

KIC 012109430

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})
012109430-01	OBS	No	274.448424	263.849659	1015.3	8.966	22.0	4.9	0.67	4487	2.81	0.31
012109430-03	OBS	No	456.134569	328.212647	1541.6	23.630	17.5	5.4	0.67	4487	2.52	0.16
012109430-04	OBS	No	568.232494	375.750896	2885.1	7.239	18.0	11.4	0.67	4487	4.72	0.12
012109430-05	OBS	No	322.169953	356.093757	1459.5	5.222	16.0	8.0	0.67	4487	3.58	0.25

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
012109430-01	OBS	FP	0.00	1	0	0	0	LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
012109430-03	OBS	FP	0.00	1	0	0	0	LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
012109430-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
012109430-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—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.

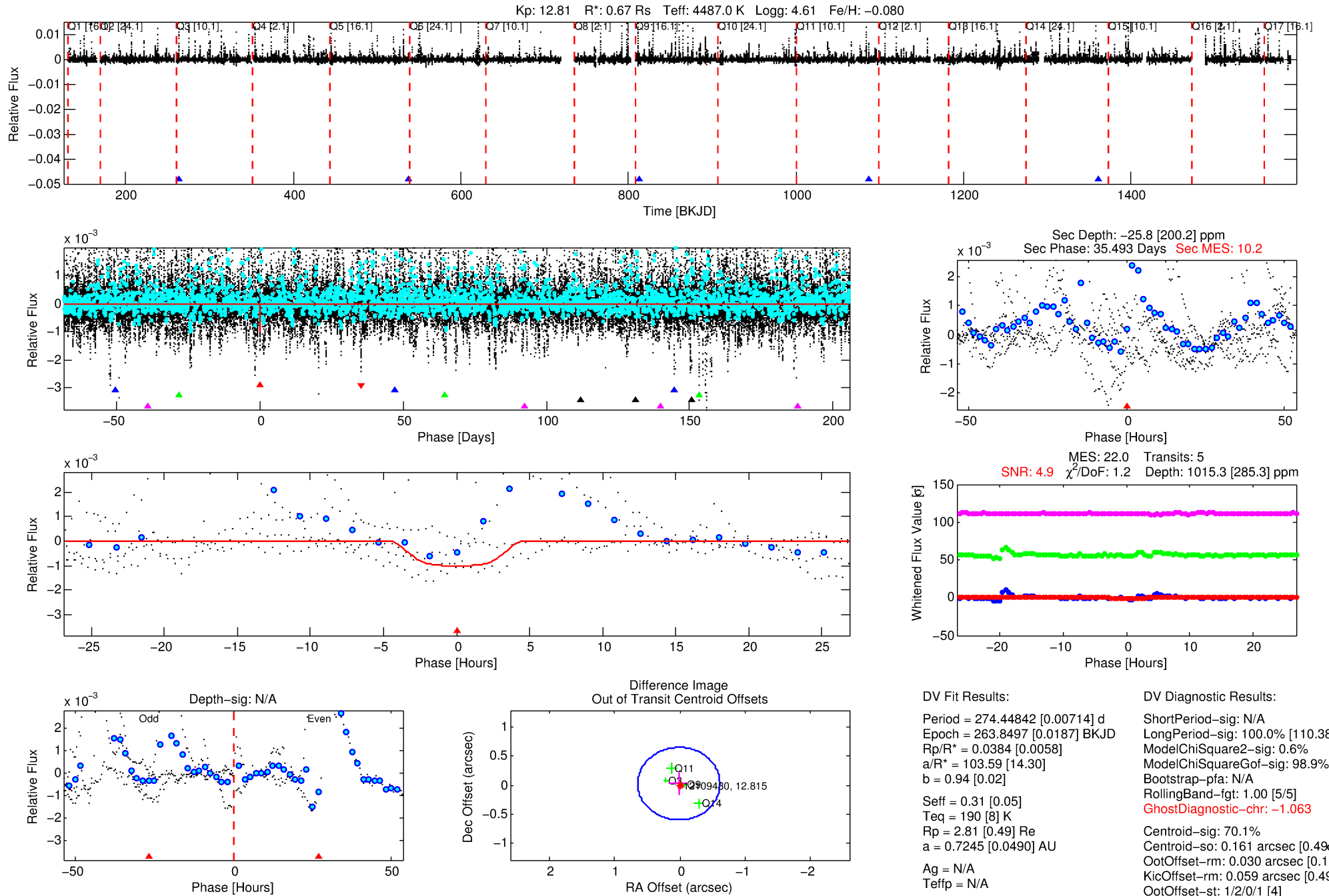
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 012109430-01

No Significant Match Found

DV One-Page Summary

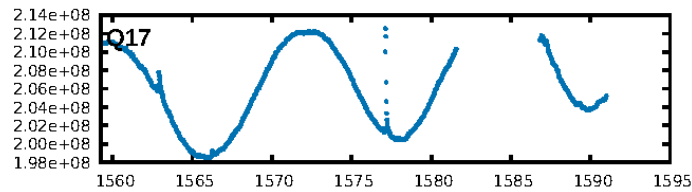
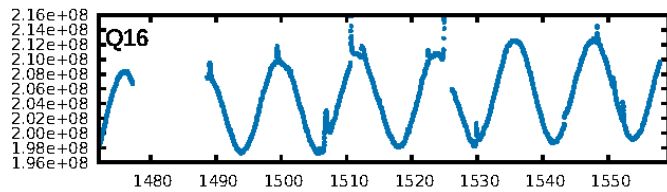
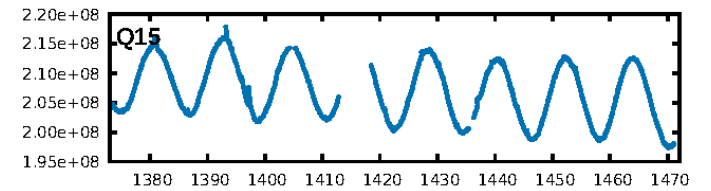
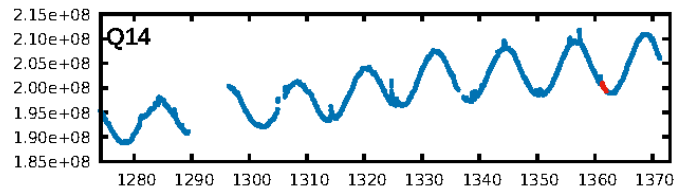
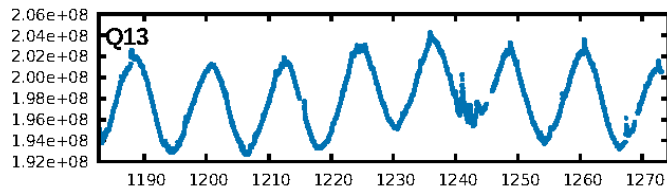
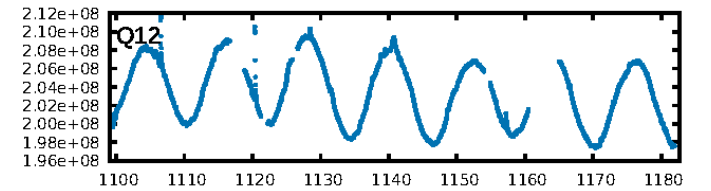
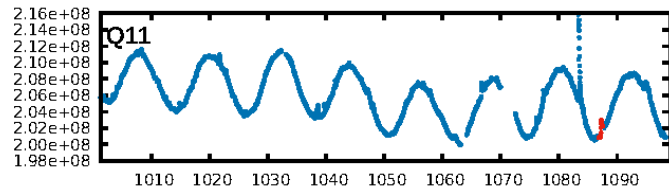
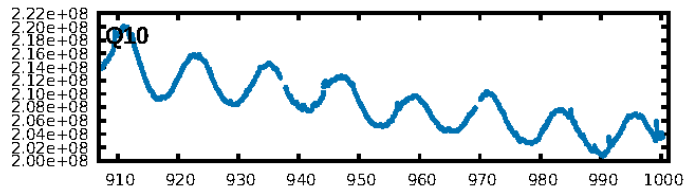
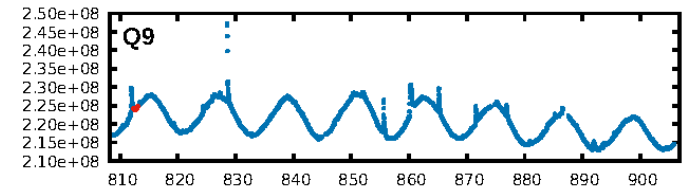
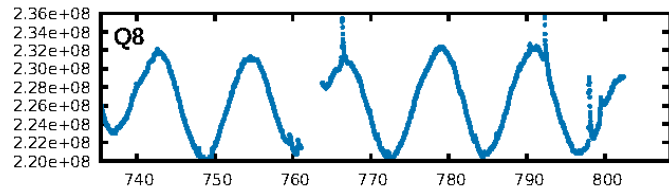
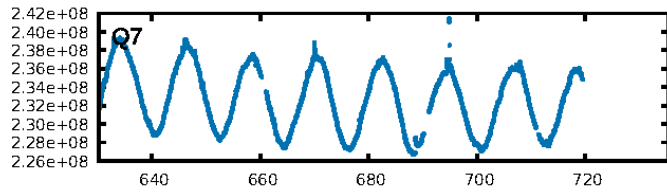
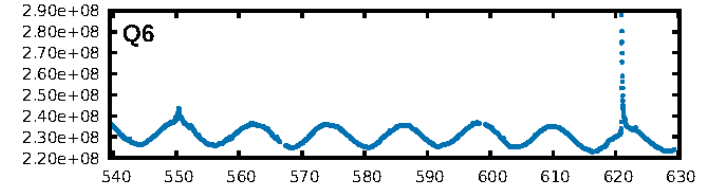
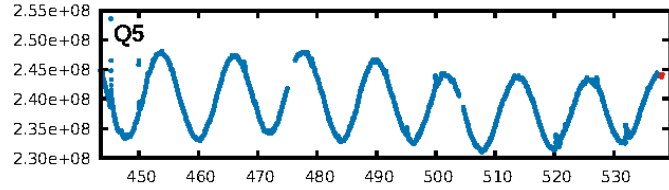
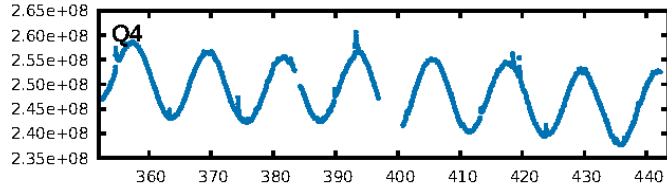
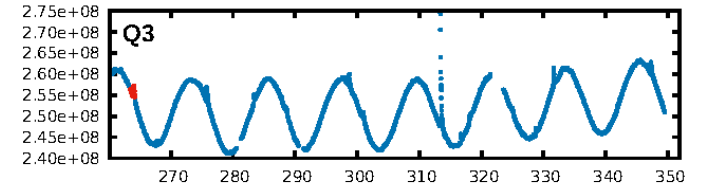
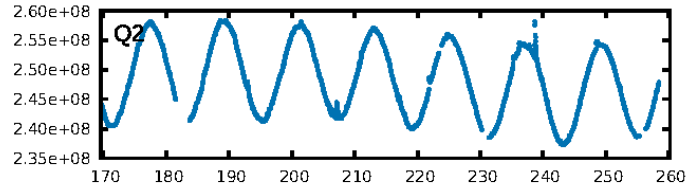
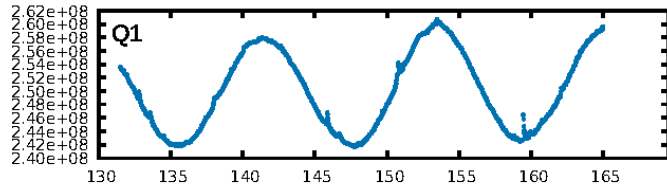
KIC: 12109430 Candidate: 1 of 5 Period: 274.448 d



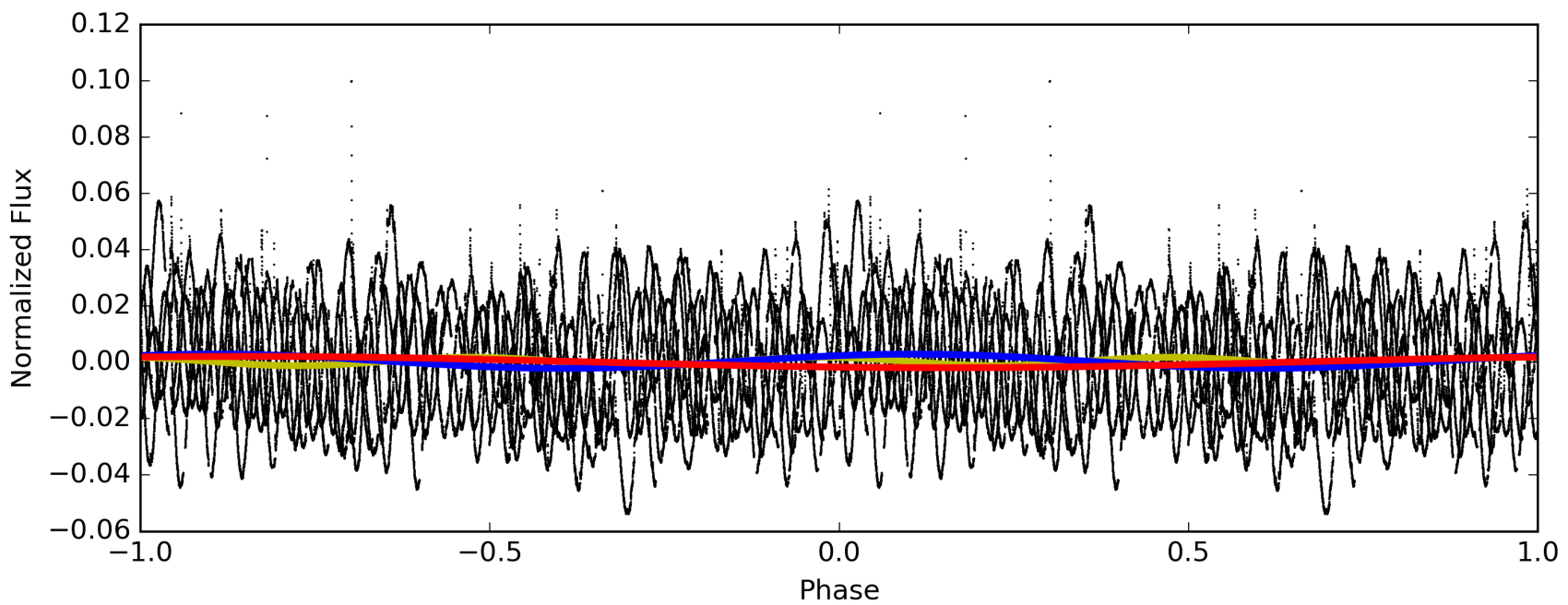
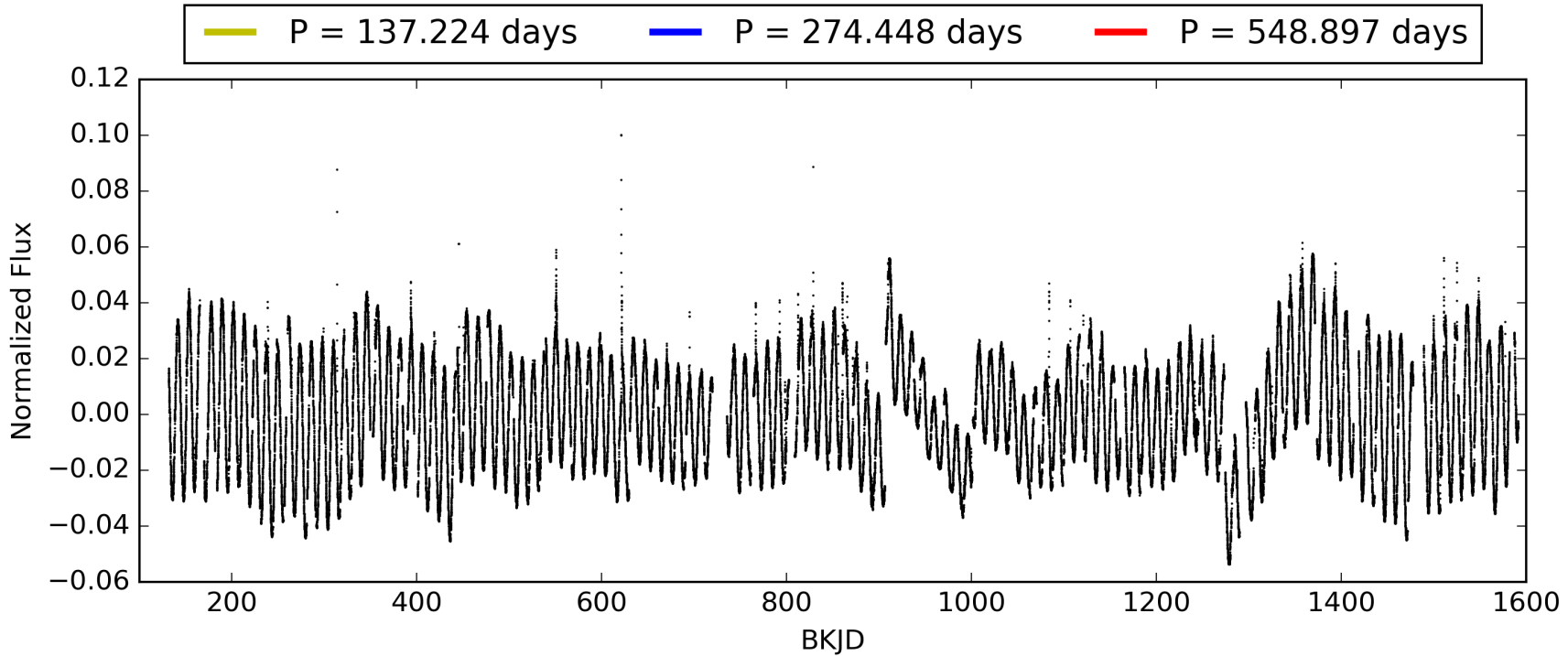
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 05:45:20 Z

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

TCE 012109430-01, PDC Light Curves

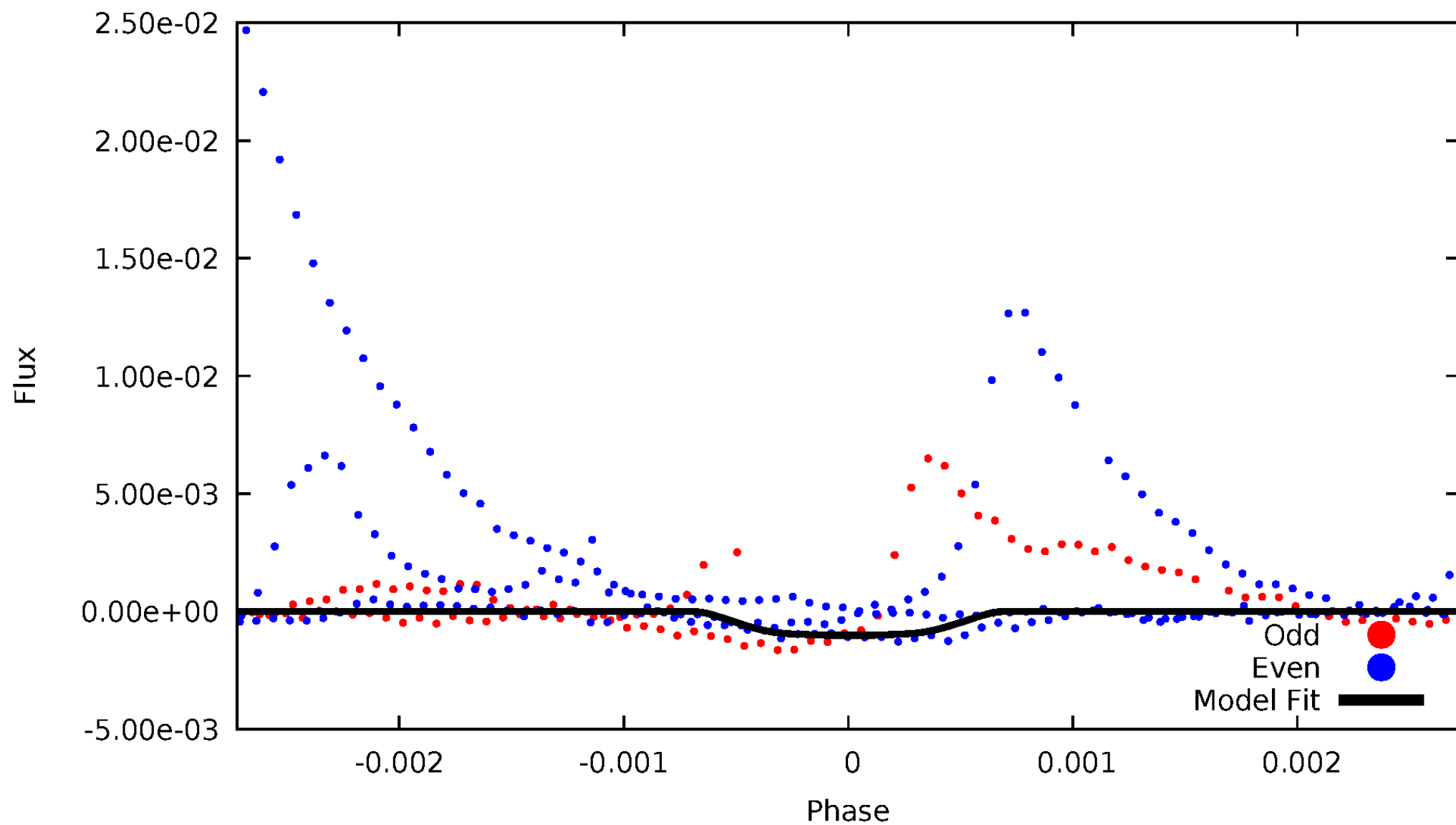


TCE 012109430-01



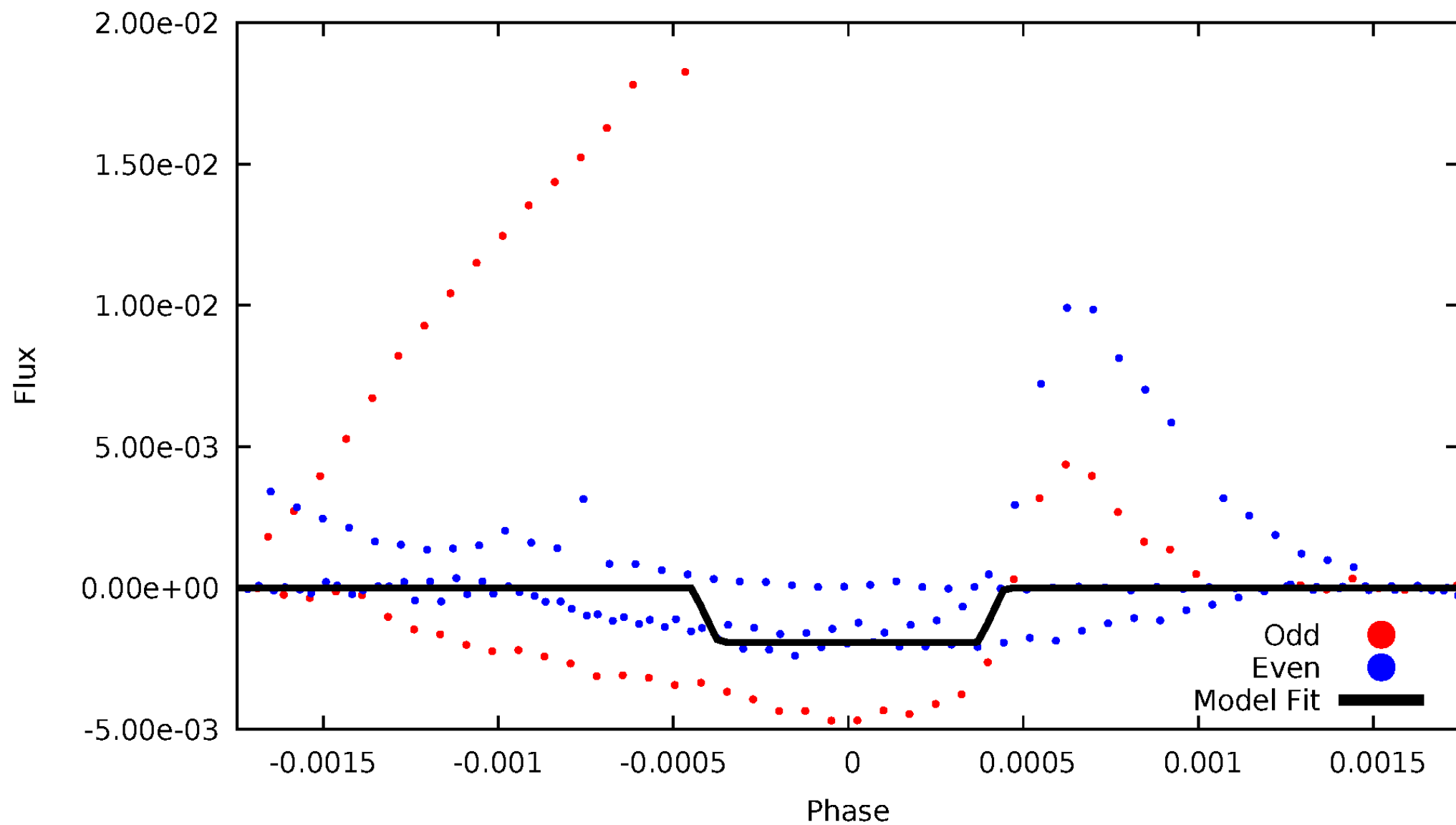
DV Odd/Even

TCE 012109430-01



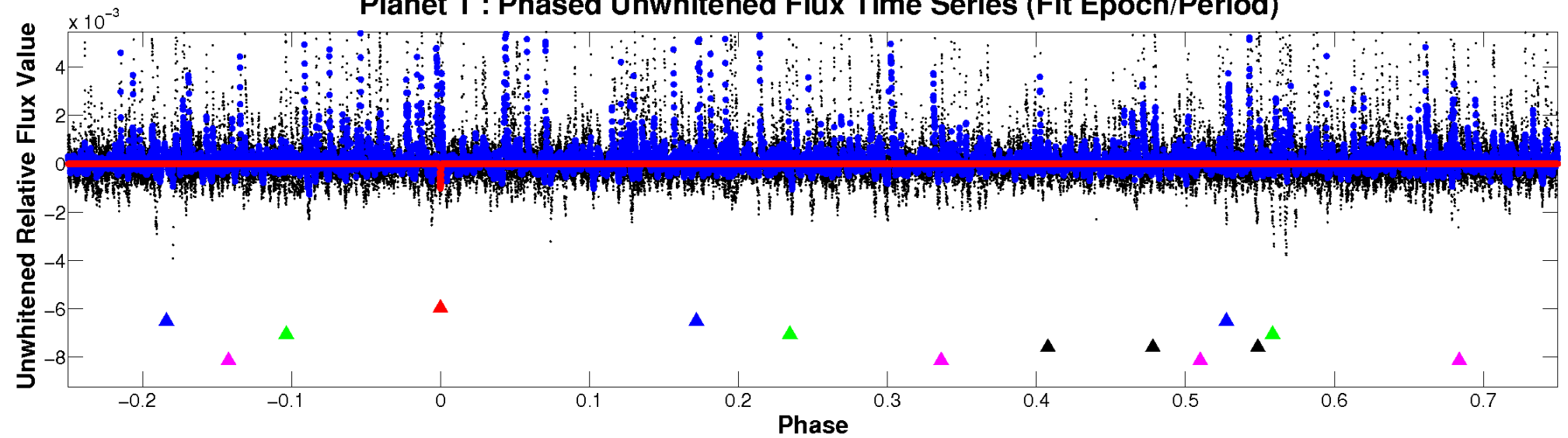
ALT Odd/Even

TCE 012109430-01

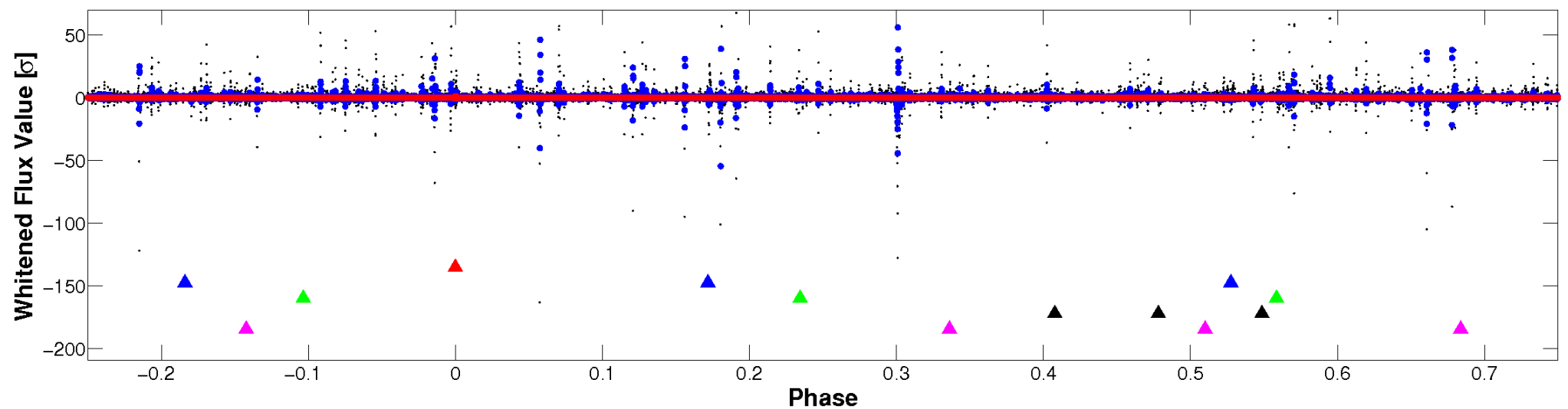


Non-Whitened Vs. Whitened Light Curve

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

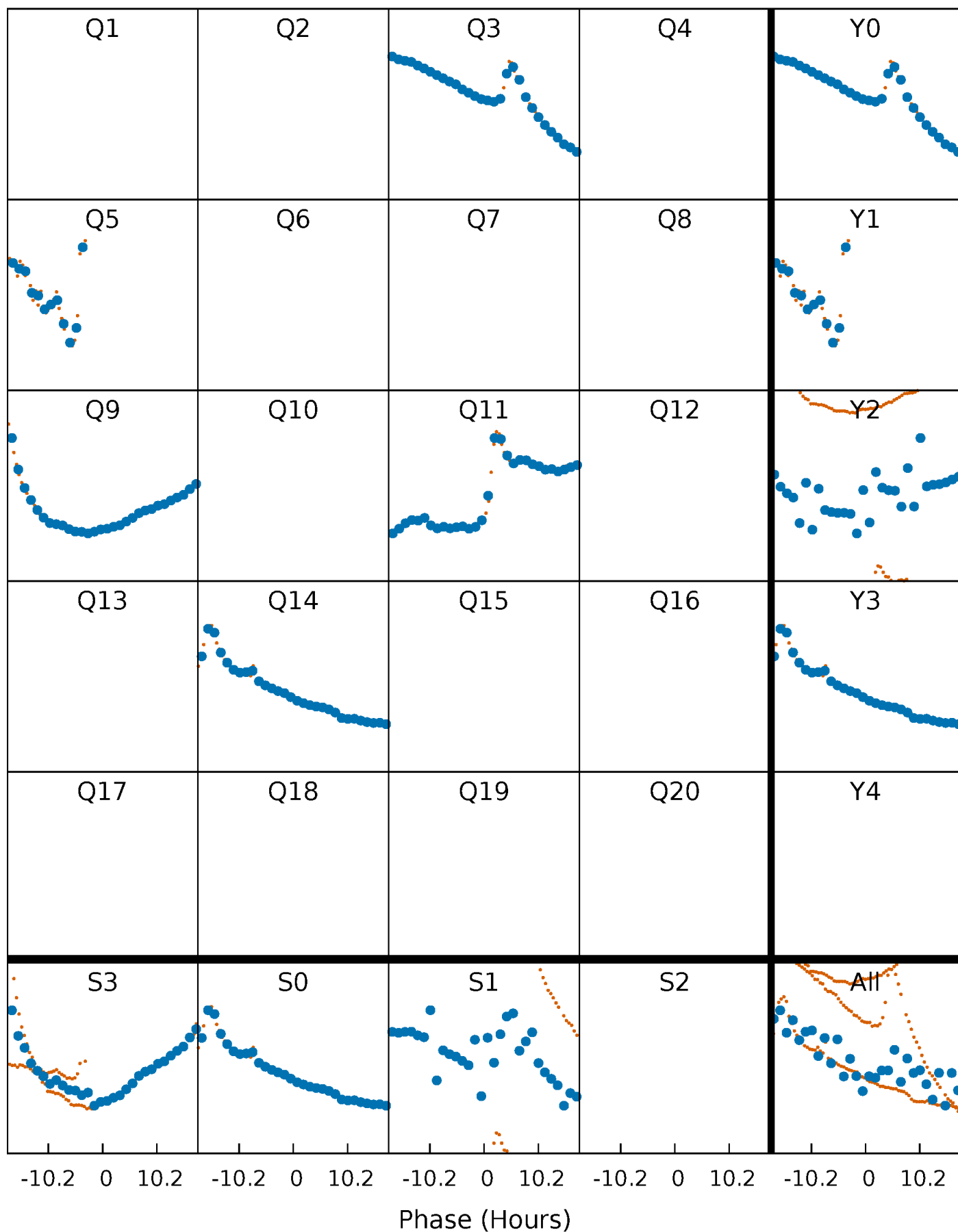


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



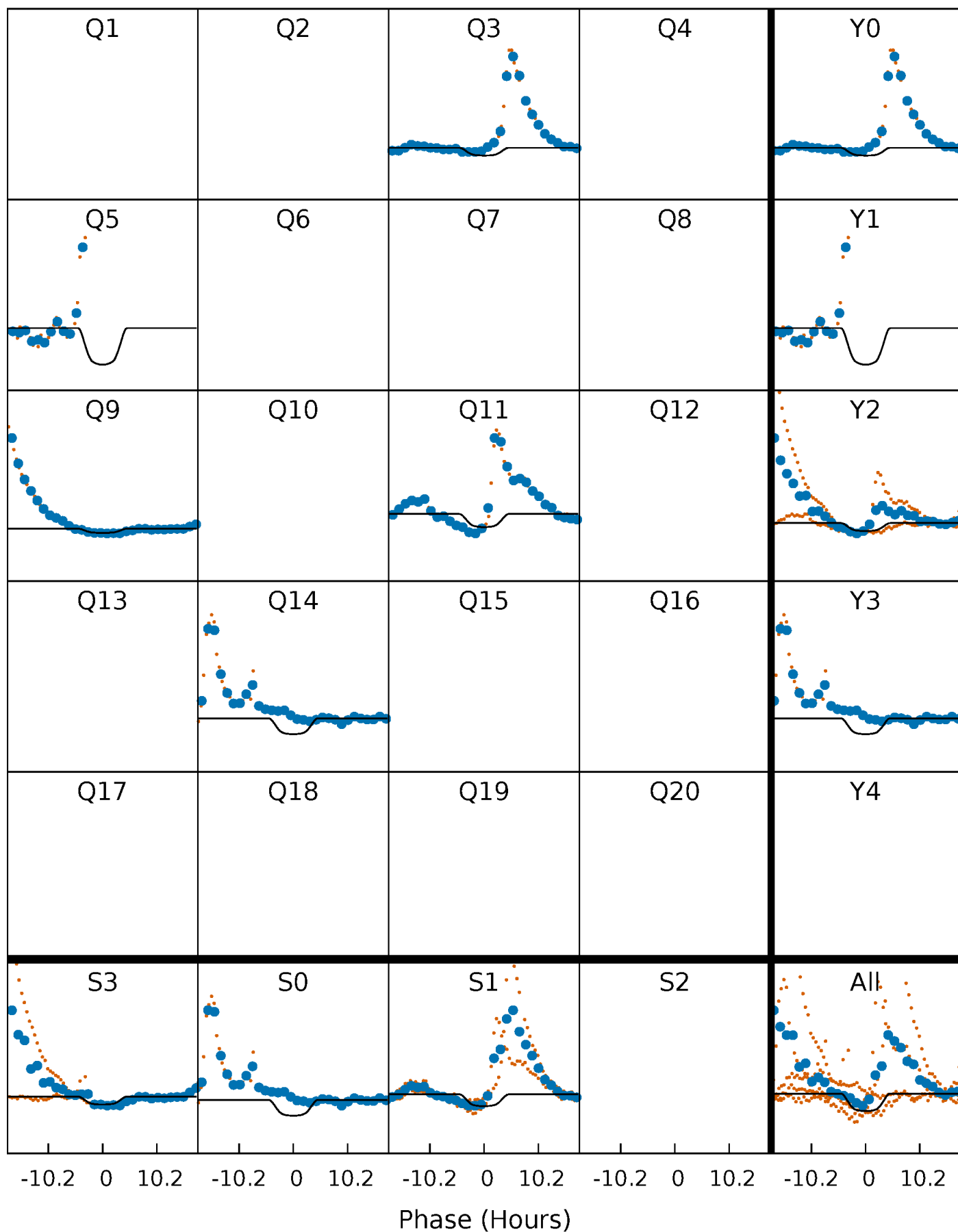
PDC Quarter-Phased Transit Curves

TCE 012109430-01 P=274.448424 Days $T_0=263.849659$ (BKJD)



