

KIC 010224550

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})
010224550-01	OBS	No	0.717827	131.815590	15.7	3.019	9.4	7.5	4.11	6759	1.89	85012.95
010224550-02	OBS	No	315.124743	234.774599	220.1	3.750	7.7	8.7	4.11	6759	6.90	25.48

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010224550-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
010224550-02	OBS	FP	0.00	1	0	1	0	MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—CENT_UNRESOLVED_OFFSET

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

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

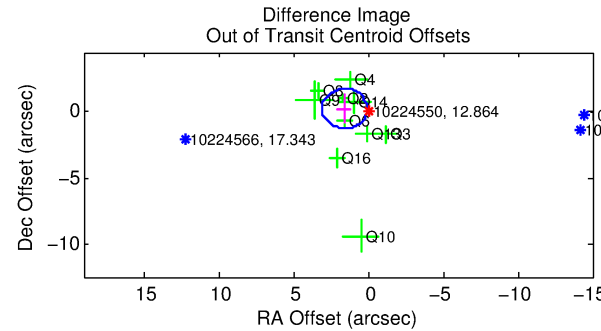
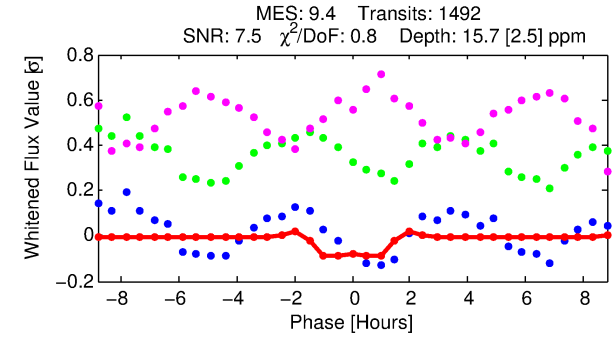
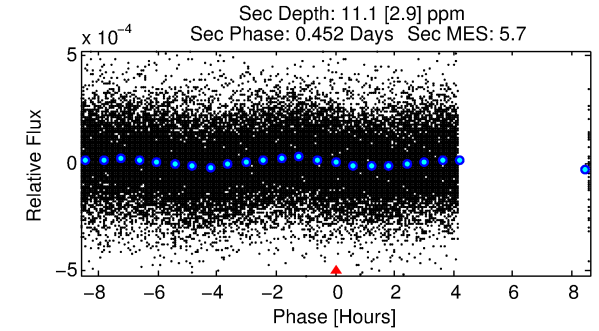
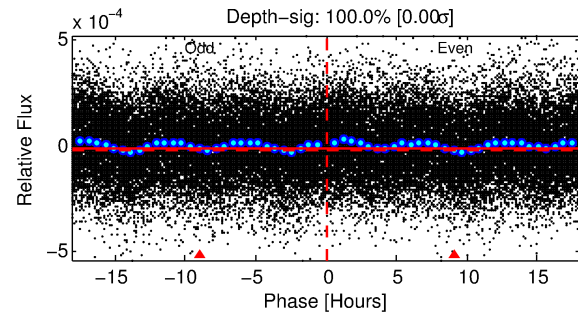
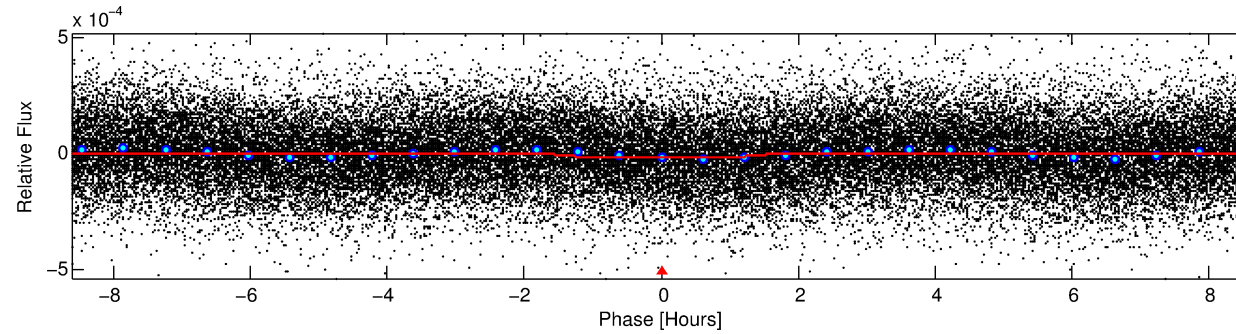
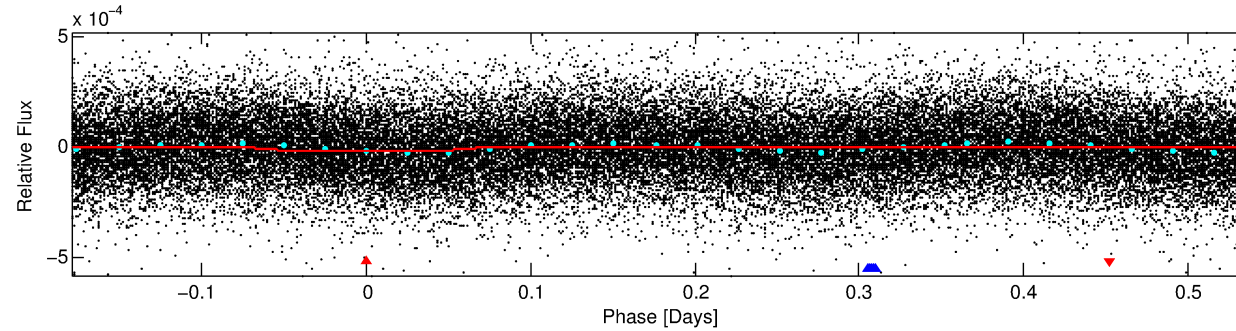
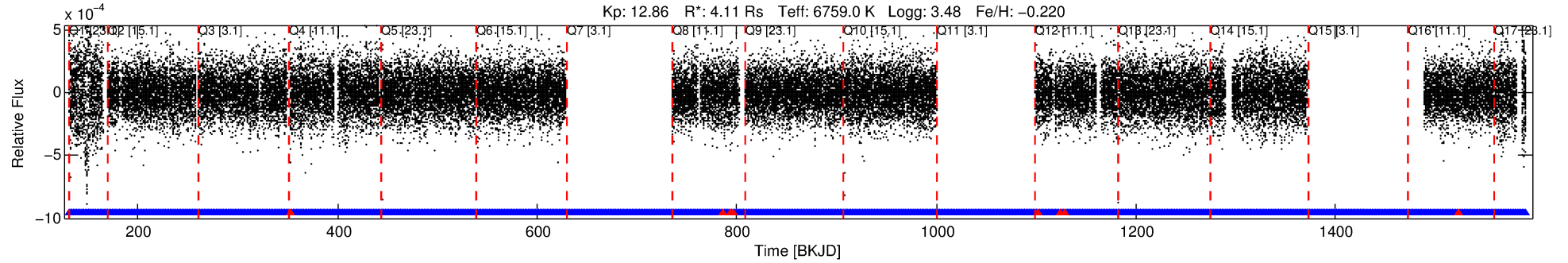
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 010224550-01

No Significant Match Found

DV One-Page Summary

KIC: 10224550 Candidate: 1 of 2 Period: 0.718 d



DV Fit Results:

Period = 0.71783 [0.00001] d
Epoch = 131.8156 [0.0036] BKJD
Rp/R* = 0.0042 [0.0015]
b/R* = 1.24 [0.89]
b = 0.90 [0.44]
Seff = 85012.95 [55040.02]
Teff = 4354 [705] K
Rp = 1.89 [1.02] Re
a = 0.0193 [0.0076] AU
Ag = 0.63 [0.62] [-0.59 σ]
Teffp = 6009 [1125] K [1.25 σ]

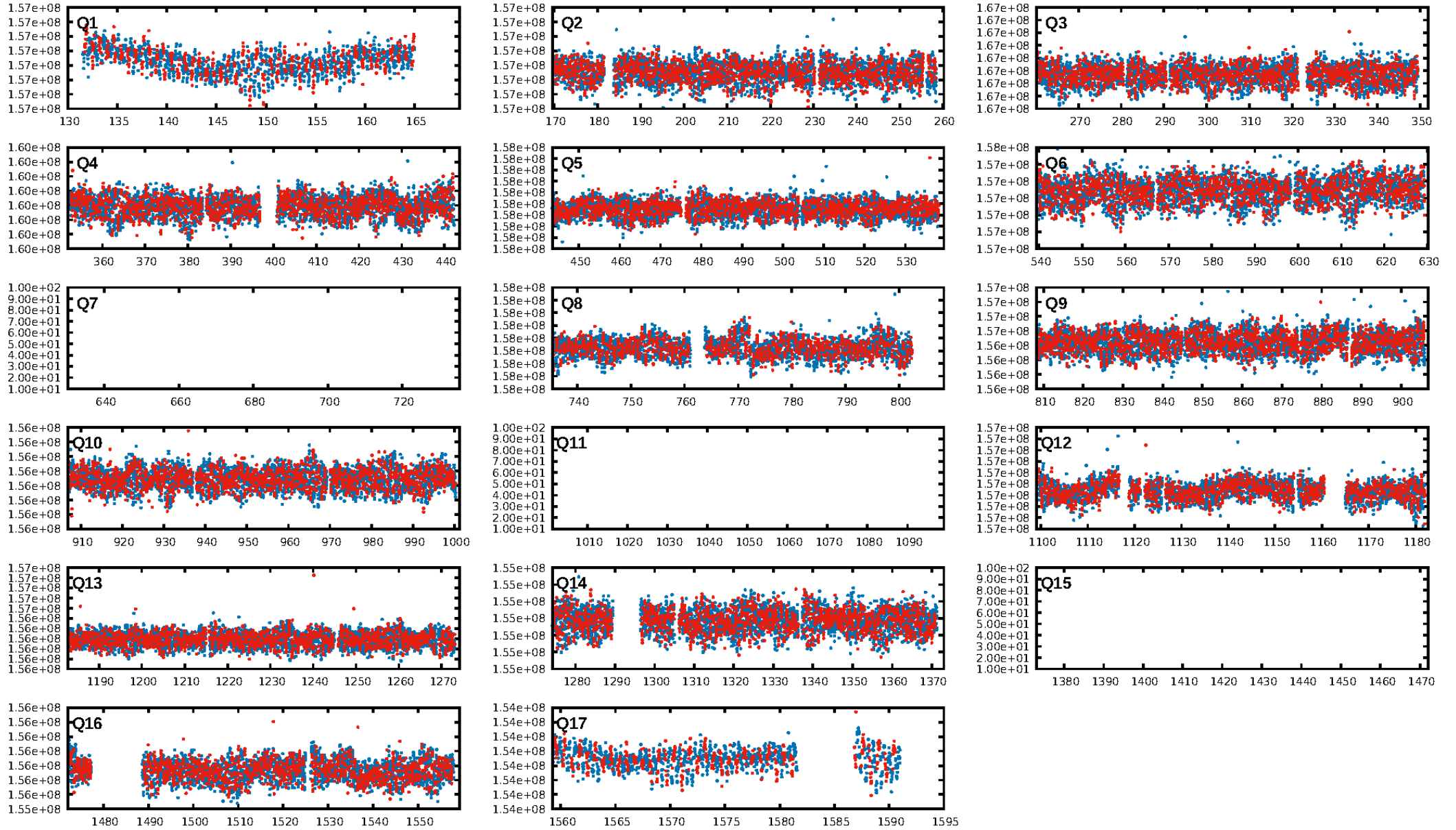
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [1567.56 σ]
ModelChiSquare2-sig: N/A
ModelChiSquareGof-sig: N/A
Bootstrap-pfa: 5.12e-16
RollingBand-igt: 0.99 [1400/1408]
GhostDiagnostic-chr: 1.682
Centroid-sig: 0.4%
Centroid-so: 2.099 arcsec [1.91 σ]
OotOffset-rm: 1.596 arcsec [3.19 σ]
KicOffset-rm: 1.558 arcsec [3.00 σ]
OotOffset-st: 4/1/3/2 [10]
KicOffset-st: 4/1/3/2 [10]
DiffImageQuality-fgm: 0.70 [7/10]
DiffImageOverlap-fno: 1.00 [14/14]

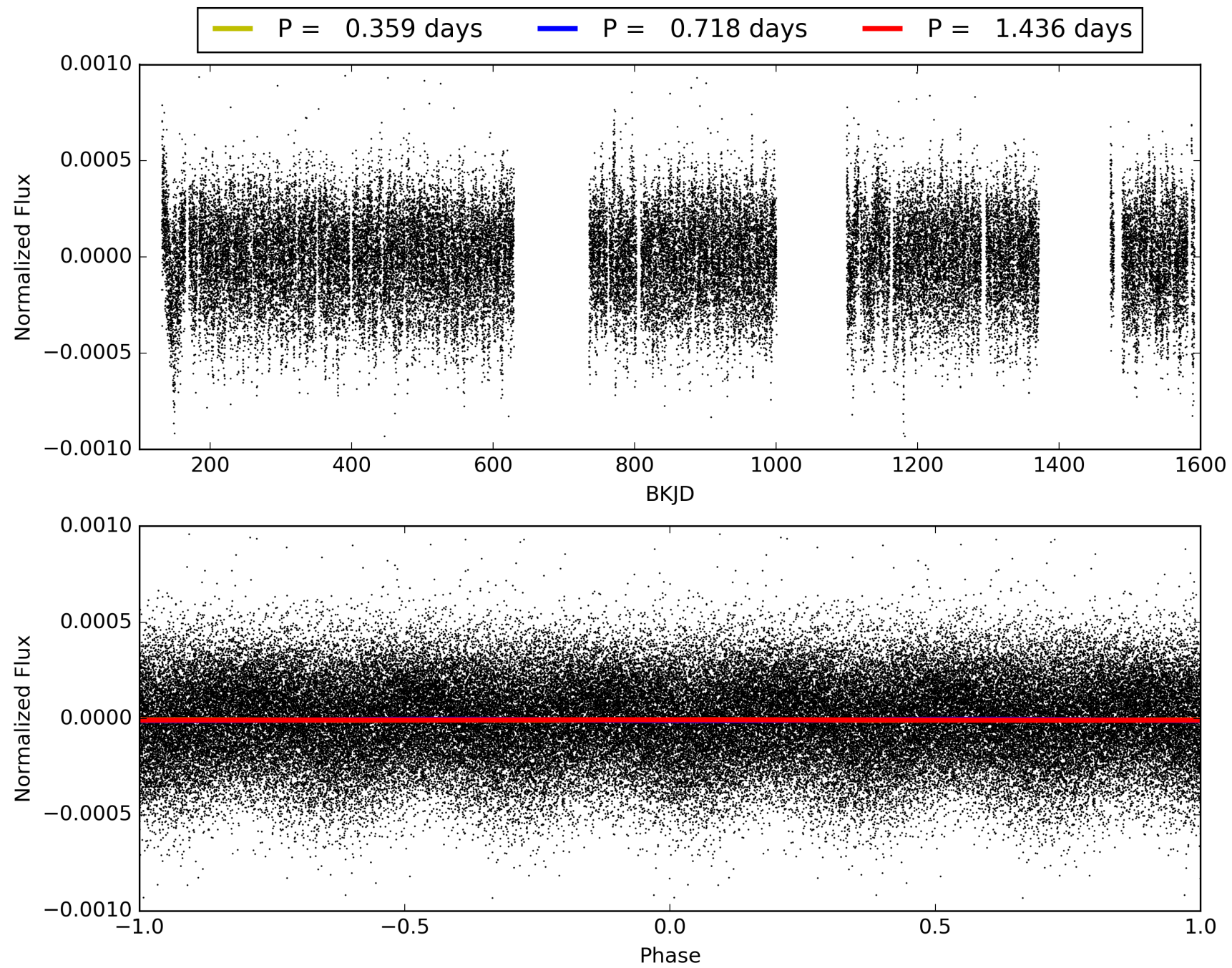
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 19:18:17 Z

