

KIC 009974113

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})
009974113-01	OBS	No	1.960268	132.678170	14.9	7.992	7.2	5.4	2.14	6434	0.93	6169.75
009974113-02	OBS	No	219.183738	172.425682	265.1	3.459	9.5	8.1	2.14	6434	3.78	11.45

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009974113-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT
009974113-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_SKYE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT— INCONSISTENT_TRANS—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.

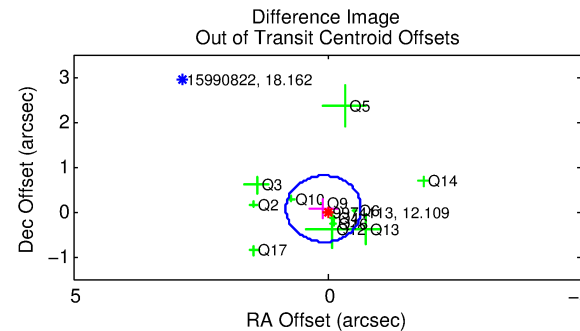
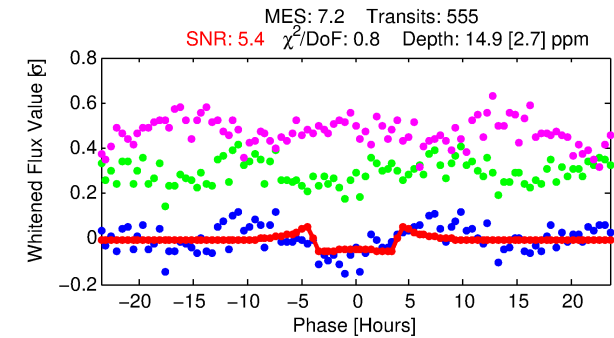
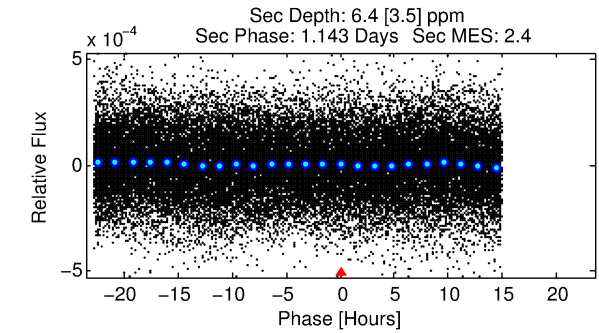
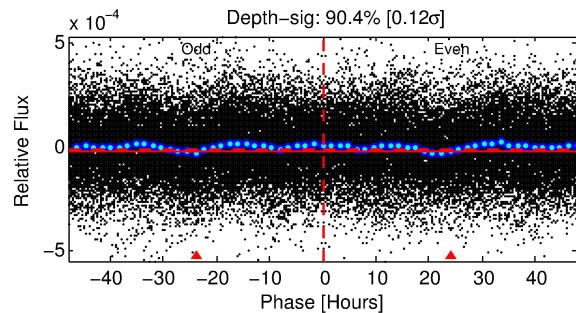
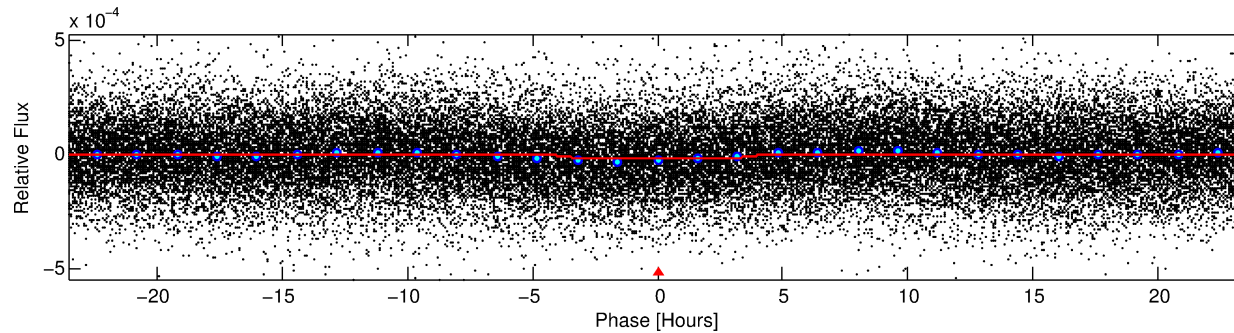
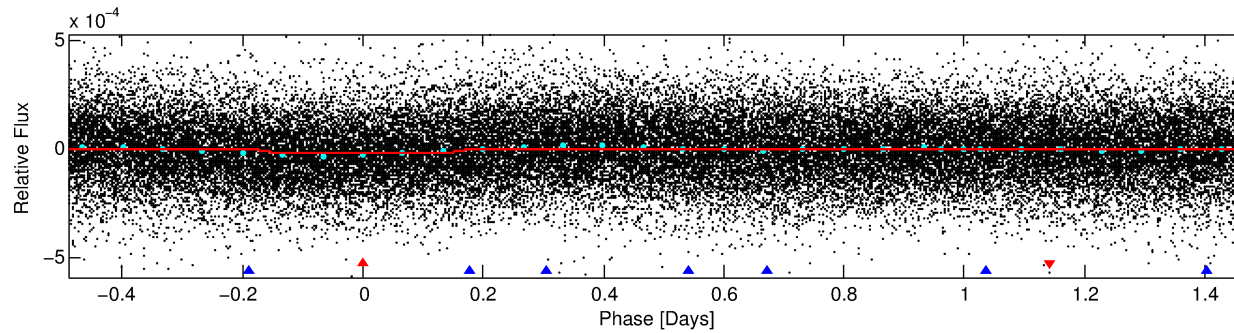
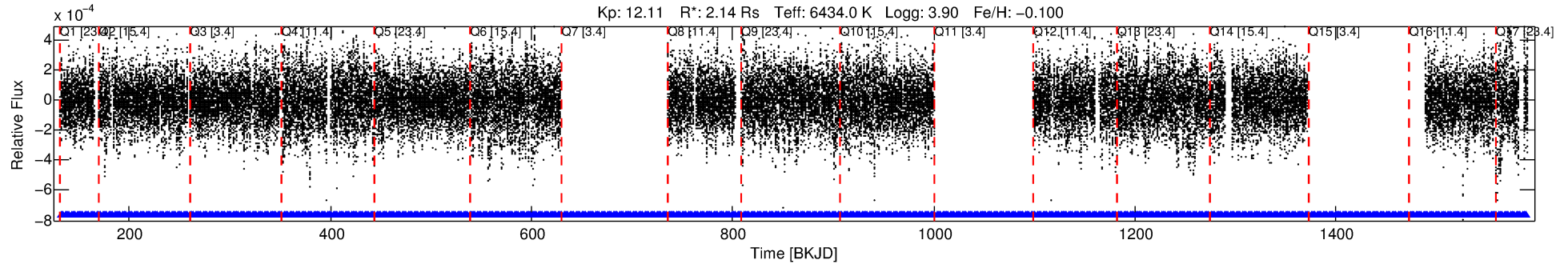
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009974113-01

No Significant Match Found

DV One-Page Summary

KIC: 9974113 Candidate: 1 of 2 Period: 1.960 d



DV Fit Results:

Period = 1.96027 [0.00003] d
Epoch = 132.6782 [0.0062] BKJD
Rp/R* = 0.0040 [0.0011]
a/R* = 1.38 [0.97]
b = 0.84 [0.54]
Seff = 6169.75 [2952.72]
Teq = 2260 [270] K
Rp = 0.92 [0.38] Re
a = 0.0337 [0.0097] AU
Ag = 4.69 [4.29] [0.86 σ]
Teffp = 5143 [1025] K [2.72 σ]

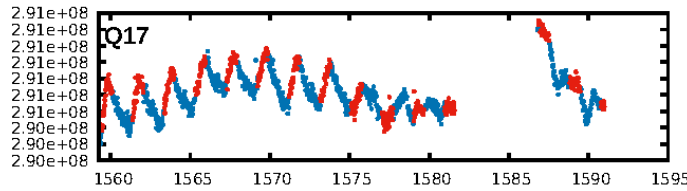
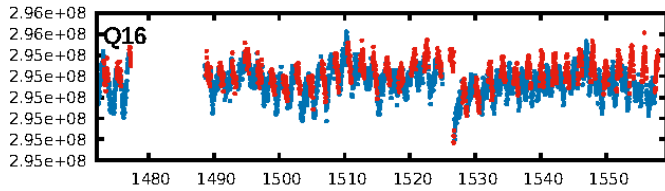
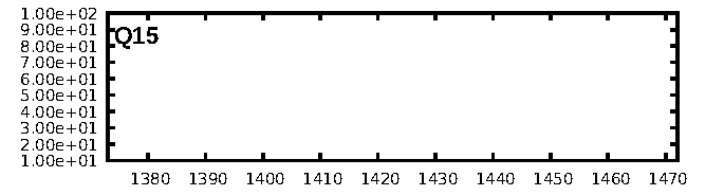
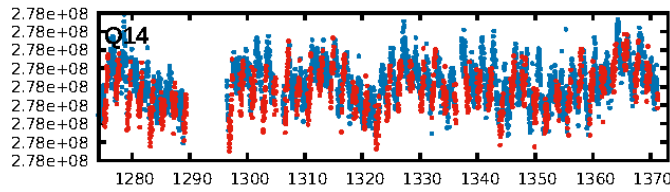
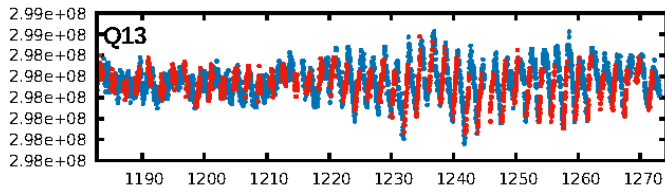
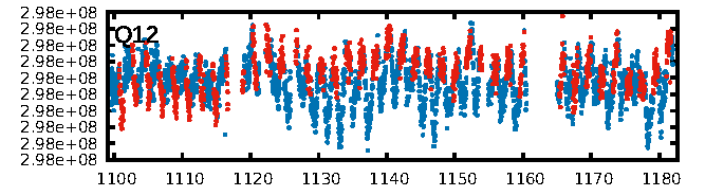
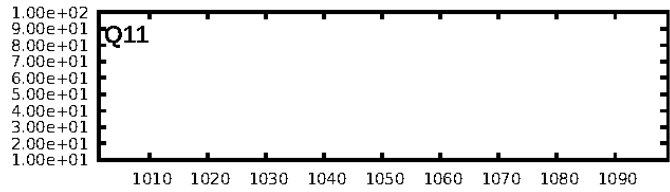
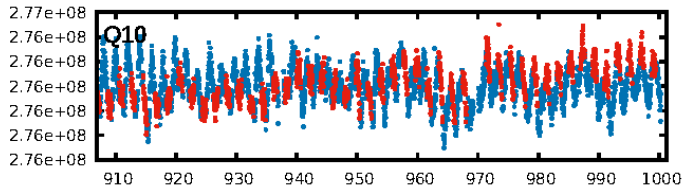
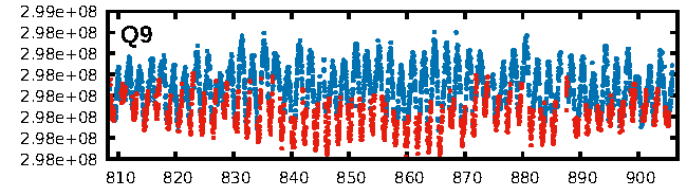
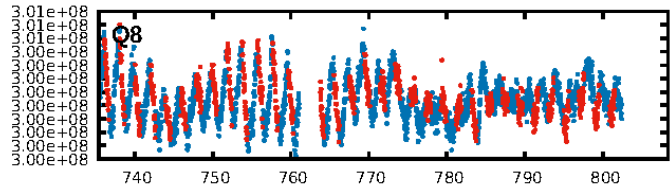
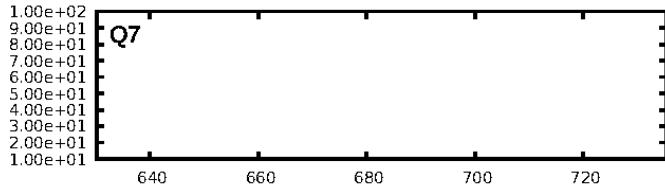
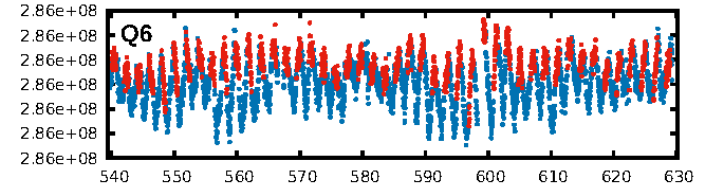
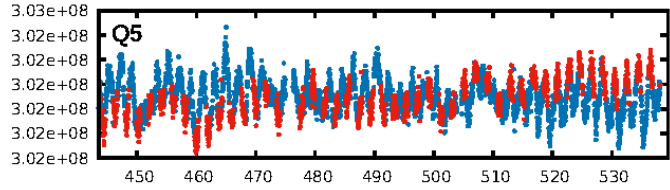
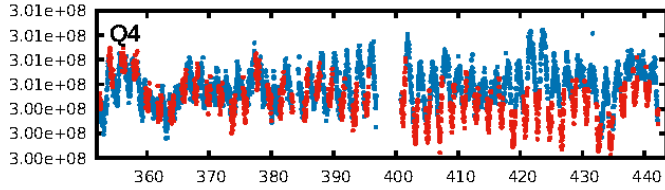
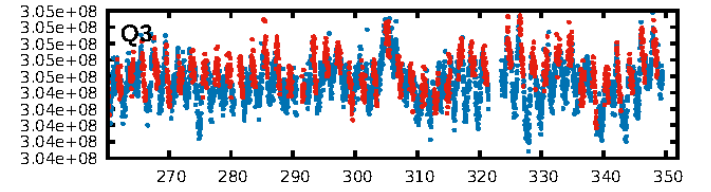
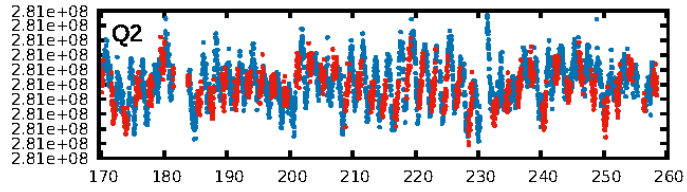
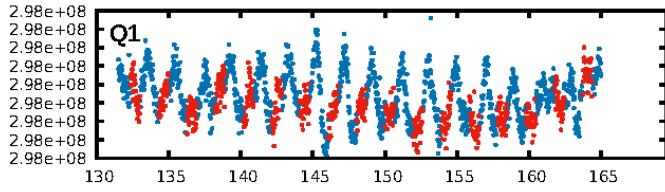
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [598.63 σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 3.84e-08
RollingBand-fgt: 1.00 [523/523]
GhostDiagnostic-chr: 3.515
Centroid-sig: N/A
Centroid-so: 0.764 arcsec [0.62 σ]
OotOffset-rm: 0.099 arcsec [0.40 σ]
KicOffset-rm: 0.294 arcsec [1.36 σ]
OotOffset-st: 4/1/3/4 [12]
KicOffset-st: 4/1/3/4 [12]
DiffImageQuality-fgm: 0.42 [5/12]
DiffImageOverlap-fno: 1.00 [14/14]

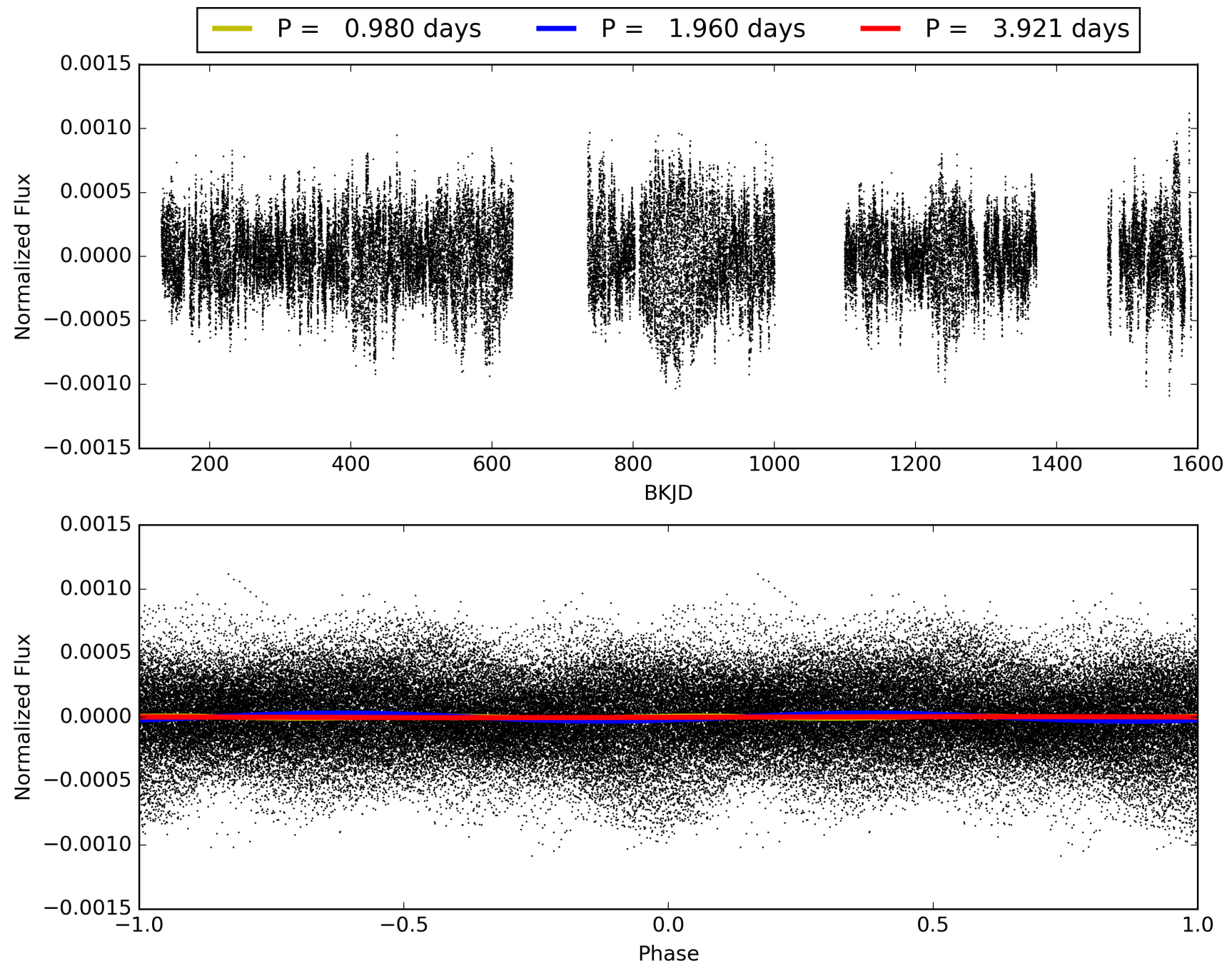
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