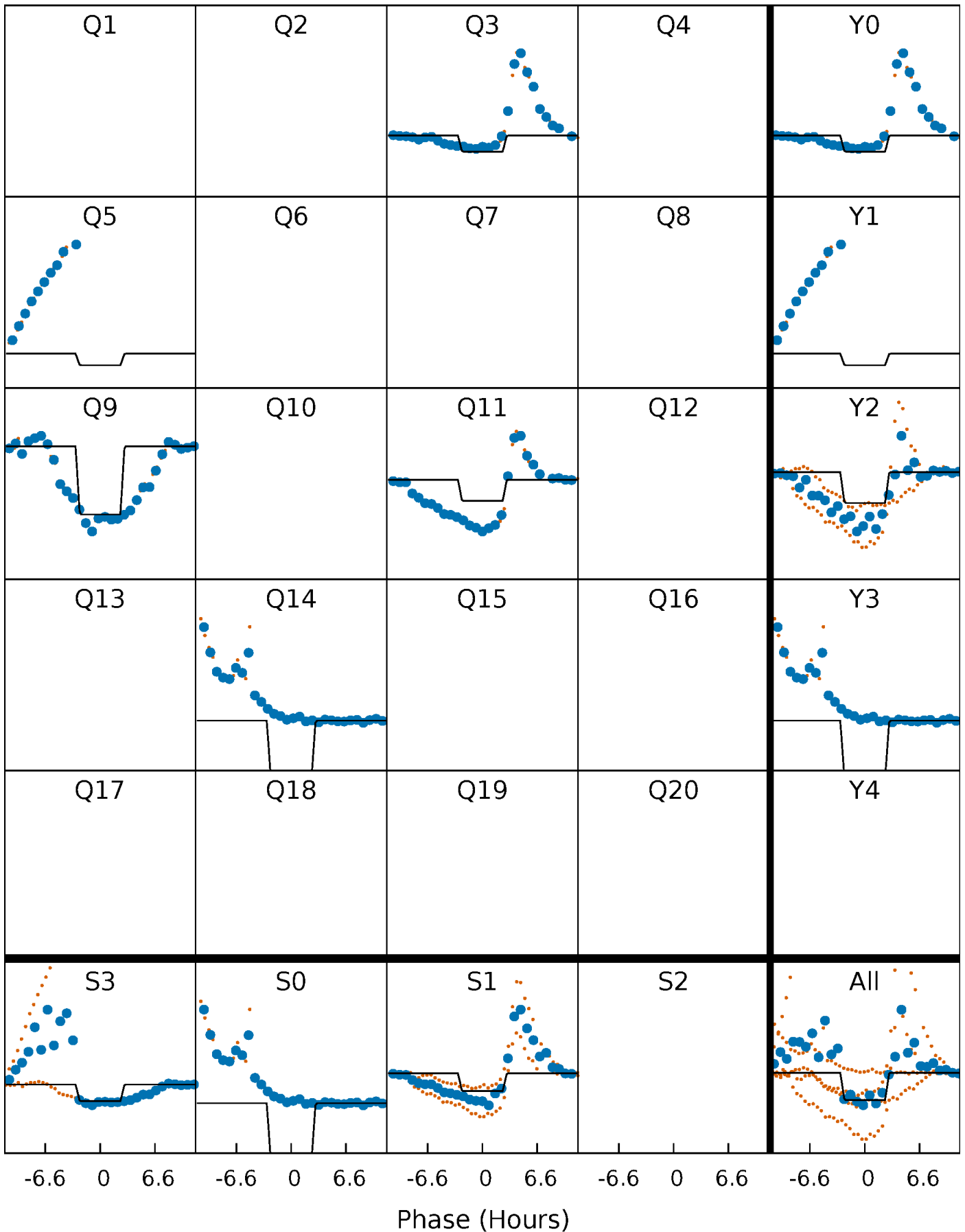
DV Quarter-Phased Transit Curves

TCE 012109430-01 $P=274.448424$ Days $T_0=263.849659$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

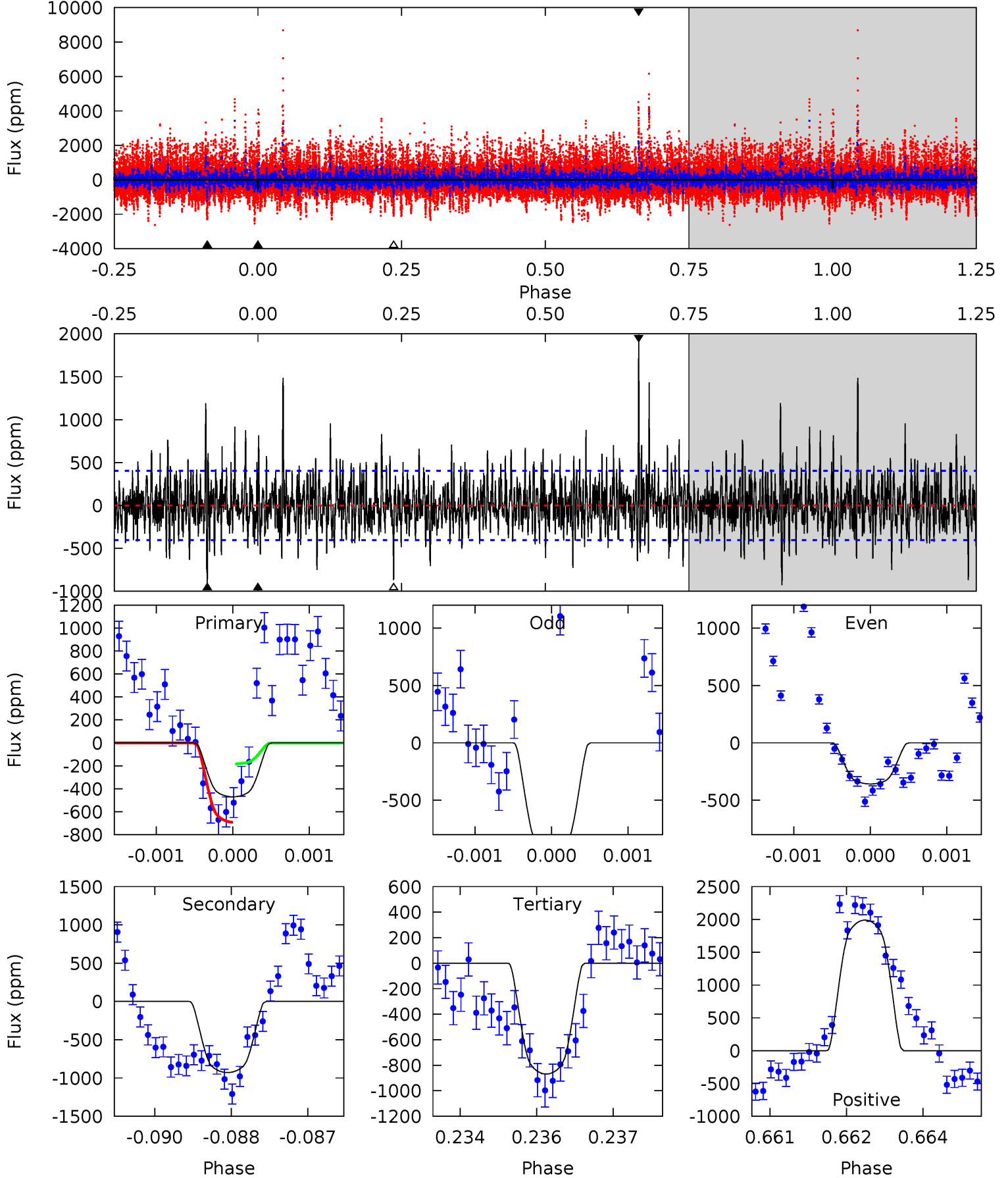
TCE 012109430-01 P=274.415900 Days $T_0=263.874113$ (BKJD)



DV Model-Shift Uniqueness Test

012109430-01, P = 274.448424 Days, E = 263.849659 Days

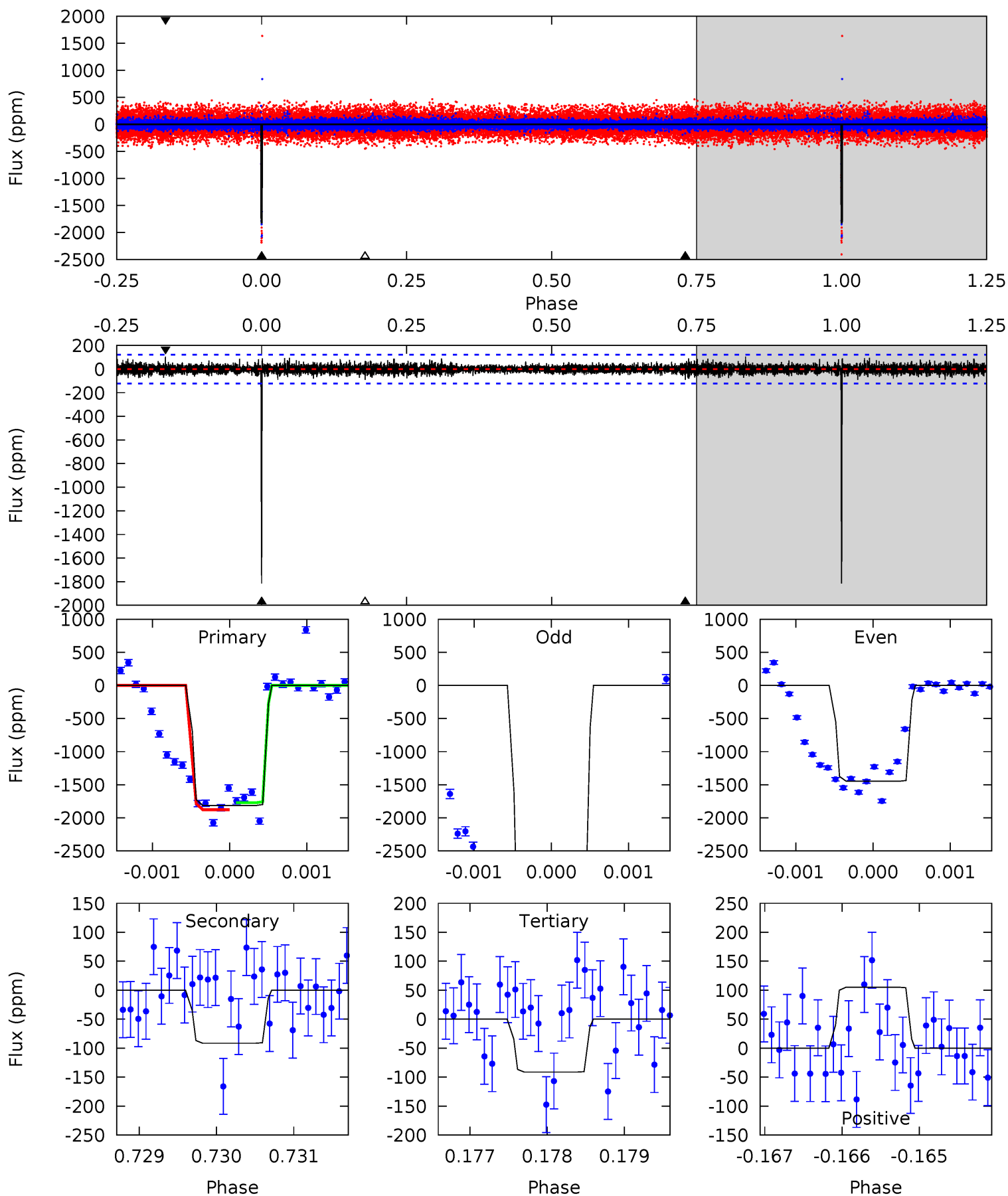
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.26	12.4	11.6	26.5	5.39	3.19	3.31	-5.31	-20.2	0.80	-14.1	2.56	4.86	0.68	3.40



Alt Model-Shift Uniqueness Test

012109430-01, P = 274.415900 Days, E = 263.874113 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
81.4	4.10	4.09	4.72	5.48	3.33	0.92	77.3	76.7	0.01	-0.62	65.2	1.12	0.05	2.28



Stellar Parameters For KIC 012109430

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (g \cdot \text{cm}^{-3})$
	4487^{+161}_{-161}	$4.614^{+0.046}_{-0.028}$	$-0.080^{+0.300}_{-0.300}$	$0.670^{+0.048}_{-0.058}$	$0.673^{+0.067}_{-0.061}$	$3.151^{+0.671}_{-0.381}$
	+4%/-4%	+1%/-1%	+375%/-375%	+7%/-9%	+10%/-9%	+21%/-12%
Source	PHO54	PHO54	PHO54	DSEP		

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

Secondary Eclipse Parameters for KIC 012109430-01 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-929 ± 75	$2.80^{+0.44}_{-0.45}$	265^{+10}_{-10}	4119^{+308}_{-254}	34723^{+14420}_{-9360}
Alt.	-91 ± 22	$3.19^{+0.45}_{-0.48}$	264^{+10}_{-10}	2758^{+157}_{-146}	2567^{+1176}_{-801}

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 $A_{obs} \gg 1.0$

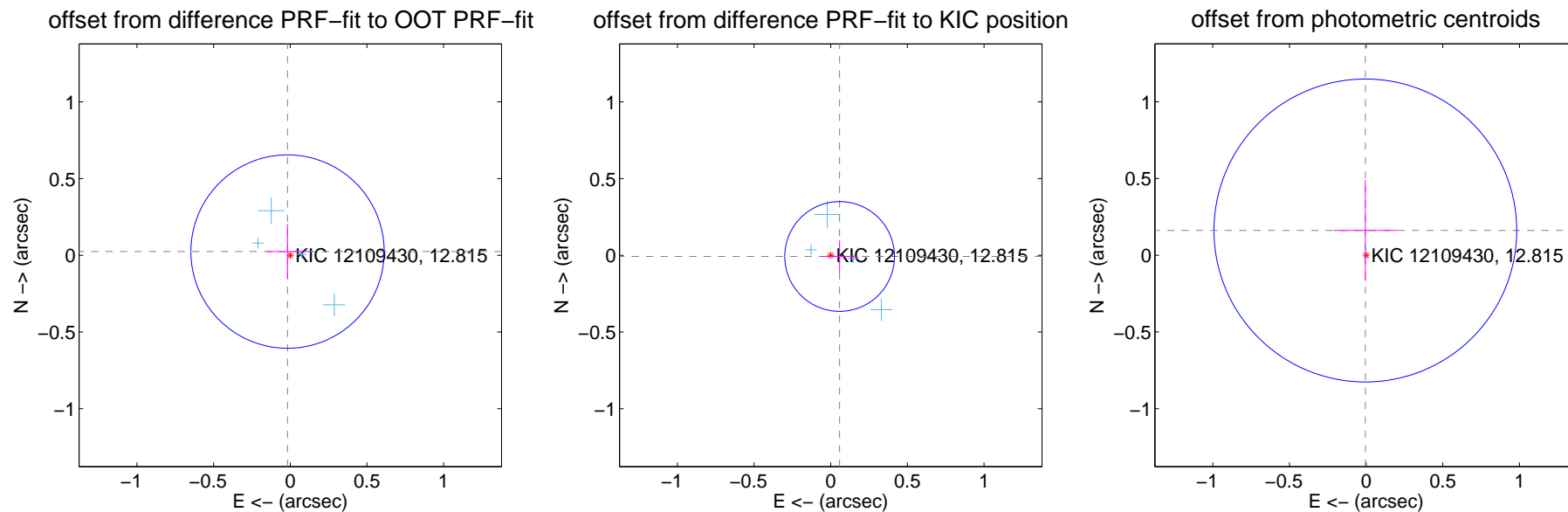
DV Centroid Data

Supplemental centroid analysis for 012109430-01. Kepler magnitude: 12.81. Transit SNR 4.85

There are 4 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	0.030 ± 0.210	0.14	0.018 ± 0.137	0.024 ± 0.177
PRF-fit source offset from KIC position	0.059 ± 0.119	0.49	-0.058 ± 0.120	-0.008 ± 0.104
photometric centroid source offset	0.16 ± 0.33	0.49	0.01 ± 0.21	0.16 ± 0.33



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



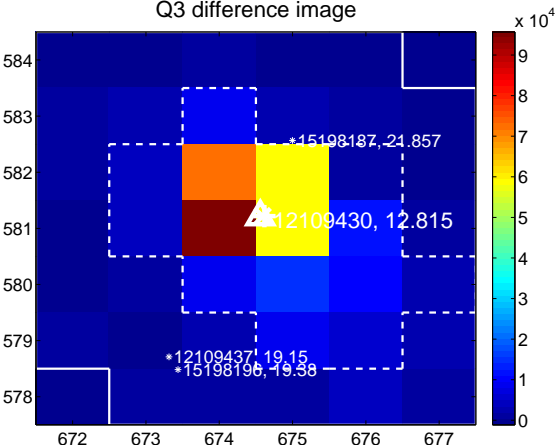
Q2 no difference image



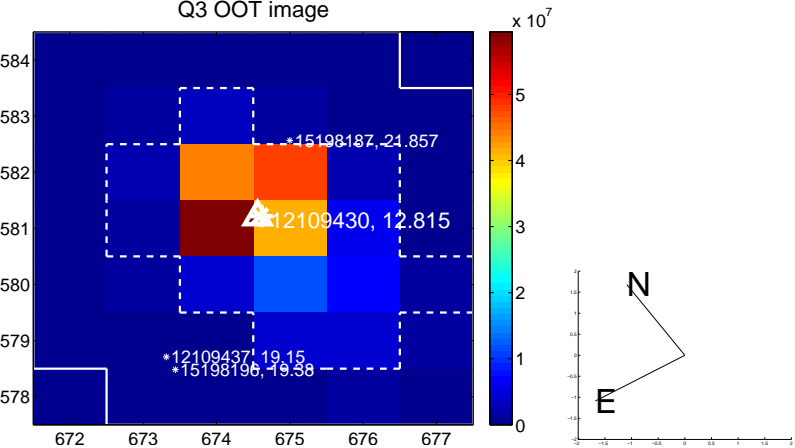
Q2 no OOT image



Q3 difference image



Q3 OOT image



Q4 no difference image



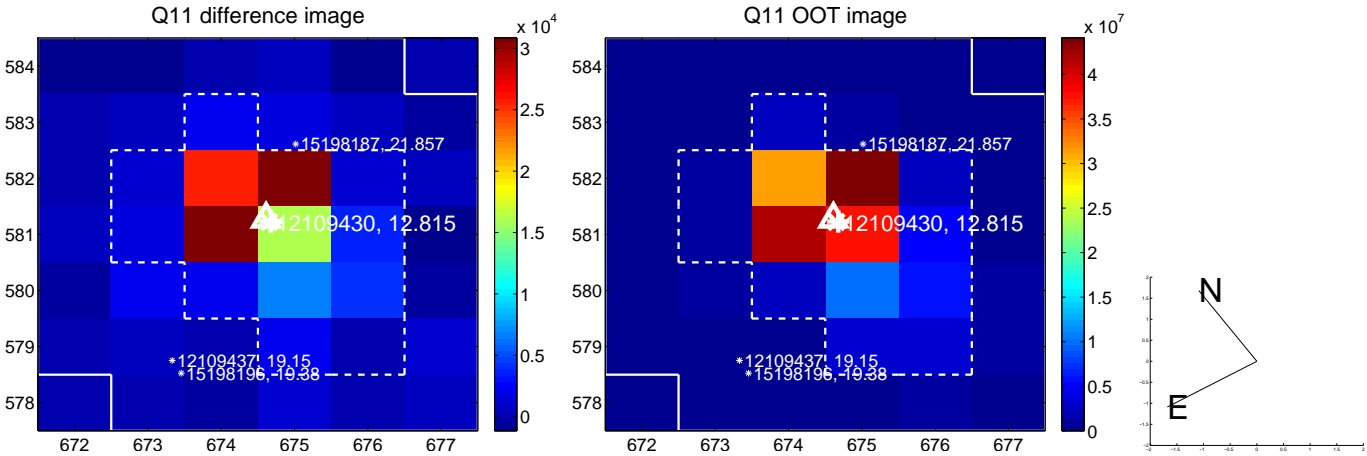
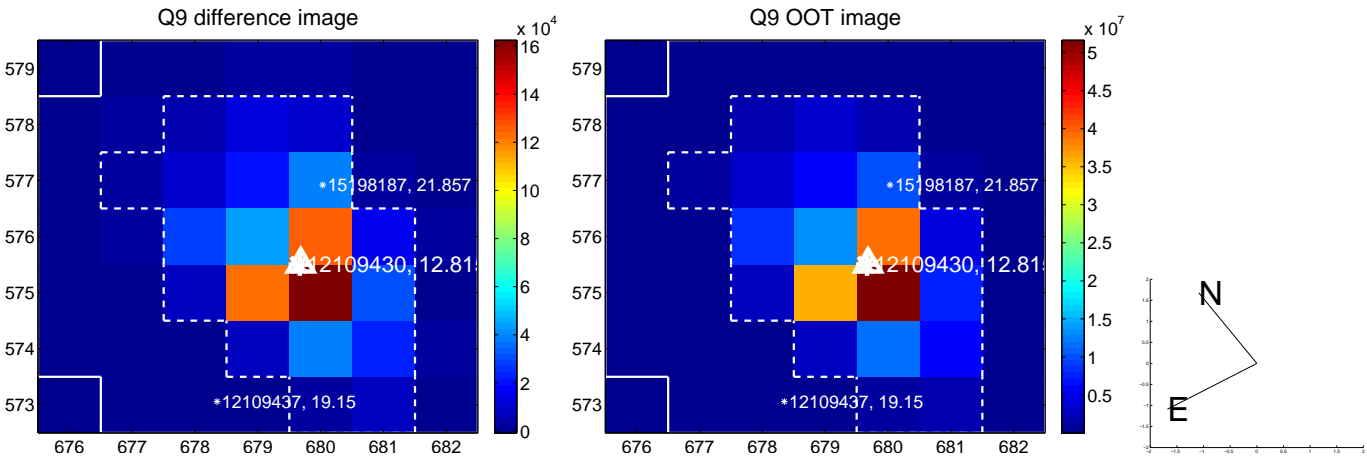
Q4 no OOT image



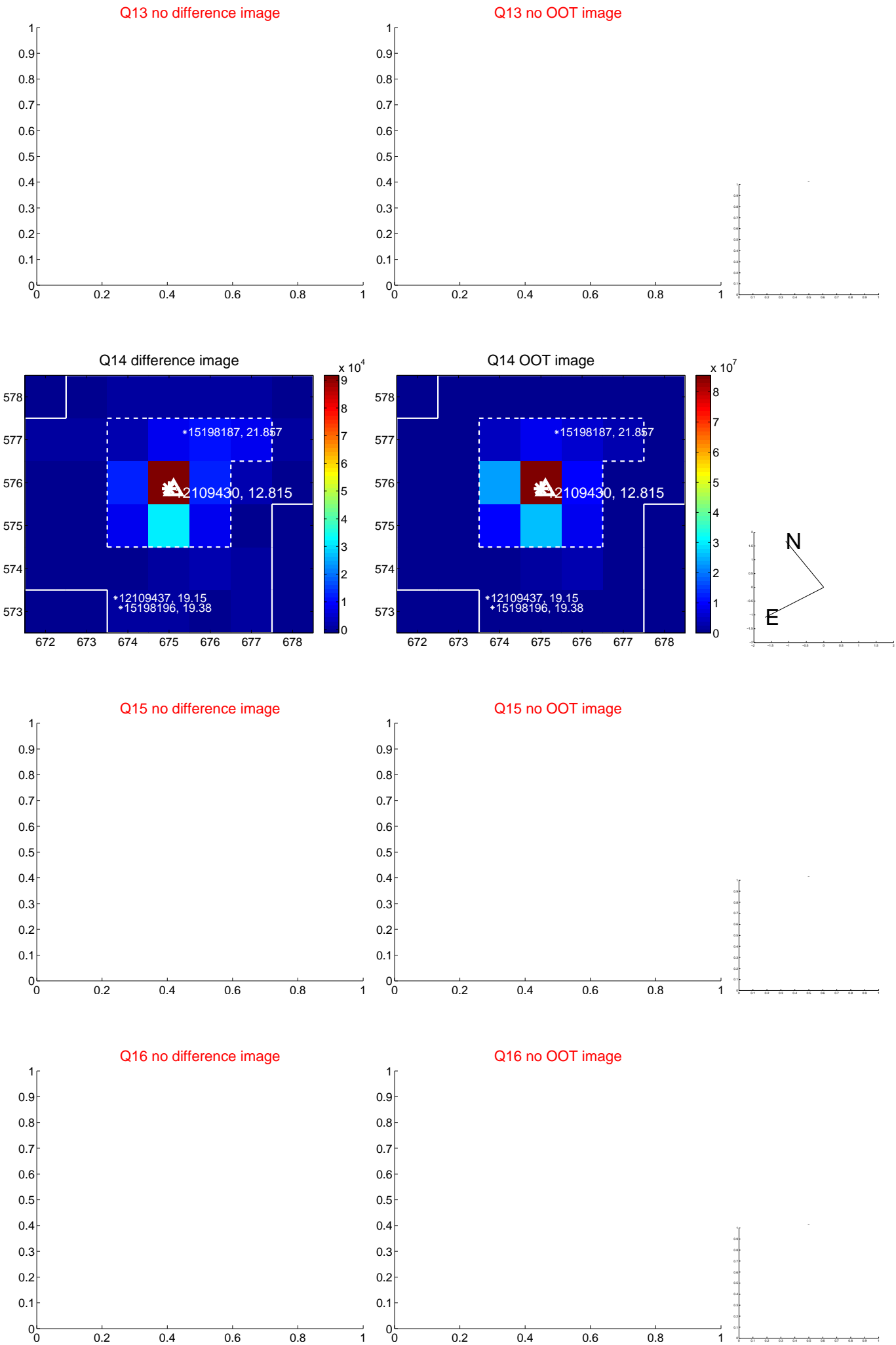
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



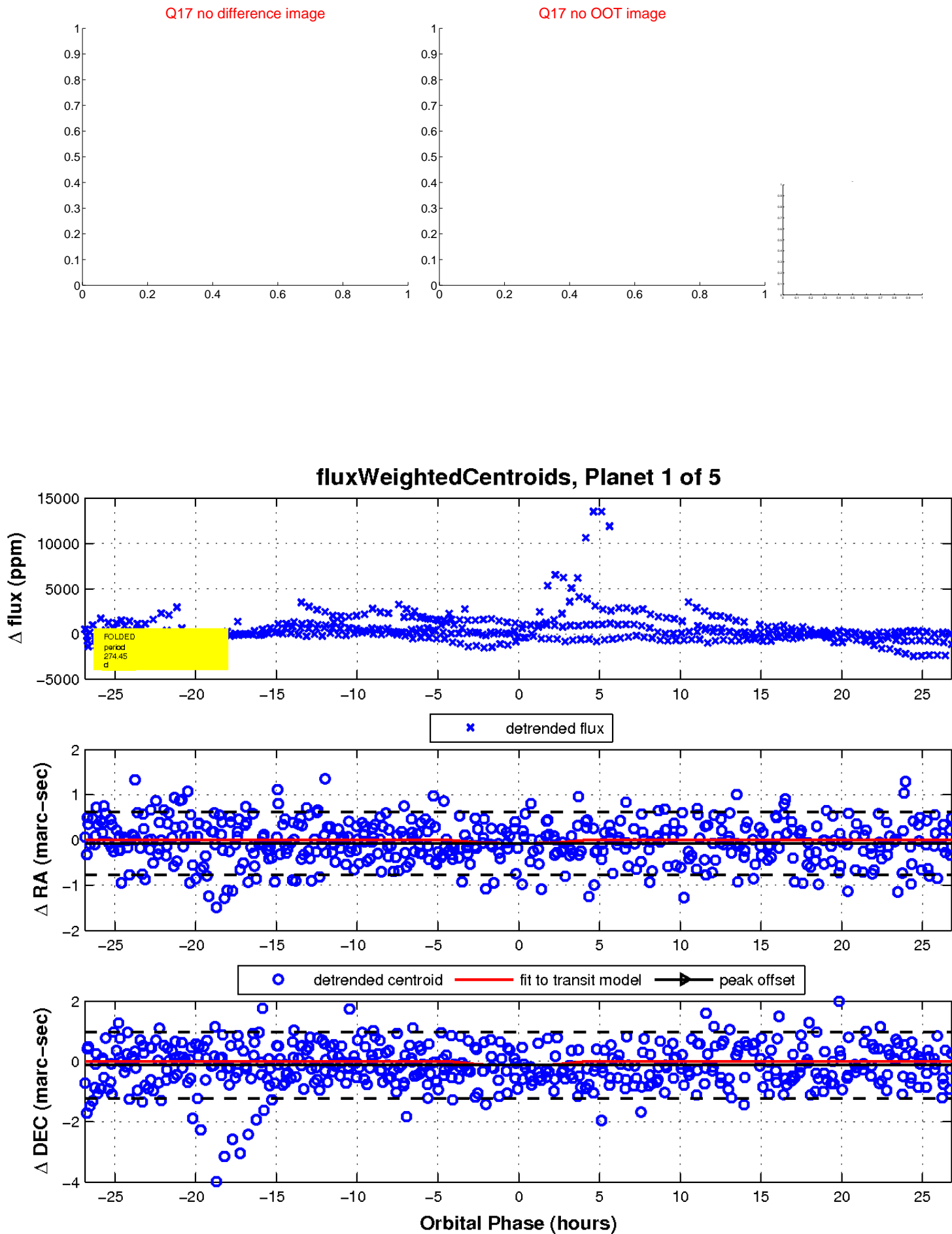
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

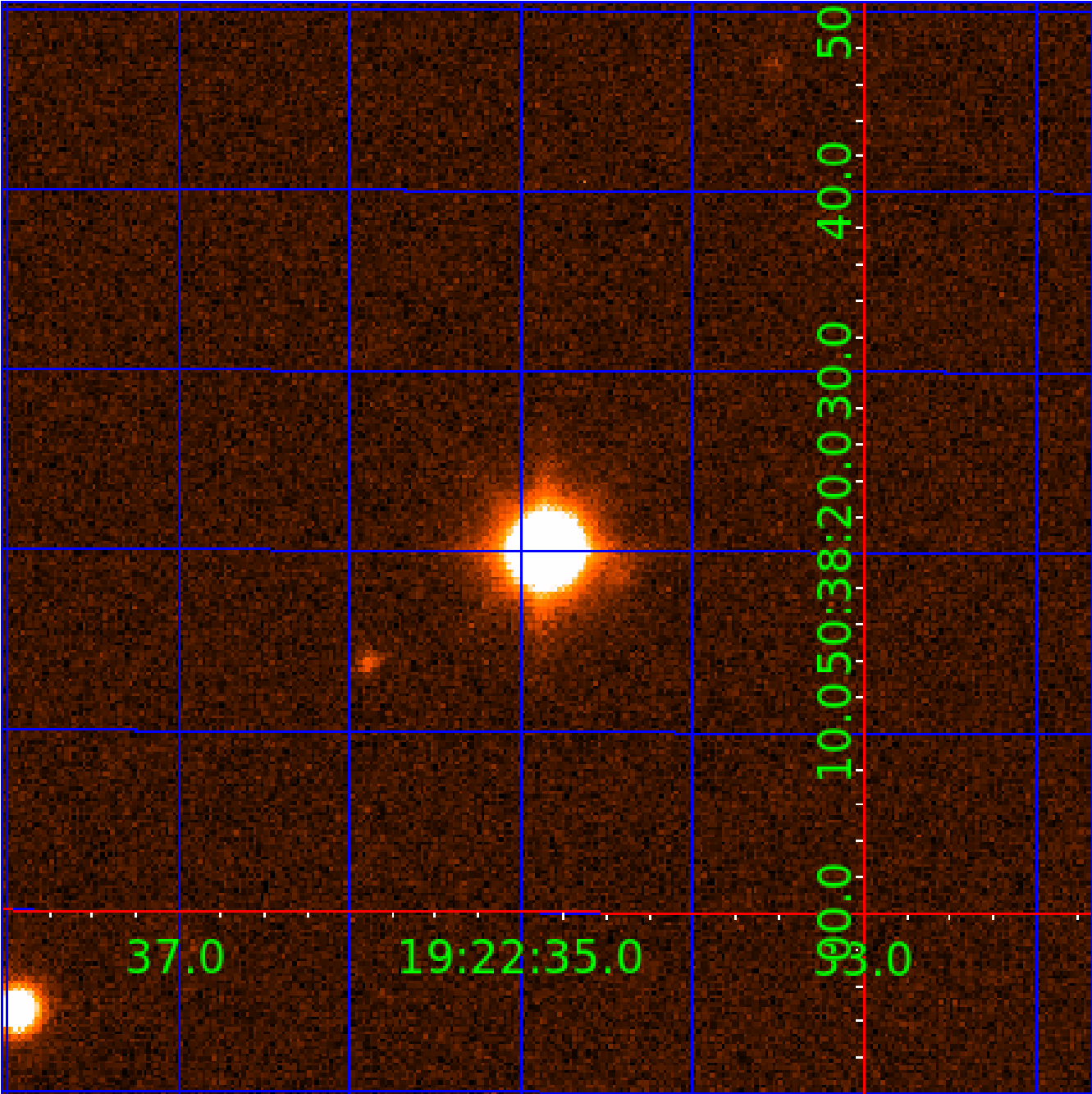


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 012109430

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})
012109430-01	OBS	No	274.448424	263.849659	1015.3	8.966	22.0	4.9	0.67	4487	2.81	0.31
012109430-03	OBS	No	456.134569	328.212647	1541.6	23.630	17.5	5.4	0.67	4487	2.52	0.16
012109430-04	OBS	No	568.232494	375.750896	2885.1	7.239	18.0	11.4	0.67	4487	4.72	0.12
012109430-05	OBS	No	322.169953	356.093757	1459.5	5.222	16.0	8.0	0.67	4487	3.58	0.25

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
012109430-01	OBS	FP	0.00	1	0	0	0	LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
012109430-03	OBS	FP	0.00	1	0	0	0	LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
012109430-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
012109430-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—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.

