

KIC 004373146

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})
004373146-02	OBS	No	625.991272	149.425982	920.2	4.942	11.4	8.2	0.63	5261	1.96	0.18
004373146-03	OBS	No	666.361759	186.972584	830.1	5.271	10.5	7.2	0.63	5261	1.95	0.17
004373146-04	OBS	No	196.686461	161.492300	468.8	5.719	9.1	6.0	0.63	5261	1.41	0.85

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004373146-02	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—INCONSISTENT_TRANS—CENT_FEW_DIFFS
004373146-03	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—INCONSISTENT_TRANS—CENT_FEW_DIFFS
004373146-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL

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

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

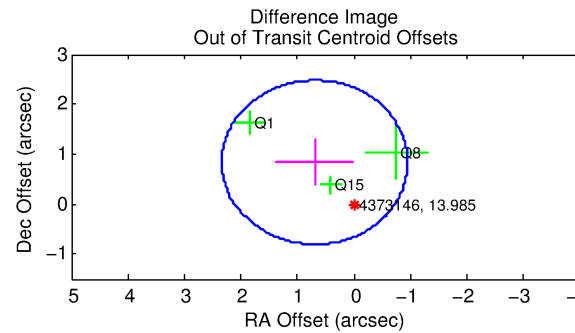
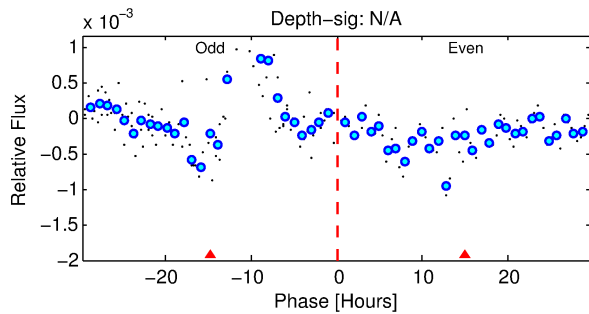
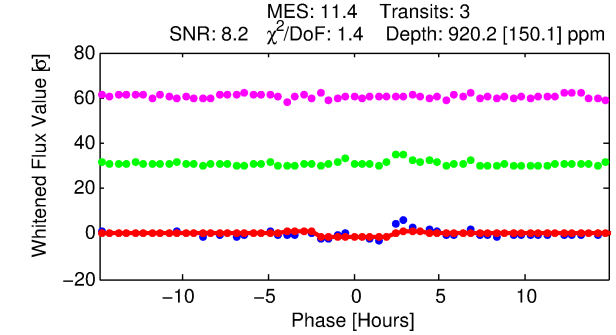
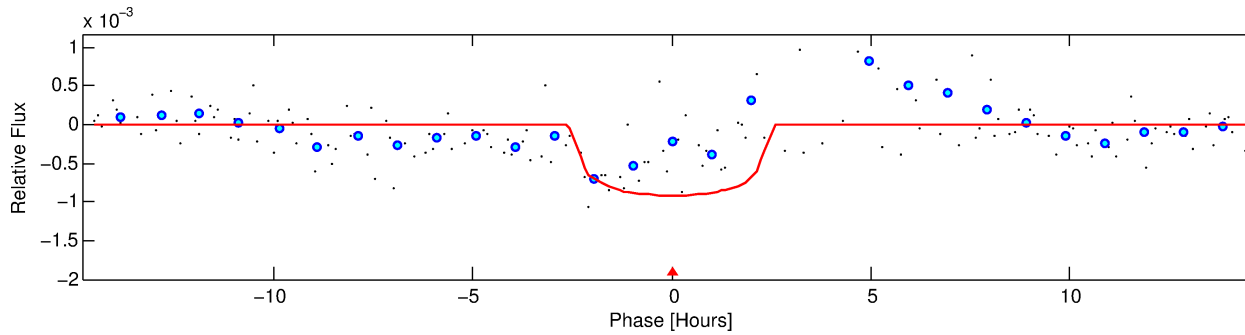
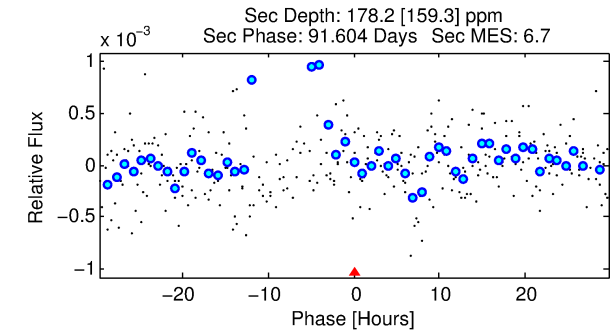
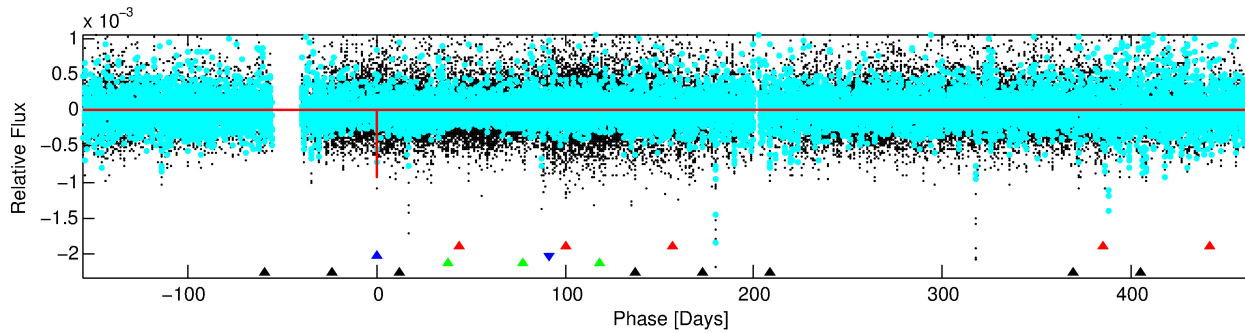
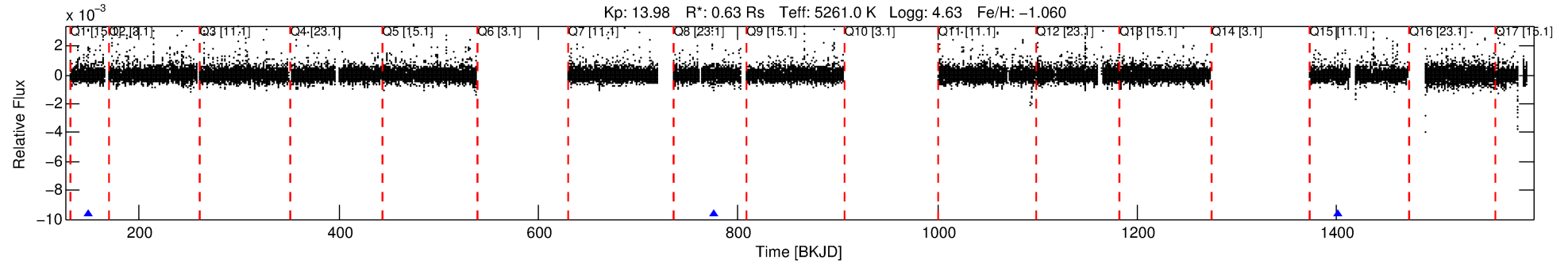
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 004373146-02

No Significant Match Found

DV One-Page Summary

KIC: 4373146 Candidate: 2 of 4 Period: 625.991 d



DV Fit Results:

Period = 625.99127 [0.00522] d
Epoch = 149.4260 [0.0068] BKJD
Rp/R* = 0.0284 [0.0258]
a/R* = 869.10 [3436.10]
b = 0.50 [5.95]
Seff = 0.18 [0.03]
Teq = 167 [7] K
Rp = 1.96 [1.78] Re
a = 1.2227 [0.0886] AU
Ag = 38333.27 [77570.75] [0.49σ]
Teffp = 3604 [1824] K [1.88σ]

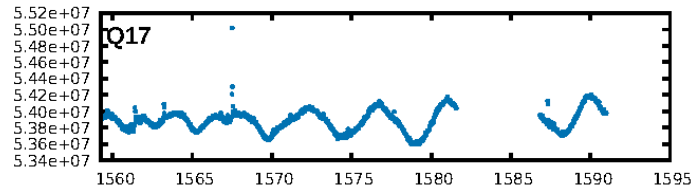
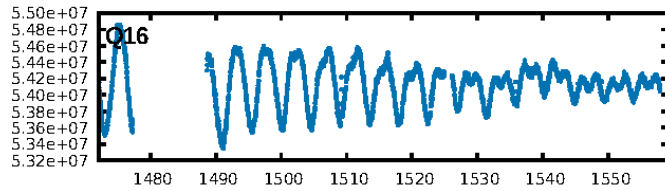
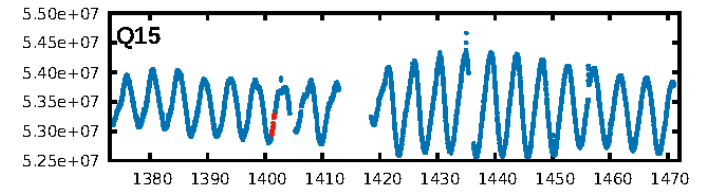
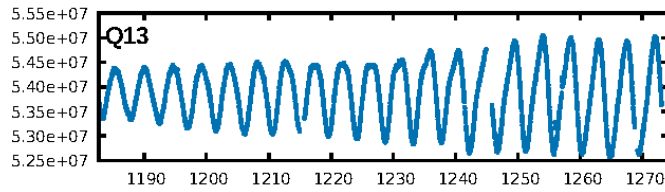
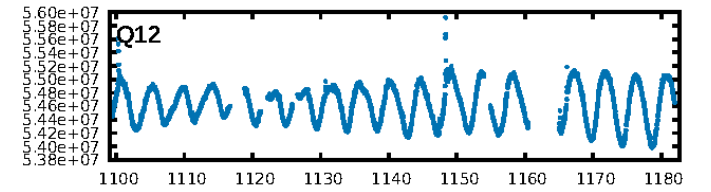
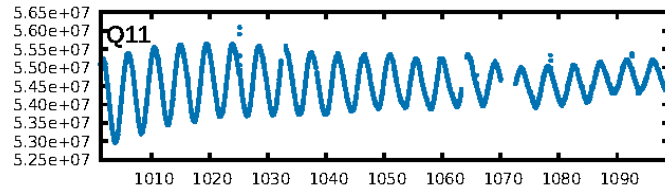
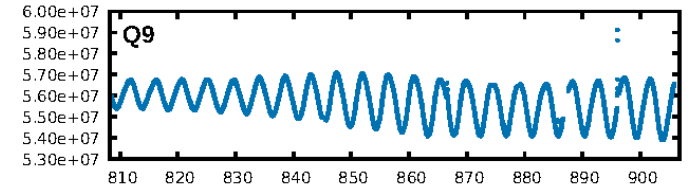
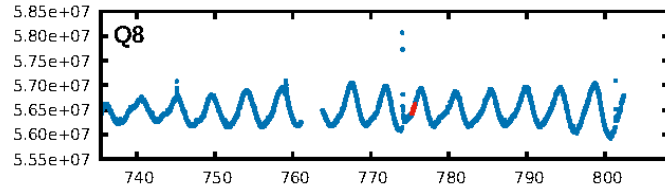
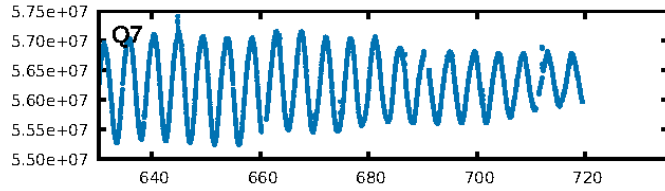
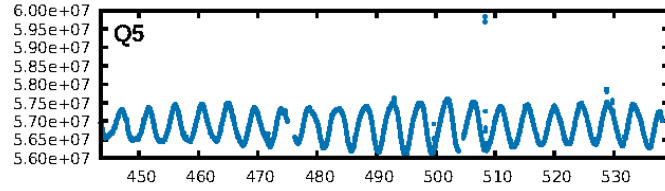
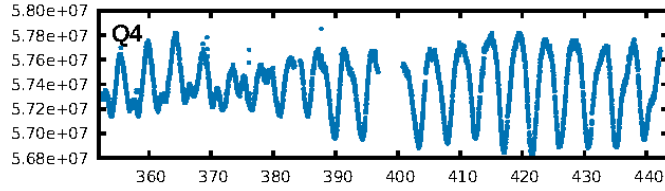
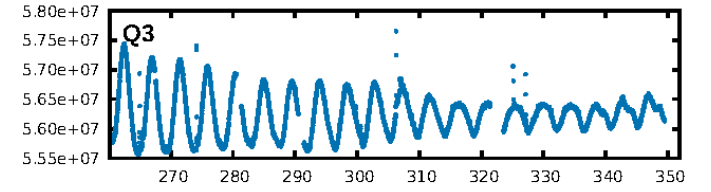
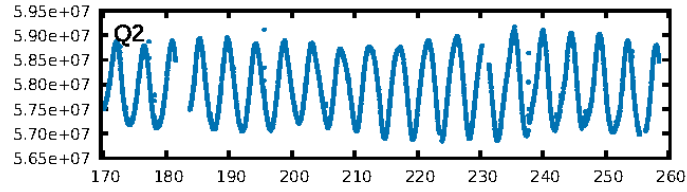
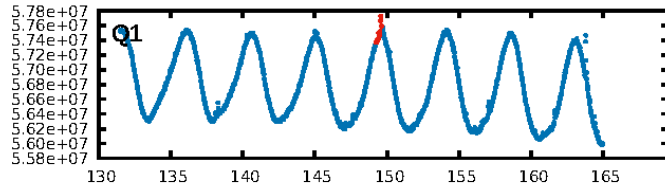
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [1291.92σ]
LongPeriod-sig: 100.0% [134.10σ]
ModelChiSquare2-sig: 2.3%
ModelChiSquareGof-sig: 62.8%
Bootstrap-pfa: 1.07e-10
RollingBand-fgt: 1.00 [2/2]
GhostDiagnostic-chr: 0.5942
Centroid-sig: 19.2%
Centroid-so: 0.819 arcsec [1.04σ]
OotOffset-rm: 1.088 arcsec [1.98σ]
OotOffset-st: 0/1/1/1 [3]
KicOffset-rm: 1.052 arcsec [1.57σ]
KicOffset-st: 0/1/1/1 [3]
DiffImageQuality-fgm: 0.67 [2/3]
DiffImageOverlap-fno: 1.00 [3/3]

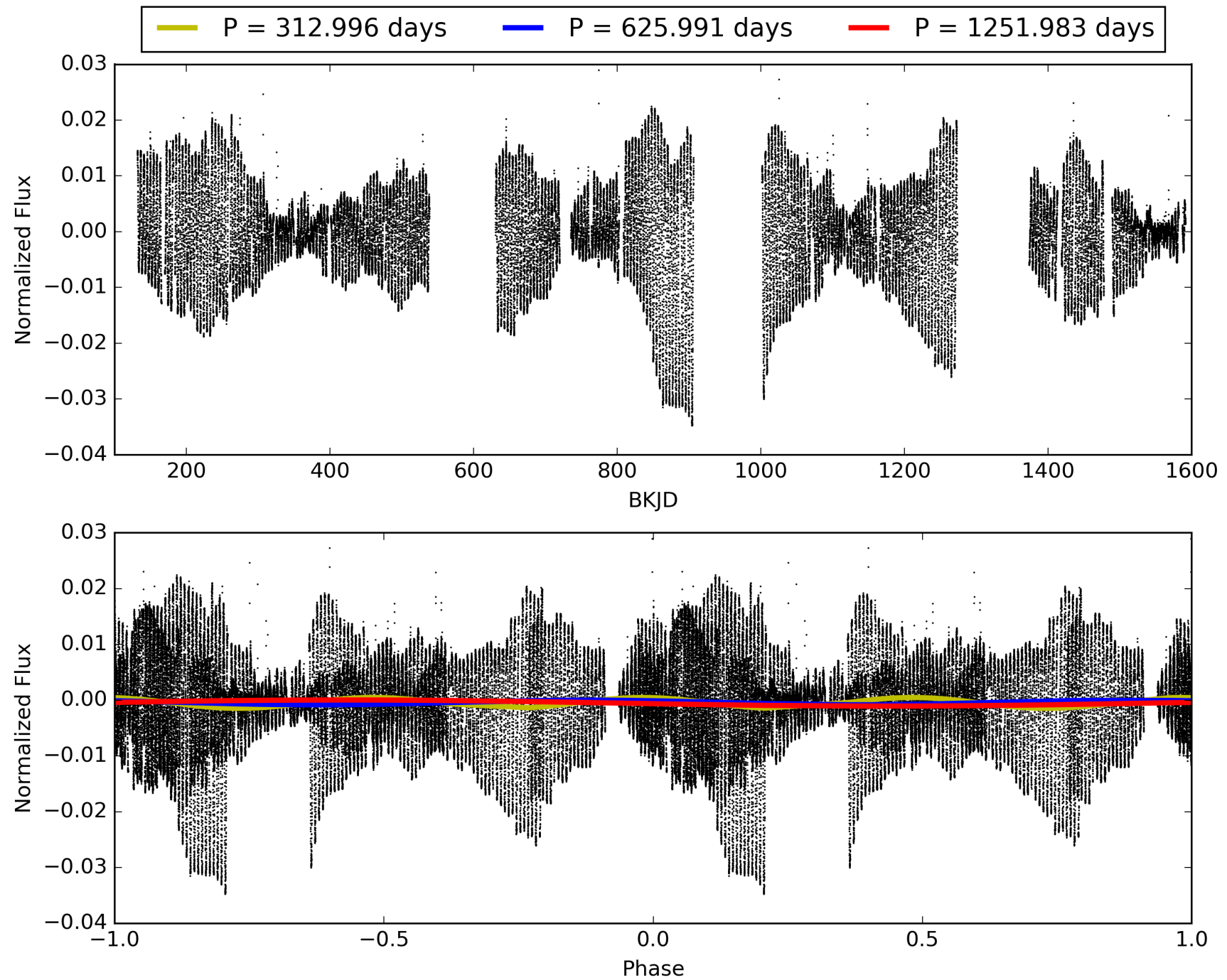
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This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

TCE 004373146-02, PDC Light Curves

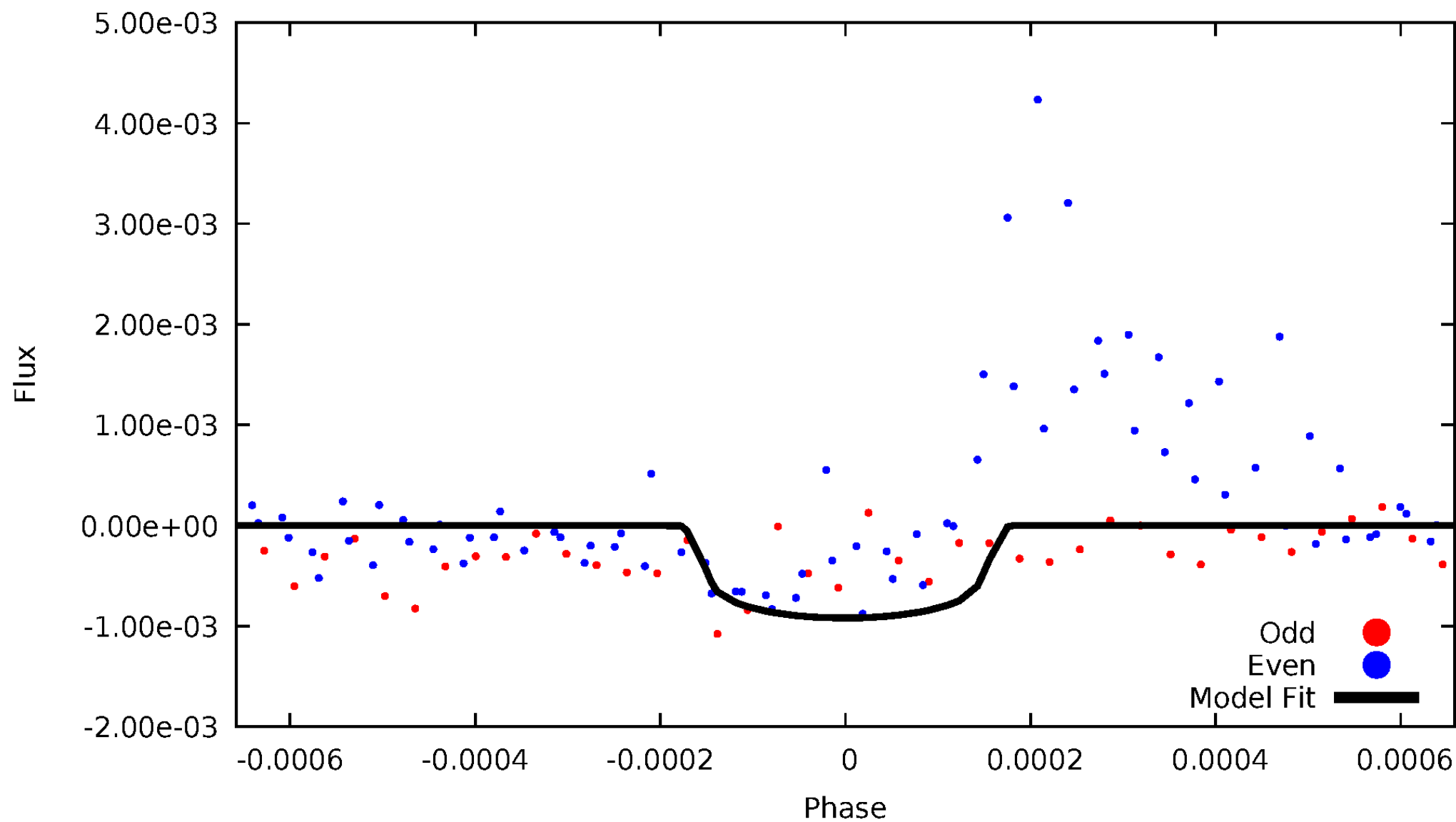


TCE 004373146-02



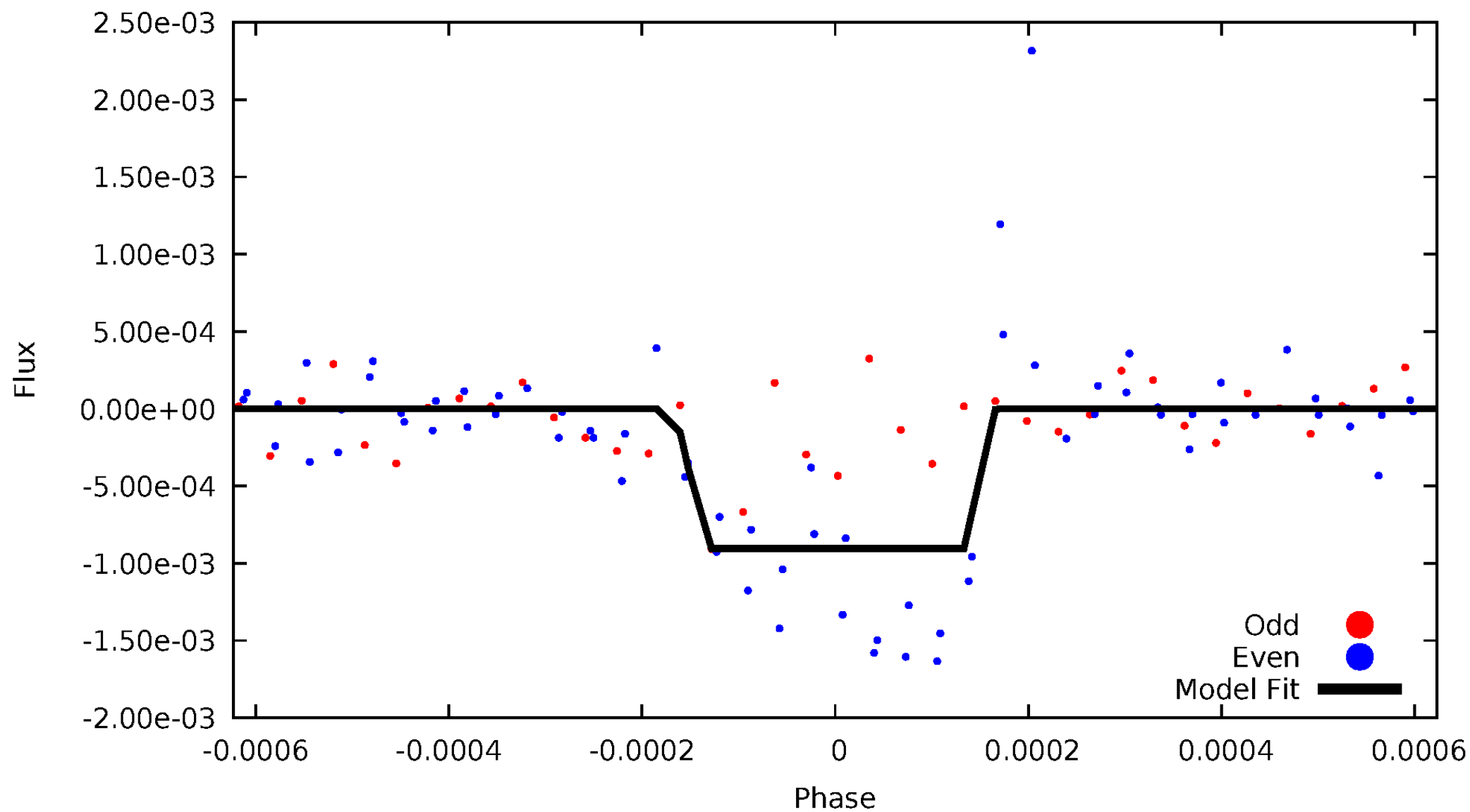
DV Odd/Even

TCE 004373146-02



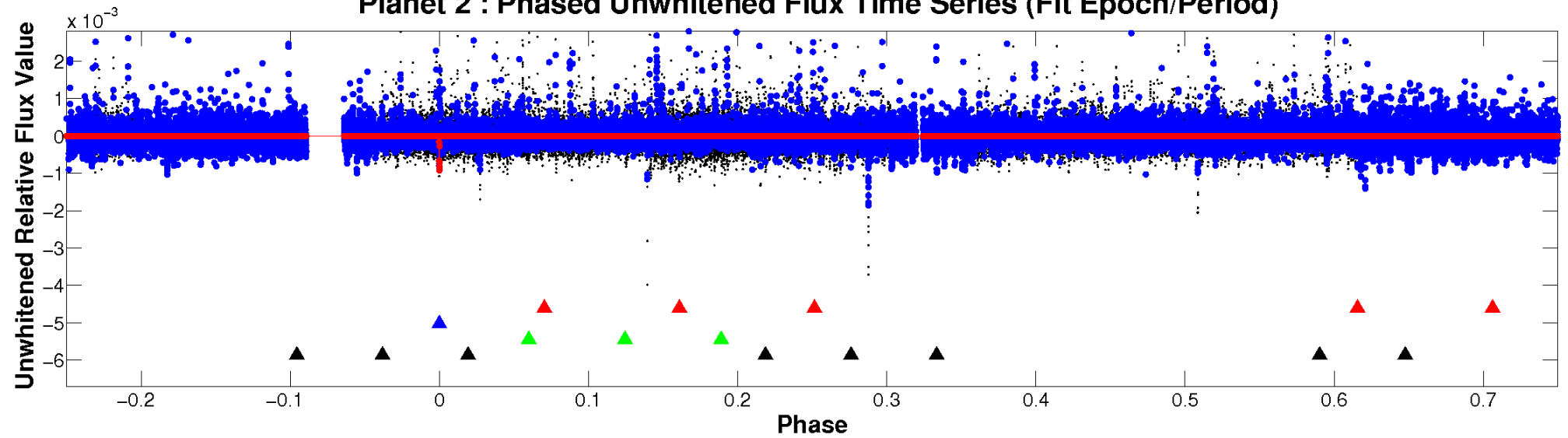
ALT Odd/Even

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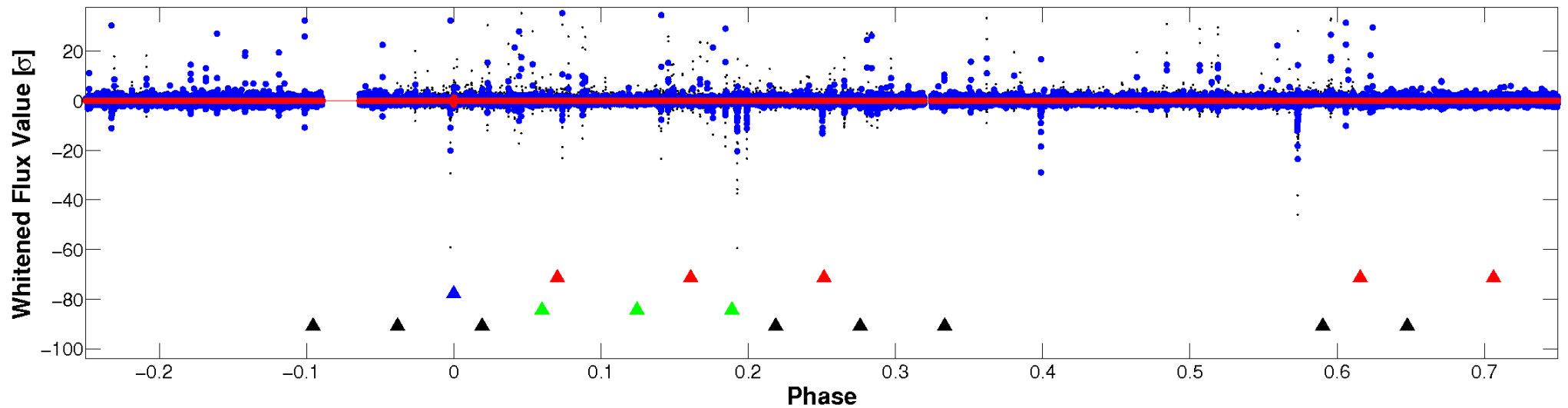