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

TCE 010224550-01, PDC Light Curves

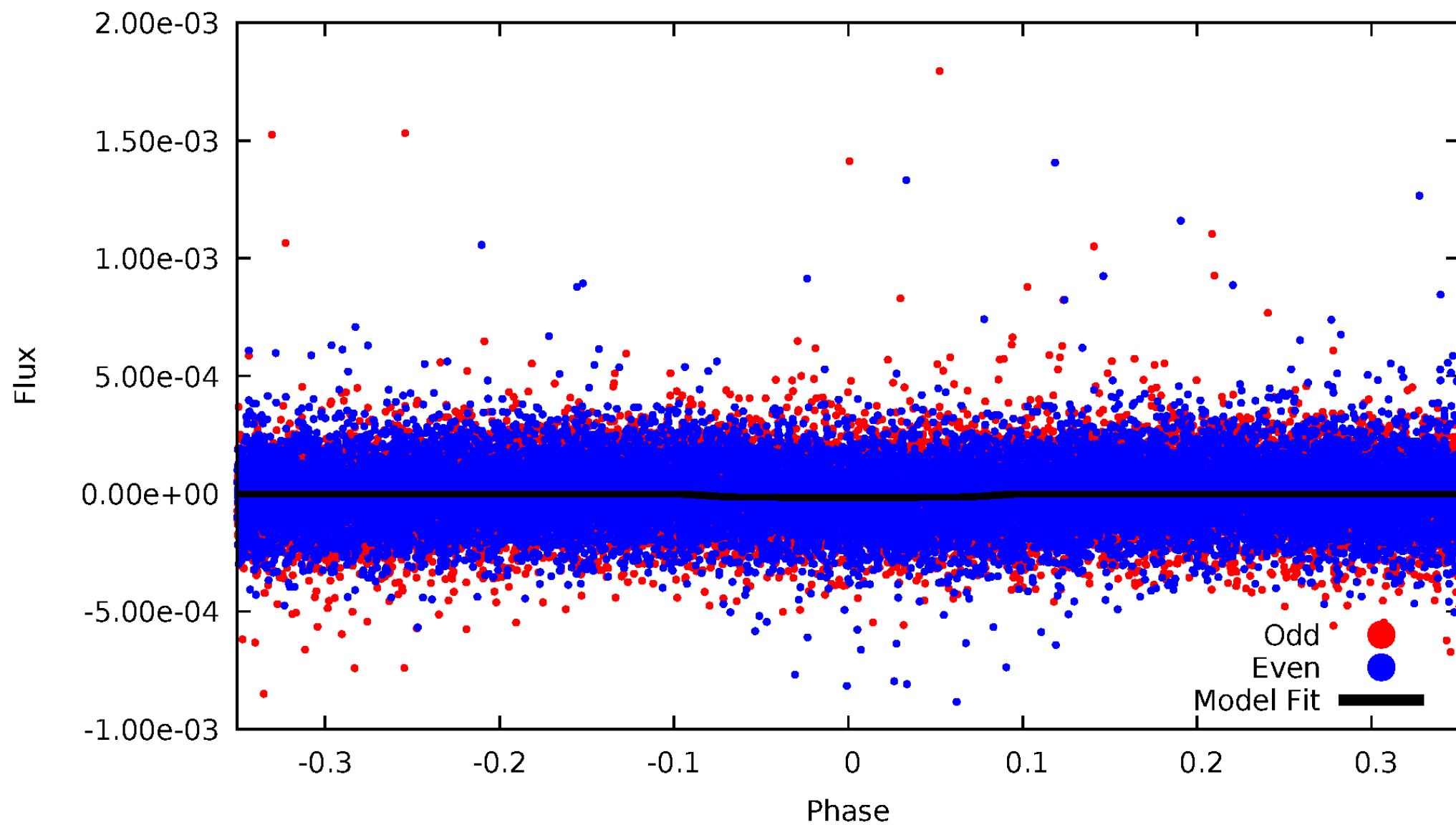


TCE 010224550-01



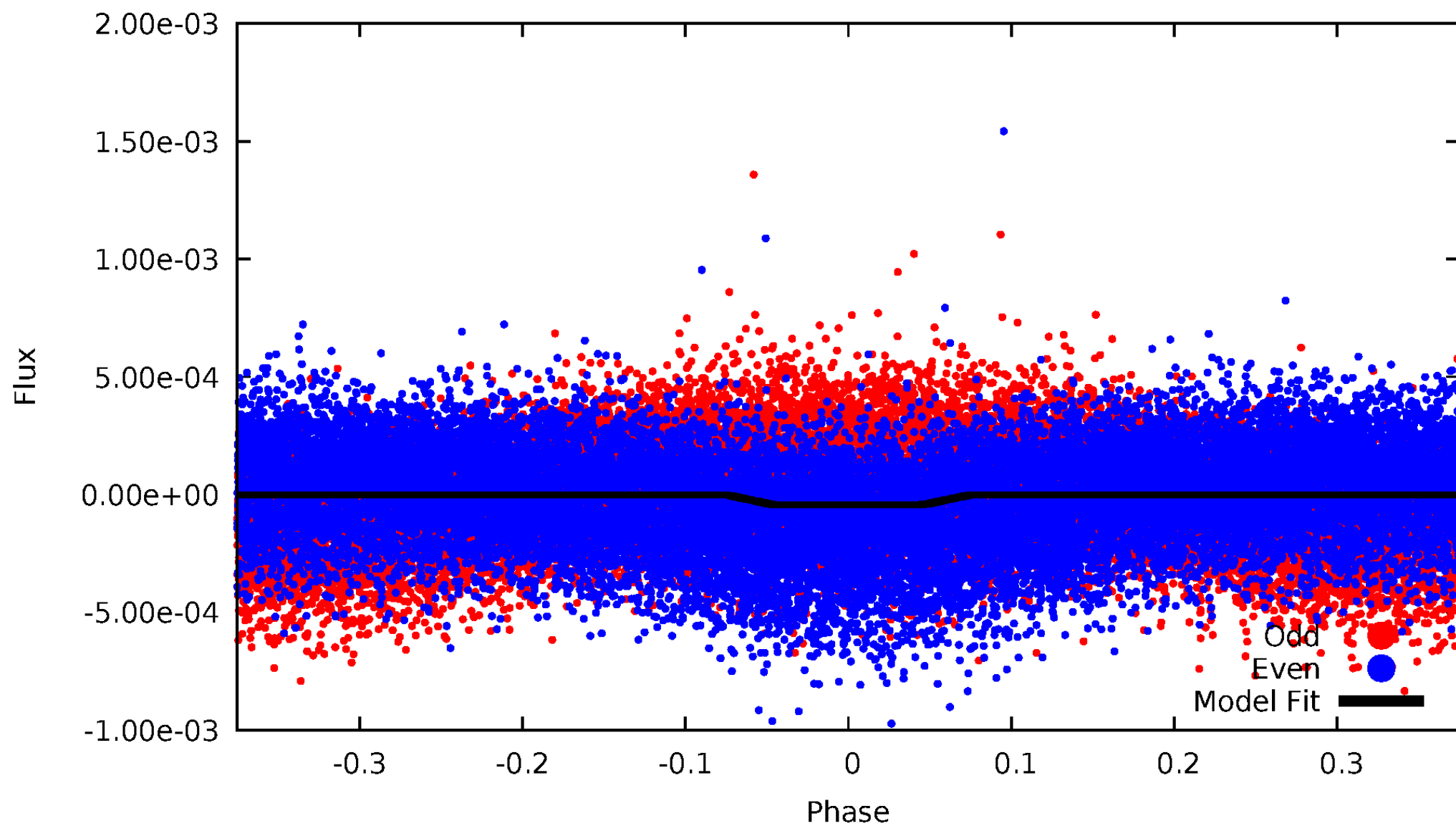
DV Odd/Even

TCE 010224550-01



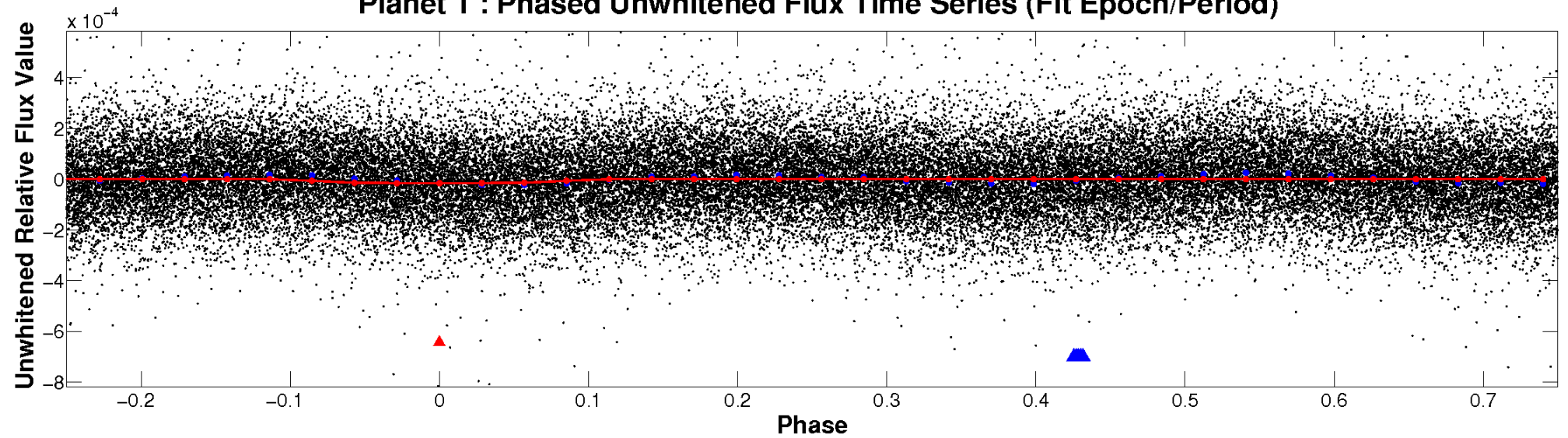
ALT Odd/Even

TCE 010224550-01

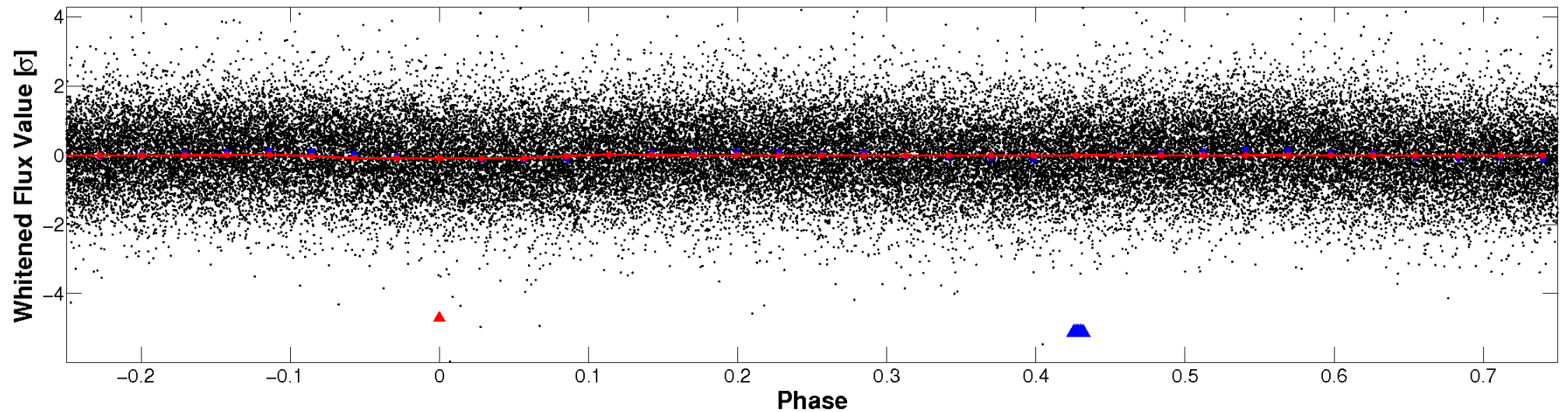


Non-Whitened Vs. Whitened Light Curve

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

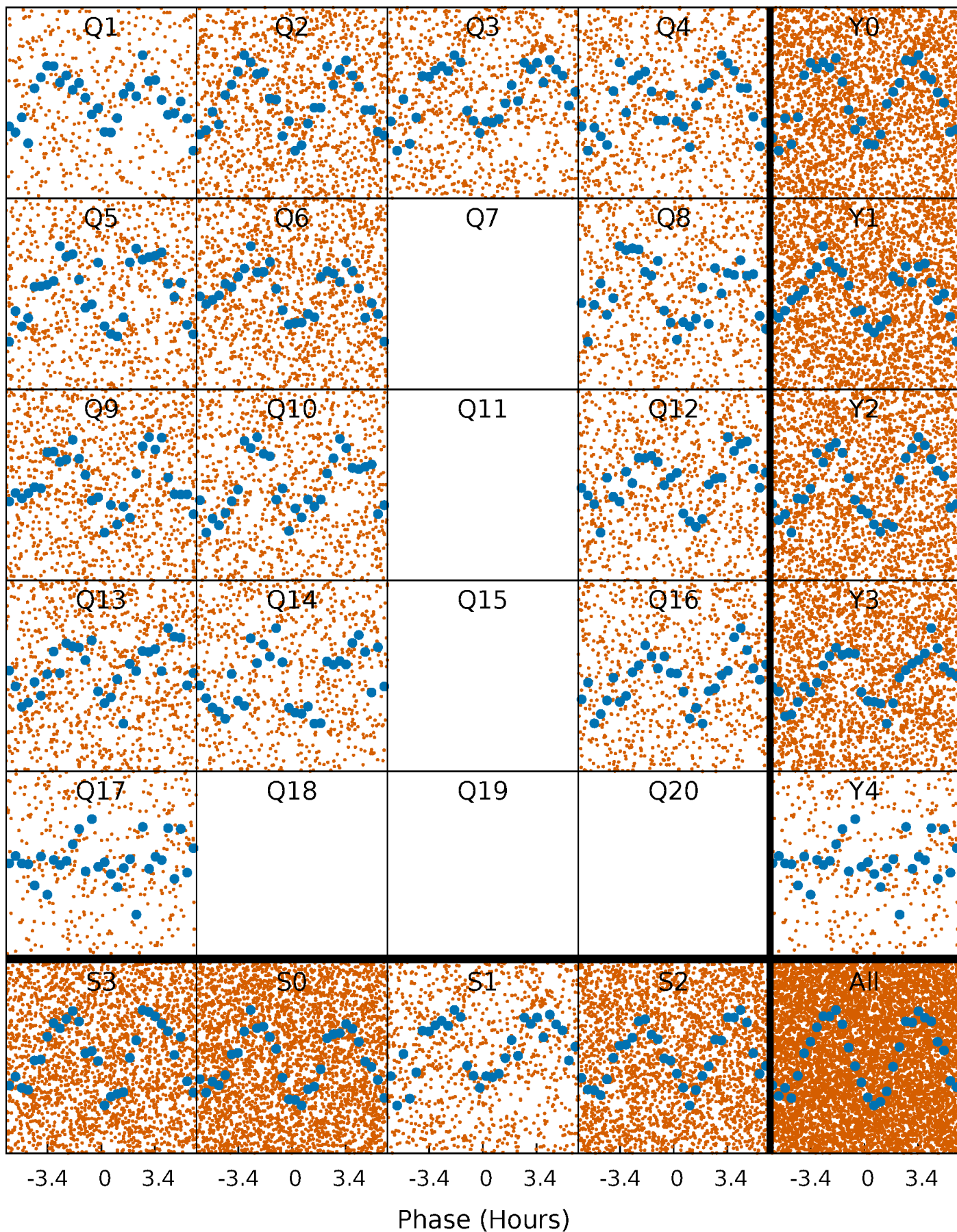


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



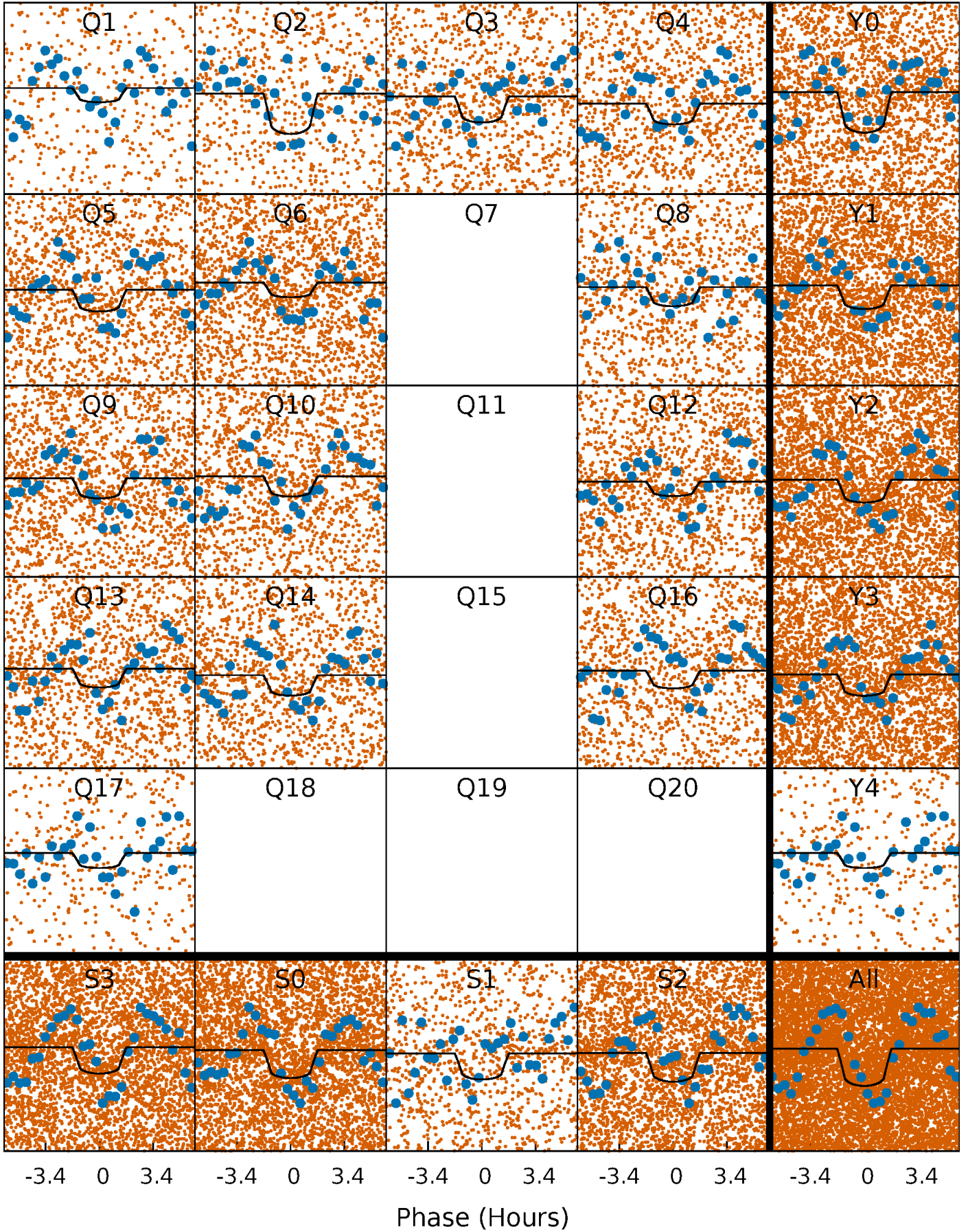
PDC Quarter-Phased Transit Curves

TCE 010224550-01 P= 0.717826 Days $T_0=131.815590$ (BKJD)



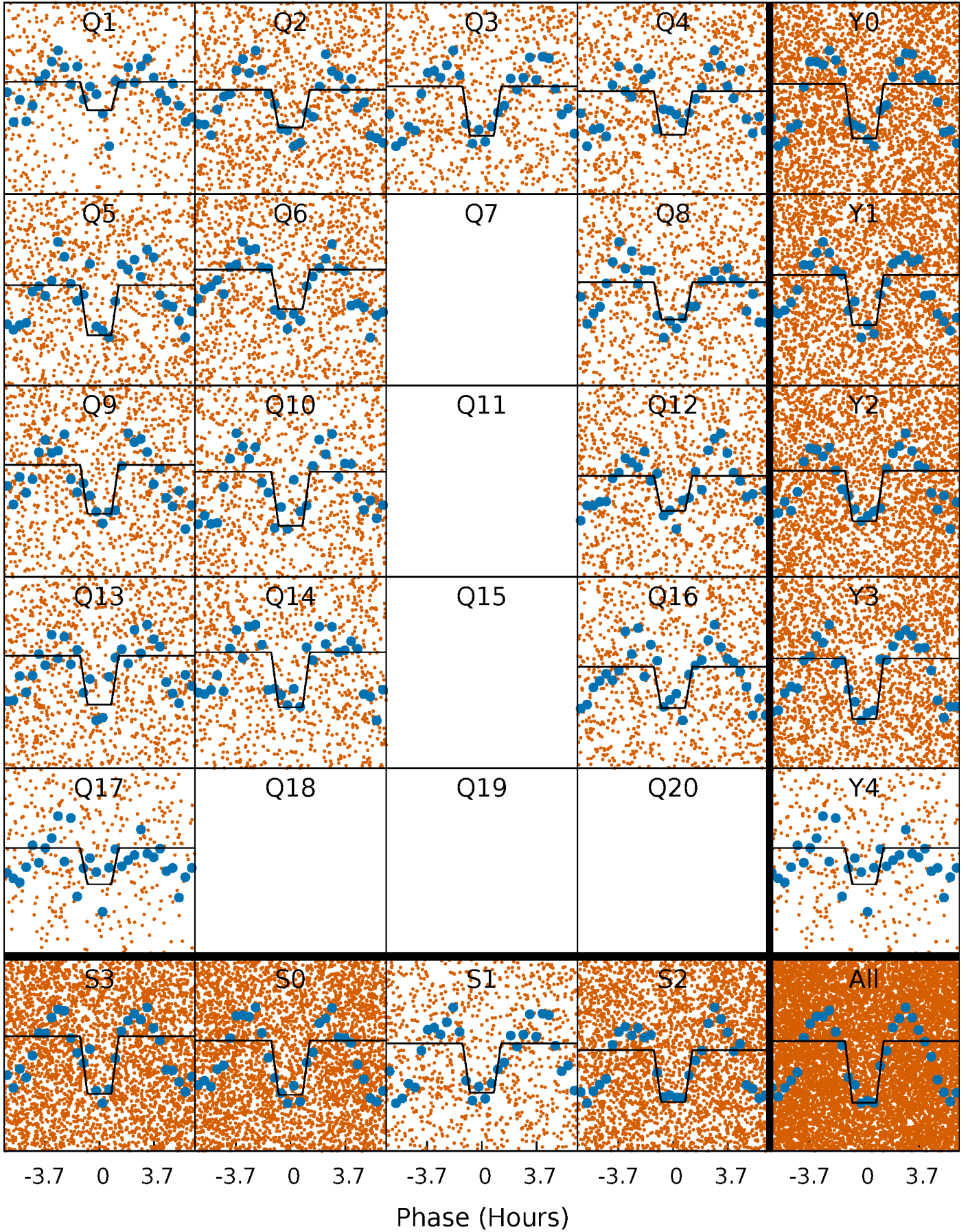
DV Quarter-Phased Transit Curves

TCE 010224550-01 P= 0.717826 Days $T_0=131.815590$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

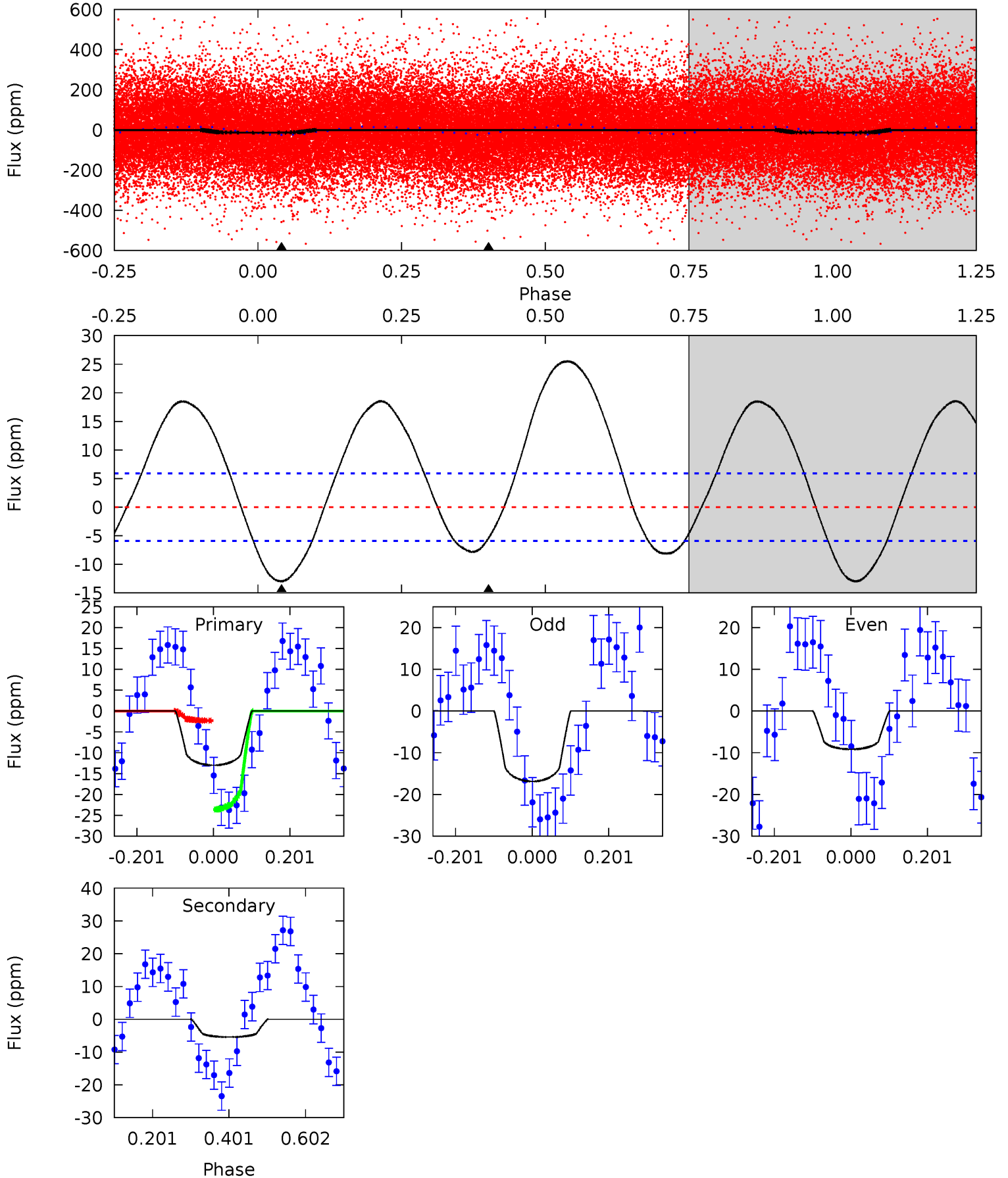
TCE 010224550-01 P= 0.717858 Days $T_0=131.814640$ (BKJD)



