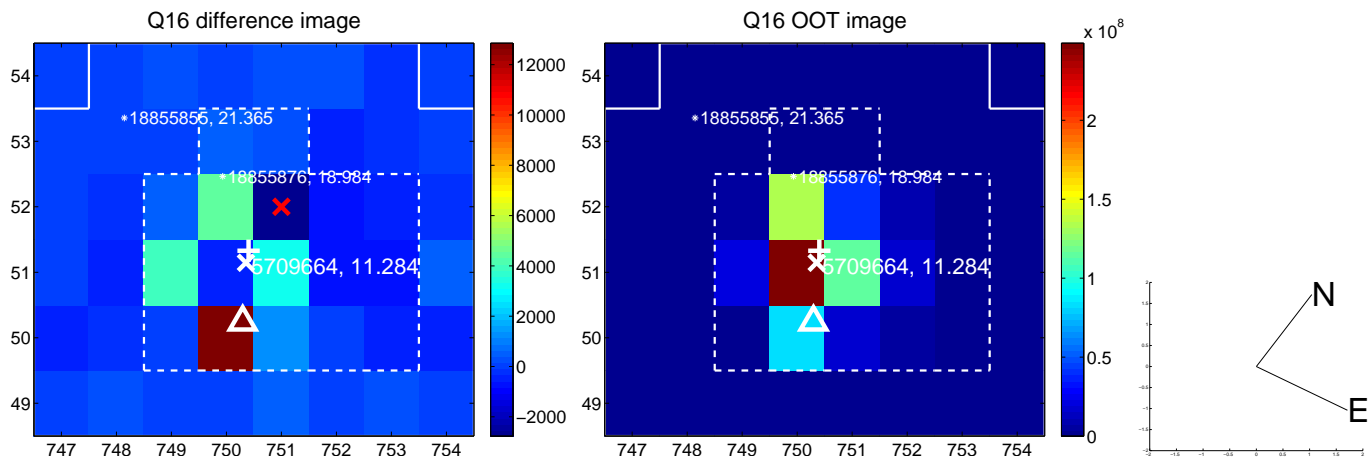
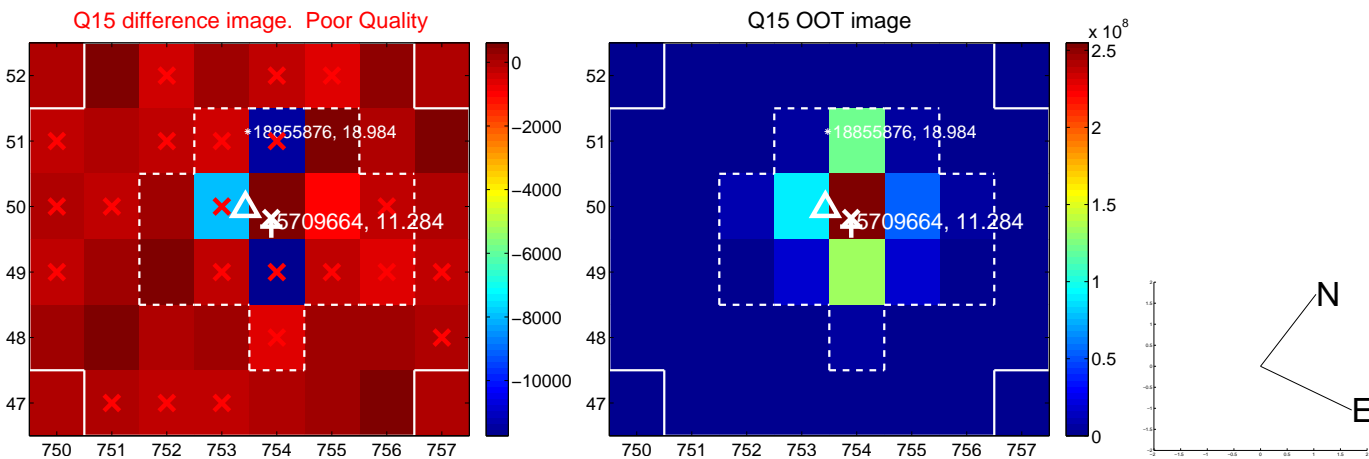
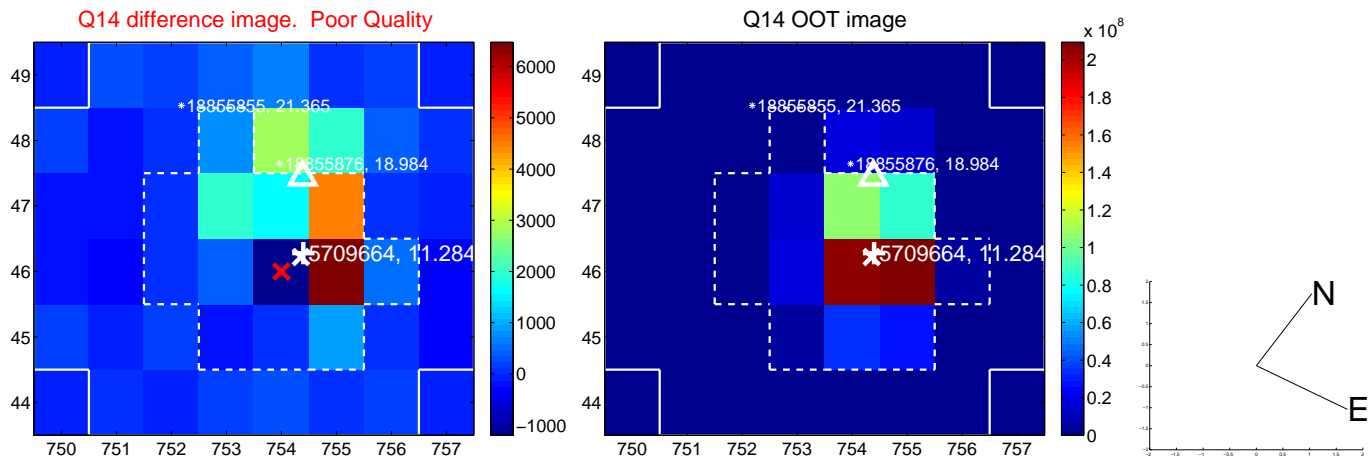
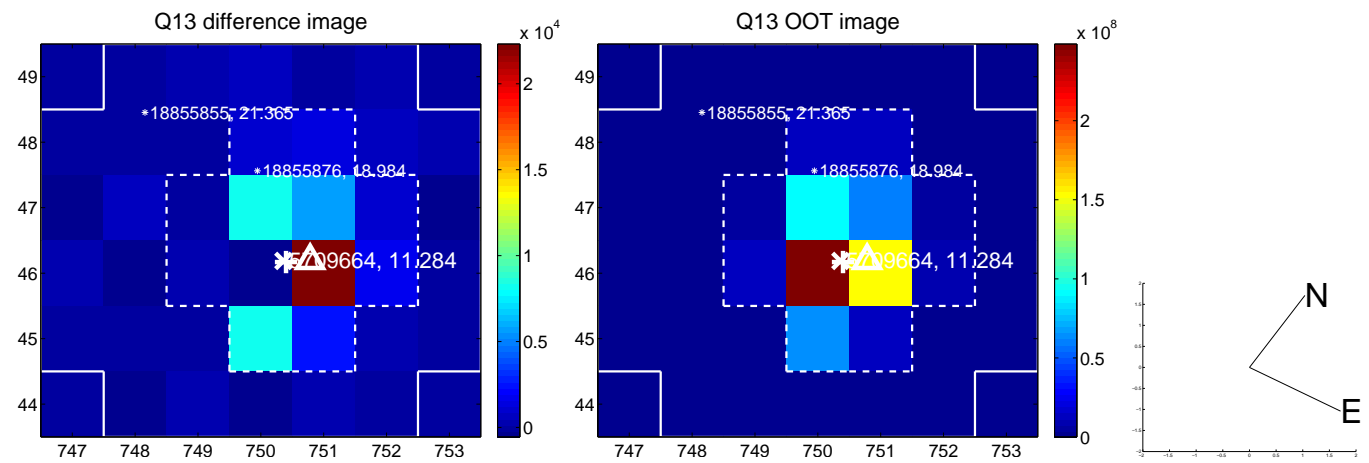
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



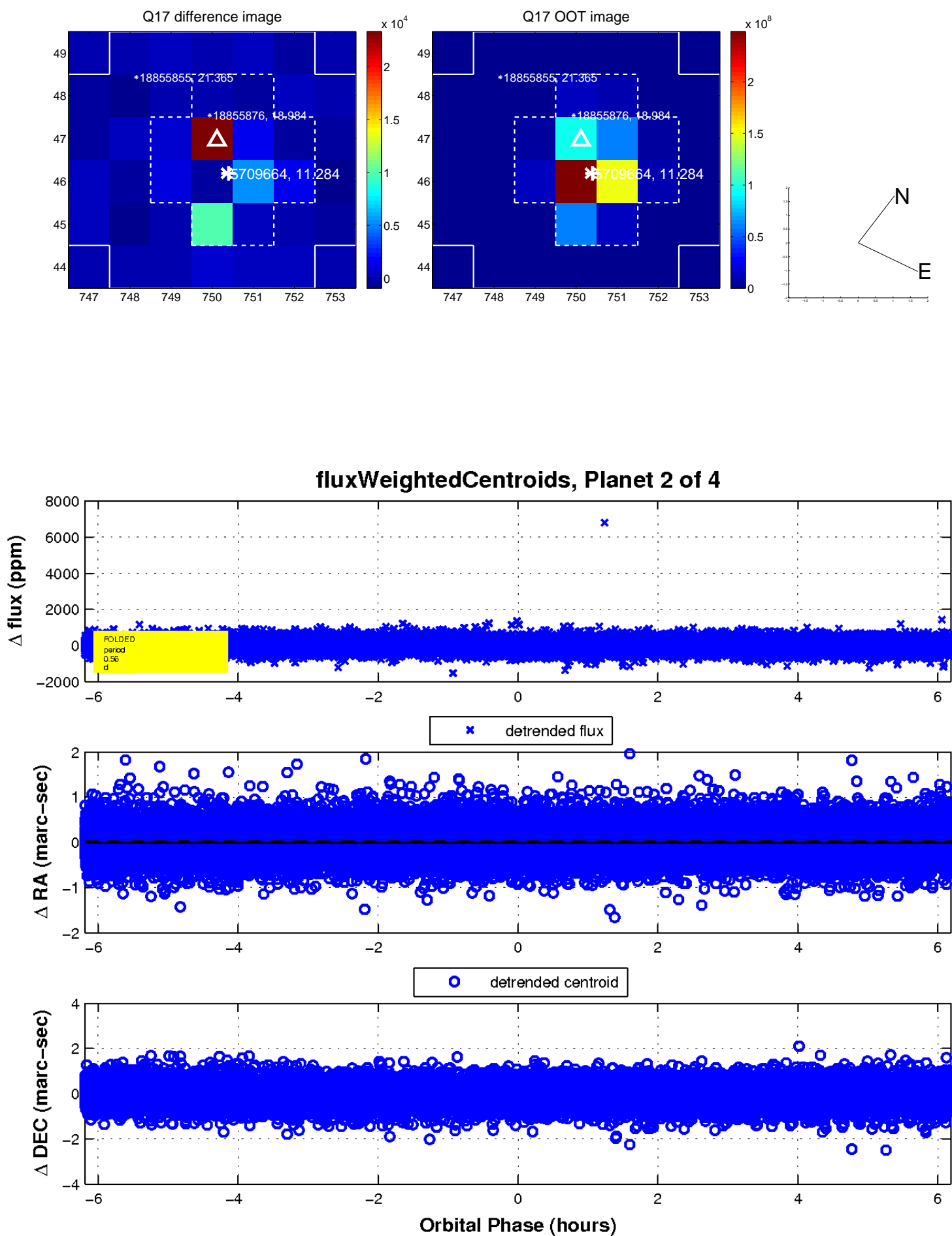
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

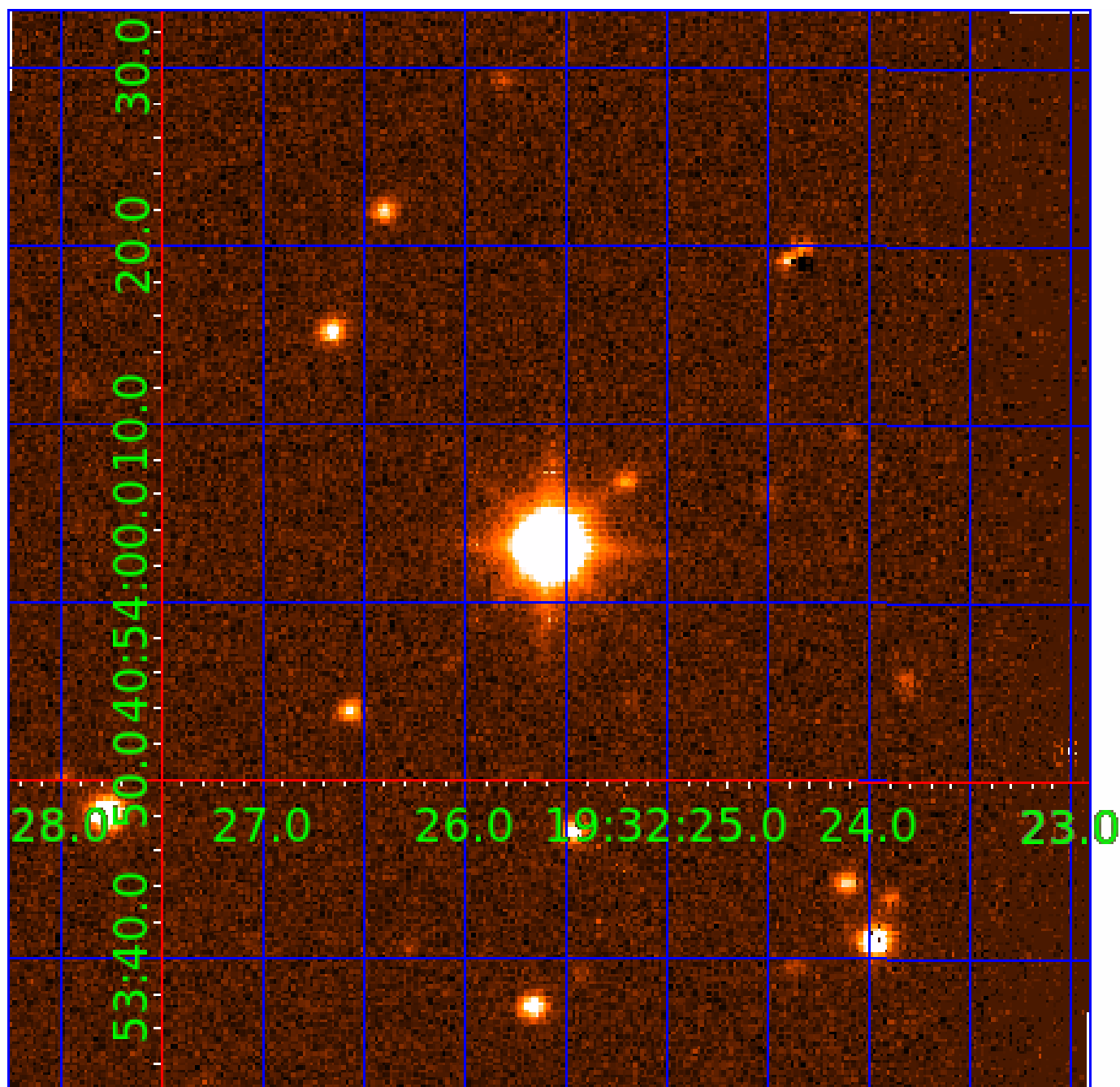


white \times : KIC target position; $+$: OOT centroid; Δ : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 005709664

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})
005709664-01	OBS	No	1.395896	132.006259	48.3	2.971	13.7	14.5	2.08	7437	1.70	14933.66
005709664-02	OBS	No	0.561236	131.988496	31.5	2.063	16.5	12.3	2.08	7437	1.35	50324.18
005709664-03	OBS	No	539.374336	139.960347	702.5	13.325	10.0	6.1	2.08	7437	6.27	5.31
005709664-04	OBS	No	1.395884	131.634519	41.2	3.259	8.1	8.2	2.08	7437	1.54	14933.83

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005709664-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—CENT_SATURATED
005709664-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
005709664-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV— MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
005709664-04	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—SAME_NTL_PERIOD—CENT_SATURATED

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

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

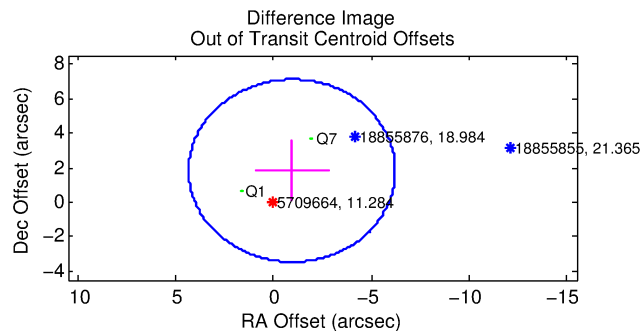
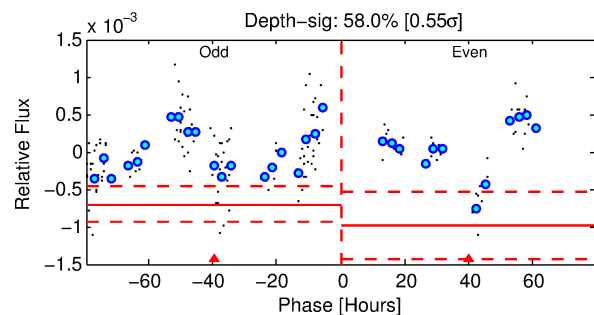
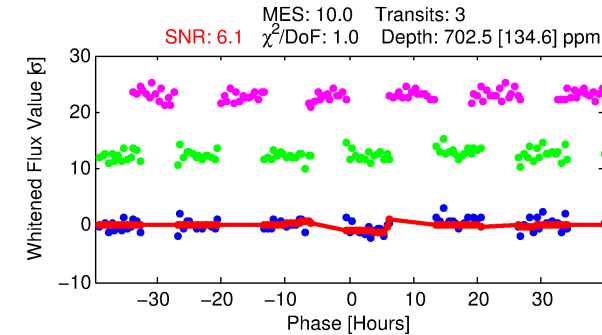
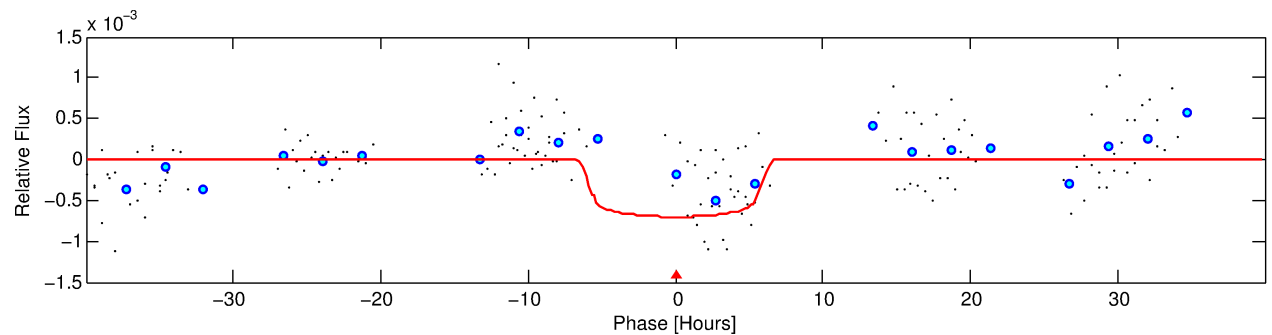
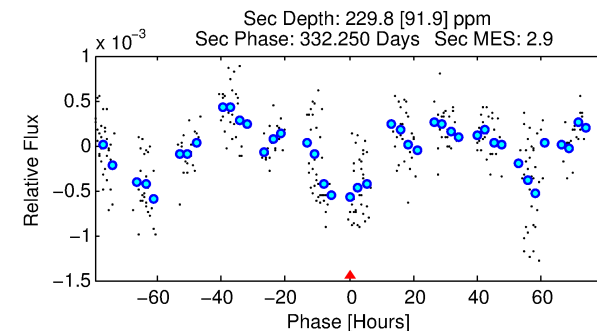
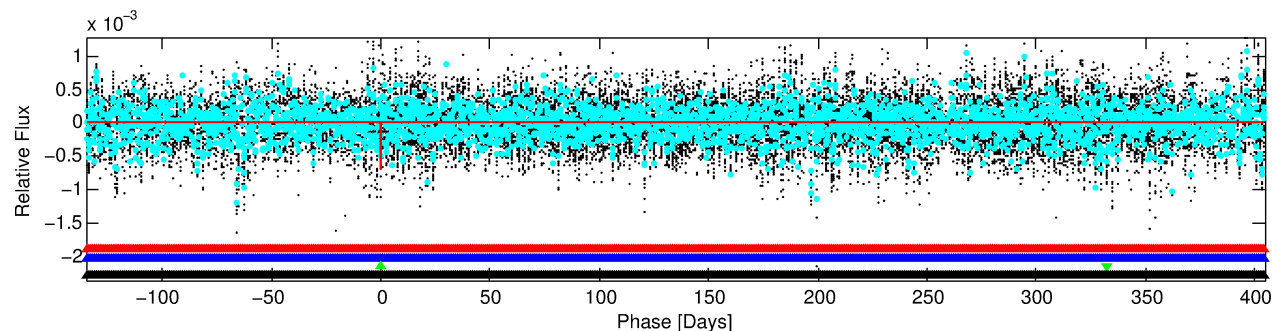
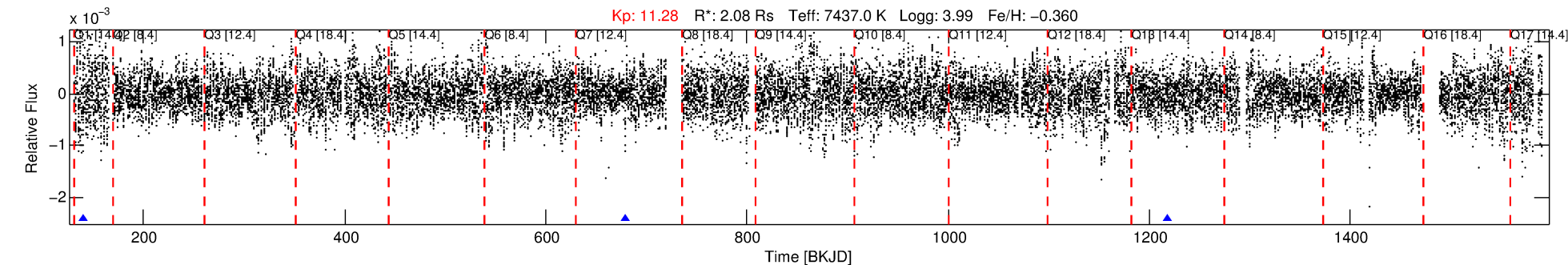
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 005709664-03

No Significant Match Found

DV One-Page Summary

KIC: 5709664 Candidate: 3 of 4 Period: 539.374 d



DV Fit Results:

Period = 539.37434 [0.01973] d
Epoch = 139.9603 [0.0212] BKJD
Rp/R* = 0.0277 [0.0038]
a/R* = 167.05 [77.68]
b = 0.87 [0.13]
Seff = 5.31 [2.70]
Teq = 387 [49] K
Rp = 6.27 [2.38] Re
a = 1.4920 [0.4706] AU
Ag = 7161.29 [4899.29] [1.46 σ]
Teffp = 5504 [708] K [7.21 σ]

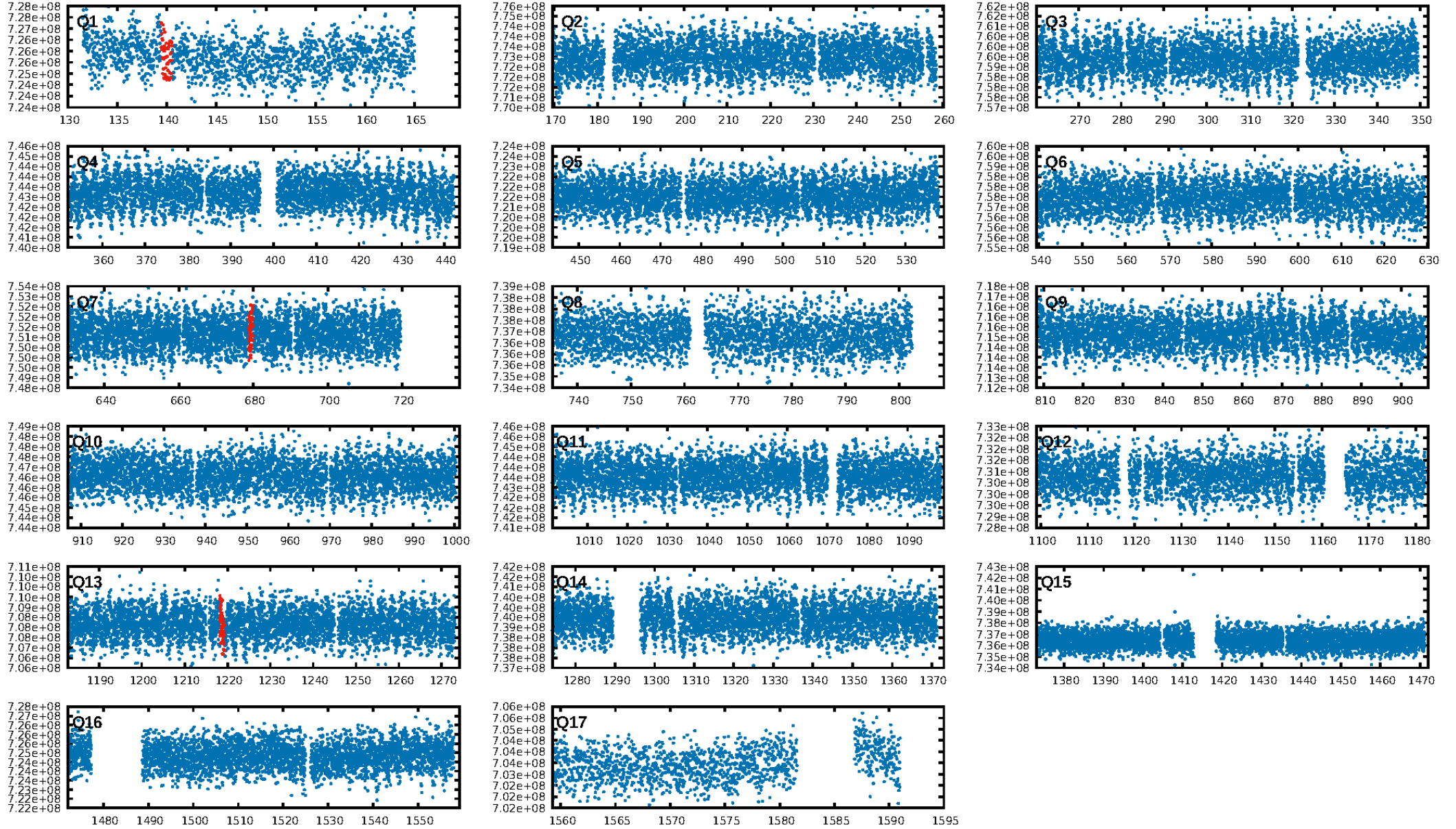
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [945.73 σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 99.4%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 1.71e-21
RollingBand-fgt: 1.00 [2/2]
GhostDiagnostic-chr: 0.6153
Centroid-sig: N/A
Centroid-so: 0.048 arcsec [0.21 σ]
OotOffset-rm: 2.056 arcsec [1.17 σ]
KicOffset-rm: 1.785 arcsec [1.18 σ]
OotOffset-st: 0/1/0/1 [2]
KicOffset-st: 0/1/0/1 [2]
DiffImageQuality-fgm: 1.00 [2/2]
DiffImageOverlap-fno: 0.00 [0/2]

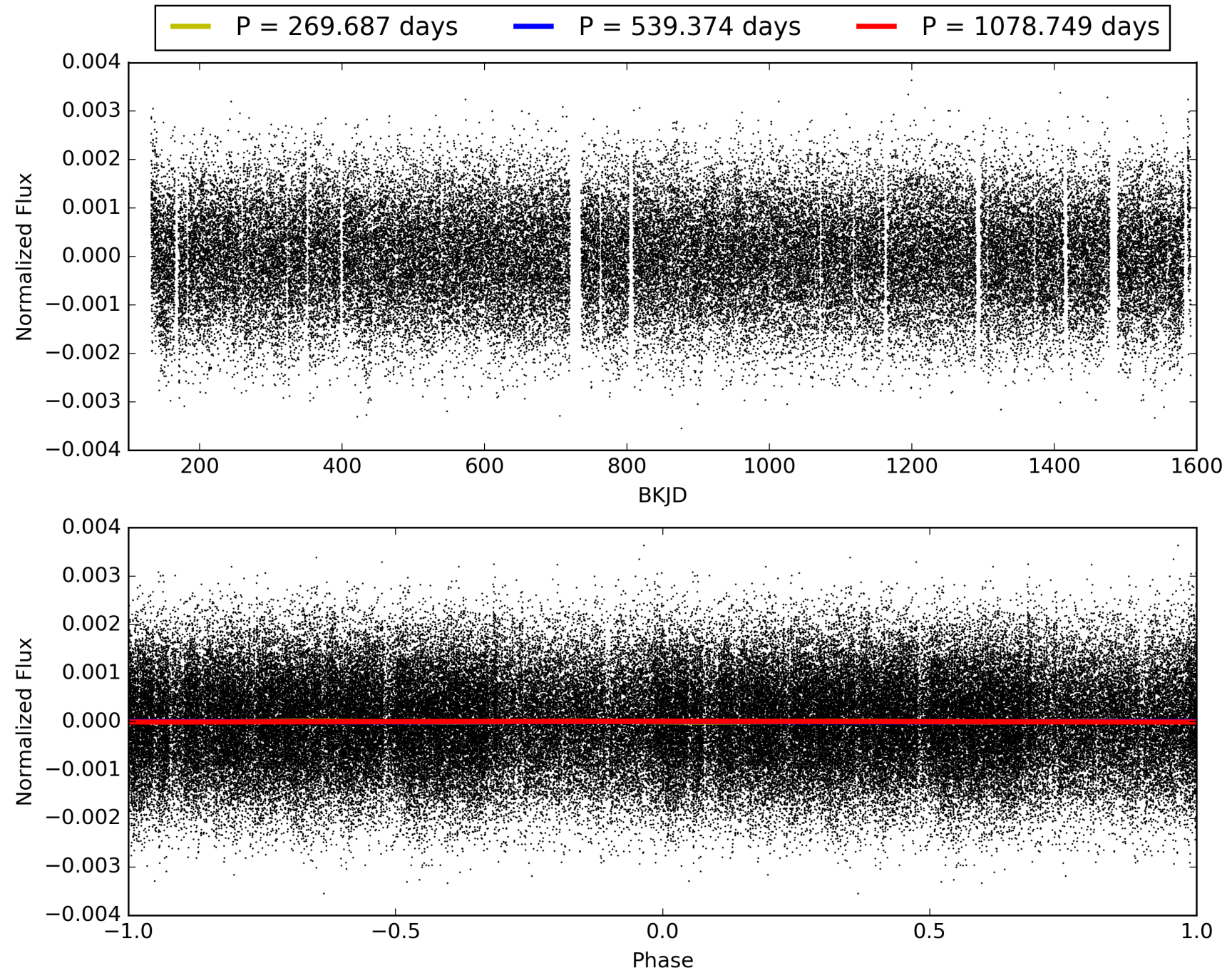
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 15:14:20 Z