TCE 009974113-01, PDC Light Curves

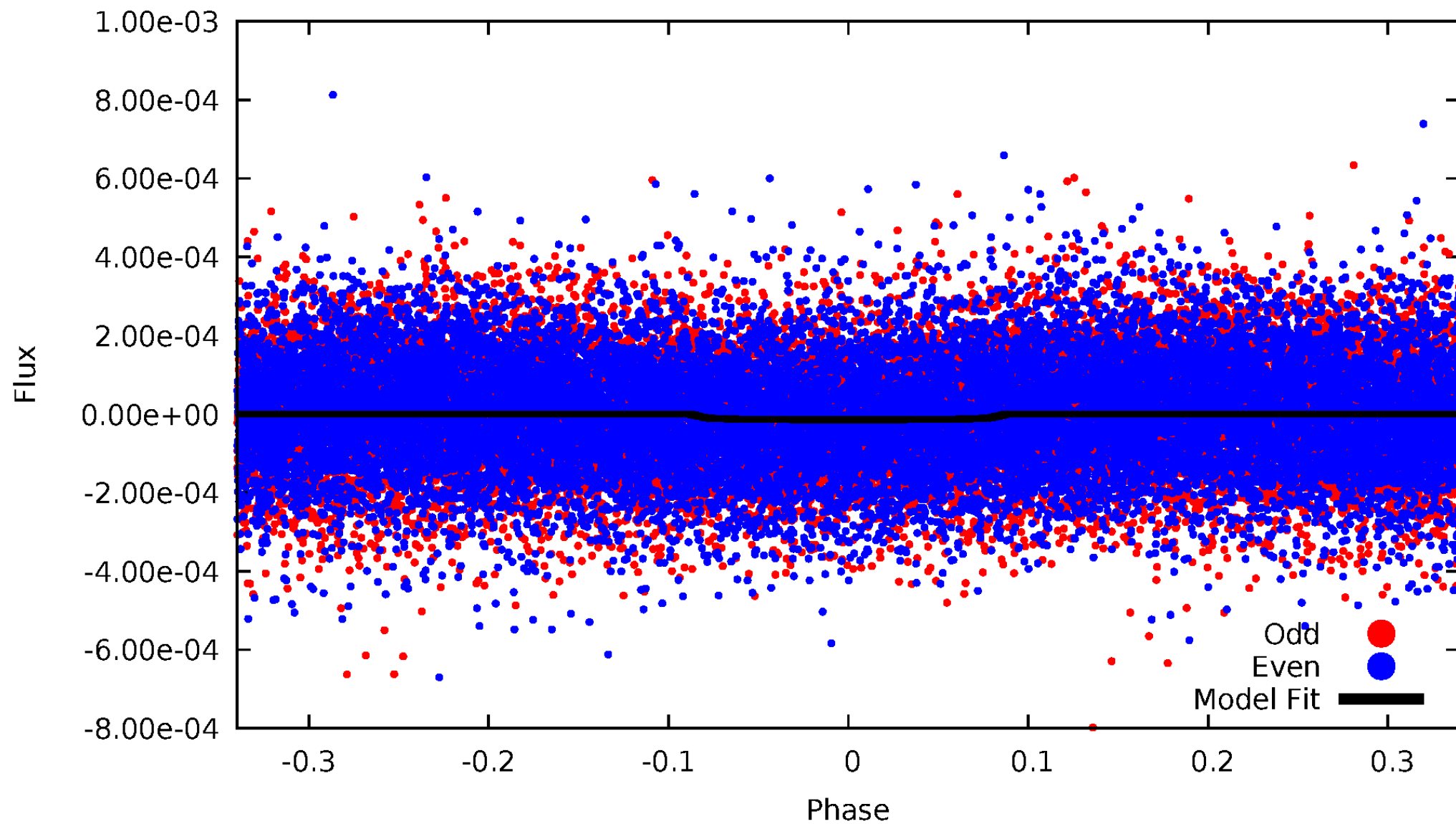


TCE 009974113-01



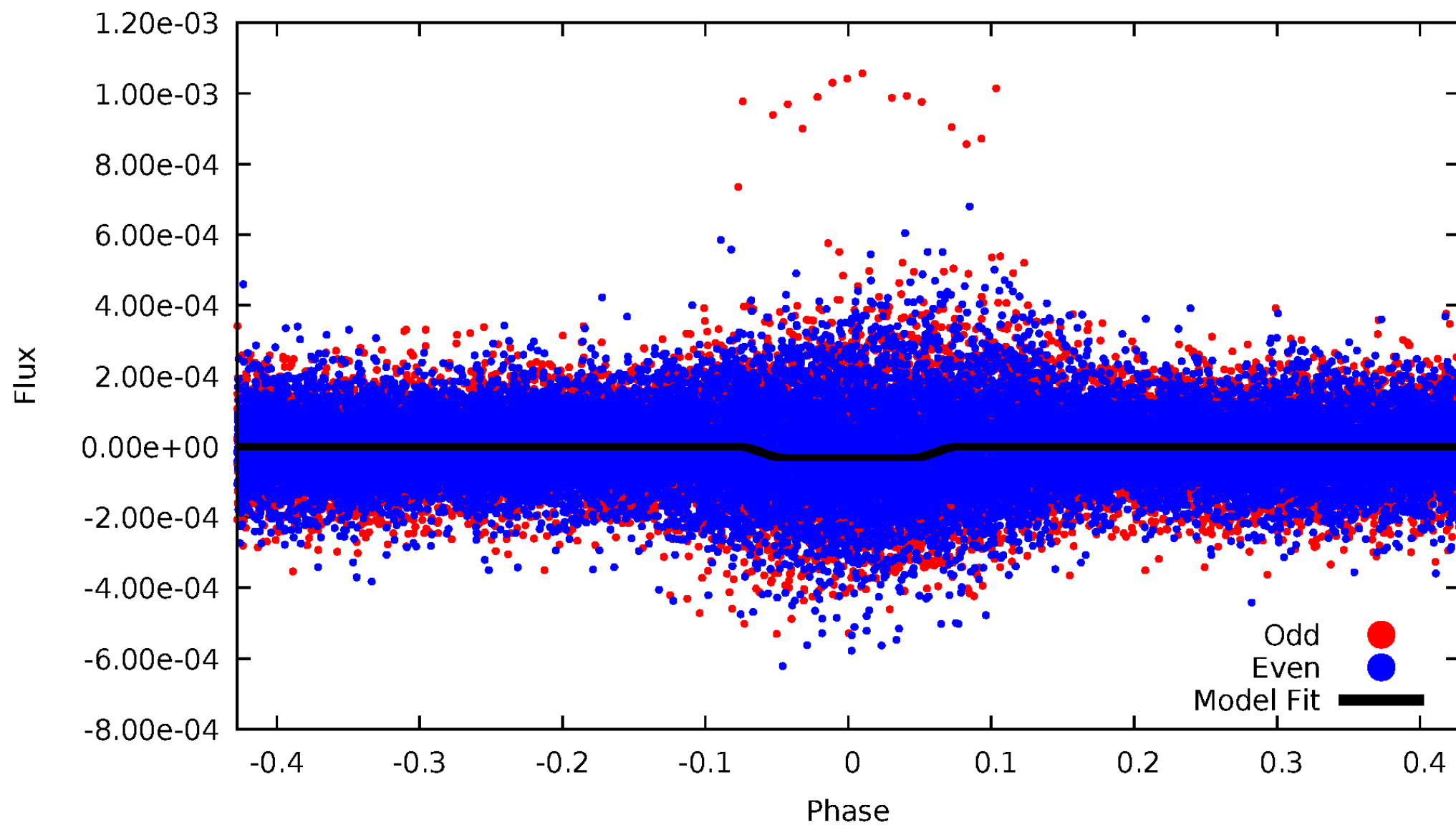
DV Odd/Even

TCE 009974113-01

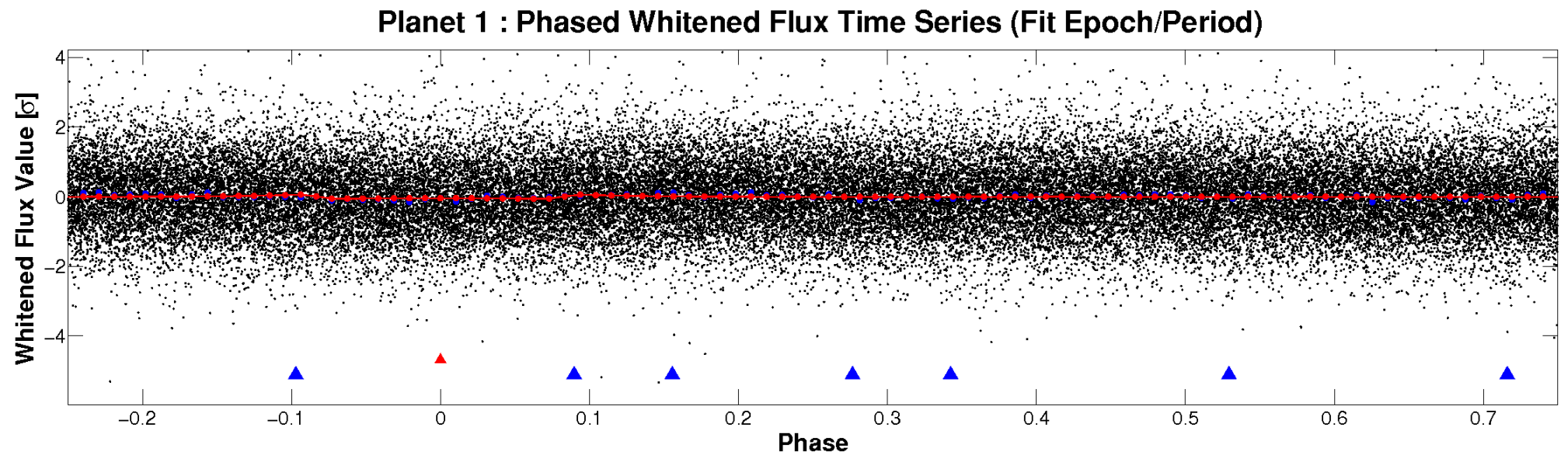
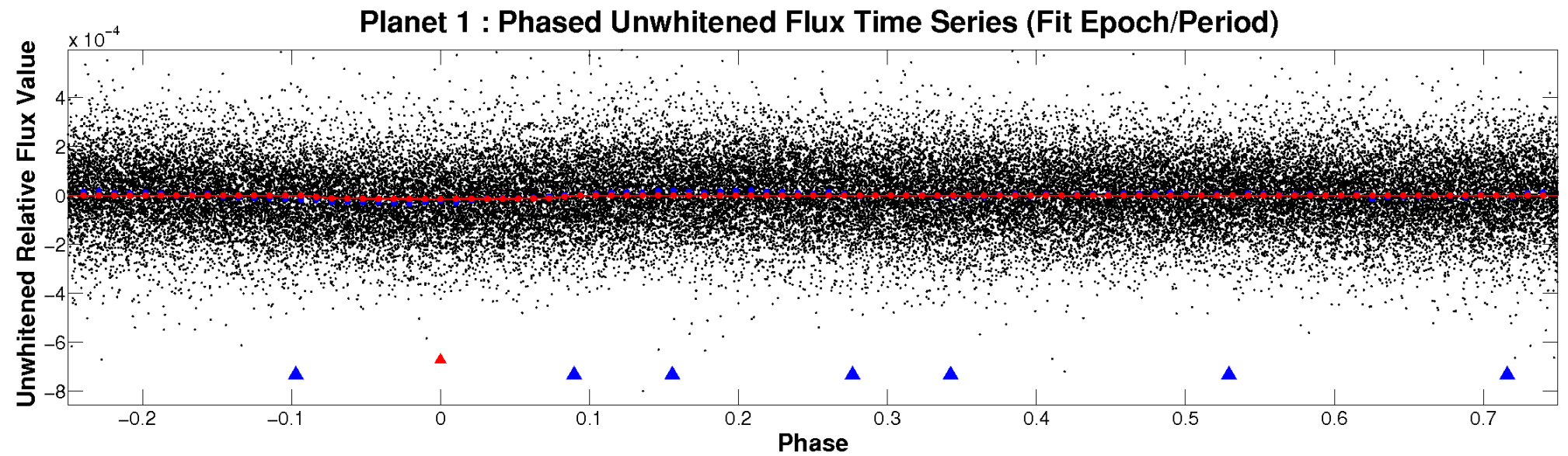


ALT Odd/Even

TCE 009974113-01

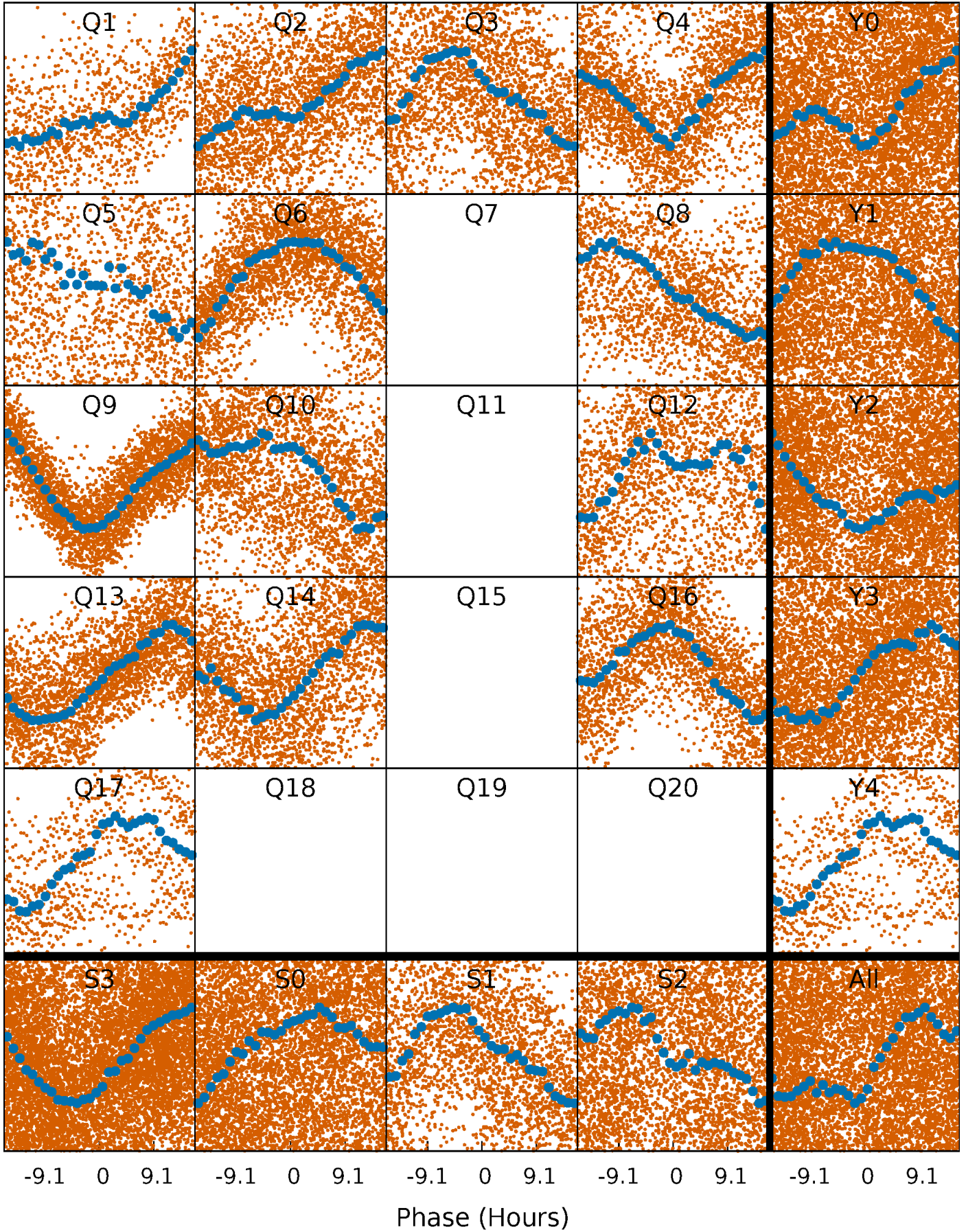


Non-Whitened Vs. Whitened Light Curve



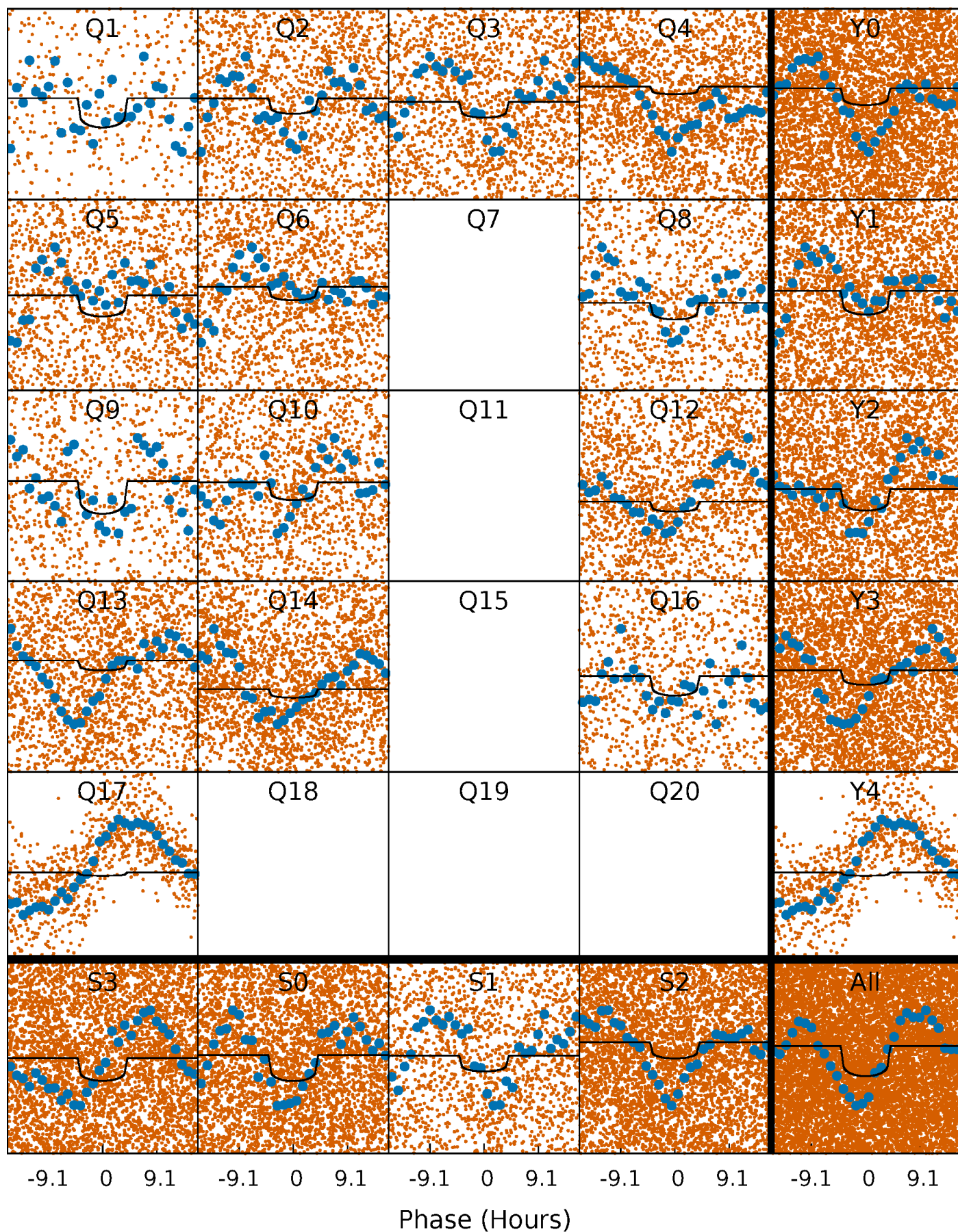
PDC Quarter-Phased Transit Curves

TCE 009974113-01 P= 1.960268 Days $T_0=132.678170$ (BKJD)



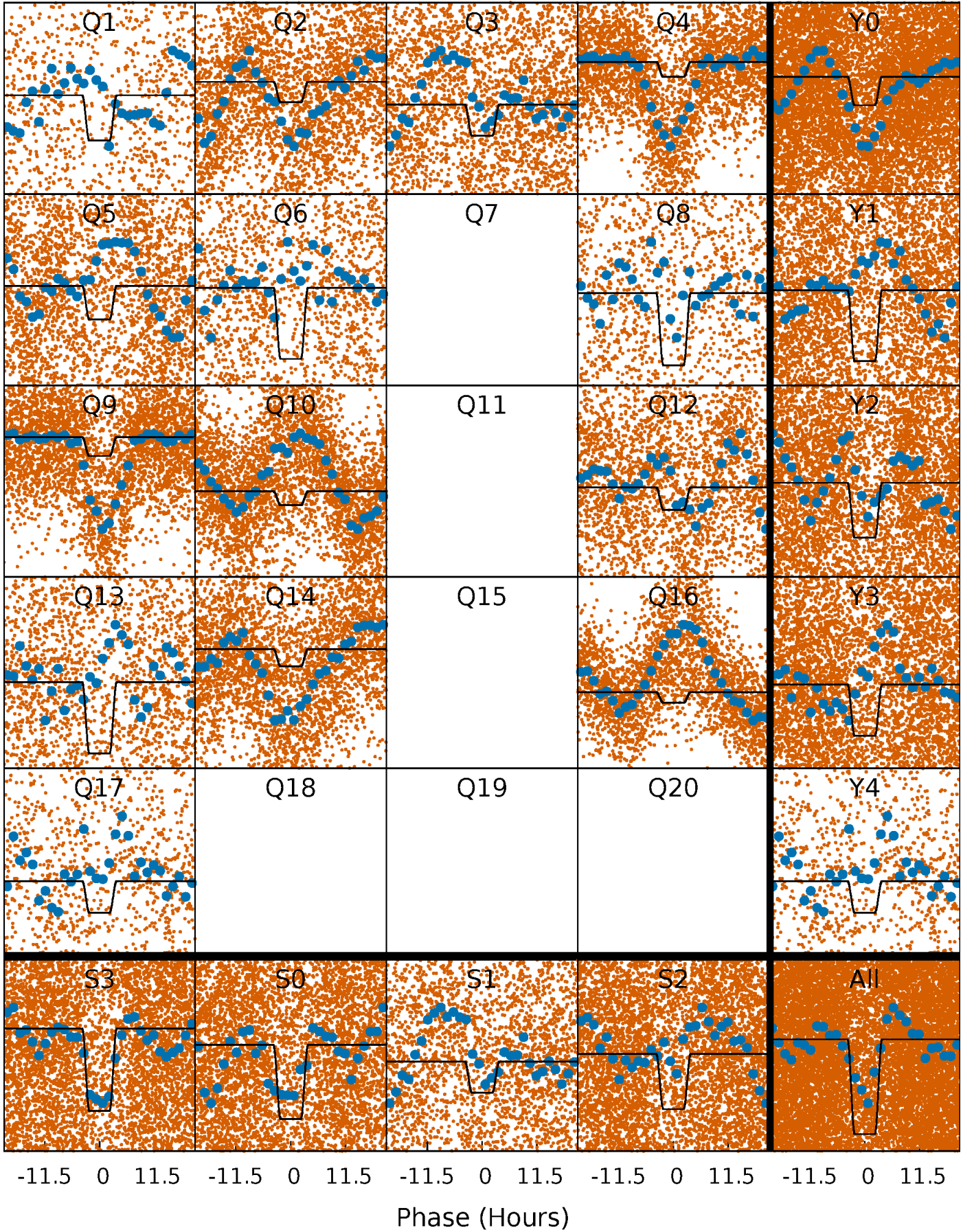
DV Quarter-Phased Transit Curves

TCE 009974113-01 P= 1.960268 Days $T_0=132.678170$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