DV Model-Shift Uniqueness Test

010224550-01, P = 0.717826 Days, E = 131.097764 Days

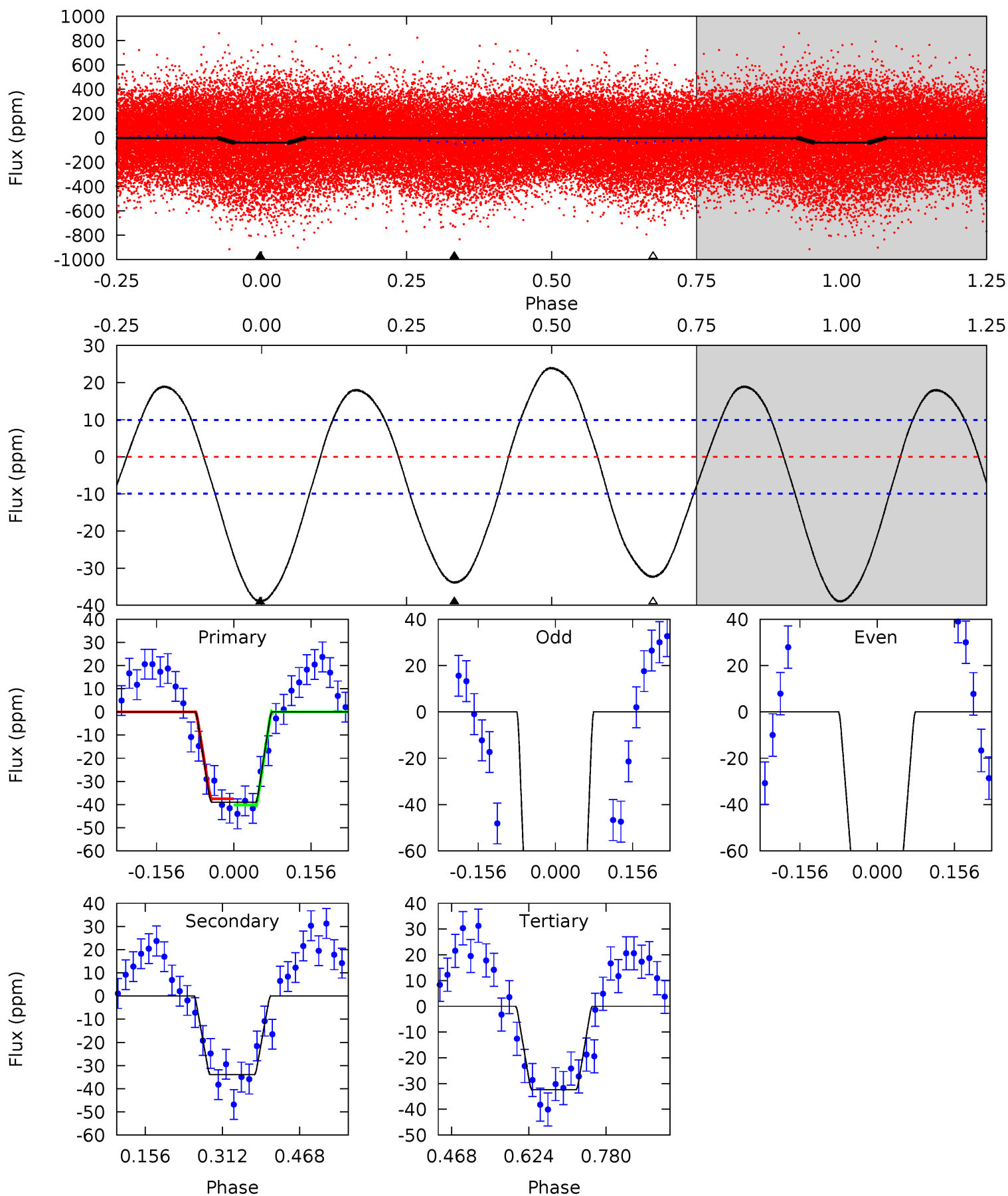
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.72	4.06	0	0	4.42	1.28	5.78	9.72	9.72	4.06	4.06	2.89	1.11	0.66	7.99



Alt Model-Shift Uniqueness Test

010224550-01, P = 0.717858 Days, E = 131.096782 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
17.6	15.3	14.6	0	4.47	1.42	8.91	2.99	17.6	0.70	15.3	18.0	1.34	0.38	0.53



Stellar Parameters For KIC 010224550

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	6759^{+183}_{-203}	$3.478^{+0.374}_{-0.088}$	$-0.220^{+0.300}_{-0.250}$	$4.108^{+0.422}_{-1.689}$	$1.851^{+0.142}_{-0.397}$	$0.038^{+0.115}_{-0.010}$
	+3%/-3%	+11%/-3%	+136%/-114%	+10%/-41%	+8%/-21%	+305%/-27%
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 010224550-01 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-5 ± 1	$1.78^{+0.70}_{-0.71}$	5975^{+338}_{-636}	3490^{+1902}_{-7740}	$0.348^{+0.568}_{-0.168}$
Alt.	-34 ± 2	$2.72^{+0.75}_{-0.84}$	5976^{+334}_{-633}	5777^{+1238}_{-873}	$0.933^{+0.984}_{-0.361}$

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 $A_{obs} \gg 1.0$

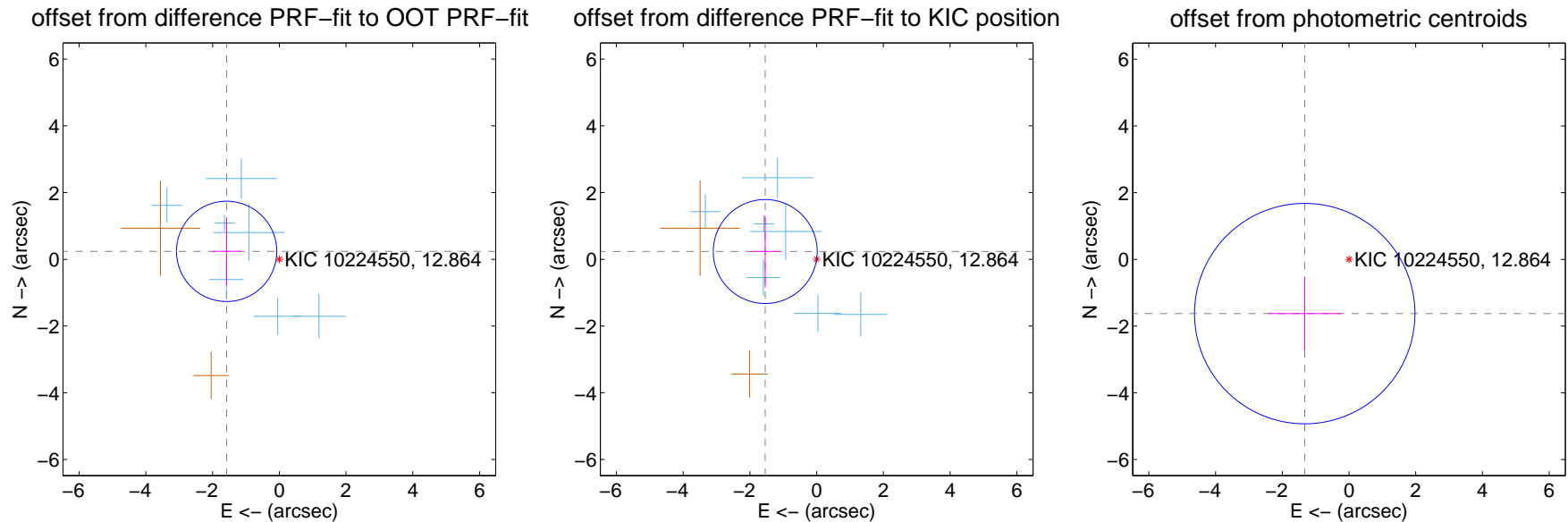
DV Centroid Data

Supplemental centroid analysis for 010224550-01. Kepler magnitude: 12.86. Transit SNR 7.47

There are 7 quarters with good PRF difference image offsets

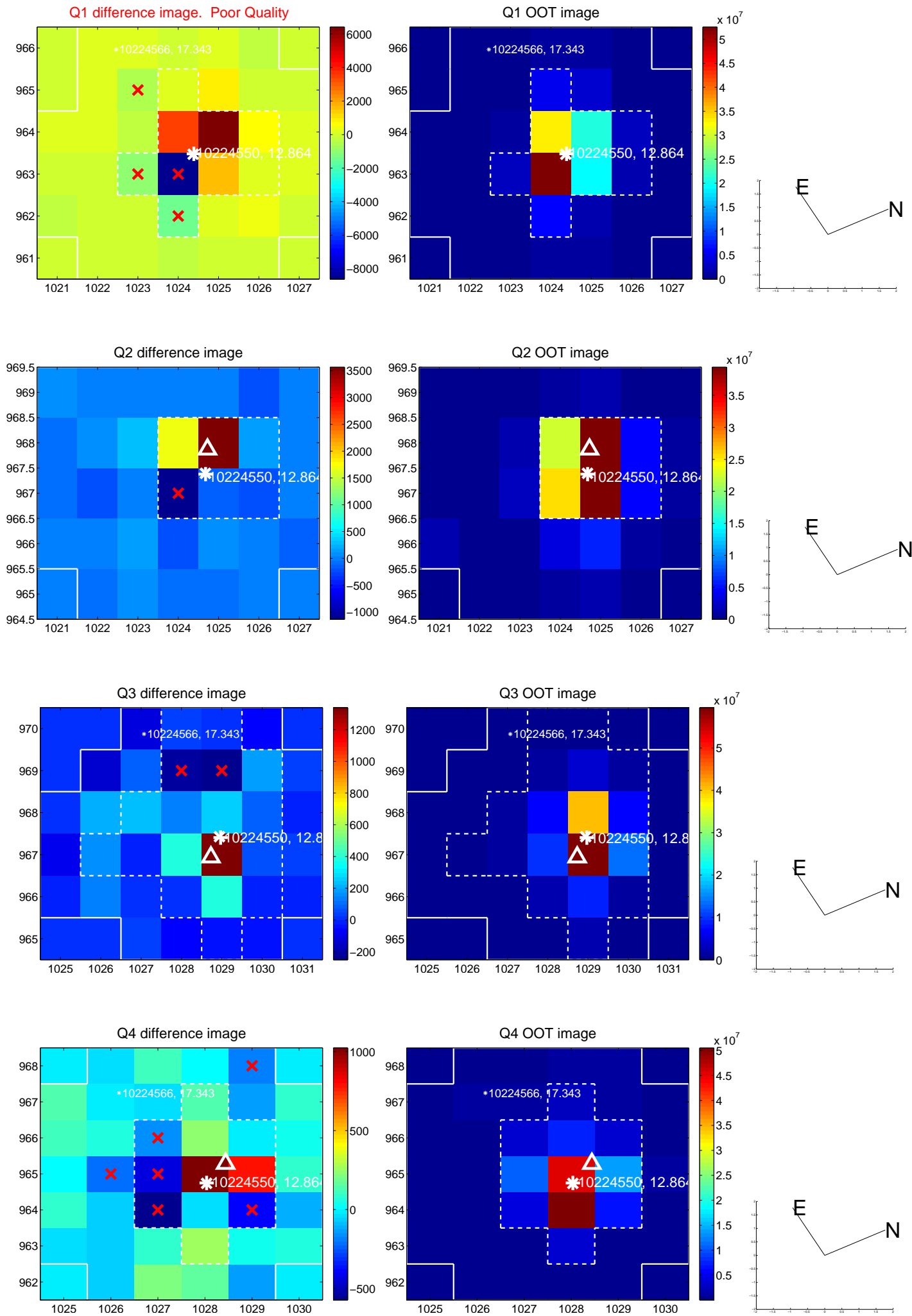
The direct PRF centroid is offset from the target star catalog position by about 0.05 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.596 \pm 0.501	3.19	1.579 \pm 0.429	0.238 \pm 1.019
PRF-fit source offset from KIC position	1.558 \pm 0.519	3.00	1.541 \pm 0.446	0.233 \pm 1.079
photometric centroid source offset	2.10 \pm 1.10	1.91	1.33 \pm 1.09	-1.63 \pm 1.11

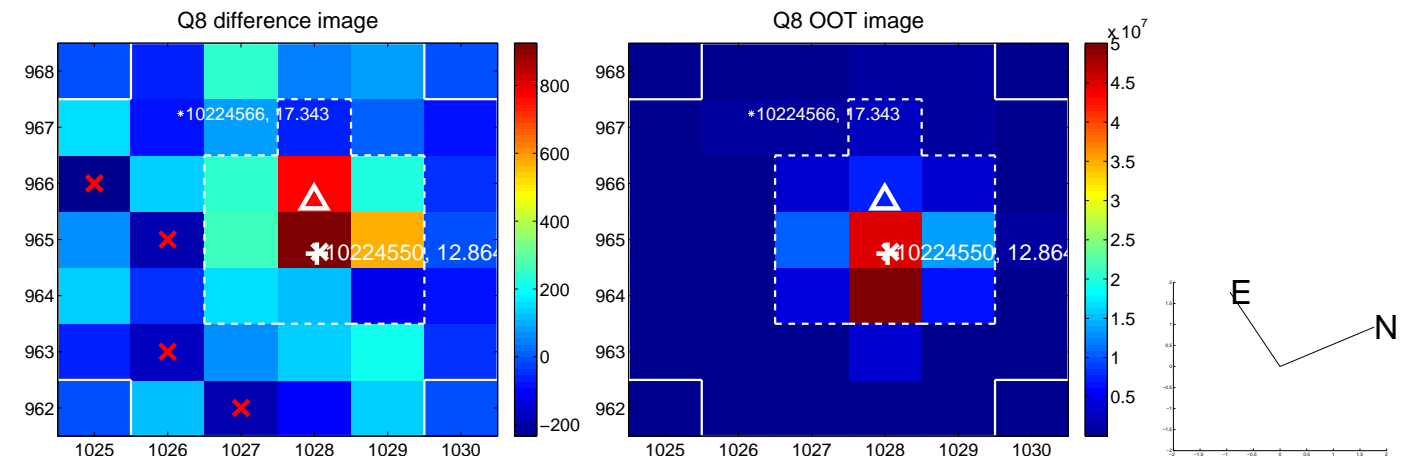
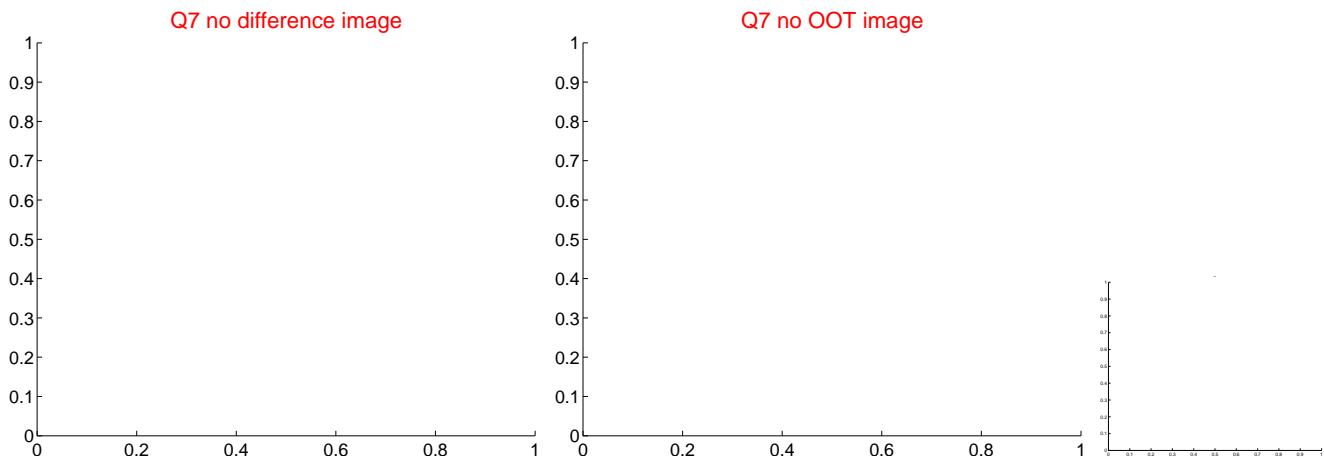
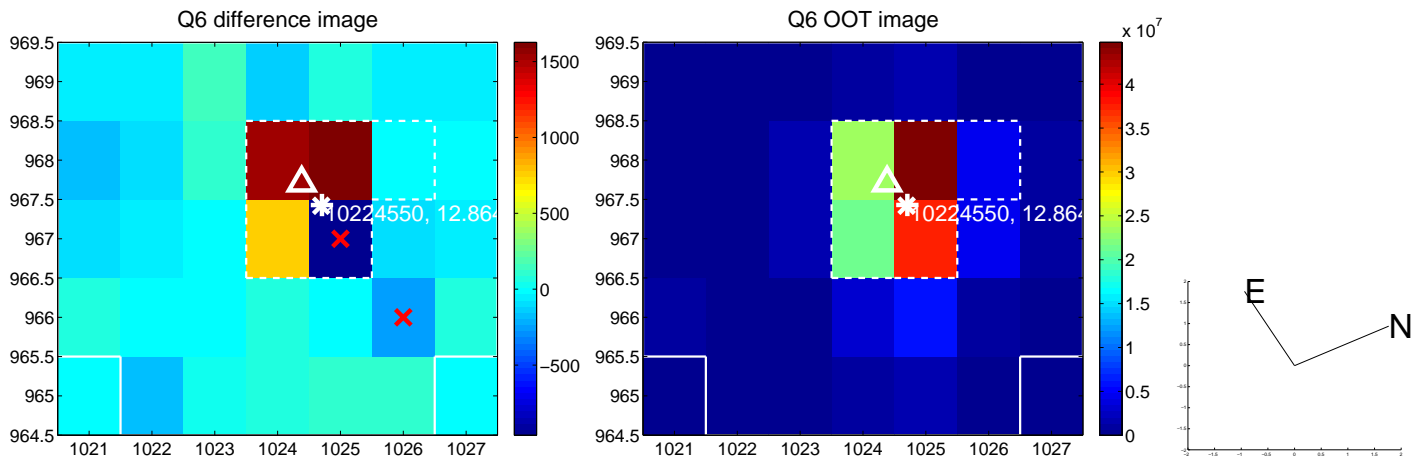
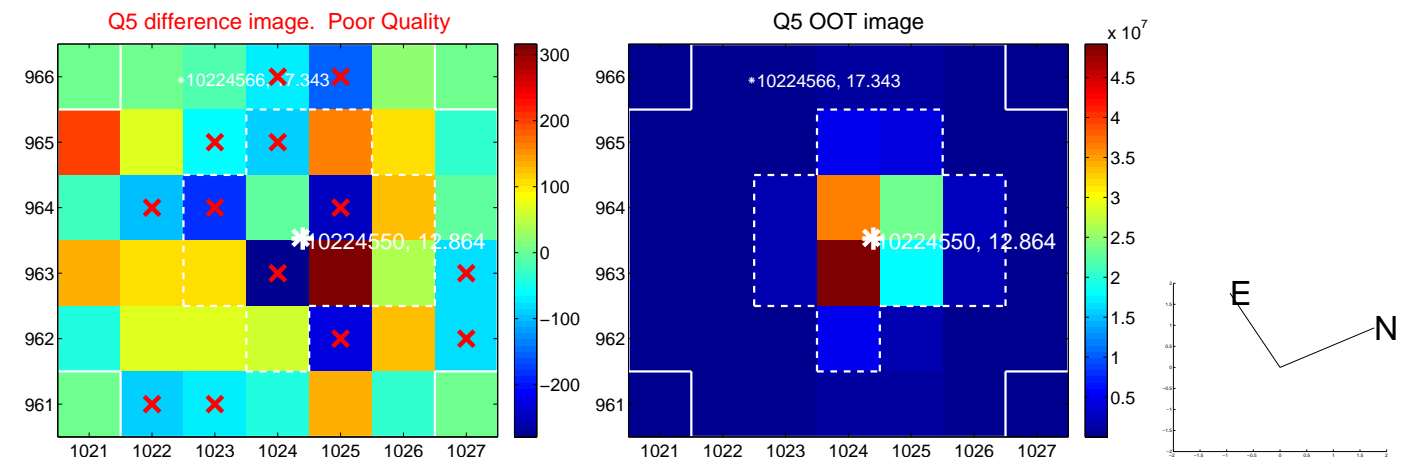