Non-Whitened Vs. Whitened Light Curve

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

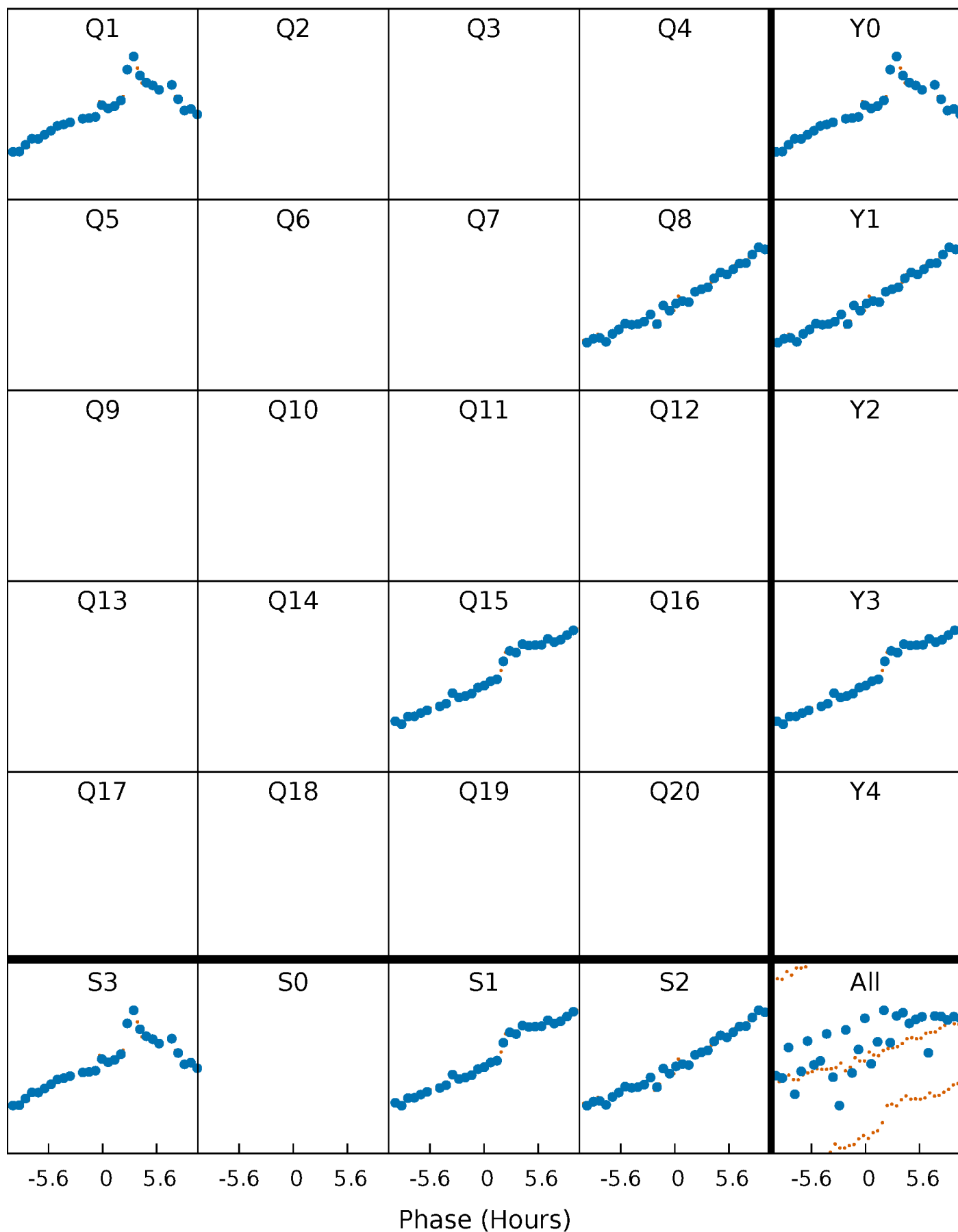


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



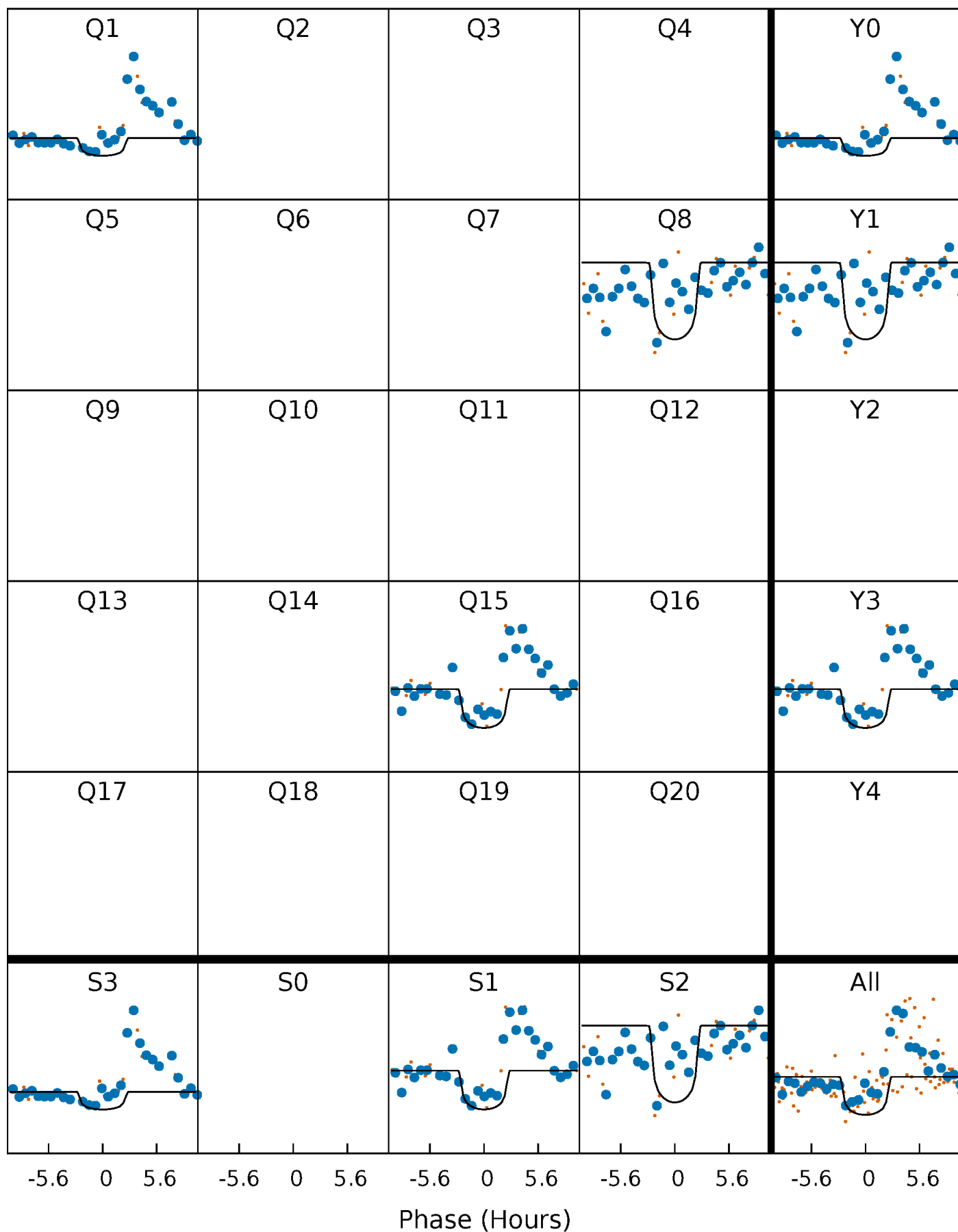
PDC Quarter-Phased Transit Curves

TCE 004373146-02 P=625.991272 Days $T_0=149.425982$ (BKJD)



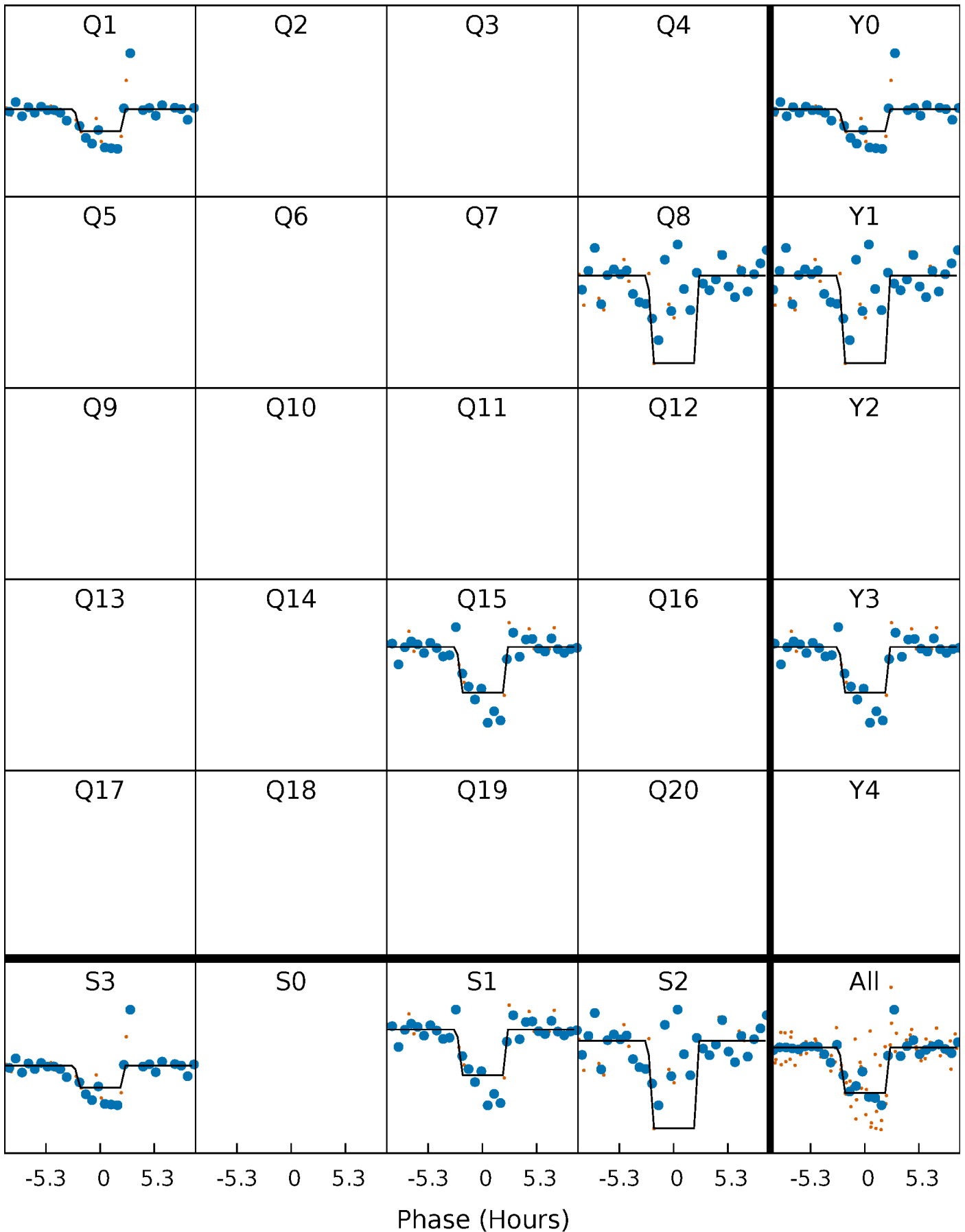
DV Quarter-Phased Transit Curves

TCE 004373146-02 $P=625.991272$ Days $T_0=149.425982$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

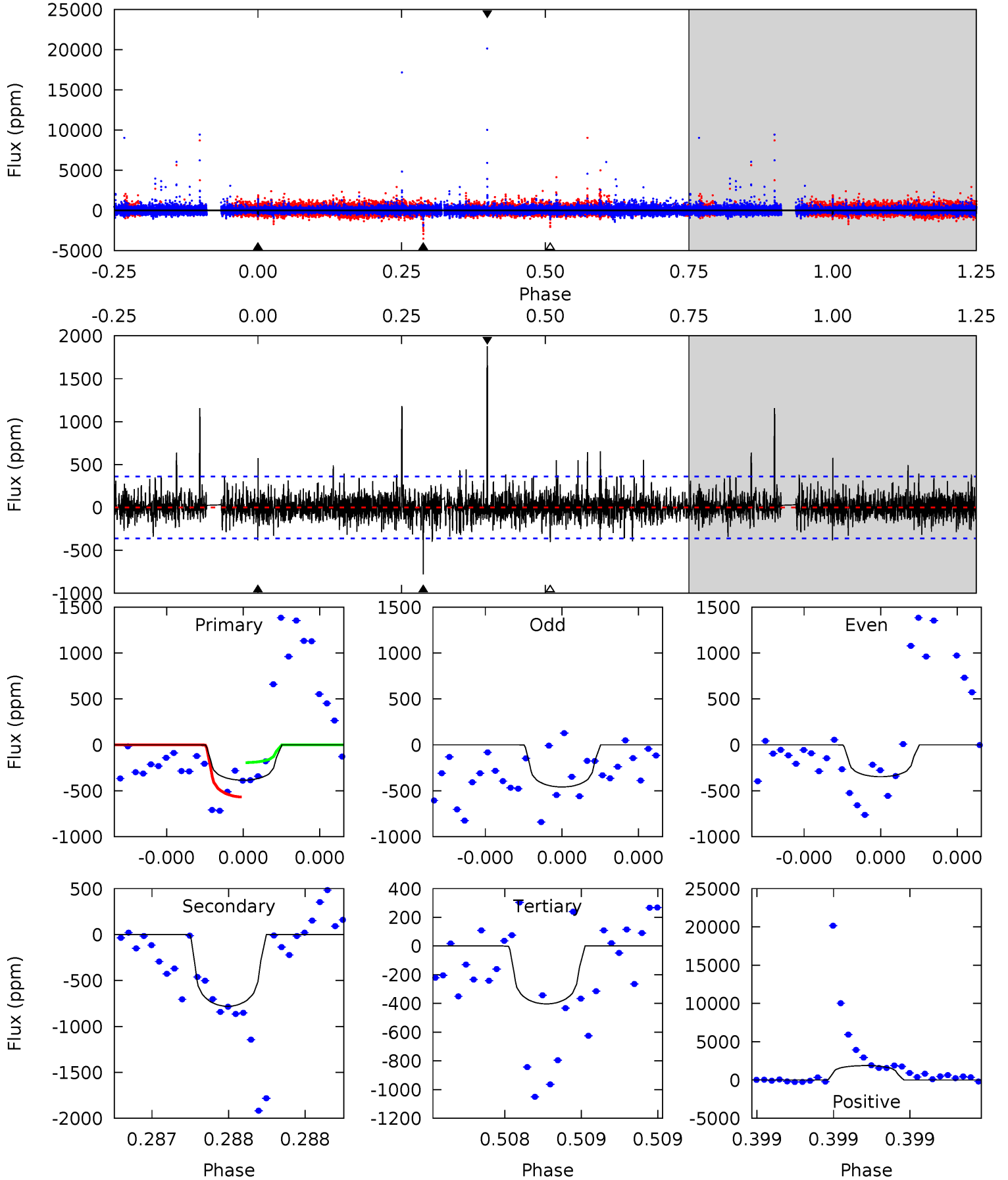
TCE 004373146-02 P=625.982111 Days $T_0=149.428639$ (BKJD)



DV Model-Shift Uniqueness Test

004373146-02, P = 625.991272 Days, E = 149.425982 Days

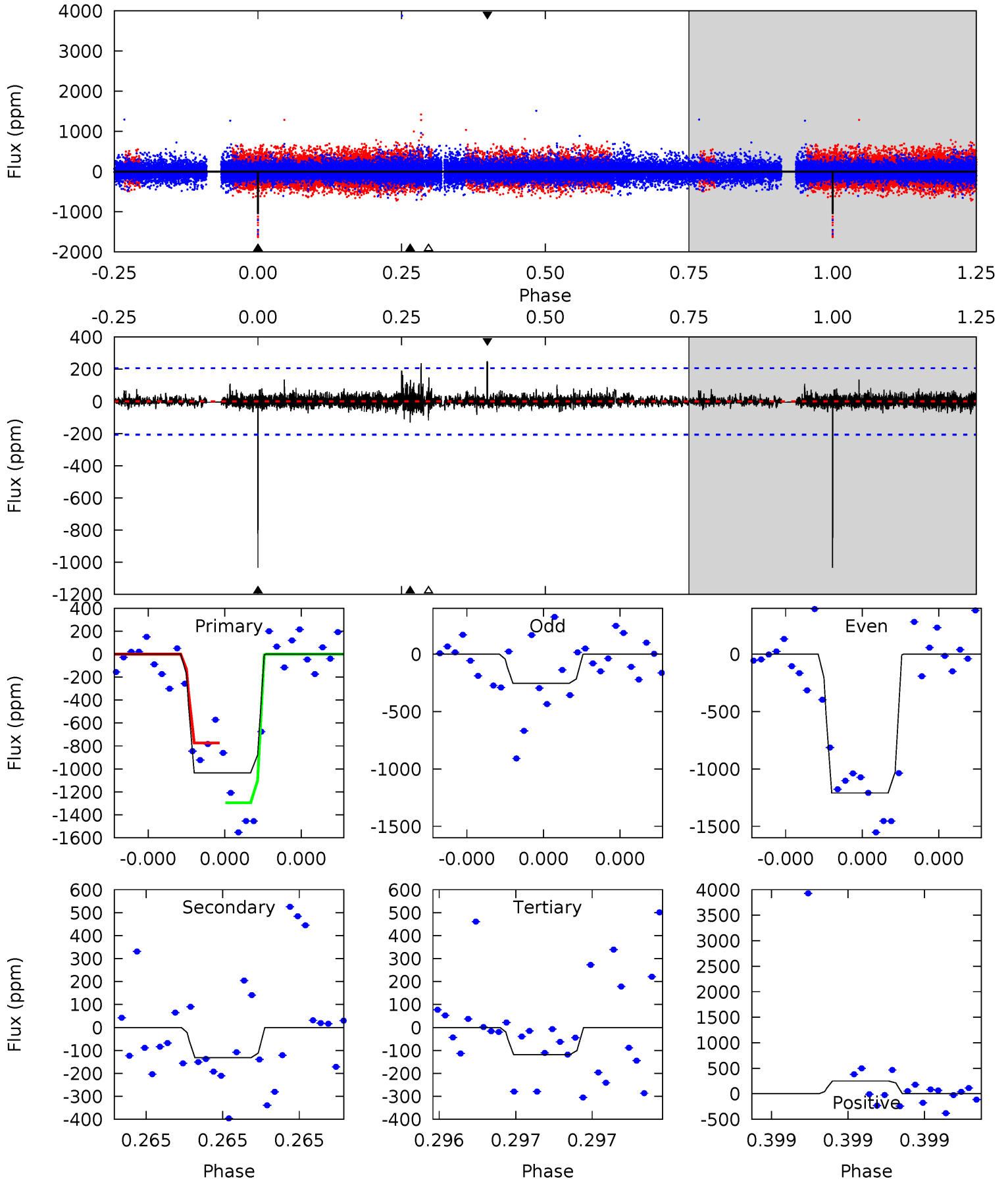
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
6.00	12.2	6.30	29.3	5.63	3.57	1.82	-0.29	-23.3	5.90	-17.2	0.43	0.83	0.71	2.93



Alt Model-Shift Uniqueness Test

004373146-02, P = 625.982111 Days, E = 149.428639 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
28.2	3.57	3.22	6.83	5.65	3.60	0.57	25.0	21.4	0.35	-3.26	13.8	0.81	0.19	7.27



Stellar Parameters For KIC 004373146

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	R (R_{\odot})	$M(M_{\odot})$	p_{\star} ($\text{g}\cdot\text{cm}^{-3}$)
	5261^{+158}_{-158}	$4.633^{+0.066}_{-0.044}$	$-1.060^{+0.350}_{-0.300}$	$0.630^{+0.049}_{-0.044}$	$0.621^{+0.059}_{-0.023}$	$3.496^{+0.838}_{-0.564}$
	+3%/-3%	+1%/-1%	+33%/-28%	+8%/-7%	+10%/-4%	+24%/-16%
Source	PHO1	KIC0	KIC0	DSEP		

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

Secondary Eclipse Parameters for KIC 004373146-02 / KOI

Detrend	Depth (ppm)	R_p (R_{\oplus})	T_{max} (K)	T_{obs} (K)	A_{obs}
DV	-781 ± 64	$2.20^{+1.69}_{-1.33}$	232^{+8}_{-8}	4981^{+2882}_{-1005}	$135750^{+724705}_{-92161}$
Alt.	-131 ± 37	$2.46^{+1.58}_{-1.52}$	232^{+8}_{-8}	3440^{+1401}_{-504}	$18290^{+100400}_{-12089}$

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

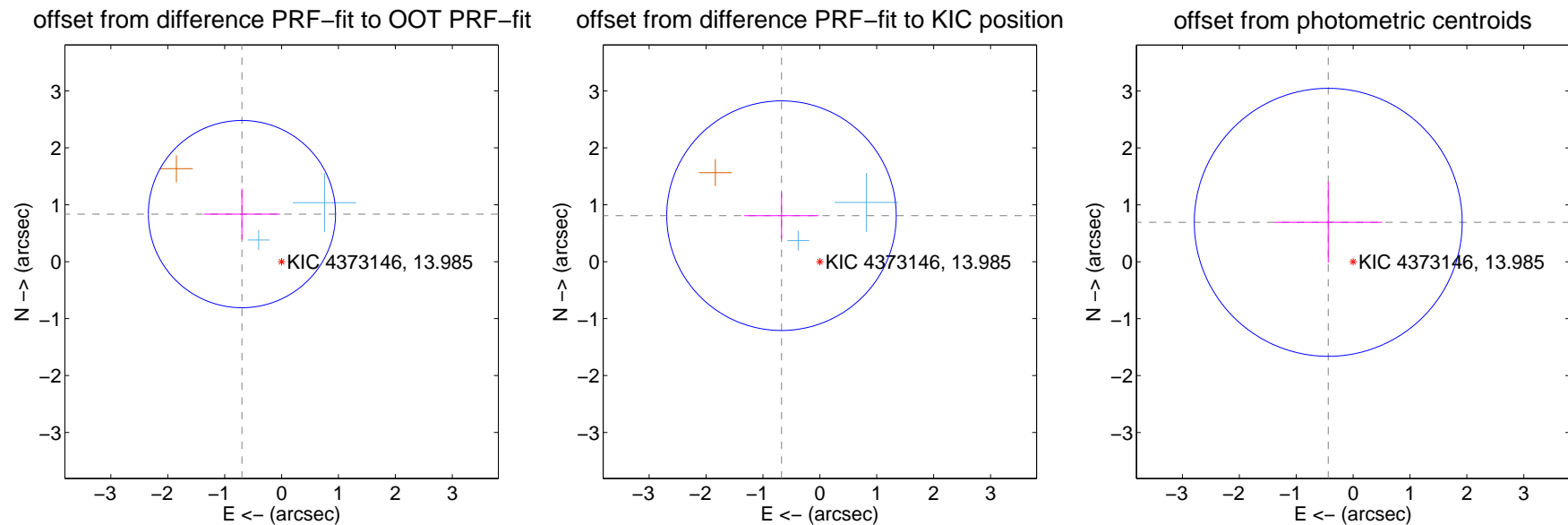
DV Centroid Data

Supplemental centroid analysis for 004373146-02. Kepler magnitude: 13.98. Transit SNR 8.21

There are 2 quarters with good PRF difference image offsets

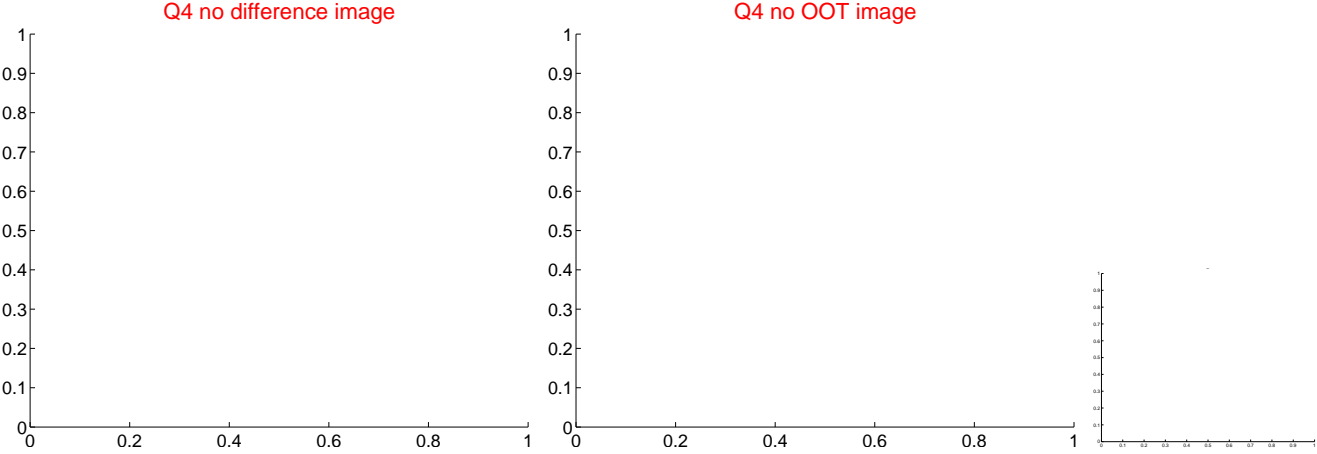
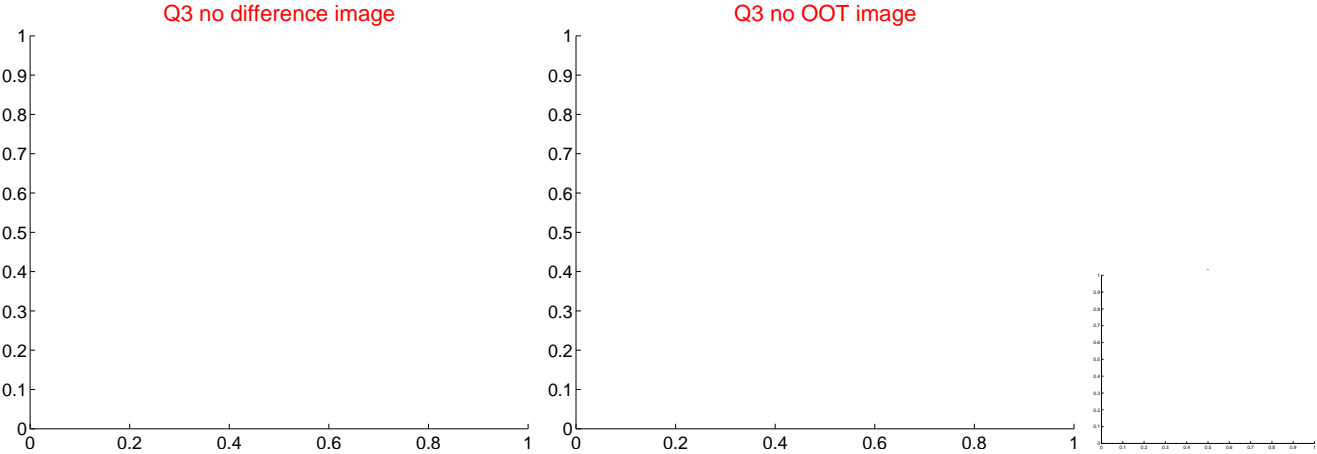
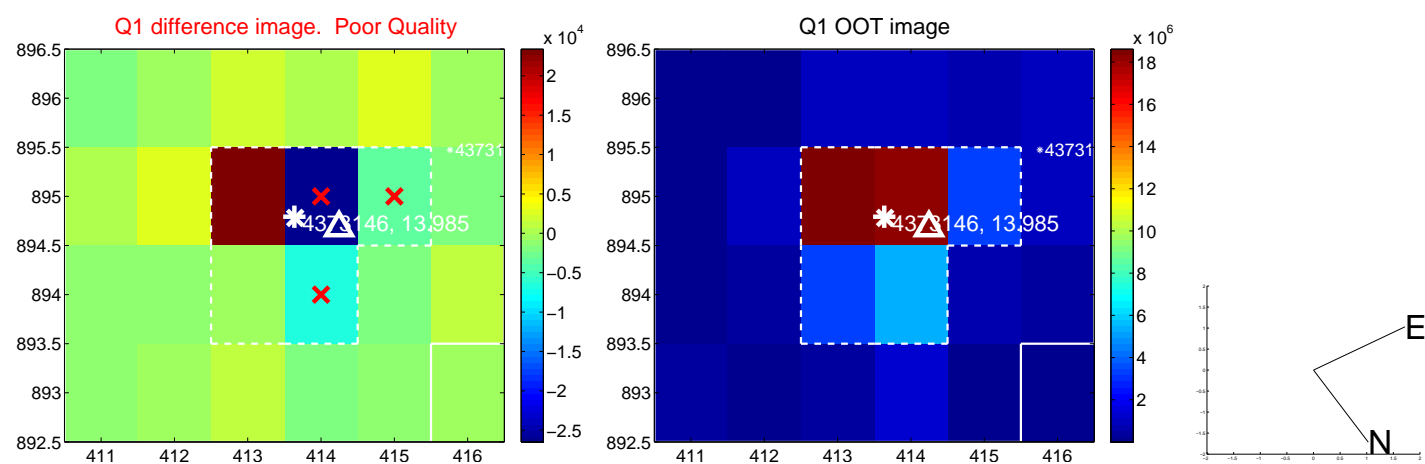
The direct PRF centroid is offset from the target star catalog position by about 0.03 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	1.088 ± 0.548	1.98	0.696 ± 0.668	0.836 ± 0.446
PRF-fit source offset from KIC position	1.052 ± 0.672	1.57	0.674 ± 0.653	0.808 ± 0.410
photometric centroid source offset	0.82 ± 0.78	1.04	0.44 ± 0.95	0.69 ± 0.71