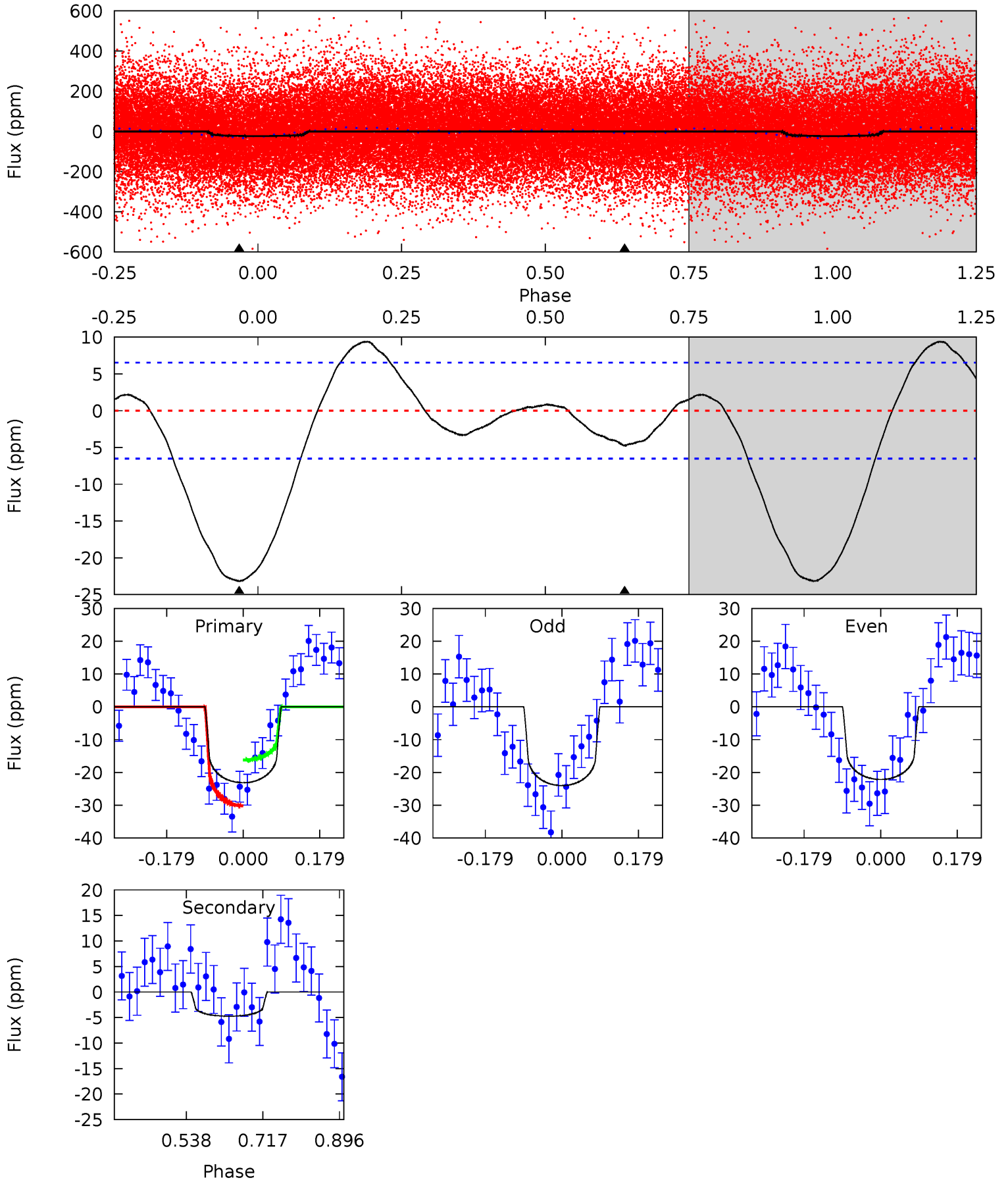
TCE 009974113-01 P= 1.959991 Days $T_0=132.734406$ (BKJD)



DV Model-Shift Uniqueness Test

009974113-01, P = 1.960268 Days, E = 130.717902 Days

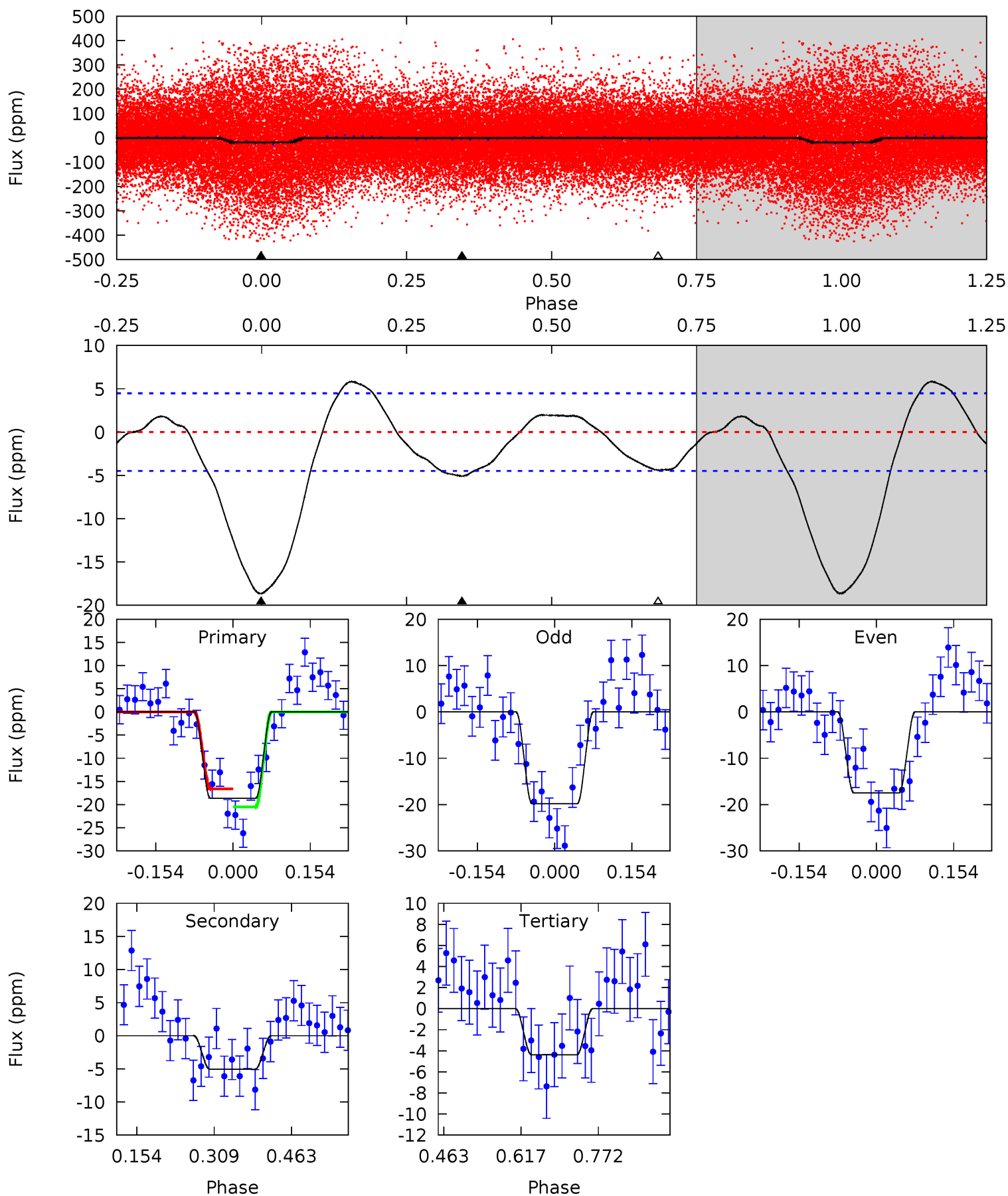
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
15.8	3.23	0	0	4.44	1.34	3.07	15.8	15.8	3.23	3.23	0.63	1.13	0.29	4.71



Alt Model-Shift Uniqueness Test

009974113-01, P = 1.959991 Days, E = 130.774415 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
18.6	5.05	4.36	0	4.47	1.42	2.83	14.2	18.6	0.69	5.05	1.13	0.75	0.24	1.93



Stellar Parameters For KIC 009974113

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6434^{+175}_{-194}	$3.902^{+0.273}_{-0.117}$	$-0.100^{+0.300}_{-0.250}$	$2.137^{+0.459}_{-0.632}$	$1.330^{+0.221}_{-0.221}$	$0.192^{+0.345}_{-0.078}$
	+3%/-3%	+7%/-3%	+300%/-250%	+21%/-30%	+17%/-17%	+180%/-41%
Source	PHO1	FLK73	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 009974113-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-5 ± 1	$0.87^{+0.29}_{-0.28}$	3108^{+188}_{-276}	4773^{+890}_{-629}	$3.734^{+4.721}_{-1.796}$
Alt.	-5 ± 1	$1.25^{+0.32}_{-0.29}$	3106^{+216}_{-261}	4160^{+453}_{-317}	$2.053^{+1.505}_{-0.790}$

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

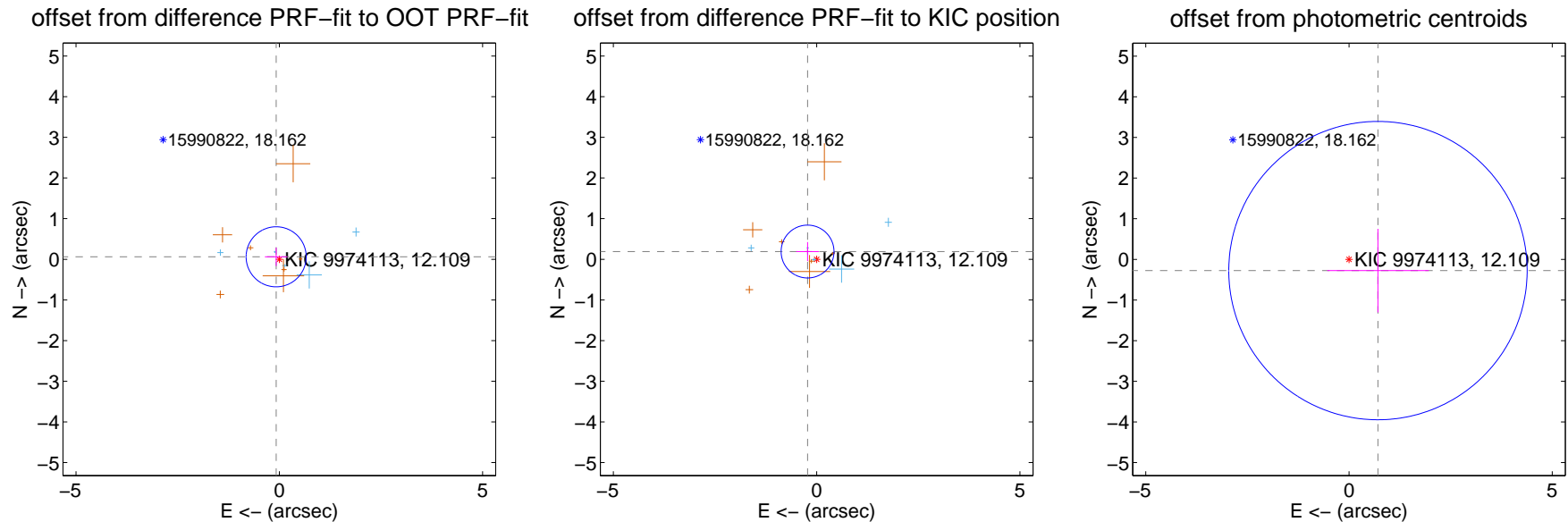
DV Centroid Data

Supplemental centroid analysis for 009974113-01. Kepler magnitude: 12.11. Transit SNR 5.44

There are 5 quarters with good PRF difference image offsets

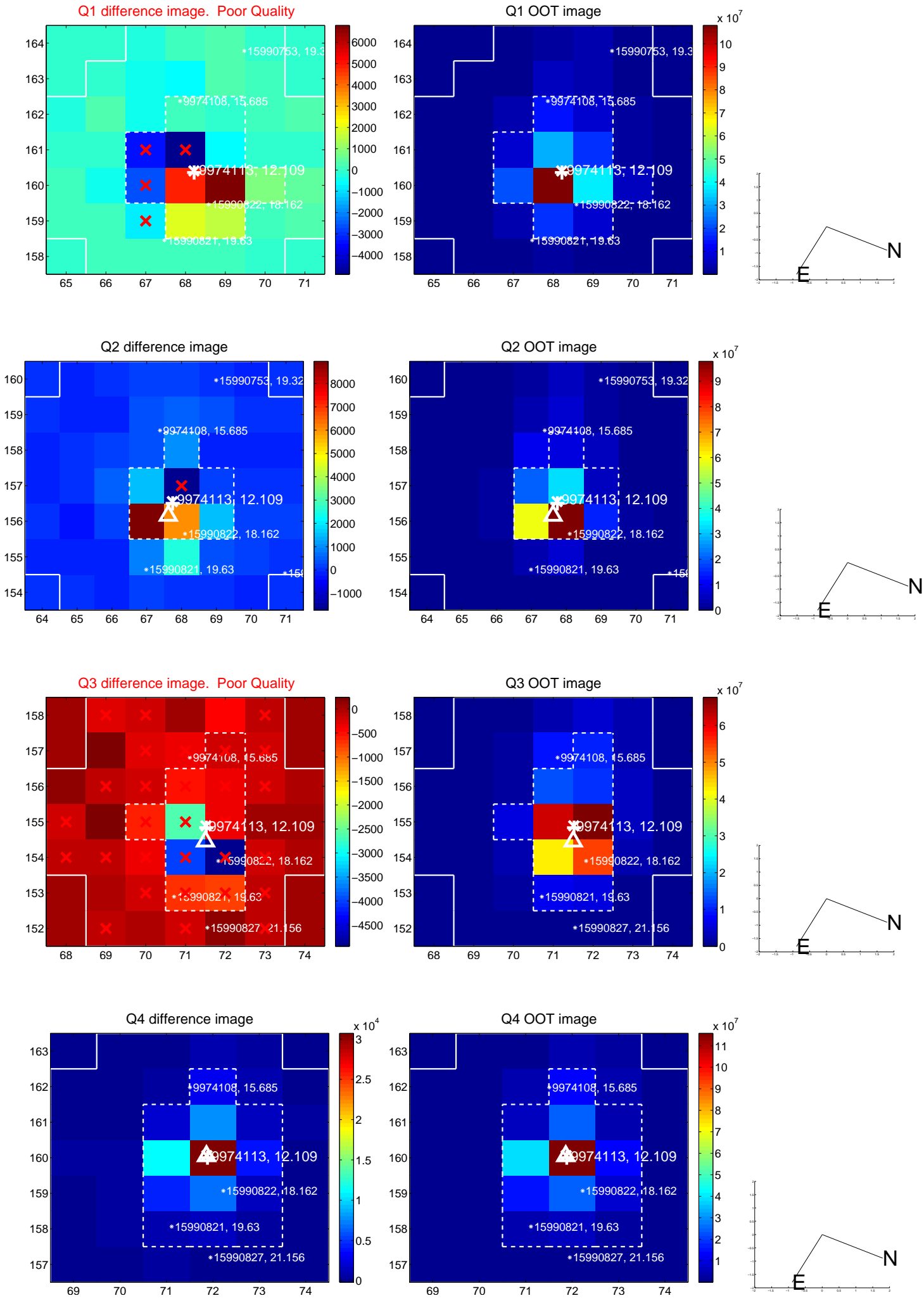
The direct PRF centroid is offset from the target star catalog position by about 0.24 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.099 ± 0.246	0.40	0.078 ± 0.275	0.062 ± 0.225
PRF-fit source offset from KIC position	0.294 ± 0.217	1.36	0.224 ± 0.277	0.191 ± 0.234
photometric centroid source offset	0.76 ± 1.22	0.62	-0.71 ± 1.25	-0.28 ± 1.03

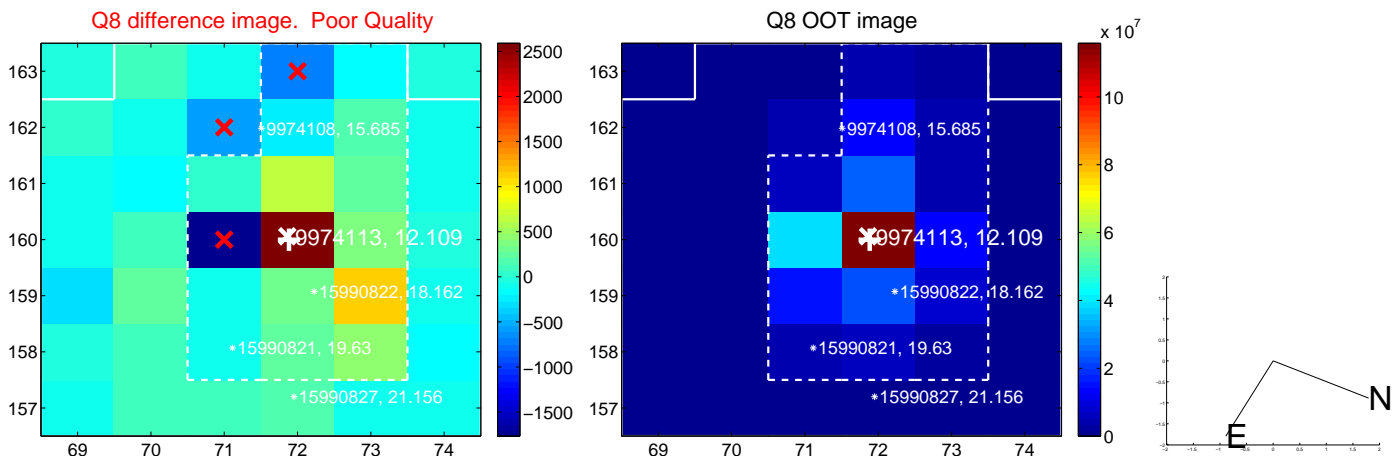
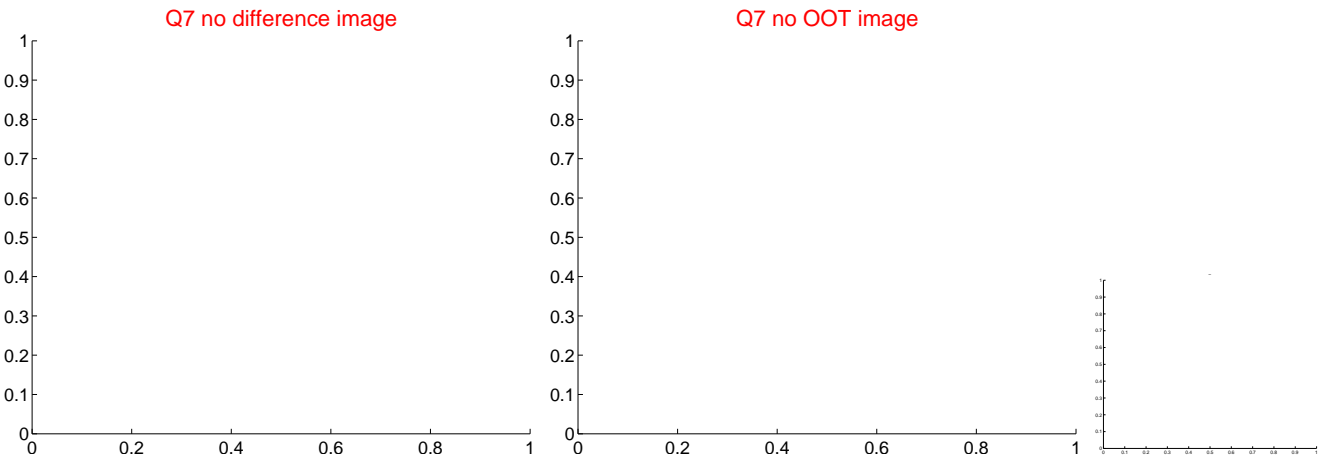
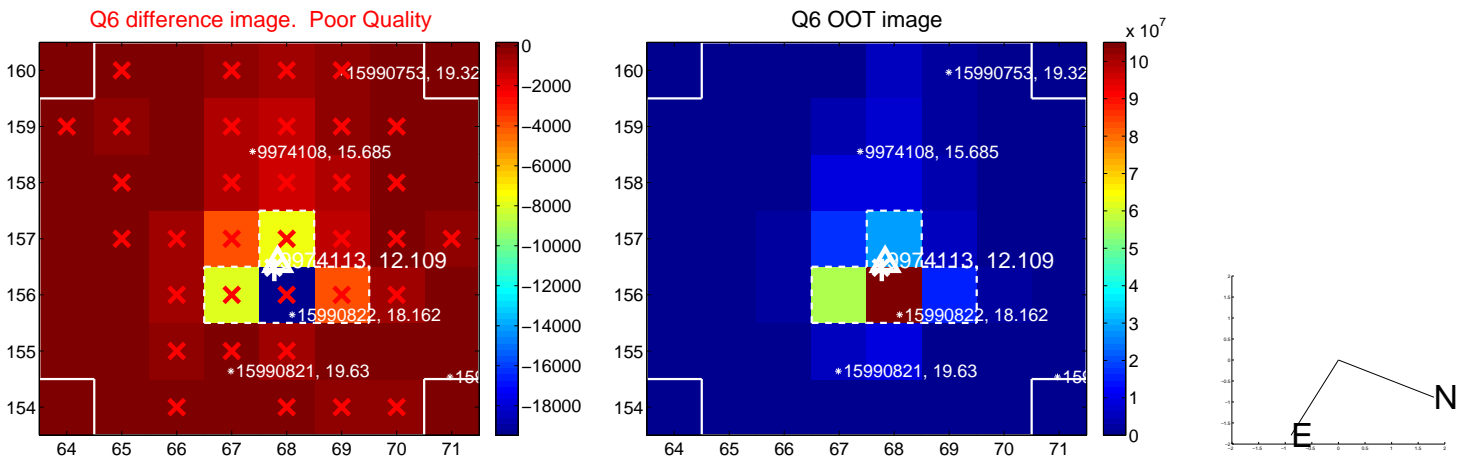
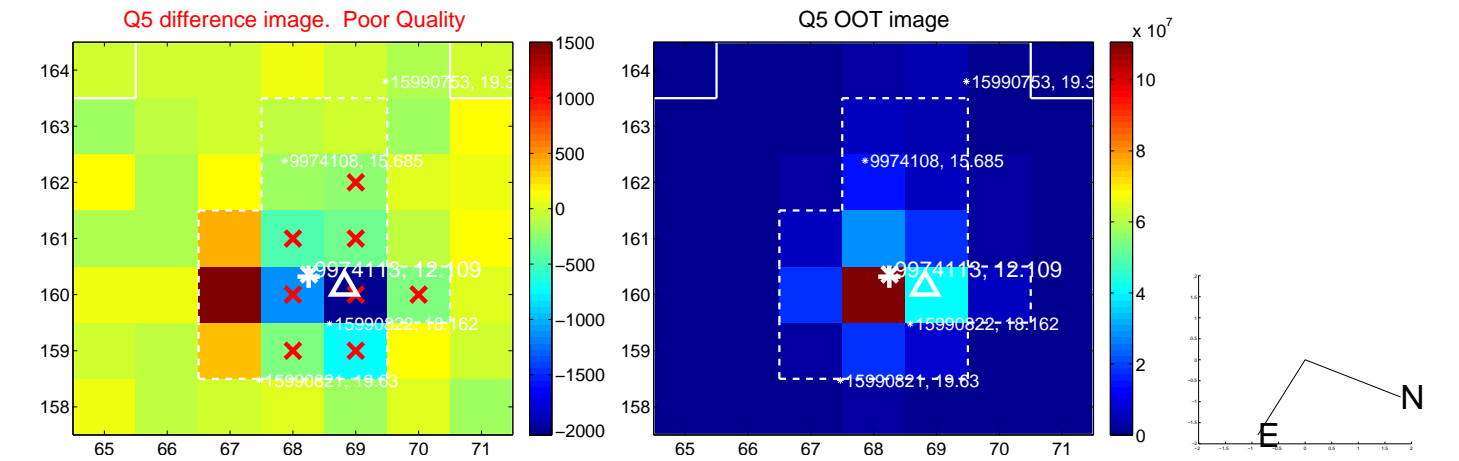