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

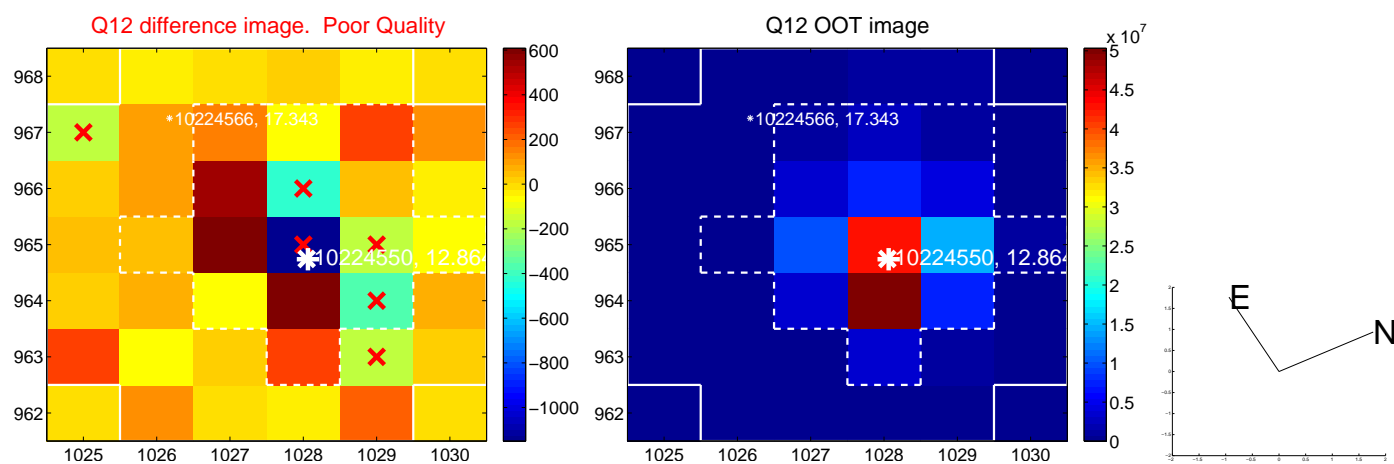
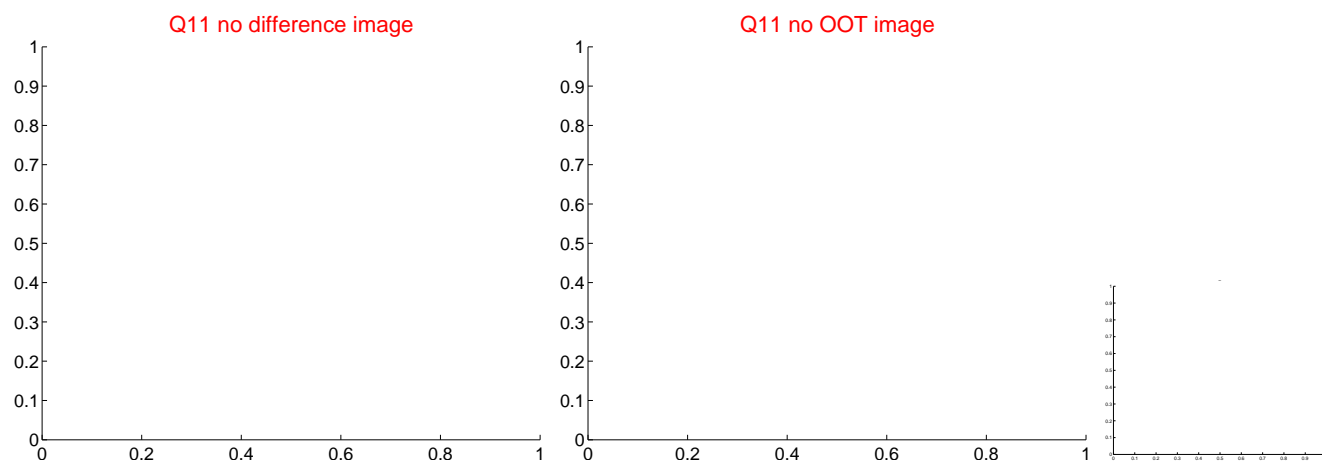
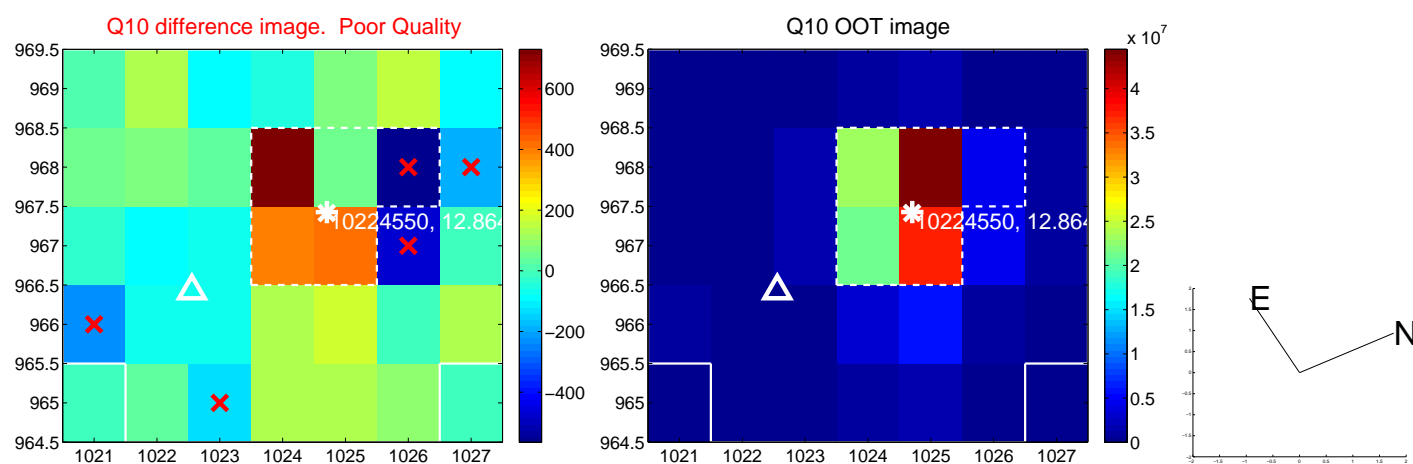
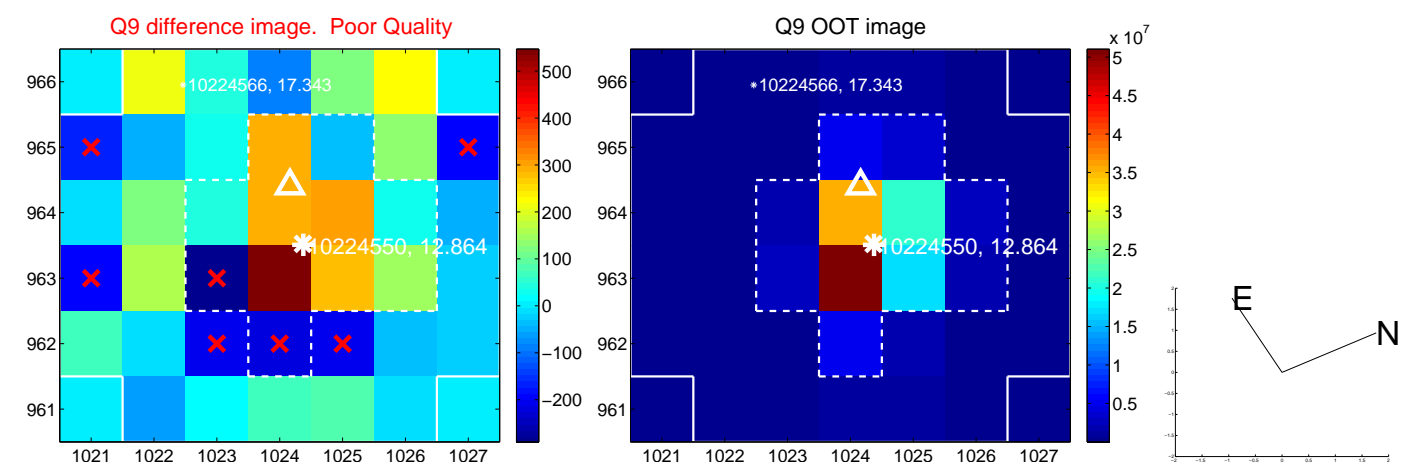
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



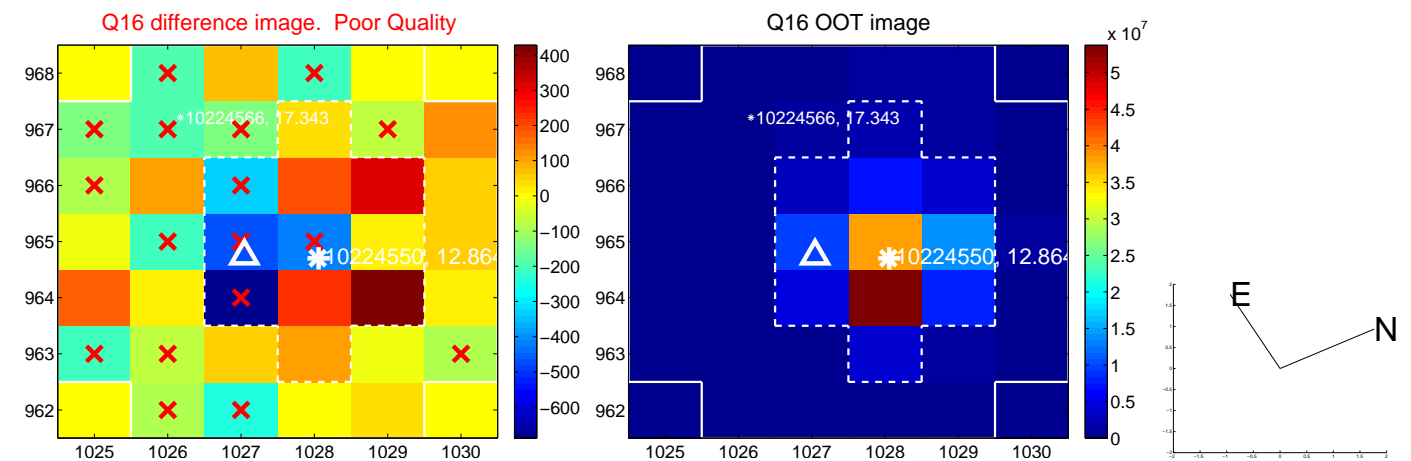
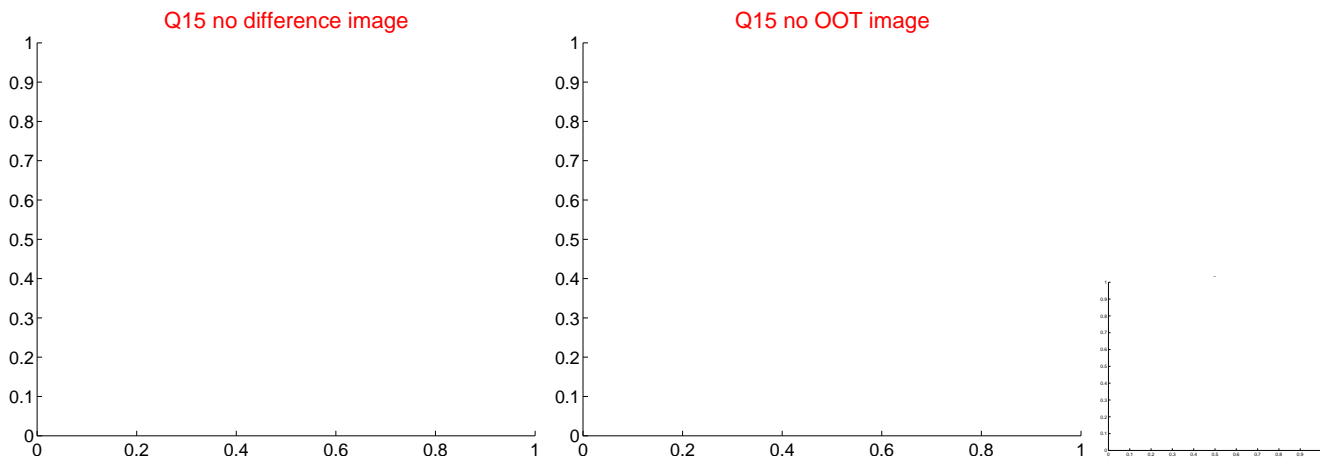
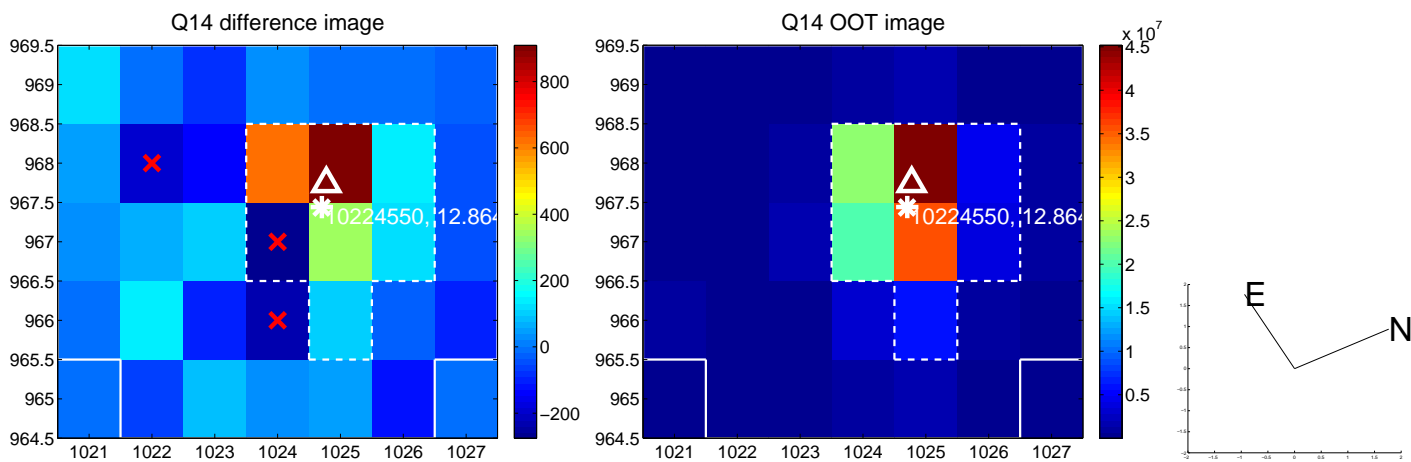
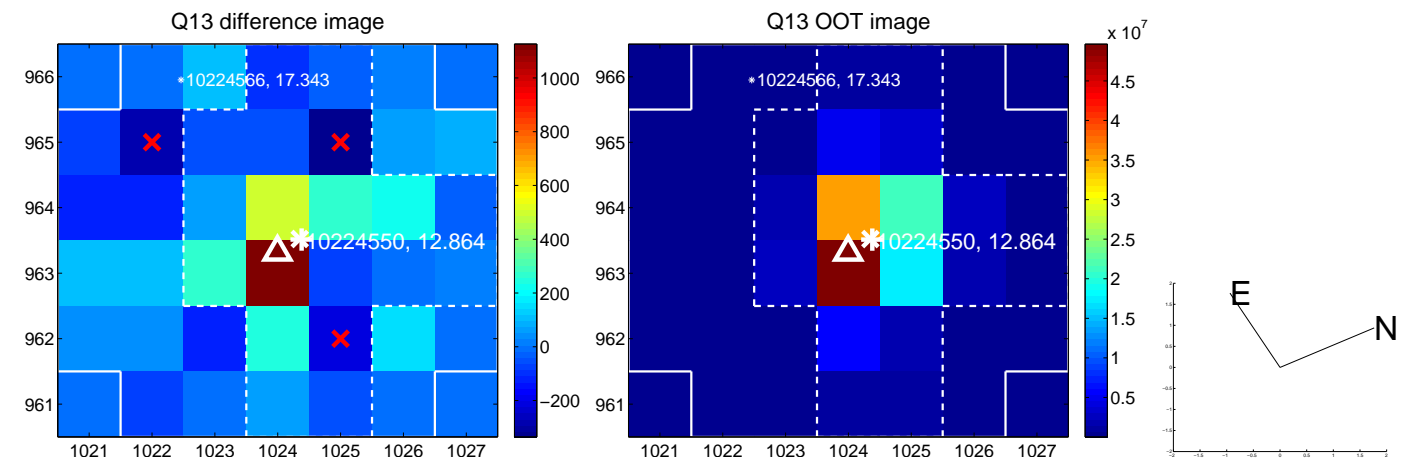
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



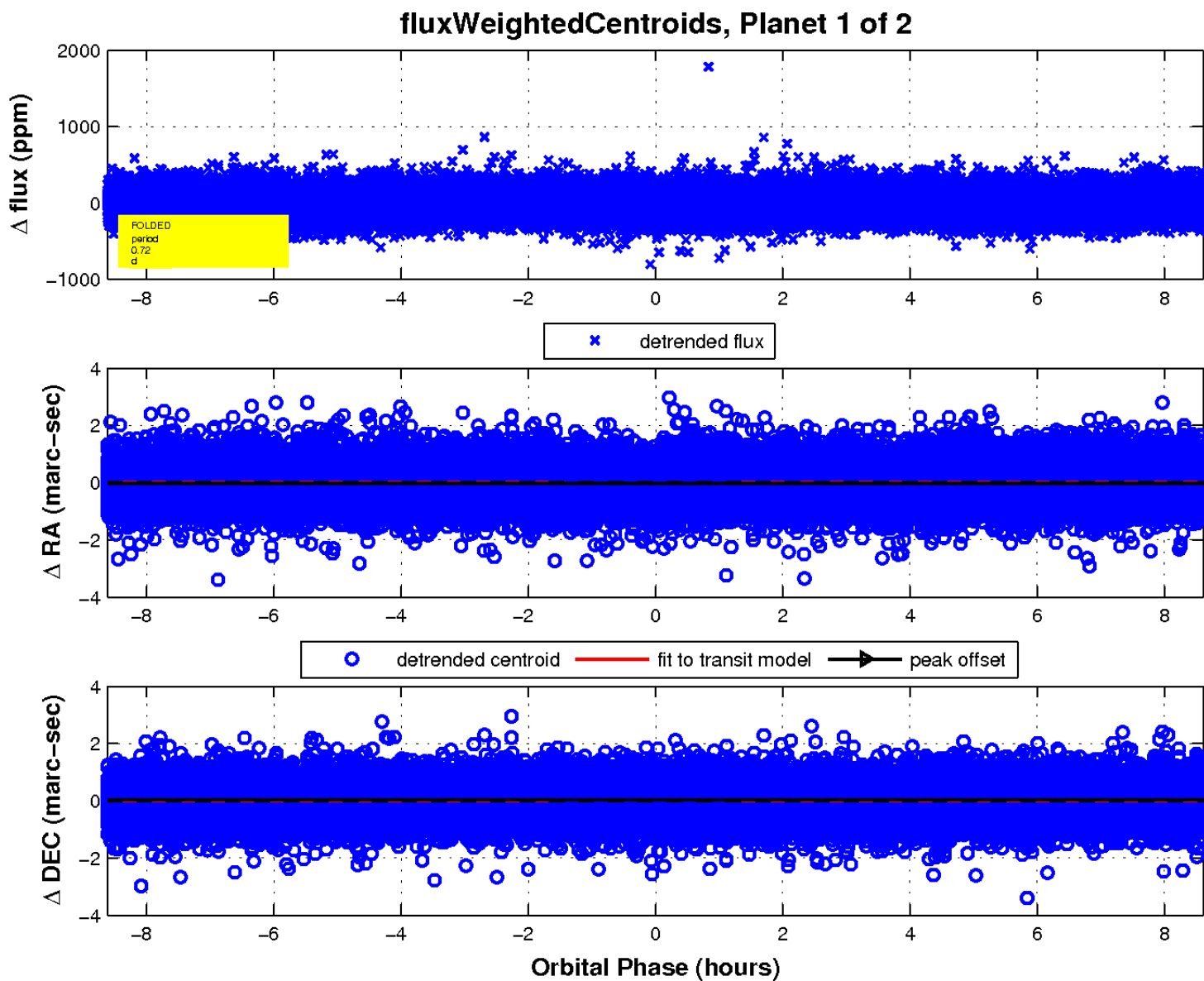
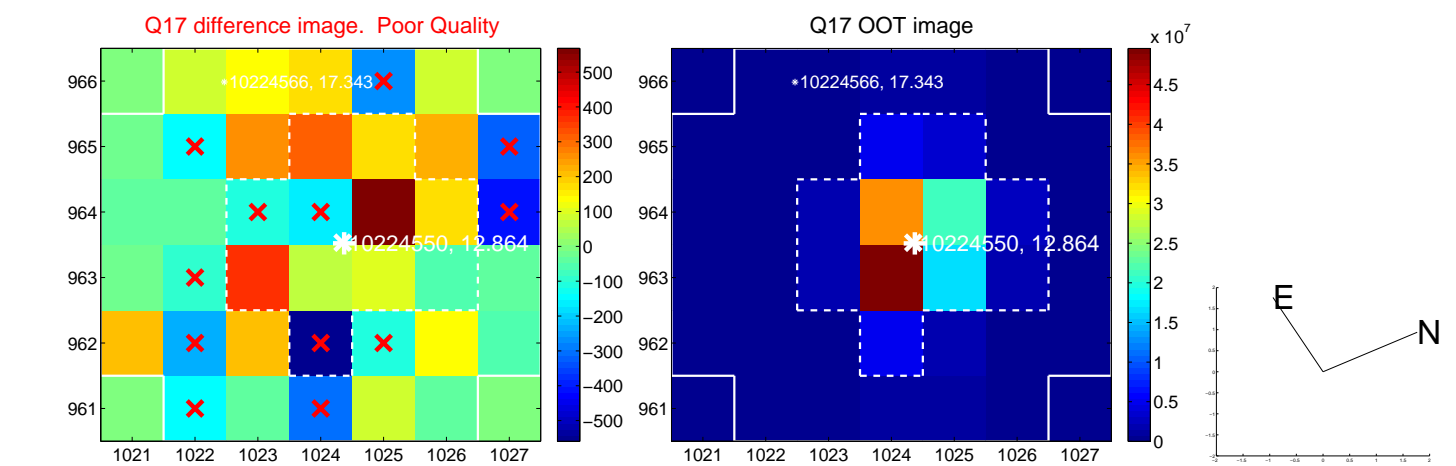
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