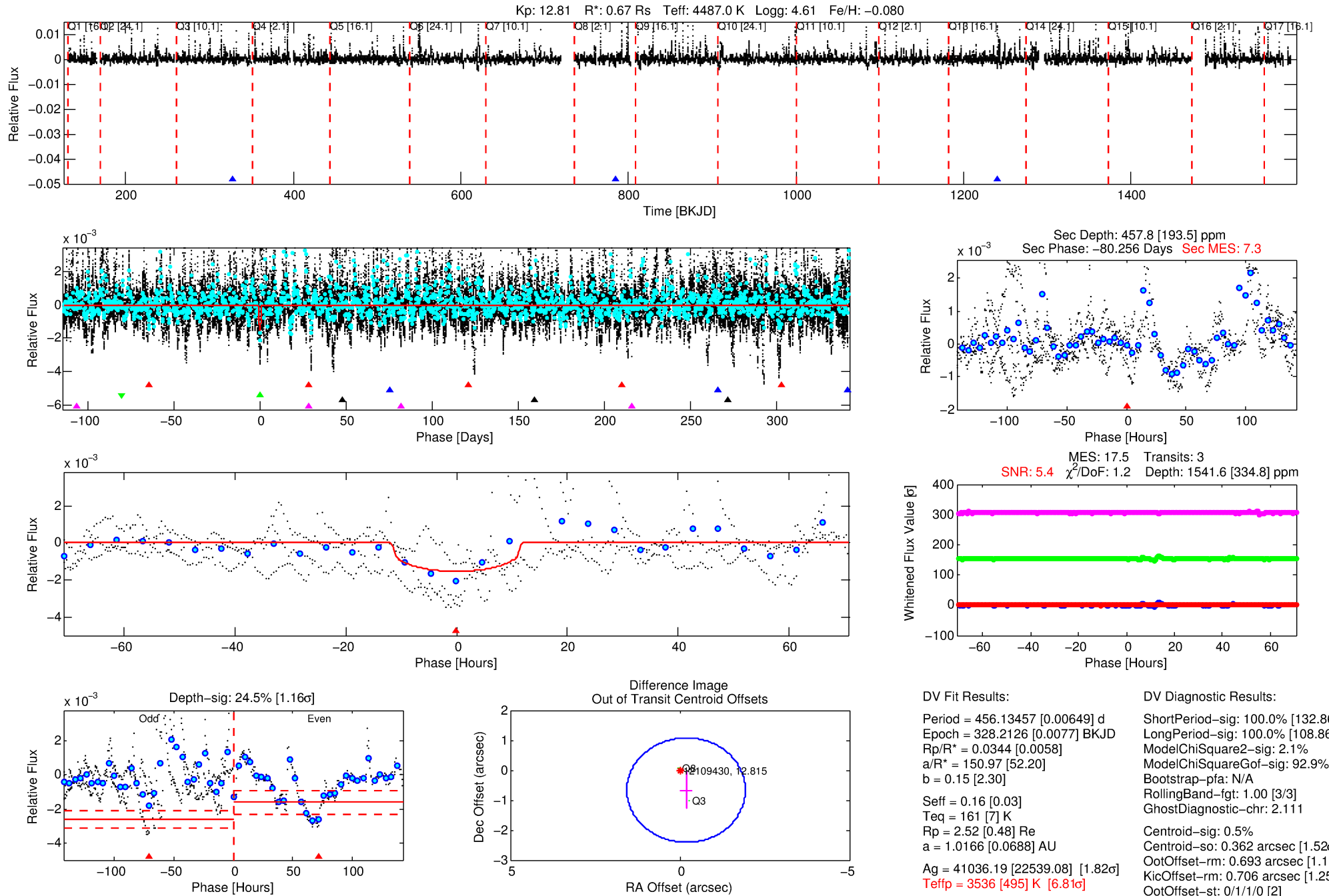
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 012109430-03

No Significant Match Found

DV One-Page Summary

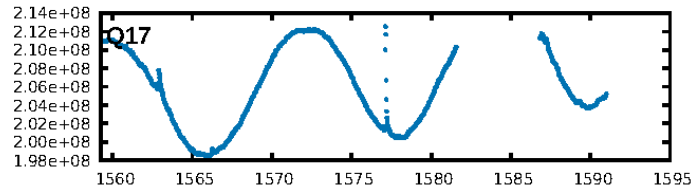
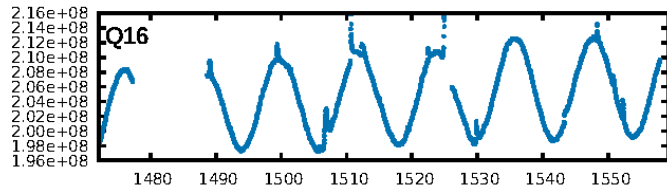
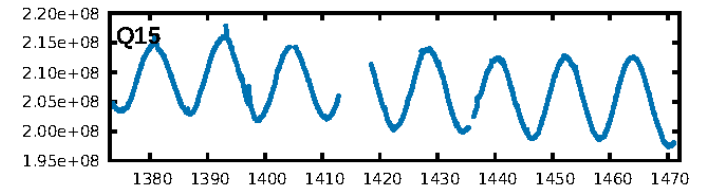
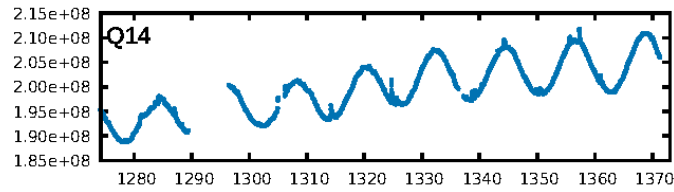
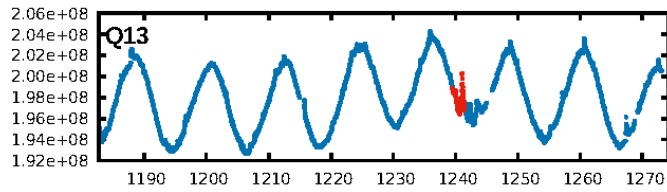
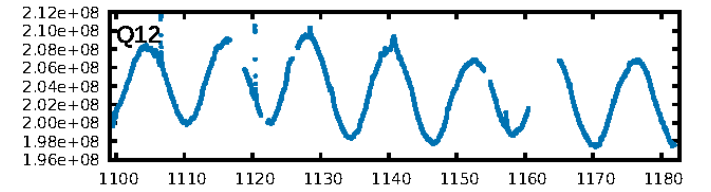
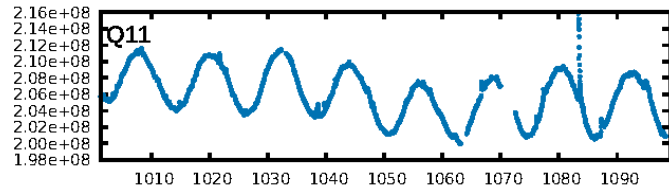
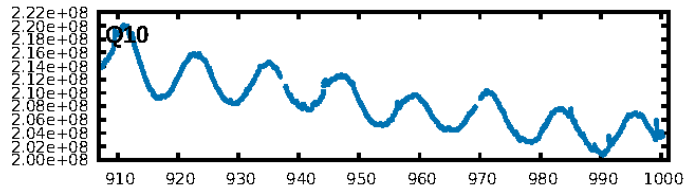
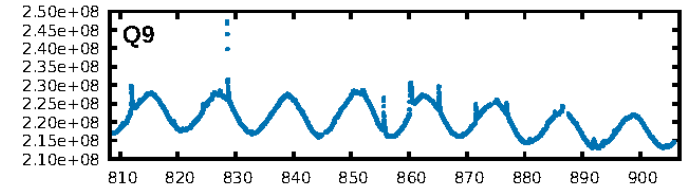
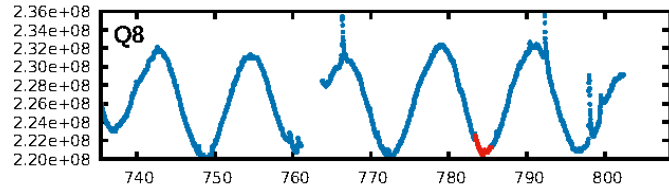
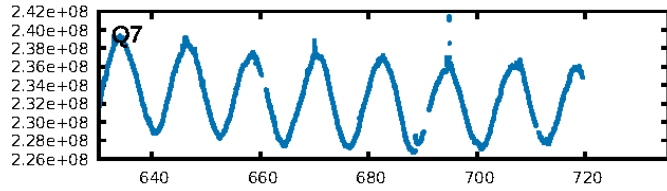
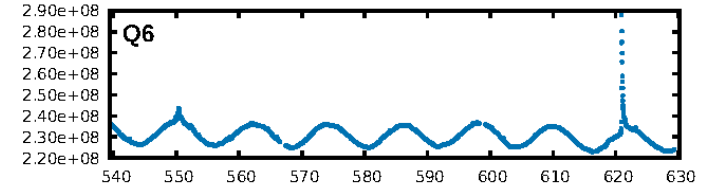
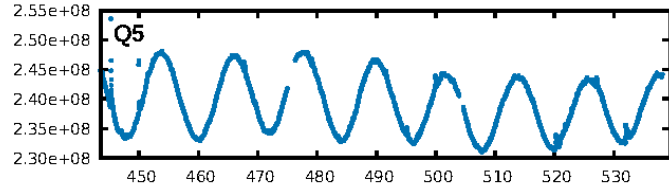
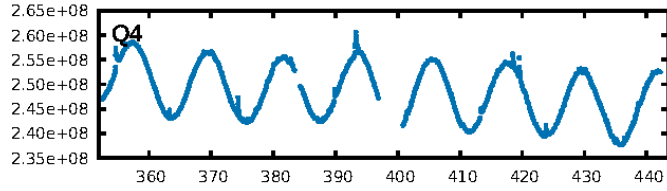
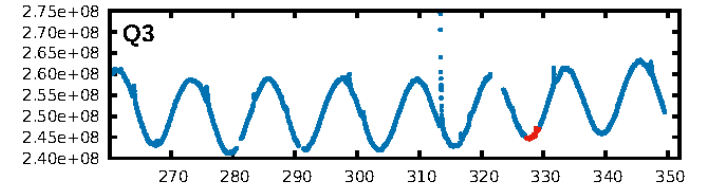
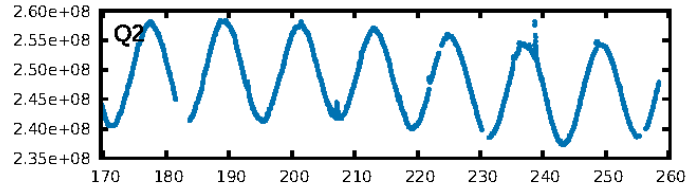
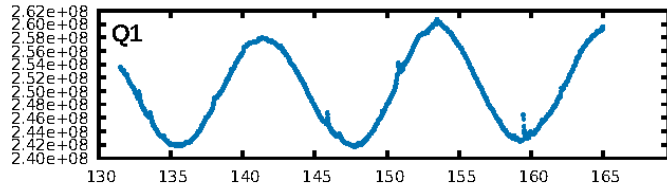
KIC: 12109430 Candidate: 3 of 5 Period: 456.135 d



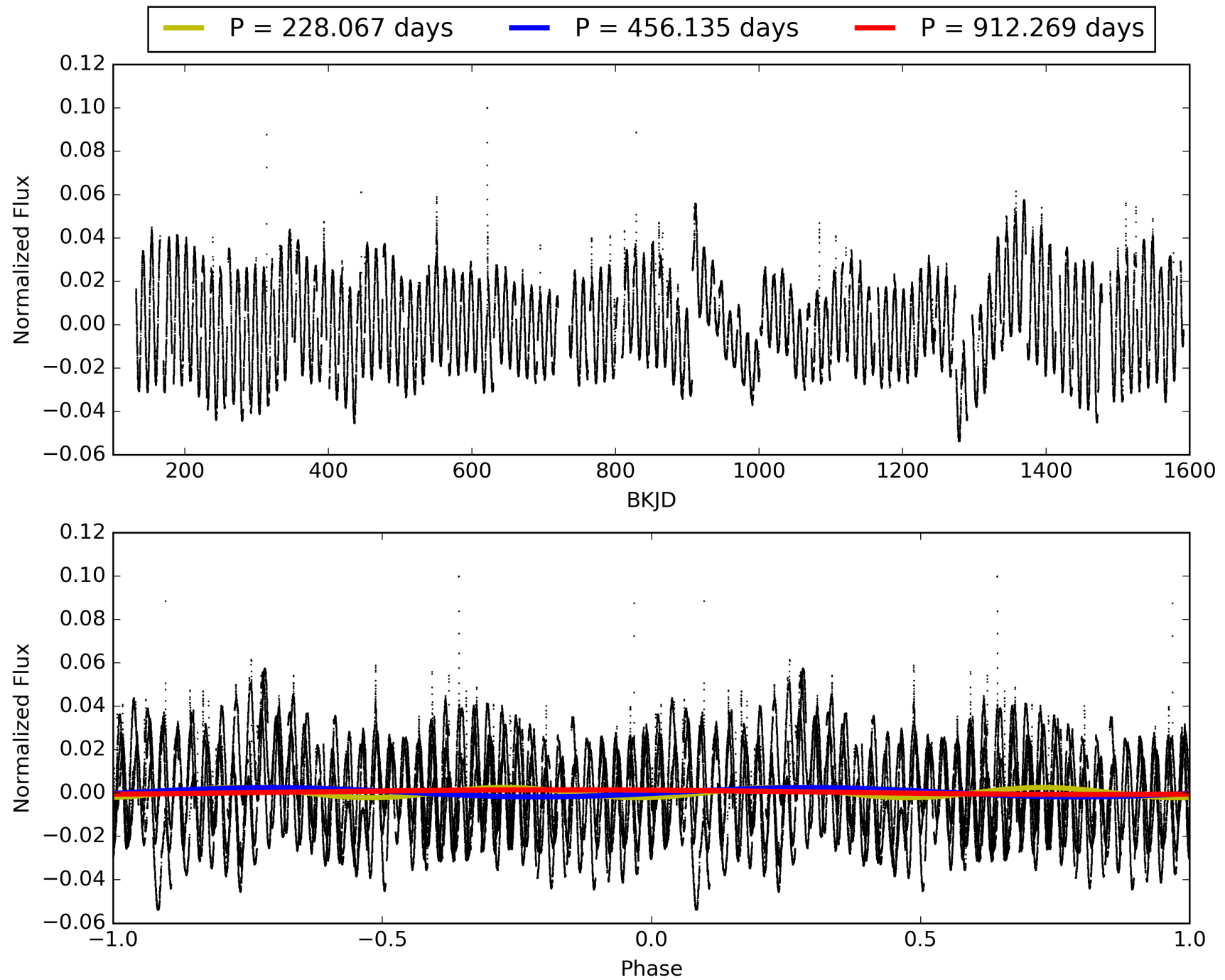
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 05:45:37 Z

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

TCE 012109430-03, PDC Light Curves

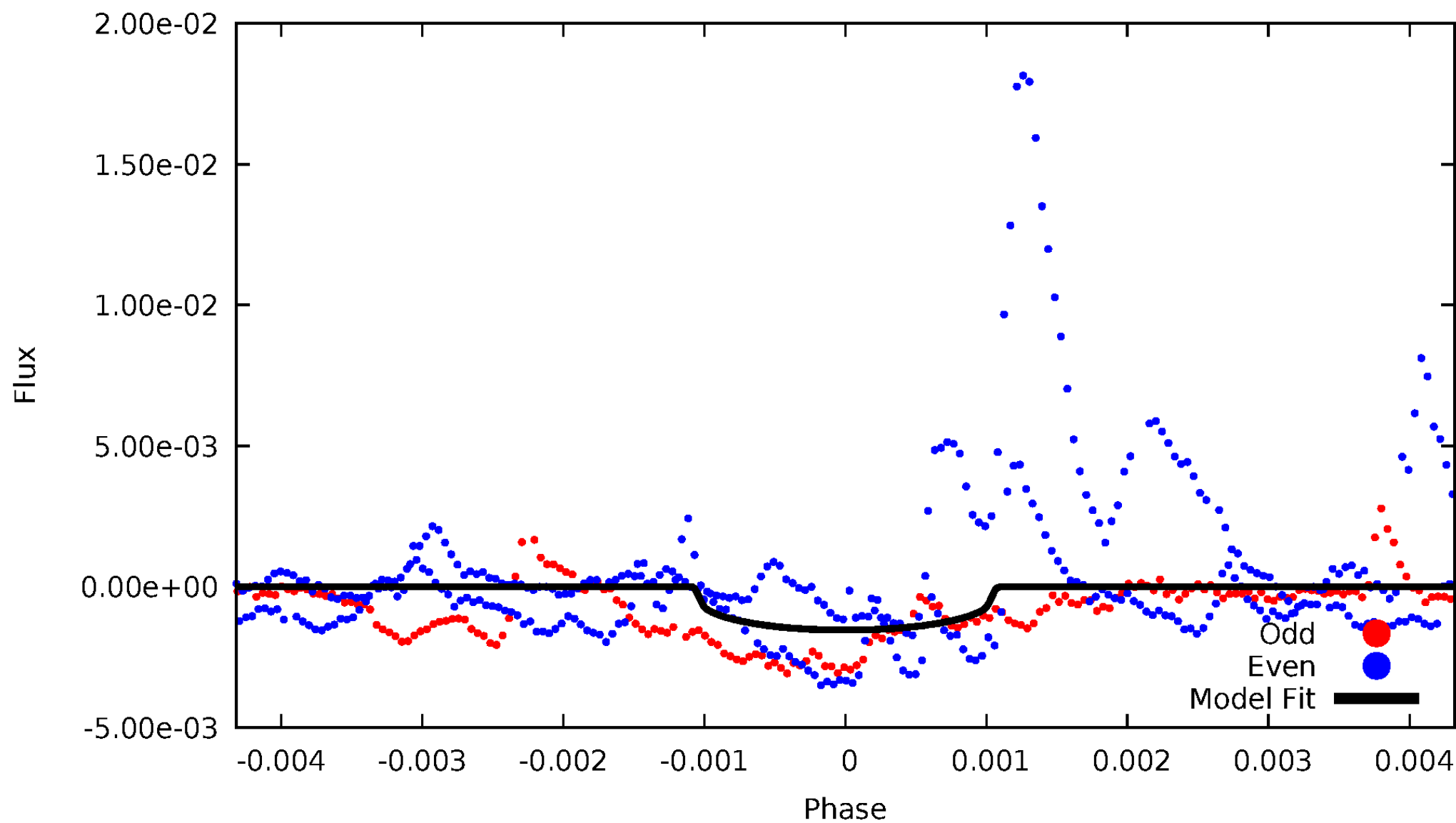


TCE 012109430-03



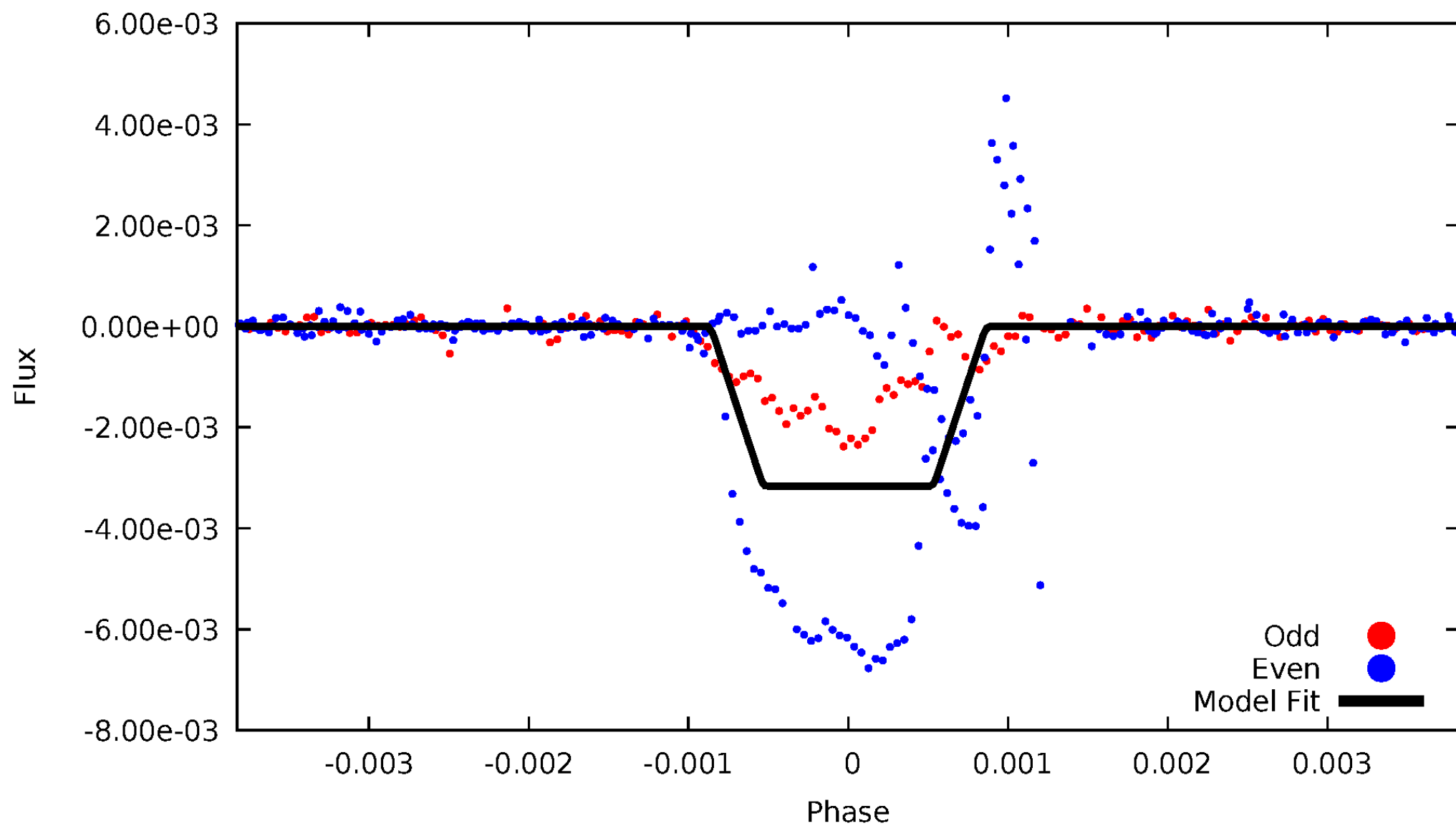
DV Odd/Even

TCE 012109430-03



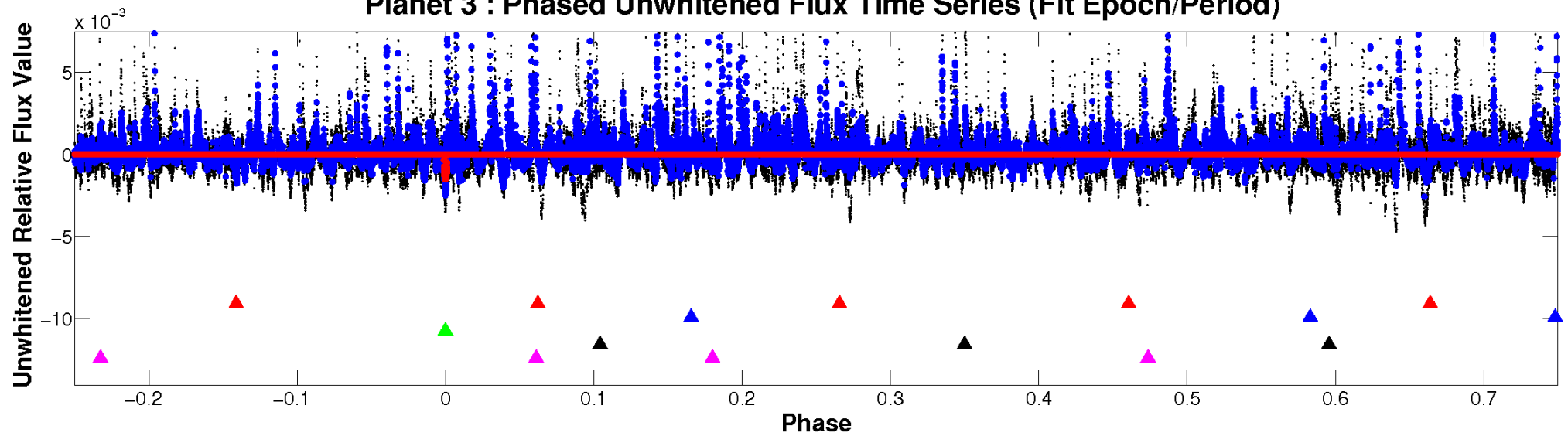
ALT Odd/Even

TCE 012109430-03

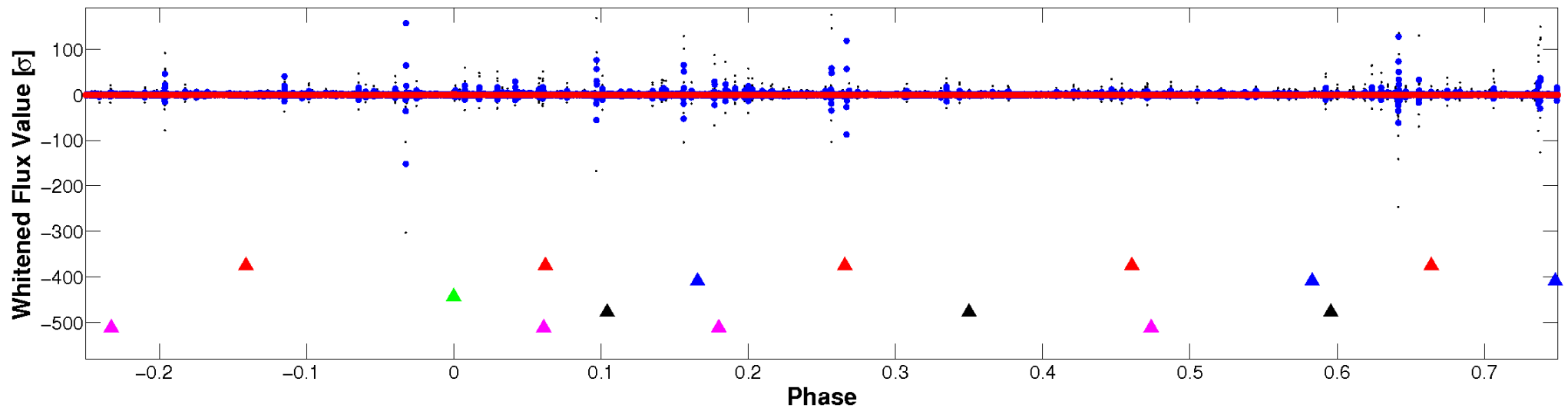


Non-Whitened Vs. Whitened Light Curve

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

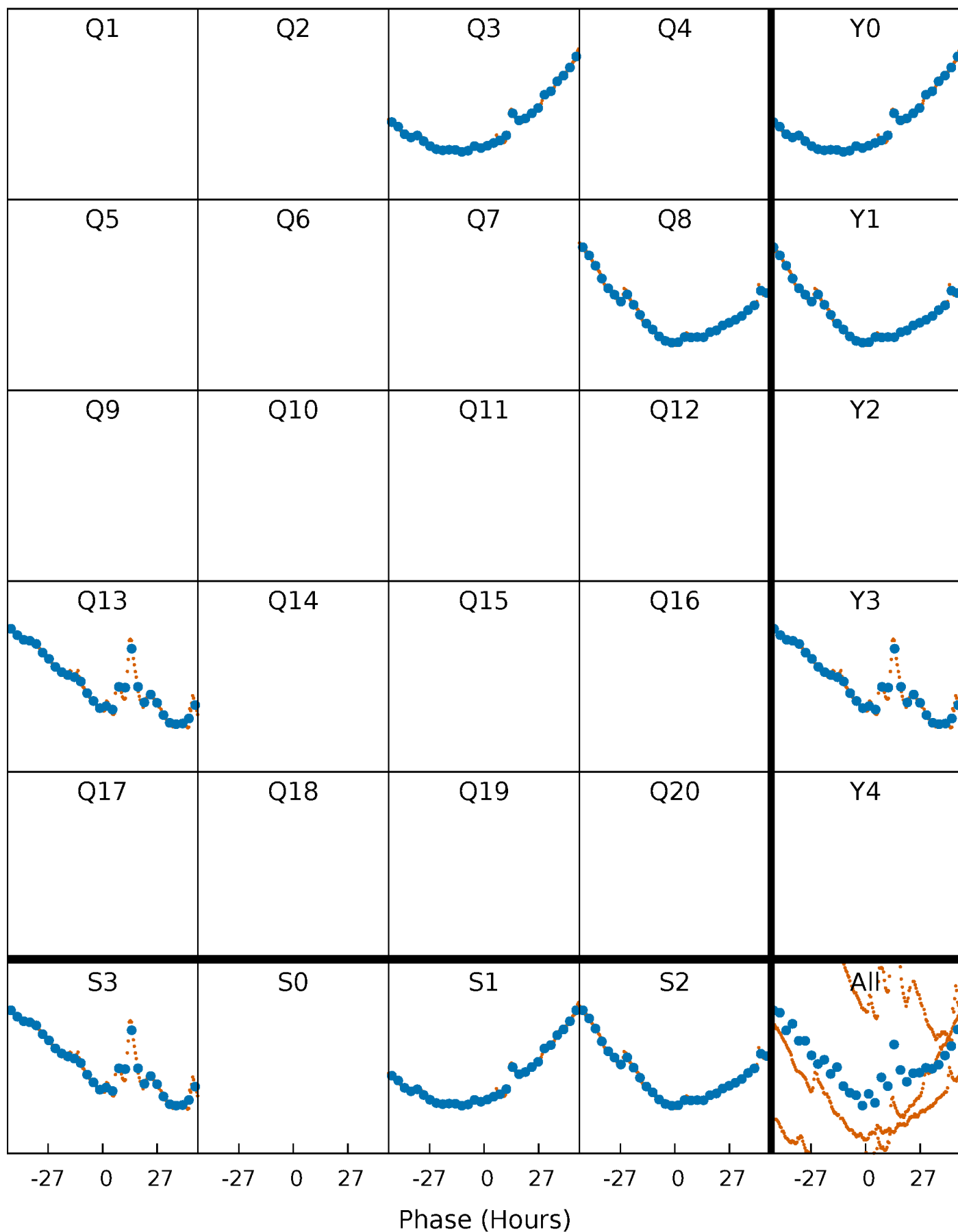


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



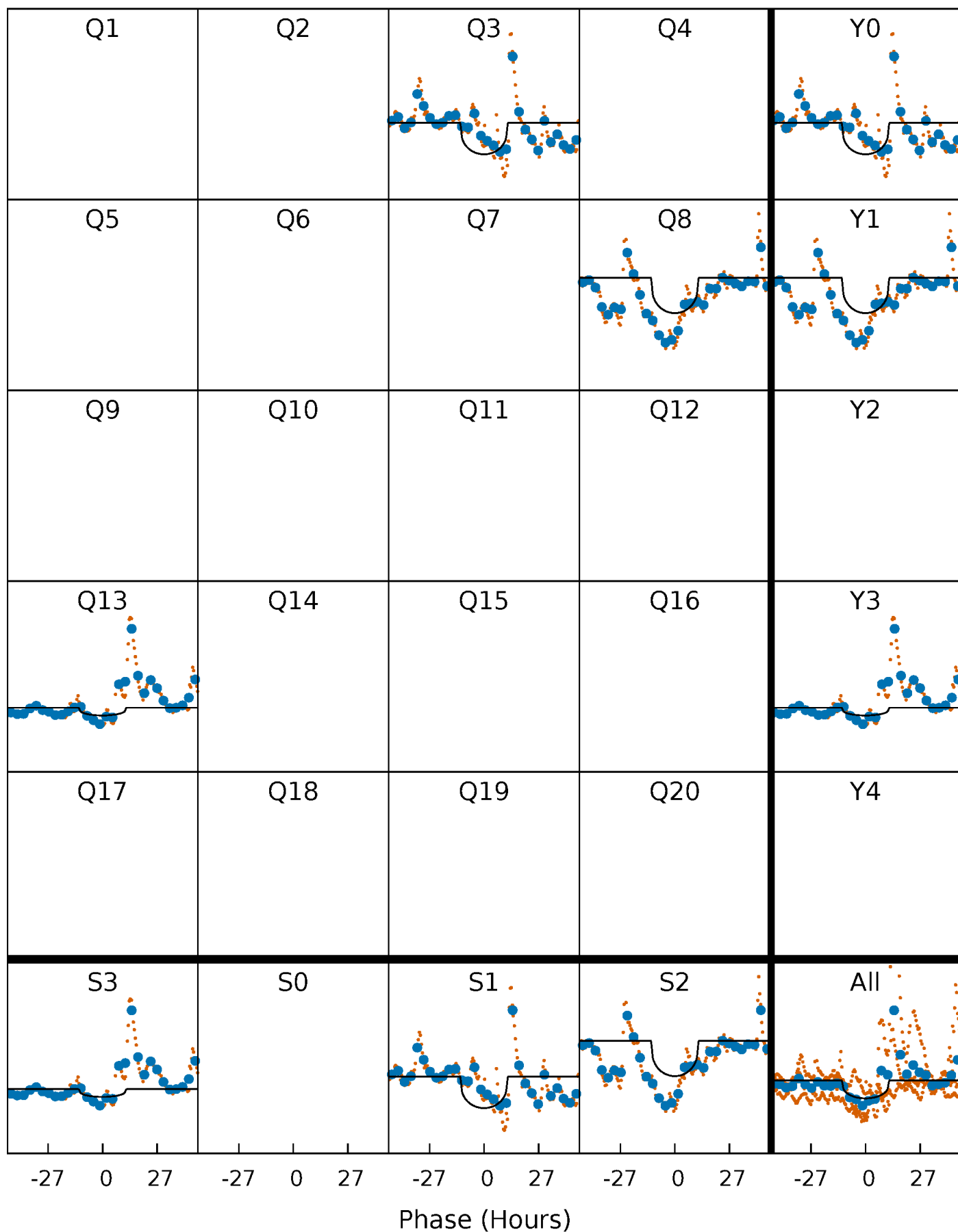
PDC Quarter-Phased Transit Curves

TCE 012109430-03 $P=456.134569$ Days $T_0=328.212647$ (BKJD)