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets**; **Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

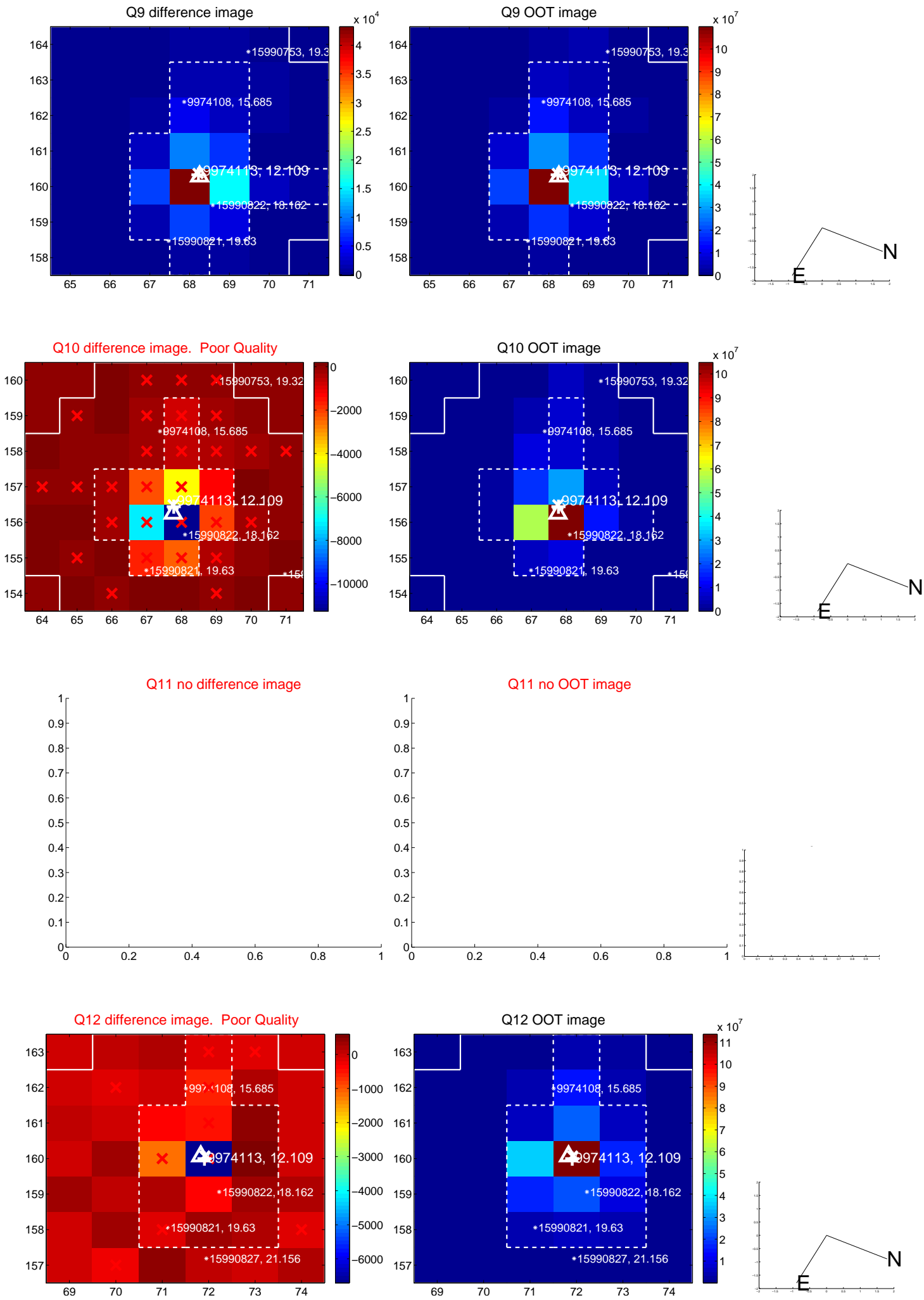
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



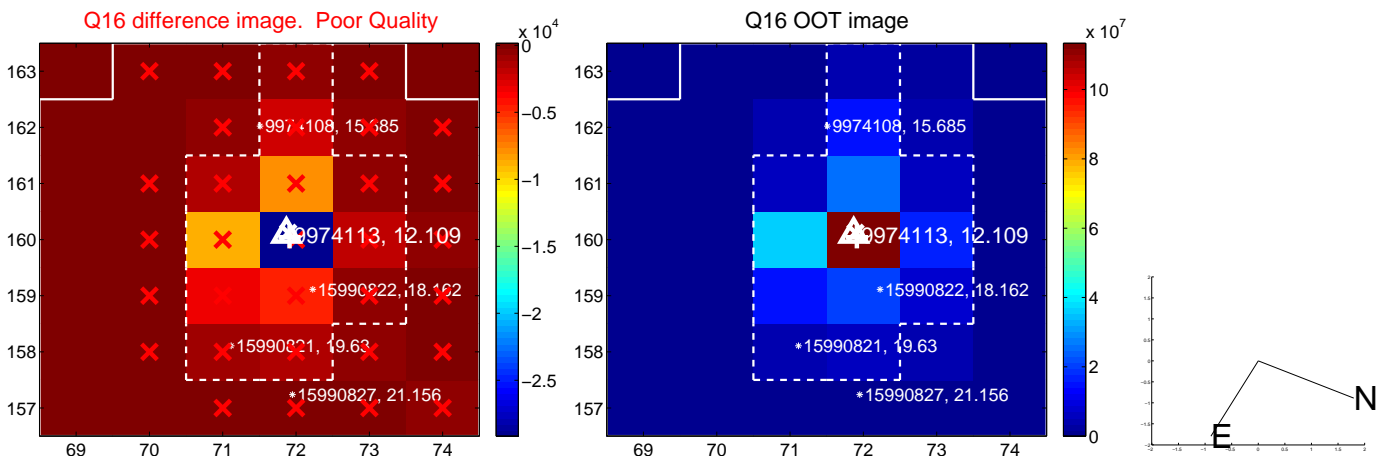
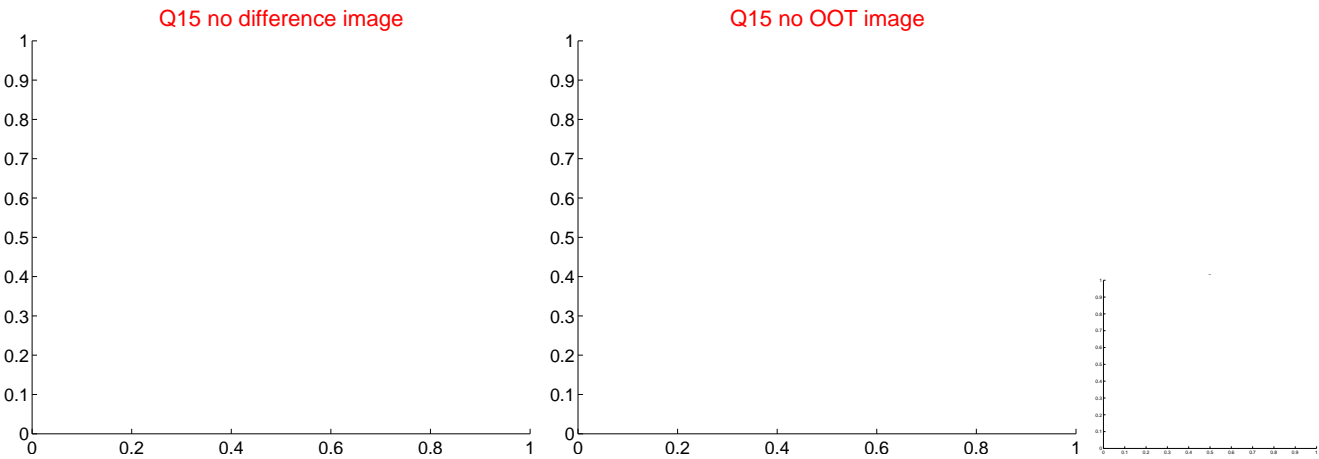
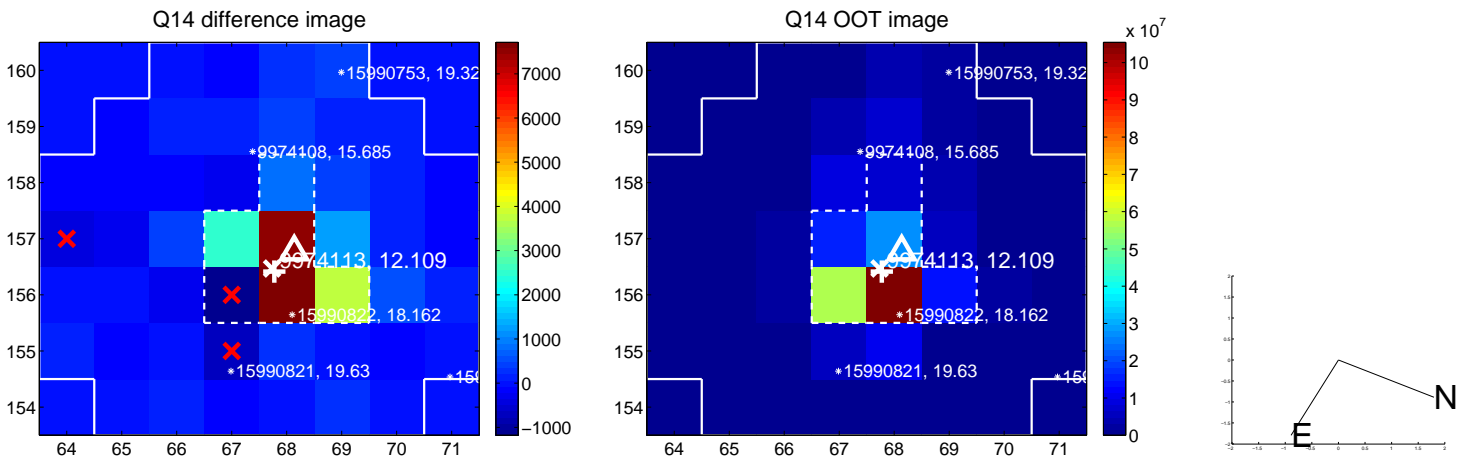
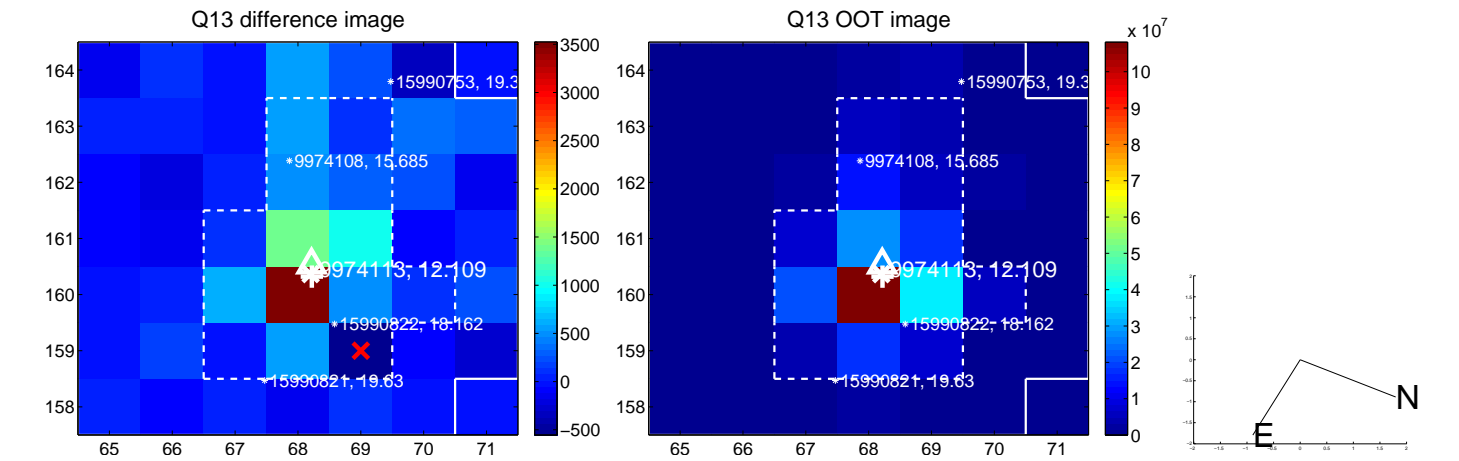
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



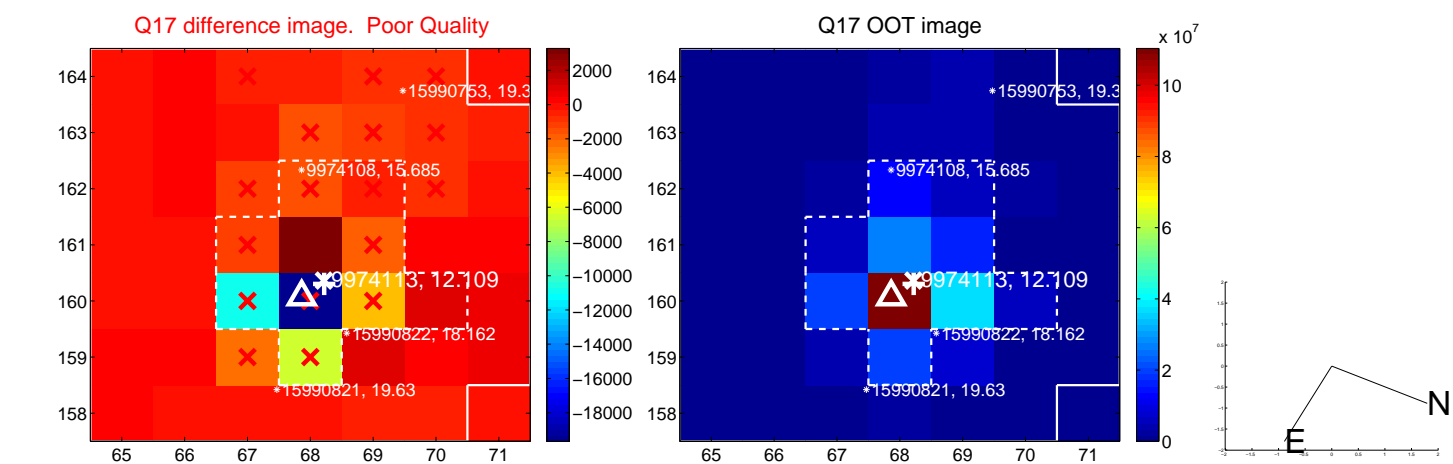
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



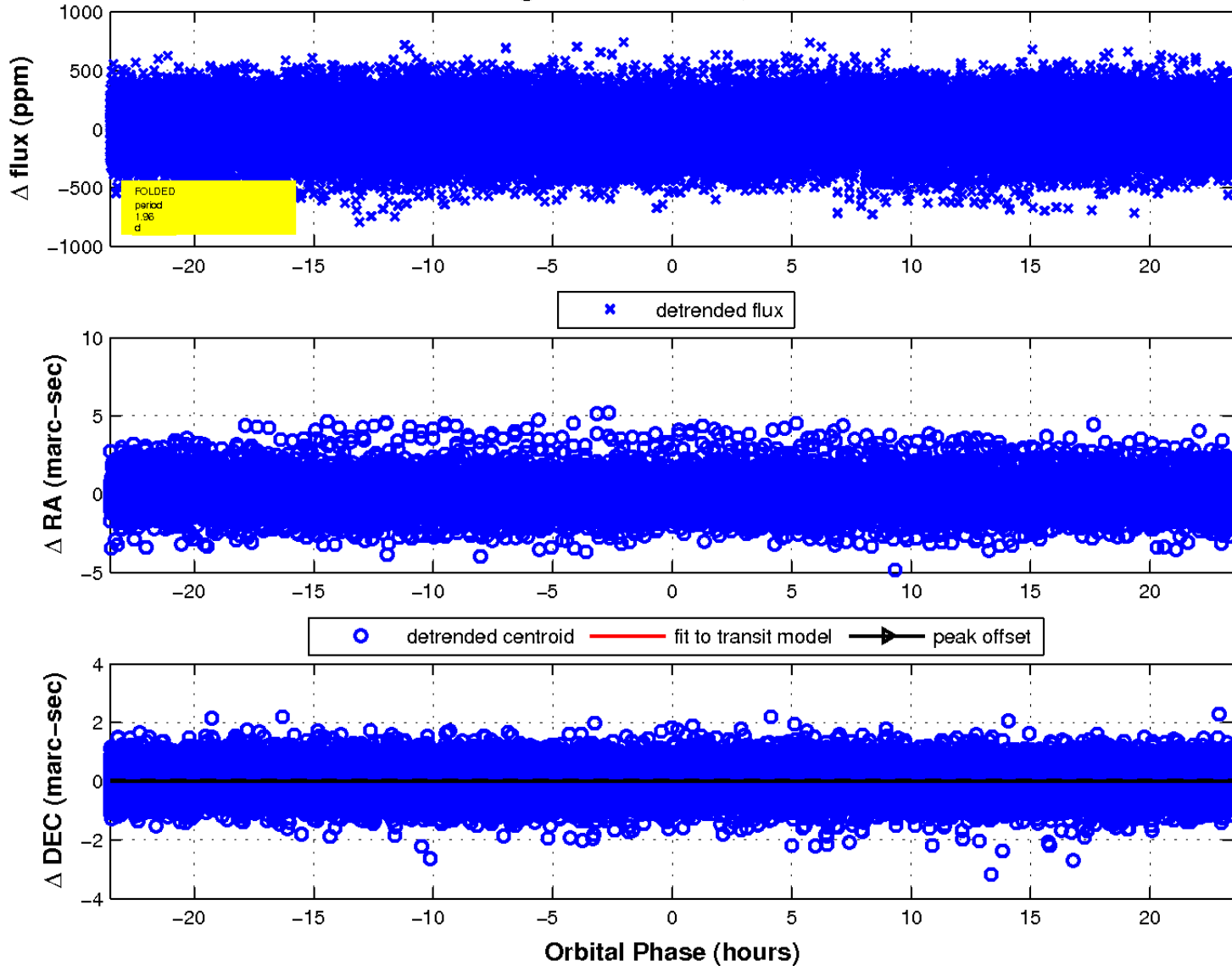
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



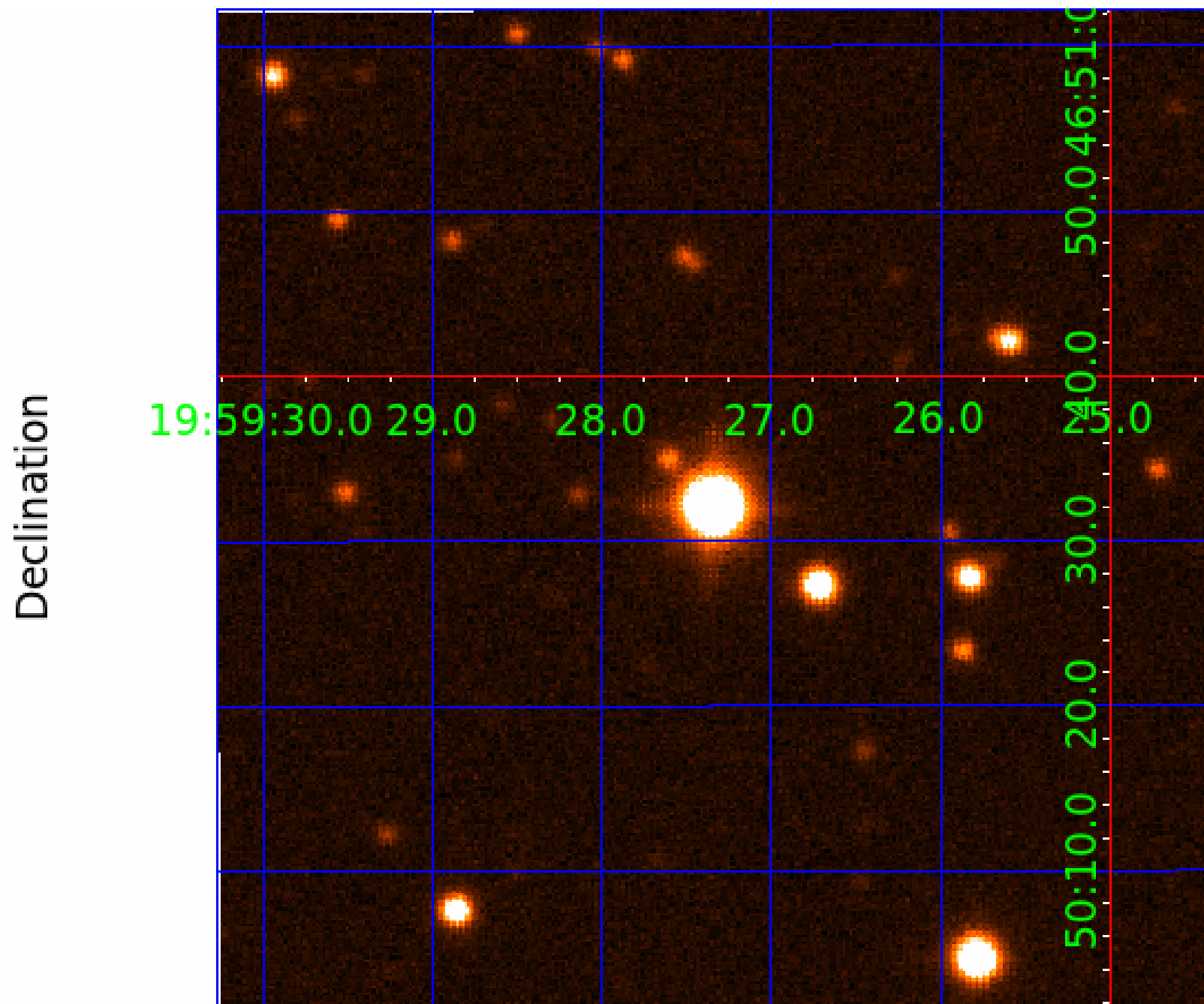
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



fluxWeightedCentroids, Planet 1 of 2



UKIRT Image



KIC 009974113

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})
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Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
009974113-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_ALT
009974113-02	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_RUBBLE_MARSHALL_SKYE—TRANS_GAPPED—ALL_TRANS_CHASES—MOD_NONUNIQ_ALT—MOD_TER_ALT—MOD_POS_ALT— INCONSISTENT_TRANS—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.