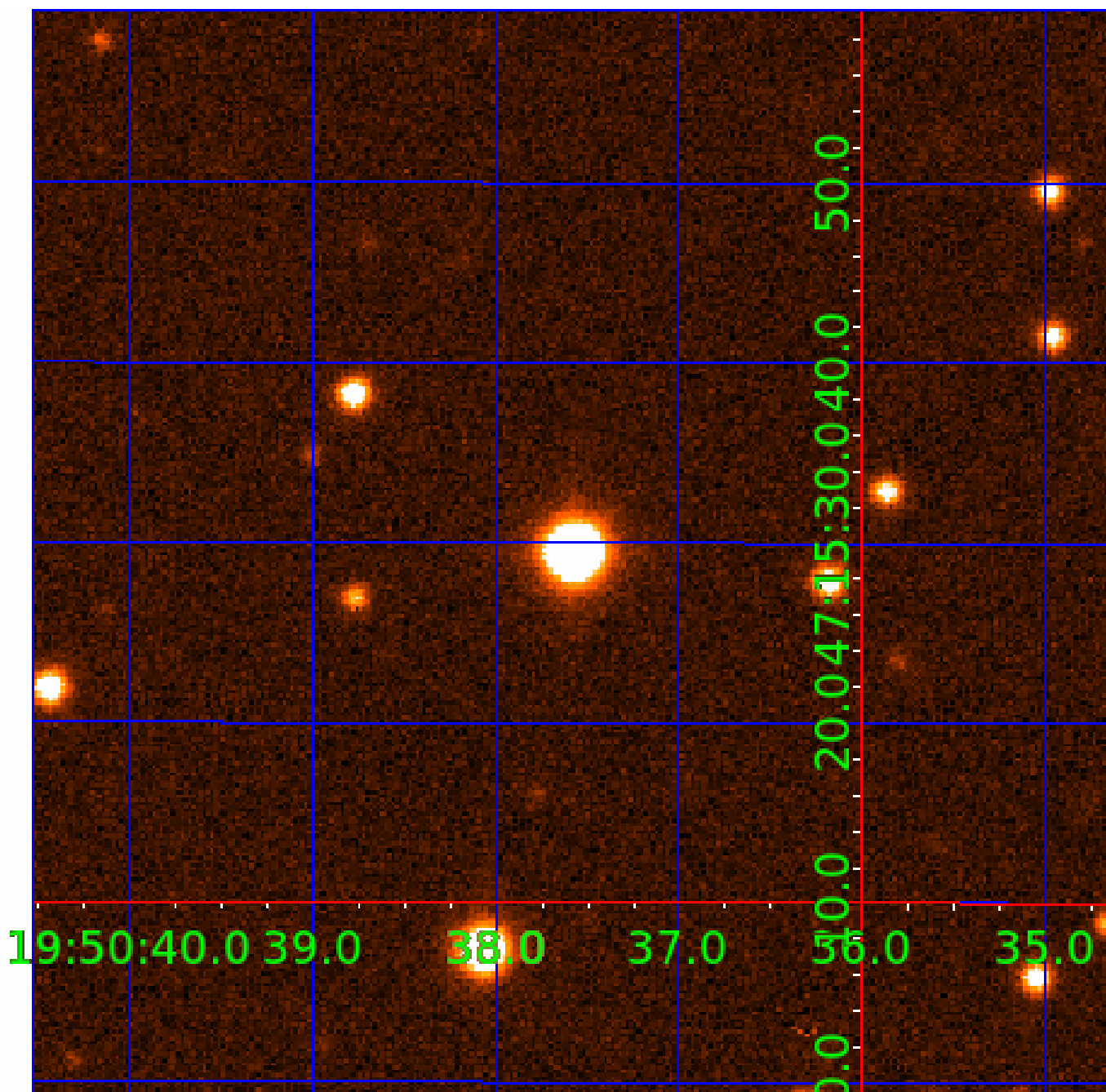


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 010224550

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})
010224550-01	OBS	No	0.717827	131.815590	15.7	3.019	9.4	7.5	4.11	6759	1.89	85012.95
010224550-02	OBS	No	315.124743	234.774599	220.1	3.750	7.7	8.7	4.11	6759	6.90	25.48

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
010224550-01	OBS	FP	0.00	1	0	0	0	LPP_DV—LPP_ALT—MOD_NONUNIQ_DV—MOD_NONUNIQ_ALT
010224550-02	OBS	FP	0.00	1	0	1	0	MOD_NONUNIQ_DV—MOD_TER_DV—MOD_NONUNIQ_ALT—CENT_UNRESOLVED_OFFSET

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

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

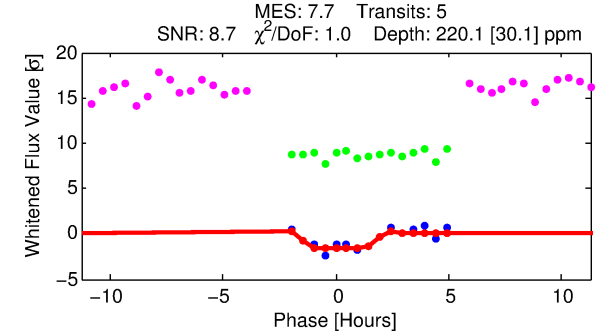
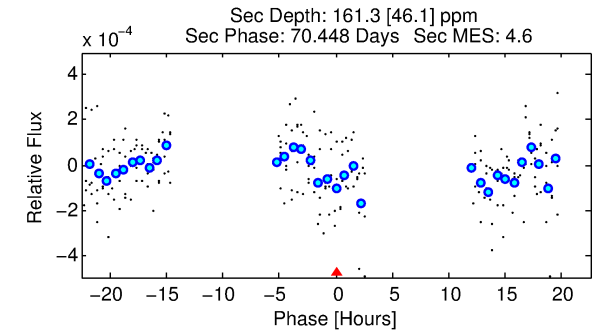
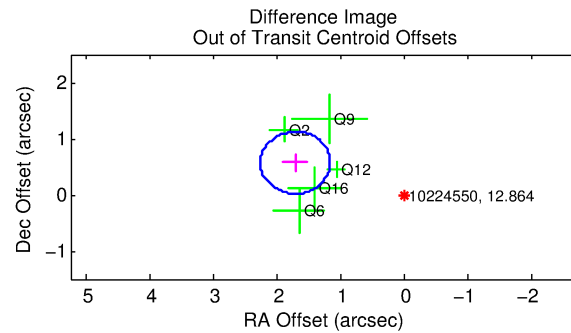
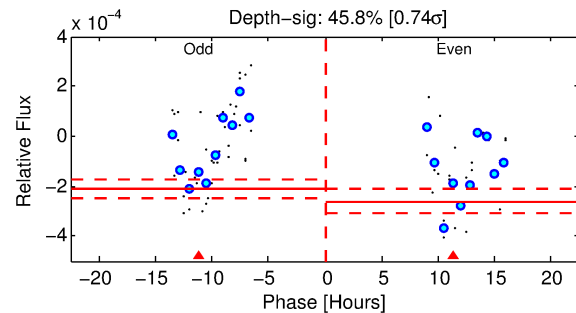
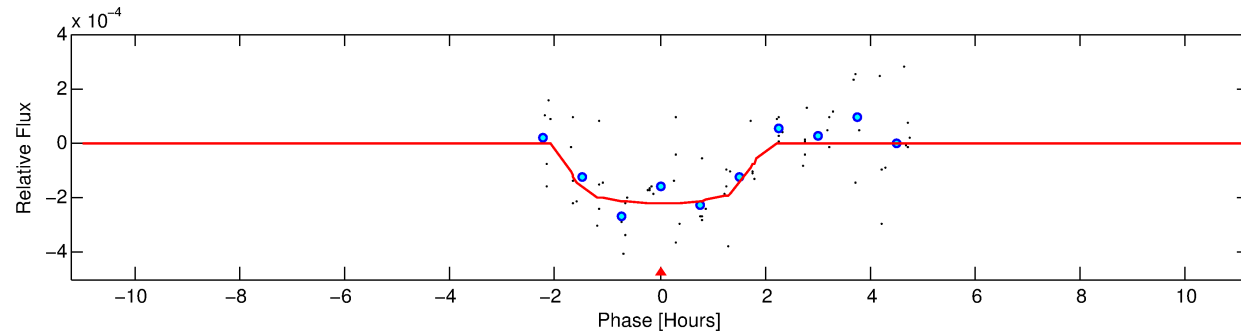
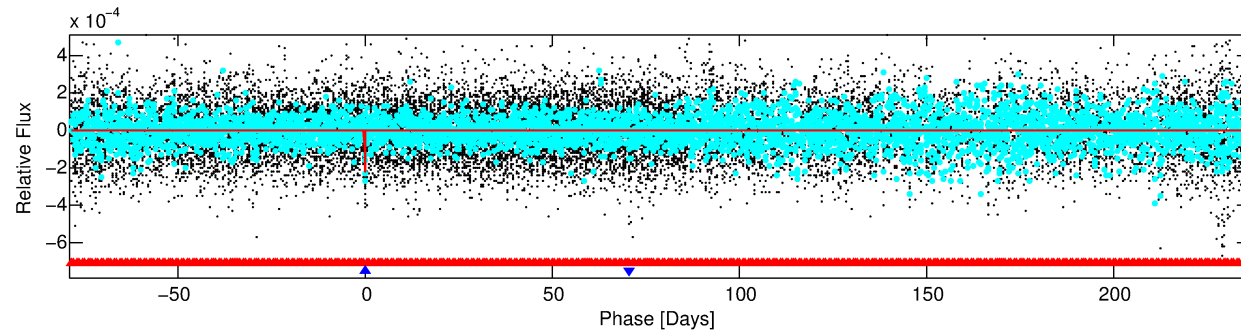
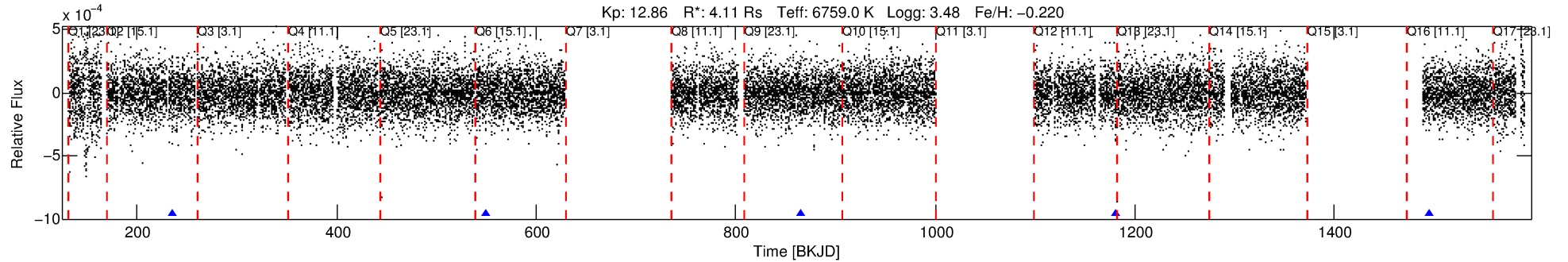
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 010224550-02

No Significant Match Found

DV One-Page Summary

KIC: 10224550 Candidate: 2 of 2 Period: 315.125 d



DV Fit Results:

Period = 315.12474 [0.00294] d
Epoch = 234.7746 [0.0074] BKJD
Rp/R* = 0.0154 [0.0186]
a/R* = 349.82 [2527.52]
b = 0.86 [2.26]
Seff = 25.48 [16.50]
Teq = 573 [93] K
Rp = 6.90 [8.81] Re
a = 1.1129 [0.4417] AU
Ag = 2305.32 [5796.67] [0.40 σ]
Teffp = 6138 [3737] K [1.49 σ]

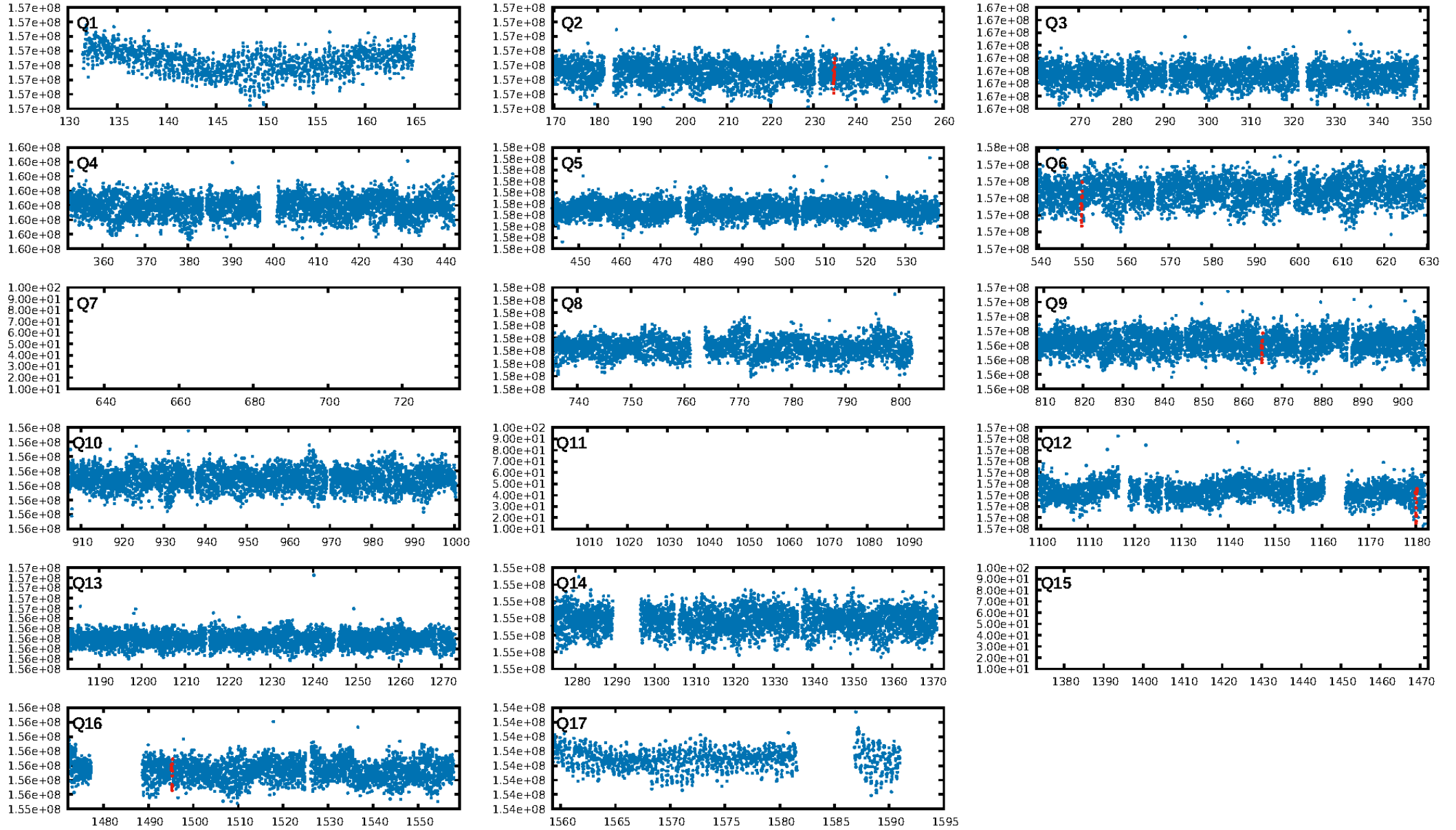
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [1567.56 σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 43.4%
ModelChiSquareGof-sig: 89.5%
Bootstrap-pfa: 2.61e-10
RollingBand-fgt: 1.00 [5/5]
GhostDiagnostic-chr: 2.78
Centroid-sig: 72.4%
Centroid-so: 0.609 arcsec [0.46 σ]
OotOffset-rm: 1.811 arcsec [9.86 σ]
KicOffset-rm: 1.789 arcsec [9.43 σ]
OotOffset-st: 2/0/2/1 [5]
KicOffset-st: 2/0/2/1 [5]
DiffImageQuality-fgm: 1.00 [5/5]
DiffImageOverlap-fno: 0.00 [0/5]

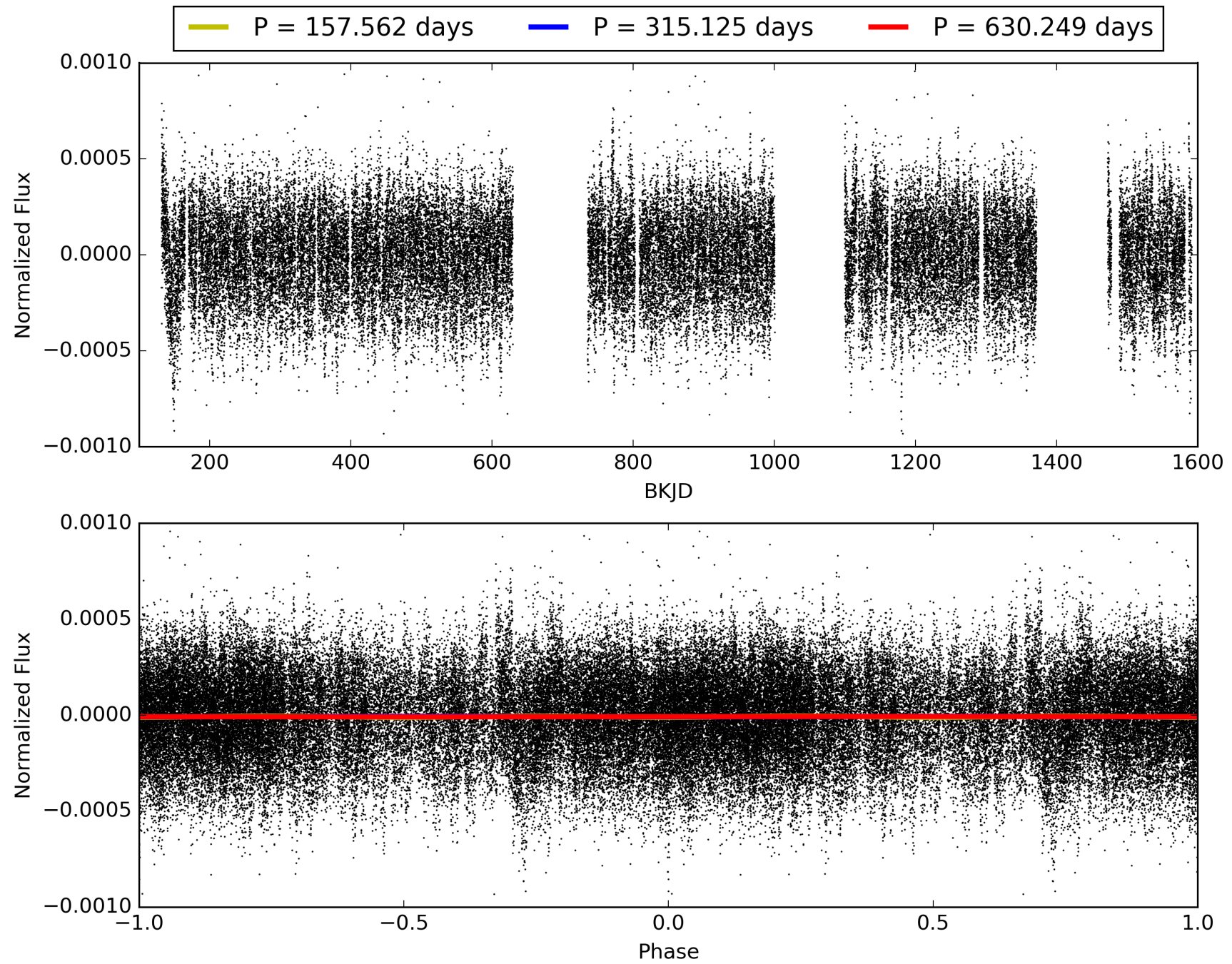
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 19:18:29 Z