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

TCE 005709664-03, PDC Light Curves

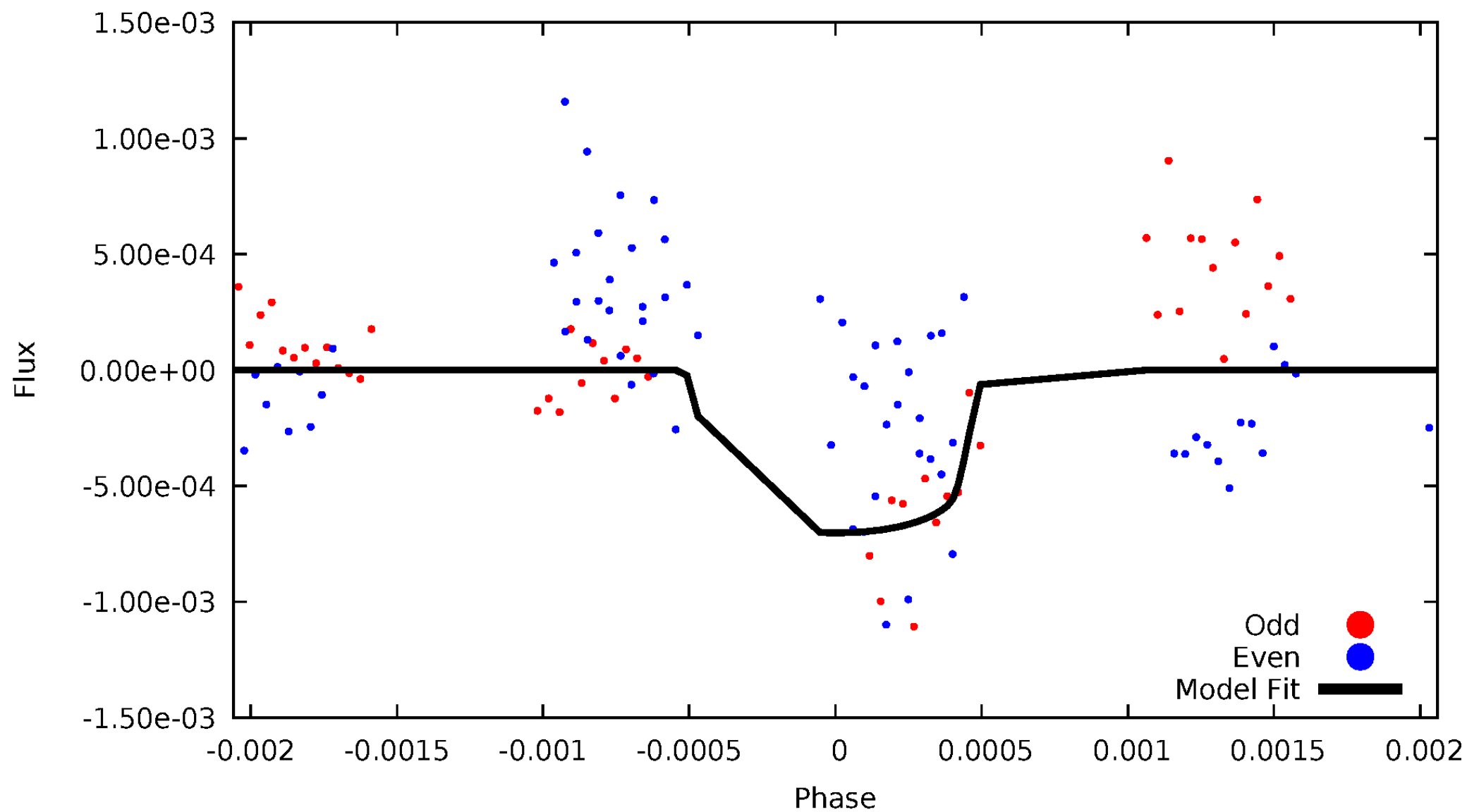


TCE 005709664-03



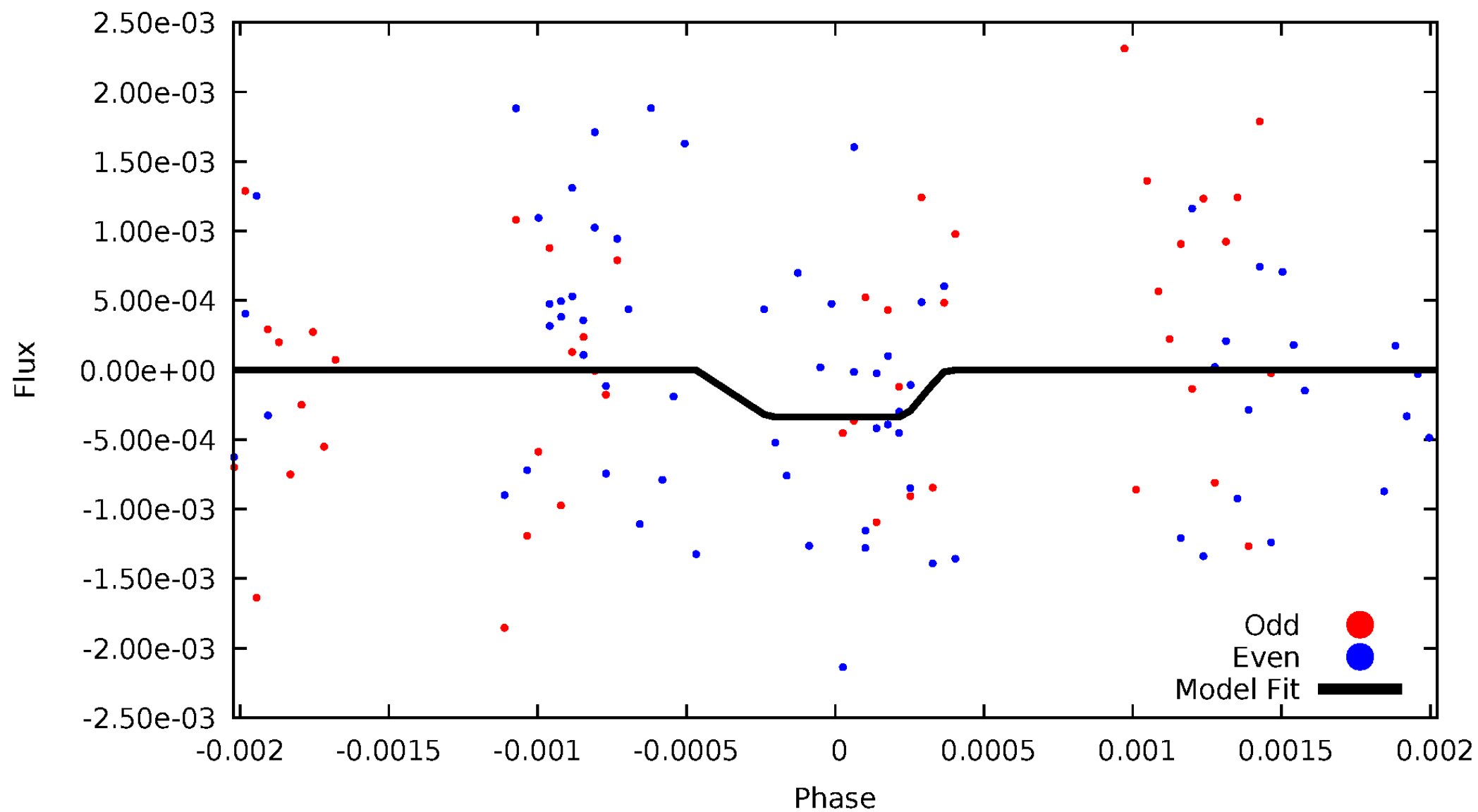
DV Odd/Even

TCE 005709664-03



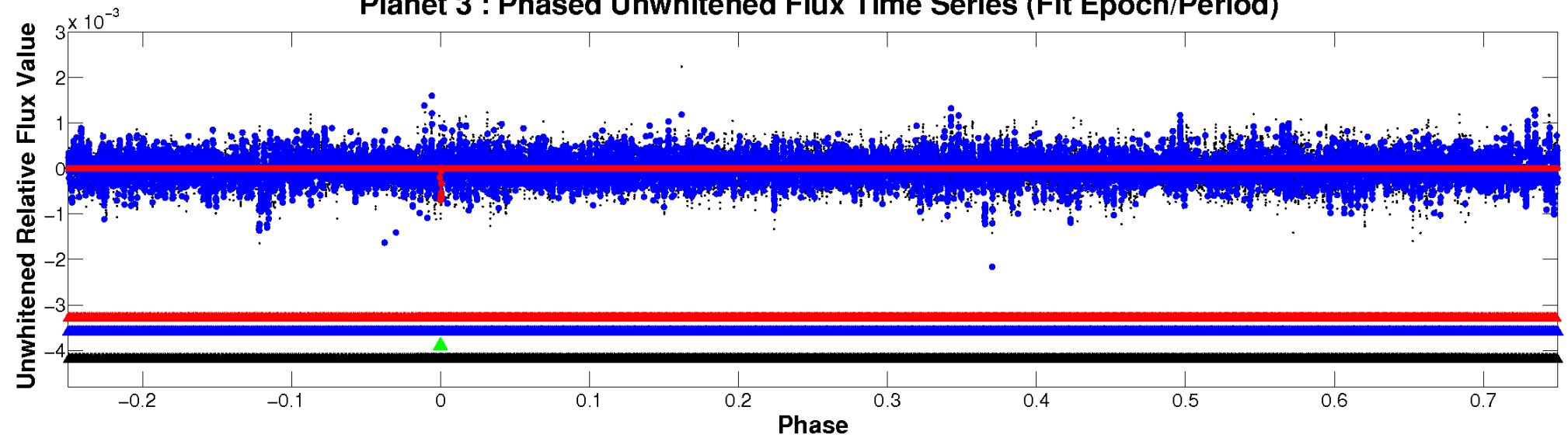
ALT Odd/Even

TCE 005709664-03

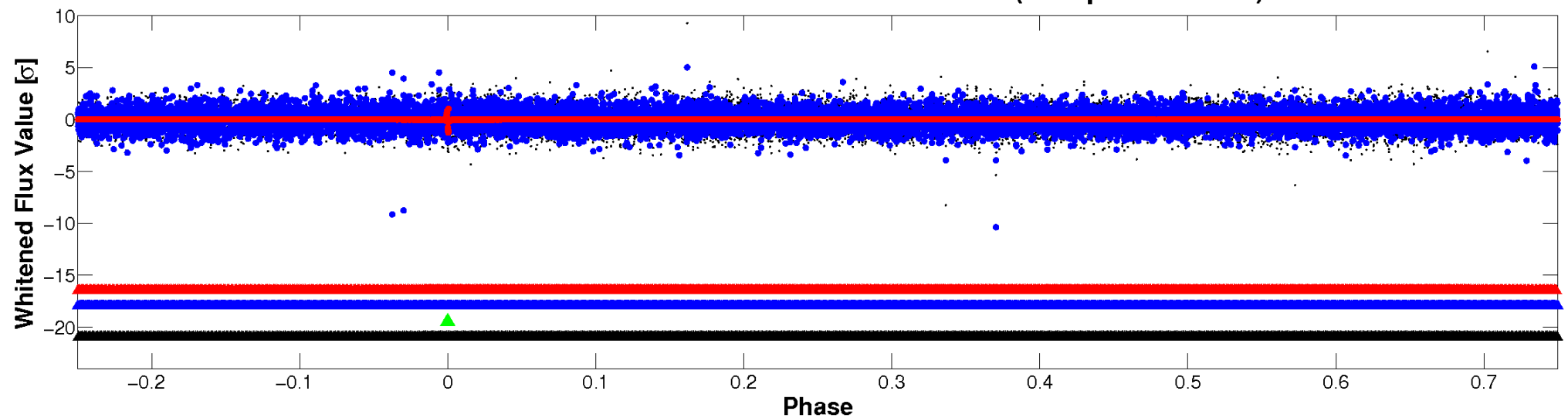


Non-Whitened Vs. Whitened Light Curve

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

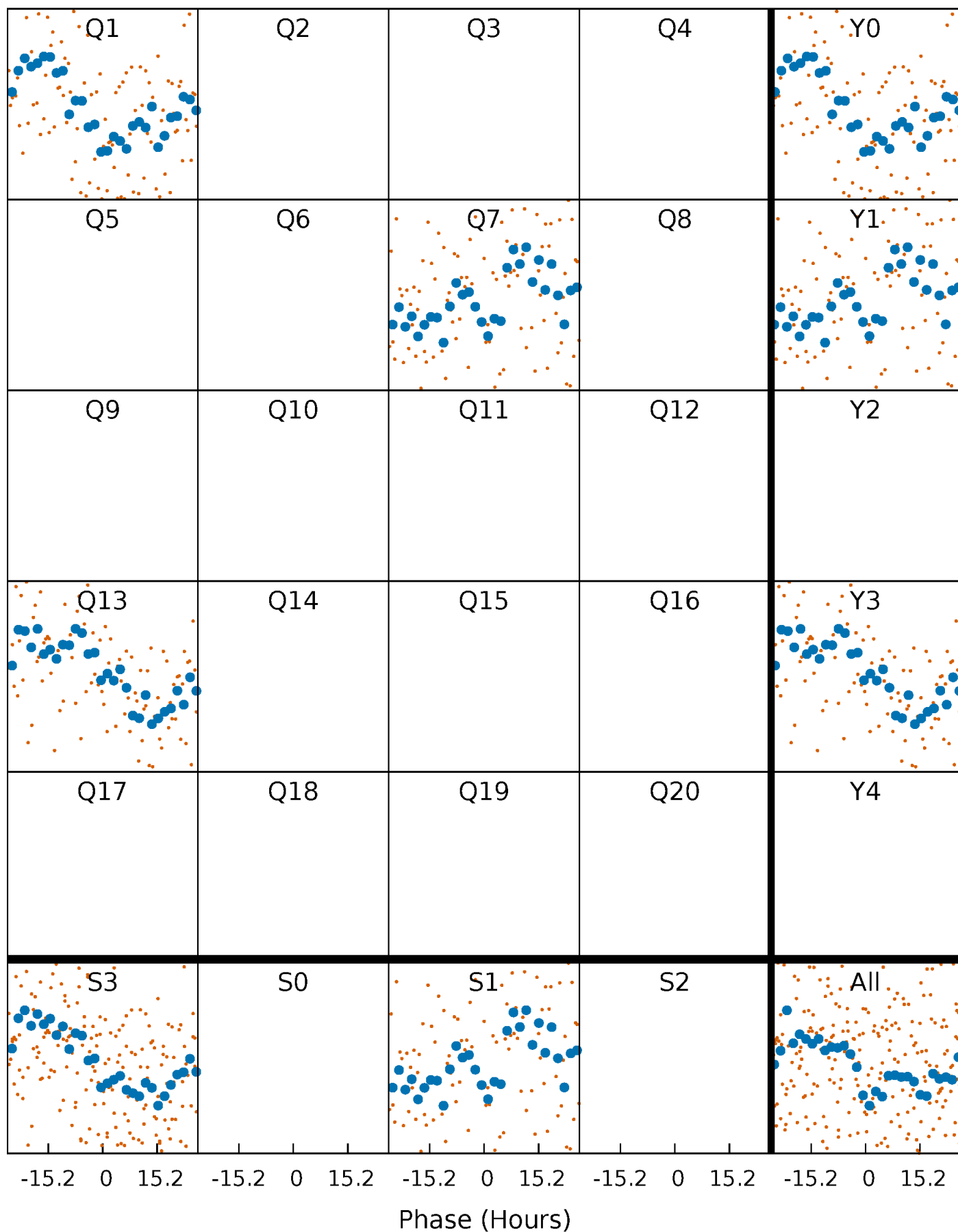


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



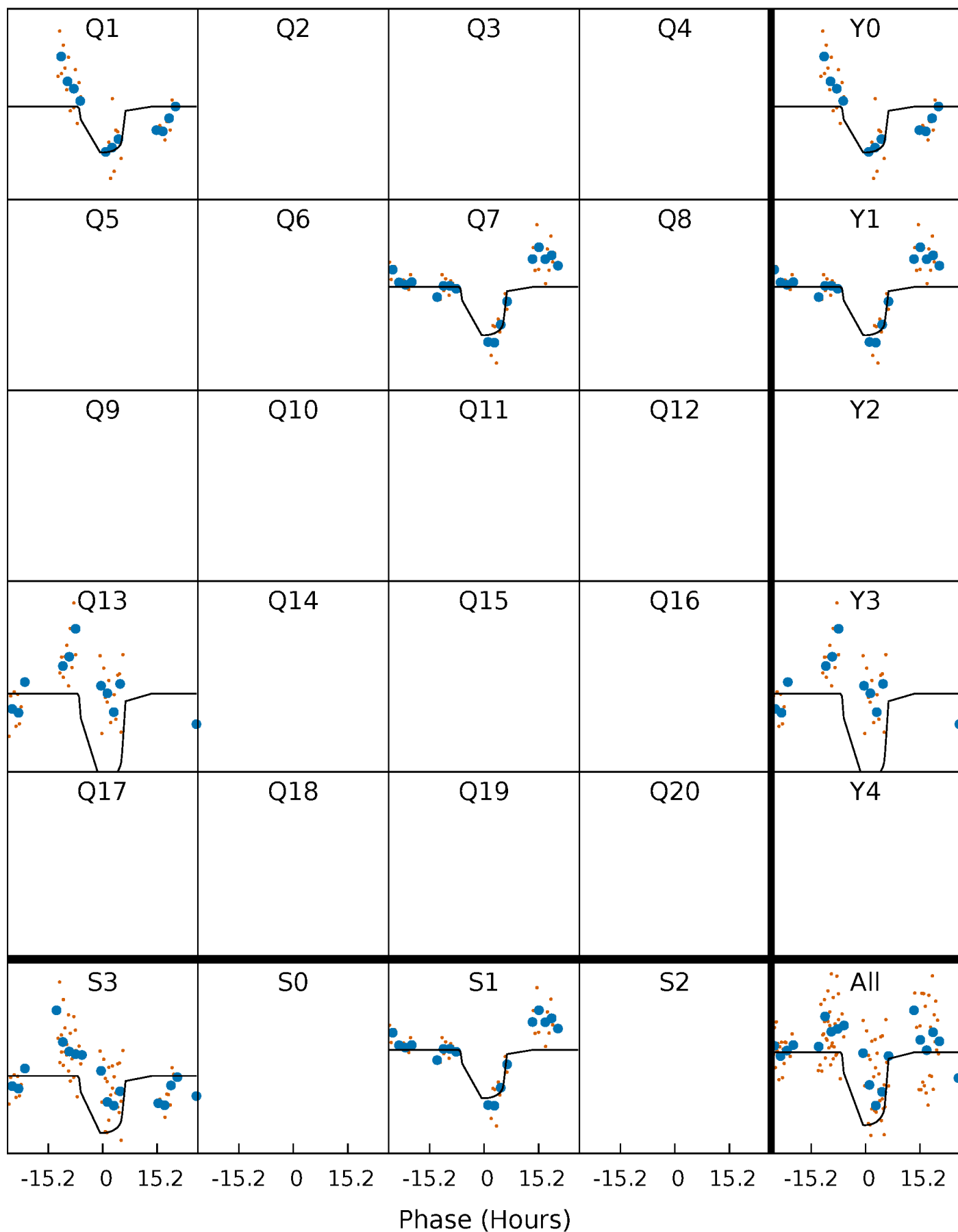
PDC Quarter-Phased Transit Curves

TCE 005709664-03 P=539.374337 Days $T_0=139.960347$ (BKJD)



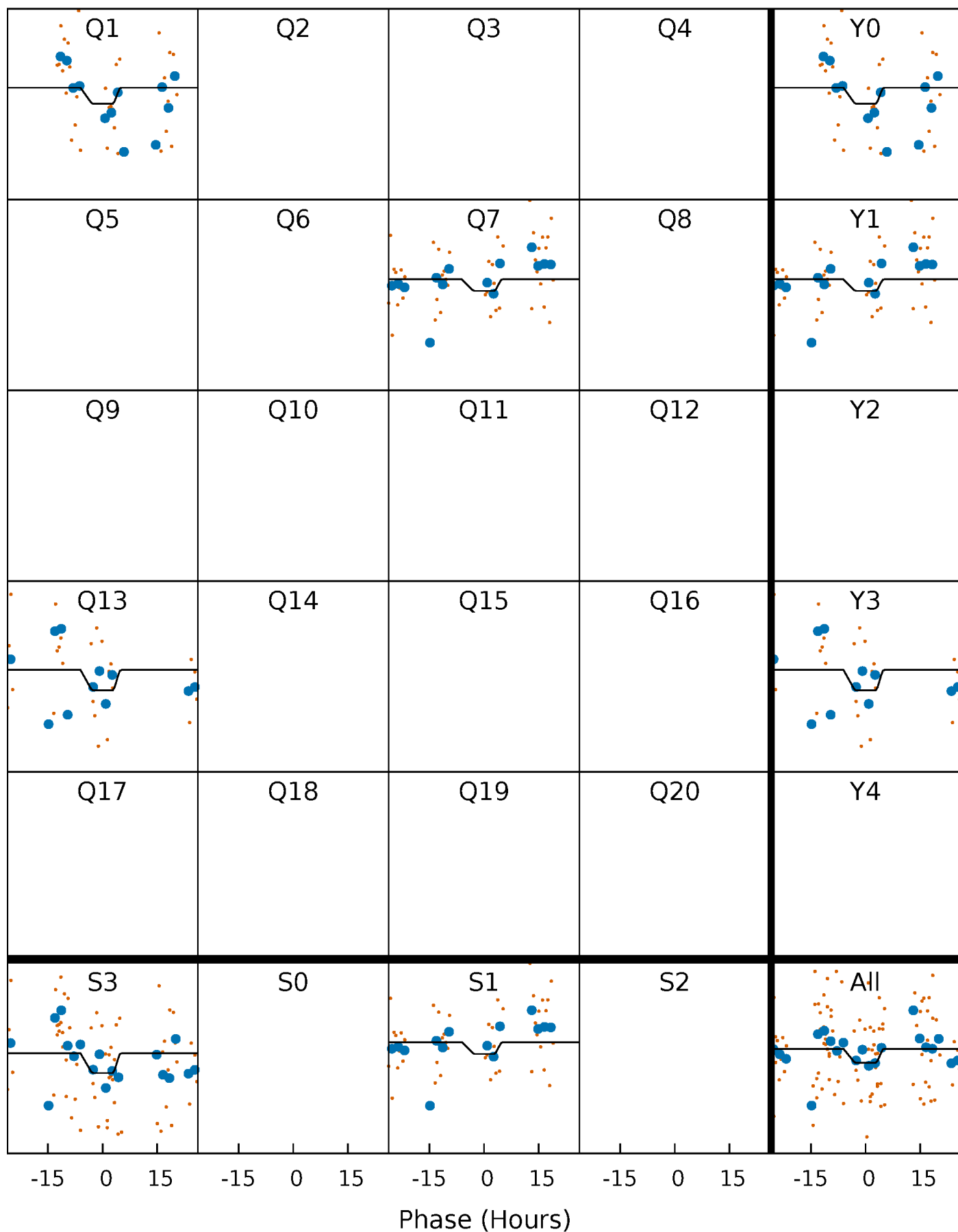
DV Quarter-Phased Transit Curves

TCE 005709664-03 $P=539.374337$ Days $T_0=139.960347$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

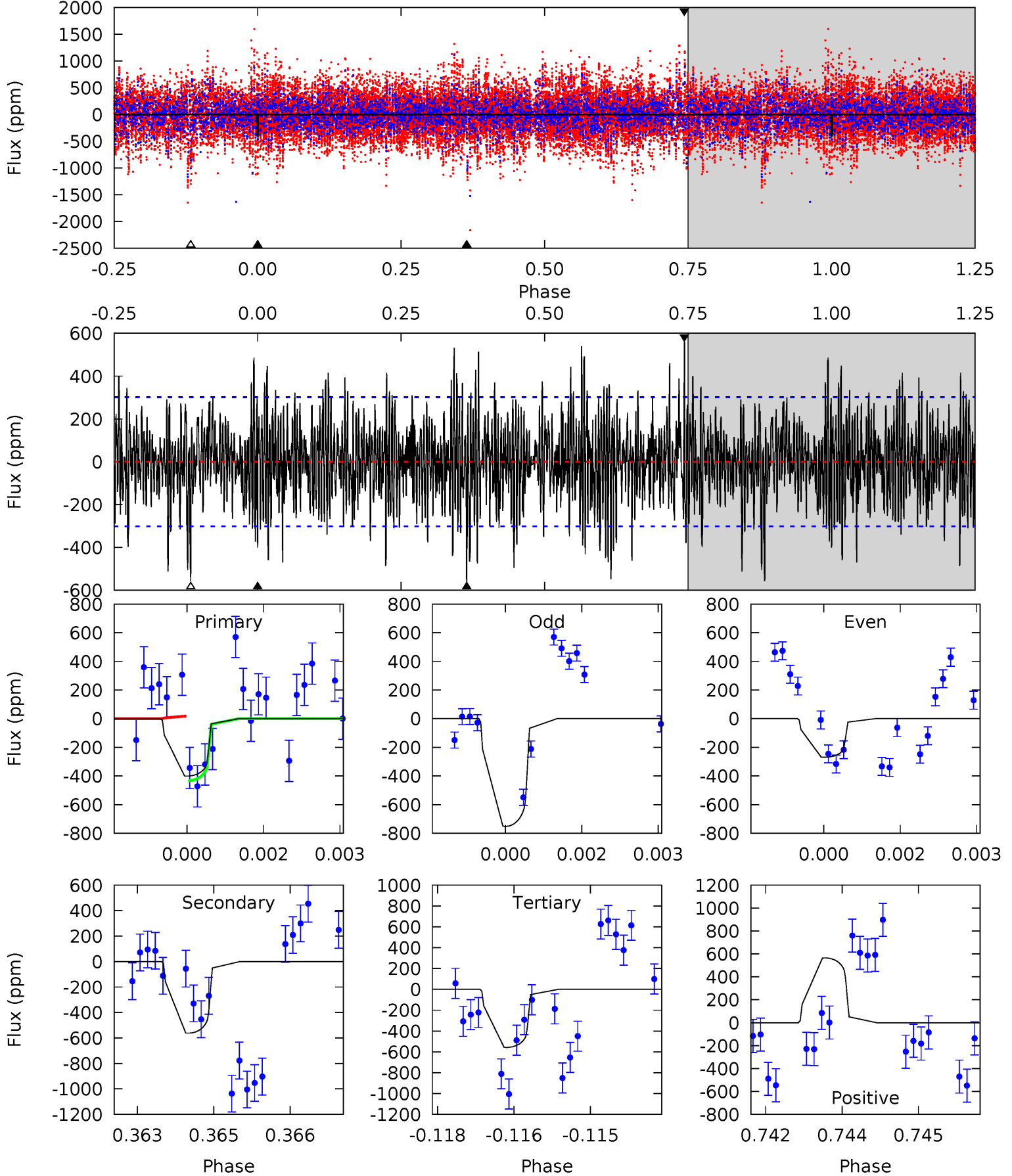
TCE 005709664-03 P=539.425550 Days $T_0=139.958820$ (BKJD)



DV Model-Shift Uniqueness Test

005709664-03, P = 539.374337 Days, E = 139.960347 Days

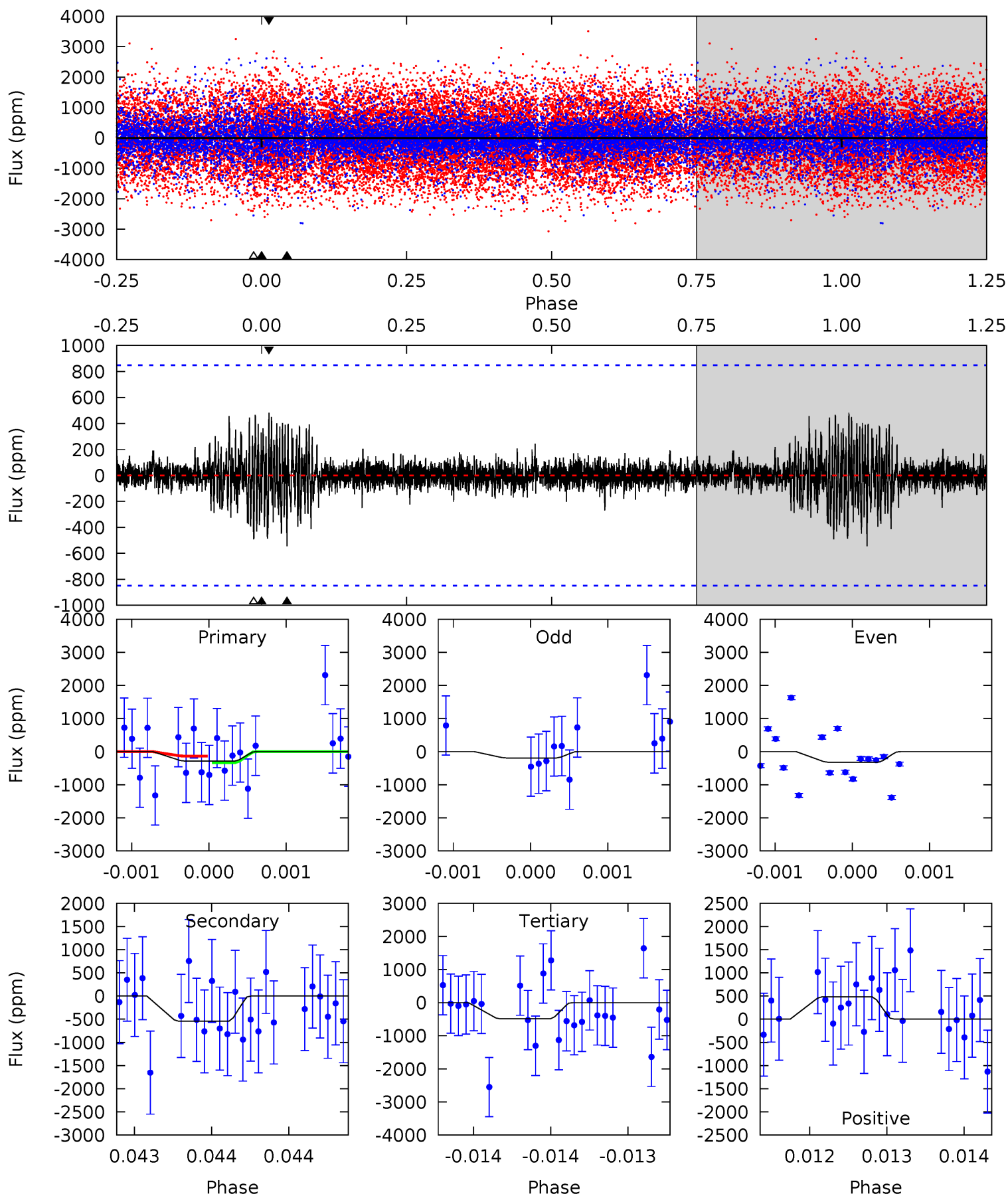
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.14	10.0	9.92	10.1	5.37	3.16	2.87	-2.78	-2.93	0.09	-0.05	3.95	0.75	0.50	2.03



Alt Model-Shift Uniqueness Test

005709664-03, P = 539.425550 Days, E = 139.958820 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
1.86	3.55	3.20	3.14	5.53	3.41	0.62	-1.34	-1.28	0.35	0.41	0.40	1.48	0.47	0.51



Stellar Parameters For KIC 005709664

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	7437^{+233}_{-311}	$3.986^{+0.273}_{-0.147}$	$-0.360^{+0.250}_{-0.350}$	$2.076^{+0.489}_{-0.734}$	$1.521^{+0.198}_{-0.296}$	$0.239^{+0.448}_{-0.106}$
	+3%/-4%	+7%/-4%	+69%/-97%	+24%/-35%	+13%/-19%	+187%/-44%
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 005709664-03 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-562 ± 56	$6.00^{+1.32}_{-1.19}$	534^{+39}_{-53}	6794^{+699}_{-533}	18789^{+10376}_{-6140}
Alt.	-545 ± 153	$4.02^{+1.27}_{-1.02}$	538^{+38}_{-48}	8539^{+1869}_{-1325}	39033^{+38350}_{-17573}

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

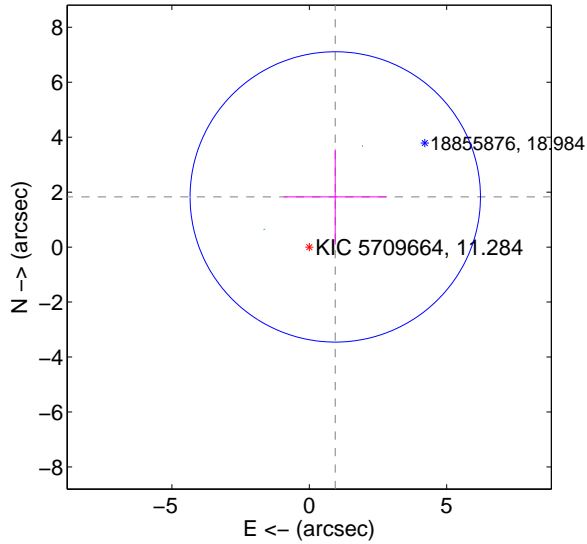
Supplemental centroid analysis for 005709664-03. **Kepler magnitude: 11.28.** Transit SNR 6.07

There are 2 quarters with good PRF difference image offsets

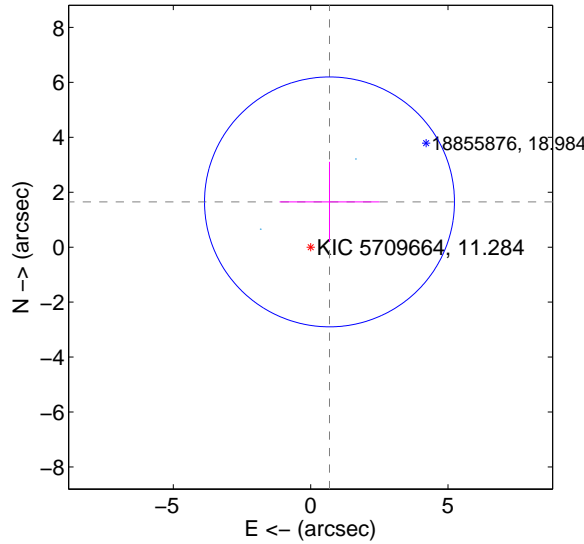
The direct PRF centroid is offset from the target star catalog position by about 0.55 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	2.056 ± 1.761	1.17	-0.945 ± 1.871	1.826 ± 1.730
PRF-fit source offset from KIC position	1.785 ± 1.516	1.18	-0.685 ± 1.815	1.648 ± 1.458
photometric centroid source offset	0.05 ± 0.23	0.21	0.01 ± 0.19	-0.05 ± 0.23

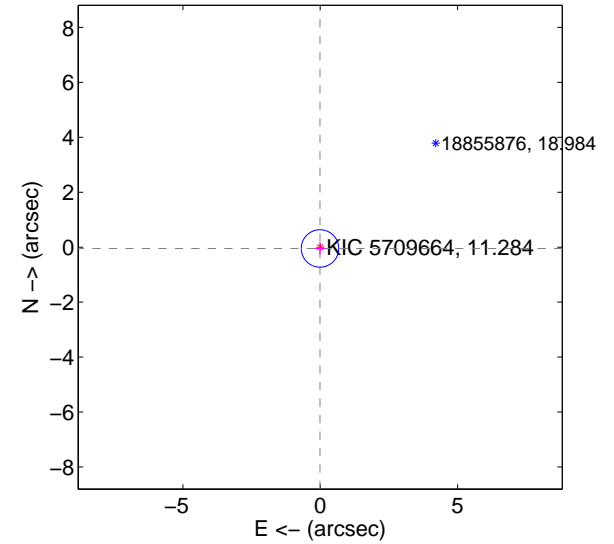
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