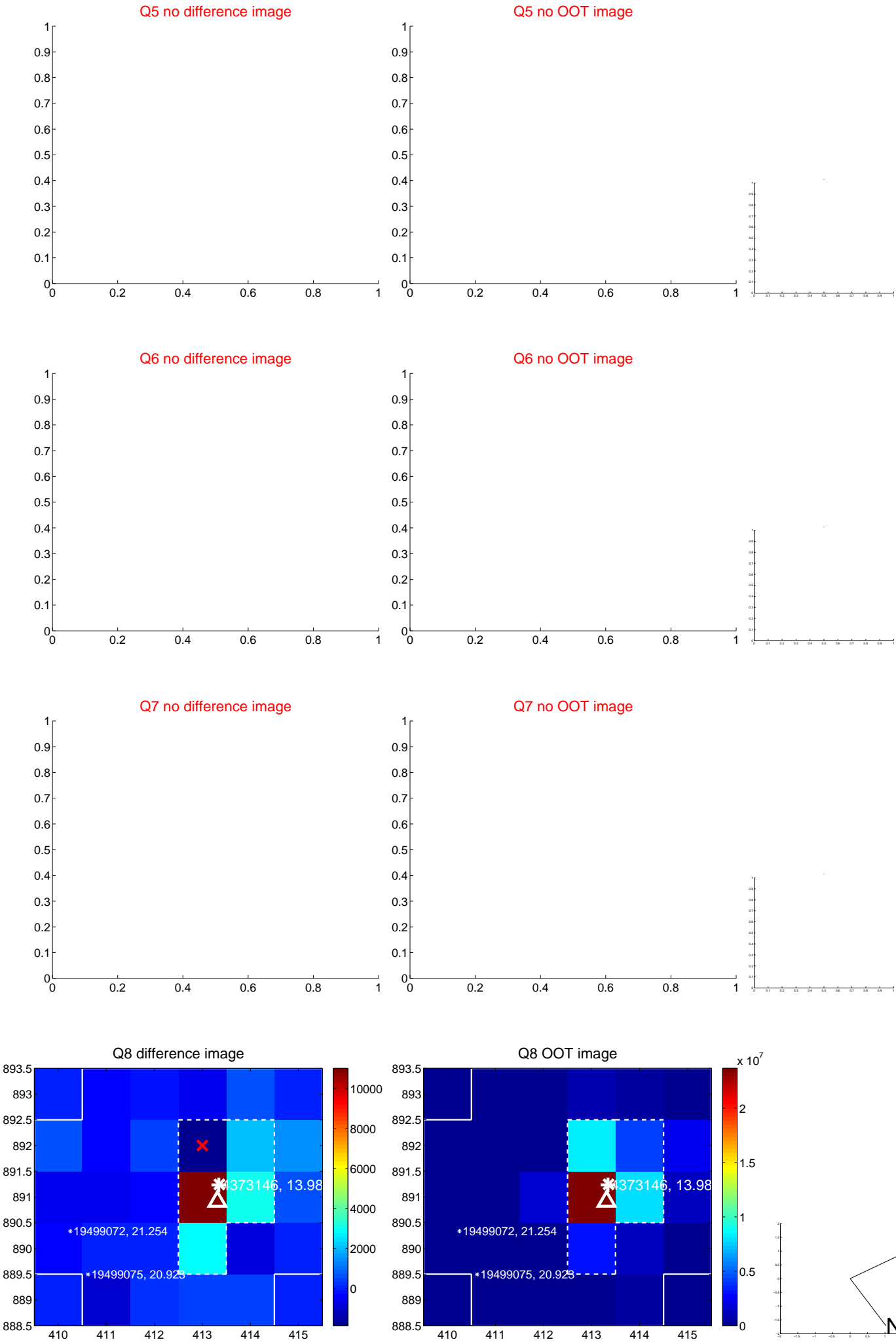


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ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



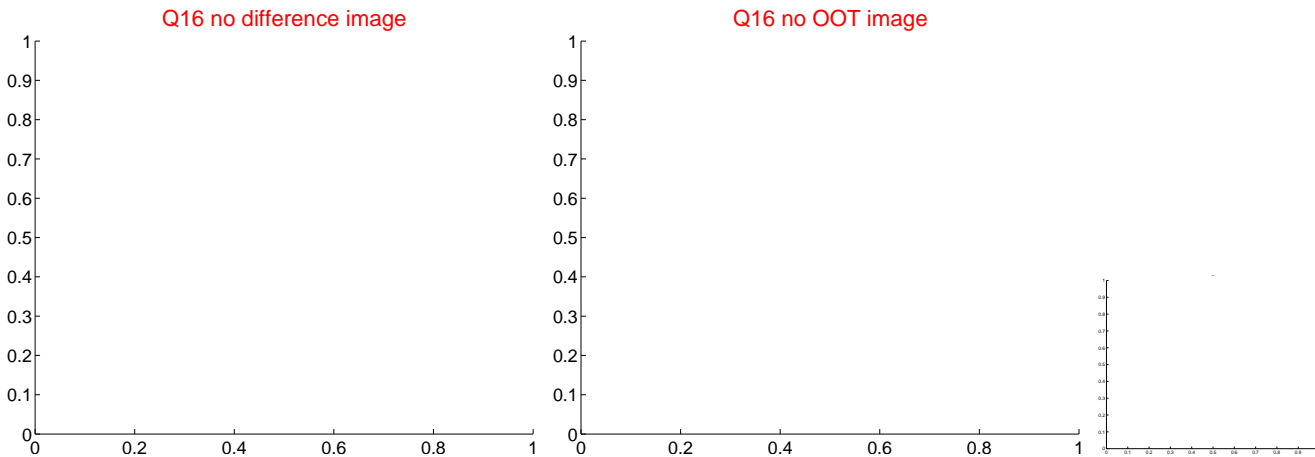
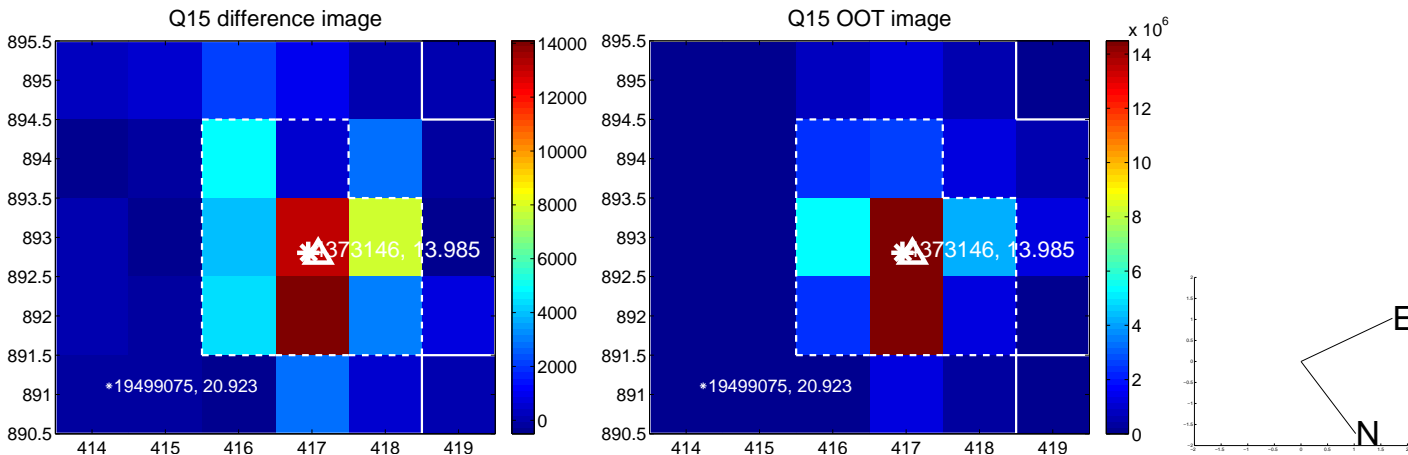
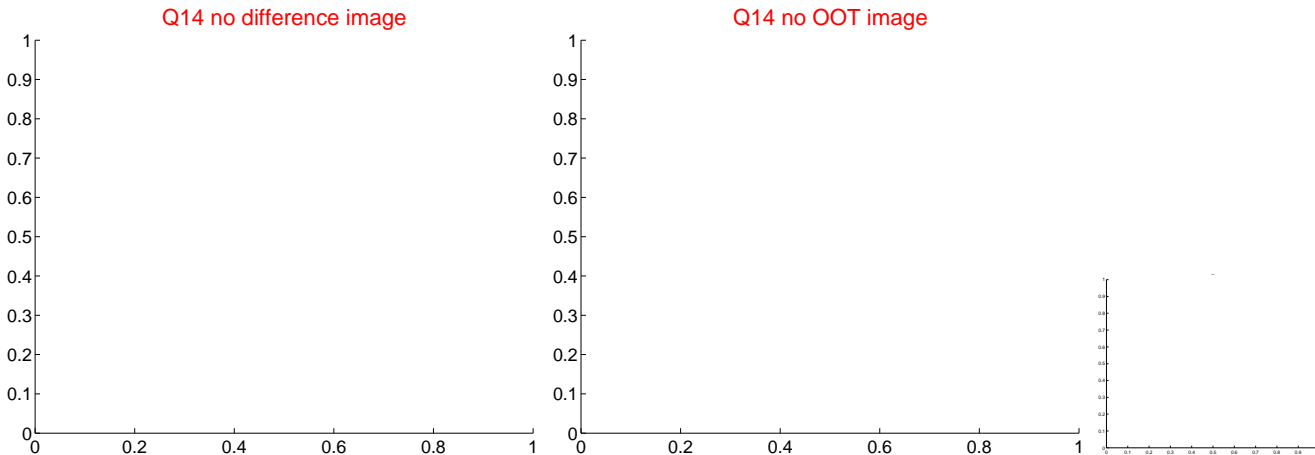
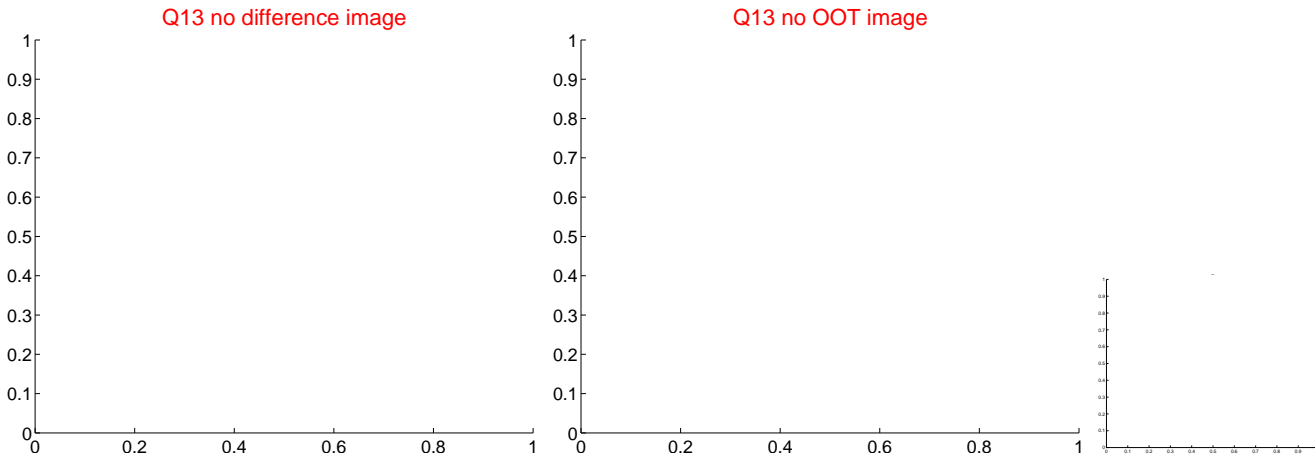
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



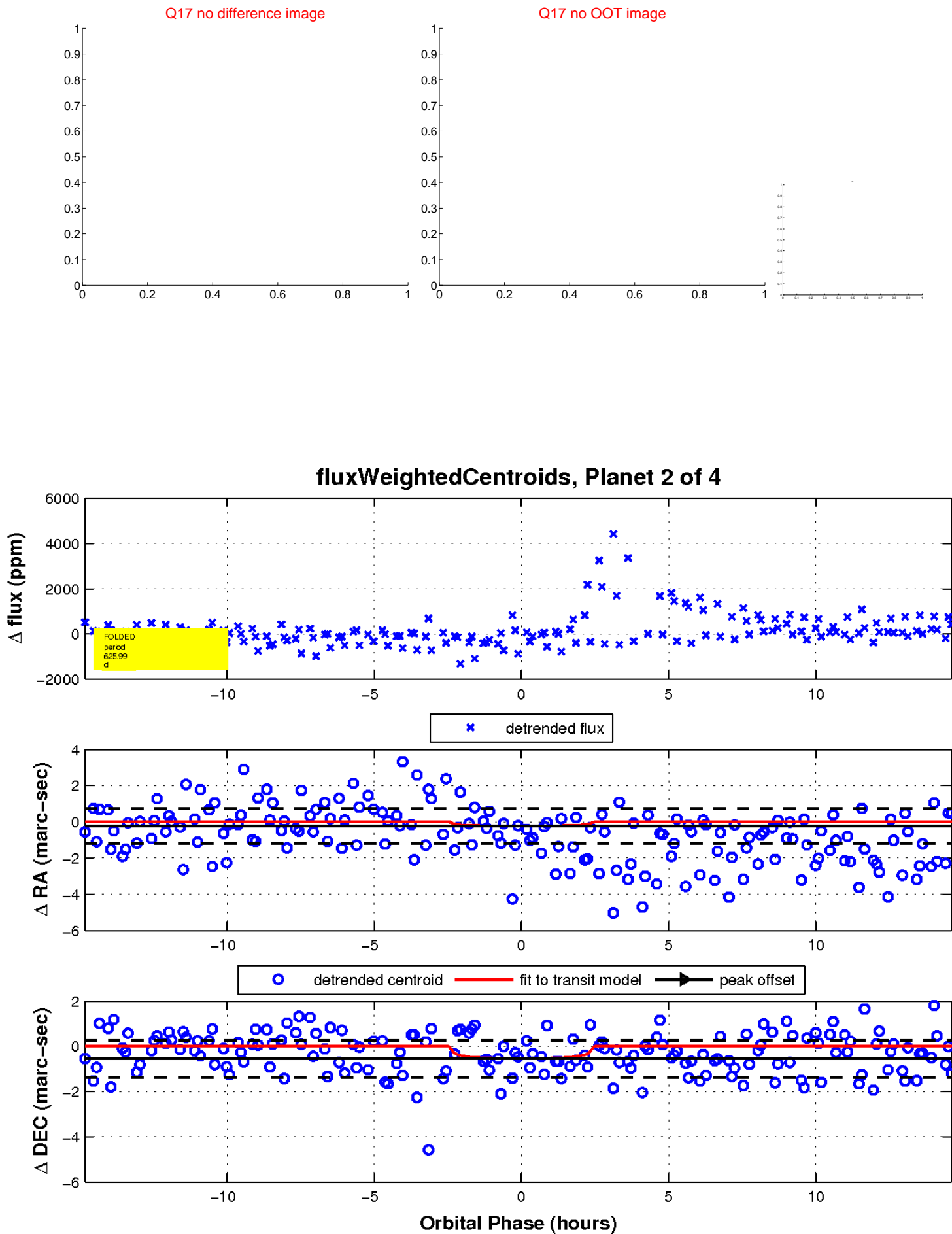
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

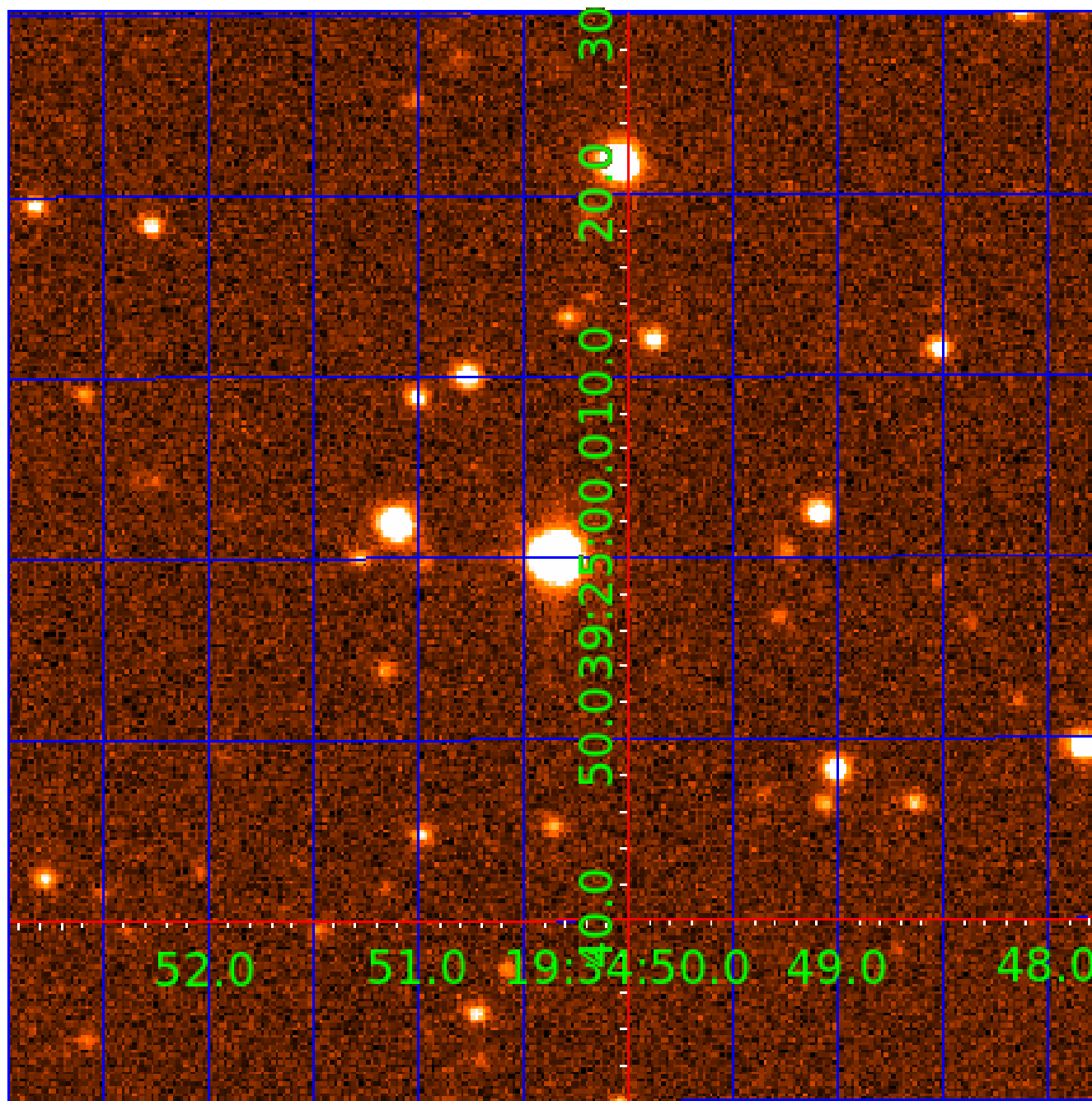


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 004373146

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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004373146-03	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—INCONSISTENT_TRANS—CENT_FEW_DIFFS
004373146-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL

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

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

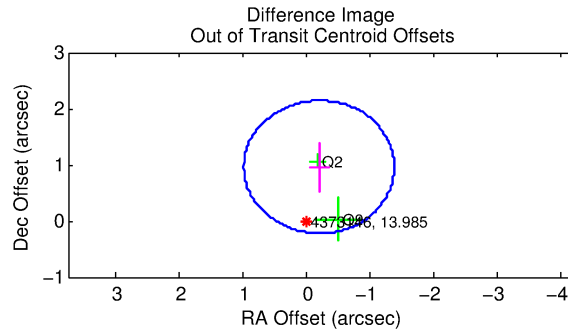
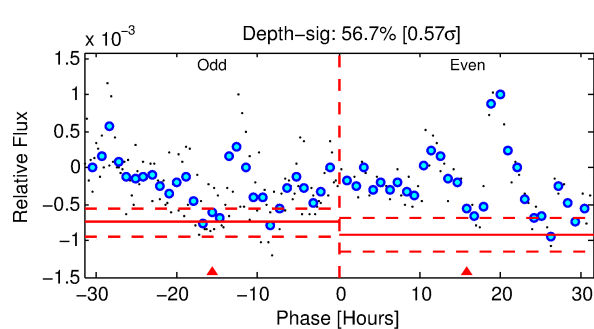
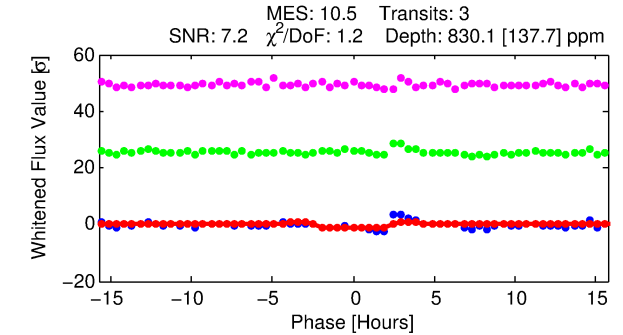
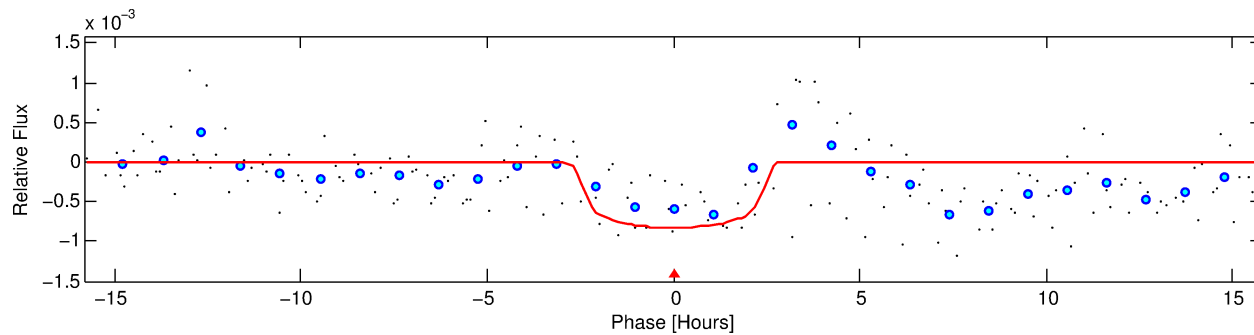
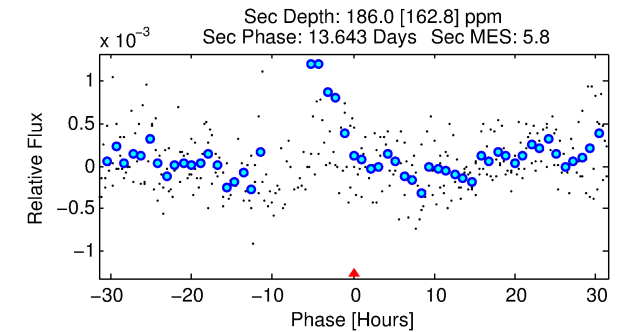
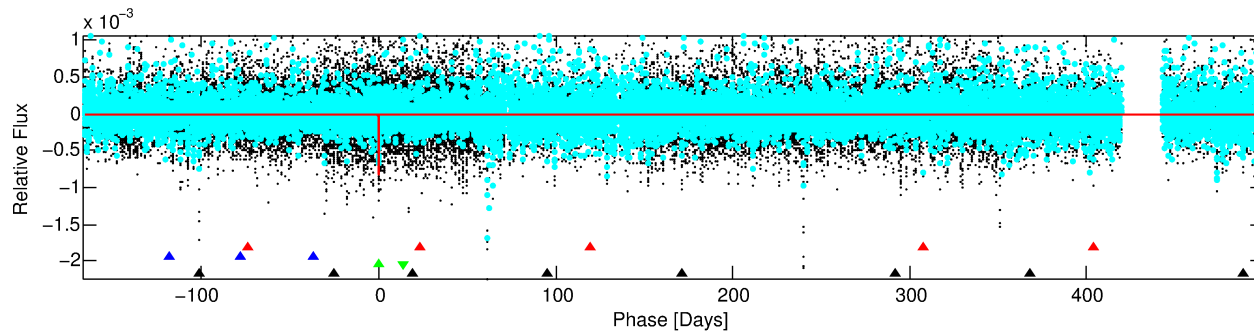
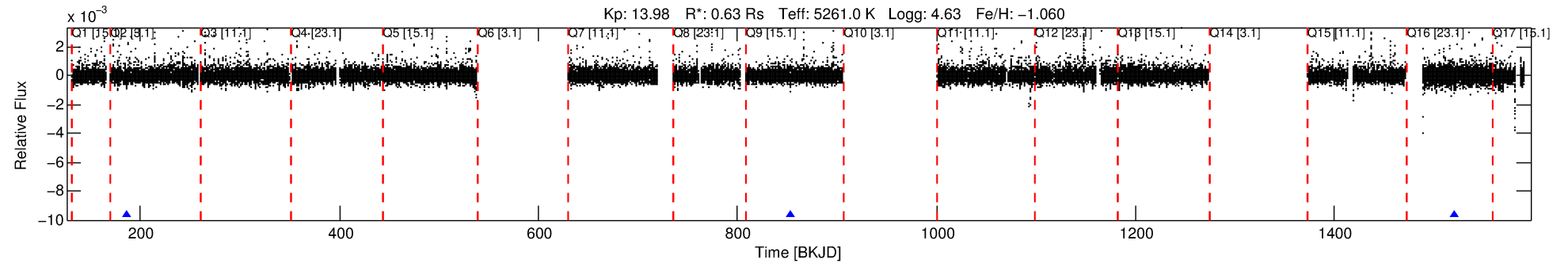
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 004373146-03

No Significant Match Found

DV One-Page Summary

KIC: 4373146 Candidate: 3 of 4 Period: 666.362 d



DV Fit Results:

Period = 666.36176 [0.00791] d
Epoch = 186.9726 [0.0062] BKJD
Rp/R* = 0.0284 [0.0173]
a/R* = 705.97 [1877.24]
b = 0.72 [1.77]
Seff = 0.17 [0.03]
Teq = 163 [7] K
Rp = 1.95 [1.20] Re
a = 1.2747 [0.0924] AU
Ag = 43641.88 [65563.93] [0.67σ]
Teffp = 3646 [1370] K [2.54σ]