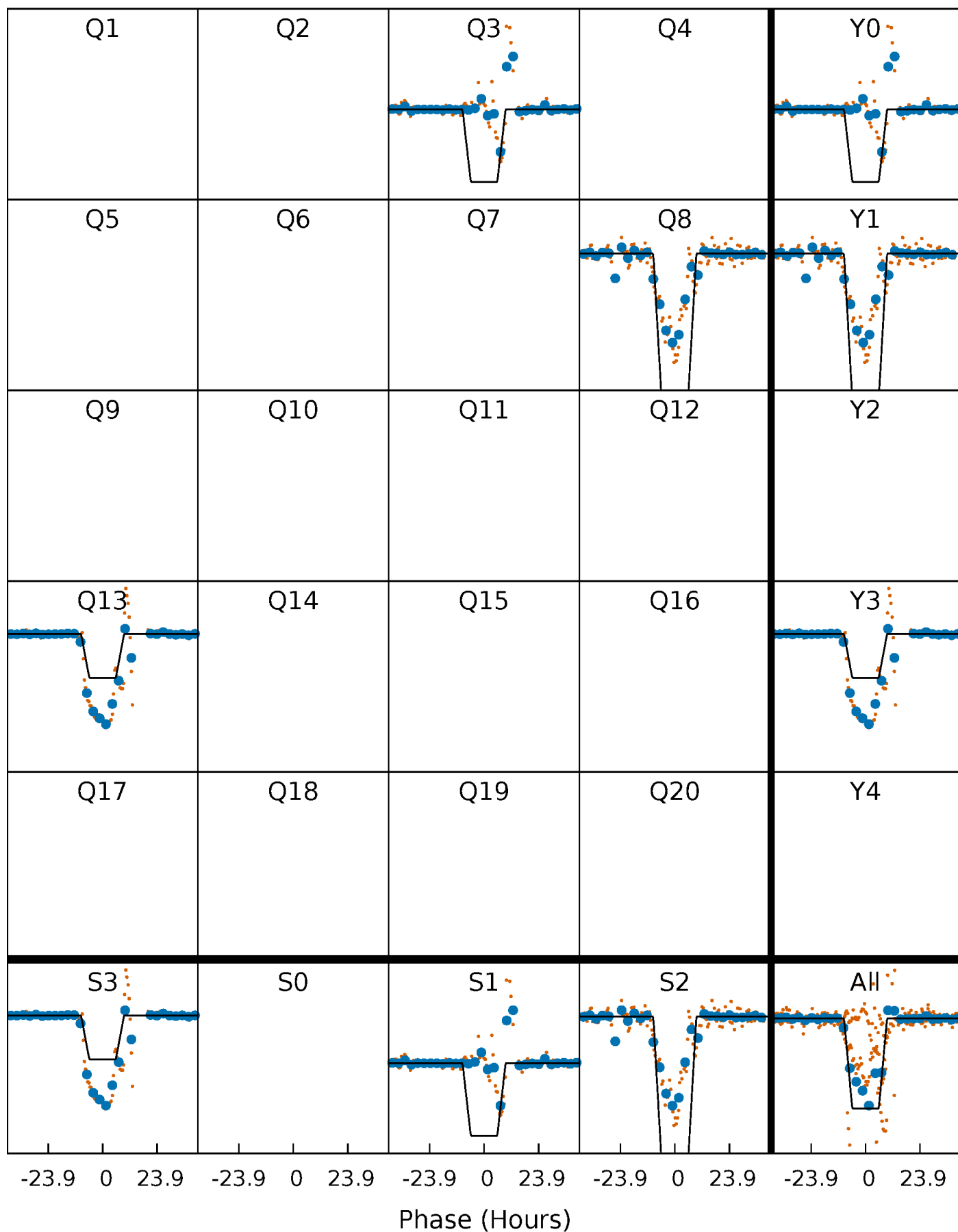
DV Quarter-Phased Transit Curves

TCE 012109430-03 $P=456.134569$ Days $T_0=328.212647$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

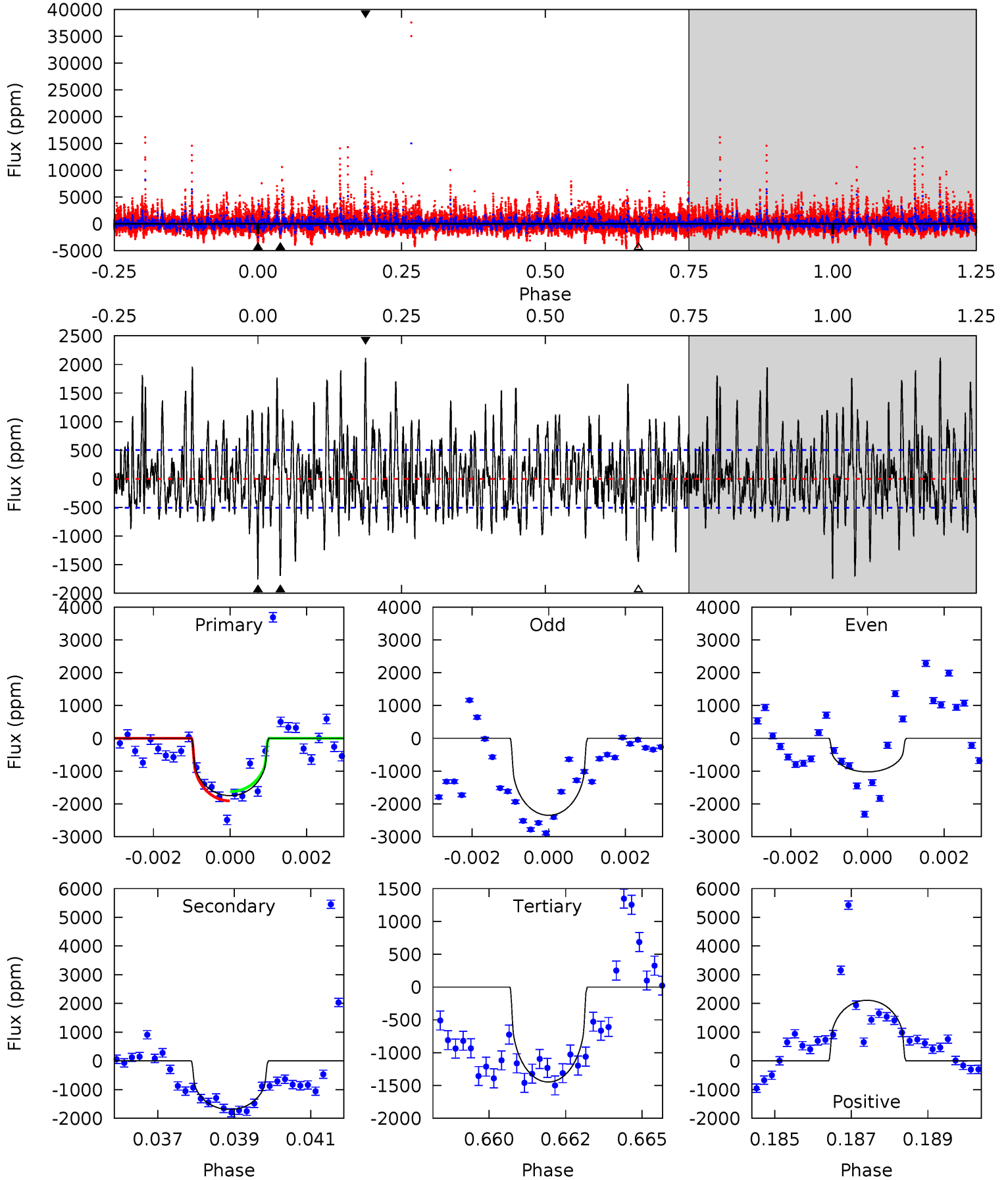
TCE 012109430-03 P=456.008947 Days $T_0=328.327065$ (BKJD)



DV Model-Shift Uniqueness Test

012109430-03, P = 456.134569 Days, E = 328.212647 Days

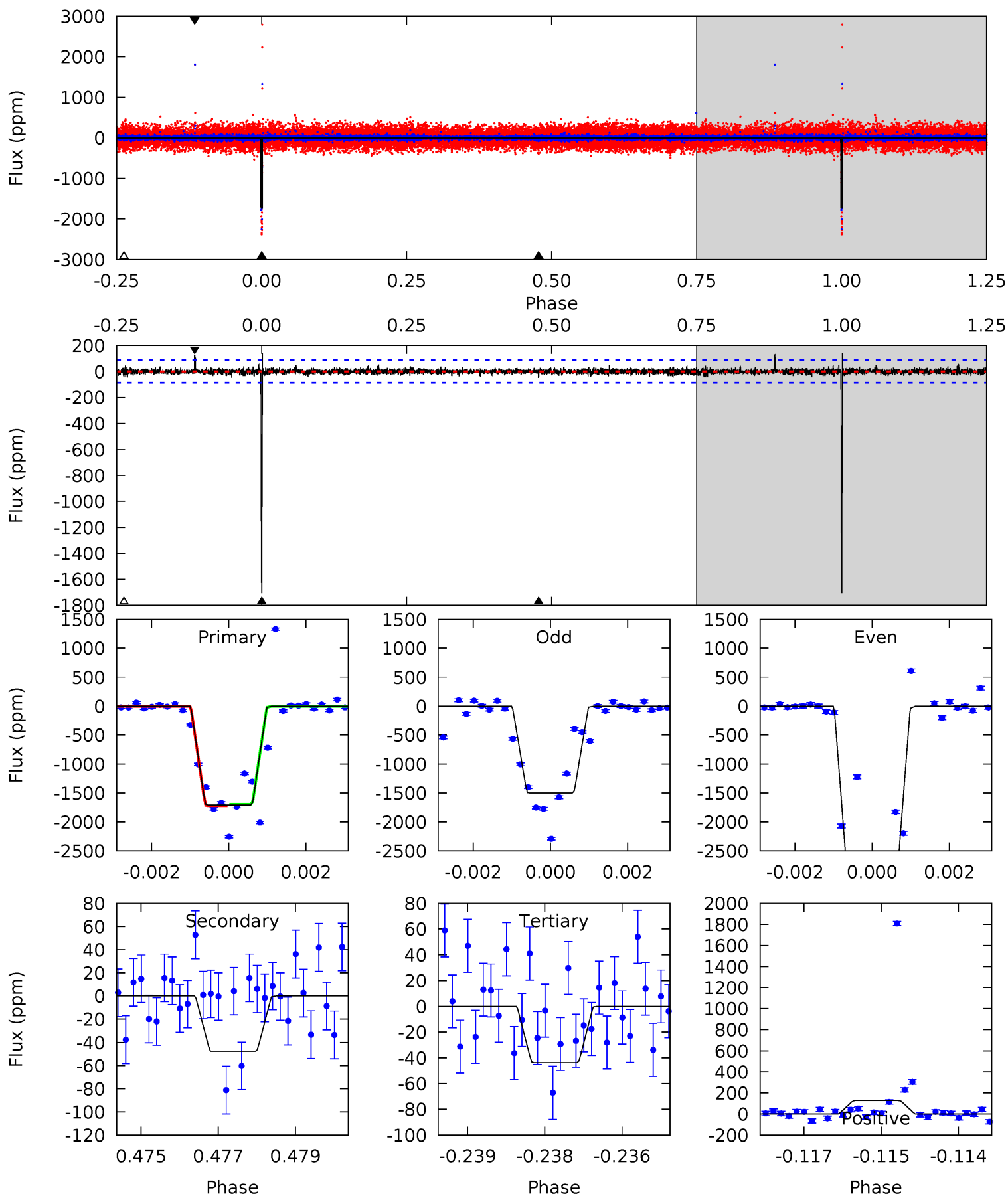
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
18.4	17.8	15.2	22.2	5.31	3.07	5.50	3.16	-3.82	2.58	-4.40	3.85	1.20	0.55	1.49



Alt Model-Shift Uniqueness Test

012109430-03, P = 456.008947 Days, E = 328.327065 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
105.3	2.95	2.69	7.86	5.35	3.13	0.64	102.6	97.4	0.25	-4.91	51.1	1.66	0.08	0



Stellar Parameters For KIC 012109430

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} \text{ (g}\cdot\text{cm}^{-3})$
	4487^{+161}_{-161}	$4.614^{+0.046}_{-0.028}$	$-0.080^{+0.300}_{-0.300}$	$0.670^{+0.048}_{-0.058}$	$0.673^{+0.067}_{-0.061}$	$3.151^{+0.671}_{-0.381}$
	+4%/-4%	+1%/-1%	+375%/-375%	+7%/-9%	+10%/-9%	+21%/-12%
Source	PHO54	PHO54	PHO54	DSEP		

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

Secondary Eclipse Parameters for KIC 012109430-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} \text{ (K)}$	$T_{obs} \text{ (K)}$	A_{obs}
DV	-1693 ± 95	$2.52^{+0.44}_{-0.44}$	224^{+9}_{-9}	4791^{+471}_{-333}	152412^{+70113}_{-41589}
Alt.	-48 ± 16	$4.08^{+0.45}_{-0.45}$	224^{+9}_{-9}	2395^{+123}_{-139}	1635^{+781}_{-635}

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 $A_{obs} \gg 1.0$

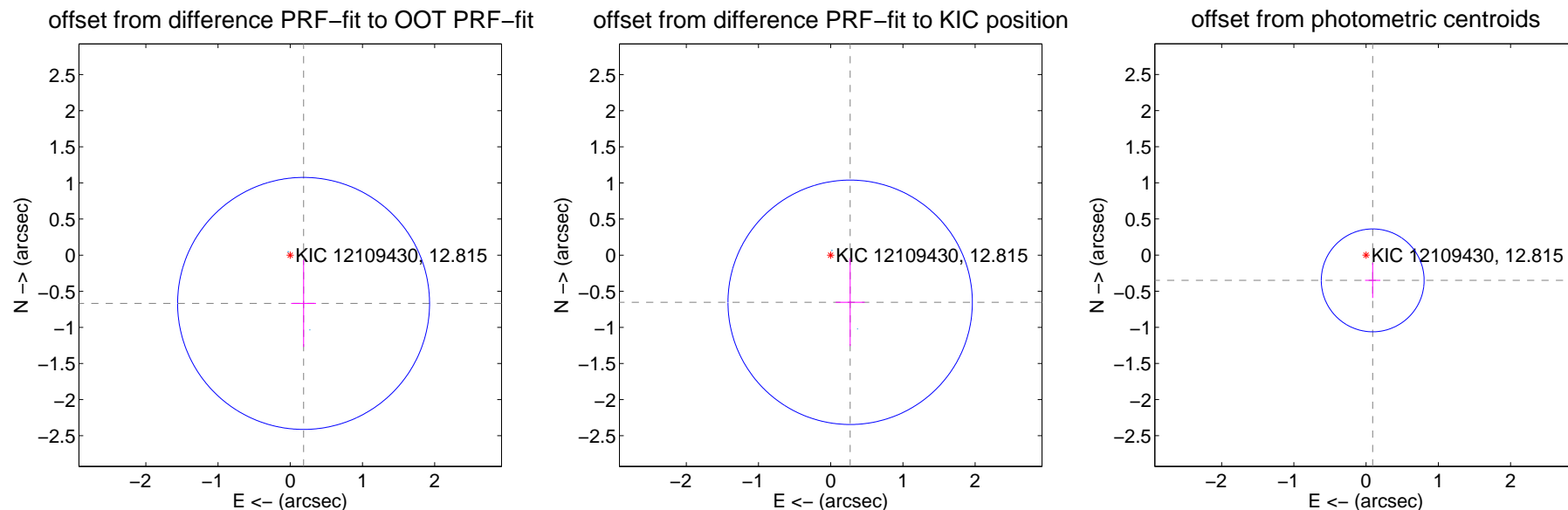
DV Centroid Data

Supplemental centroid analysis for 012109430-03. Kepler magnitude: 12.81. Transit SNR 5.42

There are 2 quarters with good PRF difference image offsets

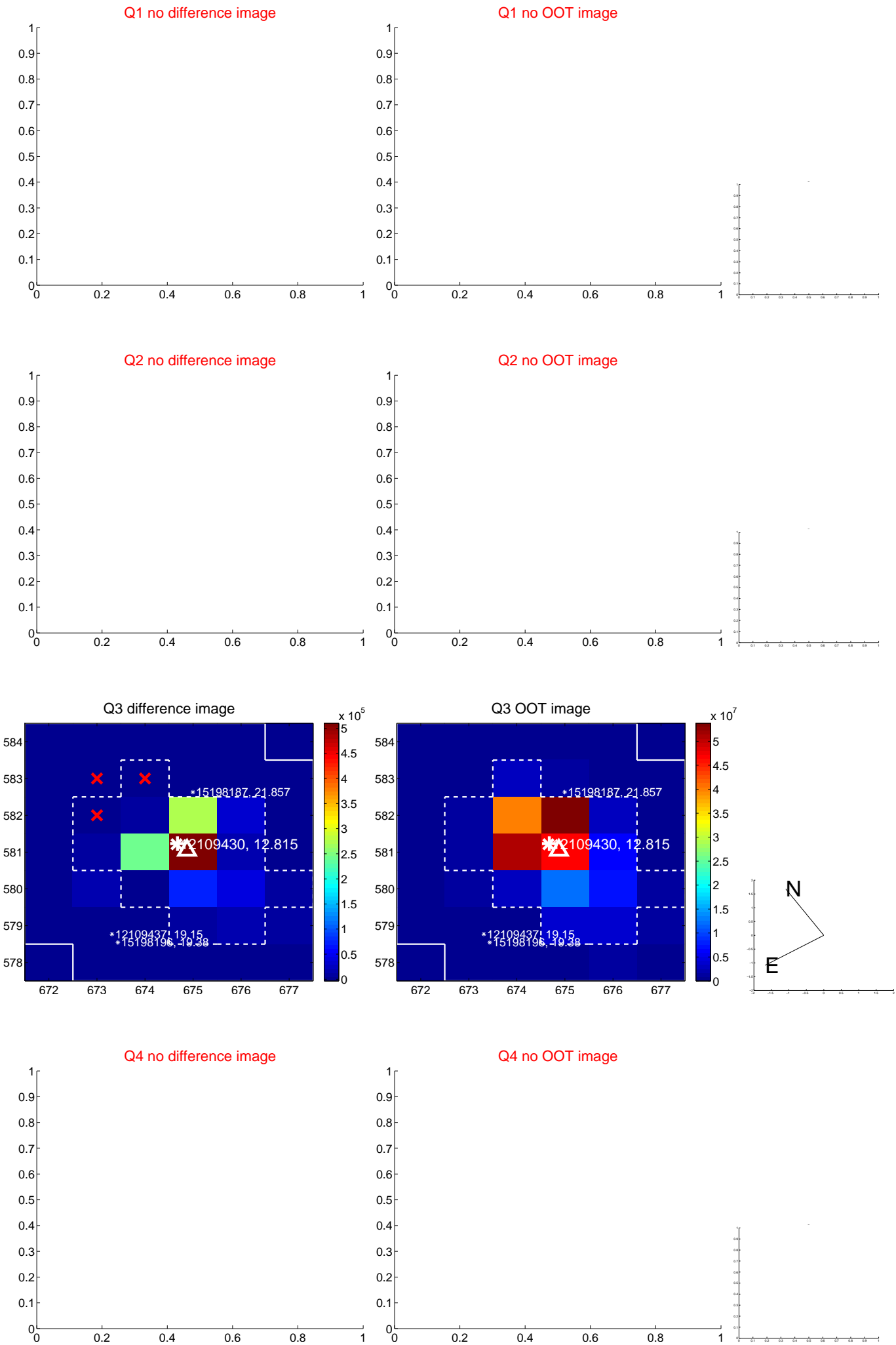
The direct PRF centroid is offset from the target star catalog position by about 0.05 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.693 ± 0.581	1.19	-0.184 ± 0.172	-0.668 ± 0.601
PRF-fit source offset from KIC position	0.706 ± 0.564	1.25	-0.269 ± 0.200	-0.653 ± 0.605
photometric centroid source offset	0.36 ± 0.24	1.52	-0.09 ± 0.11	-0.35 ± 0.24

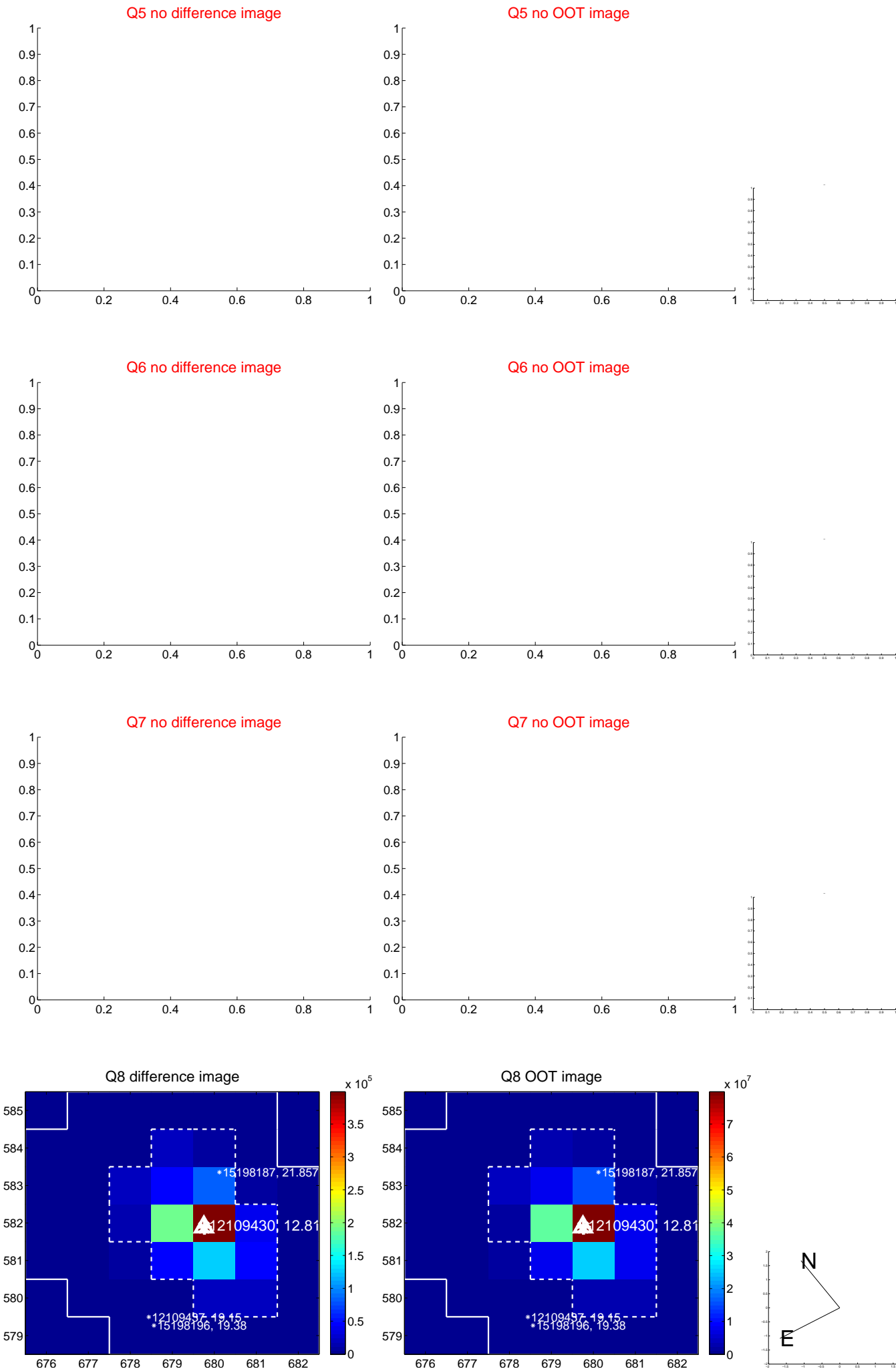


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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



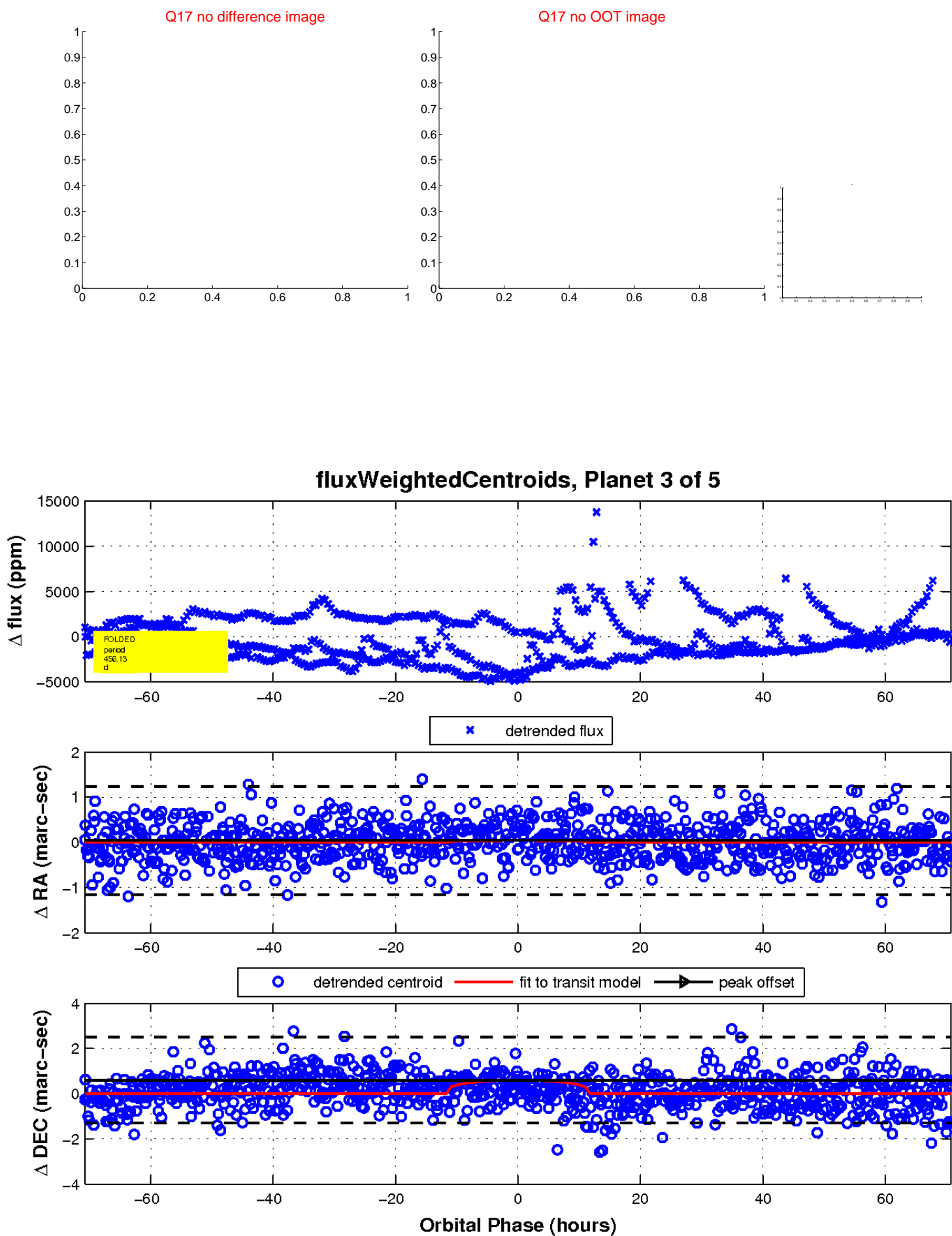
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

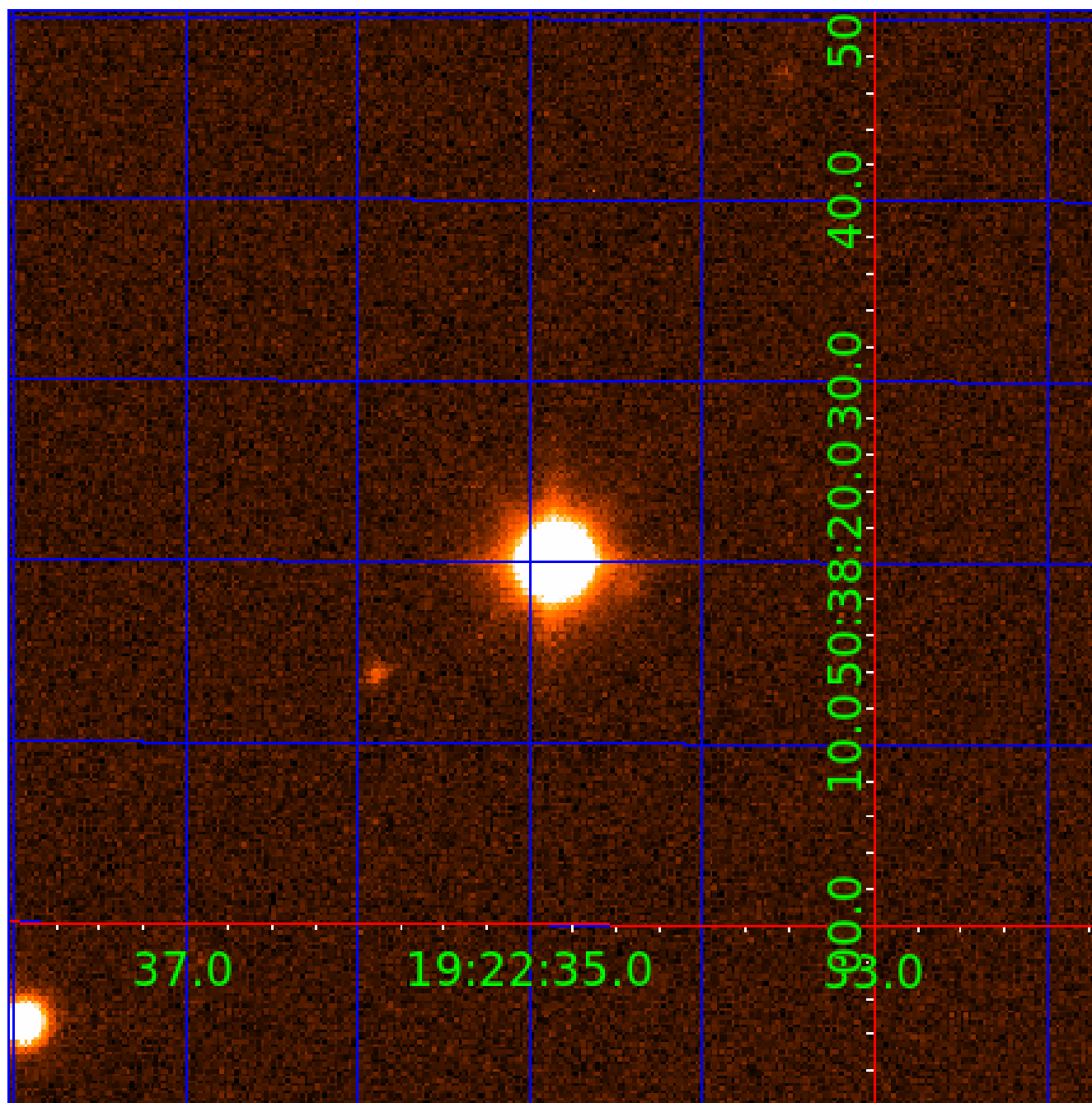


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 012109430

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})
012109430-01	OBS	No	274.448424	263.849659	1015.3	8.966	22.0	4.9	0.67	4487	2.81	0.31
012109430-03	OBS	No	456.134569	328.212647	1541.6	23.630	17.5	5.4	0.67	4487	2.52	0.16
012109430-04	OBS	No	568.232494	375.750896	2885.1	7.239	18.0	11.4	0.67	4487	4.72	0.12
012109430-05	OBS	No	322.169953	356.093757	1459.5	5.222	16.0	8.0	0.67	4487	3.58	0.25

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
012109430-01	OBS	FP	0.00	1	0	0	0	LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
012109430-03	OBS	FP	0.00	1	0	0	0	LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
012109430-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
012109430-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—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.