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

TCE 010224550-02, PDC Light Curves

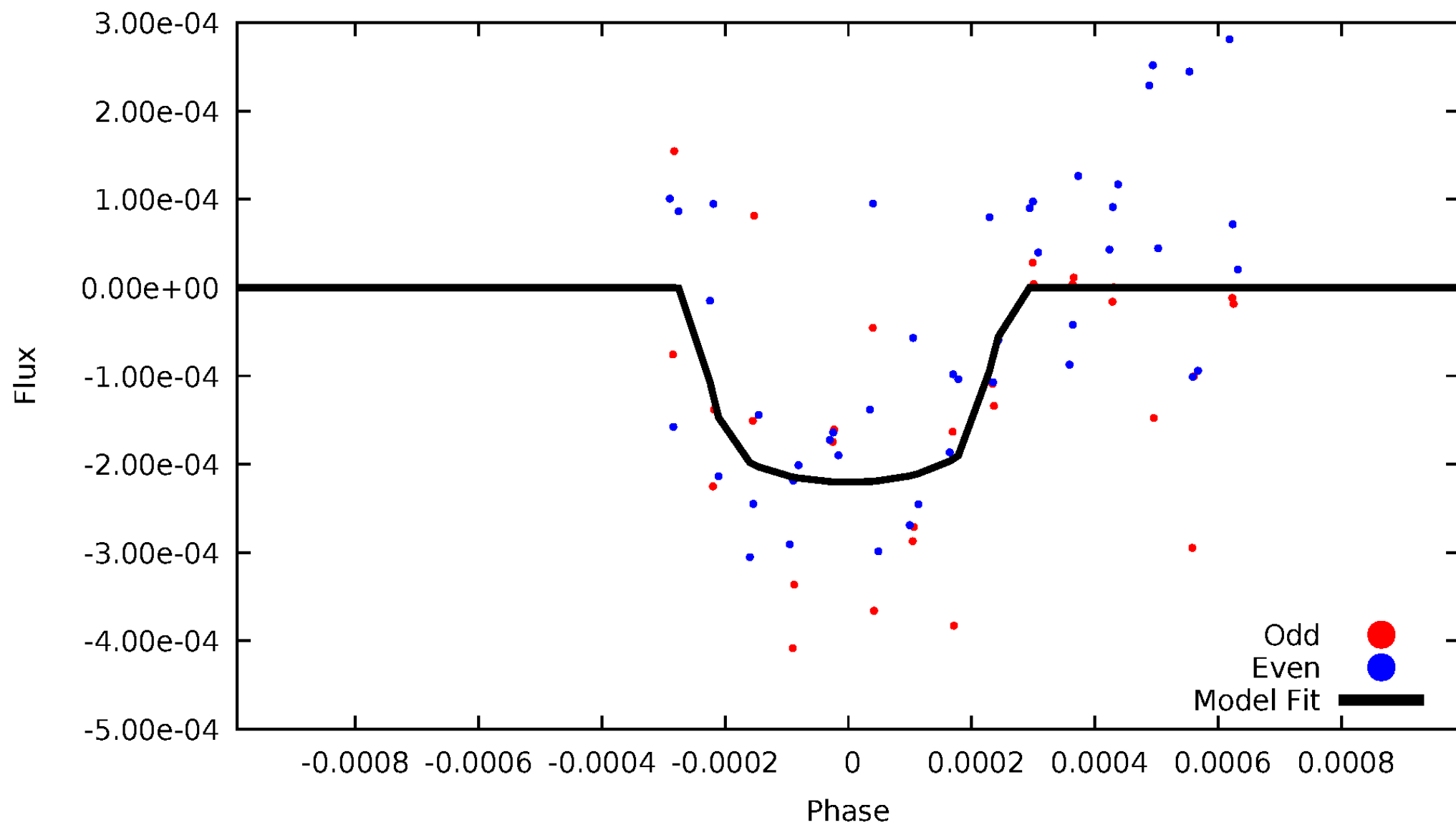


TCE 010224550-02



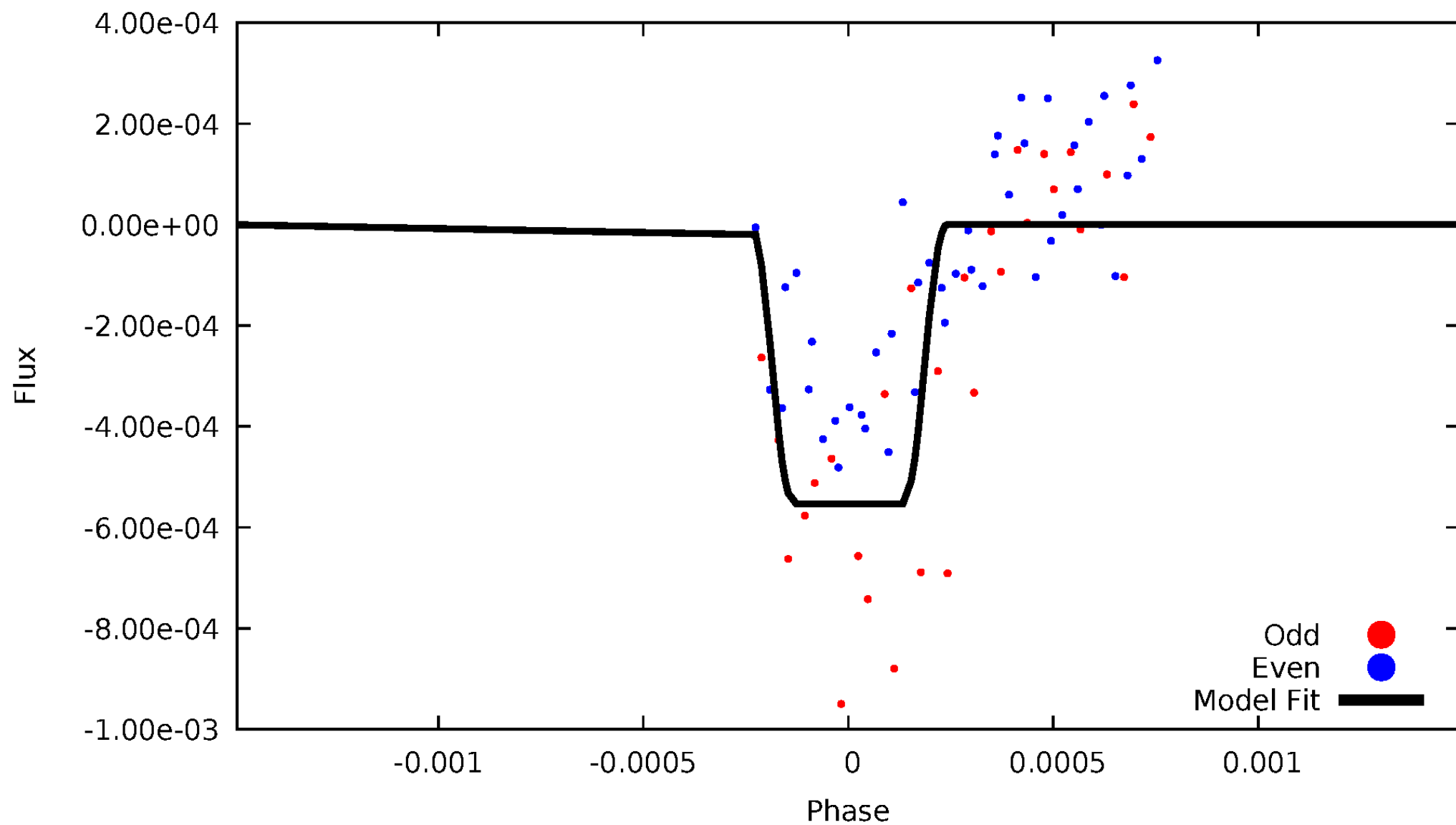
DV Odd/Even

TCE 010224550-02



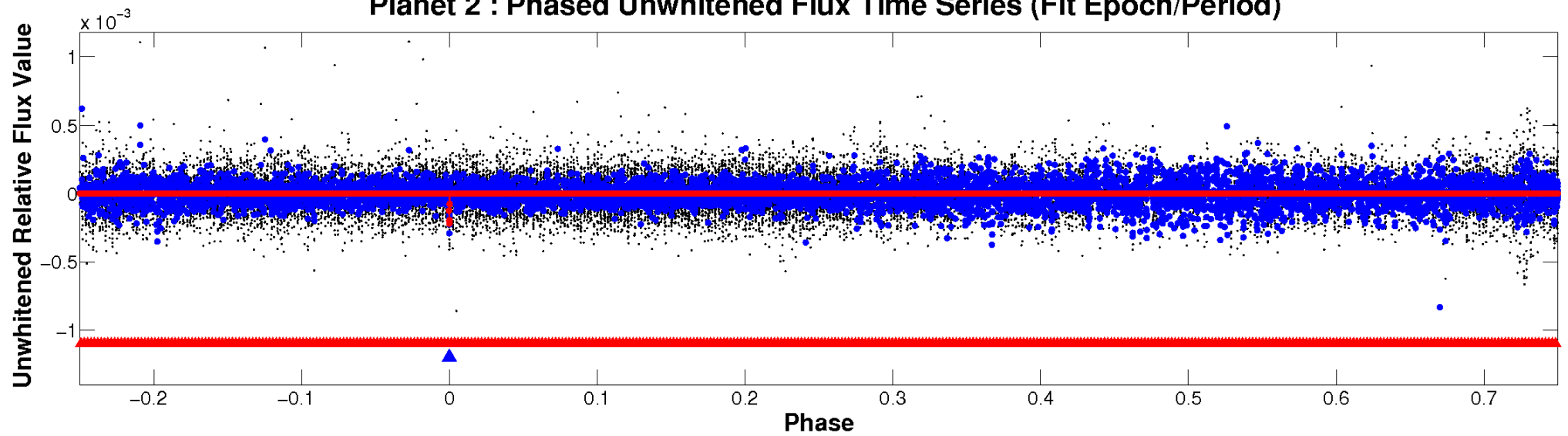
ALT Odd/Even

TCE 010224550-02

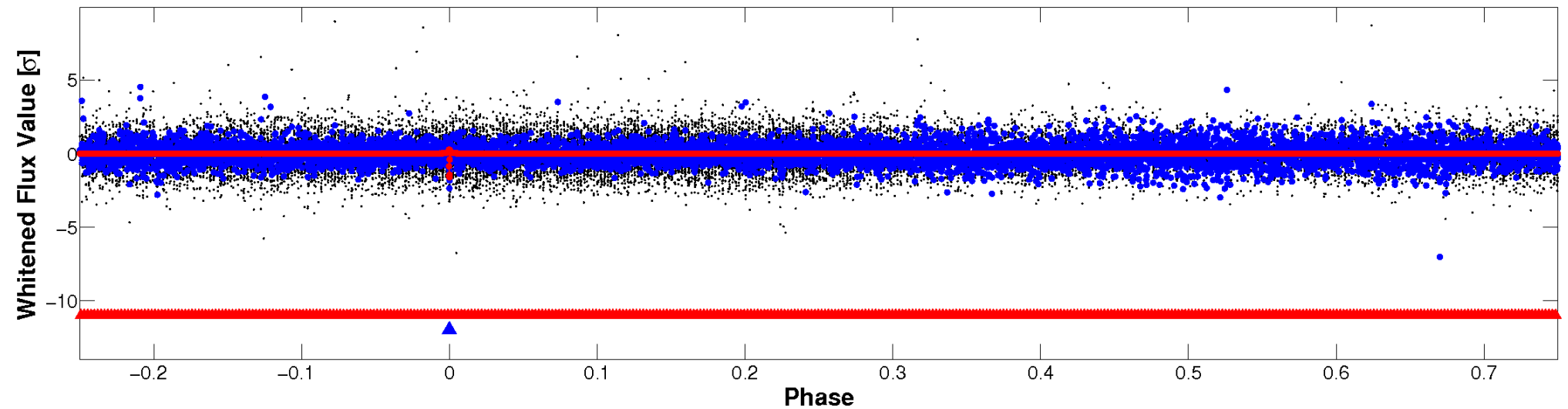


Non-Whitened Vs. Whitened Light Curve

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

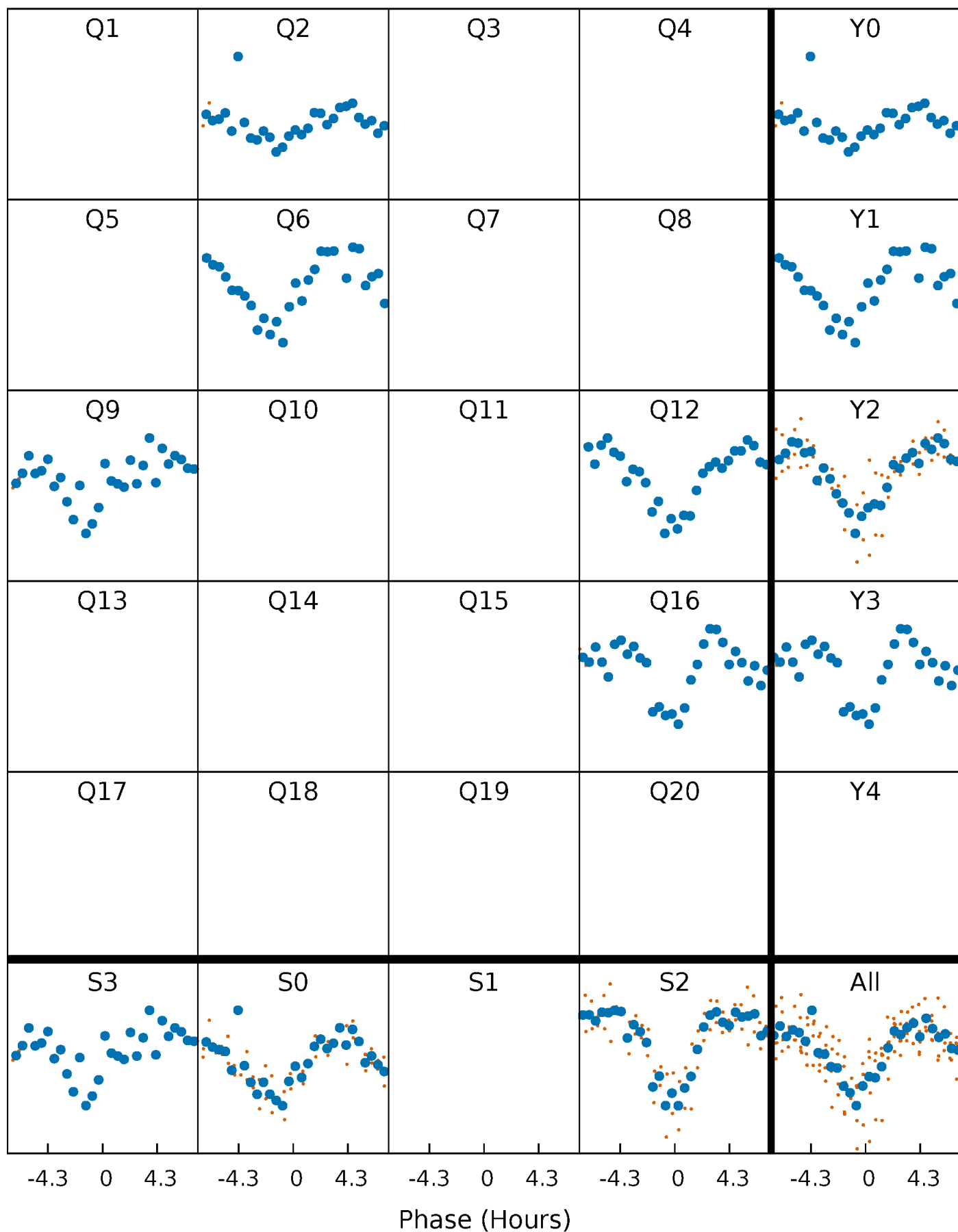


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



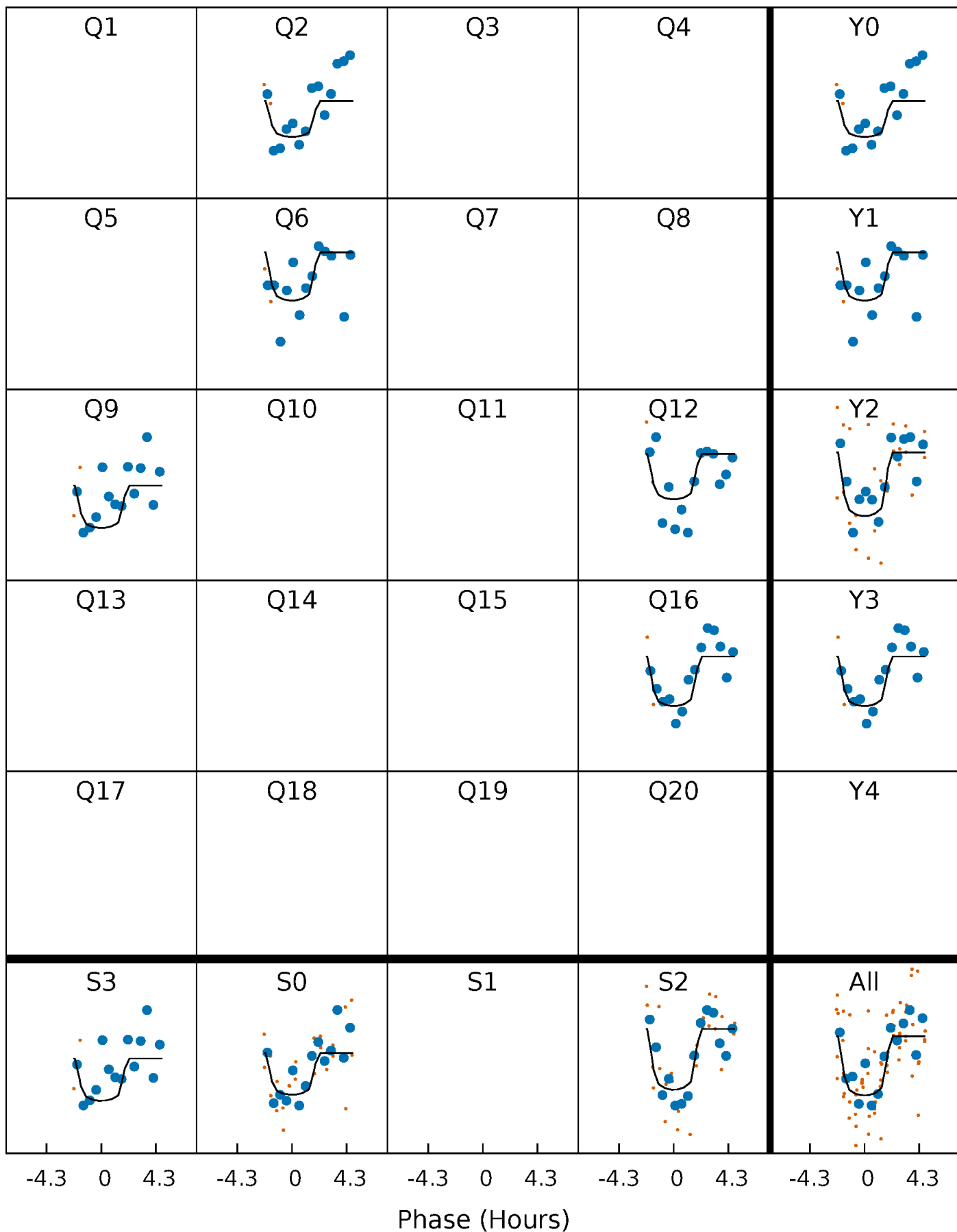
PDC Quarter-Phased Transit Curves

TCE 010224550-02 $P=315.124743$ Days $T_0=234.774599$ (BKJD)