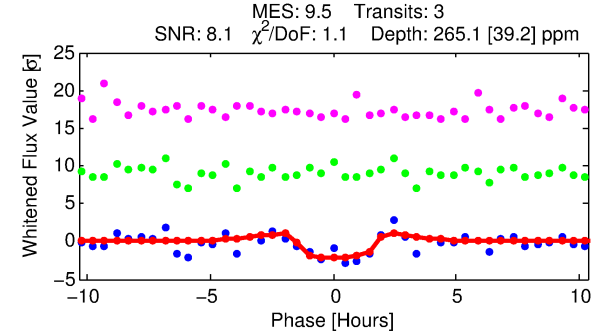
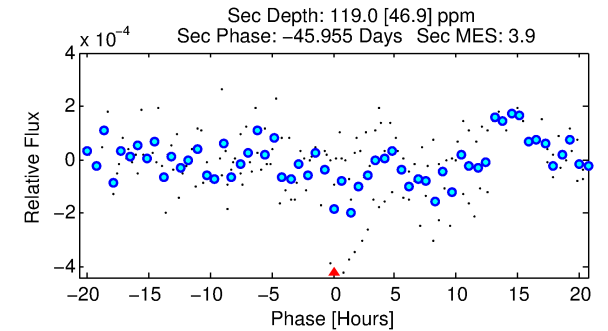
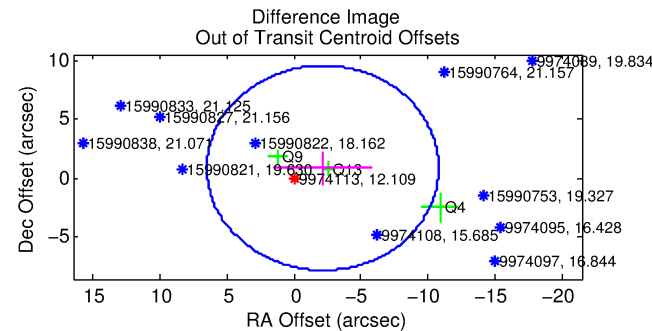
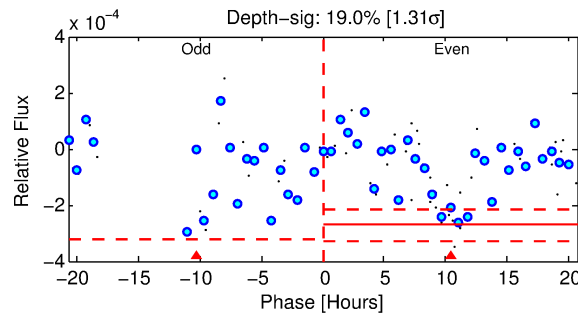
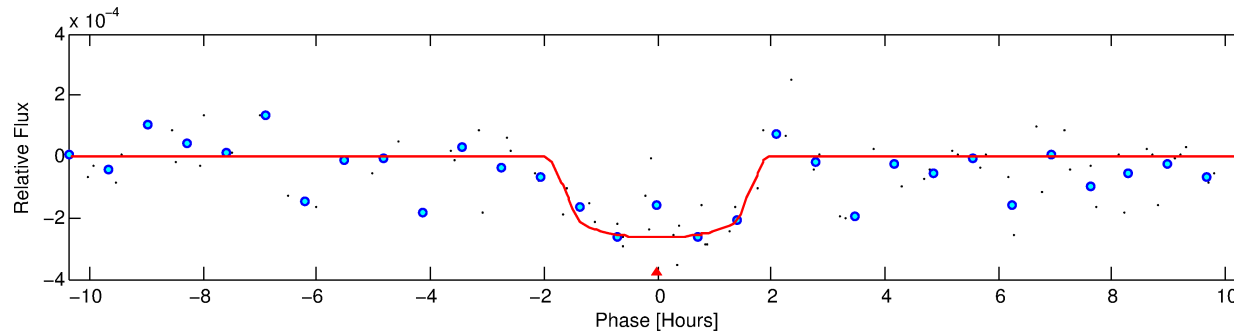
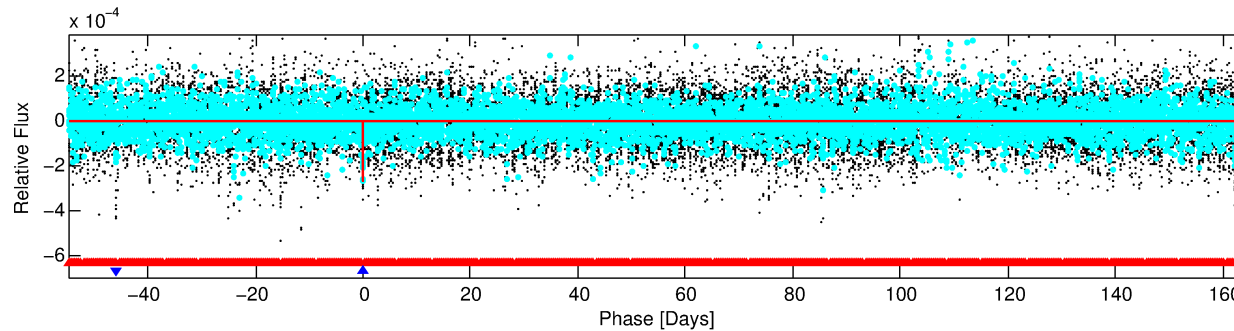
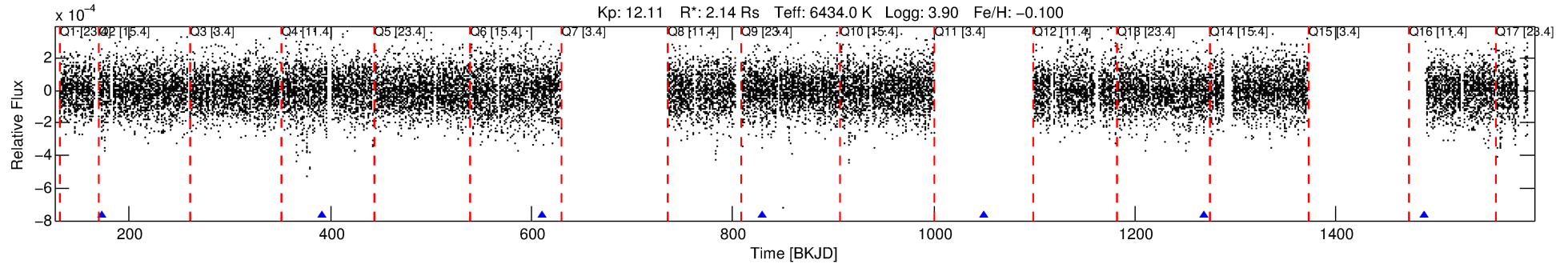
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 009974113-02

No Significant Match Found

DV One-Page Summary

KIC: 9974113 Candidate: 2 of 2 Period: 219.184 d



DV Fit Results:

Period = 219.18374 [0.00334] d
Epoch = 172.4257 [0.0136] BKJD
Rp/R* = 0.0162 [0.0267]
a/R* = 330.95 [2977.44]
b = 0.75 [5.24]
Seff = 11.45 [5.48]
Teq = 469 [56] K
Rp = 3.78 [6.33] Re
a = 0.7824 [0.2251] AU
Ag = 2803.80 [9394.92] [0.30 σ]
Teffp = 5278 [4382] K [1.10 σ]

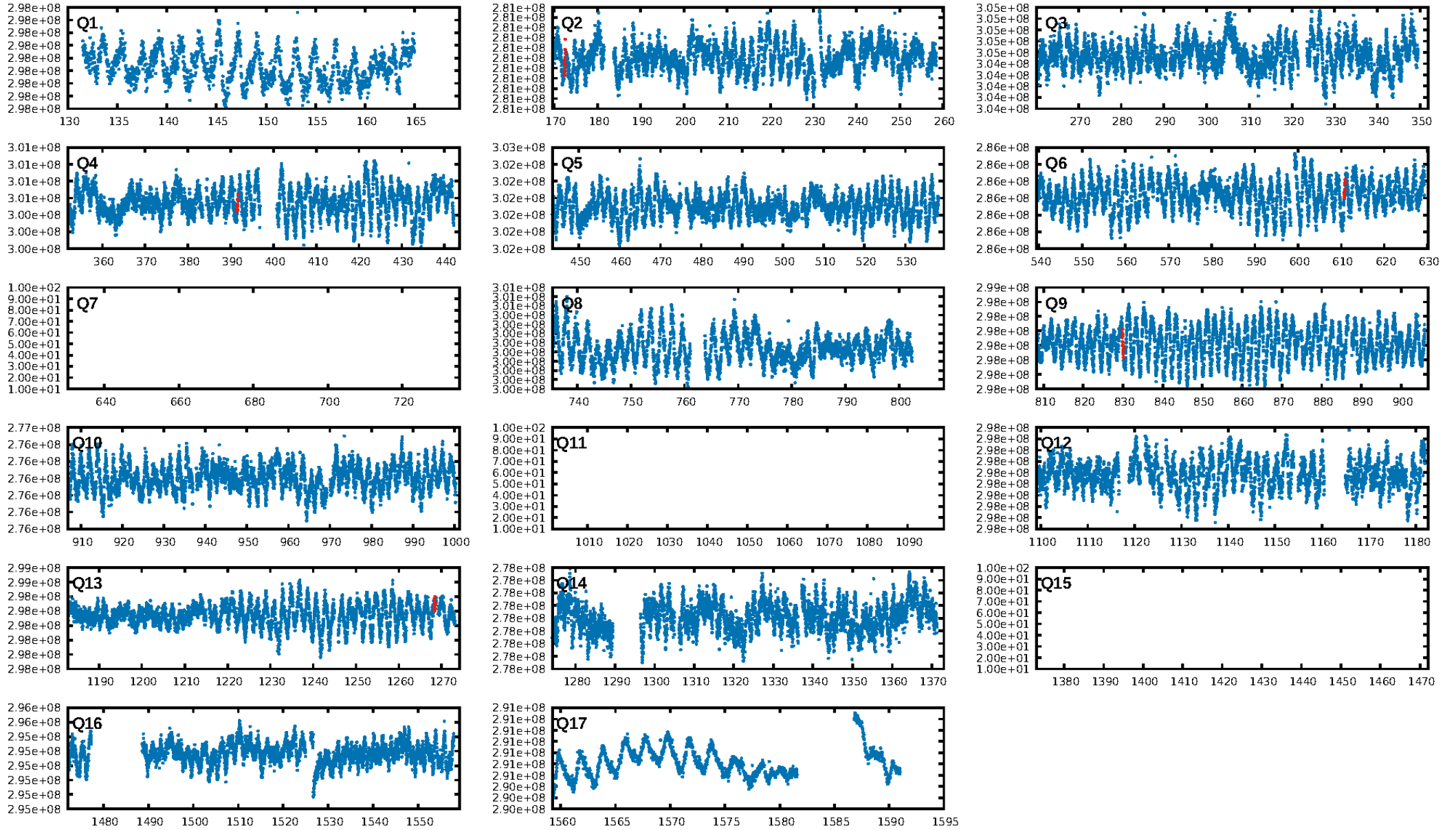
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [598.63 σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 16.9%
ModelChiSquareGof-sig: 96.4%
Bootstrap-pfa: 6.78e-15
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: 2.024
Centroid-sig: N/A
Centroid-so: 0.810 arcsec [1.02 σ]
OotOffset-rm: 2.323 arcsec [0.81 σ]
KicOffset-rm: 2.252 arcsec [0.81 σ]
OotOffset-st: 0/0/1/2 [3]
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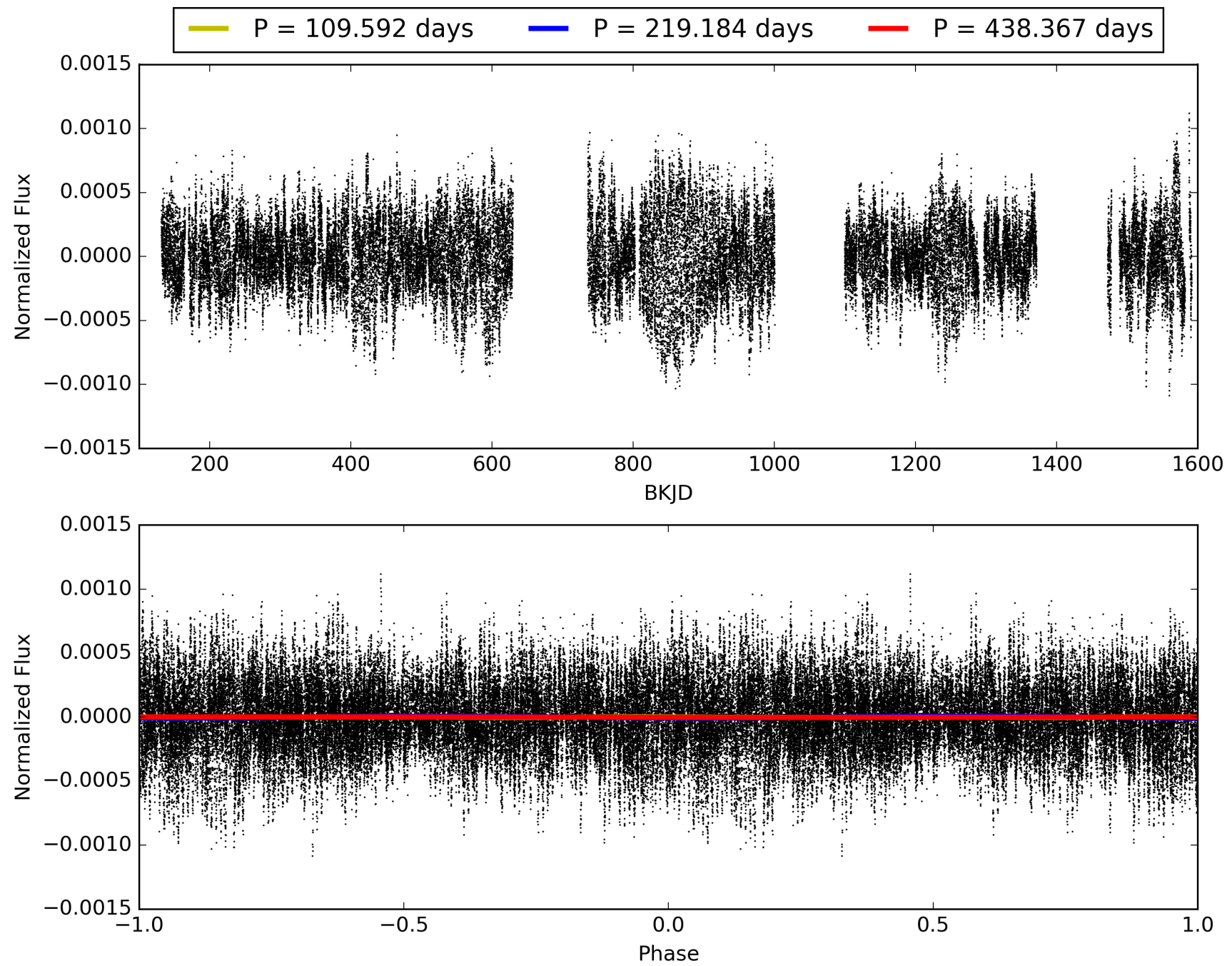
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