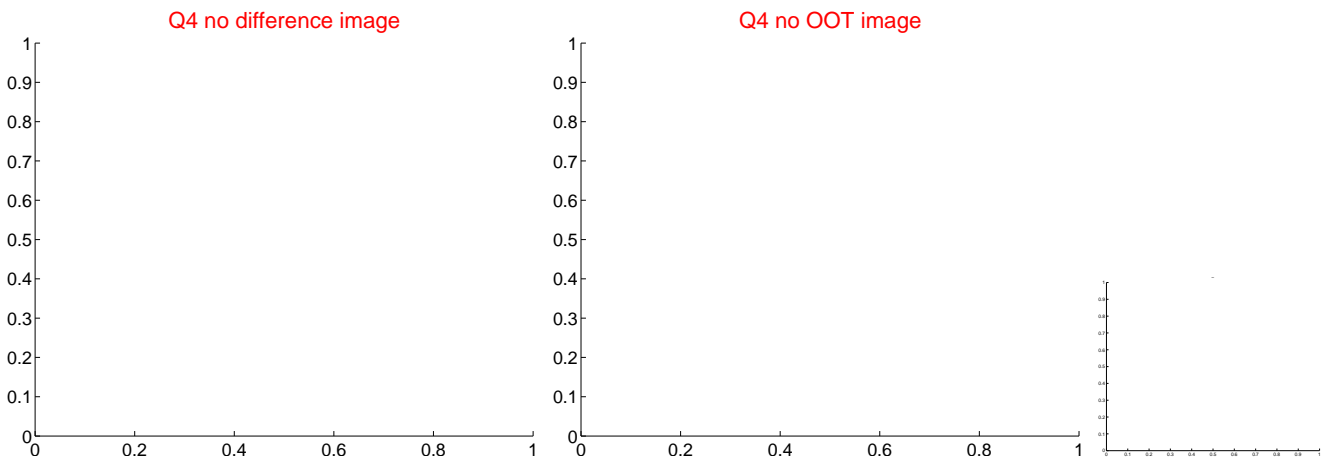
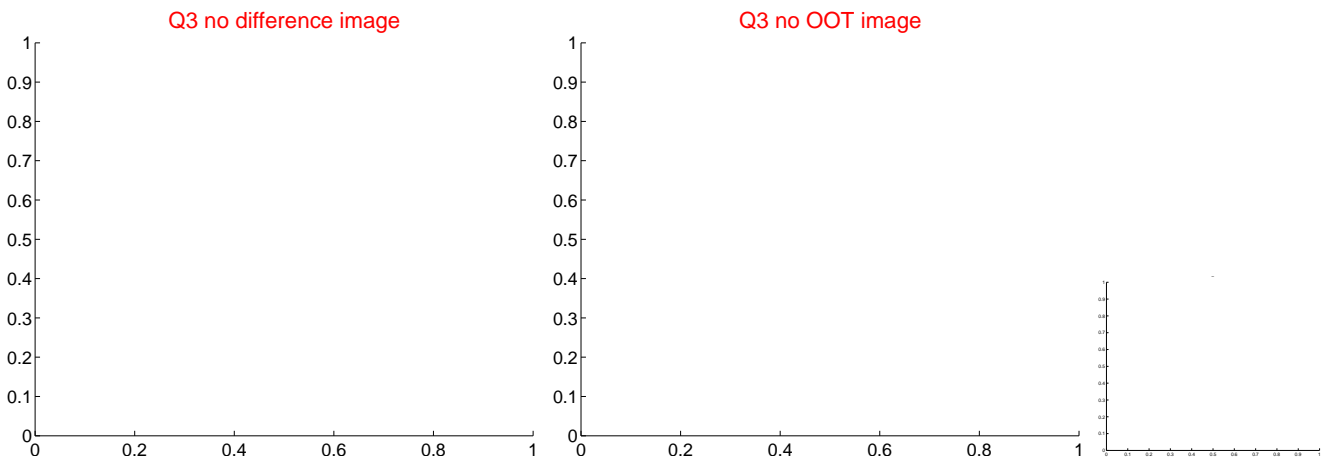
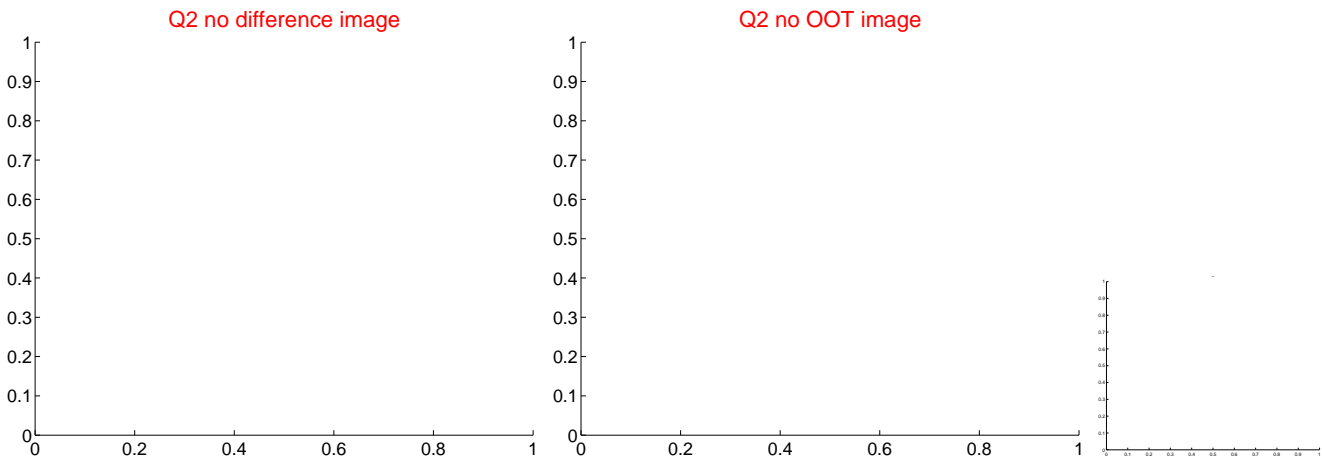
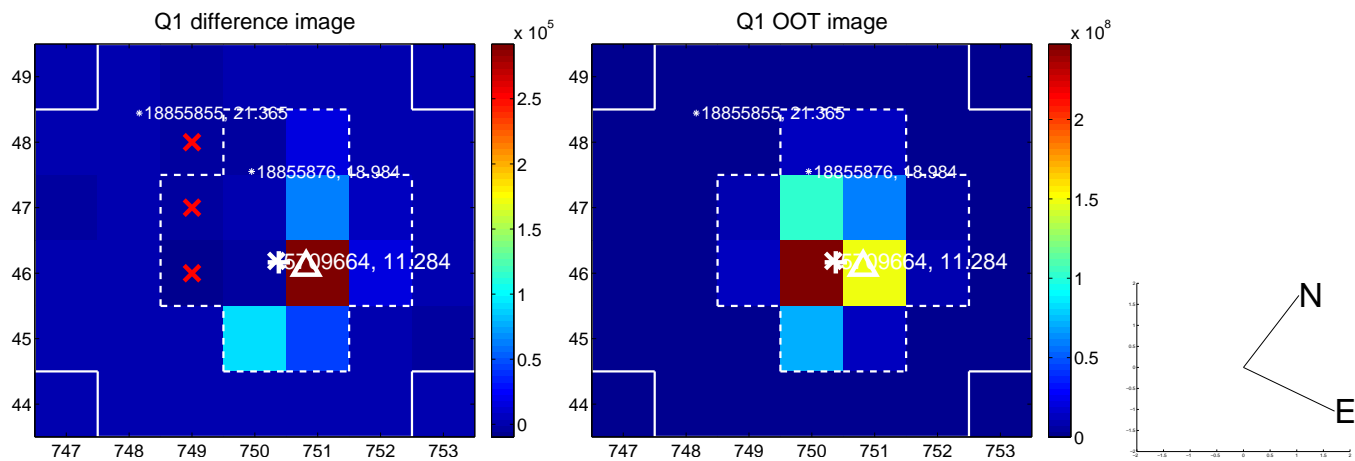


offset from photometric centroids

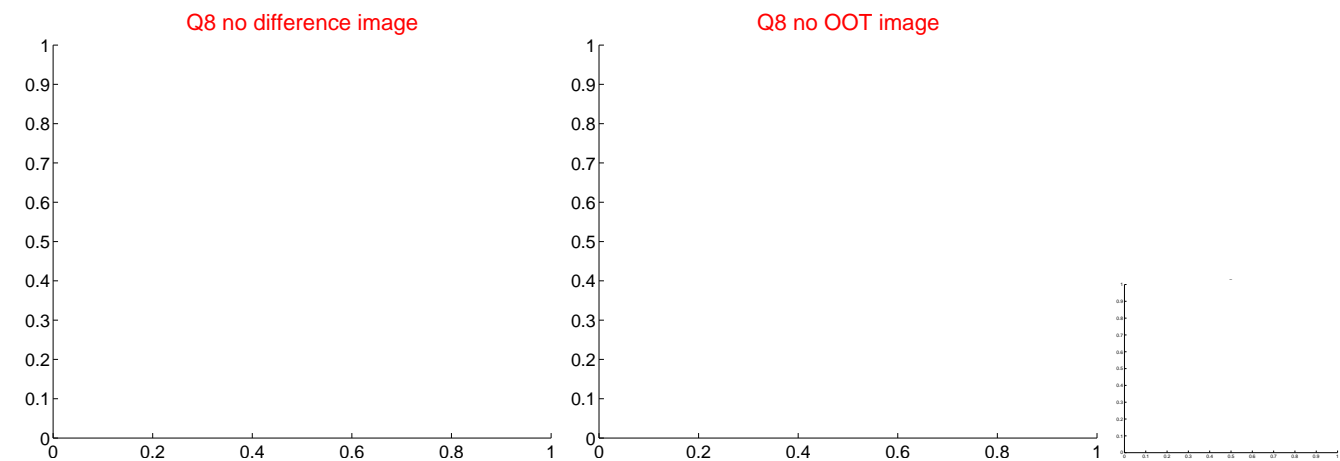
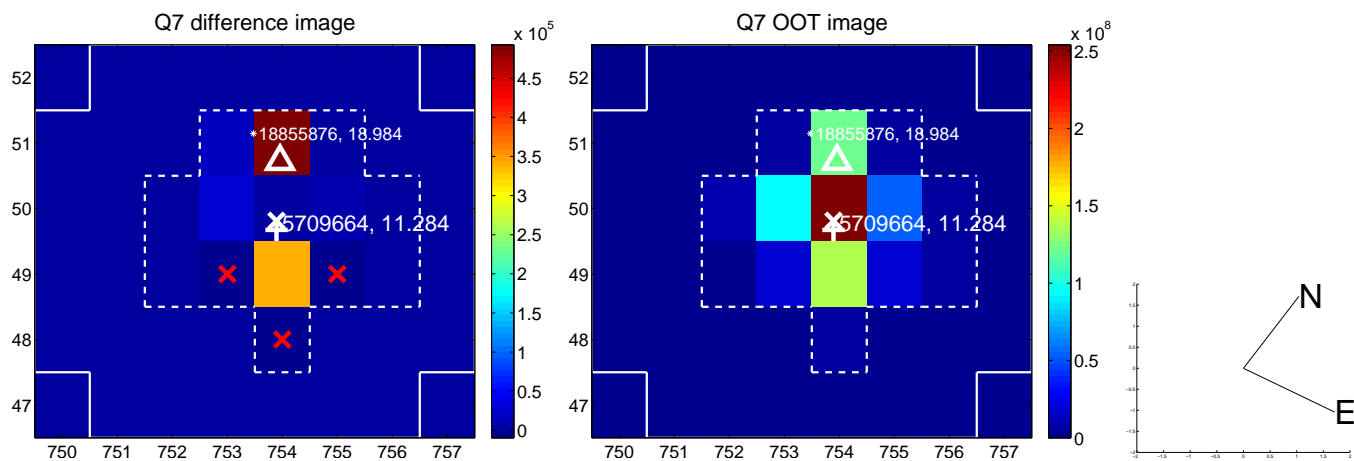
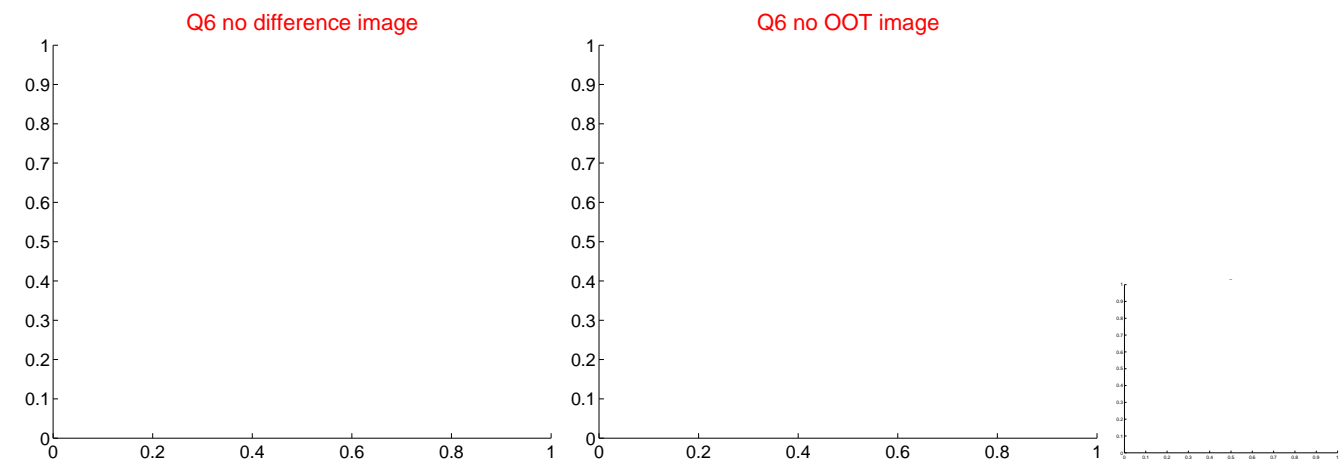
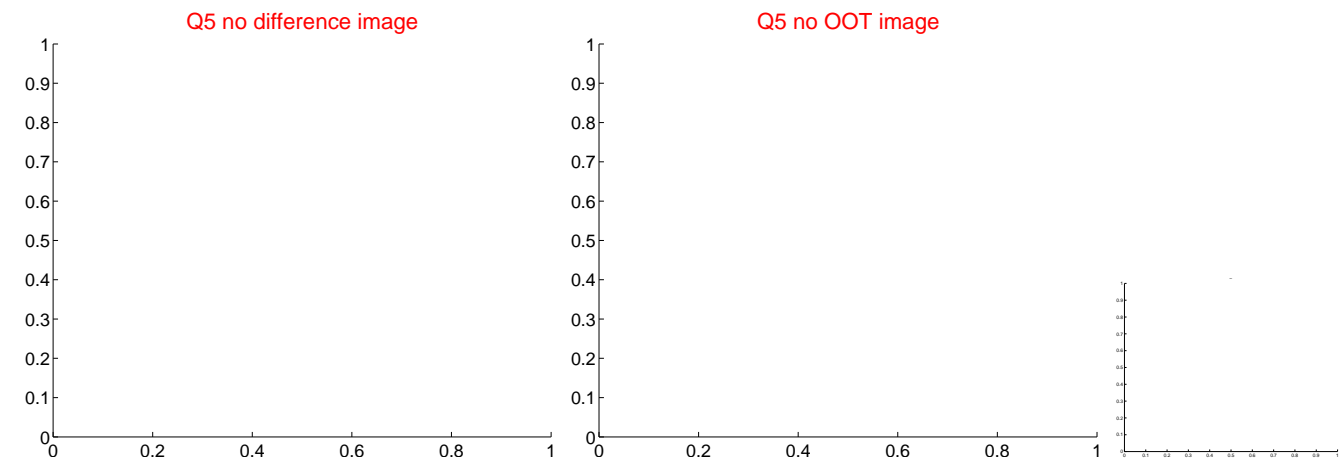


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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



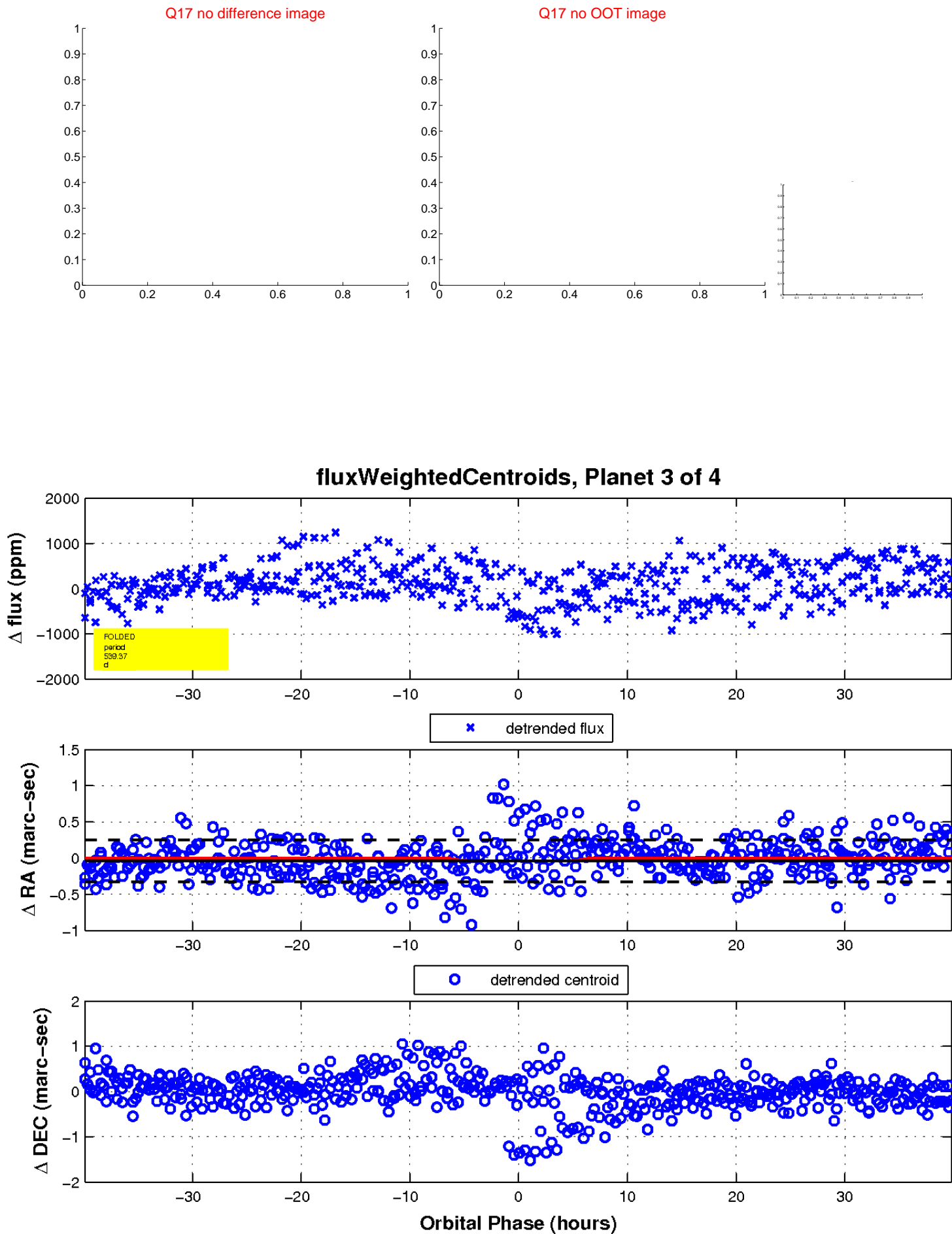
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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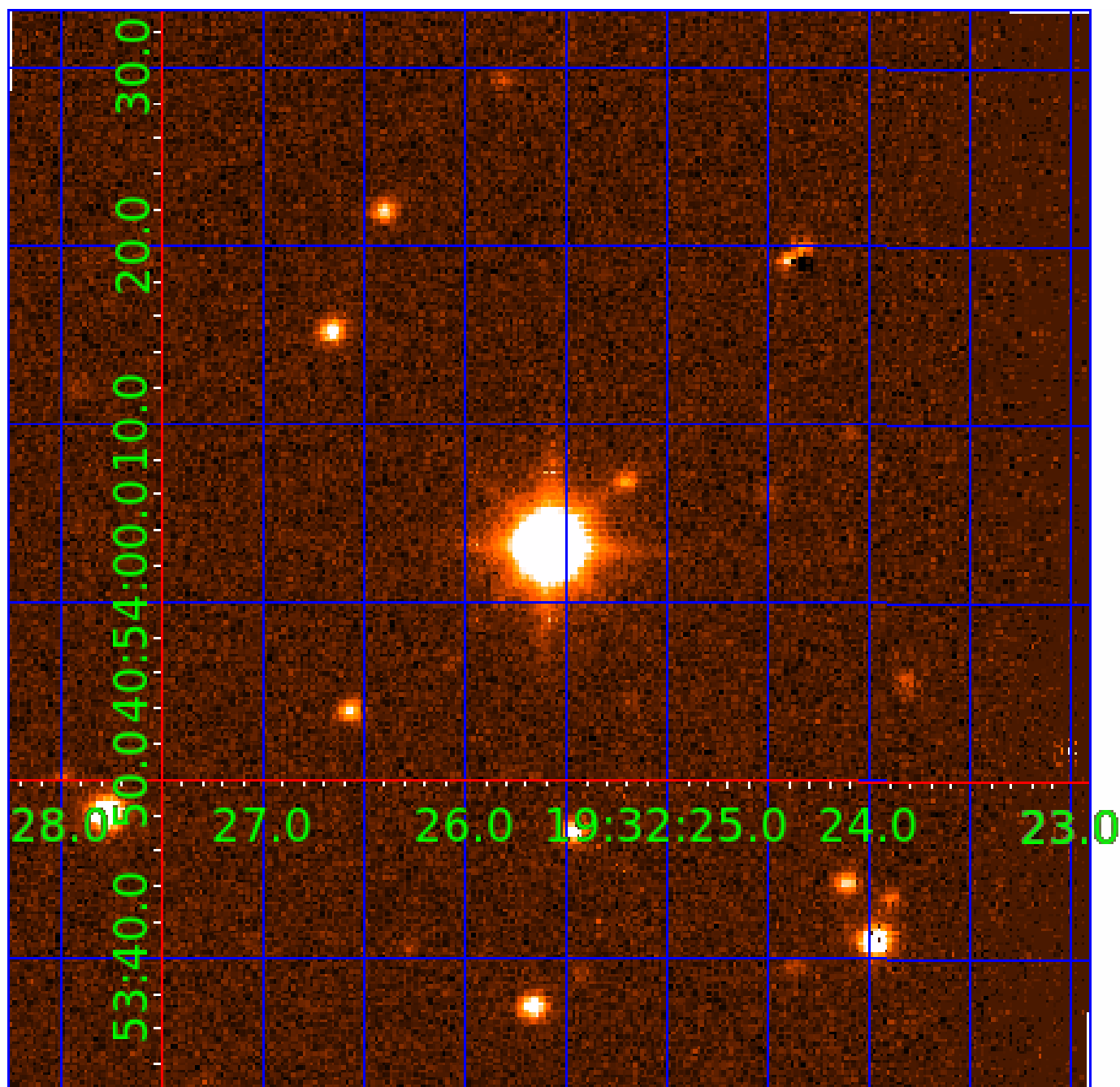


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 005709664

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})
005709664-01	OBS	No	1.395896	132.006259	48.3	2.971	13.7	14.5	2.08	7437	1.70	14933.66
005709664-02	OBS	No	0.561236	131.988496	31.5	2.063	16.5	12.3	2.08	7437	1.35	50324.18
005709664-03	OBS	No	539.374336	139.960347	702.5	13.325	10.0	6.1	2.08	7437	6.27	5.31
005709664-04	OBS	No	1.395884	131.634519	41.2	3.259	8.1	8.2	2.08	7437	1.54	14933.83

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
005709664-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_POS_ALT—CENT_SATURATED
005709664-02	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—CENT_SATURATED
005709664-03	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_CHASES_MARSHALL_SKYE—LPP_DV—LPP_ALT—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT—INCONSISTENT_TRANS—CENT_SATURATED
005709664-04	OBS	FP	0.00	1	0	0	0	TRANS_GAPPED—LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT—MOD_TER_ALT—SAME_NTL_PERIOD—CENT_SATURATED