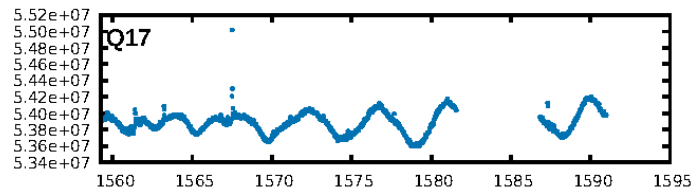
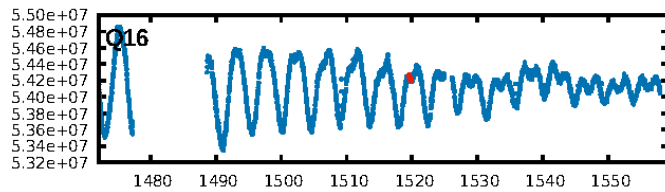
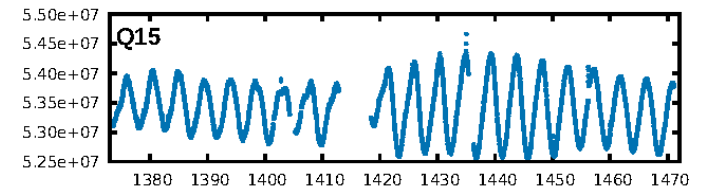
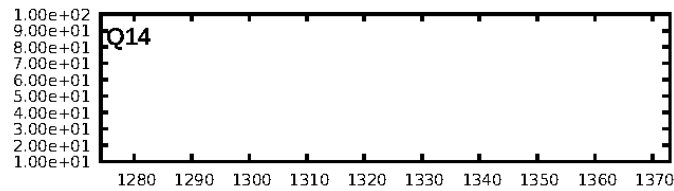
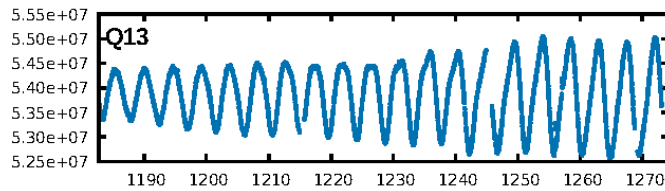
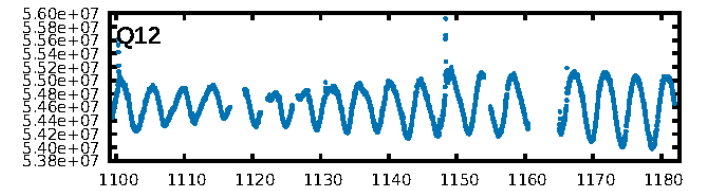
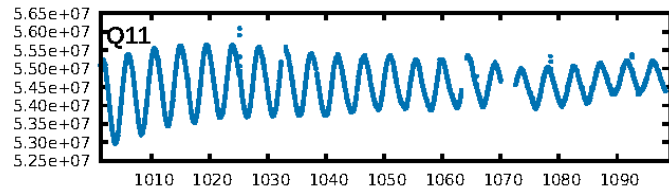
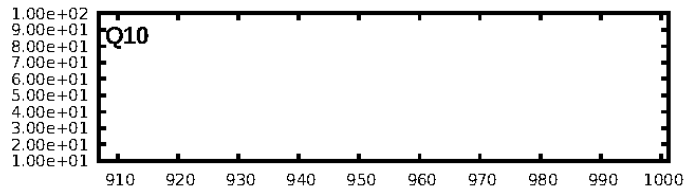
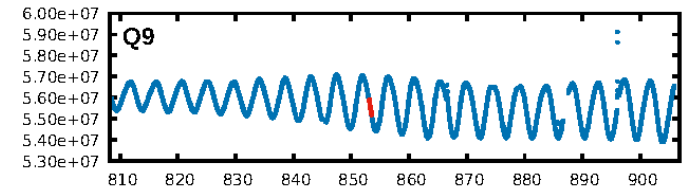
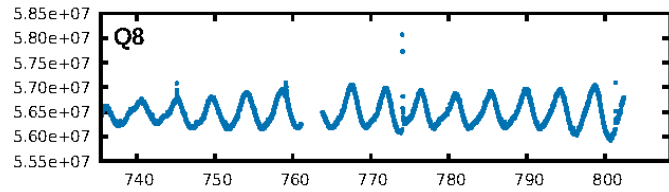
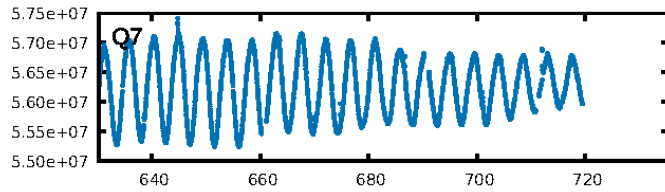
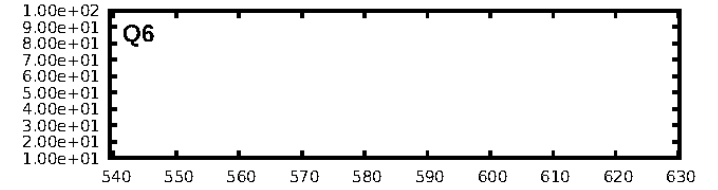
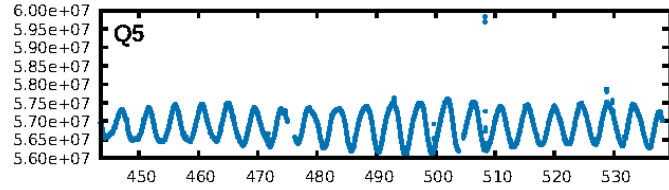
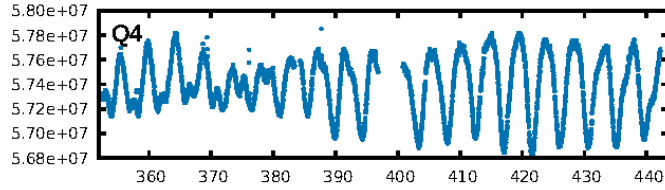
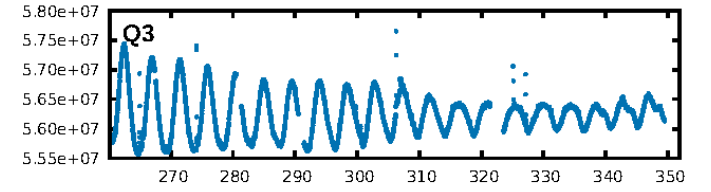
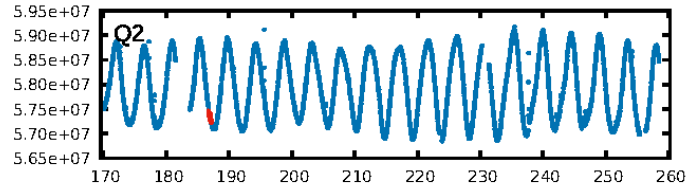
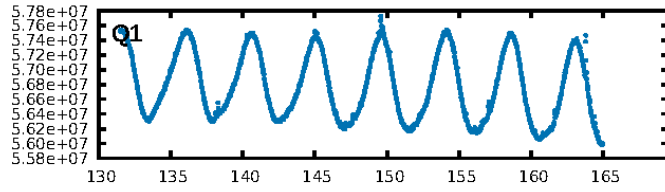
DV Diagnostic Results:

ShortPeriod-sig: 100.0% [134.10σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 2.4%
ModelChiSquareGof-sig: 92.0%
Bootstrap-pfa: 5.69e-10
RollingBand-fgt: 1.00 [3/3]
GhostDiagnostic-chr: 0.6895
Centroid-sig: 81.1%
Centroid-so: 0.343 arcsec [0.30σ]
OotOffset-rm: 0.979 arcsec [2.48σ]
KicOffset-rm: 0.999 arcsec [2.14σ]
OotOffset-st: 1/0/0/1 [2]
KicOffset-st: 1/0/0/1 [2]
DiffImageQuality-fgm: 1.00 [2/2]
DiffImageOverlap-fno: 1.00 [3/3]

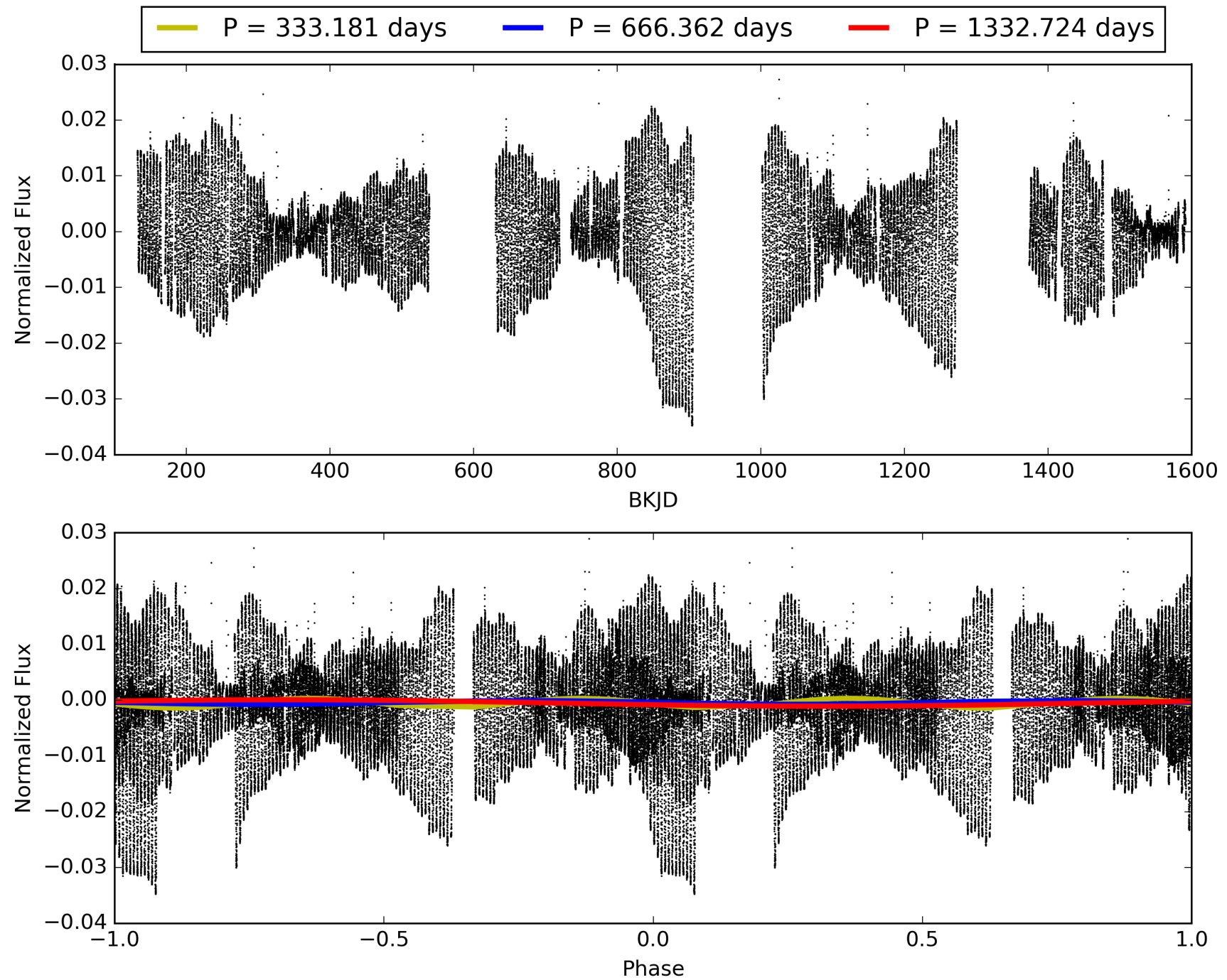
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 19:52:18 Z

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

TCE 004373146-03, PDC Light Curves

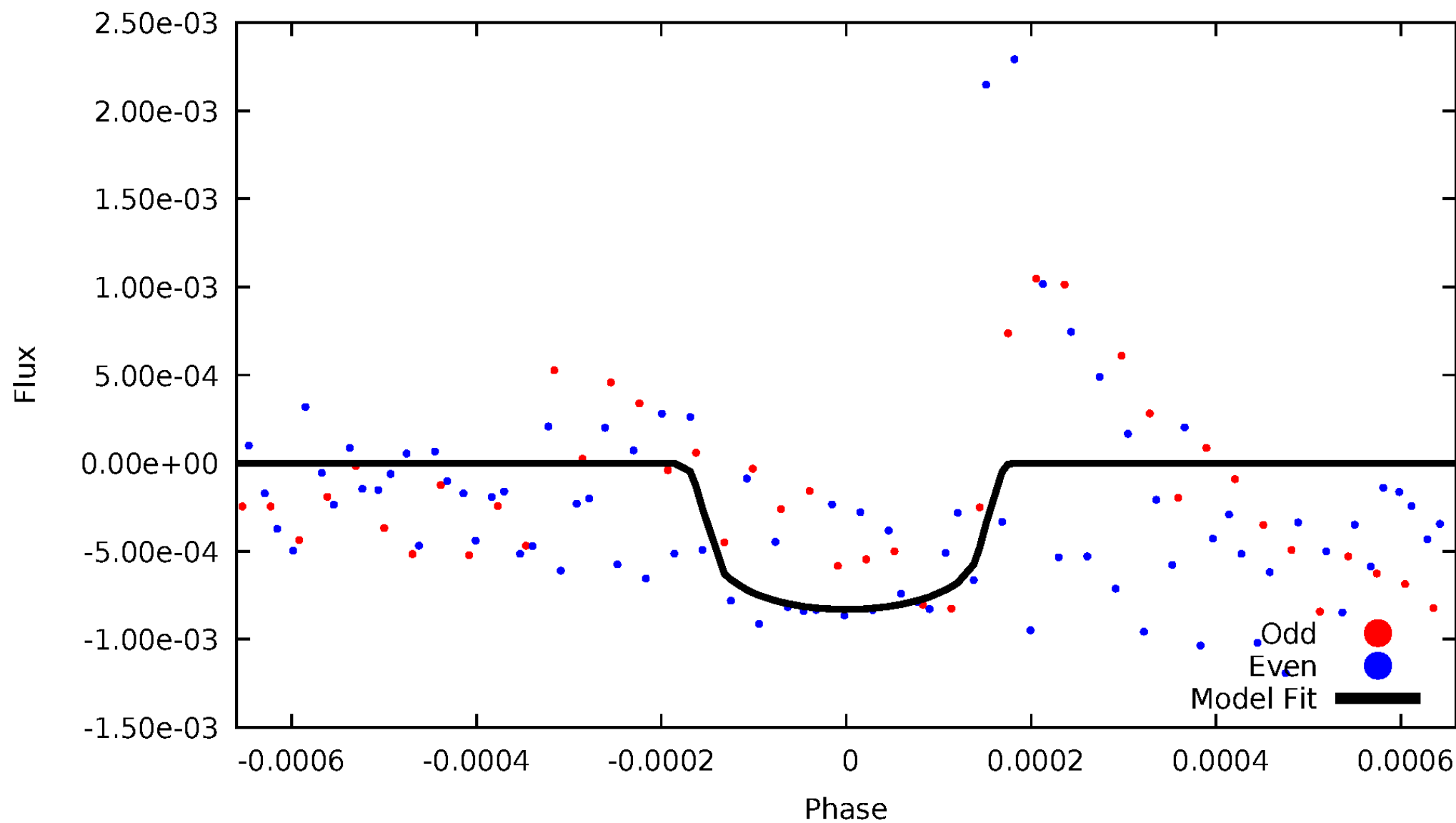


TCE 004373146-03



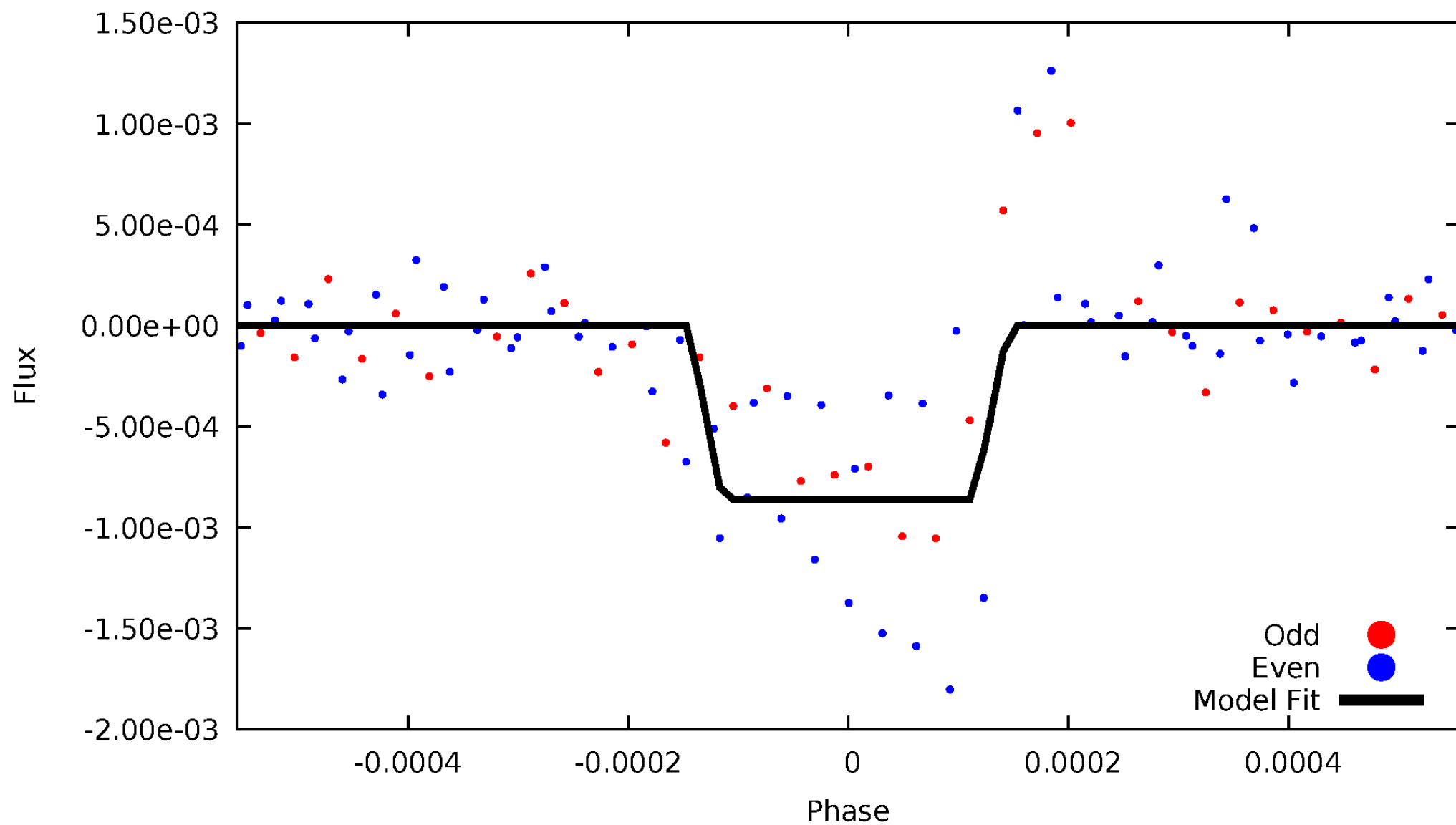
DV Odd/Even

TCE 004373146-03



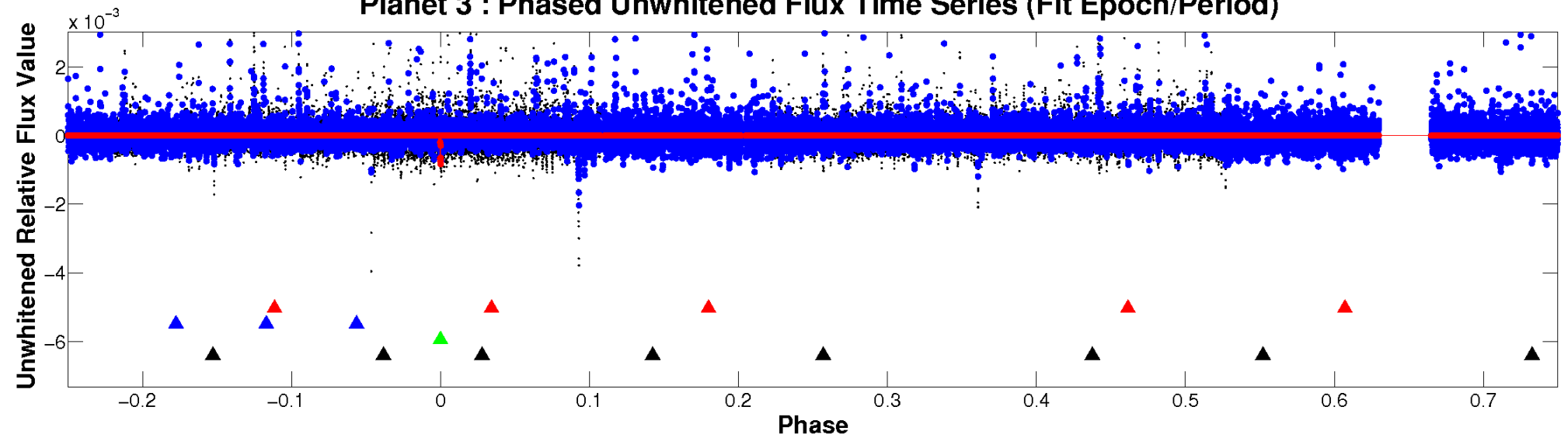
ALT Odd/Even

TCE 004373146-03

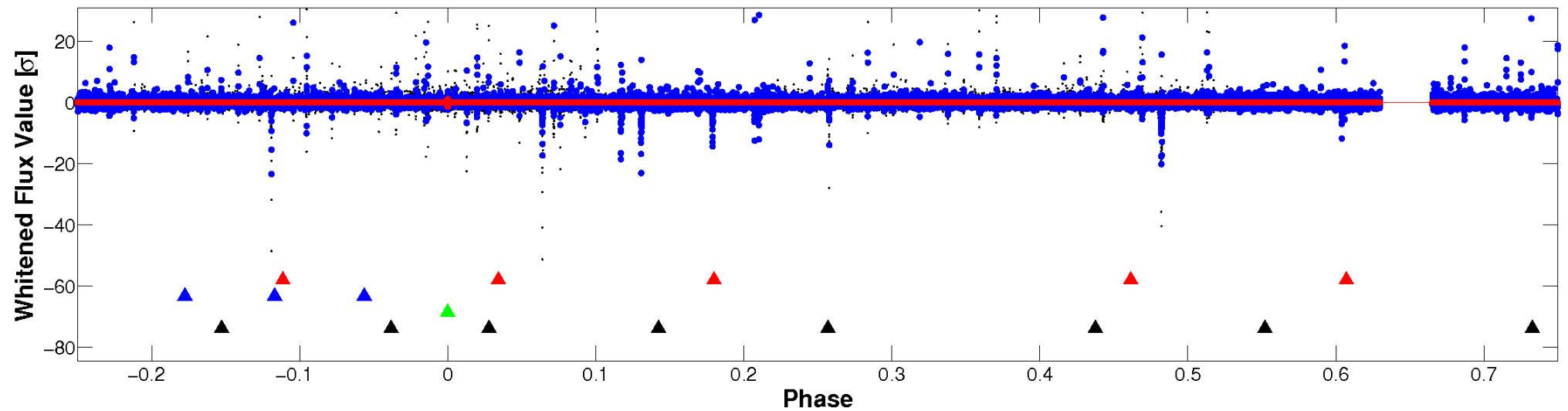


Non-Whitened Vs. Whitened Light Curve

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

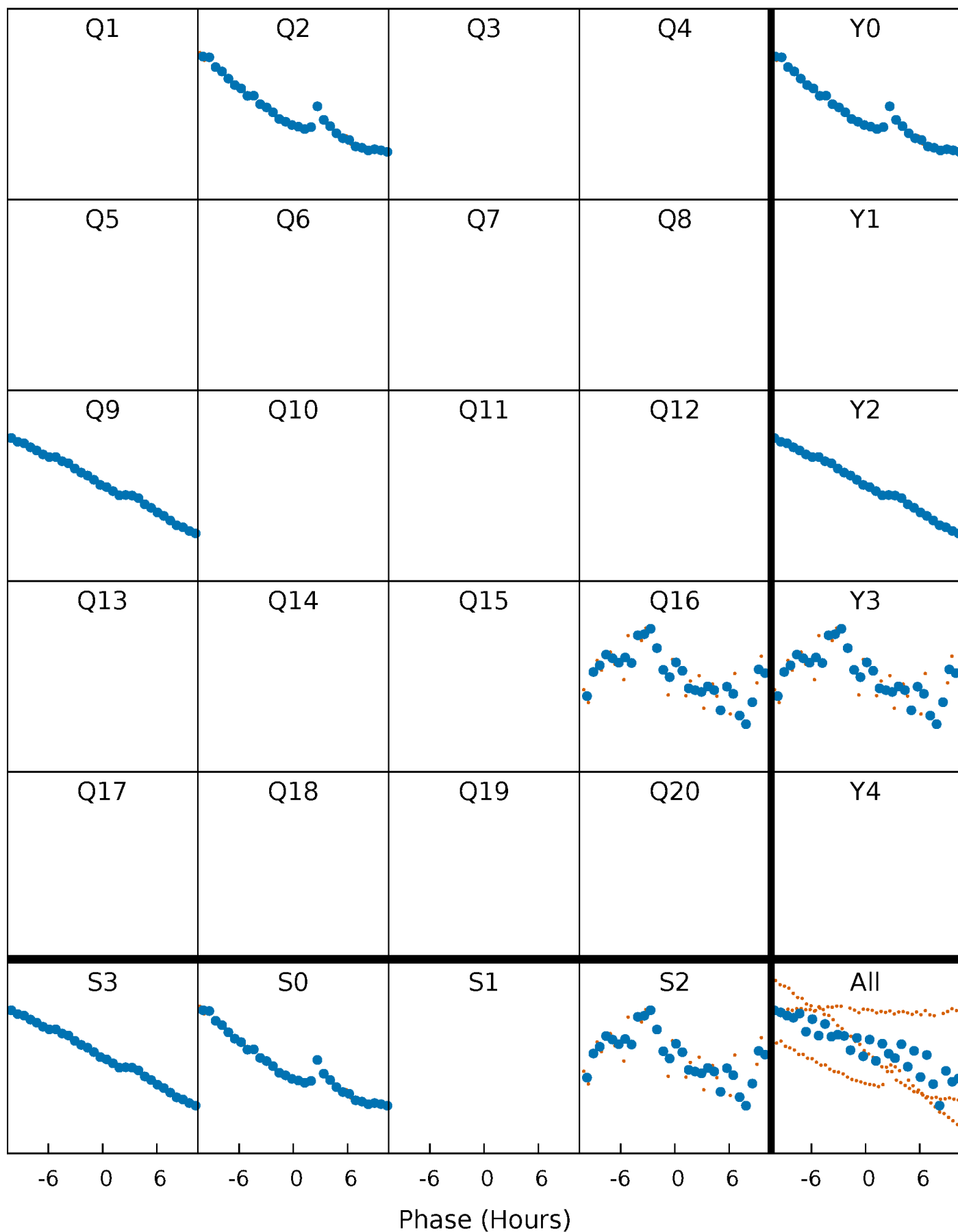


Planet 3 : Phased Whitened Flux Time Series (Fit Epoch/Period)



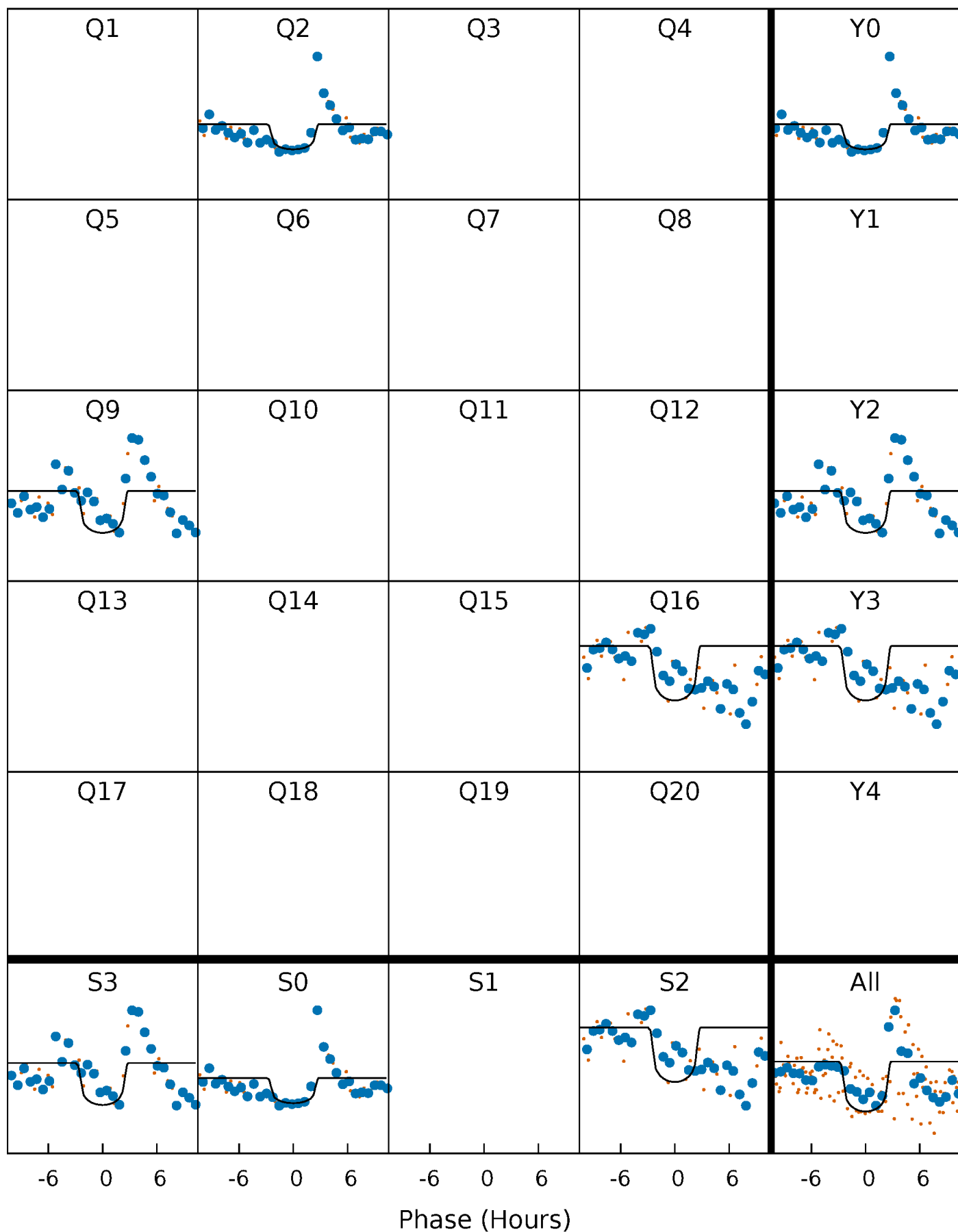
PDC Quarter-Phased Transit Curves

TCE 004373146-03 P=666.361759 Days $T_0=186.972584$ (BKJD)