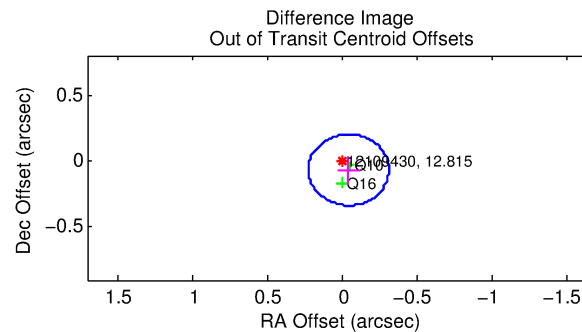
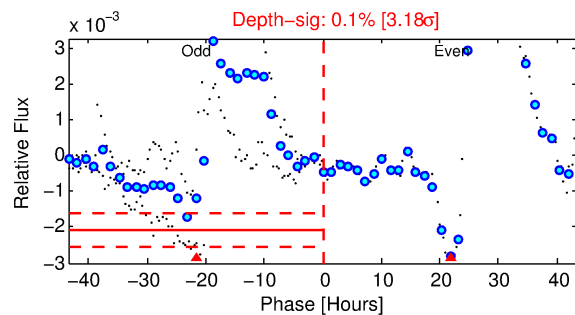
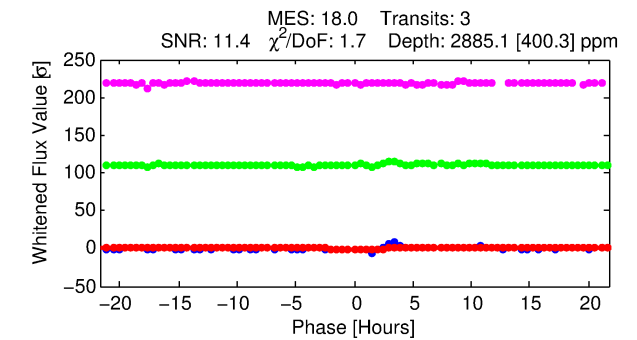
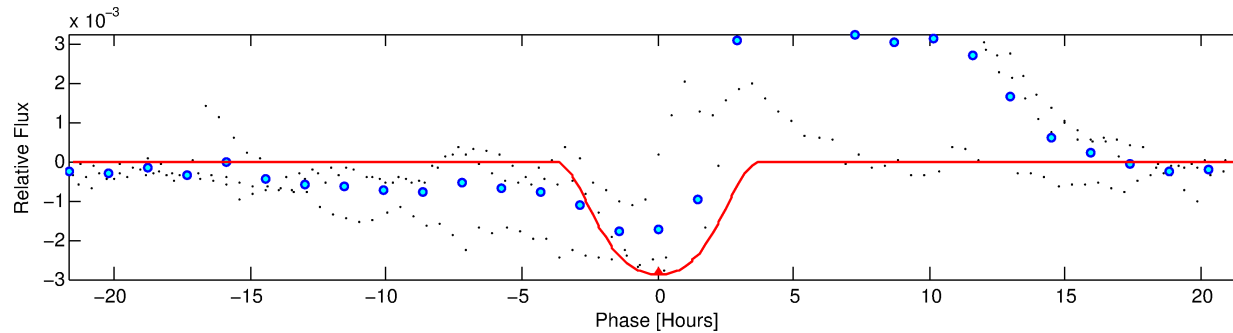
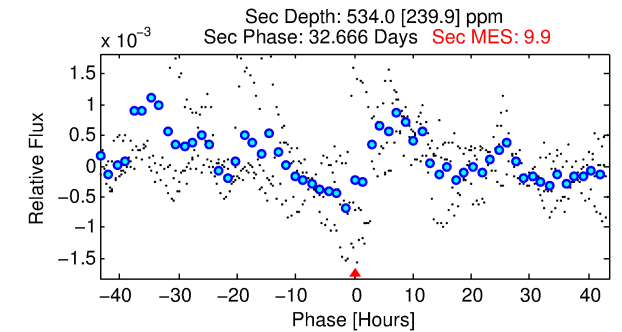
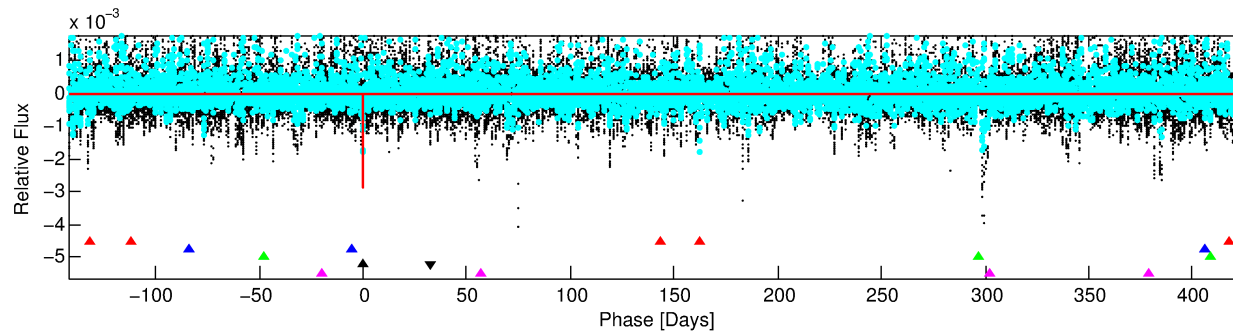
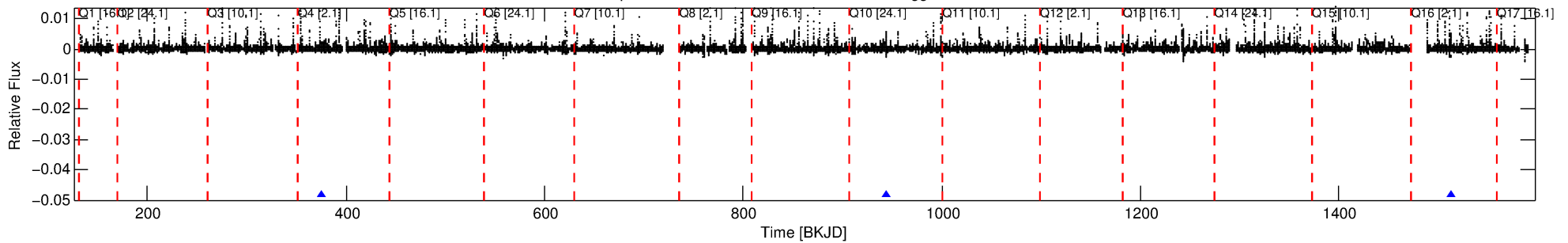
Ephemeris Match Information For 012109430-04

No Significant Match Found

DV One-Page Summary

KIC: 12109430 Candidate: 4 of 5 Period: 568.232 d

Kp: 12.81 R*: 0.67 Rs Teff: 4487.0 K Logg: 4.61 Fe/H: -0.080



DV Fit Results:

Period = 568.23249 [0.00636] d
Epoch = 375.7509 [0.0081] BKJD
Rp/R* = 0.0646 [0.0055]
a/R* = 306.15 [20.88]
b = 0.93 [0.01]
Seff = 0.12 [0.02]
Teq = 149 [6] K
Rp = 4.72 [0.58] Re
a = 1.1770 [0.0796] AU
Ag = 18238.57 [8927.74] [2.04σ]
Teffp = 2683 [337] K [7.53σ]

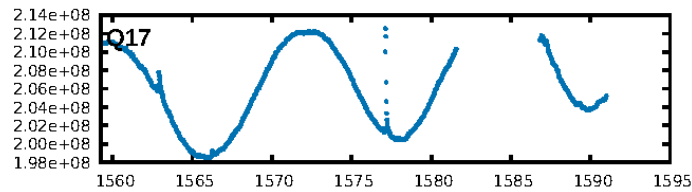
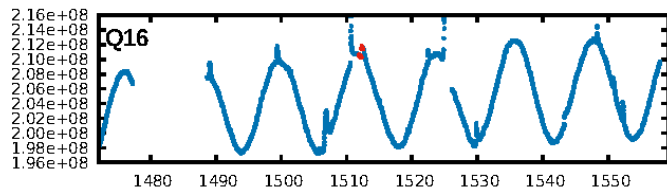
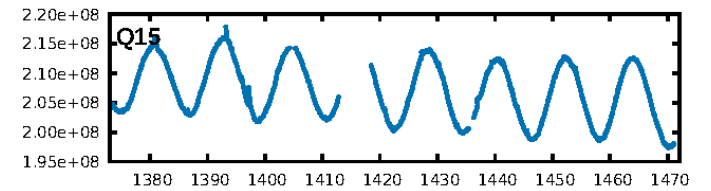
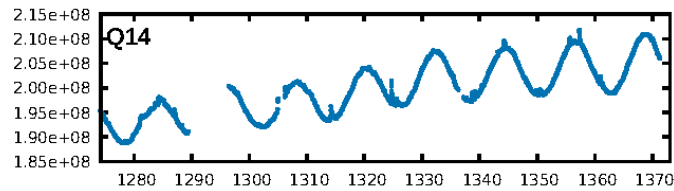
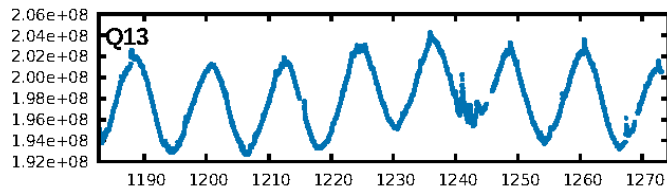
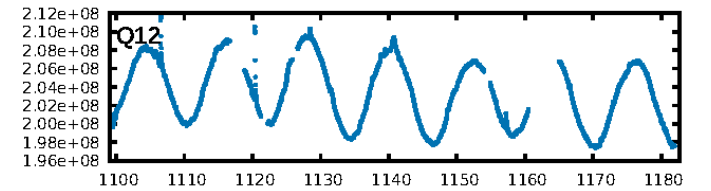
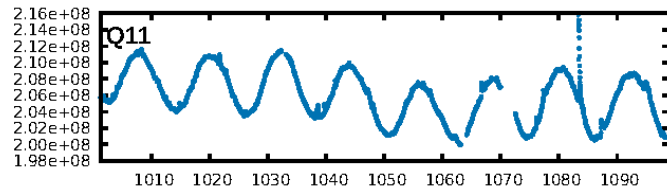
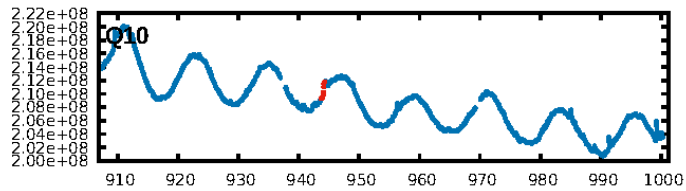
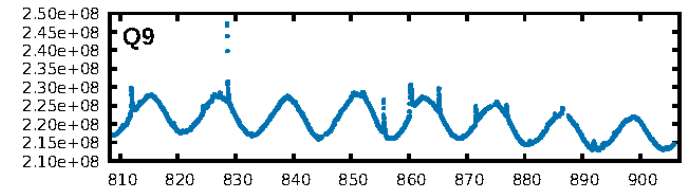
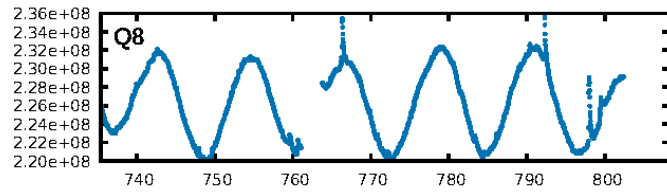
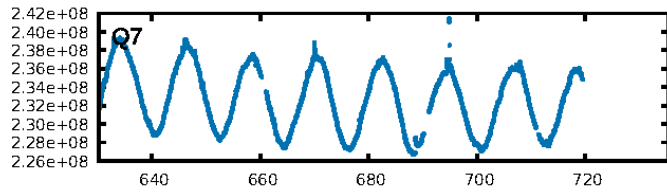
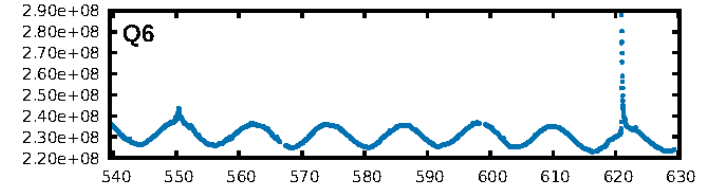
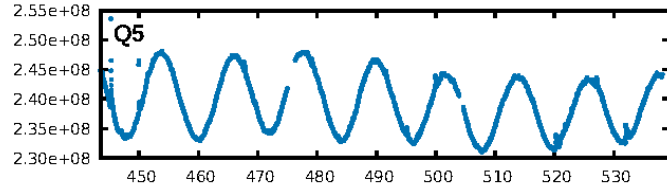
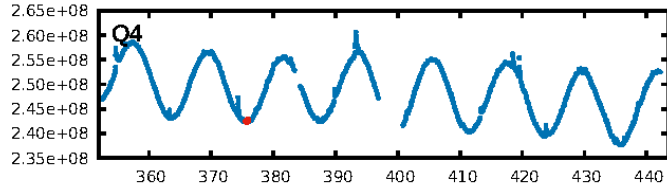
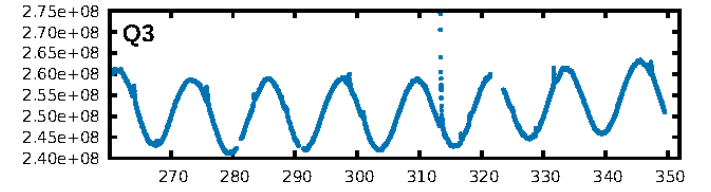
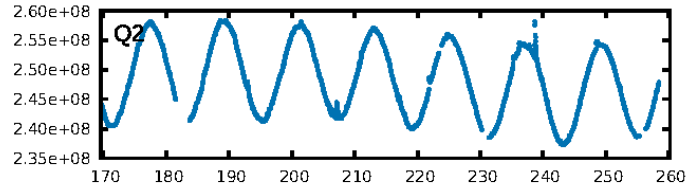
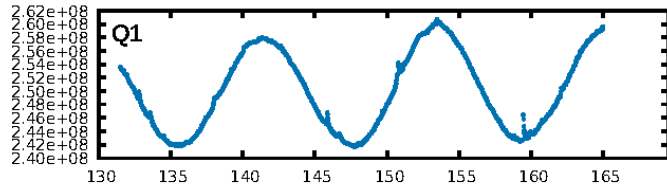
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [108.86σ]
LongPeriod-sig: 100.0% [140.60σ]
ModelChiSquare2-sig: 22.6%
ModelChiSquareGof-sig: 33.1%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: 2.72
Centroid-sig: 25.8%
Centroid-so: 0.069 arcsec [0.53σ]
OotOffset-rm: 0.081 arcsec [0.91σ]
OotOffset-st: 1/0/1/0 [2]
KicOffset-rm: 0.118 arcsec [1.42σ]
KicOffset-st: 1/0/1/0 [2]
DiffImageQuality-fgm: 1.00 [2/2]
DiffImageOverlap-fno: 1.00 [3/3]

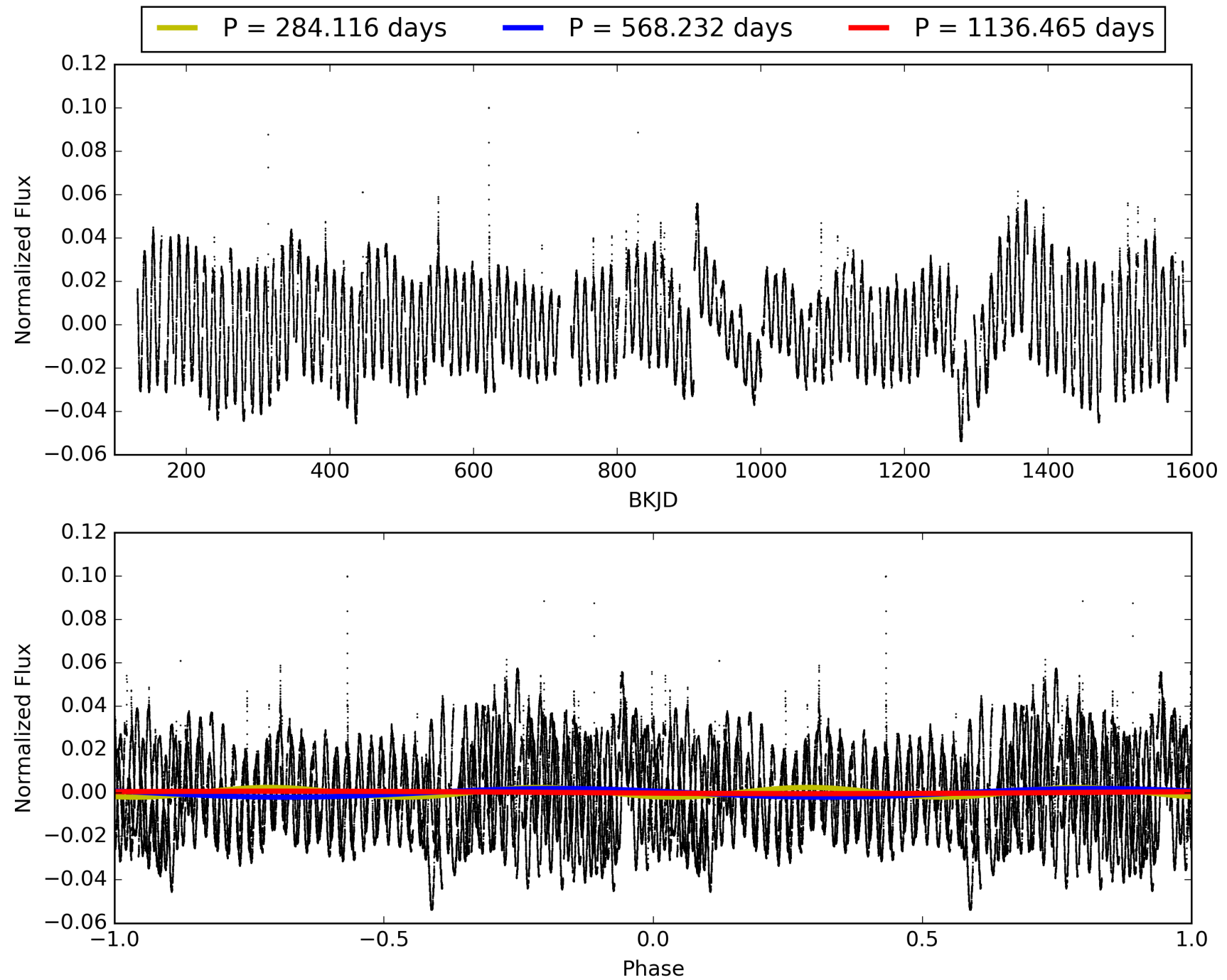
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 30-Jan-2016 05:45:50 Z

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

TCE 012109430-04, PDC Light Curves

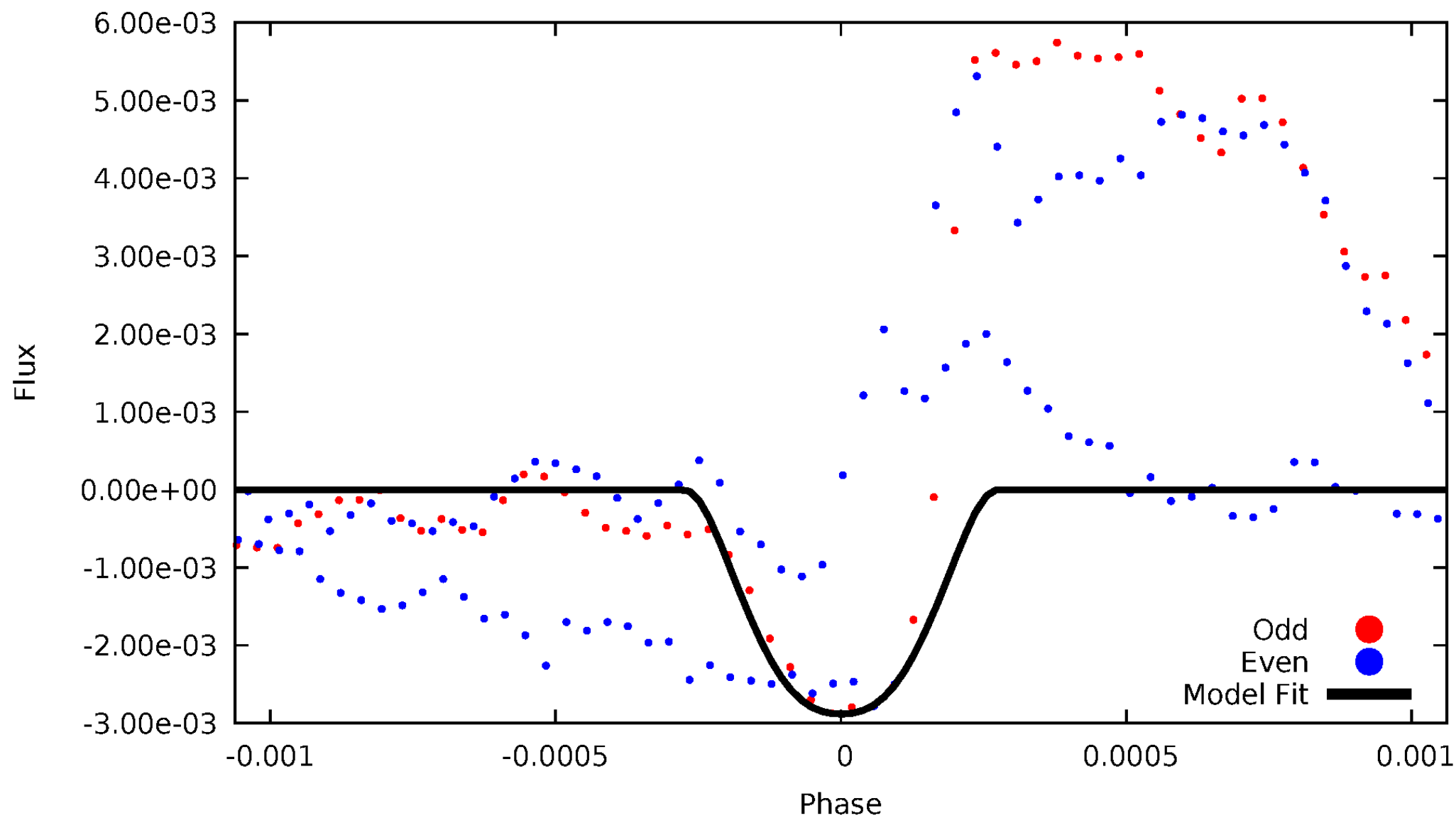


TCE 012109430-04



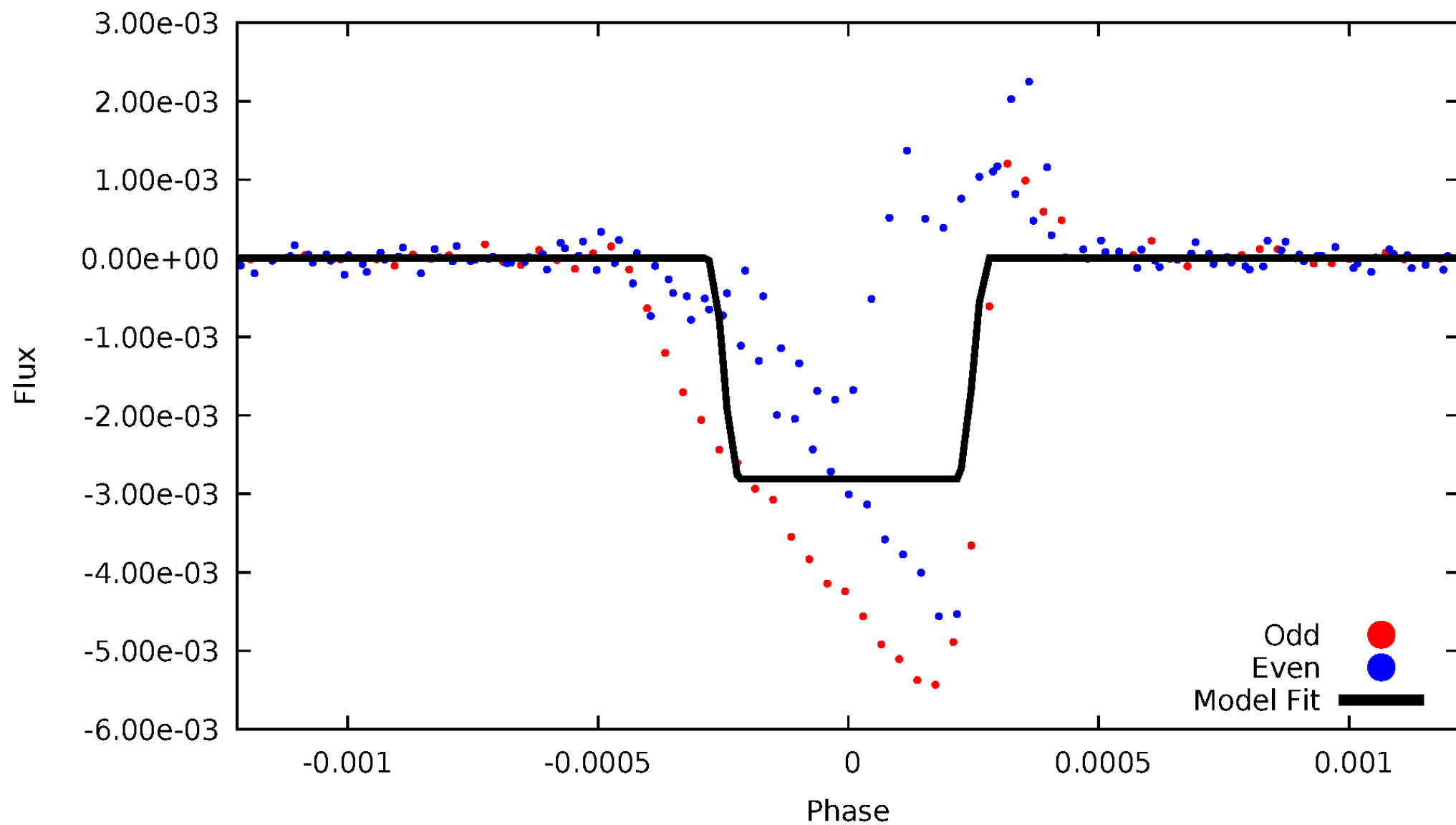
DV Odd/Even

TCE 012109430-04



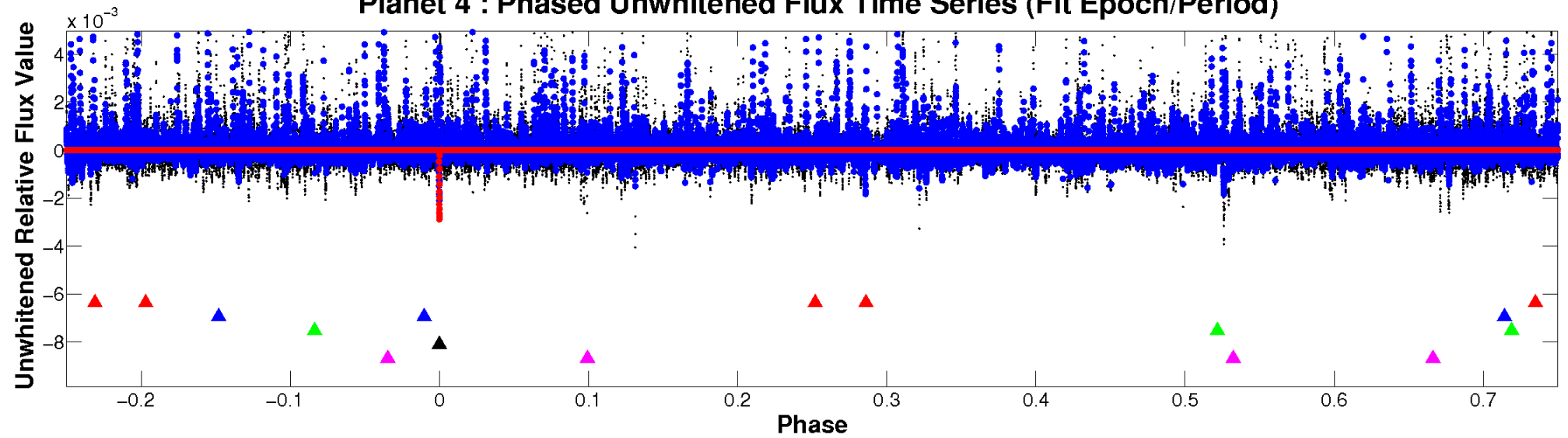
ALT Odd/Even

TCE 012109430-04

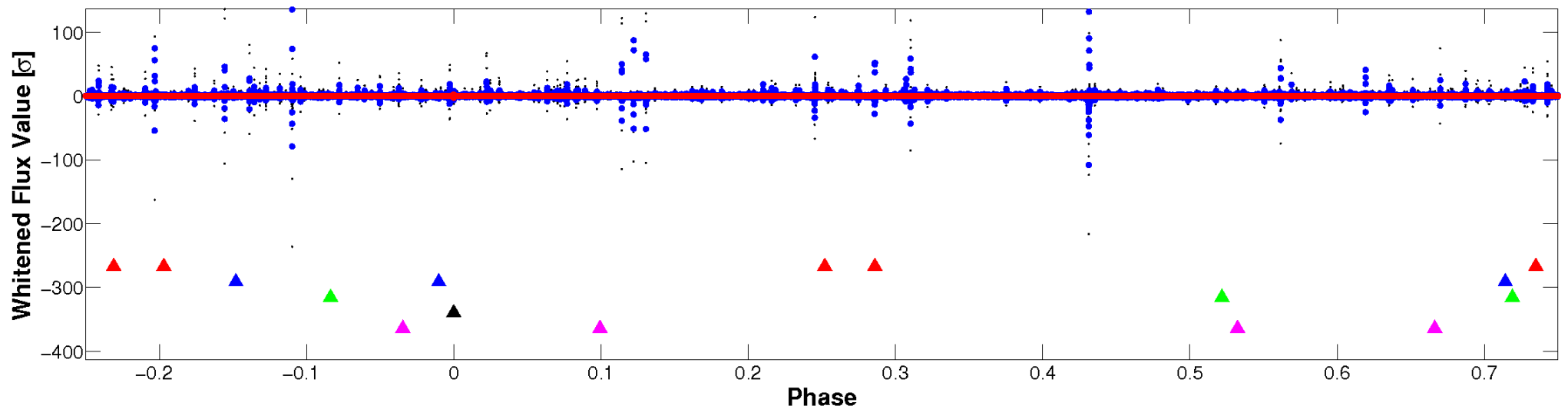


Non-Whitened Vs. Whitened Light Curve

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

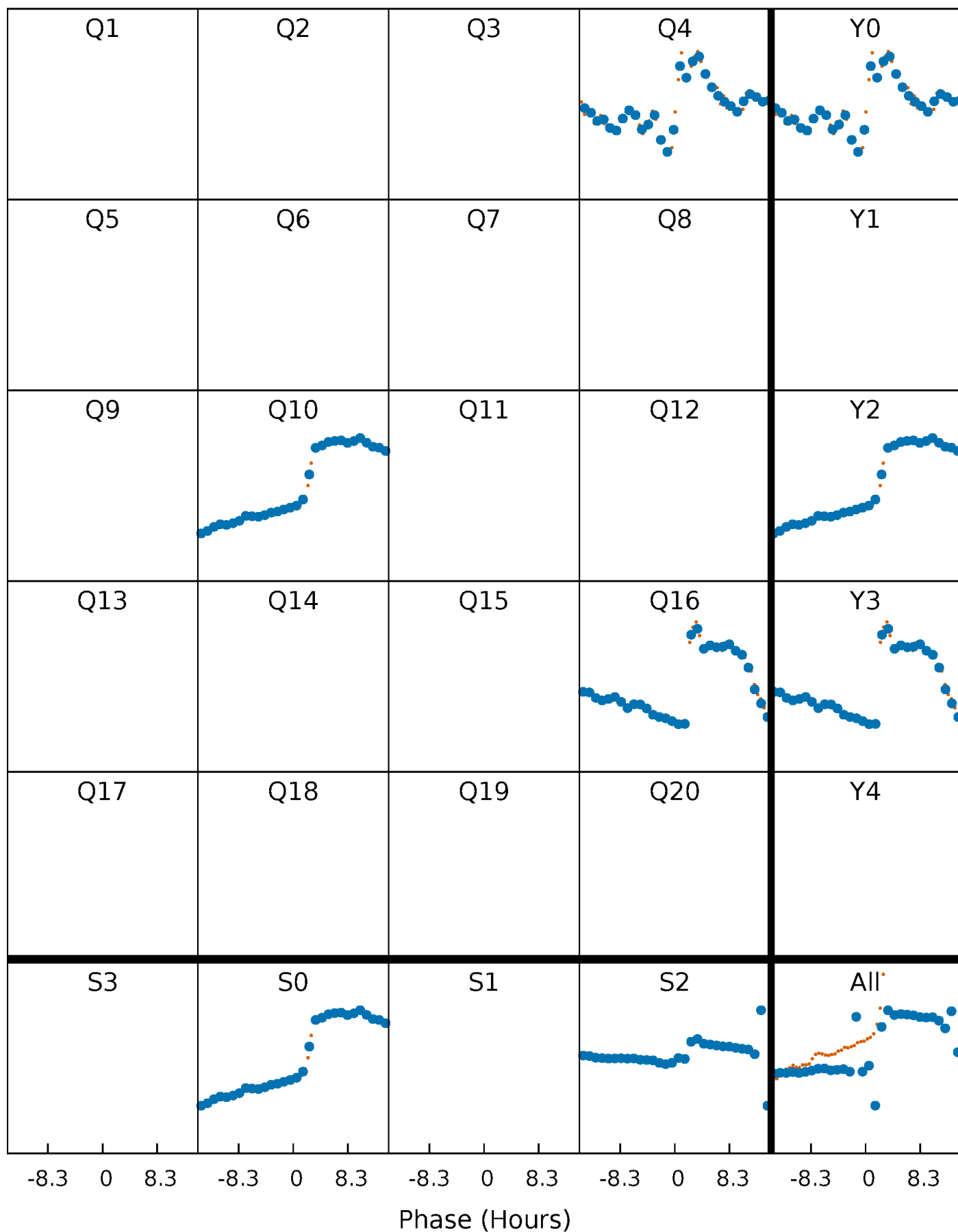


Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



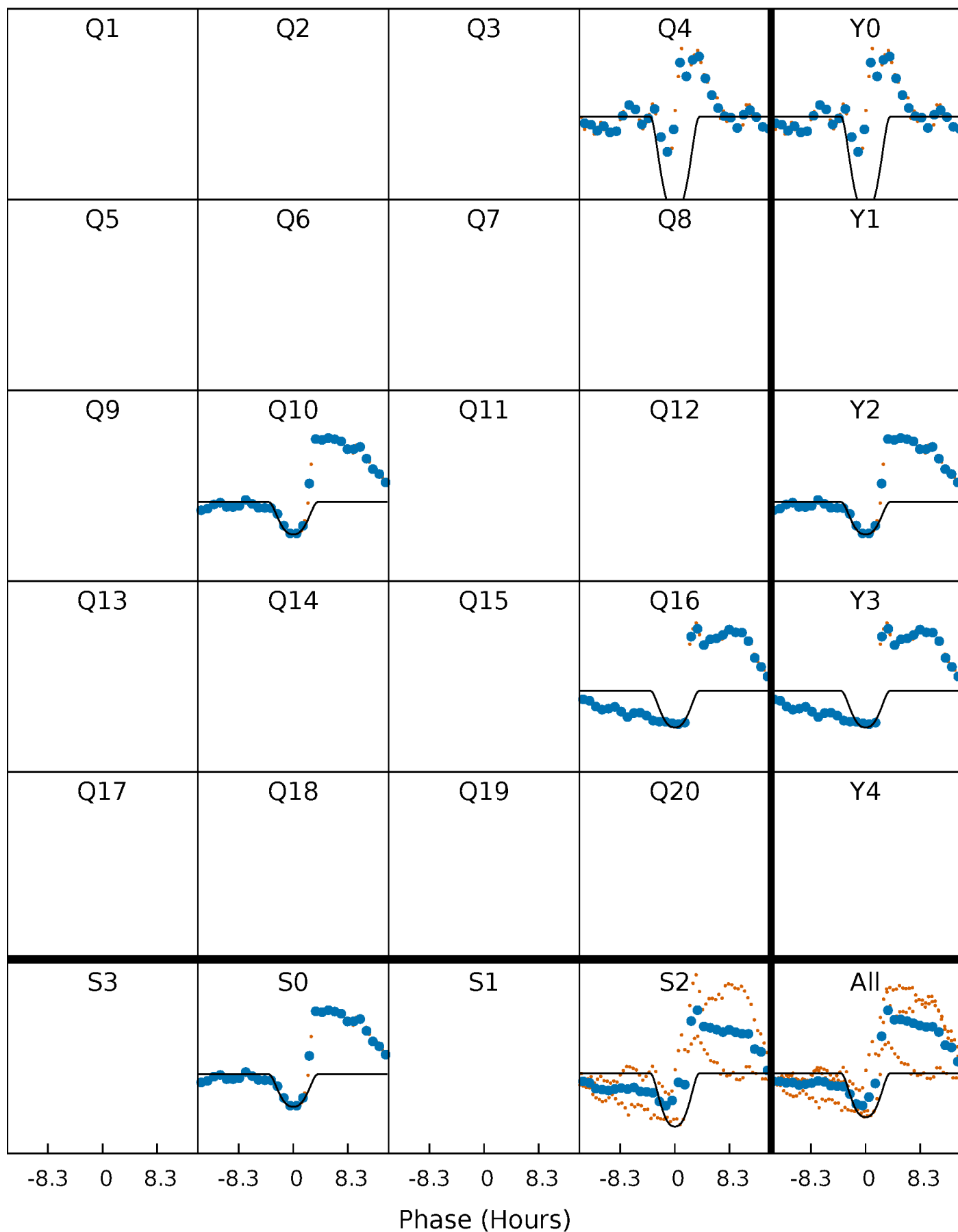
PDC Quarter-Phased Transit Curves

TCE 012109430-04 $P=568.232494$ Days $T_0=375.750896$ (BKJD)