TCE 009974113-02, PDC Light Curves

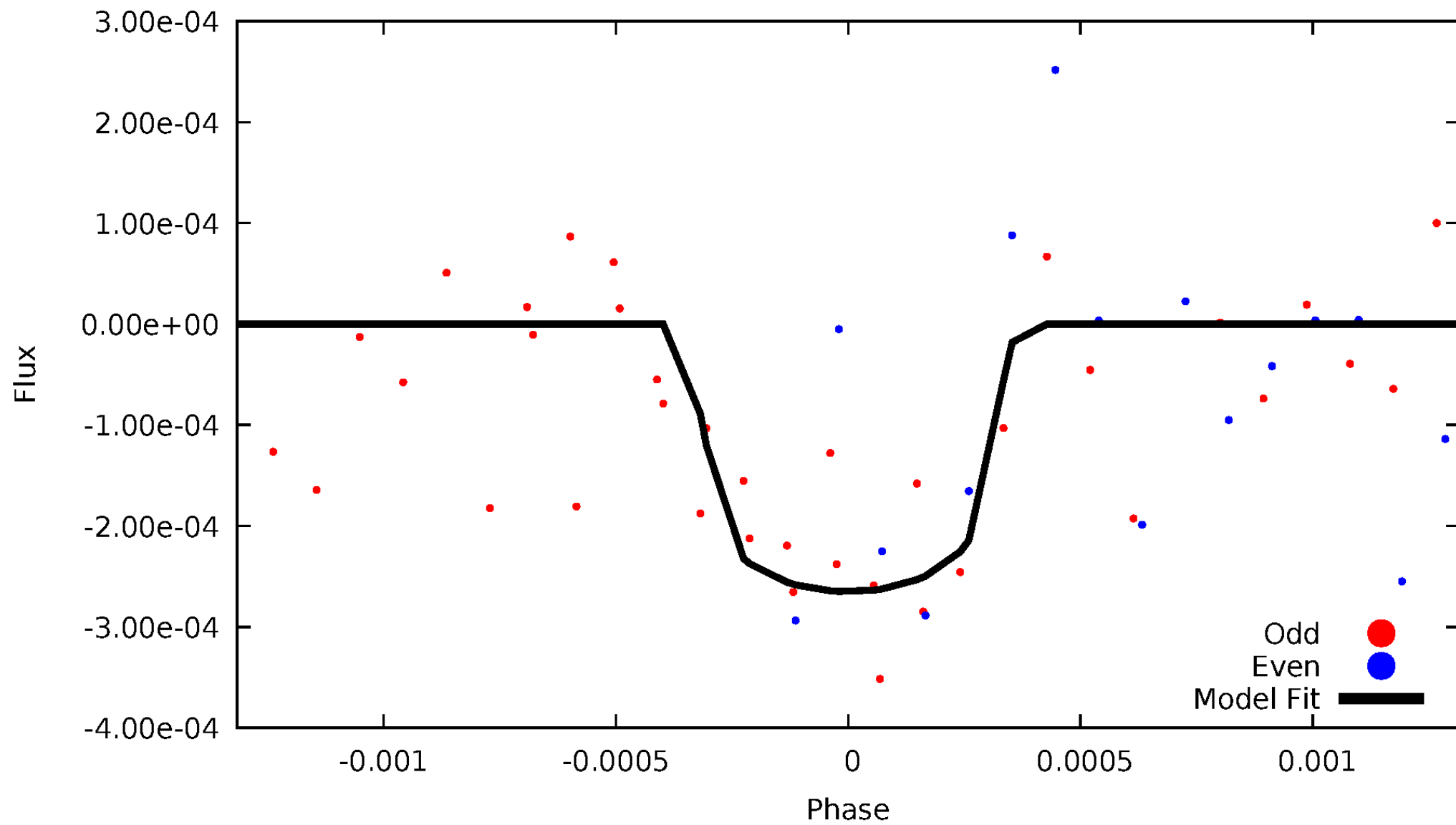


TCE 009974113-02



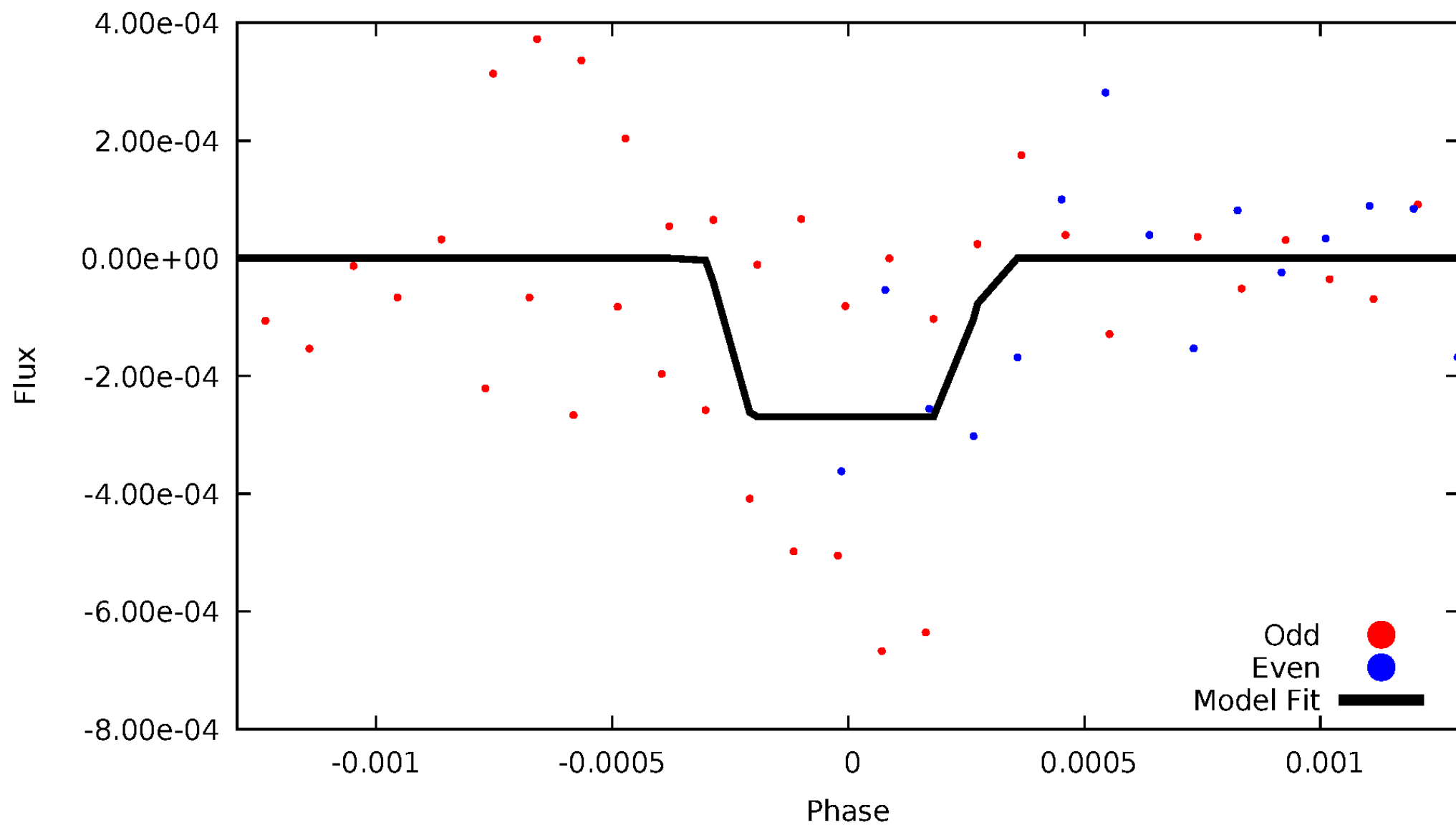
DV Odd/Even

TCE 009974113-02



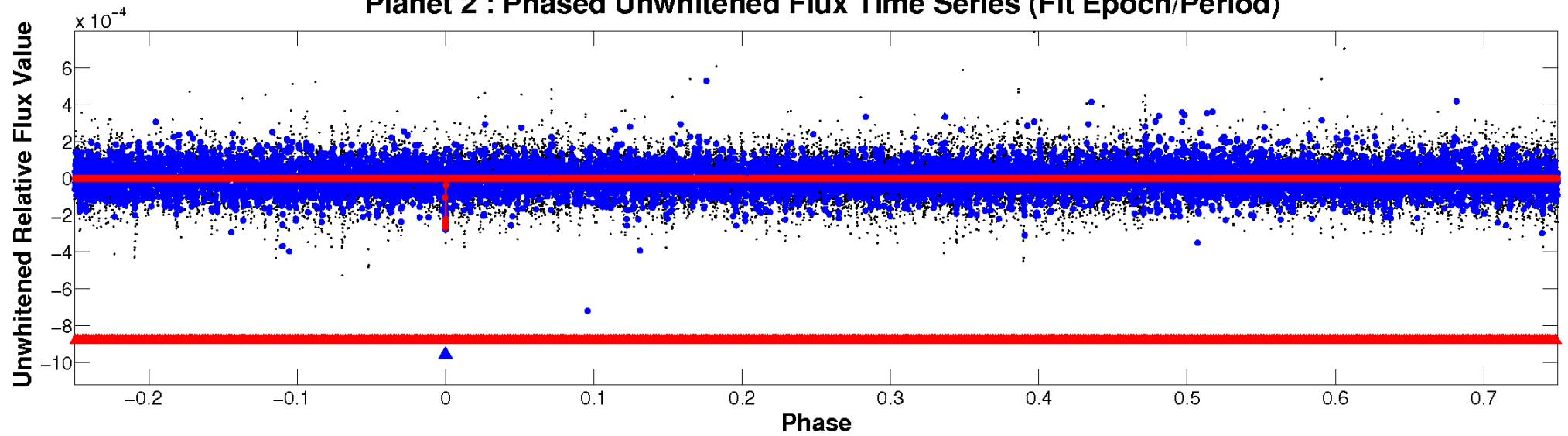
ALT Odd/Even

TCE 009974113-02

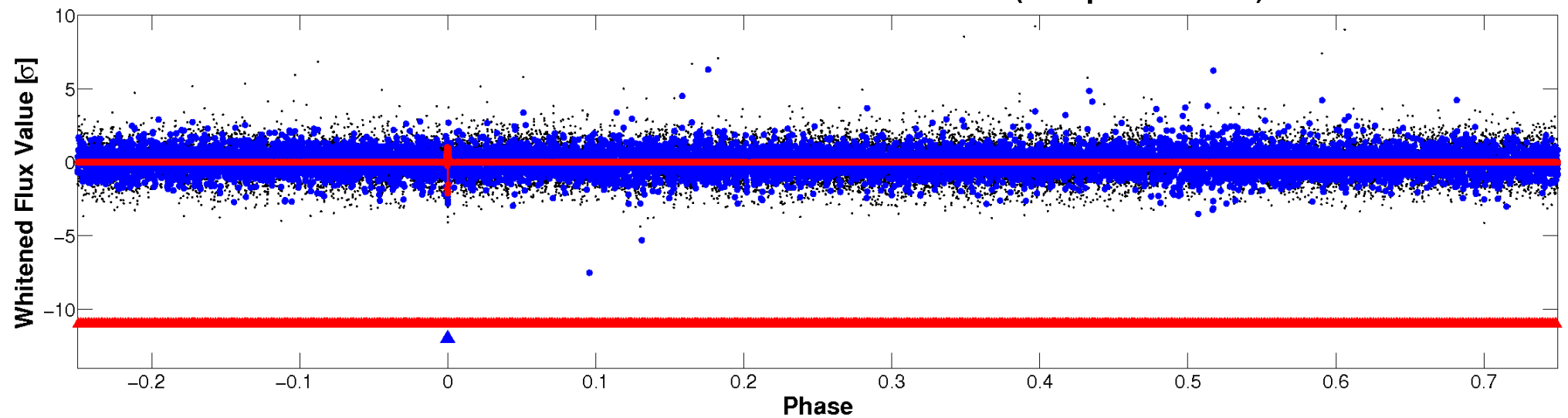


Non-Whitened Vs. Whitened Light Curve

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

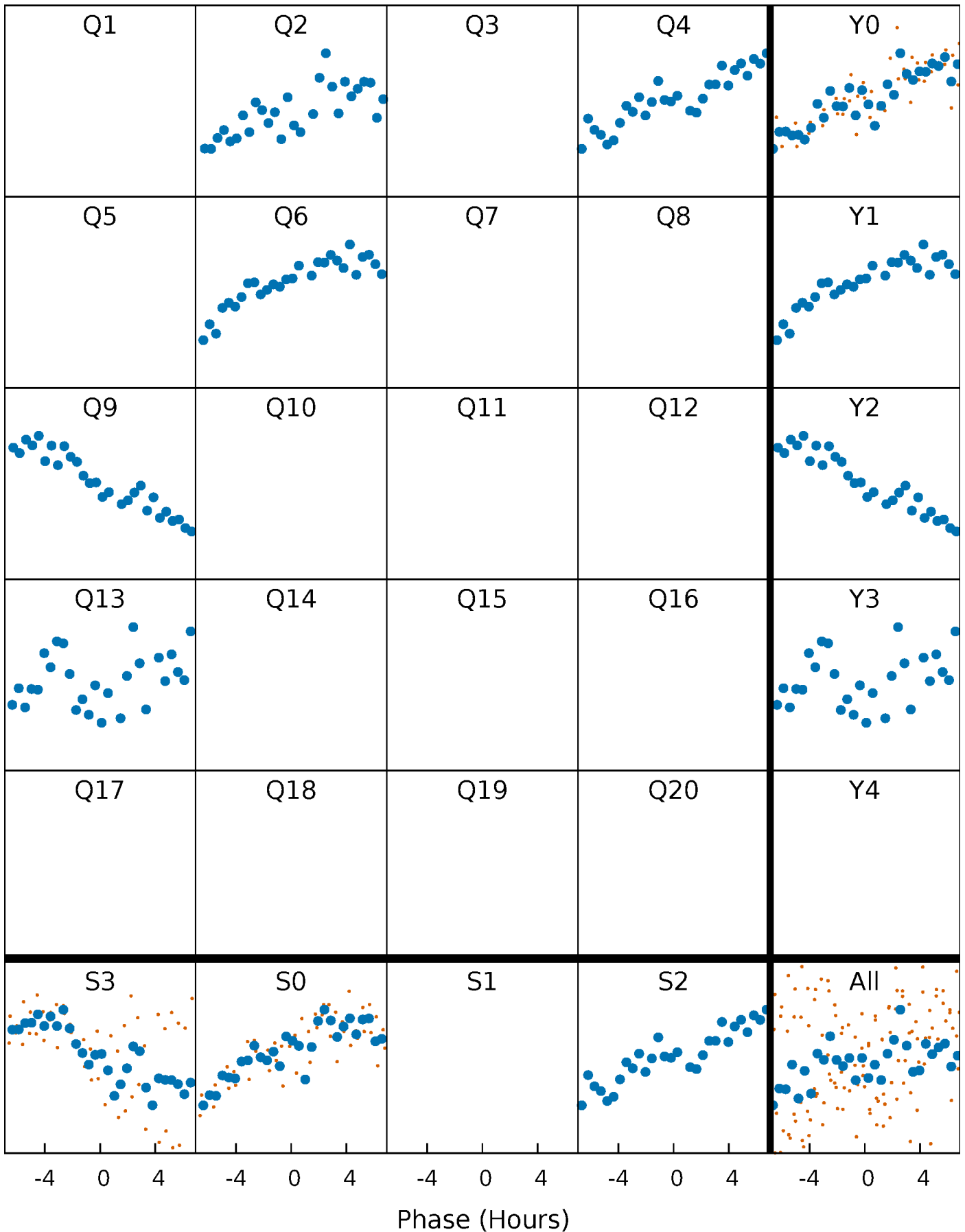


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



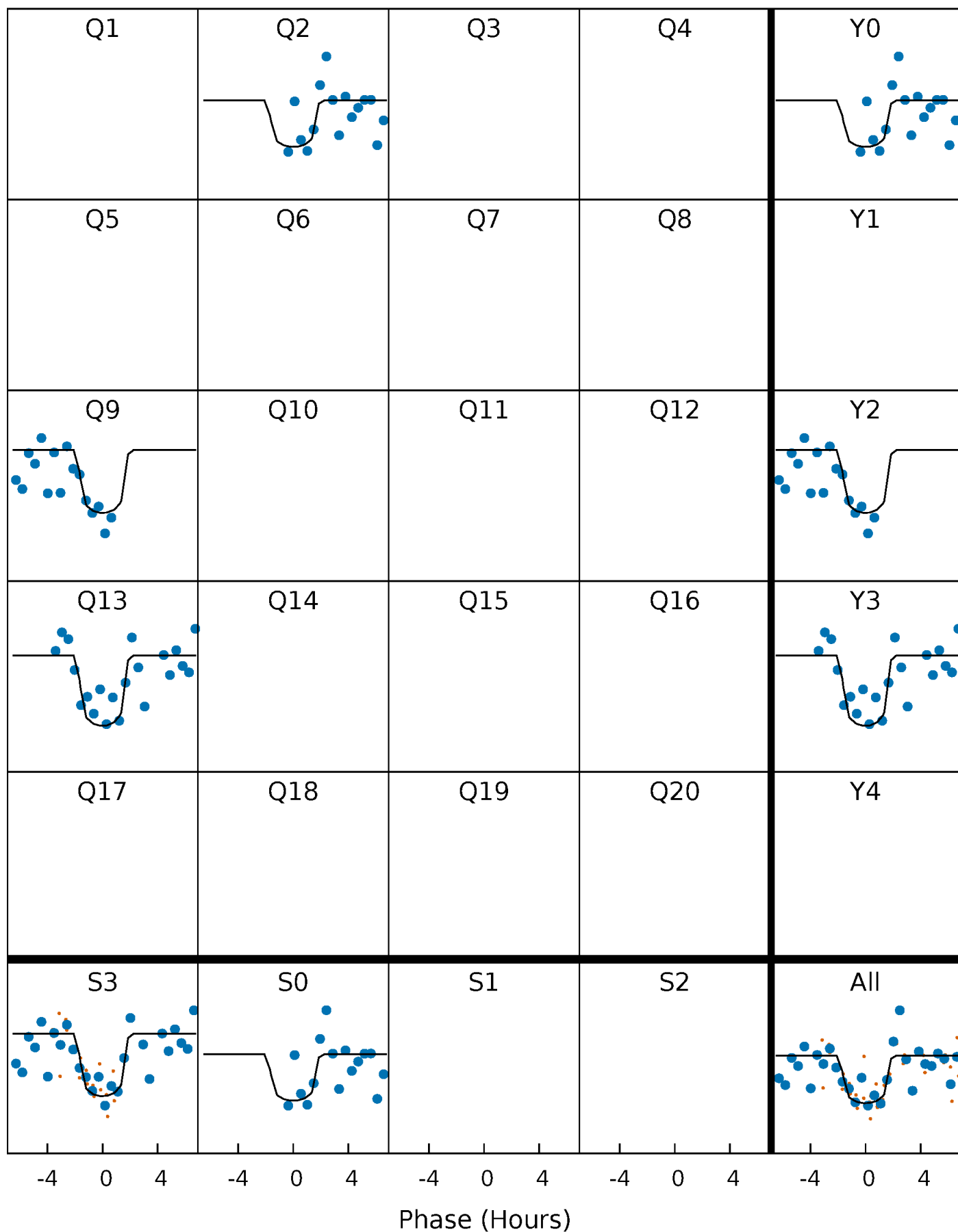
PDC Quarter-Phased Transit Curves

TCE 009974113-02 P=219.183739 Days $T_0=172.425682$ (BKJD)



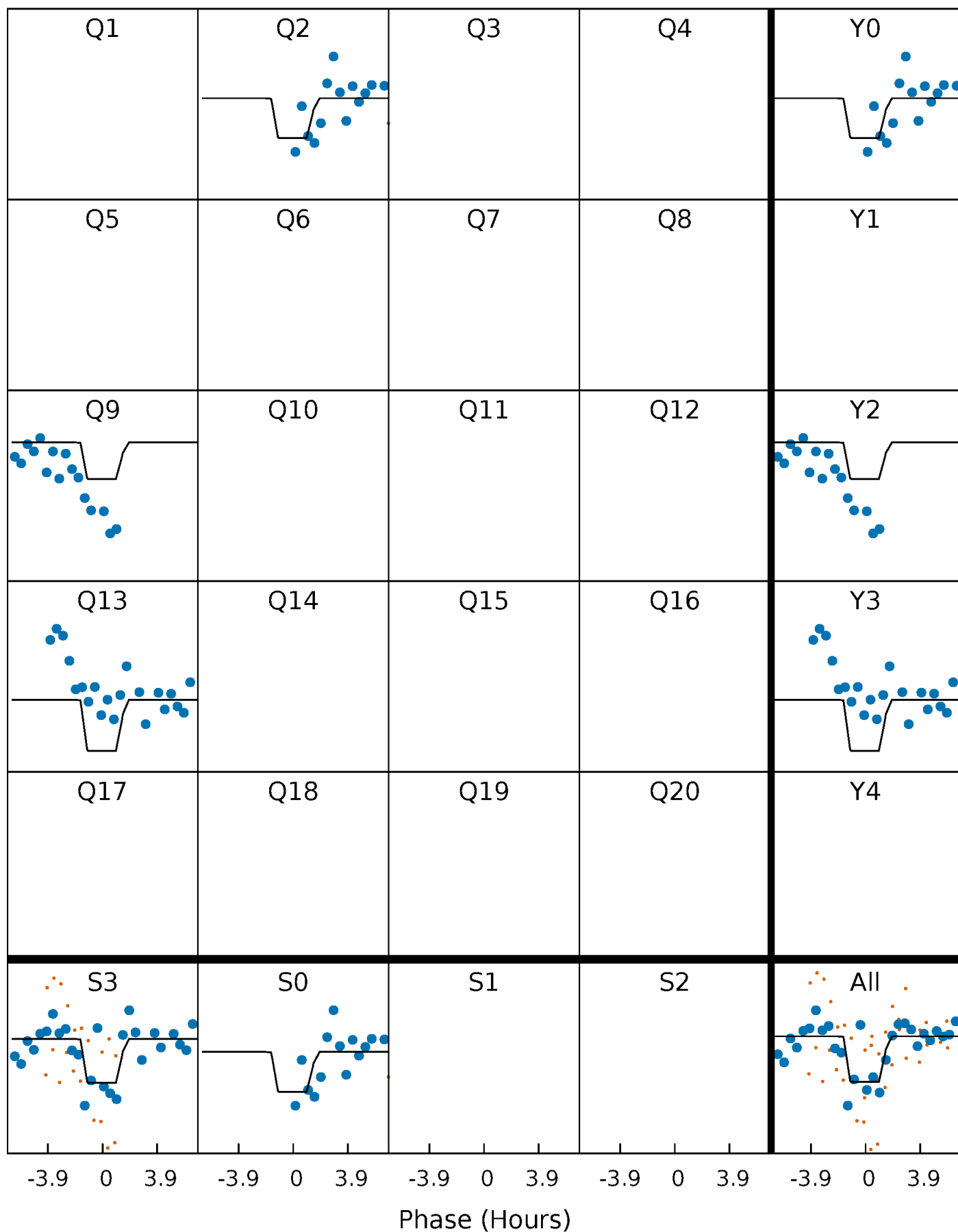
DV Quarter-Phased Transit Curves

TCE 009974113-02 P=219.183739 Days $T_0=172.425682$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

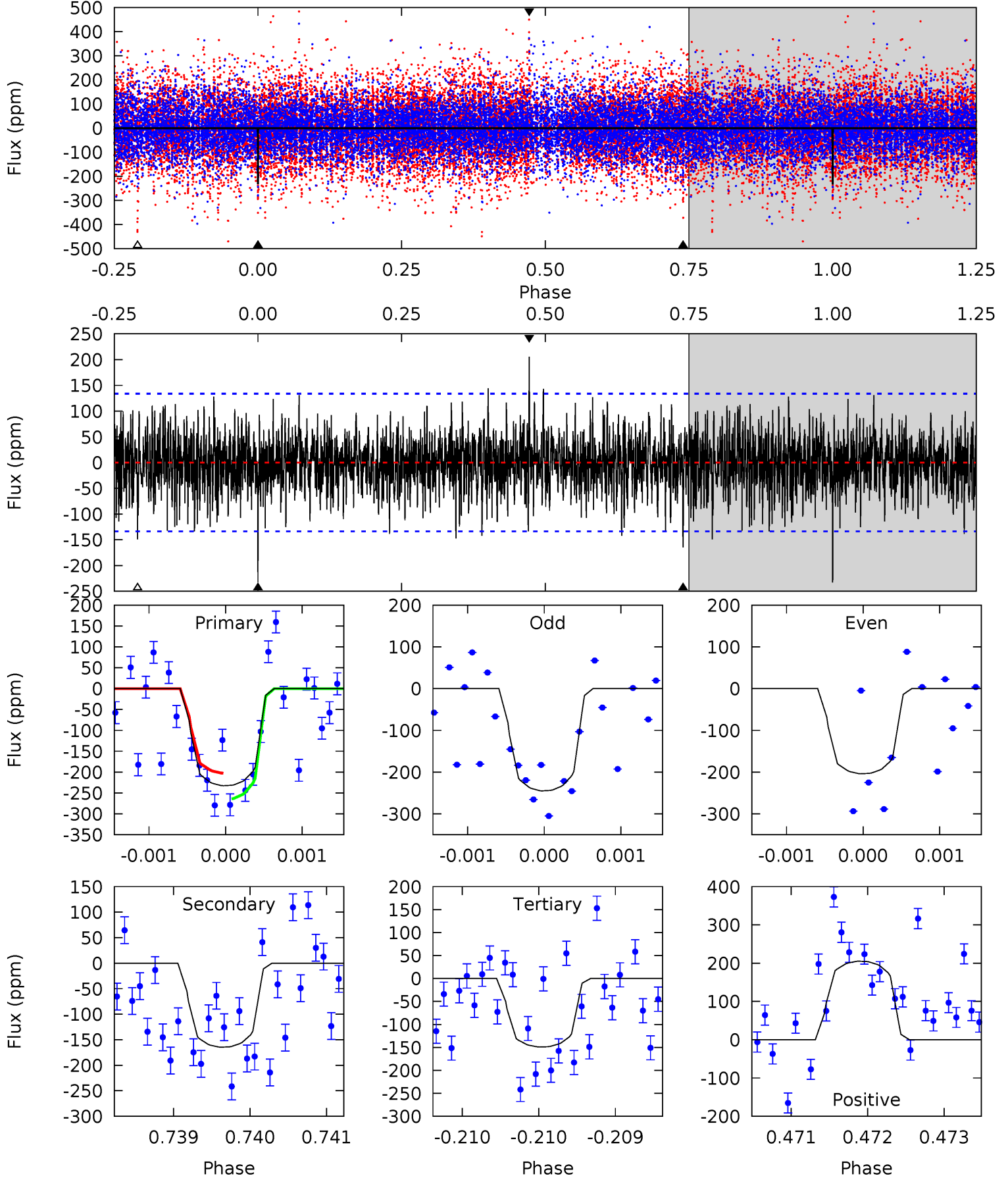
TCE 009974113-02 P=219.190712 Days $T_0=172.404076$ (BKJD)