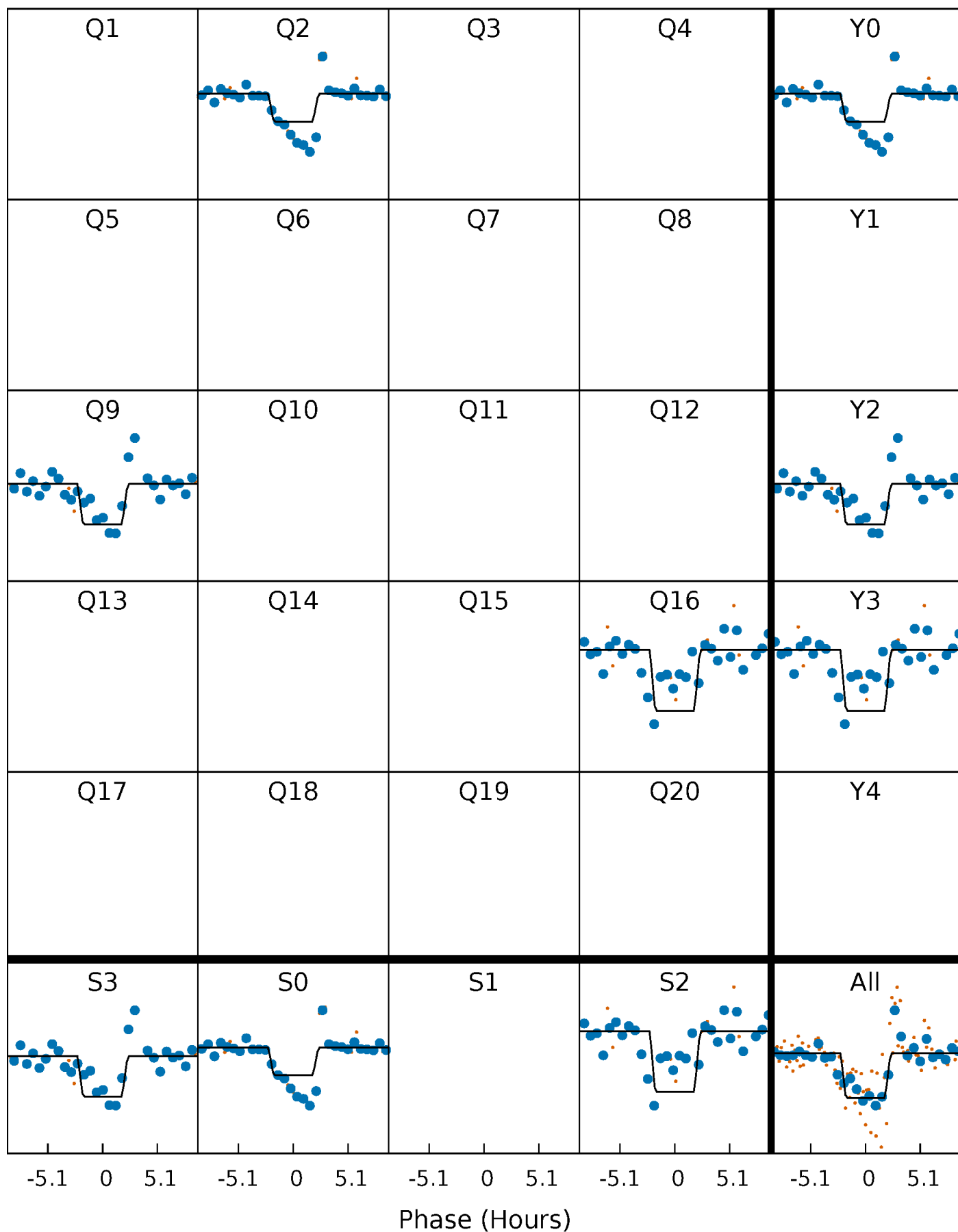
DV Quarter-Phased Transit Curves

TCE 004373146-03 $P=666.361759$ Days $T_0=186.972584$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

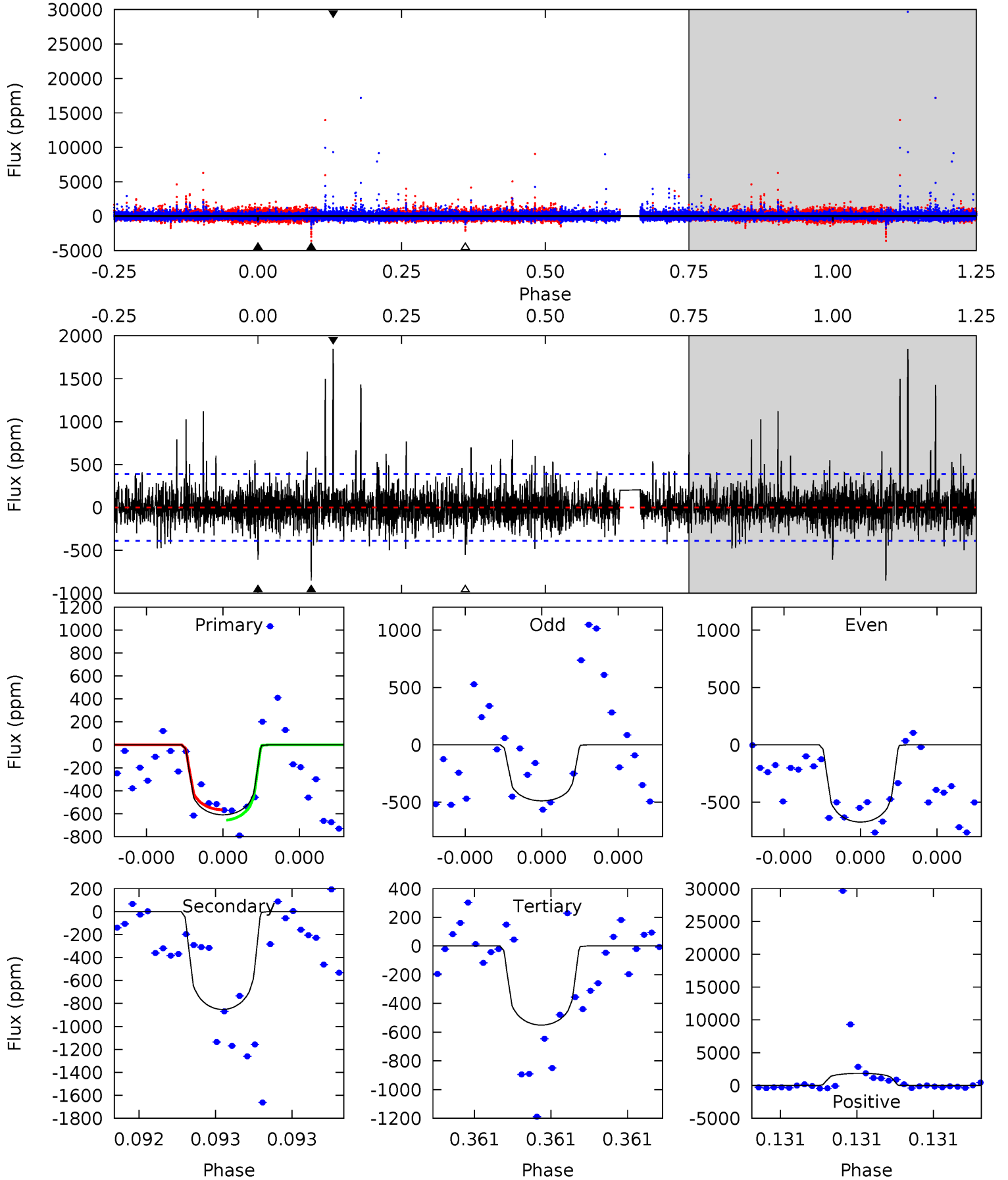
TCE 004373146-03 P=666.386070 Days $T_0=186.970978$ (BKJD)



DV Model-Shift Uniqueness Test

004373146-03, P = 666.361759 Days, E = 186.972584 Days

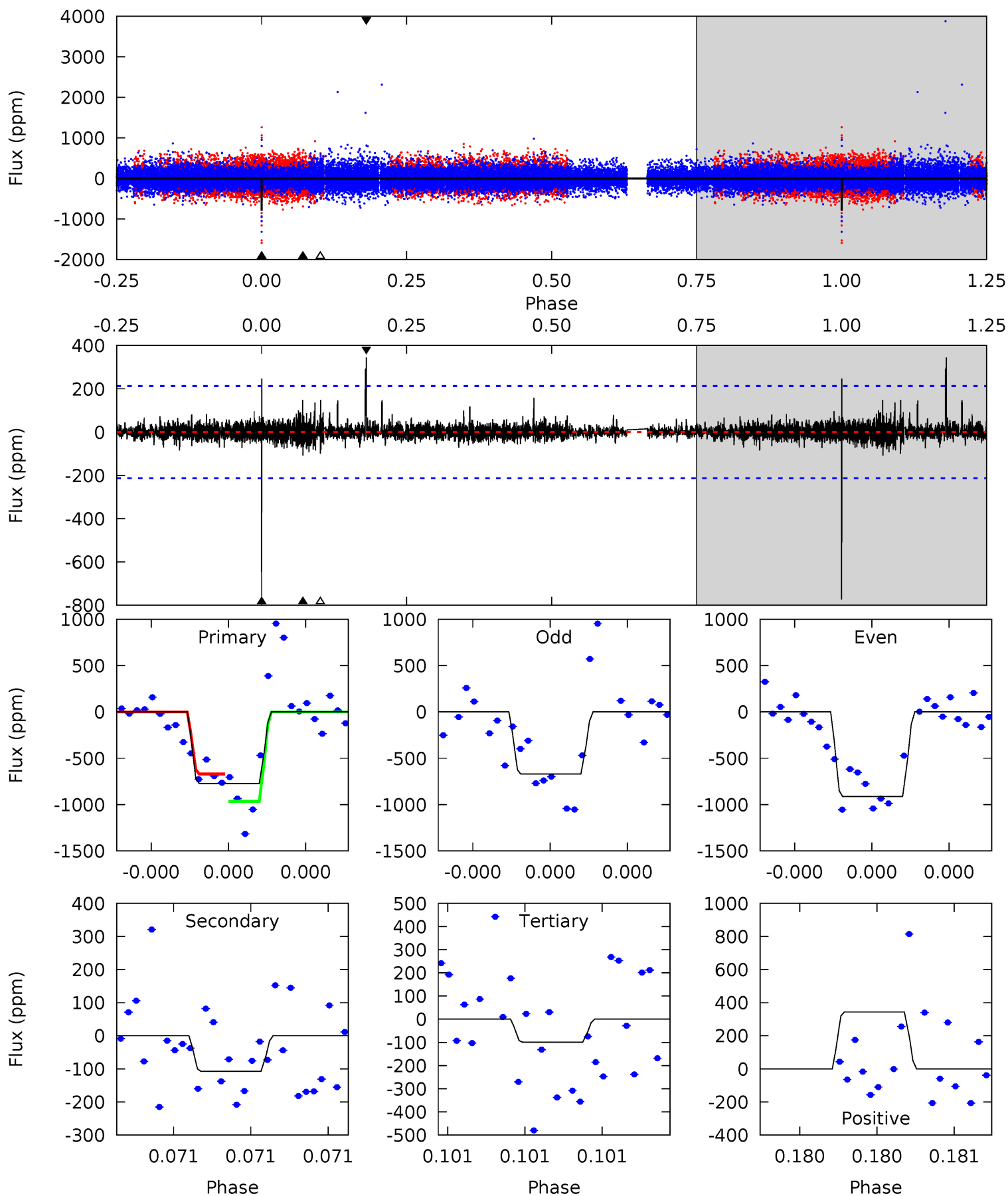
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
8.85	12.4	7.99	26.8	5.64	3.58	2.25	0.85	-18.0	4.38	-14.4	0.76	1.13	0.68	0.67



Alt Model-Shift Uniqueness Test

004373146-03, P = 666.386070 Days, E = 186.970978 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
20.6	2.87	2.65	9.16	5.68	3.64	0.56	18.0	11.4	0.22	-6.29	3.20	1.22	0.31	4.03



Stellar Parameters For KIC 004373146

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5261^{+158}_{-158}	$4.633^{+0.066}_{-0.044}$	$-1.060^{+0.350}_{-0.300}$	$0.630^{+0.049}_{-0.044}$	$0.621^{+0.059}_{-0.023}$	$3.496^{+0.838}_{-0.564}$
	+3%/-3%	+1%/-1%	+33%/-28%	+8%/-7%	+10%/-4%	+24%/-16%
Source	PHO1	KIC0	KIC0	DSEP		

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

Secondary Eclipse Parameters for KIC 004373146-03 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-852 ± 69	$2.01^{+1.24}_{-1.14}$	228^{+8}_{-9}	5234^{+2906}_{-935}	$192712^{+835887}_{-119659}$
Alt.	-108 ± 37	$2.07^{+1.26}_{-1.06}$	227^{+8}_{-8}	3514^{+984}_{-508}	21425^{+69284}_{-14087}

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

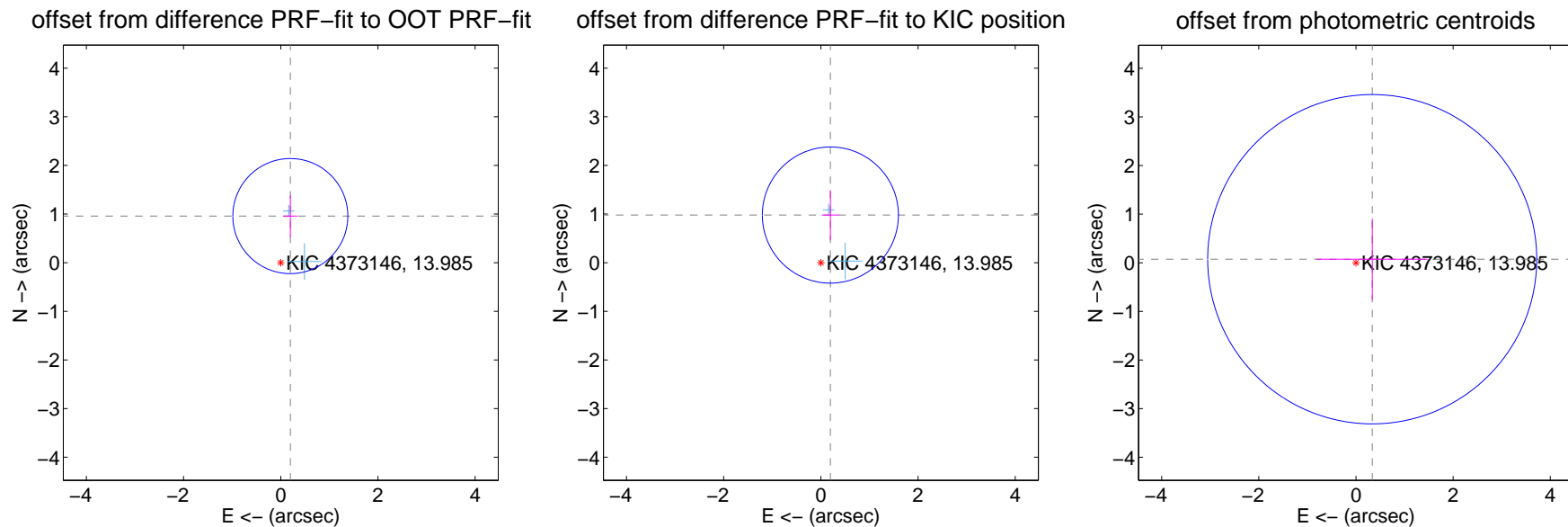
DV Centroid Data

Supplemental centroid analysis for 004373146-03. Kepler magnitude: 13.98. Transit SNR 7.24

There are 2 quarters with good PRF difference image offsets

The direct PRF centroid is offset from the target star catalog position by about 0.01 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.979 ± 0.394	2.48	-0.197 ± 0.149	0.959 ± 0.429
PRF-fit source offset from KIC position	0.999 ± 0.467	2.14	-0.196 ± 0.176	0.980 ± 0.508
photometric centroid source offset	0.34 ± 1.13	0.30	-0.33 ± 1.14	0.07 ± 0.83



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.

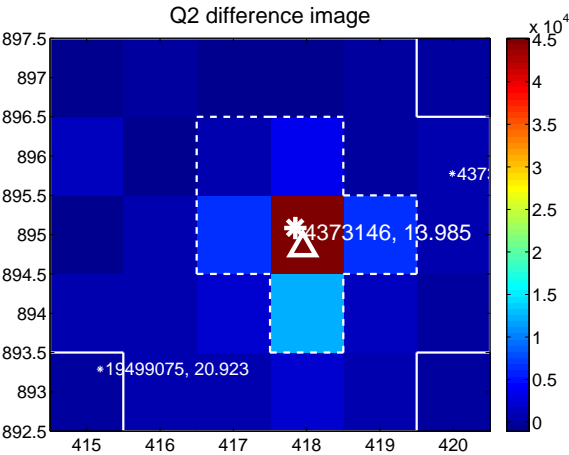
Q1 no difference image



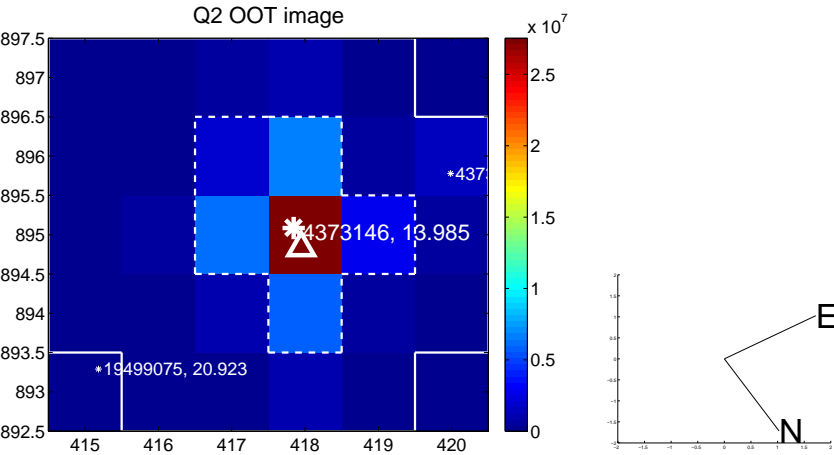
Q1 no OOT image



Q2 difference image



Q2 OOT image



Q3 no difference image



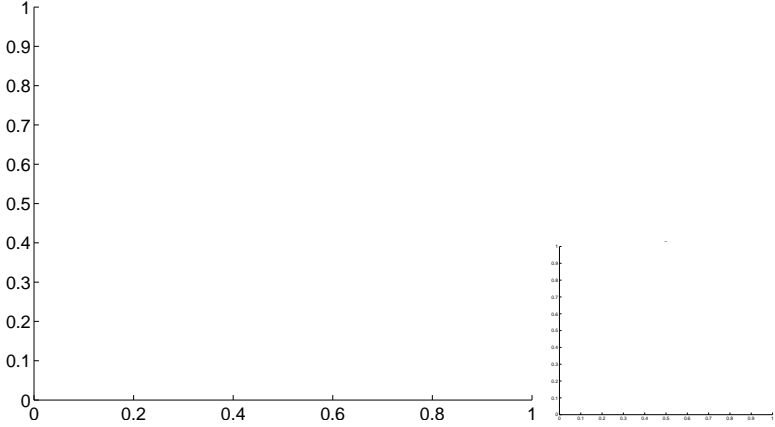
Q3 no OOT image



Q4 no difference image



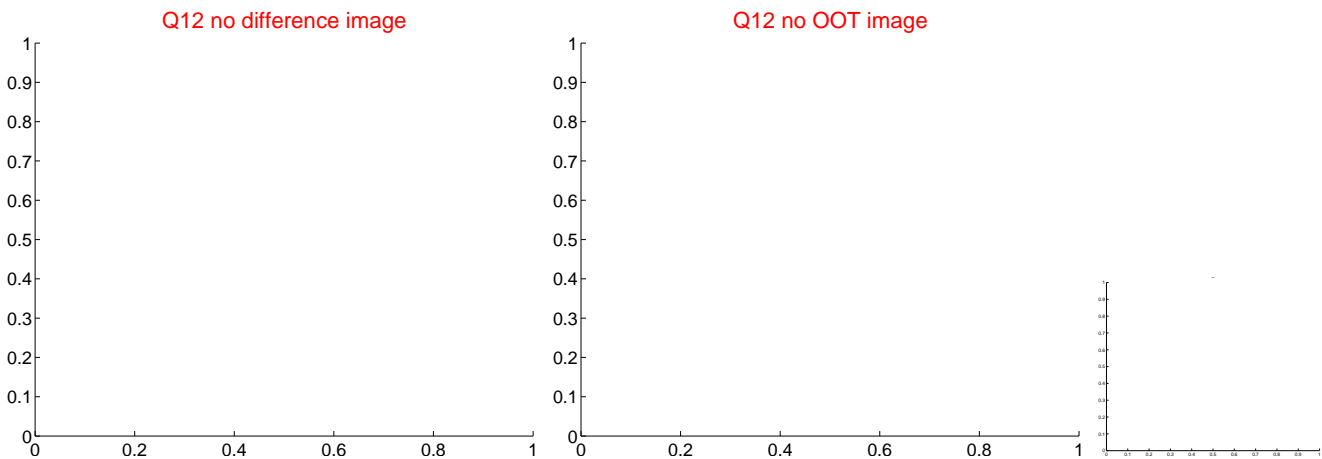
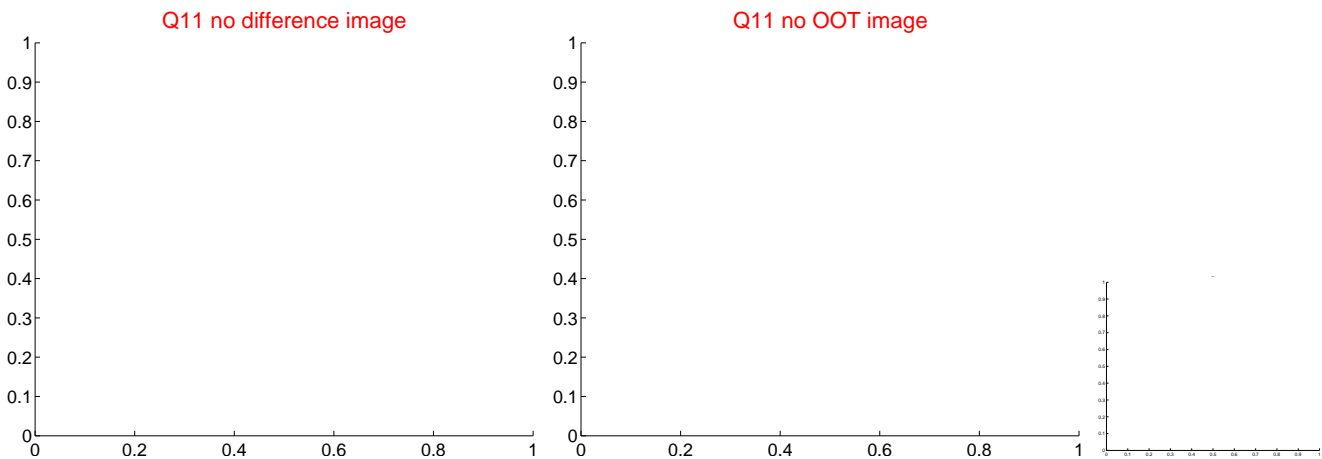
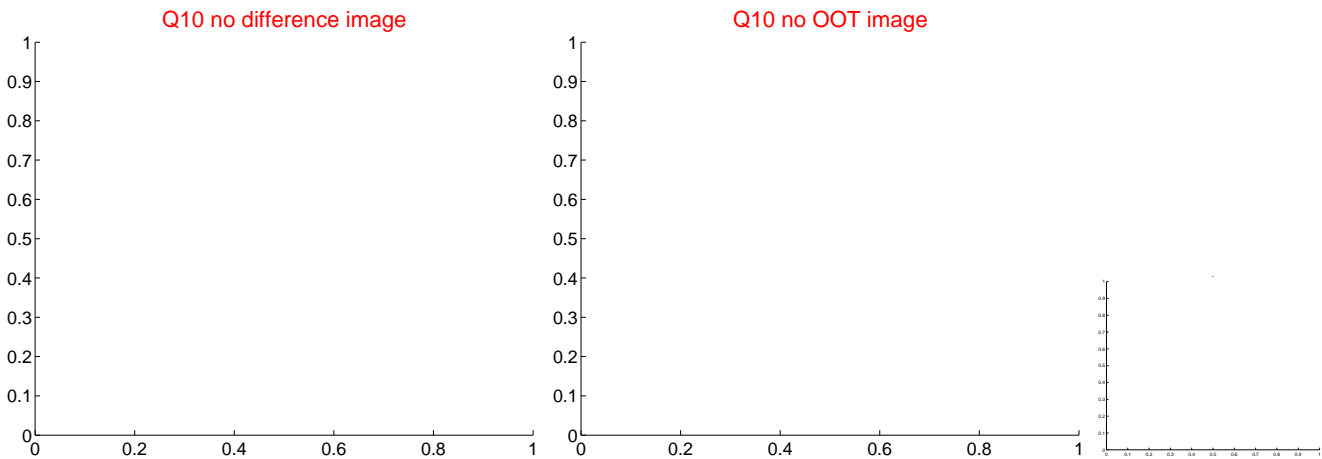
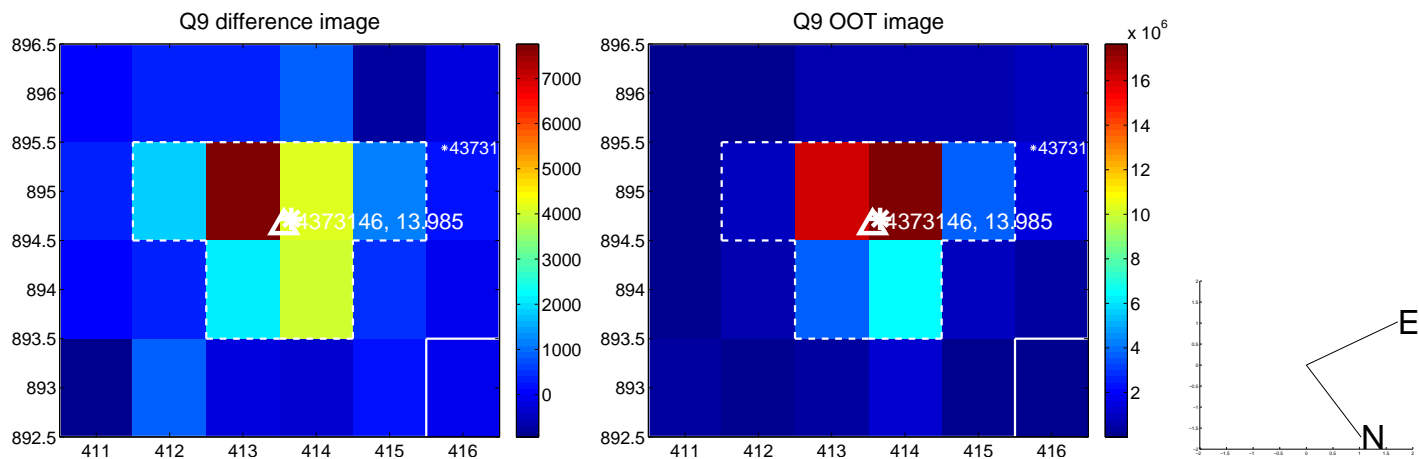
Q4 no OOT image