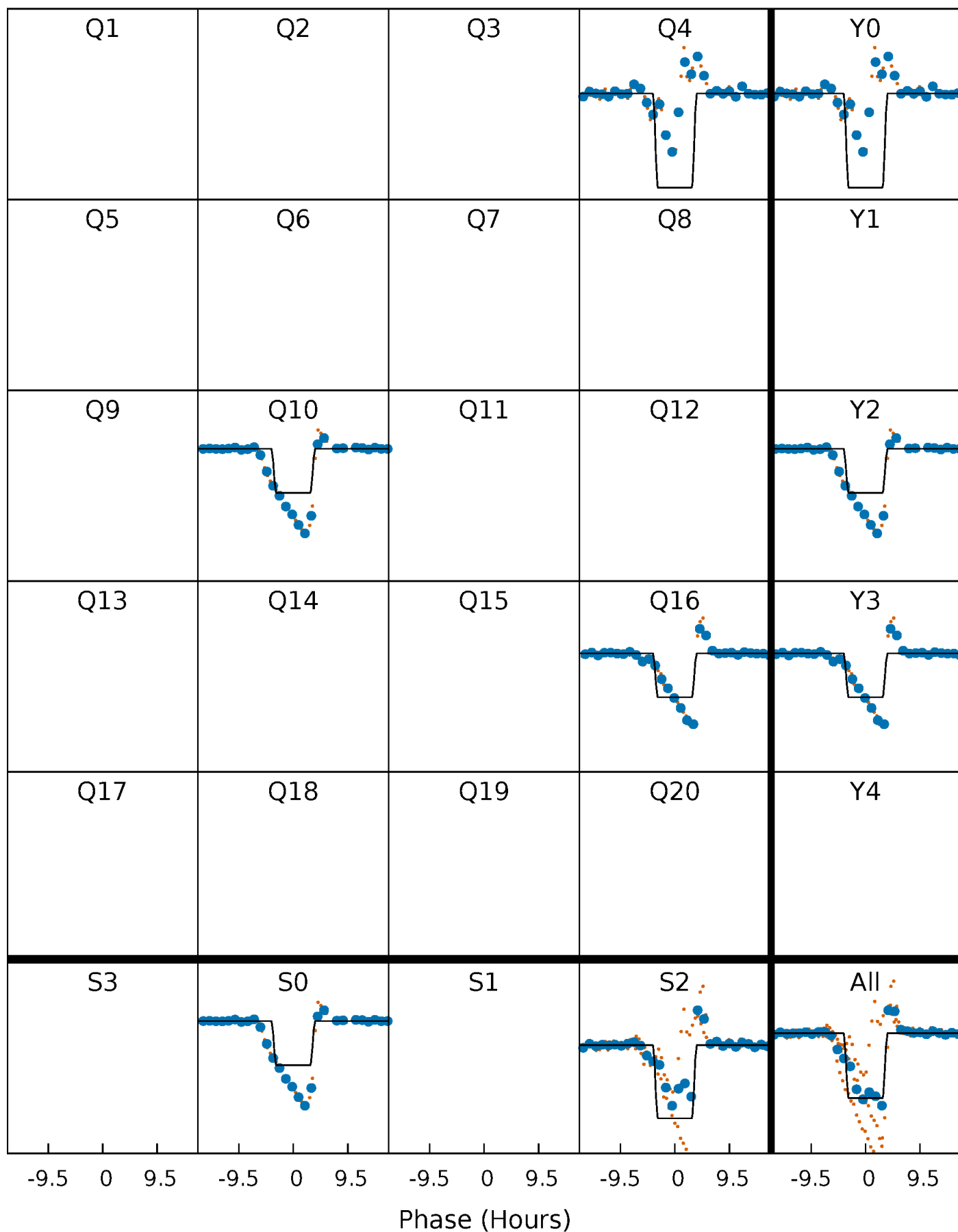
DV Quarter-Phased Transit Curves

TCE 012109430-04 P=568.232494 Days $T_0=375.750896$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

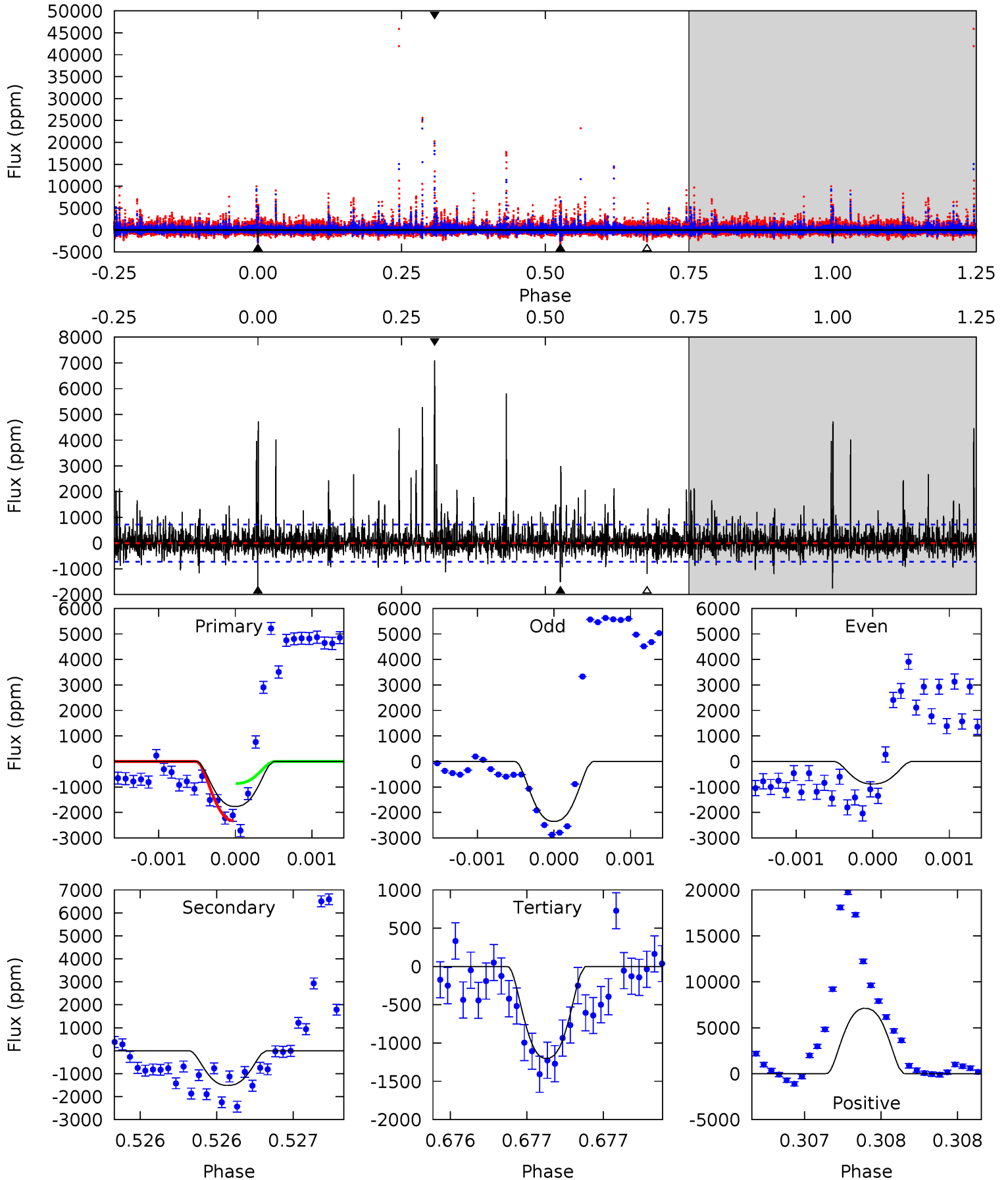
TCE 012109430-04 P=568.209625 Days $T_0=375.726887$ (BKJD)



DV Model-Shift Uniqueness Test

012109430-04, P = 568.232494 Days, E = 375.750896 Days

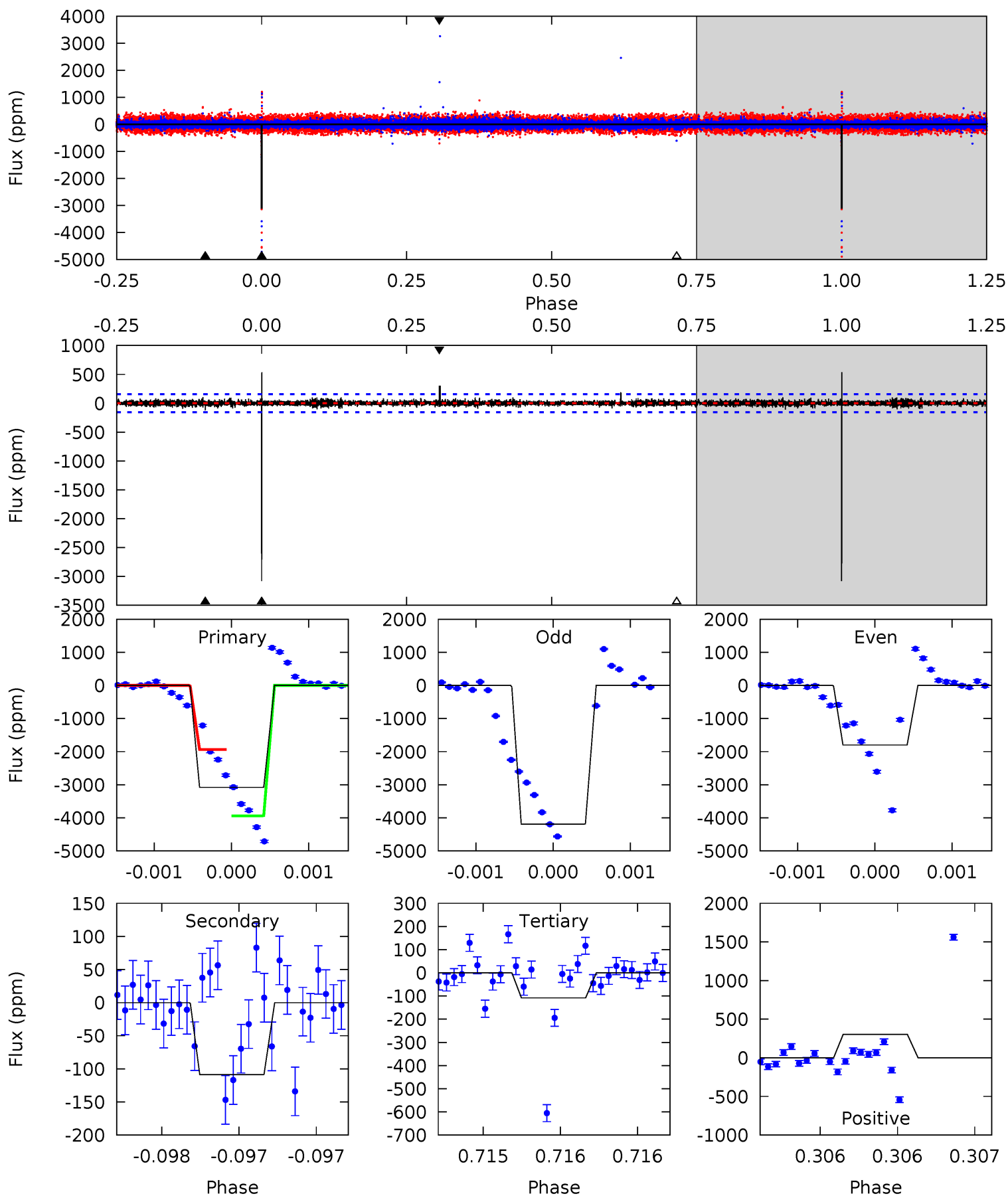
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
13.6	11.6	9.23	54.7	5.56	3.46	3.35	4.34	-41.1	2.39	-43.1	2.25	0.64	0.80	5.58



Alt Model-Shift Uniqueness Test

012109430-04, P = 568.209625 Days, E = 375.726887 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
109.6	3.87	3.85	10.8	5.57	3.47	0.74	105.8	98.9	0.02	-6.90	47.7	0.87	0.15	0



Stellar Parameters For KIC 012109430

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (g \cdot \text{cm}^{-3})$
	4487^{+161}_{-161}	$4.614^{+0.046}_{-0.028}$	$-0.080^{+0.300}_{-0.300}$	$0.670^{+0.048}_{-0.058}$	$0.673^{+0.067}_{-0.061}$	$3.151^{+0.671}_{-0.381}$
	+4%/-4%	+1%/-1%	+375%/-375%	+7%/-9%	+10%/-9%	+21%/-12%
Source	PHO54	PHO54	PHO54	DSEP		

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

Secondary Eclipse Parameters for KIC 012109430-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-1509 ± 130	$4.69^{+0.49}_{-0.46}$	208^{+9}_{-8}	3742^{+165}_{-184}	52306^{+11306}_{-9184}
Alt.	-109 ± 28	$3.85^{+0.44}_{-0.44}$	208^{+9}_{-8}	2686^{+133}_{-122}	5598^{+2012}_{-1643}

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 $A_{obs} \gg 1.0$

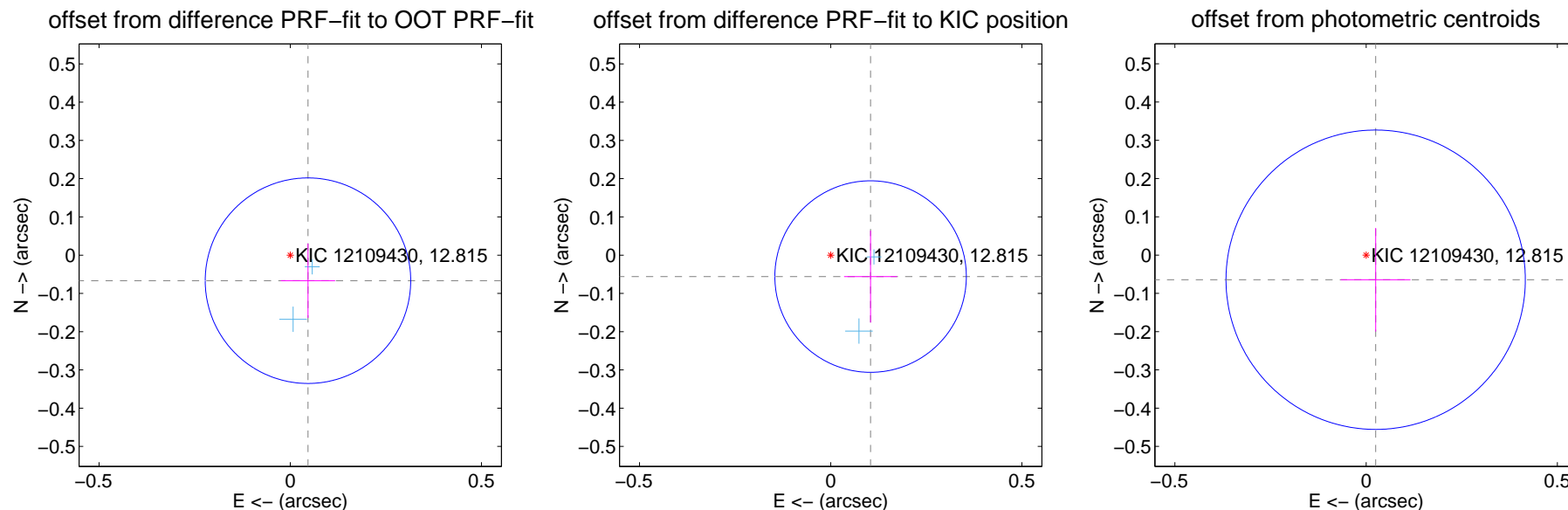
DV Centroid Data

Supplemental centroid analysis for 012109430-04. Kepler magnitude: 12.81. Transit SNR 11.40

There are 2 quarters with good PRF difference image offsets

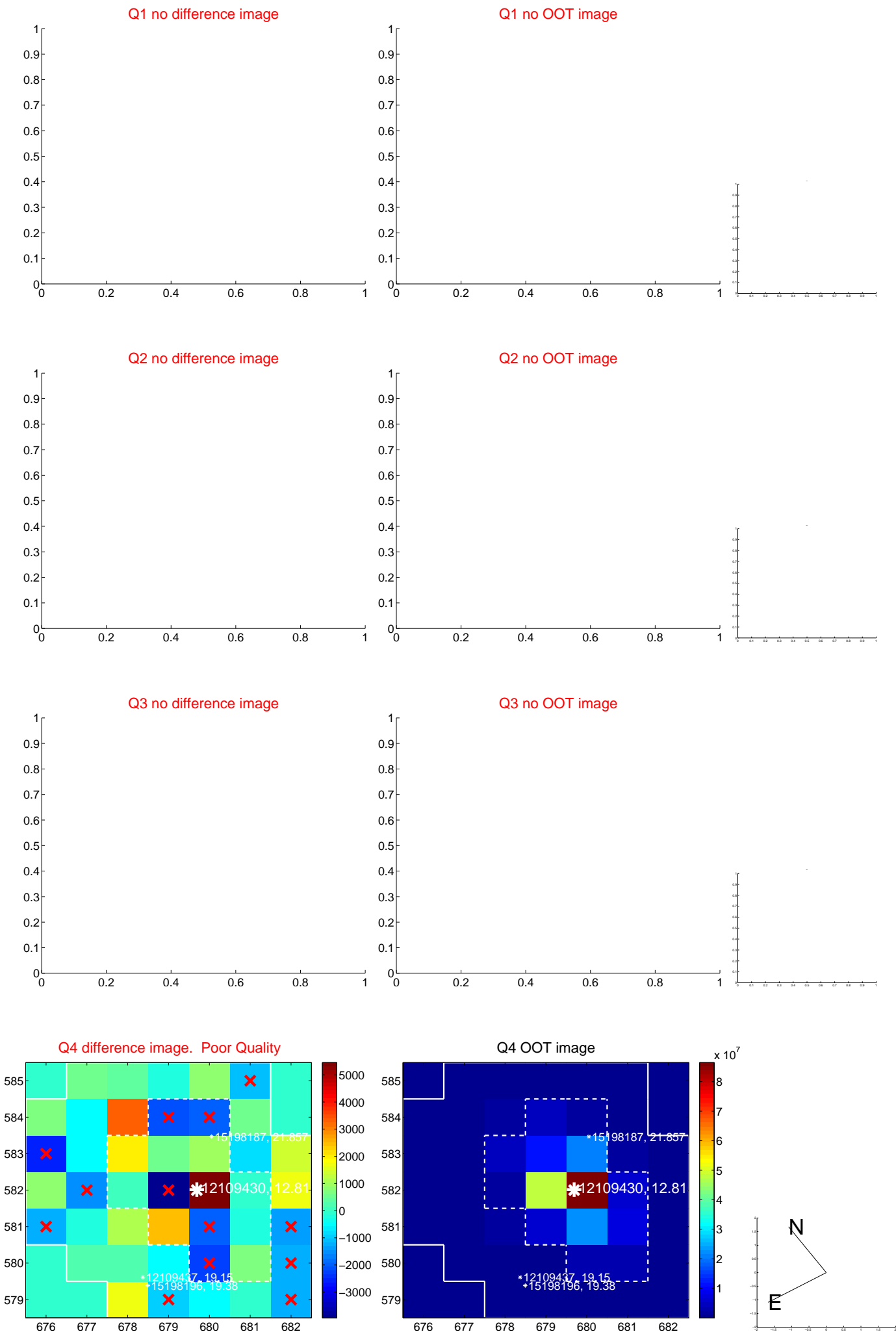
The direct PRF centroid is offset from the target star catalog position by about 0.07 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.081 ± 0.090	0.91	-0.046 ± 0.071	-0.067 ± 0.097
PRF-fit source offset from KIC position	0.118 ± 0.083	1.42	-0.104 ± 0.069	-0.056 ± 0.120
photometric centroid source offset	0.07 ± 0.13	0.53	-0.02 ± 0.09	-0.06 ± 0.14



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.

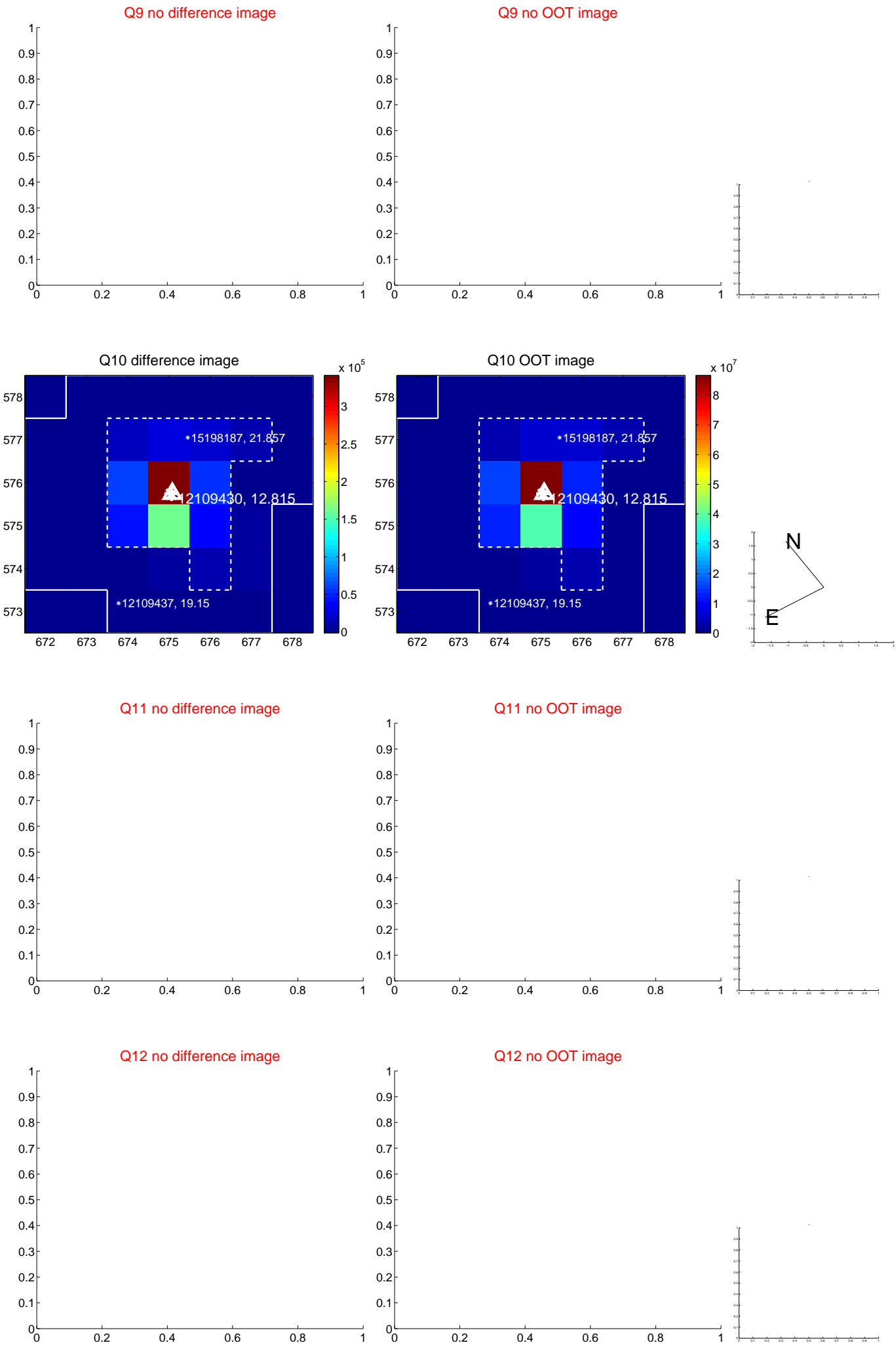
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



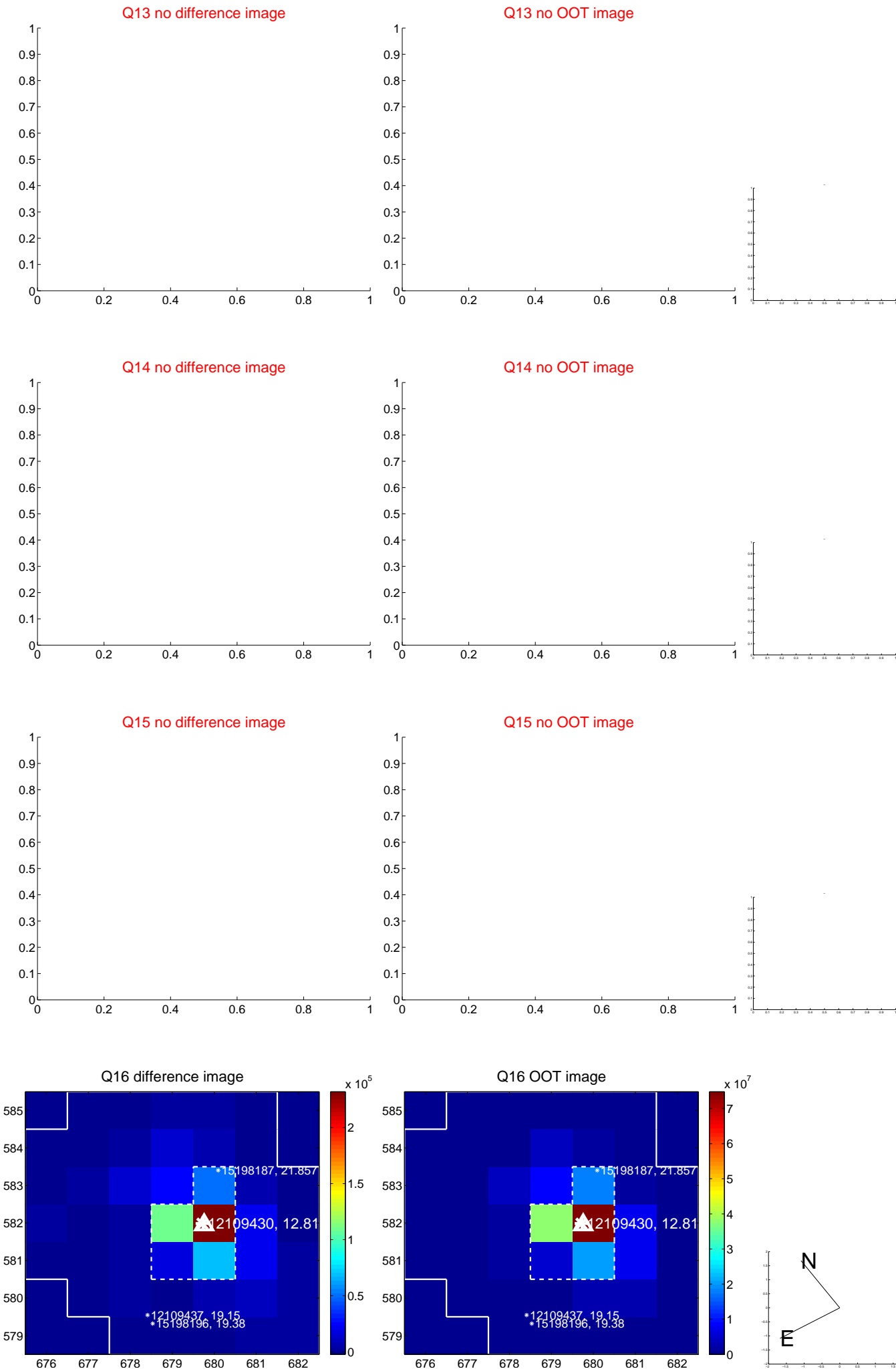
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



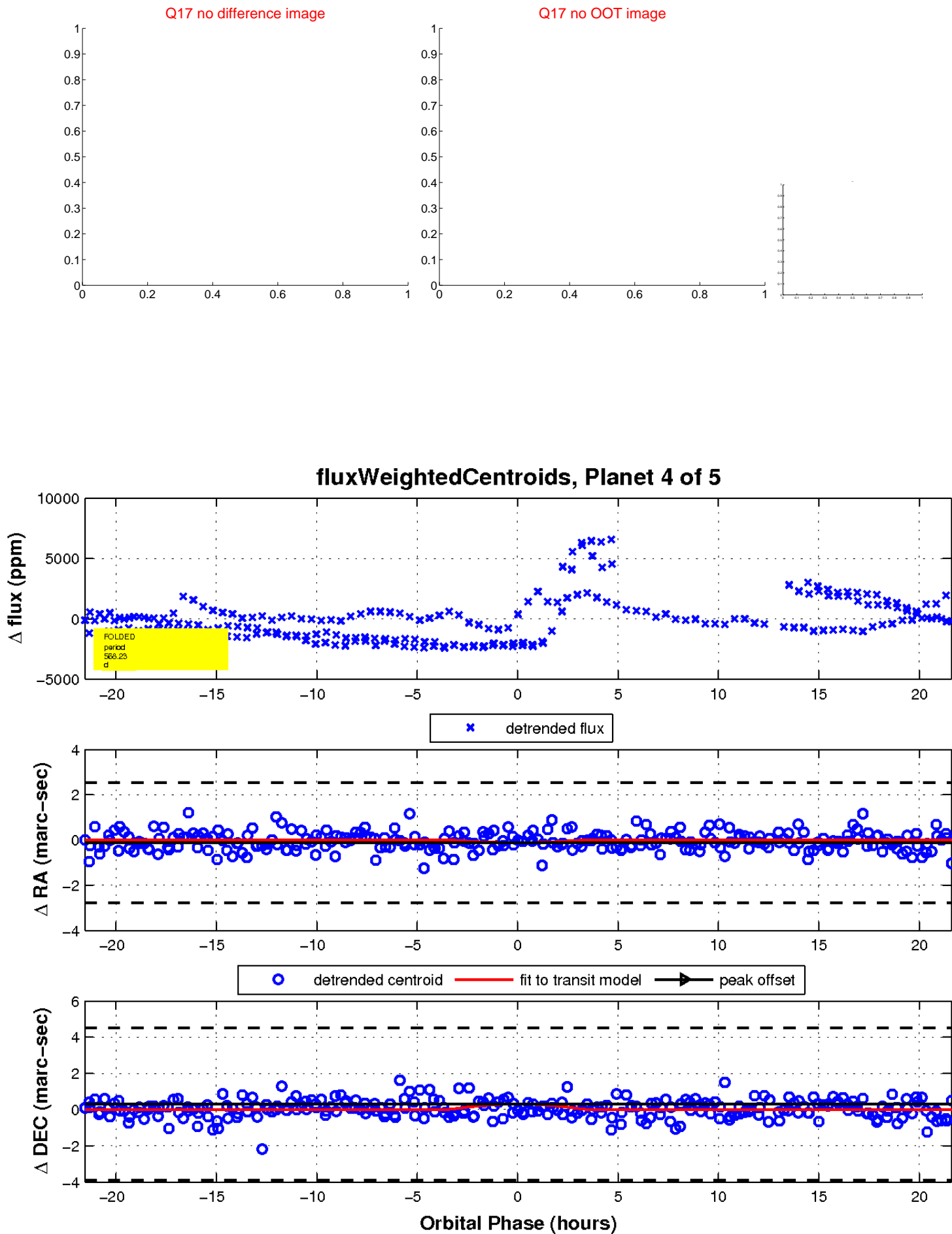
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

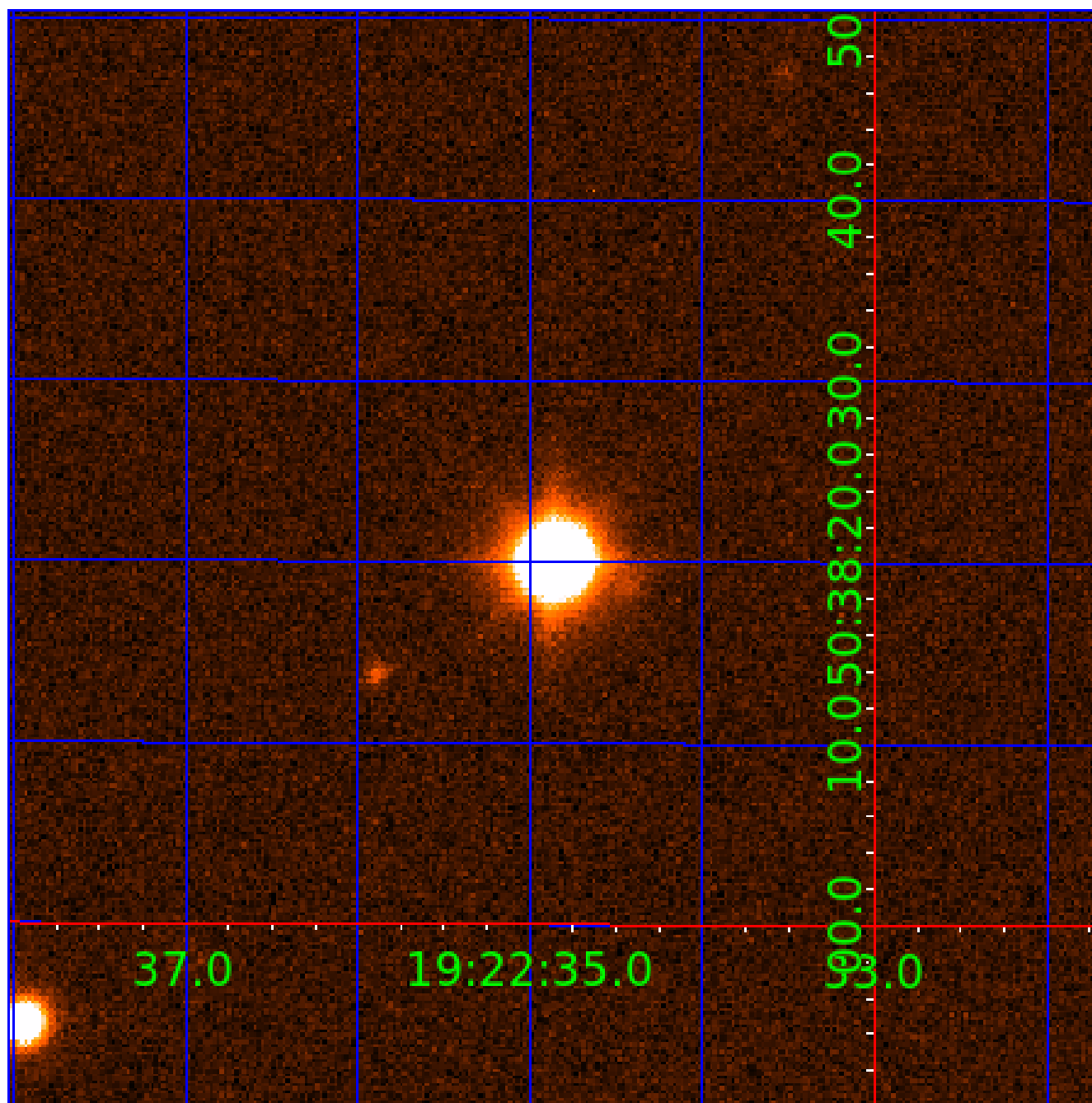


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 012109430

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})
012109430-01	OBS	No	274.448424	263.849659	1015.3	8.966	22.0	4.9	0.67	4487	2.81	0.31
012109430-03	OBS	No	456.134569	328.212647	1541.6	23.630	17.5	5.4	0.67	4487	2.52	0.16
012109430-04	OBS	No	568.232494	375.750896	2885.1	7.239	18.0	11.4	0.67	4487	4.72	0.12
012109430-05	OBS	No	322.169953	356.093757	1459.5	5.222	16.0	8.0	0.67	4487	3.58	0.25

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
012109430-01	OBS	FP	0.00	1	0	0	0	LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—INCONSISTENT_TRANS
012109430-03	OBS	FP	0.00	1	0	0	0	LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
012109430-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_POS_DV—INCONSISTENT_TRANS—CENT_FEW_DIFFS
012109430-05	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL—LPP_DV—ALL_TRANS_CHASES—MOD_NONUNIQ_DV—MOD_TER_DV—MOD_POS_DV—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.