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

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

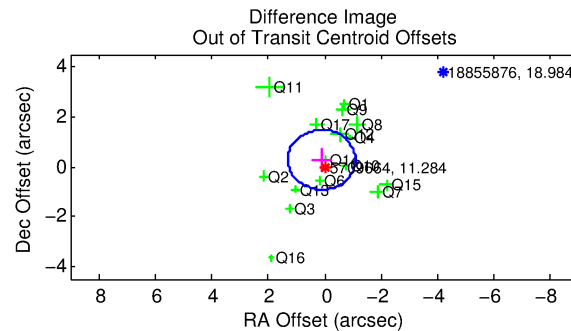
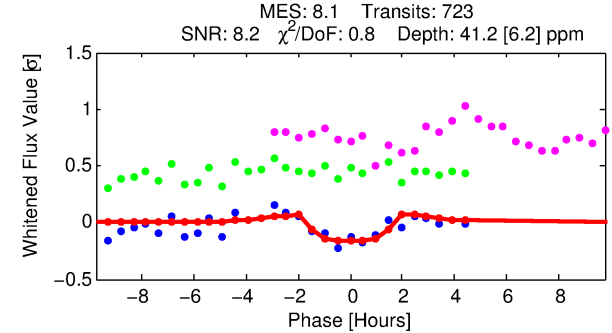
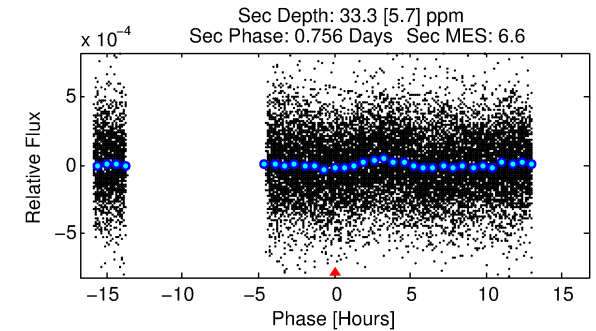
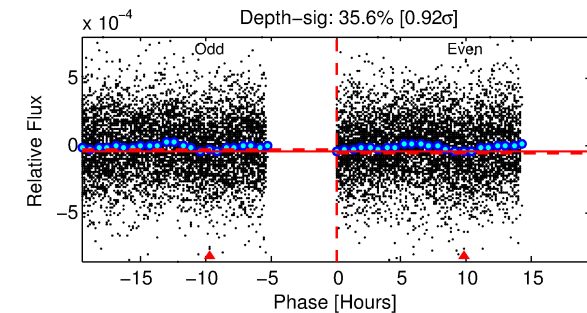
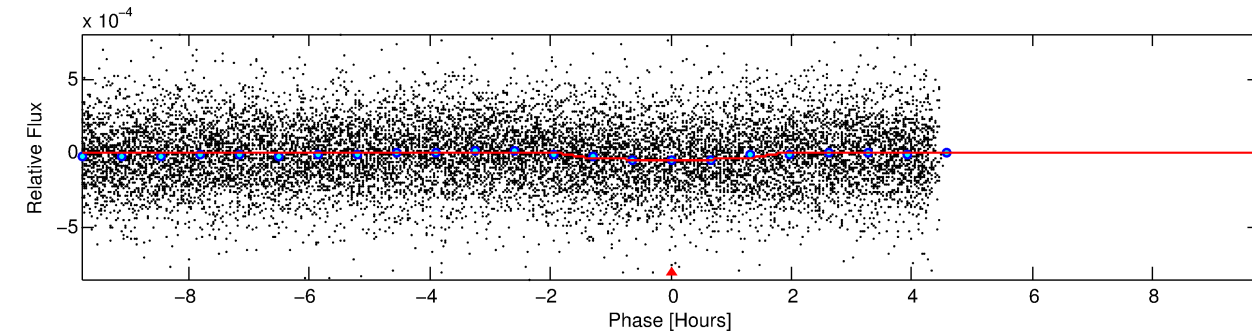
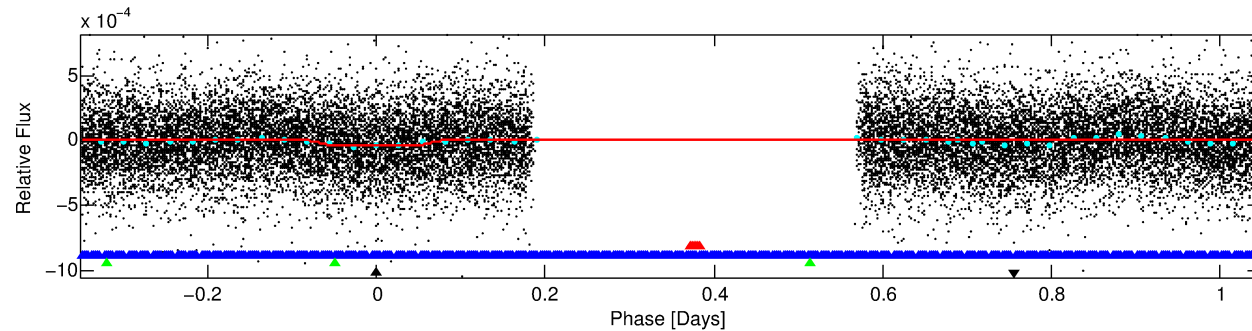
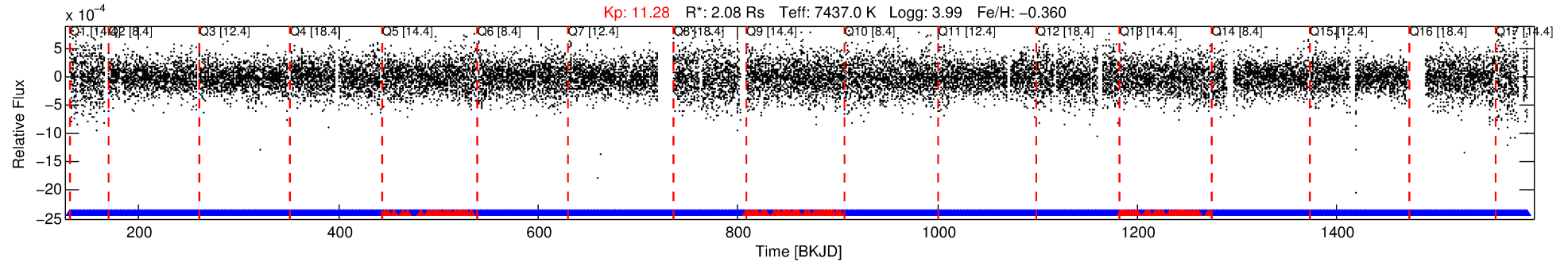
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 005709664-04

No Significant Match Found

DV One-Page Summary

KIC: 5709664 Candidate: 4 of 4 Period: 1.396 d



DV Fit Results:

Period = 1.39588 [0.00001] d
Epoch = 131.6345 [0.0039] BKJD
Rp/R* = 0.0068 [0.0029]
a/R* = 1.76 [3.22]
b = 0.90 [0.59]
Seff = 14933.83 [7602.46]
Teq = 2819 [359] K
Rp = 1.54 [0.86] Re
a = 0.0281 [0.0089] AU
Ag = 6.08 [6.09] [0.83 σ]
Teffp = 6845 [1530] K [2.56 σ]

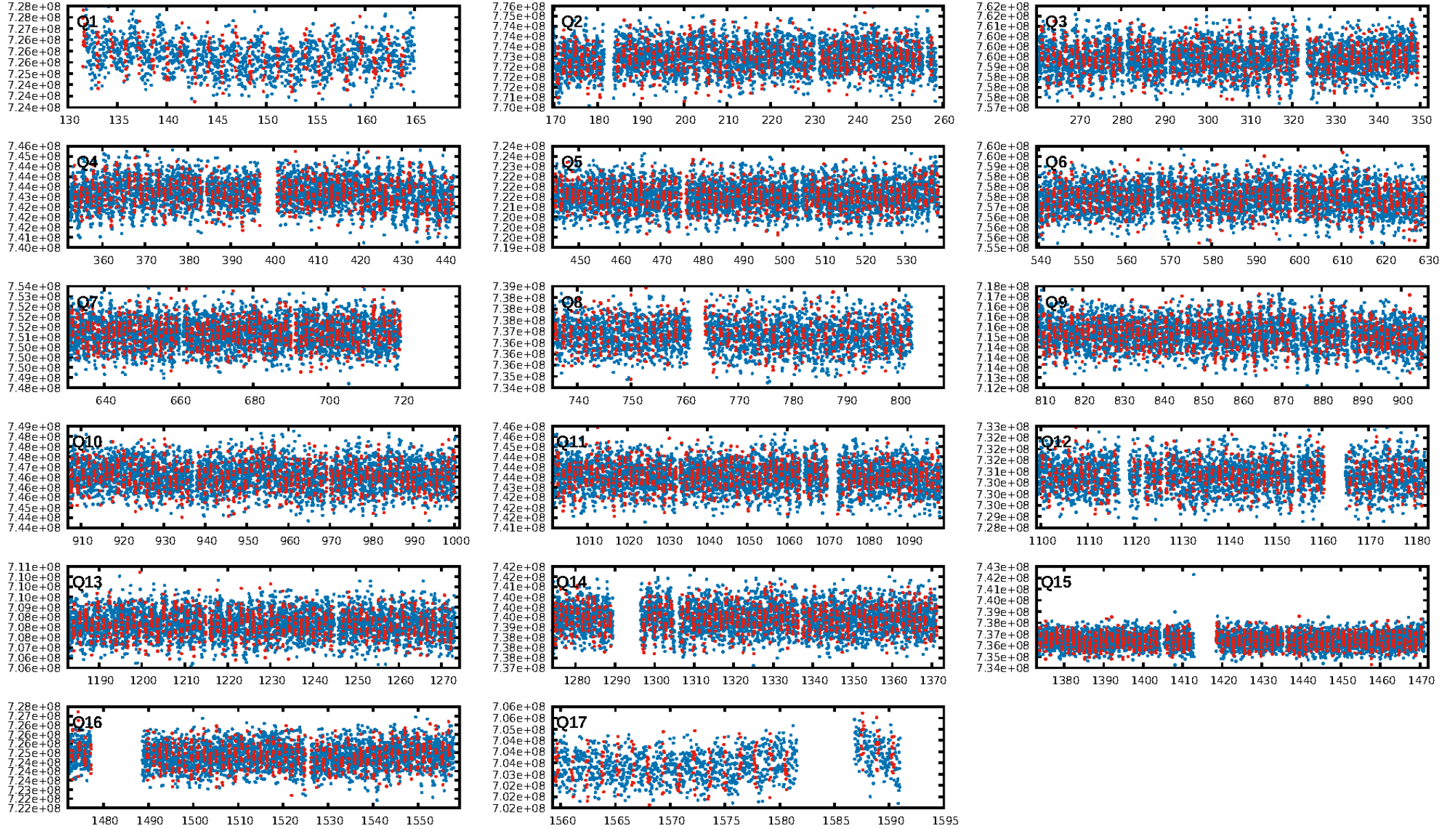
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [5.19 σ]
LongPeriod-sig: 0.0% [0.00 σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 9.66e-16
RollingBand-fgt: 0.88 [607/686]
GhostDiagnostic-chr: -35.89
Centroid-sig: N/A
Centroid-so: 0.381 arcsec [1.60 σ]
OotOffset-rm: 0.293 arcsec [0.74 σ]
KicOffset-rm: 0.401 arcsec [0.95 σ]
OotOffset-st: 4/4/4/4 [16]
KicOffset-st: 4/4/4/4 [16]
DiffImageQuality-fgm: 0.50 [8/16]
DiffImageOverlap-fno: 0.00 [0/17]

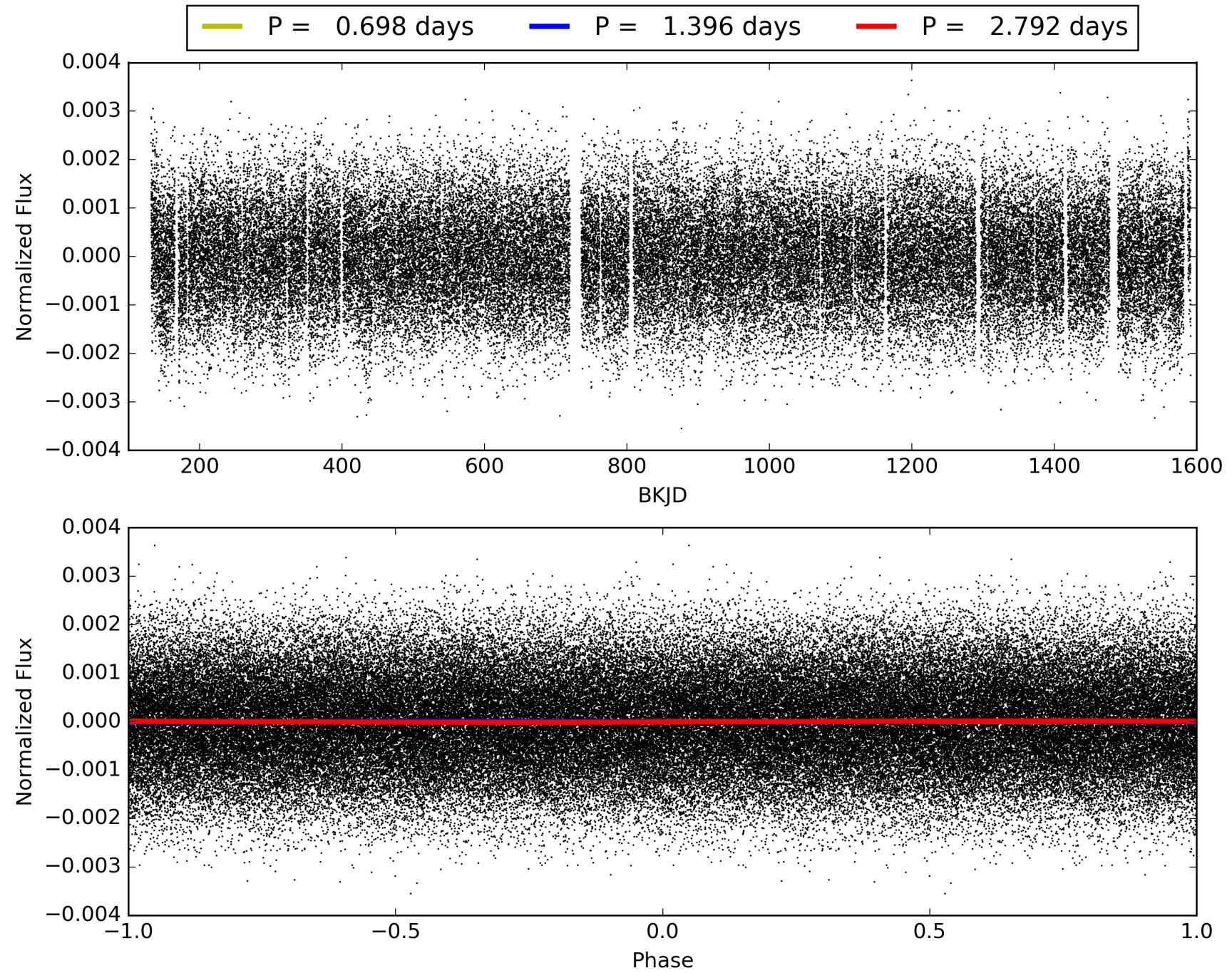
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 15:14:26 Z