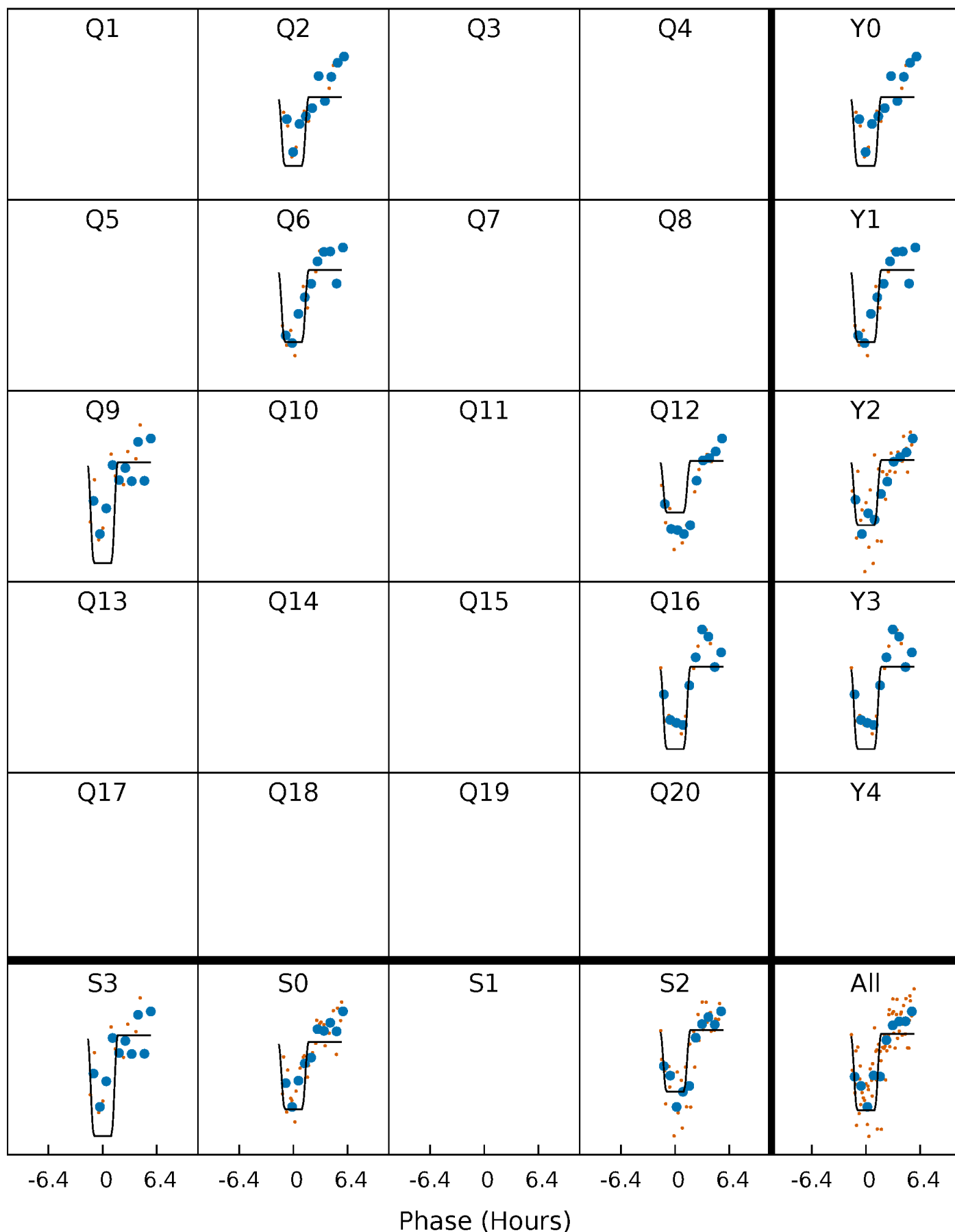
DV Quarter-Phased Transit Curves

TCE 010224550-02 P=315.124743 Days $T_0=234.774599$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

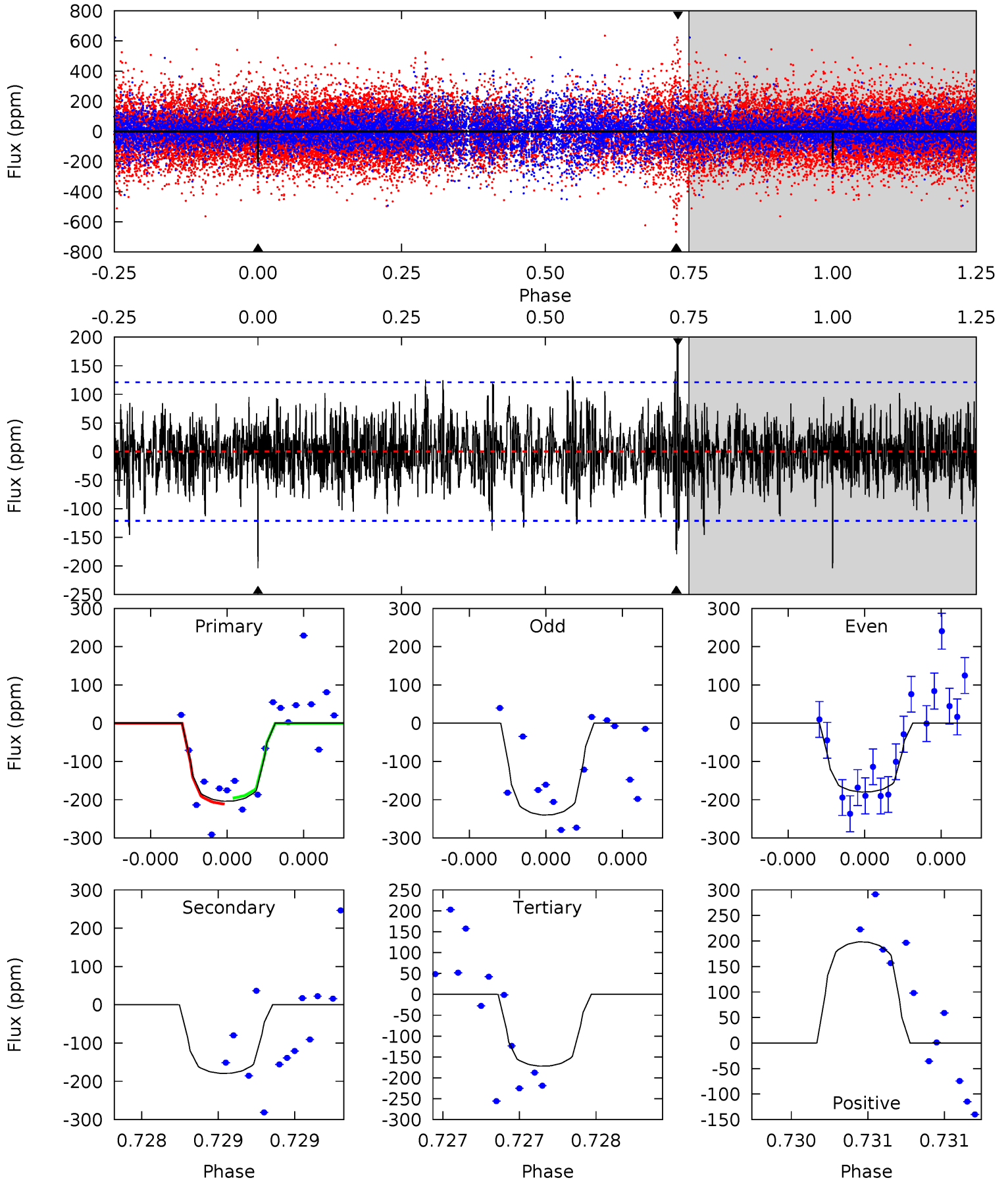
TCE 010224550-02 P=315.131568 Days $T_0=234.731810$ (BKJD)



DV Model-Shift Uniqueness Test

010224550-02, P = 315.124743 Days, E = 234.774599 Days

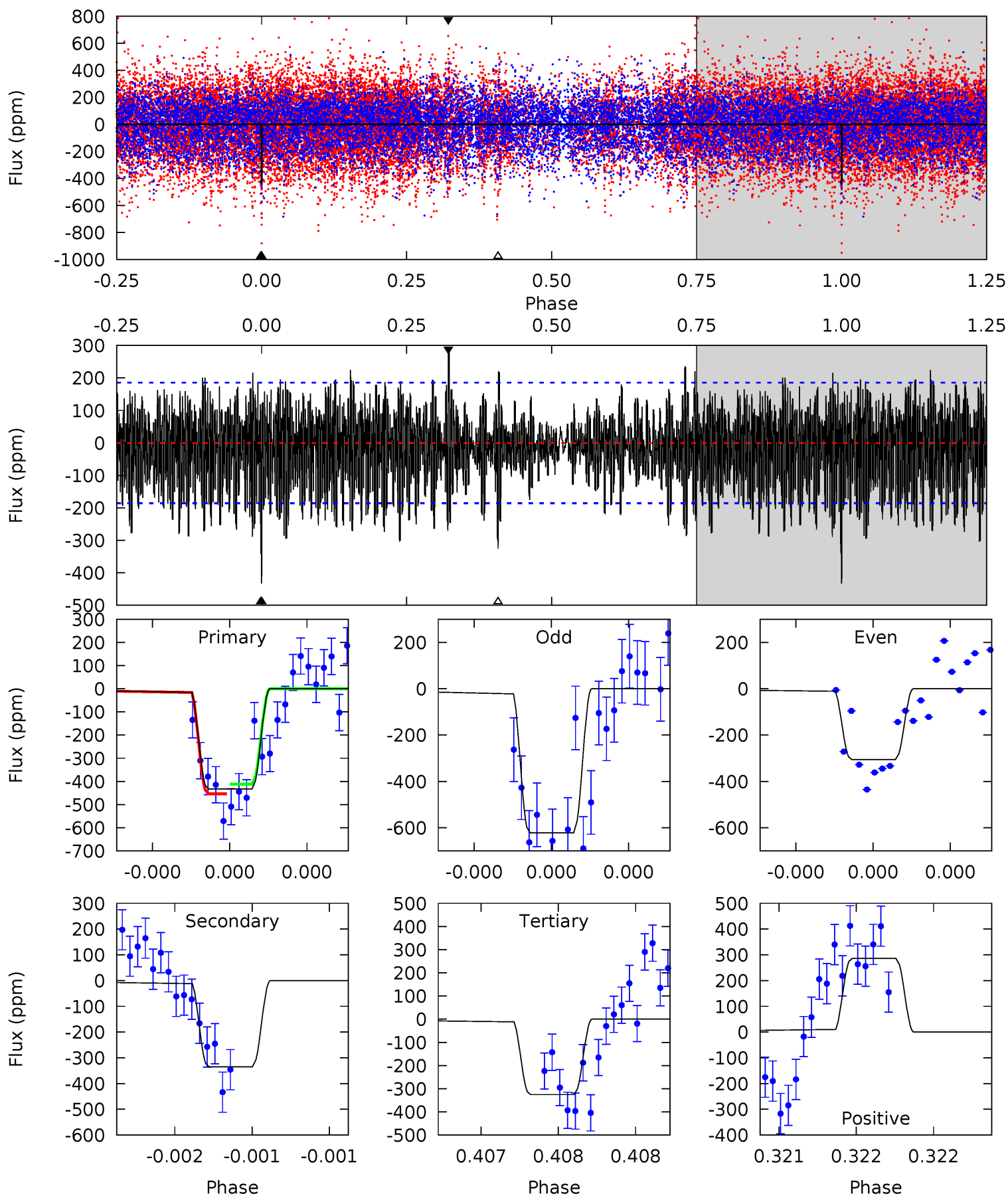
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
9.40	8.27	7.93	9.14	5.58	3.50	1.76	1.47	0.26	0.34	-0.87	1.38	0.94	0.49	0.35



Alt Model-Shift Uniqueness Test

010224550-02, P = 315.131568 Days, E = 234.731810 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.0	10.1	9.80	8.61	5.59	3.50	3.11	3.22	4.41	0.27	1.46	4.78	1.10	0.40	0.63



Stellar Parameters For KIC 010224550

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	6759^{+183}_{-203}	$3.478^{+0.374}_{-0.088}$	$-0.220^{+0.300}_{-0.250}$	$4.108^{+0.422}_{-1.689}$	$1.851^{+0.142}_{-0.397}$	$0.038^{+0.115}_{-0.010}$
	+3%/-3%	+11%/-3%	+136%/-114%	+10%/-41%	+8%/-21%	+305%/-27%
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 010224550-02 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-179 ± 22	$8.28^{+7.27}_{-5.38}$	784^{+45}_{-81}	5511^{+4227}_{-1211}	1843^{+11803}_{-1349}
Alt.	-335 ± 33	$10.71^{+7.77}_{-6.46}$	790^{+41}_{-75}	5652^{+3898}_{-1109}	1968^{+10429}_{-1321}

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 $A_{obs} \gg 1.0$

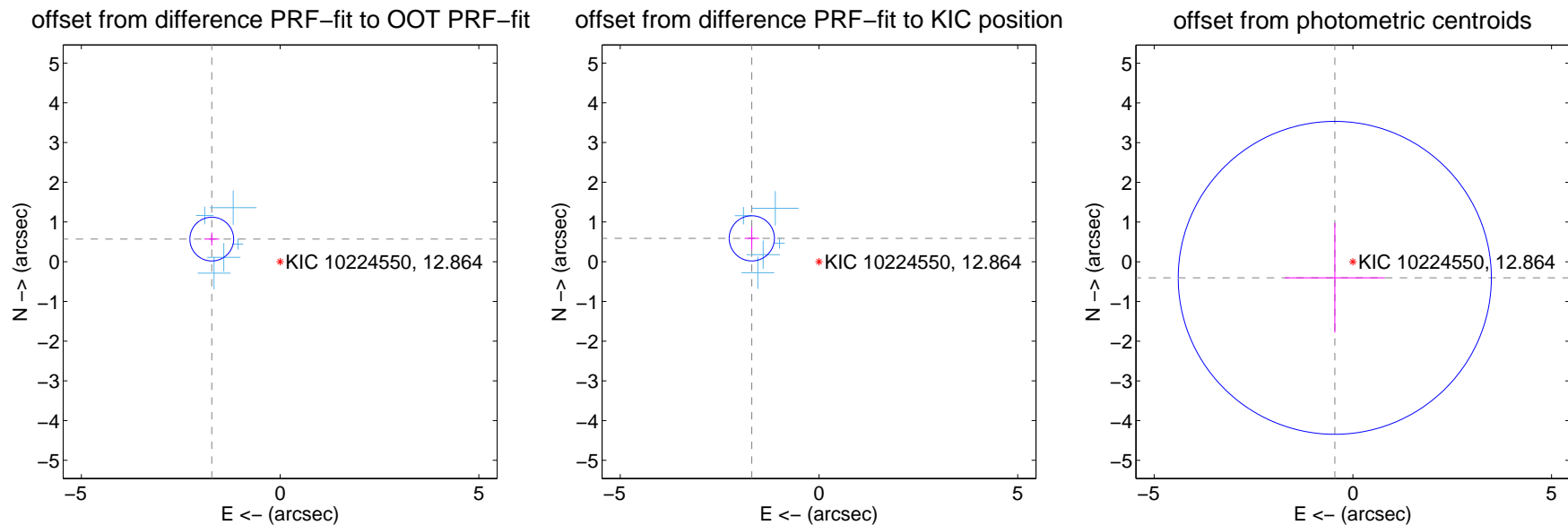
DV Centroid Data

Supplemental centroid analysis for 010224550-02. Kepler magnitude: 12.86. Transit SNR 8.69

There are 5 quarters with good PRF difference image offsets

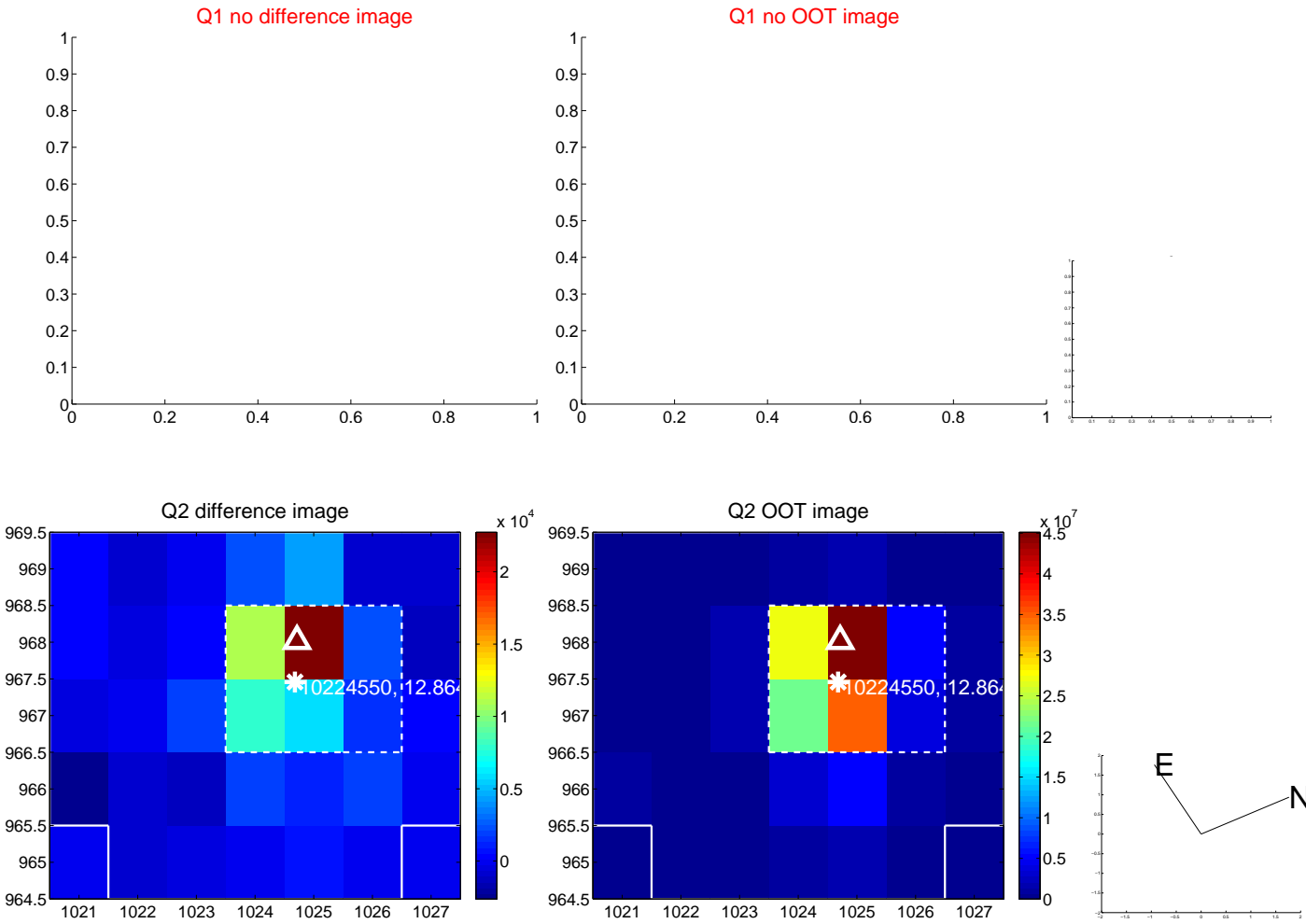
The direct PRF centroid is offset from the target star catalog position by about 0.07 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.811 ± 0.184	9.86	1.719 ± 0.186	0.569 ± 0.162
PRF-fit source offset from KIC position	1.789 ± 0.190	9.43	1.689 ± 0.182	0.588 ± 0.281
photometric centroid source offset	0.61 ± 1.31	0.46	0.45 ± 1.26	-0.40 ± 1.38



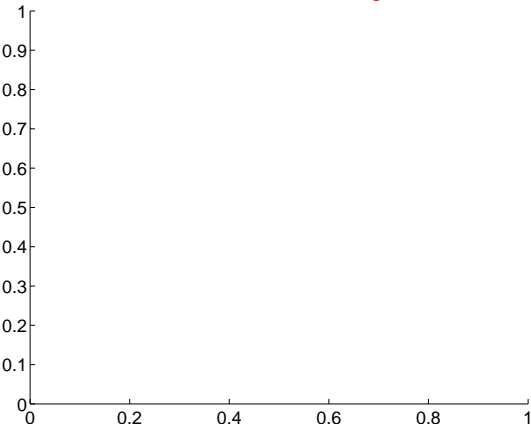
Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three-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

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

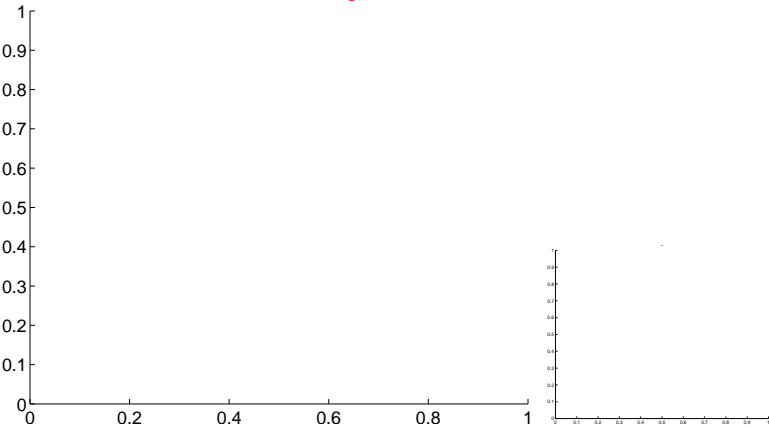


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.