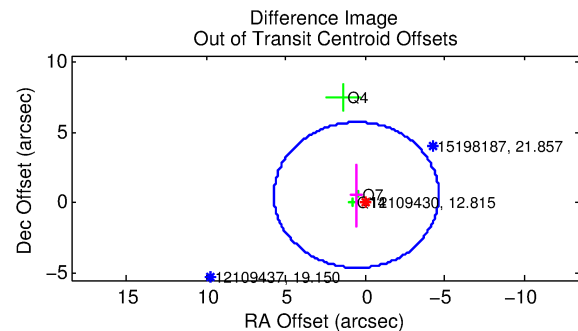
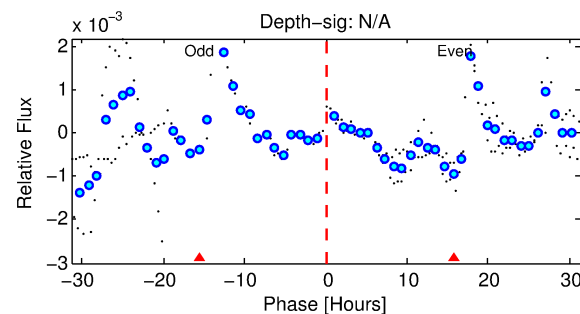
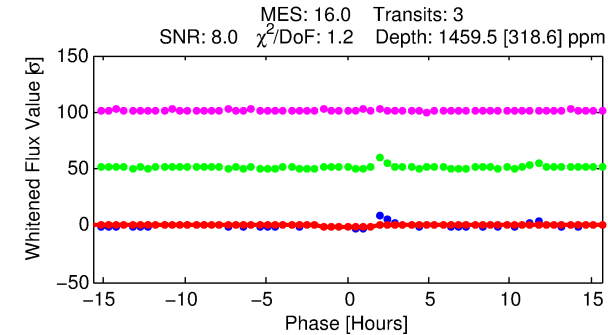
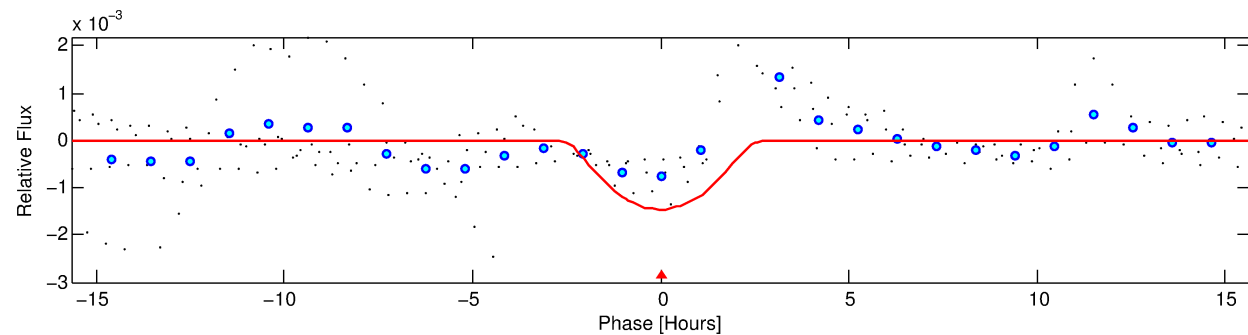
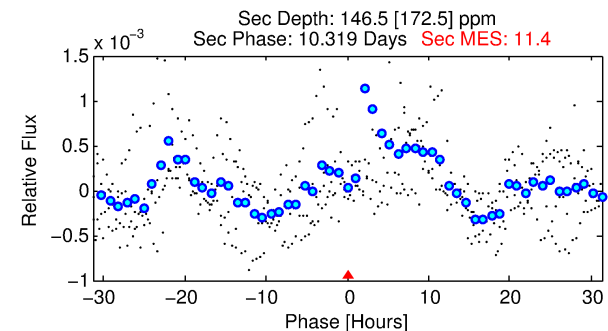
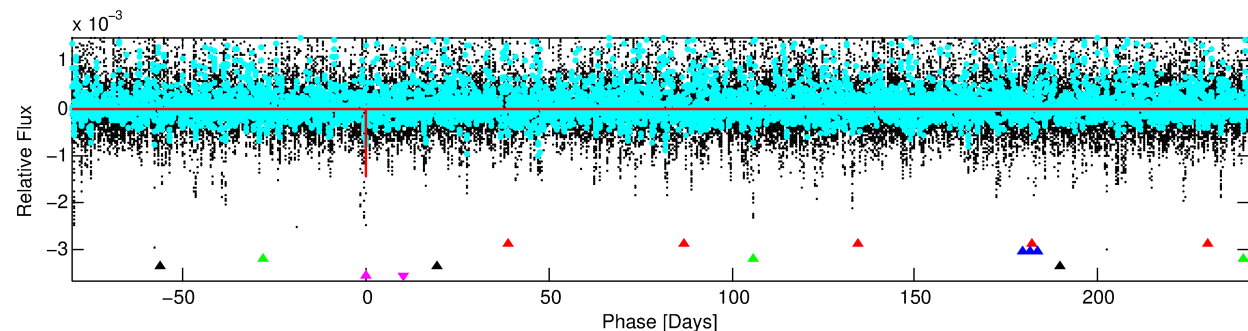
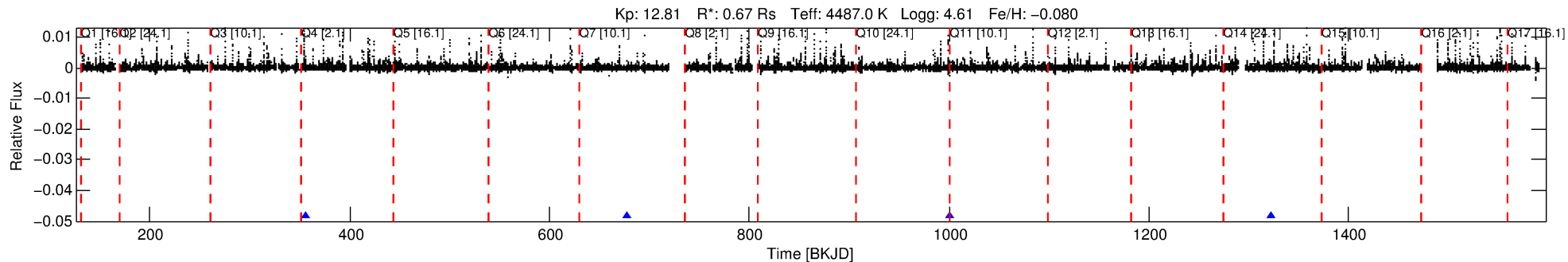
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 012109430-05

No Significant Match Found

DV One-Page Summary

KIC: 12109430 Candidate: 5 of 5 Period: 322.170 d



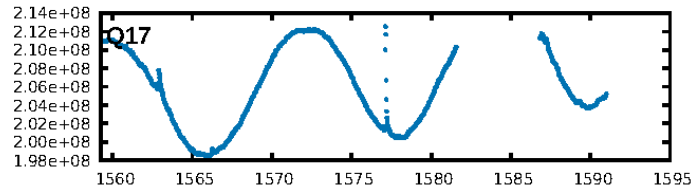
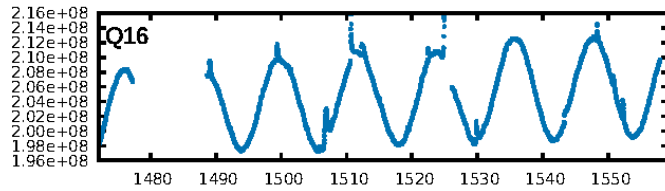
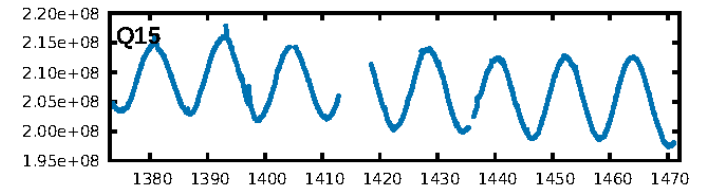
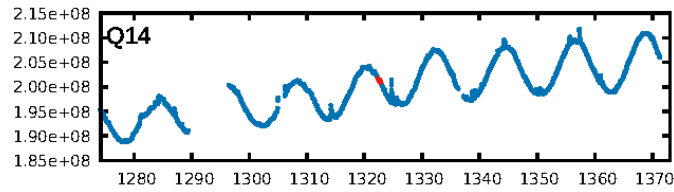
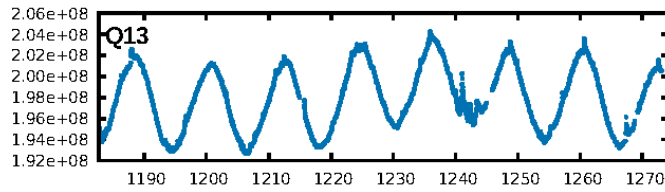
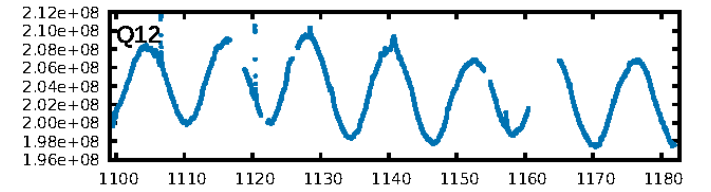
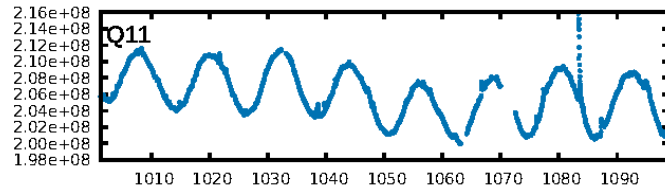
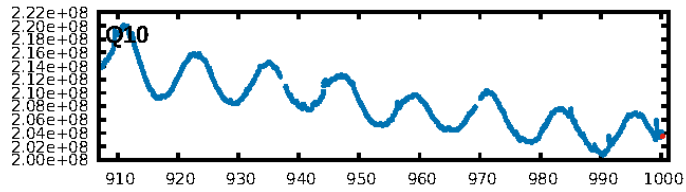
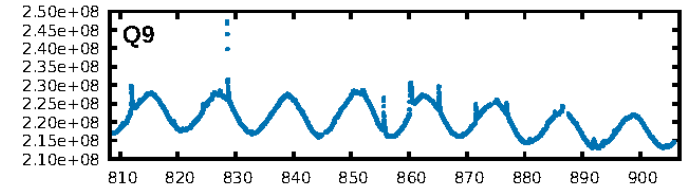
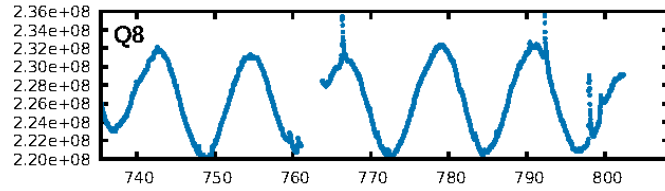
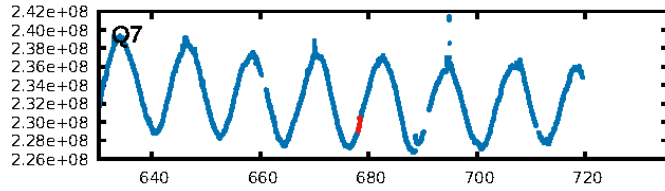
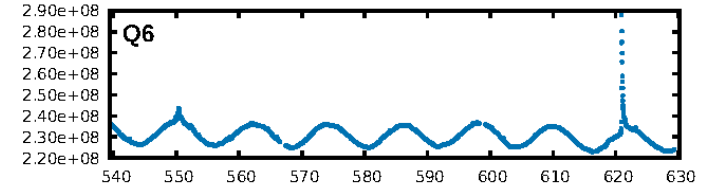
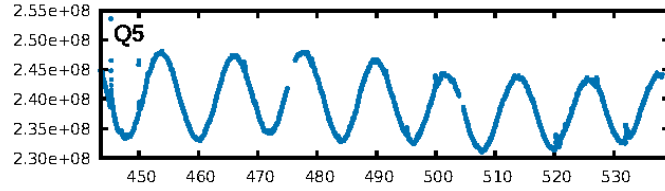
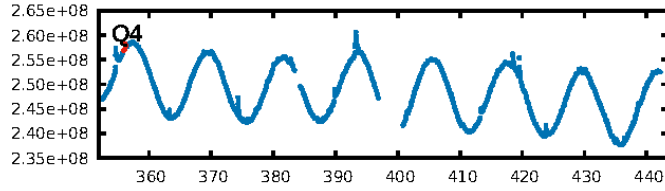
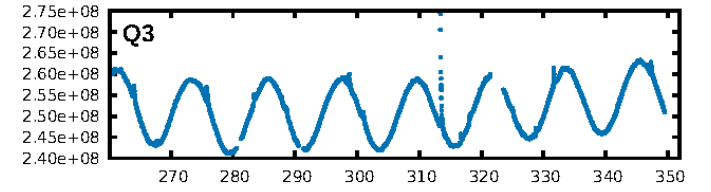
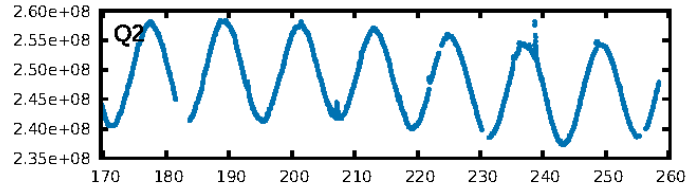
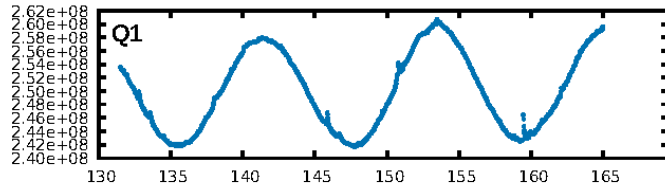
DV Fit Results:

Period = 322.16995 [0.00475] d
Epoch = 356.0938 [0.0090] BKJD
Rp/R* = 0.0489 [0.0122]
a/R* = 201.91 [33.22]
b = 0.96 [0.03]
Seff = 0.25 [0.04]
Teq = 180 [8] K
Rp = 3.58 [0.94] Re
a = 0.8063 [0.0545] AU
Ag = 4094.01 [5246.86] [0.78σ]
Teffp = 2232 [718] K [2.86σ]

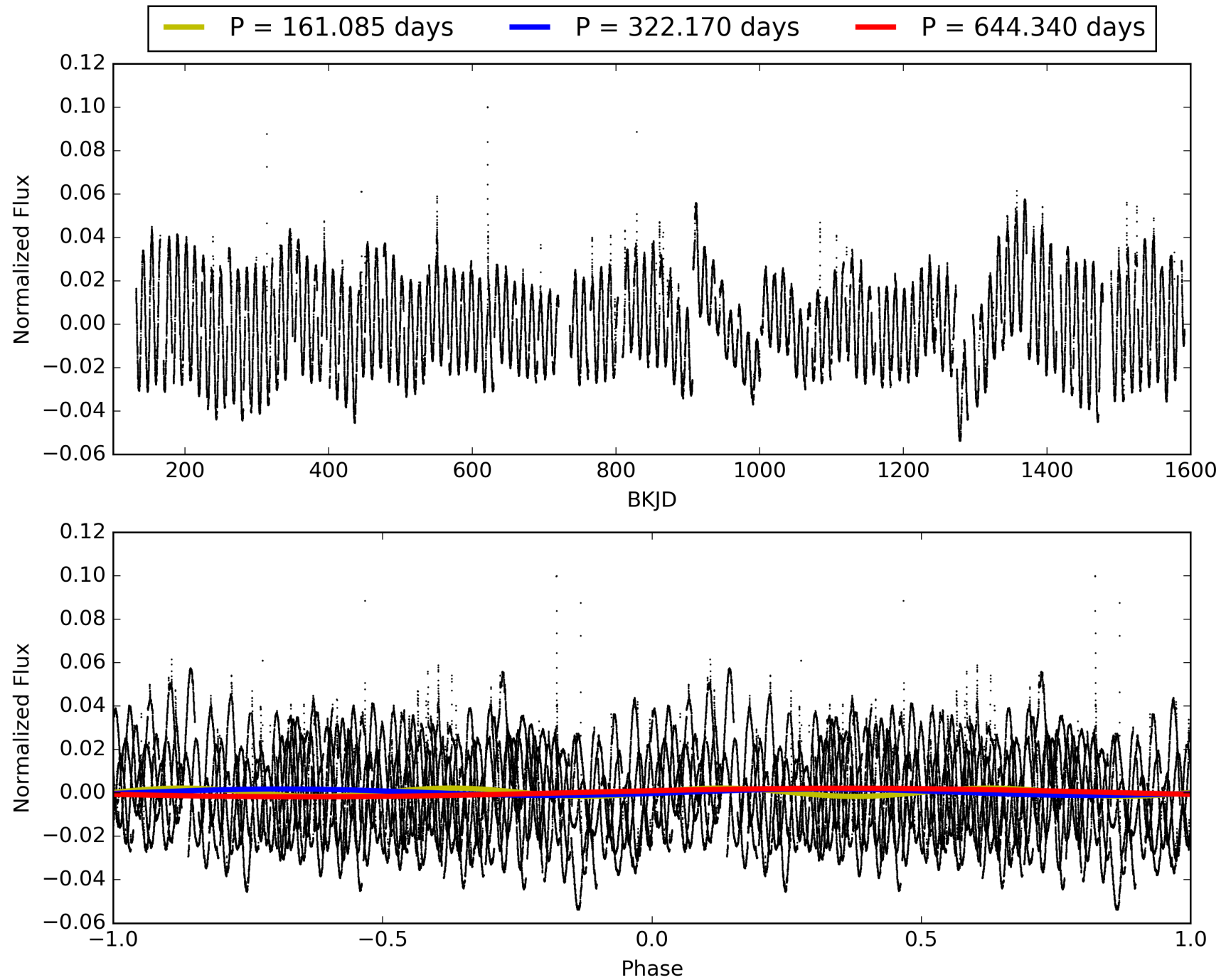
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [110.38σ]
LongPeriod-sig: 100.0% [132.86σ]
ModelChiSquare2-sig: 70.9%
ModelChiSquareGof-sig: 80.1%
Bootstrap-pfa: N/A
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: 1.066
Centroid-sig: 48.4%
Centroid-so: 0.165 arcsec [0.71σ]
OotOffset-rm: 0.781 arcsec [0.45σ]
KicOffset-rm: 0.693 arcsec [0.29σ]
OotOffset-st: 1/1/1/0 [3]
KicOffset-st: 1/1/1/0 [3]
DiffImageQuality-fgm: 0.67 [2/3]
DiffImageOverlap-fno: 1.00 [3/3]

TCE 012109430-05, PDC Light Curves

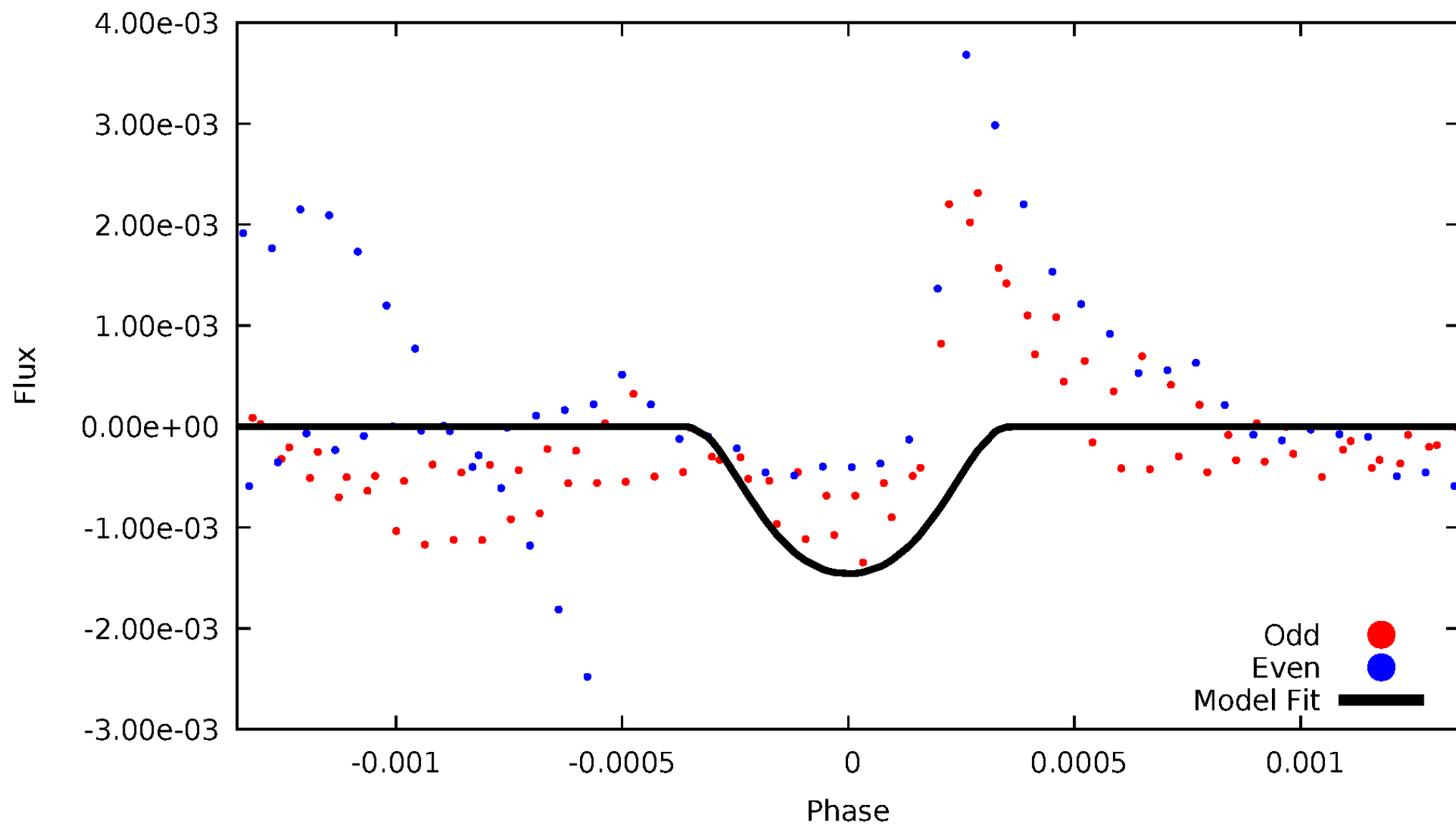


TCE 012109430-05



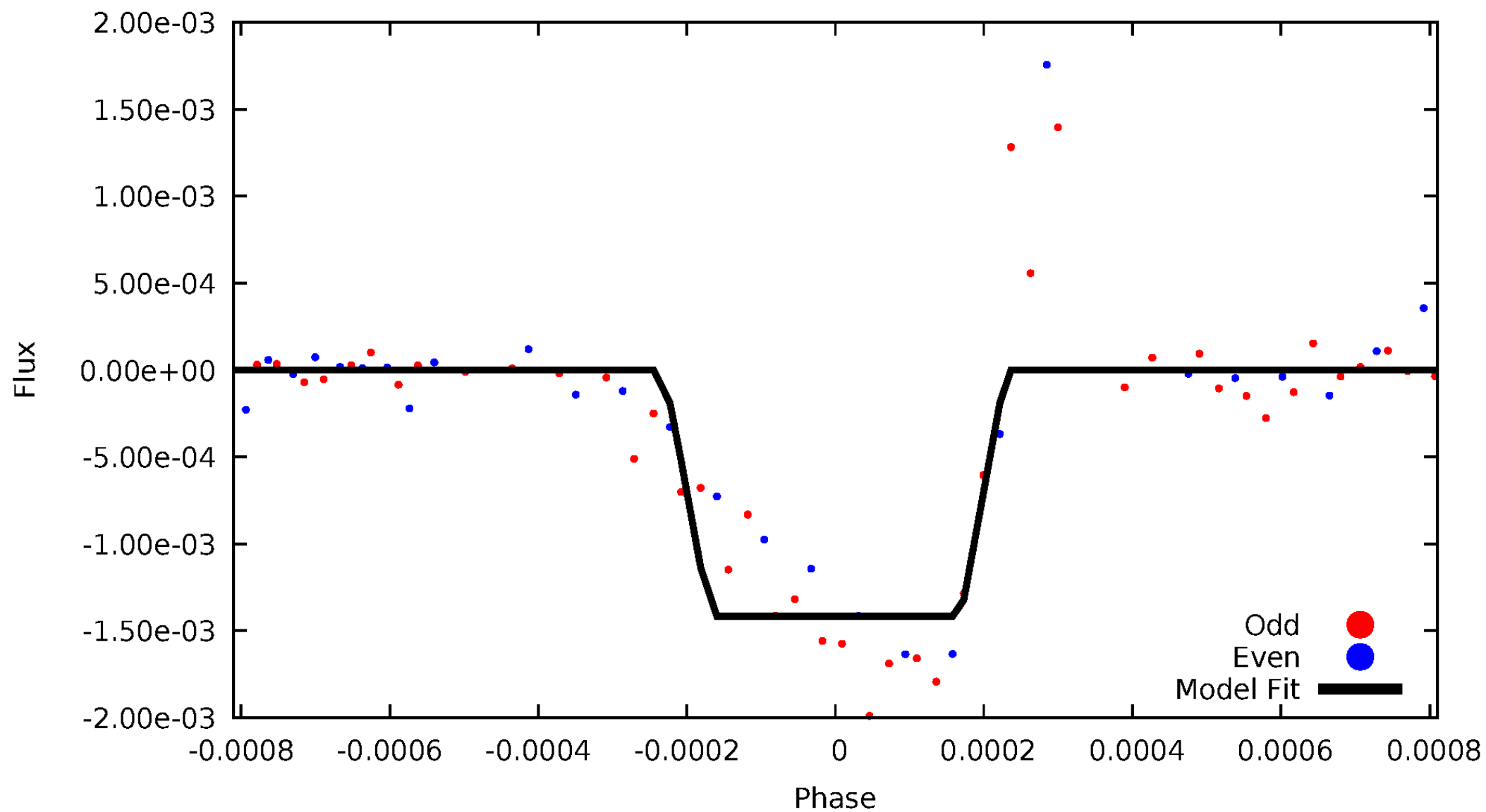
DV Odd/Even

TCE 012109430-05



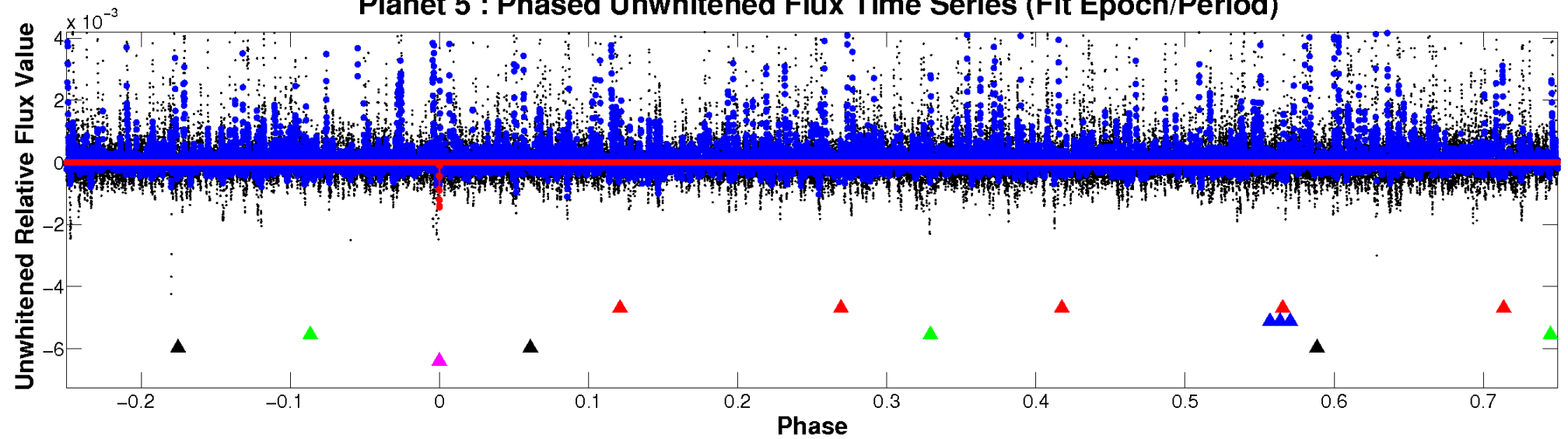
ALT Odd/Even

TCE 012109430-05

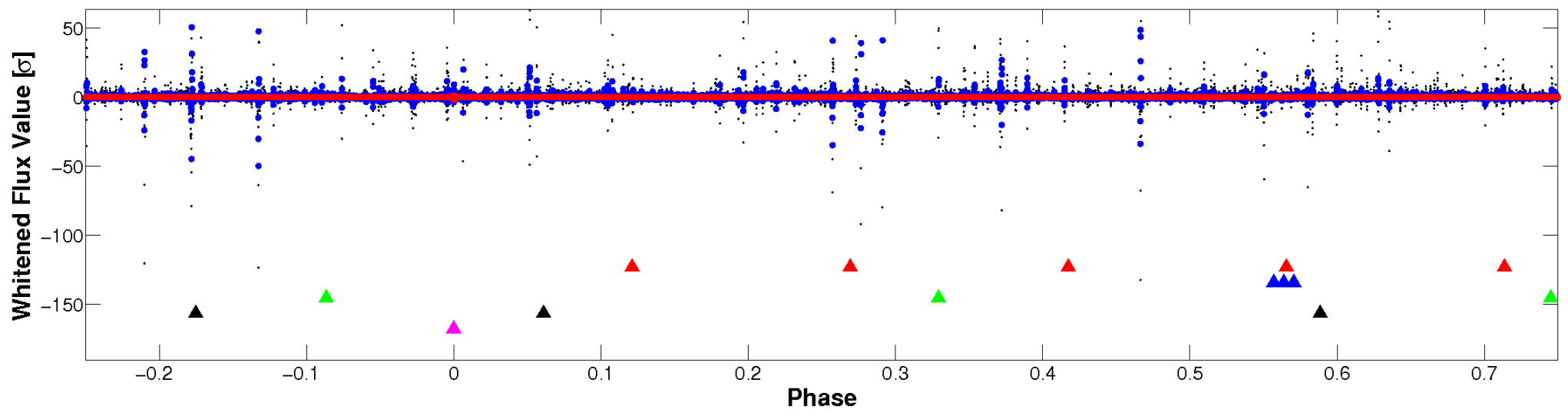


Non-Whitened Vs. Whitened Light Curve

Planet 5 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

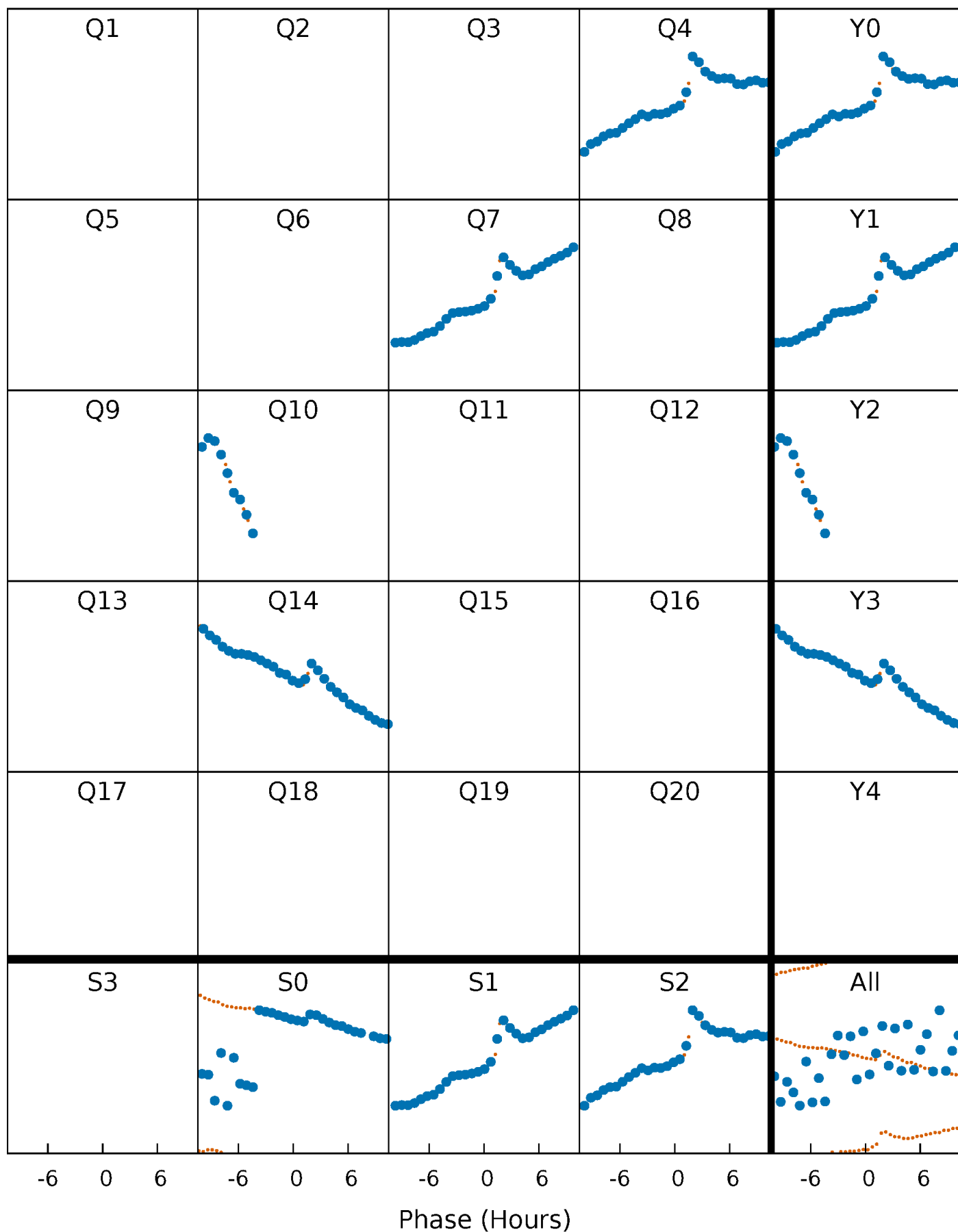


Planet 5 : Phased Whitened Flux Time Series (Fit Epoch/Period)