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

TCE 005709664-04, PDC Light Curves

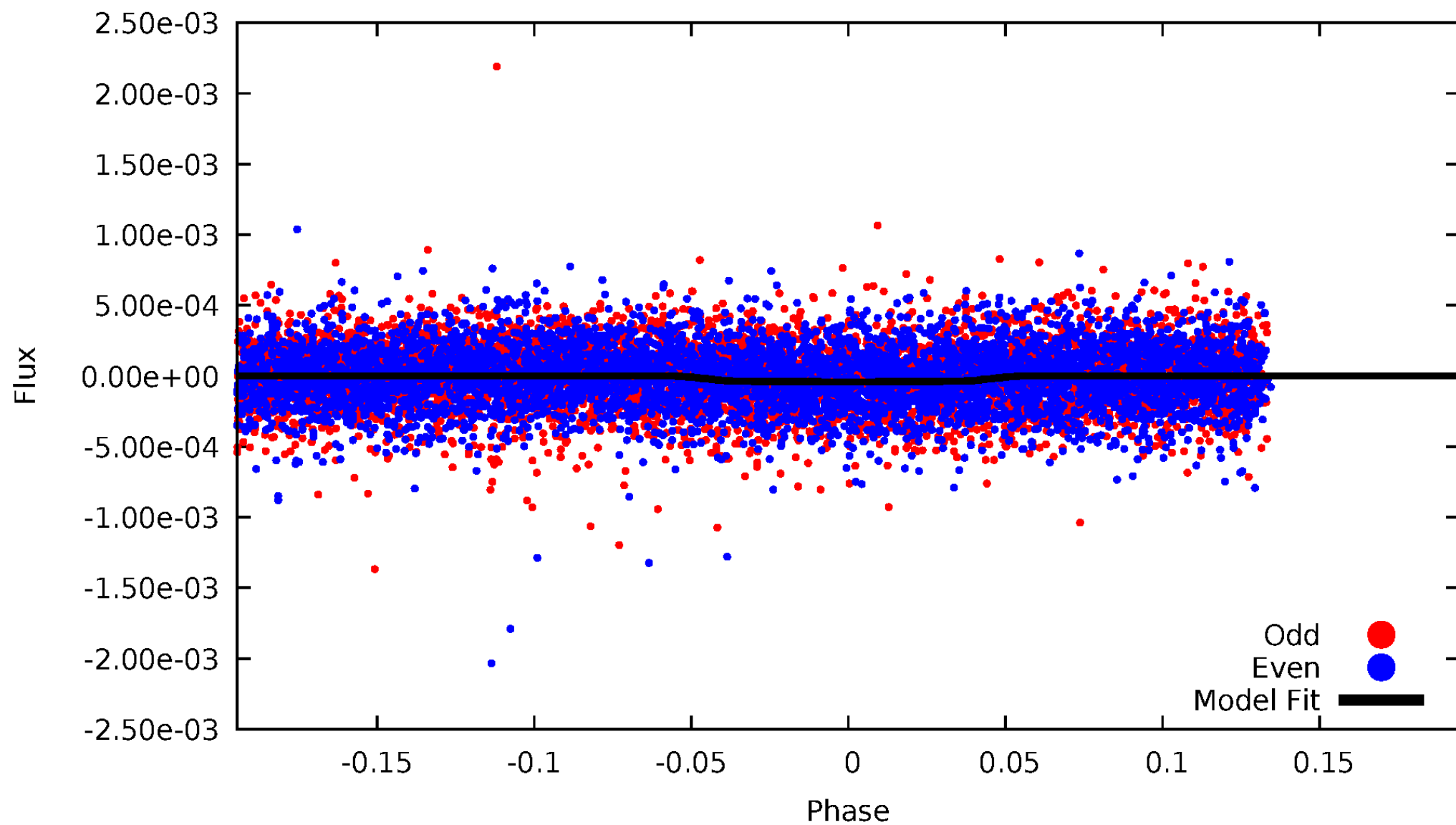


TCE 005709664-04



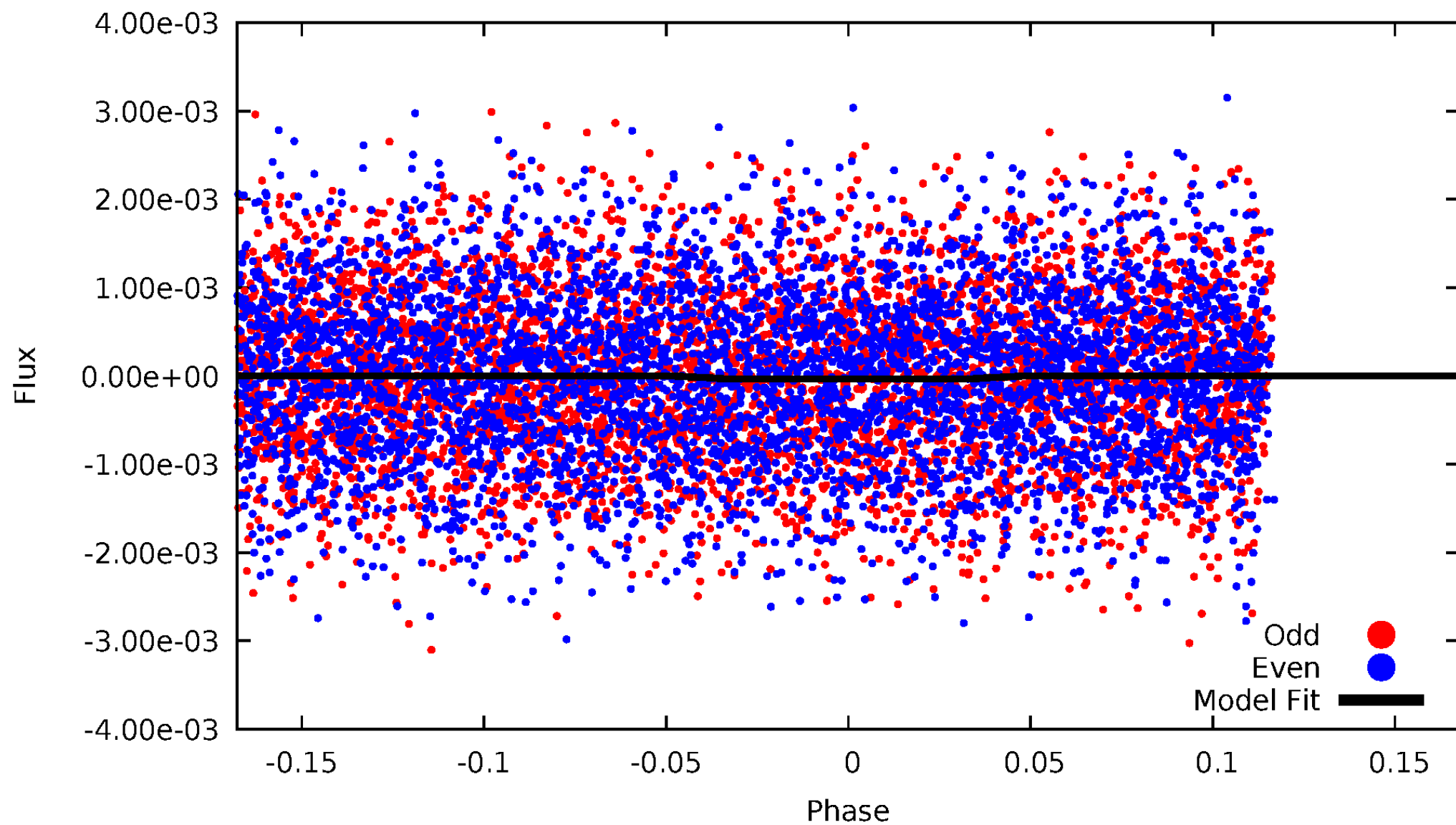
DV Odd/Even

TCE 005709664-04



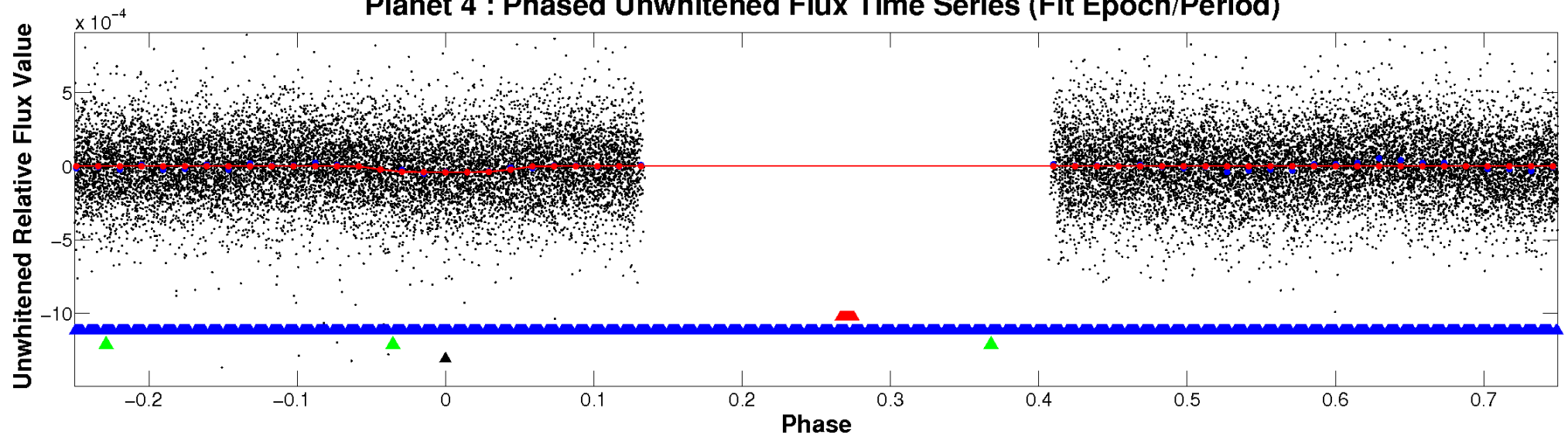
ALT Odd/Even

TCE 005709664-04

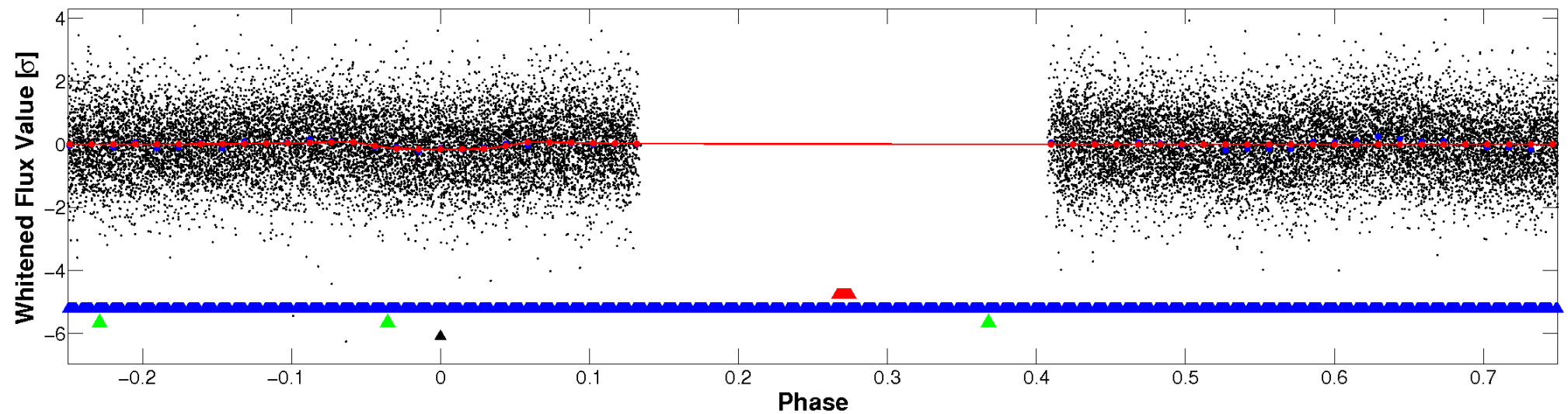


Non-Whitened Vs. Whitened Light Curve

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

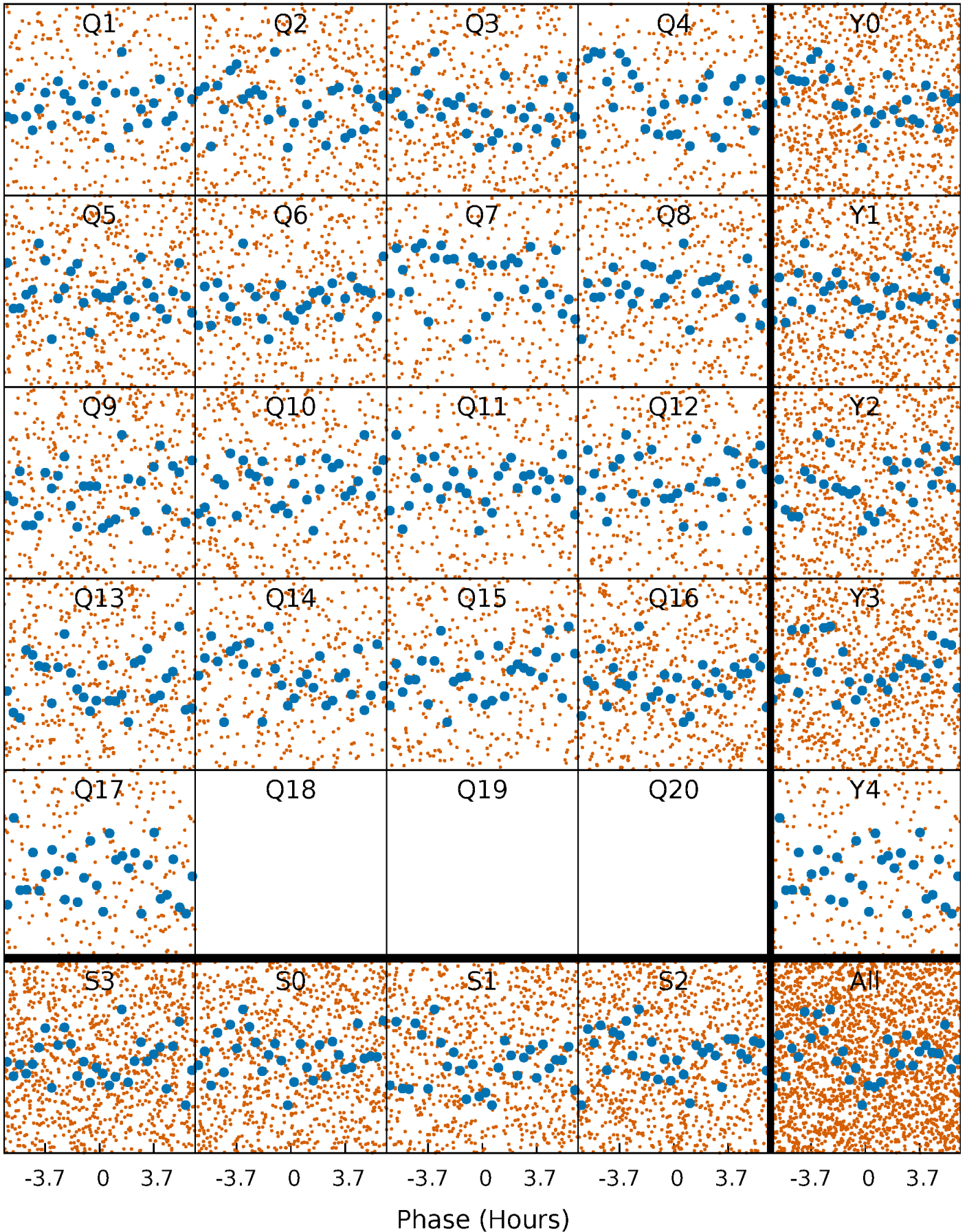


Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



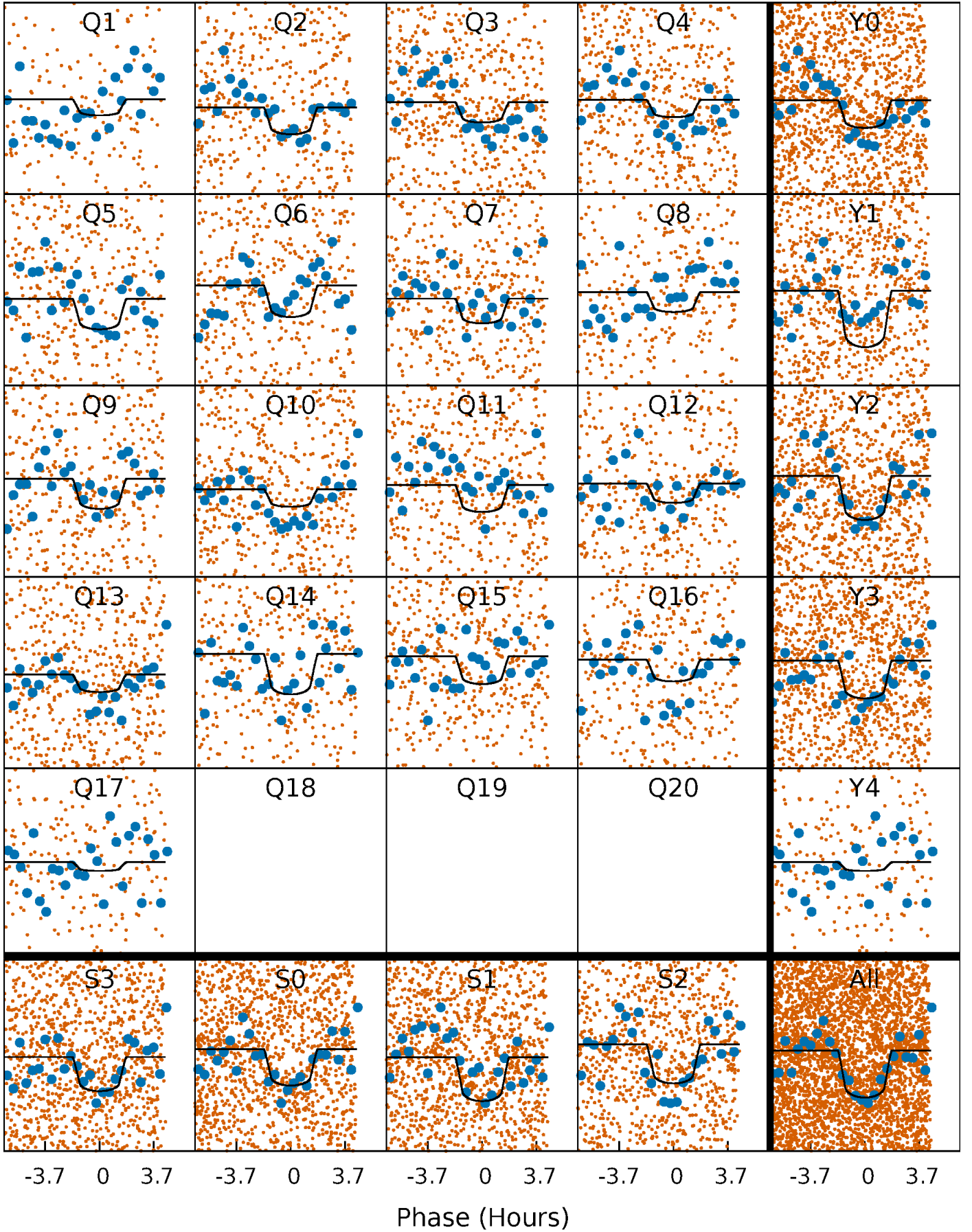
PDC Quarter-Phased Transit Curves

TCE 005709664-04 P= 1.395884 Days $T_0=131.634519$ (BKJD)



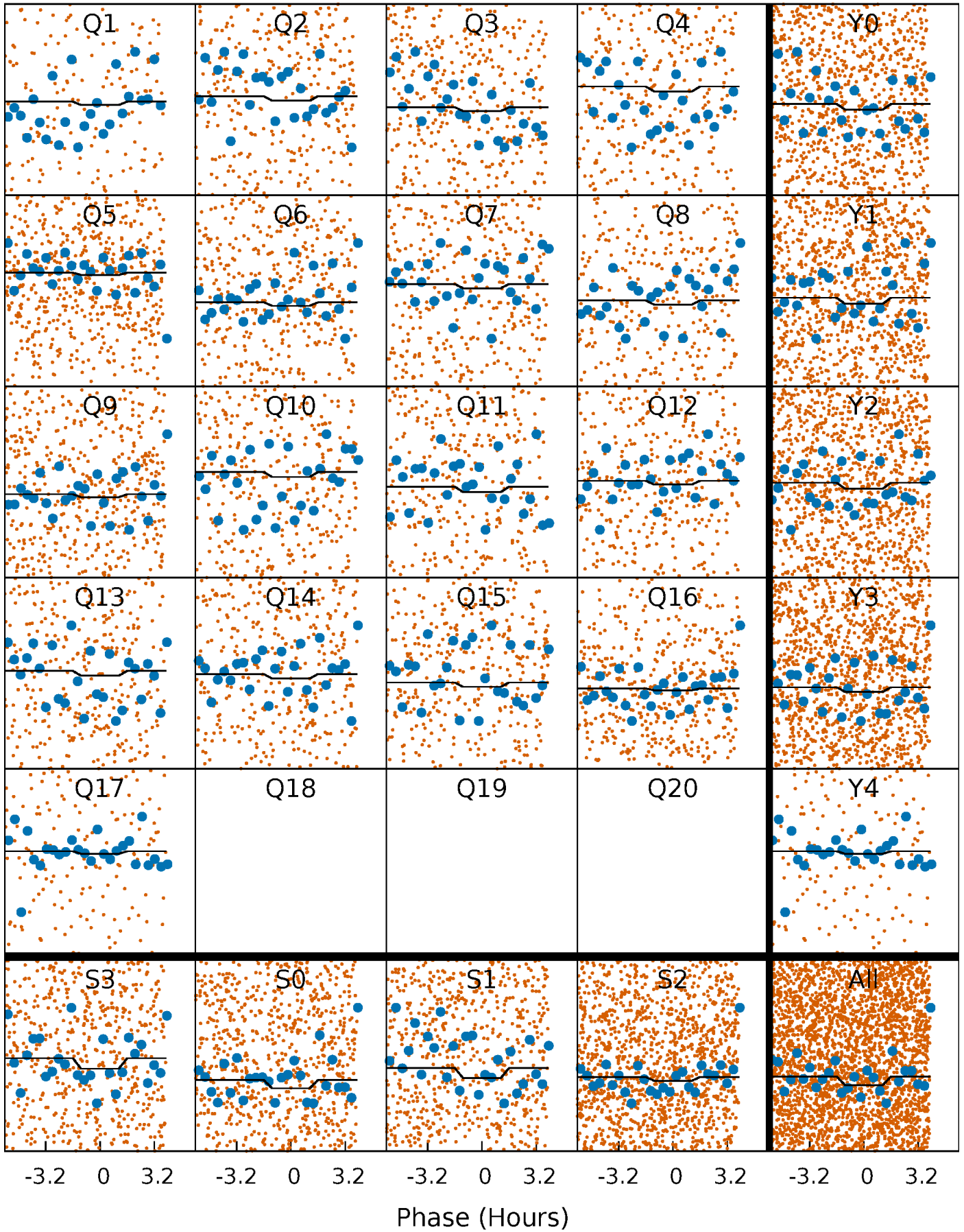
DV Quarter-Phased Transit Curves

TCE 005709664-04 P= 1.395884 Days $T_0=131.634519$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

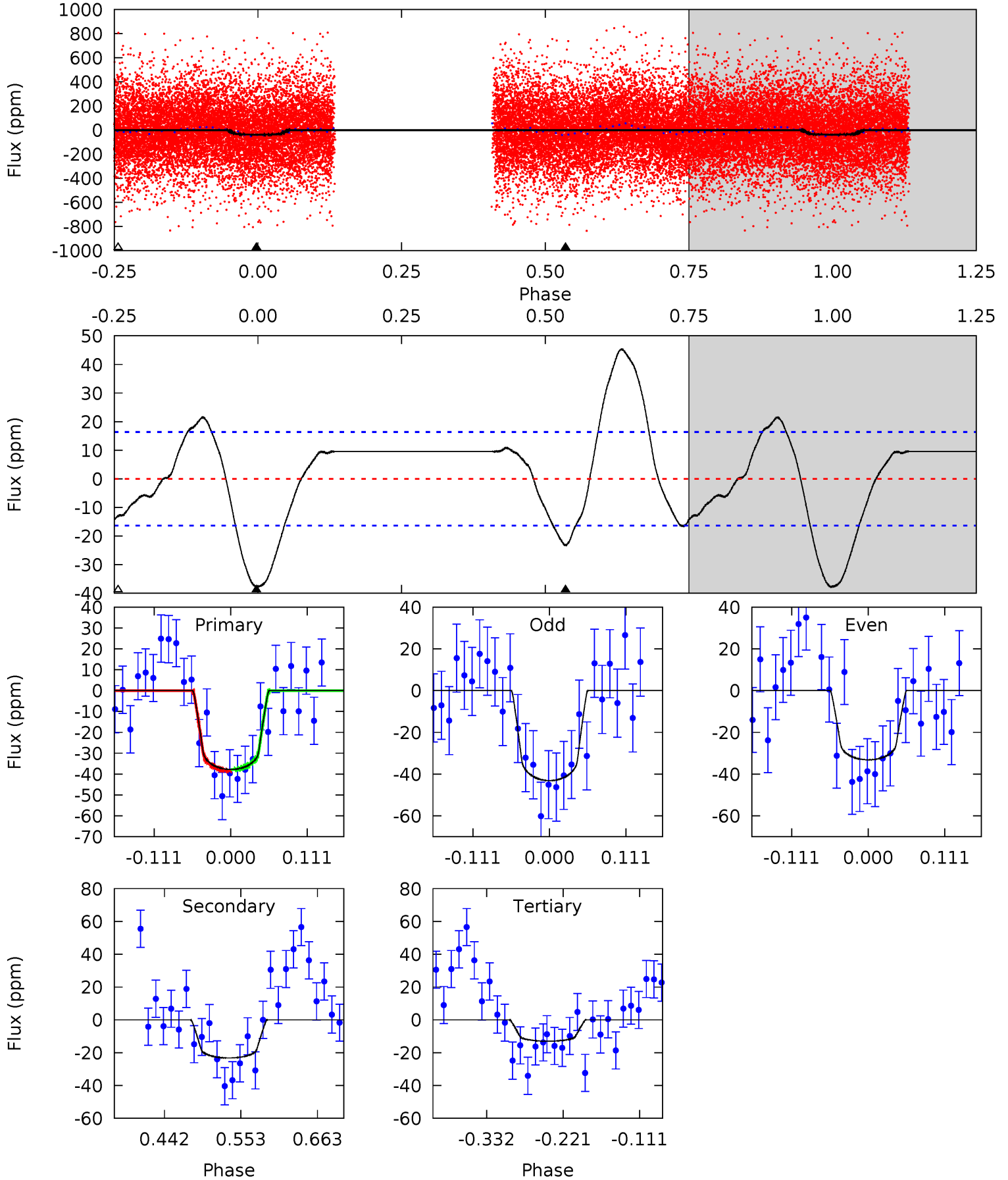
TCE 005709664-04 P= 1.395889 Days $T_0=131.654800$ (BKJD)



DV Model-Shift Uniqueness Test

005709664-04, P = 1.395884 Days, E = 130.238635 Days

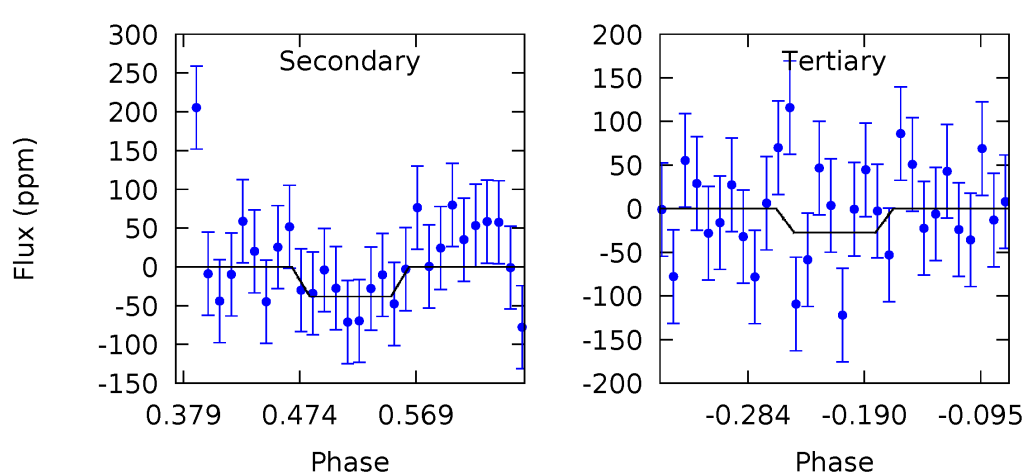
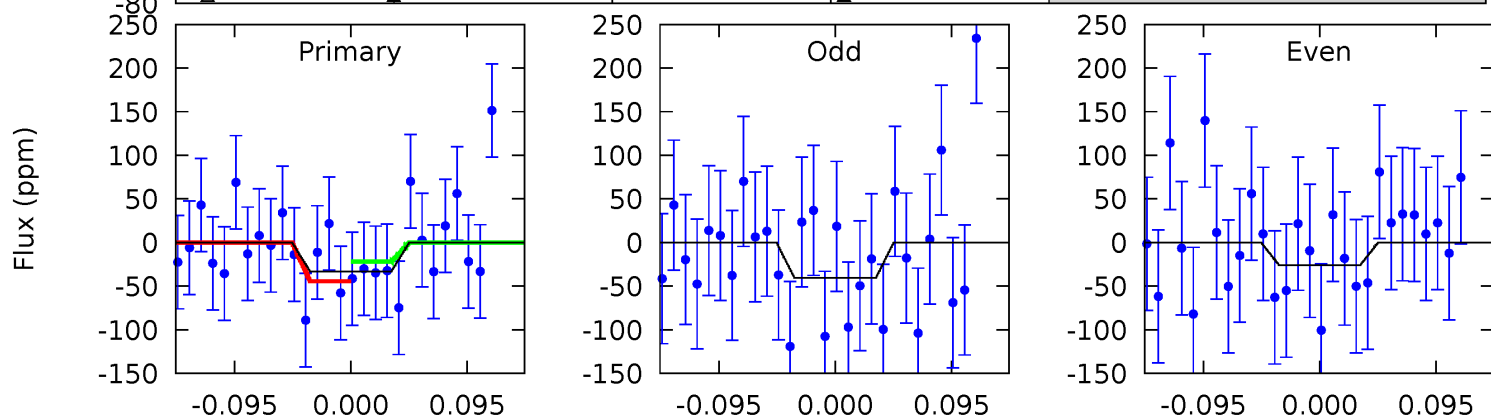
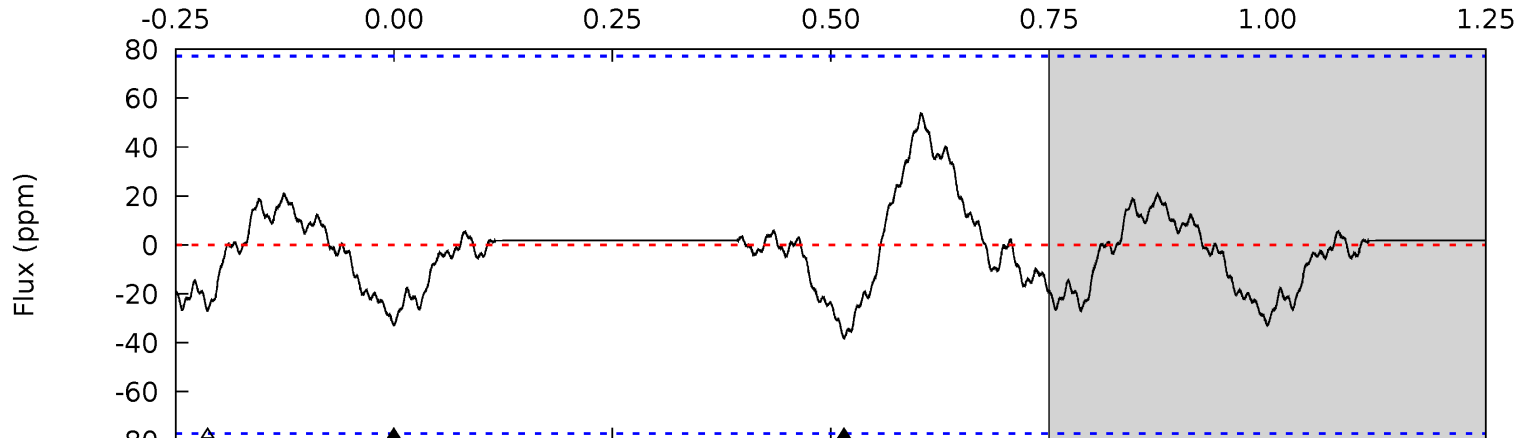
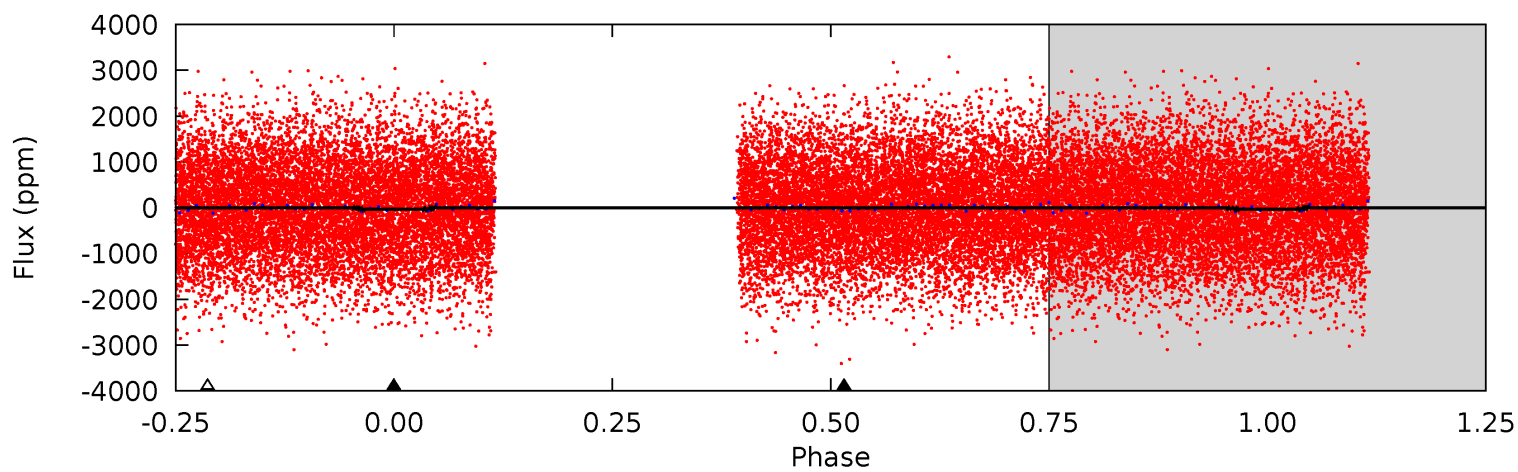
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
10.5	6.45	3.62	0	4.54	1.60	4.11	6.88	10.5	2.84	6.45	1.40	0.93	0.55	0.08