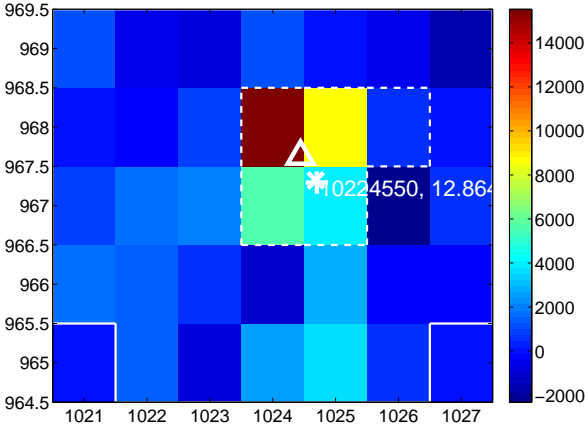
Q5 no difference image



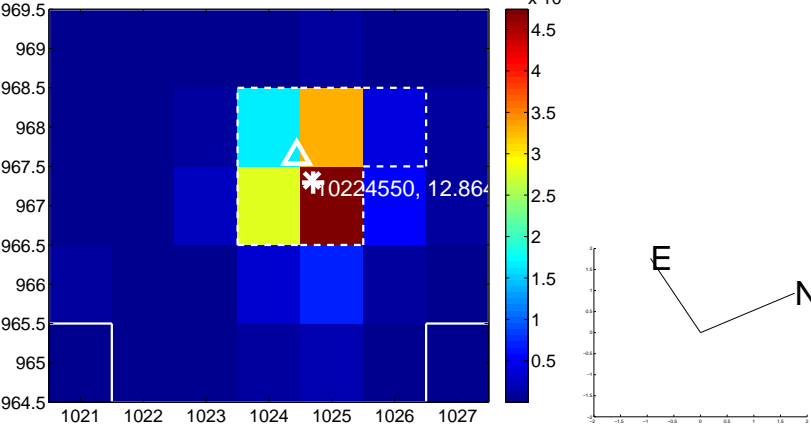
Q5 no OOT image



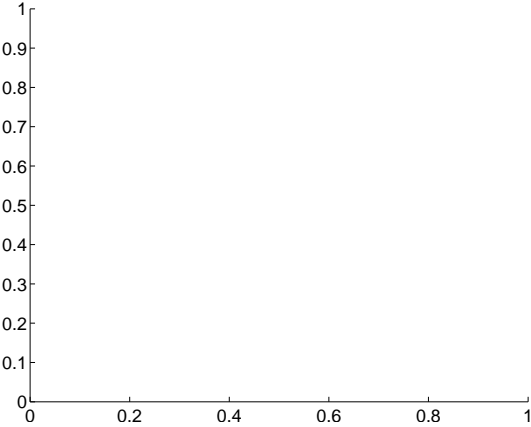
Q6 difference image



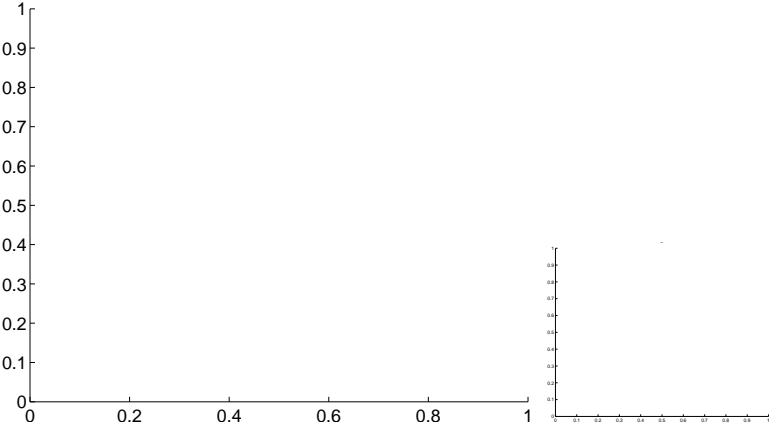
Q6 OOT image



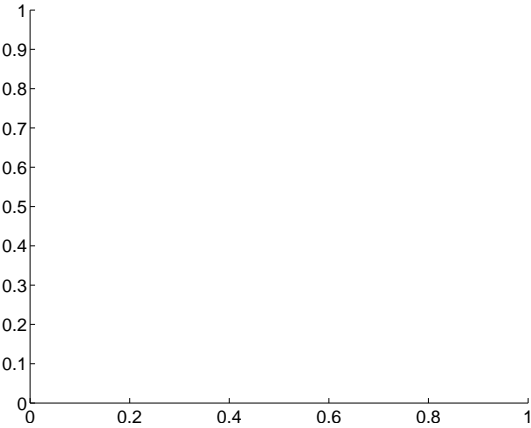
Q7 no difference image



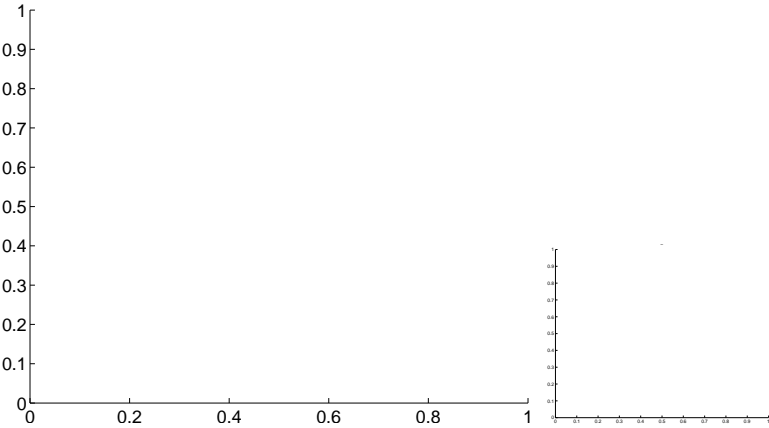
Q7 no OOT image



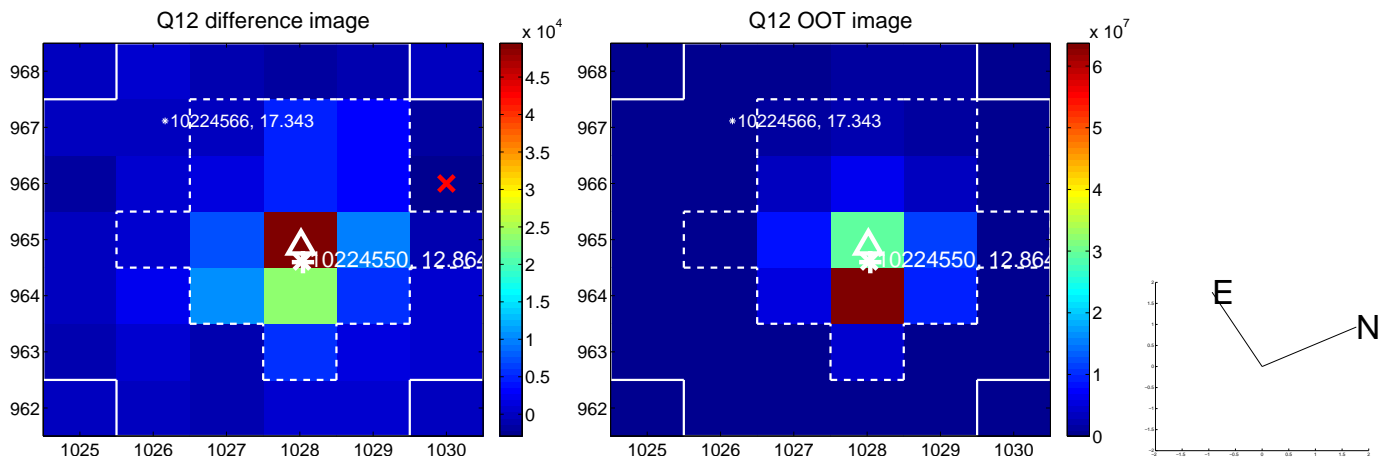
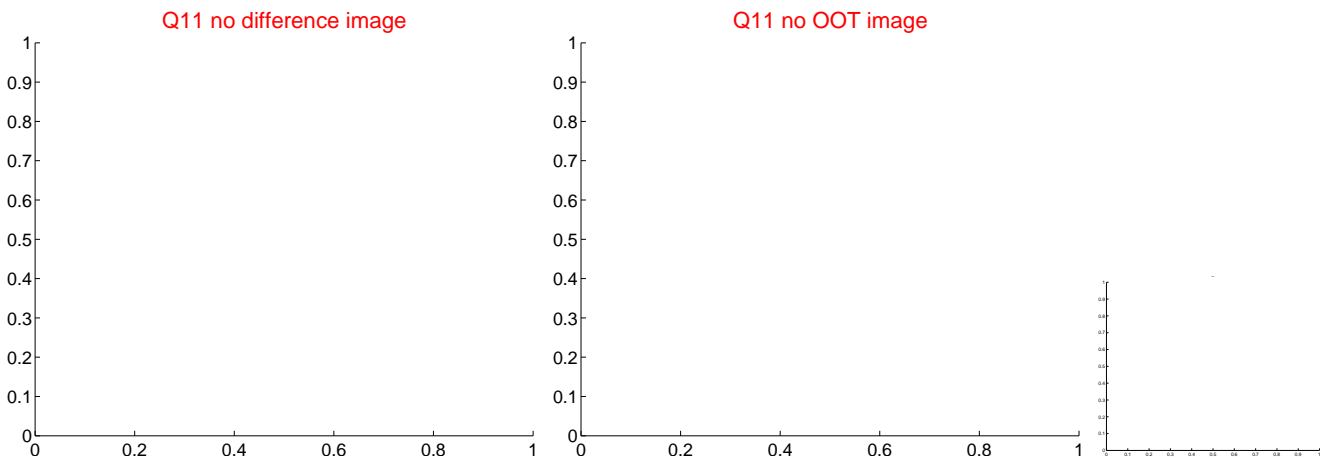
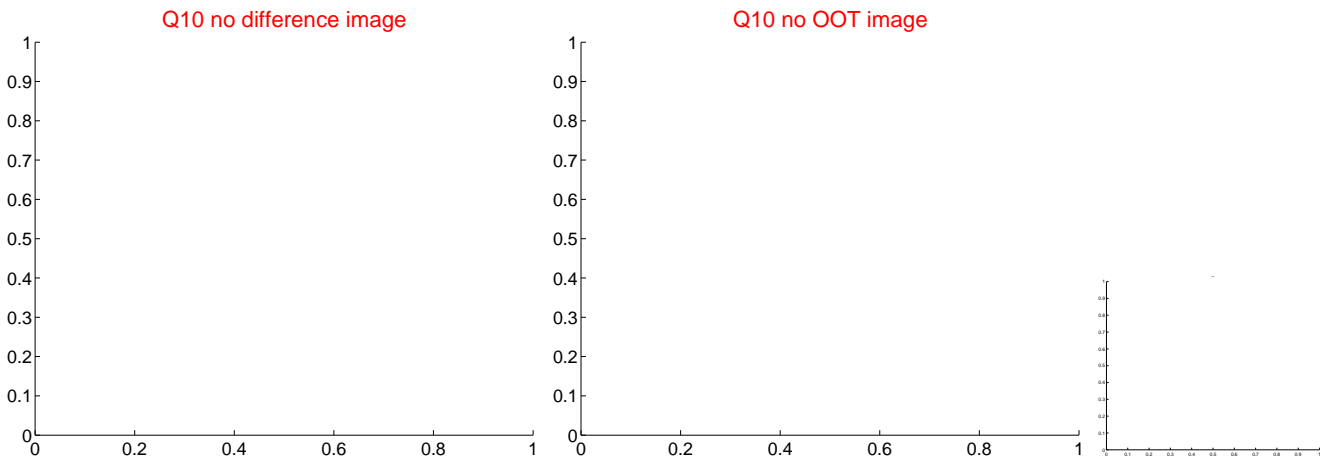
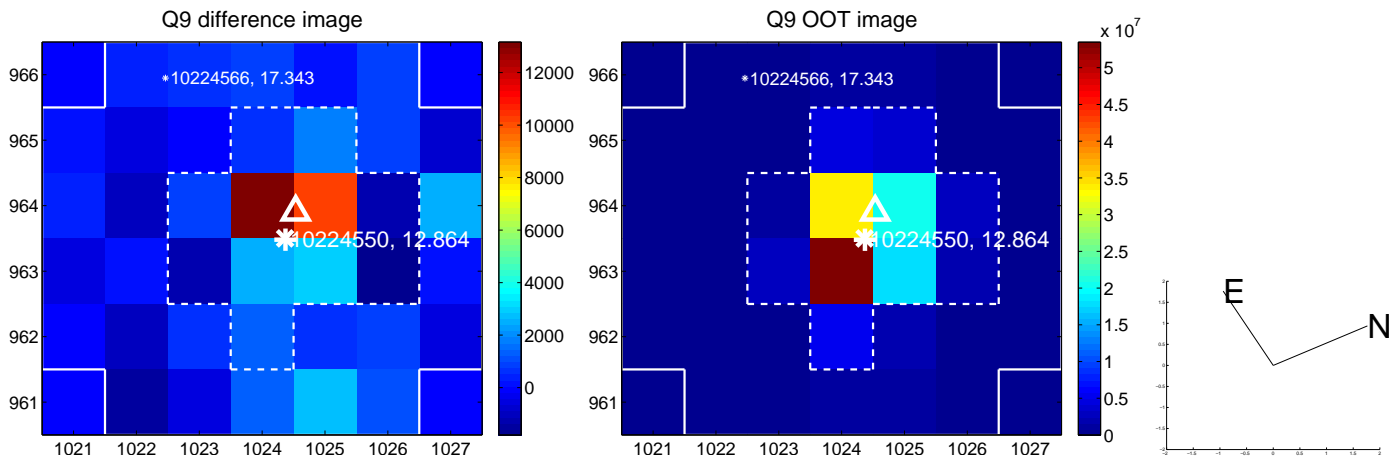
Q8 no difference image



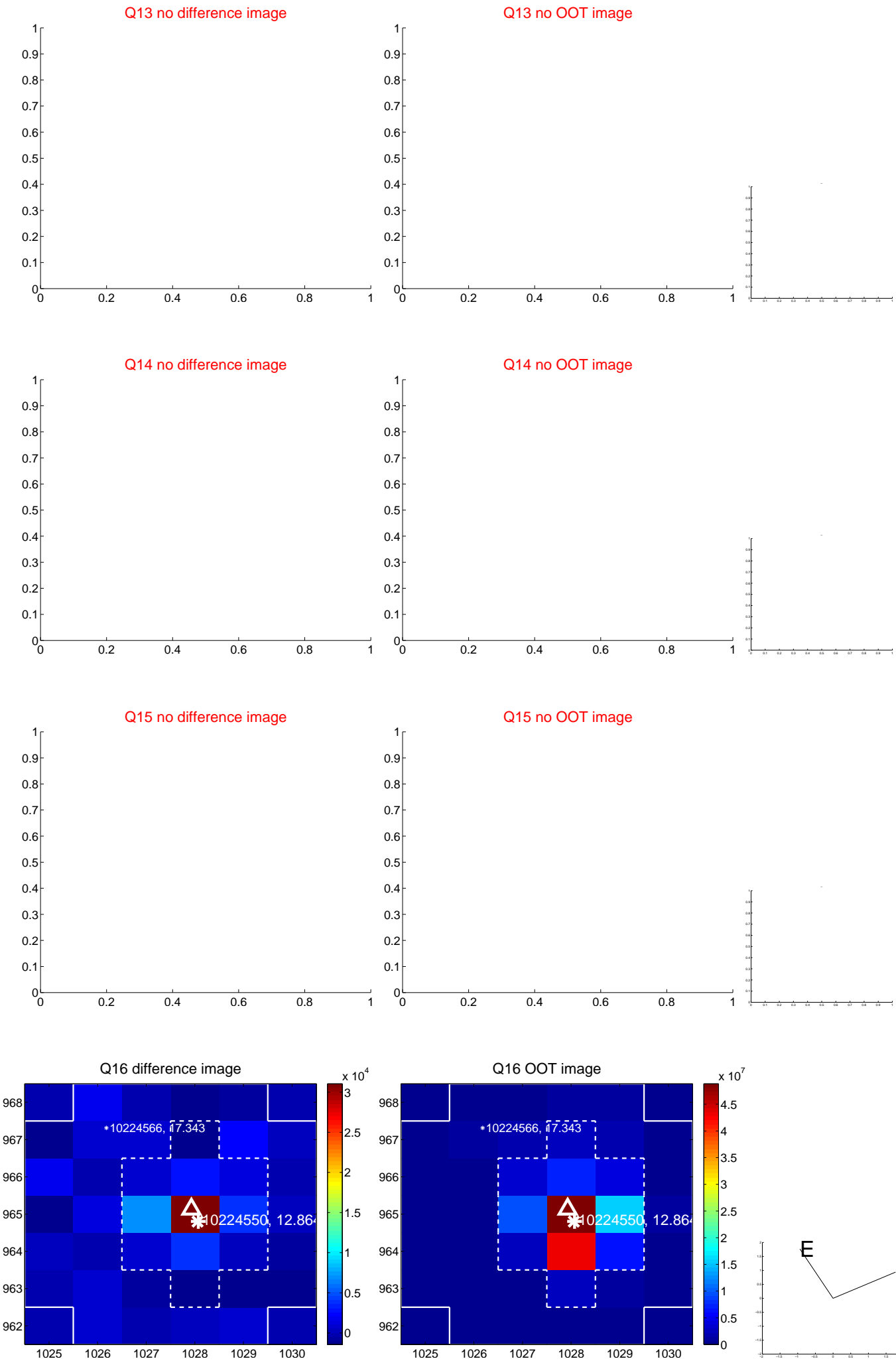
Q8 no OOT image



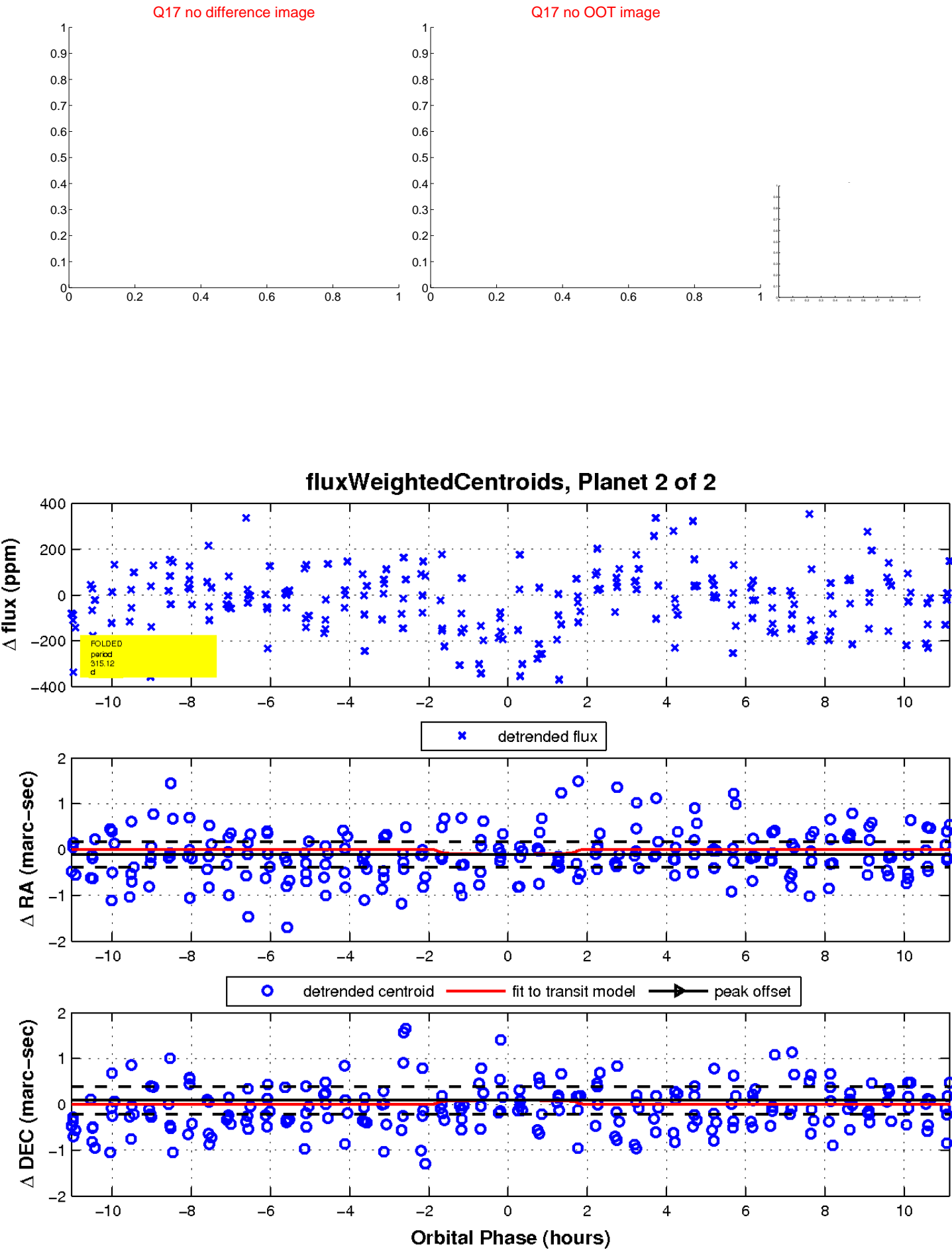
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