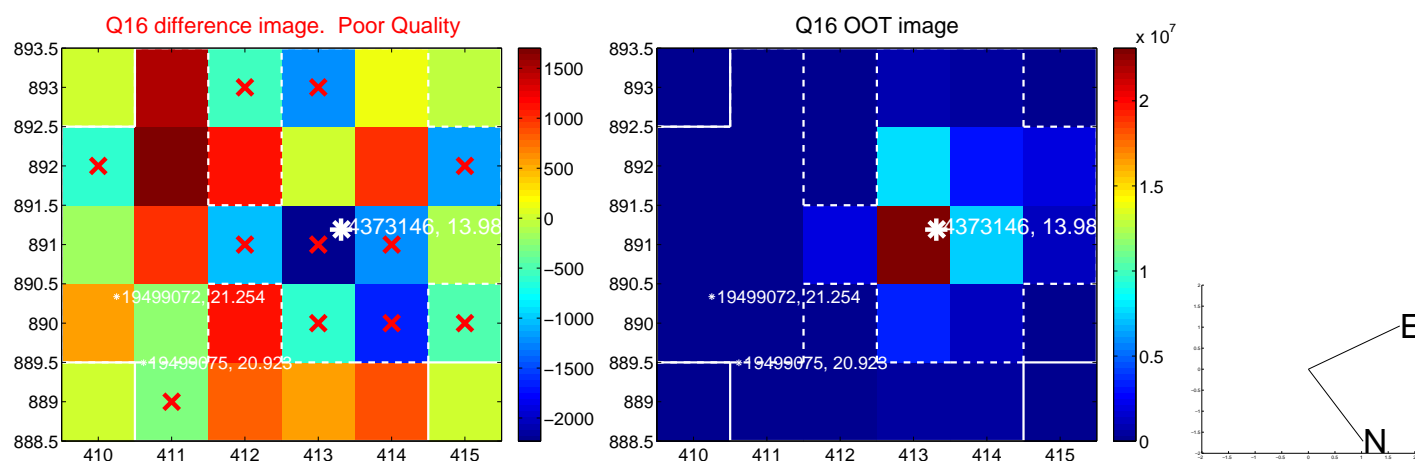
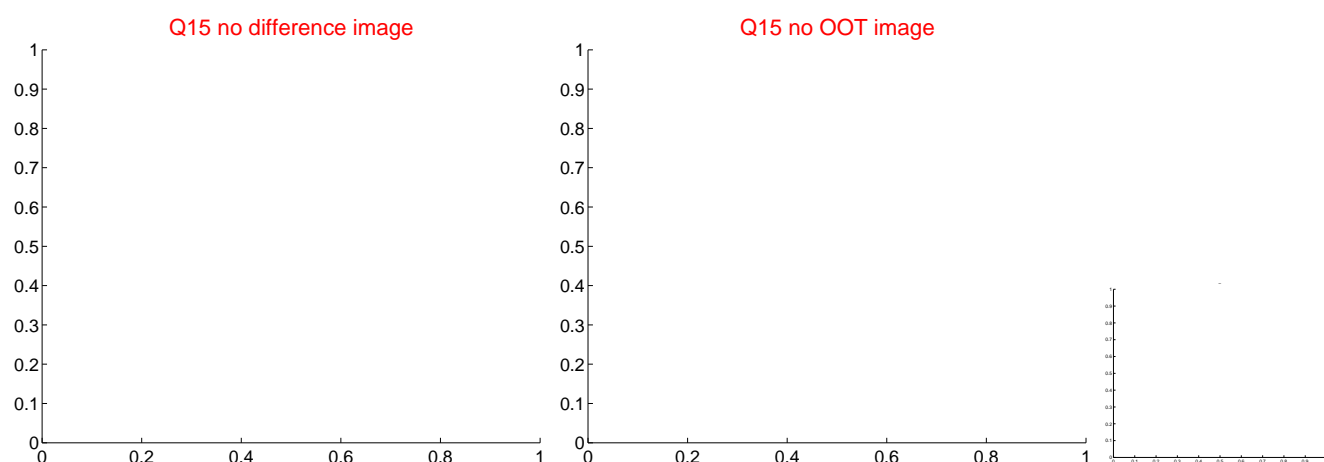
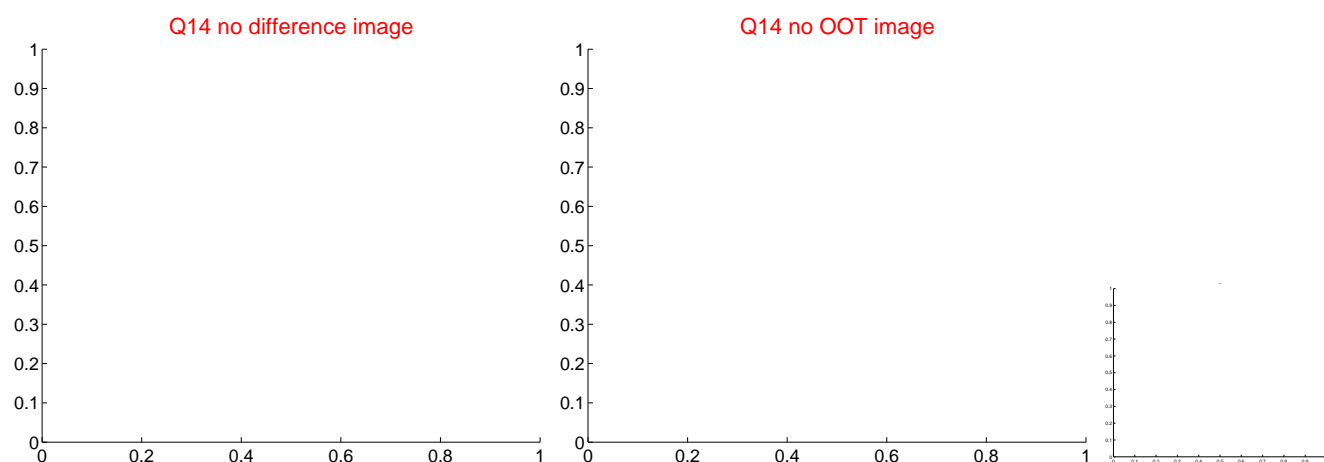
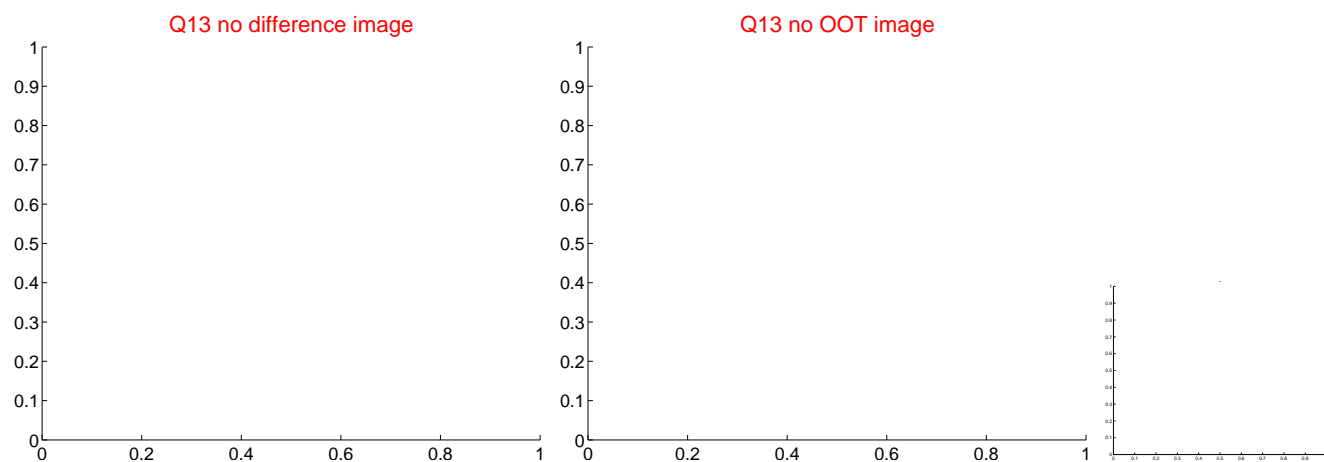
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



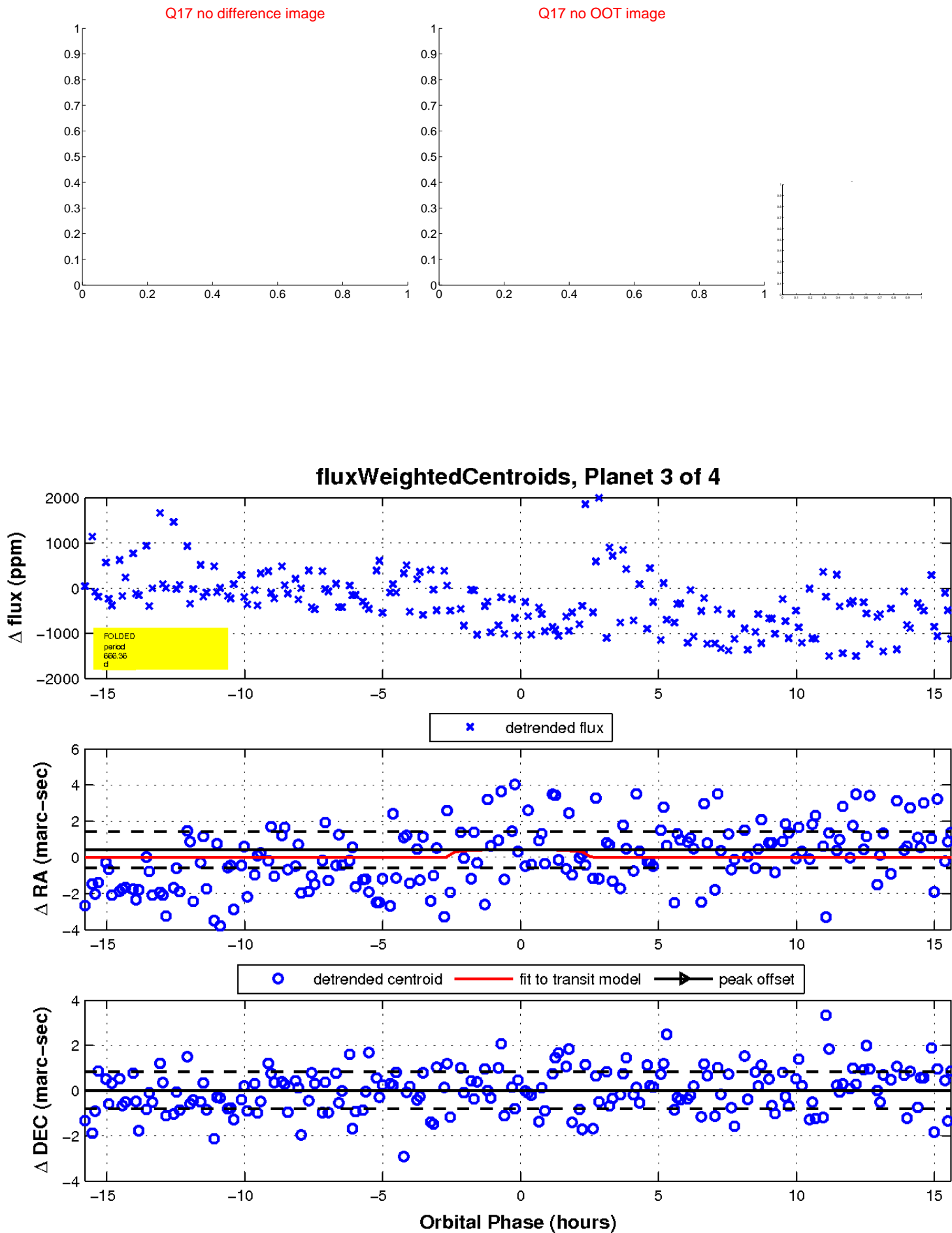
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



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

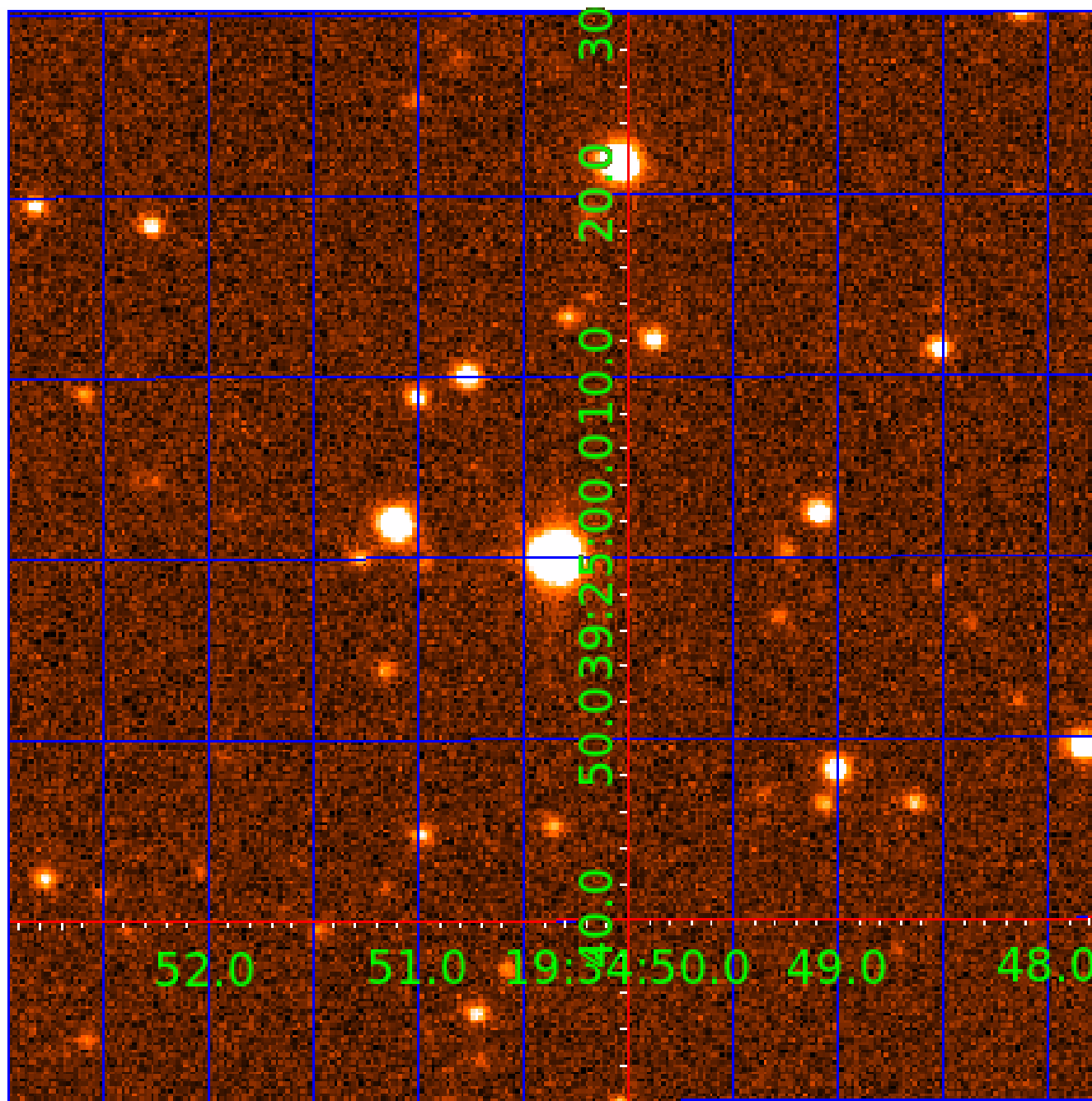


white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination



KIC 004373146

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})
004373146-02	OBS	No	625.991272	149.425982	920.2	4.942	11.4	8.2	0.63	5261	1.96	0.18
004373146-03	OBS	No	666.361759	186.972584	830.1	5.271	10.5	7.2	0.63	5261	1.95	0.17
004373146-04	OBS	No	196.686461	161.492300	468.8	5.719	9.1	6.0	0.63	5261	1.41	0.85

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004373146-02	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—INCONSISTENT_TRANS—CENT_FEW_DIFFS
004373146-03	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—INCONSISTENT_TRANS—CENT_FEW_DIFFS
004373146-04	OBS	FP	0.00	1	0	0	0	INDIV_TRANS_CHASES_MARSHALL

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

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

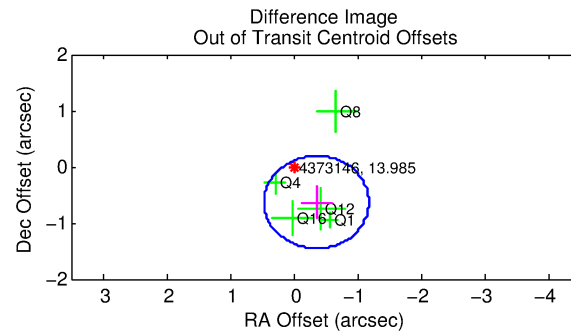
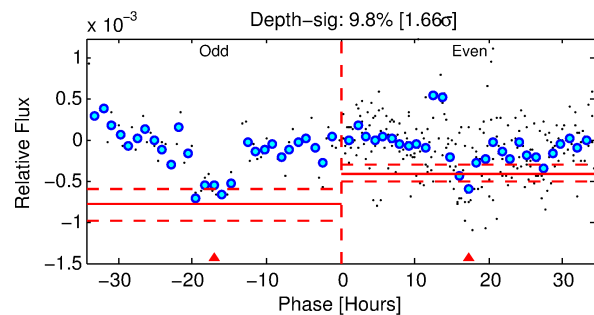
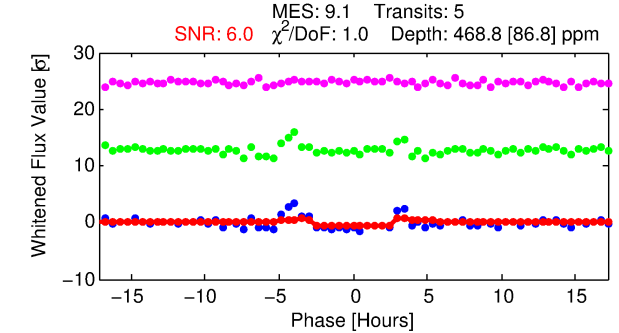
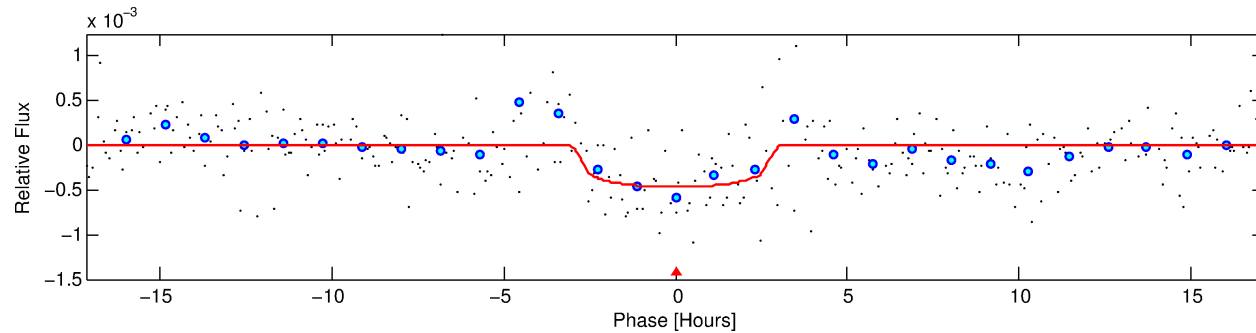
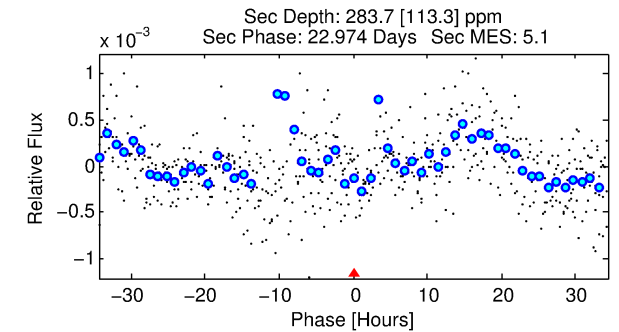
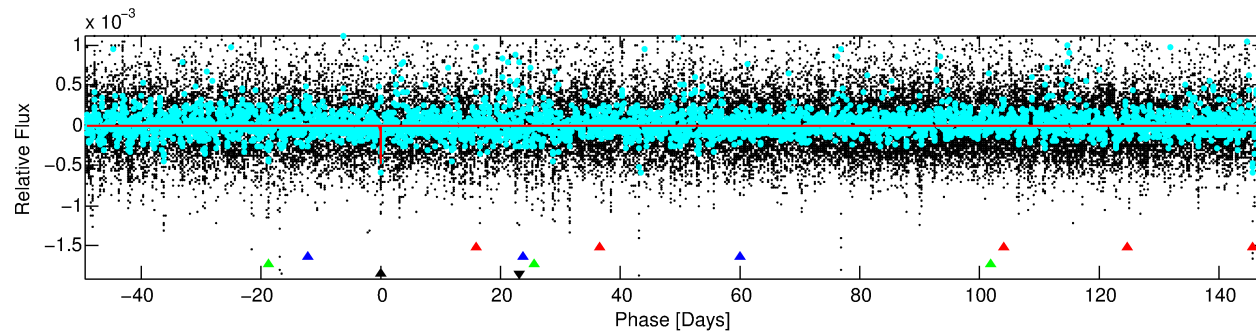
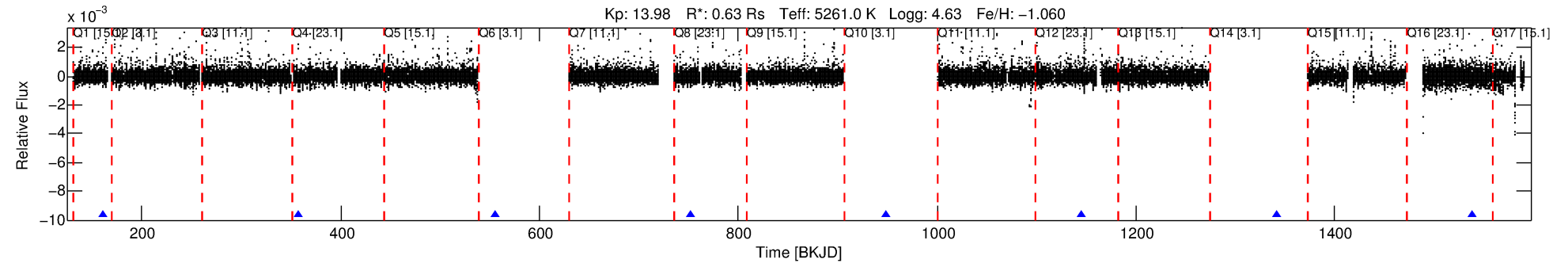
See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 004373146-04

No Significant Match Found

DV One-Page Summary

KIC: 4373146 Candidate: 4 of 4 Period: 196.686 d



DV Fit Results:

Period = 196.68646 [0.00237] d
Epoch = 161.4923 [0.0087] BKJD
Rp/R* = 0.0204 [0.0261]
a/R* = 226.42 [1288.75]
b = 0.55 [7.35]
Seff = 0.85 [0.14]
Teff = 245 [10] K
Rp = 1.41 [1.80] Re
a = 0.5651 [0.0410] AU
Ag = 25241.62 [65270.08] [0.39σ]
Teffp = 4776 [3088] K [1.47σ]

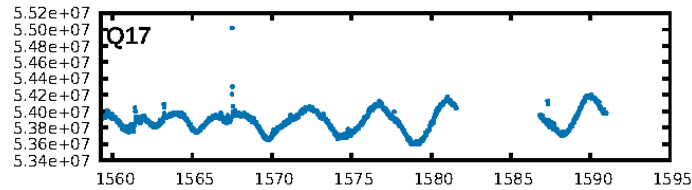
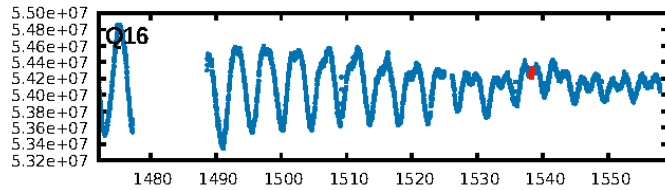
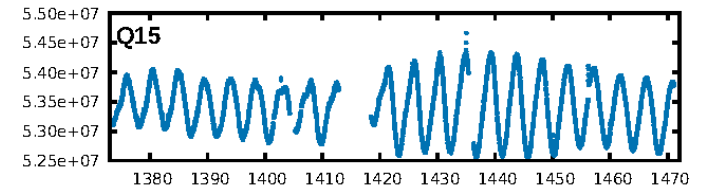
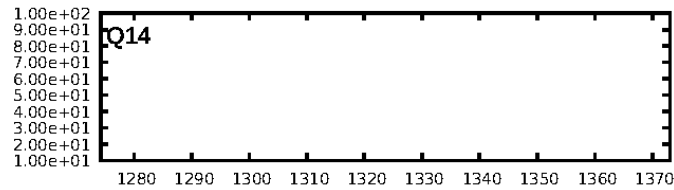
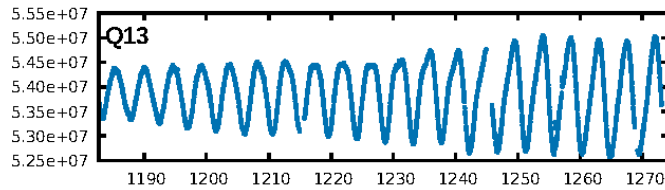
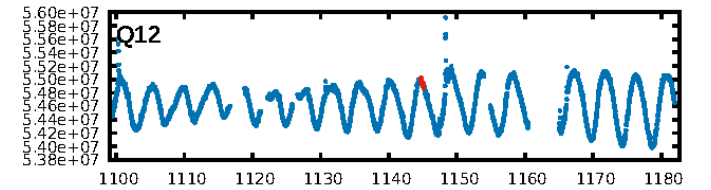
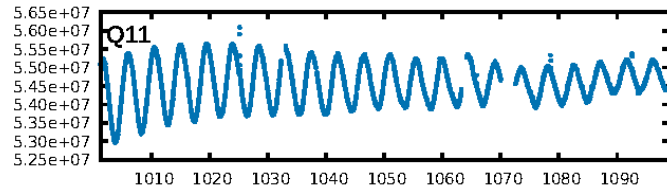
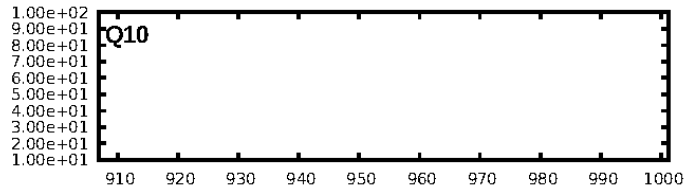
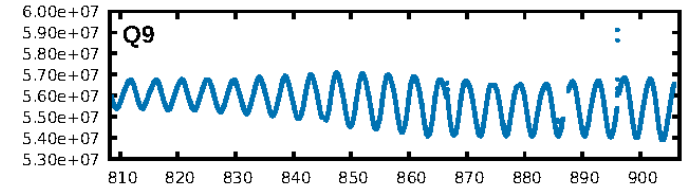
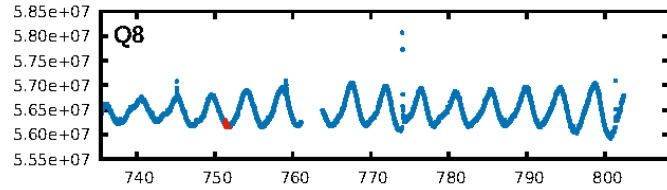
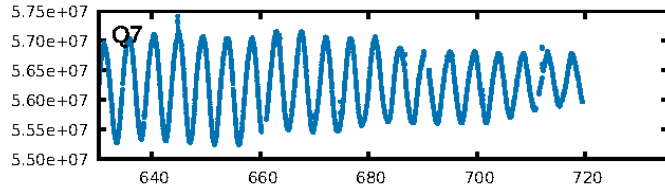
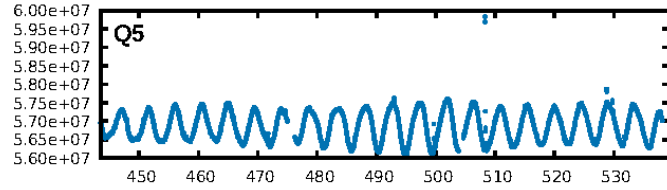
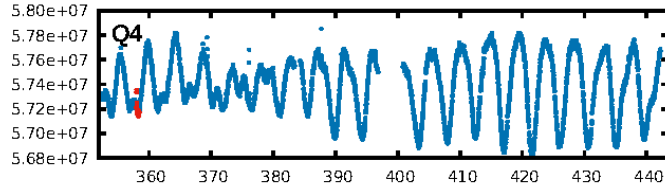
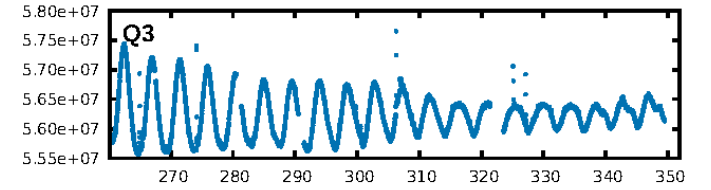
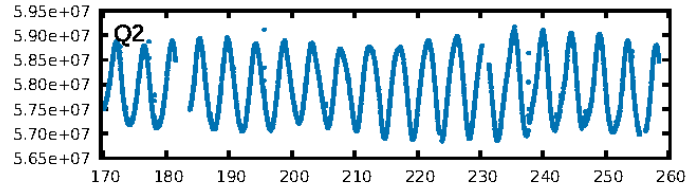
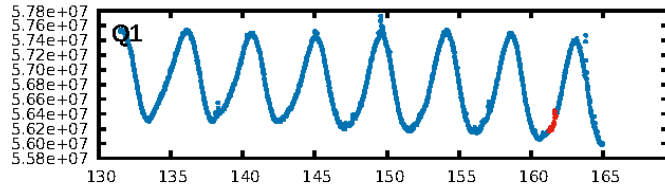
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 100.0% [303.17σ]
ModelChiSquare2-sig: 3.9%
ModelChiSquareGof-sig: 92.1%
Bootstrap-pfa: 5.21e-10
RollingBand-fgt: 1.00 [4/4]
GhostDiagnostic-chr: -1.68
Centroid-sig: 2.2%
Centroid-so: 2.506 arcsec [1.96σ]
OotOffset-rm: 0.728 arcsec [2.65σ]
KicOffset-rm: 0.756 arcsec [2.57σ]
OotOffset-st: 0/0/4/1 [5]
KicOffset-st: 0/0/4/1 [5]
DiffImageQuality-fgm: 0.80 [4/5]
DiffImageOverlap-fno: 1.00 [5/5]