Alt Model-Shift Uniqueness Test

005709664-04, P = 1.395889 Days, E = 130.258911 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
1.97	2.26	1.62	0	4.58	1.67	1.00	0.35	1.97	0.65	2.26	0.44	0.22	0.59	0.67



Stellar Parameters For KIC 005709664

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	7437^{+233}_{-311}	$3.986^{+0.273}_{-0.147}$	$-0.360^{+0.250}_{-0.350}$	$2.076^{+0.489}_{-0.734}$	$1.521^{+0.198}_{-0.296}$	$0.239^{+0.448}_{-0.106}$
	+3%/-4%	+7%/-4%	+69%/-97%	+24%/-35%	+13%/-19%	+187%/-44%
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 005709664-04 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-23 ± 4	$1.53^{+0.69}_{-0.67}$	3902^{+300}_{-327}	5897^{+2337}_{-960}	$4.104^{+9.297}_{-2.146}$
Alt.	-38 ± 17	$1.26^{+0.70}_{-0.57}$	3869^{+317}_{-359}	7257^{+4151}_{-1578}	$9.385^{+24.404}_{-5.957}$

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

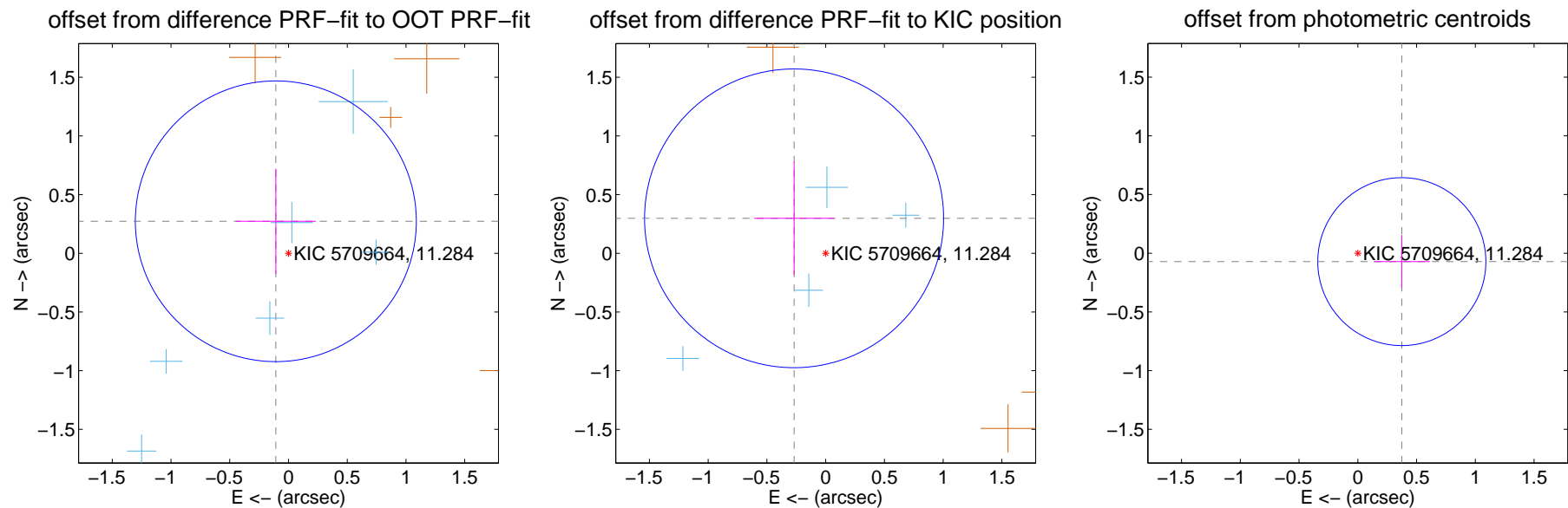
DV Centroid Data

Supplemental centroid analysis for 005709664-04. **Kepler magnitude: 11.28.** Transit SNR 8.23

There are 8 quarters with good PRF difference image offsets

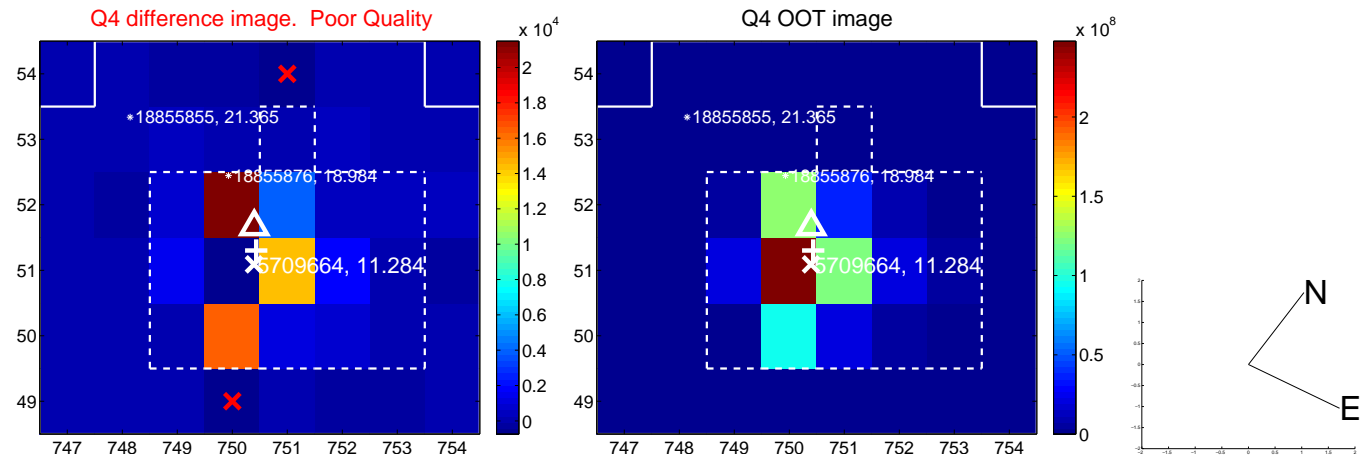
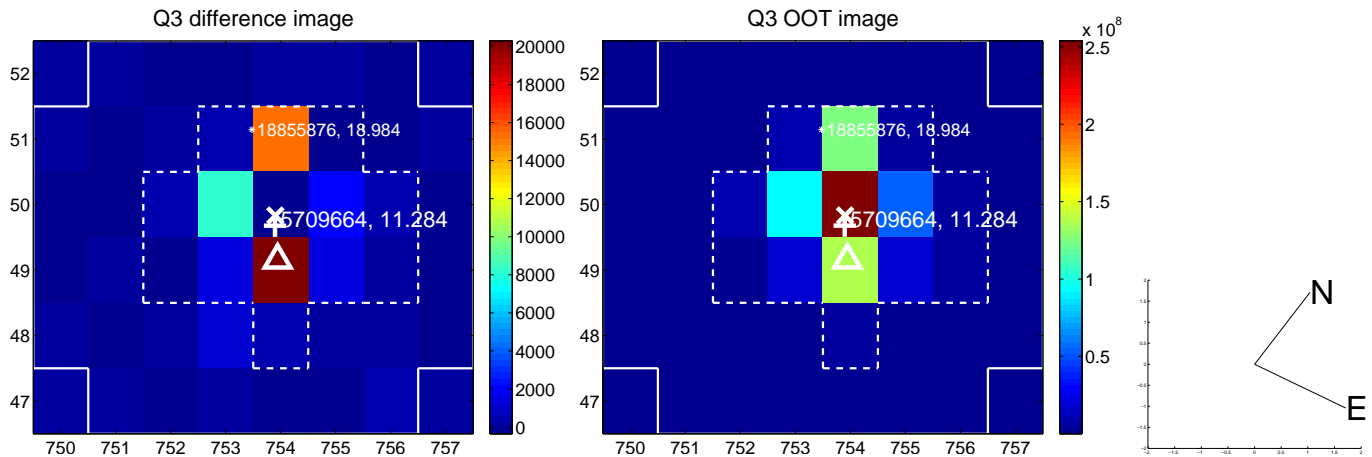
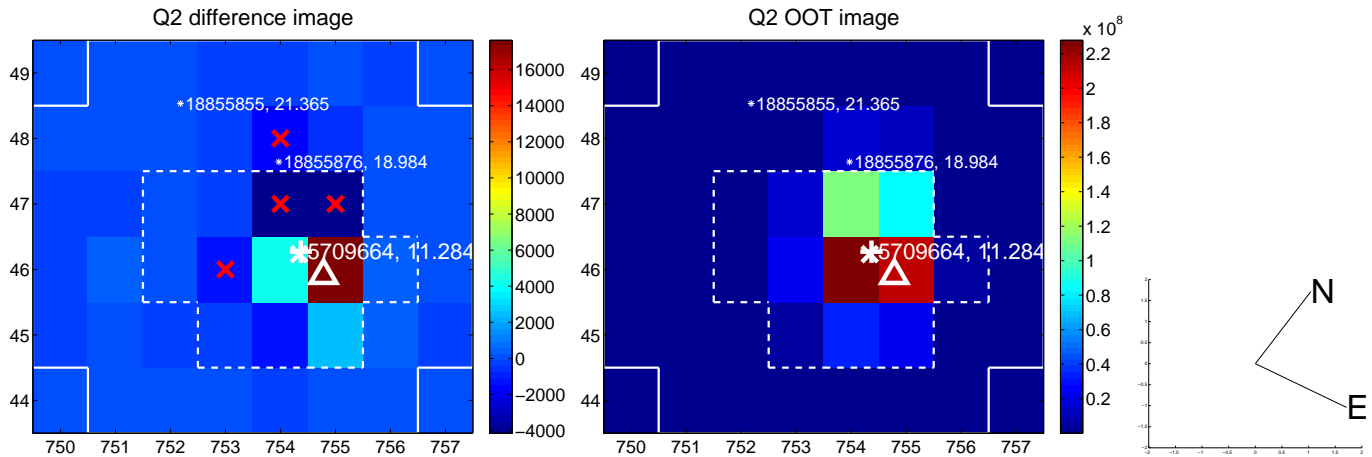
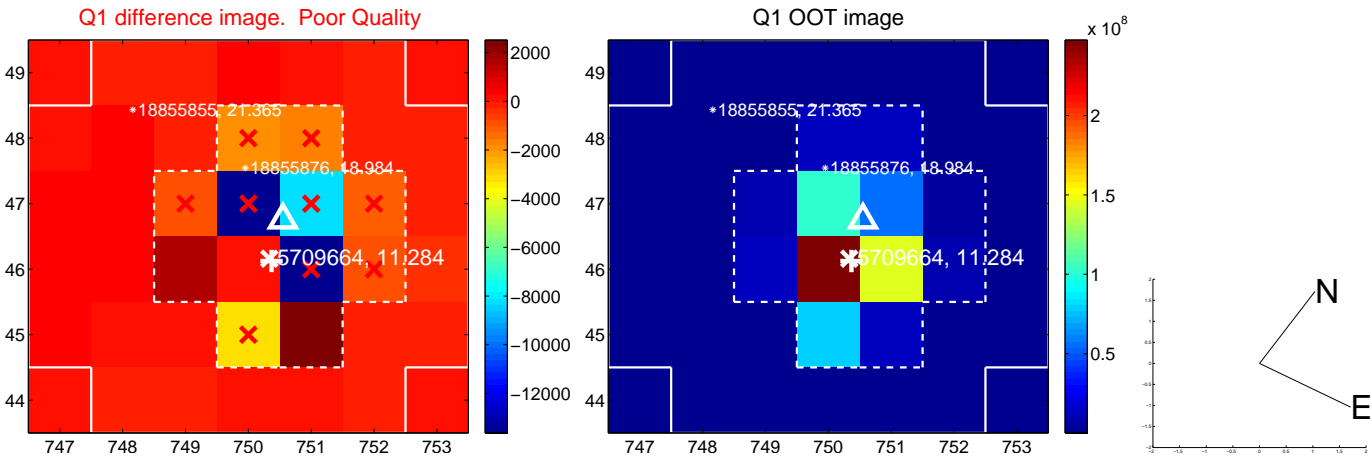
The direct PRF centroid is offset from the target star catalog position by about 0.19 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.293 ± 0.399	0.74	0.108 ± 0.341	0.273 ± 0.448
PRF-fit source offset from KIC position	0.401 ± 0.424	0.95	0.269 ± 0.340	0.298 ± 0.482
photometric centroid source offset	0.38 ± 0.24	1.60	-0.37 ± 0.24	-0.07 ± 0.23

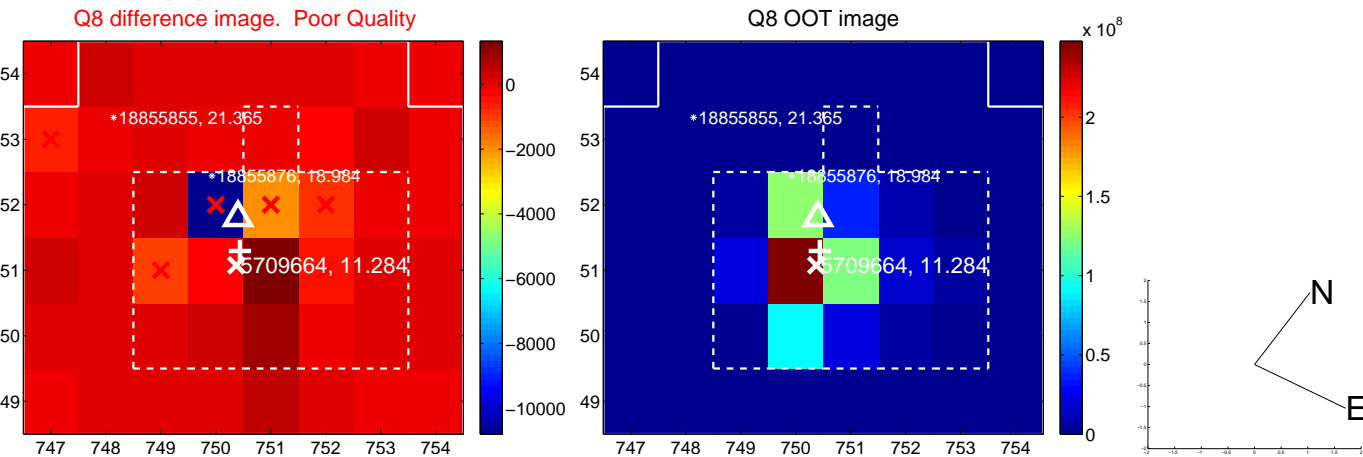
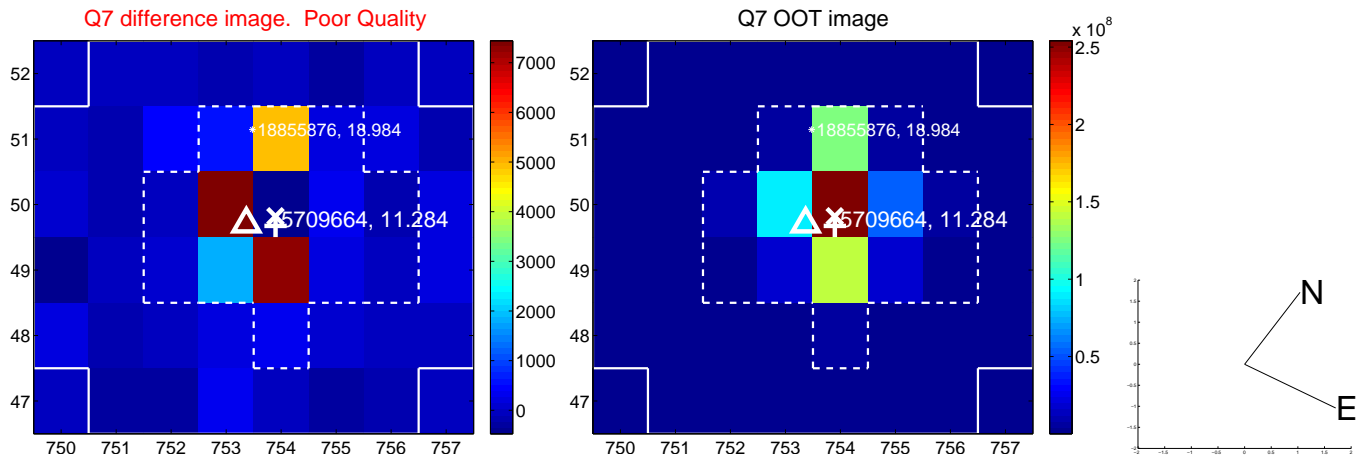
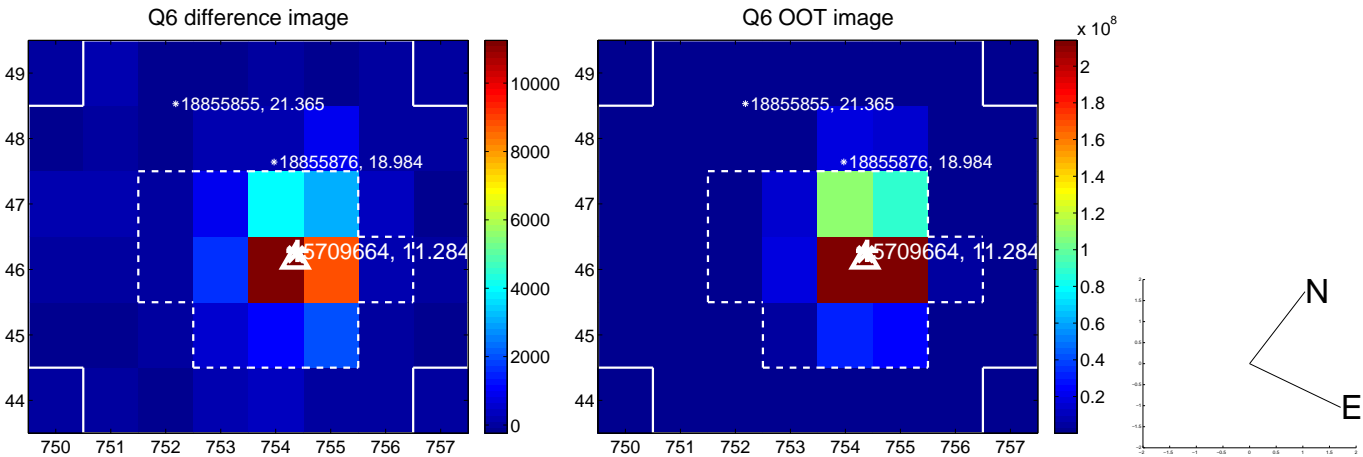
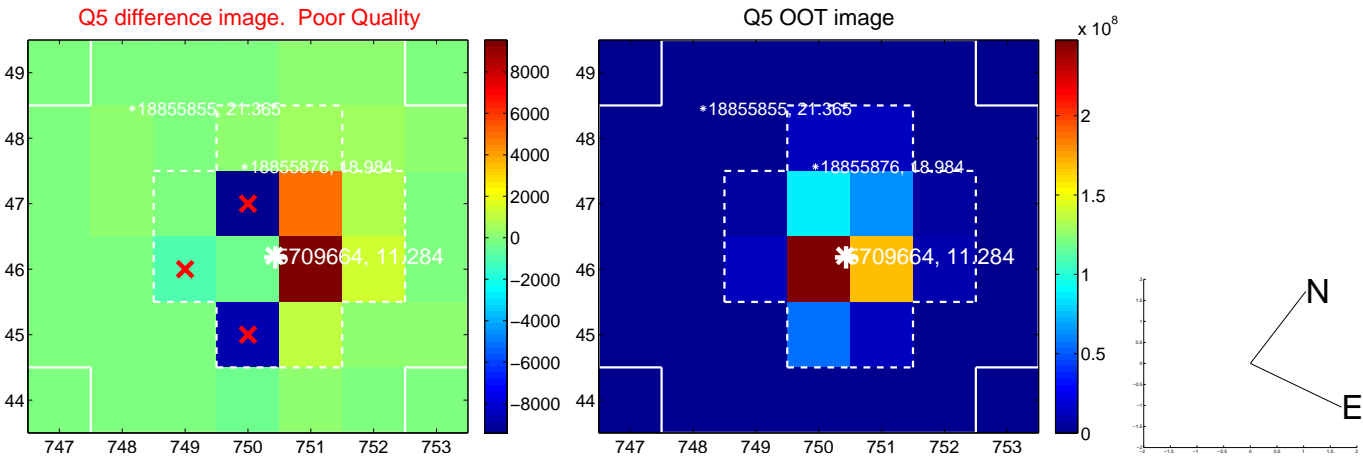