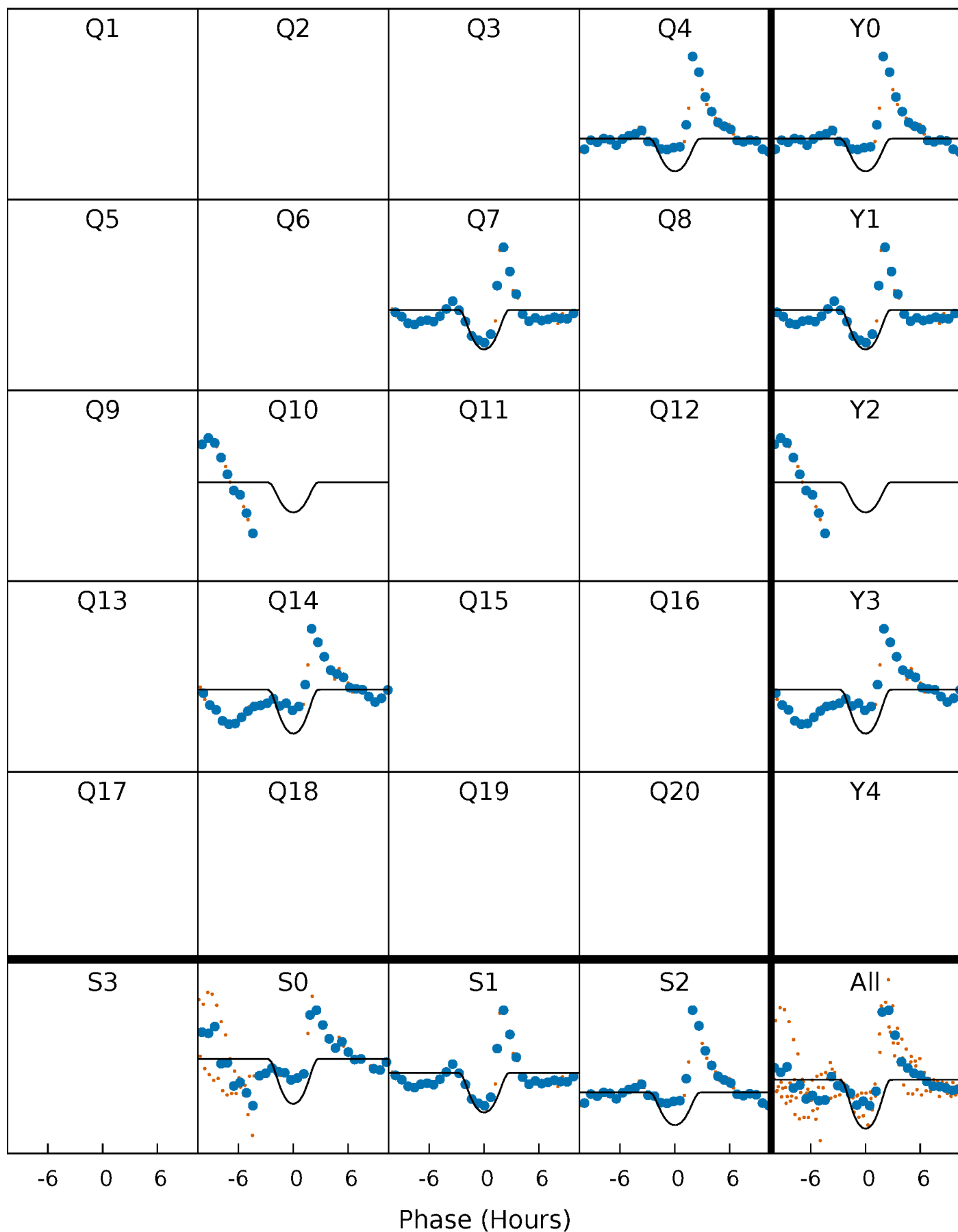
PDC Quarter-Phased Transit Curves

TCE 012109430-05 $P=322.169953$ Days $T_0=356.093757$ (BKJD)



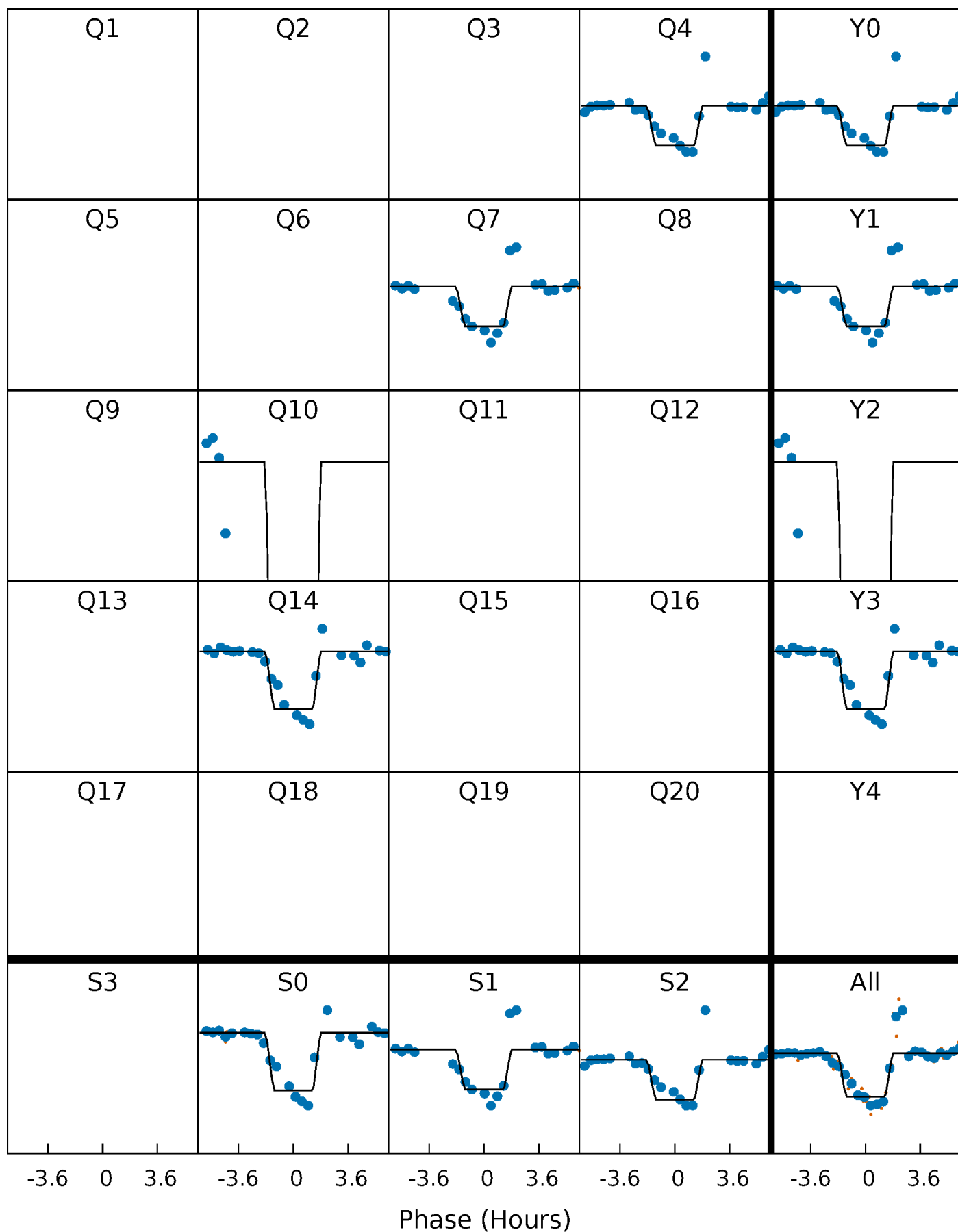
DV Quarter-Phased Transit Curves

TCE 012109430-05 $P=322.169953$ Days $T_0=356.093757$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

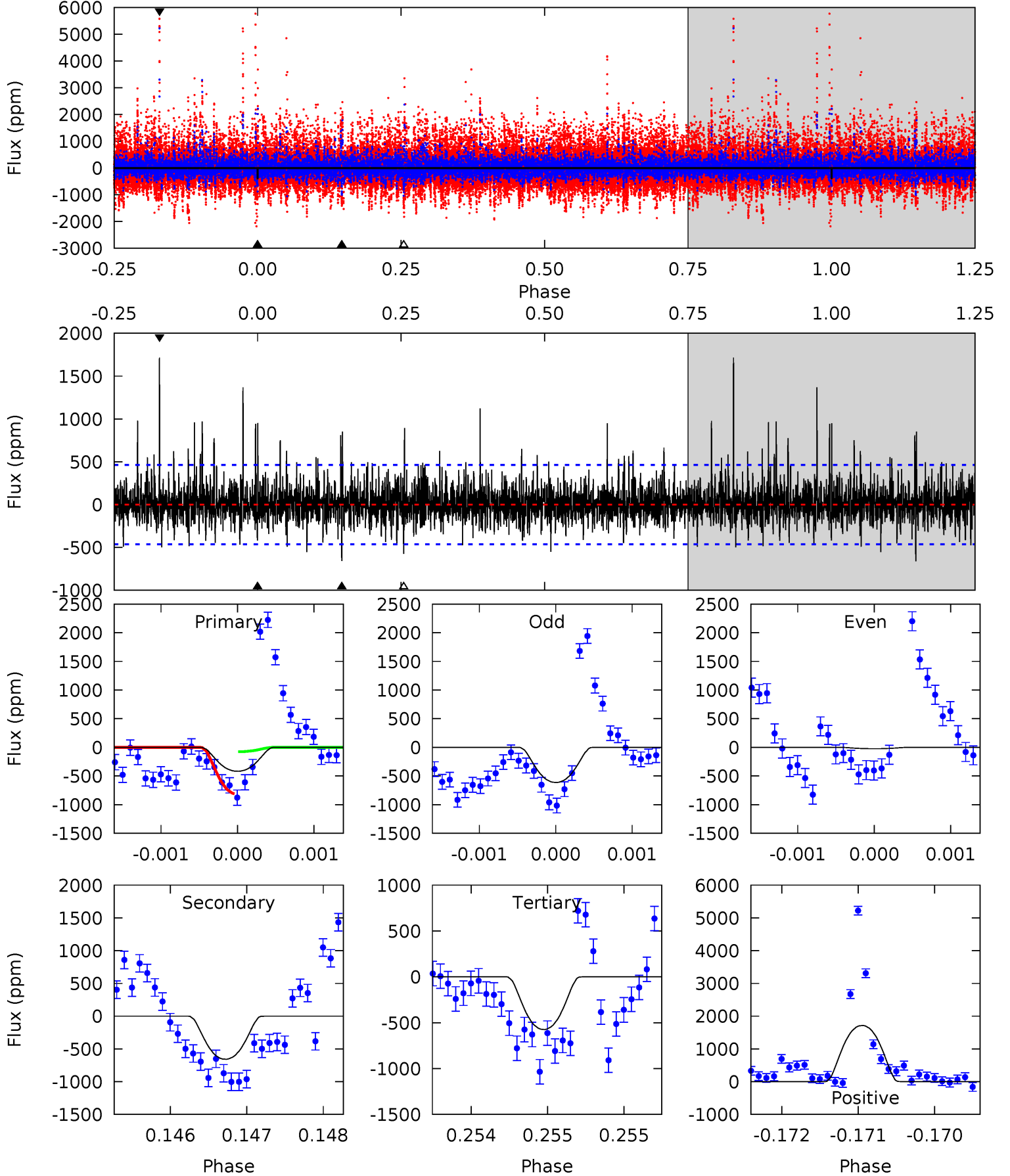
TCE 012109430-05 $P=322.173177$ Days $T_0=356.086146$ (BKJD)



DV Model-Shift Uniqueness Test

012109430-05, $P = 322.169953$ Days, $E = 33.923804$ Days

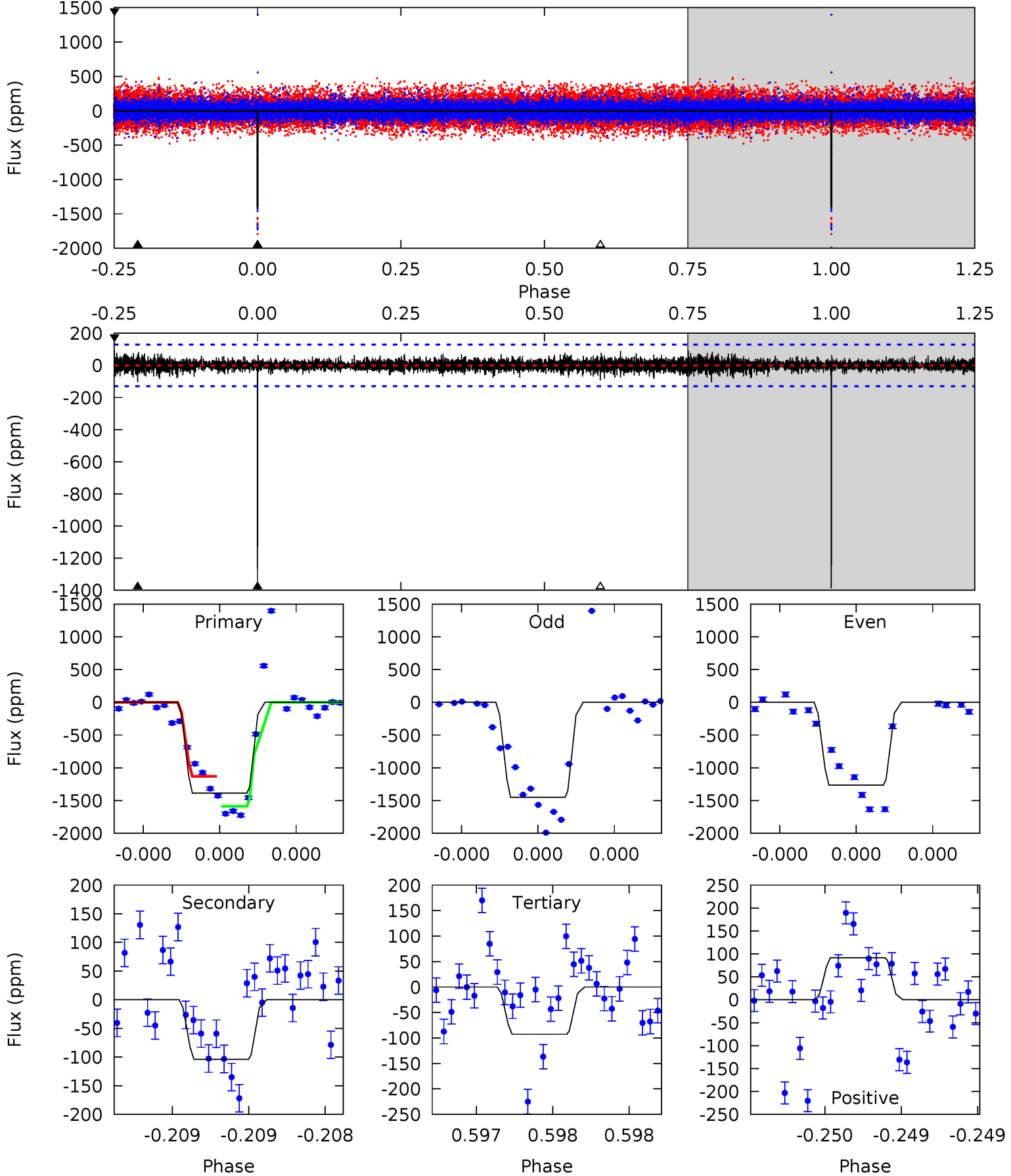
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
4.96	7.82	6.82	20.4	5.50	3.37	2.03	-1.86	-15.4	1.00	-12.6	1.95	0.98	0.72	4.40



Alt Model-Shift Uniqueness Test

012109430-05, $P = 322.173177$ Days, $E = 33.912969$ Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
60.0	4.48	4.00	3.96	5.59	3.51	0.85	56.0	56.0	0.48	0.53	3.81	1.02	0.06	9.44



Stellar Parameters For KIC 012109430

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (g \cdot \text{cm}^{-3})$
	4487^{+161}_{-161}	$4.614^{+0.046}_{-0.028}$	$-0.080^{+0.300}_{-0.300}$	$0.670^{+0.048}_{-0.058}$	$0.673^{+0.067}_{-0.061}$	$3.151^{+0.671}_{-0.381}$
	+4%/-4%	+1%/-1%	+375%/-375%	+7%/-9%	+10%/-9%	+21%/-12%
Source	PHO54	PHO54	PHO54	DSEP		

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

Secondary Eclipse Parameters for KIC 012109430-05 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-659 ± 84	$3.50^{+0.93}_{-0.87}$	251^{+10}_{-10}	3585^{+391}_{-279}	18777^{+16565}_{-6948}
Alt.	-104 ± 23	$2.76^{+0.90}_{-0.91}$	251^{+10}_{-10}	2923^{+371}_{-237}	4912^{+6029}_{-2242}

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 $A_{obs} \gg 1.0$

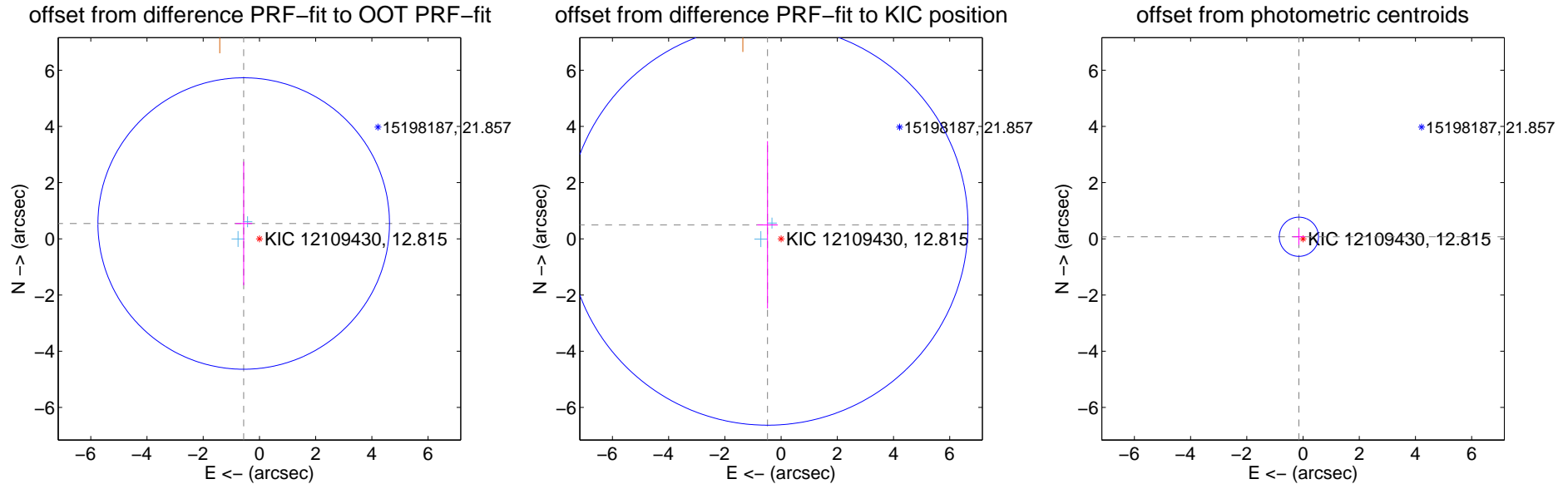
DV Centroid Data

Supplemental centroid analysis for 012109430-05. Kepler magnitude: 12.81. Transit SNR 8.02

There are 2 quarters with good PRF difference image offsets

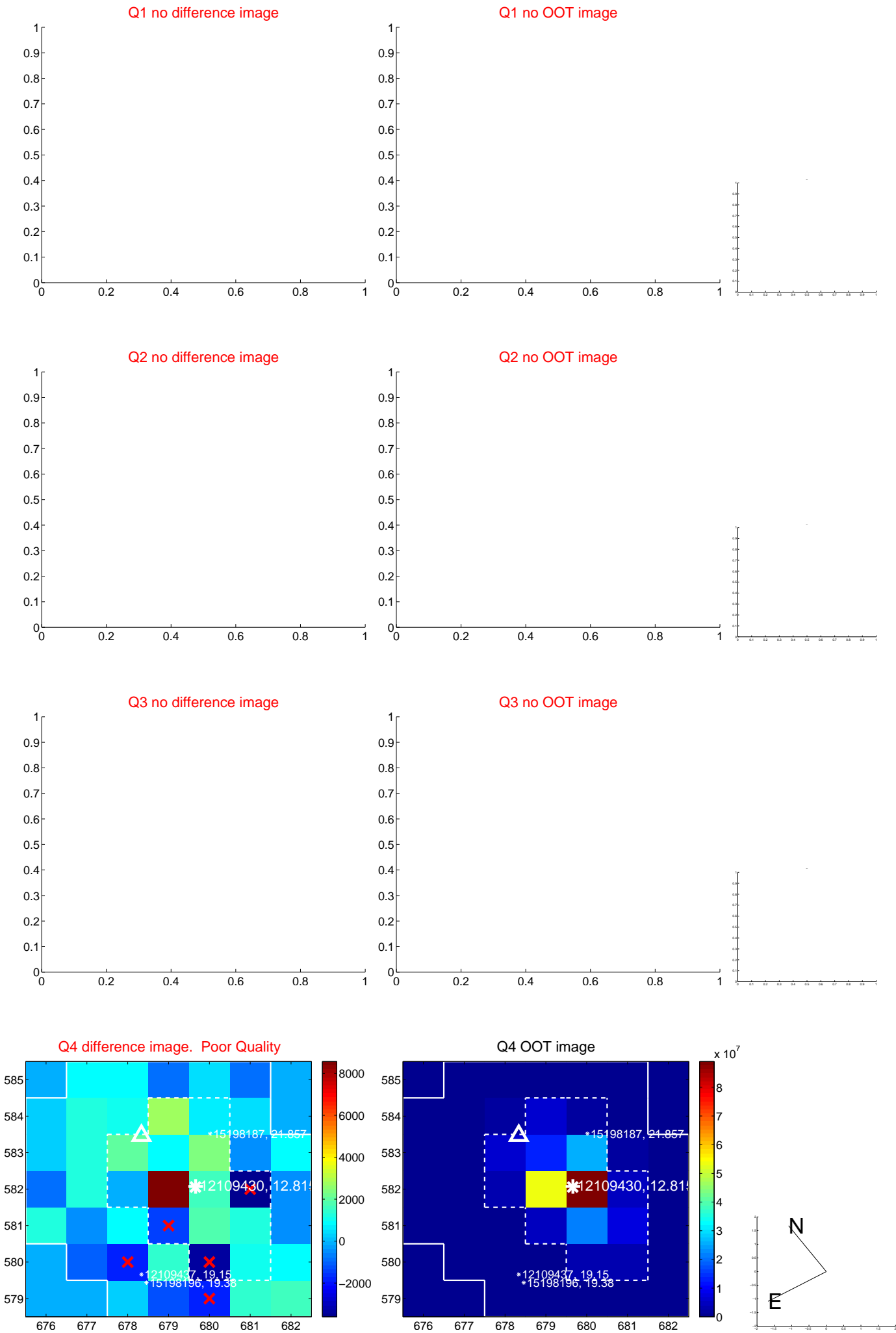
The direct PRF centroid is offset from the target star catalog position by about 0.04 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.781 ± 1.728	0.45	0.560 ± 0.301	0.545 ± 2.196
PRF-fit source offset from KIC position	0.693 ± 2.376	0.29	0.482 ± 0.366	0.497 ± 2.976
photometric centroid source offset	0.17 ± 0.23	0.71	0.15 ± 0.22	0.07 ± 0.29

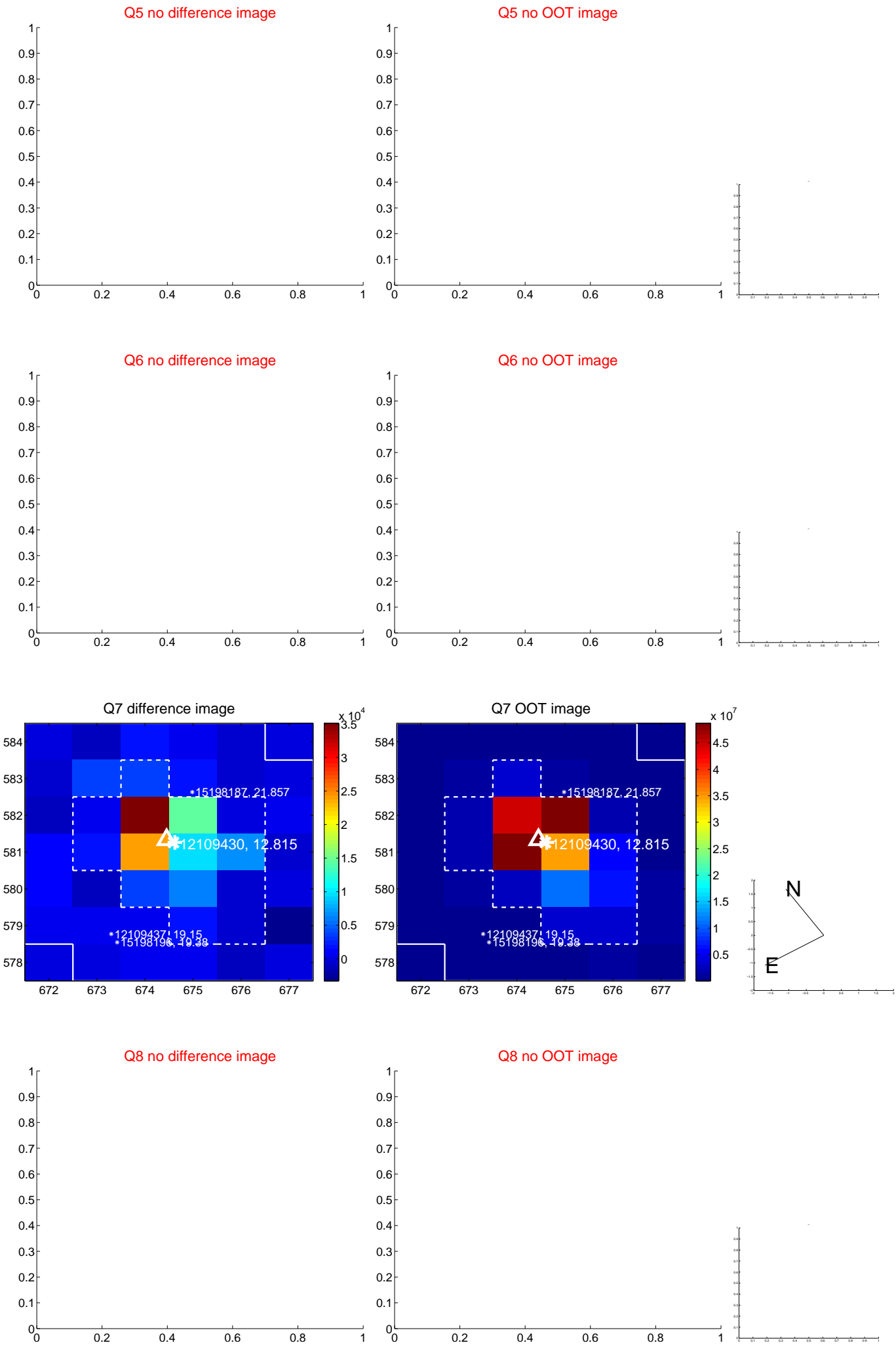


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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



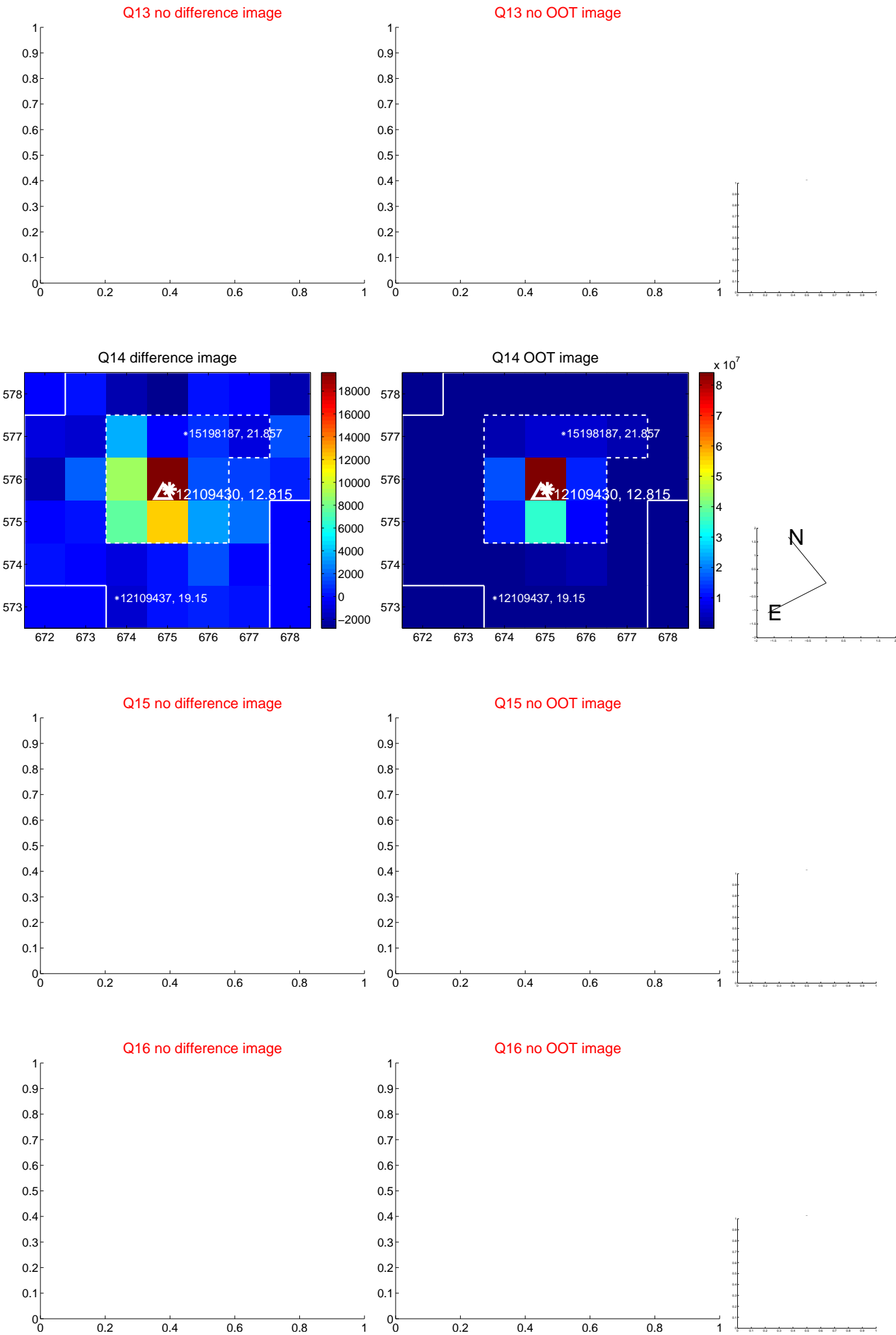
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



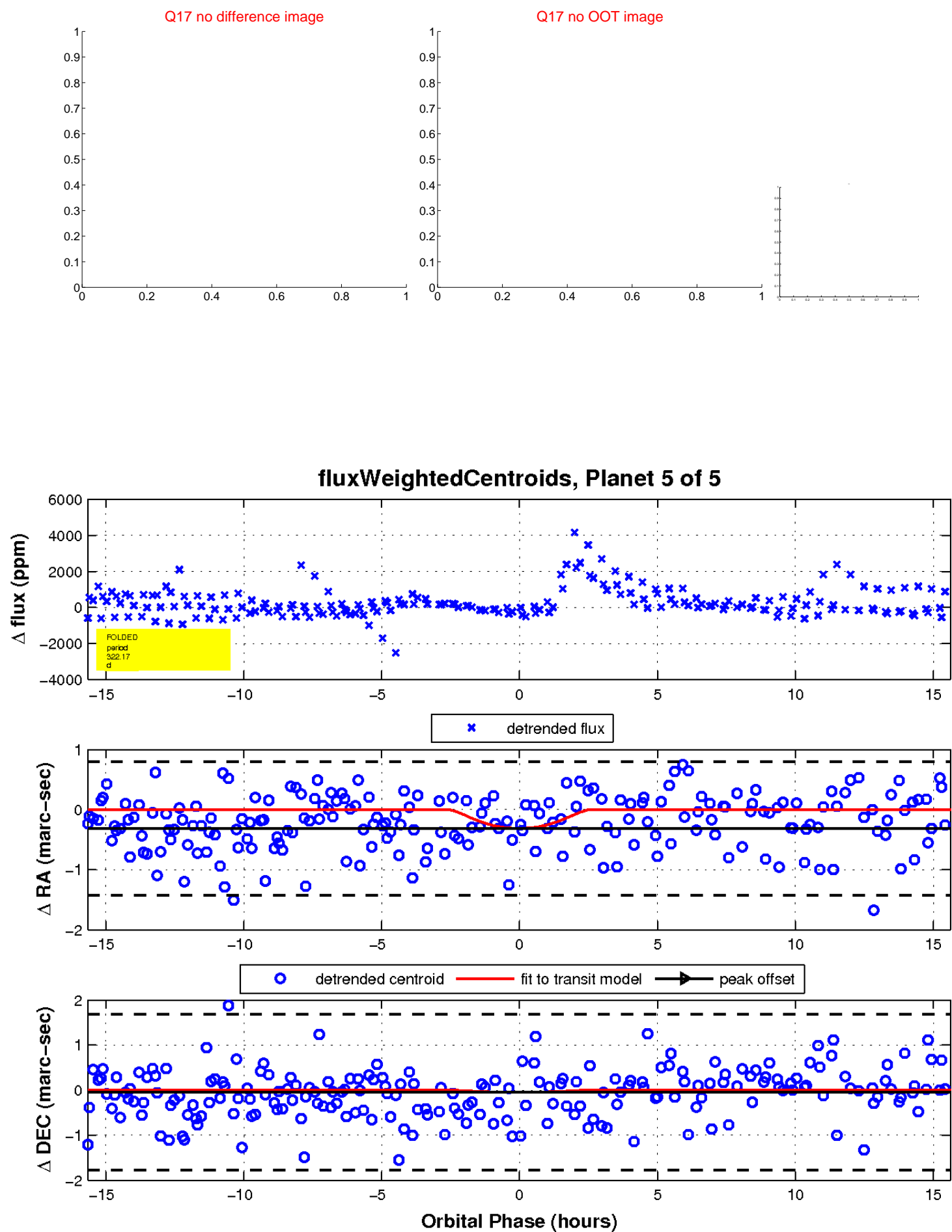
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