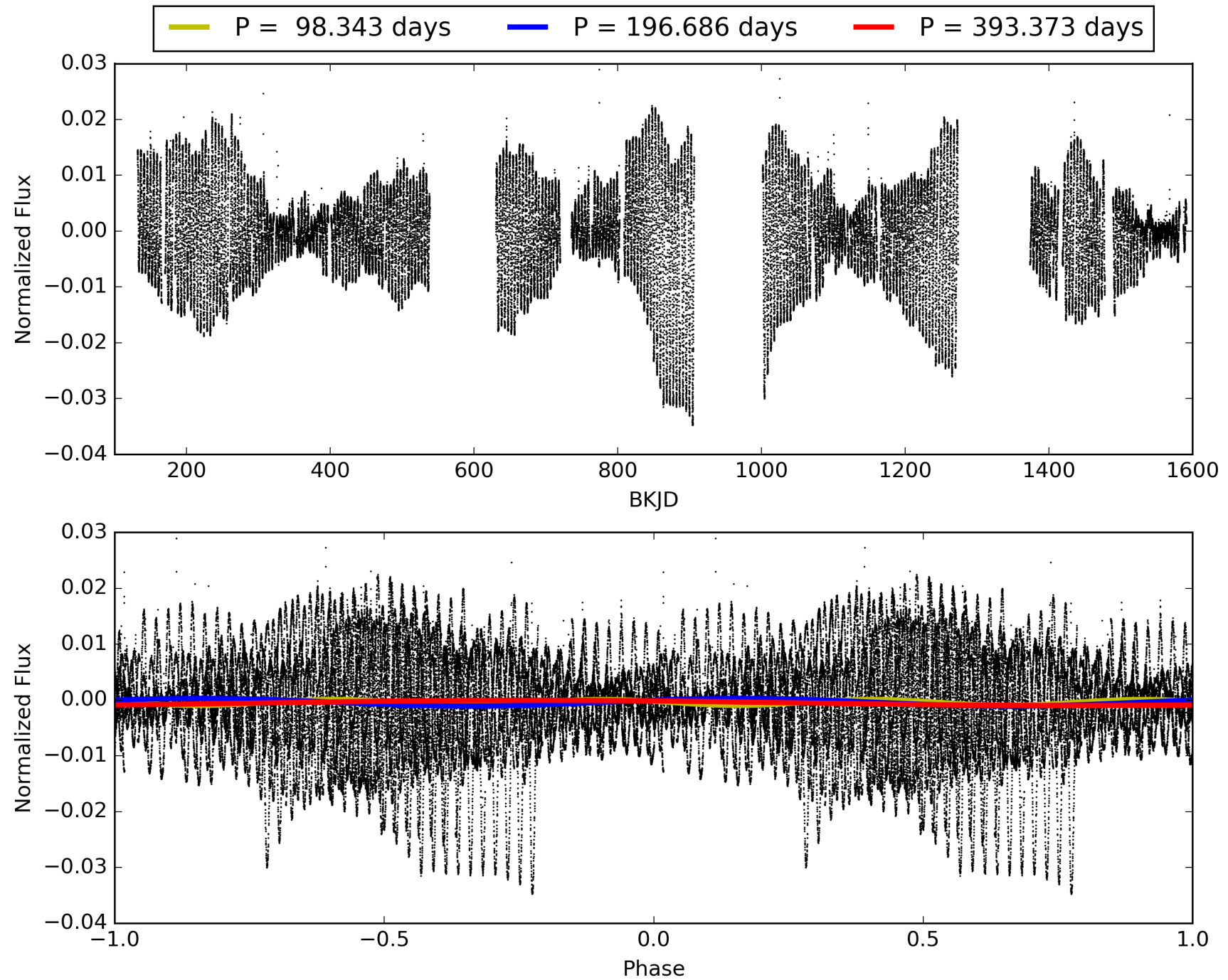
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 19:52:27 Z

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

TCE 004373146-04, PDC Light Curves

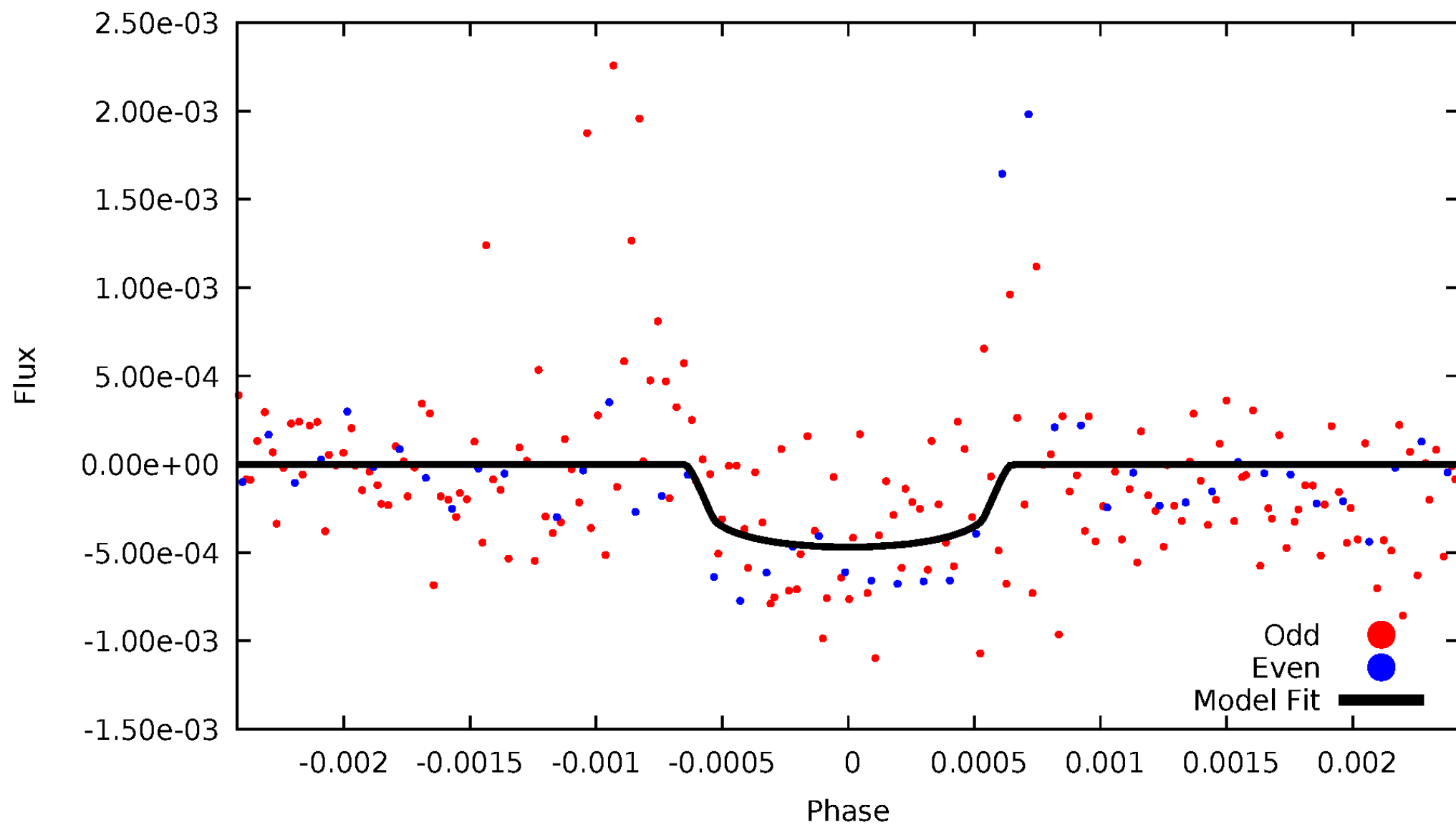


TCE 004373146-04



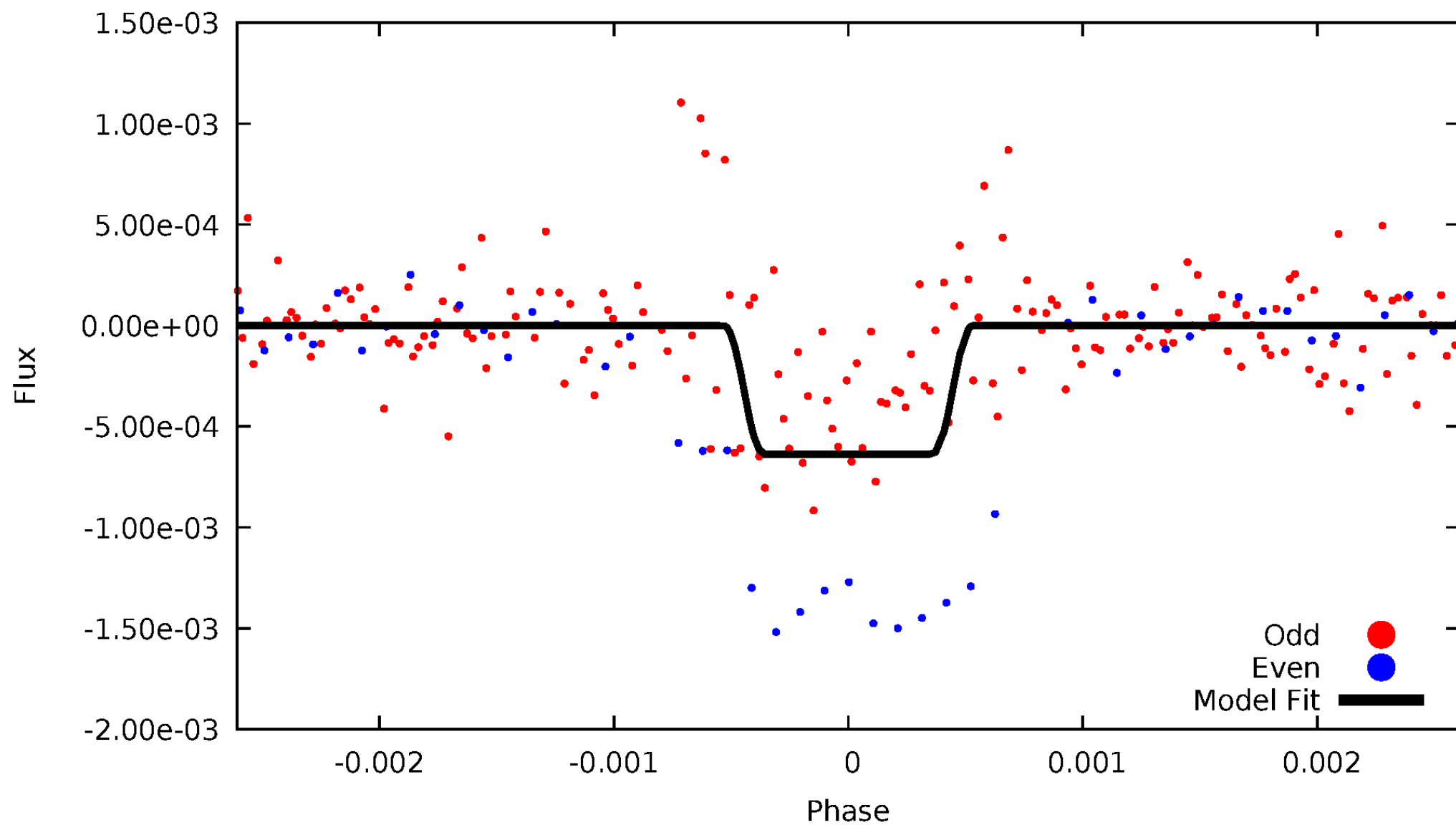
DV Odd/Even

TCE 004373146-04



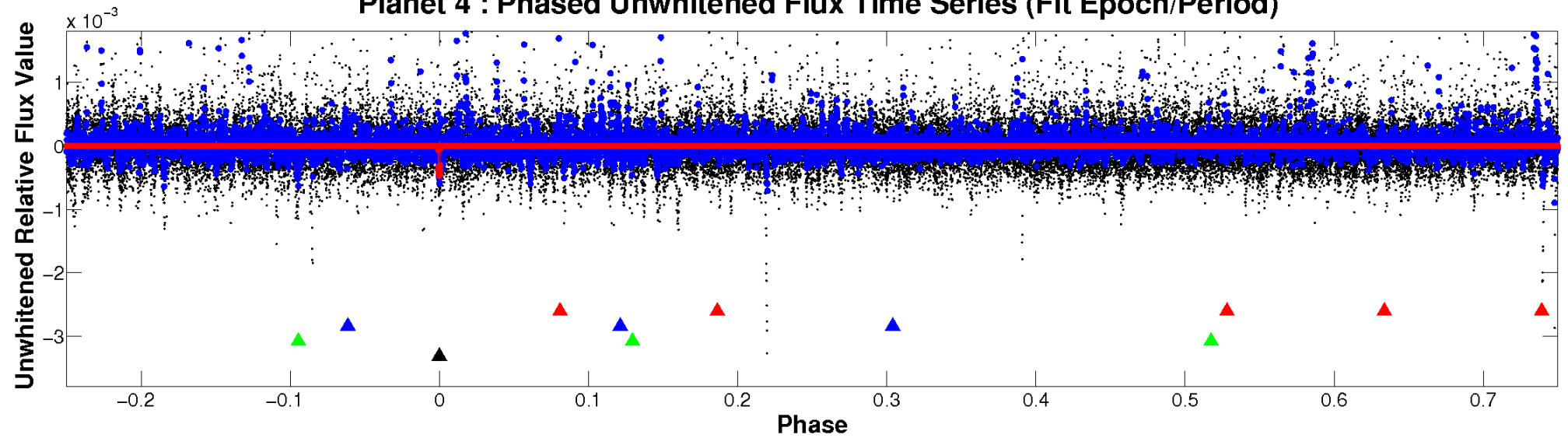
ALT Odd/Even

TCE 004373146-04

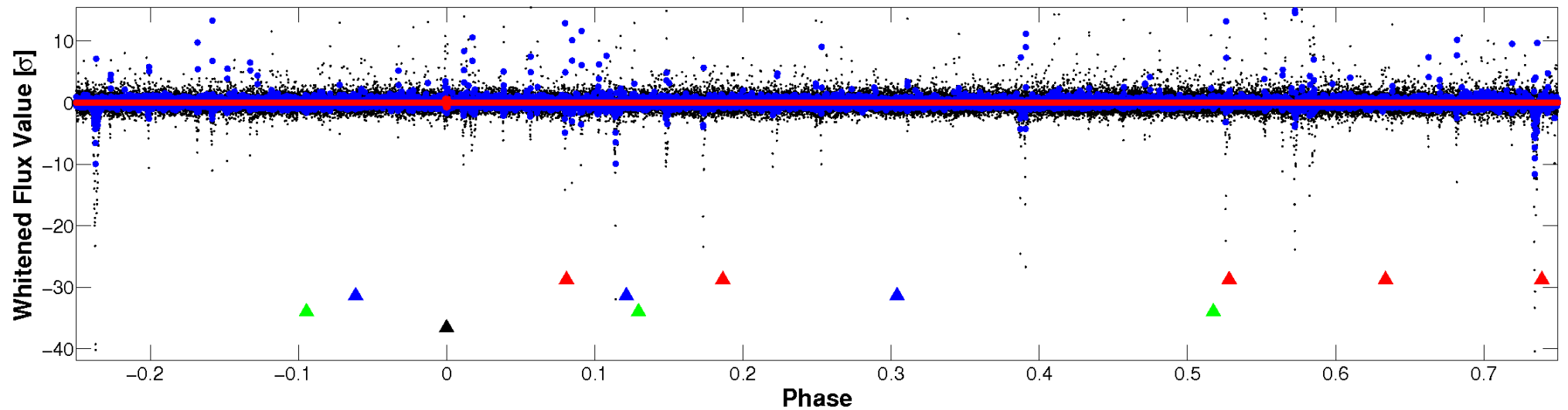


Non-Whitened Vs. Whitened Light Curve

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

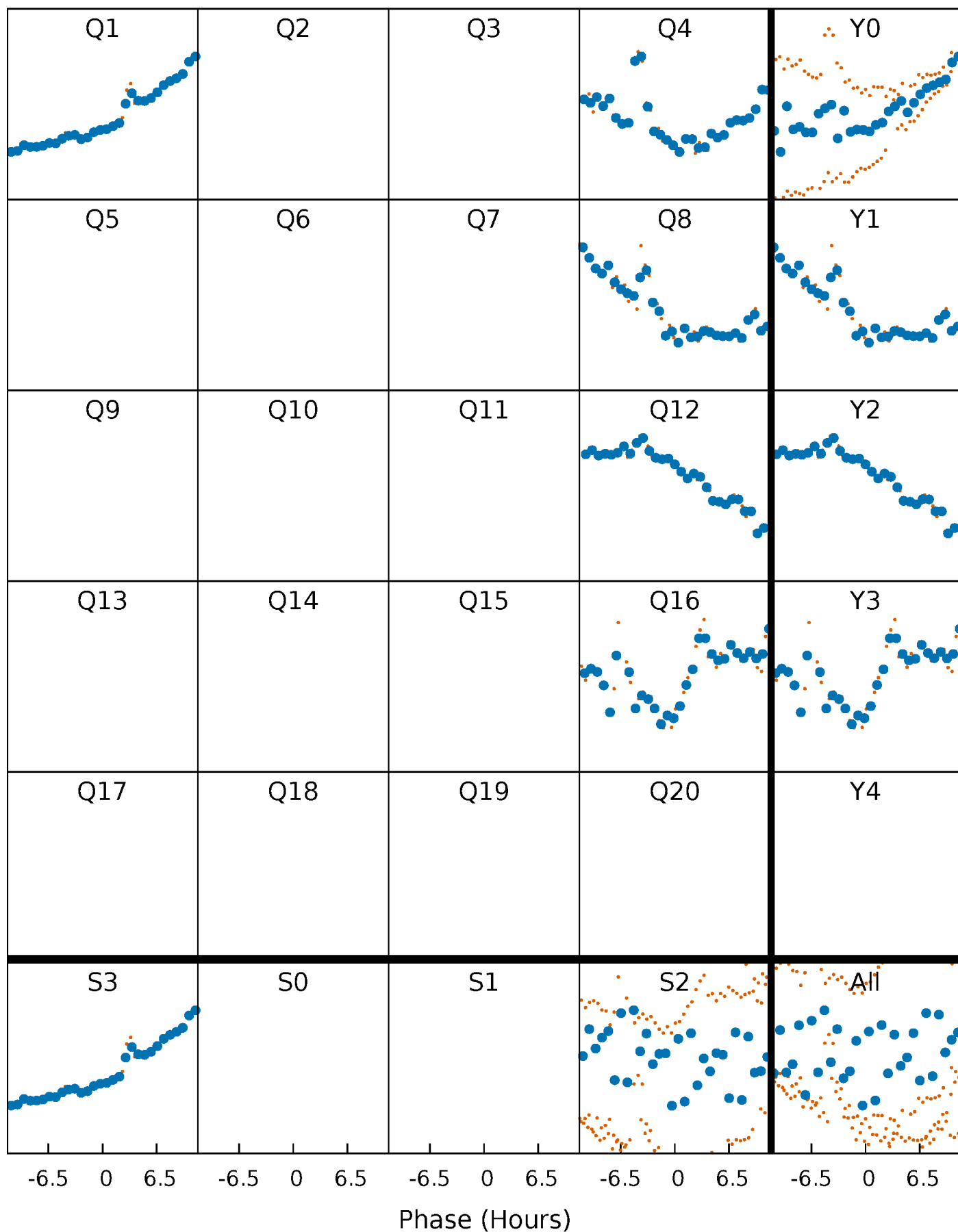


Planet 4 : Phased Whitened Flux Time Series (Fit Epoch/Period)



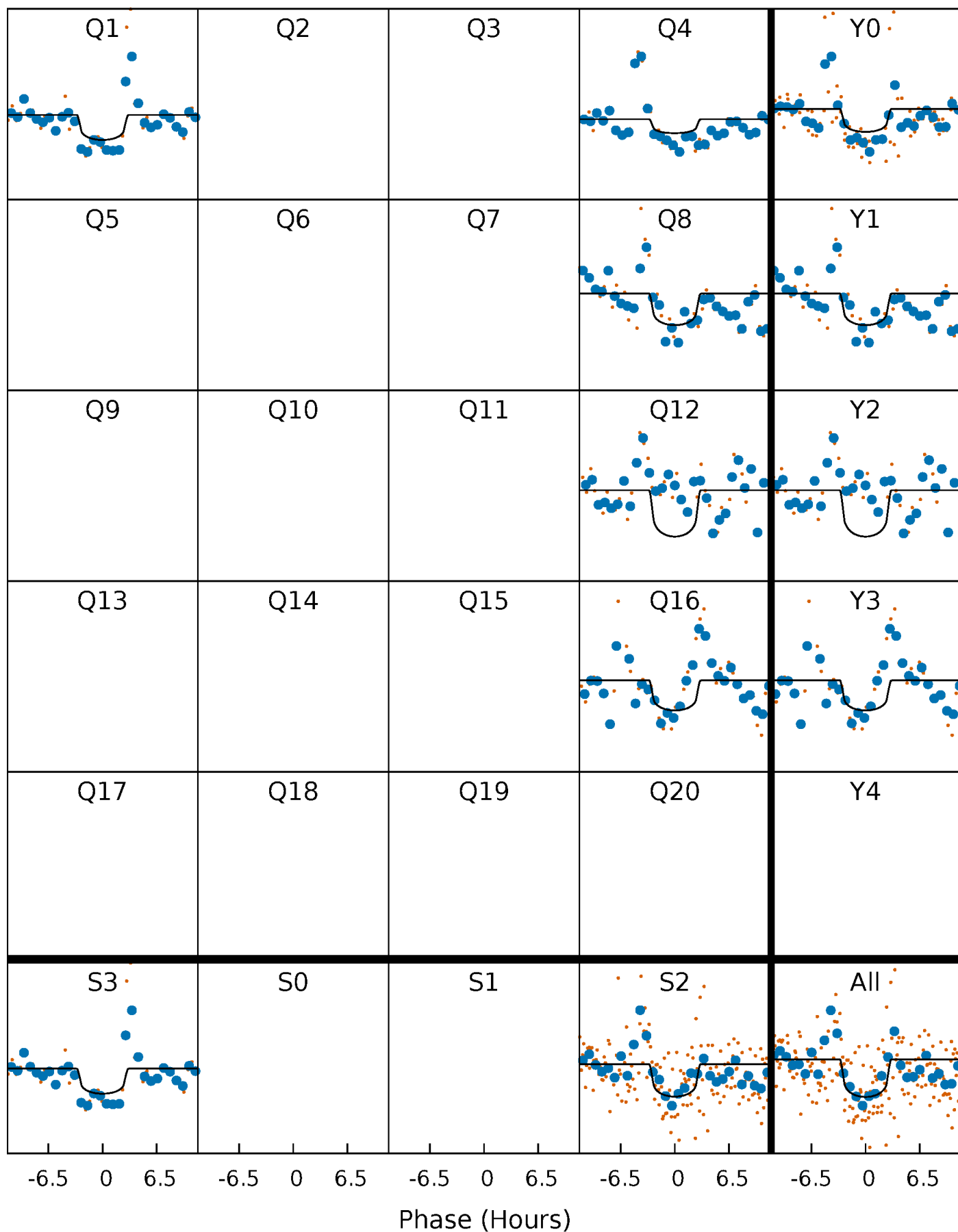
PDC Quarter-Phased Transit Curves

TCE 004373146-04 P=196.686461 Days $T_0=161.492300$ (BKJD)



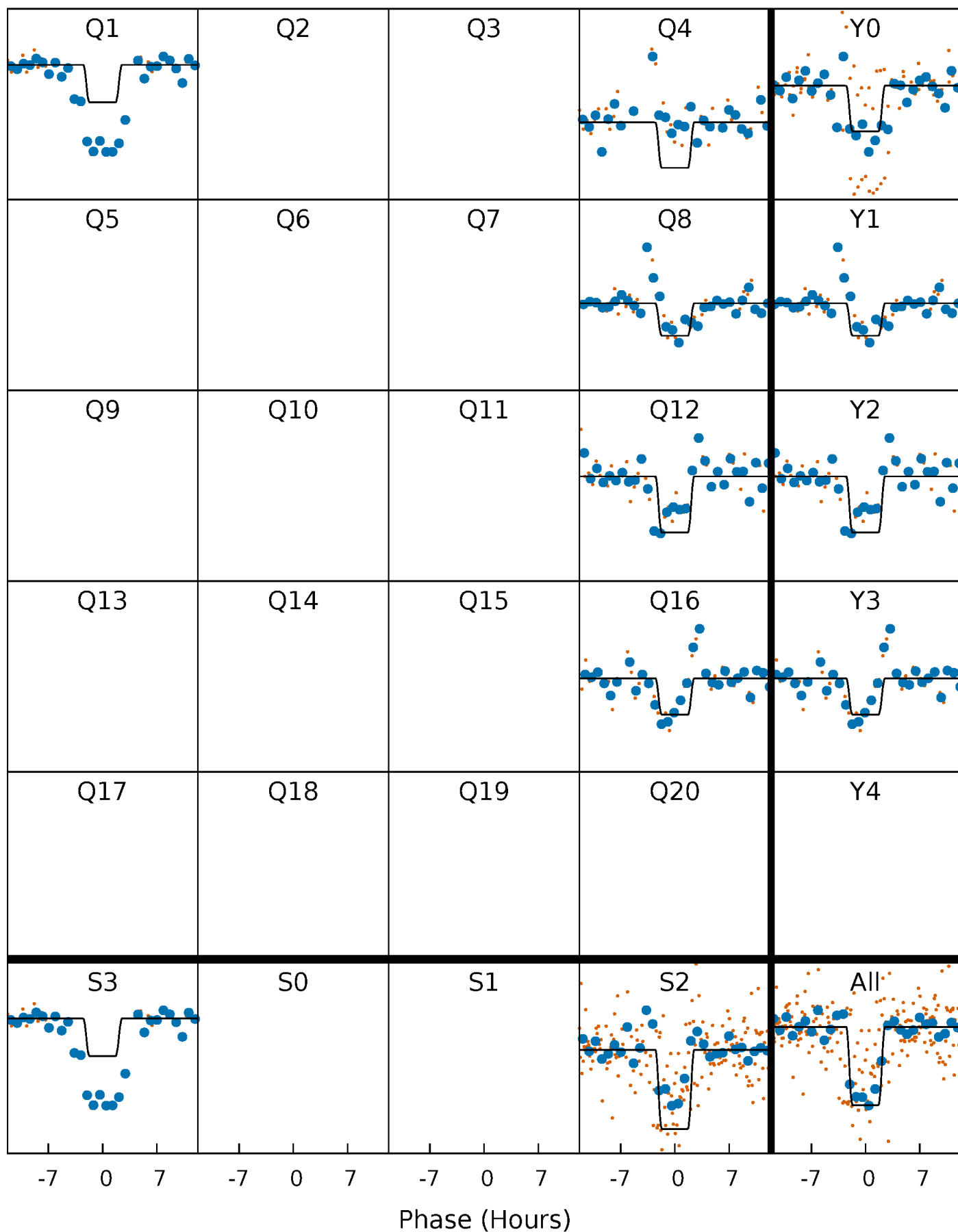
DV Quarter-Phased Transit Curves

TCE 004373146-04 $P=196.686461$ Days $T_0=161.492300$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

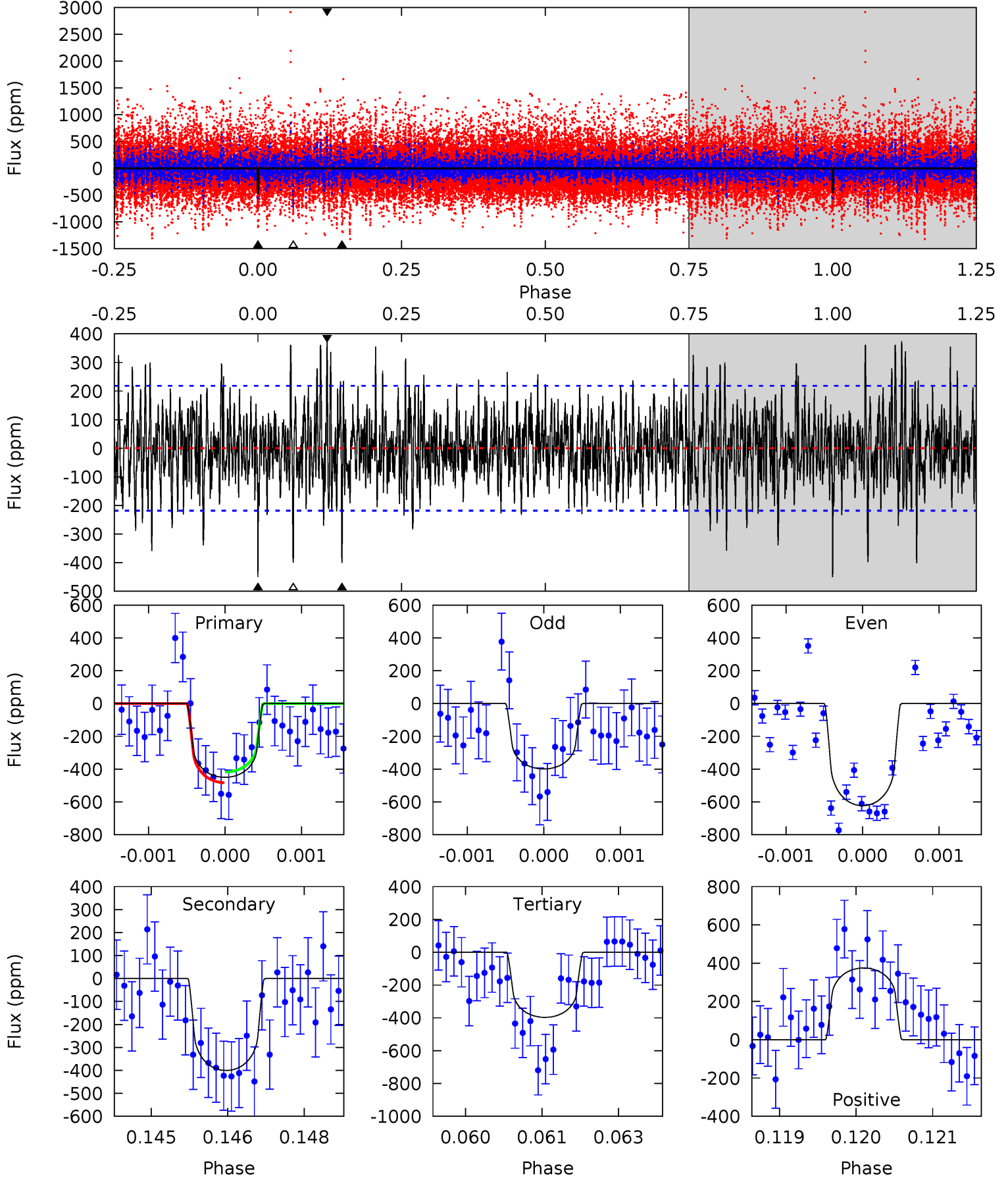
TCE 004373146-04 P=196.691569 Days $T_0=161.468808$ (BKJD)