DV Model-Shift Uniqueness Test

009974113-02, P = 219.183739 Days, E = 172.425682 Days

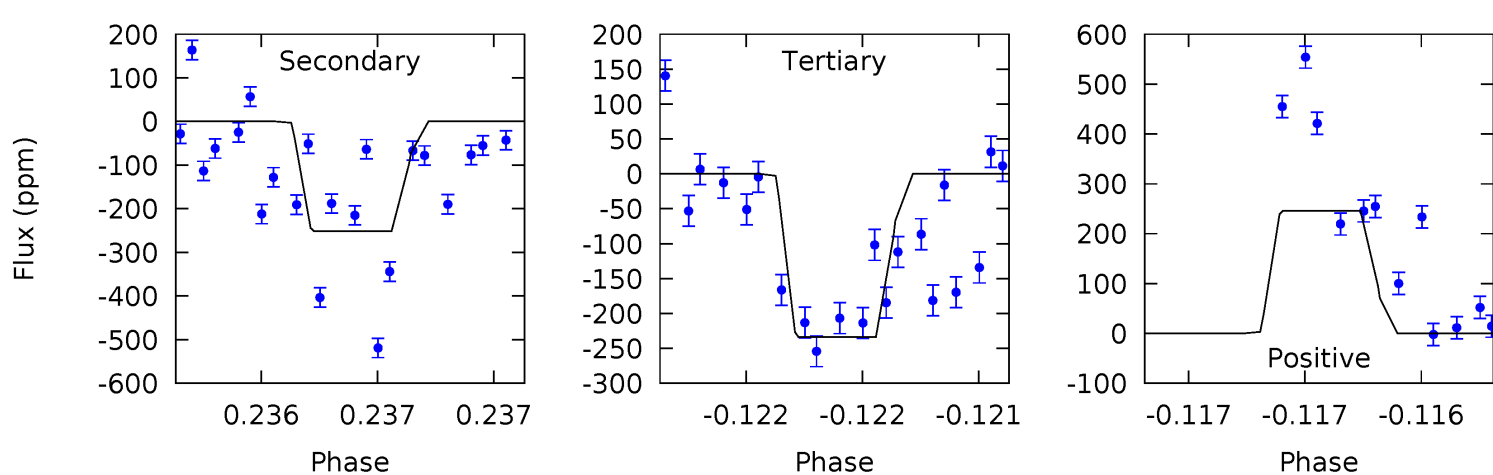
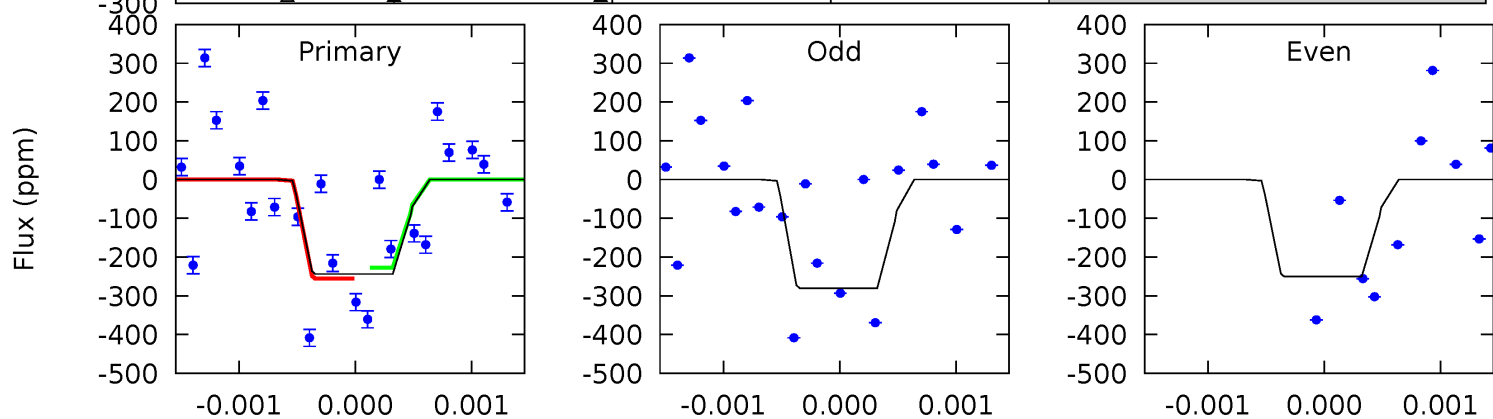
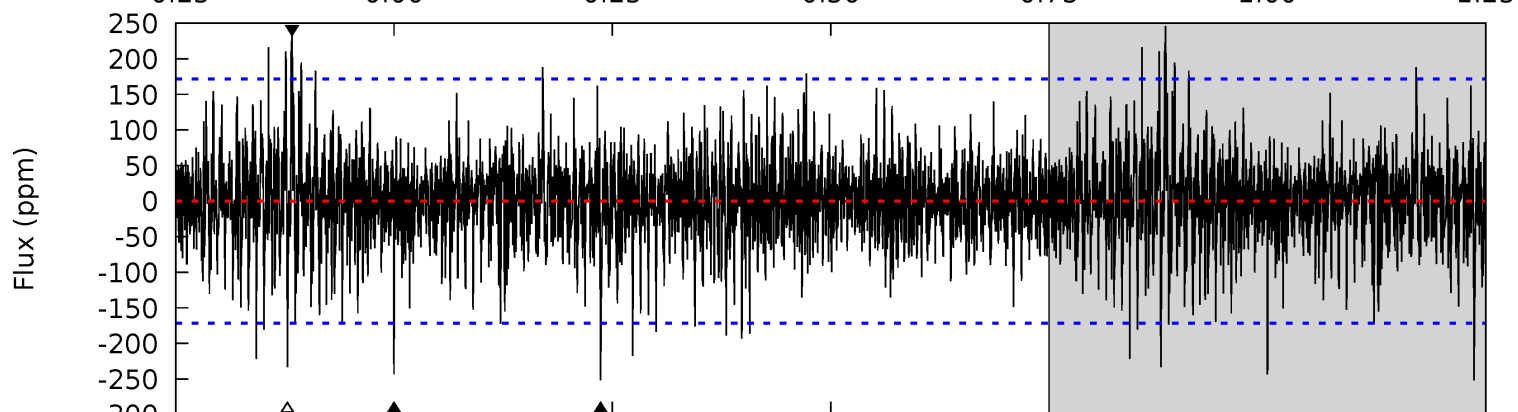
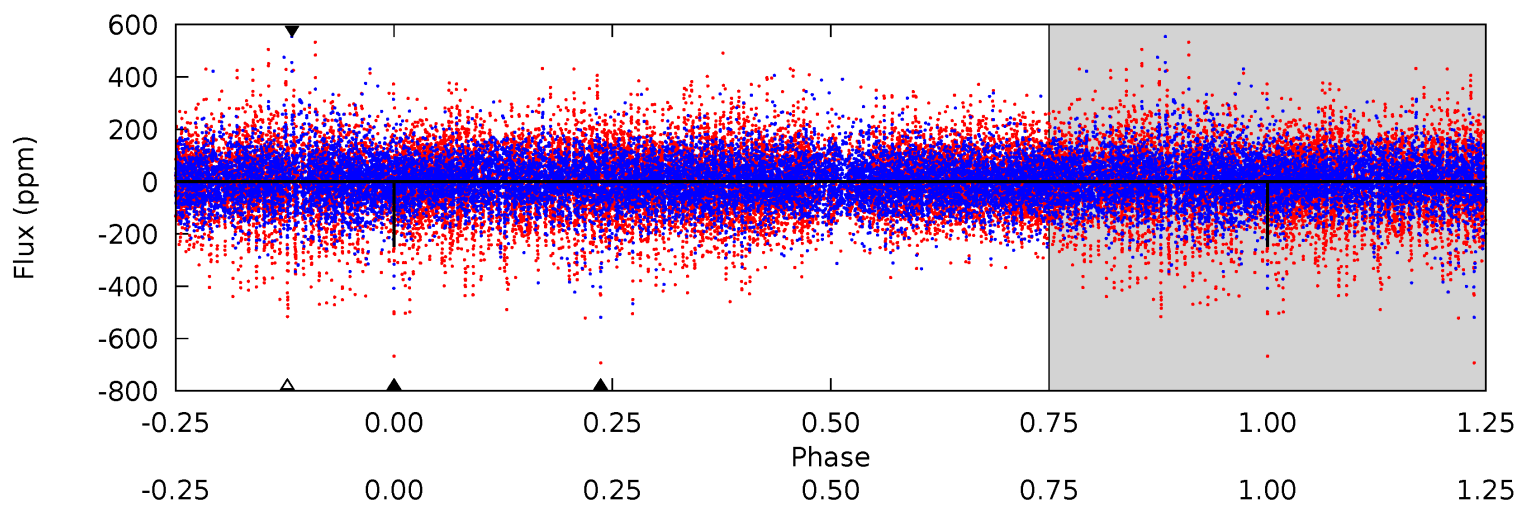
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.61	6.80	6.16	8.48	5.52	3.40	1.75	3.46	1.14	0.64	-1.68	0.75	1.08	0.47	1.27



Alt Model-Shift Uniqueness Test

009974113-02, P = 219.190712 Days, E = 172.404076 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
7.88	8.14	7.56	7.96	5.55	3.45	1.62	0.32	-0.08	0.58	0.18	0.44	1.09	0.49	0.46



Stellar Parameters For KIC 009974113

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$\rho_{\star} (\text{g}\cdot\text{cm}^{-3})$
	6434^{+175}_{-194}	$3.902^{+0.273}_{-0.117}$	$-0.100^{+0.300}_{-0.250}$	$2.137^{+0.459}_{-0.632}$	$1.330^{+0.221}_{-0.221}$	$0.192^{+0.345}_{-0.078}$
	+3%/-3%	+7%/-3%	+300%/-250%	+21%/-30%	+17%/-17%	+180%/-41%
Source	PHO1	FLK73	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 009974113-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-165 ± 24	$5.45^{+5.43}_{-3.52}$	646^{+43}_{-53}	4727^{+3246}_{-1015}	1809^{+13544}_{-1344}
Alt.	-252 ± 31	$5.56^{+5.52}_{-3.61}$	644^{+47}_{-53}	5150^{+3764}_{-1190}	2686^{+19422}_{-1997}

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

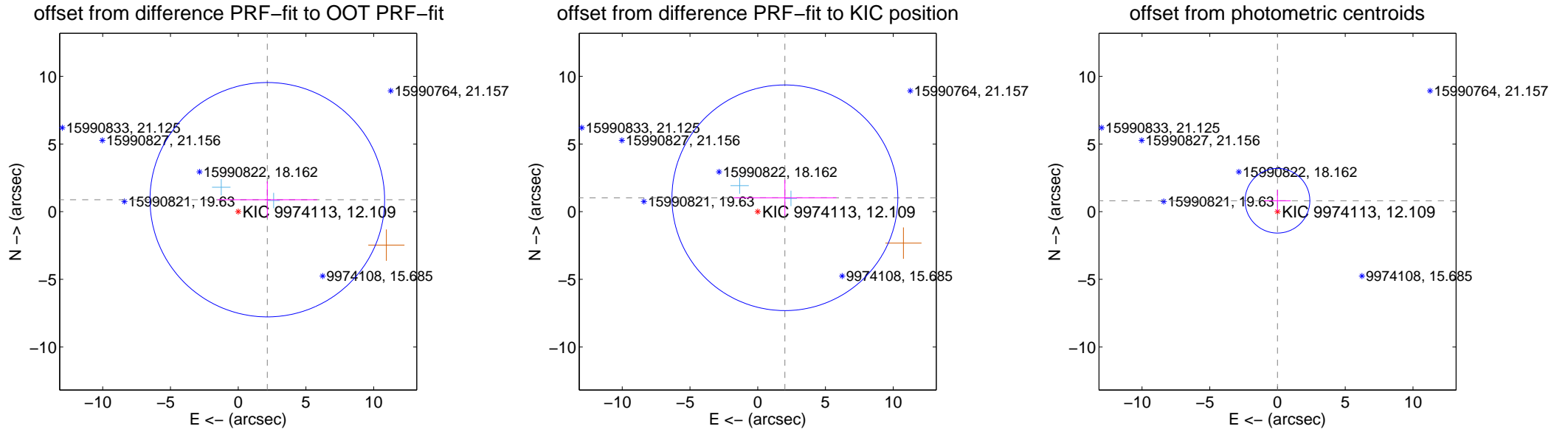
DV Centroid Data

Supplemental centroid analysis for 009974113-02. Kepler magnitude: 12.11. Transit SNR 8.12

There are 2 quarters with good PRF difference image offsets

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

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	2.323 ± 2.885	0.81	-2.148 ± 3.675	0.885 ± 1.355
PRF-fit source offset from KIC position	2.252 ± 2.778	0.81	-2.004 ± 3.795	1.026 ± 1.321
photometric centroid source offset	0.81 ± 0.80	1.02	0.00 ± 0.98	0.81 ± 0.80



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.

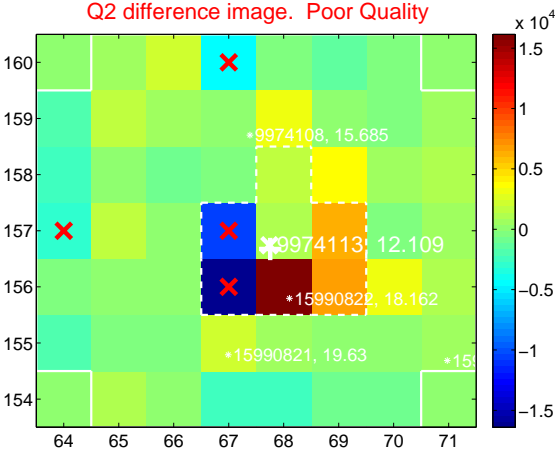
Q1 no difference image



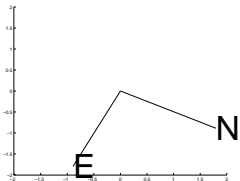
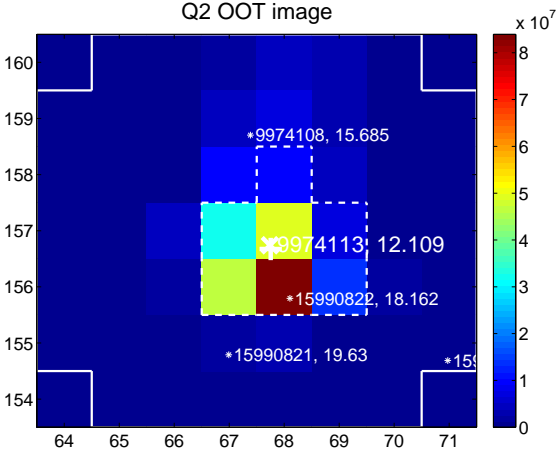
Q1 no OOT image



Q2 difference image. Poor Quality



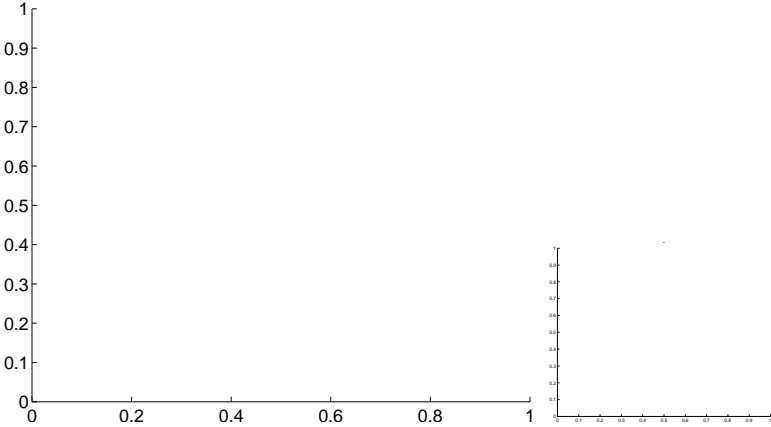
Q2 OOT image



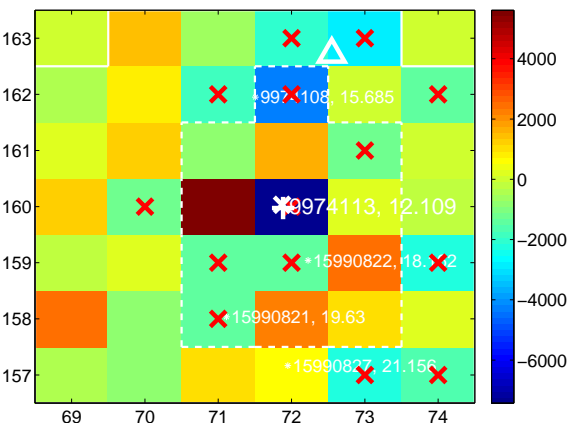
Q3 no difference image



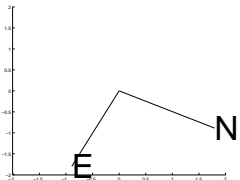
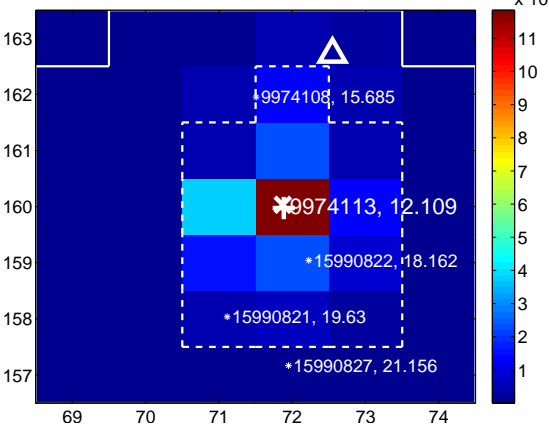
Q3 no OOT image



Q4 difference image. Poor Quality

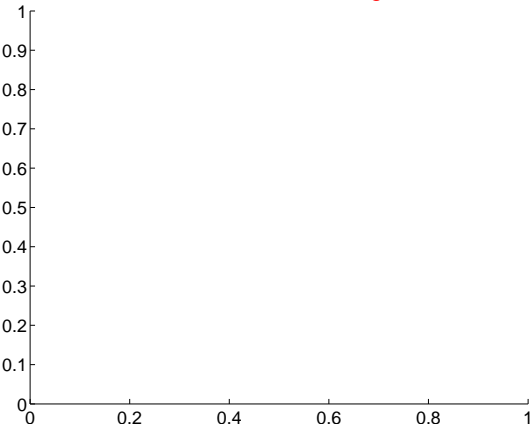


Q4 OOT image

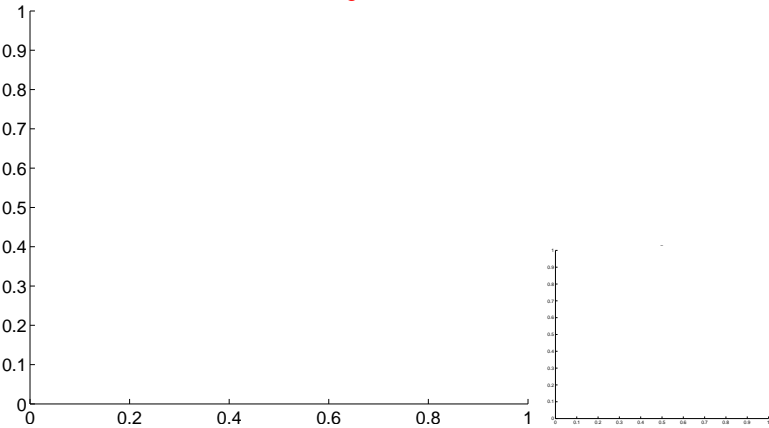


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.