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets;** magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

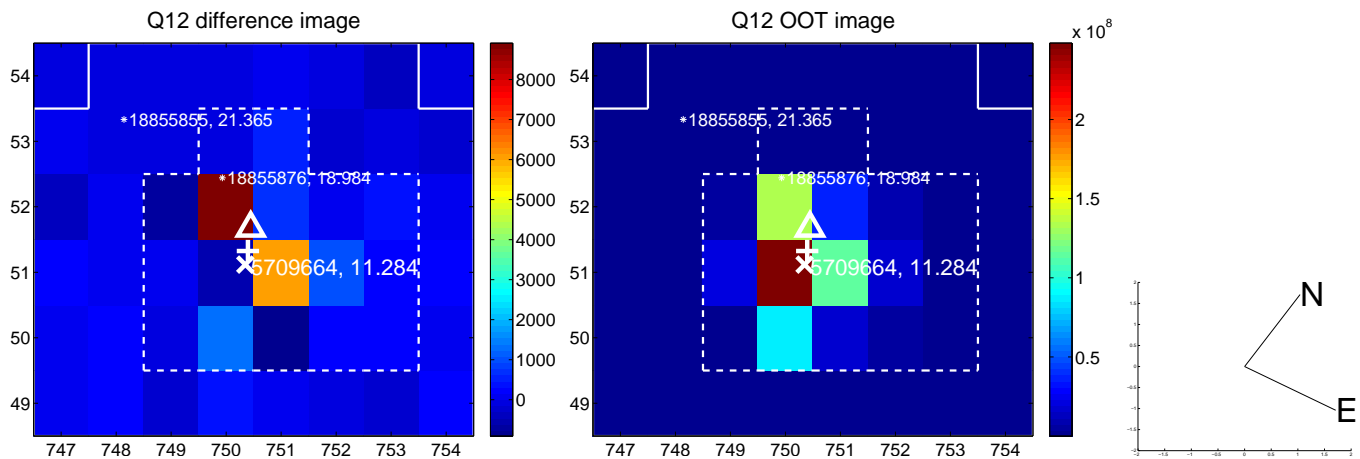
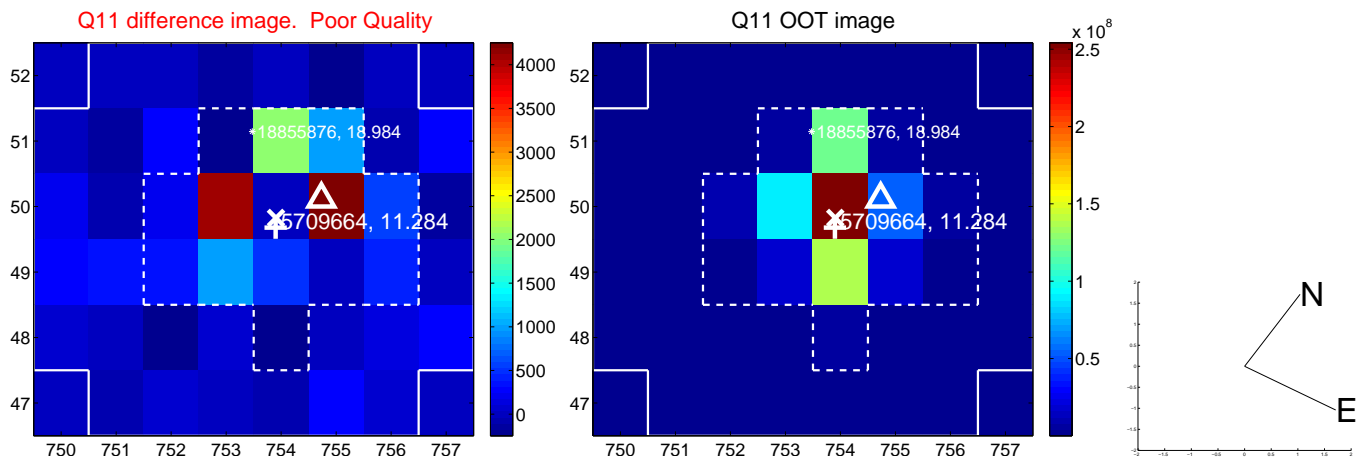
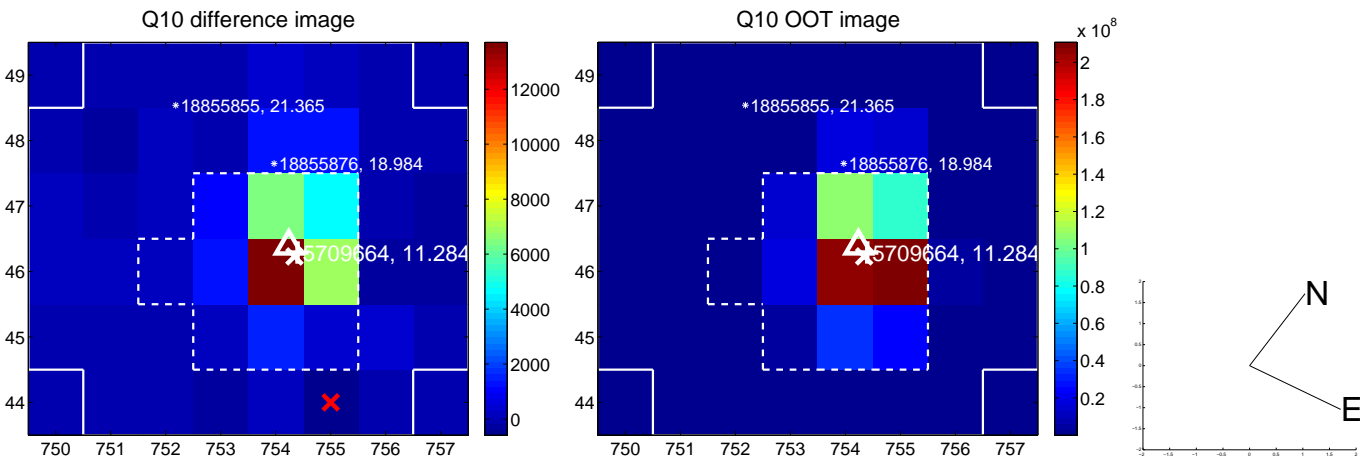
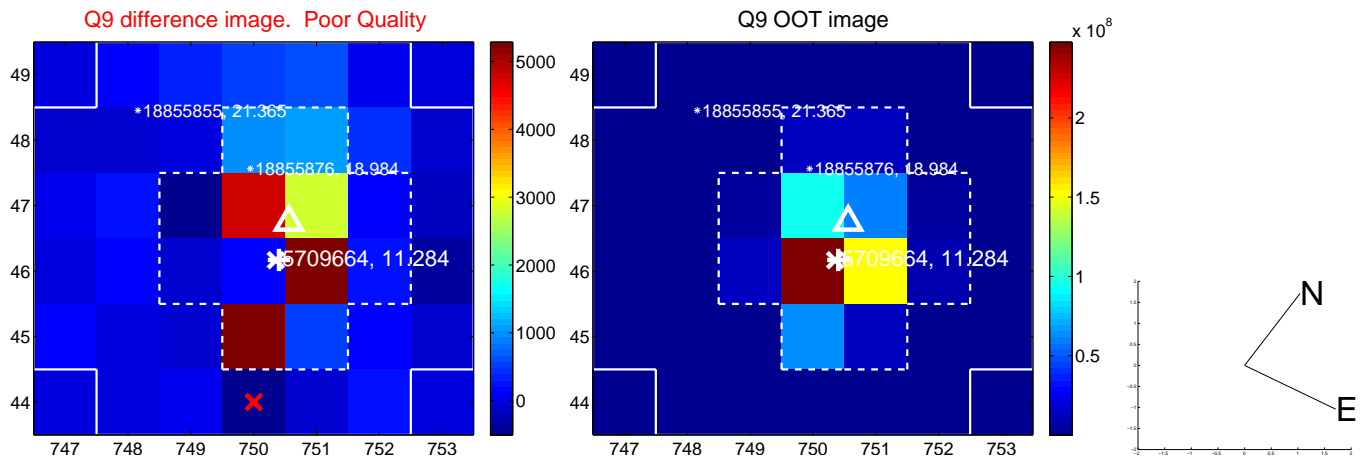
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



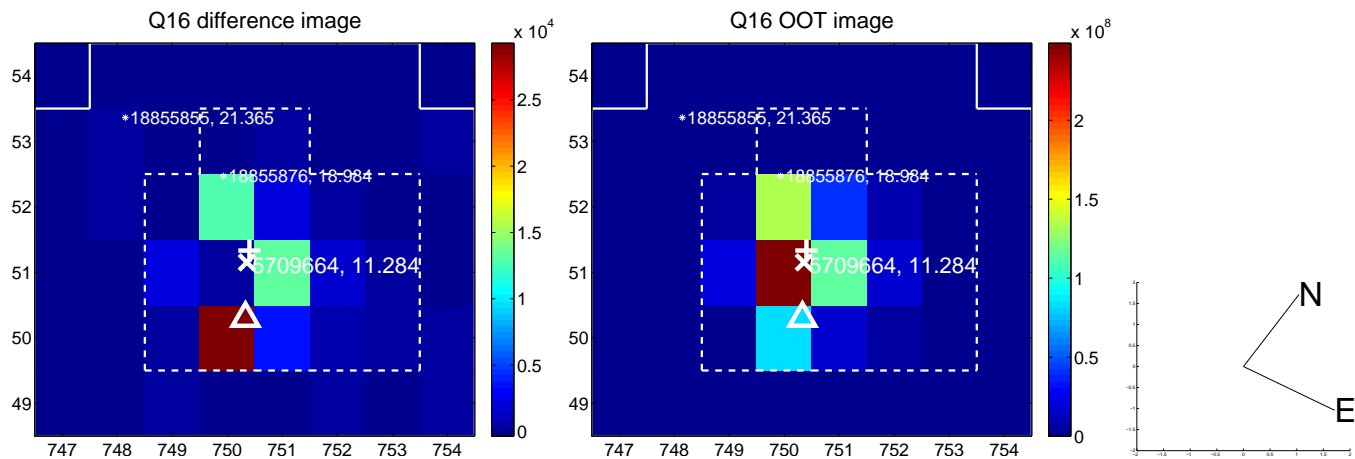
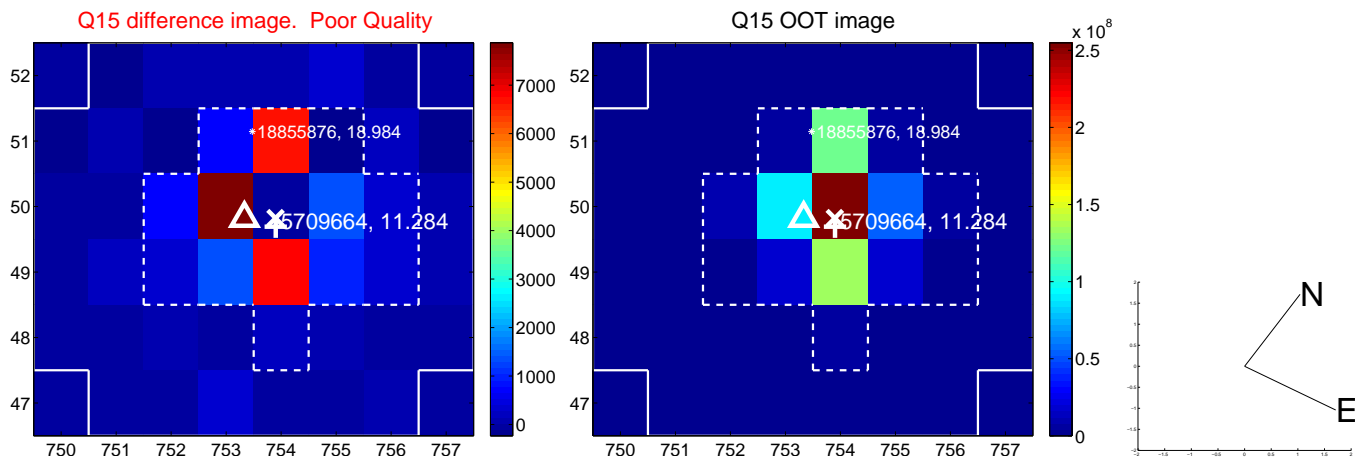
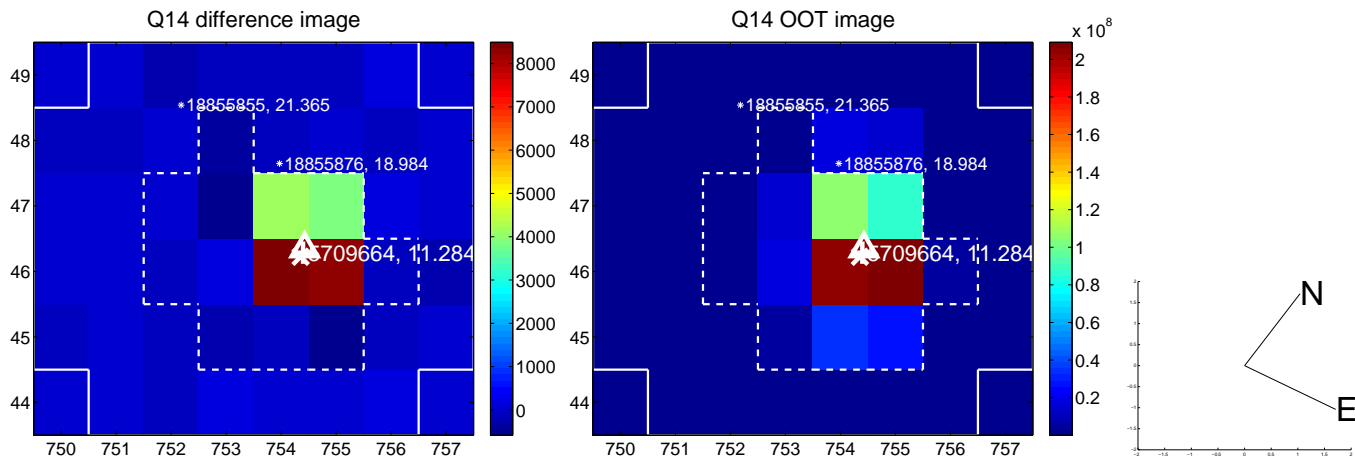
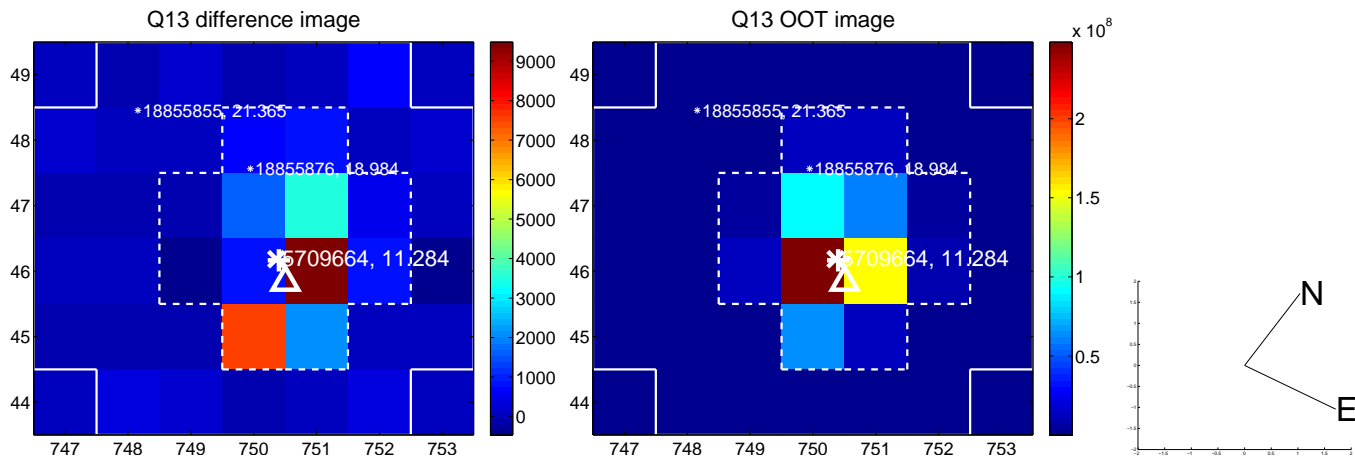
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



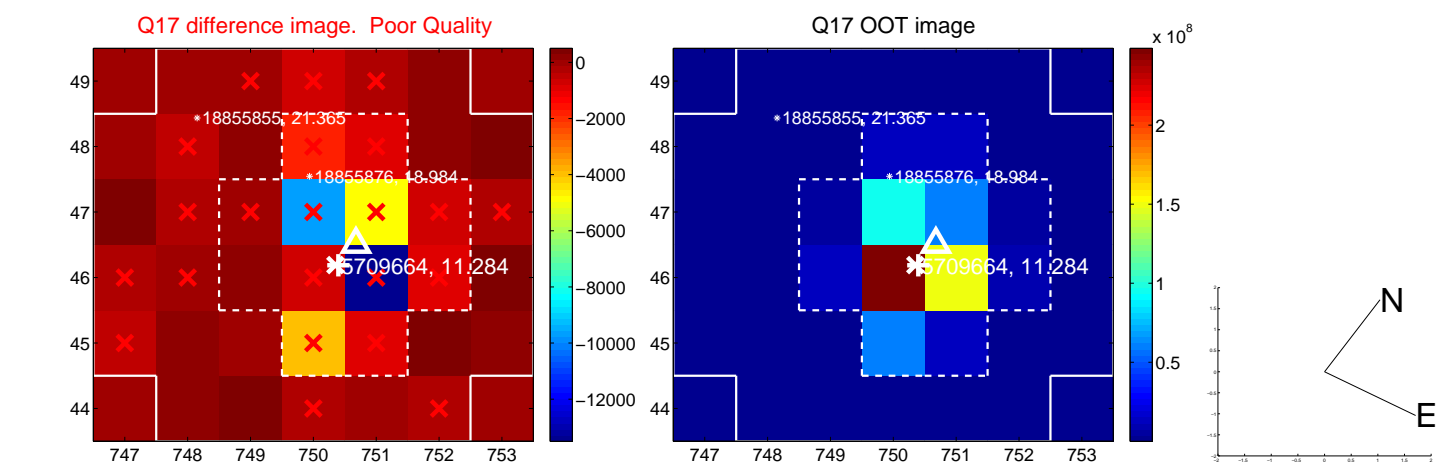
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



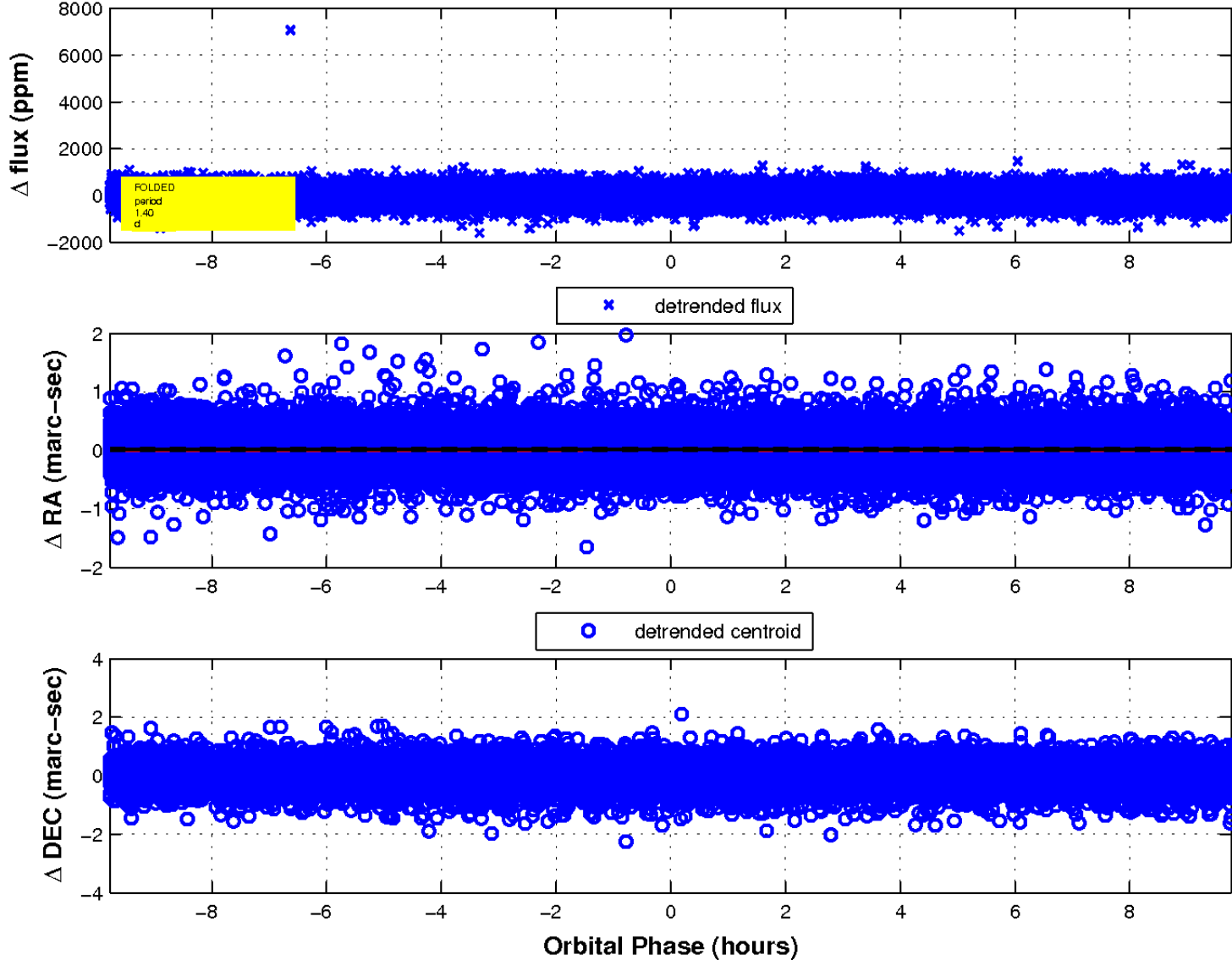
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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



fluxWeightedCentroids, Planet 4 of 4



UKIRT Image

Declination