DV Model-Shift Uniqueness Test

004373146-04, P = 196.686461 Days, E = 161.492300 Days

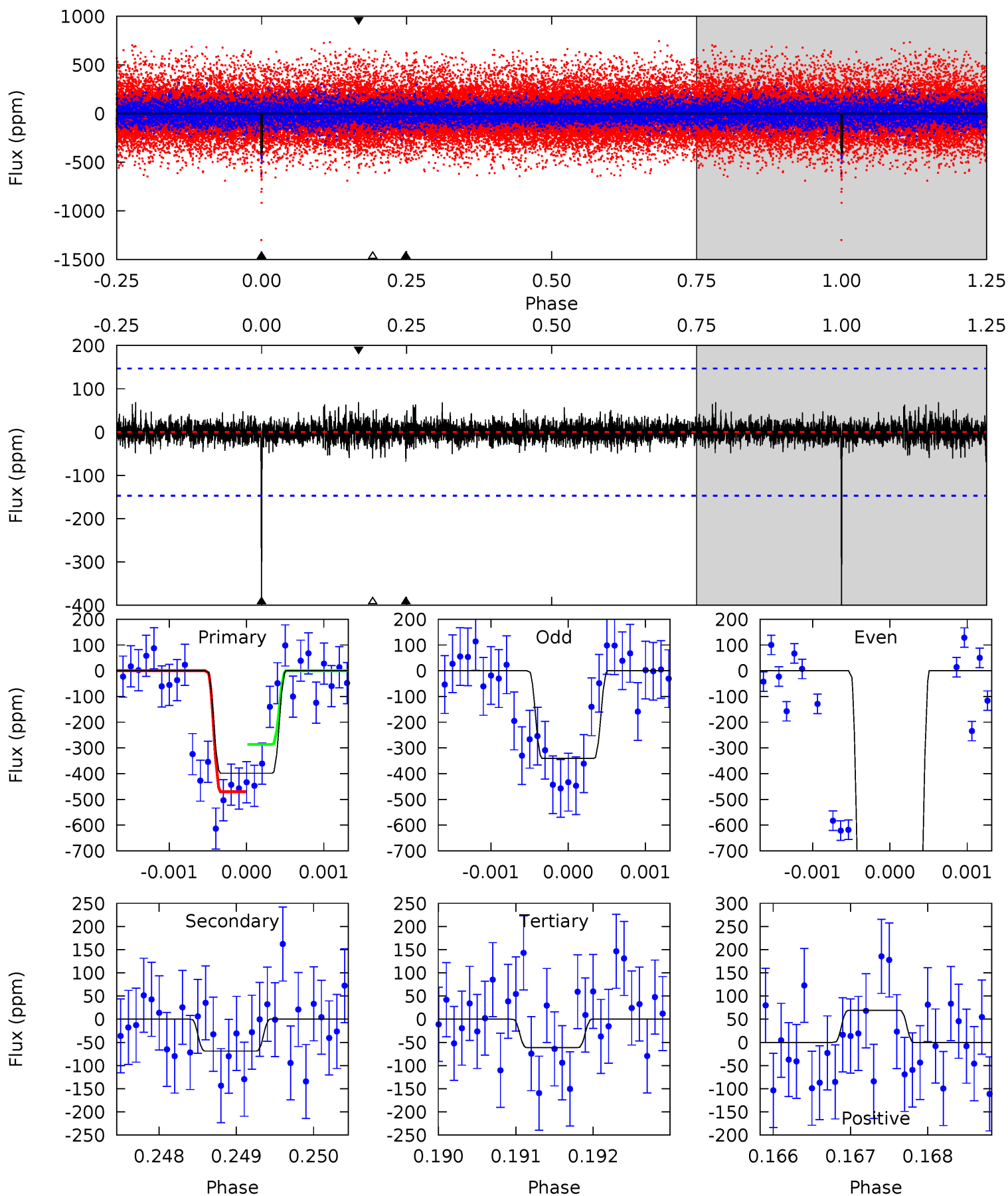
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
11.1	9.91	9.82	9.27	5.40	3.21	2.45	1.31	1.86	0.09	0.64	2.00	0.99	0.45	0.81



Alt Model-Shift Uniqueness Test

004373146-04, P = 196.691569 Days, E = 161.468808 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
14.8	2.55	2.27	2.55	5.44	3.28	0.55	12.5	12.2	0.28	-0.01	19.5	1.30	0.15	3.37



Stellar Parameters For KIC 004373146

	$T_{\text{eff}} (K)$	$\log(g)$	$[\text{Fe}/\text{H}]$	$R (R_{\odot})$	$M (M_{\odot})$	$p_{\star} (\text{g}\cdot\text{cm}^{-3})$
	5261^{+158}_{-158}	$4.633^{+0.066}_{-0.044}$	$-1.060^{+0.350}_{-0.300}$	$0.630^{+0.049}_{-0.044}$	$0.621^{+0.059}_{-0.023}$	$3.496^{+0.838}_{-0.564}$
	+3%/-3%	+1%/-1%	+33%/-28%	+8%/-7%	+10%/-4%	+24%/-16%
Source	PHO1	KIC0	KIC0	DSEP		

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

Secondary Eclipse Parameters for KIC 004373146-04 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{\text{max}} (K)$	$T_{\text{obs}} (K)$	A_{obs}
DV	-401 ± 40	$1.75^{+1.65}_{-1.09}$	341^{+12}_{-12}	4750^{+2843}_{-1026}	$23508^{+138855}_{-17513}$
Alt.	-69 ± 27	$2.18^{+1.56}_{-1.41}$	341^{+12}_{-13}	3220^{+1380}_{-513}	2469^{+17929}_{-1773}

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

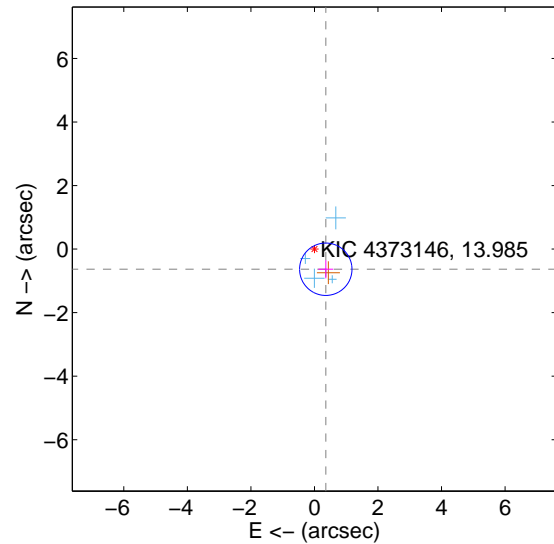
Supplemental centroid analysis for 004373146-04. Kepler magnitude: 13.98. Transit SNR 5.99

There are 4 quarters with good PRF difference image offsets

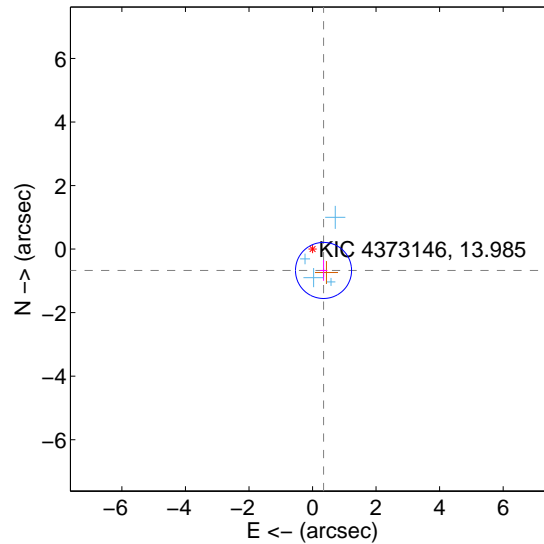
The direct PRF centroid is offset from the target star catalog position by about 0.04 arcsec

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	0.728 ± 0.275	2.65	-0.357 ± 0.237	-0.634 ± 0.286
PRF-fit source offset from KIC position	0.756 ± 0.294	2.57	-0.346 ± 0.119	-0.672 ± 0.326
photometric centroid source offset	2.51 ± 1.28	1.96	2.45 ± 1.30	-0.54 ± 0.91

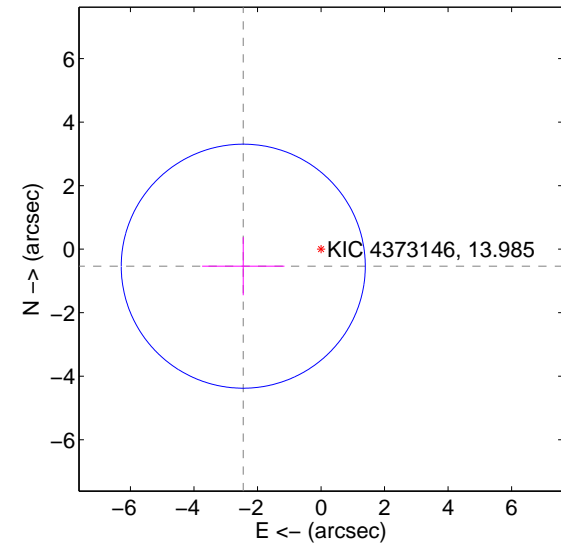
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

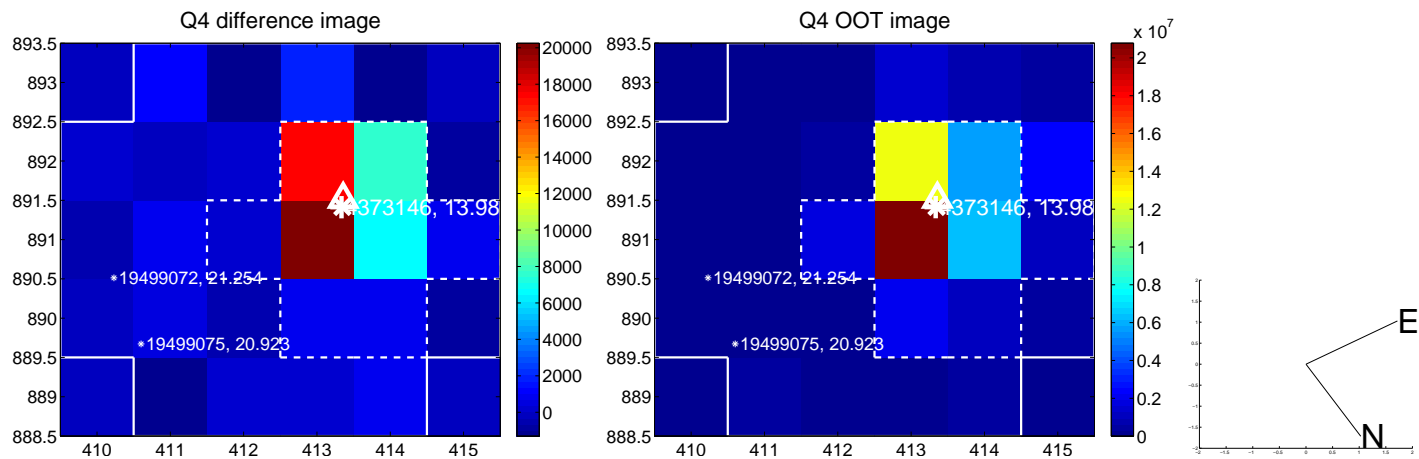
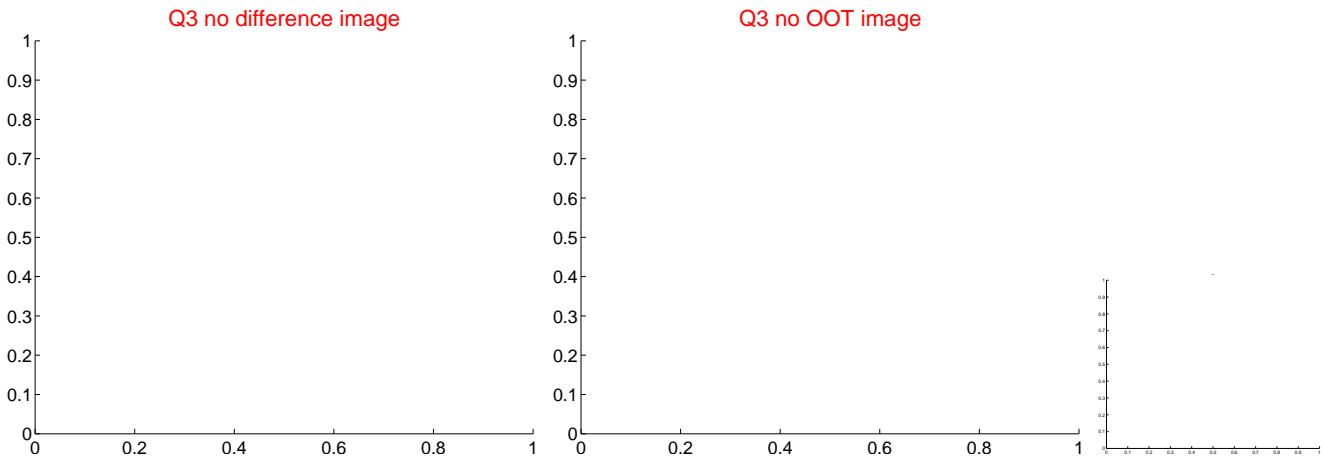
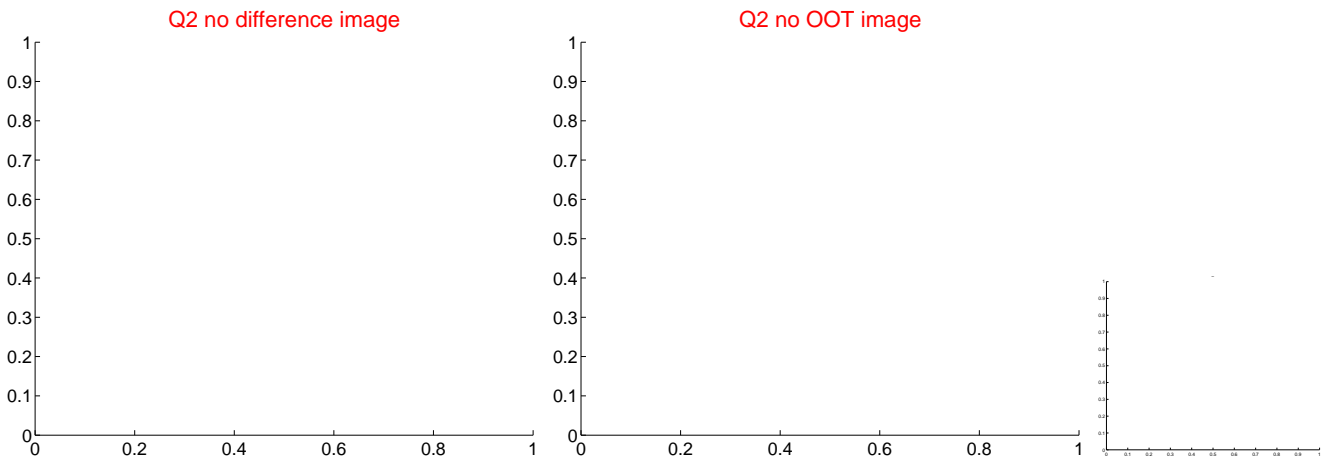
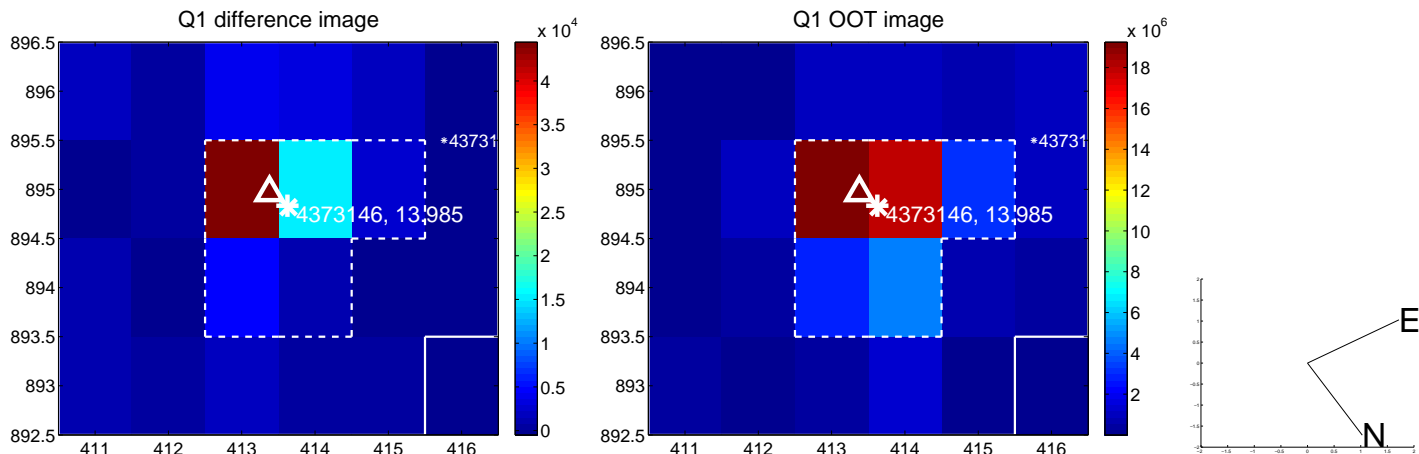


offset from photometric centroids



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

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



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

Q5 no difference image



Q5 no OOT image



Q6 no difference image



Q6 no OOT image



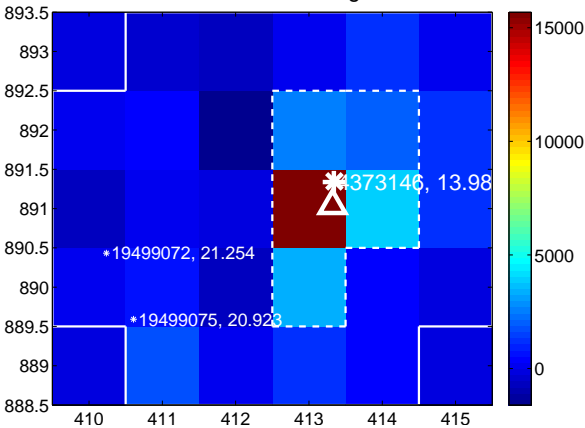
Q7 no difference image



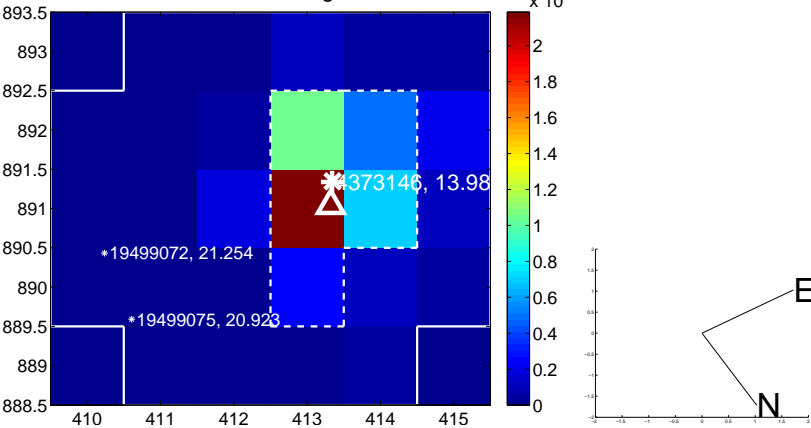
Q7 no OOT image



Q8 difference image



Q8 OOT image



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

Q9 no difference image



Q9 no OOT image



Q10 no difference image



Q10 no OOT image



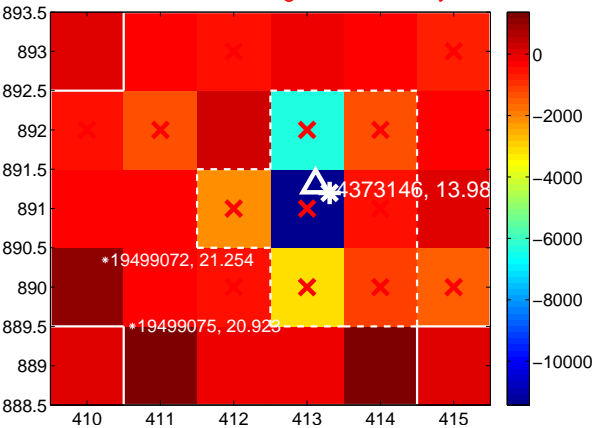
Q11 no difference image



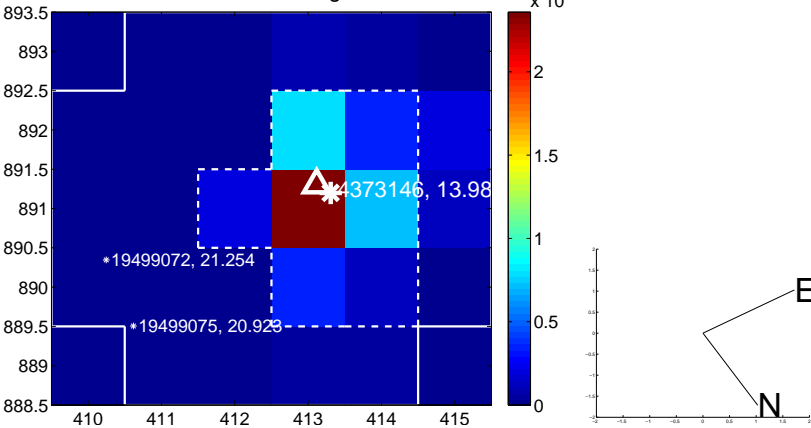
Q11 no OOT image



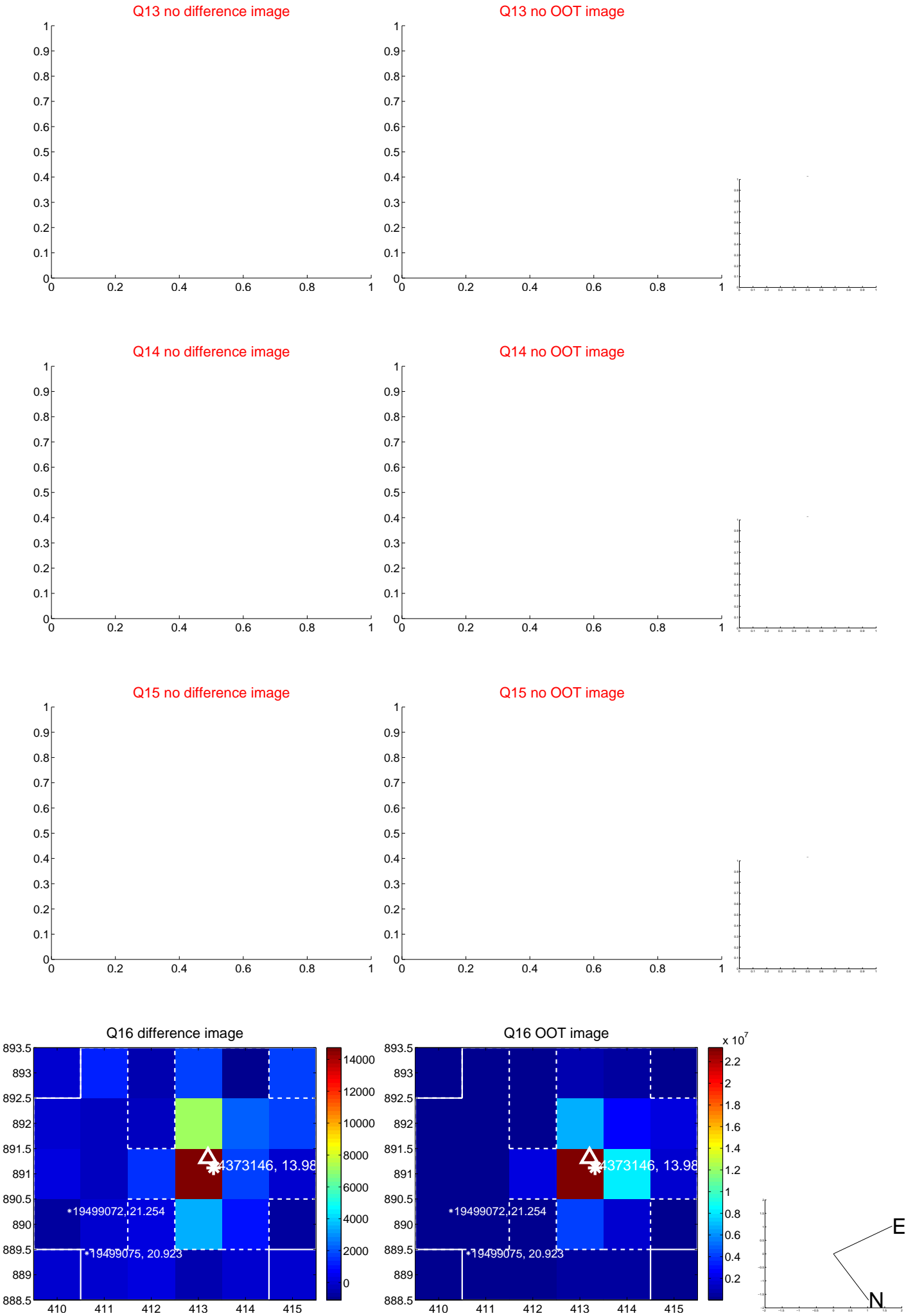
Q12 difference image. Poor Quality



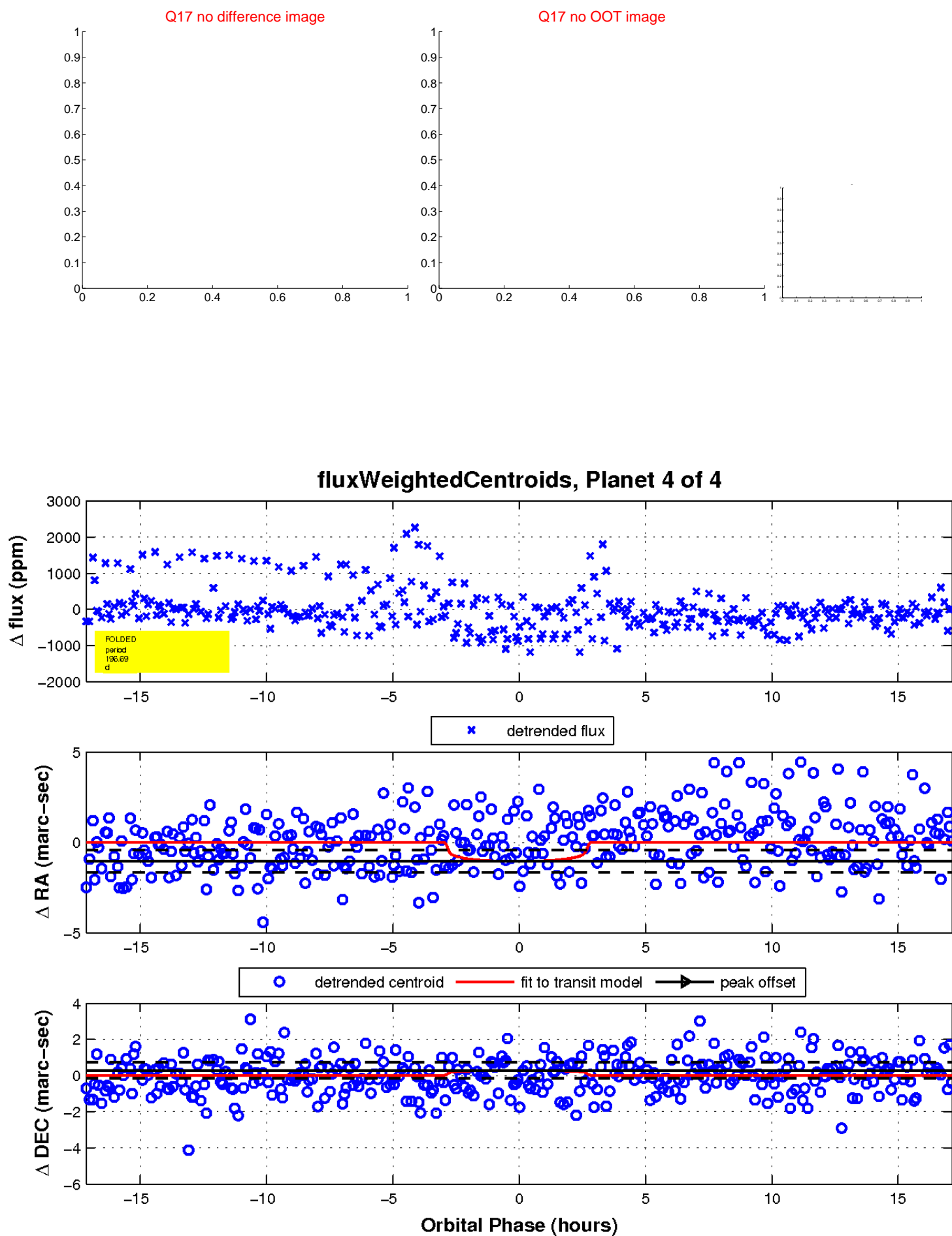
Q12 OOT image



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.



UKIRT Image

Declination