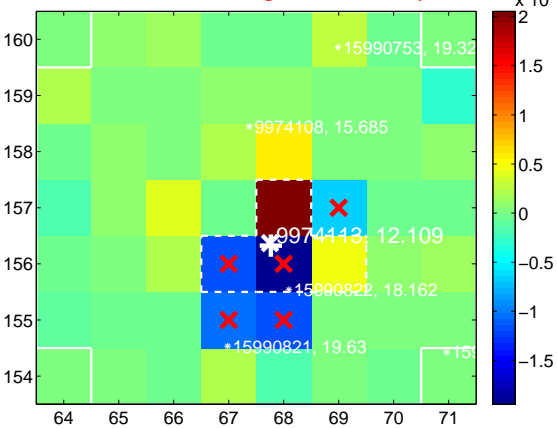
Q5 no difference image



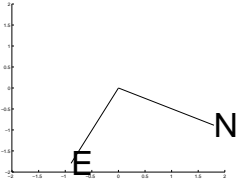
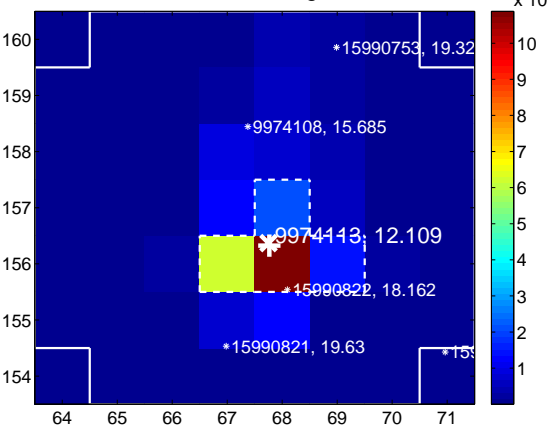
Q5 no OOT image



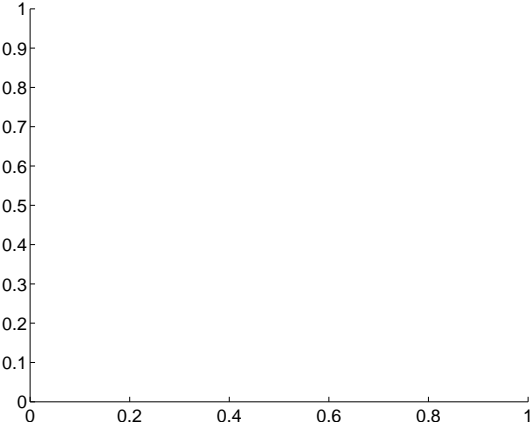
Q6 difference image. Poor Quality



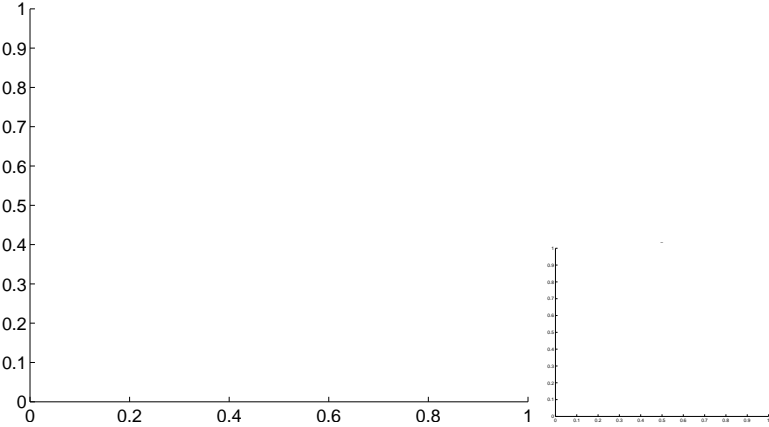
Q6 OOT image



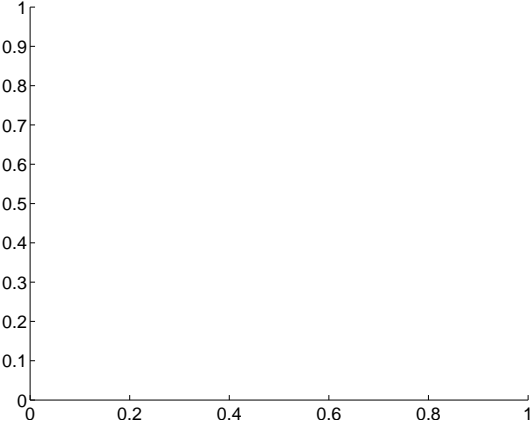
Q7 no difference image



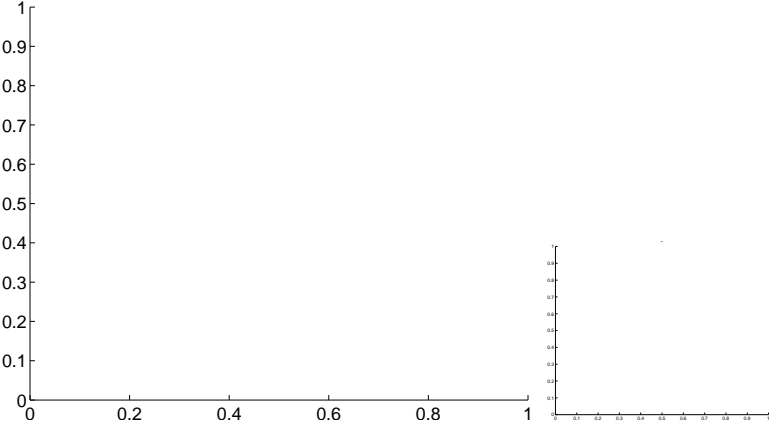
Q7 no OOT image



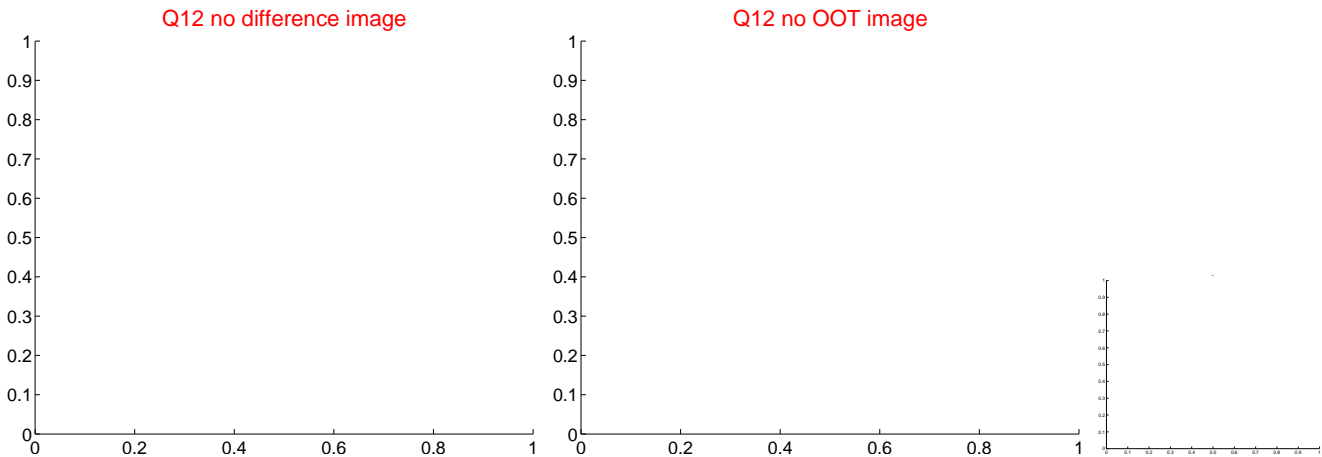
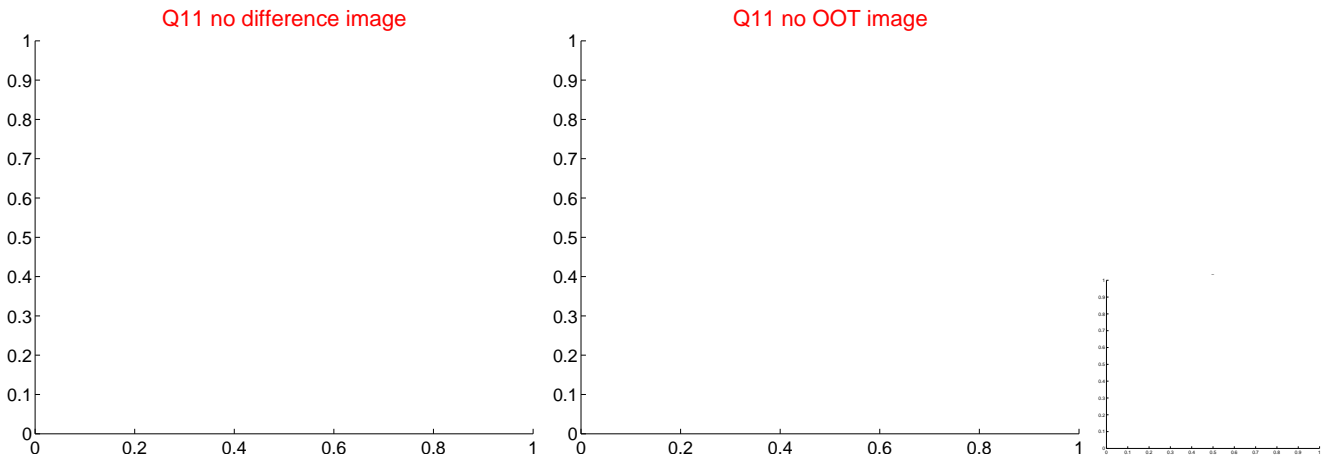
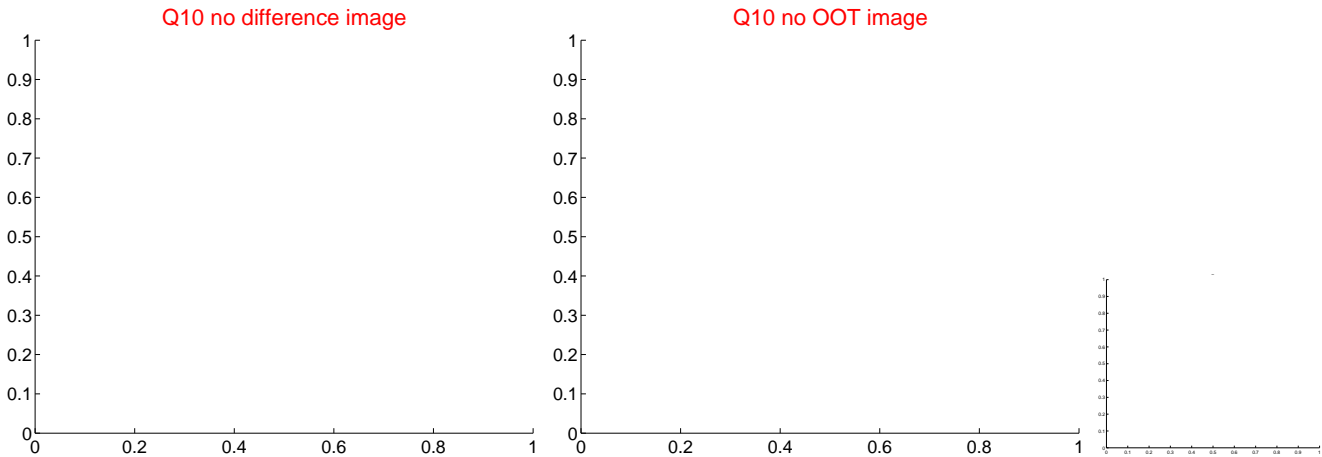
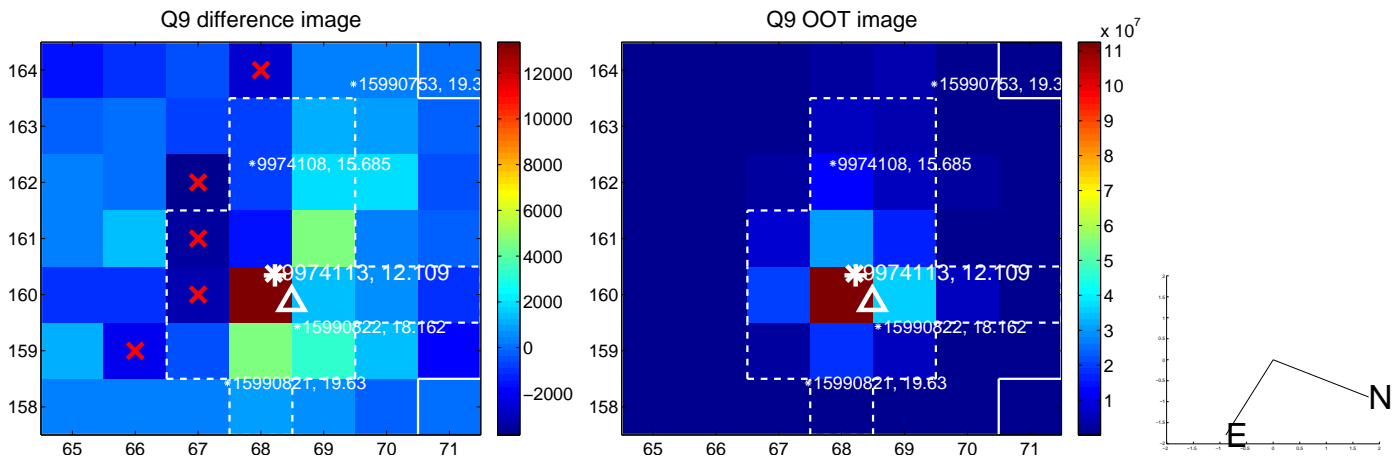
Q8 no difference image



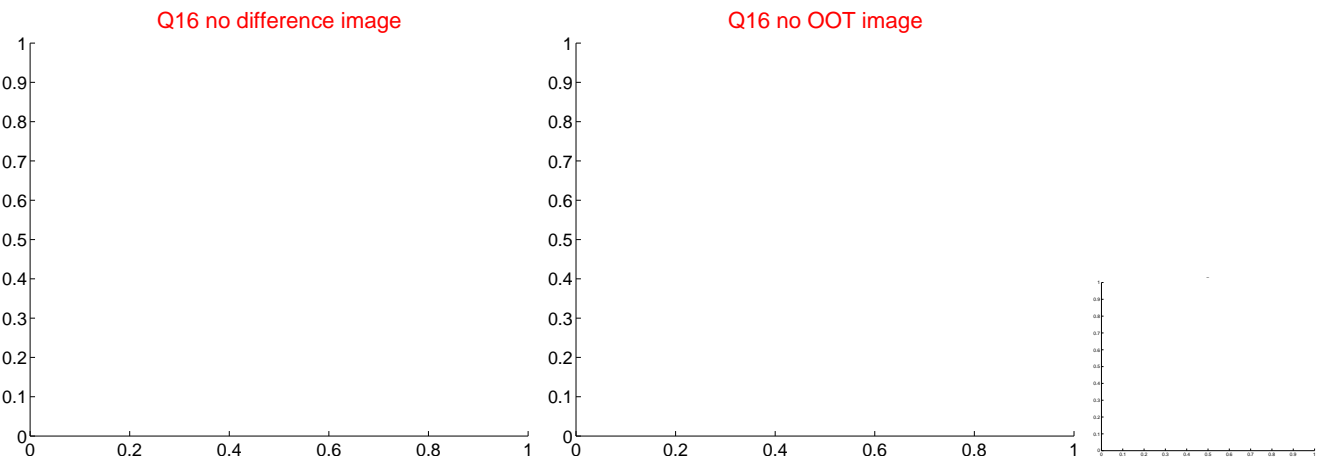
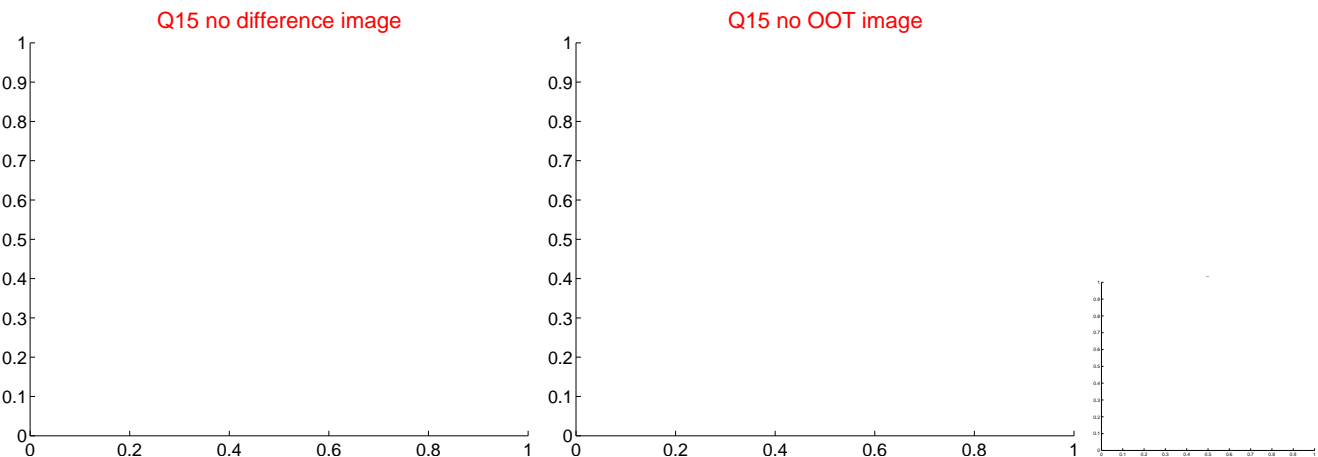
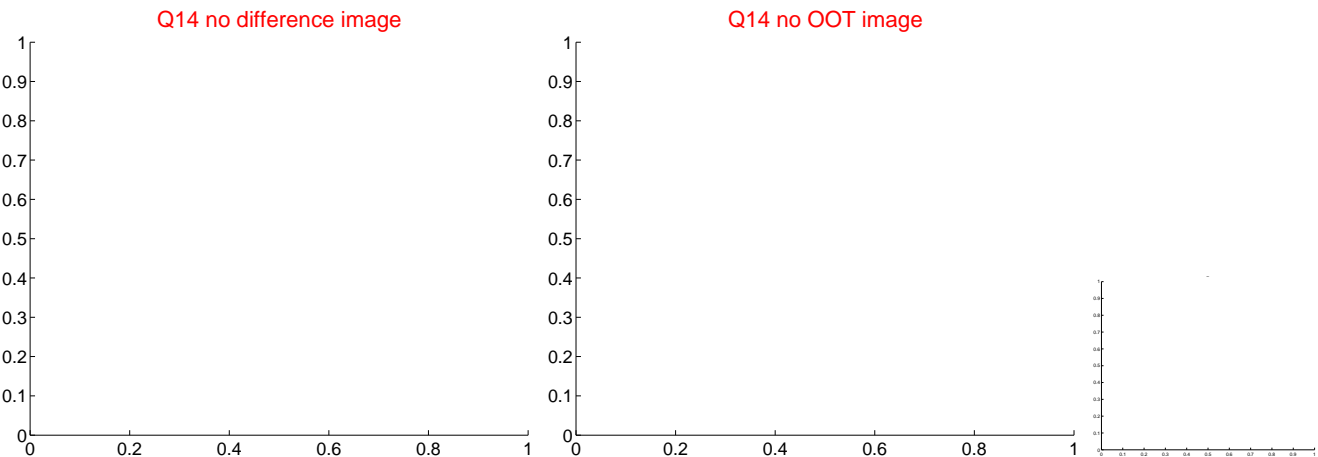
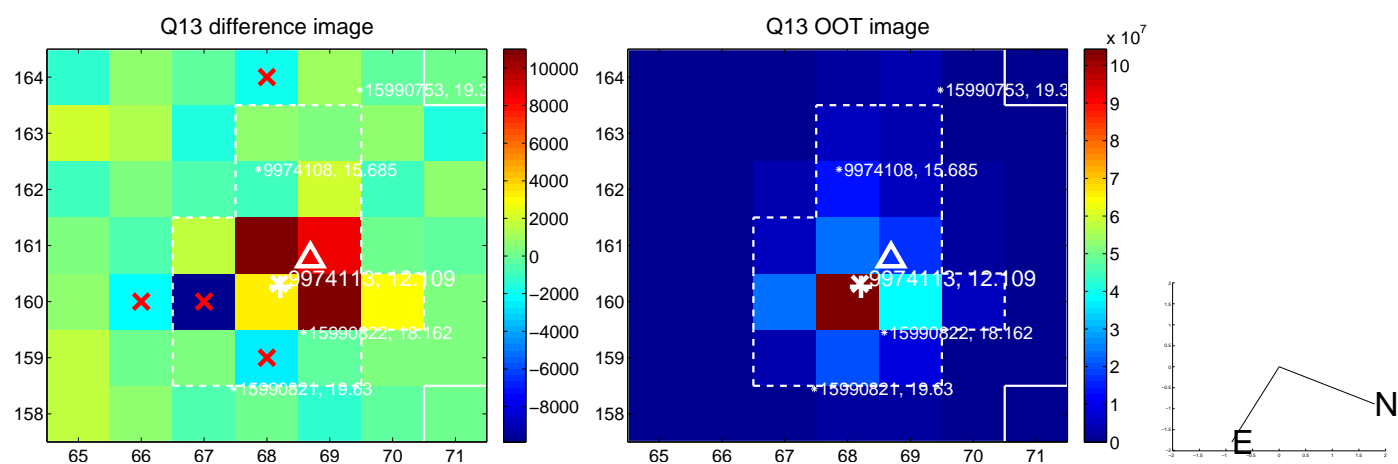
Q8 no OOT image



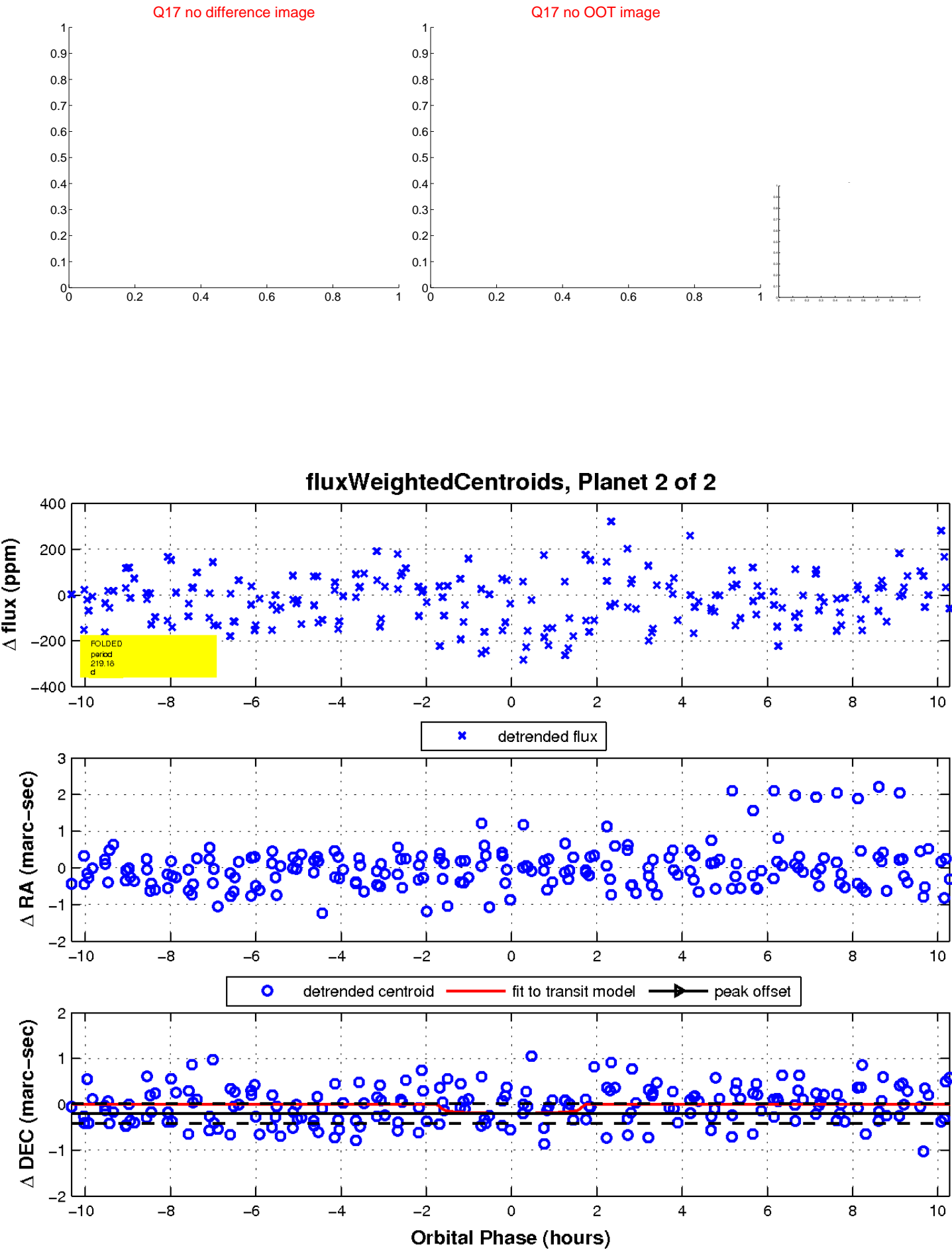
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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UKIRT Image

